

Test Report No:  
2470803R-RFUSV01S-A

## TEST REPORT

### FCC Rules&Regulations

|                                 |                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------|
| Product Name                    | WiFi USB Adapter                                                                                  |
| Brand Name                      | msi                                                                                               |
| Model No.                       | GUBE65                                                                                            |
| FCC ID                          | I4L-GUBE65                                                                                        |
| Applicant's Name / Address      | Micro-Star Int'l Co.,Ltd.<br>No.69, Lide St., Zhonghe Dist., New Taipei City 235, Taiwan          |
| Manufacturer's Name / Address   | Micro-Star Int'l Co.,Ltd.<br>No.69, Lide St., Zhonghe Dist., New Taipei City 235, Taiwan          |
| Test Method Requested, Standard | FCC CFR Title 47 Part 15 Subpart C Section 15.247<br>ANSI C63.10-2013                             |
| Verdict Summary                 | IN COMPLIANCE                                                                                     |
| Documented By                   | <br>Jennie She |
| Approved By                     | <br>Allen Lin  |
| Date of Receipt                 | Jul. 26, 2024                                                                                     |
| Date of Issue                   | Jan. 15, 2025                                                                                     |
| Report Version                  | V1.0                                                                                              |

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Appendix A. Test Result of AC Power Line Conducted Emission

Appendix B. Test Result of Occupied Bandwidth & DTS Bandwidth

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Appendix E. Test Result of Antenna Port Conducted Emission

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Appendix G. Test Setup Photograph

## Competences and Guarantees

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DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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## General Conditions

---

1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Revision History

| Version | Description             | Issued Date   |
|---------|-------------------------|---------------|
| V1.0    | Initial issue of report | Jan. 15, 2025 |
|         |                         |               |
|         |                         |               |
|         |                         |               |
|         |                         |               |
|         |                         |               |
|         |                         |               |
|         |                         |               |
|         |                         |               |

## Summary of Test Result

| Report Clause | Test Items                             | Result (PASS/FAIL) | Remark |
|---------------|----------------------------------------|--------------------|--------|
| 3             | AC Power Line Conducted Emission       | PASS               | -      |
| 4             | Occupied Bandwidth & DTS Bandwidth     | PASS               | -      |
| 5             | Maximum Conducted Output Power         | PASS               | -      |
| 6             | Maximum Power Spectral Density         | PASS               | -      |
| 7             | Antenna Port Conducted Emission        | PASS               | -      |
| 8             | Transmitter Radiated Spurious Emission | PASS               | -      |

### Comments and Explanations

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

## Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

## 1. General Information

### 1.1. EUT Description

|                     |                                                    |                                                          |
|---------------------|----------------------------------------------------|----------------------------------------------------------|
| Frequency Range     | 2400 ~ 2483.5 MHz                                  |                                                          |
| Operating Frequency | IEEE 802.11b/g<br>IEEE 802.11n/ax/be, VHT (20 MHz) | 2412 ~ 2472 MHz                                          |
|                     | IEEE 802.11n/ax/be, VHT (40 MHz)                   | 2422 ~ 2462 MHz                                          |
| Channel Number      | IEEE 802.11b/g<br>IEEE 802.11n/ax/be, VHT (20 MHz) | 13 Channels                                              |
|                     | IEEE 802.11n/ax/be, VHT (40 MHz)                   | 9 Channels                                               |
|                     |                                                    |                                                          |
| Type of Modulation  | IEEE 802.11b                                       | DSSS-DBPSK, DQPSK, CCK                                   |
|                     | IEEE 802.11g/n                                     | OFDM-BPSK, QPSK, 16QAM, 64QAM                            |
|                     | IEEE 802.11ax                                      | OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM          |
|                     | IEEE 802.11be                                      | OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM |
|                     | VHT                                                | OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM                    |

| Accessories Information |                |            |               |                            |
|-------------------------|----------------|------------|---------------|----------------------------|
| No.                     | Equipment Name | Brand Name | Model No.     | Remark                     |
| 1                       | Cradle         | msi        | GUBE65 Cradle | With cable: Shielded, 0.9m |

| Antenna Information |            |               |      |                    |                            |                        |
|---------------------|------------|---------------|------|--------------------|----------------------------|------------------------|
| Ant.                | Brand Name | Model No.     | Type | Antenna Gain (dBi) | Maximum Antenna Gain (dBi) | Directional Gain (dBi) |
| 1                   | WHA YU     | C059-510503-A | PCB  | 1.78               | 1.78                       | 4.71                   |
| 2                   | WHA YU     | C059-510504-A | PCB  | 1.62               |                            |                        |

#### For IEEE 802.11b/g/n/ax/be, VHT Mode: (2TX, 2RX)

Both Ant. 1 and Ant. 2 can be used as transmitting/receiving antennas, and they can transmit/receive signal simultaneously.

### 1.2. EUT Information

|                              |                                     |                  |                                     |                     |
|------------------------------|-------------------------------------|------------------|-------------------------------------|---------------------|
| EUT Power Type               | From Host system                    |                  |                                     |                     |
| Beamforming Function         | <input type="checkbox"/>            | With beamforming | <input checked="" type="checkbox"/> | Without beamforming |
| Resource Unit of 802.11ax/be | <input checked="" type="checkbox"/> | Full RU          | <input type="checkbox"/>            | Partial RU          |

### 1.3. Testing Applied Standards

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

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF:

- ♦ KDB 558074 D01 v05r02
- ♦ KDB 662911 D01 v02r01
- ♦ KDB 414788 D01 v01r01

### 1.4. Testing Location Information

| Testing Location Information                                                                                                             |                                                                                                                                                                                                                                                                                             |  |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Test Laboratory : DEKRA Testing and Certification Co., Ltd.                                                                              |                                                                                                                                                                                                                                                                                             |  |
| 1<br><br>(TAF: 3024)                                                                                                                     | ADD: No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.<br><br>TEL: +886-3-582-8001                      FAX: +886-3-582-8958<br><br>Test site Designation No. TW3024 with FCC.<br><br>Conformity Assessment Body Identifier (CABID) TW3024 with ISED. |  |
| 2<br><br>(TAF: 3024)                                                                                                                     | ADD: No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.<br><br>TEL: +886-3-582-8001                      FAX: +886-3-582-8958<br><br>Test site Designation No. TW3024 with FCC.<br><br>Conformity Assessment Body Identifier (CABID) TW3024 with ISED.   |  |
| Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12. |                                                                                                                                                                                                                                                                                             |  |

| Test Condition         | Test Site No. | Test Engineer | Test Environment (°C / %) | Test Date             |
|------------------------|---------------|---------------|---------------------------|-----------------------|
| AC Conduction Emission | HC-SR02       | Gary Liao     | 19~21 / 60~61.5           | 2024/11/21~2024/11/22 |
| RF Conducted Emission  | HC-SR12       | Kevin Teng    | 22.8~24.2 / 49.2~52.1     | 2024/10/01~2024/11/22 |
| Radiated Emission      | HC-CB04       | Cyril Chen    | 22.9~24.8 / 47.5~51.3     | 2024/10/04~2024/10/08 |

## 1.5. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

| Test Item                              | Uncertainty                                            |
|----------------------------------------|--------------------------------------------------------|
| AC Power Line Conducted Emission       | $\pm 2.34$ dB                                          |
| Occupied Bandwidth & DTS Bandwidth     | $\pm 282.55$ Hz                                        |
| Maximum Conducted Output Power         | $\pm 1.16$ dB                                          |
| Maximum Power Spectral Density         | $\pm 2.47$ dB                                          |
| Antenna Port Conducted Emission        | $\pm 2.47$ dB                                          |
| Transmitter Radiated Spurious Emission | $\pm 3.52$ dB below 1 GHz<br>$\pm 3.56$ dB above 1 GHz |

## 1.6. List of Test Equipment

### HC-SR02

| Instrument               | Manufacturer | Model No.          | Serial No. | Characteristics           | Cal. Date  | Next Cal. Date |
|--------------------------|--------------|--------------------|------------|---------------------------|------------|----------------|
| Artificial Mains Network | R&S          | ENV4200            | 848411/010 | 9kHz-30MHz,<br>4line/100A | 2023/12/15 | 2024/12/14     |
| EMI Test Receiver        | R&S          | ESR3               | 102608     | 9 kHz - 3.6 GHz           | 2024/09/11 | 2025/09/10     |
| Two-Line V-Network       | R&S          | ENV216             | 100096     | 9kHz-30MHz                | 2024/06/03 | 2025/06/02     |
| Coaxial Cable(9 m)       | Harbour      | RG-400             | HC-SR02    | 9 kHz–2500 MHz            | 2024/08/15 | 2025/08/14     |
| EMI Testing System       | Audix        | e3 210616 dekra V9 | HC-SR02    | N/A                       | N/A        | N/A            |

### HC-SR12

| Instrument                 | Manufacturer | Model No. | Serial No. | Characteristics | Cal. Date  | Next Cal. Date |
|----------------------------|--------------|-----------|------------|-----------------|------------|----------------|
| Power Meter                | Anritsu      | ML2496A   | 1947001    | 0.3-40 GHz      | 2024/01/09 | 2025/01/08     |
| Power Sensor               | Anritsu      | MA2411B   | 1911082    | 0.3-40 GHz      | 2024/01/09 | 2025/01/08     |
| Power Sensor               | Anritsu      | MA2411B   | 1911083    | 0.3-40 GHz      | 2024/01/09 | 2025/01/08     |
| Signal & Spectrum Analyzer | R&S          | FSV40     | 101869     | 10Hz-40GHz      | 2024/06/20 | 2025/06/19     |

