

FCC ID: 2AX7S-LN313A  
Report No.: T200928D02-RP4

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Rev.: 02

# RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART E

|                          |                                                                                                                                                     |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Standard            | FCC Part 15.407                                                                                                                                     |
| Product name             | Digital Paper System                                                                                                                                |
| Brand Name               | Avalue                                                                                                                                              |
| Model No.                | EL313XX (X= 0~9 or A~Z)                                                                                                                             |
| Test Result              | Pass                                                                                                                                                |
| Statements of Conformity | Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty. |

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc.(Wugu Laboratory)

Approved by:



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Kevin Tsai  
Deputy Manager

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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## Revision History

| Rev. | Issue Date        | Revisions                       | Effect Page | Revised By   |
|------|-------------------|---------------------------------|-------------|--------------|
| 00   | January 11, 2021  | Initial Issue                   | ALL         | Allison Chen |
| 01   | January 22, 2021  | See the following Note Rev.(01) | P.8, P.234  | Allison Chen |
| 02   | February 20, 2021 | See the following Note Rev.(02) | P.234       | Allison Chen |

**Note:**

**Rev.(01)**

1. Added FCC ID of ancillary equipment.
2. Added non-associated test data.

**Rev.(02)**

1. Revised non-associated test data.

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## 1. GENERAL INFORMATION

### 1.1 EUT INFORMATION

|                          |                                                                                                                                                                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>         | AlMobile Co., Ltd.<br>6F., No. 166, Sec.4, Chengde Rd., Shilin Dist., Taipei City 11167 ,<br>Taiwan                                                                    |
| <b>Manufacturer</b>      | AlMobile Co., Ltd.<br>6F., No. 166, Sec.4, Chengde Rd., Shilin Dist., Taipei City 11167 ,<br>Taiwan                                                                    |
| <b>Equipment</b>         | Digital Paper System                                                                                                                                                   |
| <b>Model No.</b>         | EL313XX (X= 0~9 or A~Z)                                                                                                                                                |
| <b>Model Discrepancy</b> | All the above models are identical except for the designation of<br>model numbers. The suffix of (X= 0~9 or A~Z) on model number<br>is just for marketing purpose only |
| <b>Trade Name</b>        | Avalue                                                                                                                                                                 |
| <b>Received Date</b>     | September 28, 2020                                                                                                                                                     |
| <b>Date of Test</b>      | October 27 ~ December 7, 2020                                                                                                                                          |
| <b>Power Operation</b>   | 1. Power from Host System.<br>Rechargeable Li-Polymer Battery / LIS1633RDPCA<br>Rating: 2000mAh, 7.4Wh<br>2. Power from Adapter.                                       |

**Remark:**

1. Disclaimer: The variant model numbers / trademarks are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

## 1.2 EUT CHANNEL INFORMATION

|                 |                                                                                                                                                                                                                                          |                 |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Frequency Range | <b>UNII-1</b>                                                                                                                                                                                                                            |                 |
|                 | IEEE 802.11a                                                                                                                                                                                                                             | 5180 ~ 5240 MHz |
|                 | IEEE 802.11n HT 20 MHz                                                                                                                                                                                                                   | 5180 ~ 5240 MHz |
|                 | IEEE 802.11n HT 40 MHz                                                                                                                                                                                                                   | 5190 ~ 5230 MHz |
|                 | IEEE 802.11ac VHT 20 MHz                                                                                                                                                                                                                 | 5180 ~ 5240 MHz |
|                 | IEEE 802.11ac VHT 40 MHz                                                                                                                                                                                                                 | 5190 ~ 5230 MHz |
|                 | IEEE 802.11ac VHT 80 MHz                                                                                                                                                                                                                 | 5210 MHz        |
|                 | <b>UNII-2a</b>                                                                                                                                                                                                                           |                 |
|                 | IEEE 802.11a                                                                                                                                                                                                                             | 5260 ~ 5320 MHz |
|                 | IEEE 802.11n HT 20 MHz                                                                                                                                                                                                                   | 5260 ~ 5320 MHz |
|                 | IEEE 802.11n HT 40 MHz                                                                                                                                                                                                                   | 5270 ~ 5310 MHz |
|                 | IEEE 802.11ac VHT 20 MHz                                                                                                                                                                                                                 | 5260 ~ 5320 MHz |
|                 | IEEE 802.11ac VHT 40 MHz                                                                                                                                                                                                                 | 5270 ~ 5310 MHz |
|                 | IEEE 802.11ac VHT 80 MHz                                                                                                                                                                                                                 | 5290 MHz        |
|                 | <b>UNII-2c</b>                                                                                                                                                                                                                           |                 |
|                 | IEEE 802.11a                                                                                                                                                                                                                             | 5500 ~ 5700 MHz |
|                 | IEEE 802.11n HT 20 MHz                                                                                                                                                                                                                   | 5500 ~ 5700 MHz |
|                 | IEEE 802.11n HT 40 MHz                                                                                                                                                                                                                   | 5510 ~ 5670 MHz |
|                 | IEEE 802.11ac VHT 20 MHz                                                                                                                                                                                                                 | 5500 ~ 5700 MHz |
|                 | IEEE 802.11ac VHT 40 MHz                                                                                                                                                                                                                 | 5510 ~ 5670 MHz |
|                 | IEEE 802.11ac VHT 80 MHz                                                                                                                                                                                                                 | 5530 ~ 5610 MHz |
|                 | <b>UNII-3</b>                                                                                                                                                                                                                            |                 |
|                 | IEEE 802.11a                                                                                                                                                                                                                             | 5745 ~ 5825 MHz |
|                 | IEEE 802.11n HT 20 MHz                                                                                                                                                                                                                   | 5745 ~ 5825 MHz |
|                 | IEEE 802.11n HT 40 MHz                                                                                                                                                                                                                   | 5755 ~ 5795 MHz |
|                 | IEEE 802.11ac VHT 20 MHz                                                                                                                                                                                                                 | 5745 ~ 5825 MHz |
|                 | IEEE 802.11ac VHT 40 MHz                                                                                                                                                                                                                 | 5755 ~ 5795 MHz |
|                 | IEEE 802.11ac VHT 80 MHz                                                                                                                                                                                                                 | 5775 MHz        |
| Modulation Type | 1. IEEE 802.11a mode: OFDM<br>2. IEEE 802.11n HT 20 MHz mode: OFDM<br>3. IEEE 802.11n HT 40 MHz mode: OFDM<br>4. IEEE 802.11ac VHT 20 MHz mode: OFDM<br>5. IEEE 802.11ac VHT 40 MHz mode: OFDM<br>6. IEEE 802.11ac VHT 80 MHz mode: OFDM |                 |

**Remark:**

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels

| Number of frequencies to be tested                   |                       |                                              |
|------------------------------------------------------|-----------------------|----------------------------------------------|
| Frequency range in which device operates             | Number of frequencies | Location in frequency range of operation     |
| <input type="checkbox"/> 1 MHz or less               | 1                     | Middle                                       |
| <input type="checkbox"/> 1 MHz to 10 MHz             | 2                     | 1 near top and 1 near bottom                 |
| <input checked="" type="checkbox"/> More than 10 MHz | 3                     | 1 near top, 1 near middle, and 1 near bottom |

## 1.3 ANTENNA INFORMATION

|                       |              |              |              |                               |
|-----------------------|--------------|--------------|--------------|-------------------------------|
| Antenna Specification | PIFA Antenna |              |              |                               |
| Antenna Gain          | Band         | Chain0 (dBi) | Chain1 (dBi) | Power Directional Gain: (dBi) |
|                       | 5G_U-NII 1   | 3.93         | 2.69         | 3.35                          |
|                       | 5G_U-NII 2a  | 3.93         | 2.69         | 3.35                          |
|                       | 5G_U-NII 2c  | 3.93         | 2.69         | 3.35                          |
|                       | 5G_U-NII 3   | 3.93         | 2.69         | 3.35                          |
| Antenna connector     | IPEX         |              |              |                               |

### Notes:

1. Power Directional Gain =  $10 \cdot \text{LOG}(((10^{(\text{Ant1}/10)} + 10^{(\text{Ant2}/10)})/2))$

## 1.4 MEASUREMENT UNCERTAINTY

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| AC Powerline Conducted Emission       | +/- 1.2575  |
| Emission bandwidth, 20dB bandwidth    | +/- 0.0014  |
| RF output power, conducted            | +/- 1.14    |
| Power density, conducted              | +/- 1.40    |
| 3M Semi Anechoic Chamber / 30M~200M   | +/- 4.12    |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 4.68    |
| 3M Semi Anechoic Chamber / 1G~8G      | +/- 5.18    |
| 3M Semi Anechoic Chamber / 8G~18G     | +/- 5.47    |
| 3M Semi Anechoic Chamber / 18G~26G    | +/- 3.81    |
| 3M Semi Anechoic Chamber / 26G~40G    | +/- 3.87    |

### Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

## 1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

| Test site          | Test Engineer        | Remark |
|--------------------|----------------------|--------|
| AC Conduction Room | Lance Chen           | -      |
| Radiation          | Jerry Chang / Ray Li | -      |
| RF Conducted       | Rick Lee             | -      |

**Remark:** The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 1.6 INSTRUMENT CALIBRATION

| 3M 966 Chamber Test Site         |                  |                           |                     |                  |                 |
|----------------------------------|------------------|---------------------------|---------------------|------------------|-----------------|
| Name of Equipment                | Manufacturer     | Model                     | Serial Number       | Calibration Date | Calibration Due |
| Bilog Antenna                    | Sunol Sciences   | JB3                       | A030105             | 07/24/2020       | 07/23/2021      |
| Coaxial Cable                    | HUBER SUHNER     | SUCOFLEX 104PEA           | 20995               | 02/25/2020       | 02/24/2021      |
| Coaxial Cable                    | EMCI             | EMC105                    | 190914+32710<br>9/4 | 09/19/2020       | 09/18/2021      |
| Digital Thermo-Hygro Meter       | WISEWIND         | 1206                      | D07                 | 01/15/2020       | 01/14/2021      |
| double Ridged Guide Horn Antenna | ETC              | MCTD 1209                 | DRH13M02003         | 09/30/2020       | 09/29/2021      |
| High Pass Filters                | MICRO TRONICS    | HPM13195                  | 003                 | 02/25/2020       | 02/24/2021      |
| Horn Antenna                     | ETS LINDGREN     | 3116                      | 00026370            | 12/18/2019       | 12/17/2020      |
| Loop Ant                         | COM-POWER        | AL-130                    | 121051              | 03/27/2020       | 03/26/2021      |
| Pre-Amplifier                    | EMEC             | EM330                     | 060609              | 02/25/2020       | 02/24/2021      |
| Pre-Amplifier                    | HP               | 8449B                     | 3008A00965          | 02/25/2020       | 02/24/2021      |
| Pre-Amplifier                    | MITEQ            | AMF-6F-1800<br>4000-37-8P | 985646              | 09/02/2020       | 09/01/2021      |
| PSA Series Spectrum Analyzer     | Agilent          | E4446A                    | MY46180323          | 07/24/2020       | 07/23/2021      |
| Antenna Tower                    | CCS              | CC-A-1F                   | N/A                 | N.C.R            | N.C.R           |
| Controller                       | CCS              | CC-C-1F                   | N/A                 | N.C.R            | N.C.R           |
| Turn Table                       | CCS              | CC-T-1F                   | N/A                 | N.C.R            | N.C.R           |
| Software                         | e3 6.11-20180413 |                           |                     |                  |                 |

| RF Conducted Test Site |              |         |               |                  |                 |
|------------------------|--------------|---------|---------------|------------------|-----------------|
| Name of Equipment      | Manufacturer | Model   | Serial Number | Calibration Date | Calibration Due |
| Coaxial Cable          | Woken        | WC12    | CC003         | 06/29/2020       | 06/28/2021      |
| Coaxial Cable          | Woken        | WC12    | CC001         | 06/29/2020       | 06/28/2021      |
| Signal Analyzer        | R&S          | FSV 40  | 101073        | 09/17/2020       | 09/16/2021      |
| Power Meter            | Anritsu      | ML2495A | 1149001       | 05/21/2020       | 05/21/2021      |
| Power Seneor           | Anritsu      | MA2491A | 030982        | 05/21/2020       | 05/21/2021      |
| Software               | N/A          |         |               |                  |                 |

| AC line Conduction Test Room |                    |           |               |                  |                 |
|------------------------------|--------------------|-----------|---------------|------------------|-----------------|
| Name of Equipment            | Manufacturer       | Model     | Serial Number | Calibration Date | Calibration Due |
| CABLE                        | EMCI               | CFD300-NL | CERF          | 06/29/2020       | 06/28/2021      |
| EMI Test Receiver            | R&S                | ESCI      | 100064        | 07/17/2020       | 07/16/2021      |
| LISN                         | SCHAFFNER          | NNB 41    | 03/10013      | 02/13/2020       | 02/12/2021      |
| Software                     | EZ-EMC(CCS-3A1-CE) |           |               |                  |                 |

**Remark:**

- Each piece of equipment is scheduled for calibration once a year.
- N.C.R. = No Calibration Required.

## 1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

| Support Equipment |           |       |       |            |        |
|-------------------|-----------|-------|-------|------------|--------|
| No.               | Equipment | Brand | Model | Series No. | FCC ID |
|                   | N/A       |       |       |            |        |

| Support Equipment |           |         |            |            |              |
|-------------------|-----------|---------|------------|------------|--------------|
| No.               | Equipment | Brand   | Model      | Series No. | FCC ID       |
| 1                 | Adapter   | SAMSUNG | ETA-U90JWS | N/A        | N/A          |
| 2                 | AP        | ASUS    | RT-AX88U   | N/A        | MSQ-RTAXHP00 |

## 1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.407, KDB 789033 D02, KDB 905462 D02.

## 2. TEST SUMMARY

| FCC Standard Sec. | Chapter | Test Item                   | Result |
|-------------------|---------|-----------------------------|--------|
| 15.203            | 1.3     | Antenna Requirement         | Pass   |
| 15.207            | 4.1     | AC Conducted Emission       | Pass   |
| 15.403(i)         | 4.2     | 26dB Bandwidth              | Pass   |
| 15.407(e)         | 4.2     | 6dB Bandwidth               | Pass   |
| 2.1049            | 4.2     | Occupied Bandwidth (99%)    | Pass   |
| 15.407(a)         | 4.3     | Output Power Measurement    | Pass   |
| 15.407(a)         | 4.4     | Power Spectral Density      | Pass   |
| 15.407(b)         | 4.5     | Radiation Band Edge         | Pass   |
| 15.407(b)         | 4.5     | Radiation Spurious Emission | Pass   |
| 15.407(g)         | 4.6     | Frequency Stability         | Pass   |
| 15.407(h)         | 4.7     | Dynamic Frequency Selection | Pass   |

