



# TEST REPORT

Report No.....: CHTEW19050131 Report Verification: 

Project No.....: SHT1904069805EW

FCC ID.....: 2AK4CPP20US

Applicant's name.....: Petcube, Inc.

Address.....: 2711 Centerville Road, Suite 400, Wilmington Delaware United States 19808

Manufacturer.....: Petcube, Inc.

Address.....: 2711 Centerville Road, Suite 400, Wilmington Delaware United States 19808

Test item description.....: Petcube Play 2

Trade Mark.....: Petcube

Model/Type reference.....: PP20US

Listed Model(s).....: -

Standard.....: FCC CFR Title 47 Part 15 Subpart E Section 15.407

Date of receipt of test sample.....: May 13, 2019

Date of testing.....: May 13, 2019- May 29, 2019

Date of issue.....: May 30, 2019

Result.....: PASS

Compiled by  
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*Hans Hu*

Testing Laboratory Name.....: Shenzhen Huatongwei International Inspection Co., Ltd

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*The test report merely correspond to the test sample.*

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## 1. TEST STANDARDS AND REPORT VERSION

### 1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.407](#): General technical requirements.

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

[KDB789033 D02 v02r01](#): GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

### 1.2. Report Version

| Revision No. | Date of issue | Description |
|--------------|---------------|-------------|
| N/A          | 2019-05-30    | Original    |
|              |               |             |
|              |               |             |
|              |               |             |
|              |               |             |

## 2. TEST DESCRIPTION

| Test Item                               | FCC Rule  | Result | Test Engineer   |
|-----------------------------------------|-----------|--------|-----------------|
| Antenna Requirement                     | 15.203    | PASS   | JiongSheng.Feng |
| Line Conducted Emissions (AC Main)      | 15.207    | PASS   | Zhiwei Liu      |
| Maximum Conducted Output Power          | 15.407(a) | PASS   | JiongSheng.Feng |
| Maximum Power Spectral Density          | 15.407(a) | PASS   | JiongSheng.Feng |
| 26dB Bandwidth and 99% Occupy bandwidth | 15.407(a) | PASS   | JiongSheng.Feng |
| 6dB Bandwidth                           | 15.407(a) | PASS   | JiongSheng.Feng |
| Band edge                               | 15.407(b) | PASS   | JiongSheng.Feng |
| Radiated Spurious Emissions             | 15.209    | PASS   | Tony Duan       |
| Frequency Stability                     | 15.407(g) | PASS   | JiongSheng.Feng |

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

### 3. SUMMARY

#### 3.1. Client Information

|               |                                                                         |
|---------------|-------------------------------------------------------------------------|
| Applicant:    | Petcube, Inc.                                                           |
| Address:      | 2711 Centerville Road,Suite 400,Wilmington Delaware United States 19808 |
| Manufacturer: | Petcube, Inc.                                                           |
| Address:      | 2711 Centerville Road,Suite 400,Wilmington Delaware United States 19808 |

#### 3.2. Product Description

|                        |                                                    |                                                             |                                                                           |
|------------------------|----------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------|
| Name of EUT            | Petcube Play 2                                     |                                                             |                                                                           |
| Trade Mark:            | Petcube                                            |                                                             |                                                                           |
| Model No.:             | PP20US                                             |                                                             |                                                                           |
| Listed Model(s):       | -                                                  |                                                             |                                                                           |
| Power supply:          | DC 5V, 2A                                          |                                                             |                                                                           |
| Adapter information 1: | -                                                  |                                                             |                                                                           |
| Adapter information 2: | -                                                  |                                                             |                                                                           |
| 5G WIFI                |                                                    |                                                             |                                                                           |
| Supported type:        | <input checked="" type="checkbox"/> 802.11a        | <input checked="" type="checkbox"/> 802.11n(HT20)           | <input checked="" type="checkbox"/> 802.11n(HT40)                         |
|                        | <input checked="" type="checkbox"/> 802.11ac(HT20) | <input checked="" type="checkbox"/> 802.11ac(HT40)          | <input checked="" type="checkbox"/> 802.11ac(HT80)                        |
| Function:              | <input type="checkbox"/> Outdoor AP                | <input type="checkbox"/> Indoor AP                          | <input type="checkbox"/> Fixed P2P                                        |
|                        | <input checked="" type="checkbox"/> Client         |                                                             |                                                                           |
| DFS type:              | <input type="checkbox"/> master devices            | <input type="checkbox"/> Slave devices with radar detection | <input checked="" type="checkbox"/> Slave devices without radar detection |
| Modulation:            | BPSK, QPSK, 16QAM, 64QAM                           |                                                             |                                                                           |
| Operation frequency:   | <input checked="" type="checkbox"/> Band I:        | 5150MHz~5250MHz                                             |                                                                           |
|                        | <input checked="" type="checkbox"/> Band II:       | 5250MHz~5350MHz                                             |                                                                           |
|                        | <input checked="" type="checkbox"/> Band III:      | 5470MHz~5725MHz                                             |                                                                           |
|                        | <input checked="" type="checkbox"/> Band IV:       | 5725MHz~5850MHz                                             |                                                                           |
| Supported Bandwidth    | 20MHz:                                             | 802.11ac, 802.11n, 802.11a                                  |                                                                           |
|                        | 40MHz:                                             | 802.11ac, 802.11n                                           |                                                                           |
|                        | 80MHz:                                             | 802.11ac                                                    |                                                                           |
| Antenna type:          | 1 Transmit, 1 Receive                              |                                                             |                                                                           |
| Antenna gain:          | 0.5dB                                              |                                                             |                                                                           |

### 3.3. Operation state

#### ➤ Frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

| Band | Test Channel    | 20MHz   |                 | 40MHz   |                 | 80MHz   |                 |
|------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
|      |                 | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| I    | CH <sub>L</sub> | 36      | 5180            | 38      | 5190            | -       | -               |
|      | CH <sub>M</sub> | 44      | 5220            | -       | -               | 42      | 5210            |
|      | CH <sub>H</sub> | 48      | 5240            | 46      | 5230            | -       | -               |
| II   | CH <sub>L</sub> | 52      | 5260            | 54      | 5270            | -       | -               |
|      | CH <sub>M</sub> | 56      | 5280            | -       | -               | 58      | 5290            |
|      | CH <sub>H</sub> | 64      | 5320            | 62      | 5310            | -       | -               |
| III  | CH <sub>L</sub> | 100     | 5500            | 102     | 5510            | 106     | 5530            |
|      | CH <sub>M</sub> | 120     | 5600            | 118     | 5590            | 122     | 5610            |
|      | CH <sub>H</sub> | 140     | 5700            | 134     | 5670            | 138     | 5690            |
| IV   | CH <sub>L</sub> | 149     | 5745            | 151     | 5755            | -       | -               |
|      | CH <sub>M</sub> | 157     | 5785            | -       | -               | 155     | 5775            |
|      | CH <sub>H</sub> | 165     | 5825            | 159     | 5795            | -       | -               |

#### ➤ 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) |
|-------------------------------|------------------------|
| 802.11a                       | 6Mbps                  |
| 802.11n(HT20)/ 802.11ac(HT20) | MCS0                   |
| 802.11n(HT40)/ 802.11ac(HT40) | MCS0                   |
| 802.11ac(HT80)                | MCS0                   |

#### ➤ Test mode

|                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| For RF test items                                                                                                                                                                                                                        |
| The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).                                                                                                                                  |
| For AC power line conducted emissions:                                                                                                                                                                                                   |
| The EUT was set to connect with the WLAN AP under large package sizes transmission.                                                                                                                                                      |
| For Radiated suprious emissions test item:                                                                                                                                                                                               |
| The engineering test program was provided and enabled to make EUT continuous transmit(duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report. |

### 3.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

|   |   |                |   |
|---|---|----------------|---|
| ○ | - | Manufacturer : | - |
|   |   | Model No. :    | - |
| ○ | - | Manufacturer : | - |
|   |   | Model No. :    | - |

### 3.5. Modifications

No modifications were implemented to meet testing criteria.

## **4. TEST ENVIRONMENT**

### **4.1. Address of the test laboratory**

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Phone: 86-755-26748019 Fax: 86-755-26748089

### **4.2. Test Facility**

#### **CNAS-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **A2LA-Lab Cert. No.: 3902.01**

Shenzhen Huatongwei International Inspection Co., Ltd. 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: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### **FCC-Registration No.: 762235**

Shenzhen Huatongwei International Inspection Co., Ltd. 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.

#### **IC-Registration No.: 5377B-1**

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No.: 5377B-1.

#### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.



### 4.3. Environmental conditions

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

|                    |             |
|--------------------|-------------|
| Temperature:       | 15~35°C     |
| Relative Humidity: | 30~60 %     |
| Air Pressure:      | 950~1050mba |

### 4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors in calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according 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 Shenzhen Huatongwei International Inspection Co., Ltd. quality system according to 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.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

| Test Items                              | Measurement Uncertainty | Notes |
|-----------------------------------------|-------------------------|-------|
| Transmitter power conducted             | 0.51 dB                 | (1)   |
| Conducted spurious emissions 9kHz~40GHz | 0.63 dB                 | (1)   |
| Conducted Disturbance 150kHz~30MHz      | 3.02 dB                 | (1)   |
| Radiated Emissions below 1GHz           | 4.90 dB                 | (1)   |
| Radiated Emissions above 1GHz           | 4.96 dB                 | (1)   |
| Occupied Bandwidth                      | 70 Hz                   | (1)   |
| Frequency error                         | 70 Hz                   | (1)   |

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

#### 4.5. Equipments Used during the Test

| ● Conducted Emission              |                                  |                    |                 |            |                           |                           |
|-----------------------------------|----------------------------------|--------------------|-----------------|------------|---------------------------|---------------------------|
| Used                              | Test Equipment                   | Manufacturer       | Model No.       | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ●                                 | Shielded Room                    | Albatross projects | N/A             | N/A        | 2018/09/28                | 2023/09/27                |
| ●                                 | EMI Test Receiver                | R&S                | ESCI            | 101247     | 2018/10/27                | 2019/10/26                |
| ●                                 | Artificial Mains                 | SCHWARZBECK        | NNLK 8121       | 573        | 2018/10/27                | 2019/10/26                |
| ●                                 | Pulse Limiter                    | R&S                | ESH3-Z2         | 100499     | 2018/10/27                | 2019/10/26                |
| ●                                 | RF Connection Cable              | HUBER+SUHNER       | EF400           | N/A        | 2018/11/15                | 2019/11/14                |
| ●                                 | Test Software                    | R&S                | ES-K1           | N/A        | N/A                       | N/A                       |
| ○                                 | Single Balanced Telecom Pair ISN | FCC                | FCC-TLISN-T2-02 | 20371      | 2018/10/28                | 2019/10/27                |
| ○                                 | Two Balanced Telecom Pairs ISN   | FCC                | FCC-TLISN-T4-02 | 20373      | 2018/10/28                | 2019/10/27                |
| ○                                 | Four Balanced Telecom Pairs ISN  | FCC                | FCC-TLISN-T8-02 | 20375      | 2018/10/28                | 2019/10/27                |
| ○                                 | V-Network                        | R&S                | ESH3-Z6         | 100211     | 2018/10/27                | 2019/10/26                |
| ○                                 | V-Network                        | R&S                | ESH3-Z6         | 100210     | 2018/10/27                | 2019/10/26                |
| ○                                 | 2-Line V-Network                 | R&S                | ESH3-Z5         | 100049     | 2018/10/27                | 2019/10/26                |
| ● Radiated Emission-6th test site |                                  |                    |                 |            |                           |                           |
| Used                              | Test Equipment                   | Manufacturer       | Model No.       | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ●                                 | Semi-Anechoic Chamber            | Albatross projects | SAC-3m-02       | N/A        | 2018/09/30                | 2021/09/29                |
| ●                                 | EMI Test Receiver                | R&S                | ESCI            | 100900     | 2018/10/28                | 2019/10/27                |
| ●                                 | Loop Antenna                     | R&S                | HFH2-Z2         | 100020     | 2017/11/20                | 2020/11/19                |
| ●                                 | Ultra-Broadband Antenna          | SCHWARZBECK        | VULB9163        | 546        | 2017/04/05                | 2020/04/04                |
| ●                                 | Pre-Amplifier                    | SCHWARZBECK        | BBV 9742        | N/A        | 2018/11/15                | 2019/11/14                |
| ●                                 | RF Connection Cable              | HUBER+SUHNER       | N/A             | N/A        | 2018/09/28                | 2019/09/27                |
| ●                                 | RF Connection Cable              | HUBER+SUHNER       | SUCOFLEX104     | 501184/4   | 2018/09/28                | 2019/09/27                |
| ●                                 | Test Software                    | R&S                | ES-K1           | N/A        | N/A                       | N/A                       |
| ●                                 | Turntable                        | Maturo Germany     | TT2.0-1T        | N/A        | N/A                       | N/A                       |
| ●                                 | Antenna Mast                     | Maturo Germany     | CAM-4.0-P-12    | N/A        | N/A                       | N/A                       |
| ● Radiated emission-7th test site |                                  |                    |                 |            |                           |                           |
| Used                              | Test Equipment                   | Manufacturer       | Model No.       | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ●                                 | Semi-Anechoic Chamber            | Albatross projects | SAC-3m-01       | N/A        | 2018/09/30                | 2021/09/29                |
| ●                                 | Spectrum Analyzer                | R&S                | FSP40           | 100597     | 2018/10/27                | 2019/10/26                |
| ●                                 | Horn Antenna                     | SCHWARZBECK        | 9120D           | 1011       | 2017/03/27                | 2020/03/26                |
| ●                                 | Pre-amplifier                    | BONN               | BLWA0160-2M     | 1811887    | 2018/11/14                | 2019/11/13                |
| ●                                 | Pre-amplifier                    | CD                 | PAP-0102        | 12004      | 2018/11/14                | 2019/11/13                |
| ●                                 | Broadband Pre-amplifier          | SCHWARZBECK        | BBV 9718        | 9718-248   | 2019/04/28                | 2020/04/27                |
| ●                                 | RF Connection Cable              | HUBER+SUHNER       | RE-7-FH         | N/A        | 2018/11/15                | 2019/11/14                |
| ●                                 | RF Connection Cable              | HUBER+SUHNER       | RE-7-FL         | N/A        | 2018/11/15                | 2019/11/14                |
| ●                                 | Test Software                    | Audix              | E3              | N/A        | N/A                       | N/A                       |
| ●                                 | Turntable                        | Maturo Germany     | TT2.0-1T        | N/A        | N/A                       | N/A                       |
| ●                                 | Antenna Mast                     | Maturo Germany     | CAM-4.0-P-12    | N/A        | N/A                       | N/A                       |

| ● RF Conducted Method |                              |              |                 |            |                              |                              |
|-----------------------|------------------------------|--------------|-----------------|------------|------------------------------|------------------------------|
| Used                  | Test Equipment               | Manufacturer | Model No.       | Serial No. | Last Cal. Date<br>(YY-MM-DD) | Next Cal. Date<br>(YY-MM-DD) |
| ●                     | Signal and spectrum Analyzer | R&S          | FSV40           | 100048     | 2018/10/28                   | 2019/10/27                   |
| ●                     | Spectrum Analyzer            | Agilent      | N9020A          | MY50510187 | 2018/09/29                   | 2019/09/28                   |
| ●                     | OSP                          | R&S          | OSP120          | 101317     | N/A                          | N/A                          |
| ○                     | Radio communication tester   | R&S          | CMW500          | 137688-Lv  | 2018/09/29                   | 2019/09/28                   |
| ○                     | Test software                | Tonscend     | JS1120-1(LTE)   | N/A        | N/A                          | N/A                          |
| ○                     | Test software                | Tonscend     | JS1120-2(WIFI)  | N/A        | N/A                          | N/A                          |
| ○                     | Test software                | Tonscend     | JS1120-3(WCDMA) | N/A        | N/A                          | N/A                          |
| ○                     | Test software                | Tonscend     | JS1120-4(GSM)   | N/A        | N/A                          | N/A                          |

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Antenna requirement

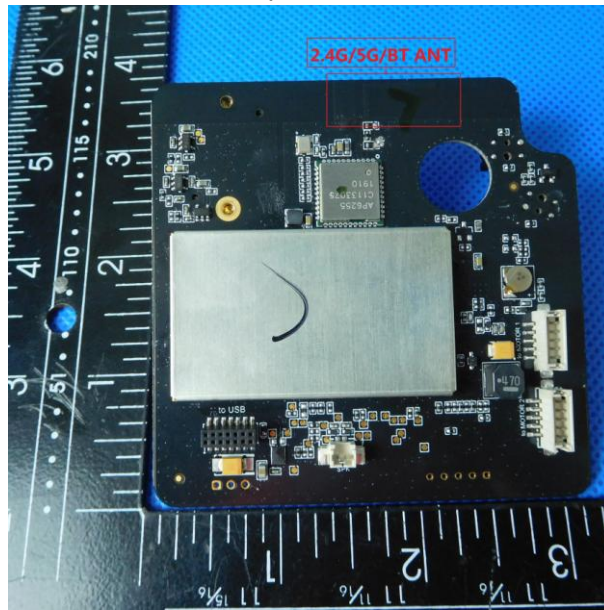
#### Requirement

##### **FCC CFR Title 47 Part 15 Subpart C 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### Test Result:

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



## 5.2. Conducted Emissions (AC Main)

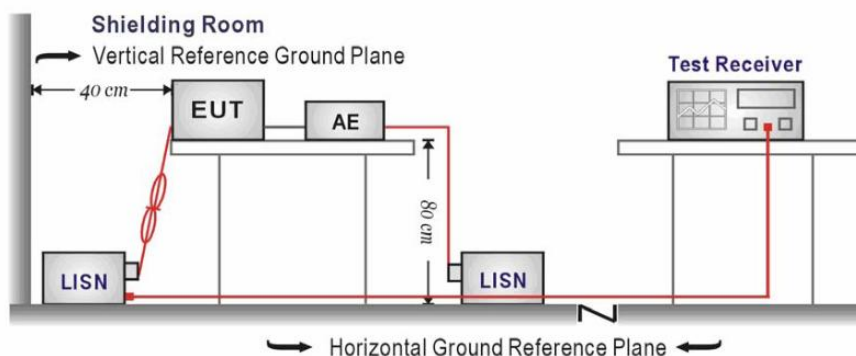
### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207:

| 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 50 ohm /50uH coupling impedance for the measuring equipment.
4. 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)
5. 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.
6. 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.
7. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

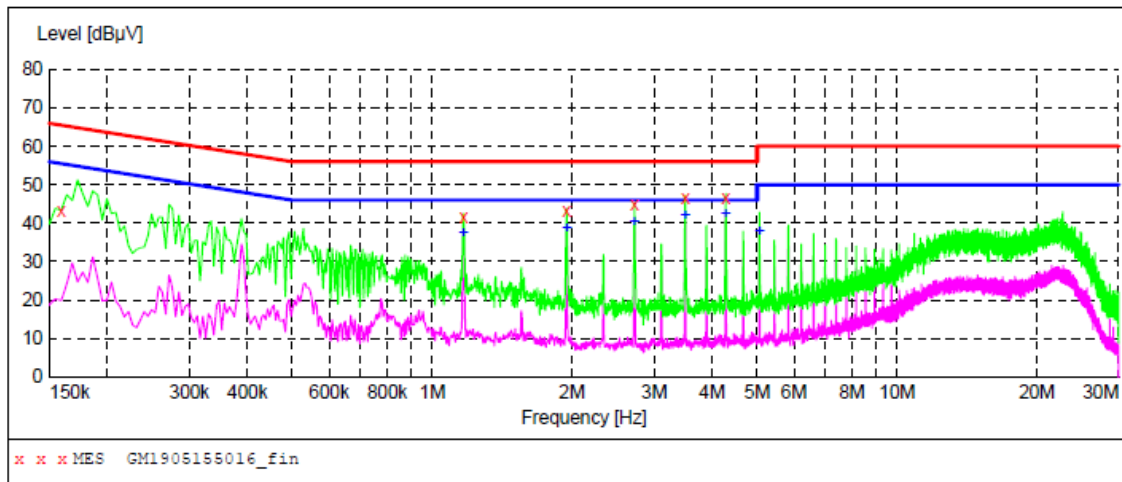
☒ Passed ☐ Not Applicable

Note:

- 1) Transd=Cable lose+ Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit -Level

Test Line:

L

**MEASUREMENT RESULT: "GM1905155016\_fin"**

5/15/2019 1:32PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.159000         | 43.30         | 9.9          | 66            | 22.2         | QP       | L1   | GND |
| 1.167000         | 41.70         | 9.9          | 56            | 14.3         | QP       | L1   | GND |
| 1.945500         | 43.10         | 9.9          | 56            | 12.9         | QP       | L1   | GND |
| 2.724000         | 44.80         | 9.9          | 56            | 11.2         | QP       | L1   | GND |
| 3.502500         | 46.50         | 9.9          | 56            | 9.5          | QP       | L1   | GND |
| 4.281000         | 46.70         | 9.9          | 56            | 9.3          | QP       | L1   | GND |

