



FCC/IC - TEST REPORT

Report Number : **68.940.19.0039.01** Date of Issue: September 17, 2019

Model : **LB126**

Product Type : Smart LED Bulb

Applicant : Shenzhen Apeman Innovations Technology Co.,Ltd

Address : Building P11, Huanancheng, Longgang District, Shenzhen, China

Production Facility : Huizhou Light Engine Limited

Address : No.9 Yuanhui Road, Chenjiang Zhongkai Hi-tech Industrial,
Development

Zone, 516029 Huizhou, PEOPLE'S REPUBLIC OF CHINA

Test Result : Positive Negative

Total pages including Appendices : 50

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.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.



1 Table of Contents

| | | |
|-----|---|----|
| 1 | Table of Contents | 2 |
| 2 | Details about the Test Laboratory | 3 |
| 3 | Description of the Equipment under Test | 4 |
| 4 | Summary of Test Standards | 5 |
| 5 | Summary of Test Results..... | 6 |
| 6 | General Remarks..... | 7 |
| 7 | Test Setups | 8 |
| 8 | Systems test configuration | 9 |
| 9 | Technical Requirement..... | 10 |
| 9.1 | Conducted Emission | 10 |
| 9.2 | Conducted peak output power..... | 13 |
| 9.3 | 6dB and 99% bandwidth..... | 14 |
| 9.4 | Power spectral density | 19 |
| 9.5 | Spurious RF conducted emissions..... | 24 |
| 9.6 | Band edge..... | 37 |
| 9.7 | Spurious radiated emissions for transmitter | 41 |
| 10 | Test Equipment List..... | 48 |
| 11 | System Measurement Uncertainty | 50 |



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
Building 12&13, Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052,
P. R. China

FCC Registration Number: 514049

ISED#: 10320A

CAB identifier: CN0077

Telephone: 86 755 8828 6998
Fax: 86 755 8828 5299

Test Site 2

Company name: Dongguan Dongdian Testing Service Co., Ltd.
No.17,Zong bu Road 2, Songshan Lake Sci&Tech, Industry Park,
Dongguan City,Guangdong Province, China, 523808

Telephone: +86-0769-38826678
Fax: +86-0769-38826678

IC Registration No.: 10288A

CAB identifier: CN0048

3 Description of the Equipment under Test

Description of the Equipment Under Test

| | |
|----------------------------|--|
| Product/PMN: | Smart LED Bulb |
| Model no./HVIN: | LB126 |
| FCC ID: | 2ARER-LB126 |
| IC: | 25047-LB126 |
| Options and accessories: | NIL |
| Ratings: | AC 120V/60Hz, 0.145A, 10W |
| RF Transmission Frequency: | 2412-2462MHz |
| No. of Operated Channel: | 11 |
| Modulation: | CCK, DQPSK, DBPSK for 802.11b QPSK, BPSK for 802.11g/n |
| Duty Cycle: | 100% |
| Antenna Type: | Integral Antenna |
| Antenna Gain: | 2dBi |
| Description of the EUT: | The Equipment Under Test (EUT) is a Smart LED Bulb supports 2.4GHz WI-FI function. |



4 Summary of Test Standards

| Test Standards | |
|--|--|
| FCC Part 15 Subpart C 10-1-2018 Edition | PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators |
| RSS-Gen Issue 5, Amendment 1, March 2019 | General Requirements and Information for the Certification of Radio Apparatus |
| RSS-247 Issue 2 February 2017 | Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices |

All the test methods were according to KDB558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10 (2013).

5 Summary of Test Results

| Technical Requirements | | | | | | |
|--|---|------------|-------------|-------------------------------------|--------------------------|-------------------------------------|
| FCC Part 15 Subpart C/ RSS-247 Issue 2/RSS-Gen Issue 5 | | | | | | |
| Test Condition | Pages | Test Site | Test Result | | | |
| | | | Pass | Fail | N/A | |
| §15.207 & RSS-GEN 8.8 | Conducted emission AC power port | 10 | Site 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.247 (b) (1) & RSS-247 5.4(d) | Conducted peak output power | 13 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| RSS-247 5.4(d) | Equivalent Isotropic Radiated Power | 13 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.247(a)(1) & RSS-247 5.1(b) | 20dB bandwidth | --- | --- | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1) & RSS-247 5.1(b) | Carrier frequency separation | --- | --- | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1)(iii) & RSS-247 5.1(d) | Number of hopping frequencies | --- | --- | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1)(iii) & RSS-247 5.1(d) | Dwell Time | --- | --- | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(2) & RSS-247 5.2(a) & RSS-GEN 6.7 | 6dB bandwidth and 99% Occupied Bandwidth | 14 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.247(e) & RSS-247 5.2(b) | Power spectral density | 19 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.247(d) & RSS-247 5.5 | Spurious RF conducted emissions | 24 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.247(d) & RSS-247 5.5 | Band edge | 37 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.247(d) & §15.209 & RSS-247 5.5 & RSS-Gen 6.13 | Spurious radiated emissions for transmitter | 42 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| §15.203 & RSS-Gen 6.8 | Antenna requirement | See note 1 | | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an integral antenna, which gain is 2.0dBi. In accordance to §15.203 and RSS-Gen 6.8, it is considered sufficiently to comply with the provisions of this section.



6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2ARER-LB126, IC: 25047-LB126, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules and RSS-247, RSS-GEN.

SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

o - **Not** Performed

The Equipment under Test

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

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

Sample Received Date: August 26, 2019

Testing Start Date: August 26, 2019

Testing End Date: September 03, 2019

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

Reviewed by:

Prepared by:

Tested by:

Tested by:



Laurent Yuan
EMC Project
Manager

Henry Chen
EMC Project
Engineer

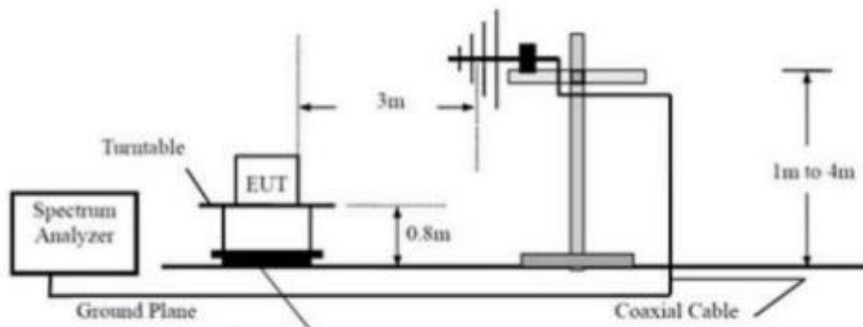
Louise Liu
EMC Test Engineer
Test Site 1

Sunny Zhang
EMC Test Engineer
Test Site 2

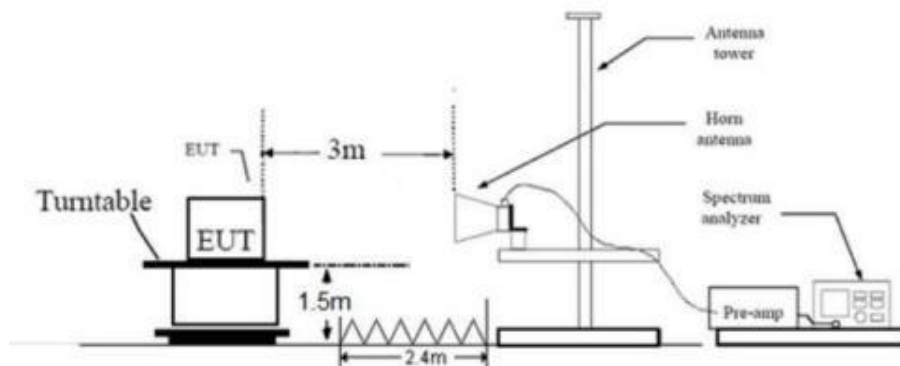
7 Test Setups

7.1 Radiated test setups

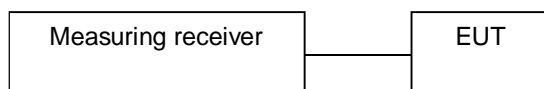
Below 1GHz



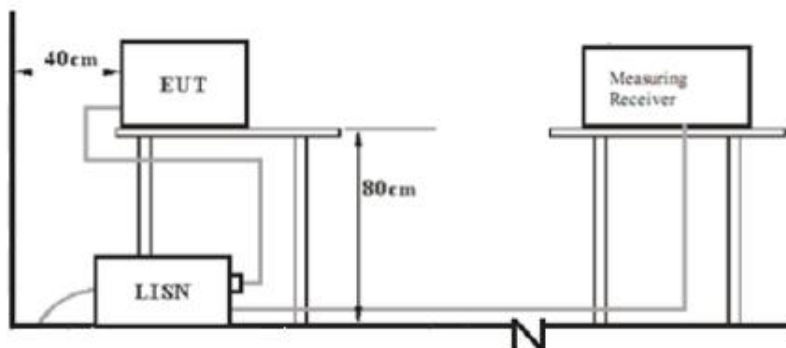
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups





8 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO. | S/N |
|-------------|--------------|-----------|-----|
| --- | --- | --- | --- |

Test software information:

| Test Software Version | UI_mptool_1V15 | |
|-----------------------|------------------|-------------|
| Modulation | Setting TX Power | Packet Type |
| 802.11b | 34 | --- |
| 802.11g | 42 | --- |
| 802.11nHT20 | 42 | --- |
| 802.11Nht40 | 40 | --- |

The system was configured to channel 1, 6 and 11 for the test.

9 Technical Requirement

9.1 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 an 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

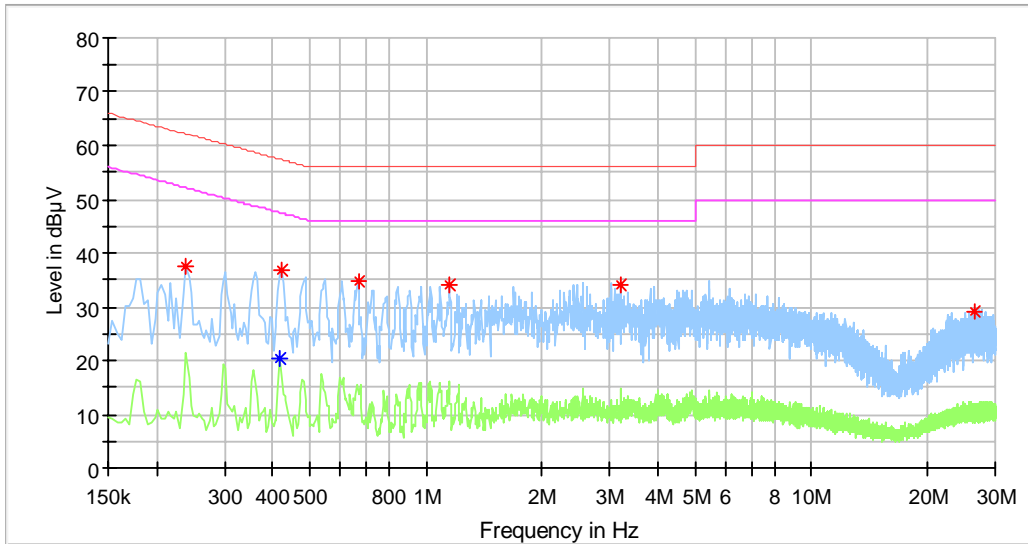
Limit

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

Note: "*" means Decreasing line;

Conducted Emission

Product Type : Smart LED Bulb
 M/N : LB126
 Operating Condition : Normal working with transmitting
 Test Specification : Power Line, Live
 Comment : AC 120V/60Hz



Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|-----------------|----------------|----------------|--------------|-------------|------|------------|
| 0.238000 | 37.53 | --- | 62.17 | 24.64 | L1 | 10.3 |
| 0.418000 | --- | 20.24 | 47.49 | 27.25 | L1 | 10.3 |
| 0.422000 | 36.92 | --- | 57.41 | 20.49 | L1 | 10.3 |
| 0.666000 | 34.64 | --- | 56.00 | 21.36 | L1 | 10.3 |
| 1.150000 | 33.90 | --- | 56.00 | 22.10 | L1 | 10.3 |
| 3.202000 | 34.15 | --- | 56.00 | 21.85 | L1 | 10.4 |
| 26.494000 | 29.21 | --- | 60.00 | 30.79 | L1 | 11.3 |

Remark :

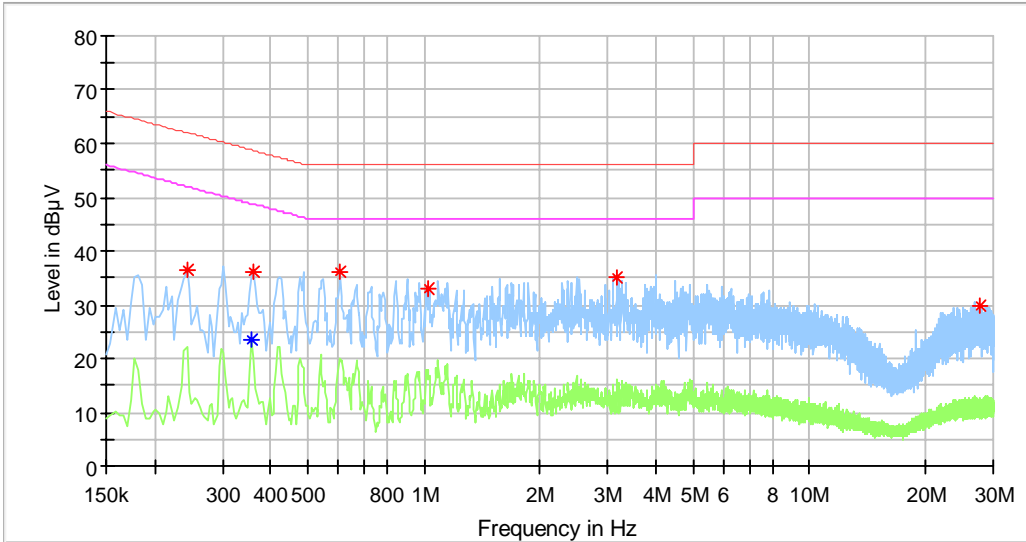
Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

Conducted Emission

Product Type : Smart LED Bulb
 M/N : LB126
 Operating Condition : Normal working with transmitting
 Test Specification : Power Line, Neutral
 Comment : AC 120V/60Hz



Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|-----------------|----------------|----------------|--------------|-------------|------|------------|
| 0.242000 | 36.57 | --- | 62.03 | 25.46 | N | 10.3 |
| 0.358000 | --- | 23.66 | 48.77 | 25.12 | N | 10.3 |
| 0.362000 | 35.98 | --- | 58.68 | 22.70 | N | 10.3 |
| 0.606000 | 36.06 | --- | 56.00 | 19.94 | N | 10.3 |
| 1.026000 | 32.97 | --- | 56.00 | 23.03 | N | 10.3 |
| 3.154000 | 35.06 | --- | 56.00 | 20.94 | N | 10.4 |
| 27.802000 | 29.76 | --- | 60.00 | 30.24 | N | 11.7 |

Remark :

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

9.2 Conducted peak output power

Test Method

1. Connect the power meter to the EUT
 - a) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
 - b) At all times the EUT is transmitting at its maximum power control level.
 - c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Adjust the measurement in dBm by adding $10\log(1/x)$, where x is the duty cycle to the measurement result.

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

802.11b

| Frequency MHz | Conducted Peak Output Power dBm | Antenna Gain dBi | EIRP dBm | Result |
|------------------------|------------------------------------|---------------------|-------------|--------|
| Top channel 2412MHz | 13.67 | 2 | 15.67 | Pass |
| Middle channel 2437MHz | 13.35 | 2 | 15.35 | Pass |
| Bottom channel 2462MHz | 13.89 | 2 | 15.89 | Pass |

802.11g

| Frequency MHz | Conducted Peak Output Power dBm | Antenna Gain dBi | EIRP dBm | Result |
|------------------------|------------------------------------|---------------------|-------------|--------|
| Top channel 2412MHz | 12.40 | 2 | 14.40 | Pass |
| Middle channel 2437MHz | 12.42 | 2 | 14.42 | Pass |
| Bottom channel 2462MHz | 12.93 | 2 | 14.93 | Pass |

802.11nHT20

| Frequency MHz | Conducted Peak Output Power dBm | Antenna Gain dBi | EIRP dBm | Result |
|------------------------|------------------------------------|---------------------|-------------|--------|
| Top channel 2412MHz | 12.70 | 2 | 14.70 | Pass |
| Middle channel 2437MHz | 12.67 | 2 | 14.67 | Pass |
| Bottom channel 2462MHz | 13.40 | 2 | 15.40 | Pass |

802.11nHT40

| Frequency MHz | Conducted Peak Output Power dBm | Antenna Gain dBi | EIRP dBm | Result |
|------------------------|------------------------------------|---------------------|-------------|--------|
| Top channel 2422MHz | 11.25 | 2 | 13.25 | Pass |
| Middle channel 2437MHz | 11.21 | 2 | 13.21 | Pass |
| Bottom channel 2452MHz | 11.66 | 2 | 13.66 | Pass |

9.3 6dB and 99% bandwidth

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Use the following spectrum analyzer settings:
Set RBW ³ 1% of the 99% bandwidth, VBW ³ RBW.
Sweep = auto, Detector function = peak, Trace = max hold
3. 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.
4. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]

—————
 ≥ 500

Test result

802.11b

| Frequency MHz | 6dB bandwidth MHz | 99% bandwidth MHz | Result |
|------------------------|----------------------|----------------------|--------|
| Bottom channel 2412MHz | 10.120 | 14.76 | Pass |
| Middle channel 2437MHz | 10.160 | 14.8 | Pass |
| Top channel 2462MHz | 10.120 | 14.8 | Pass |

802.11g

| Frequency MHz | 6dB bandwidth MHz | 99% bandwidth MHz | Result |
|------------------------|----------------------|----------------------|--------|
| Bottom channel 2412MHz | 16.600 | 16.44 | Pass |
| Middle channel 2437MHz | 16.600 | 16.44 | Pass |
| Top channel 2462MHz | 16.560 | 16.44 | Pass |

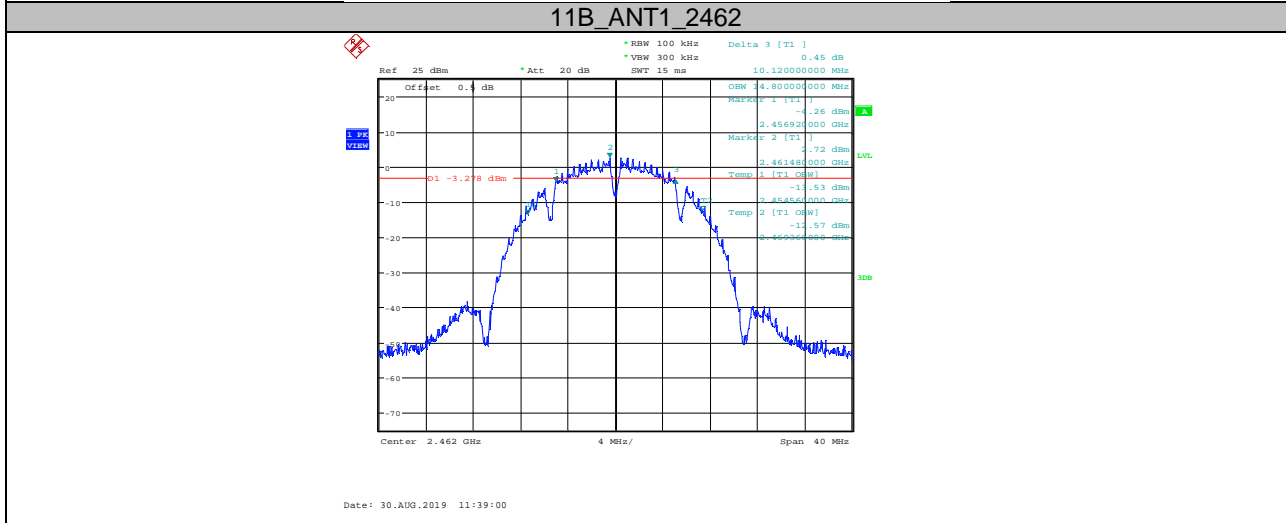
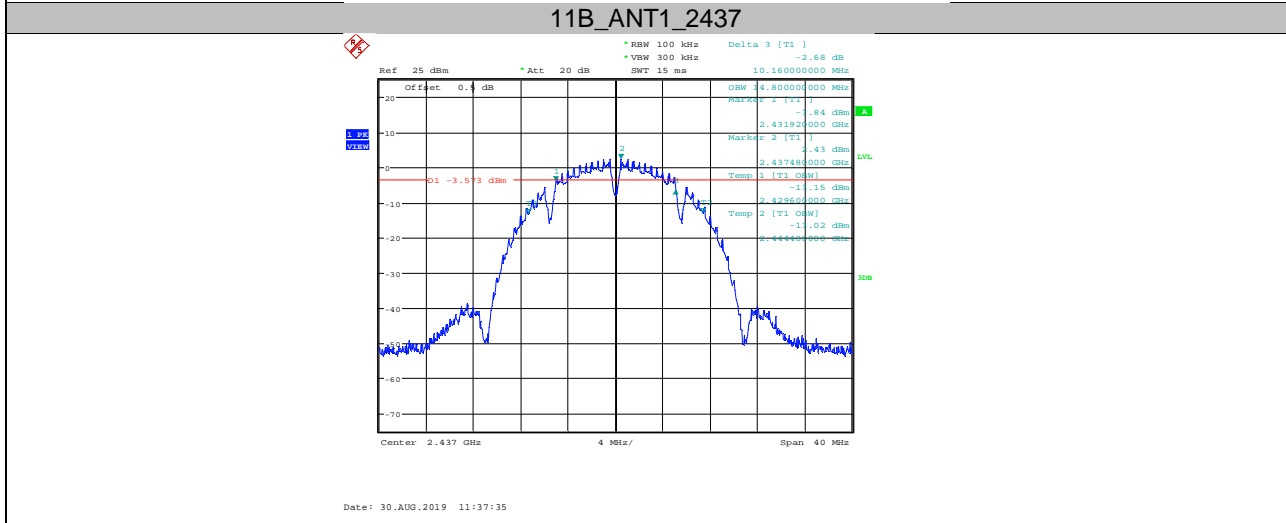
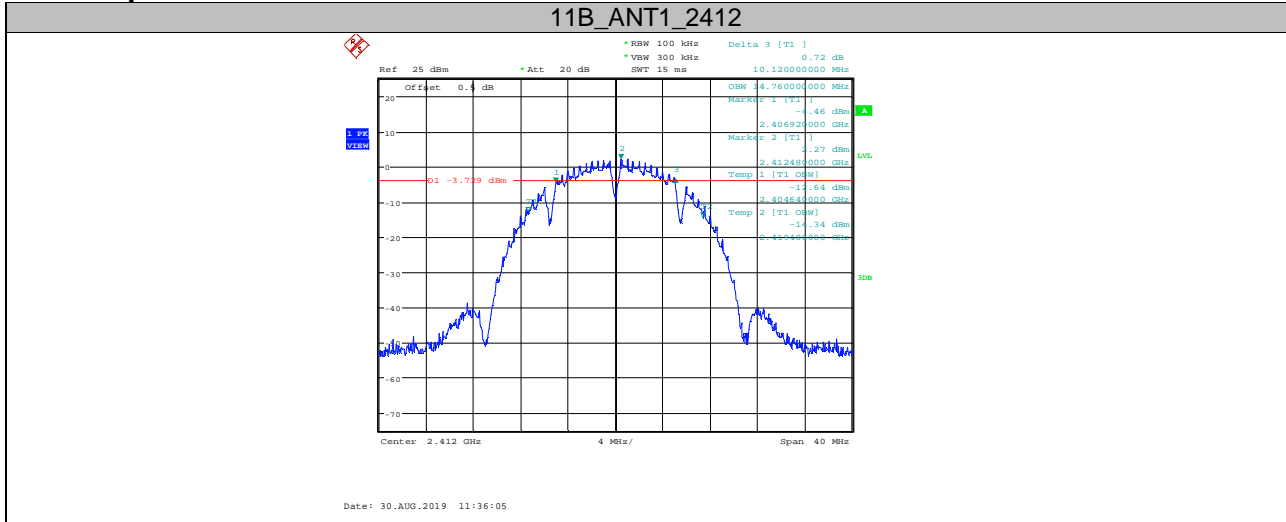
802.11nHT20

| Frequency MHz | 6dB bandwidth MHz | 99% bandwidth MHz | Result |
|------------------------|----------------------|----------------------|--------|
| Bottom channel 2412MHz | 17.840 | 17.68 | Pass |
| Middle channel 2437MHz | 17.840 | 17.64 | Pass |
| Top channel 2462MHz | 17.800 | 17.64 | Pass |

