# FCC - TEST REPORT

| | | | | |
|---|---|---|---|---|
| Report Number | : | **68.950.20.0773.01** | Date of Issue: | **December 08, 2020** |
| Model | : | MDA1L11-3 | | |
| Product Type | : | 2.4G Wi-Fi Communication Module | | |
| Applicant | : | GD Midea Air-Conditioning Equipment Co., Ltd. | | |
| Address | : | Lingang Road, Beijiao, Shunde 528311 Foshan, Guangdong PEOPLE'S REPUBLIC OF CHINA | | |
| Manufacturer | : | GD Midea Air-Conditioning Equipment Co., Ltd. | | |
| Address | : | Lingang Road, Beijiao, Shunde 528311 Foshan, Guangdong PEOPLE'S REPUBLIC OF CHINA | | |
| Test Result | : | ■ **Positive** ☐ **Negative** | | |
| Total pages including Appendices | : | **56** | | |

*TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen 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. Shenzhen 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. Shenzhen 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. Shenzhen Branch issued reports.*





TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

# 1 Table of Contents





TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

# 2 Details about the Test Laboratory

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

| | |
|---|---|
| Company name: | TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch<br>Building 12&13, Zhiheng Wisdomland Business Park,<br>Nantou Checkpoint Road 2, Nanshan District,<br>Shenzhen City, 518052,<br>P. R. China |
| FCC Registration No.: | 514049 |
| Telephone: | 86 755 8828 6998 |
| Fax: | 86 755 8828 5299 |

# 3 Description of the Equipment Under Test

| | |
|---|---|
| Product: | 2.4G Wi-Fi Communication Module |
| Model no.: | MDA1L11-3 |
| Brand name: | Midea |
| FCC ID: | 2ADQOMDA1L11-3 |
| Rating: | DC 5V, 0.5A |
| RF Transmission Frequency: | 2412-2462MHz |
| No. of Operated Channel: | 11 |
| Modulation: | DSSS, OFDM |
| Antenna Type: | Internal Antenna |
| Antenna Gain: | 2 dBi |
| Description of the EUT: | EUT is a 2.4G Wi-Fi Communication Module with WIFI function which operated at 2.4GHz. |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

# 4 Summary of Test Standards

| Test Standards | |
|---|---|
| FCC Part 15 Subpart C<br>10-1-2019 Edition | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators |

All the test methods were according to KDB 558074 D01 DTS Measurement Guidance v05r02 DTS Measurement Guidance and ANSI C63.10 (2013).


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

# 5 Summary of Test Results

| Technical Requirements | | | | | |
|---|---|---|---|---|---|
| **FCC Part 15 Subpart C** | | | | | |
| Test Condition | | Test Site | Test Result | | |
| | | | Pass | Fail | N/A |
| §15.207 | Conducted emission AC power port | Site 1 | ☒ | ☐ | ☐ |
| §15.247 (b) (1) | Conducted peak output power | Site 1 | ☒ | ☐ | ☐ |
| §15.247(a)(1) | 20dB bandwidth | --- | ☐ | ☐ | ☒ |
| §15.247(a)(1) | Carrier frequency separation | --- | ☐ | ☐ | ☒ |
| §15.247(a)(1)(iii) | Number of hopping frequencies | --- | ☐ | ☐ | ☒ |
| §15.247(a)(1)(iii) | Dwell Time | --- | ☐ | ☐ | ☒ |
| §15.247(a)(2) | 6dB bandwidth and 99% Occupied Bandwidth | Site 1 | ☒ | ☐ | ☐ |
| §15.247(e) | Power spectral density | Site 1 | ☒ | ☐ | ☐ |
| §15.247(d) | Spurious RF conducted emissions | Site 1 | ☒ | ☐ | ☐ |
| §15.247(d) | Band edge | Site 1 | ☒ | ☐ | ☐ |
| §15.247(d) | Spurious radiated emissions for transmitter | Site 1 | ☒ | ☐ | ☐ |
| §15.203 | Antenna requirement | See note 2 | ☒ | ☐ | ☐ |

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an internal antenna, which gain is 2dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

# 6 General Remarks

**Remarks**

This submittal(s) (test report) is intended for FCC ID:2ADQOMDA1L11-3, complies with Section 15.209, 15.247 of the FCC Part 15, Subpart C rules.

**SUMMARY:**

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

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

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

Sample Received Date: November 10, 2020

Testing Start Date: November 11, 2020

Testing End Date: December 4, 2020

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

| Reviewed by: | Prepared by: | Tested by: |
|---|---|---|
|  |  |  |
| John Zhi | Moon Xiong | Louise Liu |
| Section Manager | Project Engineer | Test Engineer |

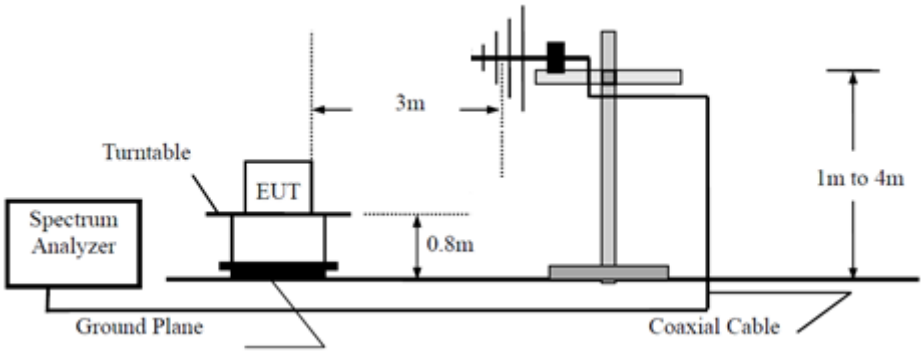


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

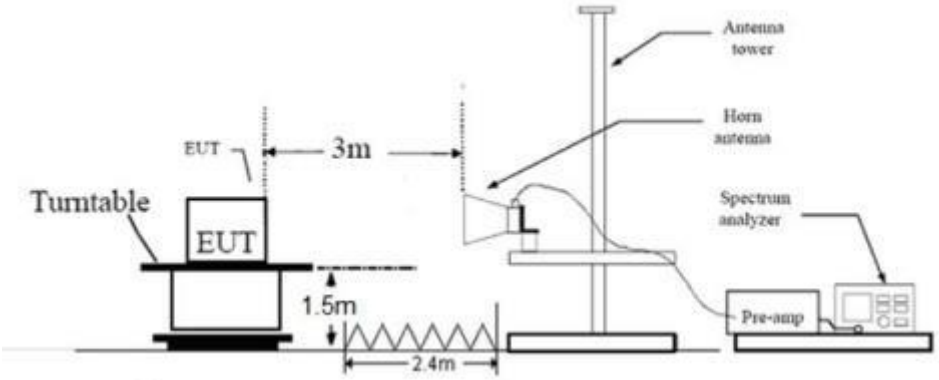
# 7 Test Setups

## 7.1 Radiated test setups

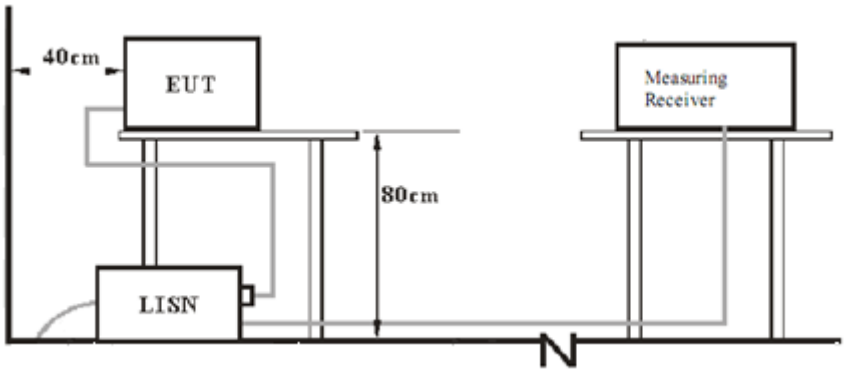
Below 1GHz



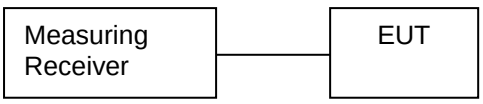

Above 1GHz




## 7.2 AC Power Line Conducted Emission test setups




## 7.3 Conducted RF test setups






TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

# 8 Technical Requirement

## 8.1 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. A EMI test receiver is used to test the emissions from both sides of AC line

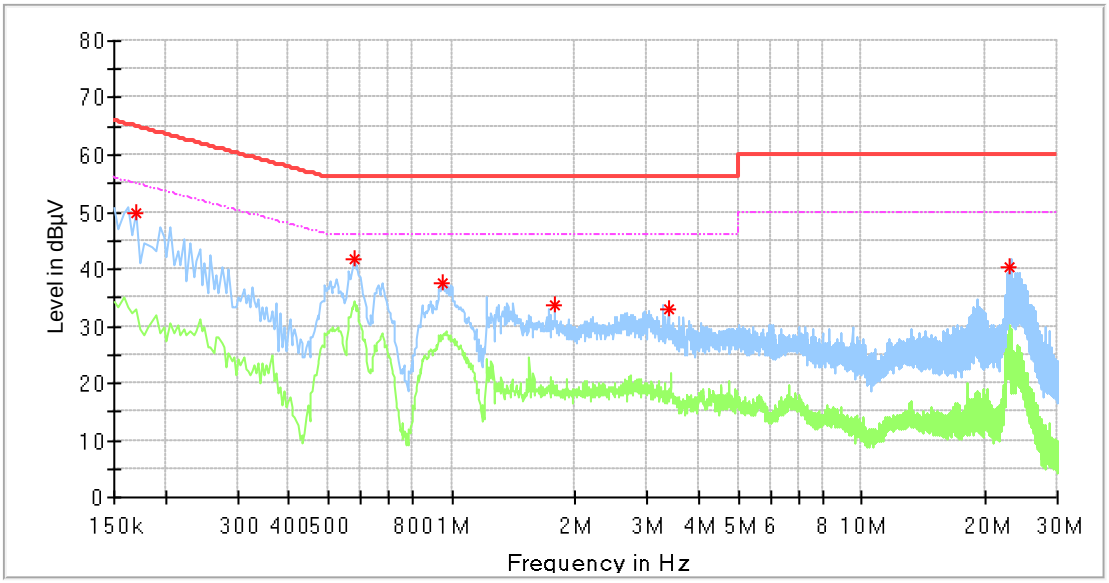
**Limit**

| 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. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

| | |
|---|---|
| Model: | MDA1L11-3 |
| Test mode: | Transmit |
| Test Voltage | AC 120V/60Hz |



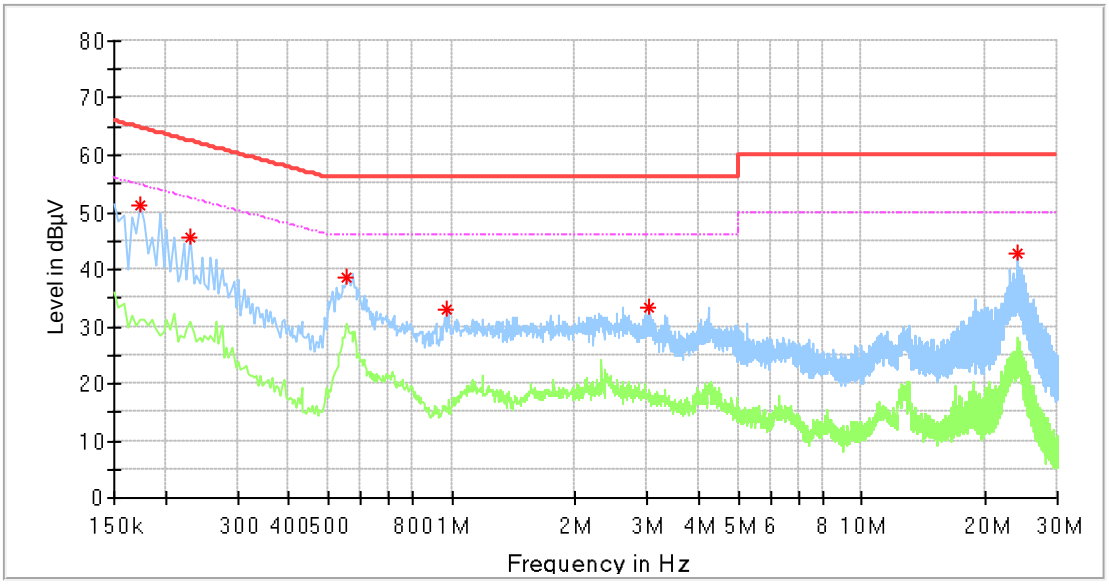

## Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|
| 0.170000 | 49.93 | --- | 64.96 | 15.03 | L1 | 10.31 |
| 0.578000 | 41.59 | --- | 56.00 | 14.41 | L1 | 10.32 |
| 0.954000 | 37.52 | --- | 56.00 | 18.48 | L1 | 10.34 |
| 1.782000 | 33.84 | --- | 56.00 | 22.16 | L1 | 10.37 |
| 3.366000 | 32.86 | --- | 56.00 | 23.14 | L1 | 10.44 |
| 22.854000 | 40.46 | --- | 60.00 | 19.54 | L1 | 11.40 |



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

| | |
|---|---|
| Model: | MDA1L11-3 |
| Test mode: | Transmit |
| Test Voltage | AC 120V/60Hz |




## Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|
| 0.174000 | 51.07 | --- | 64.77 | 13.69 | N | 10.33 |
| 0.230000 | 45.46 | --- | 62.45 | 16.99 | N | 10.32 |
| 0.554000 | 38.63 | --- | 56.00 | 17.37 | N | 10.33 |
| 0.974000 | 32.97 | --- | 56.00 | 23.03 | N | 10.35 |
| 3.038000 | 33.27 | --- | 56.00 | 22.73 | N | 10.44 |
| 23.854000 | 42.84 | --- | 60.00 | 17.16 | N | 11.60 |

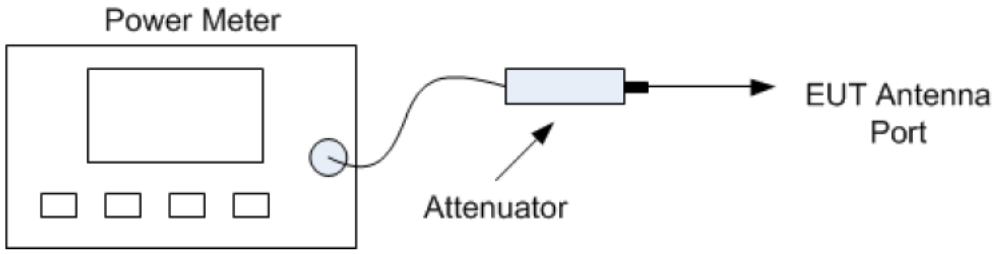

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## 8.2 Conducted peak output power

**Test Method**

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.




**Power meter conducted test setup**

**Limits**
According to §15.247 (b) (1), conducted peak output power limit as below:

| Frequency Range MHz | Limit W | Limit dBm |
|---|---|---|
| 2400-2483.5 | ≤1 | ≤30 |

Test result as below table

802.11b modulation Test Result

| Frequency (MHz) | Conducted Peak Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|
| Low channel 2412MHz | 16.9 | 30 | Pass |
| Middle channel 2437MHz | 16.5 | 30 | Pass |
| High channel 2462MHz | 16.8 | 30 | Pass |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

802.11g modulation Test Result

| Frequency (MHz) | Conducted Peak Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|
| Low channel 2412MHz | 15.5 | 30 | Pass |
| Middle channel 2437MHz | 15.1 | 30 | Pass |
| High channel 2462MHz | 15.3 | 30 | Pass |

802.11n20 modulation Test Result

| Frequency (MHz) | Conducted Peak Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|
| Low channel 2412MHz | 15.4 | 30 | Pass |
| Middle channel 2437MHz | 15.0 | 30 | Pass |
| High channel 2462MHz | 15.4 | 30 | Pass |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## 8.3 6dB bandwidth

**Test Method for 6 dB Bandwidth**

1. Use the following spectrum analyzer settings:
RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

**Limit**

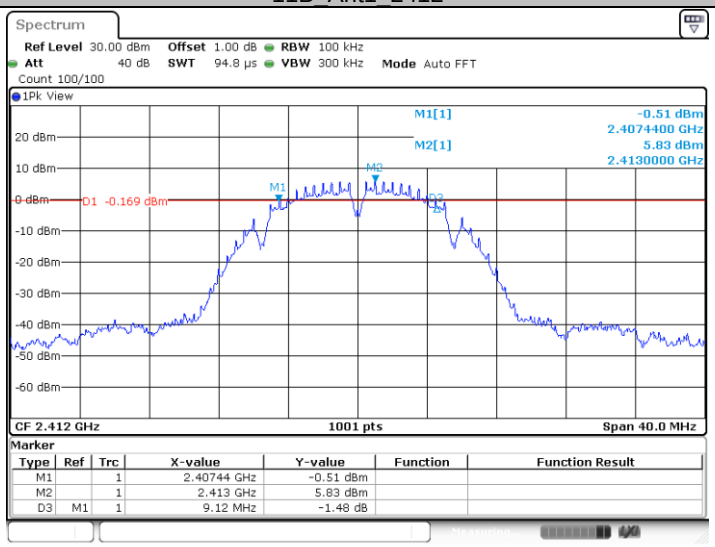
| Limit [kHz] |
|---|
| ≥500 |

| TestMode | Antenna | Channel(MHz) | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| 11B | Ant1 | 2412 | 9.120 | 2407.440 | 2416.560 | 0.5 | PASS |
| | | 2437 | 9.120 | 2432.440 | 2441.560 | 0.5 | PASS |
| | | 2462 | 9.160 | 2457.400 | 2466.560 | 0.5 | PASS |
| 11G | Ant1 | 2412 | 16.400 | 2403.800 | 2420.200 | 0.5 | PASS |
| | | 2437 | 16.440 | 2428.760 | 2445.200 | 0.5 | PASS |
| | | 2462 | 16.440 | 2453.760 | 2470.200 | 0.5 | PASS |
| 11N20SISO | Ant1 | 2412 | 17.400 | 2403.400 | 2420.800 | 0.5 | PASS |
| | | 2437 | 17.480 | 2428.320 | 2445.800 | 0.5 | PASS |
| | | 2462 | 17.640 | 2453.160 | 2470.800 | 0.5 | PASS |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