### HC-CB04

| Instrument                   | Manufacturer            | Model No.    | Serial No.  | Characteristics       | Cal. Date  | Next Cal. Date |
|------------------------------|-------------------------|--------------|-------------|-----------------------|------------|----------------|
| Signal and Spectrum Analyzer | R&S                     | FSVA40       | 101435      | 10 Hz-40 GHz          | 2024/05/17 | 2025/05/16     |
| Trilog Broadband Antenna     | Schwarzbeck             | VULB 9168    | 1209        | 30 MHz-2 GHz          | 2024/06/11 | 2025/06/10     |
| Double Ridged Horn Antenna   | RF SPIN                 | DRH18-E      | 211212A18EN | 1G-18GHz              | 2023/11/17 | 2024/11/16     |
| Horn Antenna                 | Schwarzbeck             | BBHA 9170    | 203         | 18G-40GHz             | 2024/02/02 | 2025/02/01     |
| Pre-Amplifier                | EMCI                    | EMC01820I    | 980364      | 30M-8 GHz,20 dB       | 2024/06/04 | 2025/06/03     |
| Pre-Amplifier                | EMEC                    | EM01G18GA    | 060835      | 1-18 GHz,50 dB        | 2024/07/16 | 2025/07/15     |
| Pre-Amplifier                | SGH                     | SGH184       | 20230411-2  | 18G-40 GHz,54 dB      | 2024/04/23 | 2025/04/22     |
| EMI Test Receiver            | R&S                     | ESR7         | 102260      | 10 Hz-7 GHz           | 2023/11/27 | 2024/11/26     |
| Magnetic Loop Antenna        | Teseq                   | HLA 6121     | 44287       | 0.01-30 MHz           | 2023/10/13 | 2024/10/12     |
| Coaxial Cable                | Huber+Suhner            | SF104        | HC-CB04     | 30 MHz-18 GHz,<br>11m | 2024/08/07 | 2025/08/06     |
| Coaxial Cable                | Huber+Suhner,<br>Rosnol | SF102_UP0264 | HC-CB04-1   | 18-40 GHz, 3m         | 2024/08/13 | 2025/08/12     |
| Radiated Software            | Audix                   | e3 V9        | HC-CB04_1   | N/A                   | N/A        | N/A            |

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

## 2. Test Configuration of EUT

### 2.1. Test Condition

| EUT Operational Condition |              |
|---------------------------|--------------|
| Testing Voltage           | AC 120V/60Hz |

### 2.2. Test Frequency Mode

|                       |                      |
|-----------------------|----------------------|
| Test Software Version | AX Series MP Toolkit |
|-----------------------|----------------------|

<2TX, Nss1>

| Modulation        | Frequency (MHz) | Power Setting |
|-------------------|-----------------|---------------|
| 802.11b           | 2412            | 12.25         |
|                   | 2437            | 12.25         |
|                   | 2462            | 12.25         |
|                   | 2467            | 12.25         |
|                   | 2472            | 12.25         |
| 802.11g           | 2412            | 12.25         |
|                   | 2437            | 12.50         |
|                   | 2462            | 12.50         |
|                   | 2467            | 12.50         |
|                   | 2472            | 12.50         |
| 802.11be (20 MHz) | 2412            | 12.50         |
|                   | 2437            | 12.50         |
|                   | 2462            | 12.50         |
|                   | 2467            | 12.50         |
|                   | 2472            | 12.50         |
| 802.11be (40 MHz) | 2422            | 12.50         |
|                   | 2437            | 12.50         |
|                   | 2452            | 12.25         |
|                   | 2457            | 12.50         |
|                   | 2462            | 12.50         |

**<2TX, Nss2>**

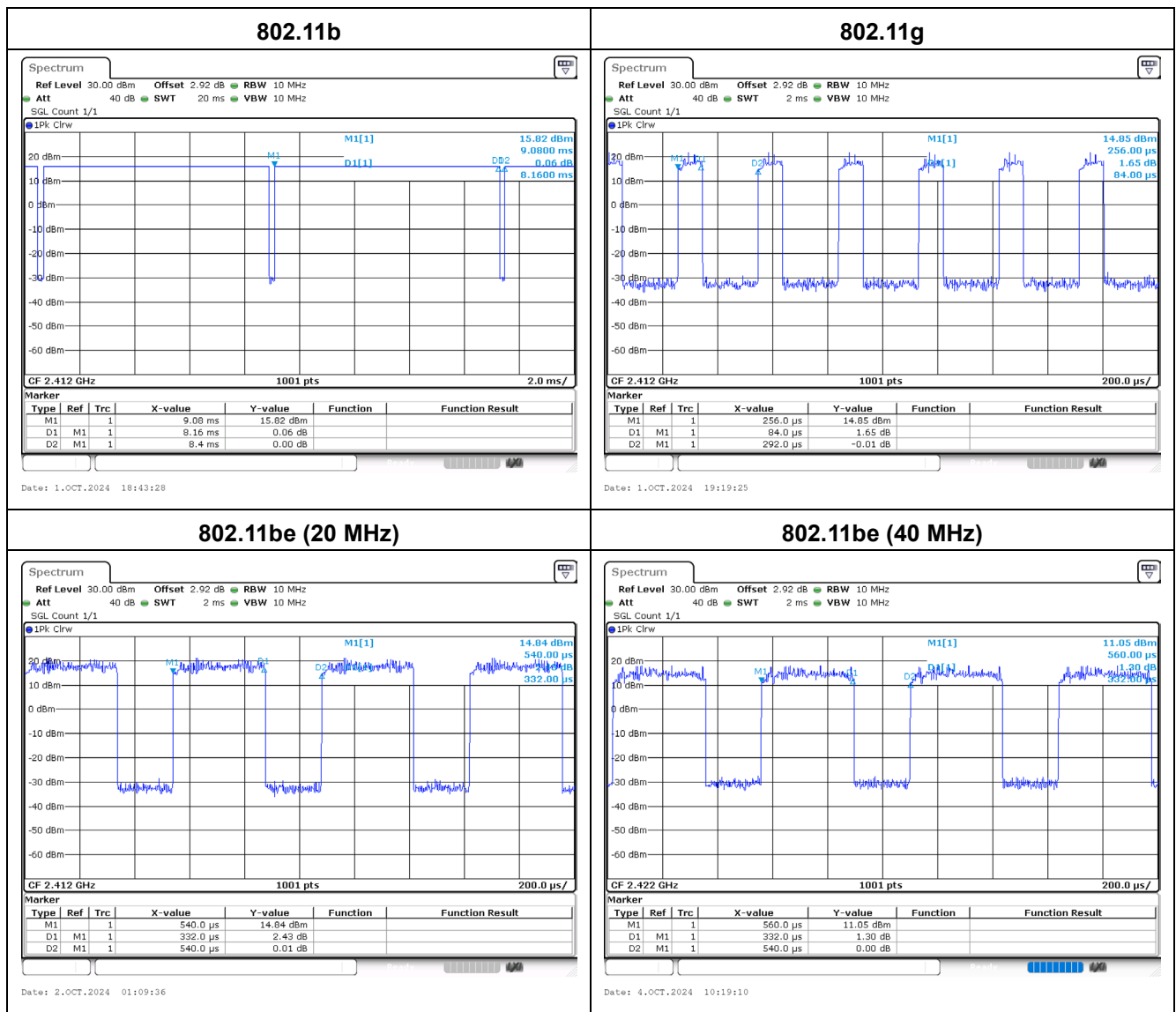
| Modulation        | Frequency<br>(MHz) | Power Setting |
|-------------------|--------------------|---------------|
| 802.11be (20 MHz) | 2412               | 12.25         |
|                   | 2437               | 12.50         |
|                   | 2462               | 12.50         |
|                   | 2467               | 12.50         |
|                   | 2472               | 12.50         |
| 802.11be (40 MHz) | 2422               | 12.25         |
|                   | 2437               | 12.25         |
|                   | 2452               | 12.25         |
|                   | 2457               | 12.25         |
|                   | 2462               | 12.25         |

## 2.3. Duty Cycle

<2TX, Nss1>

| Modulation        | On Times (ms) | On+Off Times (ms) | Duty Cycle (%) | Duty Factor (dB) | 1/T Minimum VBW (kHz) |
|-------------------|---------------|-------------------|----------------|------------------|-----------------------|
| 802.11b           | 8.160         | 8.400             | 97.14          | 0.126            | 0.123                 |
| 802.11g           | 0.084         | 0.292             | 28.77          | 5.411            | 11.905                |
| 802.11be (20 MHz) | 0.332         | 0.540             | 61.48          | 2.113            | 3.012                 |
| 802.11be (40 MHz) | 0.332         | 0.540             | 61.48          | 2.113            | 3.012                 |

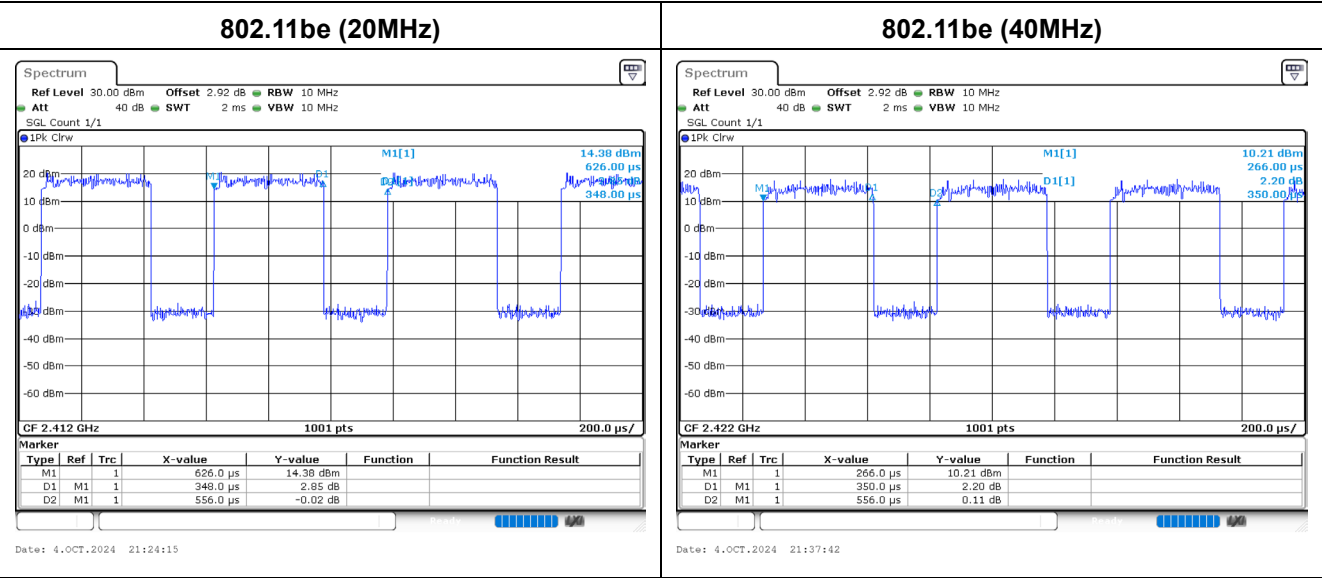
Note: The duty factor will compensate for the total power and power spectral density.



