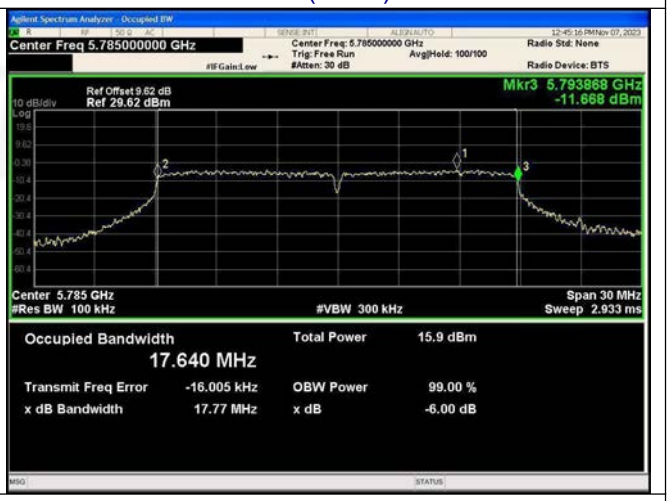

802.11ac(VH20)-5745

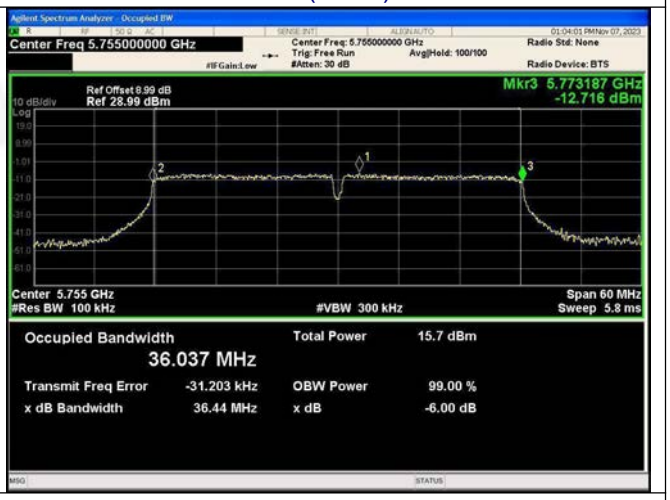

802.11ac(VH20)-5785


802.11ac(VH20)-5825

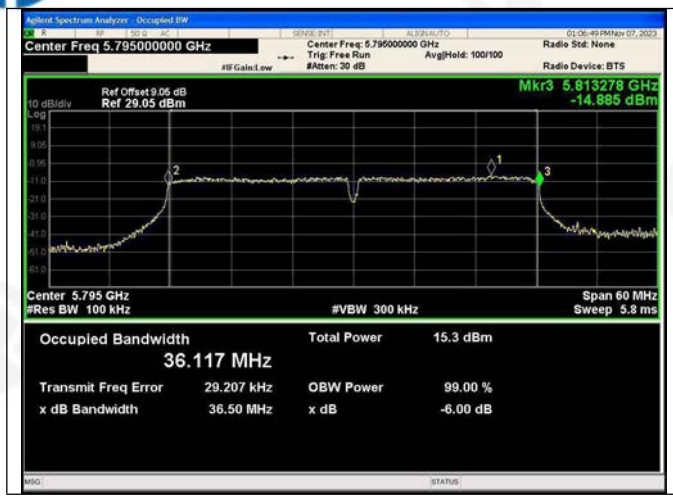


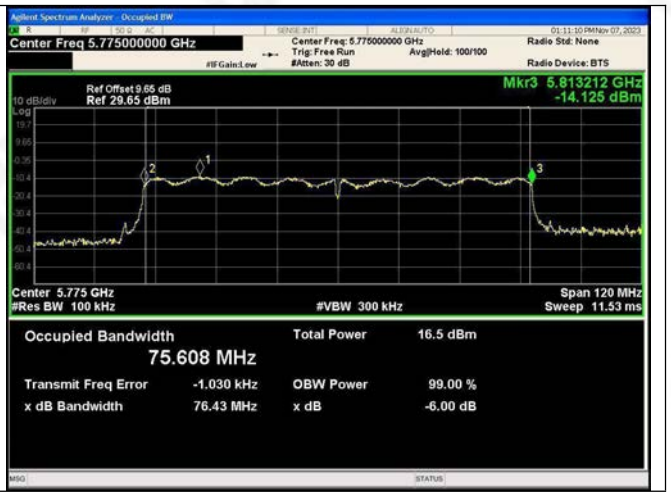

802.11ac(VH40)-5755


802.11ac(VH40)-5795



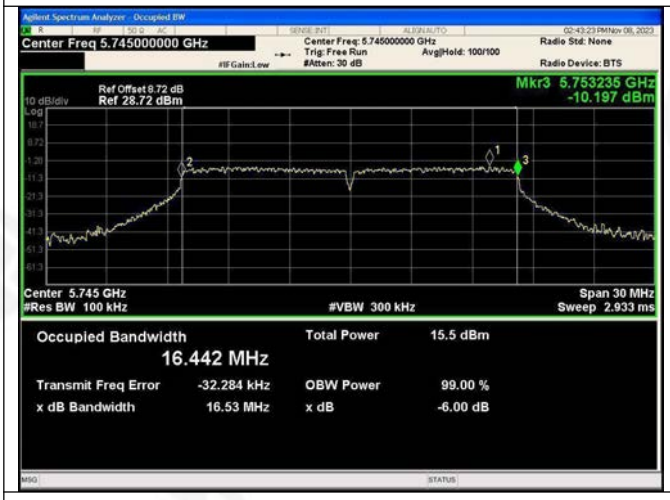

802.11ac(VH80)-5775


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.795000000 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 9.05 dB
10 dB/div
Ref 29.05 dBm
Mkr3 5.813278 GHz
-14.885 dBm
Center 5.795 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 60 MHz
Sweep 5.8 ms
Occupied Bandwidth
36.117 MHz
Total Power 15.3 dBm
Transmit Freq Error 29.207 kHz
OBW Power 99.00 %
x dB Bandwidth 36.50 MHz
x dB -6.00 dB


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.775000000 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 9.65 dB
10 dB/div
Ref 29.65 dBm
Mkr3 5.813212 GHz
-14.125 dBm
Center 5.775 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 120 MHz
Sweep 11.53 ms
Occupied Bandwidth
75.608 MHz
Total Power 16.5 dBm
Transmit Freq Error -1.030 kHz
OBW Power 99.00 %
x dB Bandwidth 76.43 MHz
x dB -6.00 dB

