

Report No.: FR801751AA



FCC RADIO TEST REPORT

FCC ID : XIA-IFWA40

Equipment : Wireless Home Internet

Brand Name : Netcomm

Model Name : IFWA-40

Applicant : NetComm Wireless Limited

18-20 Orion Road Lane Cove NSW 2066 Australia

Manufacturer : NetComm Wireless Limited

18-20 Orion Road Lane Cove NSW 2066 Australia

Standard: 47 CFR FCC Part 15.247

The product was received on Oct. 22, 2018, and testing was started from Dec. 24, 2018 and completed on Mar. 18, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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

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

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

TEL: 886-3-656-9065

FAX: 886-3-656-9085

Report Template No.: CB Ver1.0

Page Number : 1 of 29

Issued Date : Apr. 02, 2019

Report Version : 01

Table of Contents

| Histo | ory of this test report | 3 |
|-------|--|----|
| Sum | mary of Test Result | 4 |
| 1 | General Description | 5 |
| 1.1 | Information | 5 |
| 1.2 | Testing Applied Standards | 7 |
| 1.3 | Testing Location Information | 7 |
| 1.4 | Measurement Uncertainty | 7 |
| 2 | Test Configuration of EUT | 8 |
| 2.1 | Test Channel Mode | 8 |
| 2.2 | The Worst Case Measurement Configuration | 9 |
| 2.3 | EUT Operation during Test | 10 |
| 2.4 | Accessories | 10 |
| 2.5 | Support Equipment | 10 |
| 2.6 | Test Setup Diagram | 12 |
| 3 | Transmitter Test Result | 15 |
| 3.1 | AC Power-line Conducted Emissions | 15 |
| 3.2 | DTS Bandwidth | 17 |
| 3.3 | Maximum Conducted Output Power | 18 |
| 3.4 | Power Spectral Density | |
| 3.5 | Emissions in Non-restricted Frequency Bands | |
| 3.6 | Emissions in Restricted Frequency Bands | 24 |
| 4 | Test Equipment and Calibration Data | 28 |
| Appe | endix A. Test Results of AC Power-line Conducted Emissions | |
| Appe | endix B. Test Results of DTS Bandwidth | |
| Appe | endix C. Test Results of Maximum Conducted Output Power | |
| Appe | endix D. Test Results of Power Spectral Density | |
| Appe | endix E. Test Results of Emissions in Non-restricted Frequency Bands | |
| Appe | endix F. Test Results of Emissions in Restricted Frequency Bands | |
| Appe | endix G. Test Photos | |
| Phot | ographs of EUT v01 | |

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

Report Template No.: CB Ver1.0

Page Number : 2 of 29

Issued Date : Apr. 02, 2019

Report No.: FR8O1751AA

Report Version : 01

History of this test report

Report No.: FR8O1751AA

| Report No. | Version | Description | Issued Date |
|------------|---------|-------------------------|---------------|
| FR8O1751AA | 01 | Initial issue of report | Apr. 02, 2019 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

TEL: 886-3-656-9065 Page Number : 3 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

Summary of Test Result

Report No.: FR8O1751AA

| 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.

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: Viola Huang

TEL: 886-3-656-9065 Page Number : 4 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

1 General Description

1.1 Information

1.1.1 RF General Information

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

Report No.: FR8O1751AA

| 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 | 802.11ac VHT20 | 20 | 2TX |
| 2.4-2.4835GHz | 802.11n HT40 | 40 | 2TX |
| 2.4-2.4835GHz | 802.11ac VHT40 | 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.
- VHT20, VHT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM 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.

TEL: 886-3-656-9065 Page Number : 5 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

1.1.2 Antenna Information

| | | | | | | (| Gain (dBi) | |
|------|---|---------|-----------|----------------------|--------|--------|------------|------|
| Ant. | nt. Port Brand Model Name Antenna Type Co | | Connector | 2.40 | 5G | 5G | | |
| | | | | 2.4G | Band 1 | Band 4 | | |
| 1 | 1 | Netcomm | - | Printed PIFA Antenna | N/A | 5.17 | - | - |
| 2 | 2 | Netcomm | - | Printed PIFA Antenna | N/A | 3.9 | - | - |
| 3 | 1 | Netcomm | - | Printed PIFA Antenna | N/A | - | 5 | 4.45 |
| 4 | 2 | Netcomm | - | Printed PIFA Antenna | N/A | - | 5.79 | 5.1 |

Report No.: FR8O1751AA

Note: The above information was declared by manufacturer.

Note: The EUT has four WLAN antennas.

For WLAN 2.4GHz (2TX/2RX):

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

For WLAN 5GHz (2TX/2RX):

Ant. 3 (Port 1) and Ant. 4 (Port 2) could transmit/receive simultaneously.

1.1.3 Mode Test Duty Cycle

| Mode | DC | DCF(dB) | T(s) | VBW(Hz) ≥ 1/T |
|----------------|-------|---------|----------------|----------------|
| 802.11b | 0.993 | 0.031 | n/a (DC>=0.98) | n/a (DC>=0.98) |
| 802.11g | 0.958 | 0.186 | 2.068m | 1k |
| 802.11ac VHT20 | 0.893 | 0.491 | 5.017m | 300 |
| 802.11ac VHT40 | 0.783 | 1.062 | 2.441m | 1k |

| П | N | ۔ ا | | _ | |
|---|---|-----|---|---------------------|---|
| П | ı | 16 | Ħ | $\boldsymbol{\sim}$ | 6 |
| | | | | | |

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

1.1.4 EUT Operational Condition

| EUT Power Type | From Power Adapter or Lithium-ion Battery Pack (For backup purposes only during a power outage) | | | | |
|-----------------------|---|--|--|--|--|
| Beamforming Function | ☐ With beamforming ☐ Without beamforming | | | | |
| Function | ⊠ Point-to-multipoint □ Point-to-point | | | | |
| Test Software Version | QRCT-4.0.00088 | | | | |

Note: The above information was declared by manufacturer.

TEL: 886-3-656-9065 Page Number : 6 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

1.2 Testing Applied Standards

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

Report No.: FR8O1751AA

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 558074 D01 v05r01
- FCC KDB 662911 D01 v02r01

1.3 Testing Location Information

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

| Test Condition | Test Site No. | Test Engineer | Test Environment | Test Date |
|------------------------------|---------------|---------------|---------------------|-------------------------------|
| RF Conducted | TH01-CB | Welson Chen | 21°C~23°C / 53%~55% | Feb. 14, 2019 ~ Feb. 26, 2019 |
| Radiated (For below 1GHz) | 03CH01-CB | Eason Chen | 21°C~23°C / 53%~55% | Feb. 16, 2019 ~ Mar. 18, 2019 |
| Radiated (For above 1GHz) | 03CH01-CB | Eason Chen | 21°C~23°C / 53%~55% | Jan. 26, 2019 ~ Feb. 26, 2019 |
| AC Conduction | CO02-CB | Max Lin | 23°C / 55% | Dec. 24, 2018 |

Test site Designation No. TW0006 with FCC.

1.4 Measurement Uncertainty

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

| Test Items | Uncertainty | Remark |
|--------------------------------------|------------------------|--------------------------|
| Conducted Emission (150kHz ~ 30MHz) | 2.0 dB | Confidence levels of 95% |
| Radiated Emission (30MHz ~ 1,000MHz) | 3.6 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% |

TEL: 886-3-656-9065 Page Number: 7 of 29
FAX: 886-3-656-9085 Issued Date: Apr. 02, 2019

Test site registered number IC 4086B with Industry Canada.

2 Test Configuration of EUT

2.1 Test Channel Mode

| Mode | PowerSetting |
|--------------------------------|--------------|
| 802.11b_Nss1,(1Mbps)_2TX | - |
| 2412MHz | 19.5 |
| 2437MHz | 19 |
| 2457MHz | 19 |
| 2462MHz | 19 |
| 802.11g_Nss1,(6Mbps)_2TX | - |
| 2412MHz | 16 |
| 2417MHz | 18.5 |
| 2437MHz | 18 |
| 2457MHz | 17.5 |
| 2462MHz | 13.5 |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | - |
| 2412MHz | 15.5 |
| 2417MHz | 17 |
| 2437MHz | 16.5 |
| 2457MHz | 17.5 |
| 2462MHz | 13 |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | - |
| 2422MHz | 14 |
| 2437MHz | 15 |
| 2447MHz | 13 |
| 2452MHz | 11.5 |

Report No.: FR8O1751AA

Note:

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

TEL: 886-3-656-9065 Page Number : 8 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

The Worst Case Measurement Configuration 2.2

| 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 | Normal Link | |
| 1 | EUT + WCDMA Band 2 + WLAN + Adapter | |
| 2 | EUT + LTE Band 5 + WLAN + Adapter | |
| For operating mode 2 is the worst case and it was record in this test report. | | |

Report No.: FR8O1751AA

| 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 | Normal Link | | |
| 1 | EUT in Z axis + LTE Band 5 + WLAN + Adapter | | |
| 2 | EUT in Y axis + LTE Band 5 + WLAN + Adapter | | |
| Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode. | | | |
| 3 | EUT in Z axis + WCDMA Band 2 + WLAN + Adapter | | |
| Mode 3 has been evaluated to be the worst case between Mode 1~3, thus measurement for Mode 4 v follow this same test mode. | | | |
| 4 | EUT in Z axis + WCDMA Band 2 + WLAN + Battery | | |
| For operating mode 3 is the worst case and it was record in this test report. | | | |
| | СТХ | | |
| Operating Mode > 1GHz | The EUT was performed at Y axis and Z axis position for Radiated emission above 1GHz test, and the worst case was found at Z axis. So the measurement will follow this same test configuration. | | |
| 1 | EUT in Z axis | | |

Note: The USB function was not evaluated by manufacturer request.

TEL: 886-3-656-9065 Page Number : 9 of 29 FAX: 886-3-656-9085 : Apr. 02, 2019 Issued Date

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

| | Accessories | | | |
|-----|------------------------|------------|-------------------------|--|
| No. | Equipment Name | Brand Name | Model Name | Rating |
| 1 | Adapter | DVE/CUI | DSA-18PFR-12 FUS 090200 | Input: 100-240V~50/60Hz, 0.6A Output: +9V, 2A |
| 2 | Lithium-ion Battery | NetComm | BAT-40 | 3.7VDC, 3000mAh, 11.1Wh |

Report No.: FR8O1751AA

2.5 Support Equipment

For Test Site No: CO02-CB

| | Support Equipment | | | | |
|-----|-------------------|------------|------------|--------|--|
| No. | Equipment | Brand Name | Model Name | FCC ID | |
| Α | NB | DELL | E6430 | N/A | |
| В | NB | DELL | E6430 | N/A | |
| С | NB | DELL | E6430 | N/A | |
| D | LTE Base station | Anritsu | MT8820C | N/A | |
| Е | Phone | SAMPO | HT-B 907WL | N/A | |
| F | Phone | SAMPO | HT-B 907WL | N/A | |
| G | SIM card | N/A | N/A | N/A | |

TEL: 886-3-656-9065 Page Number : 10 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

For Test Site No: 03CH01-CB (below 1GHz)

| Support Equipment | | | | |
|-------------------|------------------|------------|------------|--------|
| No. | Equipment | Brand Name | Model Name | FCC ID |
| Α | NB | DELL | E4300 | N/A |
| В | NB | DELL | E4300 | N/A |
| С | NB | DELL | E4300 | N/A |
| D | LTE base station | Anritsu | MT8820C | N/A |
| Е | Phone | H-T-T | F-689 | N/A |
| F | Phone | H-T-T | F-689 | N/A |
| G | SIM card | N/A | N/A | N/A |

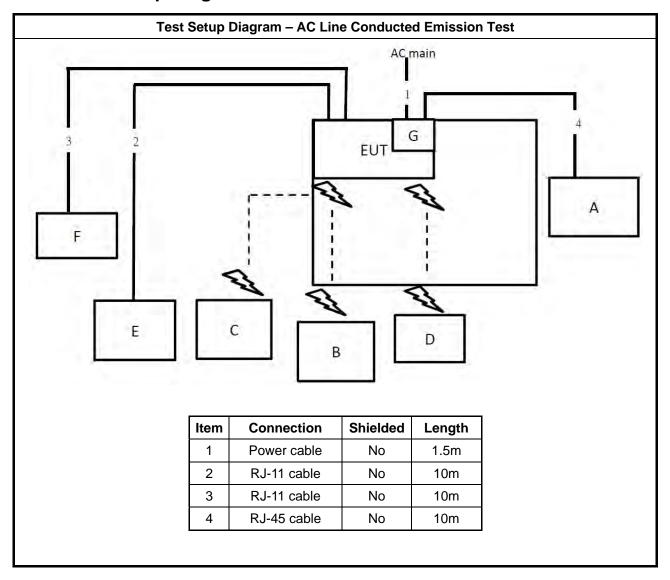
Report No.: FR8O1751AA

For Test Site No: 03CH01-CB (above 1GHz) and TH01-CB

| Support Equipment | | | | |
|-------------------|-----------|------------|------------|--------|
| No. | Equipment | Brand Name | Model Name | FCC ID |
| Α | NB | Lenovo | TP00048A | N/A |

TEL: 886-3-656-9065 Page Number : 11 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

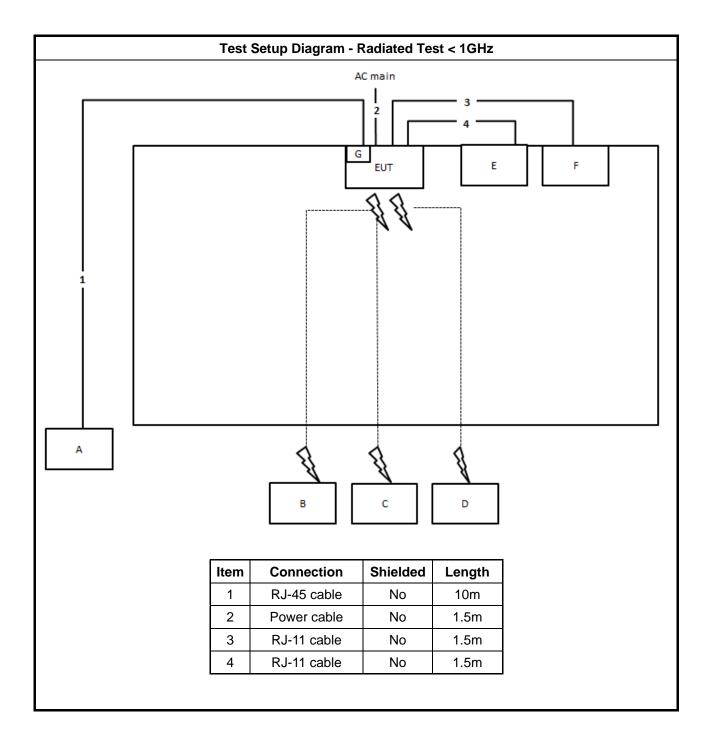
2.6 Test Setup Diagram



Report No.: FR8O1751AA

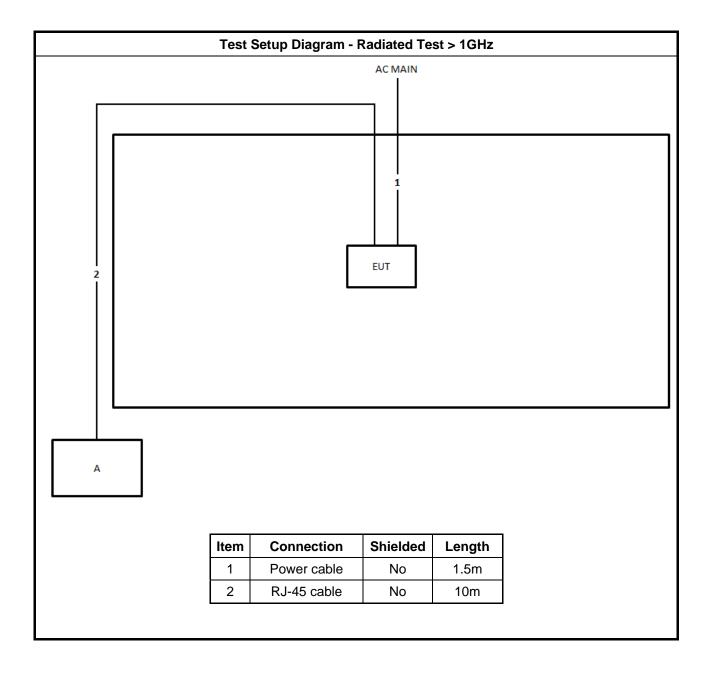
TEL: 886-3-656-9065 Page Number : 12 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

Report No. : FR8O1751AA



TEL: 886-3-656-9065 Page Number : 13 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

Report No. : FR8O1751AA



TEL: 886-3-656-9065 Page Number : 14 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

| AC Pow | er-line Conducted Emissions I | 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 | of the frequency. | |

Report No.: FR8O1751AA

3.1.2 Measuring Instruments

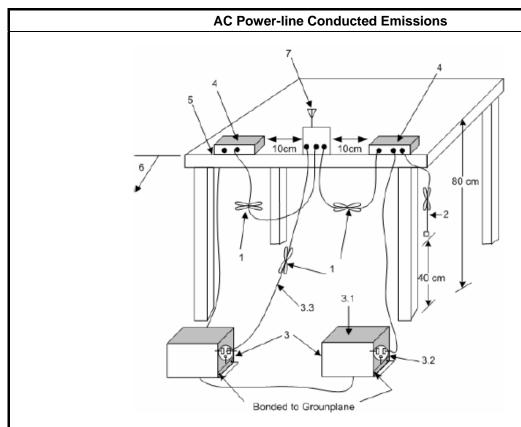
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

TEL: 886-3-656-9065 Page Number : 15 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

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.

Report No.: FR8O1751AA

- 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

TEL: 886-3-656-9065 Page Number : 16 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

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

Report No.: FR8O1751AA

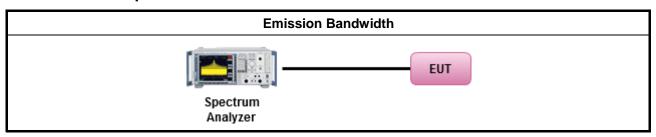
3.2.2 Measuring Instruments

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: | | |
| | \boxtimes | Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement. | | |
| | | Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement. | | |
| | | Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing. | | |

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

TEL: 886-3-656-9065 Page Number : 17 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit

- If $G_{TX} \le 6$ dBi, then $P_{Out} \le 30$ dBm (1 W)
- Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)$ dBm
- Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
- Smart antenna system (SAS):
 - Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
 - Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
 - Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3 + 8$ dB dBm

Report No.: FR801751AA

 \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.

TEL: 886-3-656-9065 Page Number : 18 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

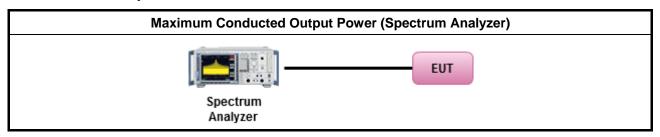
3.3.3 Test Procedures

| | | Test Method |
|---|-------|--|
| • | Max | imum 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 | imum Conducted Output Power |
| | [duty | cycle ≥ 98% or external video / power trigger] |
| | | Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1. |
| | | Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.3 Method AVGSA-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: $P_{total} = P_1 + P_2 + + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP _{total} = $P_{total} + DG$ |

Report No.: FR8O1751AA

TEL: 886-3-656-9065 Page Number : 19 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

3.3.4 Test Setup



Report No.: FR8O1751AA

3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

TEL: 886-3-656-9065 Page Number : 20 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

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

Report No.: FR8O1751AA

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

TEL: 886-3-656-9065 Page Number : 21 of 29

FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

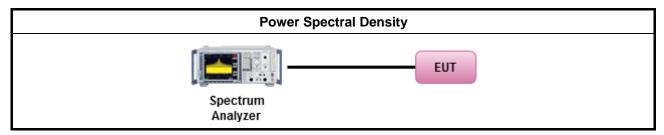
Page Number : 21 of 29

Report Templete No. : CR Vert 0

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.

Report No.: FR8O1751AA

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

TEL: 886-3-656-9065 Page Number : 22 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

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 | | | | |

Report No.: FR8O1751AA

- 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.

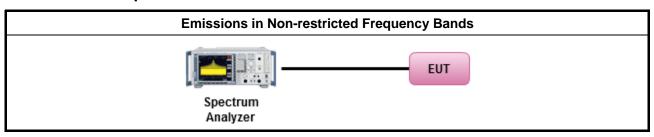
3.5.2 Measuring Instruments

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

TEL: 886-3-656-9065 Page Number : 23 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

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 | | | | | |

Report No.: FR8O1751AA

- 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 ELIT
- 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.

