



FCC ID: M82-AIM8IAC  
Report No.: T180522D10-RP4

ISED: 9404A-AIM8IAC

Page: 1 / 228  
Rev.: 00

# RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART E

### INDUSTRY CANADA RSS-247

|               |                                                                                                                                                                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Standard | FCC Part 15.407 and RSS-247 Issue 2                                                                                                                                                                                                                              |
| Brand name    | ADVANTECH                                                                                                                                                                                                                                                        |
| Applicant     | Advantech Co. Ltd                                                                                                                                                                                                                                                |
| Product name  | Computer                                                                                                                                                                                                                                                         |
| Model No.     | FCC: AIM8IACxxxxxxxxxxxxxxxxxx;<br>AIM8Ixxxxxxxxxxxxxxxxxx; AIM-x5ATxxxxxxxxxxxxx<br>(where "x" may be any alphanumeric character, "-" or<br>blank for marketing purpose and no impact safety<br>related critical components and constructions)<br>ISED: AIM8IAC |
| Test Result   | Pass                                                                                                                                                                                                                                                             |

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:

Reviewed by:

Sam Chuang  
Manager

Jerry Chuang  
Engineer

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.  
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部分複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at [www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm) and for electronic format documents, subject to Terms and Conditions for Electronic Documents at [www.sgs.com/terms\\_e-document.htm](http://www.sgs.com/terms_e-document.htm). Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: T180522D10-RP4

Page: 2 / 228  
Rev.: 00

## **Revision History**

| Rev. | Issue Date       | Revisions     | Effect Page | Revised By |
|------|------------------|---------------|-------------|------------|
| 00   | October 30, 2018 | Initial Issue | ALL         | May Lin    |



Report No.: T180522D10-RP4

Page: 3 / 228  
Rev.: 00

## Table of contents

|                                                                     |     |
|---------------------------------------------------------------------|-----|
| 1. GENERAL INFORMATION .....                                        | 4   |
| 1.1 EUT INFORMATION .....                                           | 4   |
| 1.2 EUT CHANNEL INFORMATION .....                                   | 6   |
| 1.3 ANTENNA INFORMATION .....                                       | 7   |
| 1.4 MEASUREMENT UNCERTAINTY .....                                   | 7   |
| 1.5 FACILITIES AND TEST LOCATION .....                              | 8   |
| 1.6 INSTRUMENT CALIBRATION .....                                    | 9   |
| 1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT .....                     | 10  |
| 1.8 TEST METHODOLOGY AND APPLIED STANDARDS .....                    | 10  |
| 2. TEST SUMMERY .....                                               | 11  |
| 3. DESCRIPTION OF TEST MODES .....                                  | 12  |
| 3.1 THE WORST MODE OF OPERATING CONDITION .....                     | 12  |
| 3.2 THE WORST MODE OF MEASUREMENT .....                             | 13  |
| 3.3 EUT DUTY CYCLE .....                                            | 14  |
| 4. TEST RESULT .....                                                | 15  |
| 4.1 AC POWER LINE CONDUCTED EMISSION .....                          | 15  |
| 4.2 26dB BANDWIDTH, 6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%) ..... | 18  |
| 4.3 OUTPUT POWER MEASUREMENT .....                                  | 49  |
| 4.4 POWER SPECTRAL DENSITY .....                                    | 55  |
| 4.5 RADIATION BANDEDGE AND SPURIOUS EMISSION .....                  | 74  |
| 4.6 FREQUENCY STABILITY .....                                       | 211 |
| 4.7 DYNAMIC FREQUENCY SELECTION .....                               | 216 |
| APPENDIX 1 - PHOTOGRAPHS OF EUT                                     |     |



Report No.: T180522D10-RP4

Page: 4 / 228  
Rev.: 00

## 1.1 EUT INFORMATION

|                   |                                                                                                                                                                                                                                                                                                                    |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant         | Advantech Co.Ltd.<br>No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.                                                                                                                                                                                                           |
| Manufacturer      | Advantech Co.Ltd.<br>No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.                                                                                                                                                                                                           |
| Equipment         | Computer                                                                                                                                                                                                                                                                                                           |
| Model Name        | <b>FCC:</b> AIM8IACxxxxxxxxxxxxxxxx; AIM8Ixxxxxxxxxxxxxxxx;<br>AIM-x5ATxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)<br><b>ISED:</b> AIM8IAC                                                   |
| Model Discrepancy | <b>FCC:</b> All the above models are identical except for the designation of model numbers. The suffix of (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions) on model number is just for marketing purpose only. |
| Received Date     | May 22, 2018                                                                                                                                                                                                                                                                                                       |
| Date of Test      | June 11 ~ 29, 2018                                                                                                                                                                                                                                                                                                 |
| Power Operation   | 1. VDC from Power Adapter<br>Brand: Chicony<br>Model name: A16-018N1A<br>Input: 100-240Vac, 50-60Hz, 1A<br>Output: 5.15Vdc, 3A / 9.1Vdc, 2A<br>2. Power from Battery:<br>ADVANTECH / AIM-BAT-8<br>Rating: 3.8Vdc 4900mAh                                                                                           |

| Output Power(W) | Band     | Mode                 | Frequency Range (MHz) | Output Power (W) |
|-----------------|----------|----------------------|-----------------------|------------------|
|                 | U-NII-1  | IEEE 802.11a         | 5180 ~ 5240           | 0.0371           |
|                 |          | IEEE 802.11n HT 20   | 5180 ~ 5240           | 0.0371           |
|                 |          | IEEE 802.11n HT 40   | 5190 ~ 5230           | 0.0198           |
|                 |          | IEEE 802.11ac VHT 80 | 5210                  | 0.0122           |
|                 | U-NII-2a | IEEE 802.11a         | 5260 ~ 5320           | 0.0397           |
|                 |          | IEEE 802.11n HT 20   | 5260 ~ 5320           | 0.0290           |
|                 |          | IEEE 802.11n HT 40   | 5270 ~ 5310           | 0.0204           |
|                 |          | IEEE 802.11ac VHT 80 | 5290                  | 0.0126           |
|                 | U-NII-2c | IEEE 802.11a         | 5500 ~ 5700           | 0.0360           |
|                 |          | IEEE 802.11n HT 20   | 5500 ~ 5700           | 0.0279           |
|                 |          | IEEE 802.11n HT 40   | 5510 ~ 5670           | 0.0196           |
|                 |          | IEEE 802.11ac VHT 80 | 5530~5610             | 0.0119           |
|                 | U-NII-3  | IEEE 802.11a         | 5745 ~ 5825           | 0.0500           |
|                 |          | IEEE 802.11n HT 20   | 5745 ~ 5825           | 0.0454           |
|                 |          | IEEE 802.11n HT 40   | 5755 ~ 5795           | 0.0401           |
|                 |          | IEEE 802.11ac VHT 80 | 5775                  | 0.0258           |

**Remark:**

1.For Canada the EUT Frequency Range 5600~5650MHz will be disabled.

## 1.2 EUT CHANNEL INFORMATION

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

**Remark:**

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 and RSS-GEN Table 1 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 Type | <input checked="" type="checkbox"/> PIFA <input type="checkbox"/> PCB <input type="checkbox"/> Dipole <input type="checkbox"/> Coils |
| Antenna Gain | Gain: -0.53 dBi                                                                                                                      |

### 1.4 MEASUREMENT UNCERTAINTY

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| AC Powerline Conducted Emission       | +/- 2.96    |
| Emission bandwidth, 20dB bandwidth    | +/- 1.4003  |
| RF output power, conducted            | +/- 1.1372  |
| Power density, conducted              | +/- 1.4003  |
| 3M Semi Anechoic Chamber / 30M~200M   | +/- 4.0138  |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 3.9483  |
| 3M Semi Anechoic Chamber / 1G~8G      | +/- 2.5975  |
| 3M Semi Anechoic Chamber / 8G~18G     | +/- 2.6112  |
| 3M Semi Anechoic Chamber / 18G~26G    | +/- 2.7389  |
| 3M Semi Anechoic Chamber / 26G~40G    | +/- 2.9683  |

**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.



Report No.: T180522D10-RP4

Page: 8 / 228  
Rev.: 00

## 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 24891, Taiwan. (R.O.C.)*

| Test site          | Test Engineer | Remark |
|--------------------|---------------|--------|
| AC Conduction Room | Dally Hong    | -      |
| Radiation          | Jerry Chuang  | -      |
| RF Conducted       | Jerry Chuang  | -      |

**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

| RF Conducted Test Site |                       |                 |            |            |            |
|------------------------|-----------------------|-----------------|------------|------------|------------|
| Equipment              | Manufacturer          | Model           | S/N        | Cal Date   | Cal Due    |
| Power Meter            | Anritsu               | ML2495A         | 1012009    | 09/18/2017 | 09/17/2018 |
| Power Sensor           | Anritsu               | MA2411B         | 917072     | 09/18/2017 | 09/17/2018 |
| Base Station           | R&S                   | CMW 500         | 116875     | 04/20/2018 | 04/19/2019 |
| Spectrum Analyzer      | R&S                   | FSV 40          | 101073     | 10/02/2017 | 10/01/2018 |
| Directional Coupler    | Agilent               | 87301D          | MY44350252 | 07/25/2017 | 07/24/2018 |
| SUCOFLEX Cable         | HUBER<br>SUHNER       | SUCOFLEX 104PEA | 25157      | 07/31/2017 | 07/30/2018 |
| Divider                | Solvang<br>Technology | 2-18GHz 4Way    | STI08-0015 | 07/26/2017 | 07/25/2018 |

| 3M 966 Chamber Test Site            |                  |                     |             |            |            |
|-------------------------------------|------------------|---------------------|-------------|------------|------------|
| Equipment                           | Manufacturer     | Model               | S/N         | Cal Date   | Cal Due    |
| Bilog Antenna                       | Sunol Sciences   | JB3                 | A030105     | 06/19/2018 | 06/18/2019 |
| Cable                               | HUBER<br>SUHNER  | SUCOFLEX 104PEA     | 25157       | 07/31/2017 | 07/30/2018 |
| Cable                               | HUBER<br>SUHNER  | SUCOFLEX 104PEA     | 20995       | 07/31/2017 | 07/30/2018 |
| Digital Thermo-<br>Hygro Meter      | WISEWIND         | 1206                | D07         | 02/08/2018 | 02/07/2019 |
| Double Ridged Guide<br>Horn Antenna | ETC              | MCTD 1209           | DRH13M02003 | 08/25/2017 | 08/24/2018 |
| High Pass Filters                   | MICRO<br>TRONICS | HPM13195            | 003         | 05/14/2018 | 05/13/2019 |
| Loop Ant                            | COM-POWER        | AL-130              | 121051      | 03/21/2018 | 03/20/2019 |
| Horn Antenna                        | ETS<br>LINDGREN  | 3116                | 00026370    | 01/04/2018 | 01/03/2019 |
| Pre-Amplifier                       | MITEQ            | AMF-6F-260400-40-8P | 985646      | 06/21/2018 | 06/20/2019 |
| Pre-Amplifier                       | HP               | 8449B               | 3008A00965  | 06/28/2018 | 06/27/2019 |
| Pre-Amplifier                       | EMEC             | EM330               | 060609      | 07/31/2017 | 07/30/2018 |
| PSA Series Spectrum<br>Analyzer     | Agilent          | E4446A              | MY46180323  | 05/31/2018 | 05/30/2019 |
| 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      |

| AC Conducted Emissions Test Site |              |           |          |            |            |
|----------------------------------|--------------|-----------|----------|------------|------------|
| Equipment                        | Manufacturer | Model     | S/N      | Cal Date   | Cal Due    |
| LISN                             | R&S          | ENV216    | 101054   | 02/06/2018 | 02/05/2019 |
| LISN                             | SCHWARZBECK  | NSLK 8127 | 8127-541 | 02/09/2018 | 02/08/2019 |
| EMI Test Receiver                | R&S          | ESCI      | 101203   | 11/02/2017 | 11/01/2018 |

**Remark:** Each piece of equipment is scheduled for calibration once a year.



Report No.: T180522D10-RP4

Page: 10 / 228  
Rev.: 00

## 1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

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

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

## 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.



Report No.: T180522D10-RP4

Page: 11 / 228  
Rev.: 00

| FCC Standard Sec. | IC Standard Sec.                                                             | Chapter | Test Item                   | Result |
|-------------------|------------------------------------------------------------------------------|---------|-----------------------------|--------|
| 15.203            | -                                                                            | 1.3     | Antenna Requirement         | Pass   |
| 15.207            | RSS-Gen (8.8)                                                                | 4.1     | AC Conducted Emission       | Pass   |
| 15.403(i)         | -                                                                            | 4.2     | 26dB Bandwidth              | Pass   |
| 15.407(e)         | RSS-247(6.2.4)                                                               | 4.2     | 6dB Bandwidth               | Pass   |
| 2.1049            | RSS Gen (6.7)                                                                | 4.2     | Occupied Bandwidth (99%)    | Pass   |
| 15.407(a)         | RSS-247(6.2.1.1)<br>RSS-247(6.2.2.1)<br>RSS-247(6.2.3.1)<br>RSS-247(6.2.4.1) | 4.3     | Output Power Measurement    | Pass   |
| 15.407(a)         | RSS-247(6.2.1.1)<br>RSS-247(6.2.2.1)<br>RSS-247(6.2.3.1)<br>RSS-247(6.2.4.1) | 4.4     | Power Spectral Density      | Pass   |
| 15.407(b)         | RSS-247(6.2.1.2)<br>RSS-247(6.2.2.2)<br>RSS-247(6.2.3.2)<br>RSS-247(6.2.4.2) | 4.5     | Radiation Band Edge         | Pass   |
| 15.407(b)         | RSS-247(6.2.1.2)<br>RSS-247(6.2.2.2)<br>RSS-247(6.2.3.2)<br>RSS-247(6.2.4.2) | 4.5     | Radiation Spurious Emission | Pass   |
| 15.407(g)         | RSS-Gen (6.11)                                                               | 4.6     | Frequency Stability         | Pass   |
| 15.407(h)         | -                                                                            | 4.7     | Dynamic Frequency Selection | Pass   |

### 3.1 THE WORST MODE OF OPERATING CONDITION

|                                                |                                                                                                                                           |                      |                       |                    |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|--------------------|
| Operation mode                                 | 1. IEEE 802.11a mode: 6Mbps<br>2. IEEE 802.11n HT 20 mode: MCS0<br>3. IEEE 802.11n HT 40 mode: MCS0<br>4. IEEE 802.11ac VHT 80 mode: MCS0 |                      |                       |                    |
| Operating Frequency Range & Number of Channels |                                                                                                                                           | Mode                 | Frequency Range (MHz) | Number of Channels |
|                                                | U-NII-1                                                                                                                                   | IEEE 802.11a         | 5180 ~ 5240           | 4 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11n HT 20   | 5180 ~ 5240           | 4 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11n HT 40   | 5190 ~ 5230           | 2 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11ac VHT 80 | 5210                  | 1 Channels         |
|                                                | U-NII-2a                                                                                                                                  | IEEE 802.11a         | 5260 ~ 5320           | 4 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11n HT 20   | 5260 ~ 5320           | 4 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11n HT 40   | 5270 ~ 5310           | 2 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11ac VHT 80 | 5290                  | 1 Channels         |
|                                                | U-NII-2c                                                                                                                                  | IEEE 802.11a         | 5500 ~ 5700           | 11 Channels        |
|                                                |                                                                                                                                           | IEEE 802.11n HT 20   | 5500 ~ 5700           | 11 Channels        |
|                                                |                                                                                                                                           | IEEE 802.11n HT 40   | 5510 ~ 5670           | 5 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11ac VHT 80 | 5530~5610             | 2 Channels         |
|                                                | U-NII-3                                                                                                                                   | IEEE 802.11a         | 5745 ~ 5825           | 5 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11n HT 20   | 5745 ~ 5825           | 5 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11n HT 40   | 5755 ~ 5795           | 2 Channels         |
|                                                |                                                                                                                                           | IEEE 802.11ac VHT 80 | 5775                  | 1 Channels         |

### 3.2 THE WORST MODE OF MEASUREMENT

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

| Radiated Emission Measurement Above 1G |                                                                                                                                                                                                                                                                                               |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                         | Band edge, Emission for Unwanted and Fundamental                                                                                                                                                                                                                                              |
| Power supply Mode                      | Mode 1: EUT power by AC adapter via power cable.<br>Mode 2: EUT power by battery.                                                                                                                                                                                                             |
| 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) |
| Worst Polarity                         | <input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Vertical                                                                                                                                                                                                              |

| Radiated Emission Measurement Below 1G |                                                                                                                                            |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                         | Radiated Emission Below 1G                                                                                                                 |
| Power supply Mode                      | Mode 1: EUT power by AC adapter via power cable.<br>Mode 2: EUT power by battery.                                                          |
| 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, Horizontal and Vertical for radiated measurement. The worst case (X-Plane and Horizontal) were recorded in this report
3. For below 1G, AC power line conducted emission and radiation emission were performed the EUT transmit at the highest output power channel as worse case.

### 3.3 EUT DUTY CYCLE

| Duty Cycle     |            |             |                |                 |
|----------------|------------|-------------|----------------|-----------------|
| Configuration  | TX ON (ms) | TX ALL (ms) | Duty Cycle (%) | Duty Factor(dB) |
| 802.11a        | 1.4348     | 1.5072      | 95.20%         | 0.21            |
| 802.11n HT20   | 1.3333     | 1.4058      | 94.84%         | 0.23            |
| 802.11n HT40   | 0.6812     | 0.7536      | 90.39%         | 0.44            |
| 802.11ac VHT80 | 0.3623     | 0.4348      | 83.33%         | 0.79            |



## 4.1 AC POWER LINE CONDUCTED EMISSION

### 4.1.1 Test Limit

According to §15.207(a) and RSS-GEN section 8.8,

| 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        |

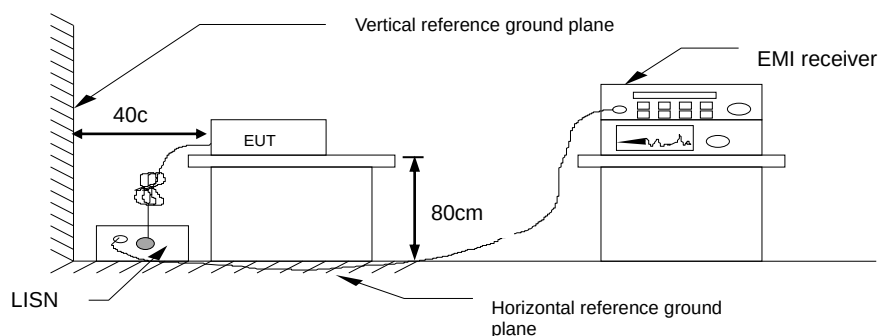
\* Decreases with the logarithm of the frequency.

### 4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 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.
6. Measure and record the result of 6 dB, 26 dB Bandwidth and 99% Bandwidth. in the test report.

### 4.1.3 Test Setup



### 4.1.4 Test Result

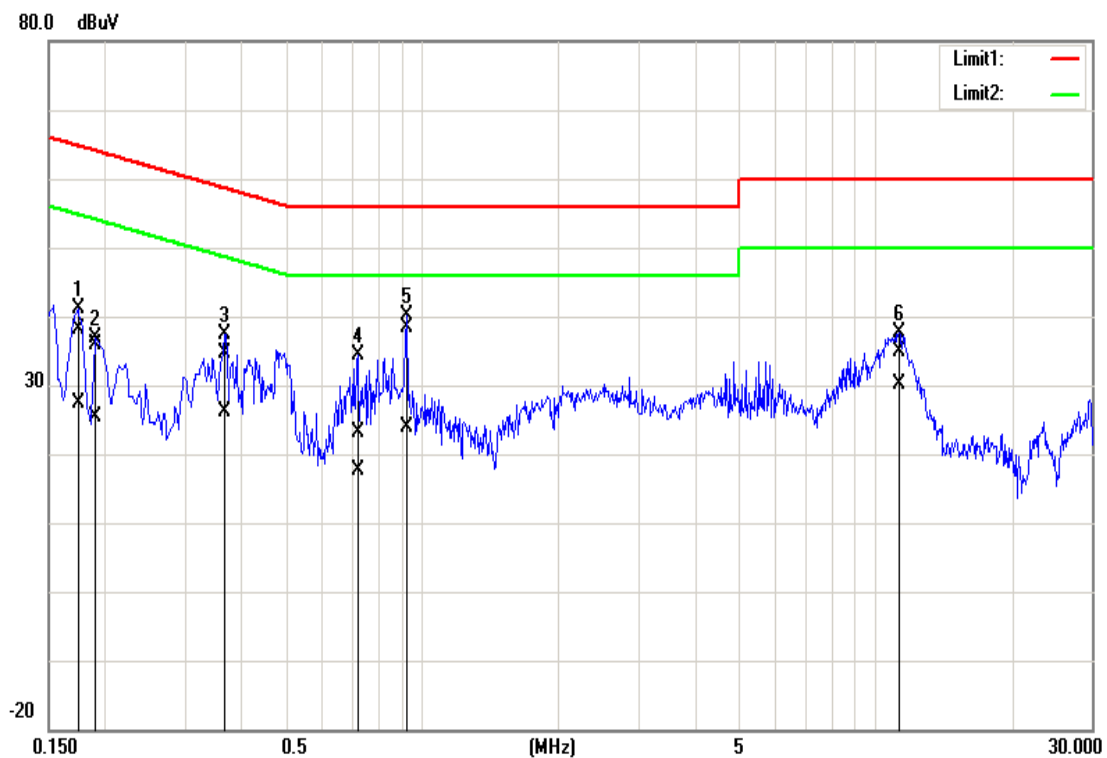
**Pass.**

Report No.: T180522D10-RP4

Page: 16 / 228  
Rev.: 00

## Test Data

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test Mode:    | Mode 1        | Temp/Hum      | 24(°C)/ 50%RH |
| Test Voltage: | 120Vac / 60Hz | Test Date     | 2018/06/29    |
| Phase:        | Line          | Test Engineer | Dally Hong    |



