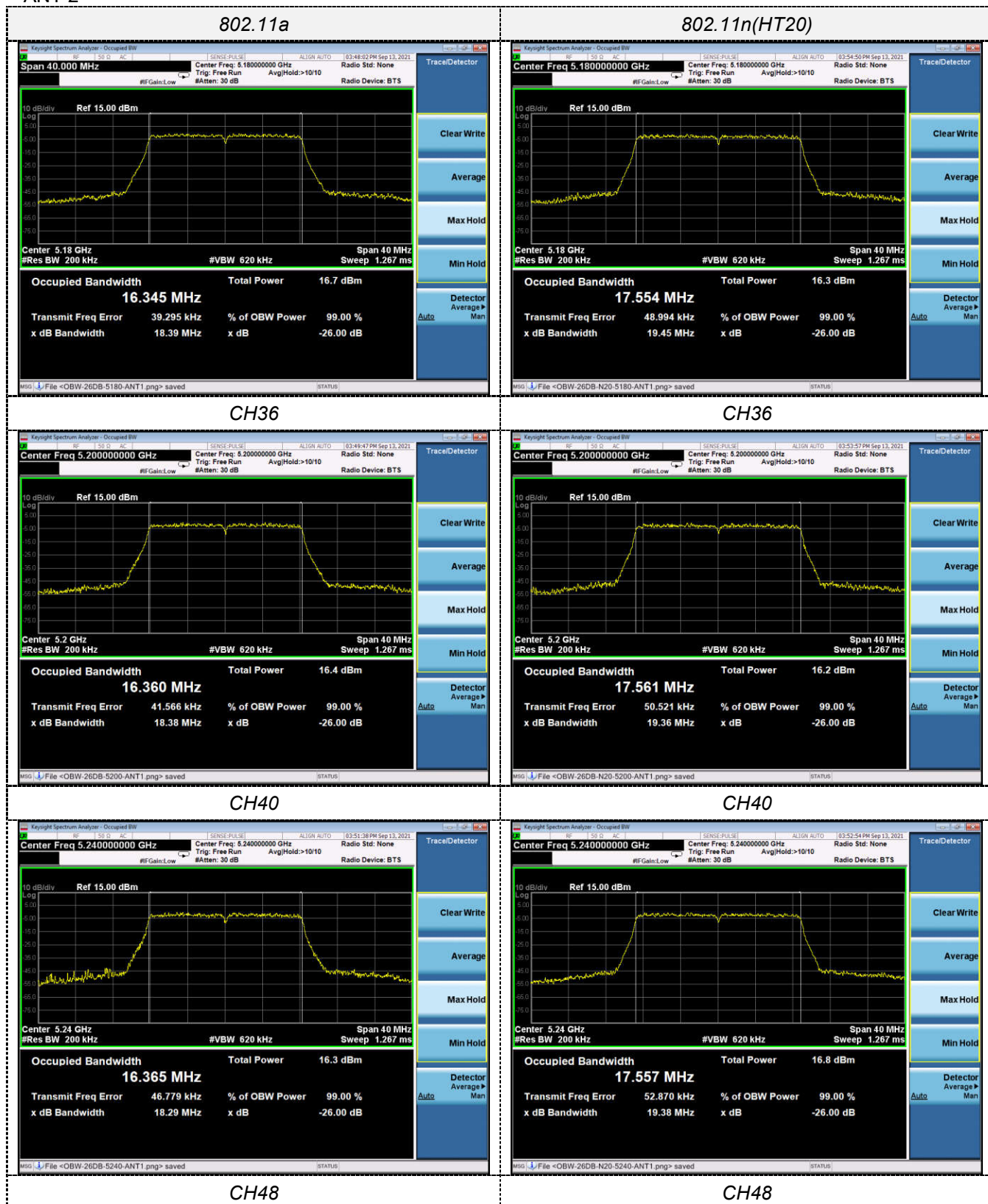
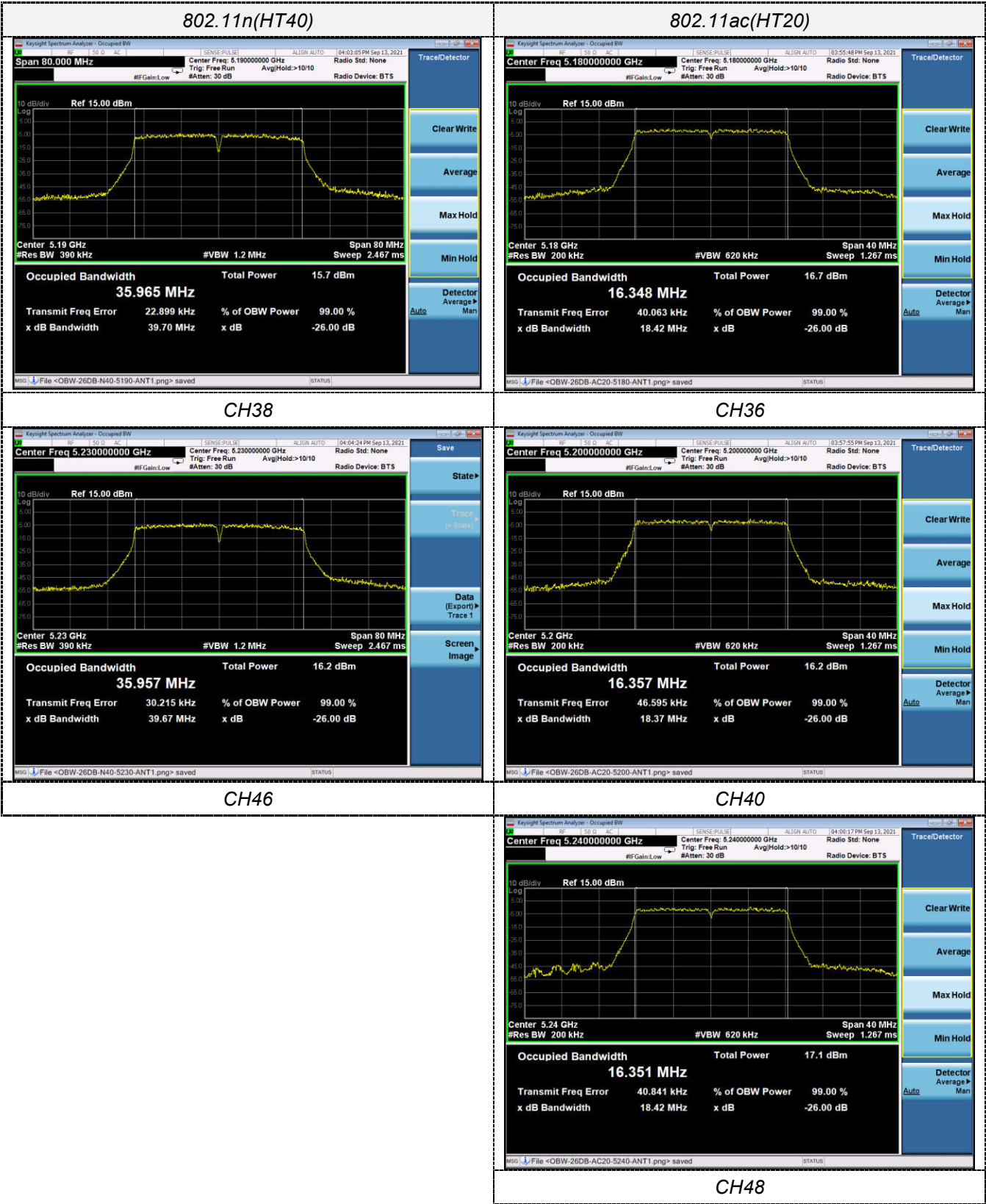
