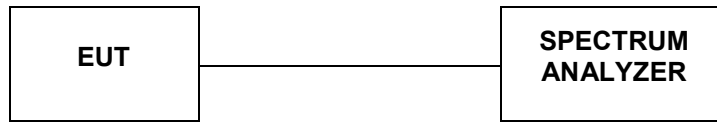


4.6. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General U-NII Test Procedures New Rules v02r01 for one of the following procedures may be used for section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize
- 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.

LIMIT

For Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz

TEST RESULTS

Temperature	23.6°C	Humidity	55.7%
Test Engineer	Oliver Ou	Configurations	IEEE 802.11a/n/ac

Antenna 0:

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	149	16.440	>500	Pass
	157	16.440		
	165	16.440		
802.11nHT20	149	16.440	>500	Pass
	157	16.440		
	165	16.440		
802.11n40	151	35.920	>500	Pass
	159	36.000		
802.11ac20	149	17.200	>500	Pass
	157	17.400		
	165	17.600		
802.11ac40	151	36.240	>500	Pass
	159	36.000		
802.11ac80	155	76.160	>500	Pass

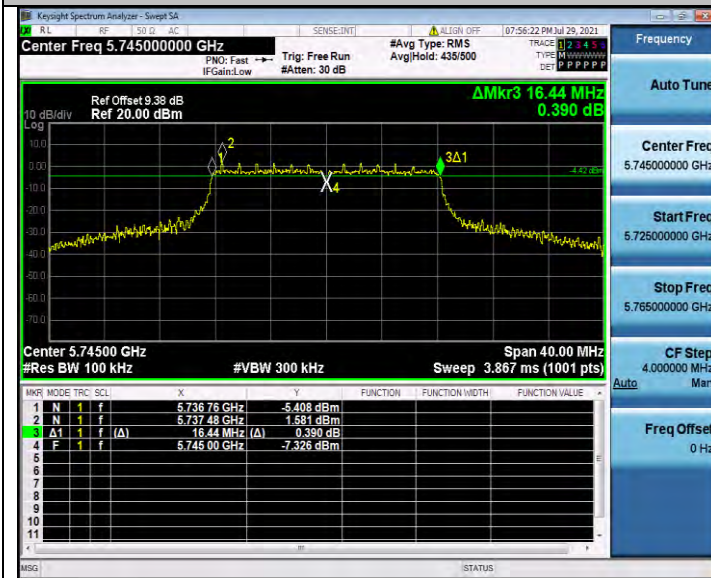
Antenna 1:

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	149	15.200	>500	Pass
	157	15.160		
	165	15.120		
802.11nHT20	149	14.880	>500	Pass
	157	15.200		
	165	15.200		
802.11n40	151	35.200	>500	Pass
	159	35.200		
802.11ac20	149	15.200	>500	Pass
	157	15.200		
	165	15.360		
802.11ac40	151	35.280	>500	Pass
	159	35.200		
802.11ac80	155	75.520	>500	Pass

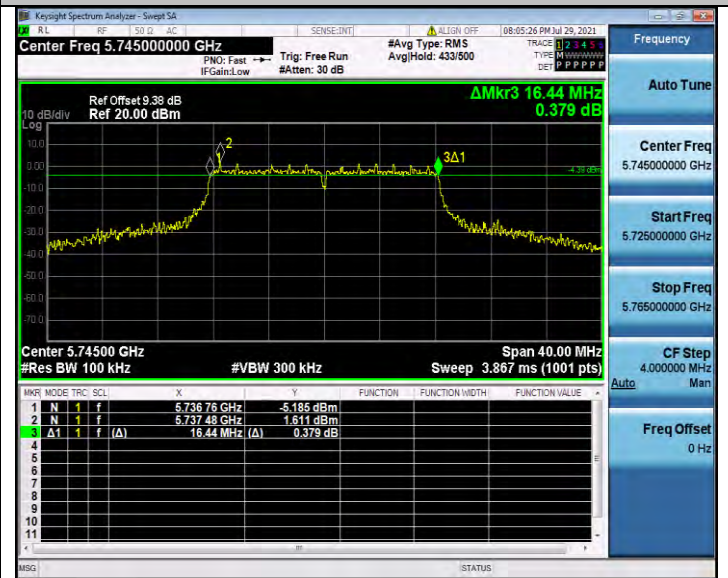
Antenna 0:

6dB Bandwidth

802.11a



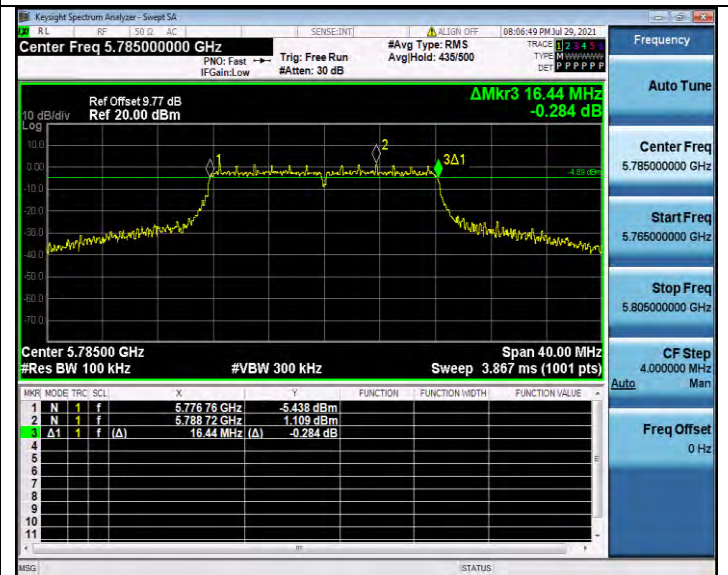
802.11n HT20



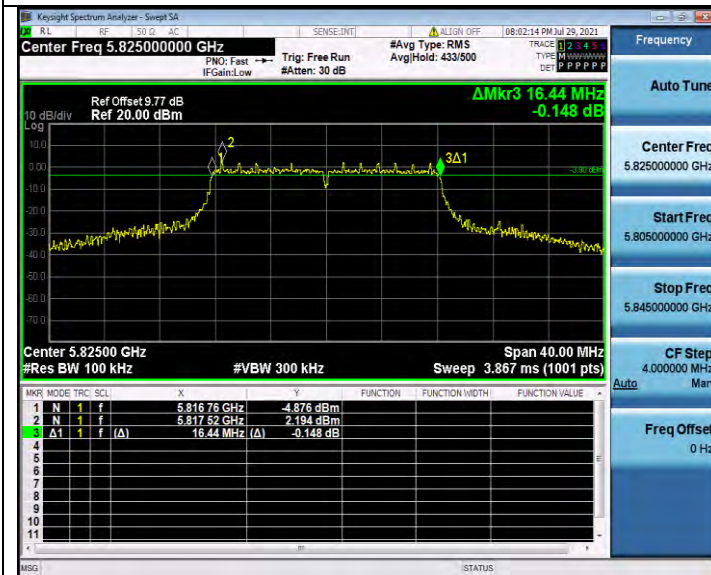
CH149



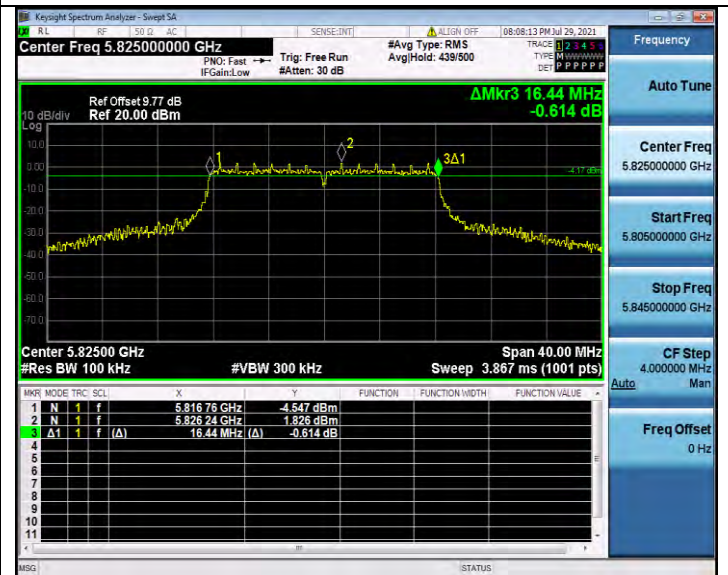
CH149



CH157

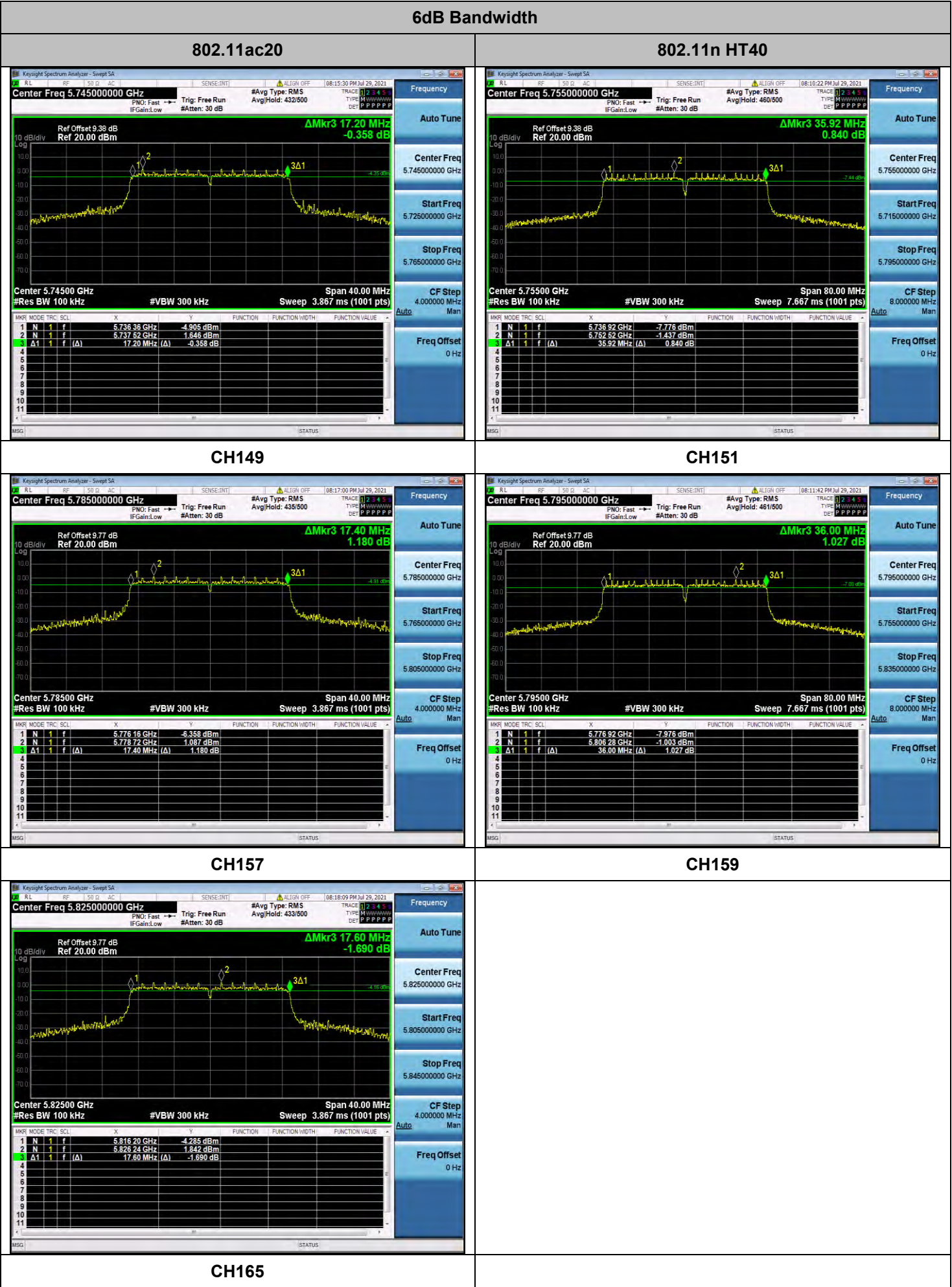


CH157



CH165

CH165





CH159

KeySight Spectrum Analyzer - Swept SA

Center Freq 5.795000000 GHz

Ref Offset 9.77 dB

Ref 20.00 dBm

ΔMkr3 36.00 MHz

-0.772 dB

10 dB/div

Log

1

2

3Δ1

Center 5.79500 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 7.667 ms (1001 pts)

Span 80.00 MHz

1

2

3

4

5

6

7

8

9

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11

MSG

STATUS

Frequency

Auto Tune

Center Freq 5.795000000 GHz

Start Freq 5.765000000 GHz

Stop Freq 5.835000000 GHz

CF Step 8.000000 MHz

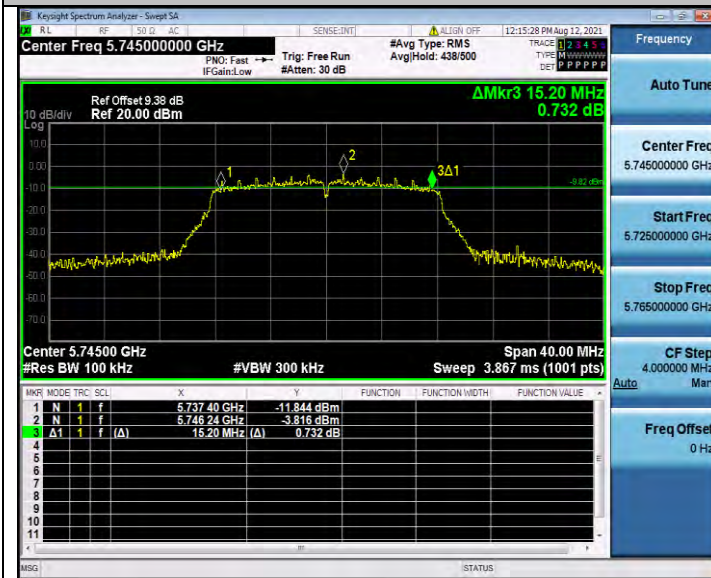
Man

Freq Offset 0 Hz

Antenna 1:

6dB Bandwidth

802.11a



802.11n HT20



CH149



CH149



CH157



CH157



CH165

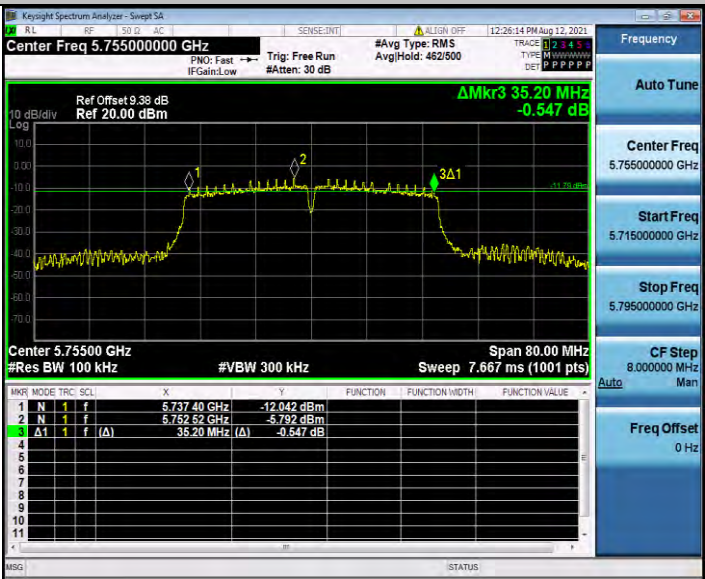
CH165

6dB Bandwidth

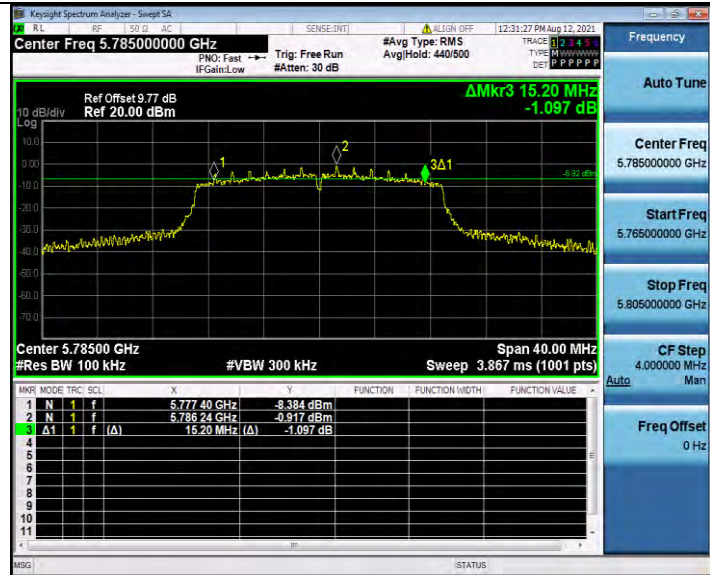
802.11ac20



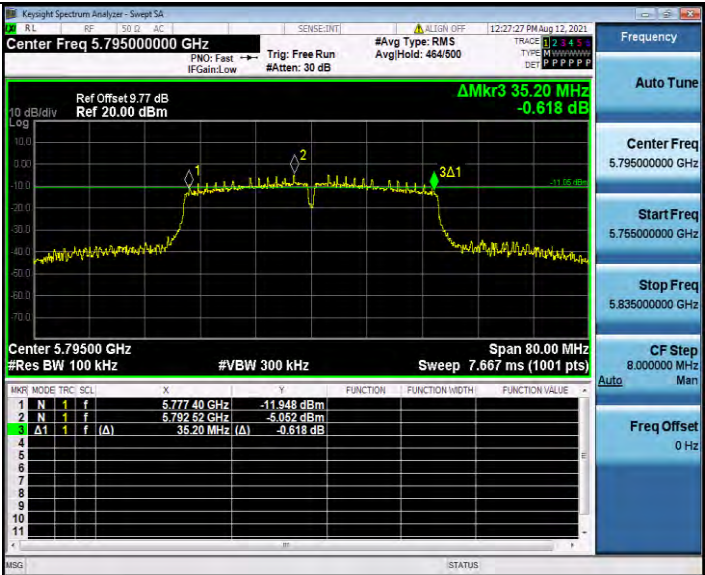
802.11n HT40



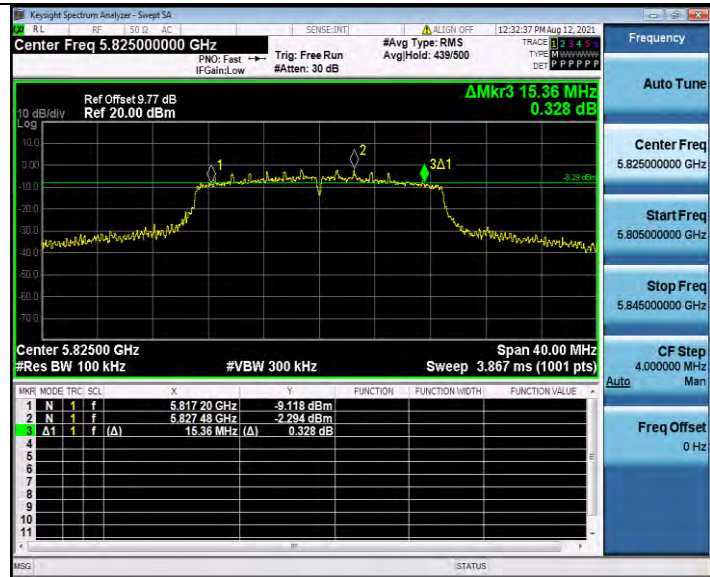
CH149



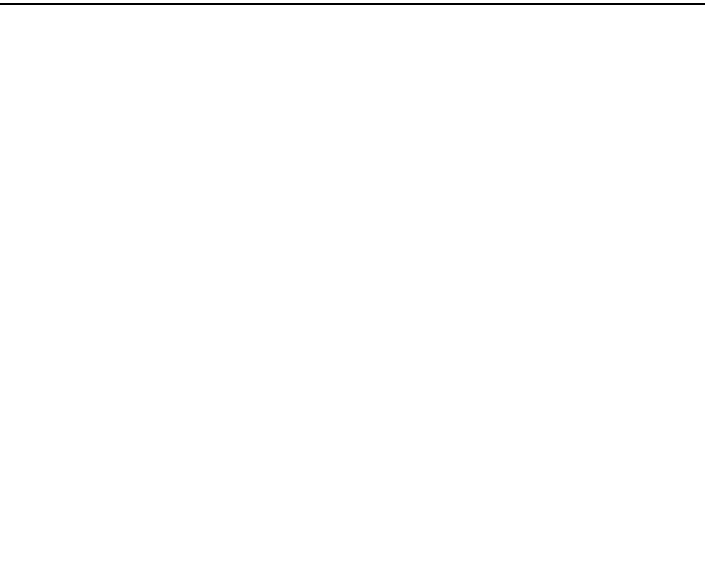
CH151



CH157

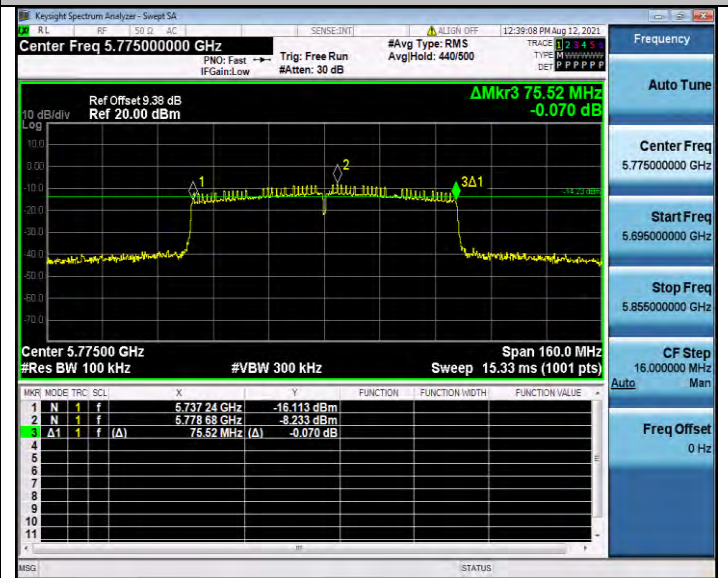


CH159



CH165

802.11ac80

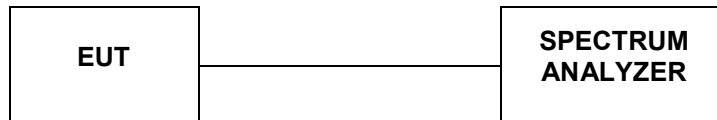


CH155

CH159

4.7. 26dBc Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General U-NII Test Procedures New Rules v02r01 for one of the following procedures may be used for Emission Bandwidth (EBW) measurement:

- Set RBW = 220 kHz/430 kHz /820 kHz (approximately 1% of the emission bandwidth).
- Set the video bandwidth (VBW) = 3* RBW
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize
- Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

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

LIMIT

No Limits for 26dBc Bandwidth

TEST RESULTS

Temperature	23.6°C	Humidity	55.7%
Test Engineer	Oliver Ou	Configurations	IEEE 802.11a/n/ac

Antenna 0:

Type	Channel	99%Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	36	17.219	19.680	-	Pass
	40	17.174	28.880		
	48	17.236	26.440		
802.11nHT20	36	18.070	28.800	-	Pass
	40	17.999	26.520		
	48	18.093	27.400		
802.11n40	38	36.535	53.360	-	Pass
	46	36.448	44.000		
802.11ac20	36	18.027	27.440	-	Pass
	40	18.000	27.640		
	48	18.048	30.080		
802.11ac40	38	36.632	39.760	-	Pass
	46	36.409	46.560		
802.11ac80	42	75.746	113.280	-	Pass

Antenna 1:

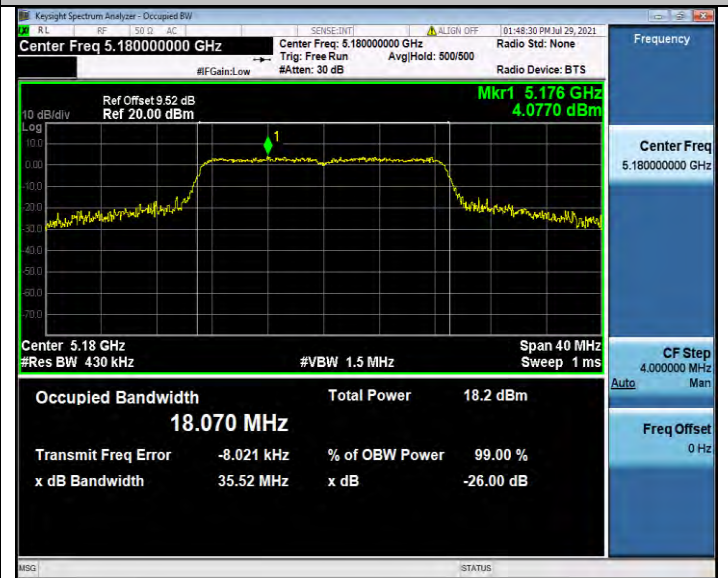
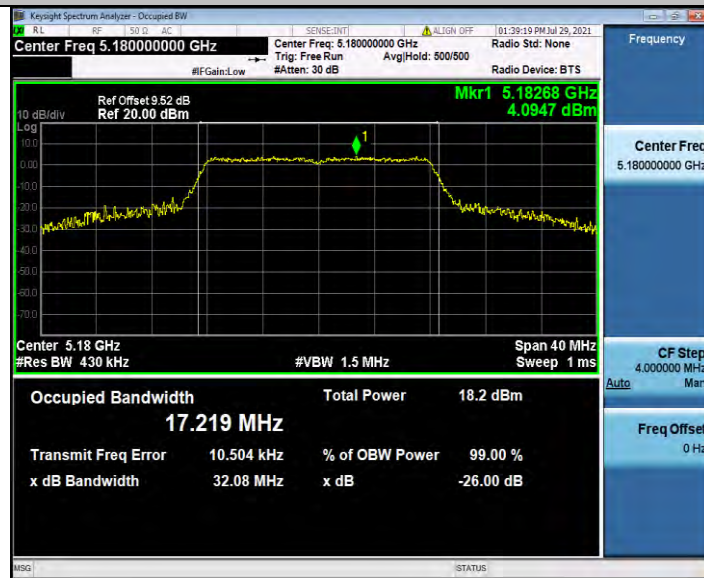
Type	Channel	99%Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	36	17.024	19.840	-	Pass
	40	16.927	19.800		
	48	16.971	19.880		
802.11nHT20	36	17.930	20.240	-	Pass
	40	17.856	20.240		
	48	17.853	20.280		
802.11n40	38	36.415	40.560	-	Pass
	46	36.385	40.320		
802.11ac20	36	17.956	20.200	-	Pass
	40	17.858	20.000		
	48	17.897	20.240		
802.11ac40	38	36.306	40.240	-	Pass
	46	36.214	40.480		
802.11ac80	42	75.196	80.960	-	Pass

