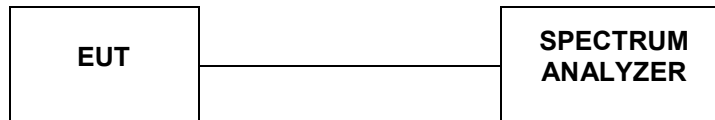


4.6. 6dB Bandwidth

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:

- a. Set RBW = 100 kHz.
- b. Set the video bandwidth (VBW) $\geq 3 \times$ 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.

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	16.400	>500	Pass
	157	16.400		
	165	16.360		
802.11nHT20	149	17.640	>500	Pass
	157	17.680		
	165	17.640		
802.11n40	151	36.160	>500	Pass
	159	36.400		
802.11ac20	149	17.600	>500	Pass
	157	17.640		
	165	17.400		
802.11ac40	151	36.400	>500	Pass
	159	36.400		
802.11ac80	155	75.680	>500	Pass

Antenna 1:

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	149	16.400	>500	Pass
	157	16.400		
	165	16.360		
802.11nHT20	149	17.640	>500	Pass
	157	17.640		
	165	17.600		
802.11n40	151	36.480	>500	Pass
	159	36.480		
802.11ac20	149	17.640	>500	Pass
	157	17.640		
	165	17.640		
802.11ac40	151	36.320	>500	Pass
	159	36.480		
802.11ac80	155	75.520	>500	Pass

Antenna 0:

6dB Bandwidth

802.11a

802.11n HT20



CH149

CH149



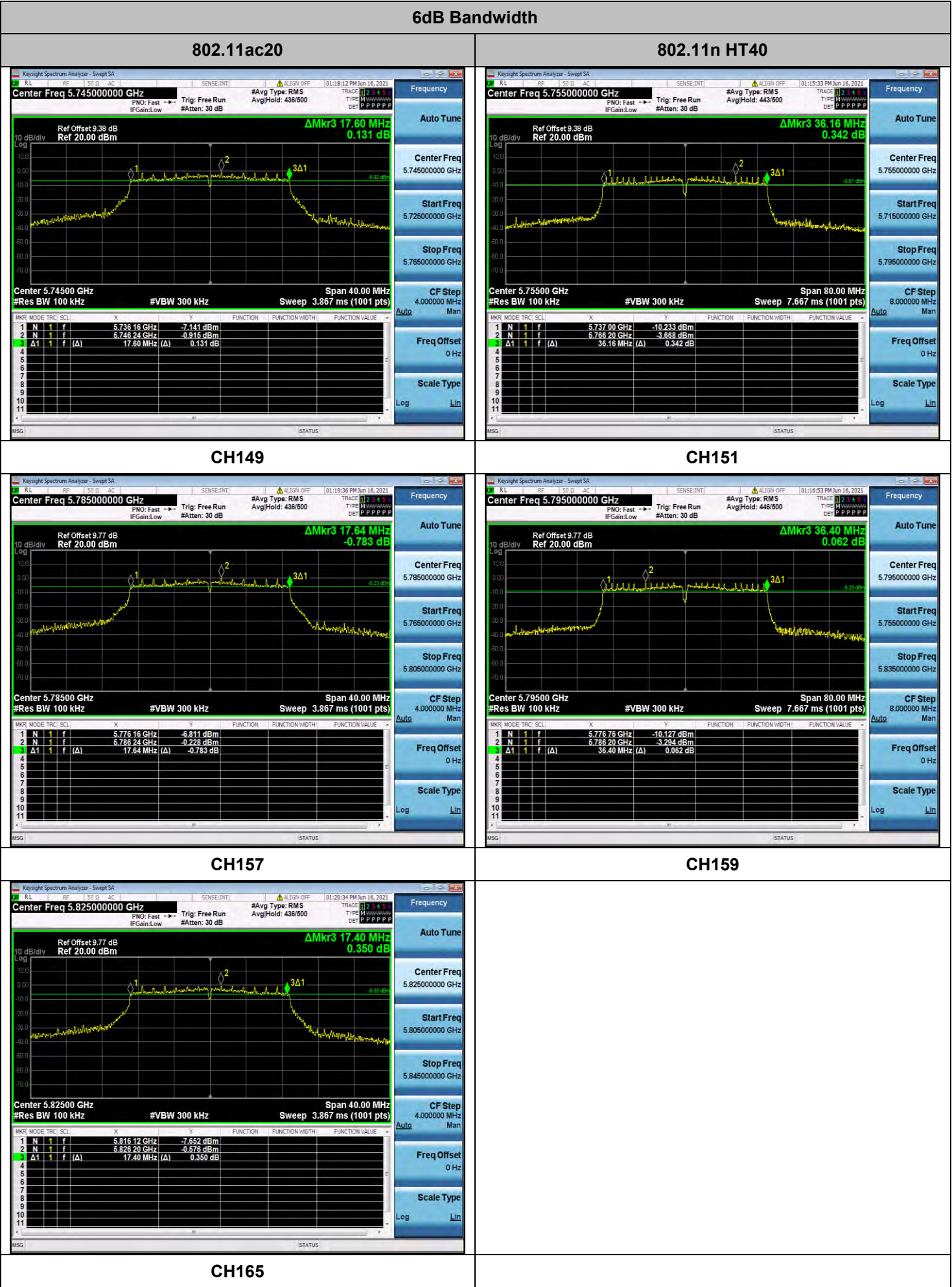
CH157

CH157



CH165

CH165





Antenna 1:

6dB Bandwidth

802.11a

802.11n HT20



CH149

CH149



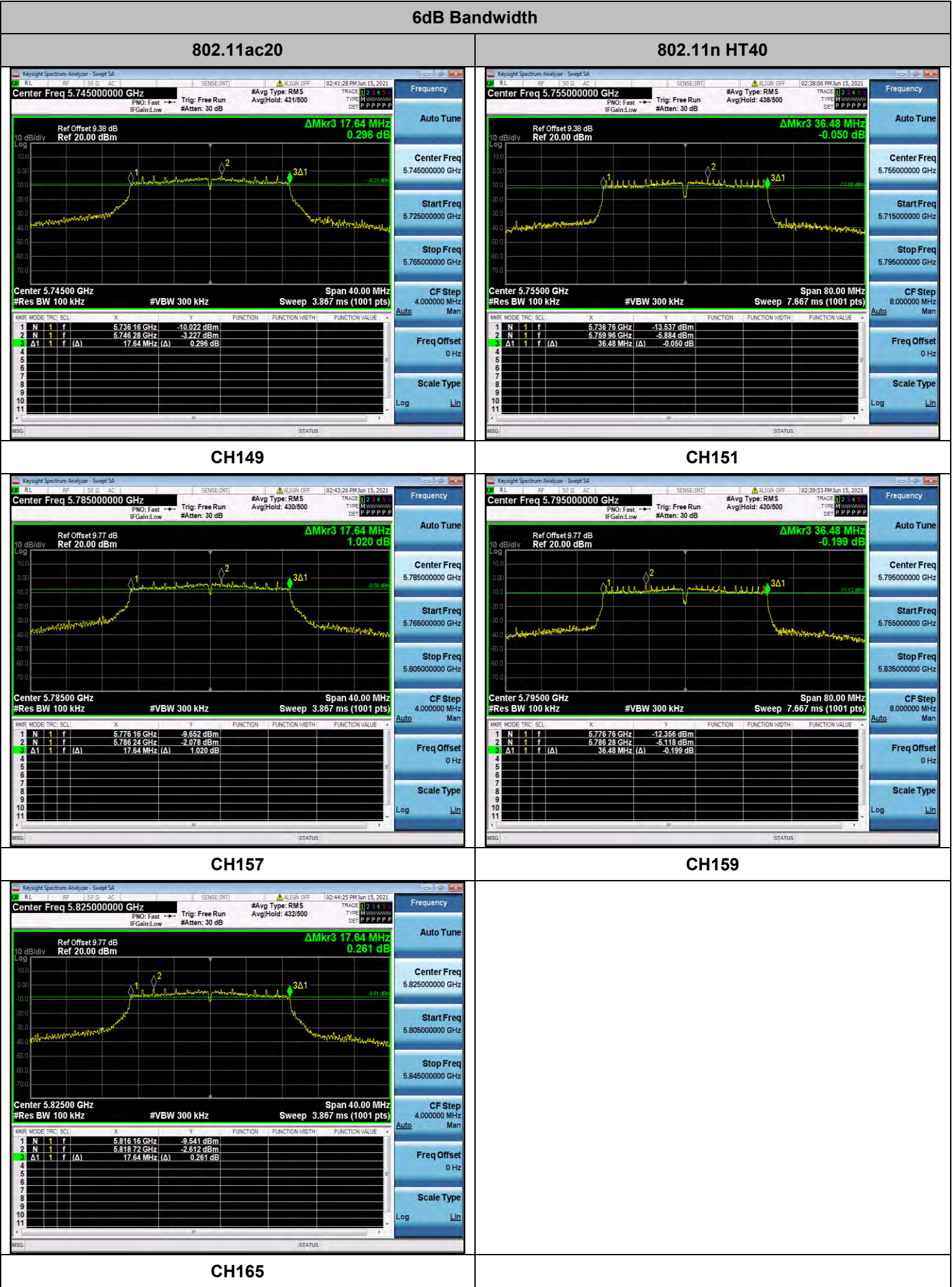
CH157

CH157



CH165

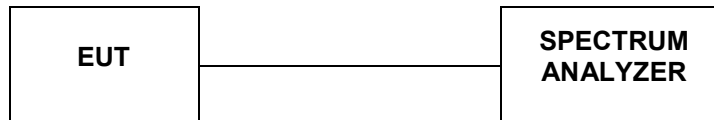
CH165





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	17.343	21.320	-	Pass
	40	17.299	21.360		
	48	17.362	21.280		
802.11nHT20	36	18.511	23.960	-	Pass
	40	18.449	21.520		
	48	18.554	24.000		
802.11n40	38	36.679	44.800	-	Pass
	46	36.632	39.920		
802.11ac20	36	18.395	21.600	-	Pass
	40	18.358	21.360		
	48	18.477	21.520		
802.11ac40	38	36.571	40.320	-	Pass
	46	36.573	40.240		
802.11ac80	42	75.647	87.520	-	Pass

Antenna 1:

Type	Channel	99%Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	36	17.293	21.240	-	Pass
	40	17.274	21.240		
	48	17.317	21.200		
802.11nHT20	36	18.478	21.840	-	Pass
	40	18.356	21.840		
	48	18.425	21.320		
802.11n40	38	36.679	39.920	-	Pass
	46	36.693	40.320		
802.11ac20	36	18.331	21.480	-	Pass
	40	18.398	21.400		
	48	18.388	21.720		
802.11ac40	38	36.674	40.960	-	Pass
	46	36.648	40.320		
802.11ac80	42	75.708	81.920	-	Pass

Antenna 0:

99%Bandwidth

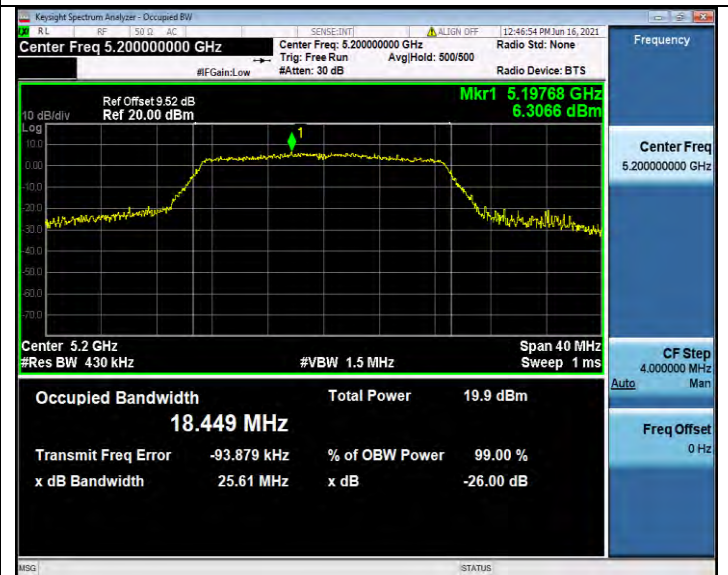
802.11a

802.11n HT20



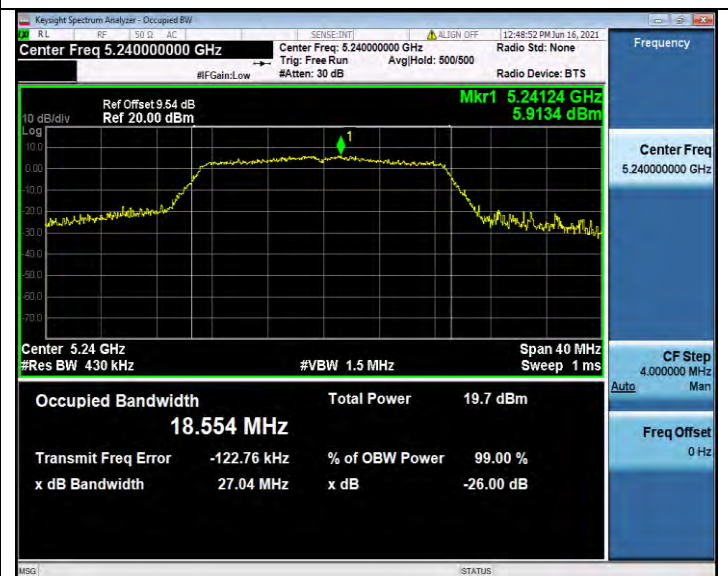
CH36

CH36



CH40

CH40

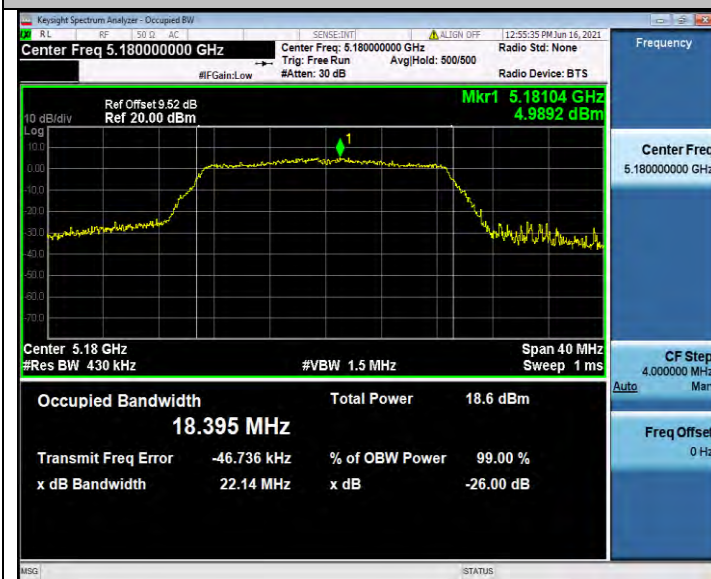


CH48

CH48

99%Bandwidth

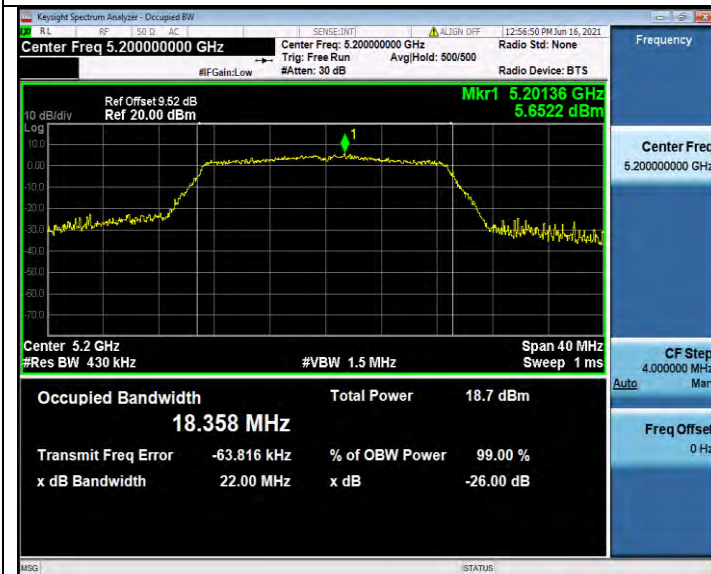
802.11ac20



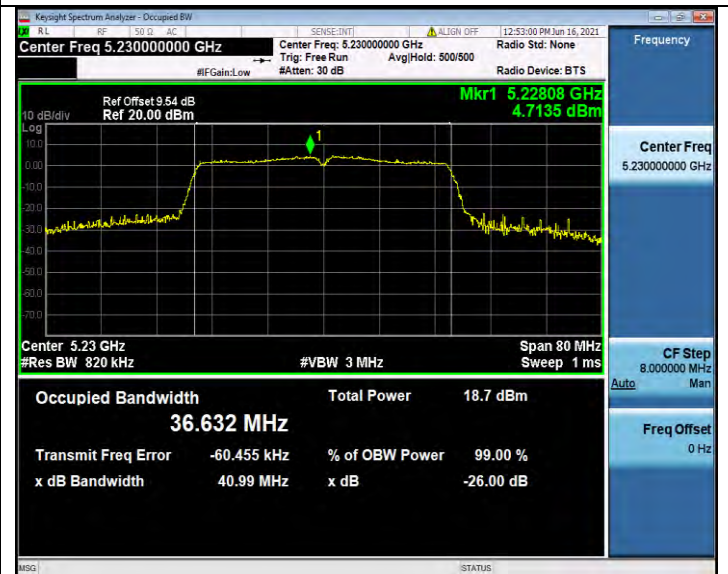
802.11n HT40



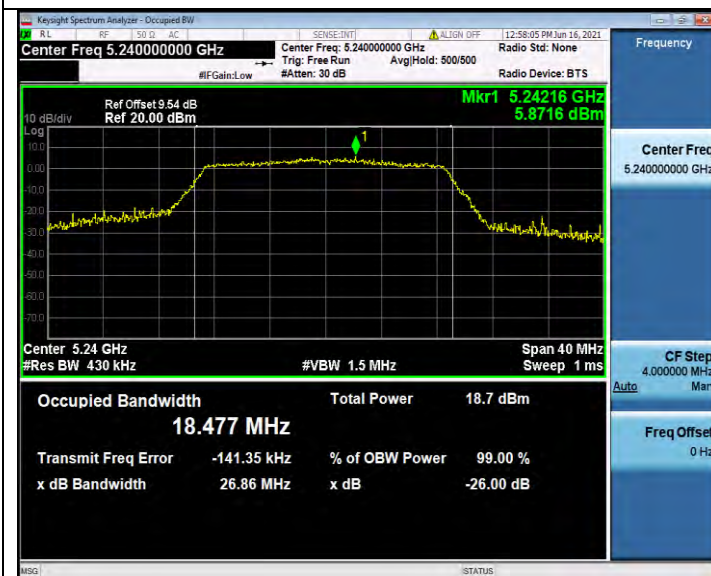
CH36



CH38



CH40



CH46



CH48



CH46

KeySight Spectrum Analyzer - Occupied BW

Center Freq 5.260000000 GHz