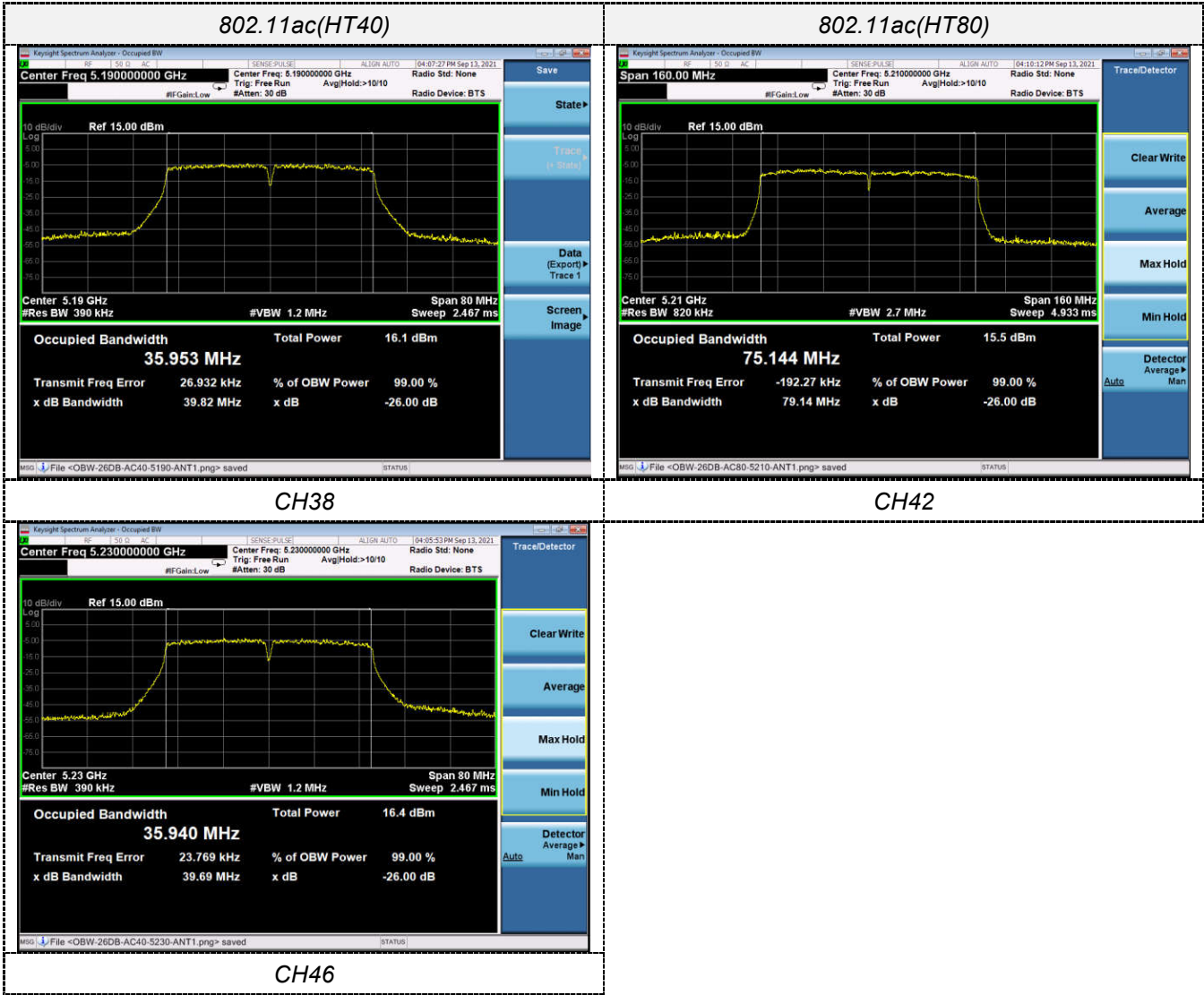


