# FCC - TEST REPORT

| | | | | |
|---|---|---|---|---|
| Report Number | : | **709502507002-00B** | Date of Issue: | August 26, 2025 |

| | | |
|---|---|---|
| Model | : | IOP25, IOL25 |
| Product Type | : | Thermal Imaging Rifle Sight |
| Applicant | : | Infitac LLC |
| Address | : | 190 E Stacy Rd, Ste 306358, Allen, Texas 75002, United States |
| Manufacturer | : | Infitac LLC |
| Address | : | 190 E Stacy Rd, Ste 306358, Allen, Texas 75002, United States |

| | | |
|---|---|---|
| Test Result | : | ■ **Positive** ☐ **Negative** |
| Total pages including Appendices | : | 89 |

*TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.*

*TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch issued reports.*





TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

# 1 Table of Contents




TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

## 2 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue | Description of Change | Date of Issue |
|---|---|---|
| 709502507002-00B | First Issue | 08/26/2025 |

## 3 Details about the Test Laboratory

**Details about the Test Laboratory**
Test Site 1

| | |
|---|---|
| Company name: | TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch<br>No.16 Lane, 1951 Du Hui Road,<br>Shanghai 201108,<br>P.R. China |
| Telephone: | +86 21 6141 0123 |
| Fax: | +86 21 6140 8600 |
| FCC Registration No.: | 820234 |
| FCC Designation Number: | CN1183 |
| ISED CAB identifier | CN0101 |
| IC Registration No.: | 31668 |

# 4 Description of the Equipment under Test

| | |
|---|---|
| Product: | Thermal Imaging Rifle Sight |
| Model no.: | IOP25, IOL25 |
| FCC ID: | 2BRRE-IOTST1 |
| Options and accessories: | NA |
| Rating: | 5VDC by Type C<br>3.6VDC Max by internal battery |
| RF Transmission Frequency: | 802.11b/g/n-HT20: 2412~2462 MHz |
| No. of Operated Channel: | 11 for 802.11b/802.11g/802.11n(H20) |
| Modulation: | Direct Sequence Spread Spectrum (DSSS) for 802.11b<br>Orthogonal Frequency Division Multiplexing (OFDM) for 802.11g/n |
| Hardware Version: | V1_0 |
| Software Version: | V1.4.8 |
| Data speed: | 11b 1-11Mbps<br>11g 6-54Mbps<br>11n(HT20) 6.5-72.2Mbps |

Channel list:

| 802.11b/g/n(HT20) | | | |
|---|---|---|---|
| Ch | Fre(MHz) | Ch | Fre(MHz) |
| 1 | 2412 | 7 | 2442 |
| 2 | 2417 | 8 | 2447 |
| 3 | 2422 | 9 | 2452 |
| 4 | 2427 | 10 | 2457 |
| 5 | 2432 | 11 | 2462 |
| 6 | 2437 | | |

| | |
|---|---|
| Antenna Type: | BT FPC antenna |
| Antenna Gain: | 0.5 dBi |
| Description of the EUT: | The Equipment Under Test (EUT) is a Thermal Imaging Rifle Sight with Wi-Fi Module. The EUT support Wi-Fi operated at 2.4GHz. |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

| | |
|---|---|
| Test sample no.: | SHA-944366-3 (Radiated sample for IOP25)<br>SHA-944366-2 (Conducted sample)<br>SHA-949023-1 (Radiated sample for IOL25) |

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment, antenna gain or any information supplied.


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

# 5 Summary of Test Standards

| Test Standards | |
|---|---|
| FCC Part 15 Subpart C<br>10-1-2023 Edition | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators |

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10-2020.


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

# 6 Summary of Test Results

| Technical Requirements | | | | | | |
|---|---|---|---|---|---|---|
| **FCC Part 15 Subpart C** | | | | | | |
| Test Condition | | Pages | Test Site | Test Result | | |
| | | | | Pass | Fail | N/A |
| §15.207 | Conducted emission AC power port | 14-18 | Site 1 | ☒ | ☐ | ☐ |
| §15.247 (b) (3) | Conducted peak (average) output power | 19-24 | Site 1 | ☒ | ☐ | ☐ |
| §15.247(a)(1) | 20dB bandwidth and 99% Occupied Bandwidth | --- | --- | ☐ | ☐ | ☒ |
| §15.247(a)(1) | Carrier frequency separation | --- | --- | ☐ | ☐ | ☒ |
| §15.247(a)(1)(iii) | Number of hopping frequencies | --- | --- | ☐ | ☐ | ☒ |
| §15.247(a)(1)(iii) | Dwell Time - Average Time of Occupancy | --- | --- | ☐ | ☐ | ☒ |
| §15.247(a)(2) | 6dB bandwidth and 99% Occupied Bandwidth | 25-31 | Site 1 | ☒ | ☐ | ☐ |
| §15.247(e) | Power spectral density | 32-35 | Site 1 | ☒ | ☐ | ☐ |
| §15.247(d) | Spurious RF conducted emissions | 36-48 | Site 1 | ☒ | ☐ | ☐ |
| §15.247(d) | Band edge | 49-53 | Site 1 | ☒ | ☐ | ☐ |
| §15.247(d) & §15.209 & §15.205 | Spurious radiated emissions for transmitter | 54-84 | Site 1 | ☒ | ☐ | ☐ |
| §15.203 | Antenna requirement | See note 1 | | ☒ | ☐ | ☐ |

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses a BT FPC antenna, which gain is 0.5 dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

# 7 General Remarks

**Remarks**

This submittal(s) (test report) is intended for FCC ID: 2BRRE-IOTST1, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

According to the client's declaration, the IOP25 have the same appearance and technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction, with IOL25. The differences of them are as follows: 1.model name 2. detector resolution 3. memory stick speed. The main differences do not impact the RF Performance.
detailed model differences as below table.

| | IOP25 | IOL25 |
|---|---|---|
| detector resolution | 256*192 | 384*288 |
| memory stick | GDQ2BFAA-WQ:2666Mbps | GDQ2BFAA-WJ：3200Mbps |

After technical evaluation, we chose model IOP25 to only perform all tests and model IOL25 to perform "Spurious radiated emissions for transmitter (below 1GHz)" test.

We tested it and listed the worst data in this report.

**SUMMARY:**

All tests according to the regulations cited on page 6 were

■ - Performed

☐ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

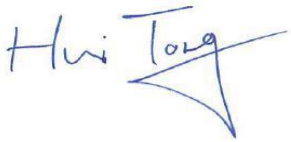
Sample Received Date: August 7, 2025

Testing Start Date: August 17, 2025

Testing End Date: August 23, 2025

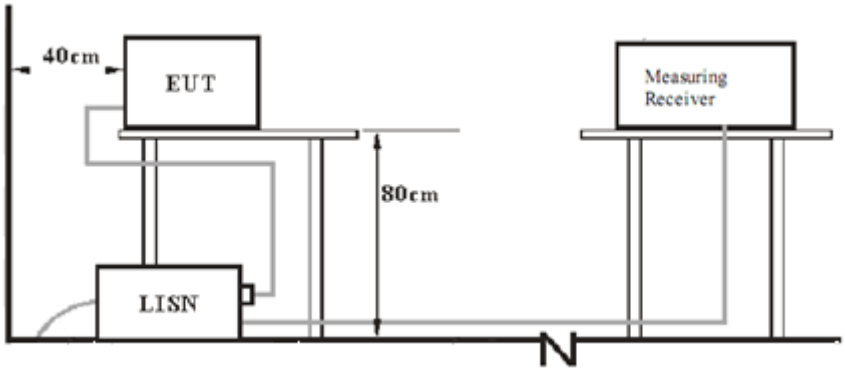
-TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

| Reviewed by: | Prepared by: | Tested by: |
|---|---|---|
|  |  |  |
| Hui TONG | Wenqiang LU | Chengjie GUO |
| Review Engineer | Project Engineer | Test Engineer |

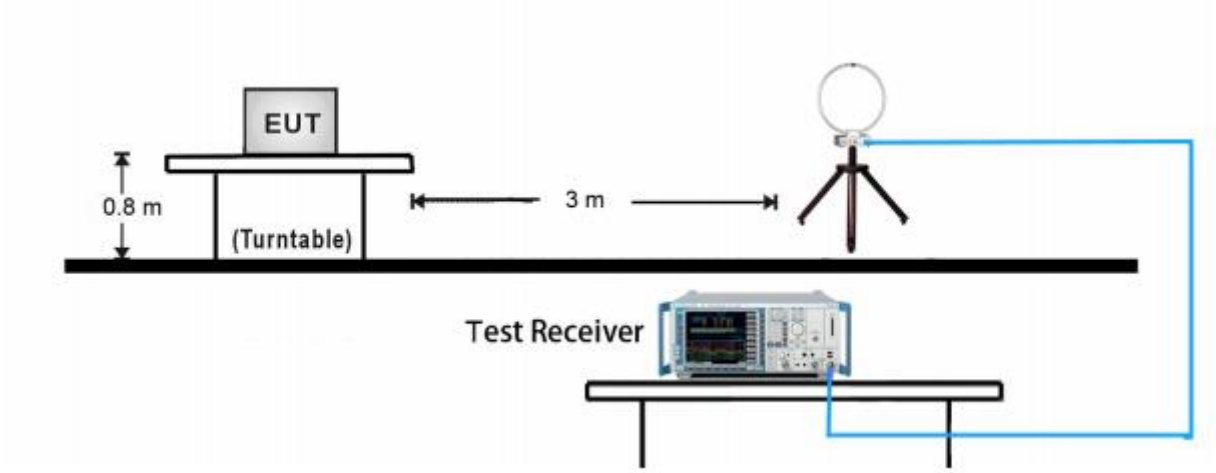
# 8 Test Setups

## 8.1 AC Power Line Conducted Emission test setups




## 8.2 Radiated test setups

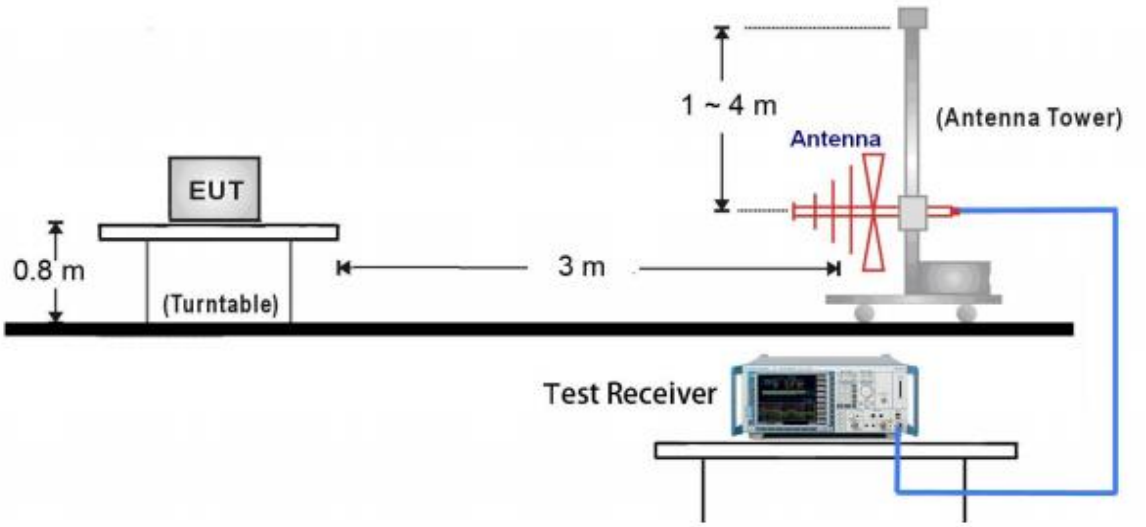
9kHz ~ 30MHz Test Setup:



