

## Appendix A

### RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: THERMOSTAT

Trade Mark: HYSEN

Test Model: HY02B05WE-WIFI

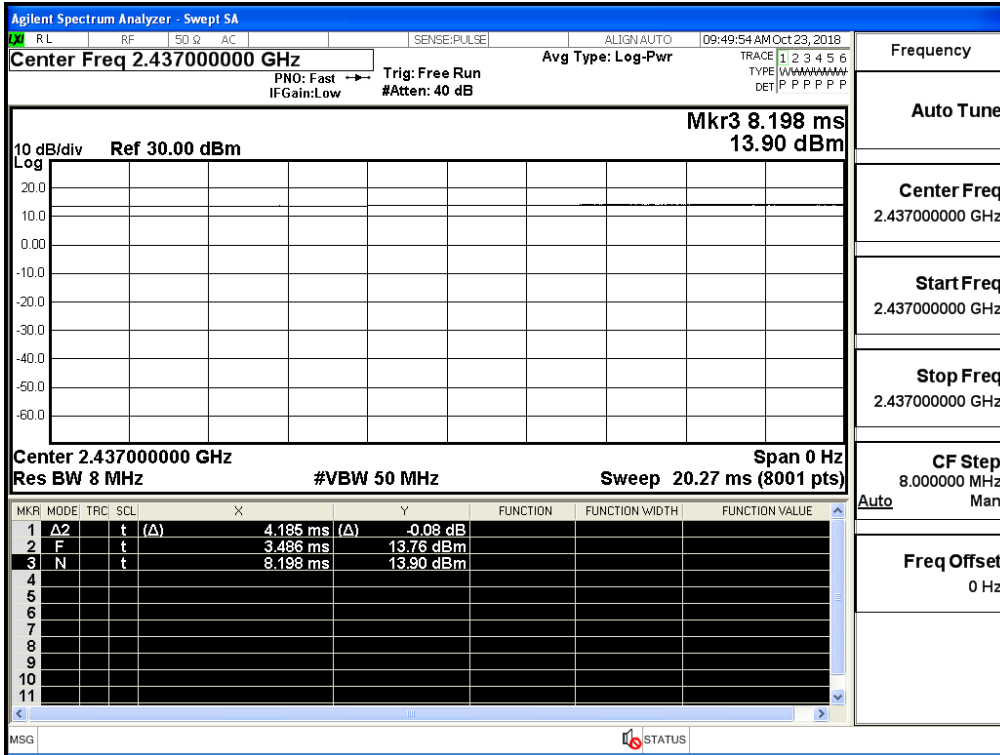
#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 23.4 ° C    |
| Relative Humidity: | 53.2%       |
| ATM Pressure:      | 100.0 kPa   |
| Test Engineer:     | Diamond.Lu  |
| Supervised by:     | Jayden.Zhuo |

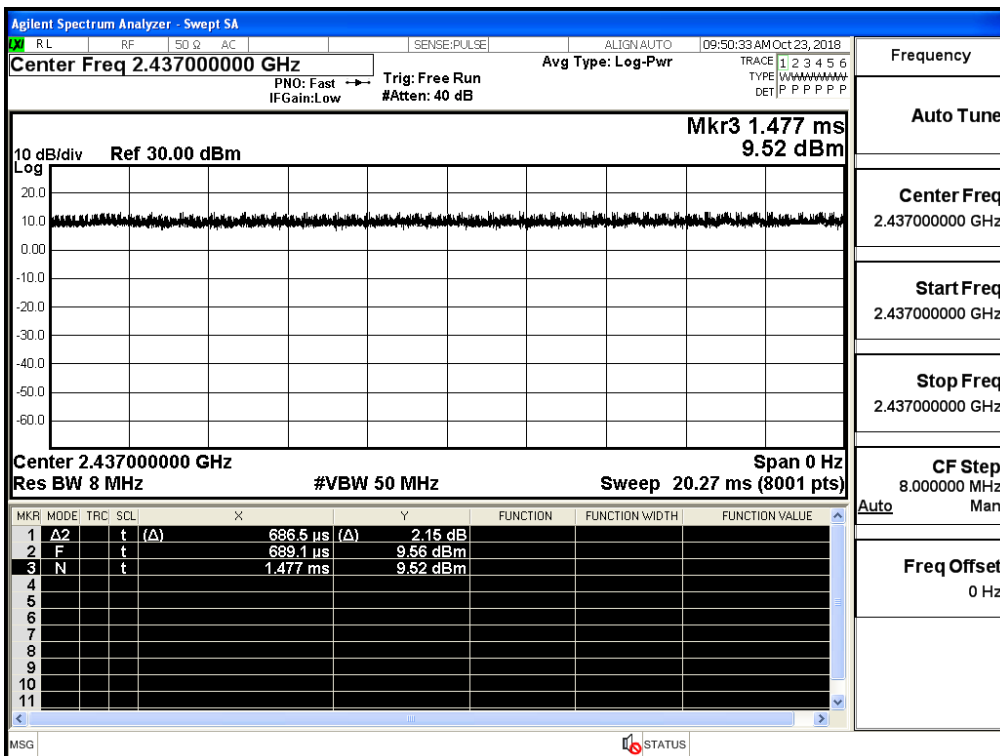
#### A.1 Duty Cycle

| Test Mode | Test Channel | Ant  | Duty Cycle[%] | Verdict |
|-----------|--------------|------|---------------|---------|
| 11B       | 2437         | Ant1 | 100           | PASS    |
| 11G       | 2437         | Ant1 | 100           | PASS    |
| 11N20SISO | 2437         | Ant1 | 100           | PASS    |

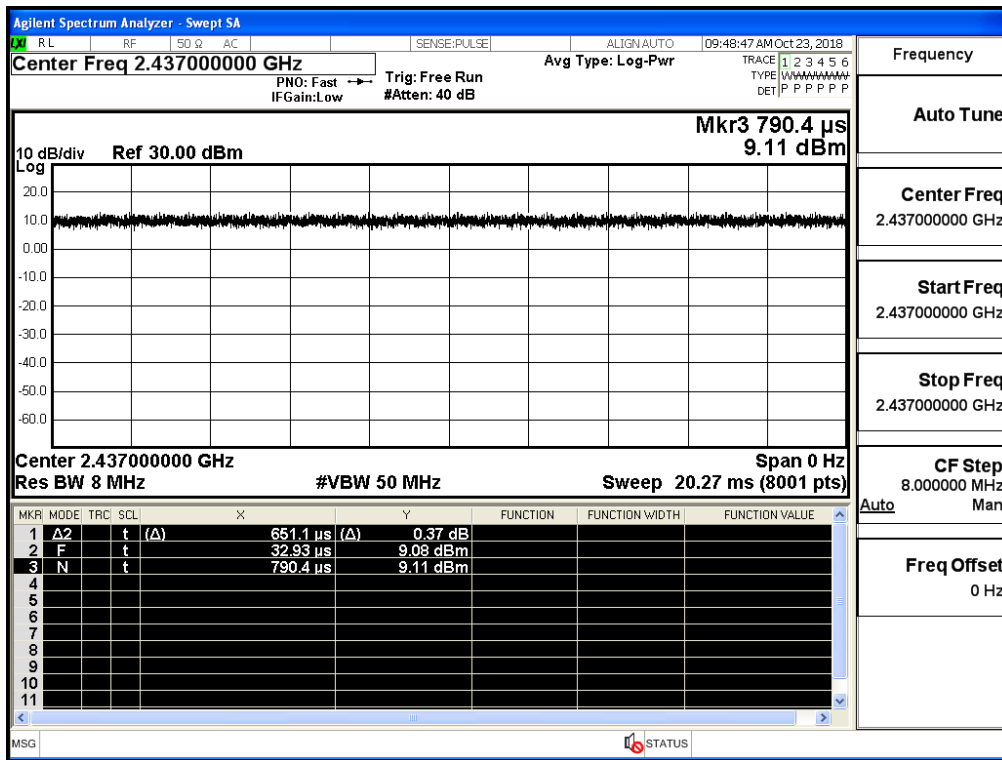
Duty Cycle\_11B\_2437\_Ant1



Duty Cycle\_11G\_2437\_Ant1



Duty Cycle\_11N20SISO\_2437\_Ant1

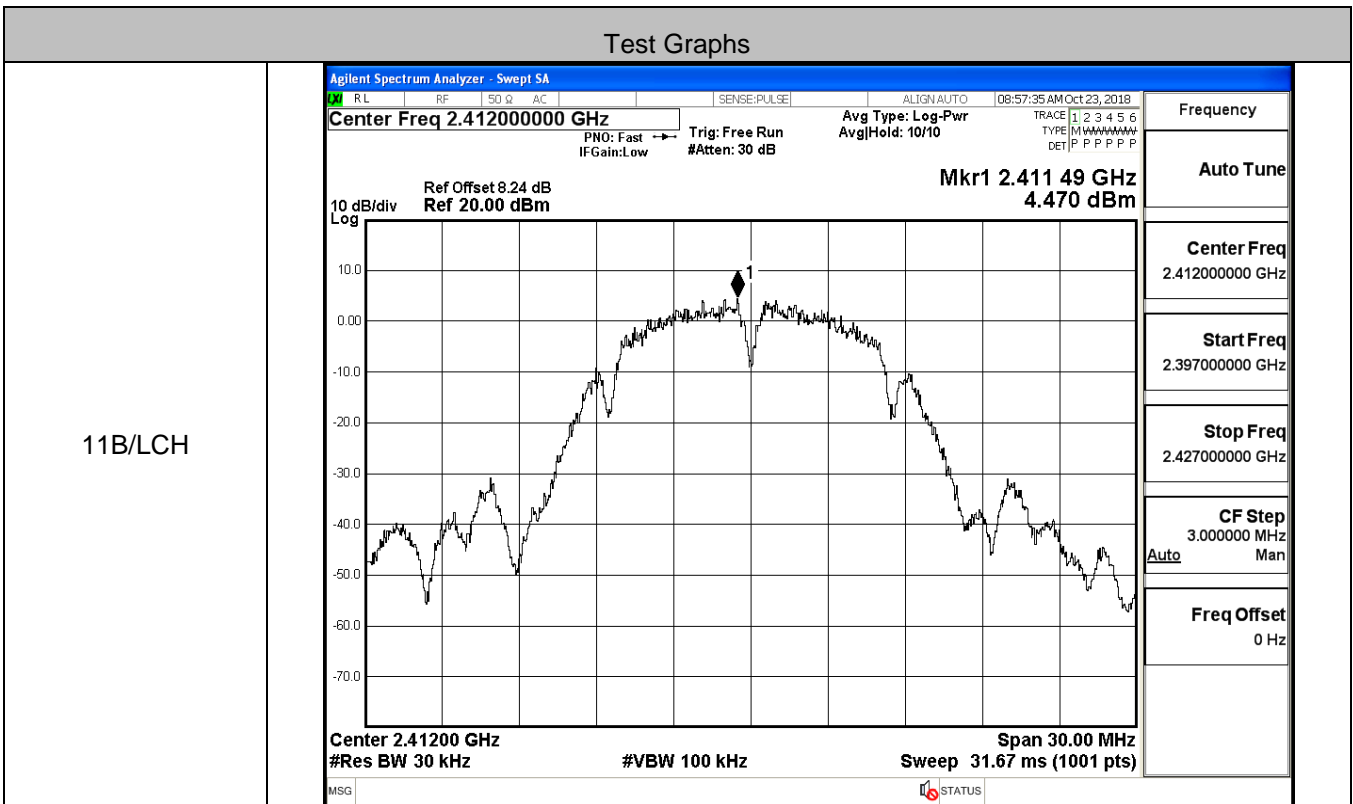


### A.2 Maximum Conducted Output Power

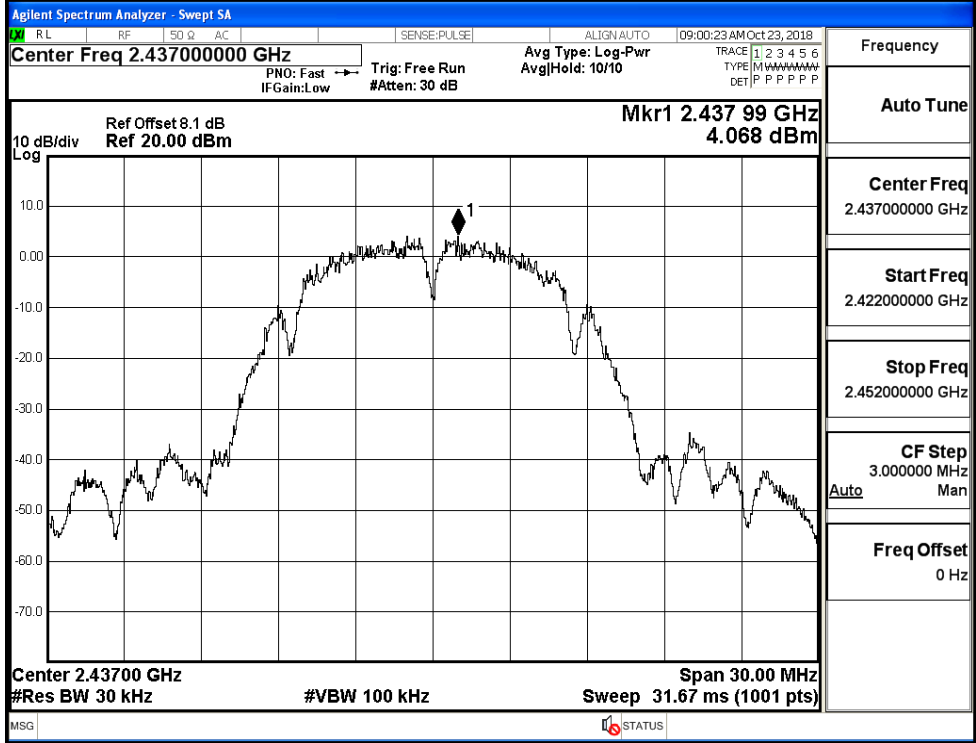
| Mode      | Channel | Meas.Level [dBm] | Limit [dBm] | Verdict |
|-----------|---------|------------------|-------------|---------|
| 11B       | LCH     | 18.24            | 30          | PASS    |
|           | MCH     | 18.79            | 30          | PASS    |
|           | HCH     | 19.01            | 30          | PASS    |
| 11G       | LCH     | 18.49            | 30          | PASS    |
|           | MCH     | 17.98            | 30          | PASS    |
|           | HCH     | 18.34            | 30          | PASS    |
| 11N20SISO | LCH     | 17.59            | 30          | PASS    |
|           | MCH     | 17.64            | 30          | PASS    |
|           | HCH     | 17.46            | 30          | PASS    |

### A.3 Maximum Power Spectral Density

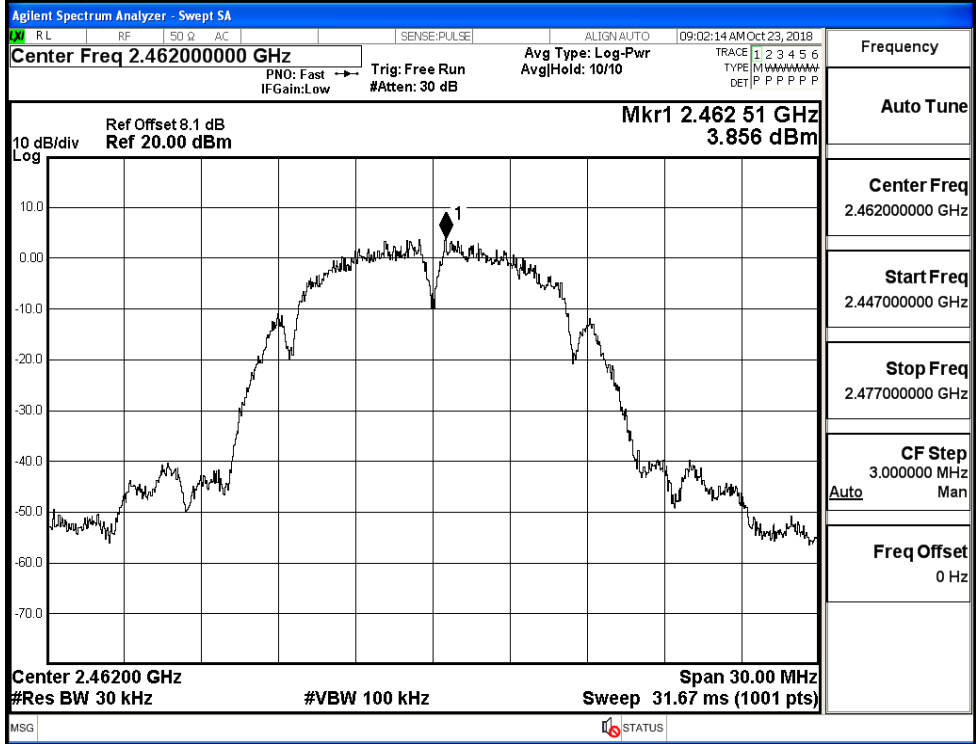
| Mode      | Channel | Meas.Level [dBm/30KHz] | Limit [dBm/3KHz] | Verdict |
|-----------|---------|------------------------|------------------|---------|
| 11B       | LCH     | 4.470                  | 8                | PASS    |
|           | MCH     | 4.068                  | 8                | PASS    |
|           | HCH     | 3.856                  | 8                | PASS    |
| 11G       | LCH     | 0.311                  | 8                | PASS    |
|           | MCH     | 0.130                  | 8                | PASS    |
|           | HCH     | -1.716                 | 8                | PASS    |
| 11N20SISO | LCH     | -0.047                 | 8                | PASS    |
|           | MCH     | -0.085                 | 8                | PASS    |
|           | HCH     | -2.359                 | 8                | PASS    |