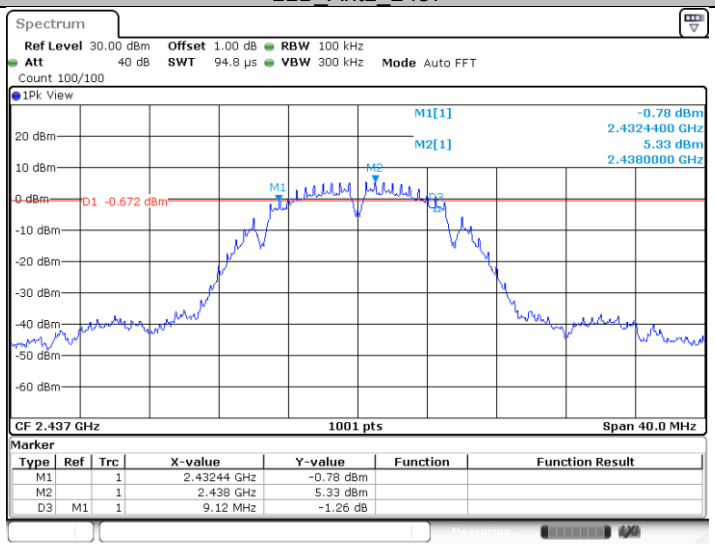
## 6 dB Bandwidth

11B_Ant1_2412




Date: 4.DEC.2020 14:27:36

11B_Ant1_2437

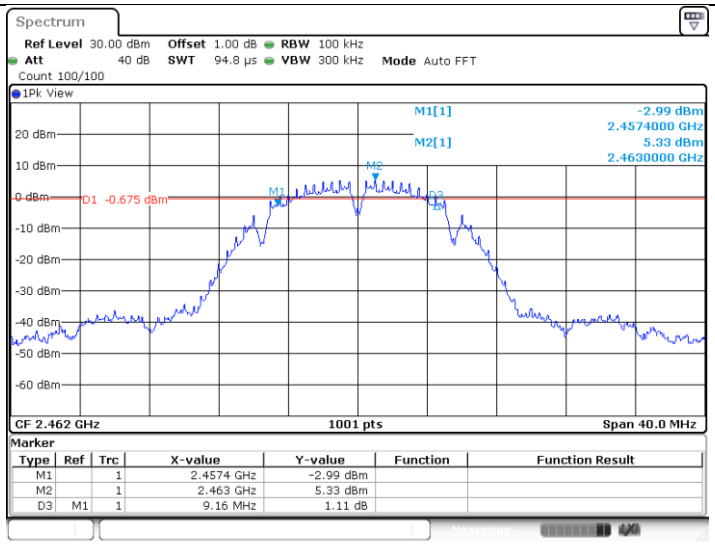



Date: 4.DEC.2020 14:31:04

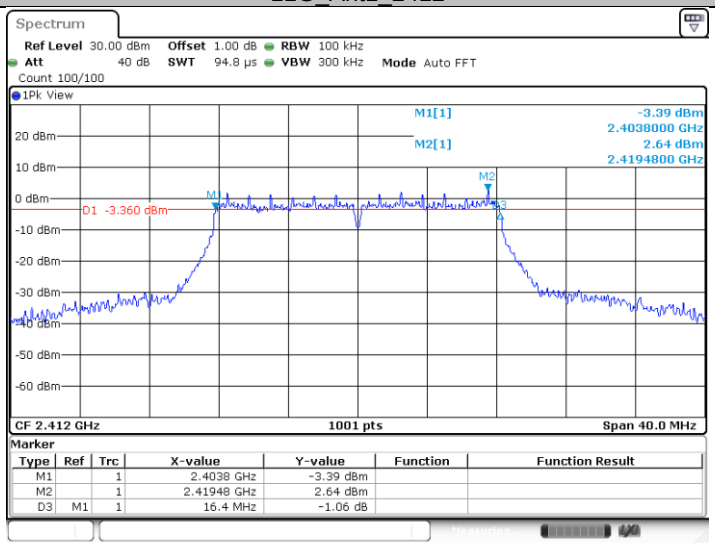
11B_Ant1_2462



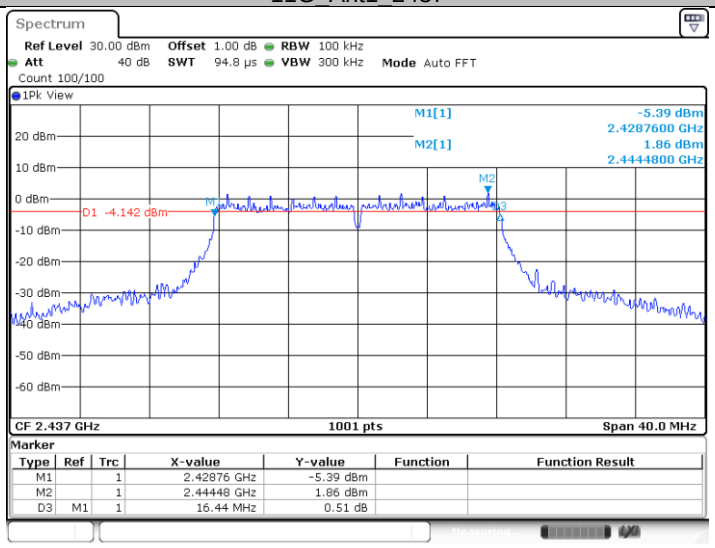
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11G_Ant1_2412



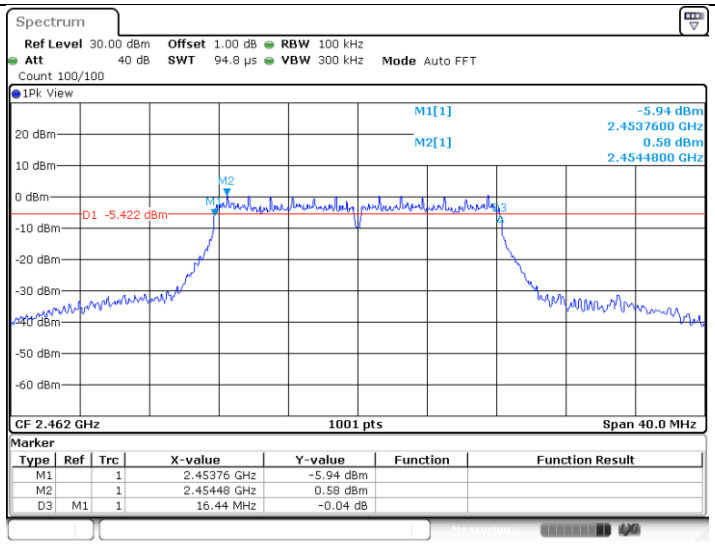

11G_Ant1_2437



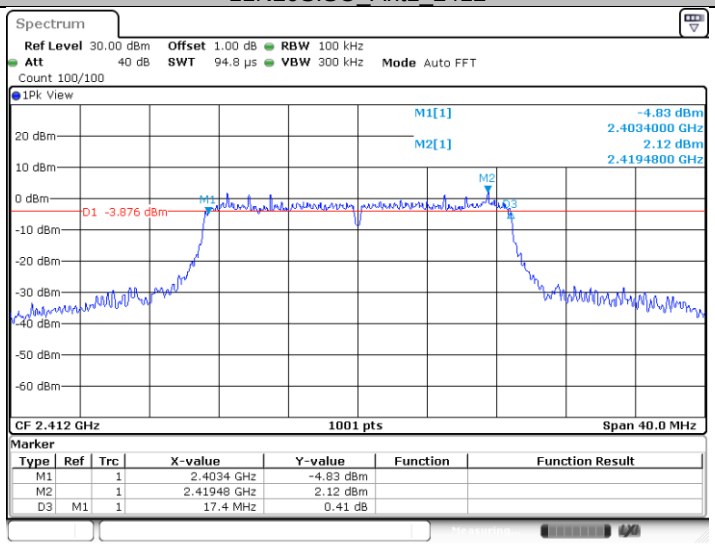

11G_Ant1_2462



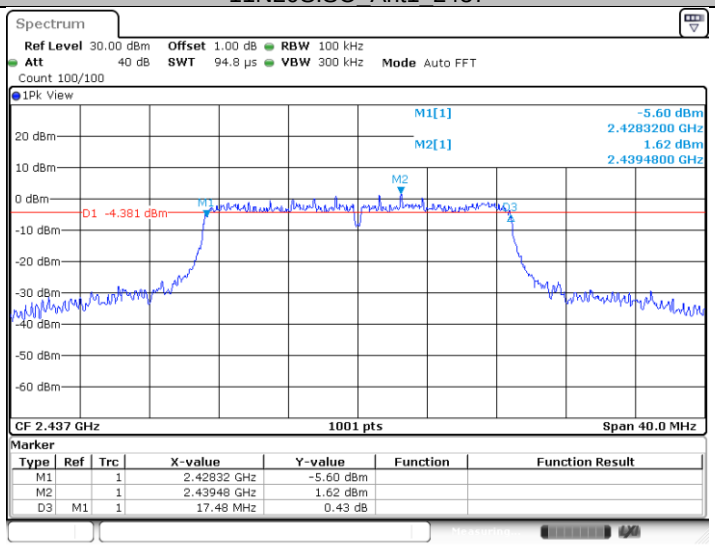
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11N20SISO_Ant1_2412



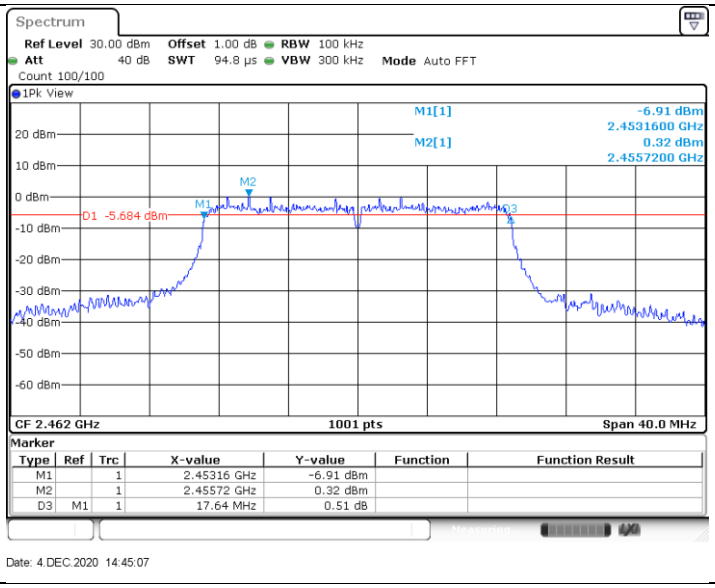

11N20SISO_Ant1_2437




11N20SISO_Ant1_2462



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299






TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## 8.4 Power spectral density

**Test Method**

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

1. 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.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

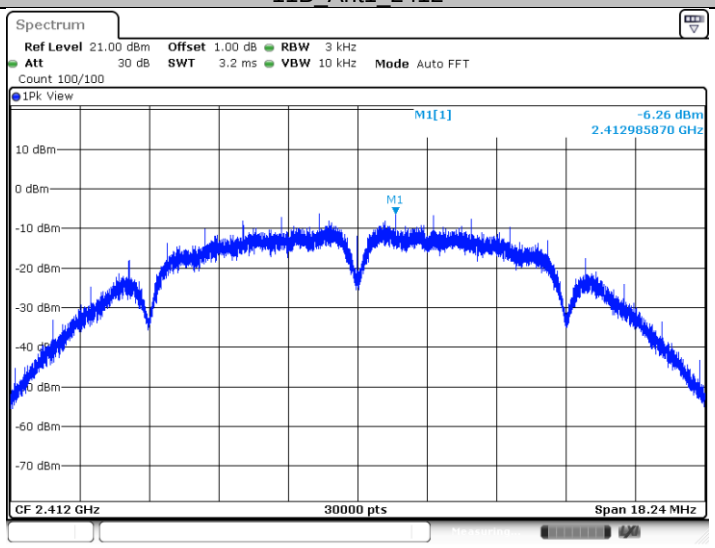
**Limit**

| Limit [dBm/3kHz] |
|---|
| ≤8 |

| TestMode | Antenna | Channel(MHz) | Result(dBm/3kHz) | Limit(dBm/3kHz) | Verdict |
|---|---|---|---|---|---|
| 11B | Ant1 | 2412 | -6.26 | <=8 | PASS |
| | | 2437 | -7.02 | <=8 | PASS |
| | | 2462 | -6.41 | <=8 | PASS |
| 11G | Ant1 | 2412 | -11.52 | <=8 | PASS |
| | | 2437 | -12.09 | <=8 | PASS |
| | | 2462 | -12.65 | <=8 | PASS |
| 11N20SISO | Ant1 | 2412 | -11.27 | <=8 | PASS |
| | | 2437 | -11.6 | <=8 | PASS |
| | | 2462 | -11.82 | <=8 | PASS |

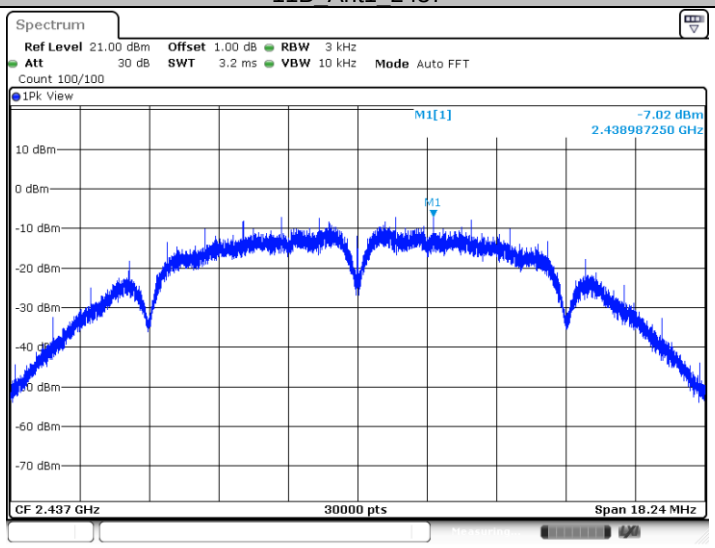

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11B_Ant1_2412



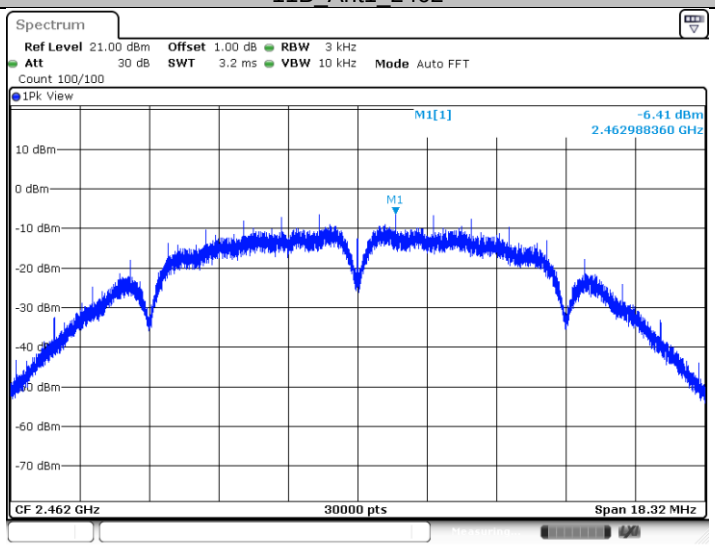

Date: 4.DEC.2020 14:27:58

11B_Ant1_2437




Date: 4.DEC.2020 14:31:26

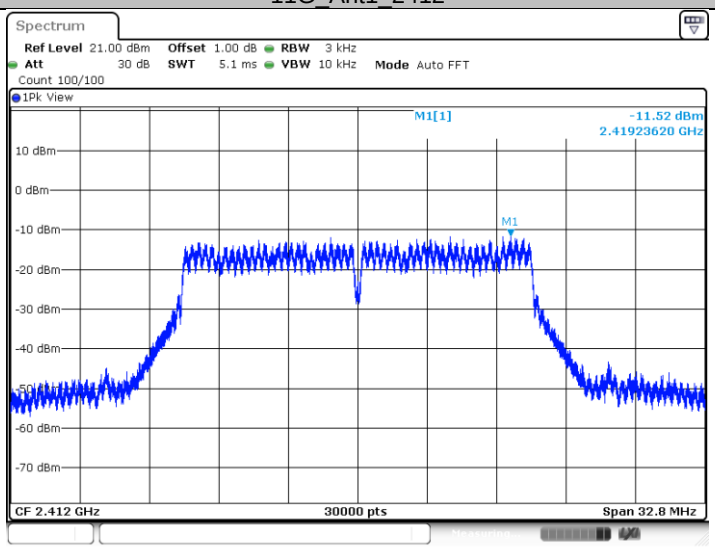
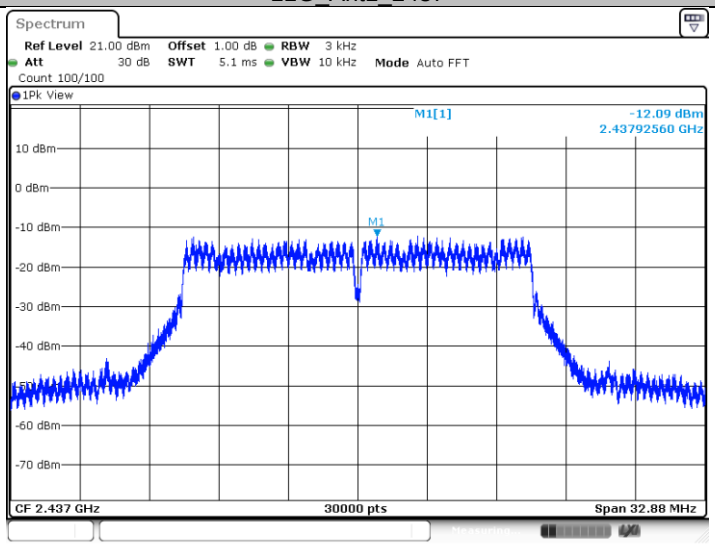
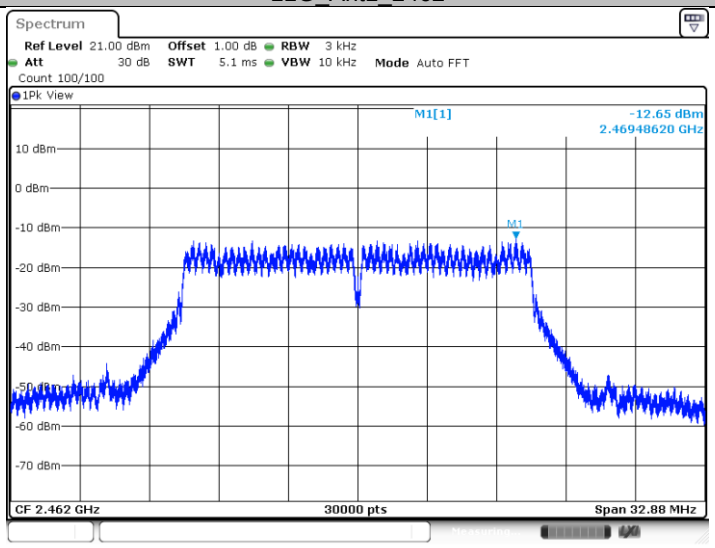
11B_Ant1_2462




Date: 4.DEC.2020 14:33:11

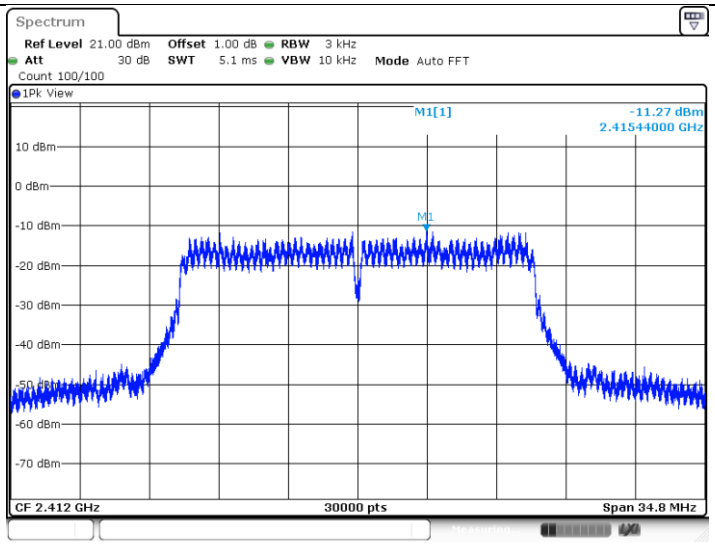


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

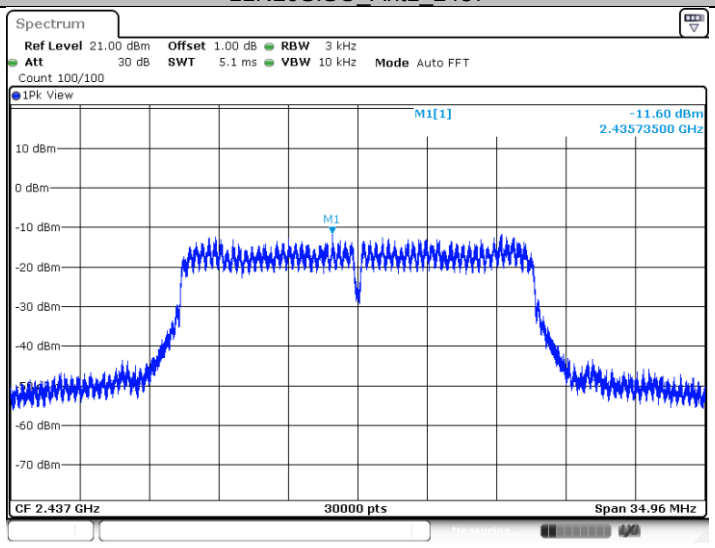
| 11G_Ant1_2412 |
|---|
|  <br>Date: 4.DEC.2020 14:35:03 |
| 11G_Ant1_2437 |
|  <br>Date: 4.DEC.2020 14:37:01 |
| 11G_Ant1_2462 |
|  <br>Date: 4.DEC.2020 14:39:06 |
| 11N20SISO_Ant1_2412 |



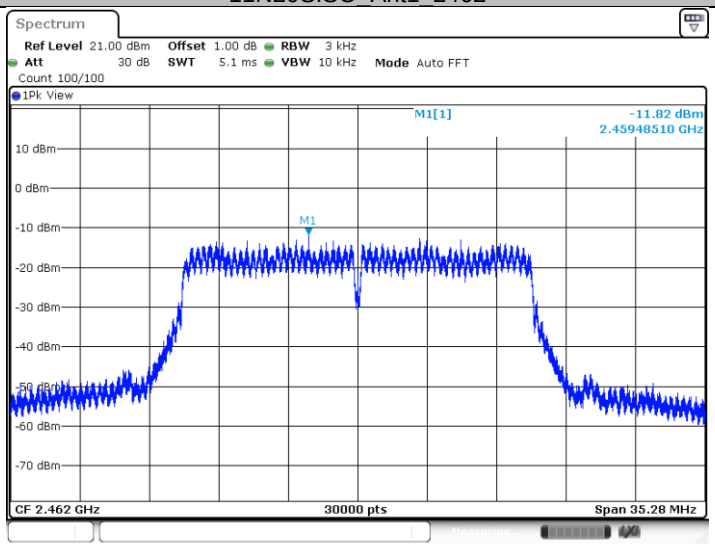
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11N20SISO_Ant1_2437




11N20SISO_Ant1_2462






TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## 8.5 Spurious RF conducted emissions

**Test Method**

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10$^{th}$ harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
3. The level displayed must comply with the limit specified in this Section. Submit these plots.
4. Repeat above procedures until all frequencies measured were complete.

