



## CTC Laboratories, Inc.

Room 101 of Building B, Room 107, 108, 207, 208 of Building A, No. 7, Lanqing 1st Road, Luh Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China

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# TEST REPORT

**Report No.** .....: **CTC2024216513**

**FCC ID**.....: **XUJPADVII**

**Applicant**.....: **Launch Tech Co., Ltd.**

**Address**.....: Launch Industrial Park, North of Wuhe Avenue, Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China

**Manufacturer**.....: Launch Tech Co., Ltd.

**Address**.....: Launch Industrial Park, North of Wuhe Avenue, Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China

**Product Name**.....: **Automotive Diagnosis Tool, Automotive intelligent diagnostic tools**

**Trade Mark**.....: LAUNCH

**Model/Type reference**.....: X-431 PAD VII

**Listed Model(s)** .....: X-431 Throttle III, X-431 PAD VII ELITE, X-431 PAD7 ELITE, OADD-PD1301x (x=A~Z, indicates configuration difference)

**Standard**.....: **FCC CFR Title 47 Part 15 Subpart C Section 15.247**

**Date of receipt of test sample**...: Sept. 2, 2024

**Date of testing**.....: Feb. 04, 2021 ~ Mar. 28, 2021  
Sept. 2, 2024 ~ Sept. 29, 2024

**Date of issue**.....: Oct. 10, 2024

**Result**.....: **PASS**

Compiled by:

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Jim Jiang

Supervised by:

(Printed name+signature)

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Approved by:

(Printed name+signature)

Totti Zhao

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## 1. TEST SUMMARY

### 1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

[RSS-247 Issue 3](#): Standard Specifications for Frequency Hopping Systems (FHSs) and Digital Transmission Systems (DTSS) Operating in the Bands 902-928MHz, 2400-2483.5MHz and 5725-5850MHz.

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices.

### 1.2. Report version

| Revised No. | Report No.    | Date of issue | Description                                                                                                                                                                                                                                              |
|-------------|---------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01          | CTC2024216513 | Oct. 10, 2024 | On the basis of the original report CTC20210133E17, add 1 adapter and 28 models, update battery factory, small changes in the mainboard. Retest conducted emission and radiated spurious emission (below 1GHz). Other data refer to the original report. |
|             |               |               |                                                                                                                                                                                                                                                          |
|             |               |               |                                                                                                                                                                                                                                                          |



### 1.3. Test Description

| FCC Part 15 Subpart C (15.247) / RSS-247 Issue 3 |                         |                         |        |               |
|--------------------------------------------------|-------------------------|-------------------------|--------|---------------|
| Test Item                                        | Standard Section        |                         | Result | Test Engineer |
|                                                  | FCC                     | IC                      |        |               |
| Antenna Requirement                              | 15.203                  | /                       | Pass   | Rod Luo       |
| Conducted Emission                               | 15.207                  | RSS-Gen 8.8             | Pass   | Eva Feng      |
| Radiated Band Edge and Spurious Emissions        | 15.205&15.209&15.247(d) | RSS-247 5.5             | Pass   | Rod Luo       |
| Conducted Band Edge and Spurious Emissions       | 15.247(d)               | RSS-247 5.5             | Pass   | Rod Luo       |
| 6dB Bandwidth                                    | 15.247(a)(2)            | RSS-247 5.2 (a)         | Pass   | Rod Luo       |
| Conducted Max Output Power                       | 15.247(b)(3)            | RSS-247 5.4 (d)         | Pass   | Rod Luo       |
| Power Spectral Density                           | 15.247(e)               | RSS-247 5.2 (b)         | Pass   | Rod Luo       |
| Transmitter Radiated Spurious                    | 15.209&15.247(d)        | RSS-247 5.5&RSS-Gen 8.9 | Pass   | Rod Luo       |

Note: The measurement uncertainty is not included in the test result.



## 1.4. Test Facility

### CTC Laboratories, Inc.

Add: Room 101 of Building B, Room 107, 108, 207, 208 of Building A, No. 7, Lanqing 1st Road, Luhuhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China

### Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

#### CNAS-Lab Code: L5365

CTC Laboratories, Inc. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation .Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

#### FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

## 1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.



| Test Items                              | Measurement Uncertainty | Notes |
|-----------------------------------------|-------------------------|-------|
| Transmitter power conducted             | 0.42 dB                 | (1)   |
| Transmitter power Radiated              | 2.14 dB                 | (1)   |
| Conducted spurious emissions 9kHz~40GHz | 1.60 dB                 | (1)   |
| Radiated spurious emissions 9kHz~40GHz  | 2.20 dB                 | (1)   |
| Conducted Emissions 9kHz~30MHz          | 3.08 dB                 | (1)   |
| Radiated Emissions 30~1000MHz           | 4.51 dB                 | (1)   |
| Radiated Emissions 1~18GHz              | 5.84 dB                 | (1)   |
| Radiated Emissions 18~40GHz             | 6.12 dB                 | (1)   |
| Occupied Bandwidth                      | -----                   | (1)   |

**Note (1):** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

|                    |             |
|--------------------|-------------|
| Temperature:       | 21°C ~ 27°C |
| Relative Humidity: | 40% ~ 60%   |
| Air Pressure:      | 101kPa      |



## 2. GENERAL INFORMATION

### 2.1. Client Information

|               |                                                                                                     |
|---------------|-----------------------------------------------------------------------------------------------------|
| Applicant:    | Launch Tech Co., Ltd.                                                                               |
| Address:      | Launch Industrial Park, North of Wuhe Avenue, Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China |
| Manufacturer: | Launch Tech Co., Ltd.                                                                               |
| Address:      | Launch Industrial Park, North of Wuhe Avenue, Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China |



## 2.2. General Description of EUT

|                                          |                                                                                                                           |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Product Name:                            | Automotive Diagnosis Tool, Automotive intelligent diagnostic tools                                                        |
| Trade Mark:                              | LAUNCH                                                                                                                    |
| Model/Type reference:                    | X-431 PAD VII                                                                                                             |
| Listed Model(s):                         | X-431 Throttle III, X-431 PAD VII ELITE, X-431 PAD7 ELITE, OADD-PD1301x (x=A~Z, indicates configuration difference)       |
| Mode different:                          | All these models are identical in the same PCB, layout and electrical circuit. The difference is the plastic shell color. |
| Power supply:                            | 12Vdc/4A from AC/DC Adapter<br>7.6Vdc from 9360mAh Li-ion Battery                                                         |
| Adapter 1 Model:                         | FJ-SW20171204000D<br>Input:100-240V~ 50/60Hz 1.5A Max<br>Output: 12Vdc/4A                                                 |
| Adapter 2 Model:                         | PSY1204000<br>Input:100-240V~ 50/60Hz 1.3A<br>Output: 12Vdc/4A                                                            |
| Adapter 3 Model:                         | XDJ481D-120400<br>Input:100-240V~ 50/60Hz 1.8A<br>Output: 12Vdc/4A                                                        |
| Hardware version:                        | PL280_V2.0                                                                                                                |
| Software version:                        | V1.0.5.20210323                                                                                                           |
| <b>WIFI 802.11b/ g/ n(HT20)/ n(HT40)</b> |                                                                                                                           |
| Modulation:                              | 802.11b: DSSS(CCK, DQPSK, DBPSK)<br>802.11g/n: OFDM(BPSK, QPSK, 16QAM, 64QAM)                                             |
| Operation frequency:                     | 802.11b/g/n(HT20): 2412MHz~2462MHz<br>802.11n(HT40): 2422MHz~2452MHz                                                      |
| Channel number:                          | 802.11b/g/n(HT20):11channels<br>802.11n(HT40):7channels                                                                   |
| Channel separation:                      | 5MHz                                                                                                                      |
| Antenna type:                            | FPC Antenna                                                                                                               |
| Antenna gain:                            | 5.25dBi Max                                                                                                               |



## 2.3. Accessory Equipment information

| Equipment Information     |               |              |              |
|---------------------------|---------------|--------------|--------------|
| Name                      | Model         | S/N          | Manufacturer |
| /                         | /             | /            | /            |
| /                         | /             | /            | /            |
| Cable Information         |               |              |              |
| Name                      | Shielded Type | Ferrite Core | Length       |
| /                         | /             | /            | /            |
| Test Software Information |               |              |              |
| Name                      | /             | /            | /            |
| cmd.exe                   | /             | /            | /            |



## 2.4. Operation state

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Operation Frequency List:

| Channel | Frequency (MHz) |
|---------|-----------------|
| 01      | 2412            |
| 02      | 2417            |
| 03      | 2422            |
| 04      | 2427            |
| 05      | 2432            |
| 06      | 2437            |
| 07      | 2442            |
| 08      | 2447            |
| 09      | 2452            |
| 10      | 2457            |
| 11      | 2462            |

Note: CH 01~CH 11 for 802.11b/g/n(HT20), CH 03~CH 09 for 802.11n(HT40)

### Data Rated

Preliminary tests were performed in different data rate, and found which the below bit rate is worst case mode, so only show data which it is a worst case mode.

| Mode          | Data rate (worst mode) |
|---------------|------------------------|
| 802.11b       | 1Mbps                  |
| 802.11g       | 6Mbps                  |
| 802.11n(HT20) | HT-MCS0                |
| 802.11n(HT40) | HT-MCS0                |

### Test mode

|                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| For RF test items:                                                                                                                                                                                                       |
| The engineering test program was provided and enabled to make EUT continuous transmit.                                                                                                                                   |
| For AC power line conducted emissions:                                                                                                                                                                                   |
| The EUT was set to connect with the WLAN AP under large package sizes transmission.                                                                                                                                      |
| For Radiated spurious emissions test item:                                                                                                                                                                               |
| The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data Recorded in the report. |



## 2.5. Measurement Instruments List

| RF Test System |                                       |              |           |            |                  |
|----------------|---------------------------------------|--------------|-----------|------------|------------------|
| Item           | Test Equipment                        | Manufacturer | Model No. | Serial No. | Calibrated Until |
| 1              | Spectrum Analyzer                     | R&S          | FSV40-N   | 101331     | Mar. 21, 2025    |
| 2              | MXA Signal Analyzer                   | Keysight     | N9020A    | MY46471737 | Dec. 12, 2024    |
| 3              | MXG Vector Signal Generator           | Agilent      | N5182A    | MY47420864 | Dec. 12, 2024    |
| 4              | PSG Analog Signal Generator           | Agilent      | E8257D    | MY46521908 | Dec. 12, 2024    |
| 5              | EXG Analog Signal Generator           | Keysight     | N5173B    | MY59100842 | Dec. 12, 2024    |
| 6              | MXG Vector Signal Generator           | Keysight     | N5182B    | MY59100212 | Dec. 12, 2024    |
| 7              | USB Wideband Power Sensor             | Keysight     | U2021XA   | MY55130004 | Mar. 21, 2025    |
| 8              | USB Wideband Power Sensor             | Keysight     | U2021XA   | MY55130006 | Mar. 21, 2025    |
| 9              | Wideband Radio Communication Tester   | R&S          | CMW500    | 102414     | Dec. 12, 2024    |
| 10             | RF Control Unit                       | Tonscend     | JS0806-2  | /          | Aug. 21, 2025    |
| 11             | High and low temperature test chamber | ESPEC        | MT3035    | /          | Mar. 21, 2025    |

| Radiated Emission (3m chamber 3) |                              |              |            |            |                  |
|----------------------------------|------------------------------|--------------|------------|------------|------------------|
| Item                             | Test Equipment               | Manufacturer | Model No.  | Serial No. | Calibrated Until |
| 1                                | Trilog-Broadband Antenna     | Schwarzbeck  | VULB 9163  | 01026      | Dec. 18, 2024    |
| 2                                | Horn Antenna                 | Schwarzbeck  | BBHA 9120D | 9120D-647  | Dec. 01, 2024    |
| 3                                | Test Receiver                | Keysight     | N9038A     | MY56400071 | Dec. 12, 2024    |
| 4                                | Broadband Amplifier          | SCHWARZBECK  | BBV9743B   | 259        | Dec. 12, 2024    |
| 5                                | Mirowave Broadband Amplifier | SCHWARZBECK  | BBV9718C   | 111        | Dec. 12, 2024    |
| 6                                | 3m chamber 3                 | YIHENG       | EE106      | /          | Aug. 28, 2026    |
| 7                                | Test Software                | FARA         | EZ-EMC     | FA-03A2    | /                |

| Conducted Emission |                   |              |           |                |                  |
|--------------------|-------------------|--------------|-----------|----------------|------------------|
| Item               | Test Equipment    | Manufacturer | Model No. | Serial No.     | Calibrated Until |
| 1                  | LISN              | R&S          | ENV216    | 101112         | Dec. 12, 2024    |
| 2                  | LISN              | R&S          | ENV216    | 101113         | Dec. 12, 2024    |
| 3                  | EMI Test Receiver | R&S          | ESCS30    | 100353         | Dec. 12, 2024    |
| 4                  | ISN CAT6          | Schwarzbeck  | NTFM 8158 | CAT6-8158-0046 | Dec. 12, 2024    |
| 5                  | ISN CAT5          | Schwarzbeck  | NTFM 8158 | CAT5-8158-0046 | Dec. 12, 2024    |
| 6                  | Test Software     | R&S          | EMC32     | 6.10.10        | /                |

Note: 1. The Cal. Interval was one year.

2. The Cal. Interval was three year of the chamber

3. The cable loss has calculated in test result which connection between each test instruments

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### 3. TEST ITEM AND RESULTS

#### 3.1. Conducted Emission

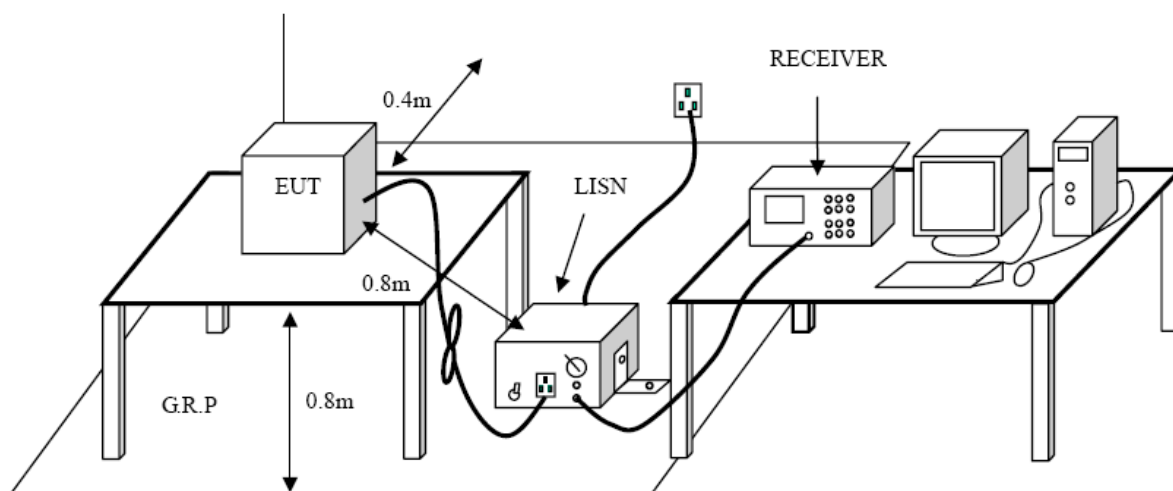
##### Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS - Gen 8.8:

| Frequency range (MHz) | Limit (dBuV) |           |
|-----------------------|--------------|-----------|
|                       | Quasi-peak   | Average   |
| 0.15-0.5              | 66 to 56*    | 56 to 46* |
| 0.5-5                 | 56           | 46        |
| 5-30                  | 60           | 50        |

\* Decreases with the logarithm of the frequency.

