



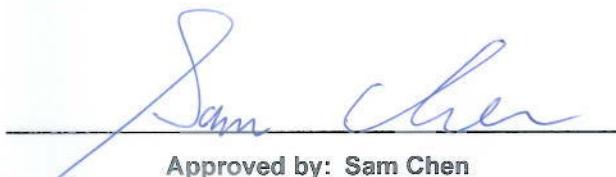
FCC RADIO TEST REPORT

FCC ID : 2ALCB-HG-W-B03-0001
Equipment : Smart Speakerphone
Brand Name : InnoMedia
Model Name : ABCDEF (Refer to 1.1.5 for more details)
Applicant : INNOMEDIA TECHNOLOGY INC
3RD FL HSINCHU SCIENCE-BASED INDUSTRIAL PARK
3 INDUSTRIAL E RD IX HSINCHU 300 TAIWAN
Manufacturer : LUEN HUEI ELECTRONICS CO.,LTD
17 Kuang Fu Rd.,Hsinchu Industrial Park Hsinchu
Hsien 303,Taiwan
Standard : 47 CFR FCC Part 15.247

The product was received on Dec. 25, 2018, and testing was started from Jan. 24, 2019 and completed on Feb. 12, 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.)



Table of Contents

| | |
|---|-----------|
| History of this test report..... | 3 |
| Summary of Test Result..... | 4 |
| 1 General Description | 5 |
| 1.1 Information..... | 5 |
| 1.2 Testing Applied Standards | 8 |
| 1.3 Testing Location Information..... | 8 |
| 1.4 Measurement Uncertainty | 8 |
| 2 Test Configuration of EUT..... | 9 |
| 2.1 Test Channel Mode | 9 |
| 2.2 The Worst Case Measurement Configuration..... | 10 |
| 2.3 EUT Operation during Test | 10 |
| 2.4 Accessories | 11 |
| 2.5 Support Equipment..... | 11 |
| 2.6 Test Setup Diagram | 12 |
| 3 Transmitter Test Result | 14 |
| 3.1 AC Power-line Conducted Emissions | 14 |
| 3.2 DTS Bandwidth | 16 |
| 3.3 Maximum Conducted Output Power | 17 |
| 3.4 Power Spectral Density | 20 |
| 3.5 Emissions in Non-restricted Frequency Bands | 22 |
| 3.6 Emissions in Restricted Frequency Bands..... | 23 |
| 4 Test Equipment and Calibration Data | 27 |

Appendix A. Test Results of AC Power-line Conducted Emissions**Appendix B. Test Results of DTS Bandwidth****Appendix C. Test Results of Maximum Conducted Output Power****Appendix D. Test Results of Power Spectral Density****Appendix E. Test Results of Emissions in Non-restricted Frequency Bands****Appendix F. Test Results of Emissions in Restricted Frequency Bands****Appendix G. Test Photos****Photographs of EUT v01**



History of this test report



Summary of Test Result

| 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:

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: Sandy Chuang



1 General Description

1.1 Information

1.1.1 RF General Information

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

| 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 | 802.11n HT40 | 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.
- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

1.1.2 Antenna Information

| Ant. | Port | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | |
|------|------|---------|------------------|--------------|-----------|------------|------|
| | | | | | | 2.4GHz | 5GHz |
| 1 | 1 | LYNwave | ALT140-222020-01 | PIFA Antenna | I-PEX | 2 | 3 |

Note1: The above information was declared by manufacturer.

Note2:

<For 2.4GHz Band>

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

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

<For 5GHz Band>

For IEEE 802.11a/n/ac 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) $\geq 1/T$ |
|--------------|-------|---------|----------------|--------------------|
| 802.11b | 0.992 | 0.035 | n/a (DC>=0.98) | n/a (DC>=0.98) |
| 802.11g | 0.95 | 0.223 | 2.068m | 1k |
| 802.11n HT20 | 0.951 | 0.218 | 1.925m | 1k |
| 802.11n HT40 | 0.903 | 0.443 | 950u | 3k |

1.1.4 EUT Operational Condition

| | | | | |
|-----------------------|---|---------------------|-------------------------------------|---------------------|
| EUT Power Type | From Power Adapter | | | |
| Beamforming Function | <input type="checkbox"/> | With beamforming | <input checked="" type="checkbox"/> | Without beamforming |
| Function | <input checked="" type="checkbox"/> | Point-to-multipoint | <input type="checkbox"/> | Point-to-point |
| Test Software Version | SecureCRT(virSION 1.0.1.111A-audio_wifi Mon Jan 14 15:30:17 2019) | | | |

Note: The above information was declared by manufacturer.



1.1.5 Table for Multiple Listing

The model names: ABCDEF are defined as below information:

- ✓ A : Two letter Series identifier
- ✓ B : Number 0~9 and 4 digit is optional
- ✓ C : Use G (Google) or A (Amazon) or other letters for designation letter from A~Z for another customer offering
- ✓ D: - or empty
- ✓ E : 1 or empty
- ✓ F : W or empty

| Character | Number | Description |
|-----------|---------------|---|
| A | HG | Home Gateway Series Identifier for marketing needs |
| | SP | Smart Phone Series Identifier for marketing needs |
| | BT | BuddyTalk Series Identifier for marketing needs |
| | SC | SmartCommunicator Series Identifier for marketing needs |
| B | 0~9 | This can be changed with Software configuration |
| C | G (Google) | Optional designation letter from A~Z for another customer offering, marketing needs |
| | A (Amazon) | |
| | other letters | |
| D | - | a field separator |
| | empty | No separator |
| E | 1 | 1 port FXS |
| | empty | No FXS port |
| F | W | Wifi used |
| | empty | Without Wifi used |

From the above models, model: HG8328-1W was selected as representative model for the test and its data was recorded in this report.



1.2 Testing Applied Standards

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

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

1.3 Testing Location Information

| Testing Location | | | | |
|-------------------------------------|--------|---|--|--|
| <input type="checkbox"/> | 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 | | |
| <input checked="" type="checkbox"/> | 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 | Eason Chen | 22~24°C / 54~56% | Jan. 28, 2019~ Jan. 30, 2019 |
| Radiated | 03CH01-CB | Stim Sung | 22~24°C / 52~55% | Jan. 24, 2019~ Feb. 11, 2019 |
| AC Conduction | CO02-CB | Wei Li | 26.3~26.7°C / 60.1~60.7% | Feb. 12, 2019 |

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

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 | 9.74×10^{-8} | Confidence levels of 95% |



2 Test Configuration of EUT

2.1 Test Channel Mode

| Mode | PowerSetting |
|------------------------------|--------------|
| 802.11b_Nss1,(1Mbps)_1TX | - |
| 2412MHz | 48 |
| 2437MHz | 46 |
| 2462MHz | 42 |
| 802.11g_Nss1,(6Mbps)_1TX | - |
| 2412MHz | 54 |
| 2417MHz | 62 |
| 2422MHz | 63 |
| 2437MHz | 63 |
| 2447MHz | 63 |
| 2452MHz | 62 |
| 2457MHz | 59 |
| 2462MHz | 52 |
| 802.11n HT20_Nss1,(MCS0)_1TX | - |
| 2412MHz | 52 |
| 2417MHz | 61 |
| 2422MHz | 63 |
| 2437MHz | 63 |
| 2447MHz | 63 |
| 2452MHz | 61 |
| 2457MHz | 58 |
| 2462MHz | 50 |
| 802.11n HT40_Nss1,(MCS0)_1TX | - |
| 2422MHz | 49 |
| 2432MHz | 52 |
| 2437MHz | 52 |
| 2442MHz | 50 |
| 2447MHz | 49 |
| 2452MHz | 48 |



2.2 The Worst Case Measurement Configuration

| The Worst Case Mode for Following Conformance Tests | |
|---|--|
| Tests Item | AC power-line conducted emissions |
| Condition | AC power-line conducted measurement for line and neutral |
| Operating Mode | CTX |
| 1 | CTX + 2.4GHz |
| 2 | CTX + 5GHz |

For operating mode 1 is the worst case and it was record in this test report.

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

| The Worst Case Mode for Following Conformance Tests | |
|---|---|
| Tests Item | Emissions in Restricted Frequency Bands |
| Test Condition | Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. |
| Operating Mode < 1GHz | CTX |
| 1 | CTX + 2.4GHz |
| 2 | CTX + 5GHz |

For operating mode 2 is the worst case and it was record in this test report.

Operating Mode > 1GHz | CTX

Note: The EUT can only be used in Z-axis position.

2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



2.4 Accessories

| Accessories | | | | |
|-------------|----------------|------------|------------------|--|
| No. | Equipment Name | Brand Name | Model Name | Rating |
| 1 | Adapter | AtechOEM | ADS0248T-W120200 | Input: 100-240V~50-60Hz, 0.6A Output: 12V, 2.0A |

2.5 Support Equipment

For Test Site No: CO02-CB

| Support Equipment | | | | |
|-------------------|---------------|------------|--------------|--------|
| No. | Equipment | Brand Name | Model Name | FCC ID |
| A | Flash disk3.0 | Transcend | JetFlash-700 | N/A |
| B | Earphone | e-Power | S90W | N/A |

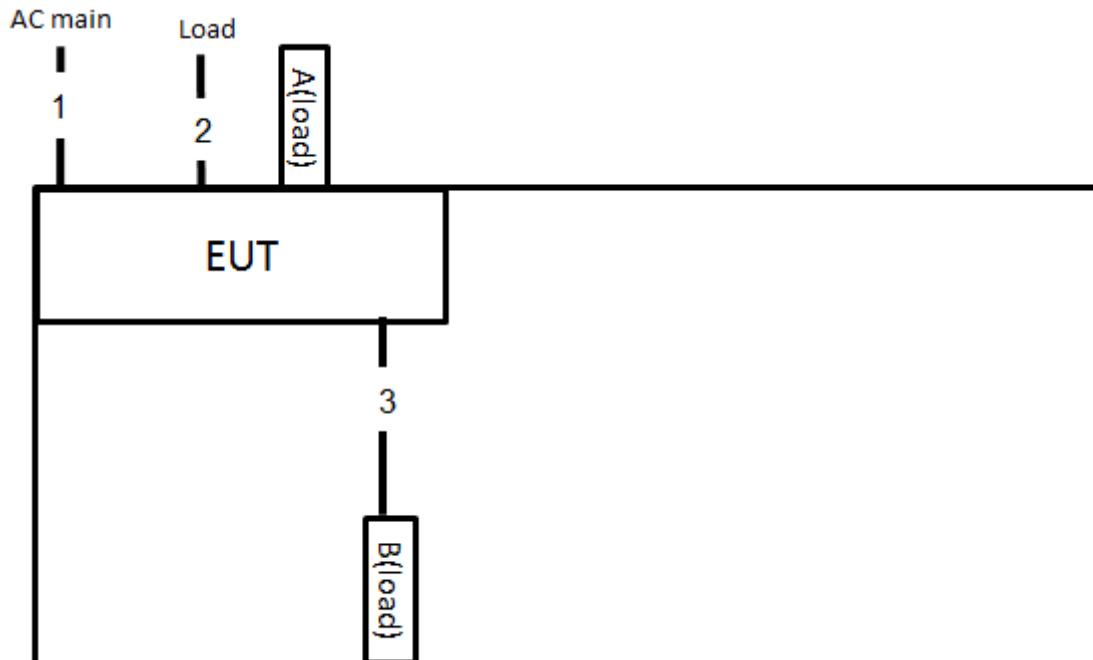
For Test Site No: 03CH01-CB and TH01-CB

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



2.6 Test Setup Diagram

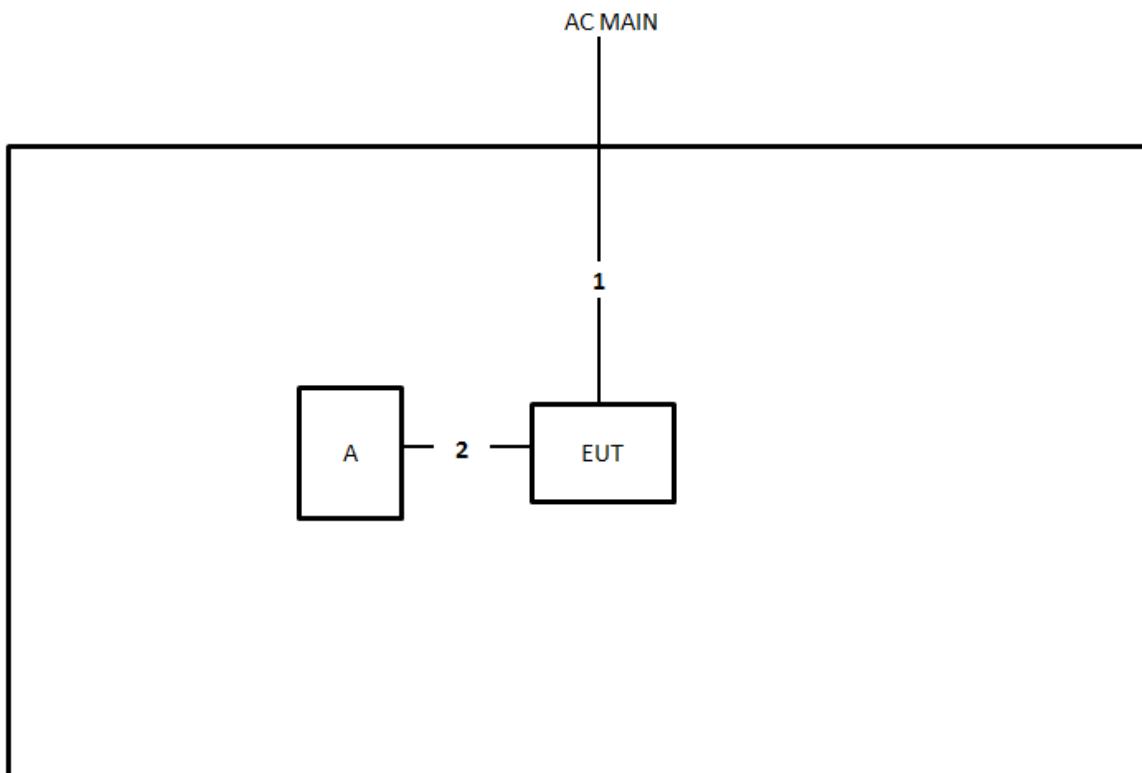
Test Setup Diagram – AC Line Conducted Emission Test



| Item | Connection | Shielded | Length |
|------|-------------|----------|--------|
| 1 | Power cable | No | 1.5m |
| 2 | RJ-11 cable | No | 1.5m |
| 3 | Audio cable | No | 1.4m |



Test Setup Diagram - Radiated Test



| Item | Connection | Shielded | Length |
|------|---------------|----------|--------|
| 1 | Power cable | No | 1.5m |
| 2 | Console cable | Yes | 0.7m |



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.

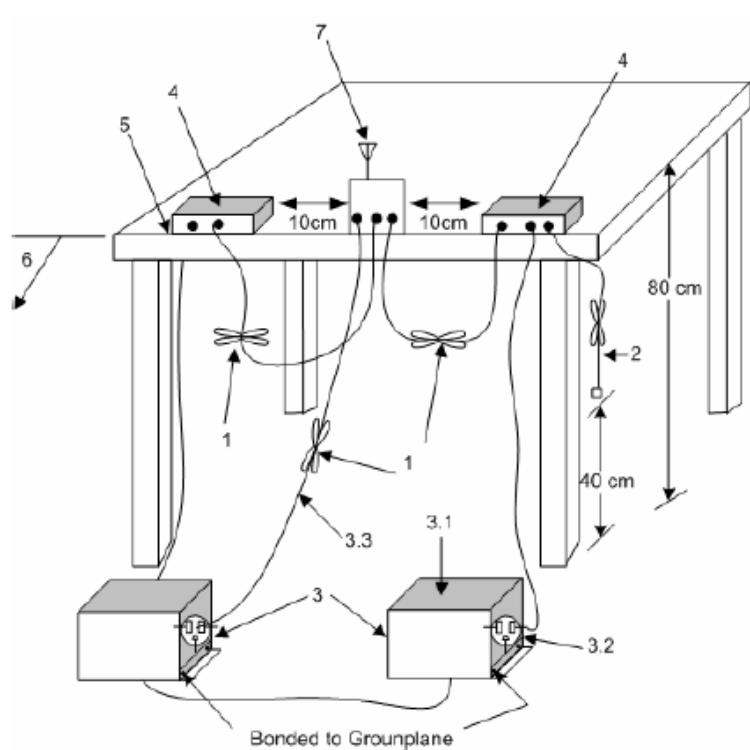
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

| Test Method |
|--|
| <input checked="" type="checkbox"/> Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions. |

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.
- 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 50Ω 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



3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

| 6dB Bandwidth Limit |
|---|
| Systems using digital modulation techniques: |
| ▪ 6 dB bandwidth \geq 500 kHz. |

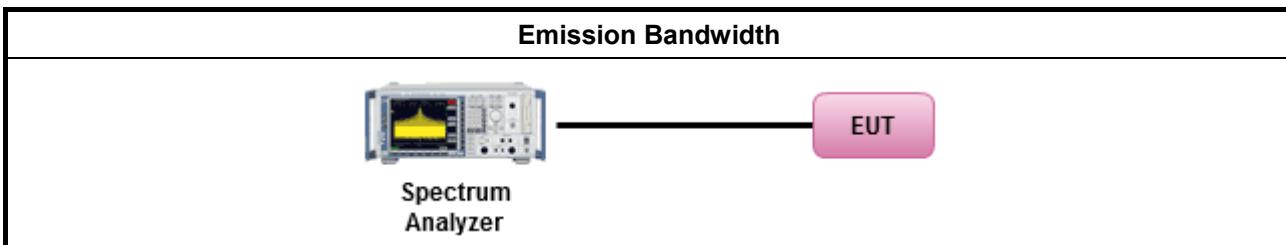
3.2.2 Measuring Instruments

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: |
| <input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement. |
| <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement. |
| <input type="checkbox"/> 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



3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

| Maximum Conducted Output Power Limit | |
|--------------------------------------|---|
| | <ul style="list-style-type: none">▪ If $G_{TX} \leq 6 \text{ dBi}$, then $P_{Out} \leq 30 \text{ dBm}$ (1 W) |
| | <ul style="list-style-type: none">▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 6) \text{ dBm}$ |
| | <ul style="list-style-type: none">▪ Point-to-point systems (P2P): If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 6)/3 \text{ dBm}$ |
| | <ul style="list-style-type: none">▪ Smart antenna system (SAS):<ul style="list-style-type: none">- Single beam: If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 6)/3 \text{ dBm}$- Overlap beam: If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 6)/3 \text{ dBm}$- Aggregate power on all beams: If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8\text{dB dBm}$ |

P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm,

G_{TX} = the maximum transmitting antenna directional gain in dBi.

3.3.2 Measuring Instruments

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



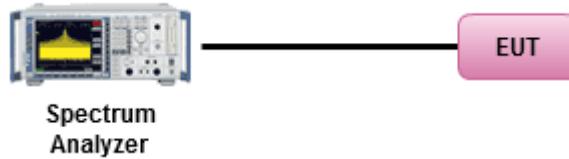
3.3.3 Test Procedures

| Test Method | |
|---------------------------------------|---|
| ▪ Maximum Peak Conducted Output Power | <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW \geq EBW method). <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter). |
| ▪ Maximum Conducted Output Power | <p>[duty cycle \geq 98% or external video / power trigger]</p> <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1. <input type="checkbox"/> 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 |
| | <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2. <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative) <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3 <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative) |
| | Measurement using a power meter (PM) |
| | <input checked="" type="checkbox"/> 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). <input type="checkbox"/> 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. | <ul style="list-style-type: none">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: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$ |



3.3.4 Test Setup

Maximum Conducted Output Power (Spectrum Analyzer)



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C



3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

| Power Spectral Density Limit |
|--|
| ▪ Power Spectral Density (PSD) \leq 8 dBm/3kHz |

3.4.2 Measuring Instruments

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

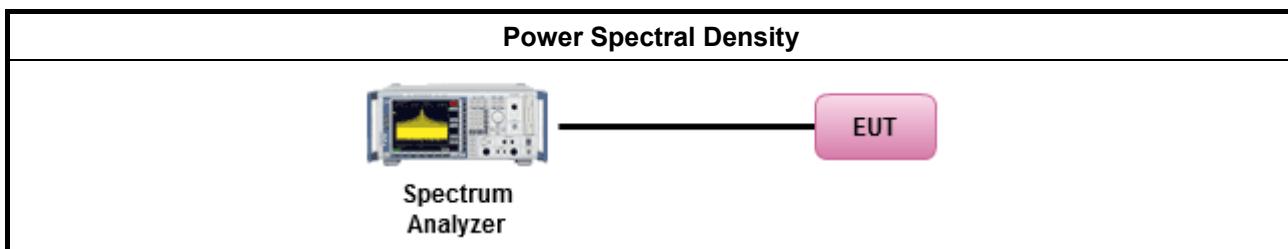
3.4.3 Test Procedures

| 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). | | | |
| <input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.2 Method PKPSD. [duty cycle \geq 98% or external video / power trigger] | | | |
| <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.3 Method AVGPSD-1. | | | |
| <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.5 Method AVGPSD-2. | | | |
| <input type="checkbox"/> 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 | | | |
| <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.4 Method AVGPSD-1A. (alternative). | | | |
| <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.6 Method AVGPSD-2A. (alternative) | | | |
| <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.8 Method AVGPSD-3A. (alternative) | | | |
| ▪ For conducted measurement. | | | |
| <table border="1"><tr><td>▪ If The EUT supports multiple transmit chains using options given below:</td></tr><tr><td><input checked="" type="checkbox"/> 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.</td></tr><tr><td><input type="checkbox"/> 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,</td></tr></table> | ▪ If The EUT supports multiple transmit chains using options given below: | <input checked="" type="checkbox"/> 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. | <input type="checkbox"/> 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, |
| ▪ If The EUT supports multiple transmit chains using options given below: | | | |
| <input checked="" type="checkbox"/> 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. | | | |
| <input type="checkbox"/> 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, | | | |



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.

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Refer as Appendix D



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 |

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.

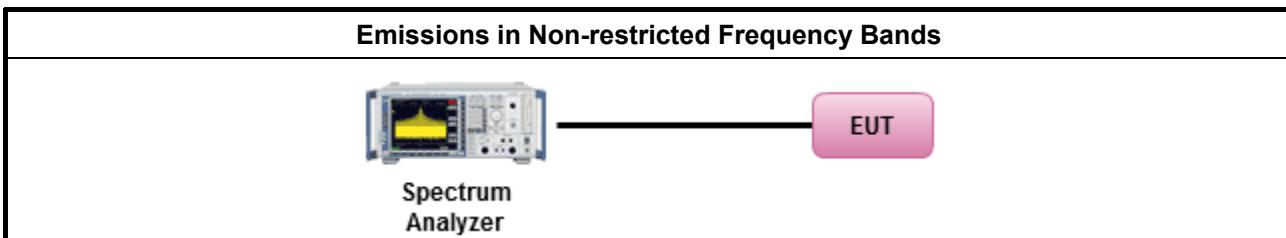
3.5.2 Measuring Instruments

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



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 |

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.

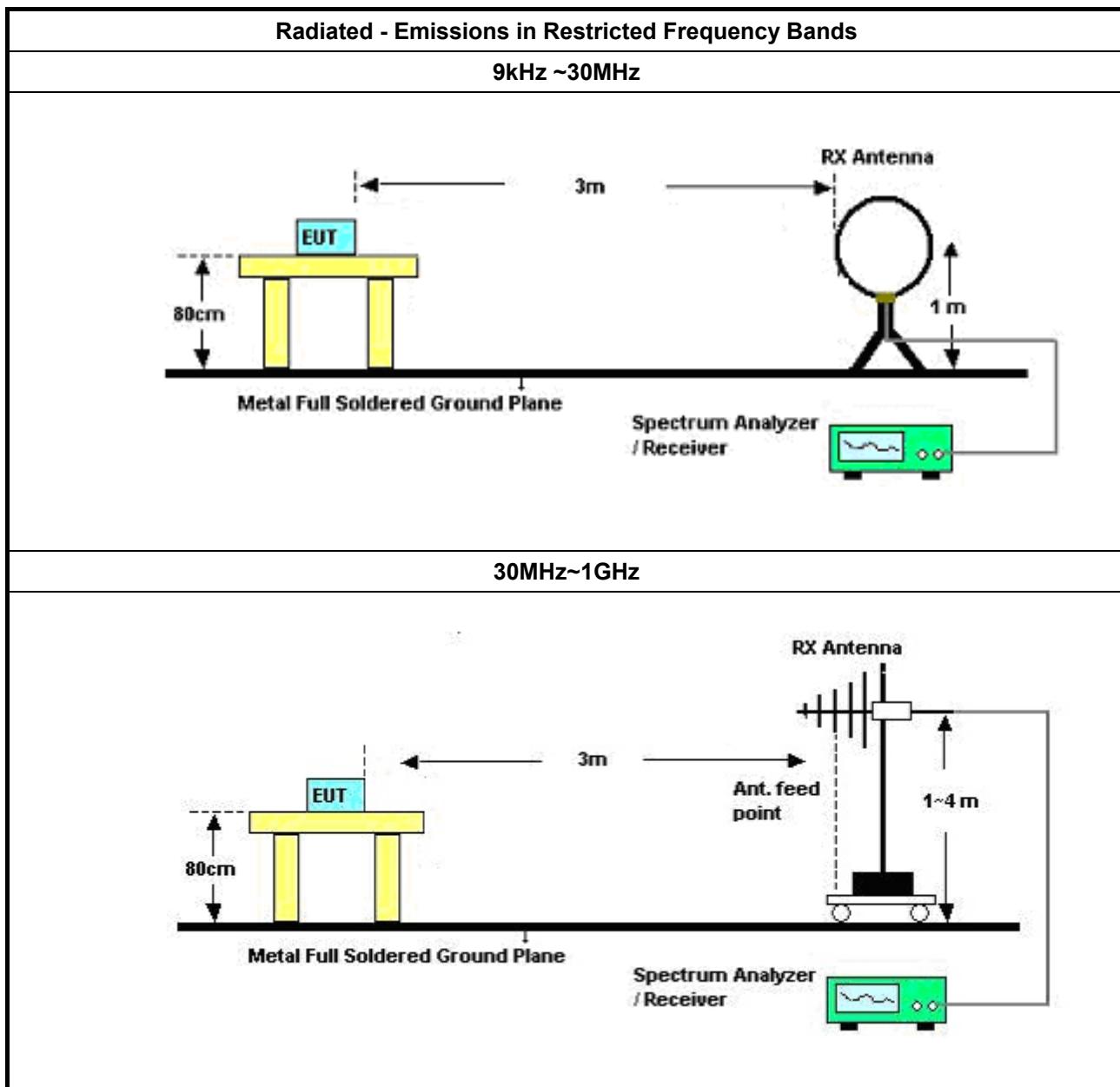


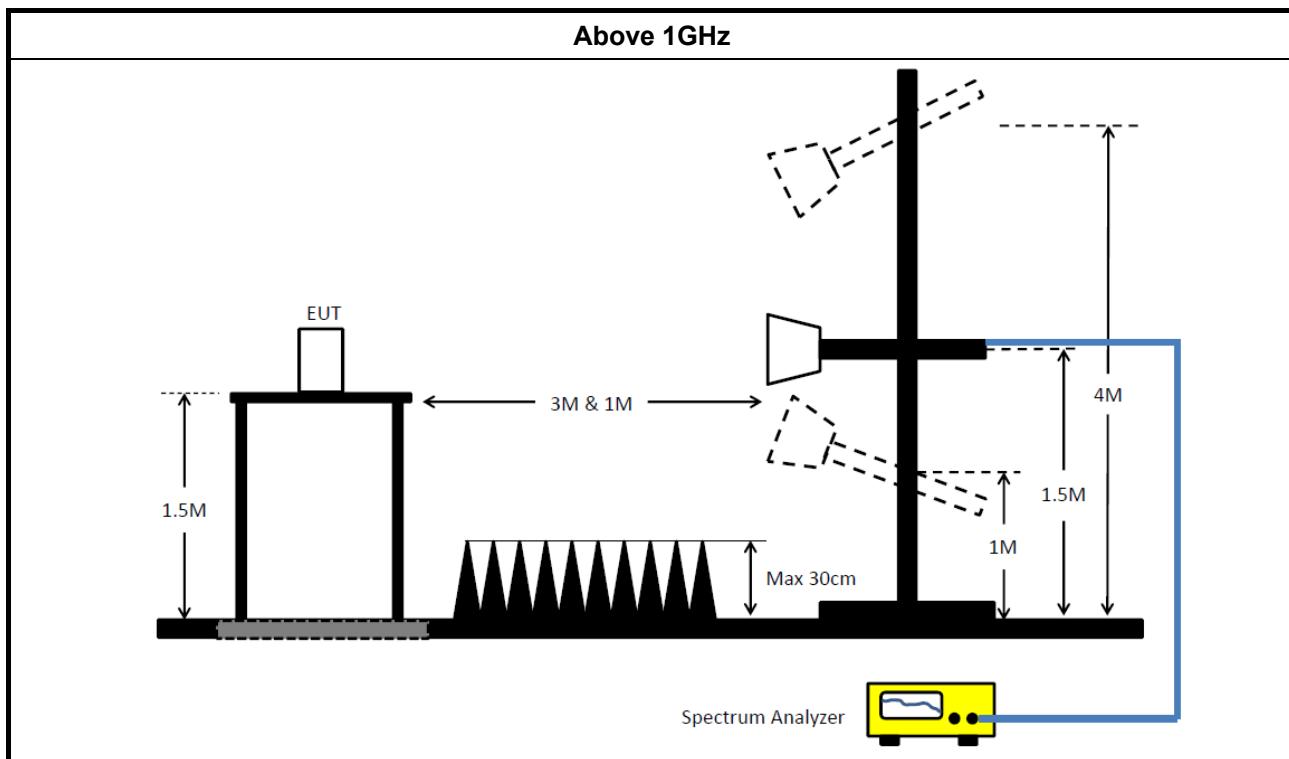
3.6.3 Test Procedures

| Test Method | |
|---|--|
| ▪ The average emission levels shall be measured in [duty cycle \geq 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. |
| | <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle \geq 98%). |
| | <input type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor). |
| | <input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced $VBW \geq 1/T$). |
| | <input type="checkbox"/> Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). $VBW \geq 1/T$, where T is pulse time. |
| | <input type="checkbox"/> Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions. |
| | <input checked="" type="checkbox"/> 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. |



3.6.4 Test Setup





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



4 Test Equipment and Calibration Data

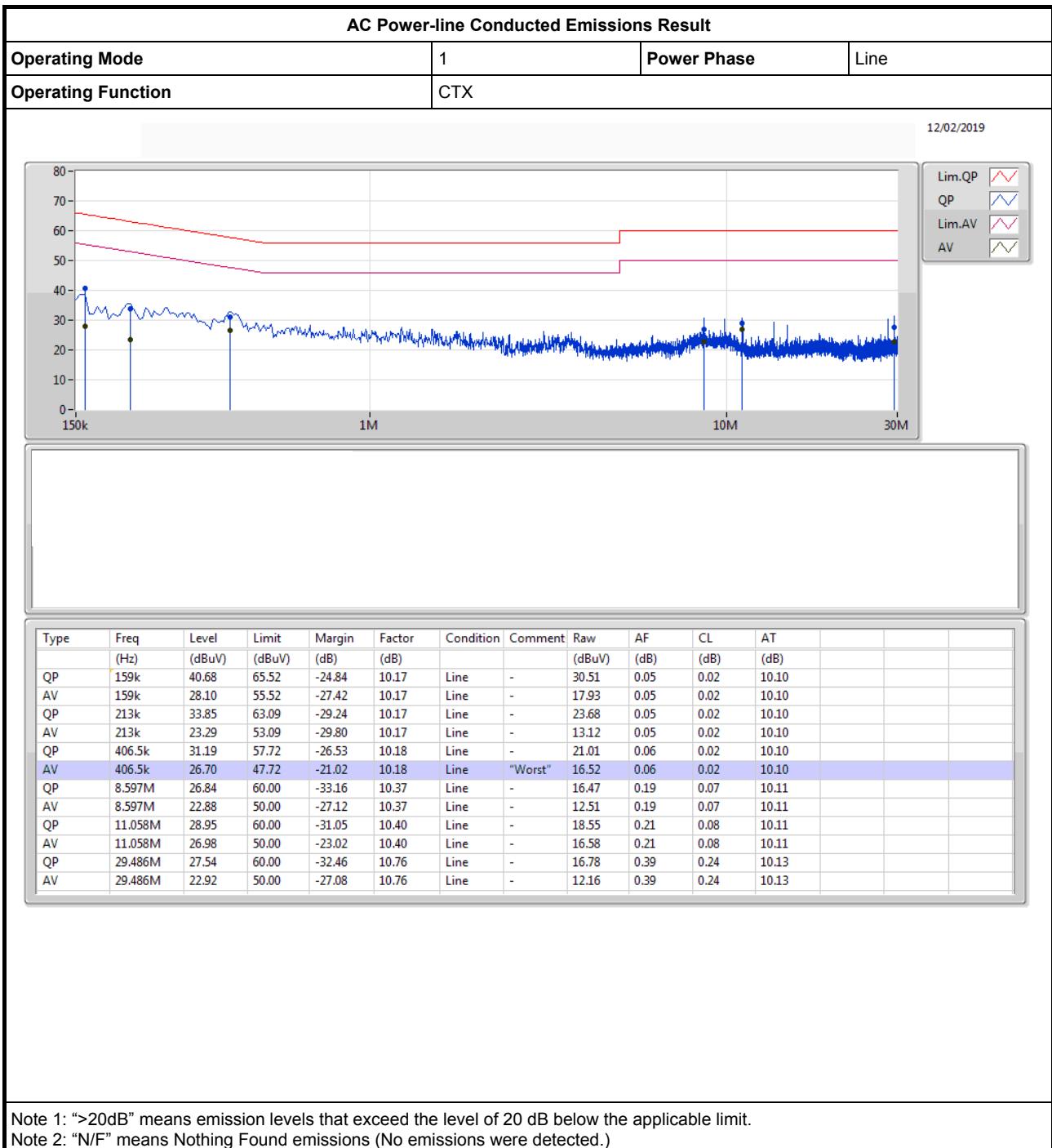
| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|-----------------------------------|--------------|-------------------|------------------|------------------|------------------|----------------------|-----------------------|
| 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. 16, 2019 | Jan. 15, 2020 | 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) |
| Loop Antenna | Teseq | HLA 6120 | 24155 | 9kHz - 30 MHz | Mar. 16, 2018 | Mar. 15, 2019 | Radiation (03CH01-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) |
| 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 Analyzer | 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) |
| 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) |

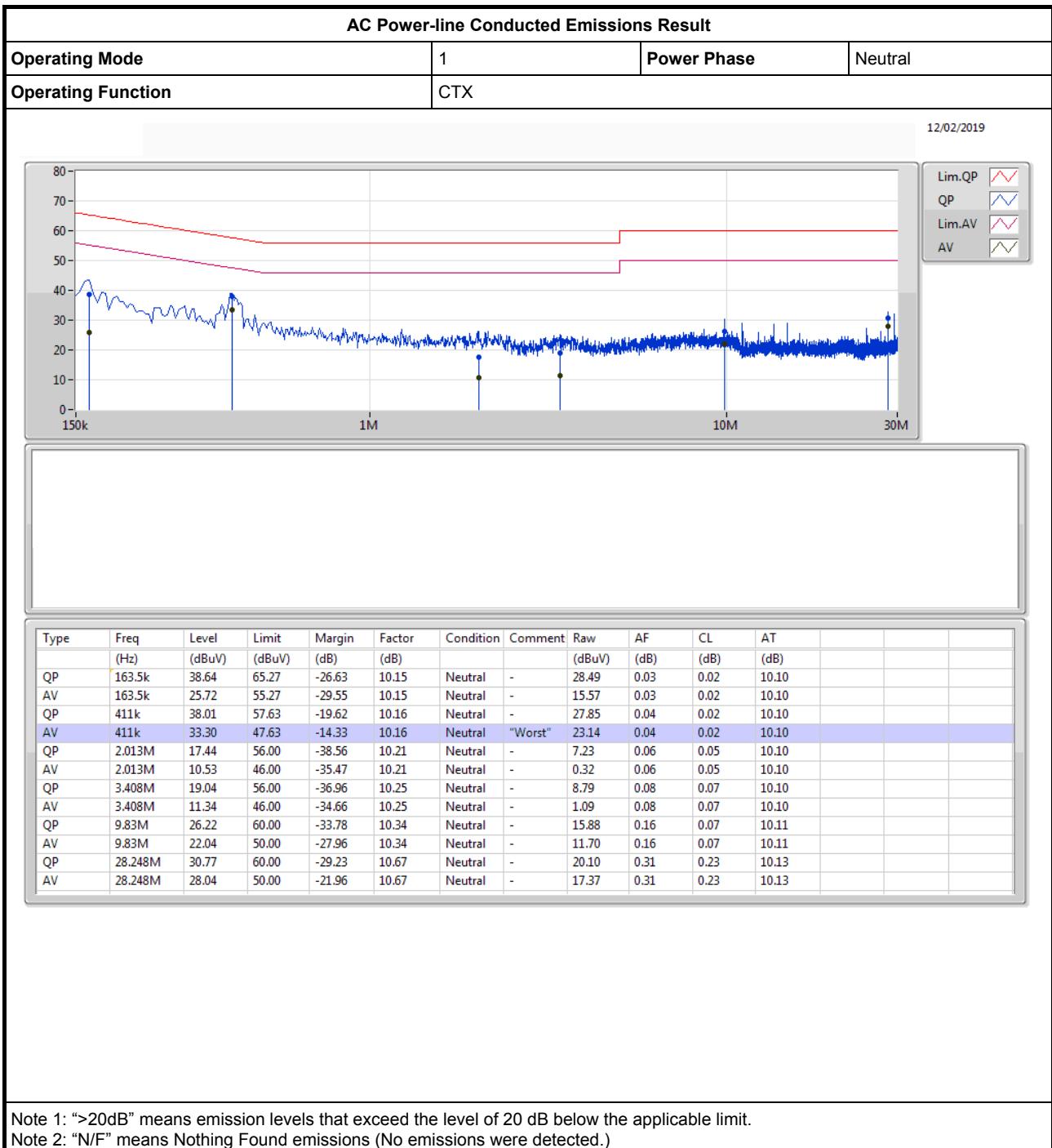
**FCC RADIO TEST REPORT****Report No. : FR8D2544AA**

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date | Remark |
|---------------|--------------|-----------|---------------|-----------------|------------------|----------------------|---------------------|
| 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) |

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

NCR means Non-Calibration required.