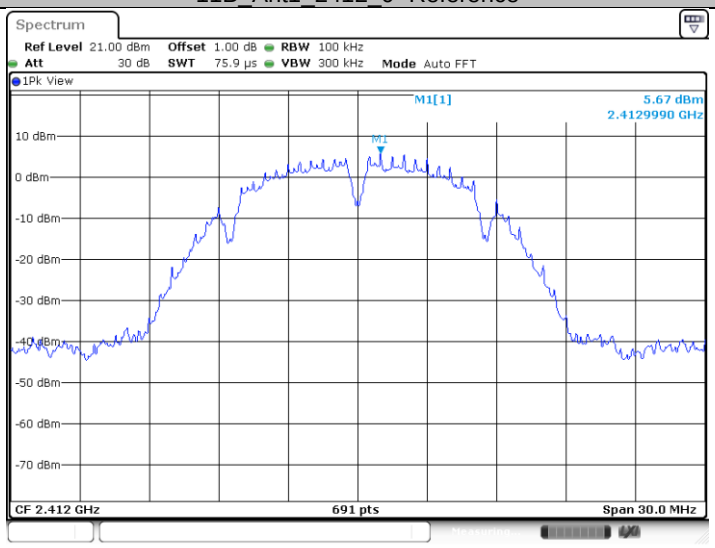
**Limit**

| Frequency Range MHz | Limit (dBc) |
|---|---|
| 30-25000 | -20 |

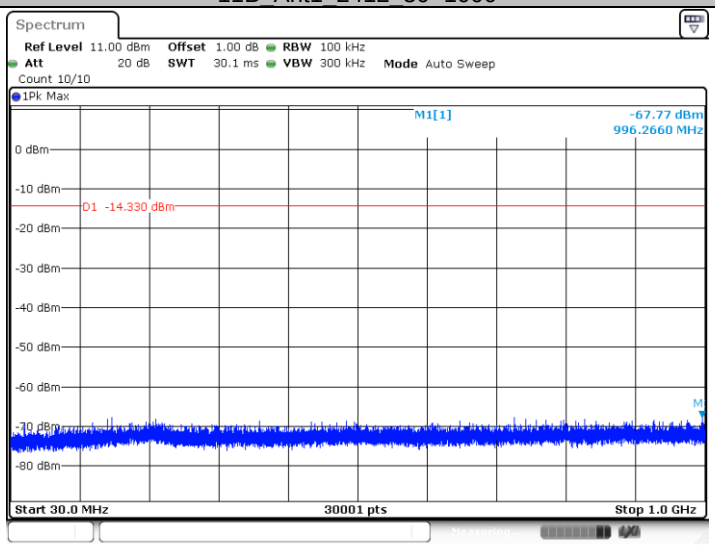

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## Spurious RF conducted emissions

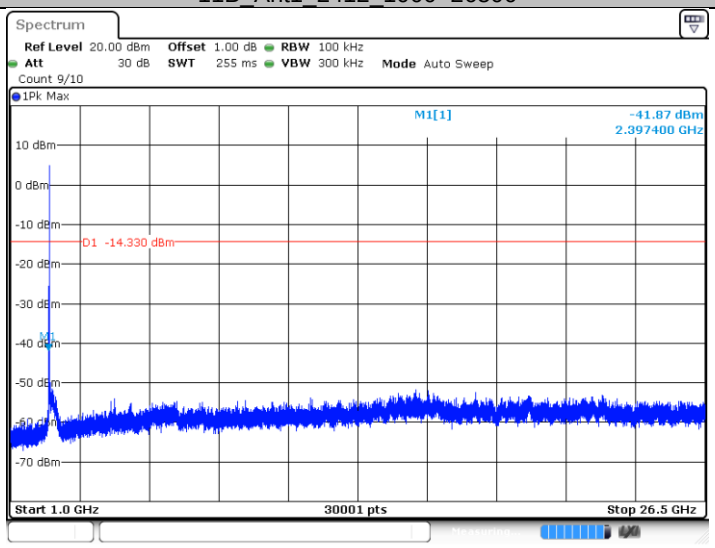
11B_Ant1_2412_0~Reference




11B_Ant1_2412_30~1000

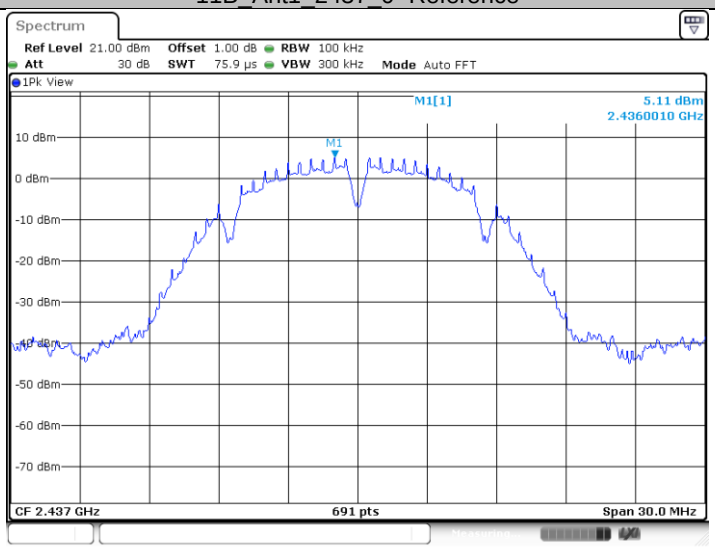
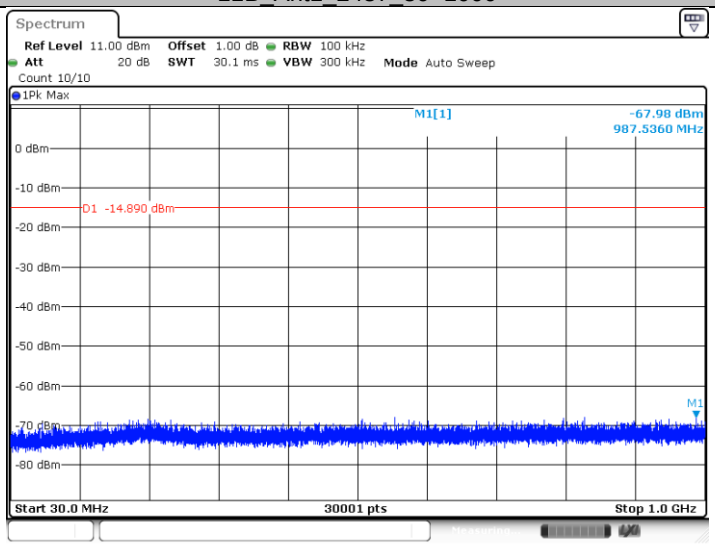
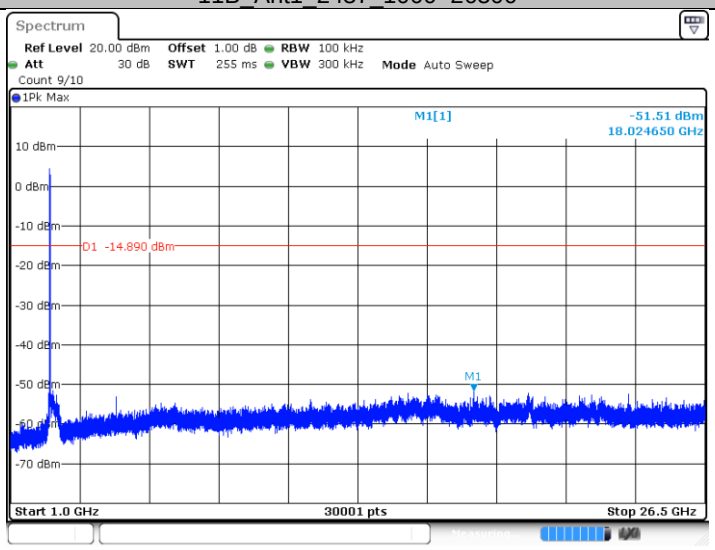



11B_Ant1_2412_1000~26500



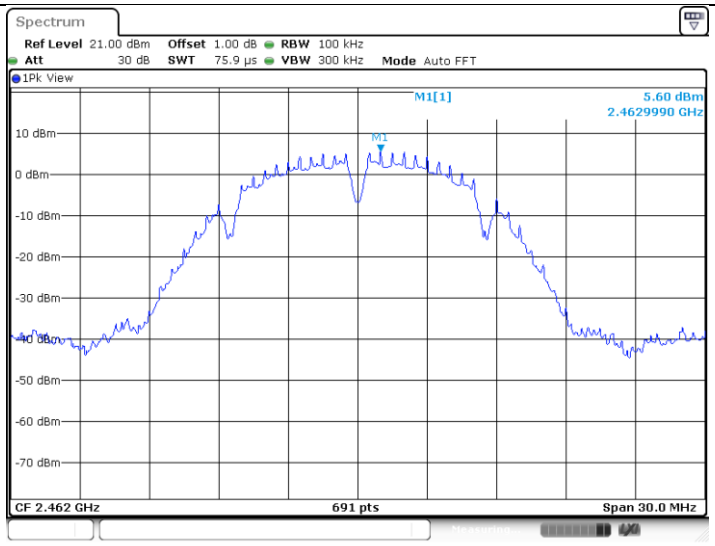



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

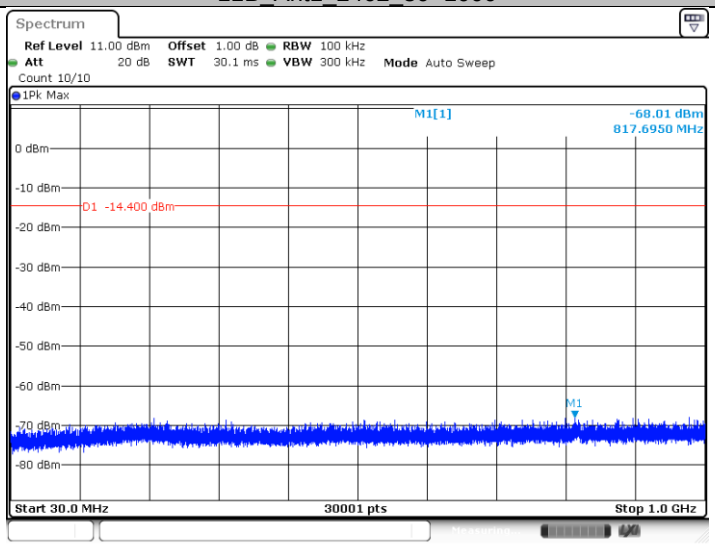
| 11B_Ant1_2437_0~Reference |
|---|
|  |
| 11B_Ant1_2437_30~1000 |
|  |
| 11B_Ant1_2437_1000~26500 |
|  |
| 11B_Ant1_2462_0~Reference |



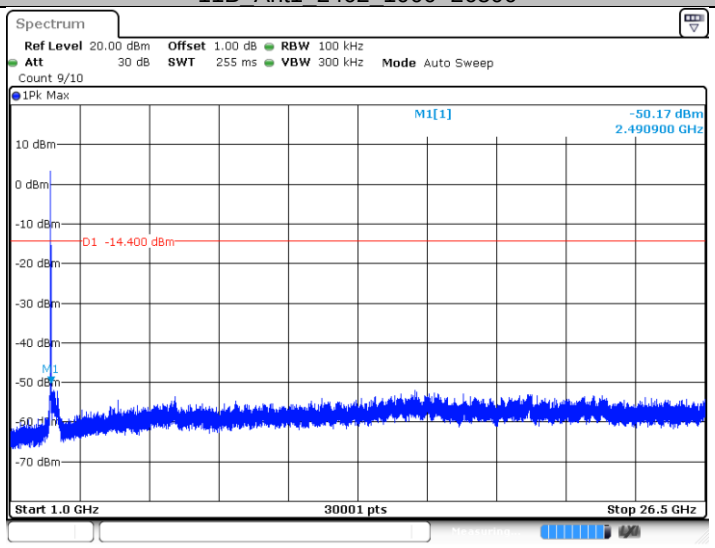
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11B_Ant1_2462_30~1000



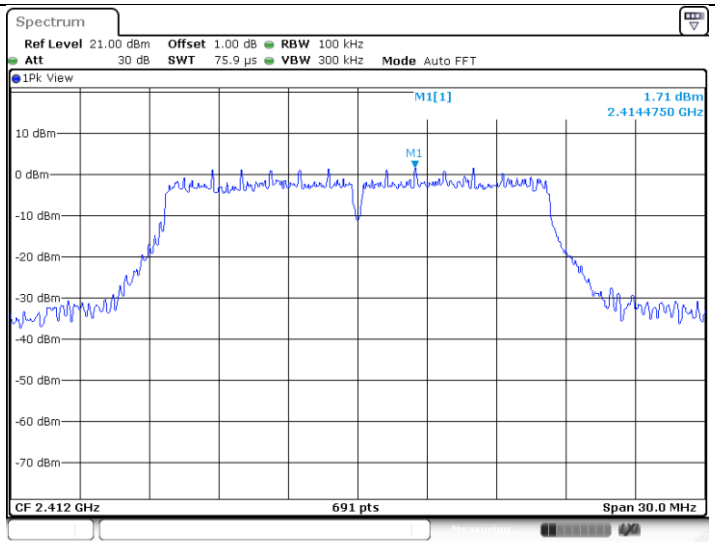

11B_Ant1_2462_1000~26500



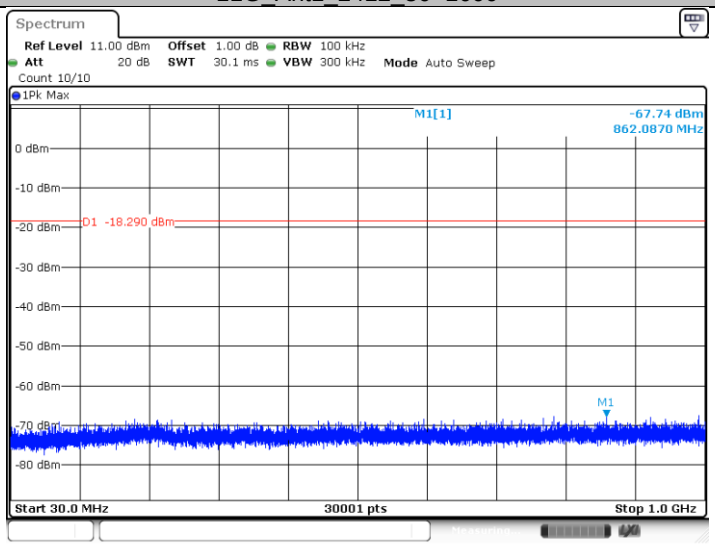

11G_Ant1_2412_0~Reference



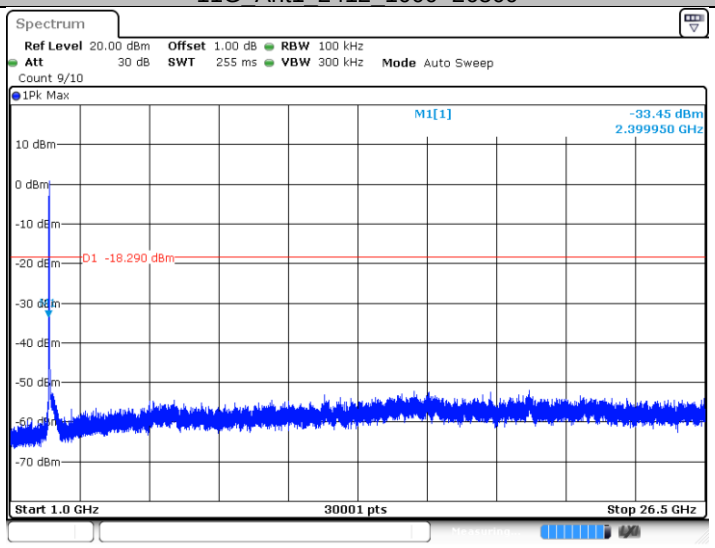
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11G_Ant1_2412_30~1000



