

Report No.: FR7D2501



FCC RADIO TEST REPORT

FCC ID : TV7PL64112ND

: PWR-LINE AP Equipment

Brand Name : Mikrotik

: PL6411-2nD Model Name

: Mikrotikls SIA Applicant

Brivibas gatve 214i, Riga, LV-1039 Latvia

Manufacturer : MIKROTIKLS SIA

Brivibas gatve 214i, Riga, LV-1039 Latvia

Standard : 47 CFR FCC Part 15.247

The product was received on Dec. 26, 2017, and testing was started from Jan. 22, 2018 and completed on May 30 ,2018. 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 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

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TEL: 886-3-656-9065 FAX: 886-3-656-9085

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Issued Date

: Jun. 12, 2018

Report Version : 01

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Photographs of EUT v01

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History of this test report

Report No.: FR7D2501

| Report No. | Version | Description | Issued Date |
|------------|---------|-------------------------|---------------|
| FR7D2501 | 01 | Initial issue of report | Jun. 12, 2018 |
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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 | 15.207 | AC Power-line Conducted Emissions | PASS | - |
| 3.2 | 15.247(a) | DTS Bandwidth | PASS | - |
| 3.3 | 15.247(b) | Maximum Conducted Output Power | PASS | - |
| 3.4 | 15.247(e) | Power Spectral Density | PASS | - |
| 3.5 | 15.247(d) | Emissions in Non-restricted Frequency Bands | PASS | - |
| 3.6 | 15.247(d) | Emissions in Restricted Frequency Bands | PASS | - |

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) | 2412-2462 | 1-11 [11] |
| 2400-2483.5 | n (HT40) | 2422-2452 | 3-9 [7] |

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| Band | Mode | BWch (MHz) | Nant |
|---------------|--------------|------------|------|
| 2.4-2.4835GHz | 802.11b | 20 | 2TX |
| 2.4-2.4835GHz | 802.11g | 20 | 2TX |
| 2.4-2.4835GHz | 802.11n HT20 | 20 | 2TX |
| 2.4-2.4835GHz | 802.11n HT40 | 40 | 2TX |

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.
- 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.

1.1.2 Antenna Information

| Ant. | Port | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|------|----------|--------------|--------------|-----------|------------|
| 1 | 1 | Mikrotik | Mikrotik PLC | PCB Antenna | N/A | 1.5 |
| 2 | 2 | Mikrotik | Mikrotik PLC | PCB Antenna | N/A | 1.5 |

Note: The EUT has two antennas (2TX/2RX).

Ant. 1 (Port 1) and Ant. 2 (Port 2) could transmit/receive simultaneously.

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1.1.3 Mode Test Duty Cycle

| Mode | DC | DCF(dB) | T(s) | VBW(Hz) ≥ 1/T |
|--------------|-------|---------|---------|---------------|
| 802.11b | 0.977 | 0.101 | 12.483m | 100 |
| 802.11g | 0.953 | 0.209 | 2.075m | 1k |
| 802.11n HT20 | 0.946 | 0.241 | 1.935m | 1k |
| 802.11n HT40 | 0.898 | 0.467 | 952.5u | 3k |

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1.1.4 EUT Operational Condition

| EUT Power Type | Internal power supply | | | | |
|-----------------------|-----------------------|--|--|----------------|--|
| Beamforming Function | \ \ | ☐ With beamforming ☐ Without beamforming | | | |
| Function | ⊠ I | Point-to-multipoint | | Point-to-point | |
| Test Software Version | winbox.exe | | | | |

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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 v04
- FCC KDB 662911 D01 v02r01
- FCC KDB 412172 D01 v01r01

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 | Brian Sun | 22°C / 54% | Feb. 07, 2018 |
| Radiated Below 1GHz | 10CH01-CB | Wei Liu | 26°C / 58% | May 30, 2018 |
| Radiated Above 1GHz | 03CH01-CB | Jeff Wu, Cola Chang | 22°C / 54% | Jan. 22, 2018~Mar. 05, 2018 |
| AC Conduction | CO01-CB | GN Hou | 24°C / 59% | May 22 ,2018 |

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

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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)

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| Test Items | Uncertainty | Remark |
|--------------------------------------|------------------------|--------------------------|
| Conducted Emission (150kHz ~ 30MHz) | 3.2 dB | Confidence levels of 95% |
| Radiated Emission (30MHz ~ 1,000MHz) | 5.0 dB | Confidence levels of 95% |
| 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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2 Test Configuration of EUT

2.1 Test Channel Mode

| Mode | Power Setting |
|------------------------------|---------------|
| 802.11b_Nss1,(1Mbps)_2TX | - |
| 2412MHz | 14 |
| 2437MHz | 14 |
| 2462MHz | 12 |
| 802.11g_Nss1,(6Mbps)_2TX | - |
| 2412MHz | 16 |
| 2417MHz | 20 |
| 2437MHz | 20 |
| 2457MHz | 20 |
| 2462MHz | 16 |
| 802.11n HT20_Nss1,(MCS0)_2TX | - |
| 2412MHz | 16 |
| 2417MHz | 20 |
| 2437MHz | 20 |
| 2457MHz | 20 |
| 2462MHz | 16 |
| 802.11n HT40_Nss1,(MCS0)_2TX | - |
| 2422MHz | 12 |
| 2427MHz | 14 |
| 2432MHz | 20 |
| 2437MHz | 20 |
| 2442MHz | 20 |
| 2447MHz | 14 |
| 2452MHz | 12 |

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2.2 The Worst Case Measurement Configuration

| The Worst Case Mode for Following Conformance Tests | | | |
|--|----------|--|--|
| Tests Item AC power-line conducted emissions | | | |
| Condition AC power-line conducted measurement for line and neutral | | | |
| Operating Mode CTX | | | |
| 1 | CTX mode | | |

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| 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. |

| 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 |

The EUT was performed at X axis, Y axis and Z axis position for Emissions in Restricted Frequency Bands above 1GHz test, and the worst case was found at X axis for Emissions in Restricted Frequency Bands above 1GHz test, thus the measurement for Emissions in Restricted Frequency Bands test will follow this same test configuration.

| 1 | EUT in X axis |
|-----------------------|---------------|
| Operating Mode > 1GHz | CTX |
| 1 | EUT in Z axis |
| 2 | EUT in Y axis |
| 3 | EUT in X axis |

Mode 3 has been evaluated to be the worst case after evaluating. Consequently, measurement will follow this same test mode.

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2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.4 Accessories

N/A

2.5 Support Equipment

For Test Site No: CO01-CB and 10CH01-CB

| Support Equipment | | | | |
|-------------------|-----------|------------|------------|--------|
| No. | Equipment | Brand Name | Model Name | FCC ID |
| 1 | NB | DELL | E6430 | N/A |

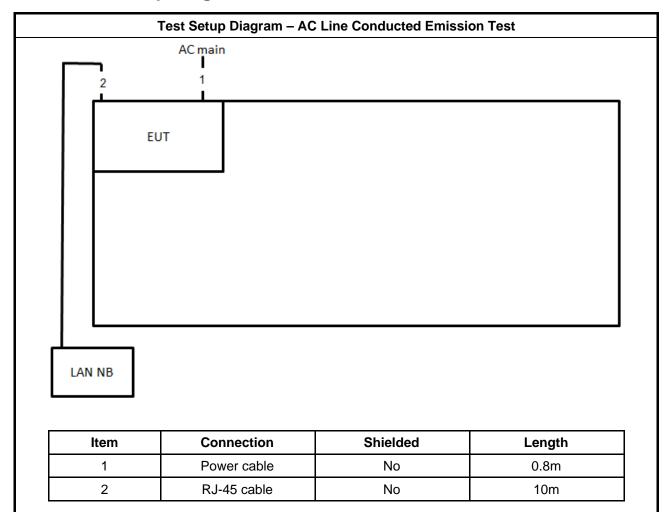
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For Test Site No: 03CH01-CB and TH01-CB

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

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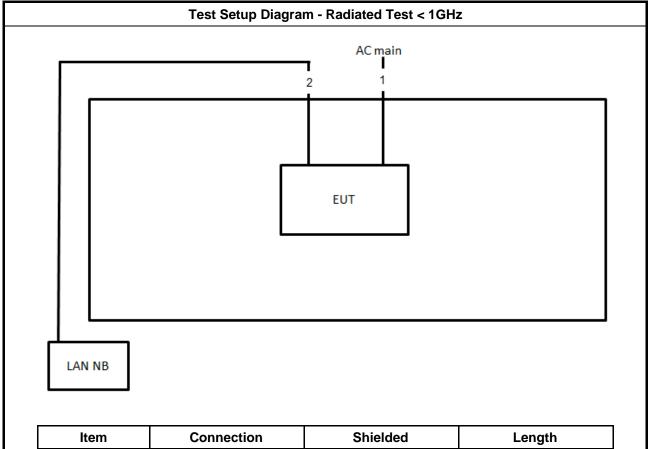
2.6 Test Setup Diagram



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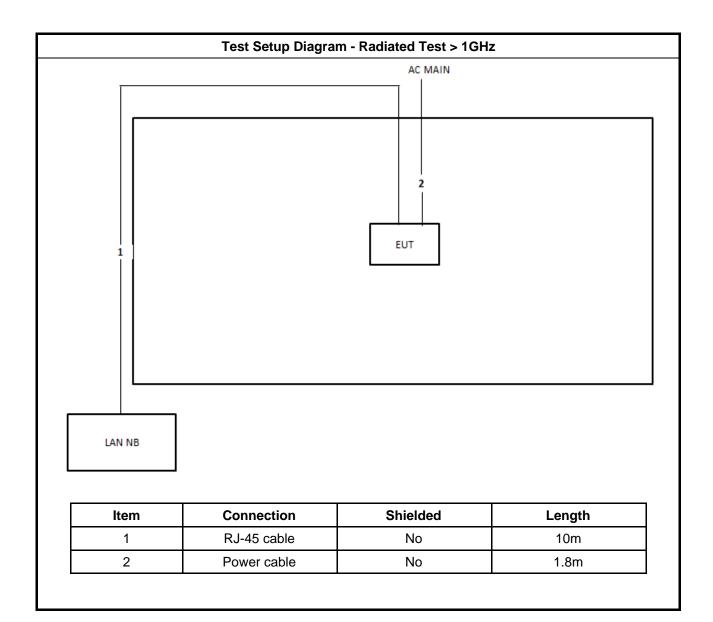




| Item | Connection | Shielded | Length |
|------|-------------|----------|--------|
| 1 | Power cable | No | 0.8m |
| 2 | RJ-45 cable | No | 10m |

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3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

| AC Power | er-line Conducted Emissions L | imit |
|---|-------------------------------|-----------|
| Frequency Emission (MHz) | Quasi-Peak | Average |
| 0.15-0.5 | 66 - 56 * | 56 - 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| Note 1: * Decreases with the logarithm of | of the frequency. | |

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3.1.2 Measuring Instruments

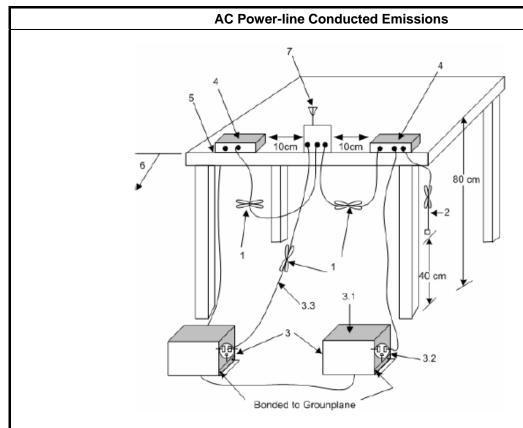
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

| Test Method |
|--|
| Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions. |

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3.1.4 Test Setup



1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.

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- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
- 3.1—All other equipment powered from additional LISN(s).
- 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
- 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

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3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

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

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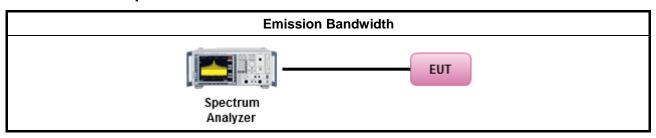
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

| | | Test Method |
|---|-------------|--|
| • | For th | he emission bandwidth shall be measured using one of the options below: |
| | \boxtimes | Refer as FCC KDB 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement. |
| | | Refer as FCC KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement. |
| | | Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing. |

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

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3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit

- If G_{TX} ≤ 6 dBi, then P_{Out} ≤ 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

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 \mathbf{P}_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, \mathbf{G}_{TX} = the maximum transmitting antenna directional gain in dBi.

3.3.2 Measuring Instruments

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

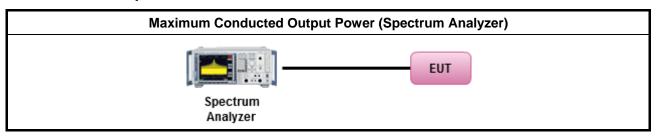
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3.3.3 Test Procedures

| | Test Method |
|---|--|
| • | Maximum Peak Conducted Output Power |
| | Refer as FCC KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method). |
| | ☐ Refer as FCC KDB 558074, clause 9.1.3 (peak power meter for VBW ≥ DTS BW) |
| • | Maximum Conducted Output Power |
| | [duty cycle ≥ 98% or external video / power trigger] |
| | Refer as FCC KDB 558074, clause 9.2.2.2 Method AVGSA-1 (spectral trace averaging). |
| | Refer as FCC KDB 558074, clause 9.2.2.3 Method AVGSA-1 Alt. (slow sweep speed) |
| | duty cycle < 98% and average over on/off periods with duty factor |
| | Refer as FCC KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging). |
| | Refer as FCC KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed) |
| | Measurement using a power meter (PM) |
| | Refer as FCC KDB 558074, clause 9.2.3 Method AVGPM (using an RF average power meter). |
| | Refer as FCC KDB 558074, clause 9.2.3.2 Method AVGPM-G (using an gate RF average power meter). |
| • | 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. |
| | ■ 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 |

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3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

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3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

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

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3.4.2 Measuring Instruments

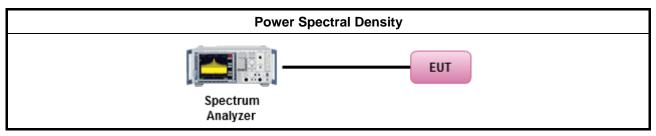
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

| | Test Method |
|---|---|
| • | Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peal PSD procedure is also an acceptable option). |
| | Refer as FCC KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak). |
| | [duty cycle ≥ 98% or external video / power trigger] |
| | Refer as FCC KDB 558074, clause 10.3 Method AVGPSD-1 (spectral trace averaging). |
| | Refer as FCC KDB 558074, clause 10.4 Method AVGPSD-2 (slow sweep speed) |
| | duty cycle < 98% and average over on/off periods with duty factor |
| | Refer as FCC KDB 558074, clause 10.5 Method AVGPSD-1 Alt (spectral trace averaging). |
| | Refer as FCC KDB 558074, clause 10.6 Method AVGPSD-2 Alt. (slow sweep speed) |
| • | 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 ther 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, |
| | 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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3.4.4 Test Setup



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3.4.5 Test Result of Power Spectral Density

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3.5 Emissions in Non-restricted Frequency Bands

3.5.1 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.

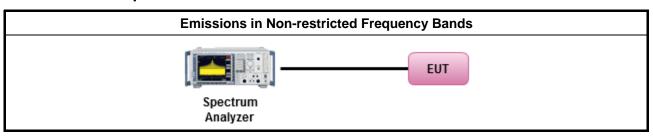
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method ■ Refer as FCC KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

3.5.4 Test Setup



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

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3.6 Emissions in Restricted Frequency Bands

3.6.1 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.

3.6.2 Measuring Instruments

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

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3.6.3 Test Procedures

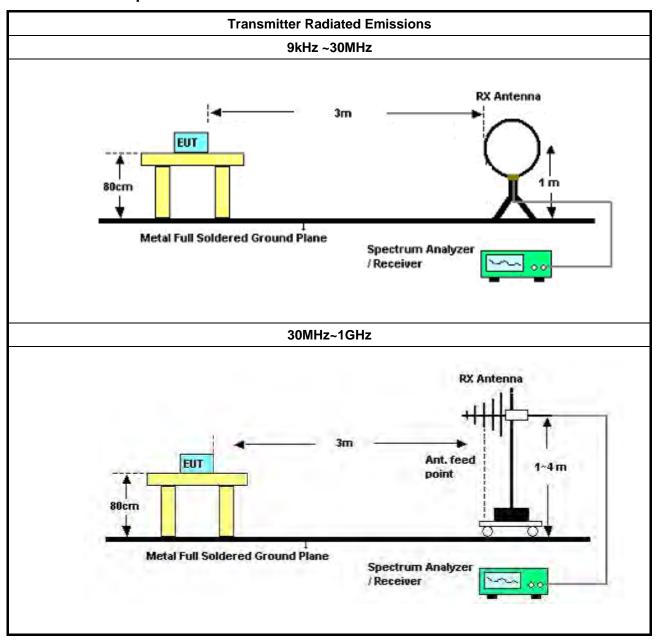
| | | Test Method | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|
| • | The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor]. | | | | | | | | |
| • | Refer as ANSI C63.10, clause 6.9.2.2 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band. | | | | | | | | |
| • | For th | ne transmitter unwanted emissions shall be measured using following options below: | | | | | | | |
| | • | Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands. | | | | | | | |
| | | Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle ≥98%) | | | | | | | |
| | | Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor). | | | | | | | |
| | | Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW≥1/T). | | | | | | | |
| | | Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time. | | | | | | | |
| | | Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. | | | | | | | |
| | | Refer as FCC KDB 558074, clause 12.2.4 measurement procedure peak limit. | | | | | | | |
| • | For th | ne transmitter band-edge emissions shall be measured using following options below: | | | | | | | |
| | | Refer as FCC KDB 558074 clause 13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below. | | | | | | | |
| | | Refer as FCC KDB 558074, clause 13.2 (ANSI C63.10, clause 6.9.3) for marker-delta method for band-edge measurements. | | | | | | | |
| | | Refer as FCC KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz). | | | | | | | |
| • | For c | onducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 12.2.2. | | | | | | | |
| | | 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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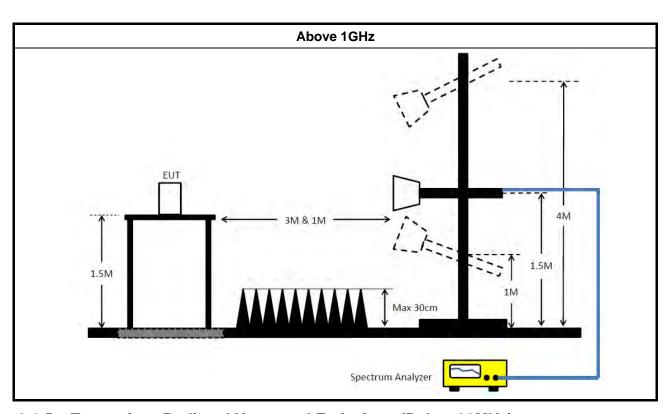
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3.6.4 Test Setup



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3.6.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

3.6.6 Test Result of Transmitter Radiated Unwanted Emissions

Refer as Appendix F

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4 Test Equipment and Calibration Data

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|---------------------------------|---------------|----------------------|-------------------|----------------------|---------------------|-------------------------|--------------------------|
| EMI Receiver | Agilent | N9038A | My52260123 | 9kHz ~ 8.45GHz | Jan. 31, 2018 | Jan. 30, 2019 | Conduction (CO01-CB) |
| LISN | F.C.C. | FCC-LISN-5 0-16-2 | 04083 | 150kHz ~ 100MHz | Dec. 20, 2017 | Dec. 19, 2018 | Conduction (CO01-CB) |
| LISN | Schwarzbeck | NSLK 8127 | 8127647 | 9kHz ~ 30MHz | Dec. 29, 2017 | Dec. 28, 2018 | Conduction (CO01-CB) |
| COND Cable | Woken | Cable | Low cable-CO01 | 150kHz ~ 30MHz | May 22, 2018 | May 21, 2019 | Conduction (CO01-CB) |
| Software | Audix | E3 | 6.120210n | - | N.C.R. | N.C.R. | Conduction (CO01-CB) |
| 10m Semi Anechoic Chamber | TDK | NSA | 10CH01-CB | 30MHz~1GHz 10m,3m | Mar. 18, 2018 | Mar. 17, 2019 | Radiation (10CH01-CB) |
| Pre-Amplifier | Agilent | 8447D | 2944A10783 | 9kHz ~ 1.3GHz | Mar. 26, 2018 | Mar. 25, 2019 | Radiation (10CH01-CB) |
| Pre-Amplifier | Agilent | 8447D | 2944A10784 | 9kHz ~ 1.3GHz | Mar. 13, 2018 | Mar. 12, 2019 | Radiation (10CH01-CB) |
| Low Cable | Woken | SUCOFLEX 104 | low cable-01 | 25MHz ~ 1GHz | Nov. 27, 2017 | Nov. 26, 2018 | Radiation (10CH01-CB) |
| High Cable | Woken | SUCOFLEX 104 | low cable-02 | 25MHz ~ 1GHz | Nov. 27, 2017 | Nov. 26, 2018 | Radiation (10CH01-CB) |
| Biconical Antenna | Schwarzbeck | VHBB 9124 | 324 | 30MHz ~ 200MHz | Apr. 24, 2018 | Apr. 23, 2019 | Radiation (10CH01-CB) |
| Log Antenna | Schwarzbeck | VUSLP 9111 | 247 | 200MHz ~ 1GHz | May 22, 2018 | May 21, 2019 | Radiation (10CH01-CB) |
| EMI Test Receiver | Rohde&Schwarz | ESCI | 100186 | 9kHz ~ 3GHz | Jul. 12, 2017 | Jul. 11, 2018 | Radiation (10CH01-CB) |
| Spectrum Analyzer | Rohde&Schwarz | FSV30 | 101026 | 9kHz ~ 30GHz | Jan. 10, 2018 | Jan. 09, 2019 | Radiation (10CH01-CB) |
| Loop Antenna | Teseq | HLA 6120 | 24155 | 9kHz - 30 MHz | Mar. 16, 2018 | Mar. 15, 2019 | Radiation (10CH01-CB) |
| Software | Audix | E3 | 6.120210m | - | N.C.R. | N.C.R. | Radiation (10CH01-CB) |
| Horn Antenna | EMCO | 3115 | 00075790 | 750MHz ~ 18GHz | Nov. 20, 2017 | Nov. 19, 2018 | Radiation (03CH01-CB) |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA9170252 | 15GHz ~ 40GHz | Jul. 05, 2017 | Jul. 04, 2018 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8449B | 3008A02310 | 1GHz ~ 26.5GHz | Jan. 09, 2018 | Jan. 08, 2019 | Radiation (03CH01-CB) |
| Pre-Amplifier | MITEQ | TTA1840-35- HG | 1864479 | 18GHz ~ 40GHz | Jul. 10, 2017 | Jul. 09, 2018 | Radiation (03CH01-CB) |
| Spectrum Analyzer | R&S | FSP40 | 100056 | 9kHz ~ 40GHz | Nov. 23, 2017 | Nov. 22, 2018 | 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) |

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| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|----------------------|--------------|---------------------|---------------|------------------|---------------------|-------------------------|--------------------------|
| 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-40G#1 | 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 | Oct. 11, 2017 | Oct. 10, 2018 | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSV40 | 100979 | 9kHz~40GHz | Dec. 21, 2017 | Dec. 20, 2018 | 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-07 | 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. 11, 2017 | Oct. 10, 2018 | 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) |
| RF Cable-high | Woken | RG402 | High Cable-10 | 1 GHz –26.5 GHz | Oct. 11, 2017 | Oct. 10, 2018 | Conducted (TH01-CB) |
| Power Sensor | Agilent | U2021XA | MY53410001 | 50MHz~18GHz | Nov. 20, 2017 | Nov. 19, 2018 | Conducted (TH01-CB) |

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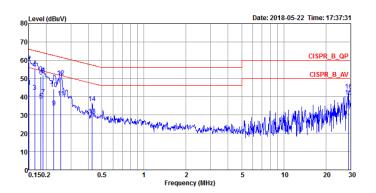
Note: Calibration Interval of instruments listed above is one year.