**Summary**

| Mode | Max-N dB (Hz) | Max-OBW (Hz) | ITU-Code | Min-N dB (Hz) | Min-OBW (Hz) |
|------------------------------|------------------|-----------------|----------|------------------|-----------------|
| 2.4-2.4835GHz | - | - | - | - | - |
| 802.11b_Nss1,(1Mbps)_1TX | 10.075M | 15.425M | 15M4G1D | 10.05M | 15.1M |
| 802.11g_Nss1,(6Mbps)_1TX | 16.325M | 22.325M | 22M3D1D | 16M | 16.625M |
| 802.11n HT20_Nss1,(MCS0)_1TX | 17.55M | 23.35M | 23M3D1D | 15.9M | 17.725M |
| 802.11n HT40_Nss1,(MCS0)_1TX | 36.05M | 36.6M | 36M6D1D | 35.1M | 36.45M |

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;

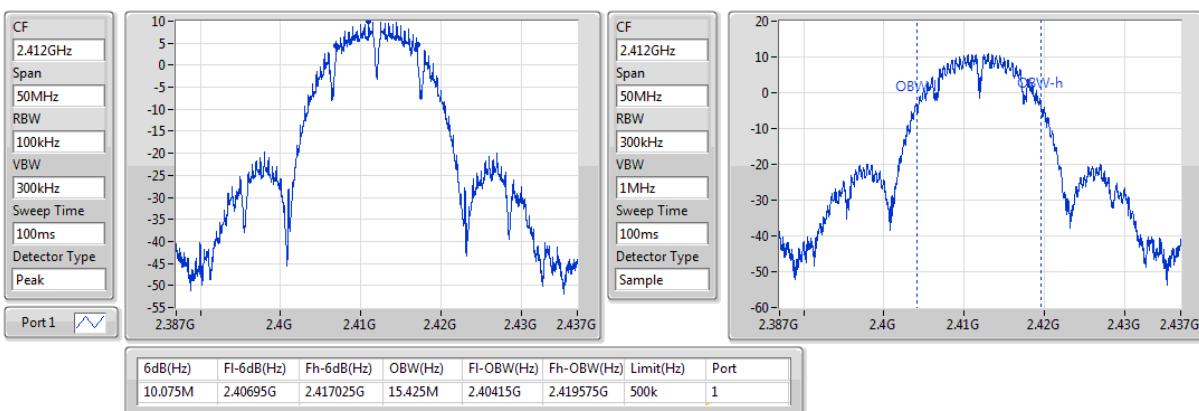
Result

| Mode | Result | Limit (Hz) | Port 1-N dB (Hz) | Port 1-OBW (Hz) |
|------------------------------|--------|---------------|---------------------|--------------------|
| 802.11b_Nss1,(1Mbps)_1TX | - | - | - | - |
| 2412MHz | Pass | 500k | 10.075M | 15.425M |
| 2437MHz | Pass | 500k | 10.05M | 15.3M |
| 2462MHz | Pass | 500k | 10.075M | 15.1M |
| 802.11g_Nss1,(6Mbps)_1TX | - | - | - | - |
| 2412MHz | Pass | 500k | 16.3M | 16.8M |
| 2437MHz | Pass | 500k | 16M | 22.325M |
| 2462MHz | Pass | 500k | 16.325M | 16.625M |
| 802.11n HT20_Nss1,(MCS0)_1TX | - | - | - | - |
| 2412MHz | Pass | 500k | 16.65M | 17.825M |
| 2437MHz | Pass | 500k | 15.9M | 23.35M |
| 2462MHz | Pass | 500k | 17.55M | 17.725M |
| 802.11n HT40_Nss1,(MCS0)_1TX | - | - | - | - |
| 2422MHz | Pass | 500k | 35.1M | 36.55M |
| 2437MHz | Pass | 500k | 36.05M | 36.6M |
| 2452MHz | Pass | 500k | 35.45M | 36.45M |

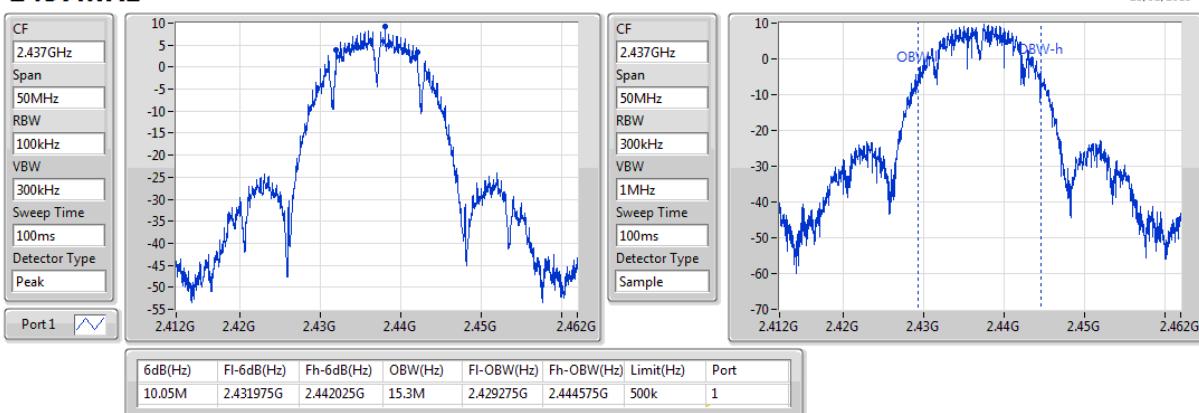
Port X-N dB = Port X 6dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

802.11b_Nss1,(1Mbps)_1TX
EBW
2412MHz

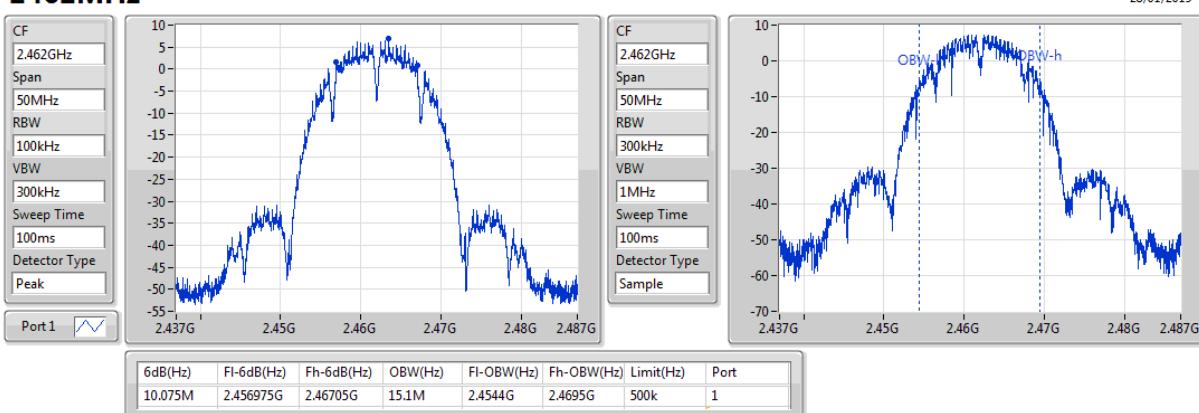
28/01/2019

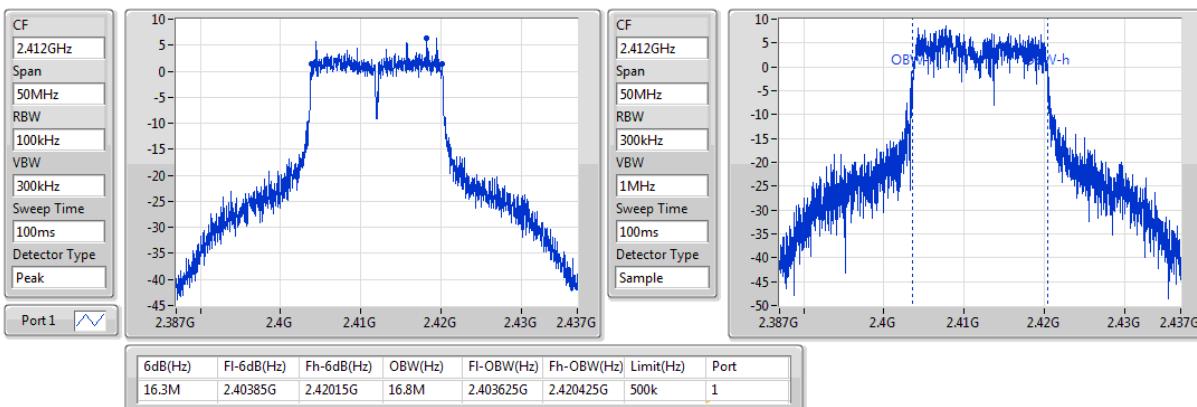
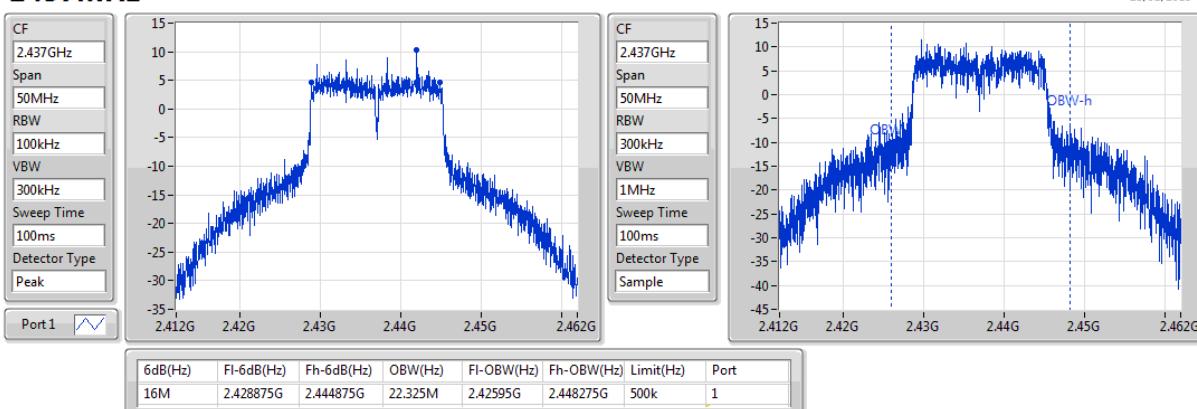
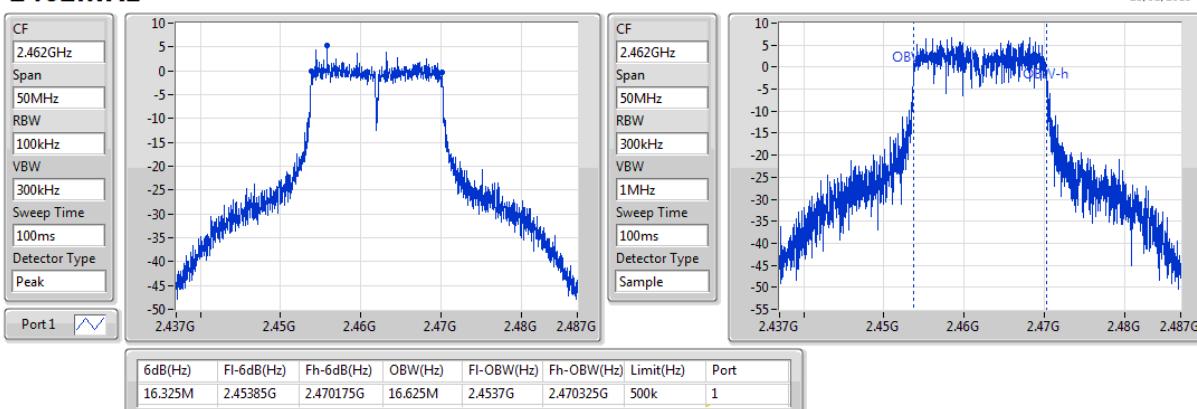

802.11b_Nss1,(1Mbps)_1TX
EBW
2437MHz

28/01/2019


802.11b_Nss1,(1Mbps)_1TX
EBW
2462MHz

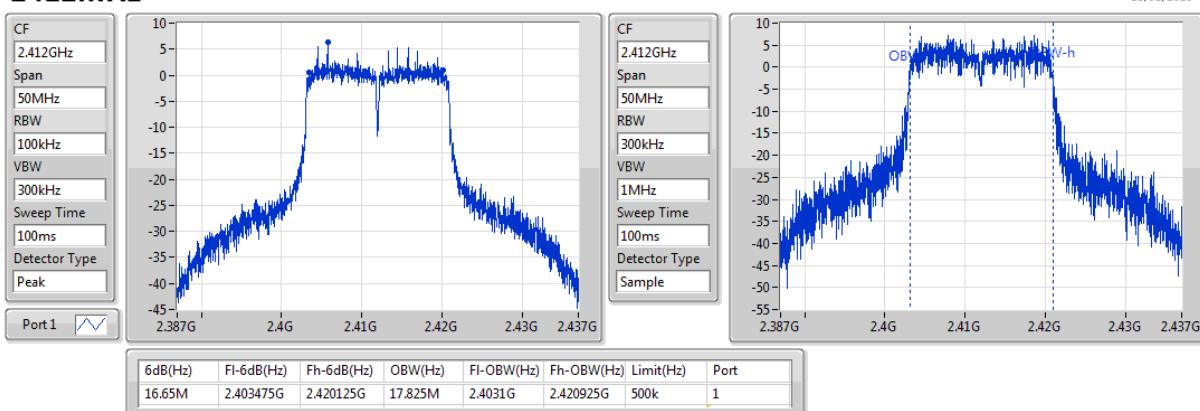
28/01/2019



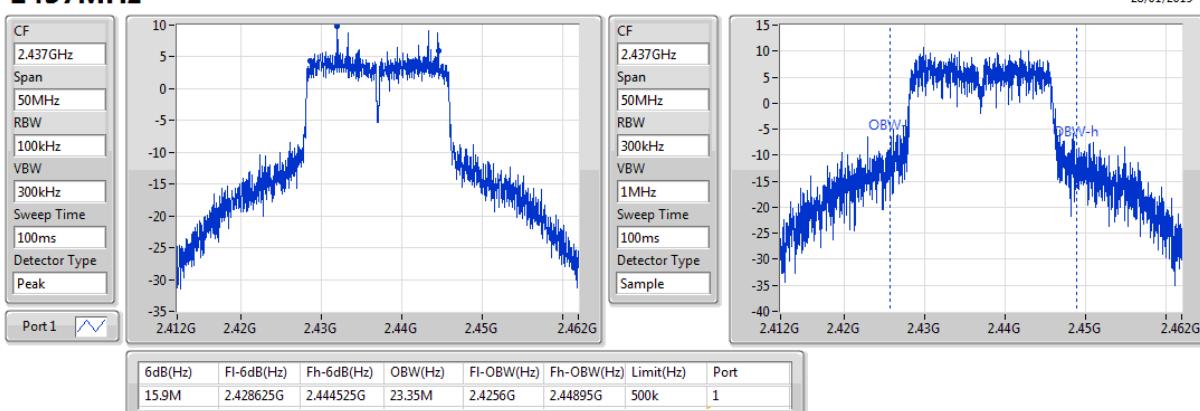
802.11g_Nss1,(6Mbps)_1TX
EBW
2412MHz

802.11g_Nss1,(6Mbps)_1TX
EBW
2437MHz

802.11g_Nss1,(6Mbps)_1TX
EBW
2462MHz


802.11n HT20_Nss1,(MCS0)_1TX
EBW
2412MHz

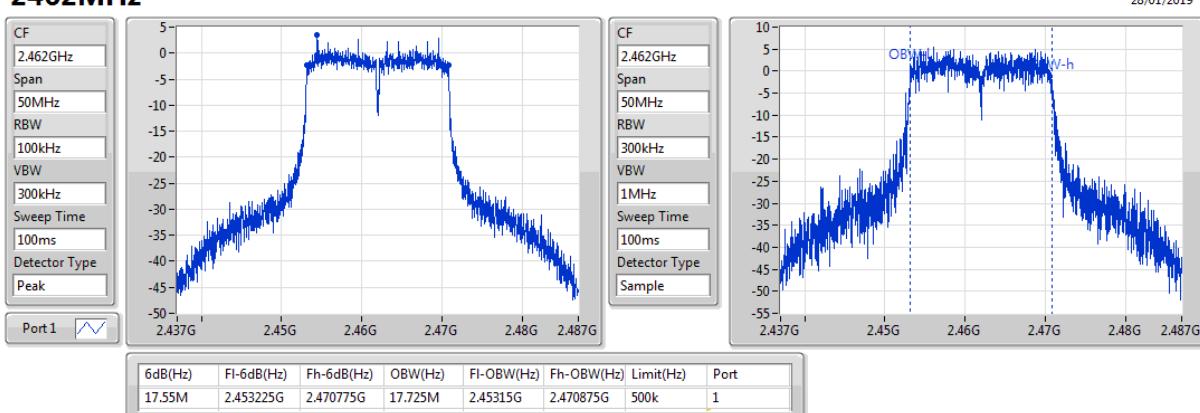
28/01/2019

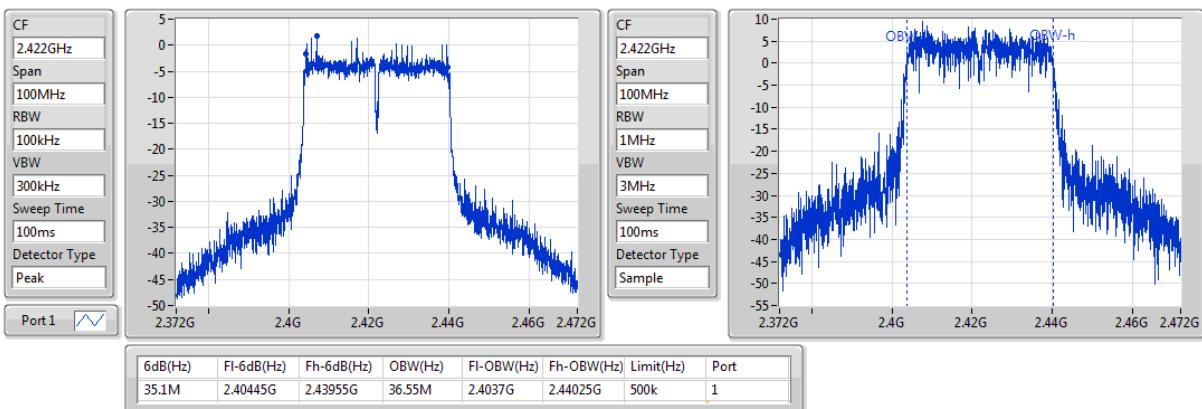
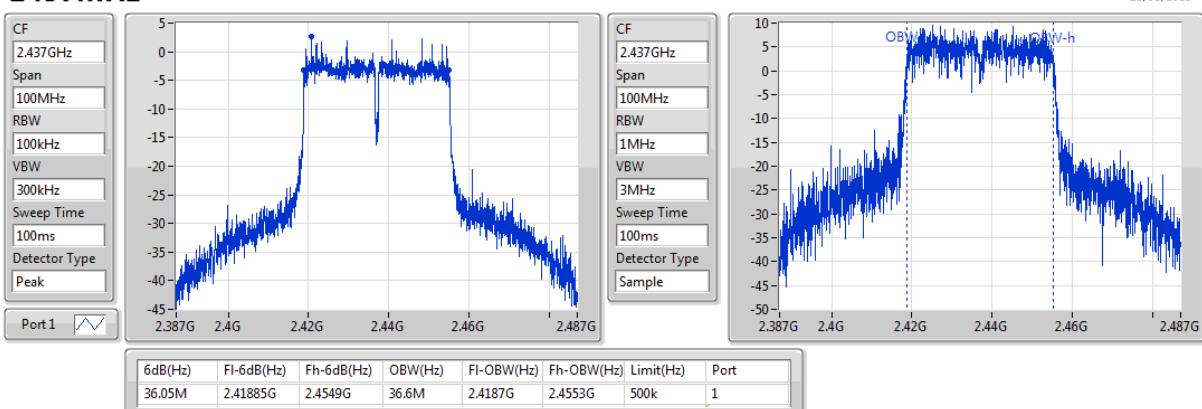
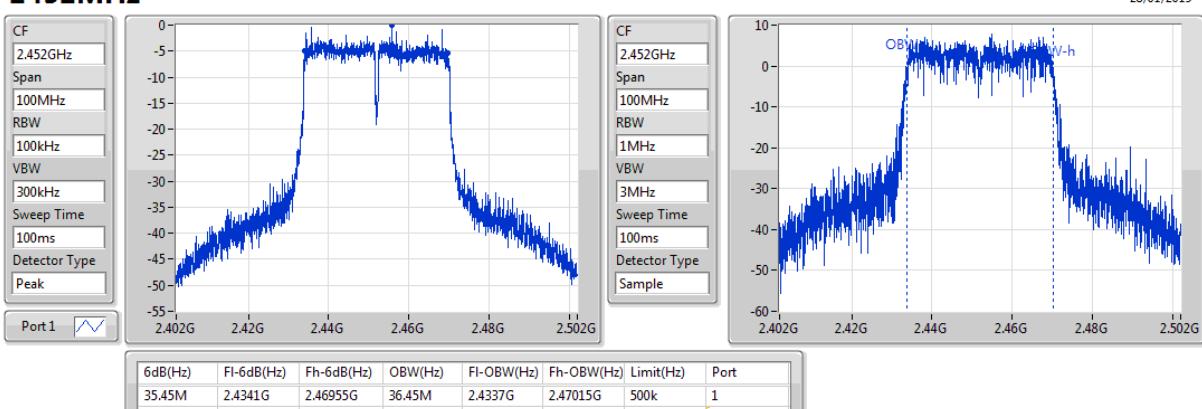

802.11n HT20_Nss1,(MCS0)_1TX
EBW
2437MHz

28/01/2019


802.11n HT20_Nss1,(MCS0)_1TX
EBW
2462MHz

28/01/2019



802.11n HT40_Nss1,(MCS0)_1TX
EBW
2422MHz

802.11n HT40_Nss1,(MCS0)_1TX
EBW
2437MHz

802.11n HT40_Nss1,(MCS0)_1TX
EBW
2452MHz


**Summary**

| Mode | Total Power (dBm) | Total Power (W) |
|------------------------------|----------------------|--------------------|
| 2.4-2.4835GHz | - | - |
| 802.11b_Nss1,(1Mbps)_1TX | 20.17 | 0.10399 |
| 802.11g_Nss1,(6Mbps)_1TX | 20.34 | 0.10814 |
| 802.11n HT20_Nss1,(MCS0)_1TX | 20.72 | 0.11803 |
| 802.11n HT40_Nss1,(MCS0)_1TX | 17.04 | 0.05058 |

Result

| Mode | Result | DG (dBi) | Port 1 (dBm) | Total Power (dBm) | Power Limit (dBm) |
|------------------------------|--------|-------------|-----------------|----------------------|----------------------|
| 802.11b_Nss1,(1Mbps)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 2.00 | 20.17 | 20.17 | 30.00 |
| 2437MHz | Pass | 2.00 | 18.80 | 18.80 | 30.00 |
| 2462MHz | Pass | 2.00 | 16.61 | 16.61 | 30.00 |
| 802.11g_Nss1,(6Mbps)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 2.00 | 17.99 | 17.99 | 30.00 |
| 2417MHz | Pass | 2.00 | 20.34 | 20.34 | 30.00 |
| 2422MHz | Pass | 2.00 | 16.63 | 16.63 | 30.00 |
| 2437MHz | Pass | 2.00 | 20.34 | 20.34 | 30.00 |
| 2442MHz | | | | | |
| 2447MHz | Pass | 2.00 | 20.11 | 20.11 | 30.00 |
| 2452MHz | Pass | 2.00 | 19.73 | 19.73 | 30.00 |
| 2457MHz | Pass | 2.00 | 18.72 | 18.72 | 30.00 |
| 2462MHz | Pass | 2.00 | 15.82 | 15.82 | 30.00 |
| 802.11n HT20_Nss1,(MCS0)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 2.00 | 17.44 | 17.44 | 30.00 |
| 2417MHz | Pass | 2.00 | 20.19 | 20.19 | 30.00 |
| 2422MHz | Pass | 2.00 | 20.72 | 20.72 | 30.00 |
| 2437MHz | Pass | 2.00 | 20.38 | 20.38 | 30.00 |
| 2447MHz | Pass | 2.00 | 19.97 | 19.97 | 30.00 |
| 2452MHz | Pass | 2.00 | 19.44 | 19.44 | 30.00 |
| 2457MHz | Pass | 2.00 | 18.44 | 18.44 | 30.00 |
| 2462MHz | Pass | 2.00 | 15.45 | 15.45 | 30.00 |
| 802.11n HT40_Nss1,(MCS0)_1TX | - | - | - | - | - |
| 2422MHz | Pass | 2.00 | 15.87 | 15.87 | 30.00 |
| 2427MHz | Pass | 2.00 | 16.40 | 16.40 | 30.00 |
| 2432MHz | Pass | 2.00 | 17.04 | 17.04 | 30.00 |
| 2437MHz | Pass | 2.00 | 16.91 | 16.91 | 30.00 |
| 2442MHz | Pass | 2.00 | 15.97 | 15.97 | 30.00 |
| 2447MHz | Pass | 2.00 | 15.43 | 15.43 | 30.00 |
| 2452MHz | Pass | 2.00 | 14.88 | 14.88 | 30.00 |

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

Note : Conducted average output power is for reference only



Summary

| Mode | PD (dBm/RBW) |
|------------------------------|-----------------|
| 2.4-2.4835GHz | - |
| 802.11b_Nss1,(1Mbps)_1TX | -3.36 |
| 802.11g_Nss1,(6Mbps)_1TX | -3.25 |
| 802.11n HT20_Nss1,(MCS0)_1TX | -4.78 |
| 802.11n HT40_Nss1,(MCS0)_1TX | -11.38 |

RBW=3kHz.

Result

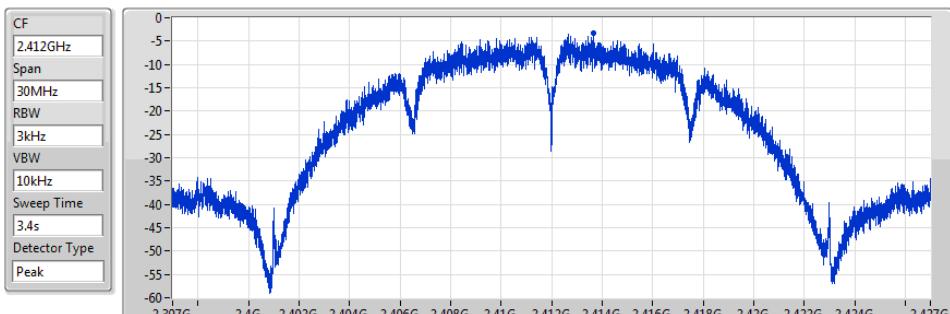
| Mode | Result | DG (dBi) | Port 1 (dBm/RBW) | PD (dBm/RBW) | PD Limit (dBm/RBW) |
|------------------------------|--------|-------------|---------------------|-----------------|-----------------------|
| 802.11b_Nss1,(1Mbps)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 2.00 | -3.36 | -3.36 | 8.00 |
| 2437MHz | Pass | 2.00 | -4.25 | -4.25 | 8.00 |
| 2462MHz | Pass | 2.00 | -6.93 | -6.93 | 8.00 |
| 802.11g_Nss1,(6Mbps)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 2.00 | -6.30 | -6.30 | 8.00 |
| 2437MHz | Pass | 2.00 | -3.25 | -3.25 | 8.00 |
| 2462MHz | Pass | 2.00 | -8.96 | -8.96 | 8.00 |
| 802.11n HT20_Nss1,(MCS0)_1TX | - | - | - | - | - |
| 2412MHz | Pass | 2.00 | -8.30 | -8.30 | 8.00 |
| 2437MHz | Pass | 2.00 | -4.78 | -4.78 | 8.00 |
| 2462MHz | Pass | 2.00 | -10.20 | -10.20 | 8.00 |
| 802.11n HT40_Nss1,(MCS0)_1TX | - | - | - | - | - |
| 2422MHz | Pass | 2.00 | -12.78 | -12.78 | 8.00 |
| 2437MHz | Pass | 2.00 | -11.38 | -11.38 | 8.00 |
| 2442MHz | Pass | 2.00 | -12.21 | -12.21 | 8.00 |
| 2452MHz | Pass | 2.00 | -12.72 | -12.72 | 8.00 |

DG = Directional Gain; RBW=3kHz;

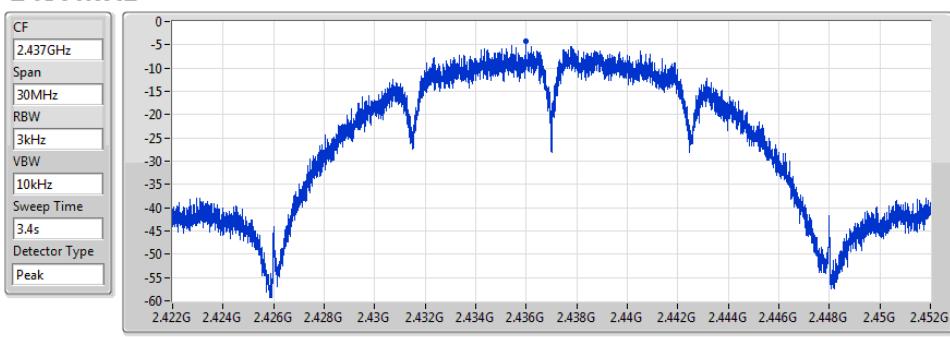
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port Xpower density;

802.11b_Nss1,(1Mbps)_1TX
PSD
2412MHz

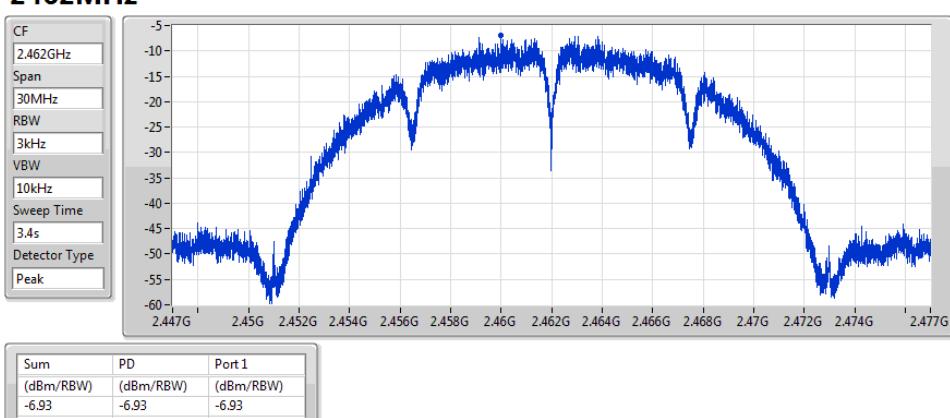
28/01/2019

Port 1

802.11b_Nss1,(1Mbps)_1TX
PSD
2437MHz

28/01/2019

Port 1

802.11b_Nss1,(1Mbps)_1TX
PSD
2462MHz

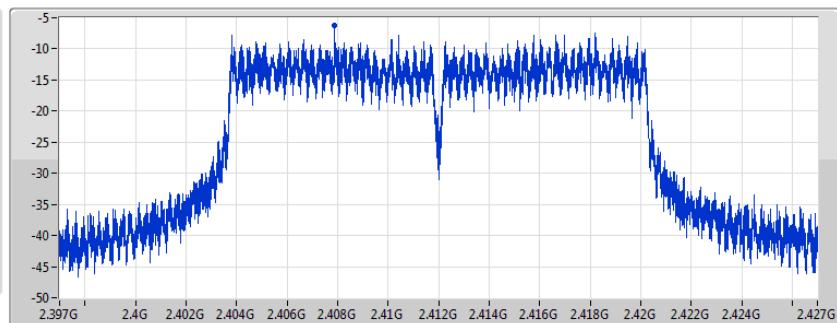
28/01/2019

Port 1


802.11g_Nss1,(6Mbps)_1TX
PSD
2412MHz

28/01/2019

CF
2.412GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
3.4s
Detector Type
Peak

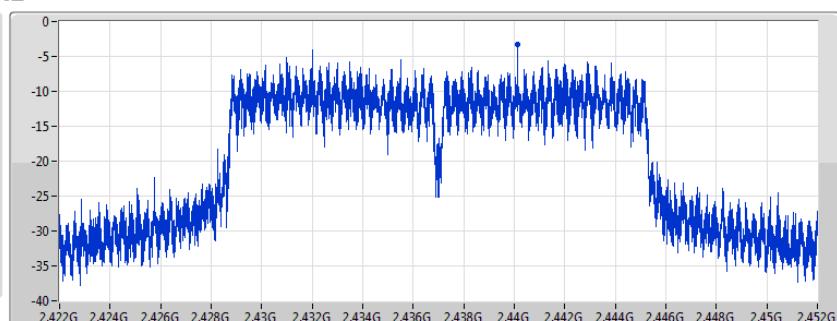


Port 1


802.11g_Nss1,(6Mbps)_1TX
PSD
2437MHz

28/01/2019

CF
2.437GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
3.4s
Detector Type
Peak

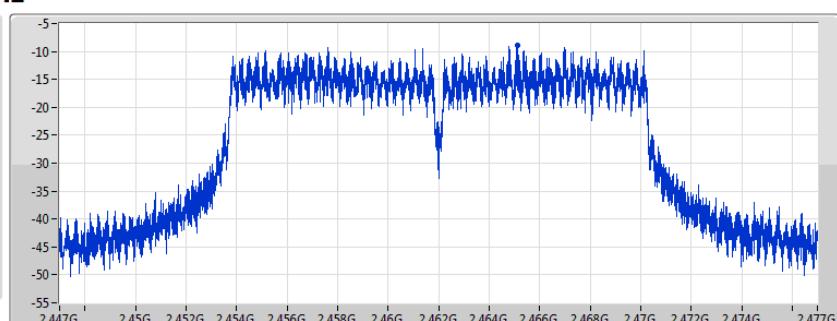


Port 1


802.11g_Nss1,(6Mbps)_1TX
PSD
2462MHz

28/01/2019

CF
2.462GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
3.4s
Detector Type
Peak



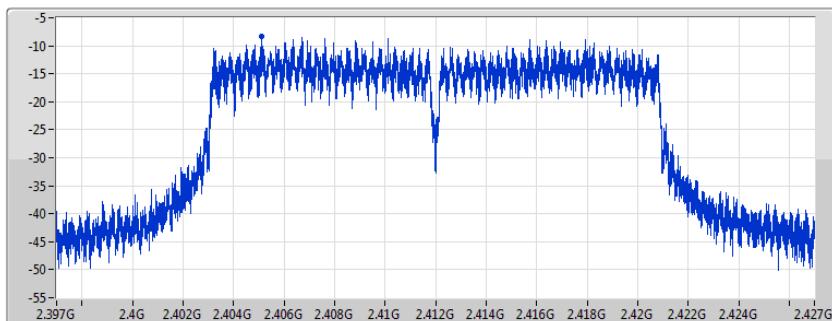
Port 1



802.11n HT20_Nss1,(MCS0)_1TX
PSD
2412MHz

28/01/2019

CF
2.412GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
3.4s
Detector Type
Peak

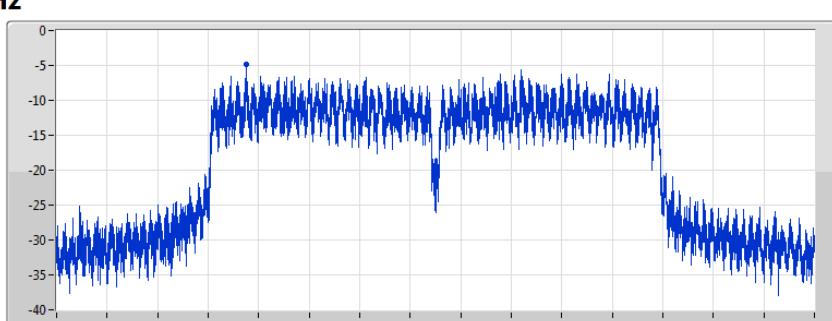


Port 1


802.11n HT20_Nss1,(MCS0)_1TX
PSD
2437MHz

28/01/2019

CF
2.437GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
3.4s
Detector Type
Peak

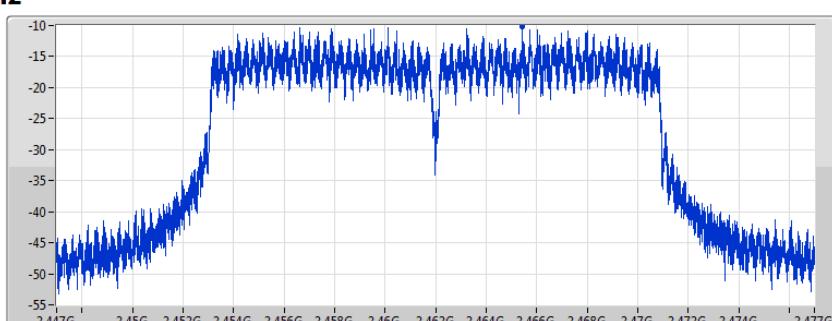


Port 1


802.11n HT20_Nss1,(MCS0)_1TX
PSD
2462MHz

28/01/2019

CF
2.462GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
3.4s
Detector Type
Peak

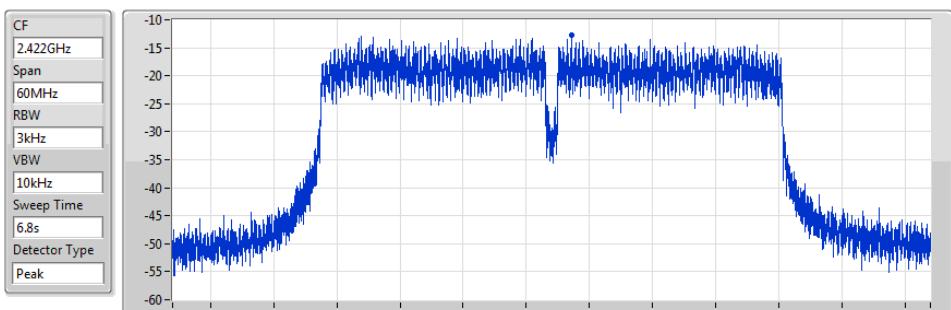


Port 1



802.11n HT40_Nss1,(MCS0)_1TX
PSD
2422MHz

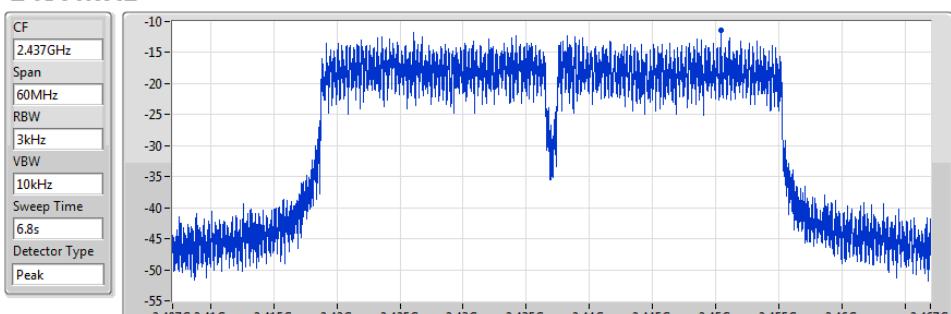
28/01/2019

Port 1


| Sum | PD | Port 1 |
|-----------|-----------|-----------|
| (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| -12.78 | -12.78 | -12.78 |

802.11n HT40_Nss1,(MCS0)_1TX
PSD
2437MHz

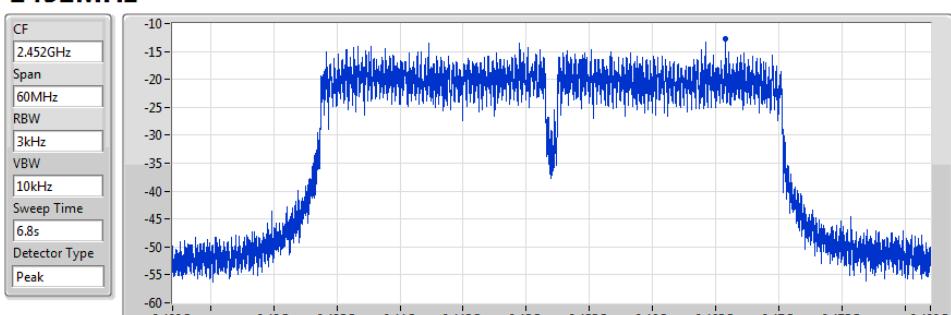
28/01/2019

Port 1


| Sum | PD | Port 1 |
|-----------|-----------|-----------|
| (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| -11.38 | -11.38 | -11.38 |