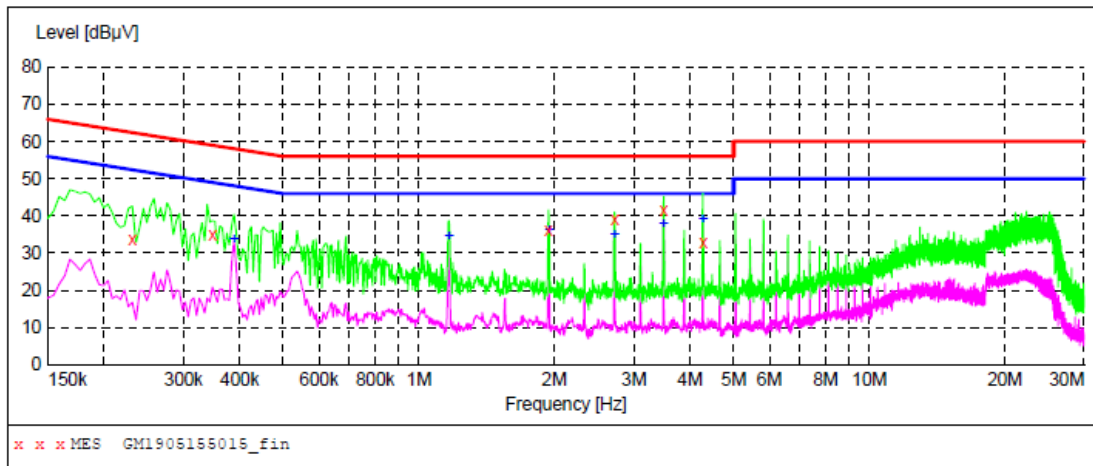
**MEASUREMENT RESULT: "GM1905155016\_fin2"**

5/15/2019 1:32PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 1.167000         | 37.40         | 9.9          | 46            | 8.6          | AV       | L1   | GND |
| 1.945500         | 38.70         | 9.9          | 46            | 7.3          | AV       | L1   | GND |
| 2.724000         | 40.30         | 9.9          | 46            | 5.7          | AV       | L1   | GND |
| 3.502500         | 42.20         | 9.9          | 46            | 3.8          | AV       | L1   | GND |
| 4.281000         | 42.40         | 9.9          | 46            | 3.6          | AV       | L1   | GND |
| 5.059500         | 37.80         | 10.0         | 50            | 12.2         | AV       | L1   | GND |

Test Line:

N

**MEASUREMENT RESULT: "GM1905155015\_fin"**

5/15/2019 1:29PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.231000         | 33.80         | 9.9          | 62            | 28.6         | QP       | N    | GND |
| 0.348000         | 34.80         | 9.9          | 59            | 24.2         | QP       | N    | GND |
| 1.941000         | 36.10         | 9.9          | 56            | 19.9         | QP       | N    | GND |
| 2.719500         | 38.90         | 9.9          | 56            | 17.1         | QP       | N    | GND |
| 3.498000         | 41.50         | 9.9          | 56            | 14.5         | QP       | N    | GND |
| 4.272000         | 32.90         | 9.9          | 56            | 23.1         | QP       | N    | GND |

**MEASUREMENT RESULT: "GM1905155015\_fin2"**

5/15/2019 1:29PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.388500         | 33.50         | 9.9          | 48            | 14.6         | AV       | N    | GND |
| 1.167000         | 34.70         | 9.9          | 46            | 11.3         | AV       | N    | GND |
| 1.945500         | 36.10         | 9.9          | 46            | 9.9          | AV       | N    | GND |
| 2.719500         | 34.90         | 9.9          | 46            | 11.1         | AV       | N    | GND |
| 3.498000         | 37.90         | 9.9          | 46            | 8.1          | AV       | N    | GND |
| 4.276500         | 39.00         | 9.9          | 46            | 7.0          | AV       | N    | GND |

### 5.3. Maximum Conducted Output Power

#### LIMIT

#### FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

For the 5.15~5.25GHz band:

- Outdoor AP  
The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 1W (30dBm).  
if  $G_{TX} > 6\text{dBi}$ , then  $P_{out} = 30 - (G_{TX} - 6)$ . e.i.r.p. at any elevation angle above 30 degrees  $\leq 125\text{mW}$  (21dBm)
- Indoor AP  
The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 1W (30dBm).  
if  $G_{TX} > 6\text{dBi}$ , then  $P_{out} = 30 - (G_{TX} - 6)$ .
- Point-to-point AP  
The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 1W (30dBm).  
if  $G_{TX} > 23\text{dBi}$ , then  $P_{out} = 30 - (G_{TX} - 23)$ .
- Client devices  
The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 250W (24dBm).  
if  $G_{TX} > 6\text{dBi}$ , then  $P_{out} = 24 - (G_{TX} - 6)$ .

For the 5.25~5.35GHz band:

The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 250mW (24dBm) or 11dBm+10 log B, where B is the 26dB emission bandwidth in MHz.  
if  $G_{TX} > 6\text{dBi}$ , then  $P_{out} = 24 - (G_{TX} - 6)$ .

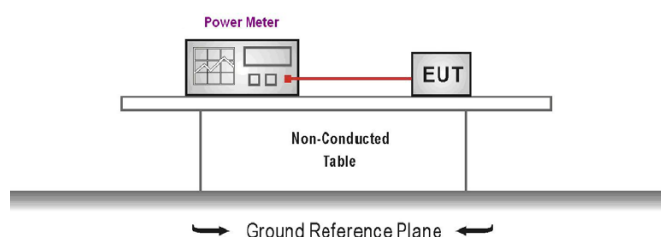
For the 5.47~5.725GHz band:

The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 250mW (24dBm) or 11dBm+10 log B, where B is the 26dB emission bandwidth in MHz.  
if  $G_{TX} > 6\text{dBi}$ , then  $P_{out} = 24 - (G_{TX} - 6)$ .

For the 5.725~5.85GHz band:

- Point-to-multipoint systems (P2M)  
The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 1W (30dBm).  
if  $G_{TX} > 6\text{dBi}$ , then  $P_{out} = 30 - (G_{TX} - 6)$ .
- Point-to-point systems (P2P)  
The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 1W (30dBm).

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. The EUT was tested according to KDB789033 Section E-3-b)
2. The maximum conducted output power may be measured using a broadband AVG RF power meter.
3. Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
4. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
5. Record the measurement data.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

☒ Passed ☐ Not Applicable



| Band | Bandwidth (MHz) | Type     | Channel         | Conducted Output Power (dBm) | Limit (dBm) | Result |
|------|-----------------|----------|-----------------|------------------------------|-------------|--------|
| I    | 20              | 802.11ac | CH <sub>L</sub> | 15.35                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 15.37                        |             |        |
|      |                 |          | CH <sub>H</sub> | 15.78                        |             |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 15.07                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 15.00                        |             |        |
|      |                 |          | CH <sub>H</sub> | 15.65                        |             |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 14.83                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 14.79                        |             |        |
|      |                 |          | CH <sub>H</sub> | 15.28                        |             |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 15.58                        | 24.00       | Pass   |
|      |                 |          | CH <sub>H</sub> | 15.69                        |             |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 15.06                        | 24.00       | Pass   |
|      |                 |          | CH <sub>H</sub> | 15.94                        |             |        |
|      | 80              | 802.11ac | CH <sub>M</sub> | 15.88                        | 24.00       | Pass   |
| II   | 20              | 802.11ac | CH <sub>L</sub> | 15.57                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 15.38                        |             |        |
|      |                 |          | CH <sub>H</sub> | 16.16                        |             |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 15.71                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 15.37                        |             |        |
|      |                 |          | CH <sub>H</sub> | 16.07                        |             |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 15.42                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 15.04                        |             |        |
|      |                 |          | CH <sub>H</sub> | 15.83                        |             |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 15.86                        | 24.00       | Pass   |
|      |                 |          | CH <sub>H</sub> | 16.09                        |             |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 15.78                        | 24.00       | Pass   |
|      |                 |          | CH <sub>H</sub> | 15.86                        |             |        |
|      | 80              | 802.11ac | CH <sub>M</sub> | 15.91                        | 24.00       | Pass   |

| Band | Bandwidth (MHz) | Type     | Channel         | Conducted Output Power (dBm) | Limit (dBm) | Result |
|------|-----------------|----------|-----------------|------------------------------|-------------|--------|
| III  | 20              | 802.11ac | CH <sub>L</sub> | 16.09                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 16.22                        |             |        |
|      |                 |          | CH <sub>H</sub> | 15.74                        |             |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 15.49                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 16.25                        |             |        |
|      |                 |          | CH <sub>H</sub> | 15.45                        |             |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 15.41                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 15.91                        |             |        |
|      |                 |          | CH <sub>H</sub> | 15.24                        |             |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 14.68                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 14.95                        |             |        |
|      |                 |          | CH <sub>H</sub> | 14.53                        |             |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 15.33                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 15.71                        |             |        |
|      |                 |          | CH <sub>H</sub> | 15.41                        |             |        |
|      | 80              | 802.11ac | CH <sub>L</sub> | 15.47                        | 24.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 15.39                        |             |        |
|      |                 |          | CH <sub>H</sub> | 14.57                        |             |        |
| IV   | 20              | 802.11ac | CH <sub>L</sub> | 15.15                        | 30.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 13.84                        |             |        |
|      |                 |          | CH <sub>H</sub> | 14.03                        |             |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 15.22                        | 30.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 13.83                        |             |        |
|      |                 |          | CH <sub>H</sub> | 13.99                        |             |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 14.94                        | 30.00       | Pass   |
|      |                 |          | CH <sub>M</sub> | 13.63                        |             |        |
|      |                 |          | CH <sub>H</sub> | 12.66                        |             |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 15.99                        | 30.00       | Pass   |
|      |                 |          | CH <sub>H</sub> | 14.60                        |             |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 15.47                        | 30.00       | Pass   |
|      |                 |          | CH <sub>H</sub> | 14.32                        |             |        |
|      | 80              | 802.11ac | CH <sub>M</sub> | 15.44                        | 30.00       | Pass   |

## 5.4. Maximum Power Spectral Density

### LIMIT

FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

For the 5.15~5.25GHz band:

- Outdoor AP  
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.  
if  $G_{TX} > 6\text{dBi}$ , then  $\text{PSD} = 17 - (G_{TX} - 6)$ .
- Indoor AP  
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.  
if  $G_{TX} > 6\text{dBi}$ , then  $\text{PSD} = 17 - (G_{TX} - 6)$ .
- Point-to-point AP  
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.  
if  $G_{TX} > 23\text{dBi}$ , then  $\text{PSD} = 17 - (G_{TX} - 23)$ .
- Client devices  
The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.  
if  $G_{TX} > 6\text{dBi}$ , then  $\text{PSD} = 11 - (G_{TX} - 6)$ .

For the 5.25~5.35GHz band:

The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.  
if  $G_{TX} > 6\text{dBi}$ , then  $\text{PSD} = 11 - (G_{TX} - 6)$ .

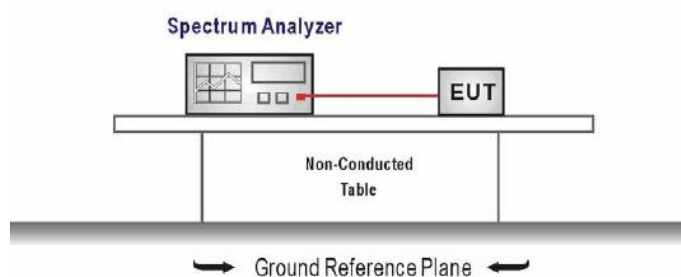
For the 5.47~5.725GHz band:

The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.  
if  $G_{TX} > 6\text{dBi}$ , then  $\text{PSD} = 11 - (G_{TX} - 6)$ .

For the 5.725~5.85GHz band:

- Point-to-multipoint systems (P2M)  
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.  
if  $G_{TX} > 6\text{dBi}$ , then  $\text{PSD} = 30 - (G_{TX} - 6)$ .
- Point-to-point systems (P2P)  
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

### TEST CONFIGURATION



### TEST PROCEDURE

1. According KDB 789033 D02 – Section F
2. Analyzer was setting as follow:  
Center frequency: test channel  
Span was set to encompass the entire emission bandwidth of the signal  
RBW=1MHz for devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz  
RBW=500kHz for devices operating in the band 5.725-5.85 GHz  
VBW  $\geq$  3 RBW  
Number of sweep points  $> 2 \times (\text{span}/\text{RBW})$   
Sweep time = auto  
Detector = Peak  
Trigger was set to free run for all modes, trace was averaged over 100 sweeps
3. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

### TEST MODE:

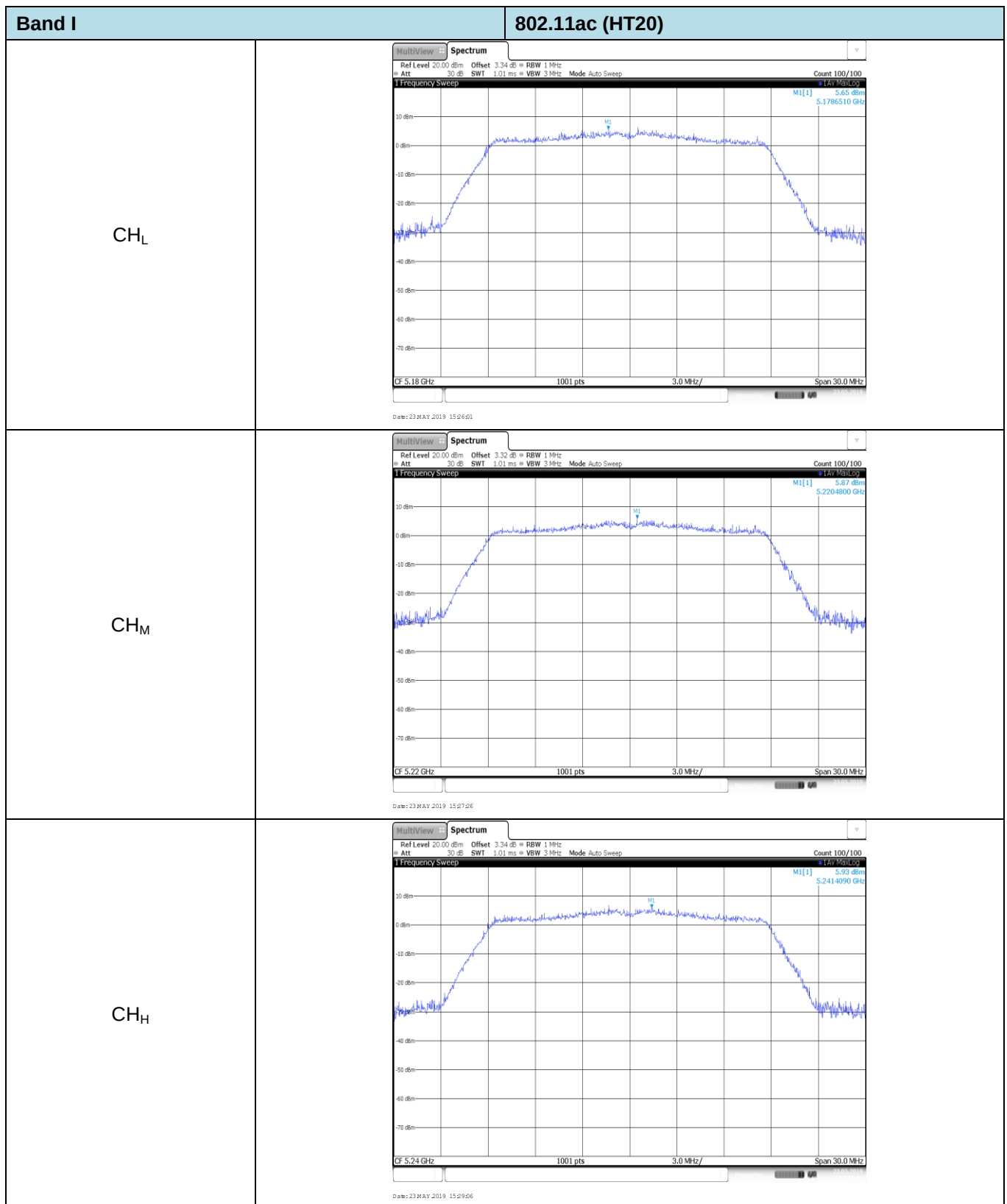
Please refer to the clause 3.3

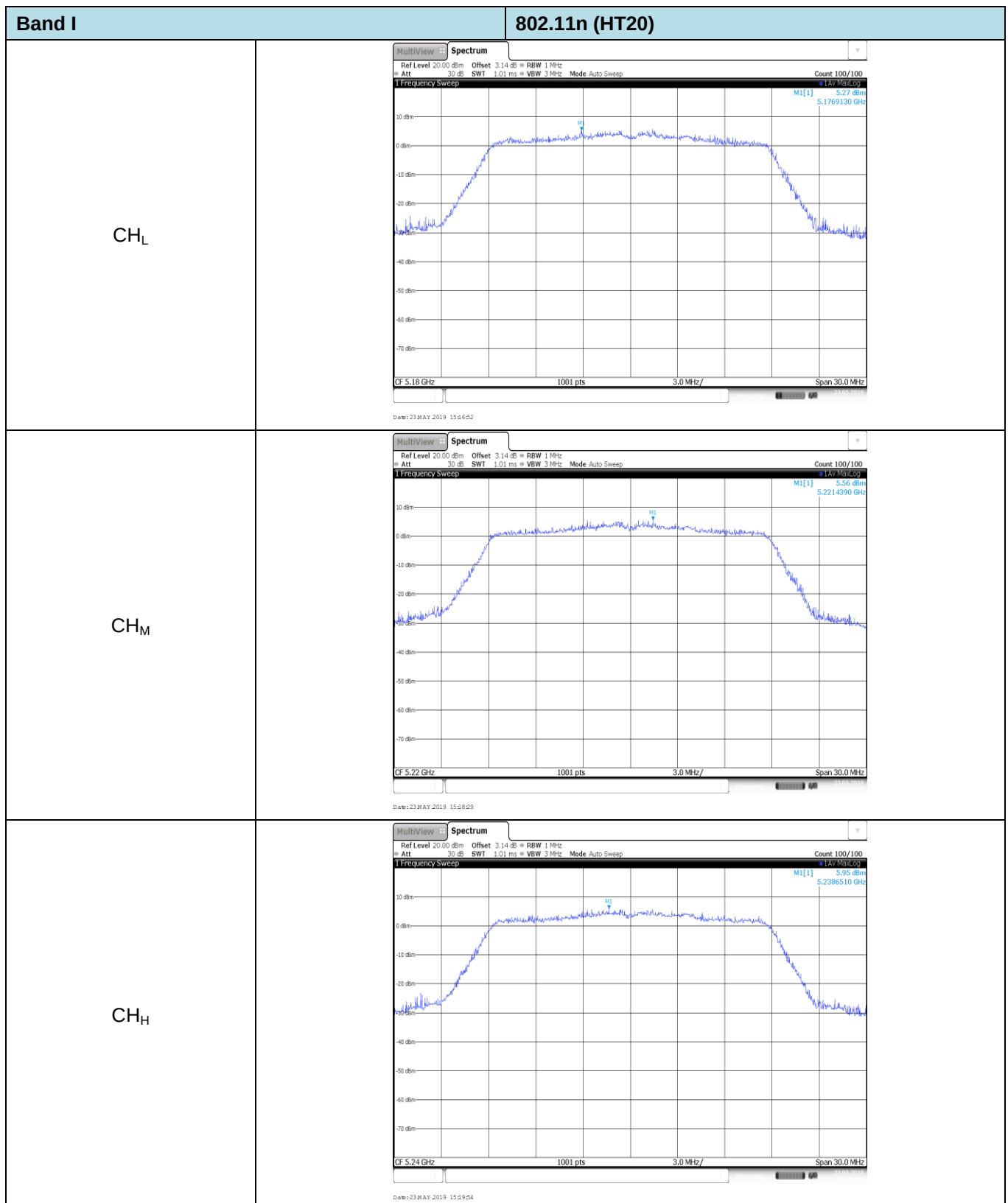
**TEST RESULTS**
☒ Passed
 ☐ Not Applicable

| Band | Bandwidth (MHz) | Type     | Channel         | Power Spectral Density (dBm/MHz) | Limit (dBm/MHz) | Result |
|------|-----------------|----------|-----------------|----------------------------------|-----------------|--------|
| I    | 20              | 802.11ac | CH <sub>L</sub> | 5.65                             | 11.00           | Pass   |
|      |                 |          | CH <sub>M</sub> | 5.87                             |                 |        |
|      |                 |          | CH <sub>H</sub> | 5.93                             |                 |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 5.27                             | 11.00           | Pass   |
|      |                 |          | CH <sub>M</sub> | 5.56                             |                 |        |
|      |                 |          | CH <sub>H</sub> | 5.95                             |                 |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 4.75                             | 11.00           | Pass   |
|      |                 |          | CH <sub>M</sub> | 4.64                             |                 |        |
|      |                 |          | CH <sub>H</sub> | 5.77                             |                 |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 4.02                             | 11.00           | Pass   |
|      |                 |          | CH <sub>H</sub> | 4.14                             |                 |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 2.70                             | 11.00           | Pass   |
|      |                 |          | CH <sub>H</sub> | 2.71                             |                 |        |
|      | 80              | 802.11ac | CH <sub>M</sub> | 0.77                             | 11.00           | Pass   |
| II   | 20              | 802.11ac | CH <sub>L</sub> | 6.75                             | 11.00           | Pass   |
|      |                 |          | CH <sub>M</sub> | 5.57                             |                 |        |
|      |                 |          | CH <sub>H</sub> | 5.84                             |                 |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 6.22                             | 11.00           | Pass   |
|      |                 |          | CH <sub>M</sub> | 6.22                             |                 |        |
|      |                 |          | CH <sub>H</sub> | 6.23                             |                 |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 5.93                             | 11.00           | Pass   |
|      |                 |          | CH <sub>M</sub> | 5.18                             |                 |        |
|      |                 |          | CH <sub>H</sub> | 6.01                             |                 |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 3.05                             | 11.00           | Pass   |
|      |                 |          | CH <sub>H</sub> | 3.29                             |                 |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 3.18                             | 11.00           | Pass   |
|      |                 |          | CH <sub>H</sub> | 3.10                             |                 |        |
|      | 80              | 802.11ac | CH <sub>M</sub> | 0.29                             | 11.00           | Pass   |