Center Freq: 5.260000000 GHz

Trig: Free Run

Avg/Hold: 500/500

Radio Std: None

Radio Device: BTS

Frequency

10 dB/div

Ref Offset 9.54 dB

Ref 20.00 dBm

Mkr1 5.25784 GHz

5.4132 dBm

Center Freq 5.260000000 GHz

Center 5.26 GHz

#Res BW 820 kHz

#VBW 3 MHz

Span 80 MHz

Sweep 1 ms

CF Step 8.0000000 MHz

Auto

Man

Frequency Offset 0 Hz

Occupied Bandwidth 36.573 MHz

Total Power 18.8 dBm

Transmit Freq Error -89.427 kHz

% of OBW Power 99.00 %

x dB Bandwidth 42.84 MHz

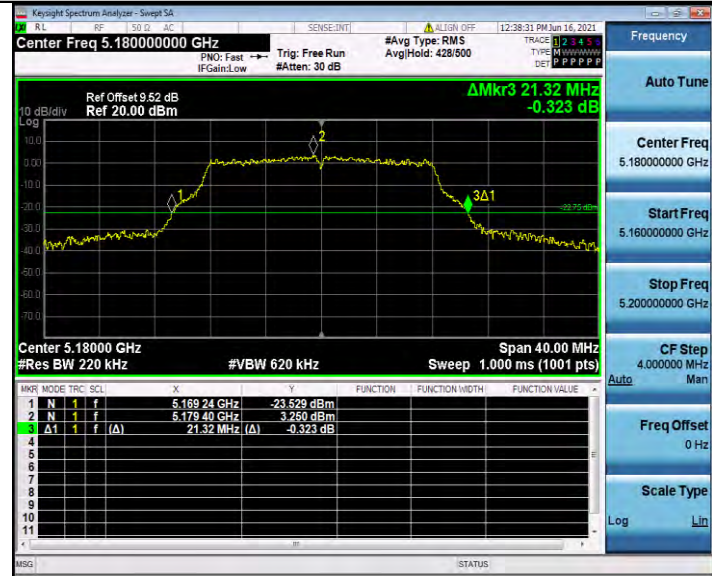
x dB -26.00 dB

MSG

STATUS

26dB Bandwidth

802.11a



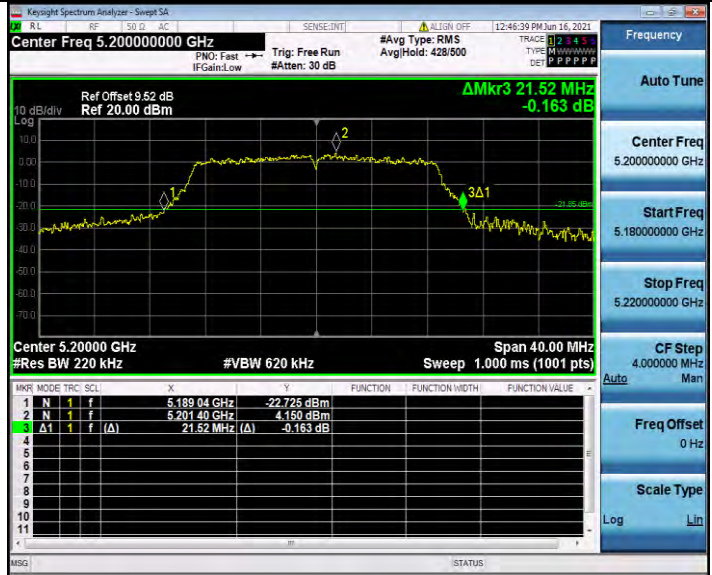
802.11n HT20



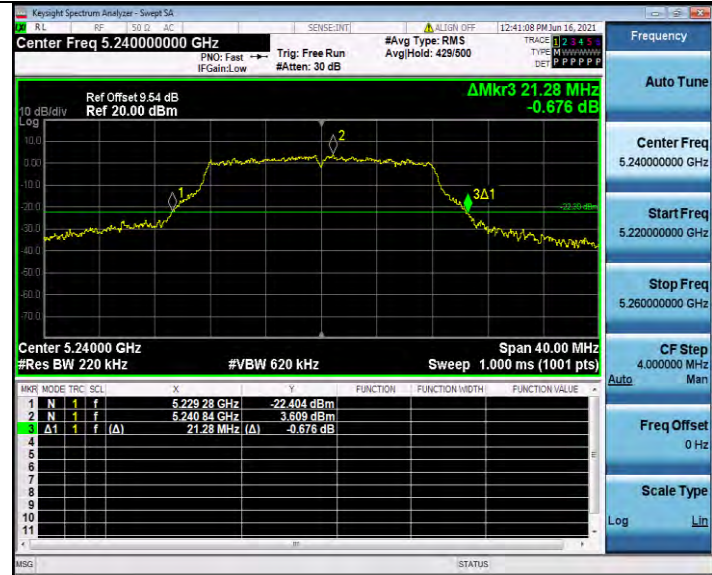
CH36



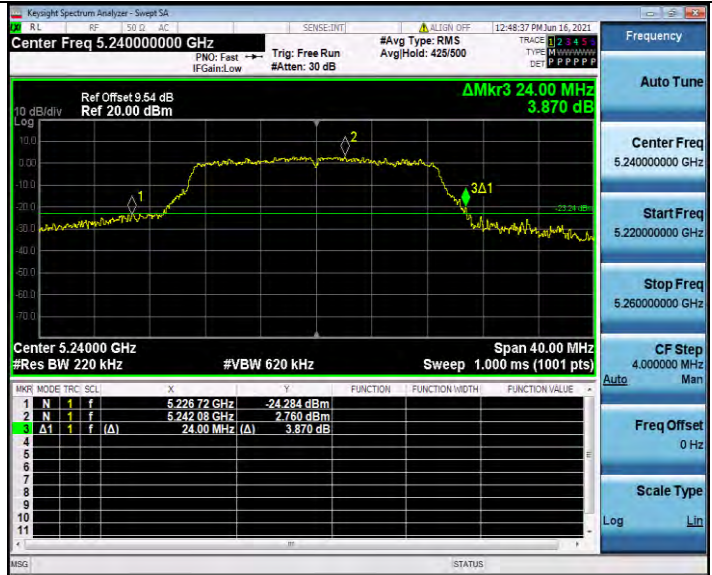
CH36



CH40



CH40



CH48

CH48

26dB Bandwidth

802.11ac20



802.11n HT40



CH36



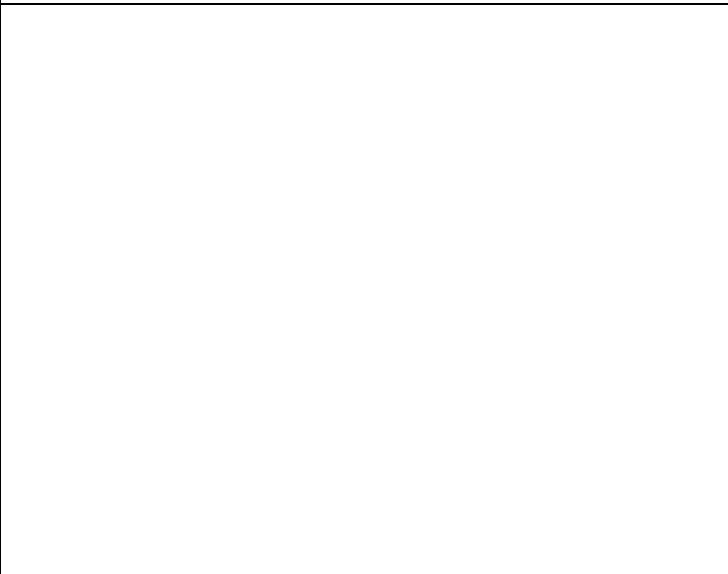
CH38



CH40



CH46



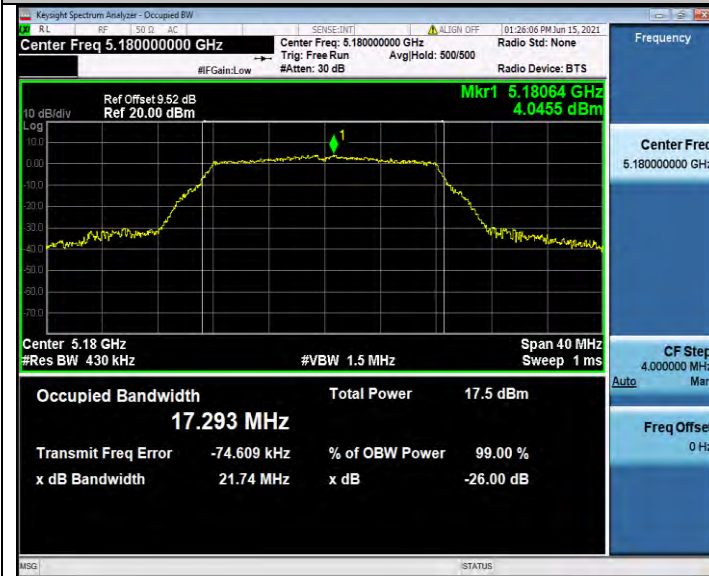
CH48



Antenna 1:

99%Bandwidth

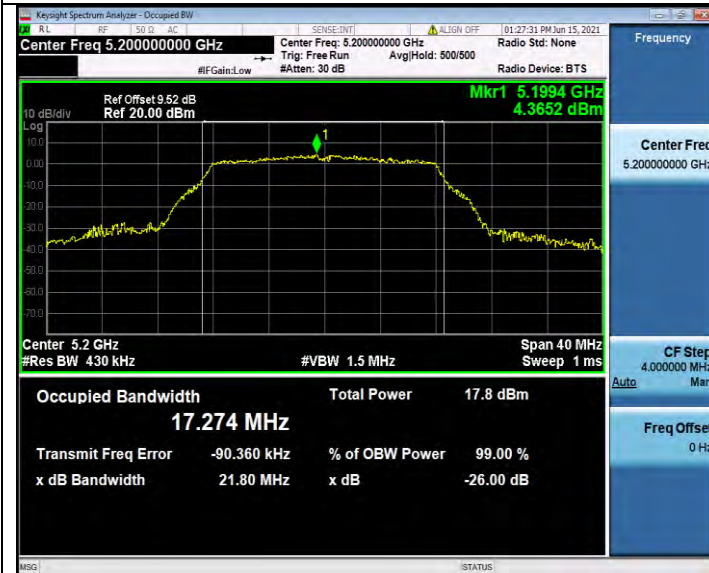
802.11a



802.11n HT20



CH36



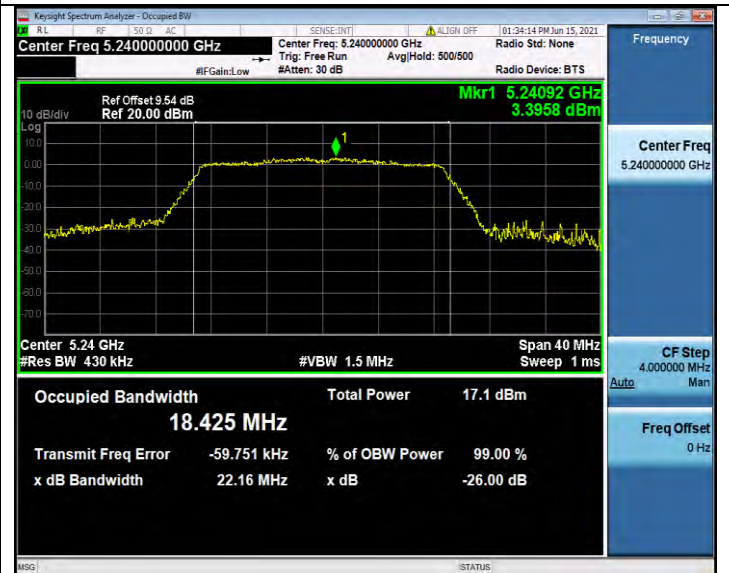
CH36



CH40



CH40

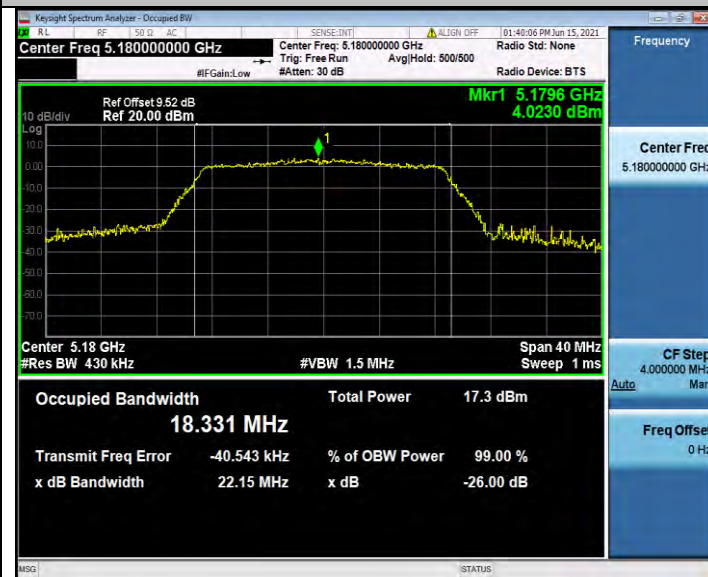


CH48

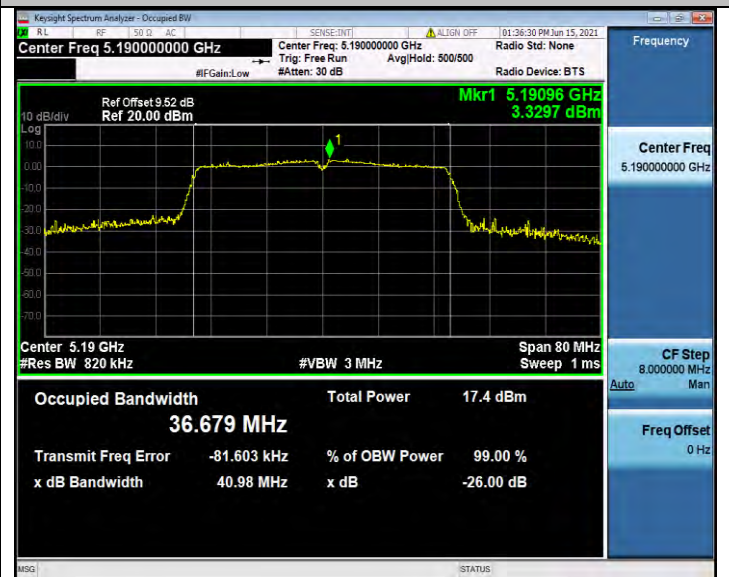
CH48

99%Bandwidth

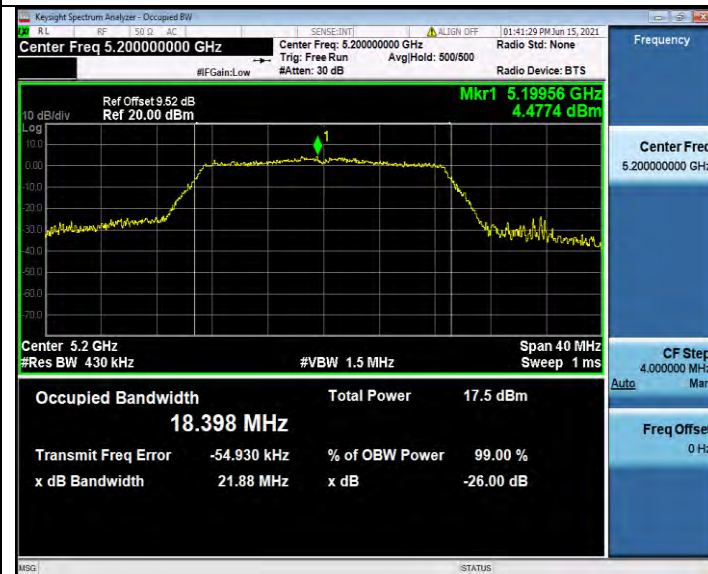
802.11ac20



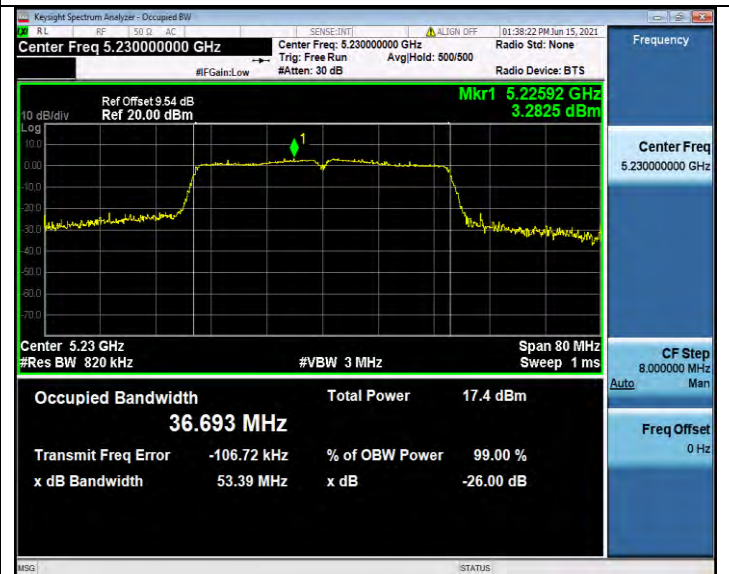
802.11n HT40



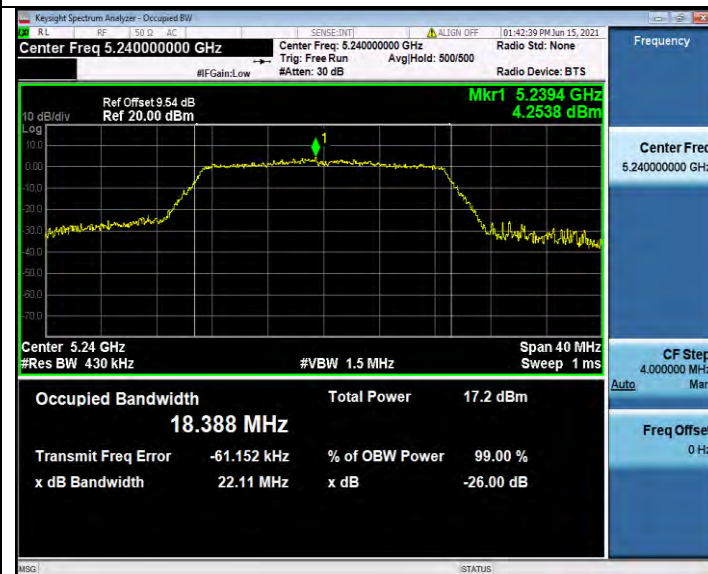
CH36



CH38



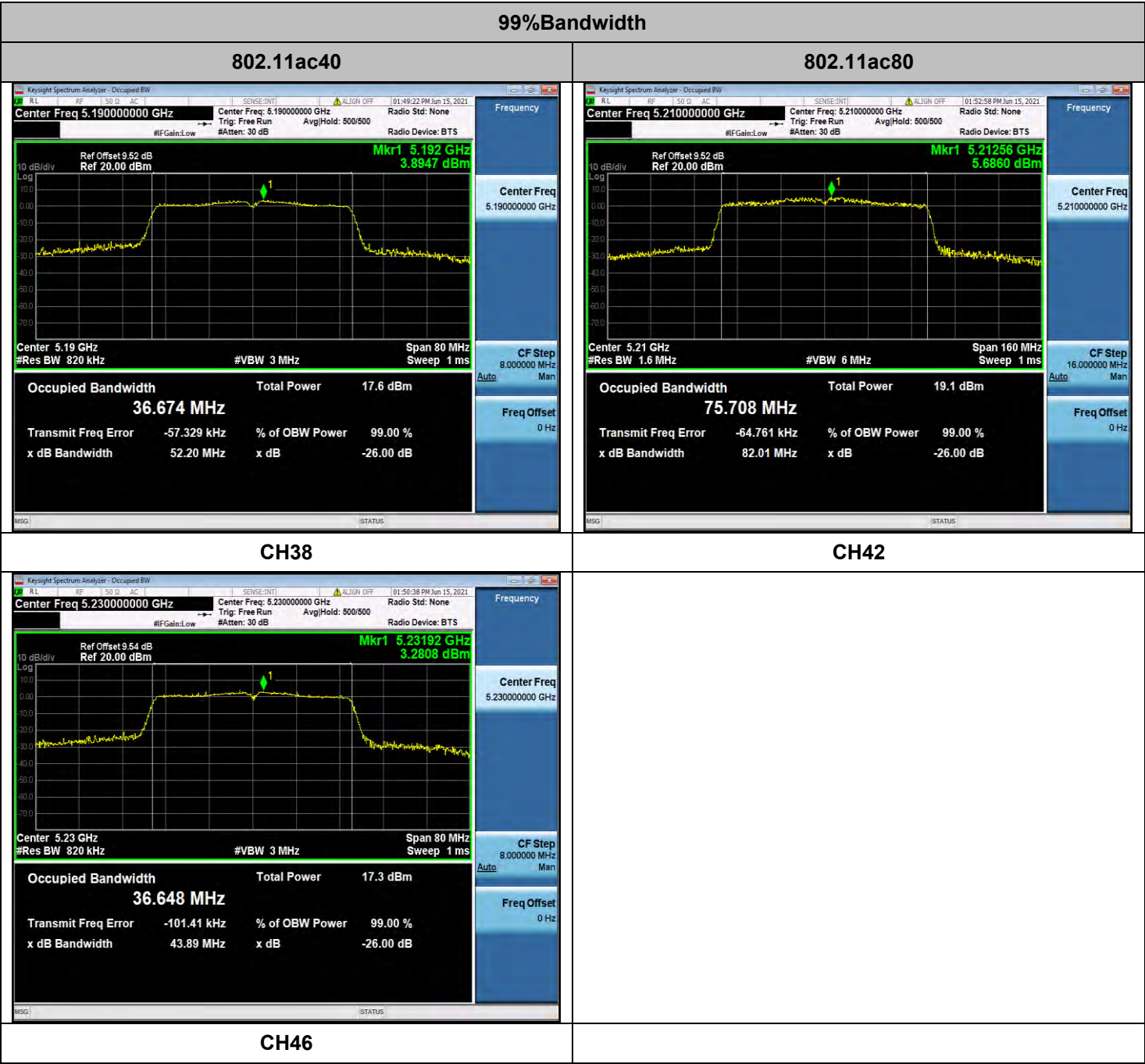
CH40



CH46



CH48



802.11a



The screenshot displays the Keysight Spectrum Analyzer interface. The main display shows a swept spectrum plot with a yellow trace. The x-axis represents frequency, and the y-axis represents power in dBm. A prominent signal is visible at 21.84 MHz, with a peak level of 1.695 dB. The plot is set to a resolution bandwidth (RBW) of 620 kHz and a span of 40.00 MHz. The center frequency is 5.180000000 GHz. The plot is labeled with 'Mkr3 21.84 MHz' and '1.695 dB'. The interface includes various control panels on the right for Frequency, Auto Tune, Center Freq, Start Freq, Stop Freq, CF Step, Freq Offset, and Scale Type. The bottom status bar shows the current frequency (5.180 GHz) and the span (40.00 MHz).