N.C.R. means Non-Calibration required.

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AC Power-line Conducted Emissions Result

| AC Power-line Conducted Emissions Result | | | | | | | |
|--|-----|-------------|---------|--|--|--|--|
| Operating Mode | 1 | Power Phase | Neutral | | | | |
| Operating Function | CTX | | | | | | |

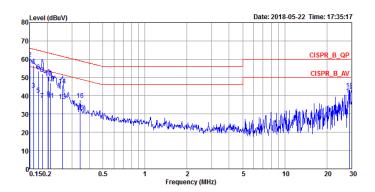


| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark | Pol/Phase |
|----|---------|-------|---------------|---------------|---------------|----------------|---------------|---------|-----------|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | | |
| 1 | 0.1508 | 45.56 | -10.40 | 55.96 | 35.30 | 10.10 | 0.16 | Average | NEUTRAL |
| 2 | 0.1508 | 58.79 | -7.17 | 65.96 | 48.53 | 10.10 | 0.16 | QP | NEUTRAL |
| 3 | 0.1659 | 42.85 | -12.31 | 55.16 | 32.59 | 10.10 | 0.16 | Average | NEUTRAL |
| 4 | 0.1659 | 55.34 | -9.82 | 65.16 | 45.08 | 10.10 | 0.16 | QP | NEUTRAL |
| 5 | 0.1835 | 38.11 | -16.22 | 54.33 | 27.95 | 10.01 | 0.15 | Average | NEUTRAL |
| 6 | 0.1835 | 51.08 | -13.25 | 64.33 | 40.92 | 10.01 | 0.15 | QP | NEUTRAL |
| 7 | 0.1904 | 40.53 | -13.49 | 54.02 | 30.38 | 10.01 | 0.14 | Average | NEUTRAL |
| 8 | 0.1904 | 51.99 | -12.03 | 64.02 | 41.84 | 10.01 | 0.14 | QP | NEUTRAL |
| 9 | 0.2268 | 34.11 | -18.46 | 52.57 | 23.92 | 10.05 | 0.14 | Average | NEUTRAL |
| 10 | 0.2268 | 44.35 | -18.22 | 62.57 | 34.16 | 10.05 | 0.14 | QP | NEUTRAL |
| 11 | 0.2548 | 39.45 | -12.15 | 51.60 | 29.24 | 10.08 | 0.13 | Average | NEUTRAL |
| 12 | 0.2548 | 50.77 | -10.83 | 61.60 | 40.56 | 10.08 | 0.13 | QP | NEUTRAL |
| 13 | 0.4260 | 29.81 | -17.52 | 47.33 | 19.43 | 10.25 | 0.13 | Average | NEUTRAL |
| 14 | 0.4260 | 36.72 | -20.61 | 57.33 | 26.34 | 10.25 | 0.13 | QP | NEUTRAL |
| 15 | 29.2350 | 40.25 | -9.75 | 50.00 | 29.40 | 10.56 | 0.29 | Average | NEUTRAL |
| 16 | 29.2350 | 43.27 | -16.73 | 60.00 | 32.42 | 10.56 | 0.29 | QP | NEUTRAL |

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

AC Power-line Conducted Emissions Result

| AC Power-line Conducted Emissions Result | | | | | | | | |
|--|-----|-------------|------|--|--|--|--|--|
| Operating Mode | 1 | Power Phase | Line | | | | | |
| Operating Function | CTX | | | | | | | |



| | | | Over | Limit | Read | LISN | Cable | | |
|----|---------|-------|--------|-------|-------|--------|-------|---------|-----------|
| | Freq | Level | Limit | Line | Level | Factor | Loss | Remark | Pol/Phase |
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | | · |
| | | | | | | | | | |
| 1 | 0.1500 | 46.68 | -9.32 | 56.00 | 36.52 | 10.00 | 0.16 | Average | LINE |
| 2 | 0.1500 | 60.14 | -5.86 | 66.00 | 49.98 | 10.00 | 0.16 | QP | LINE |
| 3 | 0.1598 | 43.38 | -12.09 | 55.47 | 33.22 | 10.00 | 0.16 | Average | LINE |
| 4 | 0.1598 | 56.57 | -8.90 | 65.47 | 46.41 | 10.00 | 0.16 | QP | LINE |
| 5 | 0.1731 | 40.68 | -14.13 | 54.81 | 30.53 | 10.00 | 0.15 | Average | LINE |
| 6 | 0.1731 | 53.42 | -11.39 | 64.81 | 43.27 | 10.00 | 0.15 | QP | LINE |
| 7 | 0.1844 | 37.89 | -16.39 | 54.28 | 27.83 | 9.91 | 0.15 | Average | LINE |
| 8 | 0.1844 | 51.84 | -12.44 | 64.28 | 41.78 | 9.91 | 0.15 | QP | LINE |
| 9 | 0.2040 | 38.78 | -14.67 | 53.45 | 28.72 | 9.92 | 0.14 | Average | LINE |
| 10 | 0.2040 | 49.82 | -13.63 | 63.45 | 39.76 | 9.92 | 0.14 | QP | LINE |
| 11 | 0.2117 | 37.66 | -15.48 | 53.14 | 27.60 | 9.92 | 0.14 | Average | LINE |
| 12 | 0.2117 | 47.08 | -16.06 | 63.14 | 37.02 | 9.92 | 0.14 | QP | LINE |
| 13 | 0.2575 | 37.14 | -14.37 | 51.51 | 27.09 | 9.92 | 0.13 | Average | LINE |
| 14 | 0.2575 | 45.71 | -15.80 | 61.51 | 35.66 | 9.92 | 0.13 | QP | LINE |
| 15 | 0.3446 | 31.17 | -17.92 | 49.09 | 21.11 | 9.94 | 0.12 | Average | LINE |
| 16 | 0.3446 | 37.84 | -21.25 | 59.09 | 27.78 | 9.94 | 0.12 | QP | LINE |
| 17 | 29.2350 | 40.33 | -9.67 | 50.00 | 29.53 | 10.51 | 0.29 | Average | LINE |
| 18 | 29.2350 | 43.45 | -16.55 | 60.00 | 32.65 | 10.51 | 0.29 | QP | LINE |

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



EBW Result Appendix B

Summary

| Mode | Max-N dB | Max-OBW | ITU-Code | Min-N dB | Min-OBW |
|------------------------------|----------|---------|----------|----------|---------|
| | (Hz) | (Hz) | | (Hz) | (Hz) |
| 2.4-2.4835GHz | - | - | - | - | - |
| 802.11b_Nss1,(1Mbps)_2TX | 10.025M | 13.468M | 13M5G1D | 9.525M | 13.193M |
| 802.11g_Nss1,(6Mbps)_2TX | 15.1M | 16.242M | 16M2D1D | 12.8M | 16.167M |
| 802.11n HT20_Nss1,(MCS0)_2TX | 15.075M | 16.242M | 16M2D1D | 13.7M | 16.192M |
| 802.11n HT40_Nss1,(MCS0)_2TX | 34.95M | 35.832M | 35M8D1D | 31.35M | 35.682M |

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;

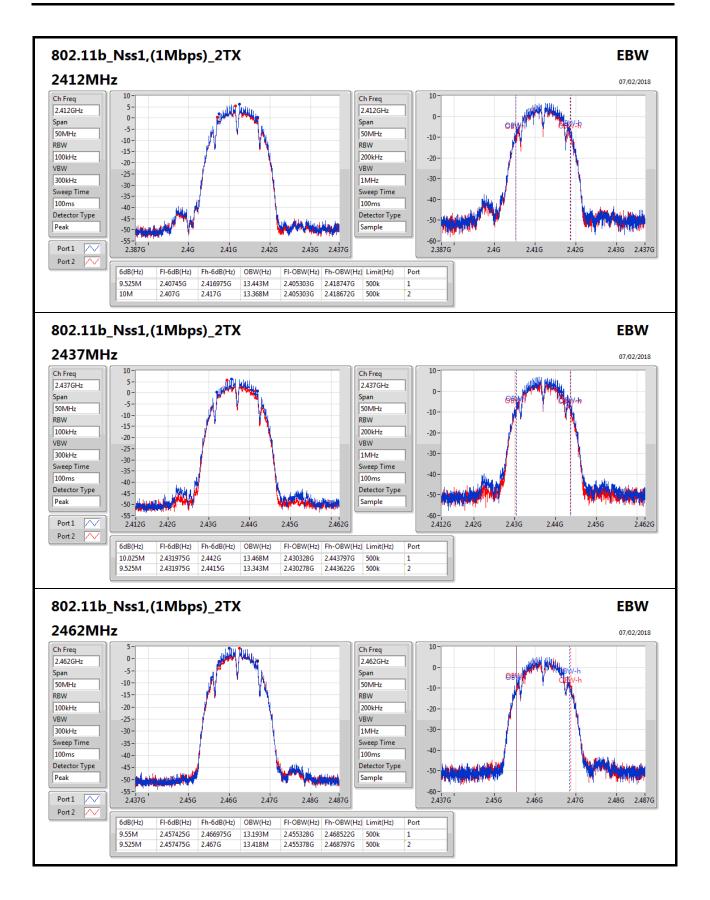
Result

| Mode | Result | Limit | Port 1-N dB | Port 1-OBW | Port 2-N dB | Port 2-OBW |
|------------------------------|--------|-------|-------------|------------|-------------|------------|
| | | (Hz) | (Hz) | (Hz) | (Hz) | (Hz) |
| 802.11b_Nss1,(1Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 500k | 9.525M | 13.443M | 10M | 13.368M |
| 2437MHz | Pass | 500k | 10.025M | 13.468M | 9.525M | 13.343M |
| 2462MHz | Pass | 500k | 9.55M | 13.193M | 9.525M | 13.418M |
| 802.11g_Nss1,(6Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 500k | 12.8M | 16.192M | 14.975M | 16.192M |
| 2437MHz | Pass | 500k | 14.075M | 16.217M | 15.1M | 16.242M |
| 2462MHz | Pass | 500k | 15M | 16.167M | 15.025M | 16.217M |
| 802.11n HT20_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 500k | 14.425M | 16.217M | 13.85M | 16.217M |
| 2437MHz | Pass | 500k | 15.025M | 16.217M | 13.7M | 16.192M |
| 2462MHz | Pass | 500k | 15.075M | 16.217M | 13.75M | 16.242M |
| 802.11n HT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2422MHz | Pass | 500k | 33.8M | 35.832M | 31.35M | 35.682M |
| 2437MHz | Pass | 500k | 34.95M | 35.682M | 32.6M | 35.682M |
| 2452MHz | Pass | 500k | 32.5M | 35.682M | 31.35M | 35.782M |

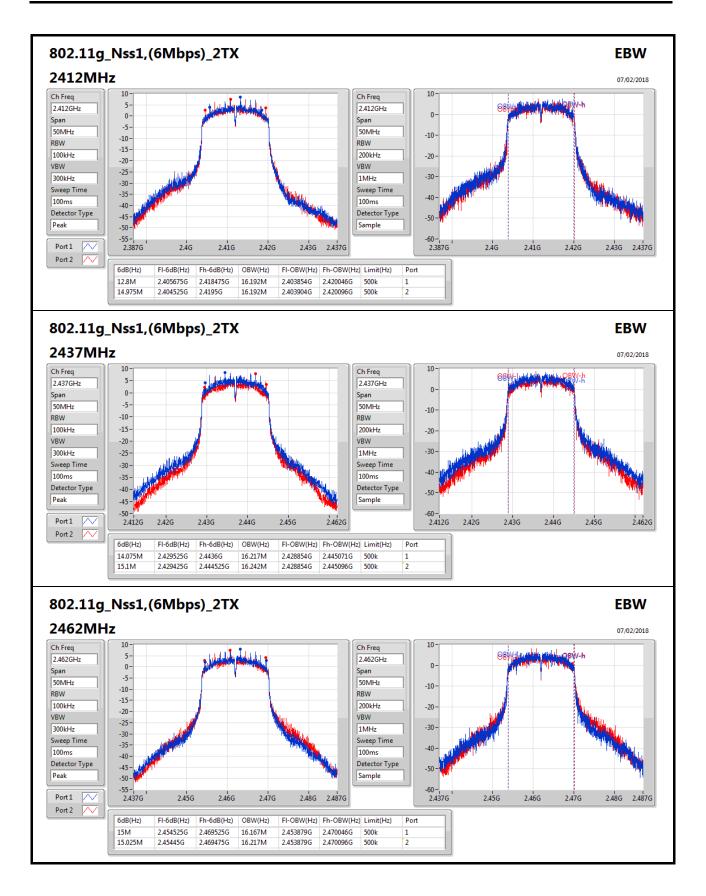
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Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

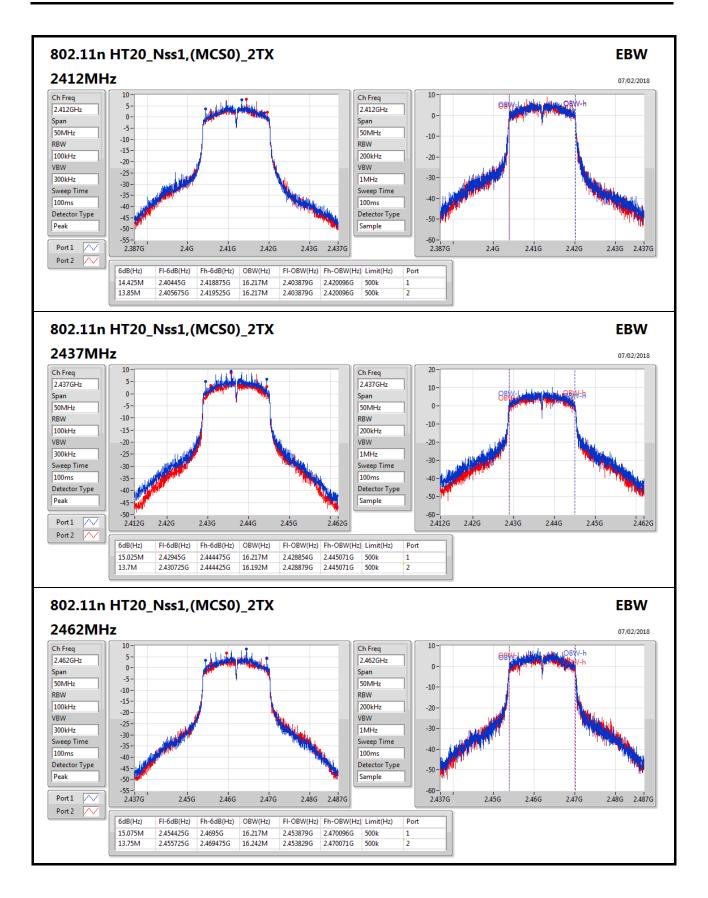




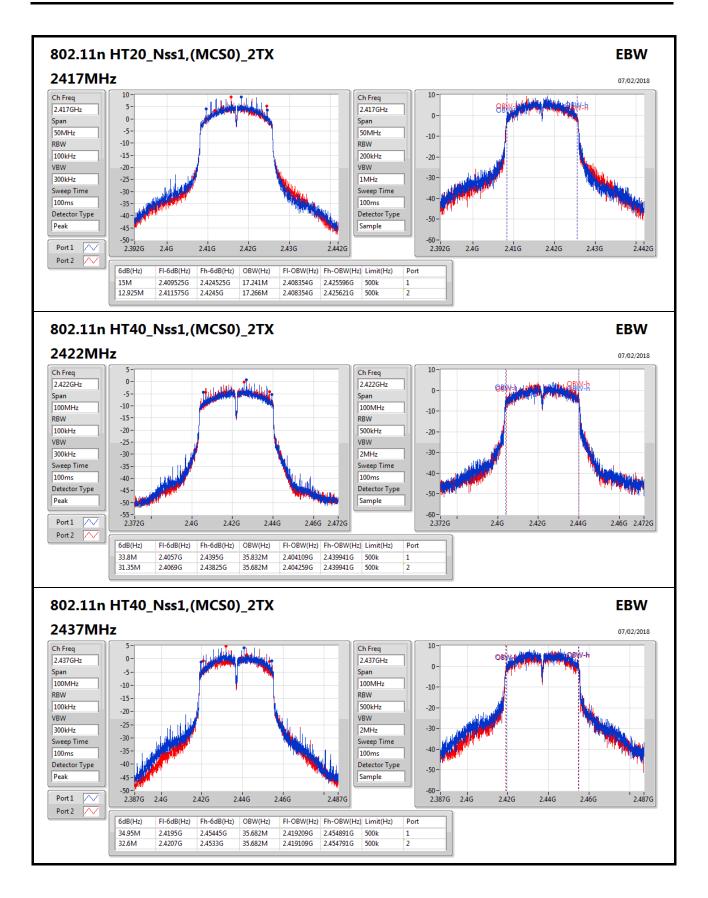


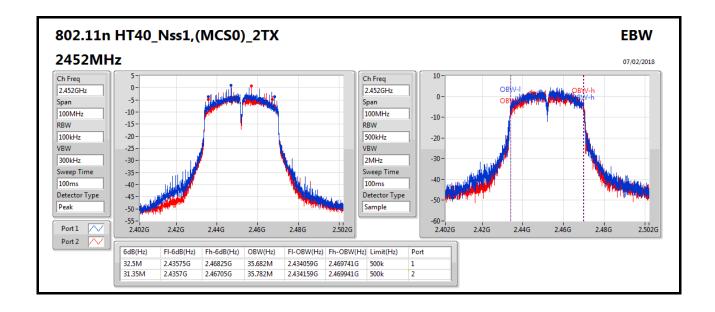














AV Power Result Appendix C

Summary

| Mode | Total Power | Total Power |
|------------------------------|-------------|-------------|
| | (dBm) | (W) |
| 2.4-2.4835GHz | | - |
| 802.11b_Nss1,(1Mbps)_2TX | 18.27 | 0.06714 |
| 802.11g_Nss1,(6Mbps)_2TX | 21.82 | 0.15205 |
| 802.11n HT20_Nss1,(MCS0)_2TX | 21.88 | 0.15417 |
| 802.11n HT40_Nss1,(MCS0)_2TX | 21.01 | 0.12618 |

Result

| Mode | Result | DG | Port 1 | Port 2 | Total Power | Power Limit |
|------------------------------|--------|-------|--------|--------|-------------|-------------|
| | | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| 802.11b_Nss1,(1Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 1.50 | 14.89 | 14.57 | 17.74 | 30.00 |
| 2437MHz | Pass | 1.50 | 15.81 | 14.62 | 18.27 | 30.00 |
| 2462MHz | Pass | 1.50 | 13.22 | 12.59 | 15.93 | 30.00 |
| 802.11g_Nss1,(6Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 1.50 | 17.3 | 16.99 | 20.16 | 30.00 |
| 2437MHz | Pass | 1.50 | 19.15 | 18.24 | 21.73 | 30.00 |
| 2462MHz | Pass | 1.50 | 18.01 | 17.23 | 20.65 | 30.00 |
| 2417MHz | Pass | 1.50 | 18.97 | 18.65 | 21.82 | 30.00 |
| 2457MHz | Pass | 1.50 | 18.86 | 18.75 | 21.82 | 30.00 |
| 802.11n HT20_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 1.50 | 17.7 | 17.24 | 20.49 | 30.00 |
| 2437MHz | Pass | 1.50 | 19.32 | 17.82 | 21.64 | 30.00 |
| 2462MHz | Pass | 1.50 | 17.95 | 17.03 | 20.52 | 30.00 |
| 2417MHz | Pass | 1.50 | 18.96 | 18.78 | 21.88 | 30.00 |
| 2457MHz | Pass | 1.50 | 18.69 | 18.08 | 21.41 | 30.00 |
| 802.11n HT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2422MHz | Pass | 1.50 | 12.9 | 12.93 | 15.93 | 30.00 |
| 2437MHz | Pass | 1.50 | 18.13 | 17.3 | 20.75 | 30.00 |
| 2452MHz | Pass | 1.50 | 13.86 | 12.97 | 16.45 | 30.00 |
| 2427MHz | Pass | 1.50 | 15.56 | 15.63 | 18.61 | 30.00 |
| 2432MHz | Pass | 1.50 | 18.43 | 17.52 | 21.01 | 30.00 |
| 2442MHz | Pass | 1.50 | 18.49 | 17.23 | 20.92 | 30.00 |
| 2447MHz | Pass | 1.50 | 18.57 | 17.28 | 20.98 | 30.00 |

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DG = Directional Gain; **Port X** = Port X output power



Appendix D **PSD Result**

Summary

| Mode | PD |
|------------------------------|-----------|
| | (dBm/RBW) |
| 2.4-2.4835GHz | · |
| 802.11b_Nss1,(1Mbps)_2TX | -6.68 |
| 802.11g_Nss1,(6Mbps)_2TX | -4.81 |
| 802.11n HT20_Nss1,(MCS0)_2TX | -3.56 |
| 802.11n HT40_Nss1,(MCS0)_2TX | -8.58 |

RBW=3kHz.