802.11nHT40

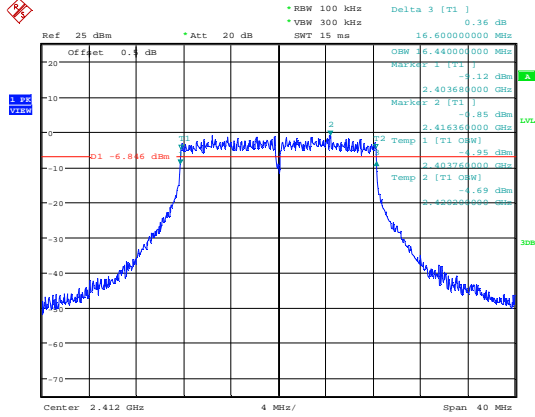
| Frequency MHz | 6dB bandwidth MHz | 99% bandwidth MHz | Result |
|------------------------|----------------------|----------------------|--------|
| Bottom channel 2412MHz | 36 | 36.480 | Pass |
| Middle channel 2437MHz | 36 | 36.640 | Pass |
| Top channel 2452MHz | 36 | 36.560 | Pass |

Test Graphs



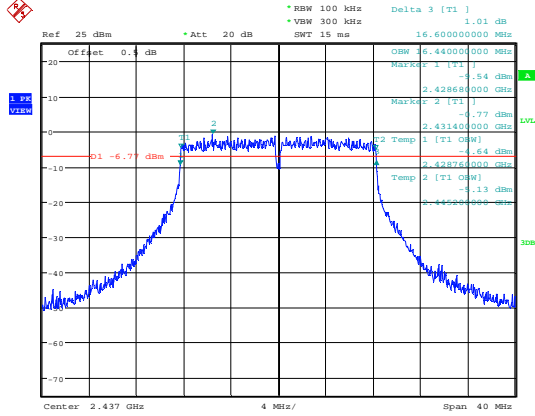


11G_ANT1_2412



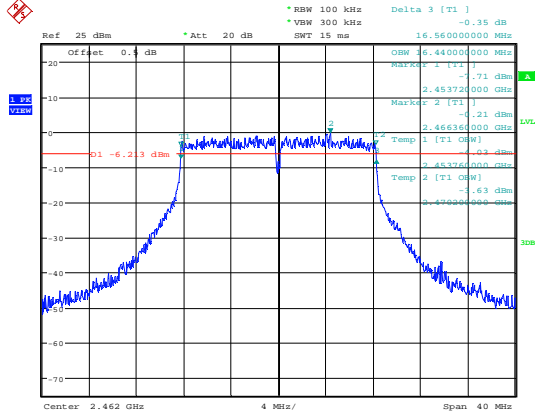
Date: 30.AUG.2019 11:40:43

11G_ANT1_2437

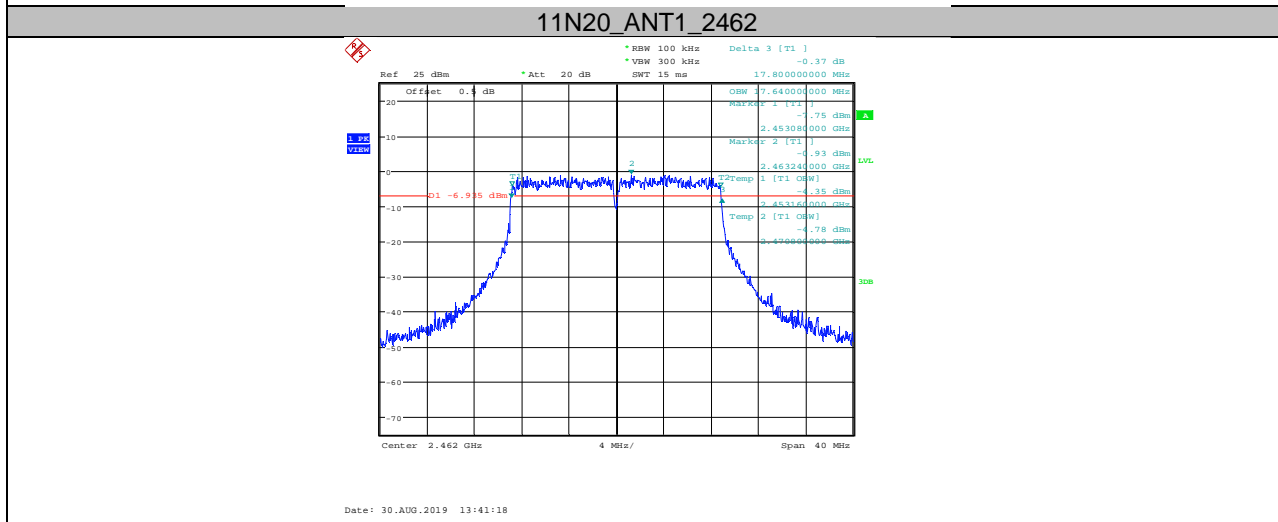
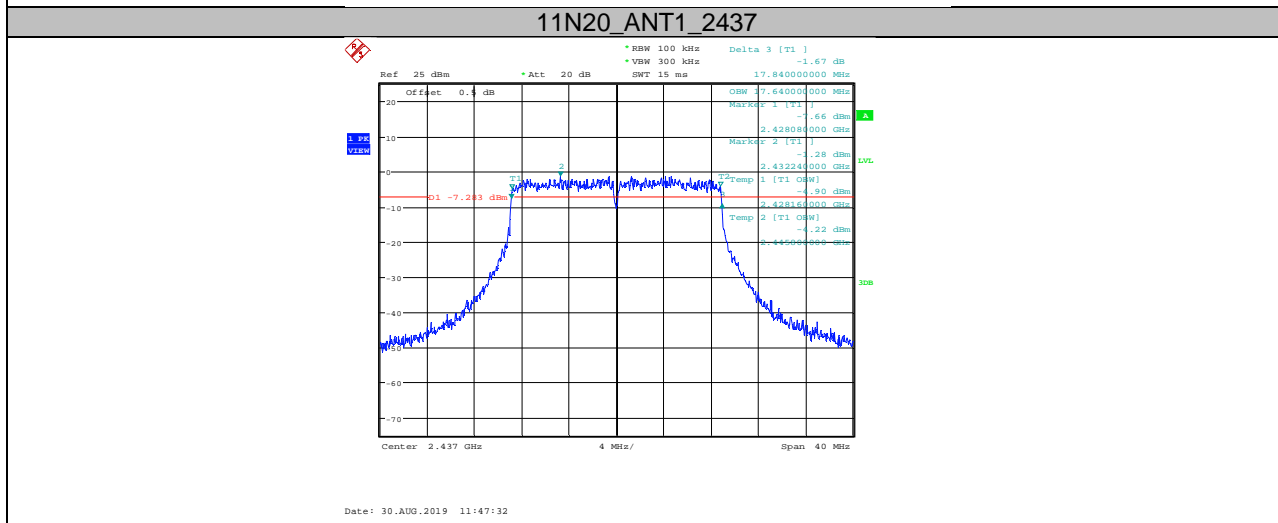
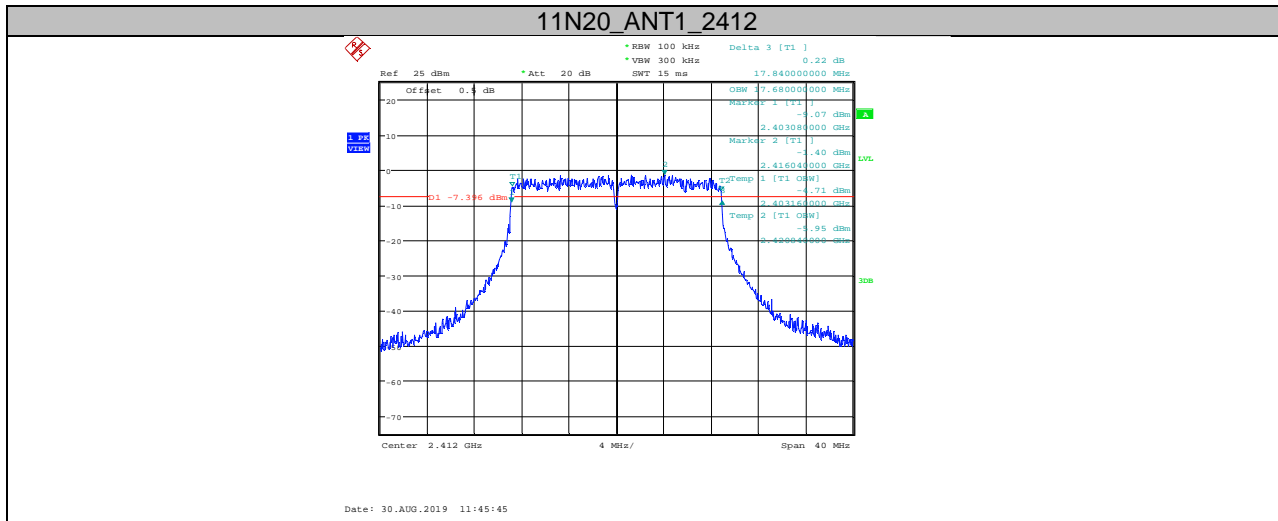


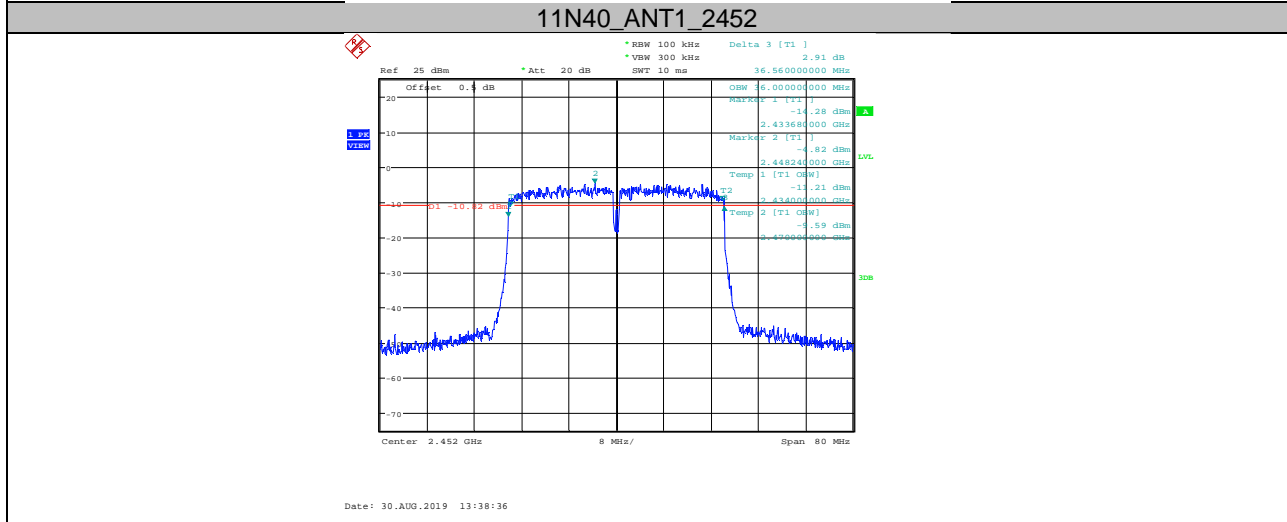
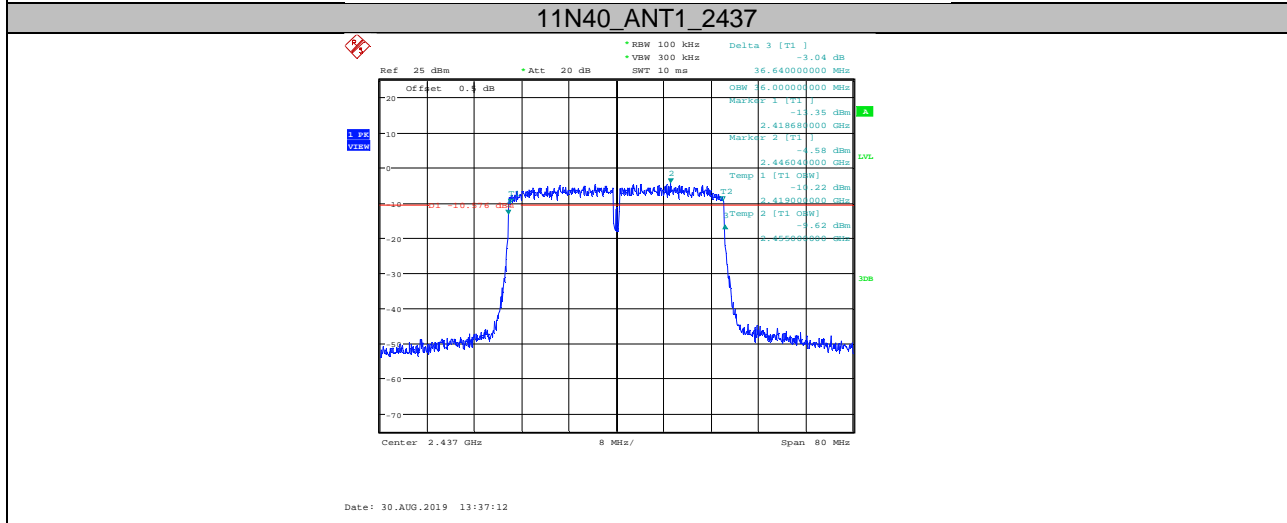
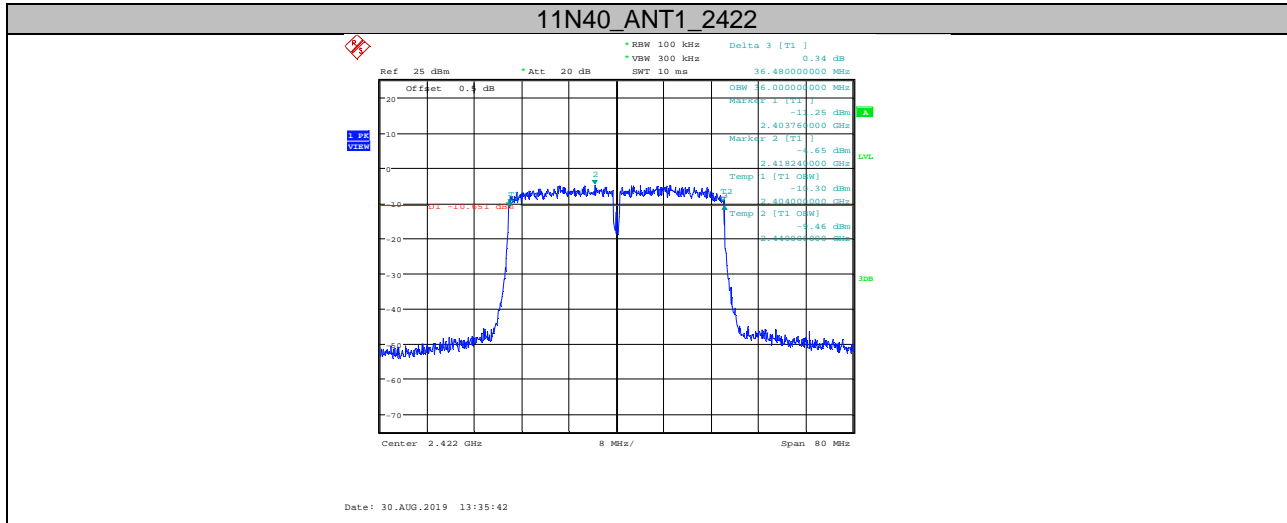
Date: 30.AUG.2019 11:42:40

11G_ANT1_2462



Date: 30.AUG.2019 11:43:57







9.4 Power spectral density

Test Method

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

Limit

Limit [dBm/3KHz]

≤8

Test result

802.11b

| Frequency MHz | Power spectral density dBm/3KHz | Result |
|------------------------|---------------------------------------|--------|
| Top channel 2412MHz | -13.81 | Pass |
| Middle channel 2437MHz | -13.09 | Pass |
| Bottom channel 2462MHz | -12.82 | Pass |

802.11g

| Frequency MHz | Power spectral density dBm/3KHz | Result |
|------------------------|---------------------------------------|--------|
| Top channel 2412MHz | -14.88 | Pass |
| Middle channel 2437MHz | -14.77 | Pass |
| Bottom channel 2462MHz | -14.3 | Pass |

802.11nHT20

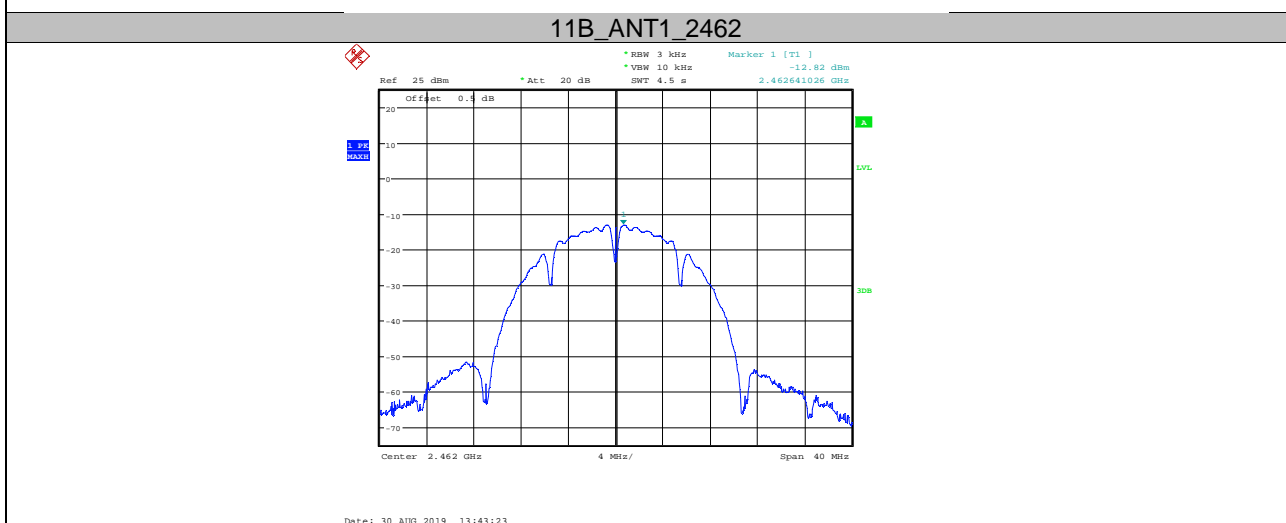
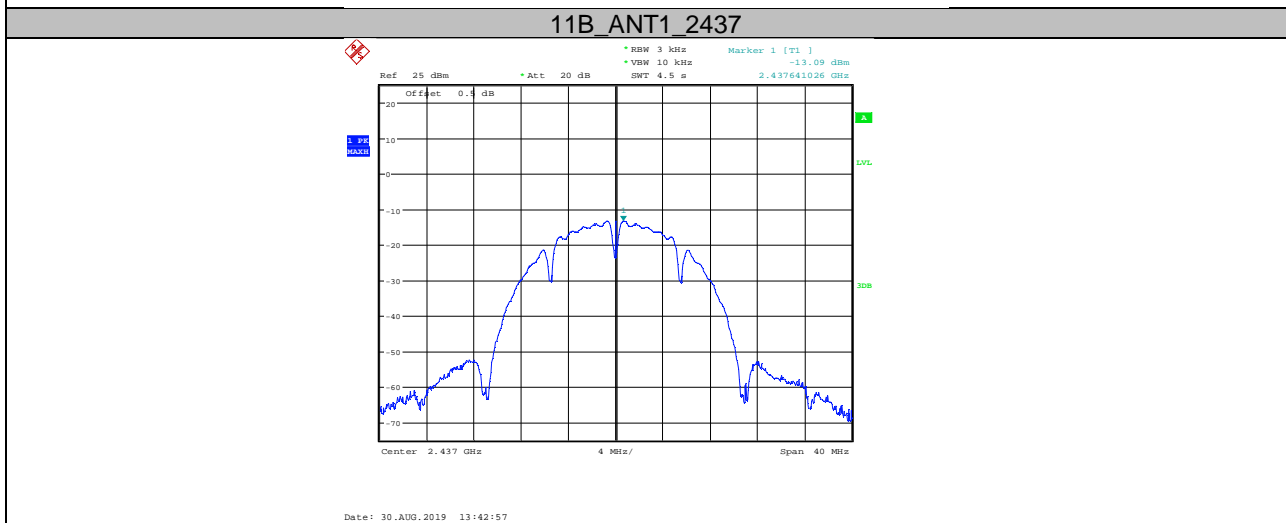
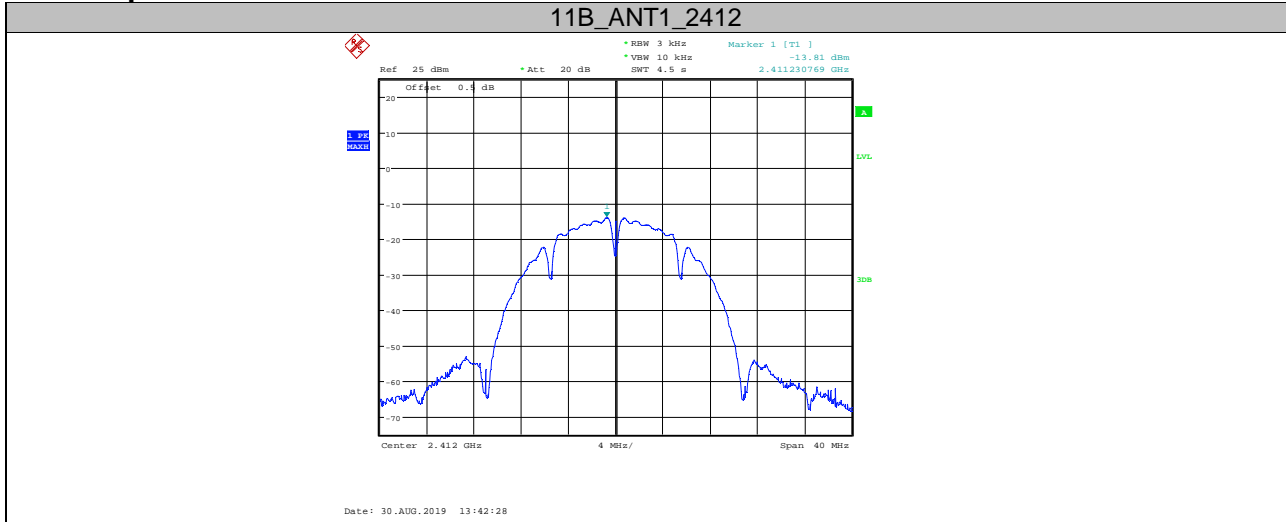
| Frequency MHz | Power spectral density dBm/3KHz | Result |
|------------------------|---------------------------------------|--------|
| Top channel 2412MHz | -15.25 | Pass |
| Middle channel 2437MHz | -14.75 | Pass |
| Bottom channel 2462MHz | -14.35 | Pass |