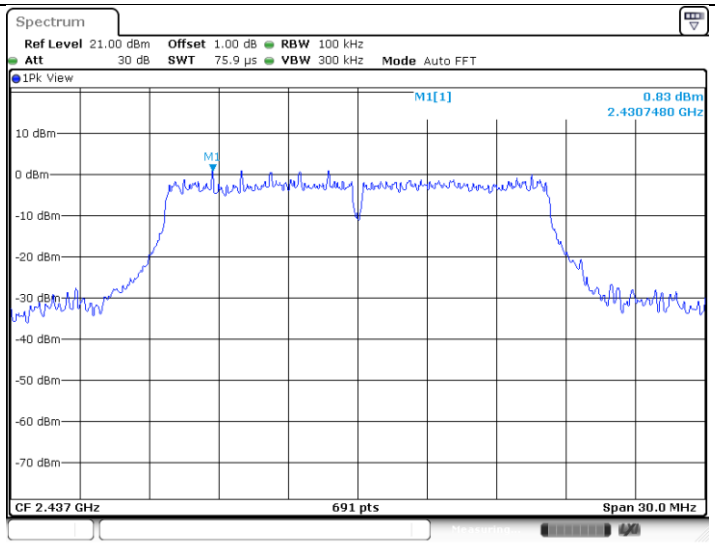

11G_Ant1_2412_1000~26500



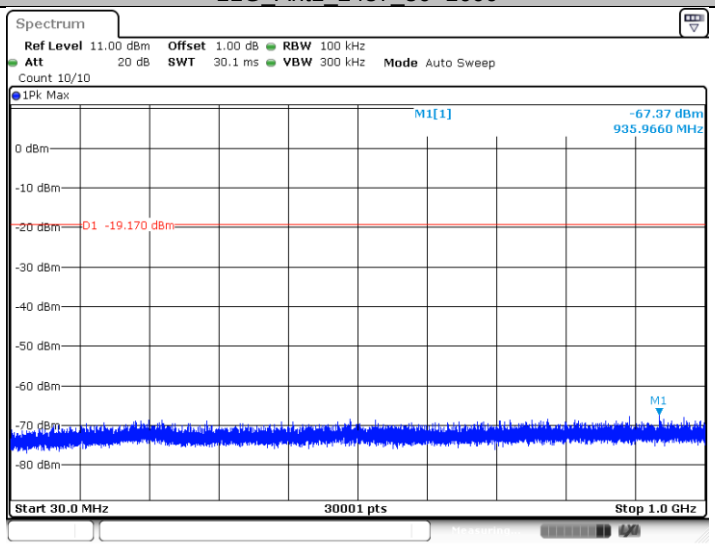

11G_Ant1_2437_0~Reference



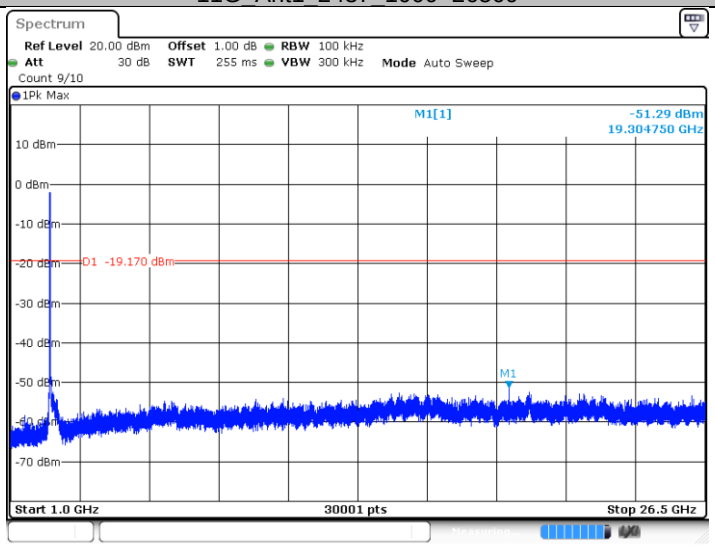
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11G_Ant1_2437_30~1000



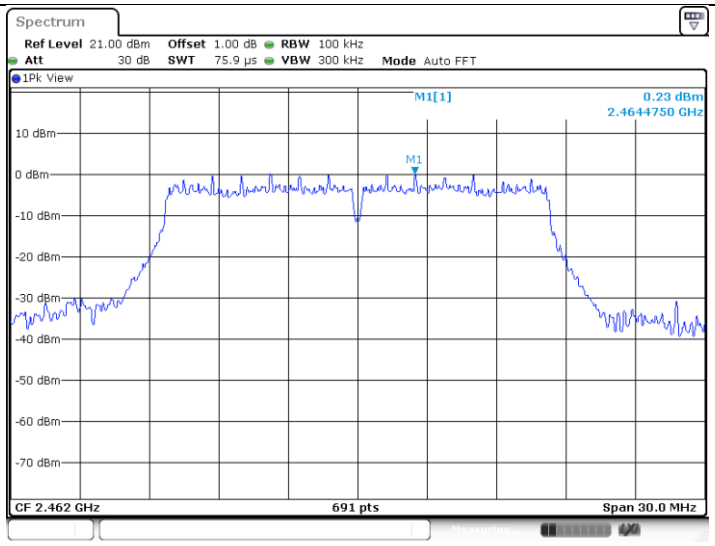

11G_Ant1_2437_1000~26500



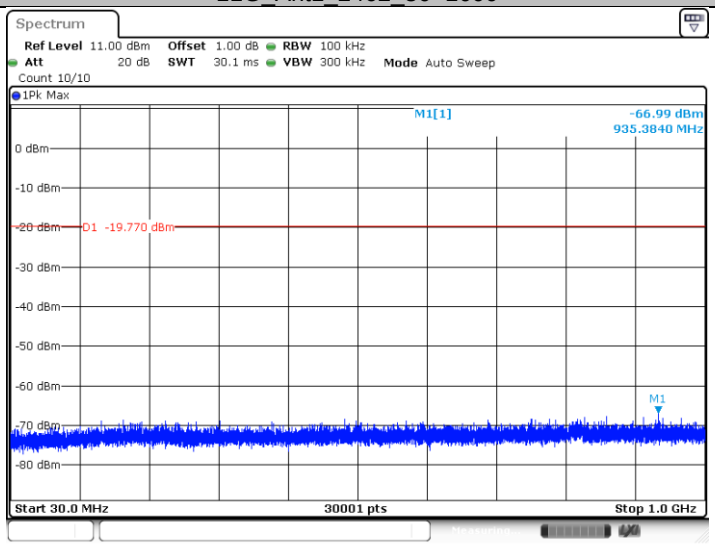

11G_Ant1_2462_0~Reference



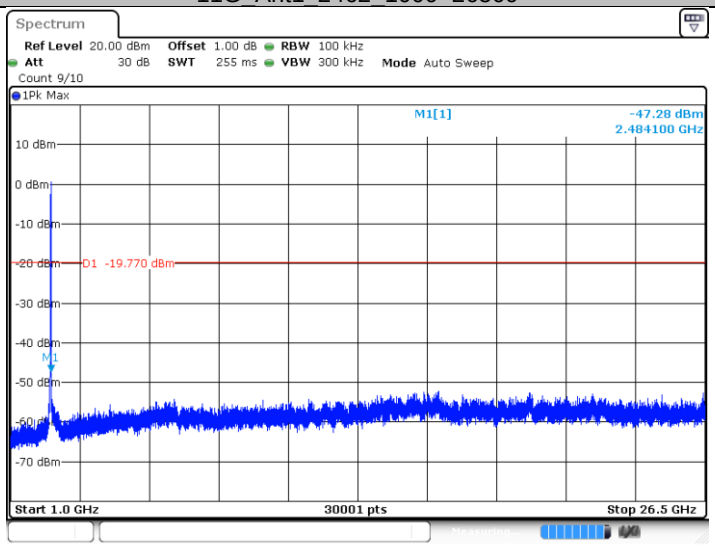
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11G_Ant1_2462_30~1000



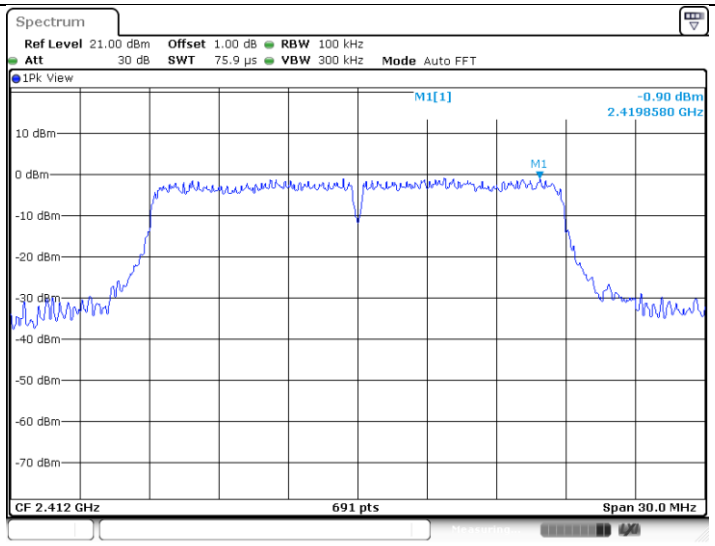

11G_Ant1_2462_1000~26500



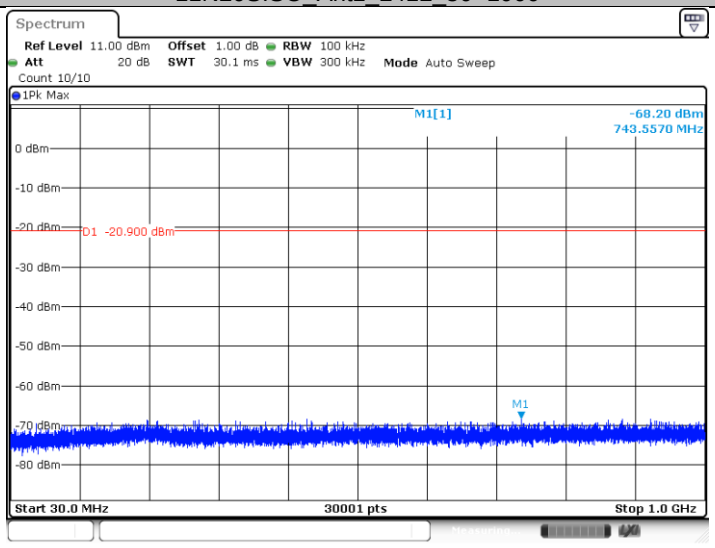

11N20SISO_Ant1_2412_0~Reference



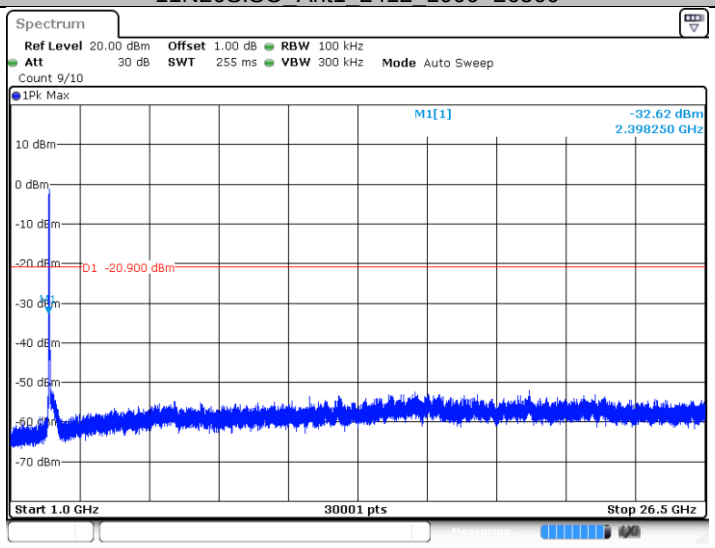
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11N20SISO_Ant1_2412_30~1000



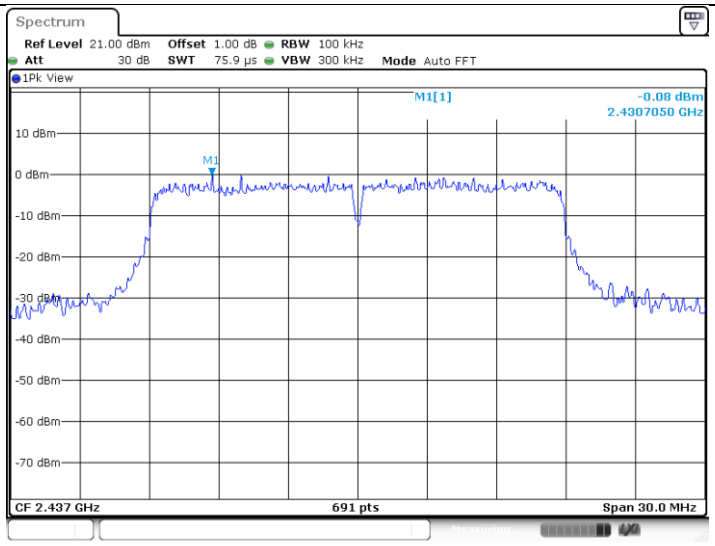

11N20SISO_Ant1_2412_1000~26500



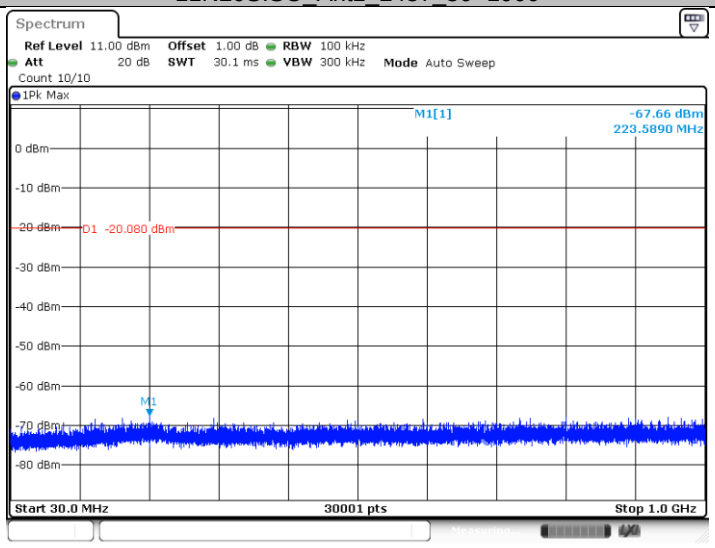

11N20SISO_Ant1_2437_0~Reference



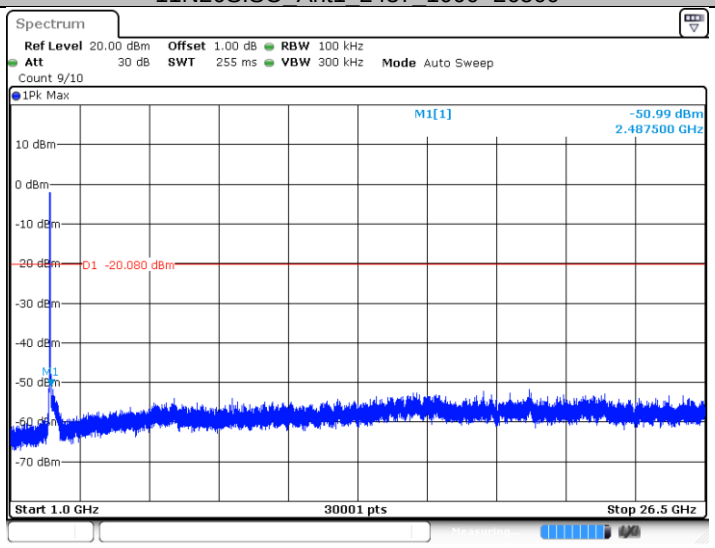
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11N20SISO_Ant1_2437_30~1000



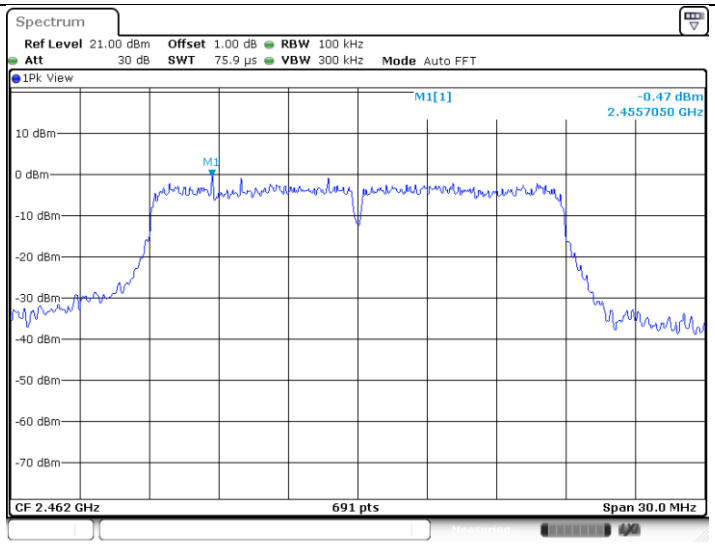

11N20SISO_Ant1_2437_1000~26500



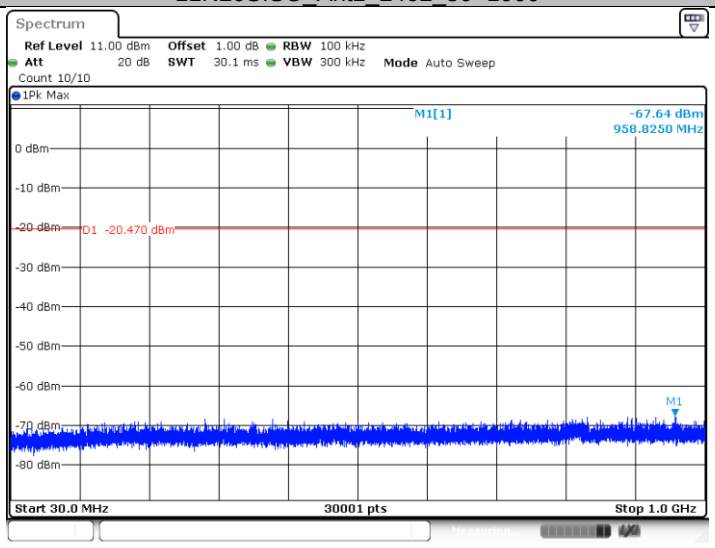

11N20SISO_Ant1_2462_0~Reference



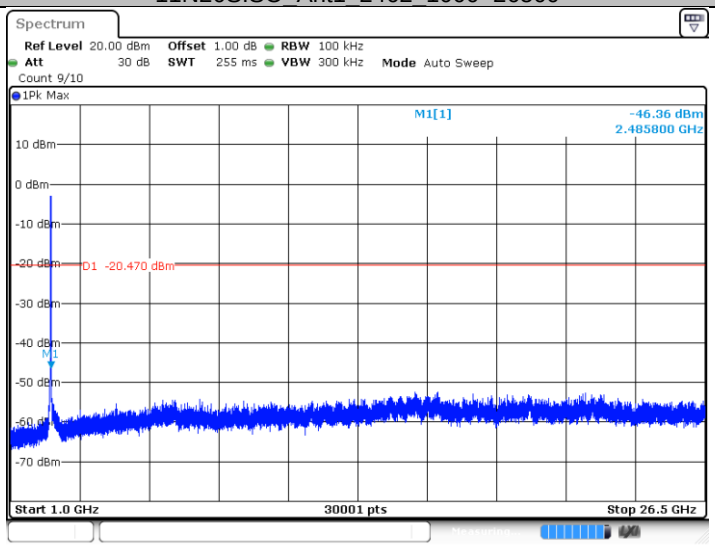
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299