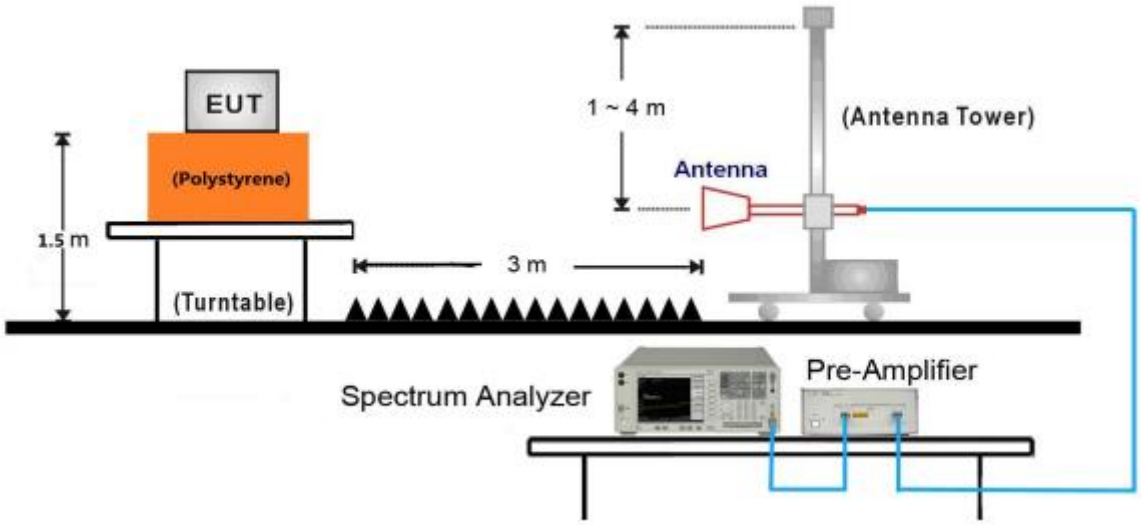


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

30MHz ~ 1GHz Test Setup:



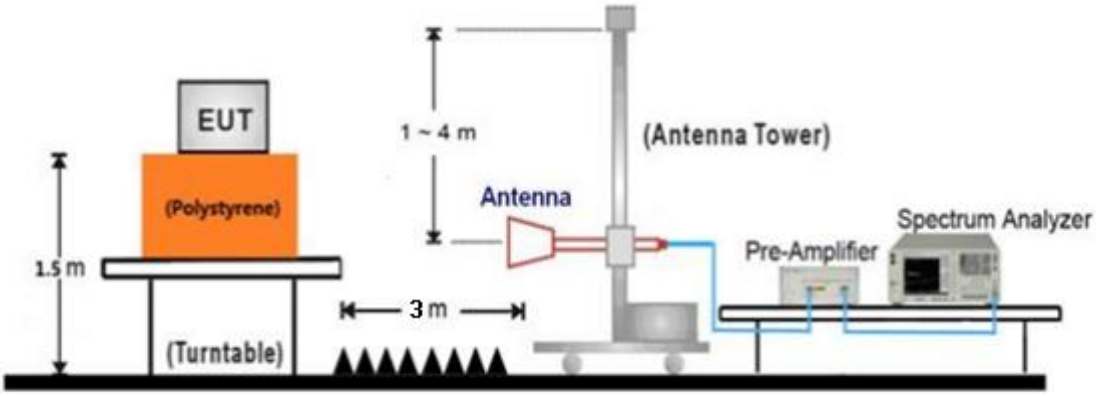

1GHz ~ 18GHz Test Setup:





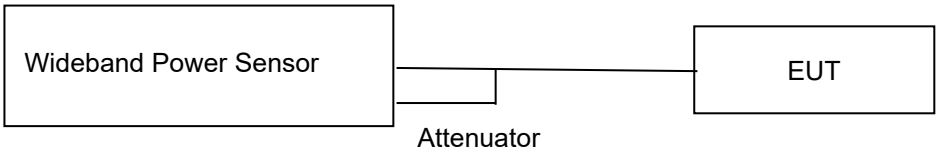
TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

18GHz ~ 25GHz Test Setup:

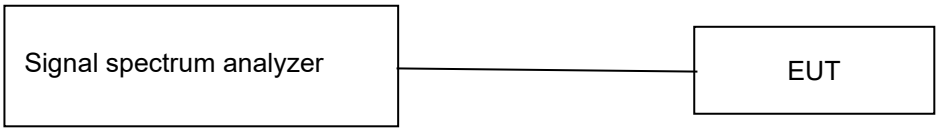



## 8.3 Conducted RF test setups

For Conducted peak output power




For other test items





TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

# 9 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH) |
|---|---|---|---|
| Notebook | Lenove | E470 | PF-OU5TS7 17/09 |

Transmitting mode:
1. Enable the IOT function of the device;
2. The device is connected to the PC via usb. On the PC end, you can see the storage disk marked with "IOP25".
3. Copy wl and fccce.sh to the cal directory;
4. 4. Restart the device, and it will be in the transmission mode
5. If you need to switch channels, simply rename the corresponding script in the TX fixed-frequency script folder to fccce.sh, copy it to the cal directory and then restart.

The system was configured to 802.11b/g/n-HT20 channel 1(2412MHz), 6(2437MHz), and 11(2462MHz).

Test Mode Applicability and Tested Channel Detail:

| Mode | Tested Channel | Data Rate (Mbps) | Modulation | Index Value (Power level setting) |
|---|---|---|---|---|
| 802.11b | 1 | 1 | CCK | default |
| | 6 | 1 | CCK | default |
| | 11 | 1 | CCK | default |
| 802.11g | 1 | 6 | OFDM | default |
| | 6 | 6 | OFDM | default |
| | 11 | 6 | OFDM | default |
| 802.11n HT20 | 1 | MCS0 (6.5Mbps) | OFDM | default |
| | 6 | MCS0 (6.5Mbps) | OFDM | default |
| | 11 | MCS0 (6.5Mbps) | OFDM | default |

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power.


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

# 10 Technical Requirement

## 10.1 Conducted Emission

**Test Method**

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. An EMI test receiver is used to test the emissions from both sides of AC line

**Limit**

According to §15.207, conducted emissions limit as below:

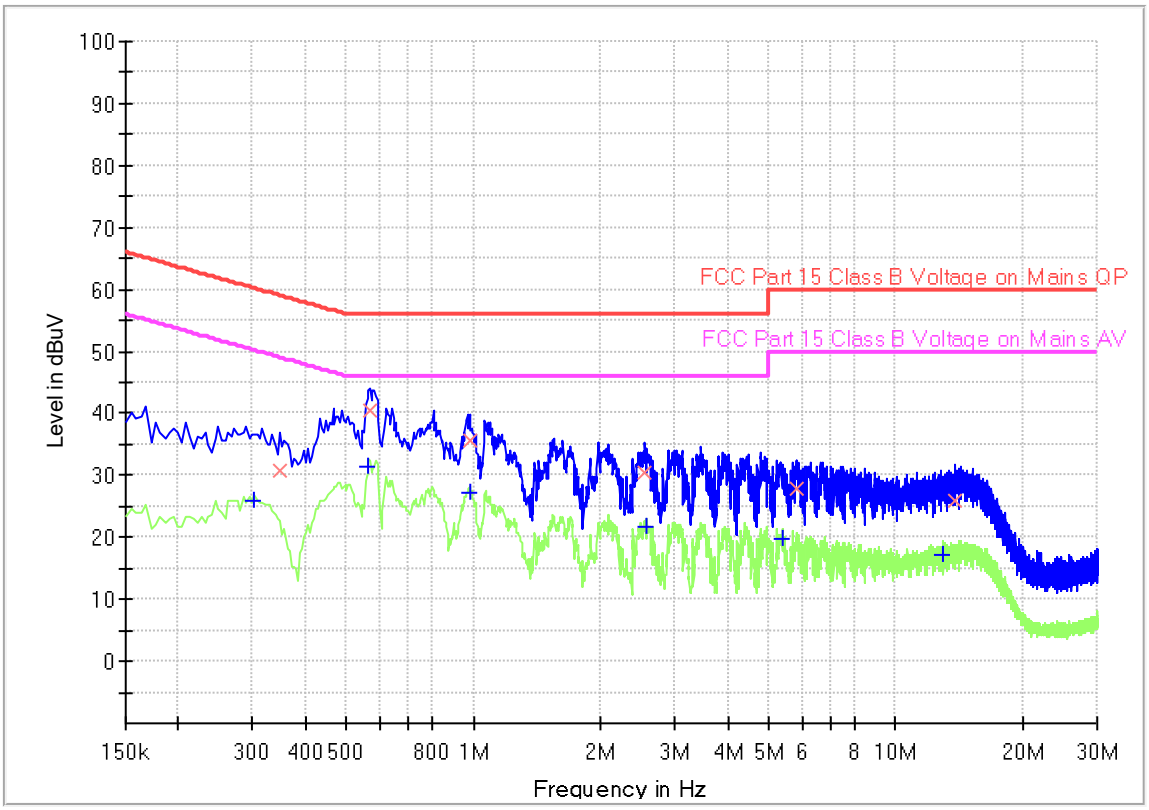
| Frequency MHz | QP Limit dBµV | AV Limit dBµV |
|---|---|---|
| 0.150-0.500 | 66-56* | 56-46* |
| 0.500-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreasing linearly with logarithm of the frequency


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

## Conducted Emission

| | | |
|---|---|---|
| Product Type | : | Thermal Imaging Rifle Sight |
| M/N | : | IOP25 |
| Operating Condition | : | Transmit mode, 802.11g Tx_2462MHz (worst case) |
| Test Specification | : | L-line |
| Comment | : | 120V~, 60Hz |



