



# FCC RADIO TEST REPORT

Applicant : Guangzhou Bresser Optical Instruments Co., Ltd.

Address : Kangda Rd. 12, Yunpu Ind. Area, Huangpu,  
Guangzhou, PRC

Equipment : 4-days Smart weather station

Model No. : WSH4103

Trade Name : 

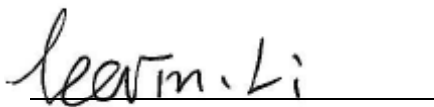
FCC ID. : 2AE3N-WSH4103

Standard : FCC part 15 Subpart C §15.247

## I HEREBY CERTIFY THAT :

The sample was received on May 18, 2022 and the testing was completed on May 27, 2022 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

  
Leevin Li / Supervisor



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History of this test report

■ Original.

□ Additional attachment as following record:

| Attachment No. | Issue Date   | Description   |
|----------------|--------------|---------------|
| DEF12203163    | May 31, 2022 | Initial Issue |
|                |              |               |
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|                |              |               |
|                |              |               |



## 1. Summary of Test Procedure and Test Results

### 1.1 Applicable Standards

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.247

| FCC Rule                                                                                                                                                                                                                                                                                                                    | Description of Test                | Result |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------|
| FCC CFR Title 47 Part 15 Subpart C:<br>Section 15.203/15.247 (b)                                                                                                                                                                                                                                                            | . Antenna Requirement              | Pass   |
| FCC CFR Title 47 Part 15 Subpart C:<br>Section 15.207                                                                                                                                                                                                                                                                       | . AC Power Line Conducted Emission | Pass   |
| FCC CFR Title 47 Part 15 Subpart C:<br>Section 15.205/15.209;                                                                                                                                                                                                                                                               | . Spurious Emission(Radiated)      | Pass   |
| FCC CFR Title 47 Part 15 Subpart C:<br>Section 15.247(d);                                                                                                                                                                                                                                                                   | . Spurious Emission(Conducted)     | Pass   |
| FCC CFR Title 47 Part 15 Subpart C:<br>Section 15.247(a)(2);                                                                                                                                                                                                                                                                | . 6dB Bandwidth                    | Pass   |
| FCC CFR Title 47 Part 15 Subpart C:<br>Section 15.247(b);                                                                                                                                                                                                                                                                   | . Maximum Peak Output Power        | Pass   |
| FCC CFR Title 47 Part 15 Subpart C:<br>Section 15.247(e)                                                                                                                                                                                                                                                                    | . Power Spectral Density           | Pass   |
| Note: Deviations    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/><br>*The lab has reduced the uncertainty risk factor from test equipment, environment and staff technicians which according to the standard on contract. Therefore, the test result will only be determined by standard requirement. |                                    |        |



## 2. Test Configuration of Equipment under Test

### 2.1 Feature of Equipment under Test

|                   |                                                                                                                           |
|-------------------|---------------------------------------------------------------------------------------------------------------------------|
| Equipment         | 4-days Smart weather station                                                                                              |
| Model Name        | WSH4103                                                                                                                   |
| Model Discrepancy | N/A                                                                                                                       |
| Frequency Range   | WIFI 2.4G: 2400MHz-2483.5MHz                                                                                              |
| Modulation Type   | 2.4GHz<br>802.11b: CCK, DQPSK, DBPSK<br>802.11g/n: BPSK, QPSK, 16QAM, 64QAM                                               |
| Data Rate         | WIFI 2.4GHz:<br>802.11b: 1, 2, 5.5, 11Mbps<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps<br>802.11n: MCS0-MCS15, HT20/HT40 |
| Antenna Type      | PCB Antenna                                                                                                               |
| Antenna Gain.     | For Wlan<br>2400~2483.5MHz:<br>ANT A: 2.2dBi                                                                              |
| Adapter           | Model: HS06-0501000US<br>Input: 100-240V~ 50/60Hz 0.2A Max<br>Output: 5.0V---1.0A 5.0W                                    |
| Temperature Range | -10℃~+50℃                                                                                                                 |

Note: for more details, please refer to the User's manual of the EUT.

### 2.2 Carrier Frequency of Channels

802.11b, 802.11g, 802.11n HT 20 (2412MHz~2462MHz)

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

802.11n HT40 (2422MHz~2452MHz)

| Channel    | Frequency(MHz) | Channel    | Frequency(MHz) |
|------------|----------------|------------|----------------|
| ---        | ---            | 07         | 2442           |
| ---        | ---            | 08         | 2447           |
| <b>*03</b> | <b>2422</b>    | <b>*09</b> | <b>2452</b>    |
| 04         | 2427           | ---        | ---            |
| 05         | 2432           | ---        | ---            |
| <b>*06</b> | <b>2437</b>    | ---        | ---            |

Note: Channels remarked \* are selected to perform test.



## 2.3 Test Mode and Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.10.
- The complete test system included Remote workstation and EUT for the RF test.
- An executive program, "WifiTestTool(v1.5.2).exe" under Windows 7 system was executed to transmit and receive data via WLAN.
- The following test modes were performed for the test:

| Conducted Emissions from the AC mains power ports                                                 |                                  |
|---------------------------------------------------------------------------------------------------|----------------------------------|
| Test Mode                                                                                         | Operating Description            |
| 1                                                                                                 | 802.11b (1Mbps) for 120V         |
| 2                                                                                                 | 802.11g (6Mbps) for 120V         |
| 3                                                                                                 | 802.11n HT20 (6.5Mbps) for 120V  |
| 4                                                                                                 | 802.11n HT40 (13.5Mbps) for 120V |
| 5                                                                                                 | 802.11g (6Mbps) for 240V         |
| caused "Test Mode 2 at CH01:2412" generated the worst case, it was reported as the final data.    |                                  |
| Radiation Emissions (30MHz ~ 1GHz)                                                                |                                  |
| Test Mode                                                                                         | Operating Description            |
| 1                                                                                                 | 802.11b (1Mbps)                  |
| 2                                                                                                 | 802.11g (6Mbps)                  |
| 3                                                                                                 | 802.11n HT20 (6.5Mbps)           |
| 4                                                                                                 | 802.11n HT40 (13.5Mbps)          |
| caused "Test Mode 2 at CH01:2412" generated the worst case, they were reported as the final data. |                                  |
| Radiated emission (above 1GHz)                                                                    |                                  |
| 1                                                                                                 | 802.11b (1Mbps)                  |
| 2                                                                                                 | 802.11g (6Mbps)                  |
| 3                                                                                                 | 802.11n HT20 (6.5Mbps)           |
| 4                                                                                                 | 802.11n HT40 (13.5Mbps)          |
| caused "Test Mode 1~4" generated the worst case, they were reported as the final data.            |                                  |

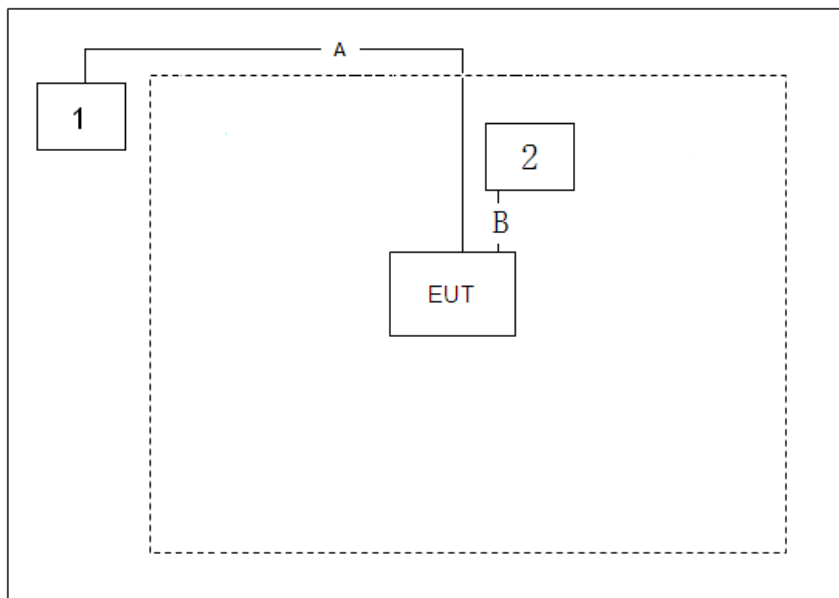
| Modulation Type | TX CONFIGURATION |
|-----------------|------------------|
| 802.11b         | 1TX              |
| 802.11g         | 1TX              |
| 802.11n HT20    | 1TX              |
| 802.11n HT40    | 1TX              |



## 2.4 Description of Test System

| Product    | Manufacturer | Model No.      | Power Cord         |
|------------|--------------|----------------|--------------------|
| 1 Notebook | SONY         | PCG-71811P     | Non-Shielded, 1.8m |
| 2 Adapter  | Bresser      | HS06-0501000EU | N/A                |

### Connection Diagram



| Signal Cable Type |           | Signal cable Description |
|-------------------|-----------|--------------------------|
| A                 | USB Cable | 5.0m Shielding           |
| B                 | DC Cable  | 1.7m Non-Shielding       |



## 2.5 General Information of Test

|                                  |                                                                                                                                                                                                                |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Site                        | <b>CerpPASS Technology Corporation(CerpPASS Laboratory)</b><br>Address: Room 102, No. 5, Xing'an Road, Chang'an Town,<br>Dongguan City, Guangdong Province<br>Tel: +86-769-8547-1212<br>Fax: +86-769-8547-1912 |
| FCC Designation No.:             | CN1288                                                                                                                                                                                                         |
| Frequency Range<br>Investigated: | Conducted: from 150kHz to 30 MHz<br>Radiation: from 30 MHz to 25,000MHz                                                                                                                                        |
| Test Distance:                   | The test distance of radiated emission from antenna to EUT is 3 M.                                                                                                                                             |

| Test Item                           | Test Site  | Test period | Environmental<br>Conditions | Tested By  |
|-------------------------------------|------------|-------------|-----------------------------|------------|
| RF Conducted                        | RFCON01-DG | 2022/05/23  | 23°C / 54%                  | Amos Zhang |
| Radiated Emissions                  | 3M01-DG    | 2022/05/26  | 24.7°C / 60%                | Amos Zhang |
| AC Power Line<br>Conducted Emission | CON01-DG   | 2022/05/27  | 26°C / 59%                  | Amos Zhang |

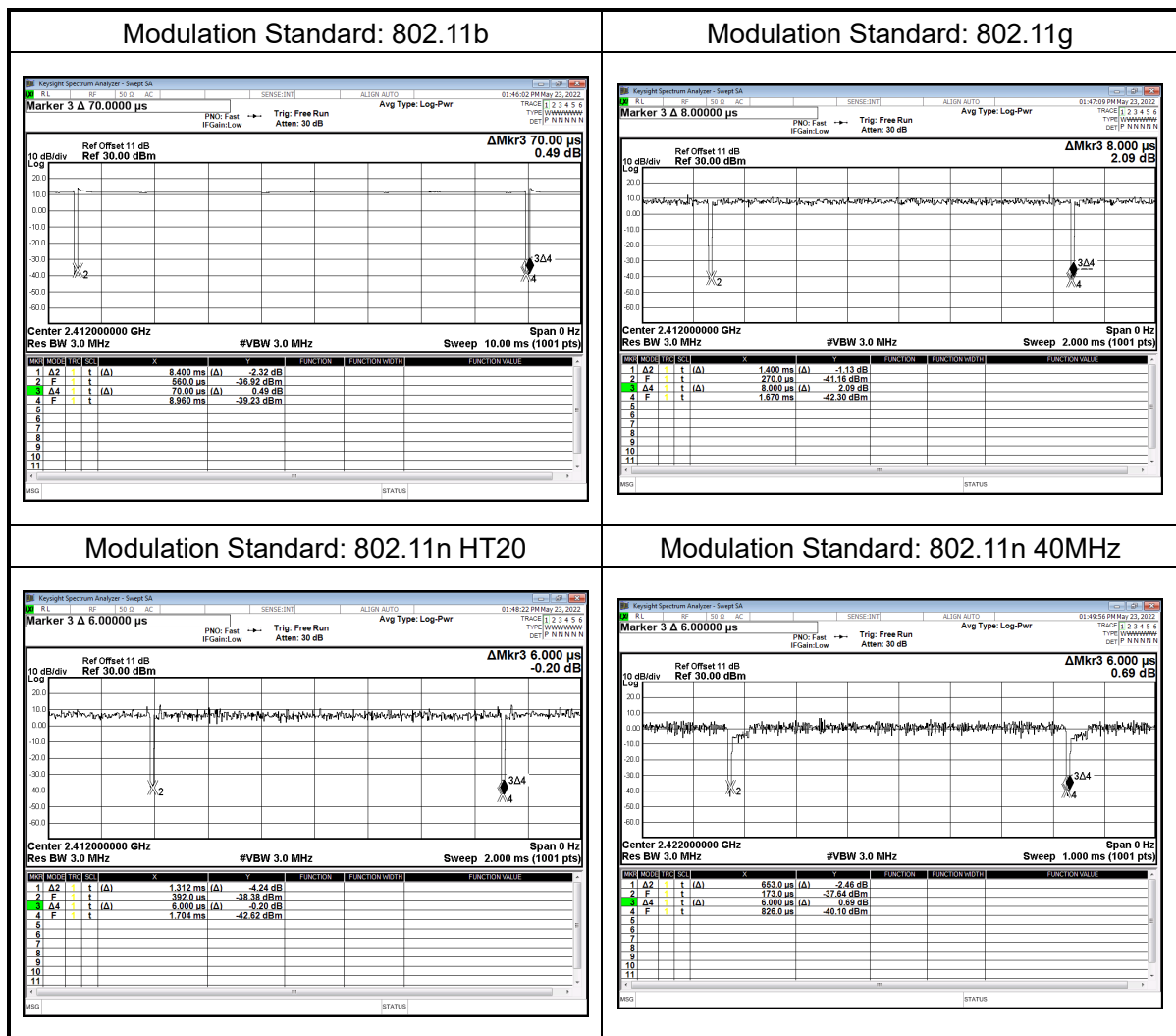
## 2.6 Measurement Uncertainty

| Measurement Item                         | Uncertainty |
|------------------------------------------|-------------|
| AC Power Line Conduction(150K~30MHz)     | ±3.15dB.    |
| Radiated Spurious Emission(9KHz~30MHz)   | ±4.39dB     |
| Radiated Spurious Emission(30MHz~1GHz)   | ±4.51dB     |
| Radiated Spurious Emission(1GHz~18GHz)   | ±5.34dB.    |
| Radiated Spurious Emission(18GHz~40GHz)  | ±5.43dB     |
| 6dB Bandwidth&26dB Bandwidth             | ±4.4%       |
| Occupied Bandwidth                       | ±4.4%       |
| Peak Output Power(Conducted Power Meter) | ±0.57 dB    |
| Power Spectral Density                   | ±1.01 dB    |
| Frequency Stability                      | ±99.743Hz   |



## 2.7 Duty cycle

| Modulation Type | On Time (msec) | Period Time (msec) | Duty Cycle (%) |
|-----------------|----------------|--------------------|----------------|
| 802.11b, 1M     | 8.40           | 8.47               | 99.17%         |
| 802.11g, 6M     | 1.40           | 1.41               | 99.43%         |
| 802.11n HT20    | 1.31           | 1.32               | 99.54%         |
| 802.11n HT40    | 0.65           | 0.66               | 99.09%         |





### 3. Test Equipment and Ancillaries Used for Tests

| AC Power Line Conducted Emission    |              |             |            |                  |             |
|-------------------------------------|--------------|-------------|------------|------------------|-------------|
| Instrument/Ancillary                | Manufacturer | Model No.   | Serial No. | Calibration Date | Valid Date. |
| Test Receiver                       | R&S          | ESCI        | 100564     | 2022.01.08       | 2023.01.07  |
| LISN                                | SCHWARZBECK  | NSLK 8127   | 8127748    | 2022.01.08       | 2023.01.07  |
| LISN                                | R&S          | ENV216      | 100024     | 2022.01.08       | 2023.01.07  |
| ISN                                 | TESEQ        | ISN T800    | 42809      | 2022.05.07       | 2023.05.06  |
| Pulse Limiter with 10dB Attenuation | SCHWARZBECK  | VTSD 9561-F | 9561-F106  | 2022.01.08       | 2023.01.07  |
| Temperature/ Humidity Meter         | GEMLEAD      | STH200A     | N/A        | 2021.08.17       | 2022.08.16  |

| Radiated Emissions          |               |           |            |                  |            |
|-----------------------------|---------------|-----------|------------|------------------|------------|
| Test Site                   | 3M01-DG       |           |            |                  |            |
| Instrument                  | Manufacturer  | Model No. | Serial No. | Calibration Date | Valid Date |
| EMI Test Receiver           | R&S           | ESCI      | 100563     | 2022.05.07       | 2023.05.06 |
| H64 Preamplifier            | HP            | 8447F     | 3113A05582 | 2022.01.08       | 2023.01.07 |
| Loop Antenna                | R&S           | HFH2-Z2   | 100150     | 2022.05.11       | 2024.05.10 |
| Bilog Antenna               | Sunol Science | JB1       | A072414-1  | 2020.11.25       | 2022.11.24 |
| Preamplifier                | EMEC          | EM01G18G  | 060739     | 2022.05.07       | 2023.05.06 |
| Preamplifier                | COM-POWER     | PA-840    | 711885     | 2022.05.07       | 2023.05.06 |
| Horn Antenna                | Sunol         | DRH-118   | A072913    | 2021.08.22       | 2023.08.21 |
| Standard Gain Horn Antenna  | TRC           | HA-2640   | 18050      | 2022.05.09       | 2024.05.08 |
| Standard Gain Horn Antenna  | TRC           | HA-1726   | 18051      | 2022.05.09       | 2024.05.08 |
| FSQ Signal Analyzer         | R&S           | FSQ40     | 200012     | 2022.05.07       | 2023.05.06 |
| Temperature/ Humidity Meter | GEMLEAD       | STH200A   | N/A        | 2021.08.17       | 2022.08.16 |

| RF Conducted                |              |           |            |                  |            |
|-----------------------------|--------------|-----------|------------|------------------|------------|
| Test Site                   | RFCON01-DG   |           |            |                  |            |
| Instrument                  | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date |
| MXA Signal Analyzer         | KEYSIGHT     | N9020A    | US46220290 | 2022.05.07       | 2023.05.06 |
| ESG VECTOR SIGNAL GENERATOR | Agilent      | E4438C    | MY45092582 | 2022.05.07       | 2023.05.06 |
| MXG VECTOR SIGNAL GENERATOR | Agilent      | N5182B    | MY53050127 | 2022.05.07       | 2023.05.06 |
| USB Wideband Power Sensor   | Boonton      | 55006     | 9778       | 2022.01.08       | 2023.01.07 |
| Temperature/ Humidity Meter | mingle       | ETH529    | N/A        | 2022.01.08       | 2023.01.07 |



## 4. Antenna Requirements

### 4.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 4.2 Antenna Construction and Directional Gain

WIFI 2.4G:

|              |                   |
|--------------|-------------------|
| Antenna Type | PCB Antenna       |
| Antenna Gain | Antenna A: 2.2dBi |

**(Non-Beamforming)**



## 5. Test of AC Power Line Conducted Emission

### 5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.10-2013. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 6.2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

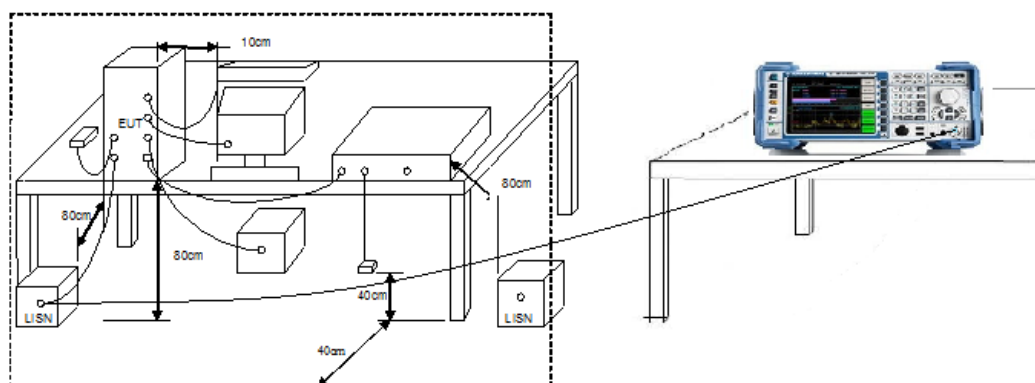
| Frequency (MHz) | Quasi Peak (dB $\mu$ V) | Average (dB $\mu$ V) |
|-----------------|-------------------------|----------------------|
| 0.15 – 0.5      | 66-56*                  | 56-46*               |
| 0.5 – 5.0       | 56                      | 46                   |
| 5.0 – 30.0      | 60                      | 50                   |

\*Decreases with the logarithm of the frequency.

### 5.2 Test Procedures

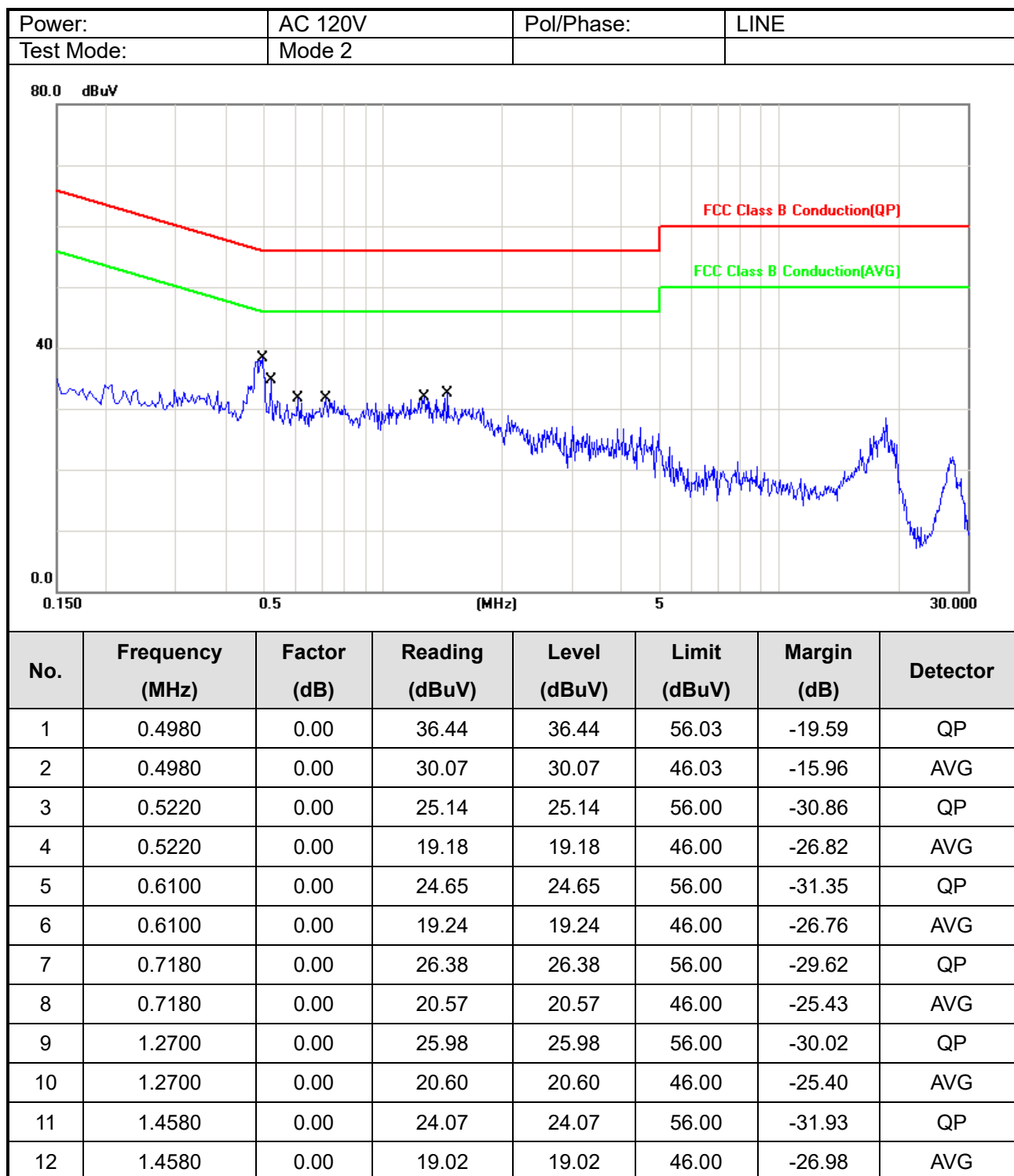
The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of Oct 2014 KDB558074 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane 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 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### 5.3 Typical Test Setup

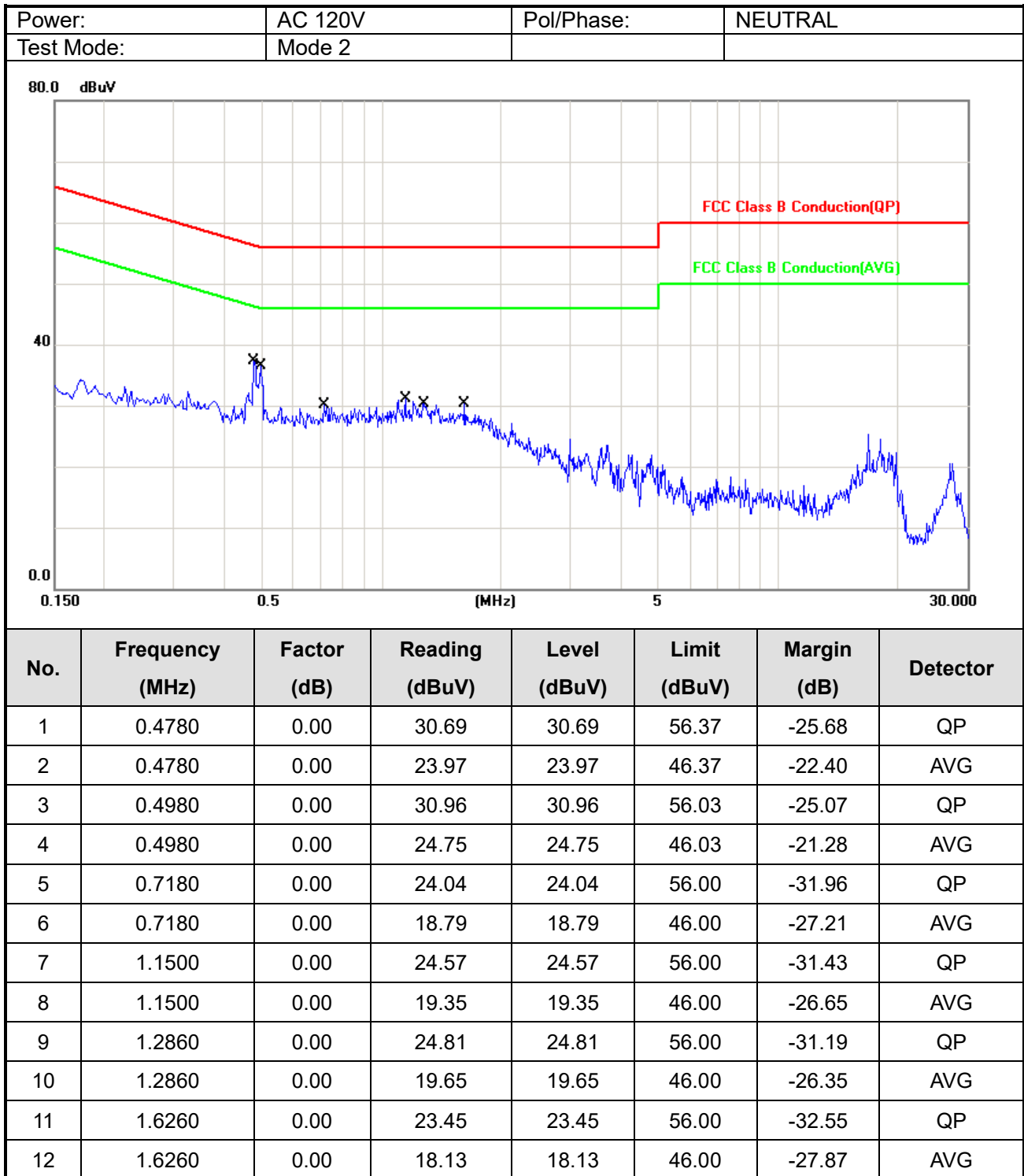




## 5.4 Test Result and Data



Note: Level = Reading + Factor  
Margin = Level – Limit



Note: Level = Reading + Factor

Margin = Level – Limit



## 6. Test of Spurious Emission (Radiated)

### 6.1 Test Limit

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

| FREQUENCIES(MHz) | FIELD STRENGTH<br>(microvolts/meter) | MEASUREMENT<br>DISTANCE(meters) |
|------------------|--------------------------------------|---------------------------------|
| 0.009~0.490      | 2400/F(kHz)                          | 300                             |
| 0.490~1.705      | 24000/F(kHz)                         | 30                              |
| 1.705~30.0       | 30                                   | 30                              |
| 30~88            | 100                                  | 3                               |
| 88~216           | 150                                  | 3                               |
| 216~960          | 200                                  | 3                               |
| Above 960        | 500                                  | 3                               |

### 6.2 Test Procedures

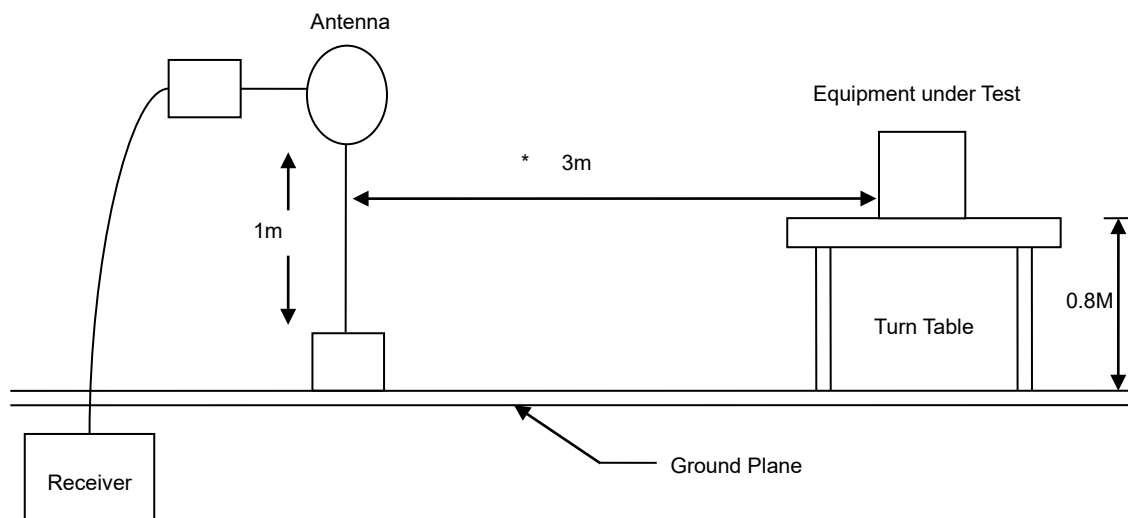
- The EUT was placed on a rotatable table top 0.8 meter for frequency below 1GHz and 1.5meter for frequency above 1GHz above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- 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 turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than AVG limit (that means the emission level in peak mode also complies with the limit in AVG mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in AVG mode again and reported.
- "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.  
Note: The supporting fixture shall permit orientation of the EUT in each of three orthogonal axis positions sch that emissions from the EUT are maximized.