## ANT 2







#### 4.6 Minimum Emission Bandwidth (6dB Bandwidth)

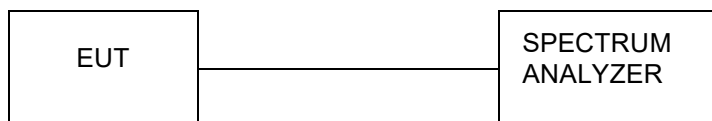
##### Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

##### Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. 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.

##### Test Configuration



##### Test Results

###### ANT 1

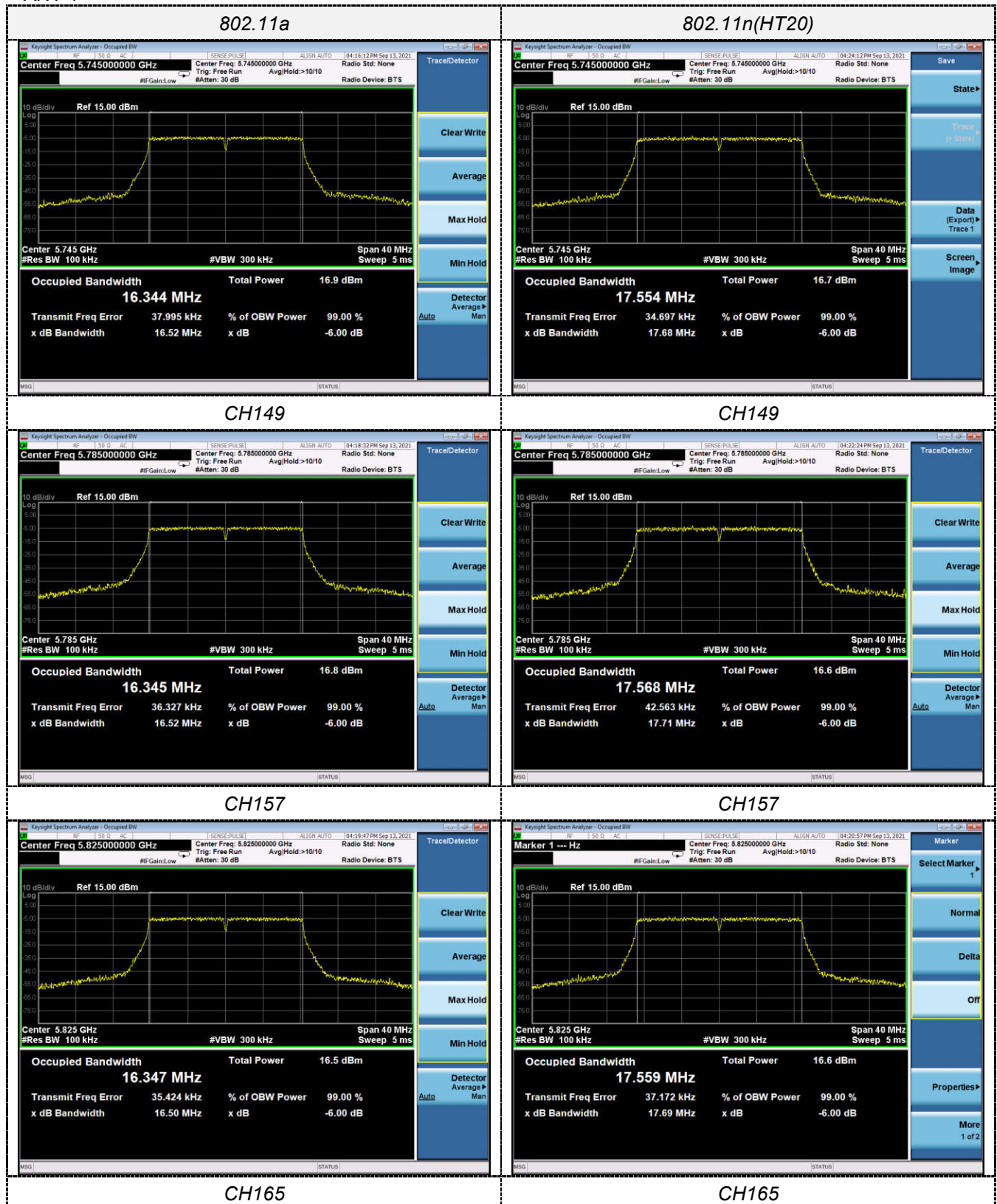
| Type           | Bands   | Channel | 6dB Bandwidth (MHz) | Limit (KHz) | Result |
|----------------|---------|---------|---------------------|-------------|--------|
| 802.11a        | U-NII 3 | 149     | 16.52               | ≥500KHz     | Pass   |
|                |         | 157     | 16.52               |             |        |
|                |         | 165     | 16.50               |             |        |
| 802.11n(HT20)  | U-NII 3 | 149     | 17.68               |             |        |
|                |         | 157     | 17.71               |             |        |
|                |         | 165     | 17.69               |             |        |
| 802.11n(HT40)  | U-NII 3 | 151     | 36.45               |             |        |
|                |         | 159     | 36.45               |             |        |
| 802.11ac(HT20) | U-NII 3 | 149     | 16.52               |             |        |
|                |         | 157     | 16.52               |             |        |
|                |         | 165     | 16.53               |             |        |
| 802.11ac(HT40) | U-NII 3 | 151     | 36.46               |             |        |
|                |         | 159     | 36.45               |             |        |
| 802.11ac(HT80) | U-NII 3 | 155     | 76.41               |             |        |