##### Test Configuration

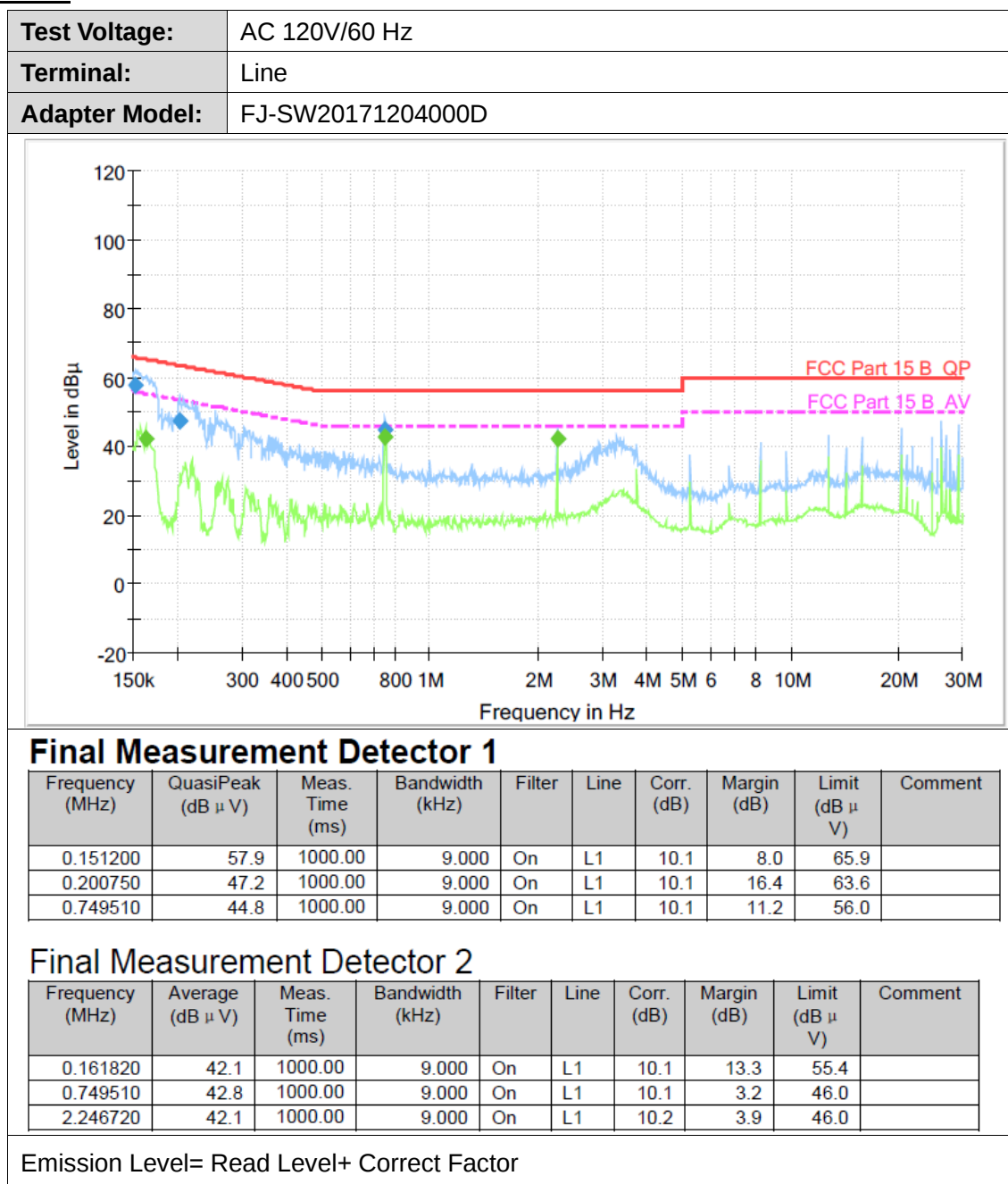


##### Test Procedure

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. 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.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /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)
4. 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.
5. 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.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

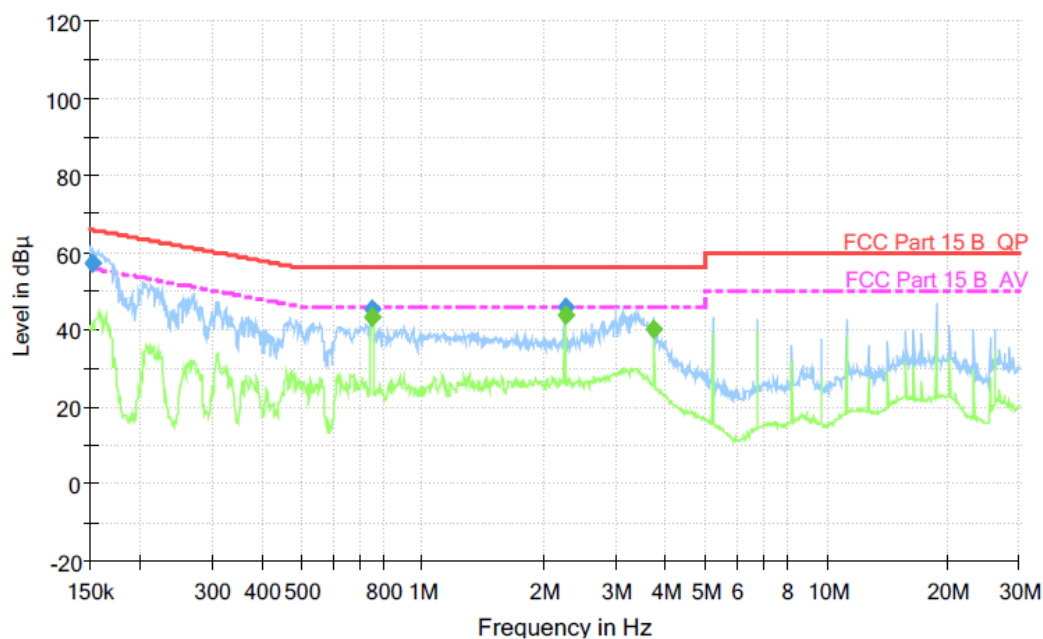
**Test Mode:**

Please refer to the clause 2.4.

**Test Results**



|                |                   |
|----------------|-------------------|
| Test Voltage:  | AC 120V/60 Hz     |
| Terminal:      | Neutral           |
| Adapter Model: | FJ-SW20171204000D |



### Final Measurement Detector 1

| Frequency (MHz) | QuasiPeak (dB μV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dB μV) | Comment |
|-----------------|-------------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.152410        | 57.3              | 1000.00         | 9.000           | On     | N    | 10.1       | 8.6         | 65.9          |         |
| 0.749510        | 45.3              | 1000.00         | 9.000           | On     | N    | 10.1       | 10.7        | 56.0          |         |
| 2.246720        | 45.7              | 1000.00         | 9.000           | On     | N    | 10.2       | 10.3        | 56.0          |         |

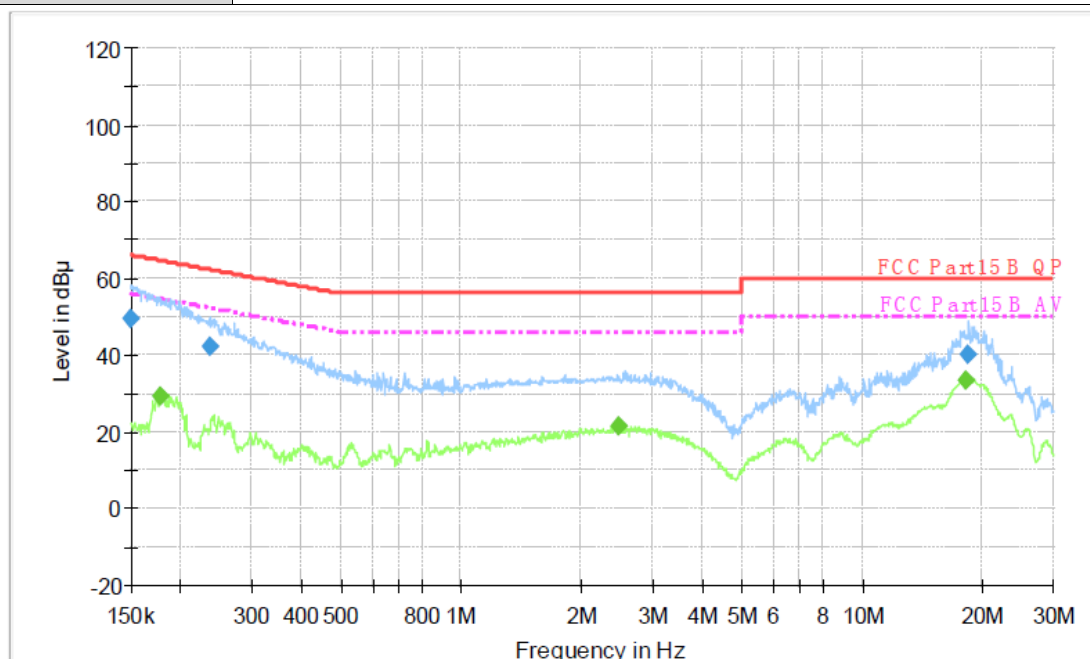
### Final Measurement Detector 2

| Frequency (MHz) | Average (dB μV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dB μV) | Comment |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.749510        | 43.3            | 1000.00         | 9.000           | On     | N    | 10.1       | 2.7         | 46.0          |         |
| 2.246720        | 43.6            | 1000.00         | 9.000           | On     | N    | 10.2       | 2.4         | 46.0          |         |
| 3.745110        | 40.2            | 1000.00         | 9.000           | On     | N    | 10.2       | 5.8         | 46.0          |         |

Emission Level= Read Level+ Correct Factor



|                |               |
|----------------|---------------|
| Test Voltage:  | AC 120V/60 Hz |
| Terminal:      | Line          |
| Adapter Model: | PSY1204000    |



### Final Measurement Detector 1

| Frequency (MHz) | QuasiPeak (dBu V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBu V) | Comment |
|-----------------|-------------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.150600        | 49.7              | 1000.00         | 9.000           | On     | L1   | 10.1       | 16.3        | 66.0          |         |
| 0.235510        | 42.0              | 1000.00         | 9.000           | On     | L1   | 10.1       | 20.3        | 62.3          |         |
| 18.416860       | 40.1              | 1000.00         | 9.000           | On     | L1   | 10.6       | 19.9        | 60.0          |         |

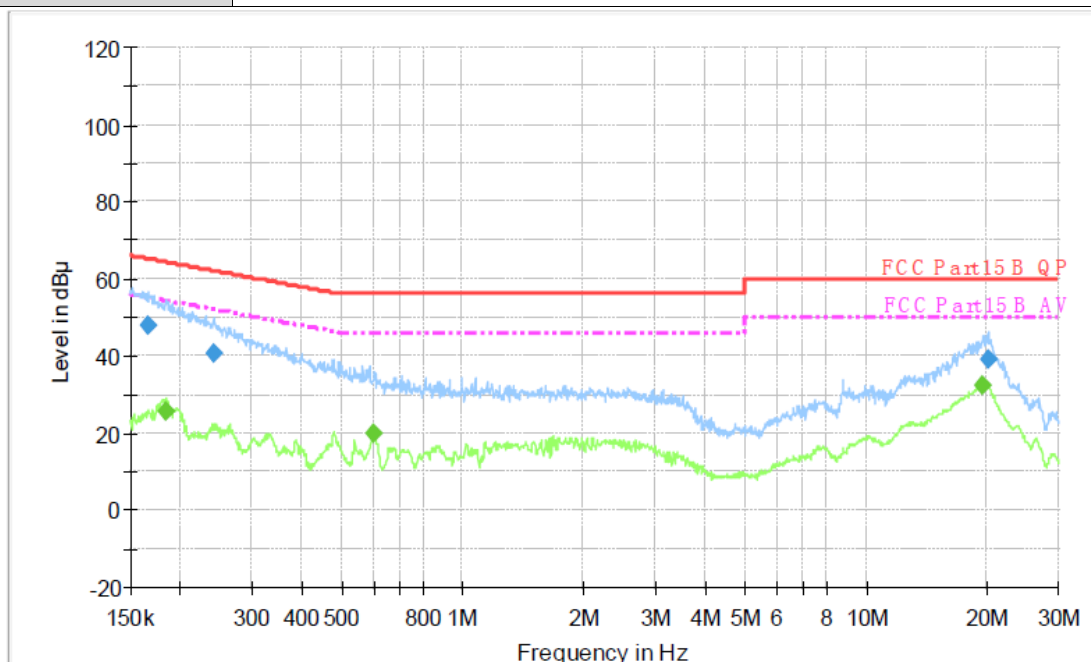
### Final Measurement Detector 2

| Frequency (MHz) | Average (dBu V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBu V) | Comment |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.178800        | 29.3            | 1000.00         | 9.000           | On     | L1   | 10.1       | 25.2        | 54.5          |         |
| 2.462770        | 21.4            | 1000.00         | 9.000           | On     | L1   | 10.2       | 24.6        | 46.0          |         |
| 18.197610       | 33.4            | 1000.00         | 9.000           | On     | L1   | 10.6       | 16.6        | 50.0          |         |

Emission Level= Read Level+ Correct Factor



|                |               |
|----------------|---------------|
| Test Voltage:  | AC 120V/60 Hz |
| Terminal:      | Neutral       |
| Adapter Model: | PSY1204000    |



### Final Measurement Detector 1

| Frequency (MHz) | QuasiPeak (dBμ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμ V) | Comment |
|-----------------|-------------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.166410        | 47.9              | 1000.00         | 9.000           | On     | N    | 10.1       | 17.2        | 65.1          |         |
| 0.241210        | 40.6              | 1000.00         | 9.000           | On     | N    | 10.1       | 21.5        | 62.1          |         |
| 20.027350       | 38.9              | 1000.00         | 9.000           | On     | N    | 10.6       | 21.1        | 60.0          |         |