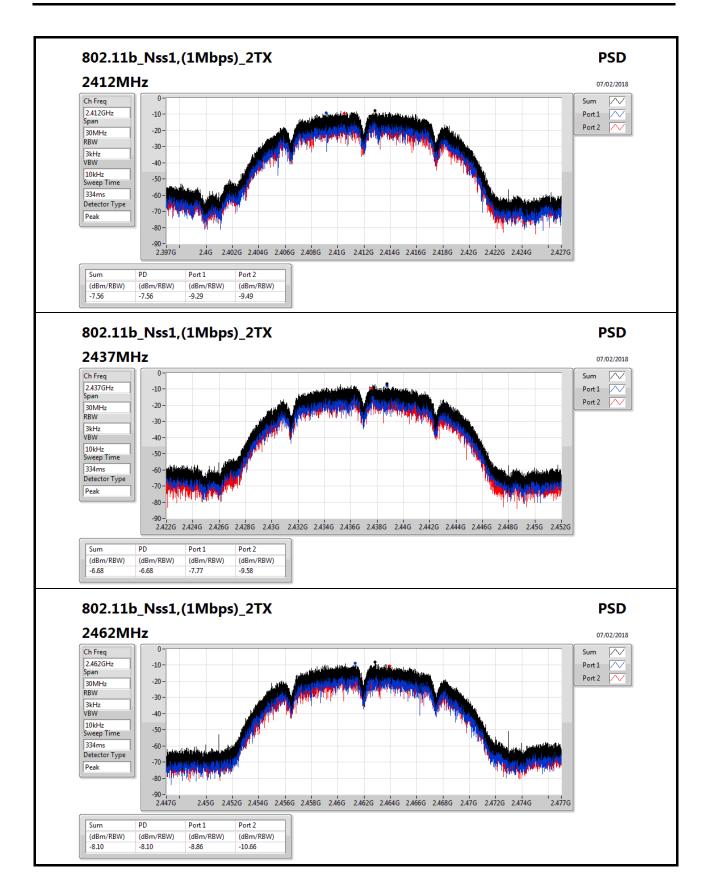
Result

| Mode | Result | DG | Port 1 | Port 2 | PD | PD Limit |
|------------------------------|--------|-------|-----------|-----------|-----------|-----------|
| | | (dBi) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| 802.11b_Nss1,(1Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 4.51 | -9.29 | -9.49 | -7.56 | 8.00 |
| 2437MHz | Pass | 4.51 | -7.77 | -9.58 | -6.68 | 8.00 |
| 2462MHz | Pass | 4.51 | -8.86 | -10.66 | -8.10 | 8.00 |
| 802.11g_Nss1,(6Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 4.51 | -7.67 | -6.84 | -5.24 | 8.00 |
| 2437MHz | Pass | 4.51 | -5.40 | -6.91 | -4.81 | 8.00 |
| 2462MHz | Pass | 4.51 | -7.62 | -7.90 | -5.97 | 8.00 |
| 802.11n HT20_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 4.51 | -6.69 | -8.09 | -5.44 | 8.00 |
| 2437MHz | Pass | 4.51 | -4.74 | -6.16 | -3.56 | 8.00 |
| 2462MHz | Pass | 4.51 | -6.93 | -6.69 | -5.85 | 8.00 |
| 802.11n HT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2422MHz | Pass | 4.51 | -14.73 | -14.22 | -12.91 | 8.00 |
| 2437MHz | Pass | 4.51 | -10.08 | -10.53 | -8.58 | 8.00 |
| 2452MHz | Pass | 4.51 | -14.35 | -13.48 | -12.94 | 8.00 |

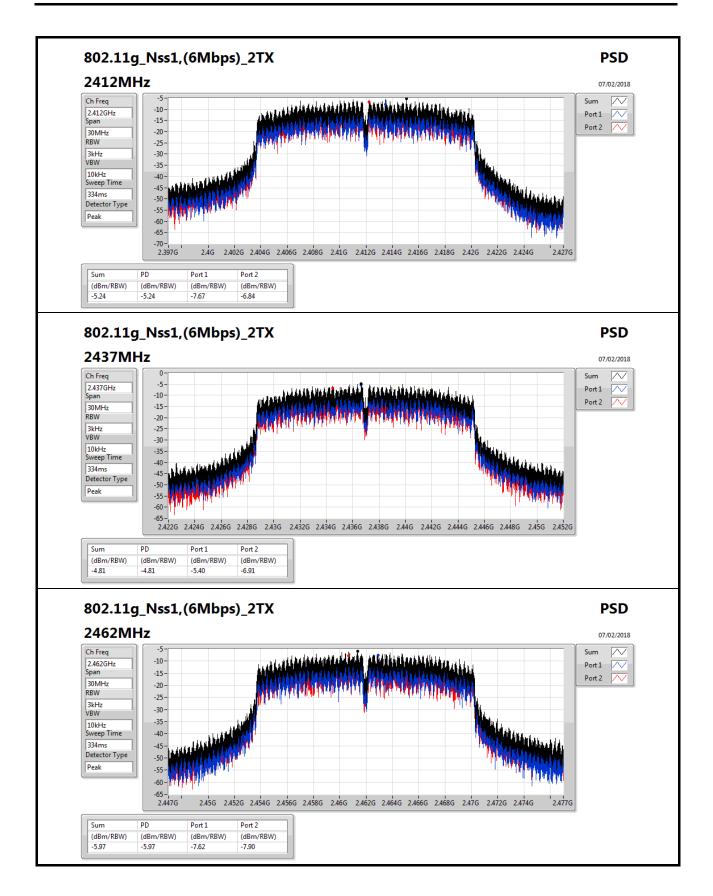
DG = Directional Gain; RBW=3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;

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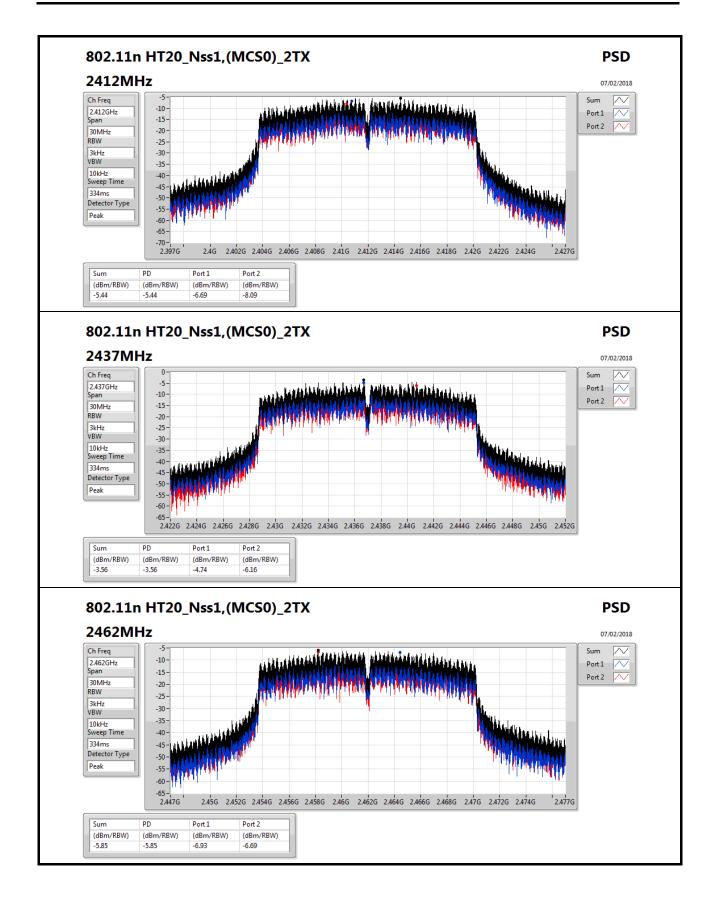




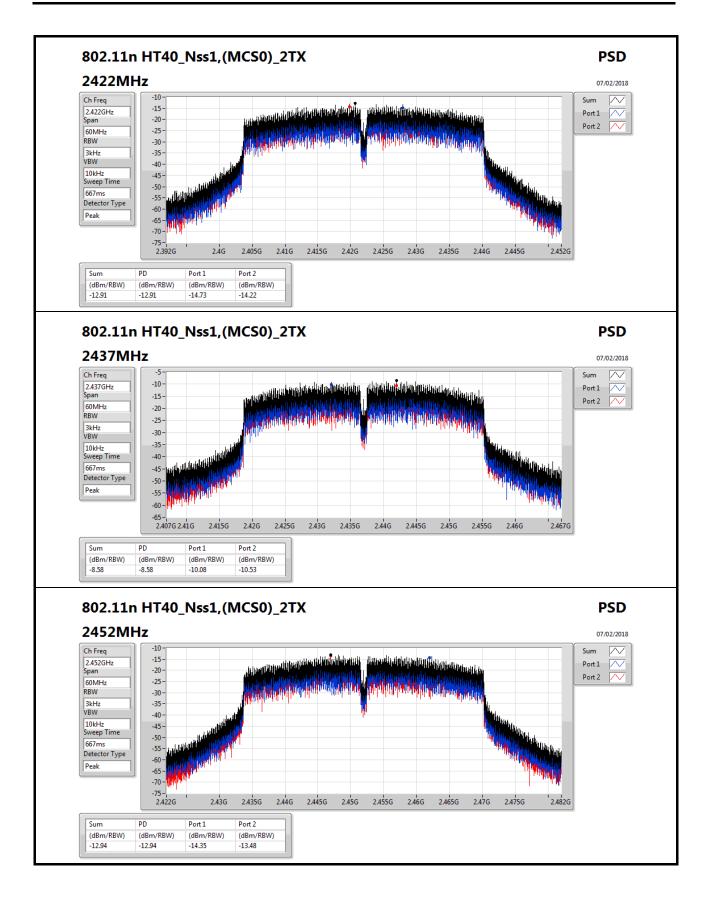














CSE Non-restricted Band Result

Appendix E

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Summary

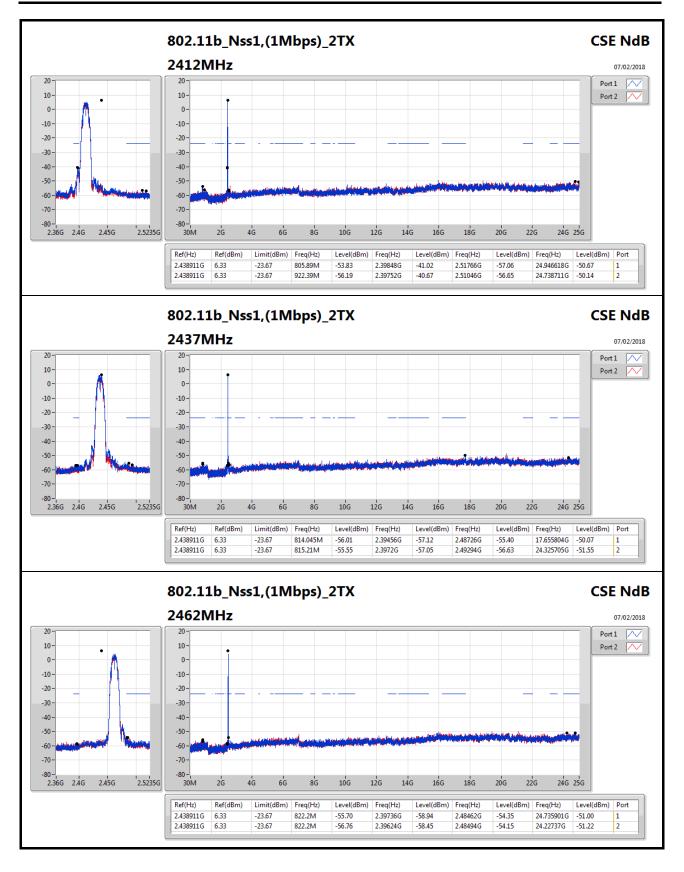
| Mode | Result | Ref | Ref | Limit | Freq | Level | Freq | Level | Freq | Level | Freq | Level | Port |
|------------------------------|--------|-----------|-------|--------|----------|--------|----------|--------|----------|--------|------------|--------|------|
| | | (Hz) | (dBm) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | |
| 2.4-2.4835GHz | | - | - | - | - | - | - | - | - | - | - | - | - |
| 802.11b_Nss1,(1Mbps)_2TX | Pass | 2.438911G | 6.33 | -23.67 | 922.39M | -56.19 | 2.39752G | -40.67 | 2.51046G | -56.65 | 24.738711G | -50.14 | 2 |
| 802.11g_Nss1,(6Mbps)_2TX | Pass | 2.437909G | 6.91 | -23.09 | 803.56M | -53.16 | 2.39704G | -26.94 | 2.50174G | -56.85 | 24.373468G | -51.37 | 1 |
| 802.11n HT20_Nss1,(MCS0)_2TX | Pass | 2.438243G | 9.26 | -20.74 | 807.055M | -55.17 | 2.39976G | -27.09 | 2.52286G | -56.52 | 24.373468G | -50.47 | 2 |
| 802.11n HT40_Nss1,(MCS0)_2TX | Pass | 2.440748G | 4.83 | -25.17 | 824.63M | -53.85 | 2.39952G | -28.96 | 2.4907G | -41.86 | 24.36056G | -51.20 | 1 |

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) | |
| 802.11b_Nss1,(1Mbps)_2TX | - | - | - | | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.438911G | 6.33 | -23.67 | 805.89M | -53.83 | 2.39848G | -41.02 | 2.51766G | -57.06 | 24.946618G | -50.67 | 1 |
| 2412MHz | Pass | 2.438911G | 6.33 | -23.67 | 922.39M | -56.19 | 2.39752G | -40.67 | 2.51046G | -56.65 | 24.738711G | -50.14 | 2 |
| 2437MHz | Pass | 2.438911G | 6.33 | -23.67 | 814.045M | -56.01 | 2.39456G | -57.12 | 2.48726G | -55.40 | 17.655804G | -50.07 | 1 |
| 2437MHz | Pass | 2.438911G | 6.33 | -23.67 | 815.21M | -55.55 | 2.3972G | -57.05 | 2.49294G | -56.63 | 24.325705G | -51.55 | 2 |
| 2462MHz | Pass | 2.438911G | 6.33 | -23.67 | 822.2M | -55.70 | 2.39736G | -58.94 | 2.48462G | -54.35 | 24.735901G | -51.00 | 1 |
| 2462MHz | Pass | 2.438911G | 6.33 | -23.67 | 822.2M | -56.76 | 2.39624G | -58.45 | 2.48494G | -54.15 | 24.22737G | -51.22 | 2 |
| 802.11g_Nss1,(6Mbps)_2TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.437909G | 6.91 | -23.09 | 803.56M | -53.16 | 2.39704G | -26.94 | 2.50174G | -56.85 | 24.373468G | -51.37 | 1 |
| 2412MHz | Pass | 2.437909G | 6.91 | -23.09 | 801.23M | -55.59 | 2.39824G | -27.41 | 2.4991G | -56.46 | 24.690948G | -50.35 | 2 |
| 2437MHz | Pass | 2.437909G | 6.91 | -23.09 | 811.715M | -52.00 | 2.39864G | -51.41 | 2.4847G | -50.80 | 24.404373G | -50.67 | 1 |
| 2437MHz | Pass | 2.437909G | 6.91 | -23.09 | 816.375M | -55.40 | 2.3916G | -53.93 | 2.4851G | -53.02 | 24.314467G | -50.03 | 2 |
| 2462MHz | Pass | 2.437909G | 6.91 | -23.09 | 821.035M | -53.12 | 2.39928G | -57.98 | 2.48382G | -41.37 | 16.402739G | -50.29 | 1 |
| 2462MHz | Pass | 2.437909G | 6.91 | -23.09 | 823.365M | -53.64 | 2.39032G | -57.79 | 2.48358G | -42.29 | 24.412801G | -51.09 | 2 |
| 802.11n HT20_Nss1,(MCS0)_2TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.438243G | 9.26 | -20.74 | 807.055M | -51.48 | 2.39952G | -27.25 | 2.48894G | -56.29 | 16.425215G | -51.13 | 1 |
| 2412MHz | Pass | 2.438243G | 9.26 | -20.74 | 807.055M | -55.17 | 2.39976G | -27.09 | 2.52286G | -56.52 | 24.373468G | -50.47 | 2 |
| 2437MHz | Pass | 2.438243G | 9.26 | -20.74 | 812.88M | -50.81 | 2.39696G | -51.19 | 2.48438G | -51.26 | 24.699377G | -49.92 | 1 |
| 2437MHz | Pass | 2.438243G | 9.26 | -20.74 | 814.045M | -53.12 | 2.39512G | -53.55 | 2.4843G | -53.39 | 24.072844G | -49.35 | 2 |
| 2462MHz | Pass | 2.438243G | 9.26 | -20.74 | 819.87M | -53.76 | 2.39312G | -57.76 | 2.48454G | -40.43 | 24.387515G | -50.29 | 1 |
| 2462MHz | Pass | 2.438243G | 9.26 | -20.74 | 819.87M | -54.88 | 2.3916G | -58.41 | 2.48358G | -39.36 | 17.647375G | -50.86 | 2 |
| 802.11n HT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 2.440748G | 4.83 | -25.17 | 715.855M | -56.51 | 2.39952G | -30.21 | 2.49454G | -56.30 | 24.36056G | -50.67 | 1 |
| 2422MHz | Pass | 2.440748G | 4.83 | -25.17 | 810.89M | -56.75 | 2.39952G | -30.23 | 2.50846G | -54.78 | 17.621196G | -50.84 | 2 |
| 2437MHz | Pass | 2.440748G | 4.83 | -25.17 | 824.63M | -53.85 | 2.39952G | -28.96 | 2.4907G | -41.86 | 24.36056G | -51.20 | 1 |
| 2437MHz | Pass | 2.440748G | 4.83 | -25.17 | 824.63M | -56.49 | 2.39952G | -34.61 | 2.4843G | -40.88 | 16.653622G | -50.25 | 2 |
| 2452MHz | Pass | 2.440748G | 4.83 | -25.17 | 844.095M | -57.12 | 2.39696G | -57.17 | 2.48574G | -39.17 | 16.726541G | -51.19 | 1 |
| 2452MHz | Pass | 2.440748G | 4.83 | -25.17 | 940.275M | -57.30 | 2.3944G | -55.77 | 2.48558G | -39.13 | 24.985977G | -51.04 | 2 |

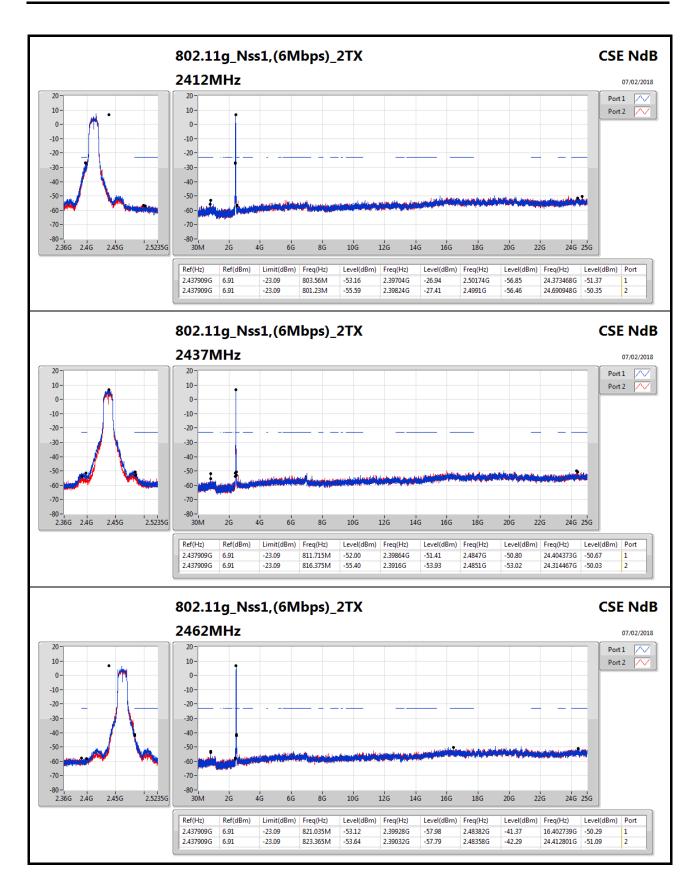
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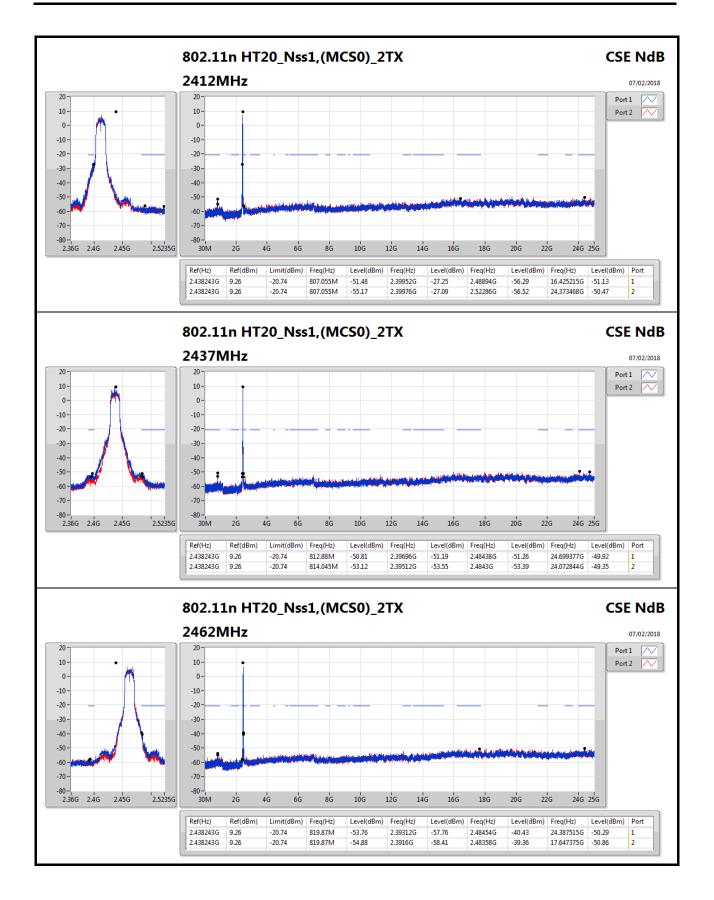
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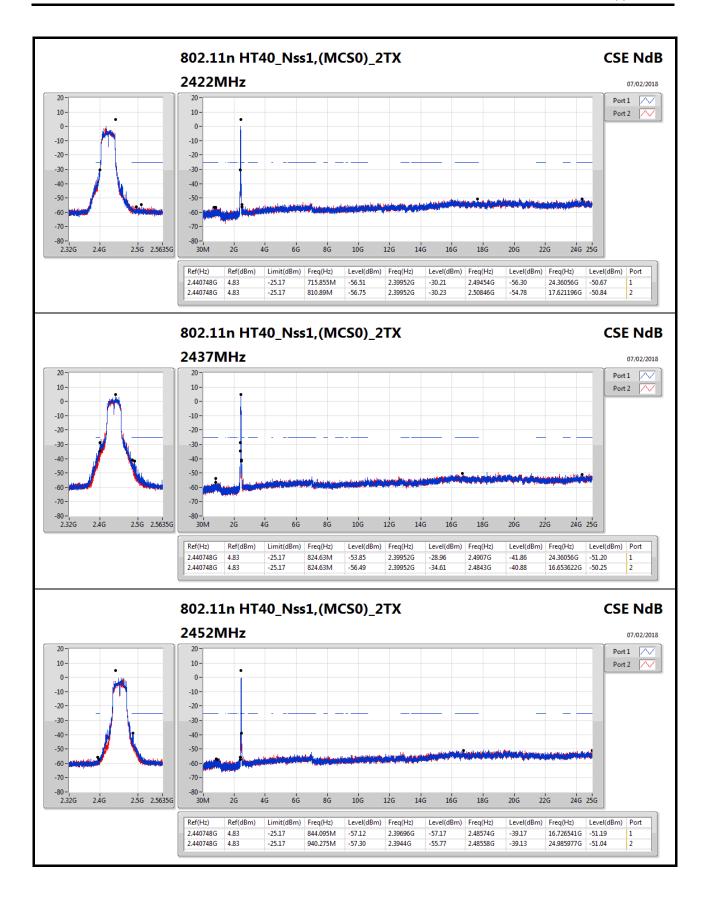
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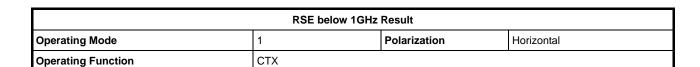


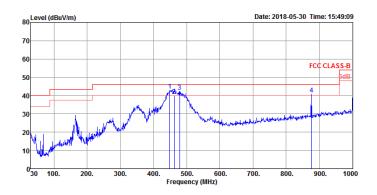


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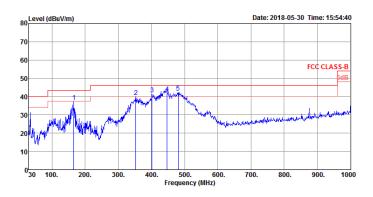


| | Freq | Level | | | | | Antenna Factor | | | A/Pos | T/Pos | Pol/Phase |
|--------|--------|--------|--------|-------|-------|-------|-------------------|------|----|------------|-------|--------------------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 2 | 462.62 | 39.86 | 46.00 | -6.14 | 44.00 | 28.71 | 17.58 17.75 | 6.82 | QP | 100 100 | 313 | HORIZONTAL HORIZONTAL |
| 3 4 | | | | | | | 17.95 23.31 | | | 100 100 | | HORIZONTAL HORIZONTAL |

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

RSE below 1GHz Result

| RSE below 1GHz Result | | | | | | | | | | | |
|-----------------------|-----|--------------|----------|--|--|--|--|--|--|--|--|
| Operating Mode | 1 | Polarization | Vertical | | | | | | | | |
| Operating Function | CTX | | | | | | | | | | |



| | Freq | Level | Limit Line | | | | Antenna Factor | | | A/Pos | | Pol/Phase |
|---|--------|--------|---------------|-------|-------|-------|-------------------|------|-----------|-------|-----|-----------|
| - | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | | | 43.50 | | | | | | Peak | 100 | | VERTICAL |
| 2 | 353.01 | 39.75 | 46.00 | -6.25 | 46.15 | 28.07 | 15.76 | 5.91 | Peak | 100 | 150 | VERTICAL |
| 3 | 401.51 | 41.23 | 46.00 | -4.77 | 46.50 | 28.42 | 16.83 | 6.32 | Peak | 100 | 172 | VERTICAL |
| 4 | 447.10 | 41.84 | 46.00 | -4.16 | 46.20 | 28.63 | 17.55 | 6.72 | OP | 100 | 150 | VERTICAL |
| 5 | 480.08 | 42.32 | 46.00 | -3.68 | 46.24 | 28.79 | 17.96 | 6.91 | Peak | 100 | 254 | VERTICAL |