**ANT 2**

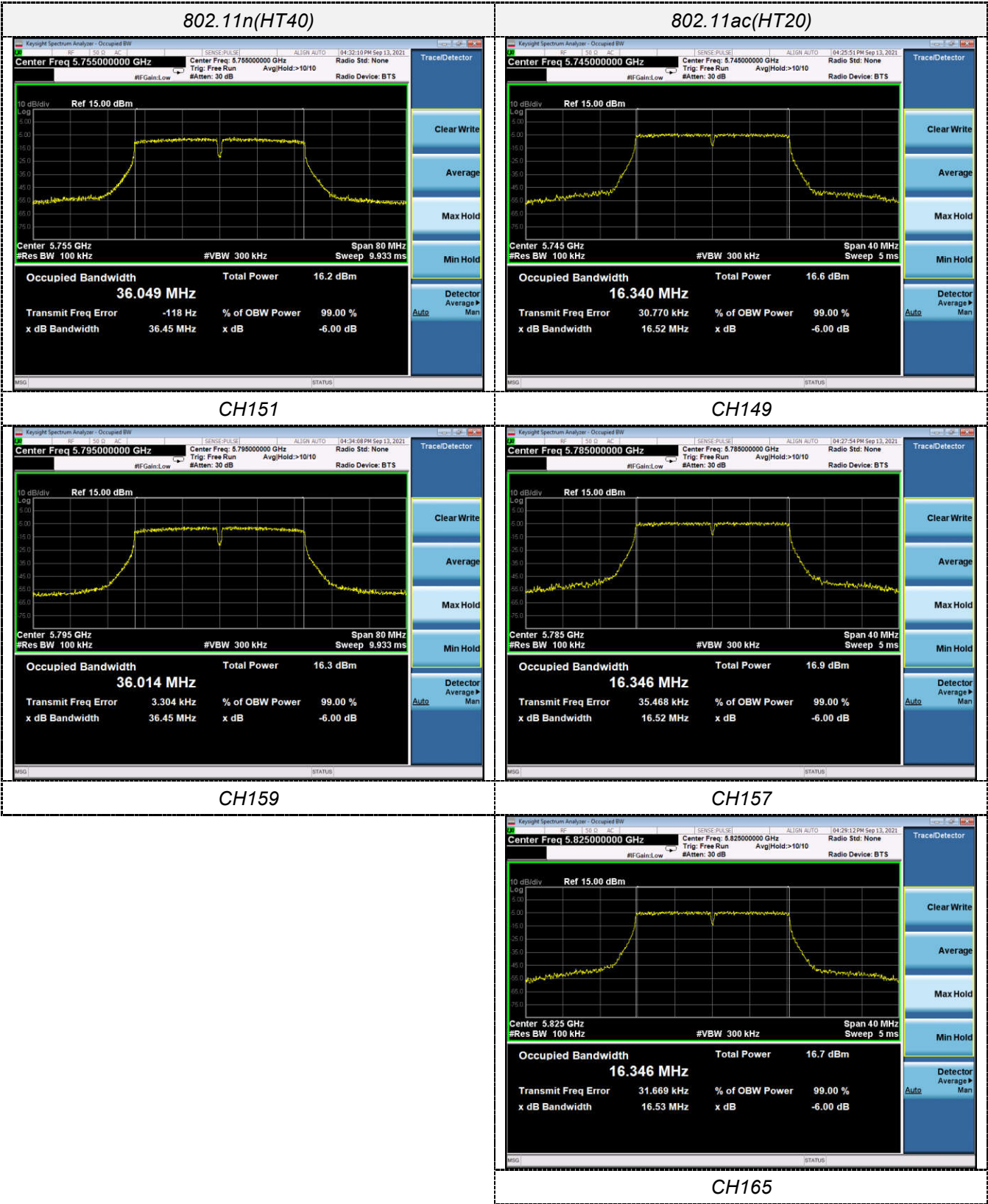
| Type           | Bands   | Channel | 6dB Bandwidth (MHz) | Limit (KHz) | Result |
|----------------|---------|---------|---------------------|-------------|--------|
| 802.11a        | U-NII 3 | 149     | 16.52               | ≥500KHz     | Pass   |
|                |         | 157     | 16.52               |             |        |
|                |         | 165     | 16.53               |             |        |
| 802.11n(HT20)  | U-NII 3 | 149     | 17.70               |             |        |
|                |         | 157     | 17.66               |             |        |
|                |         | 165     | 17.70               |             |        |
| 802.11n(HT40)  | U-NII 3 | 151     | 36.45               |             |        |
|                |         | 159     | 36.45               |             |        |
| 802.11ac(HT20) | U-NII 3 | 149     | 16.52               |             |        |
|                |         | 157     | 16.50               |             |        |
|                |         | 165     | 16.54               |             |        |
| 802.11ac(HT40) | U-NII 3 | 151     | 36.46               |             |        |
|                |         | 159     | 36.46               |             |        |
| 802.11ac(HT80) | U-NII 3 | 155     | 76.41               |             |        |