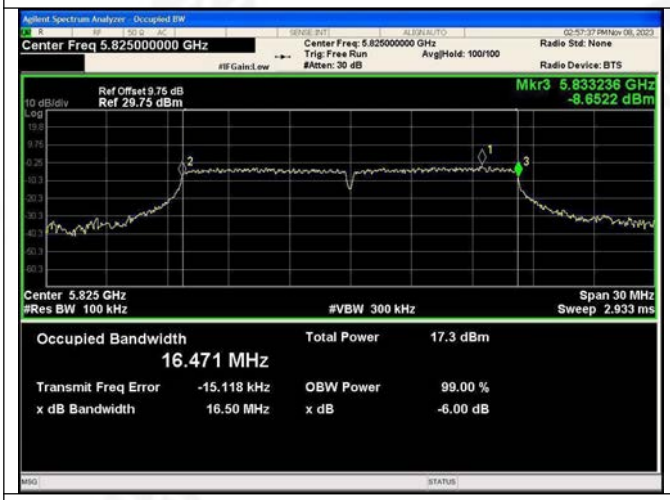
ANT2

802.11a-5745




802.11a-5785


802.11a-5825




802.11n(HT20)-5745


802.11n(HT20)-5785

802.11n(HT20)-5825



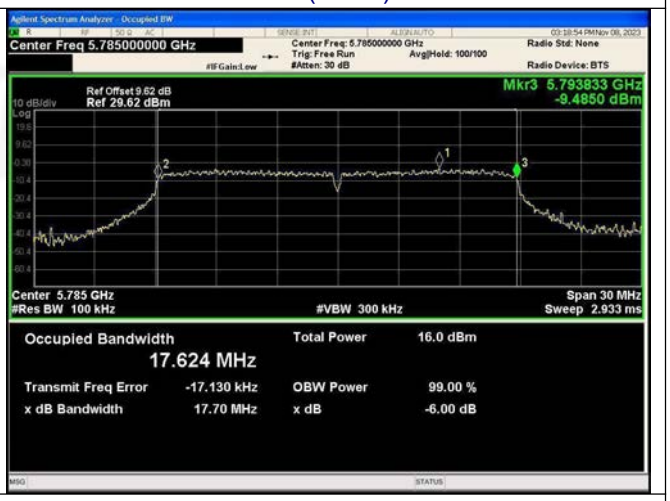
802.11n(HT40)-5755

802.11n(HT40)-5795


802.11ac(VH20)-5745

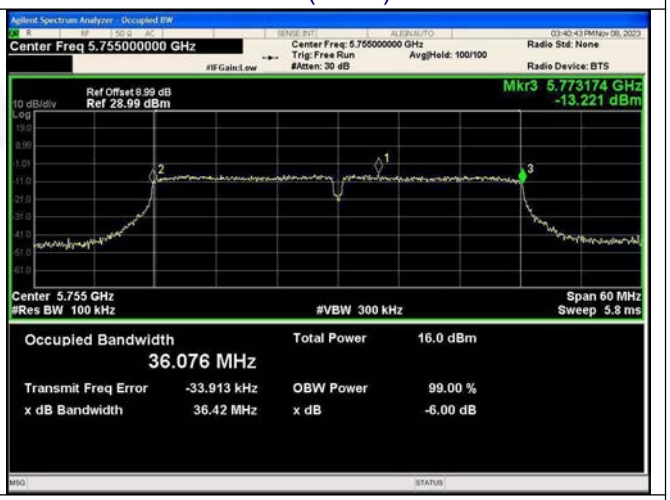

802.11ac(VH20)-5785


802.11ac(VH20)-5825

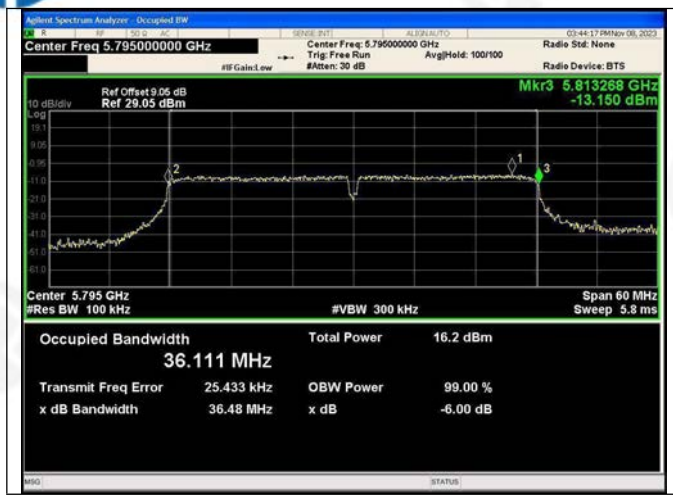


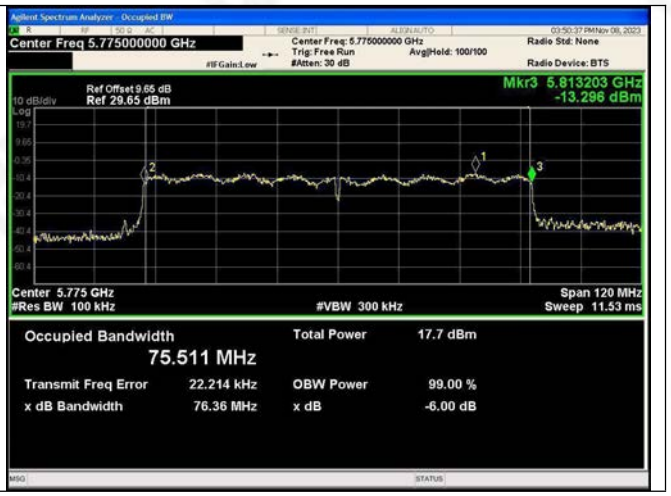

802.11ac(VH40)-5755


802.11ac(VH40)-5795



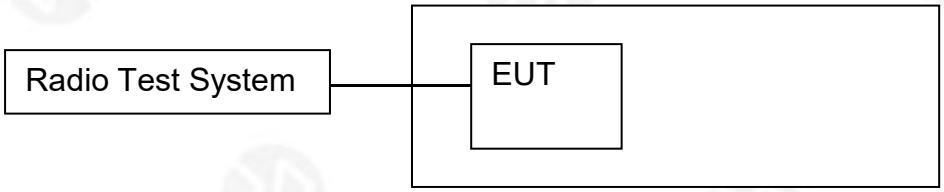

802.11ac(VH80)-5775


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.795000000 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 9.05 dB
10 dB/div
Ref 29.05 dBm
Mkr3 5.813268 GHz
-13.150 dBm
Center 5.795 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 60 MHz
Sweep 5.8 ms
Occupied Bandwidth
36.111 MHz
Total Power 16.2 dBm
Transmit Freq Error 25.433 kHz
OBW Power 99.00 %
x dB Bandwidth 36.48 MHz
x dB -6.00 dB