802.11n HT40_Nss1,(MCS0)_1TX
PSD
2452MHz

28/01/2019

Port 1


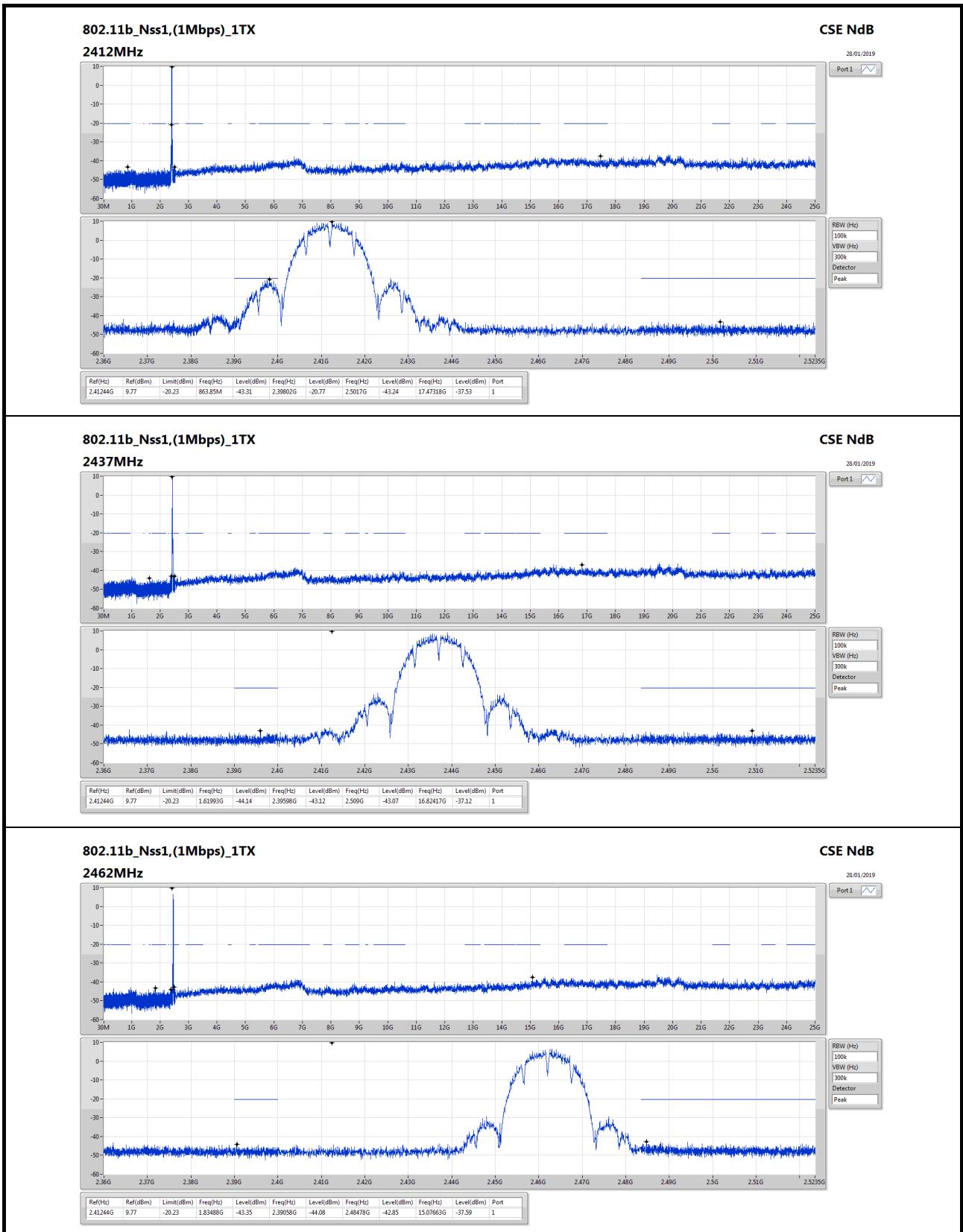
| Sum | PD | Port 1 |
|-----------|-----------|-----------|
| (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| -12.72 | -12.72 | -12.72 |

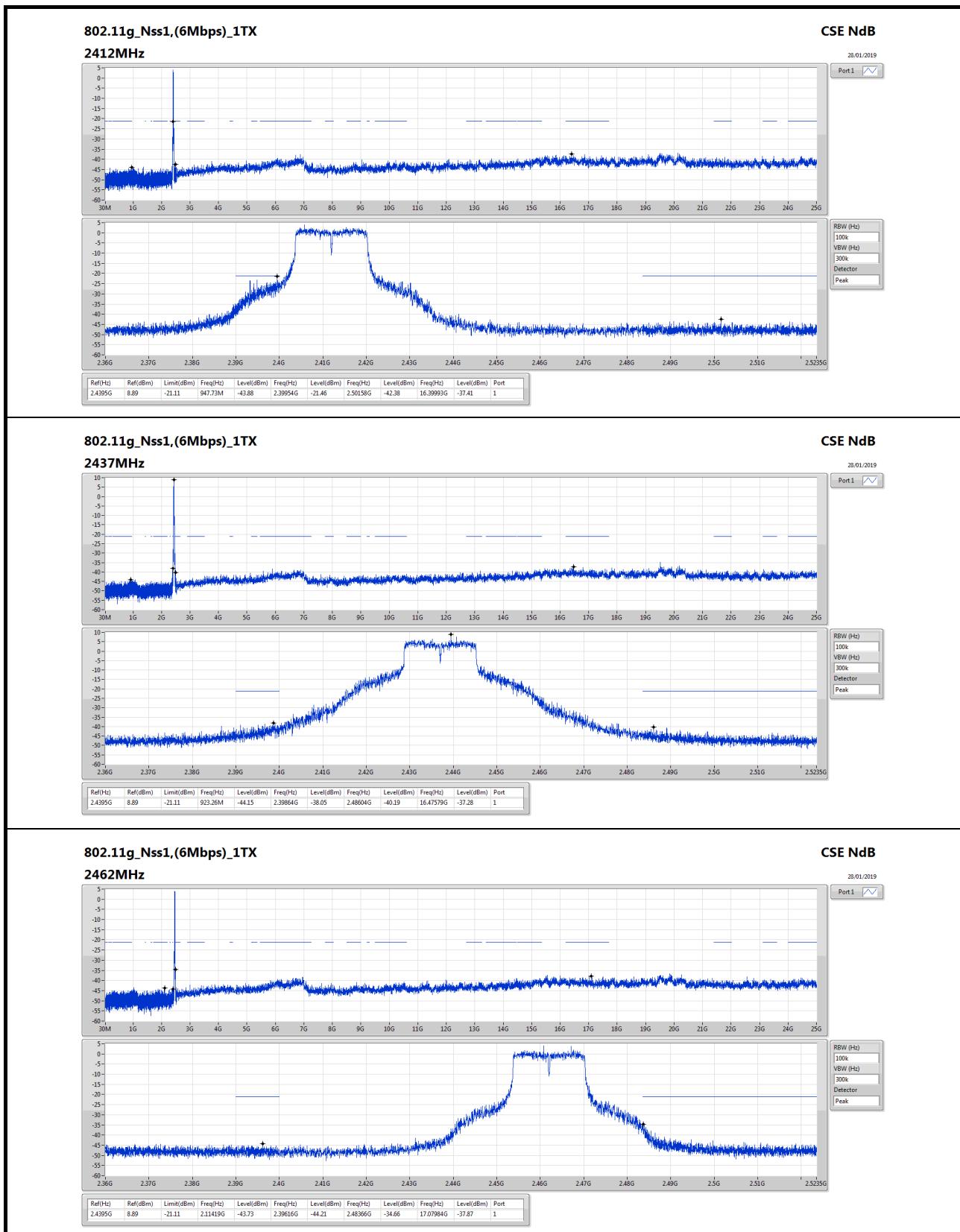
**Summary**

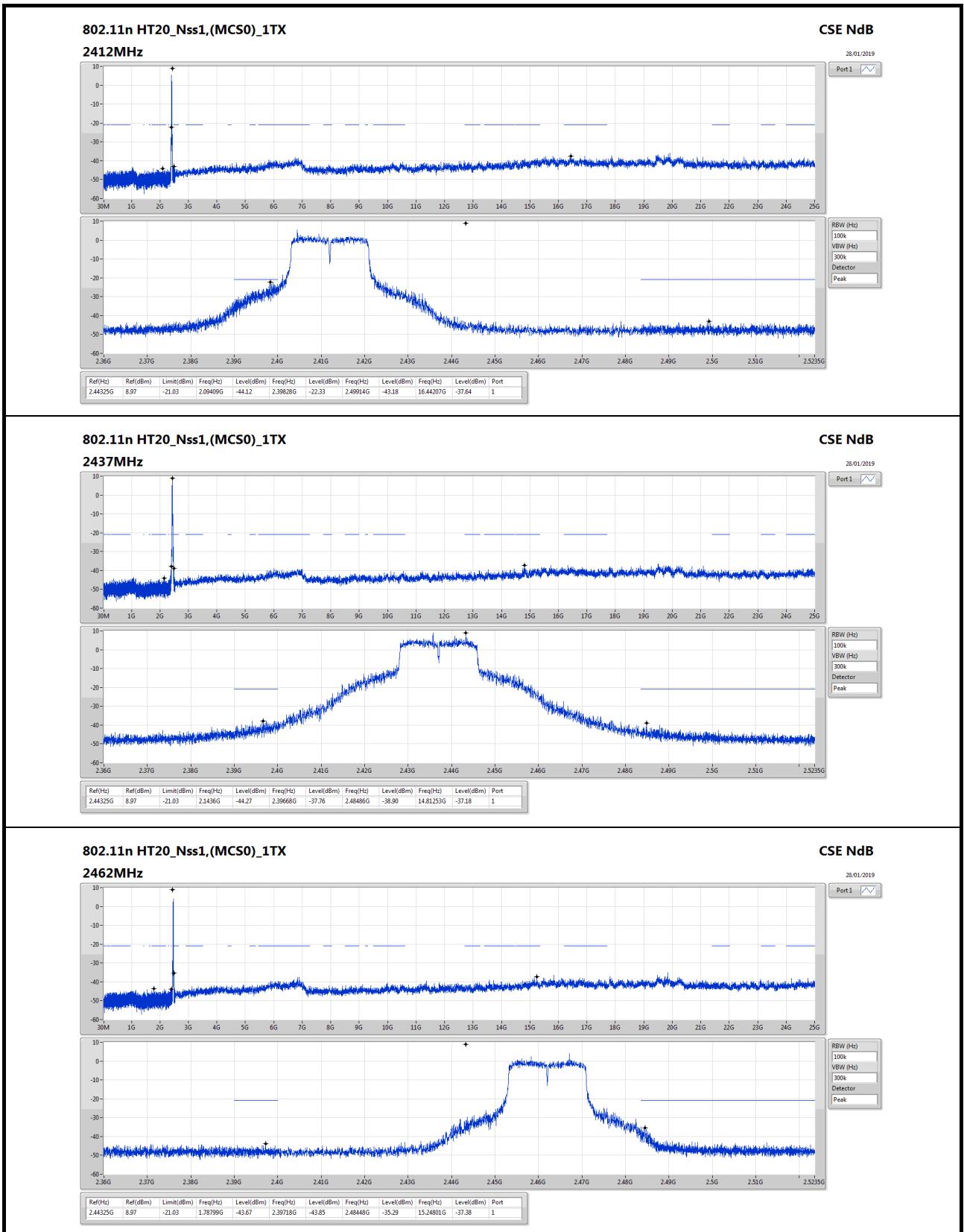
| Mode | Result | Ref (Hz) | Ref (dBm) | Limit (dBm) | Freq (Hz) | Level (dBm) | Port |
|------------------------------|--------|----------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|------|
| 2.4-2.4835GHz | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 802.11b_Nss1,(1Mbps)_1TX | Pass | 2.41244G | 9.77 | -20.23 | 863.85M | -43.31 | 2.39802G | -20.77 | 2.5017G | -43.24 | 17.47318G | -37.53 | 1 |
| 802.11g_Nss1,(6Mbps)_1TX | Pass | 2.4395G | 8.89 | -21.11 | 947.73M | -43.88 | 2.39954G | -21.46 | 2.50158G | -42.38 | 16.39993G | -37.41 | 1 |
| 802.11n HT20_Nss1,(MCS0)_1TX | Pass | 2.44325G | 8.97 | -21.03 | 2.09409G | -44.12 | 2.39828G | -22.33 | 2.49914G | -43.18 | 16.44207G | -37.64 | 1 |
| 802.11n HT40_Nss1,(MCS0)_1TX | Pass | 2.42196G | 3.12 | -26.88 | 890.75M | -44.14 | 2.39848G | -28.26 | 2.48362G | -43.10 | 16.4573G | -37.61 | 1 |

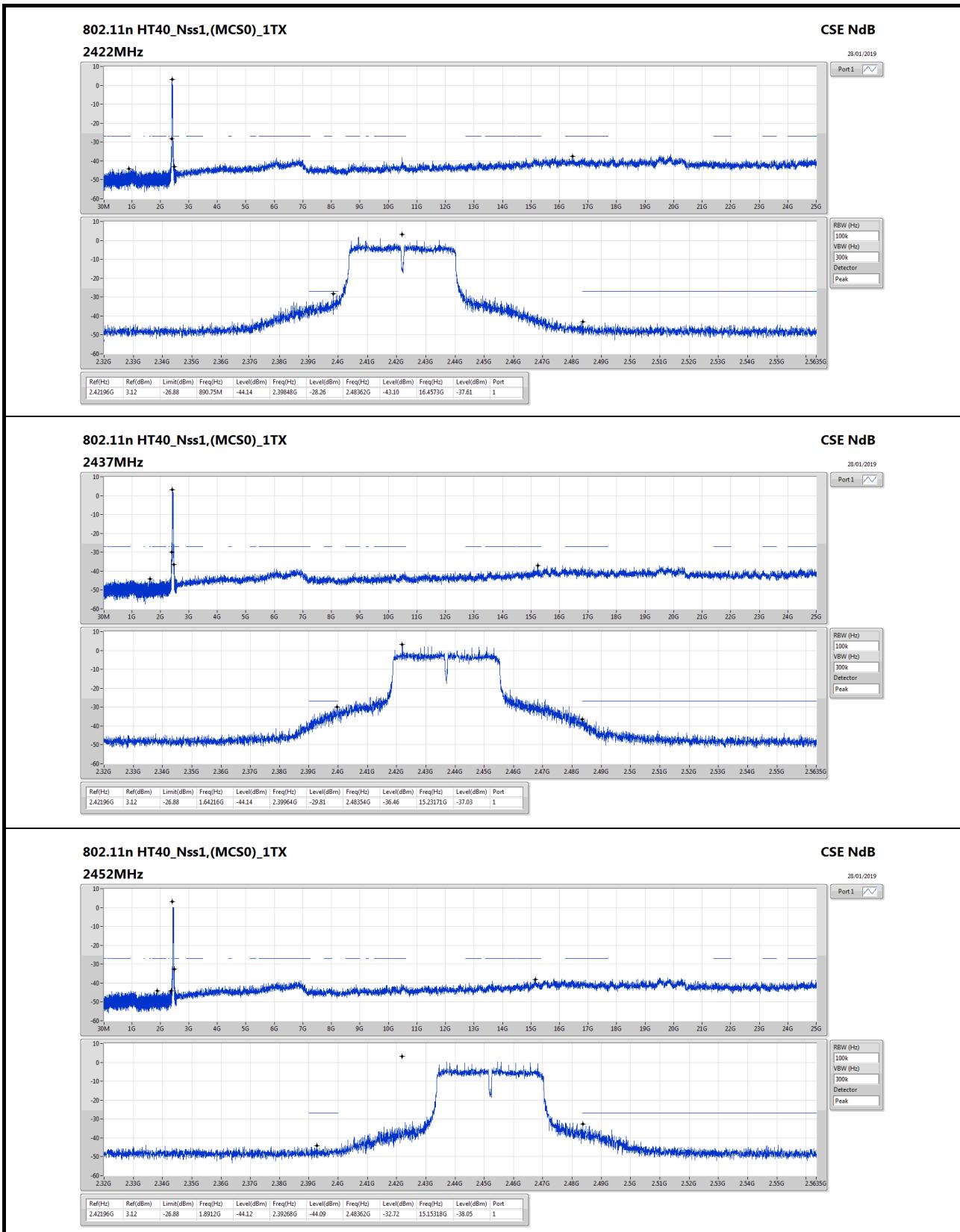
Result

| Mode | Result | Ref (Hz) | Ref (dBm) | Limit (dBm) | Freq (Hz) | Level (dBm) | Port |
|------------------------------|--------|----------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|------|
| 802.11b_Nss1,(1Mbps)_1TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.41244G | 9.77 | -20.23 | 863.85M | -43.31 | 2.39802G | -20.77 | 2.5017G | -43.24 | 17.47318G | -37.53 | 1 |
| 2437MHz | Pass | 2.41244G | 9.77 | -20.23 | 1.61993G | -44.14 | 2.39598G | -43.12 | 2.509G | -43.07 | 16.82417G | -37.12 | 1 |
| 2462MHz | Pass | 2.41244G | 9.77 | -20.23 | 1.83488G | -43.35 | 2.39058G | -44.08 | 2.48478G | -42.85 | 15.07663G | -37.59 | 1 |
| 802.11g_Nss1,(6Mbps)_1TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.4395G | 8.89 | -21.11 | 947.73M | -43.88 | 2.39954G | -21.46 | 2.50158G | -42.38 | 16.39993G | -37.41 | 1 |
| 2437MHz | Pass | 2.4395G | 8.89 | -21.11 | 923.26M | -44.15 | 2.39864G | -38.05 | 2.48604G | -40.19 | 16.47579G | -37.28 | 1 |
| 2462MHz | Pass | 2.4395G | 8.89 | -21.11 | 2.11419G | -43.73 | 2.39616G | -44.21 | 2.48366G | -34.66 | 17.07984G | -37.87 | 1 |
| 802.11n HT20_Nss1,(MCS0)_1TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2412MHz | Pass | 2.44325G | 8.97 | -21.03 | 2.09409G | -44.12 | 2.39828G | -22.33 | 2.49914G | -43.18 | 16.44207G | -37.64 | 1 |
| 2437MHz | Pass | 2.44325G | 8.97 | -21.03 | 2.1436G | -44.27 | 2.39668G | -37.76 | 2.48486G | -38.90 | 14.81253G | -37.18 | 1 |
| 2462MHz | Pass | 2.44325G | 8.97 | -21.03 | 1.78799G | -43.67 | 2.39718G | -43.85 | 2.48448G | -35.29 | 15.24801G | -37.38 | 1 |
| 802.11n HT40_Nss1,(MCS0)_1TX | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2422MHz | Pass | 2.42196G | 3.12 | -26.88 | 890.75M | -44.14 | 2.39848G | -28.26 | 2.48362G | -43.10 | 16.4573G | -37.61 | 1 |
| 2437MHz | Pass | 2.42196G | 3.12 | -26.88 | 1.64216G | -44.14 | 2.39964G | -29.81 | 2.48354G | -36.46 | 15.23171G | -37.03 | 1 |
| 2452MHz | Pass | 2.42196G | 3.12 | -26.88 | 1.8912G | -44.12 | 2.39268G | -44.09 | 2.48362G | -32.72 | 15.15318G | -38.05 | 1 |





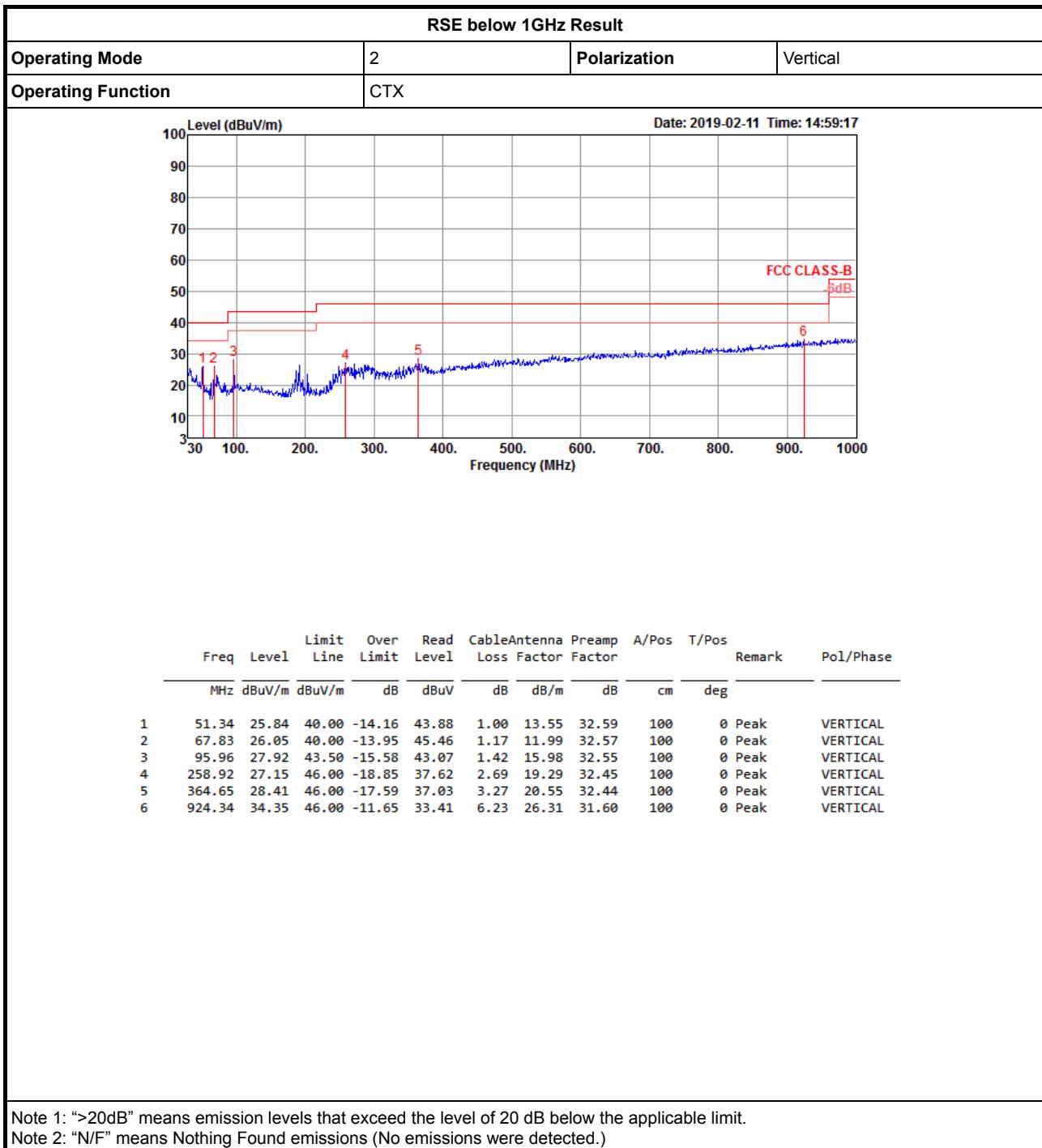






RSE below 1GHz Result

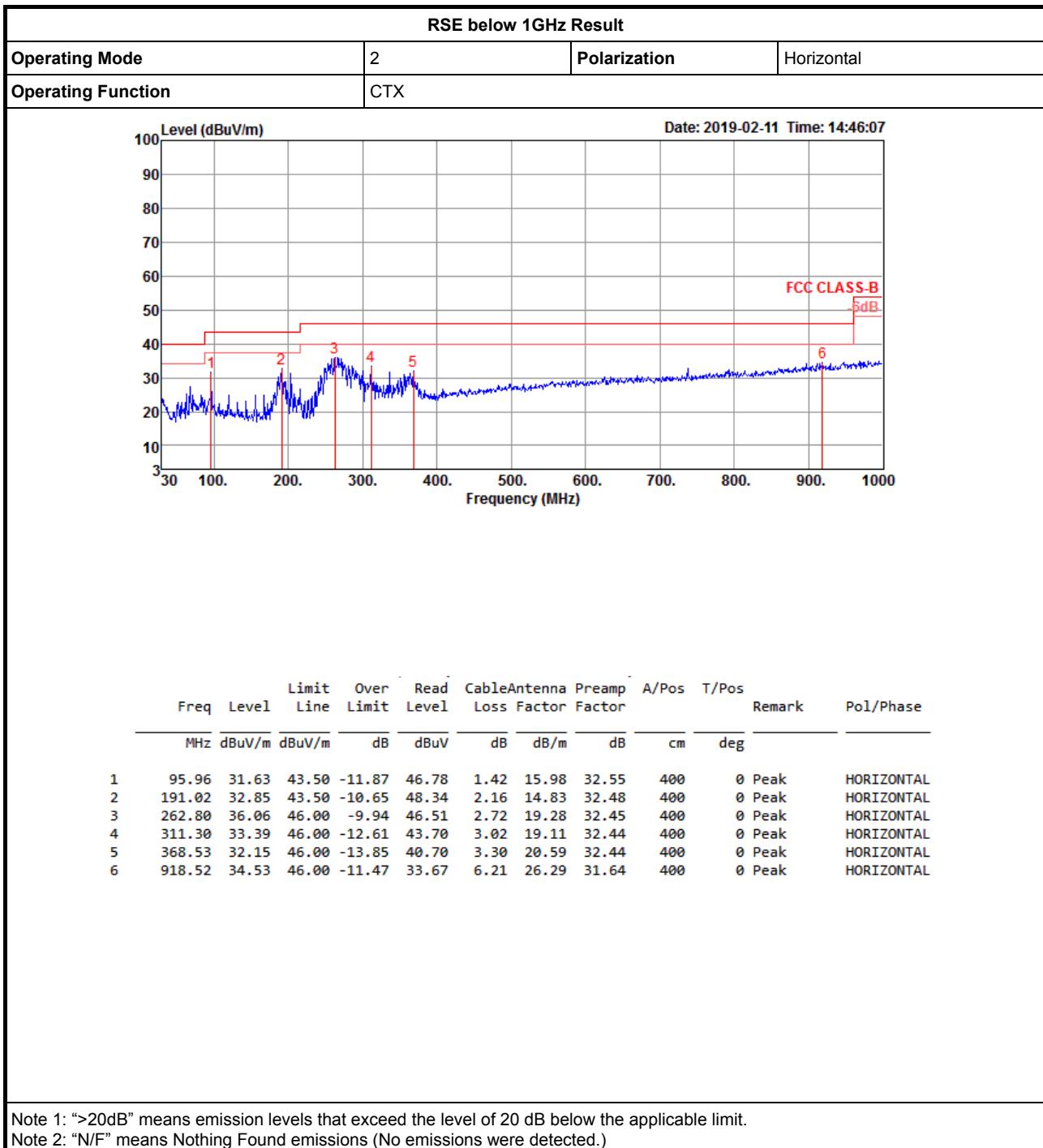
Appendix F.1





RSE below 1GHz Result

Appendix F.1





RSE TX above 1GHz Result

Appendix F.2

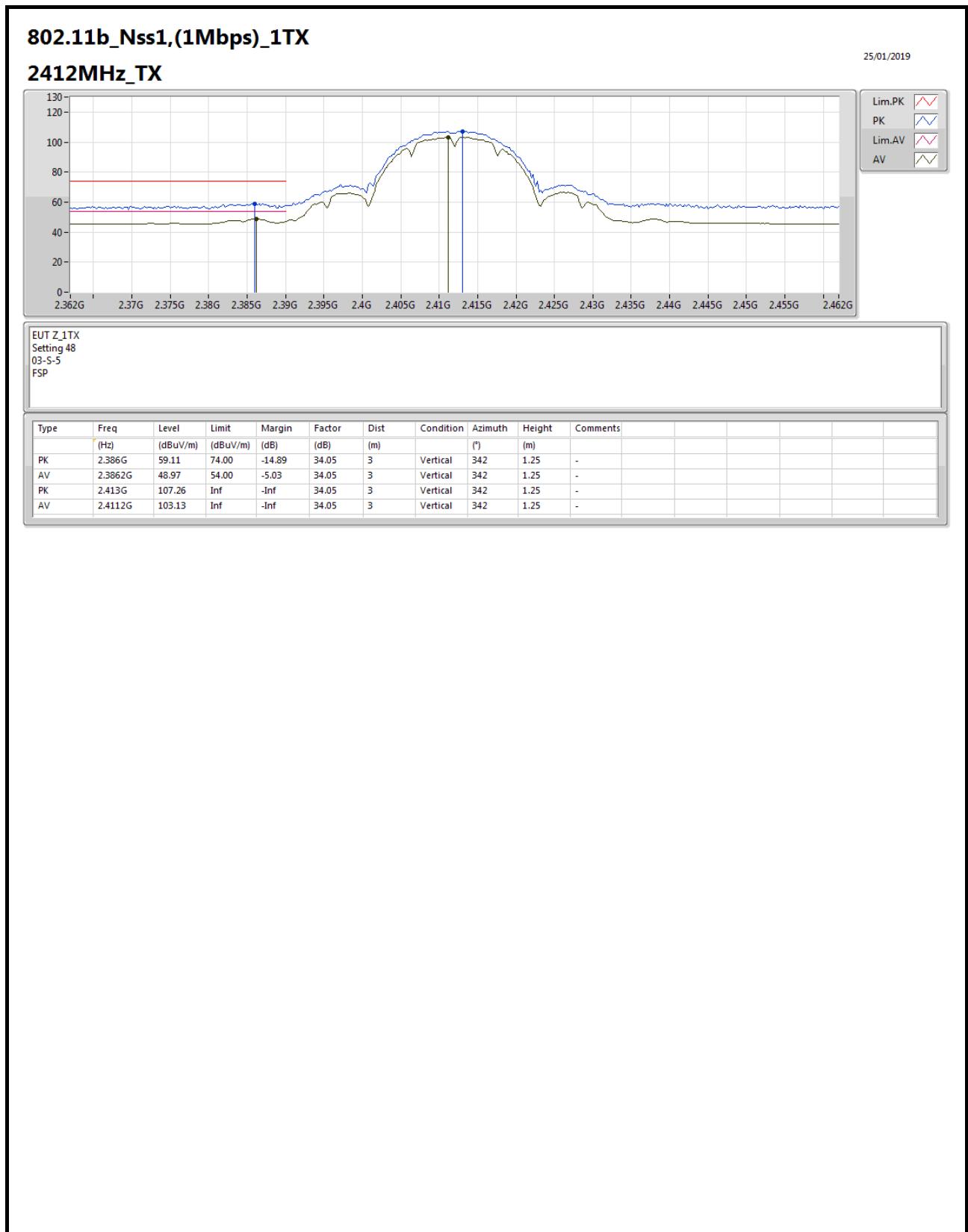
Summary

| Mode | Result | Type | Freq (Hz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Factor (dB) | Dist (m) | Condition | Azimuth (°) | Height (m) | Comments |
|--------------------------|--------|------|-----------|----------------|----------------|-------------|-------------|----------|------------|-------------|------------|----------|
| 2.4-2.4835GHz | - | - | - | - | - | - | - | - | - | - | - | - |
| 802.11b_Nss1,(1Mbps)_1TX | Pass | AV | 4.87402G | 53.97 | 54.00 | -0.03 | 5.51 | 3 | Horizontal | 53 | 1.00 | - |