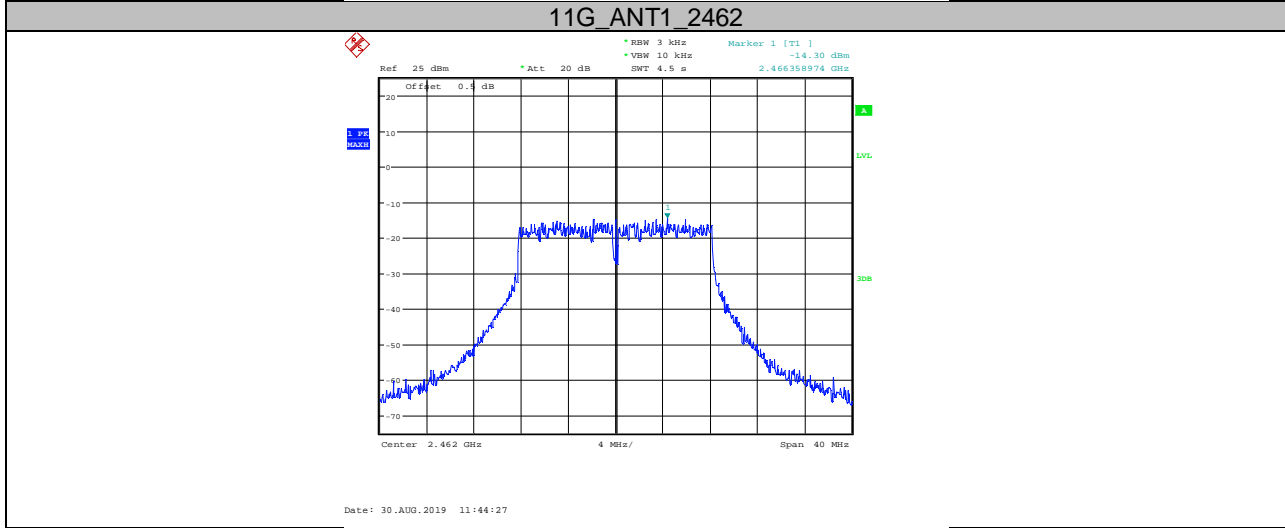
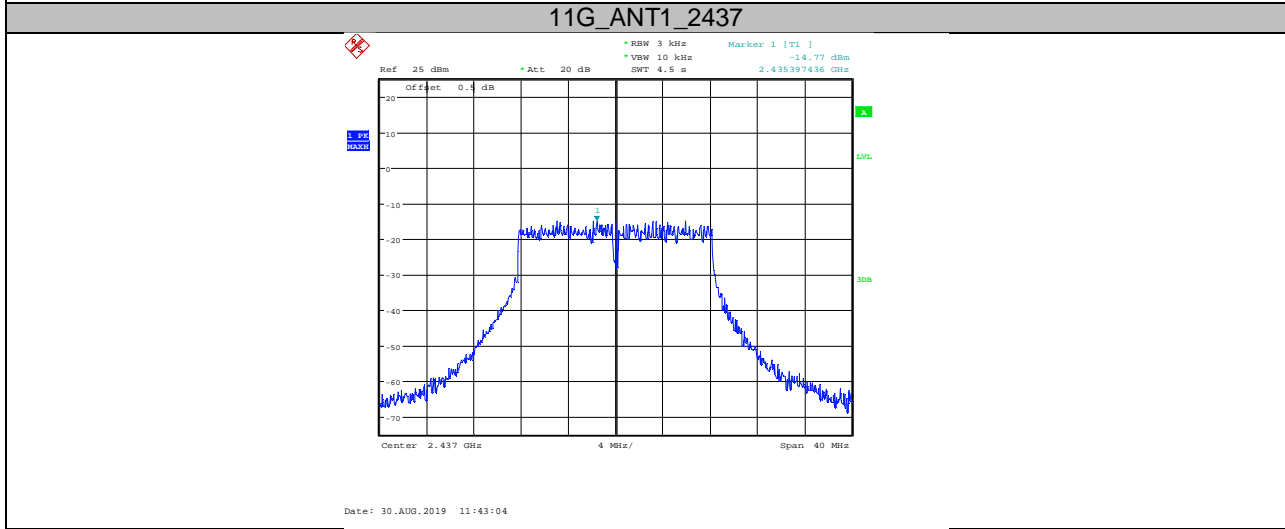
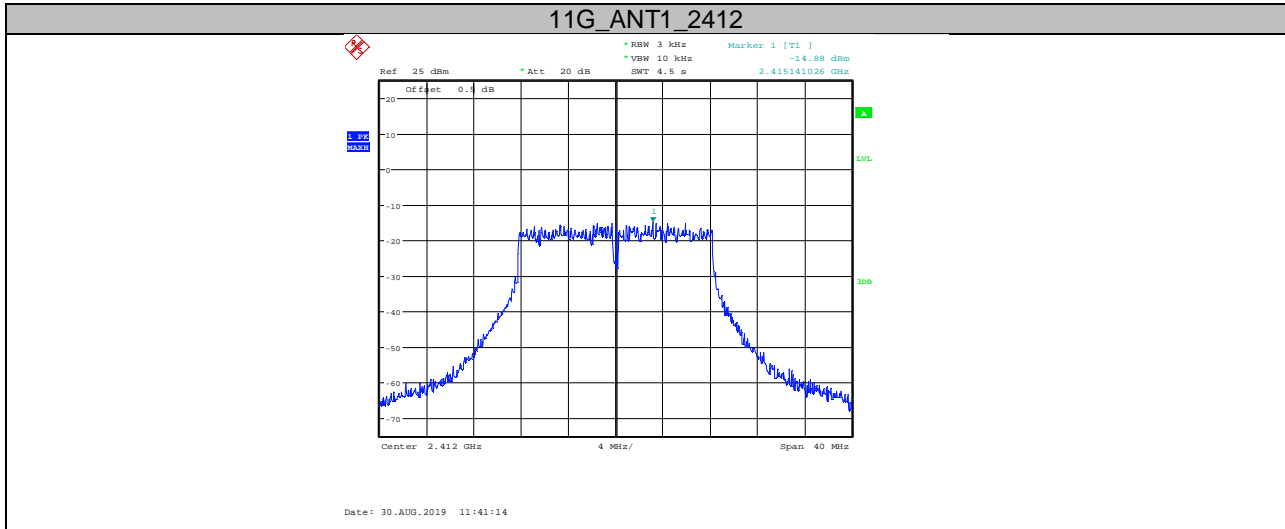
802.11nHT40

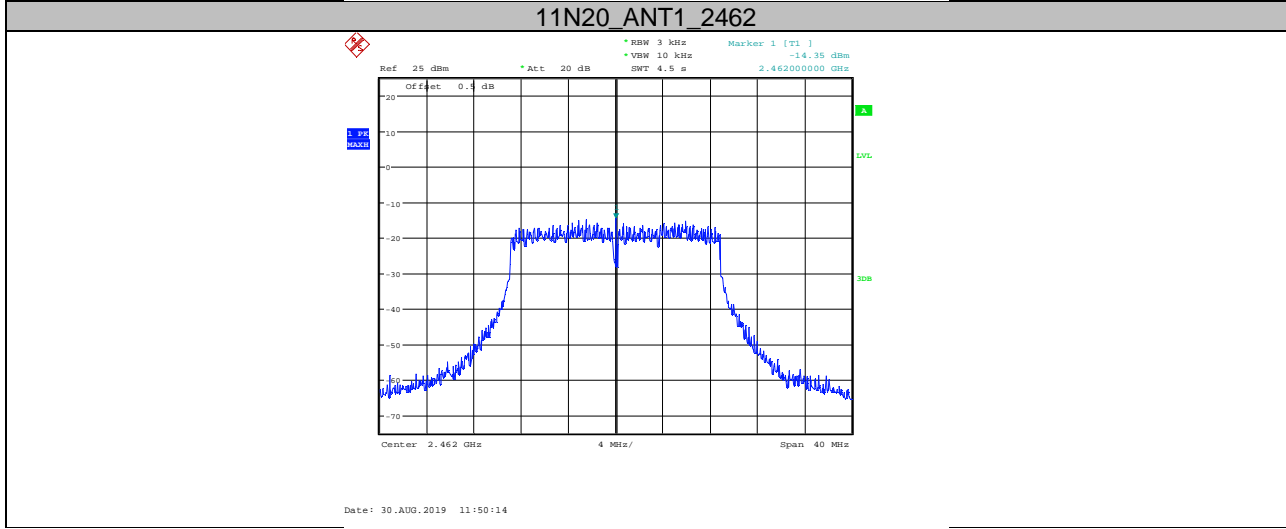
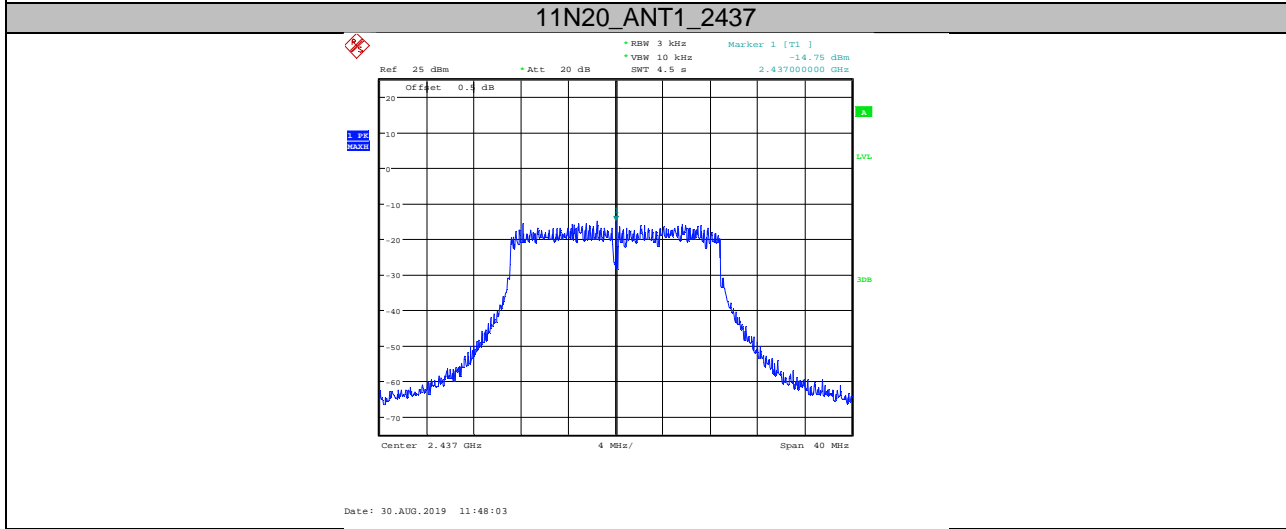
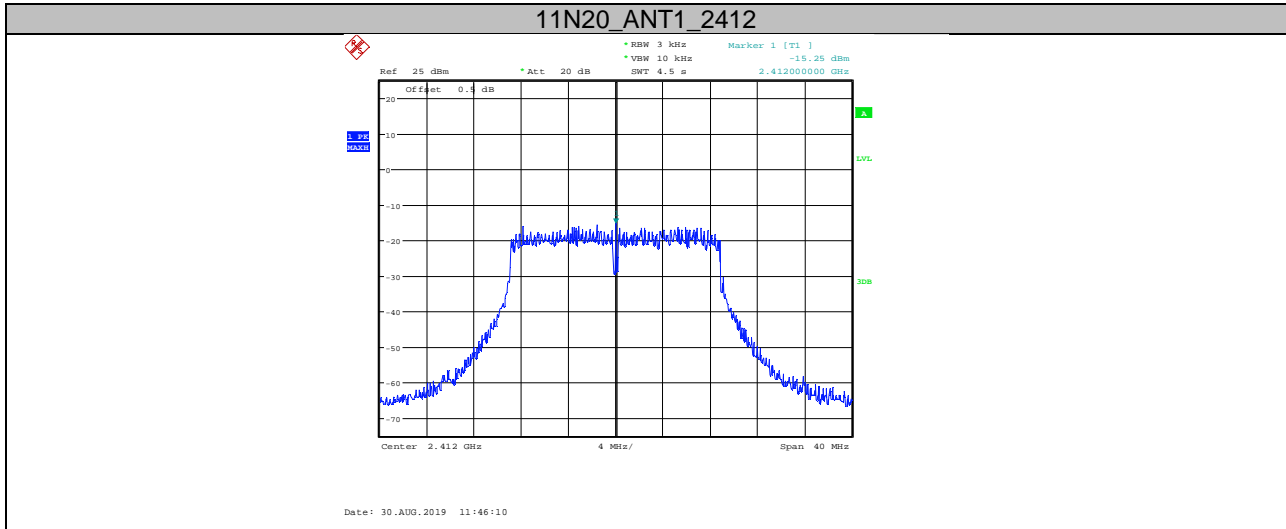
| Frequency MHz | Power spectral density dBm/3KHz | Result |
|------------------------|---------------------------------------|--------|
| Top channel 2422MHz | -13.87 | Pass |
| Middle channel 2437MHz | -14.08 | Pass |
| Bottom channel 2452MHz | -13.73 | Pass |

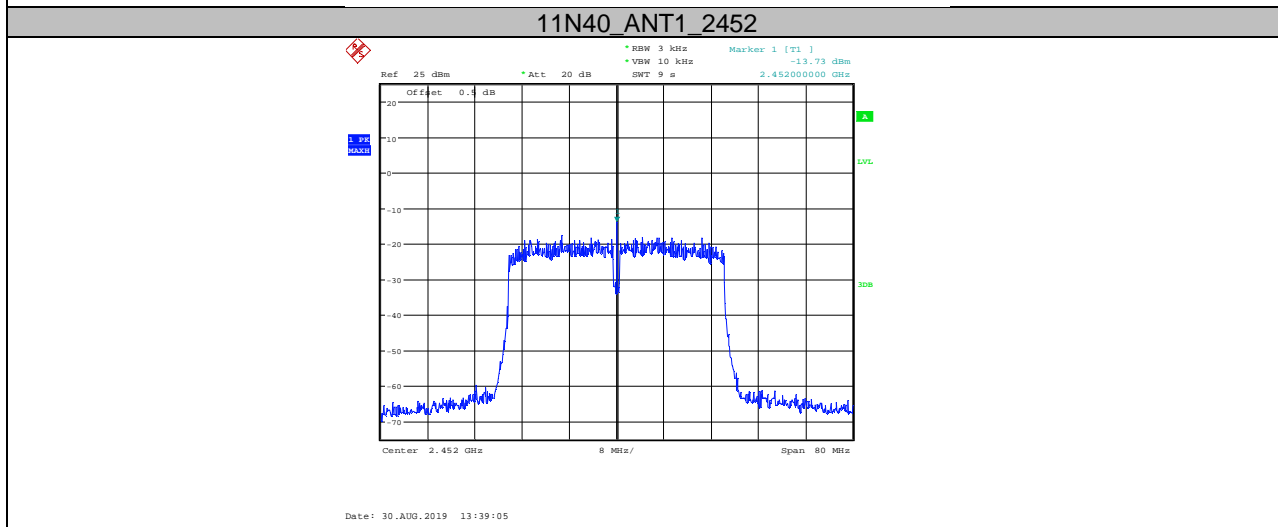
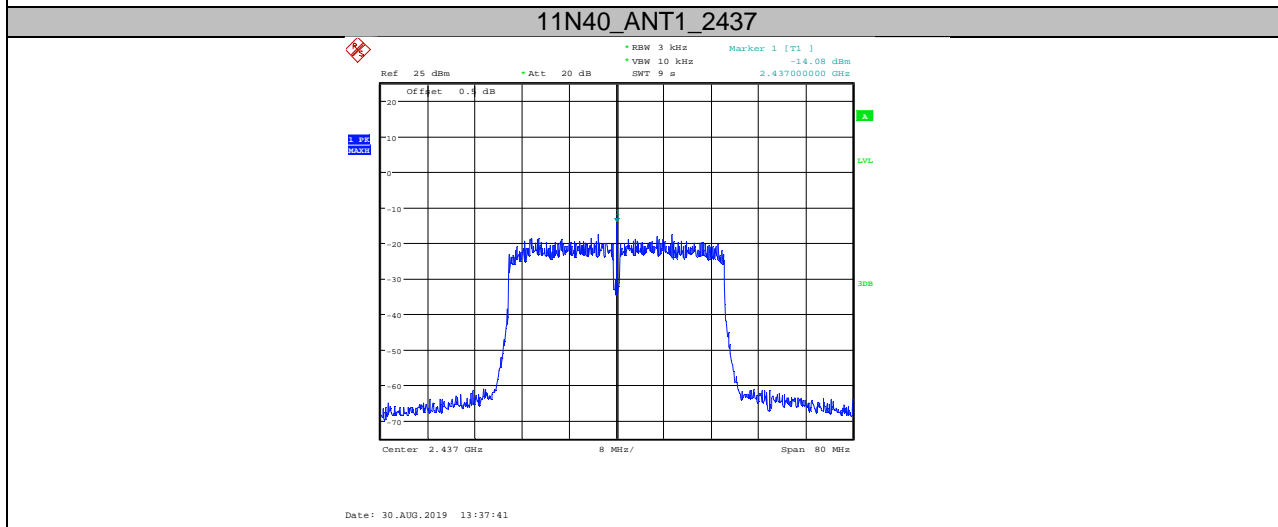
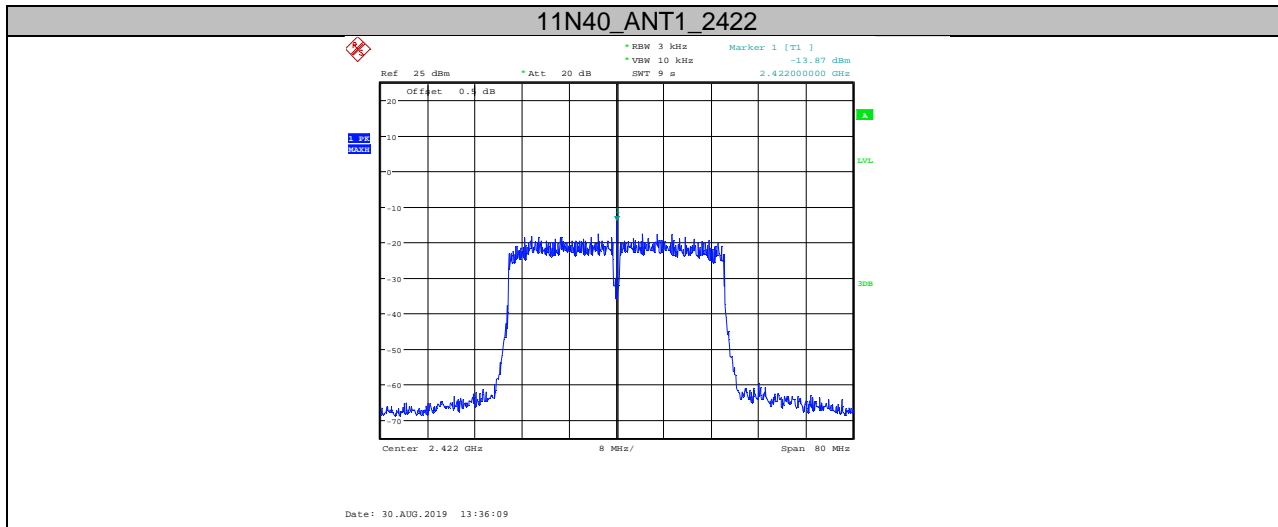


Test Graphs











9.5 Spurious RF conducted emissions

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
 - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
3. Use the maximum PSD level to establish the reference level.
 - a. Set the center frequency and span to encompass frequency range to be measured.
 - b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
4. Repeat above procedures until other frequencies measured were completed.