Antenna 0:

99%Bandwidth

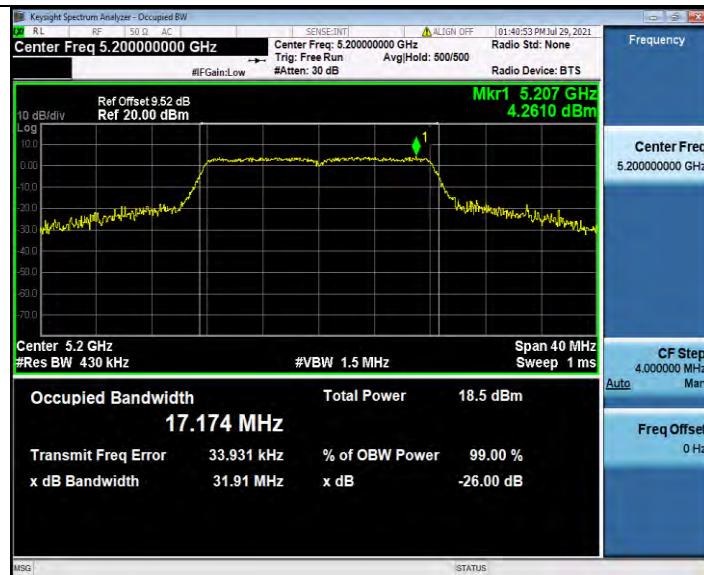
802.11a

802.11n HT20



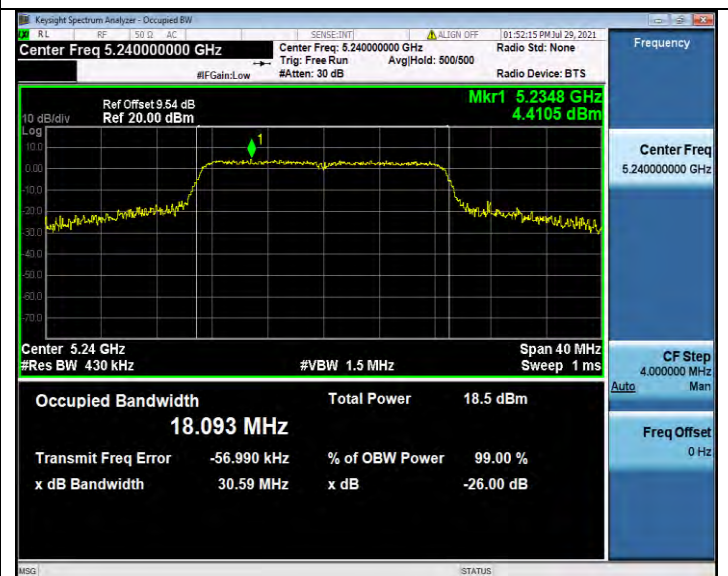
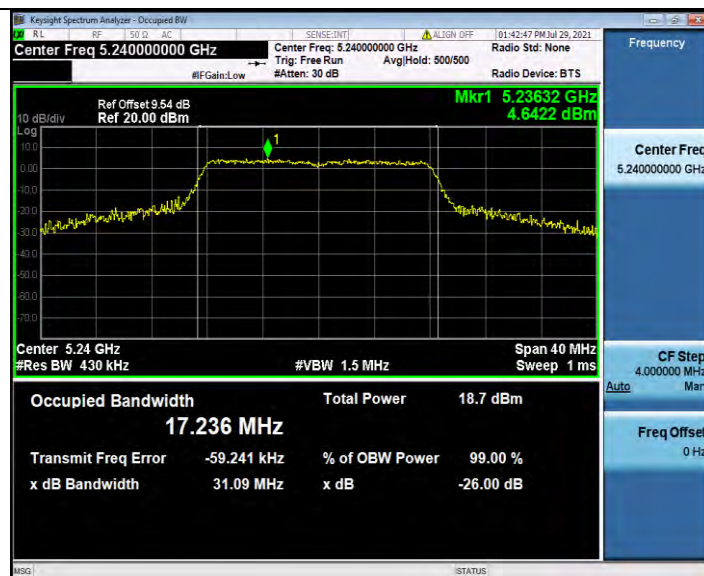
CH36