### 3. DESCRIPTION OF TEST MODES

#### 3.1 THE EUT CHANNEL NUMBER OF OPERATING CONDITION

| Operation mode      | 1. IEEE 802.11a mode: 6Mbps<br>2. IEEE 802.11n HT 20 MHz mode: MCS8<br>3. IEEE 802.11n HT 40 MHz mode: MCS8<br>4. IEEE 802.11ac VHT 20 MHz mode: MCS8<br>5. IEEE 802.11ac VHT 40 MHz mode: MCS8<br>6. IEEE 802.11ac VHT 80 MHz mode: MCS8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--|--|------|-----------------------|---------|--------------|------------------|------------------------|------------------|------------------------|------------|--------------------------|------------------|--------------------------|------------|--------------------------|------|----------|--------------|------------------|------------------------|------------------|------------------------|------------|--------------------------|------------------|--------------------------|------------|--------------------------|------|----------|--------------|------------------|------------------------|------------------|------------------------|------------------|--------------------------|------------------|--------------------------|------------------|--------------------------|------------|---------|--------------|------------------|------------------------|------------------|------------------------|------------|--------------------------|------------------|--------------------------|------------|--------------------------|------|
| Operating Frequency | <table><tr><th></th><th>Mode</th><th>Frequency Range (MHz)</th></tr><tr><td rowspan="6">U-NII-1</td><td>IEEE 802.11a</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11n HT 20 MHz</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11n HT 40 MHz</td><td>5190, 5230</td></tr><tr><td>IEEE 802.11ac VHT 20 MHz</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11ac VHT 40 MHz</td><td>5190, 5230</td></tr><tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5210</td></tr><tr><td rowspan="6">U-NII-2a</td><td>IEEE 802.11a</td><td>5260, 5280, 5320</td></tr><tr><td>IEEE 802.11n HT 20 MHz</td><td>5260, 5280, 5320</td></tr><tr><td>IEEE 802.11n HT 40 MHz</td><td>5270, 5310</td></tr><tr><td>IEEE 802.11ac VHT 20 MHz</td><td>5260, 5280, 5320</td></tr><tr><td>IEEE 802.11ac VHT 40 MHz</td><td>5270, 5310</td></tr><tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5290</td></tr><tr><td rowspan="6">U-NII-2c</td><td>IEEE 802.11a</td><td>5500, 5580, 5700</td></tr><tr><td>IEEE 802.11n HT 20 MHz</td><td>5500, 5580, 5700</td></tr><tr><td>IEEE 802.11n HT 40 MHz</td><td>5510, 5550, 5670</td></tr><tr><td>IEEE 802.11ac VHT 20 MHz</td><td>5500, 5580, 5700</td></tr><tr><td>IEEE 802.11ac VHT 40 MHz</td><td>5510, 5550, 5670</td></tr><tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5530, 5610</td></tr><tr><td rowspan="6">U-NII-3</td><td>IEEE 802.11a</td><td>5745, 5785, 5825</td></tr><tr><td>IEEE 802.11n HT 20 MHz</td><td>5745, 5785, 5825</td></tr><tr><td>IEEE 802.11n HT 40 MHz</td><td>5755, 5795</td></tr><tr><td>IEEE 802.11ac VHT 20 MHz</td><td>5745, 5785, 5825</td></tr><tr><td>IEEE 802.11ac VHT 40 MHz</td><td>5755, 5795</td></tr><tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5775</td></tr></table> |                       |  |  | Mode | Frequency Range (MHz) | U-NII-1 | IEEE 802.11a | 5180, 5220, 5240 | IEEE 802.11n HT 20 MHz | 5180, 5220, 5240 | IEEE 802.11n HT 40 MHz | 5190, 5230 | IEEE 802.11ac VHT 20 MHz | 5180, 5220, 5240 | IEEE 802.11ac VHT 40 MHz | 5190, 5230 | IEEE 802.11ac VHT 80 MHz | 5210 | U-NII-2a | IEEE 802.11a | 5260, 5280, 5320 | IEEE 802.11n HT 20 MHz | 5260, 5280, 5320 | IEEE 802.11n HT 40 MHz | 5270, 5310 | IEEE 802.11ac VHT 20 MHz | 5260, 5280, 5320 | IEEE 802.11ac VHT 40 MHz | 5270, 5310 | IEEE 802.11ac VHT 80 MHz | 5290 | U-NII-2c | IEEE 802.11a | 5500, 5580, 5700 | IEEE 802.11n HT 20 MHz | 5500, 5580, 5700 | IEEE 802.11n HT 40 MHz | 5510, 5550, 5670 | IEEE 802.11ac VHT 20 MHz | 5500, 5580, 5700 | IEEE 802.11ac VHT 40 MHz | 5510, 5550, 5670 | IEEE 802.11ac VHT 80 MHz | 5530, 5610 | U-NII-3 | IEEE 802.11a | 5745, 5785, 5825 | IEEE 802.11n HT 20 MHz | 5745, 5785, 5825 | IEEE 802.11n HT 40 MHz | 5755, 5795 | IEEE 802.11ac VHT 20 MHz | 5745, 5785, 5825 | IEEE 802.11ac VHT 40 MHz | 5755, 5795 | IEEE 802.11ac VHT 80 MHz | 5775 |
|                     | Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Frequency Range (MHz) |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
| U-NII-1             | IEEE 802.11a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 5180, 5220, 5240      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11n HT 20 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5180, 5220, 5240      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11n HT 40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5190, 5230            |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 20 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5180, 5220, 5240      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5190, 5230            |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 80 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5210                  |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
| U-NII-2a            | IEEE 802.11a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 5260, 5280, 5320      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11n HT 20 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5260, 5280, 5320      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11n HT 40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5270, 5310            |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 20 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5260, 5280, 5320      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5270, 5310            |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 80 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5290                  |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
| U-NII-2c            | IEEE 802.11a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 5500, 5580, 5700      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11n HT 20 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5500, 5580, 5700      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11n HT 40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5510, 5550, 5670      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 20 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5500, 5580, 5700      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5510, 5550, 5670      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 80 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5530, 5610            |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
| U-NII-3             | IEEE 802.11a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 5745, 5785, 5825      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11n HT 20 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5745, 5785, 5825      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11n HT 40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5755, 5795            |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 20 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5745, 5785, 5825      |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5755, 5795            |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |
|                     | IEEE 802.11ac VHT 80 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5775                  |  |  |      |                       |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |          |              |                  |                        |                  |                        |                  |                          |                  |                          |                  |                          |            |         |              |                  |                        |                  |                        |            |                          |                  |                          |            |                          |      |

#### Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.
2. The mode IEEE 802.11ac VHT20 and VHT40 are only different in control messages with IEEE 802.11n 20 MHz and HT40, and have same power setting. Therefore, the highest power(IEEE 802.11n 20 MHz and HT40) were test conducted and radiated measurement and recorded in this report.

### 3.2 THE WORST MODE OF MEASUREMENT

| Radiated Emission Measurement Above 1G |                                                                                                                                                                                                                                                                                               |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                         | Radiated Emission Above 1G                                                                                                                                                                                                                                                                    |
| Power supply Mode                      | Mode 1: EUT power by Host System                                                                                                                                                                                                                                                              |
| Worst Mode                             | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4                                                                                                                                                    |
| Worst Position                         | <input type="checkbox"/> Placed in fixed position.<br><input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane)<br><input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane)<br><input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane) |

| Radiated Emission Measurement Below 1G |                                                                                                                                            |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                         | Radiated Emission Below 1G                                                                                                                 |
| Power supply Mode                      | Mode 1: EUT power by Host System                                                                                                           |
| Worst Mode                             | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |

| AC Power Line Conducted Emission |                                                                                                                                            |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                   | AC Power line conducted emission for line and neutral                                                                                      |
| Power supply Mode                | Mode 1: EUT power by Adapter                                                                                                               |
| Worst Mode                       | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report
3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

### 3.3 EUT DUTY CYCLE

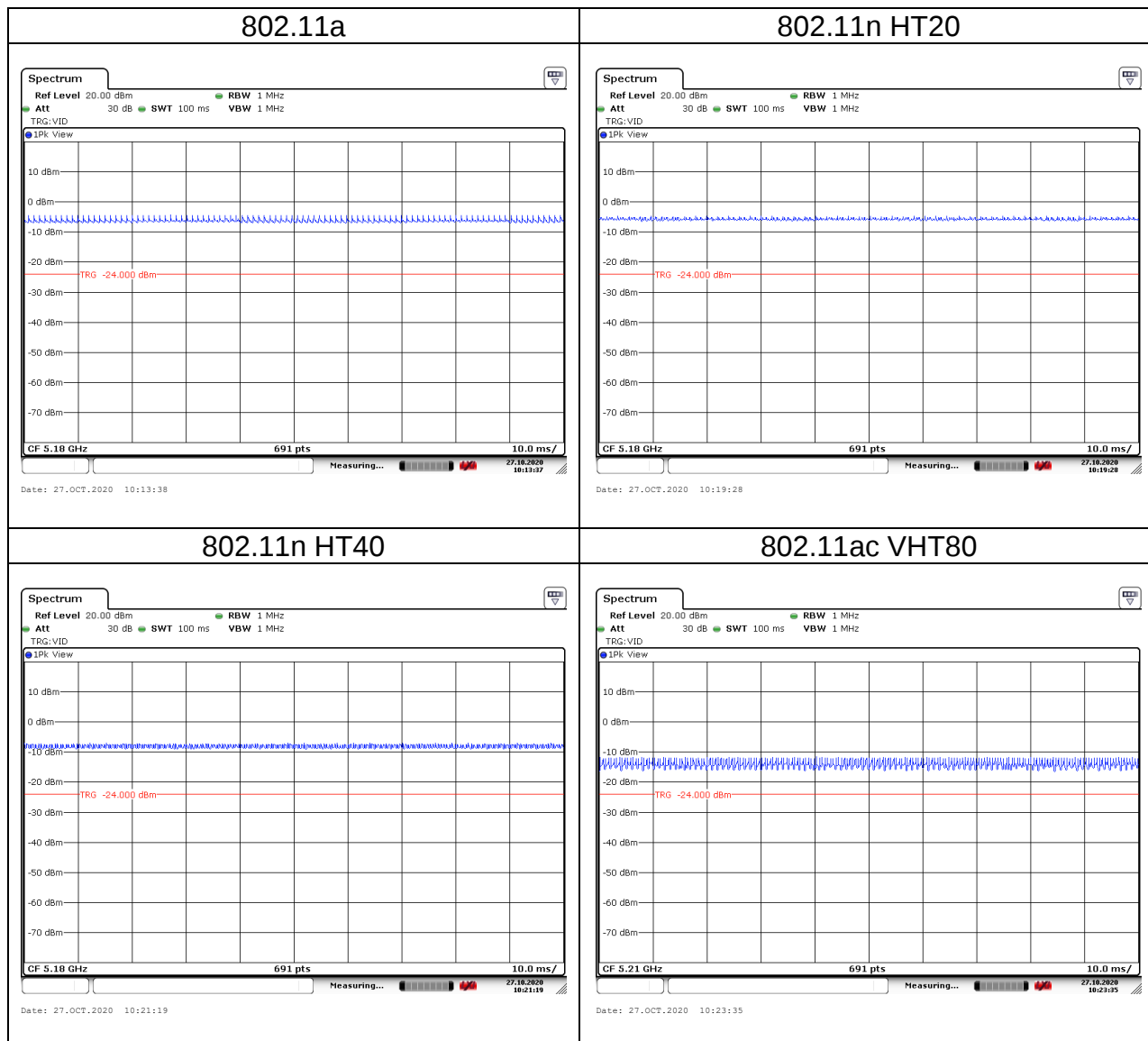
Temperature: 23.9°C

Humidity: 50% RH

Tested by: Rick Lee

Test date: October 27, 2020

| Duty Cycle     |                |                                                           |           |                   |
|----------------|----------------|-----------------------------------------------------------|-----------|-------------------|
| Configuration  | Duty Cycle (%) | Duty Factor (dB)<br>$=10 \cdot \log(1/\text{Duty Cycle})$ | 1/T (kHz) | VBW setting (kHz) |
| 802.11a        | 100.00%        | 0.00                                                      | N/A       | 0.01              |
| 802.11n HT20   | 100.00%        | 0.00                                                      | N/A       | 0.01              |
| 802.11n HT40   | 100.00%        | 0.00                                                      | N/A       | 0.01              |
| 802.11ac VHT80 | 100.00%        | 0.00                                                      | N/A       | 0.01              |



## 4. TEST RESULT

### 4.1 AC POWER LINE CONDUCTED EMISSION

#### 4.1.1 Test Limit

According to §15.207(a),

| Frequency Range<br>(MHz) | Limits(dB $\mu$ V) |           |
|--------------------------|--------------------|-----------|
|                          | Quasi-peak         | Average   |
| 0.15 to 0.50             | 66 to 56*          | 56 to 46* |
| 0.50 to 5                | 56                 | 46        |
| 5 to 30                  | 60                 | 50        |

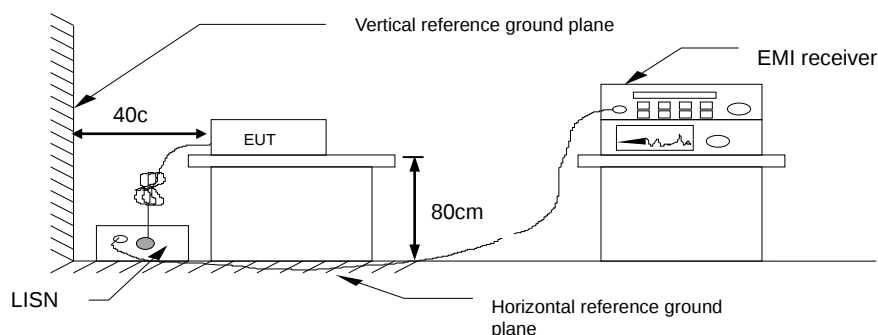
\* Decreases with the logarithm of the frequency.

#### 4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

#### 4.1.3 Test Setup

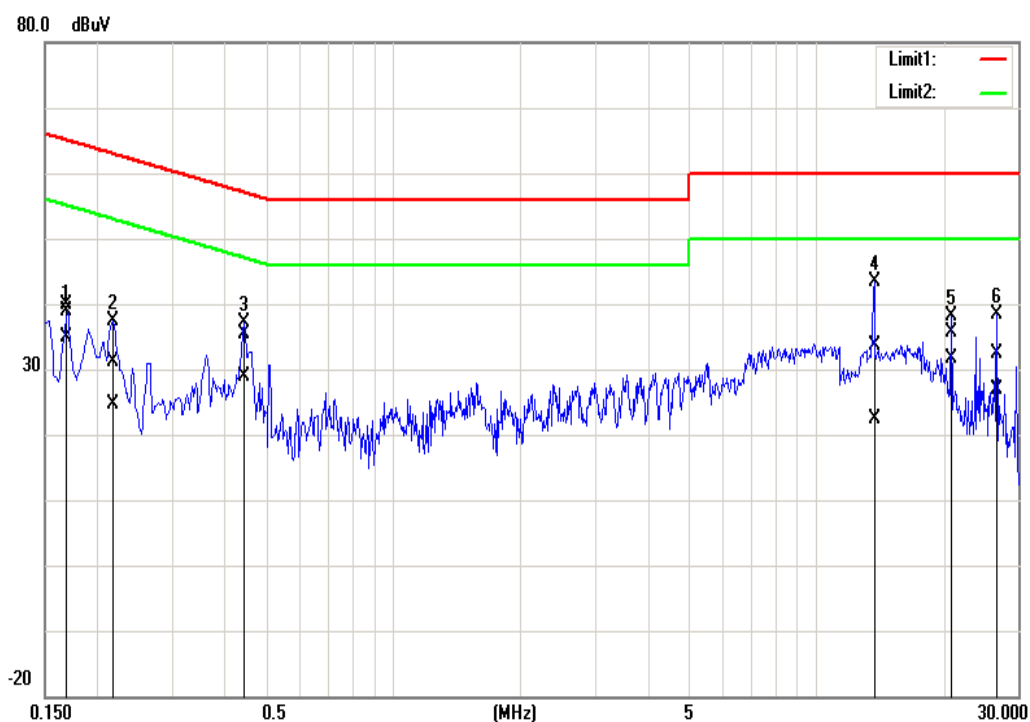


#### 4.1.4 Test Result

Pass.

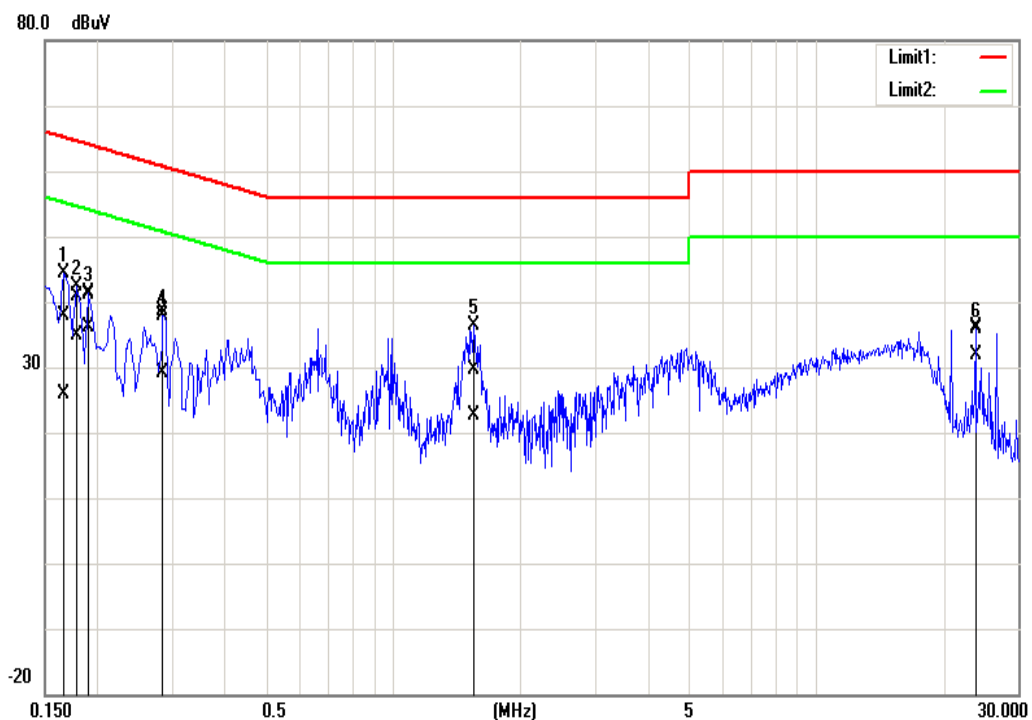
## Test Data

|               |              |               |                  |
|---------------|--------------|---------------|------------------|
| Test Mode:    | Mode 1       | Temp/Hum      | 22.4(°C)/ 57%RH  |
| Phase:        | Line         | Test Date     | December 7, 2020 |
| Test Voltage: | 120Vac, 60Hz | Test Engineer | Lance Chen       |



| Frequency (MHz) | Quasi Peak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|-----------------|---------------------------|------------------------|------------------------|--------------------------|-----------------------|-------------------------|----------------------|------------------------|---------------------|--------|
| 0.1700          | 29.77                     | 24.65                  | 10.21                  | 39.98                    | 34.86                 | 64.96                   | 54.96                | -24.98                 | -20.10              | Pass   |
| 0.2180          | 20.83                     | 14.37                  | 10.21                  | 31.04                    | 24.58                 | 62.89                   | 52.89                | -31.85                 | -28.31              | Pass   |
| 0.4460          | 25.14                     | 18.73                  | 10.22                  | 35.36                    | 28.95                 | 56.95                   | 46.95                | -21.59                 | -18.00              | Pass   |
| 13.7500         | 23.15                     | 12.01                  | 10.40                  | 33.55                    | 22.41                 | 60.00                   | 50.00                | -26.45                 | -27.59              | Pass   |
| 20.8700         | 25.21                     | 21.35                  | 10.37                  | 35.58                    | 31.72                 | 60.00                   | 50.00                | -24.42                 | -18.28              | Pass   |
| 26.8340         | 22.03                     | 16.65                  | 10.25                  | 32.28                    | 26.90                 | 60.00                   | 50.00                | -27.72                 | -23.10              | Pass   |

|               |              |               |                  |
|---------------|--------------|---------------|------------------|
| Test Mode:    | Mode 1       | Temp/Hum      | 22.4(°C)/ 57%RH  |
| Phase:        | Line         | Test Date     | December 7, 2020 |
| Test Voltage: | 120Vac, 60Hz | Test Engineer | Lance Chen       |



| Frequency (MHz) | Quasi Peak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|-----------------|---------------------------|------------------------|------------------------|--------------------------|-----------------------|-------------------------|----------------------|------------------------|---------------------|--------|
| 0.1660          | 27.80                     | 15.58                  | 10.18                  | 37.98                    | 25.76                 | 65.16                   | 55.16                | -27.18                 | -29.40              | Pass   |
| 0.1780          | 30.68                     | 24.68                  | 10.19                  | 40.87                    | 34.87                 | 64.58                   | 54.58                | -23.71                 | -19.71              | Pass   |
| 0.1900          | 31.00                     | 25.83                  | 10.19                  | 41.19                    | 36.02                 | 64.04                   | 54.04                | -22.85                 | -18.02              | Pass   |
| 0.2860          | 28.34                     | 19.03                  | 10.19                  | 38.53                    | 29.22                 | 60.64                   | 50.64                | -22.11                 | -21.42              | Pass   |
| 1.5540          | 19.38                     | 12.44                  | 10.21                  | 29.59                    | 22.65                 | 56.00                   | 46.00                | -26.41                 | -23.35              | Pass   |
| 23.8500         | 25.65                     | 21.31                  | 10.51                  | 36.16                    | 31.82                 | 60.00                   | 50.00                | -23.84                 | -18.18              | Pass   |