TEL: 886-3-656-9065 Page Number : 24 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

3.6.3 Test Procedures

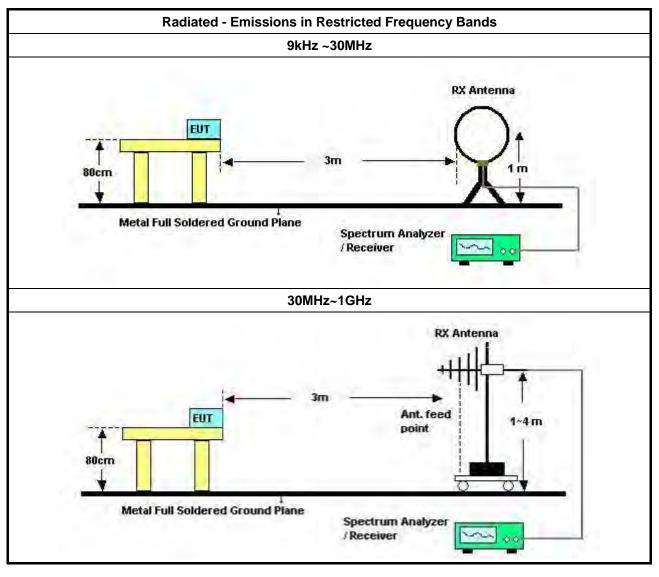
| | Test Method | | | | | | | |
|---|---|--|--|--|--|--|--|--|
| • | The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor]. | | | | | | | |
| • | Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency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

Report No.: FR8O1751AA

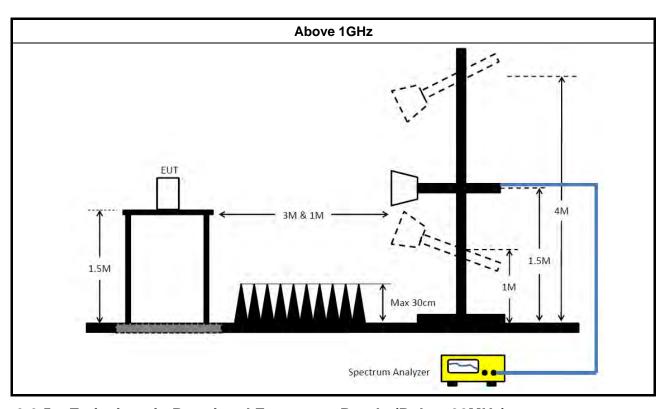
TEL: 886-3-656-9065 Page Number : 25 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

Report No.: FR8O1751AA

3.6.4 Test Setup



TEL: 886-3-656-9065 Page Number : 26 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019



Report No.: FR8O1751AA

3.6.5 Emissions in Restricted Frequency Bands (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 Emissions in Restricted Frequency Bands

Refer as Appendix F

TEL: 886-3-656-9065 Page Number : 27 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

4 Test Equipment and Calibration Data

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|---|-----------------|----------------------|---------------------|-----------------|---------------------|-------------------------|--------------------------|
| LISN | Schwarzbeck | NSLK 8127 | 8127650 | 9kHz ~ 30MHz | Nov. 21, 2018 | Nov. 20, 2019 | Conduction (CO02-CB) |
| LISN | Schwarzbeck | NSLK 8127 | 8127478 | 9kHz ~ 30MHz | Nov. 05, 2018 | Nov. 04, 2019 | Conduction (CO02-CB) |
| EMI Receiver | Agilent | N9038A | MY52260140 | 9kHz ~ 8.4GHz | Jan. 17, 2018 | Jan. 16, 2019 | Conduction (CO02-CB) |
| COND Cable | Woken | Cable | 2 | 0.15MHz ~ 30MHz | Nov. 06, 2018 | Nov. 05, 2019 | Conduction (CO02-CB) |
| Software | Audix | E3 | 6.120210n | - | N.C.R. | N.C.R. | Conduction (CO02-CB) |
| BILOG ANTENNA with 6dB Attenuator | TESEQ & EMCI | CBL6112D & N-6-06 | 37880 & AT-N0609 | 20MHz ~ 2GHz | Aug. 27, 2018 | Aug. 26, 2019 | Radiation (03CH01-CB) |
| Loop Antenna | Teseq | HLA 6120 | 24155 | 9kHz - 30 MHz | Mar. 16, 2018 | Mar. 15, 2019 | Radiation (03CH01-CB) |
| Loop Antenna | Teseq | HLA 6120 | 31244 | 9kHz - 30 MHz | Mar. 18, 2019* | Mar. 17, 2021* | Radiation (03CH01-CB) |
| Horn Antenna | EMCO | 3115 | 00075790 | 750MHz ~ 18GHz | Nov. 13, 2018 | Nov. 12, 2019 | Radiation (03CH01-CB) |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA9170252 | 15GHz ~ 40GHz | Jun. 28, 2018 | Jun. 27, 2019 | Radiation (03CH01-CB) |
| Pre-Amplifier | EMCI | EMC330N | 980332 | 20MHz ~ 3GHz | May 02, 2018 | May 01, 2019 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8449B | 3008A02310 | 1GHz ~ 26.5GHz | Jan. 08, 2019 | Jan. 07, 2020 | Radiation (03CH01-CB) |
| Pre-Amplifier | MITEQ | TTA1840-35- HG | 1864479 | 18GHz ~ 40GHz | Jul. 04, 2018 | Jul. 03, 2019 | Radiation (03CH01-CB) |
| Spectrum anal yzer | R&S | FSP40 | 100080 | 9kHz~40GHz | Oct. 03, 2018 | Oct. 02, 2019 | Radiation (03CH01-CB) |
| EMI Test Receiver | R&S | ESCS | 100359 | 9kHz ~ 2.75GHz | Jul. 03, 2018 | Jul. 02, 2019 | Radiation (03CH01-CB) |
| RF Cable-low | Woken | Low Cable-16+17 | N/A | 30 MHz ~ 1 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-16 | N/A | 1 GHz ~ 18 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-16+17 | N/A | 1 GHz ~ 18 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G#1 | N/A | 18GHz ~ 40 GHz | Jul. 27, 2018 | Jul. 26, 2019 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G#2 | N/A | 18GHz ~ 40 GHz | Jul. 27, 2018 | Jul. 26, 2019 | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSV40 | 101027 | 9kHz~40GHz | Jun. 22, 2018 | Jun. 21, 2019 | Conducted (TH01-CB) |
| Temp. and Humidity Chamber | Ten Billion | TTH-D3SP | TBN-931011 | -30~100 degree | Jun. 01, 2018 | May 31, 2019 | Conducted (TH01-CB) |

TEL: 886-3-656-9065 FAX: 886-3-656-9085 Report Template No.: CB Ver1.0 Page Number : 28 of 29
Issued Date : Apr. 02, 2019

Report No.: FR8O1751AA

Report Version : 01

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|---------------|--------------|-----------|---------------|------------------|---------------------|-------------------------|------------------------|
| RF Cable-high | Woken | RG402 | High Cable-06 | 1 GHz – 26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-07 | 1 GHz –26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-08 | 1 GHz –26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-09 | 1 GHz –26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-10 | 1 GHz –26.5 GHz | Oct. 08, 2018 | Oct. 07, 2019 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-28 | 1 GHz –26.5 GHz | Nov. 19, 2018 | Nov. 18, 2019 | Conducted (TH01-CB) |
| Power Sensor | Agilent | U2021XA | MY53410001 | 50MHz~18GHz | Nov. 05, 2018 | Nov. 04, 2019 | Conducted (TH01-CB) |

Report No.: FR8O1751AA

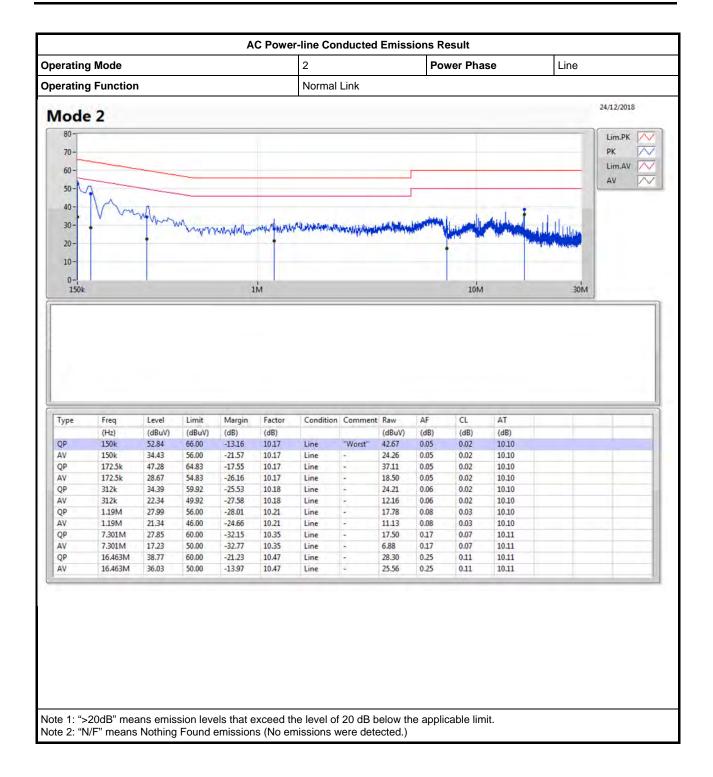
Note: Calibration Interval of instruments listed above is one year.

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

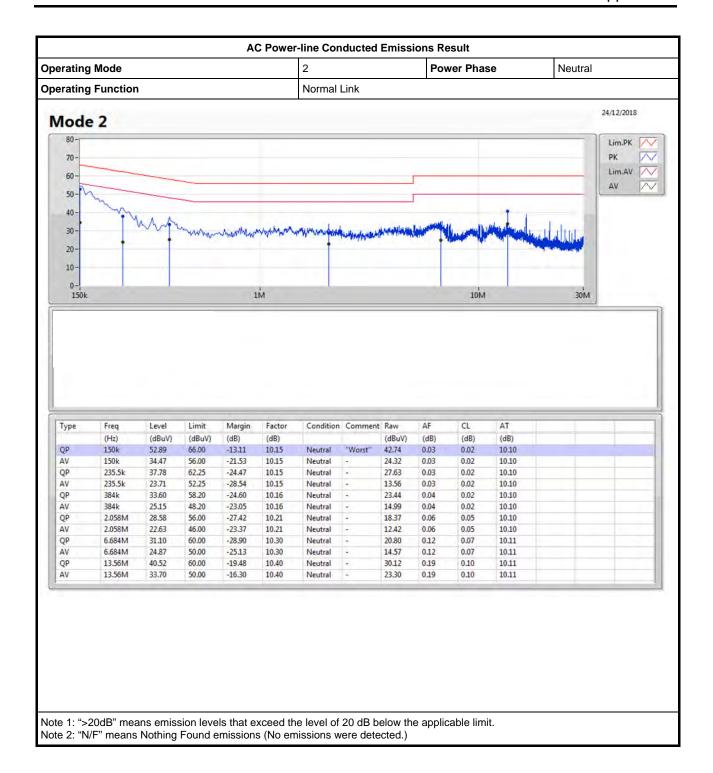
TEL: 886-3-656-9065 Page Number : 29 of 29
FAX: 886-3-656-9085 Issued Date : Apr. 02, 2019

[&]quot;*" Calibration Interval of instruments listed above is two years.

AC Power-line Conducted Emissions Result



AC Power-line Conducted Emissions Result





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 | 9.05M | 13.593M | 13M6G1D | 7.55M | 12.894M |
| 802.11g_Nss1,(6Mbps)_2TX | 16.35M | 16.692M | 16M7D1D | 16.275M | 16.492M |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | 17.575M | 17.766M | 17M8D1D | 17.55M | 17.691M |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | 36.35M | 36.332M | 36M3D1D | 35.65M | 36.182M |

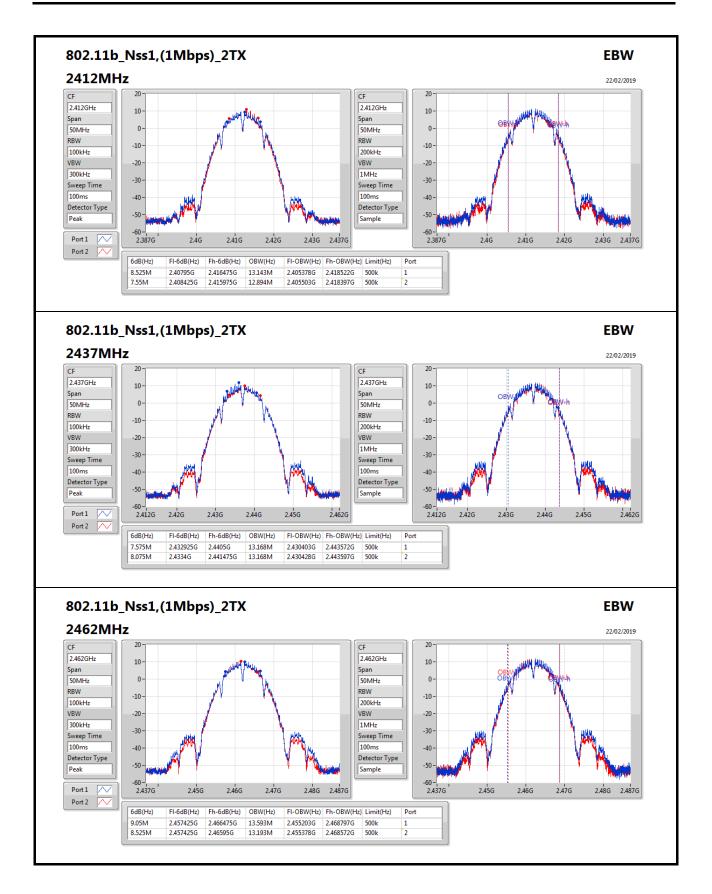
Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth; **Min-N dB** = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

Result

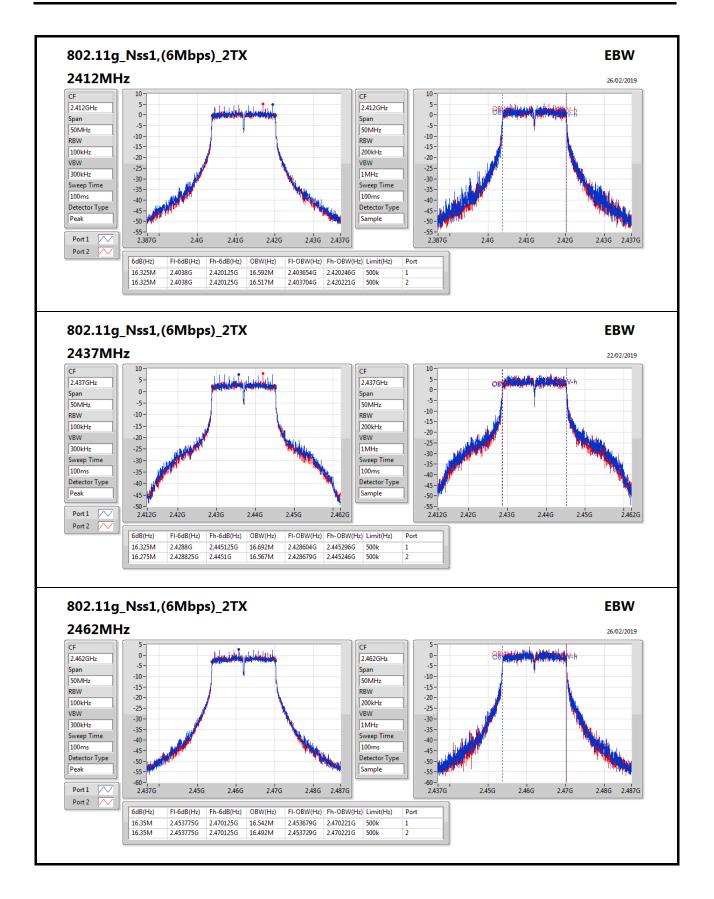
| Mode | Result | Limit | Port 1-N dB | Port 1-OBW | Port 2-N dB | Port 2-OBW |
|--------------------------------|--------|-------|-------------|------------|-------------|------------|
| | | (Hz) | (Hz) | (Hz) | (Hz) | (Hz) |
| 802.11b_Nss1,(1Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 500k | 8.525M | 13.143M | 7.55M | 12.894M |
| 2437MHz | Pass | 500k | 7.575M | 13.168M | 8.075M | 13.168M |
| 2462MHz | Pass | 500k | 9.05M | 13.593M | 8.525M | 13.193M |
| 802.11g_Nss1,(6Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 500k | 16.325M | 16.592M | 16.325M | 16.517M |
| 2437MHz | Pass | 500k | 16.325M | 16.692M | 16.275M | 16.567M |
| 2462MHz | Pass | 500k | 16.35M | 16.542M | 16.35M | 16.492M |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 500k | 17.575M | 17.741M | 17.55M | 17.716M |
| 2437MHz | Pass | 500k | 17.55M | 17.766M | 17.55M | 17.691M |
| 2462MHz | Pass | 500k | 17.575M | 17.766M | 17.575M | 17.716M |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2422MHz | Pass | 500k | 36.05M | 36.182M | 36.3M | 36.332M |
| 2437MHz | Pass | 500k | 36.3M | 36.282M | 36.35M | 36.282M |
| 2452MHz | Pass | 500k | 35.9M | 36.332M | 35.65M | 36.282M |

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

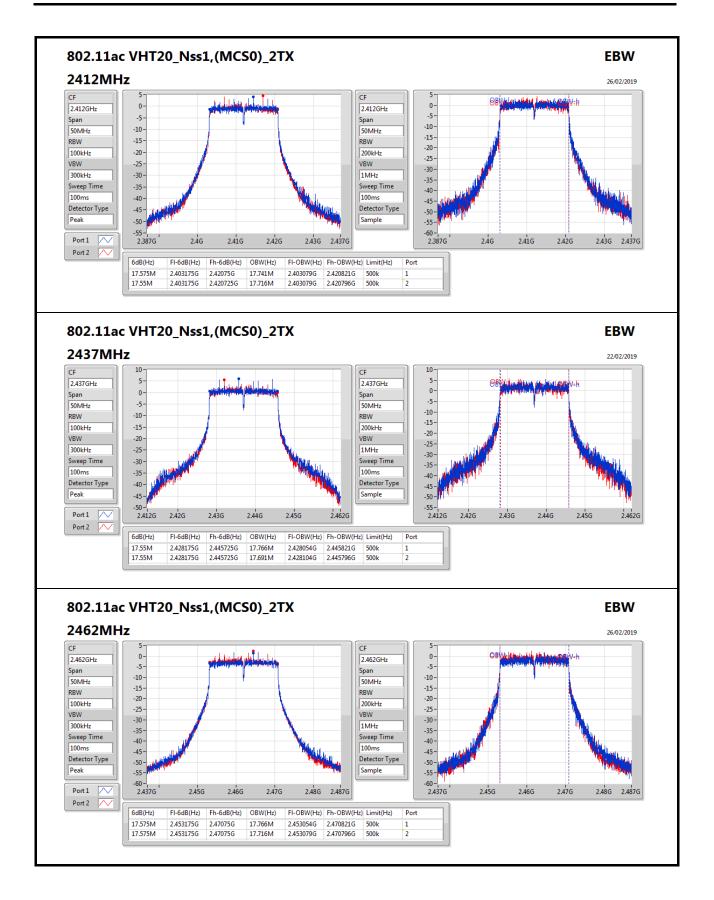




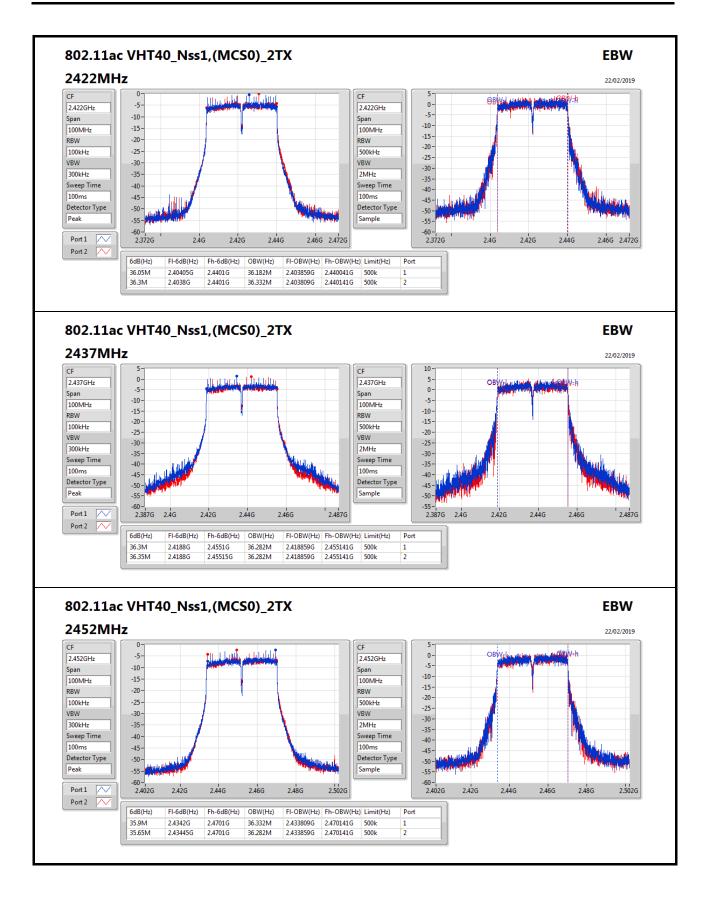














Appendix C **AV Power Result**

Summary

| Mode | Total Power | Total Power |
|--------------------------------|-------------|-------------|
| | (dBm) | (W) |
| 2.4-2.4835GHz | - | - |
| 802.11b_Nss1,(1Mbps)_2TX | 23.28 | 0.21281 |
| 802.11g_Nss1,(6Mbps)_2TX | 22.22 | 0.16672 |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | 20.65 | 0.11614 |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | 18.61 | 0.07261 |

Result

| Mode | Result | DG | Port 1 | Port 2 | Total Power | Power Limit |
|--------------------------------|--------|-------|--------|--------|-------------|-------------|
| | | (dBi) | (dBm) | (dBm) | (dBm) | (dBm) |
| 802.11b_Nss1,(1Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 5.17 | 20.30 | 20.06 | 23.19 | 30.00 |
| 2437MHz | Pass | 5.17 | 20.37 | 20.16 | 23.28 | 30.00 |
| 2457MHz | Pass | 5.17 | 20.20 | 20.18 | 23.20 | 30.00 |
| 2462MHz | Pass | 5.17 | 20.21 | 20.24 | 23.24 | 30.00 |
| 802.11g_Nss1,(6Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 5.17 | 16.86 | 16.66 | 19.77 | 30.00 |
| 2417MHz | Pass | 5.17 | 19.11 | 18.99 | 22.06 | 30.00 |
| 2437MHz | Pass | 5.17 | 19.24 | 19.17 | 22.22 | 30.00 |
| 2457MHz | Pass | 5.17 | 18.92 | 18.80 | 21.87 | 30.00 |
| 2462MHz | Pass | 5.17 | 14.63 | 14.73 | 17.69 | 30.00 |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 5.17 | 16.00 | 16.11 | 19.07 | 30.00 |
| 2417MHz | Pass | 5.17 | 17.62 | 17.54 | 20.59 | 30.00 |
| 2437MHz | Pass | 5.17 | 17.68 | 17.60 | 20.65 | 30.00 |
| 2457MHz | Pass | 5.17 | 17.55 | 17.69 | 20.63 | 30.00 |
| 2462MHz | Pass | 5.17 | 13.81 | 14.39 | 17.12 | 30.00 |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2422MHz | Pass | 5.17 | 14.39 | 14.23 | 17.32 | 30.00 |
| 2437MHz | Pass | 5.17 | 15.80 | 15.40 | 18.61 | 30.00 |
| 2447MHz | Pass | 5.17 | 13.76 | 13.77 | 16.78 | 30.00 |
| 2452MHz | Pass | 5.17 | 12.28 | 12.61 | 15.46 | 30.00 |

Page No. : 1 of 1

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



Appendix D **PSD** Result

Summary

| Mode | PD |
|--------------------------------|-----------|
| | (dBm/RBW) |
| 2.4-2.4835GHz | - |
| 802.11b_Nss1,(1Mbps)_2TX | -5.37 |
| 802.11g_Nss1,(6Mbps)_2TX | -6.59 |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | -7.93 |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | -12.35 |

RBW=3kHz.