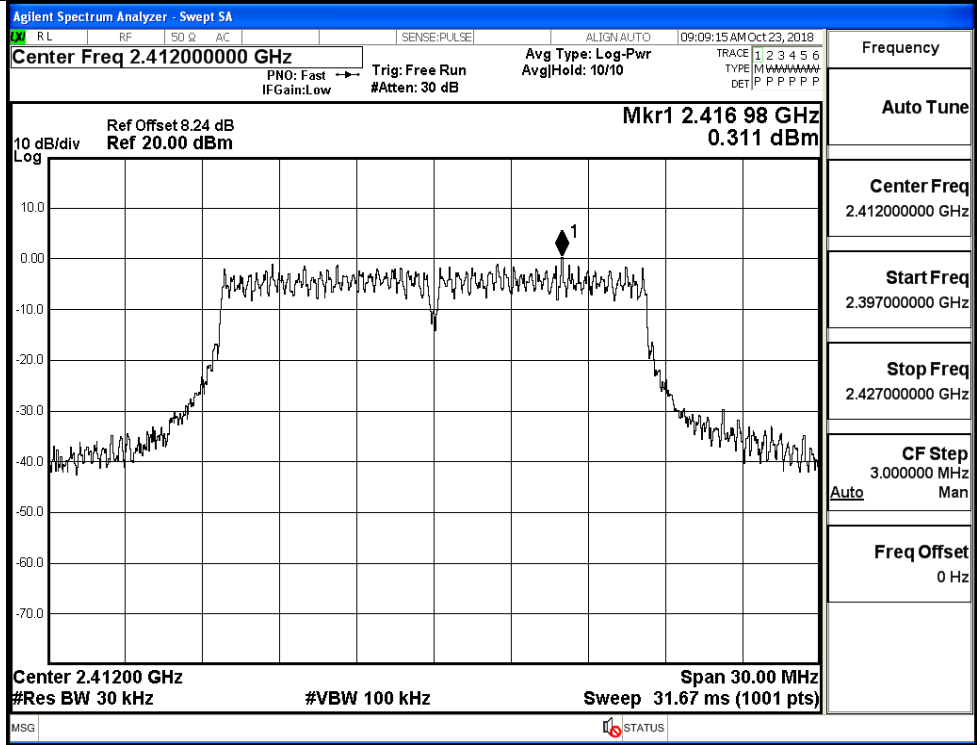
11B/MCH



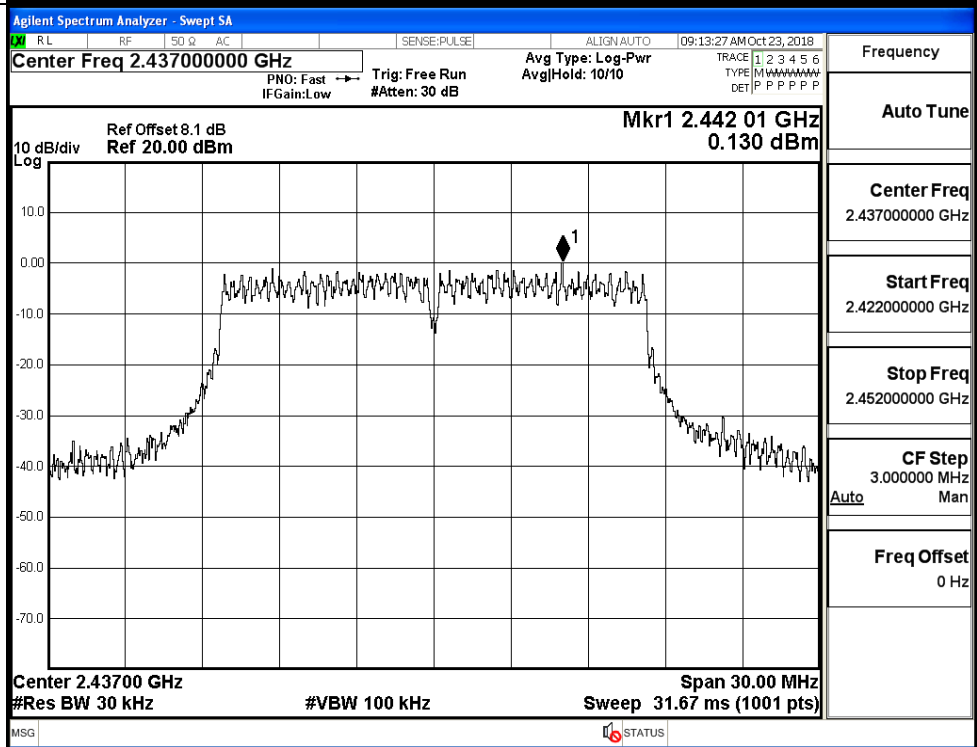
11B/HCH



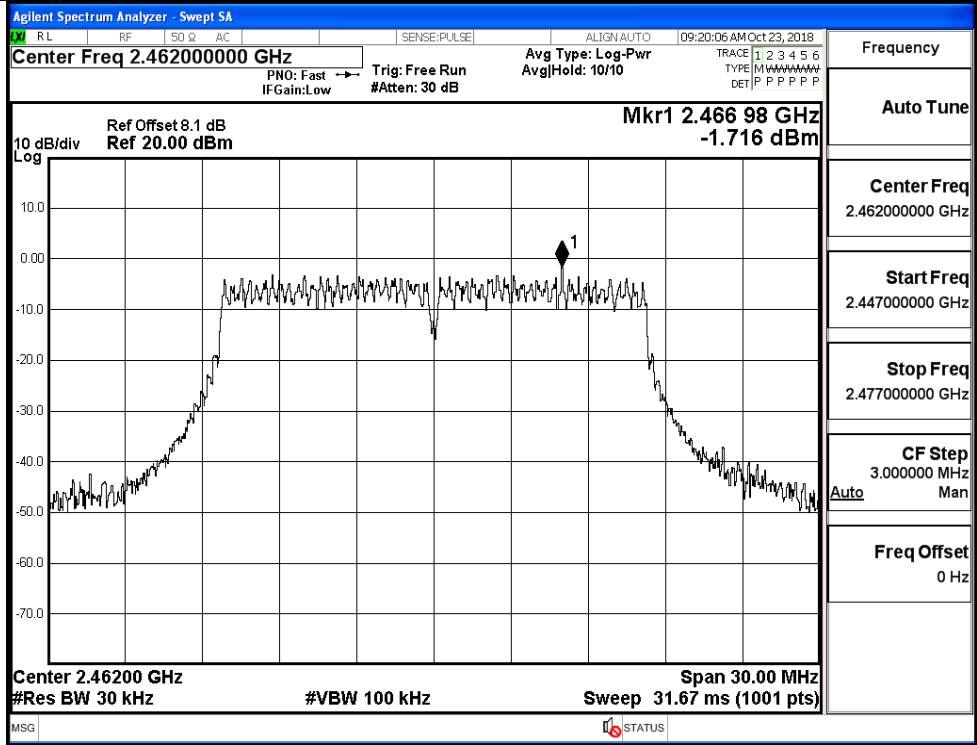
11G/LCH



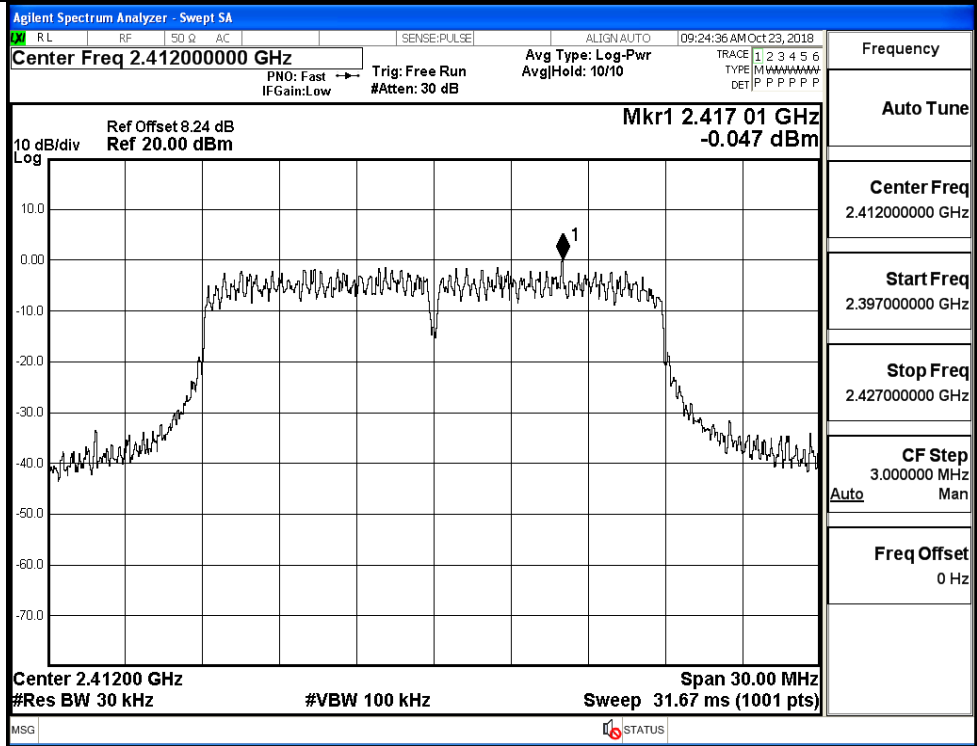
11G/MCH



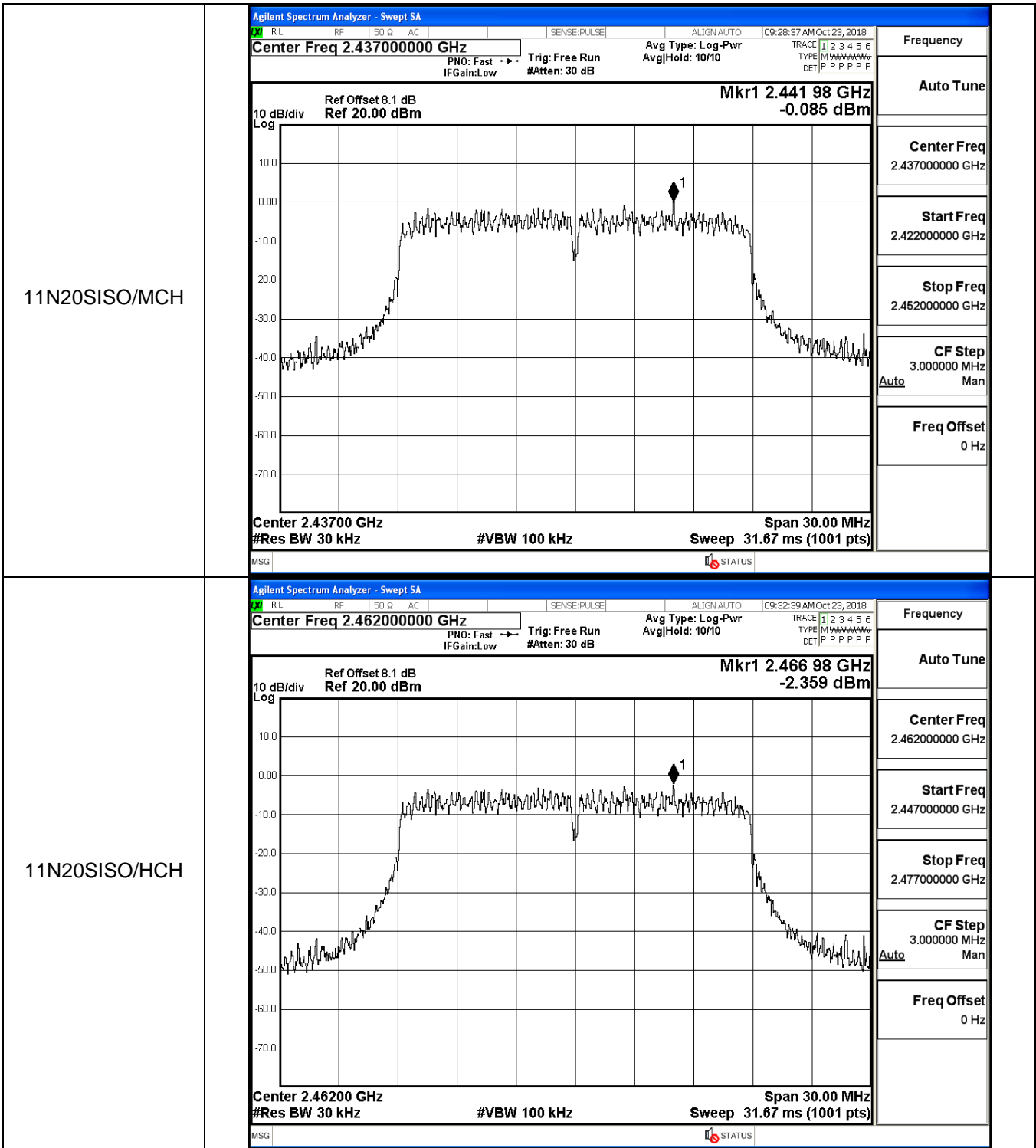
11G/HCH



11N20SISO/LCH

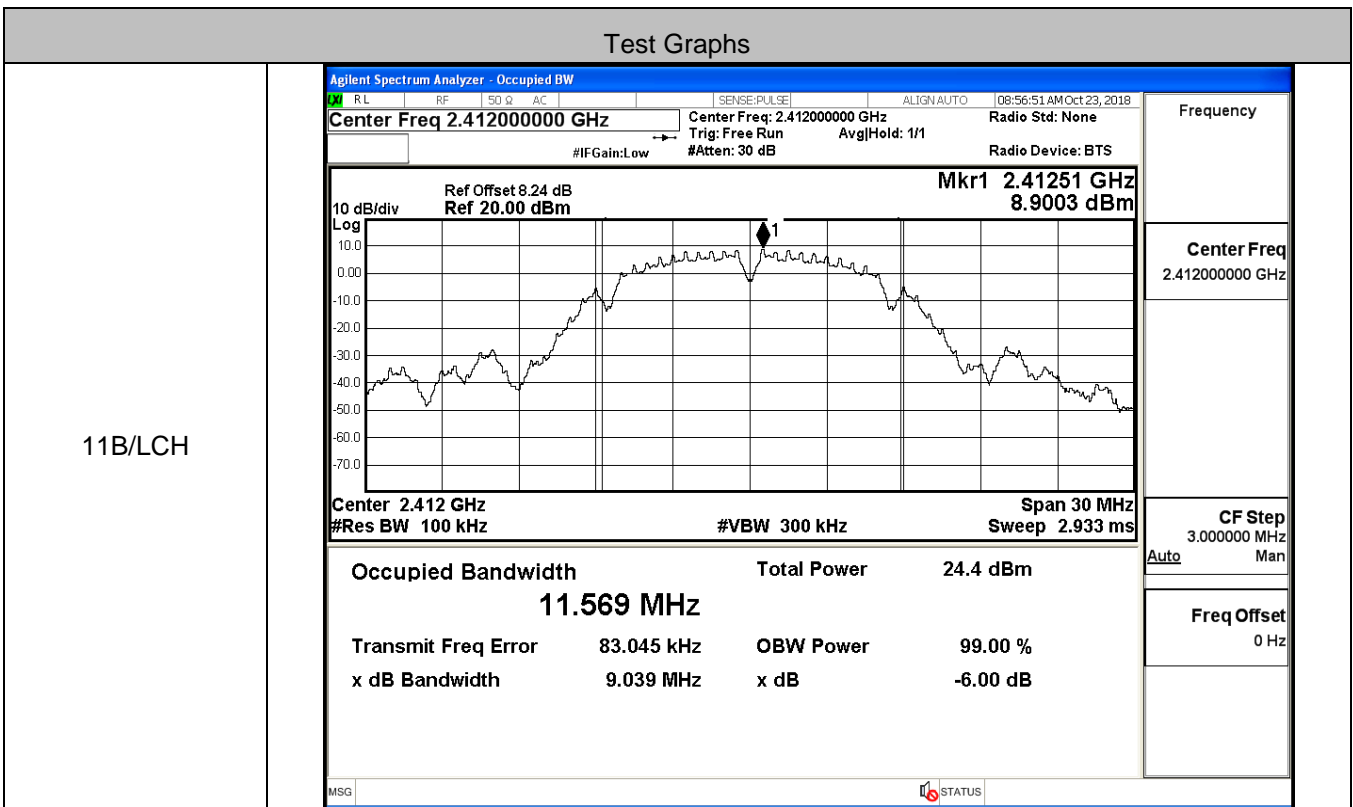




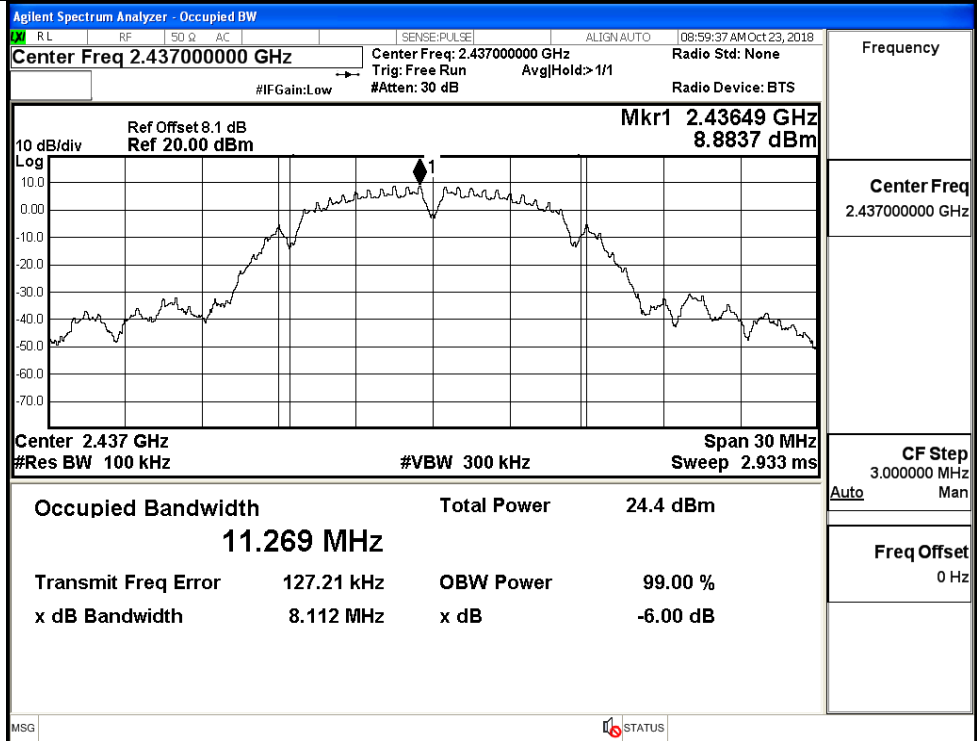


**A.4 6dB Bandwidth**

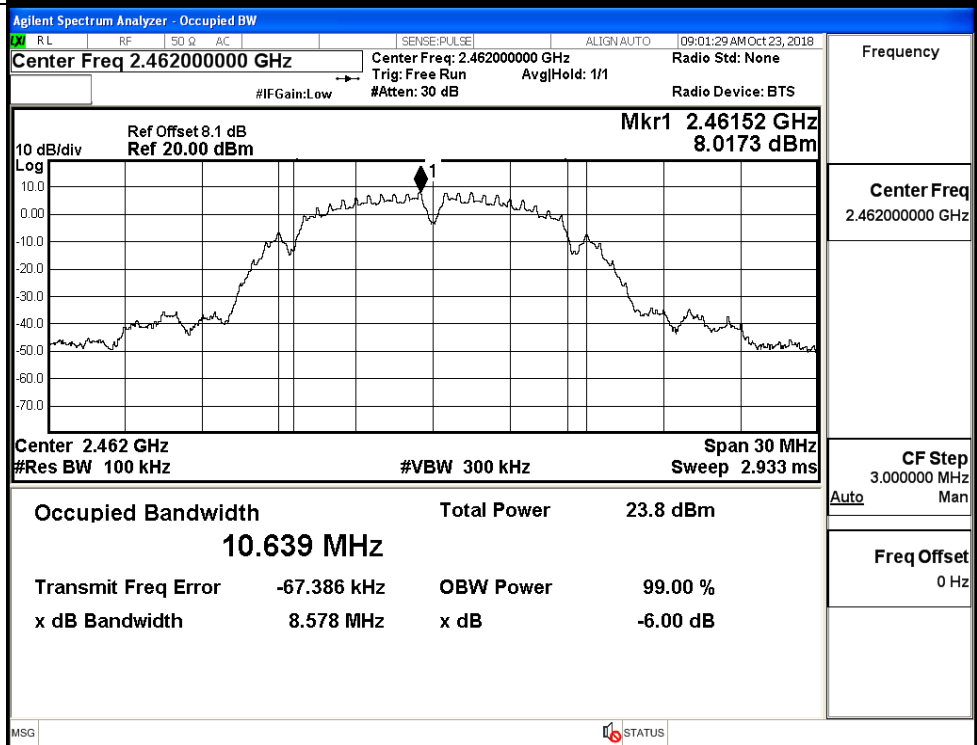
| Mode      | Channel | 6dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|-----------|---------|---------------------|-------------|---------|
| 11B       | LCH     | 9.039               | ≥0.5        | PASS    |
|           | MCH     | 8.112               | ≥0.5        | PASS    |
|           | HCH     | 8.578               | ≥0.5        | PASS    |
| 11G       | LCH     | 16.35               | ≥0.5        | PASS    |