Limit

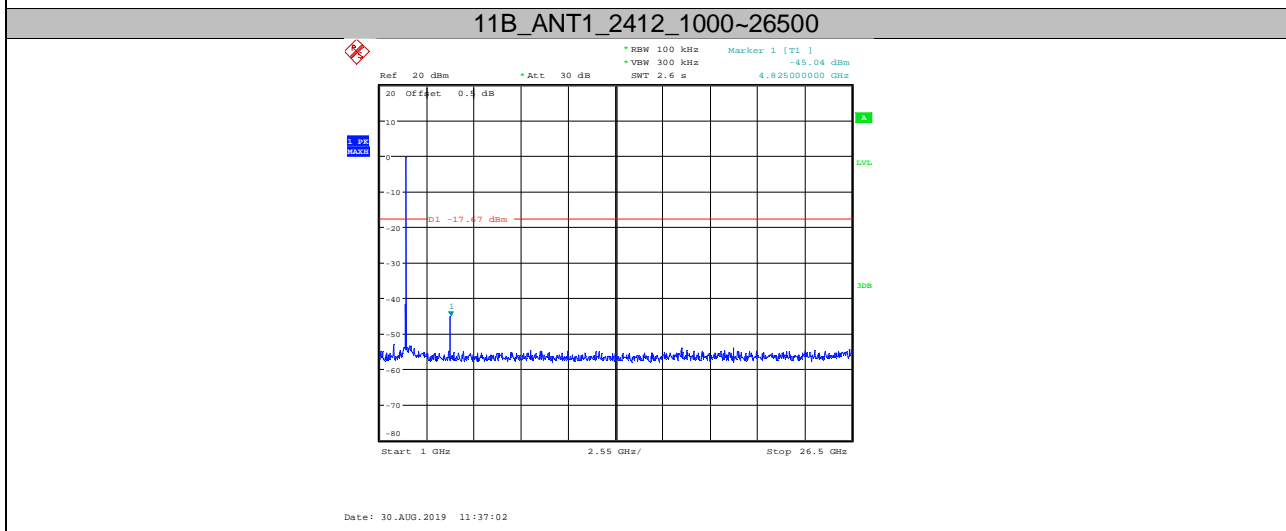
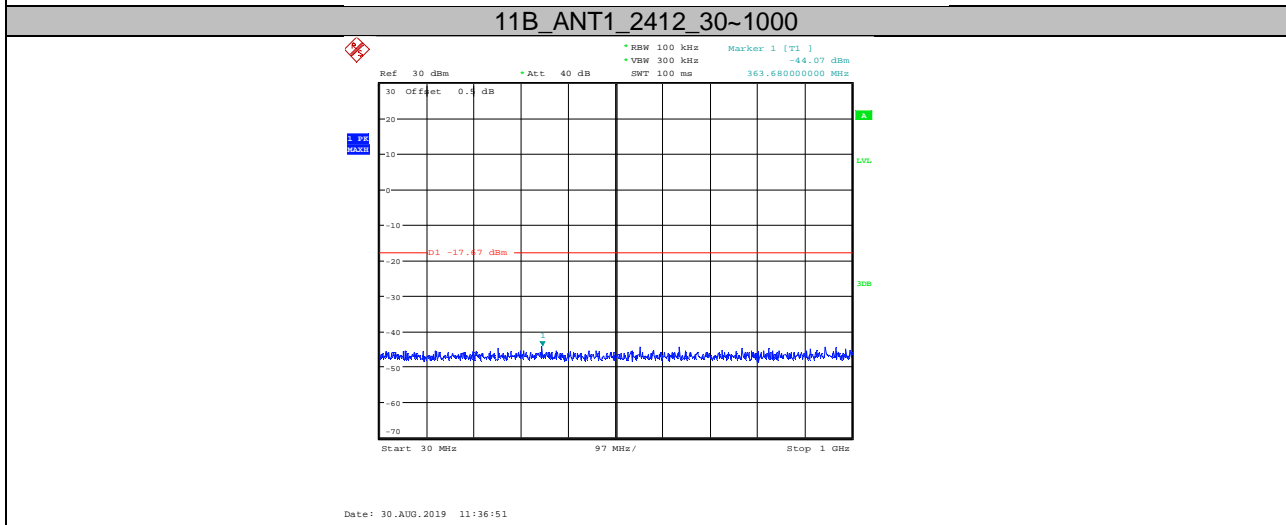
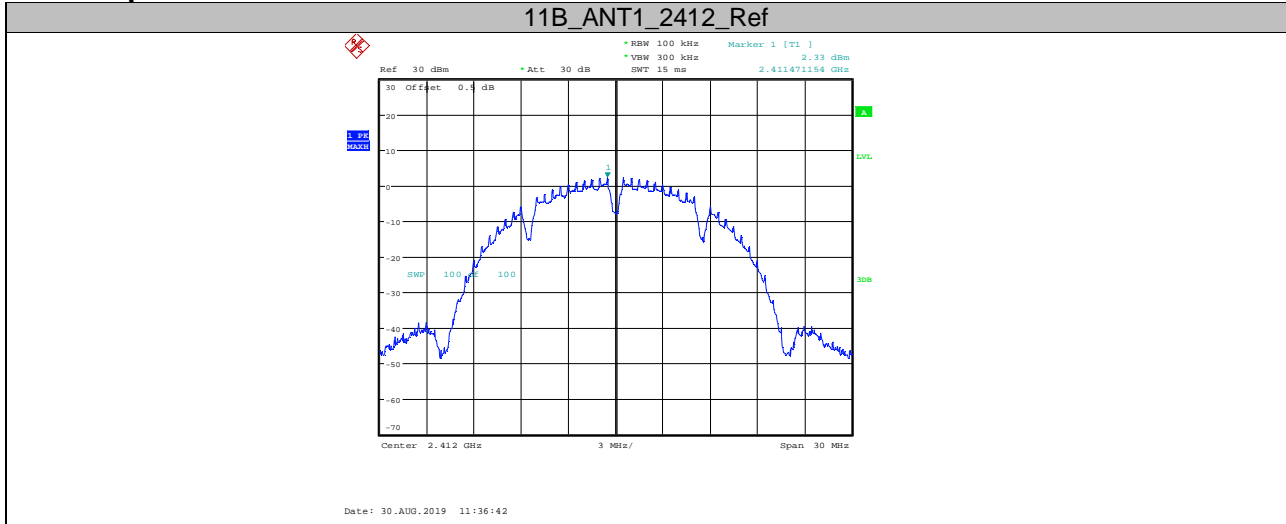
| Frequency Range MHz | Limit (dBc) |
|------------------------|-------------|
| 30-25000 | -20 |

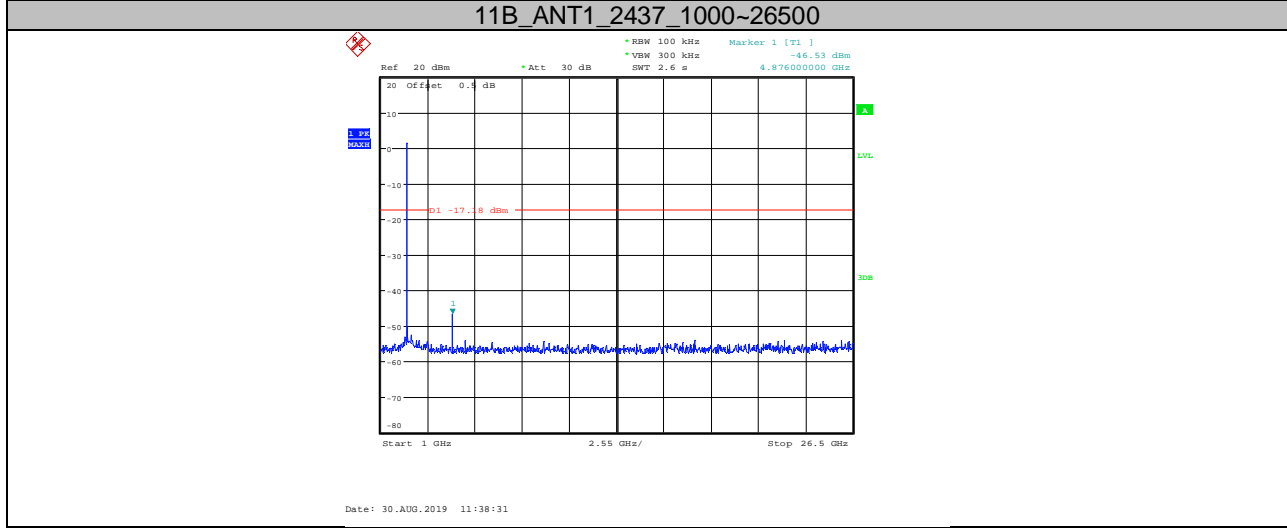
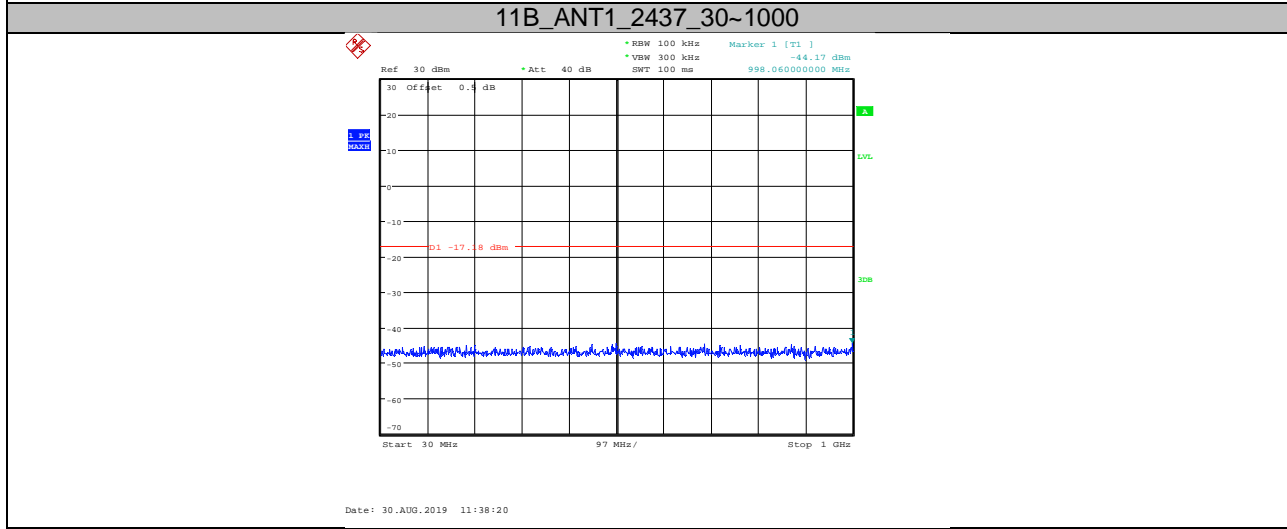
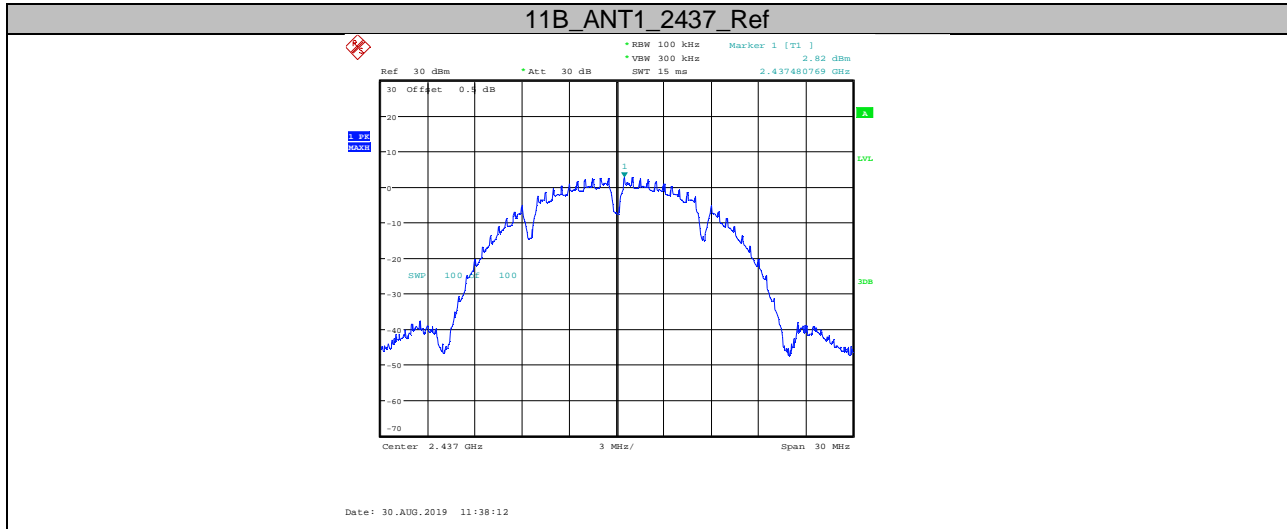
Test result

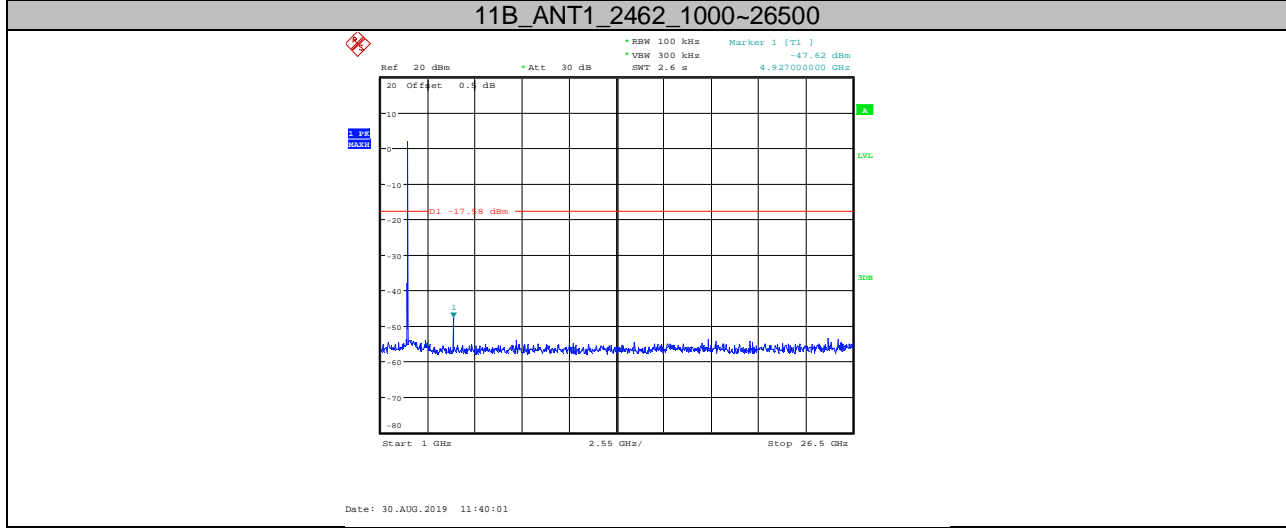
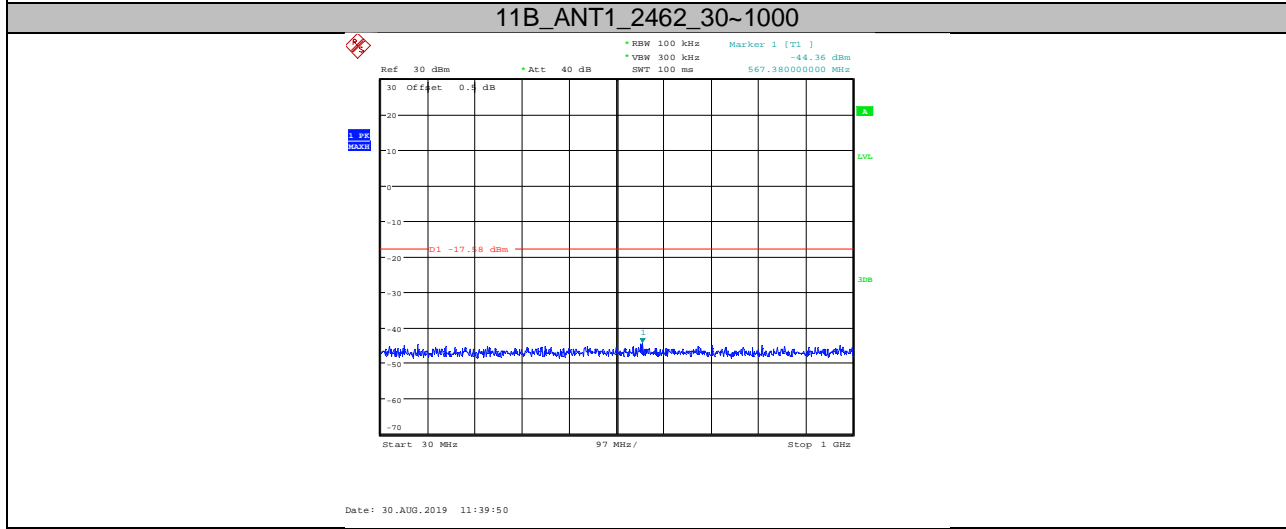
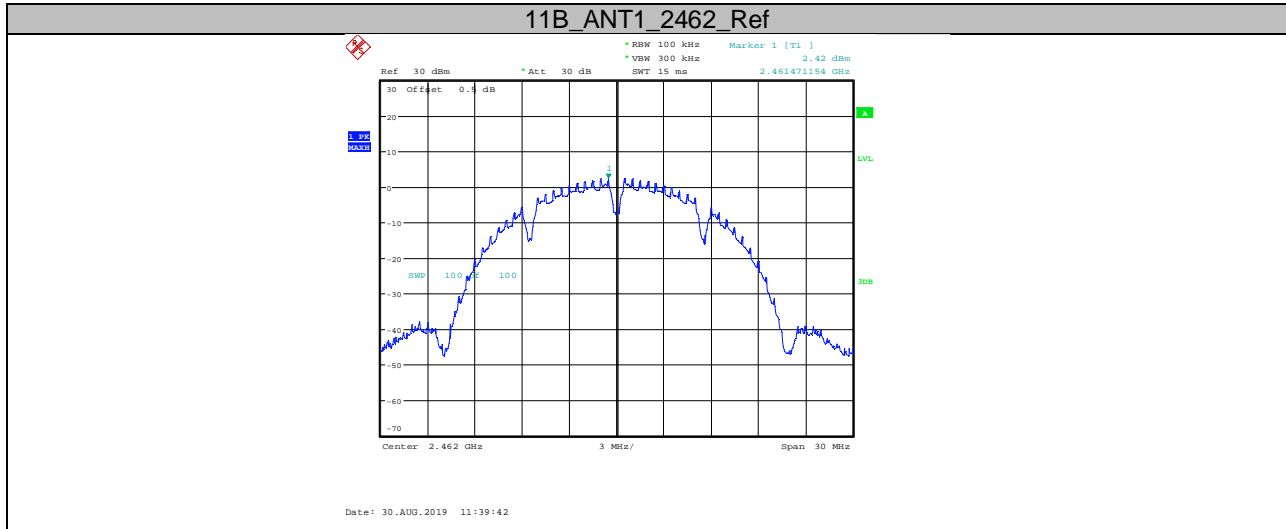
| Test Mode | Antenna | Channel (MHz) | Freq Range (MHz) | Ref Level | Result (dBm) | Limit (dBm) | Verdict |
|-----------|---------|---------------|------------------|-----------|--------------|-------------|---------|
| 11B | ANT1 | 2412 | 30~1000 | 2.33 | -44.07 | -17.67 | PASS |
| 11B | ANT1 | 2412 | 1000~26500 | 2.33 | -45.04 | -17.67 | PASS |
| 11B | ANT1 | 2437 | 30~1000 | 2.82 | -44.17 | -17.18 | PASS |
| 11B | ANT1 | 2437 | 1000~26500 | 2.82 | -46.53 | -17.18 | PASS |
| 11B | ANT1 | 2462 | 30~1000 | 2.42 | -44.36 | -17.58 | PASS |
| 11B | ANT1 | 2462 | 1000~26500 | 2.42 | -47.62 | -17.58 | PASS |
| 11G | ANT1 | 2412 | 30~1000 | -2.88 | -43.83 | -22.88 | PASS |
| 11G | ANT1 | 2412 | 1000~26500 | -2.88 | -50.28 | -22.88 | PASS |
| 11G | ANT1 | 2437 | 30~1000 | -0.62 | -44.36 | -20.62 | PASS |
| 11G | ANT1 | 2437 | 1000~26500 | -0.62 | -50.25 | -20.62 | PASS |
| 11G | ANT1 | 2462 | 30~1000 | -0.59 | -44.7 | -20.59 | PASS |
| 11G | ANT1 | 2462 | 1000~26500 | -0.59 | -50.14 | -20.59 | PASS |
| 11N20 | ANT1 | 2412 | 30~1000 | -1.60 | -44.4 | -21.6 | PASS |
| 11N20 | ANT1 | 2412 | 1000~26500 | -1.60 | -51.61 | -21.6 | PASS |
| 11N20 | ANT1 | 2437 | 30~1000 | -1.24 | -44.56 | -21.24 | PASS |
| 11N20 | ANT1 | 2437 | 1000~26500 | -1.24 | -50.88 | -21.24 | PASS |
| 11N20 | ANT1 | 2462 | 30~1000 | -4.27 | -44.12 | -24.27 | PASS |
| 11N20 | ANT1 | 2462 | 1000~26500 | -4.27 | -50.51 | -24.27 | PASS |
| 11N40 | ANT1 | 2422 | 30~1000 | -4.70 | -44.18 | -24.7 | PASS |
| 11N40 | ANT1 | 2422 | 1000~26500 | -4.70 | -51.37 | -24.7 | PASS |
| 11N40 | ANT1 | 2437 | 30~1000 | -5.14 | -44.22 | -25.14 | PASS |
| 11N40 | ANT1 | 2437 | 1000~26500 | -5.14 | -50.73 | -25.14 | PASS |
| 11N40 | ANT1 | 2452 | 30~1000 | -4.57 | -44.2 | -24.57 | PASS |
| 11N40 | ANT1 | 2452 | 1000~26500 | -4.57 | -51.9 | -24.57 | PASS |

