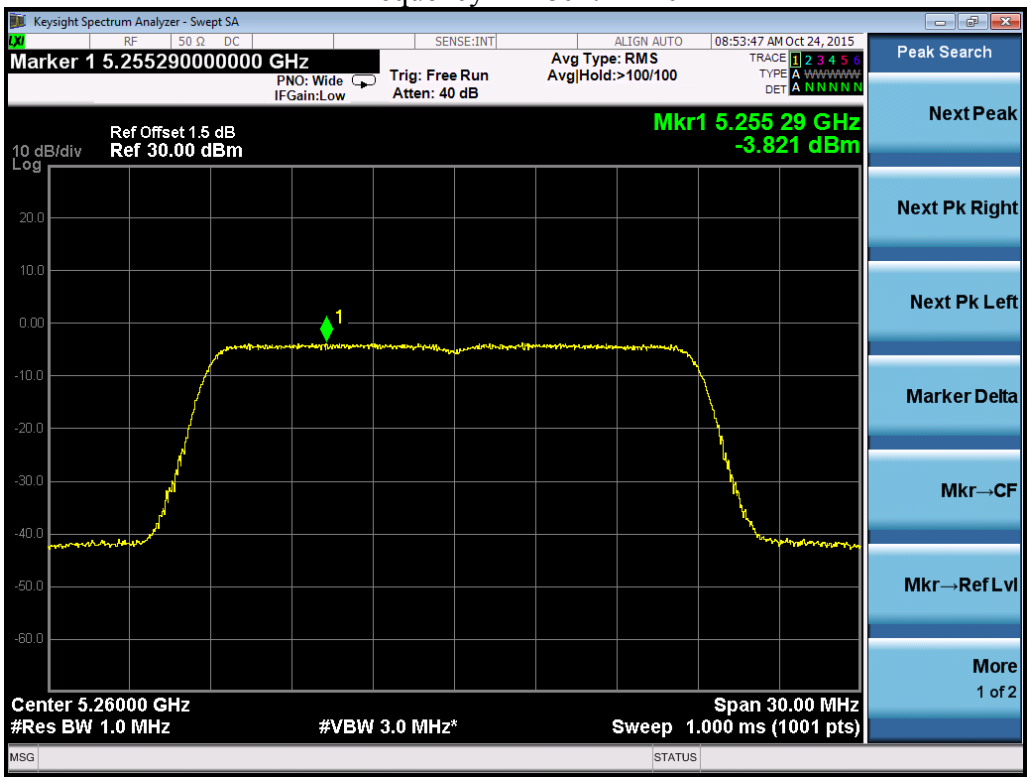
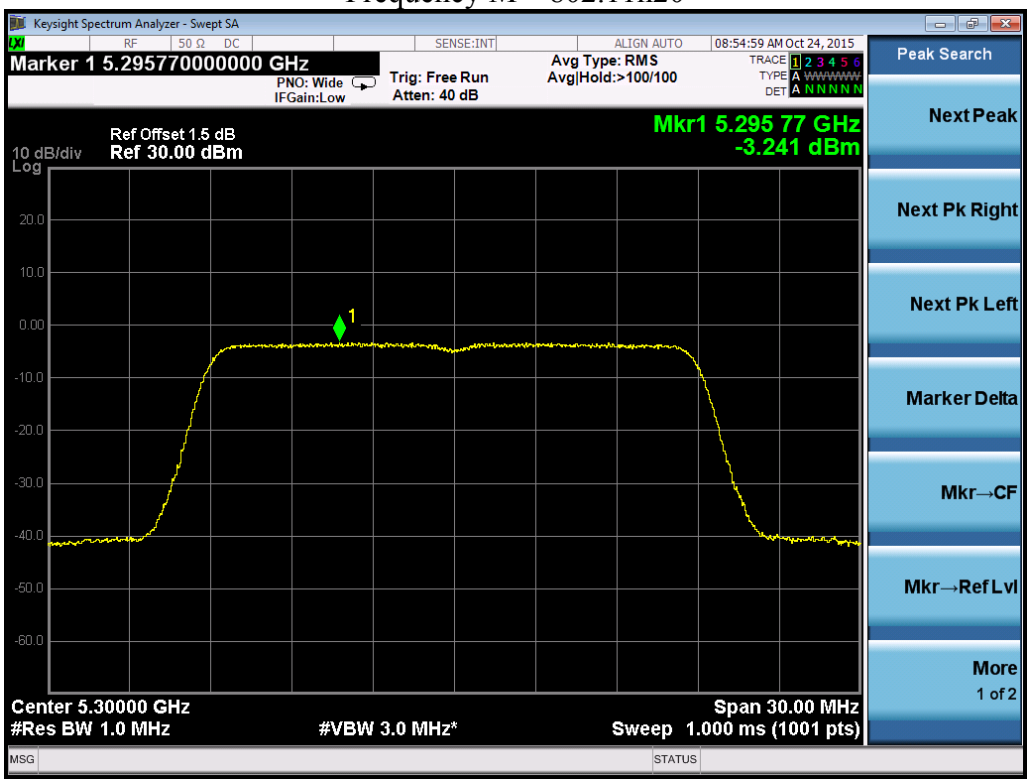
Frequency H – 802.11a

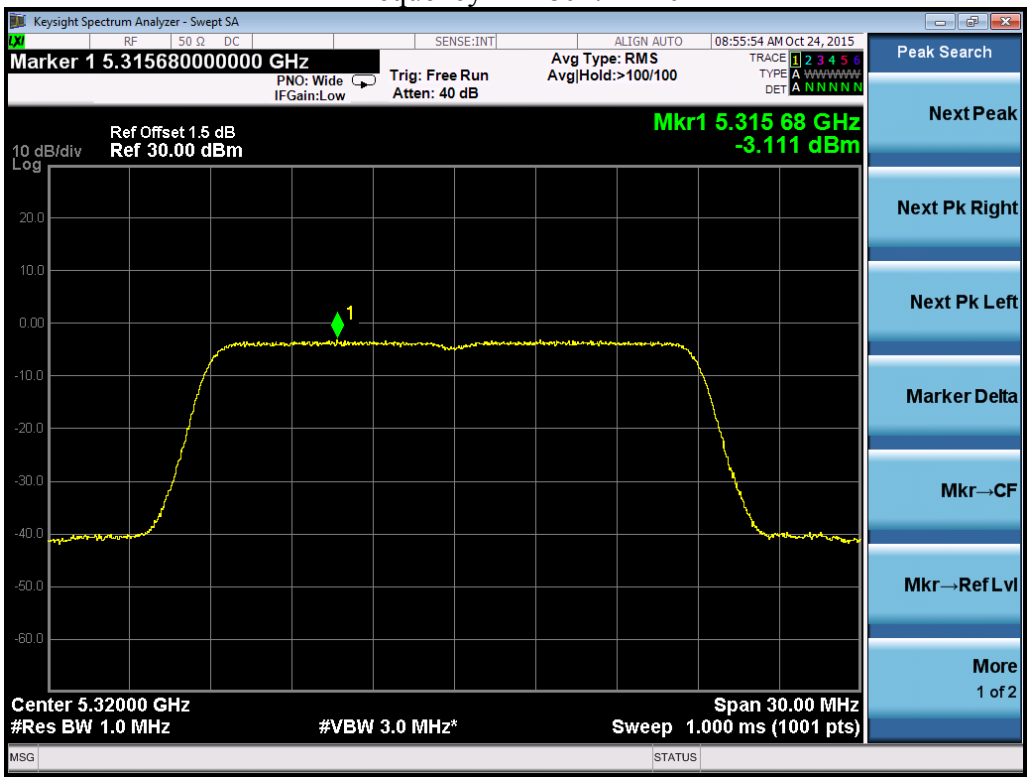

Frequency L – 802.11n20



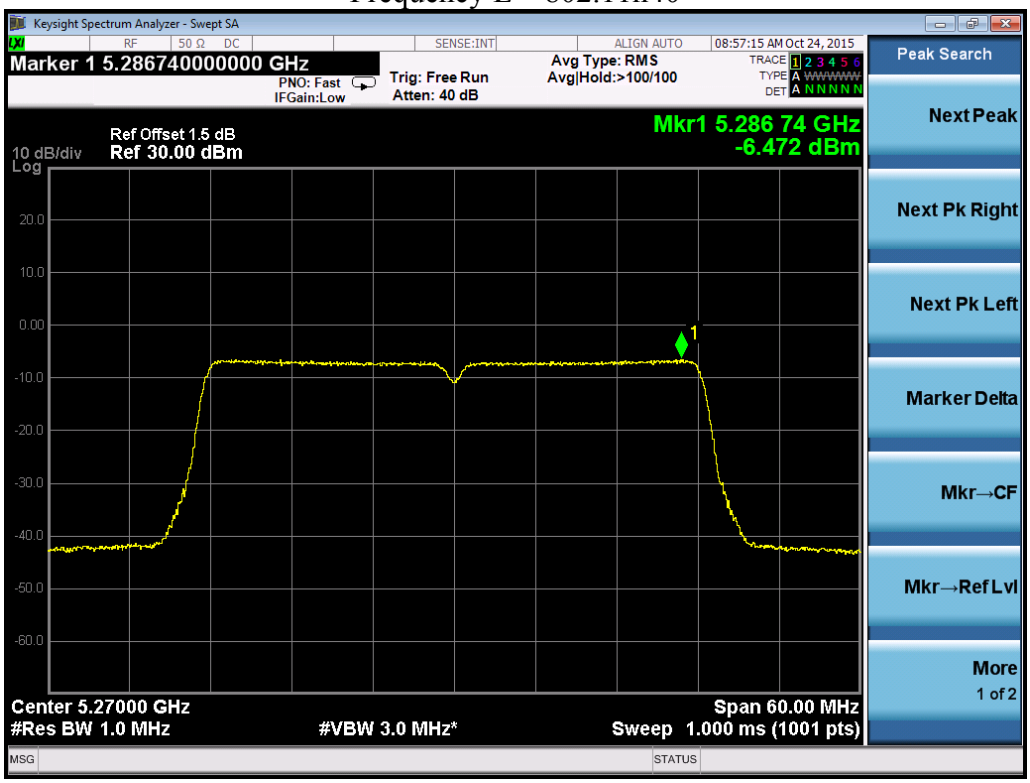
Frequency M – 802.11n20



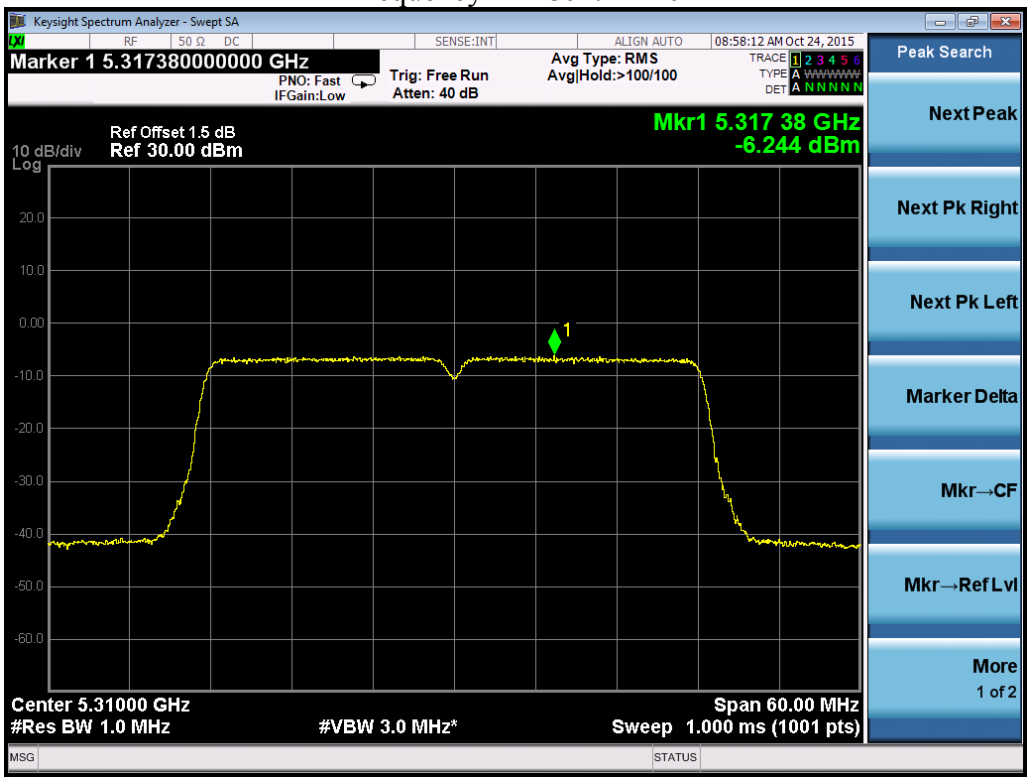

Frequency H – 802.11n20



Frequency L – 802.11n40




Frequency H – 802.11n40



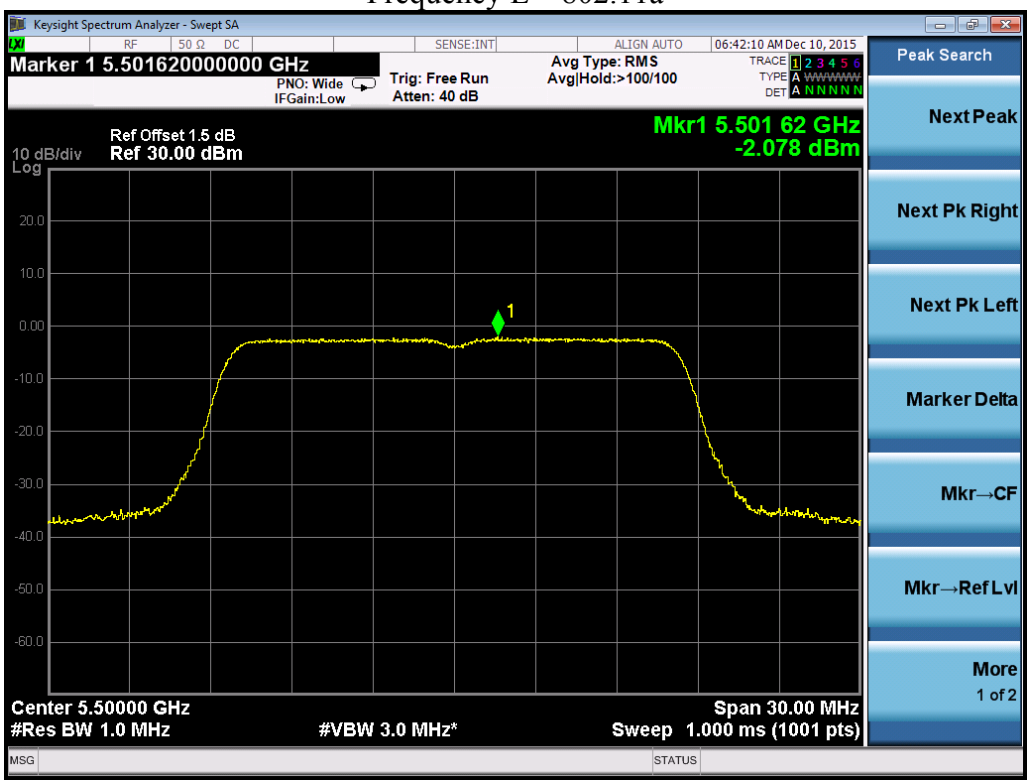
U-NII-2C Band:

| Mode | Frequency (MHz) | Reading (dBm/MHz) | | Max PSD (mw/MHz) | Max PSD (dBm/MHz) | Limits (dBm/MHz) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| | | Port 0 | Port 1 | | | | |
| 802.11a | 5500 | -2.078 | -2.438 | 1.19 | -2.08 | 11.00 | 13.08 |
| | 5580 | -2.244 | -5.099 | 0.91 | -2.24 | 11.00 | 13.24 |
| | 5700 | -5.972 | -3.986 | 0.65 | -3.99 | 11.00 | 14.99 |
| **Mode** | **Frequency (MHz)** | **Reading (dBm/MHz)** | | **Total PSD (mw/MHz)** | **Total PSD (dBm/MHz)** | **Limits (dBm/MHz)** | **Margin (dB)** |
| | | **Port 0** | **Port 1** | | | | |
| 802.11n20 | 5500 | -3.574 | -2.653 | 0.98 | -0.08 | 11.00 | 11.08 |
| | 5580 | -2.759 | -2.537 | 1.09 | 0.36 | 11.00 | 10.64 |
| | 5700 | -5.794 | -4.295 | 0.64 | -1.97 | 11.00 | 12.97 |
| 802.11n40 | 5510 | -6.407 | -5.371 | 0.52 | -2.85 | 11.00 | 13.85 |
| | 5550 | -4.643 | -3.023 | 0.84 | -0.75 | 11.00 | 11.75 |
| | 5670 | -8.621 | -6.969 | 0.34 | -4.71 | 11.00 | 15.71 |

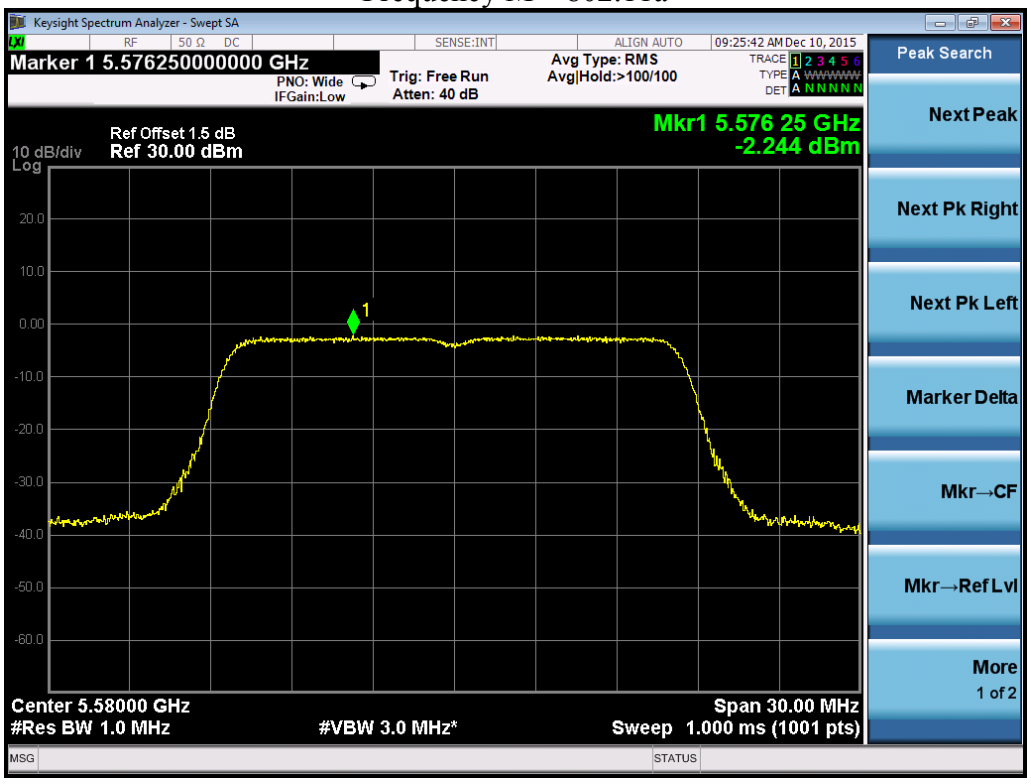
Test Plots as bellow:

Port 1

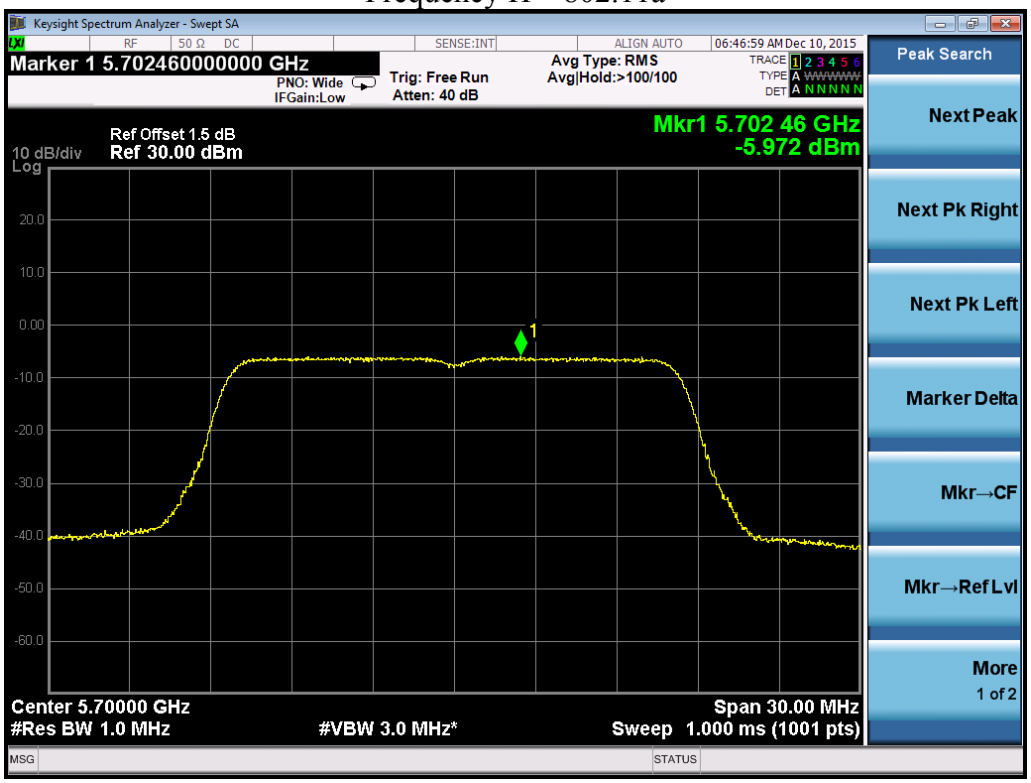
Frequency L – 802.11a



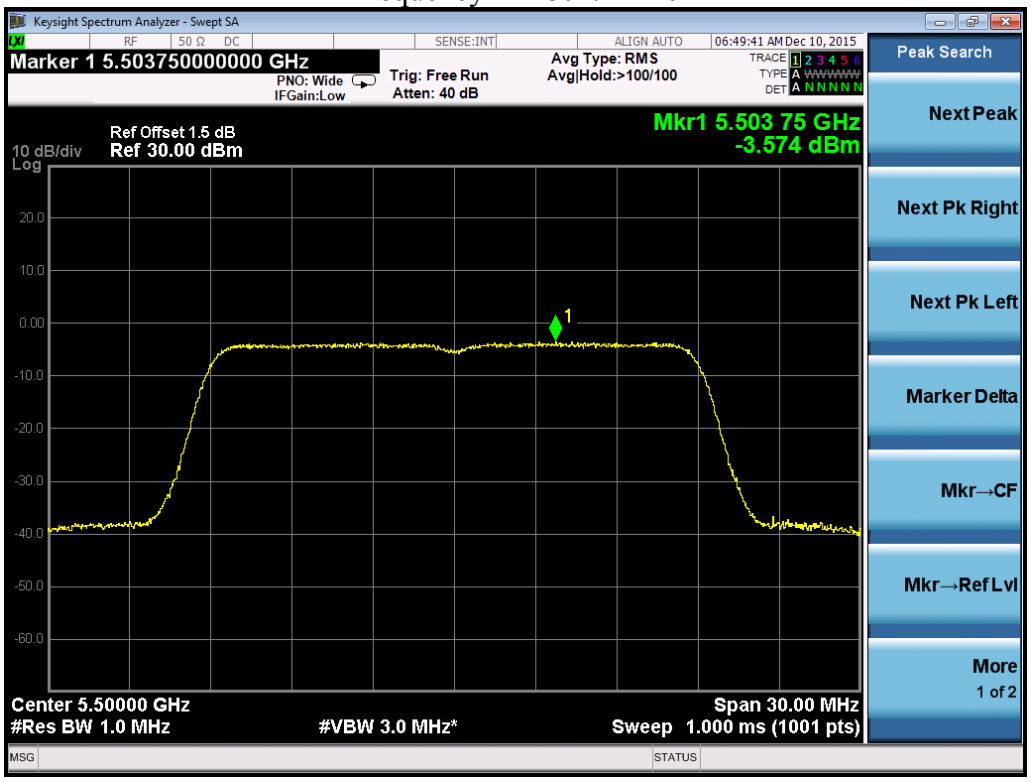

Frequency M – 802.11a



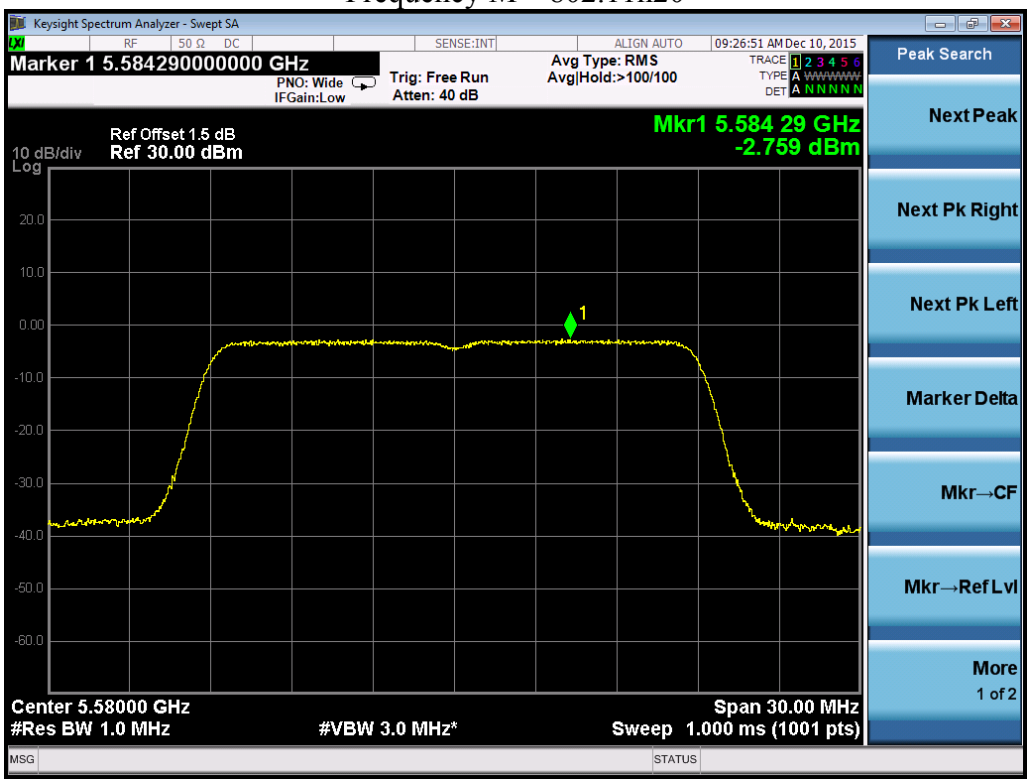
Frequency H – 802.11a



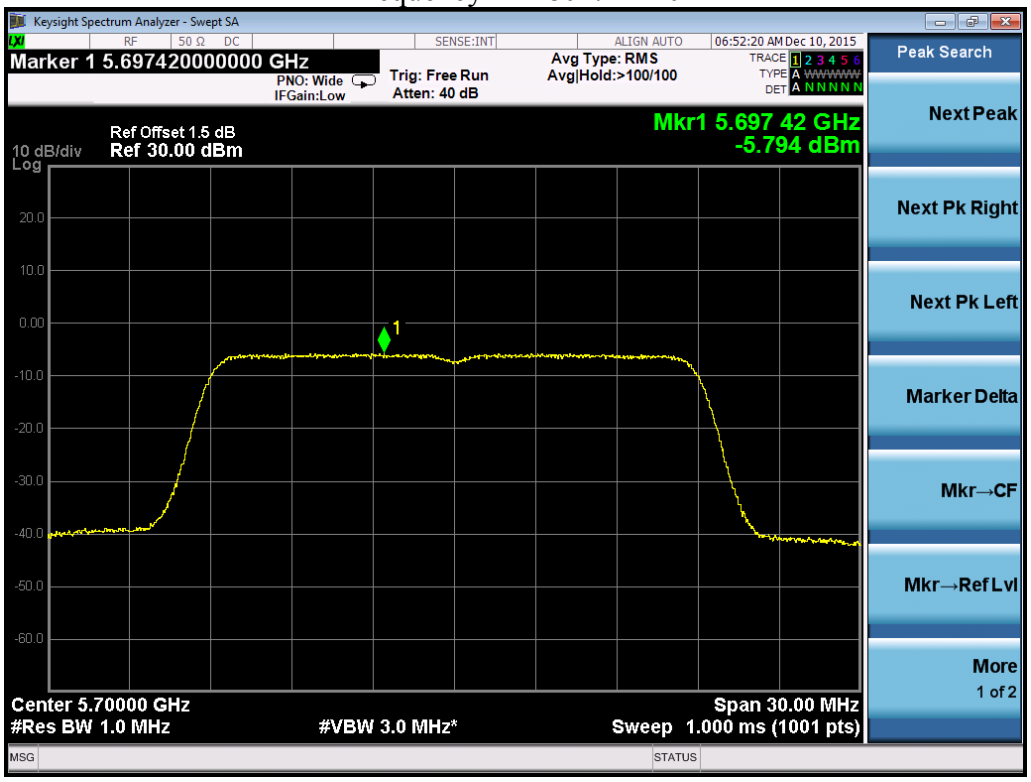

Frequency L – 802.11n20



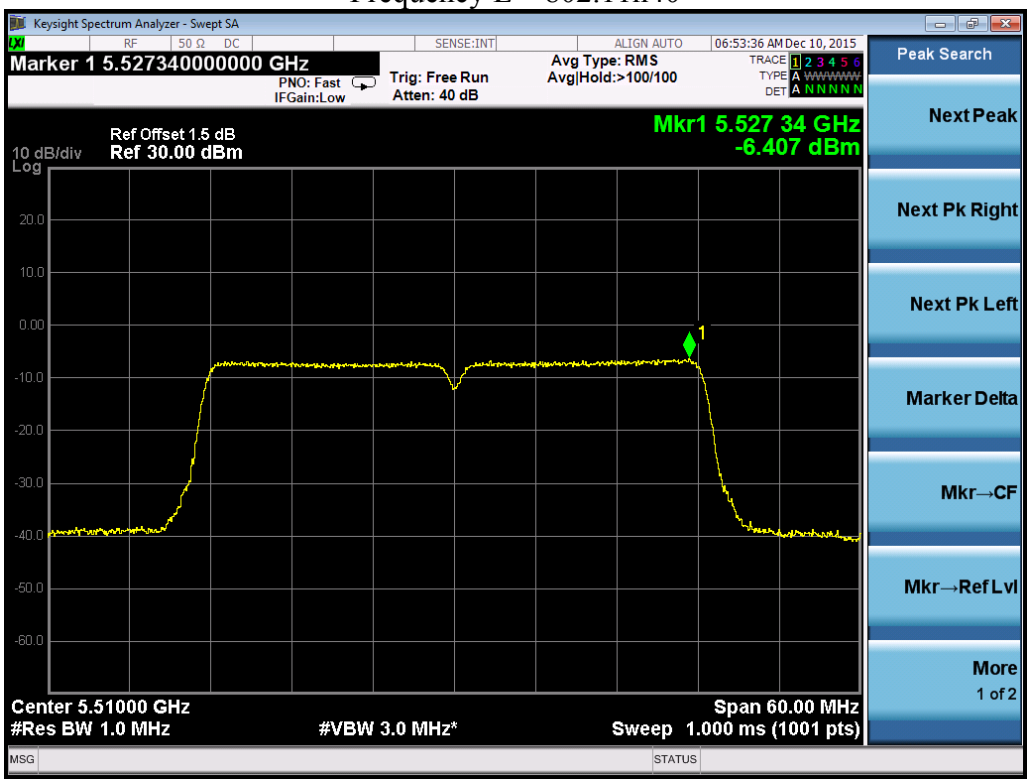
Frequency M – 802.11n20



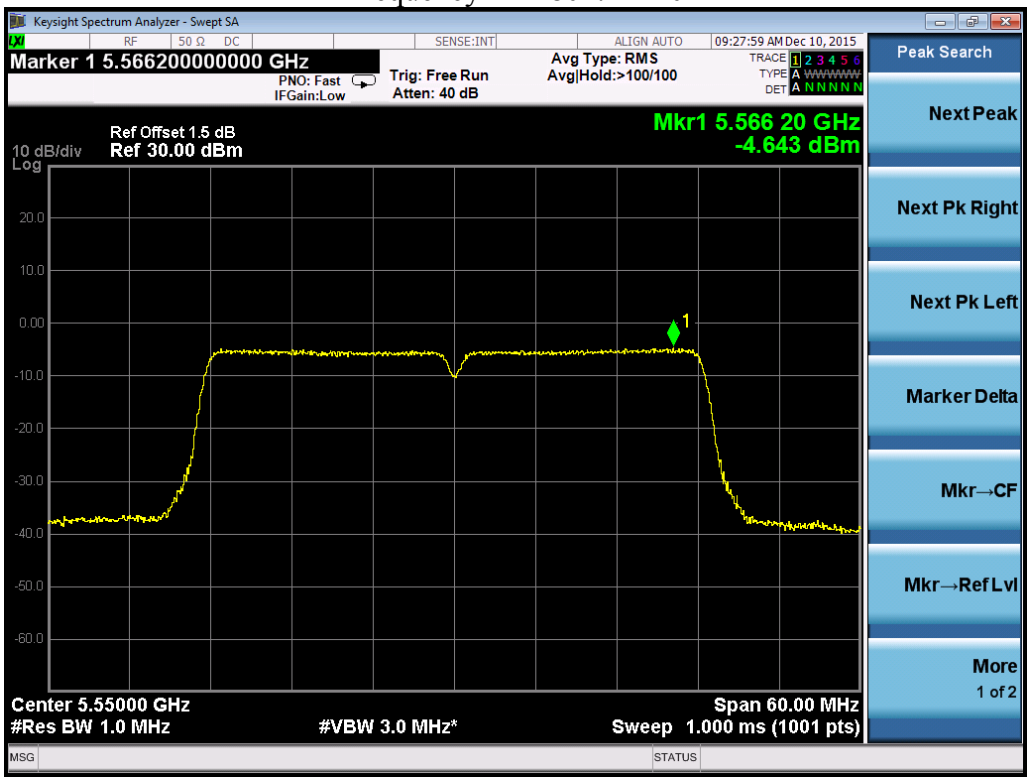

Frequency H – 802.11n20



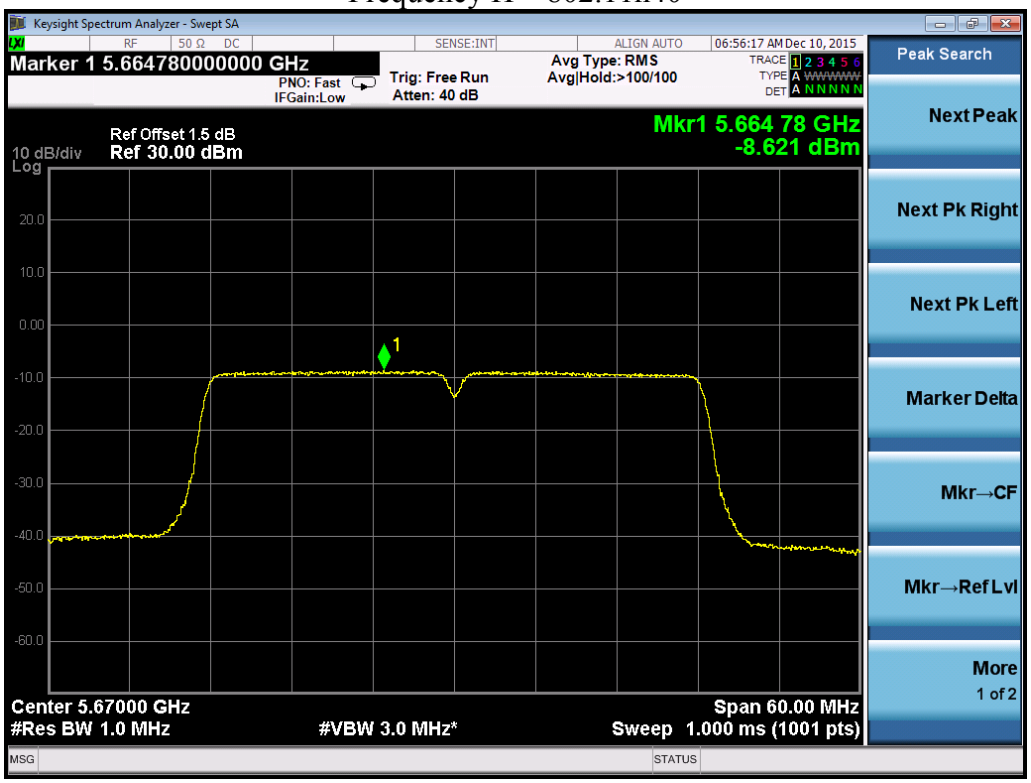
Frequency L – 802.11n40




Frequency M – 802.11n40

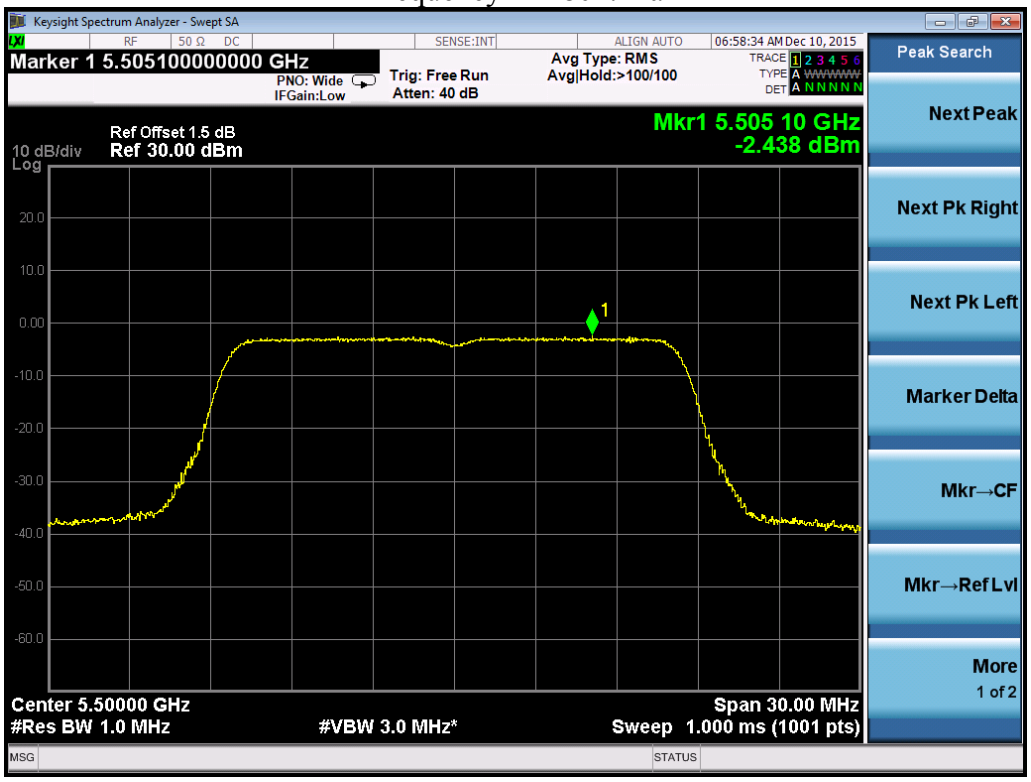


Frequency H – 802.11n40

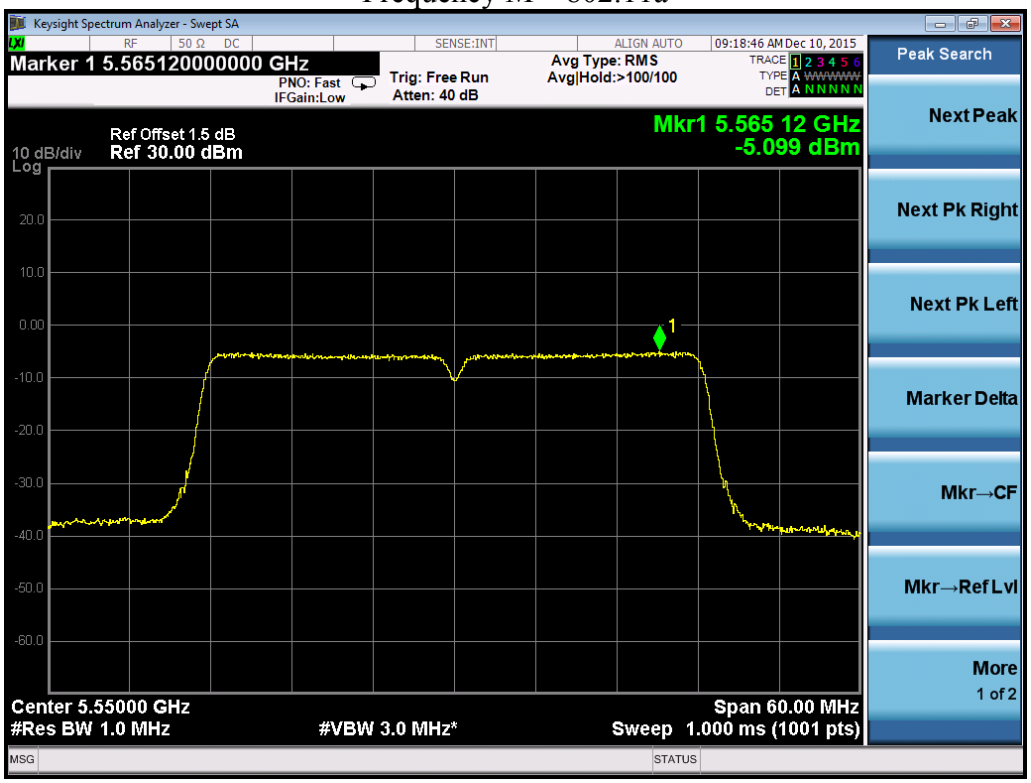



Port 2

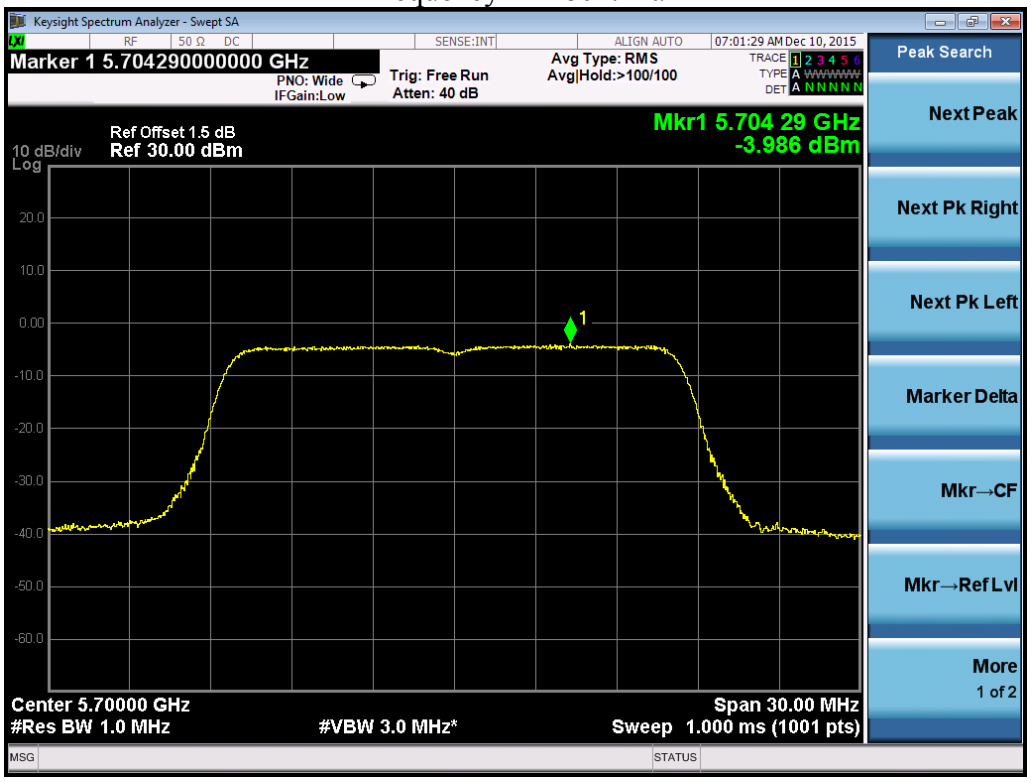
Frequency L – 802.11a



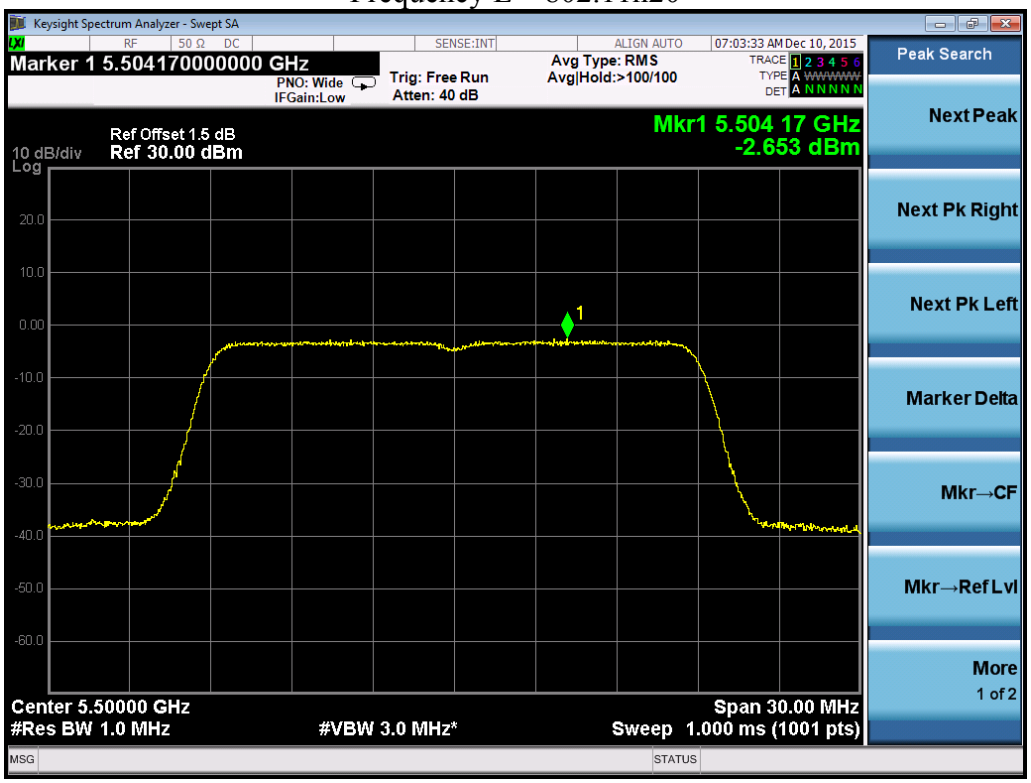
Frequency M – 802.11a



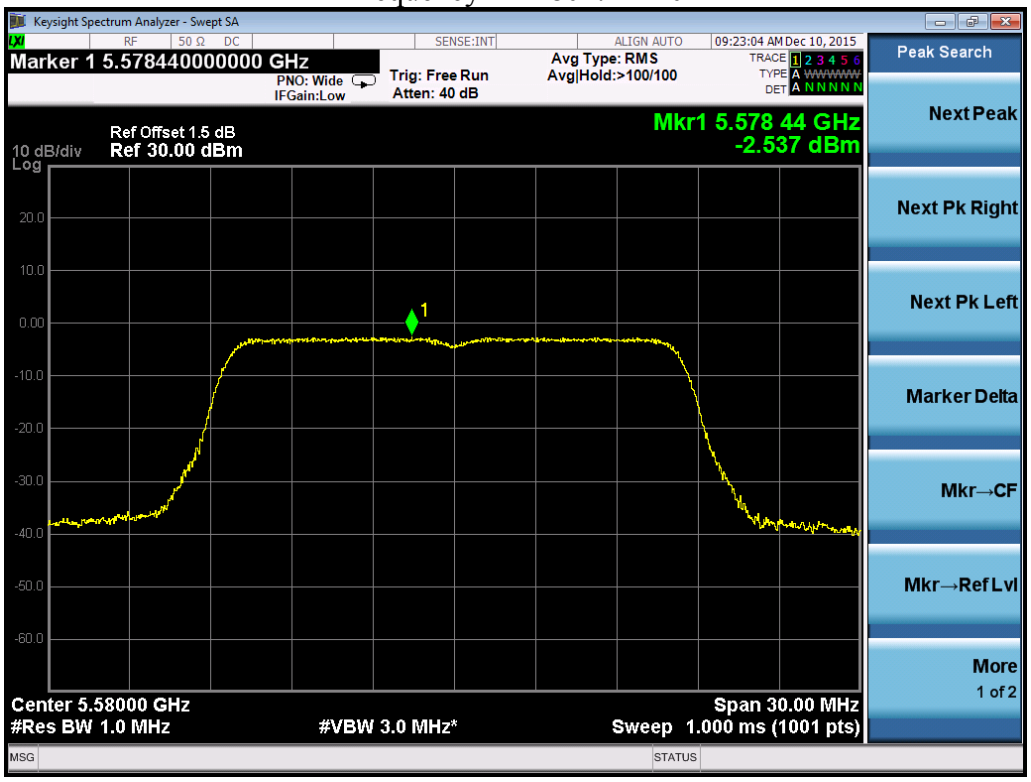

Frequency H – 802.11a



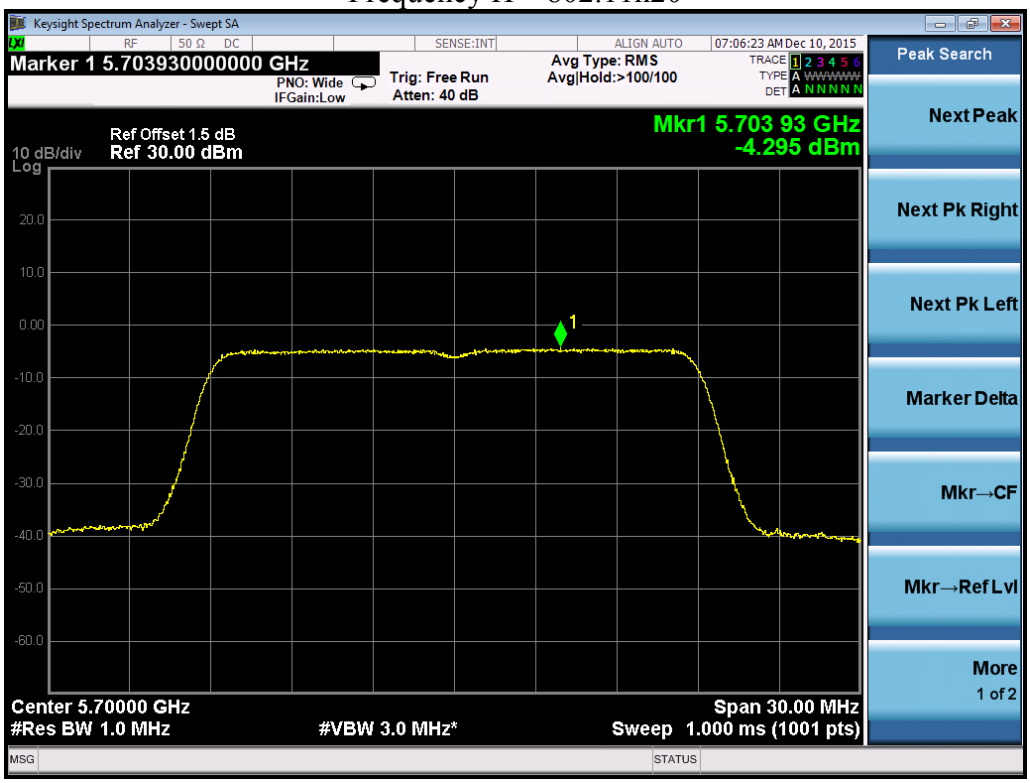
Frequency L – 802.11n20



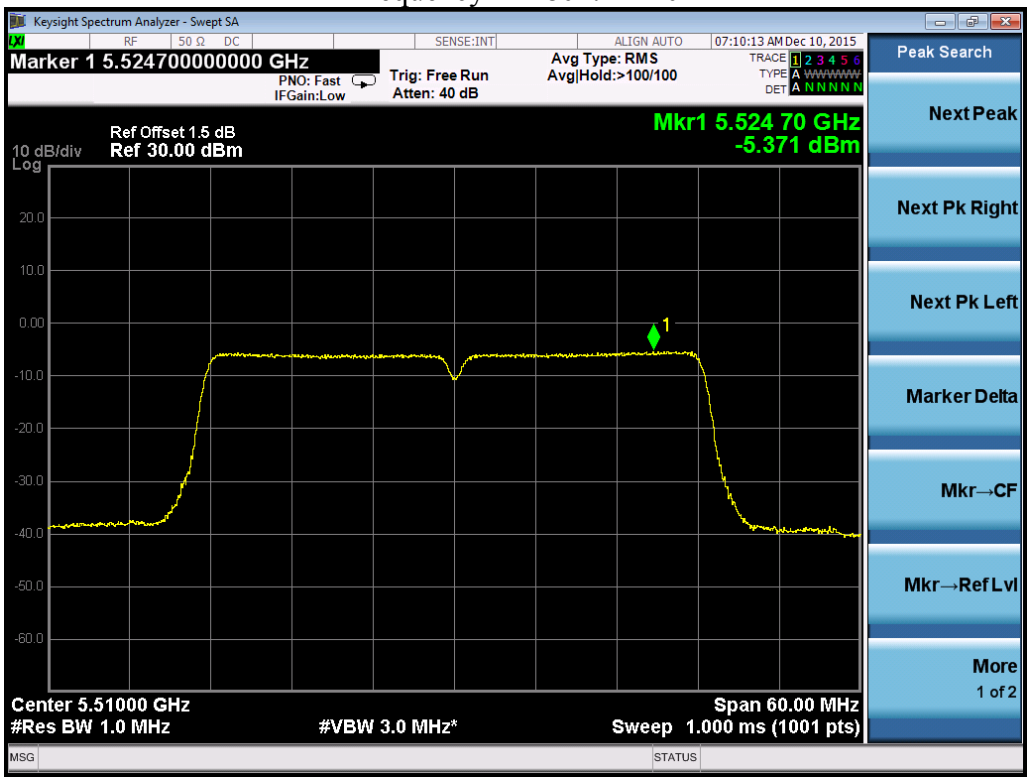

Frequency M – 802.11n20



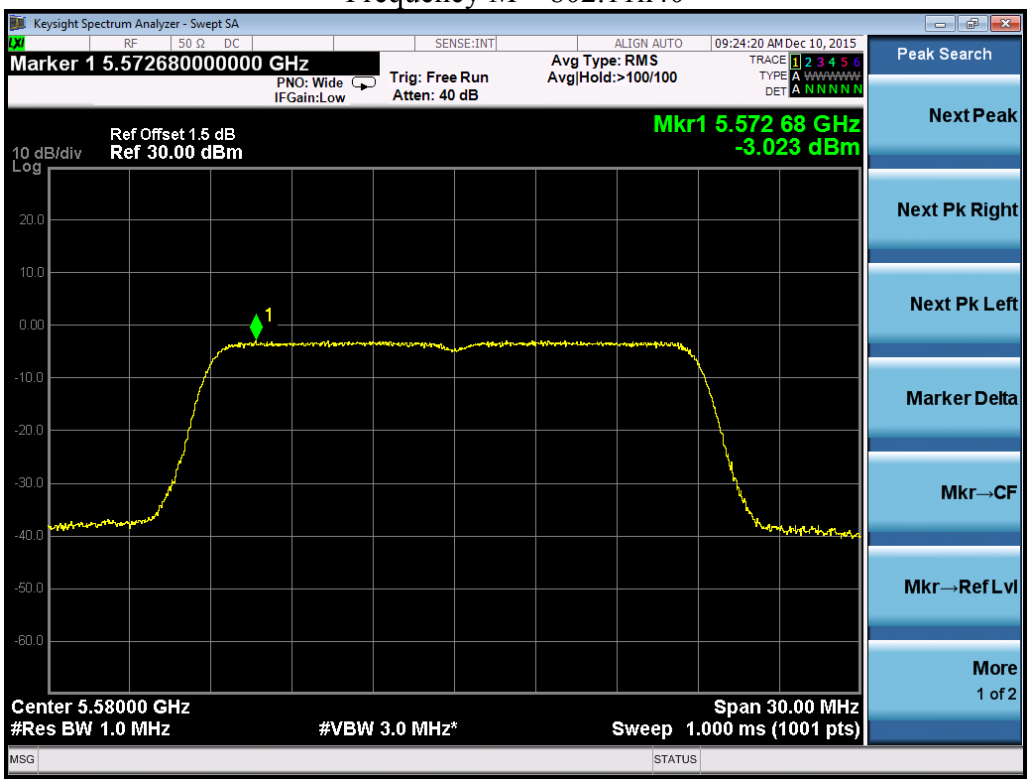
Frequency H – 802.11n20



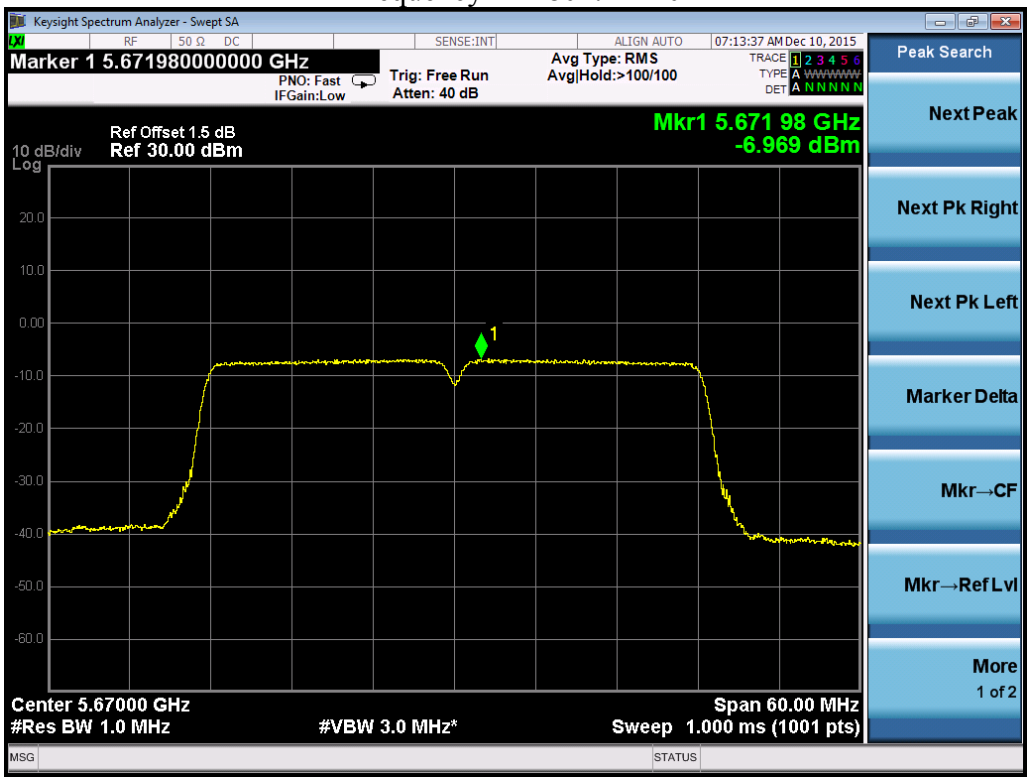