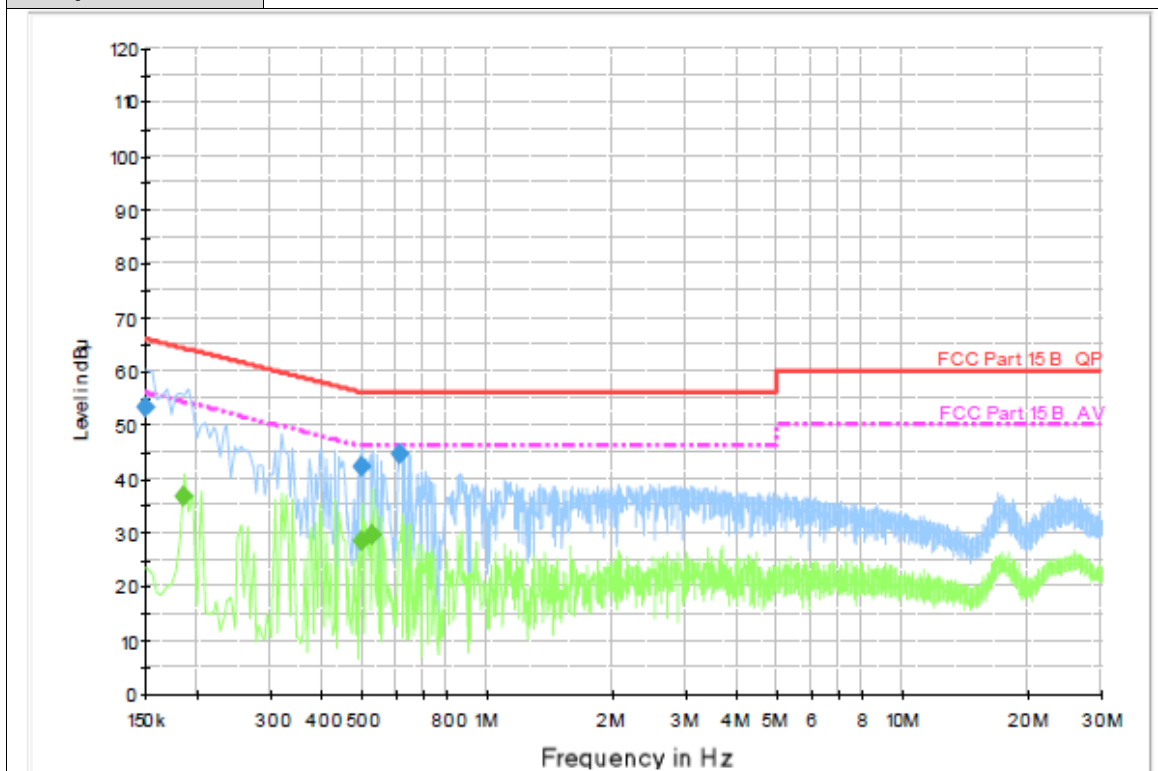
### Final Measurement Detector 2

| Frequency (MHz) | Average (dBμ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμ V) | Comment |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.183140        | 25.8            | 1000.00         | 9.000           | On     | N    | 10.1       | 28.5        | 54.3          |         |
| 0.599360        | 20.0            | 1000.00         | 9.000           | On     | N    | 10.1       | 26.0        | 46.0          |         |
| 19.553350       | 32.4            | 1000.00         | 9.000           | On     | N    | 10.6       | 17.6        | 50.0          |         |

Emission Level= Read Level+ Correct Factor



|                |                |
|----------------|----------------|
| Test Voltage:  | AC 120V/60 Hz  |
| Terminal:      | Line           |
| Adapter Model: | XDJ481D-120400 |



### Final Measurement Detector 1

| Frequency (MHz) | QuasiPeak (dBμ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμ V) | Comment |
|-----------------|-------------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.150000        | 53.2              | 1000.00         | 9.000           | On     | L1   | 9.5        | 12.8        | 66.0          |         |
| 0.496500        | 42.2              | 1000.00         | 9.000           | On     | L1   | 9.5        | 13.9        | 56.1          |         |
| 0.613500        | 44.5              | 1000.00         | 9.000           | On     | L1   | 9.5        | 11.5        | 56.0          |         |

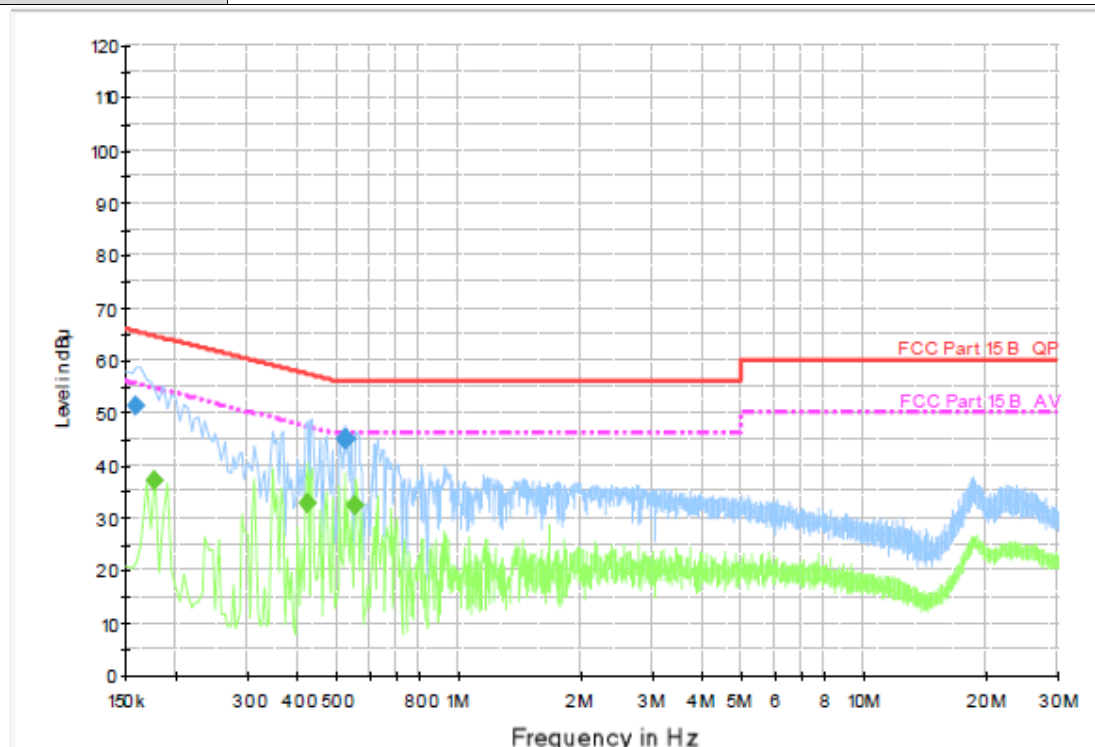
### Final Measurement Detector 2

| Frequency (MHz) | Average (dBμ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμ V) | Comment |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.186000        | 36.6            | 1000.00         | 9.000           | On     | L1   | 9.5        | 17.6        | 54.2          |         |
| 0.496500        | 28.3            | 1000.00         | 9.000           | On     | L1   | 9.5        | 17.8        | 46.1          |         |
| 0.528000        | 29.7            | 1000.00         | 9.000           | On     | L1   | 9.5        | 16.3        | 46.0          |         |

Emission Level= Read Level+ Correct Factor



|                |                |
|----------------|----------------|
| Test Voltage:  | AC 120V/60 Hz  |
| Terminal:      | Neutral        |
| Adapter Model: | XDJ481D-120400 |



### Final Measurement Detector 1

| Frequency (MHz) | QuasiPeak (dBμ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμ V) | Comment |
|-----------------|-------------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.159000        | 51.4              | 1000.00         | 9.000           | On     | N    | 9.5        | 14.1        | 65.5          |         |
| 0.519000        | 44.8              | 1000.00         | 9.000           | On     | N    | 9.4        | 11.2        | 56.0          |         |
| 0.528000        | 45.1              | 1000.00         | 9.000           | On     | N    | 9.4        | 10.9        | 56.0          |         |

### Final Measurement Detector 2

| Frequency (MHz) | Average (dBμ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμ V) | Comment |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|---------------|---------|
| 0.177000        | 37.1            | 1000.00         | 9.000           | On     | N    | 9.5        | 17.5        | 54.6          |         |
| 0.420000        | 32.7            | 1000.00         | 9.000           | On     | N    | 9.4        | 14.7        | 47.4          |         |
| 0.555000        | 32.2            | 1000.00         | 9.000           | On     | N    | 9.4        | 13.8        | 46.0          |         |

Emission Level= Read Level+ Correct Factor

## 3.2. Radiated Emission

### Limit

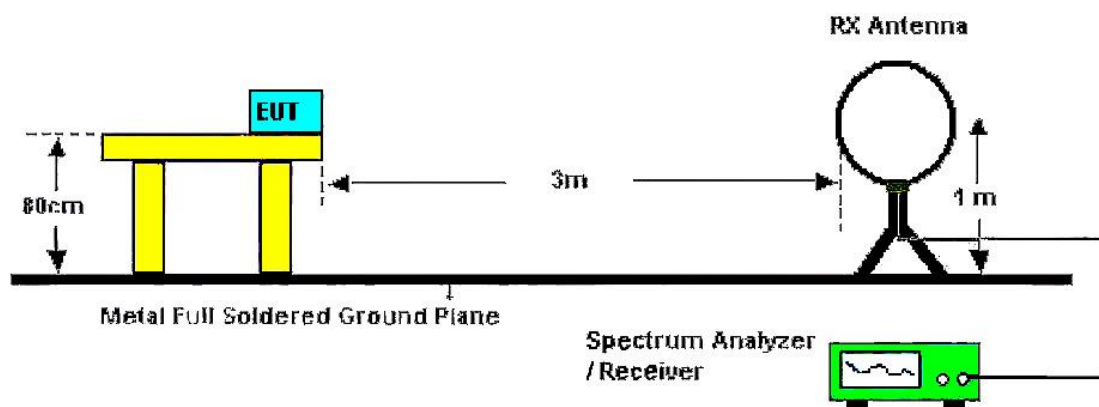
FCC CFR Title 47 Part 15 Subpart C Section 15.209/ RSS – Gen 8.9:

| Frequency         | Limit (dBuV/m @3m) | Value      |
|-------------------|--------------------|------------|
| 30 MHz ~ 88 MHz   | 40.00              | Quasi-peak |
| 88 MHz ~ 216 MHz  | 43.50              | Quasi-peak |
| 216 MHz ~ 960 MHz | 46.00              | Quasi-peak |
| 960 MHz ~ 1 GHz   | 54.00              | Quasi-peak |
| Above 1 GHz       | 54.00              | Average    |
|                   | 74.00              | Peak       |

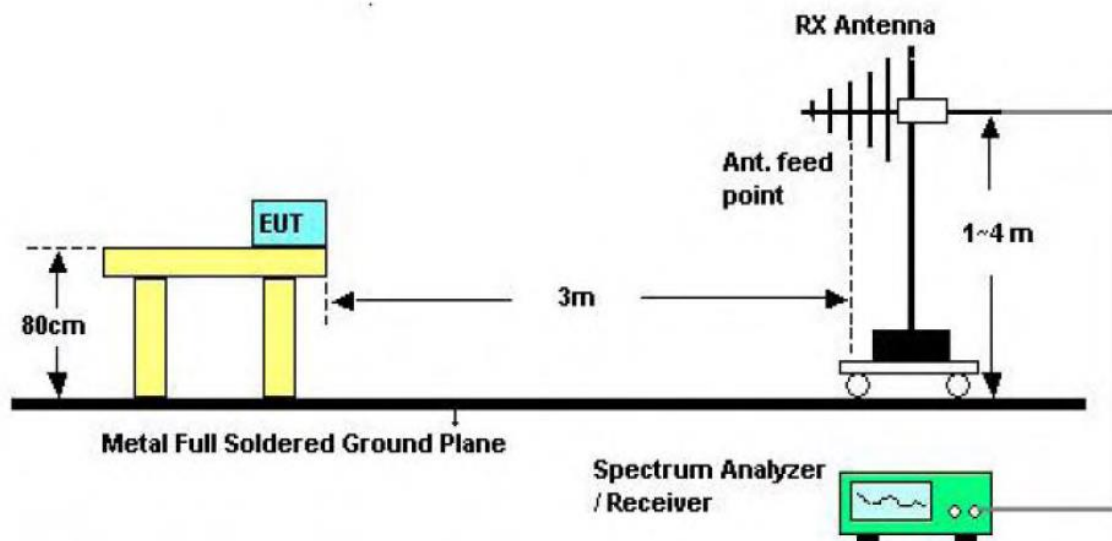
### Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

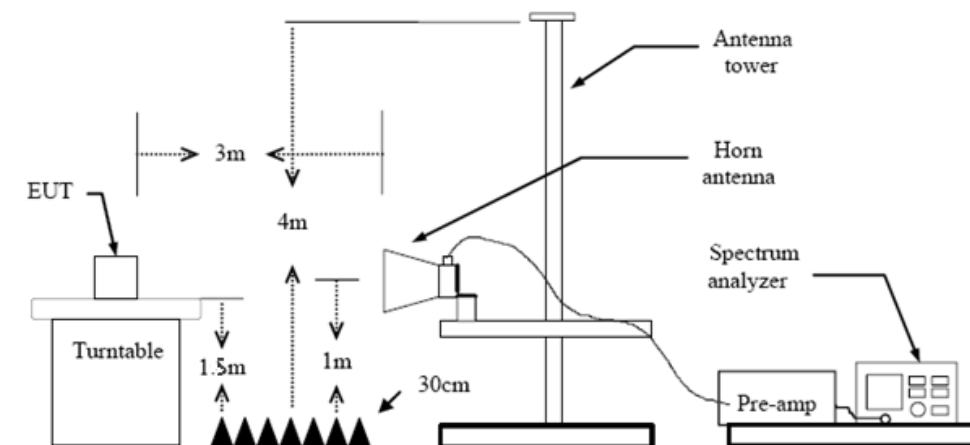
### Test Configuration



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup

### Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013
  2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
  3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
  4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
  5. Set to the maximum power setting and enable the EUT transmit continuously.
  6. Use the following spectrum analyzer settings
    - (1) Span shall wide enough to fully capture the emission being measured;
    - (2) Below 1 GHz:  
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;  
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
    - (3) From 1 GHz to 10<sup>th</sup> harmonic:  
RBW=1MHz, VBW=3MHz Peak detector for Peak value.  
RBW=1MHz, VBW $\geq$ 1/T Peak detector for Average value.
- Note 1: For the 1/T& Duty Cycle please refer to clause 3.8 Duty Cycle.

### Test Mode

Please refer to the clause 2.4.