**(X-AXIS is the worst.)**

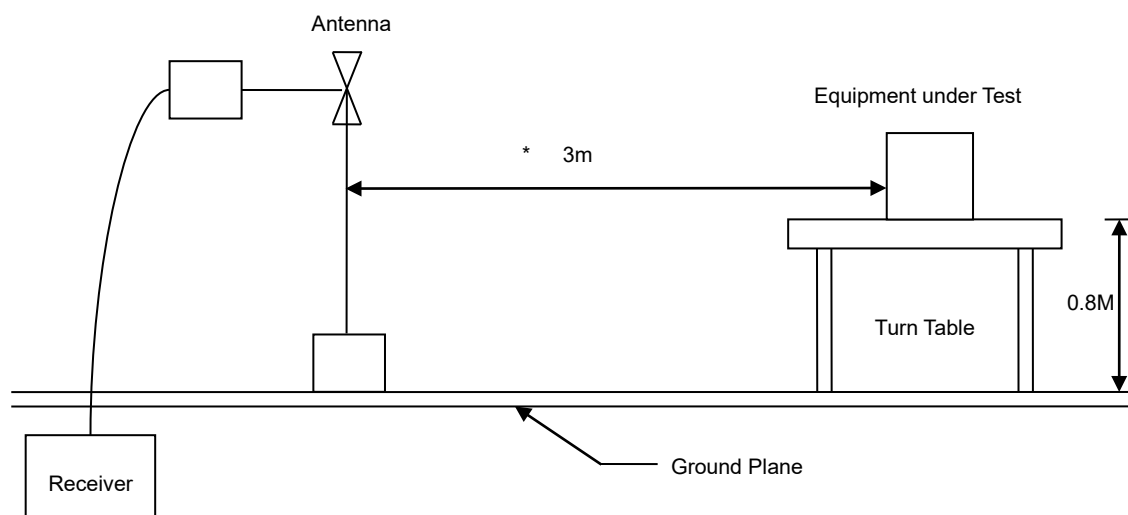


### 6.3 Typical Test Setup

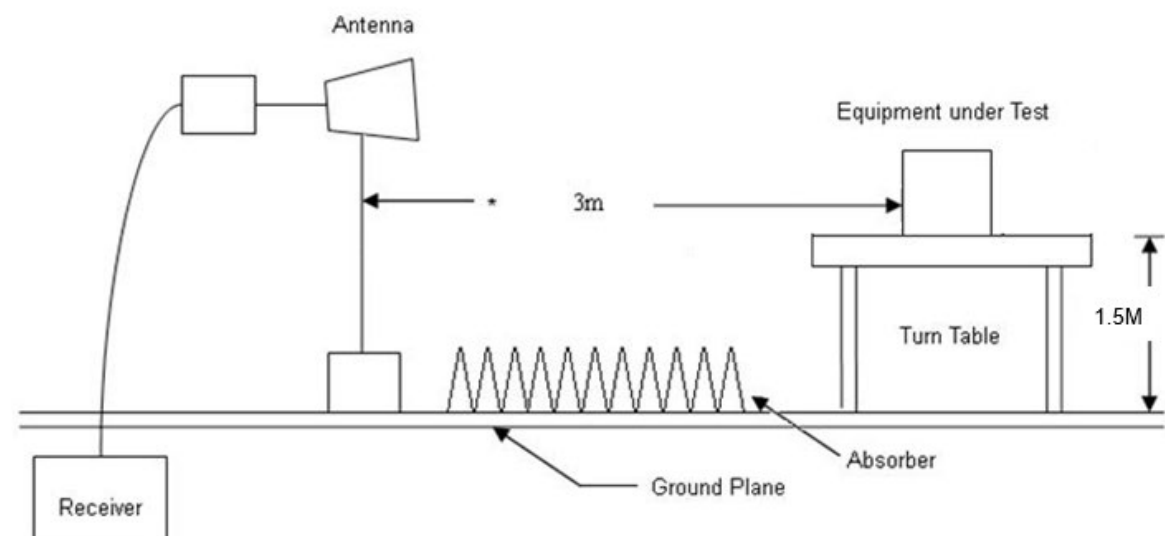
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup

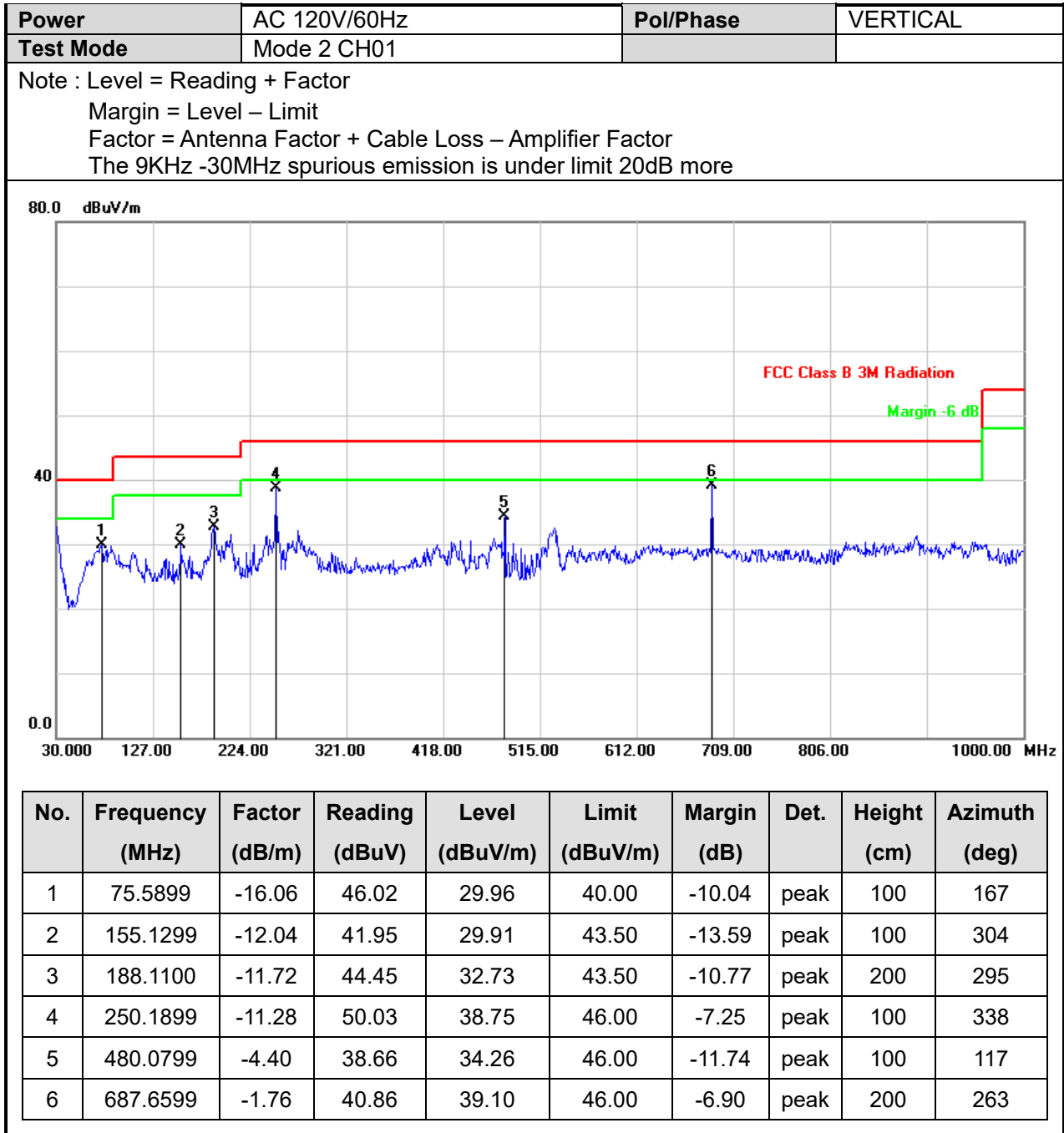


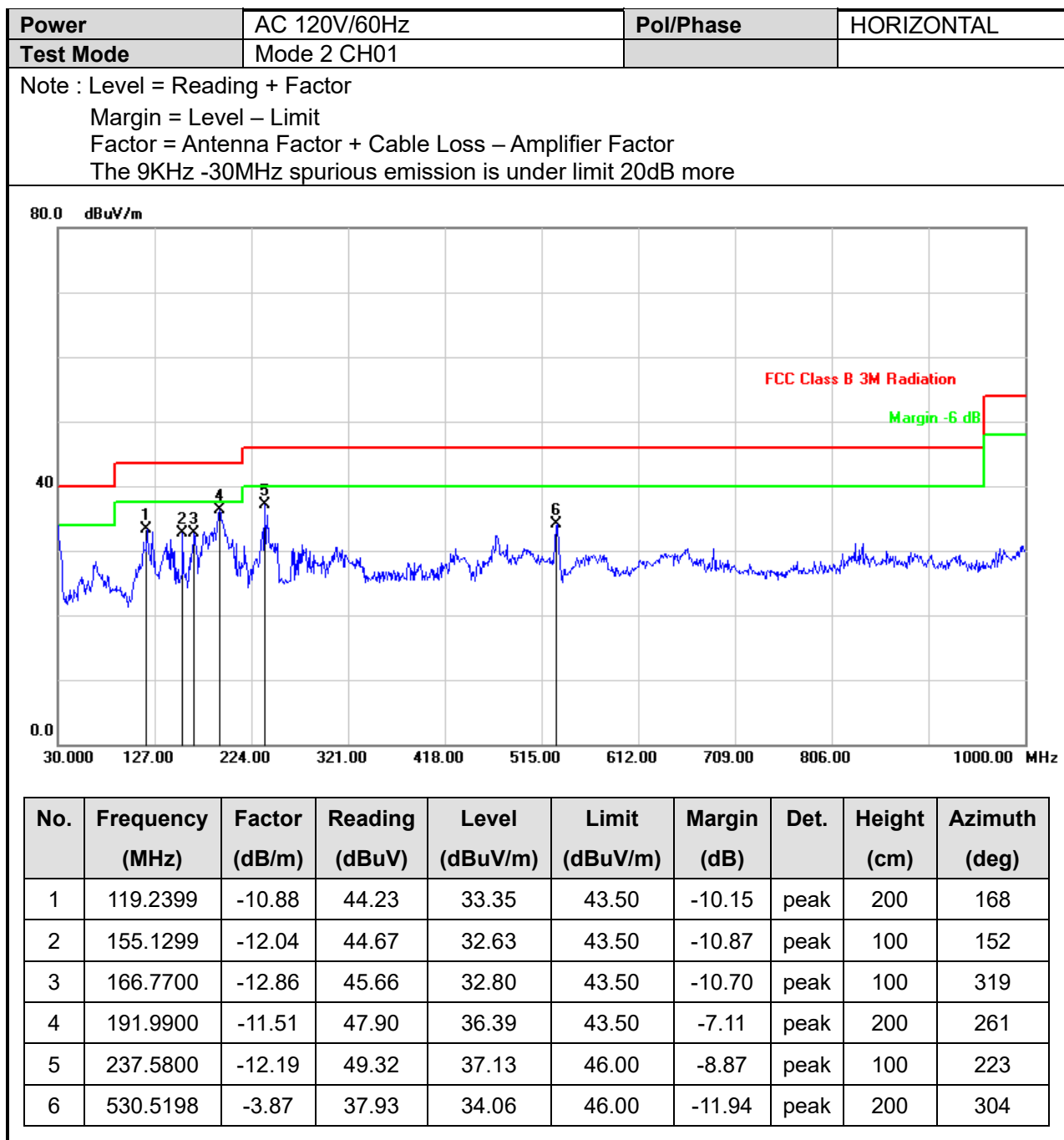


#### 6.4 Test Result and Data (9KHz ~ 30MHz)

The 9kHz-30MHz spurious emission is under limit 20dB more.

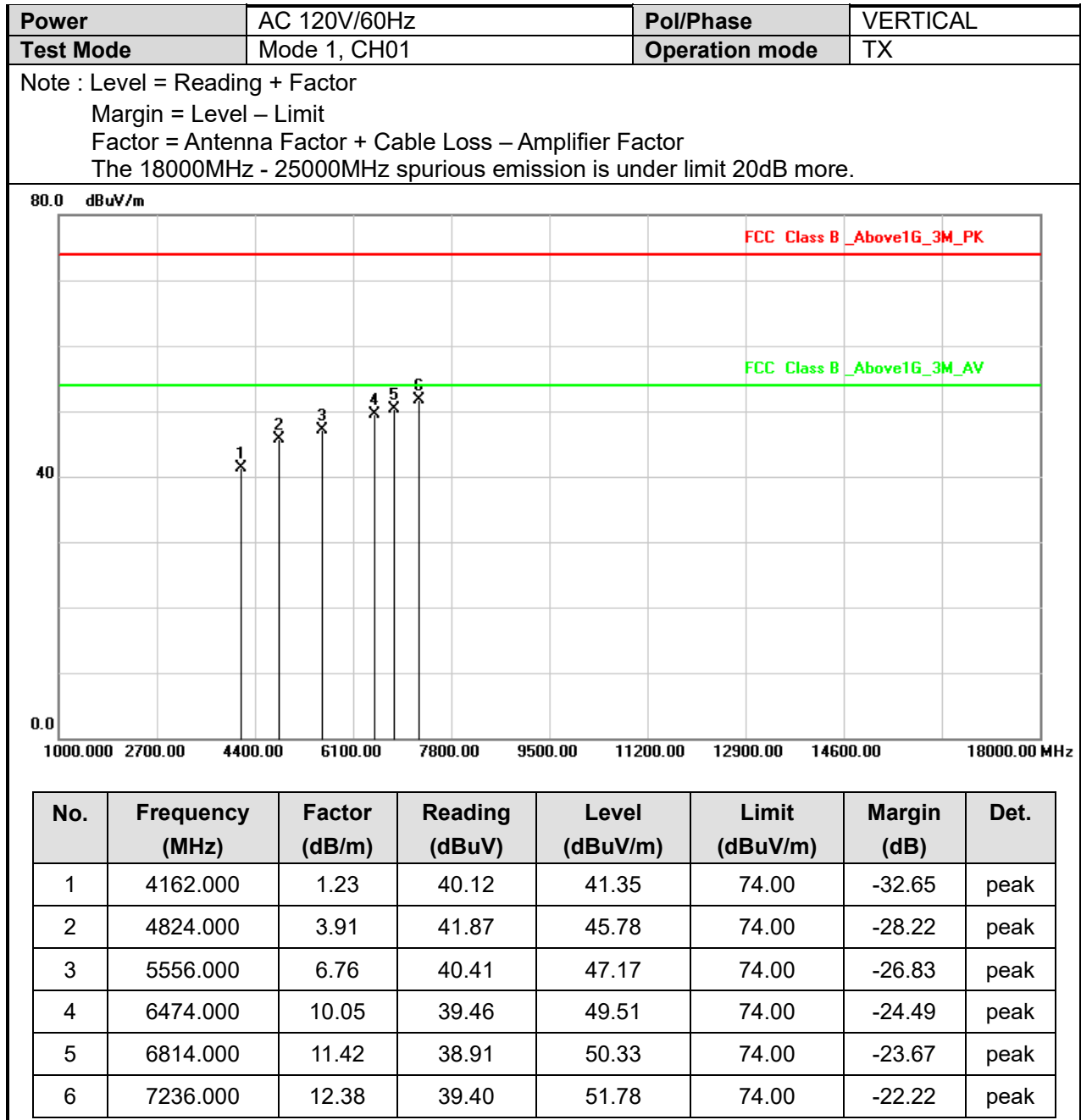
#### 6.5 Test Result and Data (30MHz ~ 1GHz)

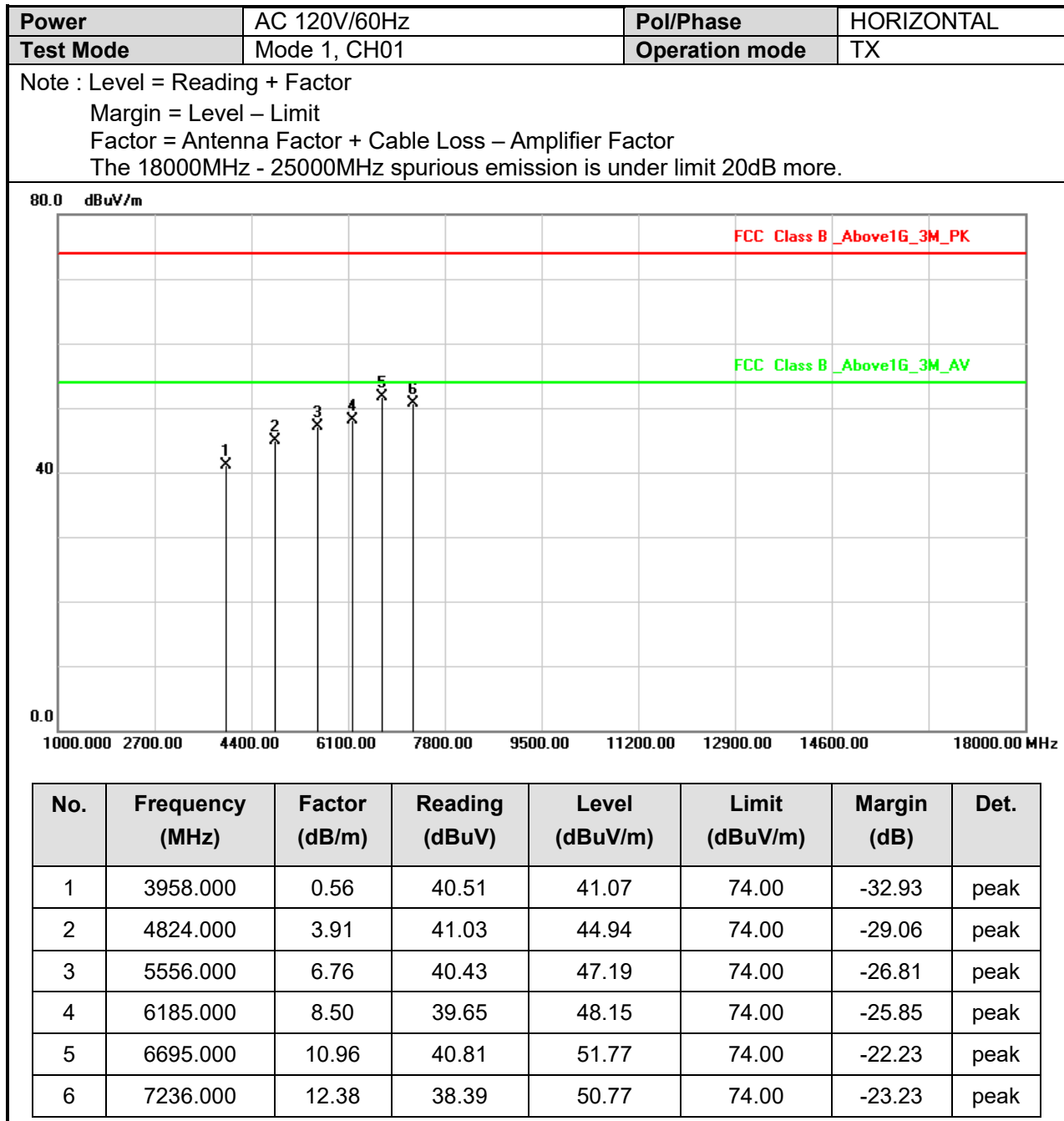


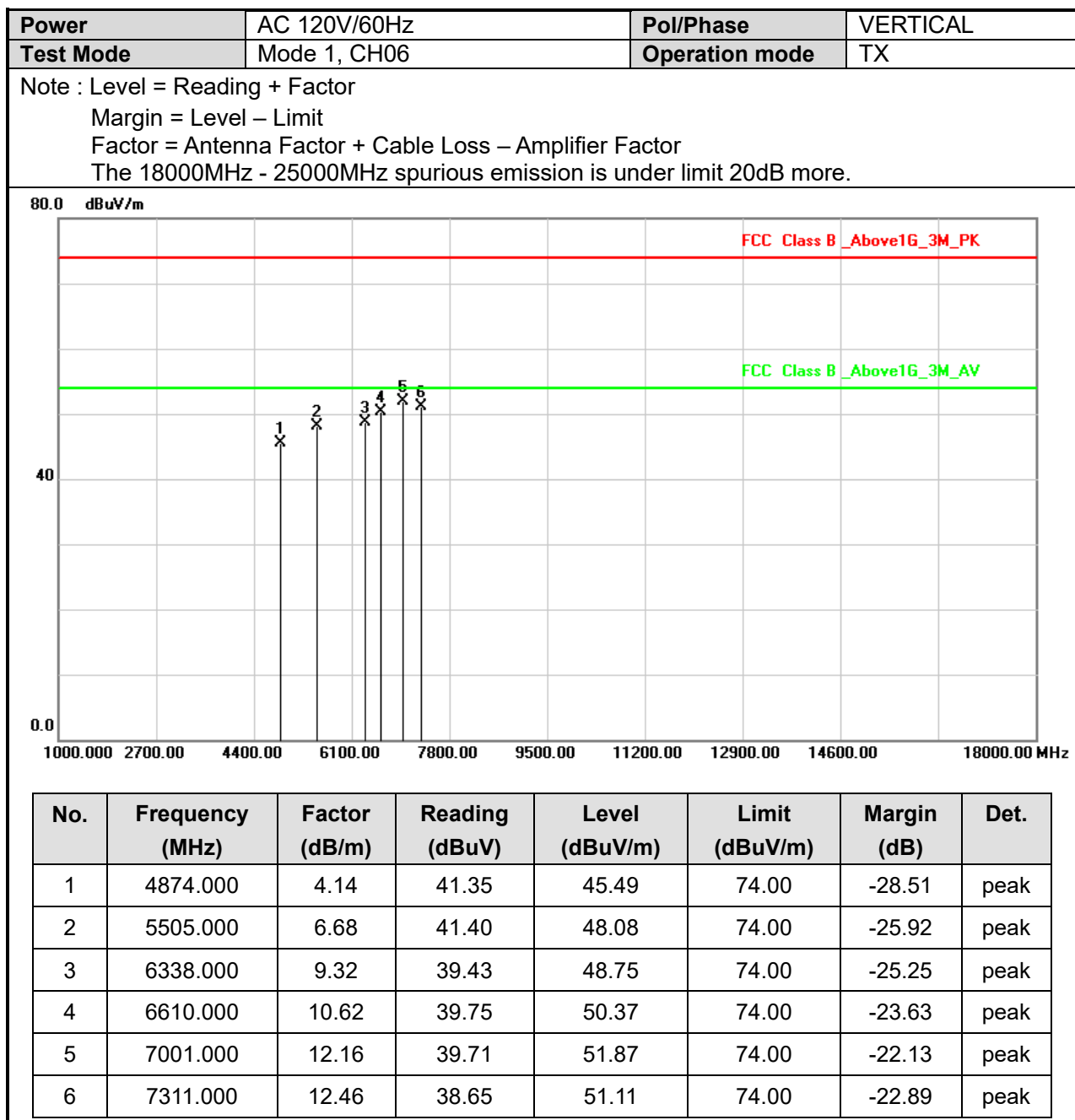


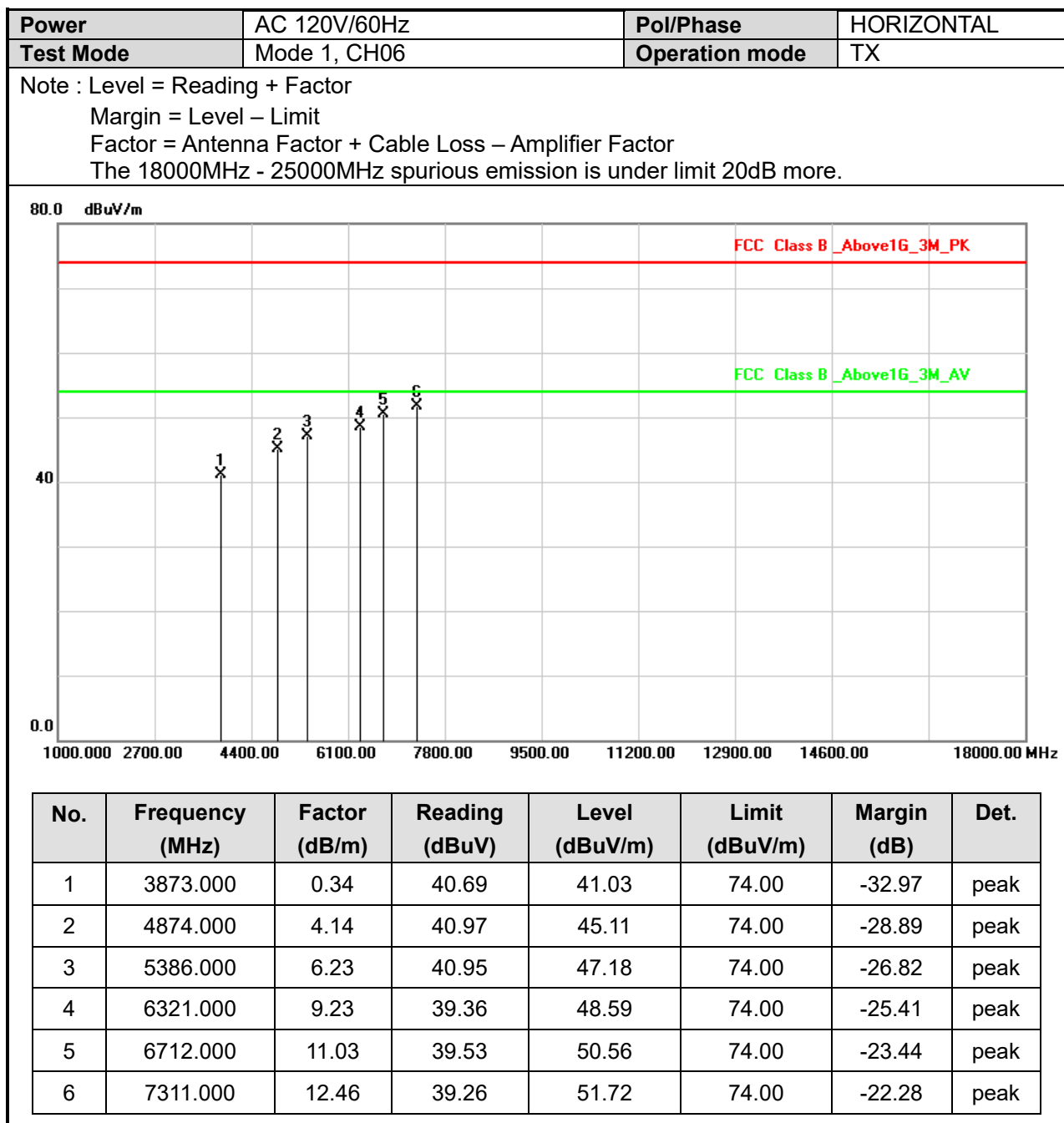


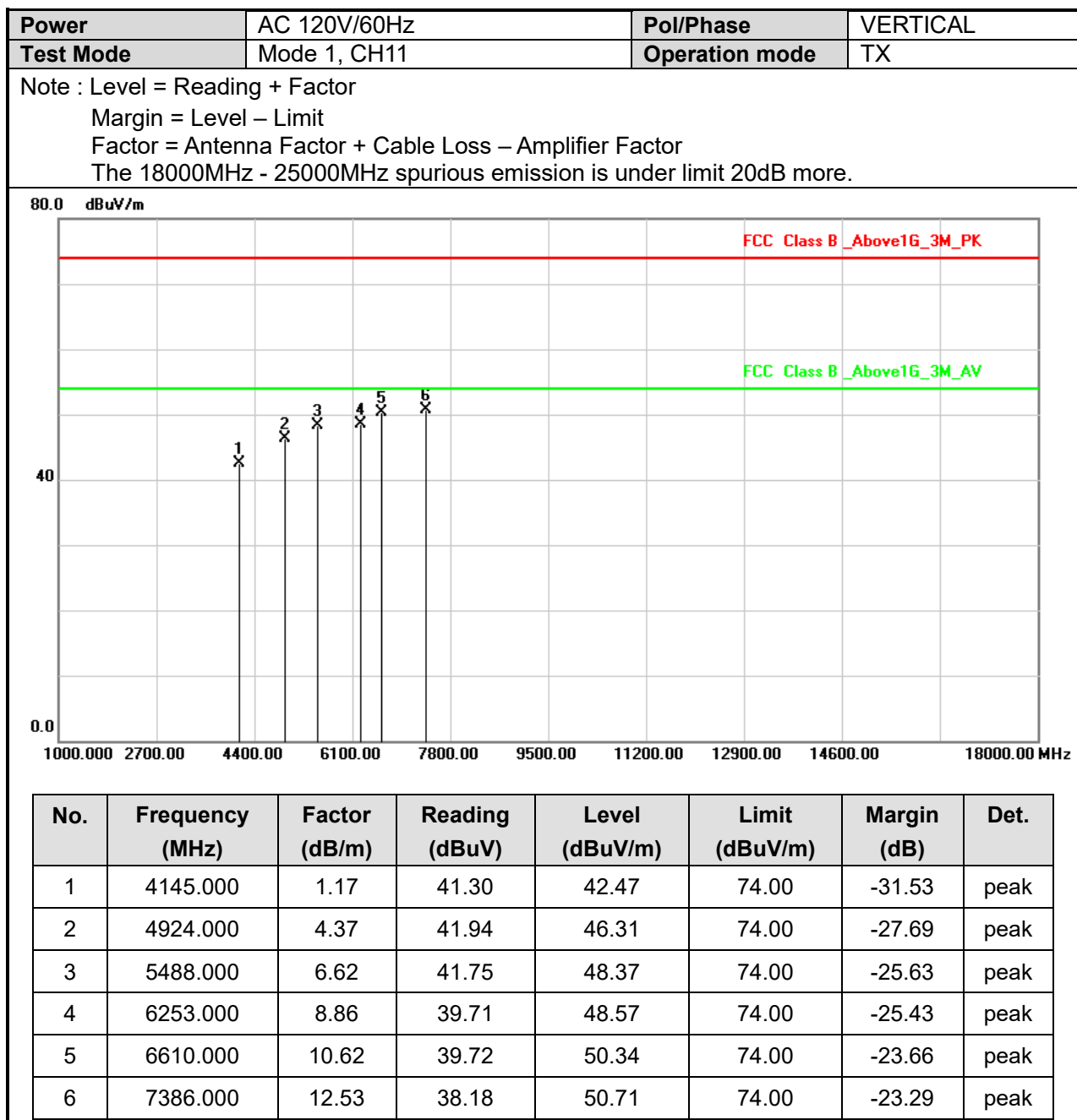
## 6.6 Test Result and Data (1GHz ~ 25GHz)