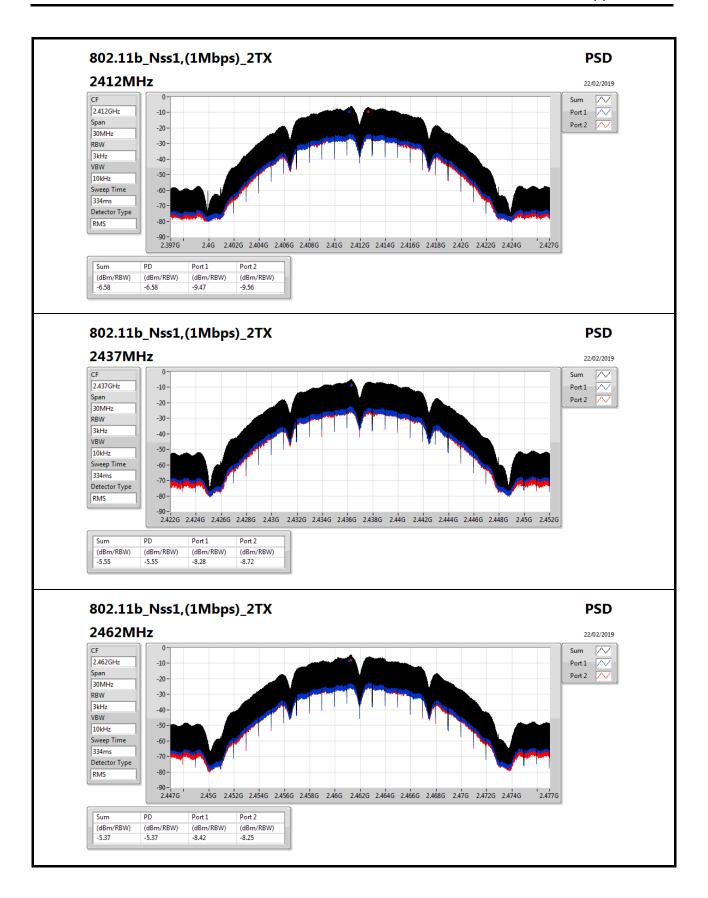
Result

| 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 | 7.57 | -9.47 | -9.56 | -6.58 | 6.43 |
| 2437MHz | Pass | 7.57 | -8.28 | -8.72 | -5.55 | 6.43 |
| 2462MHz | Pass | 7.57 | -8.42 | -8.25 | -5.37 | 6.43 |
| 802.11g_Nss1,(6Mbps)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 7.57 | -11.43 | -11.62 | -9.65 | 6.43 |
| 2437MHz | Pass | 7.57 | -9.33 | -9.40 | -6.59 | 6.43 |
| 2462MHz | Pass | 7.57 | -13.49 | -13.46 | -10.93 | 6.43 |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2412MHz | Pass | 7.57 | -11.75 | -11.89 | -9.39 | 6.43 |
| 2437MHz | Pass | 7.57 | -10.64 | -10.79 | -7.93 | 6.43 |
| 2462MHz | Pass | 7.57 | -13.16 | -14.14 | -11.84 | 6.43 |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 2422MHz | Pass | 7.57 | -15.72 | -15.81 | -12.94 | 6.43 |
| 2437MHz | Pass | 7.57 | -14.60 | -14.71 | -12.35 | 6.43 |
| 2452MHz | Pass | 7.57 | -17.55 | -16.87 | -14.53 | 6.43 |

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

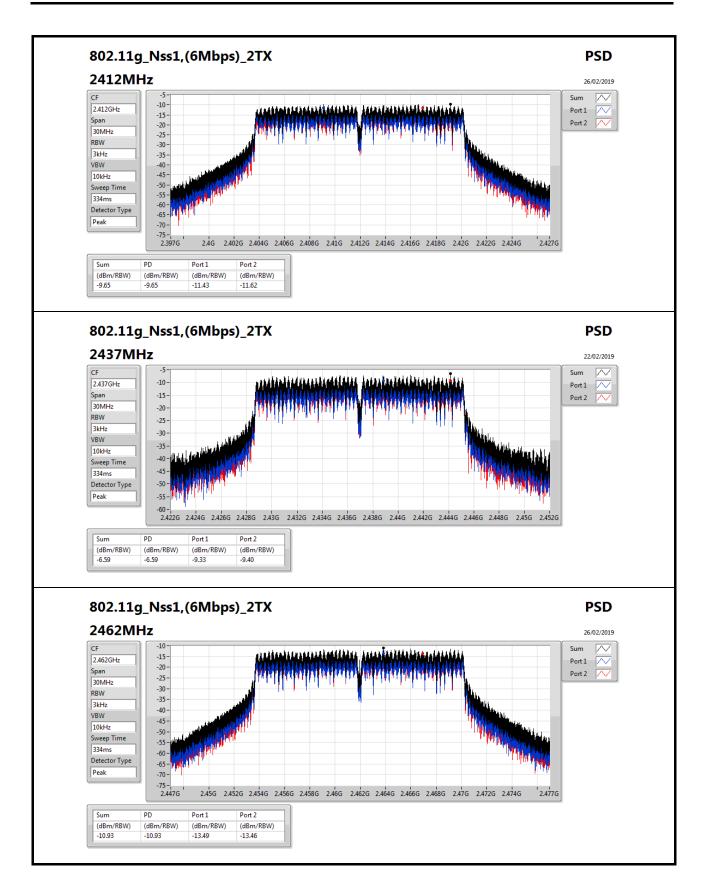
Page No. : 1 of 5





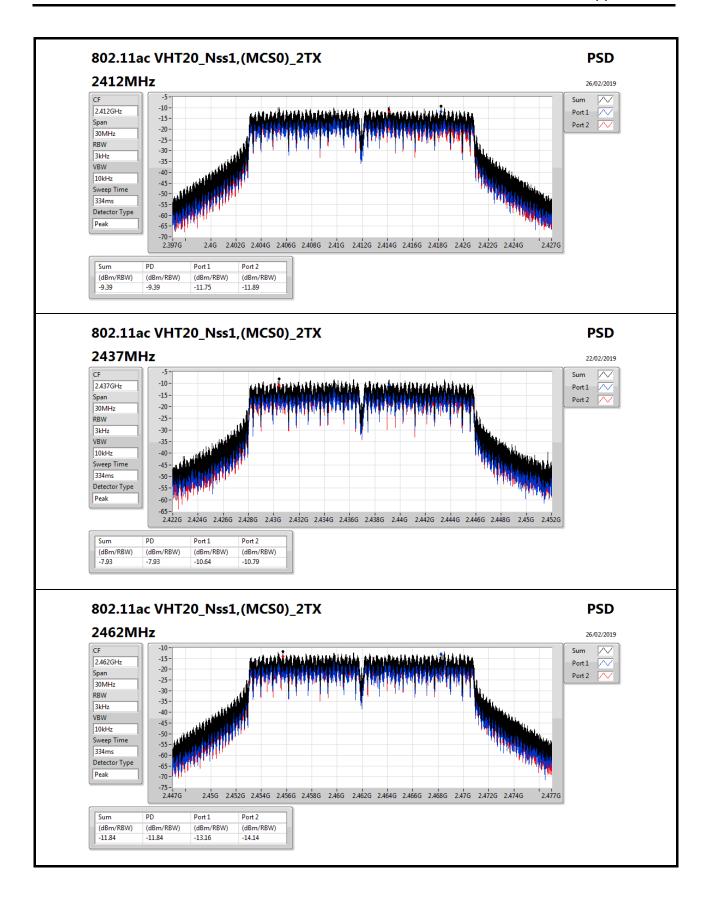
Appendix D





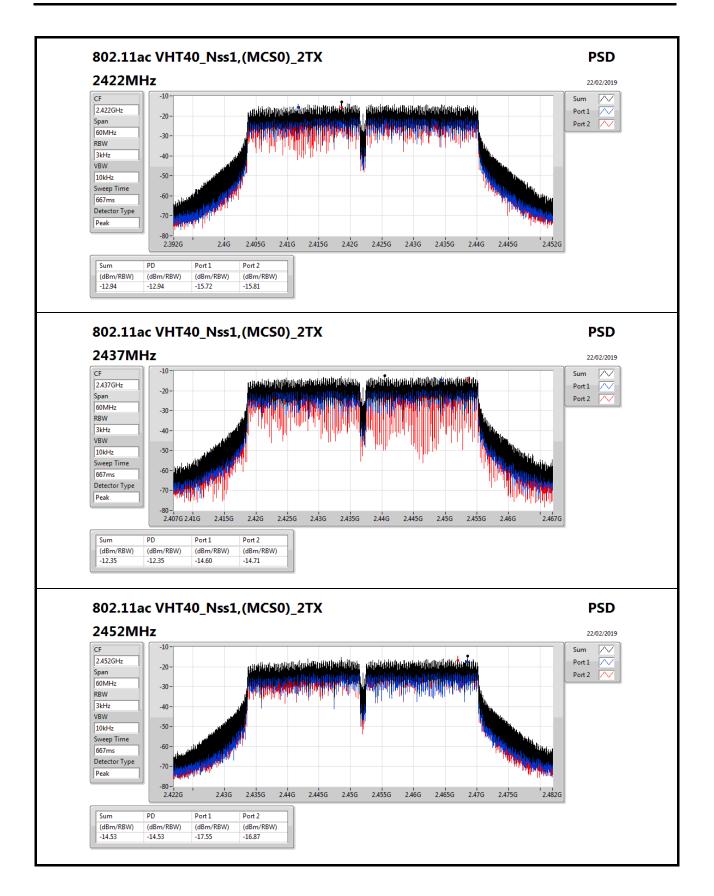
SPORTON LAB

Appendix D



Appendix D







CSE Non-restricted Band Result

Appendix E

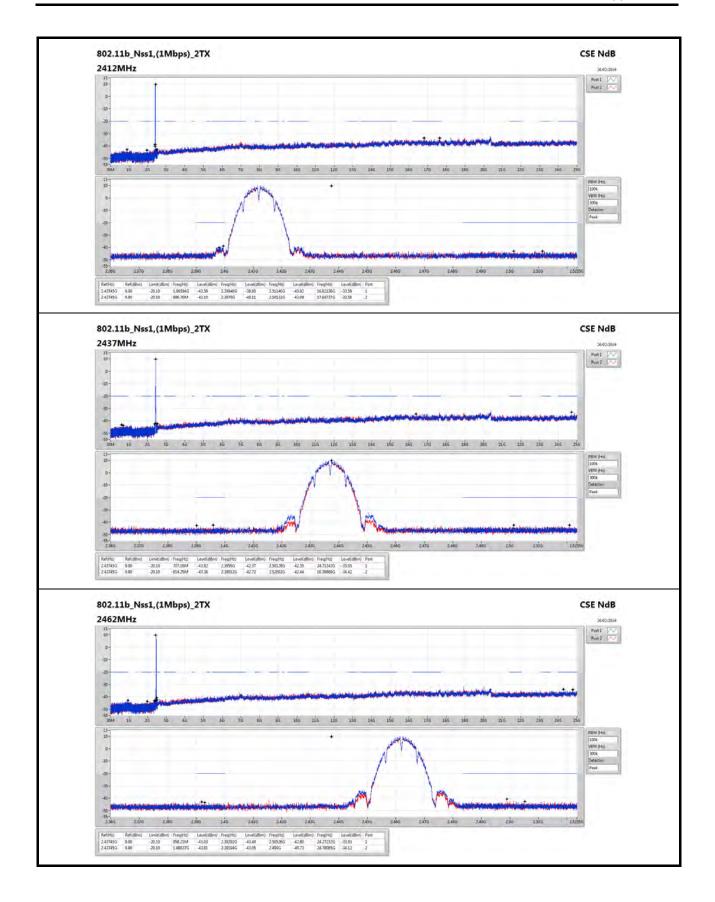
Summary

| 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 | 2.43745G | 9.90 | -20.10 | 707.16M | -43.82 | 2.3959G | -42.37 | 2.50128G | -42.35 | 24.71342G | -33.05 | 1 |
| 802.11g_Nss1,(6Mbps)_2TX | Pass | 2.44071G | 7.01 | -22.99 | 763.08M | -43.75 | 2.39986G | -26.52 | 2.52284G | -42.38 | 16.29878G | -33.64 | 1 |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | Pass | 2.4357G | 5.54 | -24.46 | 855.4M | -42.84 | 2.39986G | -28.86 | 2.50962G | -42.09 | 24.01384G | -34.45 | 2 |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | Pass | 2.44572G | 0.86 | -29.14 | 720.15M | -42.69 | 2.39852G | -40.90 | 2.5079G | -42.95 | 23.33689G | -33.16 | 1 |

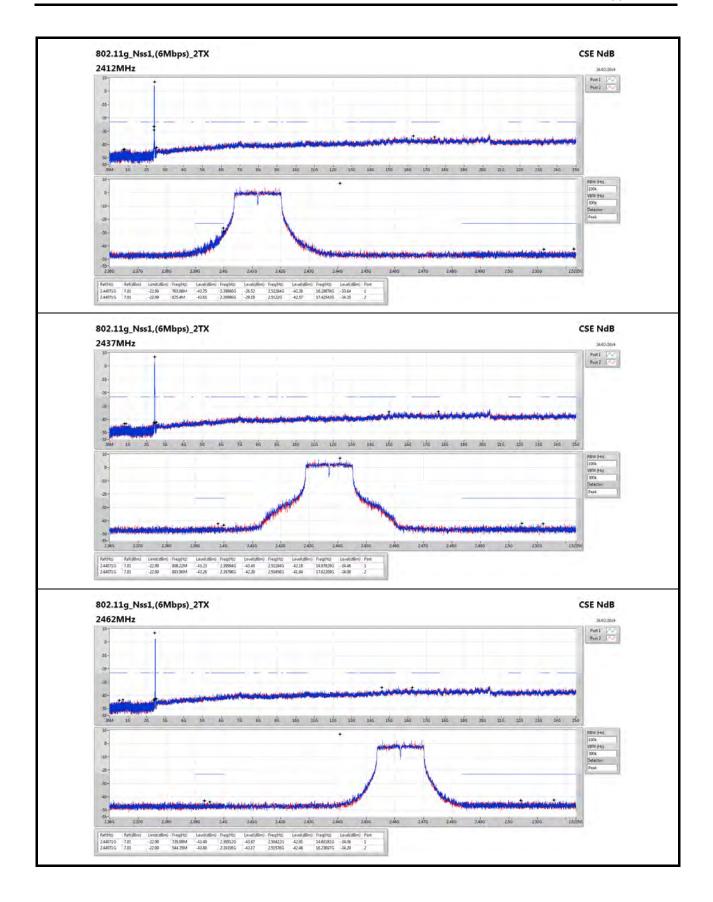
Result

| 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 | 2.43745G | 9.90 | -20.10 | 1.96594G | -43.59 | 2.39948G | -38.85 | 2.51146G | -43.02 | 16.82136G | -33.59 | 1 |
| 2412MHz | Pass | 2.43745G | 9.90 | -20.10 | 896.76M | -43.10 | 2.3979G | -40.11 | 2.50132G | -43.09 | 17.64737G | -33.58 | 2 |
| 2437MHz | Pass | 2.43745G | 9.90 | -20.10 | 707.16M | -43.82 | 2.3959G | -42.37 | 2.50128G | -42.35 | 24.71342G | -33.05 | 1 |
| 2437MHz | Pass | 2.43745G | 9.90 | -20.10 | 614.25M | -43.36 | 2.39012G | -42.72 | 2.52092G | -42.44 | 16.38869G | -34.42 | 2 |
| 2462MHz | Pass | 2.43745G | 9.90 | -20.10 | 958.21M | -43.03 | 2.39292G | -43.49 | 2.50526G | -42.80 | 24.27232G | -33.93 | 1 |
| 2462MHz | Pass | 2.43745G | 9.90 | -20.10 | 1.98837G | -43.81 | 2.39194G | -43.05 | 2.499G | -40.73 | 24.78085G | -34.12 | 2 |
| 802.11g_Nss1,(6Mbps)_2TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.44071G | 7.01 | -22.99 | 763.08M | -43.75 | 2.39986G | -26.52 | 2.52284G | -42.38 | 16.29878G | -33.64 | 1 |
| 2412MHz | Pass | 2.44071G | 7.01 | -22.99 | 825.4M | -43.65 | 2.39996G | -29.18 | 2.5122G | -42.57 | 17.42542G | -34.35 | 2 |
| 2437MHz | Pass | 2.44071G | 7.01 | -22.99 | 808.22M | -43.23 | 2.39994G | -43.40 | 2.51194G | -42.18 | 14.97829G | -34.46 | 1 |
| 2437MHz | Pass | 2.44071G | 7.01 | -22.99 | 893.56M | -43.26 | 2.39796G | -42.20 | 2.50456G | -41.94 | 17.62209G | -34.08 | 2 |
| 2462MHz | Pass | 2.44071G | 7.01 | -22.99 | 735.99M | -43.40 | 2.39512G | -43.87 | 2.50422G | -42.91 | 14.60181G | -34.06 | 1 |
| 2462MHz | Pass | 2.44071G | 7.01 | -22.99 | 544.35M | -43.80 | 2.39316G | -43.17 | 2.51576G | -42.46 | 16.23697G | -34.29 | 2 |
| 802.11ac VHT20_Nss1,(MCS0)_2TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.4357G | 5.54 | -24.46 | 712.4M | -43.58 | 2.39986G | -28.99 | 2.4922G | -42.40 | 16.83541G | -34.47 | 1 |
| 2412MHz | Pass | 2.4357G | 5.54 | -24.46 | 855.4M | -42.84 | 2.39986G | -28.86 | 2.50962G | -42.09 | 24.01384G | -34.45 | 2 |
| 2437MHz | Pass | 2.4357G | 5.54 | -24.46 | 648.32M | -43.81 | 2.39804G | -43.30 | 2.51606G | -41.71 | 17.65299G | -33.60 | 1 |
| 2437MHz | Pass | 2.4357G | 5.54 | -24.46 | 743.27M | -43.88 | 2.3922G | -43.40 | 2.52128G | -41.70 | 24.21051G | -33.49 | 2 |
| 2462MHz | Pass | 2.4357G | 5.54 | -24.46 | 923.26M | -42.71 | 2.3904G | -42.77 | 2.4885G | -42.77 | 24.26389G | -33.94 | 1 |
| 2462MHz | Pass | 2.4357G | 5.54 | -24.46 | 1.64411G | -43.95 | 2.39536G | -43.13 | 2.5215G | -42.33 | 17.64176G | -34.14 | 2 |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | - | - | - | | - | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 2.44572G | 0.86 | -29.14 | 1.63644G | -42.96 | 2.39976G | -34.28 | 2.51418G | -42.65 | 15.285G | -33.46 | 1 |
| 2422MHz | Pass | 2.44572G | 0.86 | -29.14 | 644.01M | -43.09 | 2.39956G | -34.58 | 2.54694G | -42.13 | 15.34389G | -34.08 | 2 |
| 2437MHz | Pass | 2.44572G | 0.86 | -29.14 | 720.15M | -42.69 | 2.39852G | -40.90 | 2.5079G | -42.95 | 23.33689G | -33.16 | 1 |
| 2437MHz | Pass | 2.44572G | 0.86 | -29.14 | 680.07M | -43.88 | 2.39952G | -42.25 | 2.50002G | -42.15 | 15.28219G | -33.29 | 2 |
| 2452MHz | Pass | 2.44572G | 0.86 | -29.14 | 797.72M | -43.27 | 2.3918G | -43.15 | 2.4871G | -42.32 | 14.9821G | -34.02 | 1 |
| 2452MHz | Pass | 2.44572G | 0.86 | -29.14 | 819.76M | -43.26 | 2.3952G | -44.12 | 2.49858G | -42.09 | 14.63153G | -33.86 | 2 |

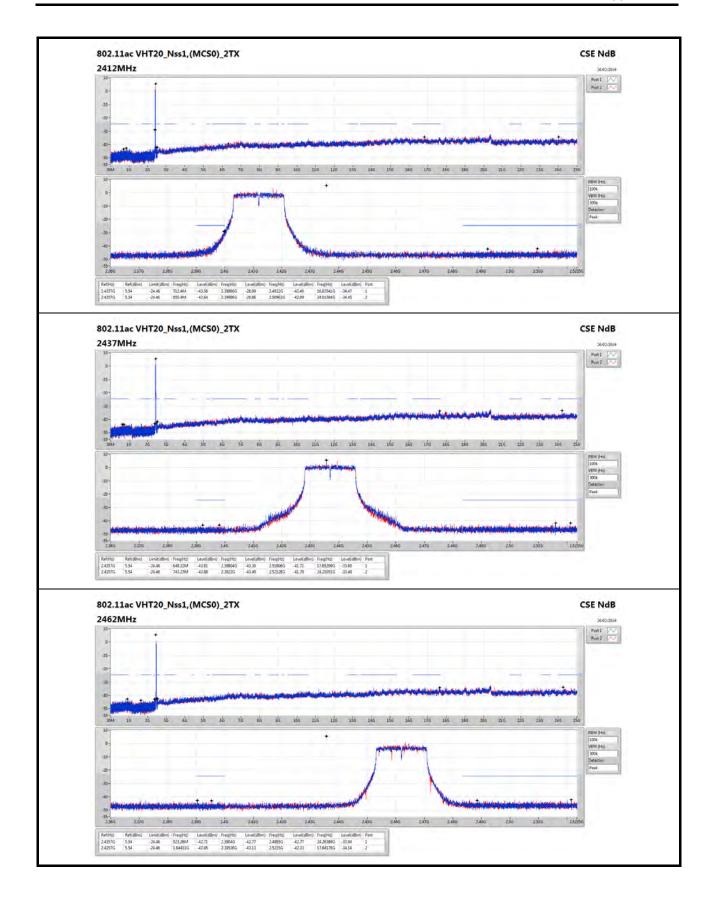




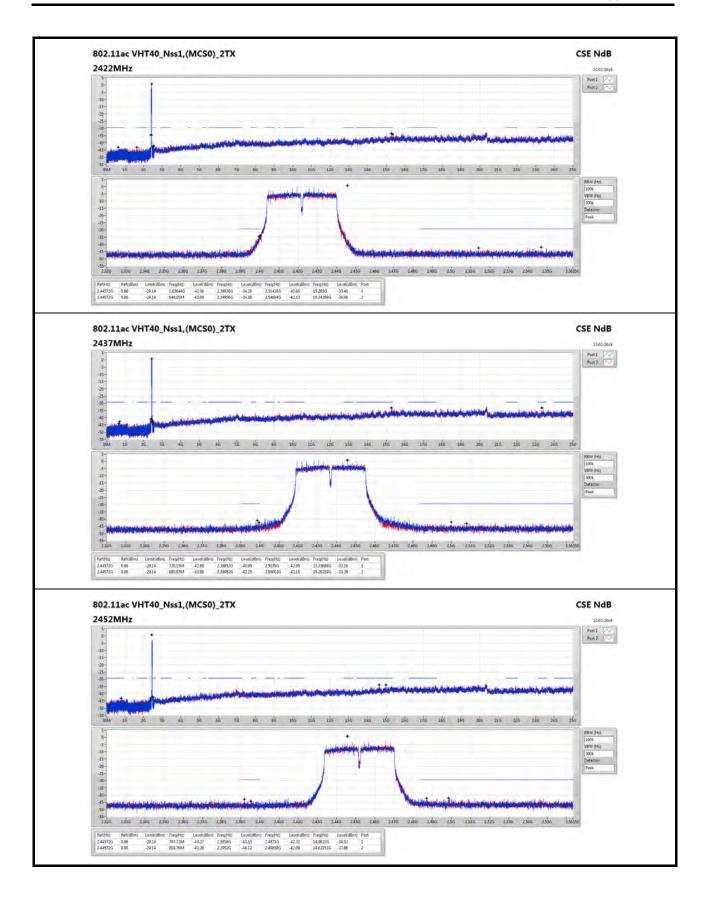




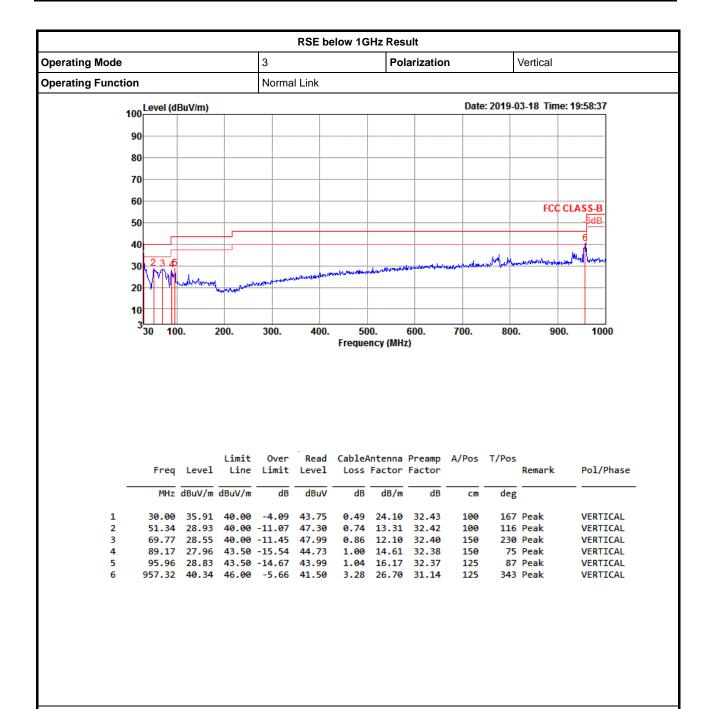








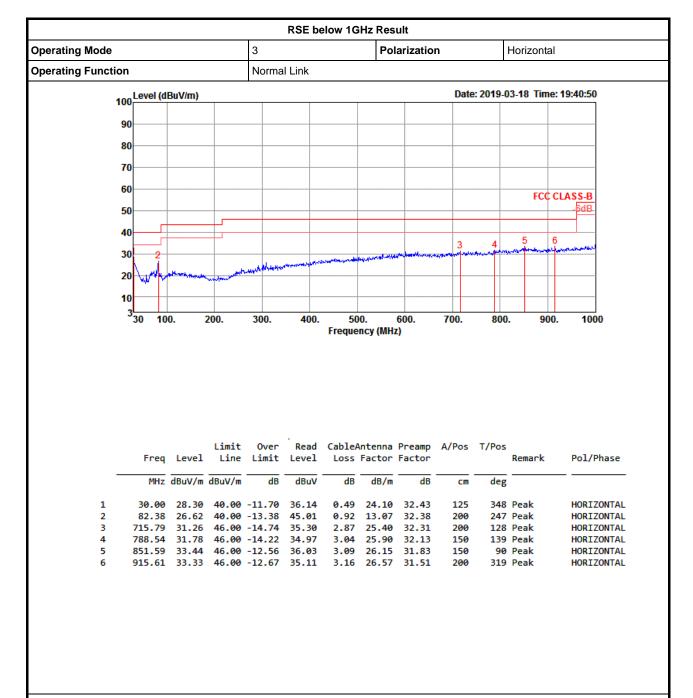




Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)