|           | MCH     | 16.34               | ≥0.5        | PASS    |
|           | HCH     | 16.36               | ≥0.5        | PASS    |
| 11N20SISO | LCH     | 16.56               | ≥0.5        | PASS    |
|           | MCH     | 16.57               | ≥0.5        | PASS    |
|           | HCH     | 16.59               | ≥0.5        | PASS    |



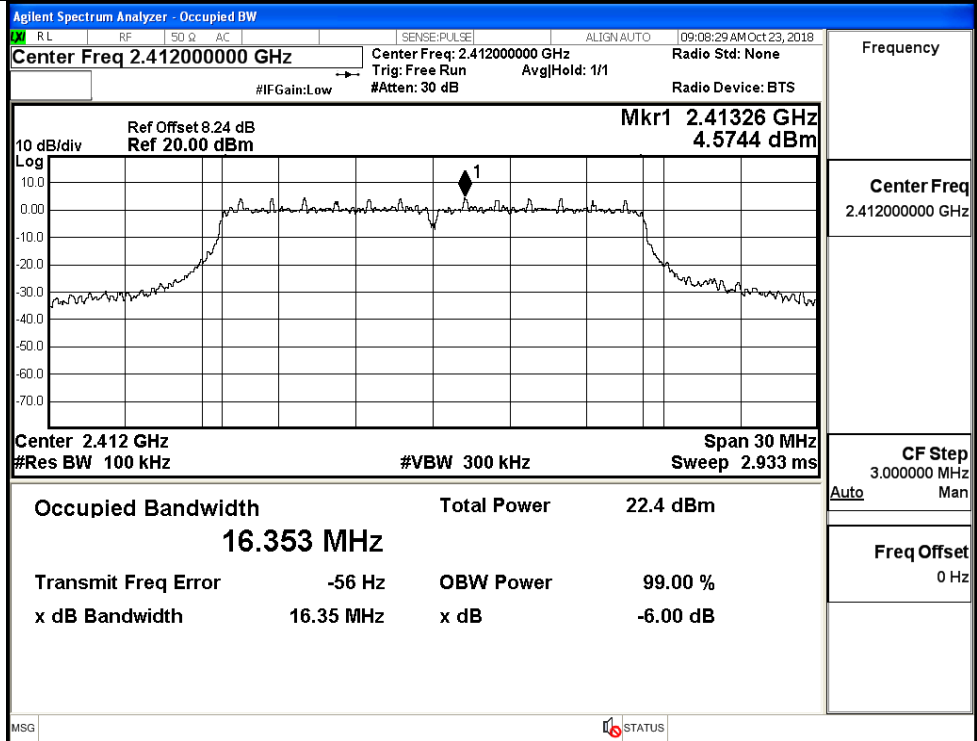
11B/MCH



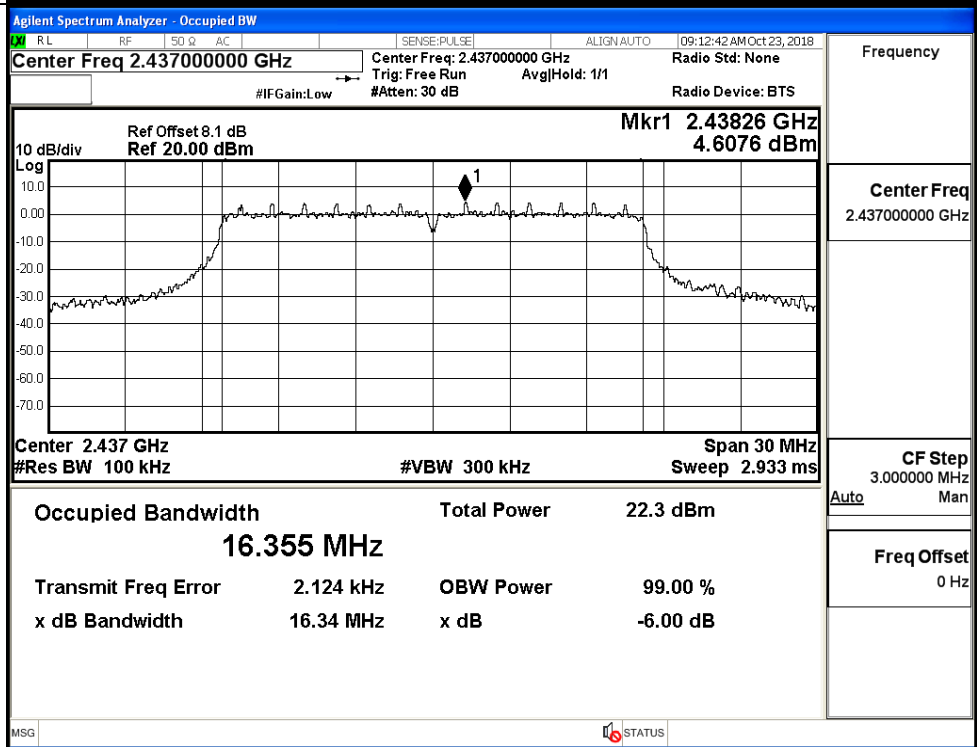
11B/HCH



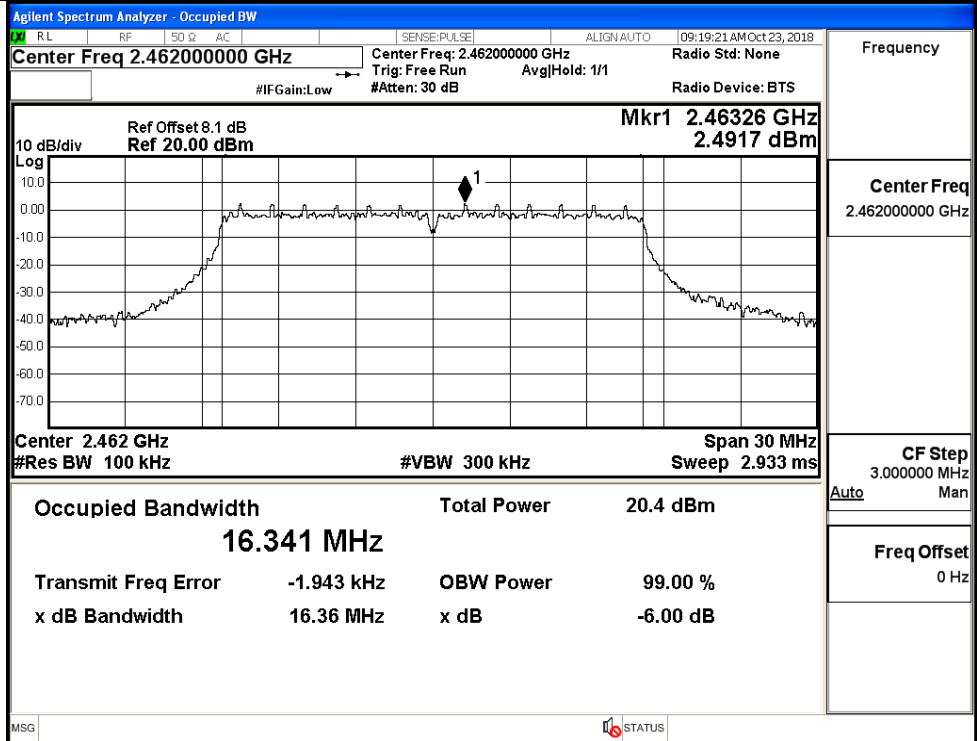
11G/LCH



11G/MCH

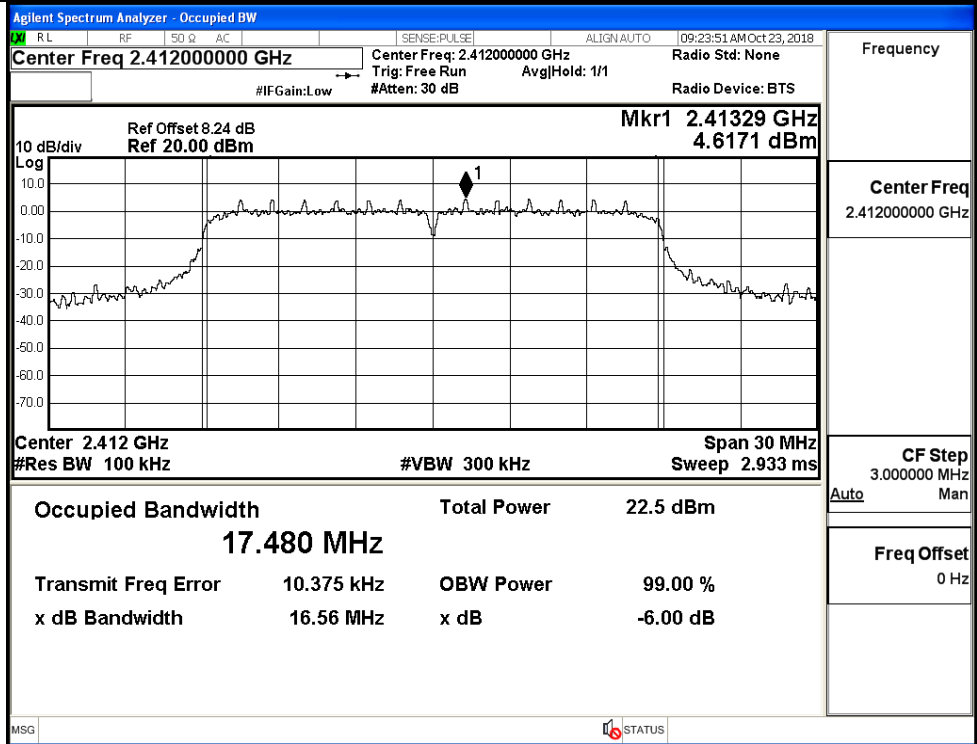


11G/HCH



|             |                |
|-------------|----------------|
| Frequency   | 2.46200000 GHz |
| Center Freq | 2.46200000 GHz |
| CF Step     | 3.000000 MHz   |
| Auto        | Man            |
| Freq Offset | 0 Hz           |

