

# RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART C

|                          |                                                                                                                                                     |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Standard            | FCC Part 15.247                                                                                                                                     |
| Brand name               | ADT                                                                                                                                                 |
| Product name             | Extender + Chime                                                                                                                                    |
| Model No.                | SCB1R0-29xxxxx(the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-", for the marketing purpose)           |
| Test Result              | Pass                                                                                                                                                |
| Statements of Conformity | Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty. |

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

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

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

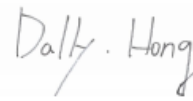
Approved by:

Tested by:



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Kevin Tsai  
Deputy Manager



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Dally Hong  
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。

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## Revision History

| Rev. | Issue Date        | Revisions                       | Effect Page | Revised By   |
|------|-------------------|---------------------------------|-------------|--------------|
| 00   | December 6, 2019  | Initial Issue                   | ALL         | Allison Chen |
| 01   | December 10, 2019 | See the following note Rev.(01) | P.12        | Allison Chen |

### **Rev.(01)**

1. Modify description RE above 1GHz in section 3.2.



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## 1. GENERAL INFORMATION

### 1.1 EUT INFORMATION

|                   |                                                                                                                                                                                                                                                                               |                         |  |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--|
| Applicant         | Sercomm Corporation<br>8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan                                                                                                                                                                                                   |                         |  |
| Manufacturer      | Sercomm Corporation<br>8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan                                                                                                                                                                                                   |                         |  |
| Equipment         | Extender + Chime                                                                                                                                                                                                                                                              |                         |  |
| Model Name        | SCB1R0-29xxxxx(the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-", for the marketing purpose)                                                                                                                                     |                         |  |
| Model Discrepancy | All the above models are identical except for the designation of model numbers. The suffix of (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-", for the marketing purpose) on model number is just for marketing purpose only. |                         |  |
| Trade Name        | ADT                                                                                                                                                                                                                                                                           |                         |  |
| Received Date     | November 04, 2019                                                                                                                                                                                                                                                             |                         |  |
| Date of Test      | November 15 ~ December 4, 2019                                                                                                                                                                                                                                                |                         |  |
| Output Power(W)   | <b>Mode</b>                                                                                                                                                                                                                                                                   | <b>Output Power (W)</b> |  |
|                   | IEEE 802.11b Mode                                                                                                                                                                                                                                                             | 0.3206                  |  |
|                   | IEEE 802.11g Mode                                                                                                                                                                                                                                                             | 0.6722                  |  |
|                   | IEEE 802.11n HT20 Mode                                                                                                                                                                                                                                                        | 0.7393                  |  |
|                   | IEEE 802.11n HT40 Mode                                                                                                                                                                                                                                                        | 0.6384                  |  |
| EUT Power Rating: | Power from AC power. (120Vac, 60Hz)                                                                                                                                                                                                                                           |                         |  |

## 1.2 EUT CHANNEL INFORMATION

|                    |                                                                                                                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Range    | 802.11b/g/n HT20: 2412MHz ~ 2462MHz<br>802.11n HT40: 2422MHz ~ 2452MHz                                                                                                                                                    |
| Modulation Type    | 1. IEEE 802.11b Mode: DSSS(DBPSK/DQPSK/CCK)<br>2. IEEE 802.11g Mode: OFDM (BPSK/QPSK/16QAM/64QAM)<br>3. IEEE 802.11n HT20 Mode : OFDM (BPSK/QPSK/16QAM/64QAM)<br>4. IEEE 802.11n HT40 Mode : OFDM (BPSK/QPSK/16QAM/64QAM) |
| Number of channels | 1. IEEE 802.11b Mode: 11 Channels<br>2. IEEE 802.11g Mode: 11 Channels<br>3. IEEE 802.11n HT20 Mode : 11 Channels<br>4. IEEE 802.11n HT40 Mode : 7 Channels                                                               |

### Remark:

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

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

## 1.3 ANTENNA INFORMATION

|                   |                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Antenna Type      | <input type="checkbox"/> PIFA <input type="checkbox"/> PCB <input checked="" type="checkbox"/> Dipole <input type="checkbox"/> Coils |
| Antenna Gain      | Chain 0: Gain: 2.3dBi<br>Chain 1: Gain: 2.7dBi<br>Power Directional Gain: 2.5dBi                                                     |
| Antenna Connector | i-pex                                                                                                                                |

### Notes:

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



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## 1.4 MEASUREMENT UNCERTAINTY

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

**Remark:**

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



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## 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          | Dally Hong    | -      |
| RF Conducted       | Dally Hong    | -      |

**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    |
| Coaxial Cable          | Woken        | WC12    | CC001   | 06/28/2019 | 06/27/2020 |
| Coaxial Cable          | Woken        | WC12    | CC003   | 06/28/2019 | 06/27/2020 |
| Power Meter            | Anritsu      | ML2495A | 1149001 | 02/12/2019 | 02/11/2020 |
| Power Seneor           | Anritsu      | MA2491A | 030982  | 02/12/2019 | 02/11/2020 |
| Signal Analyzer        | R&S          | FSV 40  | 101073  | 09/25/2019 | 09/24/2020 |
| Software               | N/A          |         |         |            |            |

| 3M 966 Chamber Test Site         |                  |                 |              |            |            |
|----------------------------------|------------------|-----------------|--------------|------------|------------|
| Equipment                        | Manufacturer     | Model           | S/N          | Cal Date   | Cal Due    |
| Band Reject Filters              | MICRO TRONICS    | BRM 50702       | 120          | 02/26/2019 | 02/25/2020 |
| Bilog Antenna                    | Sunol Sciences   | JB3             | A030105      | 07/26/2019 | 07/25/2020 |
| Coaxial Cable                    | HUBER SUHNER     | SUCOFLEX 104PEA | 20995        | 02/26/2019 | 02/25/2020 |
| Coaxial Cable                    | EMCI             | EMC105          | 190914+25111 | 09/20/2019 | 09/19/2020 |
| Digital Thermo-Hygro Meter       | WISEWIND         | 1206            | D07          | 01/30/2019 | 01/29/2020 |
| double Ridged Guide Horn Antenna | ETC              | MCTD 1209       | DRH13M02003  | 10/04/2019 | 10/03/2020 |
| Loop Ant                         | COM-POWER        | AL-130          | 121051       | 03/22/2019 | 03/21/2020 |
| Pre-Amplifier                    | EMEC             | EM330           | 060609       | 02/26/2019 | 02/25/2020 |
| Pre-Amplifier                    | HP               | 8449B           | 3008A00965   | 02/26/2019 | 02/25/2020 |
| PSA Series Spectrum Analyzer     | Agilent          | E4446A          | MY46180323   | 05/29/2019 | 05/28/2020 |
| Antenna Tower                    | CCS              | CC-A-1F         | N/A          | N.C.R      | N.C.R      |
| Controller                       | CCS              | CC-C-1F         | N/A          | N.C.R      | N.C.R      |
| Turn Table                       | CCS              | CC-T-1F         | N/A          | N.C.R      | N.C.R      |
| Software                         | e3 6.11-20180413 |                 |              |            |            |

| AC line Conduction Test Room |                    |           |          |            |            |
|------------------------------|--------------------|-----------|----------|------------|------------|
| Equipment                    | Manufacturer       | Model     | S/N      | Cal Date   | Cal Due    |
| CABLE                        | EMCI               | CFD300-NL | CERF     | 06/27/2019 | 06/26/2020 |
| EMI Test Receiver            | R&S                | ESCI      | 100064   | 07/26/2019 | 07/25/2020 |
| LISN                         | SCHWARZBECK        | NSLK 8127 | 8127-541 | 01/31/2019 | 01/30/2020 |
| LISN                         | SCHAFFNER          | NNB 41    | 03/10013 | 02/13/2019 | 02/12/2020 |
| Software                     | EZ-EMC(CCS-3A1-CE) |           |          |            |            |

### Remark:

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



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## 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     |
| 1                 | NB (C)    | HP    | dv6-1332TX | N/A        | CNF9491GPS |

## 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 15.247, KDB 558074 D01, KDB 662911 D01.



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## 2. TEST SUMMERY

| FCC Standard Section | Report Section | Test Item                   | Result |
|----------------------|----------------|-----------------------------|--------|
| 15.203               | 1.3            | Antenna Requirement         | Pass   |
| 15.207(a)            | 5.1            | AC Conducted Emission       | Pass   |
| 15.247(a)(2)         | 5.2            | 6 dB Bandwidth              | Pass   |
| 2.1049               | 5.2            | Occupied Bandwidth (99%)    | Pass   |
| 15.247(b)(3)         | 5.3            | Output Power Measurement    | Pass   |
| 15.247(e)            | 5.4            | Power Spectral Density      | Pass   |
| 15.247(d)            | 5.5            | Conducted Band Edge         | Pass   |
| 15.247(d)            | 5.5            | Conducted Spurious Emission | Pass   |
| 15.247(d)            | 5.6            | Radiation Band Edge         | Pass   |
| 15.247(d)            | 5.6            | Radiation Spurious Emission | Pass   |

### 3. DESCRIPTION OF TEST MODES

#### 3.1 THE WORST MODE OF OPERATING CONDITION

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation mode           | IEEE 802.11b Mode: 1Mbps<br>IEEE 802.11g Mode: 6Mbps<br>IEEE 802.11n HT20 Mode: MCS8<br>IEEE 802.11n HT40 Mode: MCS8                                                                                                                                                                                                                                                                                                                                                                                   |
| Test Channel Frequencies | <b>IEEE 802.11b Mode:</b><br>1. Lowest Channel: 2412MHz<br>2. Middle Channel: 2437MHz<br>3. Highest Channel: 2462MHz<br><b>IEEE 802.11g Mode:</b><br>1. Lowest Channel: 2412MHz<br>2. Middle Channel: 2437MHz<br>3. Highest Channel: 2462MHz<br><b>IEEE 802.11n HT20 Mode:</b><br>1. Lowest Channel: 2412MHz<br>2. Middle Channel: 2437MHz<br>3. Highest Channel: 2462MHz<br><b>IEEE 802.11n HT40 Mode:</b><br>1. Lowest Channel: 2422MHz<br>2. Middle Channel: 2437MHz<br>3. Highest Channel: 2452MHz |
| Operation Transmitter    | IEEE 802.11b Mode: 1T1R<br>IEEE 802.11g Mode: 2T2R<br>IEEE 802.11n HT20 Mode: 2T2R<br>IEEE 802.11n HT40 Mode: 2T2R                                                                                                                                                                                                                                                                                                                                                                                     |

**Remark:**

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

### 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 power.                                                                                                             |
| 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 power.                                                                                                                                                                                                                                                                |
| 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 type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane)<br><input checked="" type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane)<br><input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane) |

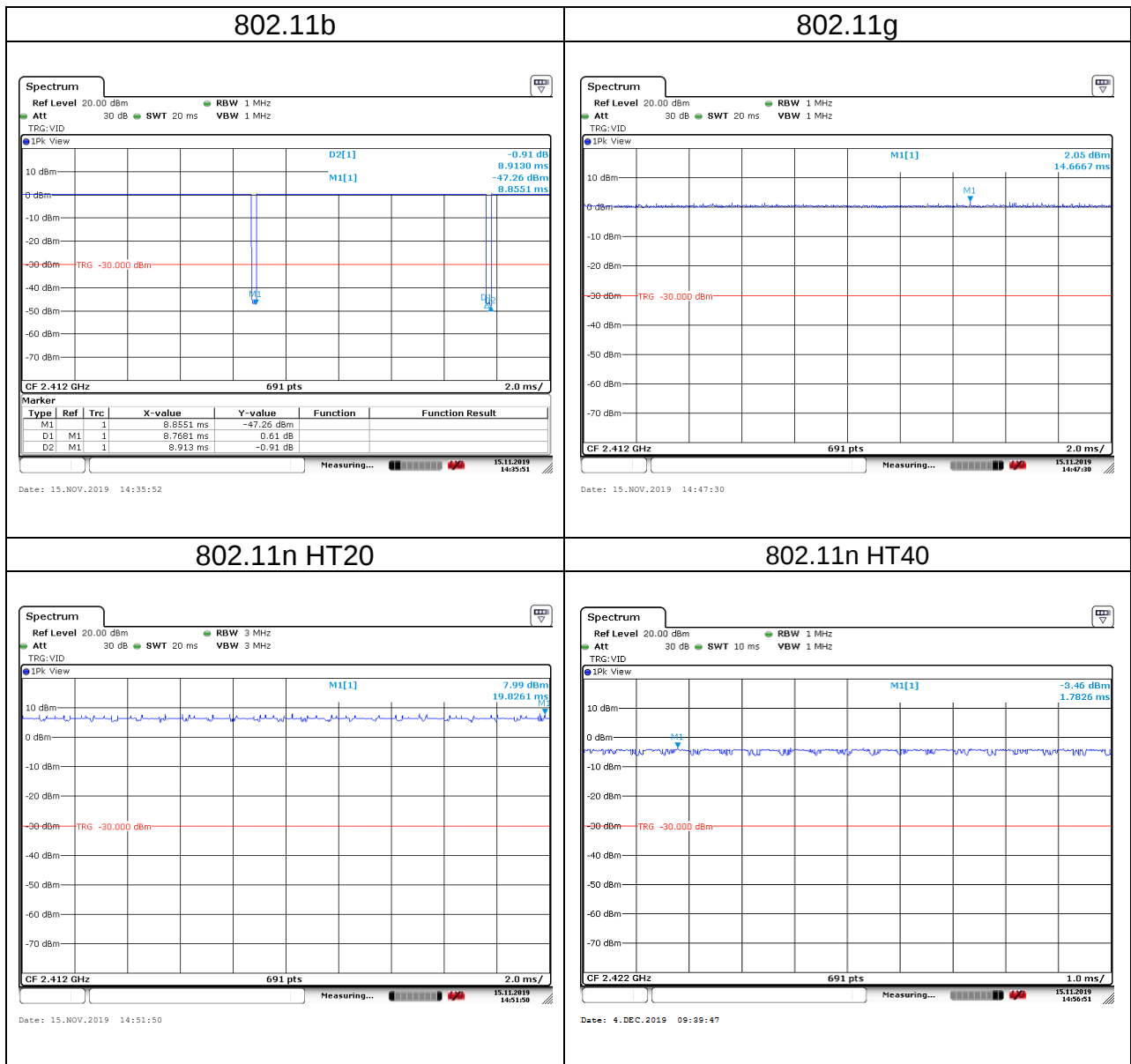
| Radiated Emission Measurement Below 1G |                                                                                                                                            |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------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

#### Remark:

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

## 4. EUT DUTY CYCLE

| Duty Cycle    |                |                                                           |           |                   |
|---------------|----------------|-----------------------------------------------------------|-----------|-------------------|
| Configuration | Duty Cycle (%) | Duty Factor (dB)<br>$=10 \cdot \log(1/\text{Duty Cycle})$ | 1/T (kHz) | VBW setting (kHz) |
| 802.11b       | 98.37%         | 0.07                                                      | 0.11      | 0.01              |
| 802.11g       | 100.00%        | 0.00                                                      | 0.00      | 0.01              |
| 802.11n HT20  | 100.00%        | 0.00                                                      | 0.00      | 0.01              |
| 802.11n HT40  | 100.00%        | 0.00                                                      | 0.00      | 0.01              |



## 5. TEST RESULT

### 5.1 AC POWER LINE CONDUCTED EMISSION

#### 5.1.1 Test Limit

According to §15.207(a),

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

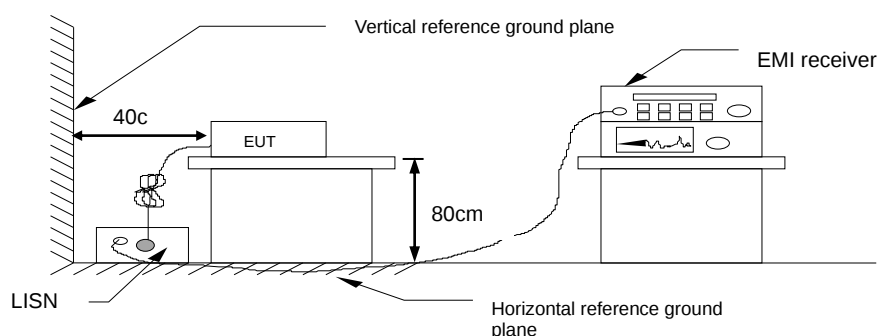
\* Decreases with the logarithm of the frequency.