CH36



CH40

CH40

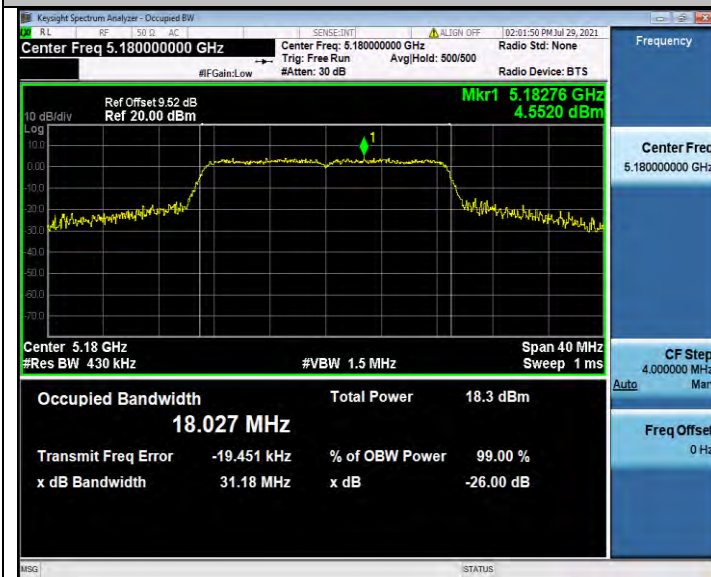


CH48

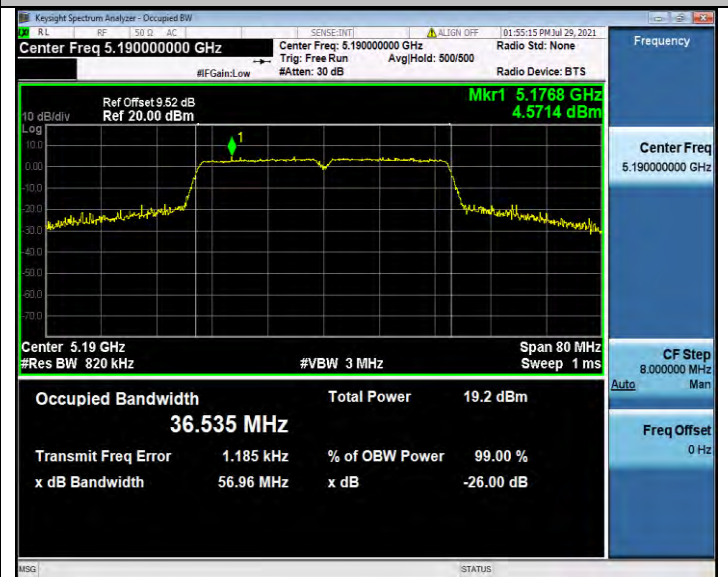
CH48

99%Bandwidth

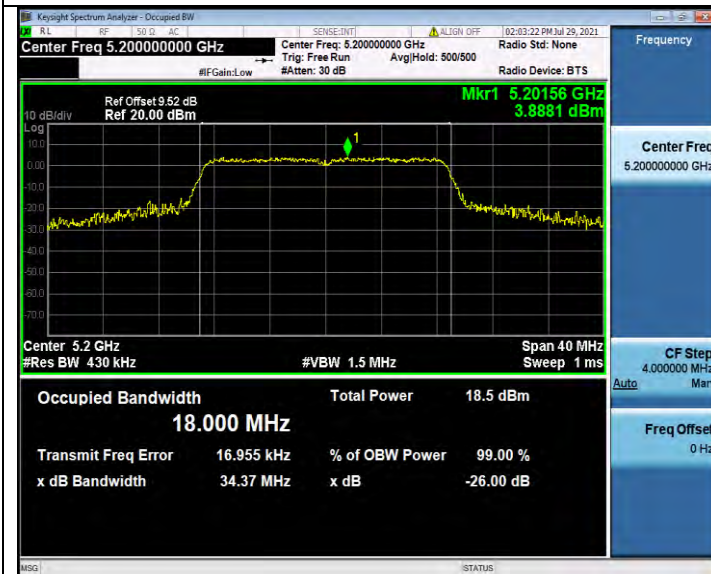
802.11ac20



802.11n HT40



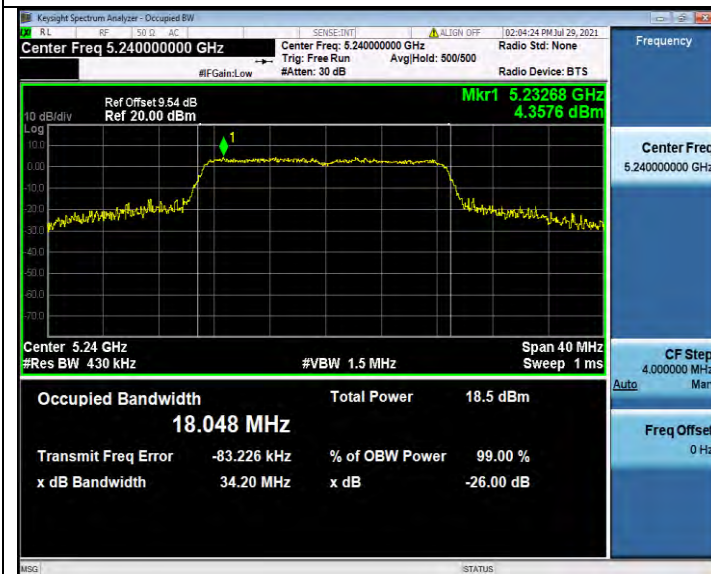
CH36



CH38



CH40



CH46



CH48

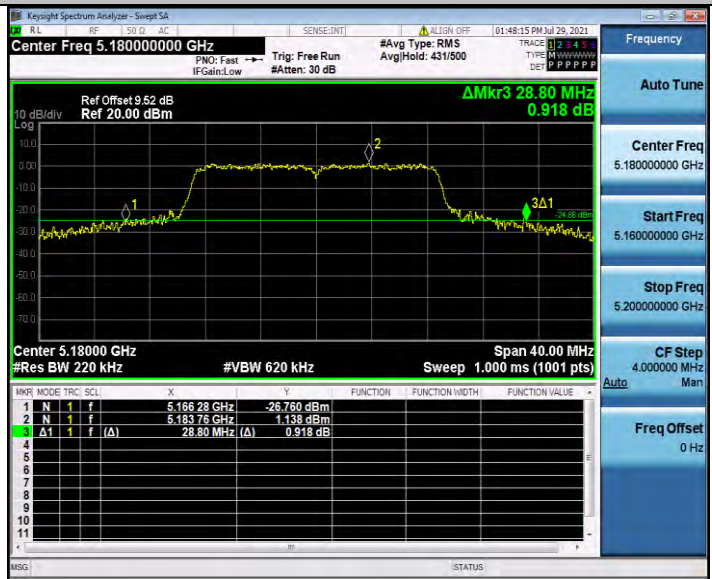


26dB Bandwidth

802.11a



802.11n HT20



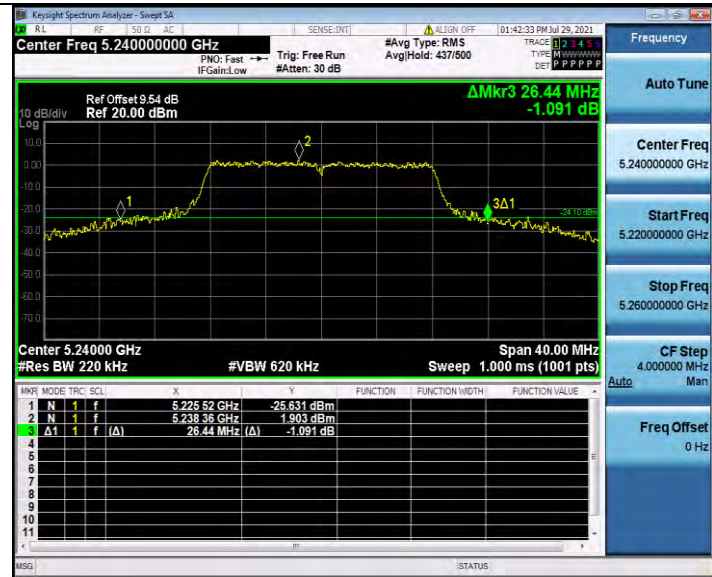
CH36



CH36



CH40



CH40



CH48

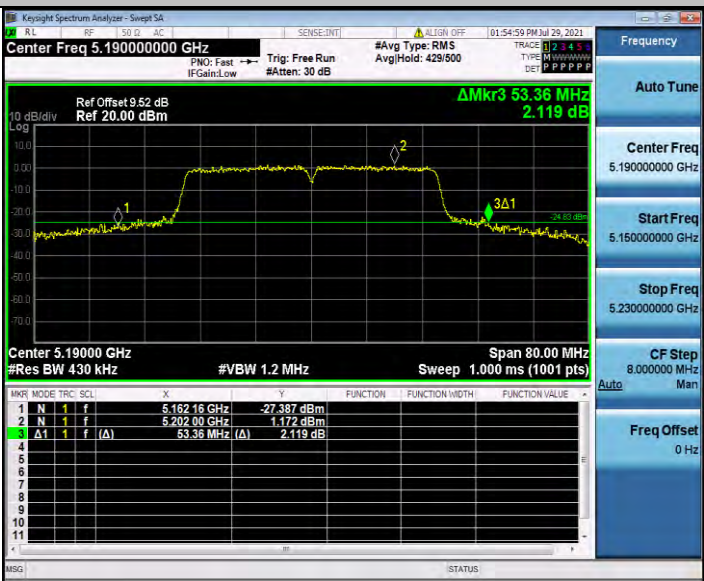
CH48

26dB Bandwidth

802.11ac20



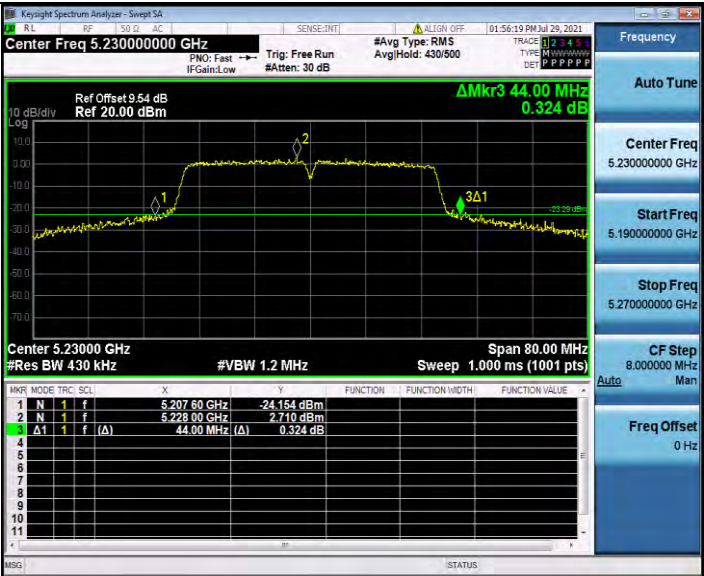
802.11n HT40



CH36



CH38



CH40

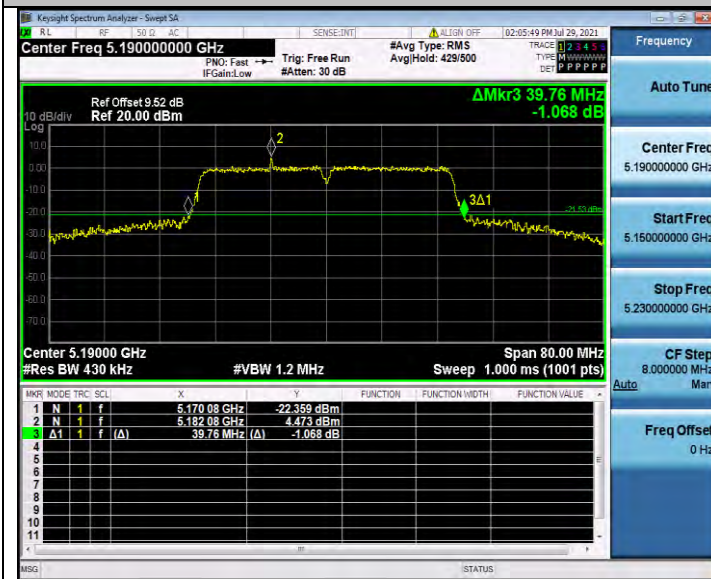


CH46



CH48

802.11ac40



Keysight Spectrums Analyzer - Sweep SA

50.00 MHz

Center Freq 5.210000000 GHz

PN0: Fast IF Gain Low

Trig: Free Run #Atten: 30 dB

#Avg Type: RMS Avg/Hold: 427/500

ALIGN OFF

02:09:09 PM Jul 29, 2021

