

Report No.: FR282322AA

RADIO TEST REPORT

FCC ID

: UDX-60072010

Equipment

: SMART Camera

Brand Name

: CISCO

Model Name

: MV93X-HW, MV93-HW

Applicant

: Cisco Systems, Inc.

170 West Tasman Drive, San Jose, CA 95134 USA

Manufacturer

: Cisco Systems, Inc.

170 West Tasman Drive, San Jose, CA 95134 USA

Standard

: 47 CFR FCC Part 15.247

The product was received on Aug. 25, 2022, and testing was started from Sep. 08, 2022 and completed on Oct. 11, 2022. We, Sporton International Inc. Hsinchu 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 test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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

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: Nov. 01, 2022

Report Version ; 01

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History of this test report

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| Report No. | Version | Description | Issued Date |
|------------|---------|-------------------------|---------------|
| FR282322AA | 01 | Initial issue of report | Nov. 01, 2022 |
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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 | - |

Declaration of Conformity:

- The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
- 2. The measurement uncertainty please refer to report "Measurement Uncertainty".

Comments and Explanations:

- 1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.
- 2. 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: Vicky Huang

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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), VHT20 | 2412-2462 | 1-11 [11] |
| 2400-2483.5 | n (HT40), VHT40 | 2422-2452 | 3-9 [7] |

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| Band | Mode | BWch (MHz) | Nant |
|---------------|--------------|------------|------|
| 2.4-2.4835GHz | 802.11b | 20 | 1TX |
| 2.4-2.4835GHz | 802.11g | 20 | 1TX |
| 2.4-2.4835GHz | 802.11n HT20 | 20 | 1TX |
| 2.4-2.4835GHz | VHT20 | 20 | 1TX |
| 2.4-2.4835GHz | 802.11n HT40 | 40 | 1TX |
| 2.4-2.4835GHz | VHT40 | 40 | 1TX |

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 modulation.
- BWch is the nominal channel bandwidth.

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1.1.2 Antenna Information

| Ant. | | Port | | Brand | Model Name | Antenna Type | Connector | Coin (dBi) |
|------|--------|------|-----------|---------|------------|--------------|-----------|-------------|
| Ant. | 2.4GHz | 5GHz | Bluetooth | Diailu | Model Name | Antenna Type | Connector | Gaiii (GBI) |
| 1 | 1 | 1 | - | Sercomm | 617211LR | PIFA Antenna | I-PEX | Note |
| 2 | 2 | 2 | 1 | Sercomm | 617211LQ | PIFA Antenna | I-PEX | Note |

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| | | Antenna Gain (dBi) | | | | | | |
|------|-------------|---------------------|----------------------|----------------------|---------------------|-----------|--|--|
| Ant. | WLAN 2.4GHz | WLAN 5GHz UNII 1 | WLAN 5GHz UNII 2A | WLAN 5GHz UNII 2C | WLAN 5GHz UNII 3 | Bluetooth | | |
| 1 | 6.49 | 6.34 | 6.34 | 6.23 | 5.13 | - | | |
| 2 | 2.86 | 5.26 | 5.26 | 5.58 | 5.05 | 2.86 | | |

Note: The above information was declared by manufacturer.

For 2.4GHz function:

For IEEE 802.11b/g/n/VHT mode (1TX/1RX):

The EUT supports the antenna with TX/RX diversity function.

Both Port 1 and Port 2 can be used as transmitting/receiving antennas, but only one of them is used as transmitting/receiving antenna.

The Port 1 generated the worst case, so it was selected to test and record in the report.

For 5GHz function:

For IEEE 802.11a/n/ac mode (1TX/1RX)

The EUT supports the antenna with TX/RX diversity function.

Both Port 1 and Port 2 can be used as transmitting/receiving antennas, but only one of them is used as transmitting/receiving antenna

The Port 1 generated the worst case, so it was selected to test and record in the report.

For Bluetooth function

For Bluetooth mode (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

1.1.3 Mode Test Duty Cycle

| Mode | DC | DCF(dB) | T(s) | VBW(Hz) ≥ 1/T |
|---------|-------|---------|----------------|----------------|
| 802.11b | 0.991 | 0.04 | n/a (DC>=0.98) | n/a (DC>=0.98) |
| 802.11g | 0.983 | 0.07 | n/a (DC>=0.98) | n/a (DC>=0.98) |
| VHT20 | 0.981 | 0.08 | n/a (DC>=0.98) | n/a (DC>=0.98) |
| VHT40 | 0.949 | 0.23 | 940u | 3k |

Note:

DC is Duty Cycle.

DCF is Duty Cycle Factor.

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1.1.4 EUT Operational Condition

| EUT Power Type | From PoE | | | | |
|-----------------------|----------------|---------------------|-------------|---------------------|--|
| Beamforming Function | | With beamforming | \boxtimes | Without beamforming | |
| Function | \boxtimes | Point-to-multipoint | | Point-to-point | |
| Test Software Version | QRCT V4.0.72.1 | | | | |

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Note: The above information was declared by manufacturer.

1.1.5 Table for Multiple Listing

The EUT has two model names which are identical to each other in all aspects except for the following table

| EUT | Model Name | Memory | |
|-----|------------|-------------|--|
| 1 | MV93X-HW | /93X-HW 1TB | |
| 2 | MV93-HW | 256GB | |

Note 1: From the above, EUT 1 has selected to execute all test items and EUT 2 has selected to execute the Emissions in Restricted Frequency Bands Below 1GHz tests.

Note 2: The above information was declared by manufacturer.

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1.2 Applicable 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 15.247
- ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 558074 D01 v05r02
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information

Test Lab.: Sporton International Inc. Hsinchu Laboratory

Hsinchu ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

(TAF: 3787) TEL: 886-3-656-9065 FAX: 886-3-656-9085

Test site Designation No. TW3787 with FCC.

Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

| Test Condition | Test Site No. | Test Engineer | Test Environment (°C / %) | Test Date |
|--------------------------|---------------|---------------|------------------------------|---------------------------------|
| RF Conducted | TH02-CB | Jay Lo | 23.9~24.2 / 58-65 | Sep. 15, 2022 |
| Radiated (below 1GHz) | 03CH05-CB | Simmon Cheng | 24.4-25.5 / 55-58 | Sep. 15, 2022~ Sep. 29, 2022 |
| Radiated (above 1GHz) | 03CH02-CB | Simmon Cheng | 23.8-24.9 / 55-58 | Sep. 08, 2022~ Sep. 15, 2022 |
| Radiated (co-location) | 03CH05-CB | Simmon Cheng | 24.4-25.5 / 55-58 | Oct. 11, 2022 |
| AC Conduction | CO01-CB | Elvin Yeh | 23~24 / 56~57 | Sep. 21, 2022 |

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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

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level (based on a coverage factor (k=2)

| Test Items | Uncertainty | Remark |
|--------------------------------------|-------------|--------------------------|
| Conducted Emission (150kHz ~ 30MHz) | 3.4 dB | Confidence levels of 95% |
| Radiated Emission (9kHz ~ 30MHz) | 3.4 dB | Confidence levels of 95% |
| Radiated Emission (30MHz ~ 1,000MHz) | 5.6 dB | Confidence levels of 95% |
| Radiated Emission (1GHz ~ 18GHz) | 5.2 dB | Confidence levels of 95% |
| Radiated Emission (18GHz ~ 40GHz) | 4.7 dB | Confidence levels of 95% |
| Conducted Emission | 3.2 dB | Confidence levels of 95% |
| Output Power Measurement | 0.8 dB | Confidence levels of 95% |
| Power Density Measurement | 3.2 dB | Confidence levels of 95% |
| Bandwidth Measurement | 2% | 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)_1TX | - |
| 2412MHz | 21 |
| 2437MHz | 21 |
| 2462MHz | 23 |
| 802.11g_Nss1,(6Mbps)_1TX | - |
| 2412MHz | 21 |
| 2417MHz | 22 |
| 2437MHz | 24.5 |
| 2457MHz | 22 |
| 2462MHz | 20 |
| VHT20_Nss1,(MCS0)_1TX | - |
| 2412MHz | 21 |
| 2417MHz | 24 |
| 2437MHz | 24.5 |
| 2457MHz | 22 |
| 2462MHz | 19.5 |
| VHT40_Nss1,(MCS0)_1TX | - |
| 2422MHz | 20.5 |
| 2437MHz | 20 |
| 2447MHz | 18 |
| 2452MHz | 16.5 |

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Note:

• Evaluated VHT20/VHT40 mode only, due to similar modulation. The power setting of HT20/HT40 mode are the same or lower than VHT20/VHT40.

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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 Test Voltage: 120Vac / 60Hz | | |
| Operating Mode | Normal Link | | |
| 1 | EUT 1+LAN mode-Day mode+Bluetooth+PoE 1 | | |
| 2 | EUT 1+LAN mode-Night mode+Bluetooth+PoE 1 | | |
| | Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 ~ 6 will follow this same test mode. | | |
| 3 | EUT 1+WLAN 2.4GHz mode-Day mode+Bluetooth+PoE 1 | | |
| 4 | EUT 1+WLAN 2.4GHz mode-Day mode+Bluetooth+PoE 2 | | |
| 5 | EUT 1+WLAN 5GHz mode-Day mode+Bluetooth+PoE 1 | | |
| 6 | EUT 1+WLAN 5GHz mode-Day mode+Bluetooth+PoE 2 | | |
| For operating mode 1 is the worst case and it was record in this test report. | | | |

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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 I regardless of spatial multiplexing MIMO configuration), the radiated test should performed with highest antenna gain of each antenna type. | | | | |
| Operating Mode < 1GHz | Normal Link | | | |
| 1 | EUT 1 at Z-axis +LAN mode-Day mode+Bluetooth+PoE 1 | | | |
| 2 | EUT 1 at Y-axis +LAN mode-Day mode+Bluetooth+PoE 1 | | | |
| 3 | EUT 1 at X-axis +LAN mode-Day mode+Bluetooth+PoE 1 | | | |
| Mode 1 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4 will follow this same test mode. | | | | |
| 4 | EUT 1 at Z-axis +LAN mode- Night mode+Bluetooth+PoE 1 | | | |
| Mode 4 has been evaluated to be the worst case among Mode 1~4, thus measurement for Mode 5 ~ 8 will follow this same test mode. | | | | |

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| EUT 1 at Z-axis +WLAN 2.4GHz mode-Night mode+Bluetooth+PoE 1 | | | |
|--|--|--|--|
| EUT 1 at Z-axis +WLAN 2.4GHz mode-Night mode+Bluetooth+PoE 2 | | | |
| EUT 1 at Z-axis +WLAN 5GHz mode-Night mode+Bluetooth+PoE 1 | | | |
| EUT 1 at Z-axis +WLAN 5GHz mode-Night mode+Bluetooth+PoE 2 | | | |
| Mode 4 has been evaluated to be the worst case among Mode 1~8, thus measurement for Mode 9 will follow this same test mode. | | | |
| EUT 2 at Z-axis +LAN mode-Night mode+Bluetooth+PoE 1 | | | |
| For operating mode 4 is the worst case and it was record in this test report. | | | |
| Operating Mode > 1GHz CTX | | | |
| The EUT was performed at X axis, Y axis and Z axis position. The worst case was found at Z axis for bandedge, Y axis for harmonic, so it was selected to perform test and its test result was written in the report. | | | |
| 1 EUT 1 in Z axis for bandedge / EUT 1 in Y axis for harmonic | | | |
| | | | |

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| · | | | | | |
|---|--|--|--|--|--|
| | The Worst Case Mode for Following Conformance Tests | | | | |
| Tests Item | Simultaneous Transmission Analysis - Radiated Emission Co-location | | | | |
| Test Condition | Test Condition Radiated measurement | | | | |
| Operating Mode | Operating Mode Normal Link | | | | |
| The EUT was performed at X axis, Y axis and Z axis position, and the worst case was found at Z axis. So the measurement will follow this same test configuration. | | | | | |
| 1 | 1 EUT 1 in Z axis-WLAN 2.4GHz+Bluetooth | | | | |
| 2 EUT 1 in Z axis-WLAN 5GHz+Bluetooth | | | | | |
| For operating mode 2 is the worst case and it was record in this test report. | | | | | |
| Refer to Appendix G for Radiated Emission Co-location. | | | | | |

| The Worst Case Mode for Following Conformance Tests | | | |
|--|--|--|--|
| Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation | | | |
| Operating Mode | | | |
| 1 EUT 1-WLAN 2.4GHz+Bluetooth | | | |
| 2 EUT 1-WLAN 5GHz+Bluetooth | | | |
| Refer to Sporton Test Report No.: FA282322 for Co-location RF Exposure Evaluation. | | | |

Note: The PoE are for measurement only, would not be marketed. PoEs information as below:

| Support Unit | Brand Name | Model Name |
|--------------|------------|--------------|
| PoE 1 | PHIHONG | POEA33U-1ATE |
| PoE 2 | Cisco | MA-PWR-MV-LV |

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2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

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For Normal Link Mode:

During the test, the EUT operation to normal function.

2.4 Accessories

Wall-mounted rack*4

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2.5 Support Equipment

For AC Conduction:

| | Support Equipment | | | | | |
|-----|--|---------|--------------|-----------|--|--|
| No. | No. Equipment Brand Name Model Name FCC ID | | | | | |
| Α | 1G LAN1 NB | DELL | E6430 | N/A | | |
| В | PoE 1 | PHIHONG | POEA33U-1ATE | N/A | | |
| С | iPhone 4 | Apple | A1332 | N/A | | |
| D | AP Router | ASUS | RP-N53 | MSQ-RPN53 | | |

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For Radiated (below 1GHz):

| Support Equipment | | | | | | |
|-------------------|--|---------|--------------|-------------|--|--|
| No. | No. Equipment Brand Name Model Name FCC ID | | | | | |
| Α | NB | Lenovo | L440 | N/A | | |
| В | WLAN AP | Netgear | R7500 | PY314300288 | | |
| С | Phone | SAMPO | HT-B 907WL | N/A | | |
| D | PoE 1 | PHIHONG | POEA33U-1ATE | N/A | | |

For Radiated (above 1GHz):

| Support Equipment | | | | | |
|-------------------|--|---------|--------------|-----|--|
| No. | No. Equipment Brand Name Model Name FCC ID | | | | |
| Α | NB | DELL | E4300 | N/A | |
| В | PoE 1 | PHIHONG | POEA33U-1ATE | N/A | |

For RF Conducted:

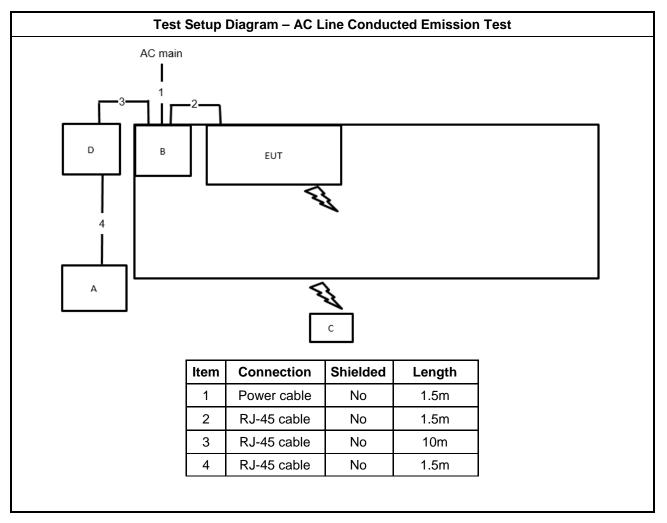
| Support Equipment | | | | | |
|-------------------|--|---------|--------------|-----|--|
| No. | No. Equipment Brand Name Model Name FCC ID | | | | |
| Α | NB | DELL | E4300 | N/A | |
| В | PoE 1 | PHIHONG | POEA33U-1ATE | N/A | |

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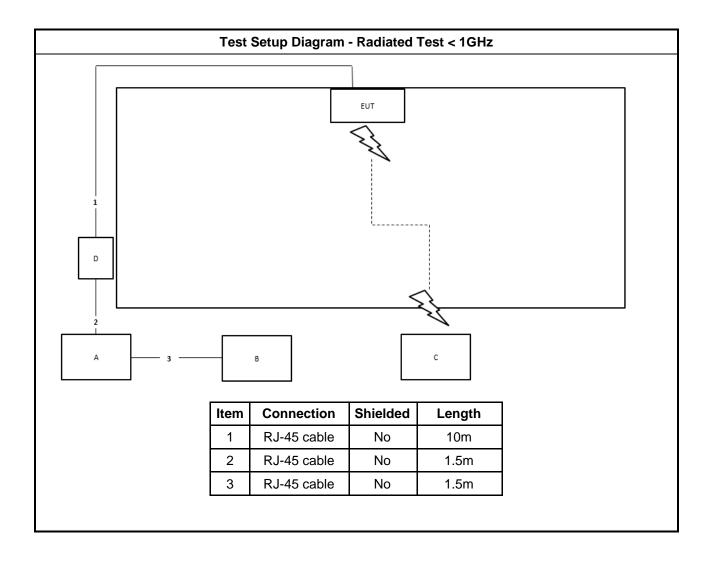


2.6 Test Setup Diagram



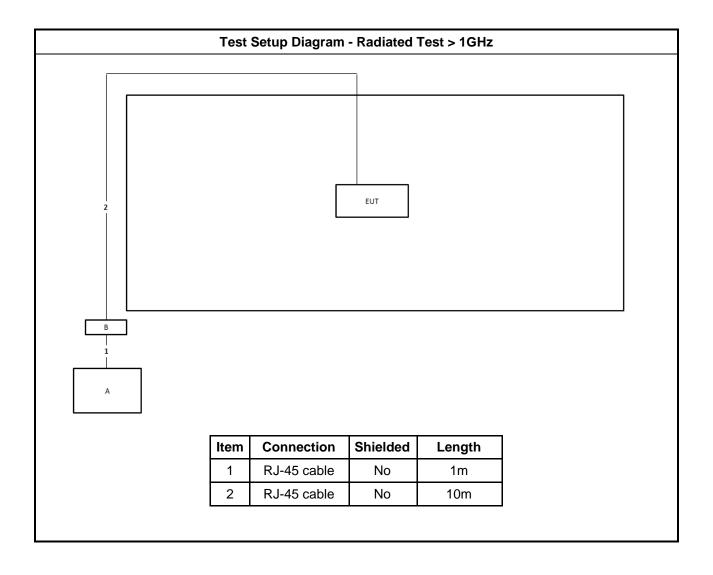
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3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

| AC Power-line Conducted Emissions Limit | | | | | | | |
|--|----|----|--|--|--|--|--|
| 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 the frequency. | | | | | | | |

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3.1.2 Measuring Instruments

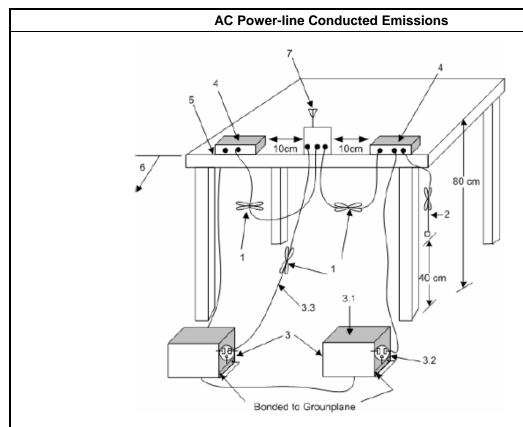
Refer a test equipment and calibration data table in this test report.

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 Measurement Results Calculation

The measured Level is calculated using:

- a. Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- b. Margin = -Limit + Level

3.1.6 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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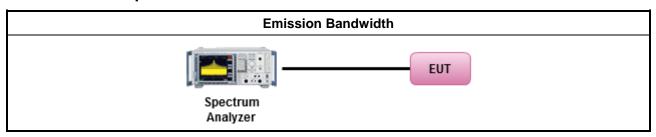
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

| | Test Method | | | | | | | |
|---|--|---|--|--|--|--|--|--|
| • | For the emission bandwidth shall be measured using one of the options below: | | | | | | | |
| | | 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. | | | | | | |

3.2.4 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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 P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, 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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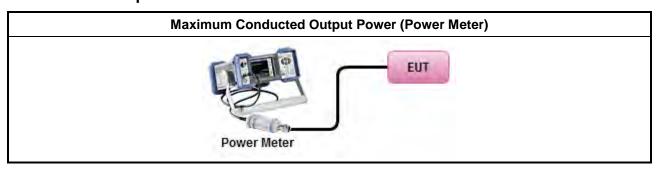
3.3.3 Test Procedures

| | | Test Method |
|---|-------|--|
| • | Max | mum 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). |
| • | Max | mum Conducted Output Power |
| | [duty | v 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-1A. (alternative) |
| | duty | 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-2A (alternative) |
| | | 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-3A (alternative) |
| | Mea | surement 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 an RF average power meter). |
| | | Refer as FCC KDB 558074, clause $8.3.2.3 \& C63.10$ clause $11.9.2.3.2$ 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: $P_{total} = P_1 + P_2 + \ldots + P_n \\ \text{(calculated in linear unit [mW] and transfer to log unit [dBm])} \\ \text{EIRP}_{total} = P_{total} + DG$ |

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3.3.4 Test Setup



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3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

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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

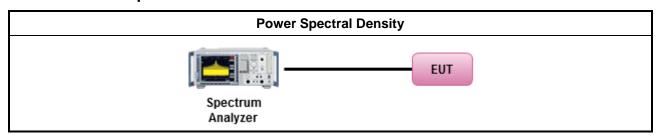
Refer a test equipment and calibration data table in this test report.