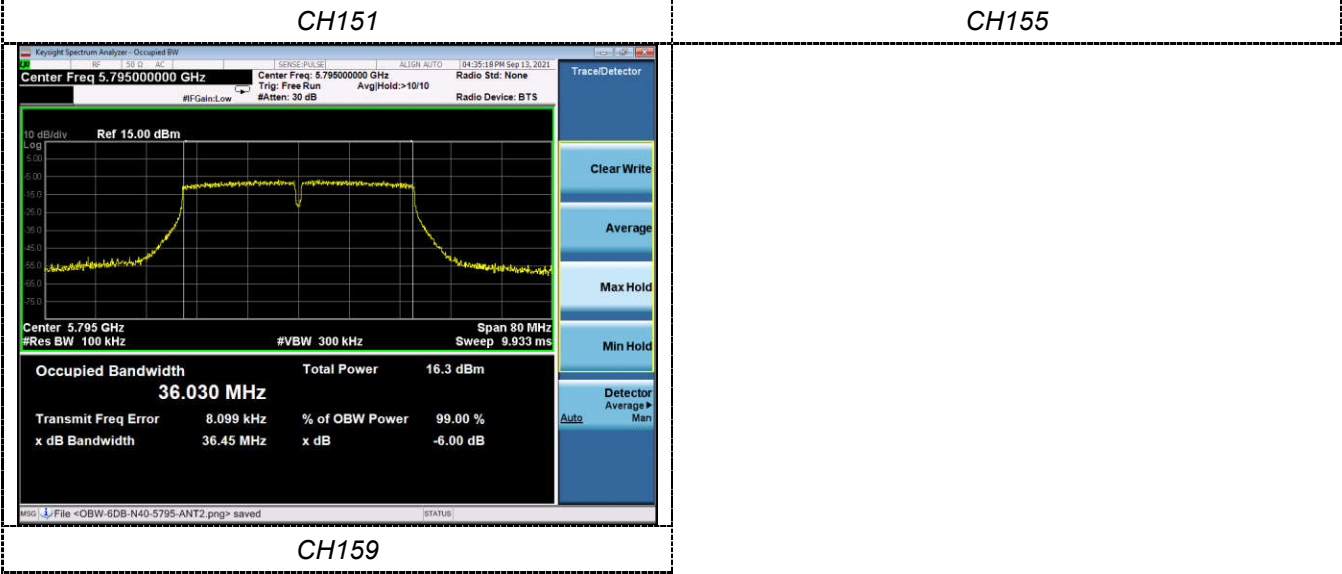
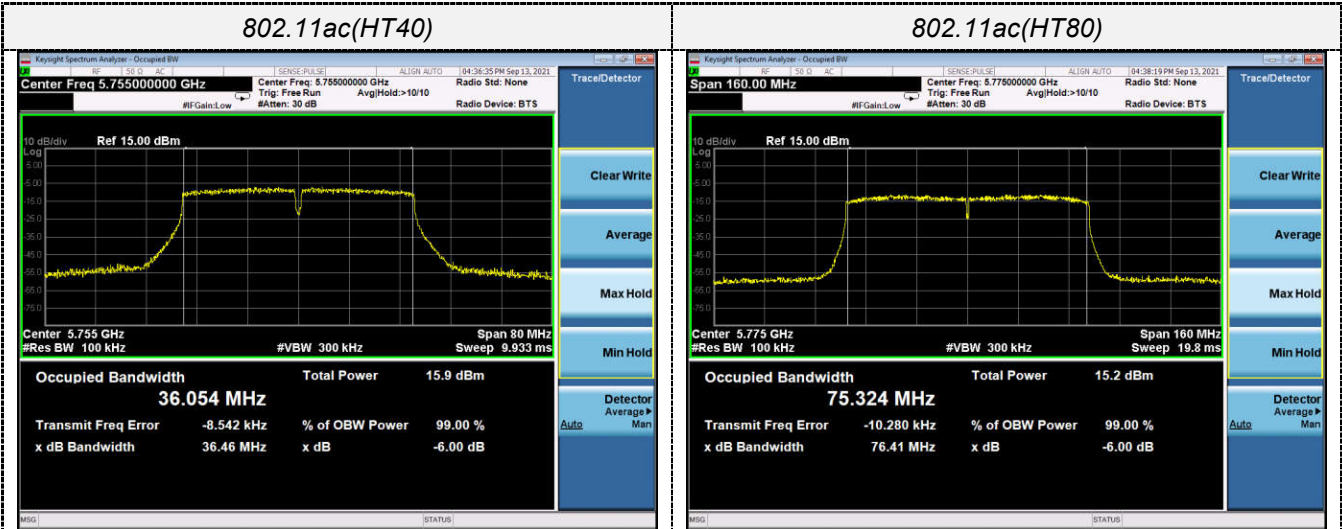
Test plot as follows:

ANT 1

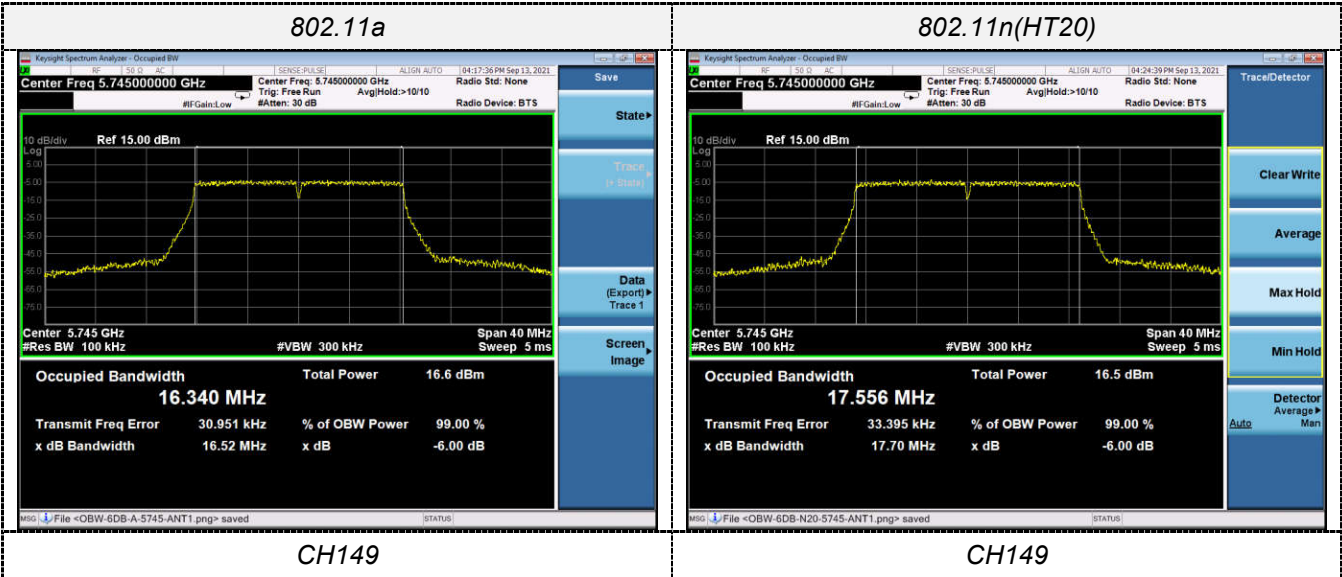




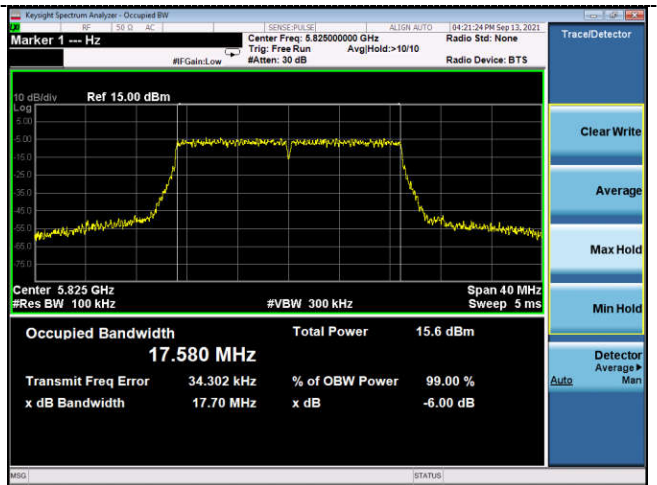
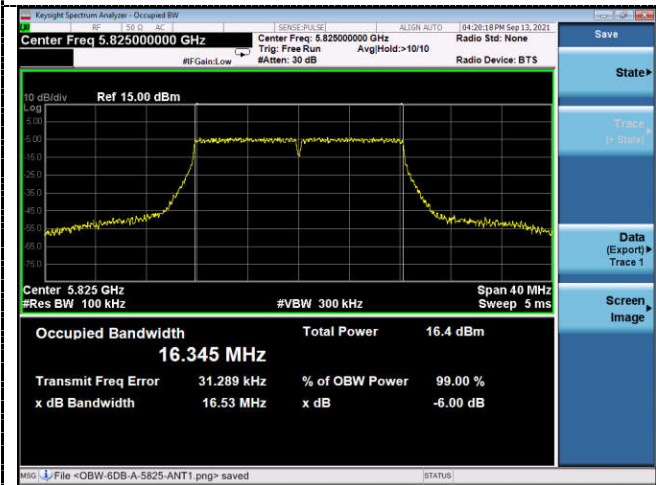
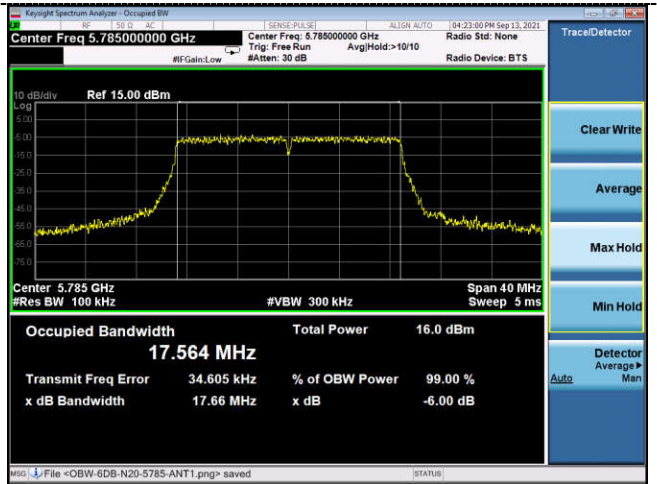




ANT 2









802.11ac(HT20)