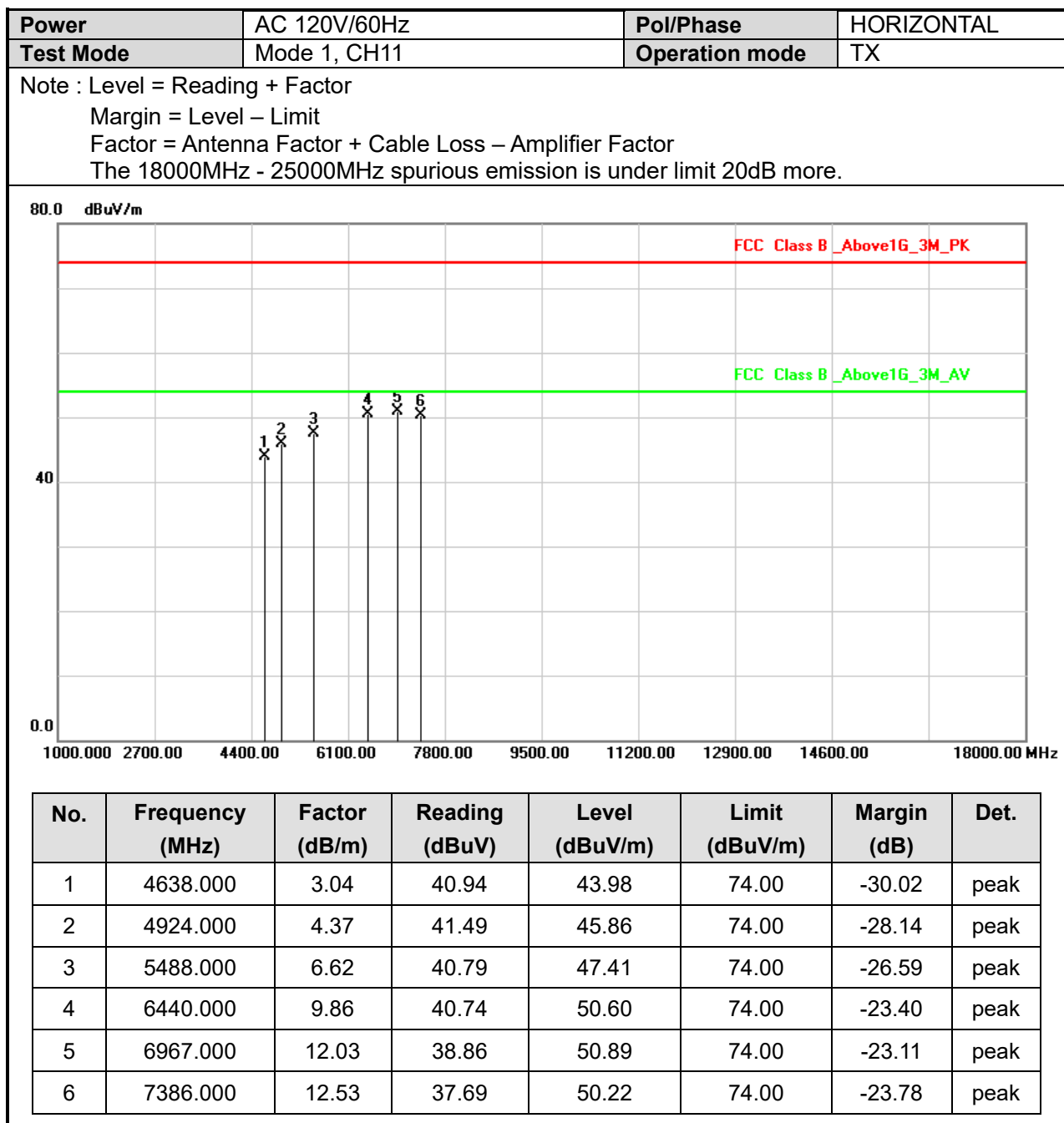


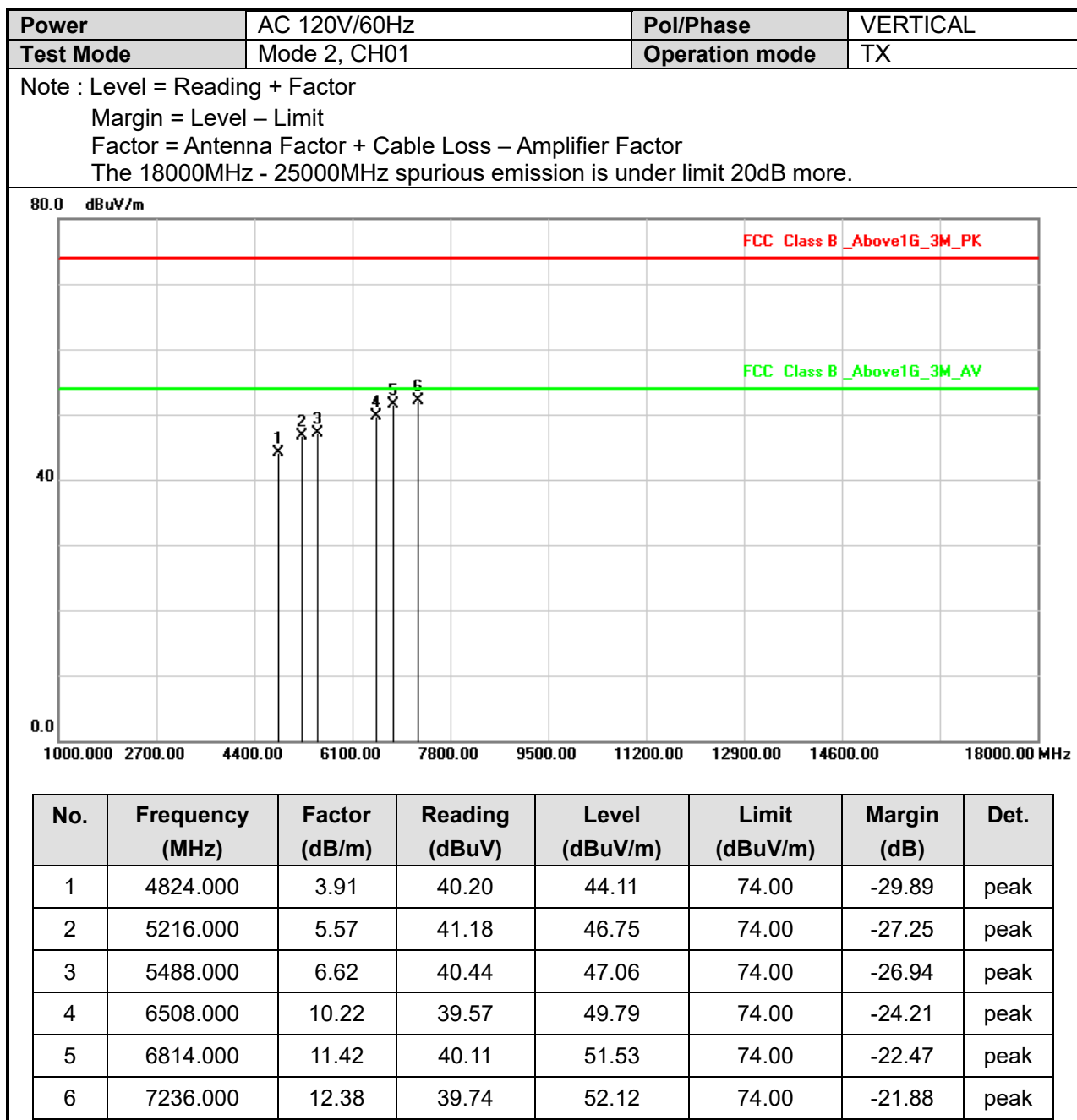


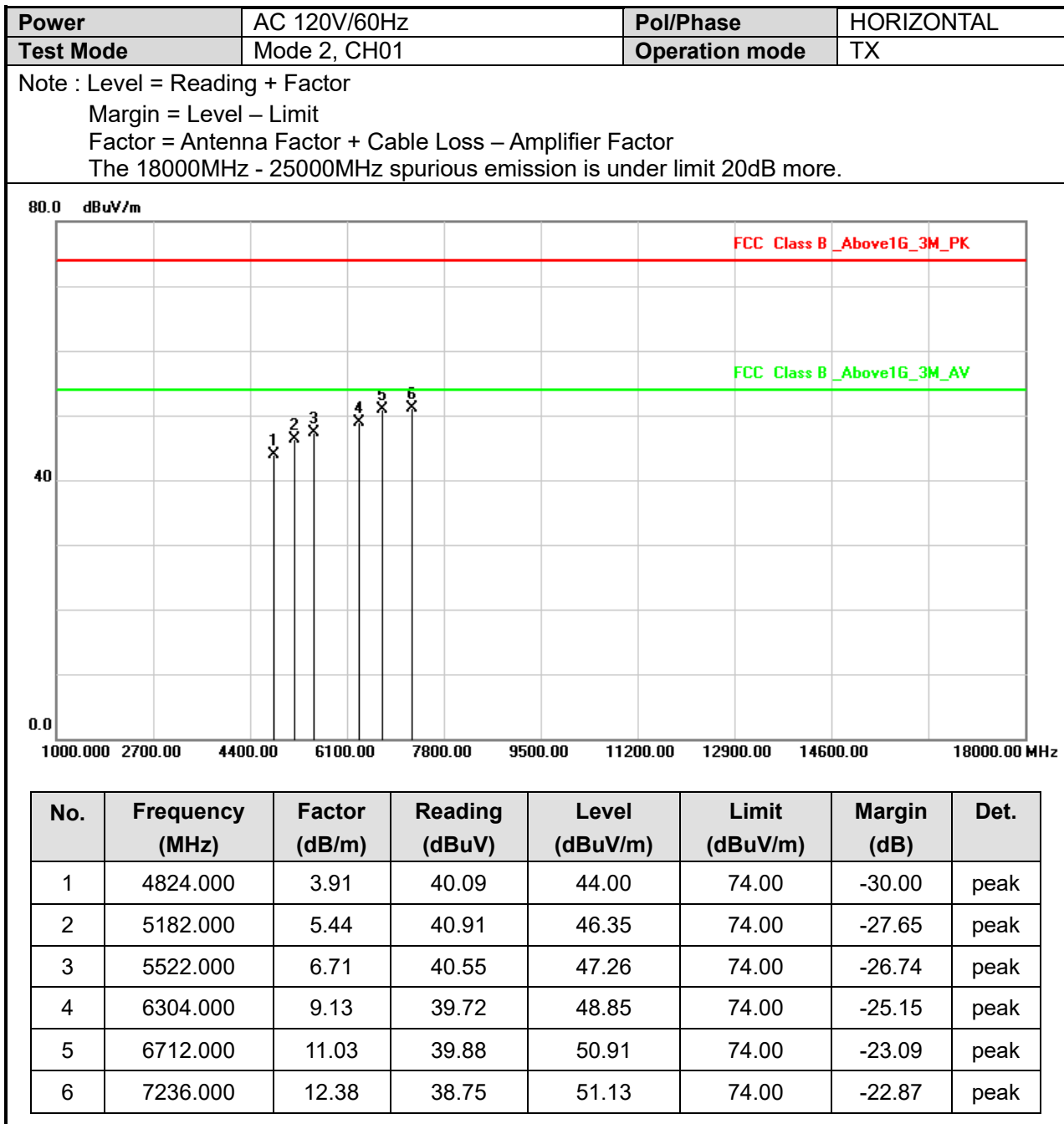


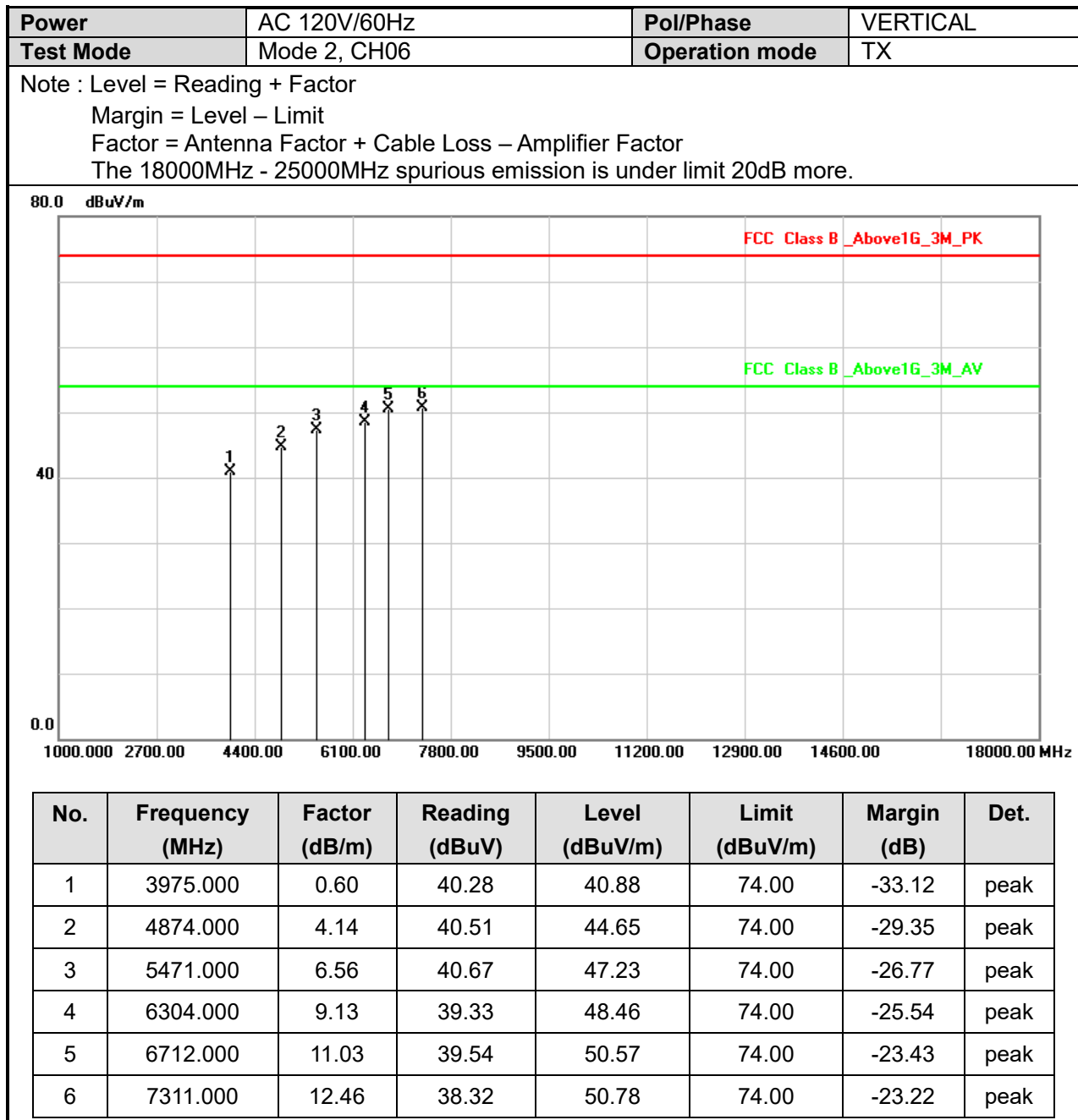


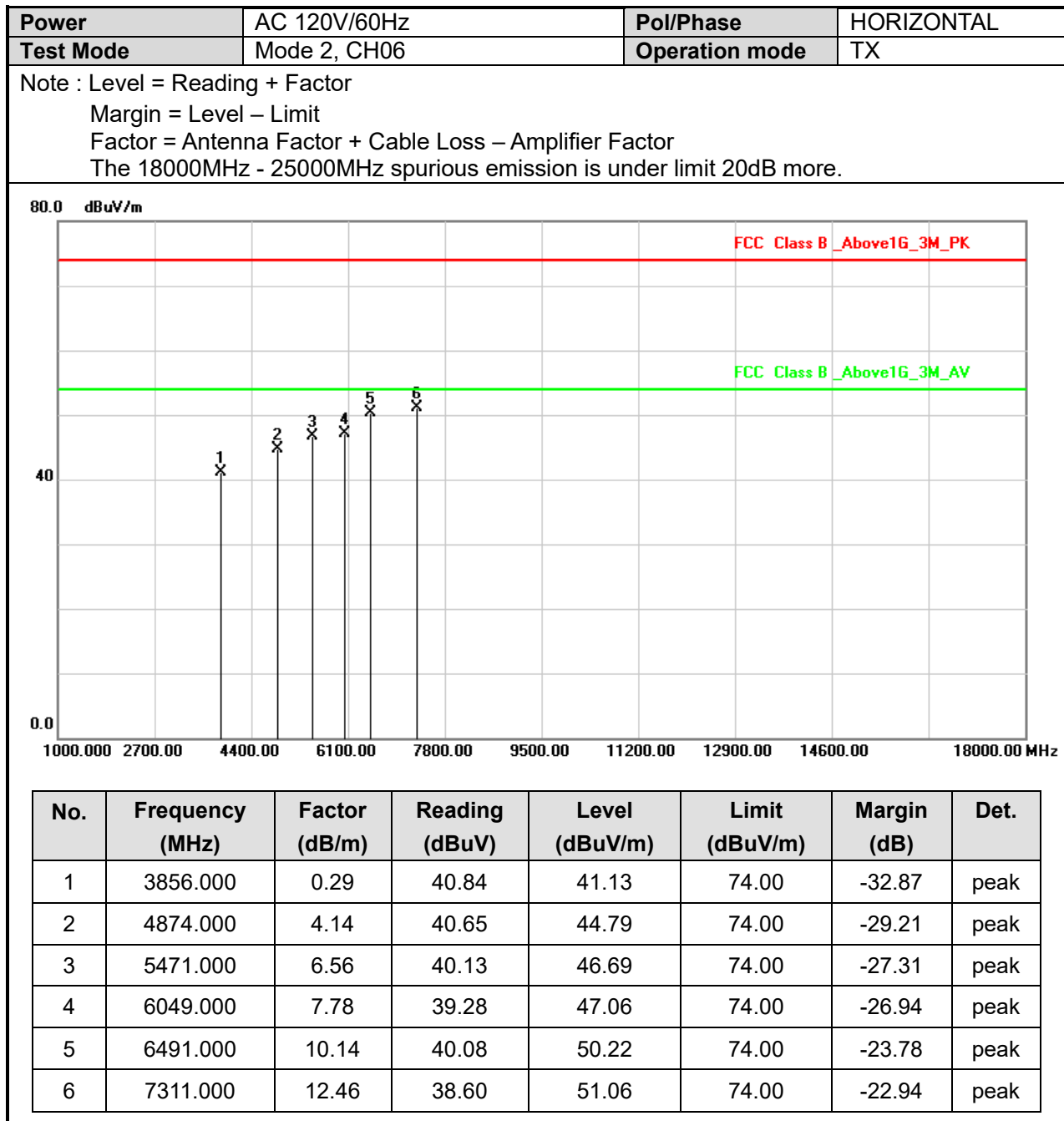


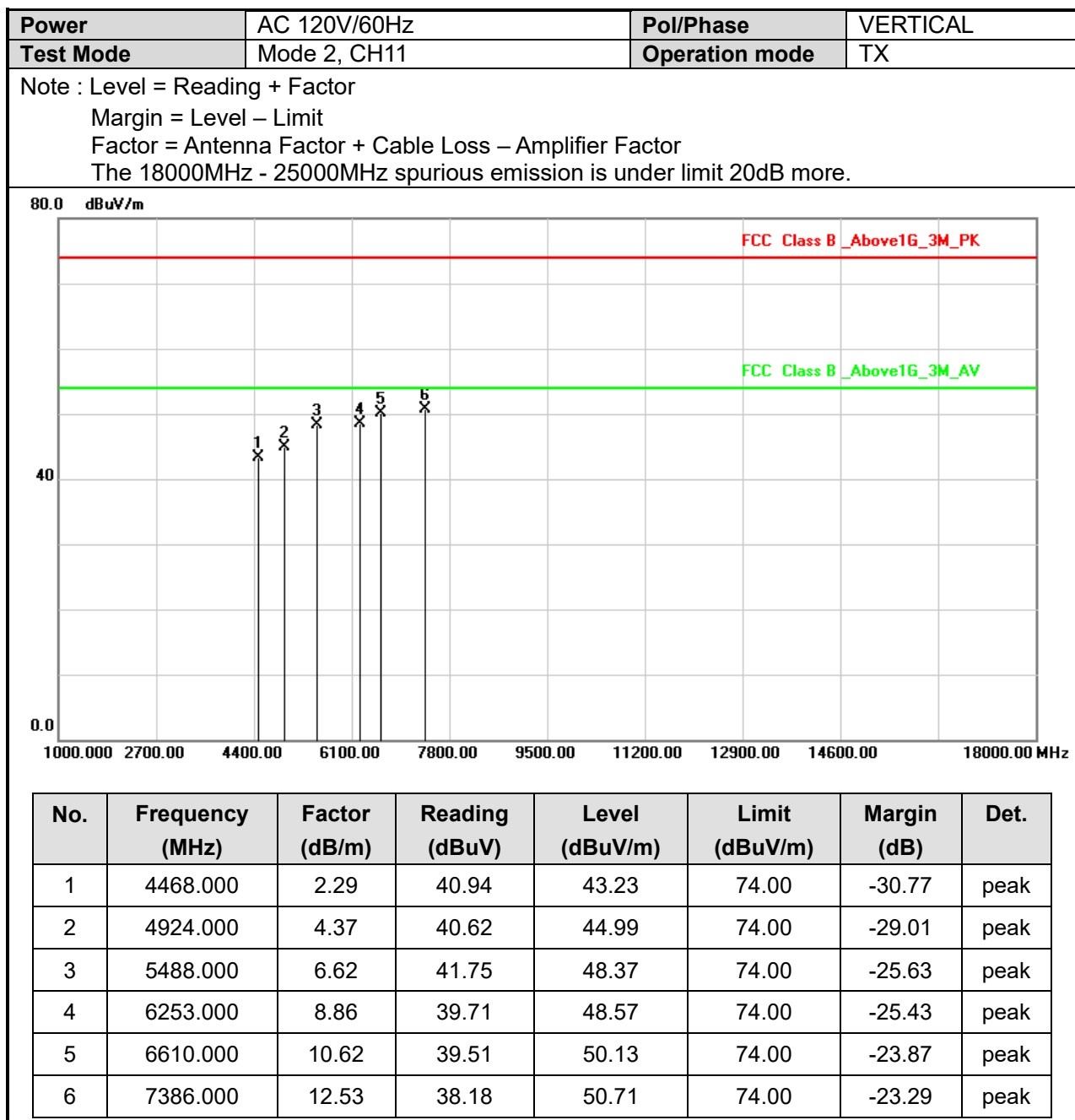


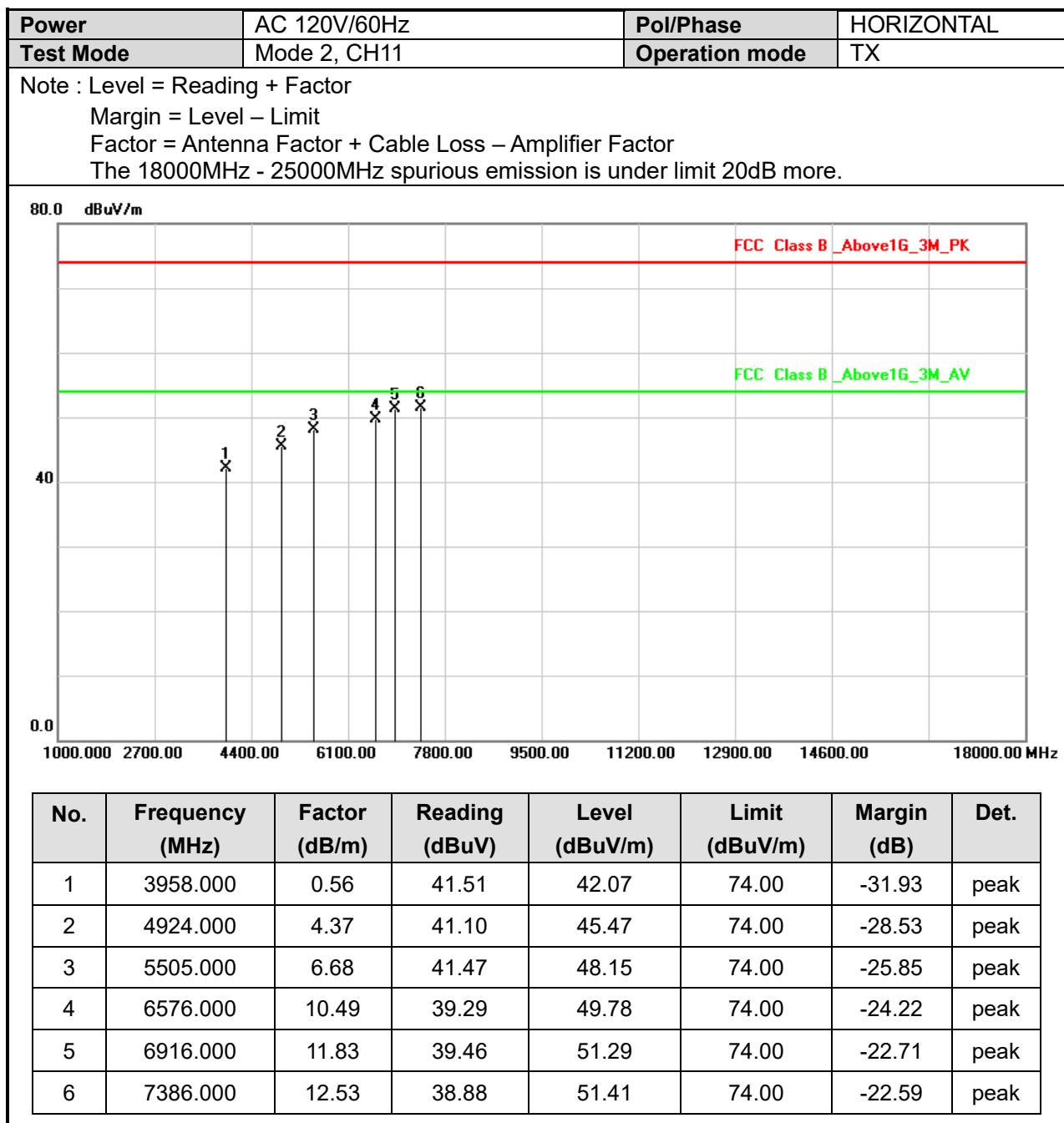


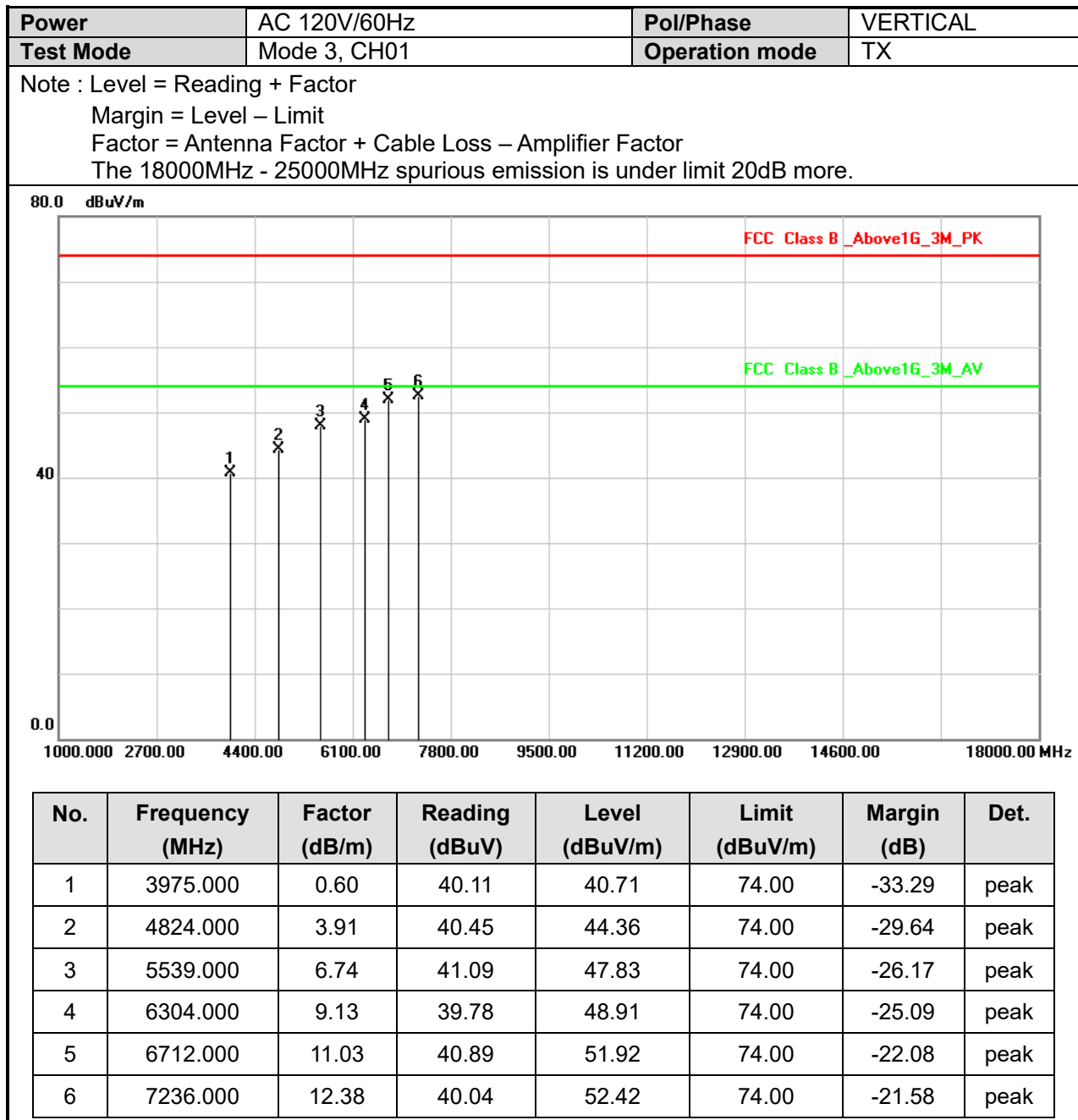


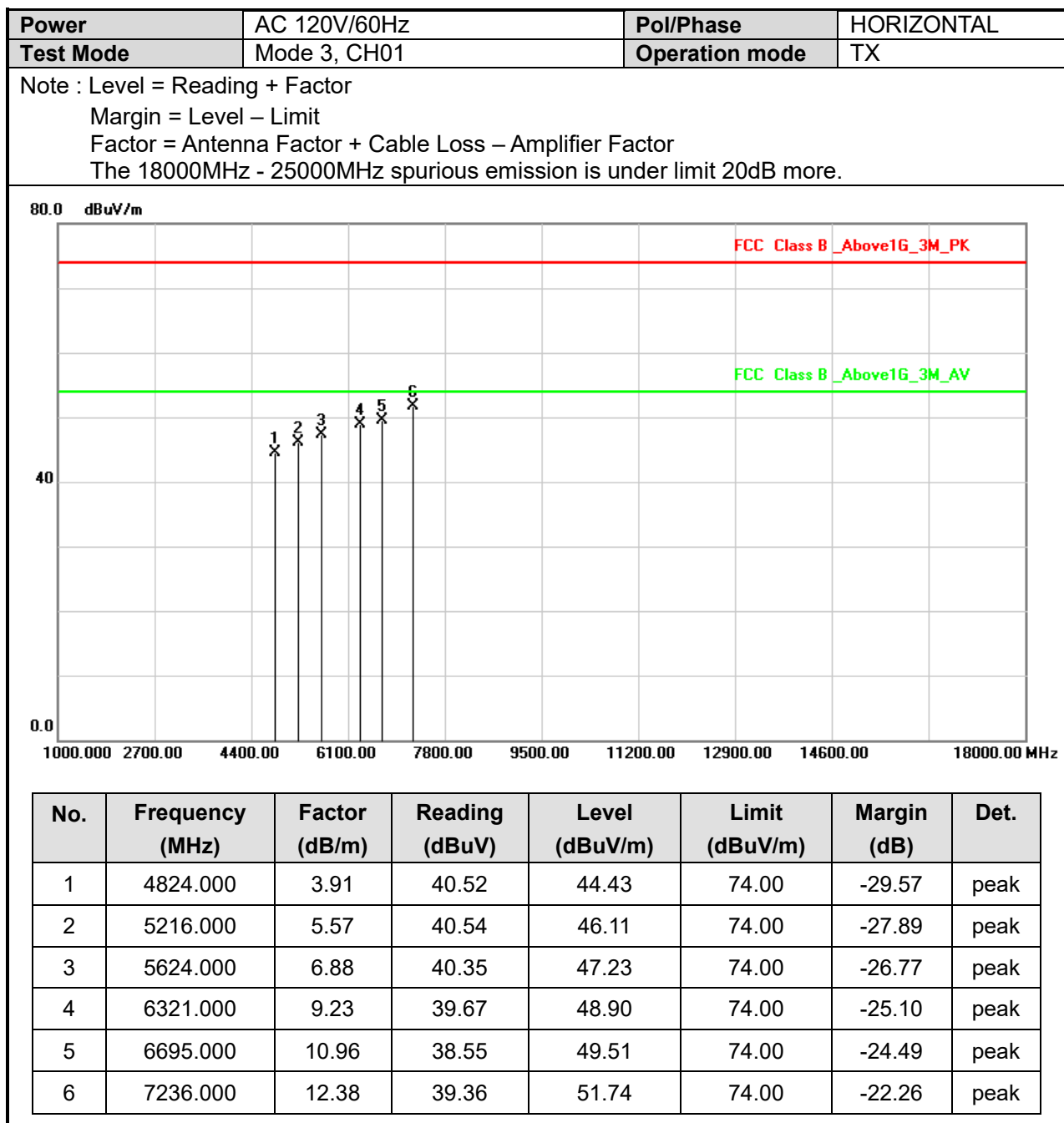


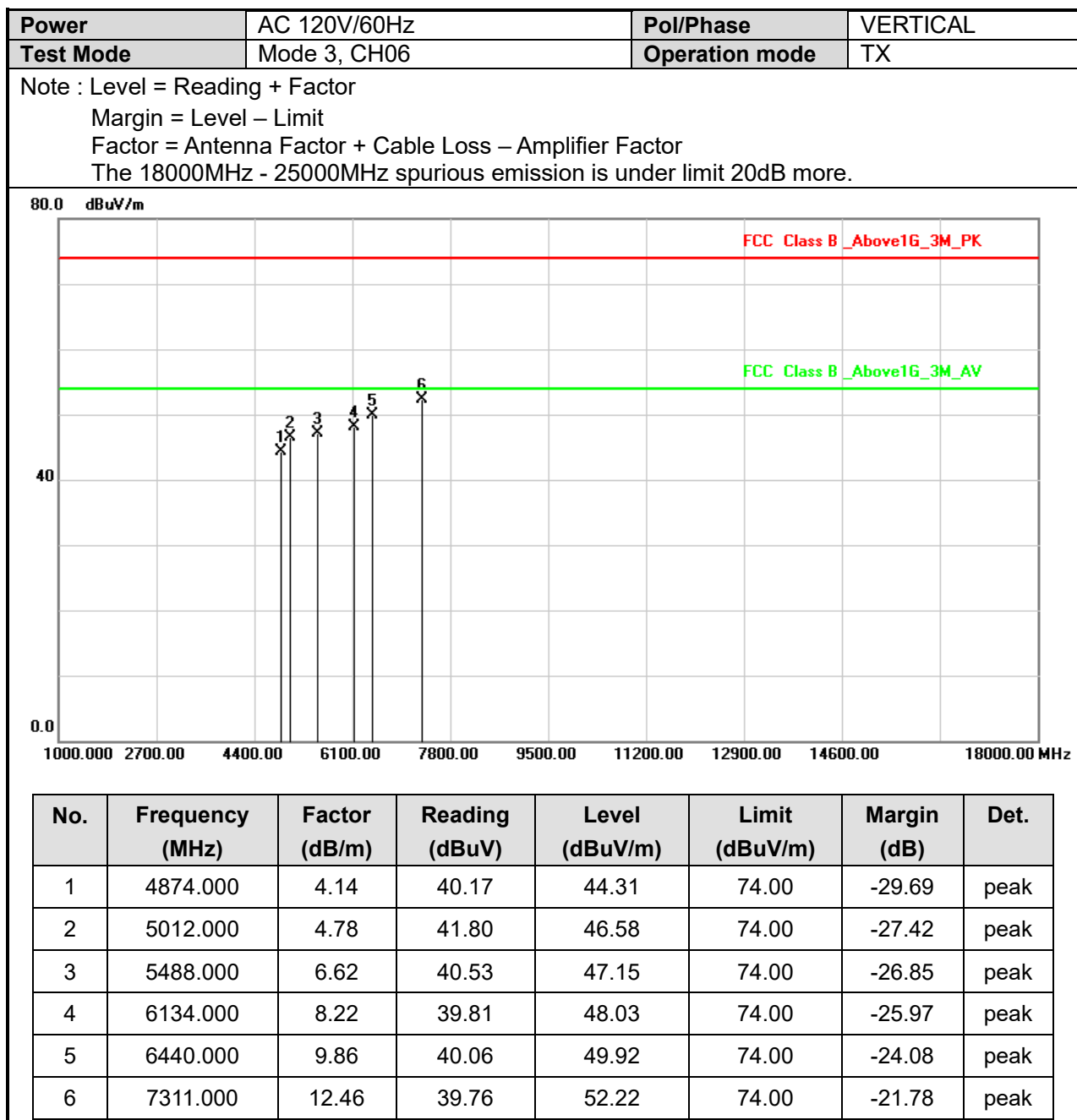


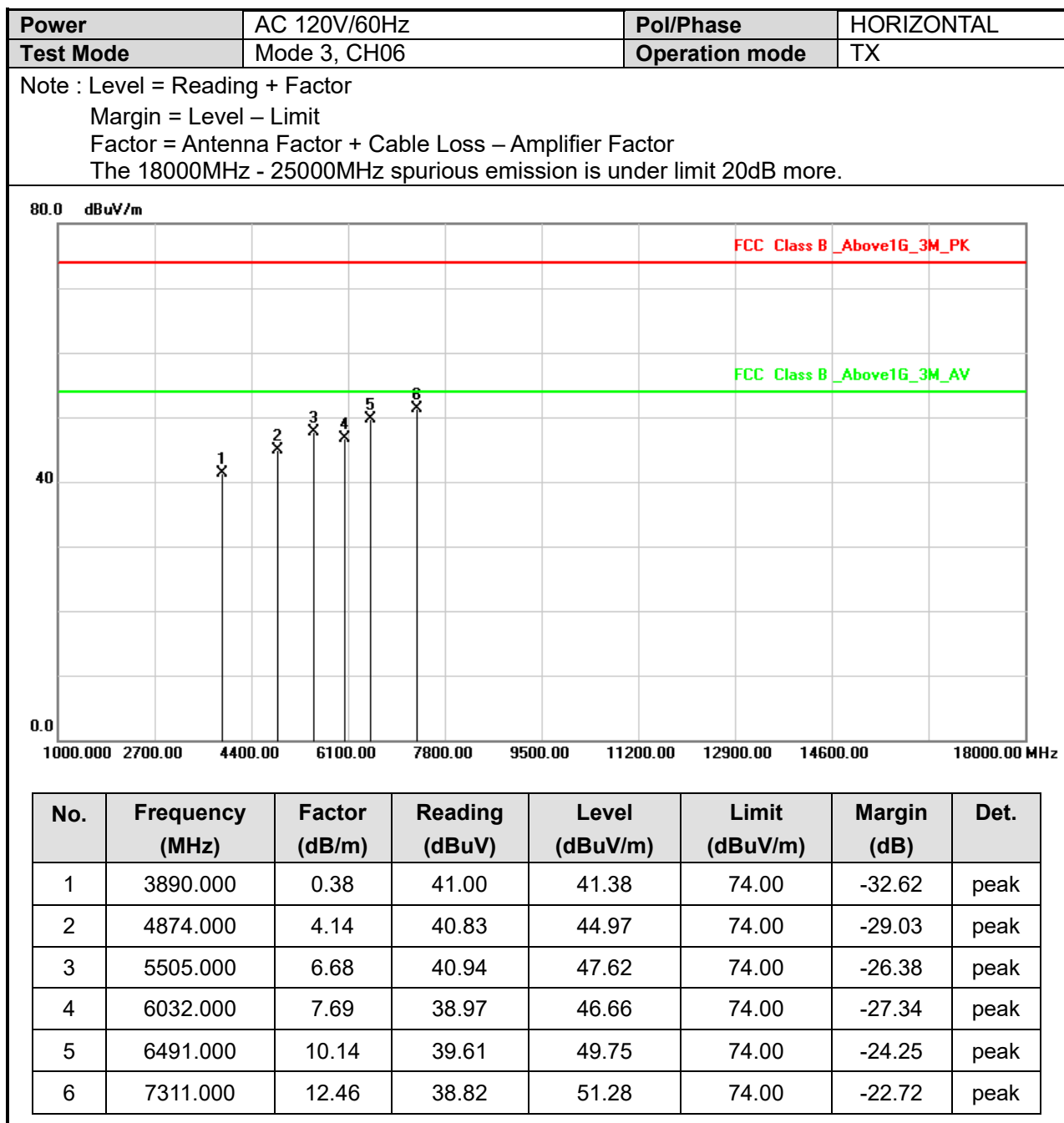


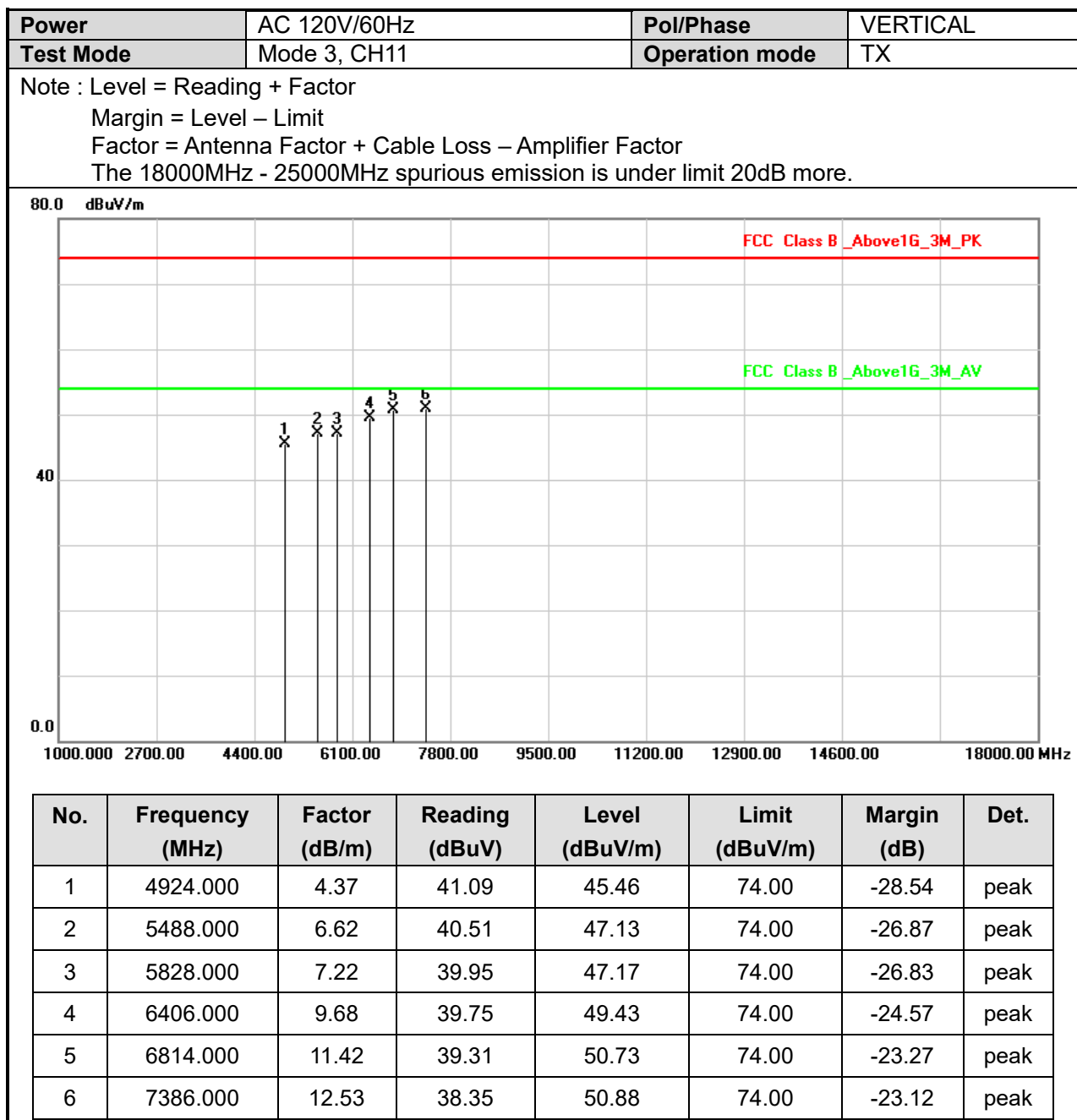


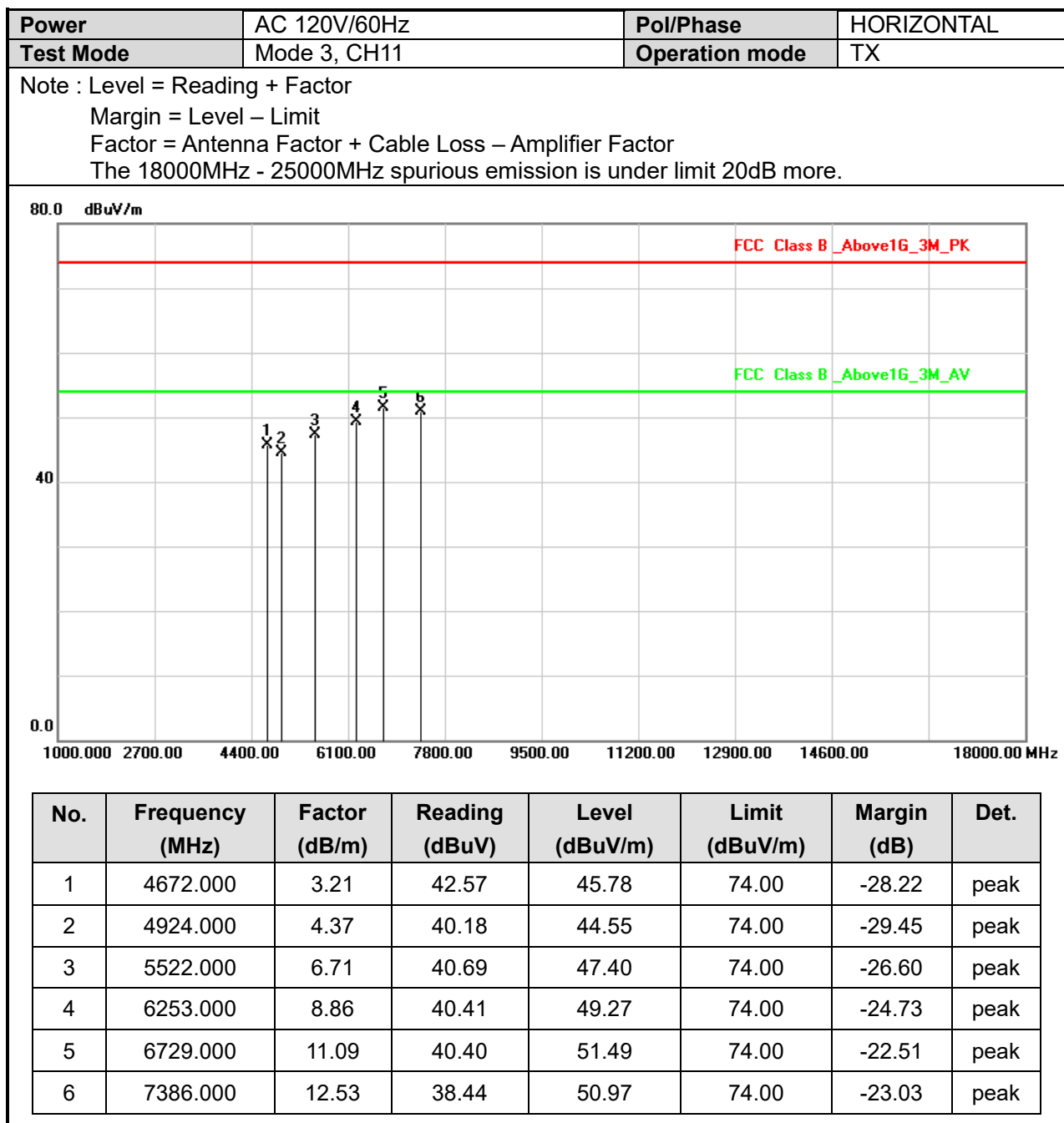


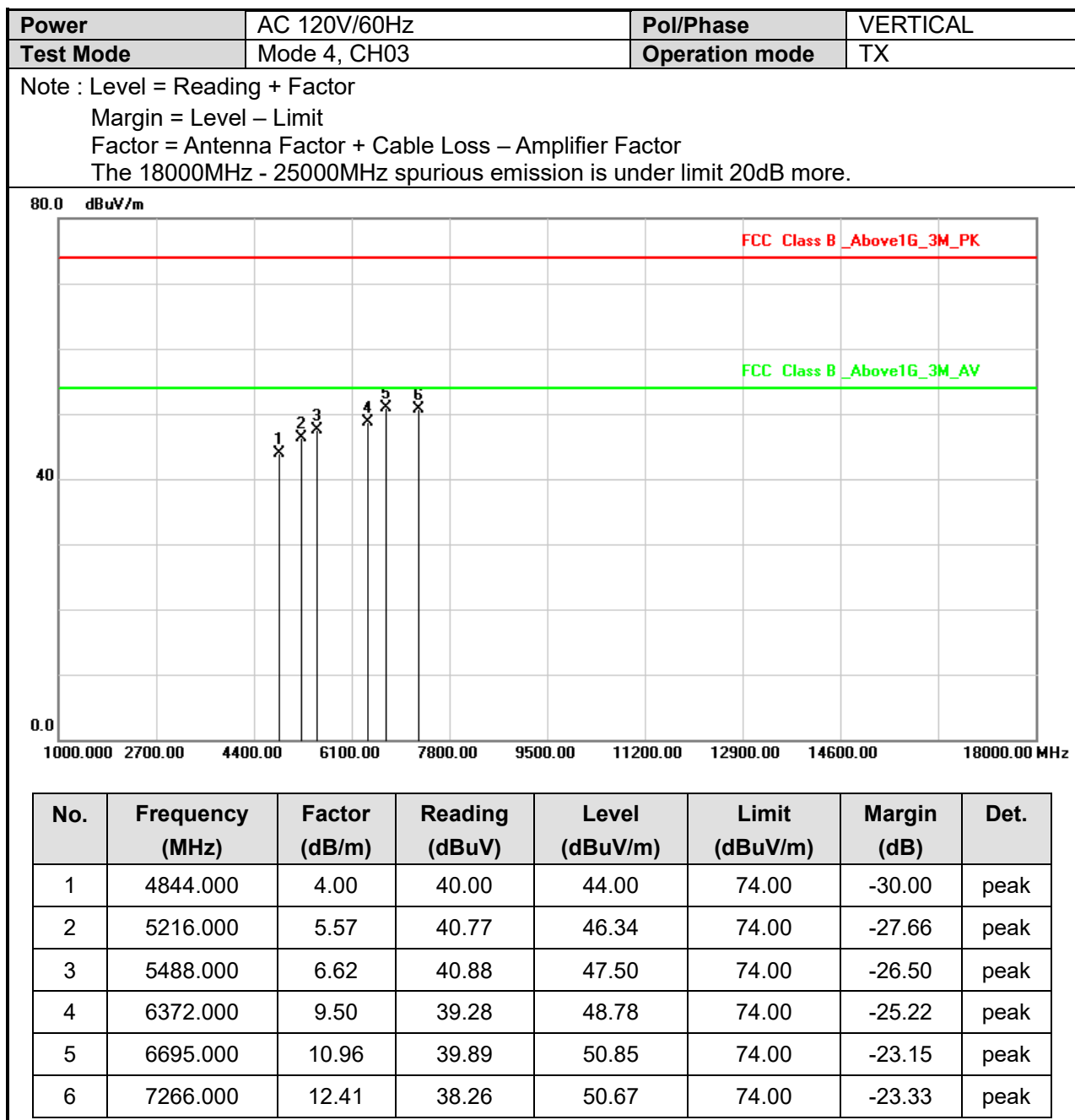


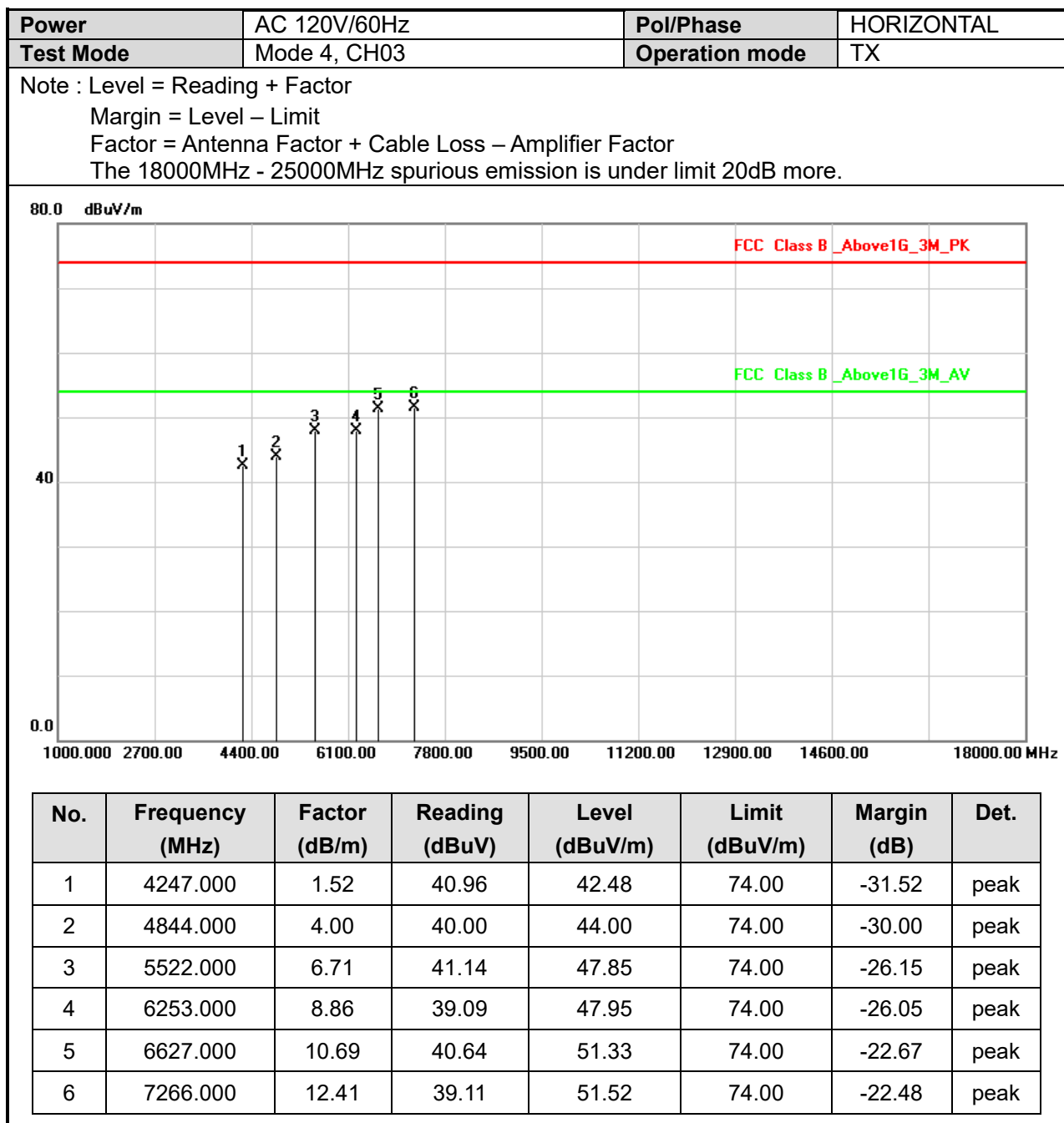


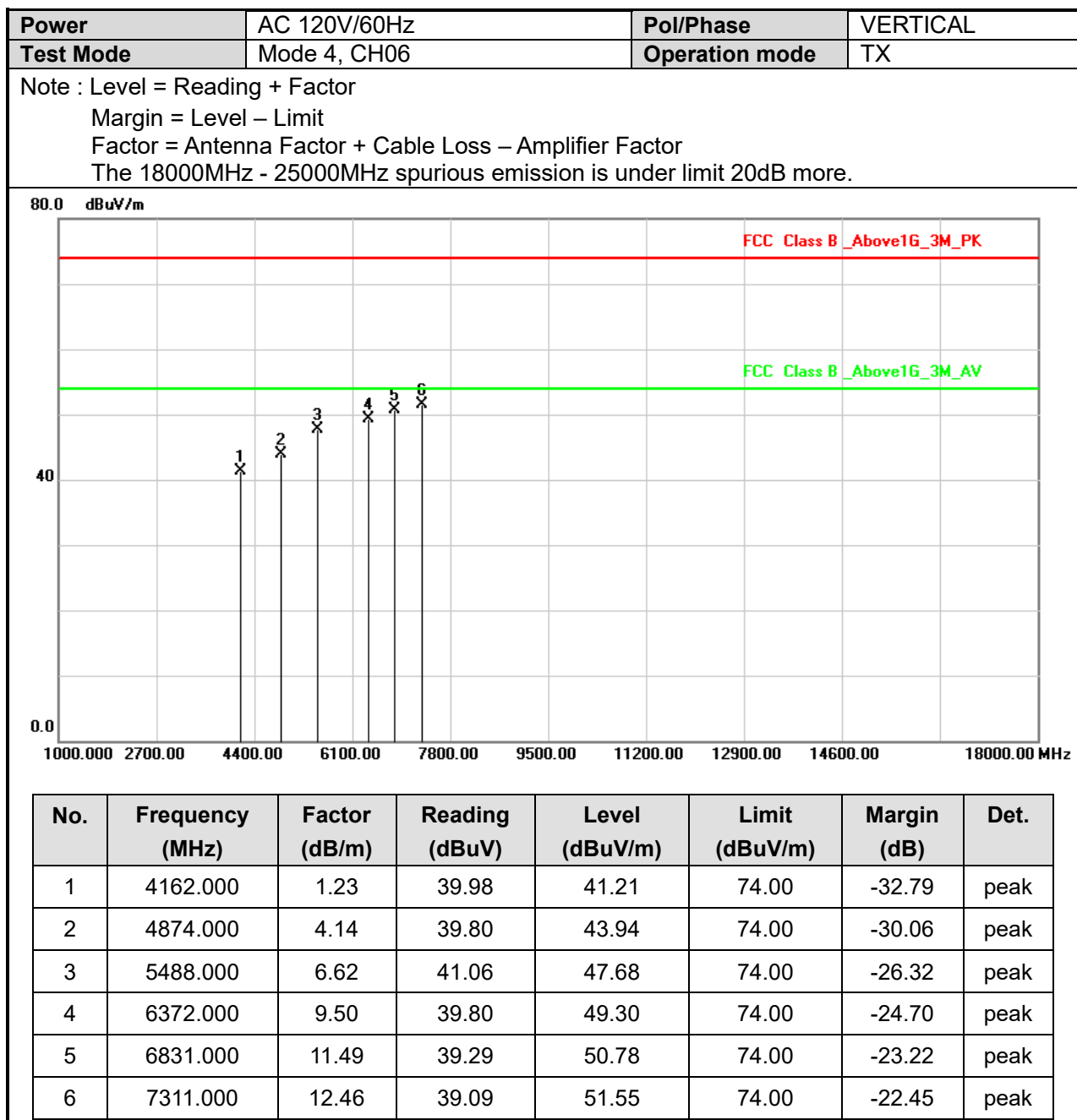


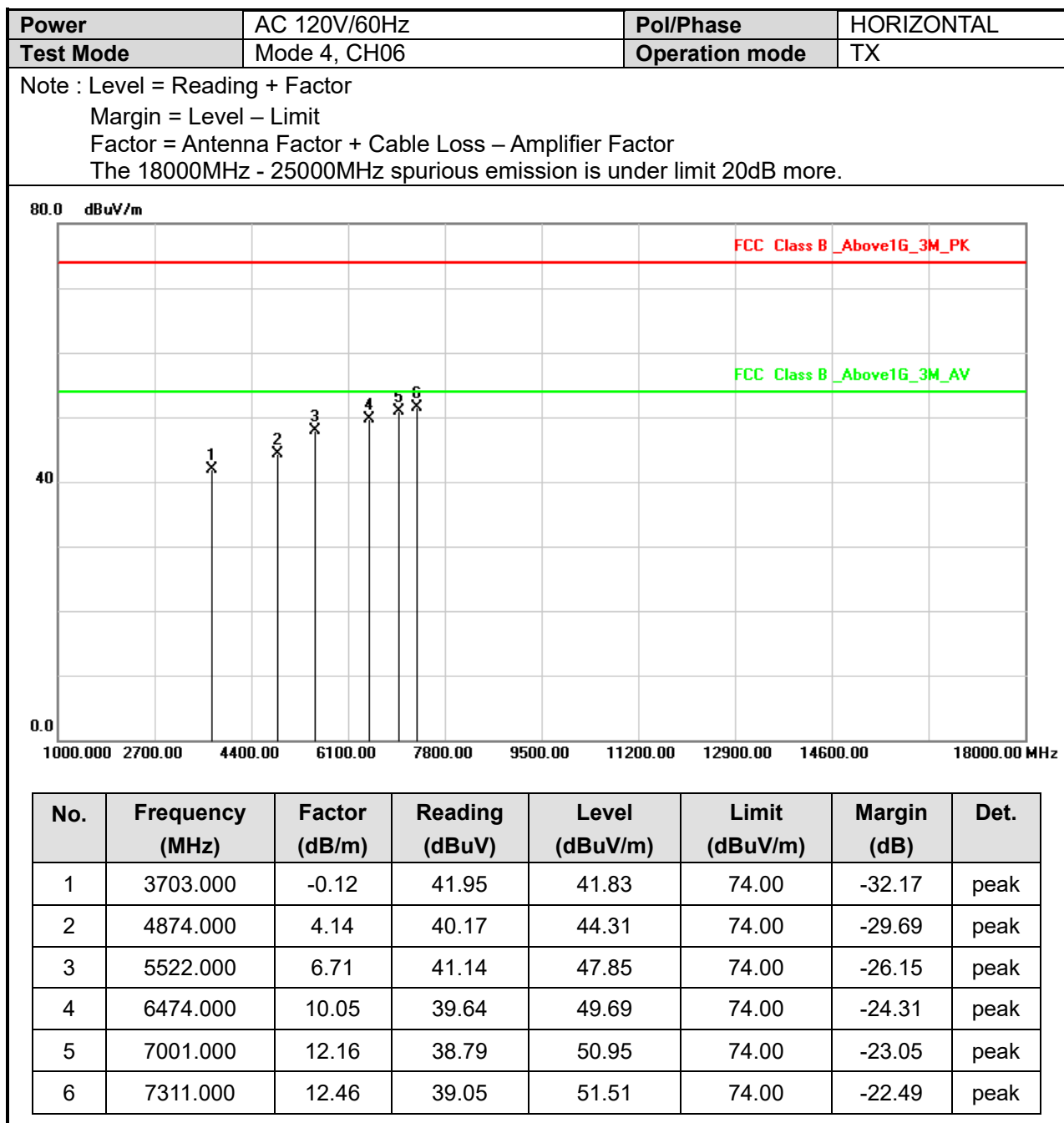


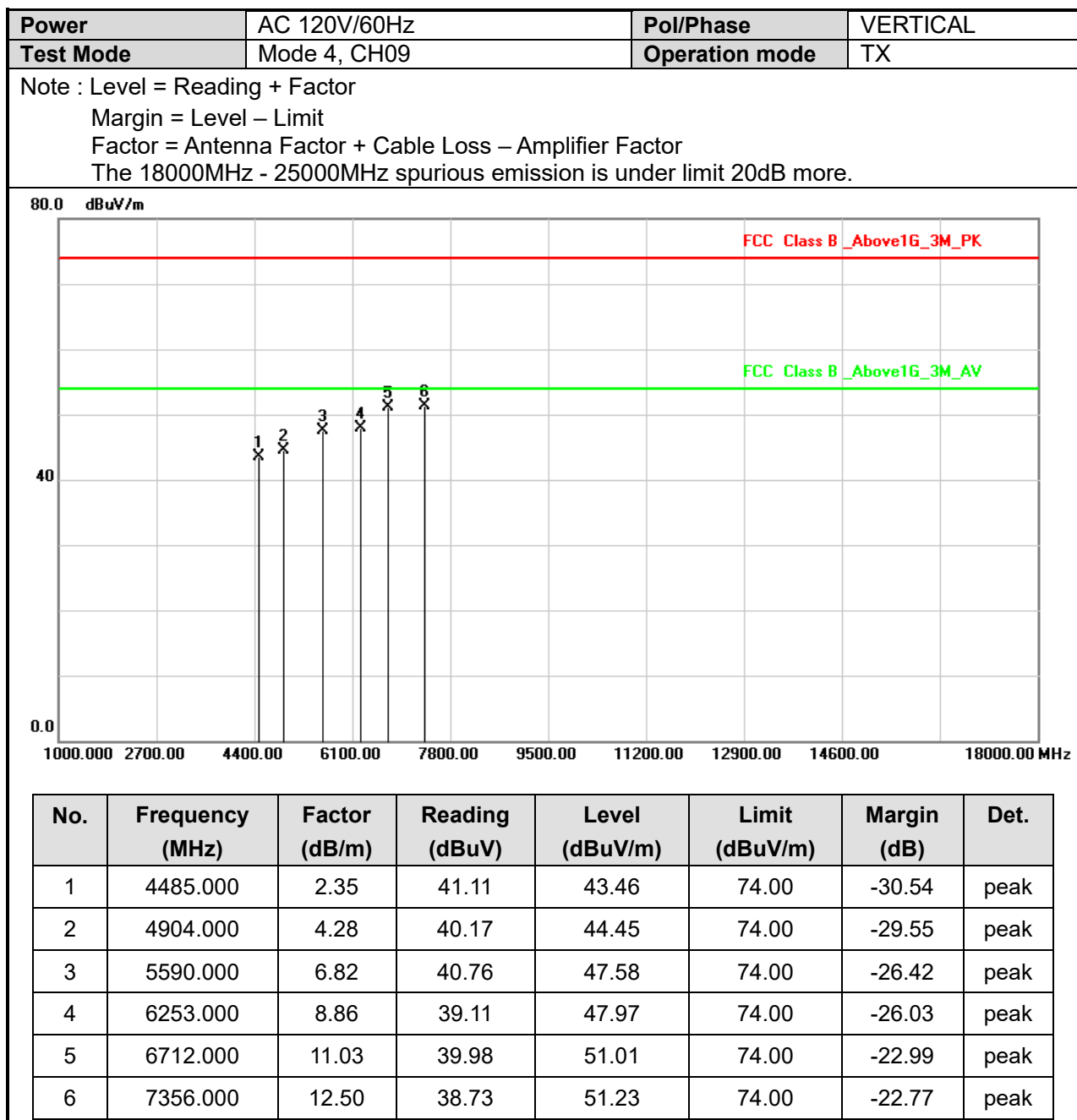


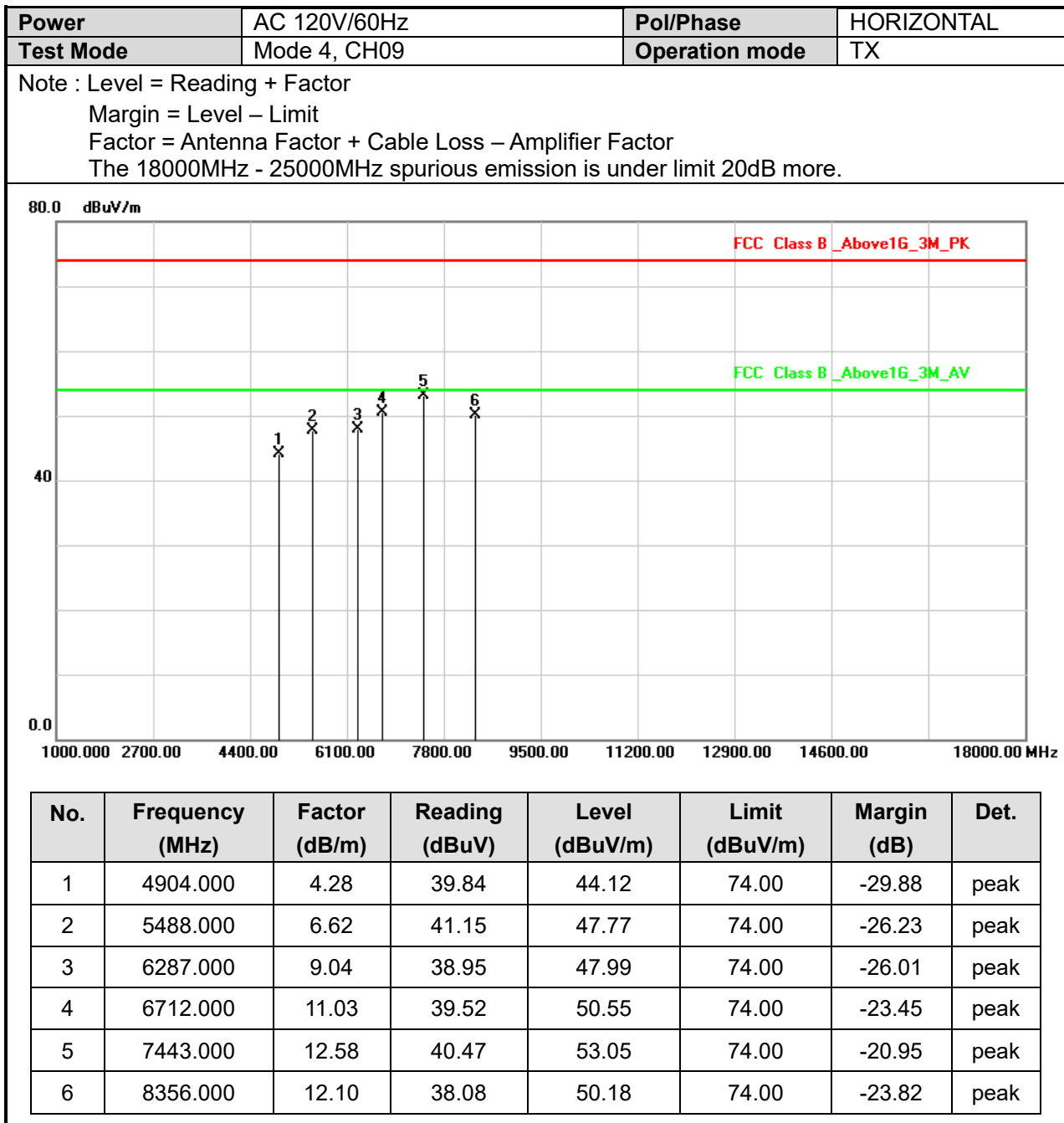














## 6.7 Restricted Bands of Operation

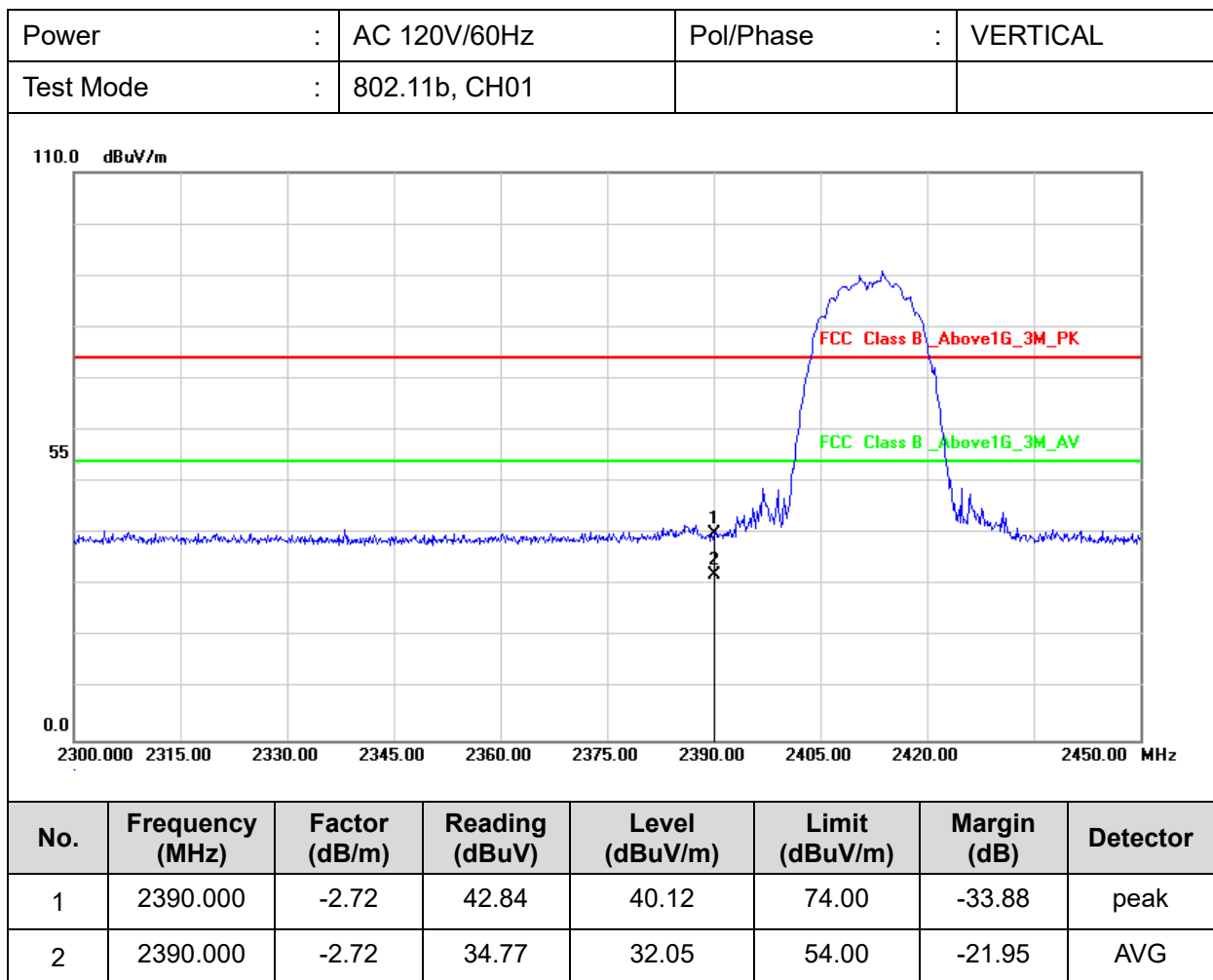
Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                 | MHz                   | MHz             | GHz             |