#### 5.1.2 Test Procedure

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

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

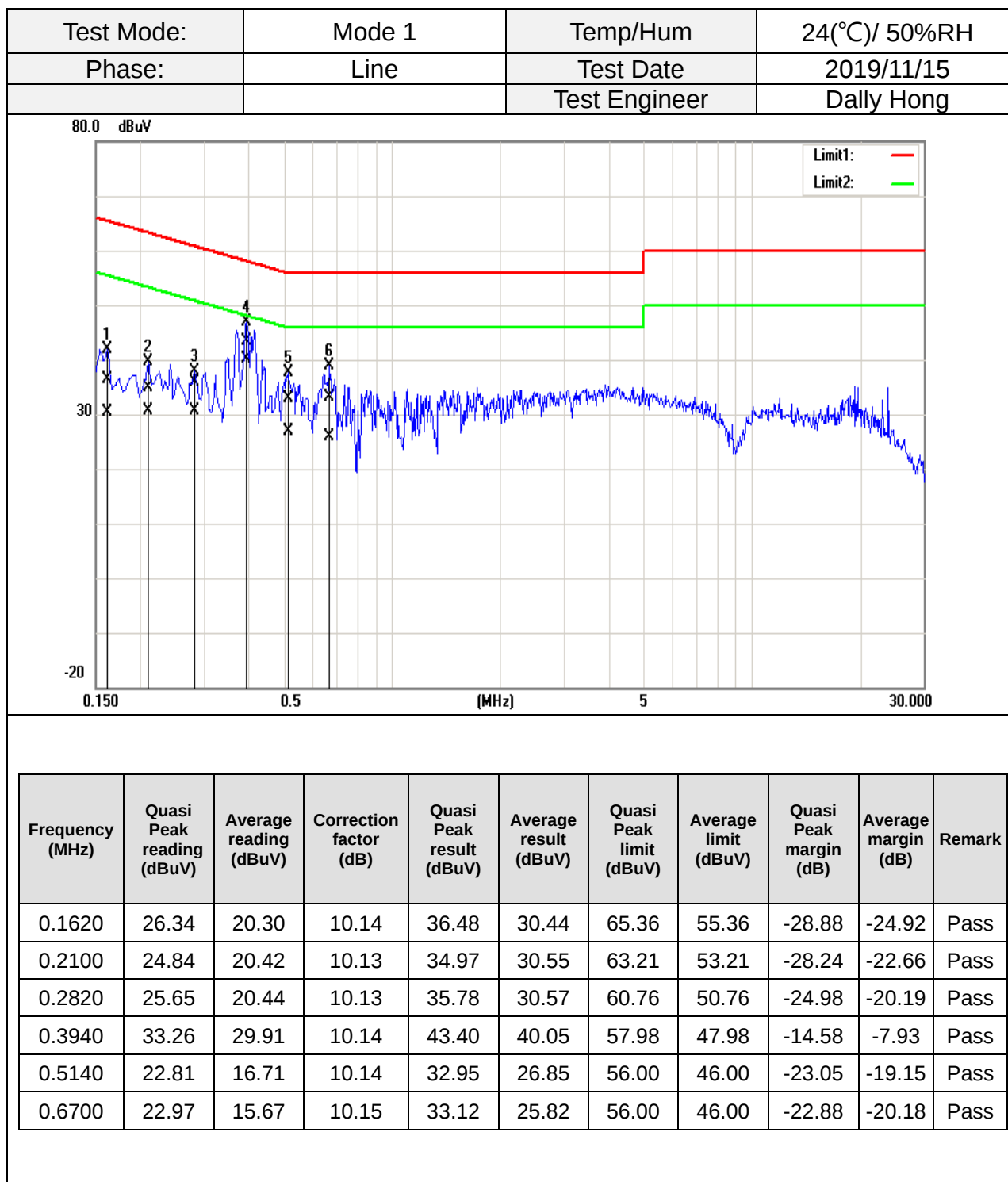
#### 5.1.3 Test Setup



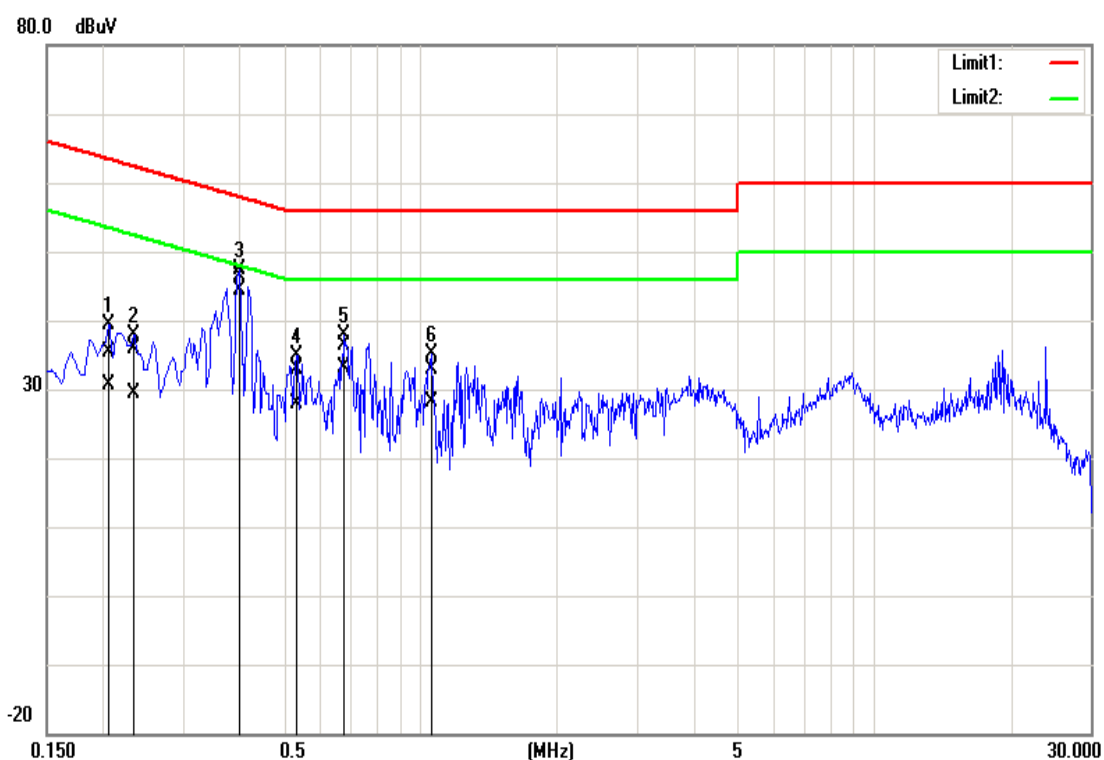
#### 5.1.4 Test Result

**Pass.**

## Test Data



|            |         |               |               |
|------------|---------|---------------|---------------|
| Test Mode: | Mode 1  | Temp/Hum      | 24(°C)/ 50%RH |
| Phase:     | Neutral | Test Date     | 2019/11/15    |
|            |         | Test Engineer | Dally Hong    |



| Frequency (MHz) | Quasi Peak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|-----------------|---------------------------|------------------------|------------------------|--------------------------|-----------------------|-------------------------|----------------------|------------------------|---------------------|--------|
| 0.2040          | 25.34                     | 20.68                  | 10.02                  | 35.36                    | 30.70                 | 63.45                   | 53.45                | -28.09                 | -22.75              | Pass   |
| 0.2340          | 25.86                     | 19.31                  | 10.02                  | 35.88                    | 29.33                 | 62.31                   | 52.31                | -26.43                 | -22.98              | Pass   |
| 0.3980          | 36.37                     | 34.28                  | 10.03                  | 46.40                    | 44.31                 | 57.90                   | 47.90                | -11.50                 | -3.59               | Pass   |
| 0.5340          | 22.76                     | 17.89                  | 10.03                  | 32.79                    | 27.92                 | 56.00                   | 46.00                | -23.21                 | -18.08              | Pass   |
| 0.6820          | 26.46                     | 23.05                  | 10.03                  | 36.49                    | 33.08                 | 56.00                   | 46.00                | -19.51                 | -12.92              | Pass   |
| 1.0580          | 22.96                     | 18.15                  | 10.04                  | 33.00                    | 28.19                 | 56.00                   | 46.00                | -23.00                 | -17.81              | Pass   |

## 5.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

### 5.2.1 Test Limit

According to §15.247(a)(2),

#### 6 dB Bandwidth :

|       |                          |
|-------|--------------------------|
| Limit | Shall be at least 500kHz |
|-------|--------------------------|

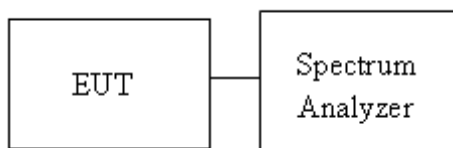
Occupied Bandwidth(99%) : For reporting purposes only.

### 5.2.2 Test Procedure

Test method Refer as KDB 558074 D01 and ANSI C63.10: 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. SA set RBW = 100KHz , VBW = 300KHz and Detector = Peak, to measurement 6dB Bandwidth
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

### 5.2.3 Test Setup



## 5.2.4 Test Result

| Test mode: IEEE 802.11b Mode / 2412-2462 MHz |                 |                        |                       |                      |                      |                 |
|----------------------------------------------|-----------------|------------------------|-----------------------|----------------------|----------------------|-----------------|
| Channel                                      | Frequency (MHz) | Chain 0 OBW(99%) (MHz) | Chain1 OBW(99%) (MHz) | Chain 0 6dB BW (MHz) | Chain 1 6dB BW (MHz) | 6dB limit (kHz) |
| Low                                          | 2412            | 12.9377                | 12.8075               | 10.0435              | 9.087                | ≥500            |
| Mid                                          | 2437            | 12.2431                | 12.2431               | 10.0435              | 10.0435              |                 |
| High                                         | 2462            | 12.9811                | 12.2431               | 10.0435              | 9.5652               |                 |

| Test mode: IEEE 802.11g Mode / 2412-2462 MHz |                 |                        |                       |                      |                      |                 |
|----------------------------------------------|-----------------|------------------------|-----------------------|----------------------|----------------------|-----------------|
| Channel                                      | Frequency (MHz) | Chain 0 OBW(99%) (MHz) | Chain1 OBW(99%) (MHz) | Chain 0 6dB BW (MHz) | Chain 1 6dB BW (MHz) | 6dB limit (kHz) |
| Low                                          | 2412            | 17.0622                | 17.1056               | 16.3478              | 16.3478              | ≥500            |
| Mid                                          | 2437            | 16.7583                | 16.7583               | 16.3478              | 16.3043              |                 |
| High                                         | 2462            | 16.7583                | 16.8451               | 16.3478              | 16.3478              |                 |

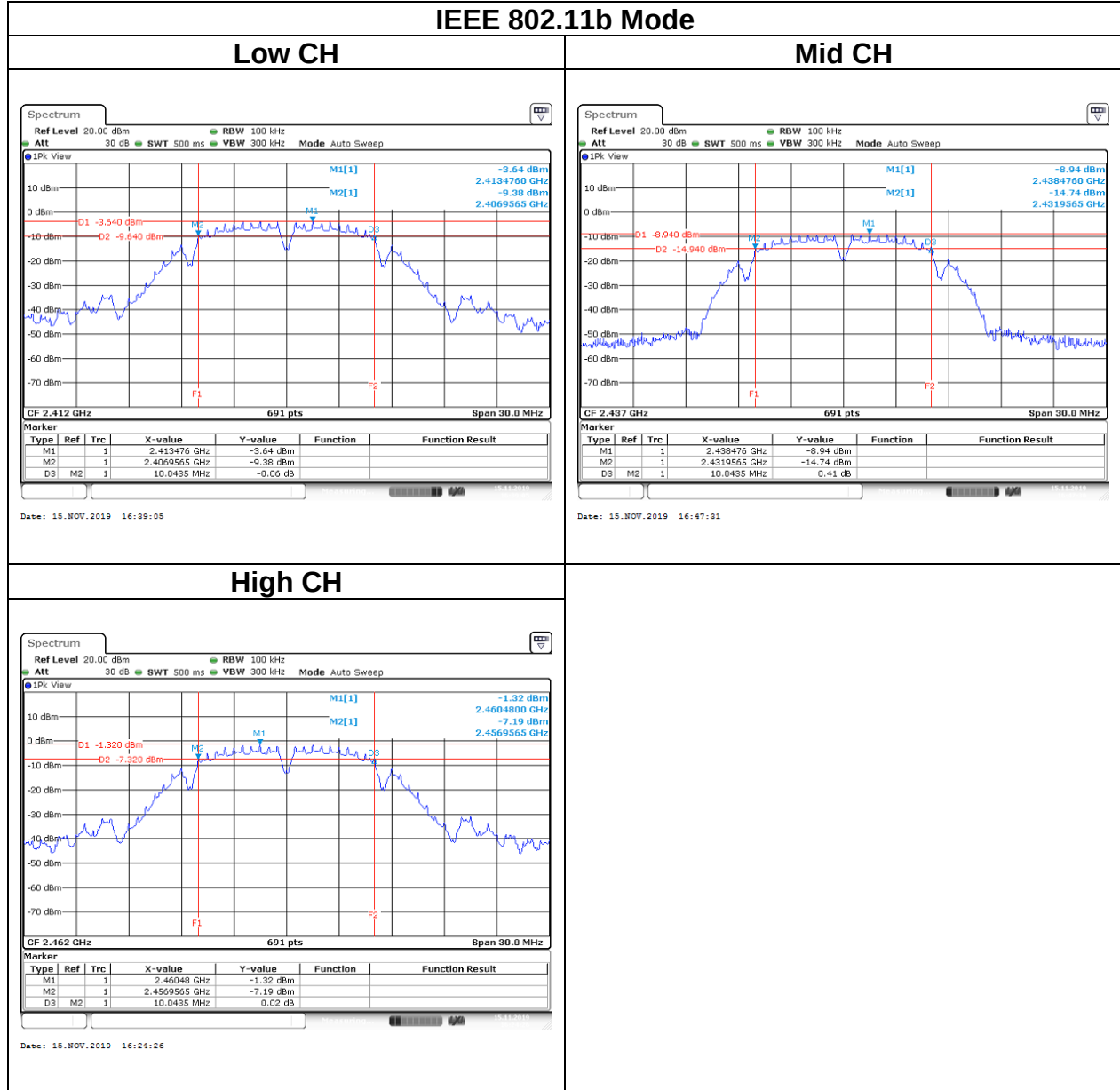
| Test mode: IEEE 802.11n HT20 Mode / 2412-2462 MHz |                 |                        |                       |                      |                      |                 |
|---------------------------------------------------|-----------------|------------------------|-----------------------|----------------------|----------------------|-----------------|
| Channel                                           | Frequency (MHz) | Chain 0 OBW(99%) (MHz) | Chain1 OBW(99%) (MHz) | Chain 0 6dB BW (MHz) | Chain 1 6dB BW (MHz) | 6dB limit (kHz) |
| Low                                               | 2412            | 17.8871                | 17.8437               | 17.2609              | 17.0435              | ≥500            |
| Mid                                               | 2437            | 17.6700                | 17.6266               | 17.3043              | 16.9565              |                 |
| High                                              | 2462            | 17.6700                | 17.6266               | 17.2609              | 16.9565              |                 |