Keylight Spectrum Analyzer - Occupied BW

Center Freq 5.745000000 GHz

Center Freq: 5.745000000 GHz

Trig: Free Run

AvgHold: >10/10

Radio Std: None

Radio Device: BTS

Ref 15.00 dBm

10 dB/div

5.00

0.00

25.0

50.0

75.0

Center 5.745 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 40 MHz

Sweep 5 ms

Occupied Bandwidth

16.344 MHz

Total Power

16.5 dBm

Transmit Freq Error

28.772 kHz

% of OBW Power

99.00 %

x dB Bandwidth

16.52 MHz

x dB

-6.00 dB

File <OBW-6DB-AC20-5745-ANT1.png> saved

STATUS

TraceDetector

ClearWrite

Average

Max Hold

Min Hold

Detector Average Man

CH151

Keylight Spectrum Analyzer - Occupied BW

Center Freq 5.795000000 GHz

Center Freq: 5.795000000 GHz

Trig: Free Run

AvgHold: >10/10

Radio Std: None

Radio Device: BTS

Ref 15.00 dBm

10 dB/div

5.00

0.00

25.0

50.0

75.0

Center 5.795 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 80 MHz

Sweep 9.933 ms

Occupied Bandwidth

36.023 MHz

Total Power

16.2 dBm

Transmit Freq Error

13.166 kHz

% of OBW Power

99.00 %

x dB Bandwidth

36.45 MHz

x dB

-6.00 dB

File <OBW-6DB-N40-5795-ANT2.png> saved

STATUS

TraceDetector

ClearWrite

Average

Max Hold

Min Hold

Detector Average Man

CH149

Keylight Spectrum Analyzer - Occupied BW

Center Freq 5.785000000 GHz

Center Freq: 5.785000000 GHz

Trig: Free Run

AvgHold: >10/10

Radio Std: None

Radio Device: BTS

Ref 15.00 dBm

10 dB/div

5.00

0.00

25.0

50.0

75.0

Center 5.785 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 40 MHz

Sweep 5 ms

Occupied Bandwidth

16.346 MHz

Total Power

16.5 dBm

Transmit Freq Error

36.510 kHz

% of OBW Power

99.00 %

x dB Bandwidth

16.50 MHz

x dB

-6.00 dB

File <OBW-6DB-AC20-5785-ANT1.png> saved

STATUS

TraceDetector

ClearWrite

Average

Max Hold

Min Hold

Detector Average Man

CH159

Keylight Spectrum Analyzer - Occupied BW

Center Freq 5.825000000 GHz

Center Freq: 5.825000000 GHz

Trig: Free Run

AvgHold: >10/10

Radio Std: None

Radio Device: BTS

Ref 15.00 dBm

10 dB/div

5.00

0.00

25.0

50.0

75.0

Center 5.825 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 40 MHz

Sweep 5 ms

Occupied Bandwidth

16.354 MHz

Total Power

16.3 dBm

Transmit Freq Error

29.814 kHz

% of OBW Power

99.00 %

x dB Bandwidth

16.54 MHz

x dB

-6.00 dB

File <OBW-6DB-AC20-5825-ANT1.png> saved

STATUS

TraceDetector

ClearWrite

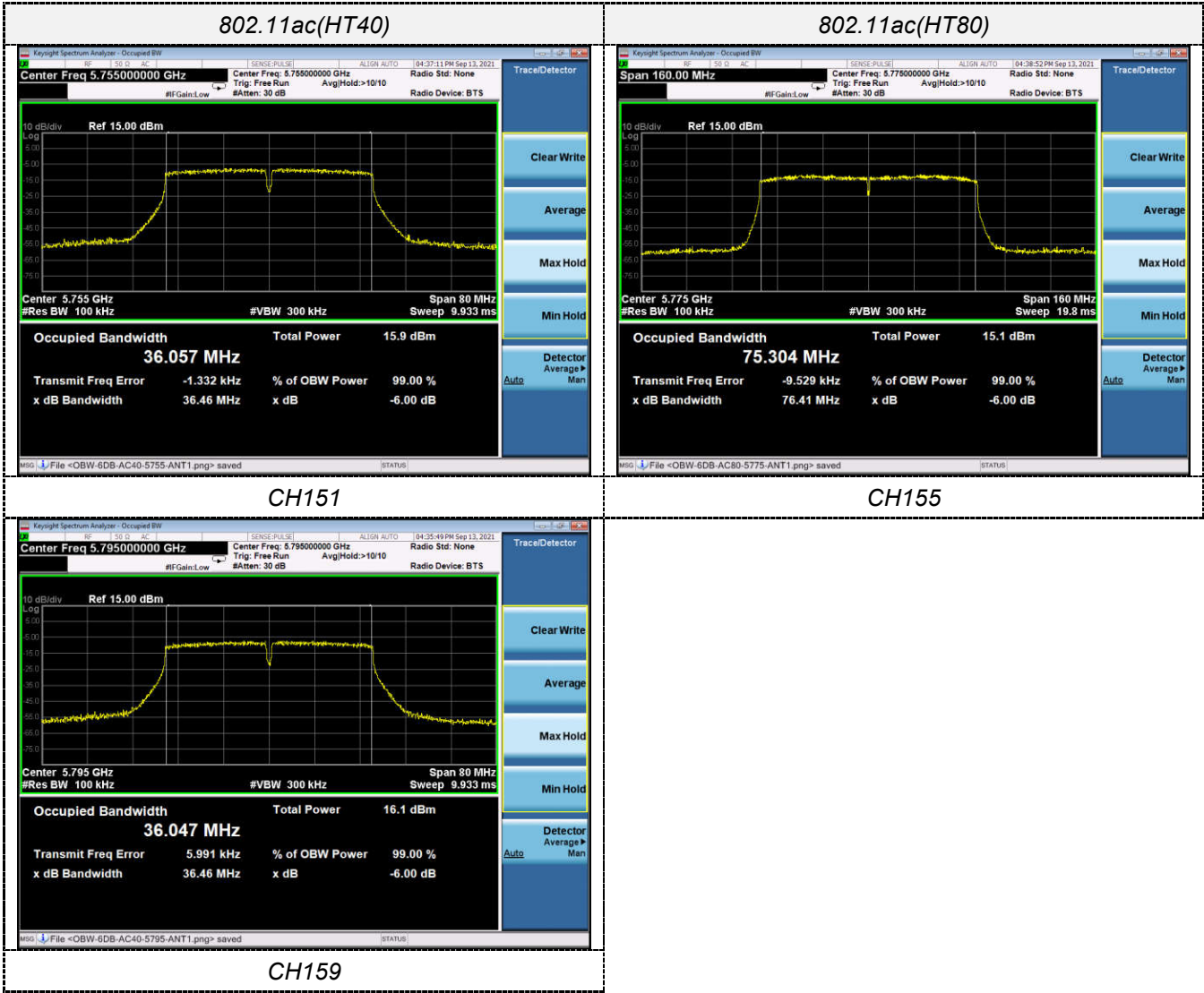
Average

Max Hold

Min Hold

Detector Average Man

CH165

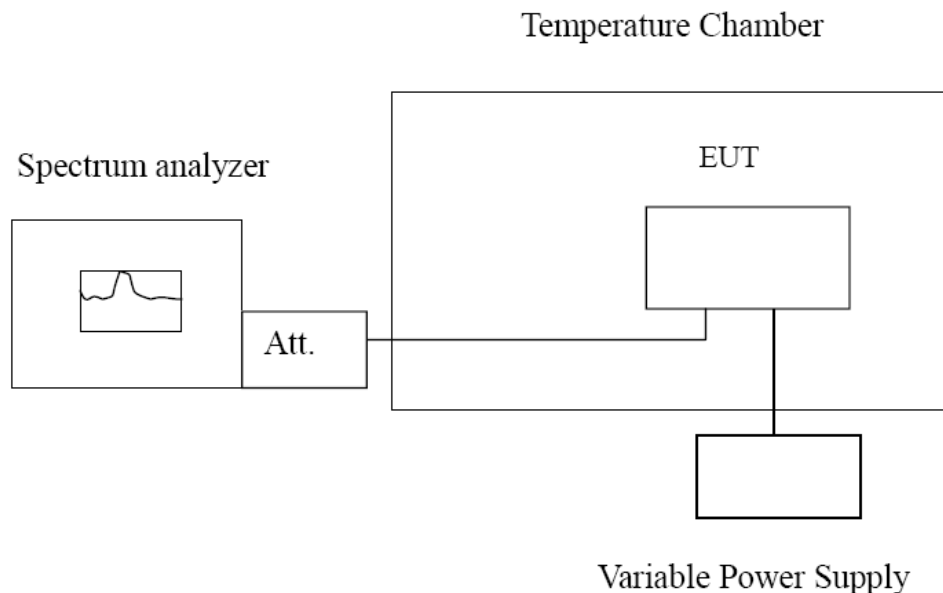


## 4.7 Frequency Stability

### LIMIT

Manufacturers 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 users manual.

### TEST CONFIGURATION



### TEST PROCEDURE

#### **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 -30°C. After the temperature stabilized for approximately 30 minutes, record the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C 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 record the frequency.

Reduce the input voltage to specify extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.

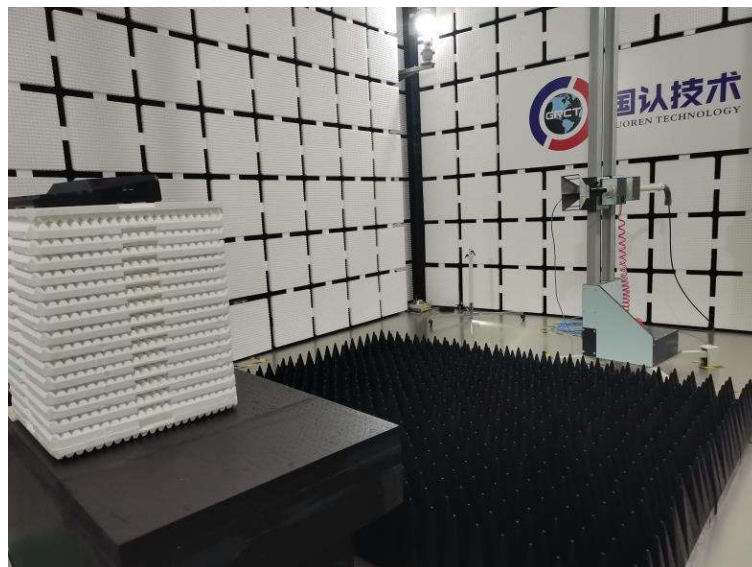
### TEST RESULTS

Record worst case as below:

| Reference Frequency: 802.11ac channel=36 frequency=5180MHz |                  |                 |        |                              |        |
|--|------------------|-----------------|--------|------------------------------|--------|
| Voltage ( V )  | Temperature (°C) | Frequency error |        | Limit (ppm)                  | Result |
|  |                  | Hz              | ppm    |                              |        |
| 19.00  | -30              | 108.43          | 0.0209 | Within the band of operation | Pass   |
|  | -20              | 172.51          | 0.0333 |                              |        |
|  | -10              | 135.18          | 0.0261 |                              |        |
|  | 0                | 107.58          | 0.0208 |                              |        |
|  | 10               | 135.71          | 0.0262 |                              |        |
|  | 20               | 95.84           | 0.0185 |                              |        |
|  | 30               | 171.72          | 0.0332 |                              |        |
|  | 40               | 101.74          | 0.0196 |                              |        |
|  | 50               | 118.63          | 0.0229 |                              |        |
| 21.85  | 25               | 195.84          | 0.0378 | Within the band of operation | Pass   |
| 16.15  | 25               | 114.85          | 0.0222 |                              |        |

| Reference Frequency: 802.11ac channel=149 frequency=5745MHz |                  |                 |        |                              |        |
|---|------------------|-----------------|--------|------------------------------|--------|
| Voltage ( V )   | Temperature (°C) | Frequency error |        | Limit (ppm)                  | Result |
|   |                  | Hz              | ppm    |                              |        |
| 19.00   | -30              | 135.64          | 0.0236 | Within the band of operation | Pass   |
|   | -20              | 126.32          | 0.0220 |                              |        |
|   | -10              | 163.59          | 0.0285 |                              |        |
|   | 0                | 167.29          | 0.0291 |                              |        |
|   | 10               | 133.63          | 0.0233 |                              |        |
|   | 20               | 134.95          | 0.0235 |                              |        |
|   | 30               | 105.83          | 0.0184 |                              |        |
|   | 40               | 178.21          | 0.0310 |                              |        |
|   | 50               | 155.28          | 0.0270 |                              |        |
| 21.85   | 25               | 147.49          | 0.0257 | Within the band of operation | Pass   |
| 16.15   | 25               | 113.74          | 0.0198 |                              |        |

## 5 Test Setup Photos of the EUT





## **6 Photos of the EUT**

Reference to the test report No. **GRCTR210902004-01**.

\*\*\*\*\* End of Report \*\*\*\*\*