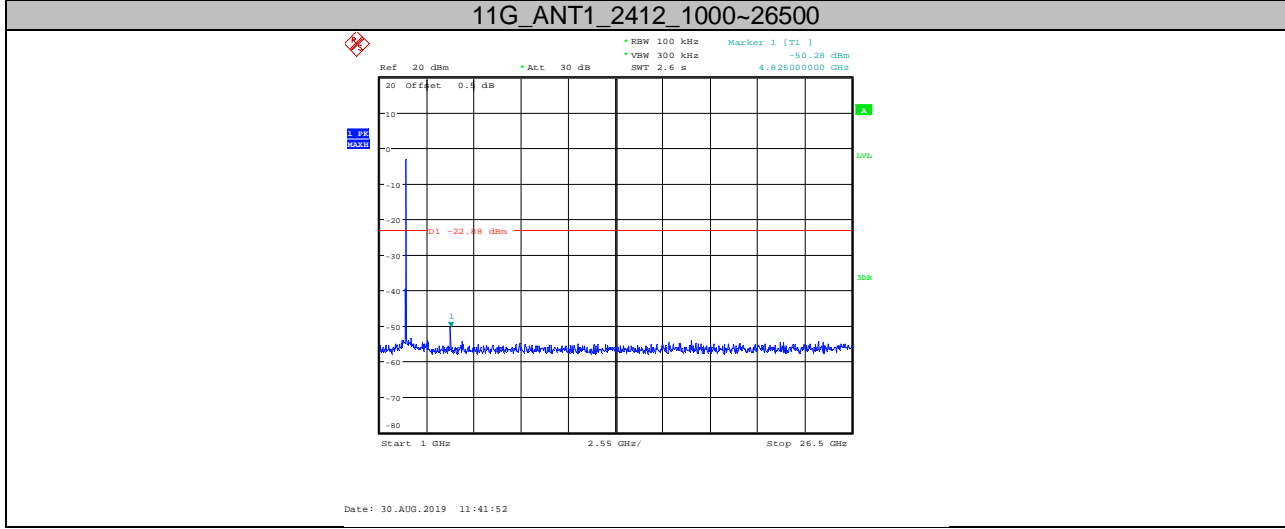
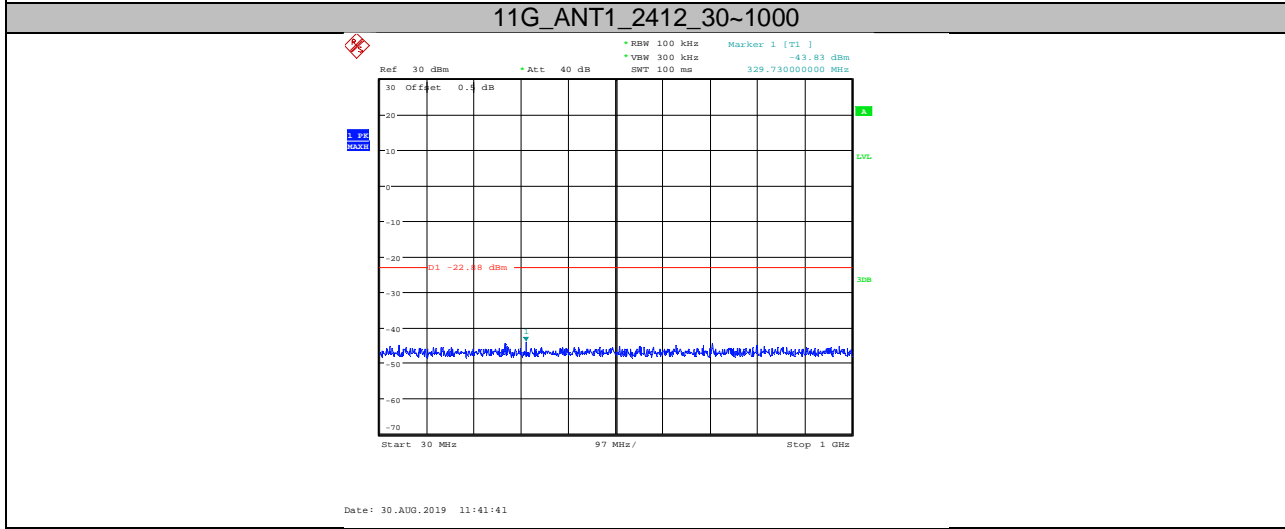
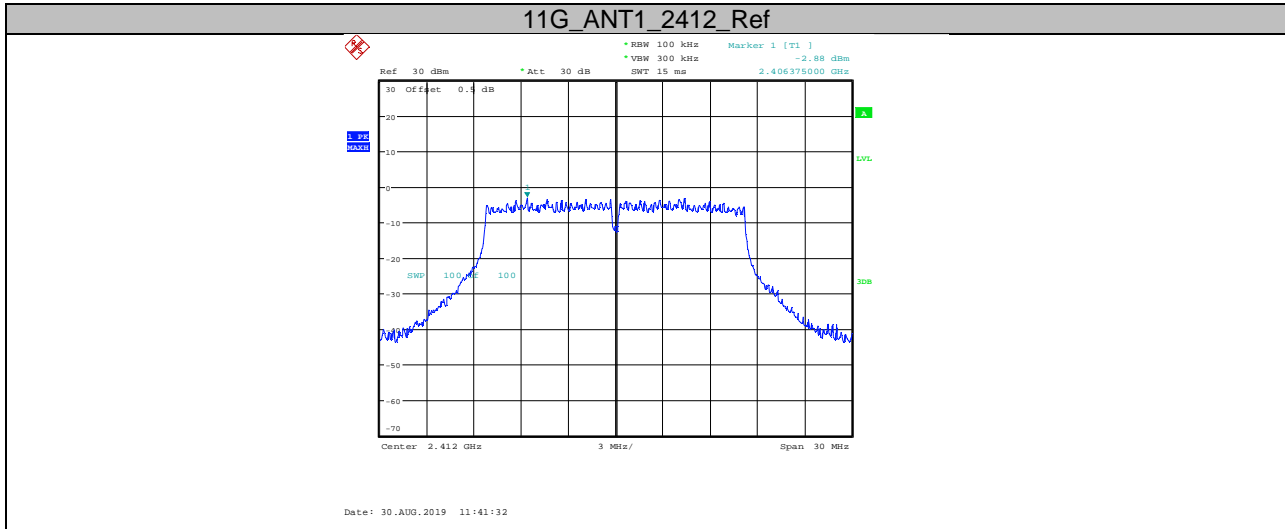


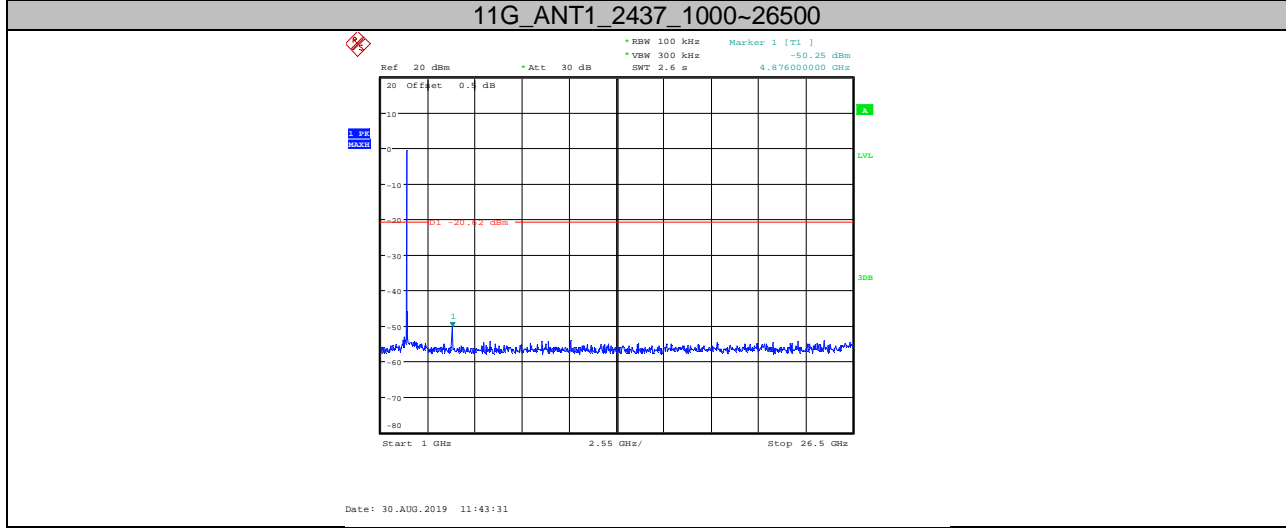
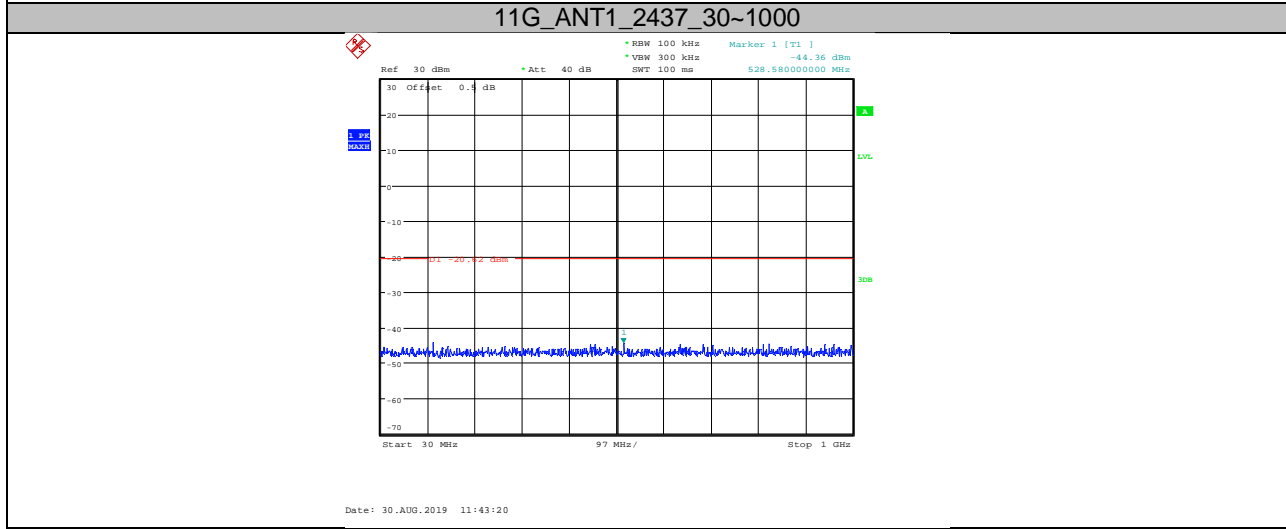
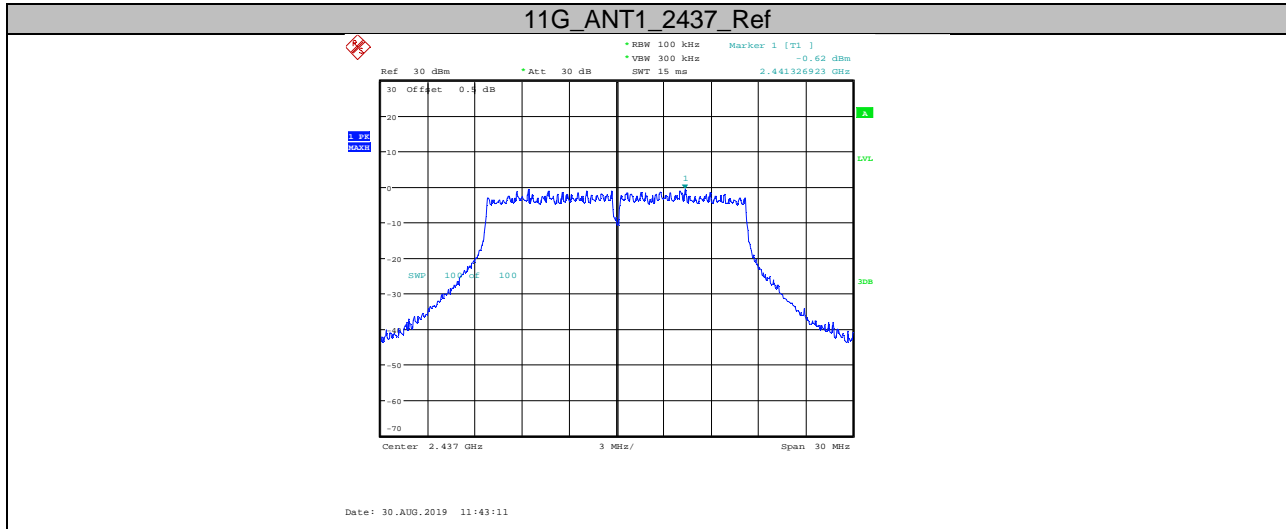
Test Graphs

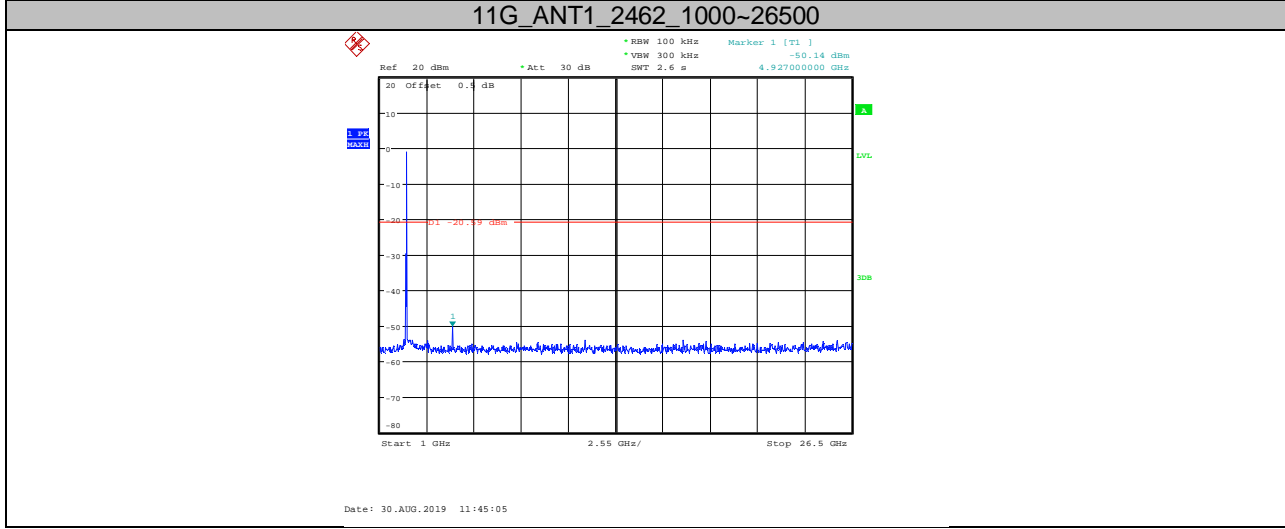
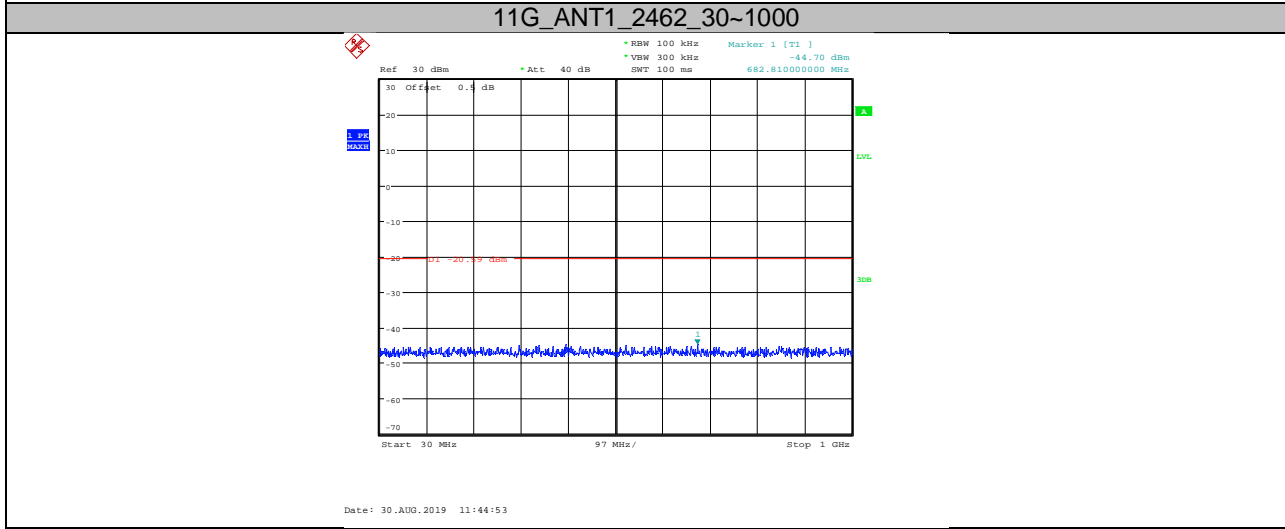
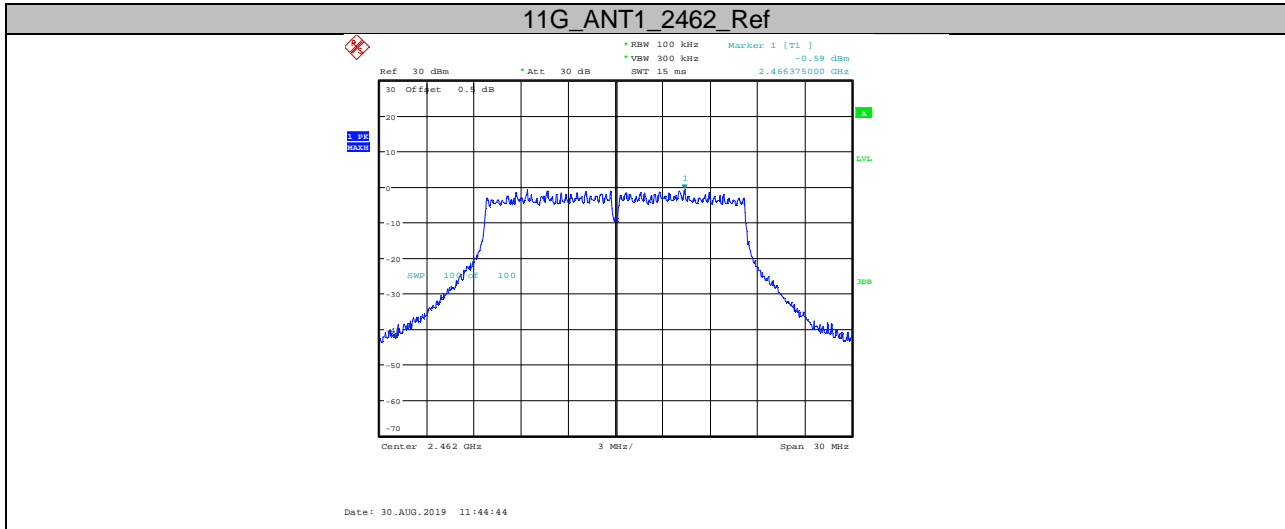


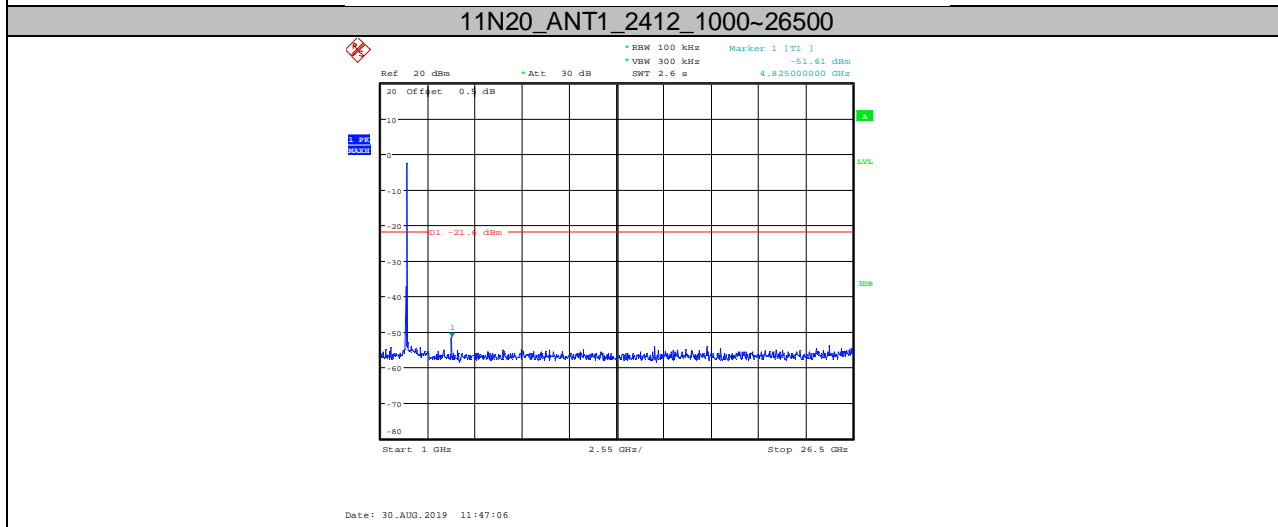
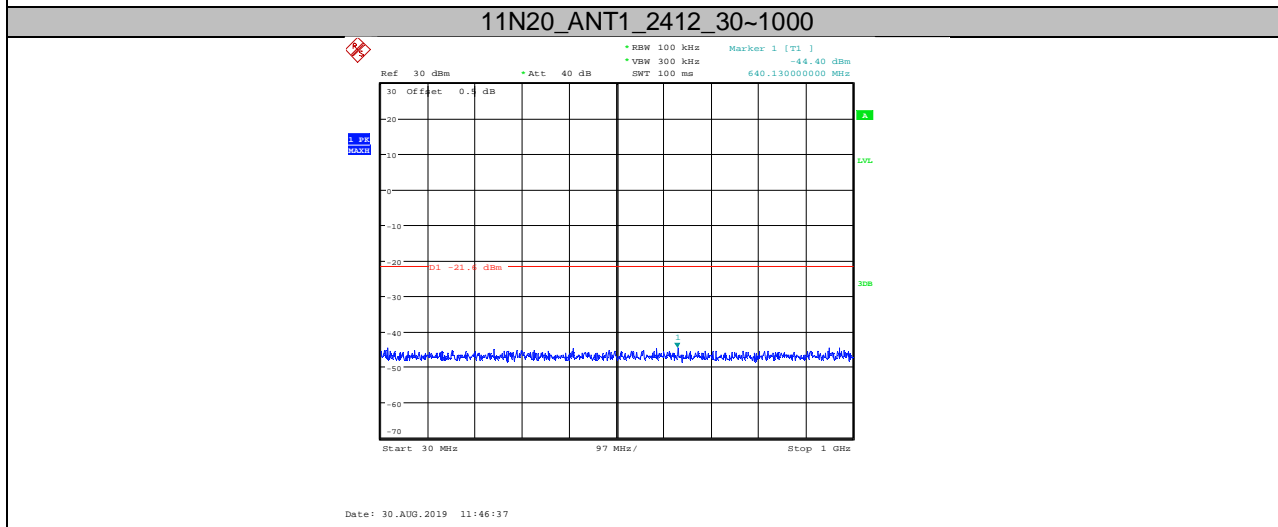
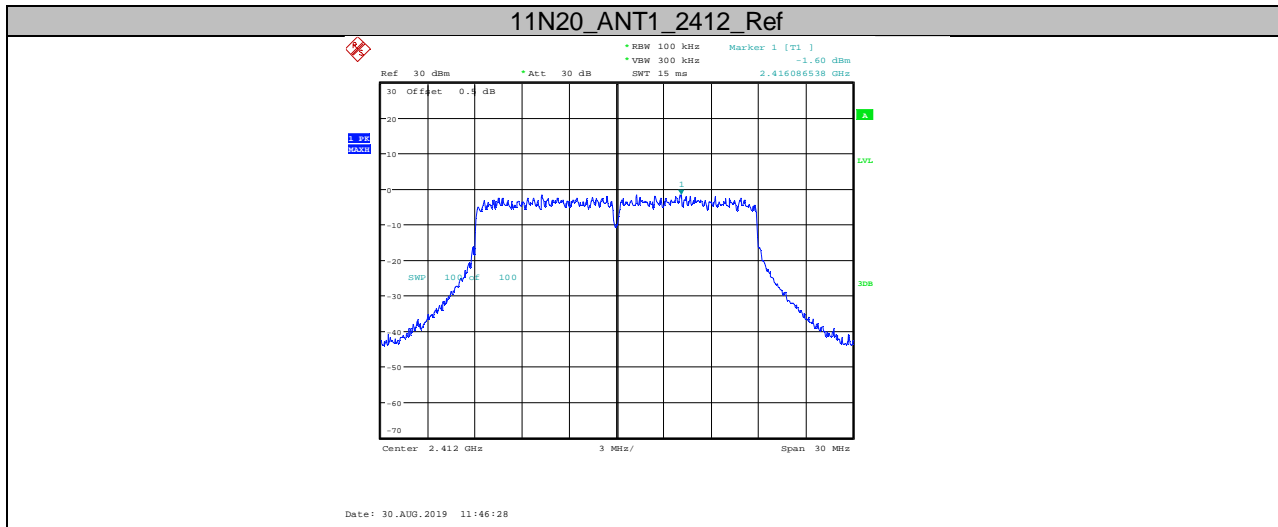