| Band | Bandwidth (MHz) | Type     | Channel         | Power Spectral Density (dBm/MHz)    | Limit (dBm/MHz)    | Result |
|------|-----------------|----------|-----------------|-------------------------------------|--------------------|--------|
| III  | 20              | 802.11ac | CH <sub>L</sub> | 6.33                                | 11.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | 6.40                                |                    |        |
|      |                 |          | CH <sub>H</sub> | 5.66                                |                    |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 6.13                                | 11.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | 6.41                                |                    |        |
|      |                 |          | CH <sub>H</sub> | 5.84                                |                    |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 6.04                                | 11.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | 6.27                                |                    |        |
|      |                 |          | CH <sub>H</sub> | 5.77                                |                    |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 3.18                                | 11.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | 3.38                                |                    |        |
|      |                 |          | CH <sub>H</sub> | 2.08                                |                    |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 3.27                                | 11.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | 2.79                                |                    |        |
|      |                 |          | CH <sub>H</sub> | 2.72                                |                    |        |
|      | 80              | 802.11ac | CH <sub>L</sub> | -0.37                               | 11.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | -0.56                               |                    |        |
|      |                 |          | CH <sub>H</sub> | 0.35                                |                    |        |
| Band | Bandwidth (MHz) | Type     | Channel         | Power Spectral Density (dBm/500kHz) | Limit (dBm/500kHz) | Result |
| IV   | 20              | 802.11ac | CH <sub>L</sub> | 3.87                                | 30.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | 2.78                                |                    |        |
|      |                 |          | CH <sub>H</sub> | 2.17                                |                    |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 3.84                                | 30.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | 1.74                                |                    |        |
|      |                 |          | CH <sub>H</sub> | 2.40                                |                    |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 3.06                                | 30.00              | Pass   |
|      |                 |          | CH <sub>M</sub> | 1.61                                |                    |        |
|      |                 |          | CH <sub>H</sub> | 0.74                                |                    |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 1.22                                | 30.00              | Pass   |
|      |                 |          | CH <sub>H</sub> | 0.72                                |                    |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 1.28                                | 30.00              | Pass   |
|      |                 |          | CH <sub>H</sub> | -0.49                               |                    |        |
|      | 80              | 802.11ac | CH <sub>M</sub> | -1.85                               | 30.00              | Pass   |

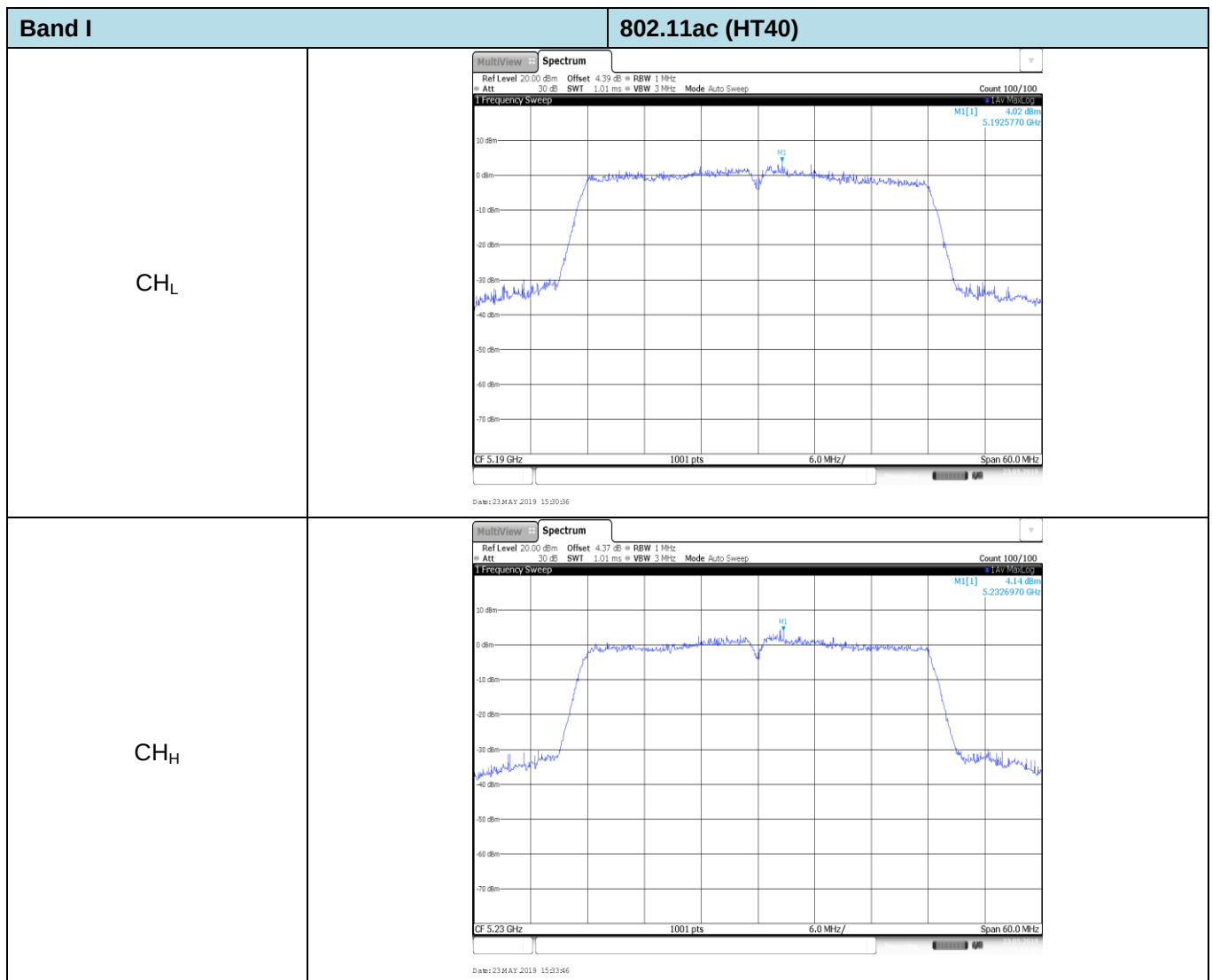
Test plot as follows:

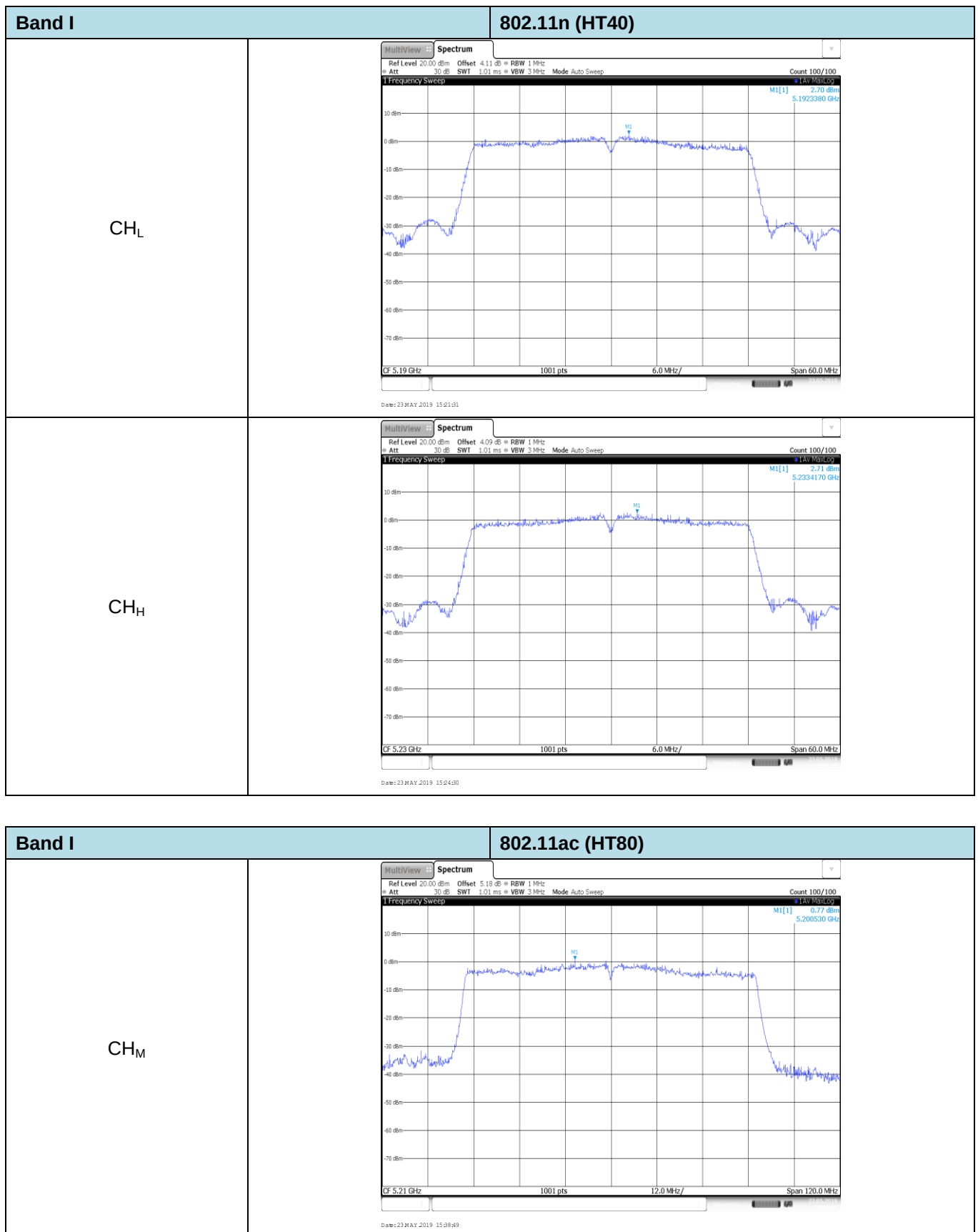


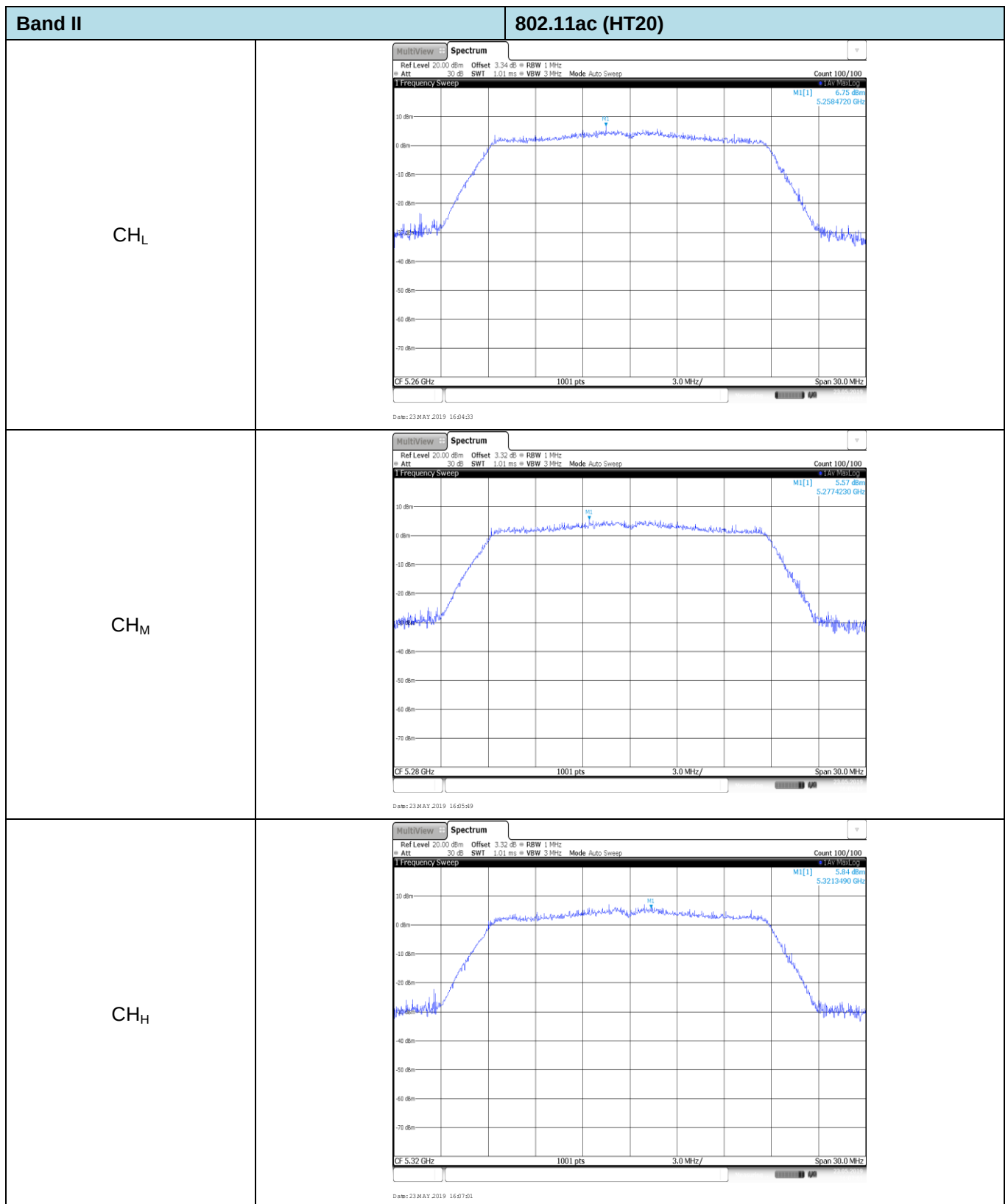


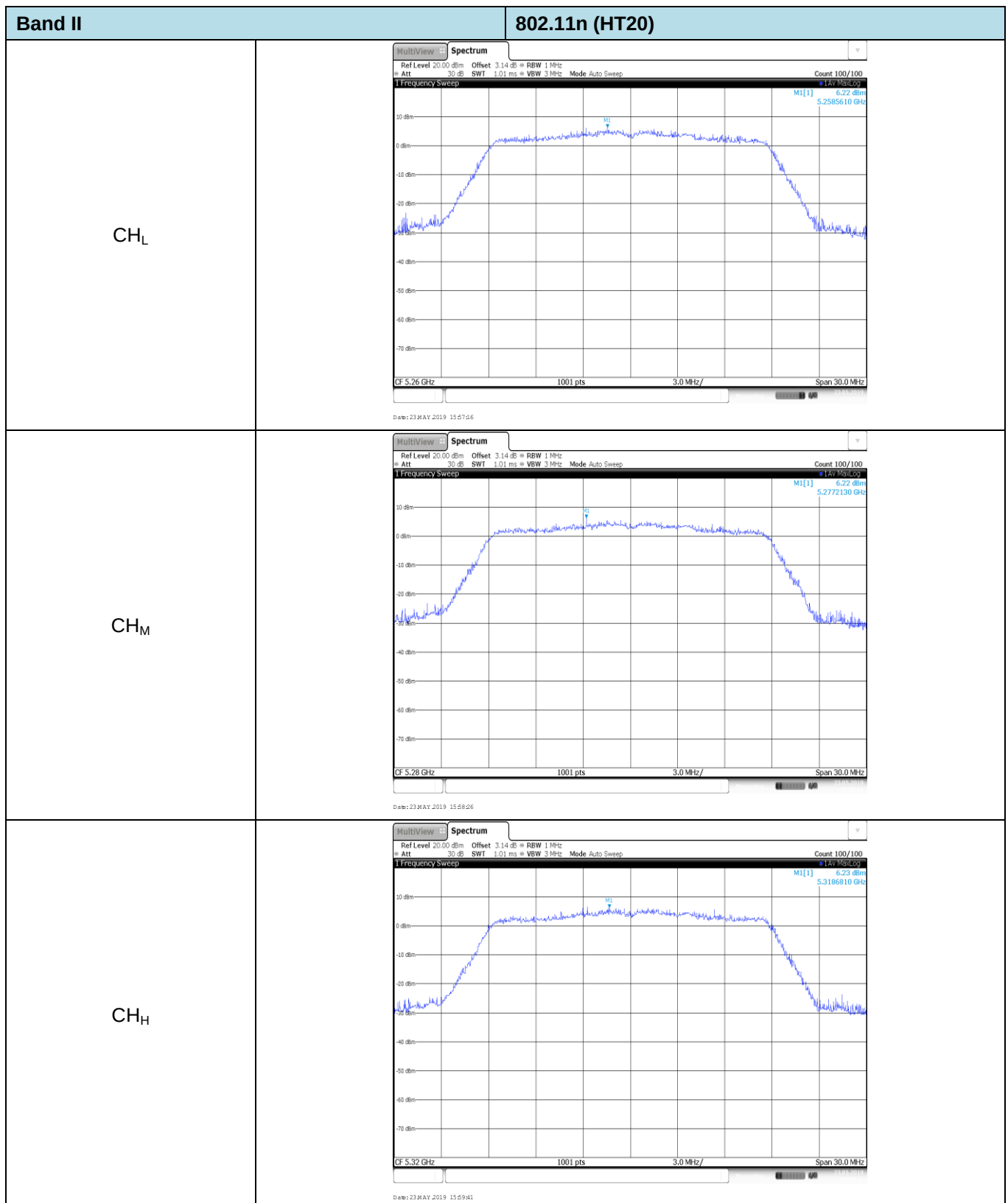
| Band I          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 802.11a |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| CH <sub>L</sub> | <div><div><div><div>MultiView</div><div>Spectrum</div><div>Ref Level 20.00 dBm Offset 3.01 dB RBW 1 MHz</div><div>Att 30 dB SWF 1.01 ms VBW 3 MHz Mode Auto Sweep</div><div>Count 100/100</div><div>STAT MSK Log</div><div>Frequency Sweep</div><div>MU[1] 4.75 dBm</div><div>5.1815580 GHz</div><div>10 dBm</div><div>0 dBm</div><div>-10 dBm</div><div>-20 dBm</div><div>-30 dBm</div><div>-40 dBm</div><div>-50 dBm</div><div>-60 dBm</div><div>-70 dBm</div><div>CF 5.18 GHz</div><div>1001 pts</div><div>3.0 MHz/</div><div>Span 30.0 MHz</div><div>Date: 23 MAY 2019 15:09:22</div></div></div></div> |         |
| CH <sub>M</sub> | <div><div><div><div>MultiView</div><div>Spectrum</div><div>Ref Level 20.00 dBm Offset 3.03 dB RBW 1 MHz</div><div>Att 30 dB SWF 1.01 ms VBW 3 MHz Mode Auto Sweep</div><div>Count 100/100</div><div>STAT MSK Log</div><div>Frequency Sweep</div><div>MU[1] 4.64 dBm</div><div>5.2214990 GHz</div><div>10 dBm</div><div>0 dBm</div><div>-10 dBm</div><div>-20 dBm</div><div>-30 dBm</div><div>-40 dBm</div><div>-50 dBm</div><div>-60 dBm</div><div>-70 dBm</div><div>CF 5.22 GHz</div><div>1001 pts</div><div>3.0 MHz/</div><div>Span 30.0 MHz</div><div>Date: 23 MAY 2019 15:03:20</div></div></div></div> |         |
| CH <sub>H</sub> | <div><div><div><div>MultiView</div><div>Spectrum</div><div>Ref Level 20.00 dBm Offset 3.01 dB RBW 1 MHz</div><div>Att 30 dB SWF 1.01 ms VBW 3 MHz Mode Auto Sweep</div><div>Count 100/100</div><div>STAT MSK Log</div><div>Frequency Sweep</div><div>MU[1] 5.77 dBm</div><div>5.2414990 GHz</div><div>10 dBm</div><div>0 dBm</div><div>-10 dBm</div><div>-20 dBm</div><div>-30 dBm</div><div>-40 dBm</div><div>-50 dBm</div><div>-60 dBm</div><div>-70 dBm</div><div>CF 5.24 GHz</div><div>1001 pts</div><div>3.0 MHz/</div><div>Span 30.0 MHz</div><div>Date: 23 MAY 2019 15:05:06</div></div></div></div> |         |