RSE TX above 1GHz Result

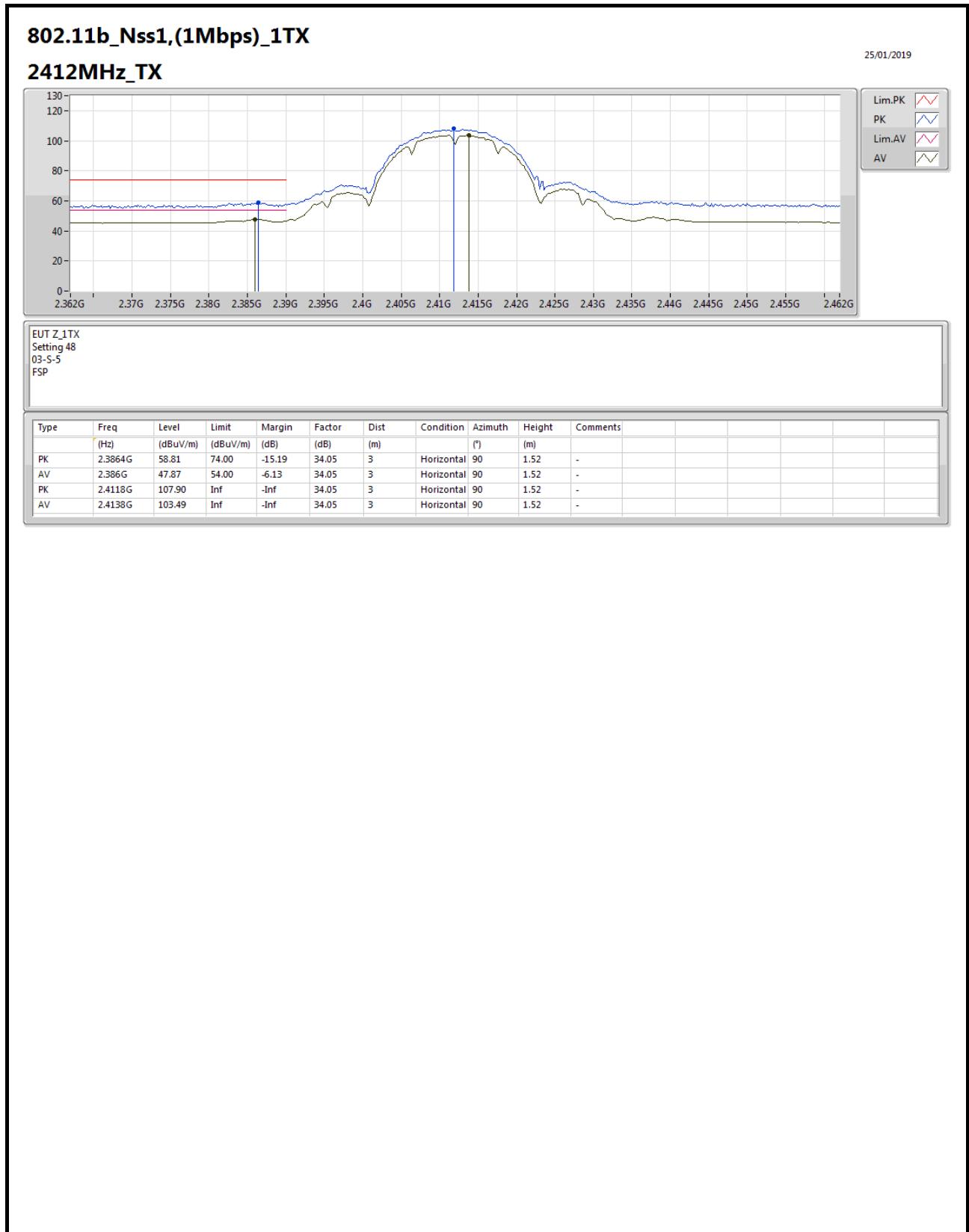
Appendix F.2





RSE TX above 1GHz Result

Appendix F.2





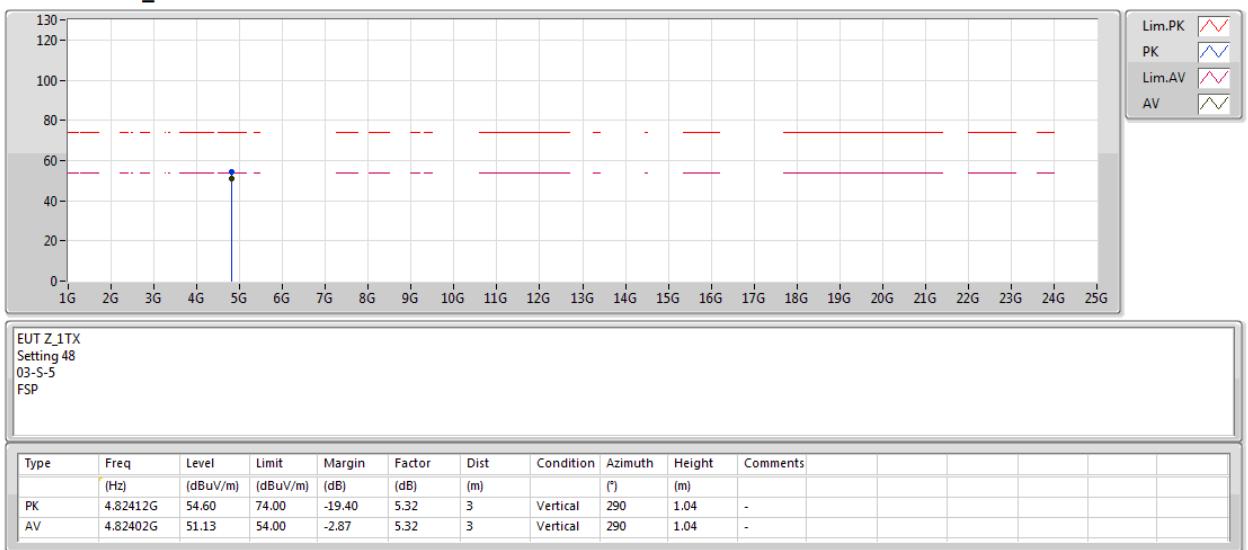
RSE TX above 1GHz Result

Appendix F.2

802.11b_Nss1,(1Mbps)_1TX

25/01/2019

2412MHz_TX





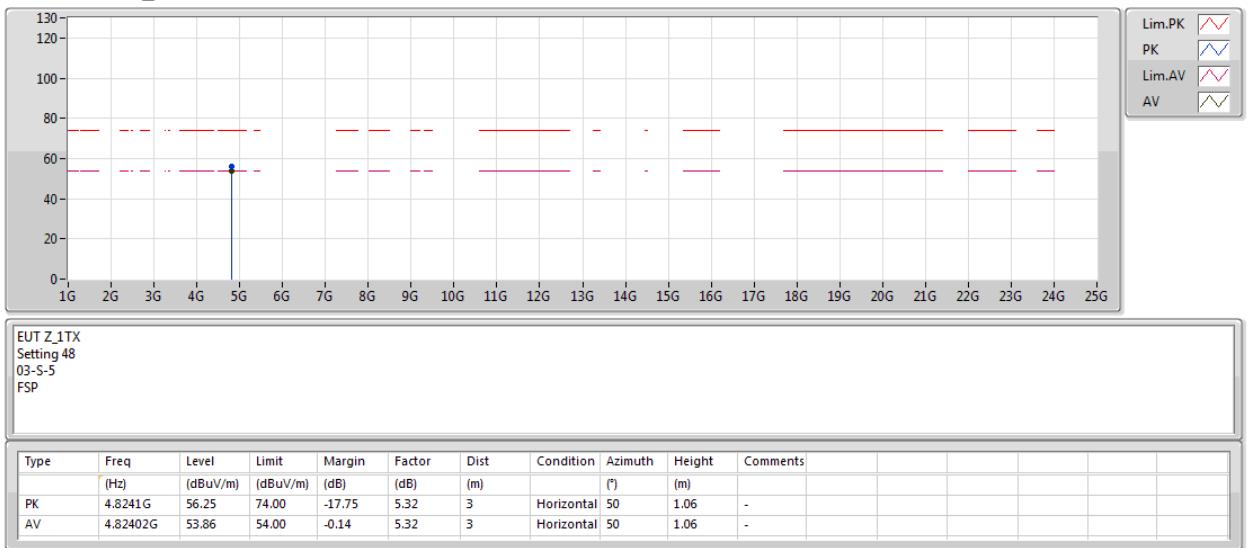
RSE TX above 1GHz Result

Appendix F.2

802.11b_Nss1,(1Mbps)_1TX

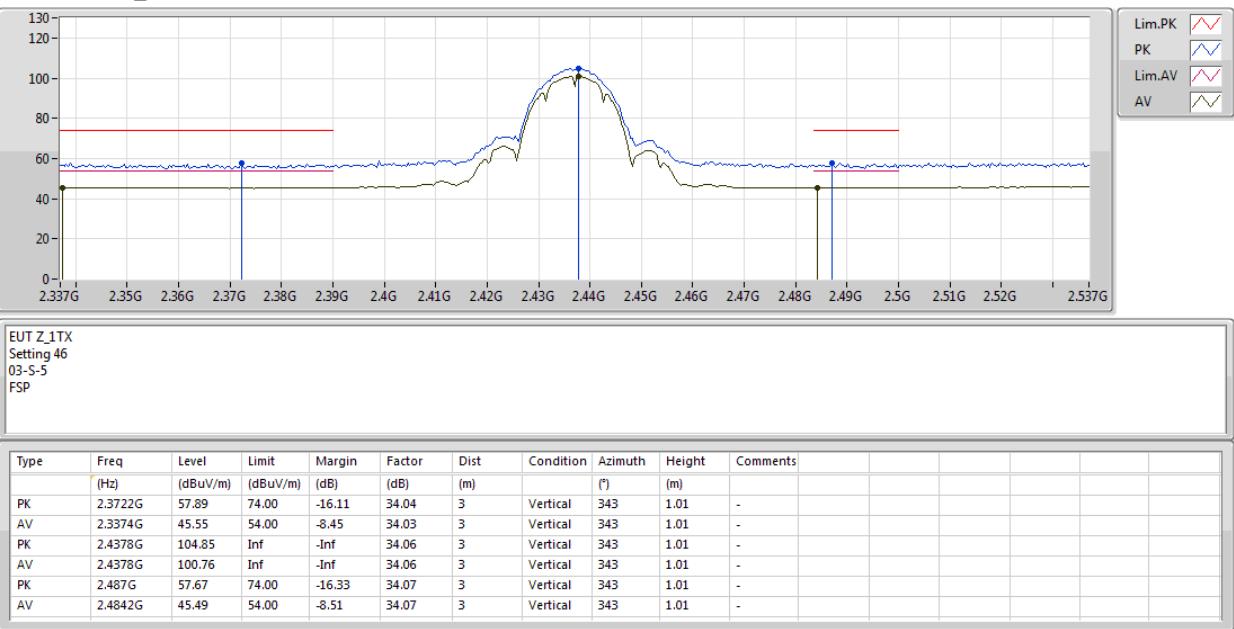
25/01/2019

2412MHz_TX



802.11b_Nss1,(1Mbps)_1TX

25/01/2019

2437MHz_TX




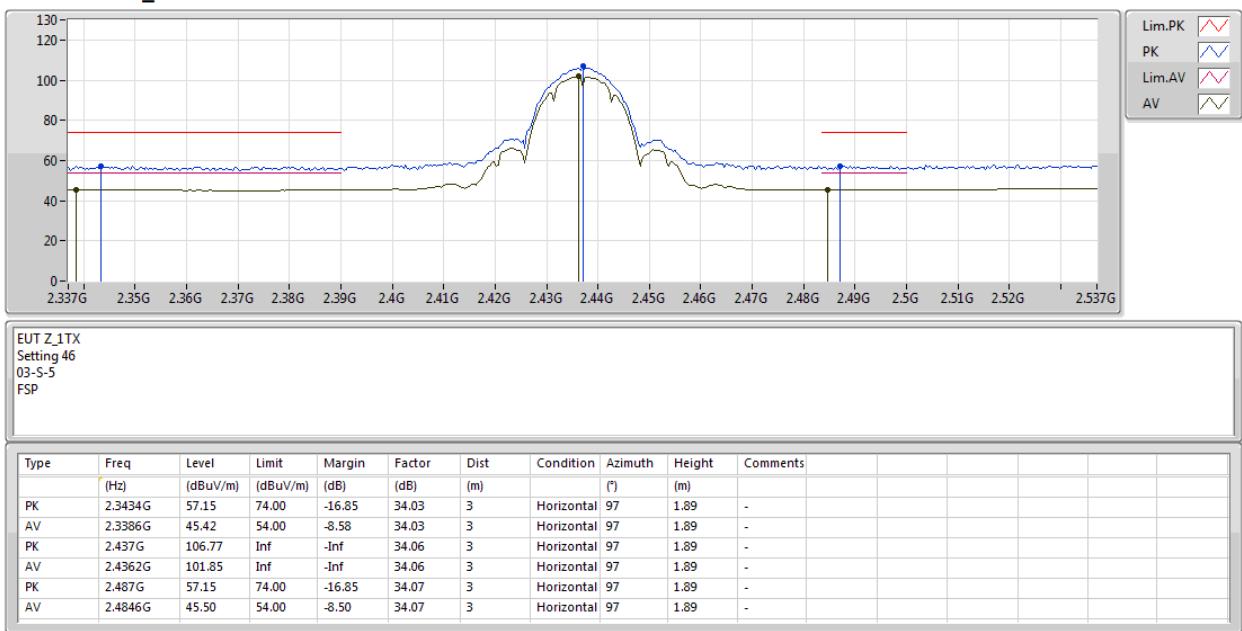
RSE TX above 1GHz Result

Appendix F.2

802.11b_Nss1,(1Mbps)_1TX

25/01/2019

2437MHz_TX





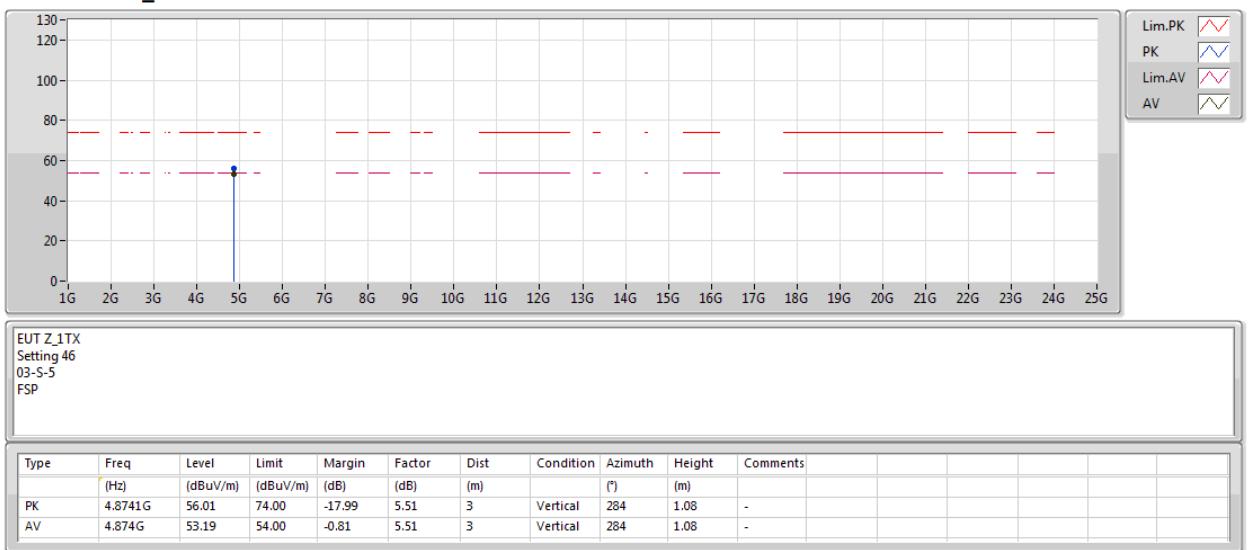
RSE TX above 1GHz Result

Appendix F.2

802.11b_Nss1,(1Mbps)_1TX

25/01/2019

2437MHz_TX





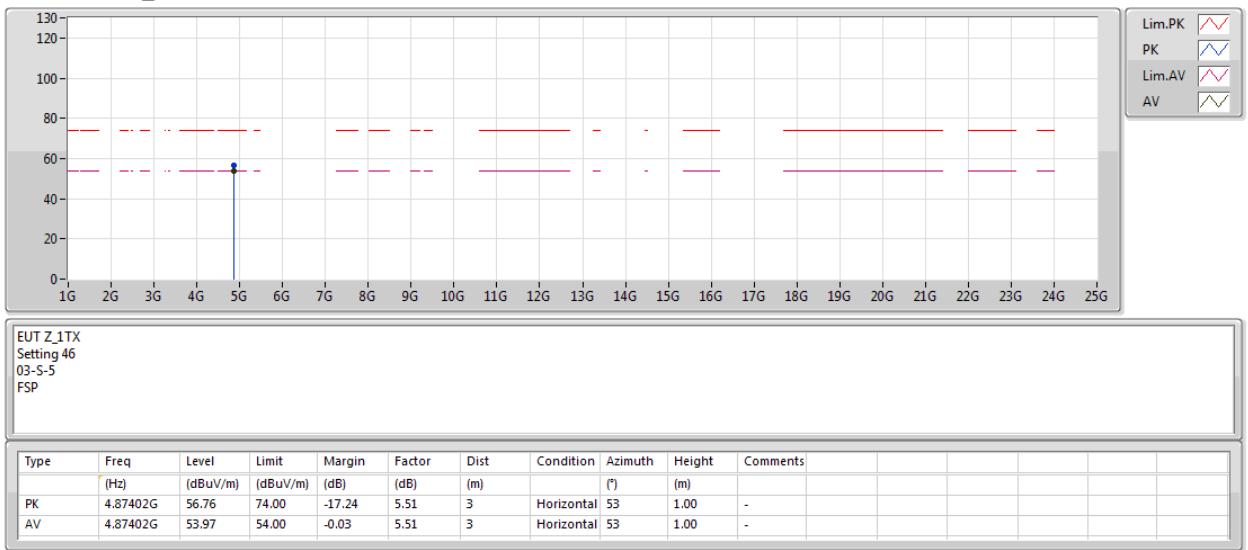
RSE TX above 1GHz Result

Appendix F.2

802.11b_Nss1,(1Mbps)_1TX

25/01/2019

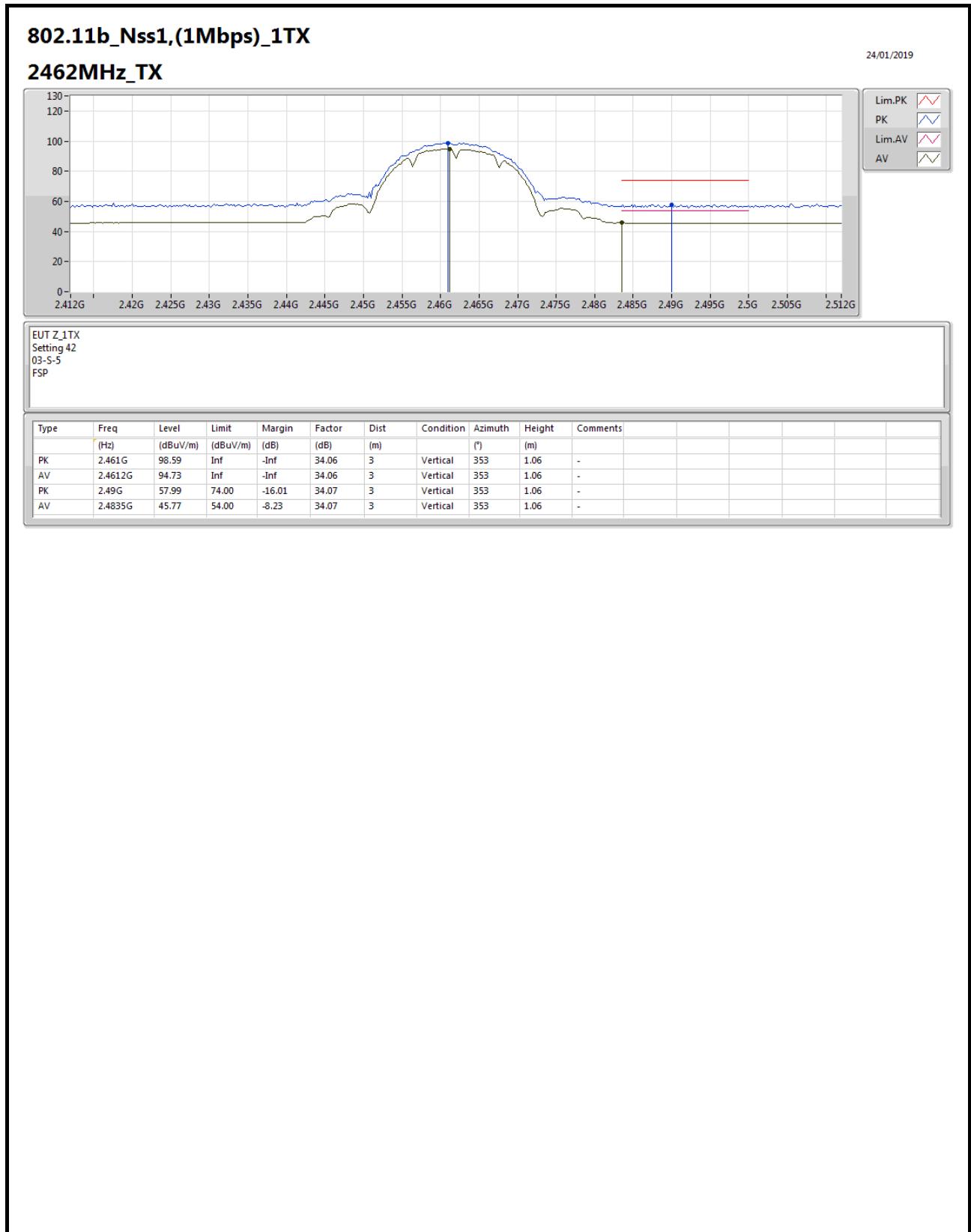
2437MHz_TX





RSE TX above 1GHz Result

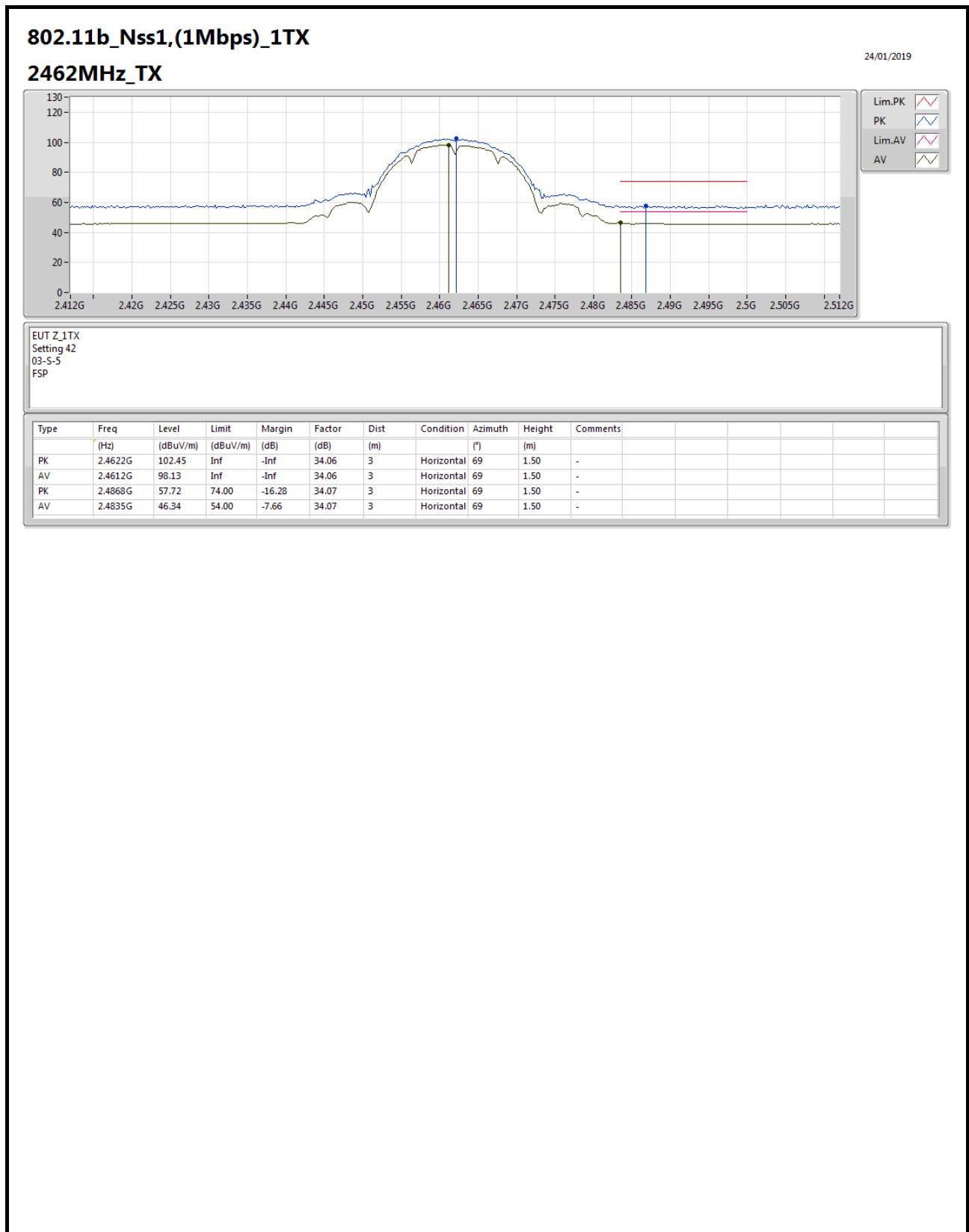
Appendix F.2





RSE TX above 1GHz Result

Appendix F.2





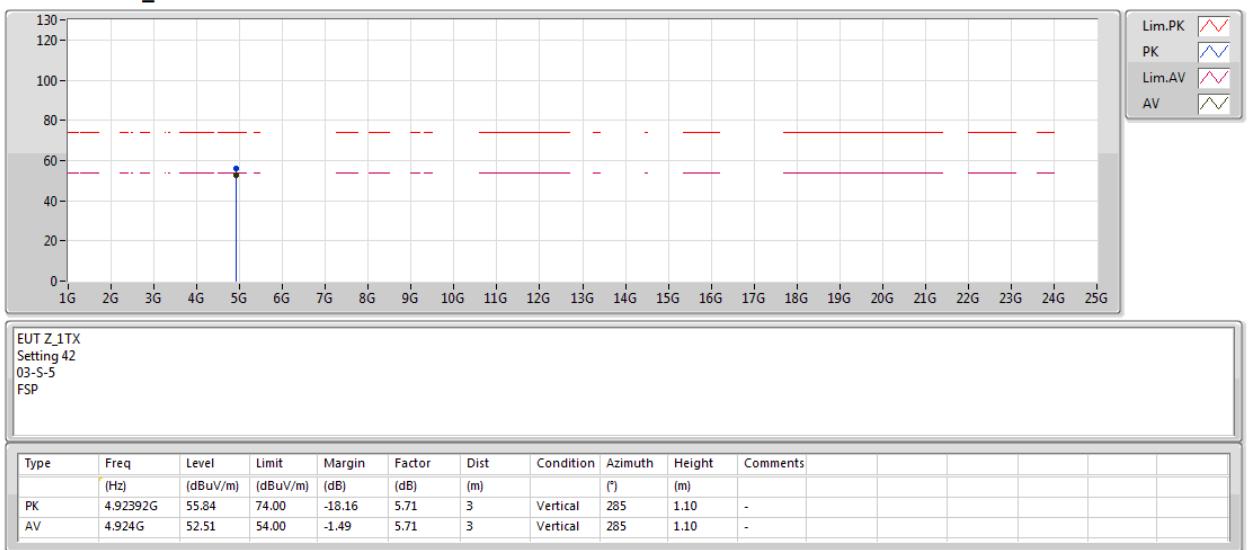
RSE TX above 1GHz Result

Appendix F.2

802.11b_Nss1,(1Mbps)_1TX

25/01/2019

2462MHz_TX





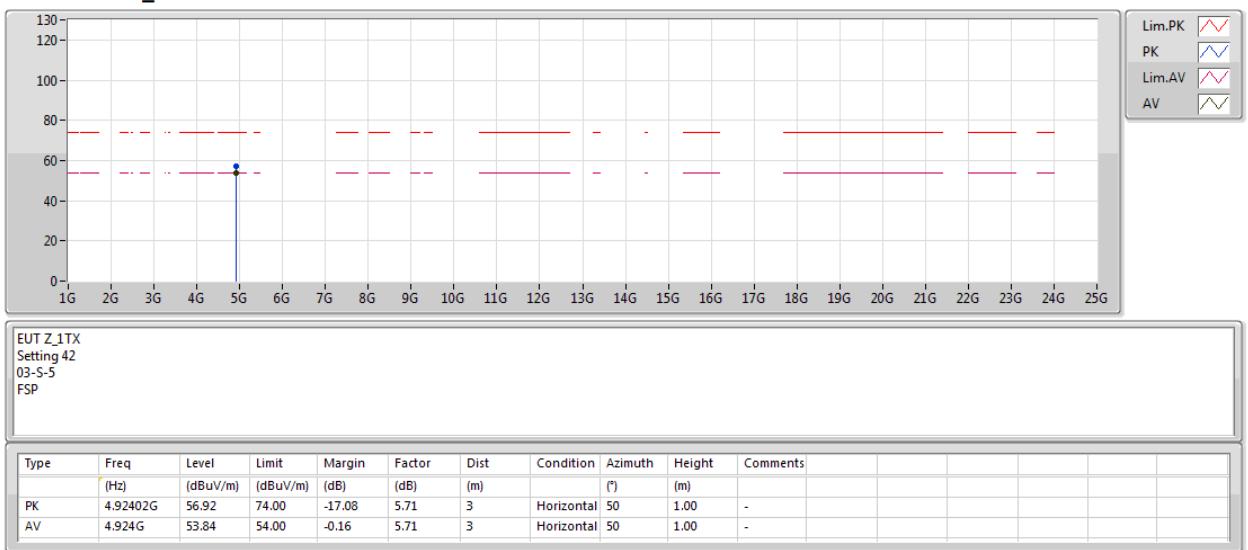
RSE TX above 1GHz Result

Appendix F.2

802.11b_Nss1,(1Mbps)_1TX

25/01/2019

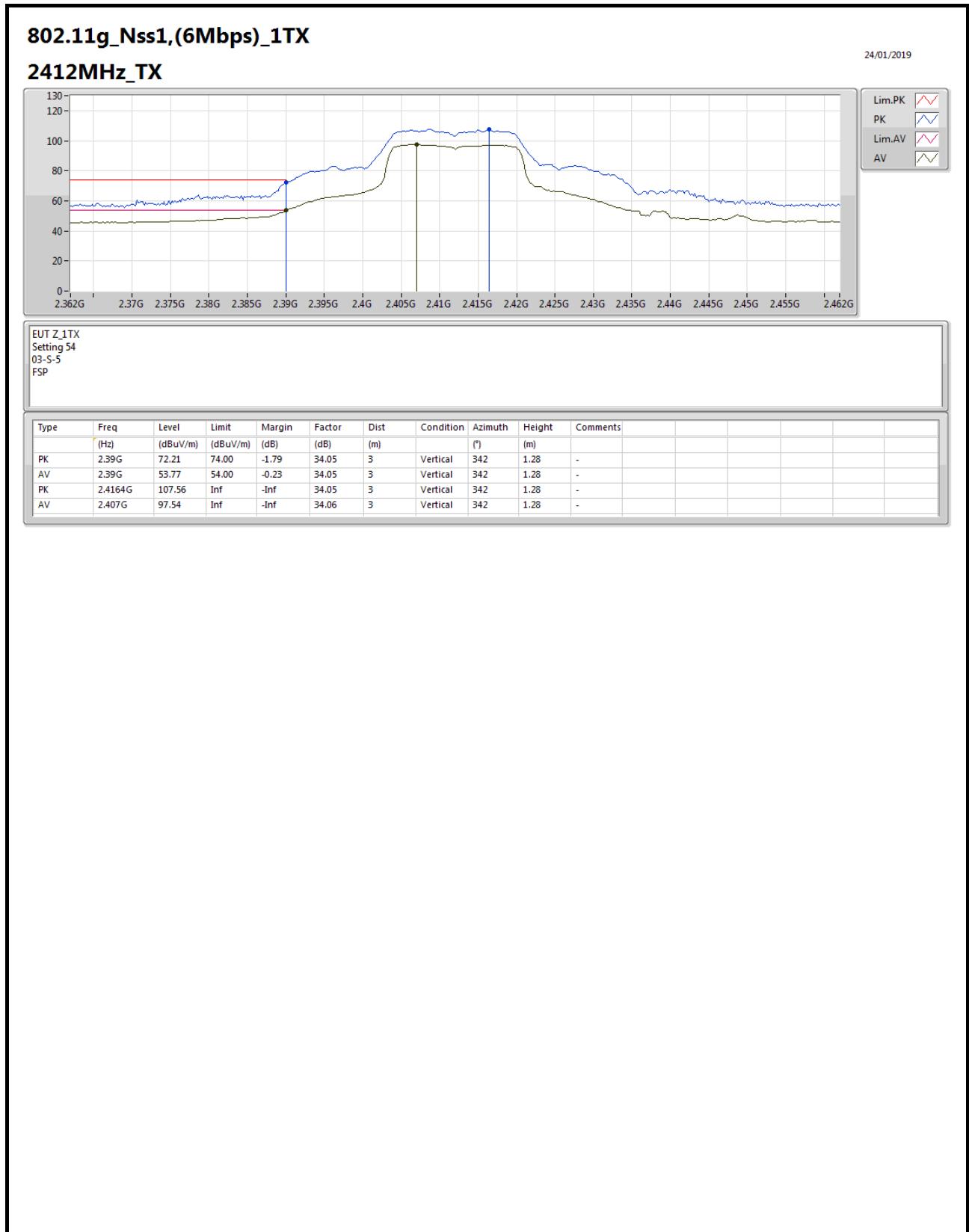
2462MHz_TX