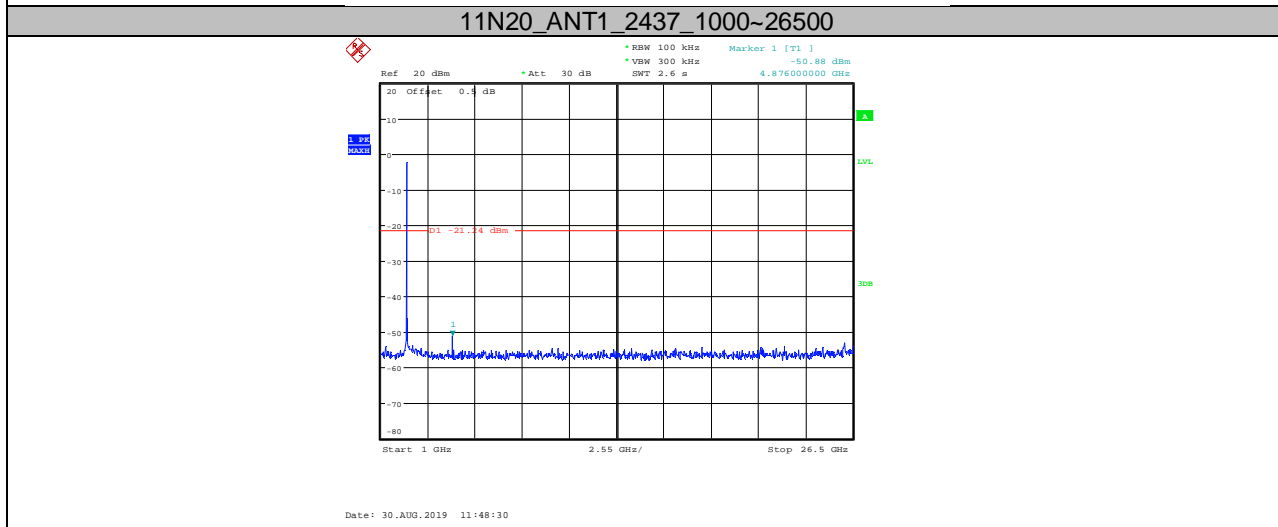
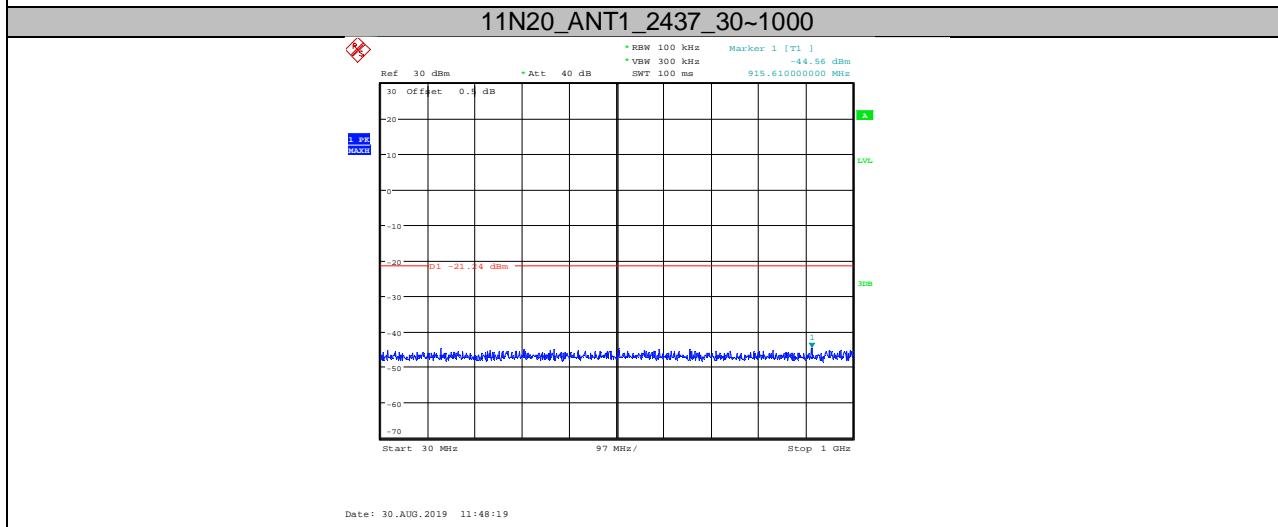
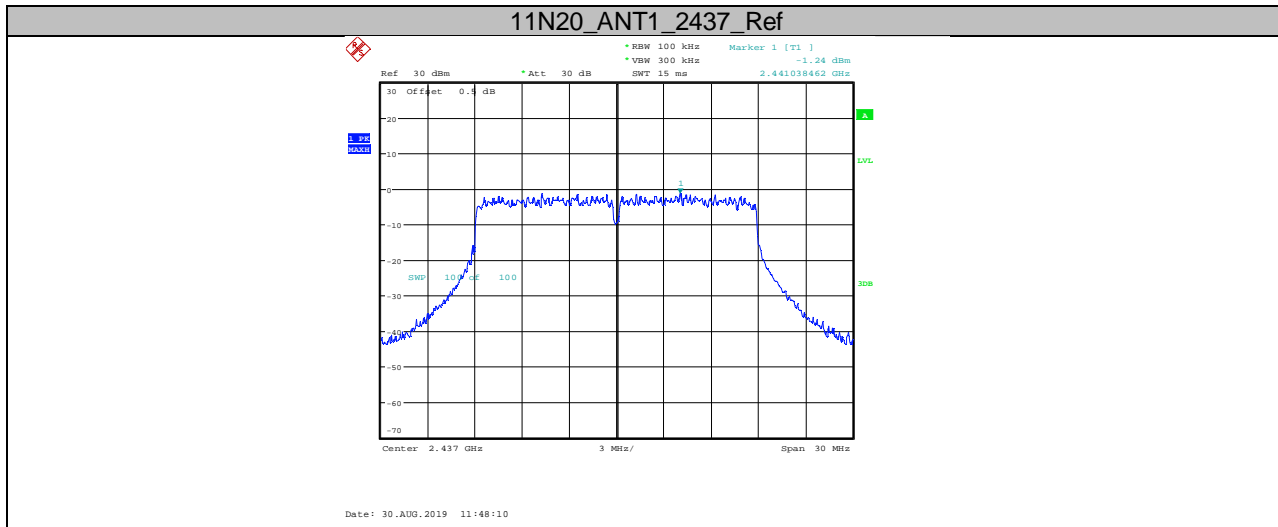


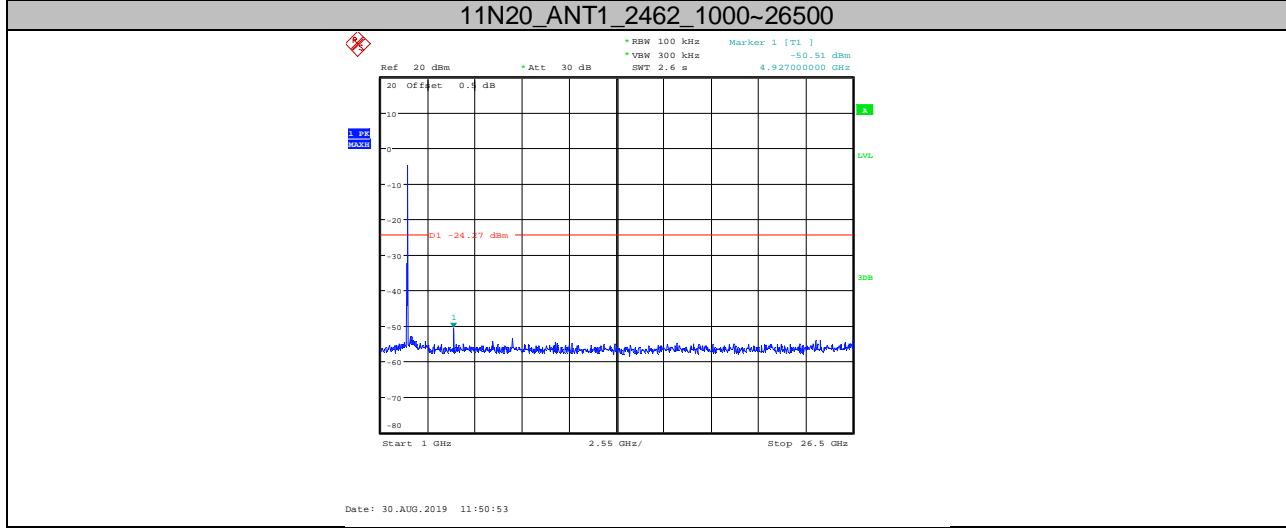
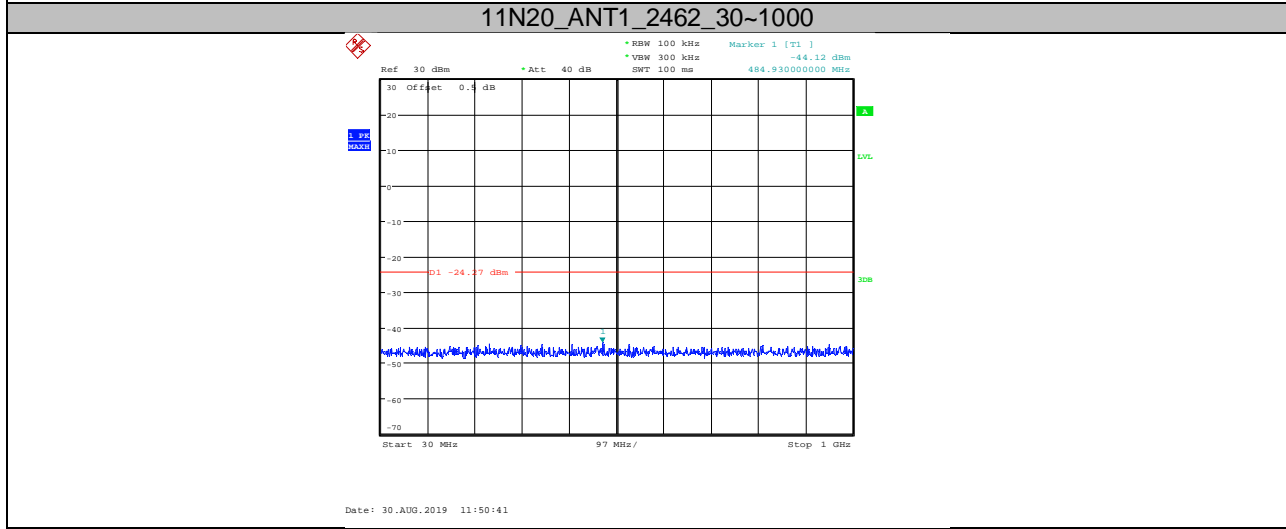
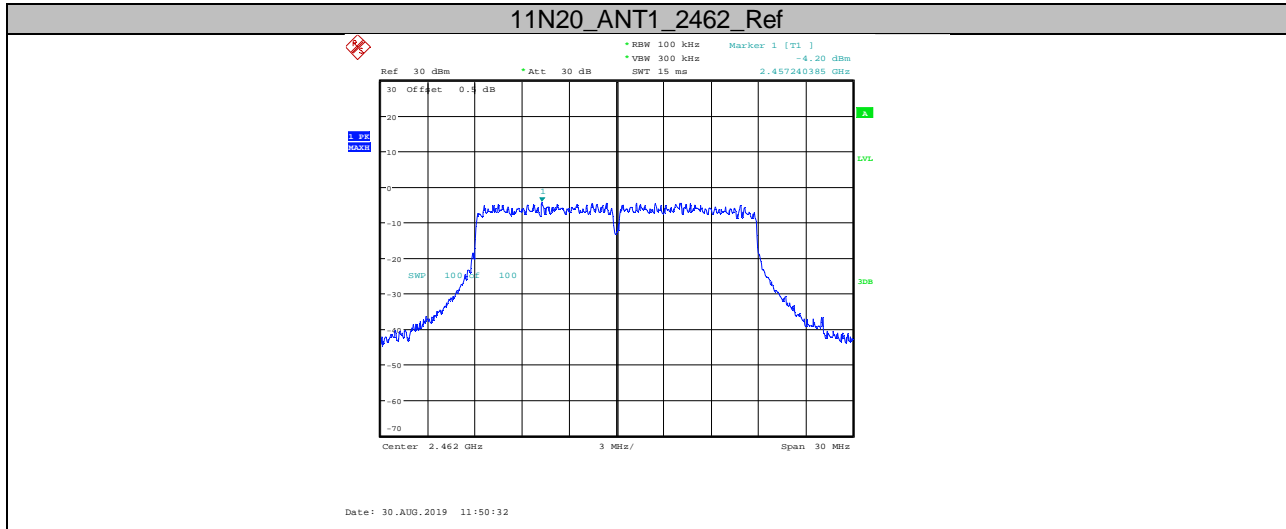


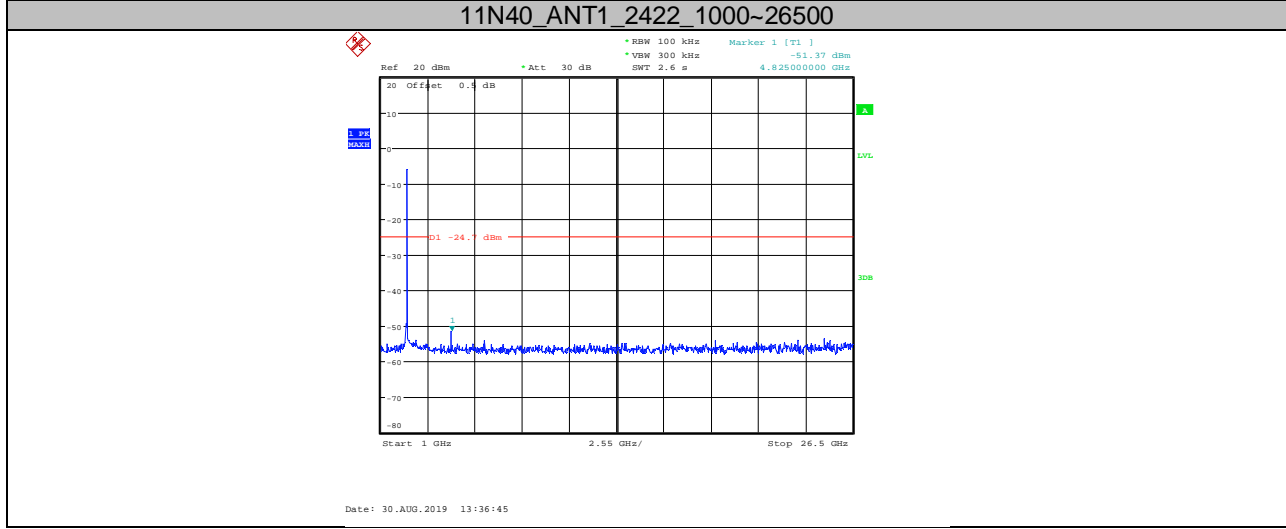
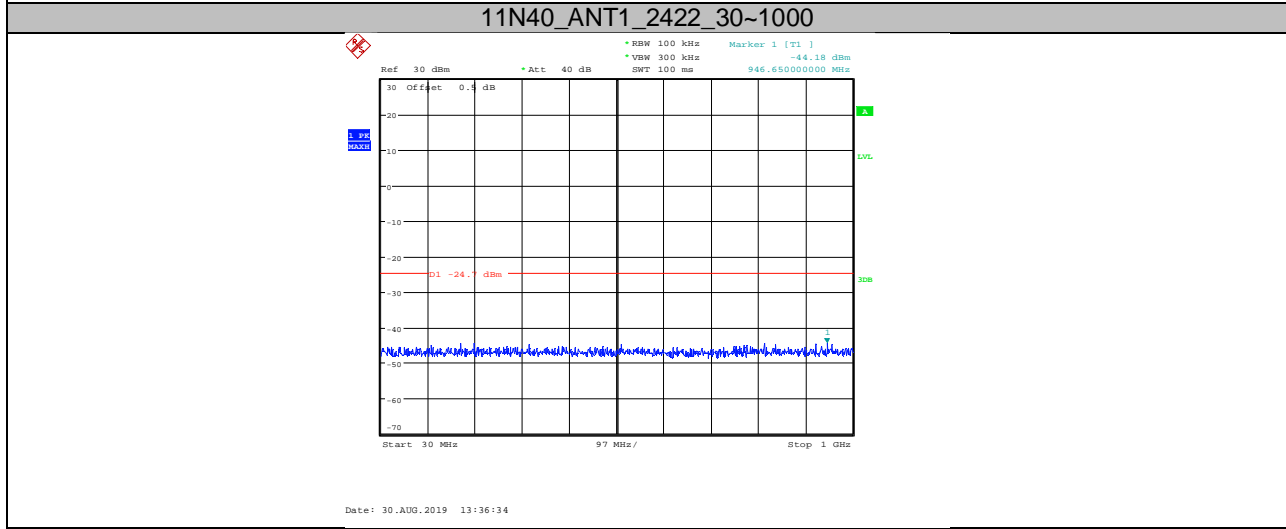
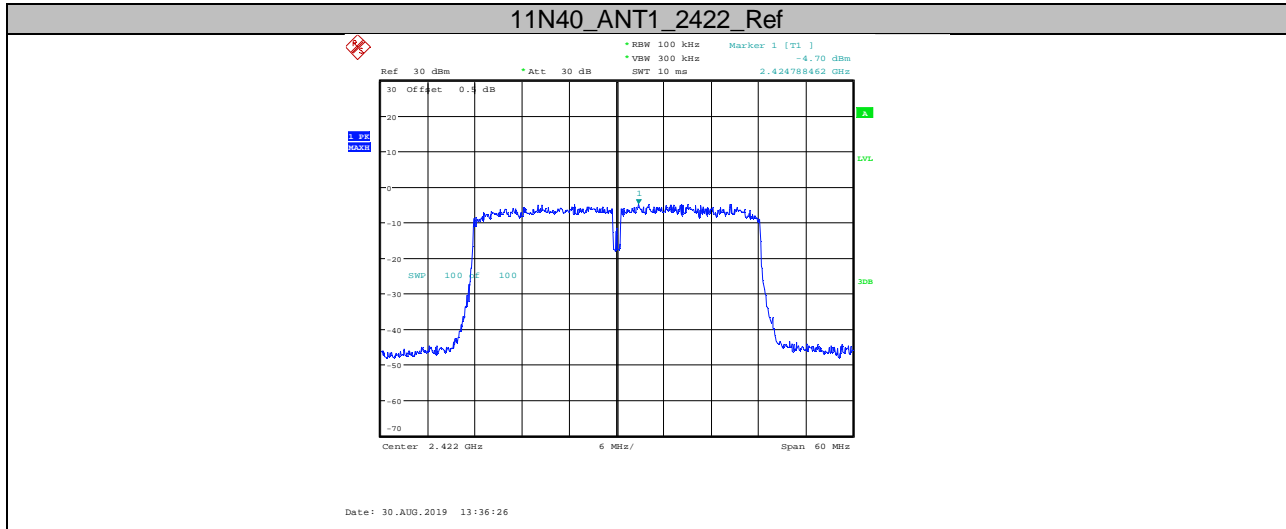


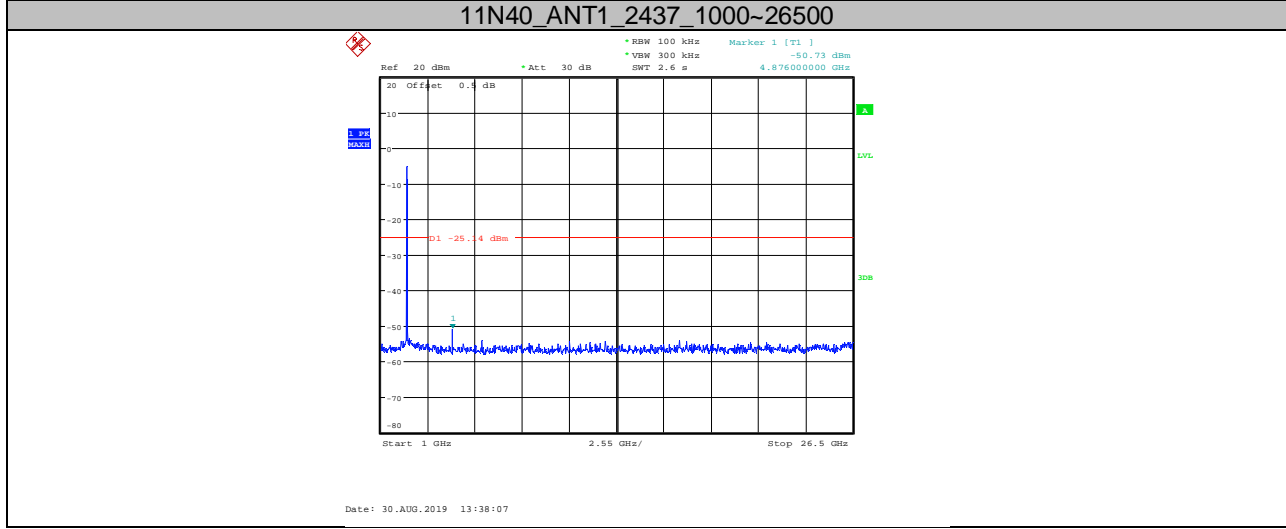
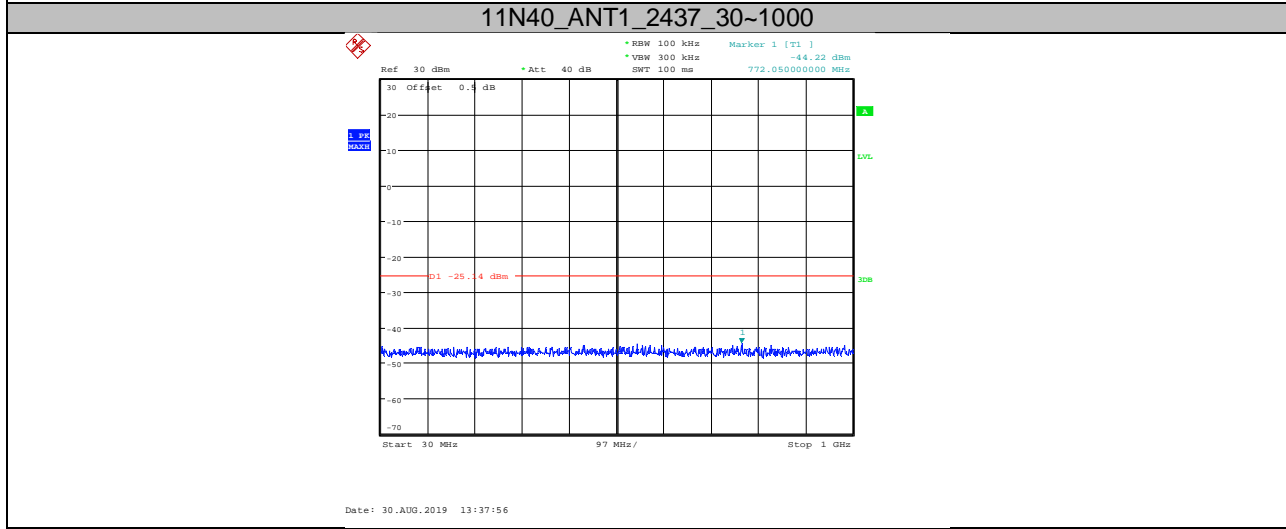
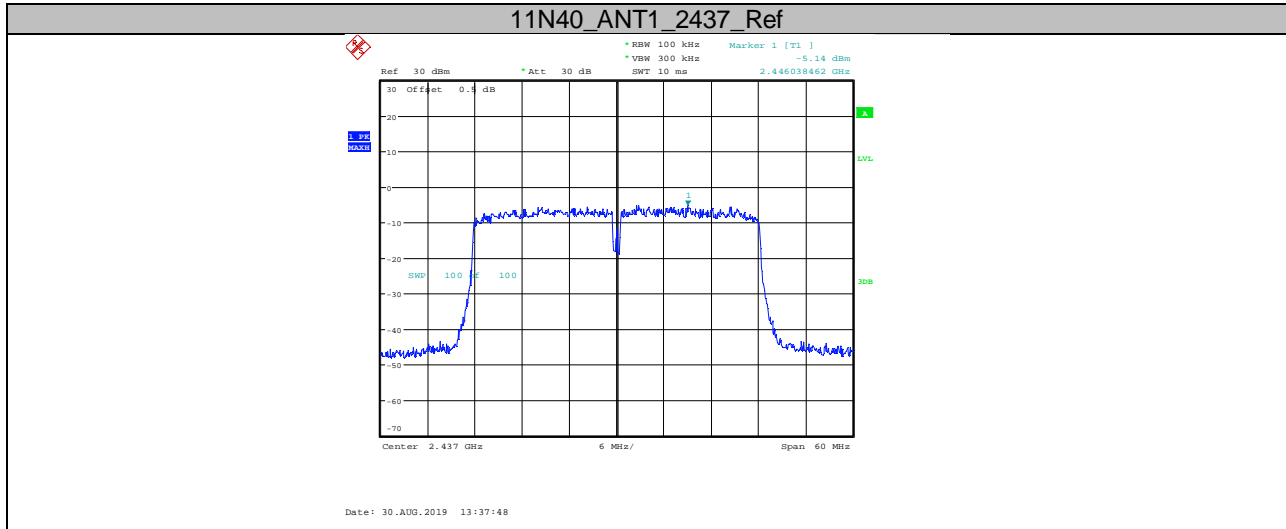