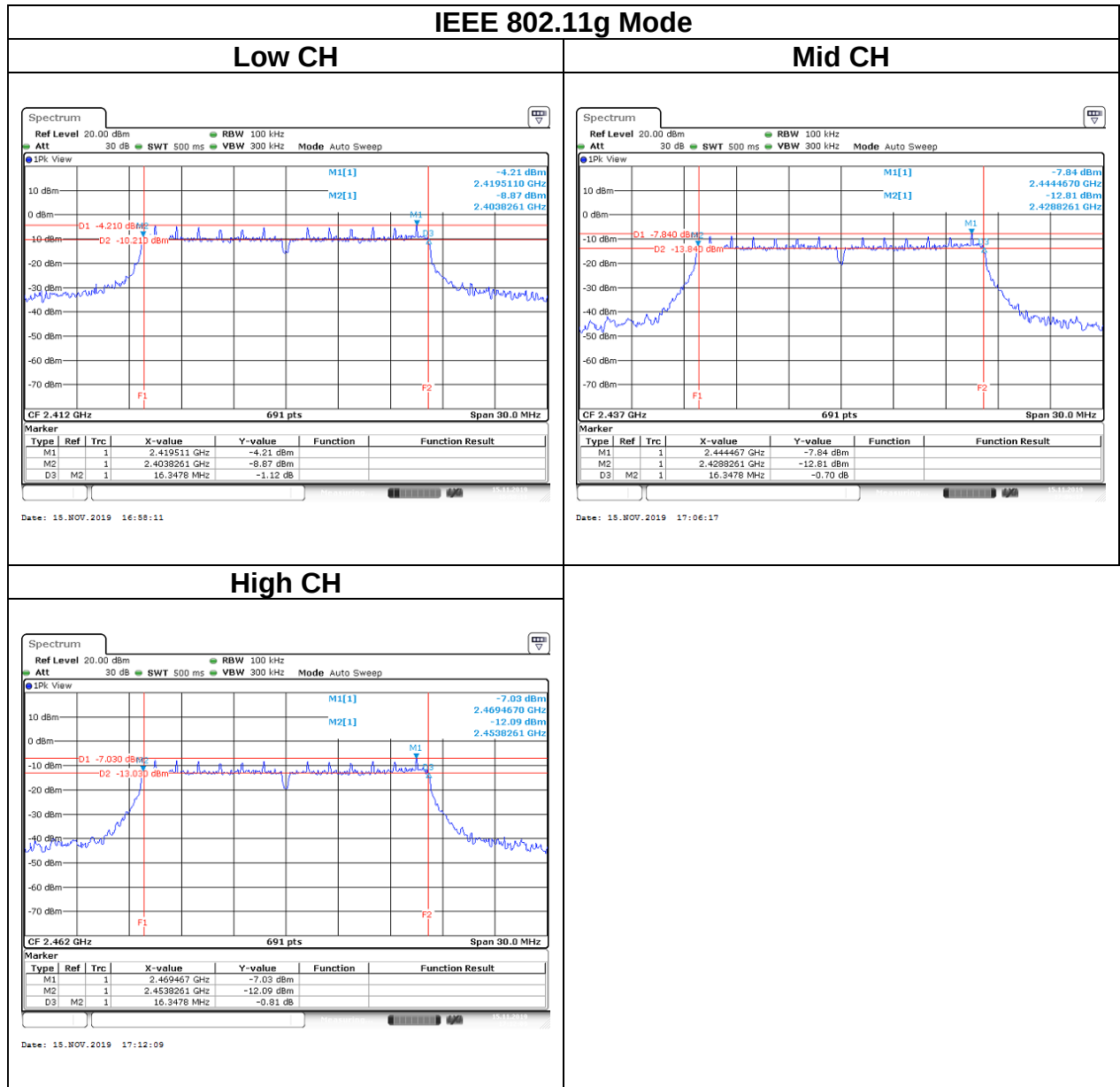
| Test mode: IEEE 802.11n HT40 Mode / 2422-2452 MHz |                 |                        |                       |                      |                      |                 |
|---------------------------------------------------|-----------------|------------------------|-----------------------|----------------------|----------------------|-----------------|
| Channel                                           | Frequency (MHz) | Chain 0 OBW(99%) (MHz) | Chain1 OBW(99%) (MHz) | Chain 0 6dB BW (MHz) | Chain 1 6dB BW (MHz) | 6dB limit (kHz) |
| Low                                               | 2422            | 36.4688                | 36.8162               | 35.826               | 36.406               | >500            |
| Mid                                               | 2437            | 36.3531                | 36.8162               | 36.406               | 36.174               |                 |
| High                                              | 2452            | 36.4688                | 37.0477               | 36.406               | 36.174               |                 |