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.775000000 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 9.65 dB
10 dB/div
Ref 29.65 dBm
Mkr3 5.813203 GHz
-13.296 dBm
Center 5.775 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 120 MHz
Sweep 11.53 ms
Occupied Bandwidth
75.511 MHz
Total Power 17.7 dBm
Transmit Freq Error 22.214 kHz
OBW Power 99.00 %
x dB Bandwidth 76.36 MHz
x dB -6.00 dB

## 11. POWER SPECTRAL DENSITY

### 11.1 Block Diagram Of Test Setup




### 11.2 Limit

3.5.1 Limit

| FCC Part15, Subpart E (15.407) | | | |
|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.407(a) | Power Spectral Density | Master device: 17 dBm/MHz<br>Client device: 11 dBm/MHz | 5150-5250 |
| | | 11 dBm/MHz | 5250-5350 |
| | | 11 dBm/MHz | 5470-5725 |
| | | 30 dBm/500 kHz | 5725-5850 |

Note: 1. For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 300kHz and VBW at 1500kHz if the spectrum analyzer does not have 500 kHz RBW. Then, add 10 log (500 kHz/300 kHz) to the measured result, i.e. 2.22 dB. 2. During the test of U-NII 3 PSD, the measurement result with RBW=300kHz has been added 2.22 dB by compensating offset, offset=cable loss+duty factor+10log(500kHz/300kHz).

### 11.3 Test procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

For devices operating in the bands 5.15−5.25 GHz, 5.25−5.35 GHz, and 5.47−5.725 GHz, the preceding procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in Section 15.407(a)(5). For devices operating in the band 5.725−5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
a) Set RBW ≥ 1/*T*, where *T* is defined in II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.
Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the II.F.5.c) and II.F.5.d),

since RBW=100 kHz is available on nearly all spectrum analyzers.

## 11.4 Test Result

5180-5240MHz
ANT1+ANT2

| Test mode | Test Channel (MHz) | PSD (dBm/MHz) ANT 1 | PSD (dBm/MHz) ANT 2 | PSD [dBm] Total | Limit (dBm/MHz) | Result |
|---|---|---|---|---|---|---|
| 802.11a | 5180 | 6.619 | 6.898 | / | 11 | Pass |
| | 5200 | 6.987 | 6.516 | / | 11 | Pass |
| | 5240 | 6.848 | 6.976 | / | 11 | Pass |
| 802.11n(HT20) | 5180 | 6.353 | 6.219 | 9.771 | 11 | Pass |
| | 5200 | 6.56 | 6.704 | 9.768 | 11 | Pass |
| | 5240 | 7.037 | 7.217 | 9.923 | 11 | Pass |
| 802.11n(HT40) | 5190 | 4.545 | 3.964 | 9.297 | 11 | Pass |
| | 5230 | 4.297 | 4.745 | 9.643 | 11 | Pass |
| 802.11ac(VH20) | 5210 | 2.603 | 2.689 | 10.138 | 11 | Pass |
| | 5180 | 6.445 | 7.019 | 7.275 | 11 | Pass |
| | 5200 | 6.946 | 6.64 | 7.537 | 11 | Pass |
| 802.11ac(VH40) | 5240 | 7.166 | 6.88 | 5.657 | 11 | Pass |
| | 5190 | 3.964 | 4.111 | 9.752 | 11 | Pass |
| 802.11ac(VH80) | 5230 | 4.357 | 4.314 | 9.806 | 11 | Pass |
| 802.11ax(VH80) | 5230 | -16.925 | -17.899 | -14.37 | 11 | Pass |

5260-5320MHz
ANT1+ANT2

| Test mode | Test Channel (MHz) | PSD (dBm/MHz) ANT 1 | PSD (dBm/MHz) ANT 2 | PSD [dBm] Total | Limit (dBm/MHz) | Result |
|---|---|---|---|---|---|---|
| 802.11a | 5260 | 7.111 | 7.265 | / | 11 | Pass |
| | 5280 | 7.037 | 6.68 | / | 11 | Pass |
| | 5320 | 7.453 | 6.727 | / | 11 | Pass |
| 802.11n(HT20) | 5260 | 6.762 | 6.975 | 9.880 | 11 | Pass |
| | 5280 | 6.663 | 6.58 | 9.632 | 11 | Pass |
| | 5320 | 6.377 | 6.339 | 9.368 | 11 | Pass |
| 802.11n(HT40) | 5270 | 3.735 | 4.157 | 6.961 | 11 | Pass |
| | 5310 | 4.298 | 4.248 | 7.283 | 11 | Pass |
| 802.11ac(VH20) | 5260 | 2.775 | 2.691 | 5.744 | 11 | Pass |
| | 5280 | 6.692 | 6.705 | 9.709 | 11 | Pass |
| | 5320 | 6.735 | 6.71 | 9.733 | 11 | Pass |
| 802.11ac(VH40) | 5270 | 6.517 | 6.688 | 9.614 | 11 | Pass |
| | 5310 | 6.418 | 3.856 | 10.199 | 11 | Pass |
| 802.11ac(VH80) | 5290 | 4.384 | 4.672 | 9.872 | 11 | Pass |