11N20SISO_Ant1_2462_30~1000



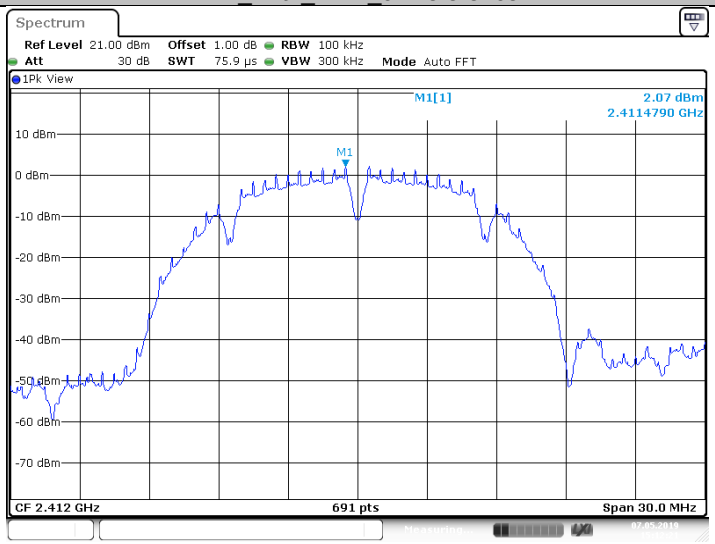

11N20SISO_Ant1_2462_1000~26500



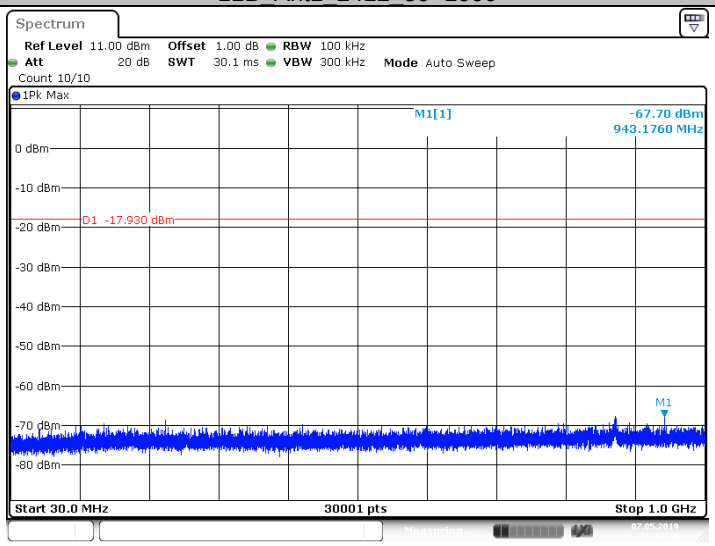



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

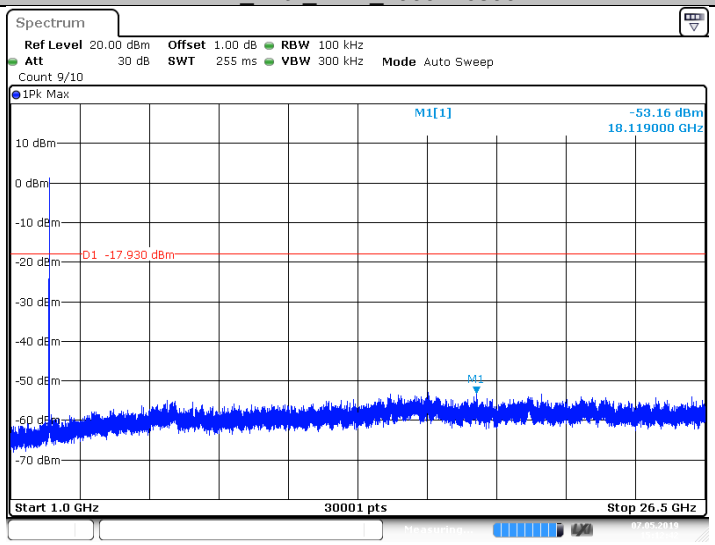
11B_Ant1_2412_0~Reference




11B_Ant1_2412_30~1000



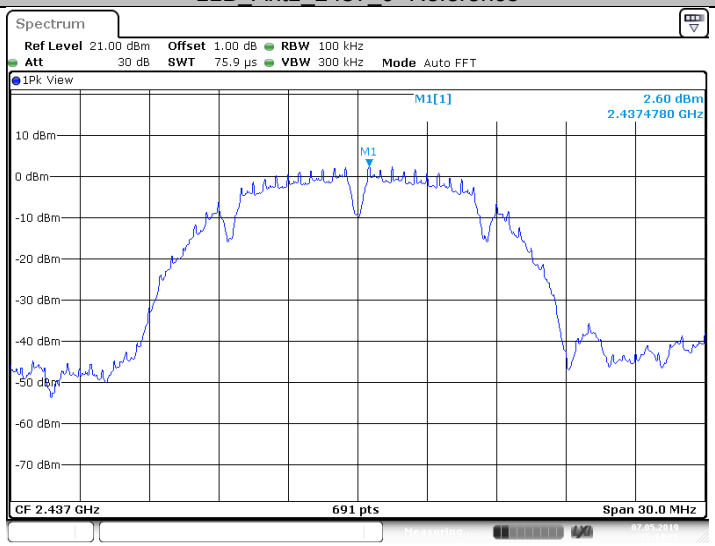

11B_Ant1_2412_1000~26500



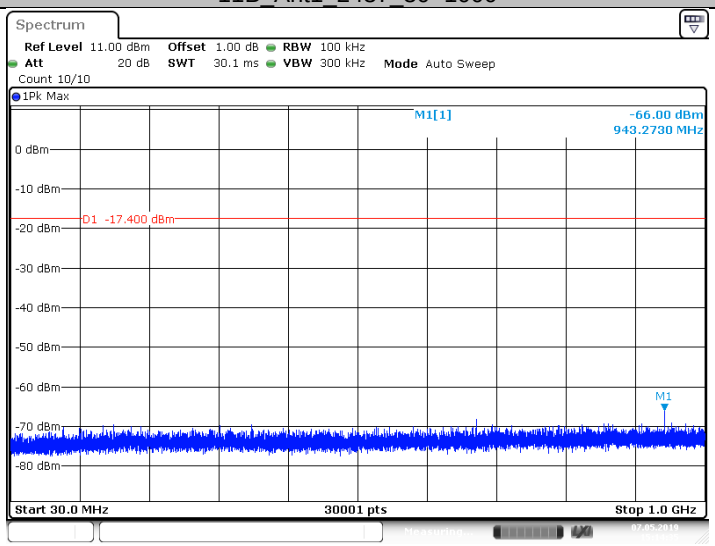



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

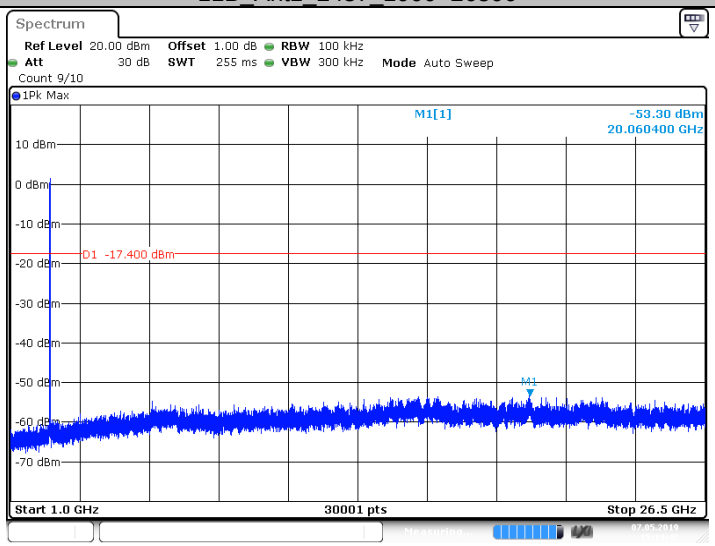
11B_Ant1_2437_0~Reference




11B_Ant1_2437_30~1000



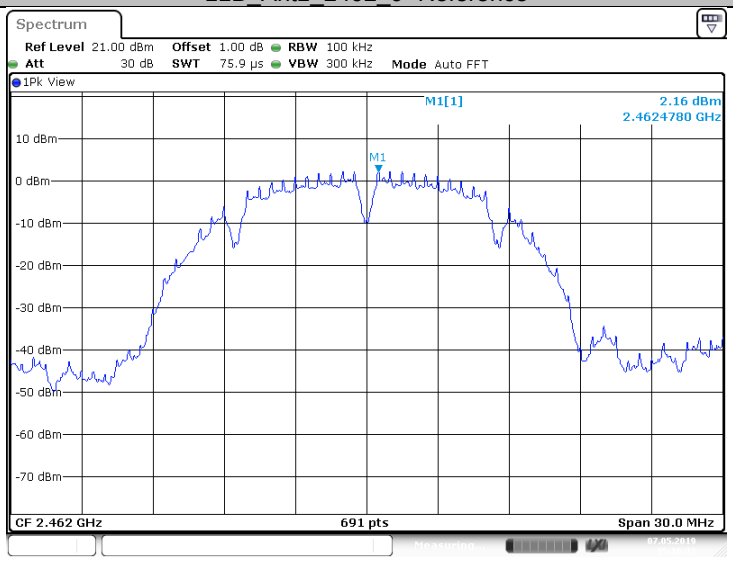

11B_Ant1_2437_1000~26500



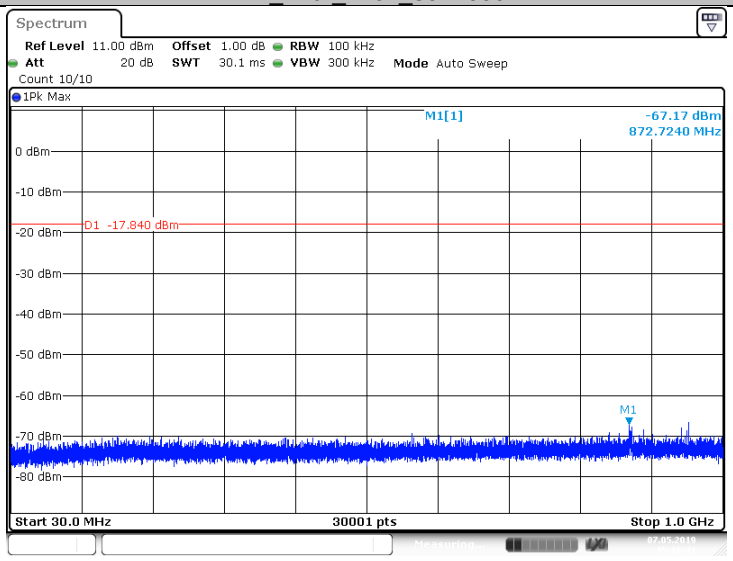



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

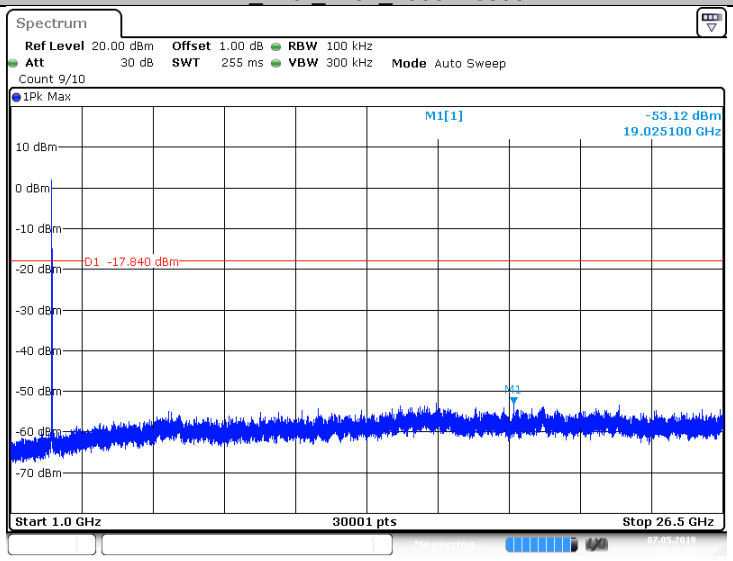
11B_Ant1_2462_0~Reference




11B_Ant1_2462_30~1000



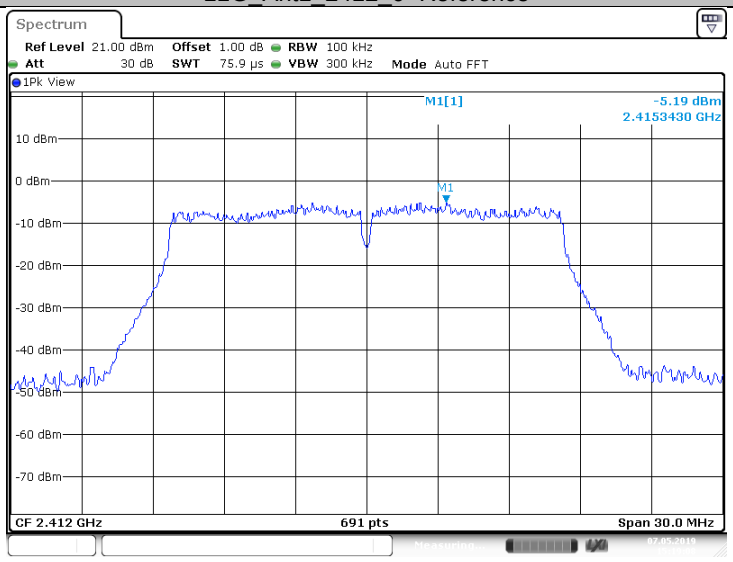

11B_Ant1_2462_1000~26500



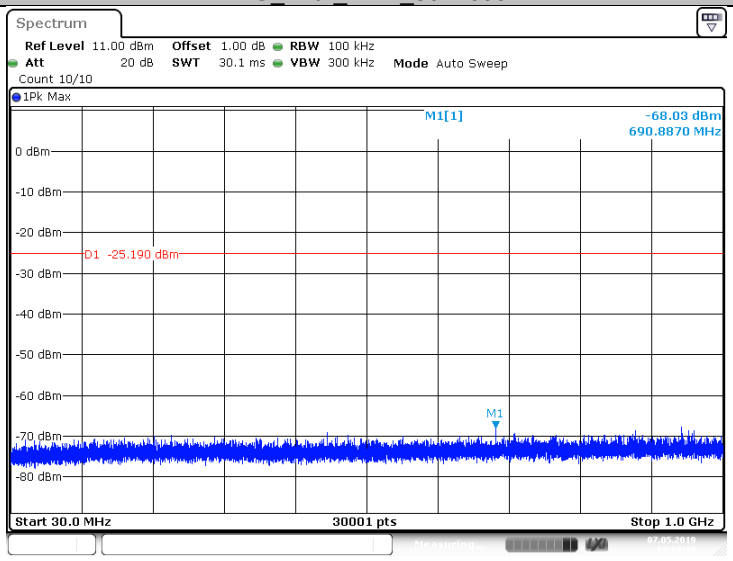



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

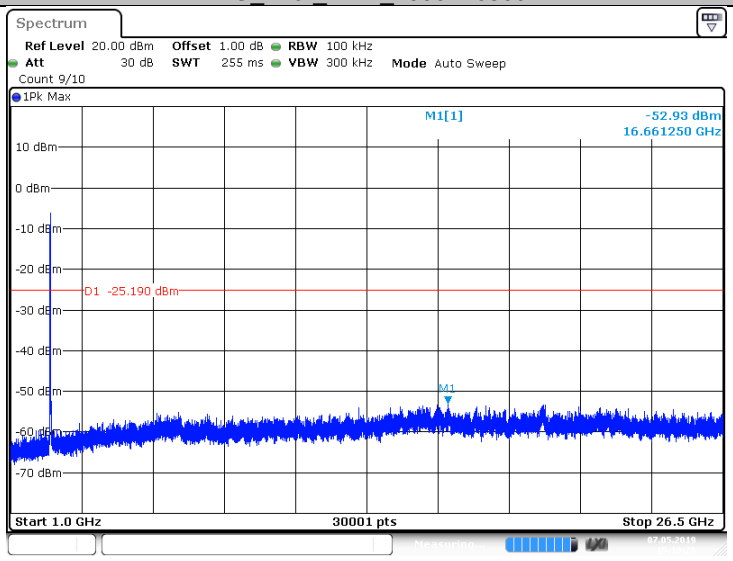
11G_Ant1_2412_0~Reference




11G_Ant1_2412_30~1000



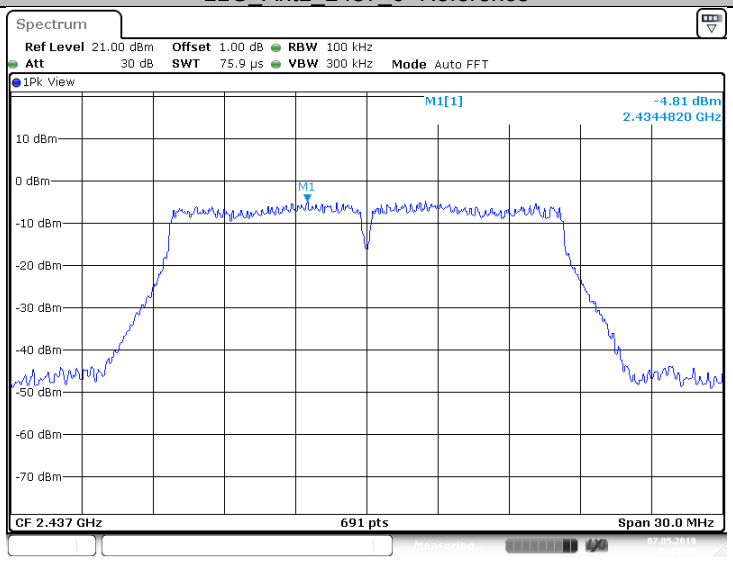

11G_Ant1_2412_1000~26500



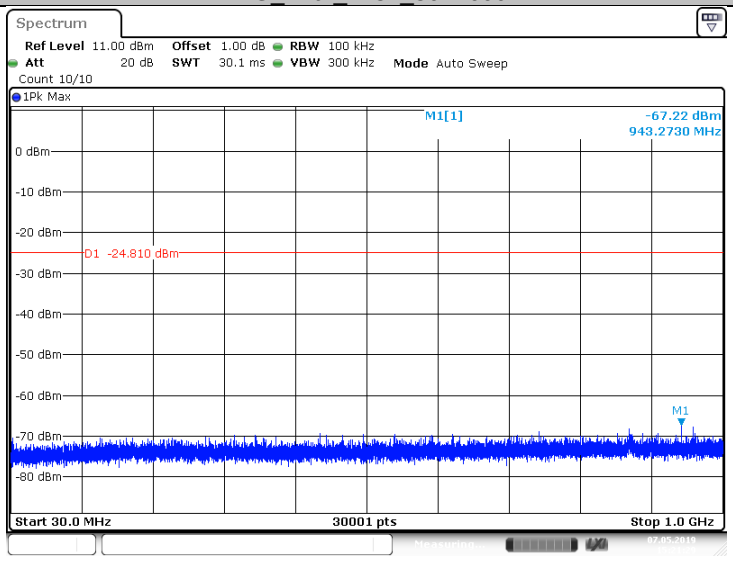



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

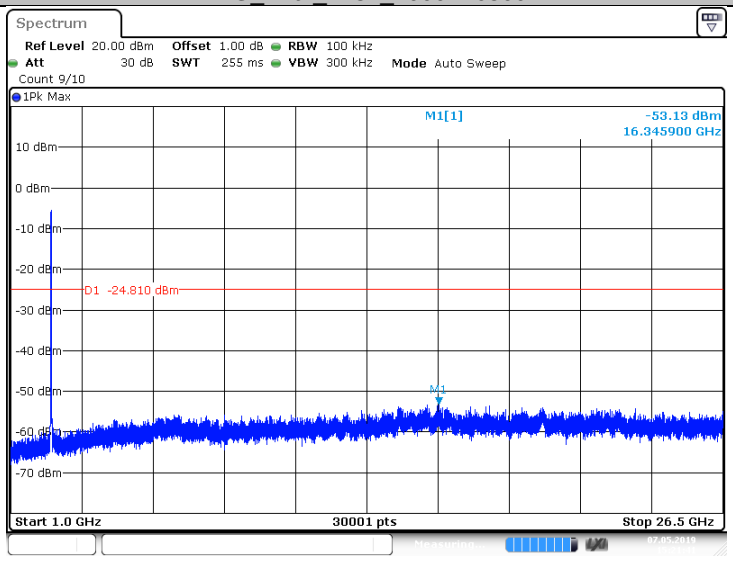
11G_Ant1_2437_0~Reference




11G_Ant1_2437_30~1000



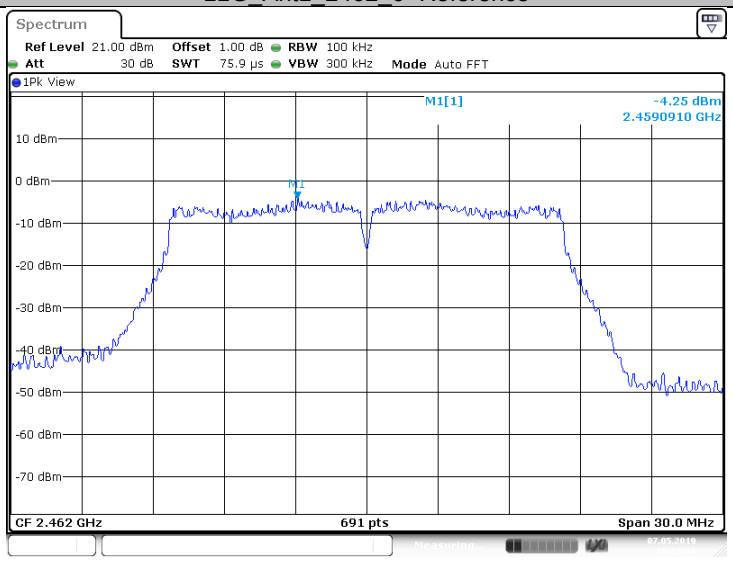

11G_Ant1_2437_1000~26500



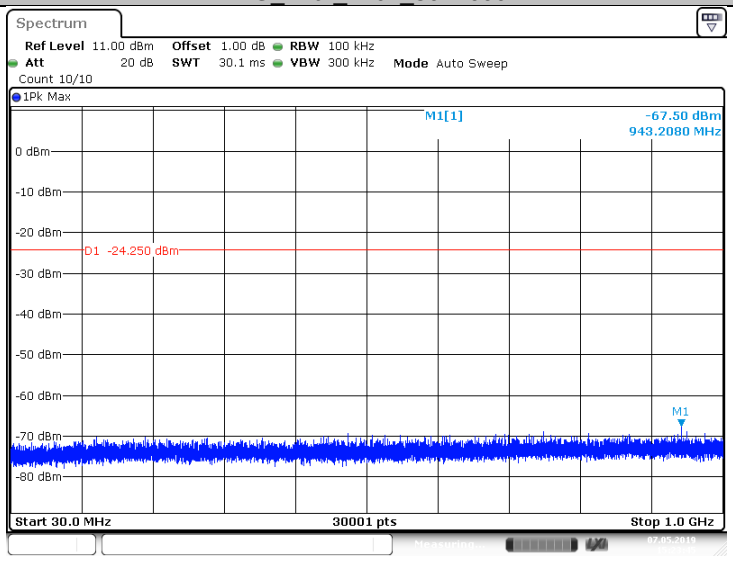



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

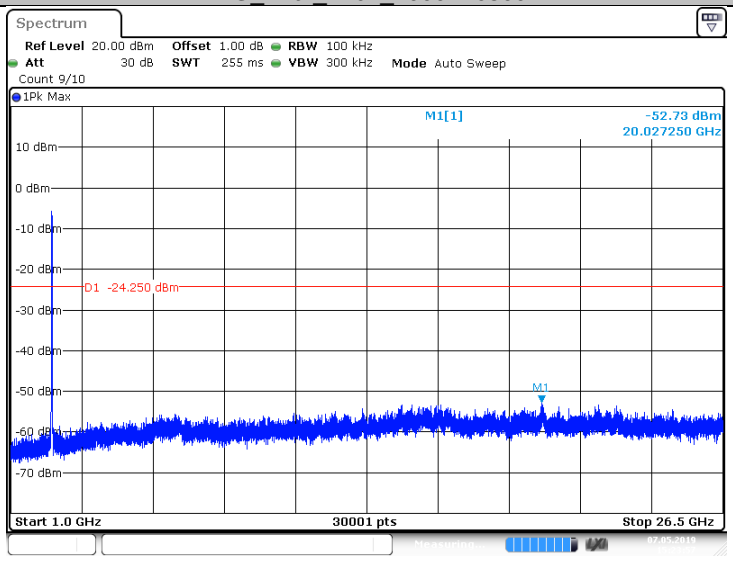
11G_Ant1_2462_0~Reference




11G_Ant1_2462_30~1000



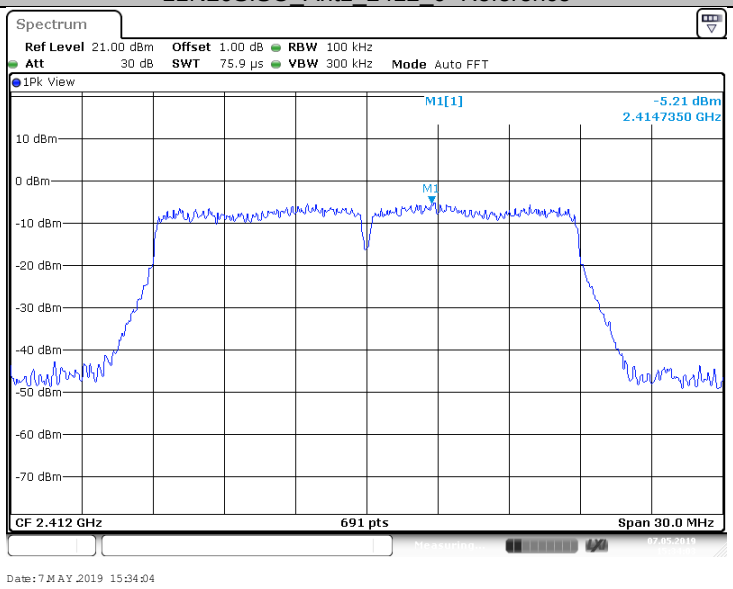

11G_Ant1_2462_1000~26500



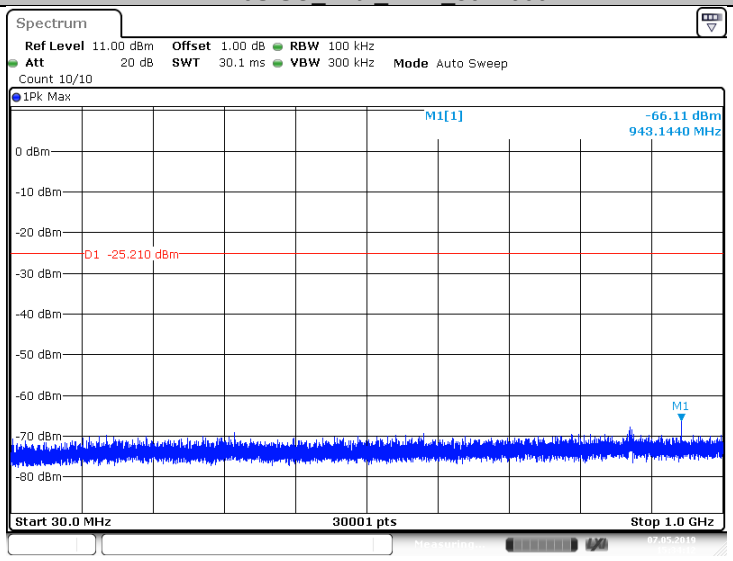



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

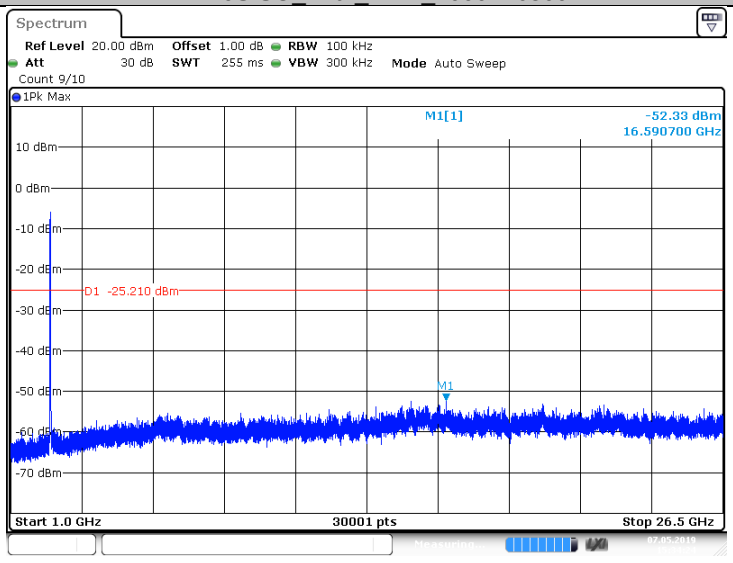
11N20SISO_Ant1_2412_0~Reference




11N20SISO_Ant1_2412_30~1000



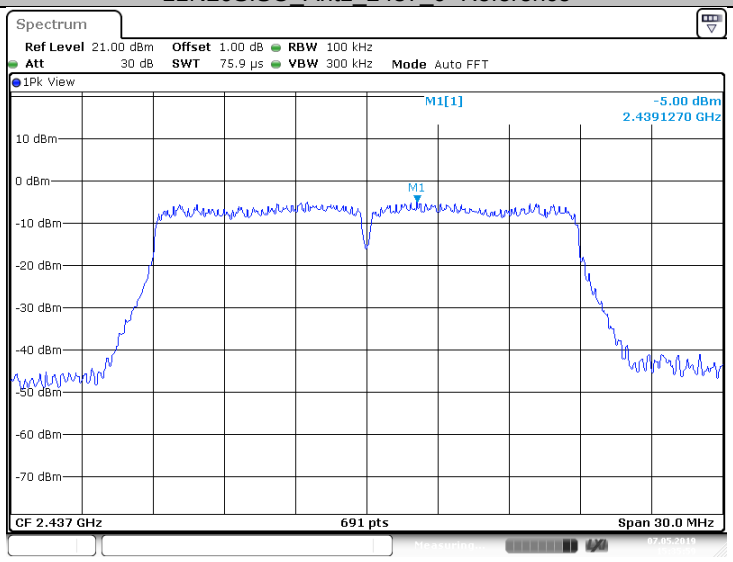

11N20SISO_Ant1_2412_1000~26500



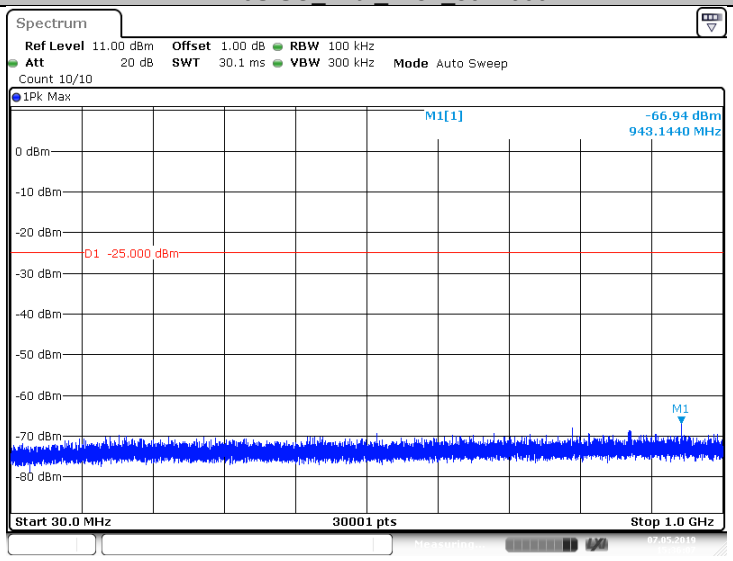



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