## 4.2 26dB BANDWIDTH, 6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

### 4.2.1 Test Limit

**26 dB Bandwidth** : For reporting purposes only.

**6 dB Bandwidth** : Least 500kHz.

**Occupied Bandwidth(99%)** : For reporting purposes only.

### 4.2.2 Test Procedure

#### 26dB

1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW: approximately 1% of the emission bandwidth.
3. Set the VBW>RBW.
4. Detoctor = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26dB down from the peak of the emission. Compare this with the RBW setting of the analyser. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

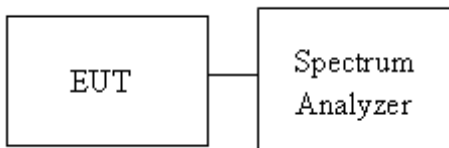
#### 6dB

1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW = 100 kHz.
3. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
4. Detoctor = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 99%

1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set center frequency to the nominal EUT channel center frequency.
3. Set span = 1.5 times to 5.0 times the OBW.
4. Set RBW = 1 % to 5% of the OBW.
5. Set VBW  $\geq 3 \times$ RBW

### 4.2.3 Test Setup



#### 4.2.4 Test Result

##### Chain 0

Temperature: 24.6°C

Humidity: 53.5% RH

Tested by: Rick Lee

Test date: November 16, 2020

##### Chain 1

Temperature: 25.9°C

Humidity: 50% RH

Tested by: Rick Lee

Test date: November 24, 2020

| UNII-1 5150-5250 MHz                |                 |                               |                               |                             |                             |
|-------------------------------------|-----------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|
| Test mode: IEEE 802.11a mode        |                 |                               |                               |                             |                             |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                                 | 5180            | -                             | -                             | 19.95                       | 19.77                       |
| Mid                                 | 5220            | -                             | -                             | 19.61                       | 19.82                       |
| High                                | 5240            | -                             | -                             | 19.78                       | 19.87                       |
| Test mode: IEEE 802.11n HT20 mode   |                 |                               |                               |                             |                             |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                                 | 5180            | -                             | -                             | 20.00                       | 20.04                       |
| Mid                                 | 5220            | -                             | -                             | 20.03                       | 19.86                       |
| High                                | 5240            | -                             | -                             | 19.91                       | 19.87                       |
| Test mode: IEEE 802.11n HT40 mode   |                 |                               |                               |                             |                             |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                                 | 5190            | -                             | -                             | 40.30                       | 39.71                       |
| High                                | 5230            | -                             | -                             | 39.05                       | 39.77                       |
| Test mode: IEEE 802.11ac VHT80 mode |                 |                               |                               |                             |                             |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                                 | 5210            | -                             | -                             | 81.69                       | 81.16                       |



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#### Chain 0

Temperature: 24.6°C

Humidity: 53.5% RH

Tested by: Rick Lee

Test date: November 16, 2020

#### Chain 1

Temperature: 25.9°C

Humidity: 50% RH

Tested by: Rick Lee

Test date: November 24, 2020

| UNII-2a 5250-5350 MHz             |                 |                               |                               |                             |                             |
|-----------------------------------|-----------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|
| Test mode: IEEE 802.11a mode      |                 |                               |                               |                             |                             |
| Channel                           | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                               | 5260            | -                             | -                             | 19.57                       | 19.69                       |
| Mid                               | 5280            | -                             | -                             | 18.97                       | 19.80                       |
| High                              | 5320            | -                             | -                             | 19.63                       | 19.67                       |
| Test mode: IEEE 802.11n HT20 mode |                 |                               |                               |                             |                             |
| Channel                           | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                               | 5260            | -                             | -                             | 19.98                       | 20.13                       |
| Mid                               | 5280            | -                             | -                             | 19.44                       | 19.83                       |
| High                              | 5320            | -                             | -                             | 20.16                       | 20.17                       |



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#### Chain 0

Temperature: 24.1°C

Humidity: 54.2% RH

Tested by: Rick Lee

Test date: November 17, 2020

#### Chain 1

Temperature: 25.9°C

Humidity: 50% RH

Tested by: Rick Lee

Test date: November 24, 2020

| UNII-2a 5250-5350 MHz               |                 |                               |                               |                             |                             |
|-------------------------------------|-----------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|
| Test mode: IEEE 802.11n HT40 mode   |                 |                               |                               |                             |                             |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                                 | 5270            | -                             | -                             | 40.46                       | 39.67                       |
| High                                | 5310            | -                             | -                             | 40.53                       | 39.63                       |
| Test mode: IEEE 802.11ac VHT80 mode |                 |                               |                               |                             |                             |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                                 | 5290            | -                             | -                             | 81.66                       | 80.95                       |

### Chain 0

**Temperature:** 24.6°C

**Humidity:** 53.5% RH

**Tested by:** Rick Lee

**Test date:** November 16, 2020

### Chain 1

**Temperature:** 25.9°C

**Humidity:** 50% RH

**Tested by:** Rick Lee

**Test date:** November 24, 2020

| UNII-2c 5475-5725 MHz             |                 |                               |                               |                             |                             |
|-----------------------------------|-----------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|
| Test mode: IEEE 802.11a mode      |                 |                               |                               |                             |                             |
| Channel                           | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                               | 5500            | -                             | -                             | 19.76                       | 19.62                       |
| Mid                               | 5580            | -                             | -                             | 19.82                       | 19.91                       |
| High                              | 5700            | -                             | -                             | 19.80                       | 19.79                       |
| Test mode: IEEE 802.11n HT20 mode |                 |                               |                               |                             |                             |
| Channel                           | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW (99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                               | 5500            | -                             | -                             | 19.96                       | 20.10                       |
| Mid                               | 5580            | -                             | -                             | 20.02                       | 19.97                       |
| High                              | 5700            | -                             | -                             | 19.99                       | 20.11                       |



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#### Chain 0

Temperature: 24.1°C

Humidity: 54.2% RH

Tested by: Rick Lee

Test date: November 17, 2020

#### Chain 1

Temperature: 25.9°C

Humidity: 50% RH

Tested by: Rick Lee

Test date: November 24, 2020

| UNII-2c 5475-5725 MHz               |                 |                               |                              |                             |                             |
|-------------------------------------|-----------------|-------------------------------|------------------------------|-----------------------------|-----------------------------|
| Test mode: IEEE 802.11n HT40 mode   |                 |                               |                              |                             |                             |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW (99%)<br>(MHz) | Chain 1<br>OBW(99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                                 | 5510            | -                             | -                            | 40.28                       | 39.48                       |
| Mid                                 | 5550            | -                             | -                            | 40.23                       | 39.92                       |
| High                                | 5670            | -                             | -                            | 40.46                       | 39.94                       |
| Test mode: IEEE 802.11ac VHT80 mode |                 |                               |                              |                             |                             |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW(99%)<br>(MHz)  | Chain 1<br>OBW(99%)<br>(MHz) | Chain 0<br>26dB BW<br>(MHz) | Chain 1<br>26dB BW<br>(MHz) |
| Low                                 | 5530            | -                             | -                            | 81.41                       | 80.96                       |
| High                                | 5610            |                               |                              | 81.69                       | 81.11                       |

### Chain 0

**Temperature:** 24.6°C

**Humidity:** 53.5% RH

**Tested by:** Rick Lee

**Test date:** November 16, 2020

### Chain 1

**Temperature:** 25.9°C

**Humidity:** 50% RH

**Tested by:** Rick Lee

**Test date:** November 24, 2020

| UNII-3 5725-5825MHz               |                 |                              |                              |                            |                            |
|-----------------------------------|-----------------|------------------------------|------------------------------|----------------------------|----------------------------|
| Test mode: IEEE 802.11a mode      |                 |                              |                              |                            |                            |
| Channel                           | Frequency (MHz) | Chain 0<br>OBW(99%)<br>(MHz) | Chain 1<br>OBW(99%)<br>(MHz) | Chain 0<br>6dB BW<br>(MHz) | Chain 1<br>6dB BW<br>(MHz) |
| Low                               | 5745            | -                            | -                            | 16.60                      | 16.59                      |
| Mid                               | 5785            | -                            | -                            | 16.60                      | 16.57                      |
| High                              | 5825            | -                            | -                            | 16.57                      | 16.58                      |
| Test mode: IEEE 802.11n HT20 mode |                 |                              |                              |                            |                            |
| Channel                           | Frequency (MHz) | Chain 0<br>OBW(99%)<br>(MHz) | Chain 1<br>OBW(99%)<br>(MHz) | Chain 0<br>6dB BW<br>(MHz) | Chain 1<br>6dB BW<br>(MHz) |
| Low                               | 5745            | -                            | -                            | 17.74                      | 17.71                      |
| Mid                               | 5785            | -                            | -                            | 17.74                      | 17.73                      |
| High                              | 5825            | -                            | -                            | 17.70                      | 17.70                      |

### Chain 0

**Temperature:** 24.1°C

**Humidity:** 54.2% RH

**Tested by:** Rick Lee

**Test date:** November 17, 2020

### Chain 1

**Temperature:** 25.9°C

**Humidity:** 50% RH

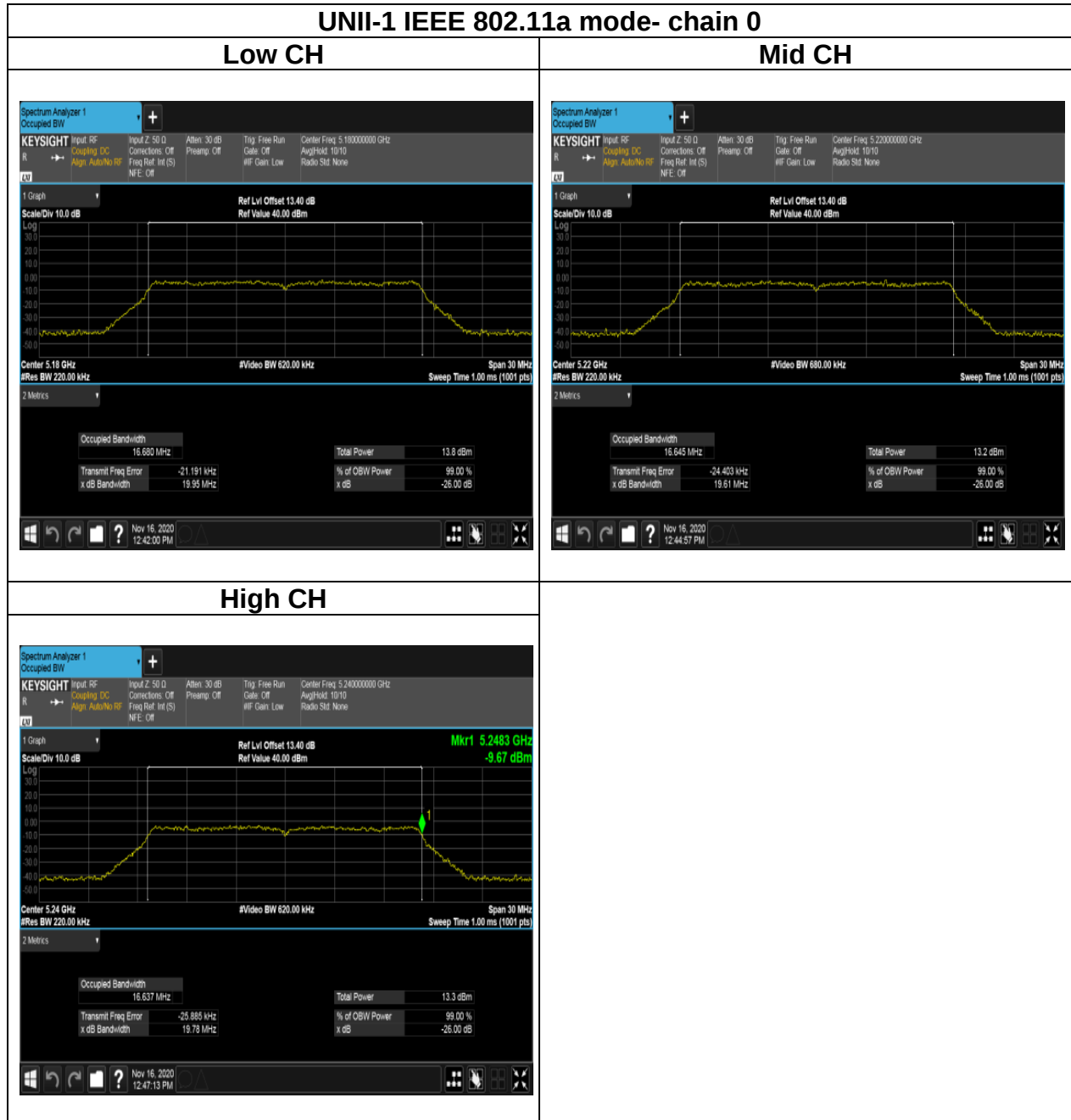
**Tested by:** Rick Lee

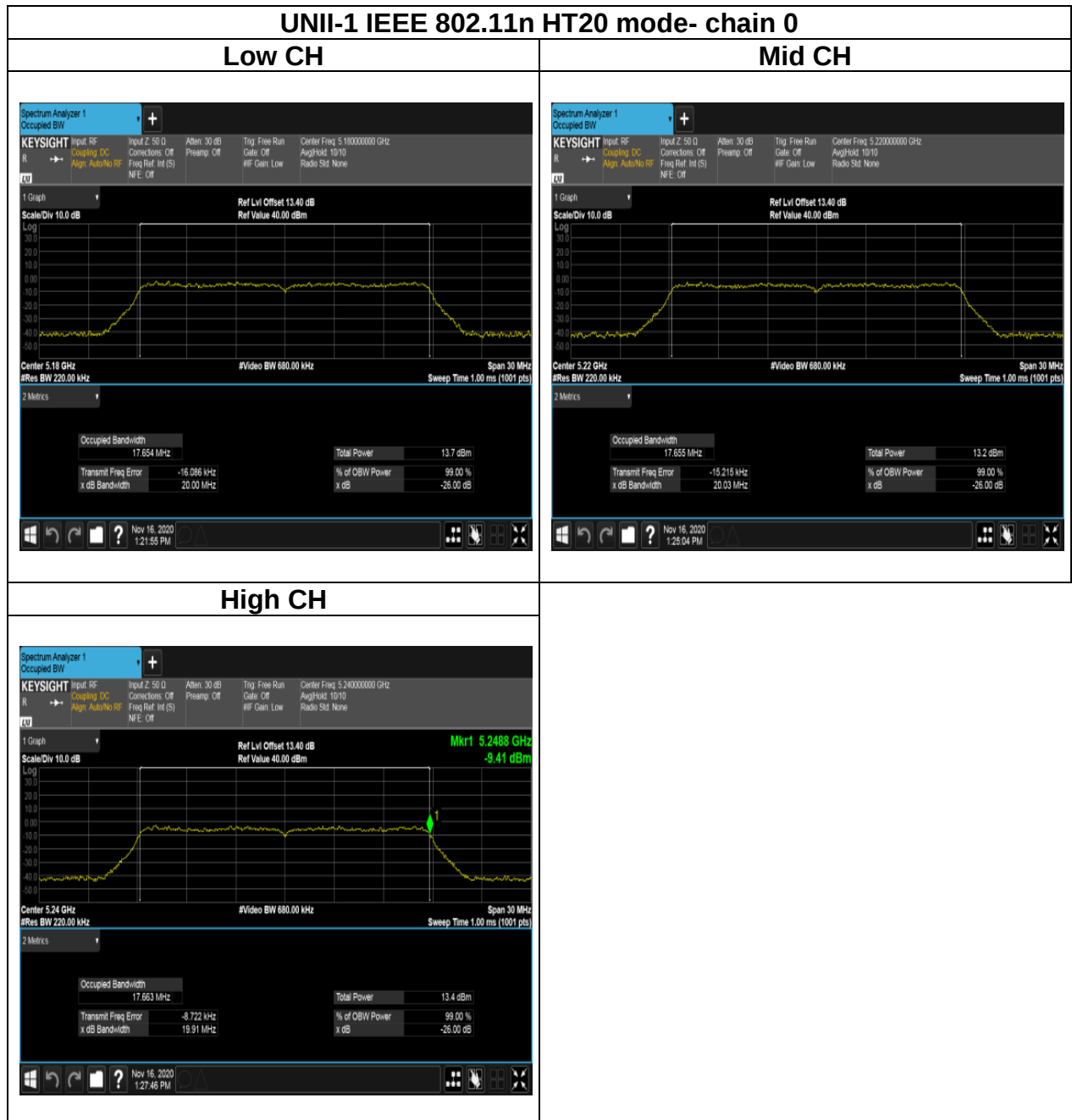
**Test date:** November 24, 2020

| UNII-3 5725-5825MHz                 |                 |                              |                              |                            |                            |
|-------------------------------------|-----------------|------------------------------|------------------------------|----------------------------|----------------------------|
| Test mode: IEEE 802.11n HT40 mode   |                 |                              |                              |                            |                            |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW(99%)<br>(MHz) | Chain 1<br>OBW(99%)<br>(MHz) | Chain 0<br>6dB BW<br>(MHz) | Chain 1<br>6dB BW<br>(MHz) |
| Low                                 | 5755            | -                            | -                            | 36.47                      | 36.44                      |
| High                                | 5795            | -                            | -                            | 36.46                      | 36.43                      |
| Test mode: IEEE 802.11ac VHT80 mode |                 |                              |                              |                            |                            |
| Channel                             | Frequency (MHz) | Chain 0<br>OBW(99%)<br>(MHz) | Chain 1<br>OBW(99%)<br>(MHz) | Chain 0<br>6dB BW<br>(MHz) | Chain 1<br>6dB BW<br>(MHz) |
| Low                                 | 5775            | -                            | -                            | 76.62                      | 76.57                      |