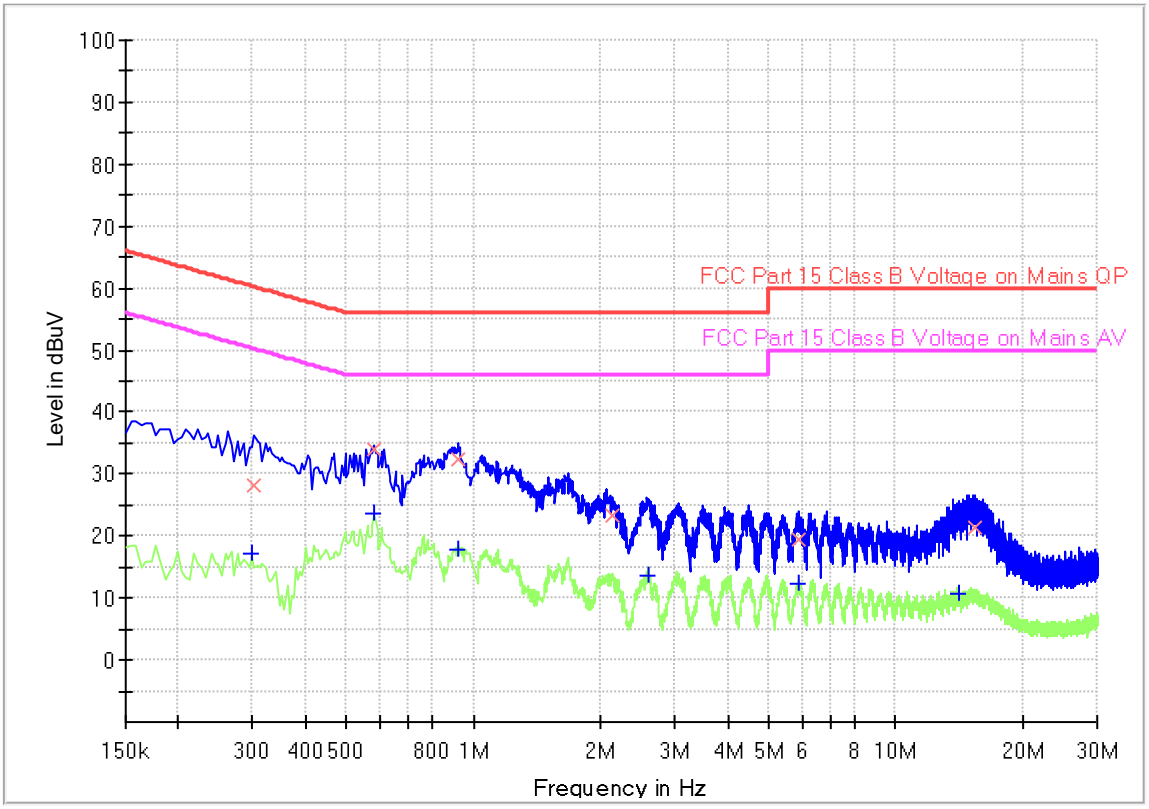

# Final_Result

| Frequency (MHz) | QuasiPeak (dBuV) | Average (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.303000 | --- | 26.04 | 50.16 | 24.12 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.348000 | 30.90 | --- | 59.01 | 28.11 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.564000 | --- | 31.26 | 46.00 | 14.74 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.568500 | 40.33 | --- | 56.00 | 15.67 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.978000 | 35.58 | --- | 56.00 | 20.42 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.982500 | --- | 27.17 | 46.00 | 18.83 | 1000.0 | 9.000 | L1 | 19.4 |
| 2.553000 | 30.59 | --- | 56.00 | 25.41 | 1000.0 | 9.000 | L1 | 19.4 |
| 2.562000 | --- | 21.84 | 46.00 | 24.16 | 1000.0 | 9.000 | L1 | 19.4 |
| 5.388000 | --- | 19.71 | 50.00 | 30.29 | 1000.0 | 9.000 | L1 | 19.5 |
| 5.833500 | 27.88 | --- | 60.00 | 32.12 | 1000.0 | 9.000 | L1 | 19.5 |
| 12.912000 | --- | 17.15 | 50.00 | 32.85 | 1000.0 | 9.000 | L1 | 19.7 |
| 13.825500 | 25.98 | --- | 60.00 | 34.02 | 1000.0 | 9.000 | L1 | 19.7 |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

| | | |
|---|---|---|
| Product Type | : | Thermal Imaging Rifle Sight |
| M/N | : | IOP25 |
| Operating Condition | : | Transmit mode, 802.11g Tx_2462MHz (worst case) |
| Test Specification | : | N-line |
| Comment | : | 120V~, 60Hz |



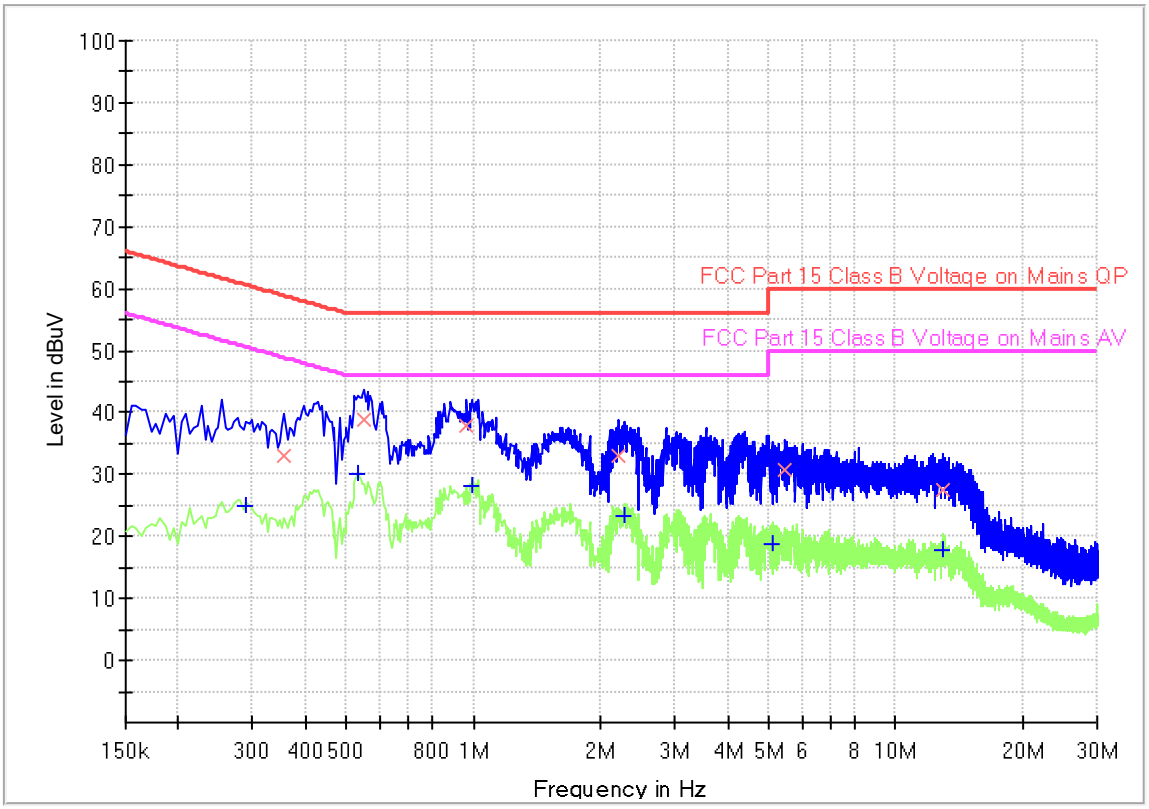

## Final_Result

| Frequency (MHz) | QuasiPeak (dBuV) | Average (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.298500 | --- | 17.06 | 50.28 | 33.22 | 1000.0 | 9.000 | N | 19.4 |
| 0.303000 | 28.10 | --- | 60.16 | 32.06 | 1000.0 | 9.000 | N | 19.4 |
| 0.582000 | --- | 23.67 | 46.00 | 22.33 | 1000.0 | 9.000 | N | 19.5 |
| 0.582000 | 33.89 | --- | 56.00 | 22.11 | 1000.0 | 9.000 | N | 19.5 |
| 0.919500 | --- | 17.77 | 46.00 | 28.23 | 1000.0 | 9.000 | N | 19.4 |
| 0.919500 | 32.41 | --- | 56.00 | 23.59 | 1000.0 | 9.000 | N | 19.4 |
| 2.139000 | 23.36 | --- | 56.00 | 32.64 | 1000.0 | 9.000 | N | 19.4 |
| 2.593500 | --- | 13.53 | 46.00 | 32.47 | 1000.0 | 9.000 | N | 19.4 |
| 5.865000 | --- | 12.34 | 50.00 | 37.66 | 1000.0 | 9.000 | N | 19.5 |
| 5.869500 | 19.34 | --- | 60.00 | 40.66 | 1000.0 | 9.000 | N | 19.5 |
| 14.041500 | --- | 10.78 | 50.00 | 39.22 | 1000.0 | 9.000 | N | 19.7 |
| 15.328500 | 21.41 | --- | 60.00 | 38.59 | 1000.0 | 9.000 | N | 19.7 |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

| | | |
|---|---|---|
| Product Type | : | Thermal Imaging Rifle Sight |
| M/N | : | IOL25 |
| Operating Condition | : | Transmit mode, 802.11g Tx_2462MHz (worst case) |
| Test Specification | : | L-line |
| Comment | : | 120V~, 60Hz |



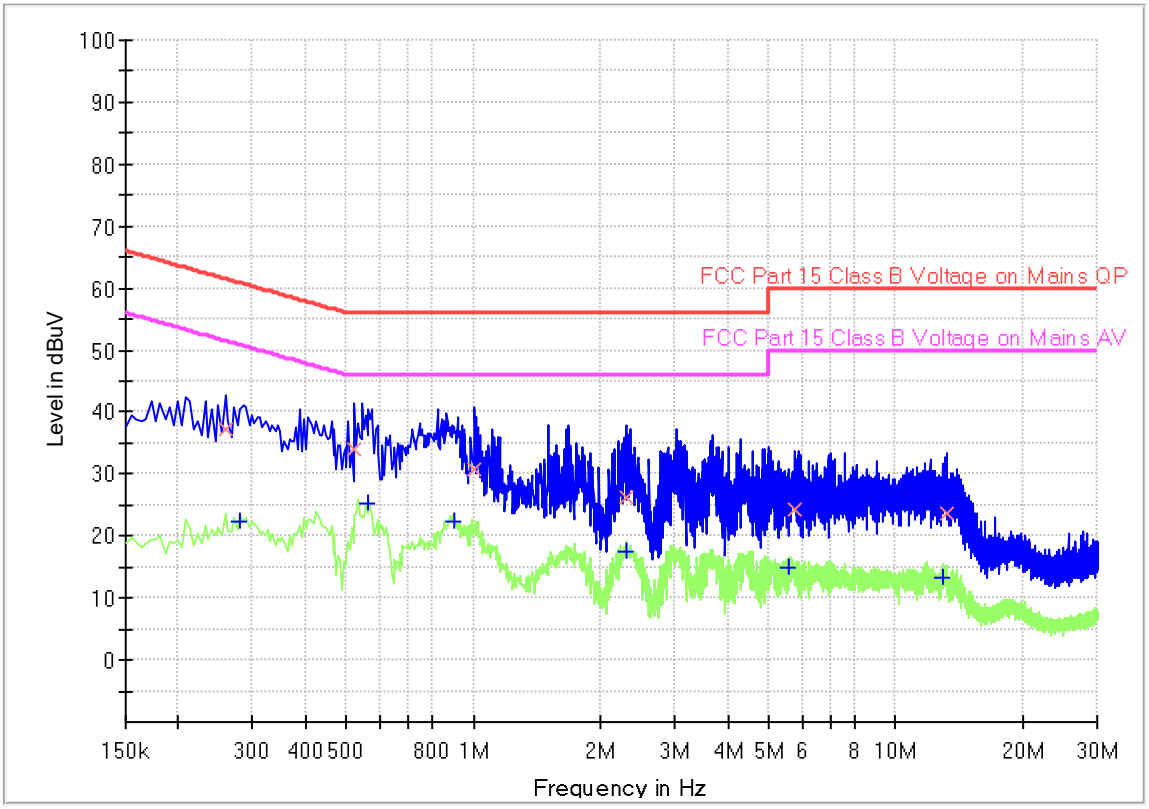

## Final_Result

| Frequency (MHz) | QuasiPeak (dBuV) | Average (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.289500 | --- | 25.09 | 50.54 | 25.45 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.357000 | 33.10 | --- | 58.80 | 25.70 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.532500 | --- | 30.16 | 46.00 | 15.84 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.550500 | 38.90 | --- | 56.00 | 17.10 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.964500 | 37.81 | --- | 56.00 | 18.19 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.996000 | --- | 28.16 | 46.00 | 17.84 | 1000.0 | 9.000 | L1 | 19.4 |
| 2.215500 | 33.03 | --- | 56.00 | 22.97 | 1000.0 | 9.000 | L1 | 19.4 |
| 2.274000 | --- | 23.17 | 46.00 | 22.83 | 1000.0 | 9.000 | L1 | 19.4 |
| 5.136000 | --- | 18.77 | 50.00 | 31.23 | 1000.0 | 9.000 | L1 | 19.5 |
| 5.487000 | 30.62 | --- | 60.00 | 29.38 | 1000.0 | 9.000 | L1 | 19.5 |
| 12.930000 | --- | 17.71 | 50.00 | 32.29 | 1000.0 | 9.000 | L1 | 19.7 |
| 12.930000 | 27.43 | --- | 60.00 | 32.57 | 1000.0 | 9.000 | L1 | 19.7 |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

| | | |
|---|---|---|
| Product Type | : | Thermal Imaging Rifle Sight |
| M/N | : | IOL25 |
| Operating Condition | : | Transmit mode, 802.11g Tx_2462MHz (worst case) |
| Test Specification | : | N-line |
| Comment | : | 120V~, 60Hz |