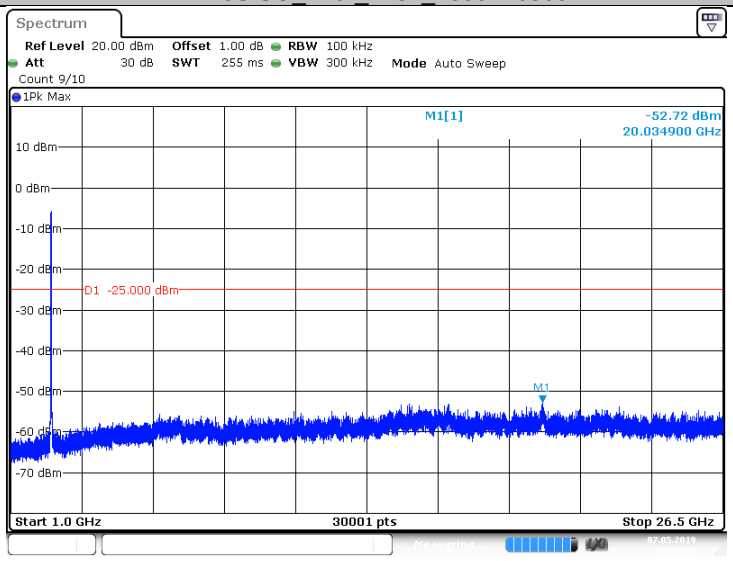
11N20SISO_Ant1_2437_0~Reference




11N20SISO_Ant1_2437_30~1000



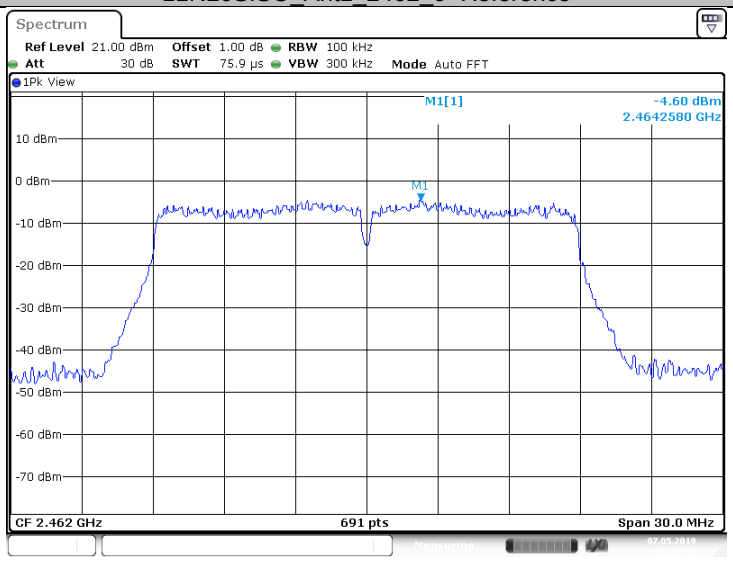

11N20SISO_Ant1_2437_1000~26500



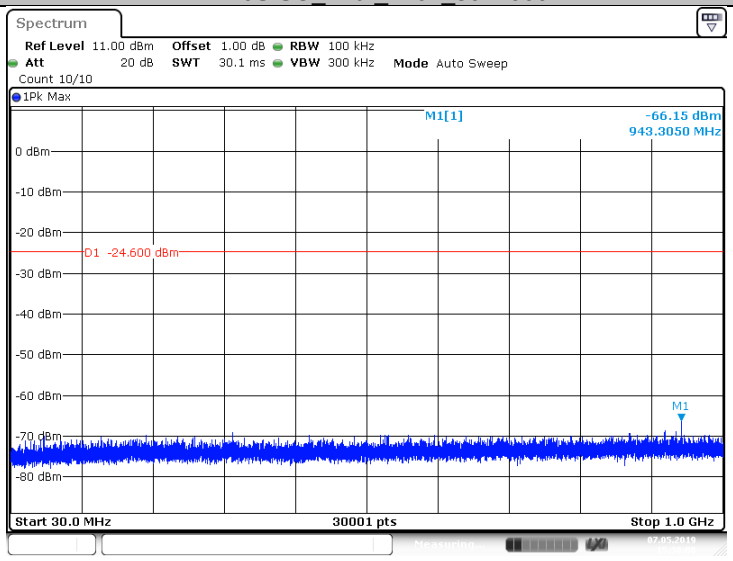



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

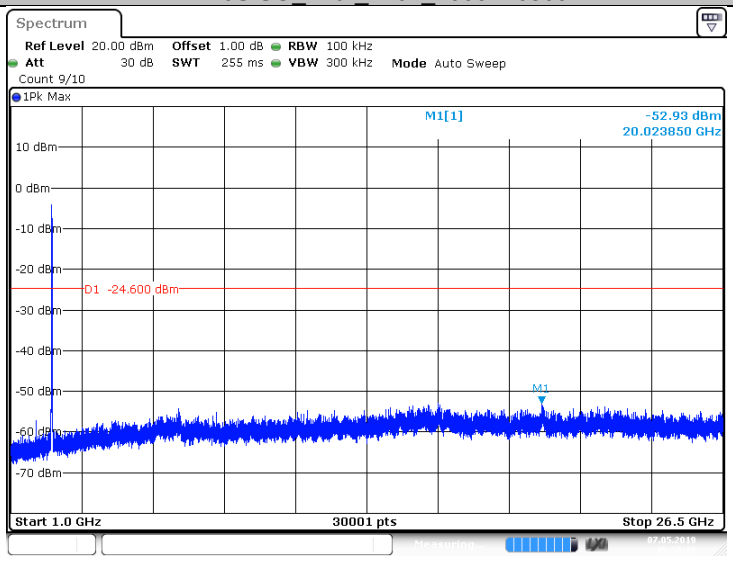
11N20SISO_Ant1_2462_0~Reference




11N20SISO_Ant1_2462_30~1000



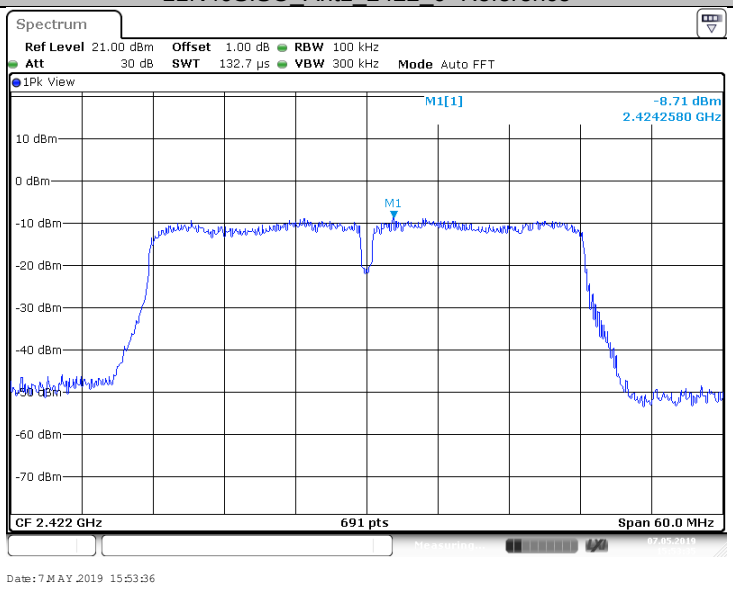

11N20SISO_Ant1_2462_1000~26500



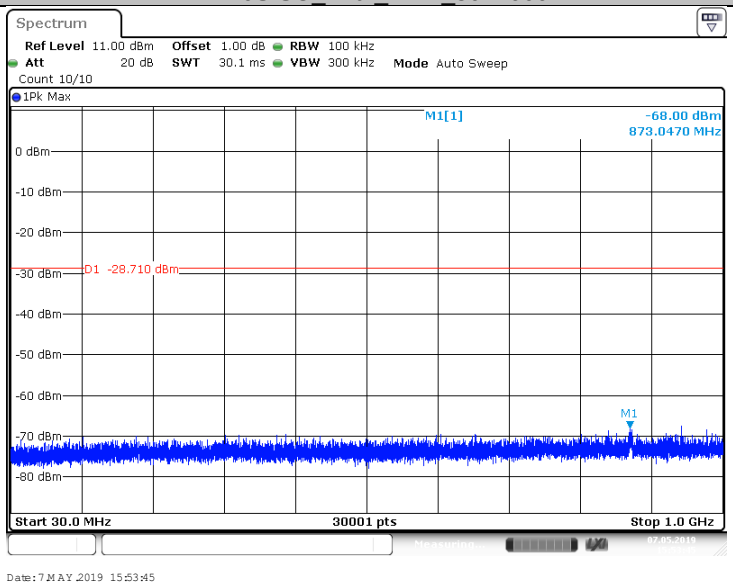



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

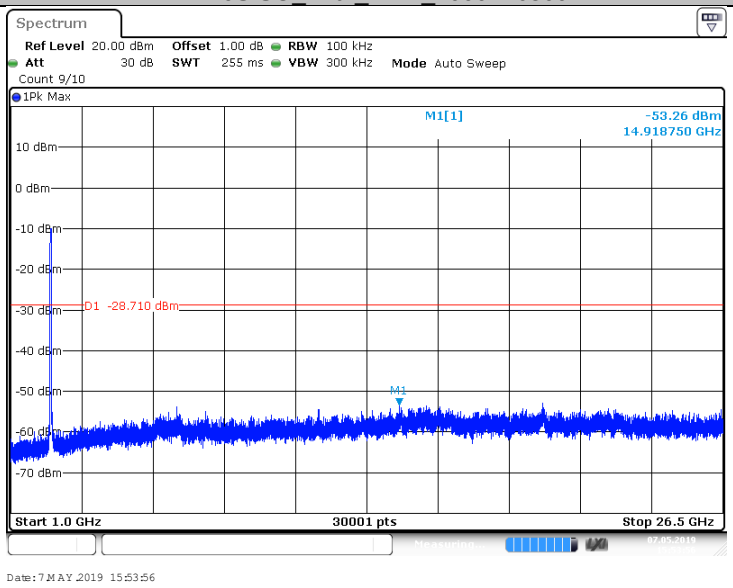
11N40SISO_Ant1_2422_0~Reference




11N40SISO_Ant1_2422_30~1000



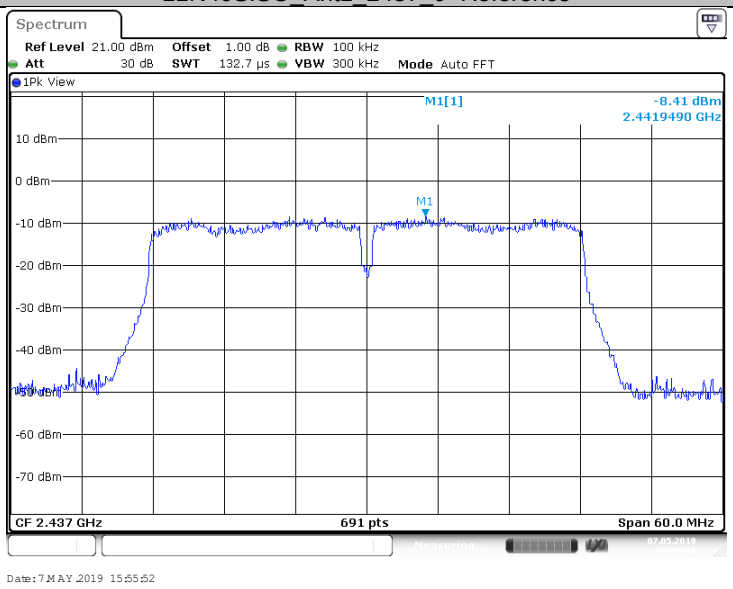

11N40SISO_Ant1_2422_1000~26500



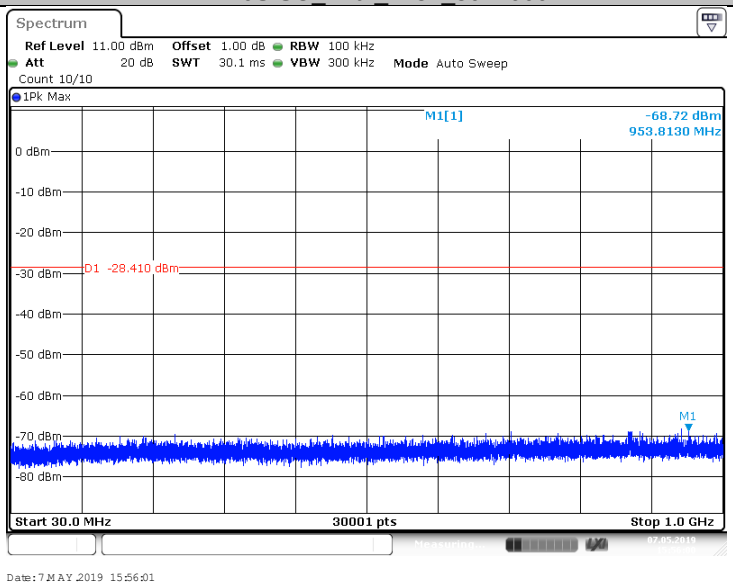



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

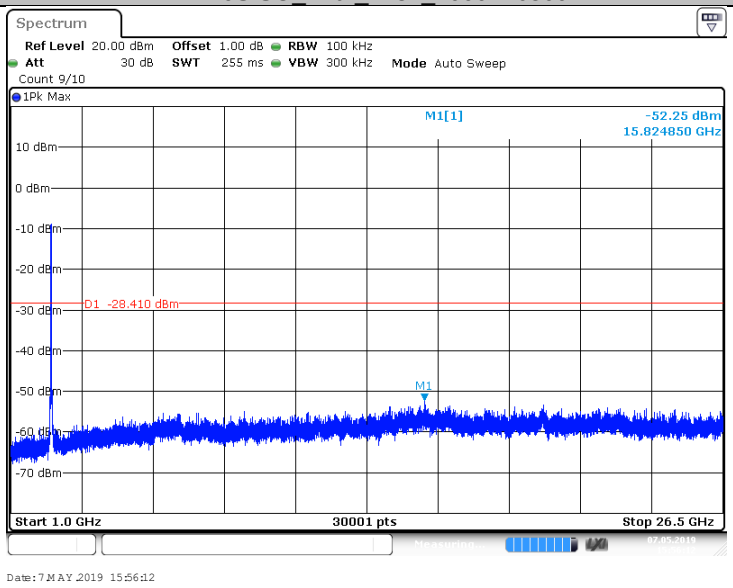
11N40SISO_Ant1_2437_0~Reference




11N40SISO_Ant1_2437_30~1000



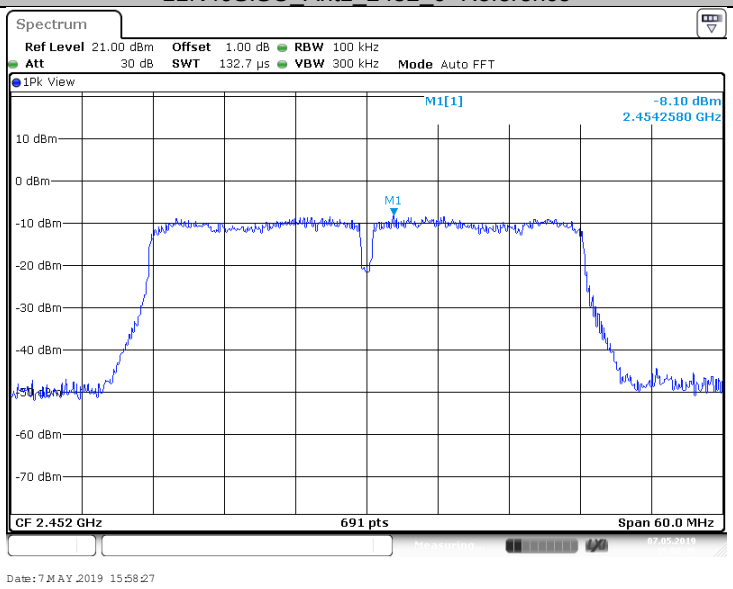

11N40SISO_Ant1_2437_1000~26500



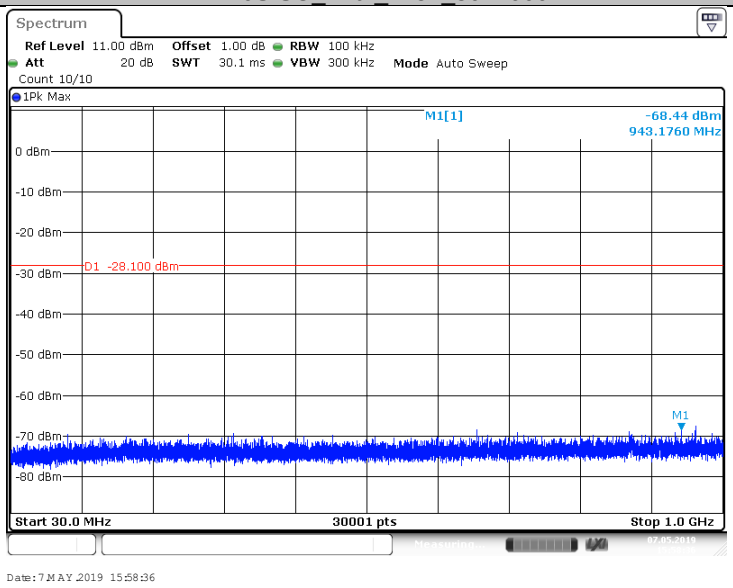



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11N40SISO_Ant1_2452_0~Reference




11N40SISO_Ant1_2452_30~1000






TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## 8.6 Band edge testing

**Test Method**

1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section. .
4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

**Limit:**

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

| Frequency Range MHz | Limit (dBc) |
|---|---|
| 30-25000 | -20 |

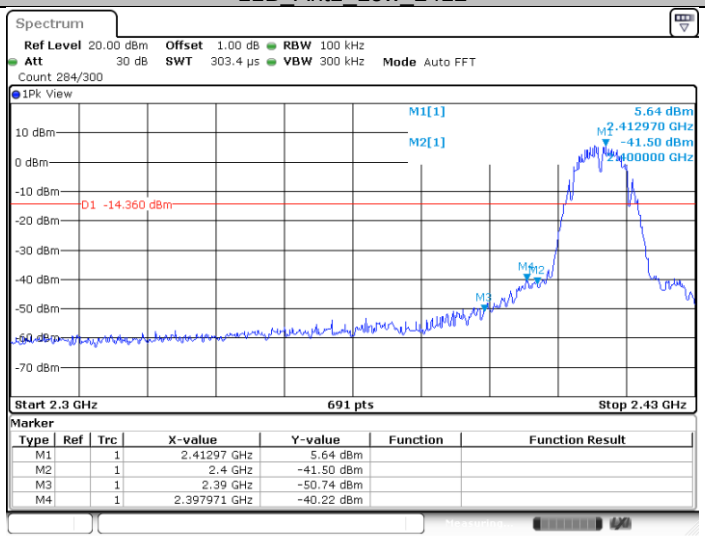
**Test result**

| TestMode | Antenna | ChName | Channel(MHz) | RefLevel(dBm) | Result(dBm) | Limit(dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| 11B | Ant1 | Low | 2412 | 5.64 | -40.22 | <=-14.36 | PASS |
| | | High | 2462 | 5.17 | -48.12 | <=-14.83 | PASS |
| 11G | Ant1 | Low | 2412 | 2.54 | -32.34 | <=-17.46 | PASS |
| | | High | 2462 | 0.03 | -43.93 | <=-19.97 | PASS |
| 11N20SISO | Ant1 | Low | 2412 | 2.76 | -31.72 | <=-17.24 | PASS |