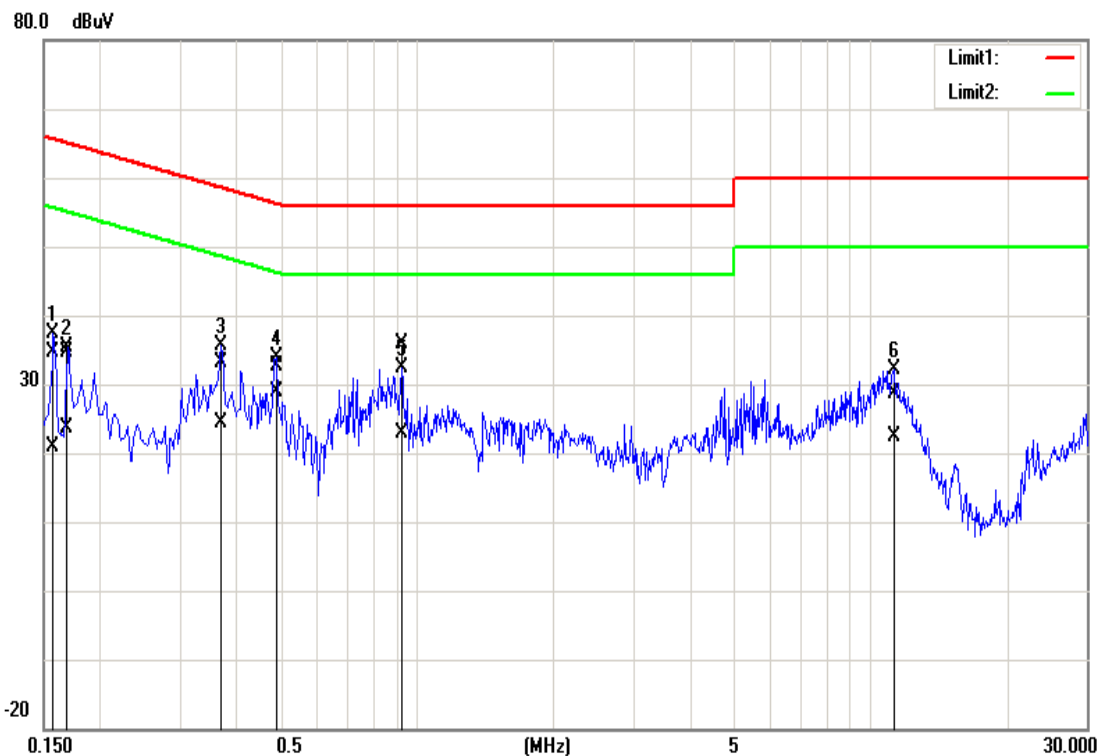
| No. | Frequency<br>(MHz) | QuasiPeak<br>reading<br>(dBuV) | Average<br>reading<br>(dBuV) | Correction<br>factor<br>(dB) | QuasiPeak<br>result<br>(dBuV) | Average<br>result<br>(dBuV) | QuasiPeak<br>limit<br>(dBuV) | Average<br>limit<br>(dBuV) | QuasiPeak<br>margin<br>(dB) | Average<br>margin<br>(dB) | Remark |
|-----|--------------------|--------------------------------|------------------------------|------------------------------|-------------------------------|-----------------------------|------------------------------|----------------------------|-----------------------------|---------------------------|--------|
| 1   | 0.1740             | 38.01                          | 27.25                        | 0.11                         | 38.12                         | 27.36                       | 64.77                        | 54.77                      | -26.65                      | -27.41                    | Pass   |
| 2   | 0.1900             | 35.72                          | 25.38                        | 0.11                         | 35.83                         | 25.49                       | 64.04                        | 54.04                      | -28.21                      | -28.55                    | Pass   |
| 3   | 0.3660             | 34.57                          | 25.98                        | 0.12                         | 34.69                         | 26.10                       | 58.59                        | 48.59                      | -23.90                      | -22.49                    | Pass   |
| 4   | 0.7220             | 23.06                          | 17.51                        | 0.13                         | 23.19                         | 17.64                       | 56.00                        | 46.00                      | -32.81                      | -28.36                    | Pass   |
| 5   | 0.9260             | 38.34                          | 23.82                        | 0.13                         | 38.47                         | 23.95                       | 56.00                        | 46.00                      | -17.53                      | -22.05                    | Pass   |
| 6   | 11.3060            | 34.59                          | 29.69                        | 0.32                         | 34.91                         | 30.01                       | 60.00                        | 50.00                      | -25.09                      | -19.99                    | Pass   |



Report No.: T180522D10-RP4

Page: 17 / 228  
Rev.: 00

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test Mode:    | Mode 1        | Temp/Hum      | 24(°C)/ 50%RH |
| Test Voltage: | 120Vac / 60Hz | Test Date     | 2018/06/29    |
| Phase:        | Neutral       | Test Engineer | Dally Hong    |



| No. | Frequency<br>(MHz) | QuasiPeak<br>reading<br>(dBuV) | Average<br>reading<br>(dBuV) | Correction<br>factor<br>(dB) | QuasiPeak<br>result<br>(dBuV) | Average<br>result<br>(dBuV) | QuasiPeak<br>limit<br>(dBuV) | Average<br>limit<br>(dBuV) | QuasiPeak<br>margin<br>(dB) | Average<br>margin<br>(dB) | Remark |
|-----|--------------------|--------------------------------|------------------------------|------------------------------|-------------------------------|-----------------------------|------------------------------|----------------------------|-----------------------------|---------------------------|--------|
| 1   | 0.1580             | 34.49                          | 20.72                        | 0.14                         | 34.63                         | 20.86                       | 65.57                        | 55.57                      | -30.94                      | -34.71                    | Pass   |
| 2   | 0.1700             | 34.38                          | 23.57                        | 0.14                         | 34.52                         | 23.71                       | 64.96                        | 54.96                      | -30.44                      | -31.25                    | Pass   |
| 3   | 0.3700             | 33.05                          | 24.26                        | 0.13                         | 33.18                         | 24.39                       | 58.50                        | 48.50                      | -25.32                      | -24.11                    | Pass   |
| 4   | 0.4900             | 32.60                          | 28.70                        | 0.13                         | 32.73                         | 28.83                       | 56.17                        | 46.17                      | -23.44                      | -17.34                    | Pass   |
| 5   | 0.9260             | 35.85                          | 22.65                        | 0.14                         | 35.99                         | 22.79                       | 56.00                        | 46.00                      | -20.01                      | -23.21                    | Pass   |
| 6   | 11.2660            | 28.19                          | 21.98                        | 0.32                         | 28.51                         | 22.30                       | 60.00                        | 50.00                      | -31.49                      | -27.70                    | 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.

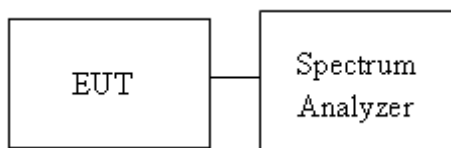
**Occupied Bandwidth(99%)** : For reporting purposes only.

### 4.2.2 Test Procedure

Test method Refer as KDB 789033 D02 and ANSI 63.10:2013 clause 6.9.2,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. UNII-1, UNII-2a and UNII-2c,
  - (1) BW=20MHz : SA set RBW = 300kHz, VBW = 1MHz and Detector = Peak, to measurement 26 dB Bandwidth
  - (2) BW=40MHz : SA set RBW = 1MHz, VBW = 3MHz and Detector = Peak, to measurement 26 dB Bandwidth
  - (3) BW=80MHz : SA set RBW = 1MHz, VBW = 3MHz and Detector = Peak, to measurement 26 dB Bandwidth
4. UNII-3, SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth
5. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
6. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

### 4.2.3 Test Setup



#### 4.2.4 Test Result

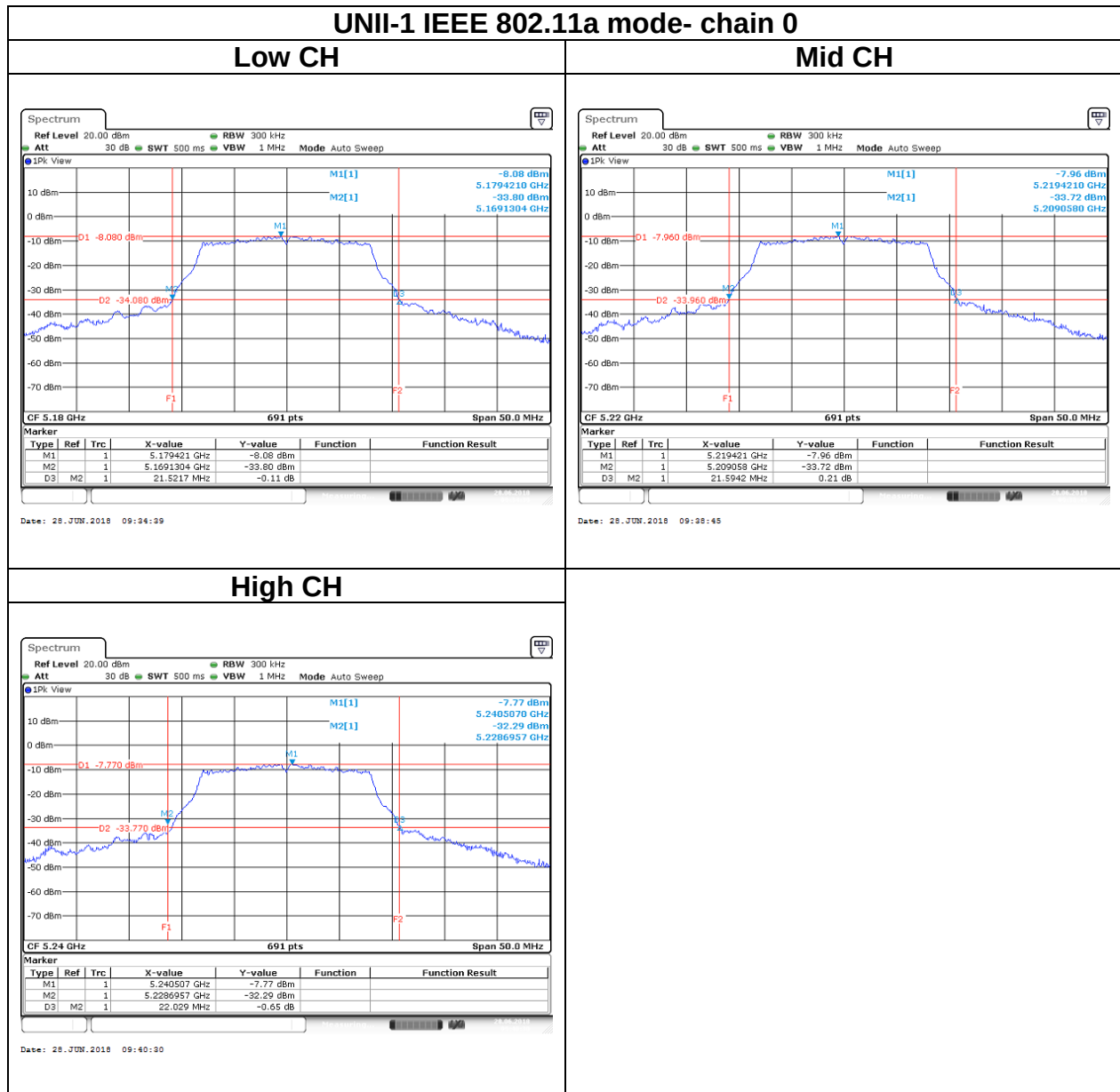
| UNII-1 5150-5250 MHz                |                 |                              |                              |                             |                             |
|-------------------------------------|-----------------|------------------------------|------------------------------|-----------------------------|-----------------------------|
| 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            | 16.9319                      | -                            | 21.5217                     | -                           |
| Mid                                 | 5220            | 16.8596                      | -                            | 21.5942                     | -                           |
| High                                | 5240            | 16.9319                      | -                            | 22.029                      | -                           |
| 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            | 18.1620                      | -                            | 22.1739                     | -                           |
| Mid                                 | 5220            | 18.0173                      | -                            | 21.8841                     | -                           |
| High                                | 5240            | 18.0173                      | -                            | 22.3913                     | -                           |
| 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            | 36.7004                      | -                            | 40.928                      | -                           |
| High                                | 5230            | 36.5846                      | -                            | 41.043                      | -                           |
| 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) |
| Mid                                 | 5210            | 75.9479                      | -                            | 82.087                      | -                           |

| 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            | 17.9450                      | -                            | 21.6667                     | -                           |
| Mid                                 | 5280            | 18.0897                      | -                            | 21.7391                     | -                           |
| High                                | 5320            | 18.0173                      | -                            | 21.5942                     | -                           |
| 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            | 18.1620                      | -                            | 21.7391                     | -                           |
| Mid                                 | 5280            | 18.0173                      | -                            | 21.8116                     | -                           |
| High                                | 5320            | 17.9450                      | -                            | 22.3913                     | -                           |
| 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            | 36.7004                      | -                            | 41.507                      | -                           |
| High                                | 5310            | 36.8162                      | -                            | 41.159                      | -                           |
| 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) |
| Mid                                 | 5290            | 75.9479                      | -                            | 81.855                      | -                           |

| 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            | 16.8596                      | -                            | 21.7391                     | -                           |
| Mid                                 | 5580            | 16.7149                      | -                            | 21.5942                     | -                           |
| High                                | 5700            | 16.7872                      | -                            | 21.7391                     | -                           |
| 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            | 17.9450                      | -                            | 22.1739                     | -                           |
| Mid                                 | 5580            | 18.0173                      | -                            | 21.6667                     | -                           |
| High                                | 5700            | 17.9450                      | -                            | 22.1014                     | -                           |
| 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            | 36.5846                      | -                            | 41.159                      | -                           |
| Mid                                 | 5500            | 36.7004                      | -                            | 41.739                      | -                           |
| High                                | 5670            | 36.5846                      | -                            | 41.275                      | -                           |
| 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) |
| Mid                                 | 5530            | 75.9479                      | -                            | 82.319                      | -                           |

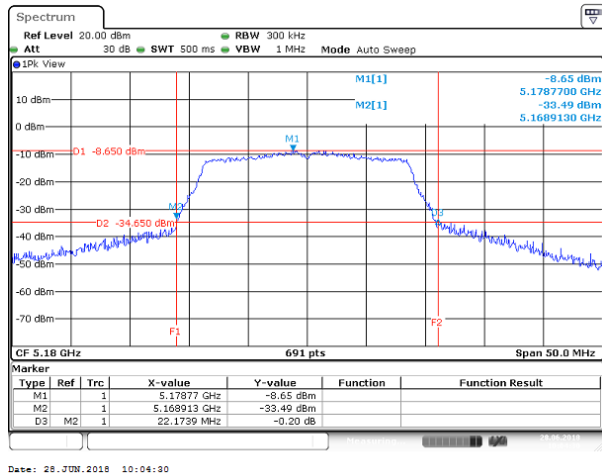
| UNII-3 5725-5825MHz                 |                 |                              |                              |                            |                            |
|-------------------------------------|-----------------|------------------------------|------------------------------|----------------------------|----------------------------|
| 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            | 16.8596                      | -                            | 16.3043                    | -                          |
| Mid                                 | 5785            | 16.9319                      | -                            | 16.3043                    | -                          |
| High                                | 5825            | 16.7872                      | -                            | 16.3478                    | -                          |
| 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            | 17.9450                      | -                            | 17.2609                    | -                          |
| Mid                                 | 5785            | 18.0173                      | -                            | 17.5652                    | -                          |
| High                                | 5825            | 18.0173                      | -                            | 17.5652                    | -                          |
| 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            | 36.5846                      | -                            | 35.942                     | -                          |
| High                                | 5795            | 36.7004                      | -                            | 35.826                     | -                          |
| 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) |
| Mid                                 | 5775            | 75.9479                      | -                            | 75.594                     | -                          |

## Test Data (26dB BANDWIDTH)

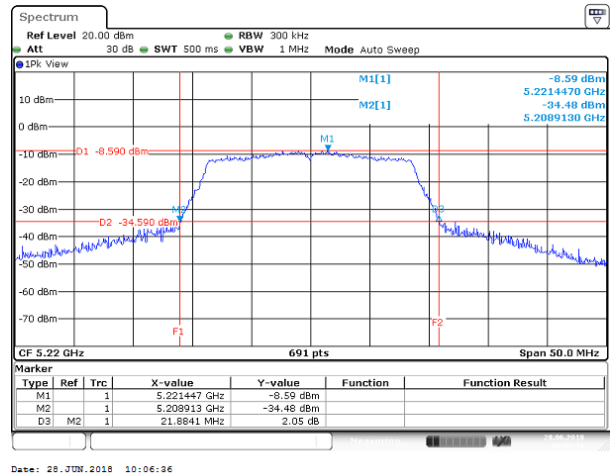


## UNII-1 IEEE 802.11n HT20 mode- chain 0

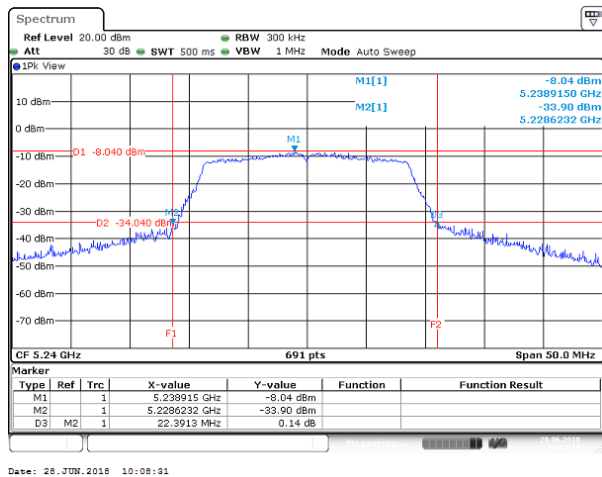
### Low CH



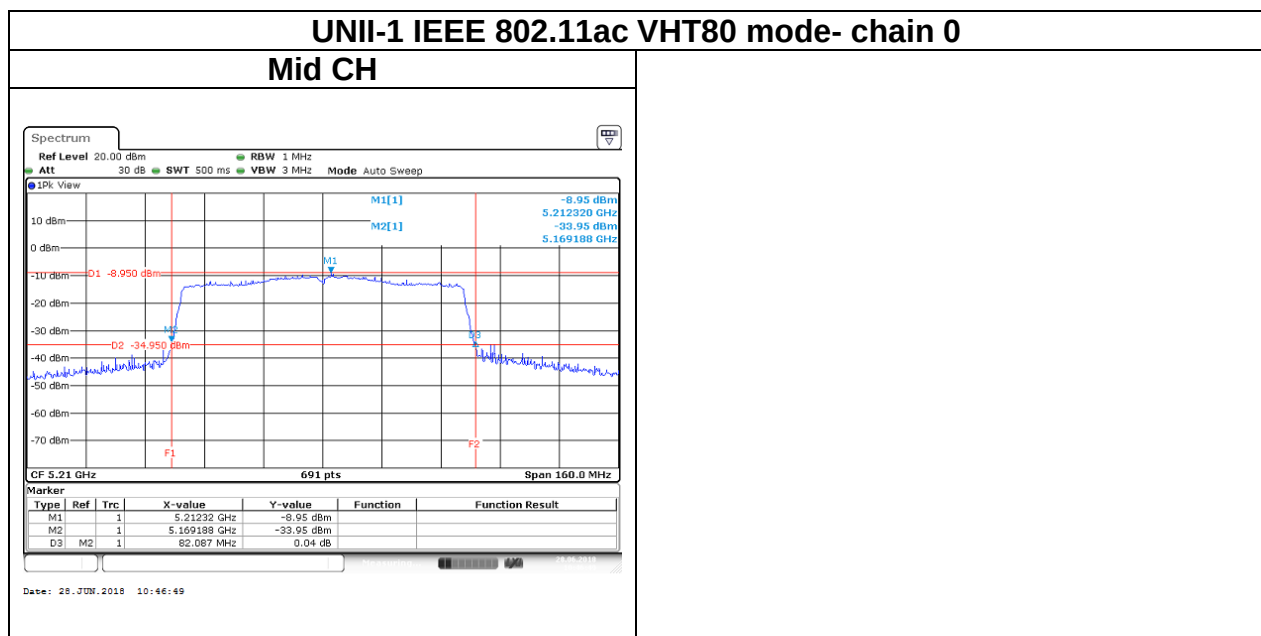
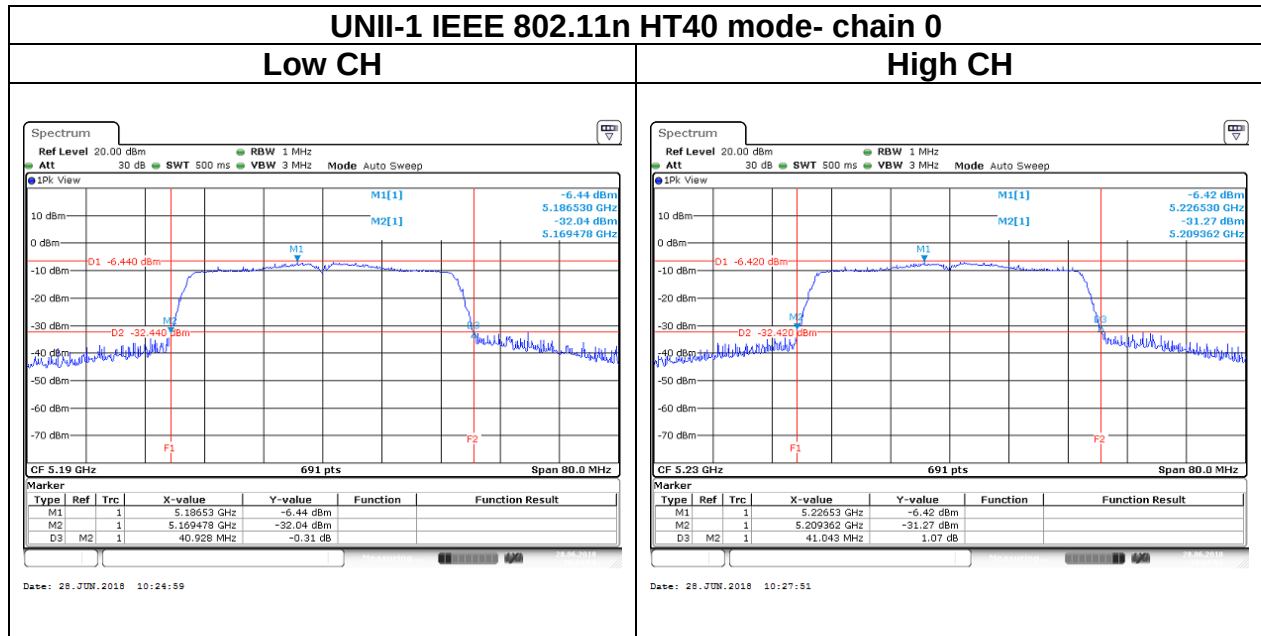
### Mid CH