5500-5700MHz
ANT1+ANT2

| Test mode | Test Channel (MHz) | PSD (dBm/MHz) ANT 1 | PSD (dBm/MHz) ANT 2 | PSD [dBm] Total | Limit (dBm/MHz) | Result |
|---|---|---|---|---|---|---|
| 802.11a | 5500 | 6.548 | 7.13 | / | 11 | Pass |
| | 5580 | 7.351 | 7.374 | / | 11 | Pass |
| | 5700 | 6.47 | 6.971 | / | 11 | Pass |
| 802.11n(HT20) | 5500 | 6.795 | 6.834 | 9.825 | 11 | Pass |
| | 5580 | 6.694 | 6.366 | 9.543 | 11 | Pass |
| | 5700 | 5.958 | 6.005 | 8.992 | 11 | Pass |
| 802.11n(HT40) | 5510 | 4.619 | 4.757 | 7.699 | 11 | Pass |
| | 5670 | 4.354 | 4.062 | 7.221 | 11 | Pass |
| 802.11ac(VH20) | 5530 | 1.61 | 3.172 | 5.471 | 11 | Pass |
| | 5500 | 7.385 | 7.233 | 10.320 | 11 | Pass |
| | 5580 | 6.662 | 6.64 | 9.661 | 11 | Pass |
| 802.11ac(VH40) | 5700 | 5.956 | 6.192 | 9.086 | 11 | Pass |
| | 5510 | 4.406 | 3.864 | 9.825 | 11 | Pass |
| 802.11ac(VH80) | 5530 | 4.304 | 3.966 | 9.825 | 11 | Pass |
| | 5670 | 4.078 | 3.445 | 9.543 | 11 | Pass |

5745-5825MHz
ANT1+ANT2

| Test mode | Test Channel (MHz) | PSD (dBm/500kHz) ANT 1 | PSD (dBm/500kHz) ANT 2 | PSD [dBm] Total | Limit (dBm/500kHz) | Result |
|---|---|---|---|---|---|---|
| 802.11a | 5745 | 4.088 | 1.436 | / | 30 | Pass |
| | 5785 | 3.827 | 1.629 | / | 30 | Pass |
| | 5825 | 4.742 | 3.954 | / | 30 | Pass |
| 802.11n(HT20) | 5745 | 3.926 | 2.788 | 6.404 | 30 | Pass |
| | 5785 | 2.282 | 1.807 | 5.061 | 30 | Pass |
| | 5825 | 3.562 | 3.594 | 6.588 | 30 | Pass |
| 802.11n(HT40) | 5755 | -1.422 | -1.165 | 1.719 | 30 | Pass |
| | 5795 | -1.212 | -0.272 | 2.294 | 30 | Pass |
| 802.11ac(VH20) | 5745 | -2.801 | -1.273 | 1.040 | 30 | Pass |
| | 5785 | 3.355 | 1.829 | 5.669 | 30 | Pass |
| | 5825 | 3.645 | 2.139 | 5.967 | 30 | Pass |
| 802.11ac(VH40) | 5755 | 4.847 | 3.897 | 7.408 | 30 | Pass |
| | 5795 | -1.081 | -0.19 | 6.404 | 30 | Pass |
| 802.11ac(VH80) | 5775 | -1.355 | -1.429 | 5.061 | 30 | Pass |