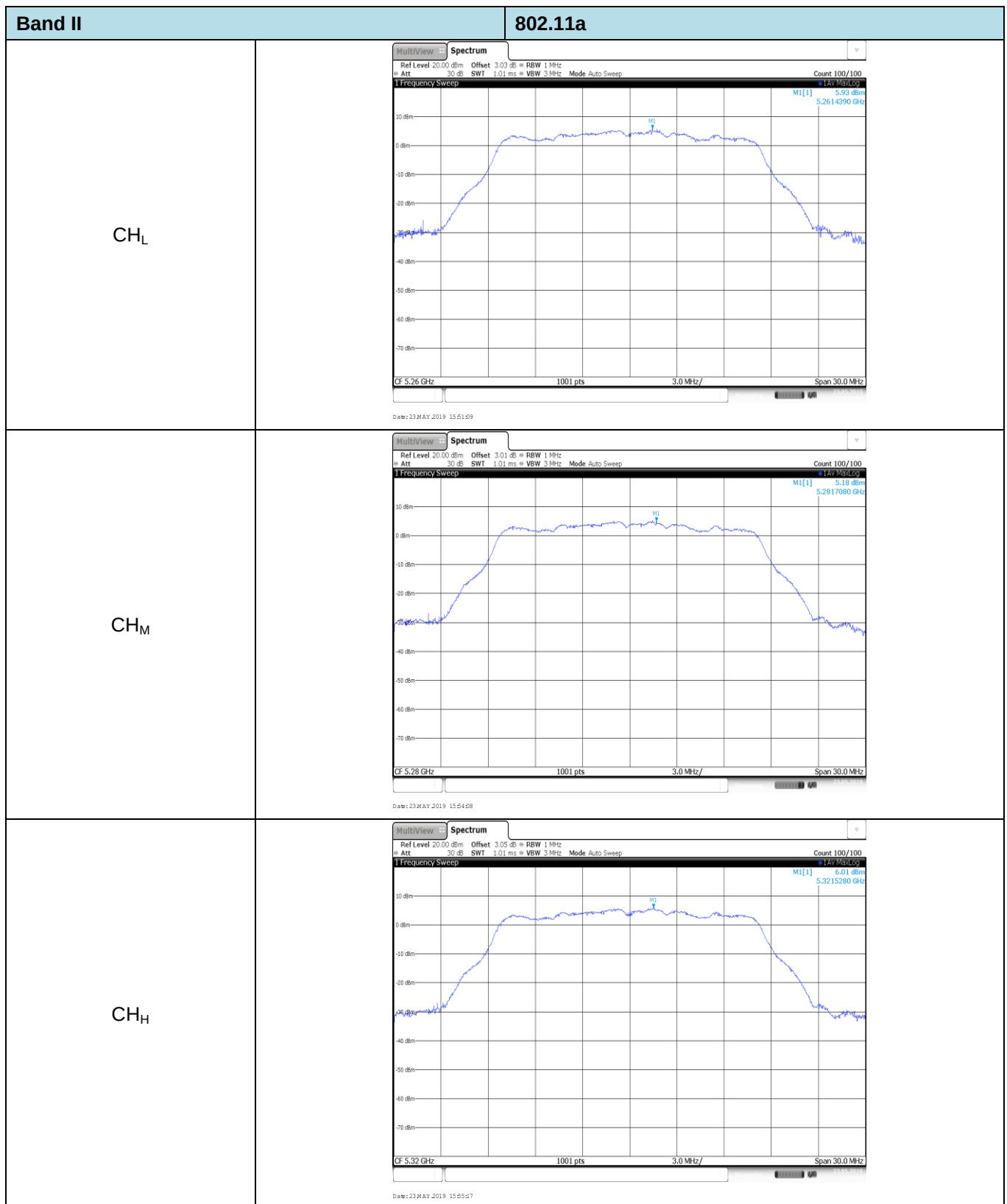




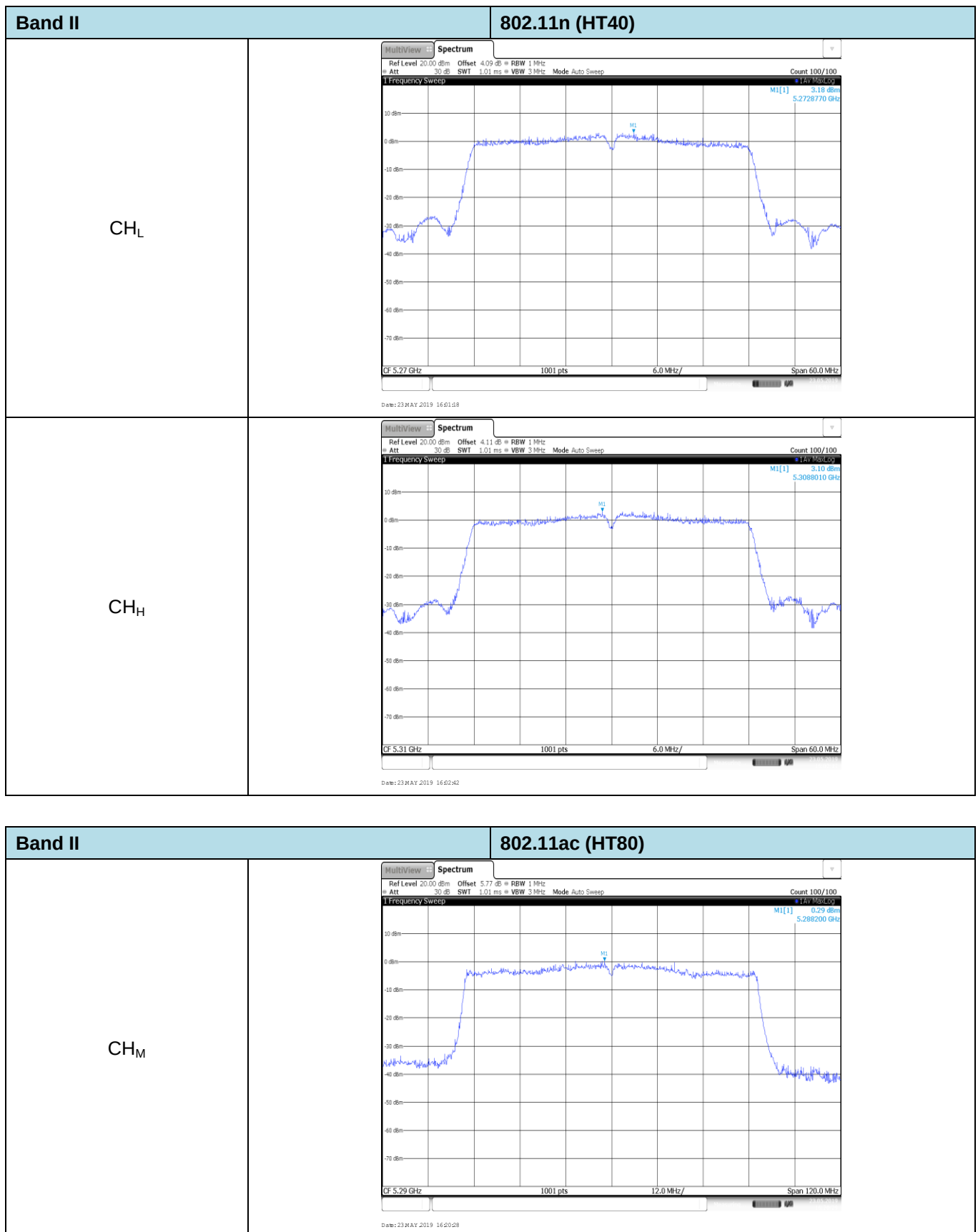


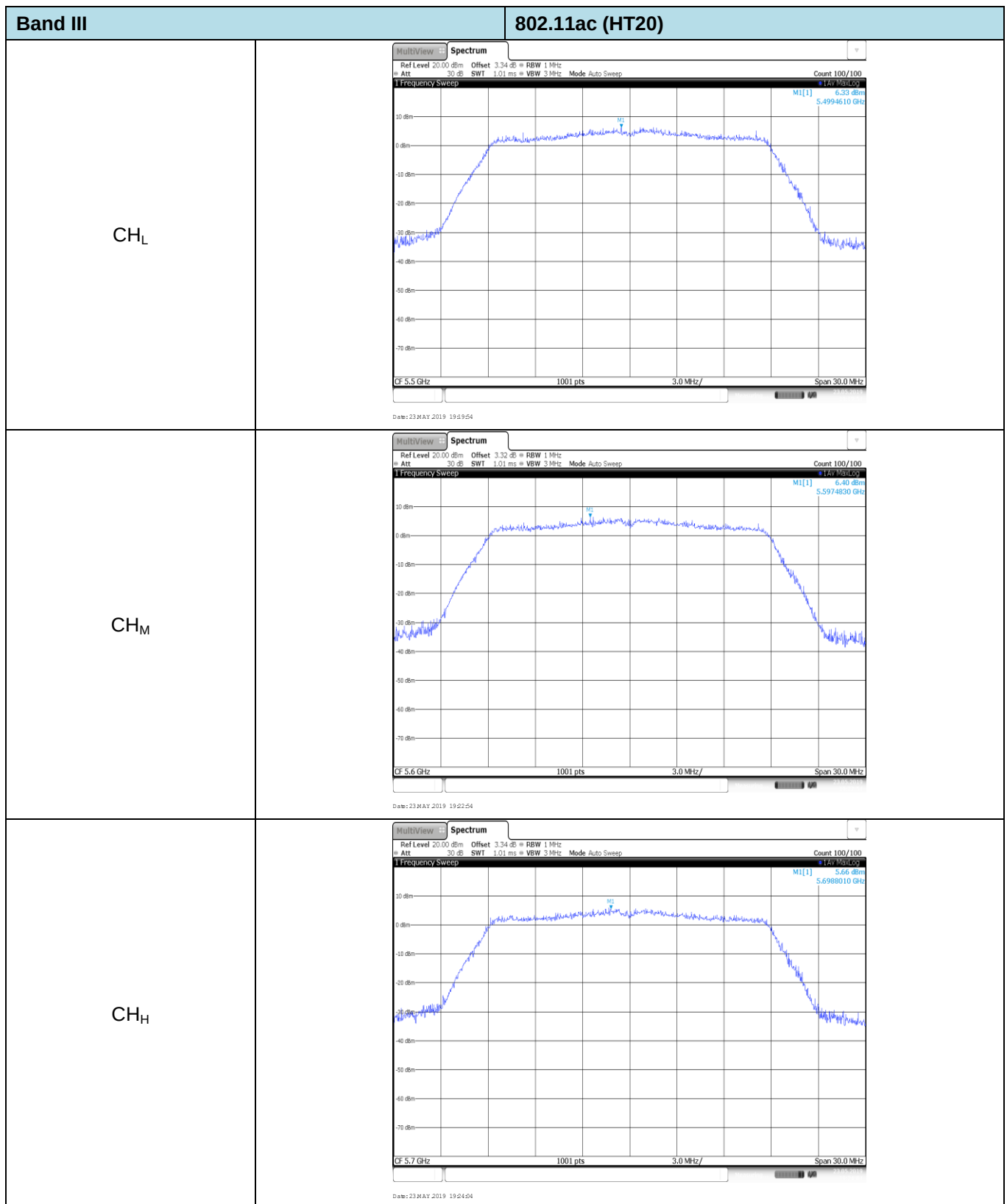




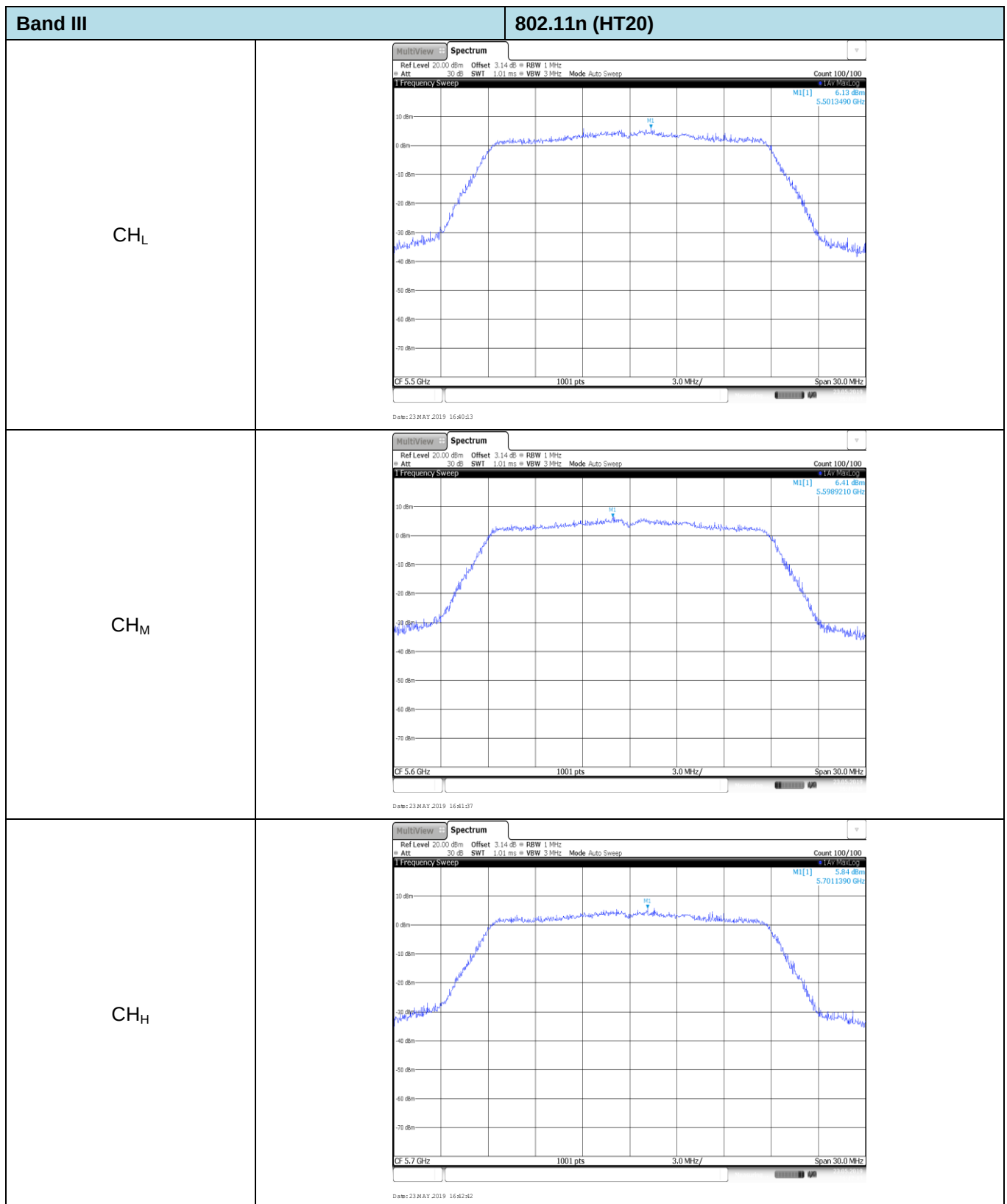


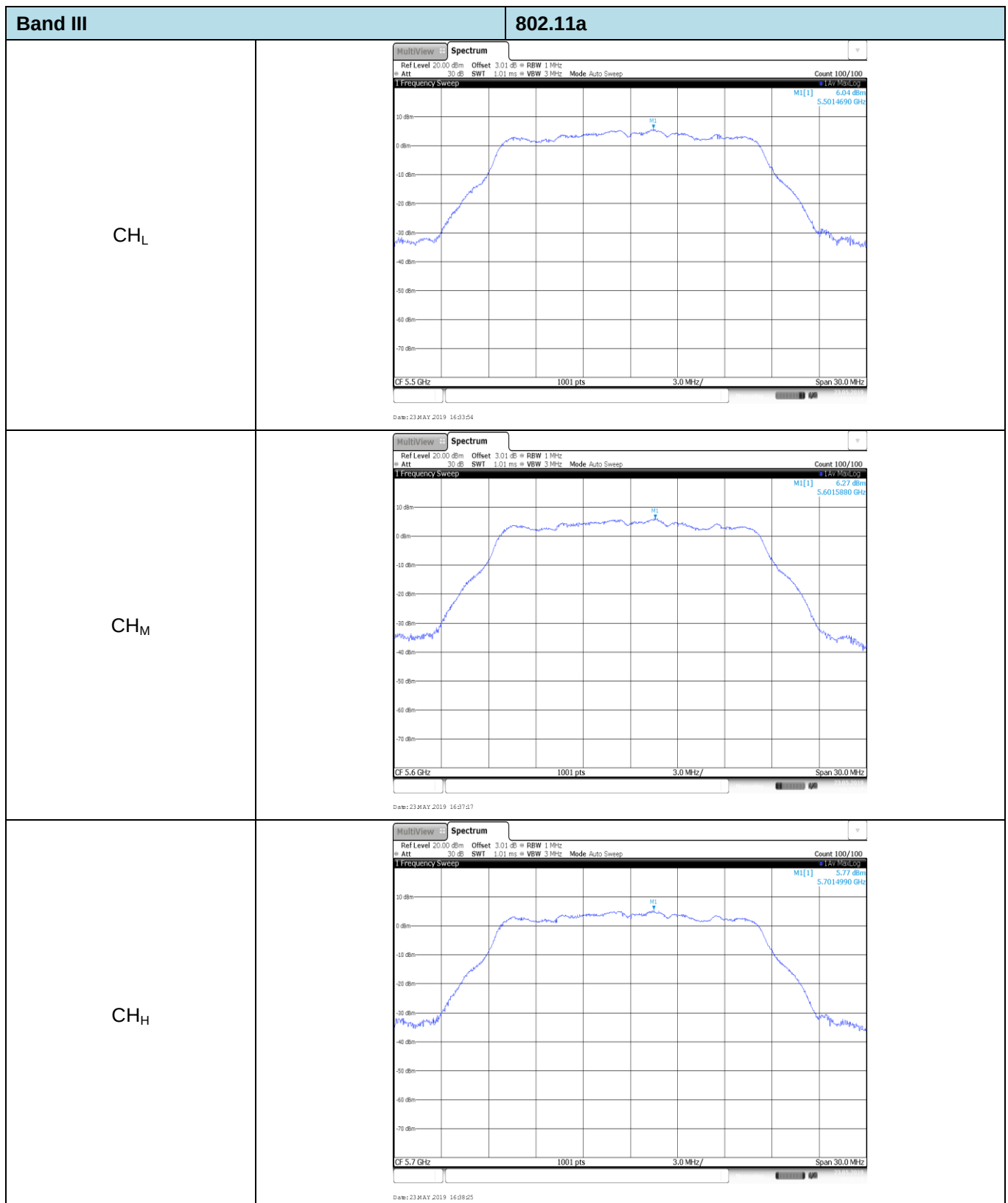
| Band II         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 802.11ac (HT40) |  |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| CH <sub>L</sub> | <div><div><div><div>MultiView</div><div>Spectrum</div><div></div></div><div><div>Ref Level 20.00 dBm</div><div>Att 30 dB</div><div>Offset 4.39 dB</div><div>RBW 1 MHz</div><div>Count 100/100</div><div>STAT MSK LOG</div></div><div><div>Frequency Sweep</div><div>Mode Auto Sweep</div></div></div><div><div><div>10 dBm</div><div>0 dBm</div><div>-10 dBm</div><div>-20 dBm</div><div>-30 dBm</div><div>-40 dBm</div><div>-50 dBm</div><div>-60 dBm</div><div>-70 dBm</div></div><div><div>M1</div><div>M1[1]</div><div>3.05 dBm</div><div>5.2634670 GHz</div></div></div><div><div>CF 5.27 GHz</div><div>1001 pts</div><div>6.0 MHz/</div><div>Span 60.0 MHz</div></div><div>Date: 23 MAY 2019 16:08:30</div></div> |                 |  |
| CH <sub>H</sub> | <div><div><div><div>MultiView</div><div>Spectrum</div><div></div></div><div><div>Ref Level 20.00 dBm</div><div>Att 30 dB</div><div>Offset 4.40 dB</div><div>RBW 1 MHz</div><div>Count 100/100</div><div>STAT MSK LOG</div></div><div><div>Frequency Sweep</div><div>Mode Auto Sweep</div></div></div><div><div><div>10 dBm</div><div>0 dBm</div><div>-10 dBm</div><div>-20 dBm</div><div>-30 dBm</div><div>-40 dBm</div><div>-50 dBm</div><div>-60 dBm</div><div>-70 dBm</div></div><div><div>M1</div><div>M1[1]</div><div>3.29 dBm</div><div>5.3082620 GHz</div></div></div><div><div>CF 5.31 GHz</div><div>1001 pts</div><div>6.0 MHz/</div><div>Span 60.0 MHz</div></div><div>Date: 23 MAY 2019 16:00:04</div></div> |                 |  |