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



RSE TX above 1GHz Result

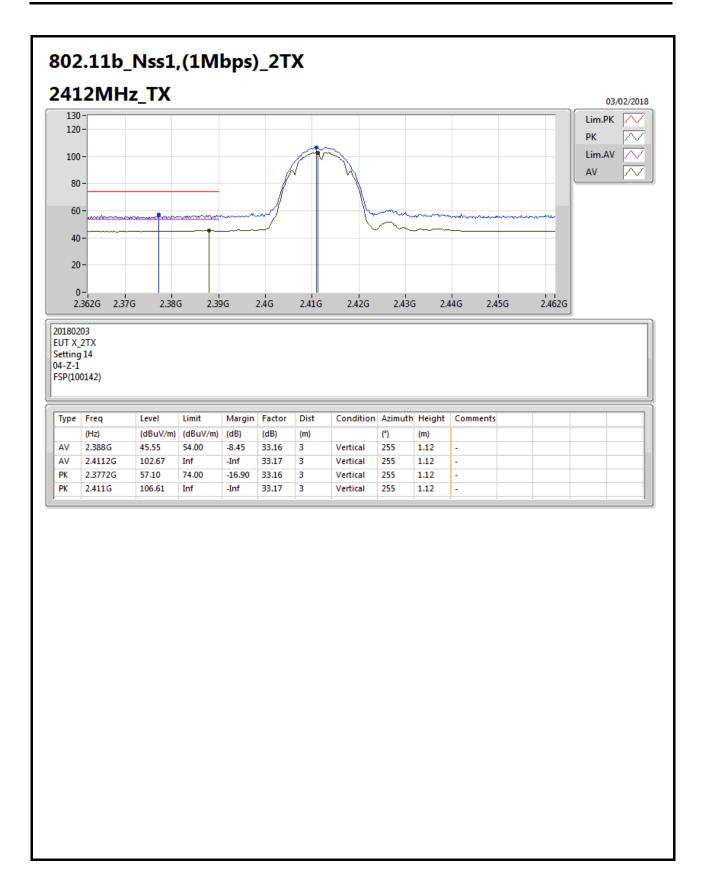
Appendix F.2

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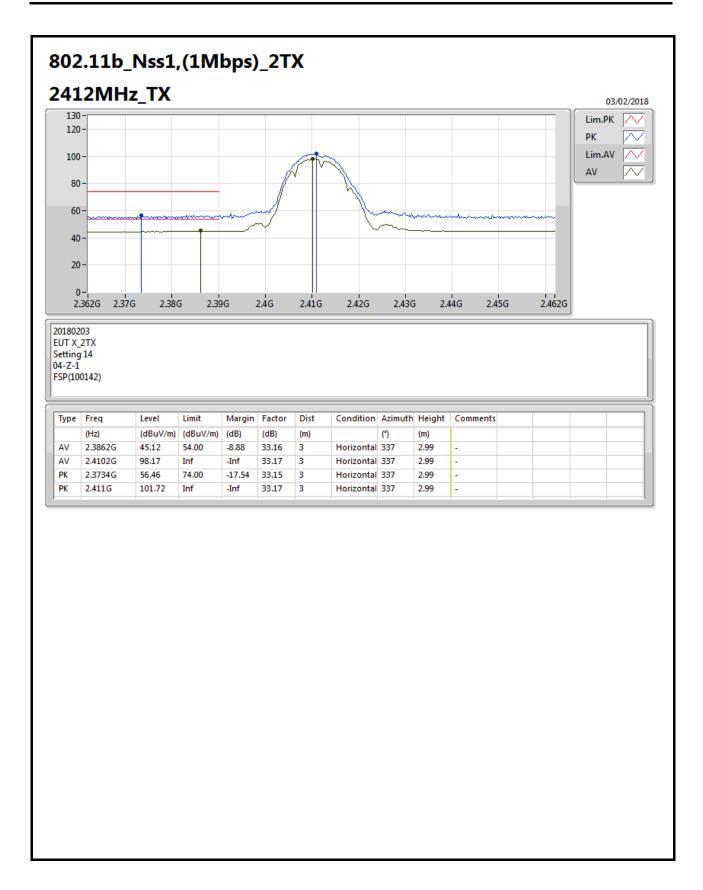
Summary

| Mode | Result | Туре | Freq (Hz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Factor (dB) | Dist (m) | Condition | Azimuth | Height | Comments |
|------------------------------|--------|------|--------------|-------------------|-------------------|----------------|----------------|-------------|-----------|---------|--------|----------|
| | | | (HZ) | (dBuV/III) | (uBuv/III) | (dB) | (dB) | (III) | | () | (m) | |
| 2.4-2.4835GHz | - | - | - | - | - | - | - | - | - | - | - | - |
| 802.11n HT40_Nss1,(MCS0)_2TX | Pass | AV | 2.483502G | 53.88 | 54.00 | -0.12 | 32.42 | 3 | Vertical | 309 | 1.09 | - |