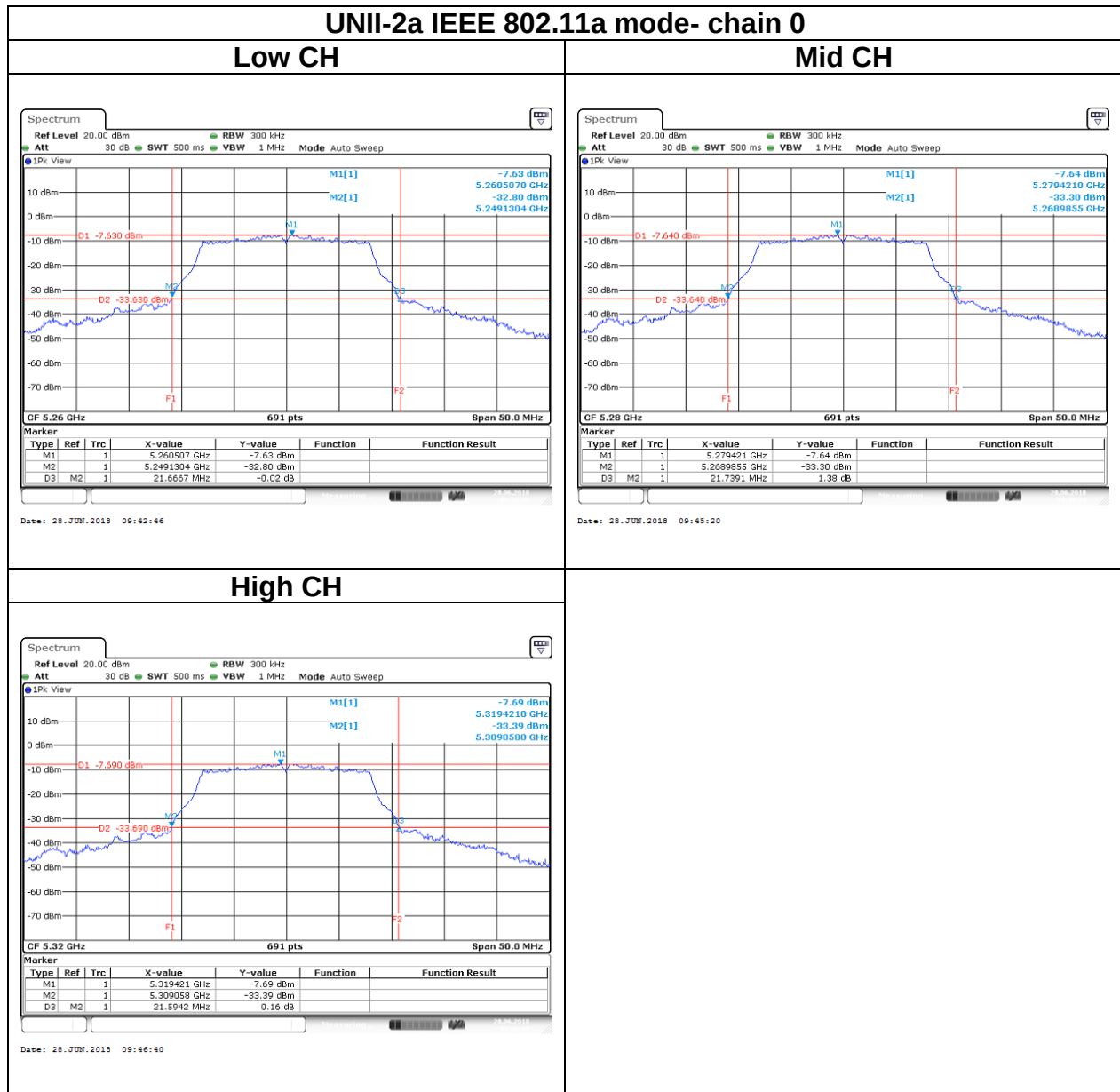
### High CH





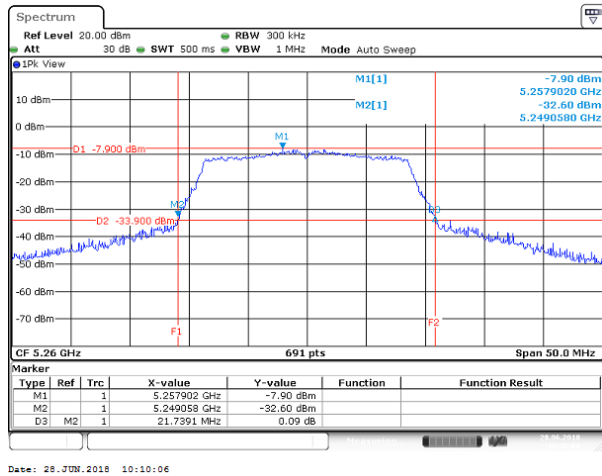


## Test Data (26dB BANDWIDTH)

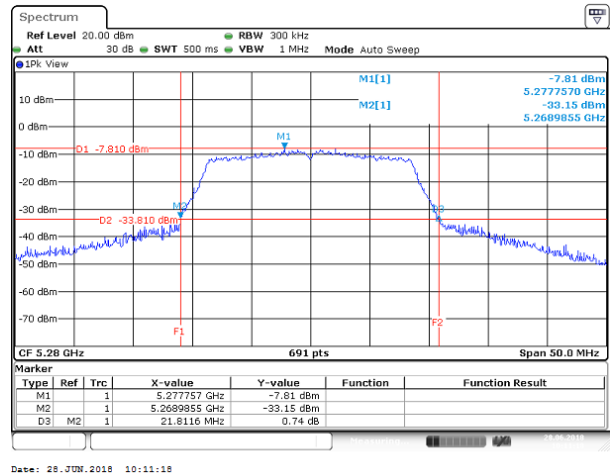


## UNII-2a IEEE 802.11n HT20 mode- chain 0

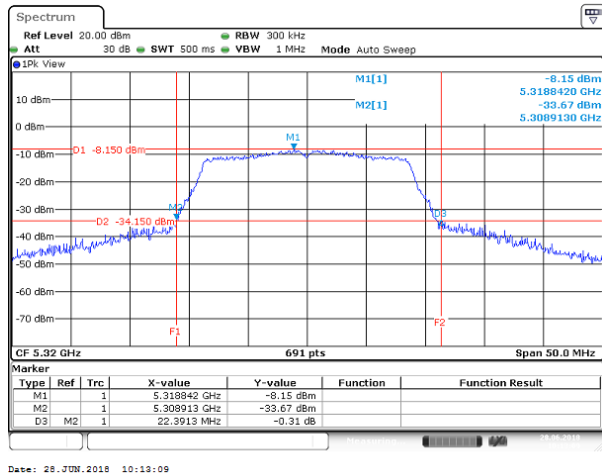
### Low CH

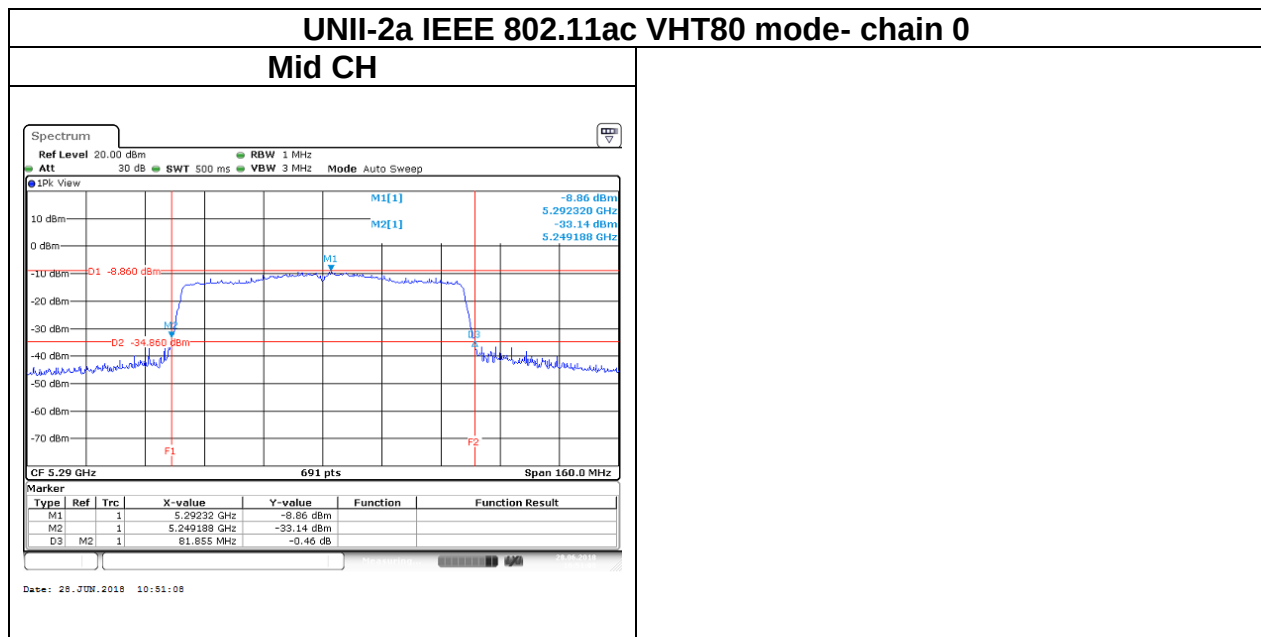
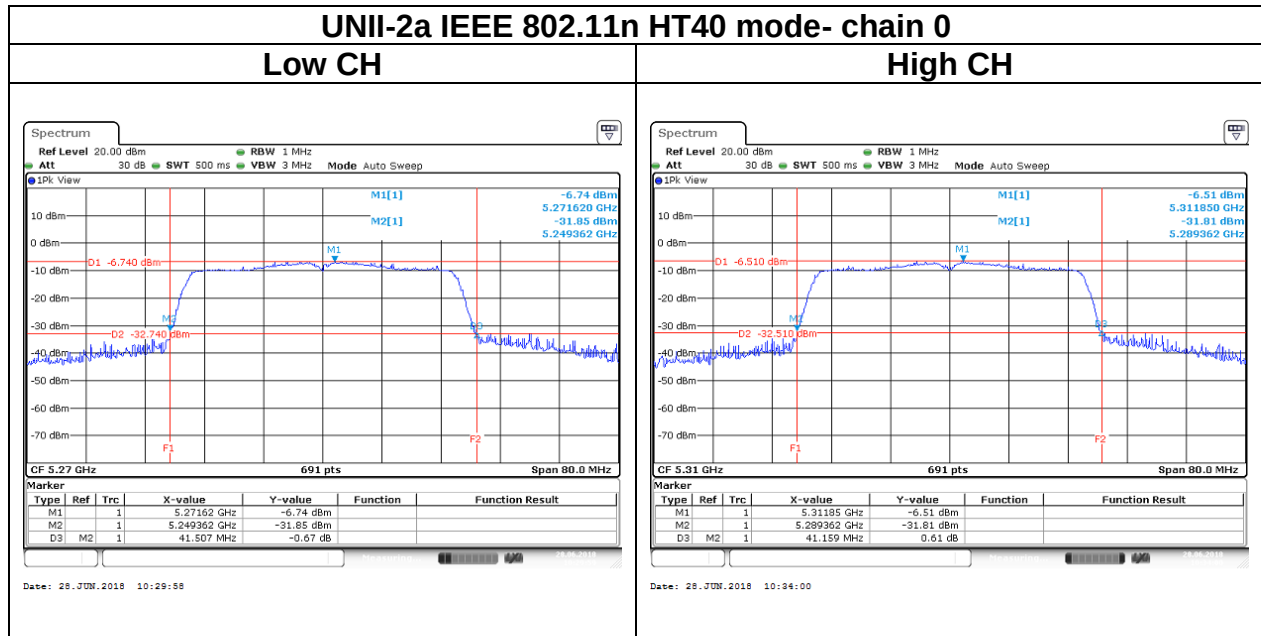