RSE TX above 1GHz Result

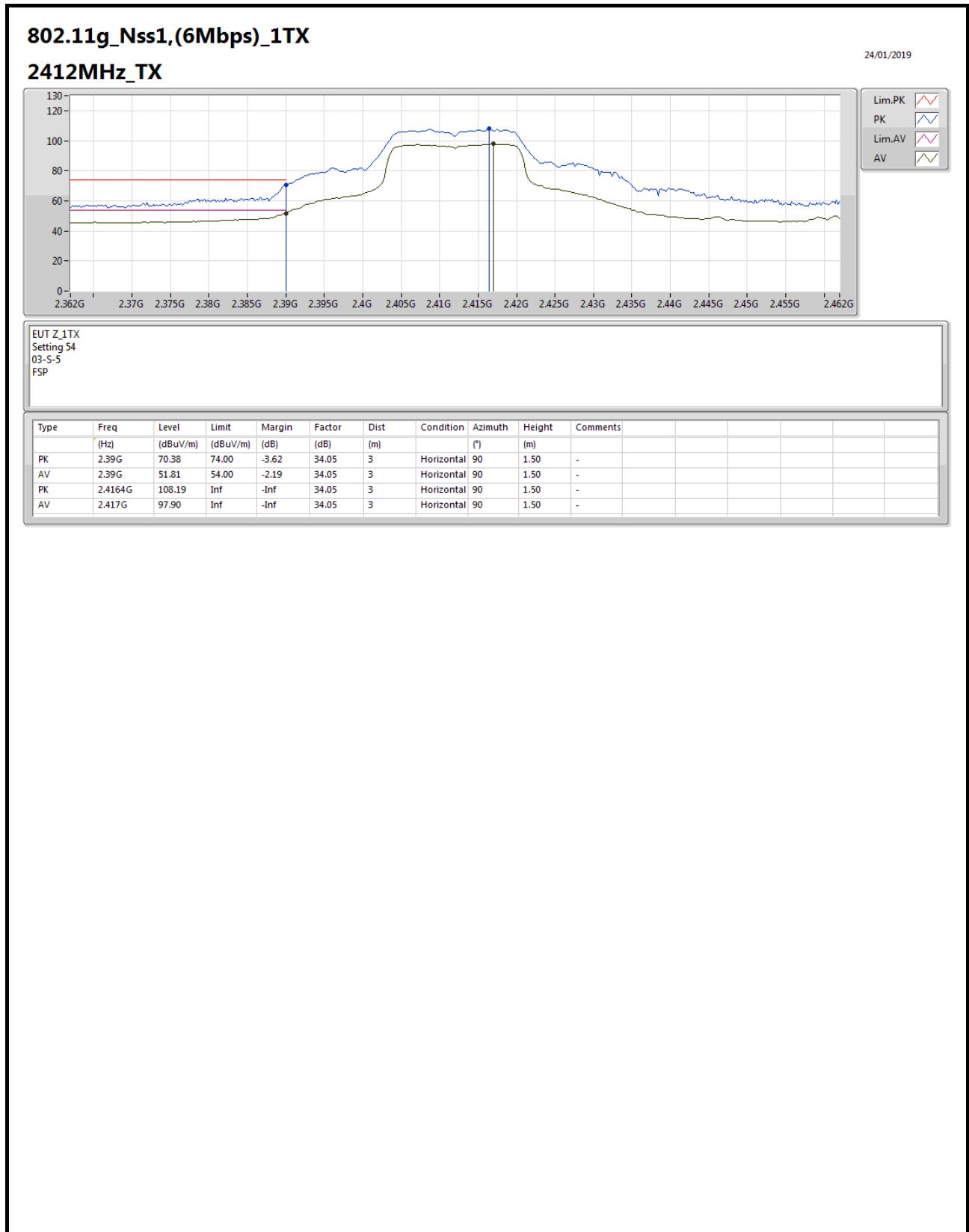
Appendix F.2





RSE TX above 1GHz Result

Appendix F.2





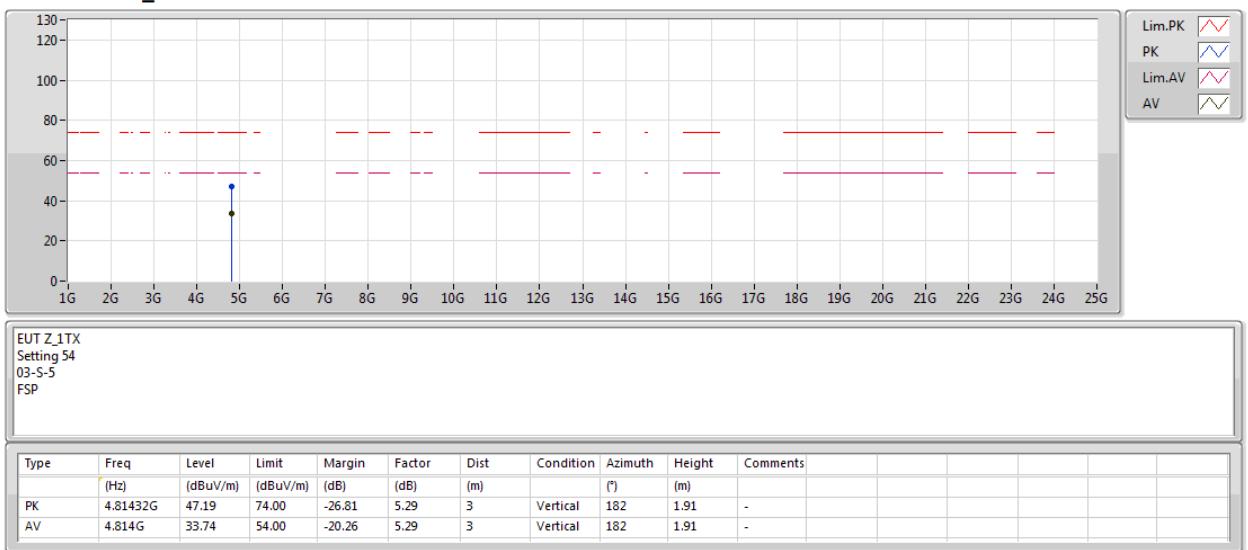
RSE TX above 1GHz Result

Appendix F.2

802.11g_Nss1,(6Mbps)_1TX

25/01/2019

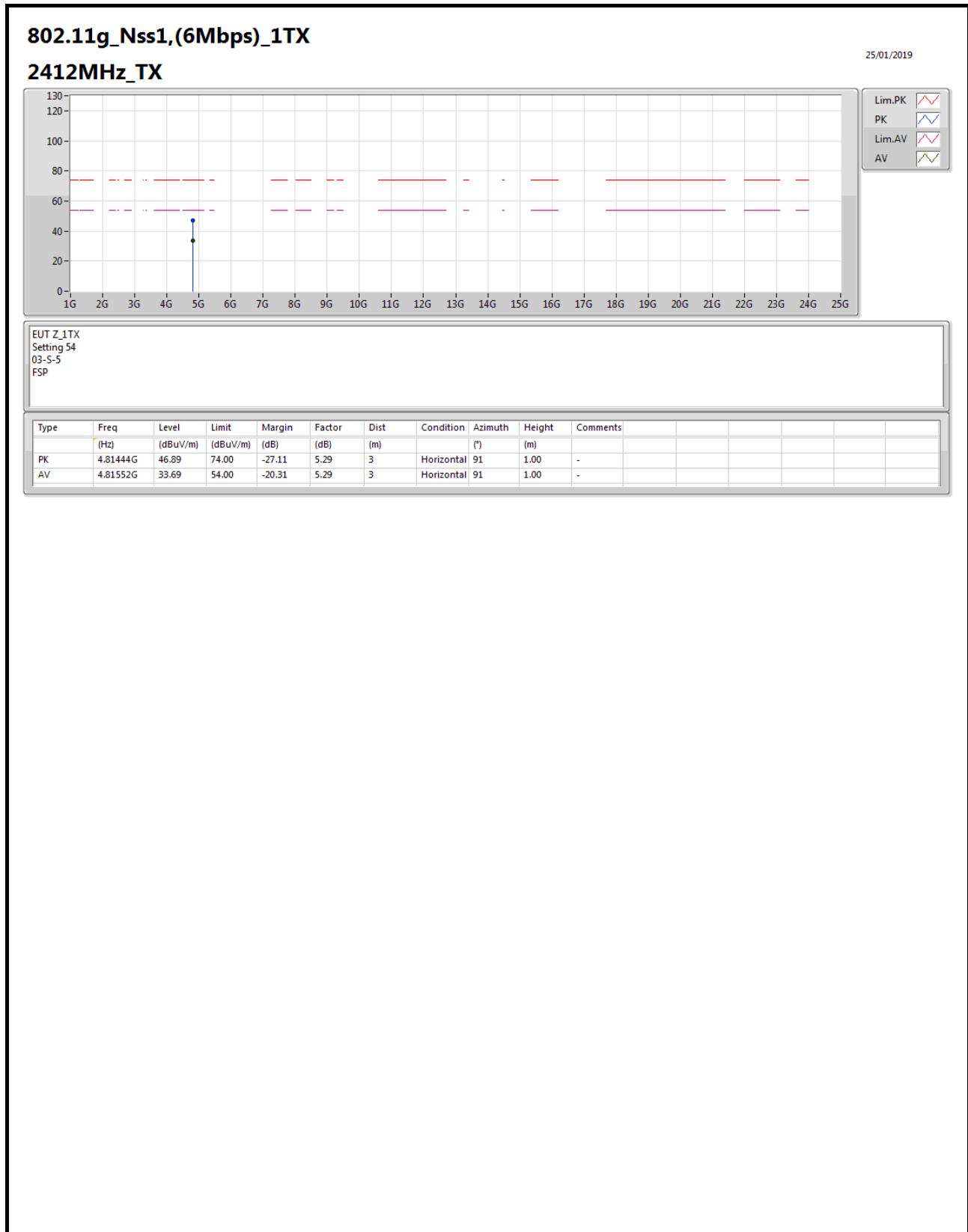
2412MHz_TX





RSE TX above 1GHz Result

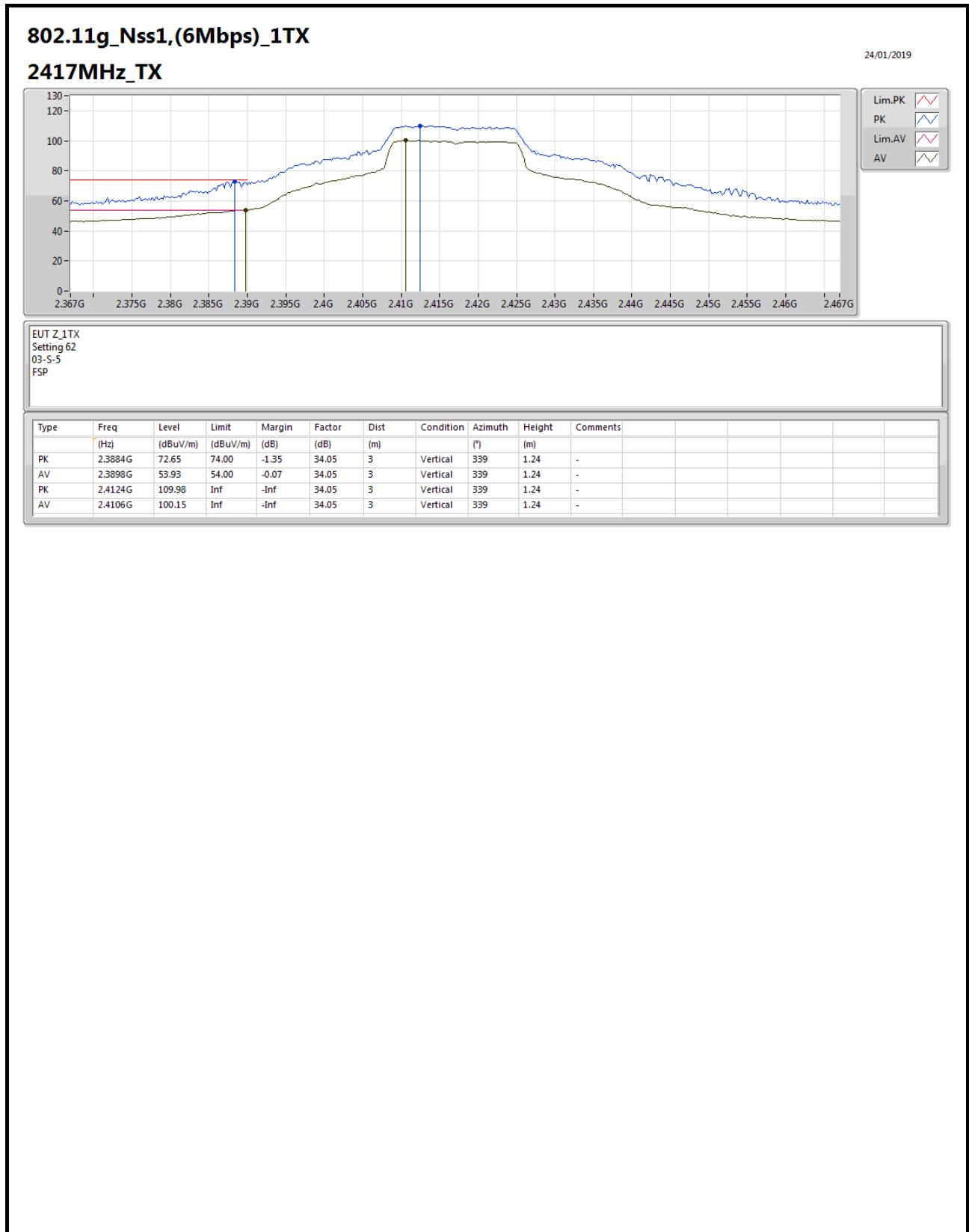
Appendix F.2





RSE TX above 1GHz Result

Appendix F.2





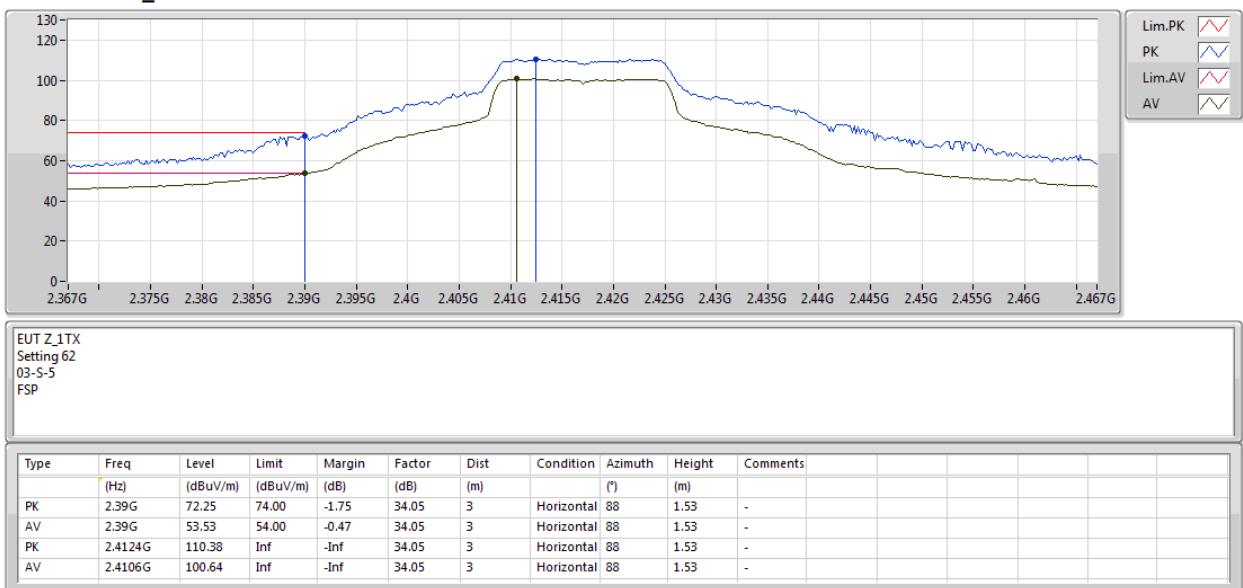
RSE TX above 1GHz Result

Appendix F.2

802.11g_Nss1,(6Mbps)_1TX

24/01/2019

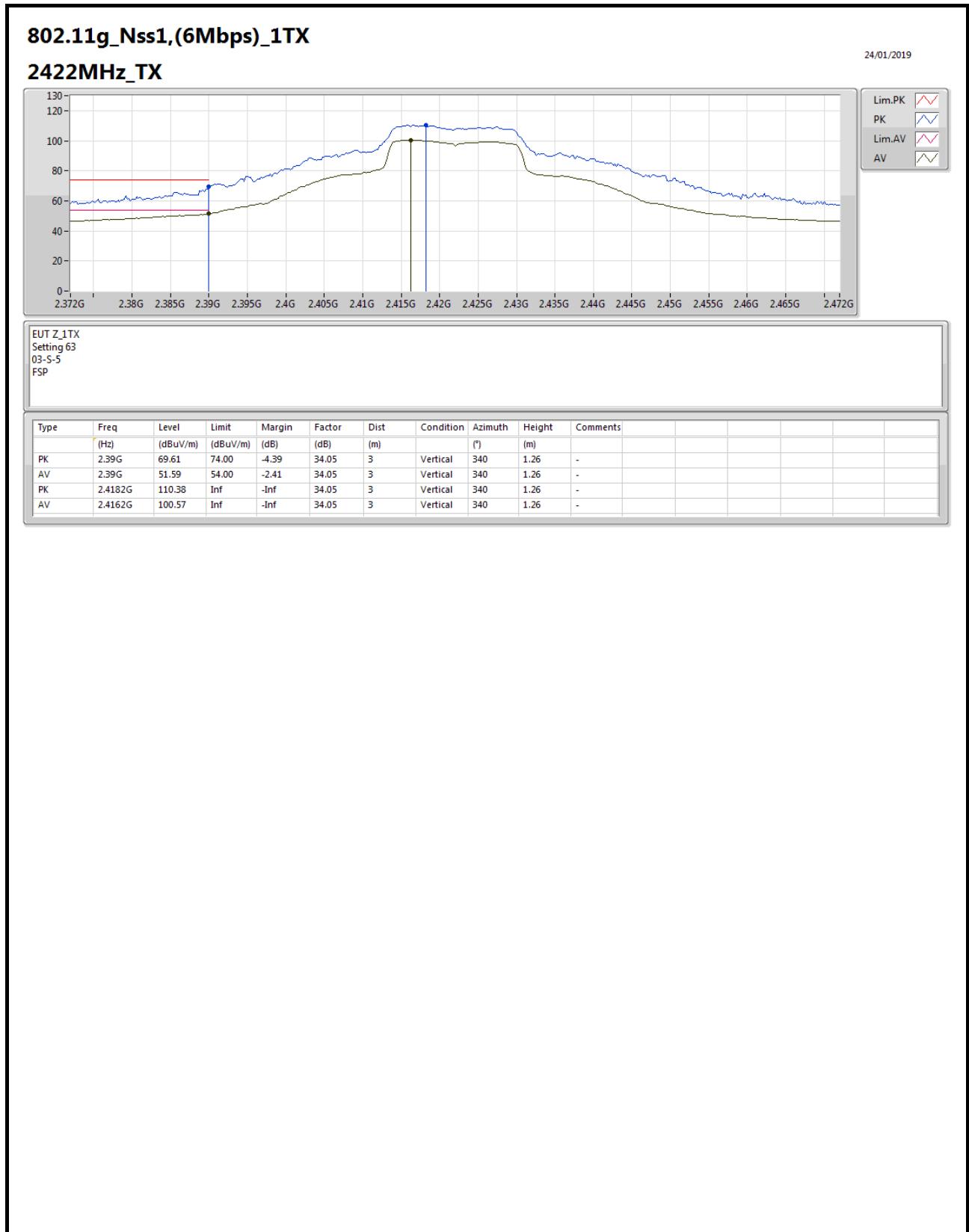
2417MHz_TX





RSE TX above 1GHz Result

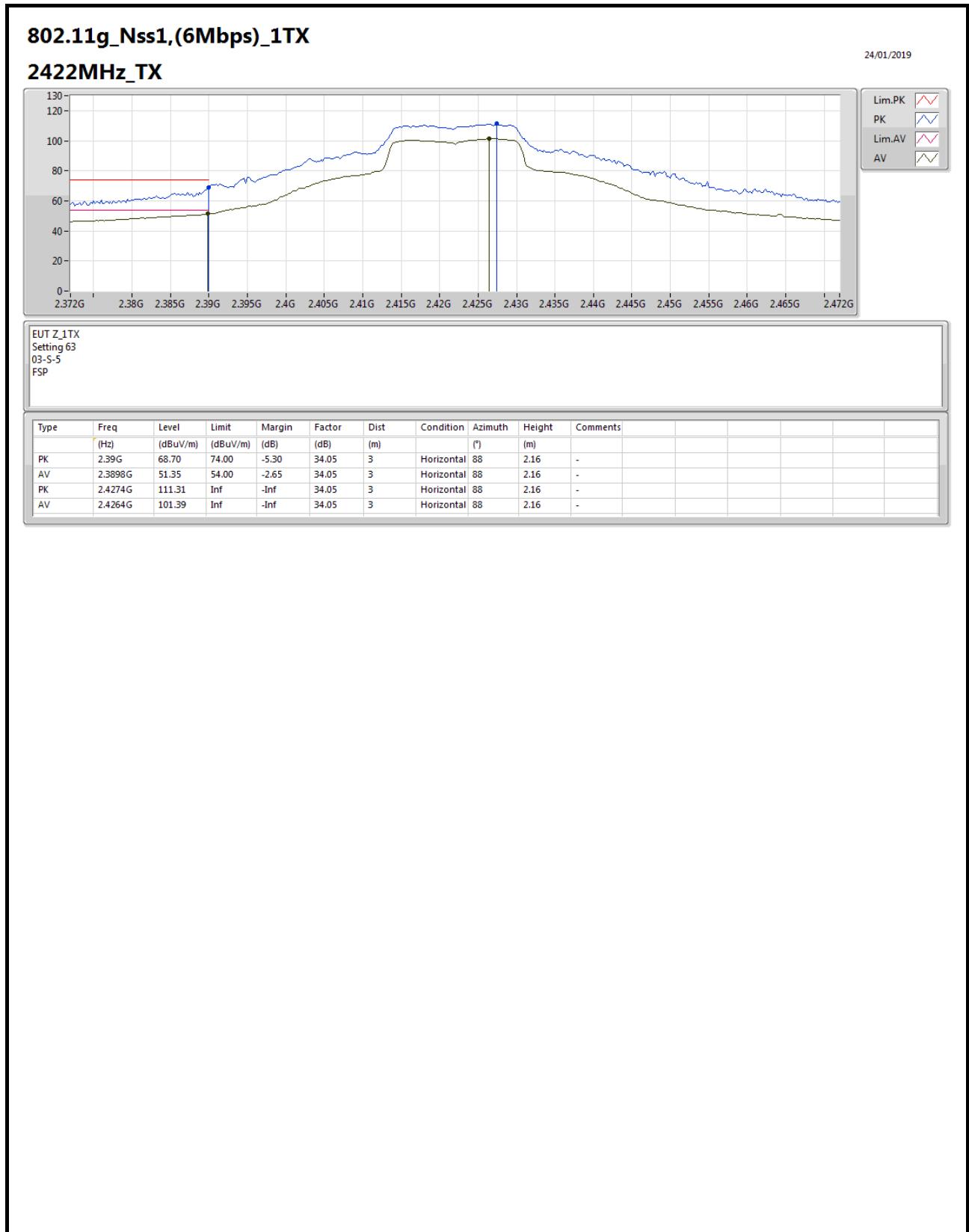
Appendix F.2





RSE TX above 1GHz Result

Appendix F.2





RSE TX above 1GHz Result

Appendix F.2

802.11g_Nss1,(6Mbps)_1TX

24/01/2019

2437MHz_TX





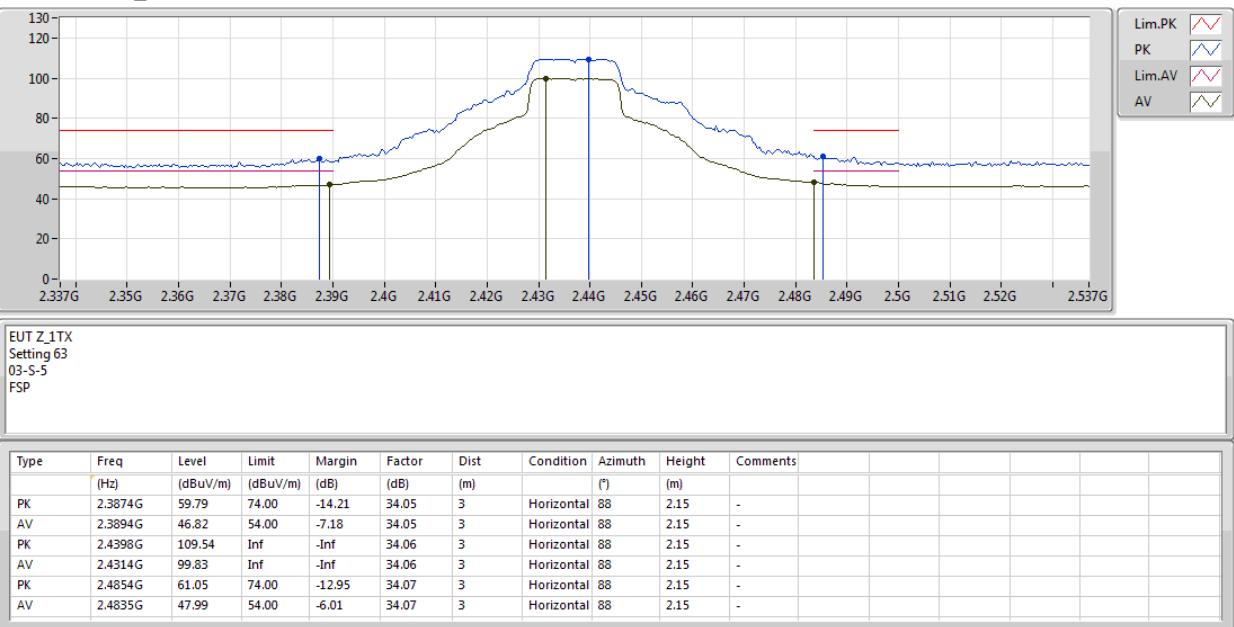
RSE TX above 1GHz Result

Appendix F.2

802.11g_Nss1,(6Mbps)_1TX

24/01/2019

2437MHz_TX





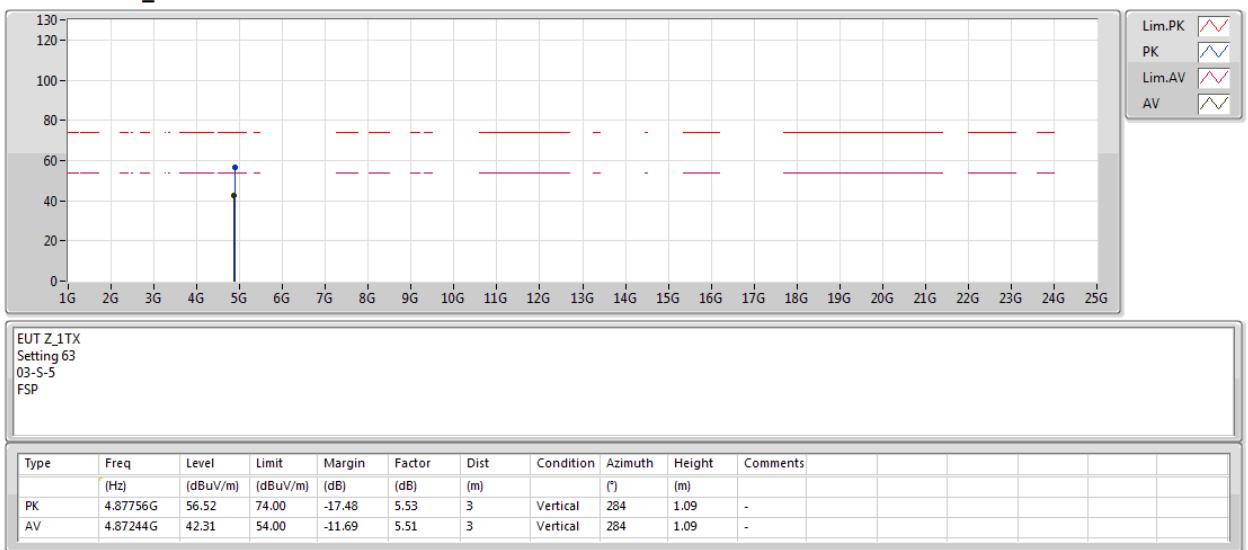
RSE TX above 1GHz Result

Appendix F.2

802.11g_Nss1,(6Mbps)_1TX

25/01/2019

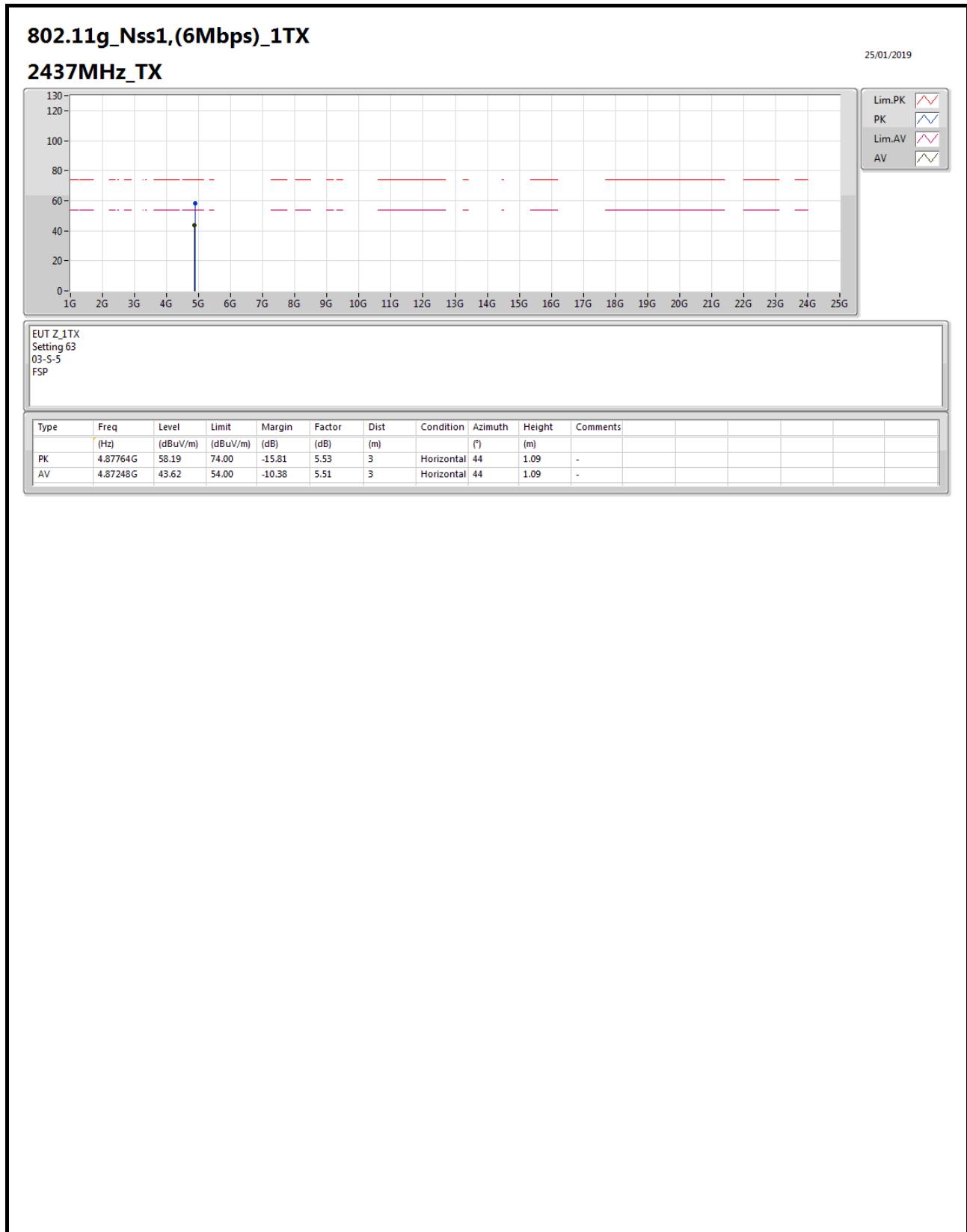
2437MHz_TX





RSE TX above 1GHz Result

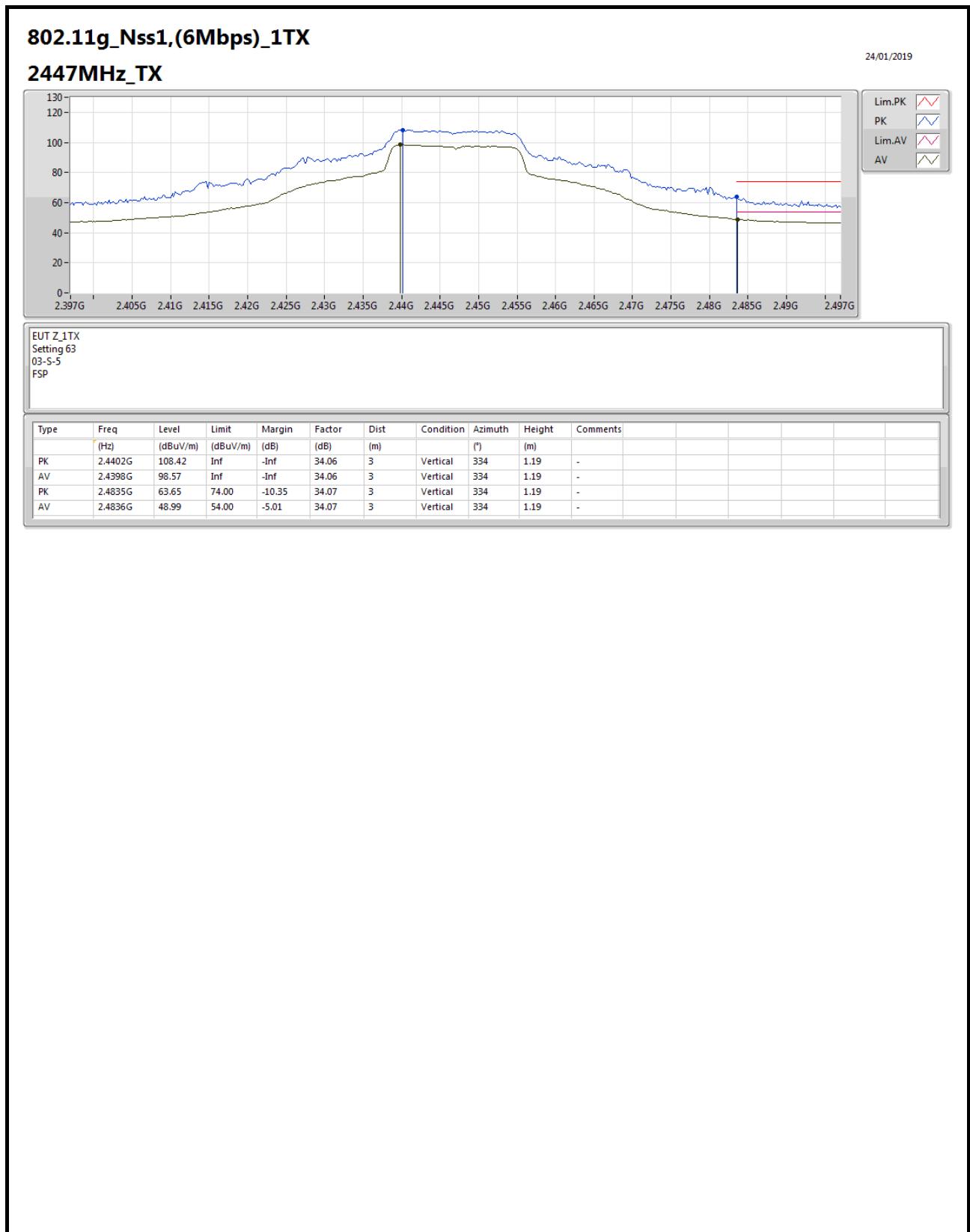
Appendix F.2





RSE TX above 1GHz Result

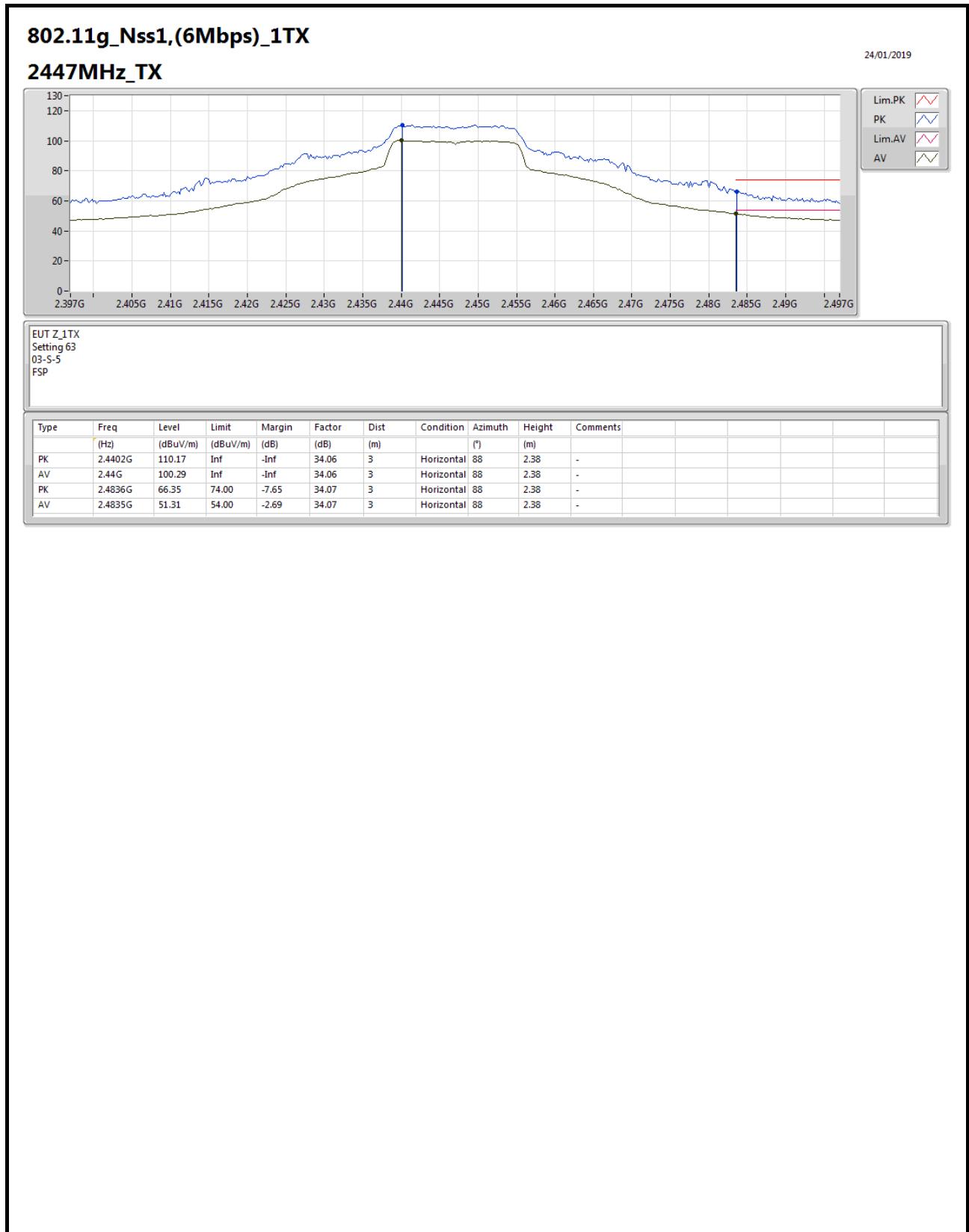
Appendix F.2





RSE TX above 1GHz Result

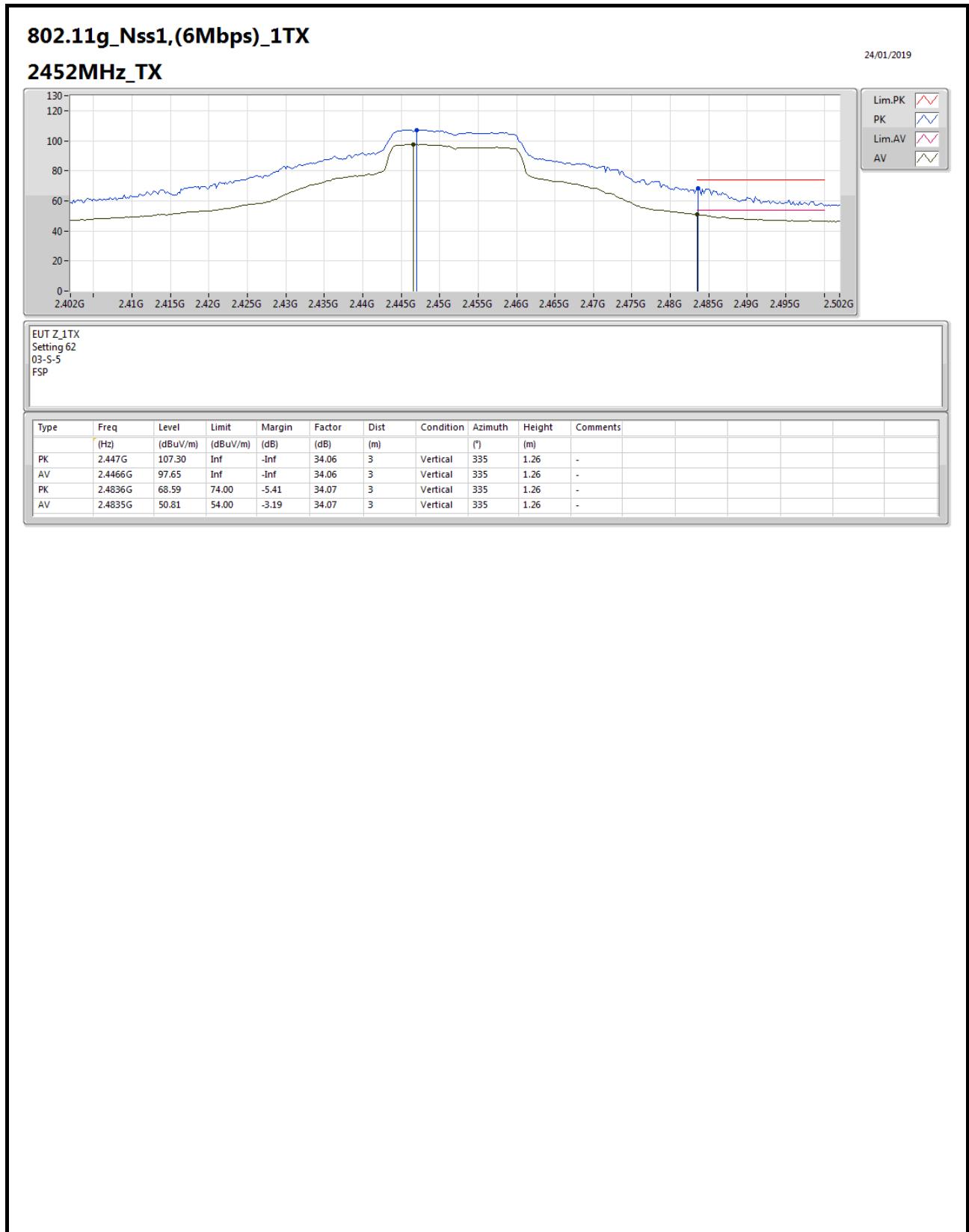