5180-5240MHz
ANT1

802.11a-5180


802.11a-5200


802.11a-5240


802.11n(HT20)-5180


802.11n(HT20)-5200

802.11n(HT20)-5240


802.11n(HT40)-5190


802.11n(HT40)-5230


802.11ac(VH20)-5180

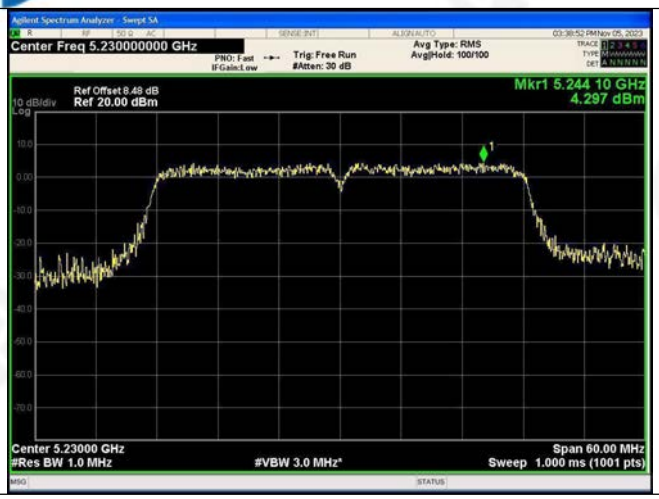

802.11ac(VH20)-5200


802.11ac(VH20)-5240


802.11ac(VH40)-5190

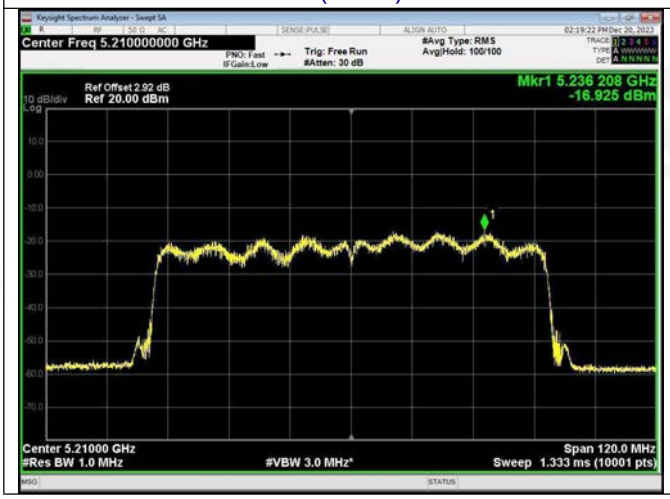

802.11ac(VH40)-5230


802.11ac(VH80)-5210





802.11ax(VH80)-5210



ANT2

802.11a-5180


802.11a-5200


802.11a-5240


802.11n(HT20)-5180


802.11n(HT20)-5200


802.11n(HT20)-5240


802.11n(HT40)-5190

802.11n(HT40)-5230


802.11ac(VH20)-5180

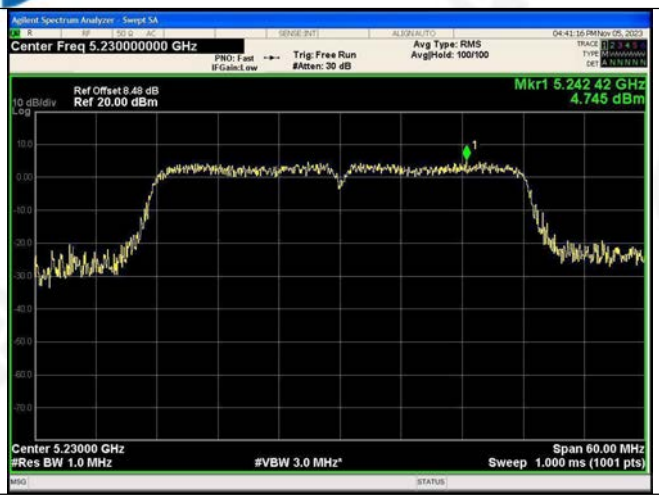

802.11ac(VH20)-5200


802.11ac(VH20)-5240


802.11ac(VH40)-5190

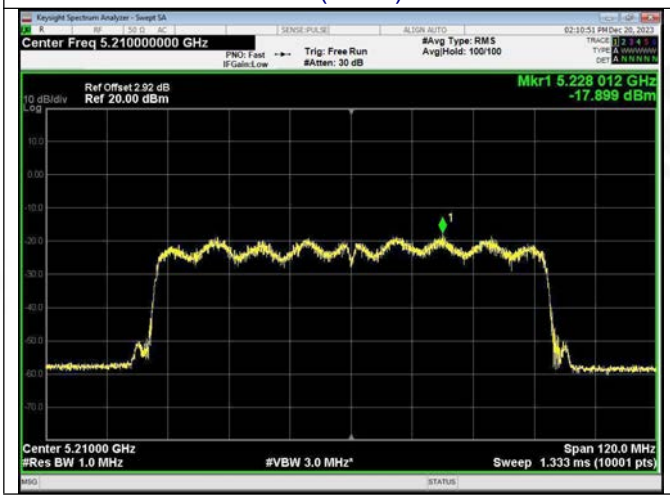

802.11ac(VH40)-5230


802.11ac(VH80)-5210





802.11ax(VH80)-5210



5260-5320MHz
ANT1

802.11a-5260


802.11a-5280


802.11a-5320


802.11ac(VH20)-5260


802.11ac(VH20)-5280


802.11ac(VH20)-5320


802.11ac(VH40)-5270

802.11ac(VH40)-5310


802.11n(HT20)-5260

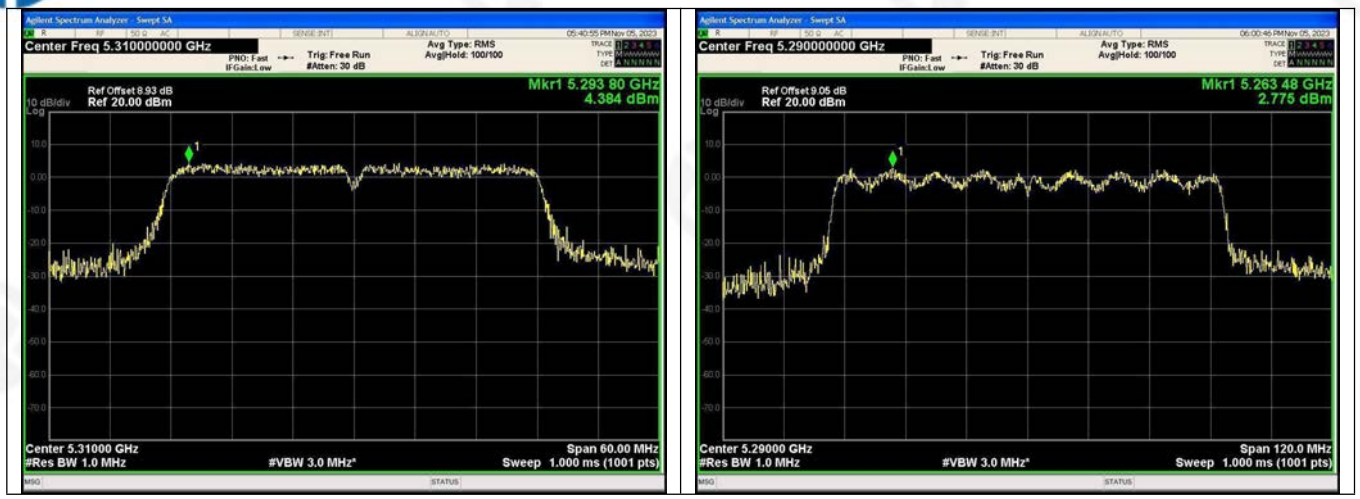

802.11n(HT20)-5280


802.11n(HT20)-5320


802.11n(HT40)-5270


802.11n(HT40)-5310


802.11ac(HT80)-5290


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.310000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 8.93 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.293 80 GHz
4.384 dBm
Center 5.31000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 60.00 MHz
Sweep 1.000 ms (1001 pts)
Agilent Spectrum Analyzer - Swept SA
Center Freq 5.290000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 9.05 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.263 48 GHz
2.775 dBm
Center 5.29000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 120.0 MHz
Sweep 1.000 ms (1001 pts)

ANT2

802.11a-5260


802.11a-5280


802.11a-5320


802.11ac(VH20)-5260


802.11ac(VH20)-5280


802.11ac(VH20)-5320


802.11ac(VH40)-5270

802.11ac(VH40)-5310


802.11n(HT20)-5260


802.11n(HT20)-5280


802.11n(HT20)-5320


802.11n(HT40)-5270


802.11n(HT40)-5310


802.11ac(HT80)-5290


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.310000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
07:34:25 PM Nov 05, 2023
Ref Offset 8.93 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.323 98 GHz
4.672 dBm
Center 5.31000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 60.00 MHz
Sweep 1.000 ms (1001 pts)


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.290000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
07:53:02 PM Nov 05, 2023
Ref Offset 9.05 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.262 88 GHz
2.691 dBm
Center 5.29000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 120.0 MHz
Sweep 1.000 ms (1001 pts)