### Mid CH

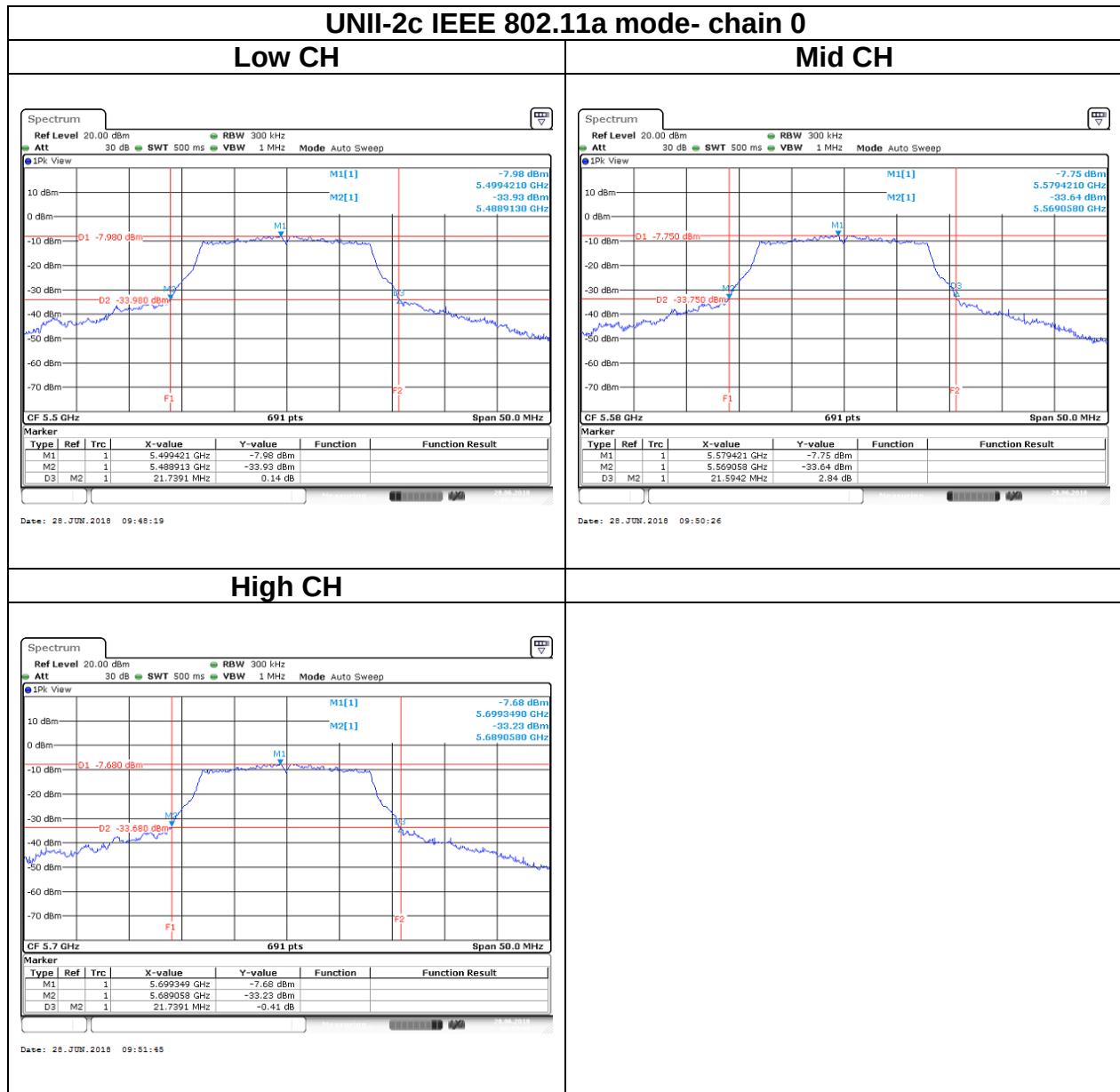


### High CH



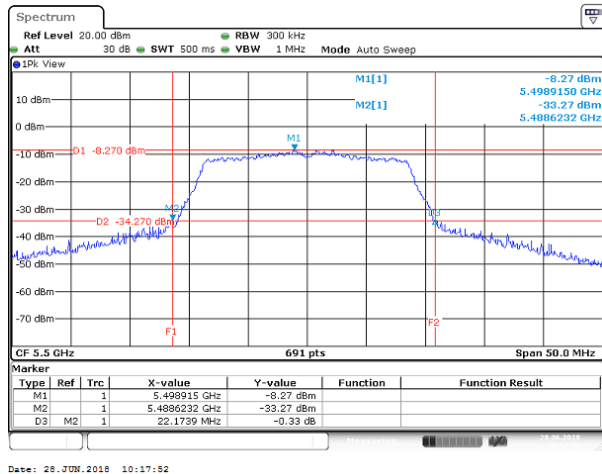


## Test Data (26dB BANDWIDTH)

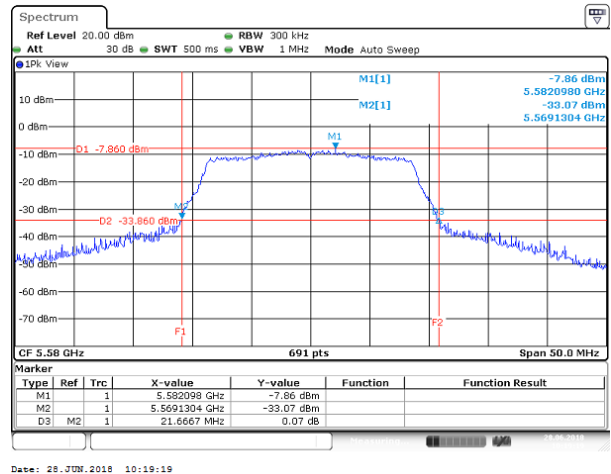


## UNII-2c IEEE 802.11n HT20 mode- chain 0

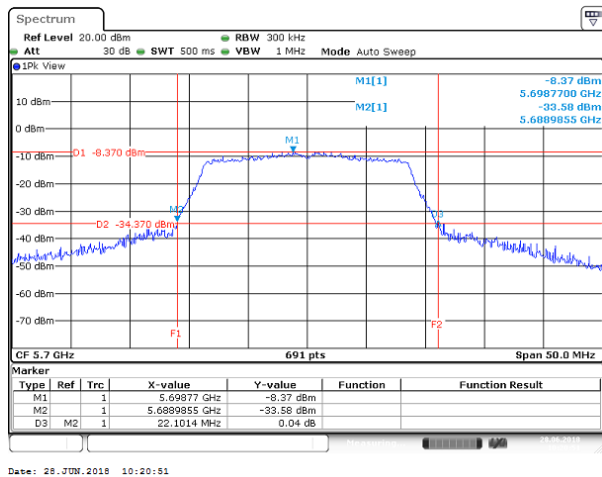
### Low CH



### Mid CH

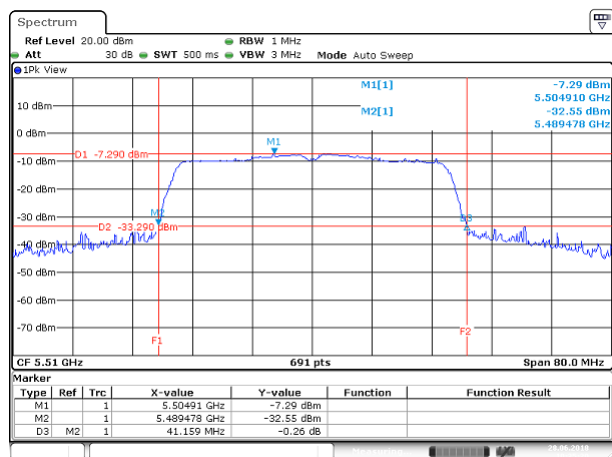


### High CH

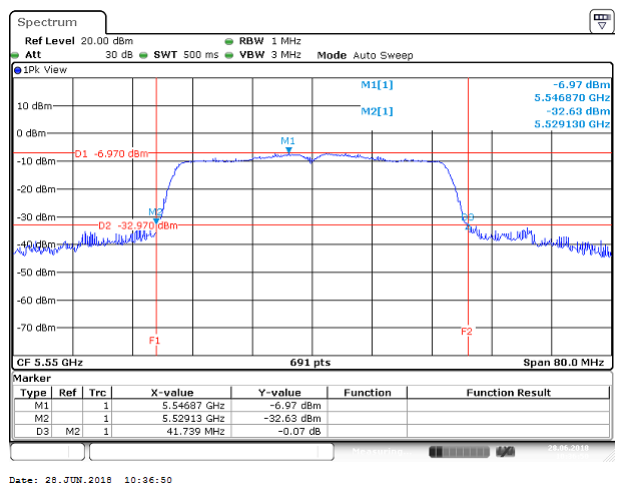


## UNII-2c IEEE 802.11n HT40 mode- chain 0

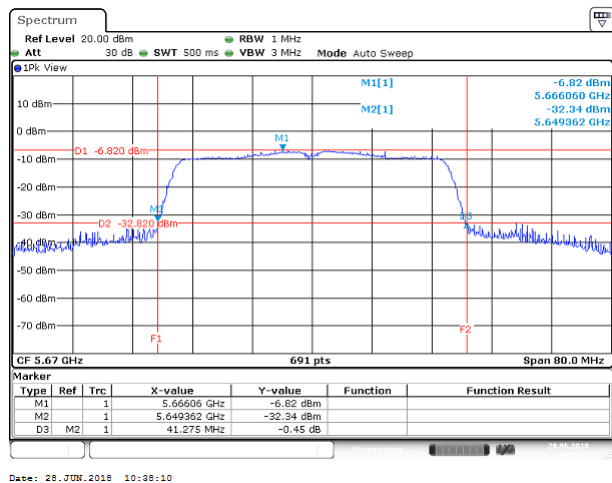
### Low CH



### Mid CH



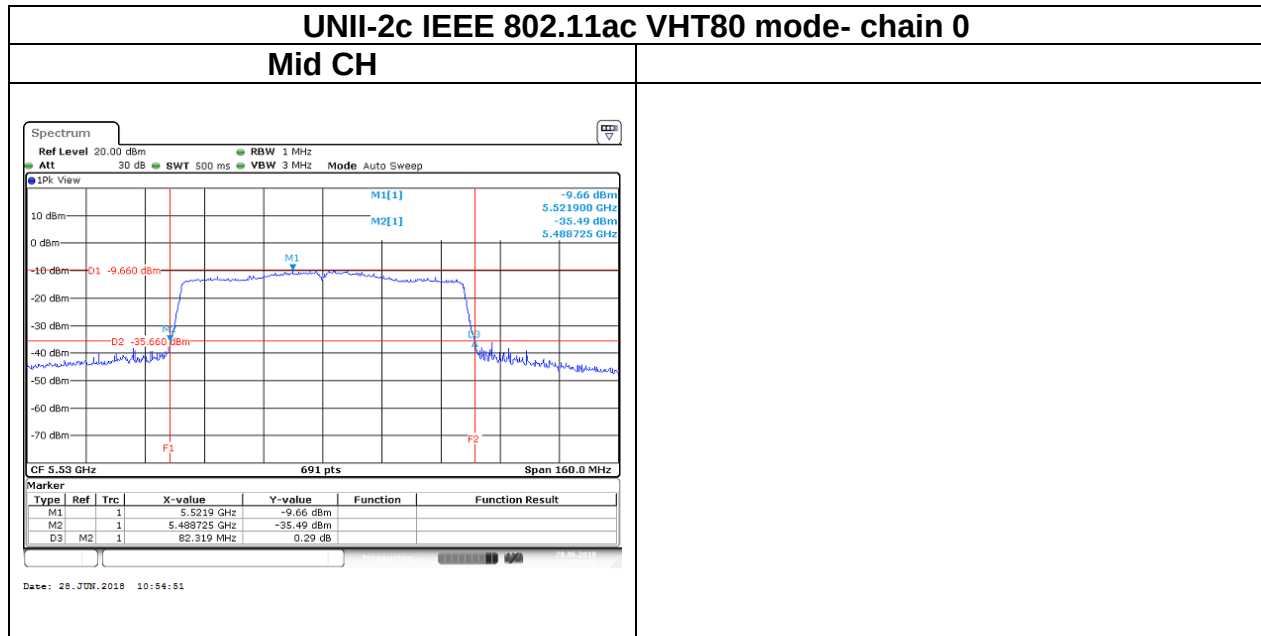
### High CH





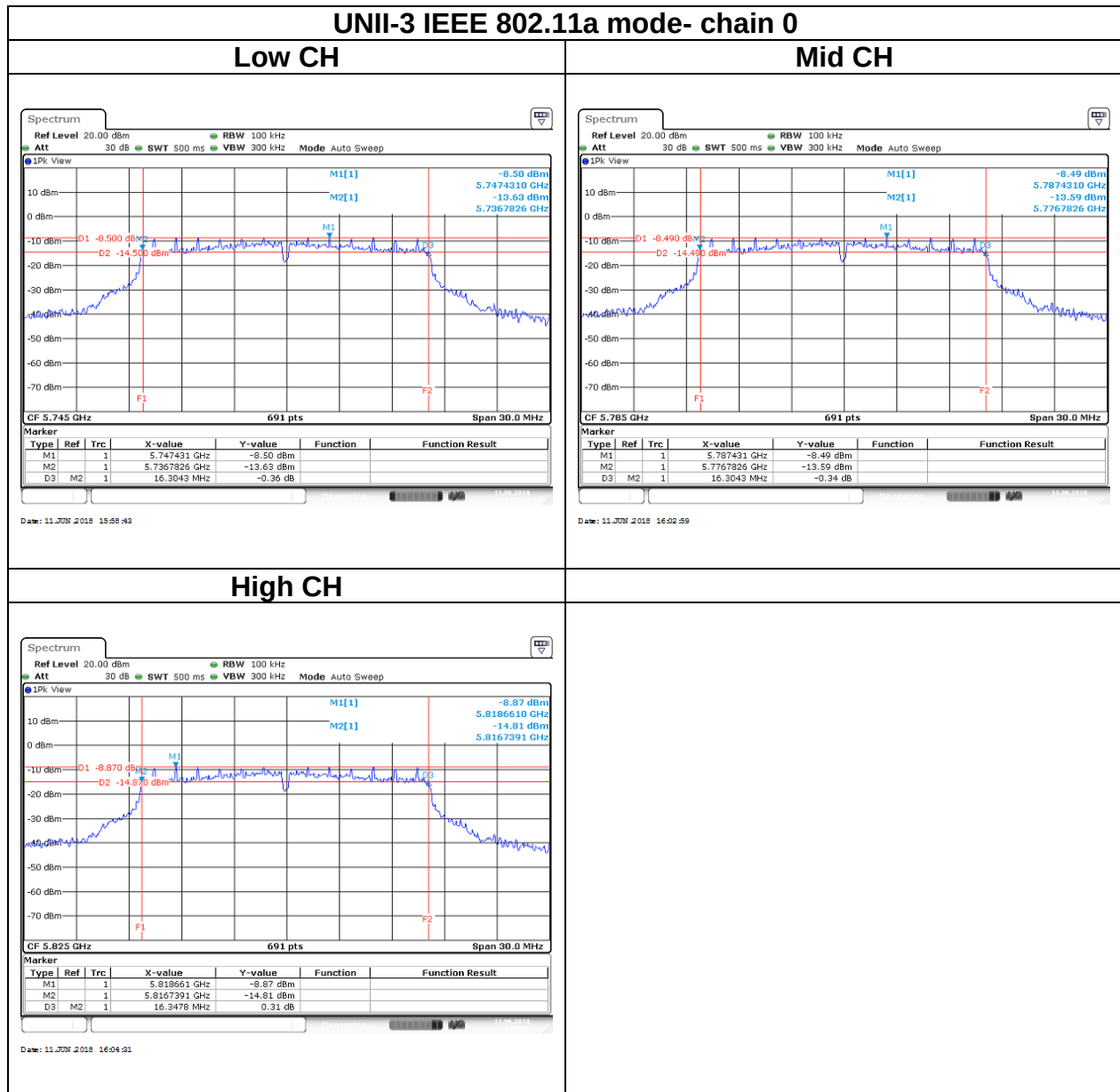
Report No.: T180522D10-RP4

Page: 32 / 228  
Rev.: 00



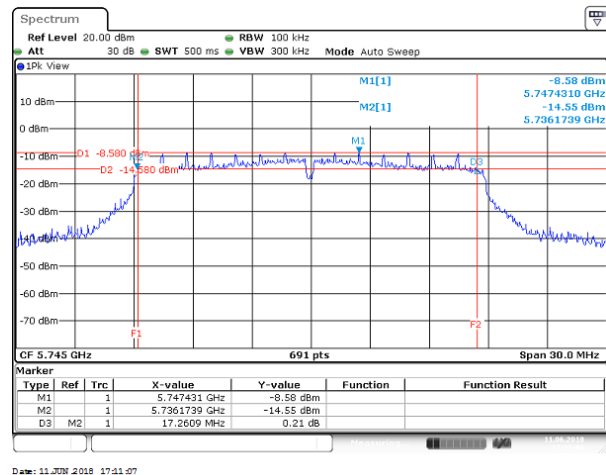


## Test Data (6dB BANDWIDTH)

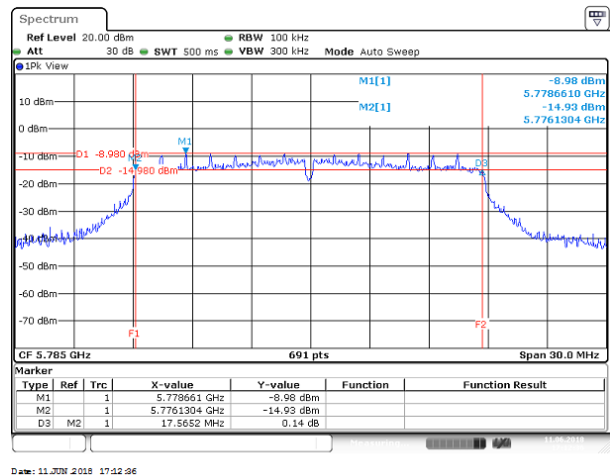


## UNII-3 IEEE 802.11n HT20 mode- chain 0

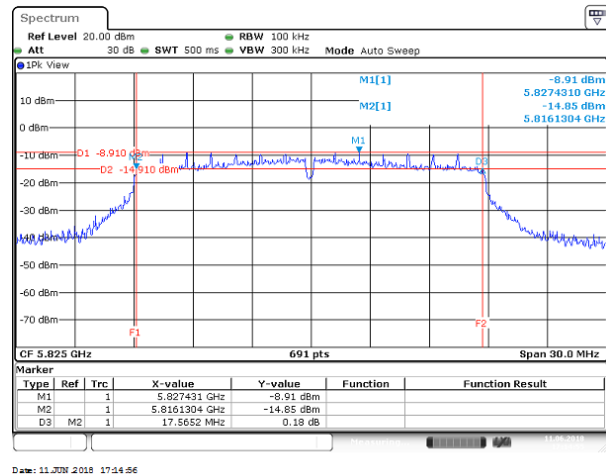
### Low CH

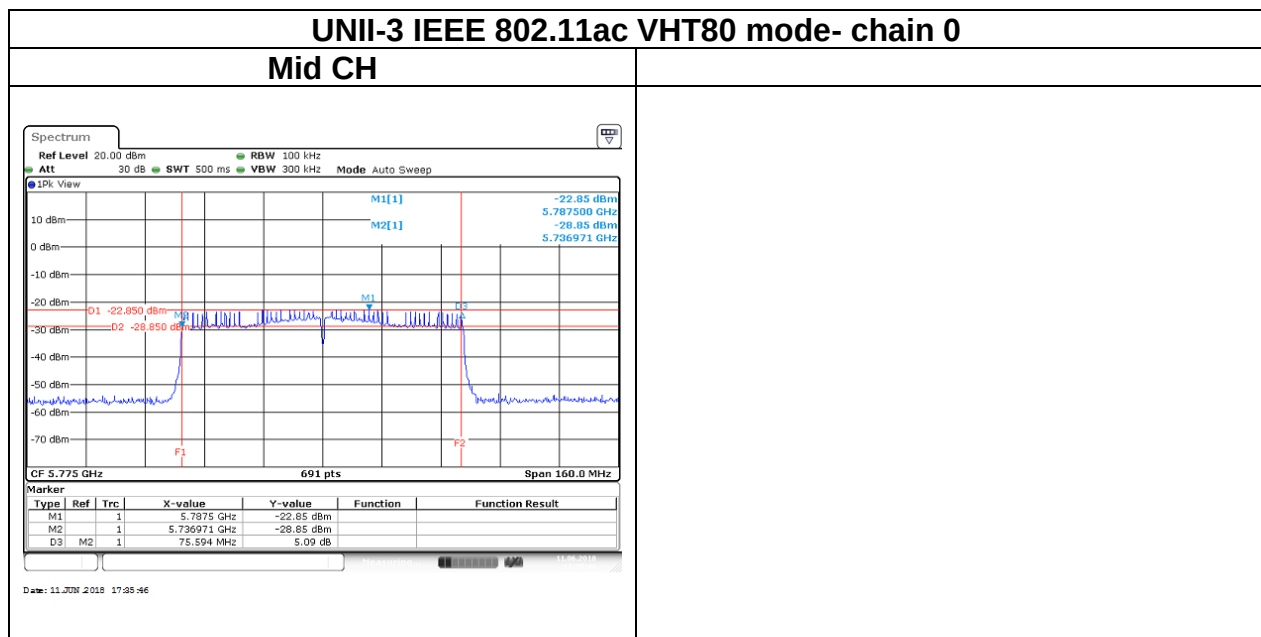
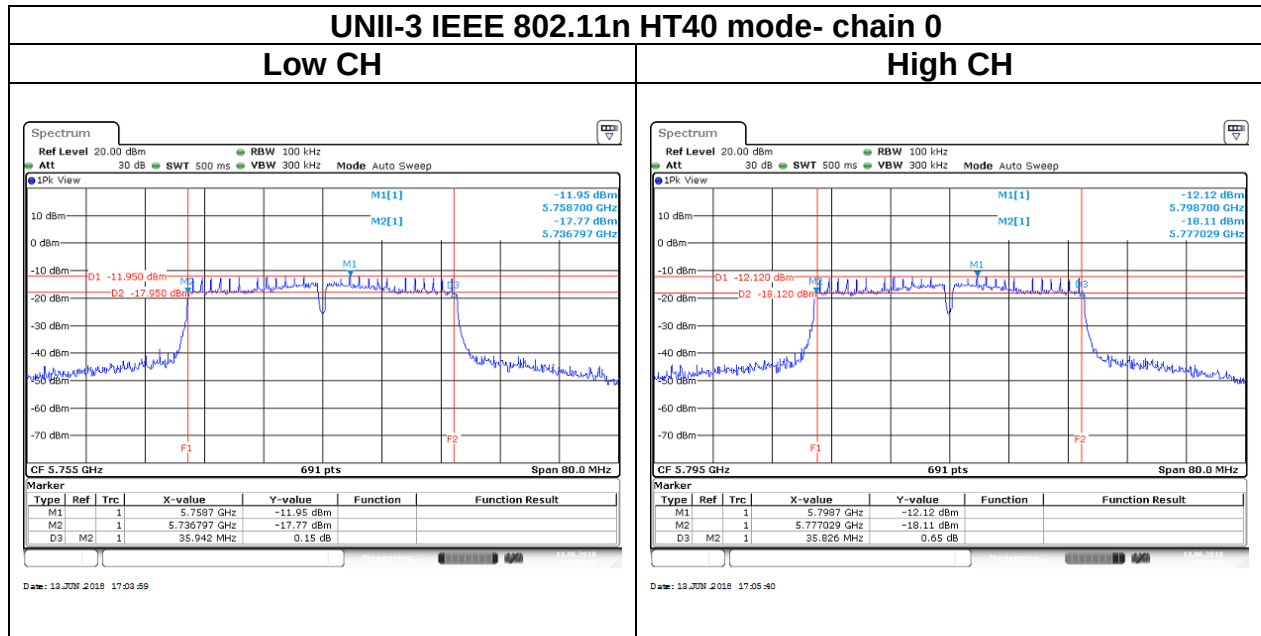


### Mid CH

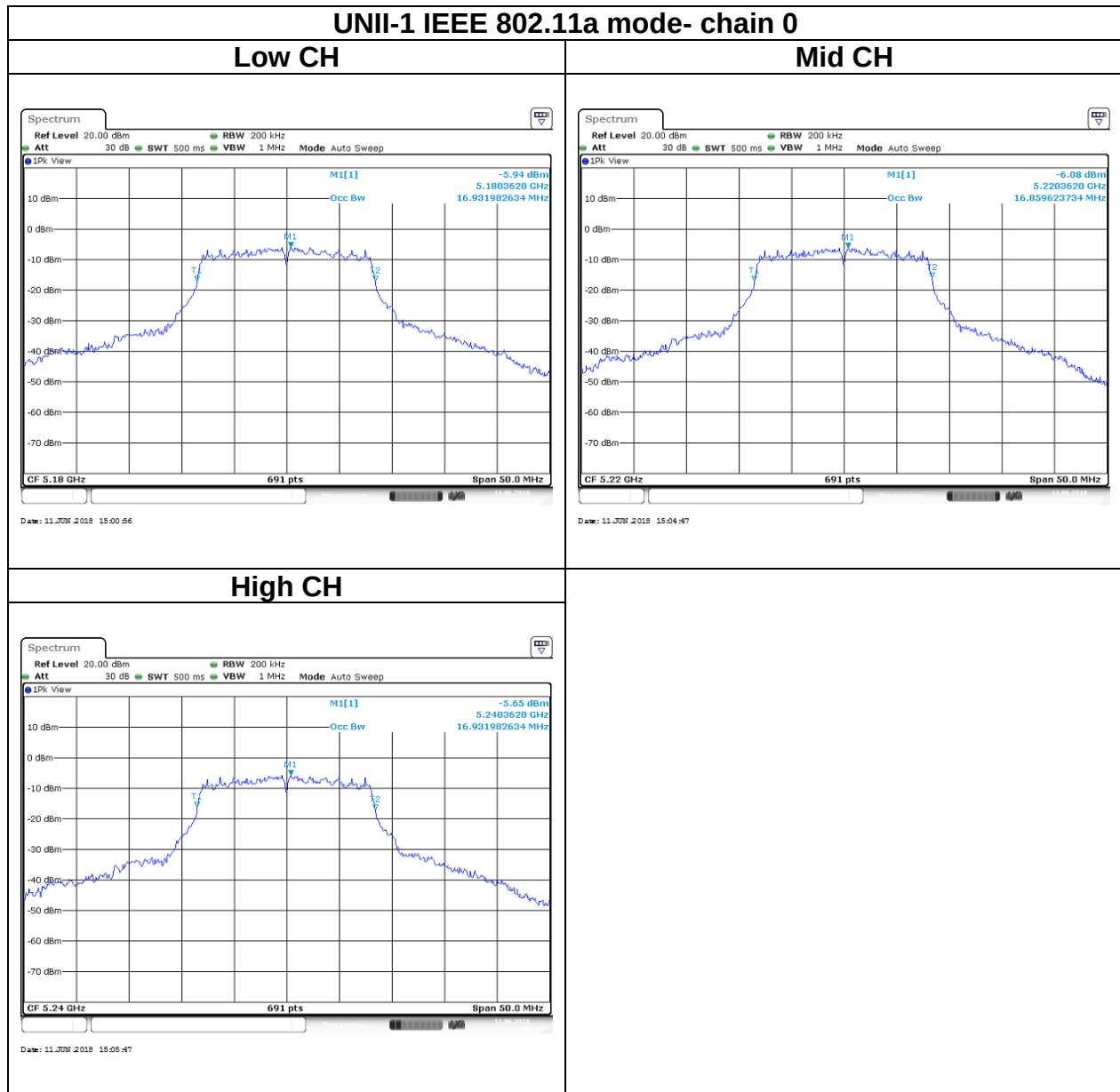


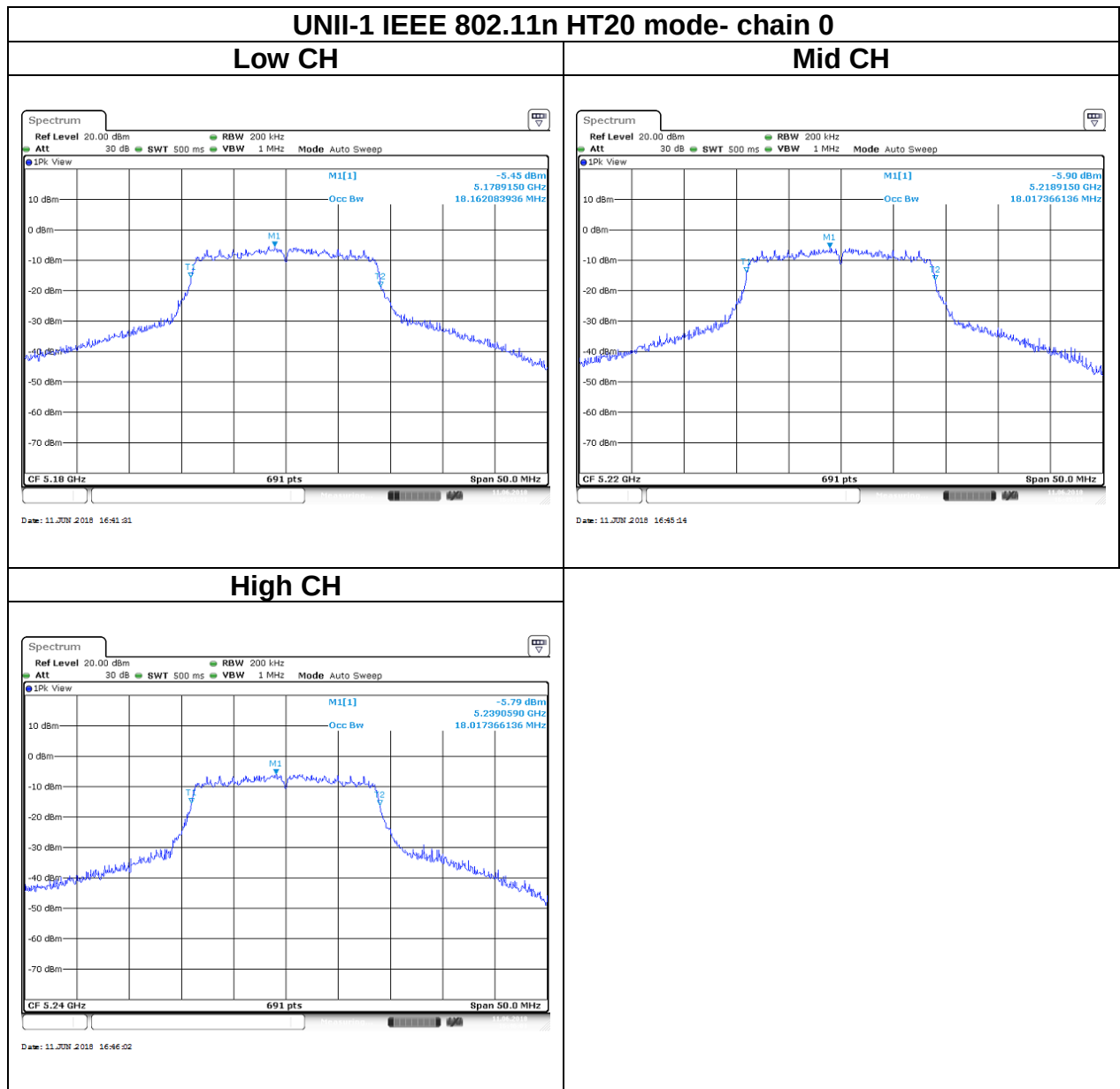
### High CH

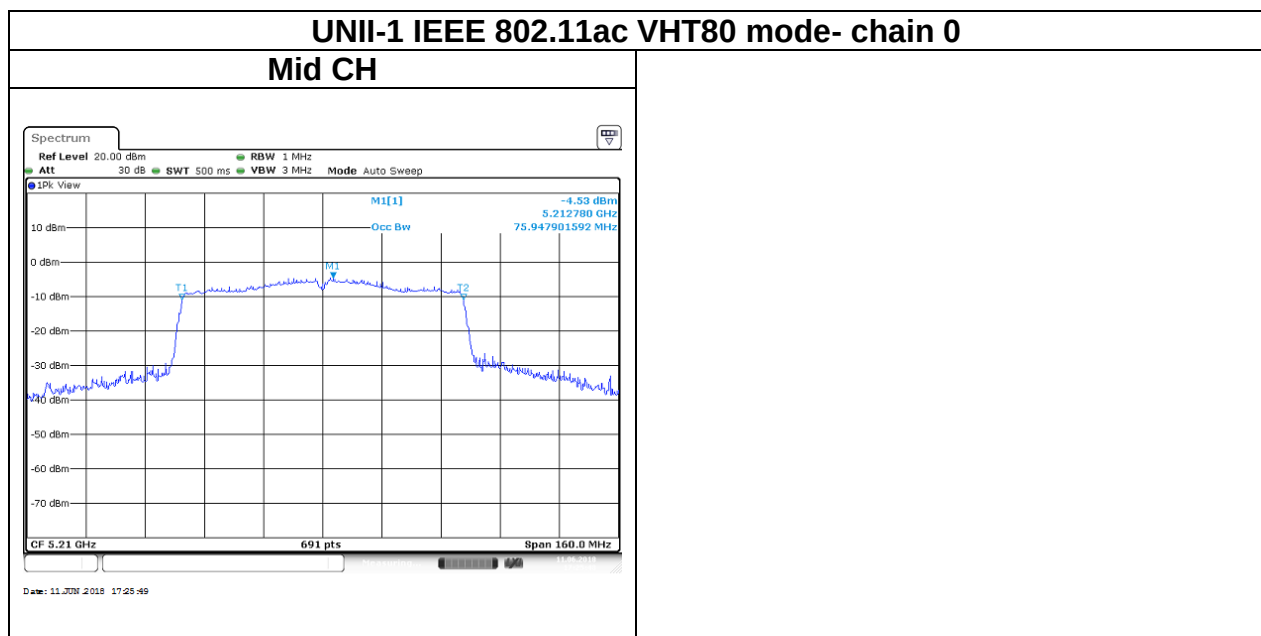
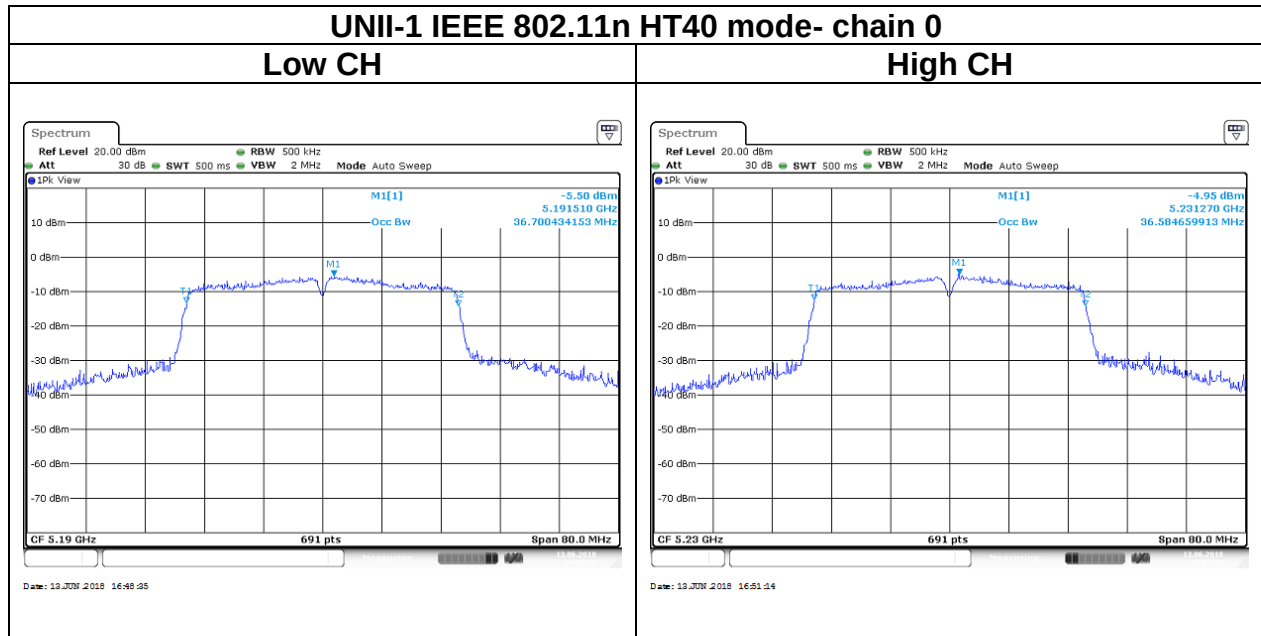