|---------------------|-----------------------|-----------------|-----------------|
| 0.09000 – 0.11000   | 16.42000 – 16.42300   | 399.9 – 410.0   | 4.500 – 5.250   |
| 0.49500 – 0.505**   | 16.69475 – 16.69525   | 608.0 – 614.0   | 5.350 – 5.460   |
| 2.17350 – 2.19050   | 16.80425 – 16.80475   | 960.0 – 1240.0  | 7.250 – 7.750   |
| 4.12500 – 4.12800   | 25.50000 – 25.67000   | 1300.0 – 1427.0 | 8.025 – 8.500   |
| 4.17725 – 4.17775   | 37.50000 – 38.25000   | 1435.0 – 1626.5 | 9.000 – 9.200   |
| 4.20725 – 4.20775   | 73.00000 – 74.60000   | 1645.5 – 1646.5 | 9.300 – 9.500   |
| 6.21500 – 6.21800   | 74.80000 – 75.20000   | 1660.0 – 1710.0 | 10.600 – 12.700 |
| 6.26775 – 6.26825   | 108.00000 – 121.94000 | 1718.8 – 1722.2 | 13.250 – 13.400 |
| 6.31175 – 6.31225   | 123.00000 – 138.00000 | 2200.0 – 2300.0 | 14.470 – 14.500 |
| 8.29100 – 8.29400   | 149.90000 – 150.05000 | 2310.0 – 2390.0 | 15.350 – 16.200 |