Appendix F.2





RSE TX above 1GHz Result

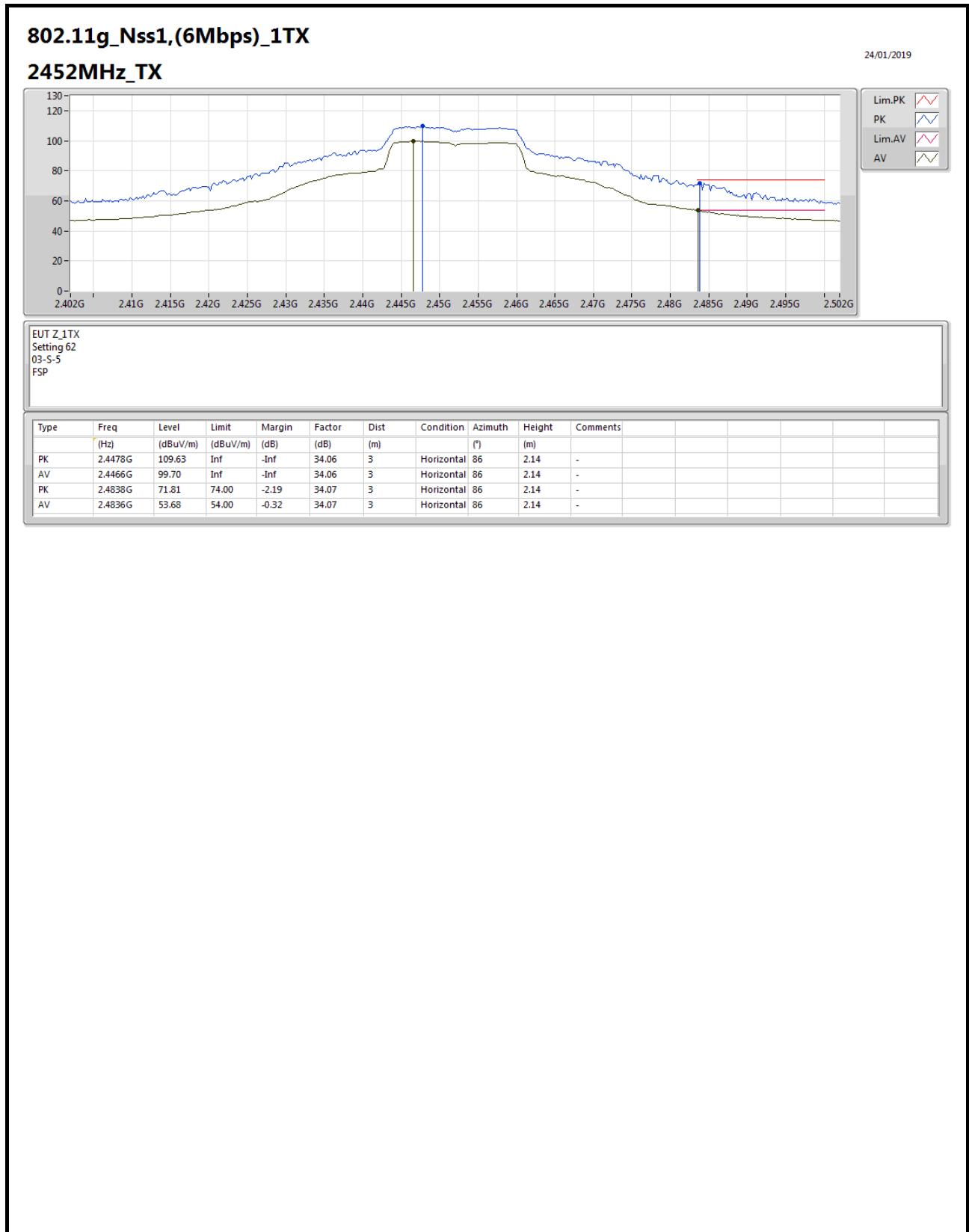
Appendix F.2





RSE TX above 1GHz Result

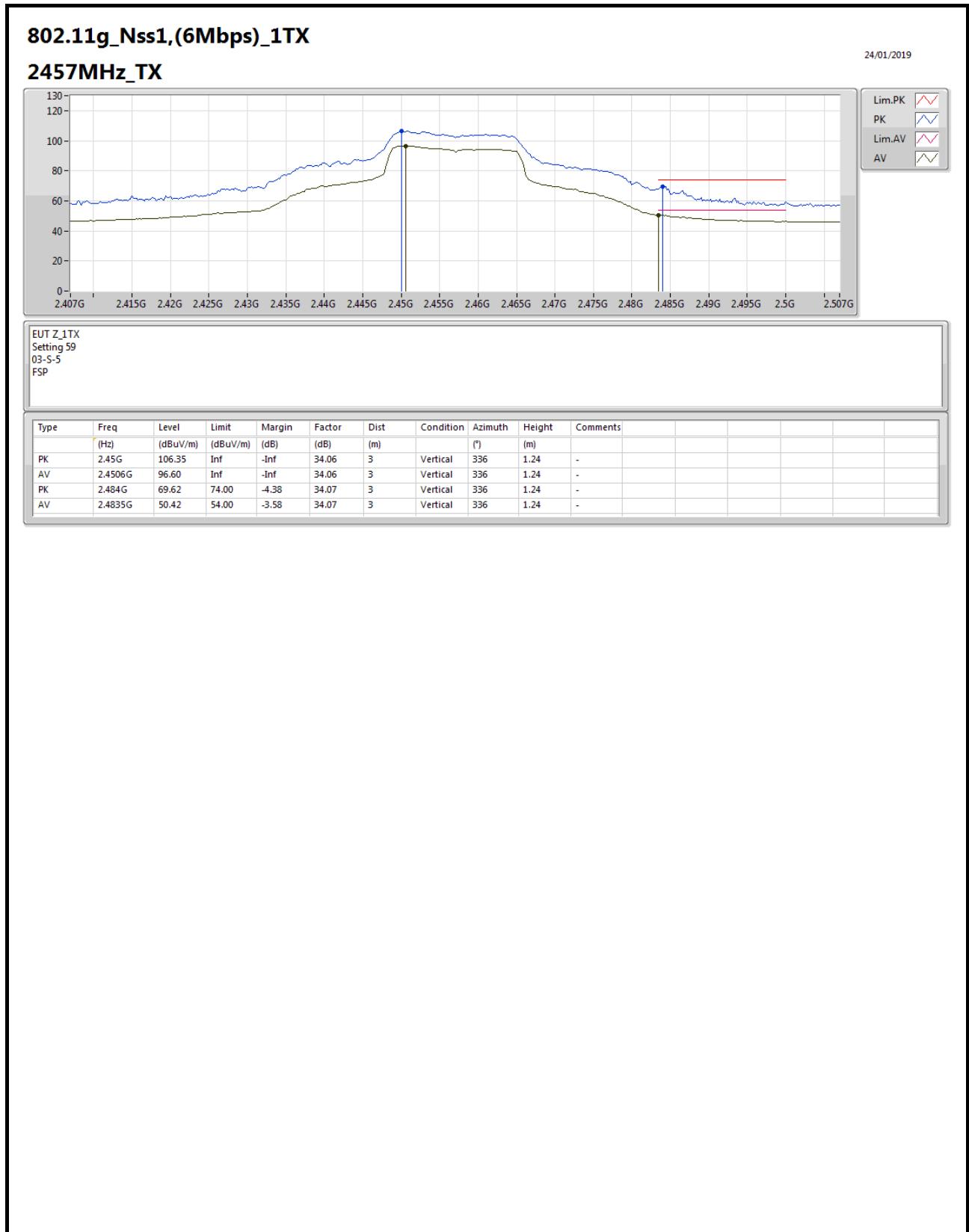
Appendix F.2





RSE TX above 1GHz Result

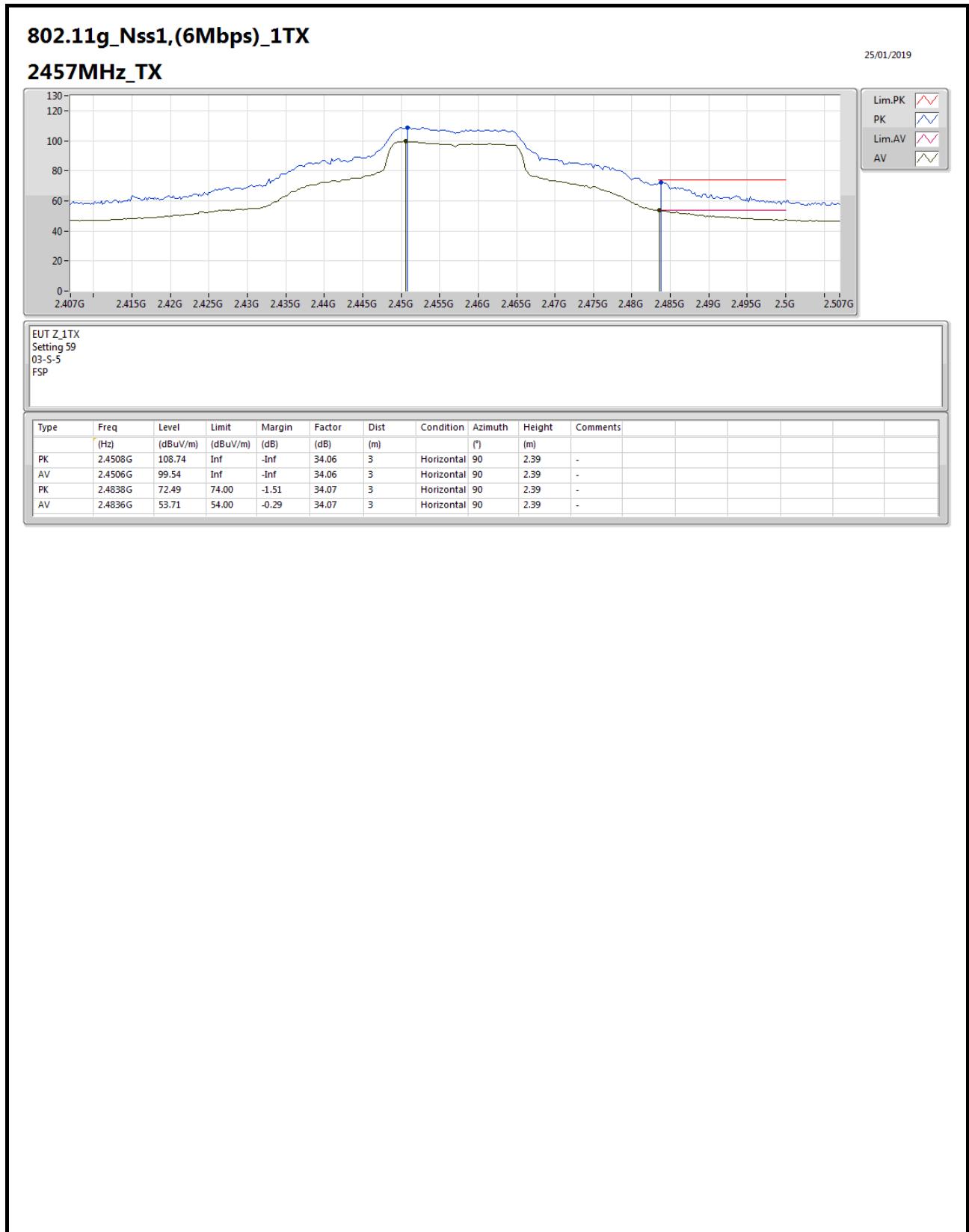
Appendix F.2





RSE TX above 1GHz Result

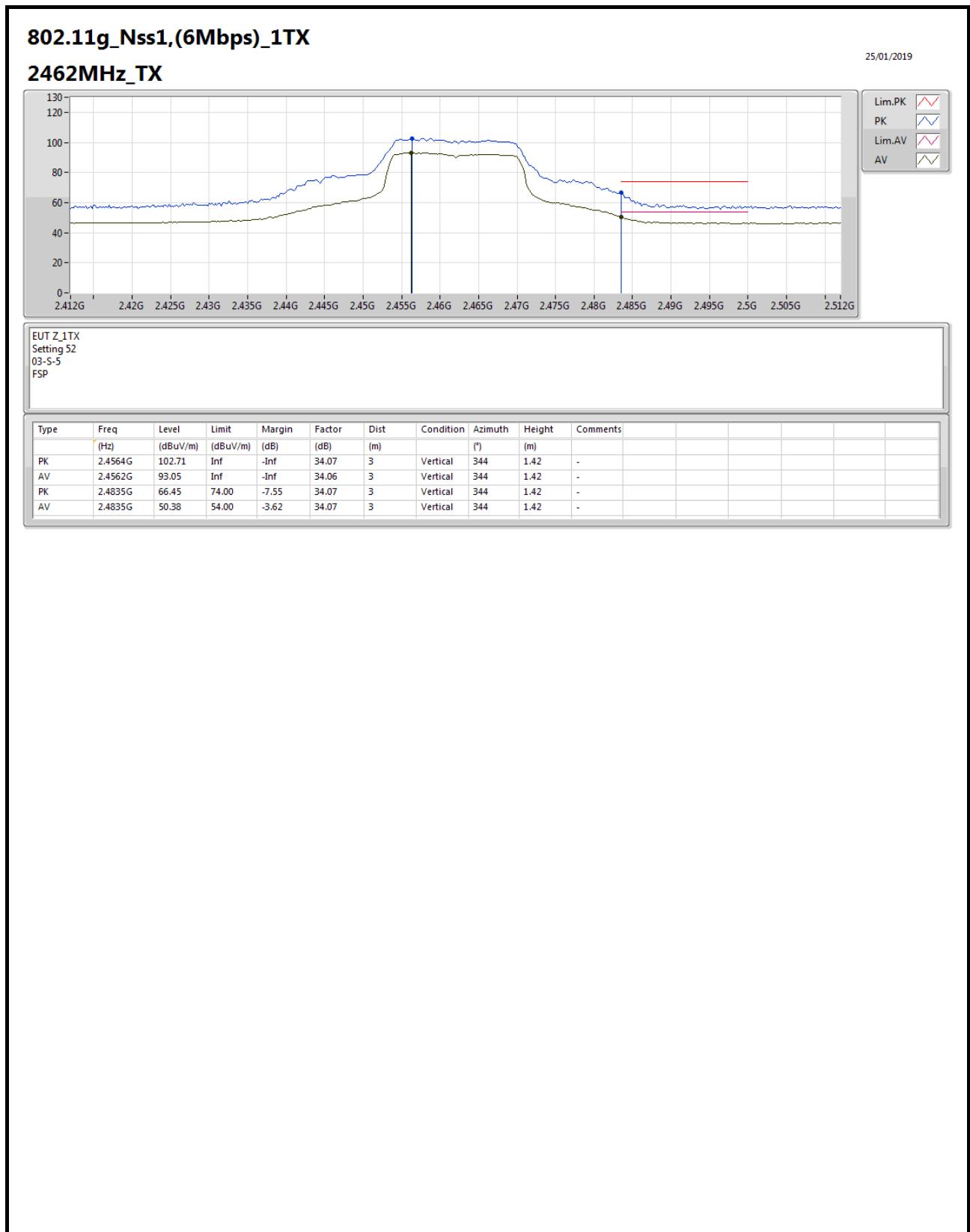
Appendix F.2

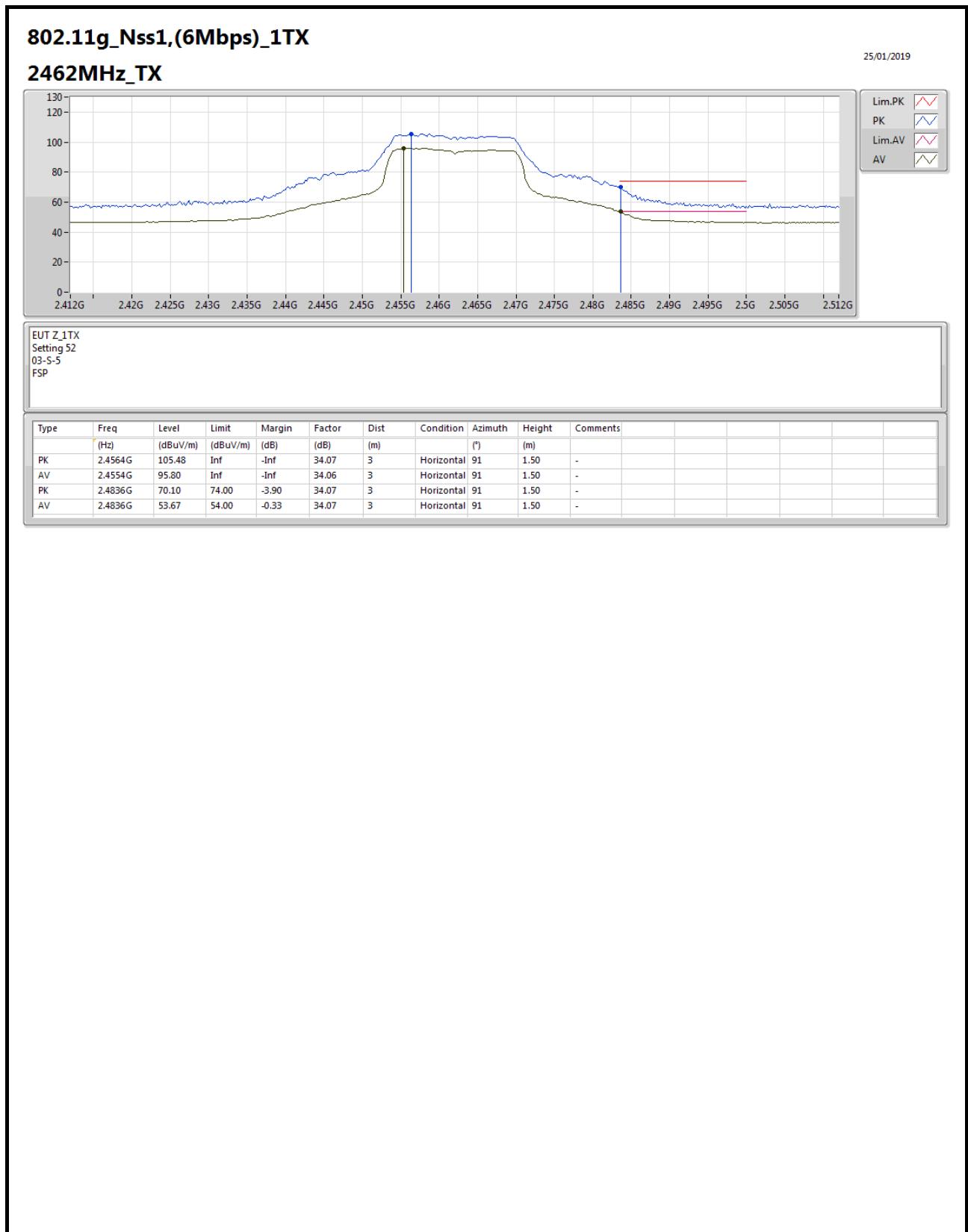




RSE TX above 1GHz Result

Appendix F.2







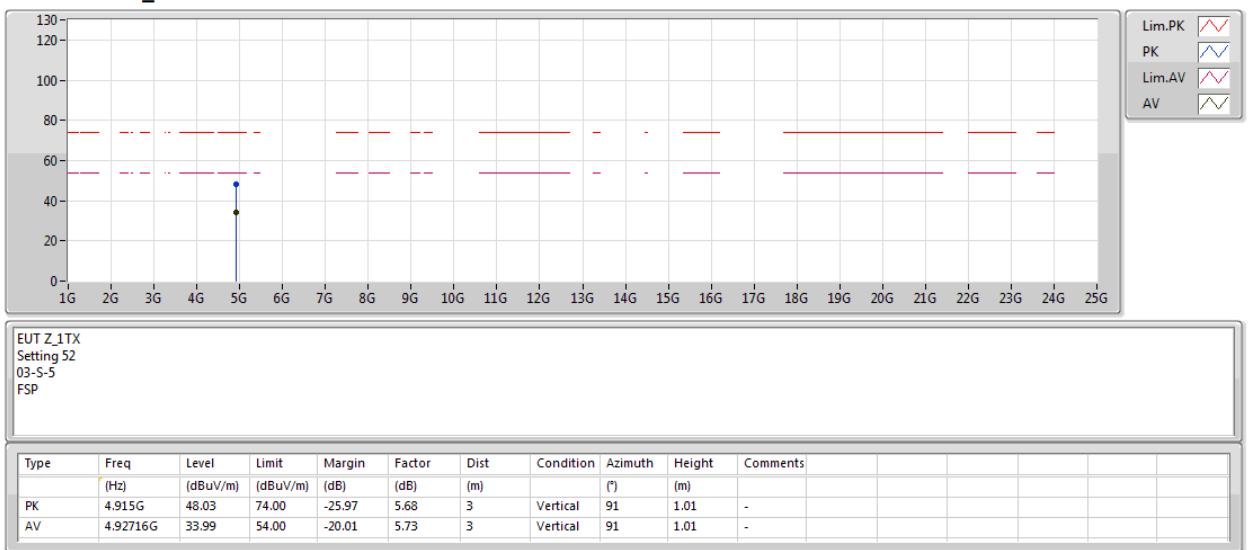
RSE TX above 1GHz Result

Appendix F.2

802.11g_Nss1,(6Mbps)_1TX

25/01/2019

2462MHz_TX





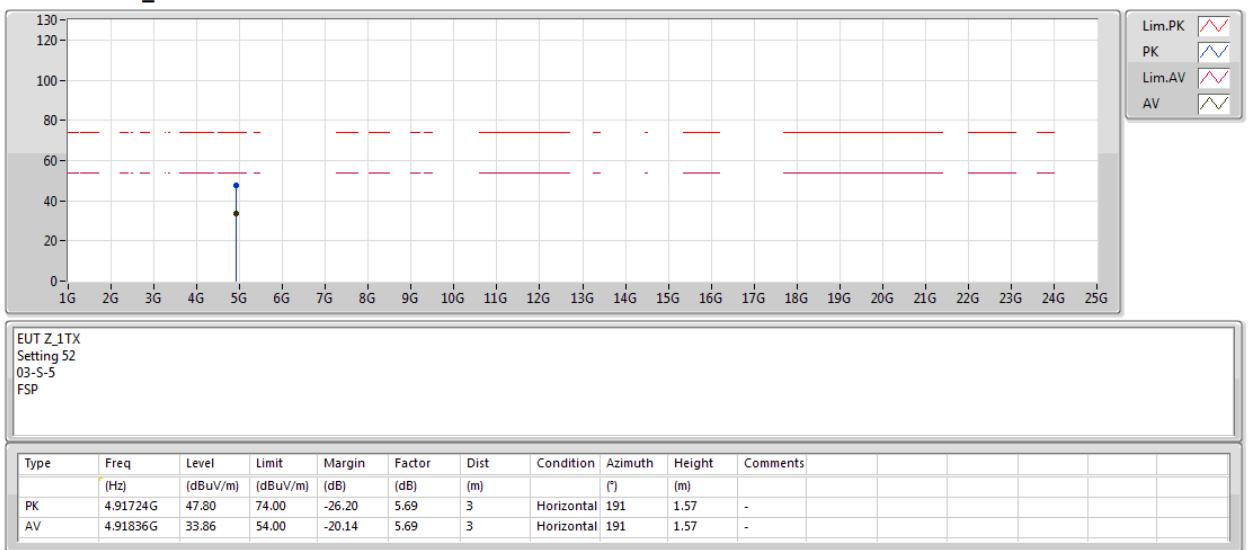
RSE TX above 1GHz Result

Appendix F.2

802.11g_Nss1,(6Mbps)_1TX

25/01/2019

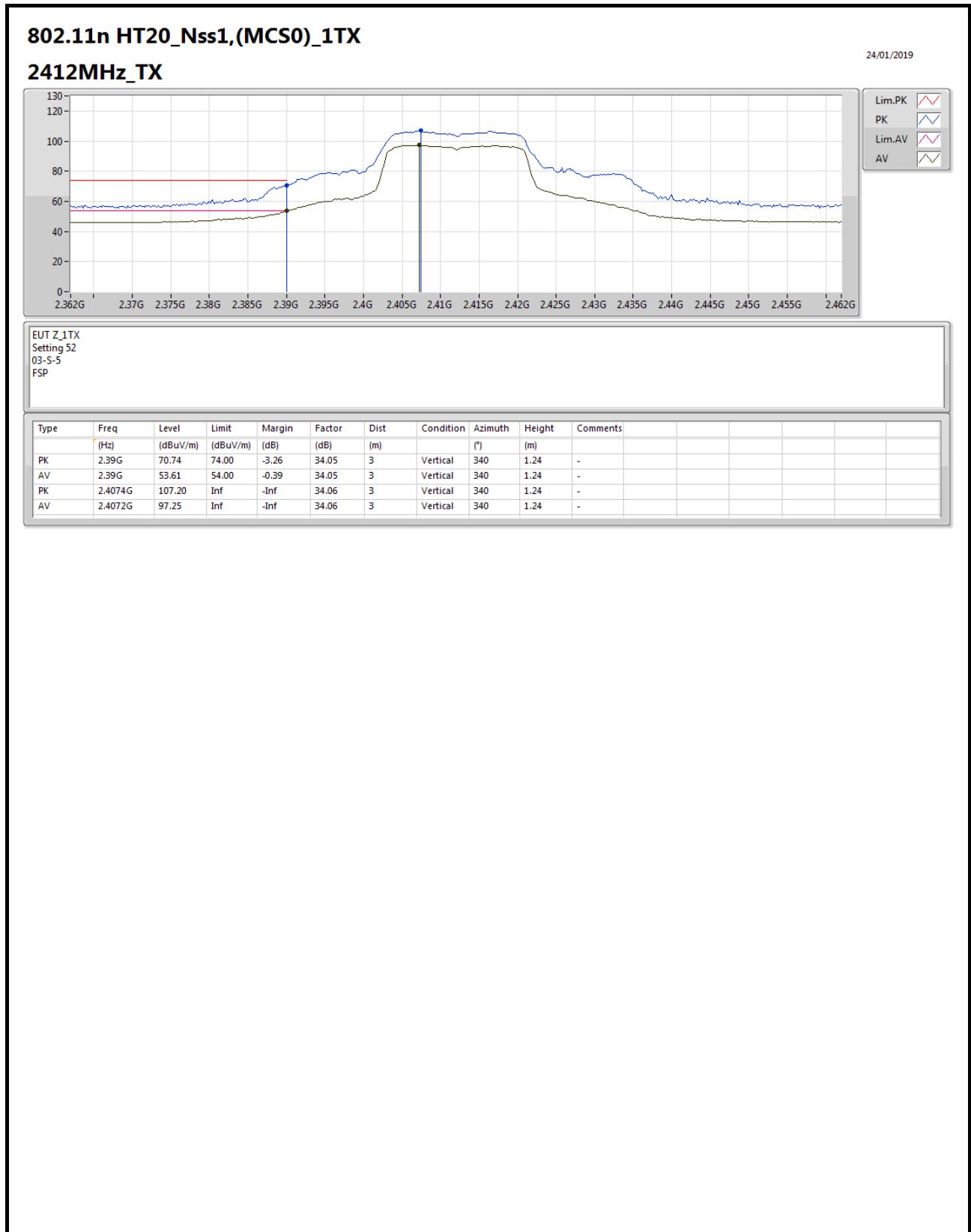
2462MHz_TX





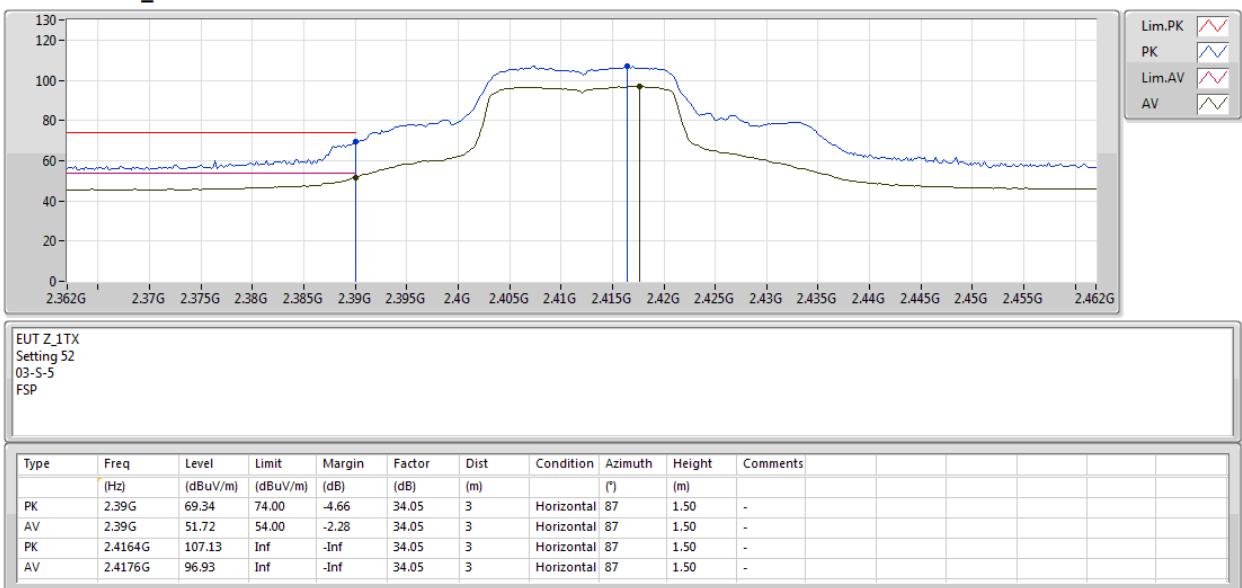
RSE TX above 1GHz Result

Appendix F.2



802.11n HT20_Nss1,(MCS0)_1TX

24/01/2019

2412MHz_TX




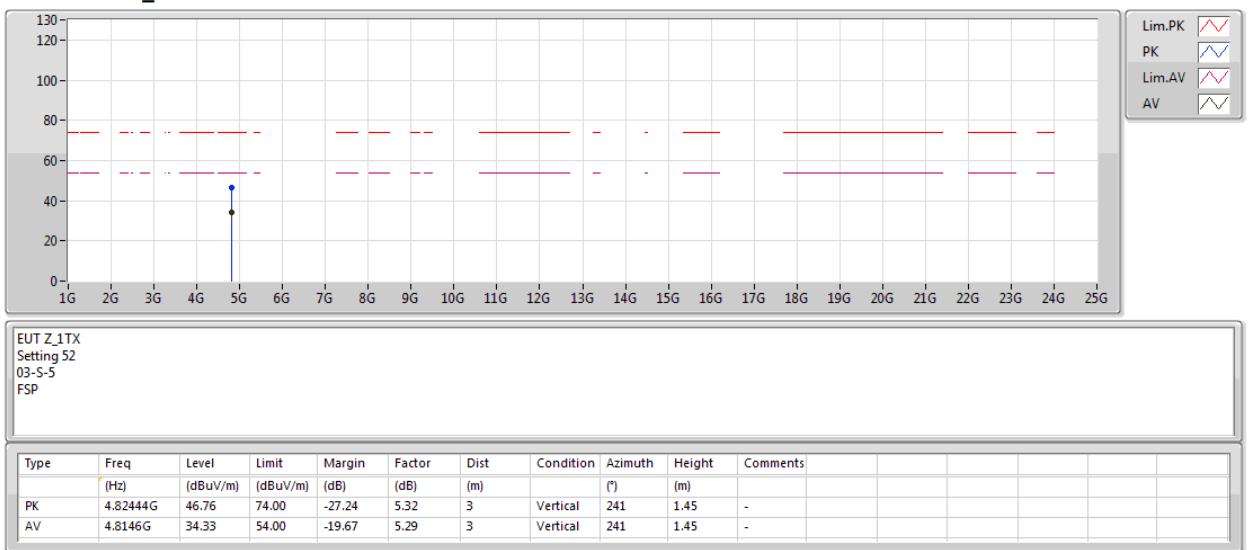
RSE TX above 1GHz Result

Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

25/01/2019

2412MHz_TX





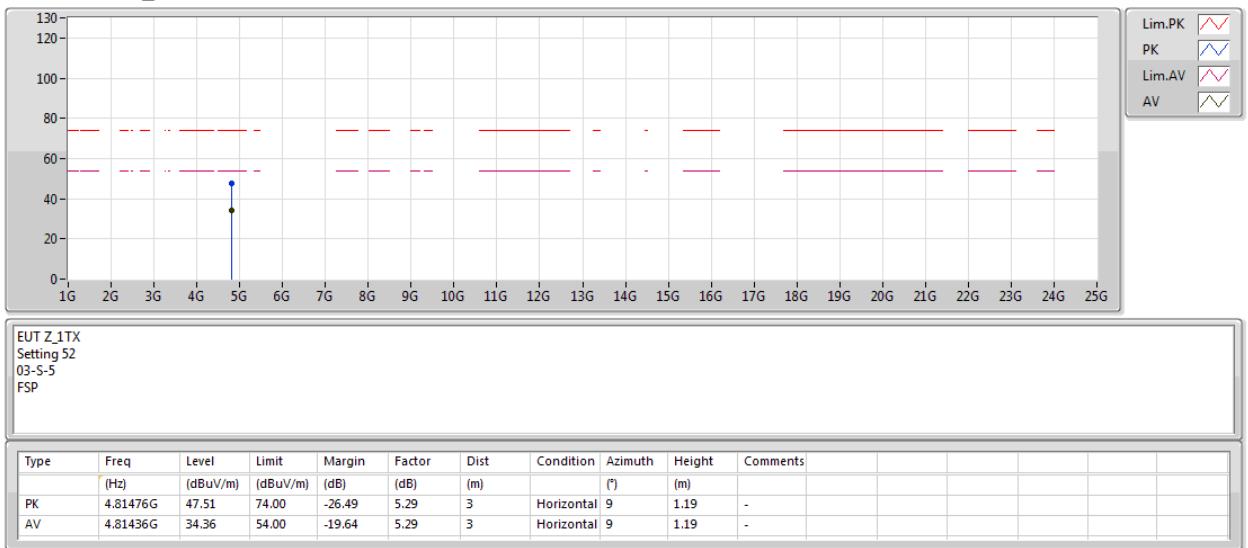
RSE TX above 1GHz Result

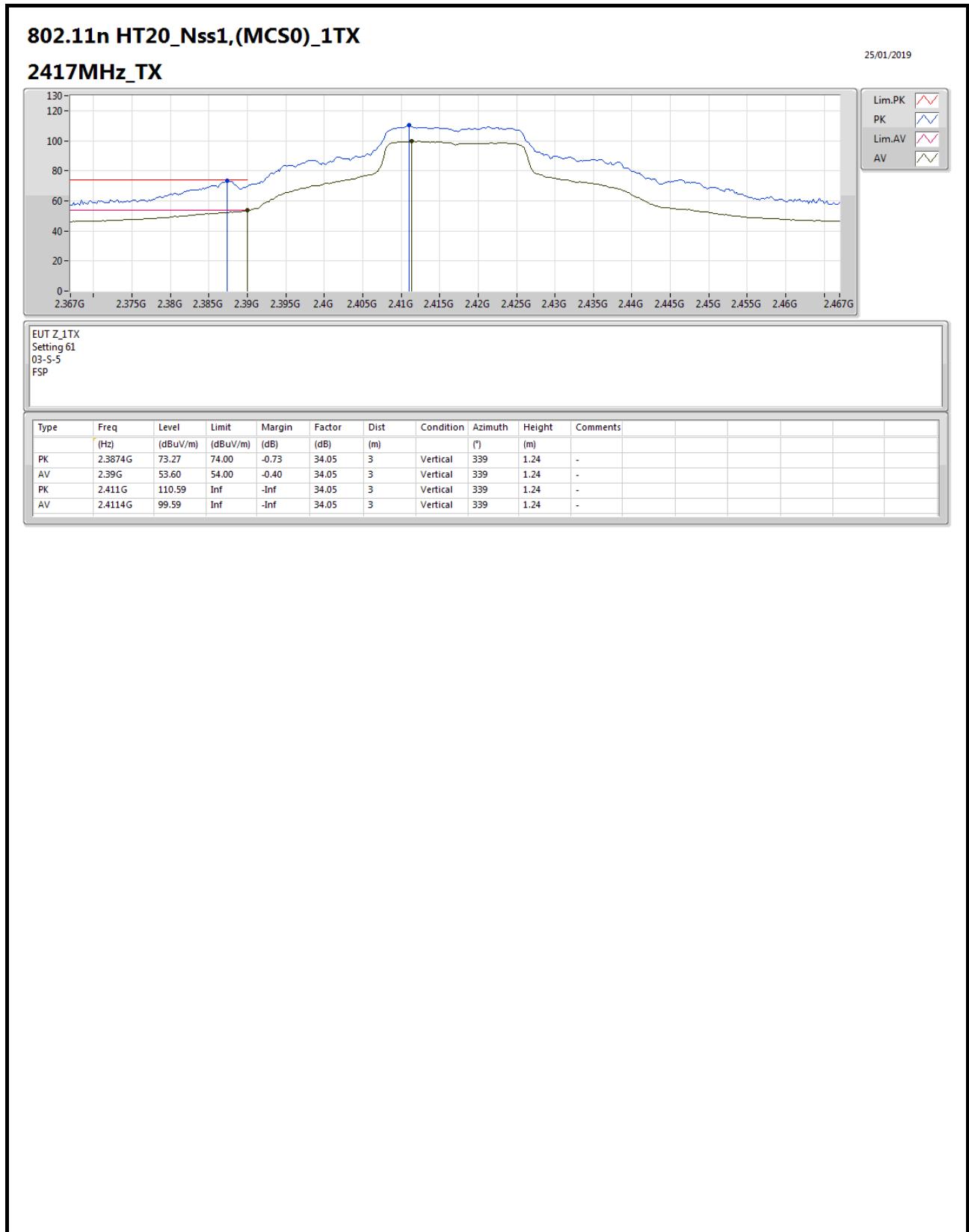
Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

25/01/2019

2412MHz_TX







RSE TX above 1GHz Result

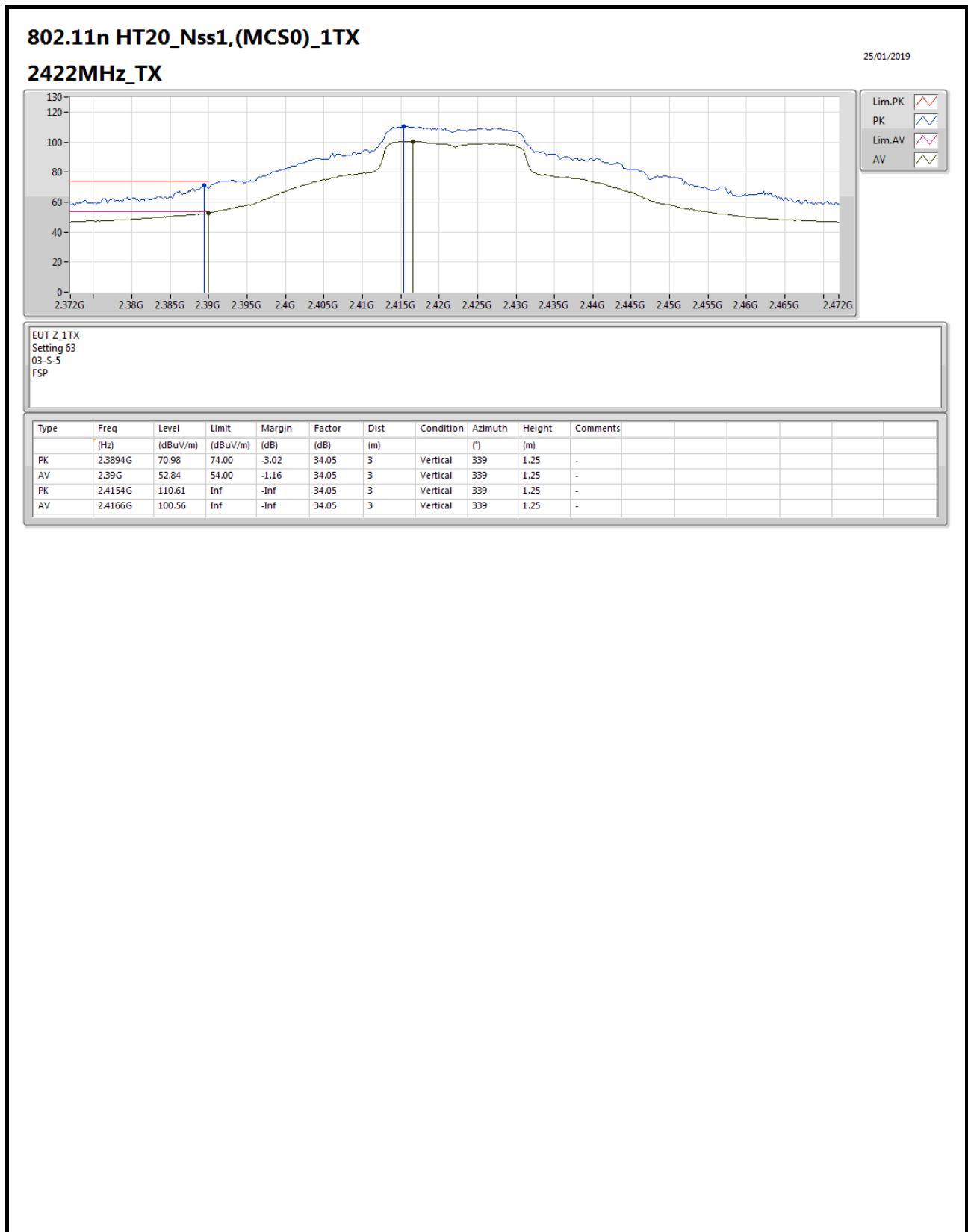
Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