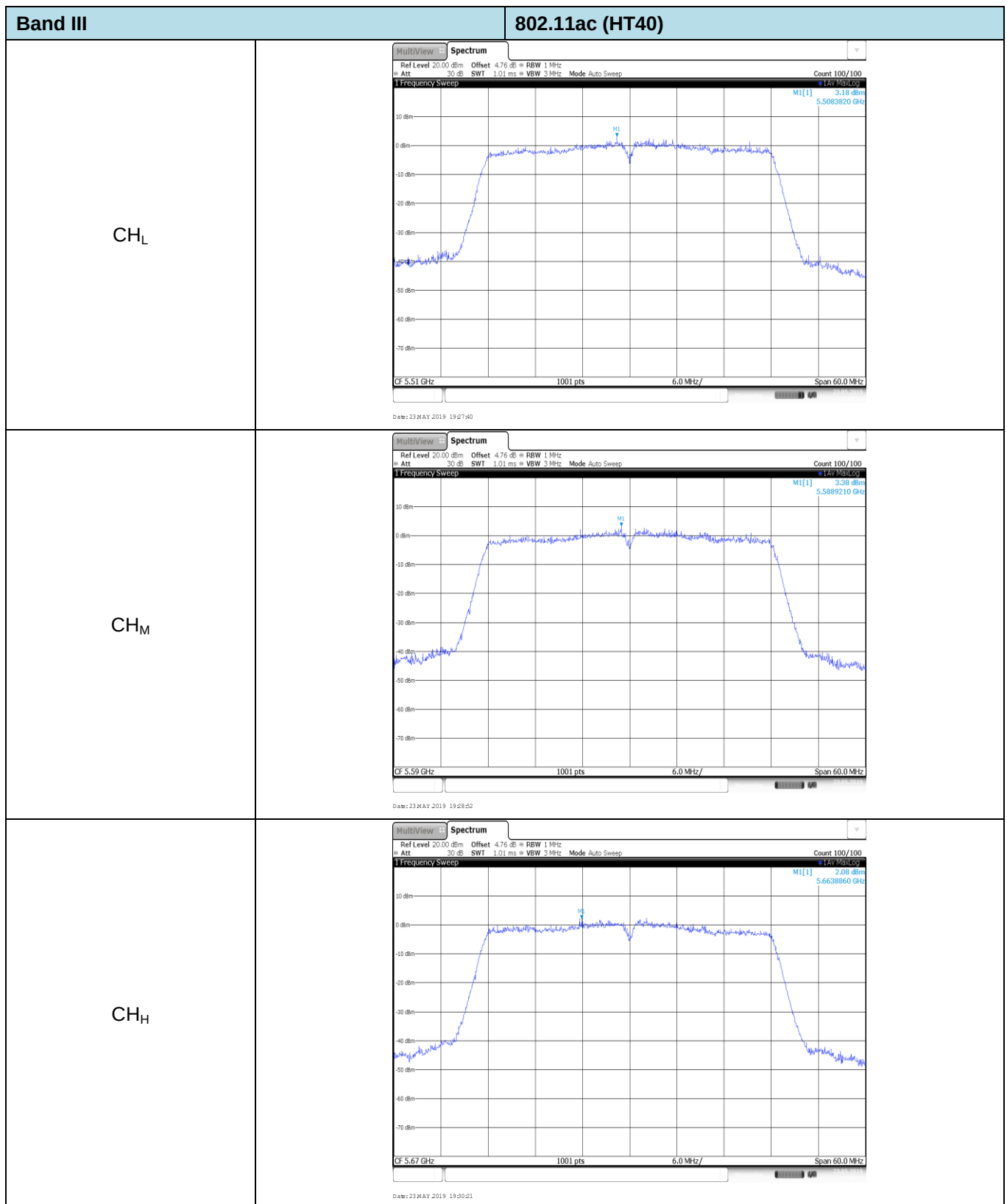


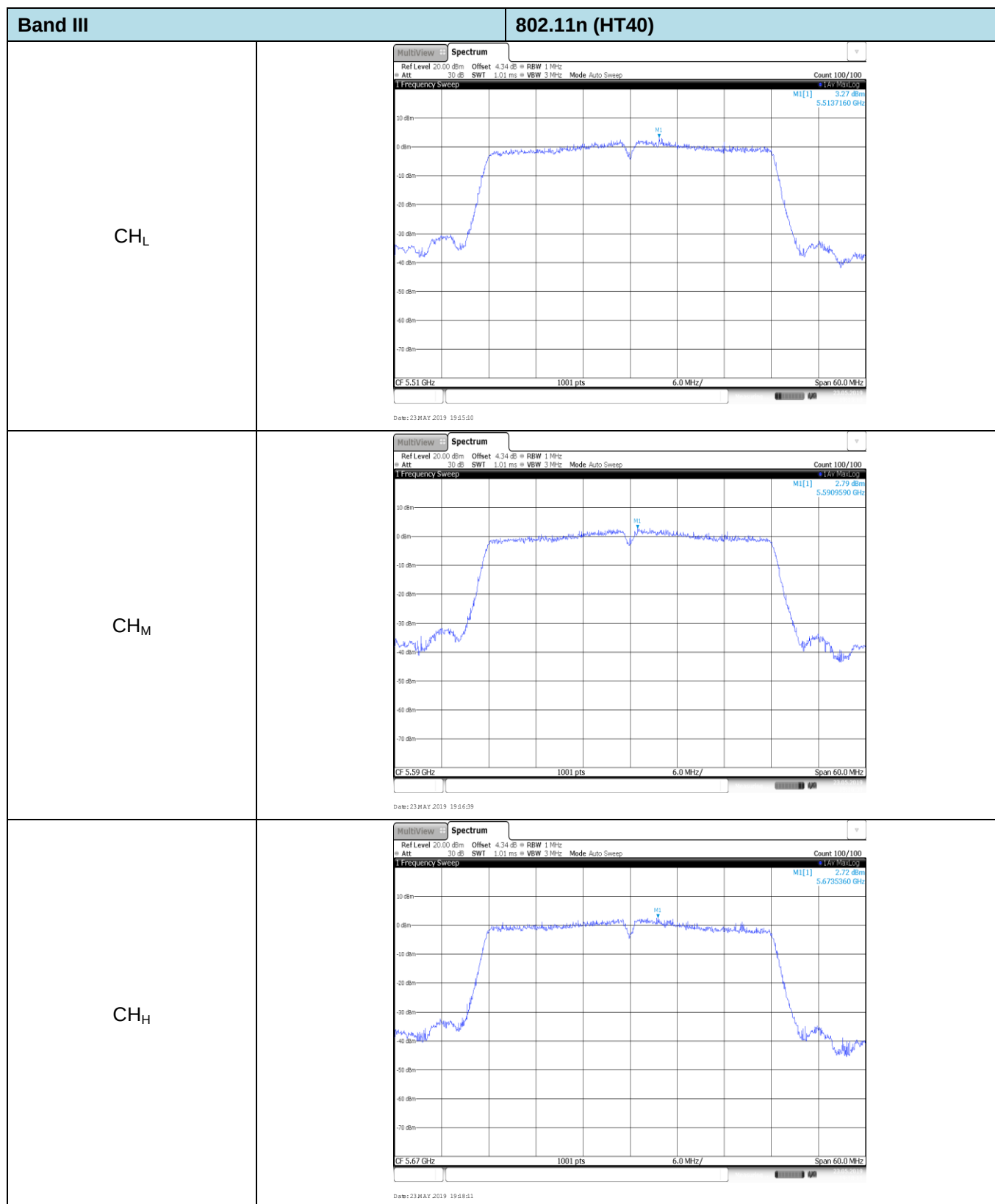


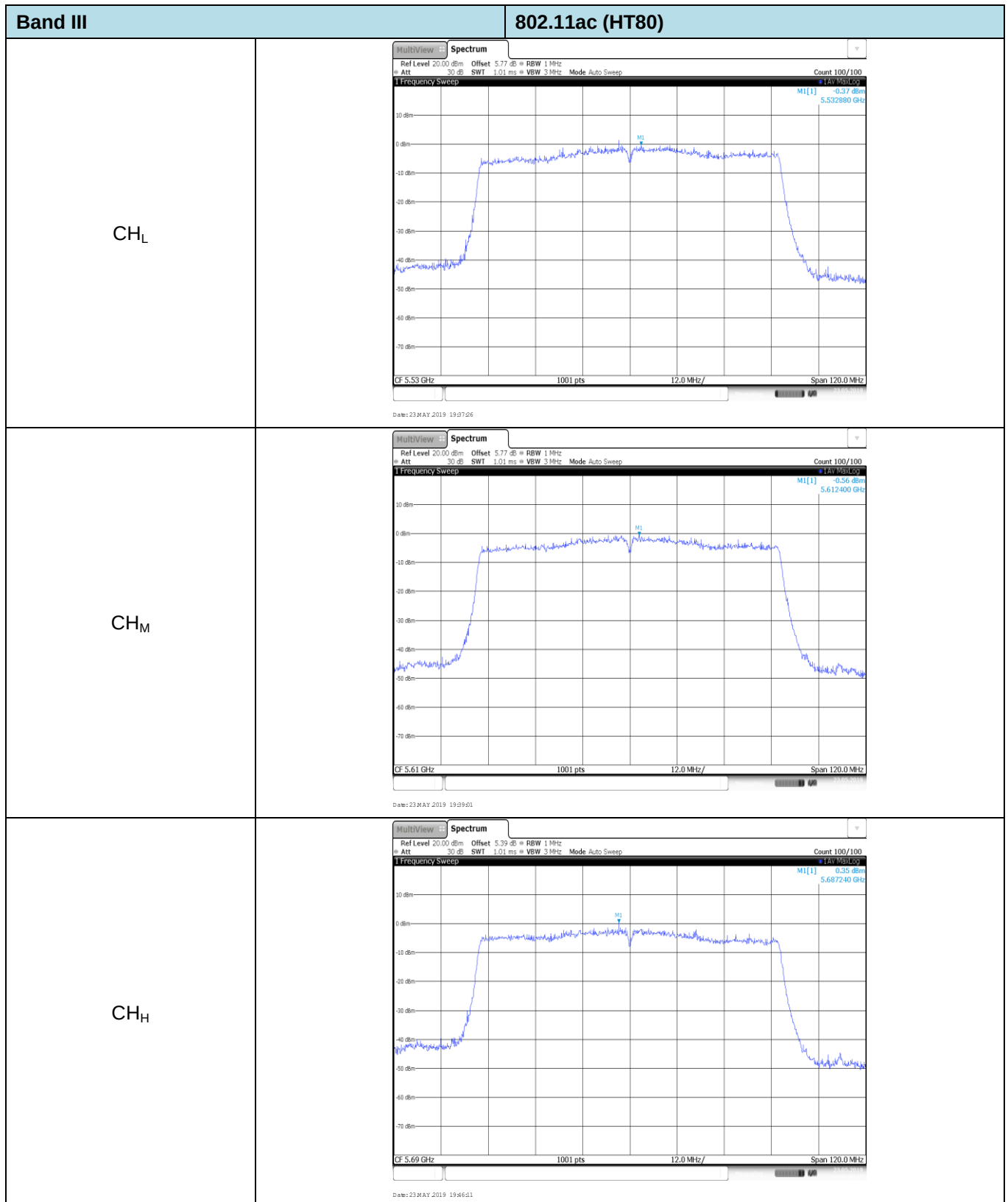


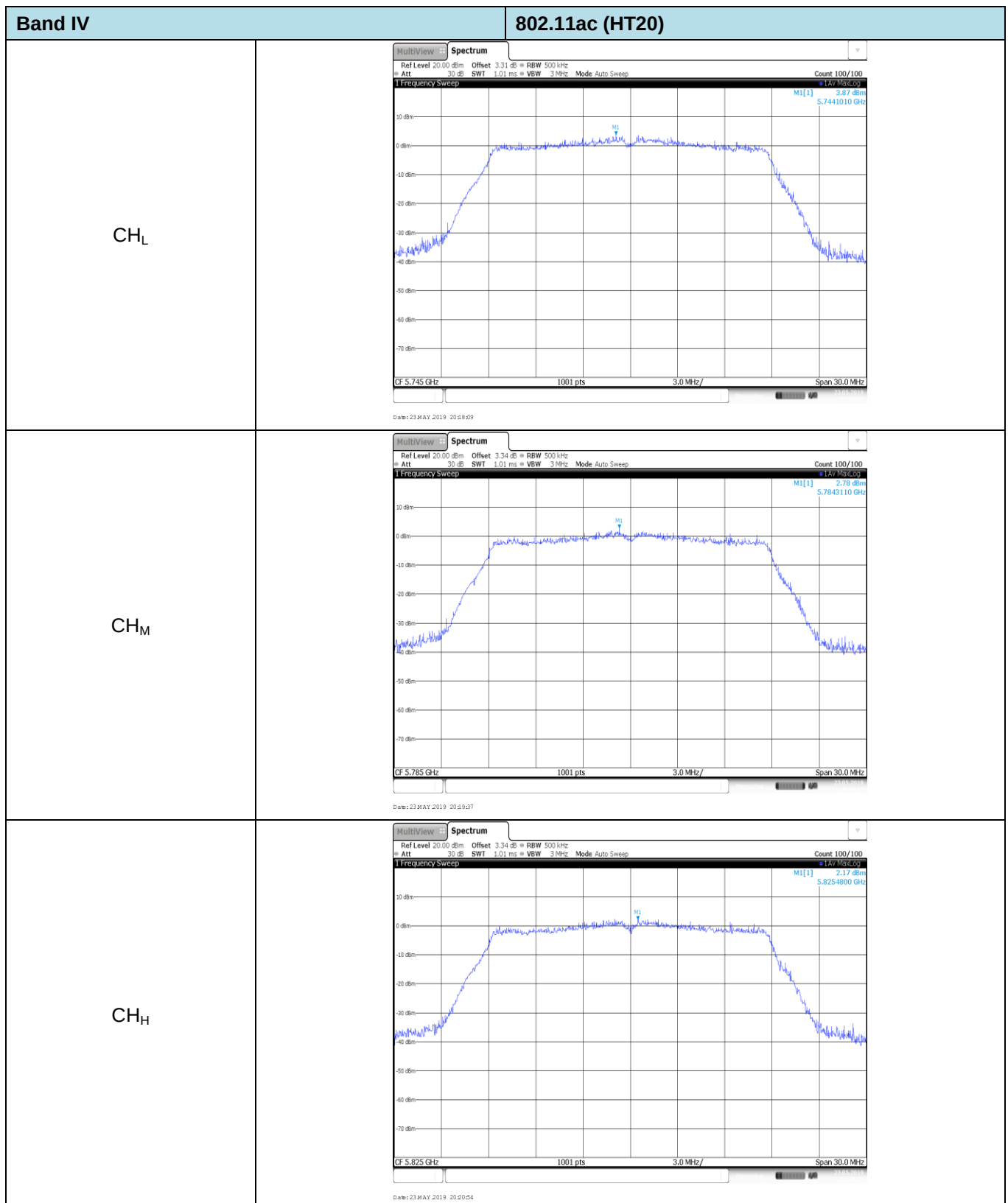


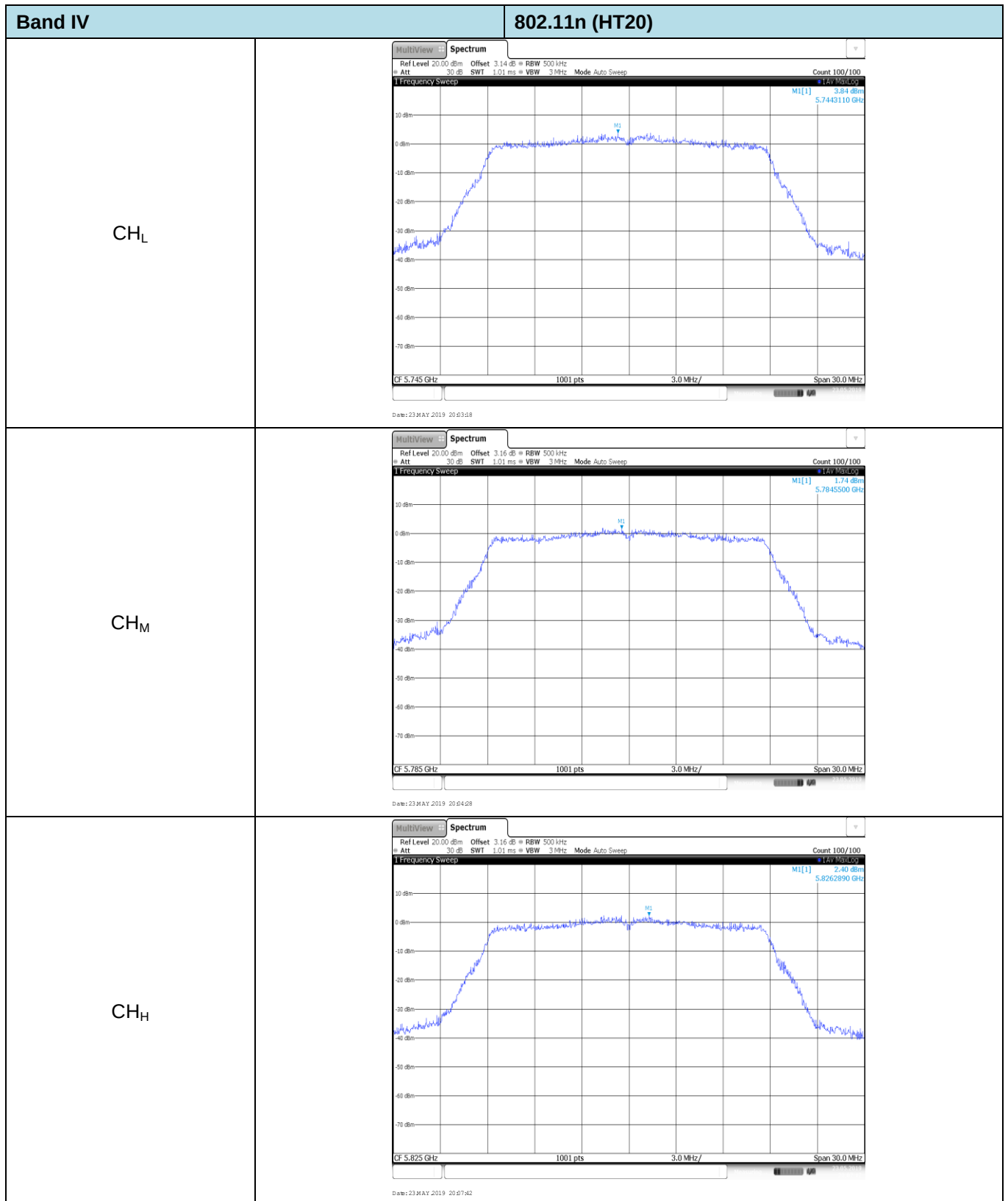






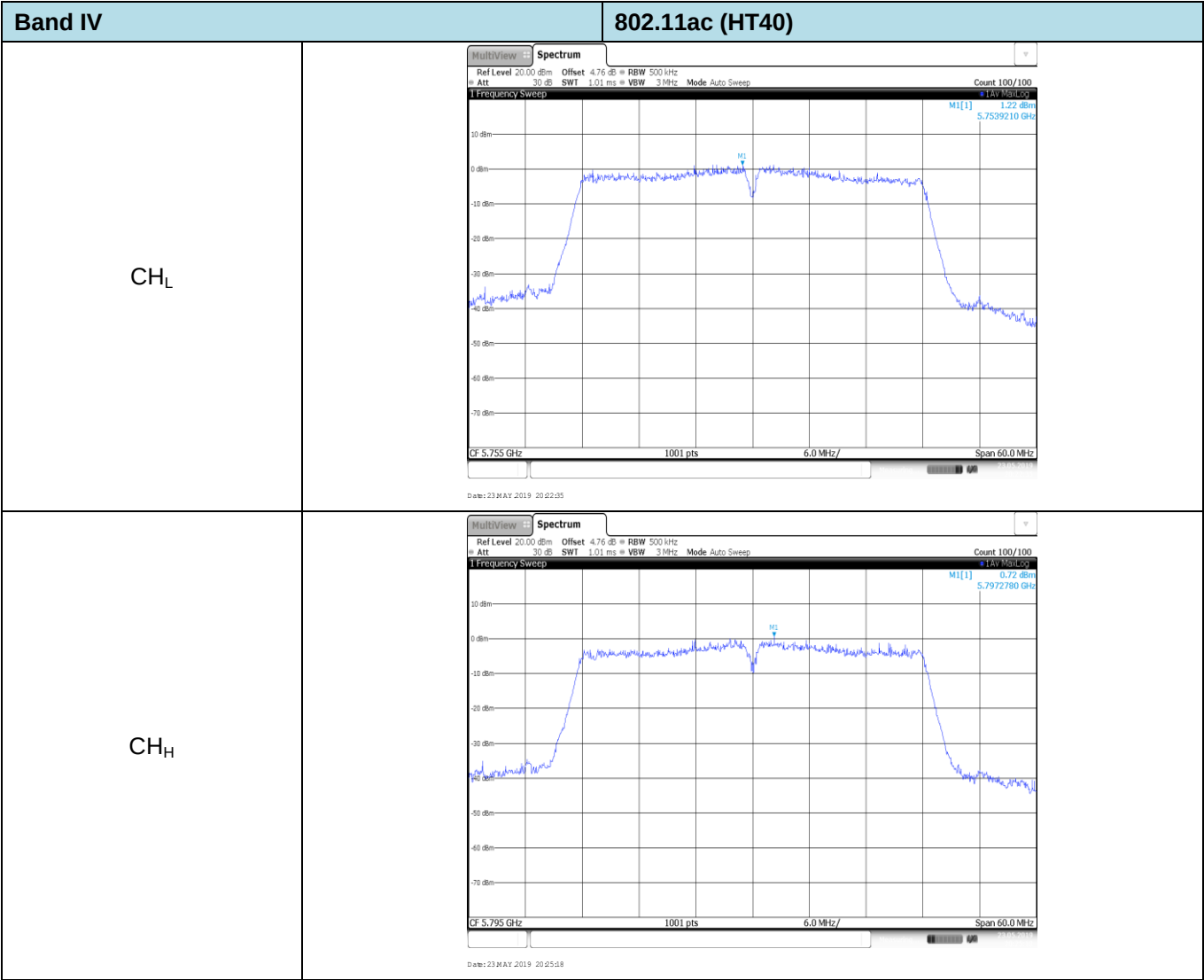


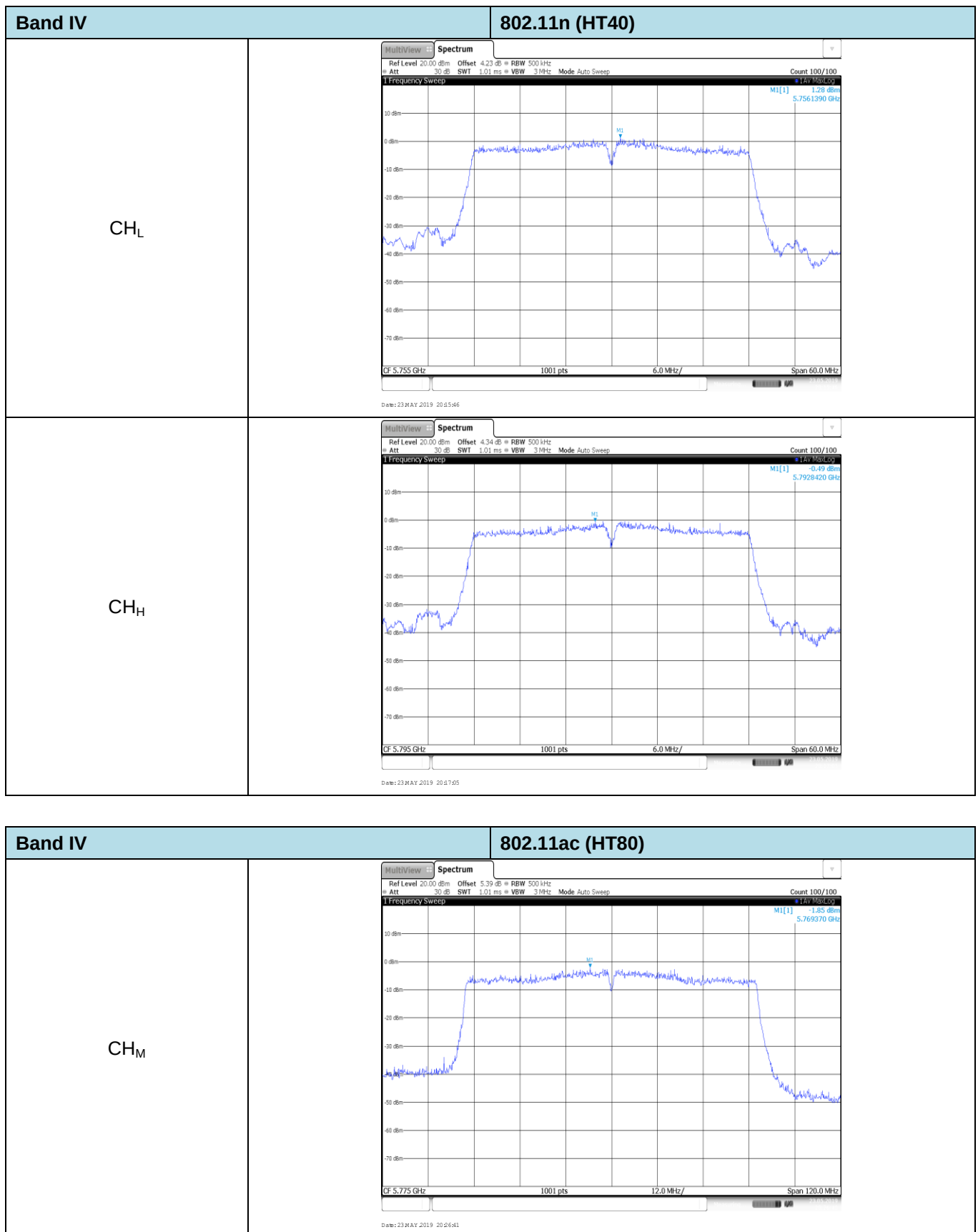




| Band IV         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 802.11a |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| CH <sub>L</sub> | <div><div><div><div>MultiView</div><div>Spectrum</div><div>Ref Level 20.00 dBm Offset 3.01 dB RBW 500 kHz</div><div>Att 30 dB SWF 1.01 ms VBW 3 MHz Mode Auto Sweep</div><div>Count 100/100</div><div>STAT MSLog</div><div>Frequency Sweep</div><div><div>M1</div><div>3.06 dBm</div><div>5.7443410 GHz</div></div><div><div>10 dBm</div><div>0 dBm</div><div>-10 dBm</div><div>-20 dBm</div><div>-30 dBm</div><div>-40 dBm</div><div>-50 dBm</div><div>-60 dBm</div><div>-70 dBm</div></div><div><div>CF 5.745 GHz</div><div>1001 pts</div><div>3.0 MHz/</div><div>Span 30.0 MHz</div></div></div></div><div>Date: 23 MAY 2019 19:57:54</div></div> |         |
| CH <sub>M</sub> | <div><div><div><div>MultiView</div><div>Spectrum</div><div>Ref Level 20.00 dBm Offset 3.01 dB RBW 500 kHz</div><div>Att 30 dB SWF 1.01 ms VBW 3 MHz Mode Auto Sweep</div><div>Count 100/100</div><div>STAT MSLog</div><div>Frequency Sweep</div><div><div>M1</div><div>1.61 dBm</div><div>5.7844010 GHz</div></div><div><div>10 dBm</div><div>0 dBm</div><div>-10 dBm</div><div>-20 dBm</div><div>-30 dBm</div><div>-40 dBm</div><div>-50 dBm</div><div>-60 dBm</div><div>-70 dBm</div></div><div><div>CF 5.785 GHz</div><div>1001 pts</div><div>3.0 MHz/</div><div>Span 30.0 MHz</div></div></div></div><div>Date: 23 MAY 2019 19:59:02</div></div> |         |
| CH <sub>H</sub> | <div><div><div><div>MultiView</div><div>Spectrum</div><div>Ref Level 20.00 dBm Offset 3.01 dB RBW 500 kHz</div><div>Att 30 dB SWF 1.01 ms VBW 3 MHz Mode Auto Sweep</div><div>Count 100/100</div><div>STAT MSLog</div><div>Frequency Sweep</div><div><div>M1</div><div>0.74 dBm</div><div>5.8243410 GHz</div></div><div><div>10 dBm</div><div>0 dBm</div><div>-10 dBm</div><div>-20 dBm</div><div>-30 dBm</div><div>-40 dBm</div><div>-50 dBm</div><div>-60 dBm</div><div>-70 dBm</div></div><div><div>CF 5.825 GHz</div><div>1001 pts</div><div>3.0 MHz/</div><div>Span 30.0 MHz</div></div></div></div><div>Date: 23 MAY 2019 20:01:27</div></div> |         |





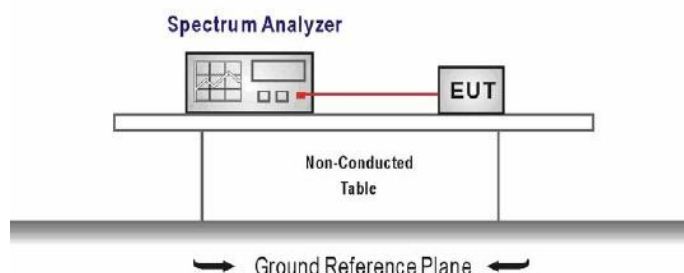


## 5.5. 26dB bandwidth and 99% Occupancy bandwidth

### LIMIT

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 , and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

### TEST CONFIGURATION



### TEST PROCEDURE

1. According KDB 789033 D02 – Section C
2. Connect the antenna port(s) to the spectrum analyzer input.
3. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).  
Center Frequency = Channel center frequency  
Span = 2 x emission bandwidth  
RBW = 1% to 5% of the emission bandwidth  
VBW > 3 x RBW  
Sweep time = auto couple  
Detector = Peak  
Trace mode = max hold
4. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission, and use the 99 % power bandwidth function of the instrument

### TEST MODE:

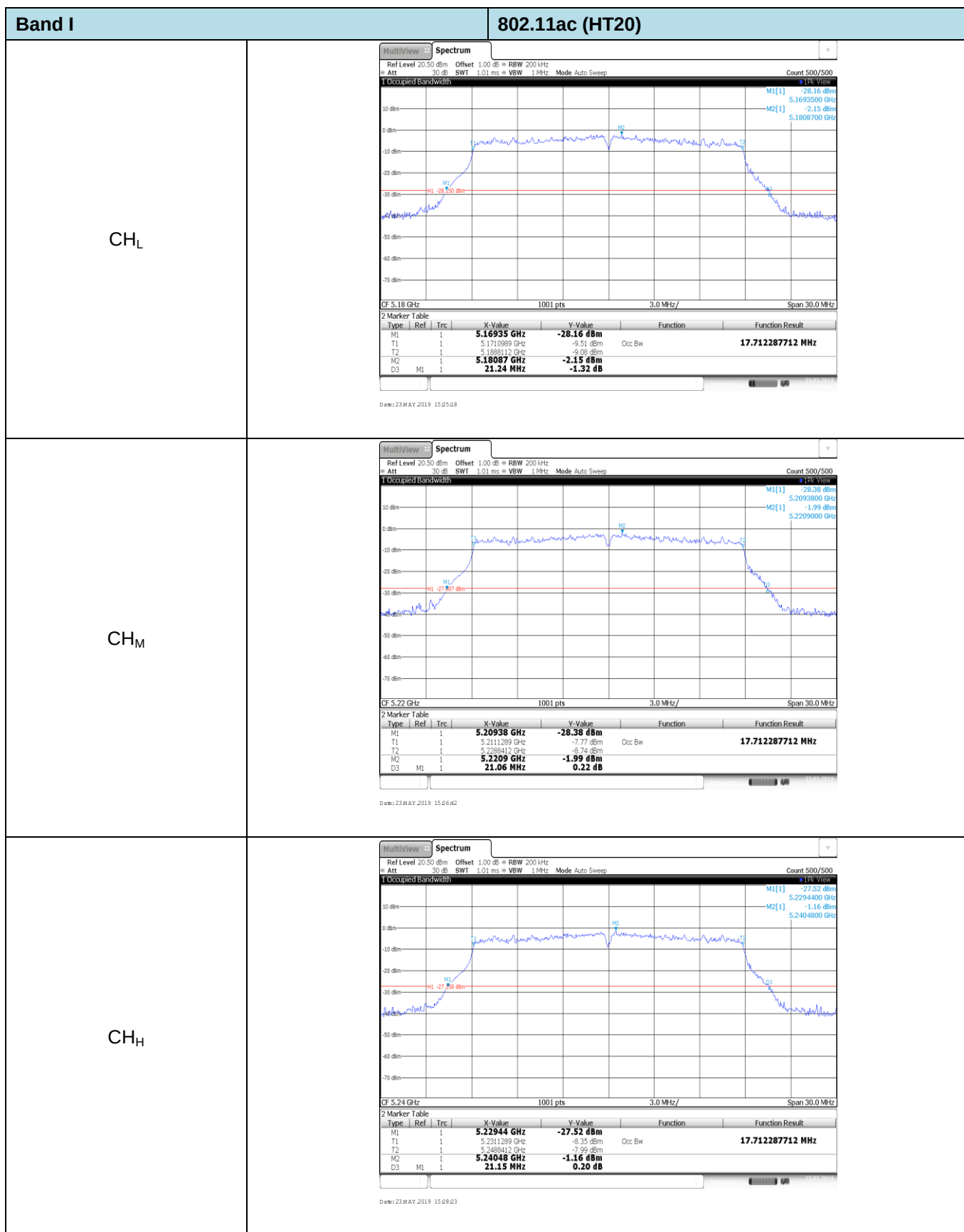
Please refer to the clause 3.3

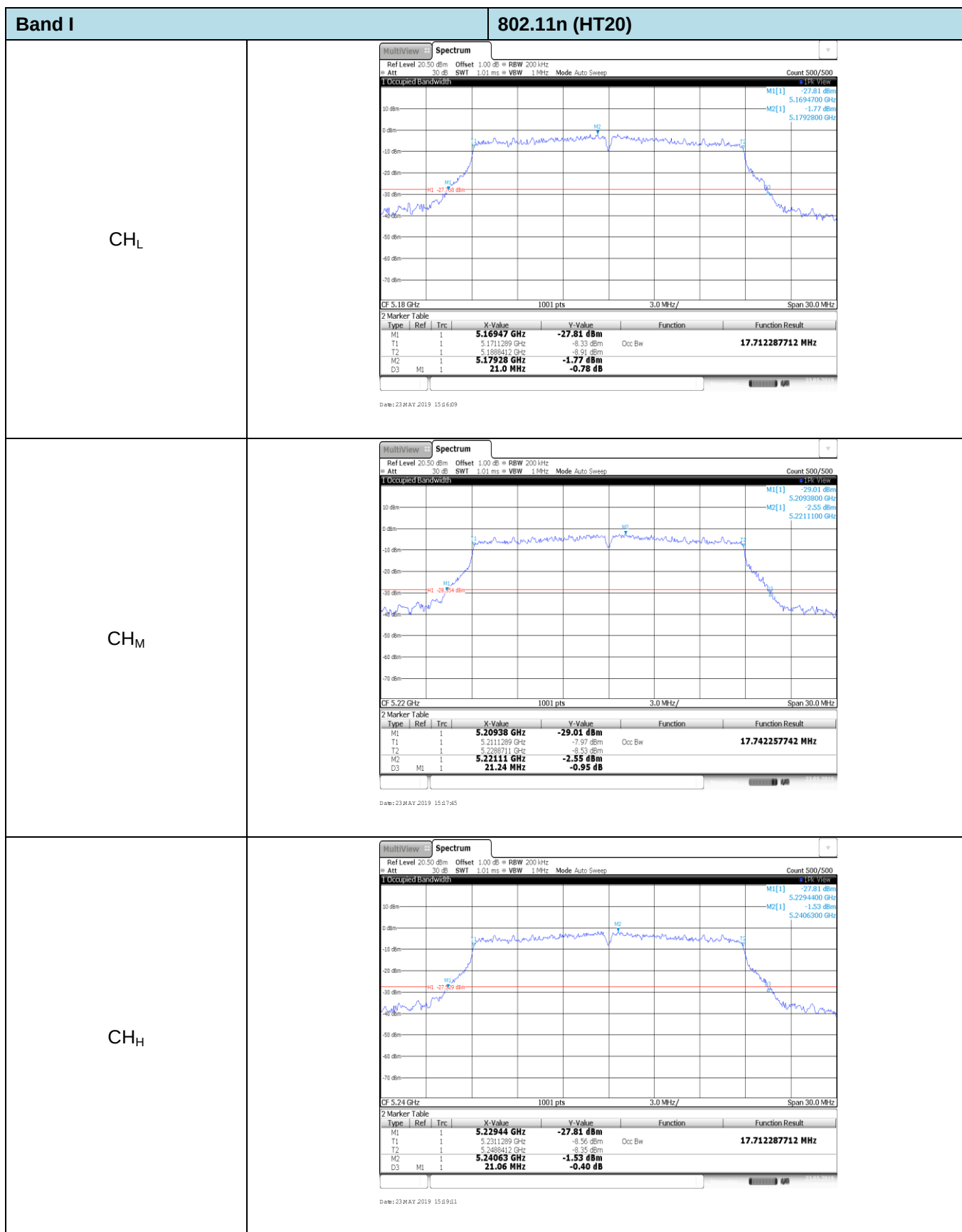
### TEST RESULTS

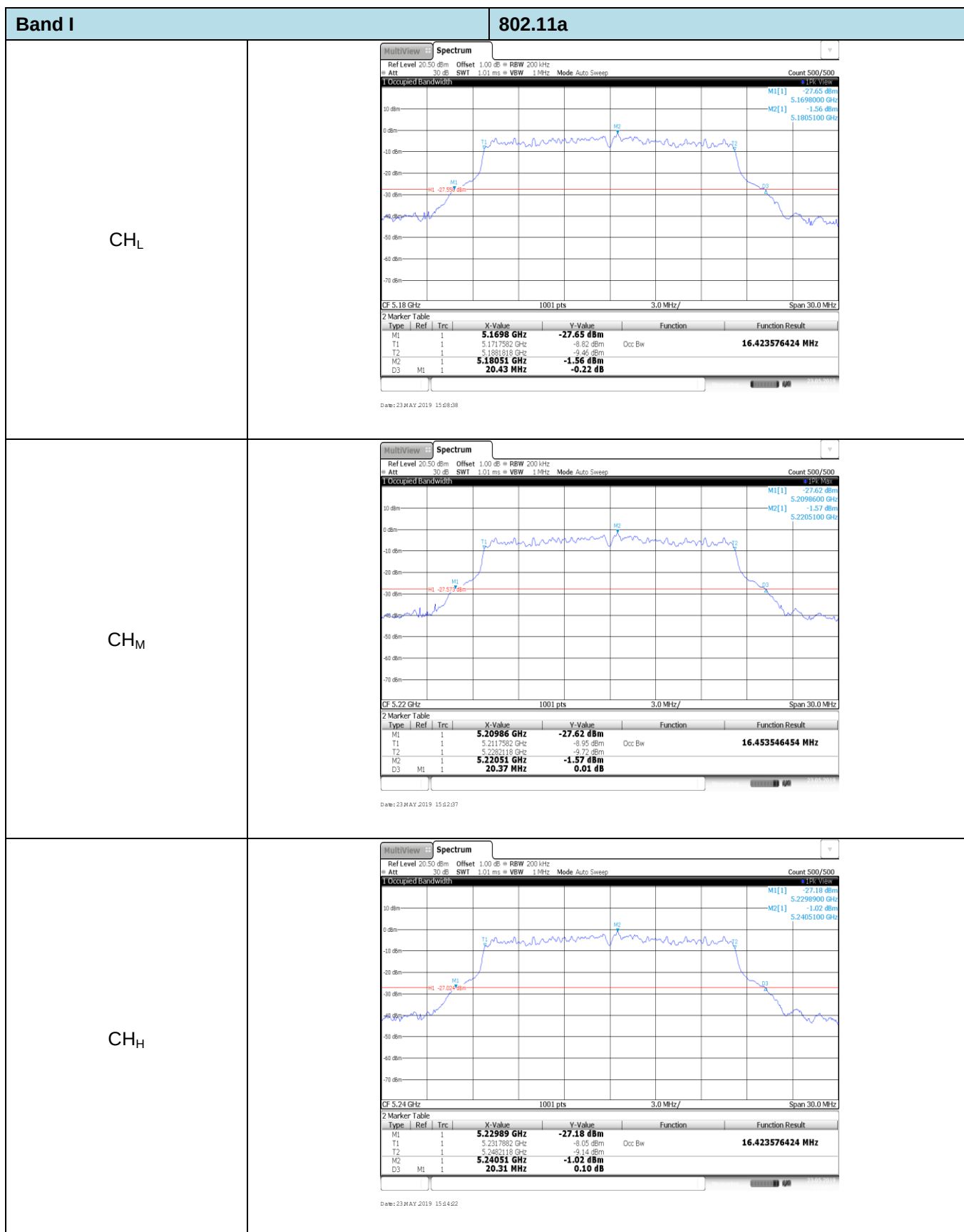
☒ Passed      ☐ Not Applicable