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

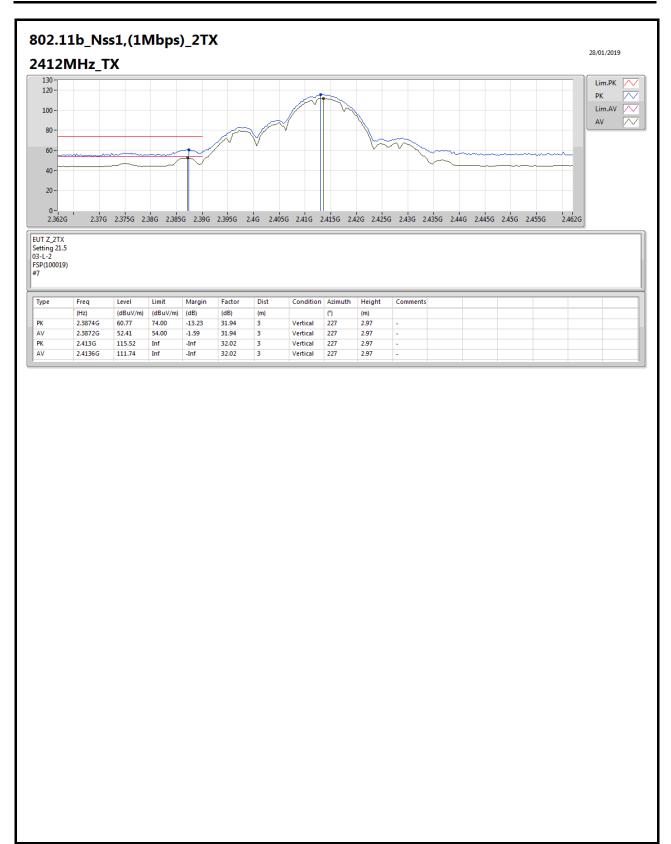
Page No. : 1 of 61

Summary

| Mode | Result | Туре | Freq (Hz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Factor (dB) | Dist (m) | Condition | Azimuth | Height (m) | Comments |
|-----------------------|--------|------|--------------|-------------------|-------------------|----------------|----------------|-------------|------------|---------|------------|----------|
| 2.4-2.4835GHz | - | - | - (112) | - (ubuviii) | - (ubuviii) | - - | - (ub) | - | - | - | - | - |
| VHT40_Nss1,(MCS0)_2TX | Pass | AV | 2.4844G | 52.95 | 54.00 | -1.05 | 33.36 | 3 | Horizontal | 55 | 1.32 | - |