| | | High | 2462 | -2.41 | -41.16 | <=-22.41 | PASS |

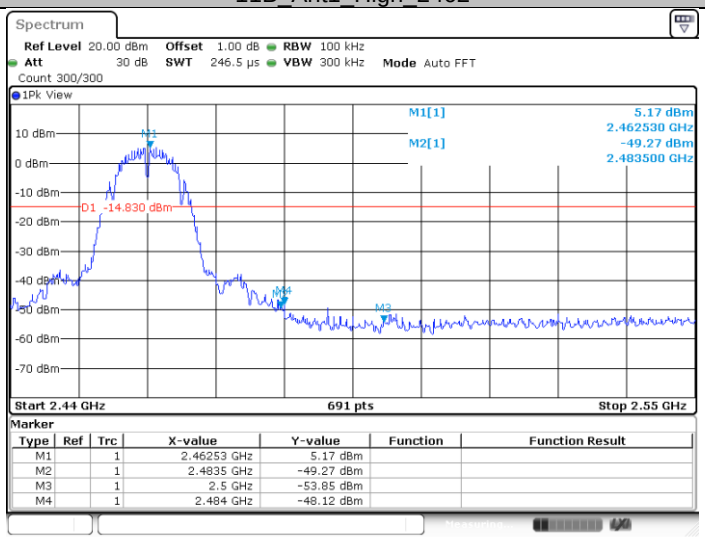

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## Band edge testing

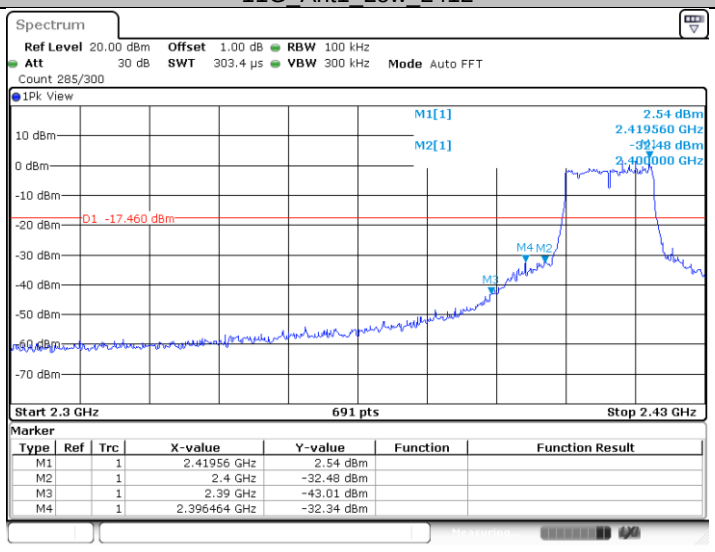
11B_Ant1_Low_2412




11B_Ant1_High_2462



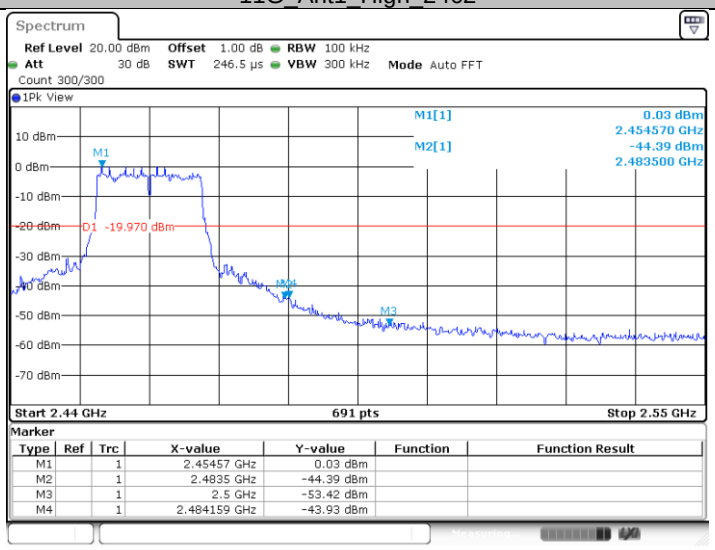

11G_Ant1_Low_2412





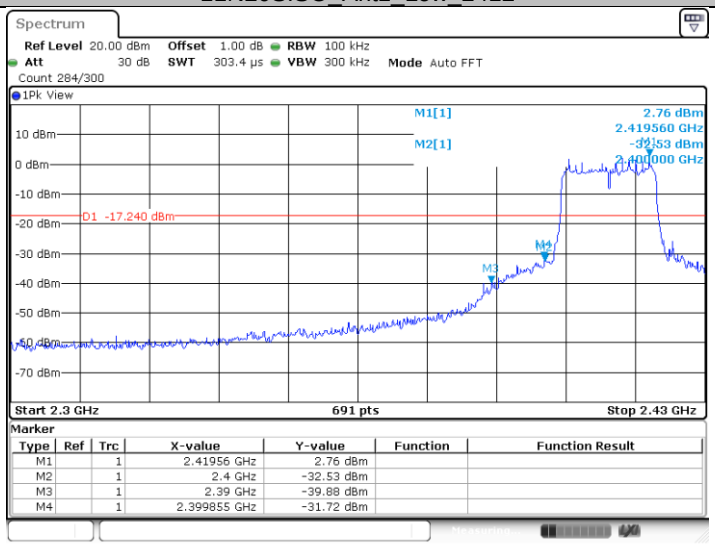

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11G_Ant1_High_2462



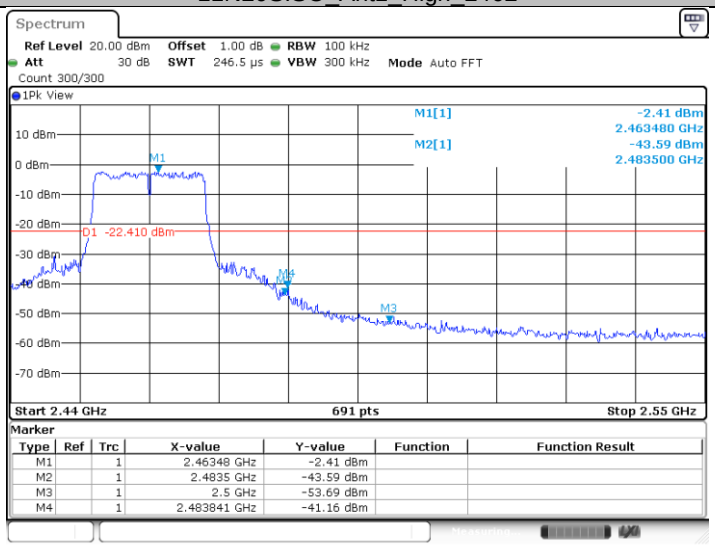

Date: 4.DEC.2020 14:39:15

11N20SISO_Ant1_Low_2412




Date: 4.DEC.2020 14:41:30

11N20SISO_Ant1_High_2462




Date: 4.DEC.2020 14:45:38



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## 8.7 Spurious radiated emissions for transmitter

**Test Method**

1. The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned
5. Use the following spectrum analyzer settings According to C63.10:
   For Below 1GHz
   Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 kHz to 120 kHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

   For Peak unwanted emissions Above 1GHz:
   Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 1MHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz

a) RBW = 1MHz.
b) VBW ≥ [3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

cycle was 50%, then 3 dB shall be added to the measured emission levels.
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

**Limit**

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

| Frequency MHz | Field Strength uV/m | Field Strength dBµV/m | Detector |
|---|---|---|---|
| 30-88 | 100 | 40 | QP |
| 88-216 | 150 | 43.5 | QP |
| 216-960 | 200 | 46 | QP |
| 960-1000 | 500 | 54 | QP |
| Above 1000 | 500 | 54 | AV |
| Above 1000 | 5000 | 74 | PK |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

## Spurious radiated emissions for transmitter

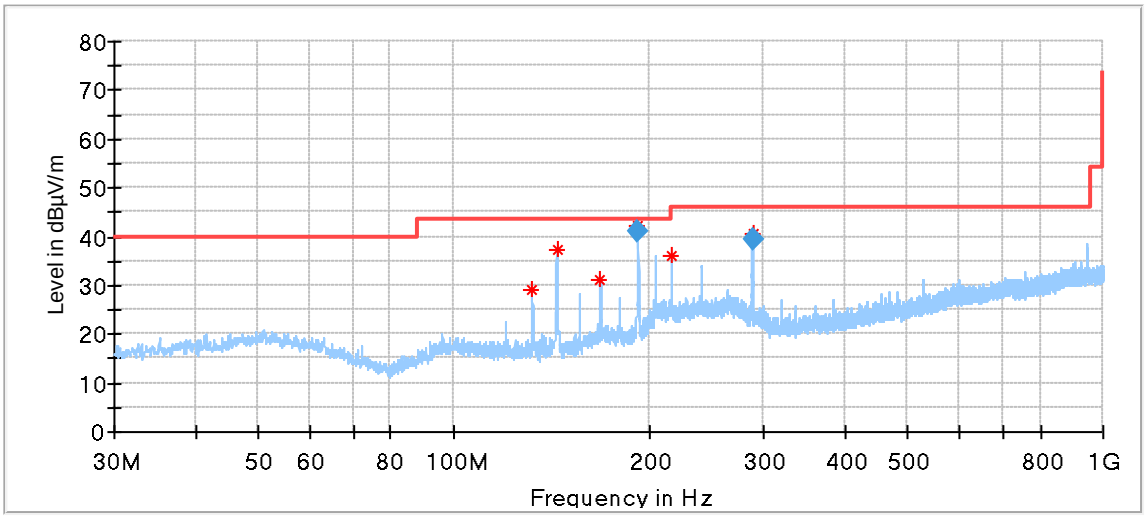
According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

The only worse case (802.11B mode) test result is listed in the report.
If the margin value exceeds 20dBuV/m that not show in the table.