## Final_Result

| Frequency (MHz) | QuasiPeak (dBuV) | Average (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.258000 | 37.11 | --- | 61.50 | 24.39 | 1000.0 | 9.000 | N | 19.4 |
| 0.280500 | --- | 22.43 | 50.80 | 28.37 | 1000.0 | 9.000 | N | 19.4 |
| 0.523500 | 34.04 | --- | 56.00 | 21.96 | 1000.0 | 9.000 | N | 19.5 |
| 0.564000 | --- | 25.39 | 46.00 | 20.61 | 1000.0 | 9.000 | N | 19.5 |
| 0.897000 | --- | 22.39 | 46.00 | 23.61 | 1000.0 | 9.000 | N | 19.4 |
| 1.005000 | 30.73 | --- | 56.00 | 25.27 | 1000.0 | 9.000 | N | 19.4 |
| 2.292000 | 26.18 | --- | 56.00 | 29.82 | 1000.0 | 9.000 | N | 19.4 |
| 2.310000 | --- | 17.50 | 46.00 | 28.50 | 1000.0 | 9.000 | N | 19.4 |
| 5.604000 | --- | 14.82 | 50.00 | 35.18 | 1000.0 | 9.000 | N | 19.5 |
| 5.766000 | 24.36 | --- | 60.00 | 35.64 | 1000.0 | 9.000 | N | 19.5 |
| 12.889500 | --- | 13.23 | 50.00 | 36.77 | 1000.0 | 9.000 | N | 19.7 |
| 13.222500 | 23.49 | --- | 60.00 | 36.51 | 1000.0 | 9.000 | N | 19.7 |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

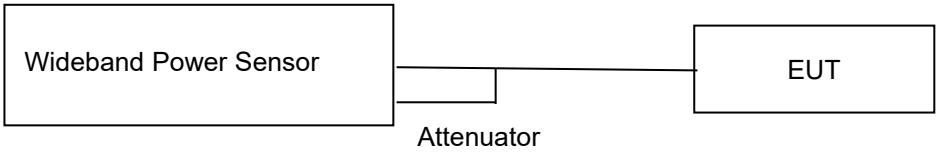

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

## 10.2 Conducted peak(average) output power

**Test Method for conducted peak power**

1) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

4) Measure the peak power of the transmitter. This measurement is a peak over both the ON and OFF periods of the transmitter.




**Wideband Power Sensor conducted test setup**

**Test Method for average power**

1. Measure the duty cycle D of the transmitter output signal.
2. Set span to at least 1.5 times the OBW.
3. Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
4. Set VBW ≥ [3 × RBW].
5. Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto.
7. Detector = RMS (i.e., power averaging), if available. Otherwise, use the sample detector mode.
8. Do not use sweep triggering. Allow the sweep to “free run.”
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
10. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
11. Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission).


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

## Limits

According to §15.247 (b) (3), conducted peak output power limit as below:

| | Frequency Range | Limit | Limit |
|---|---|---|---|
| | MHz | W | dBm |
| **Conducted peak output power** | 2400-2483.5 | ≤1 | ≤30 |

Test result (conducted peak) as below table

B mode

| Frequency (MHz) | Conducted Peak Output Power (dBm) §15.247 (b) (3) | | |
|---|---|---|---|
| | Result | limit | Verdict |
| 2412MHz | 11.99 | ≤30 | Pass |
| 2437MHz | 12.11 | ≤30 | Pass |
| 2462MHz | 12.31 | ≤30 | Pass |

G mode

| Frequency (MHz) | Conducted Peak Output Power (dBm) §15.247 (b) (3) | | |
|---|---|---|---|
| | Result | limit | Verdict |
| 2412MHz | 20.04 | ≤30 | Pass |
| 2437MHz | 20.28 | ≤30 | Pass |
| 2462MHz | 20.61 | ≤30 | Pass |

N20 mode

| Frequency (MHz) | Conducted Peak Output Power (dBm) §15.247 (b) (3) | | |
|---|---|---|---|
| | Result | limit | Verdict |
| 2412MHz | 20.12 | ≤30 | Pass |
| 2437MHz | 20.43 | ≤30 | Pass |
| 2462MHz | 20.47 | ≤30 | Pass |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

Test result (average power) as below table

802.11B

| Frequency | Duty cycle Factor | Conducted Power | Total Power(average) | Result |
|---|---|---|---|---|
| **MHz** | **dB** | **dBm** | **dBm** | |
| Low channel 2412MHz | 0.47 | 7.62 | 8.09 | Pass |
| Middle channel 2437MHz | 0.47 | 7.9 | 8.37 | Pass |
| High channel 2462MHz | 0.47 | 8.09 | 8.56 | Pass |

802.11G

| Frequency | Duty cycle Factor | Conducted Power | Total Power(average) | Result |
|---|---|---|---|---|
| **MHz** | **dB** | **dBm** | **dBm** | |
| Low channel 2412MHz | 1.95 | 6.27 | 8.22 | Pass |
| Middle channel 2437MHz | 1.95 | 6.63 | 8.58 | Pass |
| High channel 2462MHz | 1.95 | 6.98 | 8.93 | Pass |

802.11N20

| Frequency | Duty cycle Factor | Conducted Power | Total Power(average) | Result |
|---|---|---|---|---|
| **MHz** | **dB** | **dBm** | **dBm** | |
| Low channel 2412MHz | 2.07 | 6.23 | 8.3 | Pass |
| Middle channel 2437MHz | 2.07 | 6.67 | 8.74 | Pass |
| High channel 2462MHz | 2.07 | 6.73 | 8.8 | Pass |

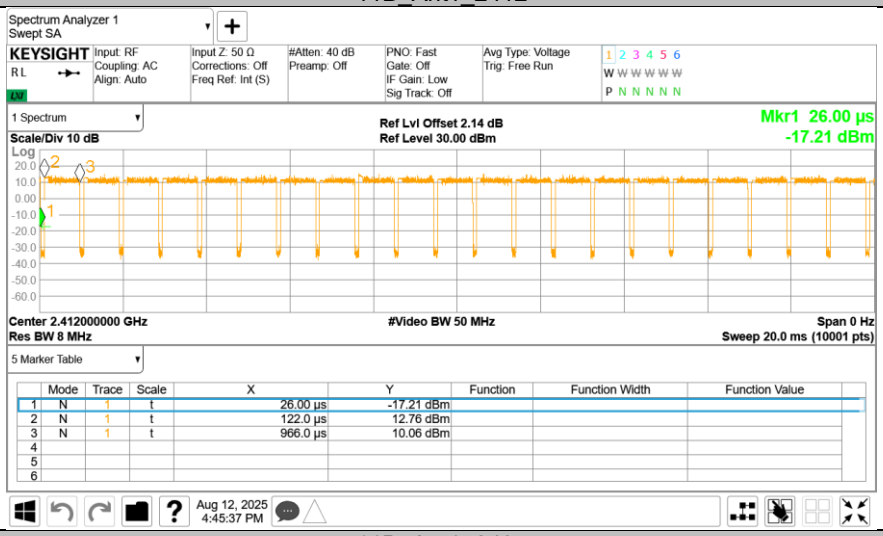
Duty Cycle

| Condition | Mode | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) |
|---|---|---|---|---|---|
| NVNT | b | 2412 | Ant1 | 89.79 | 0.47 |
| NVNT | b | 2437 | Ant1 | 89.81 | 0.47 |
| NVNT | b | 2462 | Ant1 | 89.79 | 0.47 |
| NVNT | g | 2412 | Ant1 | 63.77 | 1.95 |
| NVNT | g | 2437 | Ant1 | 63.77 | 1.95 |
| NVNT | g | 2462 | Ant1 | 63.77 | 1.95 |
| NVNT | n20 | 2412 | Ant1 | 62.12 | 2.07 |
| NVNT | n20 | 2437 | Ant1 | 62.12 | 2.07 |
| NVNT | n20 | 2462 | Ant1 | 62.12 | 2.07 |