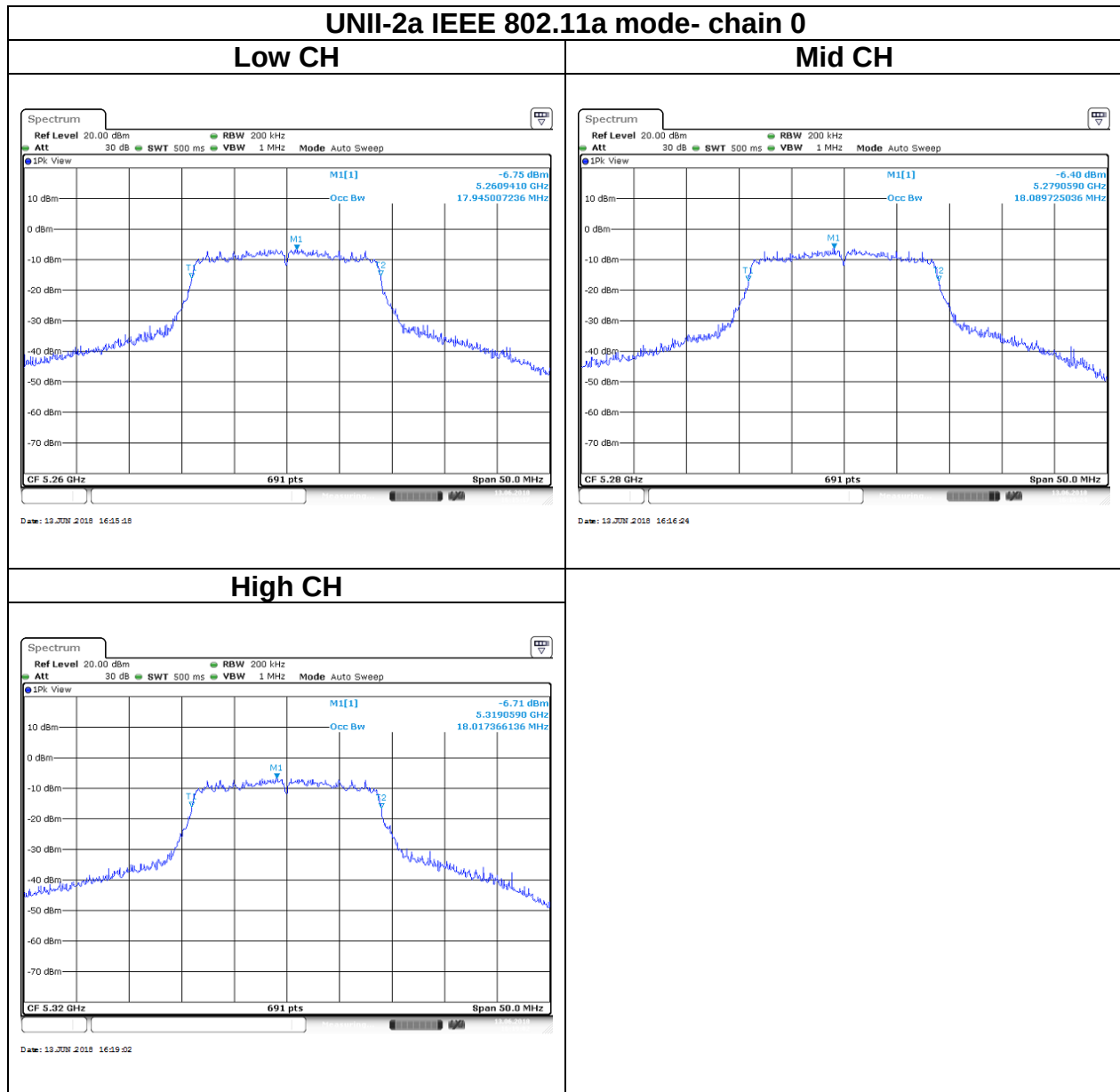
## Test Data (BANDWIDTH 99%)

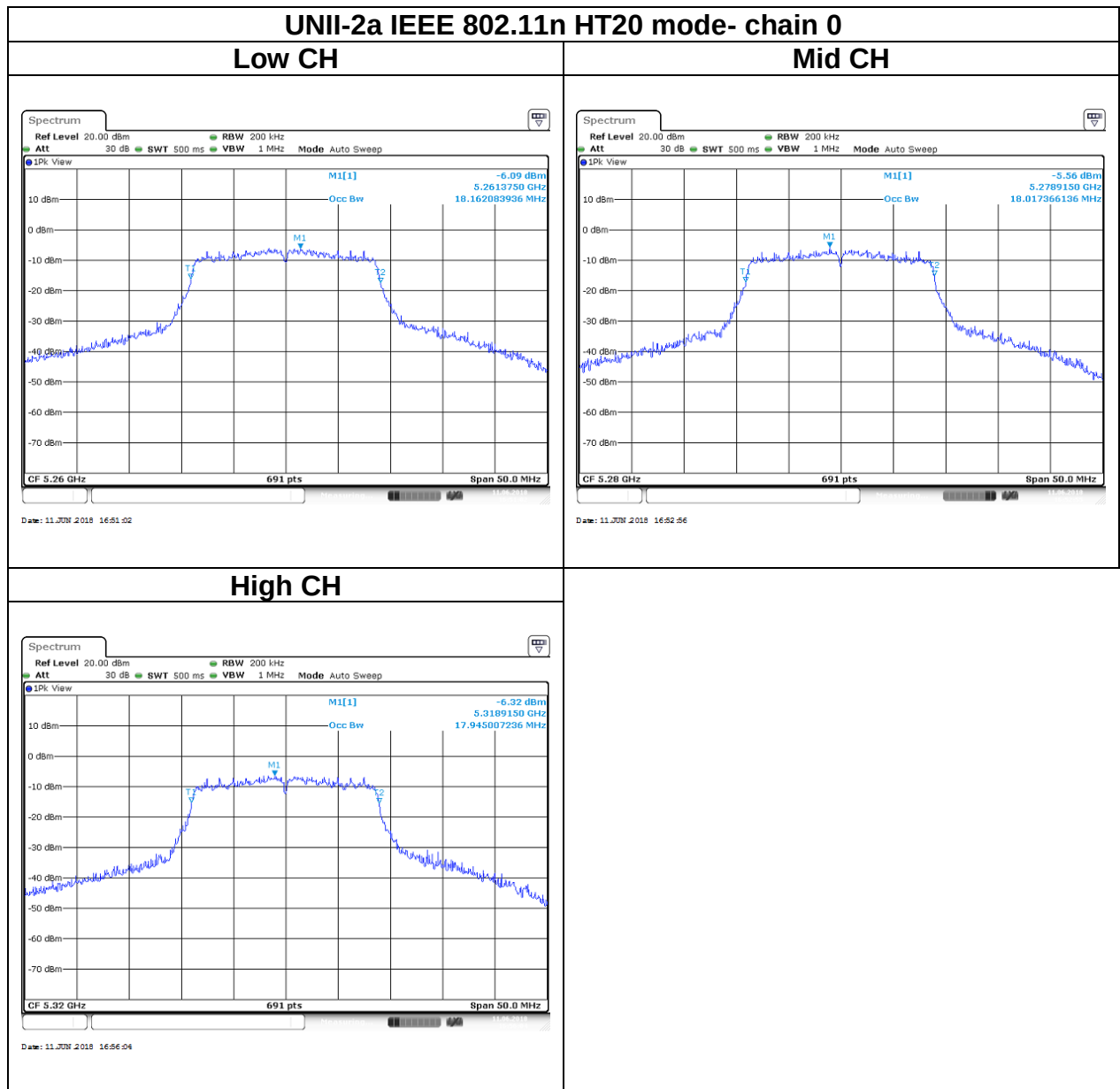




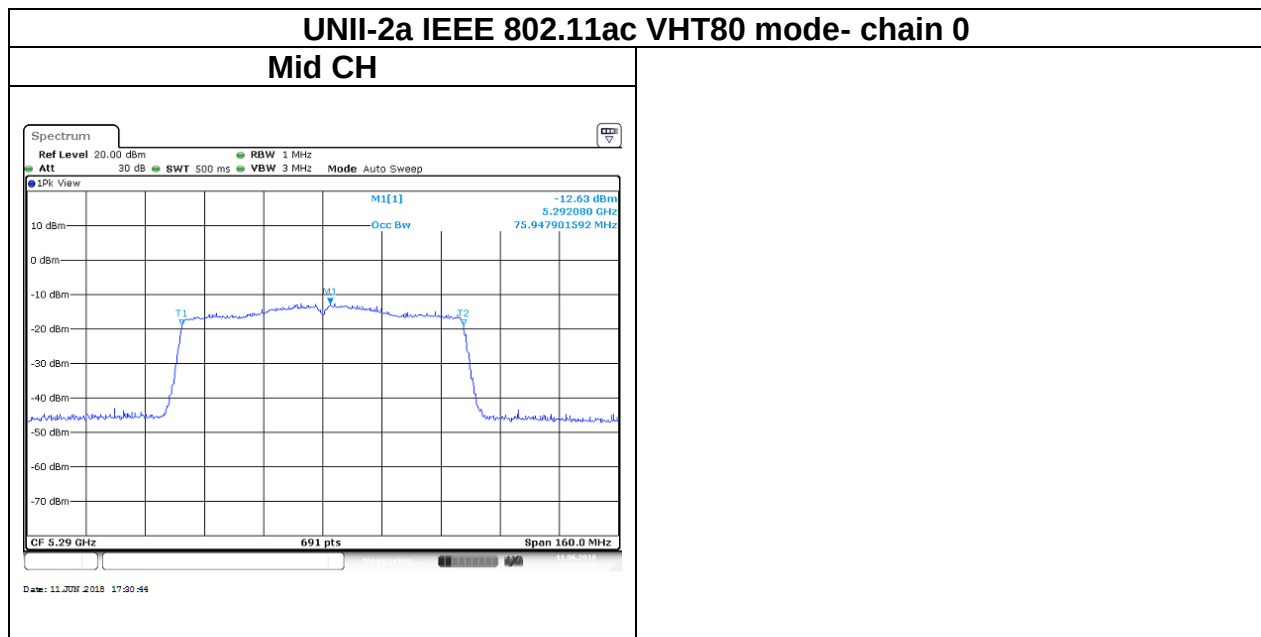
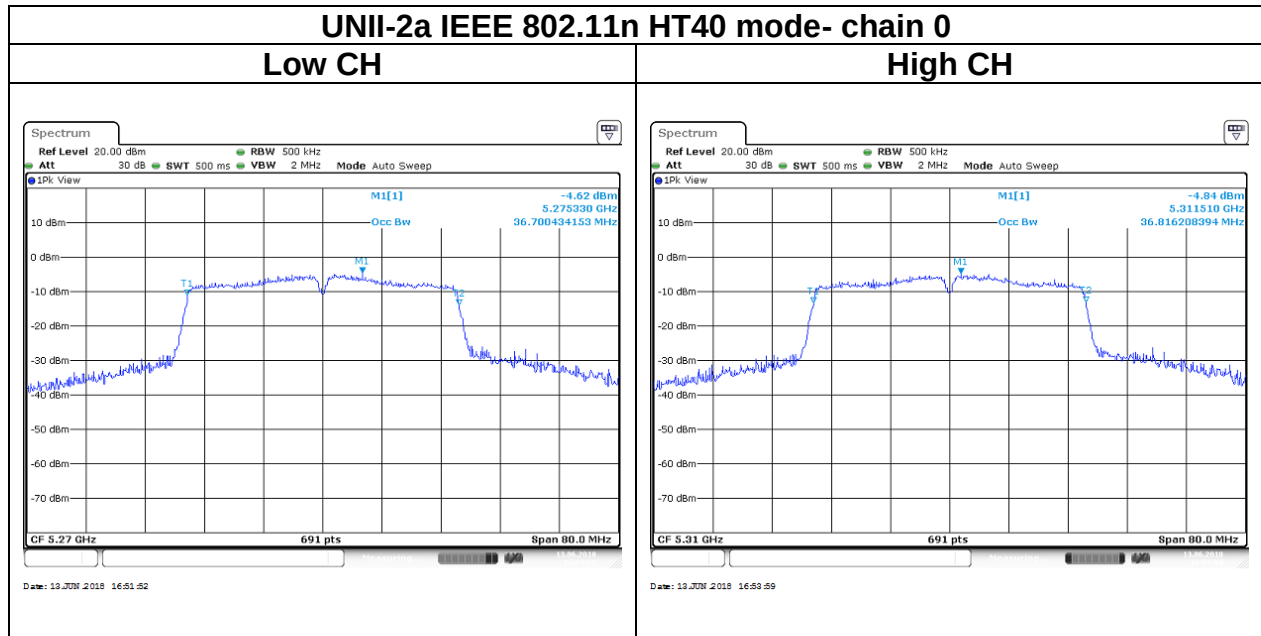