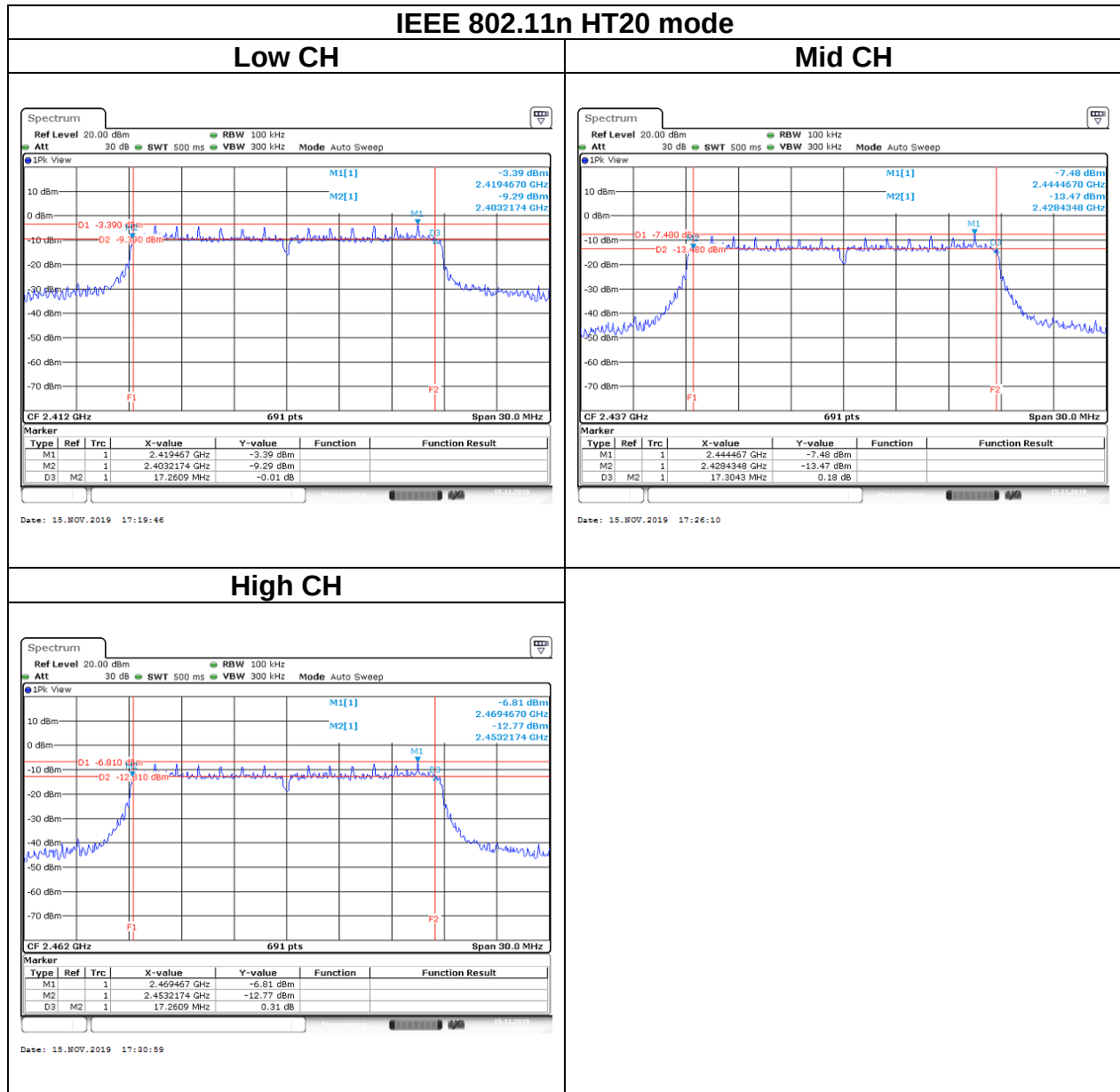
## Test Data

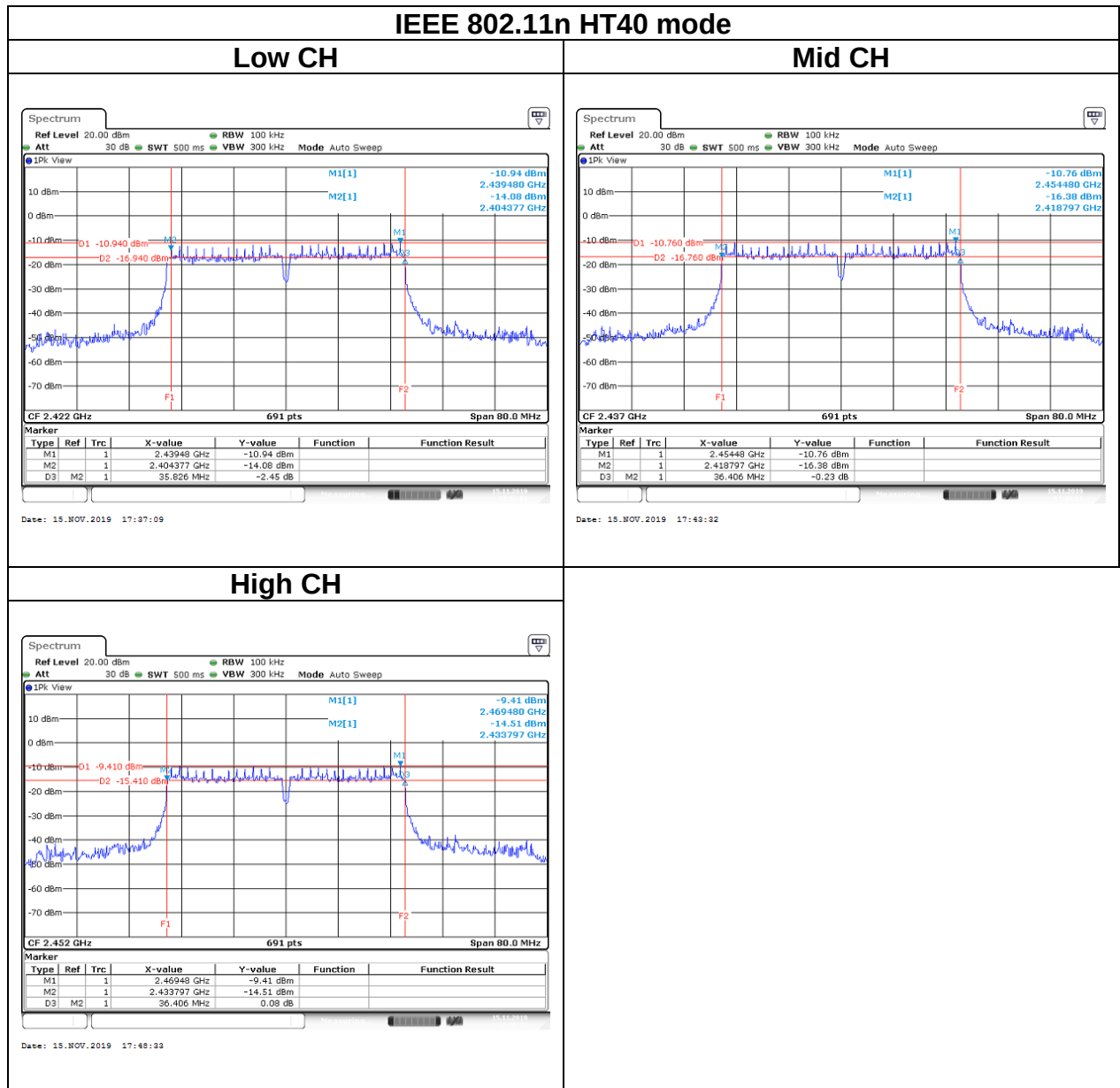
### 6dB BANDWIDTH

#### Chain 0





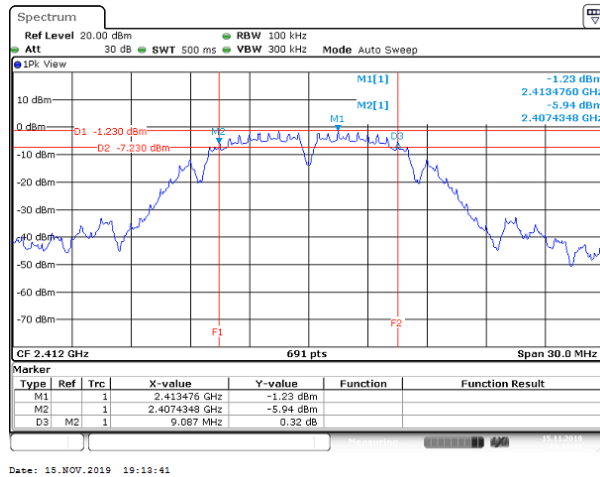




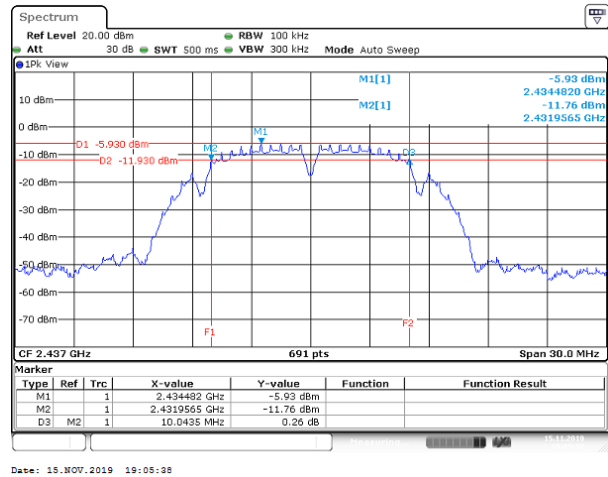
## Chain 1

### IEEE 802.11b Mode

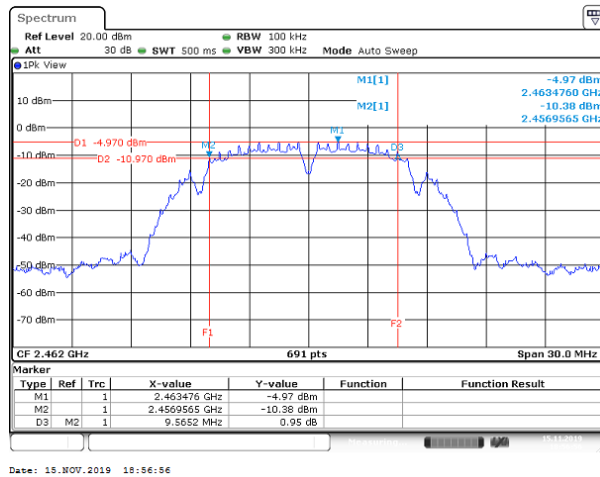
#### Low CH

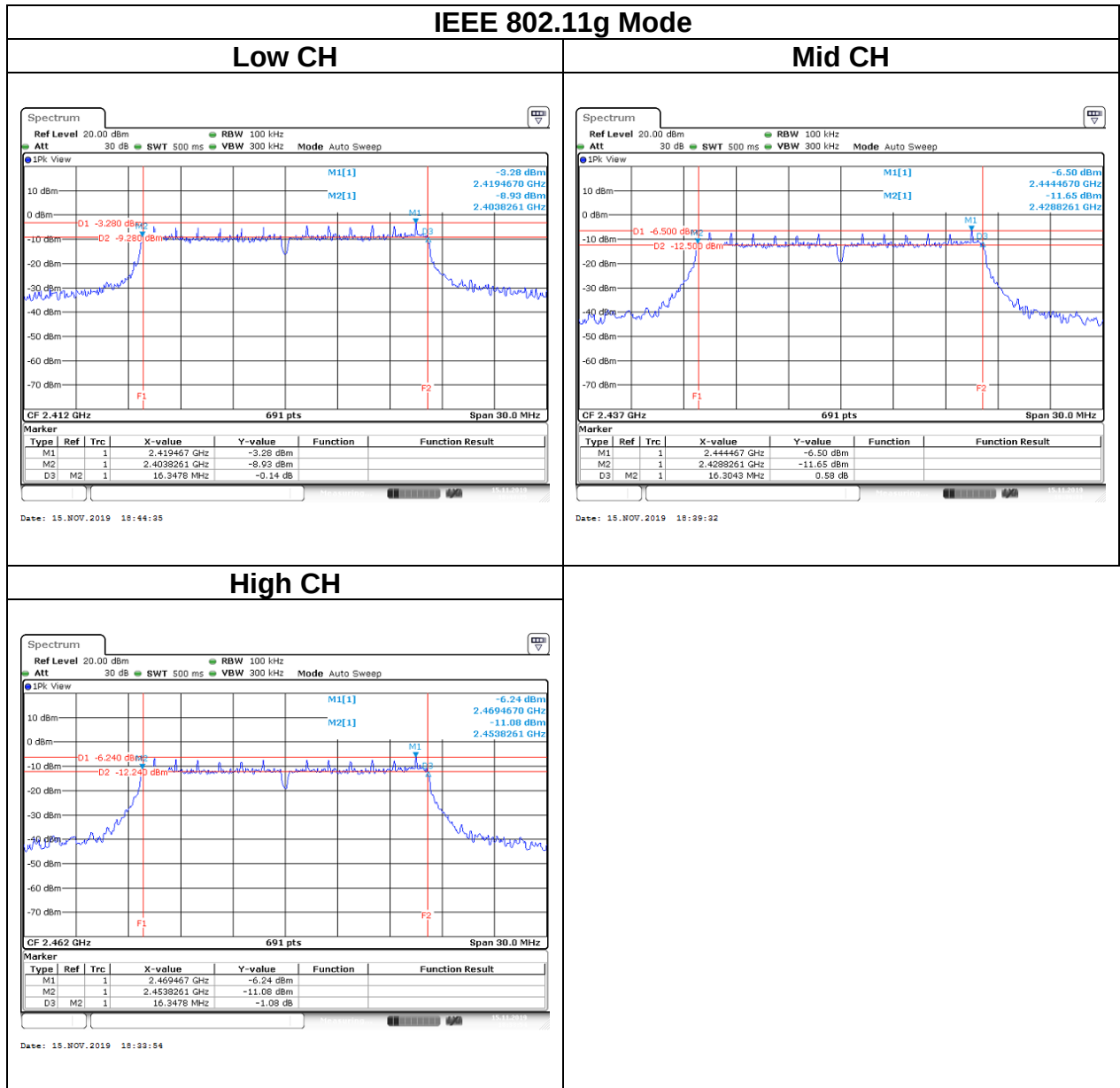


#### Mid CH



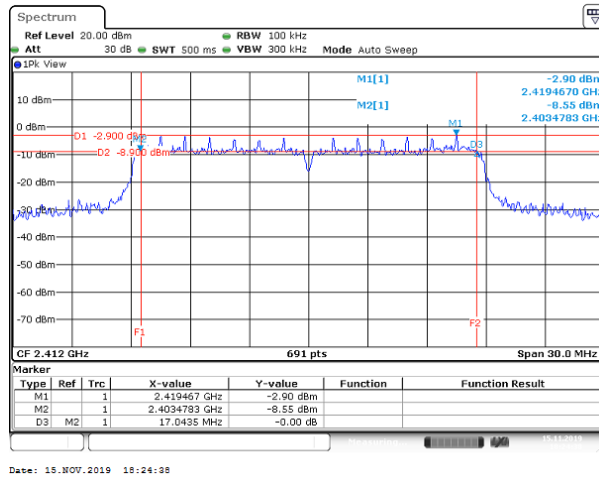
#### High CH



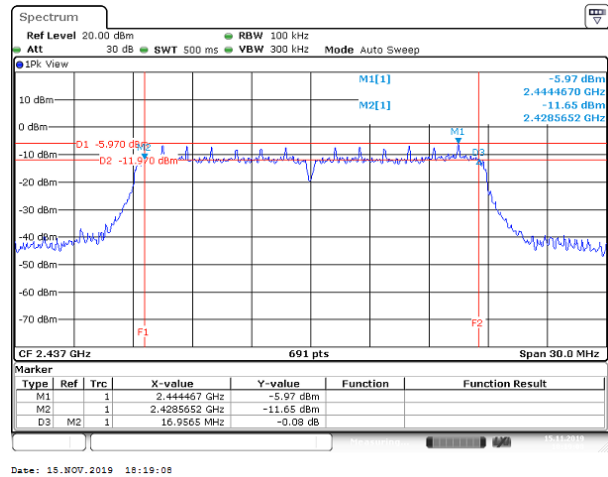