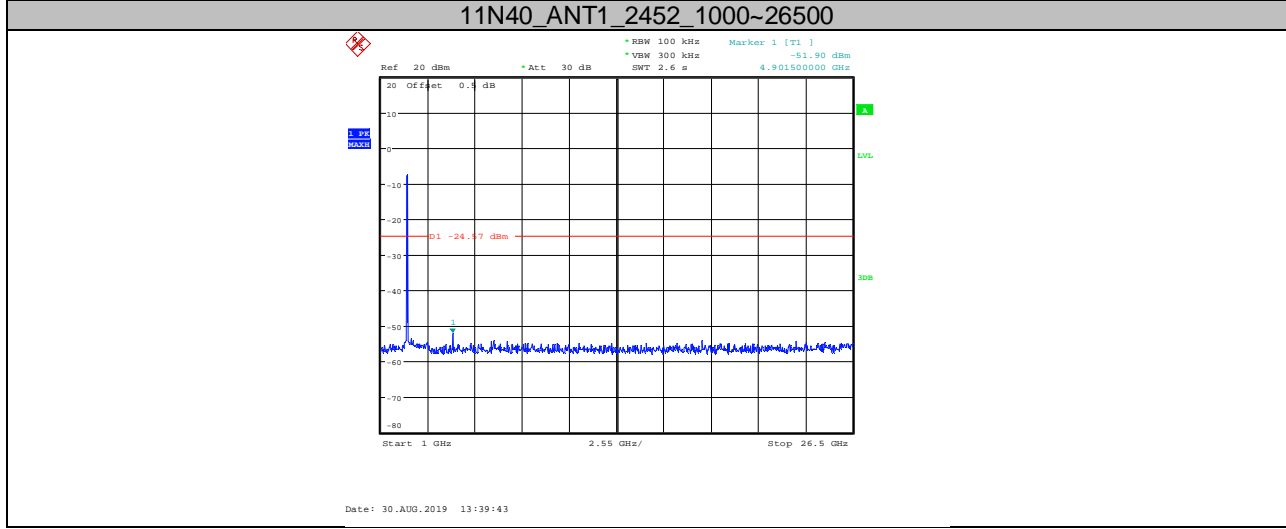
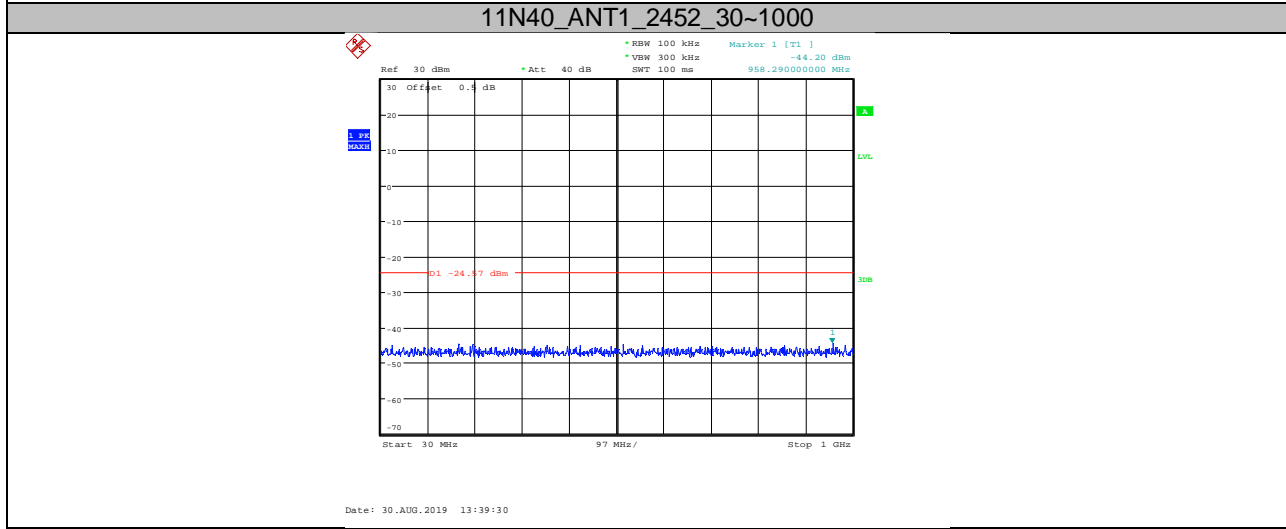
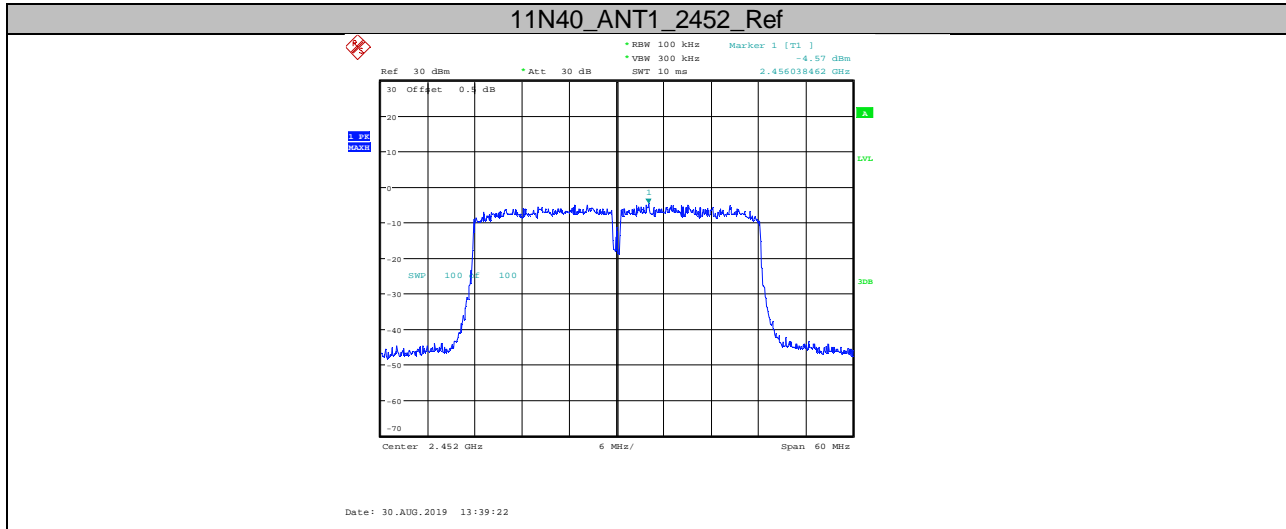














9.6 Band edge

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Set spectrum analyzer setting as below:
 Set RBW ³ 1% of the span, VBW ³ RBW.
 Set Sweep = auto. Set Detector function = peak. Allow the trace to stabilize.
 Set Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
3. Repeat above procedures until all frequencies measured were complete.

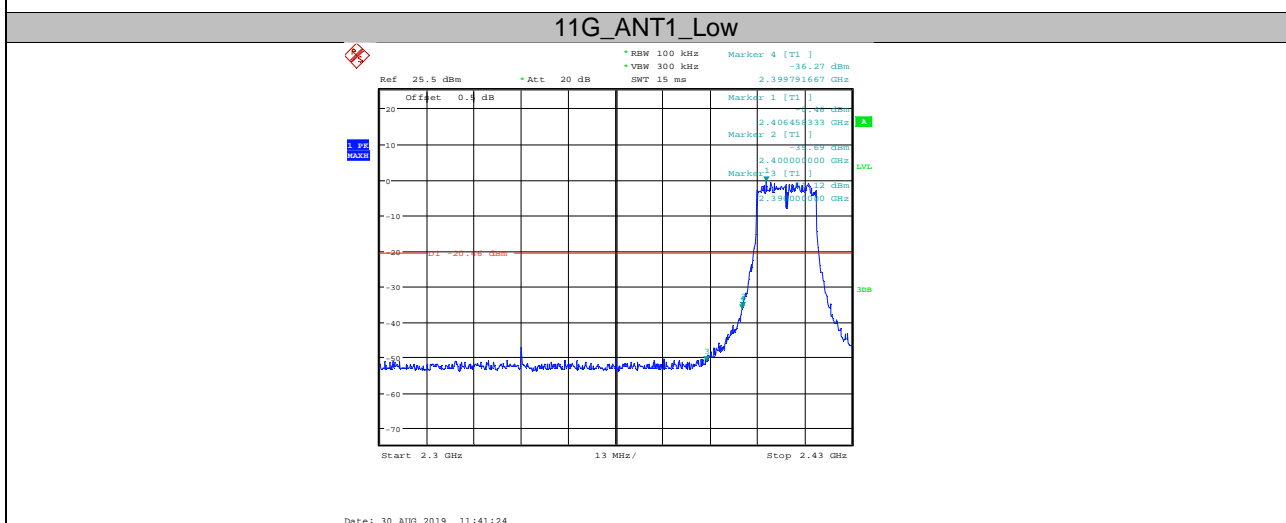
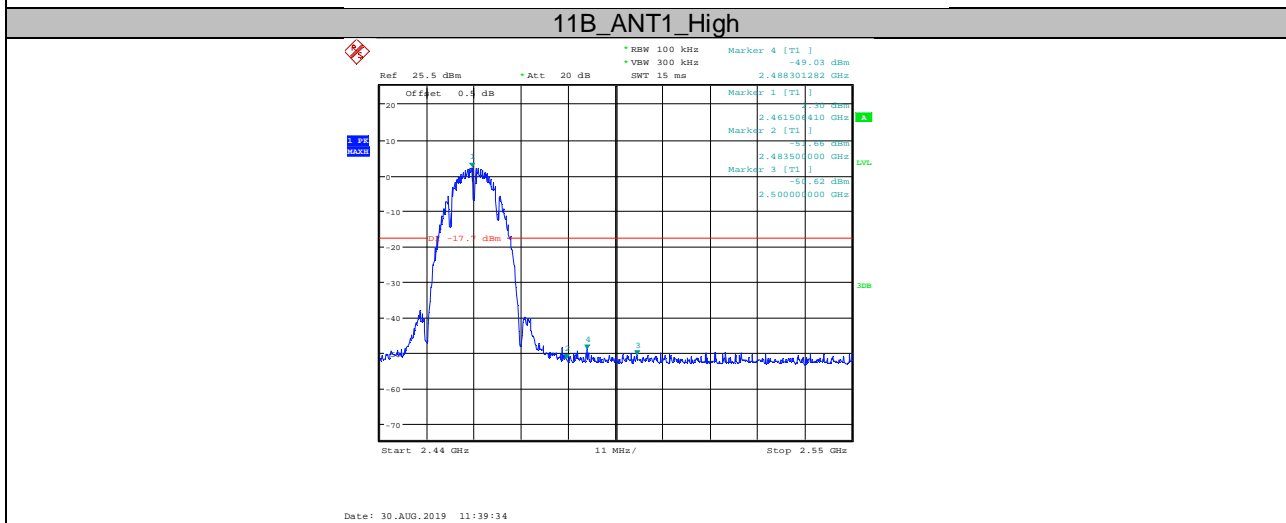
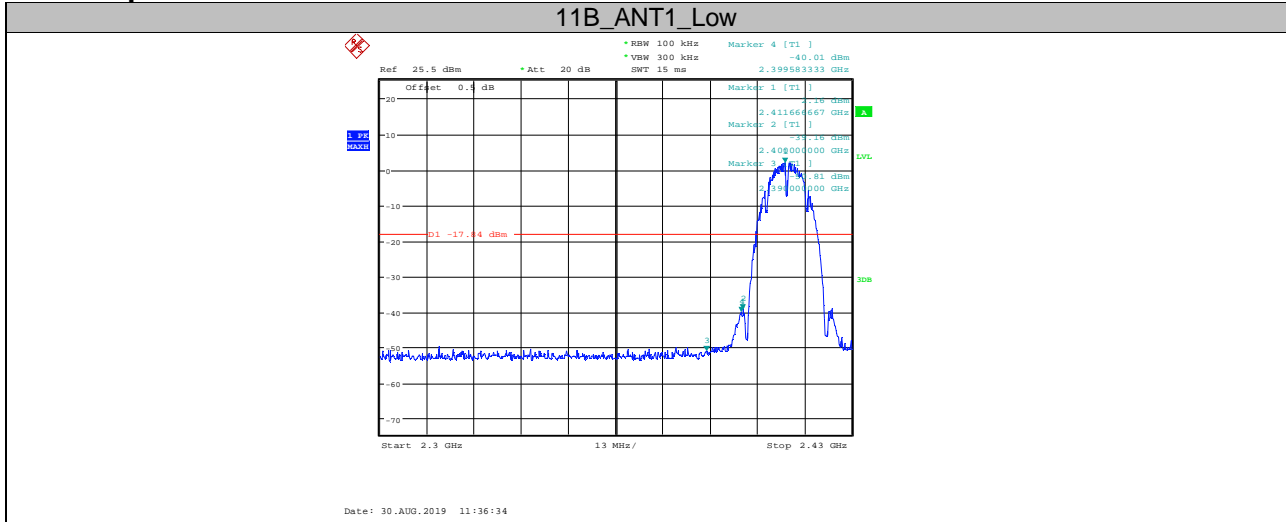
Limit

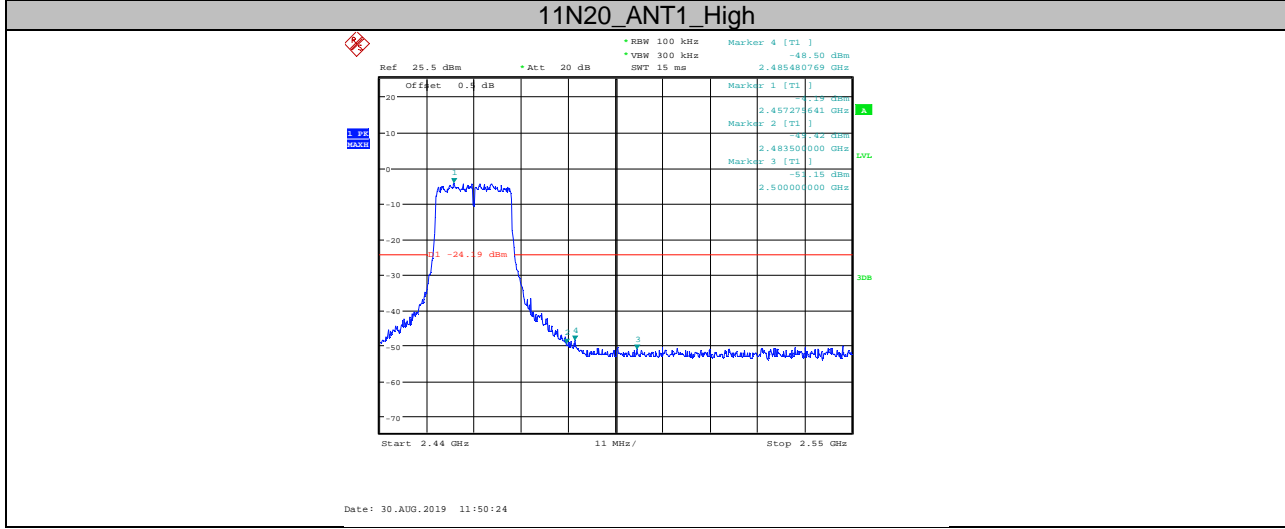
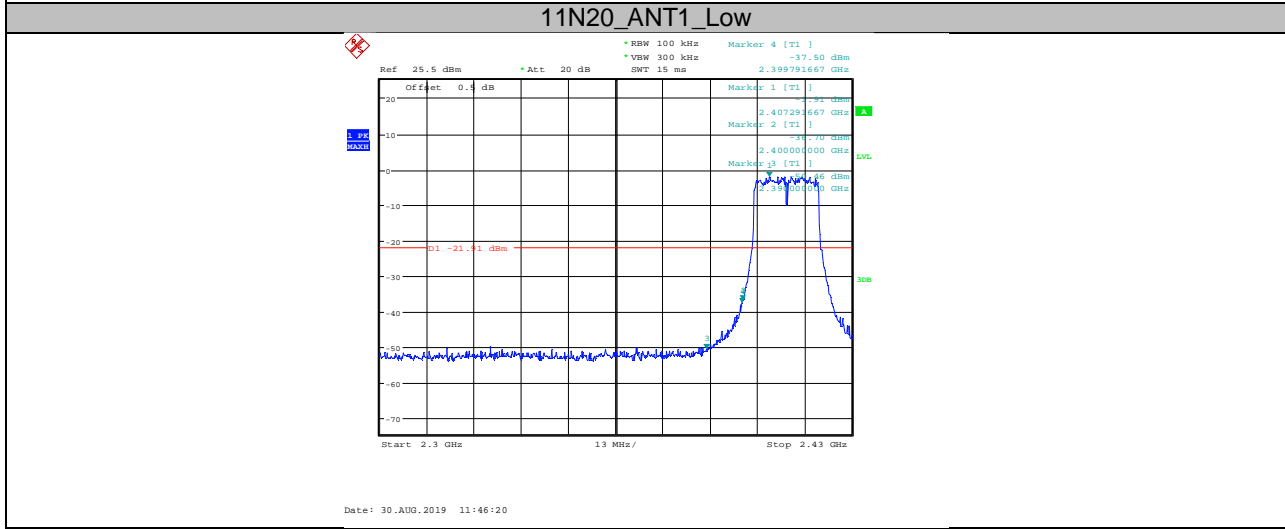
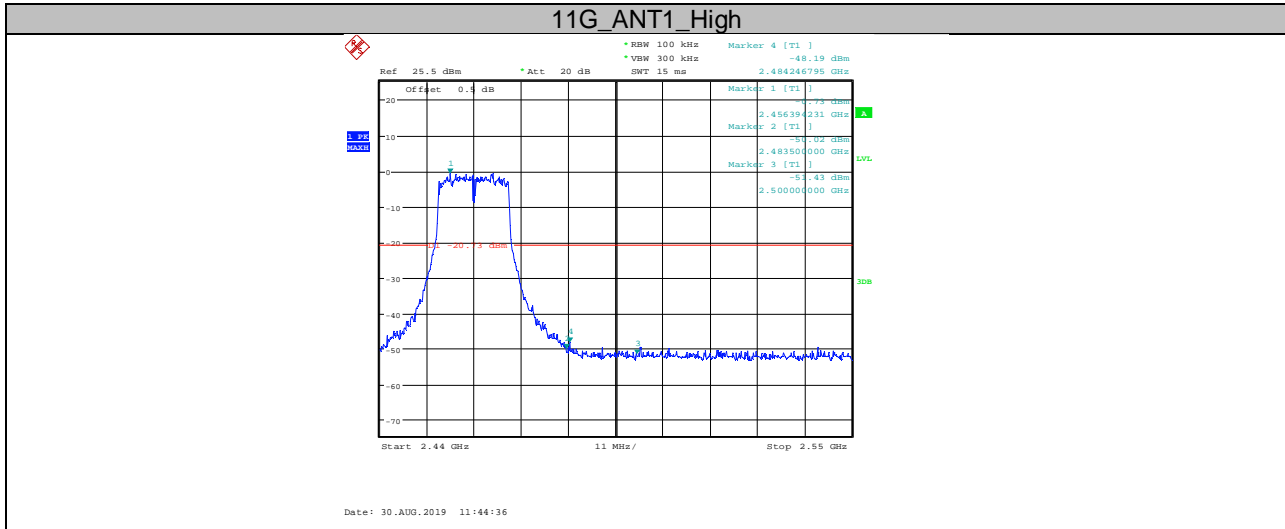
| Frequency Range MHz | Limit (dBc) |
|------------------------|-------------|
| 30-25000 | -20 |