| 8.36200 – 8.36600   | 156.52475 – 156.52525 | 2483.5 – 2500.0 | 17.700 – 21.400 |
| 8.37625 – 8.38675   | 156.70000 – 156.90000 | 2655.0 – 2900.0 | 22.010 – 23.120 |
| 8.41425 – 8.41475   | 162.01250 – 167.17000 | 3260.0 – 3267.0 | 23.600 – 24.000 |
| 12.29000 – 12.29300 | 167.72000 – 173.20000 | 3332.0 – 3339.0 | 31.200 – 31.800 |
| 12.51975 – 12.52025 | 240.00000 – 285.00000 | 3345.8 – 3358.0 | 36.430 – 36.500 |
| 12.57675 – 12.57725 | 322.00000 – 335.40000 | 3600.0 – 4400.0 | Above 38.6      |
| 13.36000 – 13.41000 |                       |                 |                 |

\*\* : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

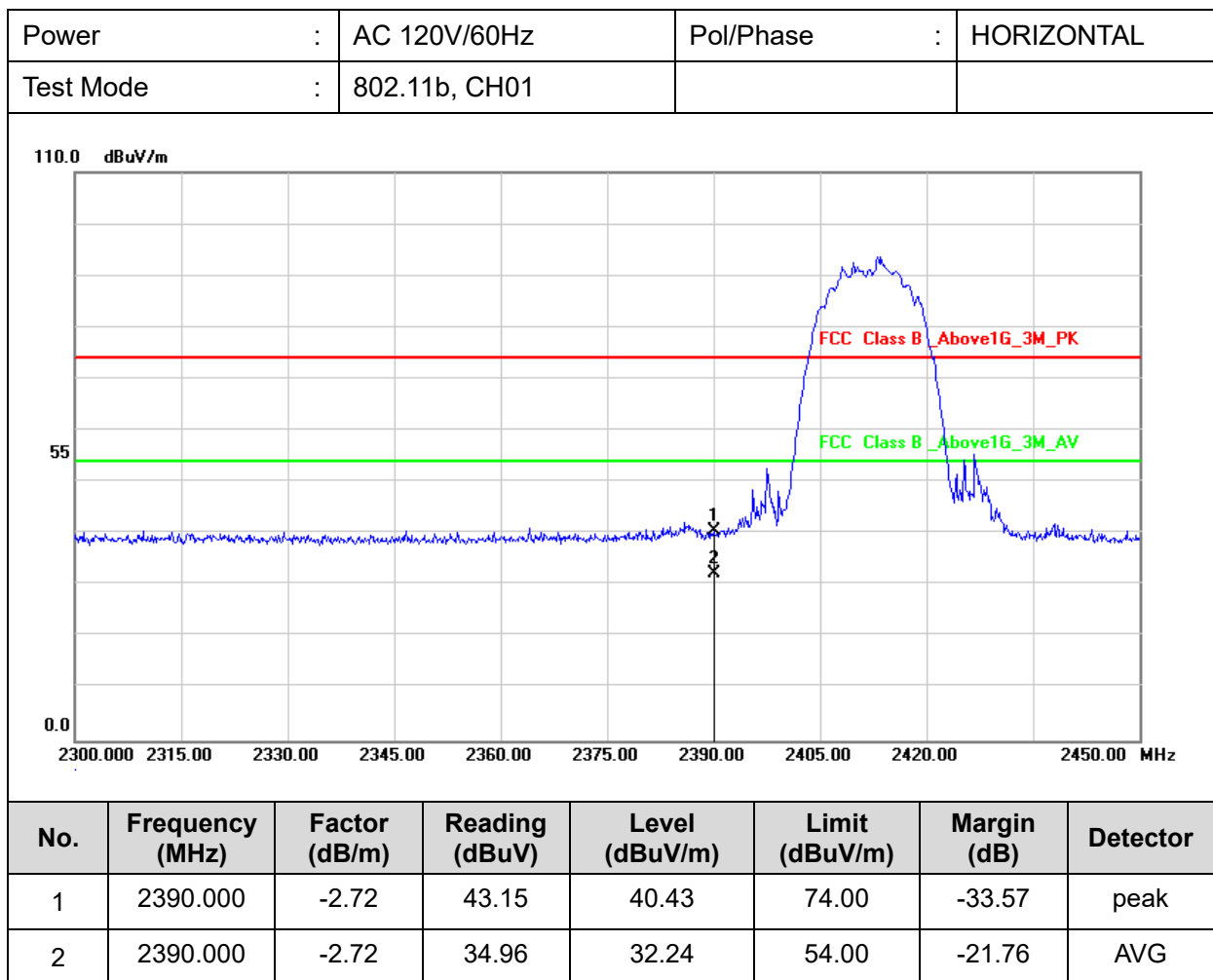


## 6.8 Restrict Band Emission Measurement Data



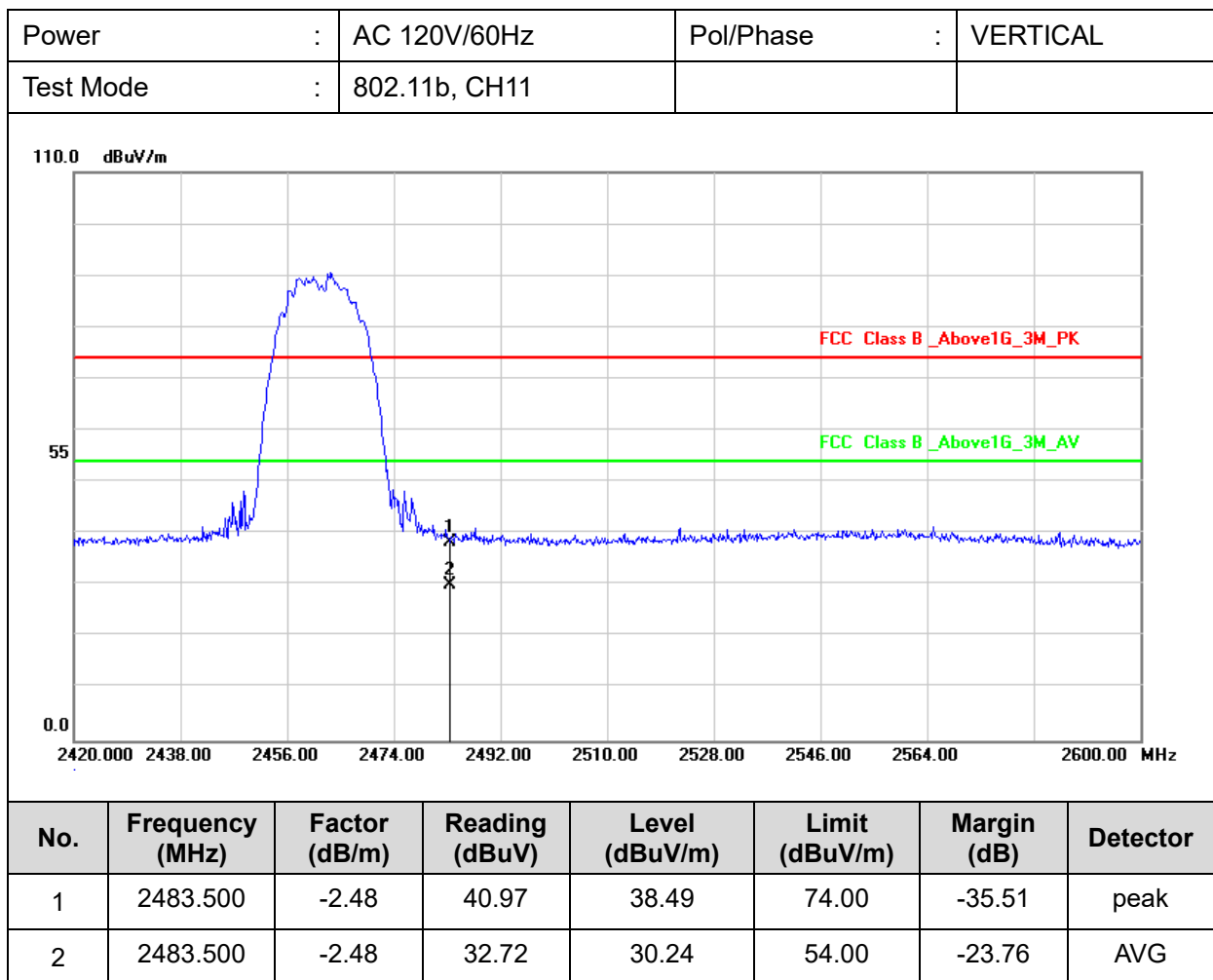
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



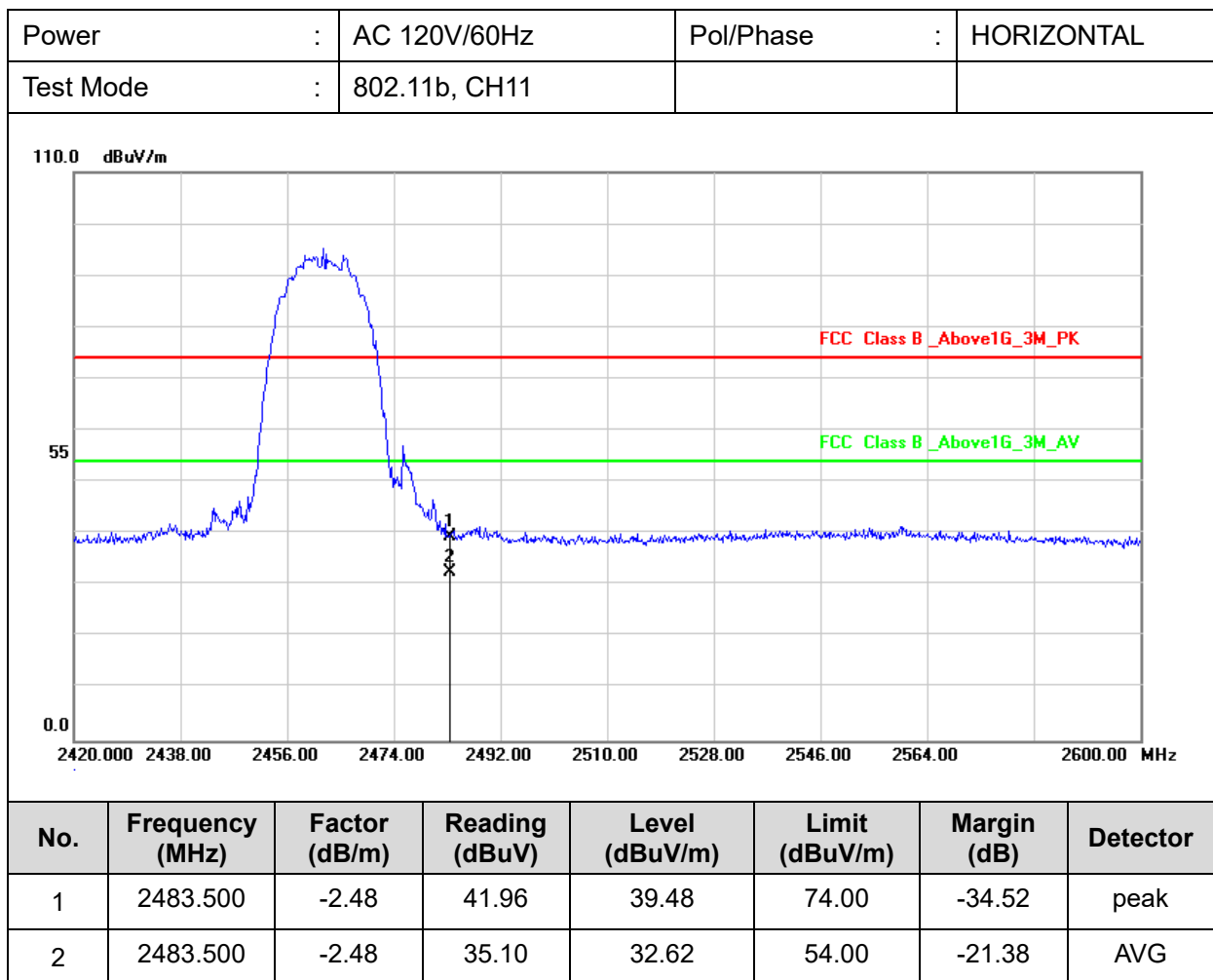
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



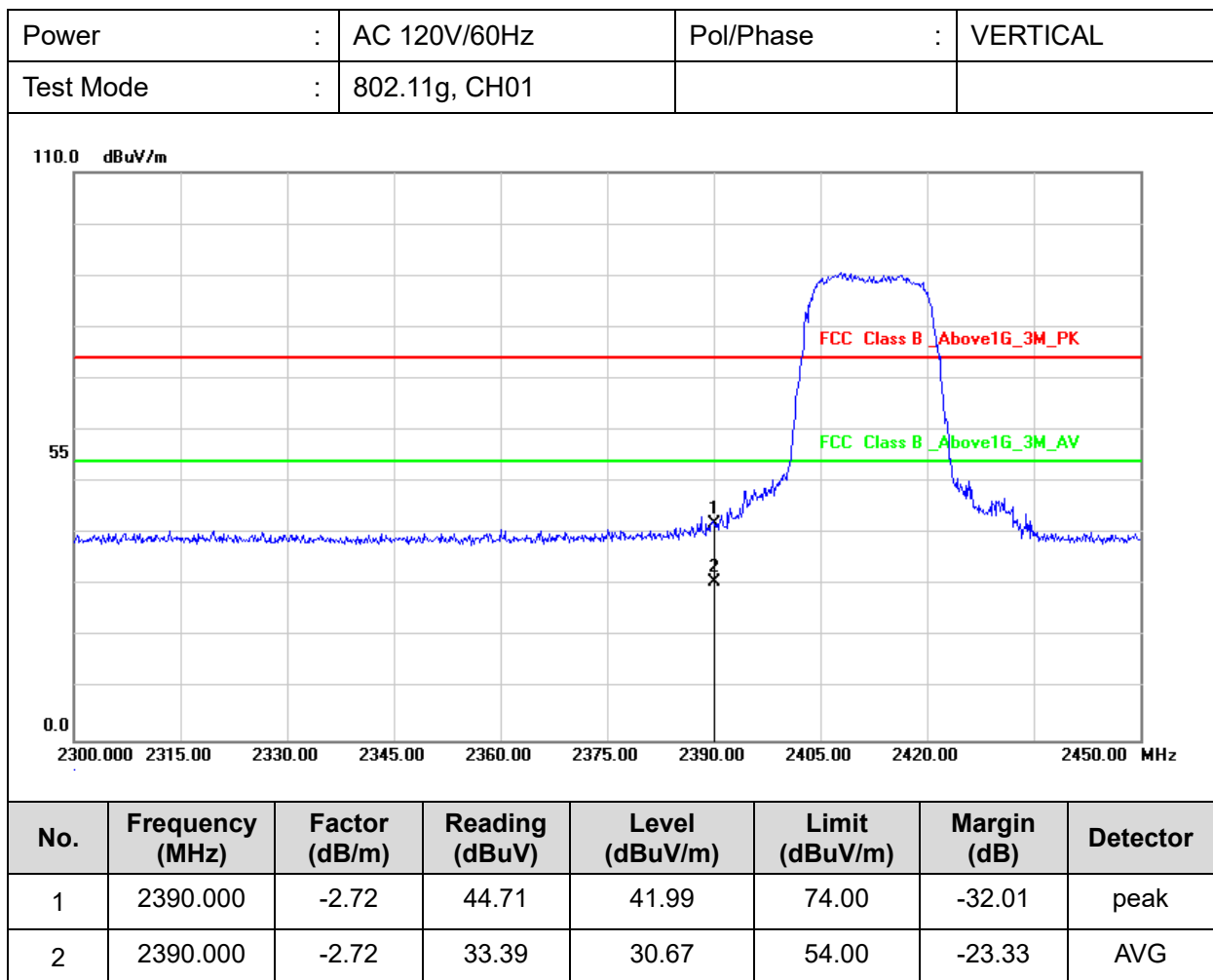
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