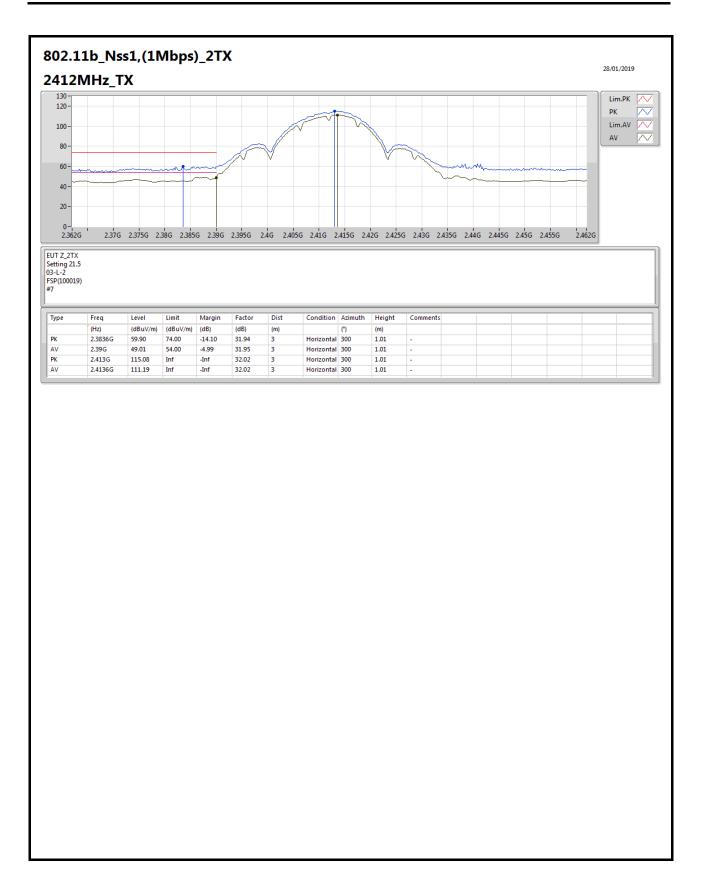
Page No. : 2 of 61





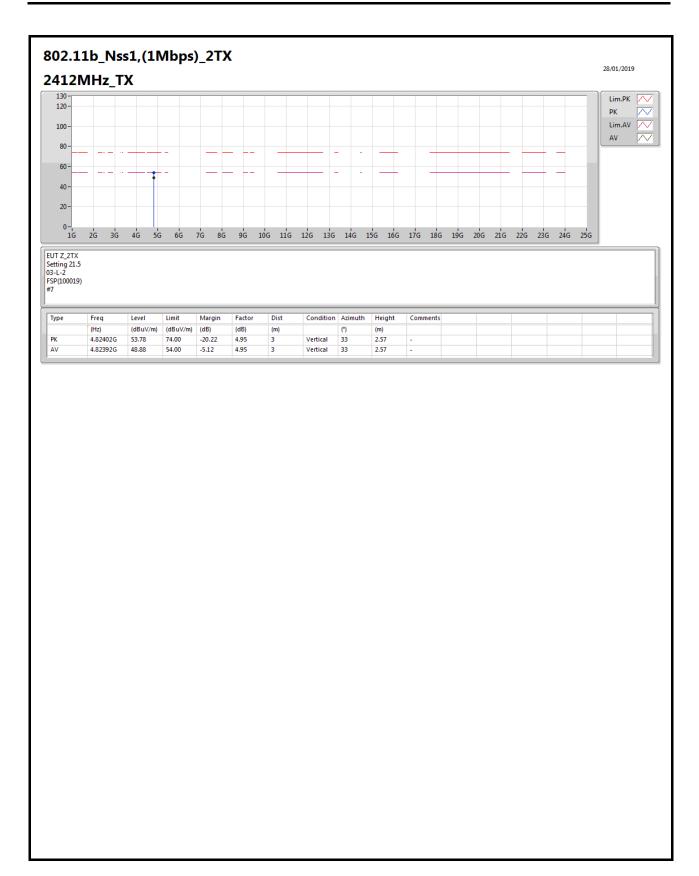
Page No. : 3 of 61





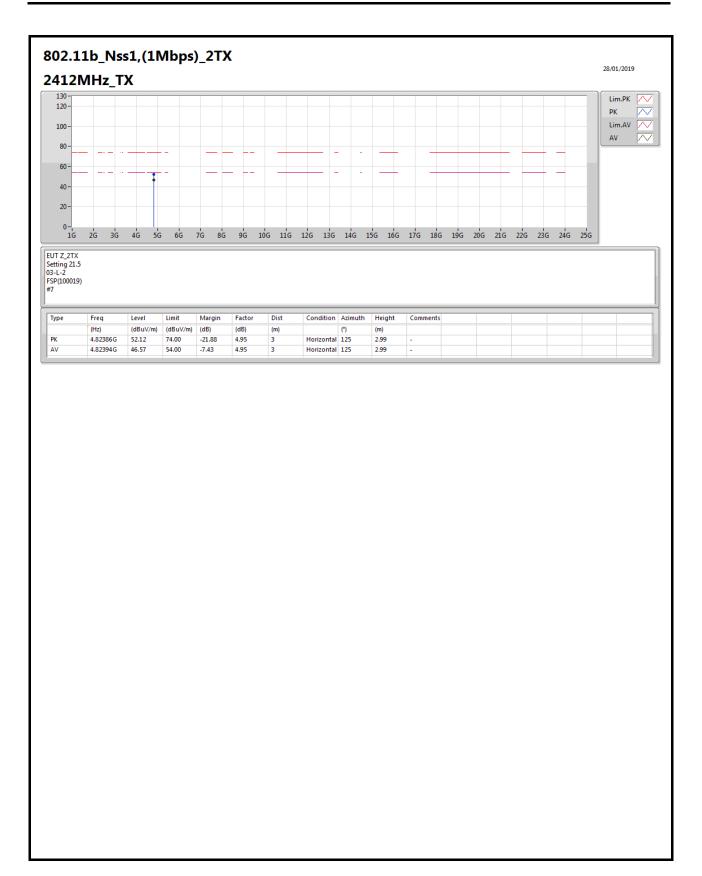
Page No. : 4 of 61





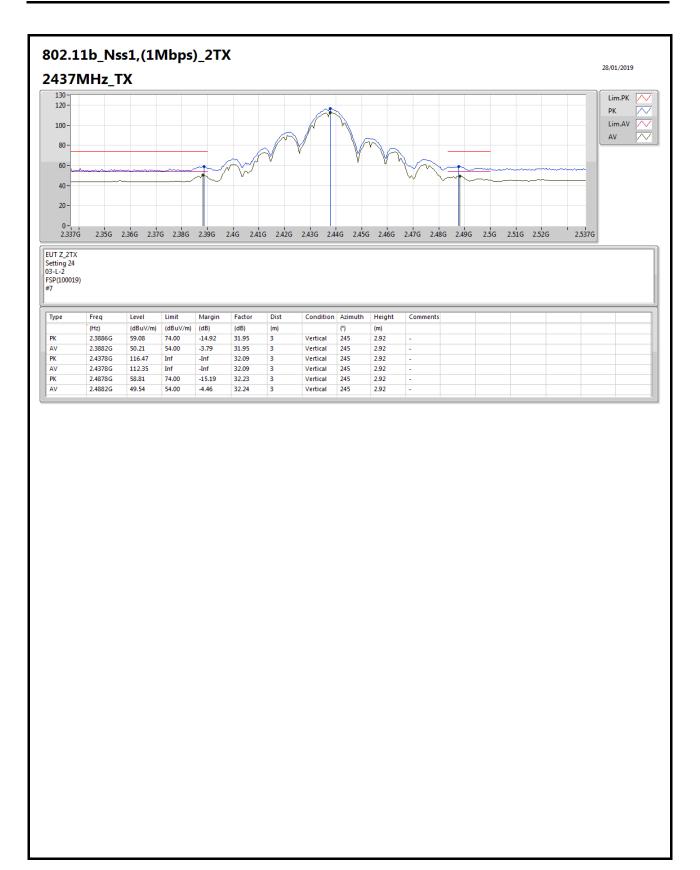
Page No. : 5 of 61





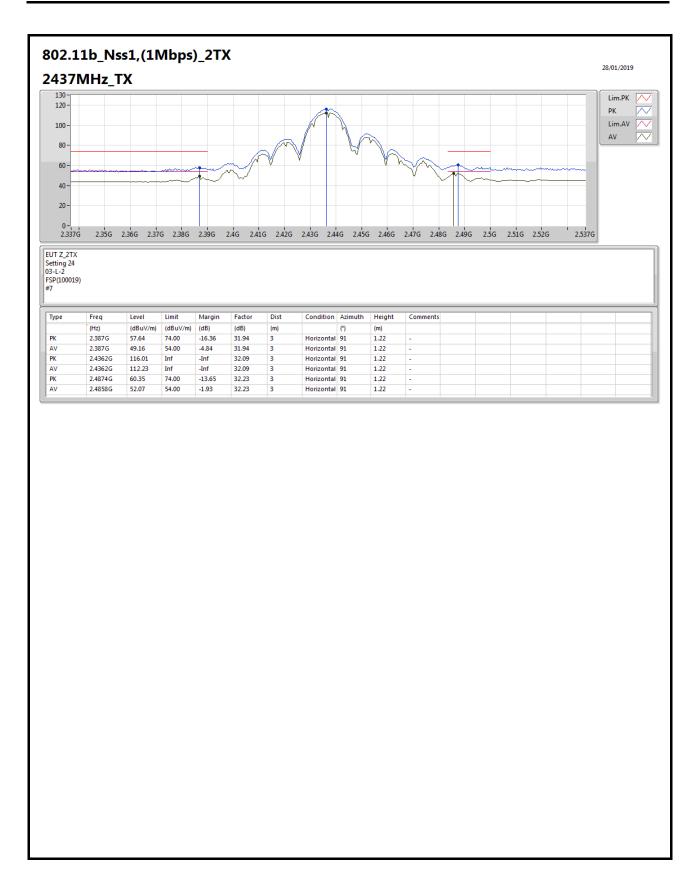
Page No. : 6 of 61





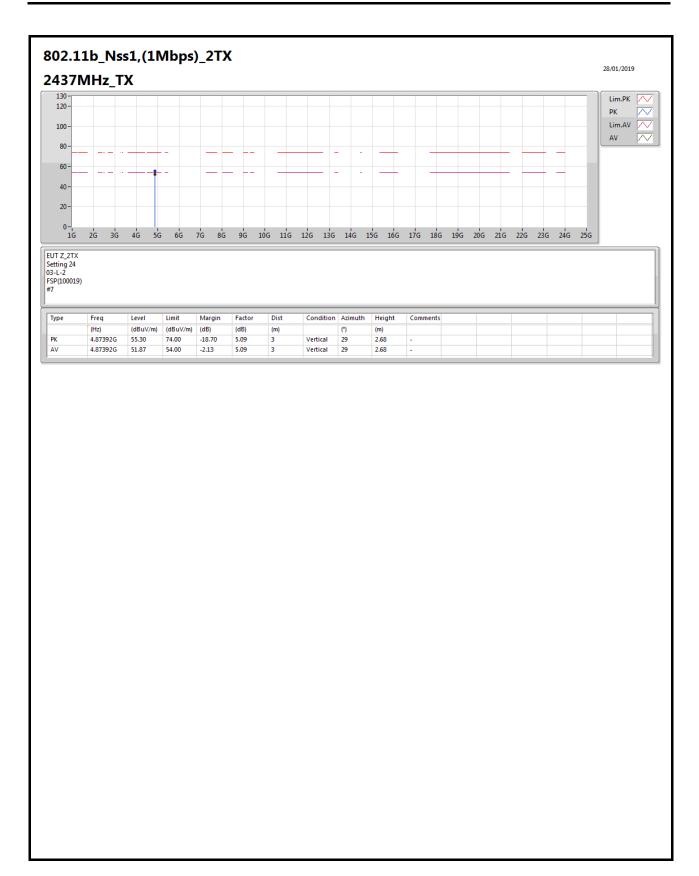
Page No. : 7 of 61





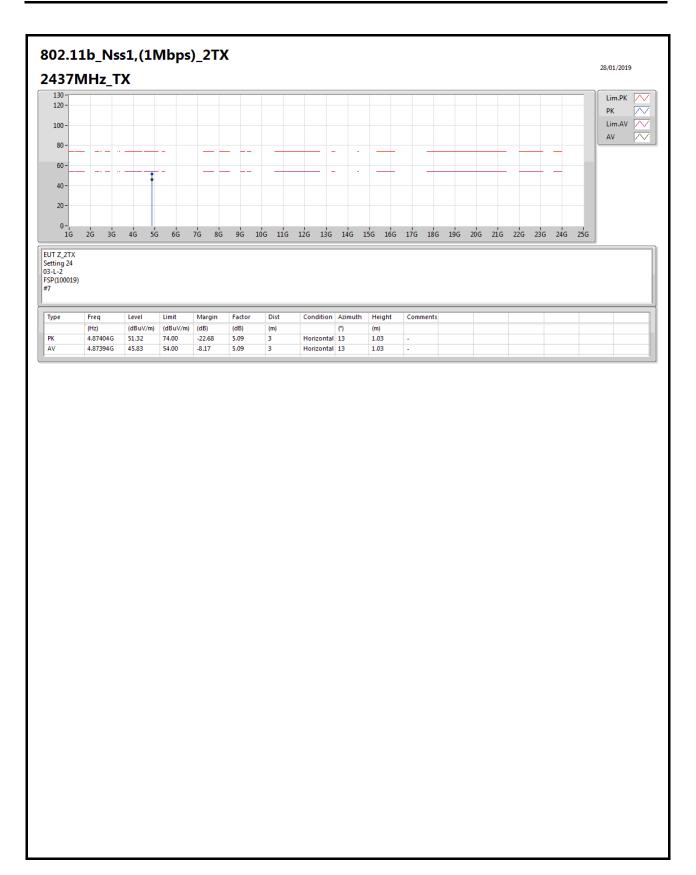
Page No. : 8 of 61



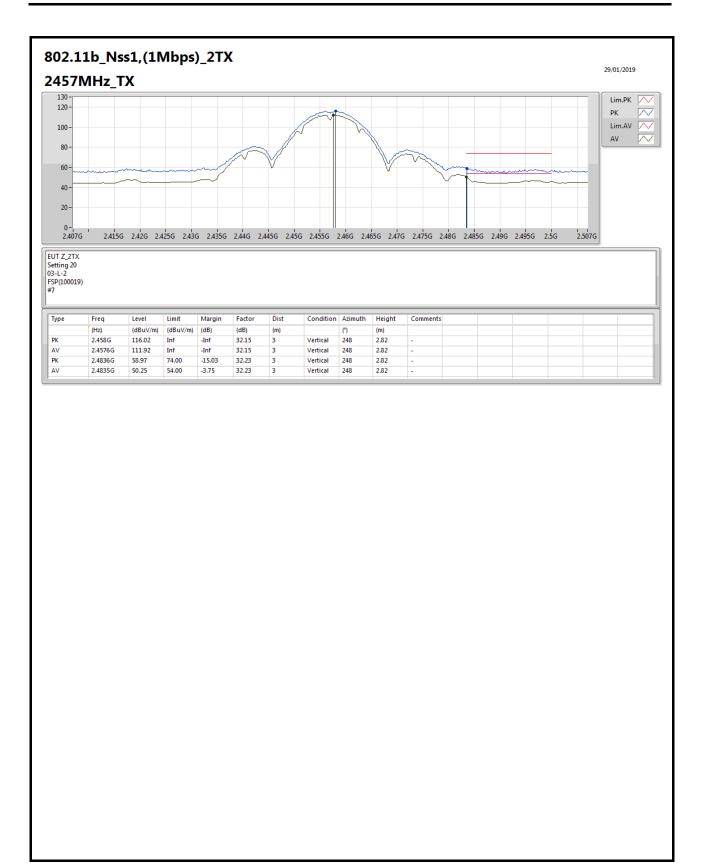


Page No. : 9 of 61



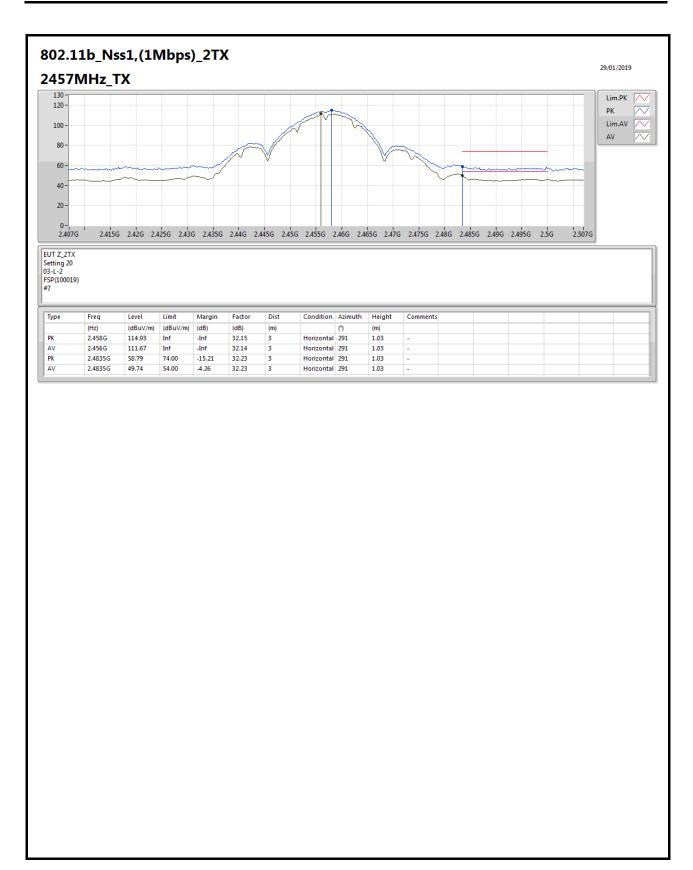






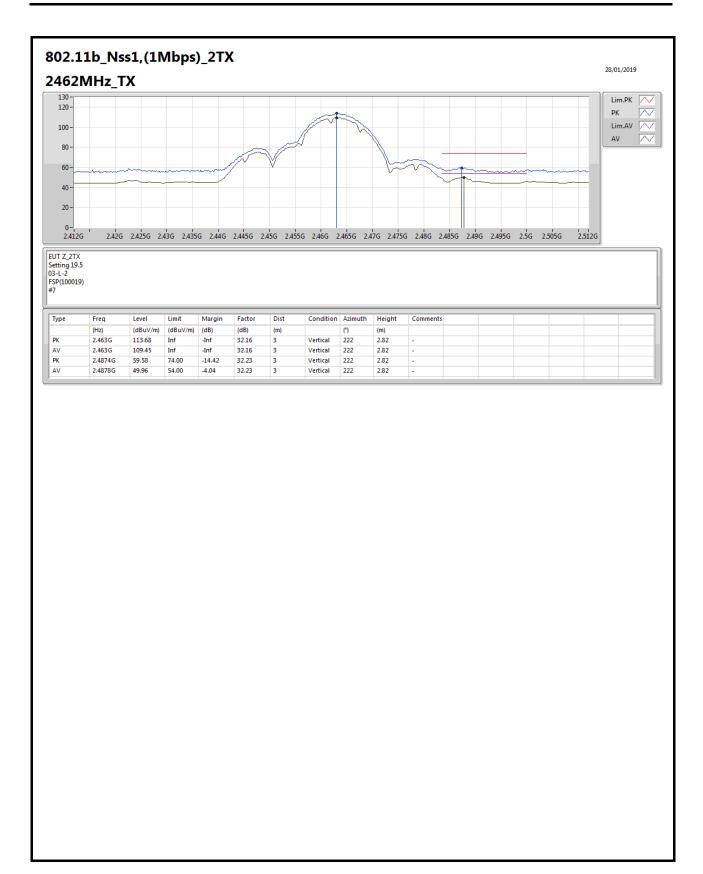
Page No. : 11 of 61





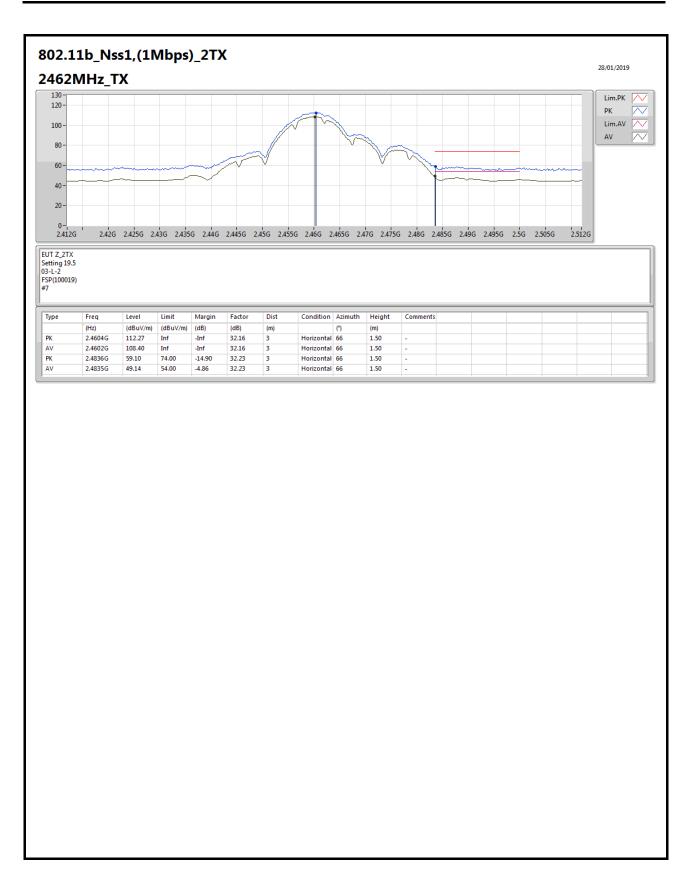
Page No. : 12 of 61





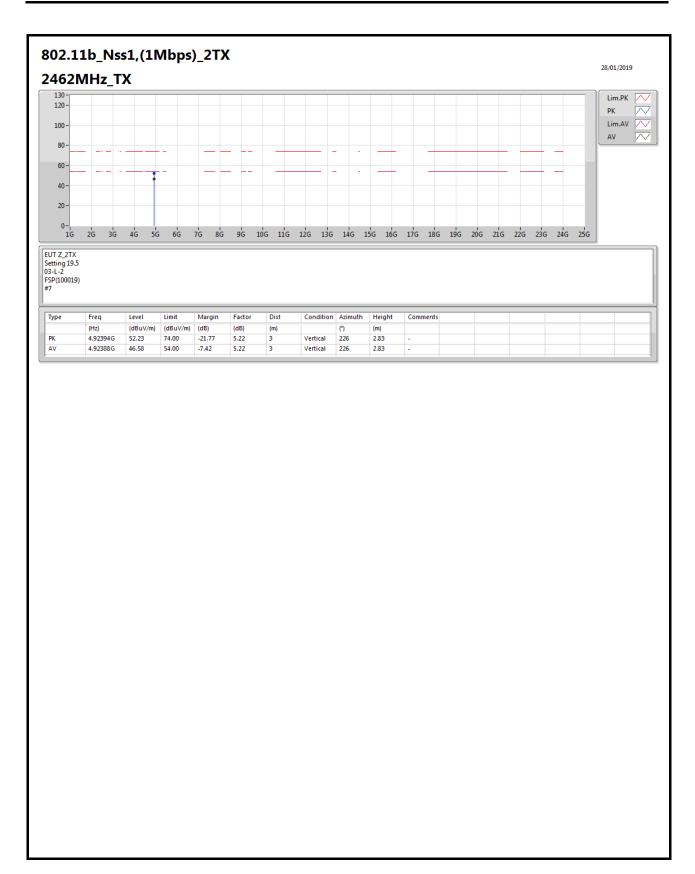
Page No. : 13 of 61





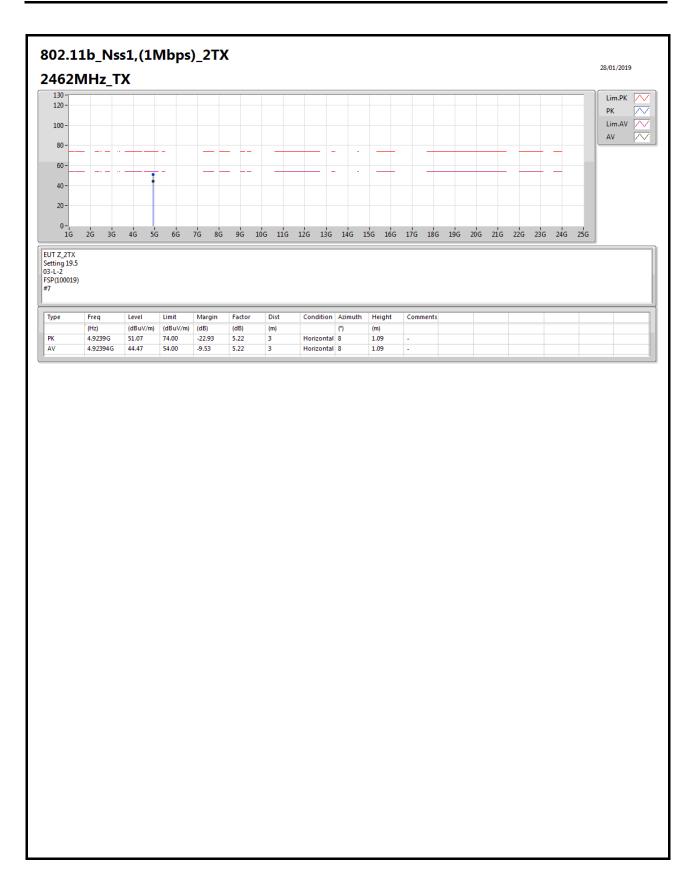
Page No. : 14 of 61





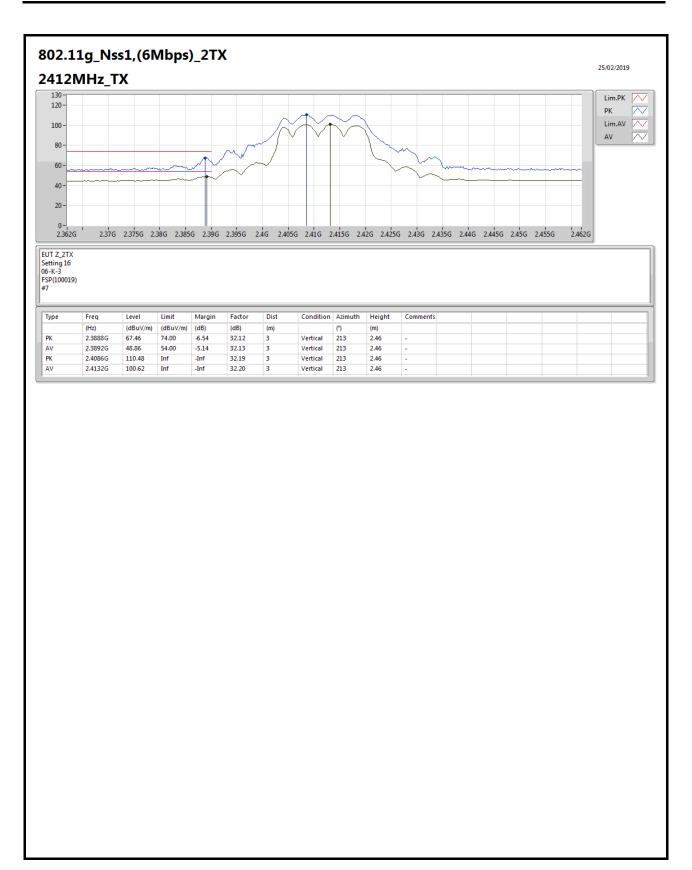
Page No. : 15 of 61





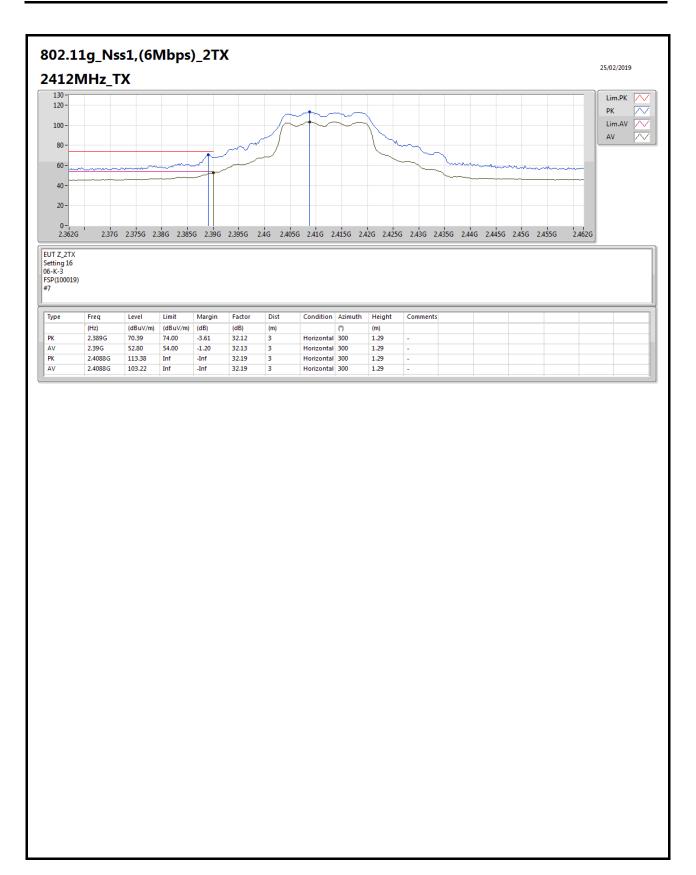