<2TX, Nss2>

| Modulation        | On Times (ms) | On+Off Times (ms) | Duty Cycle (%) | Duty Factor (dB) | 1/T Minimum VBW (kHz) |
|-------------------|---------------|-------------------|----------------|------------------|-----------------------|
| 802.11be (20 MHz) | 0.348         | 0.556             | 62.59          | 2.035            | 2.874                 |
| 802.11be (40 MHz) | 0.350         | 0.556             | 62.95          | 2.010            | 2.857                 |

Note: The duty factor will compensate for the total power and power spectral density.



## 2.4. The Worst Case Measurement Configuration

|                |                                                          |
|----------------|----------------------------------------------------------|
| Tests Item     | AC Power Line Conducted Emission                         |
| Test Condition | AC power line conducted measurement for line and neutral |
| Operating Mode | Transmit                                                 |

|                |                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Tests Item     | Occupied Bandwidth & DTS Bandwidth<br>Maximum Conducted Output Power<br>Maximum Power Spectral Density<br>Antenna Port Conducted Emission |
| Test Condition | Conducted measurement at transmit chains                                                                                                  |

|                                                                                                                                                                                                      |                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tests Item                                                                                                                                                                                           | Transmitter Radiated Spurious Emission                                                                                                                                                                                                              |
| Test Condition                                                                                                                                                                                       | Radiated measurement<br>If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. |
| Operating Mode                                                                                                                                                                                       | Transmit                                                                                                                                                                                                                                            |
| The EUT was performed at X axis, Y axis and Z axis position for radiated spurious emission test.<br>The worst case was found at Z axis, so the measurement will follow this same test configuration. |                                                                                                                                                                                                                                                     |

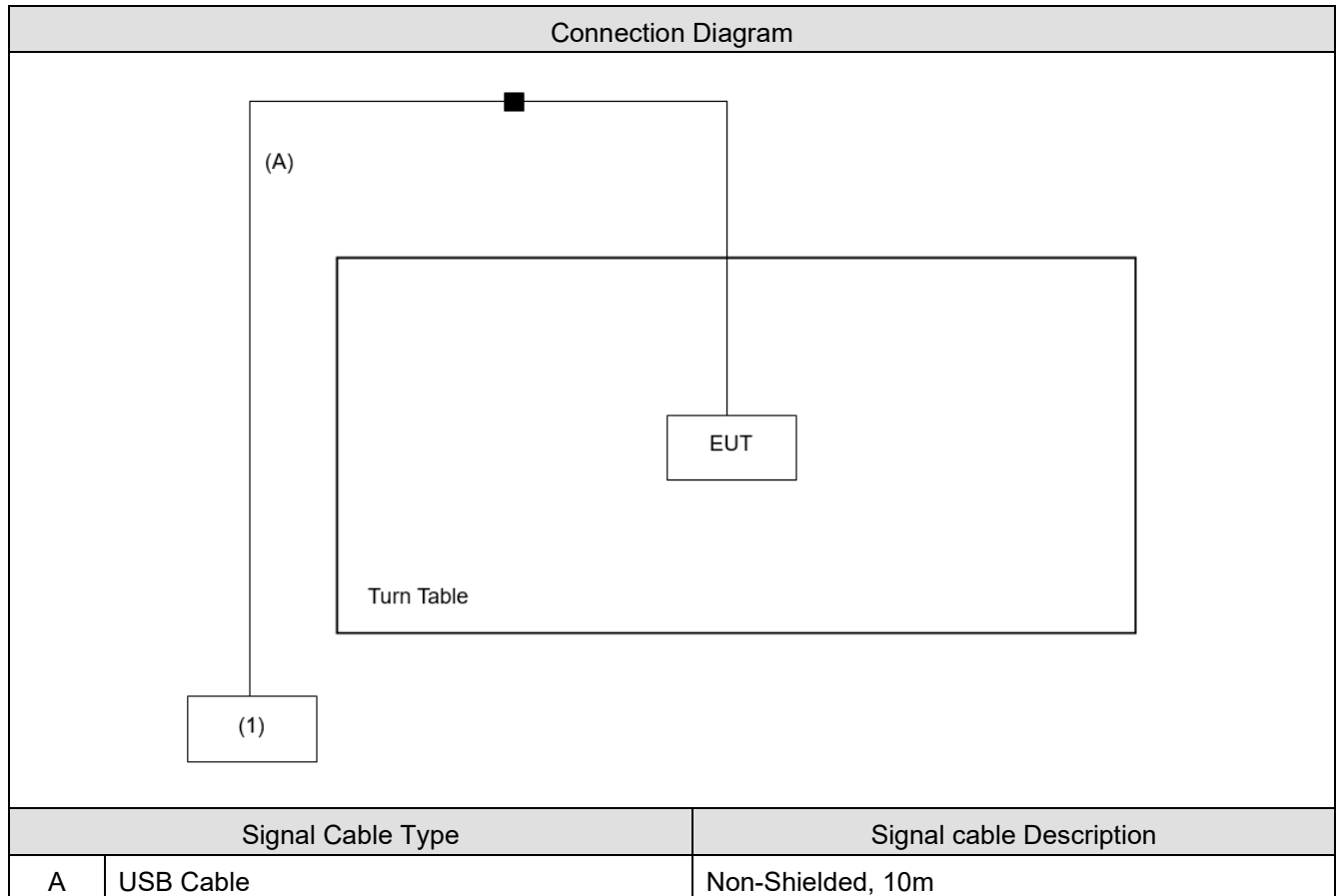
**Note:**

1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. For radiated spurious emission below 1 GHz and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
3. The modulation and bandwidth are similar for 802.11n mode for HT20/HT40, VHT mode for VHT20/VHT40, 802.11ax mode for HEW20/HEW40 and 802.11be mode for EHT20/EHT40, therefore investigated worst case to representative mode in test report.

## 2.5. Tested System Details

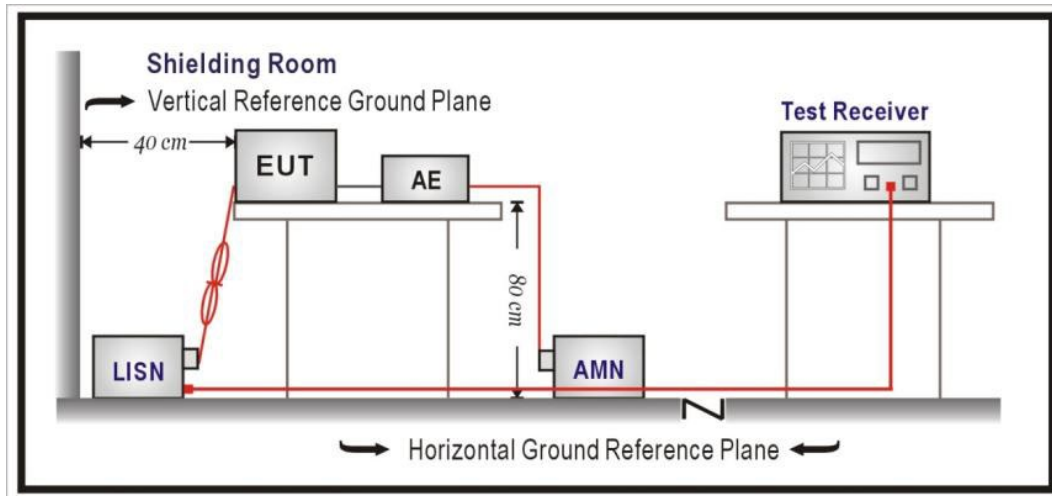
| No. | Equipment | Brand Name | Model No. | Serial No.      |
|-----|-----------|------------|-----------|-----------------|
| 1   | Notebook  | ASUS       | BX310U    | J5N0CV04S32319B |

## 2.6. Configuration of Tested System



### 3. AC Power Line Conducted Emission

#### 3.1. Test Setup



#### 3.2. Test Limit

| Frequency (MHz) | QP (dBuV) | AV (dBuV) |
|-----------------|-----------|-----------|
| 0.15 - 0.50     | 66 - 56   | 56 - 46   |
| 0.50 - 5.0      | 56        | 46        |
| 5.0 - 30        | 60        | 50        |

Remarks: In the above table, the tighter limit applies at the band edges.