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 peak PSD procedure is also an acceptable option). | | | | | | | |
| | Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD. | | | | | | | |
| • | 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 66291 In-band power spectral density (PSD). Sample all transmit ports simultaneously using spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit possumming 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 use the amplitude (power) values for the different transmit chains and use this as the new data trace. | a ort ne ne up | | | | | | |
| | Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectrare 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 the 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, | ne en oe | | | | | | |
| | Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer a FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chain 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. | ns | | | | | | |

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3.4.4 Test Setup



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3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

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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 (dBc) | | | | | |
| 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.

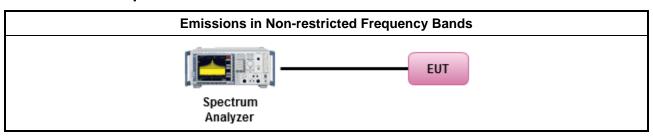
3.5.2 Measuring Instruments

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 8.5 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

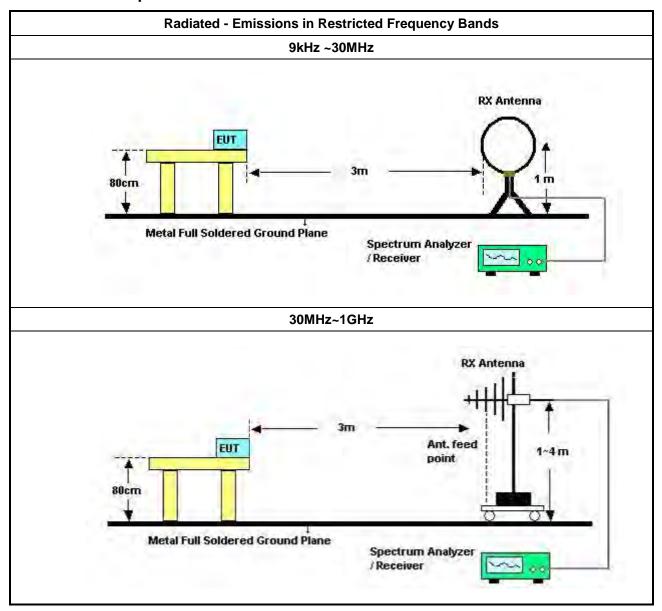
| | | Test Method | | | | | |
|---|---|--|--|--|--|--|--|
| • | The | average emission levels shall be measured in [duty cycle ≥ 98 or duty factor]. | | | | | |
| • | Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel 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 duty 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 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 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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3.6.4 Test Setup



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3.6.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

Spectrum Analyzer

3.6.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

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 10th harmonic or 40 GHz, whichever is appropriate.

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

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4 Test Equipment and Calibration Data

| Instrument | Brand | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|--------------------------------------|---------------|-----------------------|---------------------|--------------------|---------------------|-------------------------|--------------------------|
| EMI Receiver | Agilent | N9038A | My52260123 | 9kHz ~ 8.4GHz | Feb. 22, 2022 | Feb. 21, 2023 | Conduction (CO01-CB) |
| LISN | F.C.C. | FCC-LISN- 50-16-2 | 04083 | 150kHz ~ 100MHz | Feb. 09, 2022 | Feb. 08, 2023 | Conduction (CO01-CB) |
| LISN | Schwarzbeck | NSLK 8127 | 8127647 | 9kHz ~ 30MHz | Apr. 12, 2022 | Apr. 11, 2023 | Conduction (CO01-CB) |
| Pulse Limiter | Rohde&Schwarz | ESH3-Z2 | 100430 | 9kHz ~ 30MHz | Feb. 10, 2022 | Feb. 09, 2023 | Conduction (CO01-CB) |
| COND Cable | Woken | Cable | Low cable-CO01 | 9kHz ~ 30MHz | May 18, 2022 | May 17, 2023 | Conduction (CO01-CB) |
| Software | SPORTON | SENSE | V5.10 | - | N.C.R. | N.C.R. | Conduction (CO01-CB) |
| 3m Semi Anechoic Chamber NSA | TDK | SAC-3M | 03CH05-CB | 30 MHz ~1 GHz | Aug. 03, 2022 | Aug. 02, 2023 | Radiation (03CH05-CB) |
| 3m Semi Anechoic Chamber VSWR | TDK | SAC-3M | 03CH05-CB | 1GHz ~18GHz 3m | Nov. 07, 2021 | Nov. 06, 2022 | Radiation (03CH05-CB) |
| Loop Antenna | Teseq | HLA 6120 | 24155 | 9kHz - 30 MHz | May 14, 2022 | May 13, 2023 | Radiation (03CH05-CB) |
| Bilog Antenna with 6dB Attenuator | TESEQ & EMCI | CBL 6112D & N-6-06 | 35236 & AT-N0610 | 30MHz ~ 2GHz | Mar. 25, 2022 | Mar. 24, 2023 | Radiation (03CH05-CB) |
| Horn Antenna | SCHWARZBECK | BBHA9120 D | BBHA 9120 D-1291 | 1GHz~18GHz | Jun. 23, 2022 | Jun. 22, 2023 | Radiation (03CH05-CB) |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA917025 2 | 15GHz ~ 40GHz | Aug. 22, 2022 | Aug. 21, 2023 | Radiation (03CH05-CB) |
| Pre-Amplifier | EMCI | EMC330N | 980331 | 20MHz ~ 3GHz | Apr. 26, 2022 | Apr. 25, 2023 | Radiation (03CH05-CB) |
| Pre-Amplifier | EMCI | EMC12630 SE | 980287 | 1GHz – 26.5GHz | Jul. 01, 2022 | Jun. 30, 2023 | Radiation (03CH05-CB) |
| Pre-Amplifier | MITEQ | TTA1840-35 -HG | 1864479 | 18GHz ~ 40GHz | Jul. 20, 2022 | Jul. 19, 2023 | Radiation (03CH05-CB) |
| Spectrum Analyzer | R&S | FSP40 | 100304 | 9kHz ~ 40GHz | Mar. 14, 2022 | Mar. 13, 2023 | Radiation (03CH05-CB) |
| EMI Test Receiver | R&S | ESCS | 826547/017 | 9kHz ~ 2.75GHz | Jun. 17, 2022 | Jun. 16, 2023 | Radiation (03CH05-CB) |
| RF Cable-low | Woken | RG402 | Low Cable-04+23 | 30MHz~1GHz | Oct. 13, 2021 | Oct. 12, 2022 | Radiation (03CH05-CB) |
| RF Cable-high | Woken | RG402 | High Cable-28 | 1GHz~18GHz | Oct. 03, 2022 | Oct. 02, 2023 | Radiation (03CH05-CB) |
| RF Cable-high | Woken | RG402 | High Cable-04+28 | 1GHz~18GHz | Oct. 03, 2022 | Oct. 02, 2023 | Radiation (03CH05-CB) |
| High Cable | Woken | WCA0929M | 40G#5+7 | 1GHz ~ 40 GHz | Dec. 14, 2021 | Dec. 13, 2022 | Radiation (03CH05-CB) |
| High Cable | Woken | WCA0929M | 40G#5 | 1GHz ~ 40 GHz | Dec. 08, 2021 | Dec. 07, 2022 | Radiation (03CH05-CB) |

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Switch

SPTCB

Calibration Calibration Model No. Serial No. Characteristics Remark Instrument Brand Date **Due Date** Radiation Dec. 14, 2021 Dec. 13, 2022 High Cable WCA0929M 40G#7 1GHz ~ 40 GHz Woken (03CH05-CB) Radiation Test Software **SPORTON** N.C.R. N.C.R. **SENSE** V5.10 (03CH05-CB) 3m Semi Anechoic Radiation 03CH02-CB RIKEN SAC-3M 1GHz ~18GHz Mar. 26, 2022 Mar. 25, 2023 Chamber VSWR (03CH02-CB) Radiation Horn Antenna **EMCO** 9610-4976 1GHz ~ 18GHz 3115 Apr. 19, 2022 Apr. 18, 2023 (03CH02-CB) 15GHz ~ BBHA917025 Radiation **BBHA 9170** Horn Antenna Schwarzbeck Aug. 22, 2022 Aug. 21, 2023 2 40GHz (03CH02-CB) 1GHz ~ Radiation Pre-Amplifier 83017A MY39501305 Jul. 01, 2022 Jun. 30, 2023 Agilent 26.5GHz (03CH02-CB) TTA1840-35 18GHz ~ Radiation Pre-Amplifier **MITEQ** 1864479 Jul. 20, 2022 Jul. 19, 2023 (03CH02-CB) 40GHz -HG Radiation FSU Oct. 24, 2022 100015 9kHz~26GHz Oct. 25, 2021 Spectrum analyzer R&S (03CH02-CB) Radiation Spectrum Analyzer Rohde&Schwarz FSV30 101026 9kHz ~ 30GHz Apr. 22, 2022 Apr. 21, 2023 (03CH02-CB) Radiation RF Cable-high Woken RG402 High Cable-18 1GHz ~ 18GHz Oct. 04, 2021 Oct. 03, 2022 (03CH02-CB) High Radiation RF Cable-high Woken RG402 1GHz ~ 18GHz Oct. 04, 2021 Oct. 03, 2022 Cable-18+19 (03CH02-CB) Radiation Dec. 13, 2022 High Cable Woken WCA0929M 40G#5+7 1GHz ~ 40 GHz Dec. 14, 2021 (03CH02-CB) Radiation High Cable Dec. 08, 2021 Dec. 07, 2022 WCA0929M 1GHz ~ 40 GHz Woken 40G#5 (03CH02-CB) Radiation High Cable WCA0929M 1GHz ~ 40 GHz Dec. 14, 2021 Dec. 13, 2022 Woken 40G#7 (03CH02-CB) Radiation Test Software N.C.R. N.C.R. **SPORTON SENSE** V5.10 (03CH02-CB) Conducted FSV40 101027 9kHz~40GHz Spectrum analyzer R&S Aug. 15, 2022 Aug. 14, 2023 (TH02-CB) 300MHz~ Conducted Power Sensor MA2411B Oct. 25, 2021 Anritsu 1126203 Oct. 24, 2022 40GHz (TH02-CB) 300MHz~ Conducted Power Meter Anritsu ML2495A 1210004 Oct. 25, 2021 Oct. 24, 2022 40GHz (TH02-CB) Conducted RF Cable-high 1 GHz - 18 GHz Oct. 04, 2021 Oct. 03, 2022 Woken RG402 High Cable-01 (TH02-CB) Conducted 1 GHz - 18 GHz RF Cable-high Woken RG402 High Cable-02 Oct. 04, 2021 Oct. 03, 2022 (TH02-CB) Conducted RF Cable-high Woken RG402 High Cable-03 1 GHz - 18 GHz Oct. 04, 2021 Oct. 03, 2022 (TH02-CB) Conducted RF Cable-high 1 GHz - 18 GHz Woken RG402 Oct. 04, 2021 High Cable-04 Oct. 03, 2022 (TH02-CB) Conducted RF Cable-high 1 GHz - 18 GHz Woken RG402 High Cable-05 Oct. 04, 2021 Oct. 03, 2022 (TH02-CB)

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Conducted

(TH02-CB)

Dec. 12, 2022

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SP-SWI

Report Template No.: CB-A10_10 Ver1.3 Report Version : 01

SWI-02

1 GHz -

26.5 GHz

Dec. 13, 2021

| Instrument | Brand | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|---------------|---------|-----------|------------|---------------------|---------------------|-------------------------|------------------------|
| RF Cable-high | Woken | RG402 | SWI-02-P1 | 1 GHz – 26.5 GHz | Dec. 13, 2021 | Dec. 12, 2022 | Conducted (TH02-CB) |
| RF Cable-high | Woken | RG402 | SWI-02-P2 | 1 GHz – 26.5 GHz | Dec. 13, 2021 | Dec. 12, 2022 | Conducted (TH02-CB) |
| RF Cable-high | Woken | RG402 | SWI-02-P3 | 1 GHz – 26.5 GHz | Dec. 13, 2021 | Dec. 12, 2022 | Conducted (TH02-CB) |
| RF Cable-high | Woken | RG402 | SWI-02-P4 | 1 GHz – 26.5 GHz | Dec. 13, 2021 | Dec. 12, 2022 | Conducted (TH02-CB) |
| RF Cable-high | Woken | RG402 | SWI-02-P5 | 1 GHz – 26.5 GHz | Dec. 13, 2021 | Dec. 12, 2022 | Conducted (TH02-CB) |
| Test Software | SPORTON | SENSE | V5.10 | - | N.C.R. | N.C.R. | Conducted (TH02-CB) |

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Note: Calibration Interval of instruments listed above is one year. NCR means Non-Calibration required.

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Conducted Emissions at Powerline

Appendix A

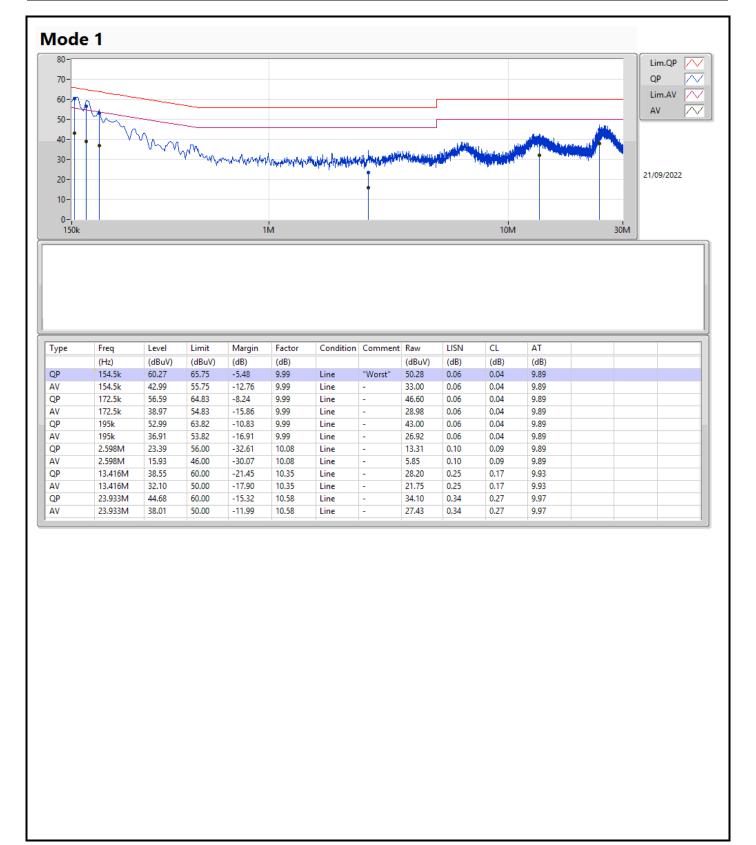
Summary

| Mode | Result | Туре | Freq (Hz) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Condition |
|--------|--------|------|--------------|-----------------|-----------------|----------------|-----------|
| Mode 1 | Pass | QP | 154.5k | 60.27 | 65.75 | -5.48 | Line |

Sporton International Inc. Hsinchu Laboratory Page No. : 1 of

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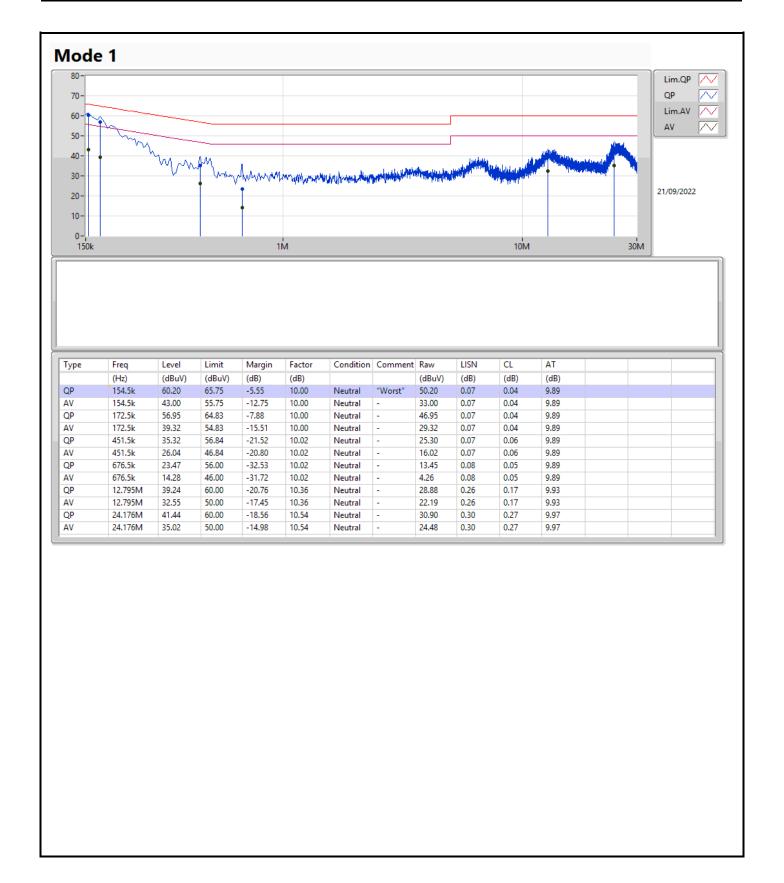




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Summary

| Mode | Max-N dB | Max-OBW | ITU-Code | Min-N dB | Min-OBW |
|--------------------------|----------|---------|----------|----------|---------|
| | (Hz) | (Hz) | | (Hz) | (Hz) |
| 2.4-2.4835GHz | - | - | = | = | - |
| 802.11b_Nss1,(1Mbps)_1TX | 9.525M | 15.181M | 15M2G1D | 8.525M | 14.085M |
| 802.11g_Nss1,(6Mbps)_1TX | 16.05M | 21.196M | 21M2D1D | 15.675M | 16.714M |
| VHT20_Nss1,(MCS0)_1TX | 16.25M | 21.357M | 21M4D1D | 15.025M | 17.882M |
| VHT40_Nss1,(MCS0)_1TX | 35.7M | 36.471M | 36M5D1D | 35.7M | 36.445M |

 $\label{eq:max-N} Max-N\,dB = Maximum\,6dB\,down\,bandwidth;\,Max-OBW = Maximum\,99\%\,\,occupied\,bandwidth;\,Min-N\,dB = Minimum\,6dB\,down\,bandwidth;\,Min-OBW = Minimum\,99\%\,\,occupied\,bandwidth$

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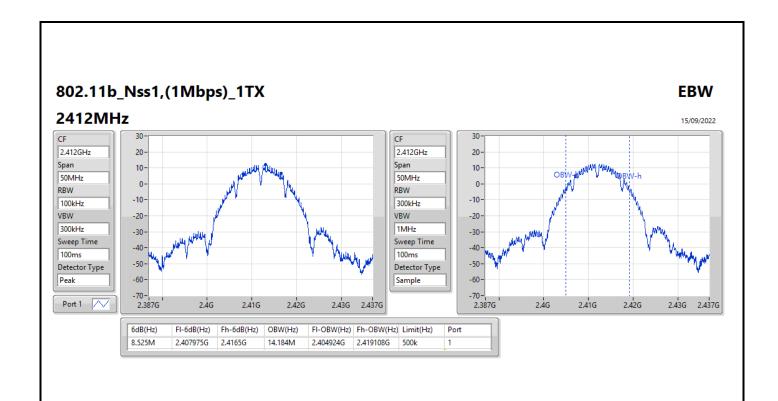
Result

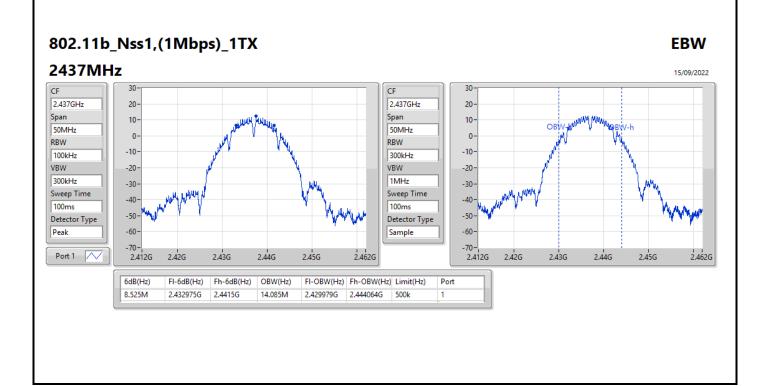
| Mode | Result | Limit | Port 1-N dB | Port 1-OBW |
|--------------------------|--------|-------|-------------|------------|
| | | (Hz) | (Hz) | (Hz) |
| 802.11b_Nss1,(1Mbps)_1TX | - | - | - | - |
| 2412MHz | Pass | 500k | 8.525M | 14.184M |
| 2437MHz | Pass | 500k | 8.525M | 14.085M |
| 2462MHz | Pass | 500k | 9.525M | 15.181M |
| 802.11g_Nss1,(6Mbps)_1TX | - | - | - | - |
| 2412MHz | Pass | 500k | 15.775M | 16.785M |
| 2437MHz | Pass | 500k | 16.05M | 21.196M |
| 2462MHz | Pass | 500k | 15.675M | 16.714M |
| VHT20_Nss1,(MCS0)_1TX | - | - | - | - |
| 2412MHz | Pass | 500k | 15.025M | 17.882M |
| 2437MHz | Pass | 500k | 16.25M | 21.357M |
| 2462MHz | Pass | 500k | 15.075M | 17.983M |
| VHT40_Nss1,(MCS0)_1TX | - | - | - | - |
| 2422MHz | Pass | 500k | 35.7M | 36.458M |
| 2437MHz | Pass | 500k | 35.7M | 36.445M |
| 2452MHz | Pass | 500k | 35.7M | 36.471M |