Page No. : 16 of 61





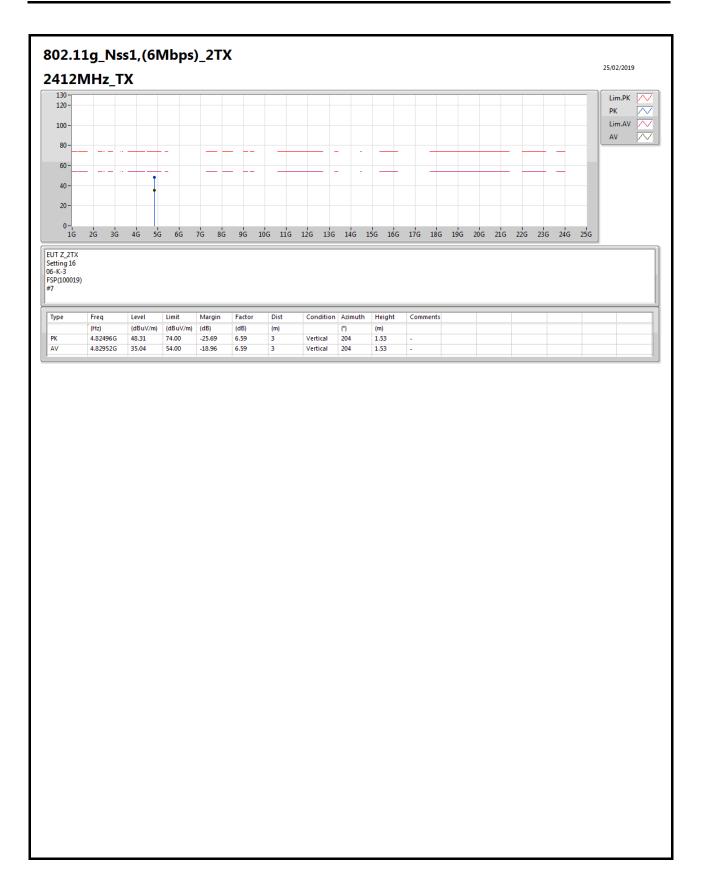
Page No. : 17 of 61





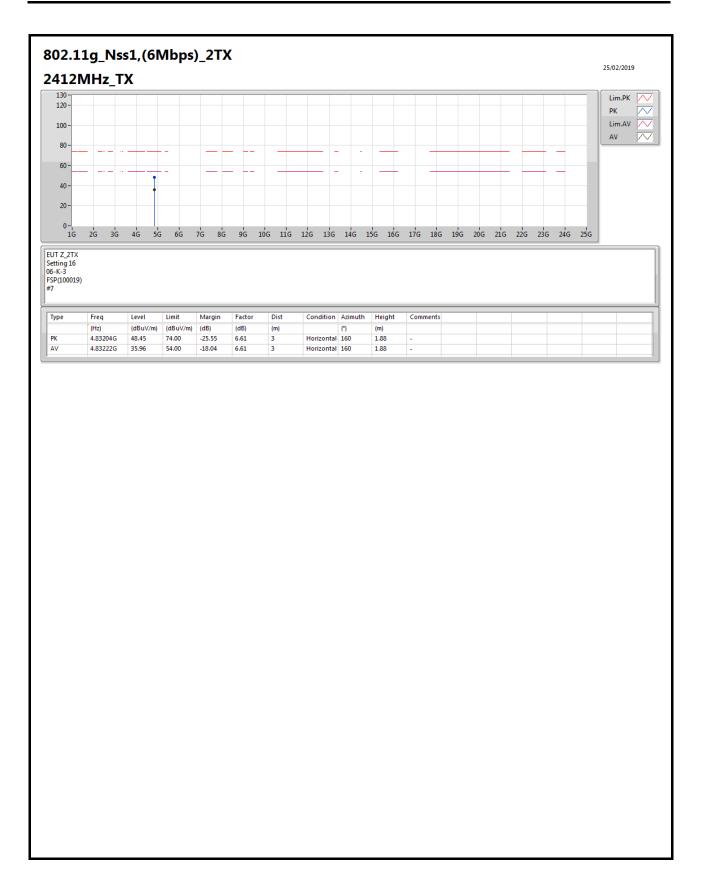
Page No. : 18 of 61





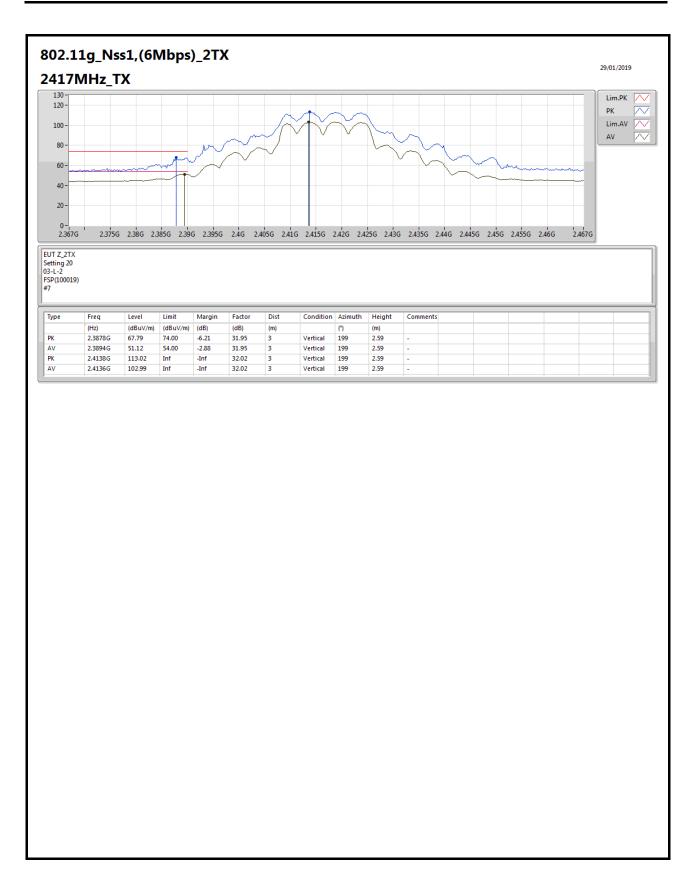
Page No. : 19 of 61





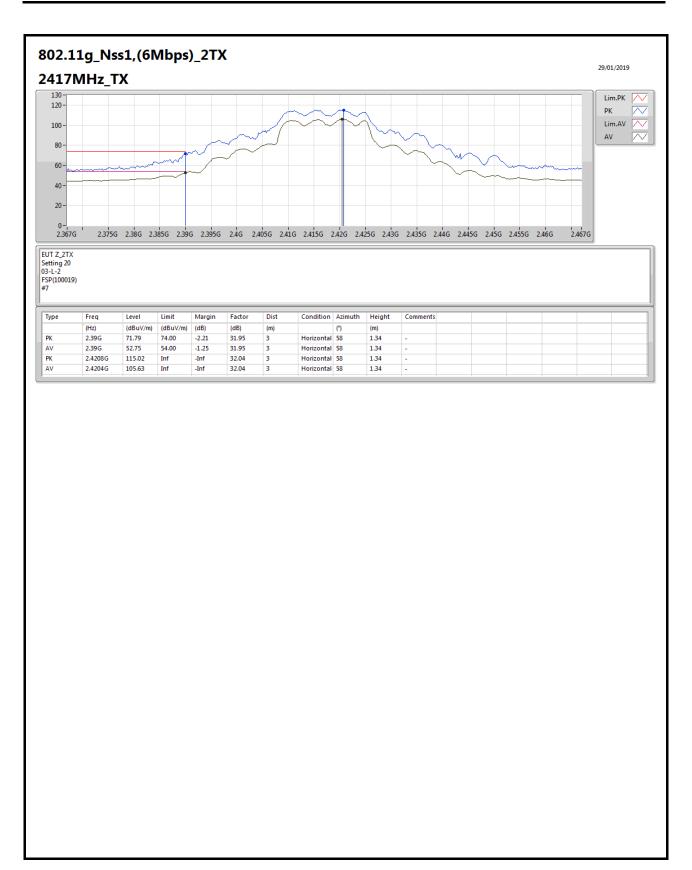
Page No. : 20 of 61





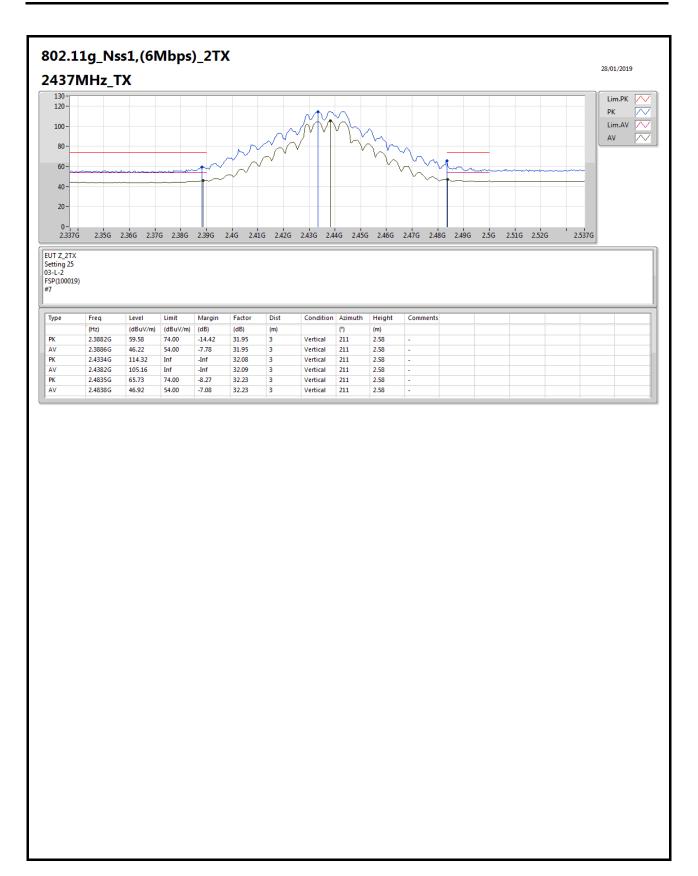
Page No. : 21 of 61





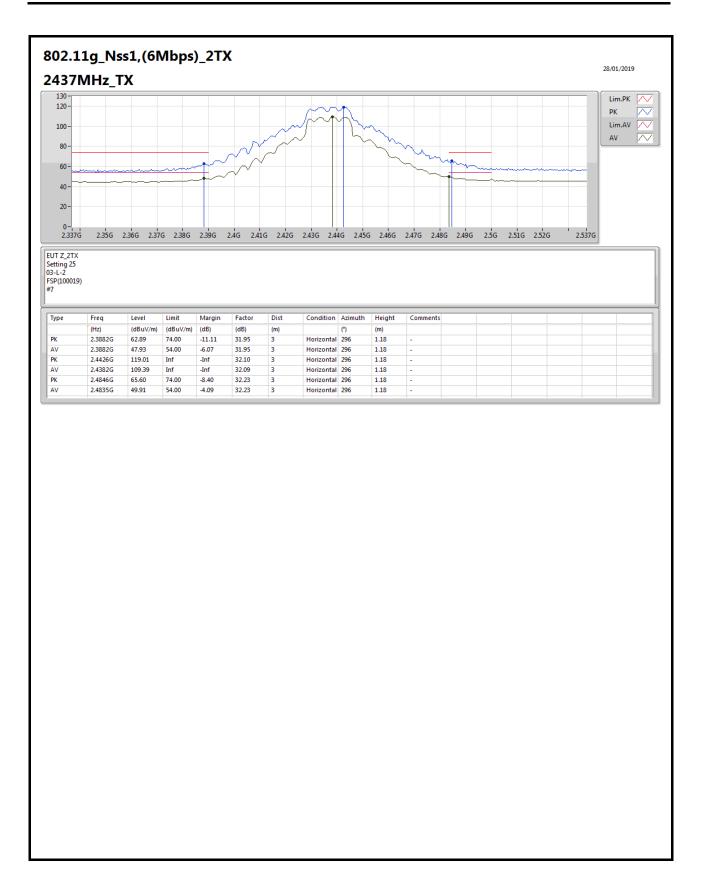
Page No. : 22 of 61





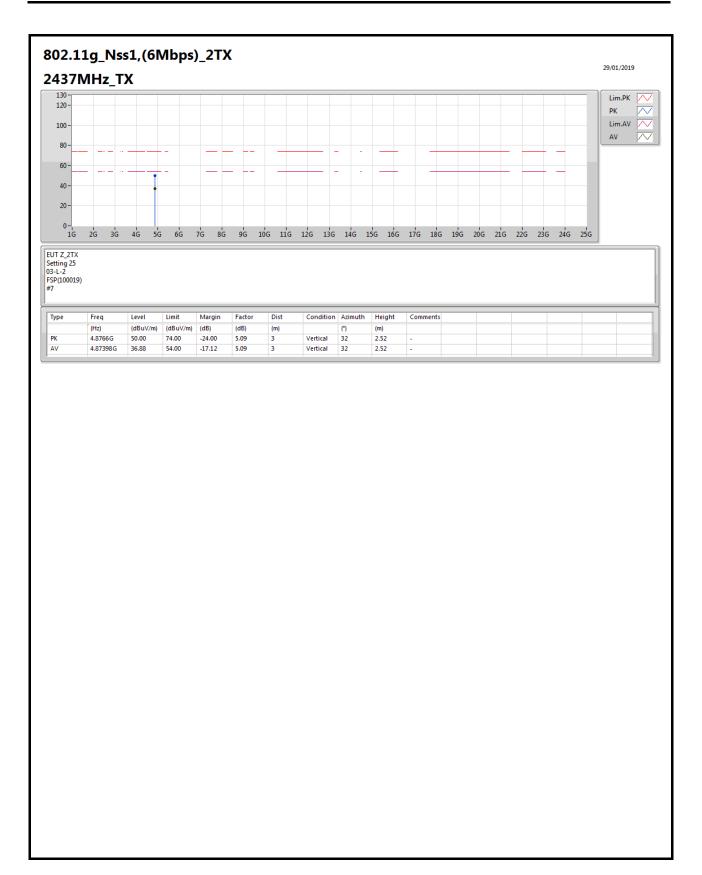
Page No. : 23 of 61





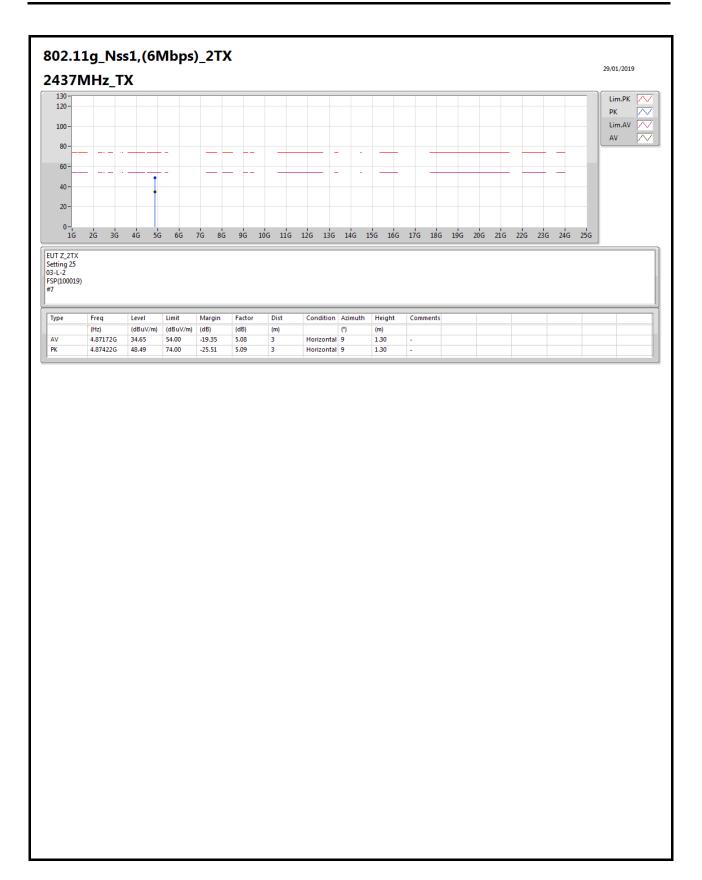
Page No. : 24 of 61





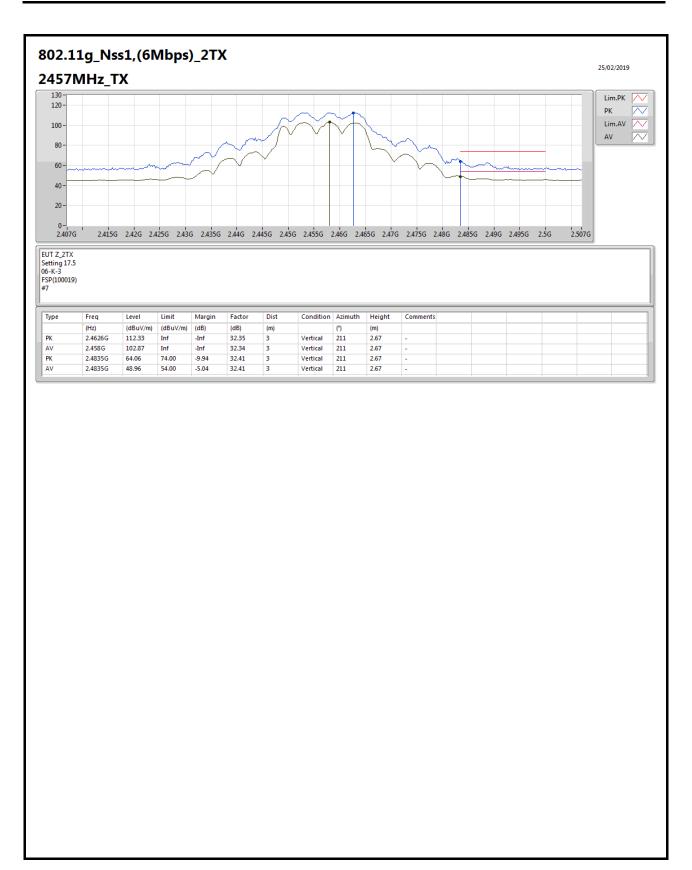
Page No. : 25 of 61



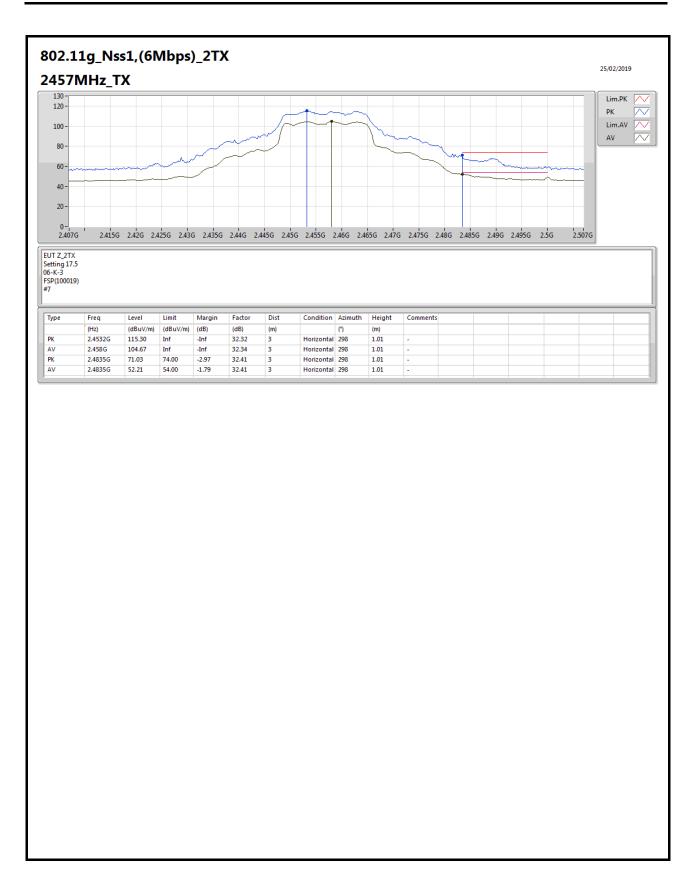


Page No. : 26 of 61



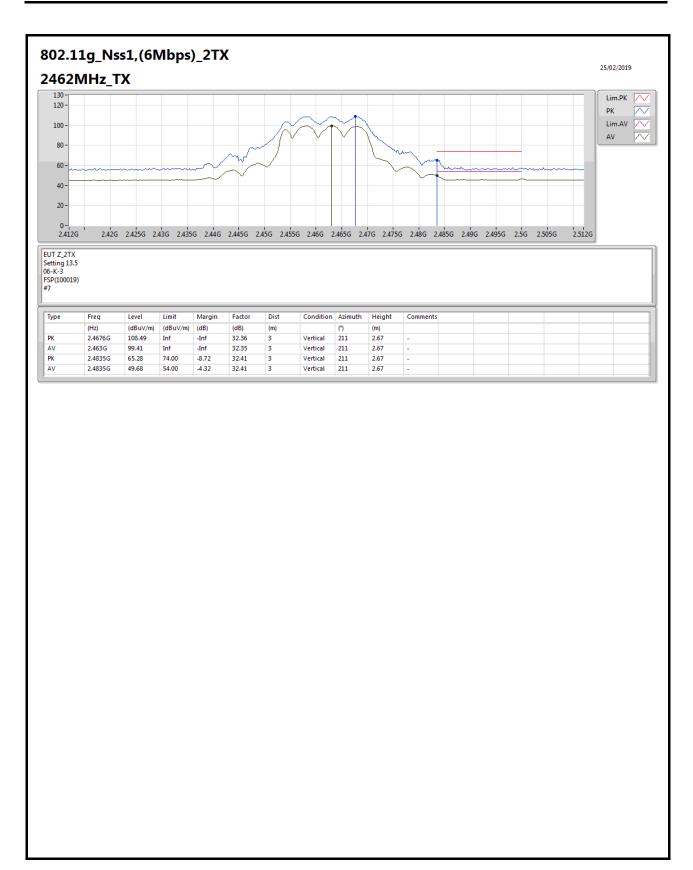






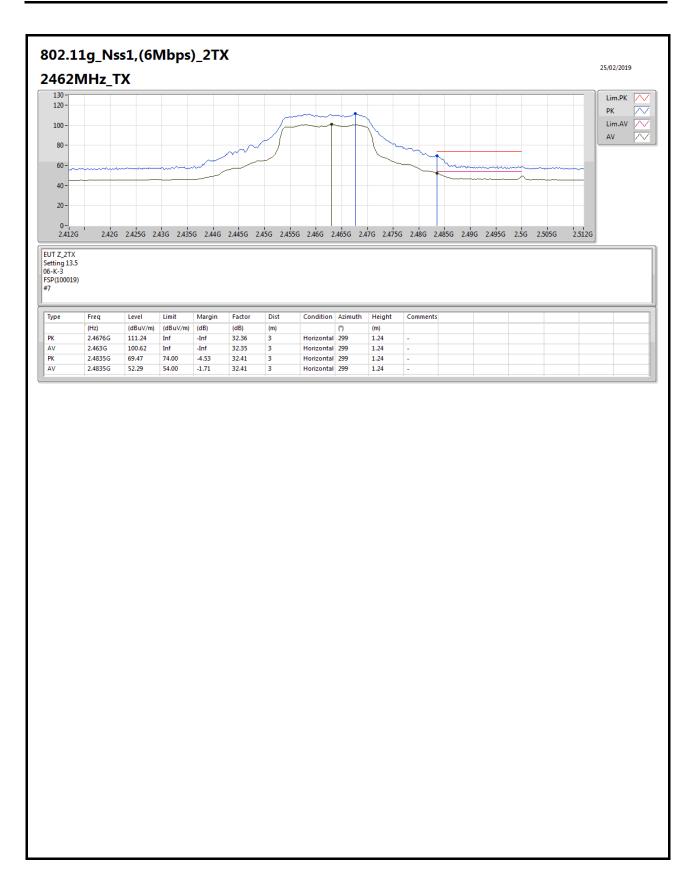
Page No. : 28 of 61





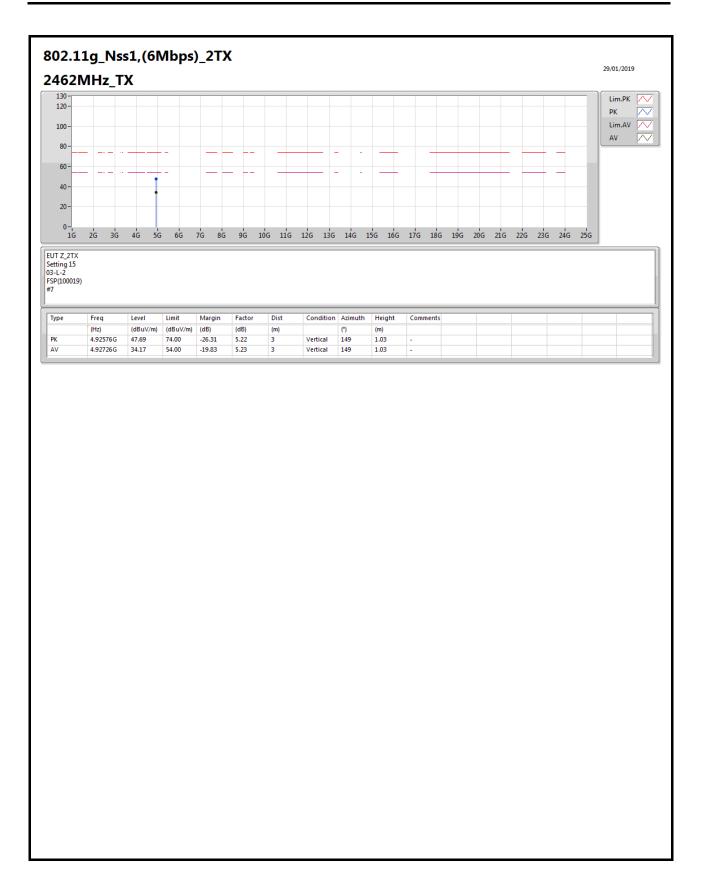
Page No. : 29 of 61





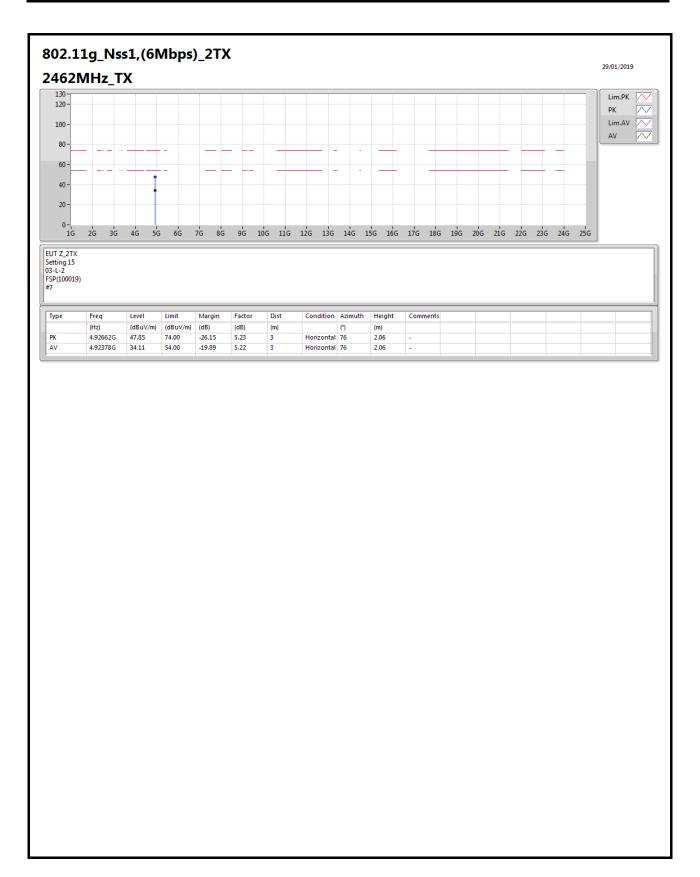