#### 3.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

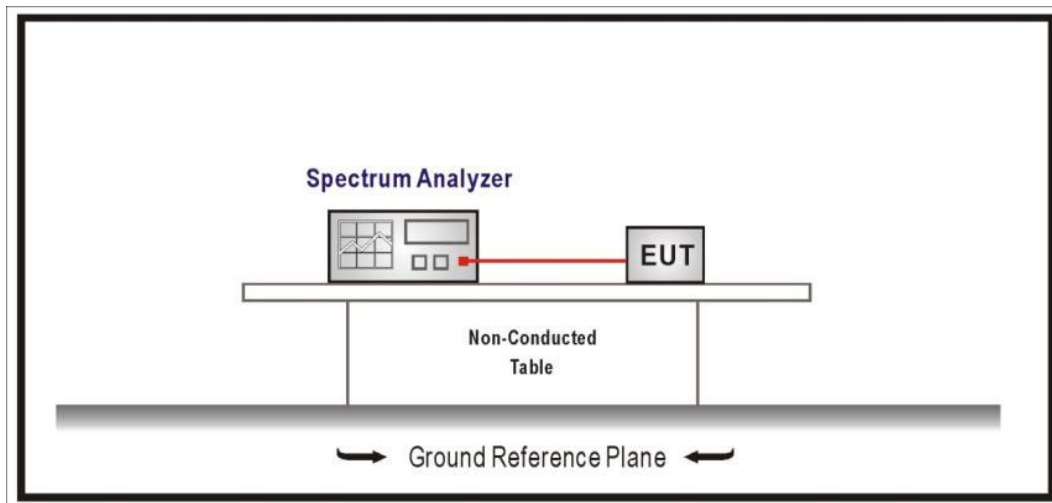
Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz.

### **3.4. Test Result of AC Power Line Conducted Emission**

Refer as Appendix A

## 4. Occupied Bandwidth & DTS Bandwidth

### 4.1. Test Setup



### 4.2. Test Limit

The 6 dB bandwidth:  $\geq 0.50$  MHz.

Occupied Bandwidth: N/A

### 4.3. Test Procedures

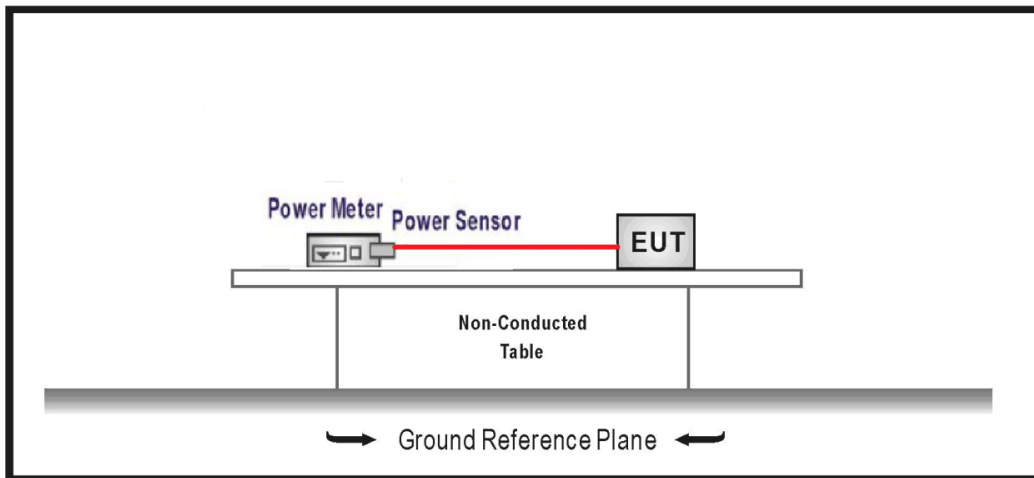
The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074.

### 4.4. Test Result of Occupied Bandwidth & DTS Bandwidth

Refer as Appendix B

## 5. Maximum Conducted Output Power

### 5.1. Test Setup



### 5.2. Test Limit

The maximum conducted output power shall be less 30 dBm (1 Watt).

### 5.3. Test Procedures

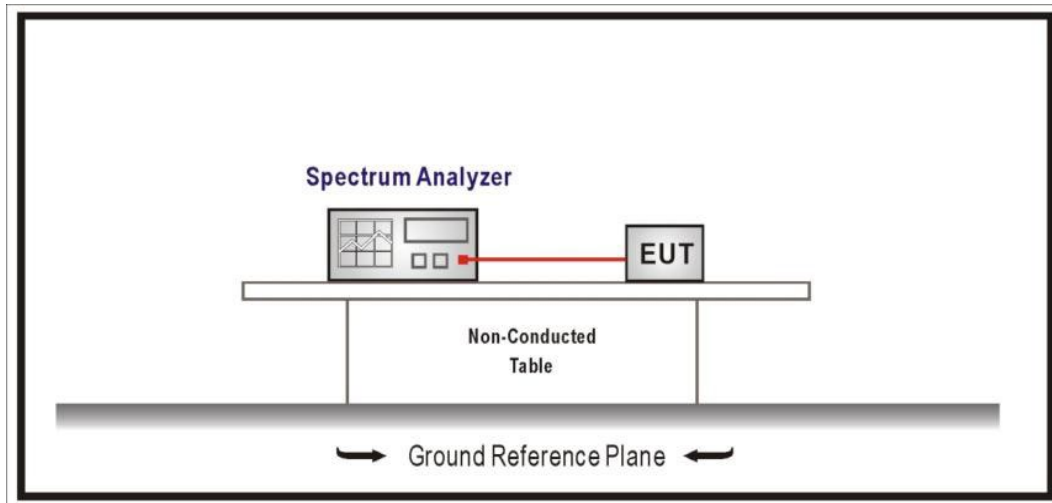
The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074.

### 5.4. Test Result of Maximum Conducted Output Power

Refer as Appendix C

## 6. Maximum Power Spectral Density

### 6.1. Test Setup



### 6.2. Test Limit

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 6.3. Test Procedures

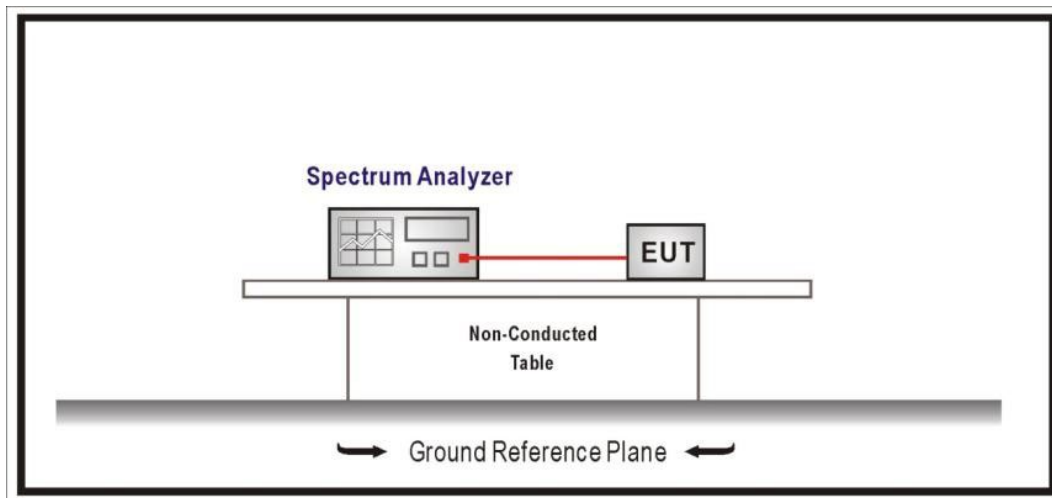
The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074.

### 6.4. Test Result of Maximum Power Spectral Density

Refer as Appendix D

## 7. Antenna Port Conducted Emission

### 7.1. Test Setup



### 7.2. Test Limit

| RF output power procedure      | Limit (dBc) |
|--------------------------------|-------------|
| Peak output power procedure    | 20          |
| Average output power procedure | 30          |

Remarks:

1. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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 limit.
2. If the transmitter complies with the conducted power limit based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

### 7.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB 558074.

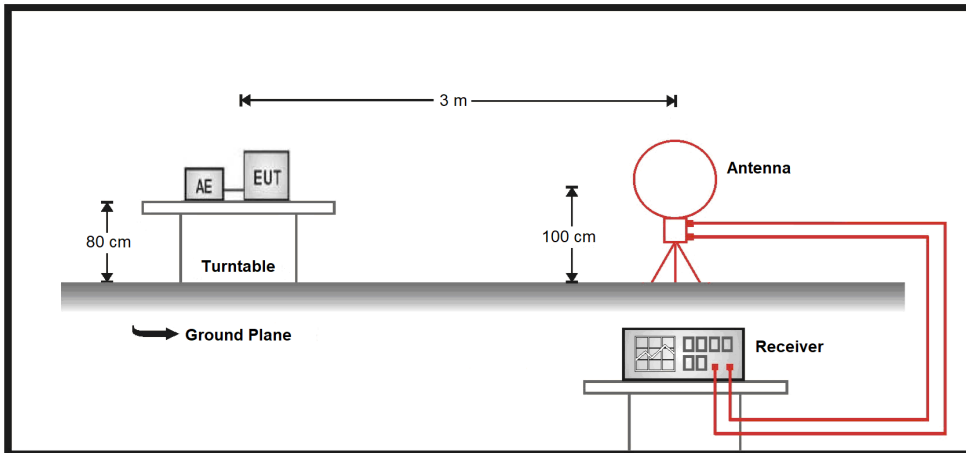
### 7.4. Test Result of Antenna Port Conducted Emission

Refer as Appendix E

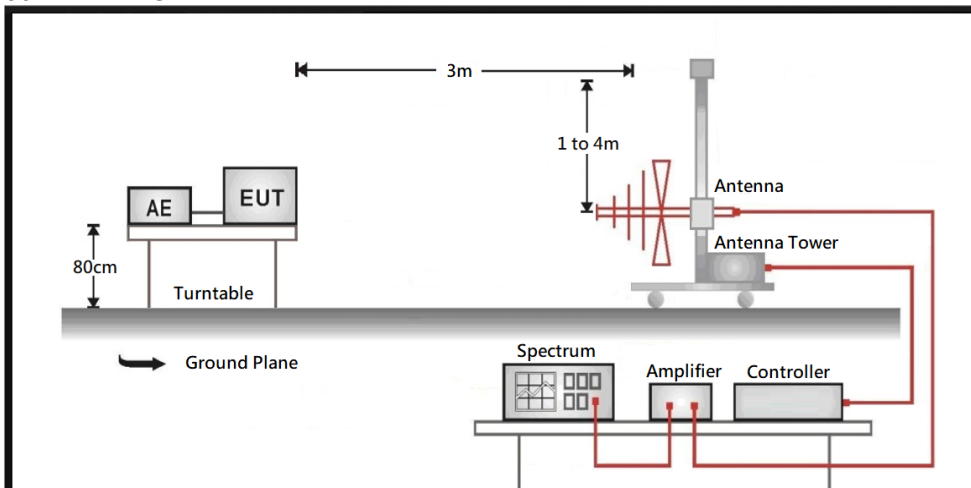
## 8. Transmitter Radiated Spurious Emission