## IEEE 802.11n HT20 mode

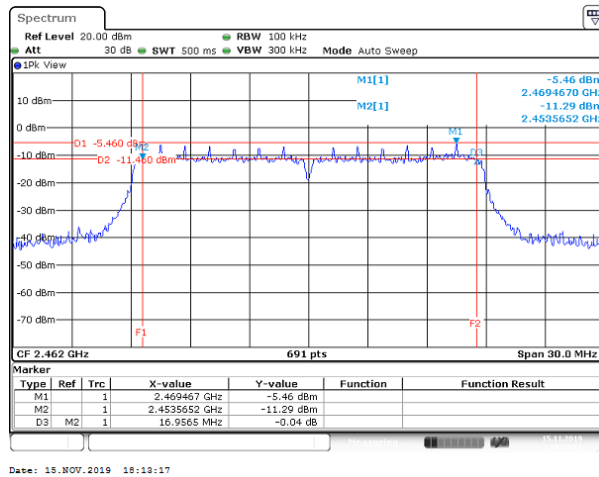
### Low CH



### Mid CH

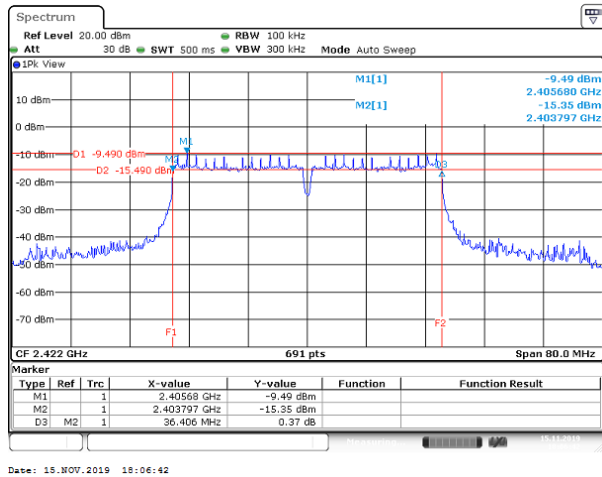


### High CH

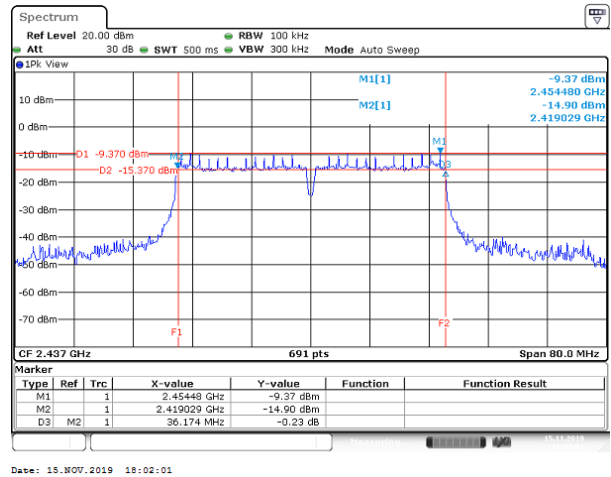


## IEEE 802.11n HT40 mode

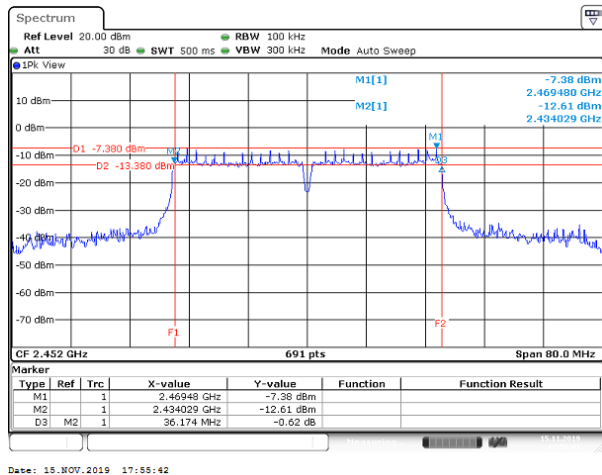
### Low CH



### Mid CH



### High CH

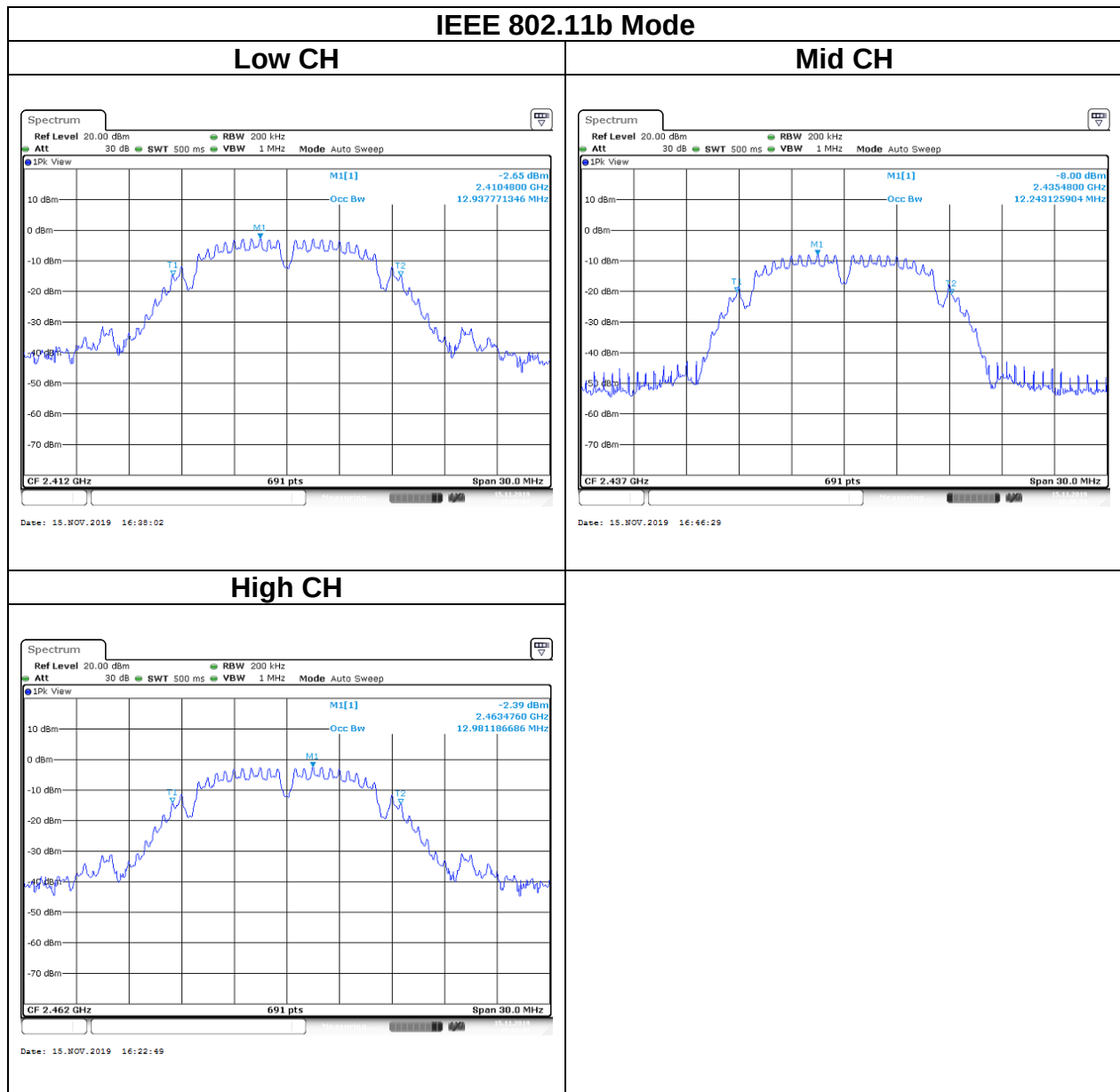


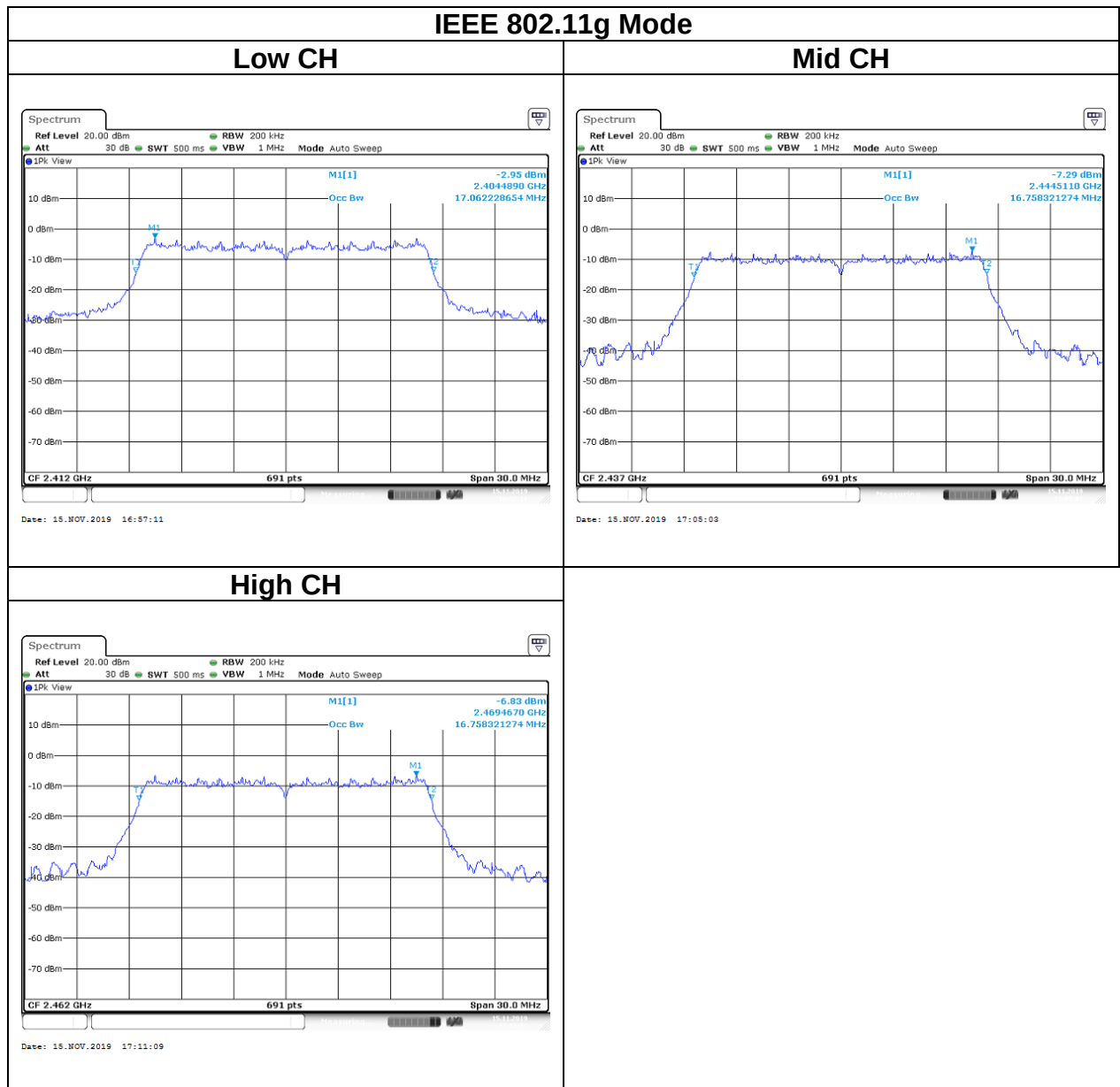
Report No.: T191104D01-RP1

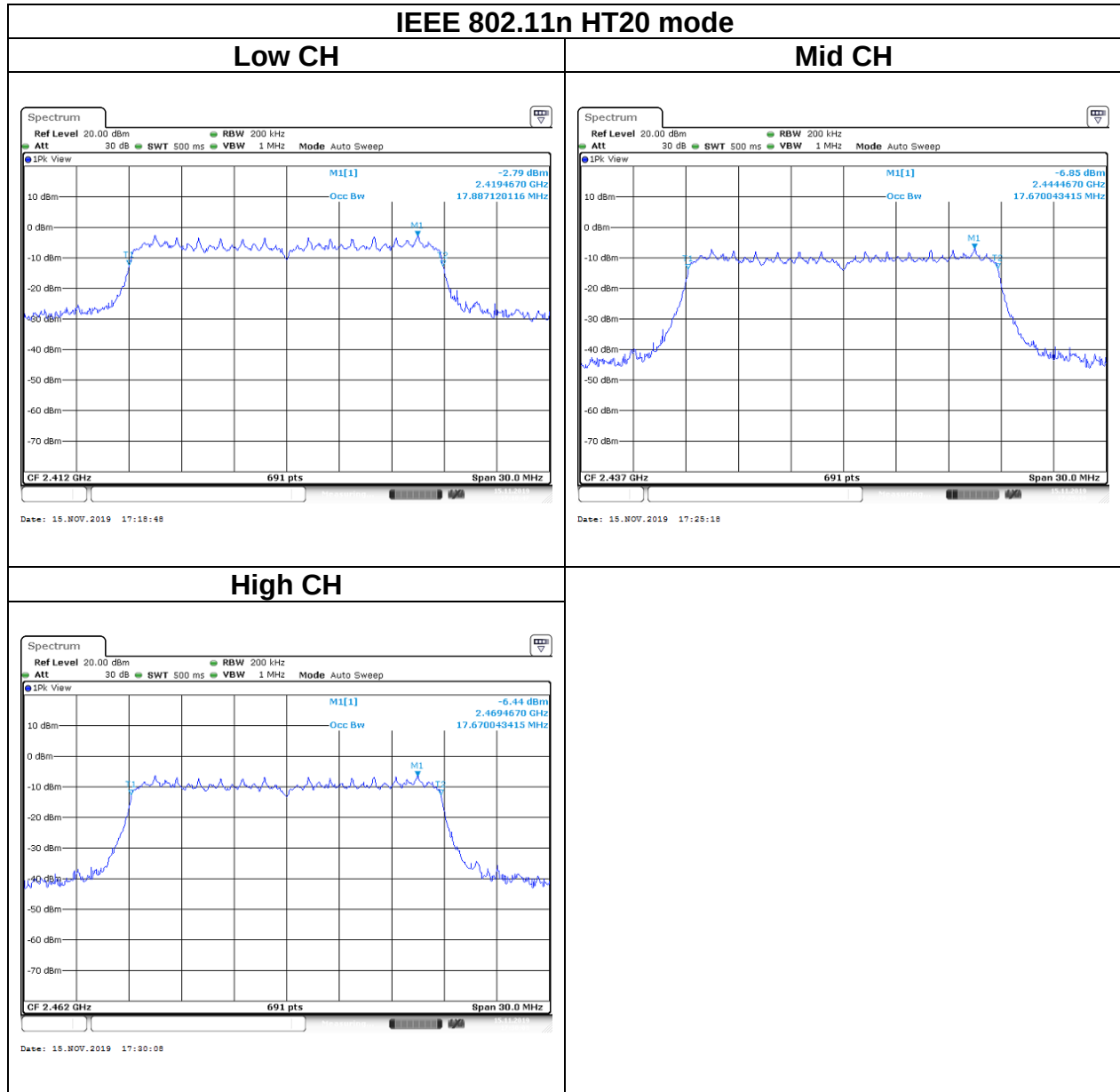
## Test Data

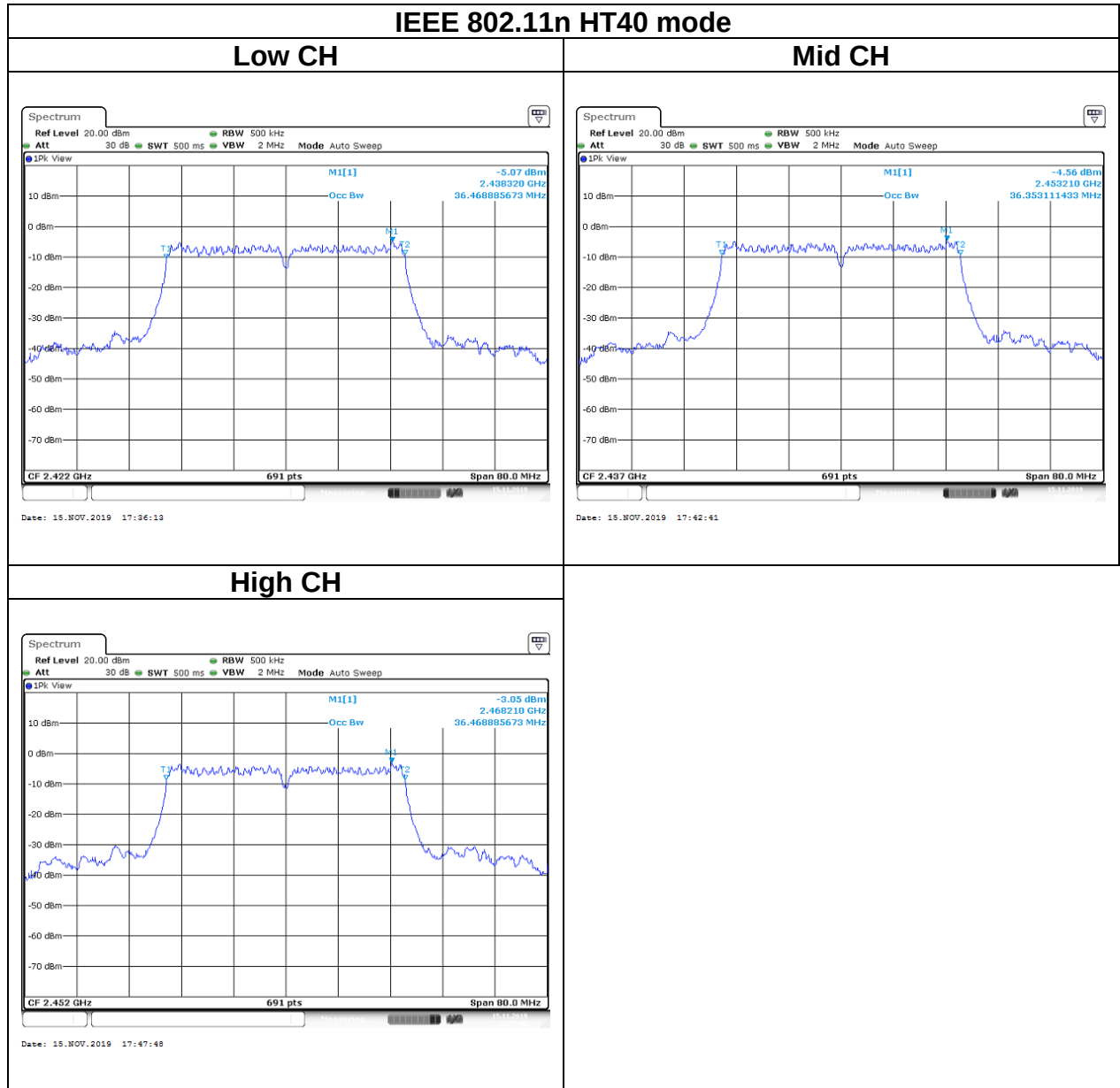
### BANDWIDTH (99%)