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### Test Data (26dB BANDWIDTH)



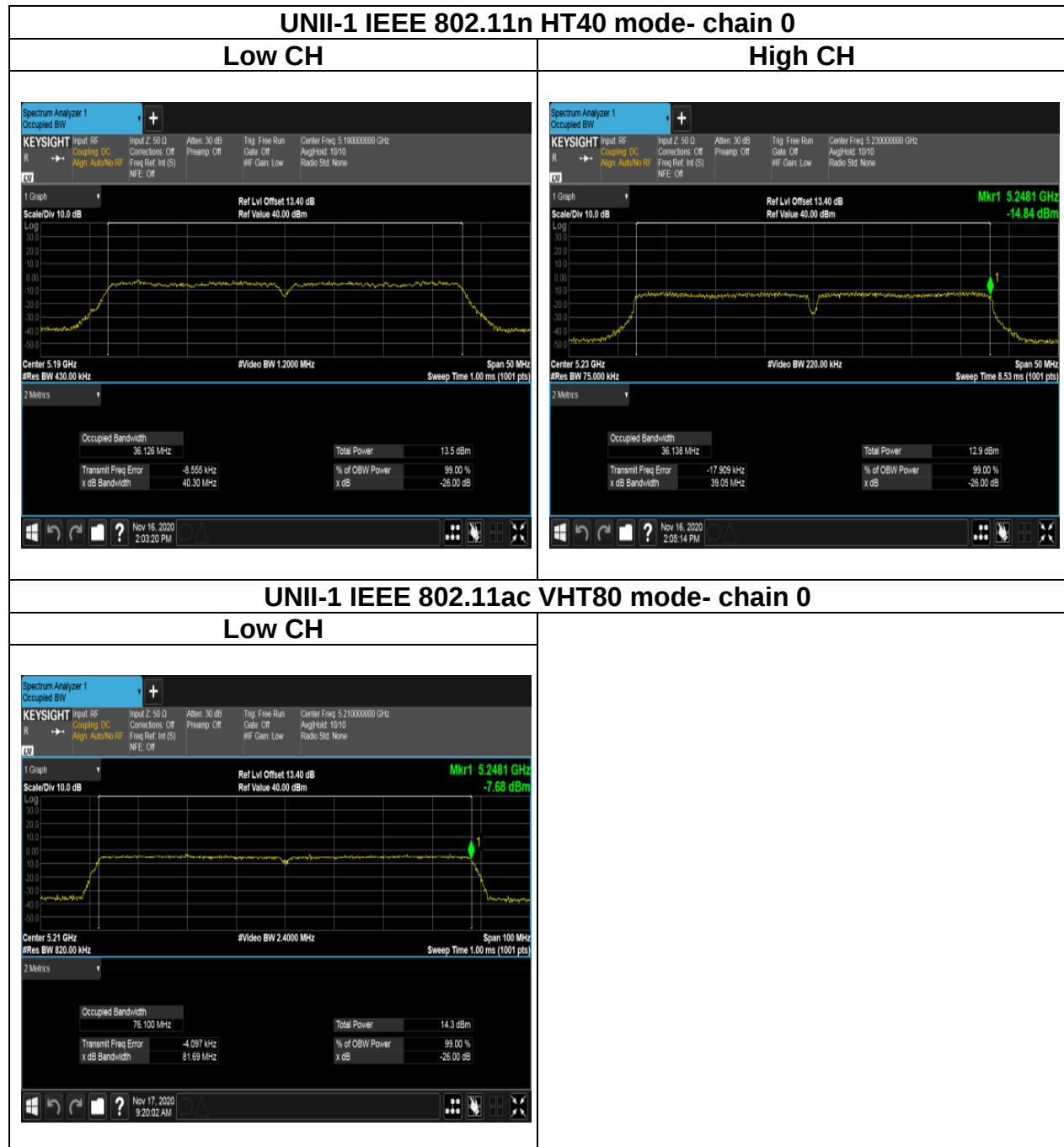




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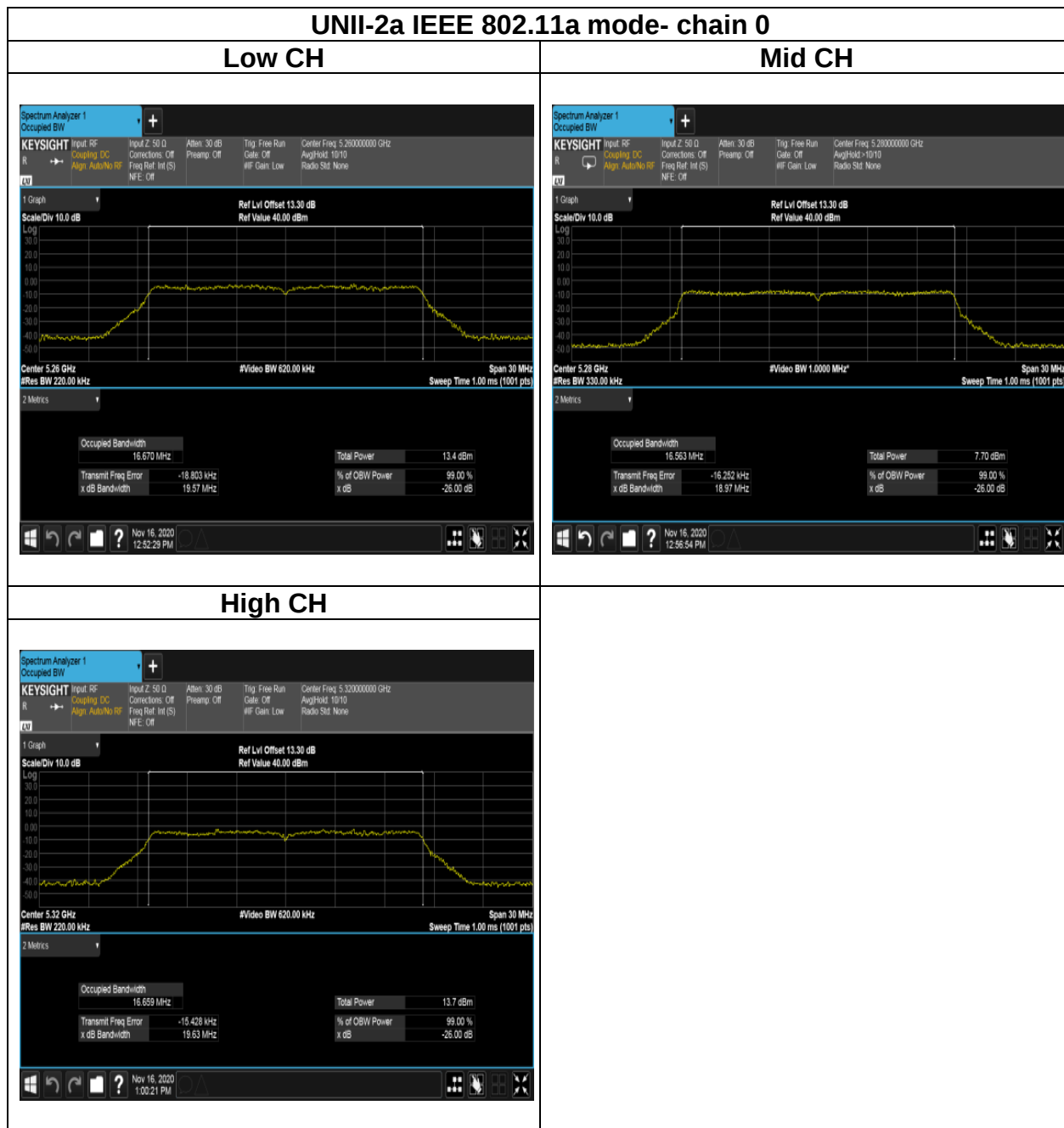
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### Test Data (26dB BANDWIDTH)

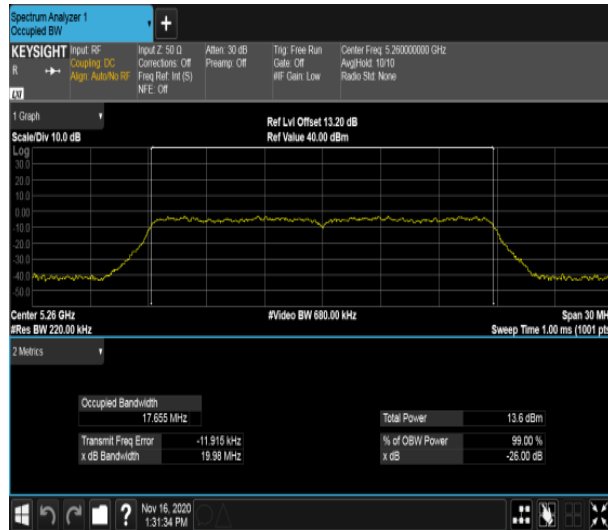




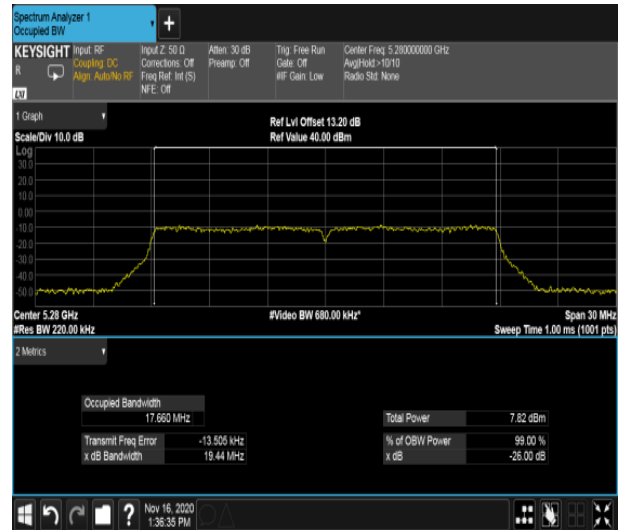
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### UNII-2a IEEE 802.11n HT20 mode- chain 0