Frequency L – 802.11n40



Frequency M – 802.11n40




Frequency H – 802.11n40



U-NII-3 Band:

| Mode | Frequency (MHz) | Reading (dBm/MHz) | | Max PSD (mw/500K Hz) | Max PSD (dBm/500K Hz) | Limit (dBm/500K Hz) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| | | Port 0 | Port 1 | | | | |
| 802.11a | 5745 | -3.122 | -2.902 | 0.51 | -2.90 | 30.00 | 32.90 |
| | 5785 | -4.197 | -4.135 | 0.39 | -4.14 | 30.00 | 34.14 |
| | 5825 | -5.277 | -4.754 | 0.33 | -4.75 | 30.00 | 34.75 |
| **Mode** | **Frequency (MHz)** | **Reading (dBm/MHz)** | | **Total PSD (mw/500K Hz)** | **Total PSD (dBm/500K Hz)** | **Limit (dBm/500K Hz)** | **Margin (dB)** |
| | | **Port 0** | **Port 1** | | | | |
| 802.11n20 | 5745 | -3.427 | -3.149 | 0.94 | -0.28 | 30.00 | 30.28 |
| | 5785 | -4.609 | -4.530 | 0.70 | -1.56 | 30.00 | 31.56 |
| | 5825 | -5.436 | -5.527 | 0.57 | -2.47 | 30.00 | 32.47 |
| 802.11n40 | 5755 | -5.979 | -5.736 | 0.52 | -2.85 | 30.00 | 32.85 |
| | 5795 | -7.152 | -7.123 | 0.39 | -4.13 | 30.00 | 34.13 |

Test Plots as bellow:

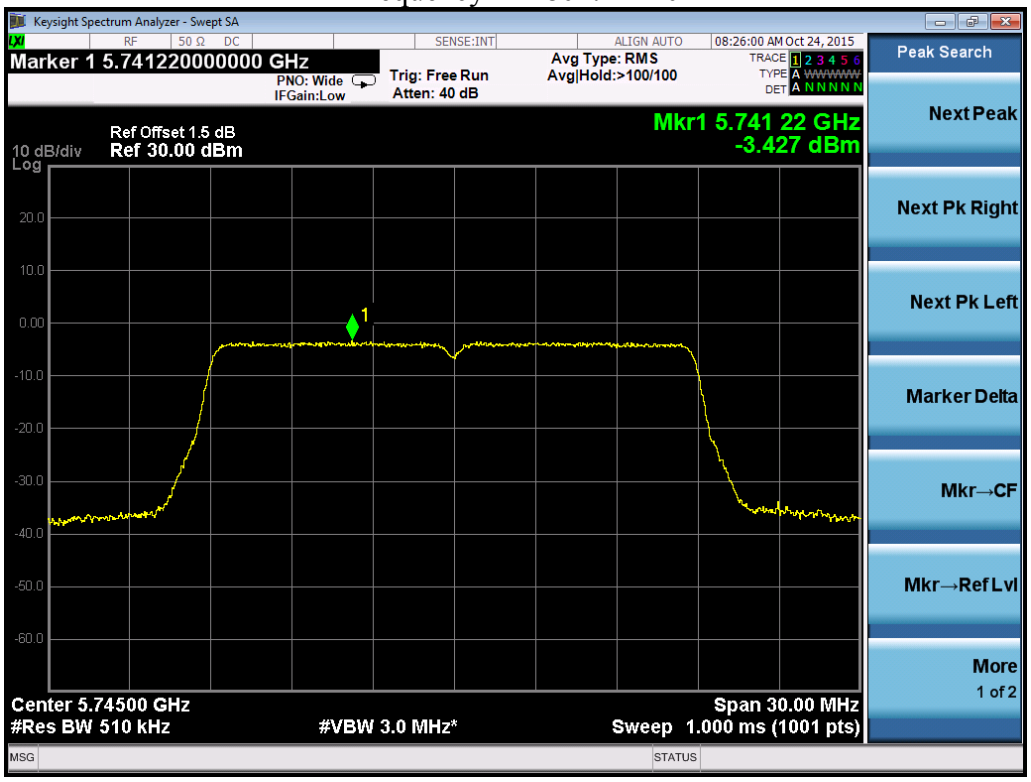
Port 1

Frequency L – 802.11a

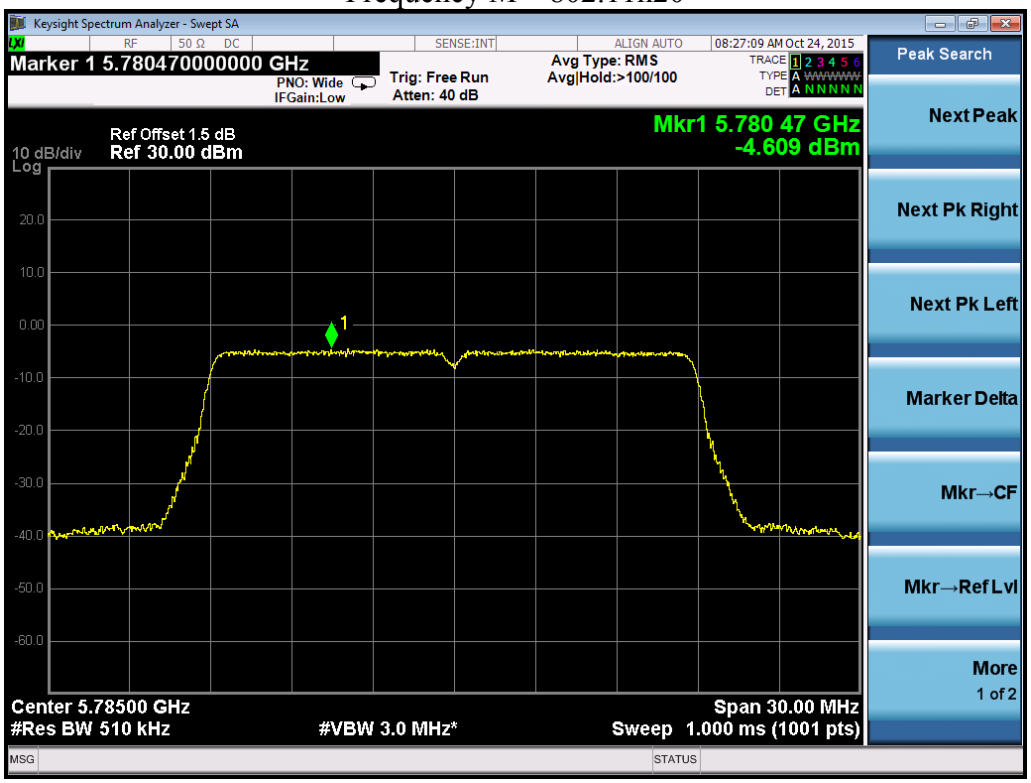

Frequency M – 802.11a

Frequency H – 802.11a

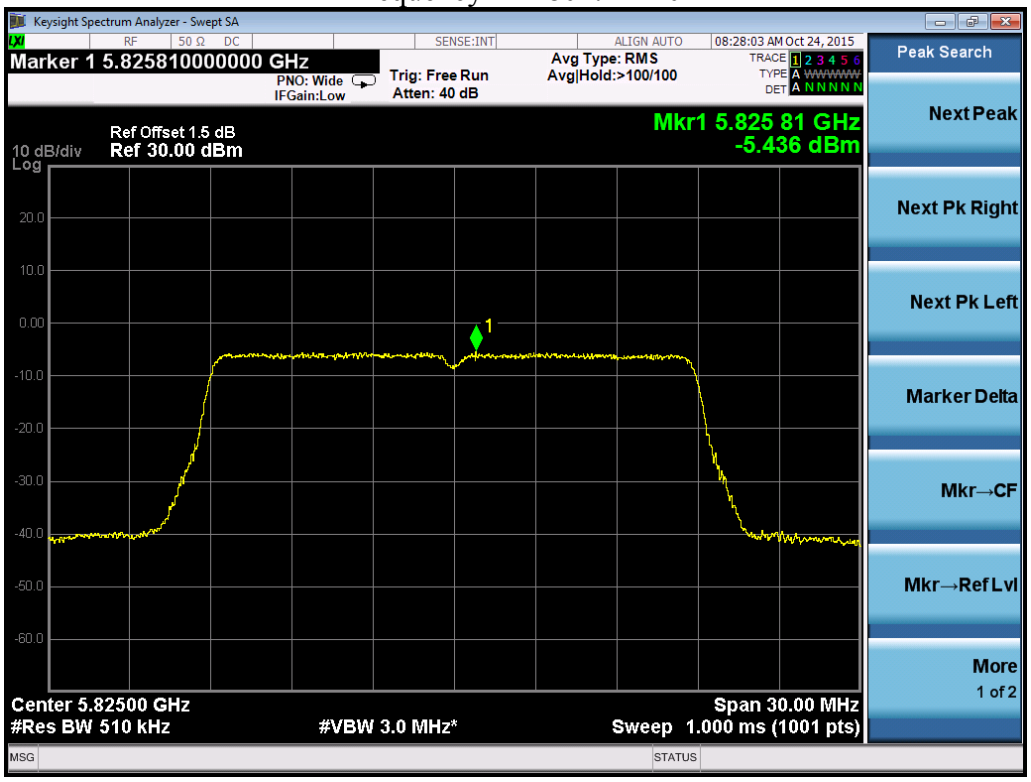

Frequency L – 802.11n20



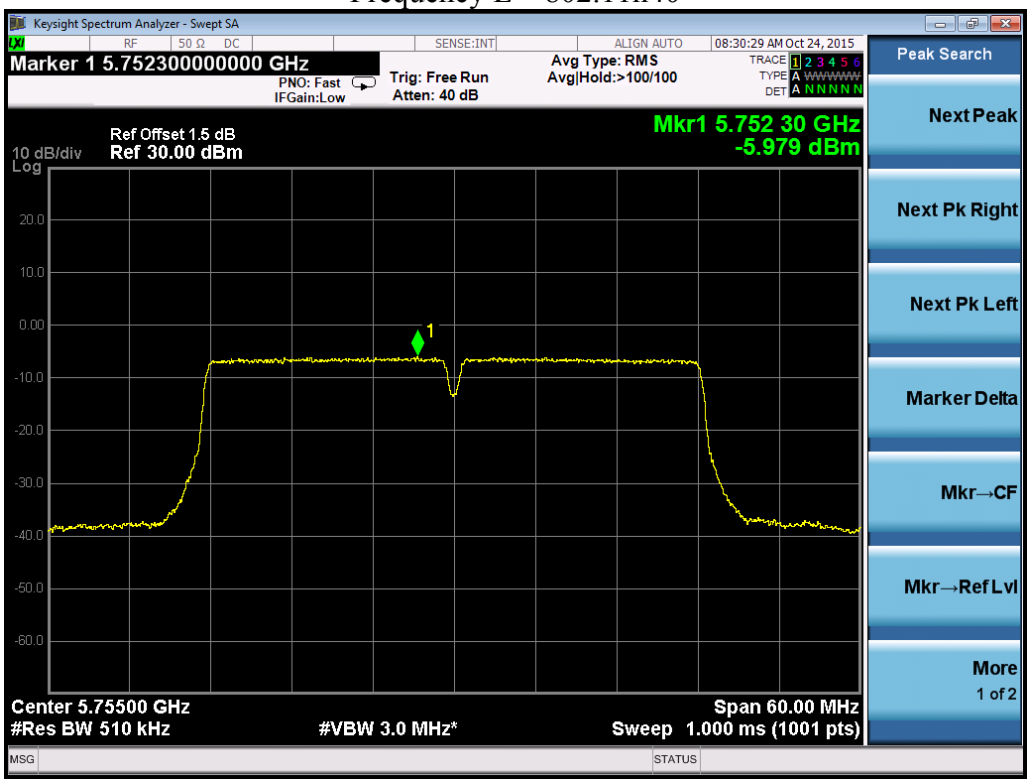
Frequency M – 802.11n20



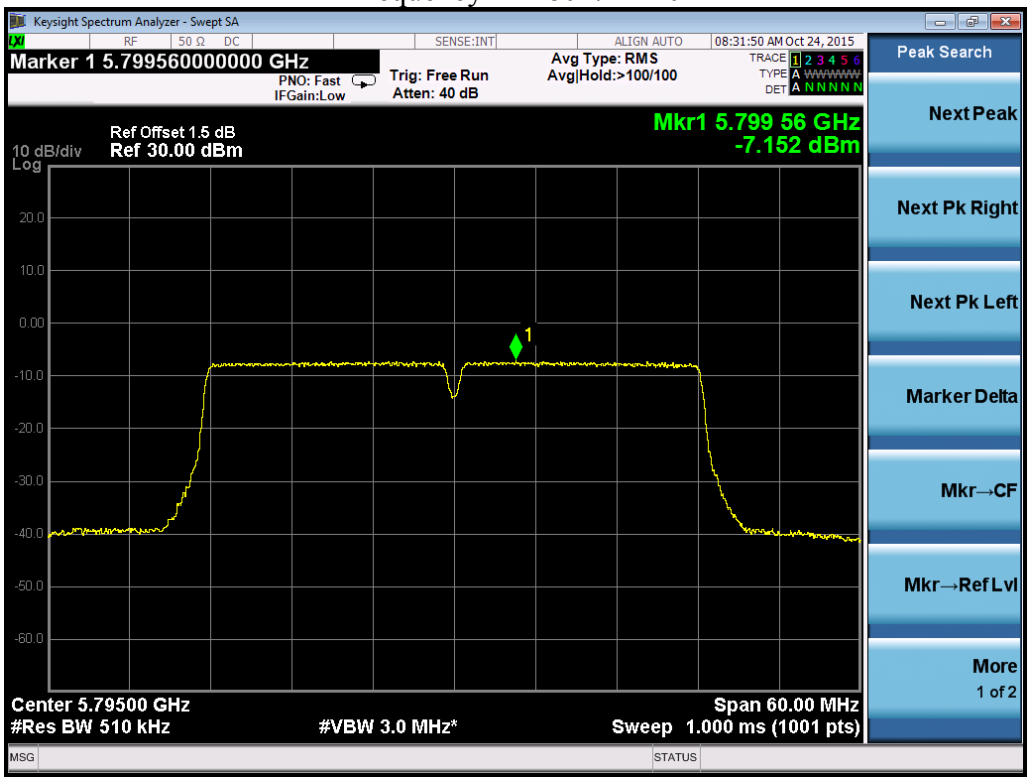

Frequency H – 802.11n20



Frequency L – 802.11n40




Frequency H – 802.11n40



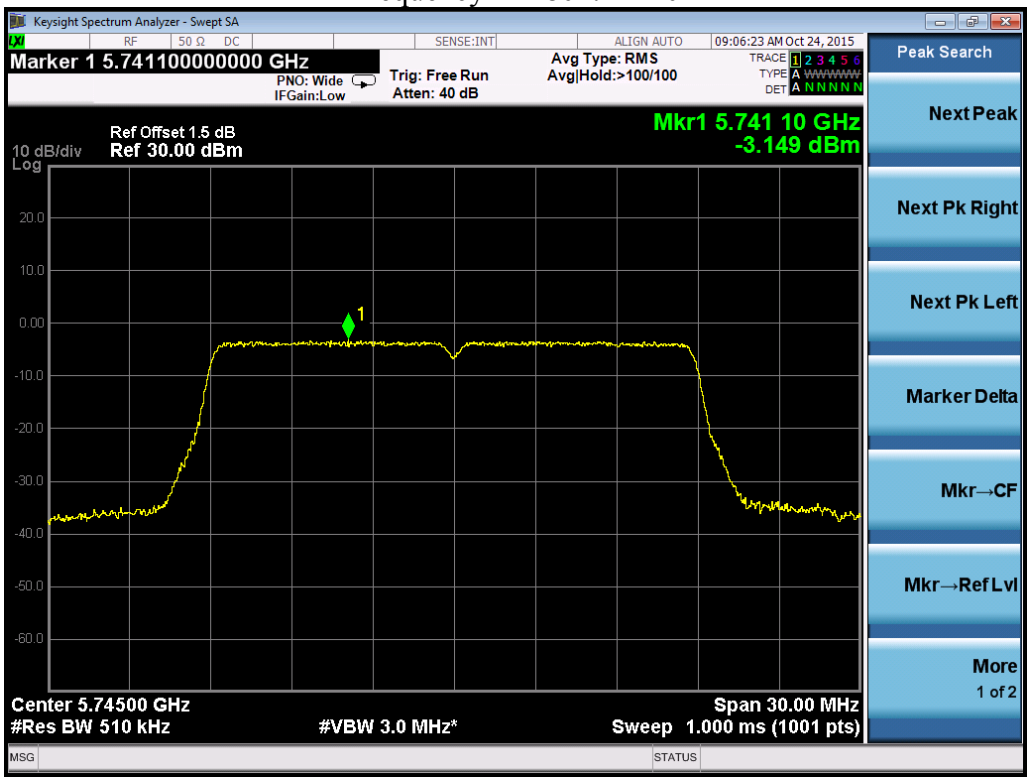
Port 2

Frequency L – 802.11a

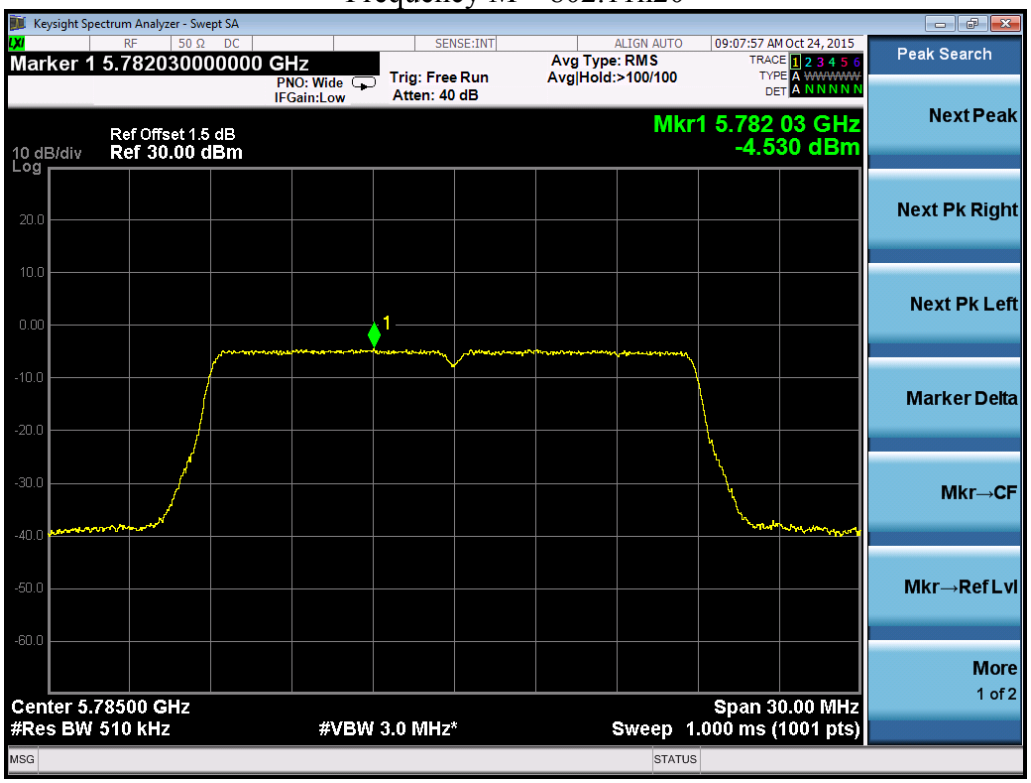

Frequency M – 802.11a

Frequency H – 802.11a

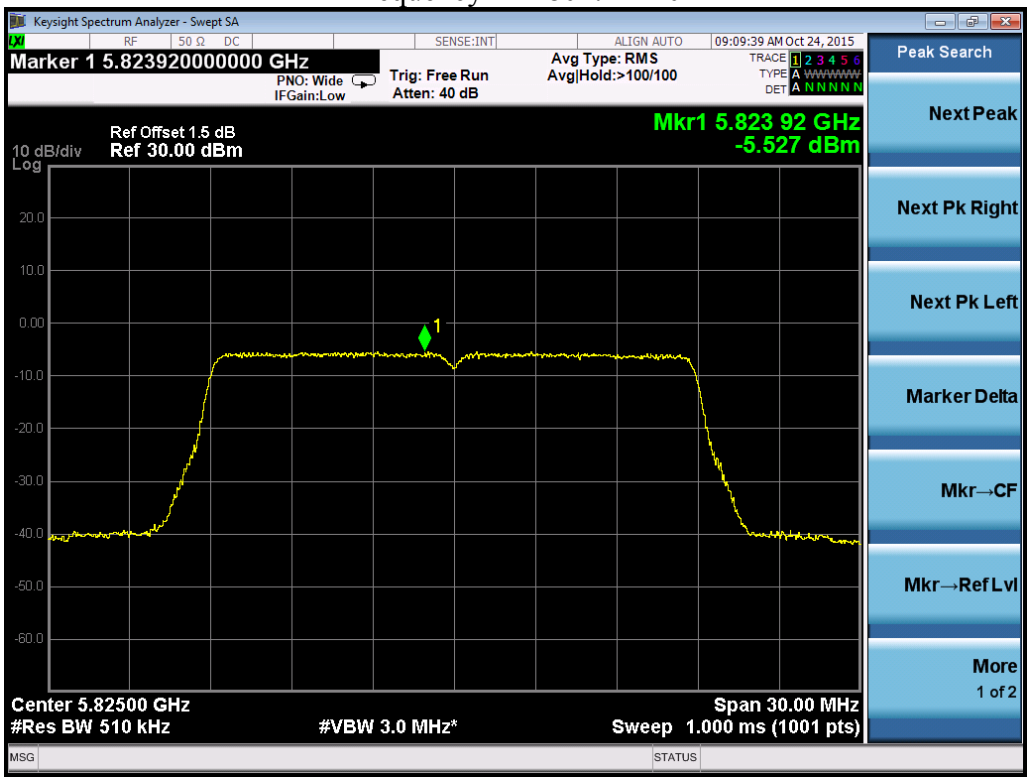

Frequency L – 802.11n20



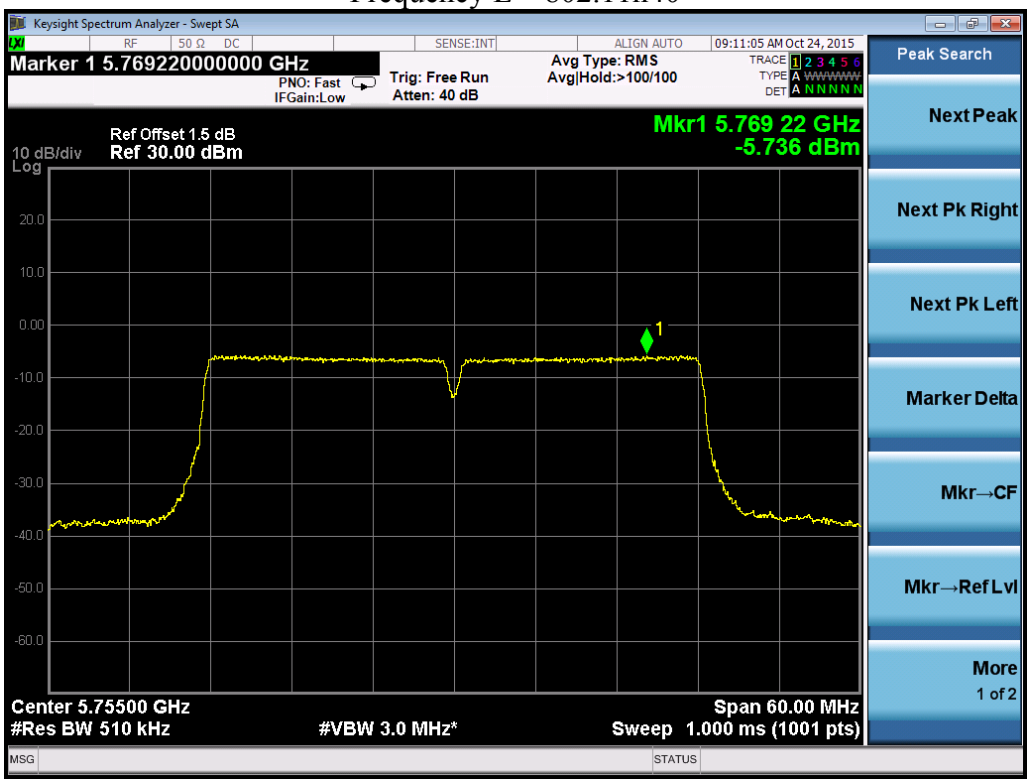
Frequency M – 802.11n20



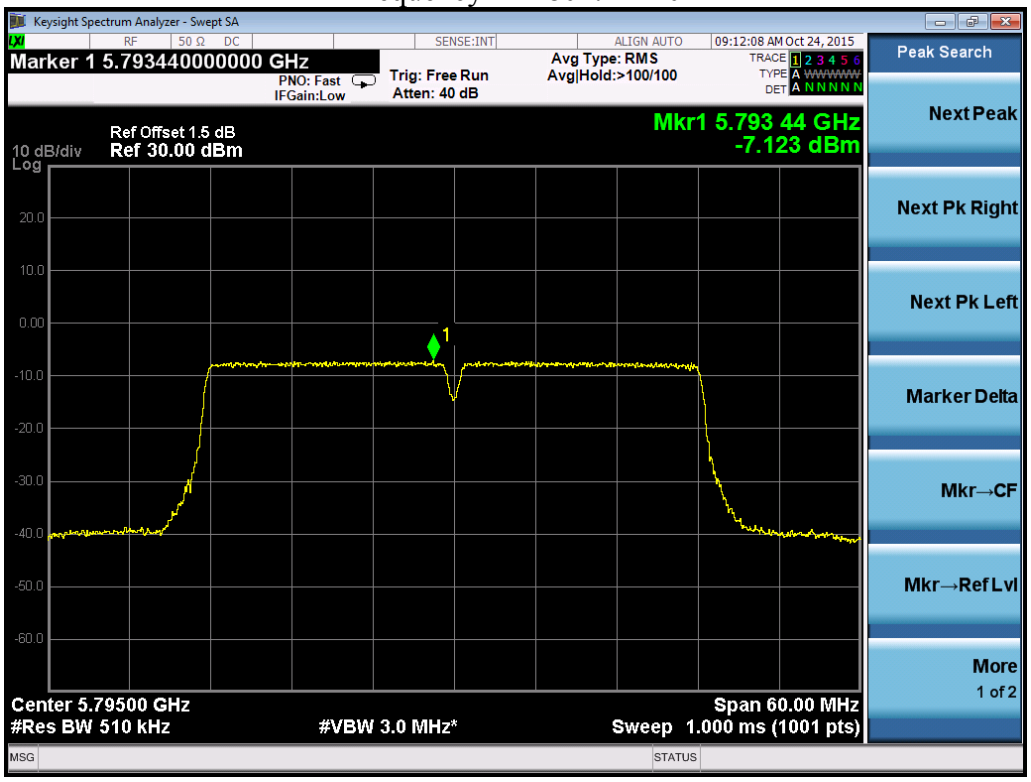

Frequency H – 802.11n20



Frequency L – 802.11n40




Frequency H – 802.11n40



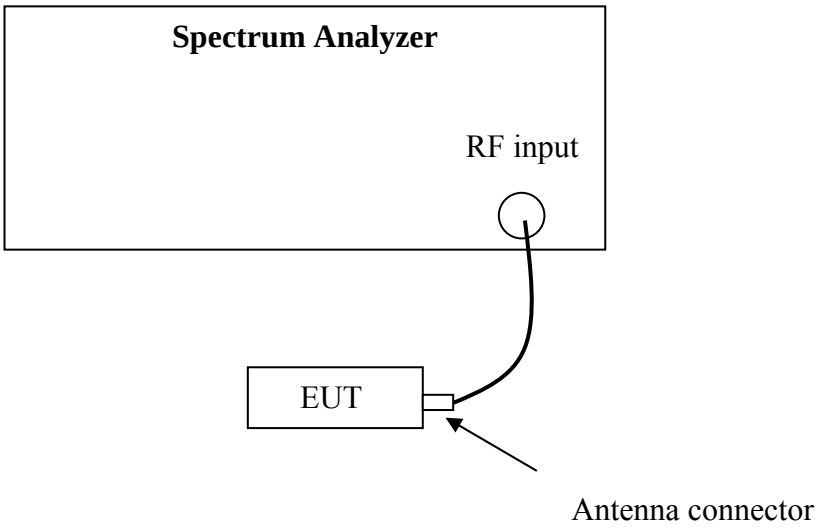
# 6. Minimum 6dB Bandwidth

**Test result: PASS**

## 6.1 Limit

For systems using digital modulation techniques that may operate in the 5725 - 5850 MHz band, the minimum 6 dB bandwidth shall be at least 500 kHz.