| Band | Bandwidth (MHz) | Type     | Channel         | 99% Occupy bandwidth (MHz) | 26dB bandwidth (MHz) | Result |
|------|-----------------|----------|-----------------|----------------------------|----------------------|--------|
| I    | 20              | 802.11ac | CH <sub>L</sub> | 17.71                      | 21.24                | Pass   |
|      |                 |          | CH <sub>M</sub> | 17.71                      | 21.06                |        |
|      |                 |          | CH <sub>H</sub> | 17.71                      | 21.15                |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 17.71                      | 21.00                | Pass   |
|      |                 |          | CH <sub>M</sub> | 17.74                      | 21.24                |        |
|      |                 |          | CH <sub>H</sub> | 17.71                      | 21.06                |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 16.42                      | 20.43                | Pass   |
|      |                 |          | CH <sub>M</sub> | 16.45                      | 20.37                |        |
|      |                 |          | CH <sub>H</sub> | 16.42                      | 20.31                |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 36.44                      | 40.20                | Pass   |
|      |                 |          | CH <sub>H</sub> | 36.38                      | 39.96                |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 36.26                      | 39.60                | Pass   |
|      |                 |          | CH <sub>H</sub> | 36.26                      | 39.66                |        |
|      | 80              | 802.11ac | CH <sub>M</sub> | 75.64                      | 81.24                | Pass   |
| II   | 20              | 802.11ac | CH <sub>L</sub> | 17.71                      | 21.09                | Pass   |
|      |                 |          | CH <sub>M</sub> | 17.71                      | 21.15                |        |
|      |                 |          | CH <sub>H</sub> | 17.71                      | 21.27                |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 17.68                      | 21.30                | Pass   |
|      |                 |          | CH <sub>M</sub> | 17.71                      | 21.21                |        |
|      |                 |          | CH <sub>H</sub> | 17.74                      | 21.03                |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 16.42                      | 20.37                | Pass   |
|      |                 |          | CH <sub>M</sub> | 16.42                      | 20.40                |        |
|      |                 |          | CH <sub>H</sub> | 16.42                      | 20.31                |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 36.50                      | 40.02                | Pass   |
|      |                 |          | CH <sub>H</sub> | 36.44                      | 40.02                |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 36.32                      | 39.60                | Pass   |
|      |                 |          | CH <sub>H</sub> | 36.26                      | 39.90                |        |
|      | 80              | 802.11ac | CH <sub>M</sub> | 75.52                      | 81.12                | Pass   |