## Test Data (BANDWIDTH 99%)



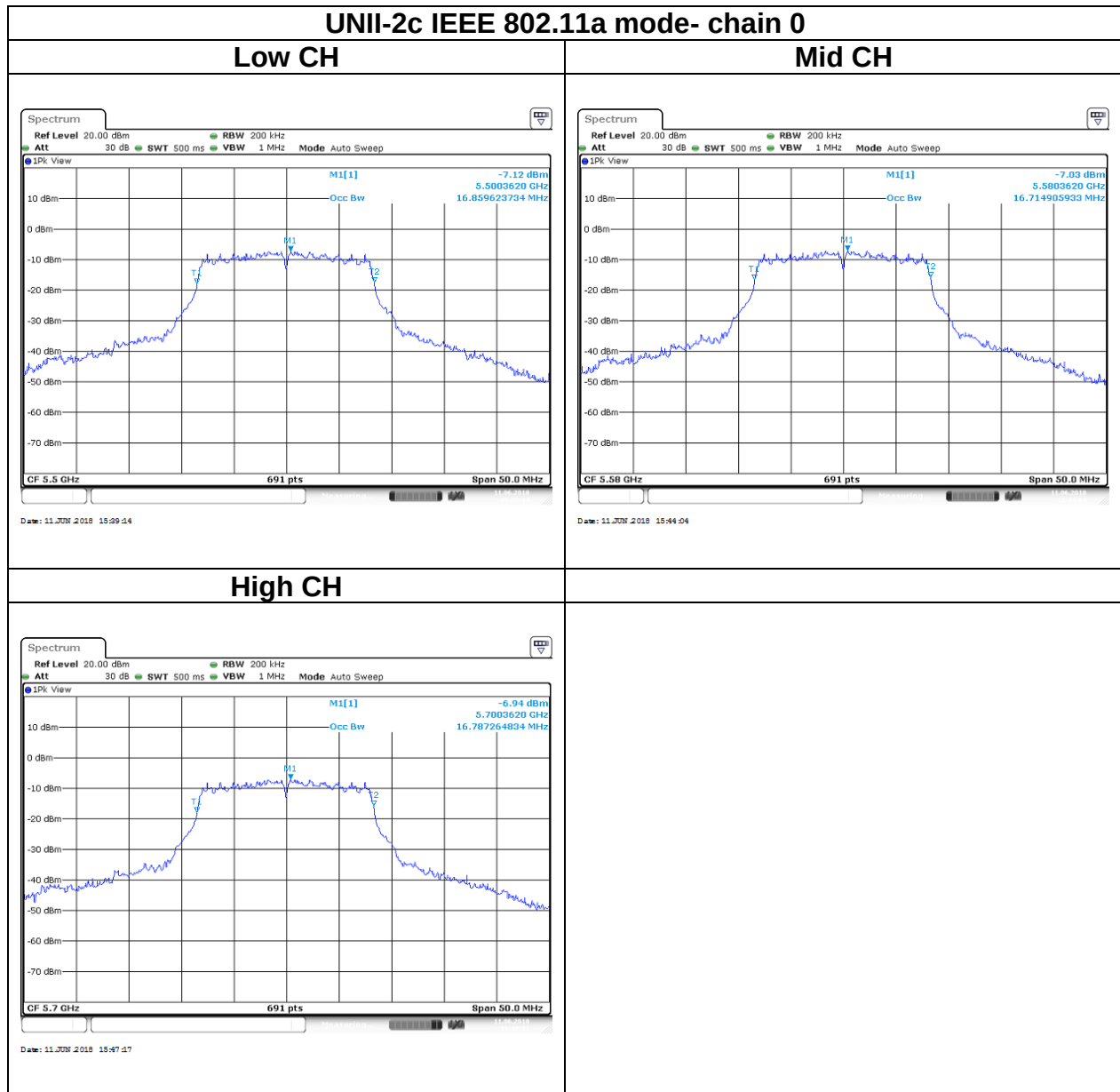


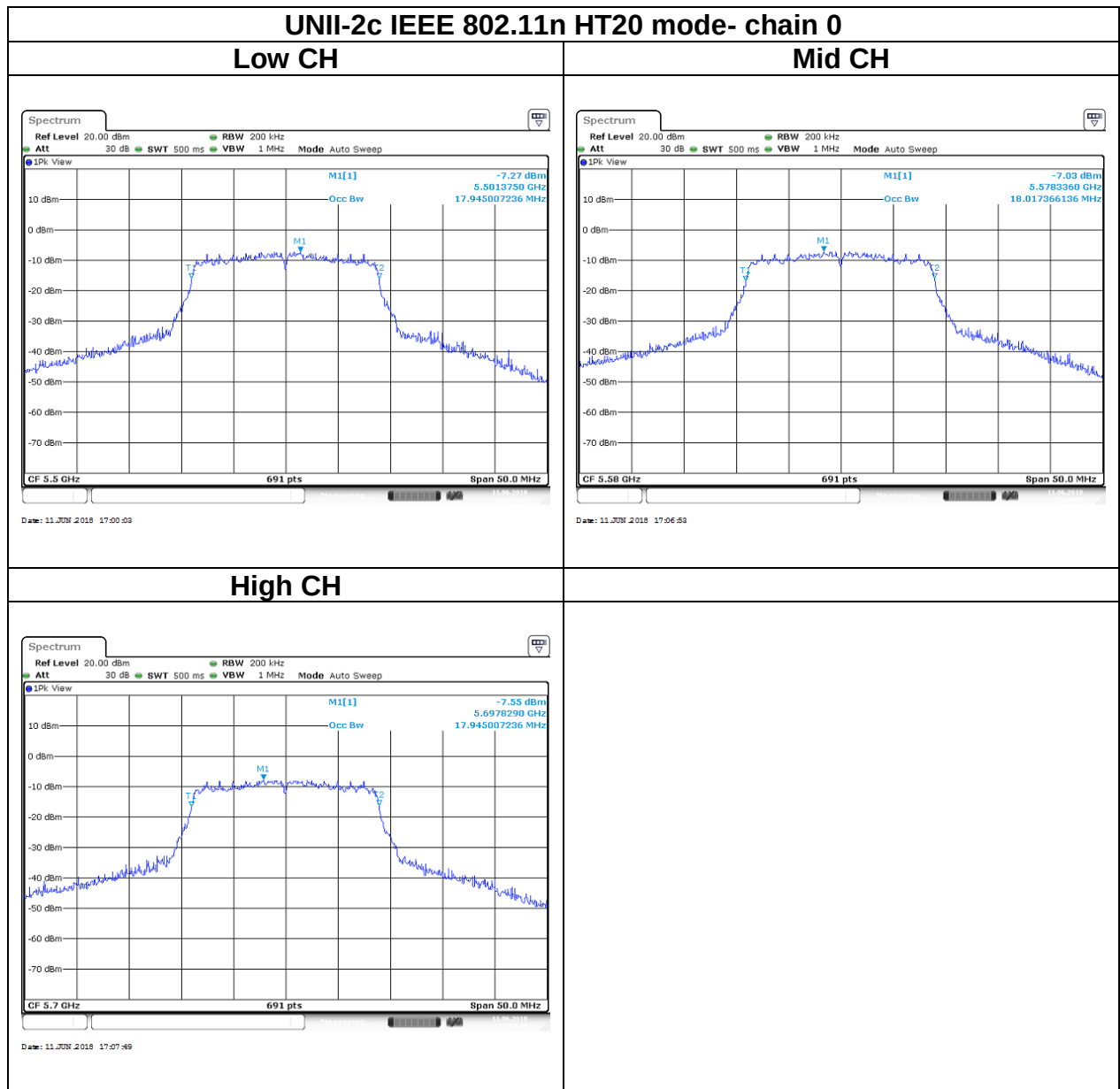


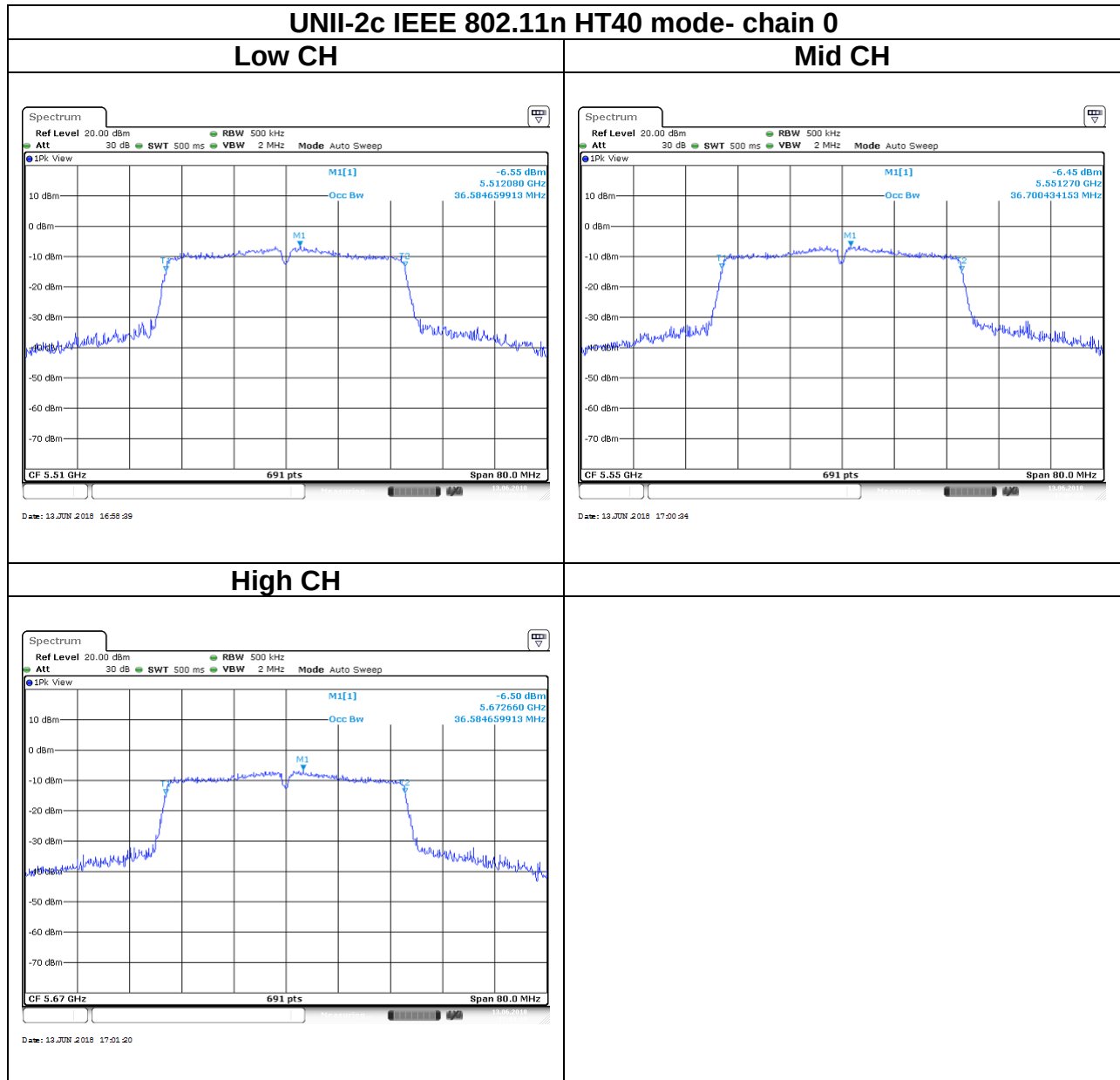


Report No.: T180522D10-RP4

## Test Data (BANDWIDTH 99%)



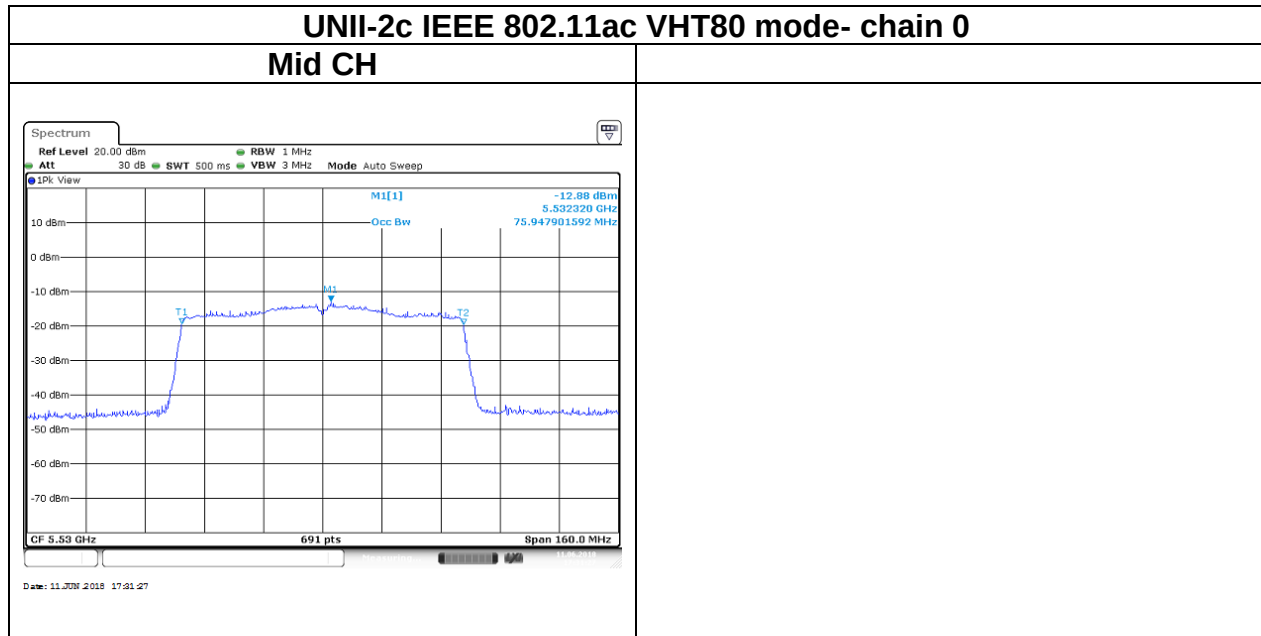






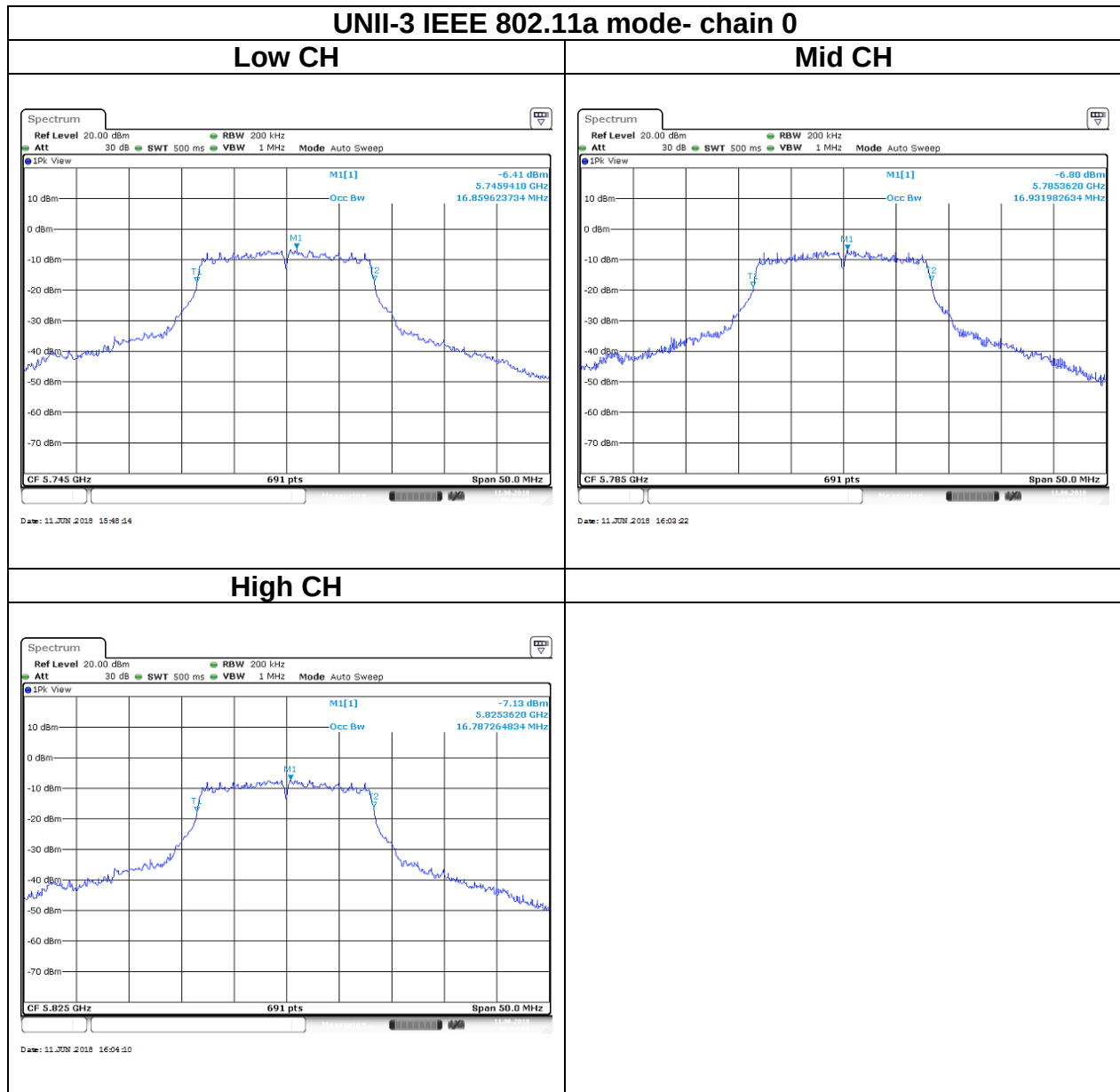
Report No.: T180522D10-RP4

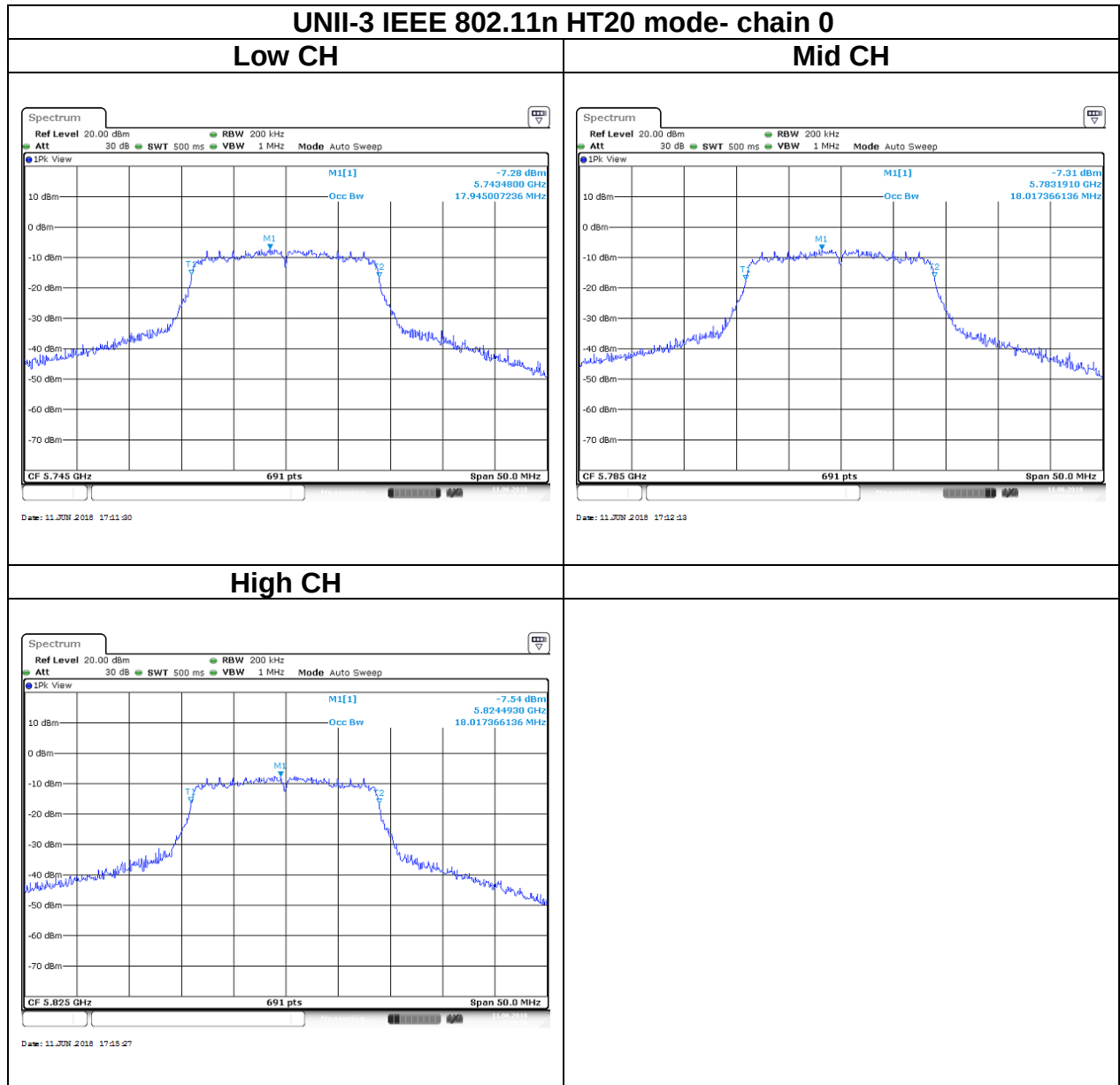
Page: 45 / 228  
Rev.: 00

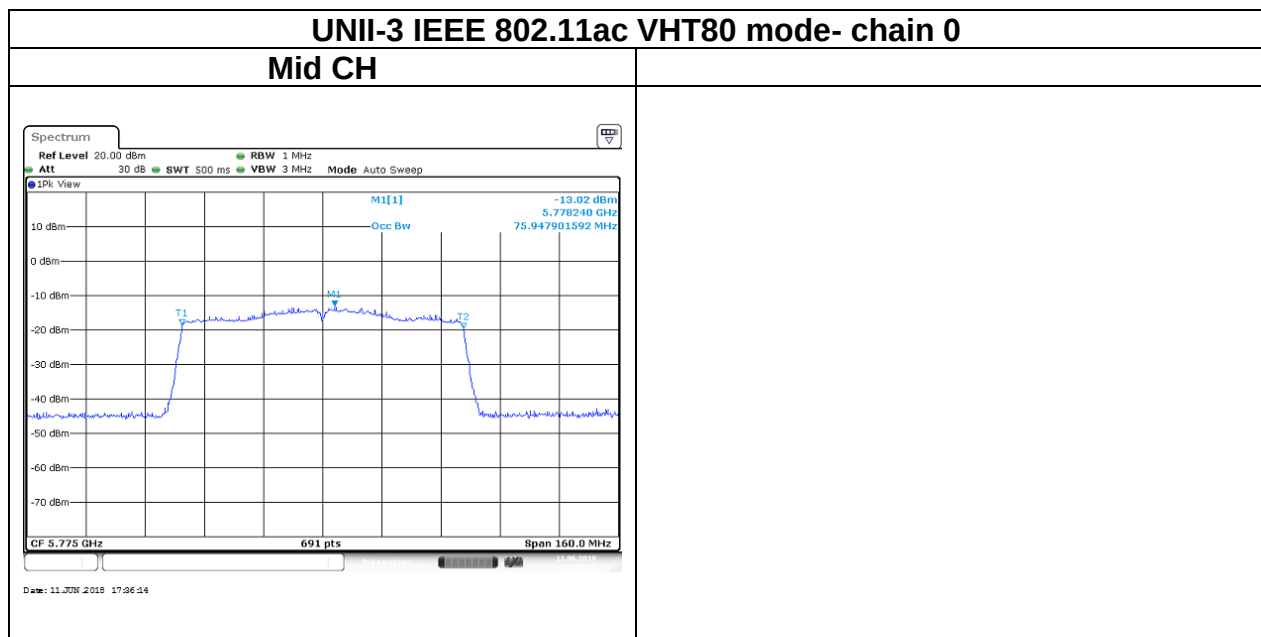
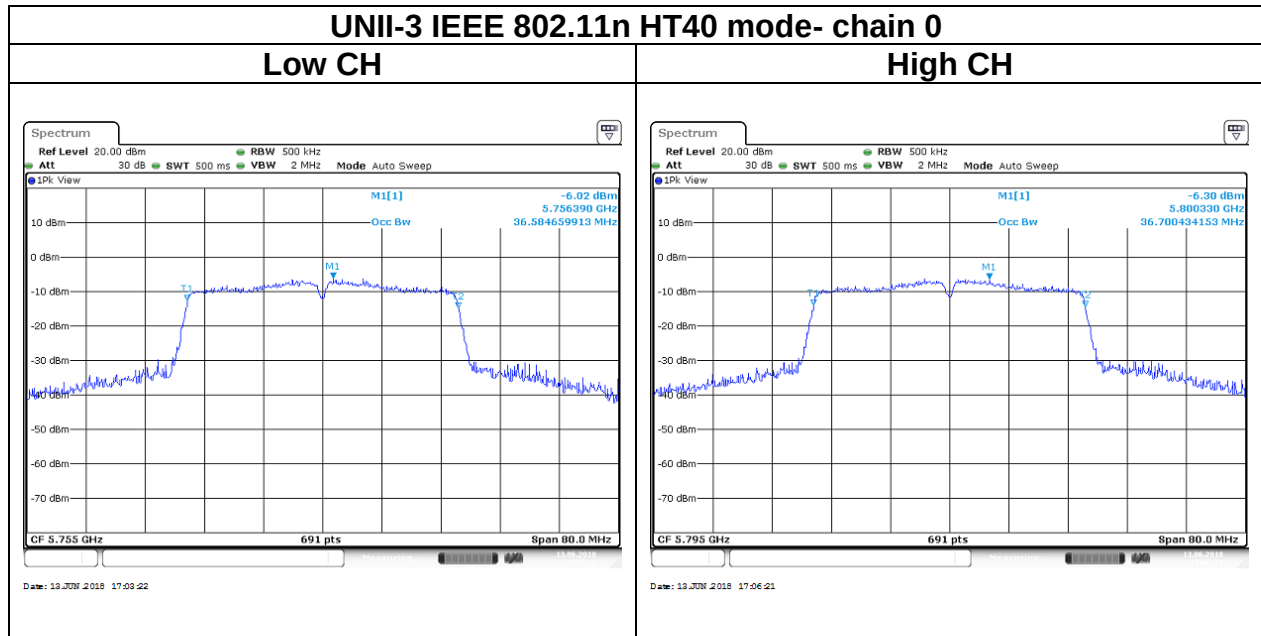


Report No.: T180522D10-RP4

## Test Data (BANDWIDTH 99%)









## 4.3 OUTPUT POWER MEASUREMENT

### 4.3.1 Test Limit

According to §15.407 (a)(1), 15.407(a)(2) and 15.407(a)(3) and RSS-247 section 6.2.1.1, section 6.2.2.1, section 6.2.3.1 and section 6.2.4.1

#### UNII-1 :

##### **FCC**

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW(24 dBm), whichever power is less. B is the 99% emission bandwidth in megahertz ,provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### **IC**

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10} B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

#### UNII-2a and 2c:

the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. and The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever power is less. B is the 99% emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

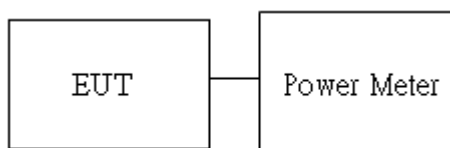
|                  |                                                                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UNII-1 Limit     | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 24dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi :<br>[Limit = 24 – (DG – 6)] |
| UNII-2a/2c Limit | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 24dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi :<br>[Limit = 24 – (DG – 6)] |
| UNII-3 Limit     | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 30dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi :<br>[Limit = 30 – (DG – 6)] |

### 4.3.2 Test Procedure

Test method Refer as KDB 789033 D02,

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Average output power. in the test report.

### 4.3.3 Test Setup



### 4.3.4 Test Result

#### Conducted output power :

| UNII-1                                          |    |                |           |        |               |        |                            |                                    |                          |                                  |             |                |                        |       |    |    |       |    |    |
|-------------------------------------------------|----|----------------|-----------|--------|---------------|--------|----------------------------|------------------------------------|--------------------------|----------------------------------|-------------|----------------|------------------------|-------|----|----|-------|----|----|
| Config                                          | CH | Freq.<br>(MHz) | Power Set |        | AV Power(dBm) |        | AV Total<br>Power<br>(dBm) | EIRP AV<br>Total<br>Power<br>(dBm) | AV Total<br>Power<br>(W) | EIRP AV<br>Total<br>Power<br>(W) | DG<br>(dBi) | Limit<br>(dBm) | EIRP<br>Limit<br>(dBm) |       |    |    |       |    |    |
|                                                 |    |                | chain0    | chain1 | chain0        | chain1 |                            |                                    |                          |                                  |             |                |                        |       |    |    |       |    |    |
| IEEE<br>802.11a<br>Data rate:<br>6Mbps          | 36 | 5180           | 16.00     | -      | 15.58         | -      | 15.58                      | 15.05                              | 0.0361                   | 0.0320                           | -0.53       | 24             | 23                     |       |    |    |       |    |    |
|                                                 | 44 | 5220           | 16.00     | -      | 15.62         | -      | 15.62                      | 15.09                              | 0.0365                   | 0.0323                           |             |                |                        |       |    |    |       |    |    |
|                                                 | 48 | 5240           | 16.00     | -      | 15.69         | -      | 15.69                      | 15.16                              | 0.0371                   | 0.0328                           |             |                |                        |       |    |    |       |    |    |
| IEEE<br>802.11n<br>HT20<br>Data rate:<br>MCS0   | 36 | 5180           | 15.00     | -      | 14.56         | -      | 14.56                      | 14.03                              | 0.0286                   | 0.0253                           |             |                |                        | -0.53 | 24 | 23 |       |    |    |
|                                                 | 44 | 5220           | 16.00     | -      | 15.62         | -      | 15.62                      | 15.09                              | 0.0365                   | 0.0323                           |             |                |                        |       |    |    |       |    |    |
|                                                 | 48 | 5240           | 16.00     | -      | 15.69         | -      | 15.69                      | 15.16                              | 0.0371                   | 0.0328                           |             |                |                        |       |    |    |       |    |    |
| IEEE<br>802.11n<br>HT40<br>Data rate:<br>MCS0   | 38 | 5190           | 14.00     | -      | 12.97         | -      | 12.97                      | 12.44                              | 0.0198                   | 0.0175                           |             |                |                        |       |    |    | -0.53 | 24 | 23 |
|                                                 | 46 | 5230           | 14.00     | -      | 12.90         | -      | 12.90                      | 12.37                              | 0.0195                   | 0.0173                           |             |                |                        |       |    |    |       |    |    |
| IEEE<br>802.11ac<br>VHT80<br>Data rate:<br>MCS0 | 42 | 5210           | 14.00     | -      | 10.86         | -      | 10.86                      | 10.33                              | 0.0122                   | 0.0108                           |             |                |                        |       |    |    |       |    |    |



Report No.: T180522D10-RP4

Page: 52 / 228  
Rev.: 00

| UNII-2a                                         |    |                |           |        |               |        |                            |                                    |                          |                                  |             |                |                        |       |    |    |       |    |    |
|-------------------------------------------------|----|----------------|-----------|--------|---------------|--------|----------------------------|------------------------------------|--------------------------|----------------------------------|-------------|----------------|------------------------|-------|----|----|-------|----|----|
| Config                                          | CH | Freq.<br>(MHz) | Power Set |        | AV Power(dBm) |        | AV Total<br>Power<br>(dBm) | EIRP AV<br>Total<br>Power<br>(dBm) | AV Total<br>Power<br>(W) | EIRP AV<br>Total<br>Power<br>(W) | DG<br>(dBi) | Limit<br>(dBm) | EIRP<br>Limit<br>(dBm) |       |    |    |       |    |    |
|                                                 |    |                | chain0    | chain1 | chain0        | chain1 |                            |                                    |                          |                                  |             |                |                        |       |    |    |       |    |    |
| IEEE<br>802.11a<br>Data rate:<br>6Mbps          | 52 | 5260           | 16        | -      | 15.99         | -      | 15.99                      | 15.46                              | 0.0397                   | 0.0352                           | -0.53       | 24             | 30                     |       |    |    |       |    |    |
|                                                 | 56 | 5280           | 16        | -      | 15.71         | -      | 15.71                      | 15.18                              | 0.0372                   | 0.0330                           |             |                |                        |       |    |    |       |    |    |
|                                                 | 64 | 5320           | 16        | -      | 15.69         | -      | 15.69                      | 15.16                              | 0.0371                   | 0.0328                           |             |                |                        |       |    |    |       |    |    |
| IEEE<br>802.11n<br>HT20<br>Data rate:<br>MCS0   | 52 | 5260           | 15        | -      | 14.51         | -      | 14.51                      | 13.98                              | 0.0282                   | 0.0250                           |             |                |                        | -0.53 | 24 | 30 |       |    |    |
|                                                 | 56 | 5280           | 15        | -      | 14.63         | -      | 14.63                      | 14.10                              | 0.0290                   | 0.0257                           |             |                |                        |       |    |    |       |    |    |
|                                                 | 64 | 5320           | 15        | -      | 14.49         | -      | 14.49                      | 13.96                              | 0.0281                   | 0.0249                           |             |                |                        |       |    |    |       |    |    |
| IEEE<br>802.11n<br>HT40<br>Data rate:<br>MCS0   | 54 | 5270           | 14        | -      | 13.00         | -      | 13.00                      | 12.47                              | 0.0200                   | 0.0177                           |             |                |                        |       |    |    | -0.53 | 24 | 30 |
|                                                 | 62 | 5310           | 14        | -      | 13.09         | -      | 13.09                      | 12.56                              | 0.0204                   | 0.0180                           |             |                |                        |       |    |    |       |    |    |
| IEEE<br>802.11ac<br>VHT80<br>Data rate:<br>MCS0 | 58 | 5290           | 14        | -      | 11.02         | -      | 11.02                      | 10.49                              | 0.0126                   | 0.0112                           |             |                |                        |       |    |    |       |    |    |