Page No. : 30 of 61





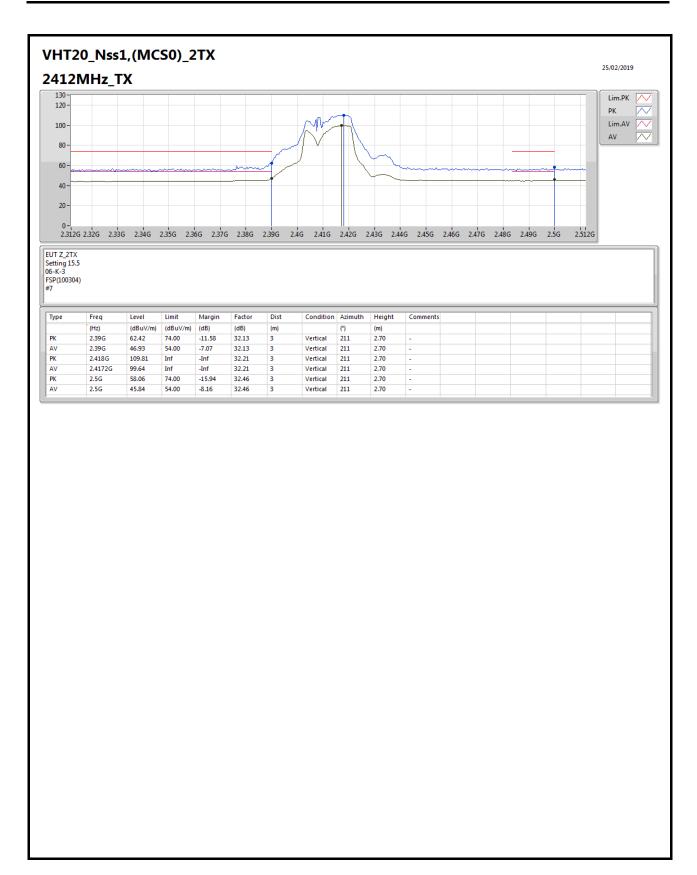
Page No. : 31 of 61





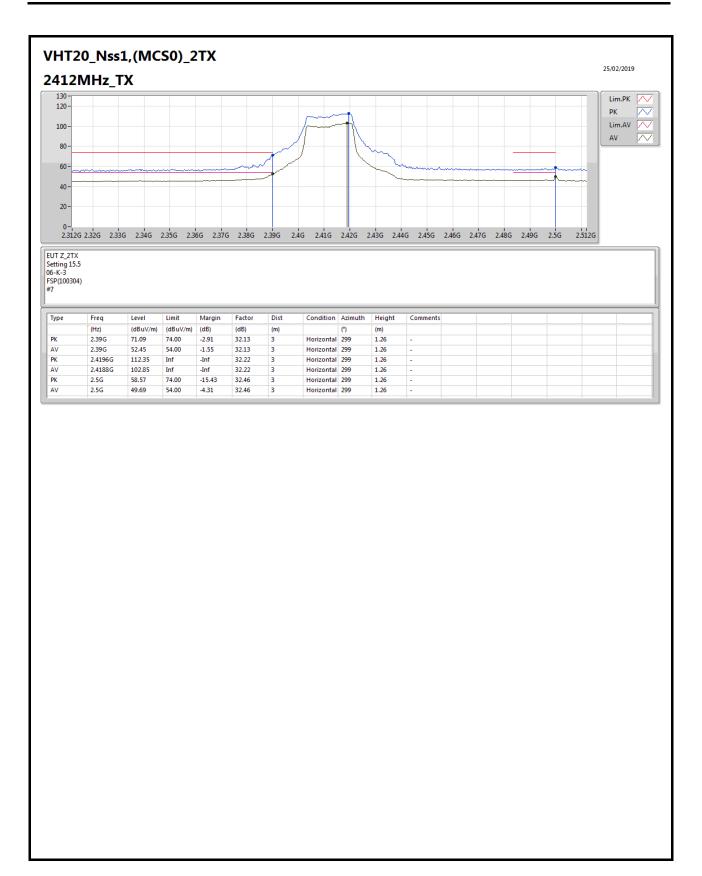
Page No. : 32 of 61



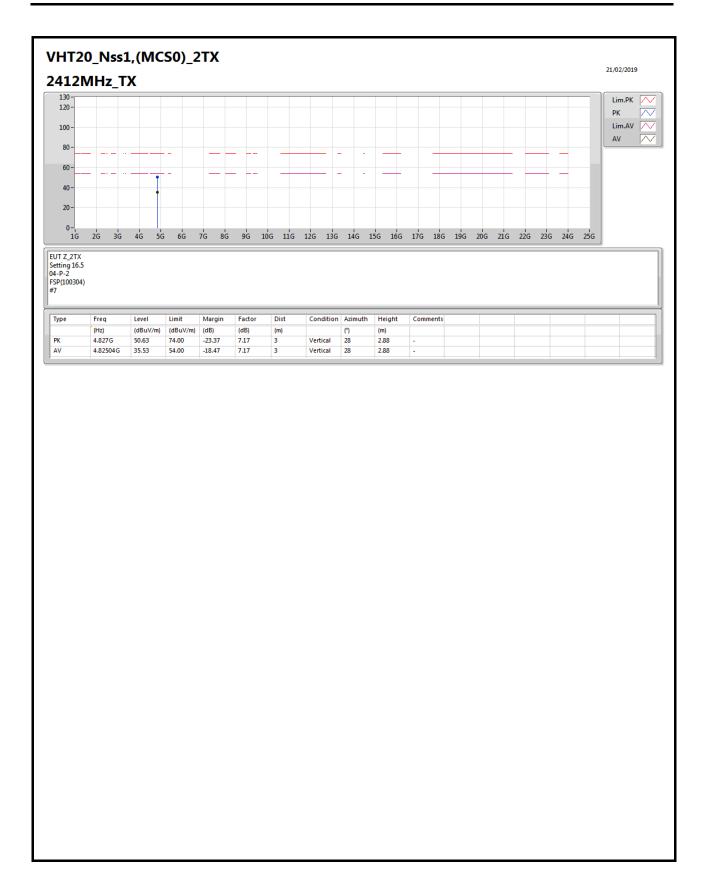


Page No. : 33 of 61



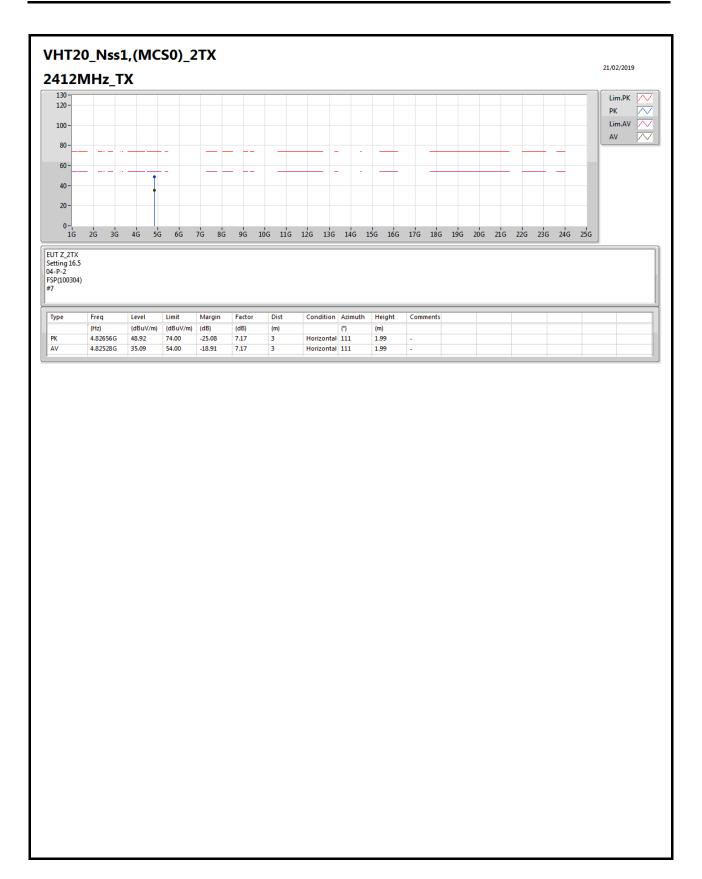




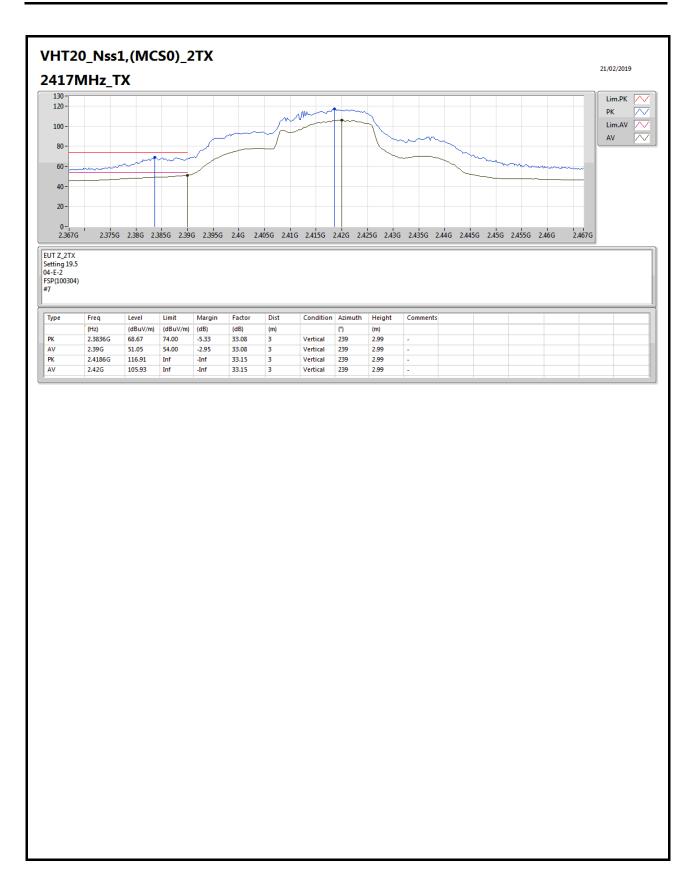


Page No. : 35 of 61



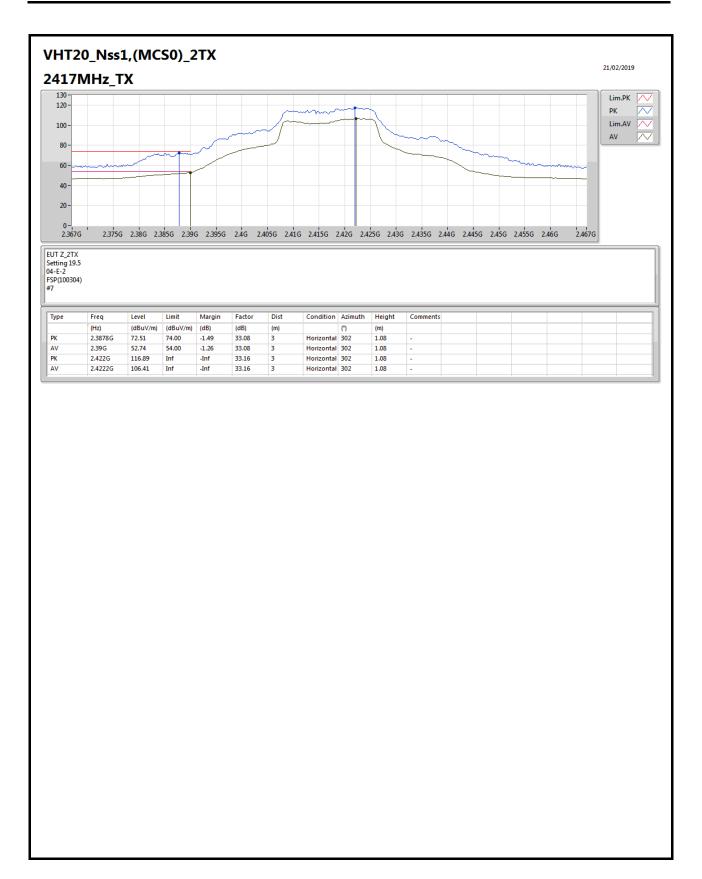




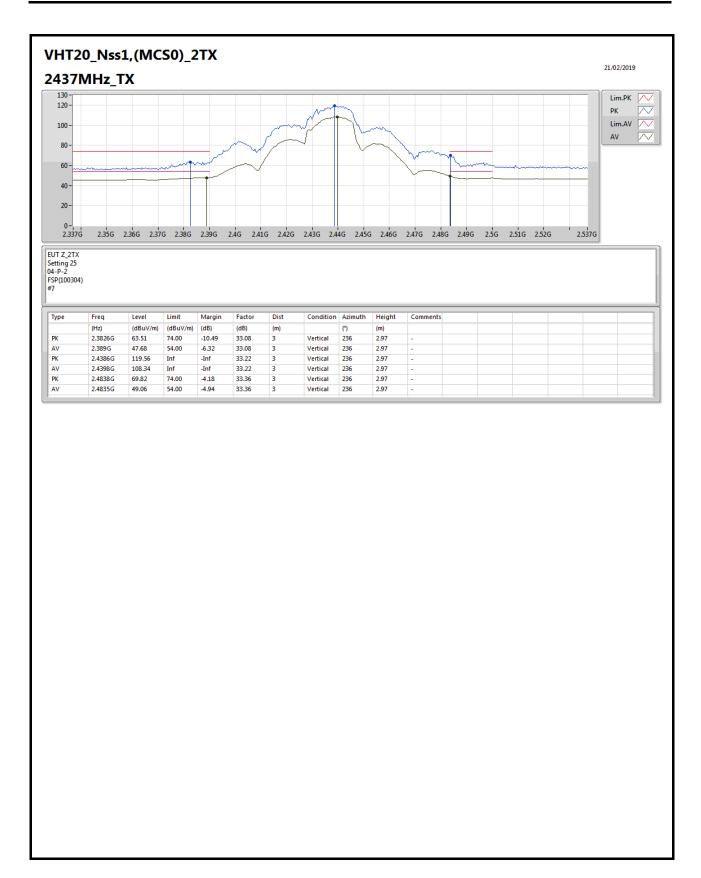


Page No. : 37 of 61

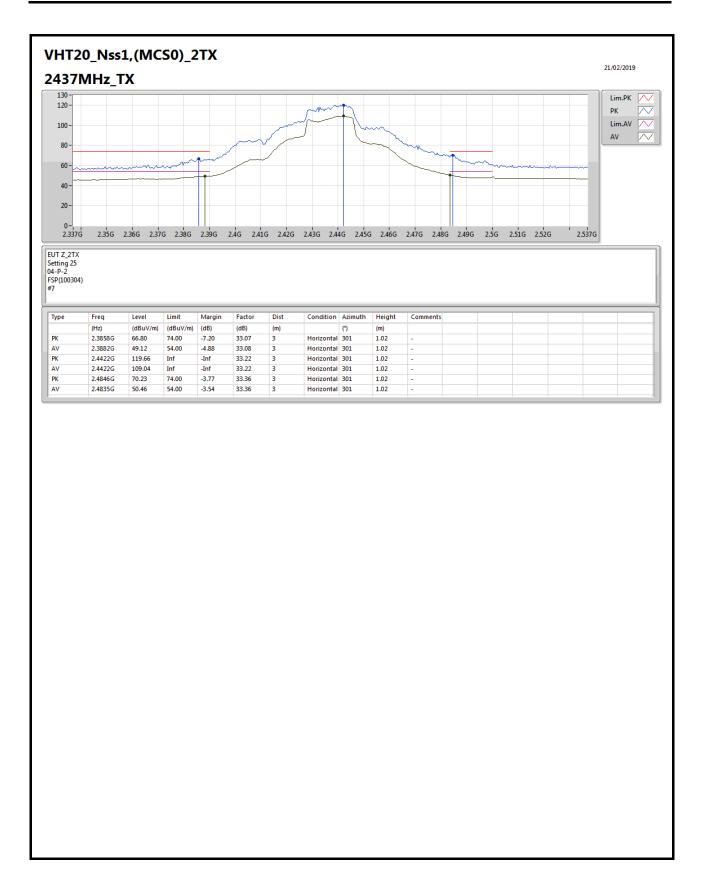






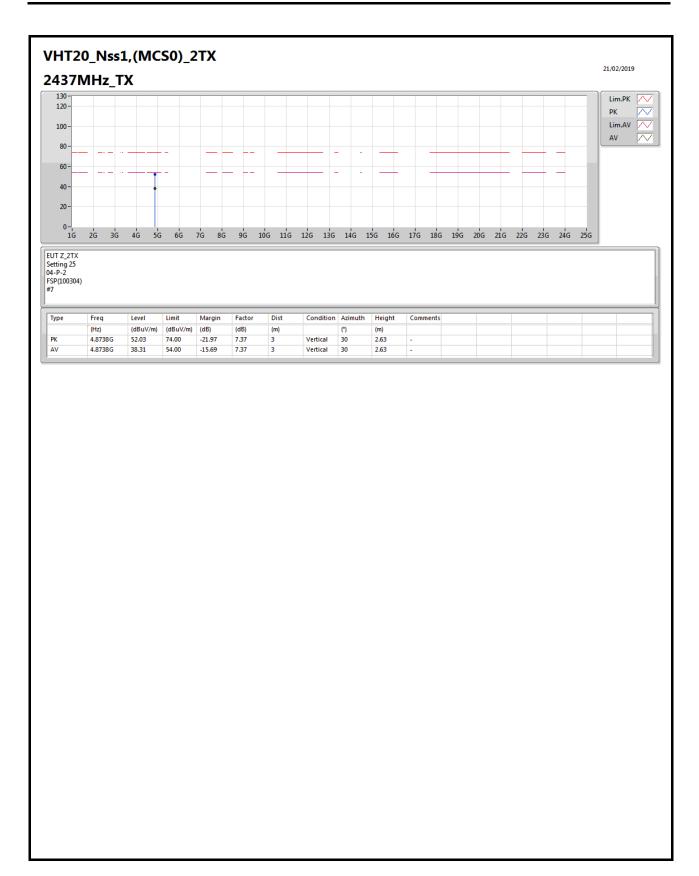






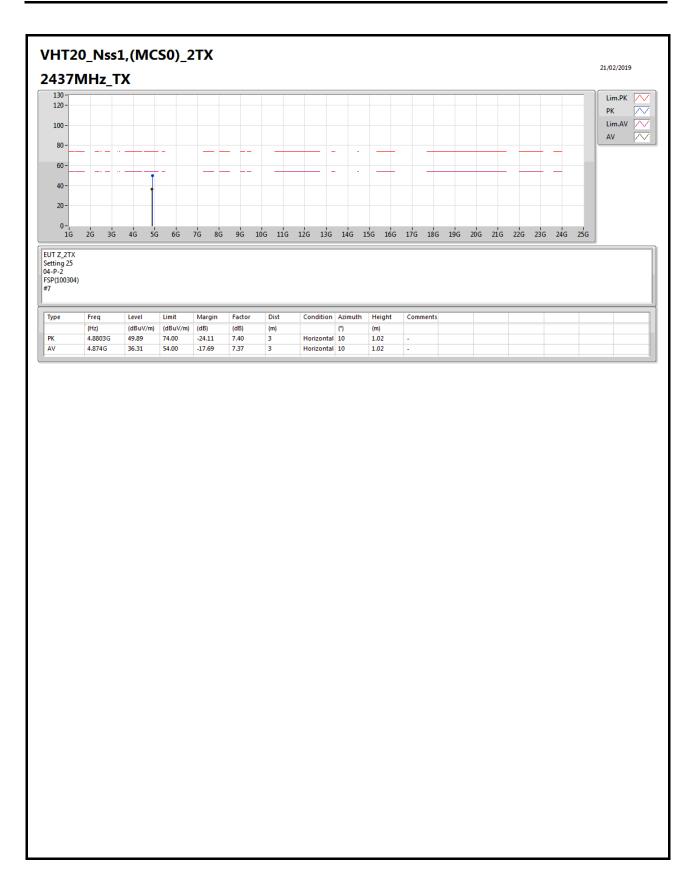
Page No. : 40 of 61





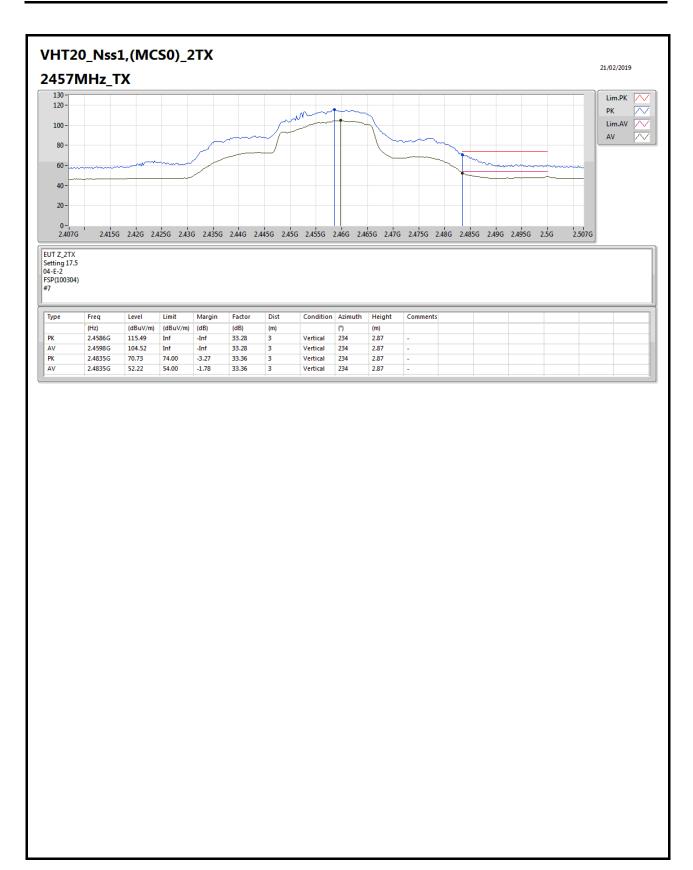
Page No. : 41 of 61





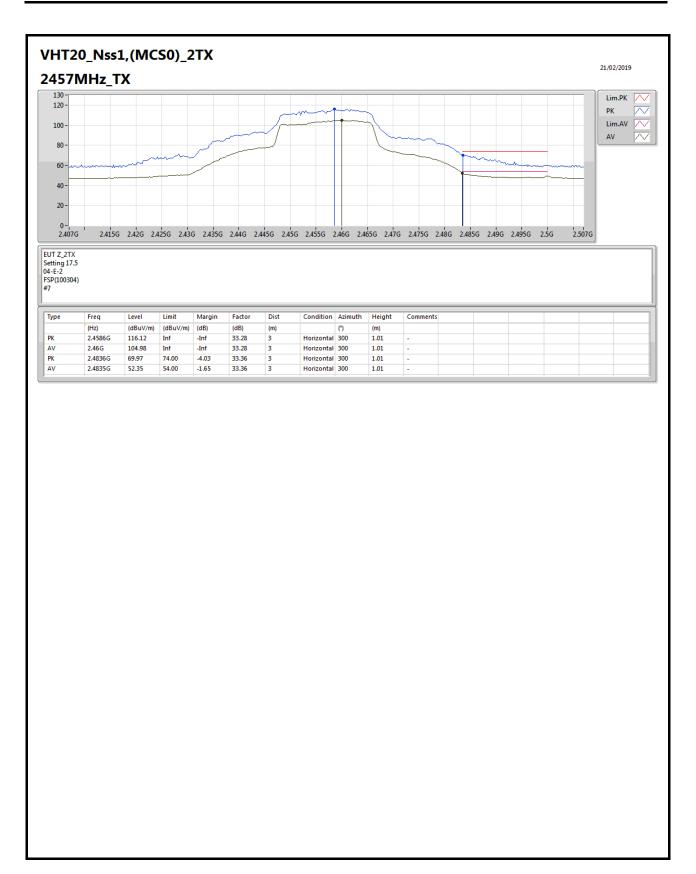
Page No. : 42 of 61



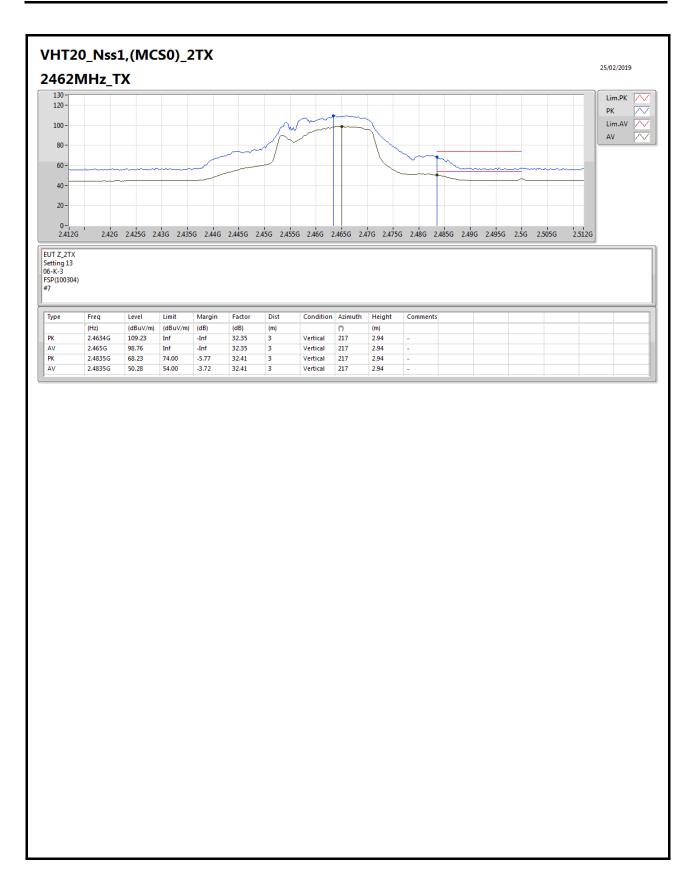


Page No. : 43 of 61



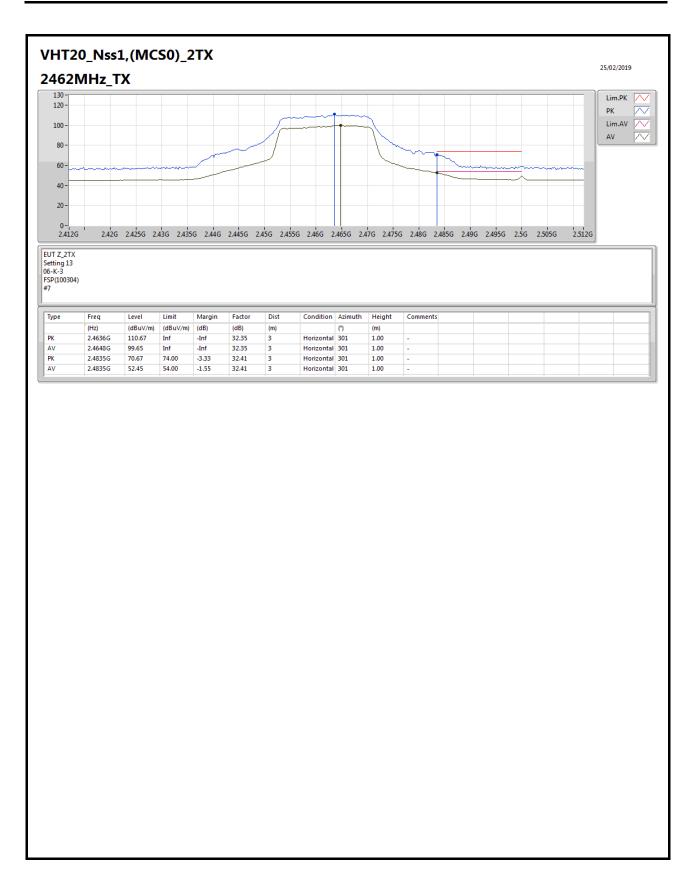






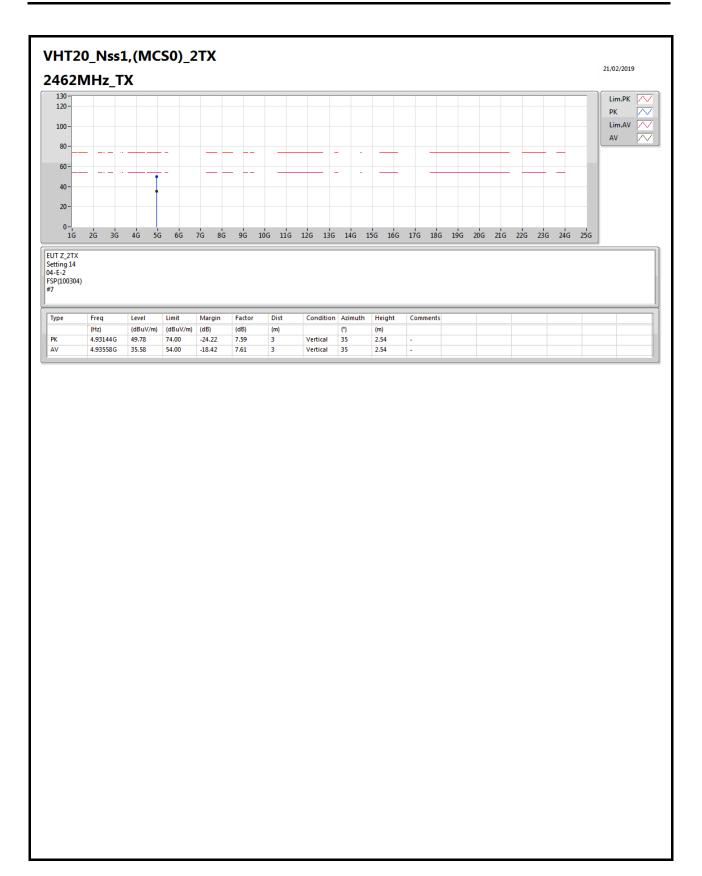
Page No. : 45 of 61





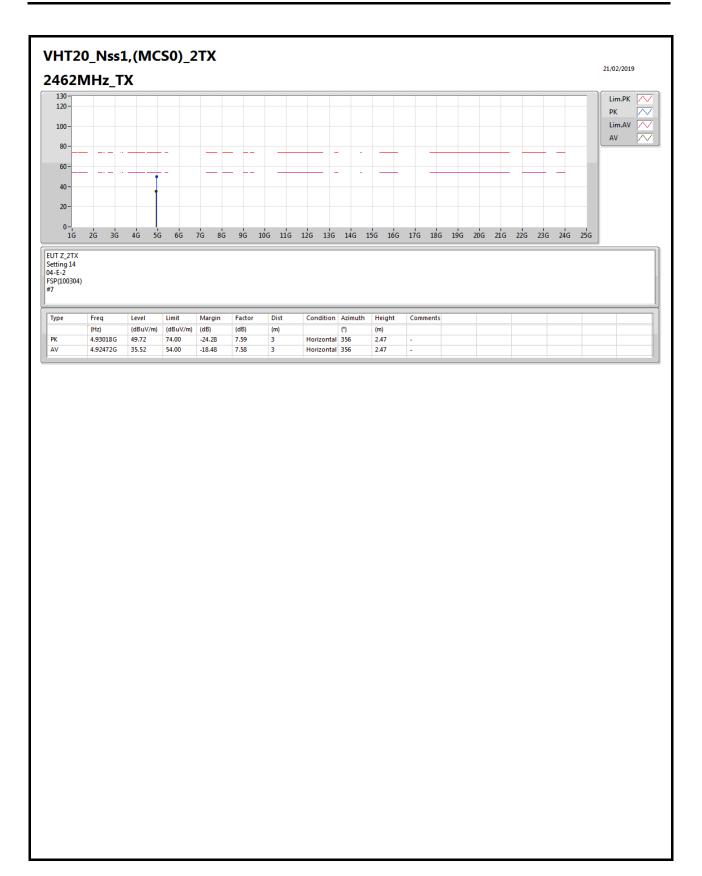