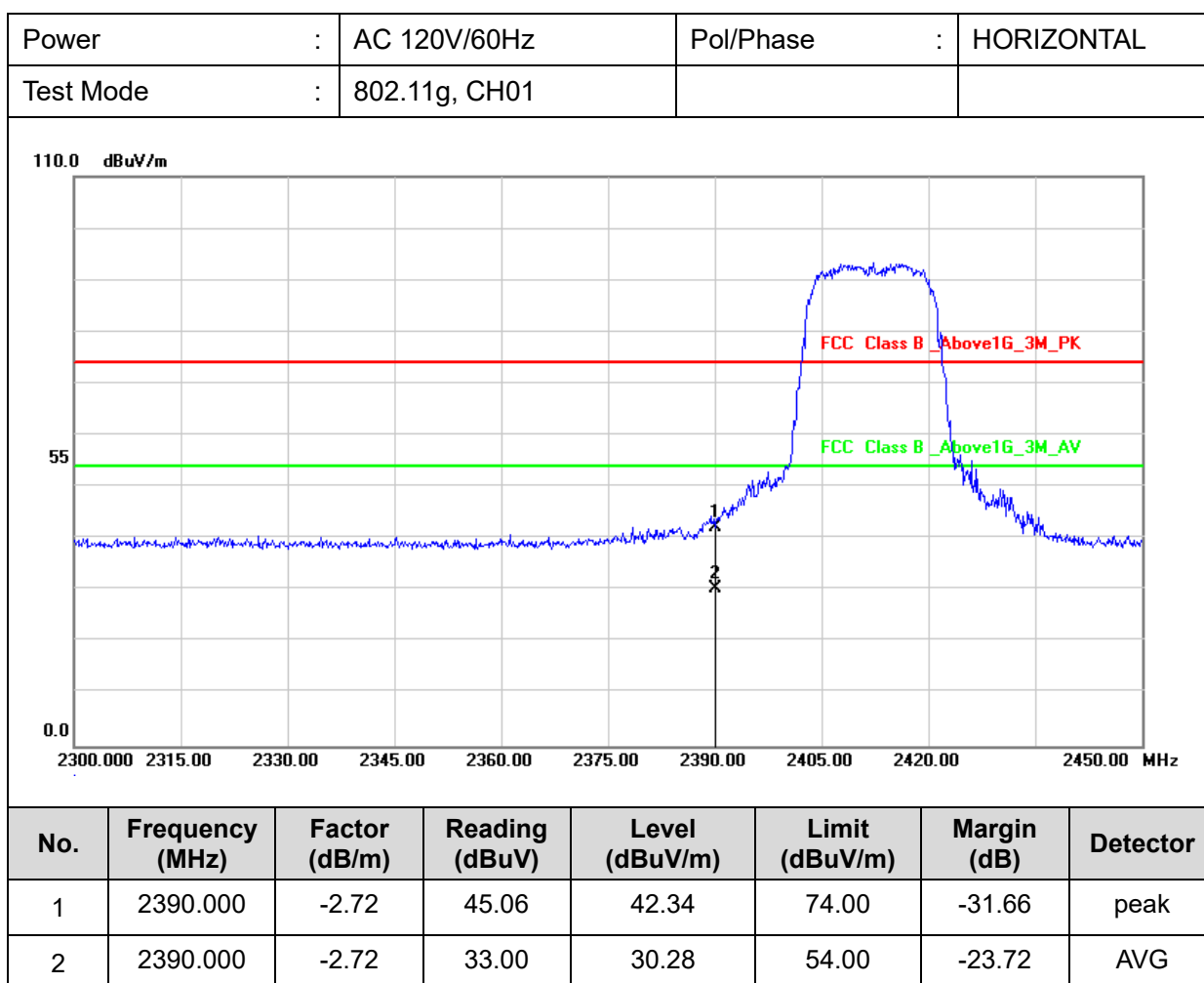
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



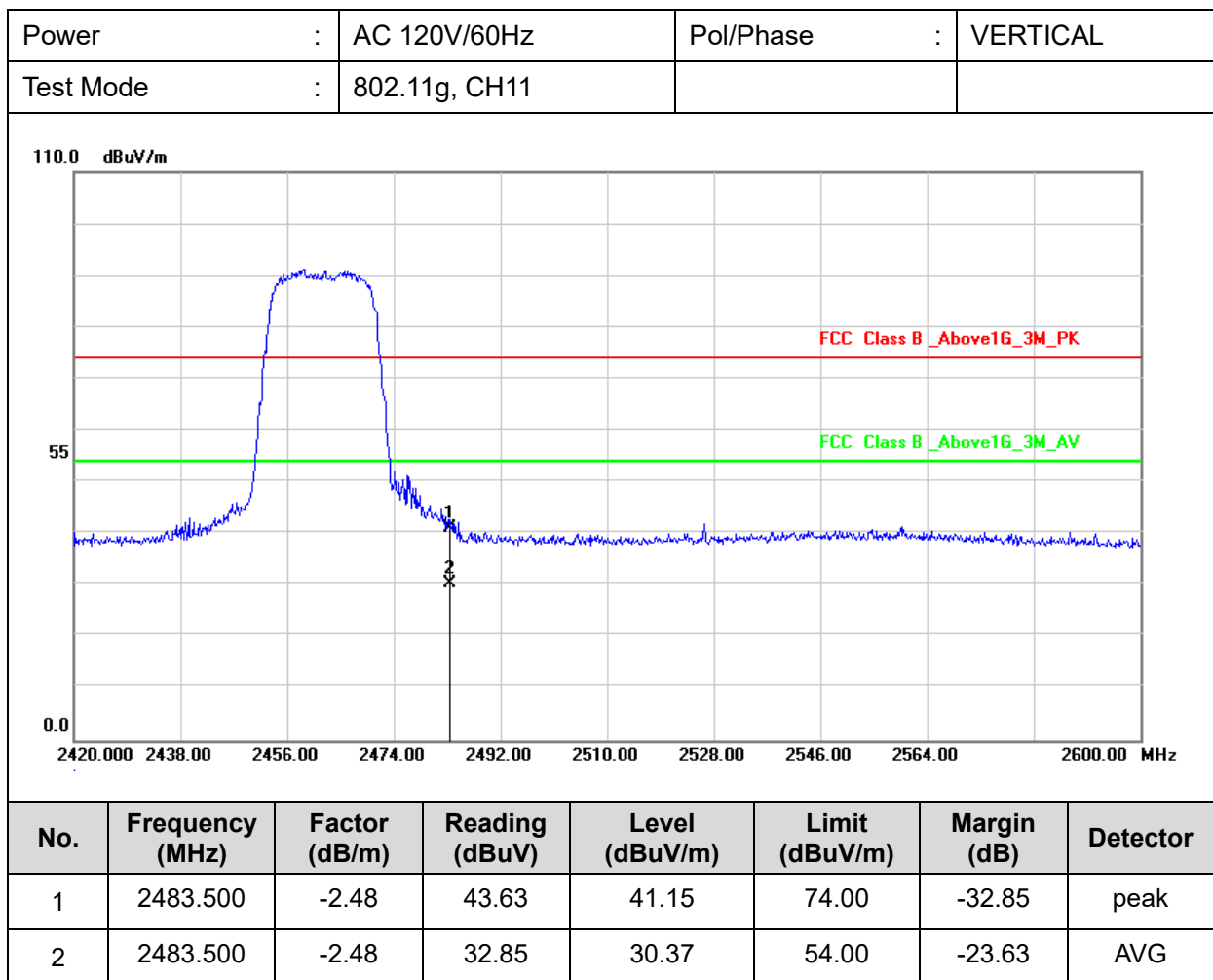
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



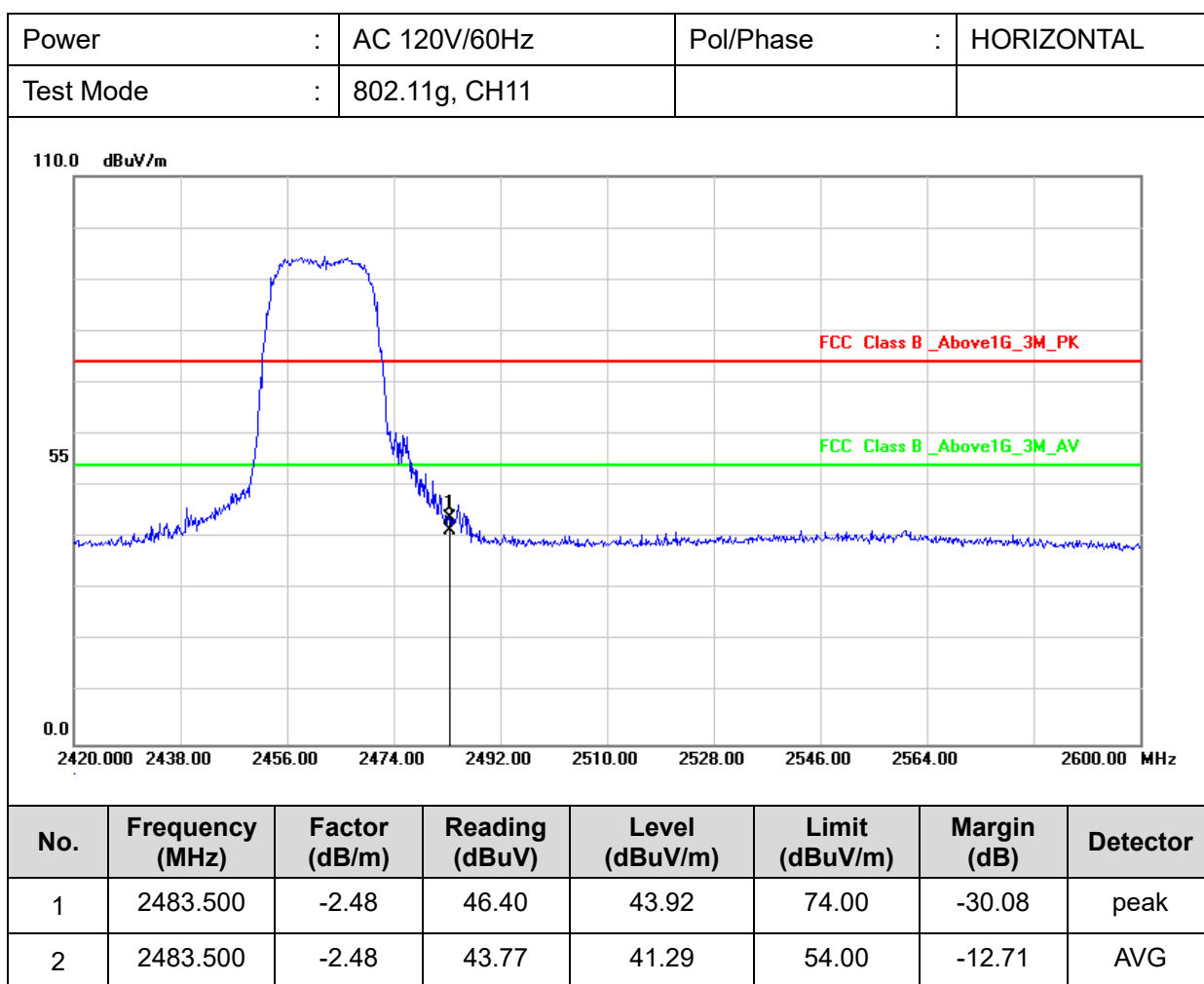
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



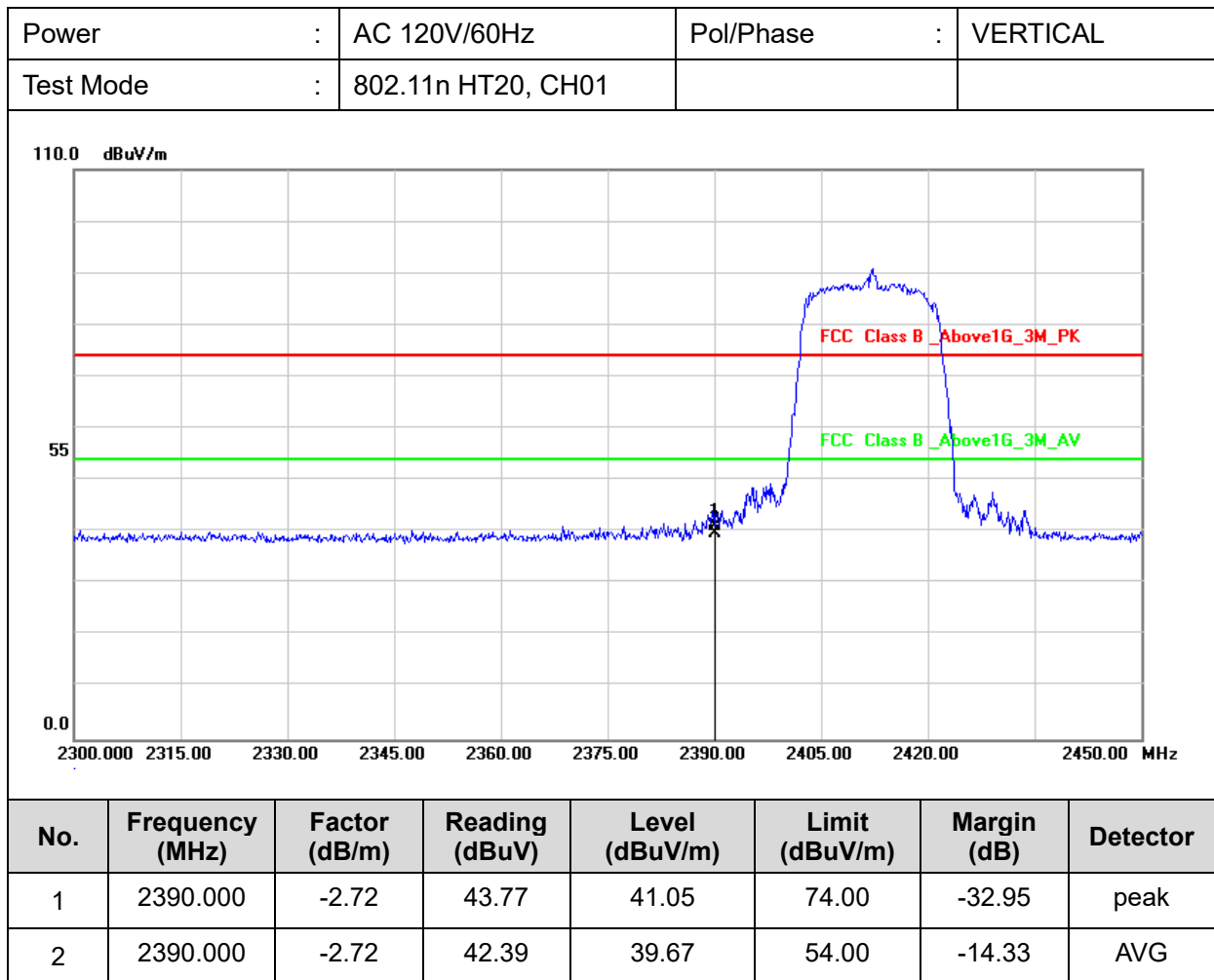
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



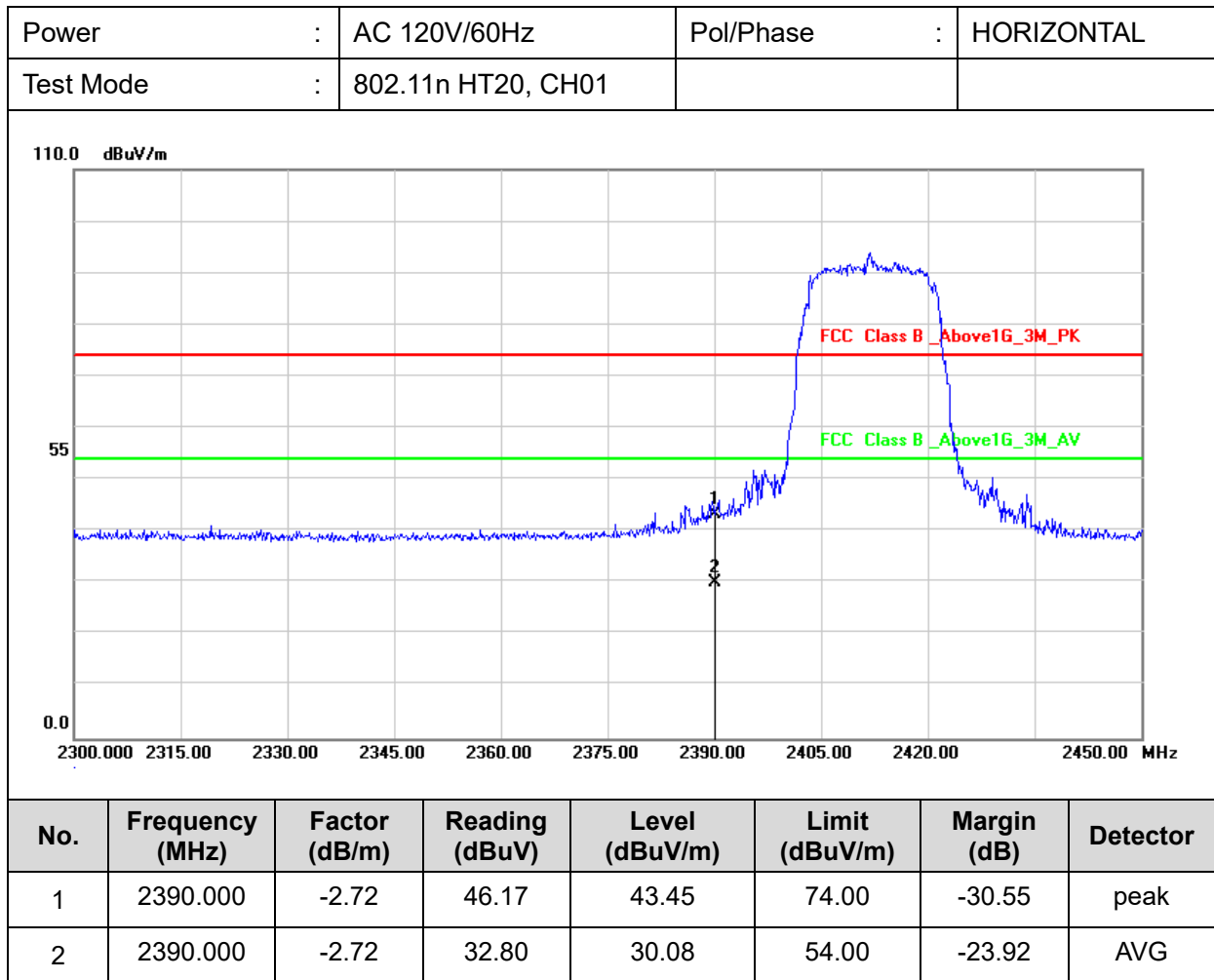
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



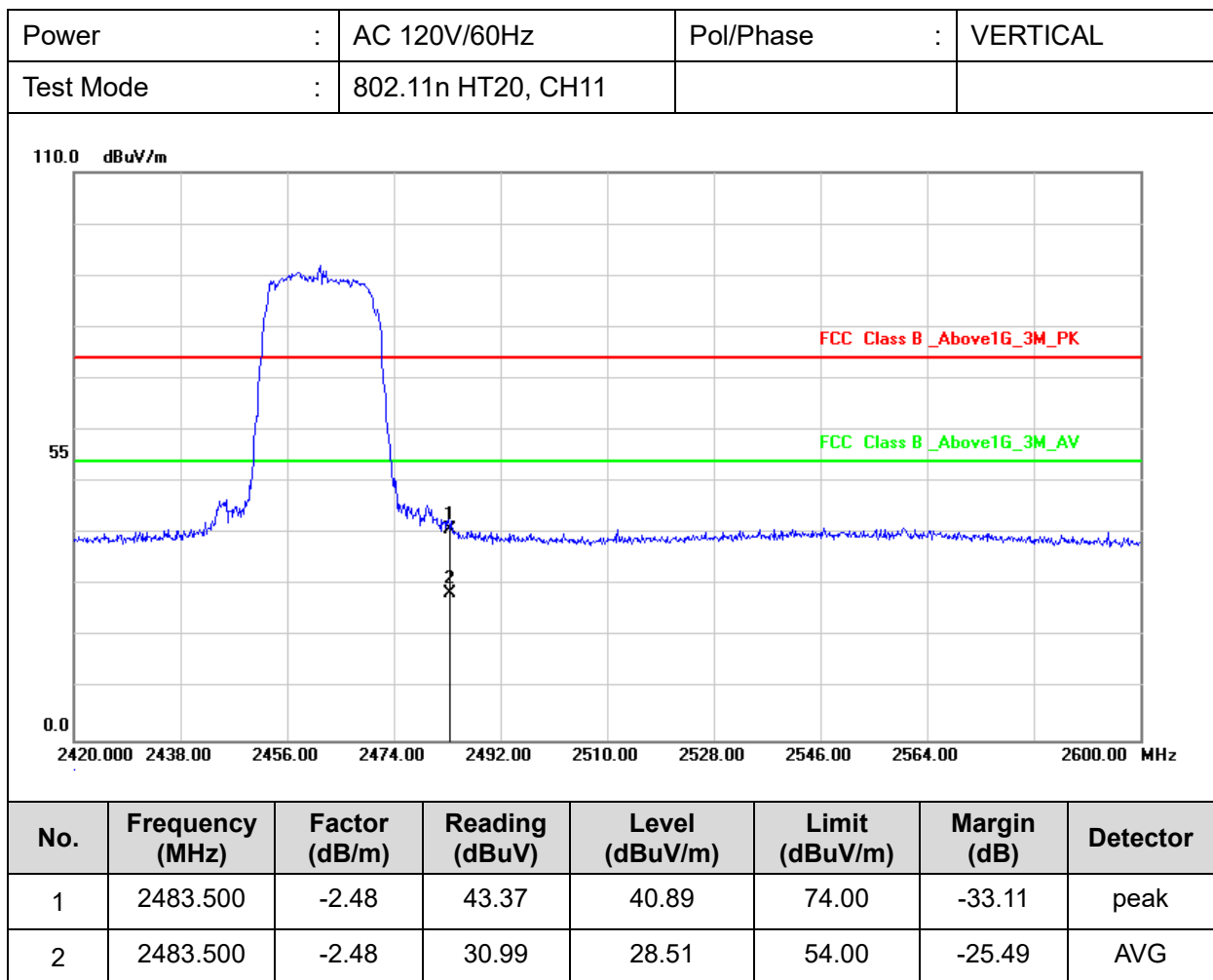
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



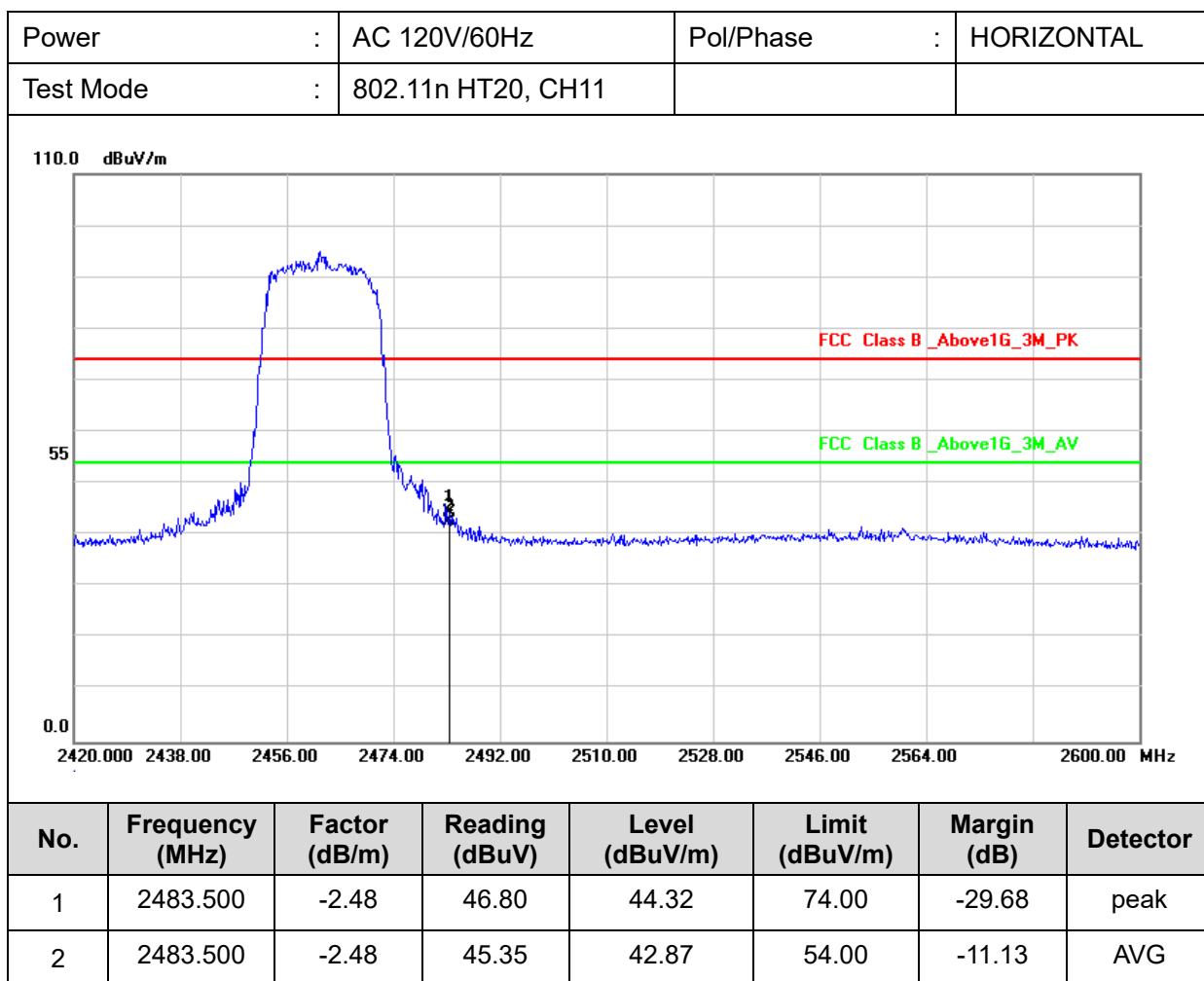
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



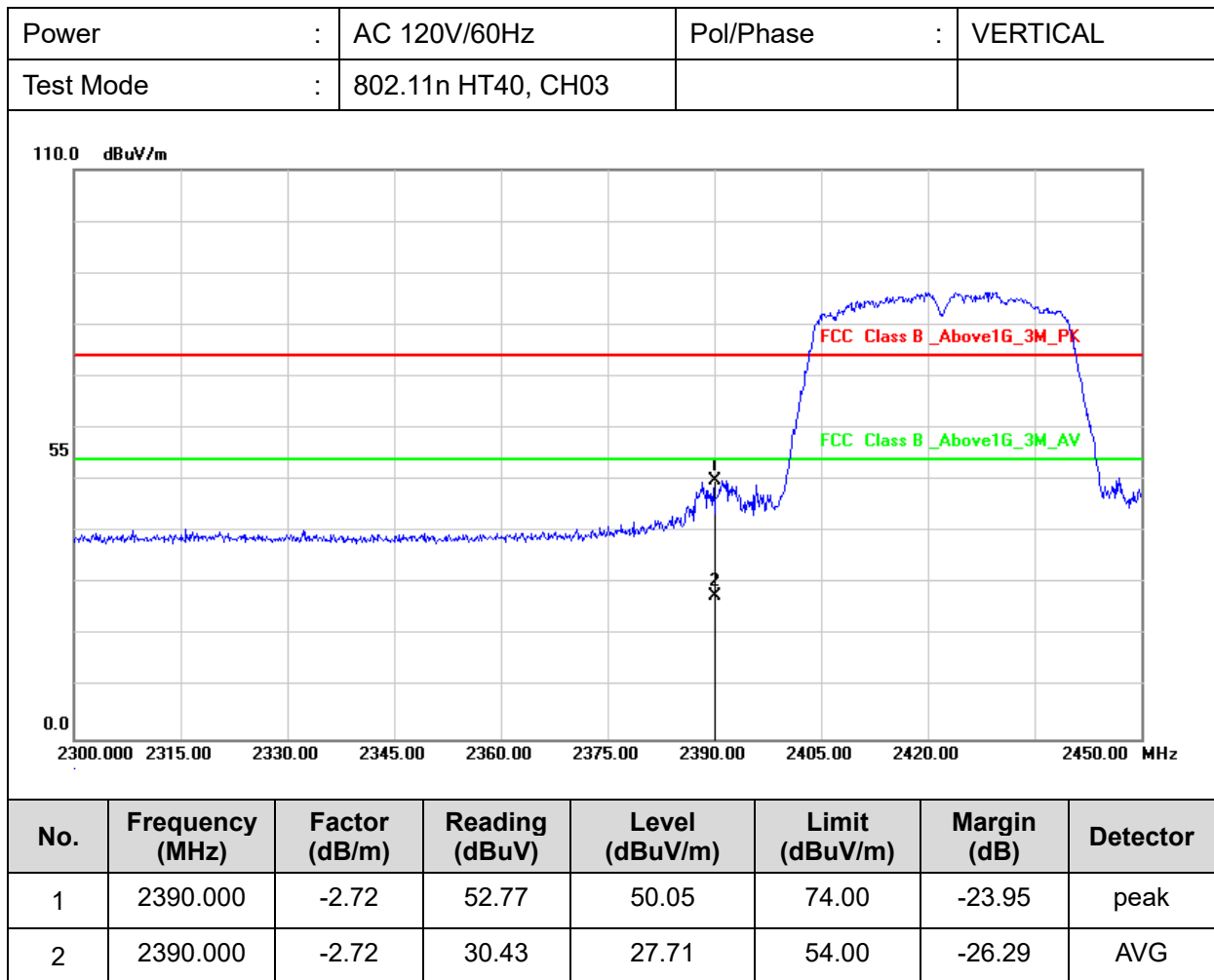
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