25/01/2019

2417MHz_TX







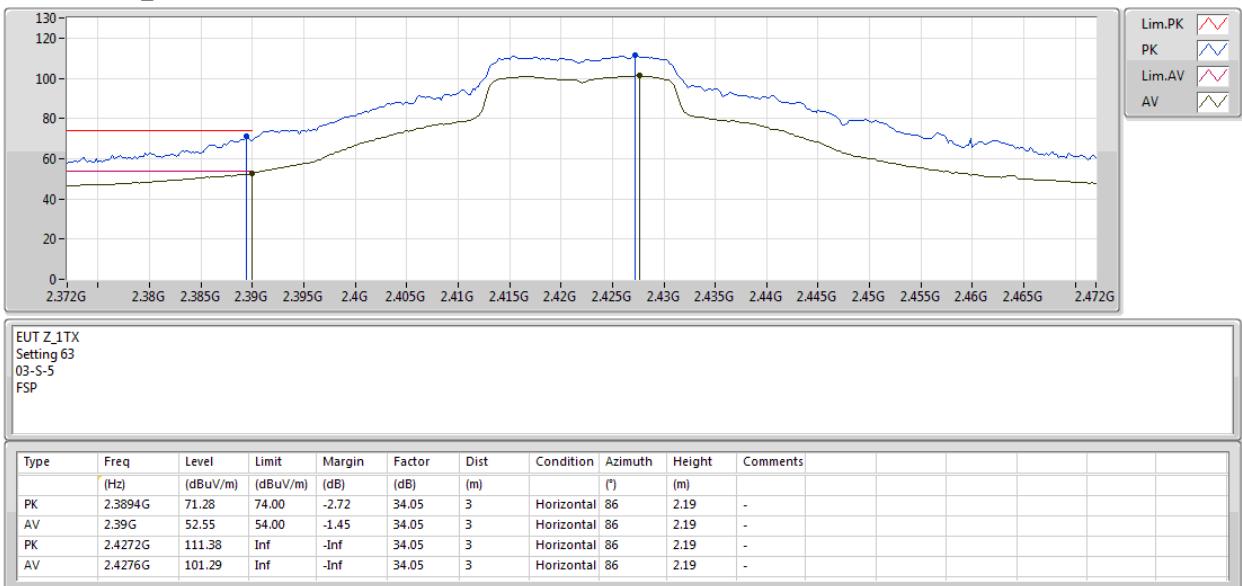
RSE TX above 1GHz Result

Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

25/01/2019

2422MHz_TX





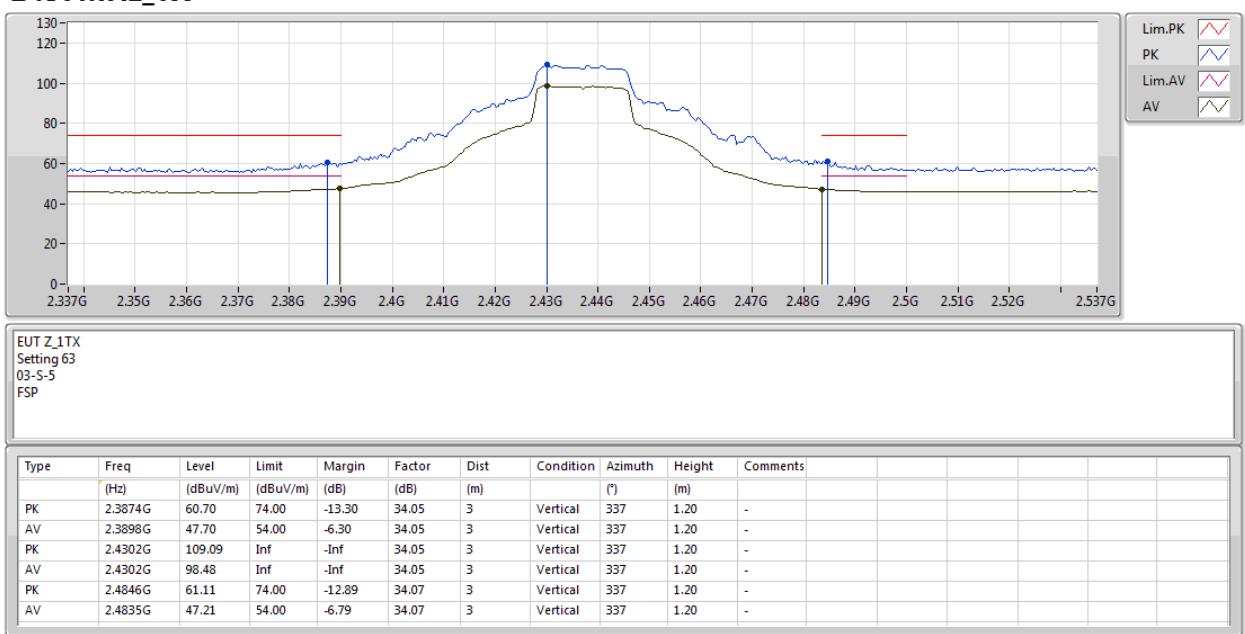
RSE TX above 1GHz Result

Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

24/01/2019

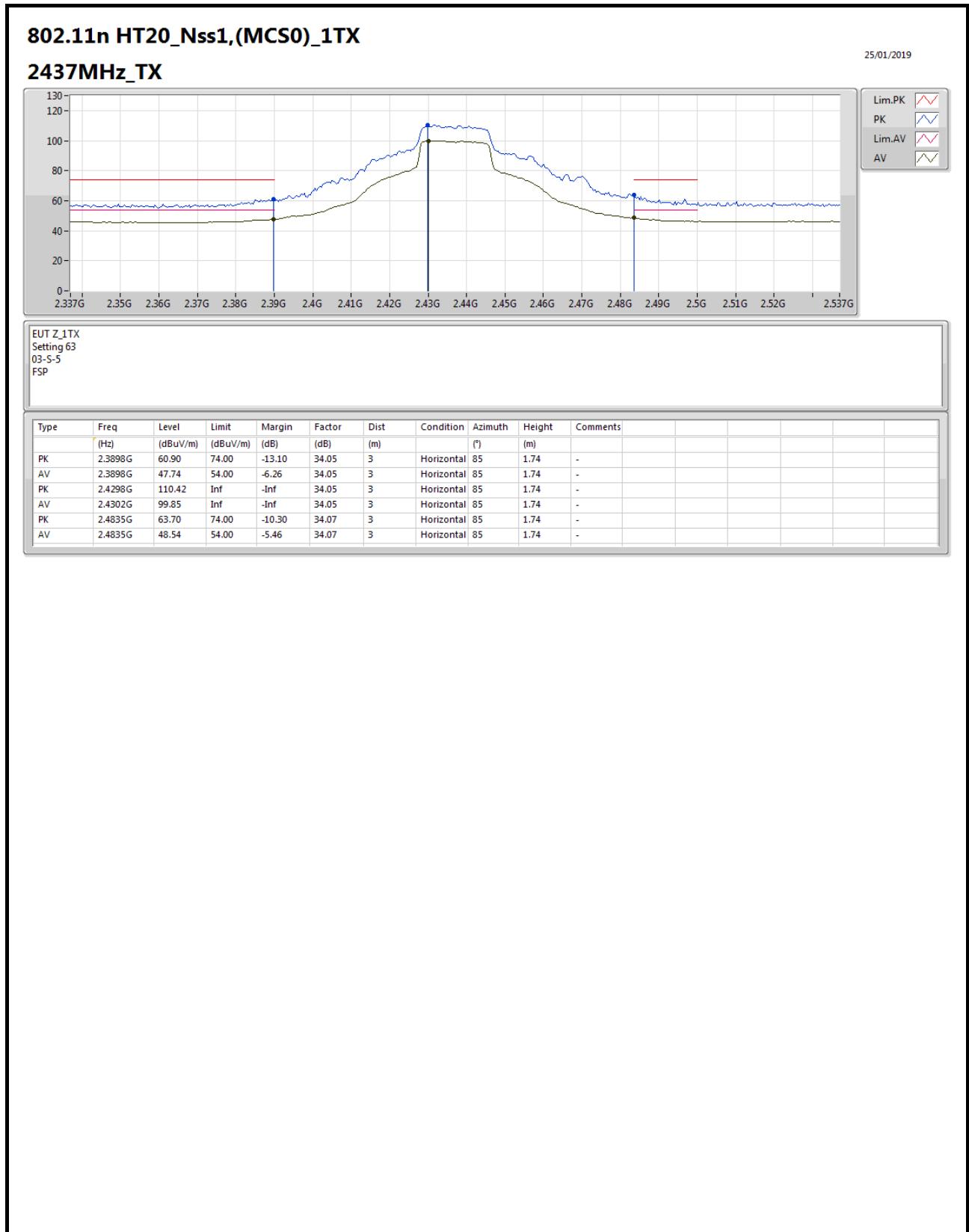
2437MHz_TX





RSE TX above 1GHz Result

Appendix F.2





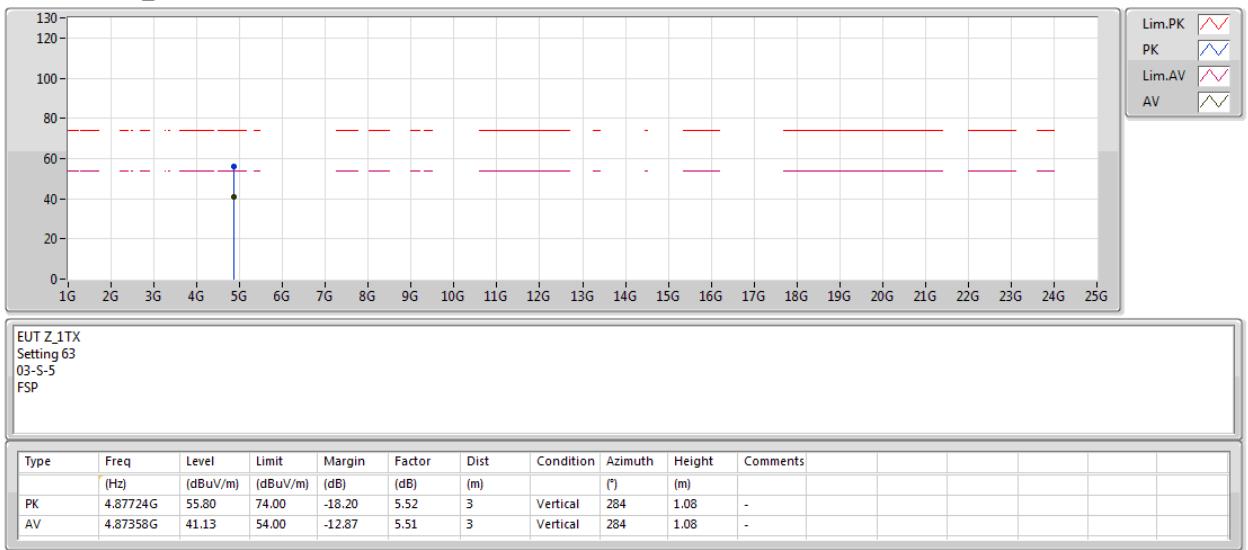
RSE TX above 1GHz Result

Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

25/01/2019

2437MHz_TX





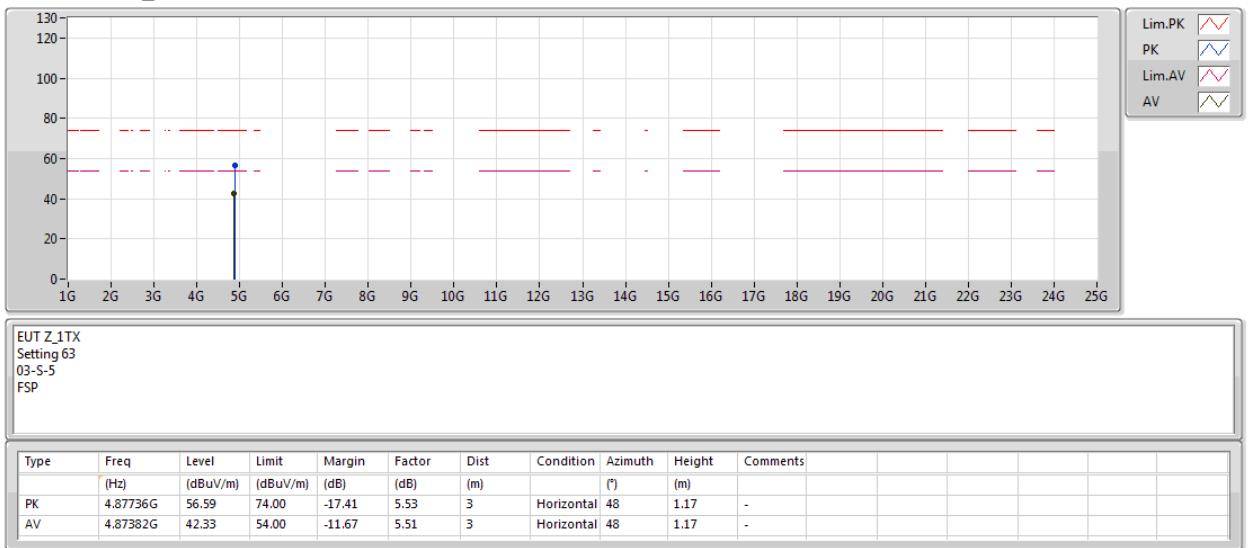
RSE TX above 1GHz Result

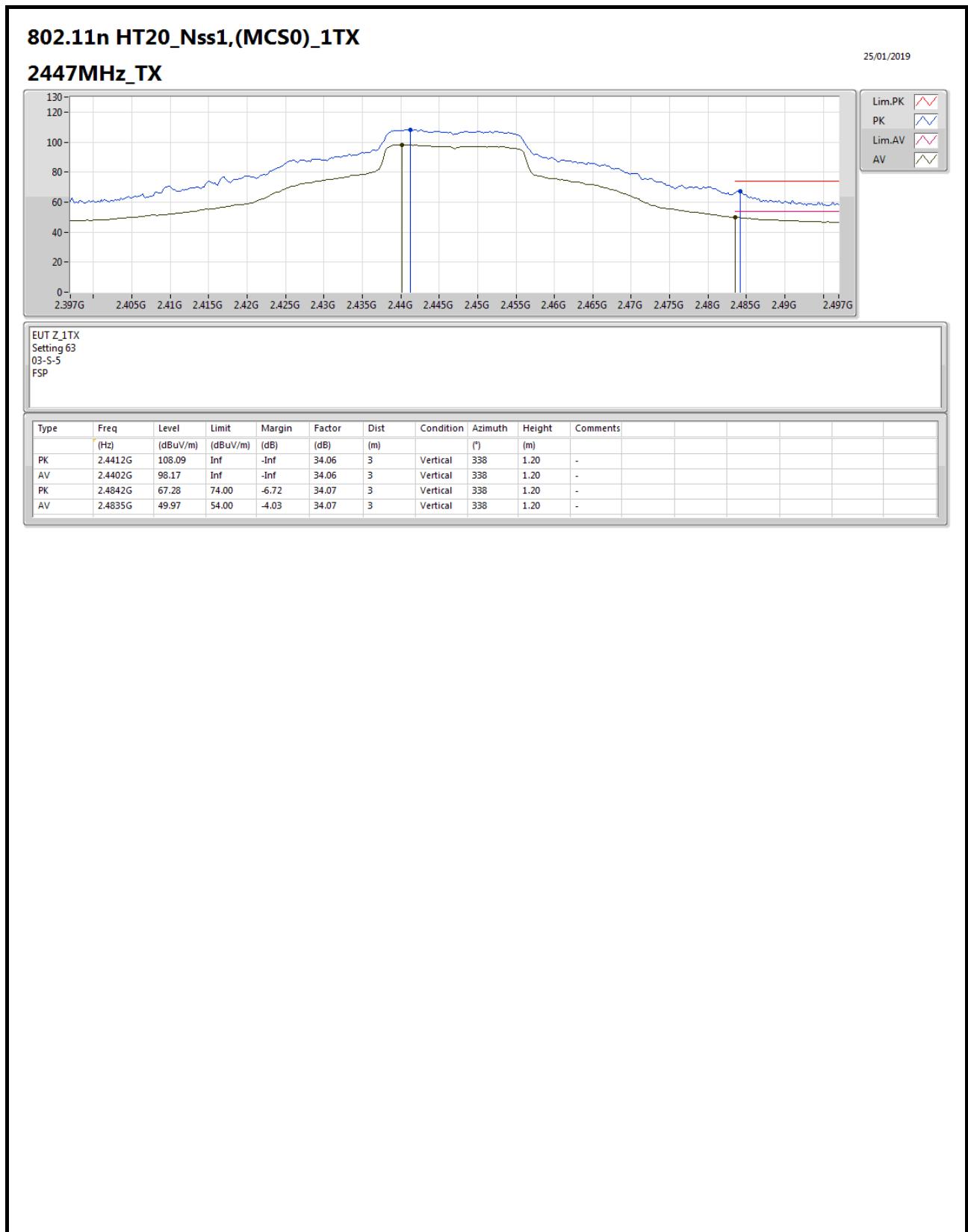
Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

25/01/2019

2437MHz_TX

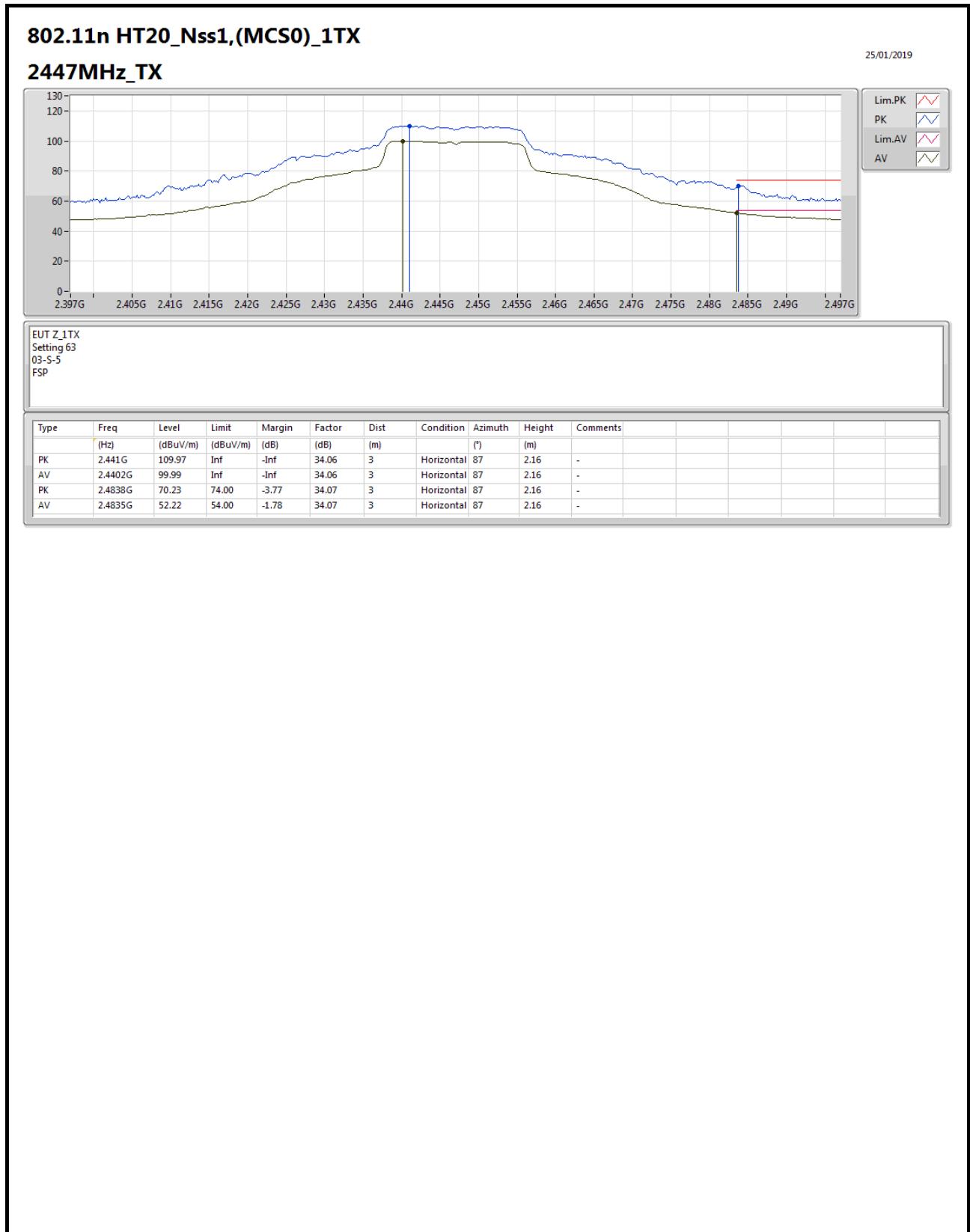


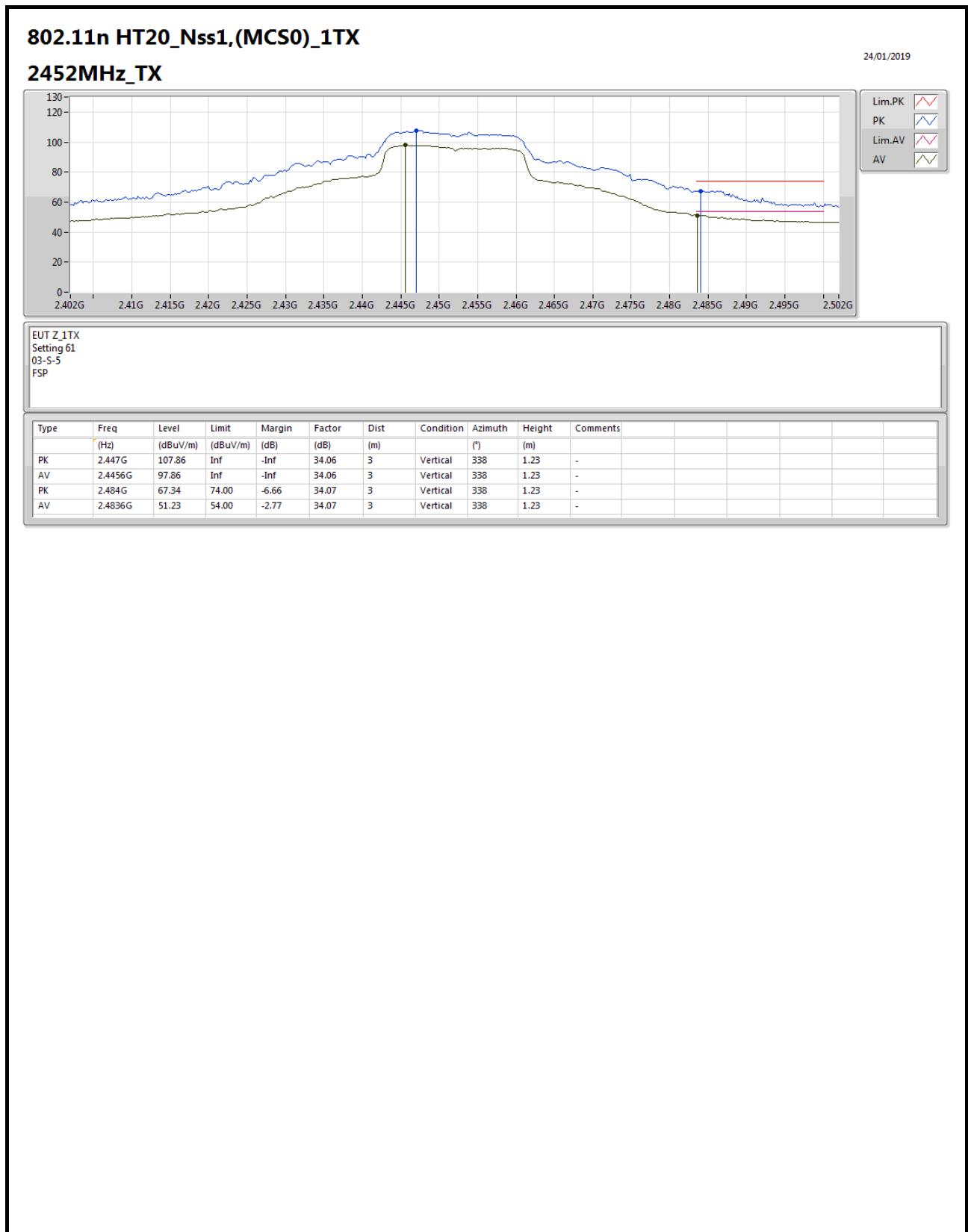




RSE TX above 1GHz Result

Appendix F.2

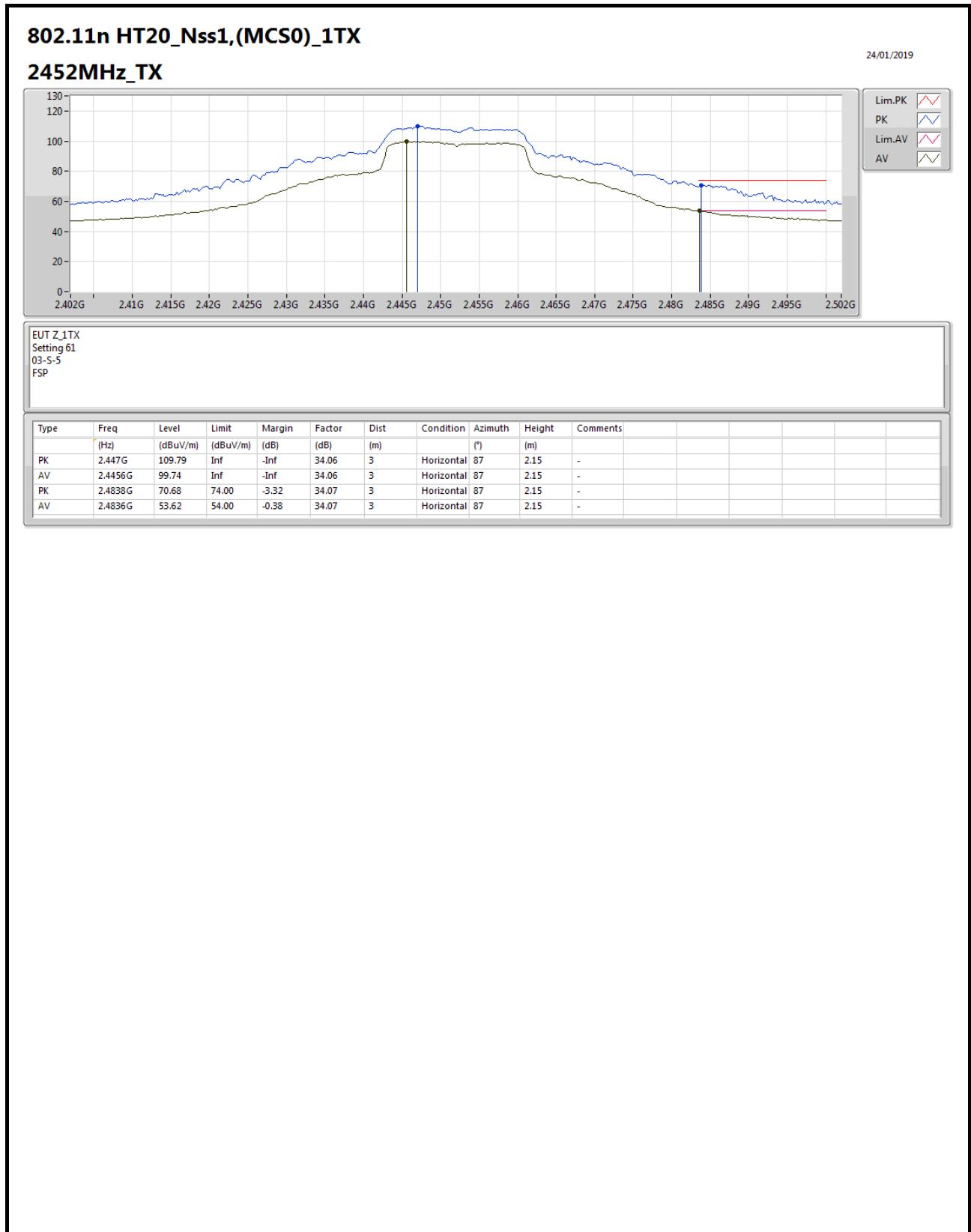






RSE TX above 1GHz Result

Appendix F.2





RSE TX above 1GHz Result

Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

24/01/2019

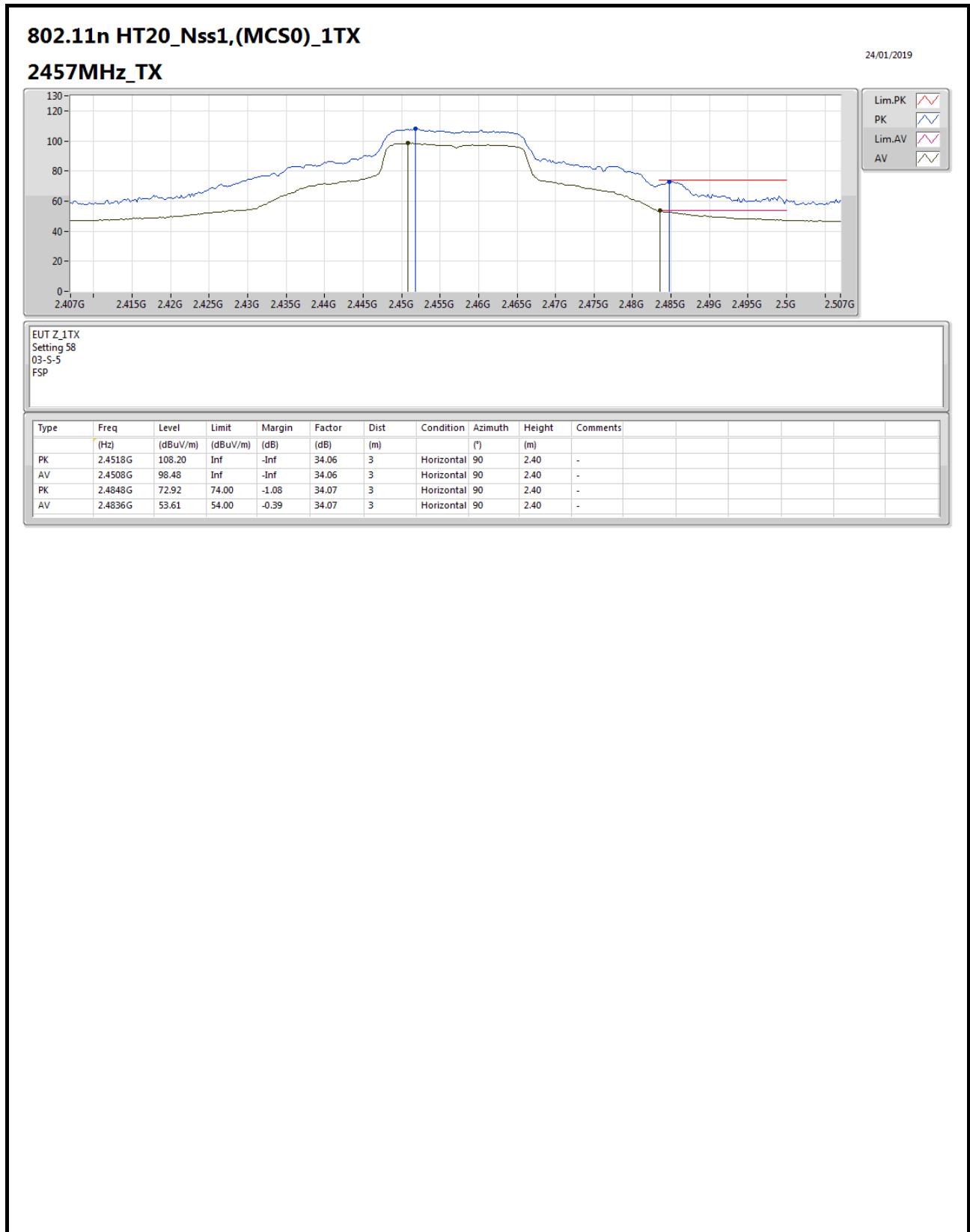
2457MHz_TX





RSE TX above 1GHz Result

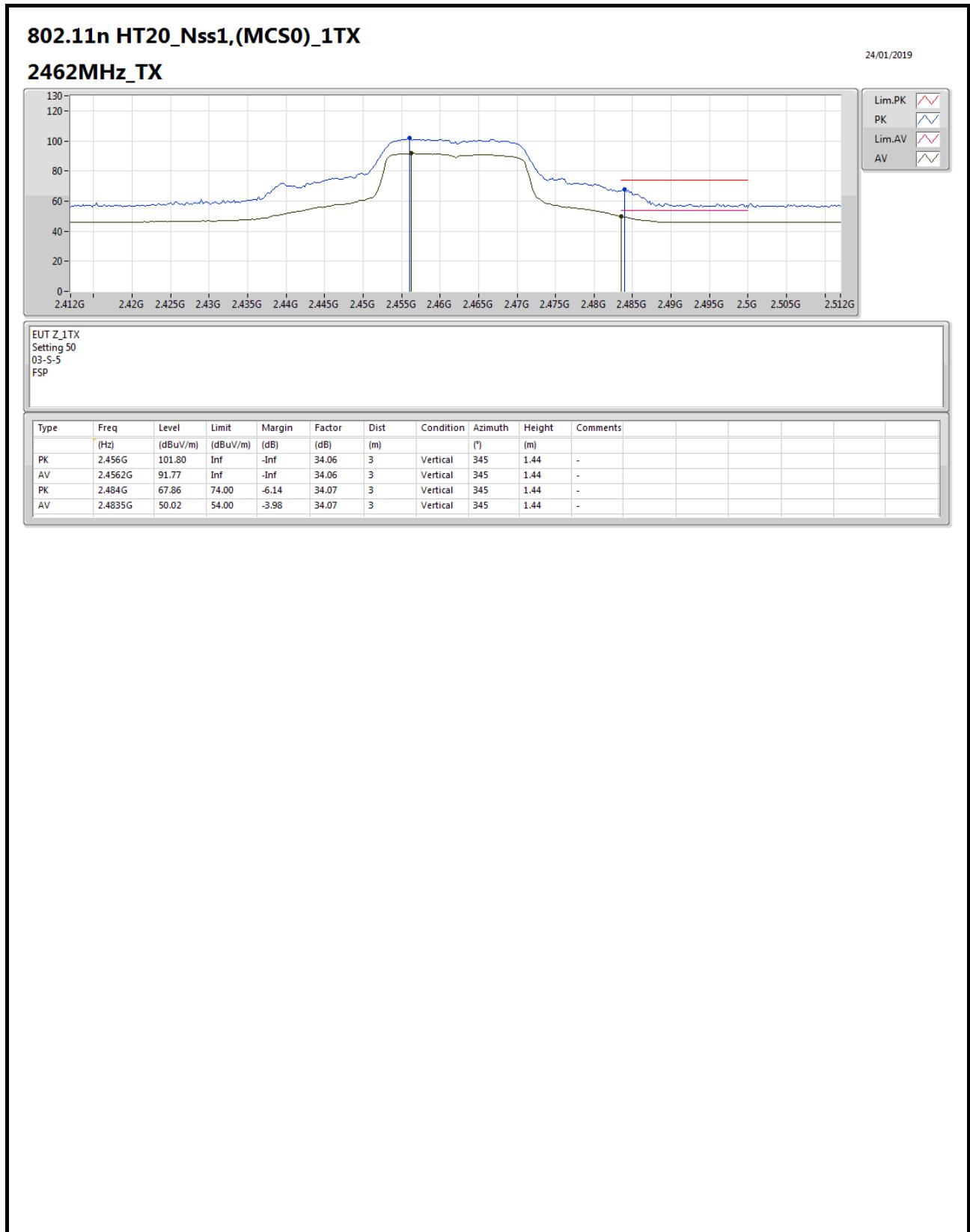
Appendix F.2





RSE TX above 1GHz Result

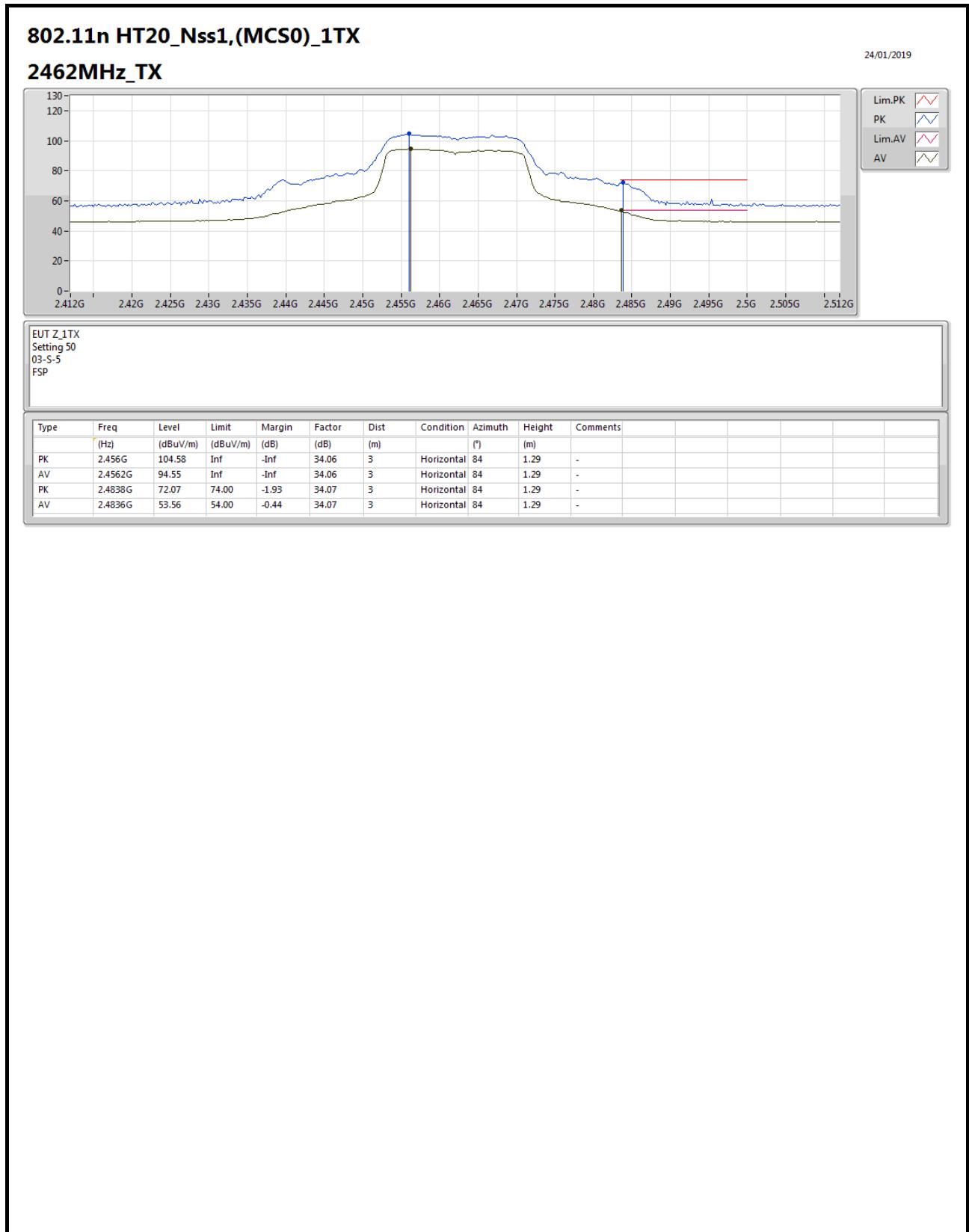
Appendix F.2





RSE TX above 1GHz Result

Appendix F.2





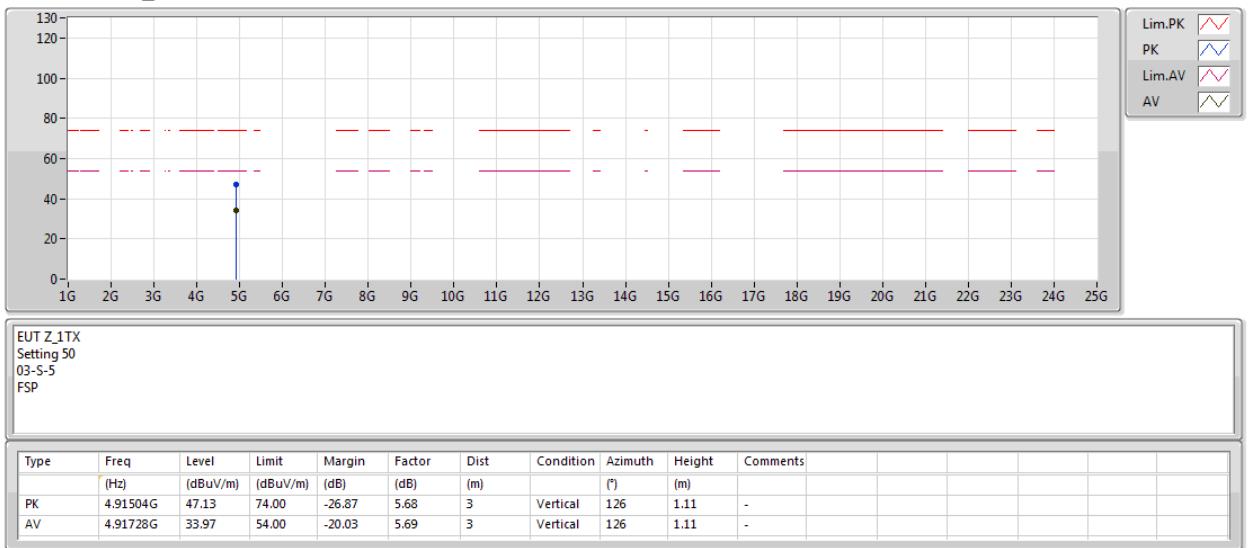
RSE TX above 1GHz Result

Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

25/01/2019

2462MHz_TX





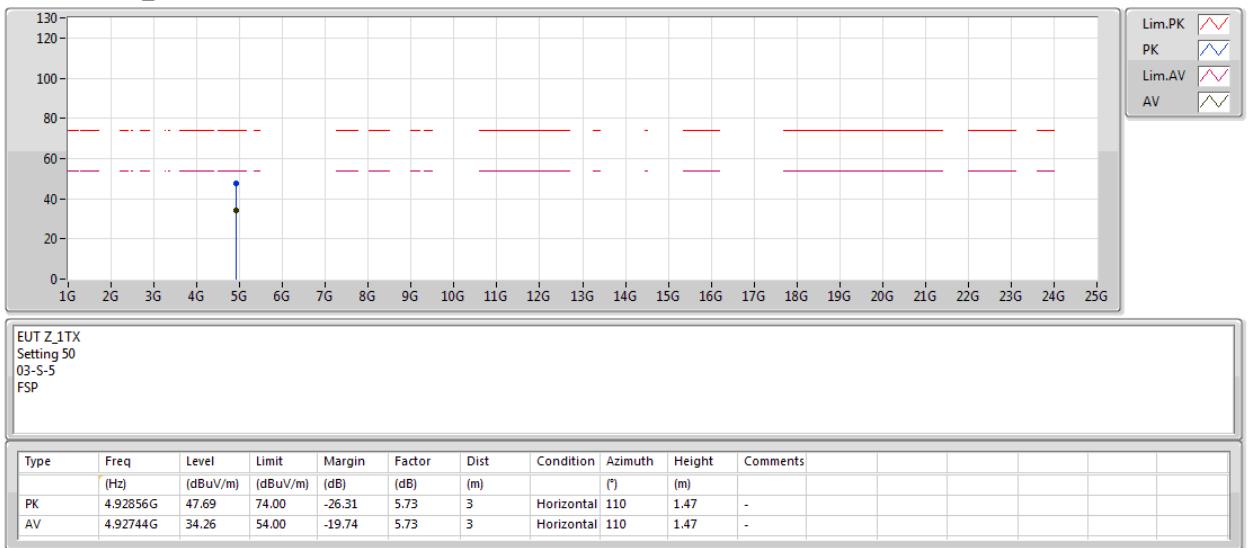
RSE TX above 1GHz Result

Appendix F.2

802.11n HT20_Nss1,(MCS0)_1TX

25/01/2019

2462MHz_TX





RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2422MHz_TX





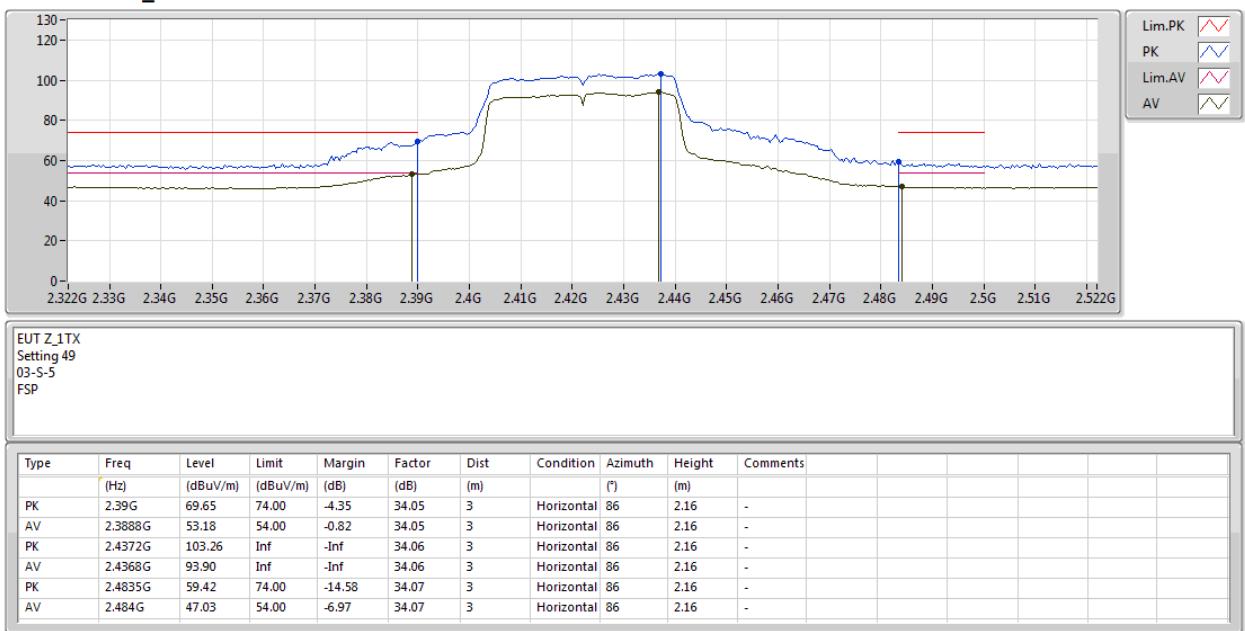
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2422MHz_TX