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

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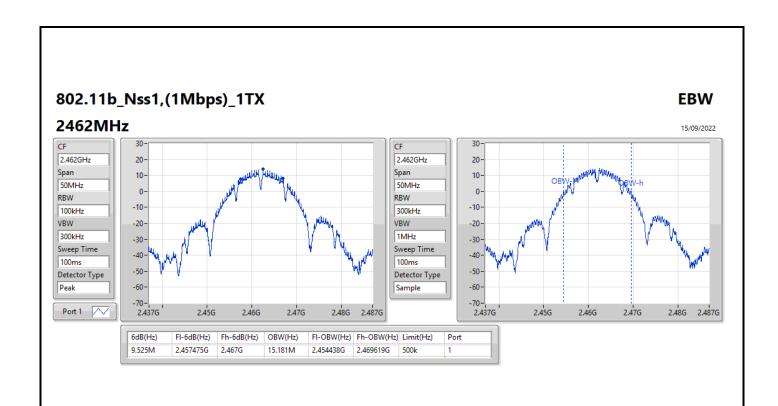
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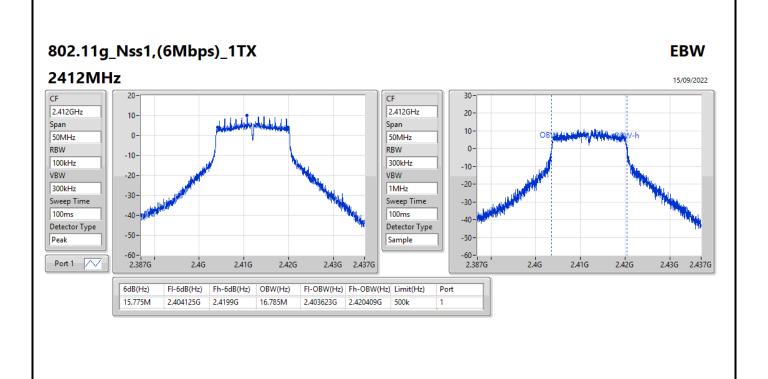




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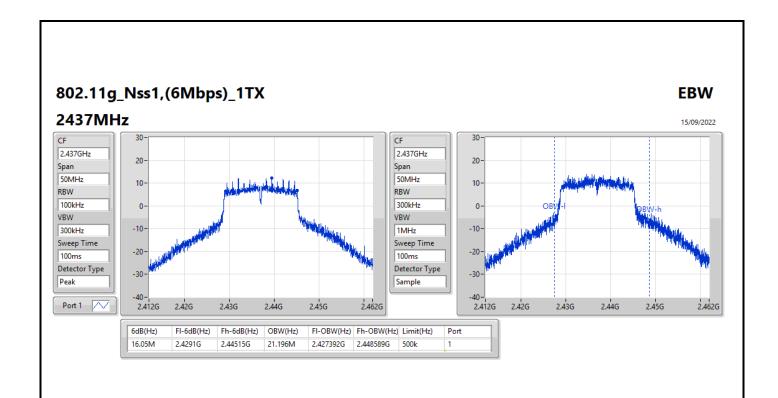


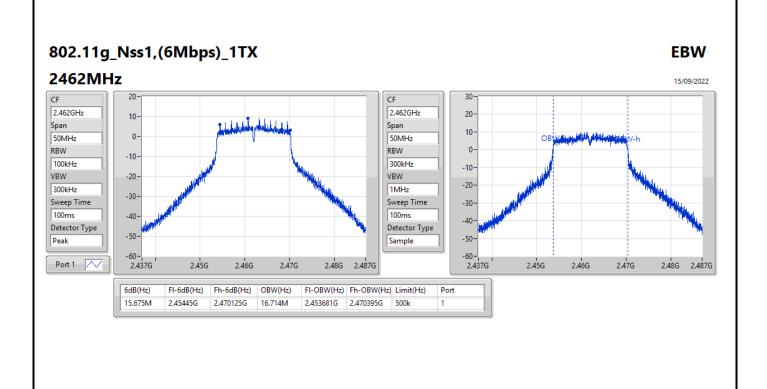
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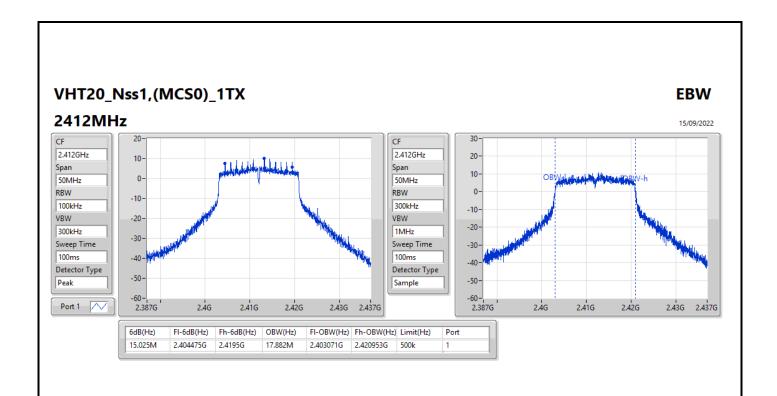
EBW Appendix B

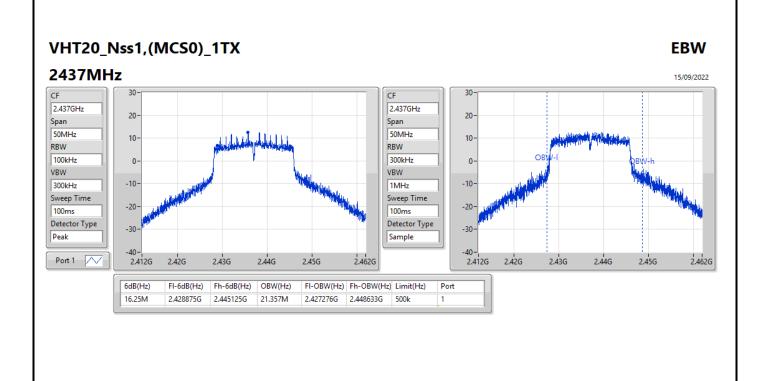




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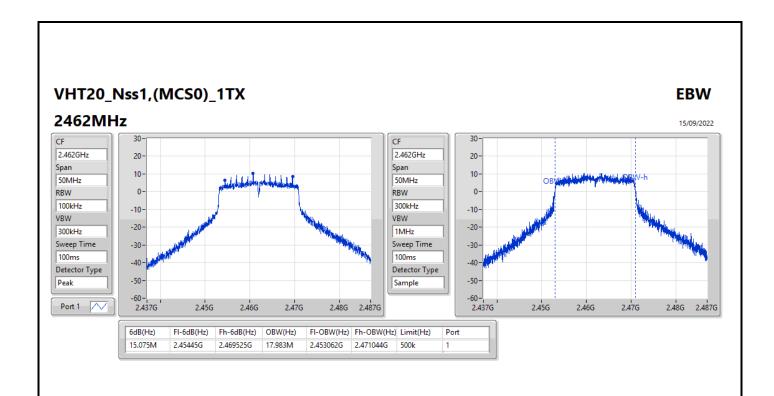
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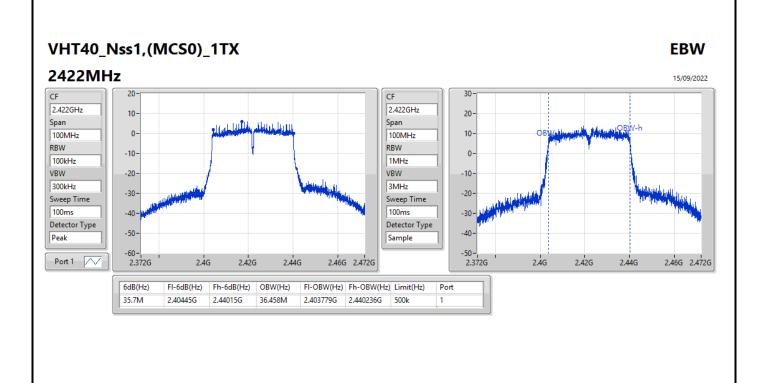




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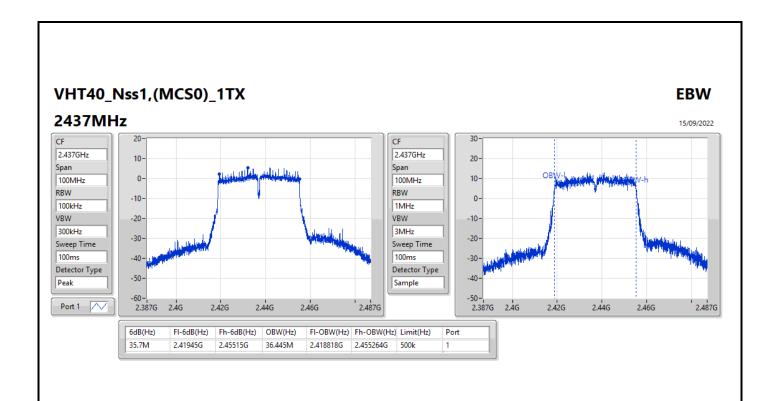
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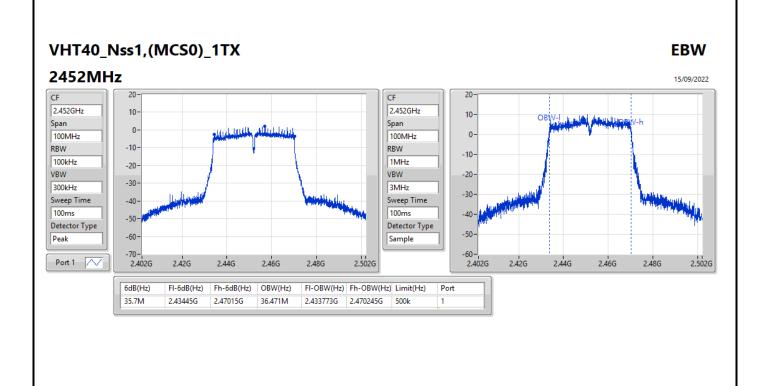




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Average Power Appendix C

Summary

| Mode | Total Power | Total Power |
|--------------------------|-------------|--------------|
| | (dBm) | (W) |
| 2.4-2.4835GHz | - | - |
| 802.11b_Nss1,(1Mbps)_1TX | 22.48 | 0.17701 |
| 802.11g_Nss1,(6Mbps)_1TX | 22.41 | 0.17418 |
| VHT20_Nss1,(MCS0)_1TX | 22.21 | 0.16634 |
| VHT40_Nss1,(MCS0)_1TX | 19.44 | 0.08790 |

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Average Power Appendix C

Result

| Mode | Result | DG | Port 1 | Total Power | Power Limit |
|--------------------------|--------|-------|--------|-------------|-------------|
| | | (dBi) | (dBm) | (dBm) | (dBm) |
| 802.11b_Nss1,(1Mbps)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 6.49 | 20.78 | 20.78 | 29.51 |
| 2437MHz | Pass | 6.49 | 20.65 | 20.65 | 29.51 |
| 2462MHz | Pass | 6.49 | 22.48 | 22.48 | 29.51 |
| 802.11g_Nss1,(6Mbps)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 6.49 | 19.80 | 19.80 | 29.51 |
| 2417MHz | Pass | 6.49 | 20.60 | 20.60 | 29.51 |
| 2437MHz | Pass | 6.49 | 22.41 | 22.41 | 29.51 |
| 2457MHz | Pass | 6.49 | 20.67 | 20.67 | 29.51 |
| 2462MHz | Pass | 6.49 | 18.74 | 18.74 | 29.51 |
| VHT20_Nss1,(MCS0)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 6.49 | 19.58 | 19.58 | 29.51 |
| 2417MHz | Pass | 6.49 | 22.08 | 22.08 | 29.51 |
| 2437MHz | Pass | 6.49 | 22.21 | 22.21 | 29.51 |
| 2457MHz | Pass | 6.49 | 20.53 | 20.53 | 29.51 |
| 2462MHz | Pass | 6.49 | 19.71 | 19.71 | 29.51 |
| VHT40_Nss1,(MCS0)_1TX | - | - | - | - | - |
| 2422MHz | Pass | 6.49 | 19.44 | 19.44 | 29.51 |
| 2437MHz | Pass | 6.49 | 18.79 | 18.79 | 29.51 |
| 2447MHz | Pass | 6.49 | 16.97 | 16.97 | 29.51 |
| 2452MHz | Pass | 6.49 | 15.60 | 15.60 | 29.51 |

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

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Summary

| Mode | PD |
|--------------------------|-----------|
| | (dBm/RBW) |
| 2.4-2.4835GHz | - |
| 802.11b_Nss1,(1Mbps)_1TX | -2.05 |
| 802.11g_Nss1,(6Mbps)_1TX | -3.42 |
| VHT20_Nss1,(MCS0)_1TX | -4.07 |
| VHT40_Nss1,(MCS0)_1TX | -9.52 |

RBW = 3kHz;

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Appendix D **PSD**

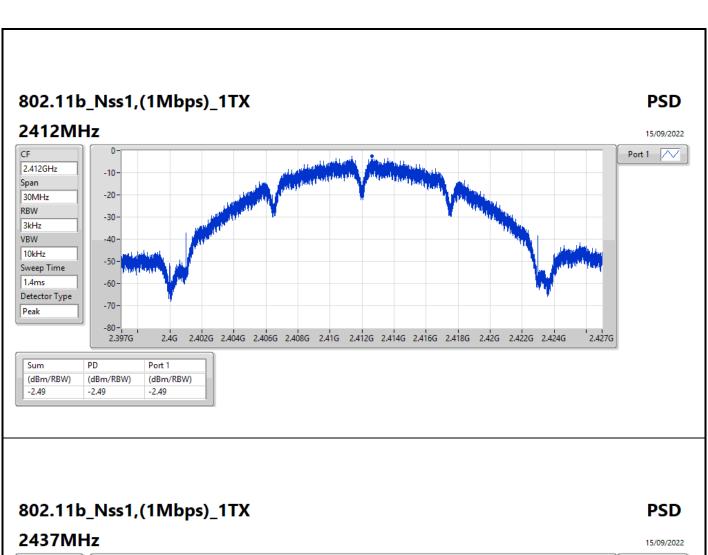
Result

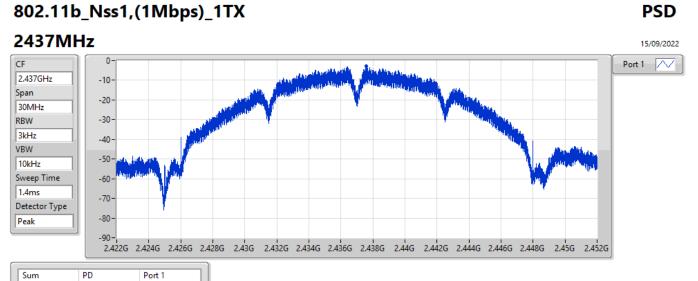
| Mode | Result | DG | Port 1 | PD | PD Limit |
|--------------------------|--------|-------|-----------|-----------|-----------|
| | | (dBi) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| 802.11b_Nss1,(1Mbps)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 6.49 | -2.49 | -2.49 | 7.51 |
| 2437MHz | Pass | 6.49 | -2.95 | -2.95 | 7.51 |
| 2462MHz | Pass | 6.49 | -2.05 | -2.05 | 7.51 |
| 802.11g_Nss1,(6Mbps)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 6.49 | -5.91 | -5.91 | 7.51 |
| 2437MHz | Pass | 6.49 | -3.42 | -3.42 | 7.51 |
| 2462MHz | Pass | 6.49 | -6.55 | -6.55 | 7.51 |
| VHT20_Nss1,(MCS0)_1TX | = | - | - | - | • |
| 2412MHz | Pass | 6.49 | -6.69 | -6.69 | 7.51 |
| 2437MHz | Pass | 6.49 | -4.07 | -4.07 | 7.51 |
| 2462MHz | Pass | 6.49 | -5.26 | -5.26 | 7.51 |
| VHT40_Nss1,(MCS0)_1TX | - | - | - | - | - |
| 2422MHz | Pass | 6.49 | -9.52 | -9.52 | 7.51 |
| 2437MHz | Pass | 6.49 | -9.69 | -9.69 | 7.51 |
| 2452MHz | Pass | 6.49 | -12.20 | -12.20 | 7.51 |

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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;





(dBm/RBW)

-2.95

(dBm/RBW)

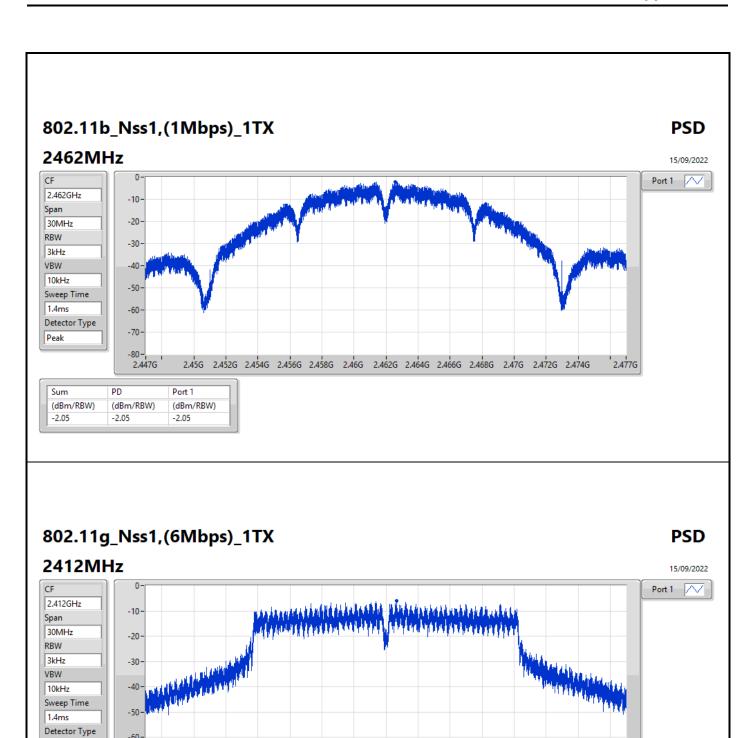
-2.95

(dBm/RBW)

-2.95

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|---------|---------------|-----|---------|-------------|

-70-2.397G

(dBm/RBW) -5.91 (dBm/RBW)

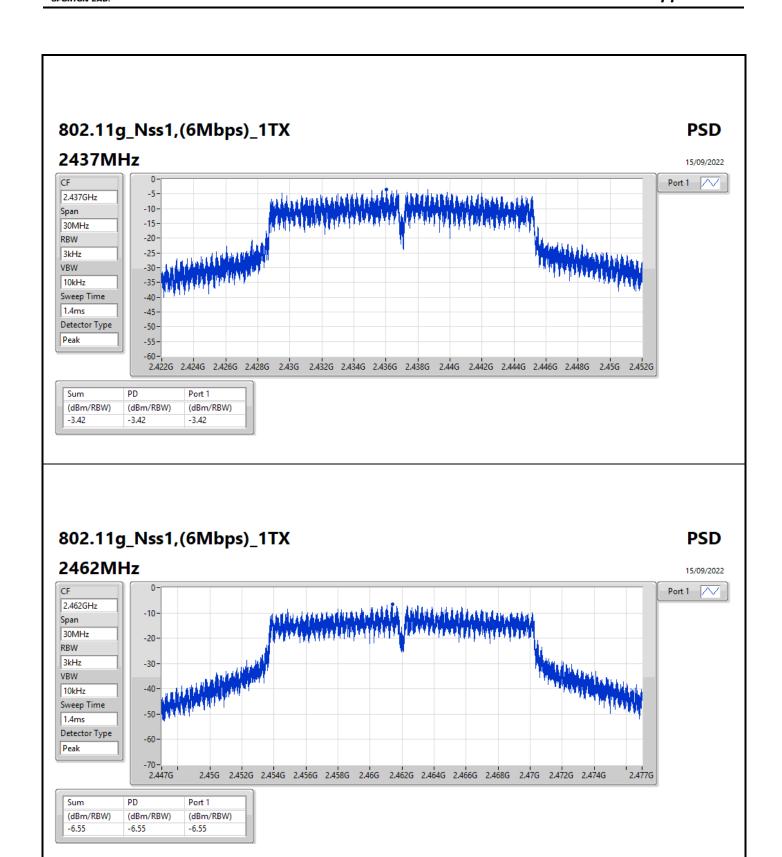
-5.91

Peak

(dBm/RBW)