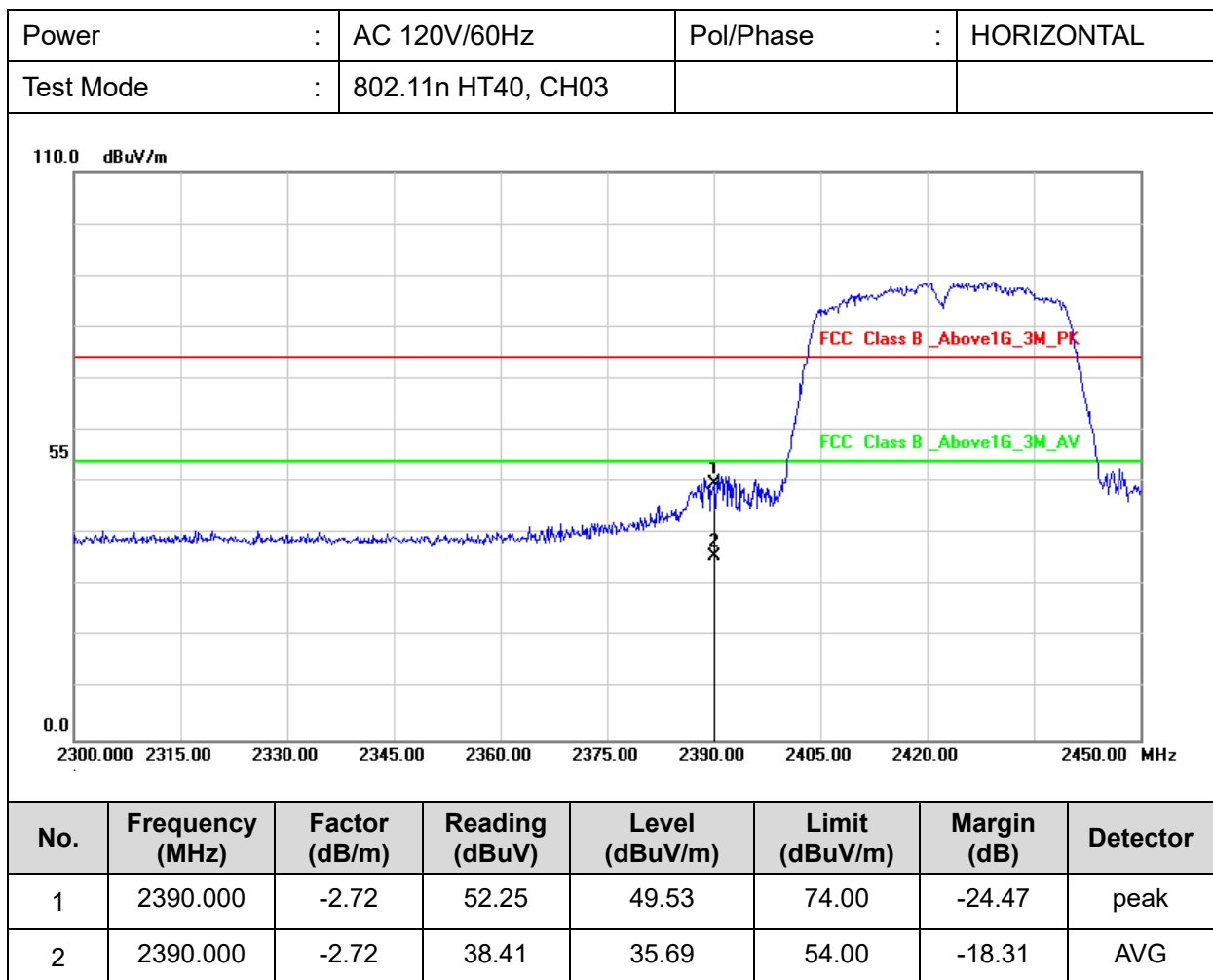
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



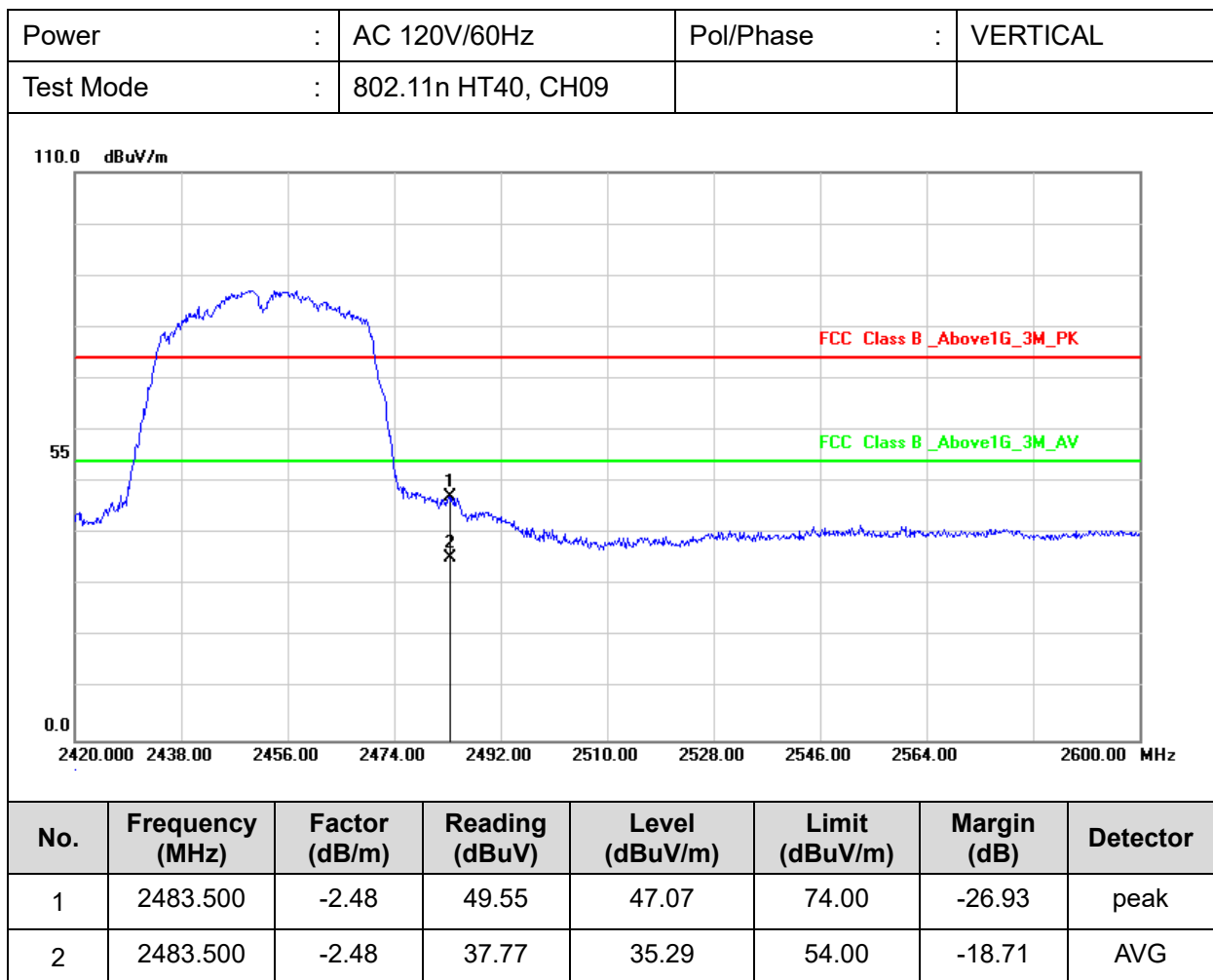
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



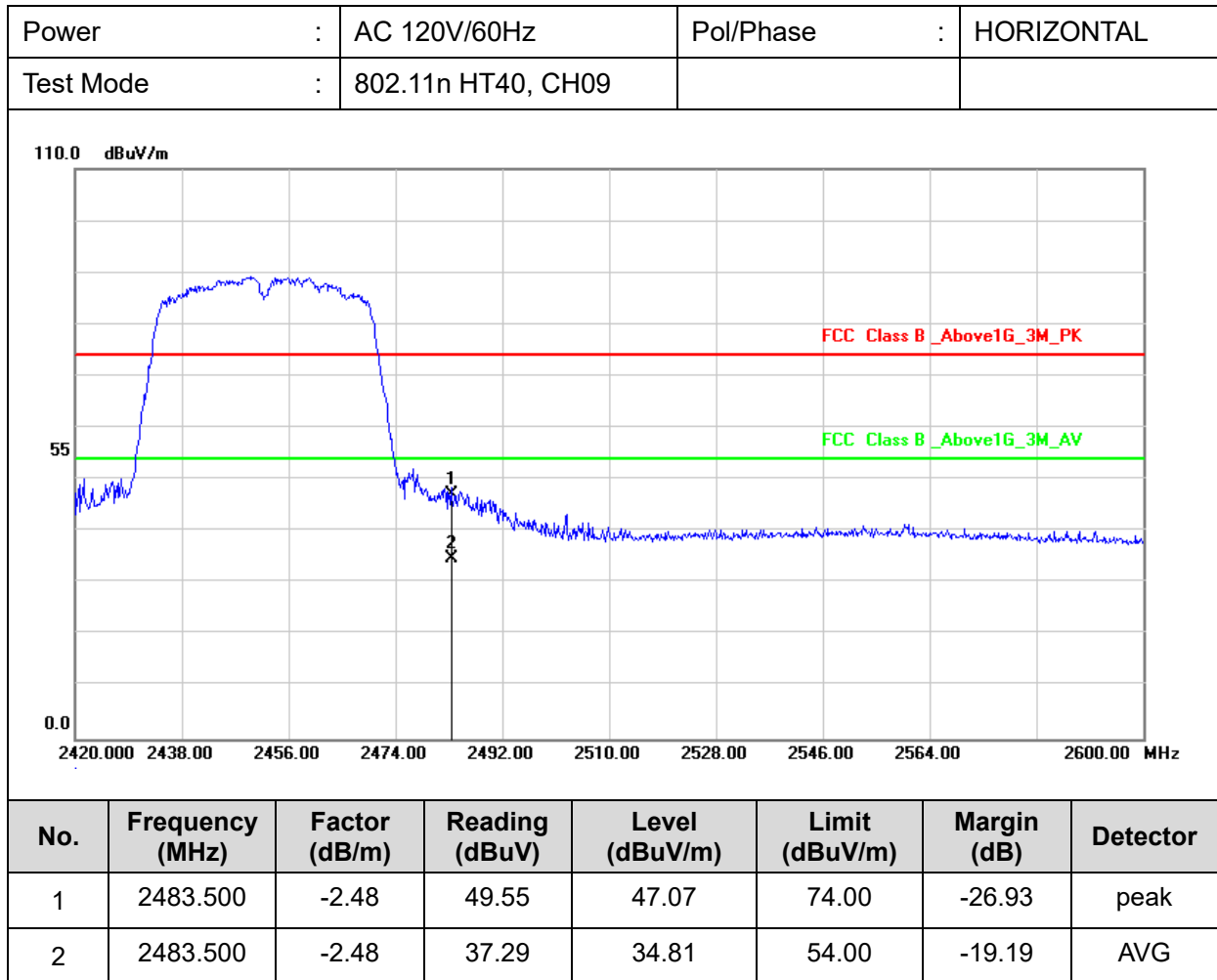
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



## 7. Test of Spurious Emission (Conducted)

### 7.1 Test Limit

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

### 7.2 Test Procedure

KDB 558074 D01 DTS Meas Guidance v05r02

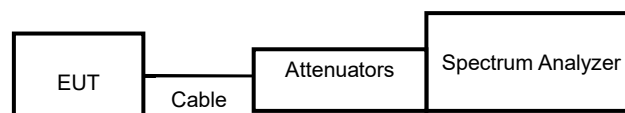
#### 1. Reference level measurement

- (a) Set instrument center frequency to DTS channel center frequency
- (b) Set the span to  $\geq 1.5$  times the DTS bandwidth
- (c) Set the RBW = 100 kHz
- (d) Set the VBW  $\geq 3 \times$  RBW
- (e) Detector = peak
- (f) Sweep time = auto couple
- (g) Trace mode = max hold
- (h) Allow trace to fully stabilize

#### 2. Emission level measurement

- (a) Set the center frequency and span to encompass frequency range to be measured
- (b) RBW = 100kHz
- (c) VBW = 300kHz
- (d) Detector = Peak
- (e) Trace mode = max hold
- (f) Sweep time = auto couple
- (g) The trace was allowed to stabilize

### 7.3 Test Setup Layout

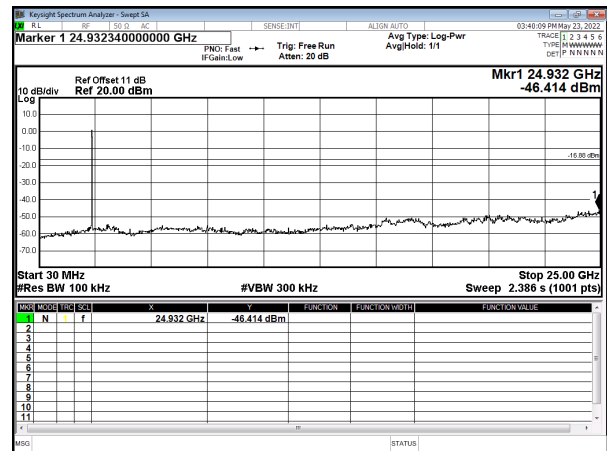
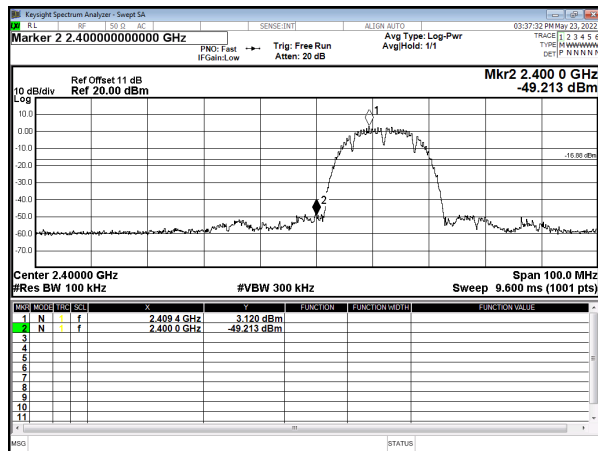




## 7.4 Test Result and Data

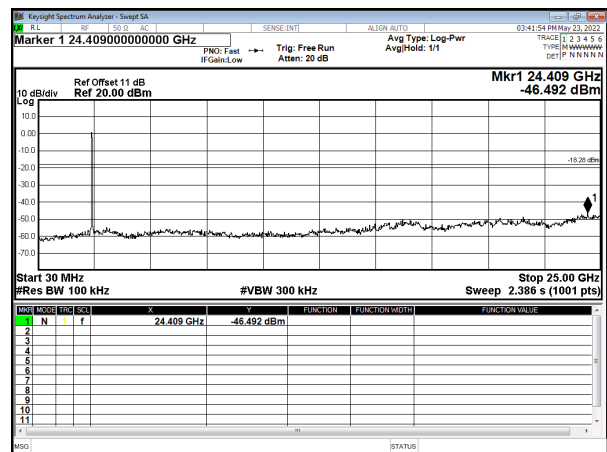
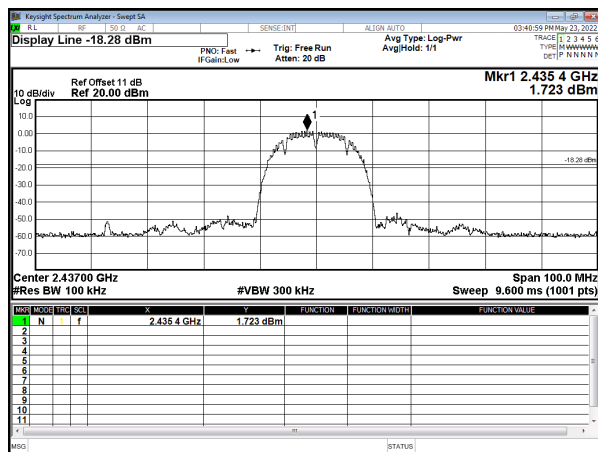
Modulation Standard: 802.11b

Channel: 01



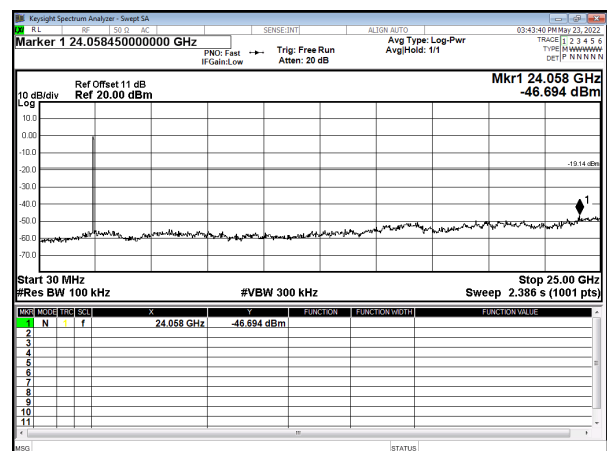
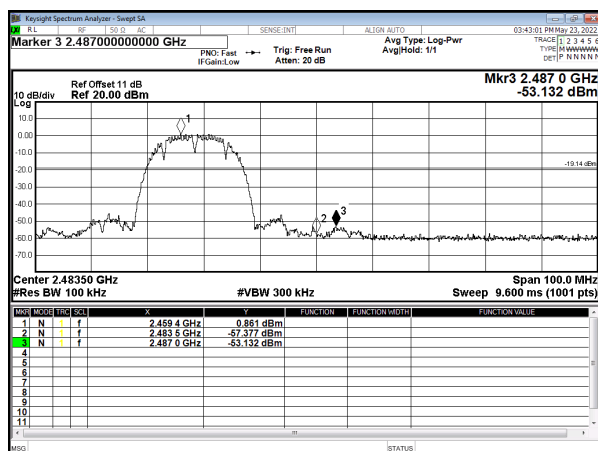
Modulation Standard: 802.11b

Channel: 06



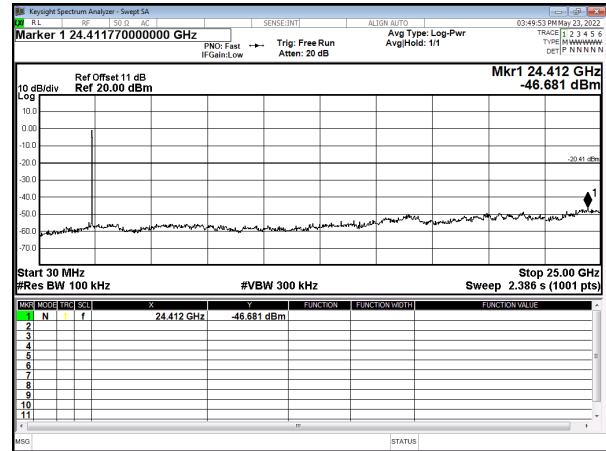
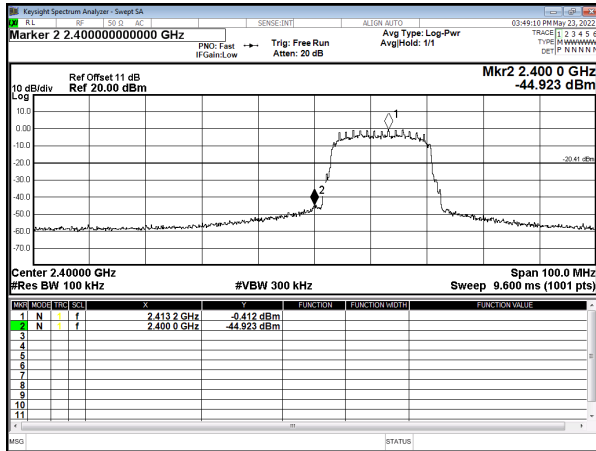
Modulation Standard: 802.11b

Channel: 11

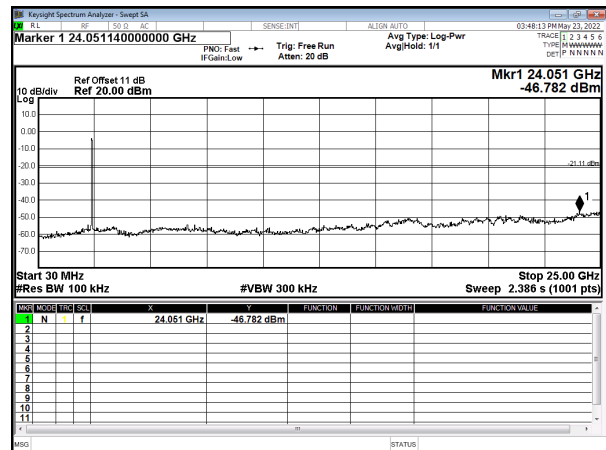
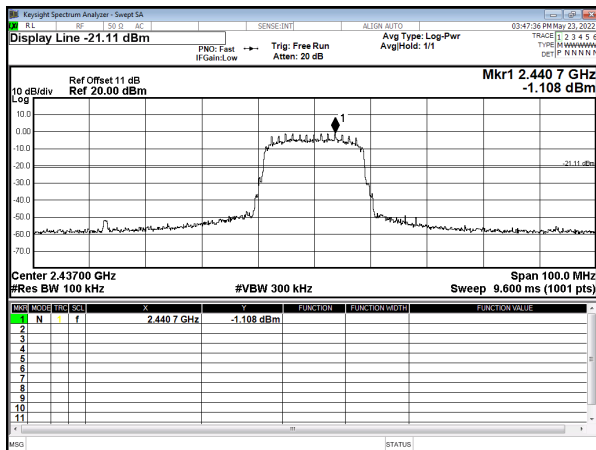




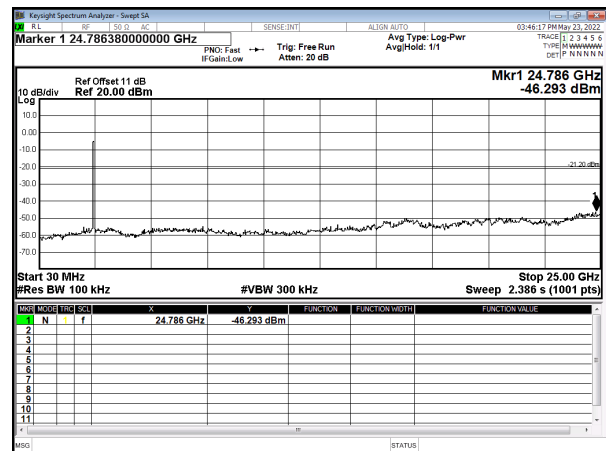
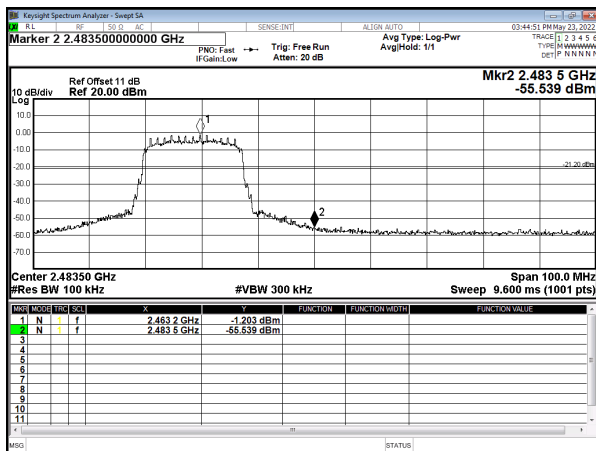
Modulation Standard: 802.11g  
Channel: 01



Modulation Standard: 802.11g  
Channel: 06

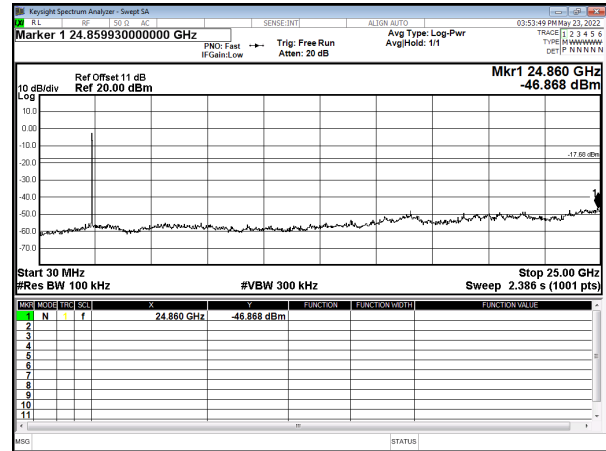
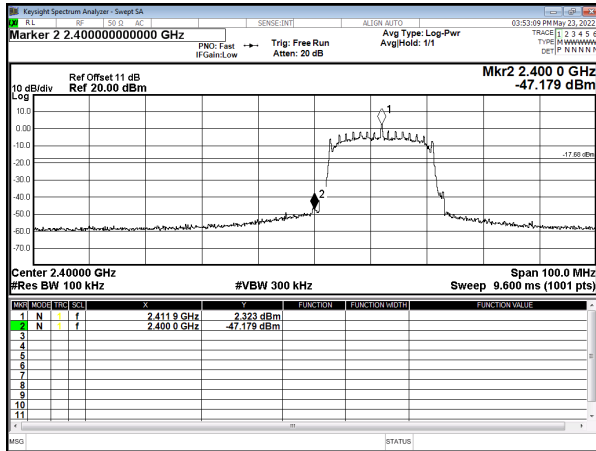


Modulation Standard: 802.11g  
Channel: 11

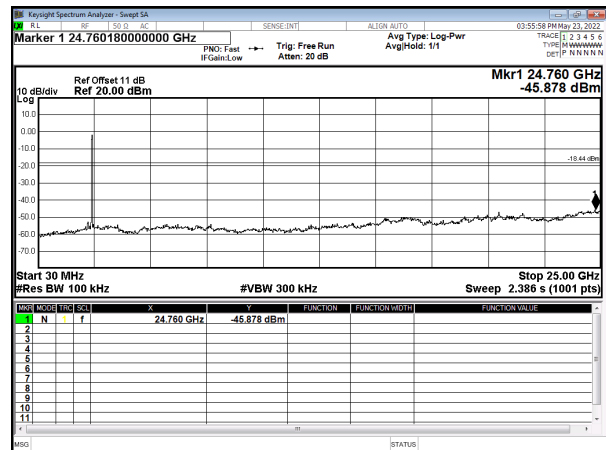
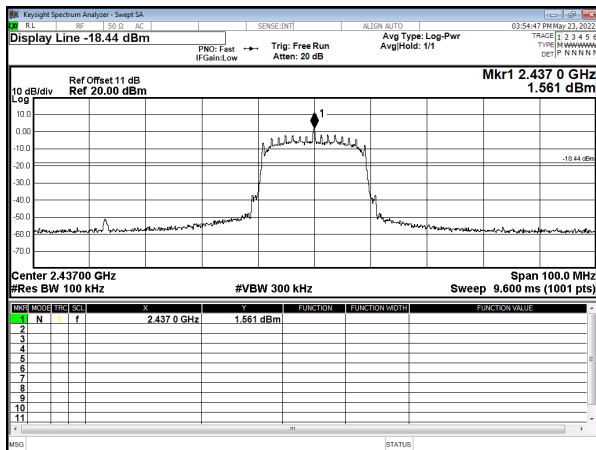




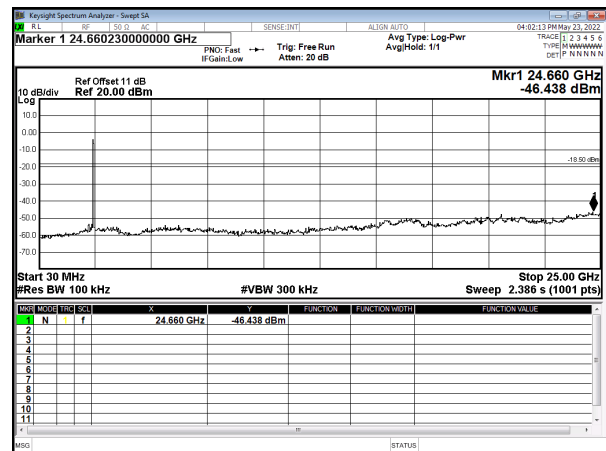
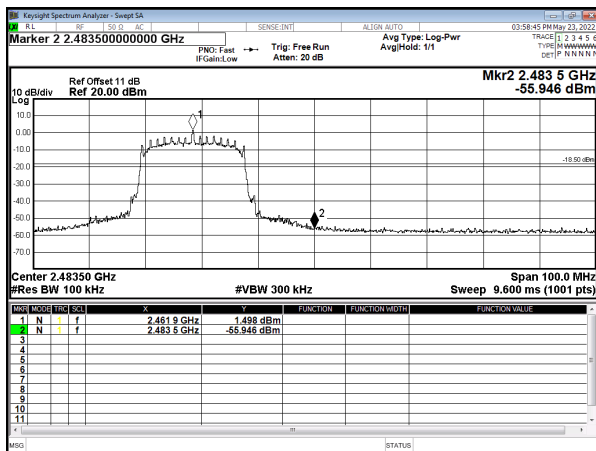
Modulation Standard: 802.11n HT20  
Channel: 01



Modulation Standard: 802.11n HT20  
Channel: 06

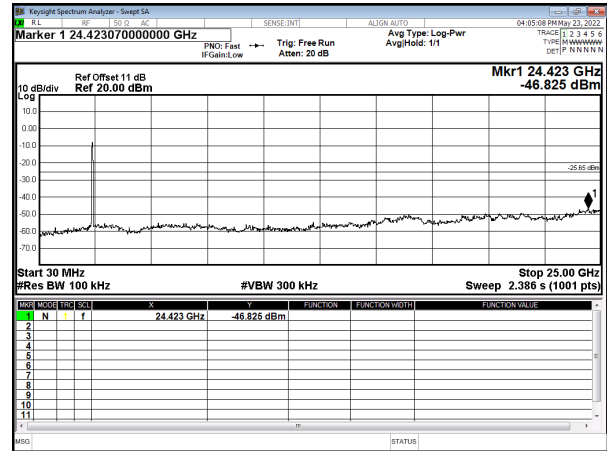
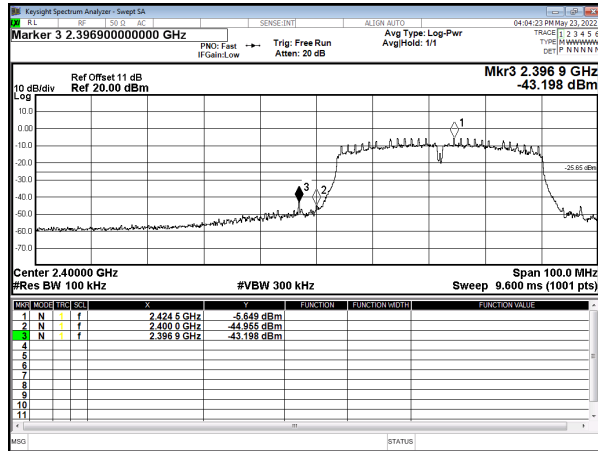


Modulation Standard: 802.11n HT20  
Channel: 11

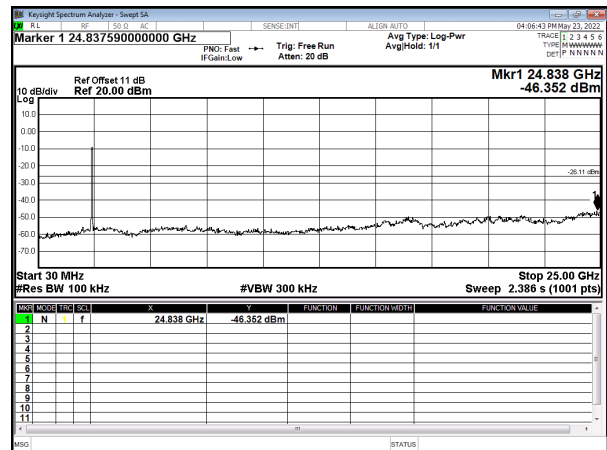
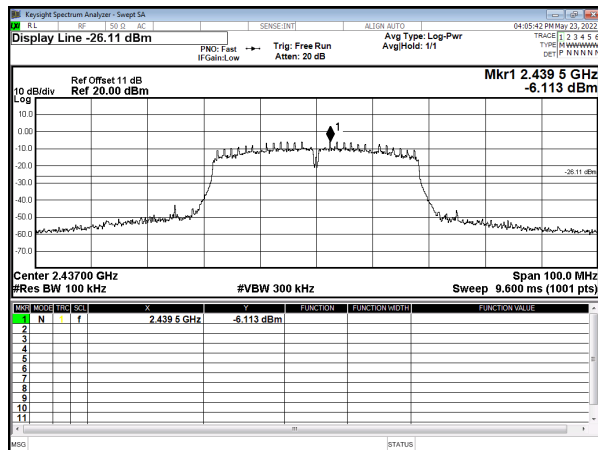




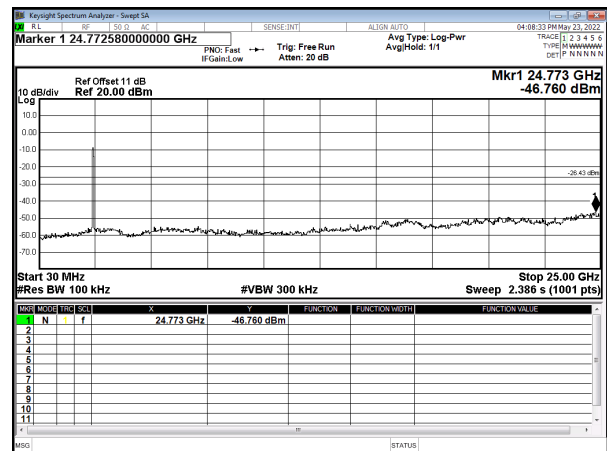
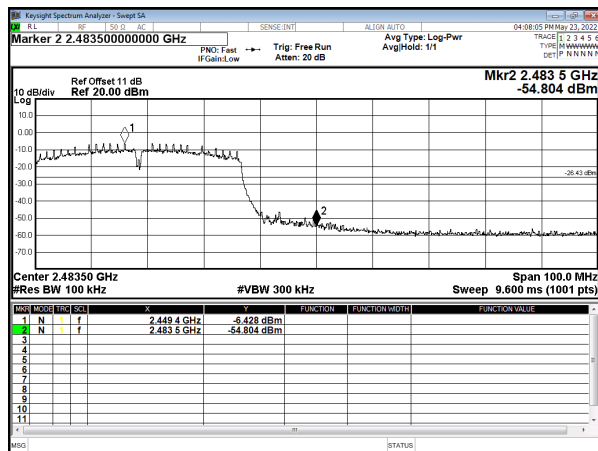
Modulation Standard: 802.11n HT40  
Channel: 03



Modulation Standard: 802.11n HT40  
Channel: 06



Modulation Standard: 802.11n HT40  
Channel: 09





## 8. 6dB Bandwidth Measurement Data

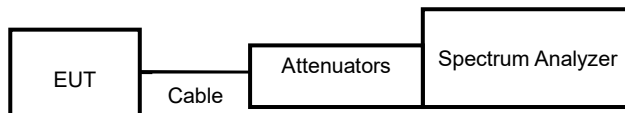
### 8.1 Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 8.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 100 KHz and VBW to 300 KHz.
- Set spectrum analyzer X dB to 6 dB.
- Set spectrum analyzer peak detector with maximum hold.