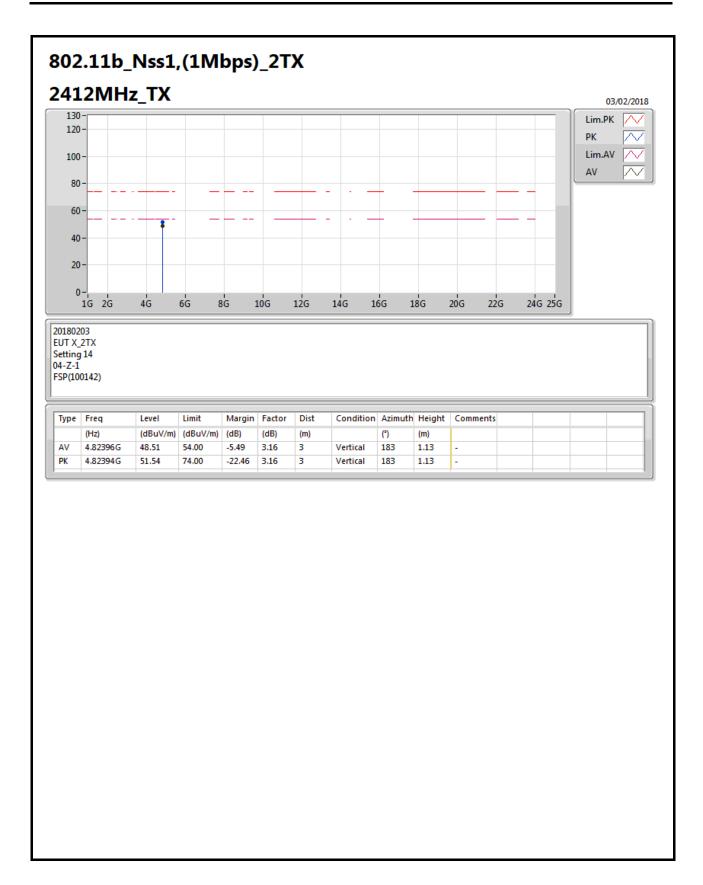






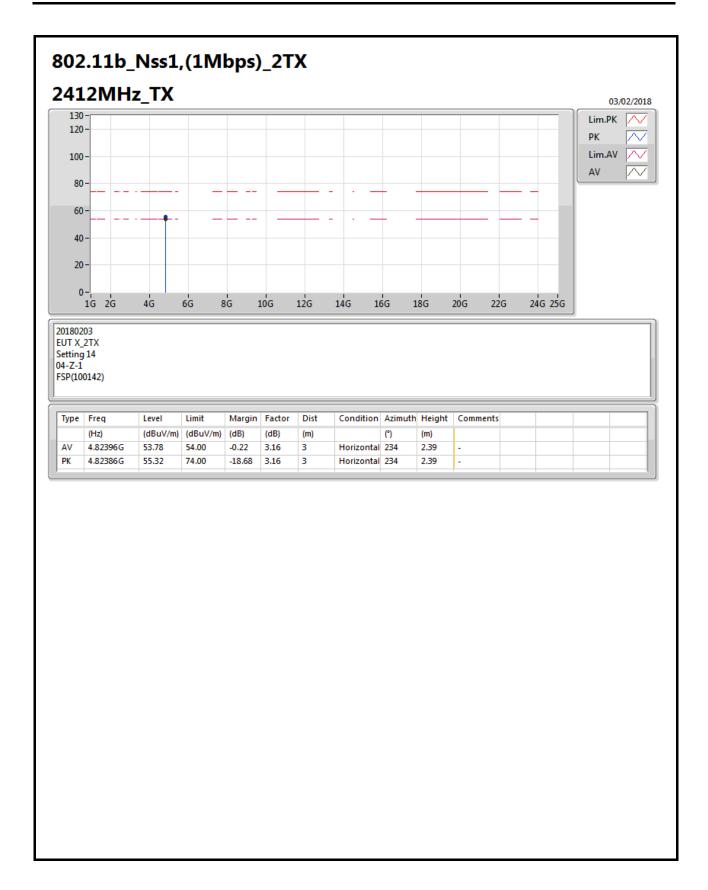
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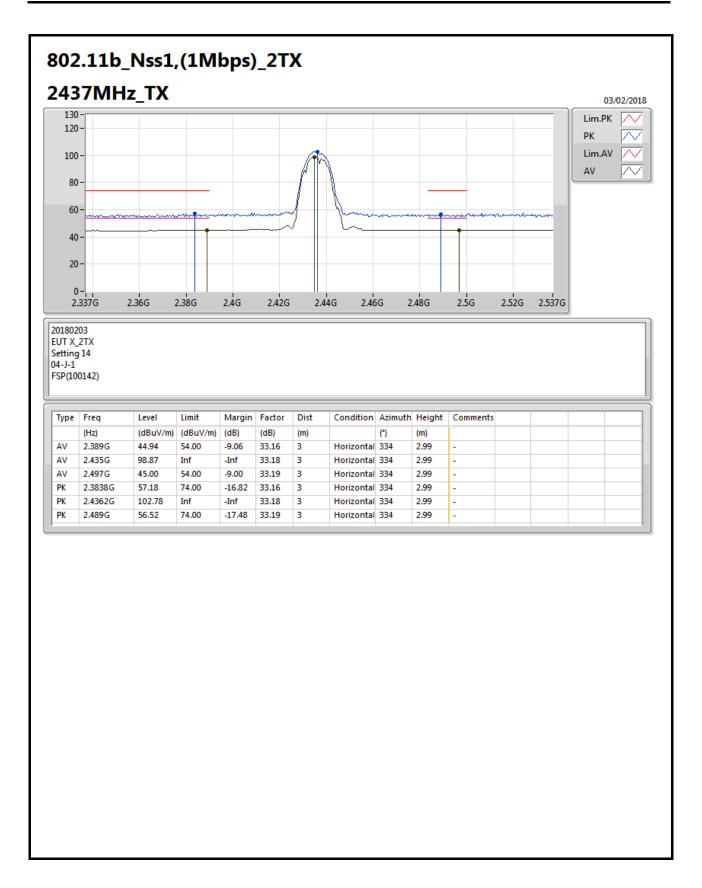
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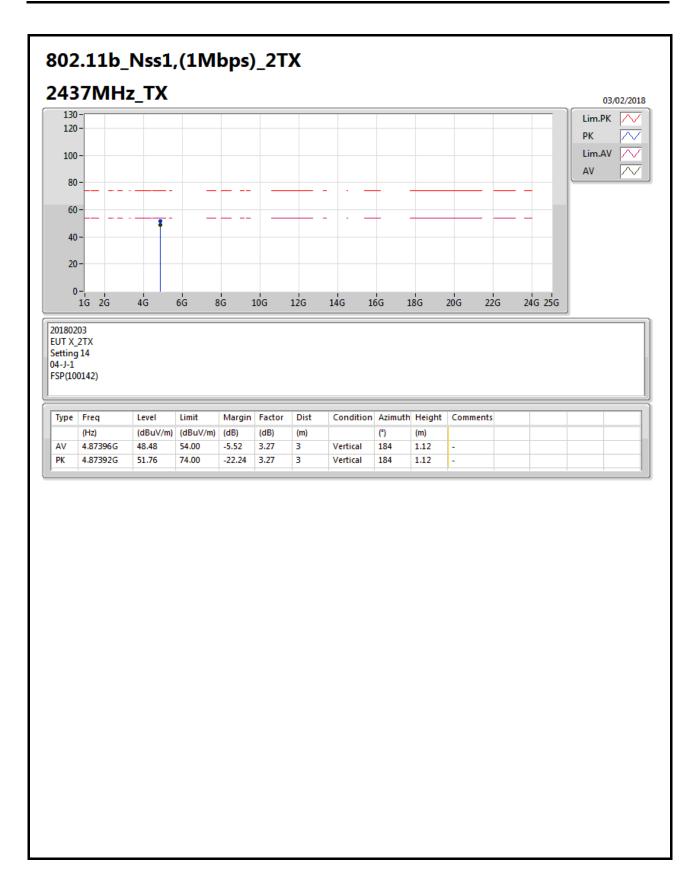
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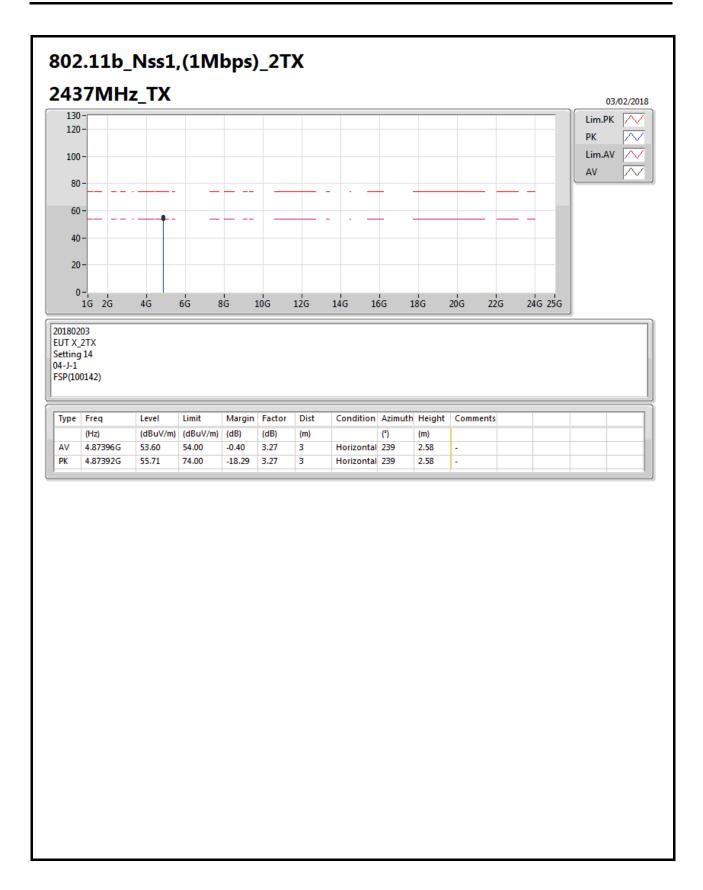
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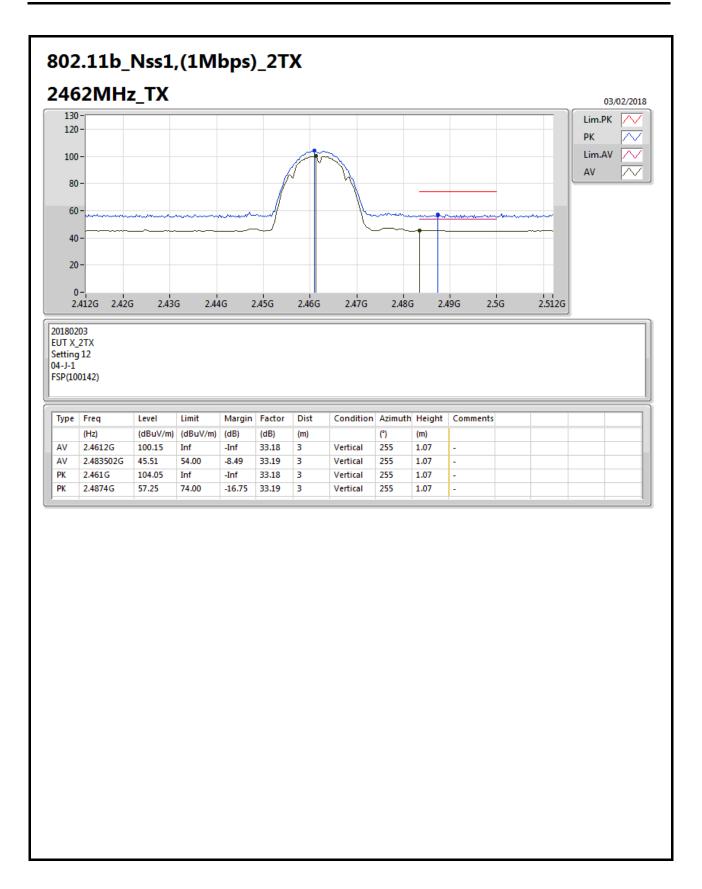
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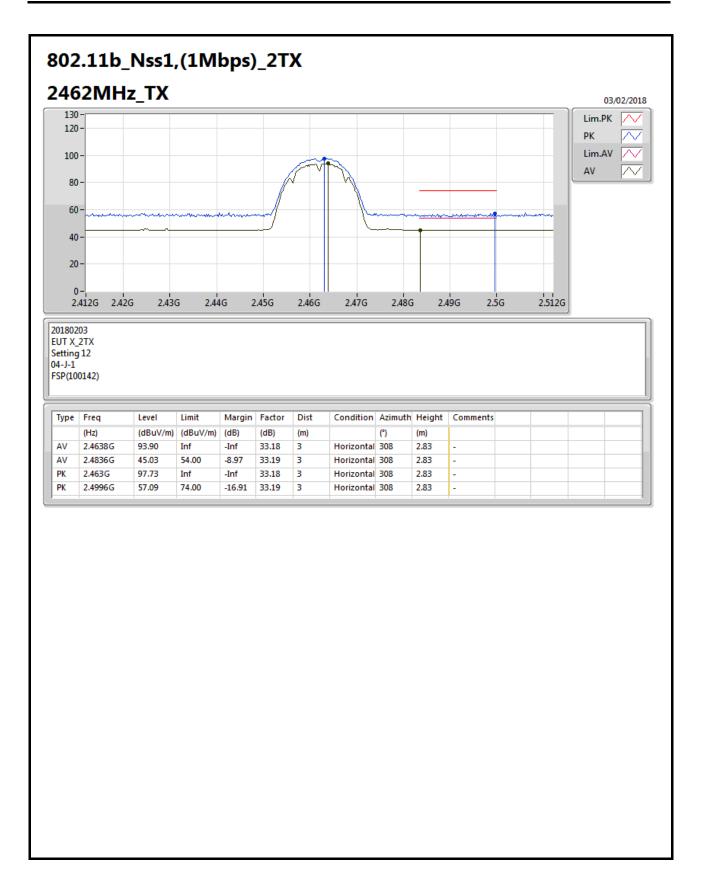
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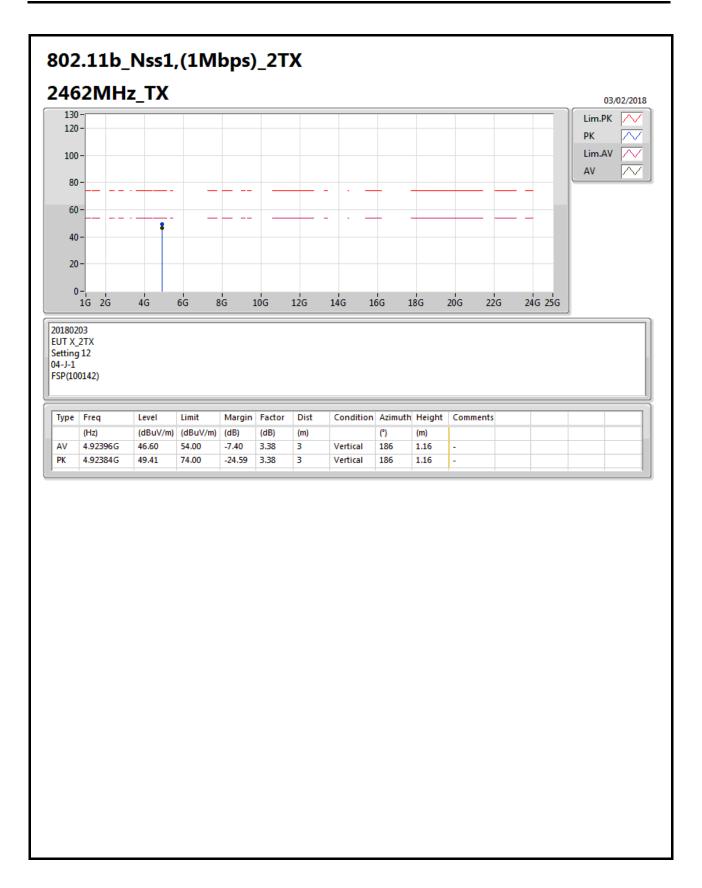
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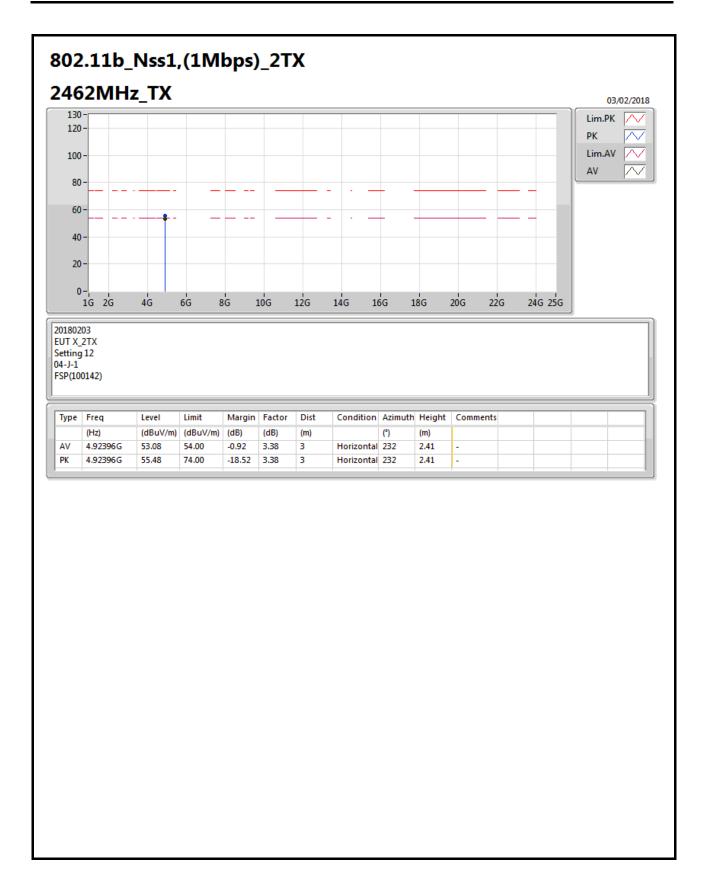
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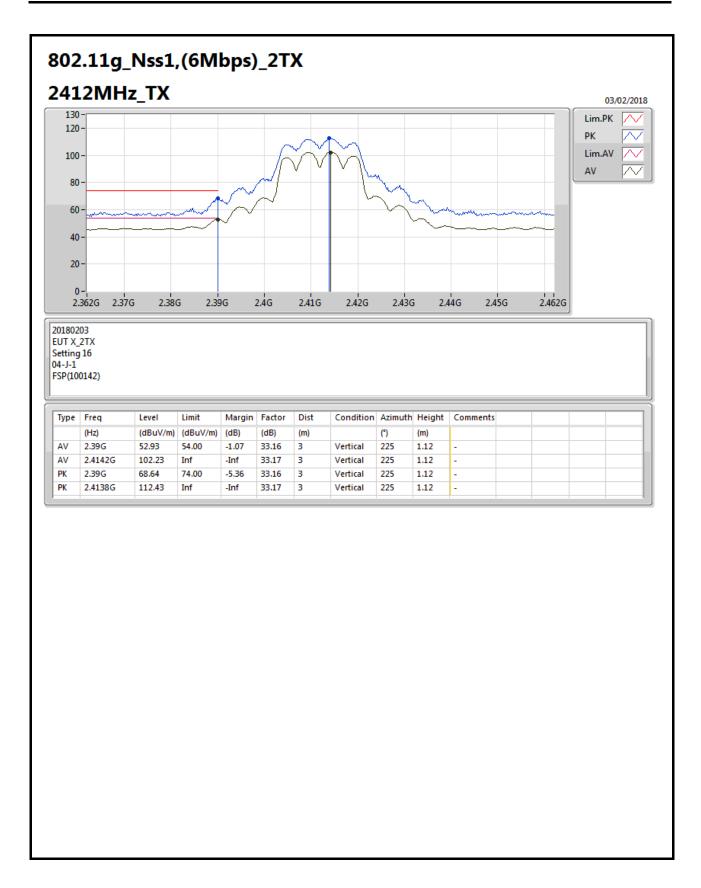
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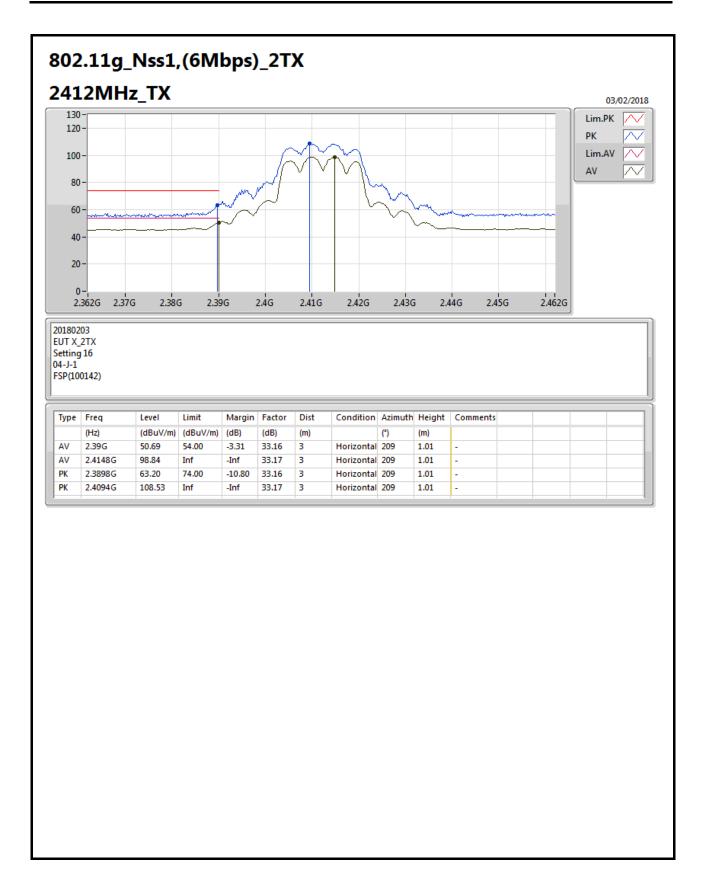
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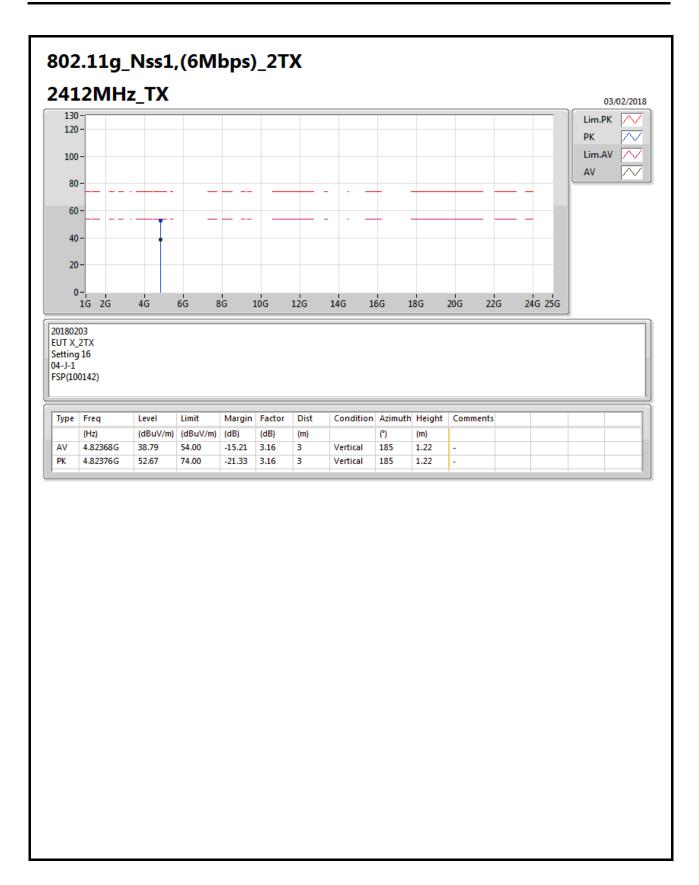
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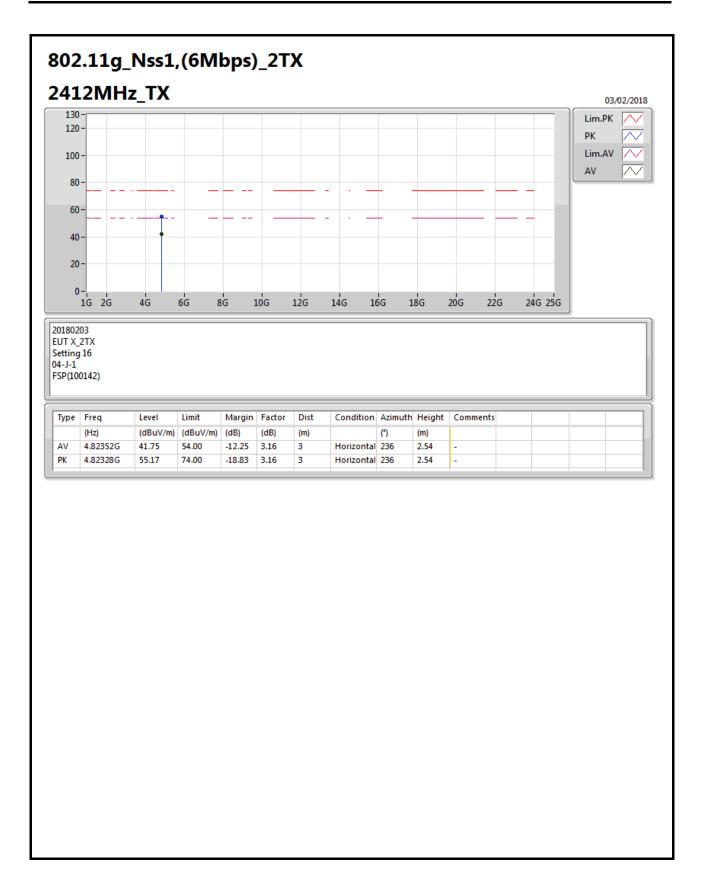
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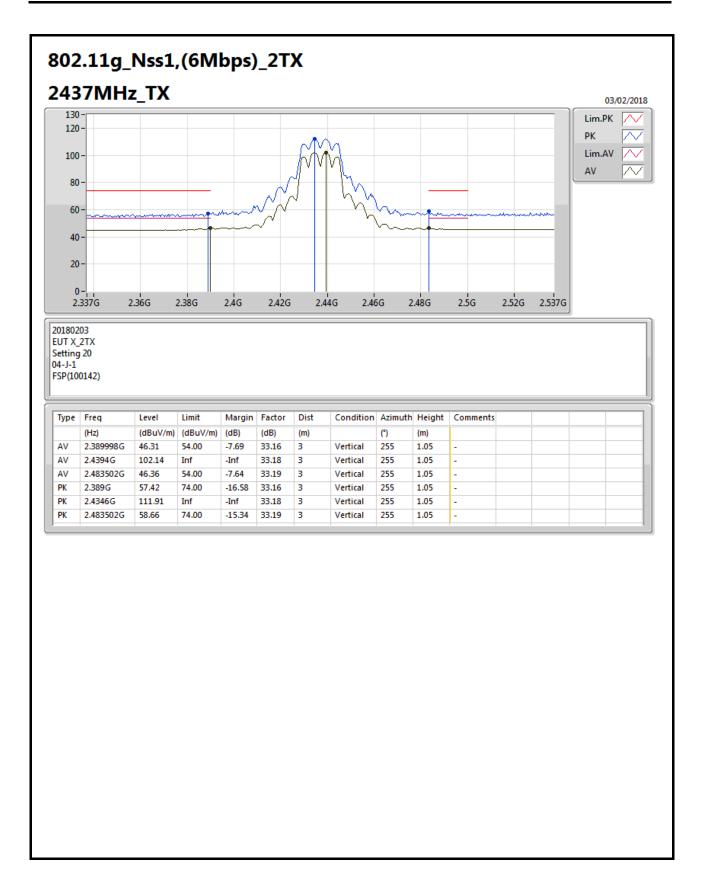
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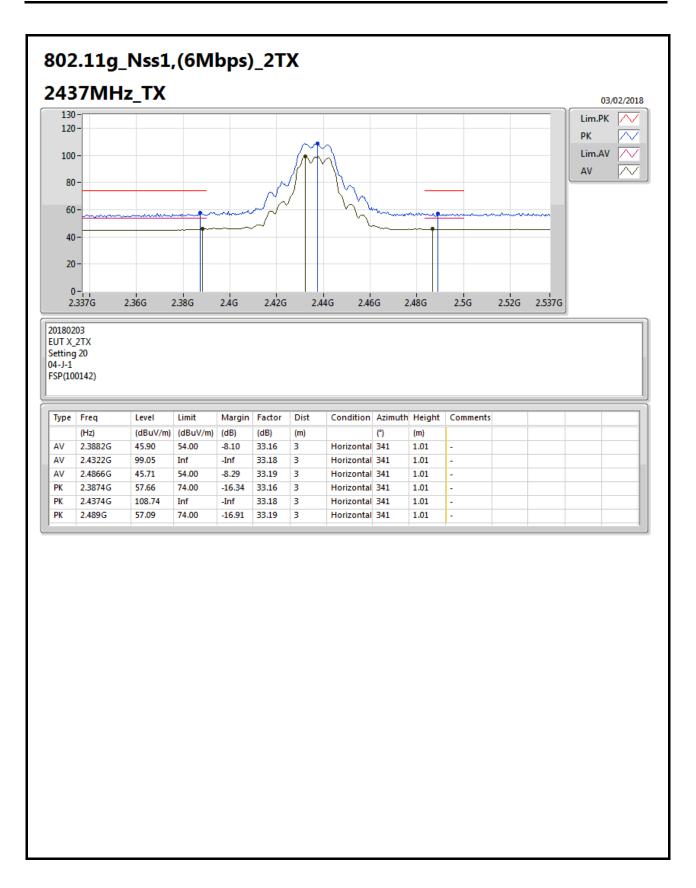