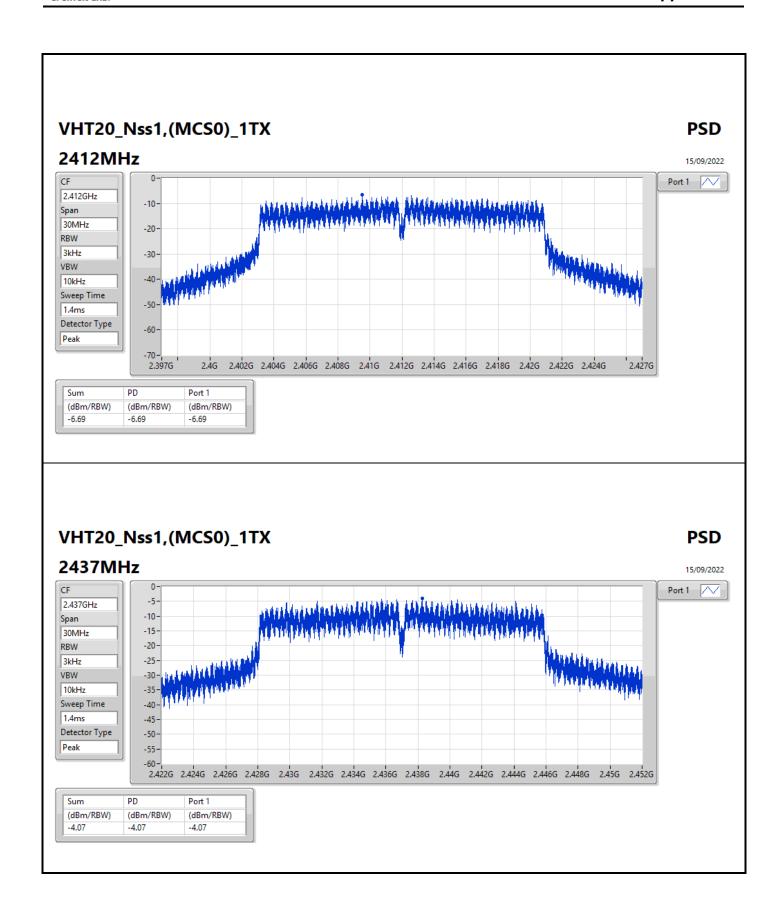
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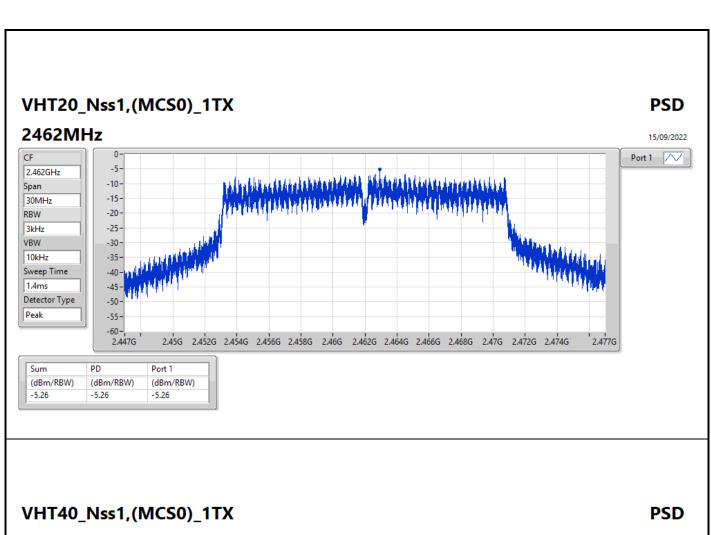
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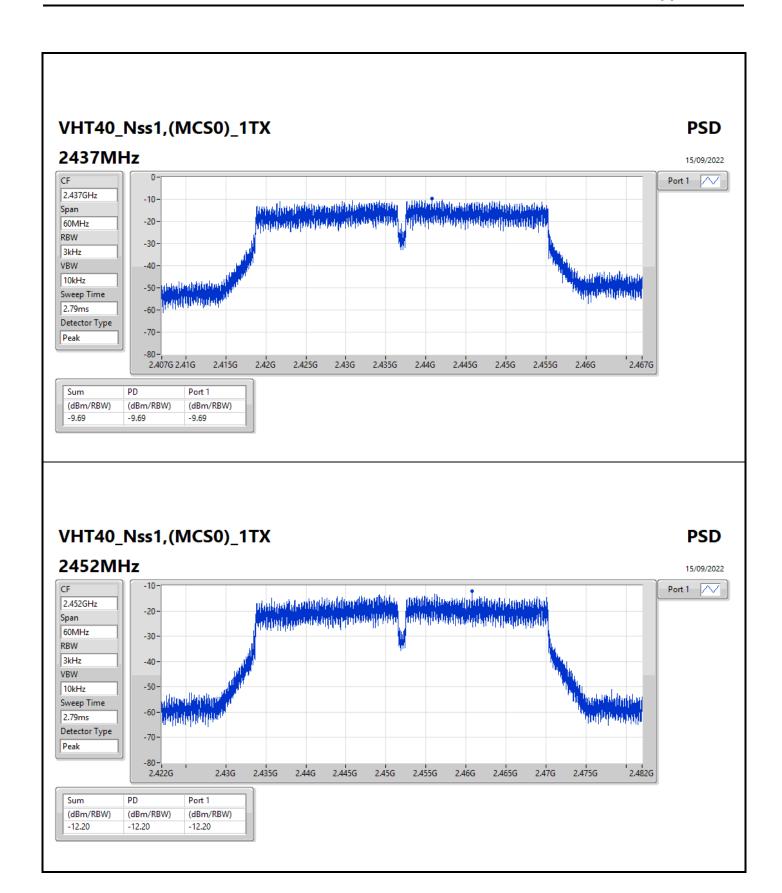
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2422MHz 15/09/2022 Port 1 2.422GHz -10-Span 60MHz -20-RBW 3kHz -30 VBW -40-10kHz Sweep Time -50-2.79ms Detector Type Peak -70-2.392G 2.405G 2.41G 2.415G 2.42G 2.425G 2.43G 2.435G 2.44G 2.445G 2.452G 2.4G (dBm/RBW) (dBm/RBW) (dBm/RBW) -9.52 -9.52

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Appendix E

Summary

| Mode | Result | Ref | Ref | Limit | Freq | Level | Freq | Level | Freq | Level | Freq | Level | Freq | Level | Port |
|--------------------------|--------|----------|-------|--------|----------|--------|----------|--------|------|--------|----------|--------|-----------|--------|------|
| | | (Hz) | (dBm) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | |
| 2.4-2.4835GHz | - | - | | - | - | - | - | - | - | | - | - | - | - | - |
| 802.11b_Nss1,(1Mbps)_1TX | Pass | 2.4615G | 13.76 | -16.24 | 2.06001G | -53.99 | 2.398G | -30.17 | 2.4G | -40.77 | 2.48464G | -50.41 | 23.2665G | -48.97 | 1 |
| 802.11g_Nss1,(6Mbps)_1TX | Pass | 2.43824G | 12.79 | -17.21 | 2.30233G | -54.13 | 2.39982G | -18.74 | 2.4G | -21.81 | 2.48512G | -48.62 | 21.41781G | -49.53 | 1 |
| VHT20_Nss1,(MCS0)_1TX | Pass | 2.43828G | 12.67 | -17.33 | 2.30991G | -54.26 | 2.39954G | -19.15 | 2.4G | -21.35 | 2.49708G | -49.20 | 21.65662G | -48.35 | 1 |
| VHT40_Nss1,(MCS0)_1TX | Pass | 2.42572G | 6.29 | -23.71 | 2.30082G | -54.00 | 2.397G | -26.56 | 2.4G | -30.34 | 2.48418G | -41.06 | 21.62331G | -48.63 | 1 |

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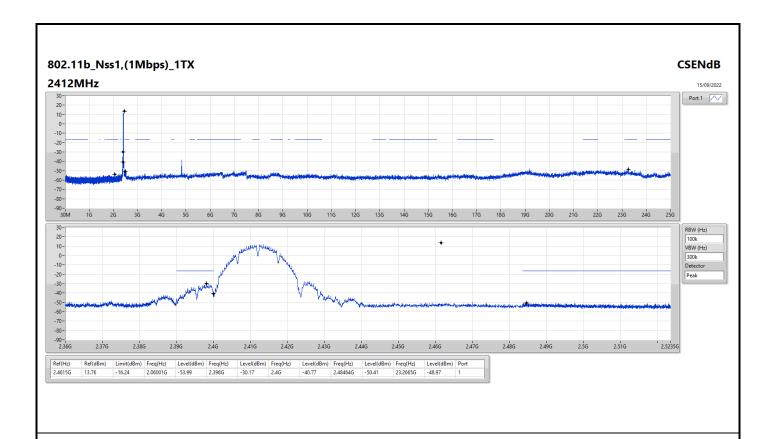


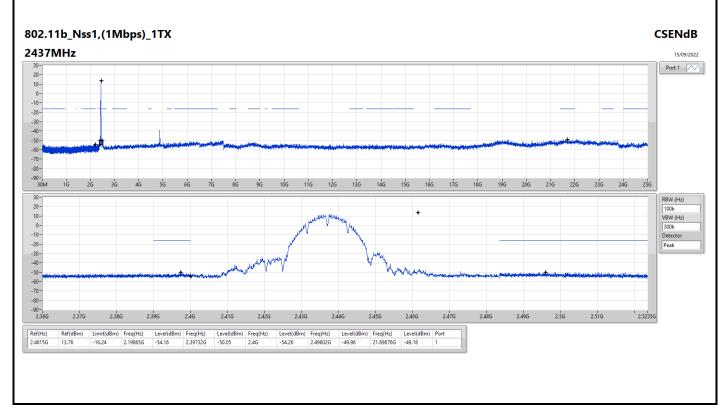
Result

| Mode | Result | Ref | Ref | Limit | Freq | Level | Freq | Level | Freq | Level | Freq | Level | Freq | Level | Port |
|--------------------------|--------|----------|-------|--------|----------|--------|----------|--------|---------|--------|----------|--------|-----------|--------|------|
| | | (Hz) | (dBm) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | (Hz) | (dBm) | |
| 802.11b_Nss1,(1Mbps)_1TX | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.4615G | 13.76 | -16.24 | 2.06001G | -53.99 | 2.398G | -30.17 | 2.4G | -40.77 | 2.48464G | -50.41 | 23.2665G | -48.97 | 1 |
| 2437MHz | Pass | 2.4615G | 13.76 | -16.24 | 2.19865G | -54.16 | 2.39732G | -50.05 | 2.4G | -54.26 | 2.49602G | -49.96 | 21.69876G | -49.18 | 1 |
| 2462MHz | Pass | 2.4615G | 13.76 | -16.24 | 2.11331G | -54.53 | 2.39444G | -50.55 | 2.4835G | -46.47 | 2.48848G | -34.00 | 6.30347G | -50.87 | 1 |
| 802.11g_Nss1,(6Mbps)_1TX | | - | - | | - | - | | - | - | - | | - | | - | - |
| 2412MHz | Pass | 2.43824G | 12.79 | -17.21 | 2.30233G | -54.13 | 2.39982G | -18.74 | 2.4G | -21.81 | 2.48512G | -48.62 | 21.41781G | -49.53 | 1 |
| 2437MHz | Pass | 2.43824G | 12.79 | -17.21 | 2.11914G | -54.42 | 2.39982G | -32.15 | 2.4G | -35.42 | 2.49198G | -33.84 | 21.92915G | -47.47 | 1 |
| 2462MHz | Pass | 2.43824G | 12.79 | -17.21 | 62.04M | -54.02 | 2.39992G | -50.68 | 2.4835G | -40.04 | 2.48414G | -37.36 | 6.44536G | -50.57 | 1 |
| VHT20_Nss1,(MCS0)_1TX | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.43828G | 12.67 | -17.33 | 2.30991G | -54.26 | 2.39954G | -19.15 | 2.4G | -21.35 | 2.49708G | -49.20 | 21.65662G | -48.35 | 1 |
| 2437MHz | Pass | 2.43828G | 12.67 | -17.33 | 2.02827G | -54.11 | 2.39794G | -32.70 | 2.4G | -36.08 | 2.492G | -34.87 | 23.14288G | -48.39 | 1 |
| 2462MHz | Pass | 2.43828G | 12.67 | -17.33 | 35.53M | -54.31 | 2.39672G | -49.94 | 2.4835G | -29.75 | 2.48382G | -30.39 | 21.58357G | -48.09 | 1 |
| VHT40_Nss1,(MCS0)_1TX | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 2.42572G | 6.29 | -23.71 | 2.30082G | -54.00 | 2.397G | -26.56 | 2.4G | -30.34 | 2.48418G | -41.06 | 21.62331G | -48.63 | 1 |
| 2437MHz | Pass | 2.42572G | 6.29 | -23.71 | 1.71773G | -54.44 | 2.39956G | -31.72 | 2.4G | -37.62 | 2.48506G | -37.42 | 21.5588G | -47.75 | 1 |
| 2452MHz | Pass | 2.42572G | 6.29 | -23.71 | 1.95875G | -54.82 | 2.4G | -51.24 | 2.4835G | -41.74 | 2.4895G | -35.60 | 21.9879G | -48.66 | 1 |

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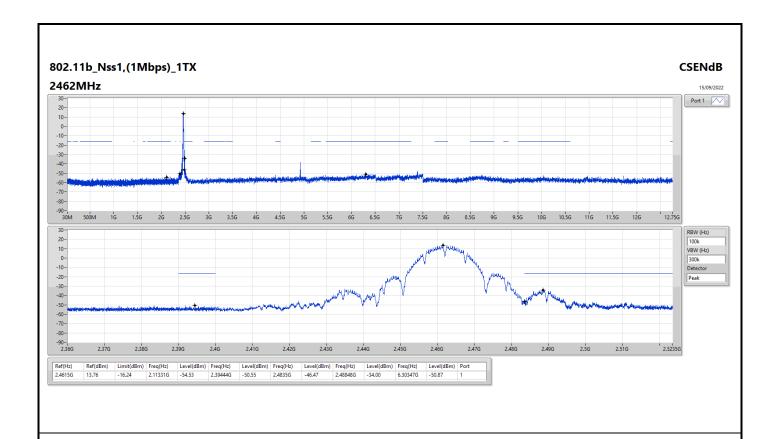


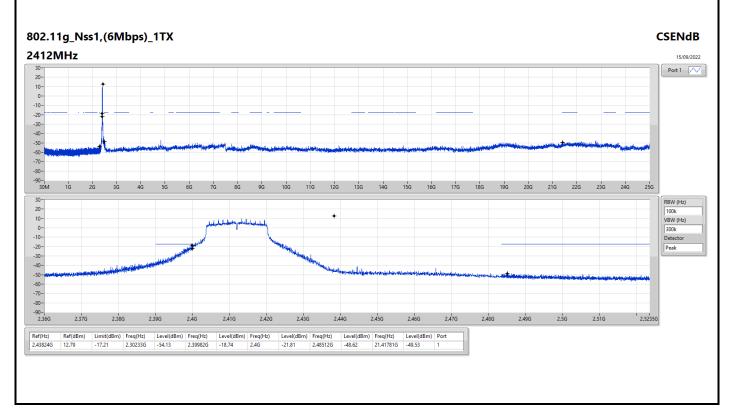


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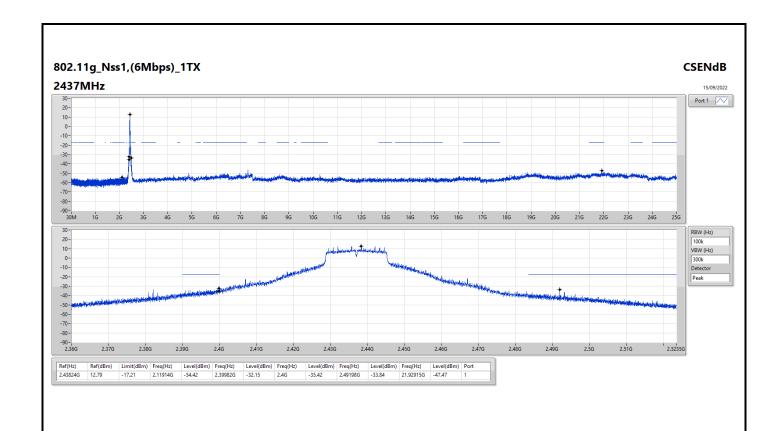


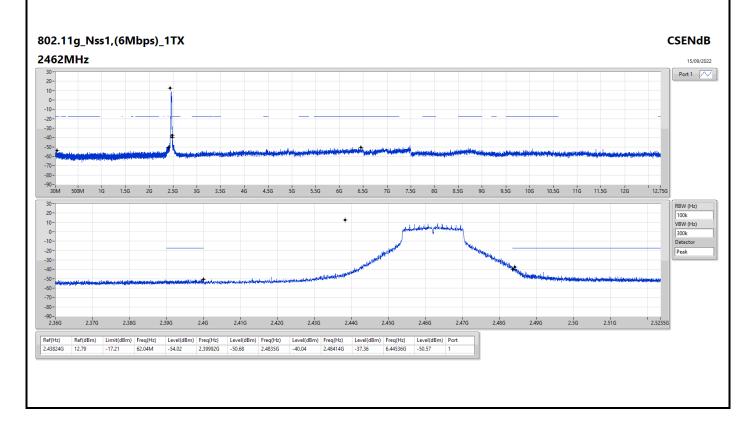


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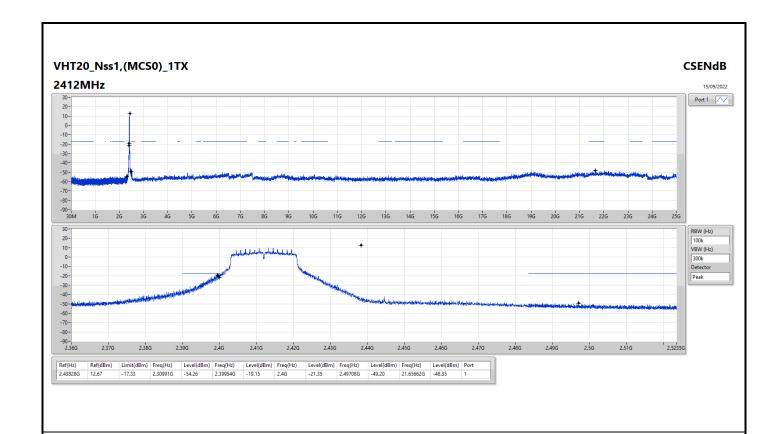


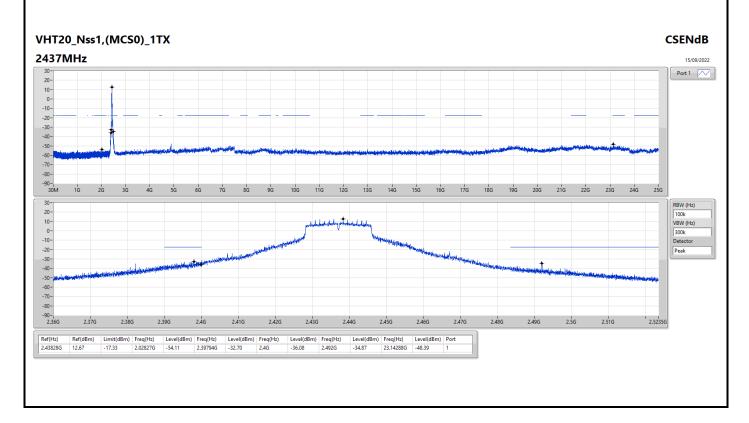


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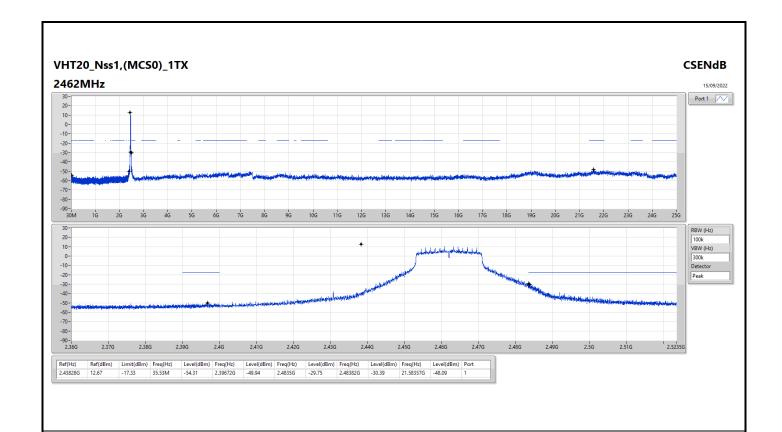


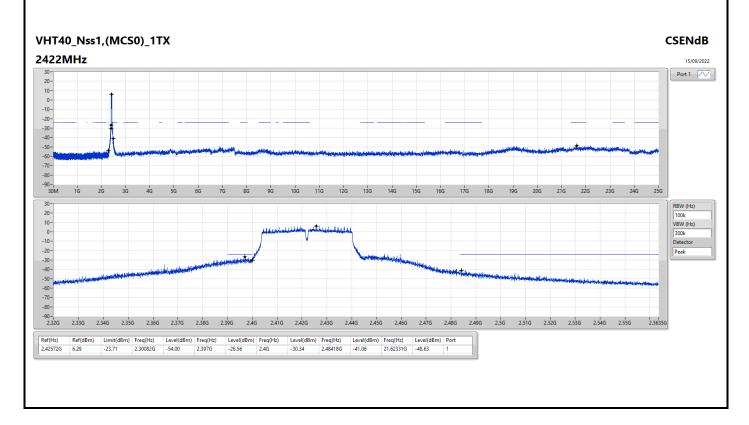


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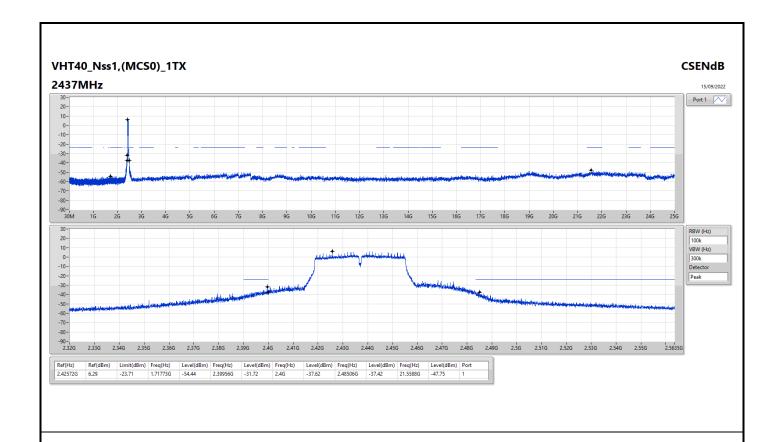