**Transmitting spurious emission test result as below:**

802.11B Modulation 2412MHz Test Result

30MHz-1GHz:



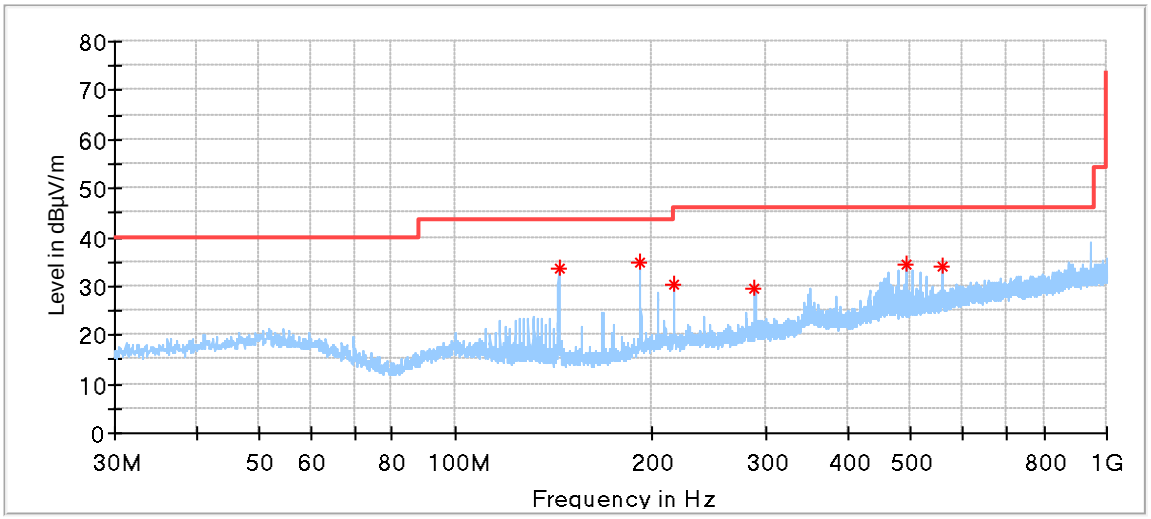

## Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 132.173333 | 29.10 | 43.50 | 14.40 | 200.0 | H | 358.0 | 9.69 | --- |
| 144.244444 | 37.31 | 43.50 | 6.19 | 200.0 | H | 335.0 | 9.28 | --- |
| 168.117222 | 31.27 | 43.50 | 12.23 | 200.0 | H | 350.0 | 10.14 | --- |
| 192.313333 | 42.37 | 43.50 | 1.13 | 200.0 | H | 343.0 | 11.99 | --- |
| 216.240000 | 36.29 | 46.00 | 9.71 | 200.0 | H | 335.0 | 12.64 | --- |
| 288.505000 | 40.54 | 46.00 | 5.46 | 200.0 | H | 201.0 | 14.59 | --- |

## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 192.313333 | 40.89 | 43.50 | 2.61 | 200.0 | H | 343.0 | 11.99 | --- |
| 288.505000 | 39.46 | 46.00 | 6.54 | 200.0 | H | 201.0 | 14.59 | --- |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

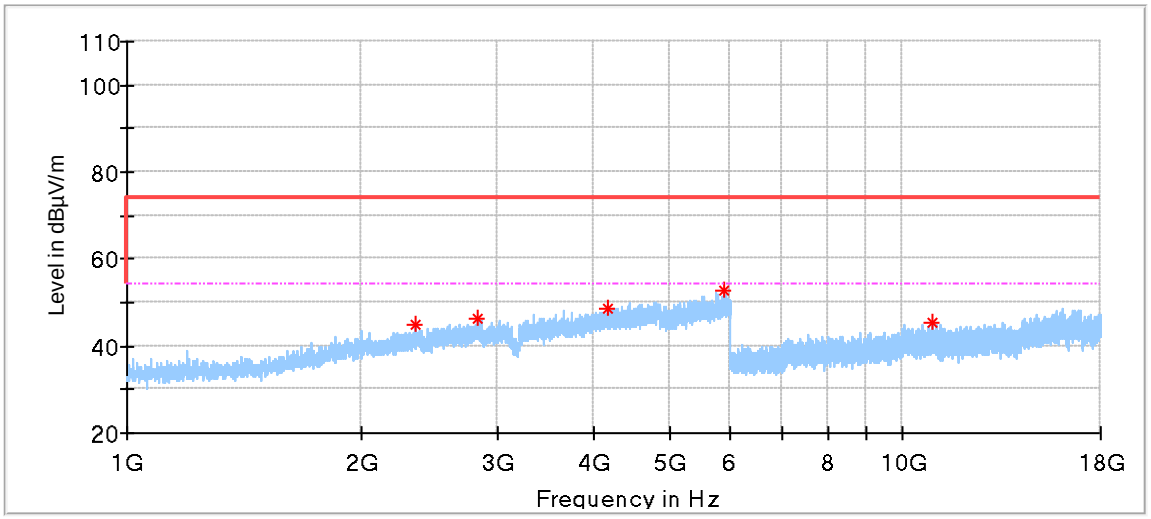



## Critical_Freqs

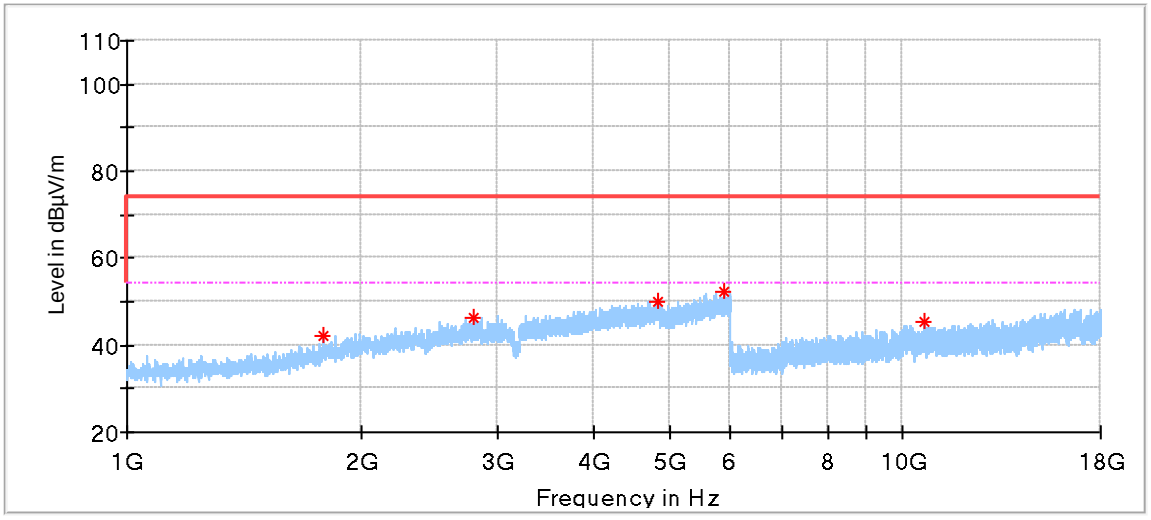
| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|
| 144.082778 | 33.62 | 43.50 | 9.88 | 100.0 | V | 257.0 | 9.28 |
| 192.367222 | 34.68 | 43.50 | 8.82 | 100.0 | V | 265.0 | 11.99 |
| 216.293889 | 30.29 | 46.00 | 15.71 | 100.0 | V | 280.0 | 12.64 |
| 288.343333 | 29.59 | 46.00 | 16.41 | 100.0 | V | 33.0 | 14.59 |
| 491.935556 | 34.52 | 46.00 | 11.48 | 100.0 | V | 1.0 | 19.07 |
| 559.727778 | 34.08 | 46.00 | 11.92 | 100.0 | V | 181.0 | 20.43 |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

1GHz-18GHz:




| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|
| 2348.500000 | 44.80 | 74.00 | 29.20 | 150.0 | H | 345.0 | -3.25 |
| 2824.500000 | 46.51 | 74.00 | 27.49 | 150.0 | H | 356.0 | -1.97 |
| 4157.000000 | 48.81 | 74.00 | 25.19 | 150.0 | H | 84.0 | 1.83 |
| 5889.000000 | 52.74 | 74.00 | 21.26 | 150.0 | H | 118.0 | 5.56 |
| 10922.500000 | 45.20 | 74.00 | 28.80 | 150.0 | H | 359.0 | 8.48 |

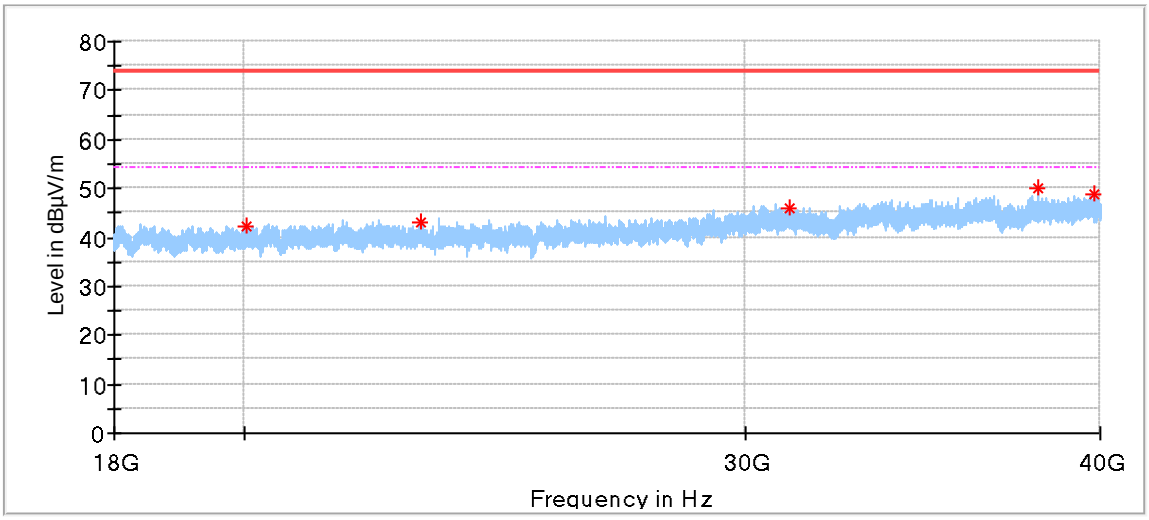



| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|
| 1793.000000 | 42.13 | 74.00 | 31.87 | 150.0 | V | 28.0 | -5.83 |
| 2791.000000 | 46.23 | 74.00 | 27.77 | 150.0 | V | 110.0 | -2.08 |
| 4834.000000 | 50.23 | 74.00 | 23.77 | 150.0 | V | 323.0 | 2.82 |
| 5893.000000 | 52.44 | 74.00 | 21.56 | 150.0 | V | 307.0 | 5.55 |
| 10639.000000 | 45.22 | 74.00 | 28.78 | 150.0 | V | 291.0 | 8.38 |



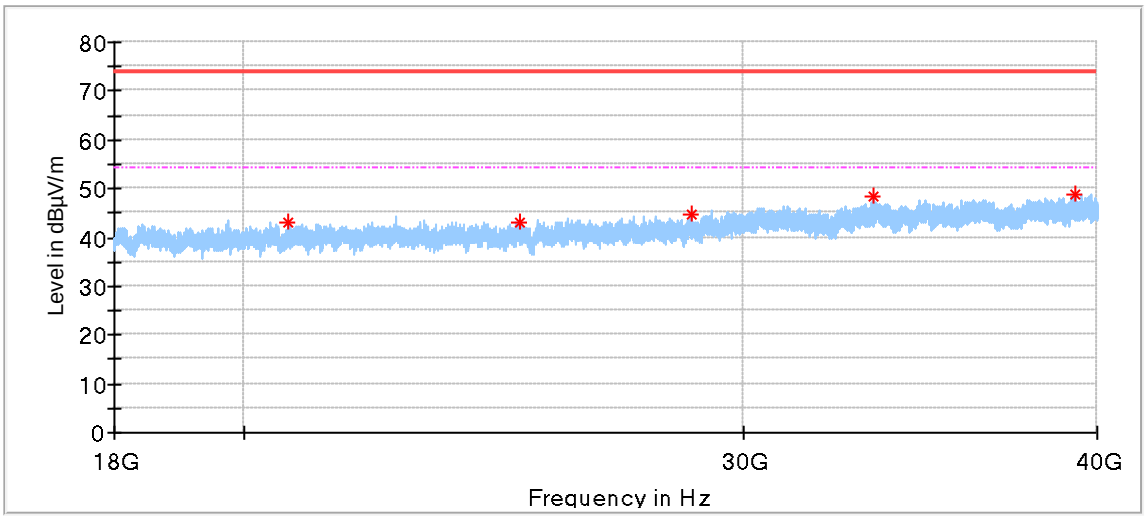
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

18GHz-40GHz:




## Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|
| 20047.375000 | 42.10 | 74.00 | 31.90 | 150.0 | H | 354.0 | -1.41 |
| 23055.187500 | 43.05 | 74.00 | 30.95 | 150.0 | H | 100.0 | 1.05 |
| 31099.625000 | 45.87 | 74.00 | 28.13 | 150.0 | H | 291.0 | 2.58 |
| 38020.687500 | 49.86 | 74.00 | 24.14 | 150.0 | H | 230.0 | 7.04 |
| 39806.812500 | 48.74 | 74.00 | 25.26 | 150.0 | H | 131.0 | 9.61 |




## Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|
| 20734.187500 | 43.13 | 74.00 | 30.87 | 150.0 | V | 182.0 | -0.31 |
| 25023.500000 | 43.24 | 74.00 | 30.76 | 150.0 | V | 304.0 | 1.77 |
| 28772.437500 | 44.89 | 74.00 | 29.11 | 150.0 | V | 52.0 | 2.46 |
| 33329.875000 | 48.25 | 74.00 | 25.75 | 150.0 | V | 22.0 | 4.44 |
| 39312.500000 | 49.02 | 74.00 | 24.98 | 150.0 | V | 128.0 | 8.11 |

Note:
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Pre-amplifier
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
Emission Level =Reading level +Correction Factor
(The Reading Level is recorded by software which is not shown in the sheet)


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

# 9 Test Equipment List

Radiated spurious emission:

| DESCRIPTION | MANUFACTURER | MODEL NO. | EQUIPMENT ID | SERIAL NO. | CAL INTERVAL (YEAR) | CAL. DUE DATE |
|---|---|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESR 26 | 68-4-74-14-002 | 101269 | 1 | 2021-6-29 |
| Trilog Super Broadband Test Antenna | Schwarzbeck | VULB 9162 | 68-4-80-19-003 | 284 | 1 | 2021-2-24 |
| Wave Guide Antenna | ETS | 3117 | 68-4-80-19-001 | 00218954 | 1 | 2021-6-15 |
| Pre-amplifier | Rohde & Schwarz | SCU 18F | 68-4-29-19-001 | 100745 | 1 | 2020-12-14 |
| Pre-amplifier | Rohde & Schwarz | SCU 08F2 | 68-4-29-19-004 | 08400018 | 1 | 2020-12-14 |
| Sideband Horn Antenna | Q-PAR | QWH-SL-18-40-K-SG | 68-4-80-14-008 | 12827 | 1 | 2021-8-5 |
| Pre-amplifier | Rohde & Schwarz | SCU 40A | 68-4-29-14-002 | 100432 | 1 | 2021-7-30 |
| 3m Semi-anechoic chamber | TDK | 9X6X6 | 68-4-90-19-006 | ---- | 3 | 2022-12-29 |
| Test software | Rohde & Schwarz | EMC32 | 68-4-90-19-006-A01 | Version10.35.02 | N/A | N/A |

AC Conducted emission:

| DESCRIPTION | MANUFACTURER | MODEL NO. | EQUIPMENT ID | SERIAL NO. | CAL INTERVAL (YEAR) | CAL. DUE DATE |
|---|---|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESR 3 | 68-4-74-14-001 | 101782 | 1 | 2021-6-29 |
| LISN | Rohde & Schwarz | ENV4200 | 68-4-87-14-001 | 100249 | 1 | 2021-6-12 |
| LISN | Rohde & Schwarz | ENV432 | 68-4-87-16-001 | 101318 | 1 | 2021-6-12 |
| LISN | Rohde & Schwarz | ENV216 | 68-4-87-14-002 | 100326 | 1 | 2021-6-12 |
| ISN | Rohde & Schwarz | ENY81 | 68-4-87-14-003 | 100177 | 1 | 2021-6-12 |
| ISN | Rohde & Schwarz | ENY81-CA6 | 68-4-87-14-004 | 101664 | 1 | 2021-6-12 |
| High Voltage Probe | Schwarzbeck | TK9420(VT9420) | 68-4-27-14-001 | 9420-584 | 1 | 2021-6-23 |
| RF Current Probe | Rohde & Schwarz | EZ-17 | 68-4-27-14-002 | 100816 | 1 | 2021-6-28 |
| Attenuator | Shanghai Huaxiang | TS2-26-3 | 68-4-81-16-003 | 080928189 | 1 | 2021-6-21 |
| Test software | Rohde & Schwarz | EMC32 | 68-4-90-14-003-A10 | Version9.15.00 | N/A | N/A |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

Conducted RF test:

| DESCRIPTION | MANUFACTURER | MODEL NO. | EQUIPMENT ID | SERIAL NO. | CAL INTERVAL (YEAR) | CAL. DUE DATE |
|---|---|---|---|---|---|---|
| Signal Generator | Rohde & Schwarz | SMB100A | 68-4-48-14-001 | 108272 | 1 | 2021-6-21 |
| Vector Signal Generator | Rohde & Schwarz | SMBV100A | 68-4-48-18-001 | 262825 | 1 | 2021-6-21 |
| Communication Synthetical Test Instrument | Rohde & Schwarz | CMW 270 | 68-4-48-18-003 | 101251 | 1 | 2021-6-21 |
| Signal Analyzer | Rohde & Schwarz | FSV40 | 68-4-74-14-004 | 101030 | 1 | 2021-6-21 |
| Vector Signal Generator | Rohde & Schwarz | SMU 200A | 68-4-48-14-003 | 105324 | 1 | 2021-6-22 |
| RF Switch Module | Rohde & Schwarz | OSP120/OSP-B157 | 68-4-93-14-003 | 101226/100851 | 1 | 2021-6-21 |
| Power Splitter | Weinschel | 1580 | 68-4-85-14-001 | SC319 | 1 | 2021-7-16 |
| 10dB Attenuator | Weinschel | 4M-10 | 68-4-81-14-003 | 43152 | 1 | 2021-6-21 |
| 10dB Attenuator | R&S | DNF | 68-4-81-14-004 | DNF-001 | 1 | 2021-6-21 |
| 10dB Attenuator | R&S | DNF | 68-4-81-14-005 | DNF-002 | 1 | 2021-6-21 |
| 10dB Attenuator | R&S | DNF | 68-4-81-14-006 | DNF-003 | 1 | 2021-6-21 |
| 10dB Attenuator | R&S | DNF | 68-4-81-14-007 | DNF-004 | 1 | 2021-6-21 |
| Test software | Rohde & Schwarz | EMC32 | 68-4-48-14-003-A10 | Version 10.60.10 | N/A | N/A |
| Test software | Tonscend | System for BT/WIFI | 68-4-74-14-006-A13 | Version 2.6.77.0518 | N/A | N/A |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

# 10 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

**System Measurement Uncertainty**

| System Measurement Uncertainty | |
|---|---|
| Test Items | Extended Uncertainty |
| Uncertainty for Radiated Spurious Emission 30MHz-3000MHz | Horizontal: 4.70dB;<br>Vertical: 4.67dB; |
| Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz | Horizontal: 4.65dB;<br>Vertical: 4.63dB; |
| Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz | Horizontal: 4.51dB;<br>Vertical: 4.50dB; |
| Uncertainty for Conducted Emission in shielding room (68-4-90-19-004)<br>9kHz-150KHz | 3.62dB |
| Uncertainty for Conducted RF test | RF Power Conducted: 1.16dB<br>Frequency test involved:<br>$0.6\times10^{-7}$ or 1% |


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299