### 8.1. Test Setup

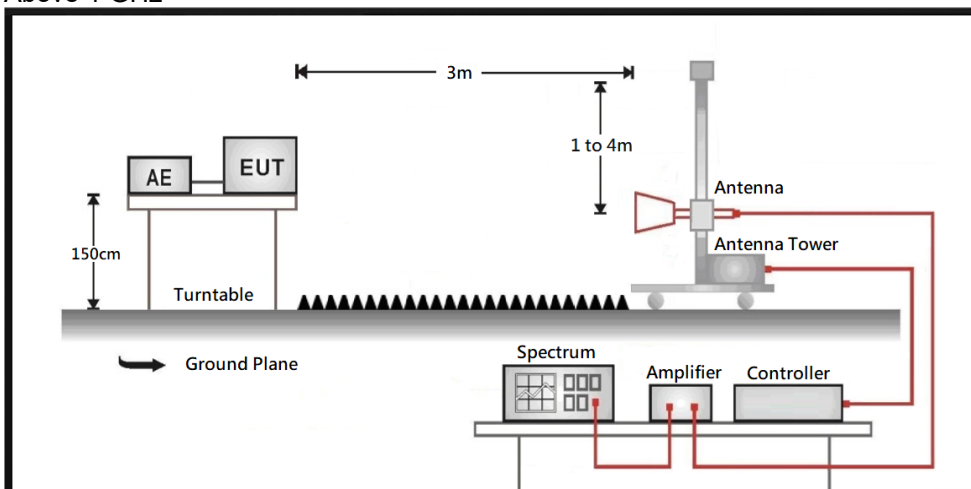
9 kHz ~ 30 MHz



30 MHz ~ 1 GHz



Above 1 GHz



## 8.2. Test Limit

| Frequency (MHz) | Field strength (uV/m) | Field strength (dBuV/m) | Measurement distance (m) |
|-----------------|-----------------------|-------------------------|--------------------------|
| 0.009 – 0.490   | 2400/F(kHz)           | 20 log (2400/F(kHz))    | 300                      |
| 0.490 – 1.705   | 24000/F(kHz)          | 20 log (24000/F(kHz))   | 30                       |
| 1.705 - 30      | 30                    | 29.5                    | 30                       |
| 30 - 88         | 100                   | 40                      | 3                        |
| 88 - 216        | 150                   | 43.5                    | 3                        |
| 216 - 960       | 200                   | 46                      | 3                        |
| Above 960       | 500                   | 54                      | 3                        |

Remarks:

1. Field strength (dBuV/m) = 20 log Field strength (uV/m)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

## 8.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB 558074.

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

On any frequency or frequencies from 9 kHz(include The the lowest oscillator frequency generated within the device up to the 10th harmonic) to 1000 MHz, the limit shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limit shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

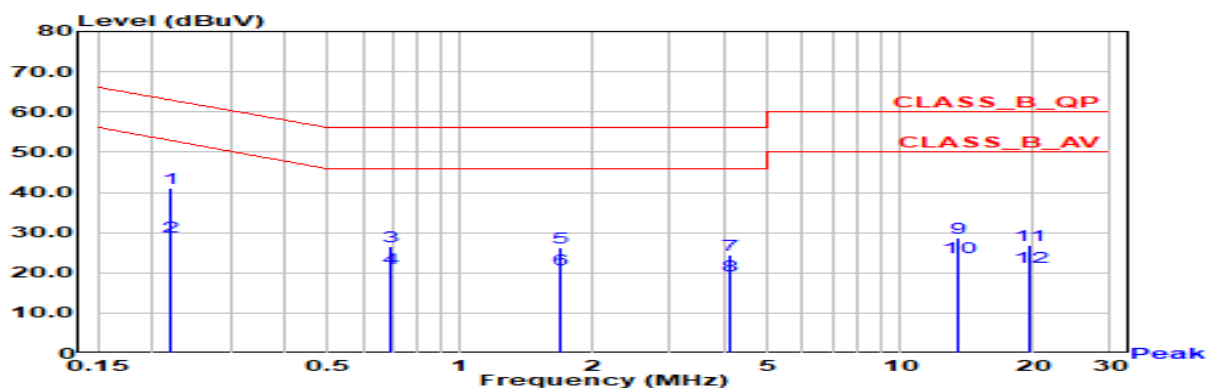
The bandwidth below 1 GHz setting on the field strength meter is 120 kHz and above 1 GHz is 1 MHz.

## 8.4. Test Result of Transmitter Radiated Spurious Emission

Refer as Appendix F

## Appendix A. Test Result of AC Power Line Conducted Emission

|                |                                                |       |      |
|----------------|------------------------------------------------|-------|------|
| Test Mode      | Transmit                                       | Phase | Line |
| Test Condition | 802.11be (40 MHz) / Ant. 1 + Ant. 2 / 2437 MHz |       |      |

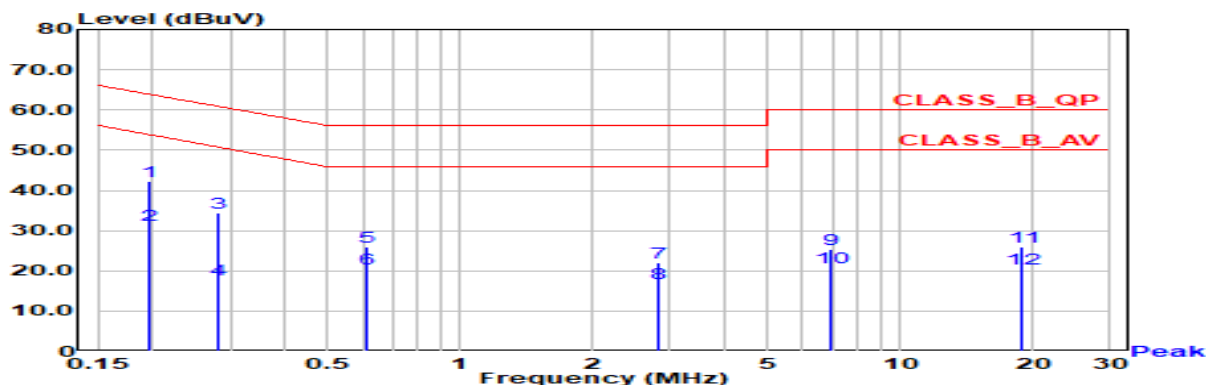


| No | Frequency (MHz) | Emission Level (dBUV) | Limit (dBUV) | Margin (dB) | Reading Level (dBUV) | Correct Factor (dB) | Detector Type |
|----|-----------------|-----------------------|--------------|-------------|----------------------|---------------------|---------------|
| *1 | 0.219           | 41.19                 | 62.85        | -21.65      | 31.52                | 9.67                | QP            |
| 2  | 0.219           | 29.06                 | 52.85        | -23.79      | 19.39                | 9.67                | AV            |
| 3  | 0.690           | 26.42                 | 56.00        | -29.58      | 16.74                | 9.68                | QP            |
| 4  | 0.690           | 21.09                 | 46.00        | -24.91      | 11.41                | 9.68                | AV            |
| 5  | 1.688           | 26.39                 | 56.00        | -29.61      | 16.57                | 9.82                | QP            |
| 6  | 1.688           | 20.73                 | 46.00        | -25.27      | 10.92                | 9.82                | AV            |
| 7  | 4.092           | 24.46                 | 56.00        | -31.54      | 14.53                | 9.93                | QP            |
| 8  | 4.092           | 19.18                 | 46.00        | -26.82      | 9.25                 | 9.93                | AV            |
| 9  | 13.551          | 28.61                 | 60.00        | -31.39      | 18.44                | 10.16               | QP            |
| 10 | 13.551          | 23.90                 | 50.00        | -26.10      | 13.74                | 10.16               | AV            |
| 11 | 19.571          | 26.81                 | 60.00        | -33.19      | 16.56                | 10.25               | QP            |
| 12 | 19.571          | 21.42                 | 50.00        | -28.58      | 11.17                | 10.25               | AV            |

Note:

1. "\*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

|                |                                                |       |         |
|----------------|------------------------------------------------|-------|---------|
| Test Mode      | Transmit                                       | Phase | Neutral |
| Test Condition | 802.11be (40 MHz) / Ant. 1 + Ant. 2 / 2437 MHz |       |         |



| No | Frequency (MHz) | Emission Level (dBuV) | Limit (dBuV) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB) | Detector Type |
|----|-----------------|-----------------------|--------------|-------------|----------------------|---------------------|---------------|
| *1 | 0.197           | 42.17                 | 63.72        | -21.55      | 32.50                | 9.67                | QP            |
| 2  | 0.197           | 31.29                 | 53.72        | -22.43      | 21.62                | 9.67                | AV            |
| 3  | 0.281           | 34.51                 | 60.79        | -26.28      | 24.84                | 9.67                | QP            |
| 4  | 0.281           | 17.88                 | 50.79        | -32.91      | 8.21                 | 9.67                | AV            |
| 5  | 0.609           | 25.93                 | 56.00        | -30.07      | 16.25                | 9.68                | QP            |
| 6  | 0.609           | 20.39                 | 46.00        | -25.61      | 10.72                | 9.68                | AV            |
| 7  | 2.809           | 21.92                 | 56.00        | -34.08      | 12.02                | 9.89                | QP            |
| 8  | 2.809           | 16.84                 | 46.00        | -29.16      | 6.94                 | 9.89                | AV            |
| 9  | 6.983           | 25.46                 | 60.00        | -34.54      | 15.45                | 10.01               | QP            |
| 10 | 6.983           | 20.96                 | 50.00        | -29.04      | 10.95                | 10.01               | AV            |
| 11 | 18.921          | 26.02                 | 60.00        | -33.98      | 15.78                | 10.24               | QP            |
| 12 | 18.921          | 20.49                 | 50.00        | -29.51      | 10.25                | 10.24               | AV            |