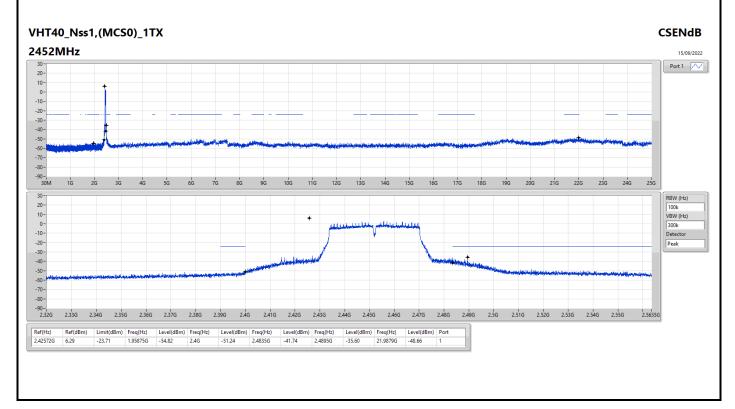


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Radiated Emissions below 1GHz

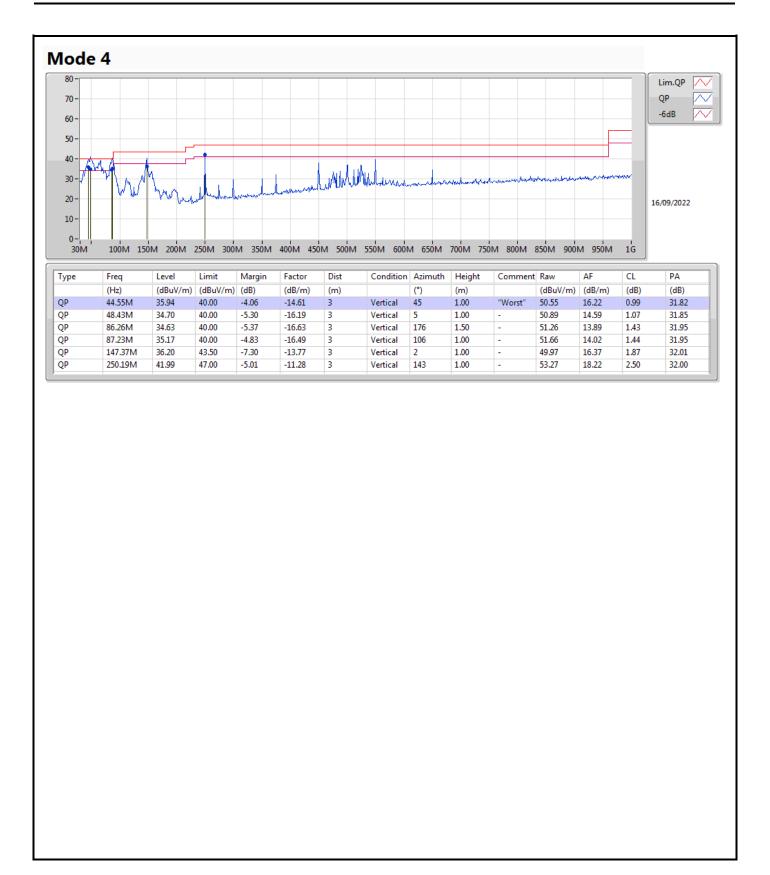
Appendix F.1

Summary

| Mode | Result | Туре | Freq (Hz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Condition |
|--------|--------|------|--------------|-------------------|-------------------|----------------|-----------|
| Mode 4 | Pass | QP | 250.19M | 41.99 | 46.00 | -4.01 | Vertical |

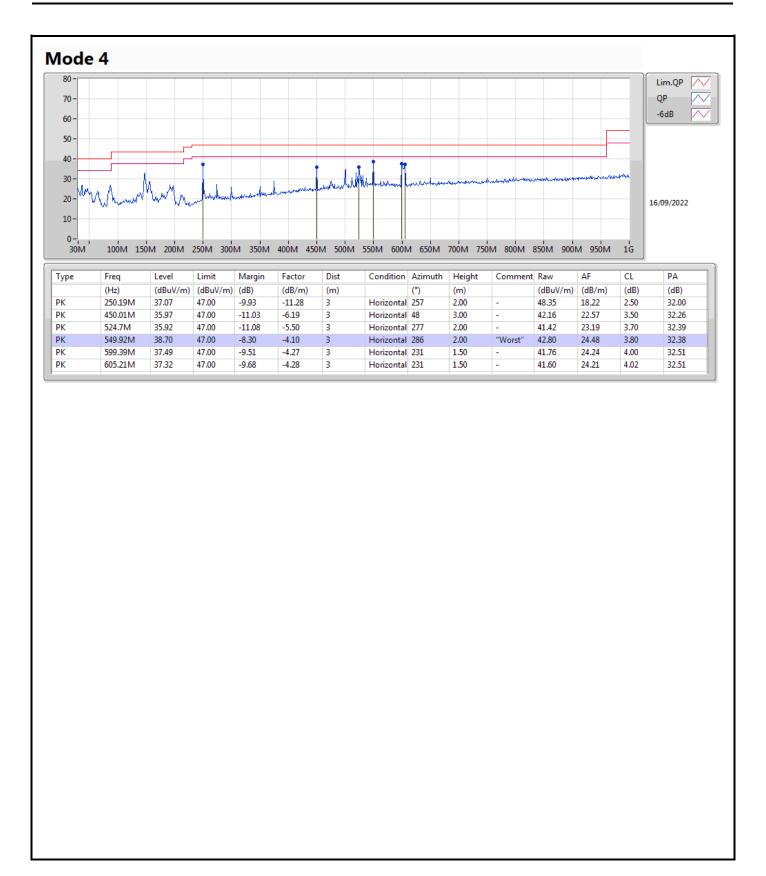
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RSE TX above 1GHz

Appendix F.2

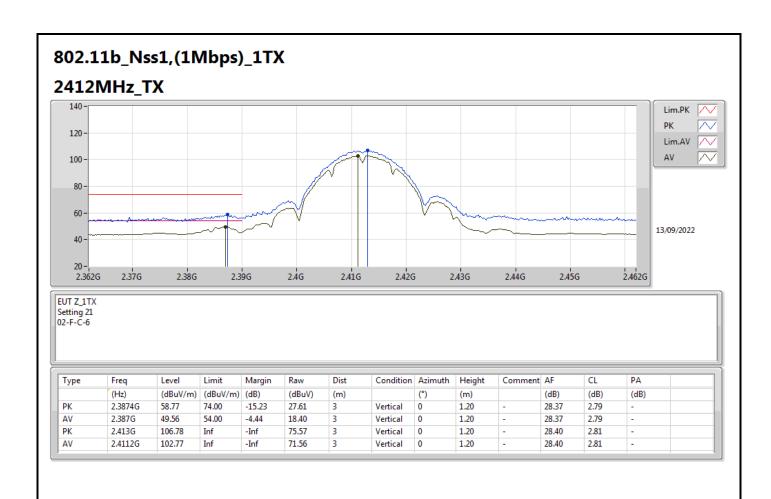
Summary

| Mode | Result | Туре | Freq (Hz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Dist (m) | Condition | Azimuth (°) | Height (m) | Comments |
|-----------------------|--------|------|--------------|-------------------|-------------------|----------------|-------------|-----------|----------------|---------------|----------|
| 2.4-2.4835GHz | - | - | - | - | - | - | - | | - | - | - |
| VHT20_Nss1,(MCS0)_1TX | Pass | AV | 2.39G | 53.85 | 54.00 | -0.15 | 3 | Vertical | 4 | 1.18 | - |

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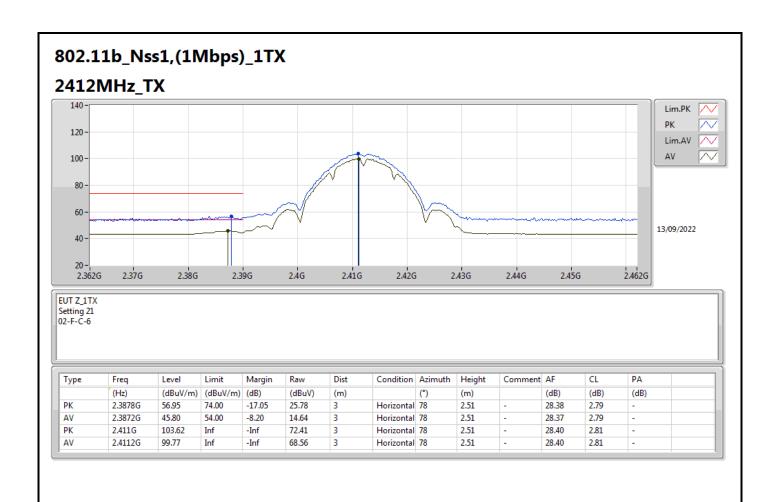




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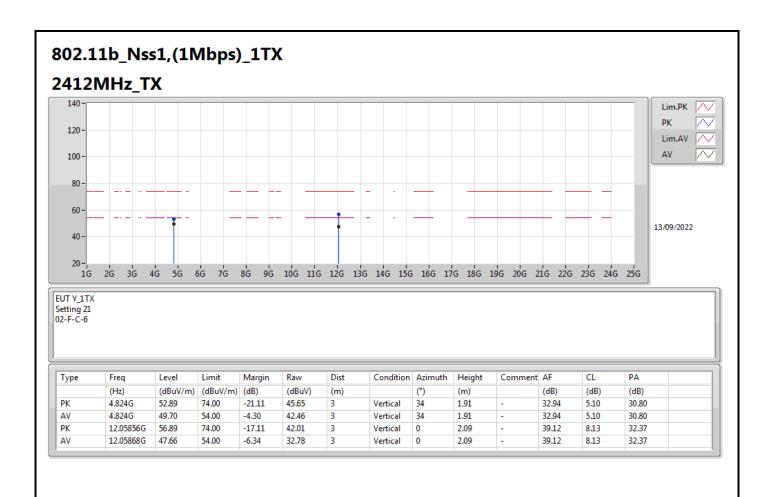




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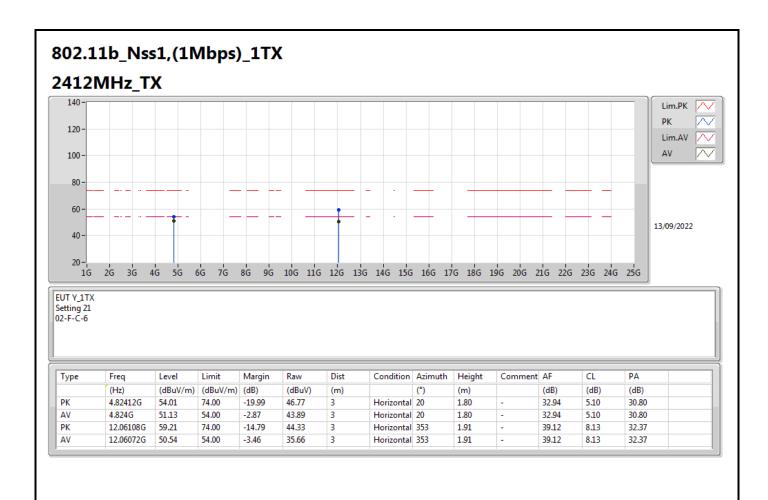




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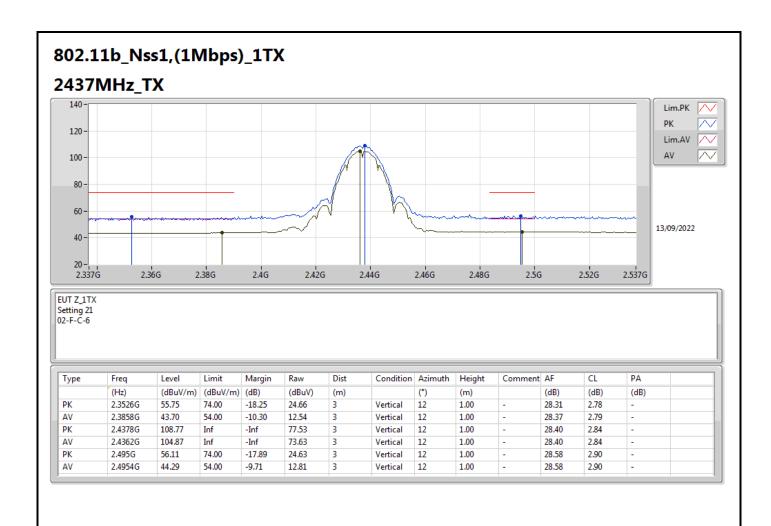




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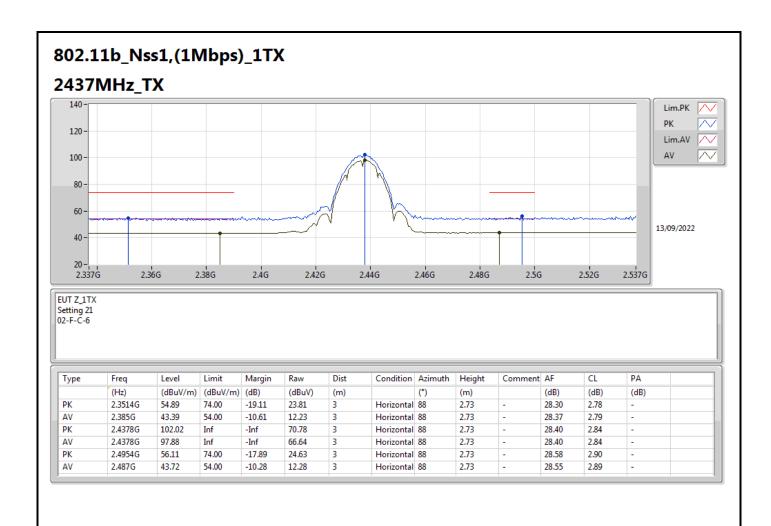




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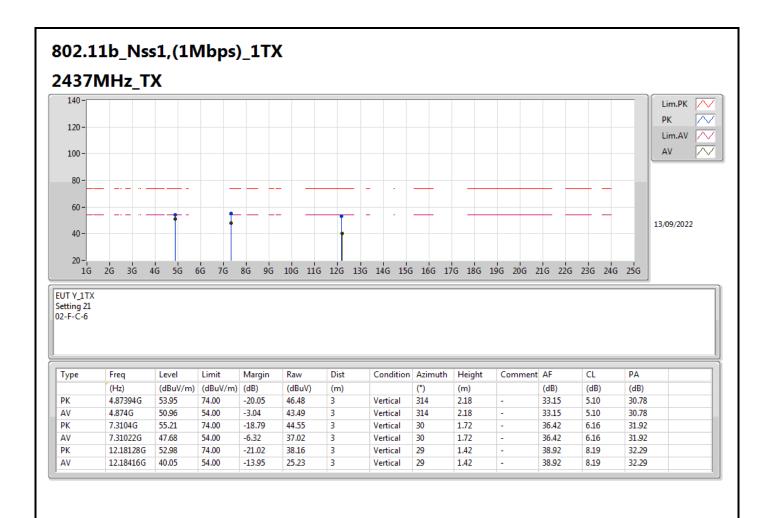




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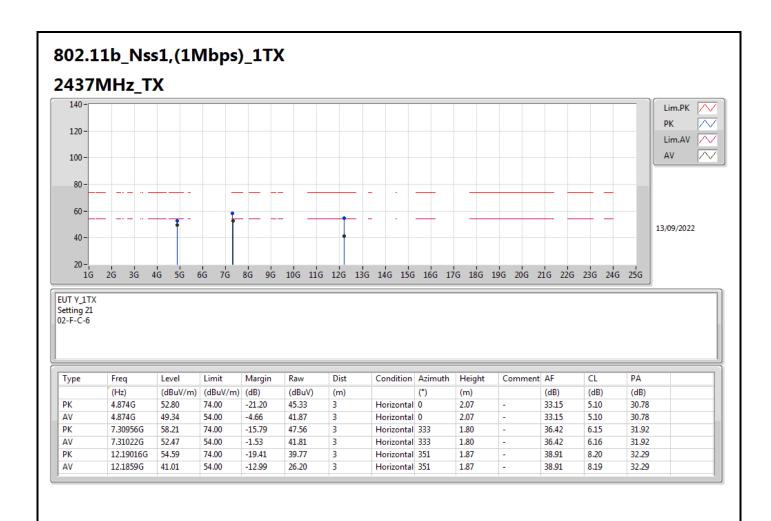




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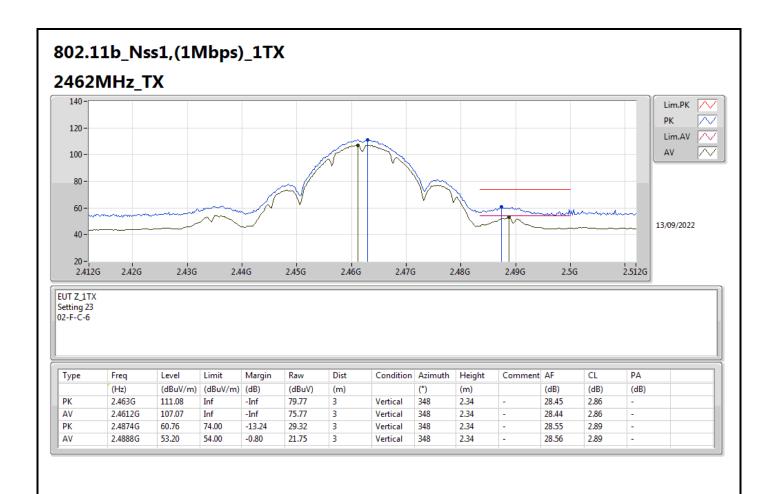




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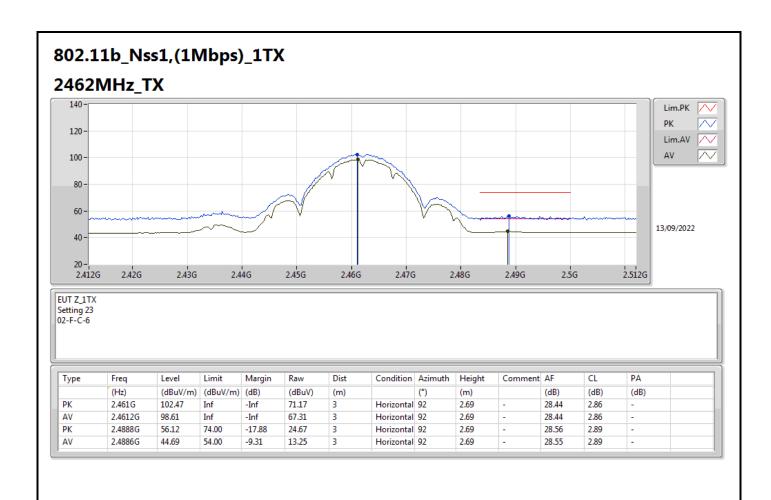




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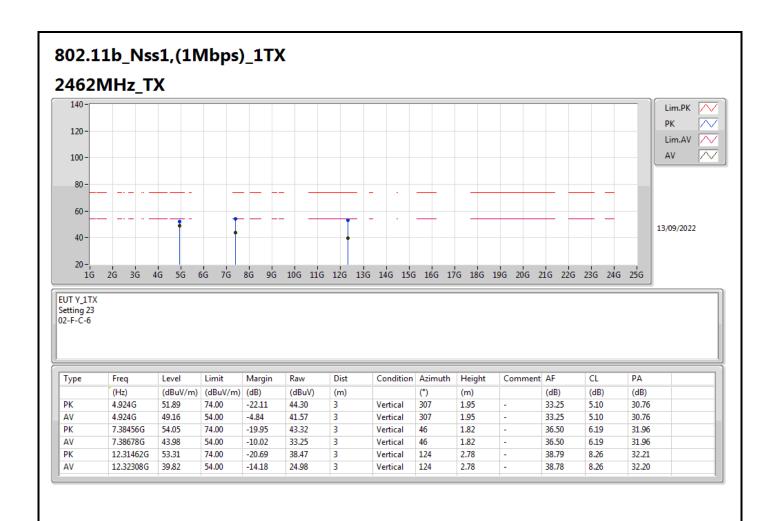




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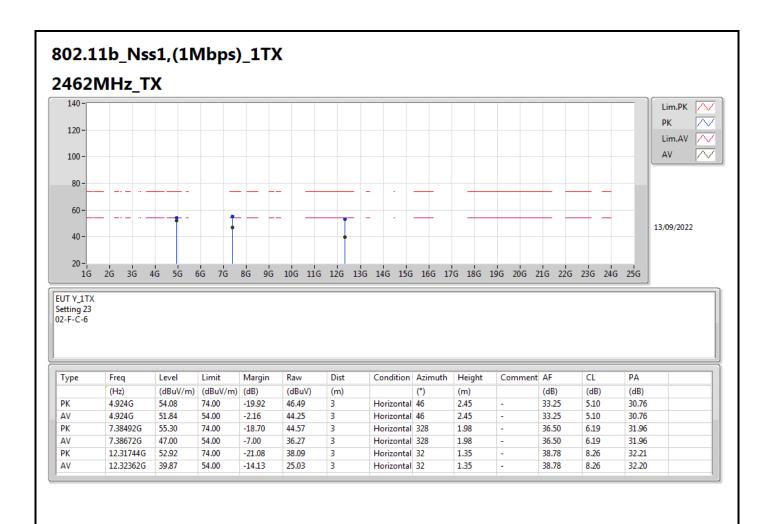