11N20SISO/LCH



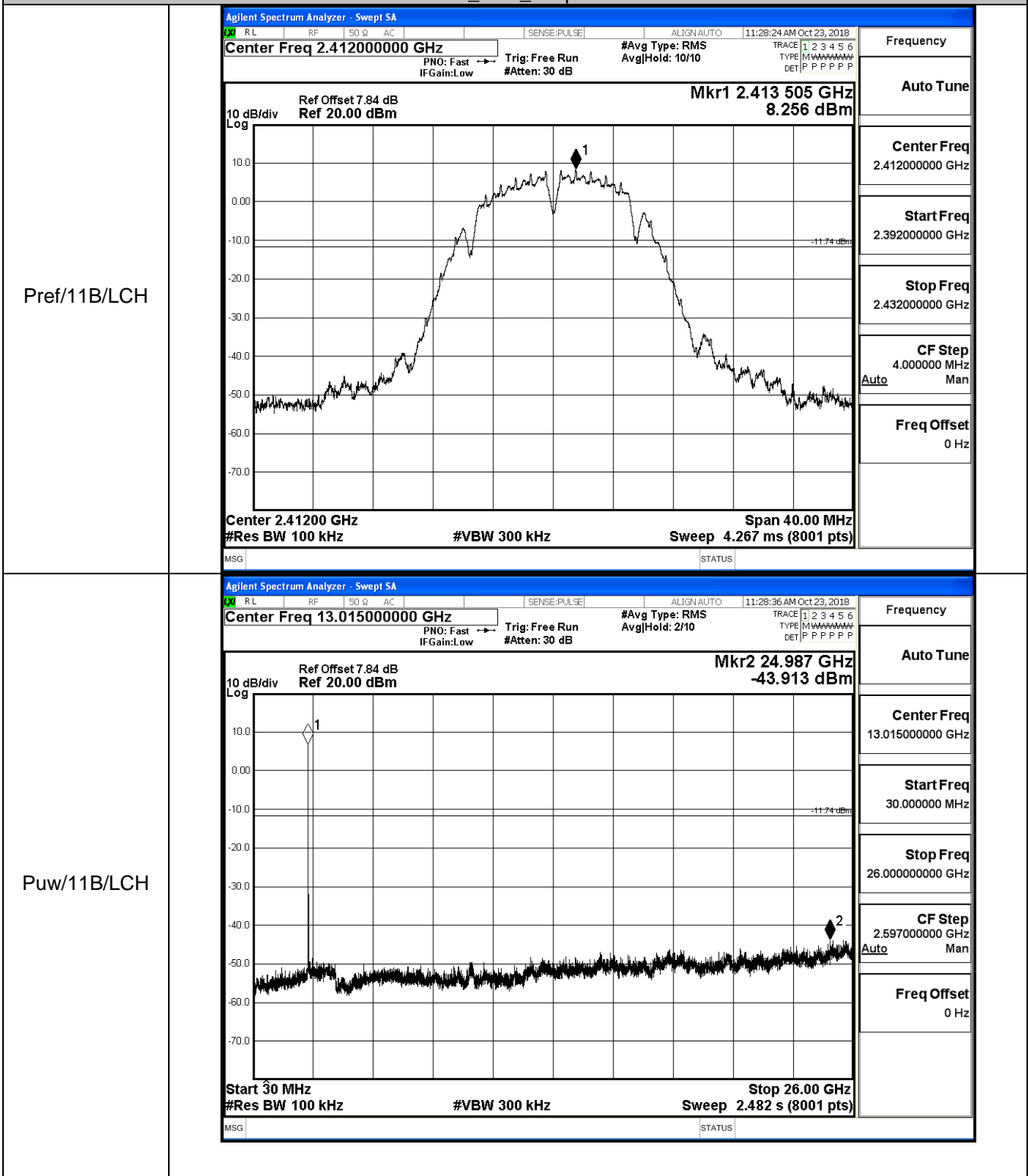
|             |                |
|-------------|----------------|
| Frequency   | 2.41200000 GHz |
| Center Freq | 2.41200000 GHz |
| CF Step     | 3.000000 MHz   |
| Auto        | Man            |
| Freq Offset | 0 Hz           |

|                      |   |  |
|----------------------|---|--|
| <p>11N20SISO/MCH</p> | <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.43700000 GHz</p> <p>Center Freq: 2.43700000 GHz<br/>Trig: Free Run<br/>#IFGain: Low<br/>#Atten: 30 dB</p> <p>Mkr1 2.43826 GHz<br/>4.5354 dBm</p> <p>10 dB/div<br/>Ref Offset 8.1 dB<br/>Ref 20.00 dBm</p> <p>Center 2.437 GHz<br/>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz<br/>Sweep 2.933 ms</p> <p>Occupied Bandwidth 17.481 MHz</p> <p>Total Power 22.2 dBm</p> <p>Transmit Freq Error 9.435 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 16.57 MHz</p> <p>x dB -6.00 dB</p> | <p>Frequency</p> <p>Center Freq<br/>2.43700000 GHz</p> <p>CF Step<br/>3.000000 MHz</p> <p>Freq Offset<br/>0 Hz</p> |
| <p>11N20SISO/HCH</p> | <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.46200000 GHz</p> <p>Center Freq: 2.46200000 GHz<br/>Trig: Free Run<br/>#IFGain: Low<br/>#Atten: 30 dB</p> <p>Mkr1 2.46326 GHz<br/>2.4903 dBm</p> <p>10 dB/div<br/>Ref Offset 8.1 dB<br/>Ref 20.00 dBm</p> <p>Center 2.462 GHz<br/>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz<br/>Sweep 2.933 ms</p> <p>Occupied Bandwidth 17.466 MHz</p> <p>Total Power 20.4 dBm</p> <p>Transmit Freq Error 3.385 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 16.59 MHz</p> <p>x dB -6.00 dB</p> | <p>Frequency</p> <p>Center Freq<br/>2.46200000 GHz</p> <p>CF Step<br/>3.000000 MHz</p> <p>Freq Offset<br/>0 Hz</p> |

### A.5 RF Conducted Spurious Emissions

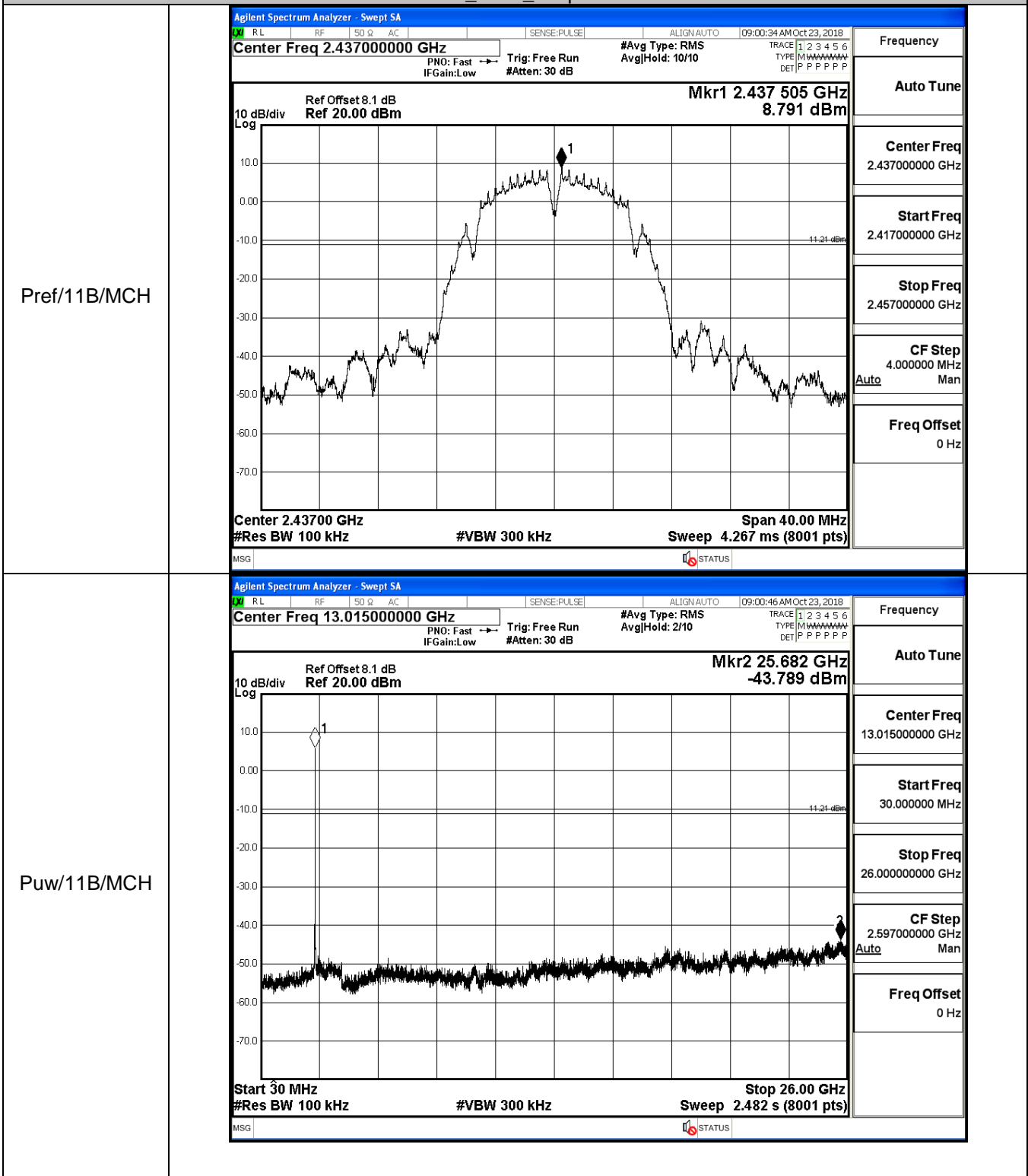
| Mode      | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|-----------|---------|------------|------------------|-------------|---------|
| 11B       | LCH     | 8.256      | -43.913          | -11.744     | PASS    |
|           | MCH     | 8.791      | -43.789          | -11.209     | PASS    |
|           | HCH     | 7.784      | -43.752          | -12.216     | PASS    |
| 11G       | LCH     | 4.658      | -43.894          | -15.342     | PASS    |
|           | MCH     | 4.167      | -43.665          | -15.833     | PASS    |
|           | HCH     | 2.581      | -44.406          | -17.419     | PASS    |
| 11N20SISO | LCH     | 4.259      | -44.012          | -15.741     | PASS    |
|           | MCH     | 4.159      | -43.576          | -15.841     | PASS    |
|           | HCH     | 2.465      | -44.213          | -17.535     | PASS    |