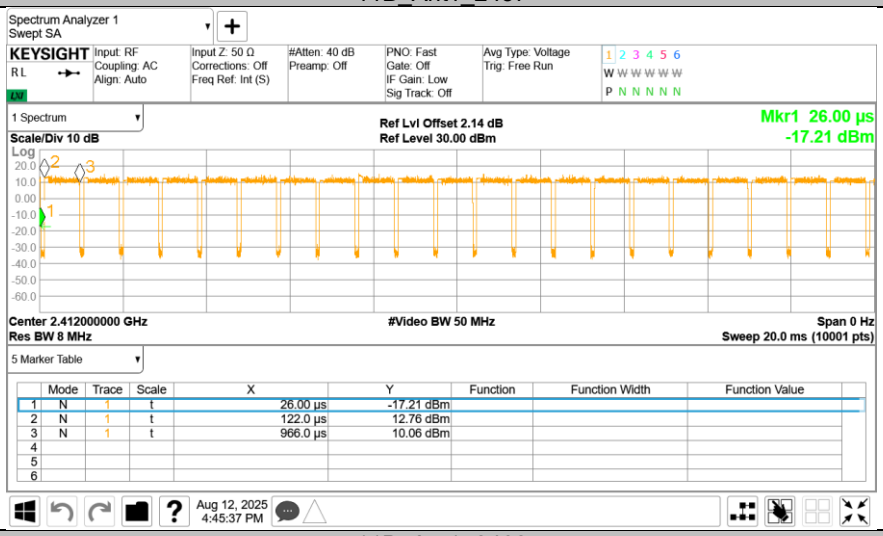

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

## Duty Cycle

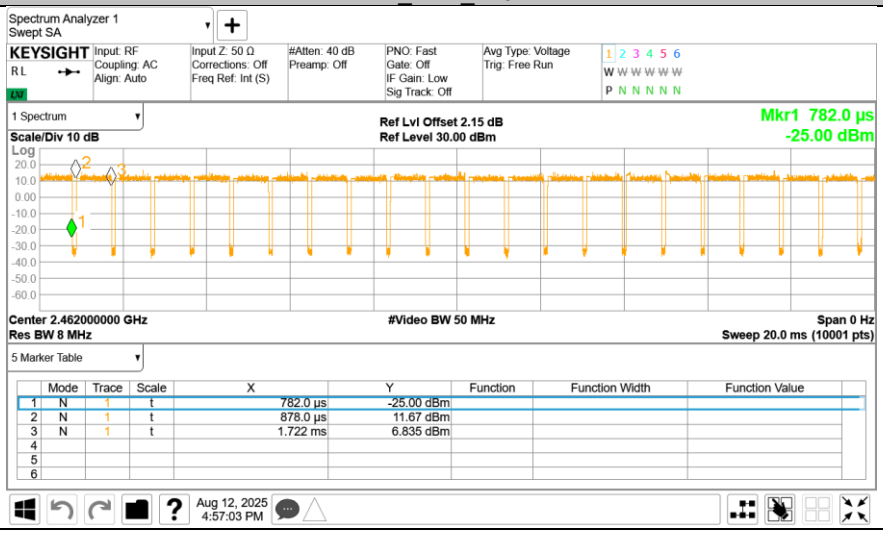
11B_Ant1_2412



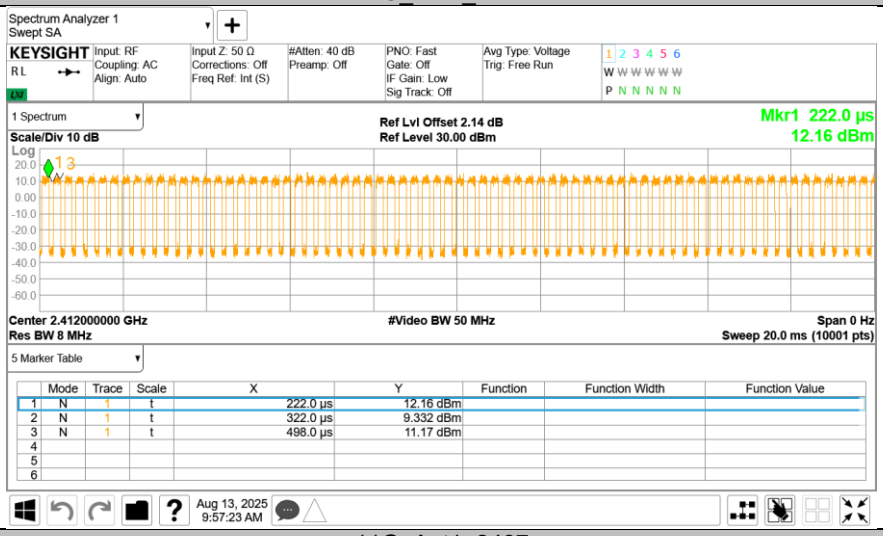

11B_Ant1_2437



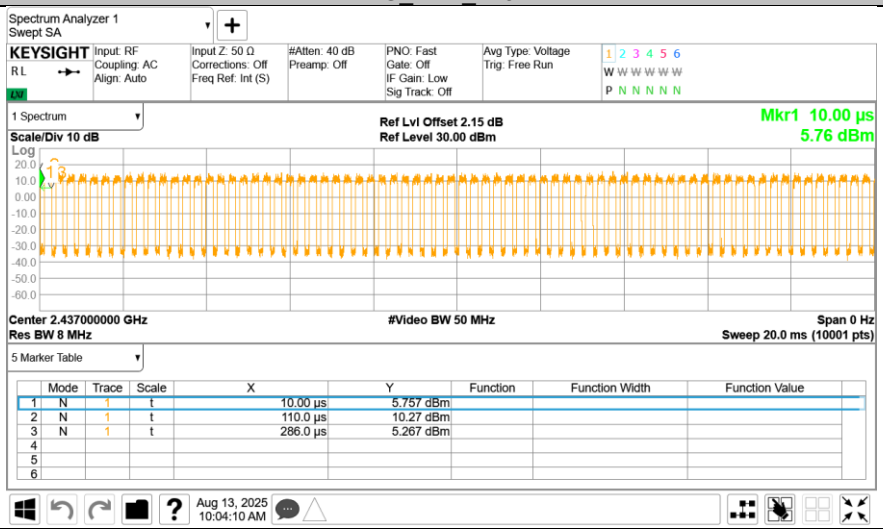

11B_Ant1_2462



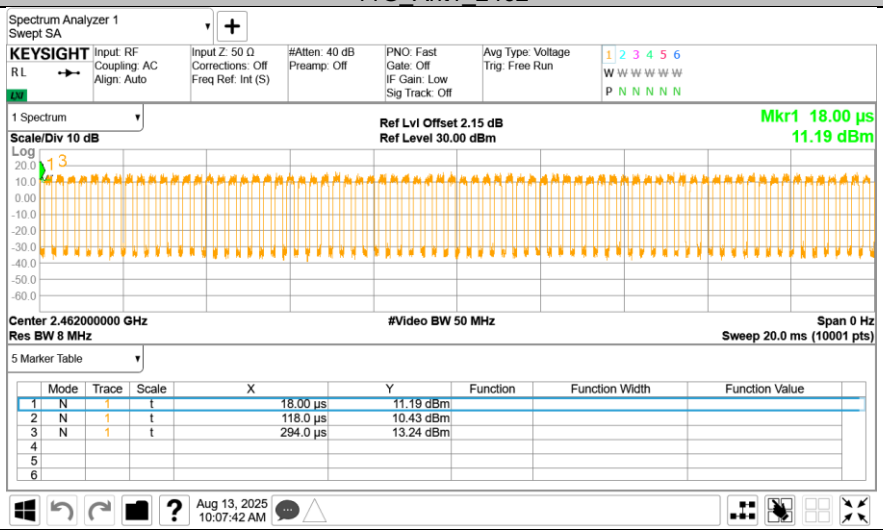
11G_Ant1_2412




11G_Ant1_2437



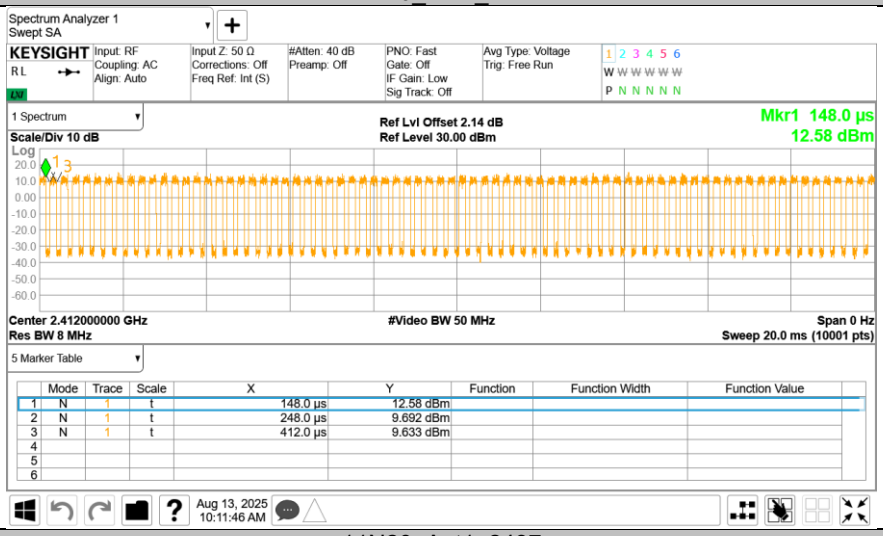

11G_Ant1_2462



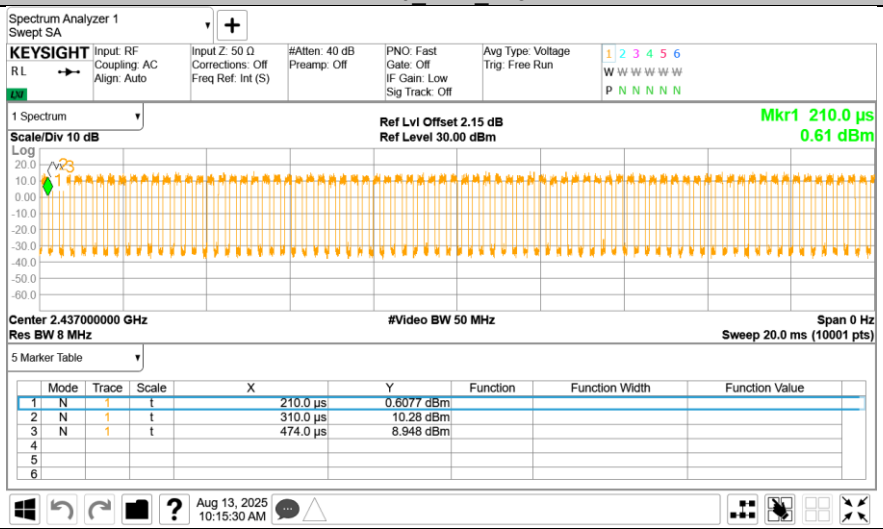



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

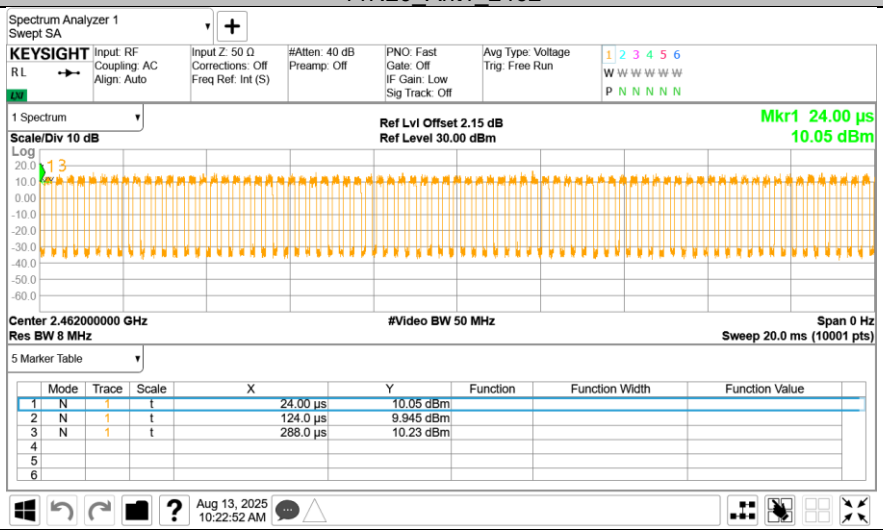
11N20_Ant1_2412




11N20_Ant1_2437




11N20_Ant1_2462



## 10.3 6dB bandwidth and 99% Occupied Bandwidth

**Test Method for 6 dB Bandwidth**

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
4. RBW=1% to 5% of the occupied bandwidth but not less than 100kHz, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
5. Use the automatic bandwidth measurement capability of an instrument, use the X dB bandwidth mode with X set to 6 dB.
6. Allow the trace to stabilize, record the 6 dB Bandwidth value.

**Test Method for 99 % Bandwidth**

1. Connect EUT test port to spectrum analyzer.
   Use the following spectrum analyzer settings:
   RBW=1% to 5% of the actual occupied, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the occupied bandwidth measurement capability of test receiver.
3. Allow the trace to stabilize, record the occupied bandwidth value.

**Limit**

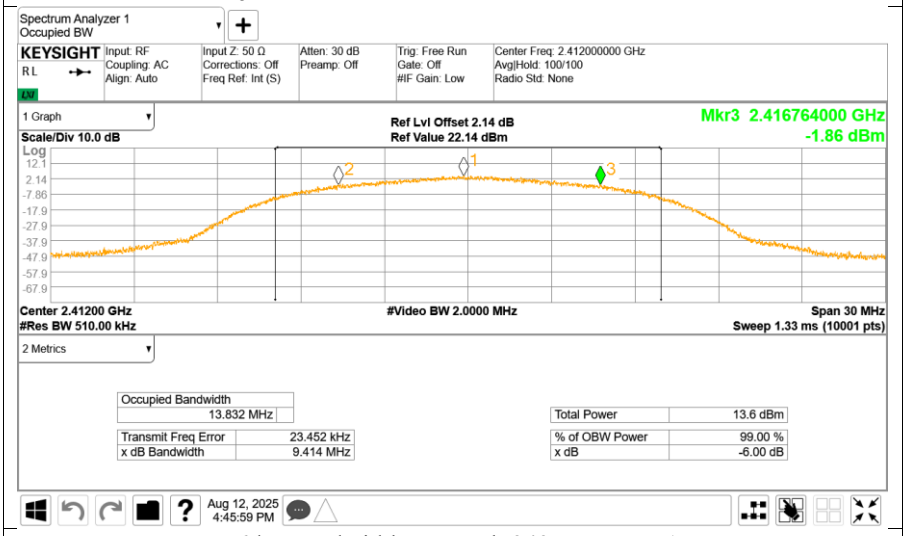
| 6dB bandwidth Limit [kHz] | 99% bandwidth Limit [kHz] |
|---|---|
| ≥500 | -- |