[illegible]

Keysight Spectrum Analyzer - Sweep SA

27 A.L. RF 150.0 AC SENSE: UN

Center Freq 5.200000000 GHz

PMW: Fast → IF Gain: Low

Trig: Free Run

Avg Type: RMS

Avg Hold: 424/500

TYPE: M W W W W W W W W W

DET: P P P P P P P

01:32:58 PM Jun 15, 2021

TRACE: 01:32:58 PM

Frequency

Auto Tune

Center Freq
5.200000000 GHz

Start Freq
5.180000000 GHz

Stop Freq
5.220000000 GHz

CF Step
4.000000 MHz

Man

Freq Offset
0 Hz

Scale Type

Log Lin

Ref Offset 9.52 dB

Ref 20.00 dBm

Δ Mkr3 21.84 MHz

1.422 dB

10 dB/div

Log

Center 5.20000 GHz

#Res BW 220 kHz

#VBW 620 kHz

Span 40.00 MHz

Sweep 1.000 ms (1001 pts)

MARK	MODE	TRC	SC1	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.188 96 GHz	-27.898 dBm			
2	N	1	f	5.197 68 GHz	0.270 dBm			
3	A1	1	f (A)	21.84 MHz (A)	1.422 dB			
4								
5								
6								
7								
8								
9								
10								
11								

MS1

STATUS

Keysight Spectrum Analyzer - Sweep SA

RF: 150.00 MHz

SENSE: INT

RES: OFF

01:28:12 PM Jun 15, 2021

Center Freq 5.240000000 GHz

Trig: Free Run

#Avg Type: RMS

IFGain: Low

#Att: 30 dB

Span: 40.00 MHz

#Res BW 220 kHz

#VBW 620 kHz