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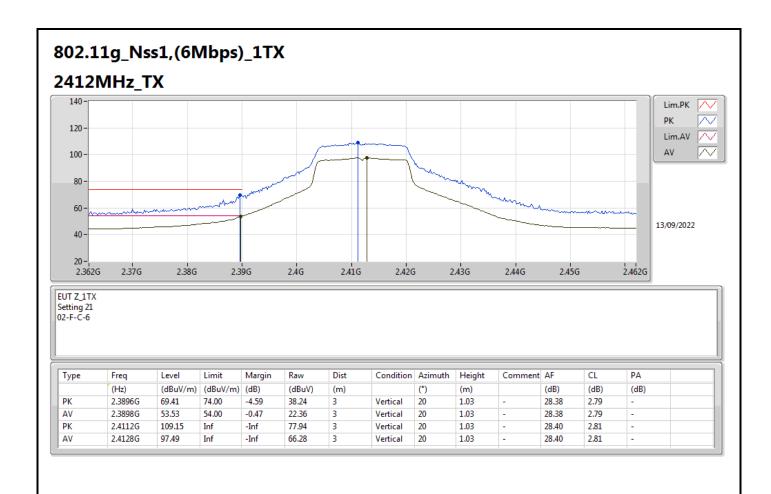




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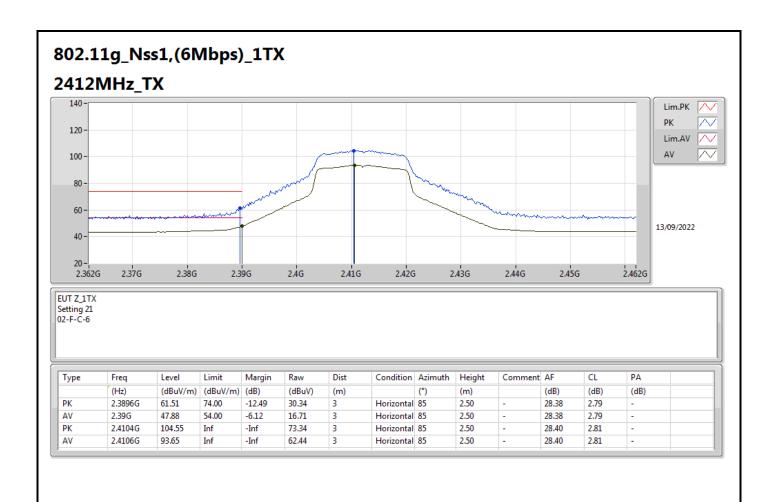




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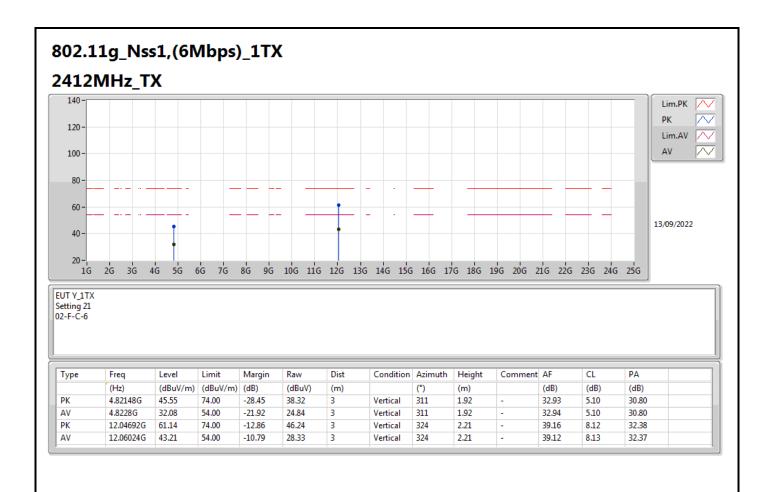




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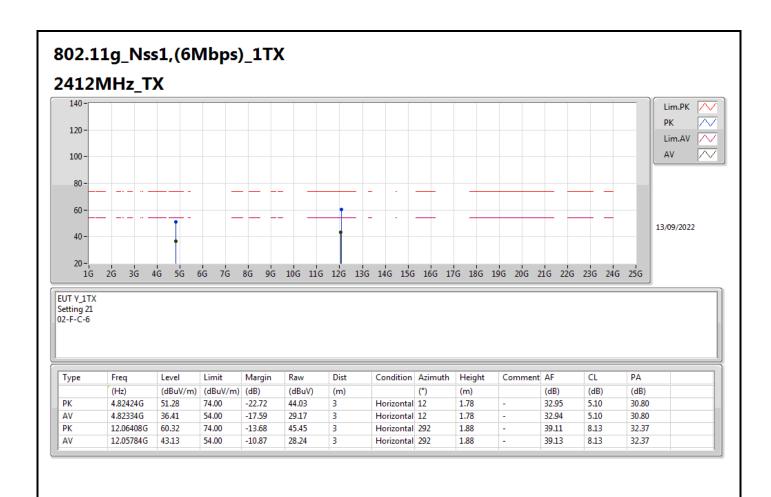




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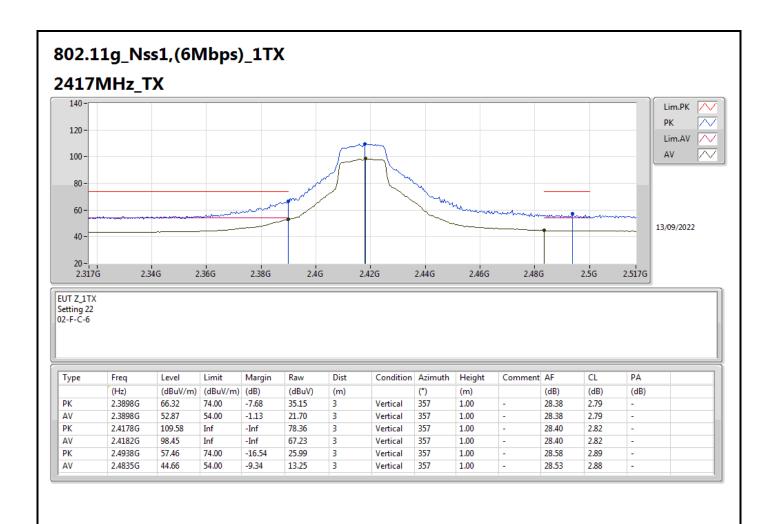




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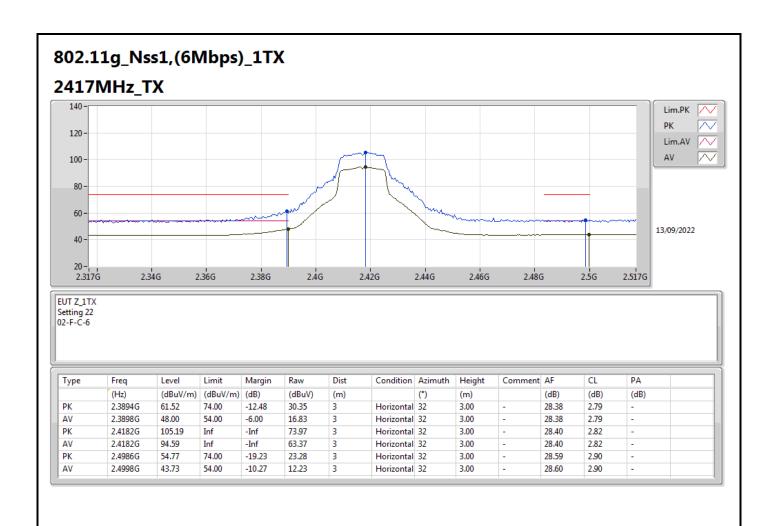




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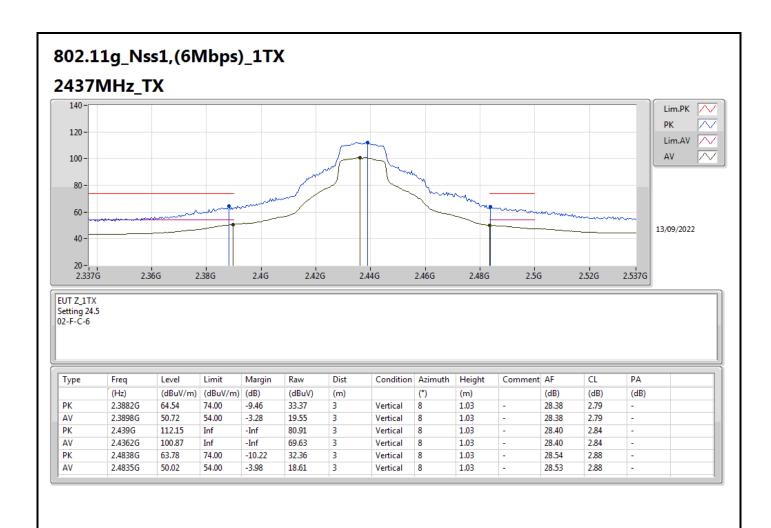




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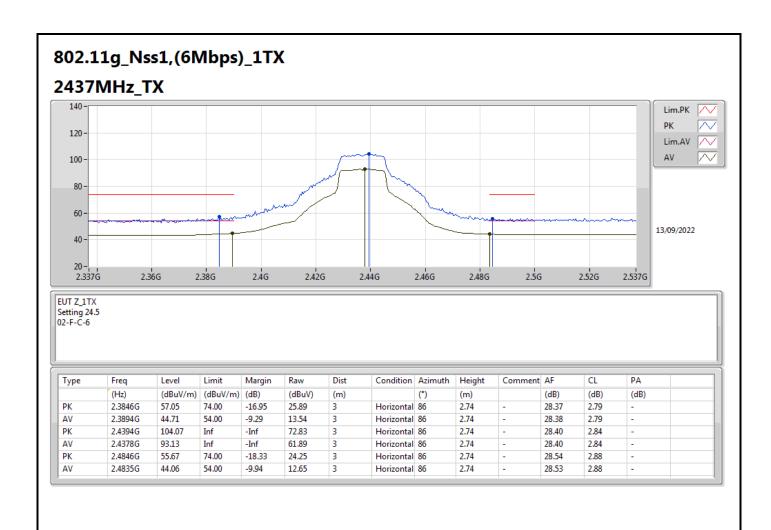




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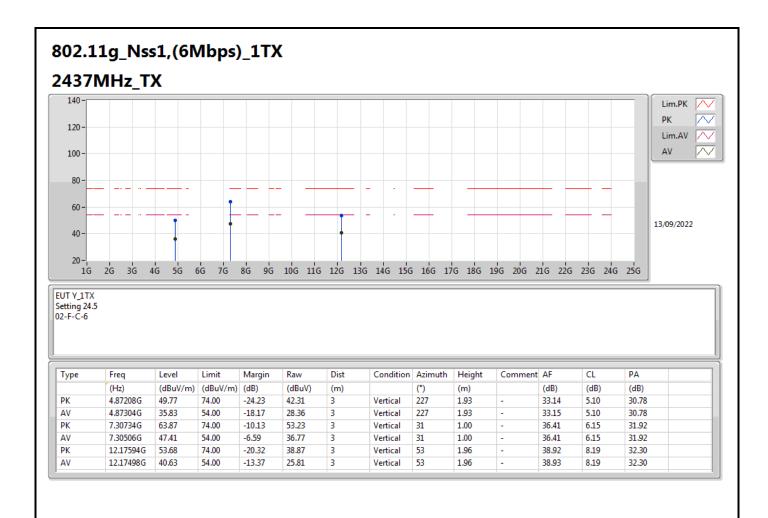




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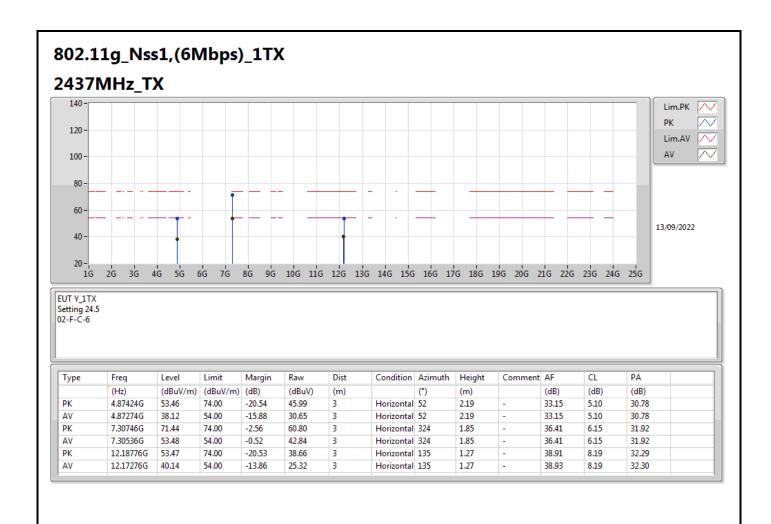




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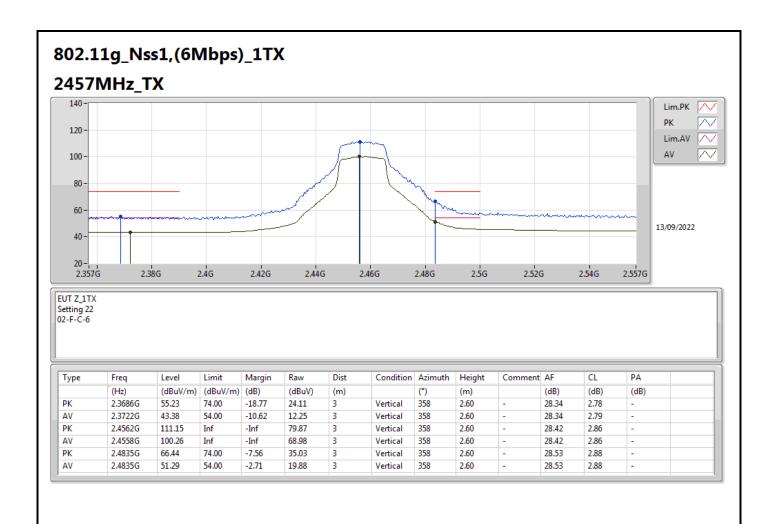




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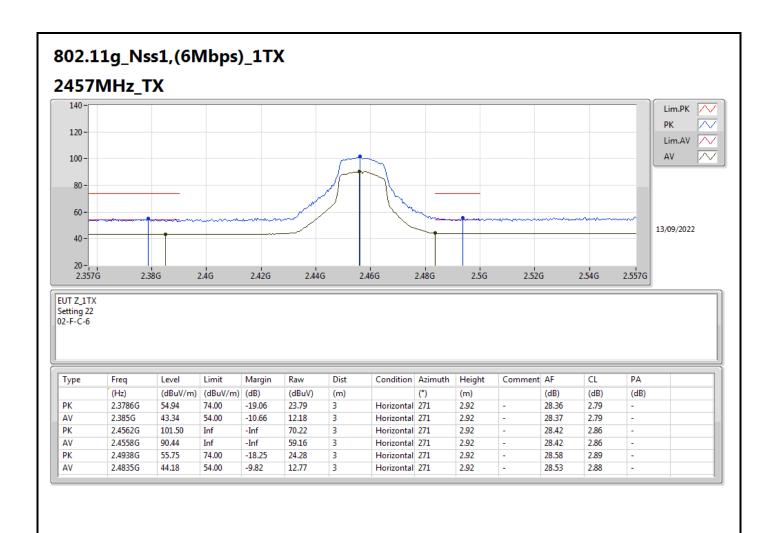




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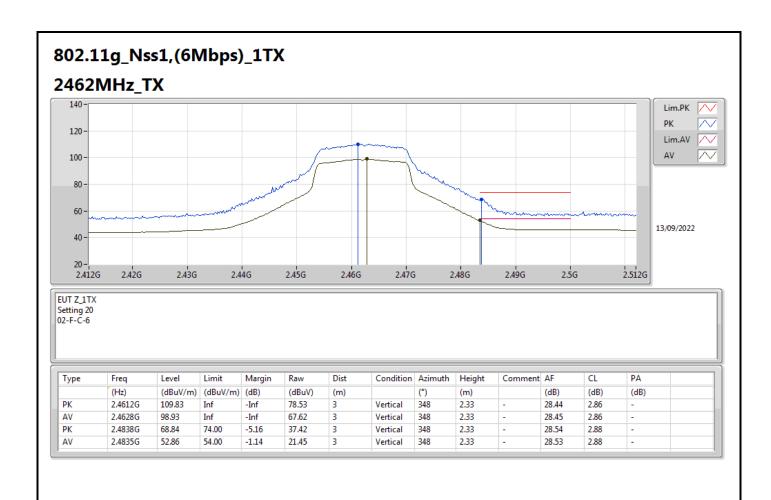




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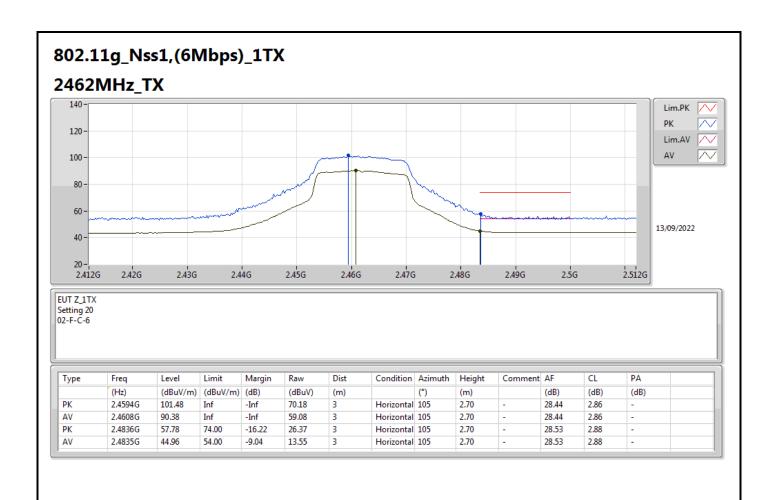




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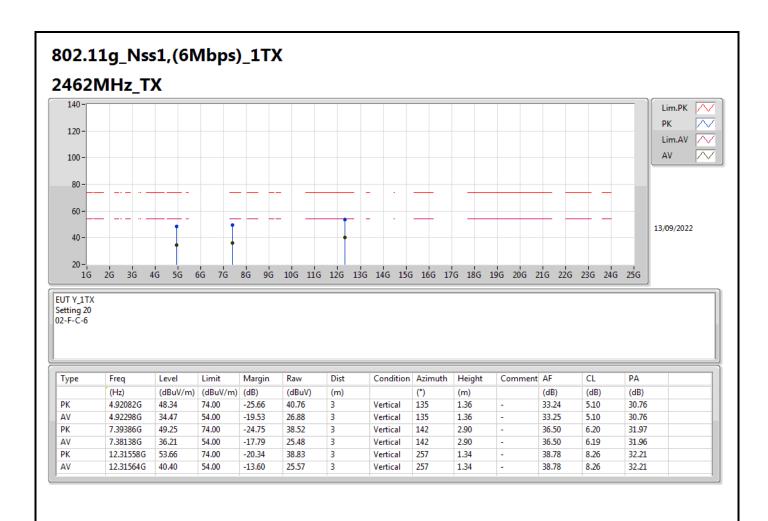




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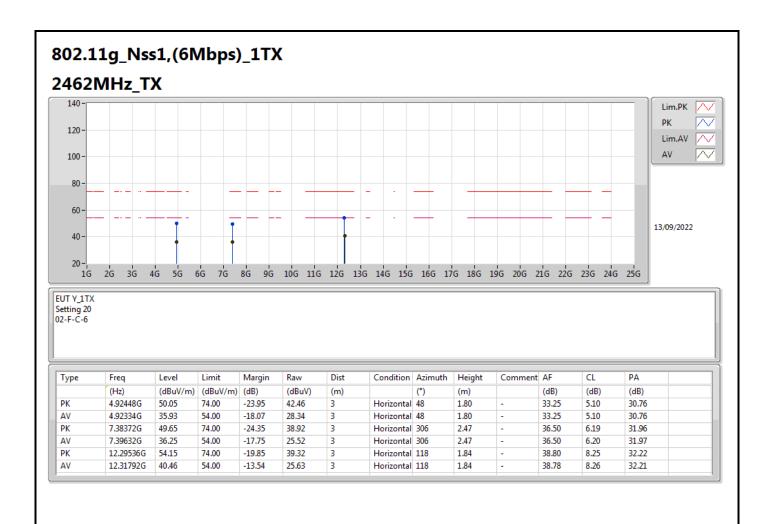




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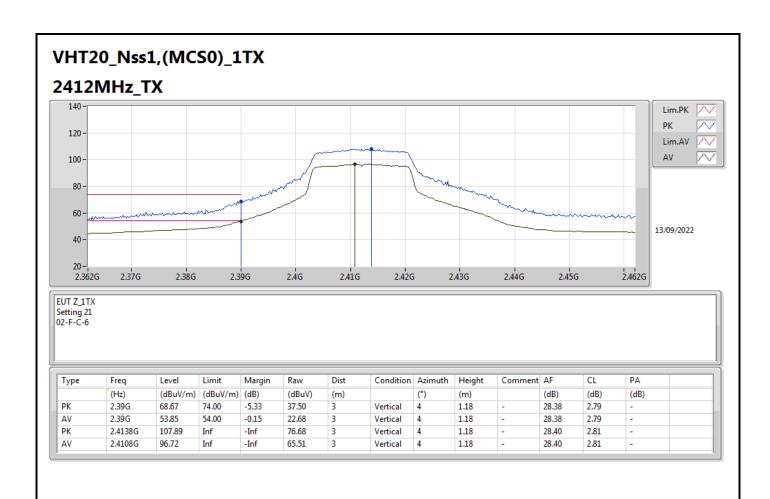