11B\_LCH\_Graphs

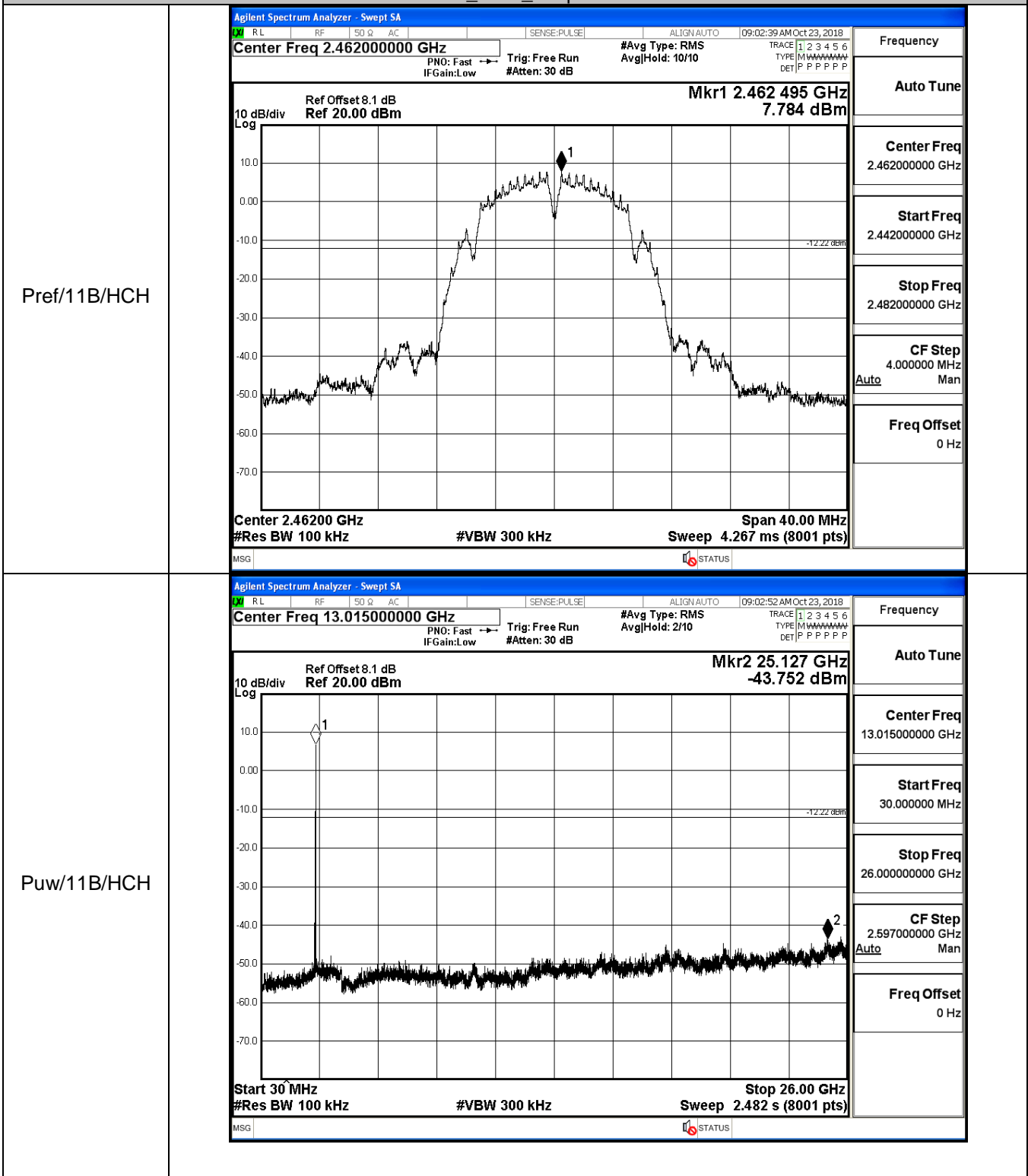




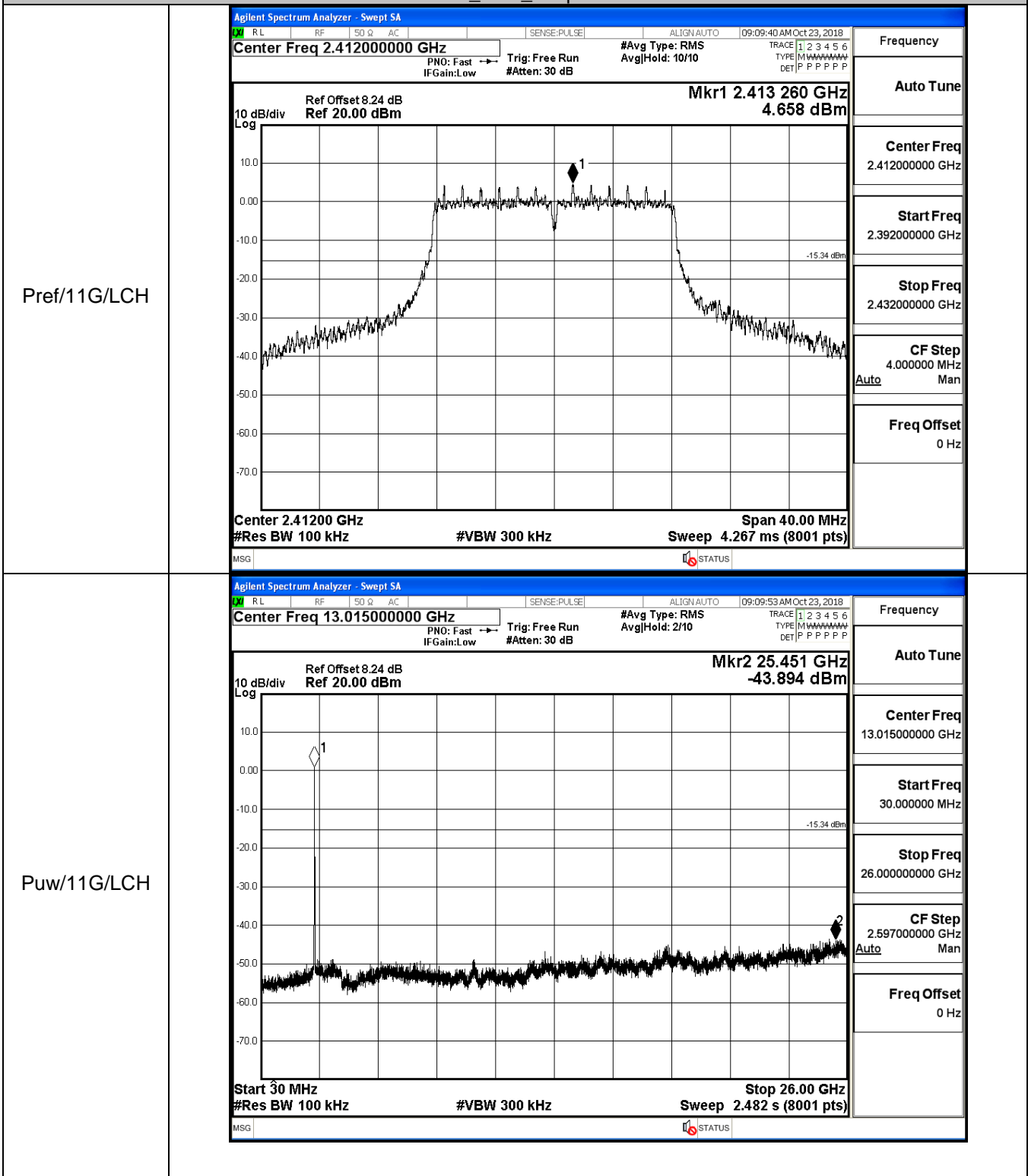
11B\_MCH\_Graphs



11B\_HCH\_Graphs



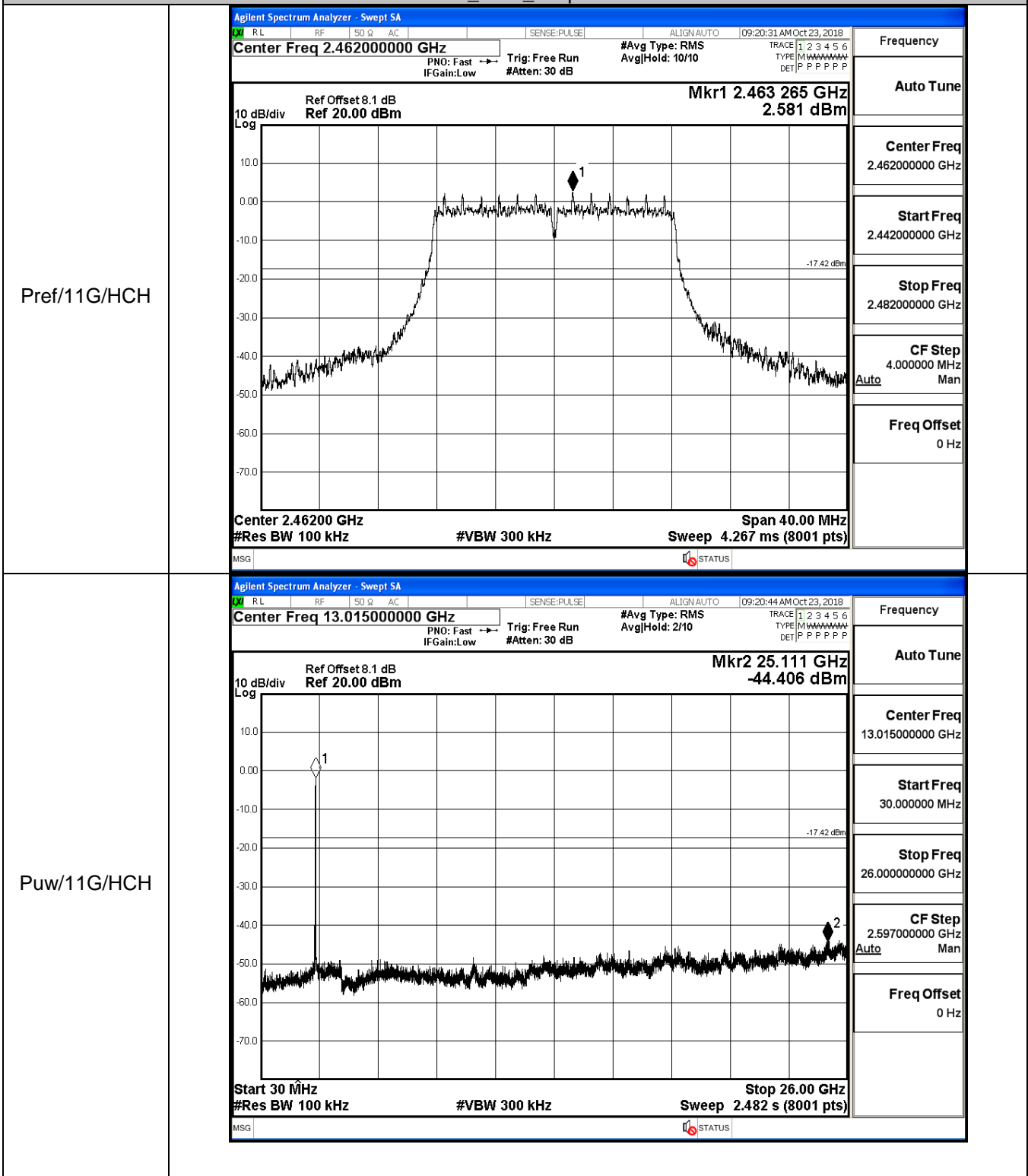
11G\_LCH\_Graphs



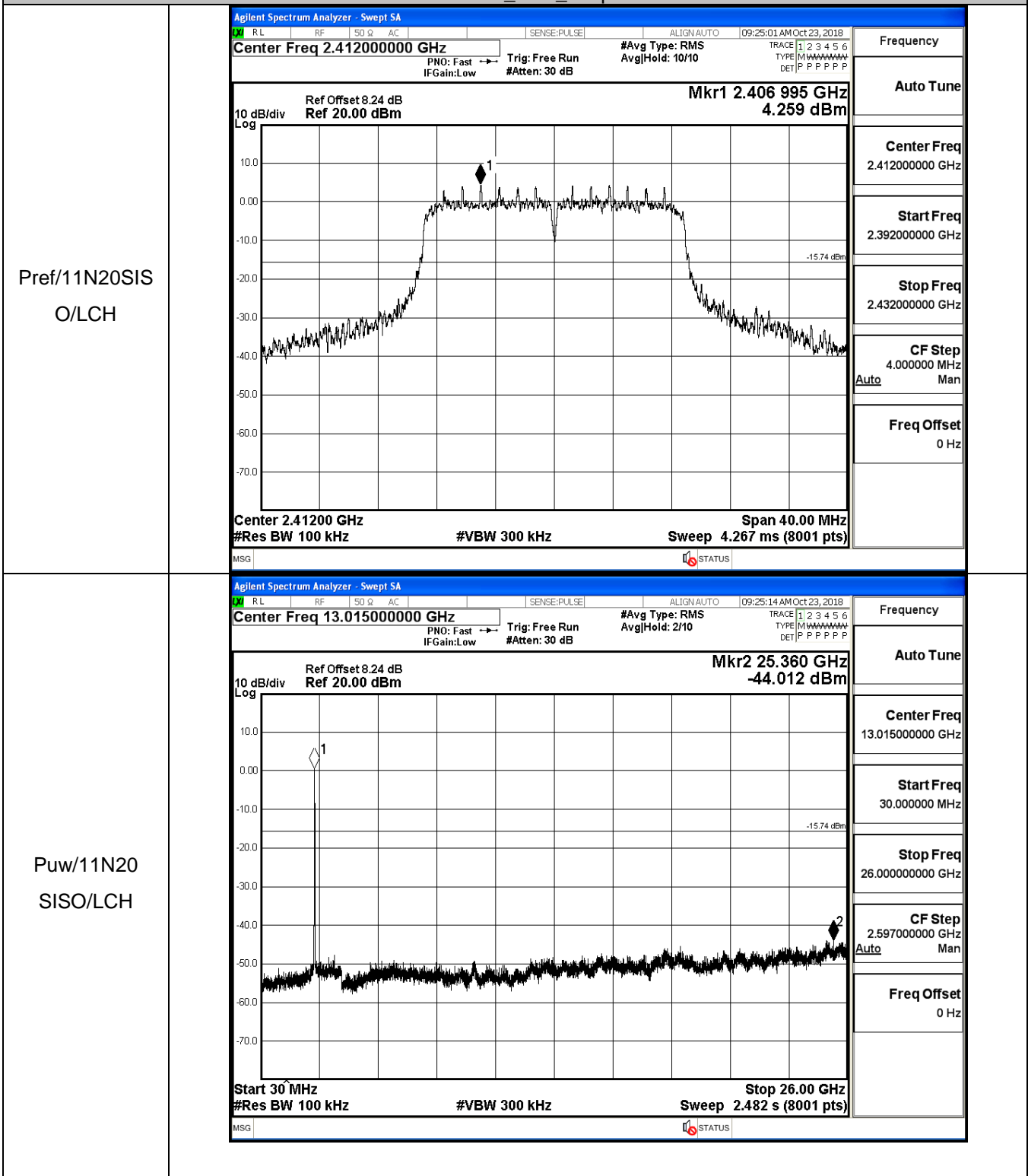
11G\_MCH\_Graphs

|                     |  |   |
|---------------------|--|---|
| <p>Pref/11G/MCH</p> | <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.43700000 GHz</p> <p>Ref Offset 8.1 dB<br/>Ref 20.00 dBm</p> <p>Mkr1 2.440760 GHz<br/>4.167 dBm</p> <p>Center 2.43700 GHz<br/>#Res BW 100 kHz<br/>#VBW 300 kHz<br/>Sweep 4.267 ms (8001 pts)</p> | <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq<br/>2.437000000 GHz</p> <p>Start Freq<br/>2.417000000 GHz</p> <p>Stop Freq<br/>2.457000000 GHz</p> <p>CF Step<br/>4.000000 MHz<br/>Auto Man</p> <p>Freq Offset<br/>0 Hz</p>    |
| <p>Puw/11G/MCH</p>  | <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 13.01500000 GHz</p> <p>Ref Offset 8.1 dB<br/>Ref 20.00 dBm</p> <p>Mkr2 25.766 GHz<br/>-43.665 dBm</p> <p>Start 30 MHz<br/>#Res BW 100 kHz<br/>#VBW 300 kHz<br/>Sweep 2.482 s (8001 pts)</p>       | <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq<br/>13.015000000 GHz</p> <p>Start Freq<br/>30.000000 MHz</p> <p>Stop Freq<br/>26.000000000 GHz</p> <p>CF Step<br/>2.597000000 GHz<br/>Auto Man</p> <p>Freq Offset<br/>0 Hz</p> |

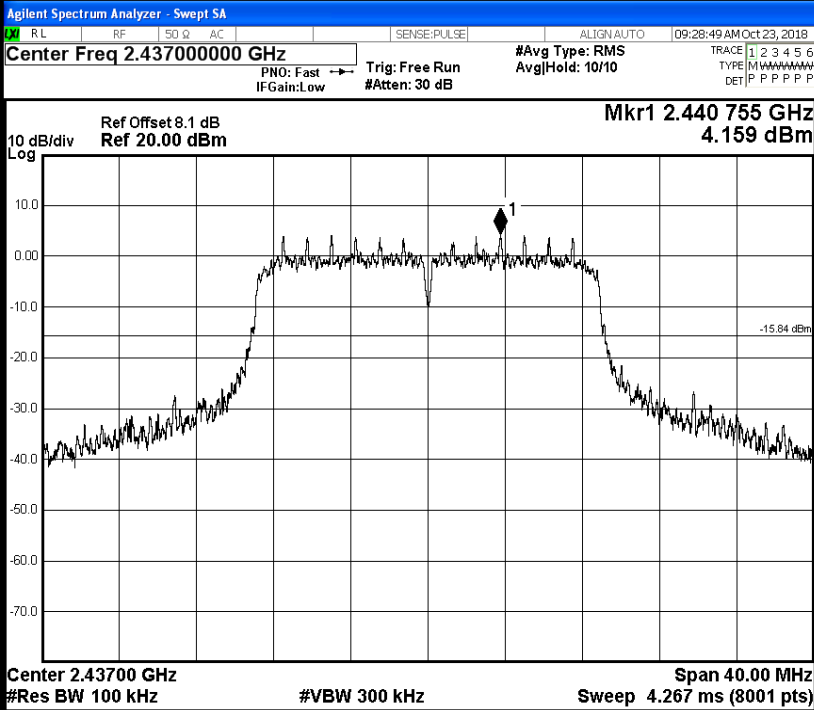
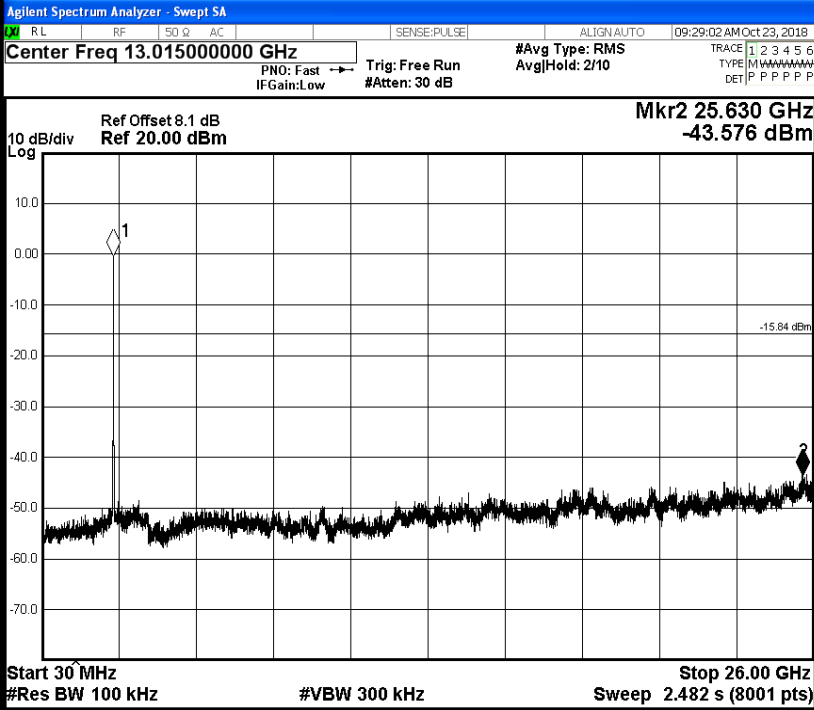
11G\_HCH\_Graphs



11N20SISO\_LCH\_Graphs



11N20SISO\_MCH\_Graphs

|                                |  |  |
|--------------------------------|--|--|
| <p>Pref/11N20<br/>SISO/MCH</p> |  <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.43700000 GHz</p> <p>Ref Offset 8.1 dB<br/>Ref 20.00 dBm</p> <p>Mkr1 2.440 755 GHz<br/>4.159 dBm</p> <p>Center 2.43700 GHz<br/>#Res BW 100 kHz<br/>#VBW 300 kHz<br/>Sweep 4.267 ms (8001 pts)</p> | <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq<br/>2.437000000 GHz</p> <p>Start Freq<br/>2.417000000 GHz</p> <p>Stop Freq<br/>2.457000000 GHz</p> <p>CF Step<br/>4.000000 MHz<br/>Auto Man</p> <p>Freq Offset<br/>0 Hz</p>   |
|                                | <p>Puw/11N20<br/>SISO/MCH</p>  |  <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 13.01500000 GHz</p> <p>Ref Offset 8.1 dB<br/>Ref 20.00 dBm</p> <p>Mkr2 25.630 GHz<br/>-43.576 dBm</p> <p>Start 30 MHz<br/>#Res BW 100 kHz<br/>#VBW 300 kHz<br/>Sweep 2.482 s (8001 pts)</p> |