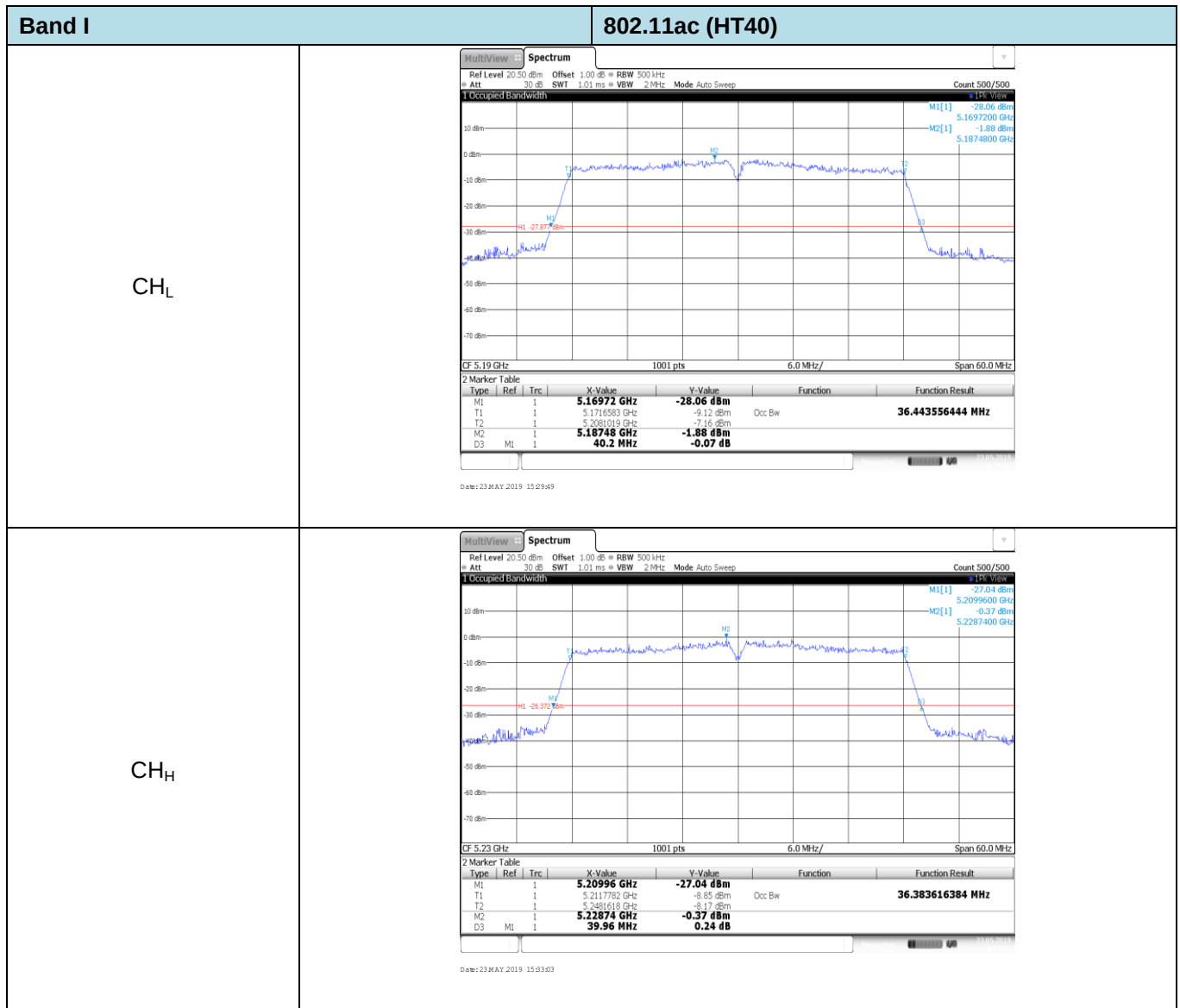
| Band | Bandwidth (MHz) | Type     | Channel         | 99% Occupy bandwidth (MHz) | 26dB bandwidth (MHz) | Result |
|------|-----------------|----------|-----------------|----------------------------|----------------------|--------|
| III  | 20              | 802.11ac | CH <sub>L</sub> | 17.74                      | 21.18                | Pass   |
|      |                 |          | CH <sub>M</sub> | 17.71                      | 20.73                |        |
|      |                 |          | CH <sub>H</sub> | 17.71                      | 20.91                |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 17.71                      | 21.30                | Pass   |
|      |                 |          | CH <sub>M</sub> | 17.71                      | 21.18                |        |
|      |                 |          | CH <sub>H</sub> | 17.74                      | 21.18                |        |
|      |                 | 802.11a  | CH <sub>L</sub> | 16.42                      | 20.40                | Pass   |
|      |                 |          | CH <sub>M</sub> | 16.42                      | 20.31                |        |
|      |                 |          | CH <sub>H</sub> | 16.42                      | 20.37                |        |
|      | 40              | 802.11ac | CH <sub>L</sub> | 36.38                      | 40.26                | Pass   |
|      |                 |          | CH <sub>M</sub> | 36.36                      | 40.04                |        |
|      |                 |          | CH <sub>H</sub> | 36.38                      | 40.14                |        |
|      |                 | 802.11n  | CH <sub>L</sub> | 36.20                      | 39.78                | Pass   |
|      |                 |          | CH <sub>M</sub> | 36.20                      | 39.42                |        |
|      |                 |          | CH <sub>H</sub> | 36.20                      | 39.66                |        |
|      | 80              | 802.11ac | CH <sub>L</sub> | 75.40                      | 81.60                | Pass   |
|      |                 |          | CH <sub>M</sub> | 75.52                      | 81.36                |        |
|      |                 |          | CH <sub>H</sub> | 75.64                      | 81.48                |        |