### Test Result

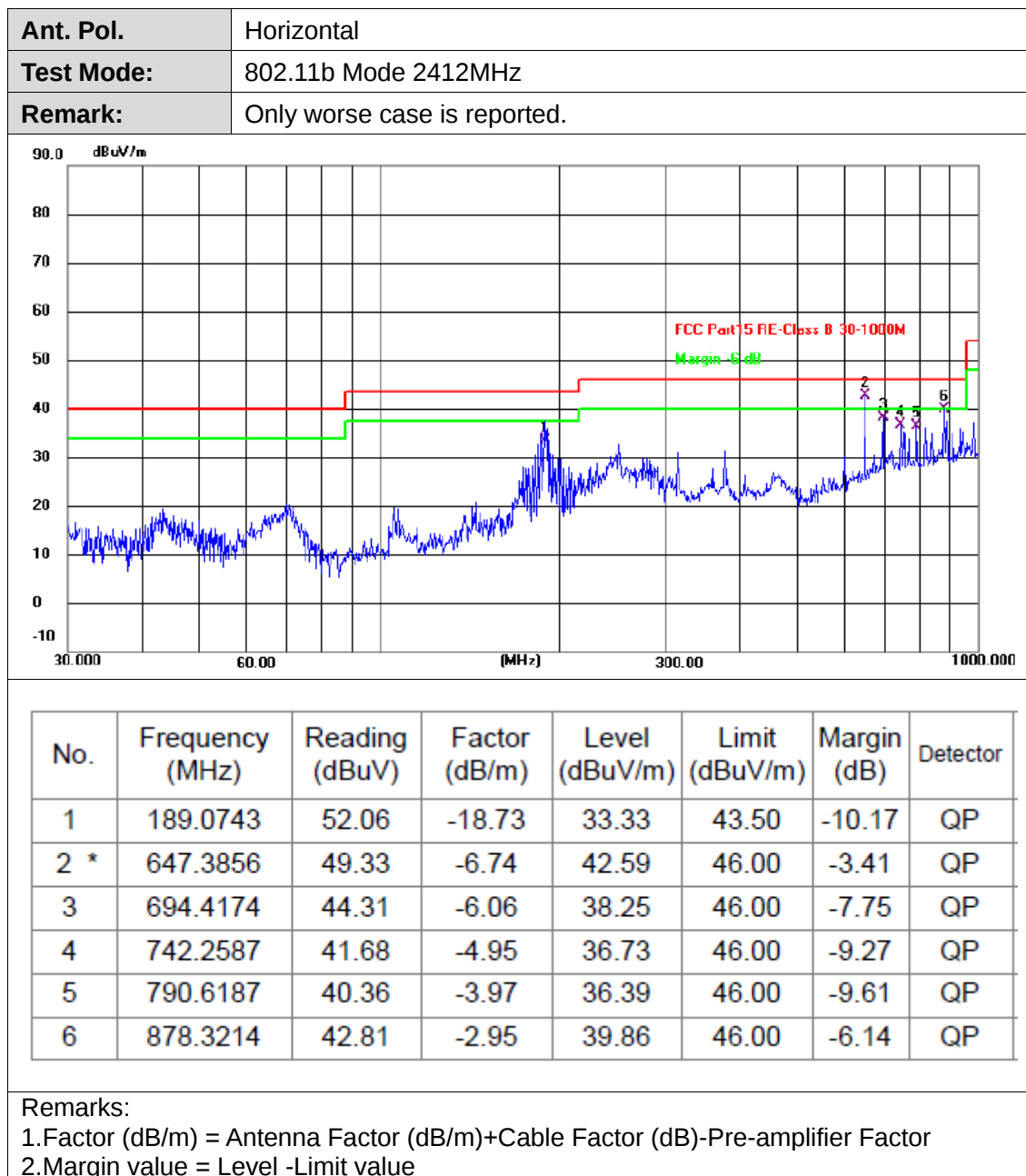
#### 9 KHz~30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

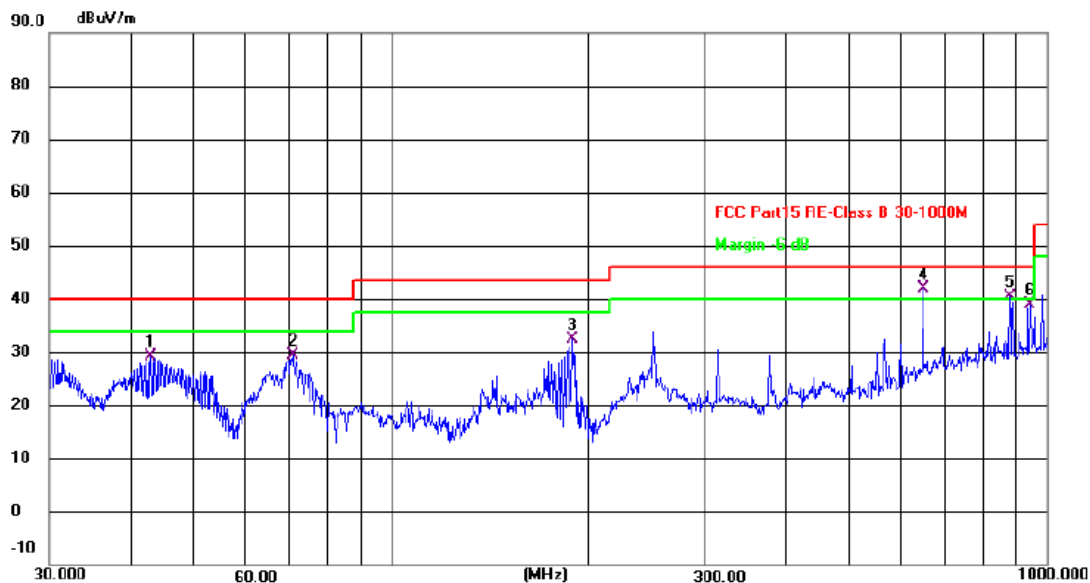


## 30MHz-1GHz





|            |                              |
|------------|------------------------------|
| Ant. Pol.  | Vertical                     |
| Test Mode: | 802.11b Mode 2412MHz         |
| Remark:    | Only worse case is reported. |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 42.8997         | 45.09          | -16.05        | 29.04          | 40.00          | -10.96      | QP       |
| 2   | 70.7400         | 48.27          | -18.98        | 29.29          | 40.00          | -10.71      | QP       |
| 3   | 188.4125        | 51.13          | -18.66        | 32.47          | 43.50          | -11.03      | QP       |
| 4 * | 647.3856        | 48.52          | -6.74         | 41.78          | 46.00          | -4.22       | QP       |
| 5 ! | 878.3214        | 43.29          | -2.95         | 40.34          | 46.00          | -5.66       | QP       |
| 6   | 942.1304        | 40.66          | -1.85         | 38.81          | 46.00          | -7.19       | QP       |

## Remarks:

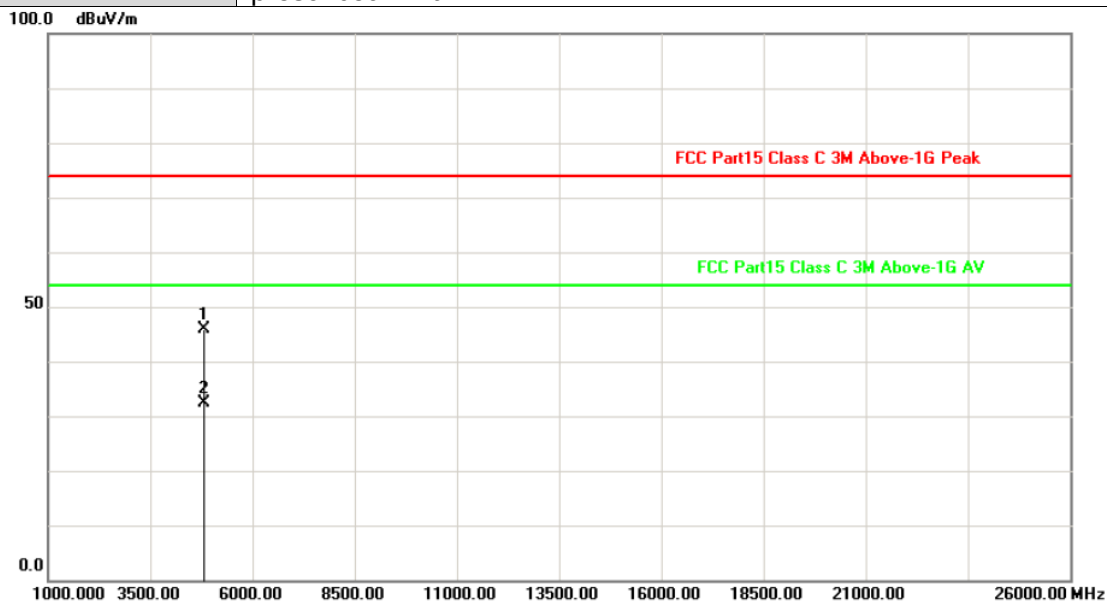
1. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor

2. Margin value = Level - Limit value



## Adobe 1GHz

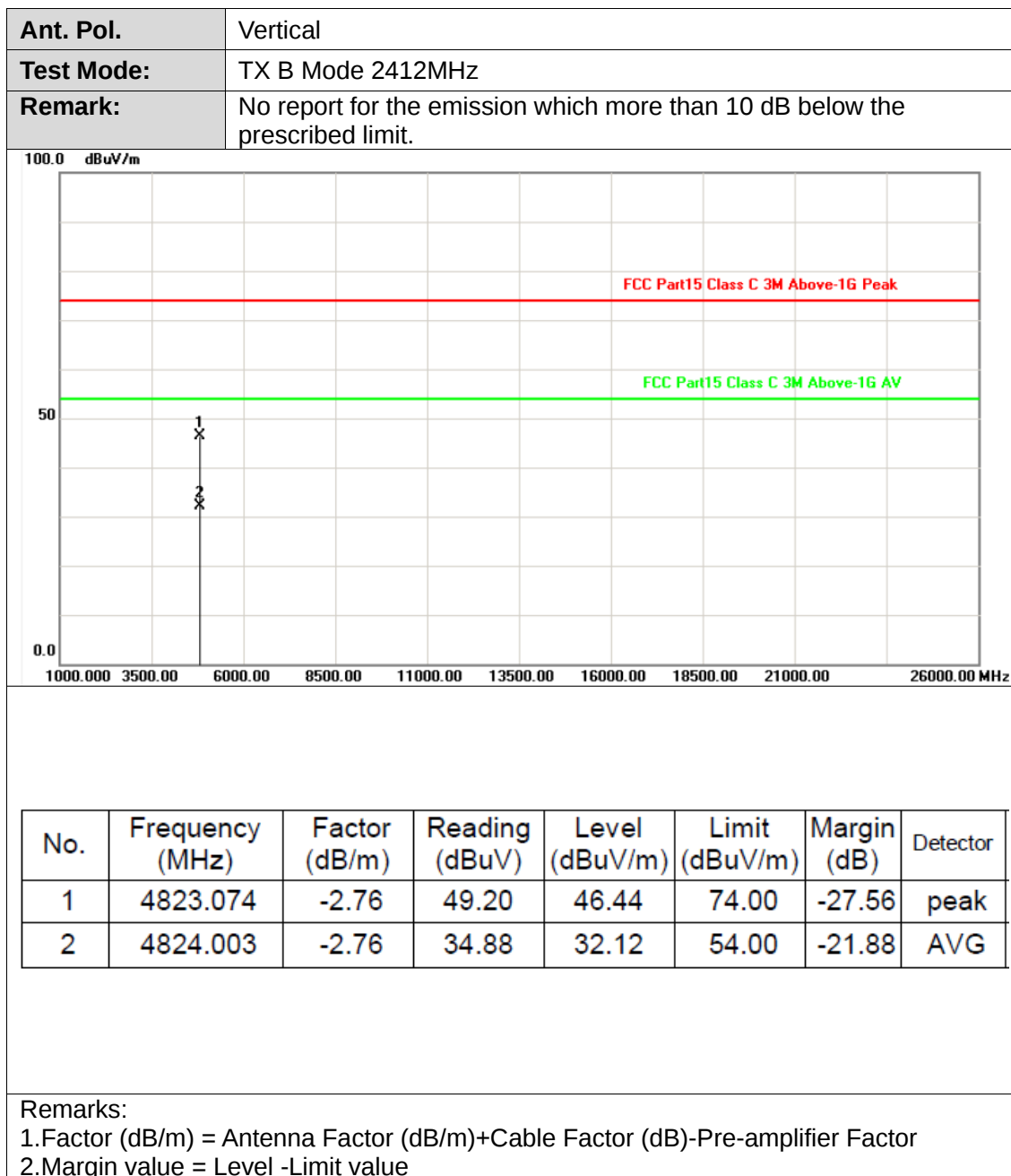
|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Horizontal                                                                   |
| Test Mode: | TX B Mode 2412MHz                                                            |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4824.340        | -2.76         | 48.56          | 45.80          | 74.00          | -28.20      | peak     |
| 2   | 4824.968        | -2.76         | 35.12          | 32.36          | 54.00          | -21.64      | AVG      |

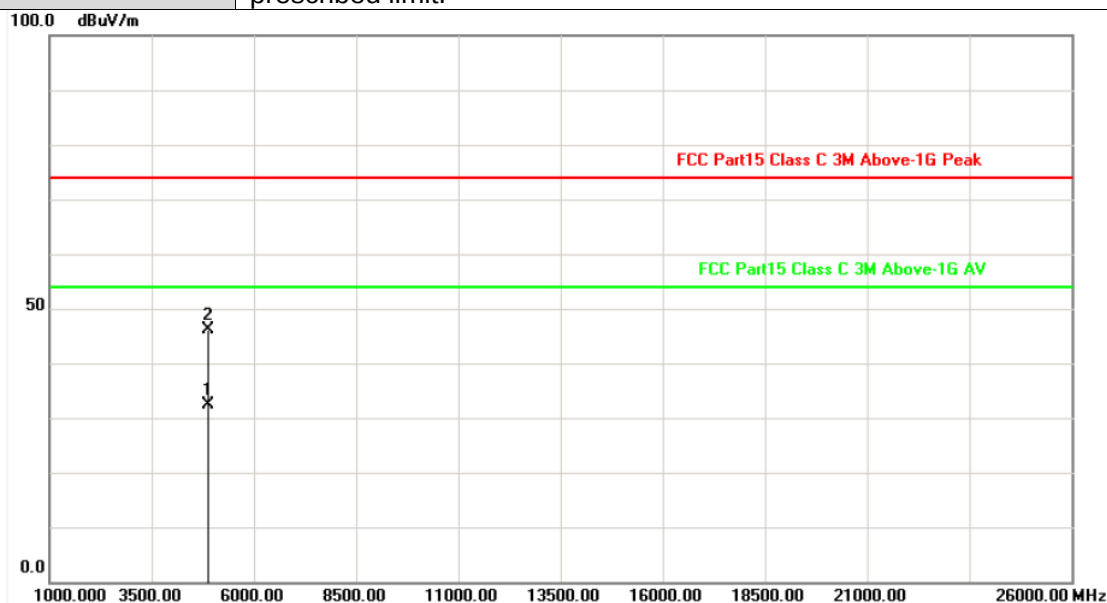
## Remarks:

1. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
2. Margin value = Level - Limit value





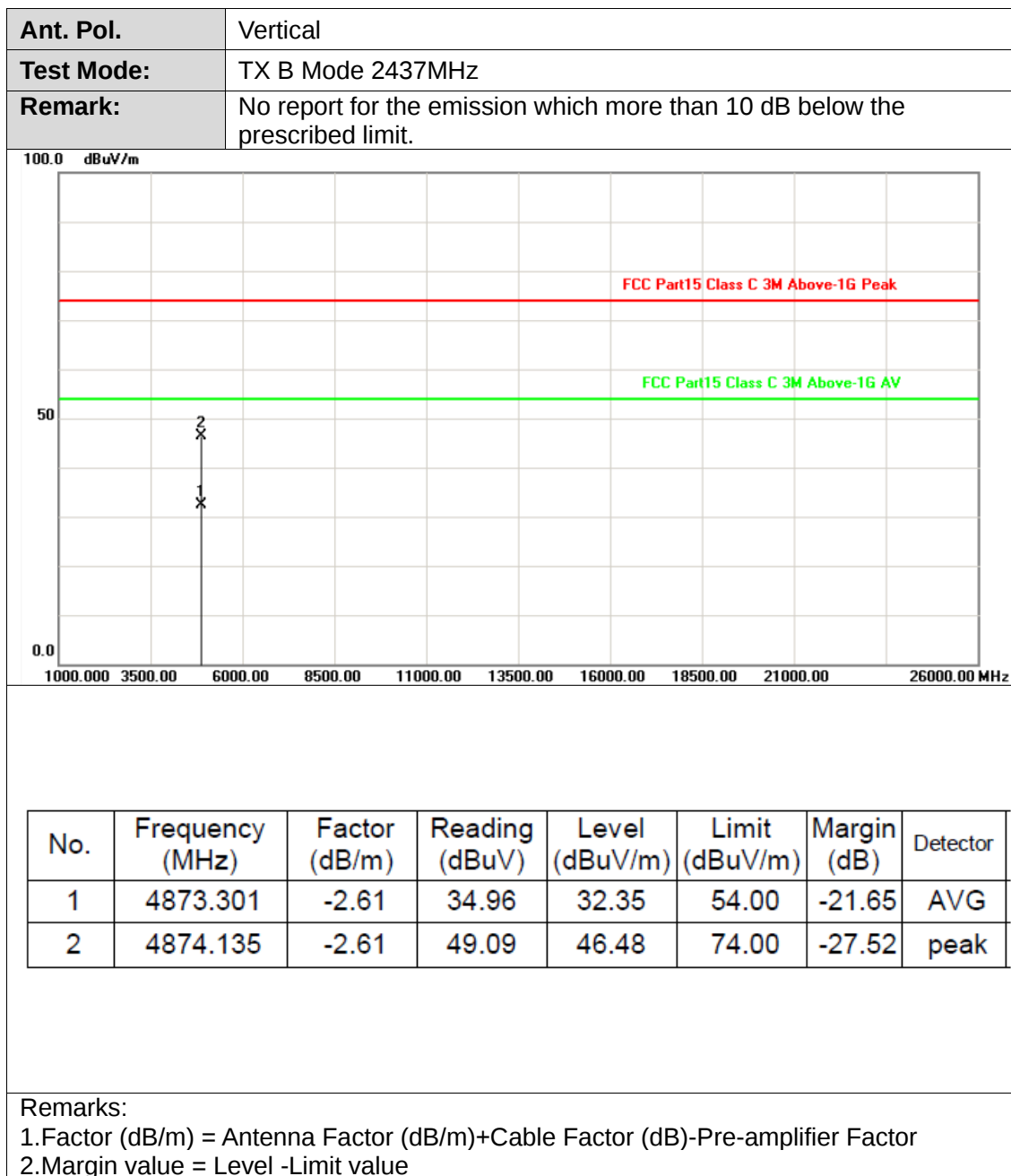
|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Horizontal                                                                   |
| Test Mode: | TX B Mode 2437MHz                                                            |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4874.218        | -2.61         | 34.97          | 32.36          | 54.00          | -21.64      | AVG      |
| 2   | 4874.984        | -2.61         | 48.82          | 46.21          | 74.00          | -27.79      | peak     |