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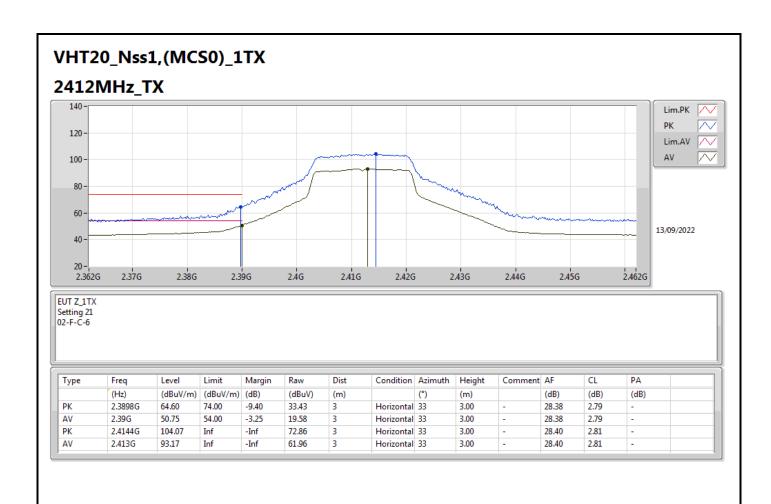




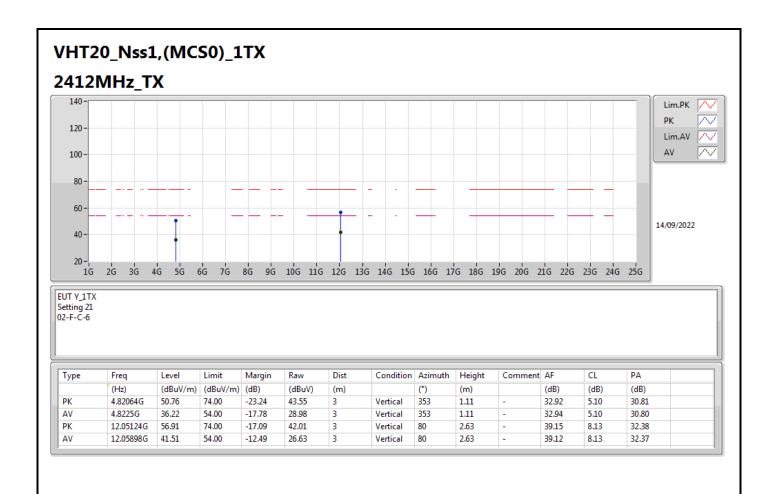
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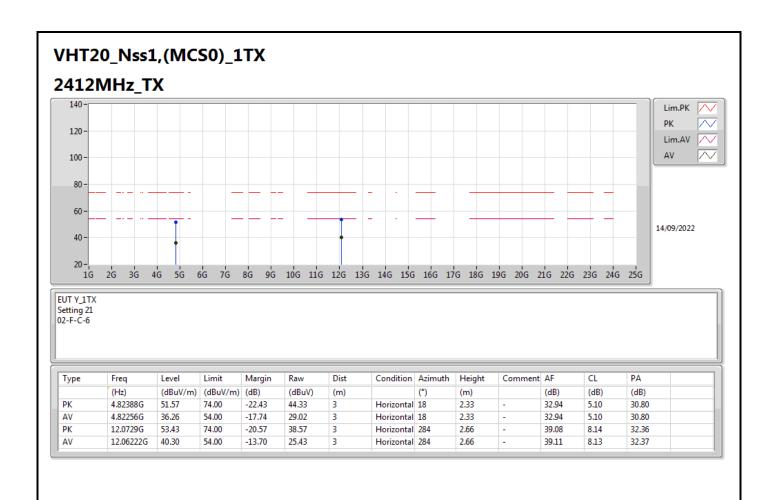




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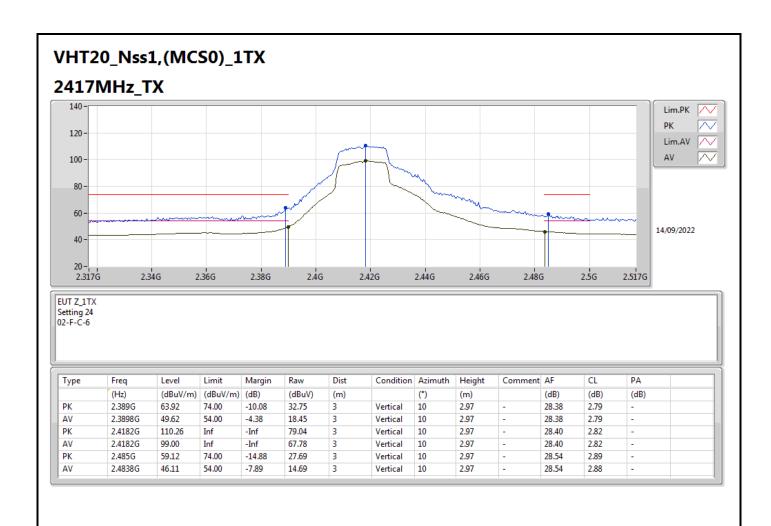




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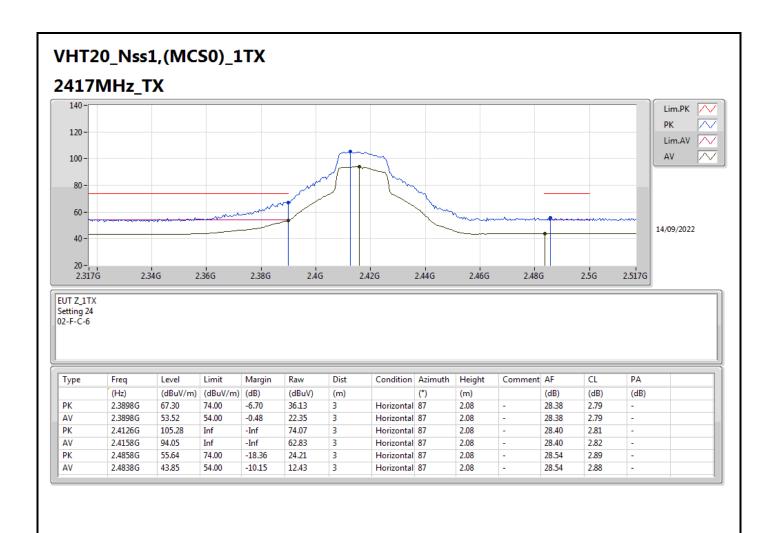




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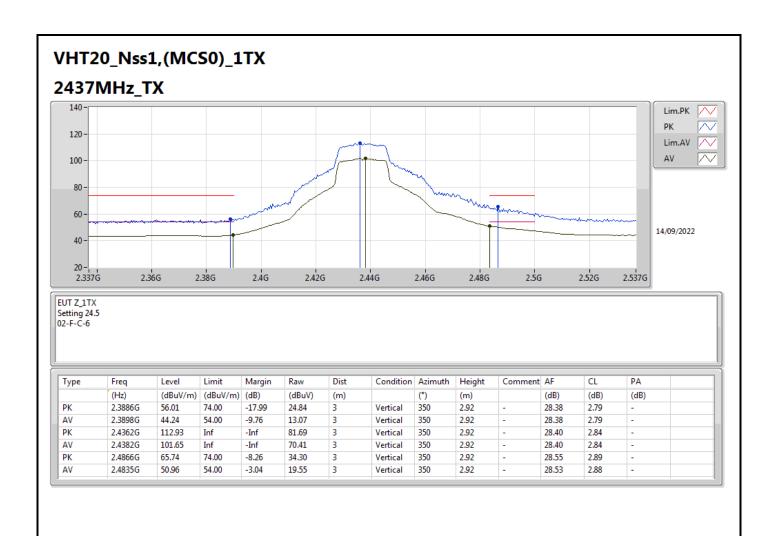




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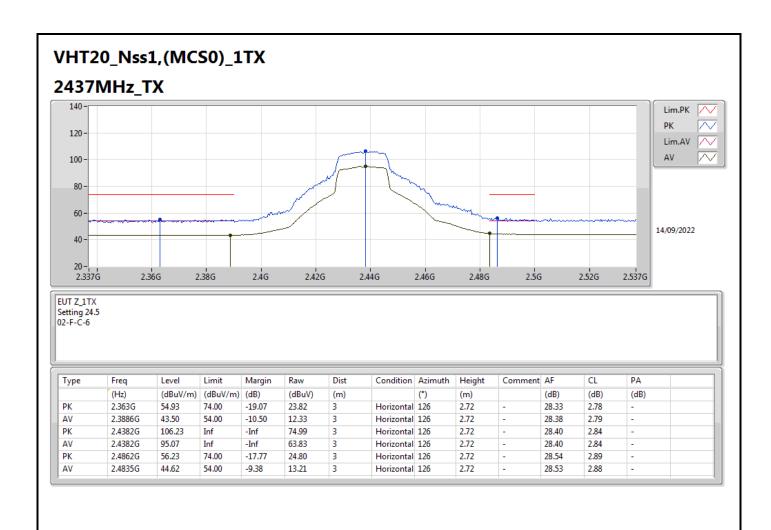




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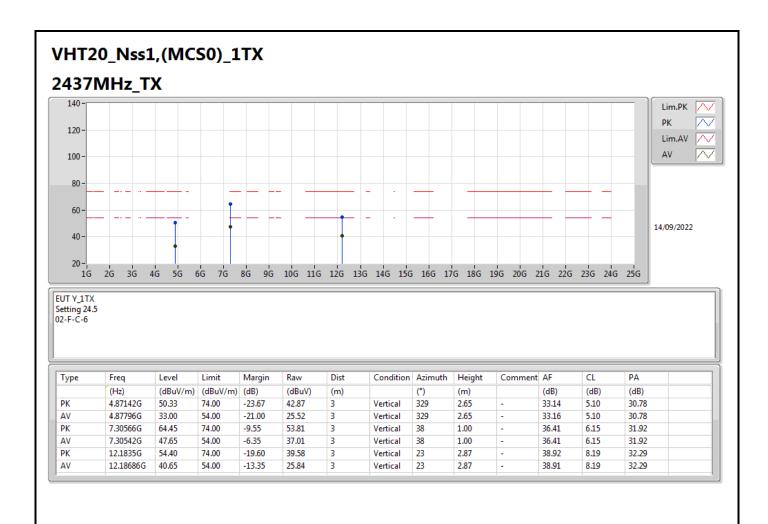




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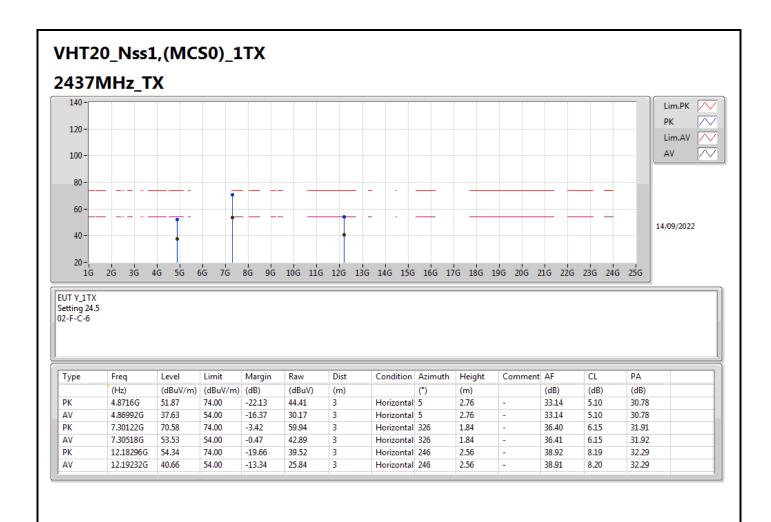




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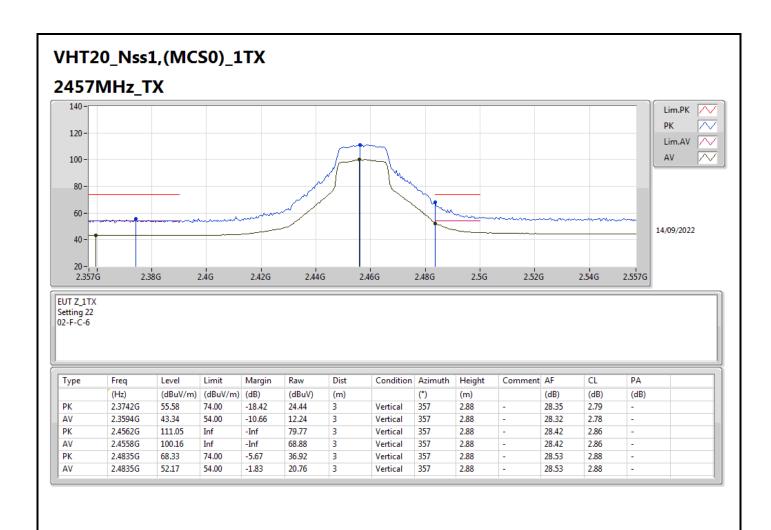




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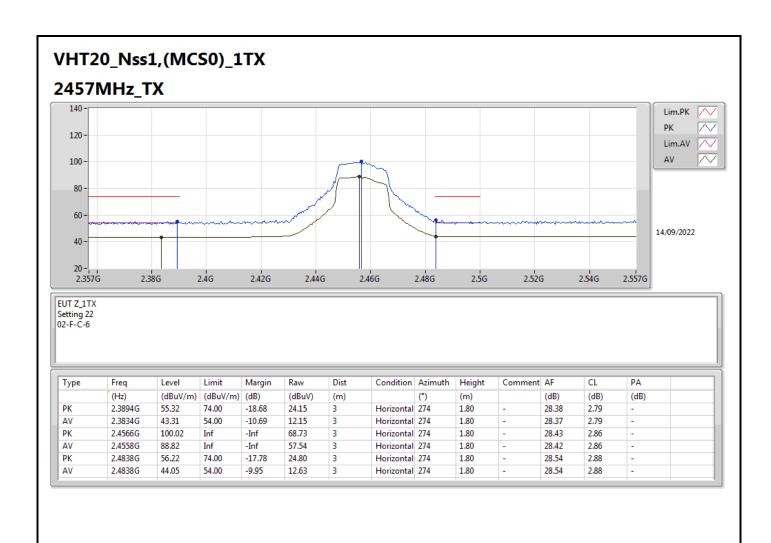




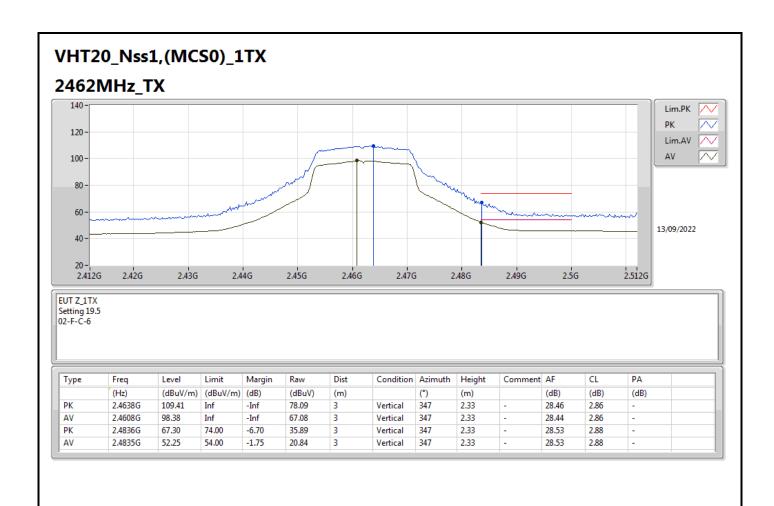
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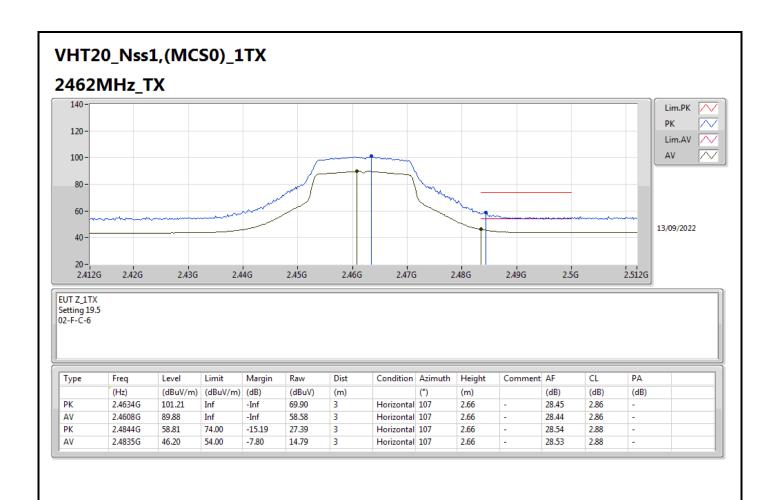




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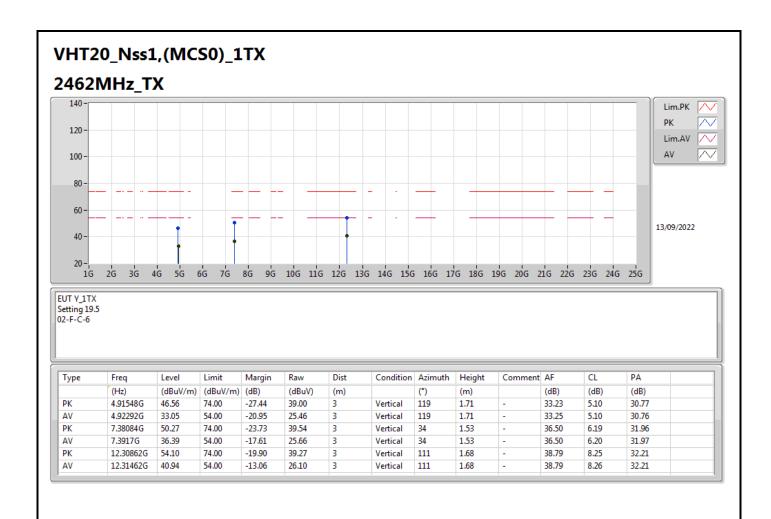




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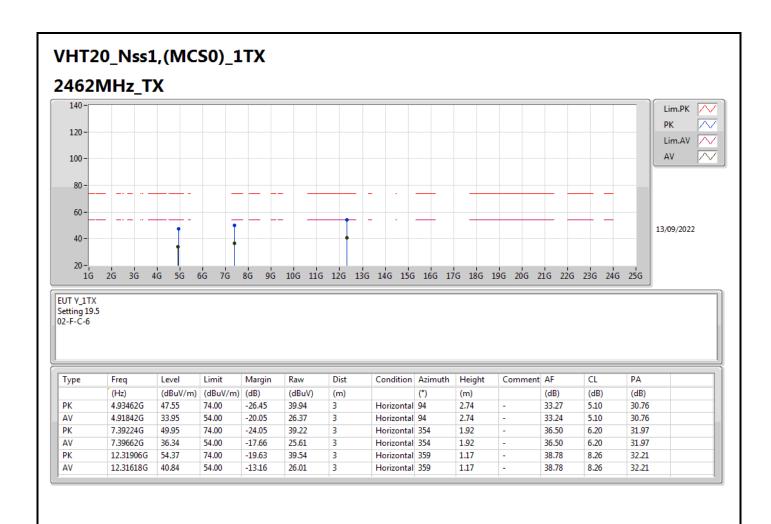




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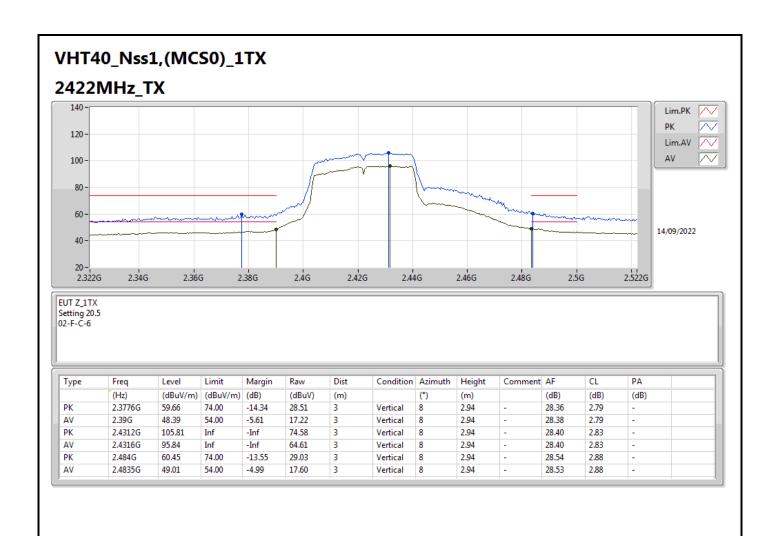