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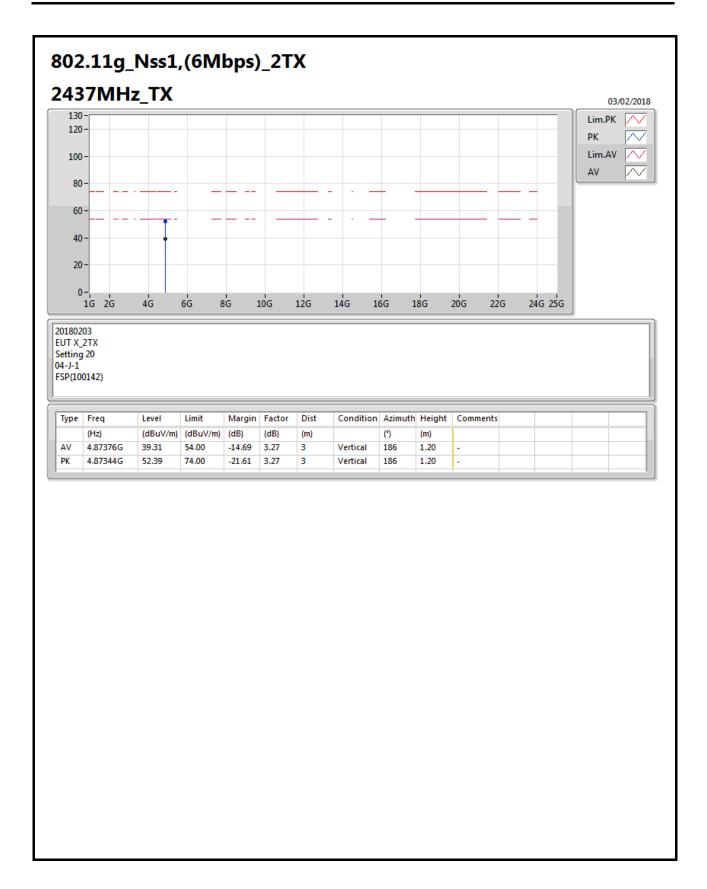
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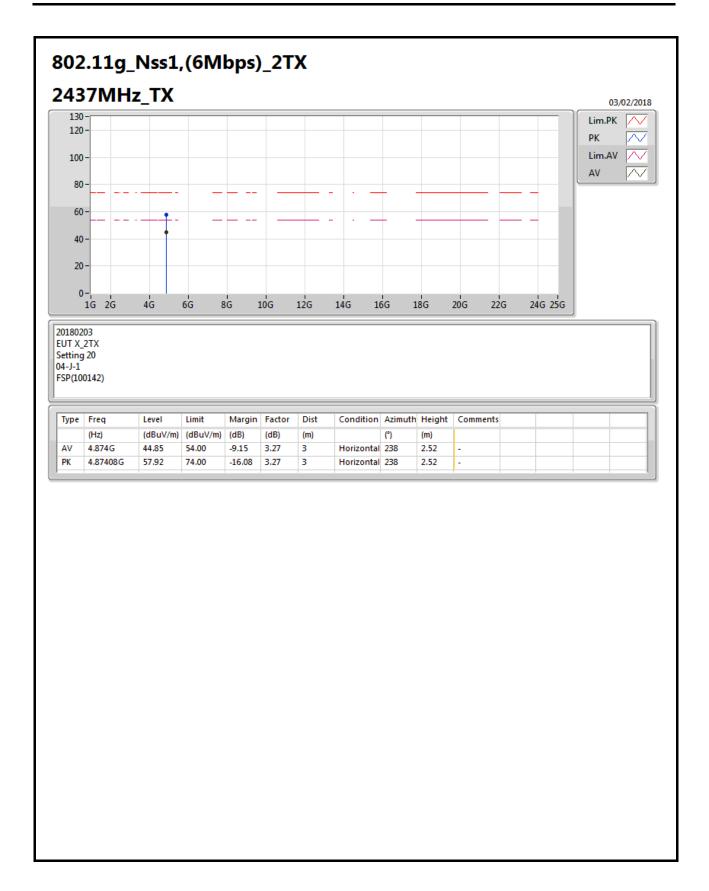
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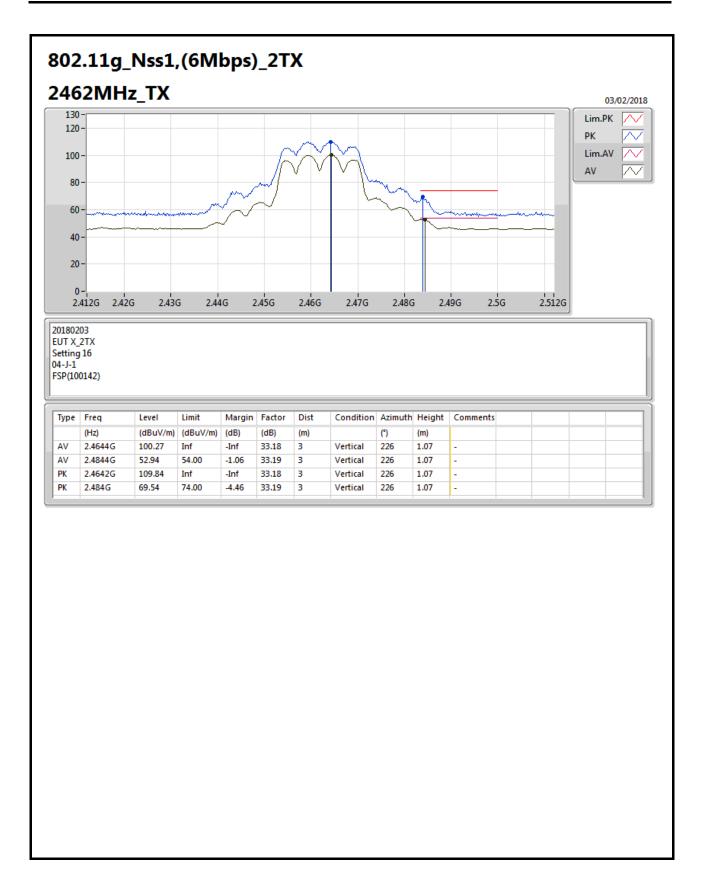
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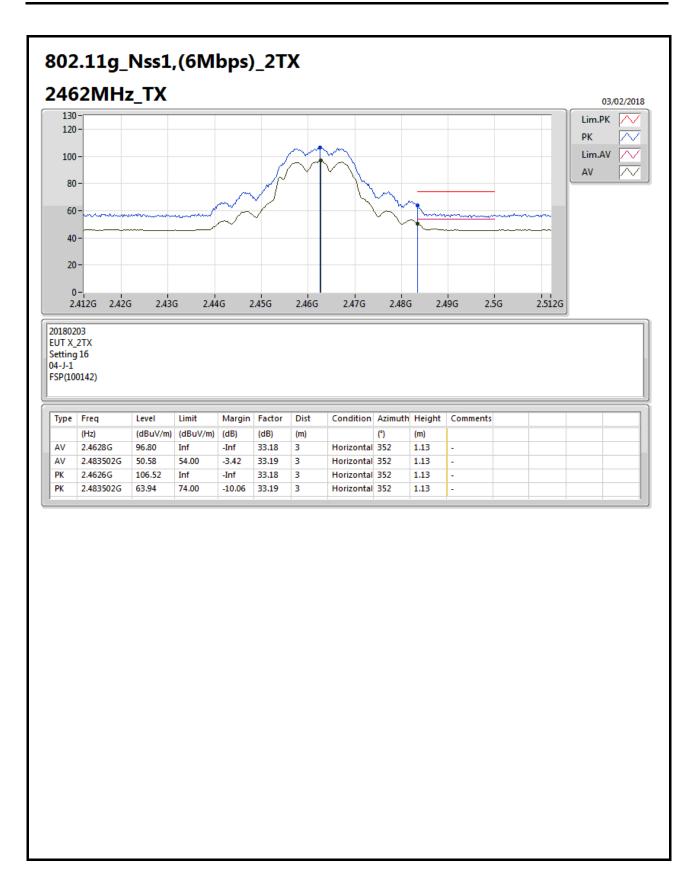
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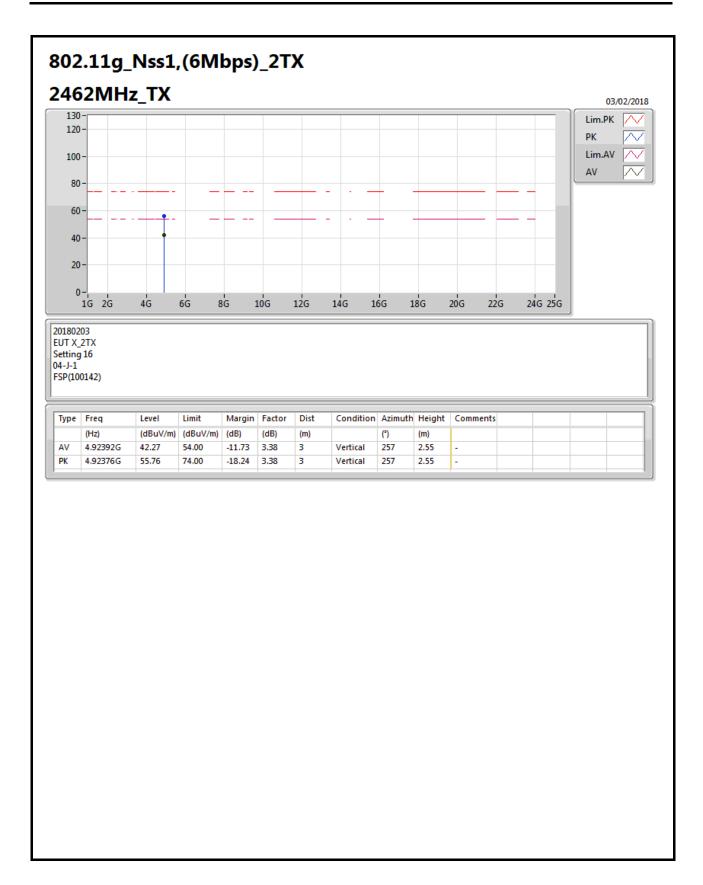
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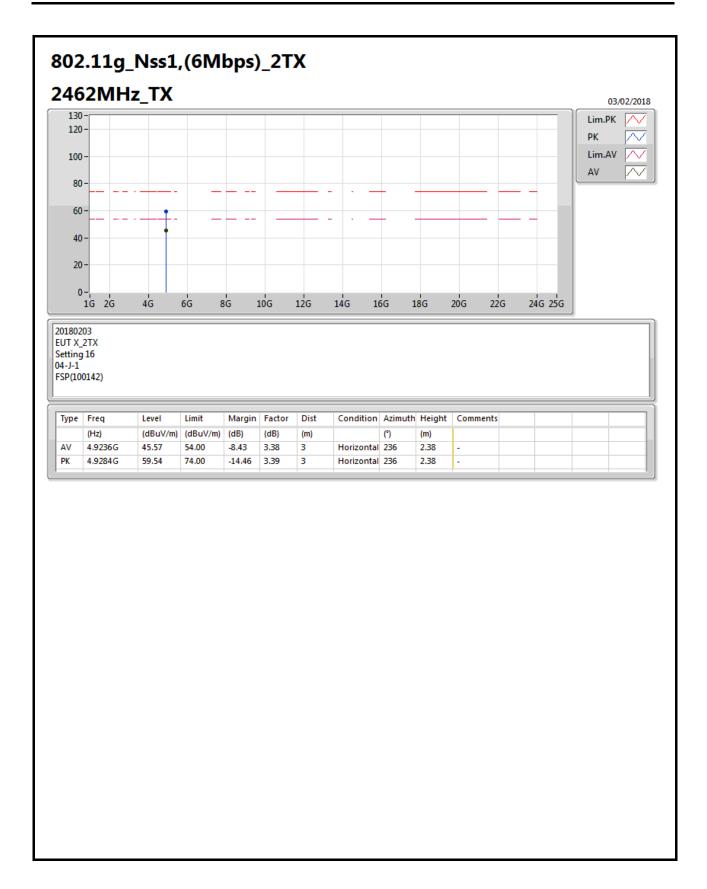
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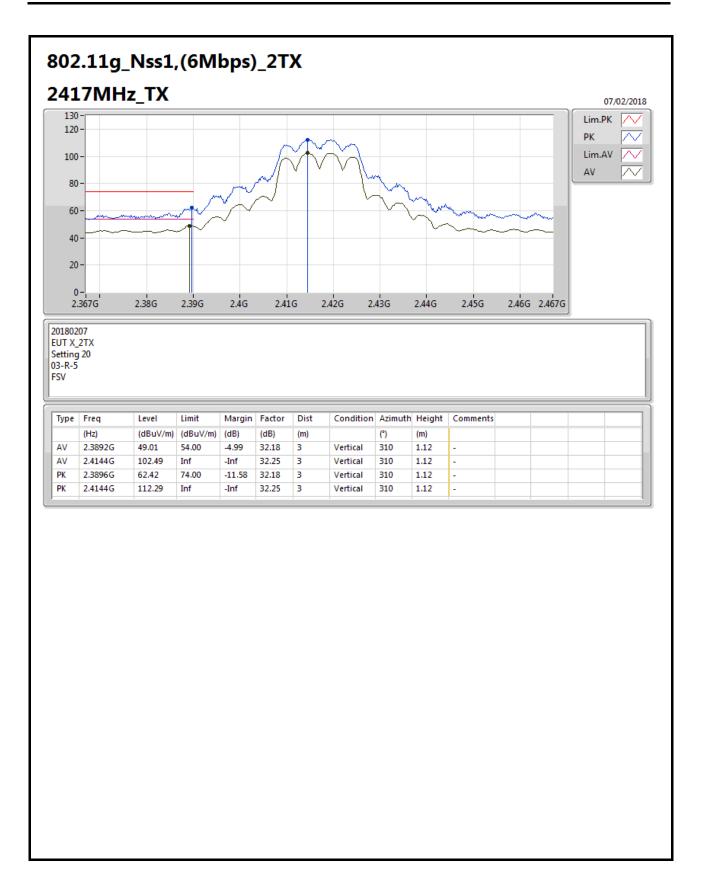
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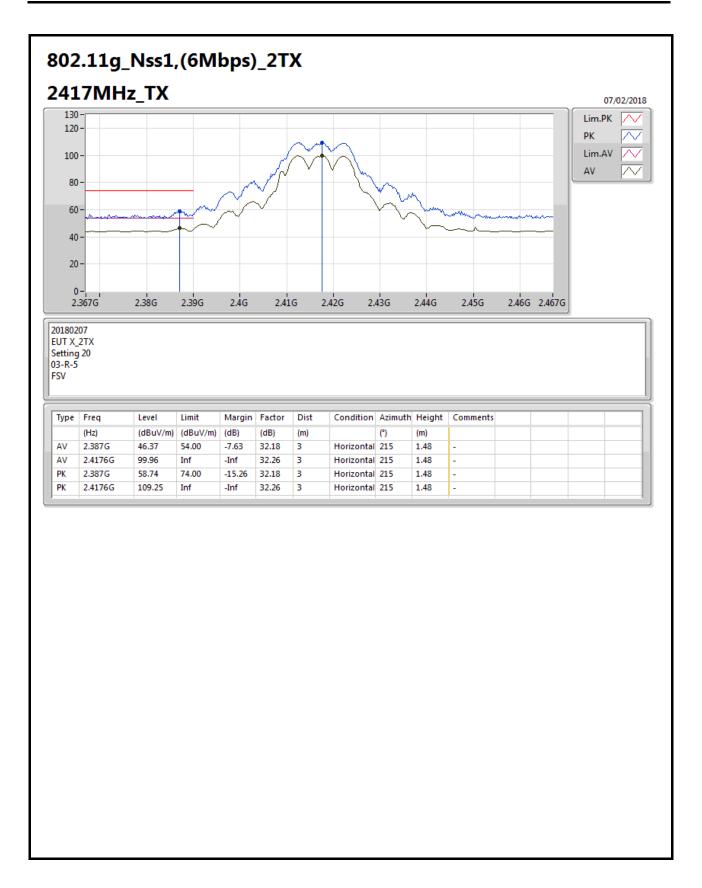
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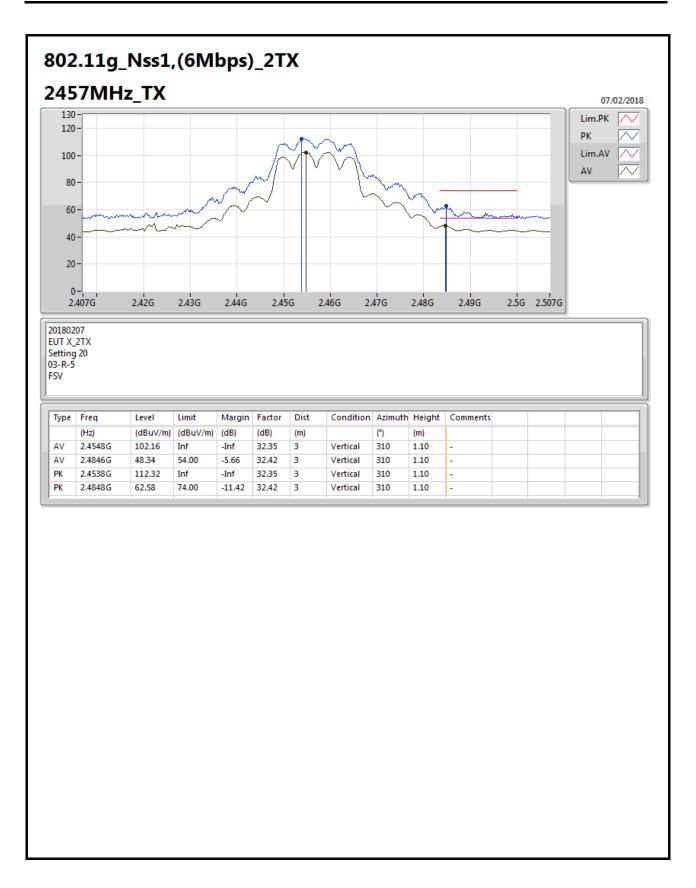
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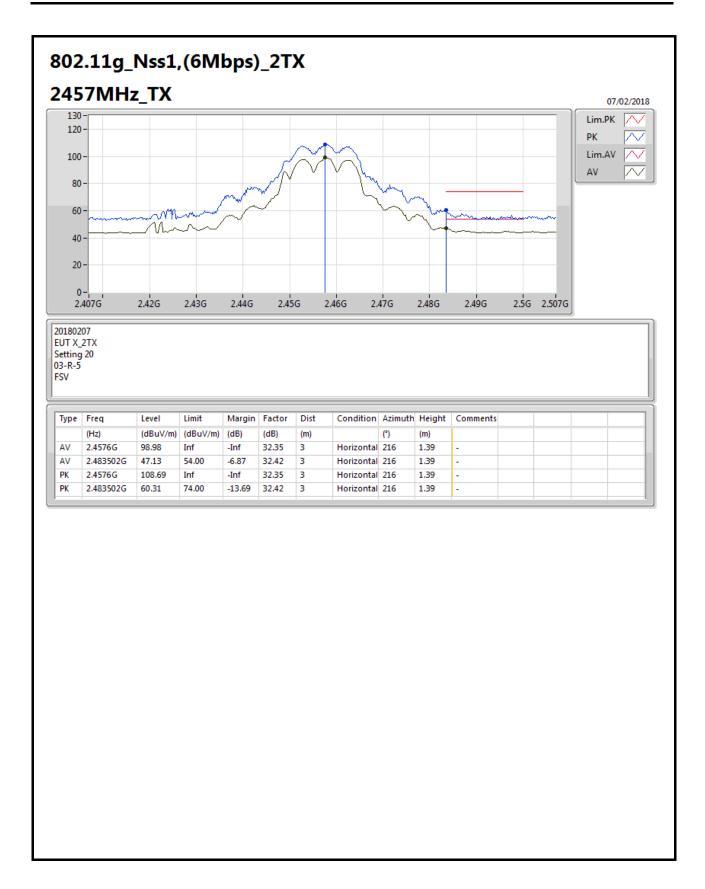
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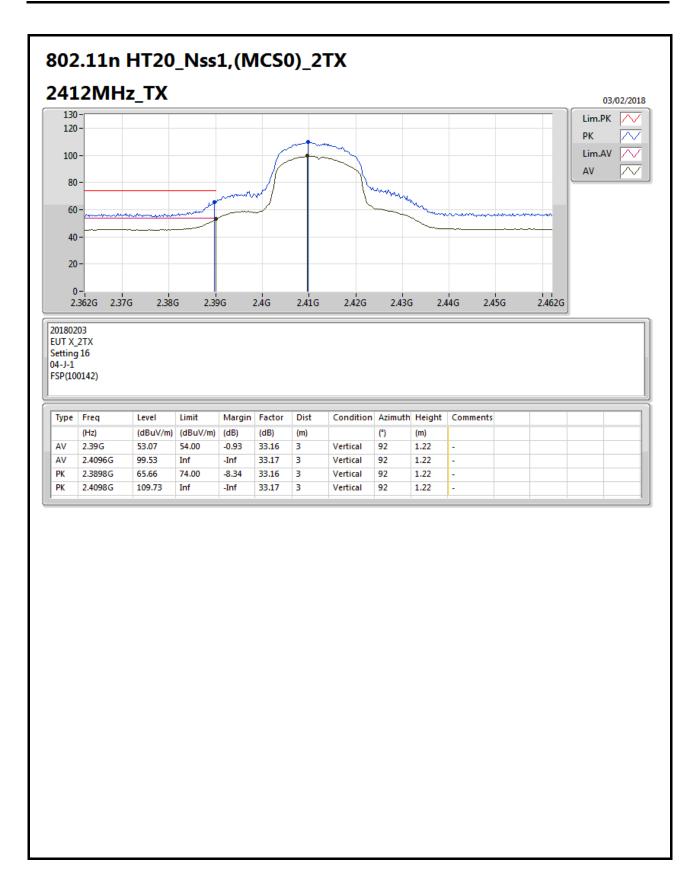
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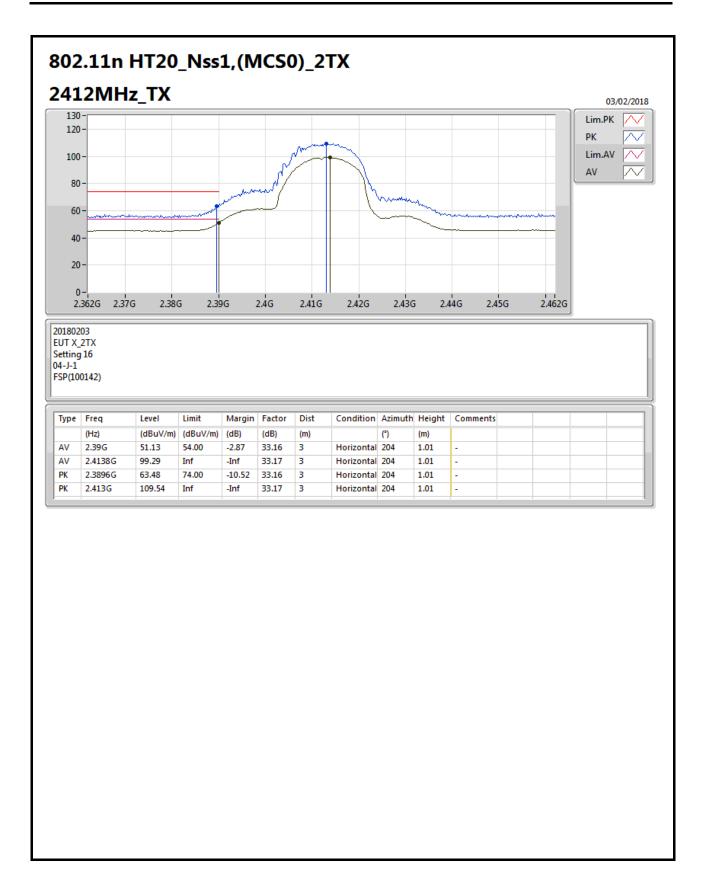
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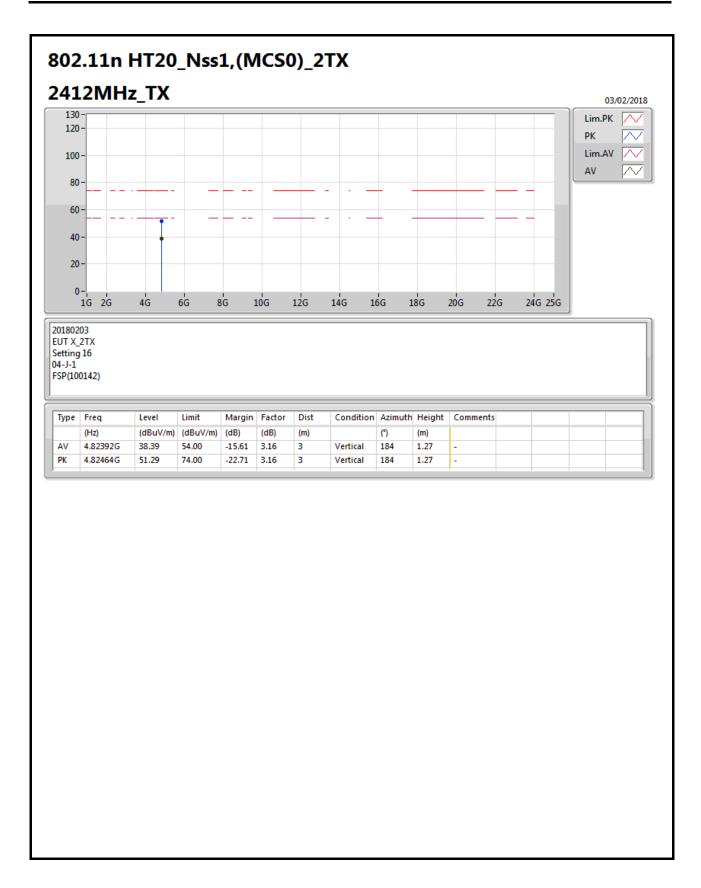
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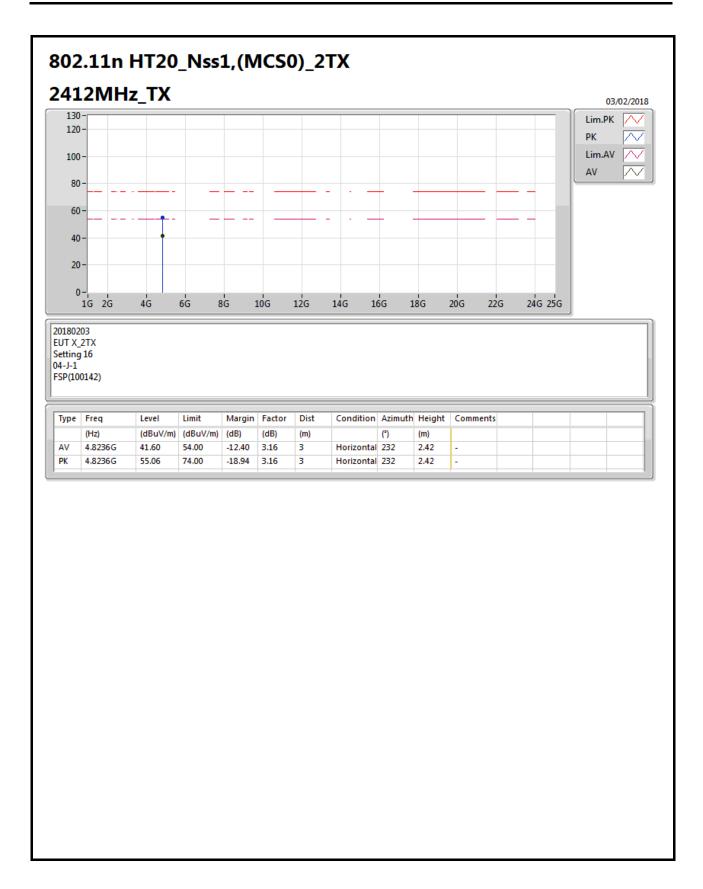
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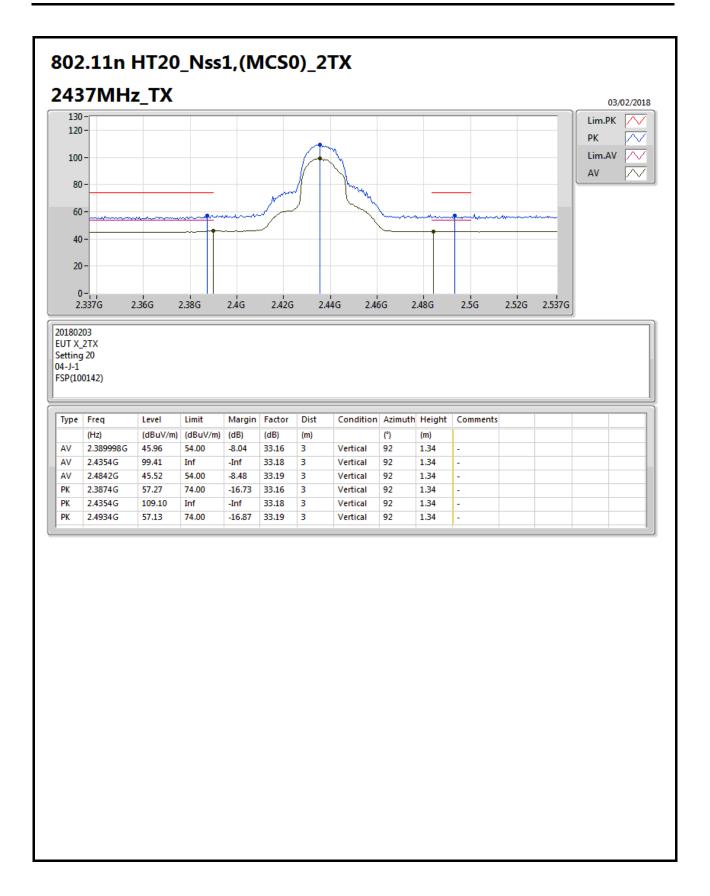