### Chain 0







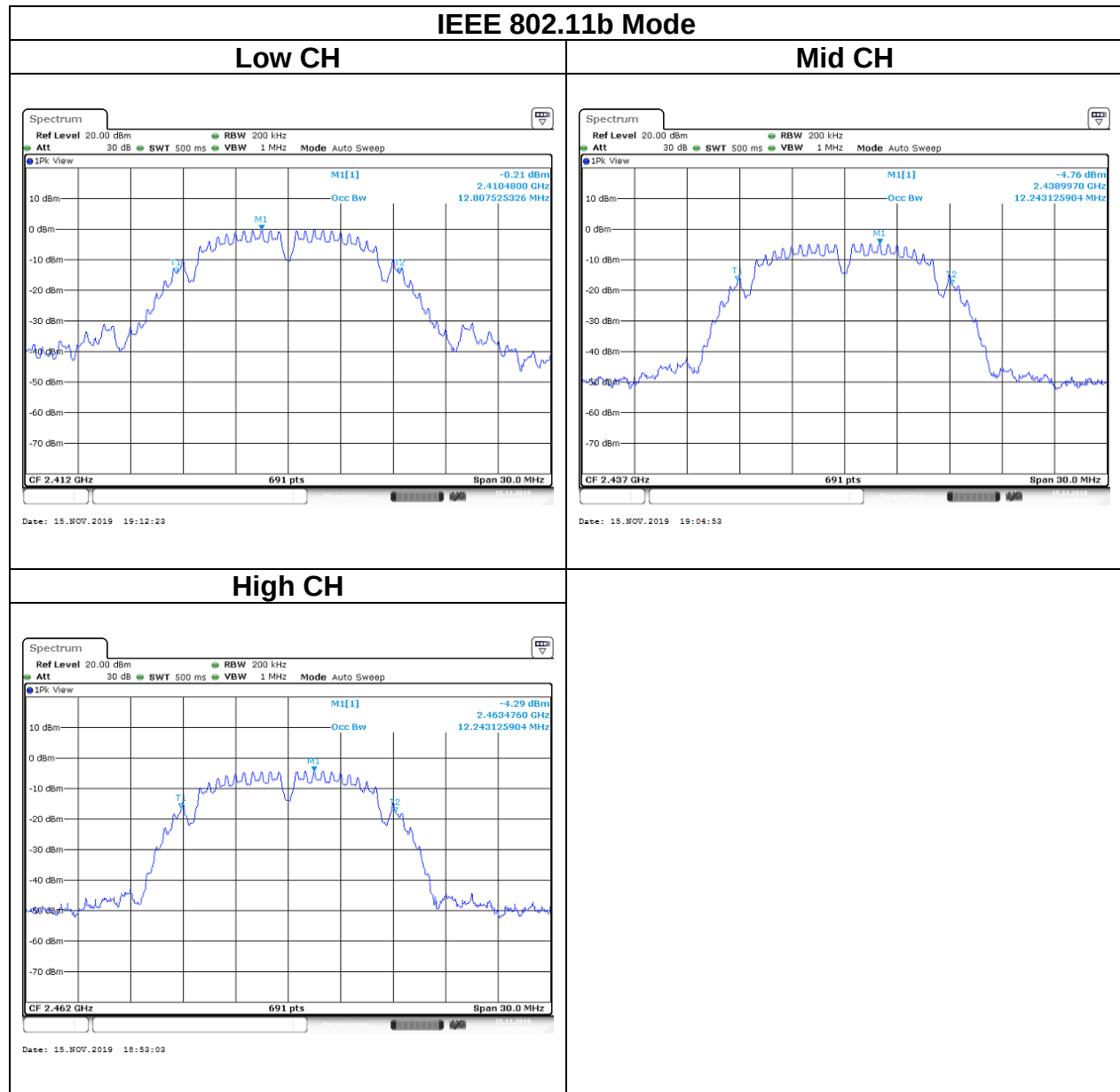


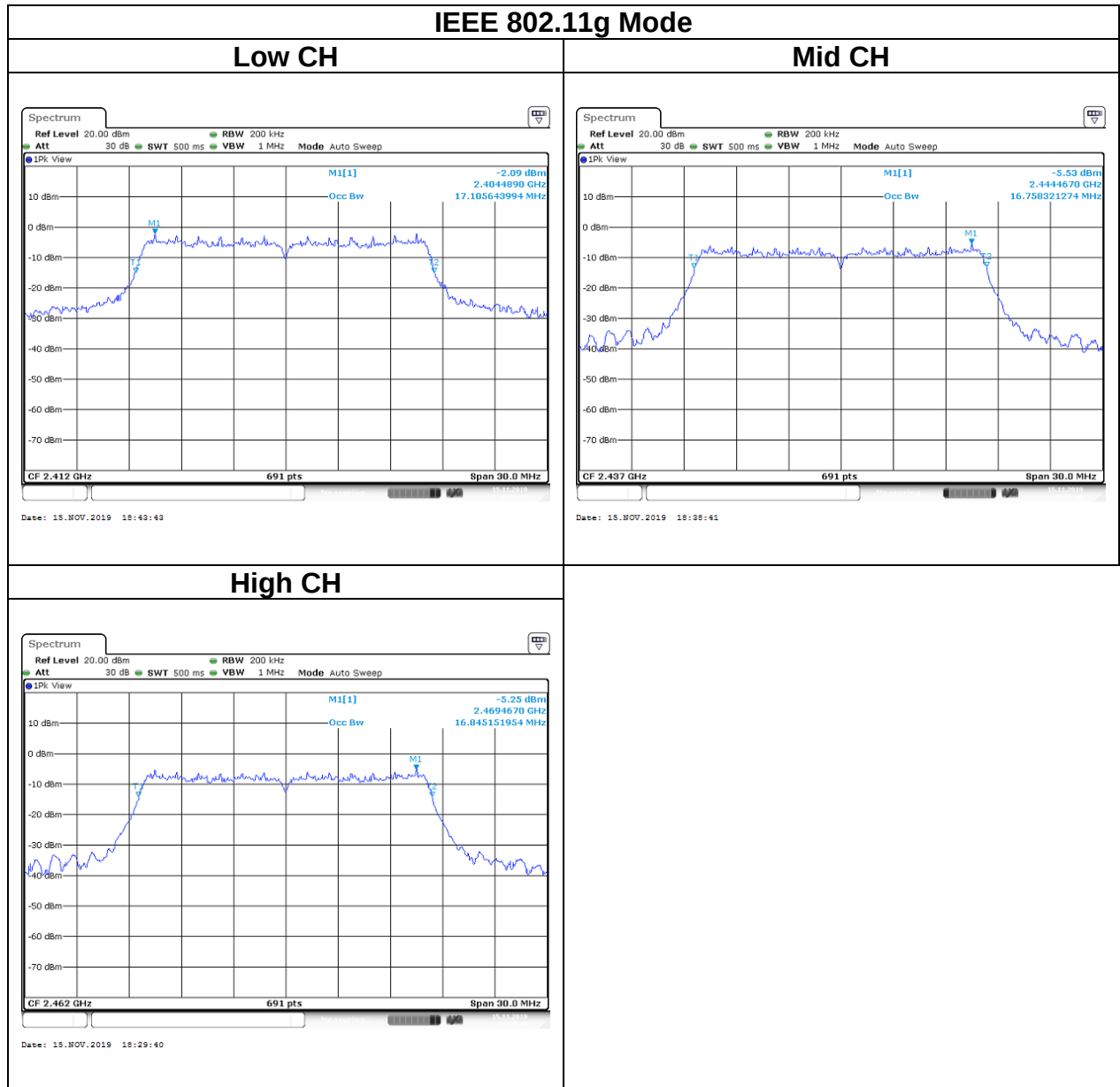


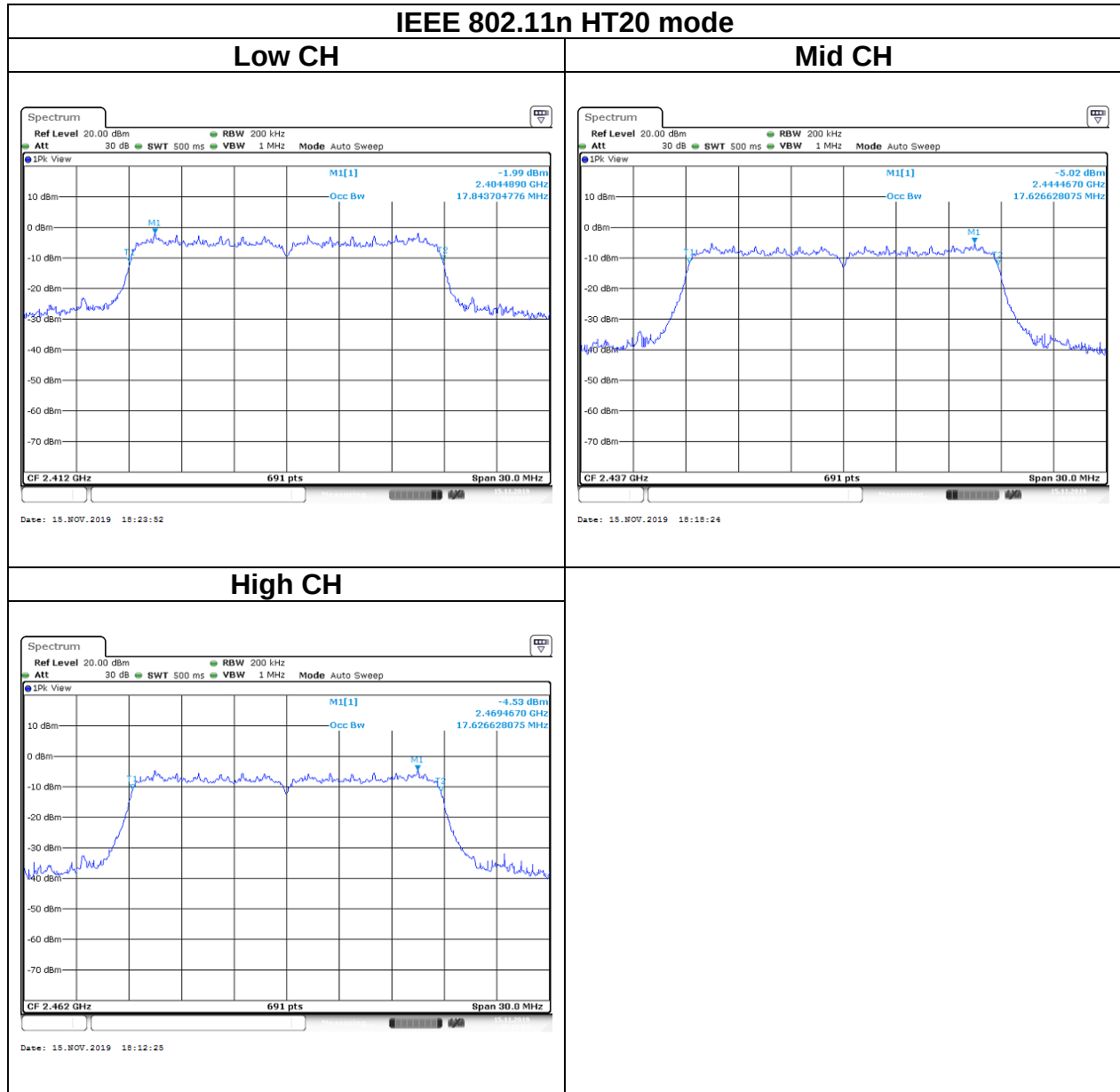
Report No.: T191104D01-RP1

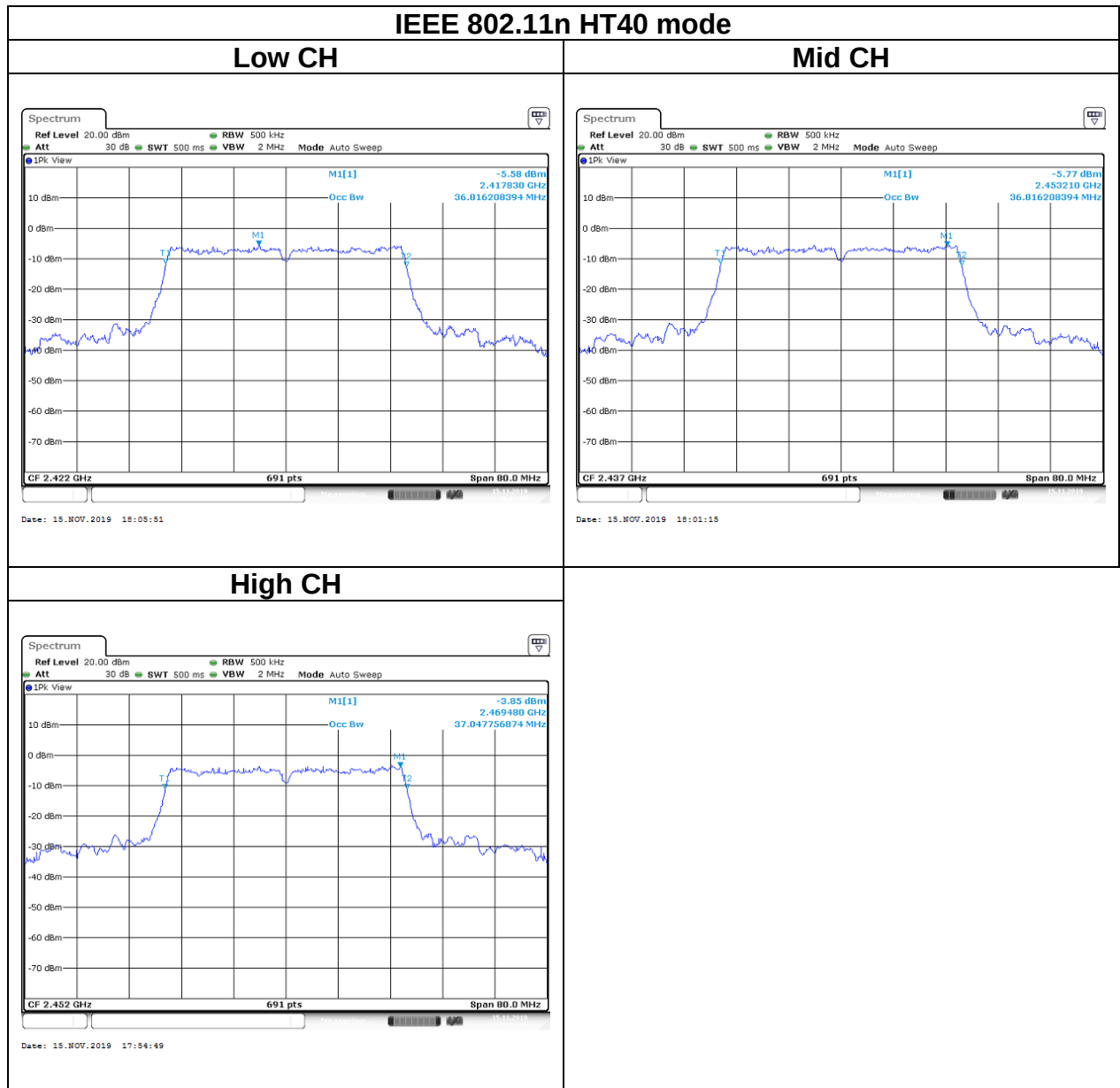
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## Chain 1









## 5.3 OUTPUT POWER MEASUREMENT

### 5.3.1 Test Limit

According to §15.247(b)(3),

#### Peak output power :

For systems using digital modulation in the 2400-2483.5 MHz: 1 Watt(30 dBm), base on the use of antennas with directional gain not exceed 6 dBi. If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

|       |                                                                                                                                                                                                                         |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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)]<br><input type="checkbox"/> Point-to-point operation : |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

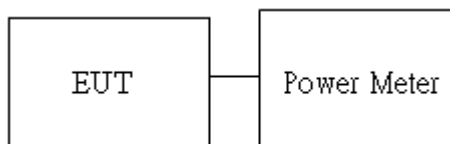
Average output power : For reporting purposes only.

### 5.3.2 Test Procedure

Test method Refer as KDB 558074 D01.

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 Peak output power and Average output power. in the test report.

### 5.3.3 Test Setup



### 5.3.4 Test Result

#### Peak output power :

##### 1TX:

| Wifi 2.4G                              |      |                |           |         |               |         |                            |                          |                |
|----------------------------------------|------|----------------|-----------|---------|---------------|---------|----------------------------|--------------------------|----------------|
| Config                                 | CH   | Freq.<br>(MHz) | power set |         | PK Power(dBm) |         | PK Total<br>Power<br>(dBm) | PK Total<br>Power<br>(W) | Limit<br>(dBm) |
|                                        |      |                | chain 0   | chain 1 | chain 0       | chain 1 |                            |                          |                |
| IEEE<br>802.11b<br>Data rate:<br>1Mbps | Low  | 2412           | 22        | -       | 24.12         | -       | 24.12                      | 0.2582                   | 30             |
|                                        | Mid  | 2437           | 23        | -       | 23.94         | -       | 23.94                      | 0.2477                   |                |
|                                        | High | 2462           | 22        | -       | 24.07         | -       | 24.07                      | 0.2553                   |                |
| IEEE<br>802.11b<br>Data rate:<br>1Mbps | Low  | 2412           | -         | 22      | -             | 24.28   | 24.28                      | 0.2679                   |                |
|                                        | Mid  | 2437           | -         | 23      | -             | 25.06   | 25.06                      | 0.3206                   |                |
|                                        | High | 2462           | -         | 22      | -             | 24.31   | 24.31                      | 0.2698                   |                |

##### 2TX:

| Wifi 2.4G                                      |      |                |           |         |               |         |                            |                          |                |
|------------------------------------------------|------|----------------|-----------|---------|---------------|---------|----------------------------|--------------------------|----------------|
| Config                                         | CH   | Freq.<br>(MHz) | power set |         | PK Power(dBm) |         | PK Total<br>Power<br>(dBm) | PK Total<br>Power<br>(W) | Limit<br>(dBm) |
|                                                |      |                | chain 0   | chain 1 | chain 0       | chain 1 |                            |                          |                |
| IEEE<br>802.11g<br>Data rate:<br>6Mbps         | Low  | 2412           | 29        | 29      | 24.71         | 25.42   | 28.09                      | 0.6441                   | 30             |
|                                                | Mid  | 2437           | 2A        | 2A      | 25.06         | 25.46   | 28.27                      | 0.6722                   |                |
|                                                | High | 2462           | 2A        | 2A      | 24.84         | 25.62   | 28.26                      | 0.6695                   |                |
| IEEE<br>802.11n<br>20MHz<br>Data rate:<br>MCS8 | Low  | 2412           | 2B        | 2B      | 25.07         | 25.29   | 28.19                      | 0.6594                   |                |
|                                                | Mid  | 2437           | 2B        | 2B      | 23.07         | 25.84   | 27.68                      | 0.5865                   |                |
|                                                | High | 2462           | 2B        | 2B      | 25.21         | 26.1    | 28.69                      | 0.7393                   |                |
| IEEE<br>802.11n<br>40MHz<br>Data rate:<br>MCS8 | Low  | 2422           | 2B        | 2B      | 23.33         | 25.99   | 27.87                      | 0.6125                   |                |
|                                                | Mid  | 2437           | 2B        | 2B      | 23.72         | 25.01   | 27.42                      | 0.5525                   |                |
|                                                | High | 2452           | 2B        | 2B      | 24.45         | 25.56   | 28.05                      | 0.6384                   |                |



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**Average output power :**

**1TX:**

| Wifi 2.4G                              |      |                |               |         |                            |
|----------------------------------------|------|----------------|---------------|---------|----------------------------|
| Config                                 | CH   | Freq.<br>(MHz) | AV Power(dBm) |         | AV Total<br>Power<br>(dBm) |
|                                        |      |                | chain 0       | chain 1 |                            |
| IEEE<br>802.11b<br>Data rate:<br>1Mbps | Low  | 2412           | 21.64         | -       | 21.64                      |
|                                        | Mid  | 2437           | 21.12         | -       | 21.12                      |
|                                        | High | 2462           | 21.25         | -       | 21.25                      |
| IEEE<br>802.11b<br>Data rate:<br>1Mbps | Low  | 2412           | -             | 20.15   | 20.15                      |
|                                        | Mid  | 2437           | -             | 19.98   | 22.87                      |
|                                        | High | 2462           | -             | 20.34   | 22.88                      |

**2TX:**

| Wifi 2.4G                                      |      |                |               |         |                            |
|------------------------------------------------|------|----------------|---------------|---------|----------------------------|
| Config                                         | CH   | Freq.<br>(MHz) | AV Power(dBm) |         | AV Total<br>Power<br>(dBm) |
|                                                |      |                | chain 0       | chain 1 |                            |
| IEEE<br>802.11g<br>Data rate:<br>6Mbps         | Low  | 2412           | 19.27         | 20.15   | 22.74                      |
|                                                | Mid  | 2437           | 19.73         | 19.98   | 22.87                      |
|                                                | High | 2462           | 19.34         | 20.34   | 22.88                      |
| IEEE<br>802.11n<br>20MHz<br>Data rate:<br>MCS8 | Low  | 2412           | 19.61         | 19.77   | 22.70                      |
|                                                | Mid  | 2437           | 13.82         | 20.73   | 21.54                      |
|                                                | High | 2462           | 19.60         | 21.14   | 23.45                      |
| IEEE<br>802.11n<br>40MHz<br>Data rate:<br>MCS8 | Low  | 2422           | 12.81         | 20.05   | 20.80                      |
|                                                | Mid  | 2437           | 13.40         | 14.93   | 17.24                      |
|                                                | High | 2452           | 14.85         | 17.10   | 19.13                      |

## 5.4 POWER SPECTRAL DENSITY

### 5.4.1 Test Limit

According to §15.247(e),

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

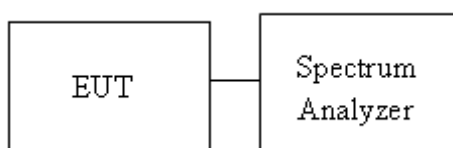
|       |                                                                                                                                                                                                                         |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Limit | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 8dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi :<br>[ Limit = 8 – (DG – 6) ]<br><input type="checkbox"/> Point-to-point operation : |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 5.4.2 Test Procedure

Test method Refer as KDB 558074 D01.