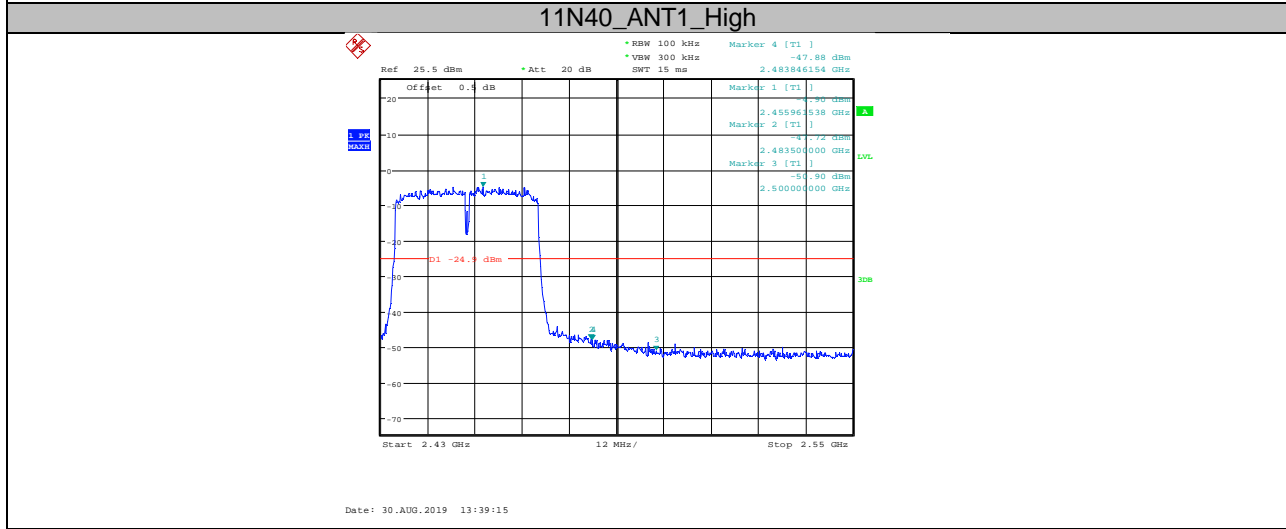
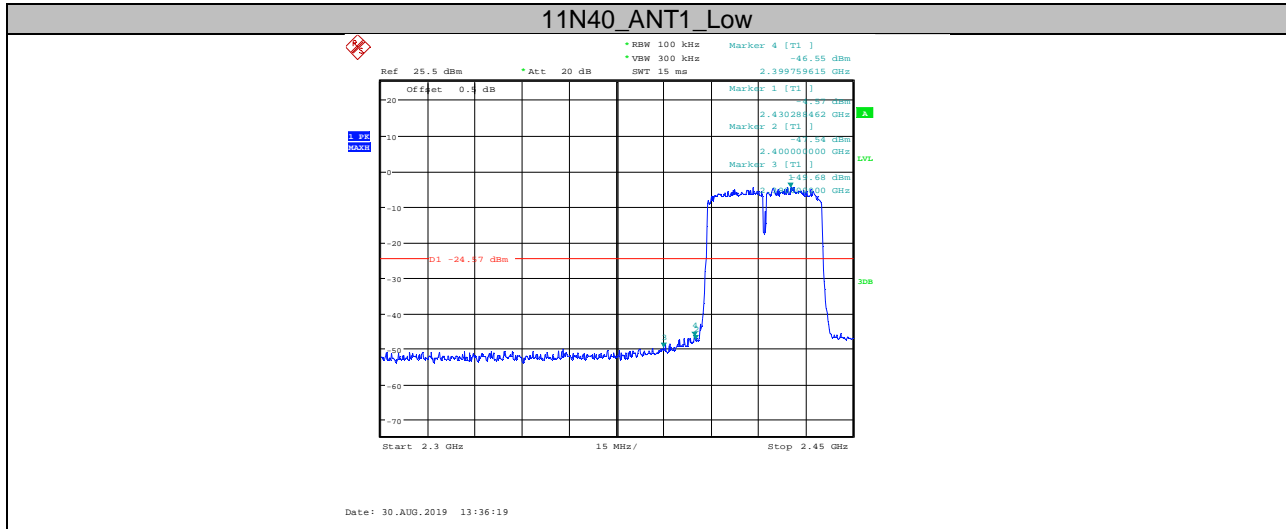
Test result

| Test Mode | Antenna | Ch Name | Channel | Max. Level | Result (dBm) | Limit (dBm) | Verdict |
|-----------|---------|---------|---------|------------|--------------|-------------|---------|
| 11B | ANT1 | Low | 2412 | 2.16 | -40.01 | -17.84 | PASS |
| 11B | ANT1 | High | 2462 | 2.30 | -49.03 | -17.7 | PASS |
| 11G | ANT1 | Low | 2412 | -0.46 | -36.27 | -20.46 | PASS |
| 11G | ANT1 | High | 2462 | -0.73 | -48.19 | -20.73 | PASS |
| 11N20 | ANT1 | Low | 2412 | -1.91 | -37.5 | -21.91 | PASS |
| 11N20 | ANT1 | High | 2462 | -4.19 | -48.5 | -24.19 | PASS |
| 11N40 | ANT1 | Low | 2422 | -4.57 | -46.55 | -24.57 | PASS |
| 11N40 | ANT1 | High | 2452 | -4.90 | -47.88 | -24.9 | PASS |

Test Graphs







9.7 Spurious radiated emissions for transmitter

Test Method

- 1: The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter 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 from 0 degrees to 360 degrees to find the maximum reading.
- 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 120KHz, 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 = 1 MHz.
- b) VBW $\geq [3 \times \text{RBW}]$.
- c) Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq \text{RBW} / 2$.
 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

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 section 15.205, must comply with the radiated emission limits specified in section 15.209.

| Frequency MHz | Field Strength uV/m | Field Strength dB μ V/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 |

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.

Transmitting spurious emission test result as below:

802.11b

2412MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBuV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 239.99 | 30.39 | Horizontal | 46.00 | 15.61 | QP | 12.57 | -- | 4.96 | Pass |
| 872.18 | 36.67 | Vertical | 46.00 | 17.08 | QP | 21.43 | -- | 6.80 | Pass |

2412MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBuV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 17524.00 | 58.42 | Horizontal | 74.00 | 15.58 | PK | 43.74 | 41.44 | 11.36 | Pass |
| 17524.00 | 47.87 | Horizontal | 54.00 | 6.13 | AV | 43.74 | 41.44 | 11.36 | Pass |
| 17796.00* | 59.03 | Vertical | 74.00 | 14.97 | PK | 44.24 | 41.30 | 11.66 | Pass |
| 17796.00* | 47.82 | Vertical | 54.00 | 6.18 | AV | 44.24 | 41.30 | 11.66 | Pass |

2437MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBuV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 383.93 | 33.37 | Horizontal | 46.00 | 12.63 | QP | 15.37 | -- | 5.45 | Pass |
| 932.27 | 28.48 | Vertical | 46.00 | 17.52 | QP | 22.07 | -- | 7.06 | Pass |

2437MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBuV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 17966.00* | 57.95 | Horizontal | 74.00 | 16.05 | PK | 44.54 | 41.21 | 11.85 | Pass |
| 17966.00* | 47.93 | Horizontal | 54.00 | 6.07 | AV | 44.54 | 41.21 | 11.85 | Pass |
| 17558.00 | 57.92 | Vertical | 74.00 | 16.08 | PK | 43.81 | 41.42 | 11.40 | Pass |
| 17558.00 | 47.72 | Vertical | 54.00 | 6.28 | AV | 43.81 | 41.42 | 11.40 | Pass |

2462MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBuV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 480.53 | 33.32 | Horizontal | 46.00 | 12.68 | QP | 16.83 | -- | 5.76 | Pass |
| 480.53 | 26.30 | Vertical | 46.00 | 19.70 | QP | 16.83 | -- | 5.76 | Pass |

2462MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 17524.00 | 59.65 | Horizontal | 74.00 | 14.35 | PK | 43.74 | 41.44 | 11.36 | Pass |
| 17524.00 | 47.81 | Horizontal | 54.00 | 6.19 | AV | 43.74 | 41.44 | 11.36 | Pass |
| 17660.00 | 58.12 | Vertical | 74.00 | 15.88 | PK | 43.99 | 41.37 | 11.51 | Pass |
| 17660.00 | 47.78 | Vertical | 54.00 | 6.22 | AV | 43.99 | 41.37 | 11.51 | Pass |

802.11g

2412MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 383.93 | 32.41 | Horizontal | 46.00 | 13.59 | QP | 15.37 | -- | 5.45 | Pass |
| 689.57 | 29.76 | Vertical | 46.00 | 16.24 | QP | 19.94 | -- | 6.35 | Pass |

2412MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 17745.00* | 58.05 | Horizontal | 74.00 | 15.95 | PK | 44.14 | 41.32 | 11.61 | Pass |
| 17745.00* | 47.85 | Horizontal | 54.00 | 6.15 | AV | 44.14 | 41.32 | 11.61 | Pass |
| 17881.00* | 58.43 | Vertical | 74.00 | 15.57 | PK | 44.39 | 41.25 | 11.76 | Pass |
| 17881.00* | 47.87 | Vertical | 54.00 | 6.13 | AV | 44.39 | 41.25 | 11.76 | Pass |

2437MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 383.93 | 32.60 | Horizontal | 46.00 | 13.40 | QP | 15.37 | -- | 5.45 | Pass |
| 935.55 | 30.90 | Vertical | 46.00 | 15.10 | QP | 22.10 | -- | 7.06 | Pass |

2437MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 17609.00 | 58.41 | Horizontal | 74.00 | 15.59 | PK | 43.90 | 41.39 | 11.46 | Pass |
| 17609.00 | 47.77 | Horizontal | 54.00 | 6.23 | AV | 43.90 | 41.39 | 11.46 | Pass |
| 17779.00* | 58.48 | Vertical | 74.00 | 15.52 | PK | 44.21 | 41.30 | 11.64 | Pass |
| 17779.00* | 47.89 | Vertical | 54.00 | 6.11 | AV | 44.21 | 41.30 | 11.64 | Pass |

2462MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 480.53 | 36.01 | Horizontal | 46.00 | 9.99 | QP | 16.83 | -- | 5.76 | Pass |
| 833.32 | 29.46 | Vertical | 46.00 | 16.54 | QP | 21.05 | -- | 6.68 | Pass |

2462MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBμV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 17830.00* | 58.32 | Horizontal | 74.00 | 15.68 | PK | 44.30 | 41.28 | 11.70 | Pass |
| 17830.00* | 47.86 | Horizontal | 54.00 | 6.14 | AV | 44.30 | 41.28 | 11.70 | Pass |
| 17524.00 | 58.95 | Vertical | 74.00 | 15.05 | PK | 43.74 | 41.44 | 11.36 | Pass |
| 17524.00 | 47.88 | Vertical | 54.00 | 6.12 | AV | 43.74 | 41.44 | 11.36 | Pass |

802.11nHT20

2412MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBμV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 478.85 | 33.79 | Horizontal | 46.00 | 12.21 | QP | 16.81 | -- | 5.76 | Pass |
| 414.72 | 24.92 | Vertical | 46.00 | 21.08 | QP | 15.84 | -- | 5.56 | Pass |

2412MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBμV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 18000.00* | 58.13 | Horizontal | 74.00 | 15.87 | PK | 44.60 | 41.19 | 11.89 | Pass |
| 18000.00* | 47.96 | Horizontal | 54.00 | 6.04 | AV | 44.60 | 41.19 | 11.89 | Pass |
| 17949.00* | 58.24 | Vertical | 74.00 | 15.76 | PK | 44.51 | 41.22 | 11.83 | Pass |
| 17949.00* | 47.99 | Vertical | 54.00 | 6.01 | AV | 44.51 | 41.22 | 11.83 | Pass |

2437MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBμV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 382.59 | 34.85 | Horizontal | 46.00 | 11.15 | QP | 15.35 | -- | 5.45 | Pass |
| 480.53 | 27.63 | Vertical | 46.00 | 18.37 | QP | 16.83 | -- | 5.76 | Pass |

2437MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBμV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 17881.00* | 58.70 | Horizontal | 74.00 | 15.30 | PK | 44.39 | 41.25 | 11.76 | Pass |
| 17881.00* | 47.93 | Horizontal | 54.00 | -6.07 | AV | 44.39 | 41.25 | 11.76 | Pass |
| 18000.00* | 59.36 | Vertical | 74.00 | 14.64 | PK | 44.60 | 41.19 | 11.89 | Pass |
| 18000.00* | 47.97 | Vertical | 54.00 | 6.03 | AV | 44.60 | 41.19 | 11.89 | Pass |

2462MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBμV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 480.53 | 28.28 | Horizontal | 46.00 | 17.72 | QP | 16.83 | -- | 5.76 | Pass |
| 714.17 | 29.09 | Vertical | 46.00 | 16.91 | QP | 20.19 | -- | 6.42 | Pass |



2462MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|--------------------------|--------------|-----------------|--------------|----------|----------------------|------------------|------------------|--------|
| 17949.00* | 58.75 | Horizontal | 74.00 | 15.25 | PK | 44.51 | 41.22 | 11.83 | Pass |
| 17949.00* | 47.96 | Horizontal | 54.00 | 6.04 | AV | 44.51 | 41.22 | 11.83 | Pass |
| 17524.00 | 57.92 | Vertical | 74.00 | 16.08 | PK | 43.74 | 41.44 | 11.36 | Pass |
| 17524.00 | 47.88 | Vertical | 54.00 | 6.12 | AV | 43.74 | 41.44 | 11.36 | Pass |

802.11nHT40

2422MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|--------------------------|--------------|-----------------|--------------|----------|----------------------|------------------|------------------|--------|
| 383.93 | 33.57 | Horizontal | 46.00 | 12.43 | QP | 15.37 | -- | 5.45 | Pass |
| 714.17 | 28.09 | Vertical | 46.00 | 17.91 | QP | 20.19 | -- | 6.42 | Pass |

2422MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|--------------------------|--------------|-----------------|--------------|----------|----------------------|------------------|------------------|--------|
| 17575.00 | 59.63 | Horizontal | 74.00 | 14.37 | PK | 43.84 | 41.41 | 11.42 | Pass |
| 17575.00 | 47.68 | Horizontal | 54.00 | 6.32 | AV | 43.84 | 41.41 | 11.42 | Pass |
| 18000.00* | 58.48 | Vertical | 74.00 | 15.52 | PK | 44.60 | 41.19 | 11.89 | Pass |
| 18000.00* | 47.96 | Vertical | 54.00 | 6.04 | AV | 44.60 | 41.19 | 11.89 | Pass |

2437MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|--------------------------|--------------|-----------------|--------------|----------|----------------------|------------------|------------------|--------|
| 383.93 | 34.57 | Horizontal | 46.00 | 11.43 | QP | 15.37 | -- | 5.45 | Pass |
| 665.80 | 29.63 | Vertical | 46.00 | 16.37 | QP | 19.58 | -- | 6.28 | Pass |

2437MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|--------------------------|--------------|-----------------|--------------|----------|----------------------|------------------|------------------|--------|
| 17694.00 | 58.27 | Horizontal | 74.00 | 15.73 | PK | 44.05 | 41.35 | 11.55 | Pass |
| 17694.00 | 47.90 | Horizontal | 54.00 | 6.10 | AV | 44.05 | 41.35 | 11.55 | Pass |
| 17575.00 | 58.86 | Vertical | 74.00 | 15.14 | PK | 43.84 | 41.41 | 11.42 | Pass |
| 17575.00 | 47.75 | Vertical | 54.00 | 6.25 | AV | 43.84 | 41.41 | 11.42 | Pass |

2452MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|--------------------------|--------------|-----------------|--------------|----------|----------------------|------------------|------------------|--------|
| 383.93 | 34.57 | Horizontal | 46.00 | 11.43 | QP | 15.37 | -- | 5.45 | Pass |
| 480.53 | 26.51 | Vertical | 46.00 | 19.49 | QP | 16.83 | -- | 5.76 | Pass |

2452MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dB μ V/m | Margin dB | Detector | Antenna Factor dB | PRM Factor dB | Cable Loss dB | Result |
|------------------|-----------------------------|--------------|-----------------------|--------------|----------|-------------------------|---------------------|---------------------|--------|
| 17524.00 | 57.64 | Horizontal | 74.00 | 16.36 | PK | 43.74 | 41.44 | 11.36 | Pass |
| 17524.00 | 47.88 | Horizontal | 54.00 | -6.12 | AV | 43.74 | 41.44 | 11.36 | Pass |
| 17354.00 | 57.95 | Vertical | 74.00 | 16.05 | PK | 43.53 | 41.53 | 11.17 | Pass |
| 17354.00 | 47.86 | Vertical | 54.00 | 6.14 | AV | 43.53 | 41.53 | 11.17 | Pass |

Remark:

- (1) "***" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- (2) Duty Cycle=100%
- (3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.
- (4) Level=Reading Level + Correction Factor
 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
 Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
 (The Reading Level is recorded by software which is not shown in the sheet)

10 Test Equipment List

Site 1: Conducted Emission Test

| DESCRIPTION | MANUFACTURER | MODEL NO. | EQUIPMENT ID | SERIAL NO. | CAL. DUE DATE |
|--------------------|-------------------|----------------|--------------------|----------------|---------------|
| EMI Test Receiver | Rohde & Schwarz | ESR 3 | 68-4-74-14-001 | 101782 | 2020-6-28 |
| LISN | Rohde & Schwarz | ENV4200 | 8-4-87-14-001 | 100249 | 2020-6-28 |
| LISN | Rohde & Schwarz | ENV432 | 68-4-87-16-001 | 101318 | 2020-7-19 |
| LISN | Rohde & Schwarz | ENV216 | 68-4-87-14-002 | 100326 | 2020-6-28 |
| ISN | Rohde & Schwarz | ENY81 | 68-4-87-14-003 | 100177 | 2020-6-28 |
| ISN | Rohde & Schwarz | ENY81-CA6 | 68-4-87-14-004 | 101664 | 2020-6-28 |
| High Voltage Probe | Rohde & Schwarz | TK9420(VT9420) | 68-4-27-14-001 | 9420-584 | 2020-6-24 |
| RF Current Probe | Rohde & Schwarz | EZ-17 | 68-4-27-14-002 | 100816 | 2020-7-2 |
| Attenuator | Shanghai Huaxiang | TS2-26-3 | 68-4-81-16-003 | 080928189 | 2020-6-28 |
| Test software | Rohde & Schwarz | EMC32 | 68-4-90-14-003-A10 | Version9.15.00 | N/A |

Test Site 2: Radiated Emission Test

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|----------------------------|--------------|-------------------|-------------------|---------------|---------------|
| EMI Test Receiver | R&S | ESU8 | 100316 | Oct. 12, 2018 | 1 Year |
| Spectrum analyzer | Agilent | E4447A | MY50180031 | Jun. 25, 2019 | 1 Year |
| Trilog Broadband Antenna | Schwarzbeck | VULB9163 | 9163-462 | Nov. 09, 2018 | 1 Year |
| Active Loop antenna | Schwarzbeck | FMZB-1519 | 1519-038 | Oct. 20, 2018 | 1 Year |
| Double Ridged Horn Antenna | R&S | HF907 | 100276 | Nov. 16, 2018 | 1 Year |
| Broad Band Horn Antenna | Schwarzbeck | BBHA 9170 | 790 | Oct. 25, 2018 | 1 Year |
| Pre-amplifier | A.H. | PAM-0118 | 360 | Oct. 12, 2018 | 1 Year |
| Pre-amplifier | TERA-MW | TRLA-0040G35 | 101303 | Oct. 12, 2018 | 1 Year |
| RF Cable | HUBSER | CP-X2+ CP-X1 | W11.03+ W12.02 | Oct. 21, 2018 | 1 Year |
| RF Cable | N/A | SMAJ-SMAJ-1M+ 11M | 17070133+17070131 | Nov. 08, 2018 | 1 Year |
| MI Cable | HUBSER | C10-01-01-1M | 1091629 | Oct. 21, 2018 | 1 Year |
| Test software | Audix | E3 | V 6.11111b | N/A | N/A |

RF Conducted Test

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|--|---------------|-------------|------------|---------------|---------------|
| Spectrum analyzer | R&S | FSU26 | 200071 | Oct. 12, 2018 | 1 Year |
| Wideband Radio Communication tester | R&S | CMW500 | 117491 | Jun. 25, 2019 | 1 Year |
| Vector Signal Generator | Agilent | E8267D | US49060192 | Oct. 12, 2018 | 1 Year |
| Vector Signal Generator | Agilent | N5182A | MY48180737 | Jun. 25, 2019 | 1 Year |
| Power Sensor | Agilent | U2021XA | MY55150010 | Jun. 28, 2019 | 1 Year |
| Power Sensor | Agilent | U2021XA | MY55150011 | Jun. 28, 2019 | 1 Year |
| DC Power Source | MATRIS | MPS-3005L-3 | D813058W | Aug. 18, 2019 | 1 Year |
| Attenuator | Mini-Circuits | BW-S10W2 | 101109 | Aug. 18, 2019 | 1 Year |
| RF Cable | Micable | C10-01-01-1 | 100309 | Oct. 21, 2018 | 1 Year |
| Temp&Humi Programmable | ZHIXIANG | ZXGDS-150L | ZX170110-A | Oct. 21, 2018 | 1 Year |
| Test Software | JS Tonscend | JS1120-3 | Ver.2.7 | N/A | N/A |

11 System Measurement Uncertainty

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

Site 1:

| System Measurement Uncertainty | |
|--|----------------------|
| Test Items | Extended Uncertainty |
| Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200) | 3.21dB |

Site 2:

| Test Item | Uncertainty |
|--|--|
| Bandwidth | 1.1% |
| Peak Output Power(Conducted)(Spectrum analyzer) | 0.86dB (10 MHz ≤ f < 3.6GHz); |
| | 1.38dB (3.6GHz ≤ f < 8GHz) |
| Peak Output Power(Conducted)(Power Sensor) | 0.74dB |
| Power Spectral Density | 0.74dB (10 MHz ≤ f < 3.6GHz); |
| | 1.38dB (3.6GHz ≤ f < 8GHz) |
| Frequencies Stability | 6.7 x 10 ⁻⁸ (Antenna couple method) |
| | 5.5 x 10 ⁻⁸ (Conducted method) |
| Conducted spurious emissions | 0.86dB (10 MHz ≤ f < 3.6GHz); |
| | 1.40dB (3.6GHz ≤ f < 8GHz) |
| | 1.66dB (8GHz ≤ f < 22GHz) |
| Uncertainty for radio frequency (RBW<20kHz) | 3x10 ⁻⁸ |
| Uncertainty for Radiation Emission test (30MHz-1GHz) | 4.70 dB (Antenna Polarize: V) |
| | 4.84 dB (Antenna Polarize: H) |
| Uncertainty for Radiation Emission test (1GHz-40GHz) | 4.10dB (1-6GHz) |
| | 4.40dB (6GHz-18GHz) |
| | 3.54dB (18GHz-26GHz) |
| | 4.30dB (26GHz-40GHz) |
| Uncertainty for Power line conduction emission test | 3.32dB (150kHz-30MHz) |