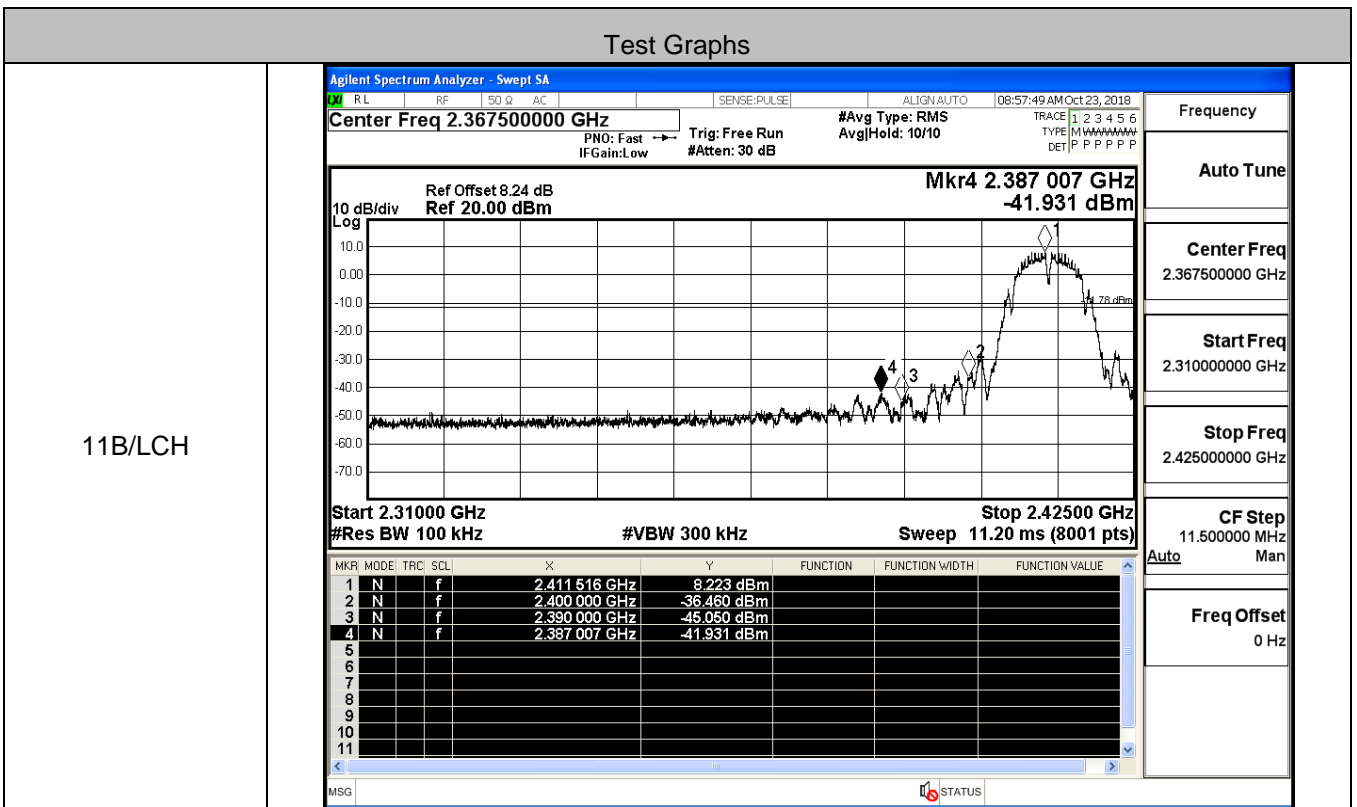
11N20SISO\_HCH\_Graphs

|                                |   |  |
|--------------------------------|---|--|
| <p>Pref/11N20<br/>SISO/HCH</p> | <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.46200000 GHz</p> <p>Ref Offset 8.1 dB<br/>Ref 20.00 dBm</p> <p>Mkr1 2.457 000 GHz<br/>2.465 dBm</p> <p>Center 2.46200 GHz<br/>#Res BW 100 kHz<br/>#VBW 300 kHz<br/>Sweep 4.267 ms (8001 pts)</p> | <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq<br/>2.462000000 GHz</p> <p>Start Freq<br/>2.442000000 GHz</p> <p>Stop Freq<br/>2.482000000 GHz</p> <p>CF Step<br/>4.000000 MHz<br/>Auto Man</p> <p>Freq Offset<br/>0 Hz</p>                           |
|                                | <p>Puw/11N20<br/>SISO/HCH</p>   | <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 13.01500000 GHz</p> <p>Ref Offset 8.1 dB<br/>Ref 20.00 dBm</p> <p>Mkr2 25.575 GHz<br/>-44.213 dBm</p> <p>Start 30 MHz<br/>#Res BW 100 kHz<br/>#VBW 300 kHz<br/>Sweep 2.482 s (8001 pts)</p> |

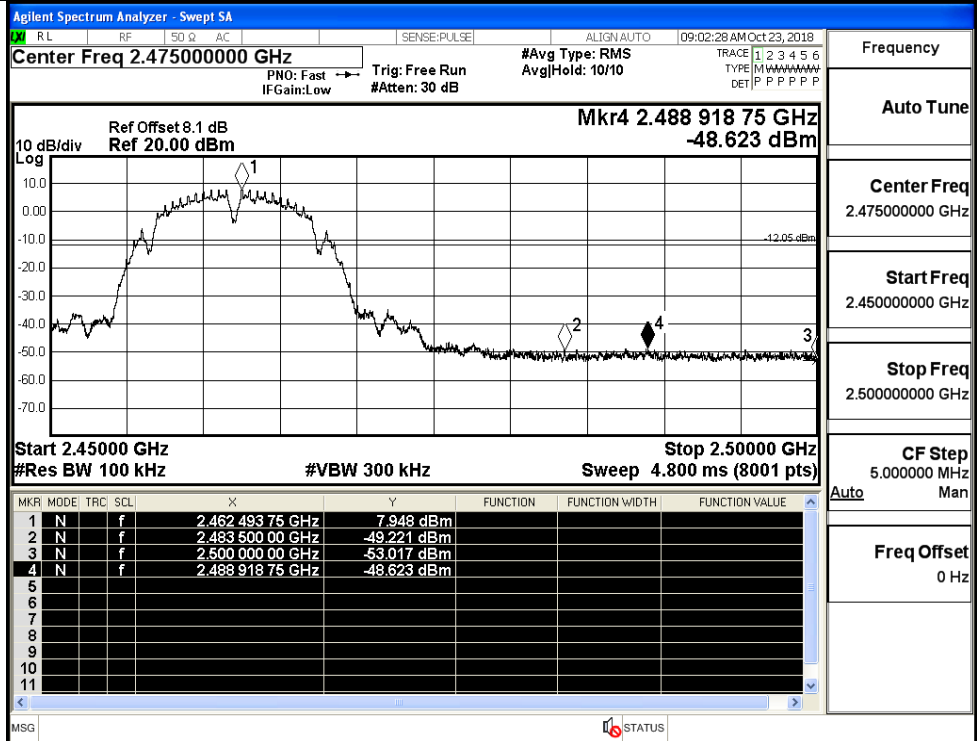


### A.6 Band-edge for RF Conducted Emissions

| Mode      | Channel | Carrier Power[dBm] | Max.Spurious Level [dBm] | Limit [dBm] | Verdict |
|-----------|---------|--------------------|--------------------------|-------------|---------|
| 11B       | LCH     | 8.223              | -41.931                  | -11.78      | PASS    |
|           | HCH     | 7.948              | -48.623                  | -12.05      | PASS    |
| 11G       | LCH     | 4.411              | -41.224                  | -15.59      | PASS    |
|           | HCH     | 2.422              | -46.639                  | -17.58      | PASS    |
| 11N20SISO | LCH     | 4.498              | -38.492                  | -15.5       | PASS    |
|           | HCH     | 2.382              | -46.616                  | -17.62      | PASS    |



11B/HCH



Frequency

Auto Tune

Center Freq  
2.47500000 GHz

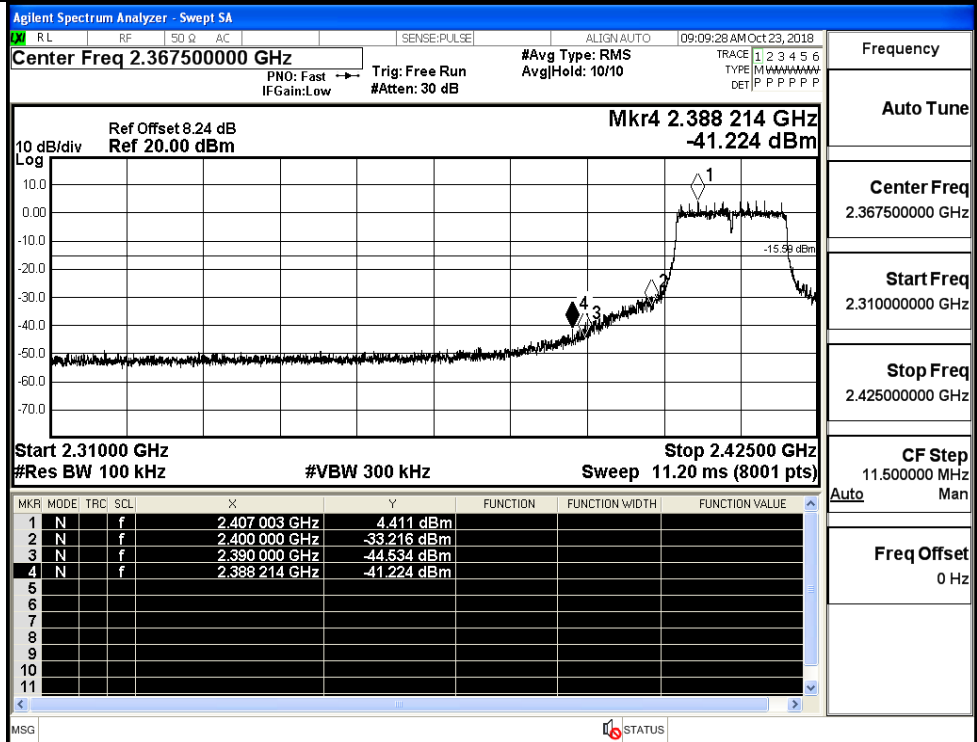
Start Freq  
2.45000000 GHz

Stop Freq  
2.50000000 GHz

CF Step  
5.000000 MHz

Freq Offset  
0 Hz

11G/LCH



Frequency

Auto Tune

Center Freq  
2.36750000 GHz

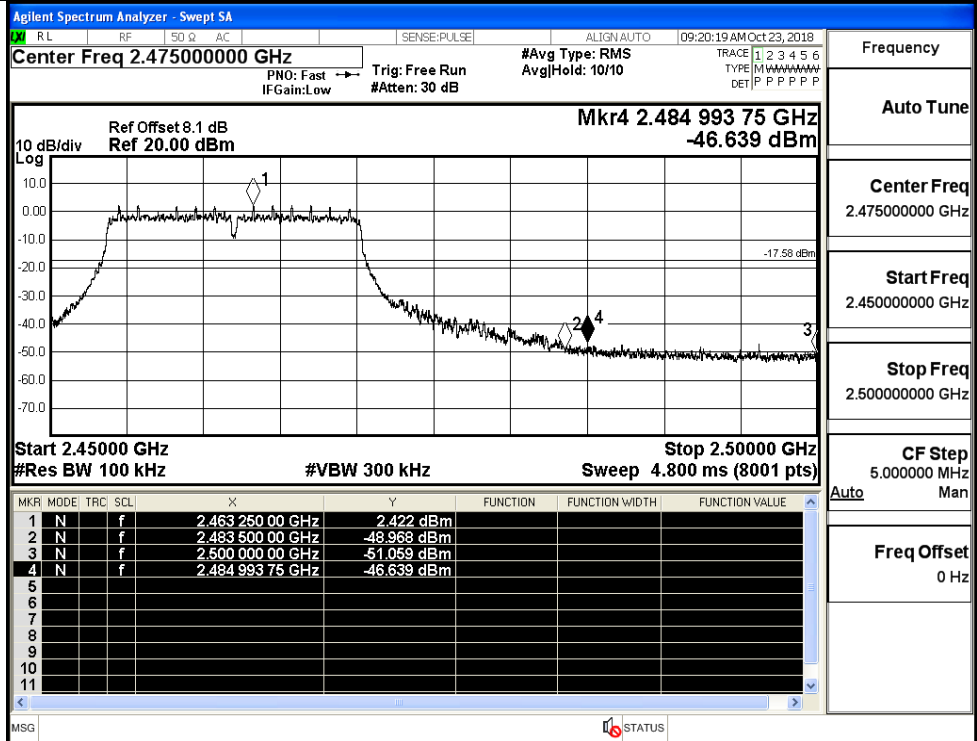
Start Freq  
2.31000000 GHz

Stop Freq  
2.42500000 GHz

CF Step  
11.500000 MHz

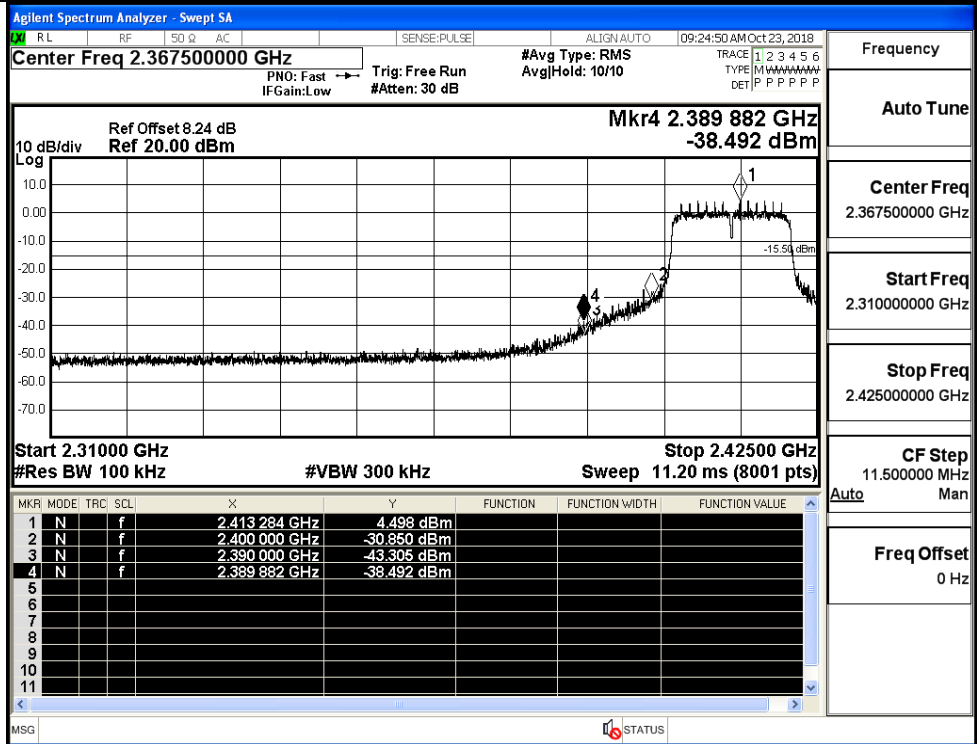
Freq Offset  
0 Hz

11G/HCH



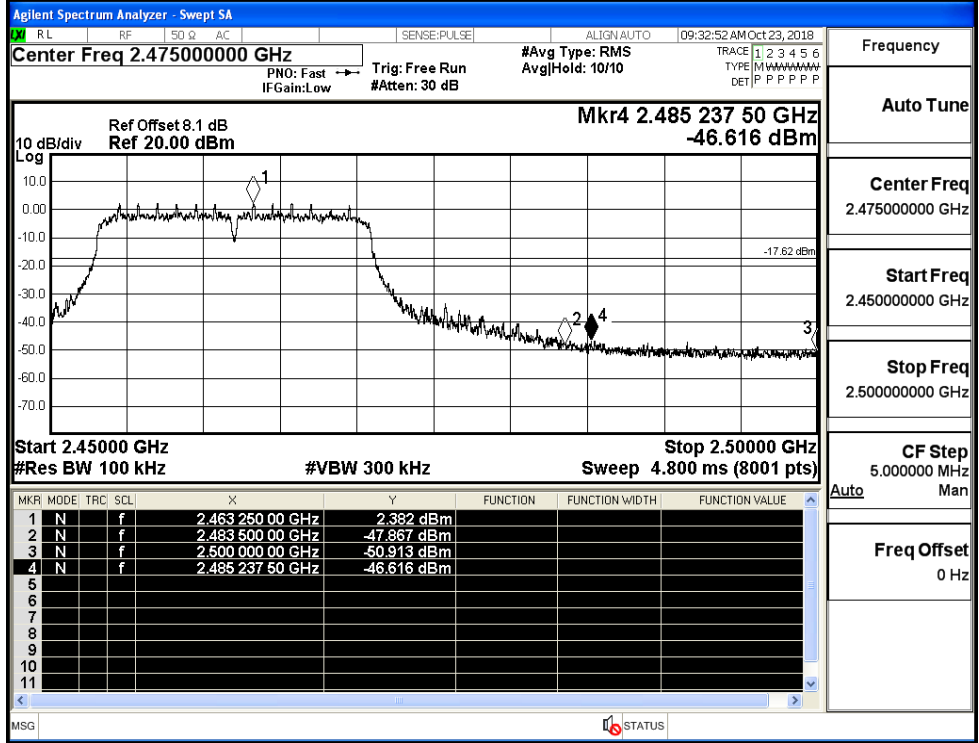
|             |                |
|-------------|----------------|
| Frequency   |                |
| Auto Tune   |                |
| Center Freq | 2.47500000 GHz |
| Start Freq  | 2.45000000 GHz |
| Stop Freq   | 2.50000000 GHz |
| CF Step     | 5.000000 MHz   |
| Freq Offset | 0 Hz           |