Note:

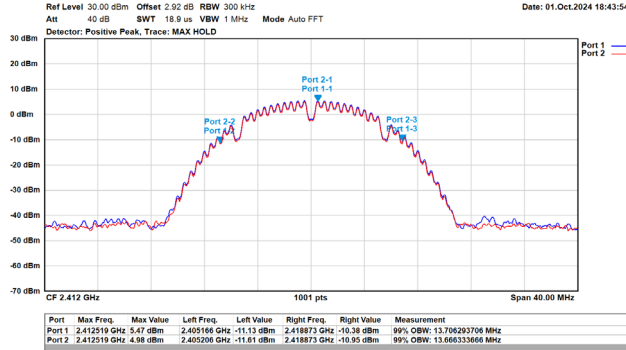
1. "\*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

## Appendix B.1 Test Result of Occupied Bandwidth

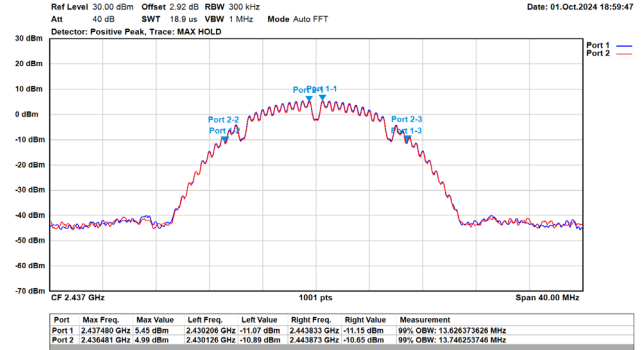
| Modulation        | Frequency<br>(MHz) | Occupied Bandwidth<br>(MHz) |        | Limit<br>(MHz) |
|-------------------|--------------------|-----------------------------|--------|----------------|
|                   |                    | Ant. 1                      | Ant. 2 |                |
| 802.11b           | 2412               | 13.71                       | 13.67  | -              |
|                   | 2437               | 13.63                       | 13.75  | -              |
|                   | 2462               | 13.67                       | 13.63  | -              |
|                   | 2467               | 13.67                       | 13.63  | -              |
|                   | 2472               | 13.67                       | 13.63  | -              |
| 802.11g           | 2412               | 16.26                       | 16.34  | -              |
|                   | 2437               | 16.18                       | 16.34  | -              |
|                   | 2462               | 16.22                       | 16.22  | -              |
|                   | 2467               | 16.26                       | 16.30  | -              |
|                   | 2472               | 16.26                       | 16.26  | -              |
| 802.11be (20 MHz) | 2412               | 18.74                       | 18.78  | -              |
|                   | 2437               | 18.74                       | 18.82  | -              |
|                   | 2462               | 18.82                       | 18.78  | -              |
|                   | 2467               | 18.78                       | 18.78  | -              |
|                   | 2472               | 18.78                       | 18.82  | -              |
| 802.11be (40 MHz) | 2422               | 37.72                       | 37.64  | -              |
|                   | 2437               | 37.32                       | 37.40  | -              |
|                   | 2452               | 37.64                       | 37.56  | -              |
|                   | 2457               | 37.72                       | 37.40  | -              |
|                   | 2462               | 37.64                       | 37.72  | -              |