## 6.2 Test Configuration




## 6.3 Test Procedure and test setup

The minimum 6dB Bandwidth was measured from the antenna port of the EUT according to the measurement method refers to KDB 789033D02 v01r02: Section C.

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

## 6.4 Test Protocol

Temperature : 25 °C
Relative Humidity : 55 %

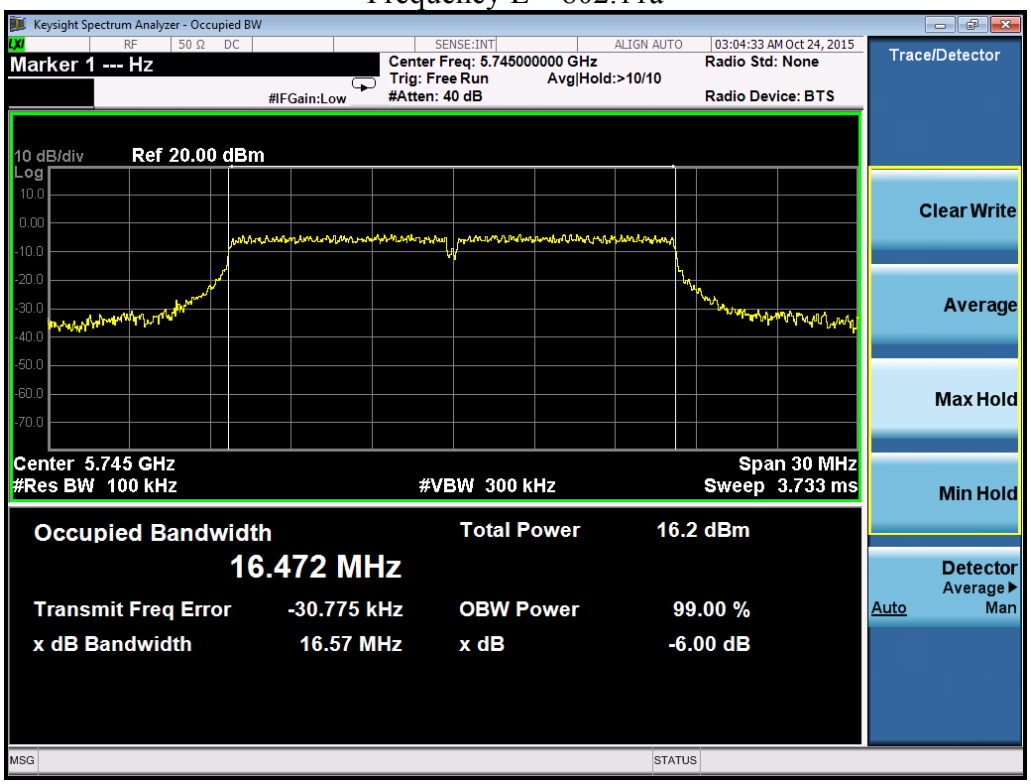
| Modulation | Frequency (MHz) | Minimum 6dB Bandwidth (MHz) | | Limits (MHz) |
|---|---|---|---|---|
| | | Port 0 | Port 1 | |
| 802.11a | 5745 | 16.57 | 16.56 | ≥0.5 |
| | 5785 | 16.37 | 16.56 | ≥0.5 |
| | 5825 | 16.57 | 16.56 | ≥0.5 |
| 802.11n20 | 5745 | 17.79 | 17.80 | ≥0.5 |
| | 5785 | 17.80 | 17.80 | ≥0.5 |
| | 5825 | 17.81 | 17.81 | ≥0.5 |
| 802.11n40 | 5755 | 36.56 | 36.59 | ≥0.5 |
| | 5795 | 36.57 | 36.57 | ≥0.5 |

| Modulation | Frequency (MHz) | 99% OBW (MHz) | | Limits (MHz) |
|---|---|---|---|---|
| | | Port 0 | Port 1 | |
| 802.11a | 5745 | 16.472 | 16.464 | no |
| | 5785 | 16.460 | 16.460 | no |
| | 5825 | 16.452 | 16.450 | no |
| 802.11n20 | 5745 | 17.693 | 17.693 | no |
| | 5785 | 17.688 | 17.675 | no |
| | 5825 | 17.687 | 17.674 | no |
| 802.11n40 | 5755 | 36.301 | 36.298 | no |
| | 5795 | 36.260 | 36.249 | no |

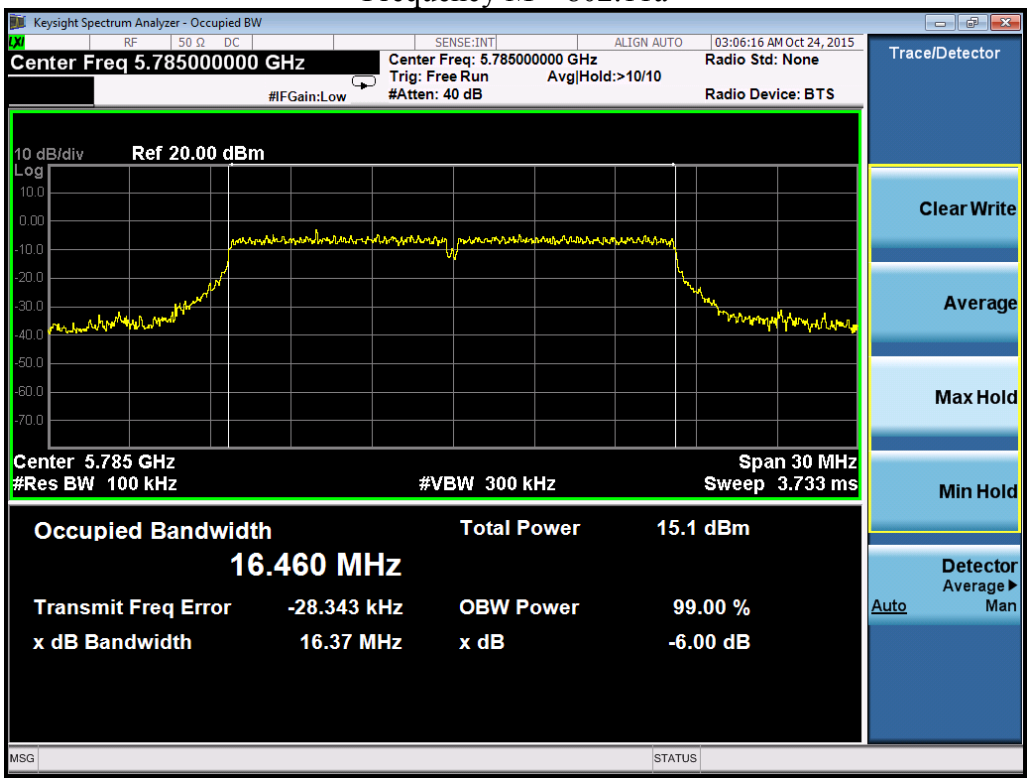
Test Plots as bellow:

Port 1

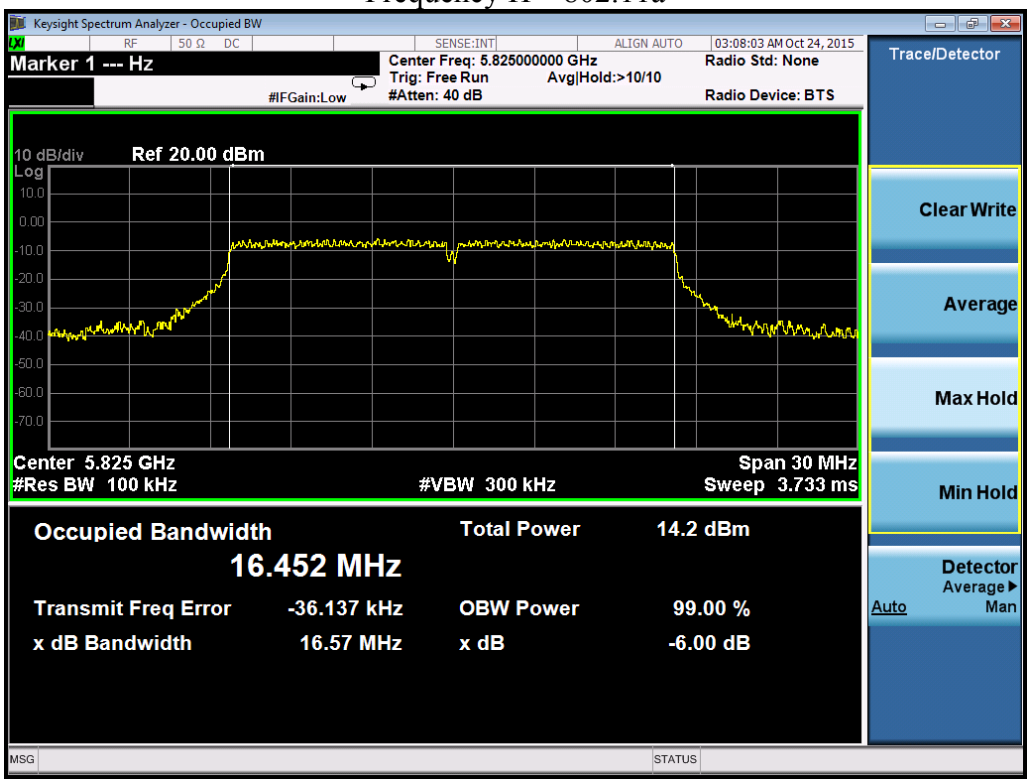
Frequency L – 802.11a



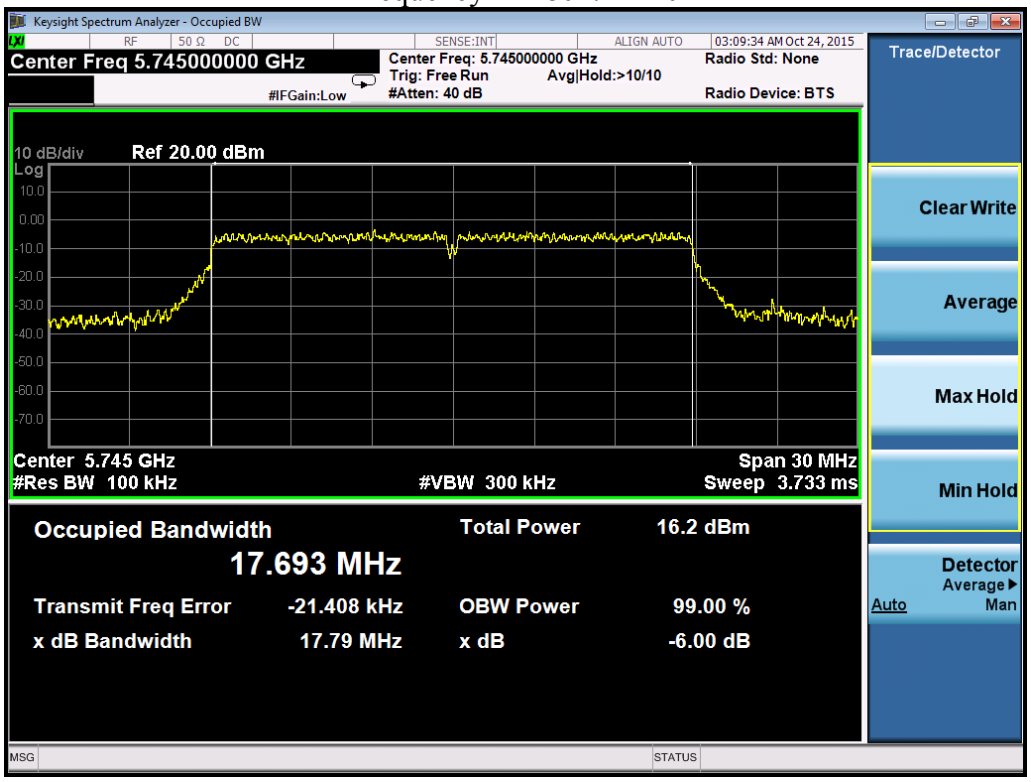

Frequency M – 802.11a



Frequency H – 802.11a

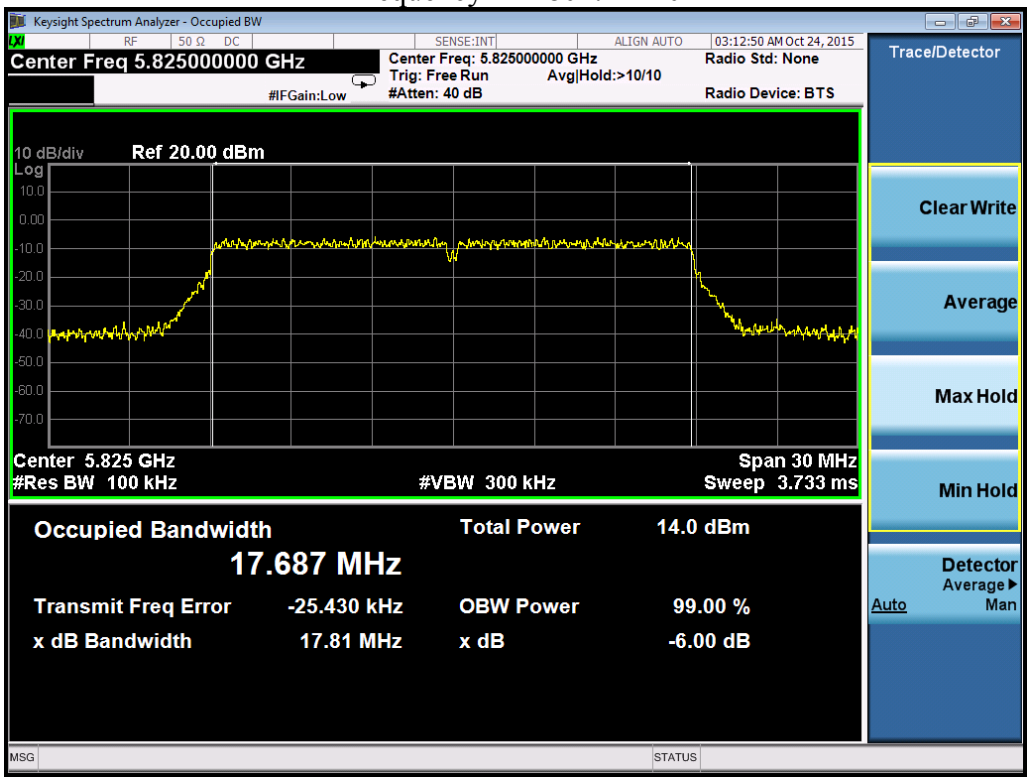



Frequency L – 802.11n20

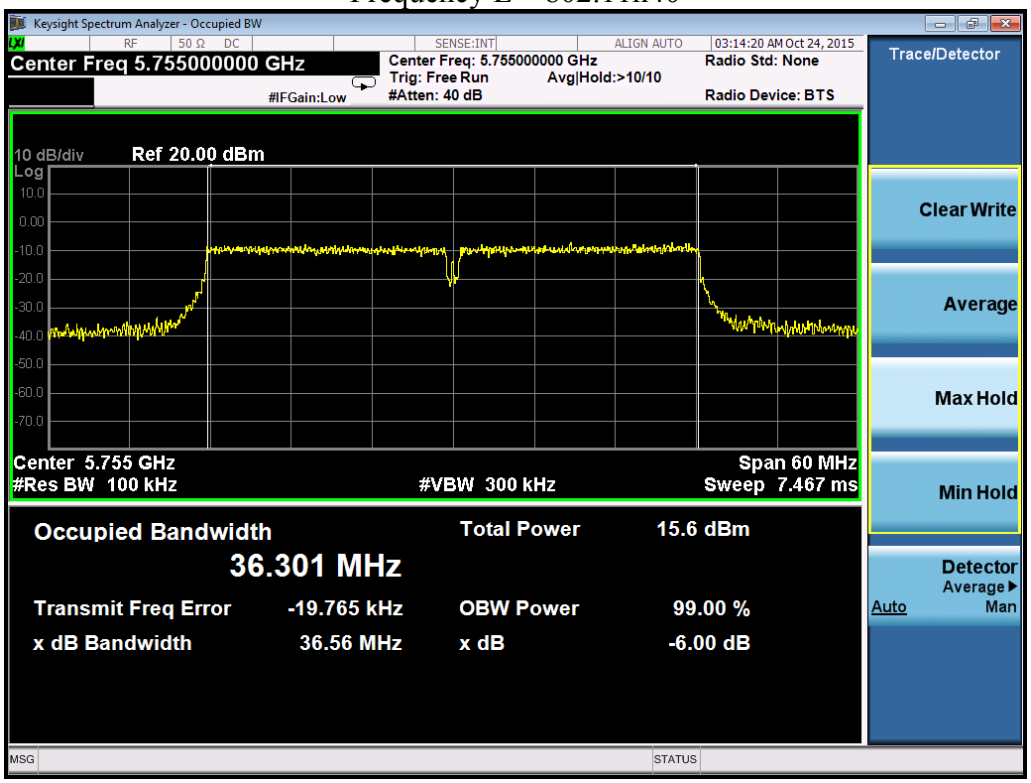


Frequency M – 802.11n20

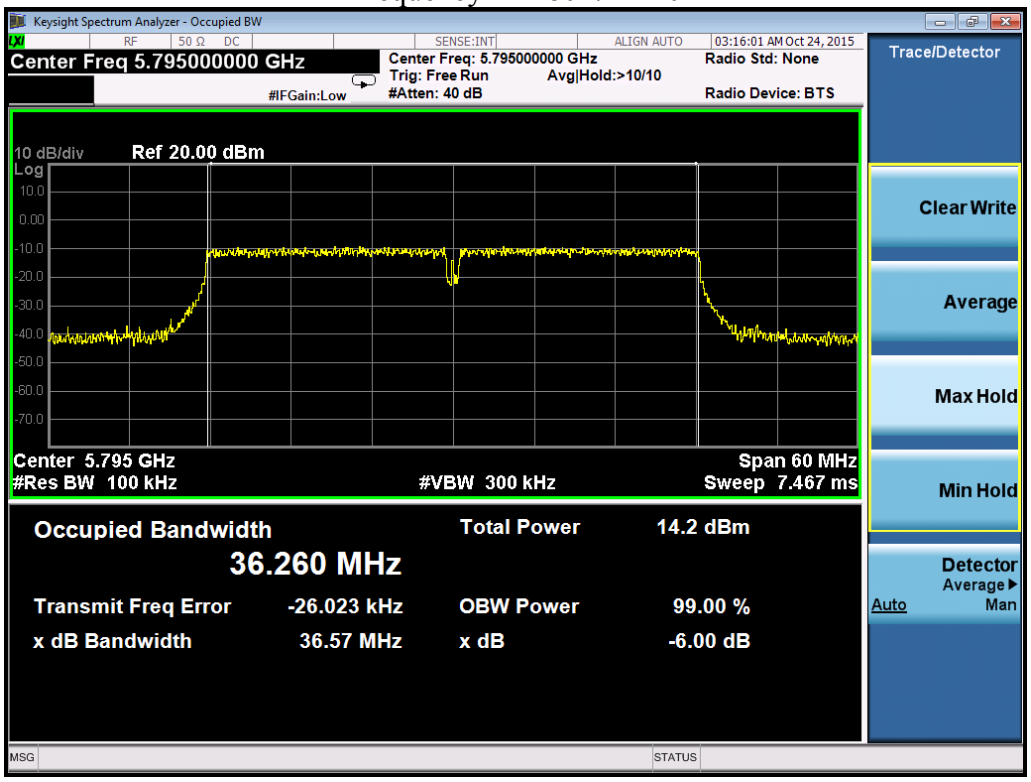

Frequency H – 802.11n20



Frequency L – 802.11n40

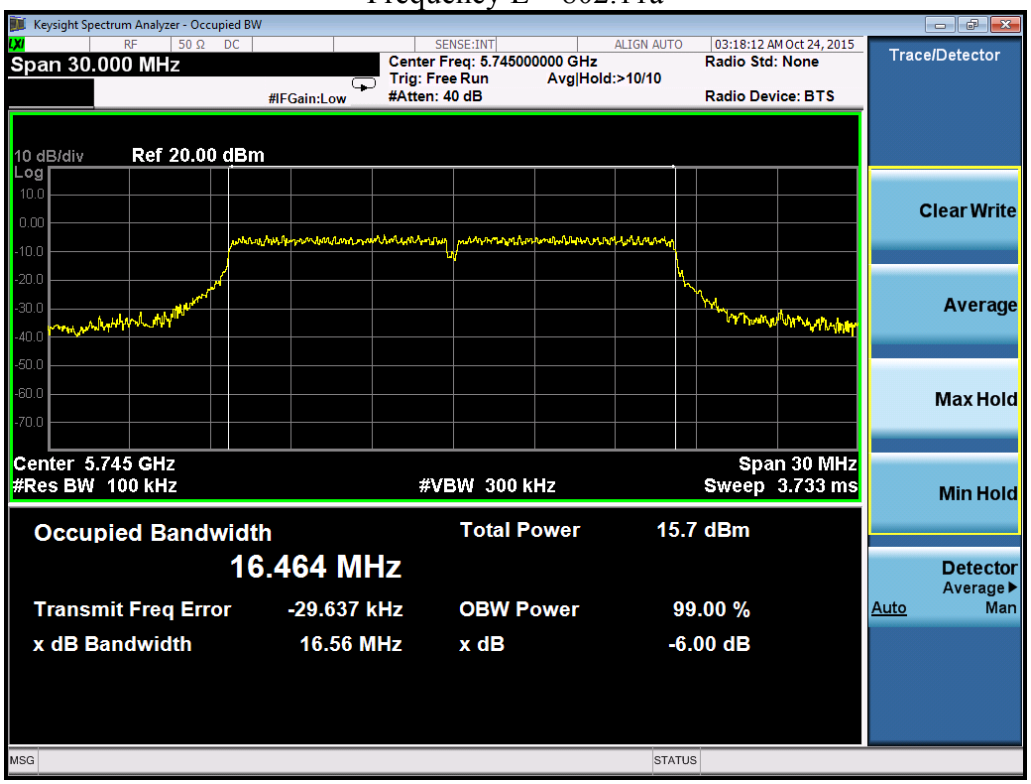



Frequency H – 802.11n40

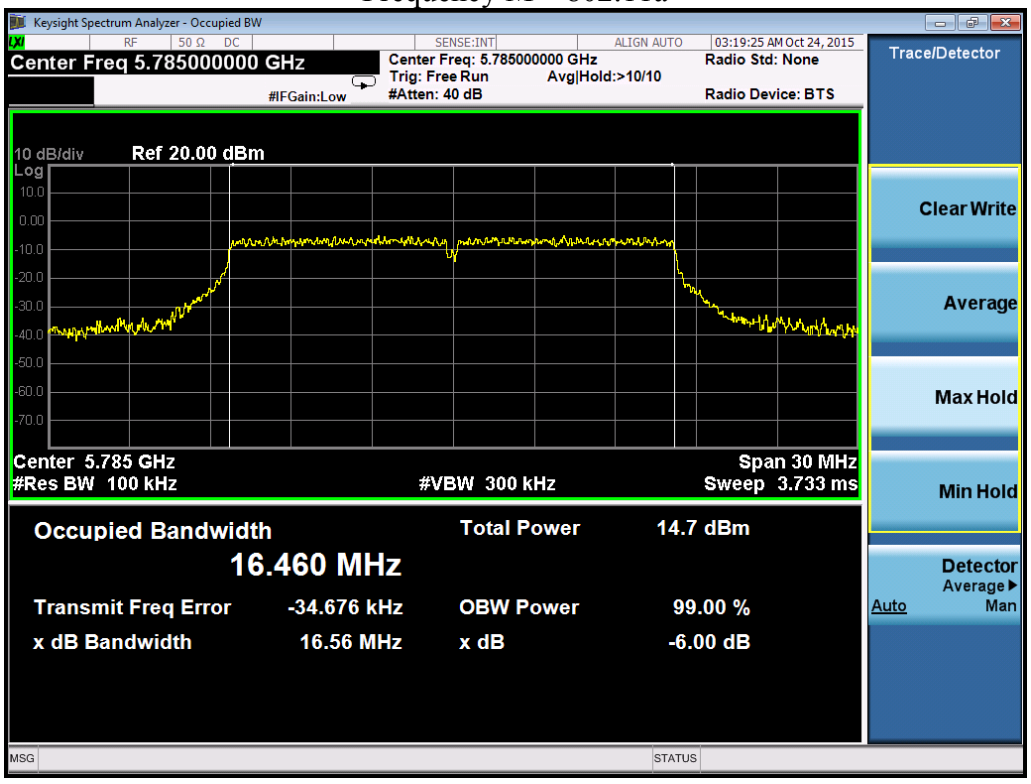


Port 2

Frequency L – 802.11a

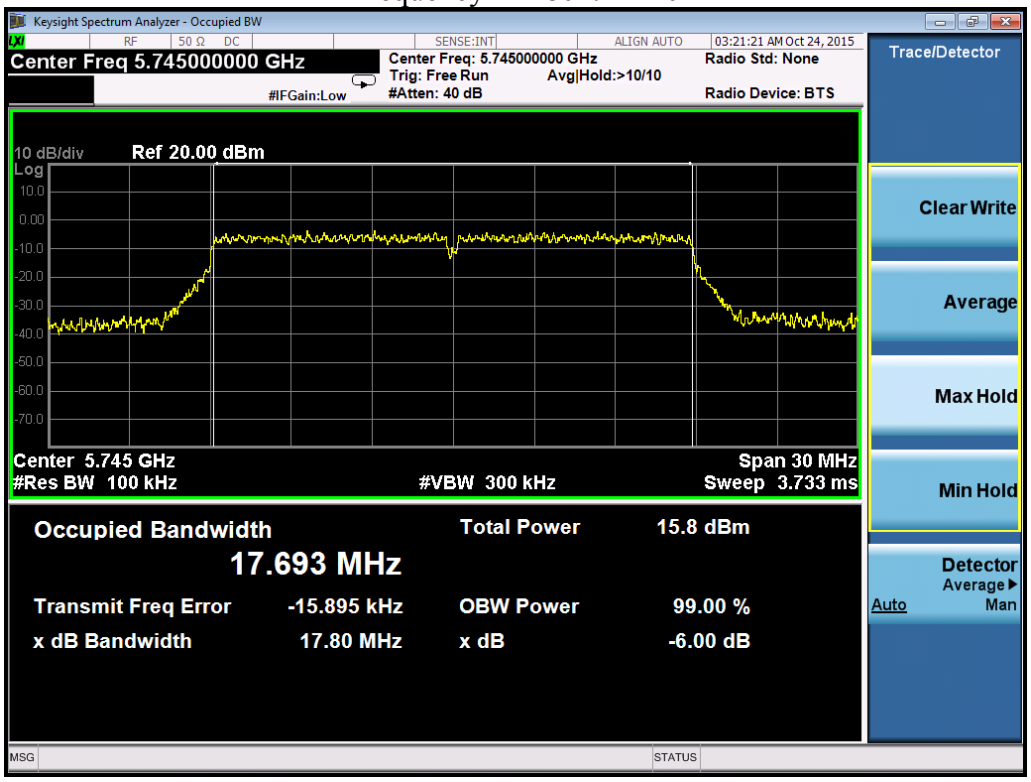



Frequency M – 802.11a

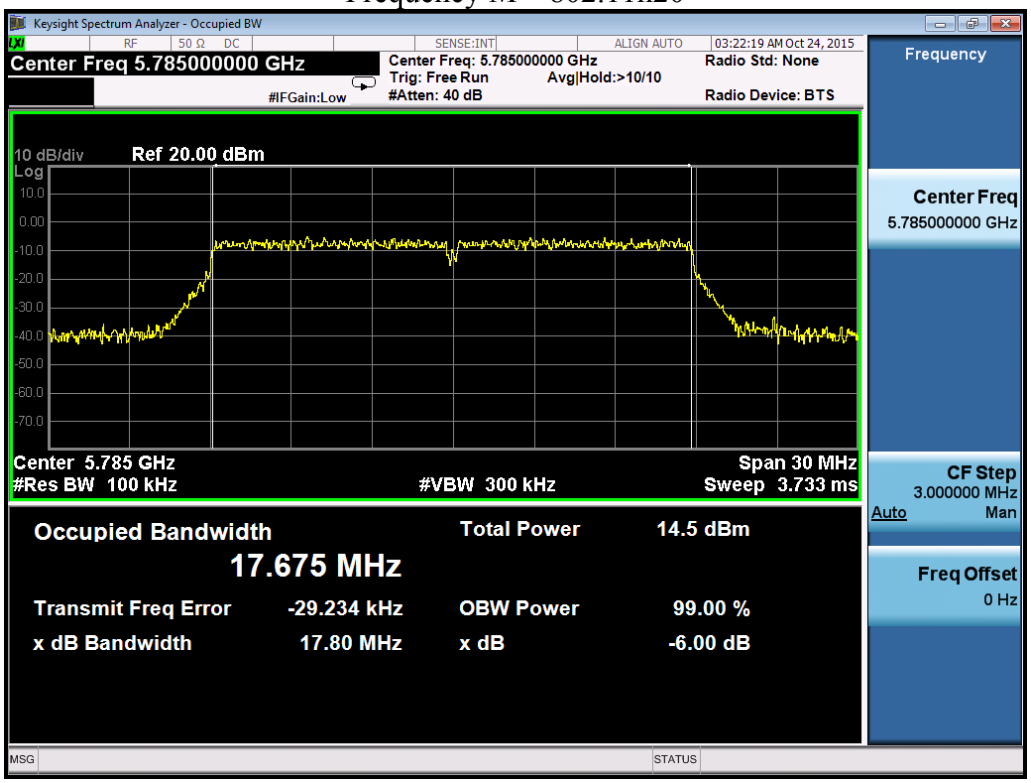


Frequency H – 802.11a

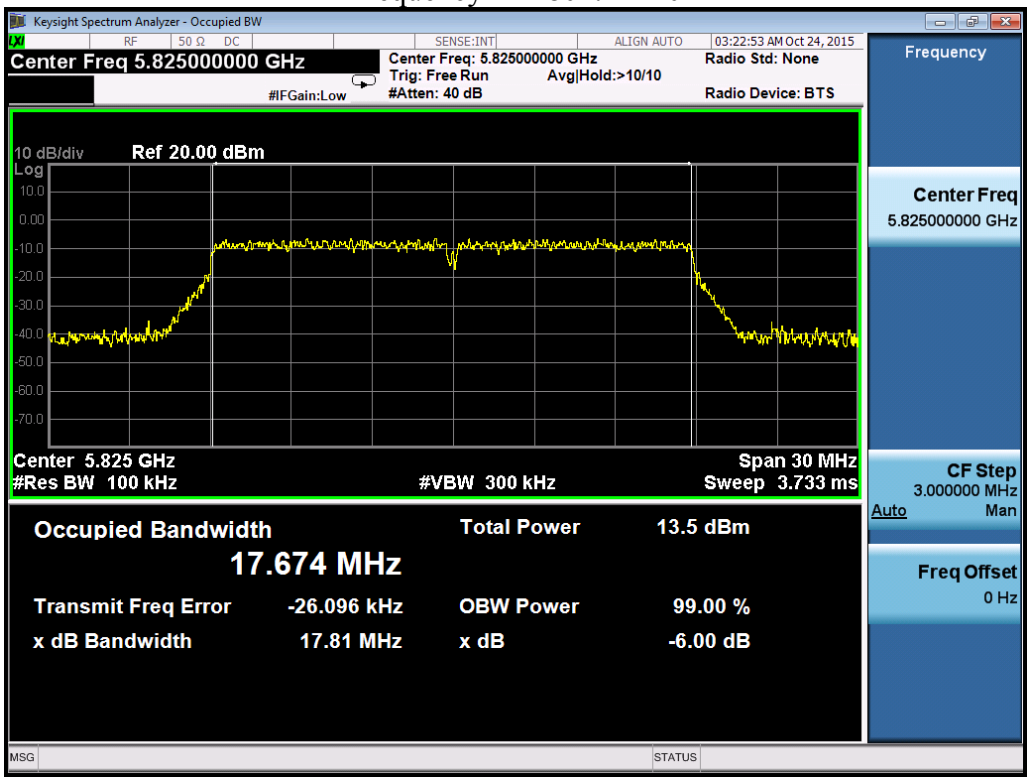

Frequency L – 802.11n20



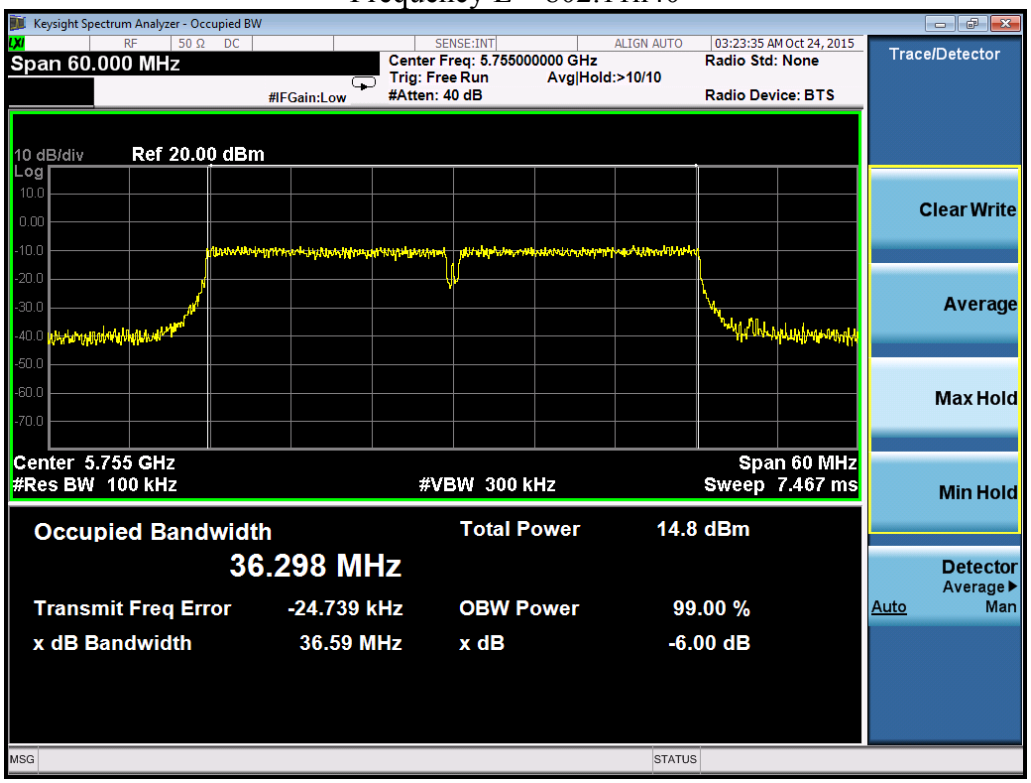
Frequency M – 802.11n20



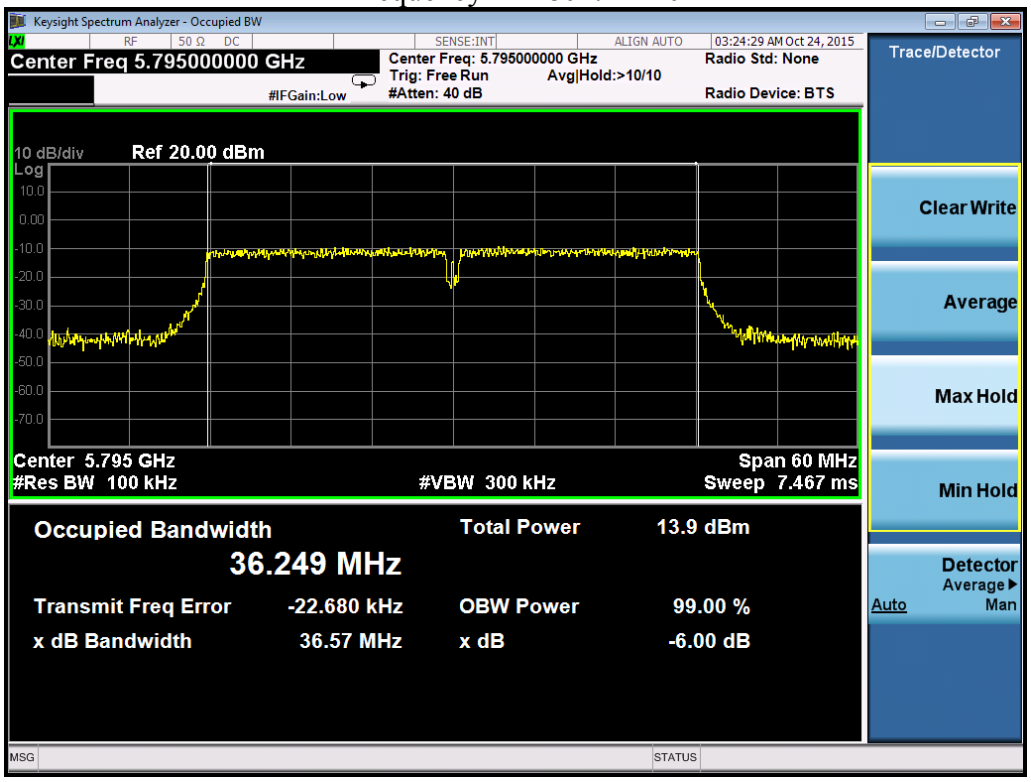

Frequency H – 802.11n20



Frequency L – 802.11n40




Frequency H – 802.11n40



# 7. Radiated emission

**Test result: PASS**

## 7.1 Test limit

7.1.1 The radiated emissions which are lower than 1GHz or fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) showed as below:

| Frequency (MHz) | Field Strength (dBuV/m) | Measurement Distance (m) |
|---|---|---|
| 30 - 88 | 40.0 | 3 |
| 88 - 216 | 43.5 | 3 |
| 216 - 960 | 46.0 | 3 |
| Above 960 | 54.0 | 3 |

7.1.2 The emission which is outside the restrict bands, should comply with the EIRP limit as below:

☒ For transmitters operating in the 5.15–5.25 / 5.25 – 5.35 / 5.47 – 5.725 GHz band:

| Frequency (MHz) | EIRP Limit (dBm) | Equivalent Field Strength (3m) (dBμV/m) |
|---|---|---|
| <5150 | -27 | 68.20 |
| >5350 | | |
| <5470 | | |
| >5725 | | |

☒ For transmitters operating in the 5.15–5.25 / 5.25 – 5.35 / 5.47 – 5.725 GHz band Assessed with 15.209(a):

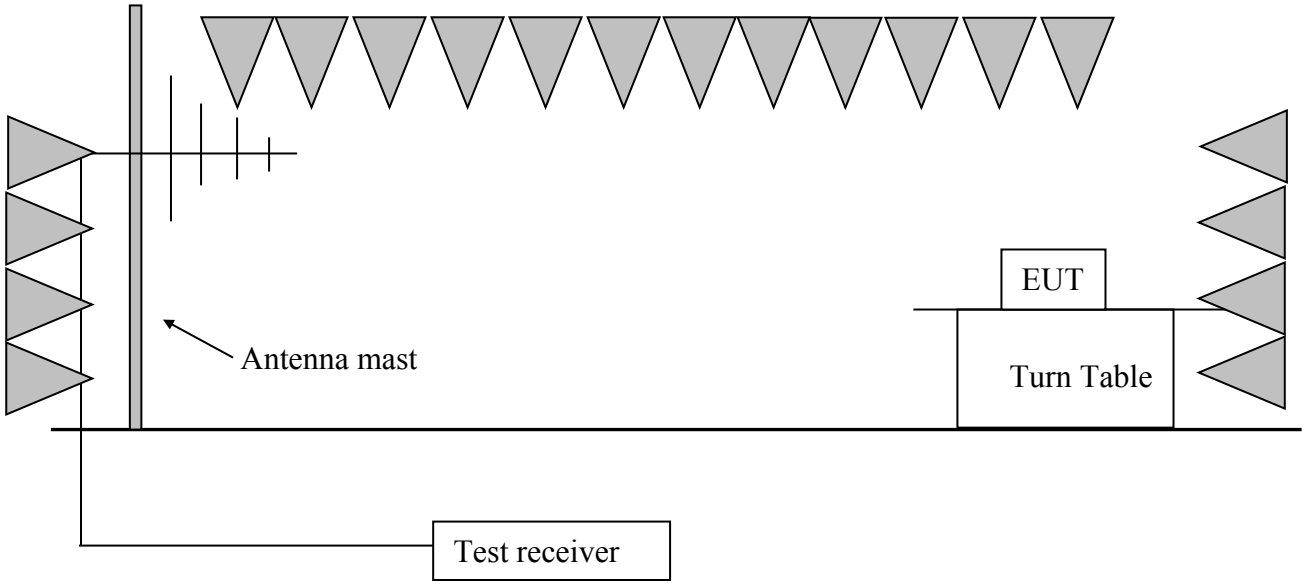
| Frequency (MHz) | Field Strength (dBuV/m) | Measurement Distance (m) |
|---|---|---|
| 30 - 88 | 40.0 | 3 |
| 88 - 216 | 43.5 | 3 |
| 216 - 960 | 46.0 | 3 |
| Above 960 | 54.0 | 3 |

☒ For transmitters operating in the 5.725 – 5.85GHz band:

| Frequency (MHz) | EIRP Limit (dBm/MHz) | Equivalent Field Strength (3m) (dBμV/m) |
|---|---|---|
| <5650 | -27 | 68.20 |
| 5650 ~ 5700 | -27 ~ 10 | 68.20 ~ 105.20 |
| 5700 ~ 5720 | 10 ~ 15.6 | 105.20 ~ 110.80 |
| 5720 ~ 5725 | 15.6 ~ 27 | 110.8 ~ 122.2 |
| 5850 ~ 5855 | 27 ~ 15.6 | 122.2 ~ 110.8 |
| 5855 ~ 5875 | 15.6 ~ 10 | 110.8 ~ 105.20 |
| 5875 ~ 5925 | 10 ~ -27 | 105.20 ~ 68.20 |
| >5925 | -27 | 68.20 |

7.1.3 As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

### 7.2 Test Configuration



### 7.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

Tabletop devices shall be placed on a non-conducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

Testing settings (refer to KDB 789033 D02 v01r02 Section G)
Below 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=120KHz
4, Detector=Quasi-Peak
5, Trace was allowed to stabilize

Peak Measurements above 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=1MHz
4, VBW=3MHz
4, Detector= Peak (Max-hold)
5, Trace was allowed to stabilize

Average Measurements above 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=1MHz
4, VBW=3MHz
4, Detector= RMS (Max-hold)
5, Trace was allowed to stabilize