Test Result

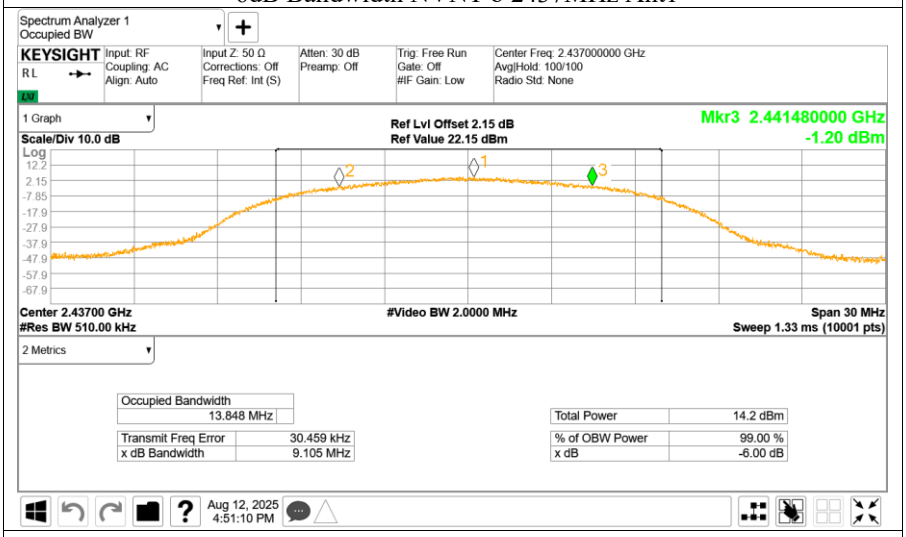
| Test Mode | Frequency MHz | 6dB bandwidth (MHz) | | Result | 99% occupied bandwidth MHz |
|---|---|---|---|---|---|
| | | result | limit | verdict | |
| 802.11b | 2412 | 9.414 | ≥0.5 | Pass | 13.826 |
| | 2437 | 9.105 | ≥0.5 | Pass | 13.744 |
| | 2462 | 8.774 | ≥0.5 | Pass | 13.818 |
| 802.11g | 2412 | 16.209 | ≥0.5 | Pass | 16.467 |
| | 2437 | 16.109 | ≥0.5 | Pass | 16.469 |
| | 2462 | 16.282 | ≥0.5 | Pass | 16.509 |
| 802.11n(HT20) | 2412 | 17.422 | ≥0.5 | Pass | 17.734 |
| | 2437 | 17.778 | ≥0.5 | Pass | 17.739 |
| | 2462 | 17.736 | ≥0.5 | Pass | 17.713 |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