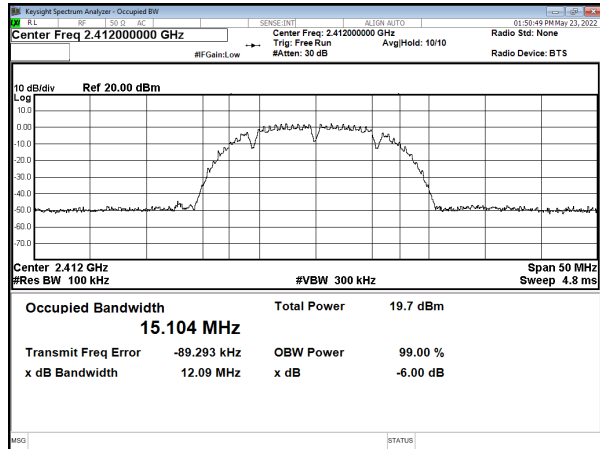
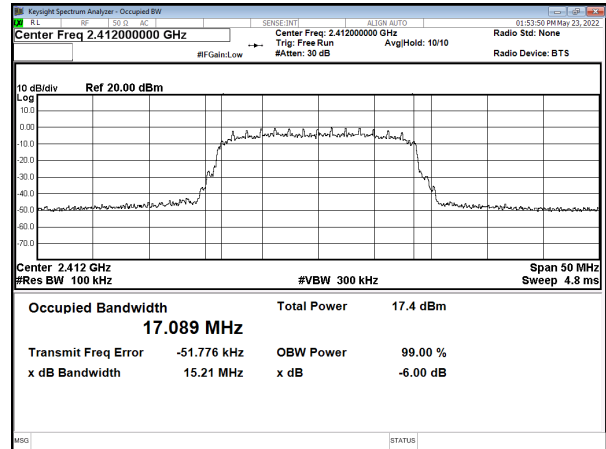
### 8.3 Test Setup Layout



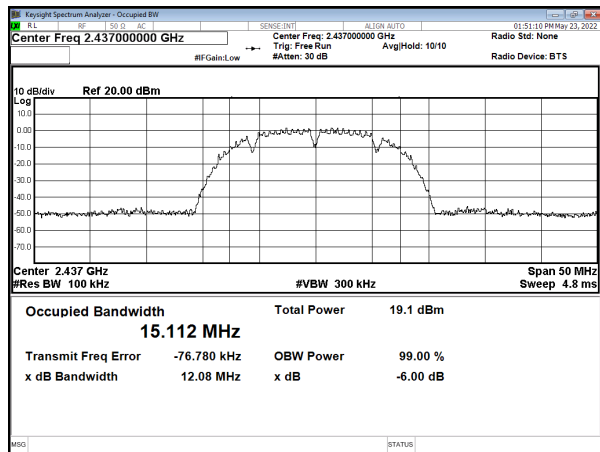


#### 8.4 Test Result and Data

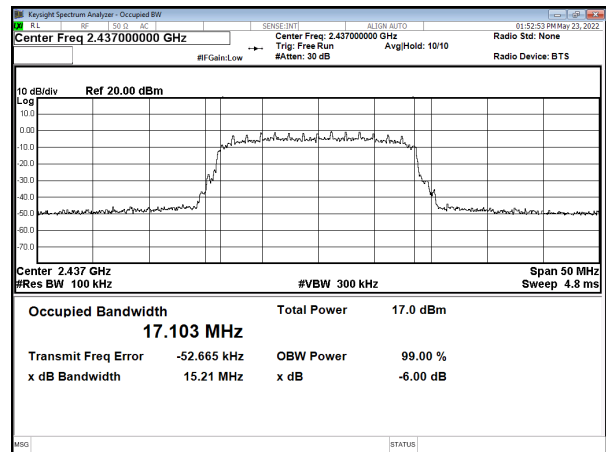
| Modulation Type   | Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) |
|-------------------|---------|-----------------|---------------------|-------------|
|                   |         |                 | ANT A               |             |
| IEEE 802.11b      | 01      | 2412            | 12.09               | 0.5         |
|                   | 06      | 2437            | 12.08               | 0.5         |
|                   | 11      | 2462            | 12.53               | 0.5         |
| IEEE 802.11g      | 01      | 2412            | 15.21               | 0.5         |
|                   | 06      | 2437            | 15.21               | 0.5         |
|                   | 11      | 2462            | 15.20               | 0.5         |
| IEEE 802.11n HT20 | 01      | 2412            | 13.86               | 0.5         |
|                   | 06      | 2437            | 13.82               | 0.5         |
|                   | 11      | 2462            | 13.80               | 0.5         |
| IEEE 802.11n HT40 | 03      | 2422            | 35.12               | 0.5         |
|                   | 06      | 2437            | 35.10               | 0.5         |
|                   | 09      | 2452            | 35.12               | 0.5         |

Modulation Type: 802.11b  
CH01Modulation Type: 802.11g  
CH01

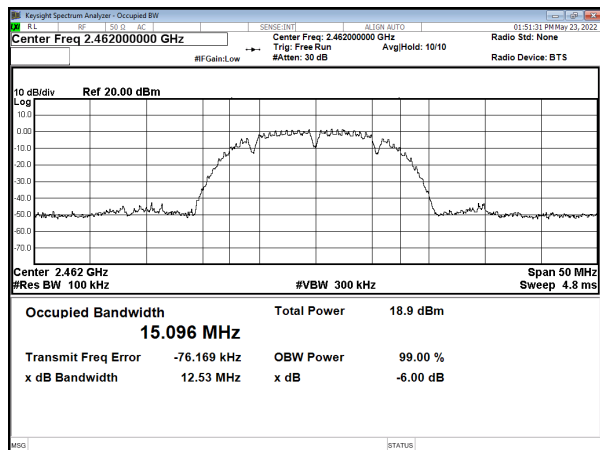
## CH06



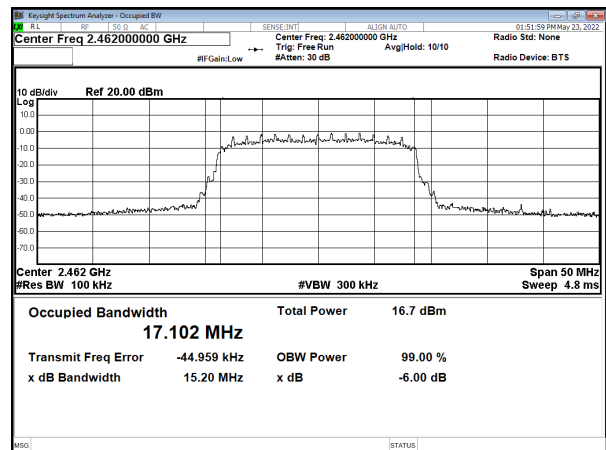
## CH06

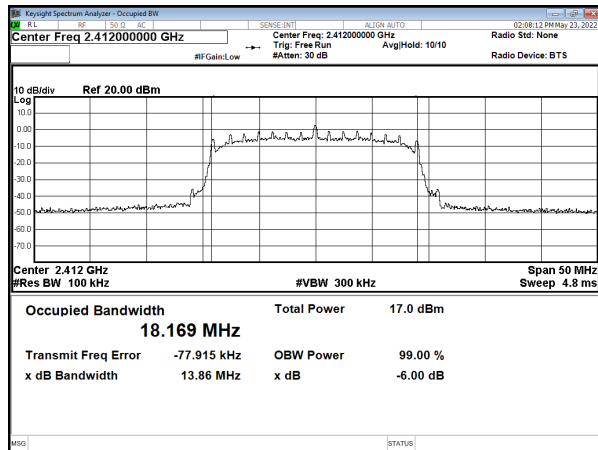
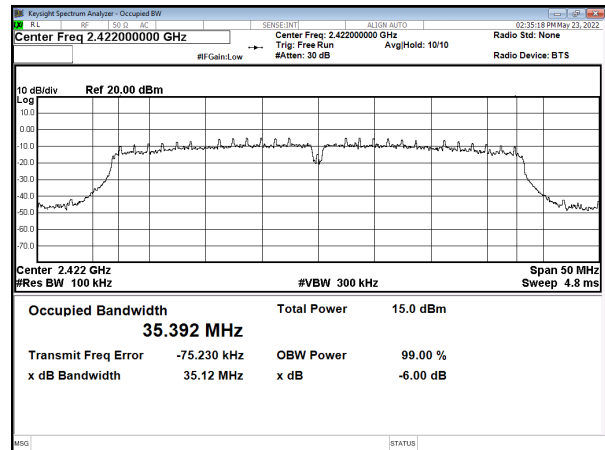


## CH11

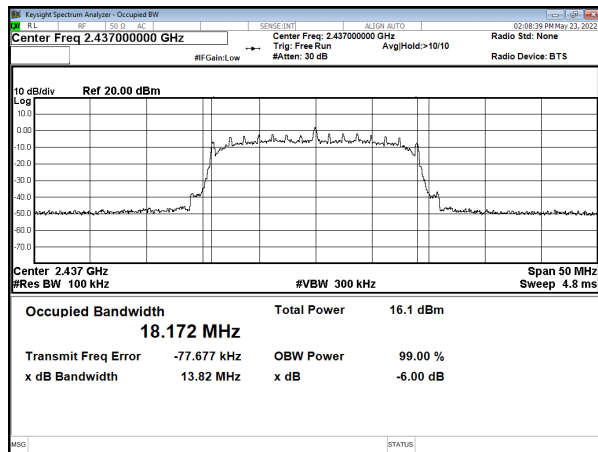


## CH11

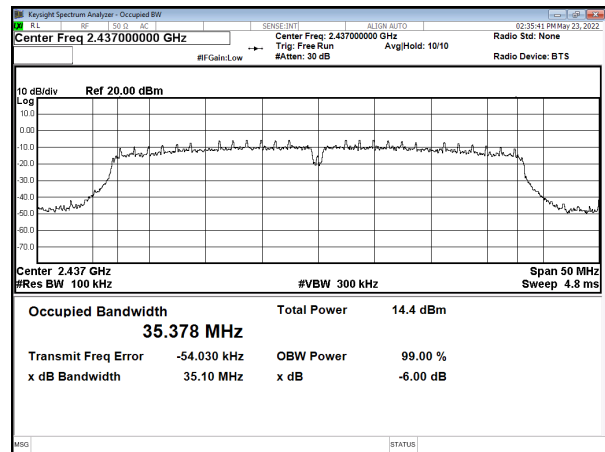


Modulation Type: 802.11n HT20  
CH01Modulation Type: 802.11n HT40  
CH03

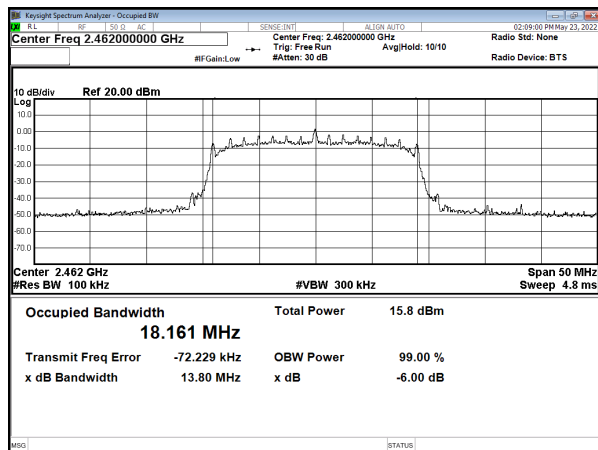
## CH06



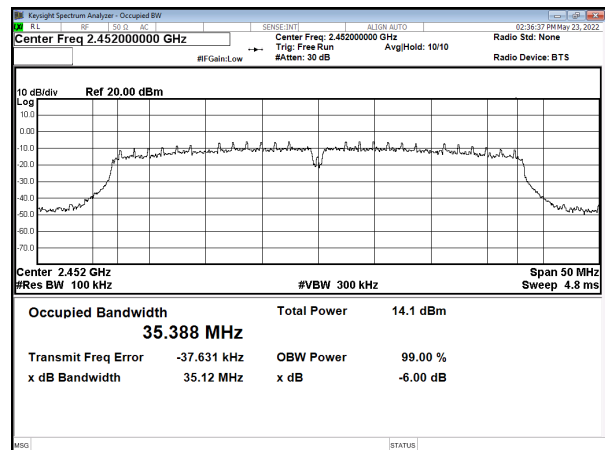
## CH06



## CH11



## CH09





## 9. Maximum Peak Output Power

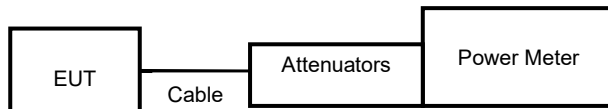
### 9.1 Test Limit

The Maximum Peak Output Power Measurement is 30dBm.

### 9.2 Test Procedures

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

### 9.3 Test Setup Layout



**9.4 Test Result and Data**

| Modulation Type | Channel | Frequency (MHz) | Conducted(peak) output power (dBm) | Total PK power (mW) | Power Limit (dBm) |
|-----------------|---------|-----------------|------------------------------------|---------------------|-------------------|
| 11b             | 1       | 2412            | 17.13                              | 51.642              | 30.00             |
|                 | 6       | 2437            | 16.35                              | 43.152              | 30.00             |
|                 | 11      | 2462            | 15.95                              | 39.355              | 30.00             |
| 11g             | 1       | 2412            | 17.77                              | 59.841              | 30.00             |
|                 | 6       | 2437            | 17.16                              | 52.000              | 30.00             |
|                 | 11      | 2462            | 17.05                              | 50.699              | 30.00             |
| 11n HT20        | 1       | 2412            | 17.31                              | 53.827              | 30.00             |
|                 | 6       | 2437            | 16.76                              | 47.424              | 30.00             |
|                 | 11      | 2462            | 16.58                              | 45.499              | 30.00             |
| 11n HT40        | 3       | 2422            | 15.19                              | 33.037              | 30.00             |
|                 | 6       | 2437            | 14.80                              | 30.200              | 30.00             |
|                 | 9       | 2452            | 14.50                              | 28.184              | 30.00             |



## 10. Power Spectral Density

### 10.1 Test Limit

The Maximum of Power Spectral Density Measurement is 8dBm.

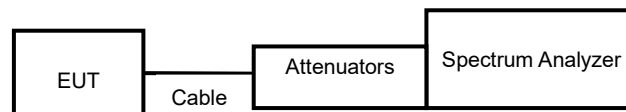
### 10.2 Test Procedures

Test procedure refers to section 11.10.2 Method PKPSD (peak PSD).

The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set the VBW  $\geq [3 \times \text{RBW}]$ .
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
  - Use the peak marker function to determine the maximum amplitude level within the RBW.
  - If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

### 10.3 Test Setup Layout

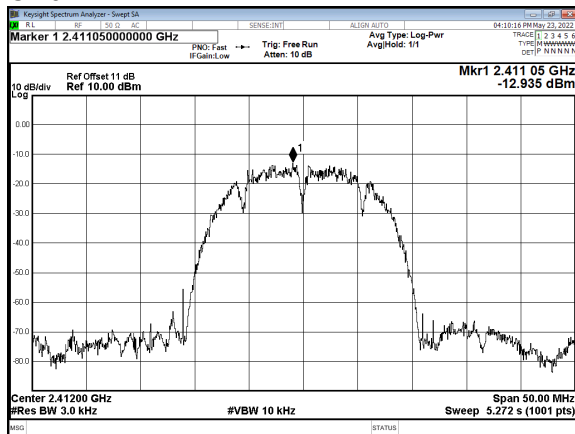


**10.4 Test Result and Data**

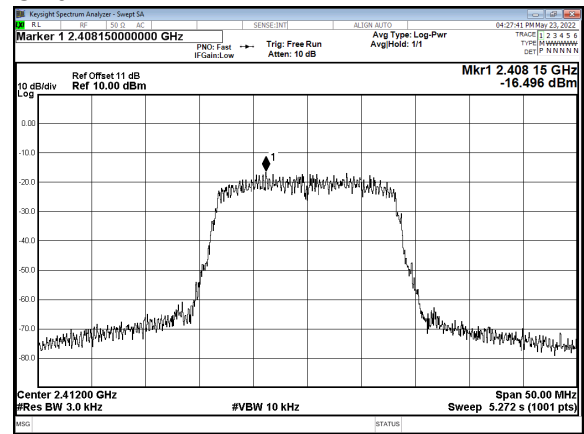
| Modulation Type | Channel | Frequency (MHz) | Maximum Power Density of 3KHz Bandwidth(dBm) | Sum chain (dBm) | Total PSD (dBm) | Limit (dBm) |
|-----------------|---------|-----------------|----------------------------------------------|-----------------|-----------------|-------------|
| 11b             | 1       | 2412            | -12.935                                      | -12.94          | -12.94          | 8.00        |
|                 | 6       | 2437            | -13.728                                      | -13.73          | -13.73          | 8.00        |
|                 | 11      | 2462            | -13.34                                       | -13.34          | -13.34          | 8.00        |
| 11g             | 1       | 2412            | -16.496                                      | -16.50          | -16.50          | 8.00        |
|                 | 6       | 2437            | -15.633                                      | -15.63          | -15.63          | 8.00        |
|                 | 11      | 2462            | -17.046                                      | -17.05          | -17.05          | 8.00        |
| 11n HT20        | 1       | 2412            | -15.781                                      | -15.78          | -15.78          | 8.00        |
|                 | 6       | 2437            | -16.636                                      | -16.64          | -16.64          | 8.00        |
|                 | 11      | 2462            | -18.291                                      | -18.29          | -18.29          | 8.00        |
| 11n HT40        | 3       | 2422            | -20.291                                      | -20.29          | -20.29          | 8.00        |
|                 | 6       | 2437            | -20.332                                      | -20.33          | -20.33          | 8.00        |
|                 | 9       | 2452            | -19.434                                      | -19.43          | -19.43          | 8.00        |



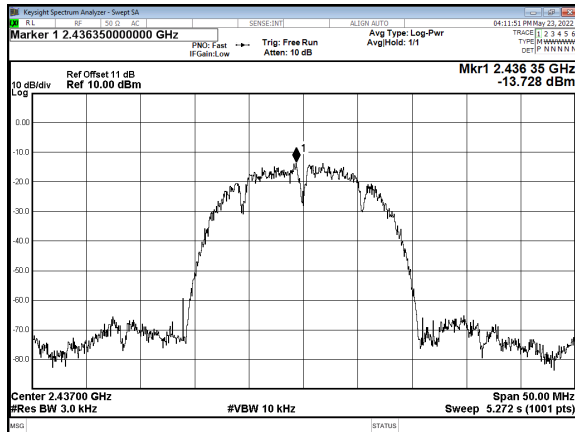
ANT A  
Modulation Type: 802.11b  
CH01



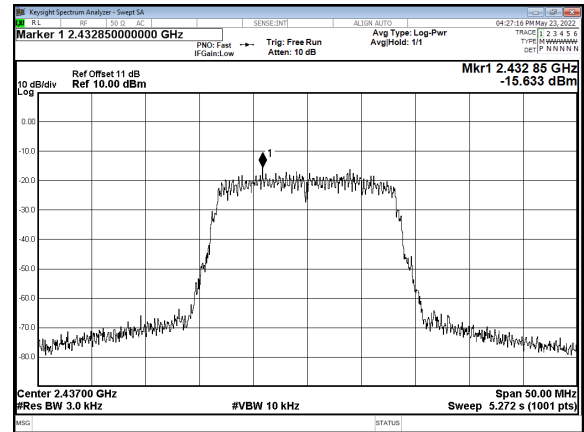
Modulation Type: 802.11g  
CH01



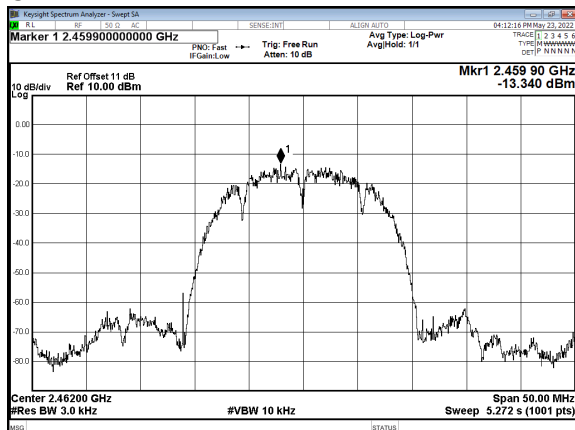
CH06



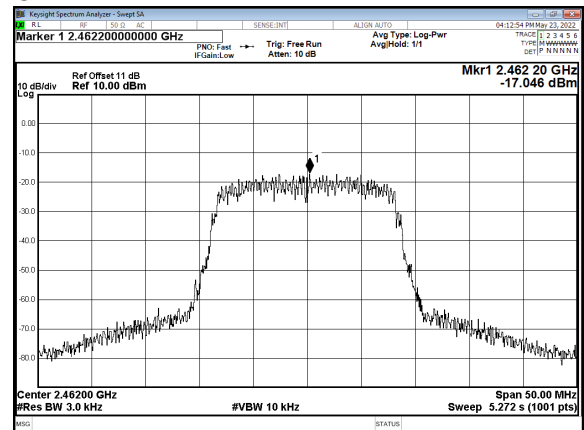
CH06

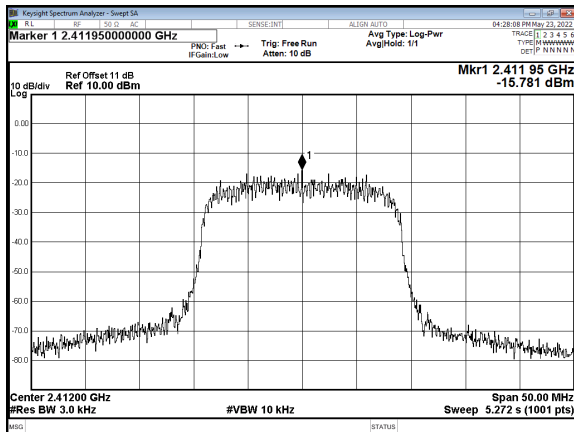
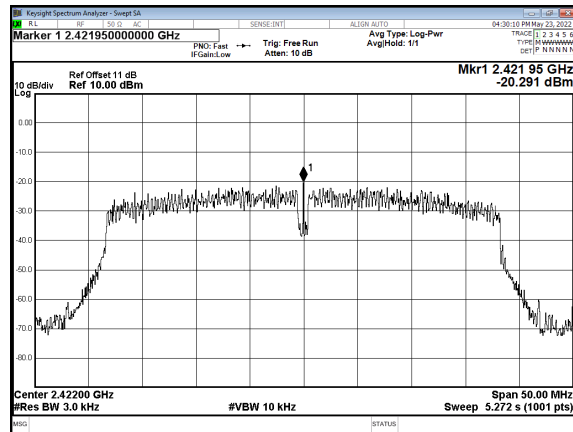


CH11

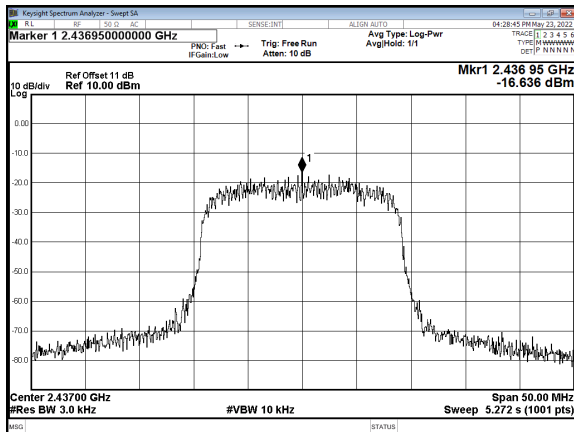


CH11

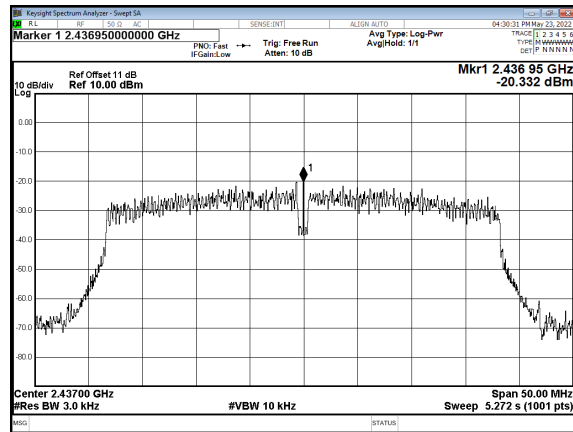


Modulation Type: 802.11n HT20  
CH01Modulation Type: 802.11n HT40  
CH03

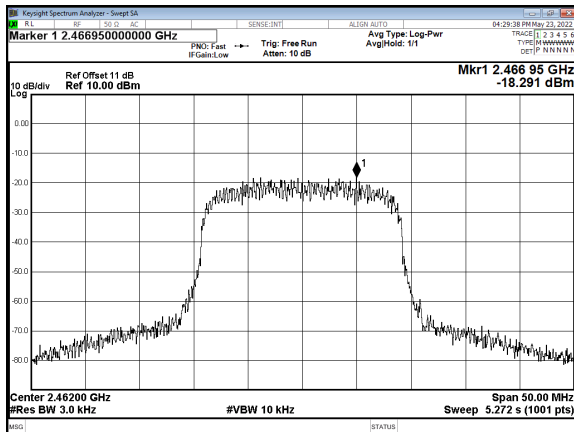
## CH06



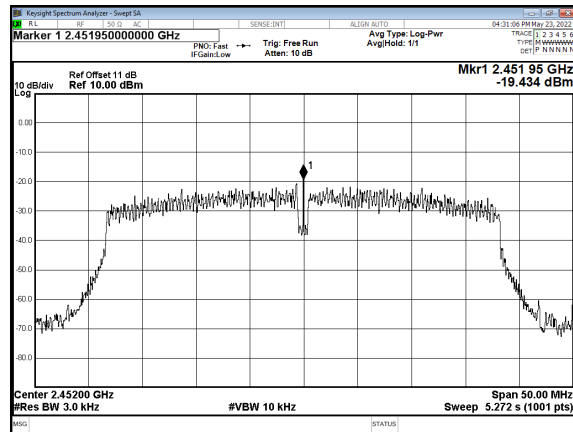
## CH06



## CH11



## CH09



----- End of the report -----