11N20SISO/LCH



|             |                |
|-------------|----------------|
| Frequency   |                |
| Auto Tune   |                |
| Center Freq | 2.36750000 GHz |
| Start Freq  | 2.31000000 GHz |
| Stop Freq   | 2.42500000 GHz |
| CF Step     | 11.500000 MHz  |
| Freq Offset | 0 Hz           |

11N20SISO/HCH



Frequency

Auto Tune

Center Freq  
2.475000000 GHz

Start Freq  
2.450000000 GHz

Stop Freq  
2.500000000 GHz

CF Step  
5.000000 MHz

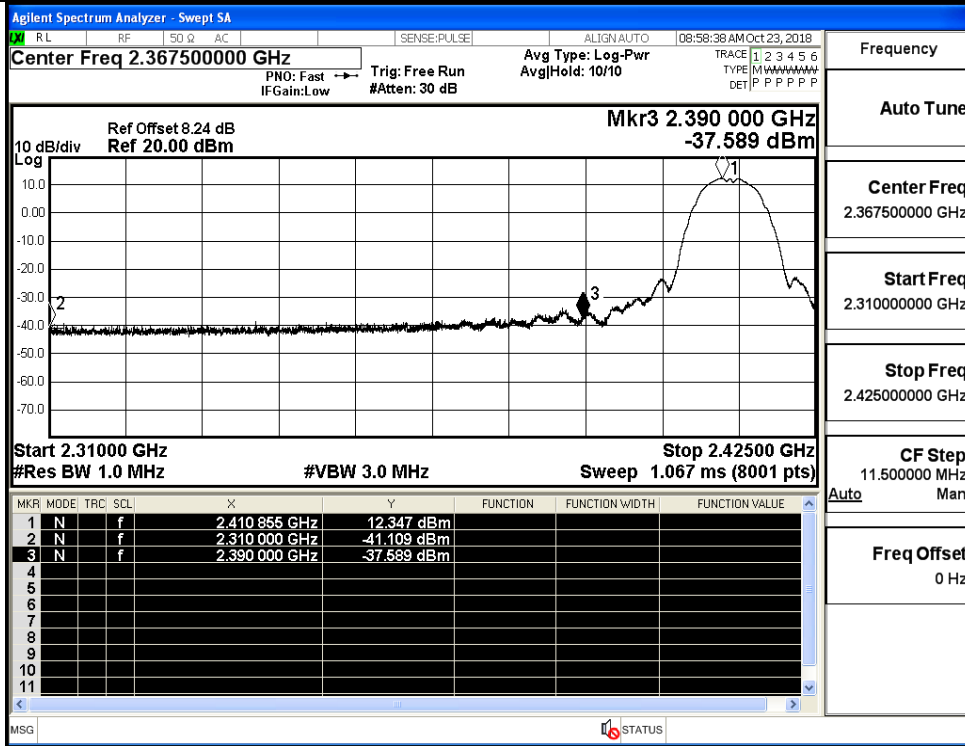
Auto Man

Freq Offset  
0 Hz

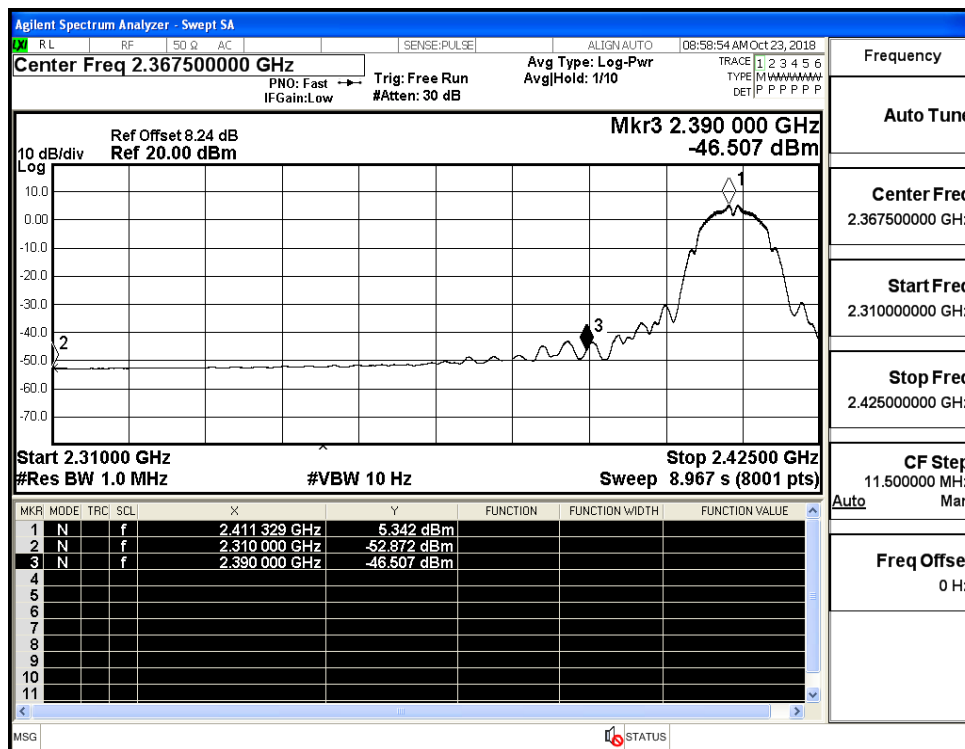
### A.7 Restrict-band band-edge measurements

| Test Mode  | Test Channel | Ant  | Freq.  | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBu V/m] | Verdict |
|------------|--------------|------|--------|-------------|------|---------------|------------|----------|-----------------|---------|
| 11B        | 2412         | Ant1 | 2310.0 | -41.109     | 2.50 | 0             | 56.619     | PEAK     | 74              | PASS    |
|            | 2412         | Ant1 | 2310.0 | -52.872     | 2.50 | 0             | 44.856     | AV       | 54              | PASS    |
|            | 2412         | Ant1 | 2390.0 | -37.589     | 2.50 | 0             | 60.139     | PEAK     | 74              | PASS    |
|            | 2412         | Ant1 | 2390.0 | -46.507     | 2.50 | 0             | 51.221     | AV       | 54              | PASS    |
|            | 2462         | Ant1 | 2483.5 | -40.320     | 2.50 | 0             | 57.408     | PEAK     | 74              | PASS    |
|            | 2462         | Ant1 | 2483.5 | -51.913     | 2.50 | 0             | 45.815     | AV       | 54              | PASS    |
|            | 2462         | Ant1 | 2500.0 | -41.319     | 2.50 | 0             | 56.409     | PEAK     | 74              | PASS    |
|            | 2462         | Ant1 | 2500.0 | -51.944     | 2.50 | 0             | 45.784     | AV       | 54              | PASS    |
| 11G        | 2412         | Ant1 | 2310.0 | -43.210     | 2.50 | 0             | 54.518     | PEAK     | 74              | PASS    |
|            | 2412         | Ant1 | 2310.0 | -52.742     | 2.50 | 0             | 44.986     | AV       | 54              | PASS    |
|            | 2412         | Ant1 | 2390.0 | -29.139     | 2.50 | 0             | 68.589     | PEAK     | 74              | PASS    |
|            | 2412         | Ant1 | 2390.0 | -45.824     | 2.50 | 0             | 51.904     | AV       | 54              | PASS    |
|            | 2462         | Ant1 | 2483.5 | -35.167     | 2.50 | 0             | 62.561     | PEAK     | 74              | PASS    |
|            | 2462         | Ant1 | 2483.5 | -49.765     | 2.50 | 0             | 47.963     | AV       | 54              | PASS    |
|            | 2462         | Ant1 | 2500.0 | -41.921     | 2.50 | 0             | 55.807     | PEAK     | 74              | PASS    |
|            | 2462         | Ant1 | 2500.0 | -51.860     | 2.50 | 0             | 45.868     | AV       | 54              | PASS    |
| 11N20 SISO | 2412         | Ant1 | 2310.0 | -42.326     | 2.50 | 0             | 55.402     | PEAK     | 74              | PASS    |
|            | 2412         | Ant1 | 2310.0 | -52.718     | 2.50 | 0             | 45.010     | AV       | 54              | PASS    |
|            | 2412         | Ant1 | 2390.0 | -26.812     | 2.50 | 0             | 70.916     | PEAK     | 74              | PASS    |
|            | 2412         | Ant1 | 2390.0 | -45.810     | 2.50 | 0             | 51.918     | AV       | 54              | PASS    |
|            | 2462         | Ant1 | 2483.5 | -34.059     | 2.50 | 0             | 63.669     | PEAK     | 74              | PASS    |
|            | 2462         | Ant1 | 2483.5 | -49.034     | 2.50 | 0             | 48.694     | AV       | 54              | PASS    |
|            | 2462         | Ant1 | 2500.0 | -39.842     | 2.50 | 0             | 57.886     | PEAK     | 74              | PASS    |
|            | 2462         | Ant1 | 2500.0 | -51.727     | 2.50 | 0             | 46.001     | AV       | 54              | PASS    |

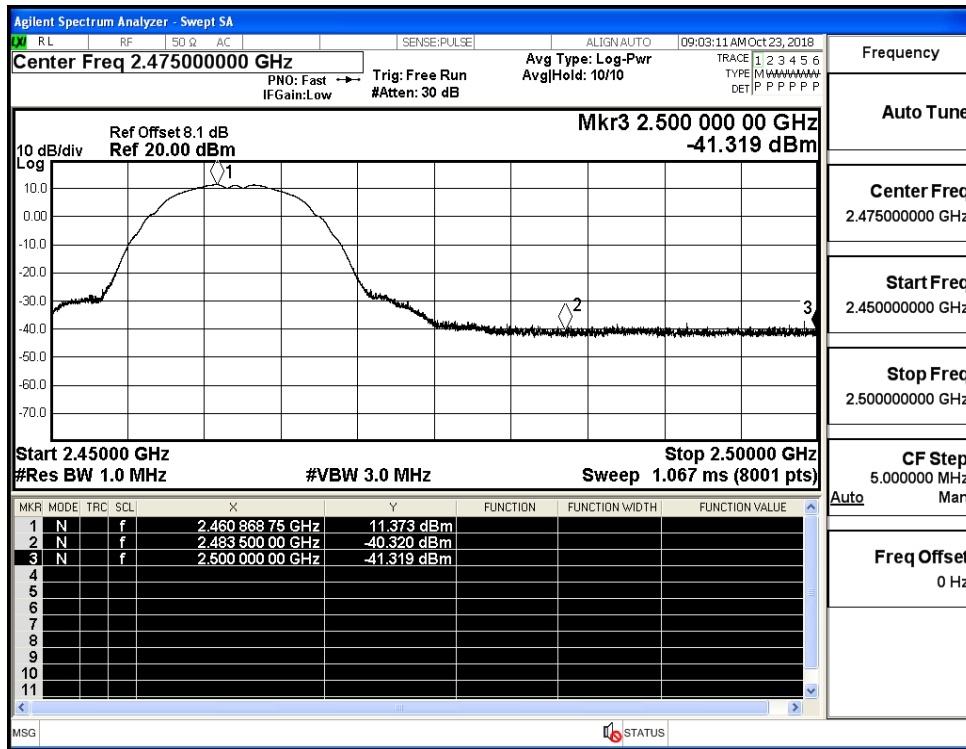
Restrict-band band-edge measurements\_11B\_2412\_Ant1\_PEAK



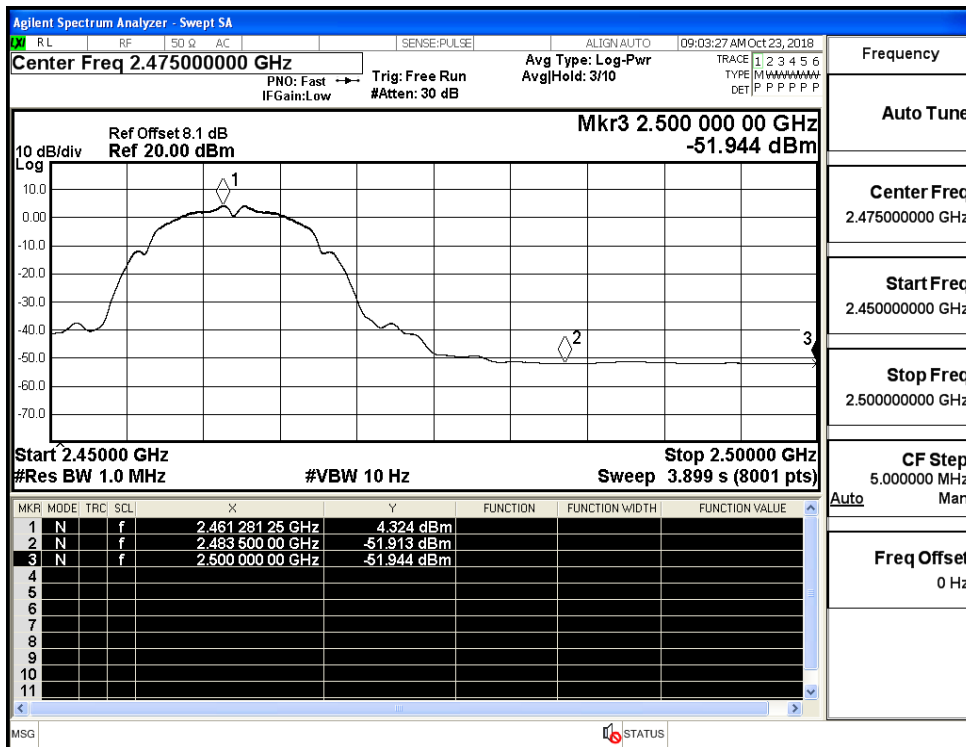
Restrict-band band-edge measurements\_11B\_2412\_Ant1\_AV