TRACE 0 2 4 8

TYPE M W W W W W W W

DET P P P P P P P

Frequency

Auto Tune

Center Freq 5.210000000 GHz

Start Freq 5.130000000 GHz

Stop Freq 5.290000000 GHz

CF Step 16.000000 MHz

Auto Man

Ref Offset 9.52 dB

Ref 20.00 dBm

ΔMkr3 113.28 MHz -3.420 dB

3Δ1 -25.00 dBm

Center 5.210000 GHz

#Res BW 820 kHz

#VBW 2.7 MHz

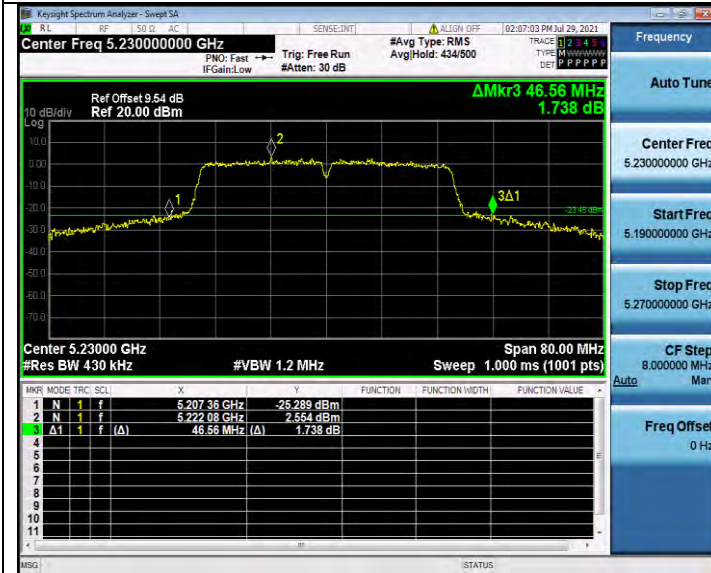
Span 160.0 MHz

Sweep 1.000 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.150 32 GHz	-25.145 dBm			
2	N	1	f	5.226 84 GHz	0.985 dBm			
3	Δ1	1	f (Δ)	113.28 MHz	-3.420 dB			

MSG STATUS

CH42



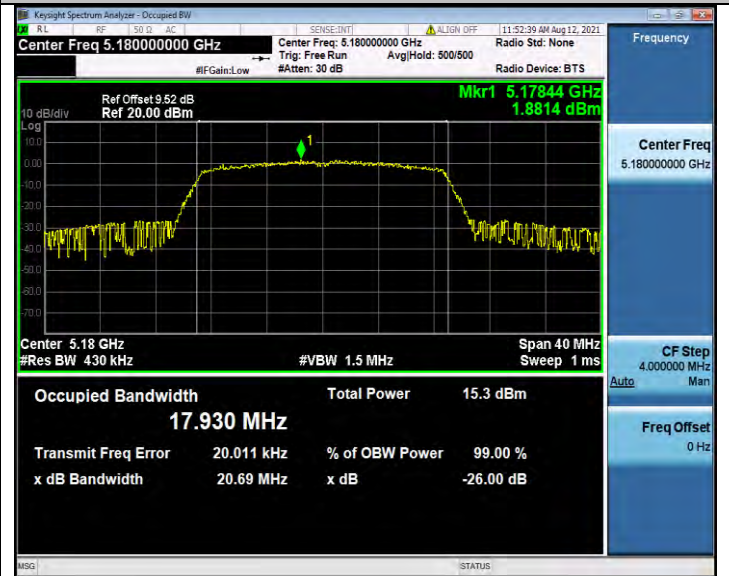
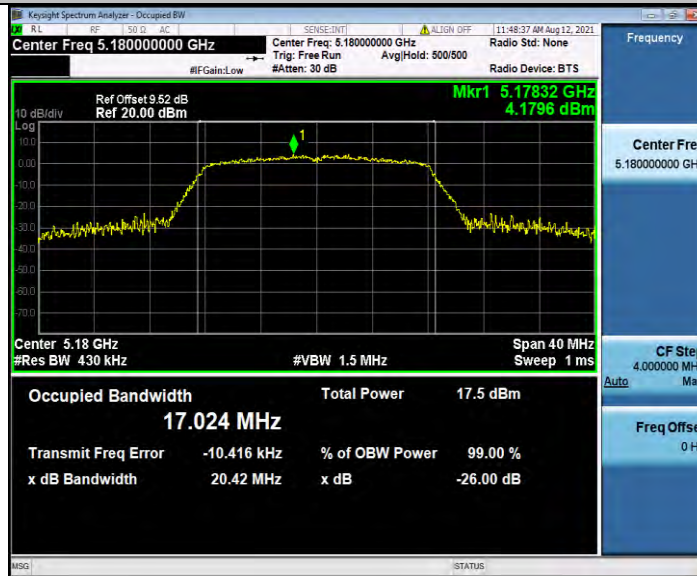
CH46

Antenna 1:

99%Bandwidth

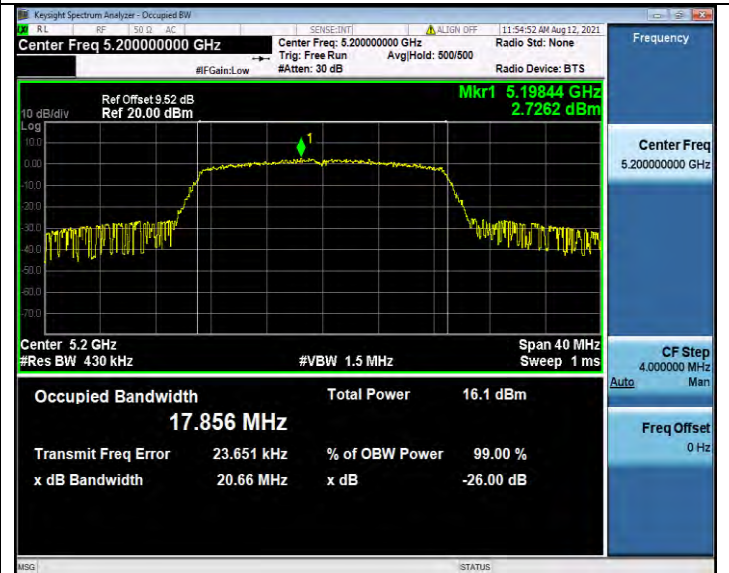
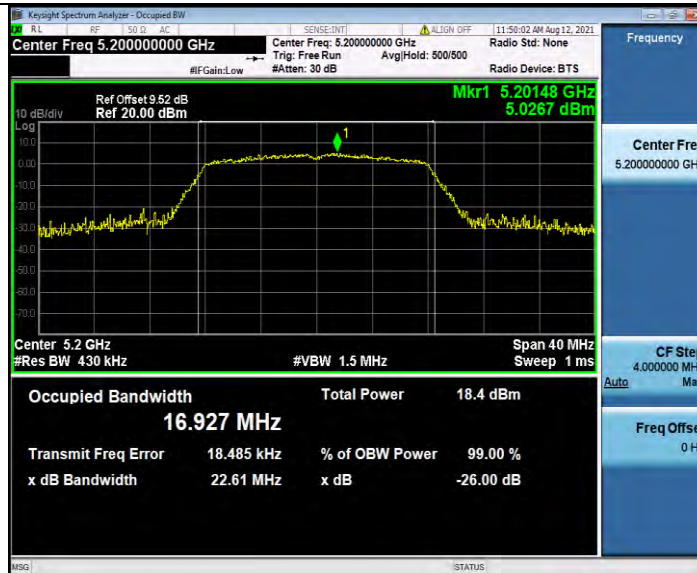
802.11a

802.11n HT20



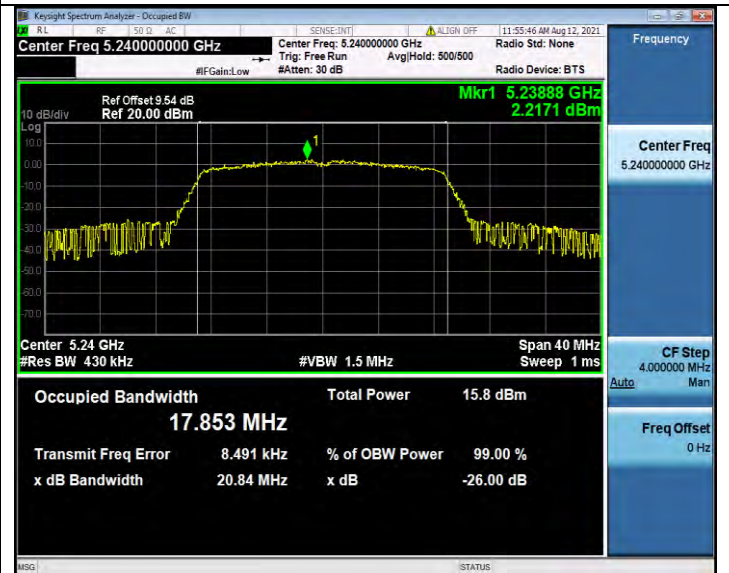
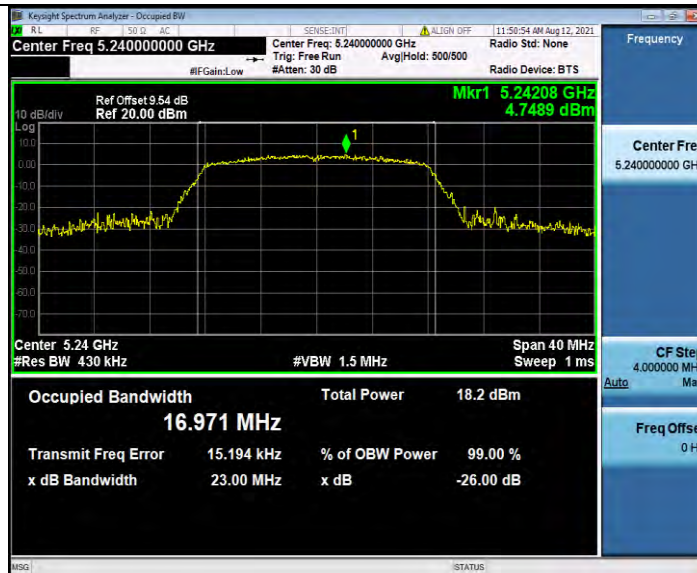
CH36