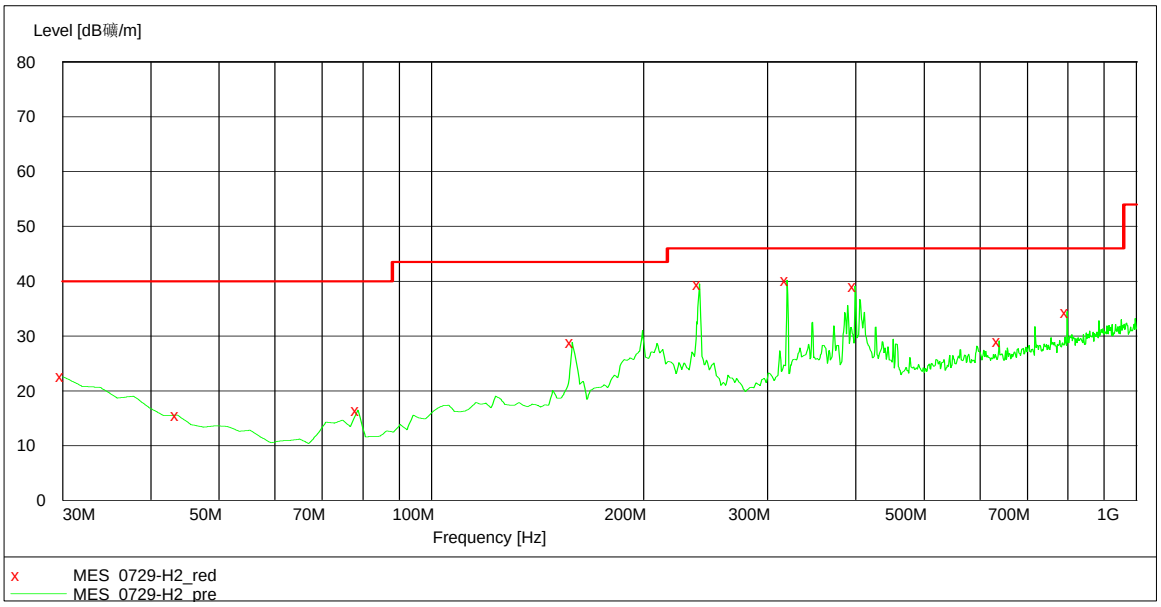
## 7.4 Test protocol

| | | |
|---|---|---|
| Temperature | : | 25 °C |
| Relative Humidity | : | 55 % |

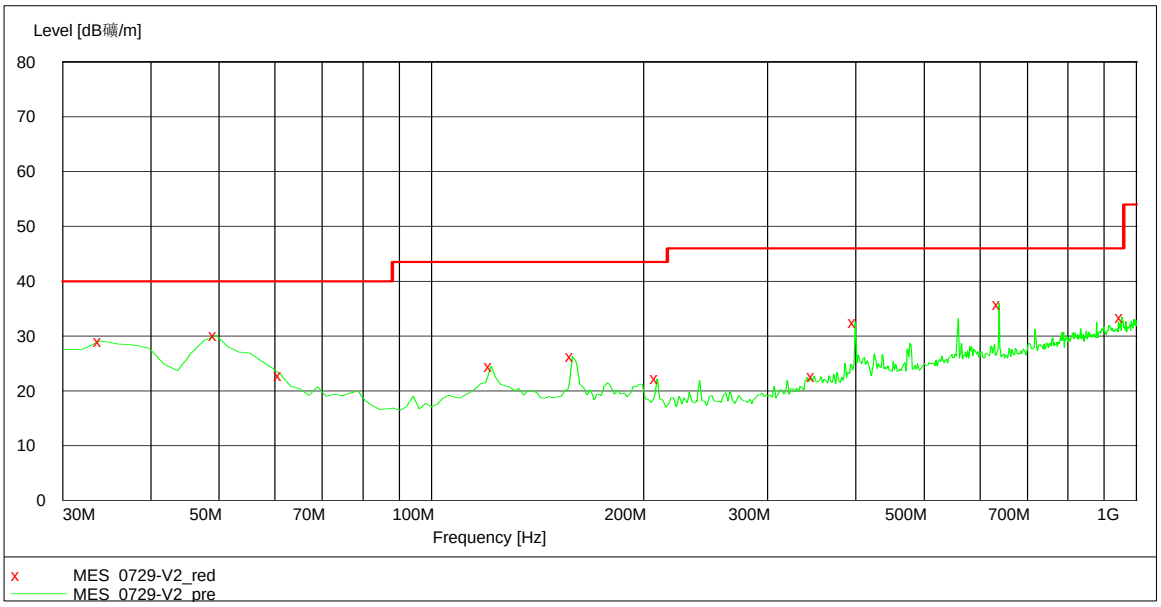
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Mode 1, 30MHz~1GHz,

Horizontal




Vertical



Mode 1, 30MHz~1GHz, Test data:

| Polarization | Frequency (MHz) | Measured level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|
| H | 30.00 | 22.6 | 40.0 | 17.4 | PK |
| | 43.61 | 15.5 | 40.0 | 24.5 | PK |
| | 78.60 | 16.5 | 40.0 | 23.5 | PK |
| | 158.30 | 28.8 | 43.5 | 14.7 | PK |
| | 239.94 | 39.5 | 46.0 | 6.5 | PK |
| | 319.64 | 40.2 | 46.0 | 5.8 | PK |
| | 399.34 | 39.1 | 46.0 | 6.9 | PK |
| | 638.44 | 29.1 | 46.0 | 16.9 | PK |
| | 797.84 | 34.4 | 46.0 | 11.6 | PK |
| V | 33.89 | 29.1 | 40.0 | 10.9 | PK |
| | 49.44 | 30.1 | 40.0 | 9.9 | PK |
| | 61.10 | 22.9 | 40.0 | 17.1 | PK |
| | 121.36 | 24.5 | 43.5 | 19.0 | PK |
| | 158.30 | 26.3 | 43.5 | 17.2 | PK |
| | 208.84 | 22.2 | 43.5 | 21.3 | PK |
| | 348.80 | 22.6 | 46.0 | 23.4 | PK |
| | 399.34 | 32.5 | 46.0 | 13.5 | PK |
| | 638.44 | 35.9 | 46.0 | 10.1 | PK |
| | 953.35 | 33.4 | 46.0 | 12.6 | PK |

**Test result above 1GHz:**

The emission was conducted from 1GHz to 25GHz.

The test model 1 and 3 was chosen to perform the above 1GHz tests as representative.

**Test mode 1:**
U-NII-1 Band:

802.11a

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5180 | -2.71 | 108.32 | Fundamental | / | PK |
| | H&V | 5150 | -2.77 | 50.25 | 74.00 | 23.75 | PK |
| | H&V | 10360 | 5.98 | 59.57 | 74.00 | 14.43 | PK |
| | H&V | 10360 | 5.98 | 44.91 | 54.00 | 9.09 | AV |
| M | H&V | 5200 | -2.67 | 107.75 | Fundamental | / | PK |
| | H&V | 10400 | 6.09 | 59.10 | 74.00 | 14.90 | PK |
| | H&V | 10400 | 6.09 | 44.60 | 54.00 | 9.40 | AV |
| H | H&V | 5240 | -2.60 | 108.13 | Fundamental | / | PK |
| | H&V | 10480 | 6.30 | 57.57 | 74.00 | 16.43 | PK |
| | H&V | 10480 | 6.30 | 42.46 | 54.00 | 11.54 | AV |

802.11n20

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5180 | -2.71 | 107.36 | Fundamental | / | PK |
| | H&V | 5150 | -2.77 | 50.25 | 74.00 | 23.75 | PK |
| | H&V | 10360 | 5.98 | 59.85 | 74.00 | 14.15 | PK |
| | H&V | 10360 | 5.98 | 44.65 | 54.00 | 9.35 | AV |
| M | H&V | 5200 | -2.67 | 107.27 | Fundamental | / | PK |
| | H&V | 10400 | 6.09 | 58.25 | 74.00 | 15.75 | PK |
| | H&V | 10400 | 6.09 | 43.61 | 54.00 | 10.39 | AV |
| H | H&V | 5240 | -2.60 | 107.42 | Fundamental | / | PK |
| | H&V | 10480 | 6.30 | 57.25 | 74.00 | 16.75 | PK |
| | H&V | 10480 | 6.30 | 42.12 | 54.00 | 11.88 | AV |

802.11n40

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5190 | -2.69 | 104.54 | Fundamental | / | PK |
| | H&V | 5150 | -2.77 | 51.66 | 74.00 | 22.34 | PK |
| | H&V | 10380 | 6.03 | 58.25 | 74.00 | 15.75 | PK |
| | H&V | 10380 | 6.03 | 43.65 | 54.00 | 10.35 | AV |
| H | H&V | 5230 | -2.62 | 104.46 | Fundamental | / | PK |
| | H&V | 10460 | 6.25 | 57.26 | 74.00 | 16.74 | PK |
| | H&V | 10460 | 6.25 | 42.81 | 54.00 | 11.19 | AV |

U-NII-2A Band:
802.11a

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5260 | -2.56 | 107.43 | Fundamental | / | PK |
| | H&V | 10520 | 6.35 | 59.58 | 74.00 | 14.42 | PK |
| | H&V | 10520 | 6.35 | 43.95 | 54.00 | 10.05 | AV |
| M | H&V | 5300 | -2.48 | 107.84 | Fundamental | / | PK |
| | H&V | 10600 | 6.37 | 59.26 | 74.00 | 14.74 | PK |
| | H&V | 10600 | 6.37 | 43.36 | 54.00 | 10.64 | AV |
| H | H&V | 5320 | -2.45 | 107.24 | Fundamental | / | PK |
| | H&V | 5350 | -2.39 | 49.88 | 74.00 | 24.12 | PK |
| | H&V | 10640 | 6.37 | 58.21 | 74.00 | 15.79 | PK |
| | H&V | 10640 | 6.37 | 43.12 | 54.00 | 10.88 | AV |

802.11n20

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5260 | -2.56 | 105.57 | Fundamental | / | PK |
| | H&V | 10520 | 6.35 | 58.58 | 74.00 | 15.42 | PK |
| | H&V | 10520 | 6.35 | 43.28 | 54.00 | 10.72 | AV |
| M | H&V | 5300 | -2.48 | 97.46 | Fundamental | / | PK |
| | H&V | 10600 | 6.37 | 105.44 | 74.00 | 14.98 | PK |
| | H&V | 10600 | 6.37 | 44.01 | 54.00 | 9.99 | AV |
| H | H&V | 5320 | -2.45 | 105.63 | Fundamental | / | PK |
| | H&V | 5350 | -2.39 | 49.89 | 74.00 | 24.11 | PK |
| | H&V | 10640 | 6.37 | 57.68 | 74.00 | 16.32 | PK |
| | H&V | 10640 | 6.37 | 42.85 | 54.00 | 11.15 | AV |

802.11n40

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5270 | -2.54 | 103.41 | Fundamental | / | PK |
| | H&V | 10540 | 6.36 | 58.26 | 74.00 | 15.74 | PK |
| | H&V | 10540 | 6.36 | 42.86 | 54.00 | 11.14 | AV |
| H | H&V | 5310 | -2.46 | 102.54 | Fundamental | / | PK |
| | H&V | 5350 | -2.39 | 51.55 | 74.00 | 22.45 | PK |
| | H&V | 10620 | 6.37 | 57.66 | 74.00 | 16.34 | PK |
| | H&V | 10620 | 6.37 | 42.14 | 54.00 | 11.86 | AV |

U-NII-2C Band:
802.11a

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5500 | -2.11 | 106.21 | Fundamental | / | PK |
| | H&V | 5460 | -2.18 | 49.22 | 74.00 | 24.78 | PK |
| | H&V | 11000 | 6.43 | 57.68 | 74.00 | 16.32 | PK |
| | H&V | 11000 | 6.43 | 42.14 | 54.00 | 11.86 | AV |
| M | H&V | 5580 | -1.97 | 106.26 | Fundamental | / | PK |
| | H&V | 11160 | 7.33 | 57.68 | 74.00 | 16.32 | PK |
| | H&V | 11160 | 7.33 | 42.63 | 54.00 | 11.37 | AV |
| H | H&V | 5700 | -1.75 | 105.85 | Fundamental | / | PK |
| | H&V | 11400 | 7.21 | 56.89 | 74.00 | 17.11 | PK |
| | H&V | 11400 | 7.21 | 41.98 | 54.00 | 12.02 | AV |

802.11n20

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5500 | -2.11 | 104.23 | Fundamental | / | PK |
| | H&V | 5460 | -2.18 | 49.33 | 74.00 | 24.78 | PK |
| | H&V | 11000 | 6.43 | 57.68 | 74.00 | 16.32 | PK |
| | H&V | 11000 | 6.43 | 42.14 | 54.00 | 11.86 | AV |
| M | H&V | 5580 | -1.97 | 104.66 | Fundamental | / | PK |
| | H&V | 11160 | 7.33 | 57.68 | 74.00 | 16.32 | PK |
| | H&V | 11160 | 7.33 | 42.63 | 54.00 | 11.37 | AV |
| H | H&V | 5700 | -1.75 | 105.36 | Fundamental | / | PK |
| | H&V | 11400 | 7.21 | 56.89 | 74.00 | 17.11 | PK |
| | H&V | 11400 | 7.21 | 41.98 | 54.00 | 12.02 | AV |

802.11n40

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5510 | -2.09 | 103.64 | Fundamental | / | PK |
| | H&V | 5460 | -2.18 | 50.21 | 74.00 | 23.79 | PK |
| | H&V | 11020 | 6.47 | 58.71 | 74.00 | 15.29 | PK |
| | H&V | 11020 | 6.47 | 43.25 | 54.00 | 10.75 | AV |
| M | H&V | 5550 | -2.02 | 104.62 | Fundamental | / | PK |
| | H&V | 11100 | 6.63 | 58.79 | 74.00 | 15.21 | PK |
| | H&V | 11100 | 6.63 | 43.62 | 54.00 | 10.38 | AV |
| H | H&V | 5670 | -1.81 | 102.35 | Fundamental | / | PK |
| | H&V | 11340 | 7.09 | 57.87 | 74.00 | 16.13 | PK |
| | H&V | 11340 | 7.09 | 42.91 | 54.00 | 11.09 | AV |

U-NII-3 Band:
802.11a

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5745 | -1.67 | 106.65 | Fundamental | / | PK |
| | H&V | 5725 | -1.67 | 58.56 | 122.20 | 63.64 | PK |
| | H&V | 5720 | -1.67 | 56.34 | 110.80 | 54.46 | PK |
| | H&V | 5700 | -1.72 | 54.32 | 105.20 | 50.88 | PK |
| | H&V | 5650 | -1.76 | 52.33 | 68.20 | 15.87 | PK |
| | H&V | 11490 | 7.38 | 57.60 | 74.00 | 16.40 | PK |
| | H&V | 11490 | 7.38 | 42.50 | 54.00 | 11.50 | AV |
| M | H&V | 5785 | -1.60 | 107.63 | Fundamental | / | PK |
| | H&V | 11570 | 7.35 | 57.10 | 74.00 | 16.90 | PK |
| | H&V | 11570 | 7.35 | 42.30 | 54.00 | 11.70 | AV |
| H | H&V | 5825 | -1.54 | 107.12 | Fundamental | / | PK |
| | H&V | 5850 | -1.54 | 57.46 | 122.20 | 64.74 | PK |
| | H&V | 5855 | -1.54 | 56.47 | 110.80 | 54.33 | PK |
| | H&V | 5875 | -1.52 | 56.33 | 105.20 | 48.87 | PK |
| | H&V | 5925 | -1.49 | 53.34 | 68.20 | 14.86 | PK |
| | H&V | 11650 | 7.29 | 57.40 | 74.00 | 16.60 | PK |
| | H&V | 11650 | 7.29 | 42.30 | 54.00 | 11.70 | AV |

802.11n20

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5745 | -1.67 | 105.83 | Fundamental | / | PK |
| | H&V | 5725 | -1.67 | 59.96 | 122.20 | 62.24 | PK |
| | H&V | 5650 | -1.76 | 54.35 | 68.20 | 13.85 | PK |
| | H&V | 11490 | 7.38 | 57.40 | 74.00 | 16.60 | PK |
| | H&V | 11490 | 7.38 | 42.30 | 54.00 | 11.70 | AV |
| M | H&V | 5785 | -1.60 | 105.68 | Fundamental | / | PK |
| | H&V | 11570 | 7.35 | 57.30 | 74.00 | 16.70 | PK |
| | H&V | 11570 | 7.35 | 42.40 | 54.00 | 11.60 | AV |
| H | H&V | 5825 | -1.54 | 105.72 | Fundamental | / | PK |
| | H&V | 5850 | -1.54 | 59.45 | 122.20 | 62.75 | PK |
| | H&V | 5925 | -1.49 | 53.54 | 68.20 | 14.66 | PK |
| | H&V | 11650 | 7.29 | 57.25 | 74.00 | 16.75 | PK |
| | H&V | 11650 | 7.29 | 42.15 | 54.00 | 11.85 | AV |

802.11n40

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5755 | -1.66 | 103.67 | Fundamental | / | PK |
| | H&V | 5725 | -1.67 | 59.42 | 122.20 | 62.78 | PK |
| | H&V | 5650 | -1.76 | 53.37 | 68.20 | 14.83 | PK |
| | H&V | 11510 | 7.39 | 57.40 | 74.00 | 16.60 | PK |
| | H&V | 11510 | 7.39 | 42.50 | 54.00 | 11.50 | AV |
| H | H&V | 5795 | -1.59 | 103.14 | Fundamental | / | PK |
| | H&V | 5850 | -1.54 | 59.67 | 122.20 | 62.53 | PK |
| | H&V | 5925 | -1.49 | 53.21 | 68.20 | 14.99 | PK |
| | H&V | 11590 | 7.33 | 57.40 | 74.00 | 16.60 | PK |
| | H&V | 11590 | 7.33 | 42.50 | 54.00 | 11.50 | AV |

**Mode 3:**
U-NII-1 Band:

802.11a

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5180 | -2.71 | 103.43 | Fundamental | / | PK |
| | H&V | 5150 | -2.77 | 50.13 | 74.00 | 23.87 | PK |
| | H&V | 10360 | 5.98 | 56.37 | 74.00 | 17.63 | PK |
| | H&V | 10360 | 5.98 | 42.33 | 54.00 | 11.67 | AV |
| M | H&V | 5200 | -2.67 | 104.22 | Fundamental | / | PK |
| | H&V | 10400 | 6.09 | 58.30 | 74.00 | 15.70 | PK |
| | H&V | 10400 | 6.09 | 42.63 | 54.00 | 11.37 | AV |
| H | H&V | 5240 | -2.60 | 103.32 | Fundamental | / | PK |
| | H&V | 10480 | 6.30 | 56.44 | 74.00 | 17.56 | PK |
| | H&V | 10480 | 6.30 | 42.32 | 54.00 | 11.68 | AV |

802.11n20

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5180 | -2.71 | 102.62 | Fundamental | / | PK |
| | H&V | 5150 | -2.77 | 50.22 | 74.00 | 23.78 | PK |
| | H&V | 10360 | 5.98 | 56.34 | 74.00 | 17.66 | PK |
| | H&V | 10360 | 5.98 | 43.64 | 54.00 | 10.36 | AV |
| M | H&V | 5200 | -2.67 | 102.27 | Fundamental | / | PK |
| | H&V | 10400 | 6.09 | 54.98 | 74.00 | 19.02 | PK |
| | H&V | 10400 | 6.09 | 42.41 | 54.00 | 11.59 | AV |
| H | H&V | 5240 | -2.60 | 102.13 | Fundamental | / | PK |
| | H&V | 10480 | 6.30 | 56.34 | 74.00 | 17.66 | PK |
| | H&V | 10480 | 6.30 | 41.82 | 54.00 | 12.18 | AV |

802.11n40

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5190 | -2.69 | 102.24 | Fundamental | / | PK |
| | H&V | 5150 | -2.77 | 51.63 | 74.00 | 22.37 | PK |
| | H&V | 10380 | 6.03 | 54.22 | 74.00 | 19.78 | PK |
| | H&V | 10380 | 6.03 | 41.63 | 54.00 | 12.37 | AV |
| H | H&V | 5230 | -2.62 | 101.32 | Fundamental | / | PK |
| | H&V | 10460 | 6.25 | 53.22 | 74.00 | 20.78 | PK |
| | H&V | 10460 | 6.25 | 40.33 | 54.00 | 13.67 | AV |

U-NII-2A Band:
802.11a

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5260 | -2.56 | 102.55 | Fundamental | / | PK |
| | H&V | 10520 | 6.35 | 59.32 | 74.00 | 14.68 | PK |
| | H&V | 10520 | 6.35 | 44.33 | 54.00 | 9.67 | AV |
| M | H&V | 5300 | -2.48 | 102.87 | Fundamental | / | PK |
| | H&V | 10600 | 6.37 | 58.23 | 74.00 | 15.77 | PK |
| | H&V | 10600 | 6.37 | 42.36 | 54.00 | 11.64 | AV |
| H | H&V | 5320 | -2.45 | 103.25 | Fundamental | / | PK |
| | H&V | 5350 | -2.39 | 48.82 | 74.00 | 25.18 | PK |
| | H&V | 10640 | 6.37 | 56.23 | 74.00 | 17.77 | PK |
| | H&V | 10640 | 6.37 | 44.33 | 54.00 | 9.67 | AV |

802.11n20

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5260 | -2.56 | 101.23 | Fundamental | / | PK |
| | H&V | 10520 | 6.35 | 58.33 | 74.00 | 15.67 | PK |
| | H&V | 10520 | 6.35 | 43.28 | 54.00 | 10.72 | AV |
| M | H&V | 5300 | -2.48 | 101.42 | Fundamental | / | PK |
| | H&V | 10600 | 6.37 | 59.02 | 74.00 | 14.98 | PK |
| | H&V | 10600 | 6.37 | 44.01 | 54.00 | 9.99 | AV |
| H | H&V | 5320 | -2.45 | 102.47 | Fundamental | / | PK |
| | H&V | 5350 | -2.39 | 47.82 | 74.00 | 26.18 | PK |
| | H&V | 10640 | 6.37 | 54.28 | 74.00 | 19.72 | PK |
| | H&V | 10640 | 6.37 | 42.23 | 54.00 | 11.77 | AV |

802.11n40

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5270 | -2.54 | 99.45 | Fundamental | / | PK |
| | H&V | 10540 | 6.36 | 54.34 | 74.00 | 19.66 | PK |
| | H&V | 10540 | 6.36 | 42.34 | 54.00 | 11.66 | AV |
| H | H&V | 5310 | -2.46 | 99.63 | Fundamental | / | PK |
| | H&V | 5350 | -2.39 | 50.32 | 74.00 | 23.68 | PK |
| | H&V | 10620 | 6.37 | 56.34 | 74.00 | 17.66 | PK |
| | H&V | 10620 | 6.37 | 42.34 | 54.00 | 11.66 | AV |