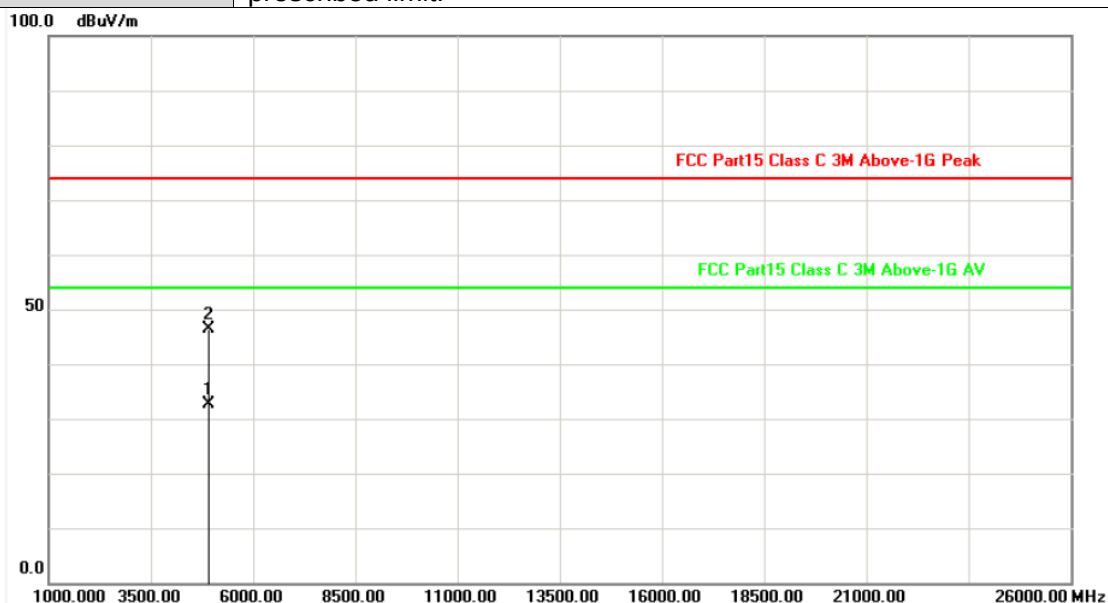
## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value





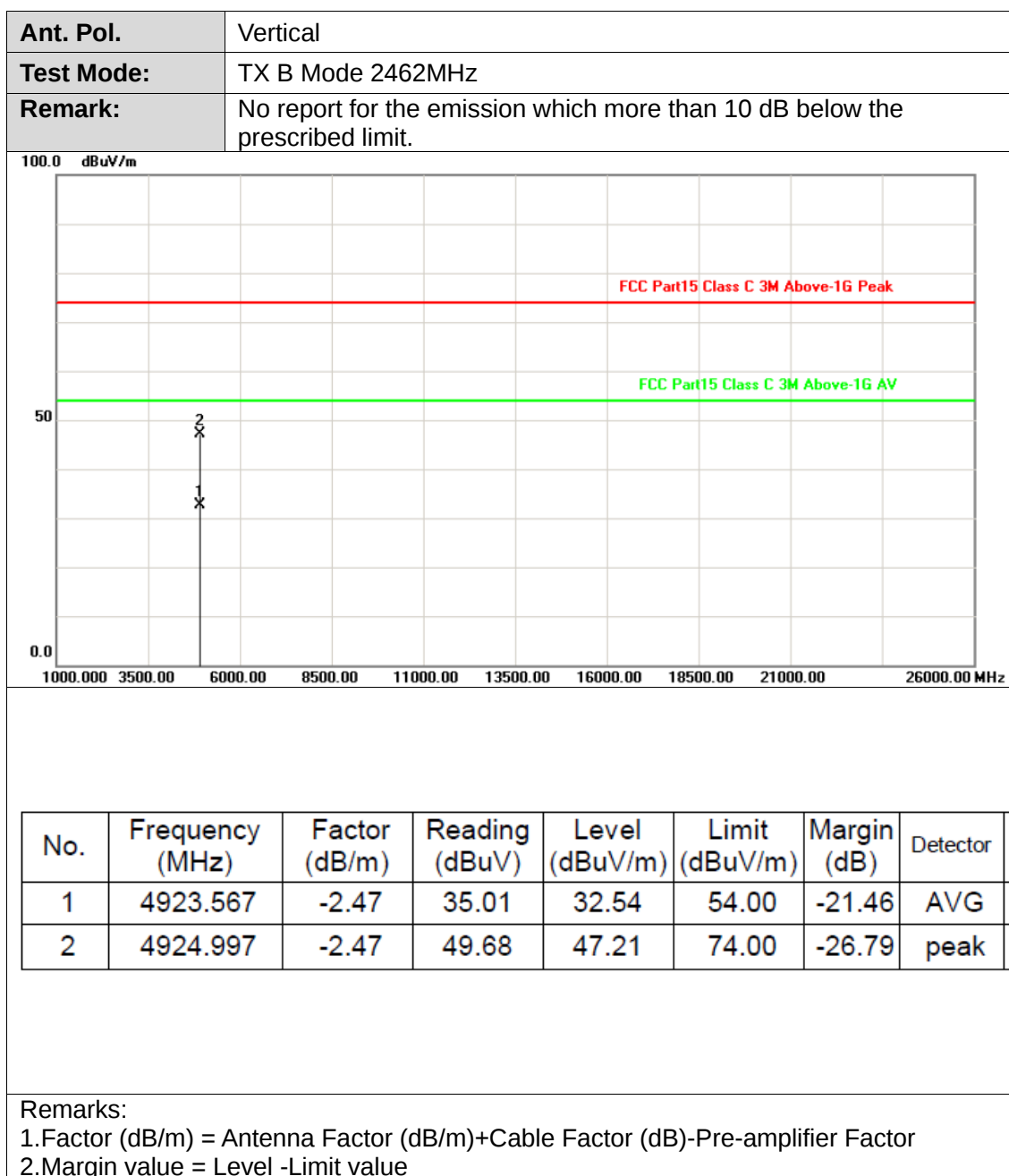
|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Horizontal                                                                   |
| Test Mode: | TX B Mode 2462MHz                                                            |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4923.724        | -2.47         | 34.99          | 32.52          | 54.00          | -21.48      | AVG      |
| 2   | 4924.000        | -2.47         | 48.80          | 46.33          | 74.00          | -27.67      | peak     |

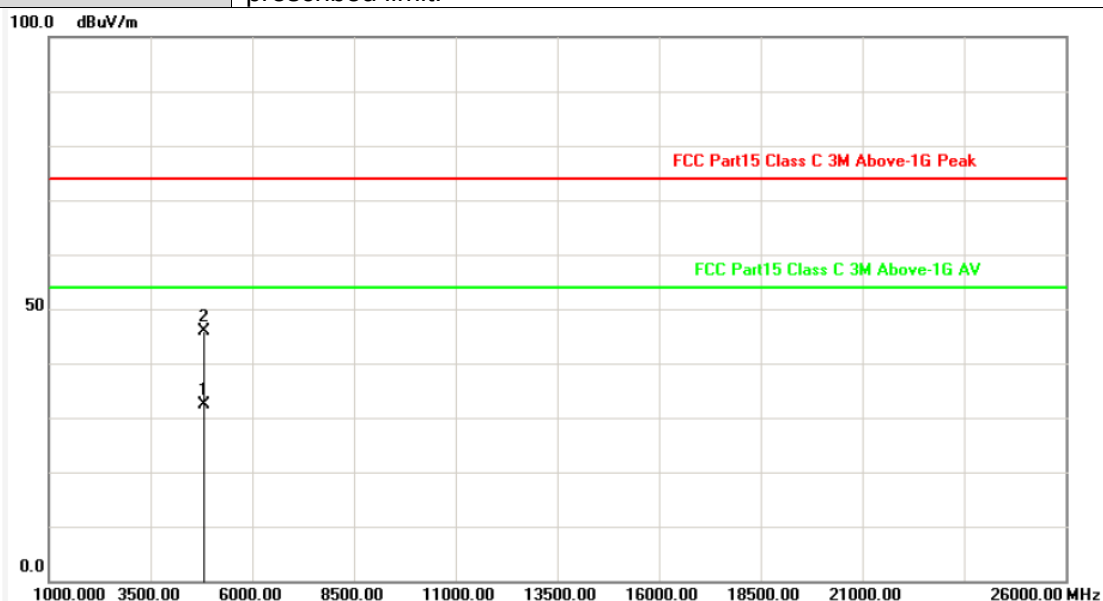
## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value





|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Horizontal                                                                   |
| Test Mode: | TX G Mode 2412MHz                                                            |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



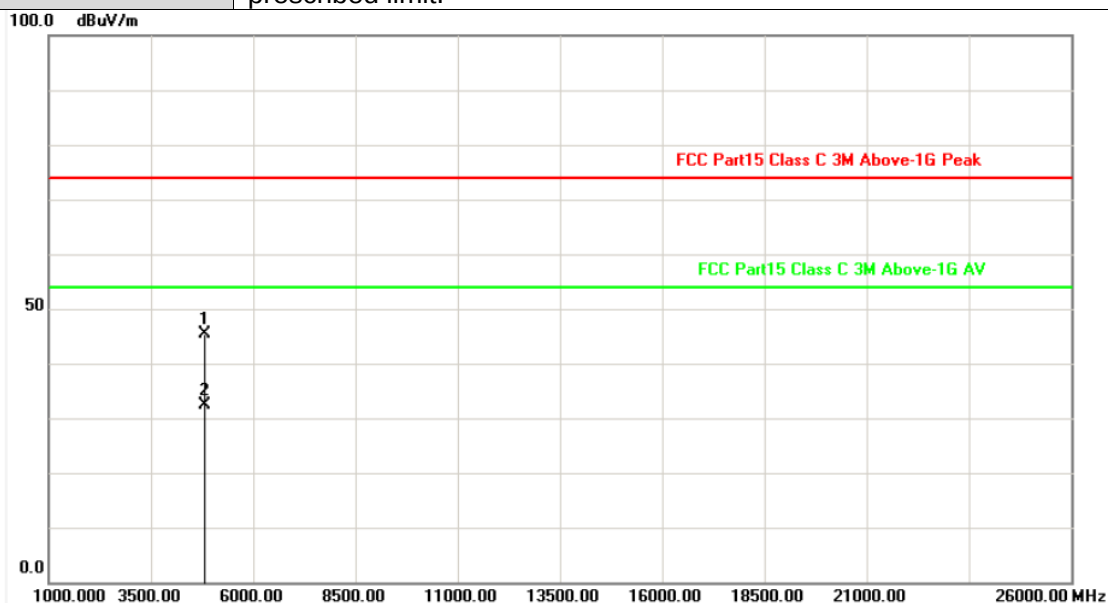
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4823.756        | -2.76         | 35.11          | 32.35          | 54.00          | -21.65      | AVG      |
| 2   | 4823.994        | -2.76         | 48.70          | 45.94          | 74.00          | -28.06      | peak     |

## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value



|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Vertical                                                                     |
| Test Mode: | TX G Mode 2412MHz                                                            |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



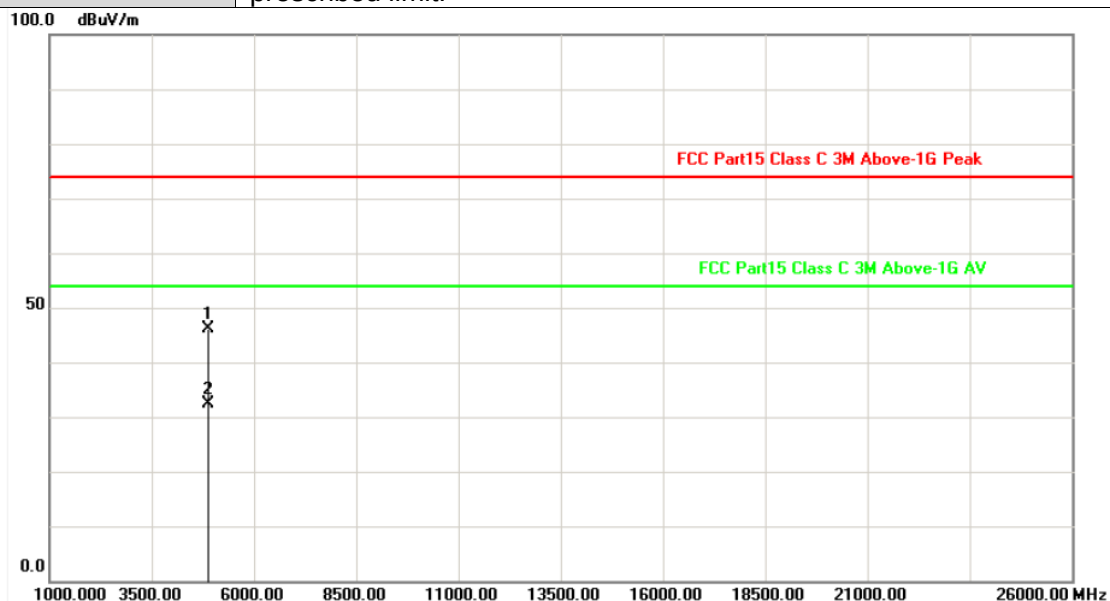
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4824.035        | -2.76         | 48.13          | 45.37          | 74.00          | -28.63      | peak     |
| 2   | 4824.369        | -2.76         | 35.08          | 32.32          | 54.00          | -21.68      | AVG      |

## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value



|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Horizontal                                                                   |
| Test Mode: | TX G Mode 2437MHz                                                            |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