CH36



CH40

CH40

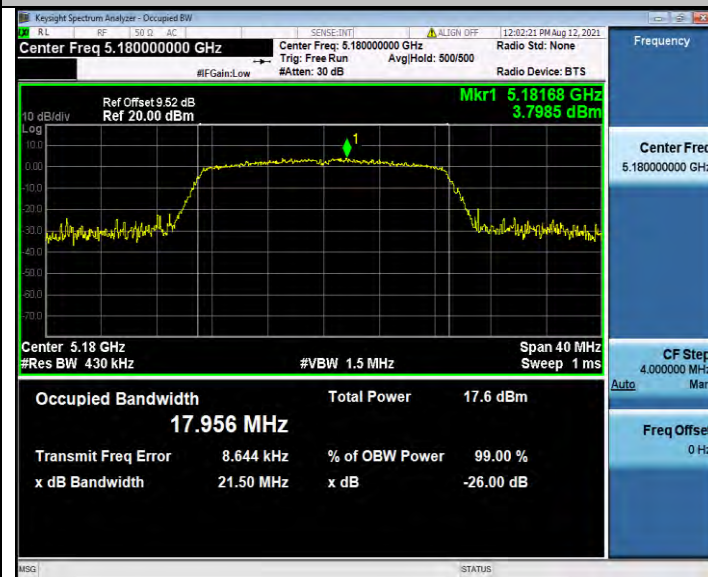


CH48

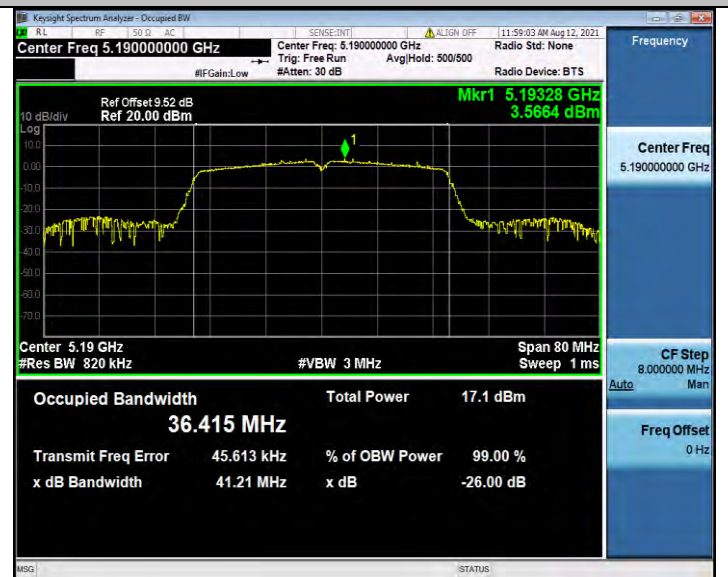
CH48

99%Bandwidth

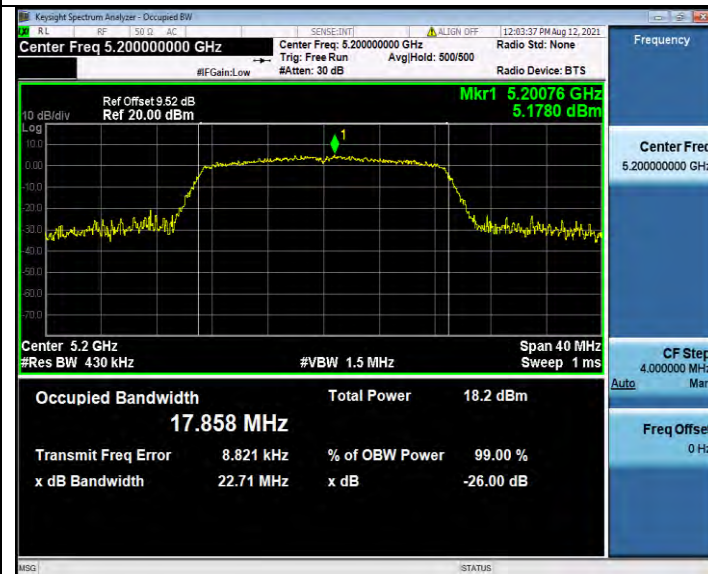
802.11ac20



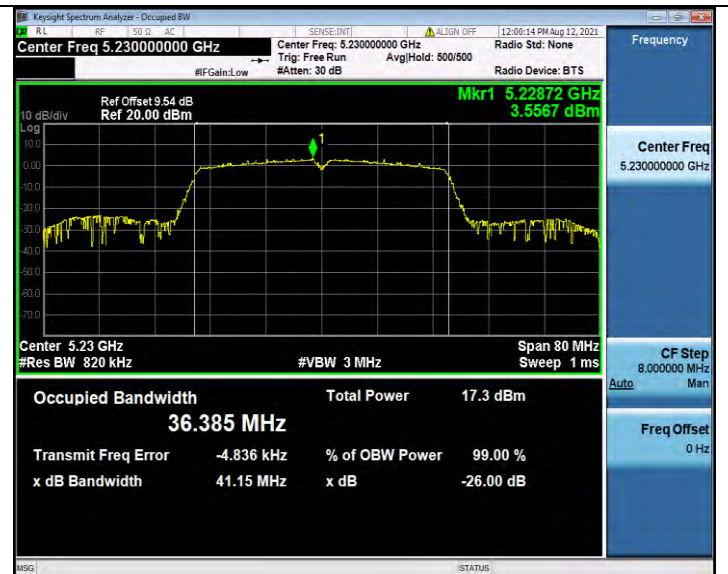
802.11n HT40



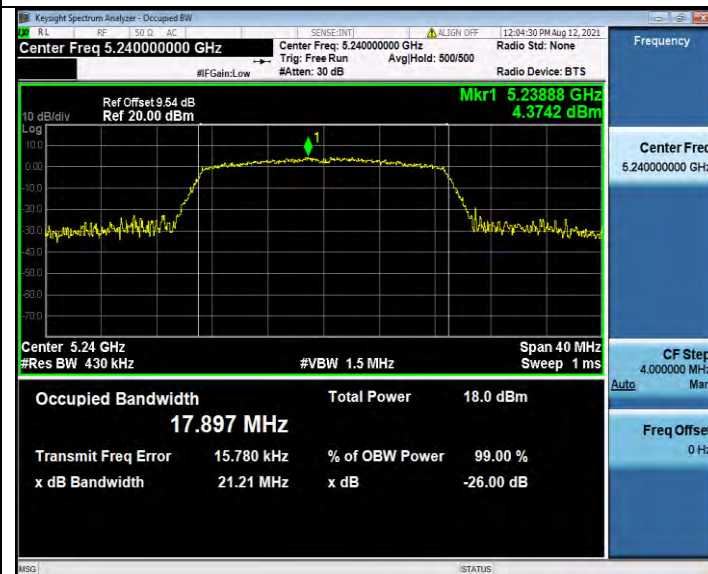
CH36



CH38



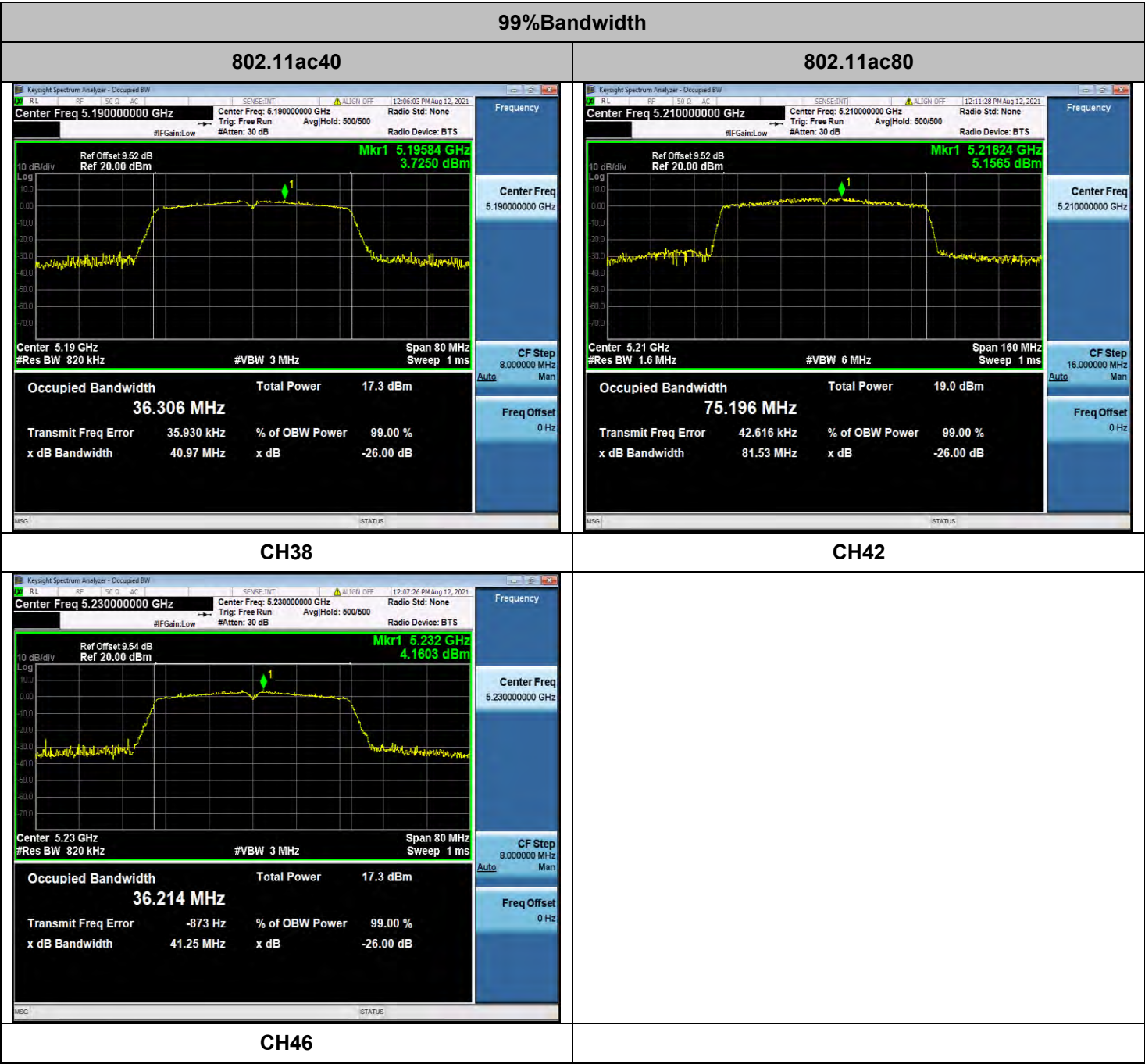
CH40



CH46



CH48



CH46

KeySight Spectrum Analyzer - Occupied BW

Center Freq 5.250000000 GHz

Center Freq: 5.250000000 GHz

Trig: Free Run

Avg/Hold: 500/500

Radio Std: None

Radio Device: BTS

Ref Offset 9.54 dB

Ref 20.00 dBm

Mkr1 5.252 GHz

4.1603 dBm

10 dB/div

Log

Center Freq 5.25 GHz

#Res BW 820 kHz

#VBW 3 MHz

Span 80 MHz

Sweep 1 ms

CF Step 8.000000 MHz

Auto

Man

Frequency

Center Freq 5.25000000 GHz

Occupied Bandwidth 36.214 MHz

Total Power 17.3 dBm

Transmit Freq Error -873 Hz

% of OBW Power 99.00 %

x dB Bandwidth 41.25 MHz

x dB -26.00 dB

MSO

STATUS

26dB Bandwidth

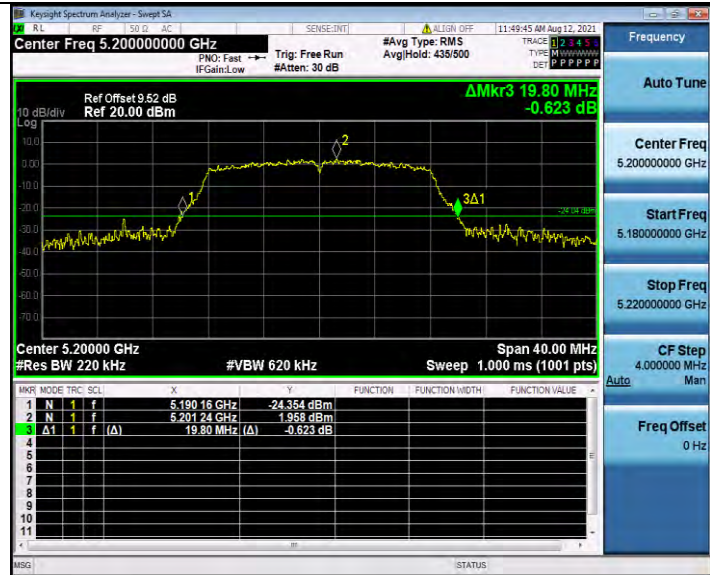
802.11a



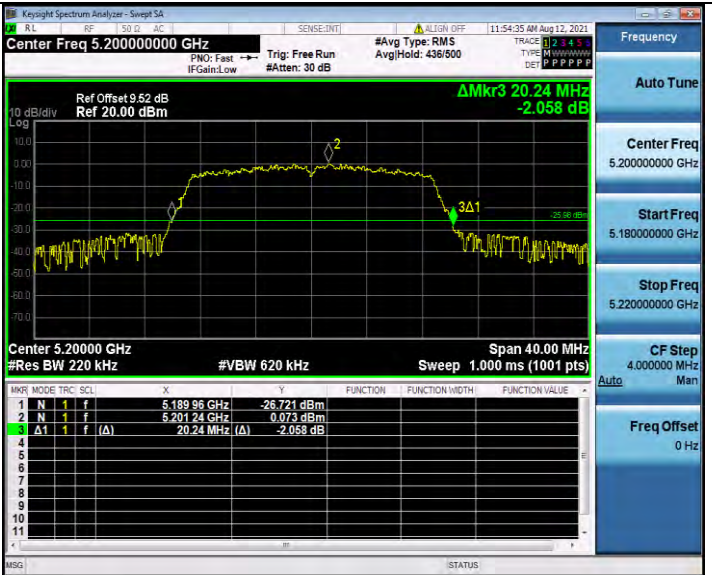
802.11n HT20



CH36



CH36



CH40



CH40



CH48

CH48



CH40

Keysight Spectrum Analyzer - Swept SA

Center Freq 5.240000000 GHz

Ref Offset 9.54 dB
Ref 20.00 dBm

ΔMkr3 20.24 MHz
-0.307 dB

10 dB/div
Log

Center 5.24000 GHz

#Res BW 220 kHz

#VBW 620 kHz

Span 40.00 MHz

Sweep 1.000 ms (1001 pts)

1 N 1 f 5.229 92 GHz -24.796 dBm