5500-5700MHz
ANT1

802.11a-5500


802.11a-5580


802.11a-5700


802.11n(HT20)-5500


802.11n(HT20)-5580


802.11n(HT20)-5700


802.11n(HT40)-5510

802.11n(HT40)-5670


802.11ac(VH20)-5500

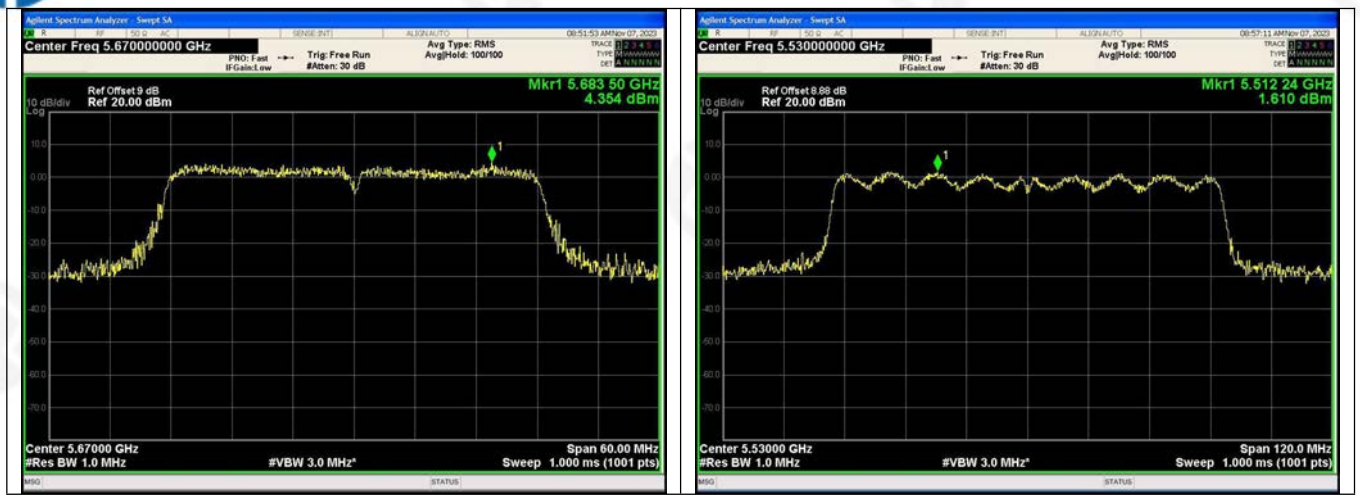

802.11ac(VH20)-5580


802.11ac(VH20)-5700


802.11ac(VH40)-5510


802.11ac(VH40)-5670


802.11ac(VH80)-5530


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.670000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 9 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.683 50 GHz
4.354 dBm
Center 5.67000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 60.00 MHz
Sweep 1.000 ms (1001 pts)
Agilent Spectrum Analyzer - Swept SA
Center Freq 5.530000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 8.88 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.512 24 GHz
1.610 dBm
Center 5.53000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 120.0 MHz
Sweep 1.000 ms (1001 pts)

ANT2

802.11a-5500


802.11a-5580


802.11a-5700


802.11n(HT20)-5500


802.11n(HT20)-5580


802.11n(HT20)-5700


802.11n(HT40)-5510

802.11n(HT40)-5670


802.11ac(VH20)-5500


802.11ac(VH20)-5580


802.11ac(VH20)-5700


802.11ac(VH40)-5510


802.11ac(VH40)-5670


802.11ac(VH80)-5530


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.670000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 9 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.657 04 GHz
4.062 dBm
Center 5.67000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 60.00 MHz
Sweep 1.000 ms (1001 pts)


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.530000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 8.88 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.502 76 GHz
3.172 dBm
Center 5.53000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 120.0 MHz
Sweep 1.000 ms (1001 pts)

5745-5825MHz
ANT1

802.11a-5745


802.11a-5785


802.11a-5825


802.11n(HT20)-5745


802.11n(HT20)-5785

802.11n(HT20)-5825


802.11n(HT40)-5755


802.11n(HT40)-5795


802.11ac(VH20)-5745


802.11ac(VH20)-5785


802.11ac(VH20)-5825


802.11ac(VH40)-5755


802.11ac(VH40)-5795


802.11ac(VH80)-5775


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.795000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 9.05 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.809 04 GHz
-1.212 dBm
Center 5.79500 GHz
#Res BW 510 kHz
#VBW 1.5 MHz*
Span 60.00 MHz
Sweep 1.000 ms (1001 pts)


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.775000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ref Offset 9.65 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.757 84 GHz
-2.801 dBm
Center 5.77500 GHz
#Res BW 510 kHz
#VBW 1.5 MHz*
Span 120.0 MHz
Sweep 1.000 ms (1001 pts)