Report No.: T180522D10-RP4

Page: 53 / 228  
Rev.: 00

| UNII-2c                                         |     |                |           |        |               |        |                            |                                    |                          |                                  |             |                |                        |
|-------------------------------------------------|-----|----------------|-----------|--------|---------------|--------|----------------------------|------------------------------------|--------------------------|----------------------------------|-------------|----------------|------------------------|
| Config                                          | CH  | Freq.<br>(MHz) | Power Set |        | AV Power(dBm) |        | AV Total<br>Power<br>(dBm) | EIRP AV<br>Total<br>Power<br>(dBm) | AV Total<br>Power<br>(W) | EIRP AV<br>Total<br>Power<br>(W) | DG<br>(dBi) | Limit<br>(dBm) | EIRP<br>Limit<br>(dBm) |
|                                                 |     |                | chain0    | chain1 | chain0        | chain1 |                            |                                    |                          |                                  |             |                |                        |
| IEEE<br>802.11a<br>Data rate:<br>6Mbps          | 100 | 5500           | 16        | -      | 15.18         | -      | 15.18                      | 14.65                              | 0.0330                   | 0.0292                           | -0.53       | 24             | 30                     |
|                                                 | 116 | 5580           | 16        | -      | 15.43         | -      | 15.43                      | 14.90                              | 0.0349                   | 0.0309                           |             |                |                        |
|                                                 | 140 | 5700           | 16        | -      | 15.56         | -      | 15.56                      | 15.03                              | 0.0360                   | 0.0318                           |             |                |                        |
| IEEE<br>802.11n<br>HT20<br>Data rate:<br>MCS0   | 100 | 5500           | 15        | -      | 13.99         | -      | 13.99                      | 13.46                              | 0.0251                   | 0.0222                           |             |                |                        |
|                                                 | 116 | 5580           | 15        | -      | 14.30         | -      | 14.30                      | 13.77                              | 0.0269                   | 0.0238                           |             |                |                        |
|                                                 | 140 | 5700           | 15        | -      | 14.45         | -      | 14.45                      | 13.92                              | 0.0279                   | 0.0247                           |             |                |                        |
| IEEE<br>802.11n<br>HT40<br>Data rate:<br>MCS0   | 102 | 5510           | 14        | -      | 12.67         | -      | 12.67                      | 12.14                              | 0.0185                   | 0.0164                           |             |                |                        |
|                                                 | 110 | 5550           | 14        | -      | 12.69         | -      | 12.69                      | 12.16                              | 0.0186                   | 0.0164                           |             |                |                        |
|                                                 | 134 | 5670           | 14        | -      | 12.92         | -      | 12.92                      | 12.39                              | 0.0196                   | 0.0173                           |             |                |                        |
| IEEE<br>802.11ac<br>VHT80<br>Data rate:<br>MCS0 | 106 | 5530           | 14        | -      | 10.74         | -      | 10.74                      | 10.21                              | 0.0119                   | 0.0105                           |             |                |                        |



Report No.: T180522D10-RP4

Page: 54 / 228  
Rev.: 00

| UNII-3                                          |     |                |           |        |               |        |                            |                                    |                          |                                  |             |                |
|-------------------------------------------------|-----|----------------|-----------|--------|---------------|--------|----------------------------|------------------------------------|--------------------------|----------------------------------|-------------|----------------|
| Config                                          | CH  | Freq.<br>(MHz) | Power Set |        | AV Power(dBm) |        | AV Total<br>Power<br>(dBm) | EIRP AV<br>Total<br>Power<br>(dBm) | AV Total<br>Power<br>(W) | EIRP AV<br>Total<br>Power<br>(W) | DG<br>(dBi) | Limit<br>(dBm) |
|                                                 |     |                | chain0    | chain1 | chain0        | chain1 |                            |                                    |                          |                                  |             |                |
| IEEE<br>802.11a<br>Data rate:<br>6Mbps          | 149 | 5745           | -1        | -      | 16.99         | -      | 16.99                      | 16.46                              | 0.0500                   | 0.0049                           | -0.53       | 30             |
|                                                 | 157 | 5785           | -1        | -      | 16.80         | -      | 16.80                      | 16.27                              | 0.0479                   | 0.0424                           |             |                |
|                                                 | 165 | 5825           | -1        | -      | 16.67         | -      | 16.67                      | 16.14                              | 0.0465                   | 0.0411                           |             |                |
| IEEE<br>802.11n<br>HT20<br>Data rate:<br>MCS0   | 149 | 5745           | -1        | -      | 16.57         | -      | 16.57                      | 16.04                              | 0.0454                   | 0.0402                           |             |                |
|                                                 | 157 | 5785           | -1        | -      | 16.43         | -      | 16.43                      | 15.90                              | 0.0440                   | 0.0389                           |             |                |
|                                                 | 165 | 5825           | -1        | -      | 16.36         | -      | 16.36                      | 15.83                              | 0.0433                   | 0.0383                           |             |                |
| IEEE<br>802.11n<br>HT40<br>Data rate:<br>MCS0   | 151 | 5755           | -1        | -      | 16.03         | -      | 16.03                      | 15.50                              | 0.0401                   | 0.0355                           |             |                |
|                                                 | 159 | 5795           | -1        | -      | 15.92         | -      | 15.92                      | 15.39                              | 0.0391                   | 0.0346                           |             |                |
| IEEE<br>802.11ac<br>VHT80<br>Data rate:<br>MCS0 | 155 | 5775           | -1.00     | -      | 14.12         | -      | 14.12                      | 13.59                              | 0.0258                   | 0.0229                           |             |                |

## 4.4 POWER SPECTRAL DENSITY

### 4.4.1 Test Limit

According to §15.407 (a)(1), 15.407(a)(2) and 15.407(a)(3) and RSS-247 section 6.2.1.1 and section 6.2.4.1

#### UNII-1 :

**FCC:** The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

**IC:** The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### UNII-2a and 2c:

The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.i.

|               |                                                                                                                                                                   |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UNII-1 Limit  | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 11 dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi :<br>[Limit = 11 – (DG – 6)] |
| UNII-2a Limit | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 11 dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi :<br>[Limit = 11 – (DG – 6)] |
| UNII-2c Limit | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 11 dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi :<br>[Limit = 11 – (DG – 6)] |
| UNII-3 Limit  | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 30 dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi :<br>[Limit = 30 – (DG – 6)] |

#### 4.4.2 Test Procedure

Test method Refer as KDB 789033 D02,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. UNII-1, UNII-2a and UNII-2c, SA set RBW = 1MHz, VBW = 3MHz and Detector = RMS, to measurement Power Density.
4. UNII-3, SA set RBW = 500kHz, VBW = 2MHz and Detector = RMS, to measurement Power Density
5. The path loss and Duty Factor were compensated to the results for each measurement by SA.
6. Mark the maximum level.
7. Measure and record the result of power spectral density. in the test report.

#### 4.4.3 Test Setup





#### 4.4.4 Test Result

| UNII-1 5150-5250 MHz                |                 |                    |                    |                  |                 |                |
|-------------------------------------|-----------------|--------------------|--------------------|------------------|-----------------|----------------|
| Test mode: IEEE 802.11a mode        |                 |                    |                    |                  |                 |                |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | FCC Limit (dBm) | IC Limit (dBm) |
| Low                                 | 5180            | 2.66               | -                  | 2.66             | 11              | 10             |
| Mid                                 | 5220            | 2.81               | -                  | 2.81             |                 |                |
| High                                | 5240            | 2.98               | -                  | 2.98             |                 |                |
| Test mode: IEEE 802.11n HT20 mode   |                 |                    |                    |                  |                 |                |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | FCC Limit (dBm) | IC Limit (dBm) |
| Low                                 | 5180            | 1.31               | -                  | 1.31             | 11              | 10             |
| Mid                                 | 5220            | 1.43               | -                  | 1.43             |                 |                |
| High                                | 5240            | 1.71               | -                  | 1.71             |                 |                |
| Test mode: IEEE 802.11n HT40 mode   |                 |                    |                    |                  |                 |                |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | FCC Limit (dBm) | IC Limit (dBm) |
| Low                                 | 5190            | -3.43              | -                  | -3.43            | 11              | 10             |
| High                                | 5230            | -3.40              | -                  | -3.40            |                 |                |
| Test mode: IEEE 802.11ac VHT80 mode |                 |                    |                    |                  |                 |                |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | FCC Limit (dBm) | IC Limit (dBm) |
| Mid                                 | 5210            | -6.40              | -                  | -6.40            | 11              | 10             |

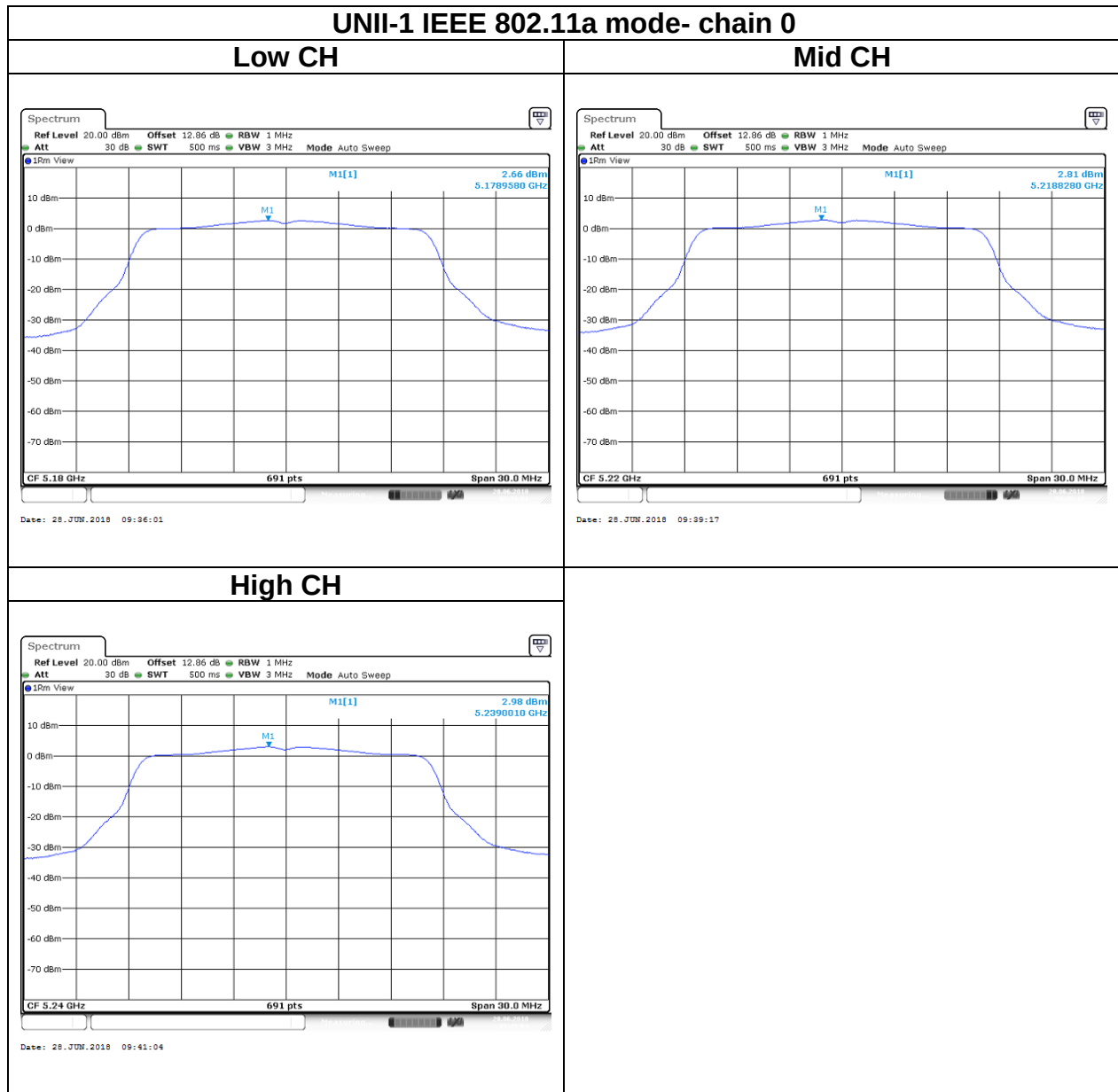
| UNII-2a 5250-5350 MHz               |                 |                    |                    |                  |             |
|-------------------------------------|-----------------|--------------------|--------------------|------------------|-------------|
| Test mode: IEEE 802.11a mode        |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5260            | 3.10               | -                  | 3.10             | 11          |
| Mid                                 | 5280            | 3.11               | -                  | 3.11             |             |
| High                                | 5320            | 3.06               | -                  | 3.06             |             |
| Test mode: IEEE 802.11n HT20 mode   |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5260            | 1.66               | -                  | 1.66             | 11          |
| Mid                                 | 5280            | 1.78               | -                  | 1.78             |             |
| High                                | 5320            | 1.90               | -                  | 1.90             |             |
| Test mode: IEEE 802.11n HT40 mode   |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5270            | -3.01              | -                  | -3.01            | 11          |
| High                                | 5310            | -3.09              | -                  | -3.09            |             |
| Test mode: IEEE 802.11ac VHT80 mode |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Mid                                 | 5290            | -6.19              | -                  | -6.19            | 11          |

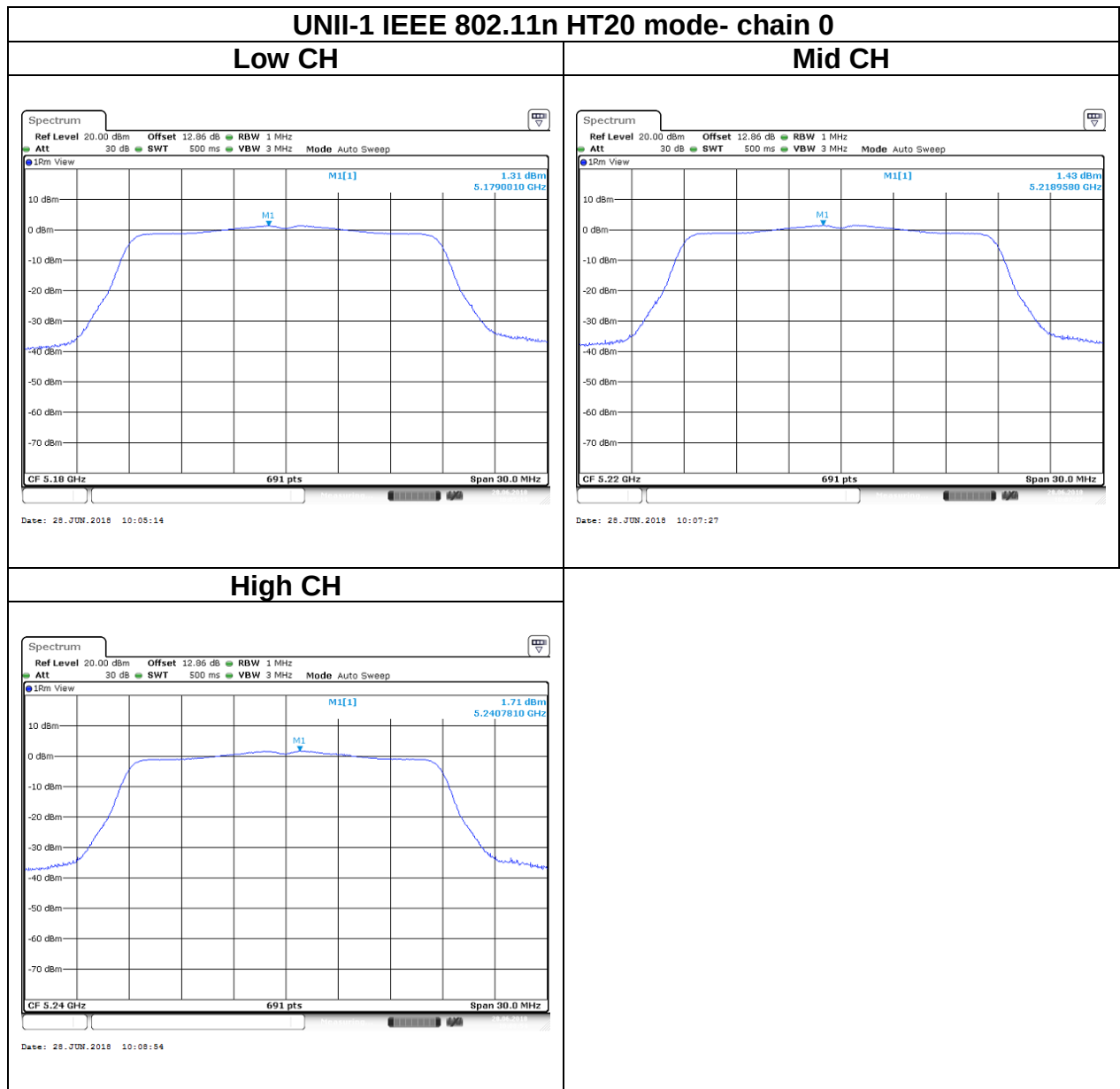
| UNII-2c 5470-5725 MHz               |                 |                    |                    |                  |             |
|-------------------------------------|-----------------|--------------------|--------------------|------------------|-------------|
| Test mode: IEEE 802.11a mode        |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5500            | 2.77               | -                  | 2.77             | 11          |
| Mid                                 | 5580            | 2.98               | -                  | 2.98             |             |
| High                                | 5700            | 3.06               | -                  | 3.06             |             |
| Test mode: IEEE 802.11n HT20 mode   |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5500            | 1.80               | -                  | 1.80             | 11          |
| Mid                                 | 5580            | 1.62               | -                  | 1.62             |             |
| High                                | 5700            | 1.60               | -                  | 1.60             |             |
| Test mode: IEEE 802.11n HT40 mode   |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5510            | -3.38              | -                  | -3.38            | 11          |
| Mid                                 | 5500            | -3.49              | -                  | -3.49            |             |
| High                                | 5670            | -3.02              | -                  | -3.02            |             |
| Test mode: IEEE 802.11ac VHT80 mode |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Mid                                 | 5530            | -6.67              | -                  | -6.67            | 11          |

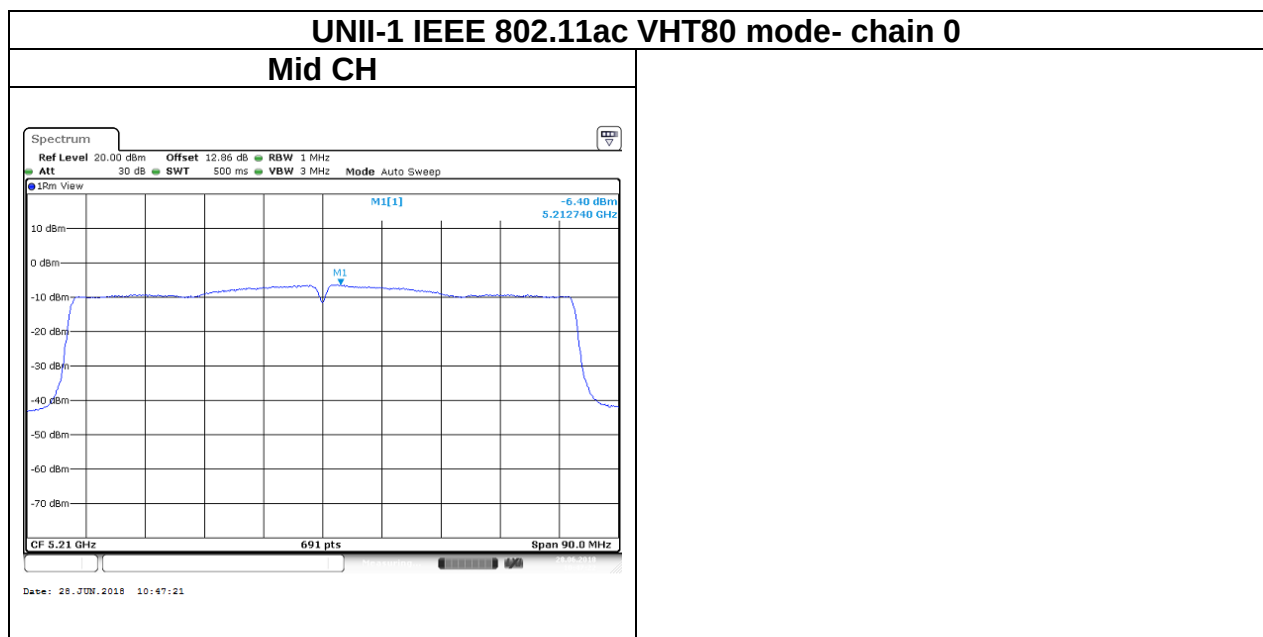
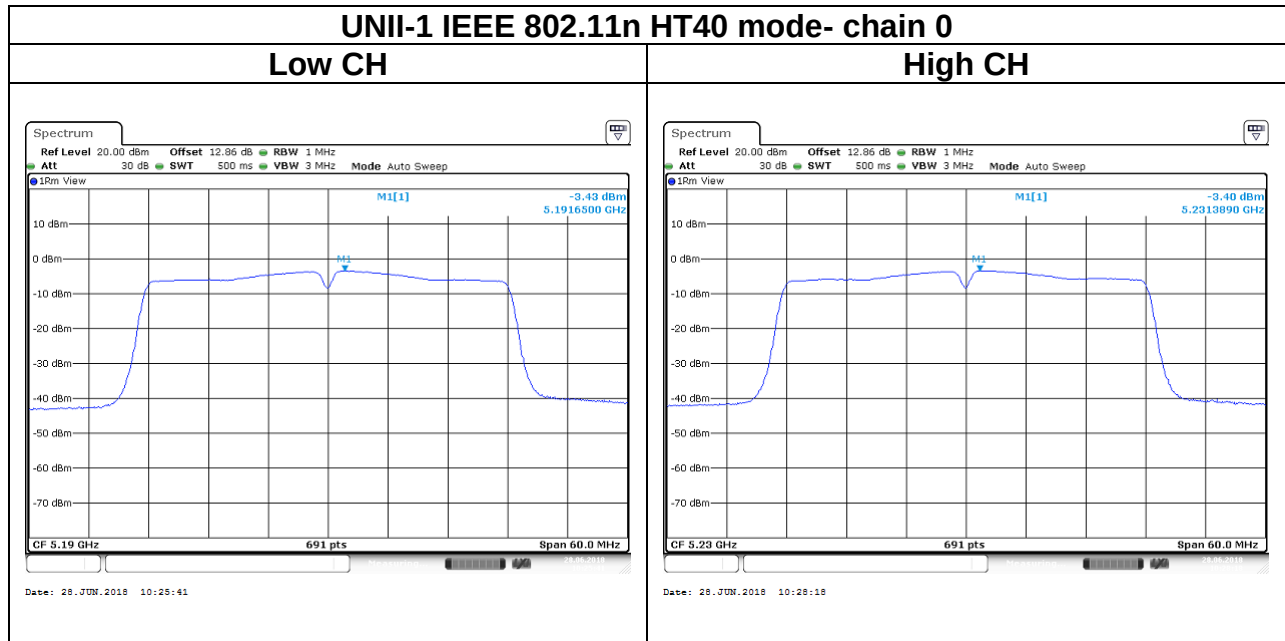
| UNII-3 5725-5825 MHz                |                 |                    |                    |                  |             |
|-------------------------------------|-----------------|--------------------|--------------------|------------------|-------------|
| Test mode: IEEE 802.11a mode        |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5745            | 12.03              | -                  | 12.03            | 30          |
| Mid                                 | 5785            | 12.05              | -                  | 12.05            |             |
| High                                | 5825            | 11.62              | -                  | 11.62            |             |
| Test mode: IEEE 802.11n HT20 mode   |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5745            | 12.78              | -                  | 12.78            | 30          |
| Mid                                 | 5785            | 12.21              | -                  | 12.21            |             |
| High                                | 5825            | 12.06              | -                  | 12.06            |             |
| Test mode: IEEE 802.11n HT40 mode   |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Low                                 | 5755            | 8.25               | -                  | 8.25             | 30          |
| High                                | 5795            | 8.45               | -                  | 8.45             |             |
| Test mode: IEEE 802.11ac VHT80 mode |                 |                    |                    |                  |             |
| Channel                             | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PPSD (dBm) | Limit (dBm) |
| Mid                                 | 5775            | -2.15              | -                  | -2.15            | 30          |