## Spectrum plot of value

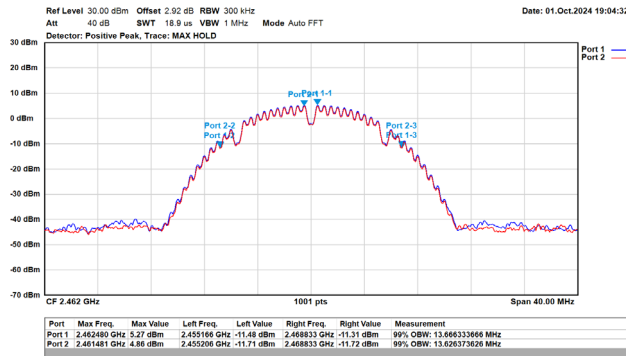
## 802.11b / Ant. 1 + Ant. 2 / 2412 MHz



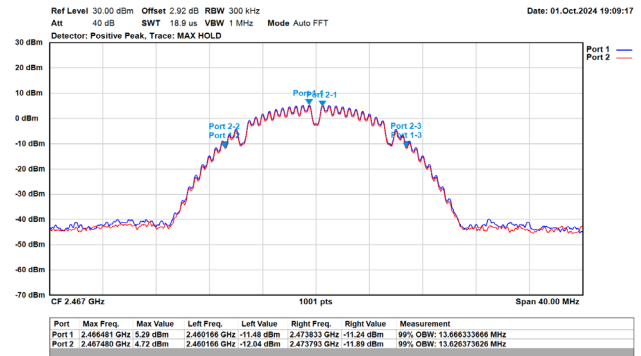
## 802.11b / Ant. 1 + Ant. 2 / 2437 MHz



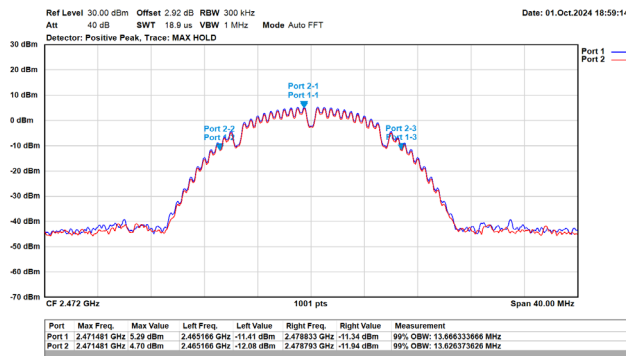
## 802.11b / Ant. 1 + Ant. 2 / 2462 MHz



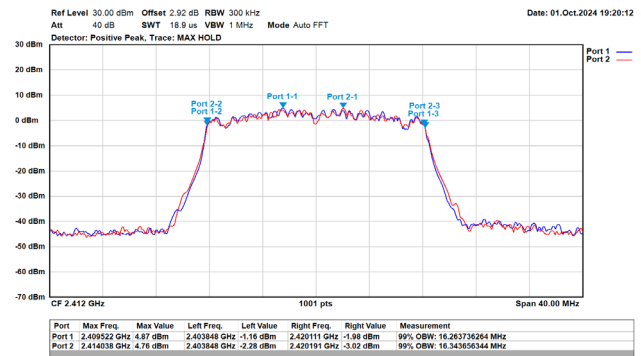
## 802.11b / Ant. 1 + Ant. 2 / 2467 MHz



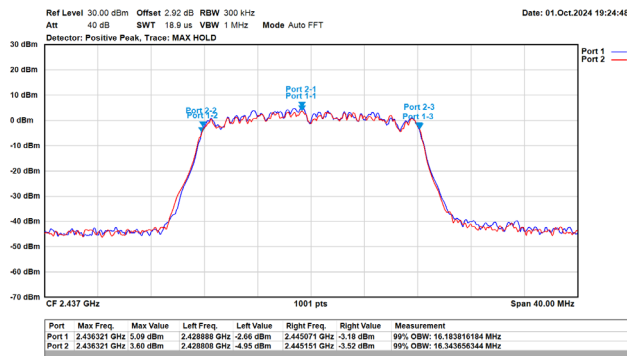
## 802.11b / Ant. 1 + Ant. 2 / 2472 MHz



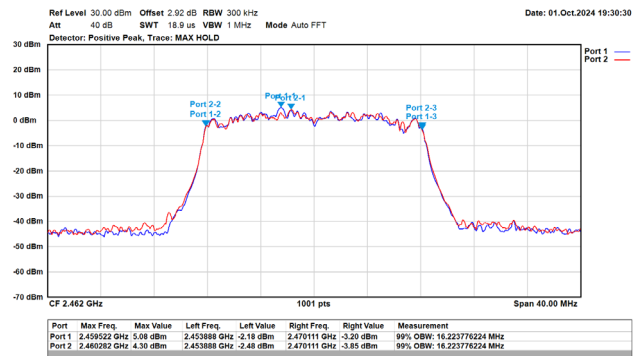
## 802.11g / Ant. 1 + Ant. 2 / 2412 MHz



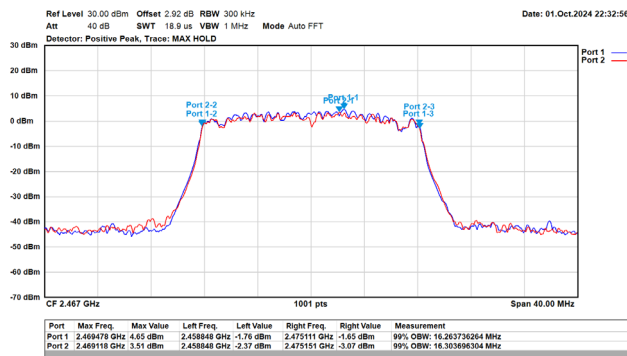
## 802.11g / Ant. 1 + Ant. 2 / 2437 MHz



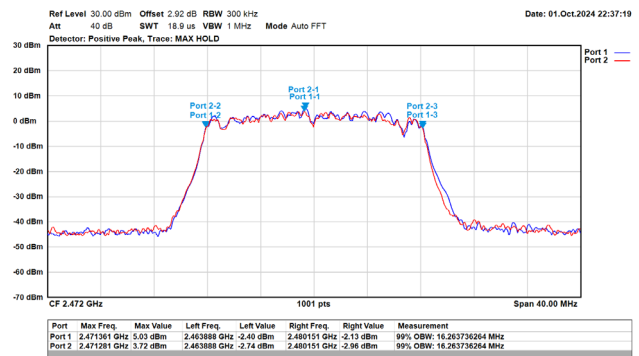
## 802.11g / Ant. 1 + Ant. 2 / 2462 MHz



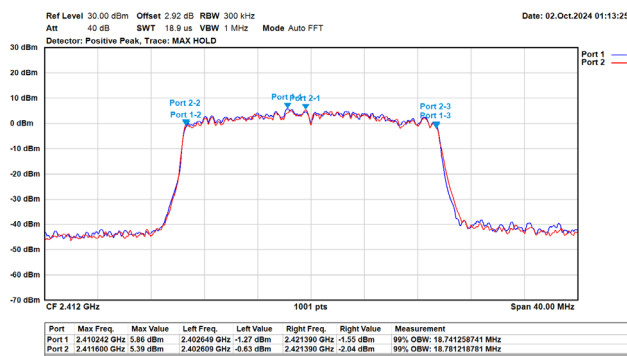
## 802.11g / Ant. 1 + Ant. 2 / 2467 MHz



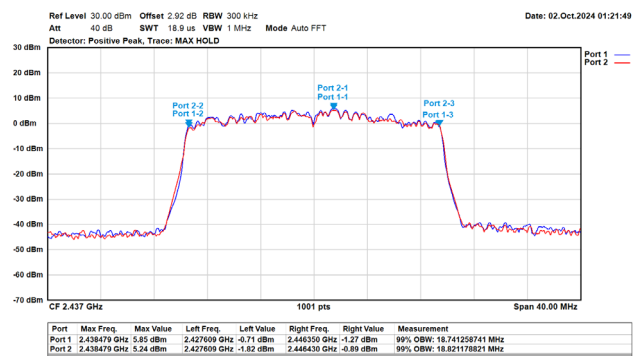
## 802.11g / Ant. 1 + Ant. 2 / 2472 MHz



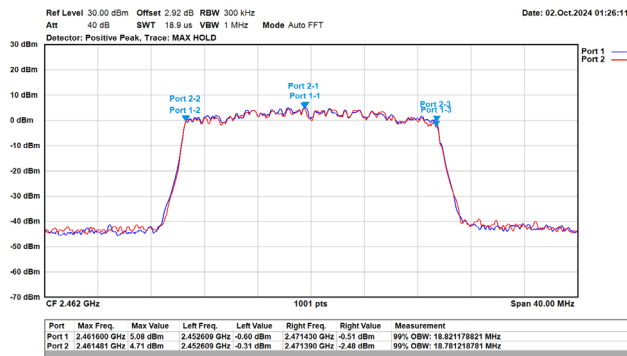
## 802.11be (20 MHz) / Ant. 1 + Ant. 2 / 2412 MHz



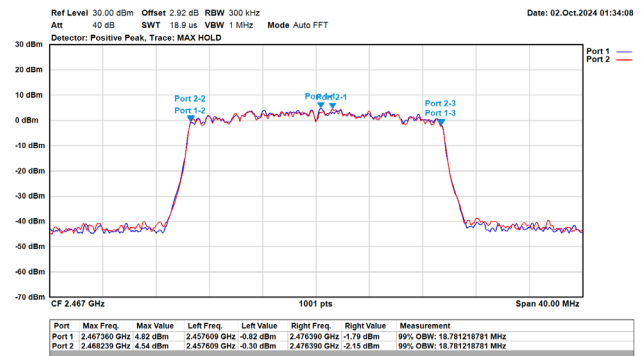
## 802.11be (20 MHz) / Ant. 1 + Ant. 2 / 2437 MHz



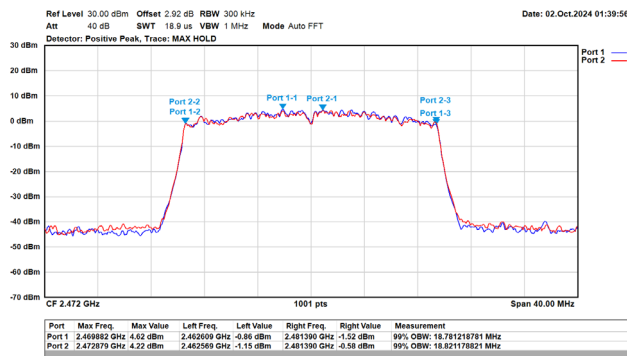
## 802.11be (20 MHz) / Ant. 1 + Ant. 2 / 2462 MHz



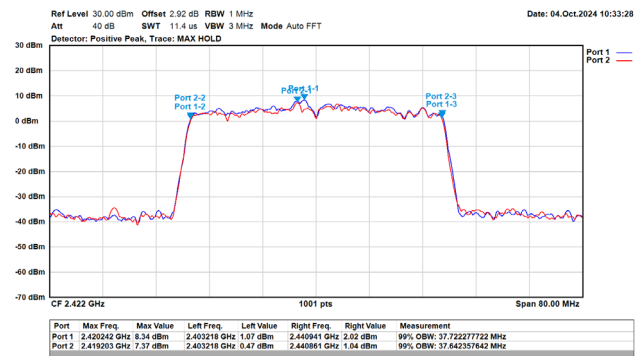
## 802.11be (20 MHz) / Ant. 1 + Ant. 2 / 2467 MHz



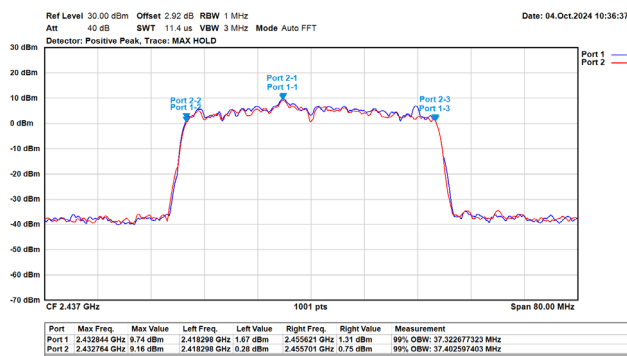
## 802.11be (20 MHz) / Ant. 1 + Ant. 2 / 2472 MHz



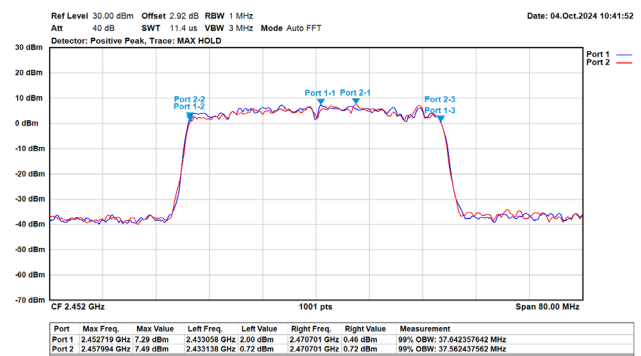
## 802.11be (40 MHz) / Ant. 1 + Ant. 2 / 2422 MHz



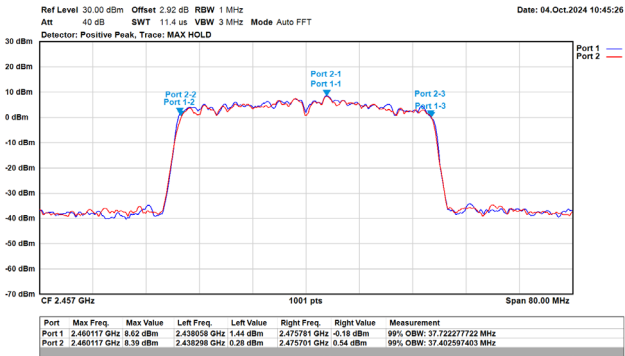
## 802.11be (40 MHz) / Ant. 1 + Ant. 2 / 2437 MHz



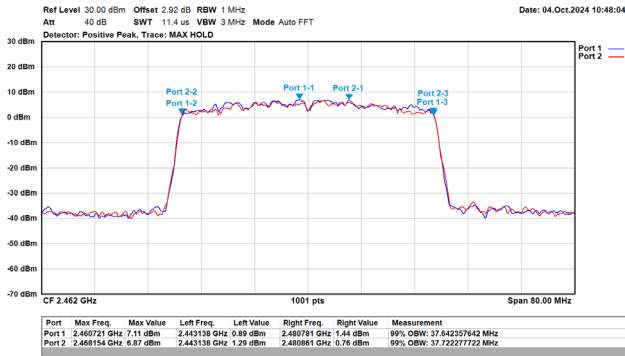
## 802.11be (40 MHz) / Ant. 1 + Ant. 2 / 2452 MHz