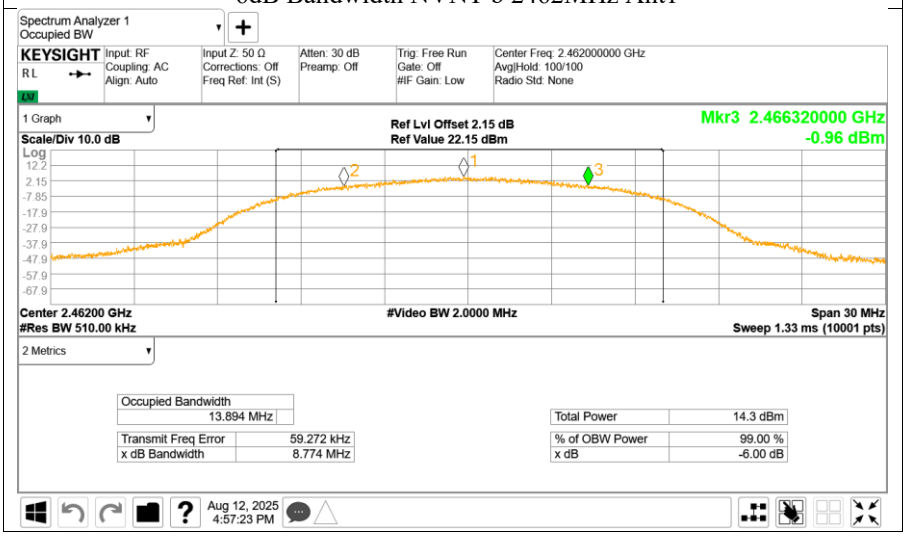
-6dB Bandwidth NVNT b 2412MHz Ant1




-6dB Bandwidth NVNT b 2437MHz Ant1



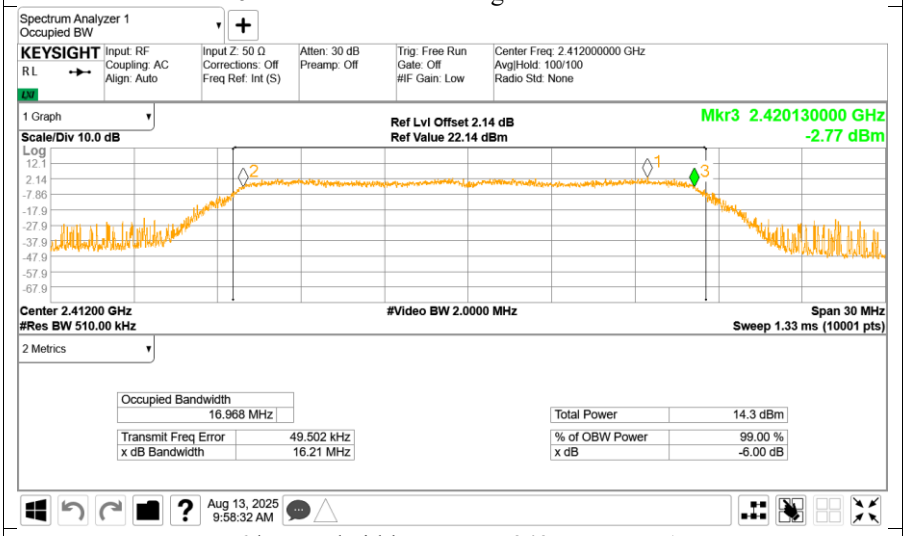

-6dB Bandwidth NVNT b 2462MHz Ant1



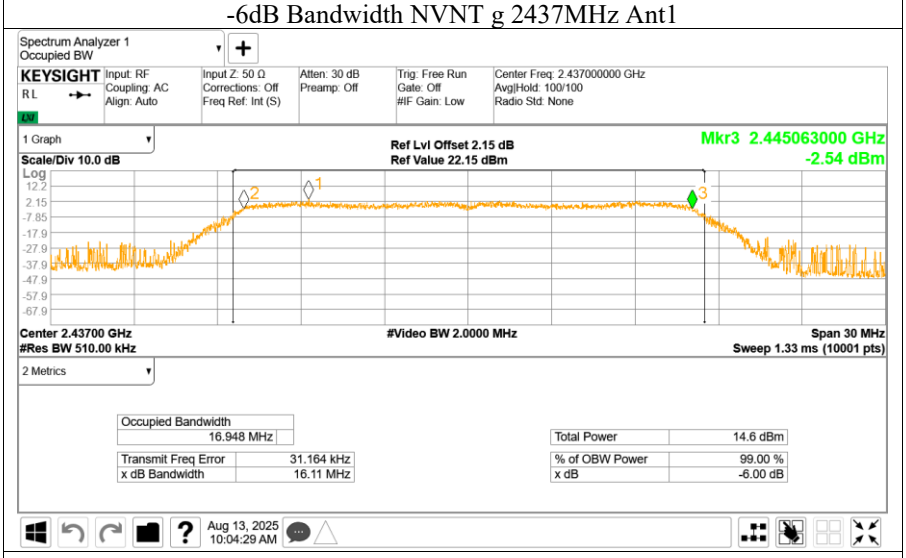



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

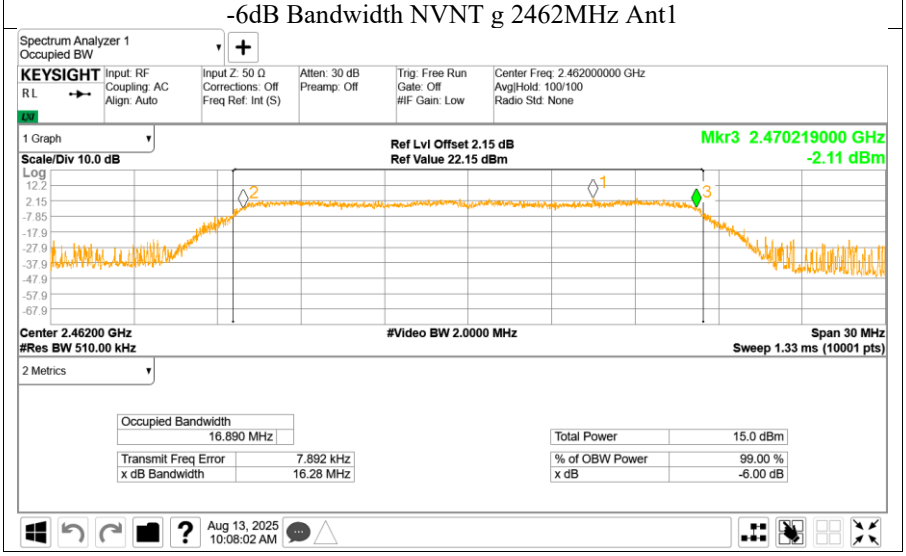
-6dB Bandwidth NVNT g 2412MHz Ant1




-6dB Bandwidth NVNT g 2437MHz Ant1



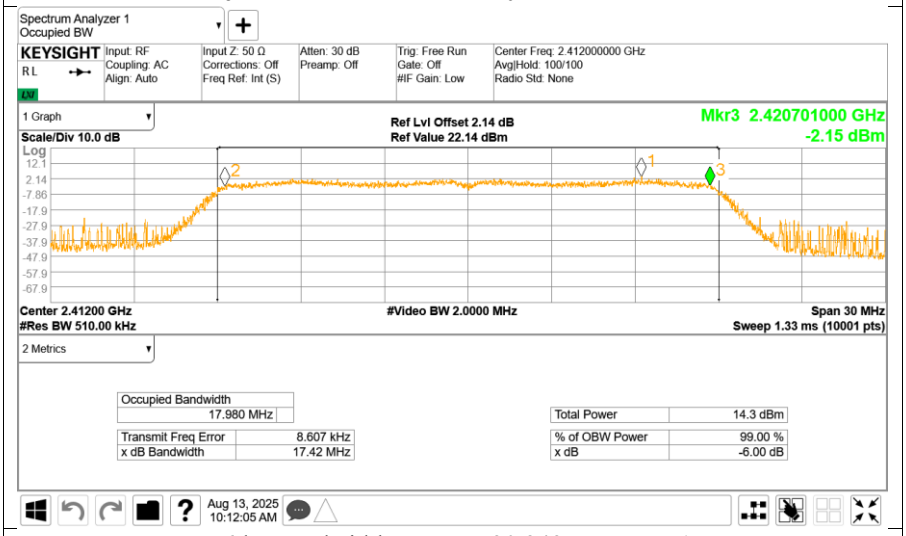

-6dB Bandwidth NVNT g 2462MHz Ant1



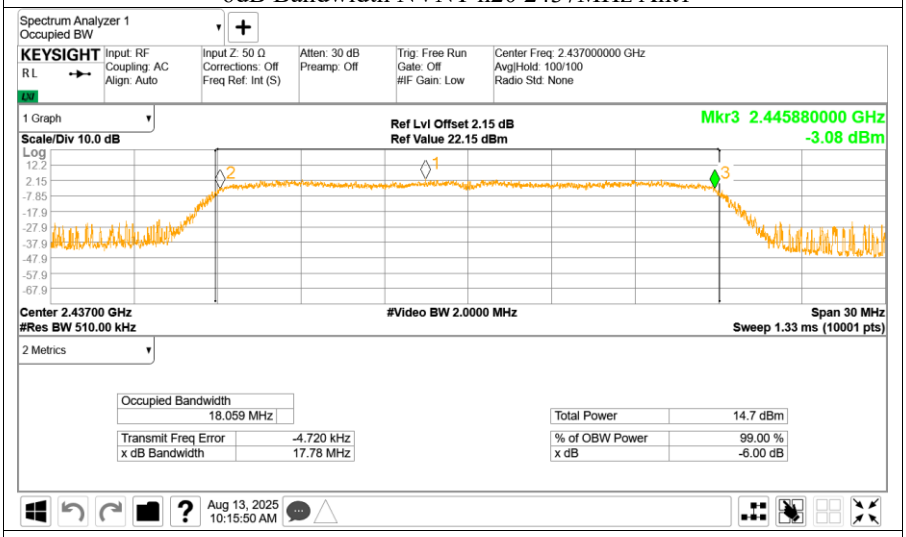



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

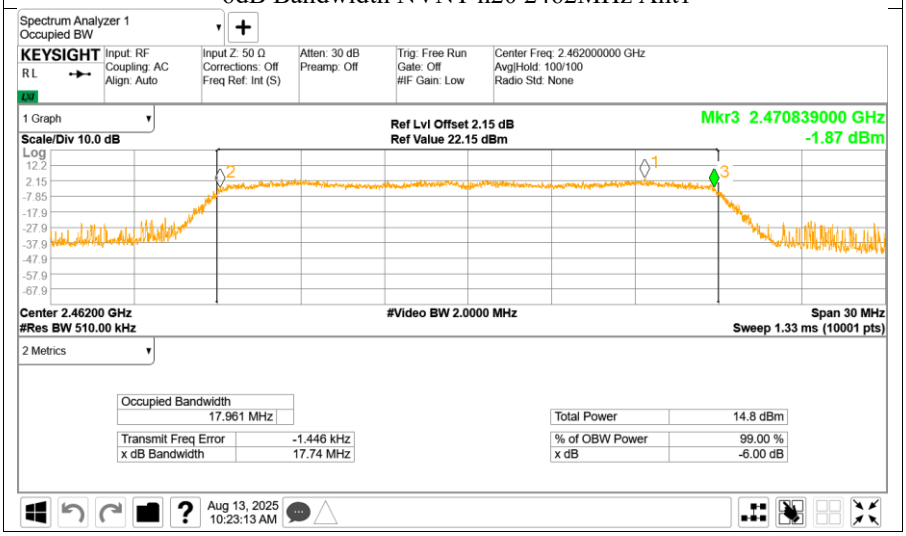
-6dB Bandwidth NVNT n20 2412MHz Ant1




-6dB Bandwidth NVNT n20 2437MHz Ant1



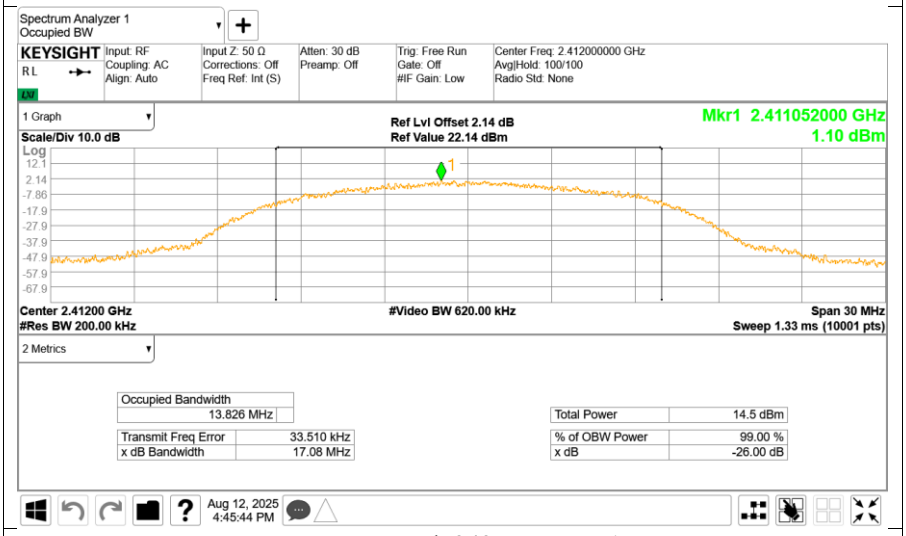

-6dB Bandwidth NVNT n20 2462MHz Ant1



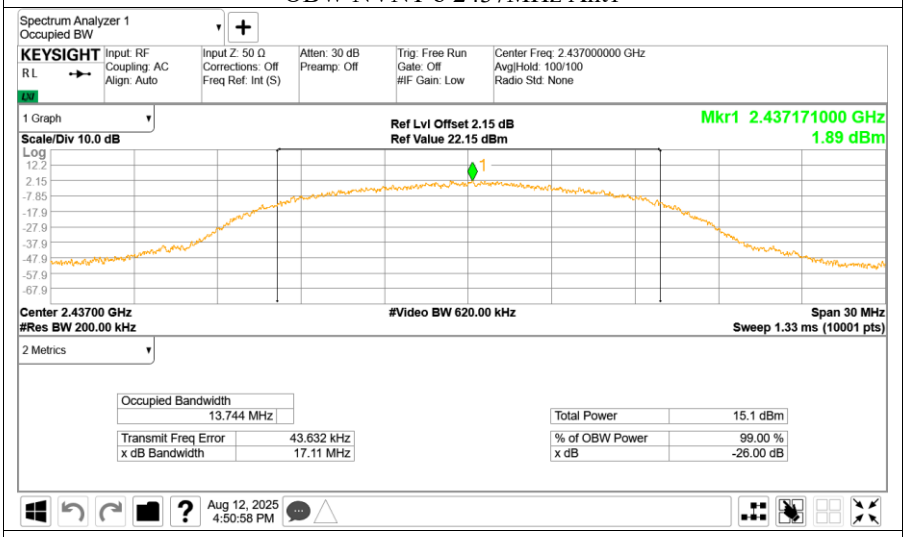



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

OBW NVNT b 2412MHz Ant1

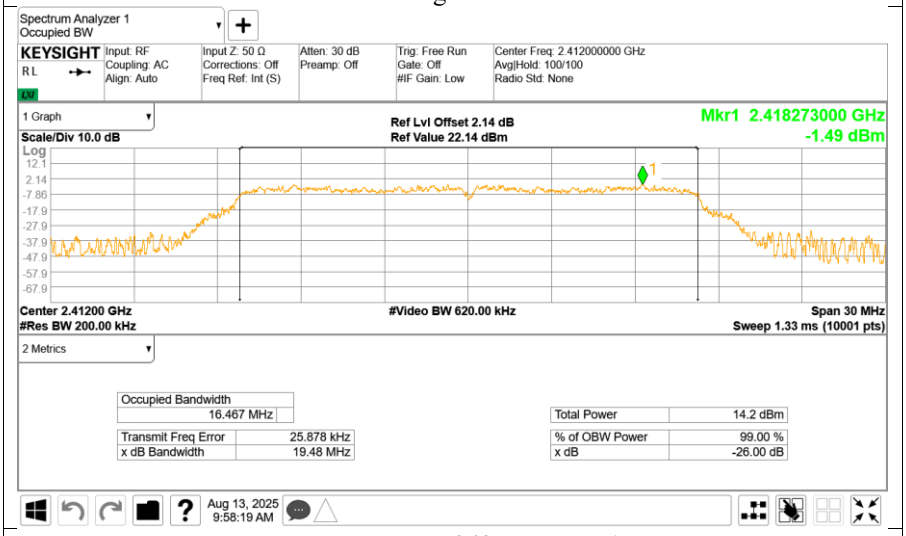



OBW NVNT b 2437MHz Ant1

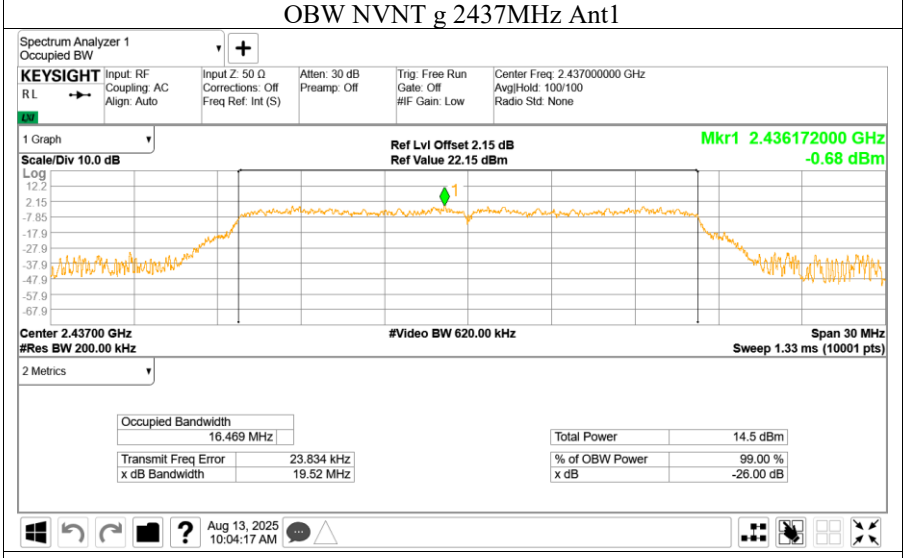



OBW NVNT b 2462MHz Ant1

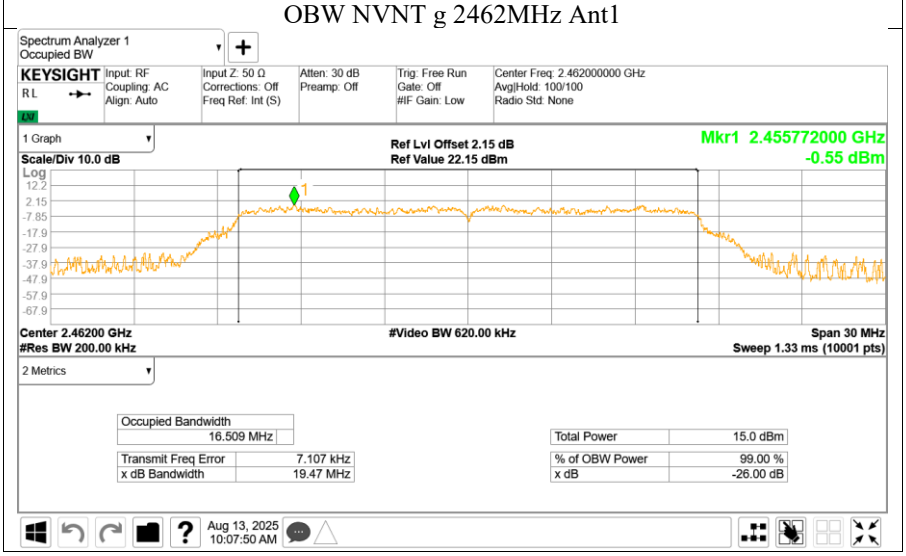
OBW NVNT g 2412MHz Ant1




OBW NVNT g 2437MHz Ant1



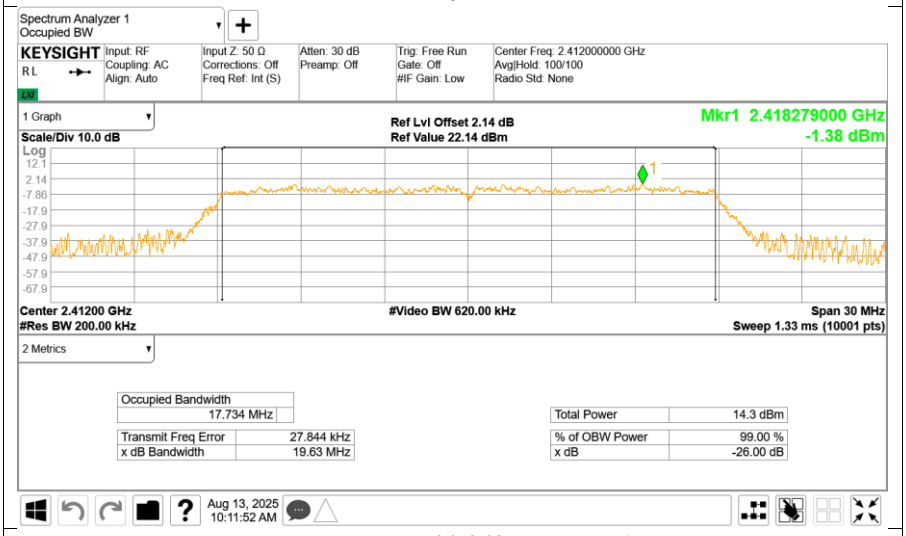

OBW NVNT g 2462MHz Ant1



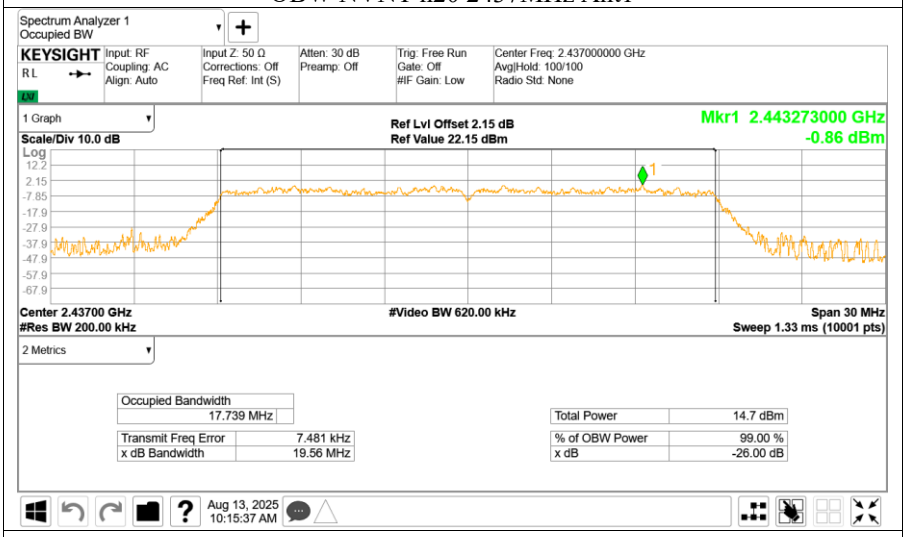



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

OBW NVNT n20 2412MHz Ant1




OBW NVNT n20 2437MHz Ant1




OBW NVNT n20 2462MHz Ant1