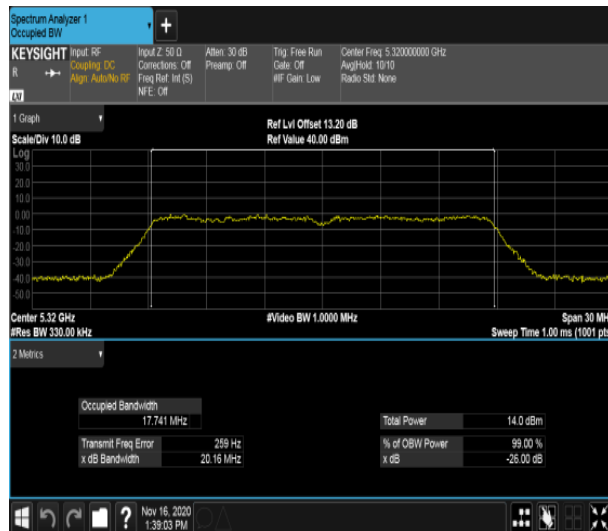
#### Low CH

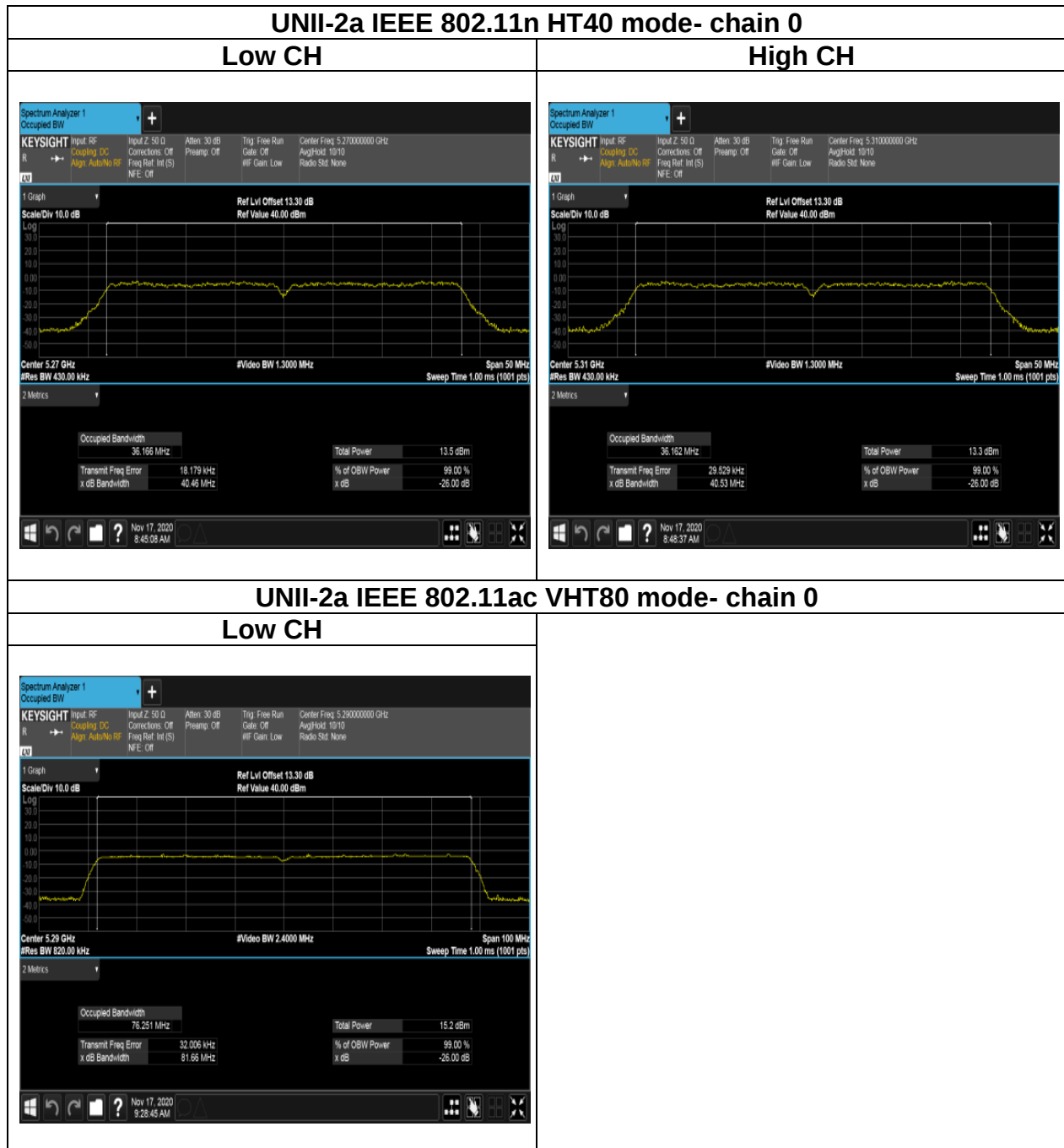


#### Mid CH



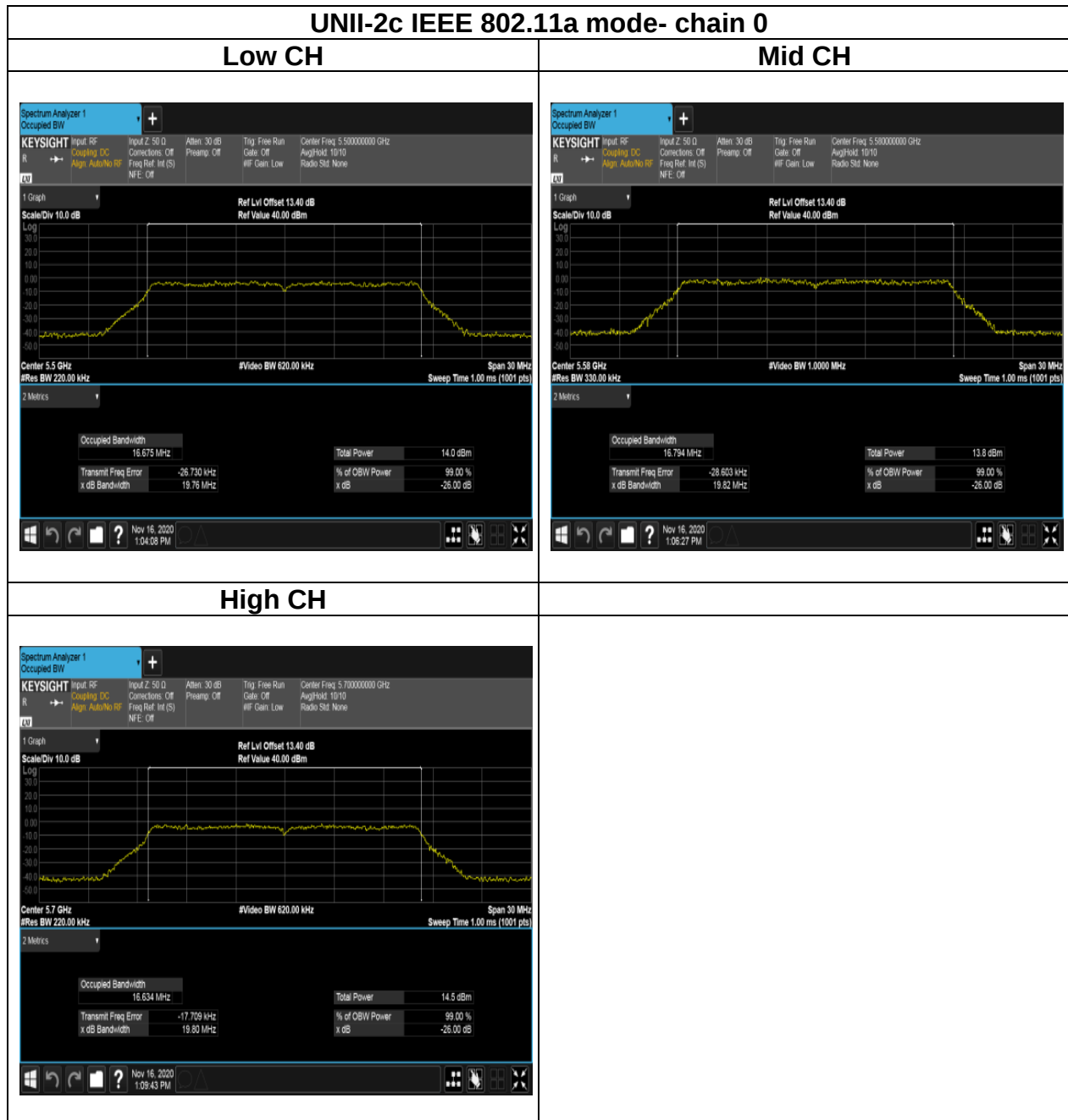
#### High CH

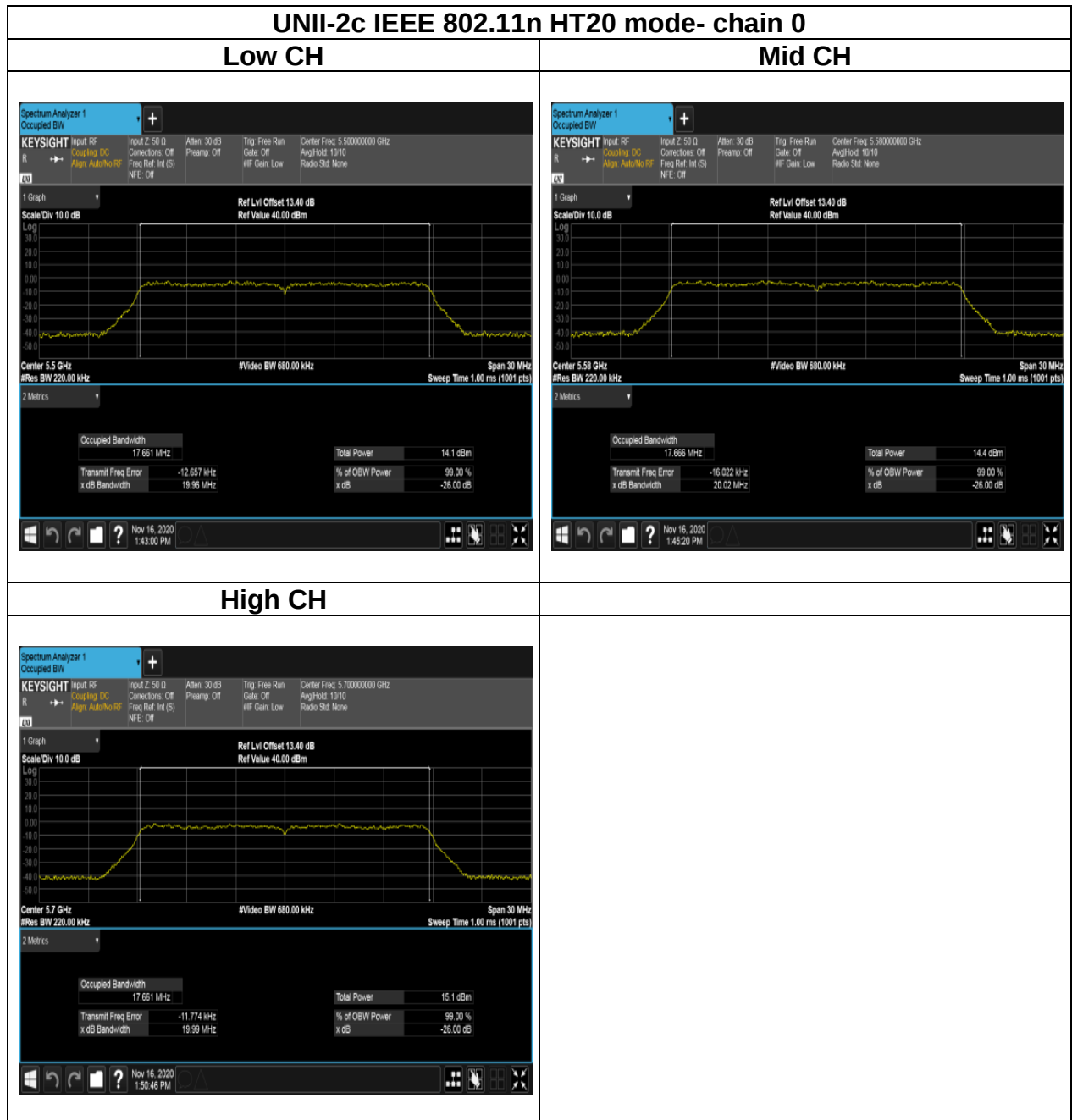


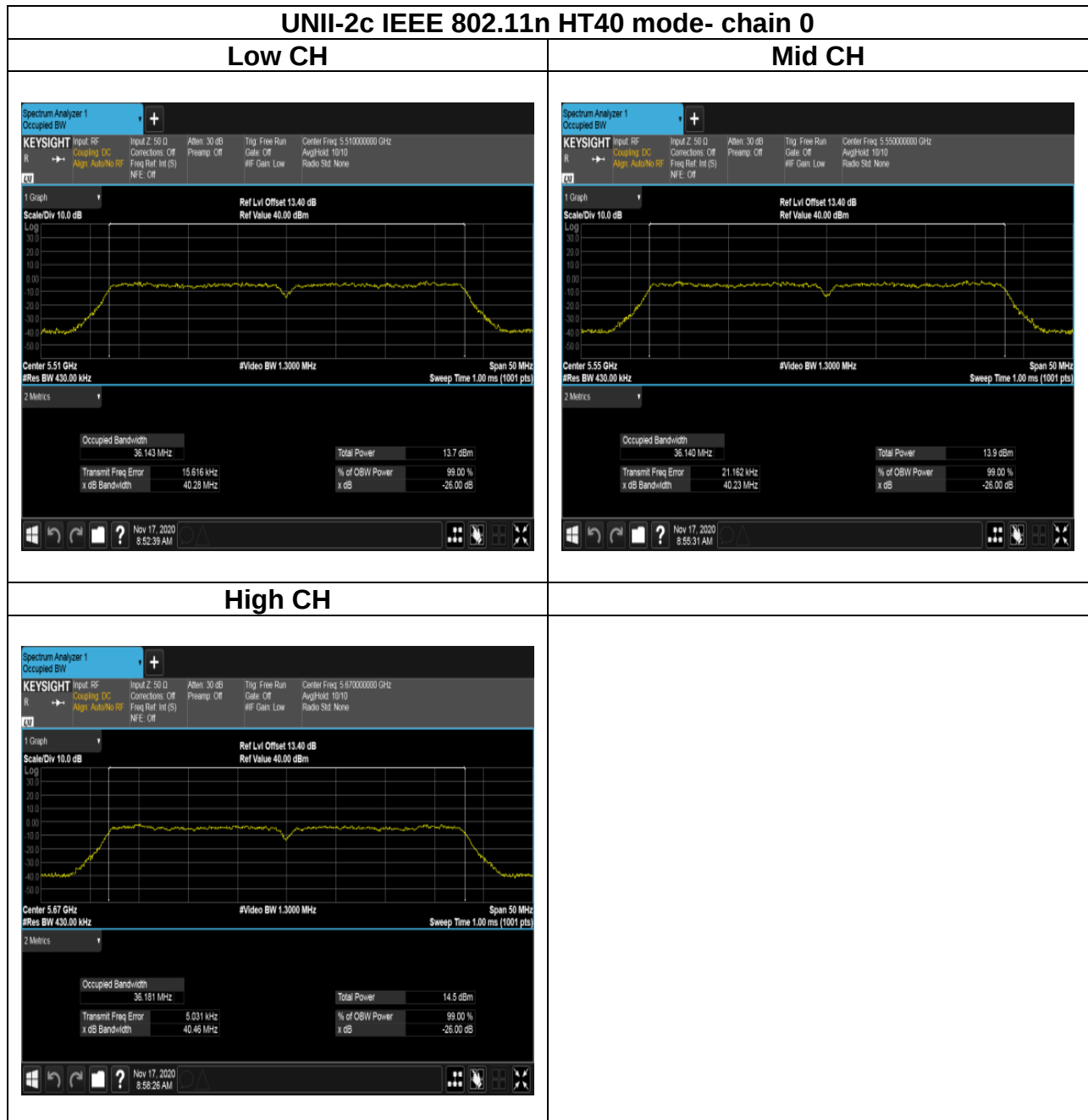


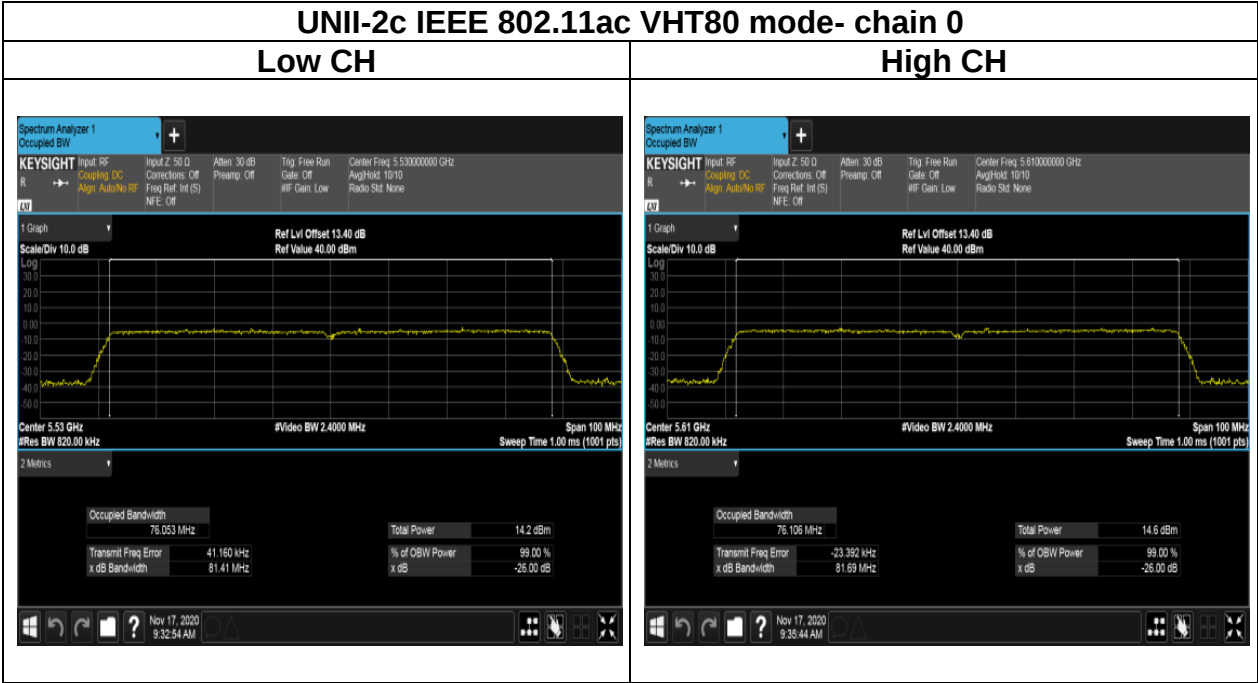
Report No.: T200928D02-RP4

### Test Data (26dB BANDWIDTH)



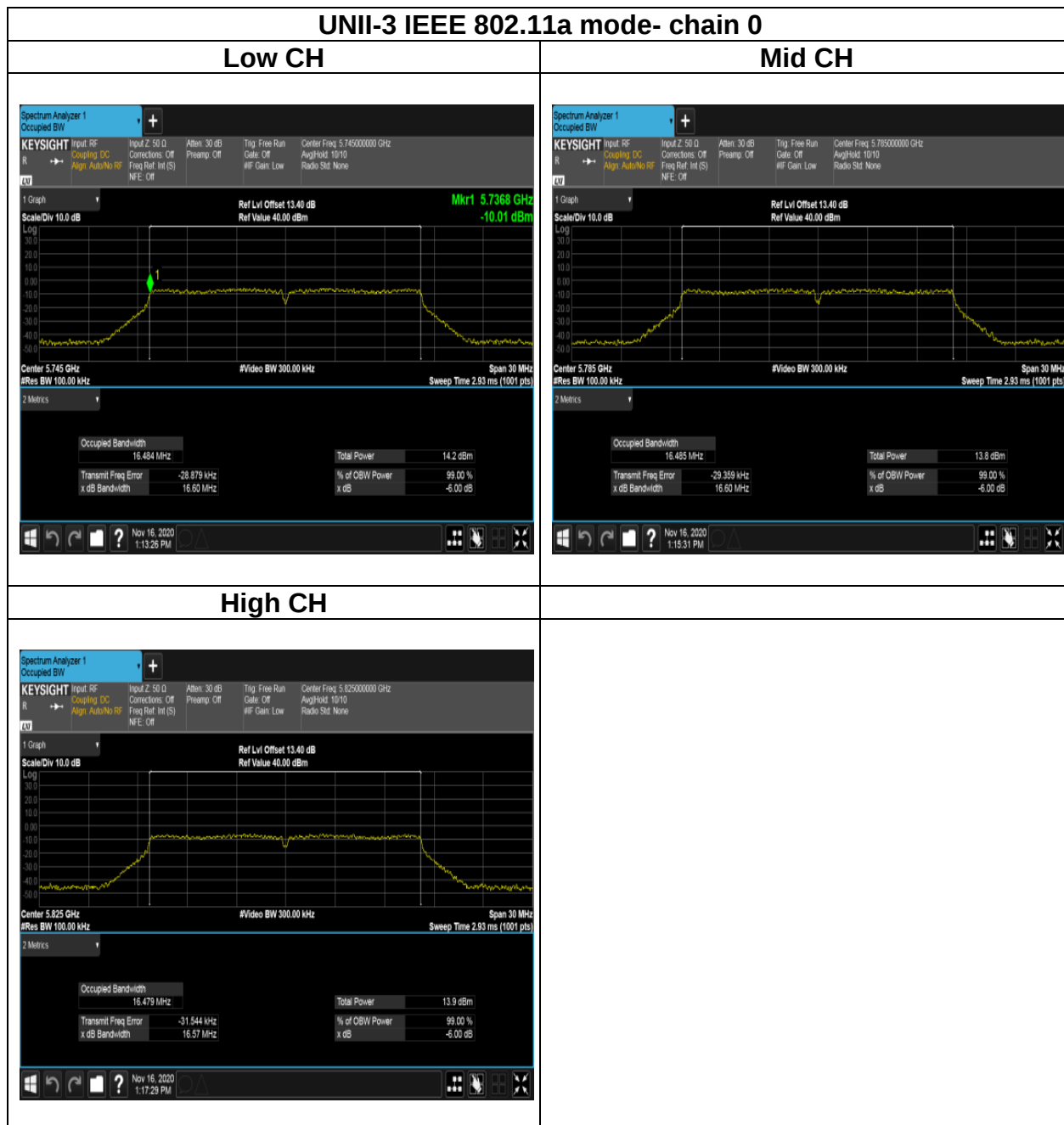