802.11be (40 MHz) / Ant. 1 + Ant. 2 / 2457 MHz



802.11be (40 MHz) / Ant. 1 + Ant. 2 / 2462 MHz

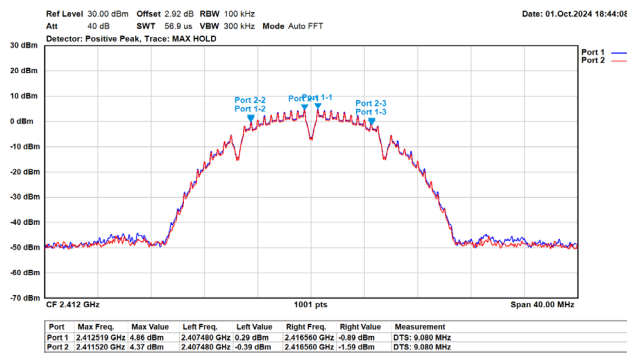


## Appendix B.2 Test Result of DTS Bandwidth

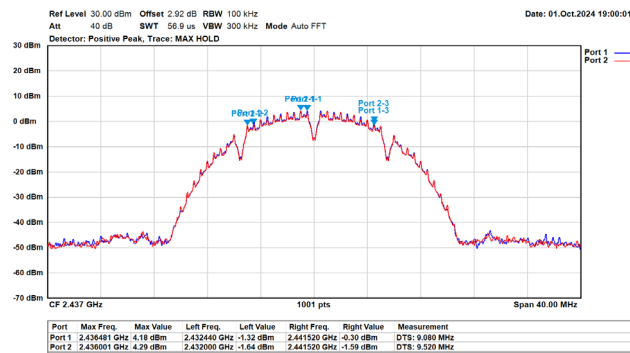
| Modulation        | Frequency<br>(MHz) | DTS Bandwidth<br>(MHz) |        | Limit<br>(MHz) | Result |
|-------------------|--------------------|------------------------|--------|----------------|--------|
|                   |                    | Ant. 1                 | Ant. 2 |                |        |
| 802.11b           | 2412               | 9.08                   | 9.08   | 0.50           | Pass   |
|                   | 2437               | 9.08                   | 9.52   | 0.50           | Pass   |
|                   | 2462               | 9.08                   | 9.04   | 0.50           | Pass   |
|                   | 2467               | 9.52                   | 9.08   | 0.50           | Pass   |
|                   | 2472               | 10.00                  | 9.08   | 0.50           | Pass   |
| 802.11g           | 2412               | 15.12                  | 15.12  | 0.50           | Pass   |
|                   | 2437               | 15.12                  | 15.12  | 0.50           | Pass   |
|                   | 2462               | 15.12                  | 15.12  | 0.50           | Pass   |
|                   | 2467               | 15.12                  | 15.16  | 0.50           | Pass   |
|                   | 2472               | 15.12                  | 15.12  | 0.50           | Pass   |
| 802.11be (20 MHz) | 2412               | 16.36                  | 15.16  | 0.50           | Pass   |
|                   | 2437               | 16.36                  | 16.80  | 0.50           | Pass   |
|                   | 2462               | 16.80                  | 16.32  | 0.50           | Pass   |
|                   | 2467               | 17.08                  | 16.36  | 0.50           | Pass   |
|                   | 2472               | 16.36                  | 16.36  | 0.50           | Pass   |
| 802.11be (40 MHz) | 2422               | 35.04                  | 35.12  | 0.50           | Pass   |
|                   | 2437               | 35.04                  | 35.20  | 0.50           | Pass   |
|                   | 2452               | 35.04                  | 35.12  | 0.50           | Pass   |
|                   | 2457               | 35.04                  | 35.12  | 0.50           | Pass   |
|                   | 2462               | 35.12                  | 35.12  | 0.50           | Pass   |

## Spectrum plot of value

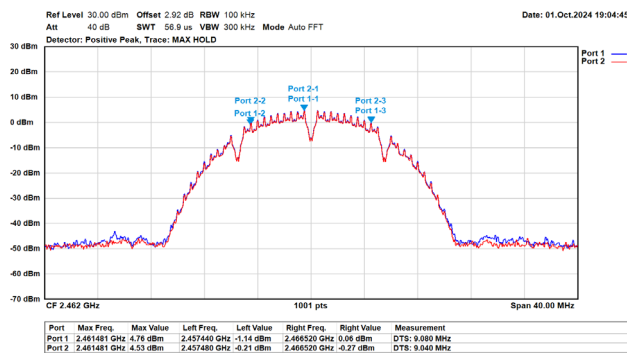
## 802.11b / Ant. 1 + Ant. 2 / 2412 MHz



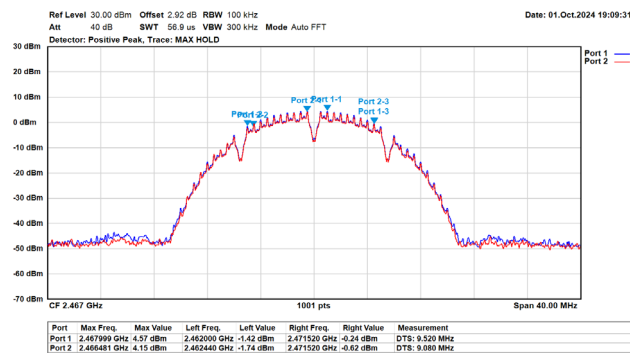
## 802.11b / Ant. 1 + Ant. 2 / 2437 MHz



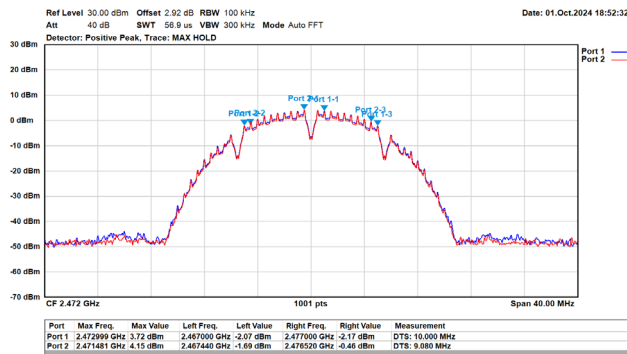
## 802.11b / Ant. 1 + Ant. 2 / 2462 MHz



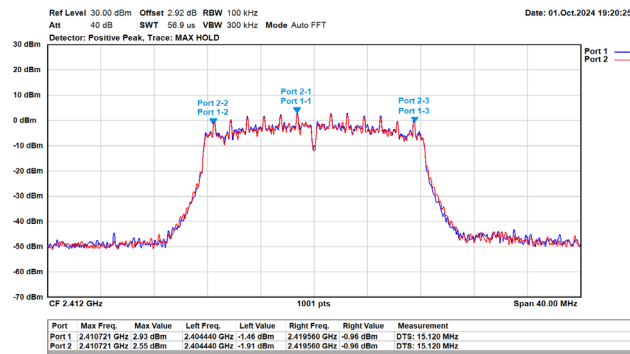
## 802.11b / Ant. 1 + Ant. 2 / 2467 MHz



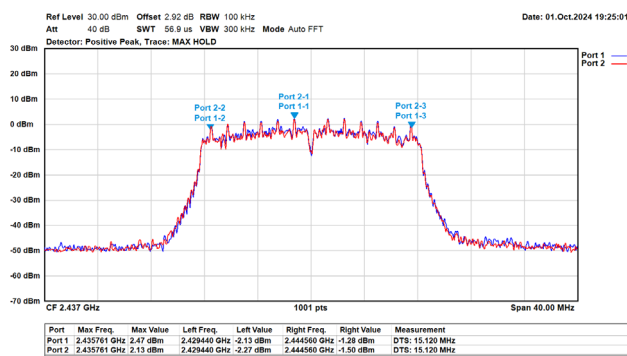
## 802.11b / Ant. 1 + Ant. 2 / 2472 MHz



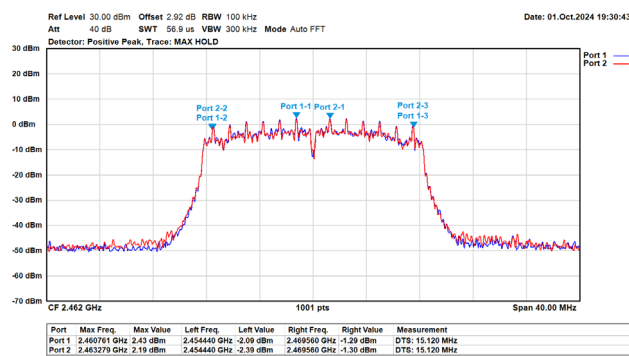
## 802.11g / Ant. 1 + Ant. 2 / 2412 MHz



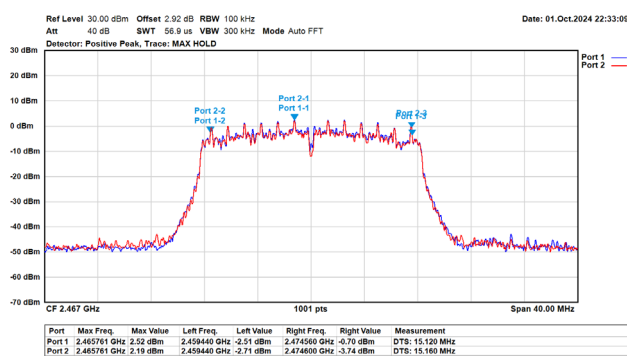
## 802.11g / Ant. 1 + Ant. 2 / 2437 MHz



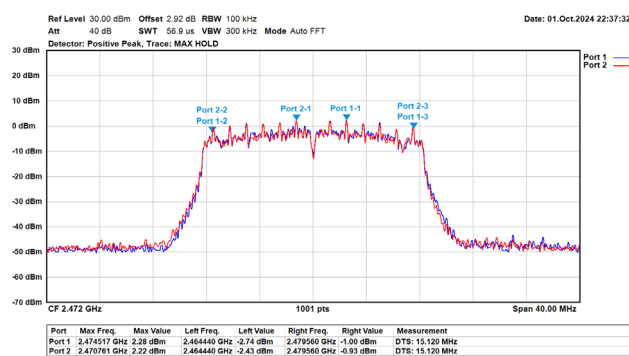
## 802.11g / Ant. 1 + Ant. 2 / 2462 MHz



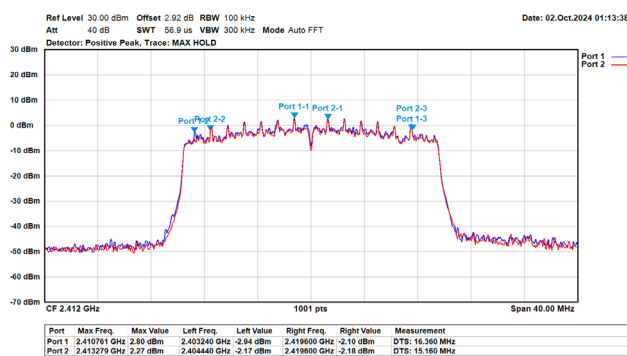
## 802.11g / Ant. 1 + Ant. 2 / 2467 MHz



## 802.11g / Ant. 1 + Ant. 2 / 2472 MHz



## 802.11be (20 MHz) / Ant. 1 + Ant. 2 / 2412 MHz



## 802.11be (20 MHz) / Ant. 1 + Ant. 2 / 2437 MHz