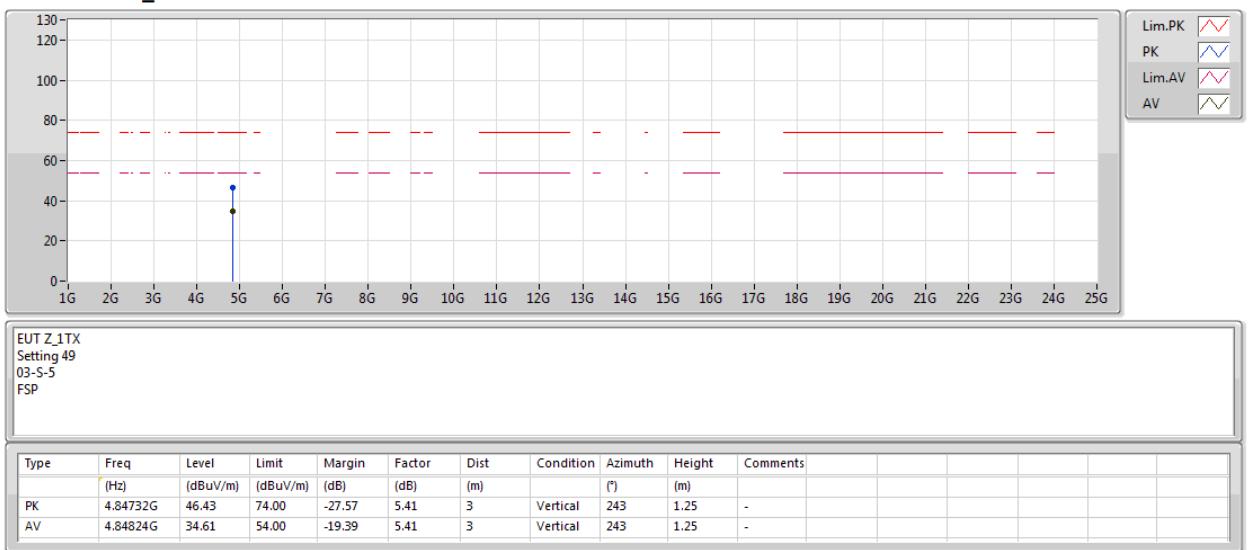
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2422MHz_TX





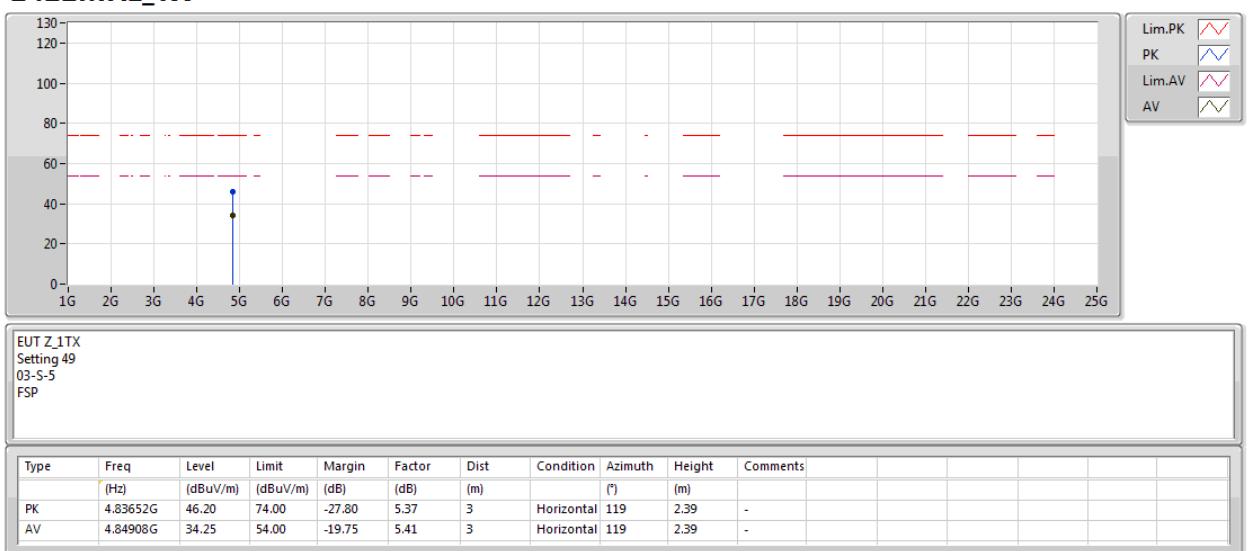
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2422MHz_TX





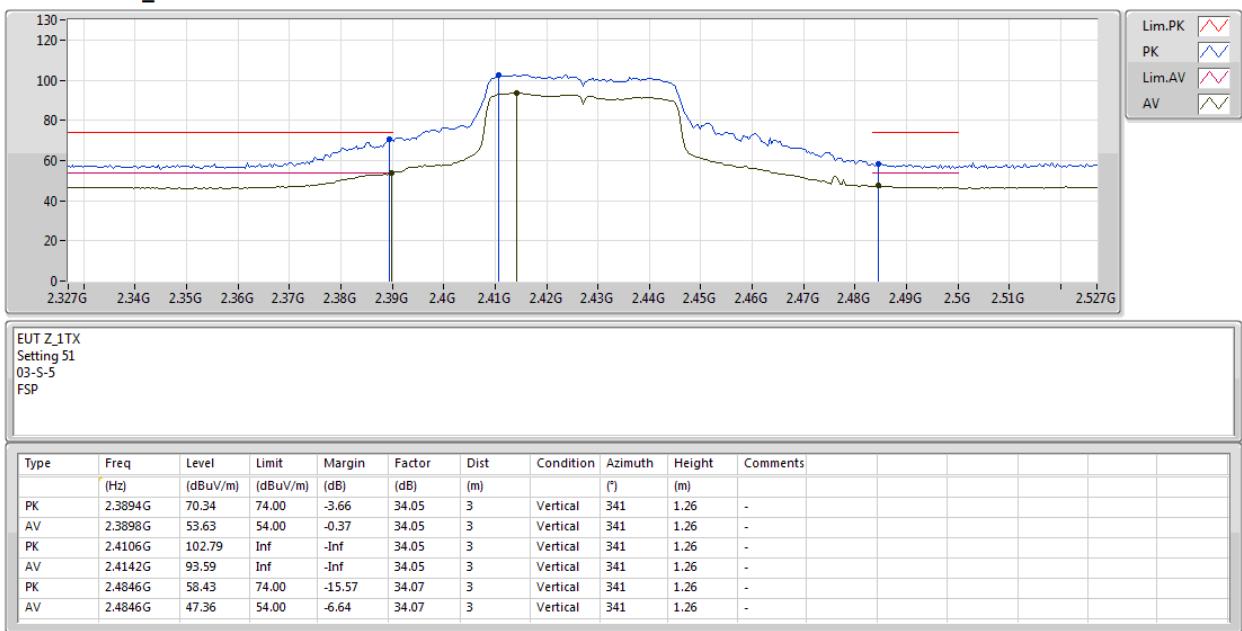
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

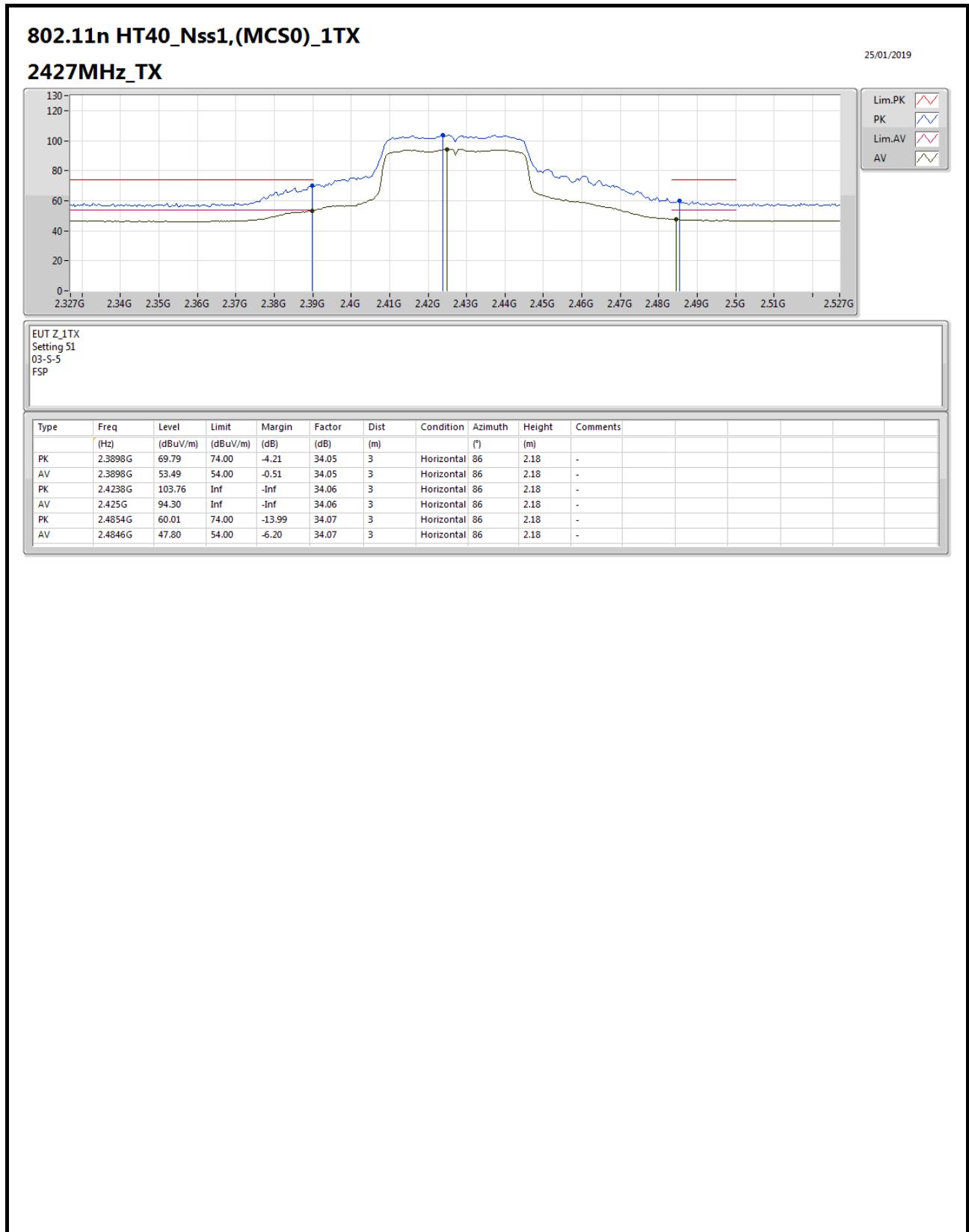
2427MHz_TX





RSE TX above 1GHz Result

Appendix F.2





RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2432MHz_TX





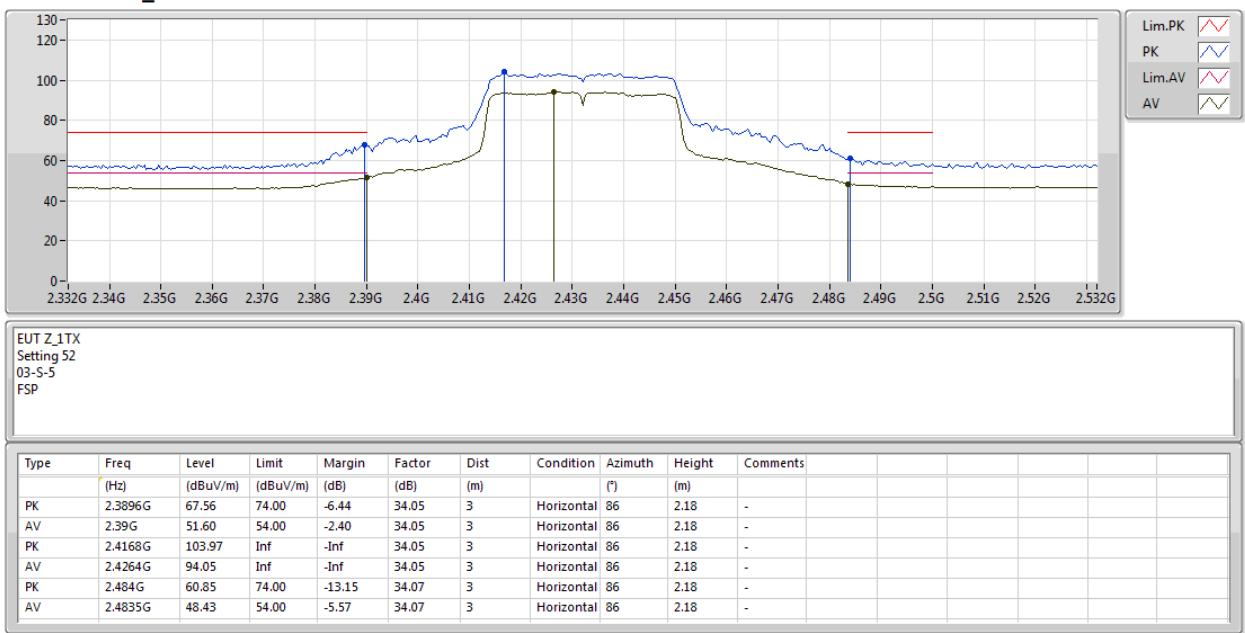
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

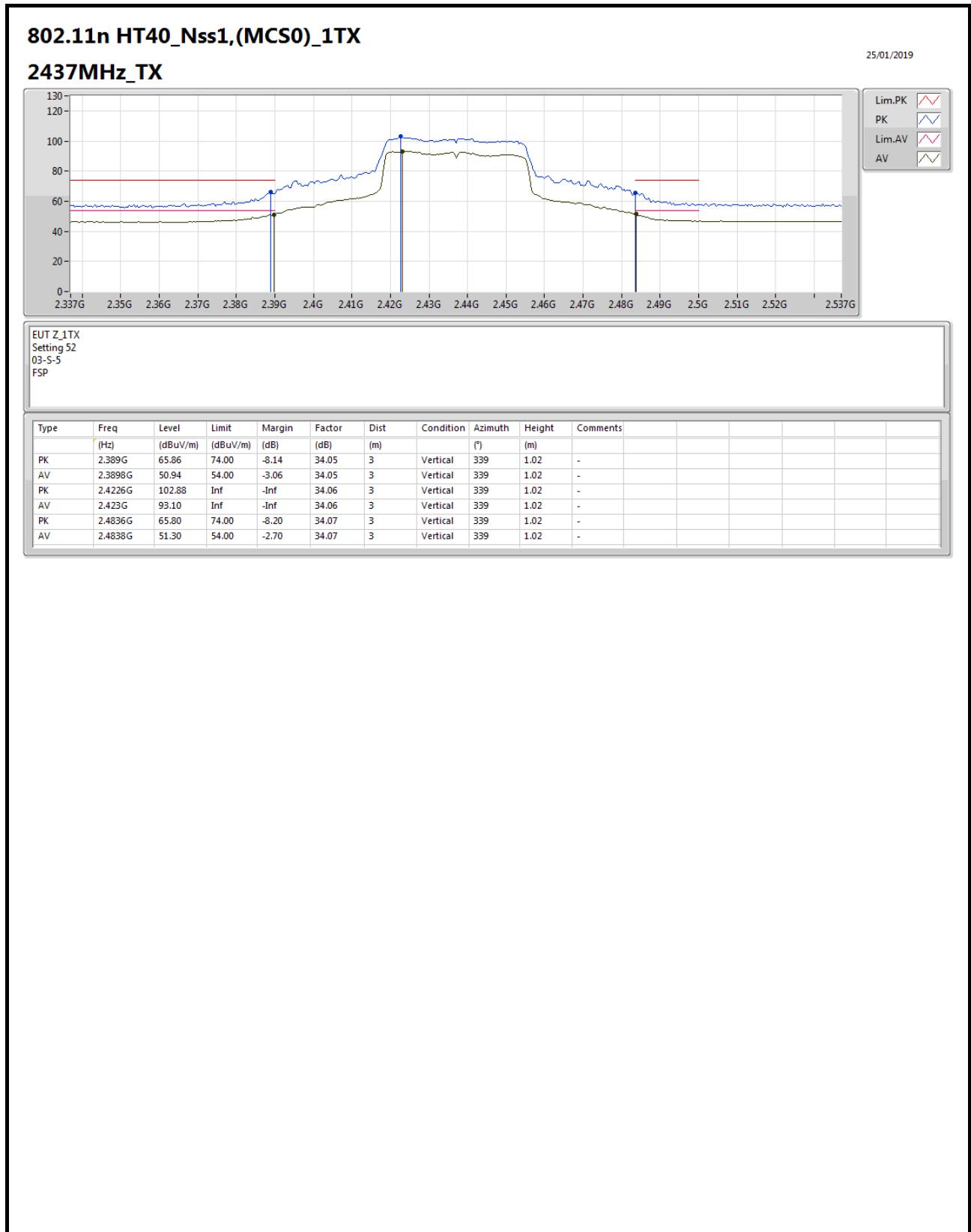
2432MHz_TX





RSE TX above 1GHz Result

Appendix F.2





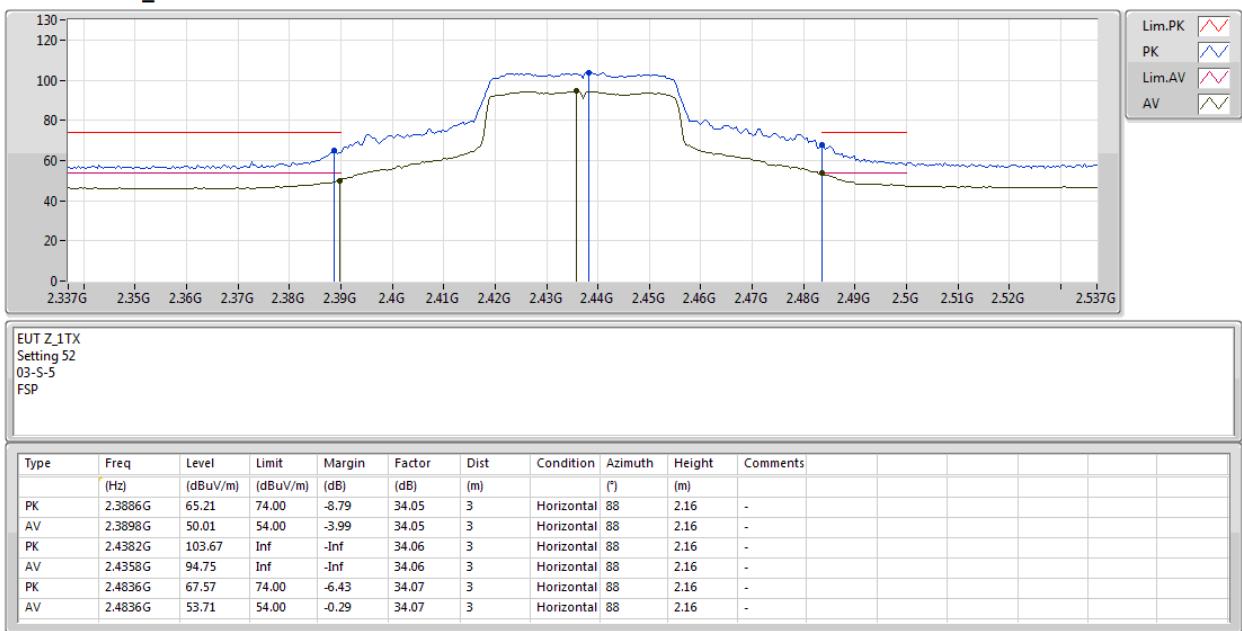
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2437MHz_TX





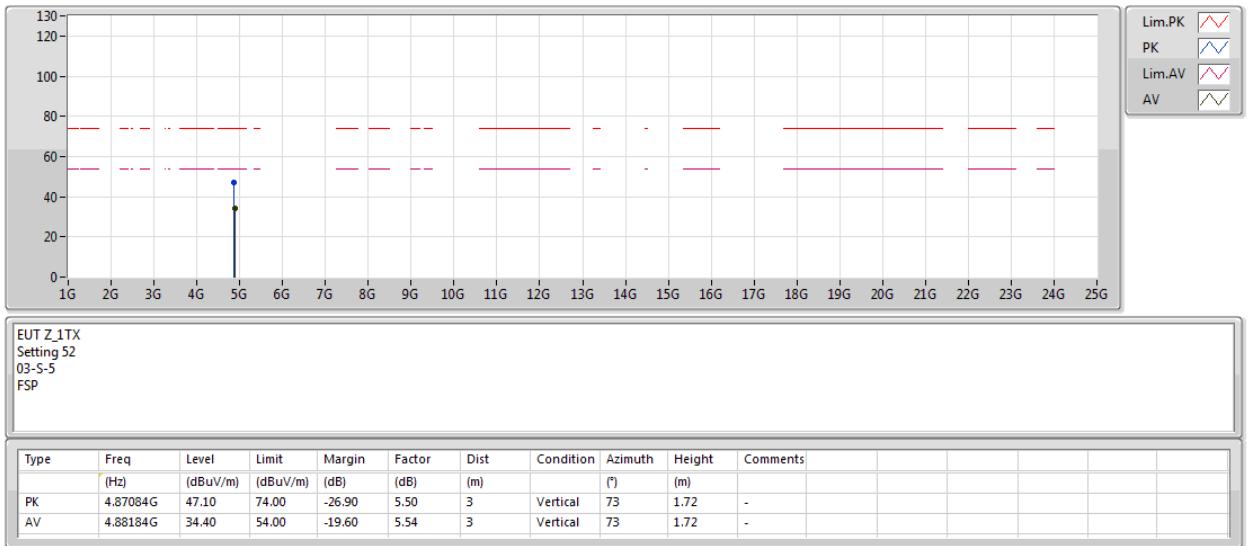
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2437MHz_TX





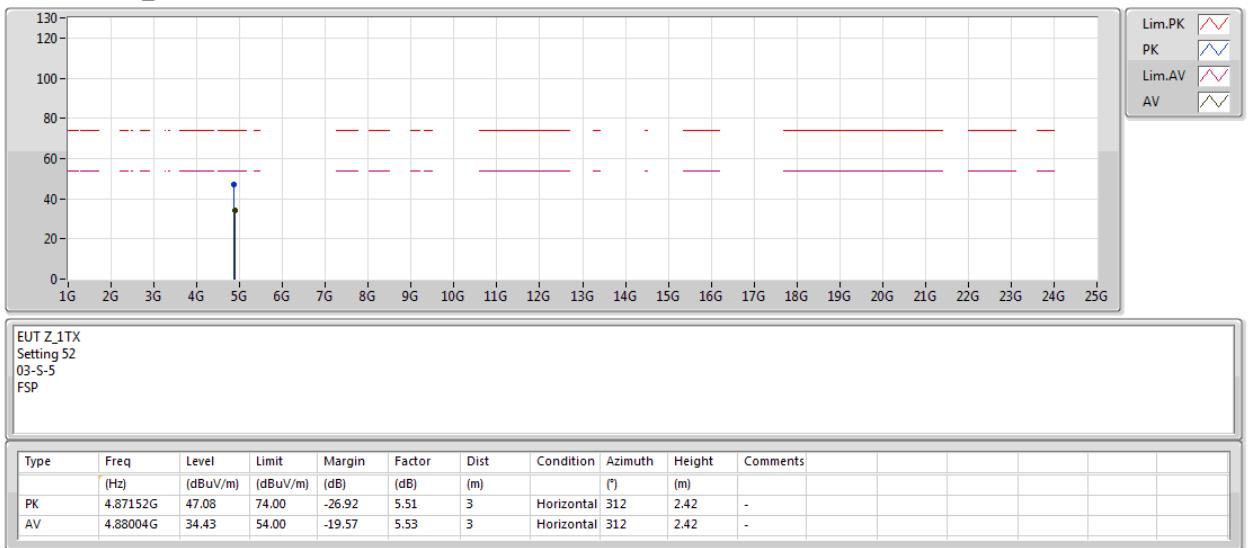
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2437MHz_TX





RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

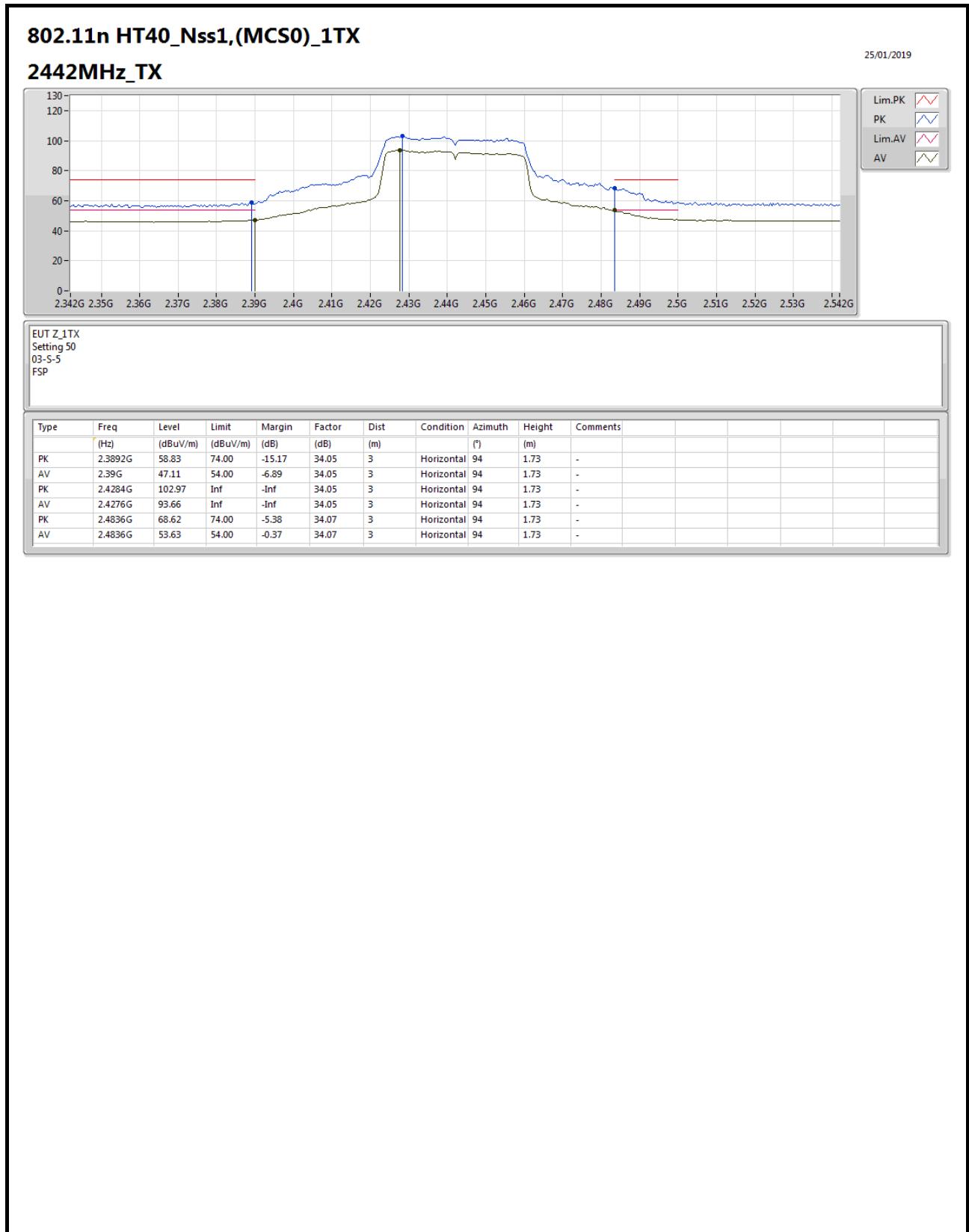
2442MHz_TX





RSE TX above 1GHz Result

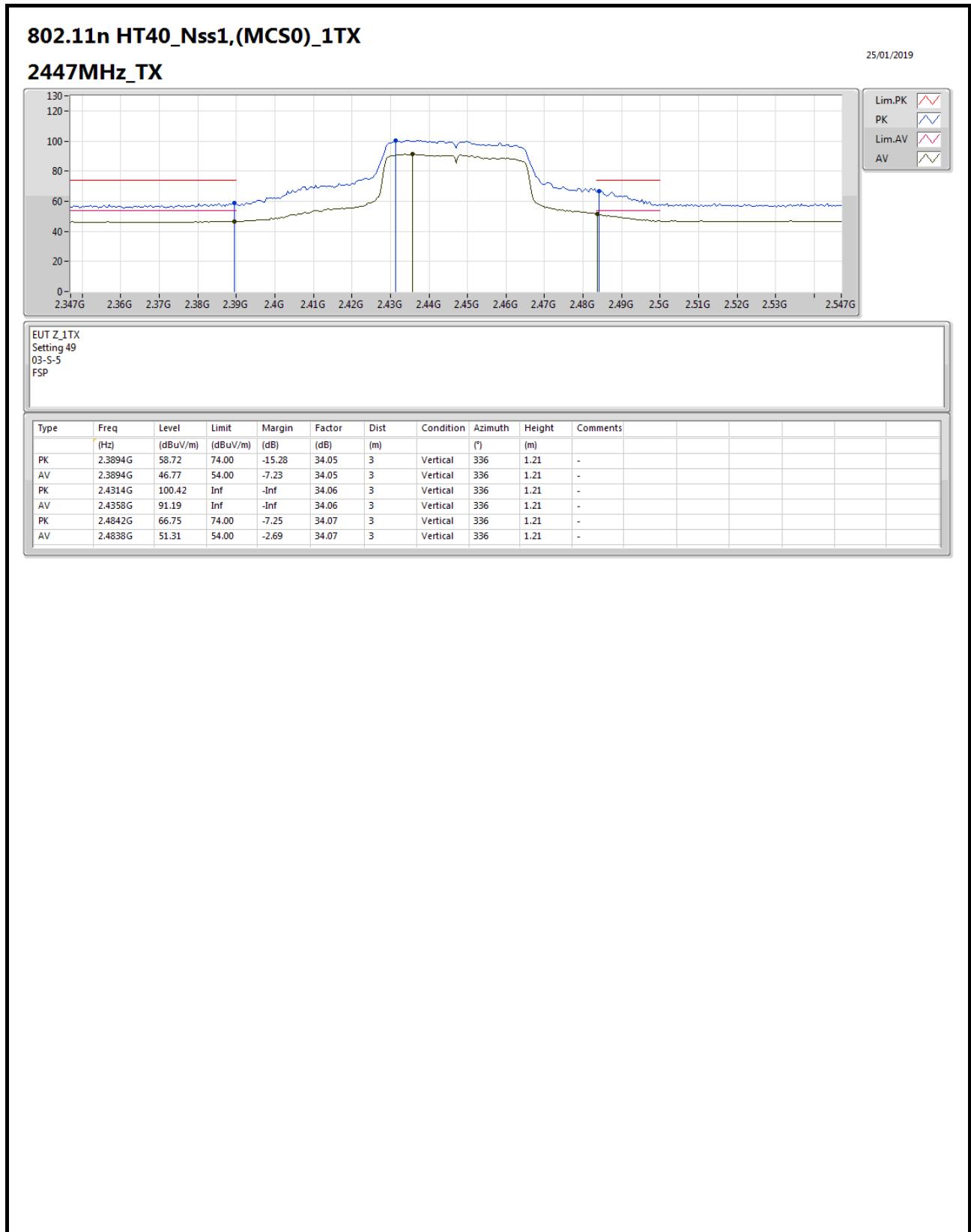
Appendix F.2





RSE TX above 1GHz Result

Appendix F.2





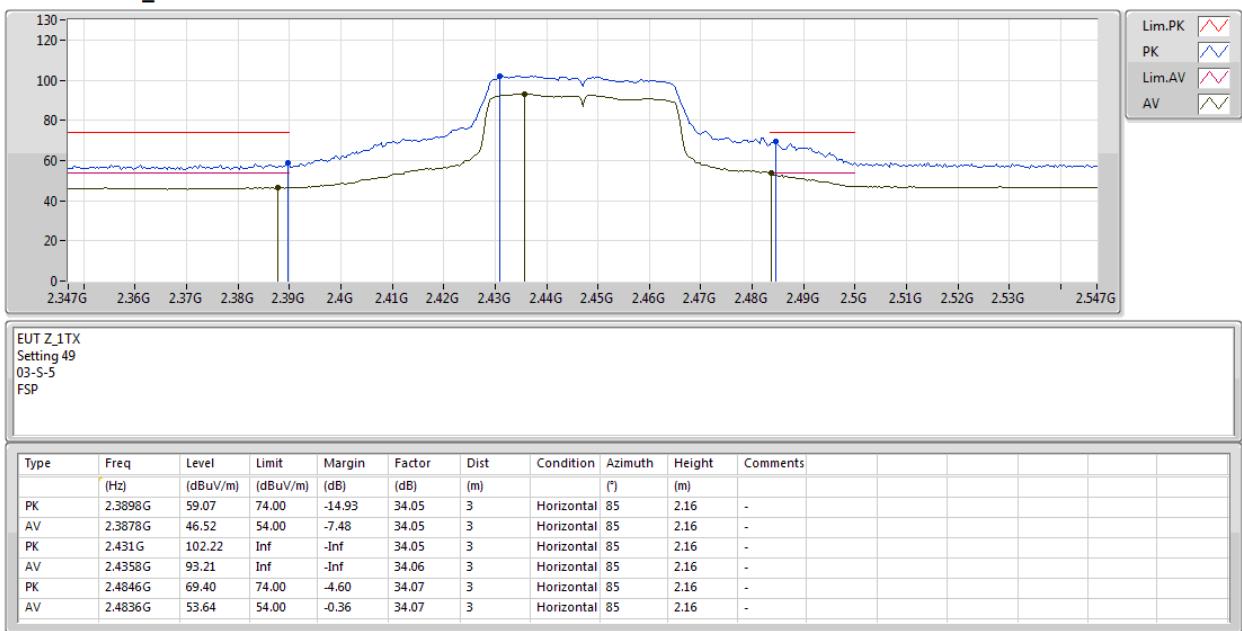
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2447MHz_TX





RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

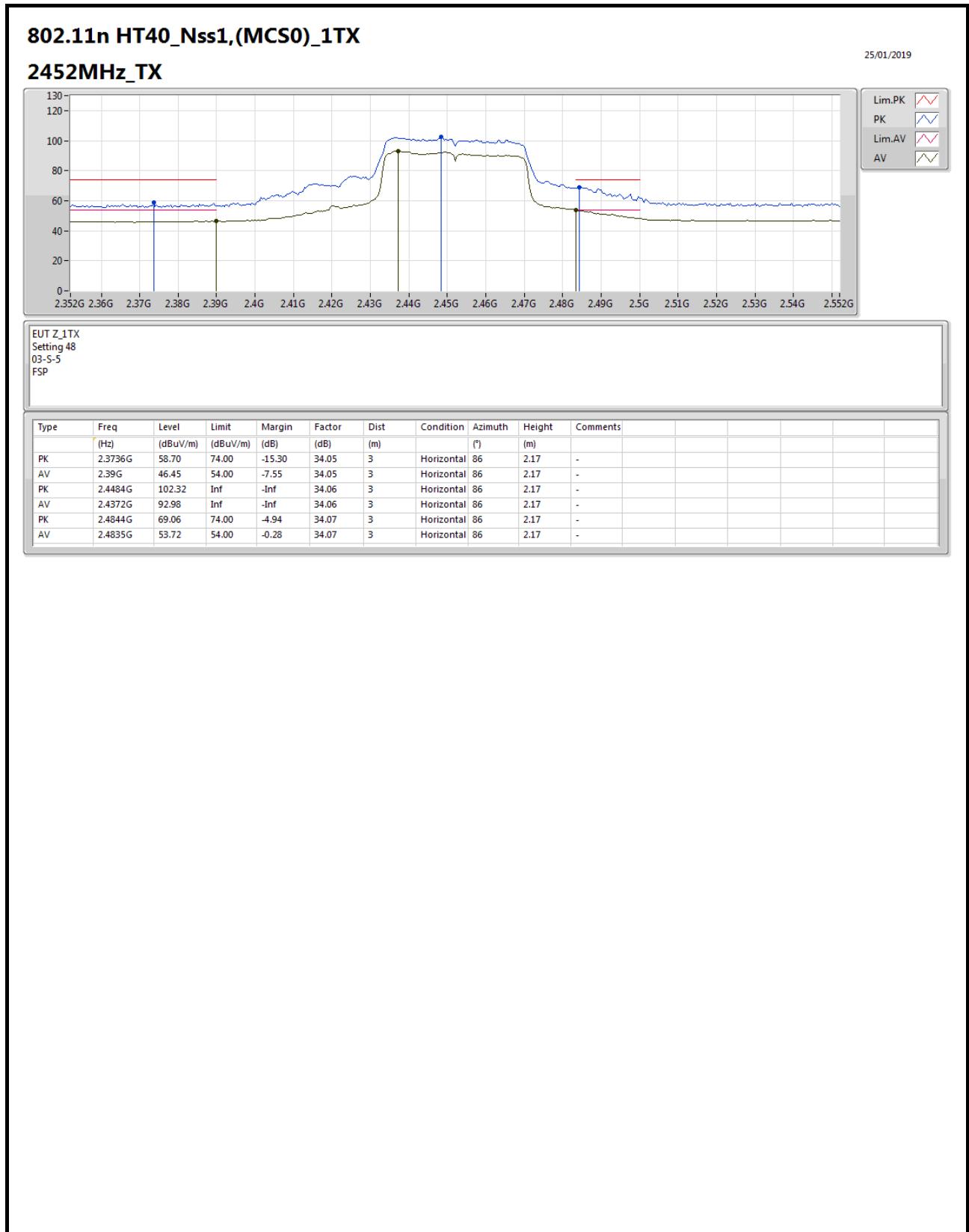
2452MHz_TX





RSE TX above 1GHz Result

Appendix F.2





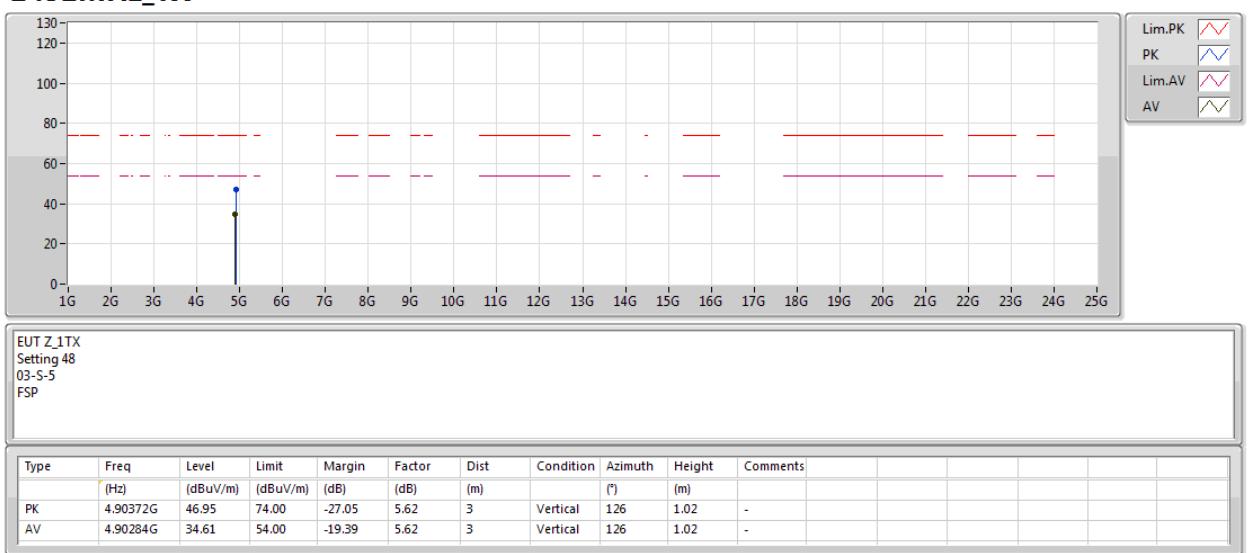
RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2452MHz_TX





RSE TX above 1GHz Result

Appendix F.2

802.11n HT40_Nss1,(MCS0)_1TX

25/01/2019

2452MHz_TX