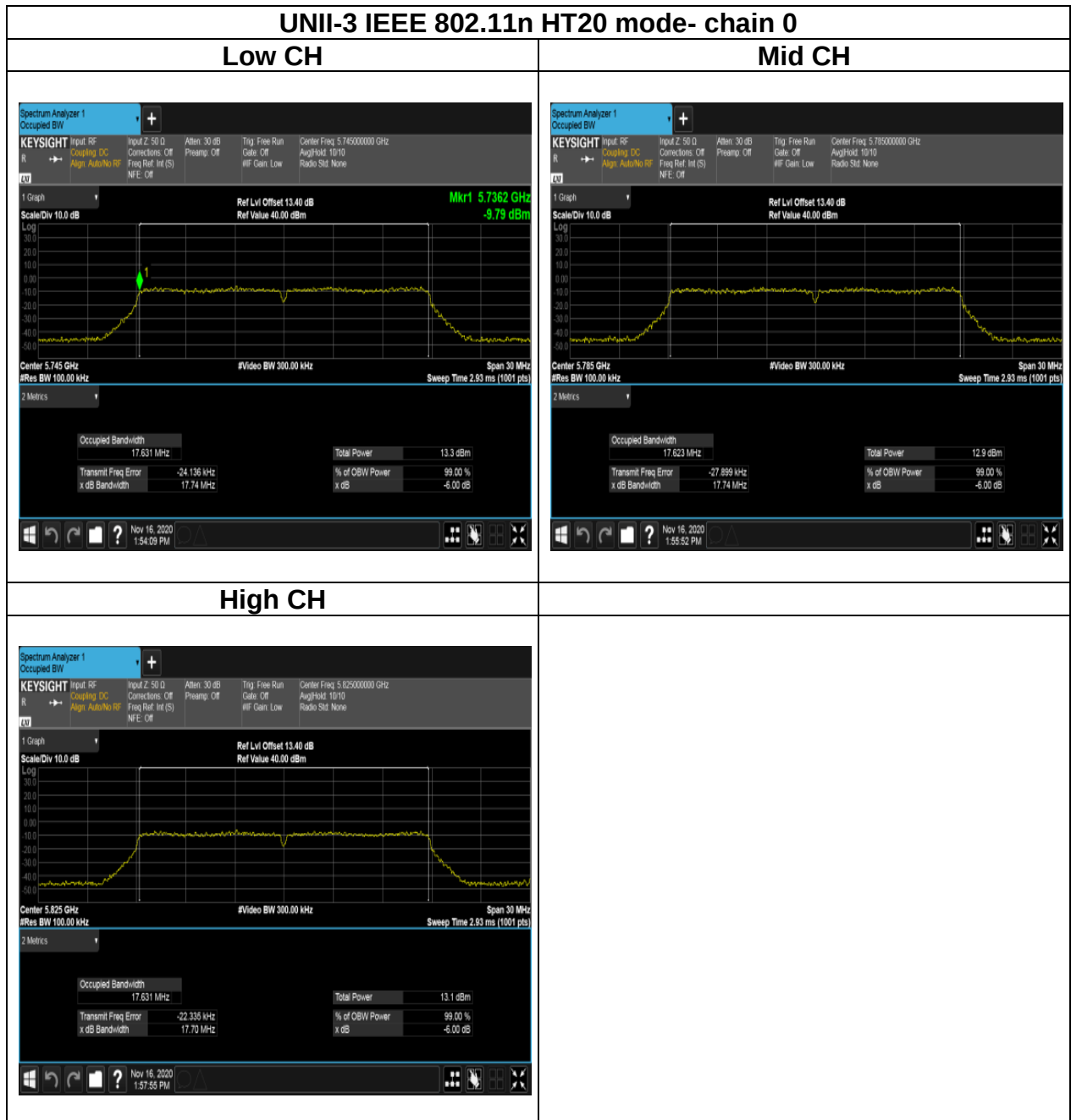




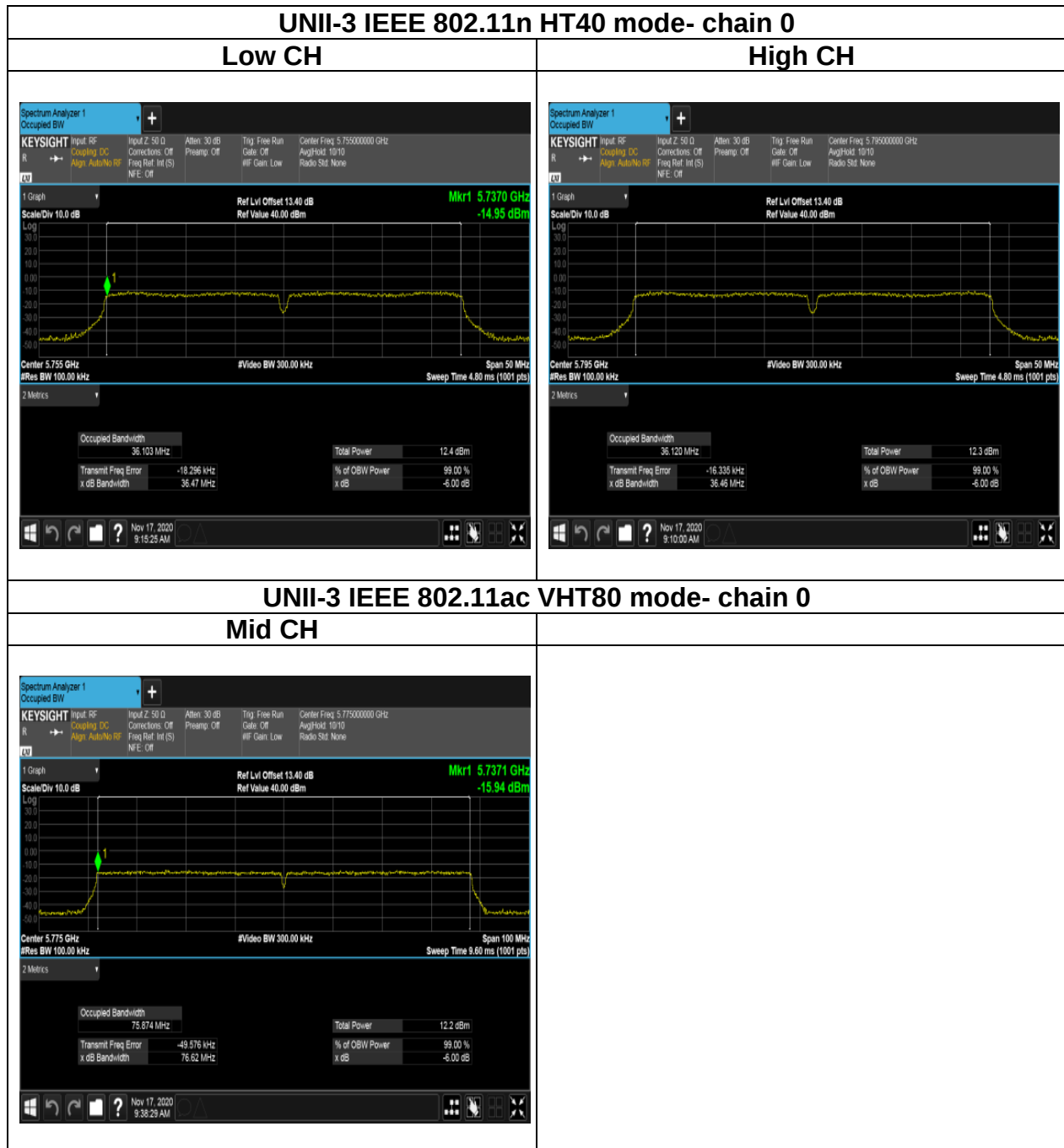
Report No.: T200928D02-RP4

### Test Data (6dB BANDWIDTH)



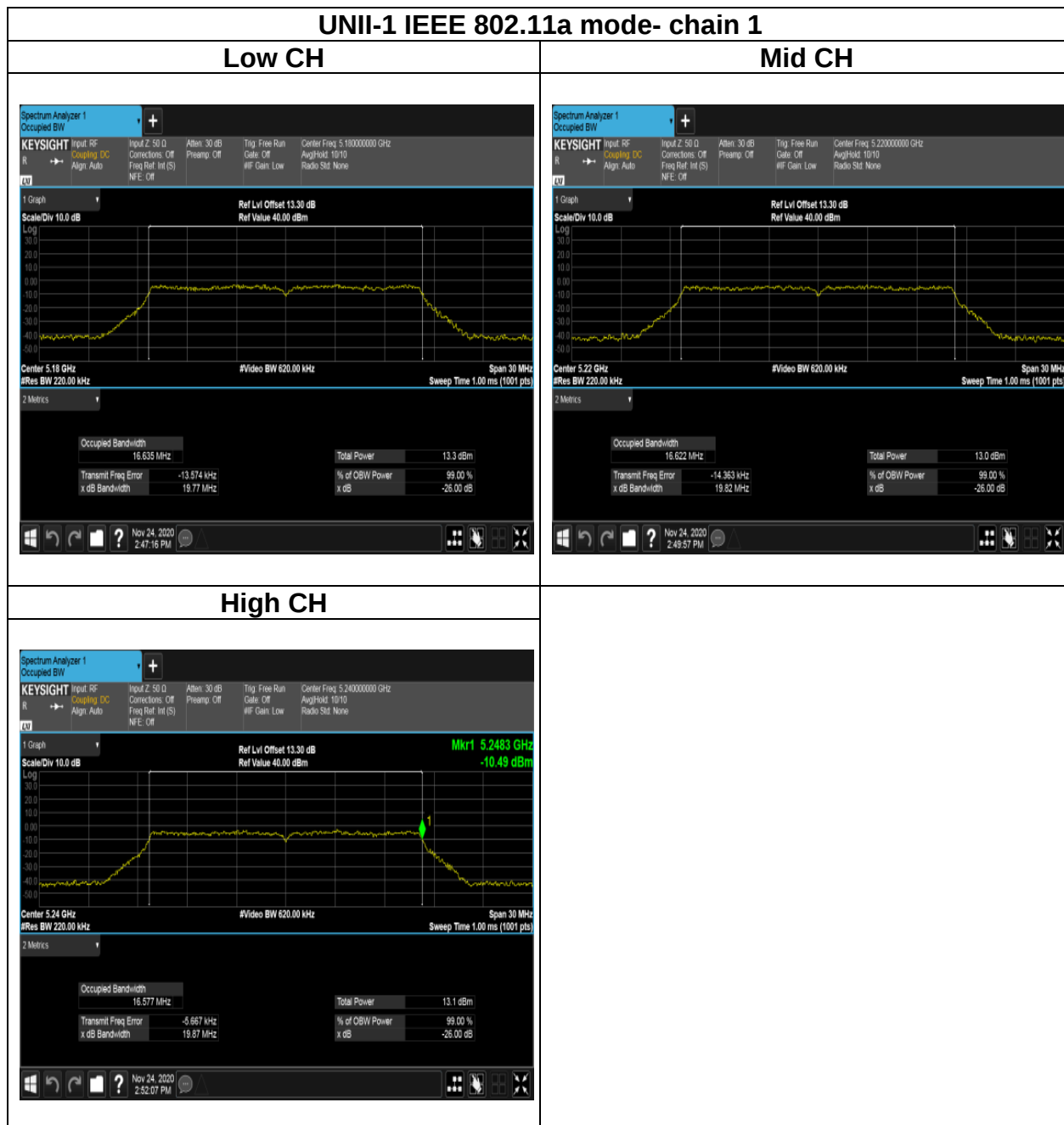


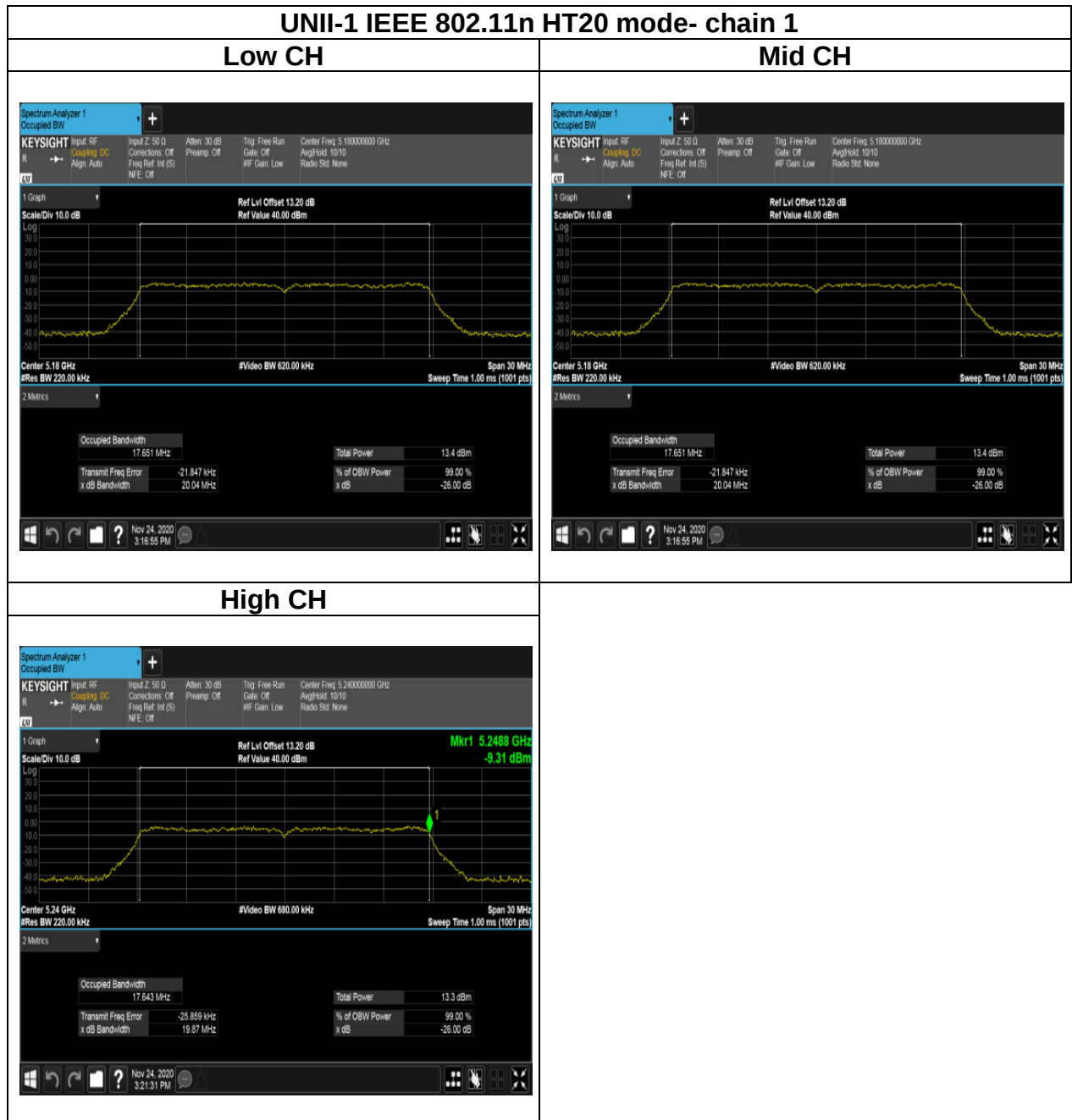
Report No.: T200928D02-RP4



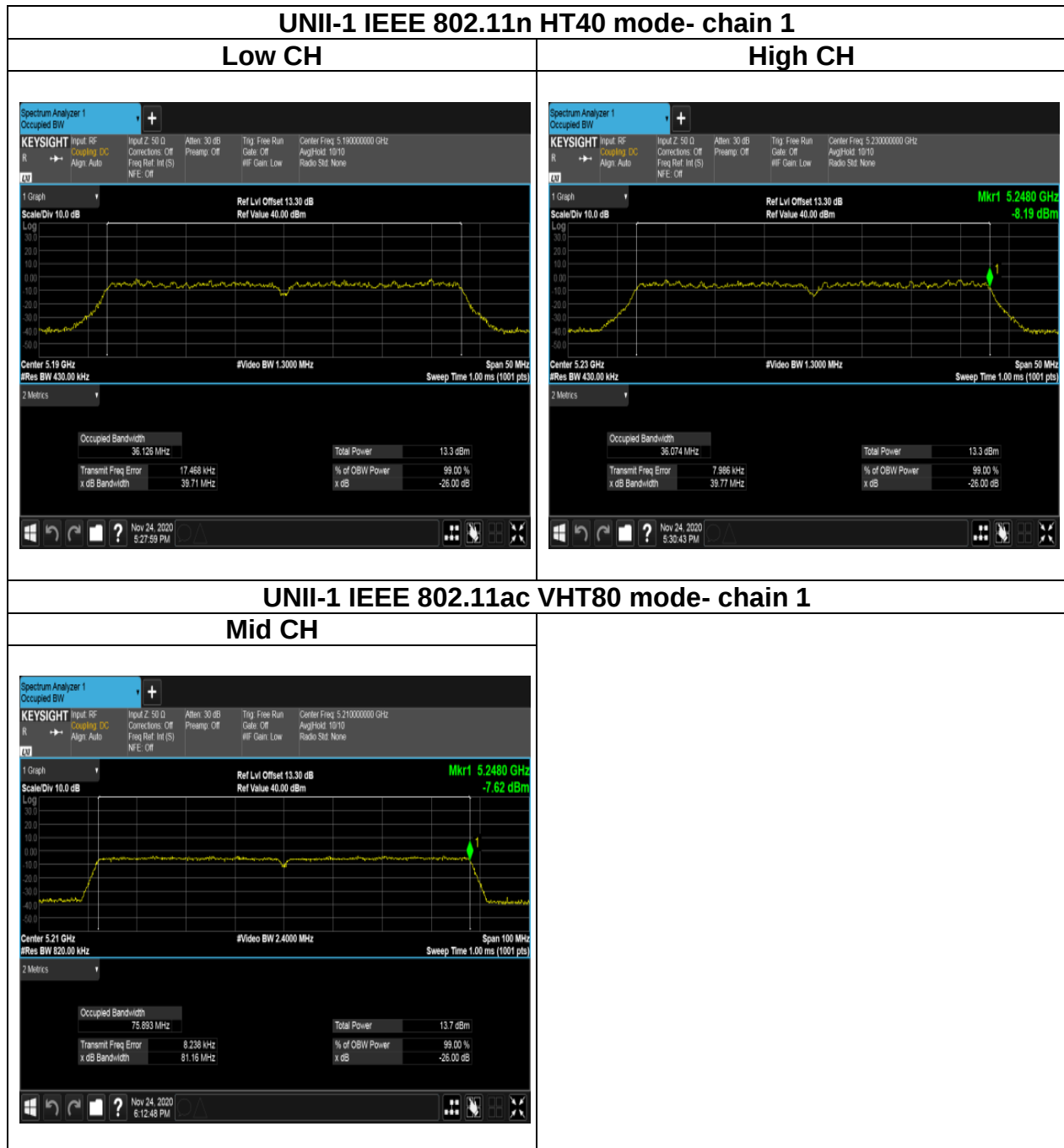
Report No.: T200928D02-RP4

### Test Data (26dB BANDWIDTH)



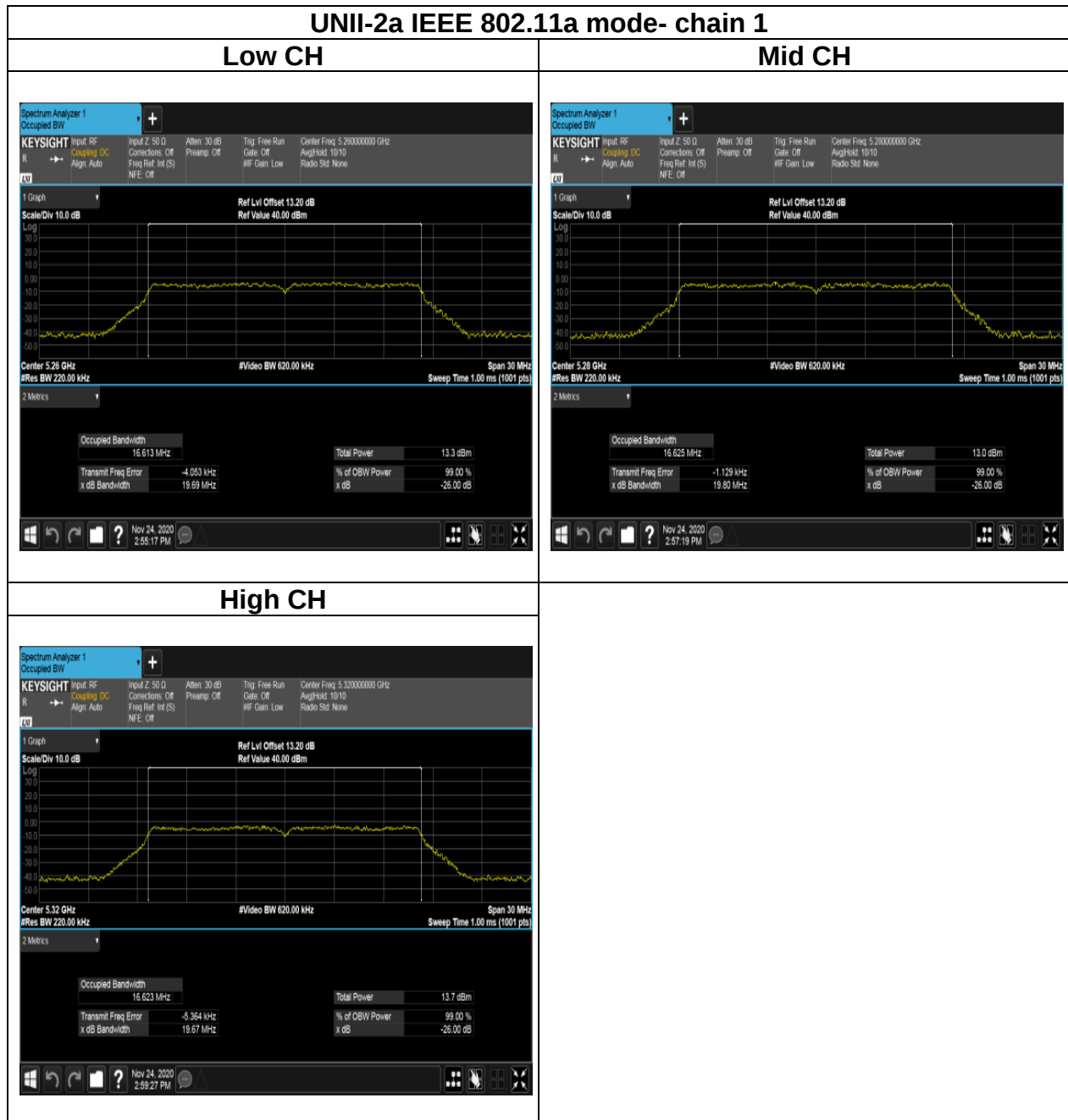