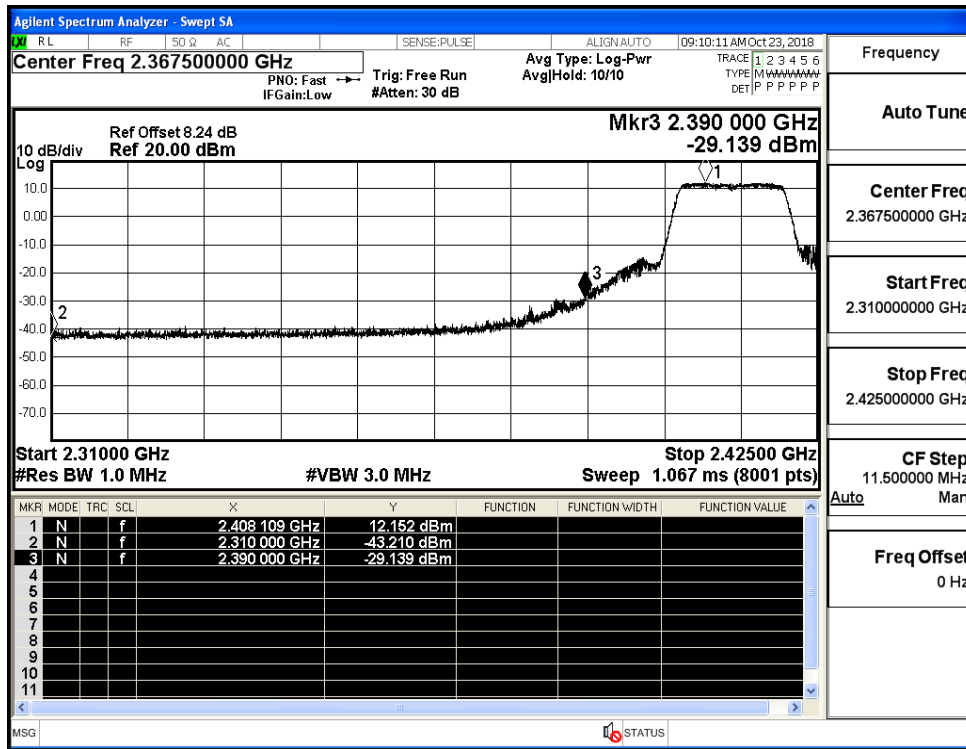
Restrict-band band-edge measurements\_11B\_2462\_Ant1\_PEAK



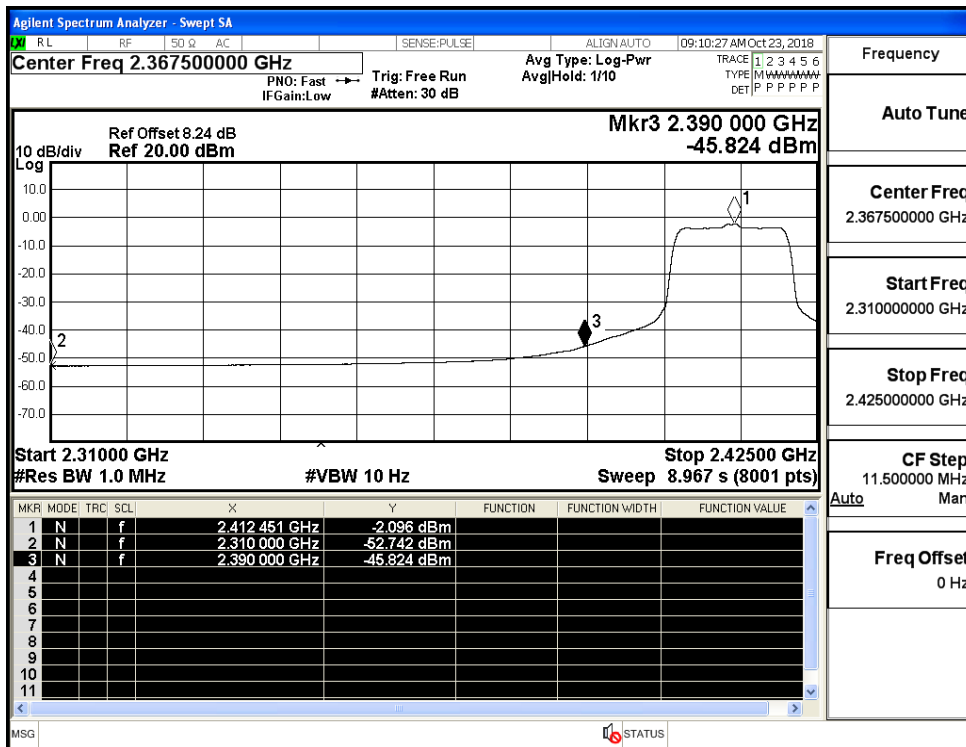
Restrict-band band-edge measurements\_11B\_2462\_Ant1\_AV



Restrict-band band-edge measurements\_11G\_2412\_Ant1\_PEAK

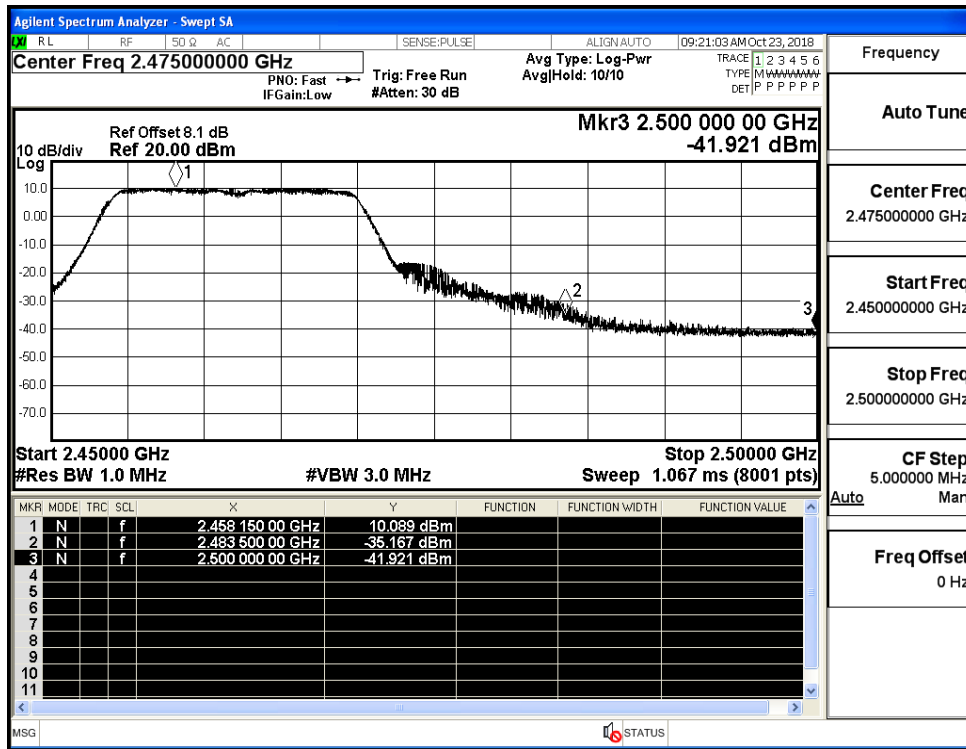


Restrict-band band-edge measurements\_11G\_2412\_Ant1\_AV

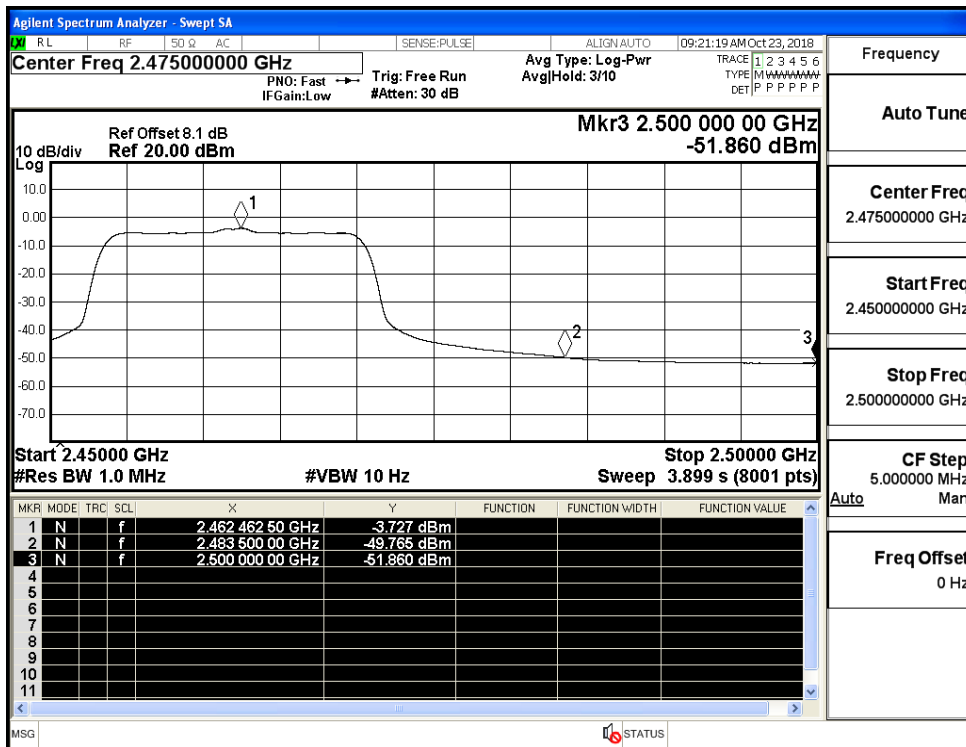




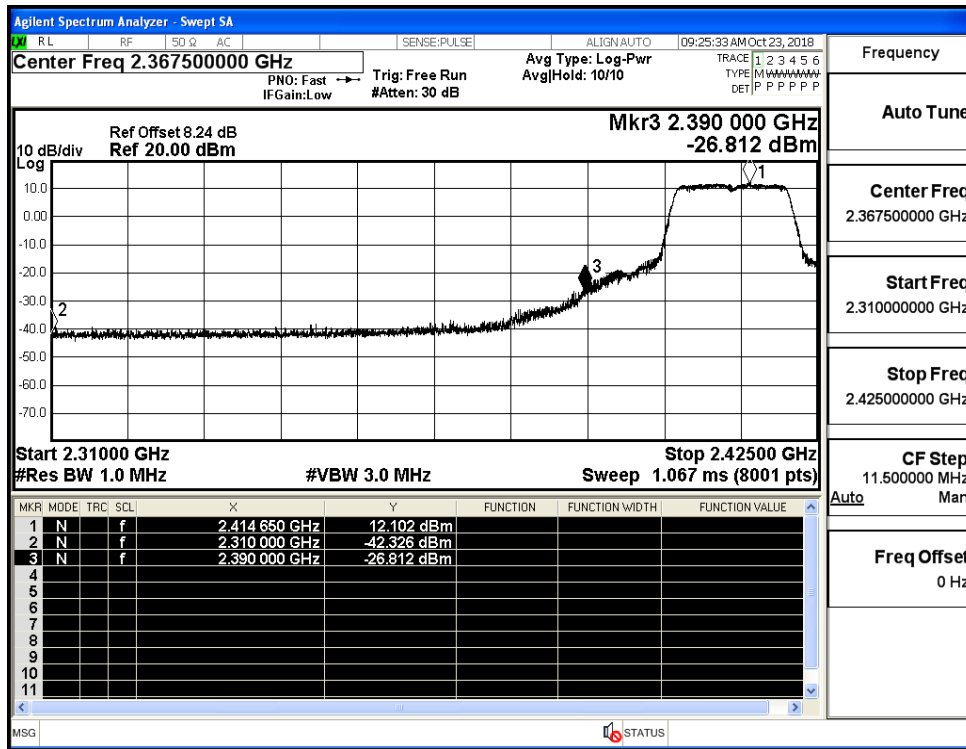
Restrict-band band-edge measurements\_11G\_2462\_Ant1\_PEAK



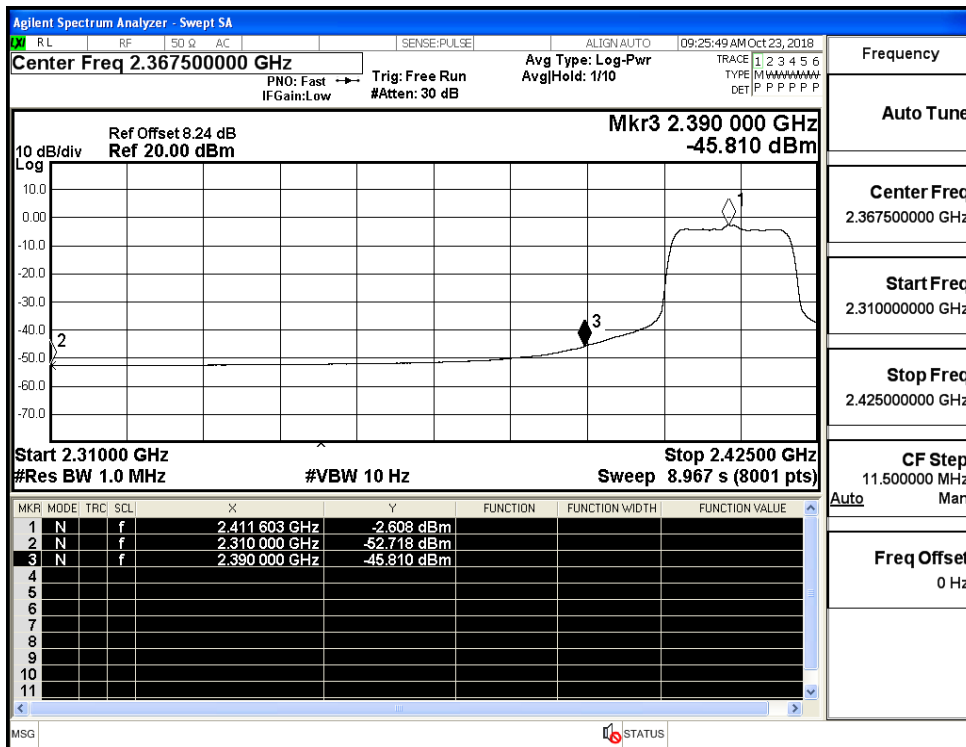
Restrict-band band-edge measurements\_11G\_2462\_Ant1\_AV



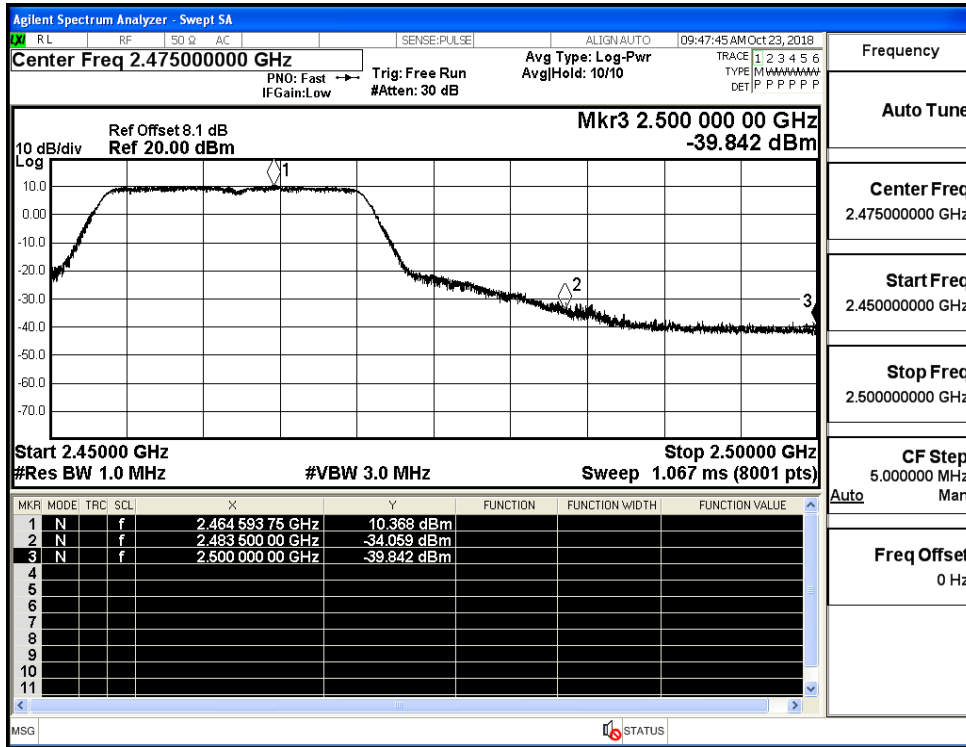
Restrict-band band-edge measurements\_11N20SISO\_2412\_Ant1\_PEAK



Restrict-band band-edge measurements\_11N20SISO\_2412\_Ant1\_AV



Restrict-band band-edge measurements\_11N20SISO\_2462\_Ant1\_PEAK



Restrict-band band-edge measurements\_11N20SISO\_2462\_Ant1\_AV