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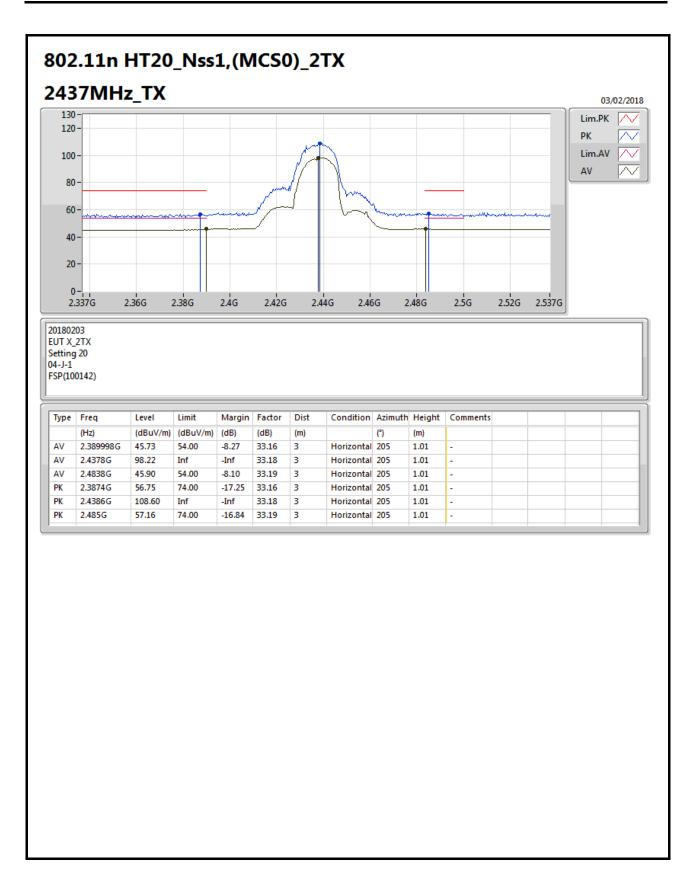
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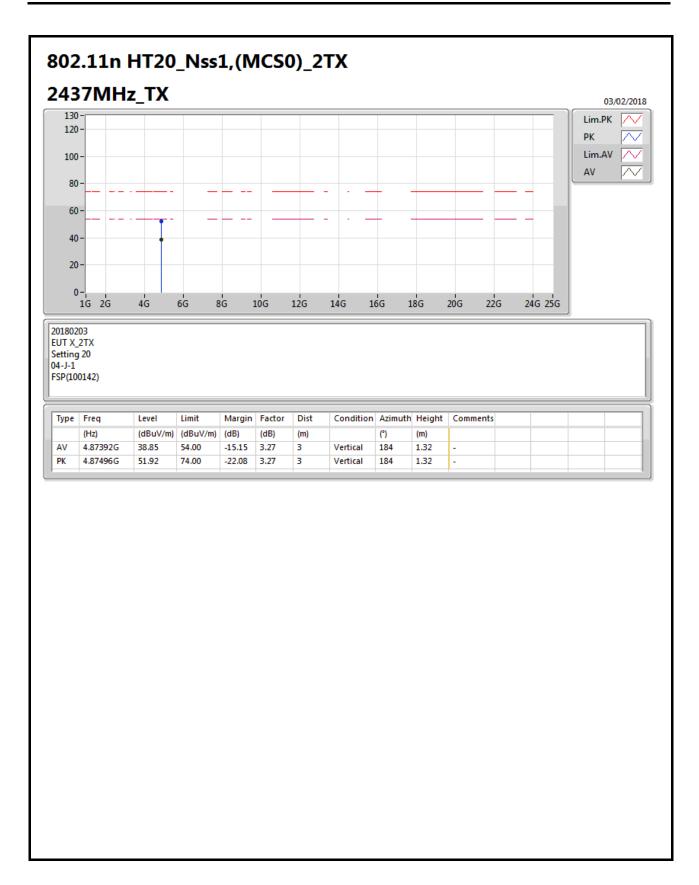
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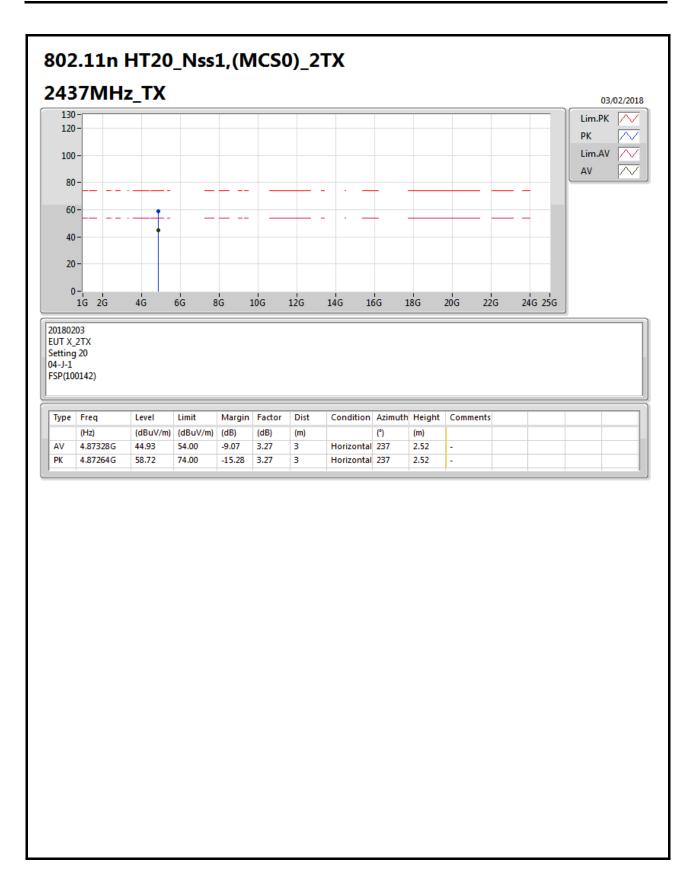
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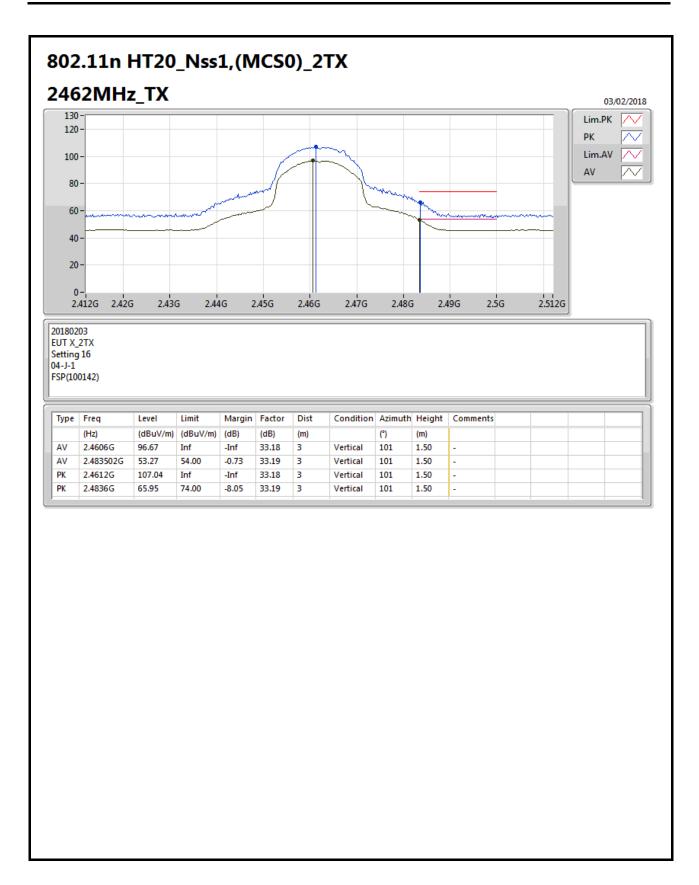
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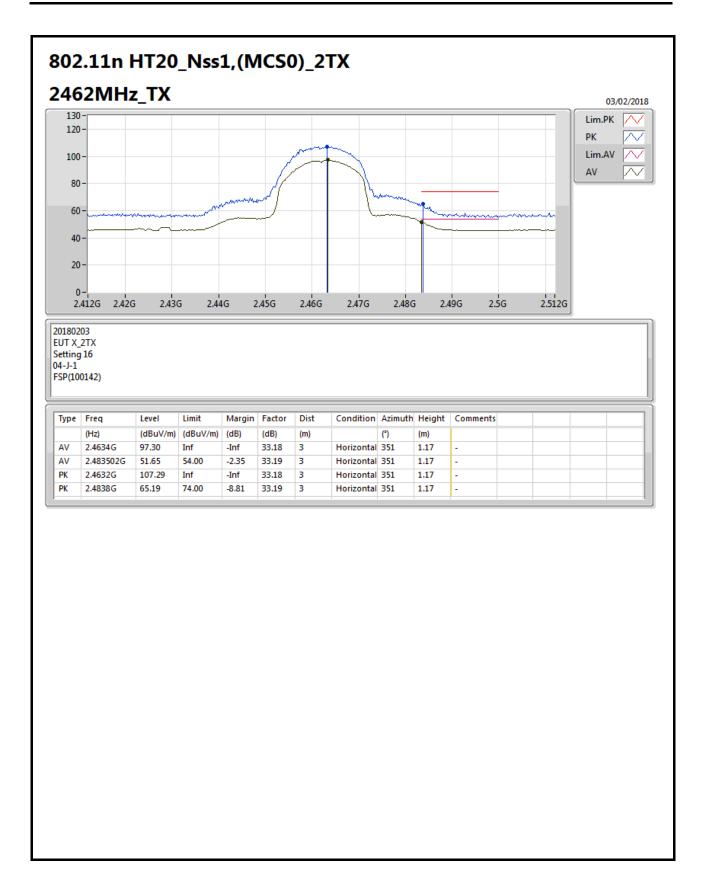
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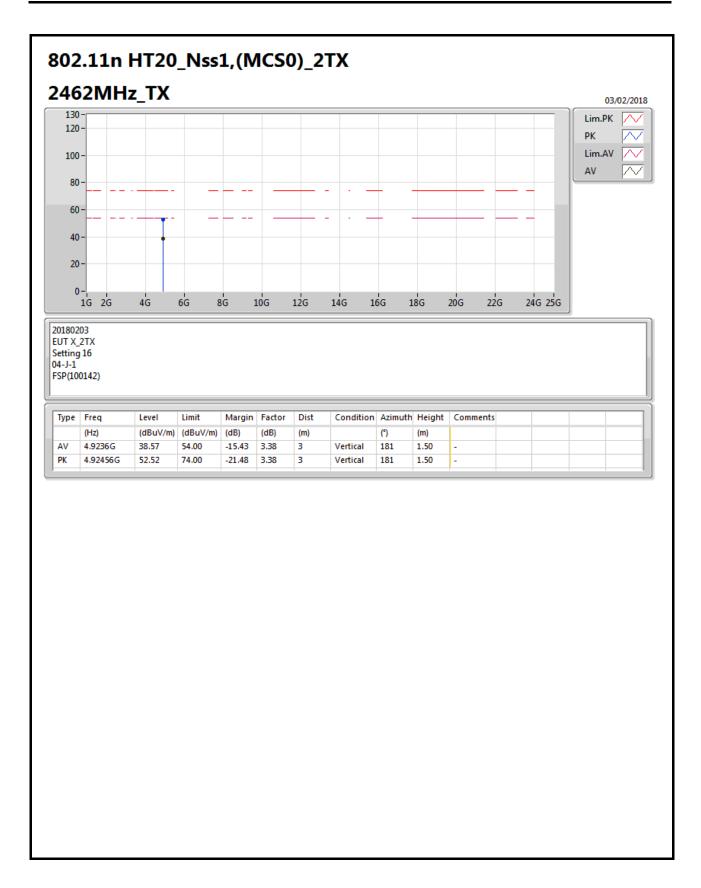
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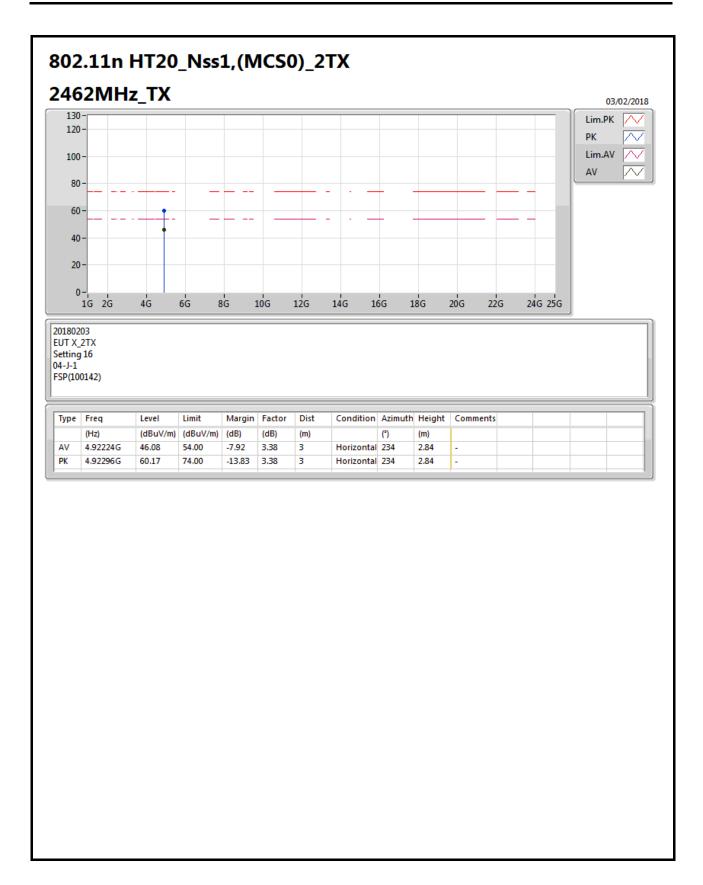
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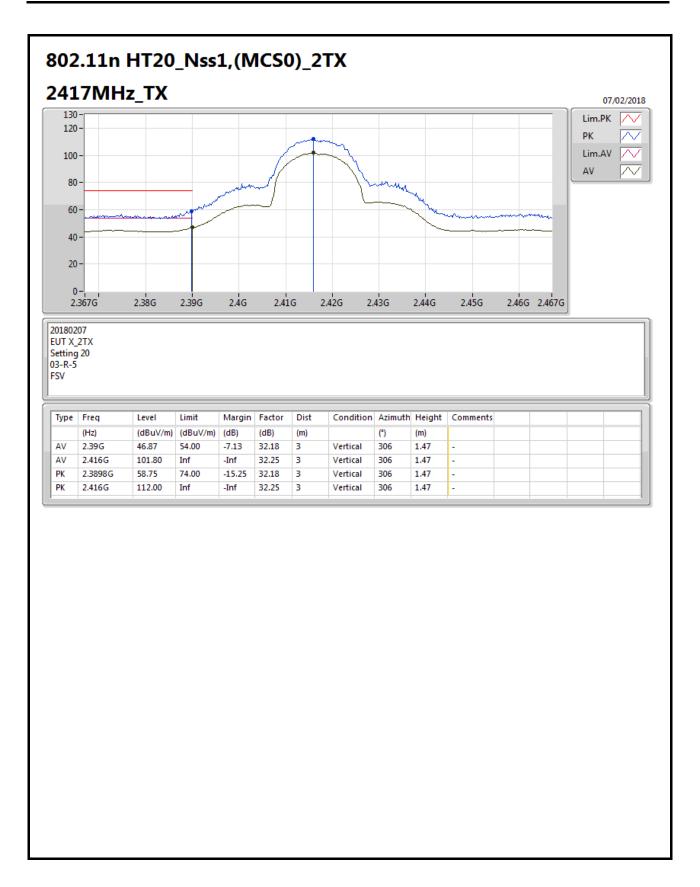
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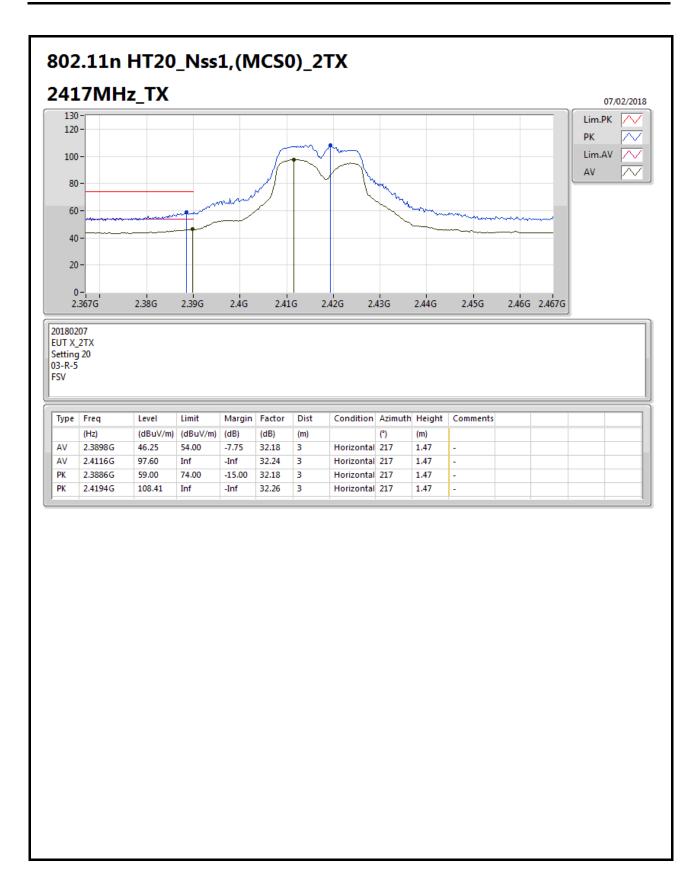
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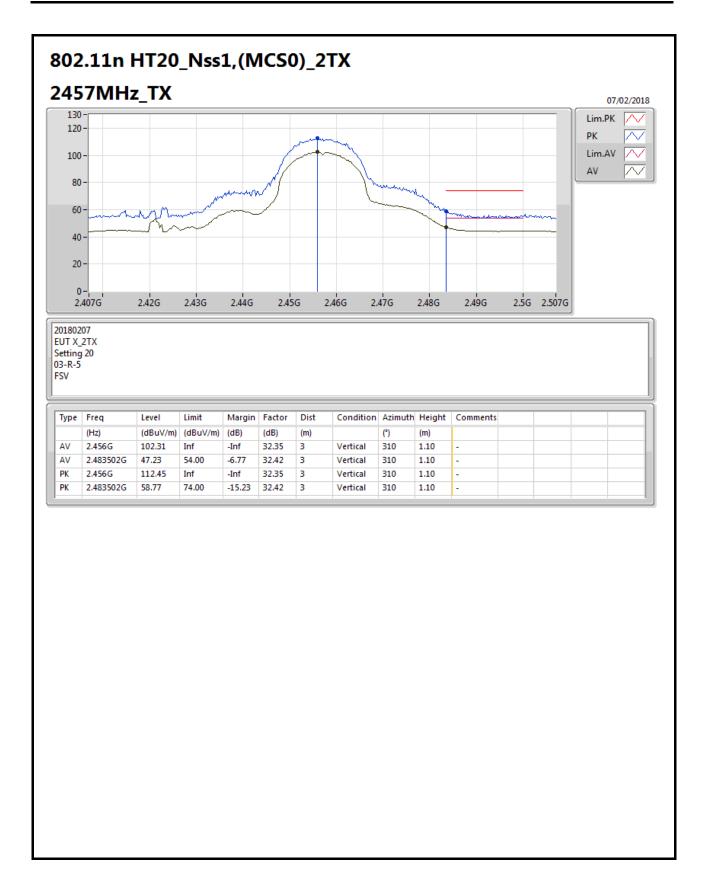
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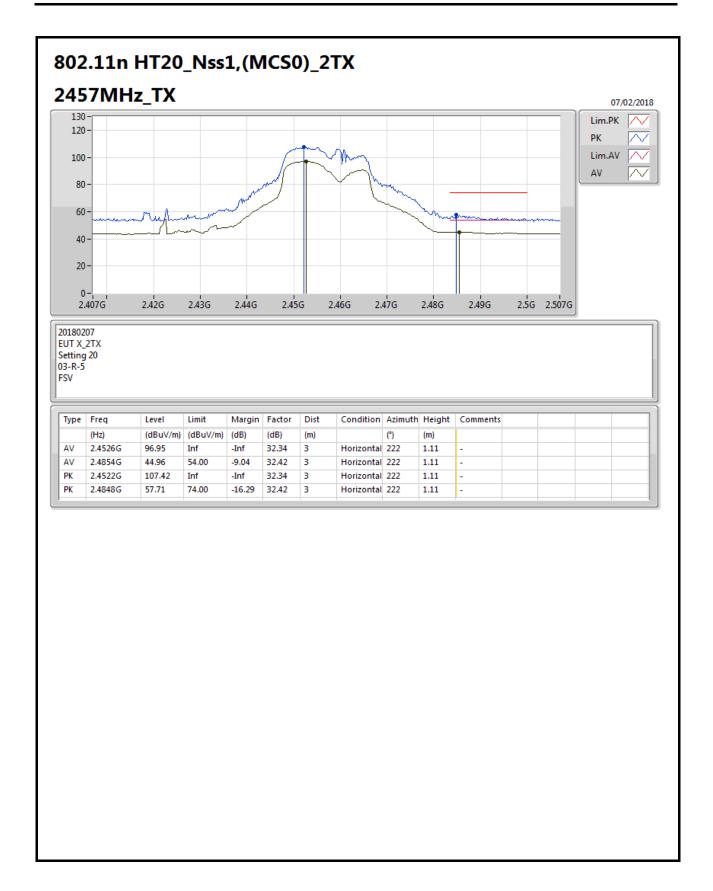
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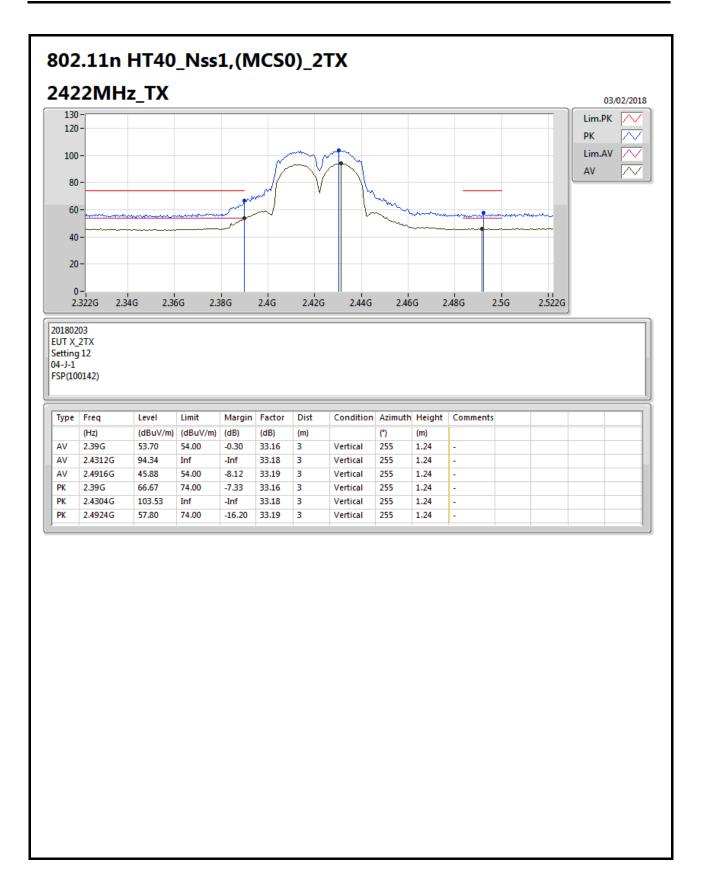
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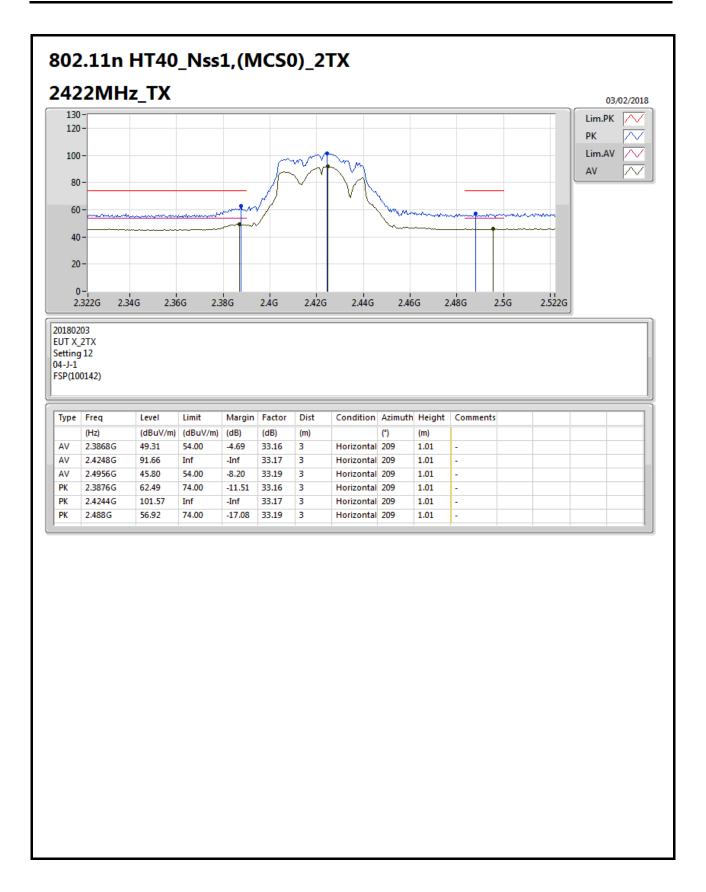
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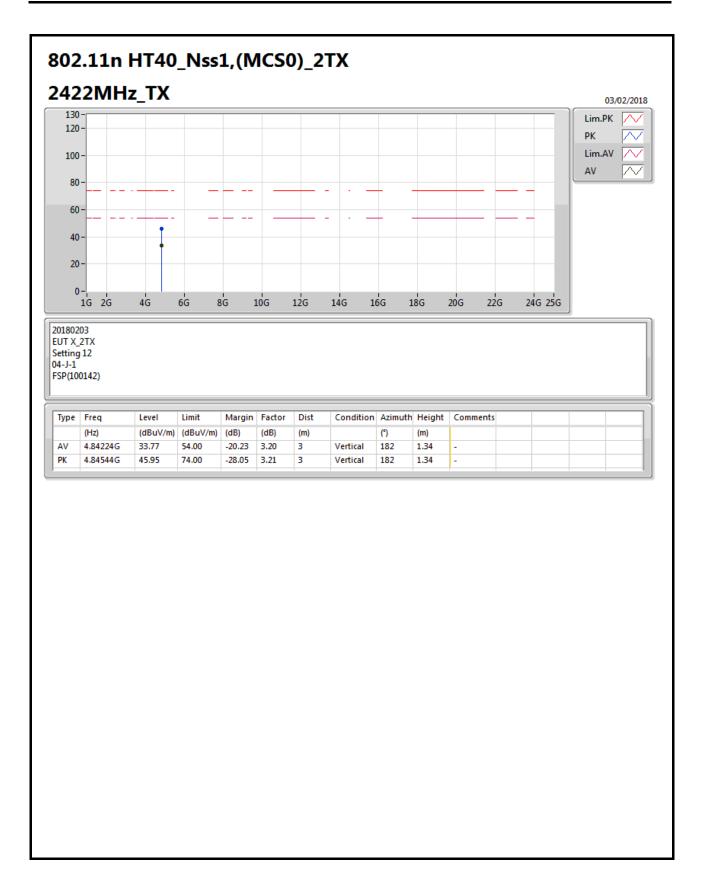