U-NII-2C Band:
802.11a

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5500 | -2.11 | 103.01 | Fundamental | / | PK |
| | H&V | 5460 | -2.18 | 48.23 | 74.00 | 25.77 | PK |
| | H&V | 11000 | 6.43 | 53.32 | 74.00 | 20.68 | PK |
| | H&V | 11000 | 6.43 | 41.12 | 54.00 | 12.88 | AV |
| M | H&V | 5580 | -1.97 | 102.23 | Fundamental | / | PK |
| | H&V | 11160 | 7.33 | 55.23 | 74.00 | 18.77 | PK |
| | H&V | 11160 | 7.33 | 41.21 | 54.00 | 12.79 | AV |
| H | H&V | 5700 | -1.75 | 102.35 | Fundamental | / | PK |
| | H&V | 11400 | 7.21 | 53.28 | 74.00 | 20.72 | PK |
| | H&V | 11400 | 7.21 | 41.33 | 54.00 | 12.67 | AV |

802.11n20

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5500 | -2.11 | 101.55 | Fundamental | / | PK |
| | H&V | 5460 | -2.18 | 48.63 | 74.00 | 25.37 | PK |
| | H&V | 11000 | 6.43 | 57.21 | 74.00 | 16.79 | PK |
| | H&V | 11000 | 6.43 | 41.32 | 54.00 | 12.68 | AV |
| M | H&V | 5580 | -1.97 | 102.12 | Fundamental | / | PK |
| | H&V | 11160 | 7.33 | 56.23 | 74.00 | 17.77 | PK |
| | H&V | 11160 | 7.33 | 41.35 | 54.00 | 12.65 | AV |
| H | H&V | 5700 | -1.75 | 102.31 | Fundamental | / | PK |
| | H&V | 11400 | 7.21 | 56.72 | 74.00 | 17.28 | PK |
| | H&V | 11400 | 7.21 | 41.22 | 54.00 | 12.78 | AV |

802.11n40

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5510 | -2.09 | 98.65 | Fundamental | / | PK |
| | H&V | 5460 | -2.18 | 49.63 | 74.00 | 24.37 | PK |
| | H&V | 11020 | 6.47 | 55.78 | 74.00 | 18.22 | PK |
| | H&V | 11020 | 6.47 | 42.46 | 54.00 | 11.54 | AV |
| M | H&V | 5550 | -2.02 | 99.69 | Fundamental | / | PK |
| | H&V | 11100 | 6.63 | 55.57 | 74.00 | 18.43 | PK |
| | H&V | 11100 | 6.63 | 42.44 | 54.00 | 11.56 | AV |
| H | H&V | 5670 | -1.81 | 99.26 | Fundamental | / | PK |
| | H&V | 11340 | 7.09 | 55.68 | 74.00 | 18.32 | PK |
| | H&V | 11340 | 7.09 | 42.28 | 54.00 | 11.72 | AV |

U-NII-3 Band:
802.11a

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5745 | -1.67 | 104.02 | Fundamental | / | PK |
| | H&V | 5725 | -1.67 | 56.54 | 122.20 | 65.66 | PK |
| | H&V | 5720 | -1.67 | 55.38 | 110.80 | 55.42 | PK |
| | H&V | 5700 | -1.72 | 53.34 | 105.20 | 51.86 | PK |
| | H&V | 5650 | -1.76 | 51.64 | 68.20 | 16.56 | PK |
| | H&V | 11490 | 7.38 | 54.62 | 74.00 | 19.38 | PK |
| | H&V | 11490 | 7.38 | 43.23 | 54.00 | 10.77 | AV |
| M | H&V | 5785 | -1.60 | 103.64 | Fundamental | / | PK |
| | H&V | 11570 | 7.35 | 54.34 | 74.00 | 19.66 | PK |
| | H&V | 11570 | 7.35 | 41.62 | 54.00 | 12.38 | AV |
| H | H&V | 5825 | -1.54 | 103.74 | Fundamental | / | PK |
| | H&V | 5850 | -1.54 | 56.28 | 122.20 | 65.92 | PK |
| | H&V | 5855 | -1.54 | 54.94 | 110.80 | 55.86 | PK |
| | H&V | 5875 | -1.52 | 53.56 | 105.20 | 51.64 | PK |
| | H&V | 5925 | -1.49 | 52.35 | 68.20 | 15.85 | PK |
| | H&V | 11650 | 7.29 | 56.43 | 74.00 | 17.57 | PK |
| | H&V | 11650 | 7.29 | 42.36 | 54.00 | 11.64 | AV |

802.11n20

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5745 | -1.67 | 102.34 | Fundamental | / | PK |
| | H&V | 5725 | -1.67 | 55.74 | 122.20 | 66.46 | PK |
| | H&V | 5650 | -1.76 | 51.63 | 68.20 | 16.57 | PK |
| | H&V | 11490 | 7.38 | 55.33 | 74.00 | 18.67 | PK |
| | H&V | 11490 | 7.38 | 41.64 | 54.00 | 12.36 | AV |
| M | H&V | 5785 | -1.60 | 102.68 | Fundamental | / | PK |
| | H&V | 11570 | 7.35 | 55.35 | 74.00 | 18.65 | PK |
| | H&V | 11570 | 7.35 | 42.43 | 54.00 | 11.57 | AV |
| H | H&V | 5825 | -1.54 | 102.44 | Fundamental | / | PK |
| | H&V | 5850 | -1.54 | 54.26 | 122.20 | 67.94 | PK |
| | H&V | 5925 | -1.49 | 50.83 | 68.20 | 17.37 | PK |
| | H&V | 11650 | 7.29 | 52.86 | 74.00 | 21.14 | PK |
| | H&V | 11650 | 7.29 | 40.33 | 54.00 | 13.67 | AV |

802.11n40

| Channel | Polarity | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| L | H&V | 5755 | -1.66 | 98.36 | Fundamental | / | PK |
| | H&V | 5725 | -1.67 | 53.56 | 122.20 | 68.64 | PK |
| | H&V | 5650 | -1.76 | 49.43 | 68.20 | 18.77 | PK |
| | H&V | 11510 | 7.39 | 54.43 | 74.00 | 19.57 | PK |
| | H&V | 11510 | 7.39 | 39.54 | 54.00 | 14.46 | AV |
| H | H&V | 5795 | -1.59 | 99.54 | Fundamental | / | PK |
| | H&V | 5850 | -1.54 | 54.21 | 122.20 | 67.99 | PK |
| | H&V | 5925 | -1.49 | 48.55 | 68.20 | 19.65 | PK |
| | H&V | 11590 | 7.33 | 54.35 | 74.00 | 19.65 | PK |
| | H&V | 11590 | 7.33 | 40.31 | 54.00 | 13.69 | AV |

Remark:
1. For fundamental & restrict emission test, no amplifier is employed.
2. Factor = Antenna Factor + Cable Loss (-Amplifier, is employed);
3. Measure level = Reading Level + Factor;
4. Over Limit = Measure level – limit;
5. If the PK reading is lower than AV limit, the AV test can be elided.

Example:

Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading level = 10dBuV.
Then Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Measure level = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Measure level = 10.20dBuV/m,
then Over Limit = 10.20 - 54= -43.80dBuV/m

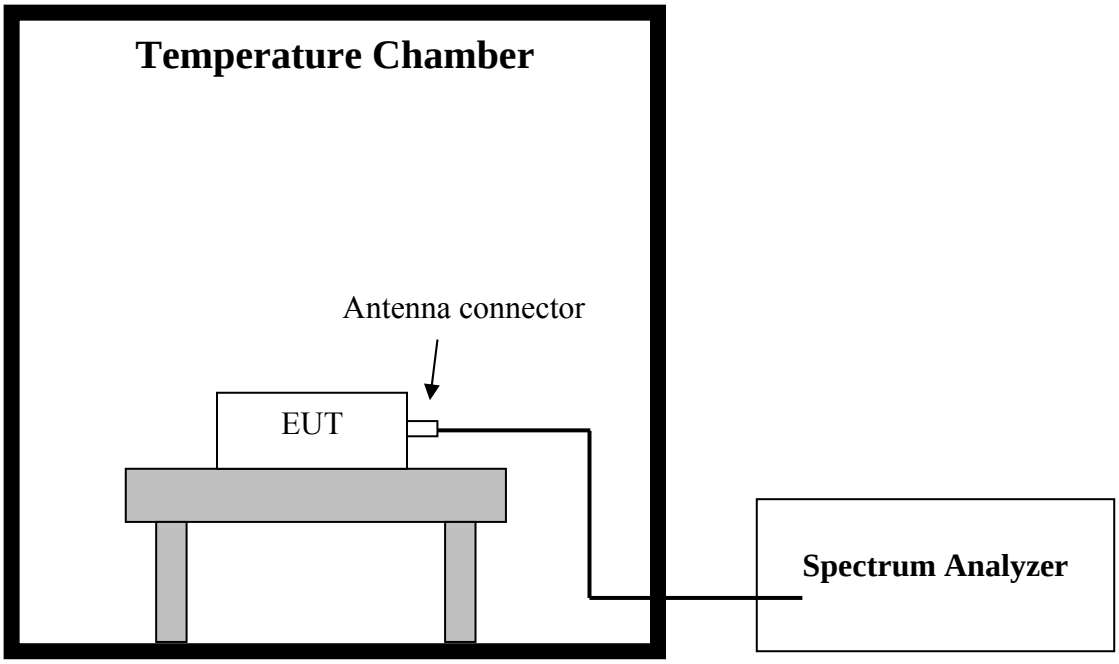
# 8. Frequency Stability Measurement

**Test result:** **Pass**

## 8.1 Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

## 8.2 Test configuration



### 8.3 Test procedure and test set up

**Frequency Stability Under Temperature Variations:**

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

**Frequency Stability Under Voltage Variations:**

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

### 8.4 Test protocol

| Operating Frequency: 5180 MHz | | | | | | |
|---|---|---|---|---|---|---|
| Voltage (%) | Power (VAC) | Temp (°C) | Frequency Tolerance (ppm) | | | |
| | | | 0 minutes | 2 minutes | 5 minutes | 10 minutes |
| 100% | 120 | - 30 | 6.21 | 5.21 | 4.15 | 4.22 |
| | | - 20 | 4.72 | 5.22 | 5.51 | 3.52 |
| | | - 10 | 5.12 | 4.94 | 2.95 | -1.53 |
| | | 0 | 5.11 | 2.14 | -5.39 | 4.34 |
| | | + 10 | 3.22 | 2.63 | -3.42 | -3.44 |
| | | + 20 (Ref) | 3.12 | 2.63 | 3.62 | 4.67 |
| | | + 30 | -3.15 | -3.23 | 2.22 | 2.47 |
| | | + 40 | 3.82 | 3.75 | 2.74 | 5.54 |
| | | + 50 | -3.43 | 2.32 | -2.72 | -1.77 |
| | | - 30 | 4.52 | 5.33 | 3.33 | 5.33 |
| 115% | 138 | + 20 | 4.52 | 4.52 | 4.23 | 5.38 |
| 85% | 102 | + 20 | 4.36 | 3.32 | -2.63 | 3.55 |

Note: Frequency Tolerance (ppm) = {[Measured Frequency (Hz) – Declared Frequency (Hz)] / Declared Frequency (Hz)} *$10^6$.

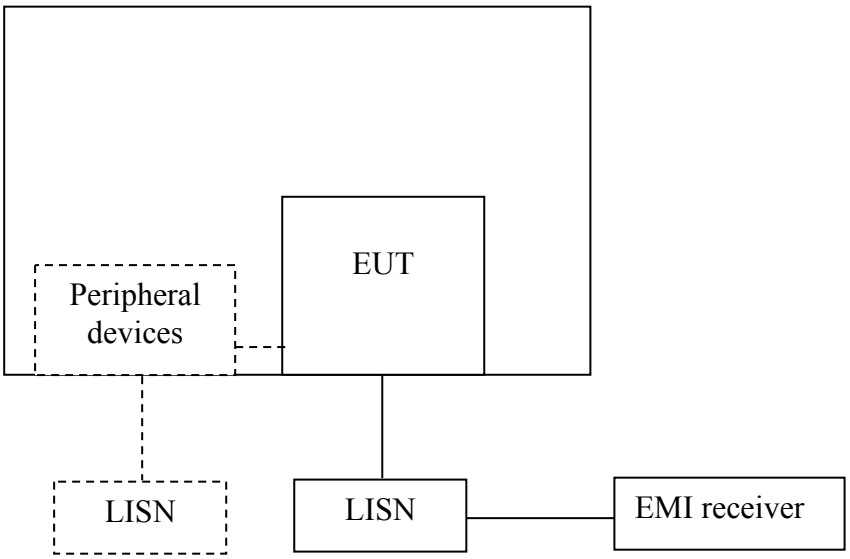
# 9. Power line conducted emission

**Test result:** **Pass**

## 9.1 Limit

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | QP | AV |
| 0.15-0.5 | 66 to 56* | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| * Decreases with the logarithm of the frequency. | | |

## 9.2 Test configuration




☒ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

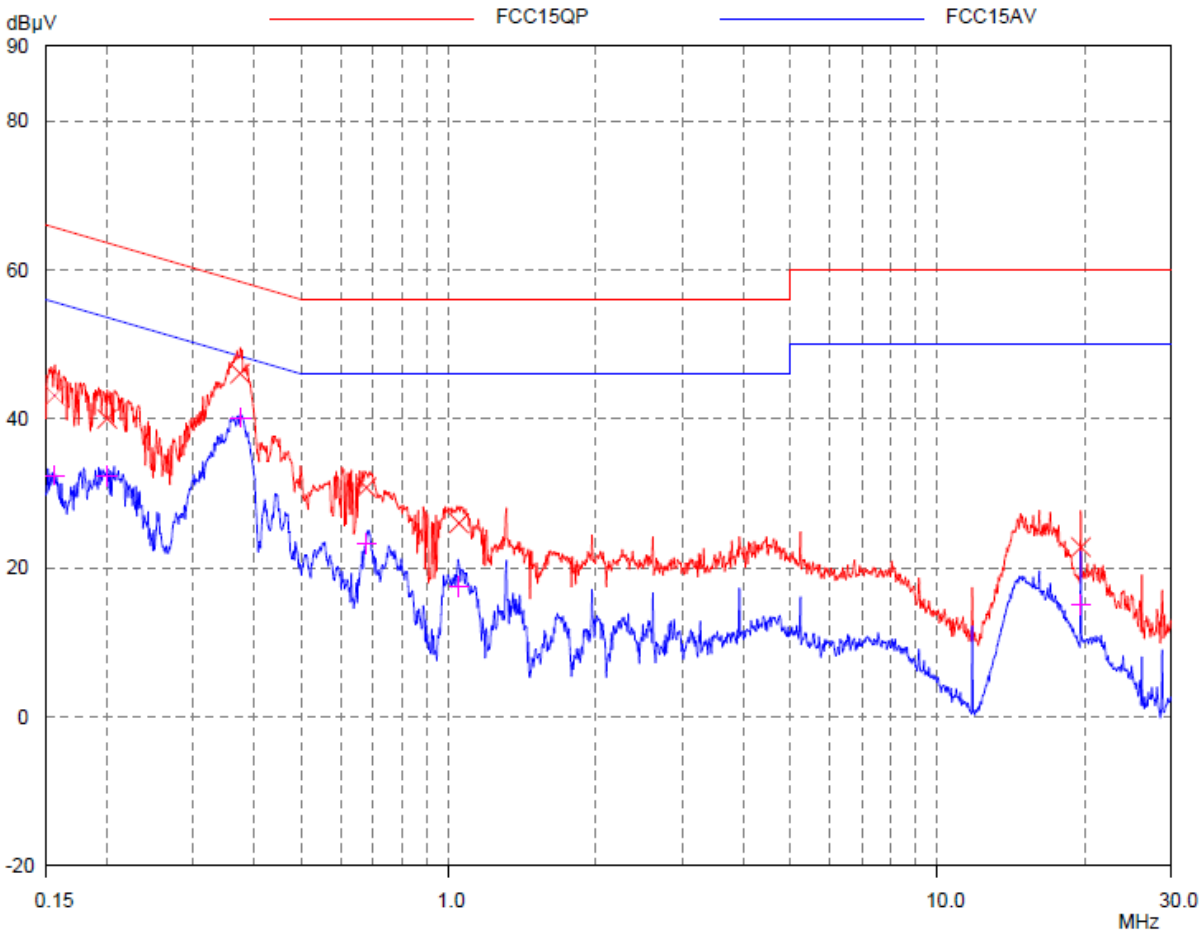
### 9.3 Test procedure and test set up

The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50Ω/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50Ω/50uH coupling impedance with 50Ω termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.
The bandwidth of the test receiver is set at 9 kHz.

## 9.4 Test protocol

Temperature : 25 °C
Relative Humidity : 55 %

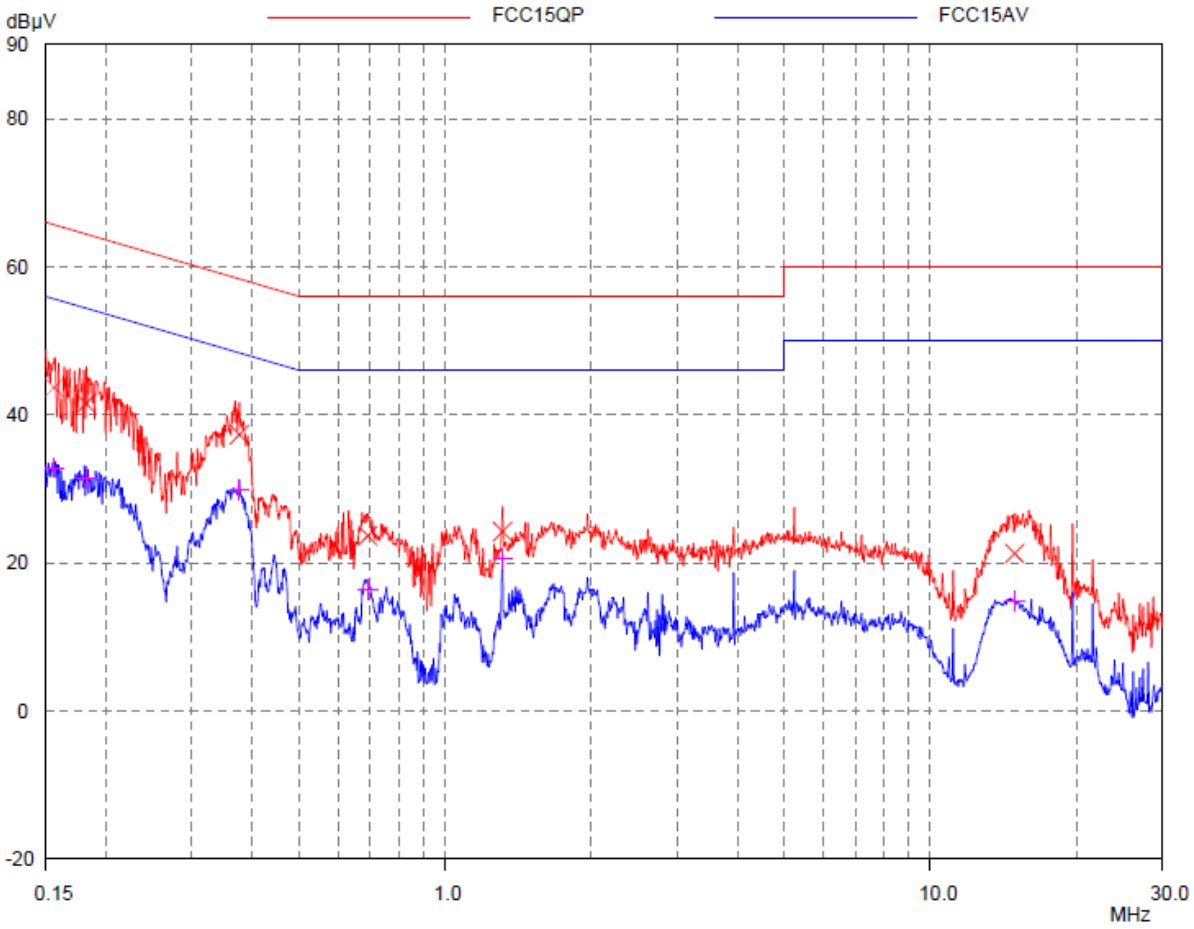
L line




**Test Data:**

| Frequency (MHz) | Quasi-peak | | | Average | | |
|---|---|---|---|---|---|---|
| | level dB(µV) | Limit dB(µV) | Margin (dB) | level dB(µV) | limit dB(µV) | Margin (dB) |
| 0.156 | 43.11 | 65.67 | 22.56 | 32.37 | 55.67 | 23.30 |
| 0.200 | 40.01 | 63.61 | 23.60 | 32.27 | 53.61 | 21.34 |
| 0.374 | 46.07 | 58.41 | 12.34 | 40.19 | 48.41 | 8.22 |
| 0.678 | 30.79 | 56.00 | 25.21 | 23.29 | 46.00 | 22.71 |
| 1.048 | 25.99 | 56.00 | 30.01 | 17.50 | 46.00 | 28.50 |
| 19.632 | 22.79 | 60.00 | 37.21 | 15.11 | 50.00 | 34.89 |

N line




**Test Data:**

| Frequency (MHz) | Quasi-peak | | | Average | | |
|---|---|---|---|---|---|---|
| | level dB(µV) | Limit dB(µV) | Margin (dB) | level dB(µV) | limit dB(µV) | Margin (dB) |
| 0.156 | 43.71 | 65.67 | 21.96 | 32.83 | 55.67 | 22.84 |
| 0.182 | 41.54 | 64.41 | 22.87 | 31.43 | 54.41 | 22.98 |
| 0.376 | 37.35 | 58.37 | 21.02 | 29.89 | 48.37 | 18.48 |
| 0.692 | 23.66 | 56.00 | 32.34 | 16.36 | 46.00 | 29.64 |
| 1.311 | 24.25 | 56.00 | 31.75 | 20.59 | 46.00 | 25.41 |
| 14.905 | 21.29 | 60.00 | 38.71 | 14.82 | 50.00 | 35.18 |