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss was compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

### 5.4.3 Test Setup





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#### 5.4.4 Test Result

##### 1TX:

| Test mode: IEEE 802.11b Mode / 2412-2462 MHz |                 |                     |                     |                   |             |
|----------------------------------------------|-----------------|---------------------|---------------------|-------------------|-------------|
| Channel                                      | Frequency (MHz) | Chain 0 PPSSD (dBm) | Chain 1 PPSSD (dBm) | Total PPSSD (dBm) | Limit (dBm) |
| Low                                          | 2412            | -7.55               | -                   | -7.55             | 8           |
| Mid                                          | 2437            | -13.17              | -                   | -13.17            |             |
| High                                         | 2462            | -9.33               | -                   | -9.33             |             |

| Test mode: IEEE 802.11b Mode / 2412-2462 MHz |                 |                     |                     |                   |             |
|----------------------------------------------|-----------------|---------------------|---------------------|-------------------|-------------|
| Channel                                      | Frequency (MHz) | Chain 0 PPSSD (dBm) | Chain 1 PPSSD (dBm) | Total PPSSD (dBm) | Limit (dBm) |
| Low                                          | 2412            | -                   | -7.82               | -7.82             | 8           |
| Mid                                          | 2437            | -                   | -10.69              | -10.69            |             |
| High                                         | 2462            | -                   | -10.28              | -10.28            |             |

**2TX:**

| Test mode: IEEE 802.11g Mode / 2412-2462 MHz |                 |                    |                    |                  |             |
|----------------------------------------------|-----------------|--------------------|--------------------|------------------|-------------|
| Channel                                      | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PSSD (dBm) | Limit (dBm) |
| Low                                          | 2412            | -8.16              | -8.76              | -5.44            | 8           |
| Mid                                          | 2437            | -13.22             | -11.38             | -9.19            |             |
| High                                         | 2462            | -11.14             | -11.64             | -8.37            |             |

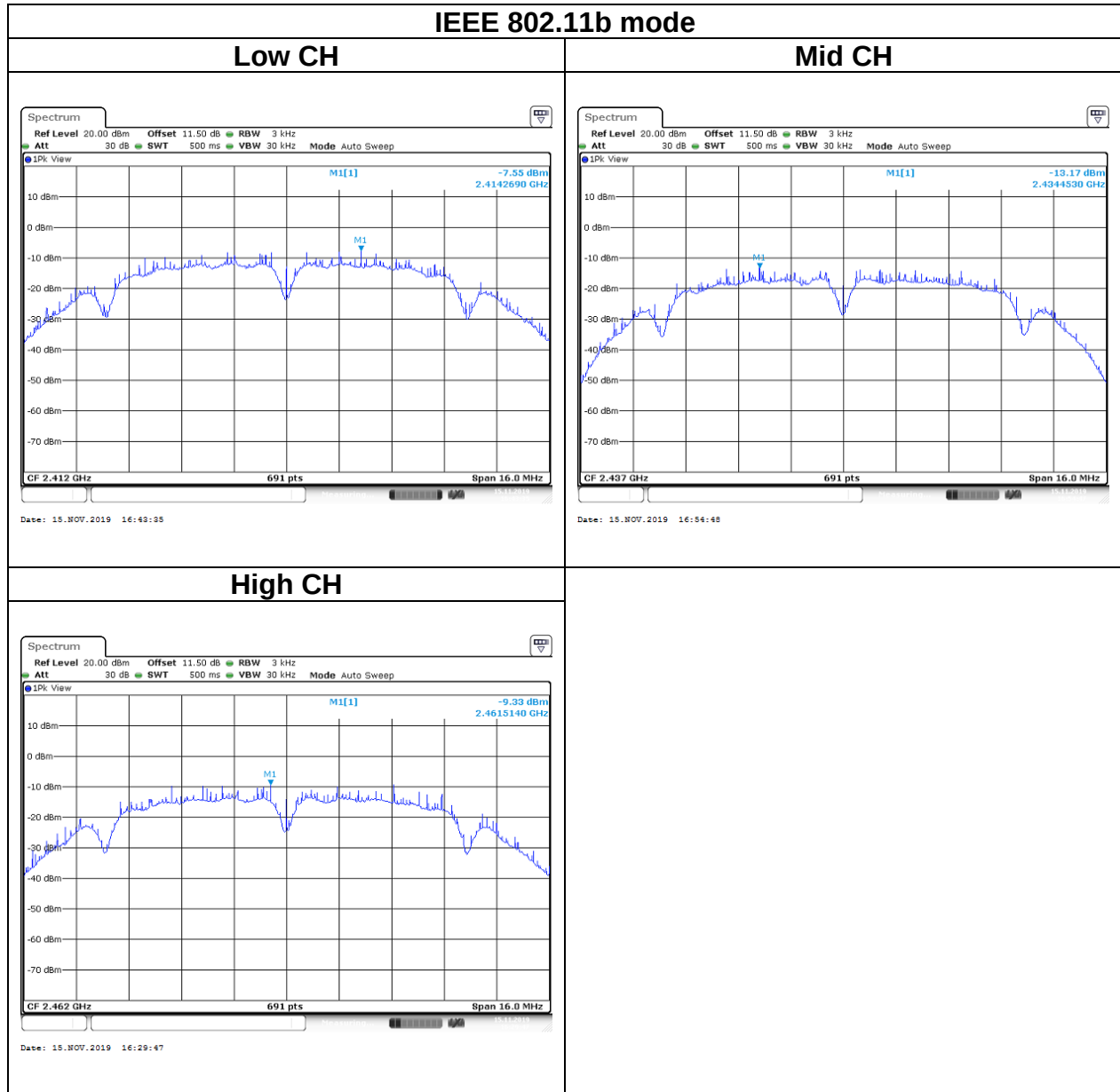
| Test mode: IEEE 802.11n HT20 Mode / 2412-2462 MHz |                 |                    |                    |                  |             |
|---------------------------------------------------|-----------------|--------------------|--------------------|------------------|-------------|
| Channel                                           | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PSSD (dBm) | Limit (dBm) |
| Low                                               | 2412            | -8.32              | -8.14              | -5.22            | 8           |
| Mid                                               | 2437            | -13.41             | -11.74             | -9.48            |             |
| High                                              | 2462            | -11.84             | -11.14             | -8.47            |             |

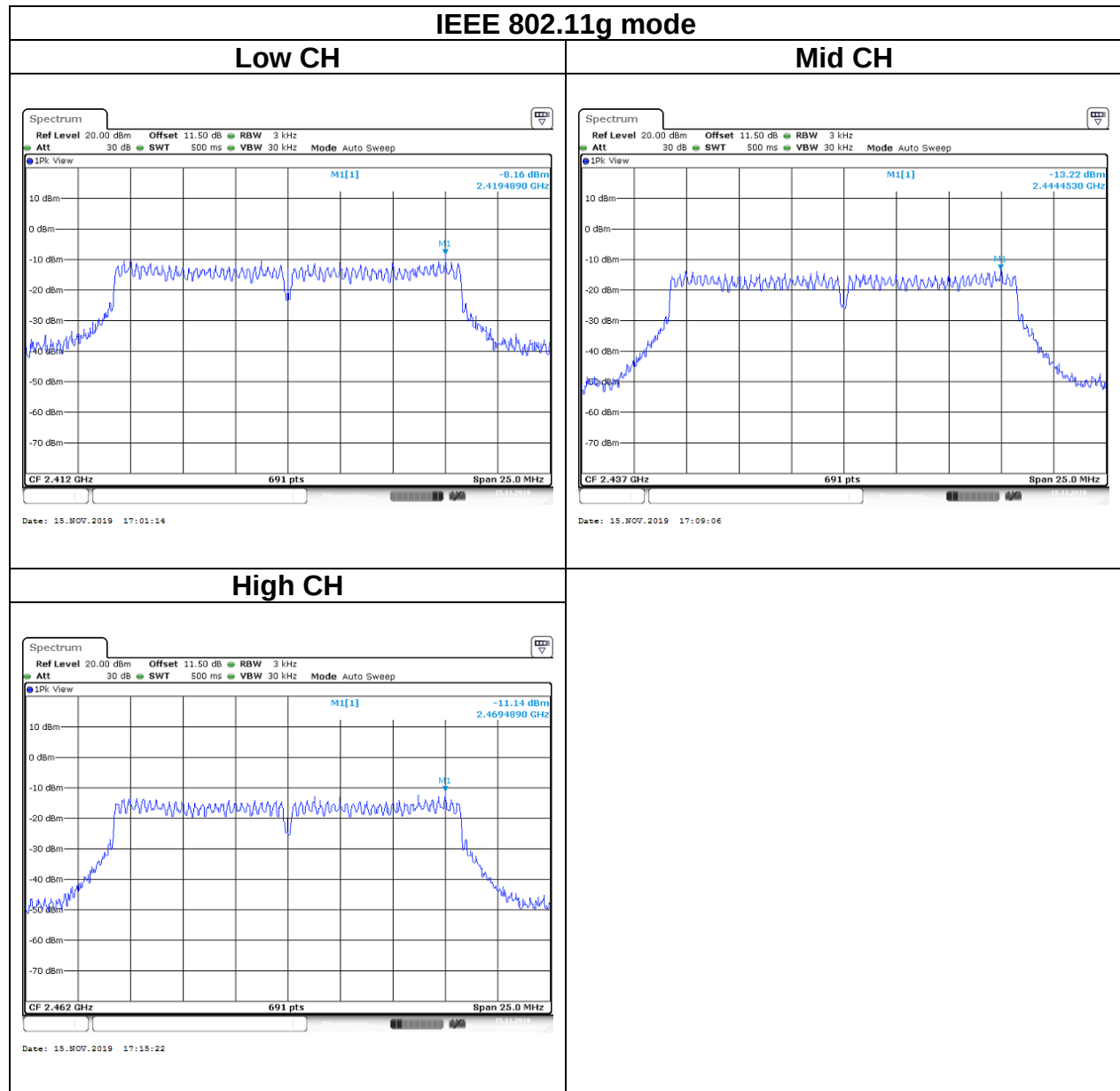
| Test mode: IEEE 802.11n HT40 Mode / 2422-2452 MHz |                 |                    |                    |                  |             |
|---------------------------------------------------|-----------------|--------------------|--------------------|------------------|-------------|
| Channel                                           | Frequency (MHz) | Chain 0 PPSD (dBm) | Chain 1 PPSD (dBm) | Total PSSD (dBm) | Limit (dBm) |
| Low                                               | 2422            | -14.18             | -13.41             | -10.77           | 8           |
| Mid                                               | 2437            | -14.05             | -13.56             | -10.79           |             |
| High                                              | 2452            | -12.74             | -11.24             | -8.92            |             |