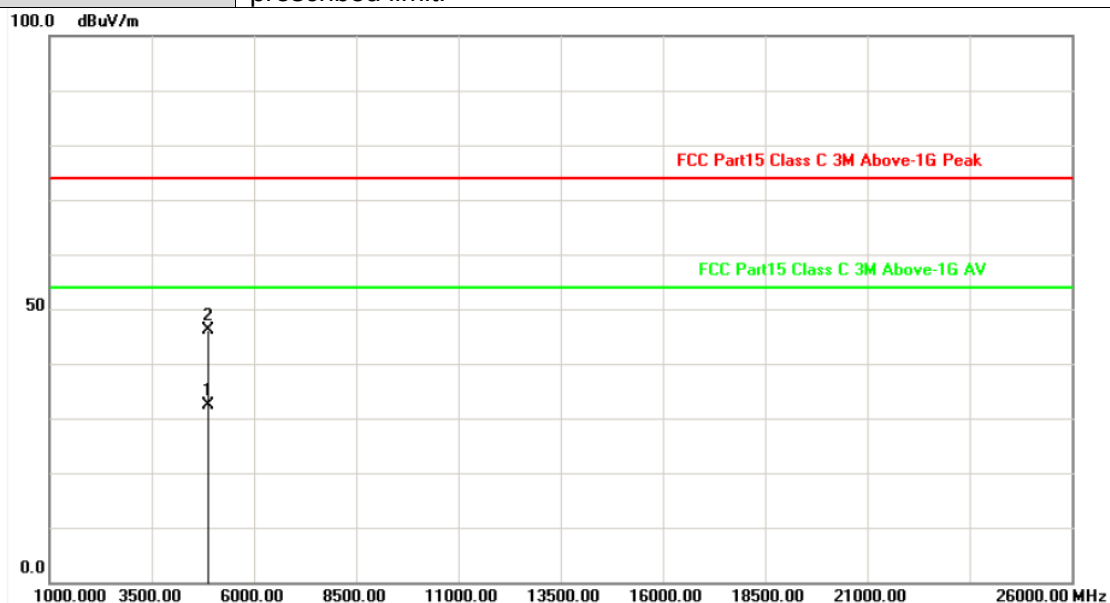
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4873.926        | -2.61         | 48.79          | 46.18          | 74.00          | -27.82      | peak     |
| 2   | 4874.458        | -2.61         | 35.11          | 32.50          | 54.00          | -21.50      | AVG      |

## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value



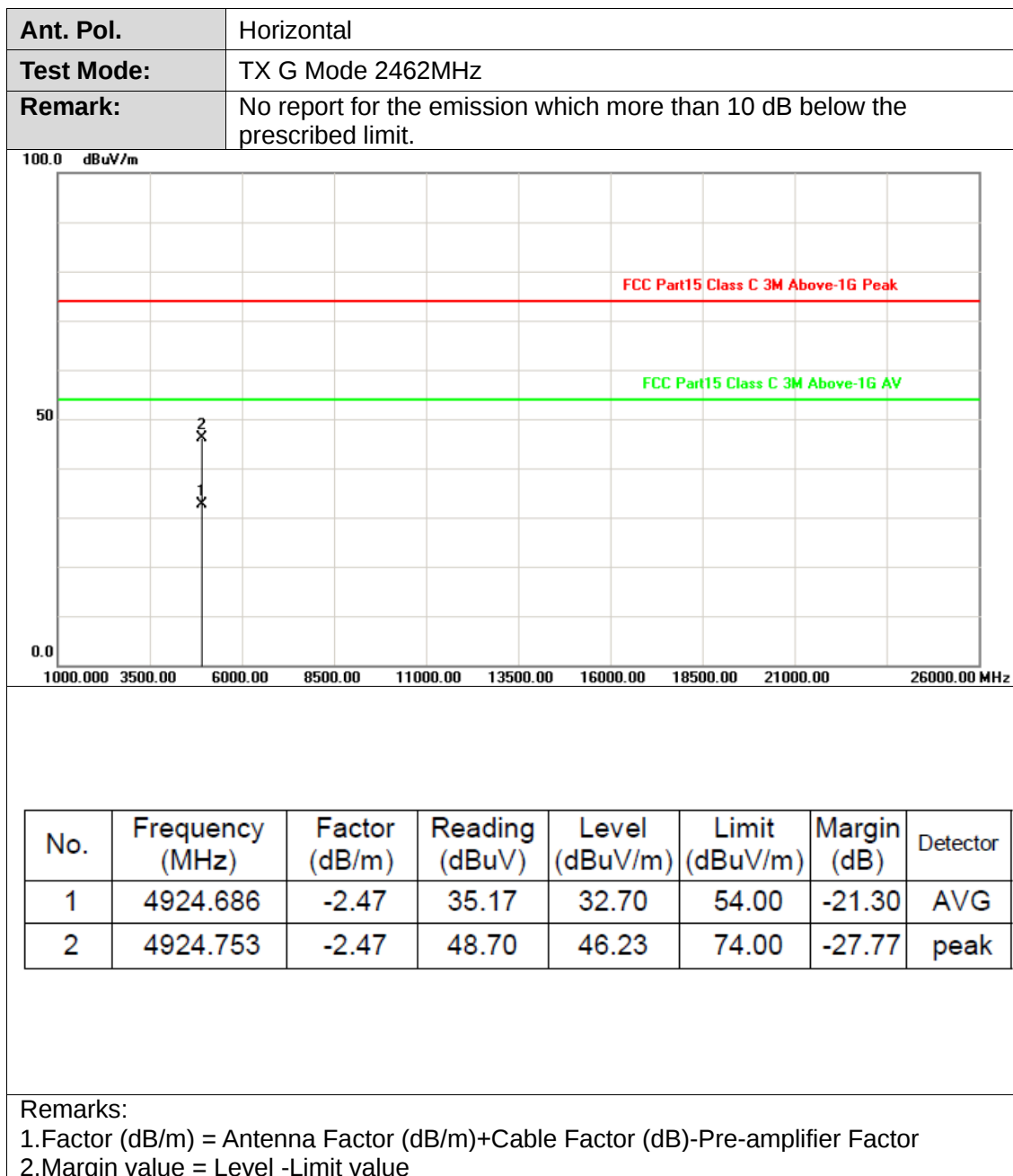
|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Vertical                                                                     |
| Test Mode: | TX G Mode 2437MHz                                                            |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |

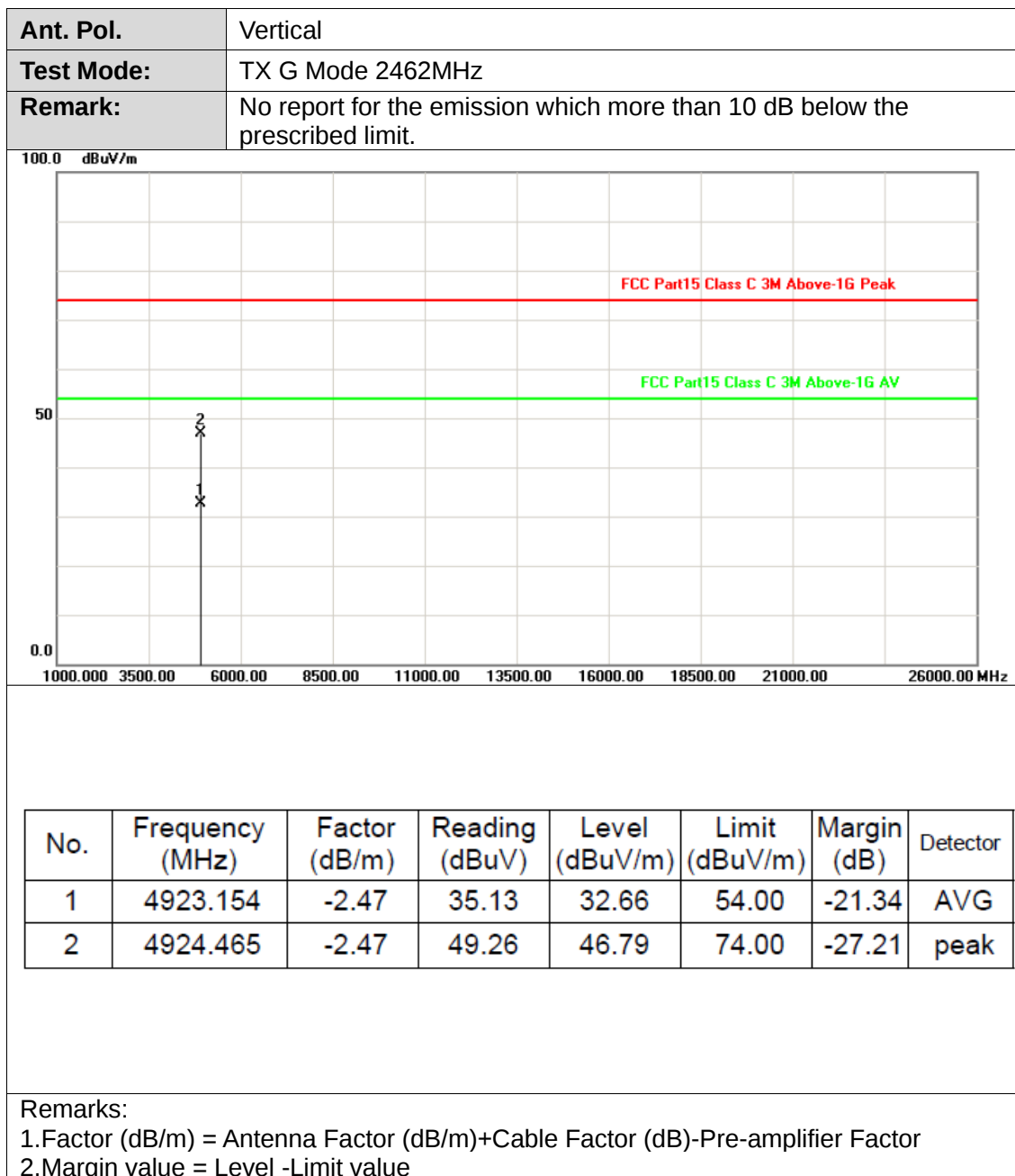


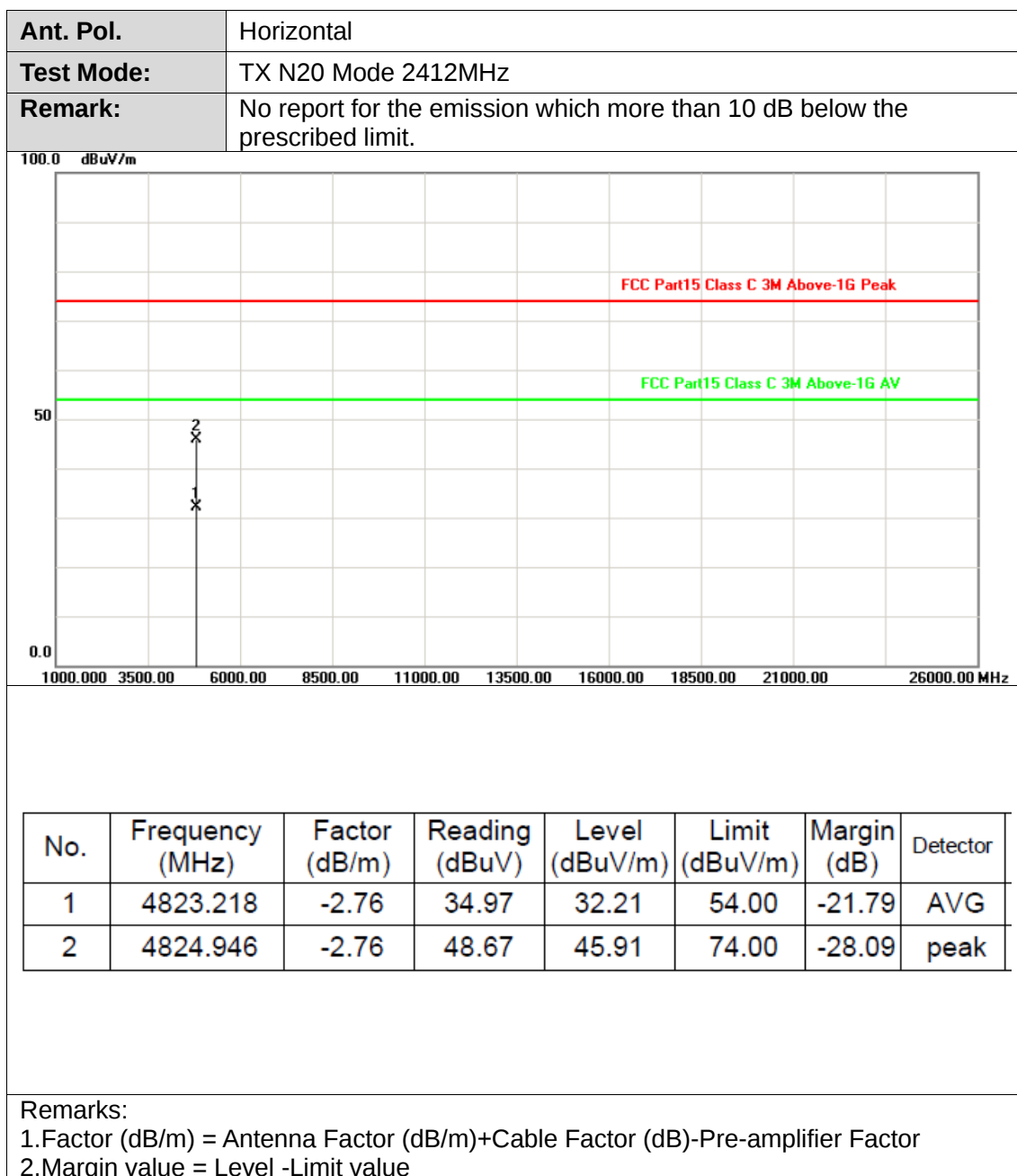
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4874.503        | -2.61         | 35.00          | 32.39          | 54.00          | -21.61      | AVG      |
| 2   | 4874.756        | -2.61         | 48.64          | 46.03          | 74.00          | -27.97      | peak     |

## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value

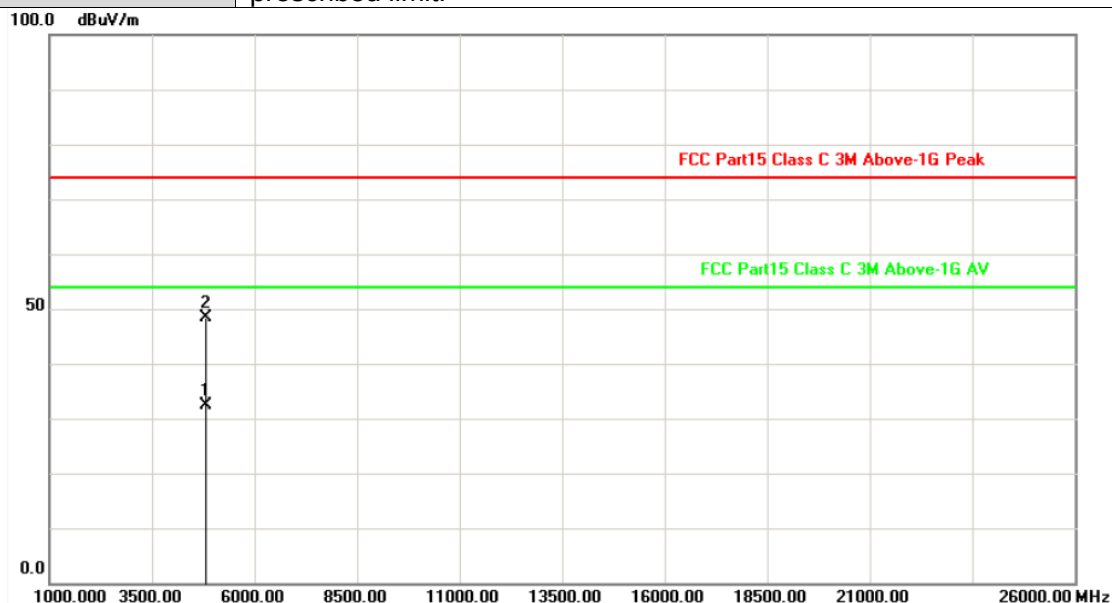








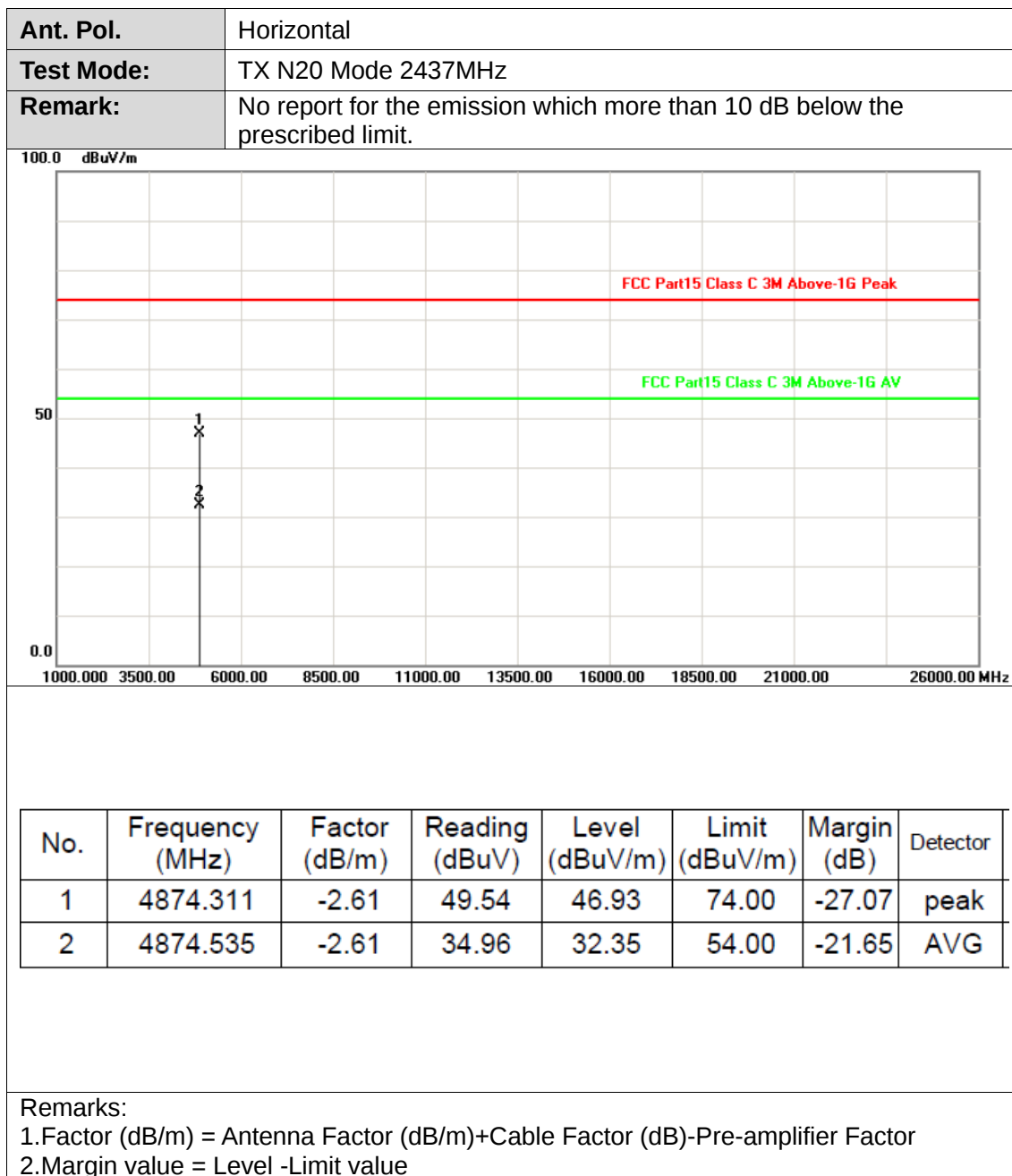
|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Vertical                                                                     |
| Test Mode: | TX N20 Mode 2412MHz                                                          |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4824.333        | -2.76         | 35.07          | 32.31          | 54.00          | -21.69      | AVG      |
| 2   | 4824.628        | -2.76         | 51.23          | 48.47          | 74.00          | -25.53      | peak     |

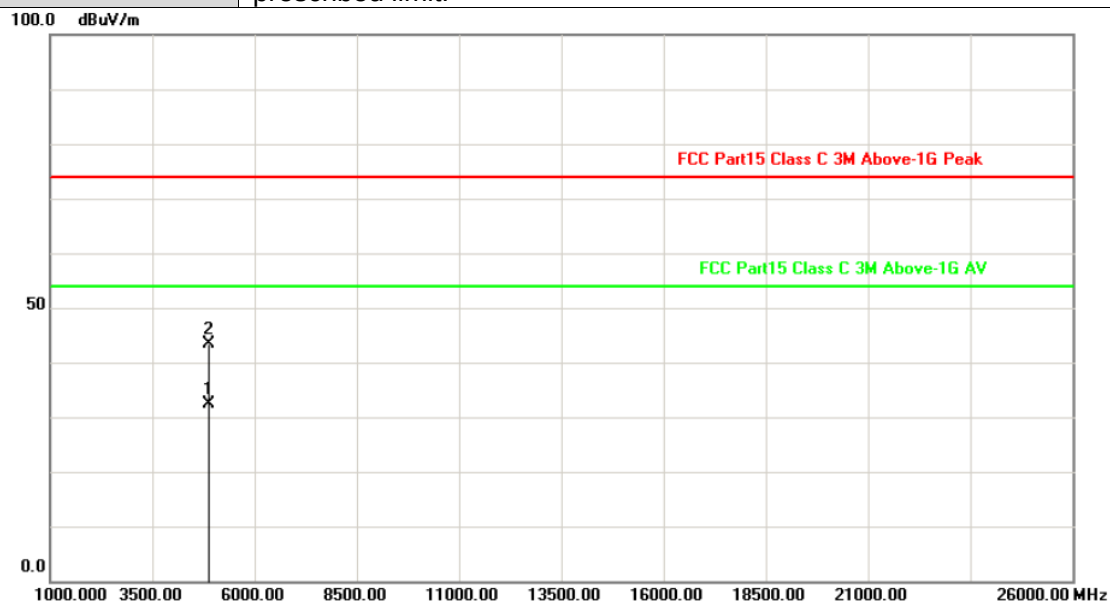
## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value





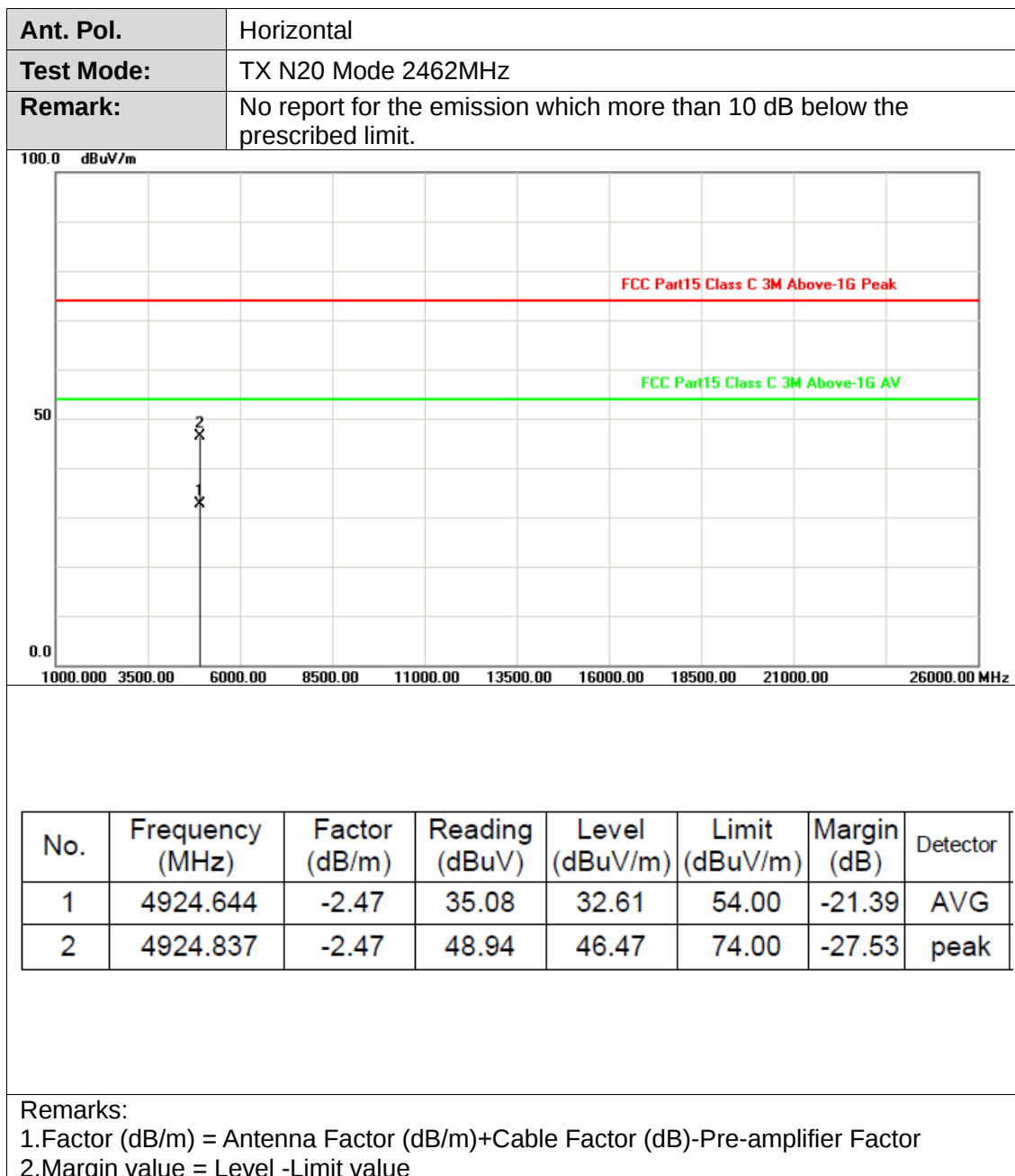
|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Vertical                                                                     |
| Test Mode: | TX N20 Mode 2437MHz                                                          |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4873.061        | -2.61         | 35.02          | 32.41          | 54.00          | -21.59      | AVG      |
| 2   | 4873.622        | -2.61         | 46.08          | 43.47          | 74.00          | -30.53      | peak     |

## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value





|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Vertical                                                                     |
| Test Mode: | TX N20 Mode 2462MHz                                                          |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |

100.0

dBuV/m

50

0.0

1000.00 3500.00 6000.00 8500.00 11000.00 13500.00 16000.00 18500.00 21000.00 26000.00 MHz

| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4923.869        | -2.47         | 48.83          | 46.36          | 74.00          | -27.64      | peak     |
| 2   | 4924.830        | -2.47         | 35.07          | 32.60          | 54.00          | -21.40      | AVG      |

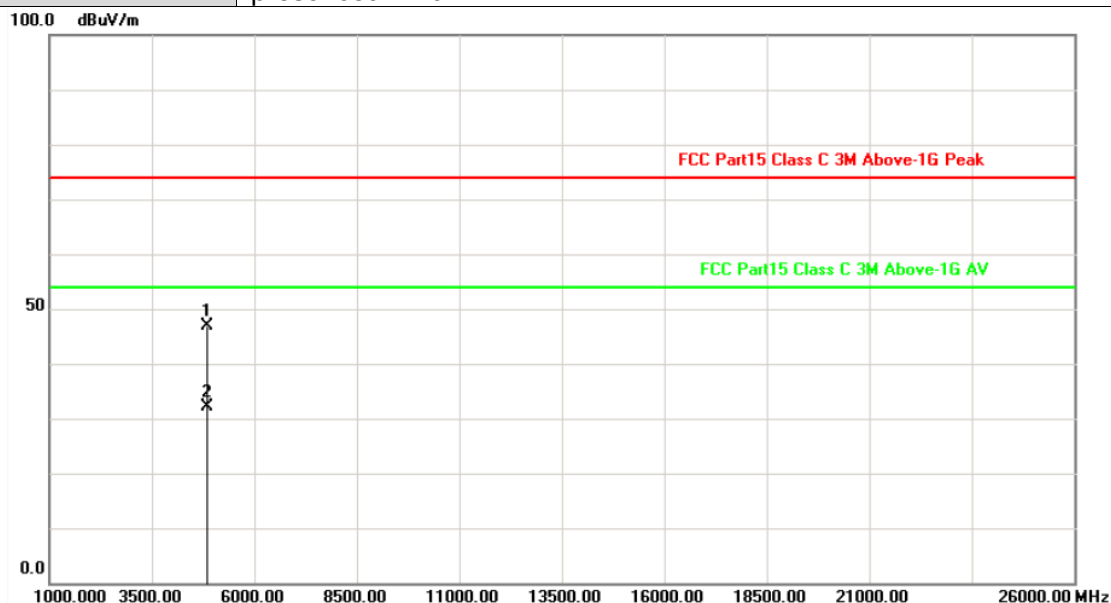
Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value



|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Horizontal                                                                   |
| Test Mode: | TX N40 Mode 2422MHz                                                          |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



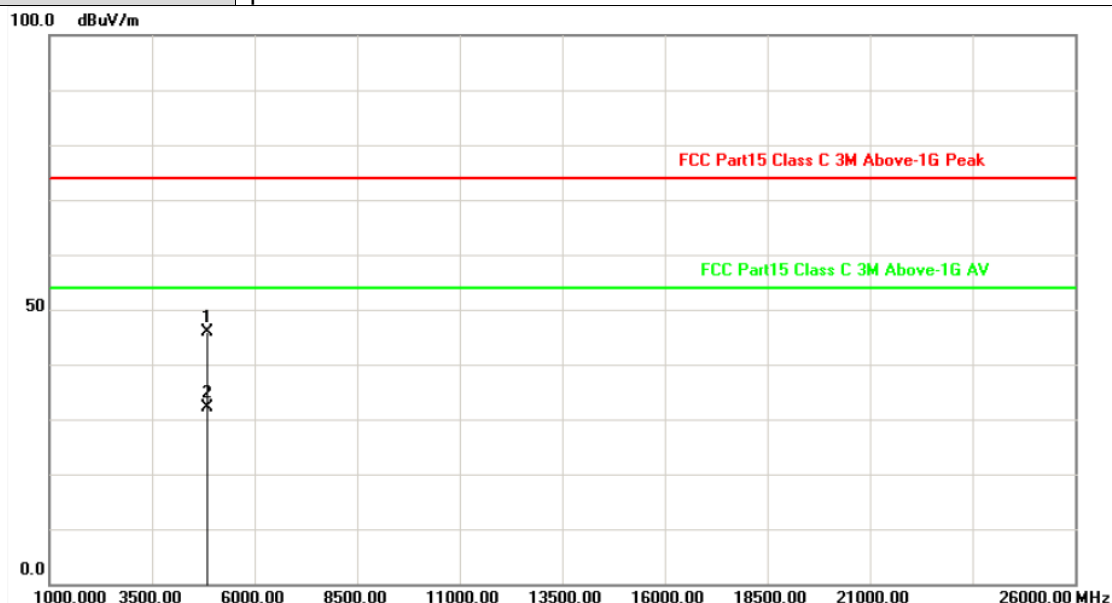
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4843.503        | -2.70         | 49.47          | 46.77          | 74.00          | -27.23      | peak     |
| 2   | 4843.657        | -2.70         | 34.93          | 32.23          | 54.00          | -21.77      | AVG      |

## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value



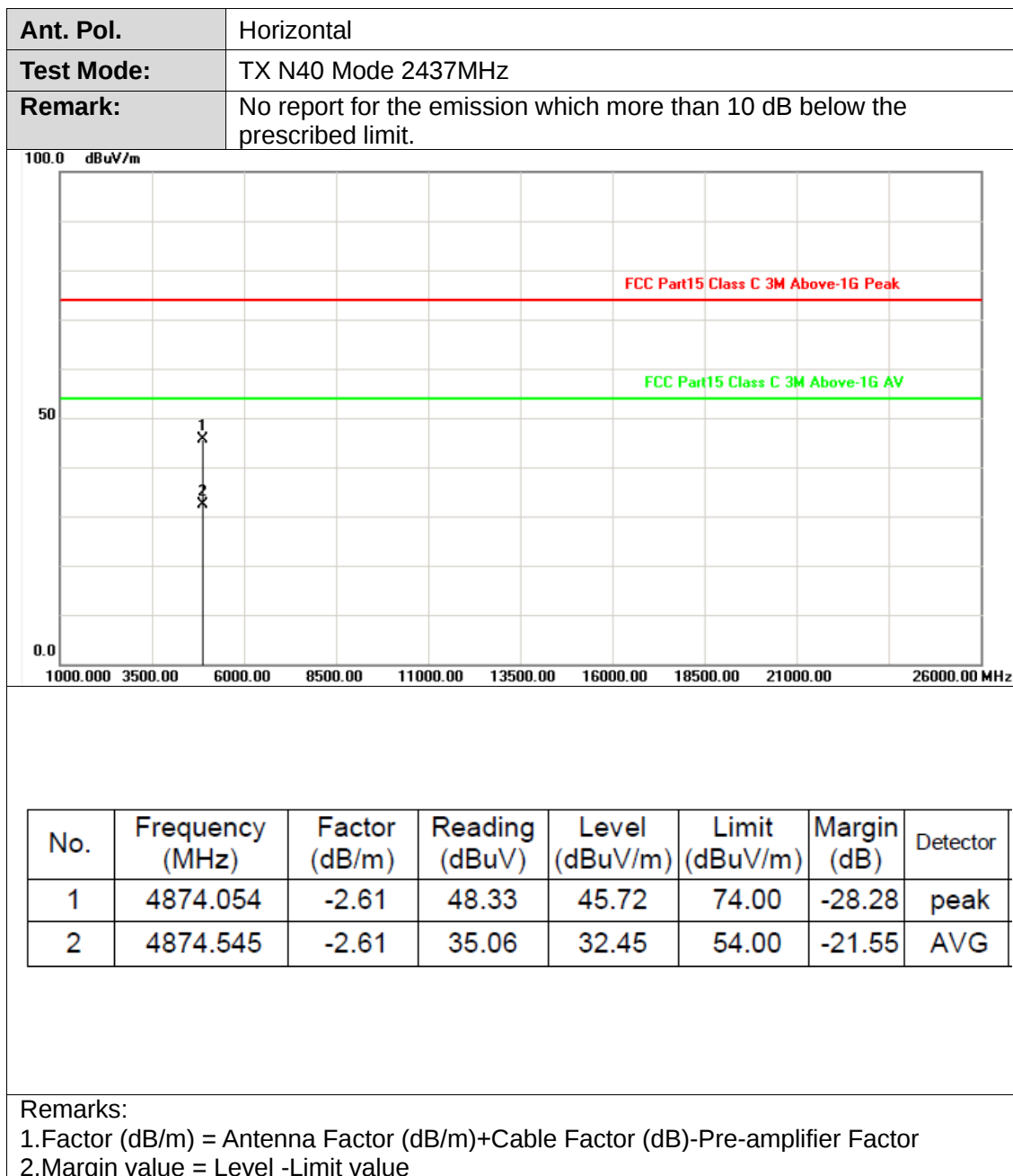
|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Vertical                                                                     |
| Test Mode: | TX N40 Mode 2422MHz                                                          |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |

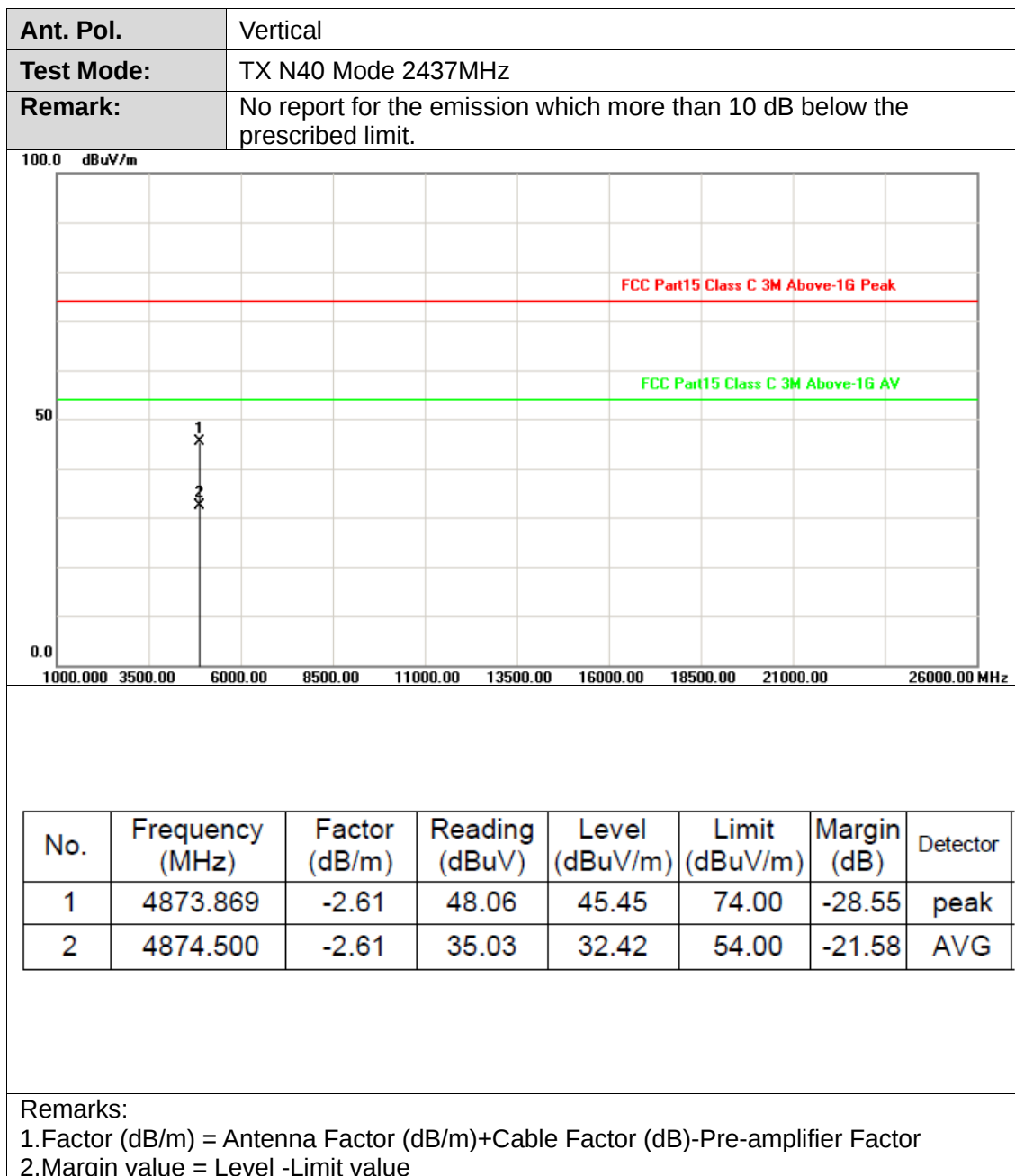


| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4844.692        | -2.70         | 48.47          | 45.77          | 74.00          | -28.23      | peak     |
| 2   | 4844.875        | -2.70         | 34.92          | 32.22          | 54.00          | -21.78      | AVG      |

## Remarks:

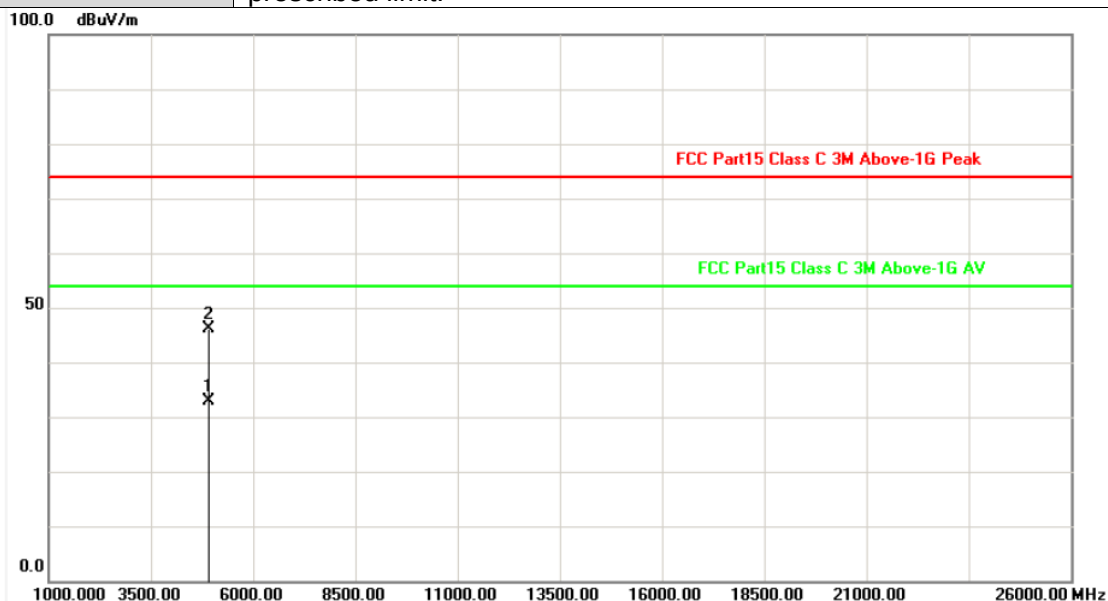
- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value







|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Horizontal                                                                   |
| Test Mode: | TX N40 Mode 2452MHz                                                          |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



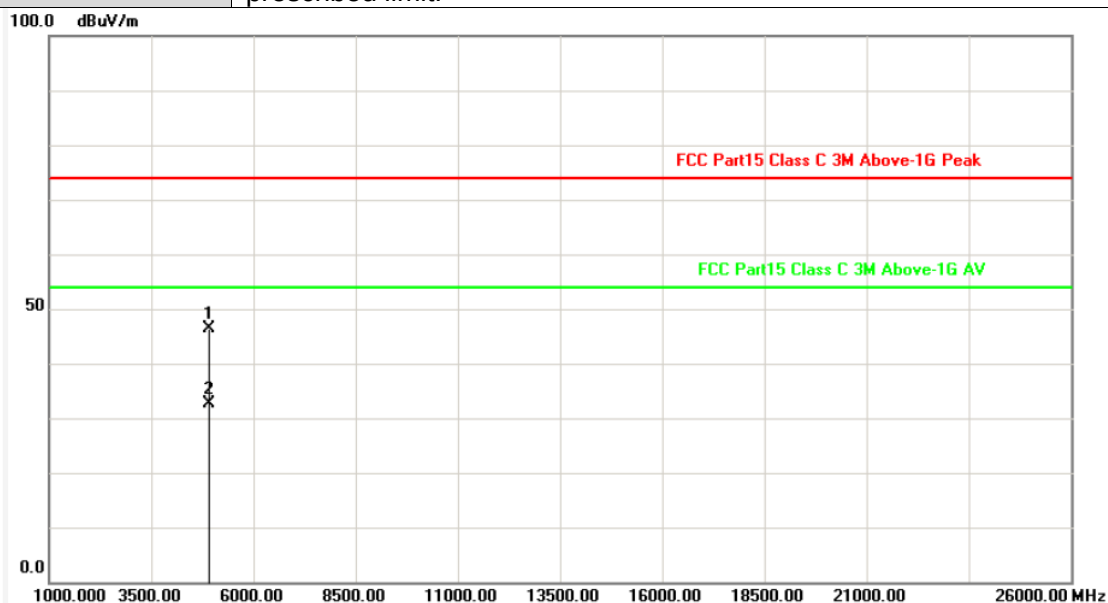
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4904.715        | -2.53         | 35.33          | 32.80          | 54.00          | -21.20      | AVG      |
| 2   | 4904.801        | -2.53         | 48.66          | 46.13          | 74.00          | -27.87      | peak     |

## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value



|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Ant. Pol.  | Vertical                                                                     |
| Test Mode: | TX N40 Mode 2452MHz                                                          |
| Remark:    | No report for the emission which more than 10 dB below the prescribed limit. |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|
| 1   | 4903.676        | -2.53         | 48.97          | 46.44          | 74.00          | -27.56      | peak     |
| 2   | 4903.872        | -2.53         | 35.15          | 32.62          | 54.00          | -21.38      | AVG      |

## Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value

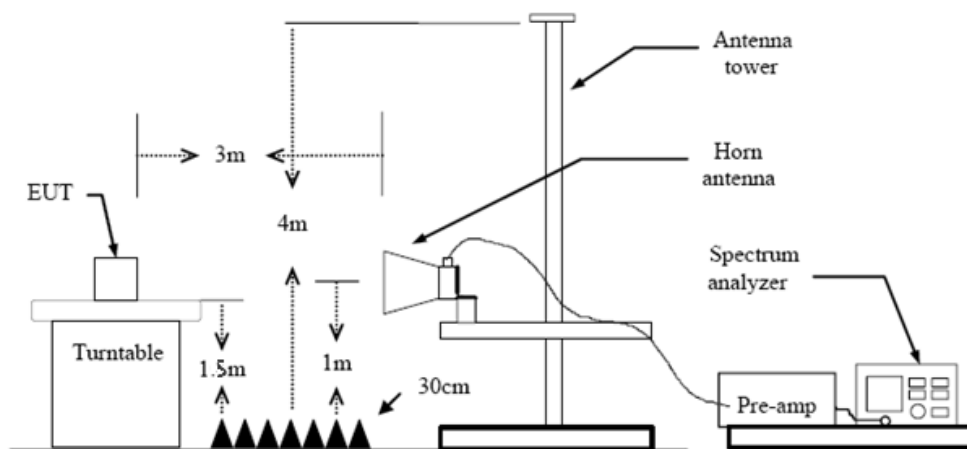
### 3.3. Band Edge Emissions (Radiated)

#### Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d)/ RSS-247 5.5:

| Restricted Frequency Band (MHz) | (dBuV/m)(at 3m) |         |
|---------------------------------|-----------------|---------|
|                                 | Peak            | Average |
| 2310 ~2390                      | 74              | 54      |
| 2483.5 ~2500                    | 74              | 54      |

#### Test Configuration



#### Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:  
RBW=1MHz, VBW=3MHz Peak detector for Peak value.  
RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.7 Duty Cycle.

#### Test Mode

Please refer to the clause 2.4.

**Test Results**