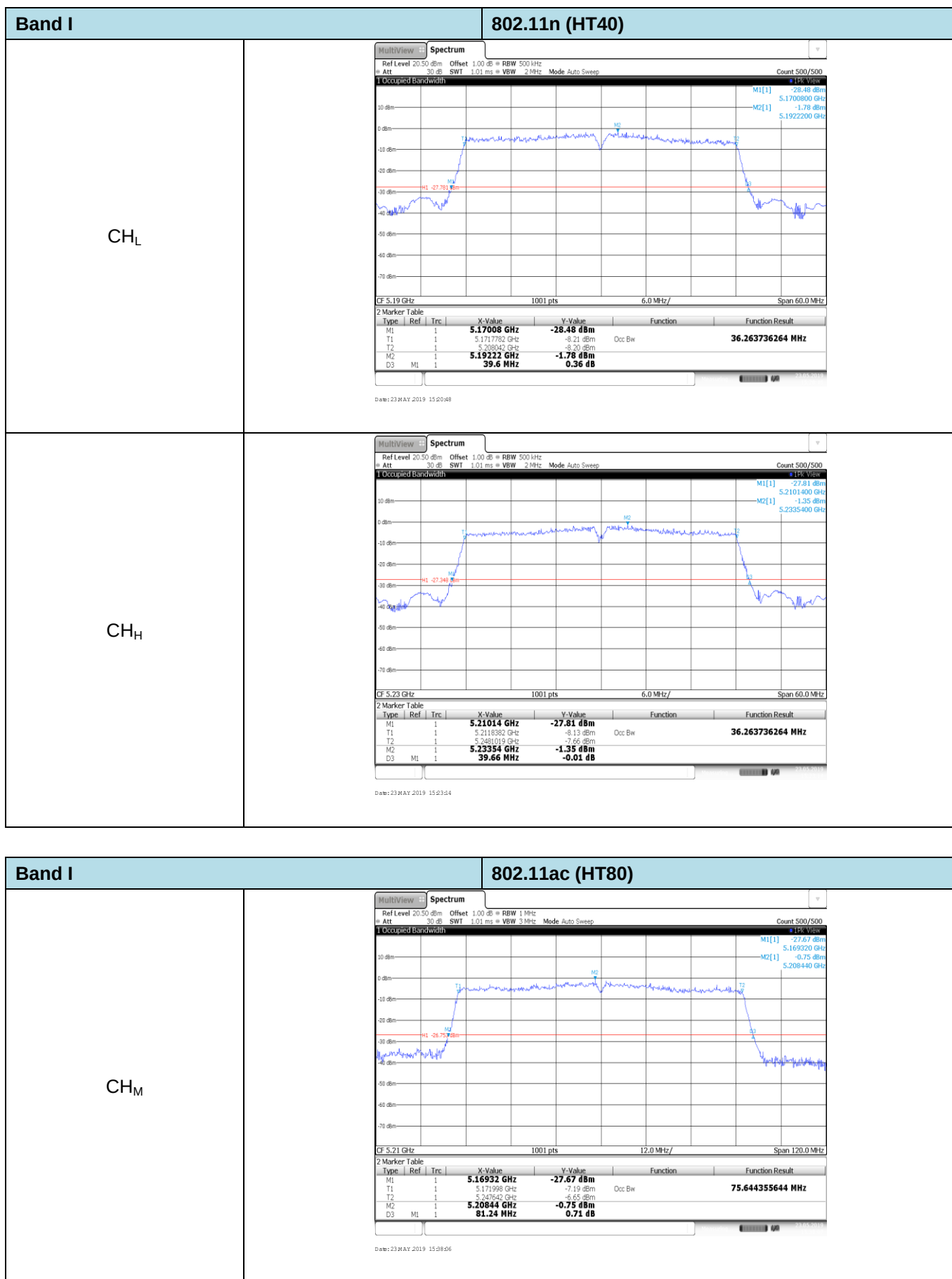


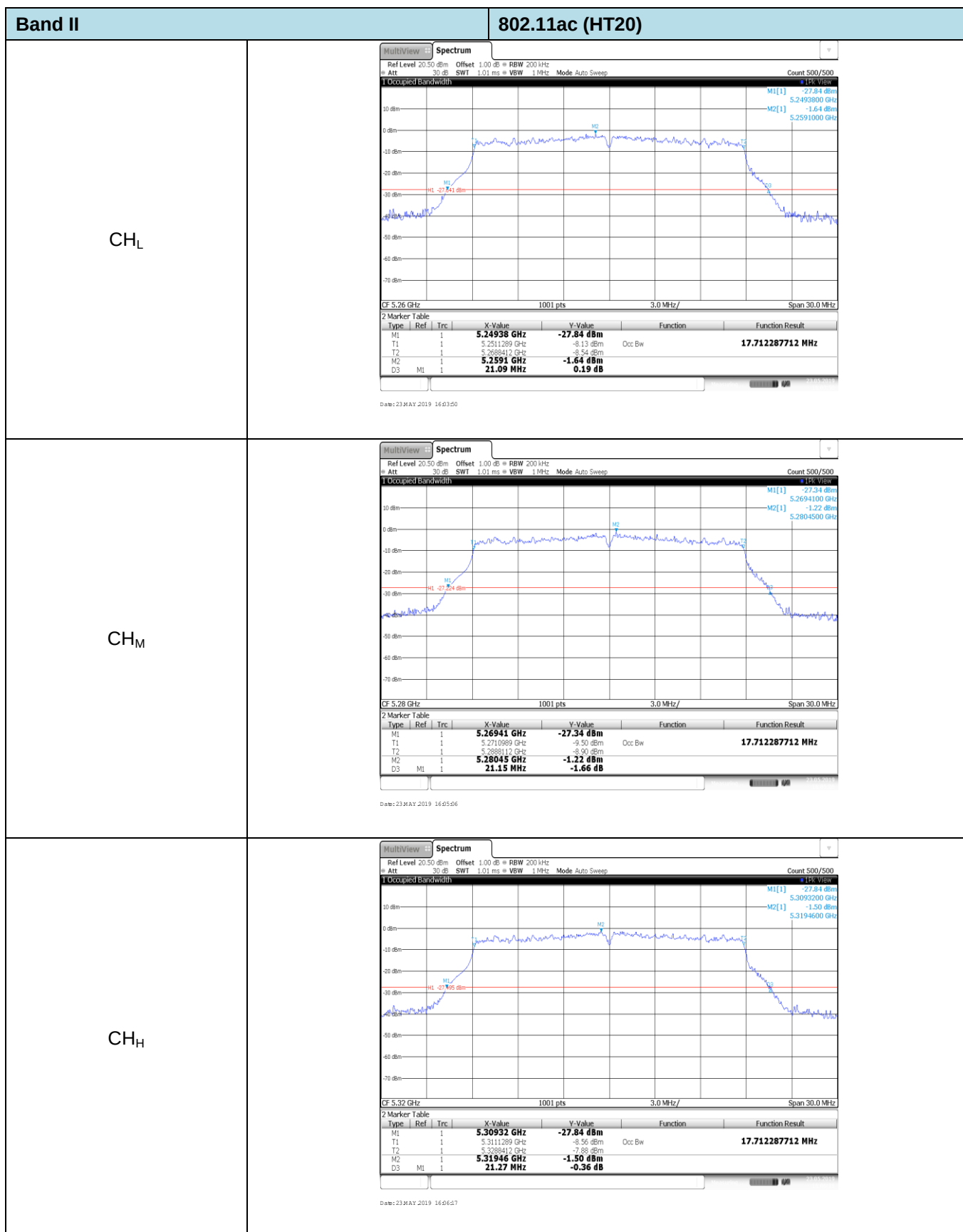


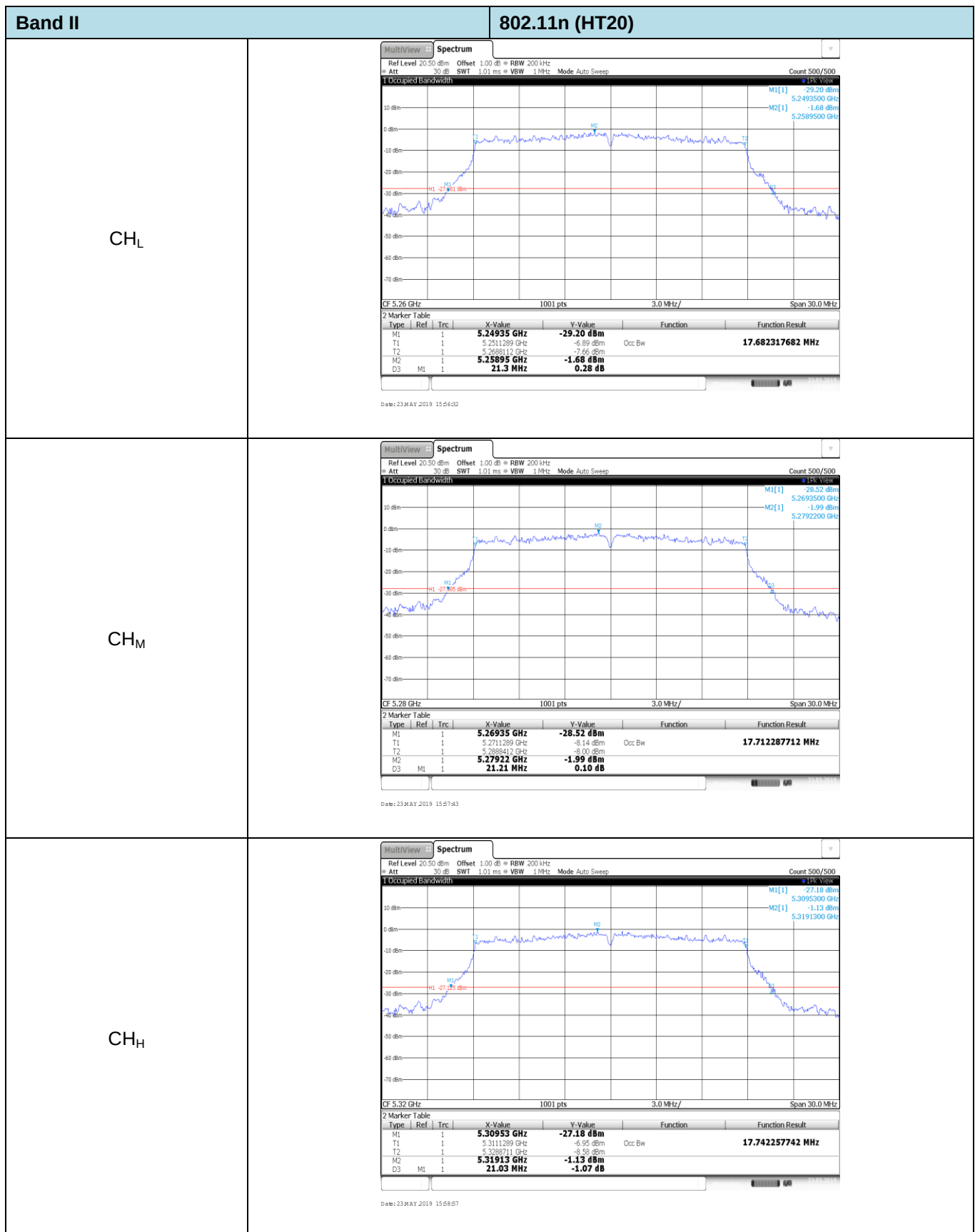


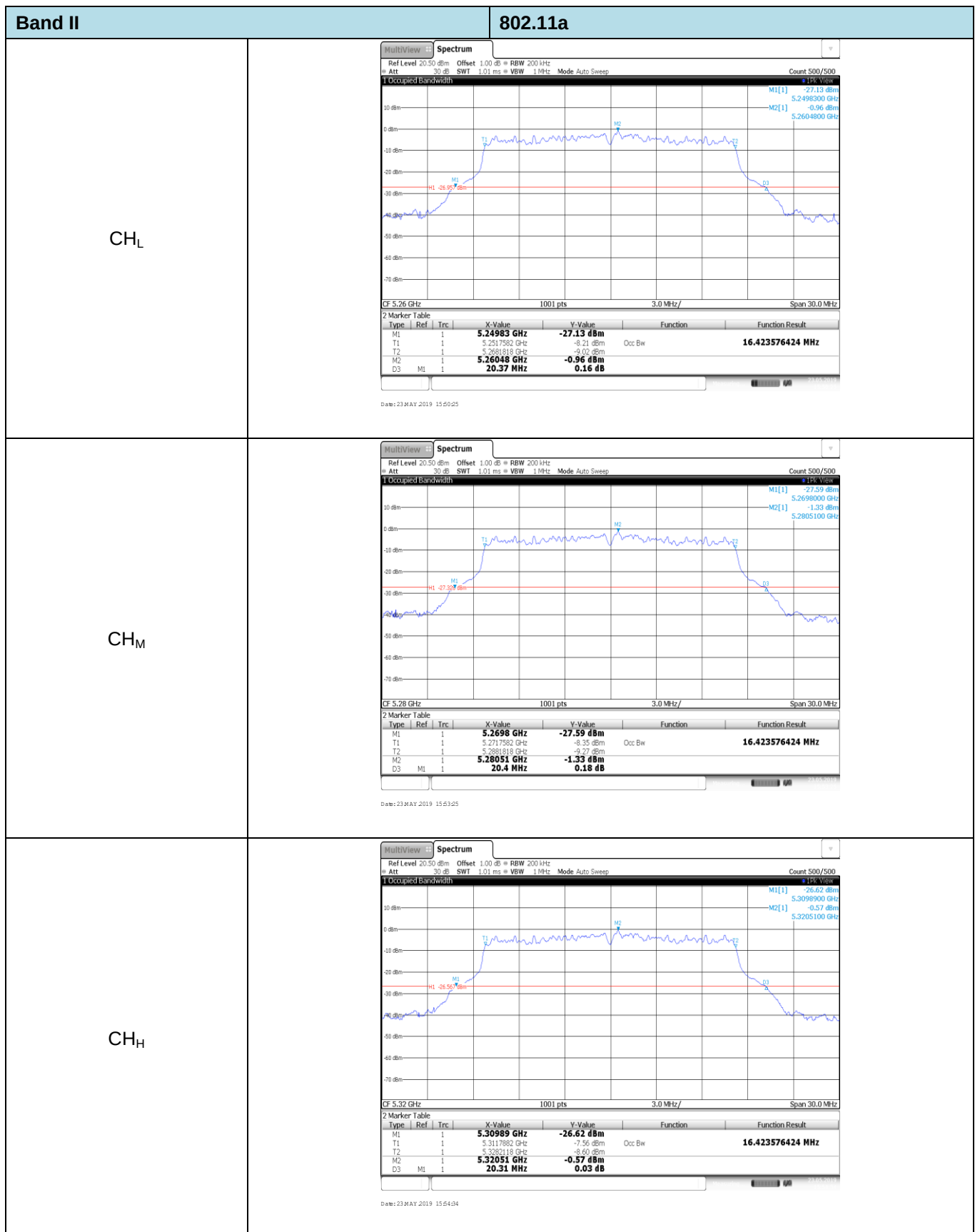


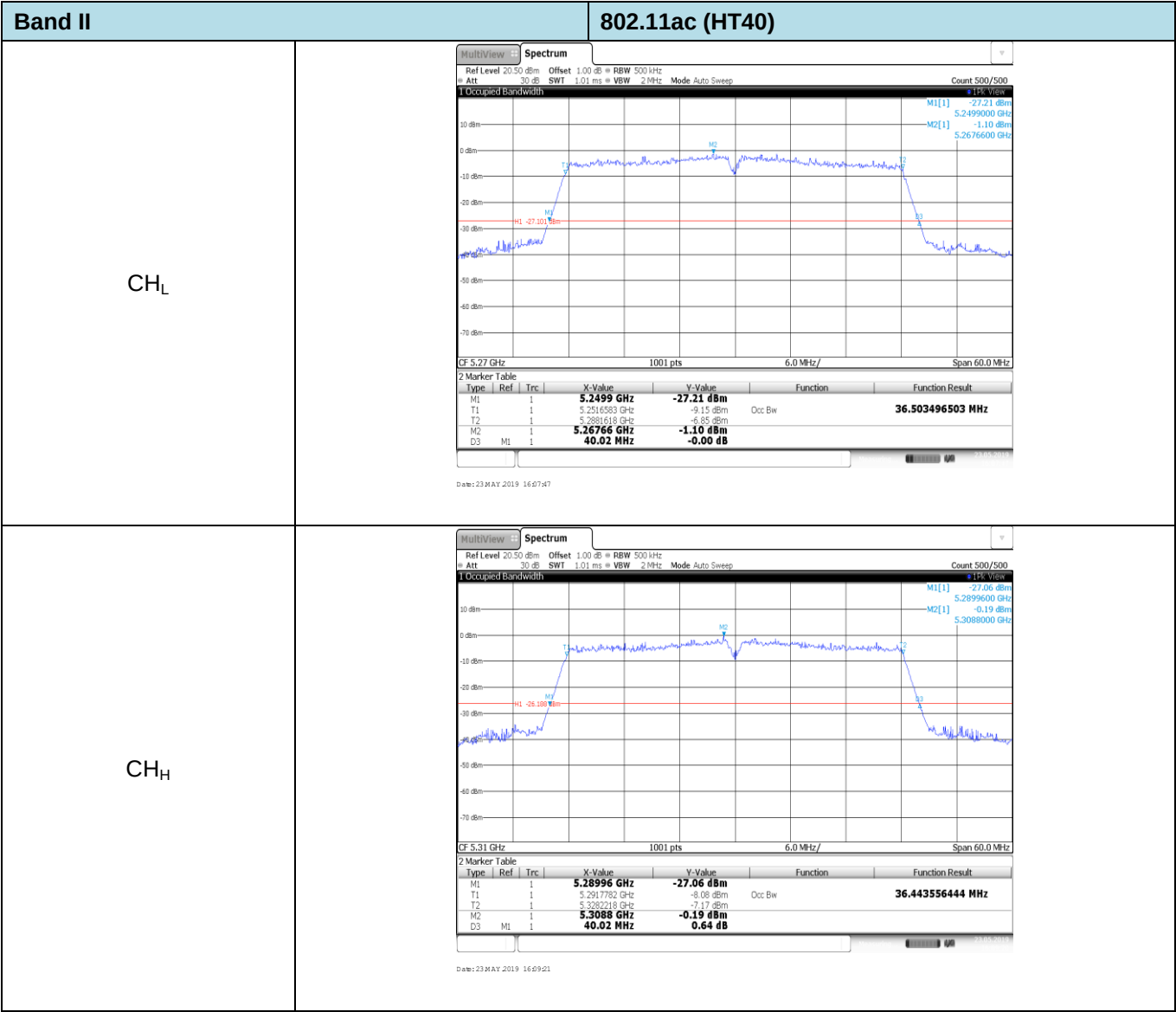


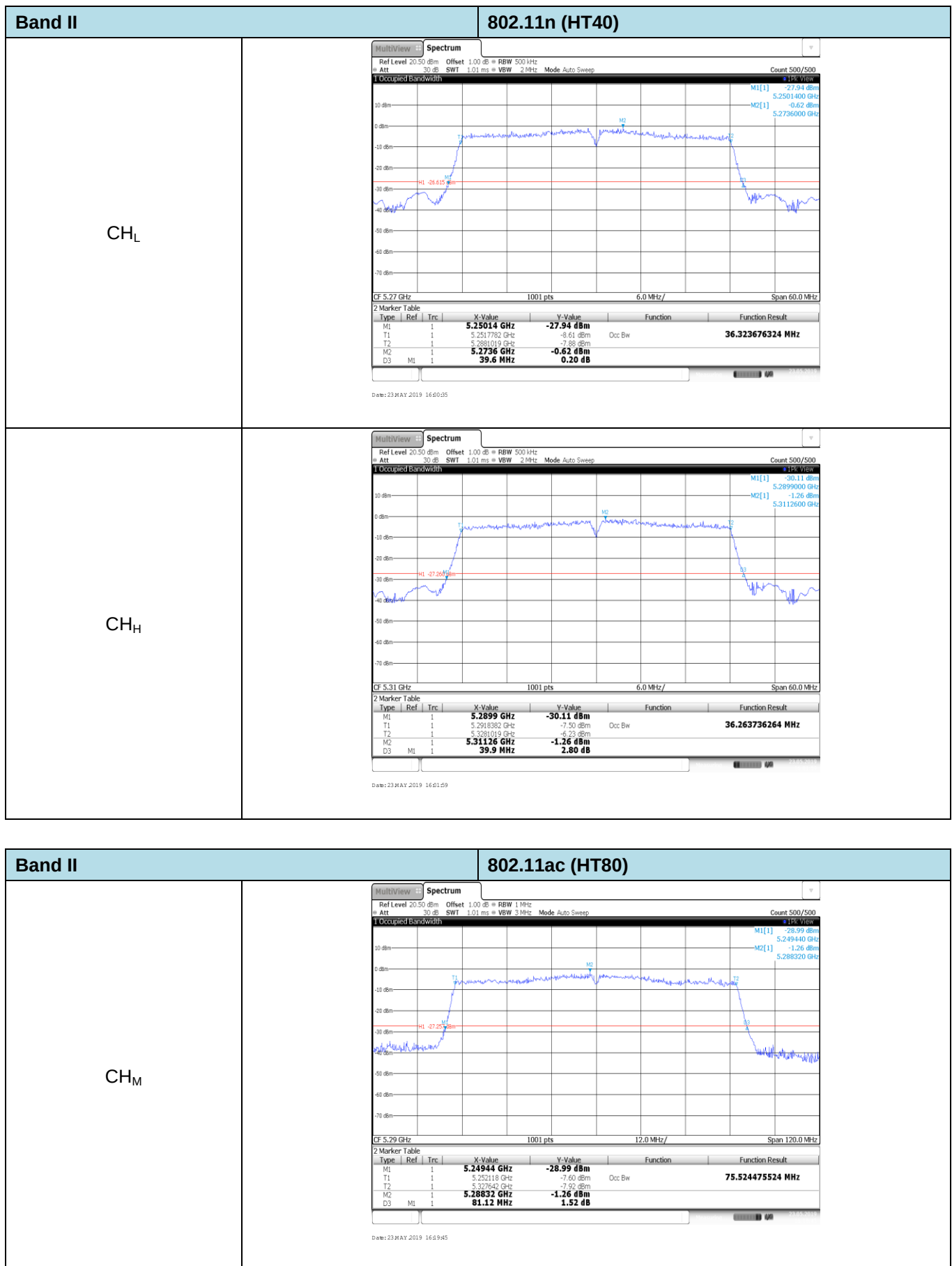


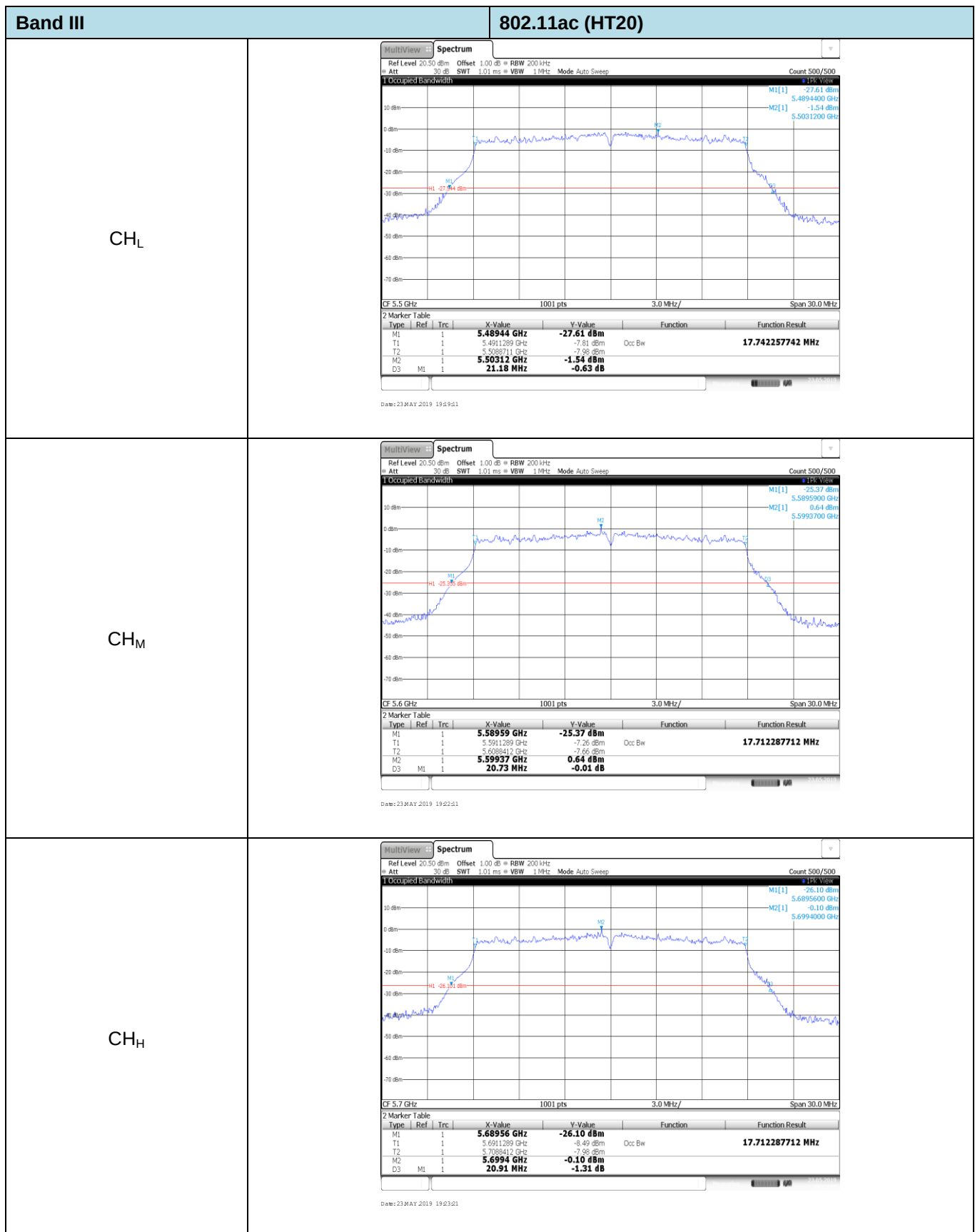




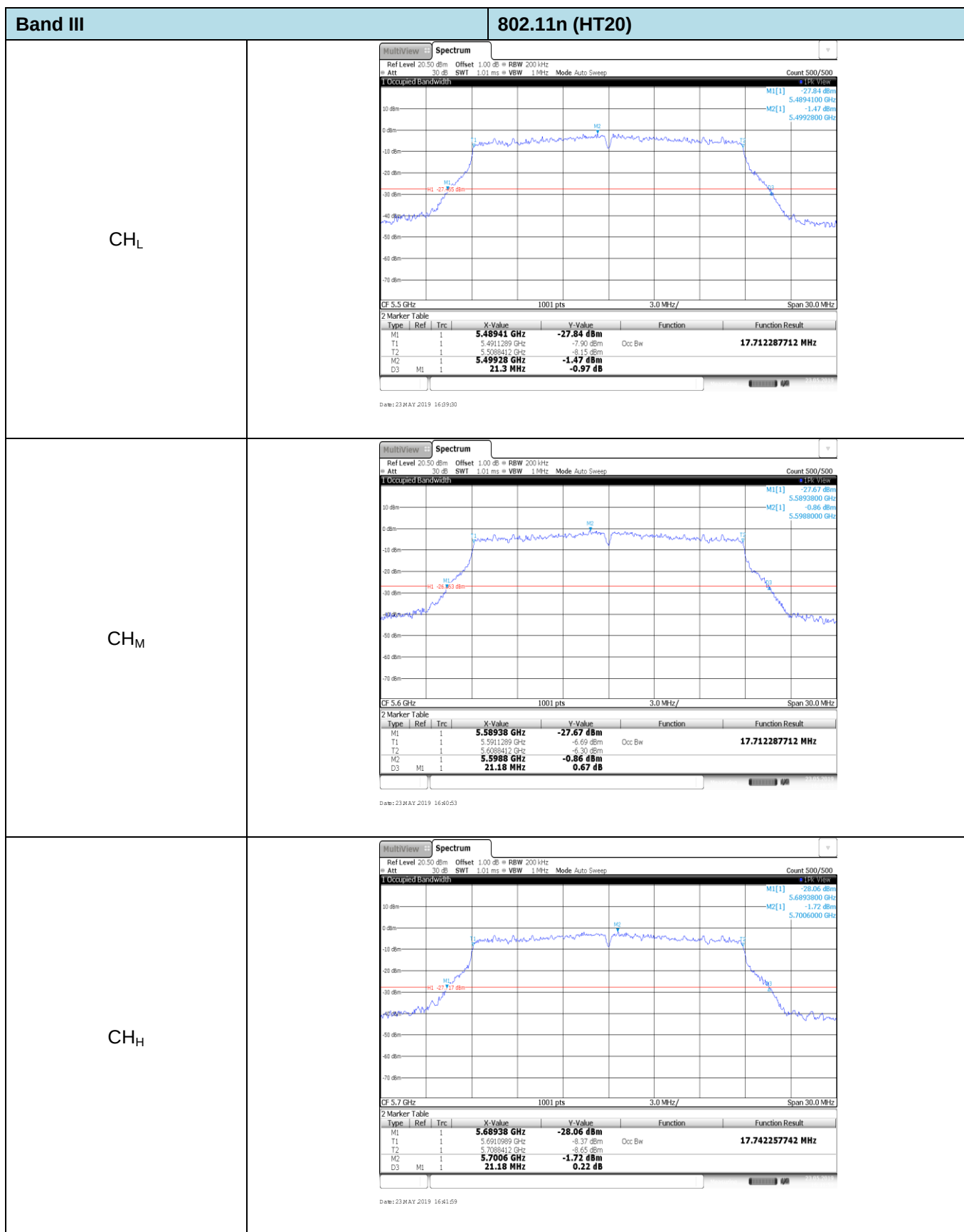


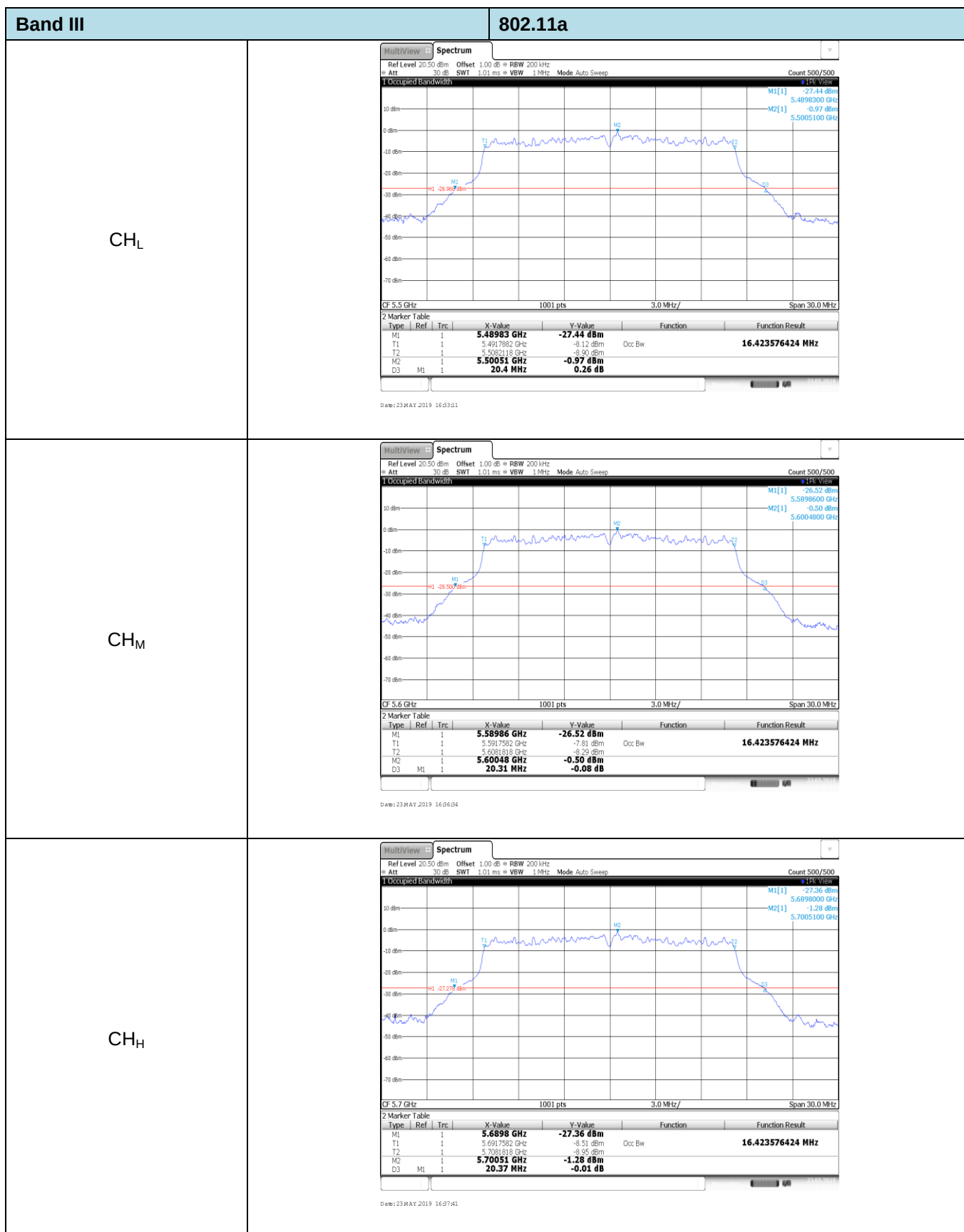






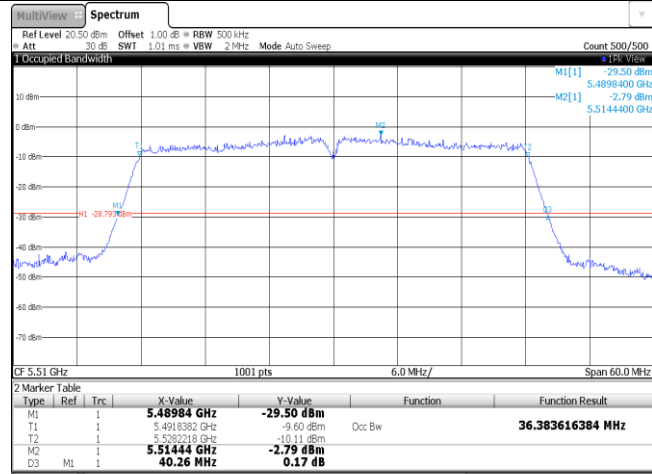






## Band III

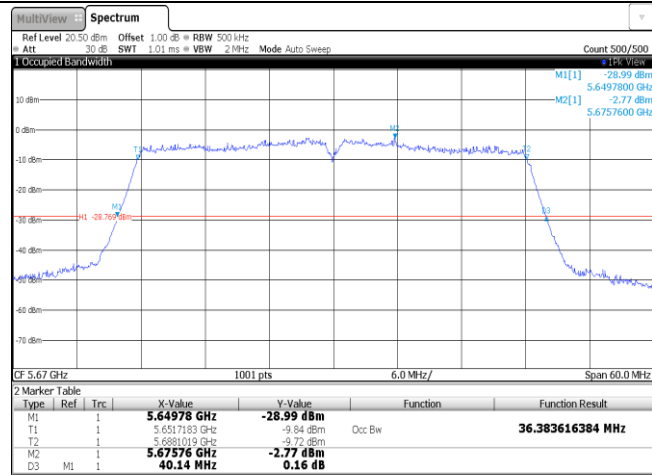
## 802.11ac (HT40)

CH<sub>L</sub>

Date: 23 MAY 2019 19:26:57

CH<sub>M</sub>

Date: 23 MAY 2019 19:28:09

CH<sub>H</sub>

Date: 23 MAY 2019 19:29:38