Page No. : 46 of 61





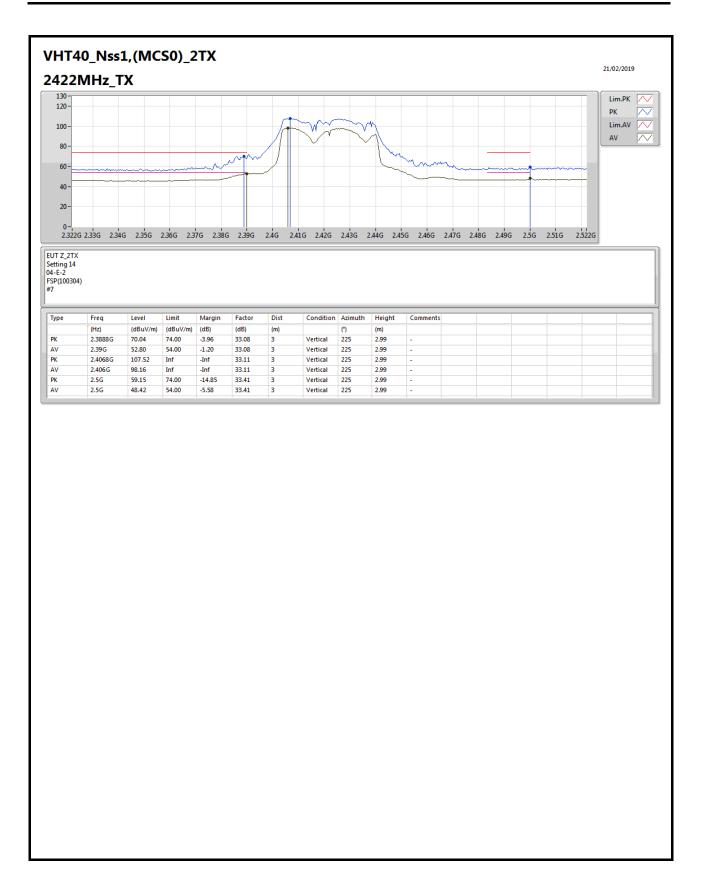
Page No. : 47 of 61





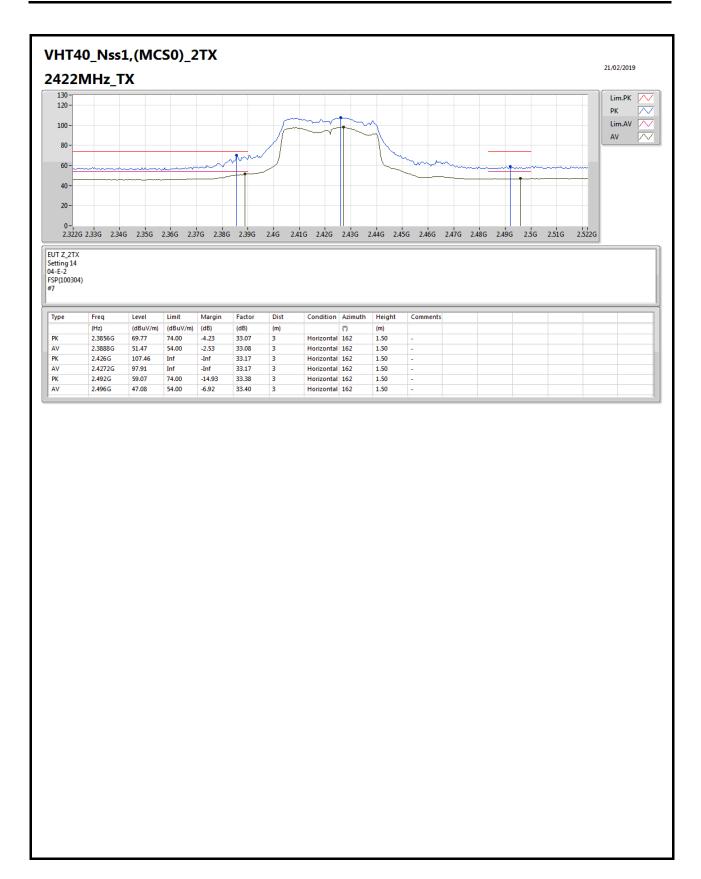
Page No. : 48 of 61





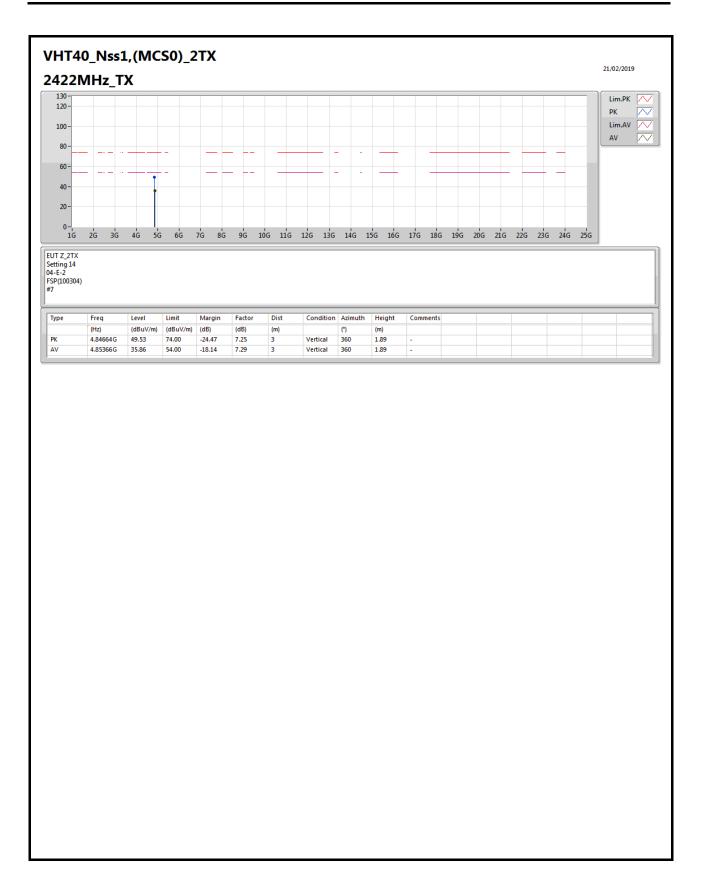
Page No. : 49 of 61





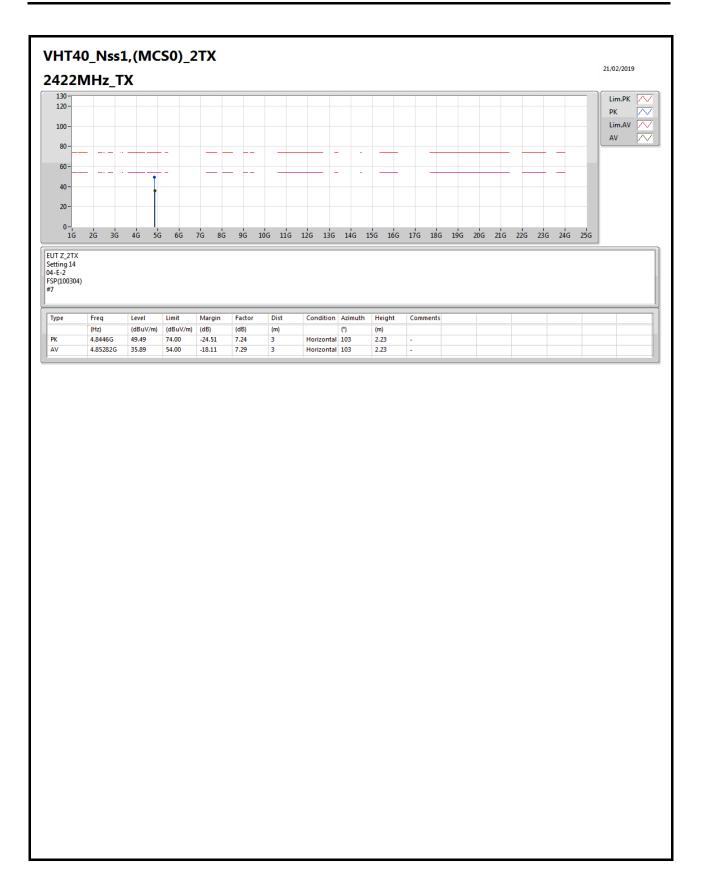
Page No. : 50 of 61



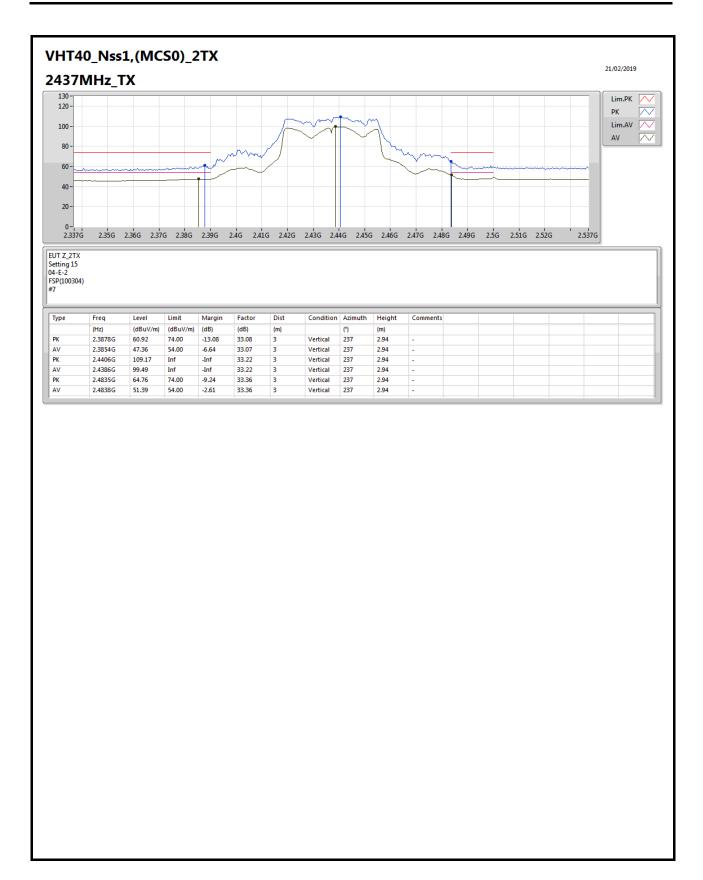


Page No. : 51 of 61



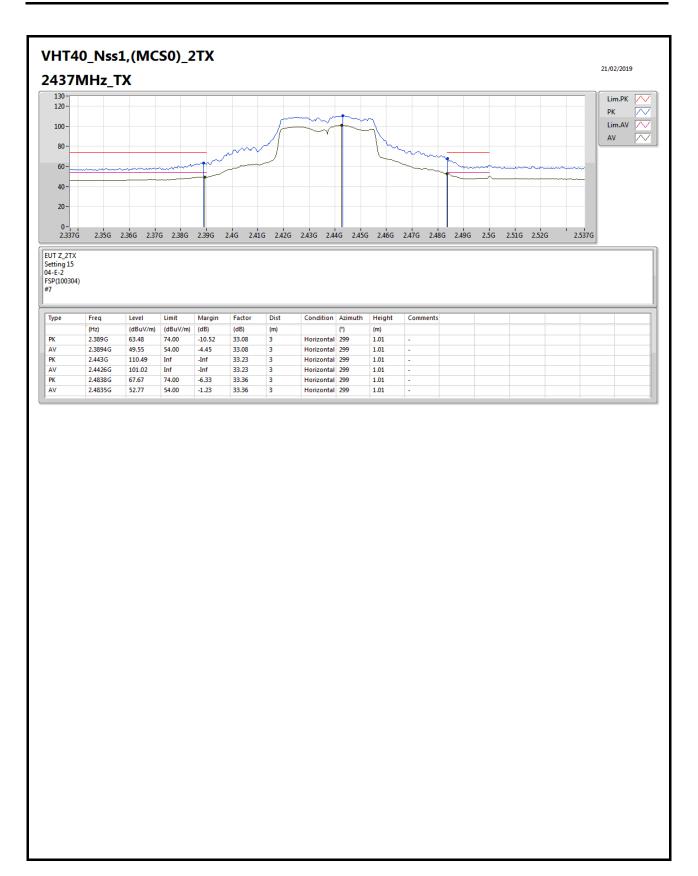






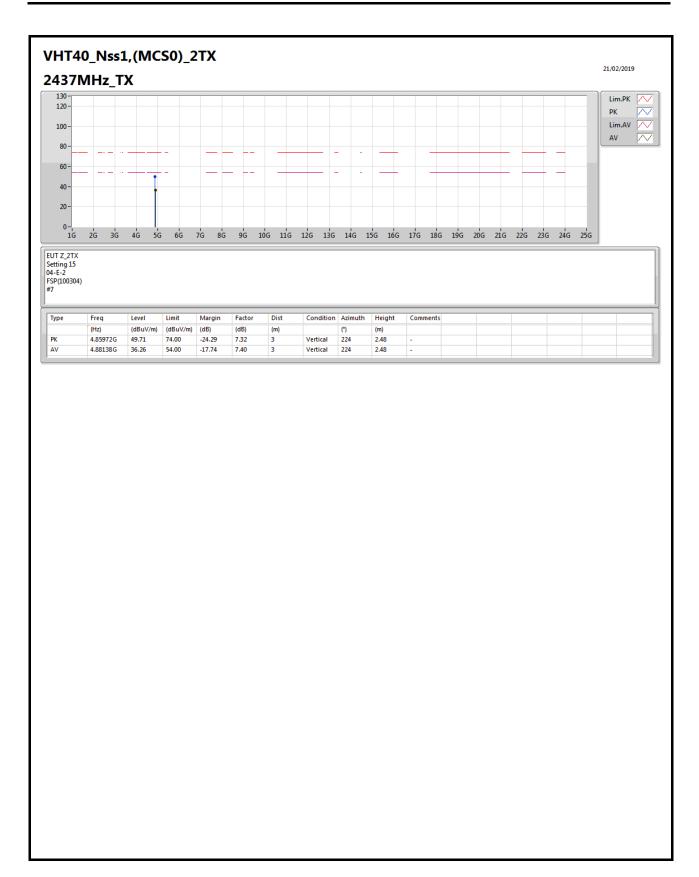
Page No. : 53 of 61





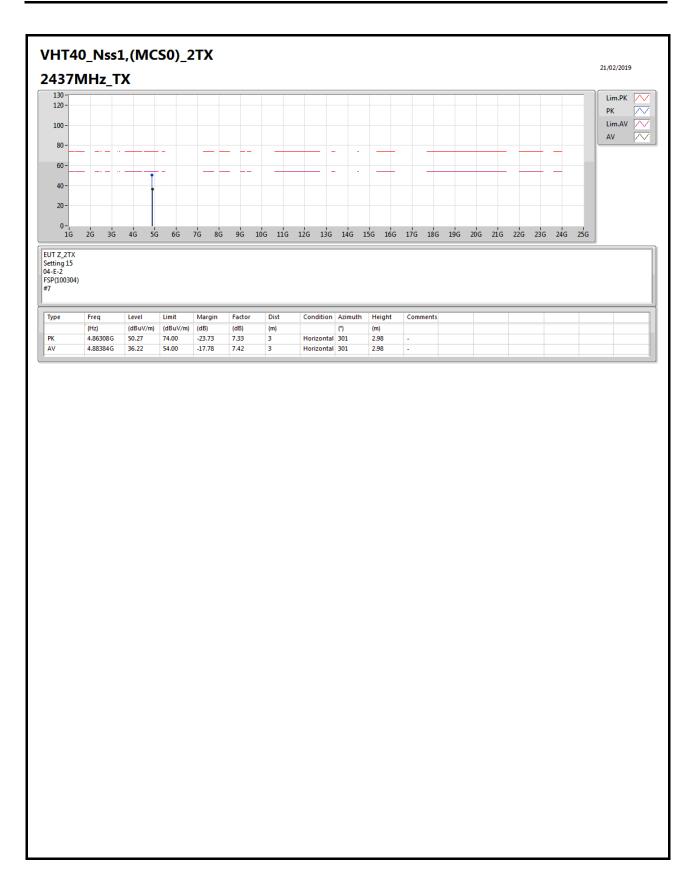
Page No. : 54 of 61





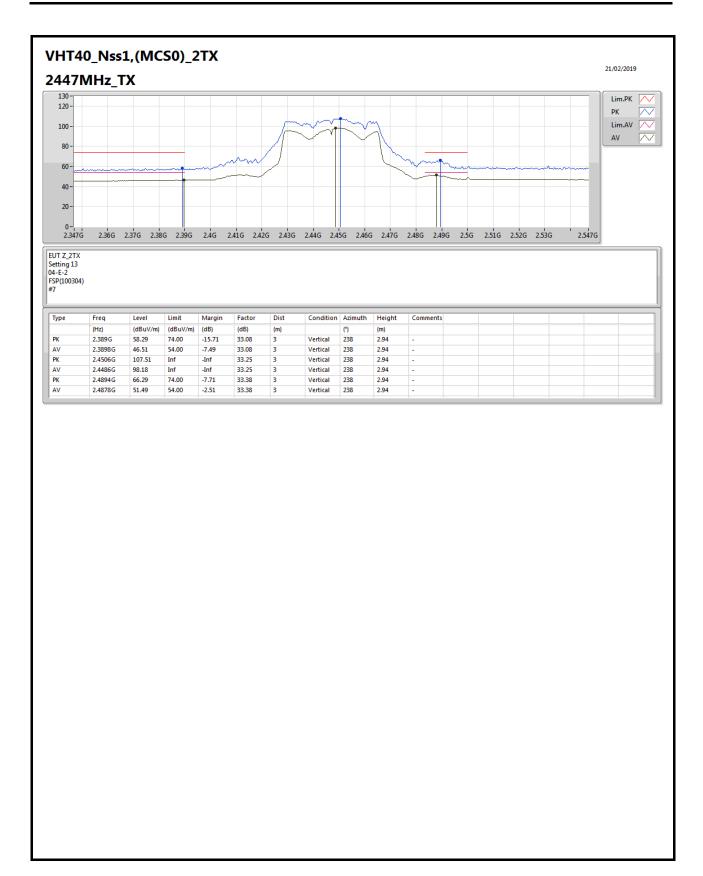
Page No. : 55 of 61





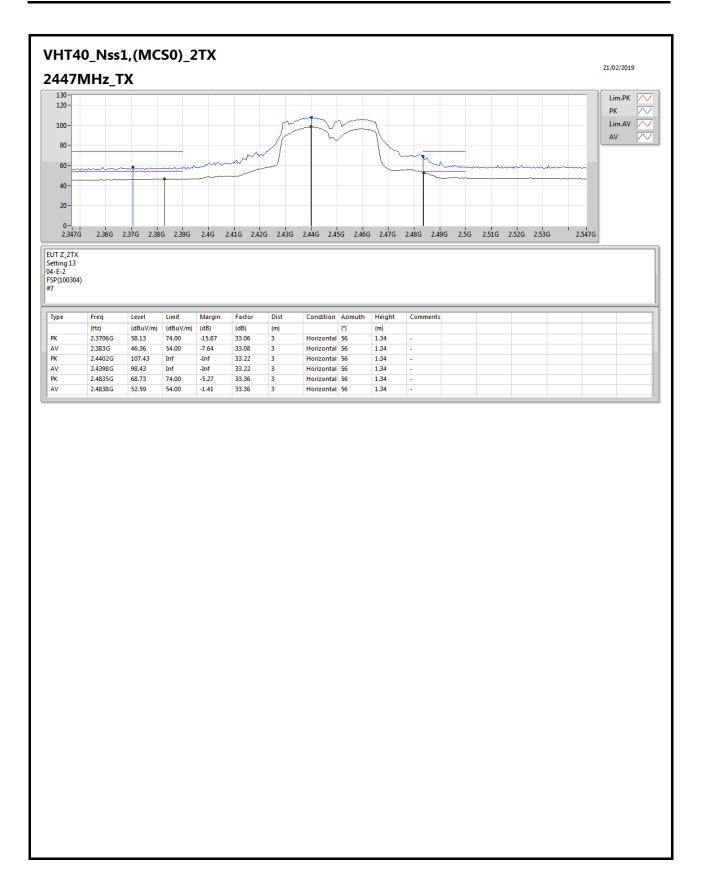
Page No. : 56 of 61





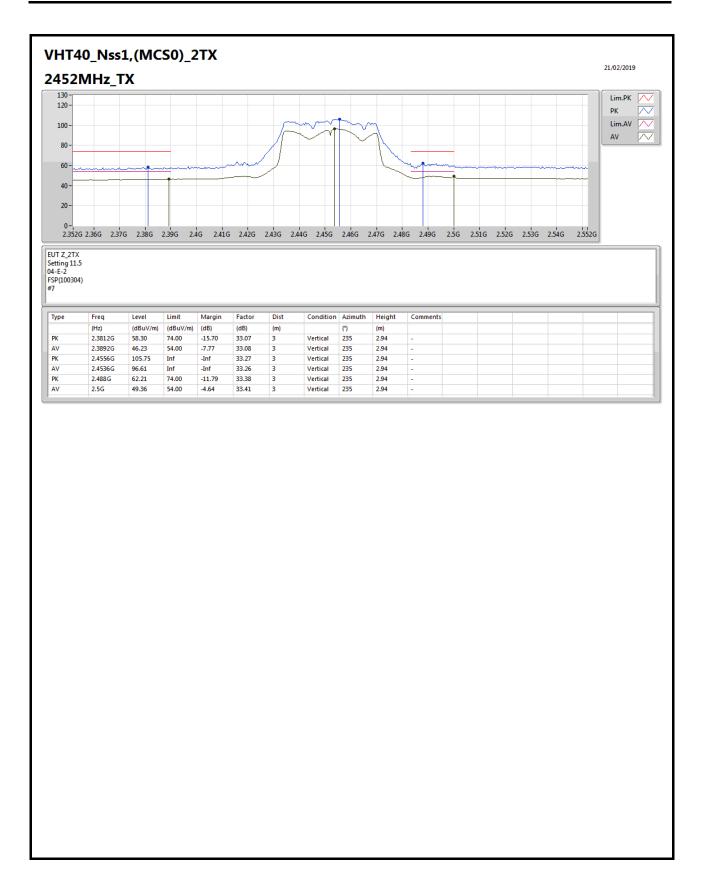
Page No. : 57 of 61





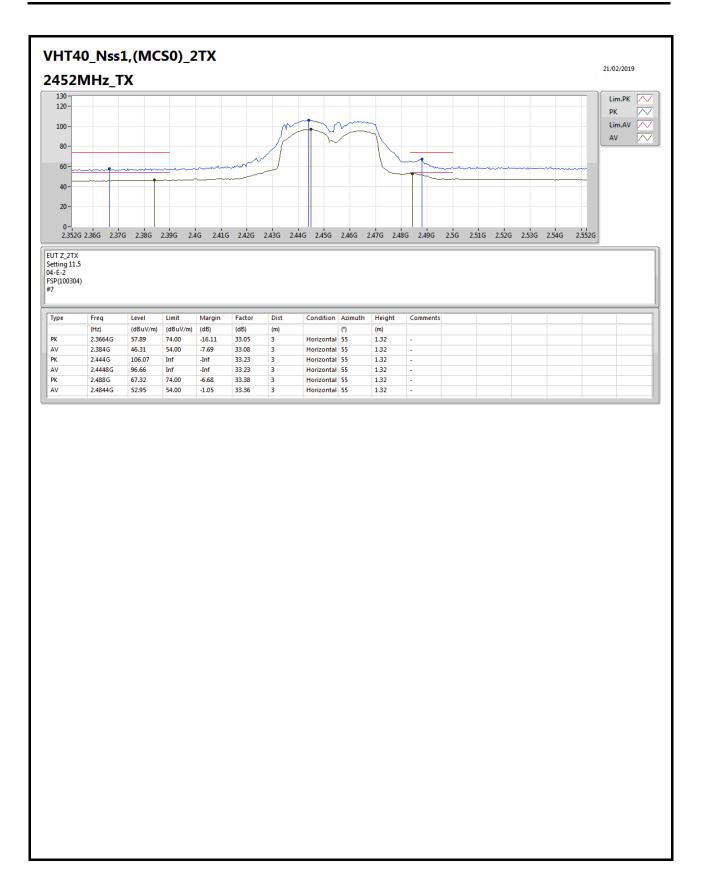
Page No. : 58 of 61





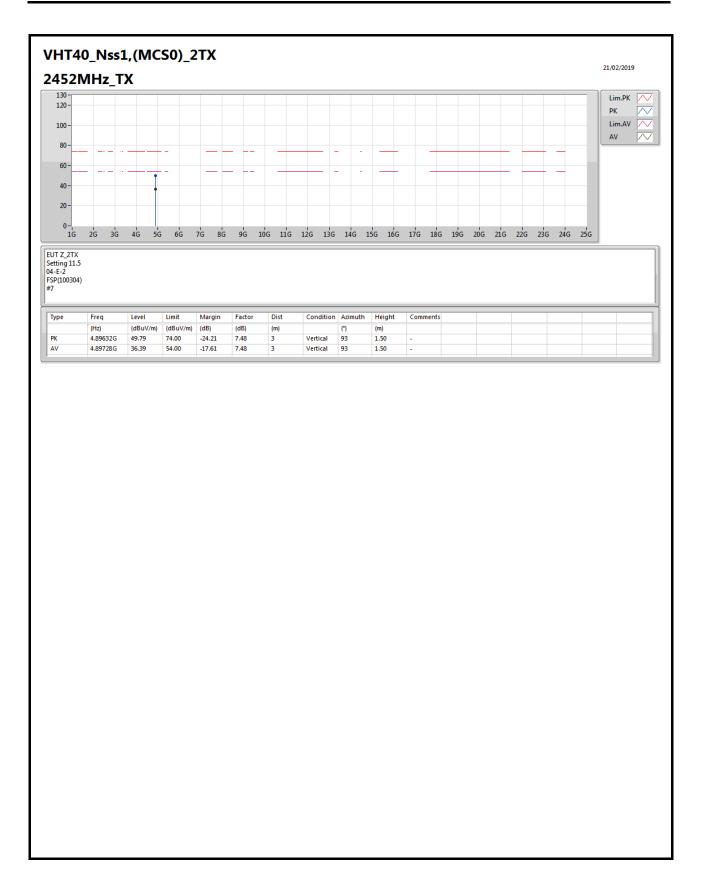
Page No. : 59 of 61





Page No. : 60 of 61





Page No. : 61 of 61