## 10.4 Power spectral density

**Test Method**

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
4. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
5. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
6. Repeat above procedures until other frequencies measured were completed.

**Limit**

| Limit [dBm/3KHz] |
|---|
| ≤8 |

Test result

802.11 B

| Frequency<br>**MHz** | Power spectral density<br>**dBm/3kHz** | Result |
|---|---|---|
| Low channel 2412MHz | -14.98 | Pass |
| Middle channel 2437MHz | -14.79 | Pass |
| High channel 2462MHz | -13.99 | Pass |

802.11 G

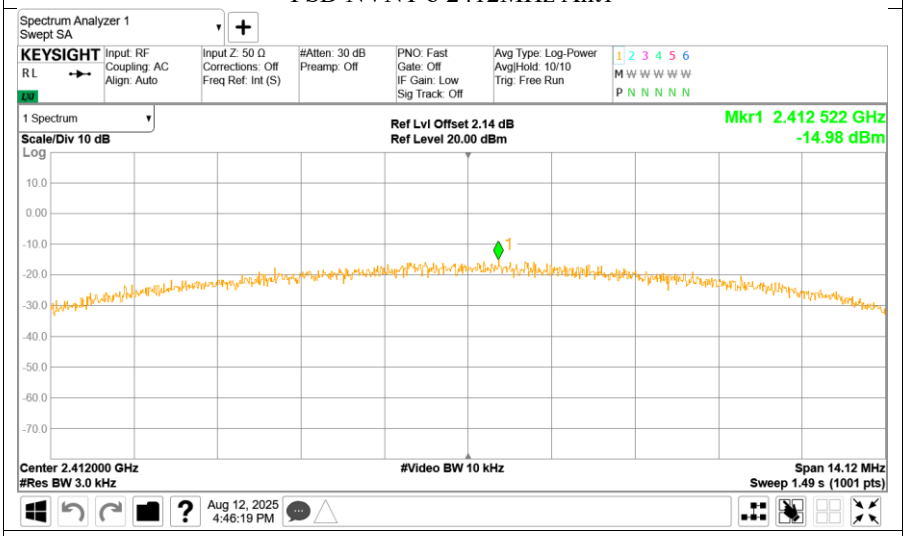
| Frequency<br>**MHz** | Power spectral density<br>**dBm/3kHz** | Result |
|---|---|---|
| Low channel 2412MHz | -16.31 | Pass |
| Middle channel 2437MHz | -17.37 | Pass |
| High channel 2462MHz | -16.16 | Pass |

802.11 N20

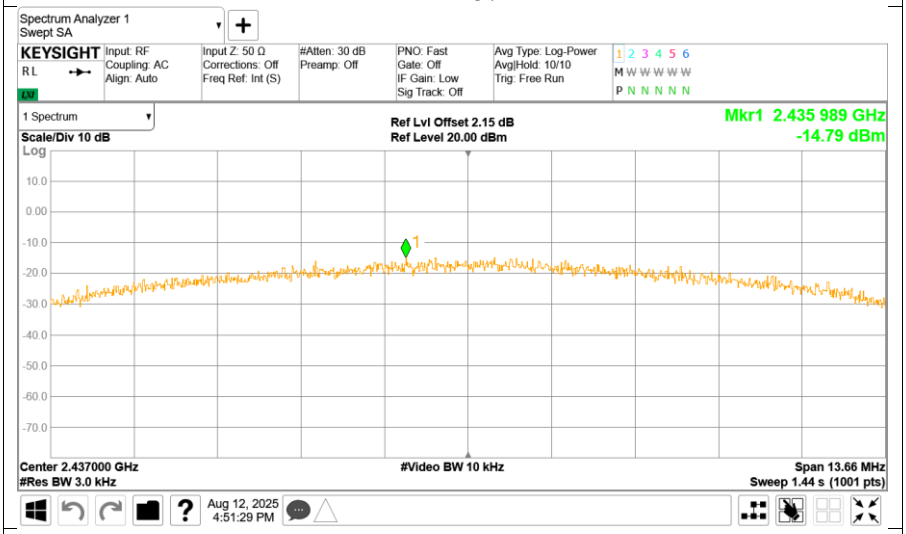
| Frequency<br>**MHz** | Power spectral density<br>**dBm/3kHz** | Result |
|---|---|---|
| Low channel 2412MHz | -17.11 | Pass |
| Middle channel 2437MHz | -16.28 | Pass |
| High channel 2462MHz | -16.14 | Pass |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

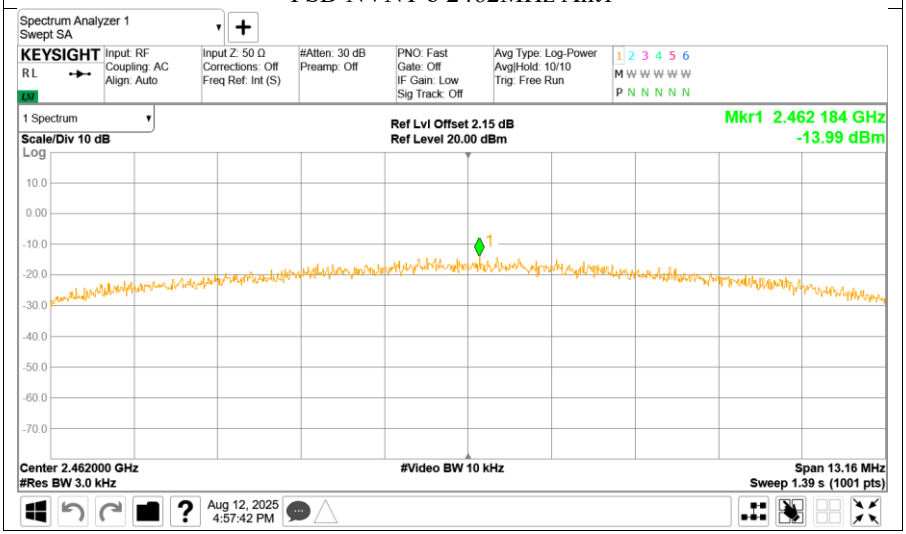
PSD NVNT b 2412MHz Ant1




PSD NVNT b 2437MHz Ant1



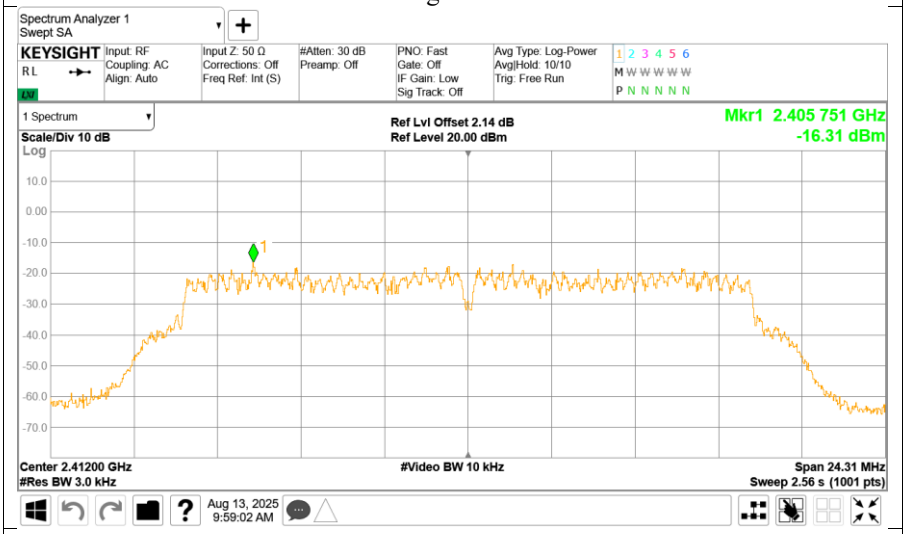

PSD NVNT b 2462MHz Ant1



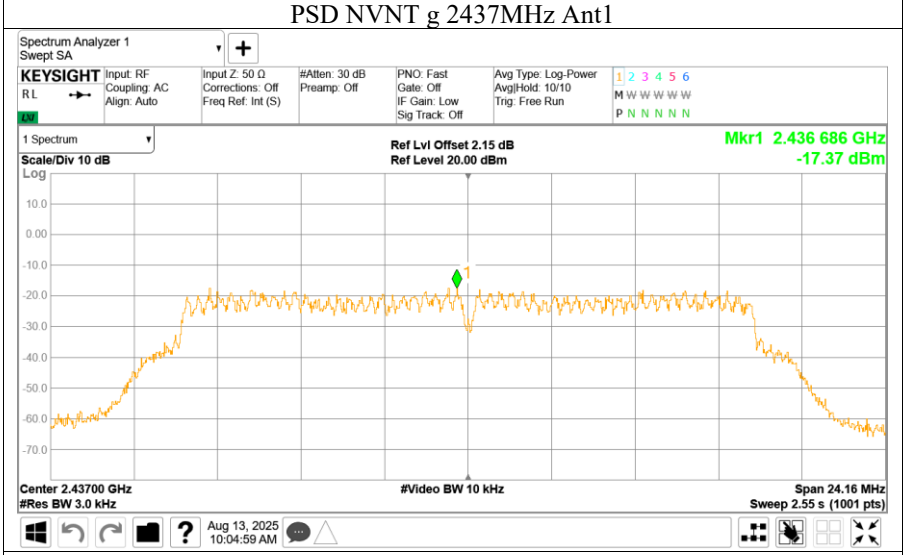



TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

PSD NVNT g 2412MHz Ant1




PSD NVNT g 2437MHz Ant1




PSD NVNT g 2462MHz Ant1