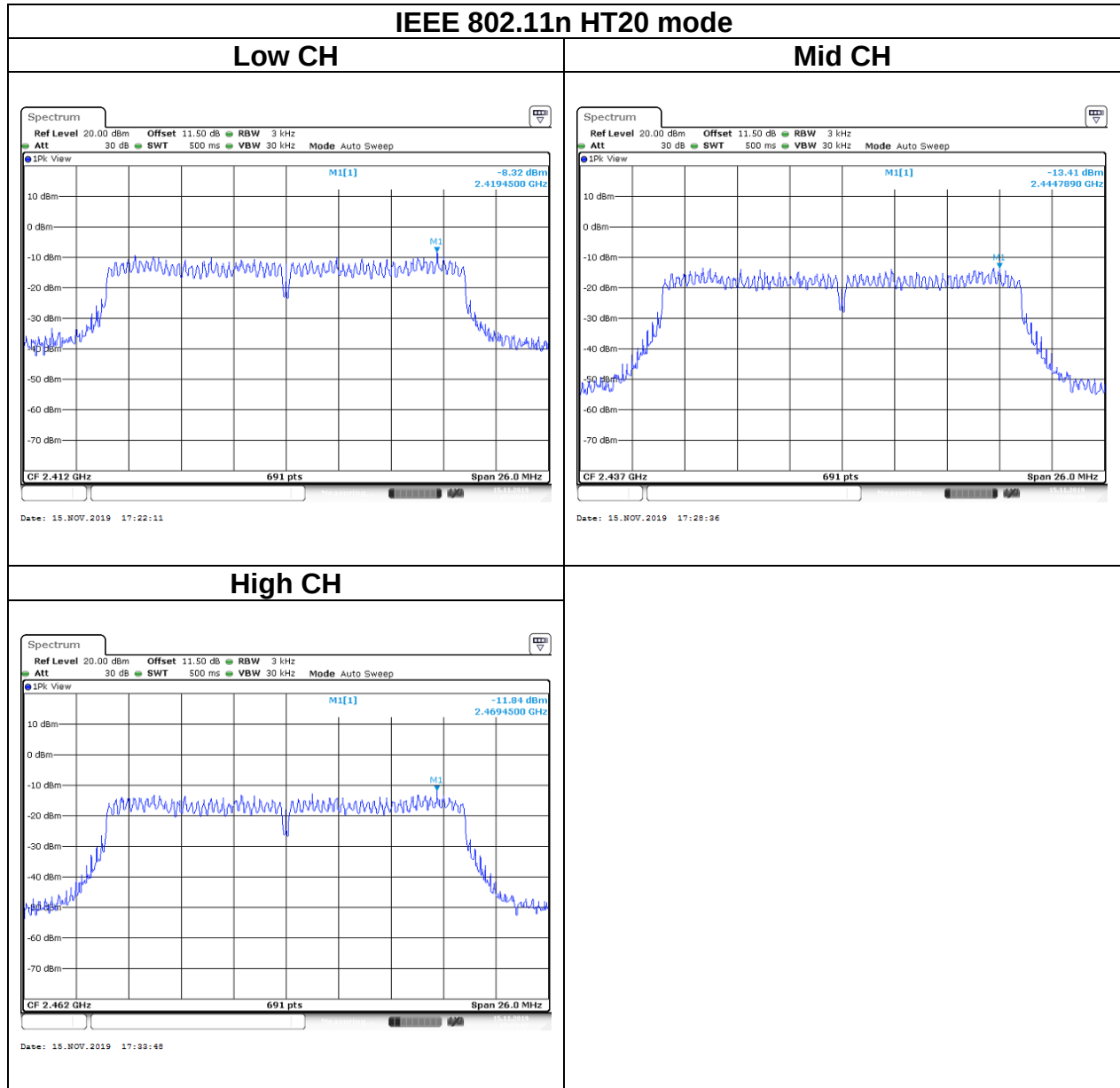


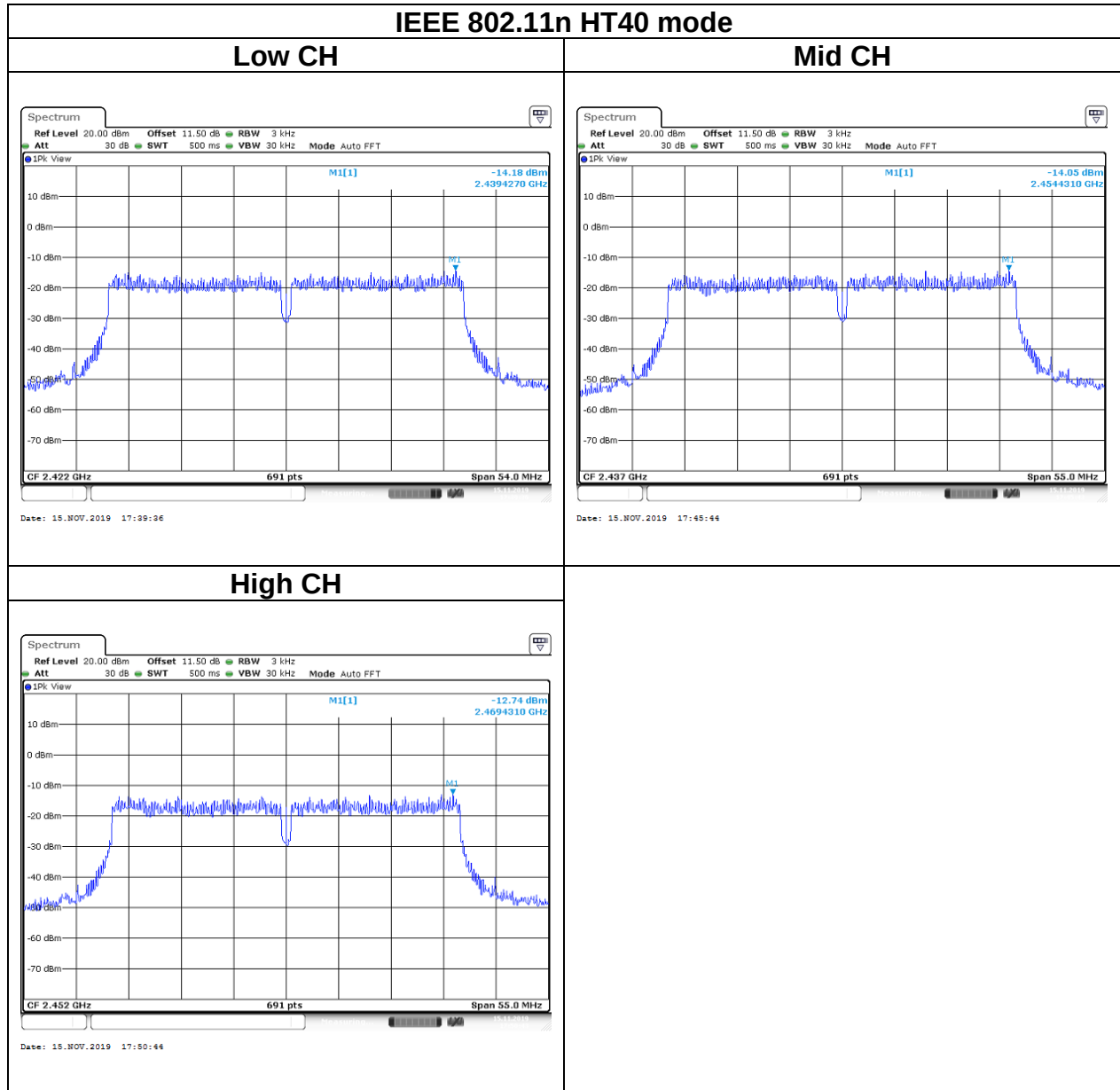
Report No.: T191104D01-RP1

## Test Data Chain 0

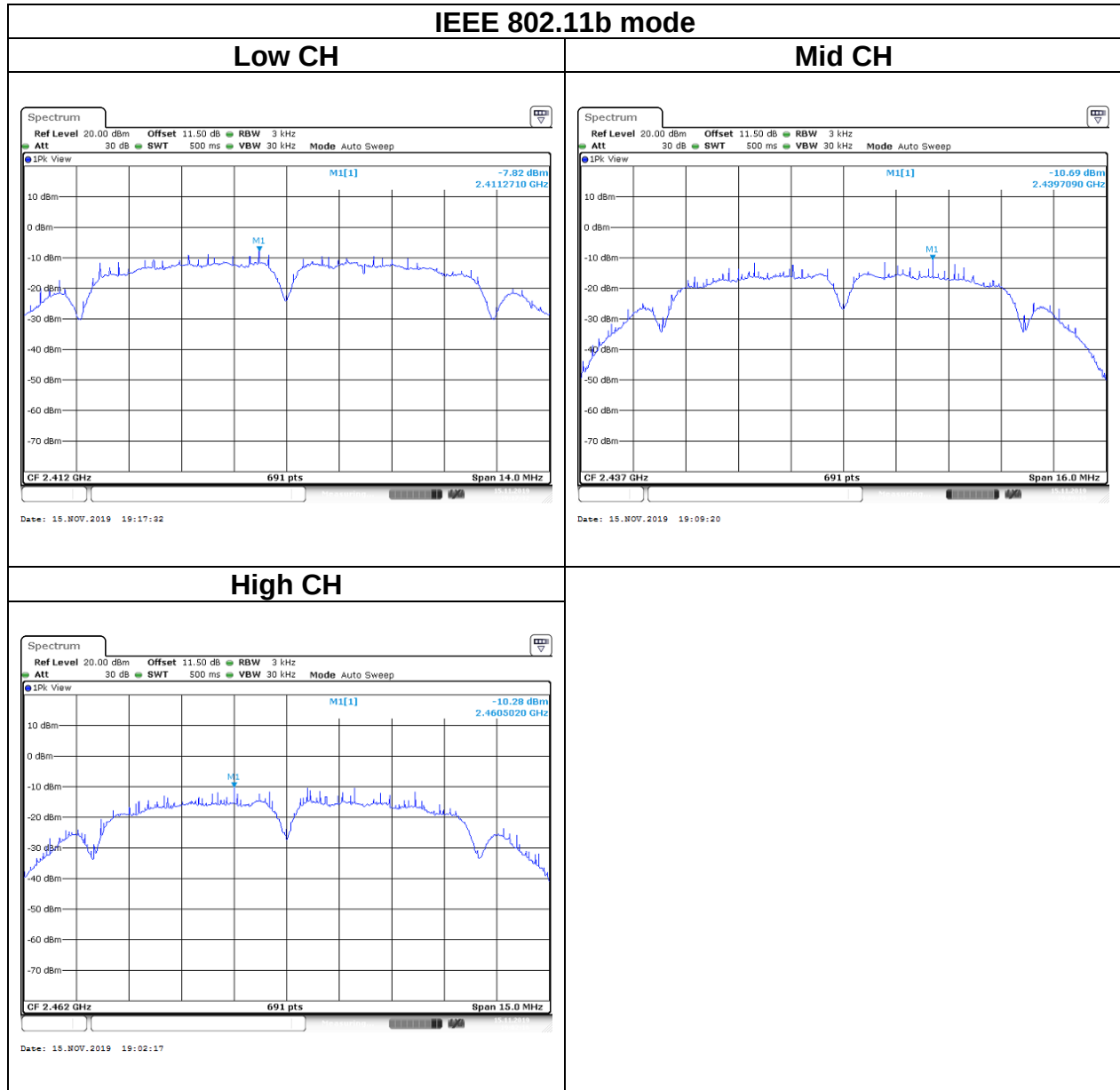


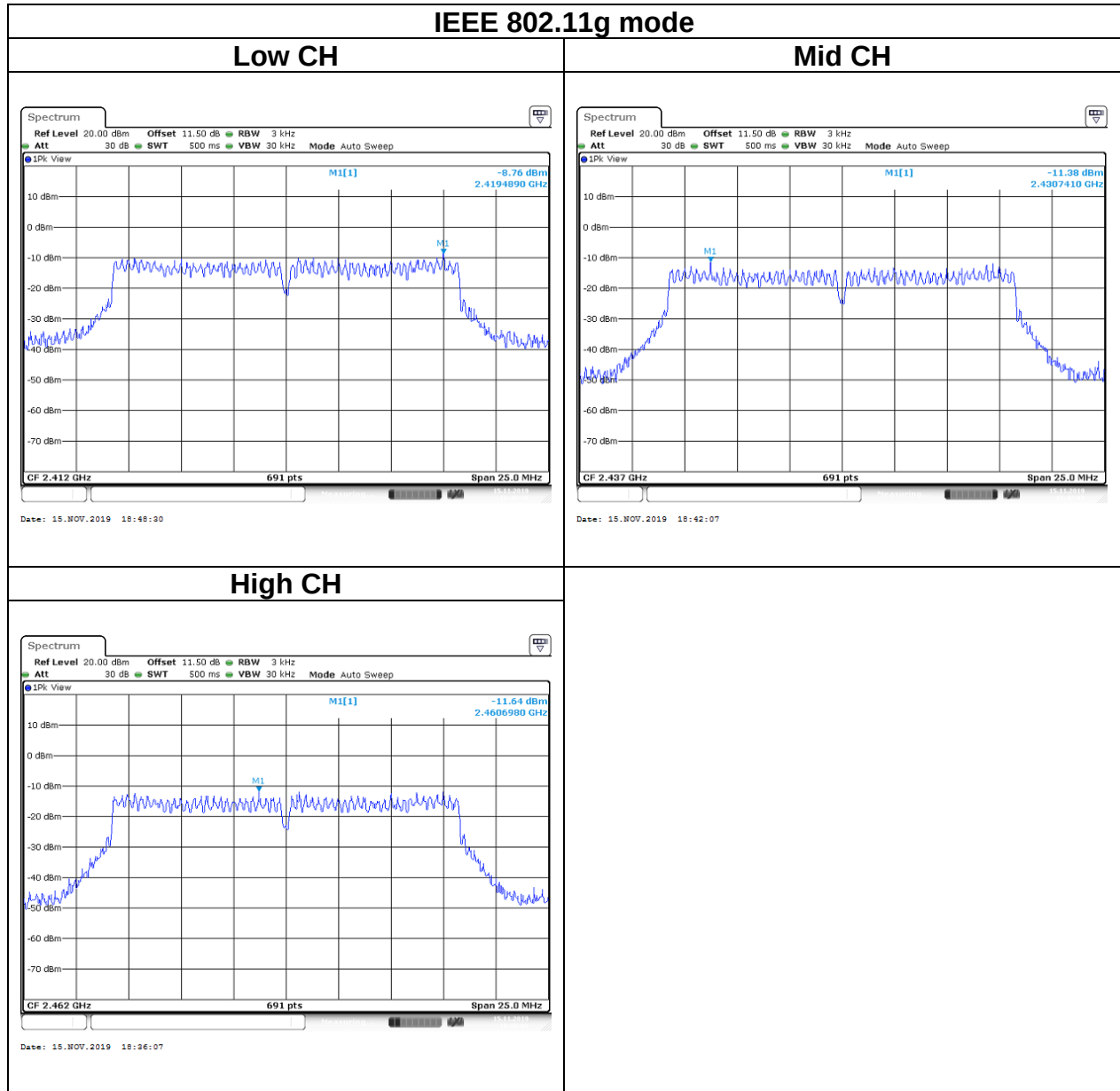


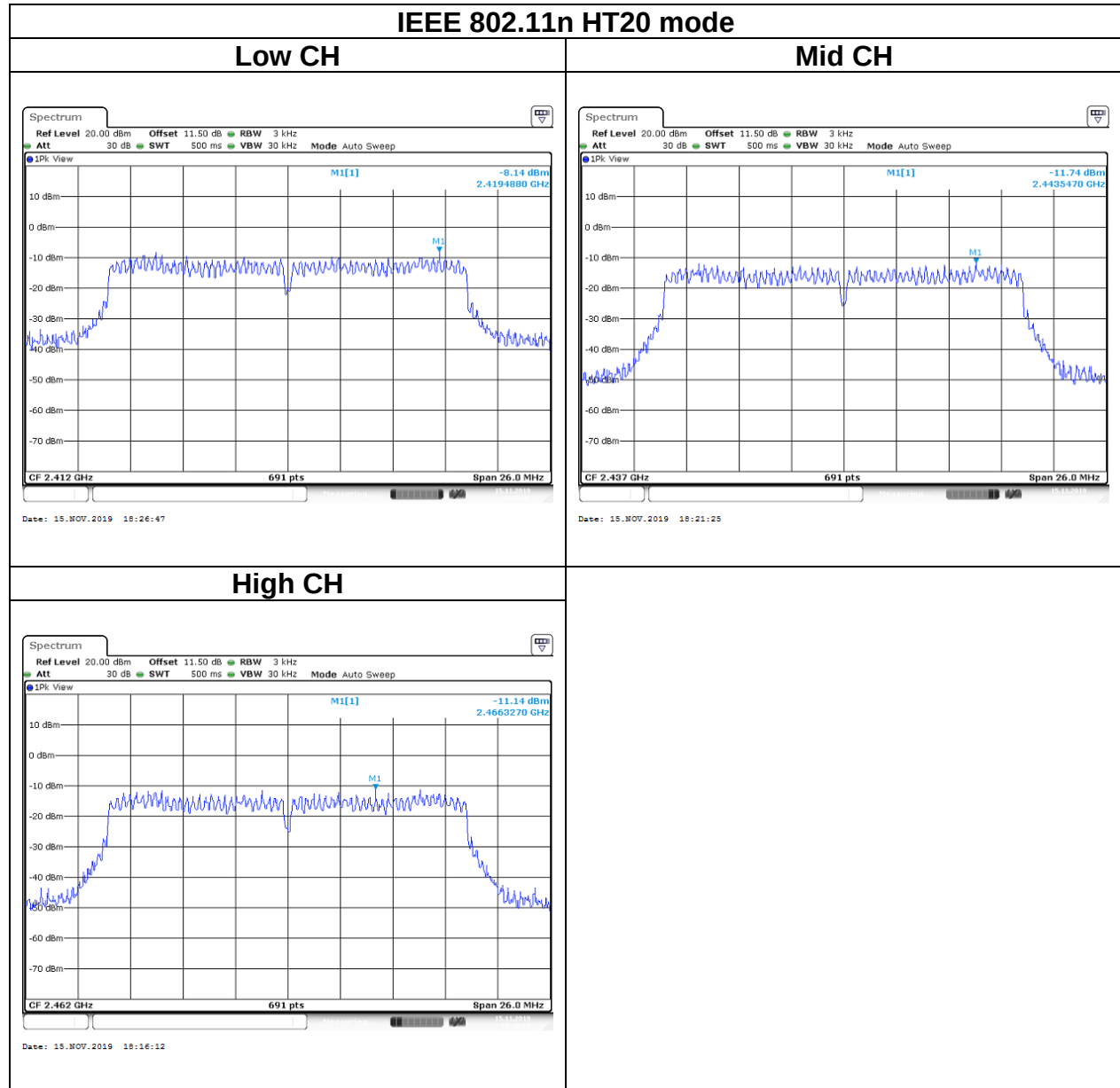


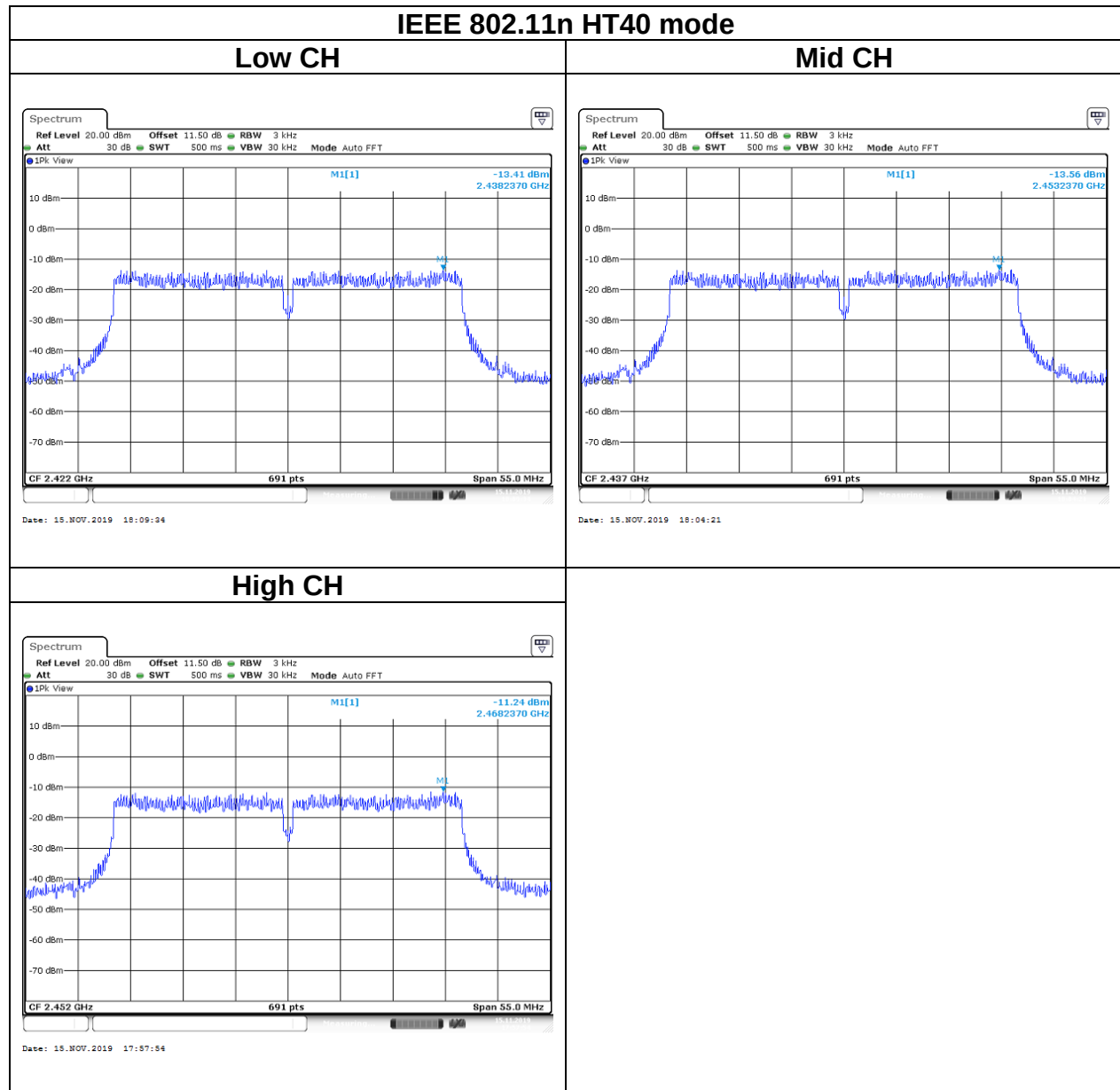


## Chain 1









## 5.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

### 5.5.1 Test Limit

According to §15.247(d),

In any 100 kHz bandwidth outside the authorized frequency band,

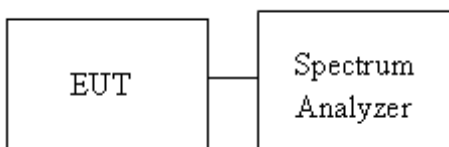
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

### 5.5.2 Test Procedure

Test method Refer as KDB 558074 D01.

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

### 5.5.3 Test Setup



## 5.5.4 Test Result

### Test Data

#### Chain 0