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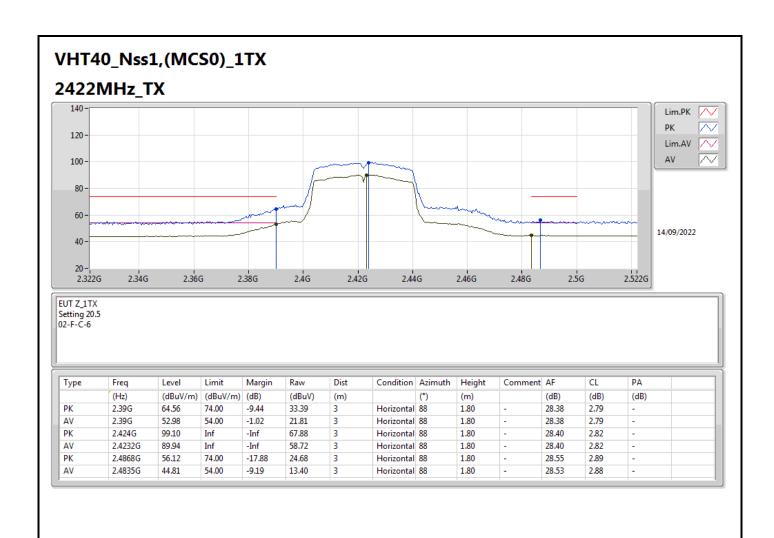




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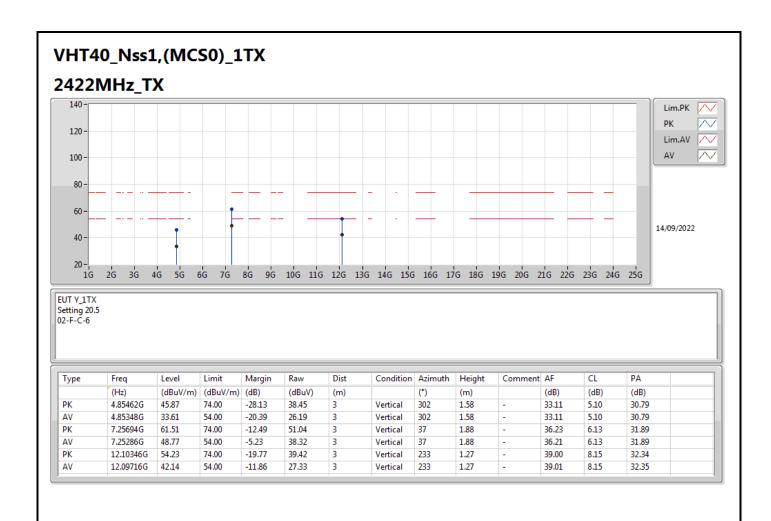




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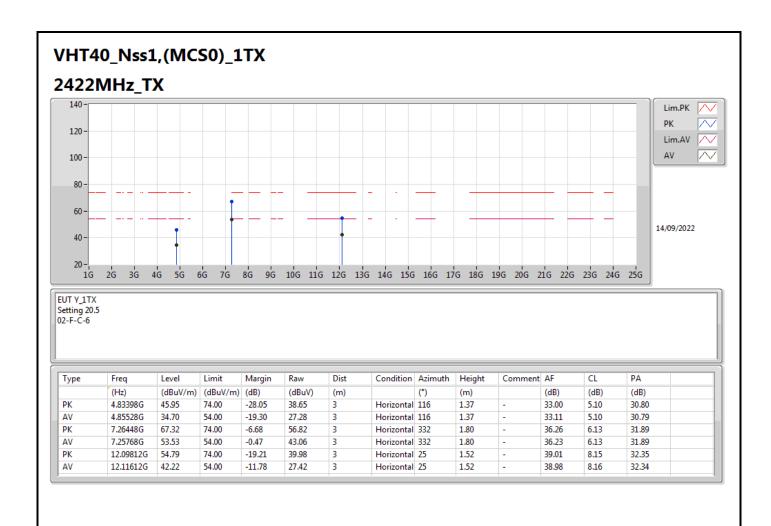




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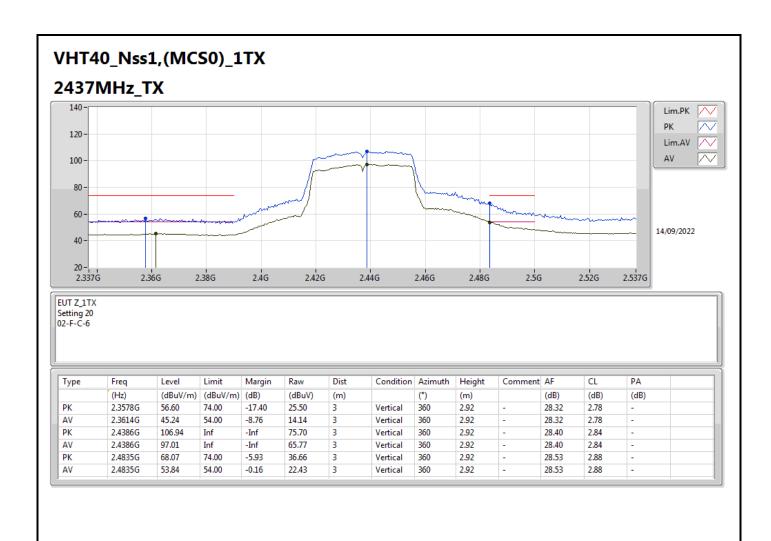




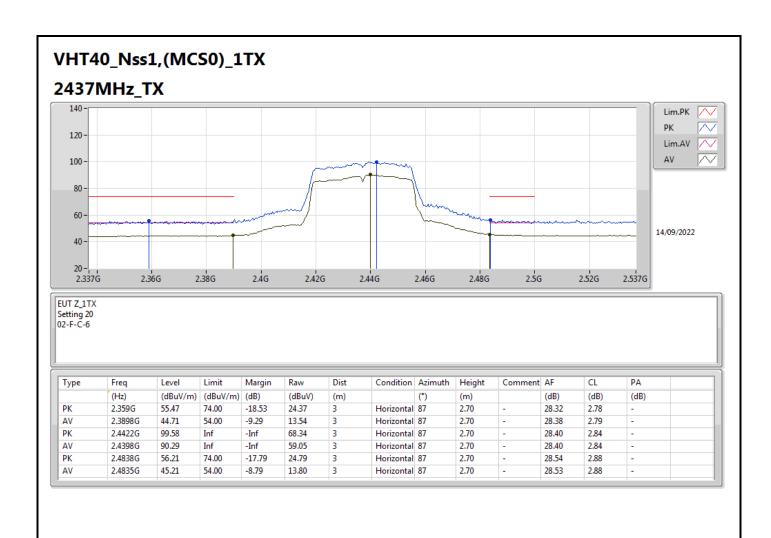
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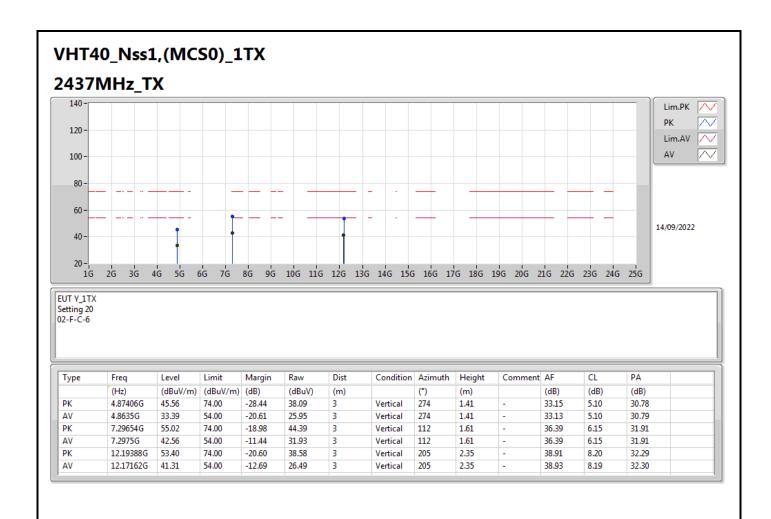




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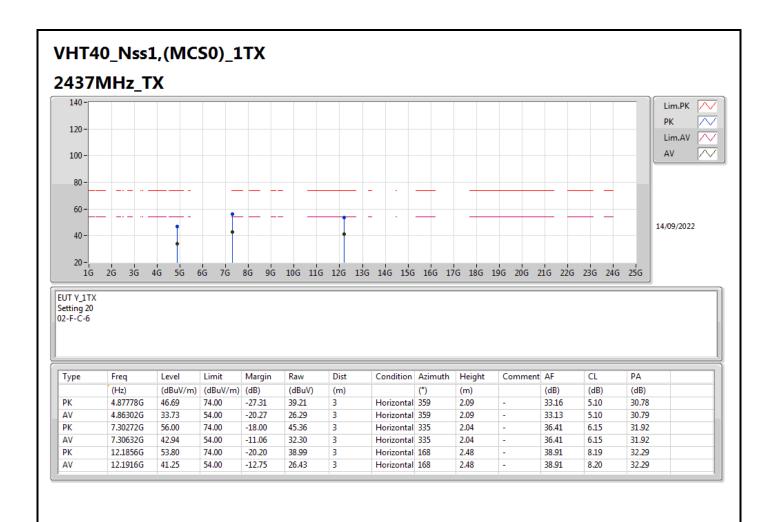




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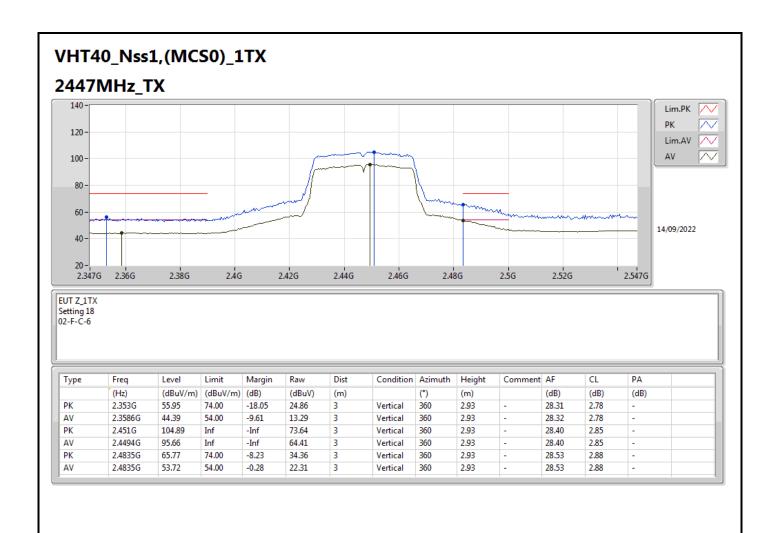




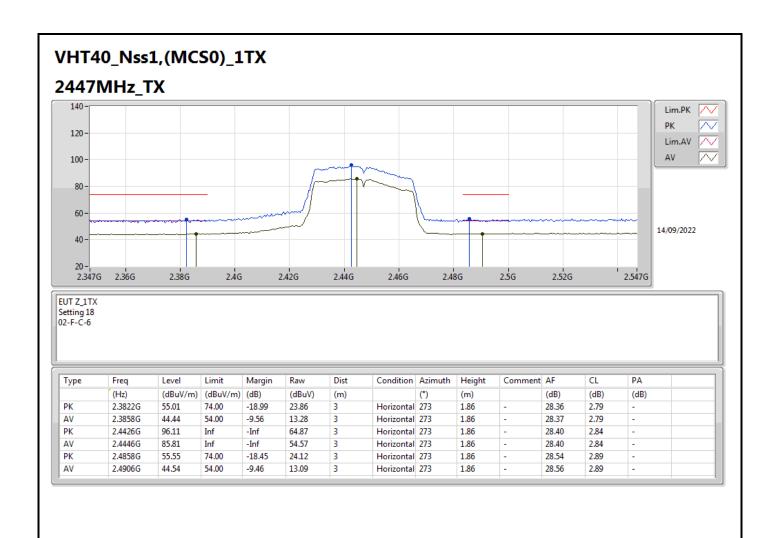
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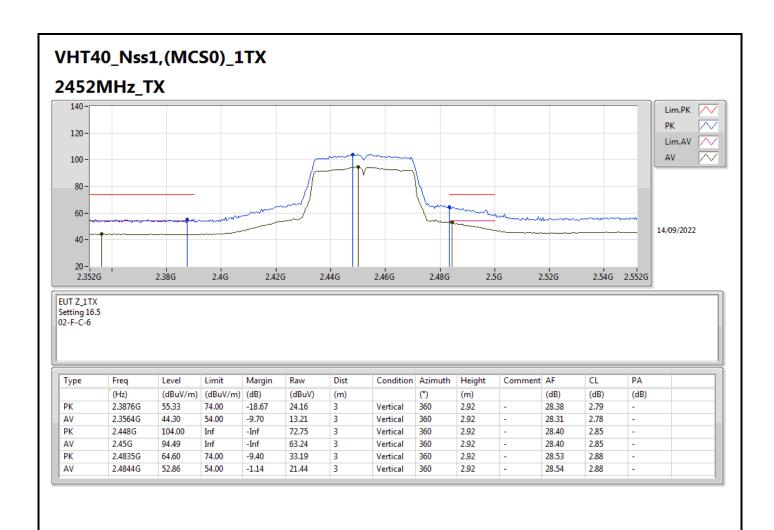




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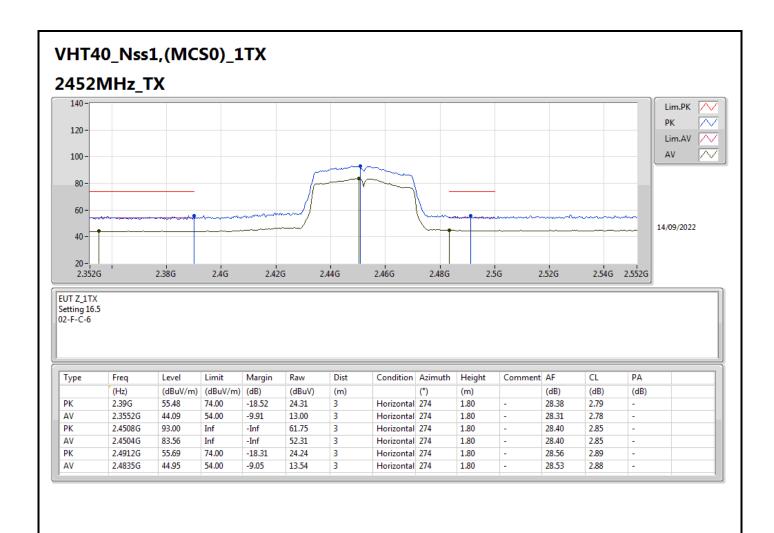




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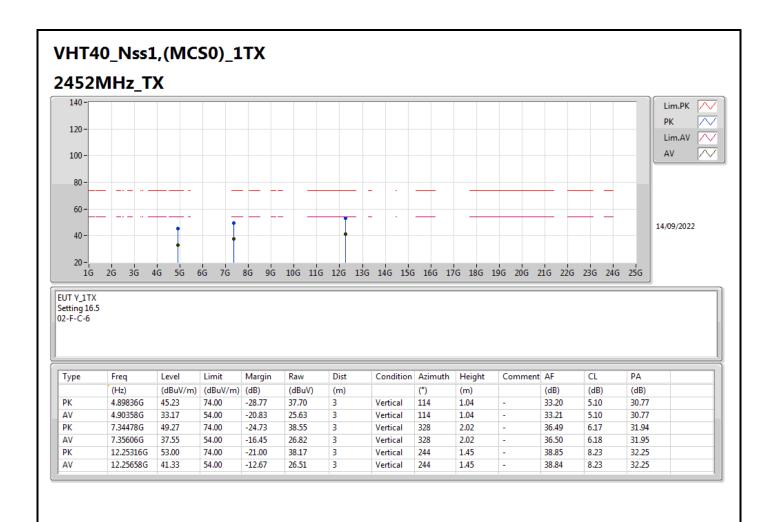




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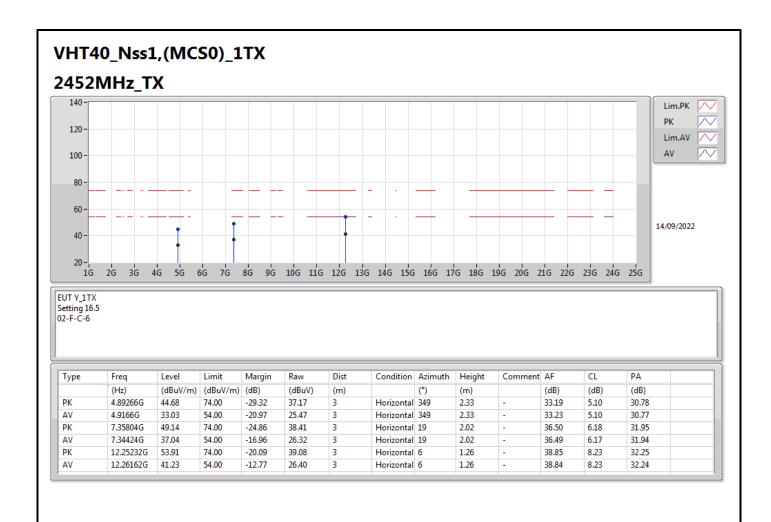




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Radiated Emission Co-location Report

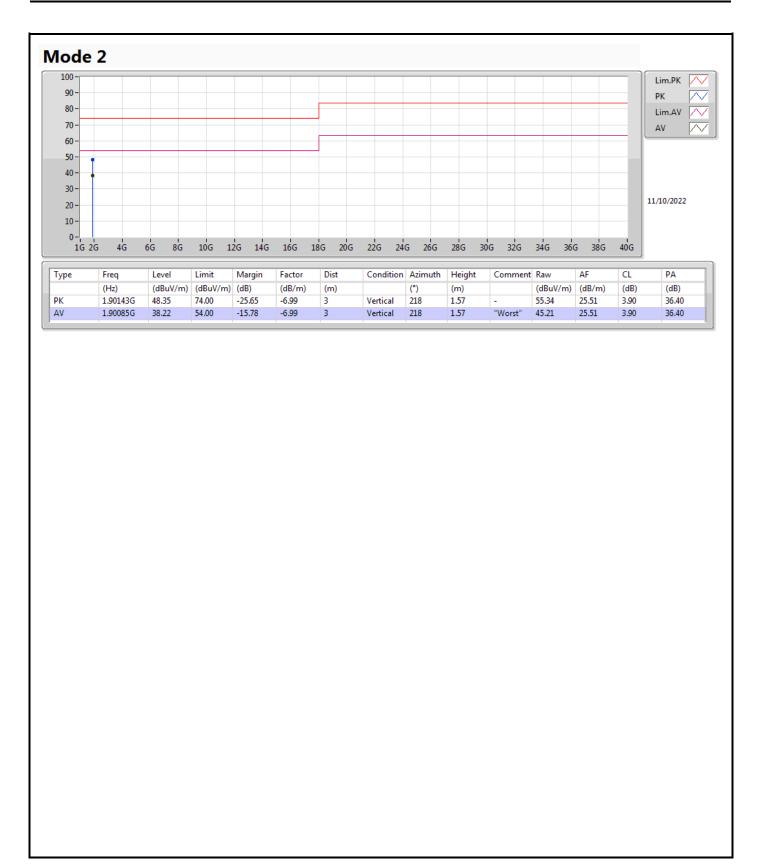
Appendix G

Summary

| Mode | Result | Туре | Freq (Hz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Condition |
|--------|--------|------|--------------|-------------------|-------------------|----------------|-----------|
| Mode 2 | Pass | AV | 1.90085G | 38.22 | 54.00 | -15.78 | Vertical |

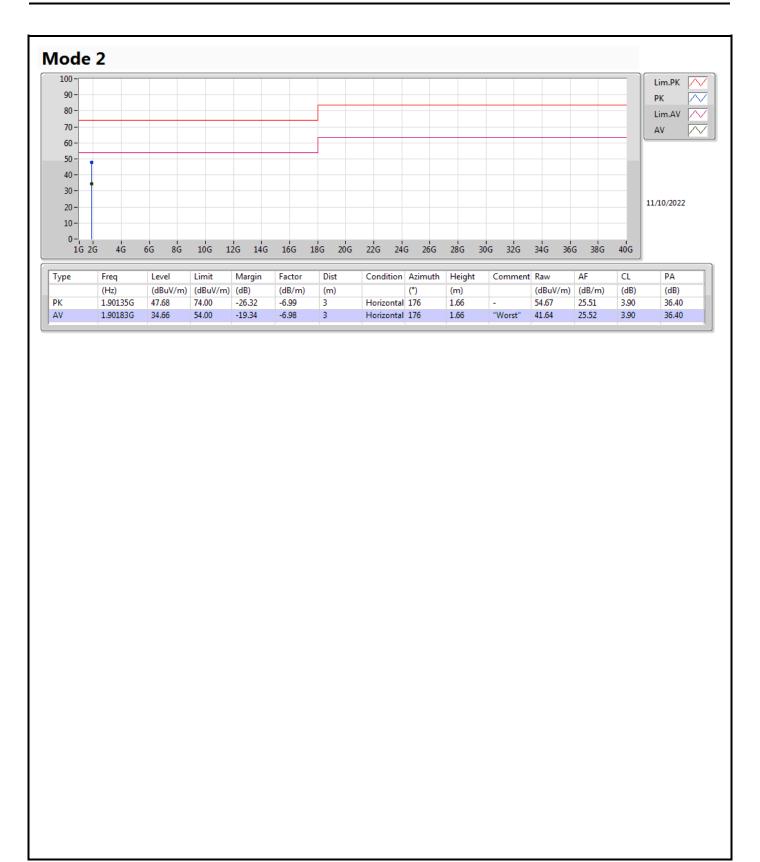
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