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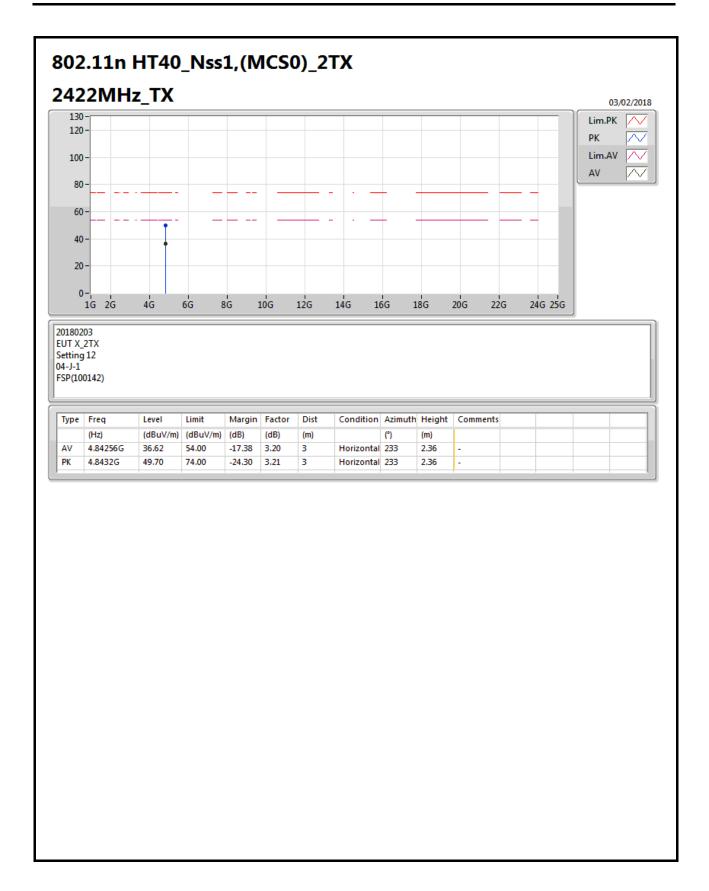
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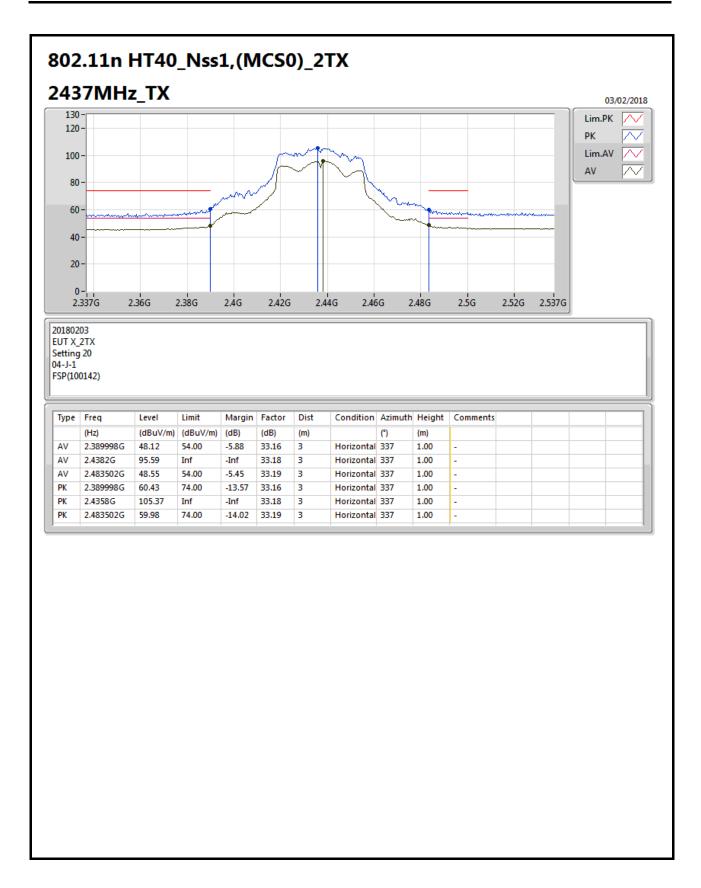
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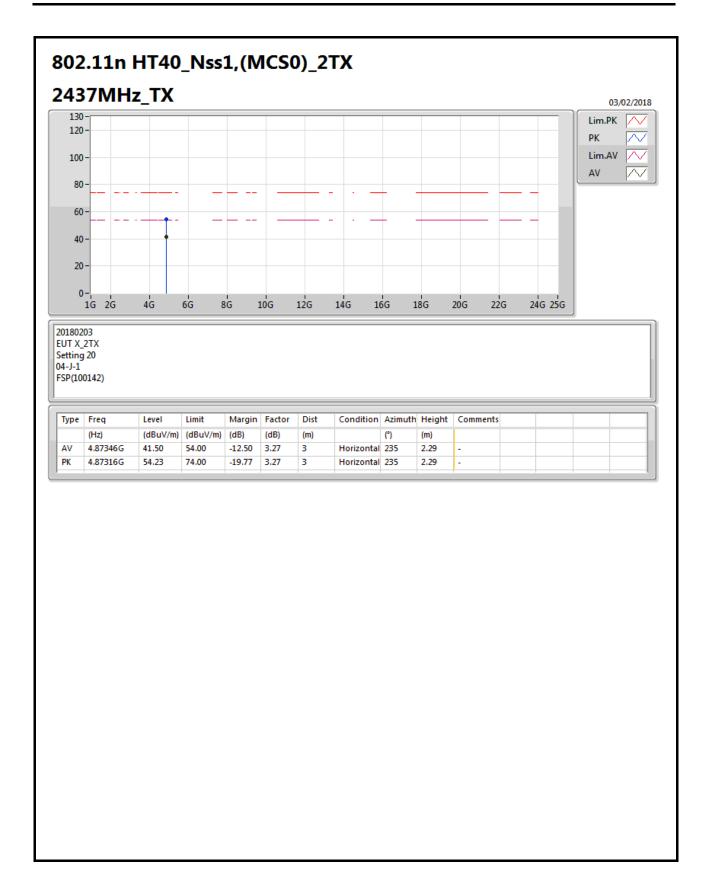
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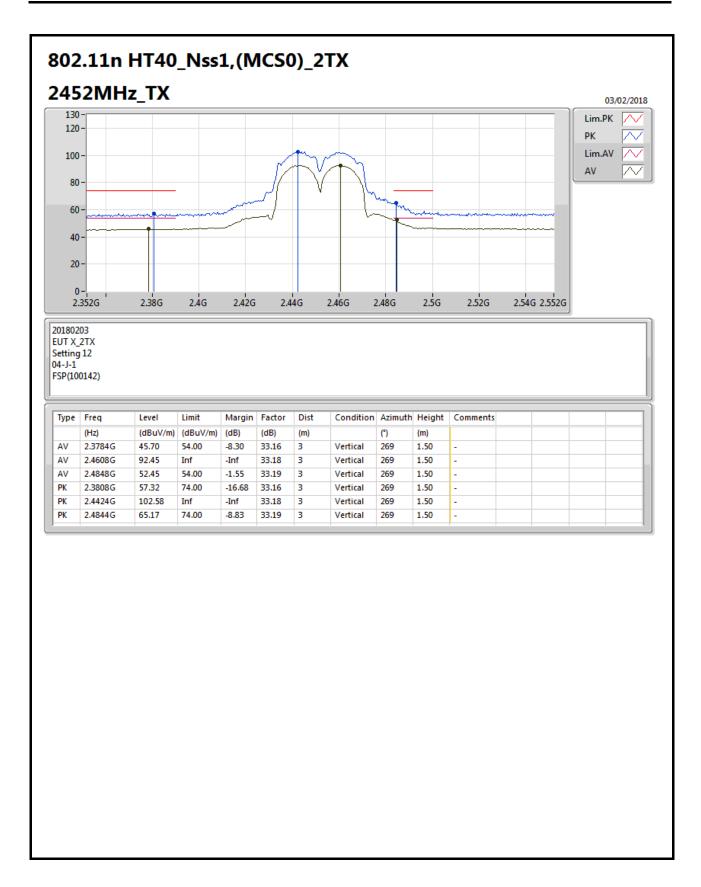
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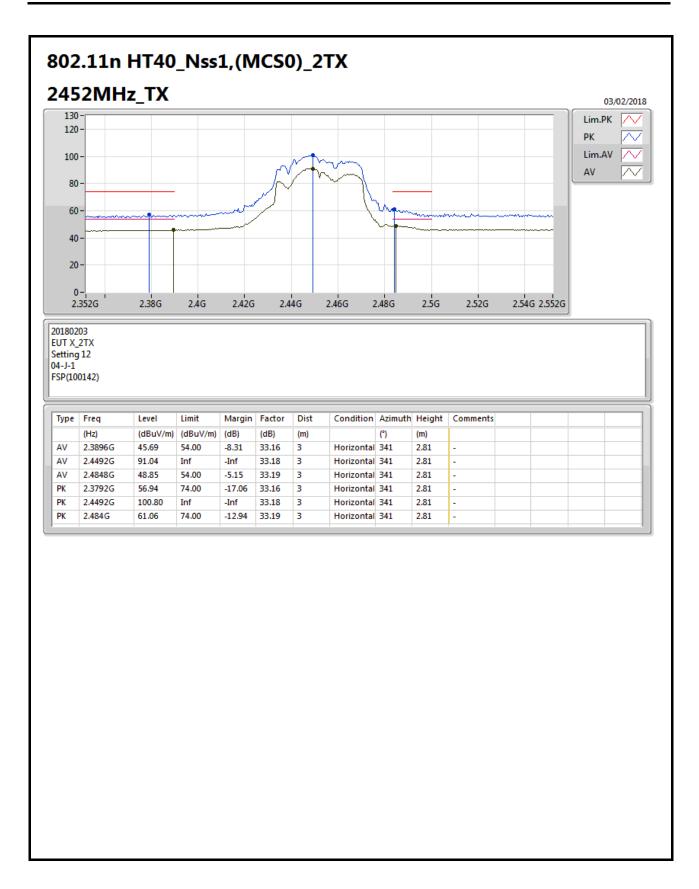
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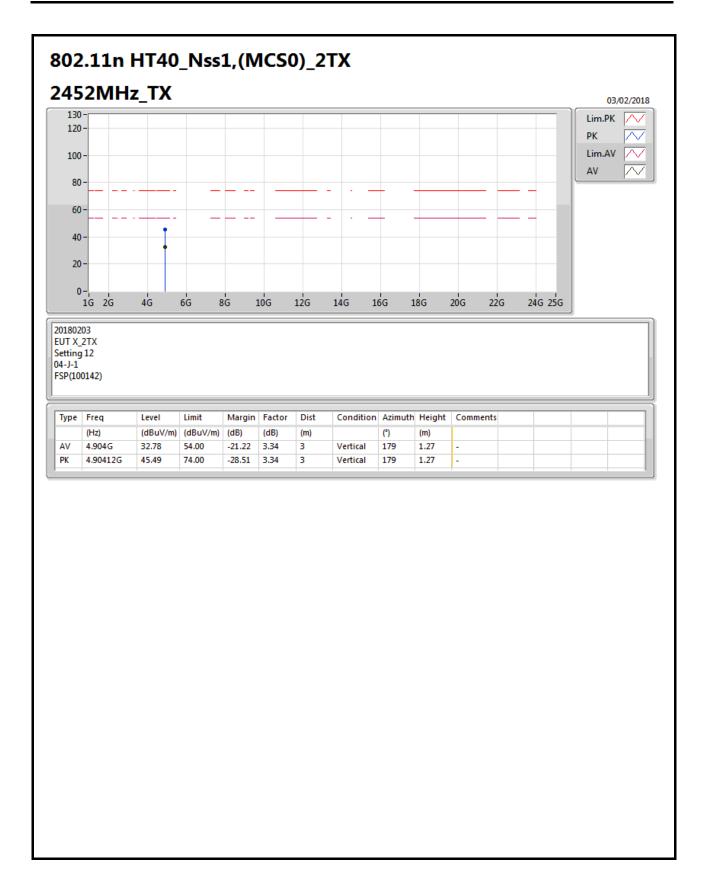
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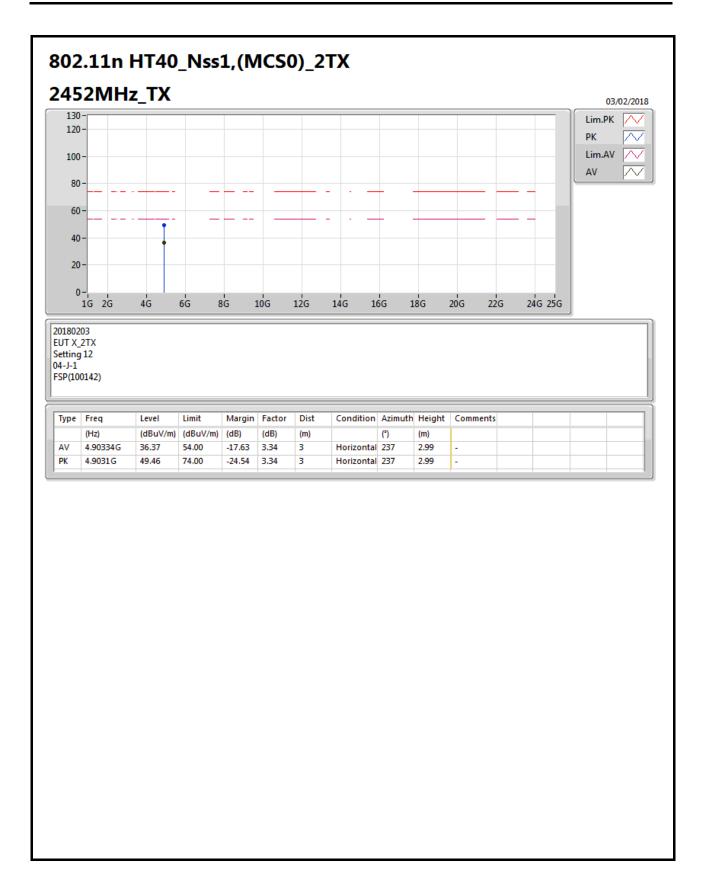
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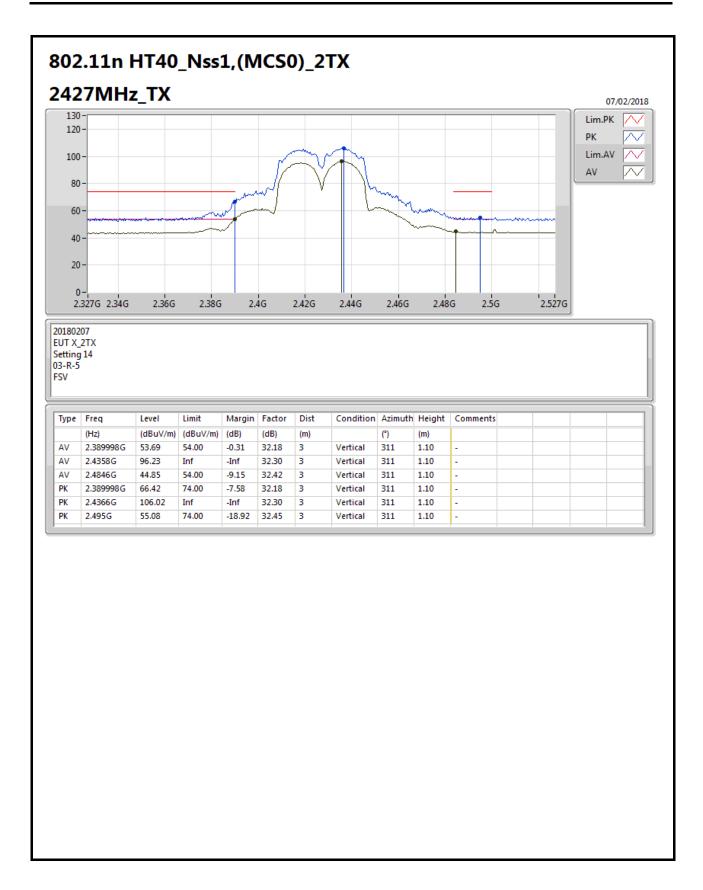
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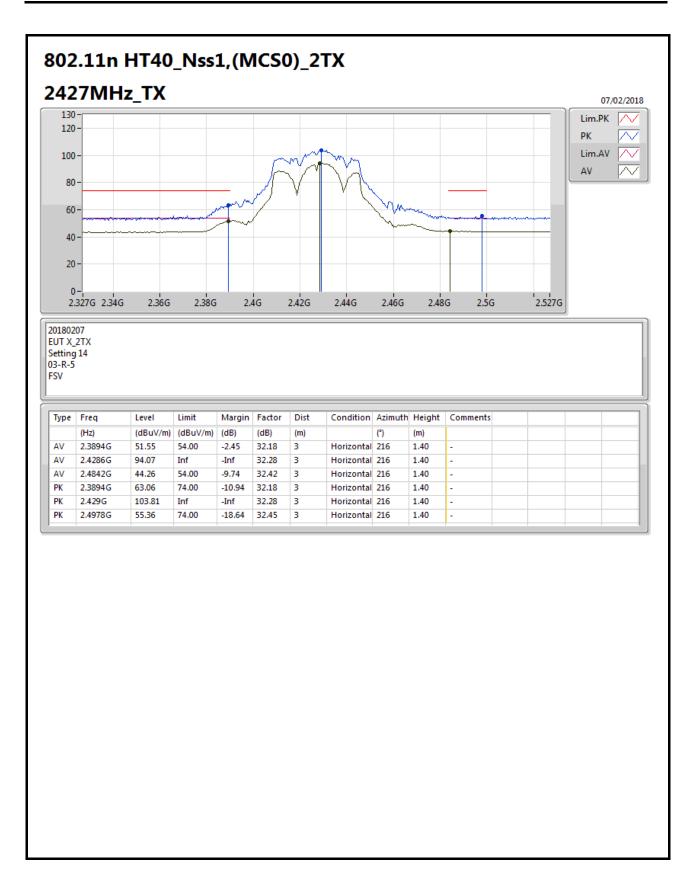
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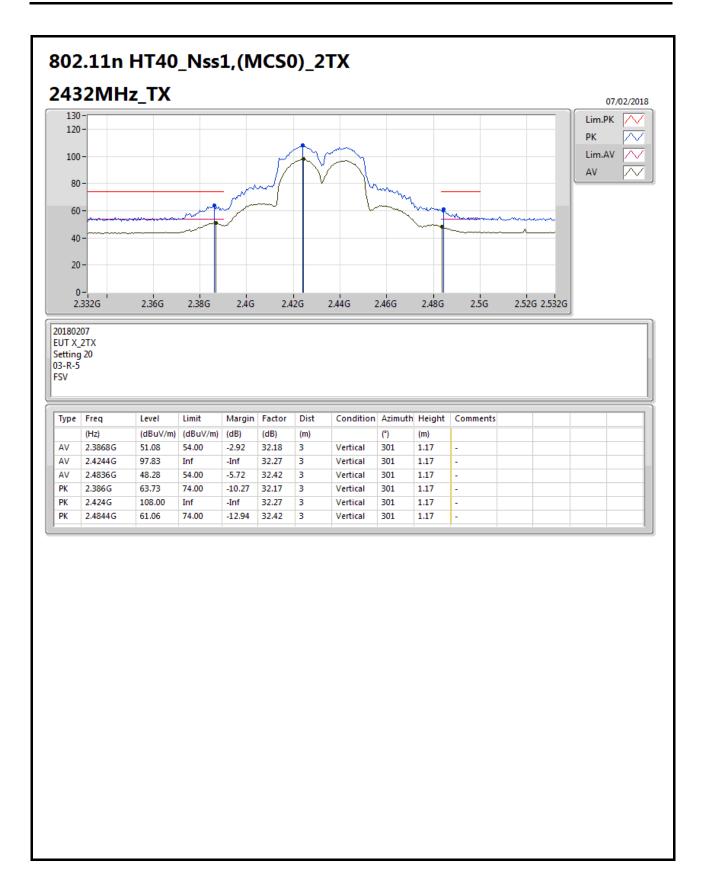
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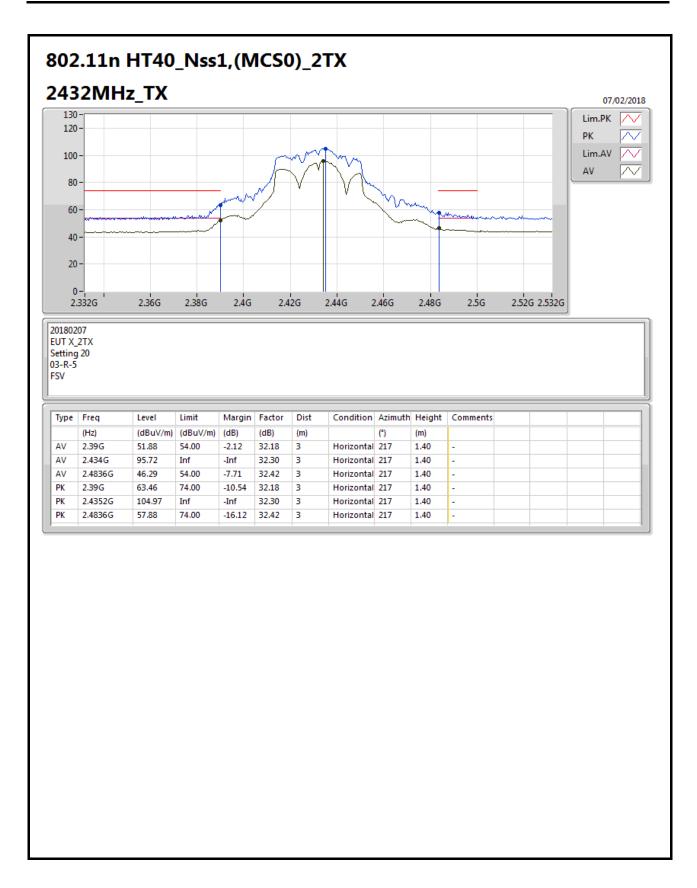
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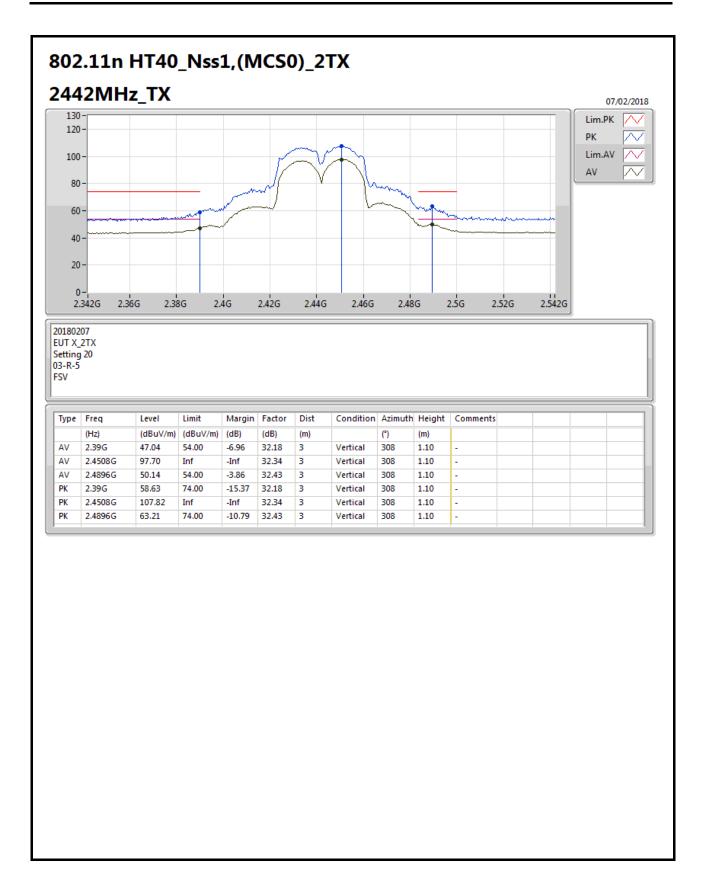
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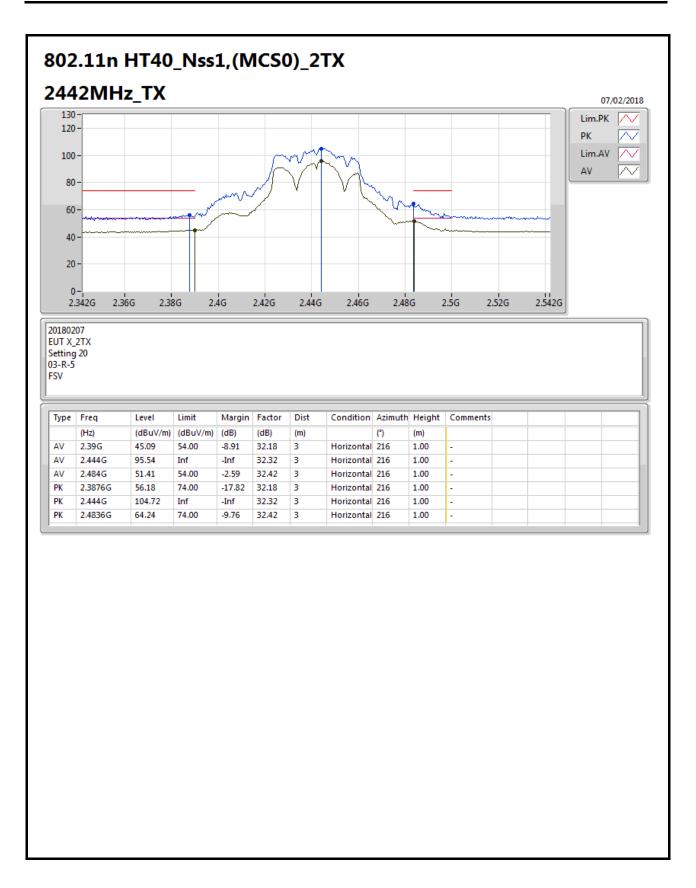
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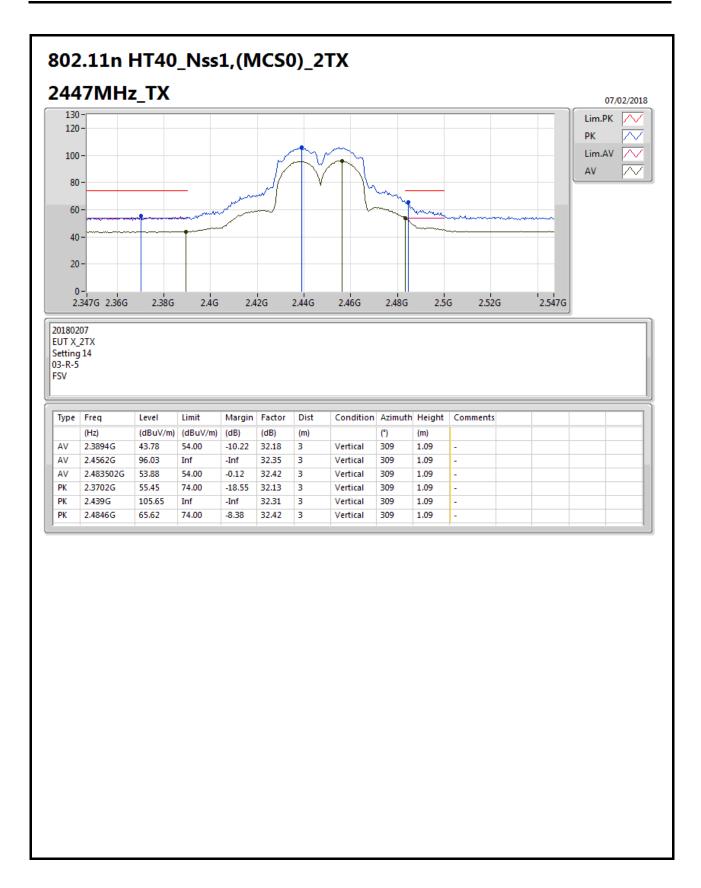
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