Report No.: T180522D10-RP4

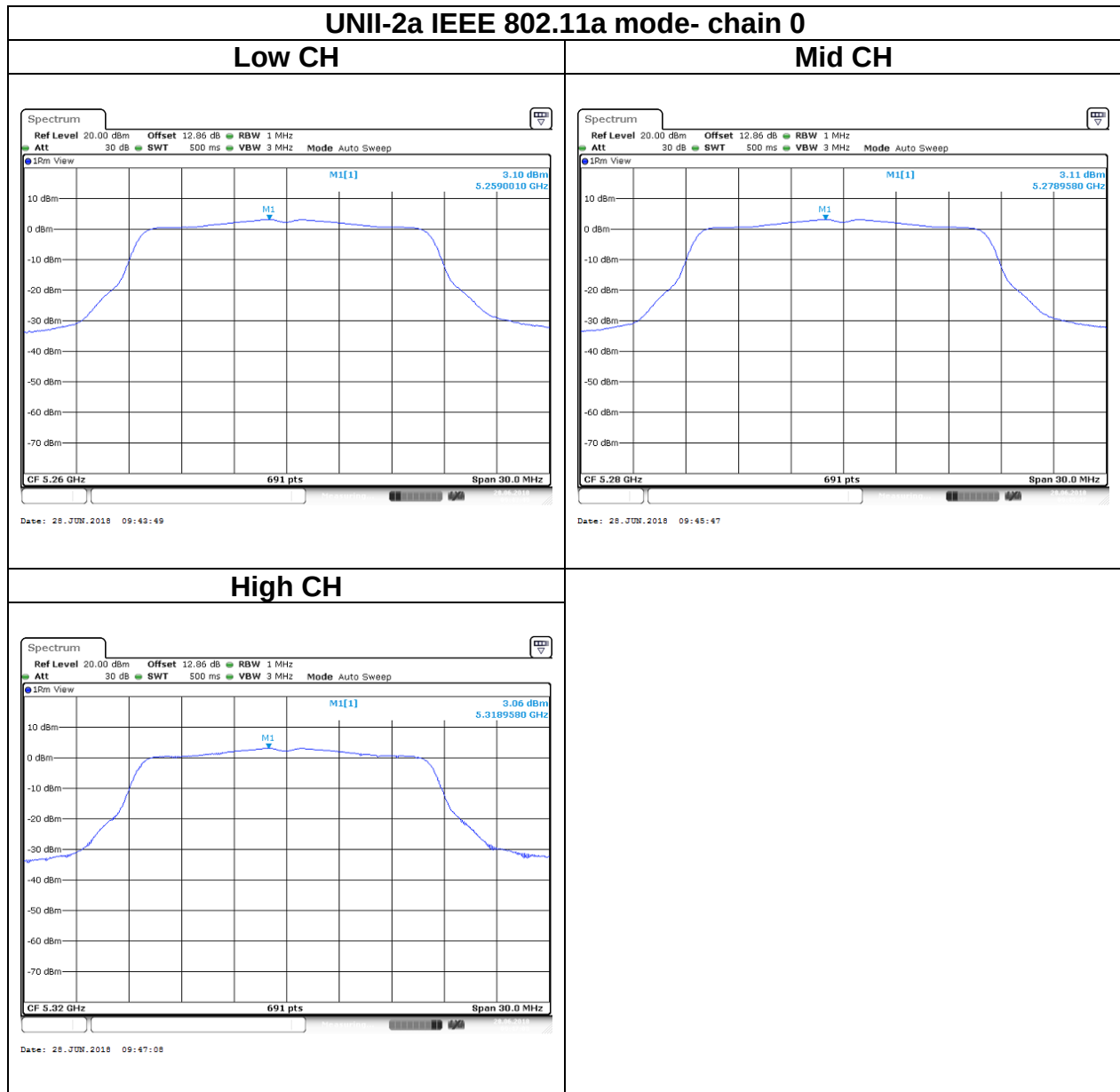
## Test Data



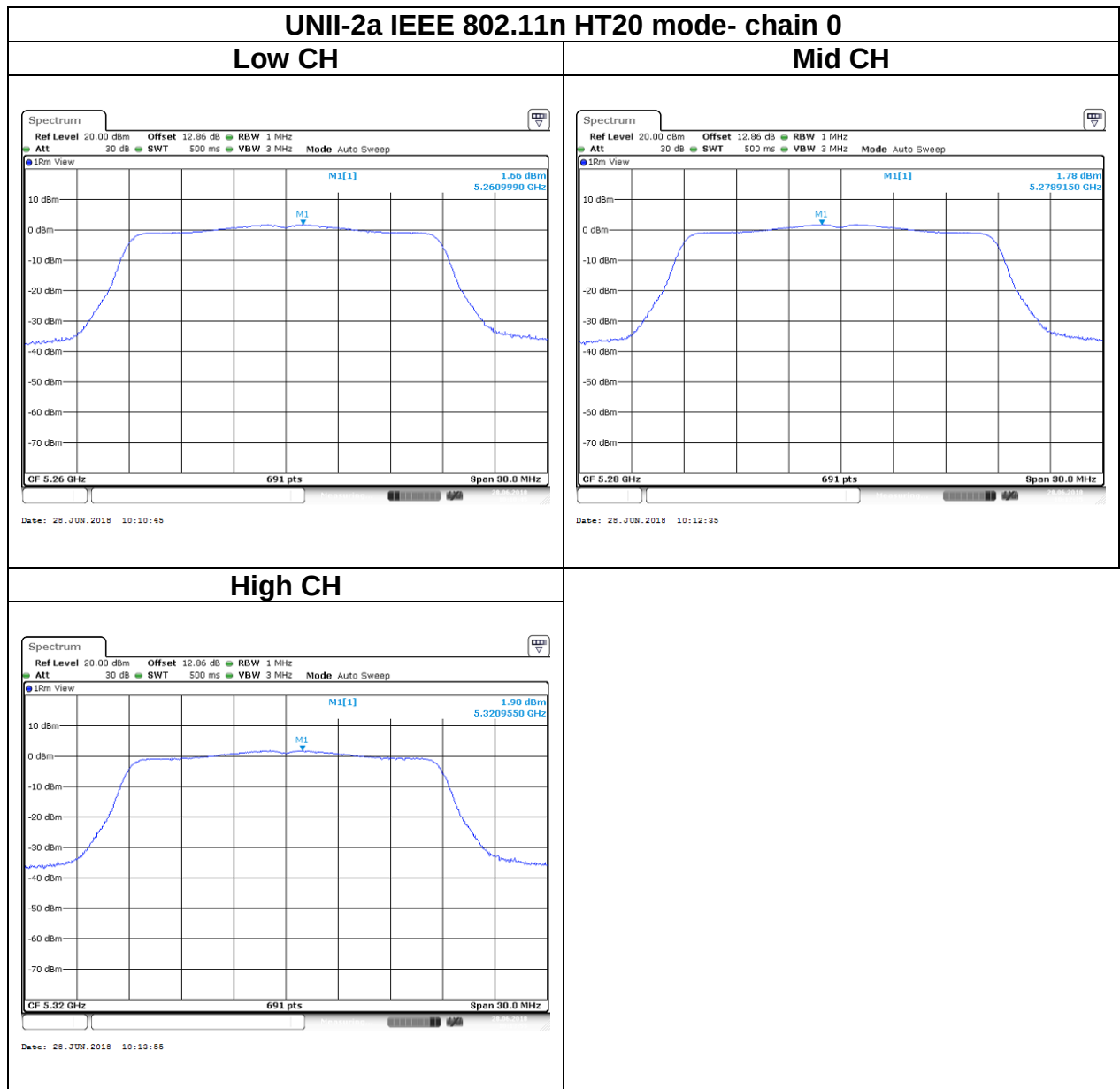


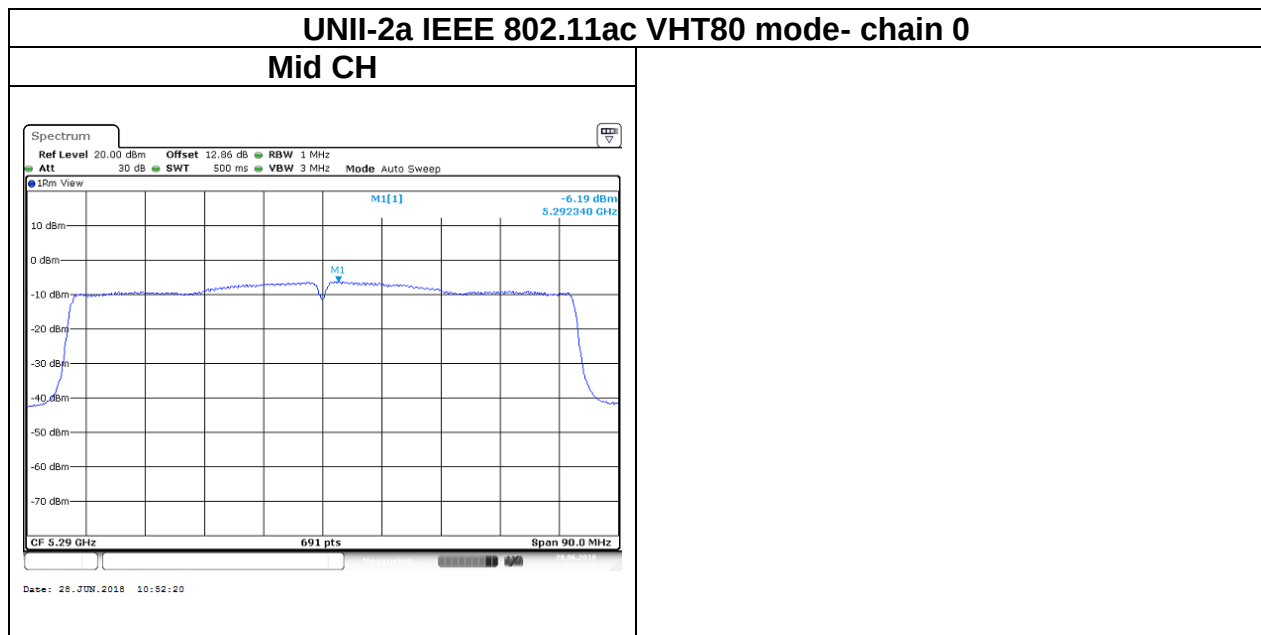
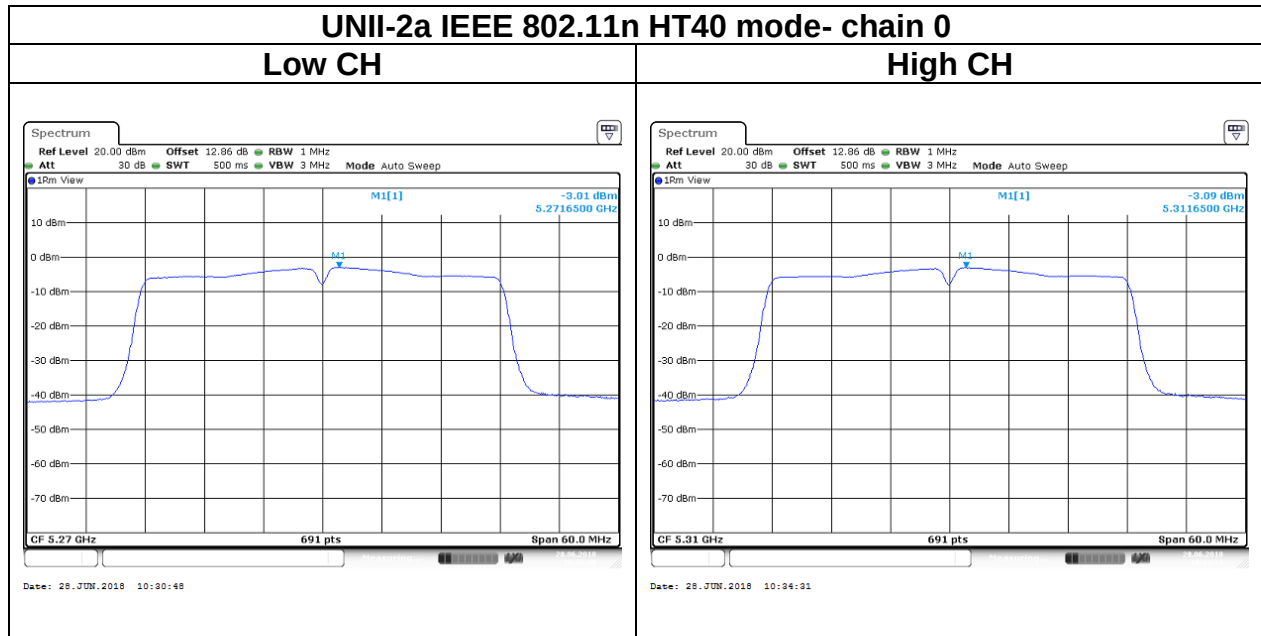


## Test Data

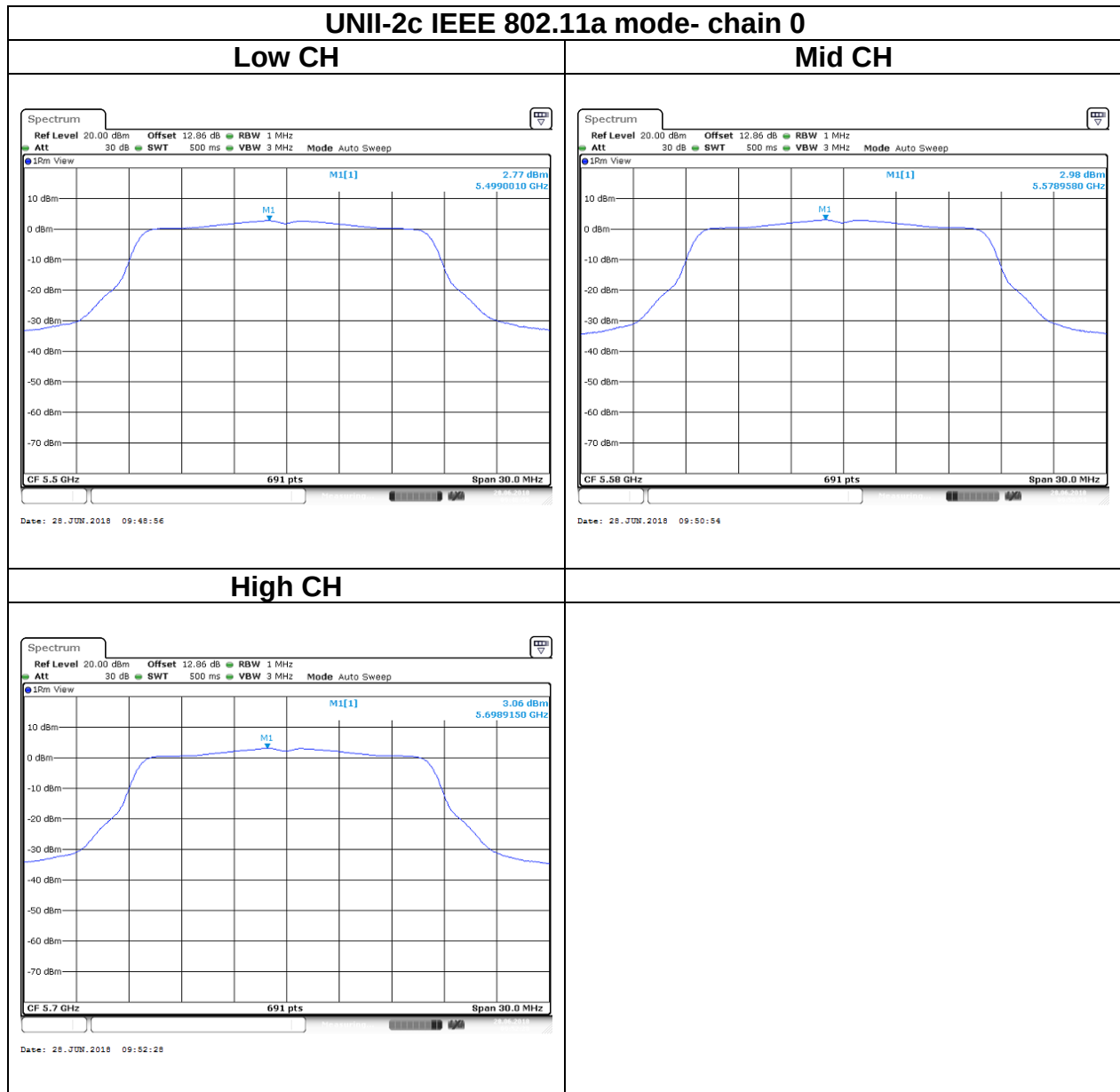


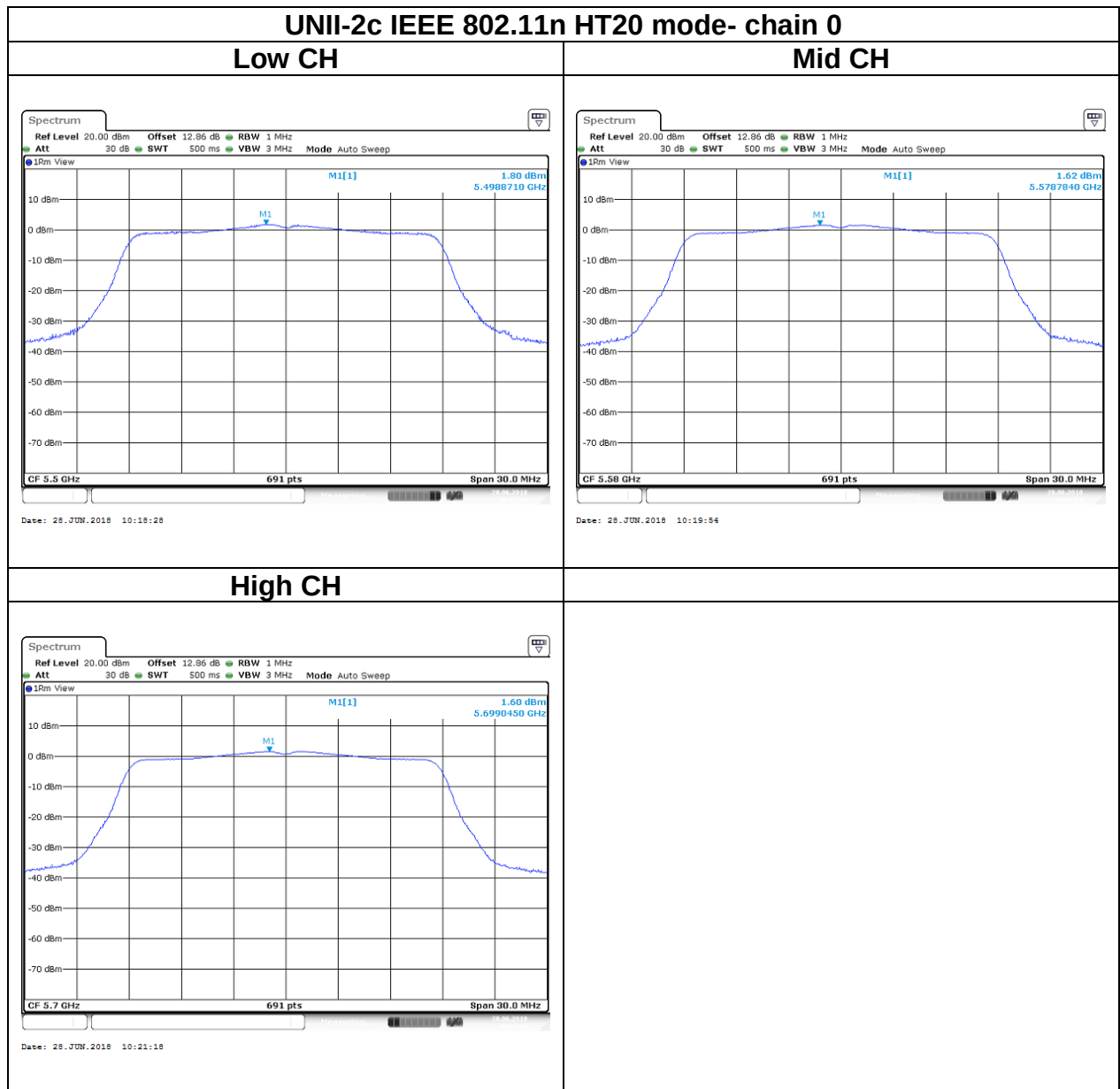


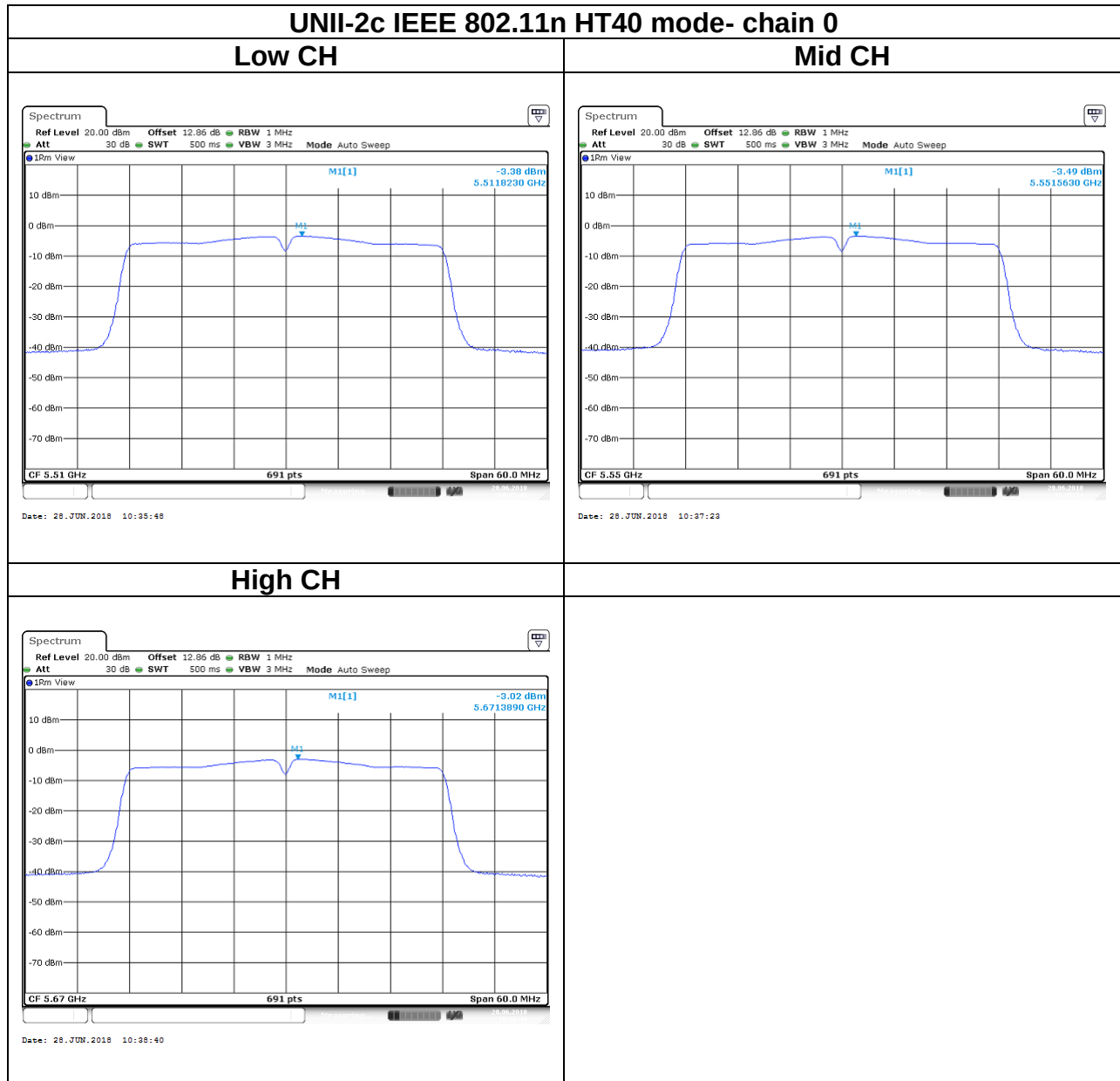




## Test Data







Report No.: T180522D10-RP4