2 N 1 f 5.238 40 GHz 1.703 dBm

Δ1 1 f (Δ) 20.24 MHz (Δ) -0.307 dB

4

5

6

7

8

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10

11

MSG

STATUS

Frequency

Auto Tune

Center Freq
5.240000000 GHz

Start Freq
5.220000000 GHz

Stop Freq
5.260000000 GHz

CF Step
4.000000 MHz
Man

Freq Offset
0 Hz

CH46

Keysight Spectrum Analyzer - Swept SA

Center Freq 5.240000000 GHz

Ref Offset 9.54 dB
Ref 20.00 dBm

ΔMkr3 20.24 MHz
-0.307 dB

10 dB/div
Log

Center 5.24000 GHz

#Res BW 220 kHz

#VBW 620 kHz

Span 40.00 MHz

Sweep 1.000 ms (1001 pts)

1 N 1 f 5.229 92 GHz -24.796 dBm

2 N 1 f 5.238 40 GHz 1.703 dBm

Δ1 1 f (Δ) 20.24 MHz (Δ) -0.307 dB

4

5

6

7

8

9

10

11

MSG

STATUS

Frequency

Auto Tune

Center Freq
5.240000000 GHz

Start Freq
5.220000000 GHz

Stop Freq
5.260000000 GHz

CF Step
4.000000 MHz
Man

Freq Offset
0 Hz

CH48

Keysight Spectrum Analyzer - Swept SA

Center Freq 5.240000000 GHz

Ref Offset 9.54 dB
Ref 20.00 dBm

ΔMkr3 20.24 MHz
-0.307 dB

10 dB/div
Log

Center 5.24000 GHz

#Res BW 220 kHz

#VBW 620 kHz

Span 40.00 MHz

Sweep 1.000 ms (1001 pts)

1 N 1 f 5.229 92 GHz -24.796 dBm

2 N 1 f 5.238 40 GHz 1.703 dBm

Δ1 1 f (Δ) 20.24 MHz (Δ) -0.307 dB

4

5

6

7

8

9

10

11

MSG

STATUS

Frequency

Auto Tune

Center Freq
5.240000000 GHz

Start Freq
5.220000000 GHz

Stop Freq
5.260000000 GHz

CF Step
4.000000 MHz
Man

Freq Offset
0 Hz