Sweep 1.000 ms (1001 pts)

Ref Offset 9.54 dB

Ref 20.00 dBm

ΔMkr3 21.20 MHz

0.064 dB

3Δ1

-25.41 dBm

10 dB/div

Log

Center Freq 5.240000000 GHz

Span 40.00 MHz

#Res BW 220 kHz

#VBW 620 kHz

Sweep 1.000 ms (1001 pts)

ΔMkr3 21.20 MHz

0.064 dB

3Δ1

-25.41 dBm

10 dB/div

Log

MNR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.229 24 GHz	-26.005 dBm			
2	N	1	f	5.239 52 GHz	0.592 dBm			
3	Δ1	1	f (Δ)	21.20 MHz (Δ)	0.064 dB			
4								
5								
6								
7								
8								
9								
10								
11								

Auto

Man

Freq Offset

0 Hz

Scale Type

Log

Lin

STATUS

Keysight Spectrum Analyzer - Sweep SA

Center Freq 5.240000000 GHz

Ref Offset 9.54 dB
Ref 20.00 dBm

ΔMkr3 21.32 MHz
-1.201 dBm

10 dB/div
Log

Center 5.240000000 GHz
Res BW 220 kHz
#VBW 620 kHz

Span 40.000 MHz
Sweep 100 ms (1001 pts)

MNR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.229 32 GHz	-25.635 dBm			
2	N	1	f	5.238 52 GHz	0.458 dBm			
3	Δ1	1	f (Δ)	21.32 MHz (Δ)	-1.201 dB			

Auto

Frequency

Auto Tune

Center Freq
5.240000000 GHz

Start Freq
5.220000000 GHz

Stop Freq
5.260000000 GHz

CF Stop
4.000000000 GHz

Man

Freq Offset
0 Hz

Scale Type
Log

Lin

CH48