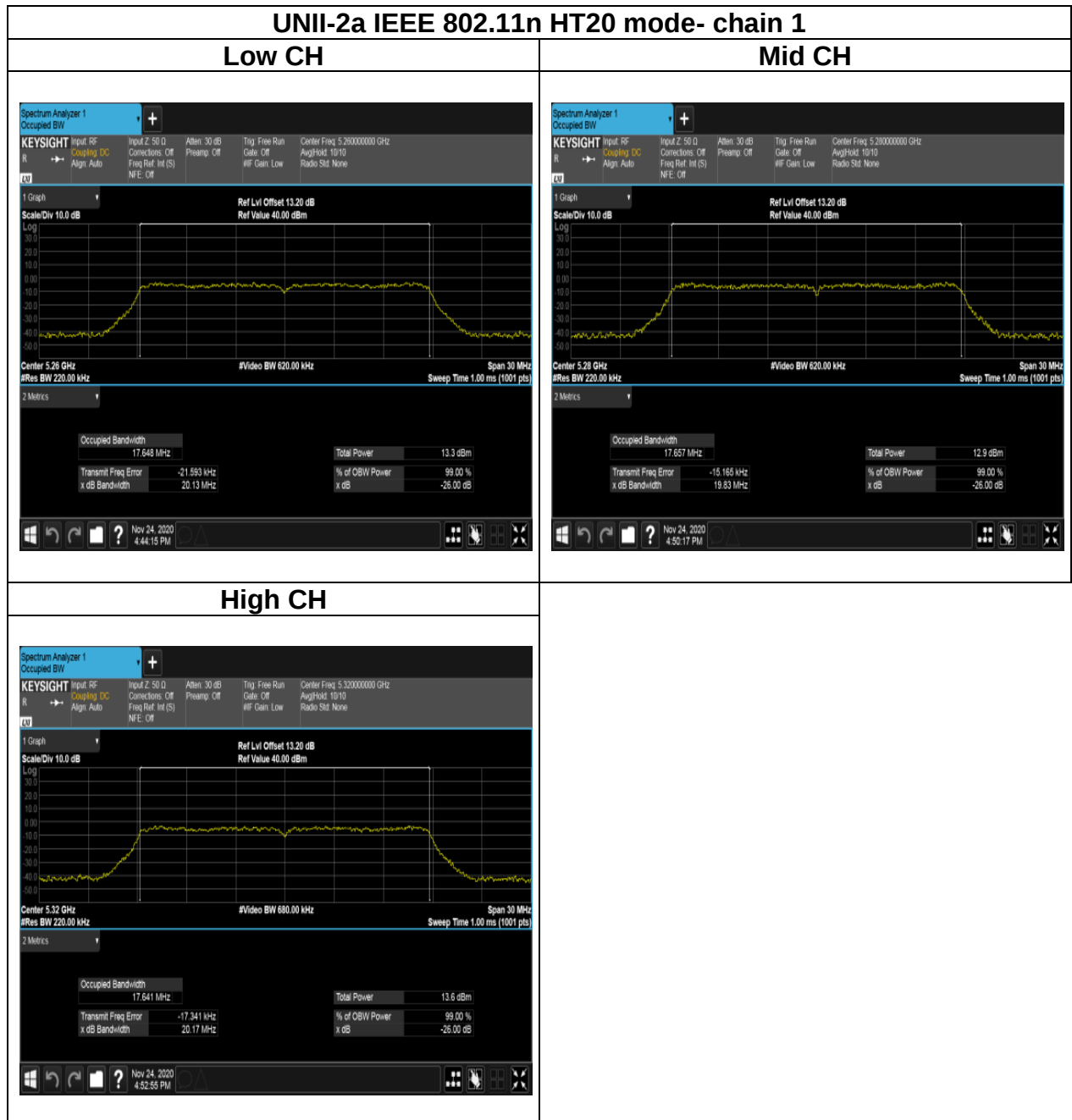
Report No.: T200928D02-RP4

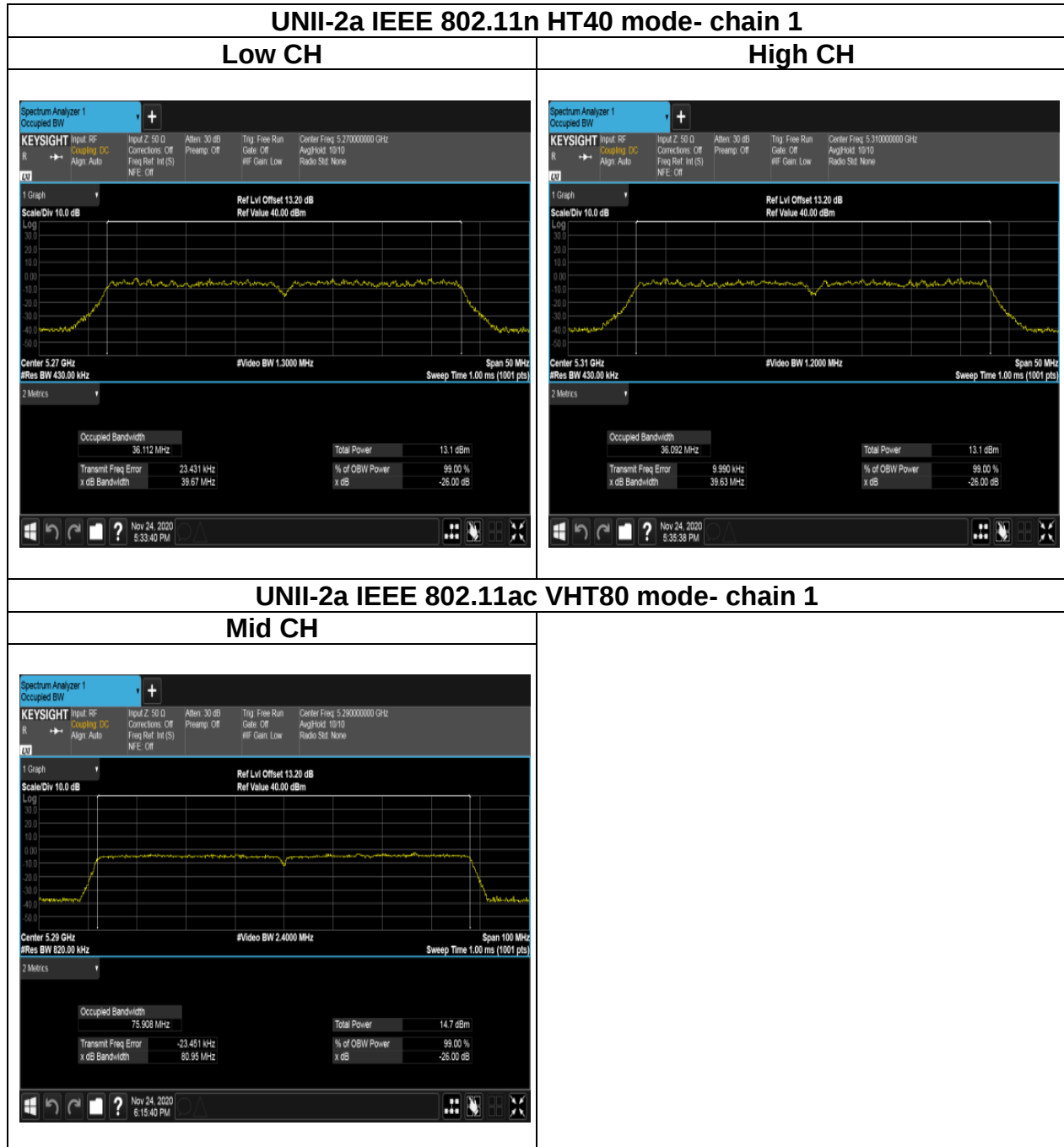


Report No.: T200928D02-RP4

### Test Data (26dB BANDWIDTH)

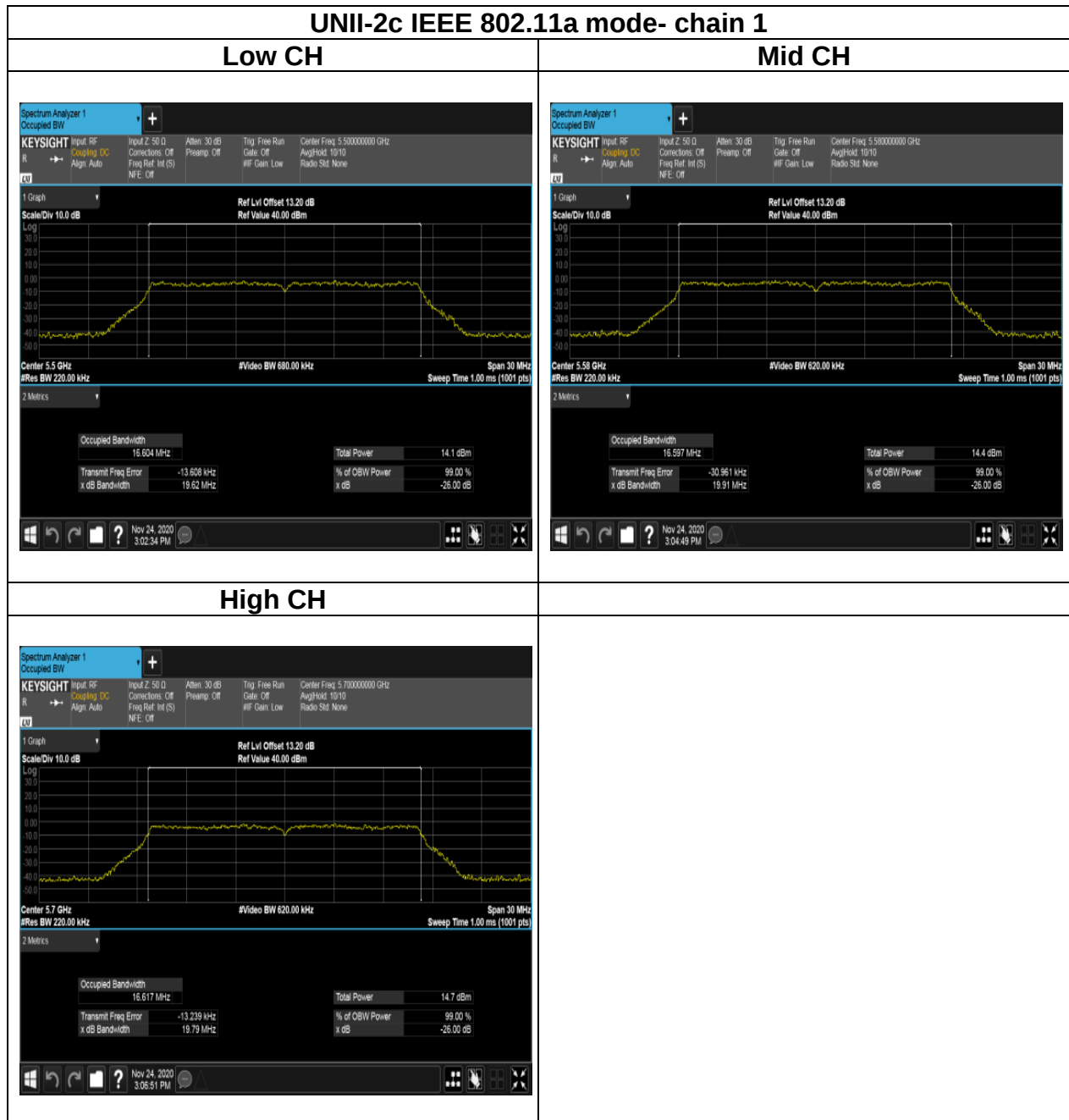


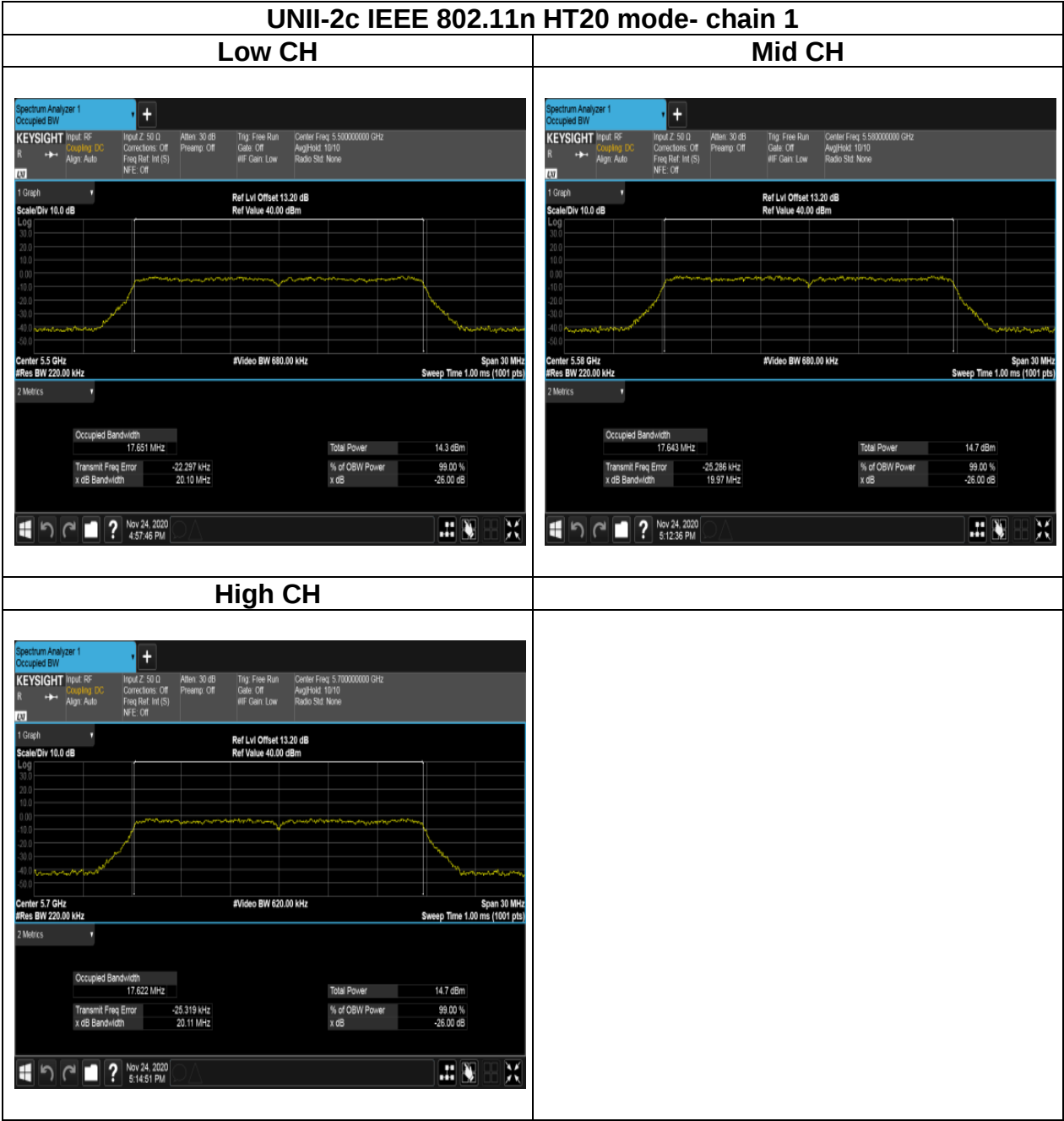


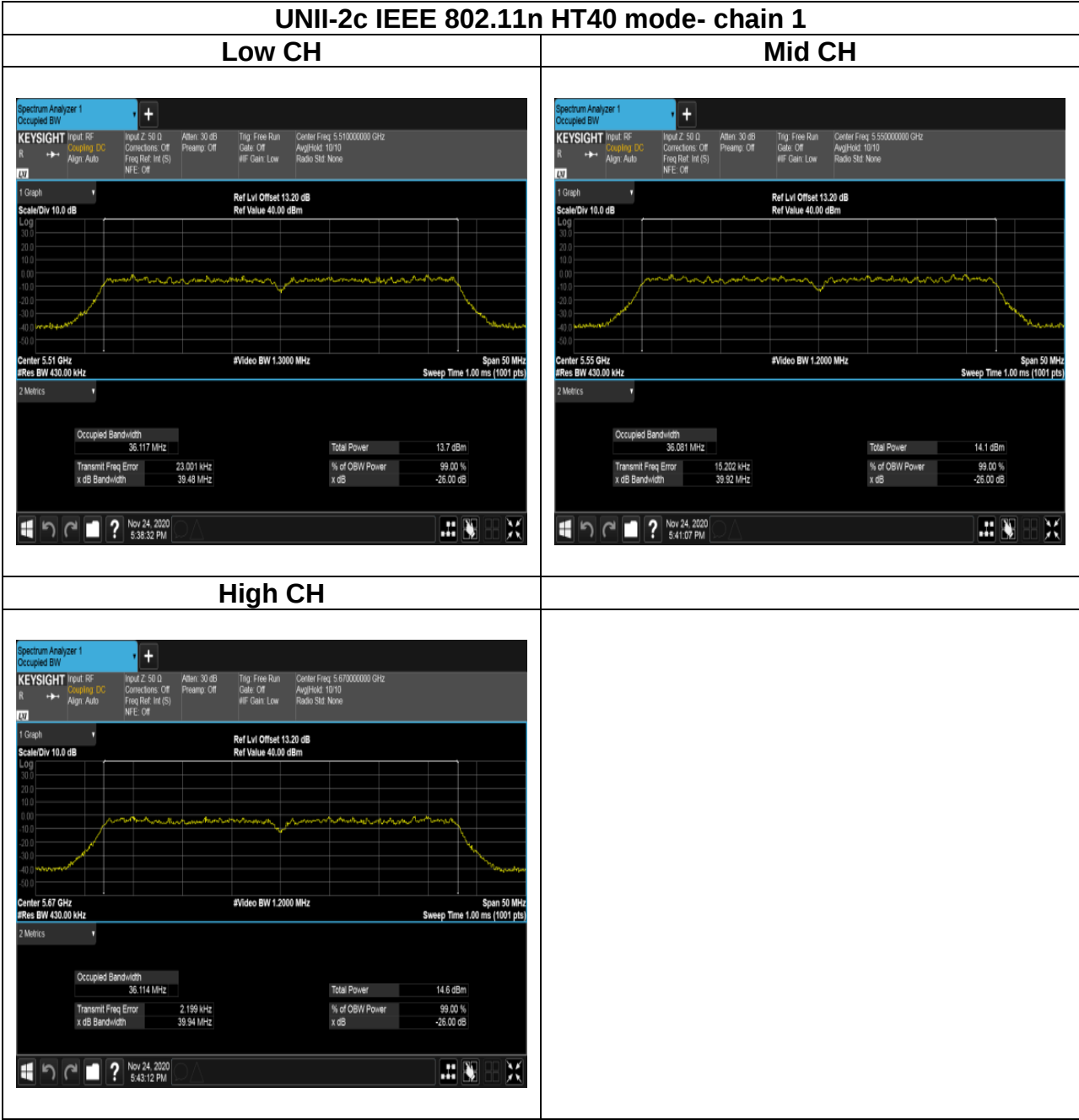


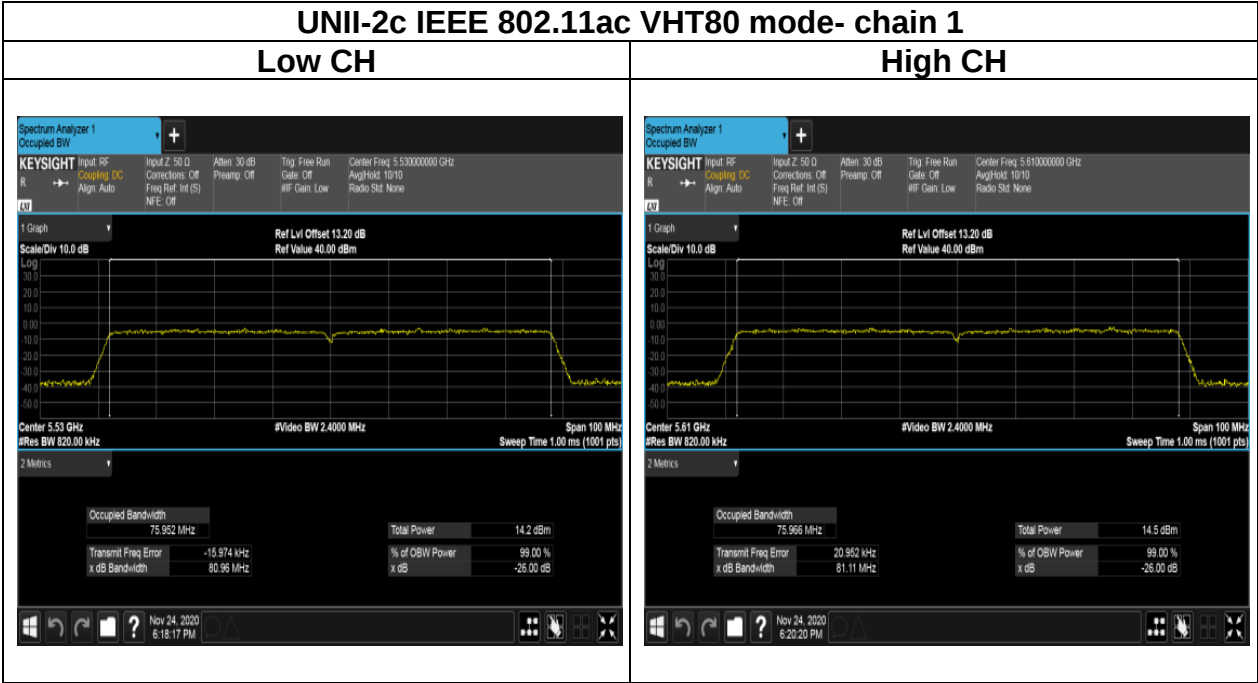
Report No.: T200928D02-RP4

### Test Data (26dB BANDWIDTH)



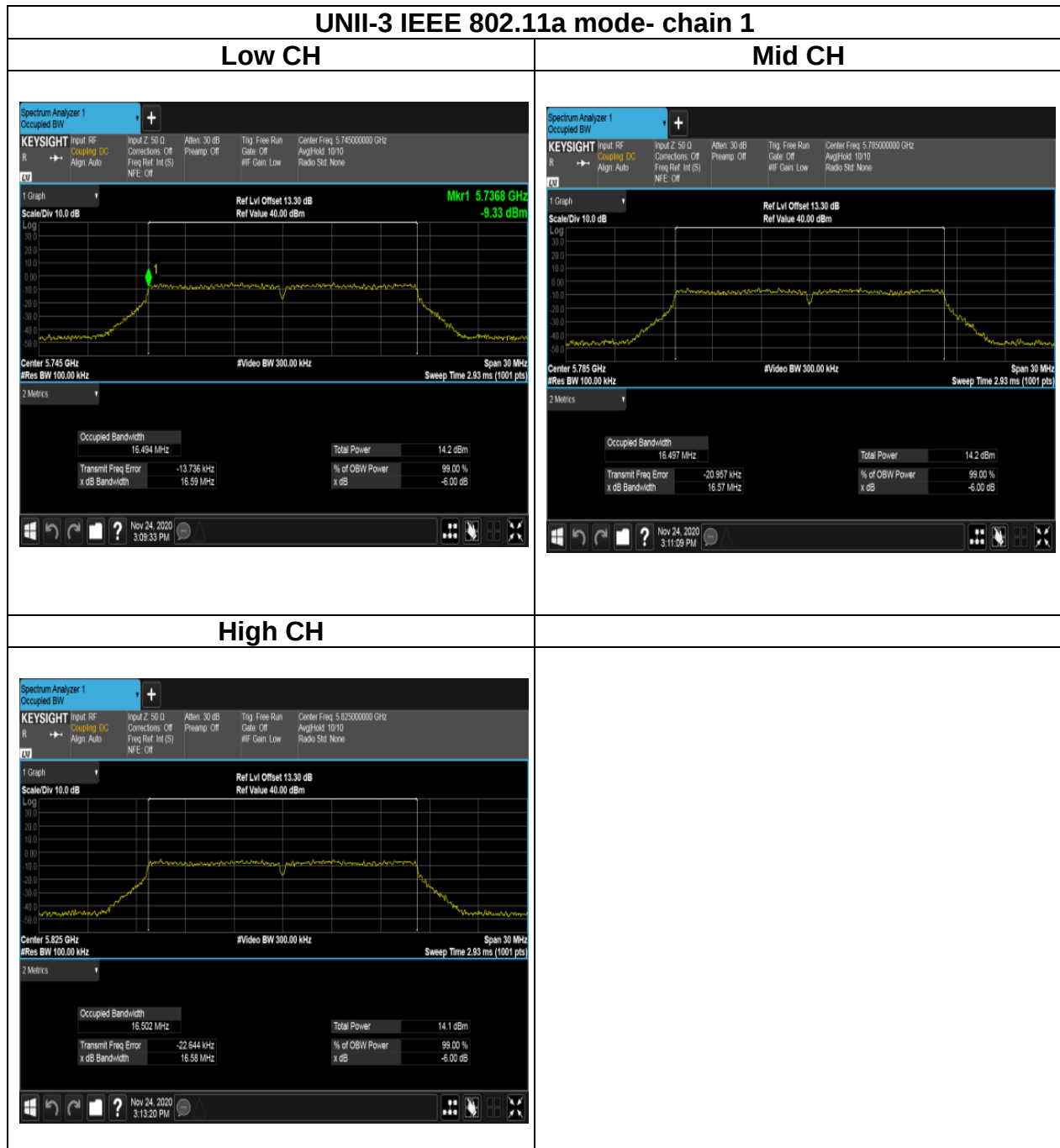






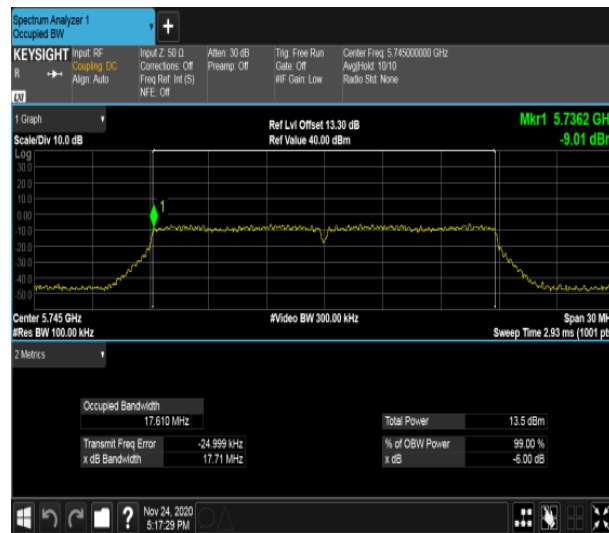
Report No.: T200928D02-RP4

### Test Data (6dB BANDWIDTH)

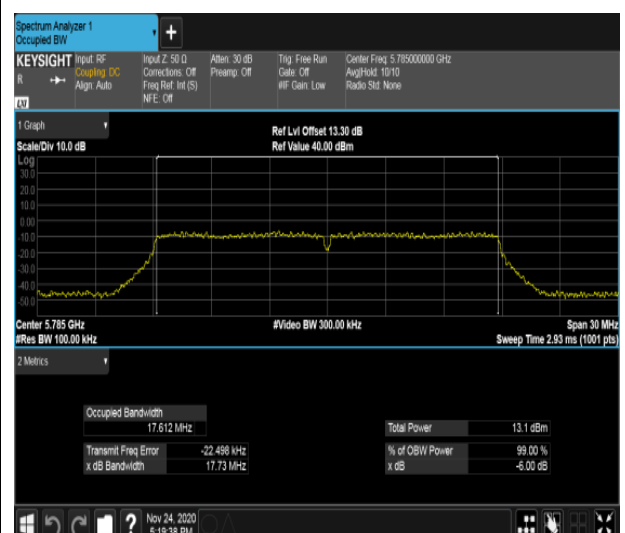


## UNII-3 IEEE 802.11n HT20 mode- chain 1

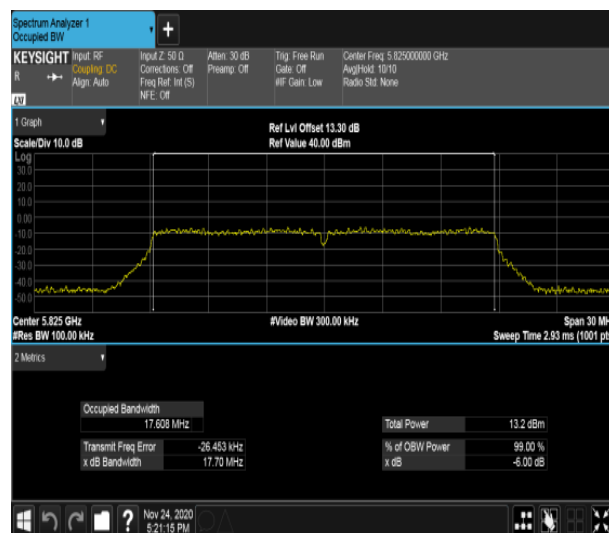
### Low CH



### Mid CH



### High CH



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