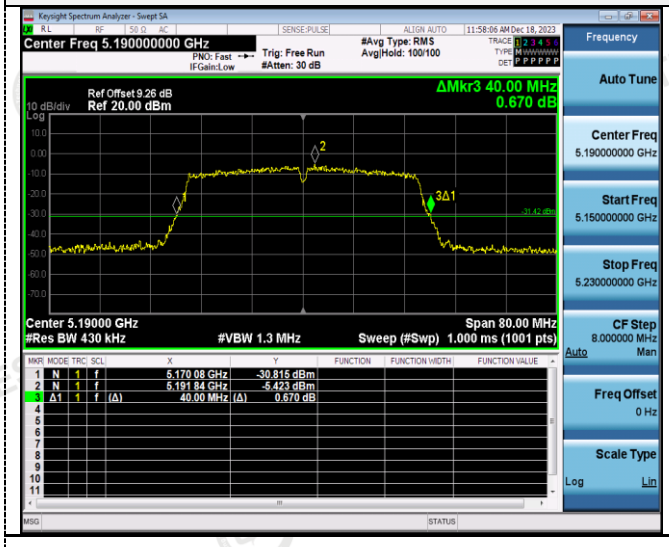
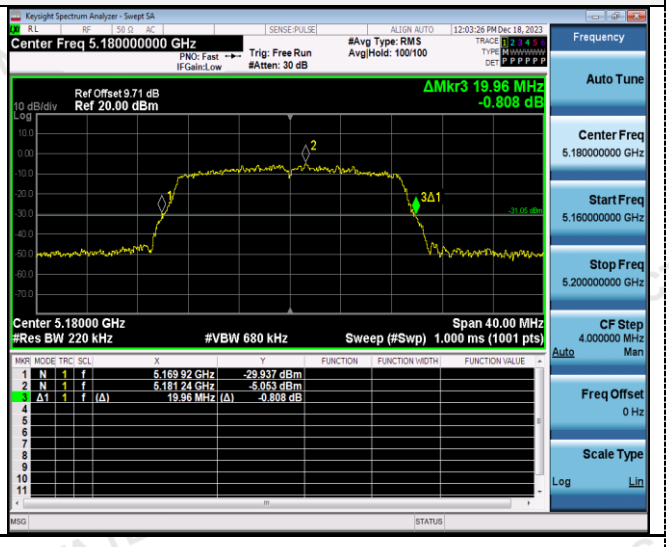
*802.11n(HT40)*




*802.11ac(HT20)*




*CH38*

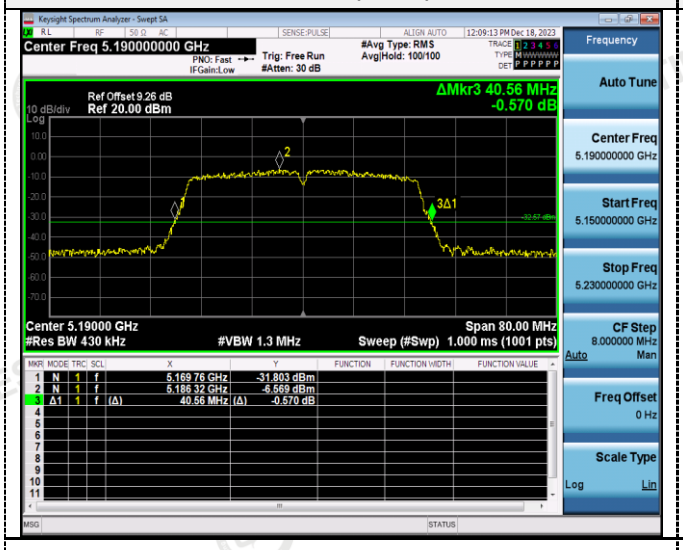
*CH36*

*CH46*

*CH40*

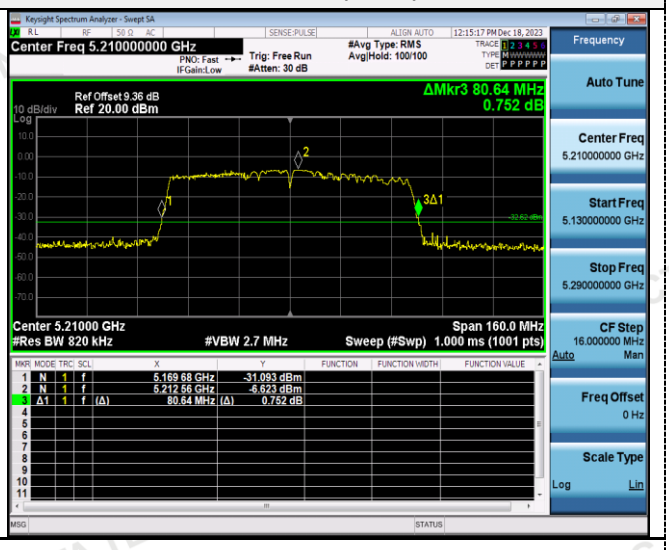
*CH48*

802.11ac(HT40)

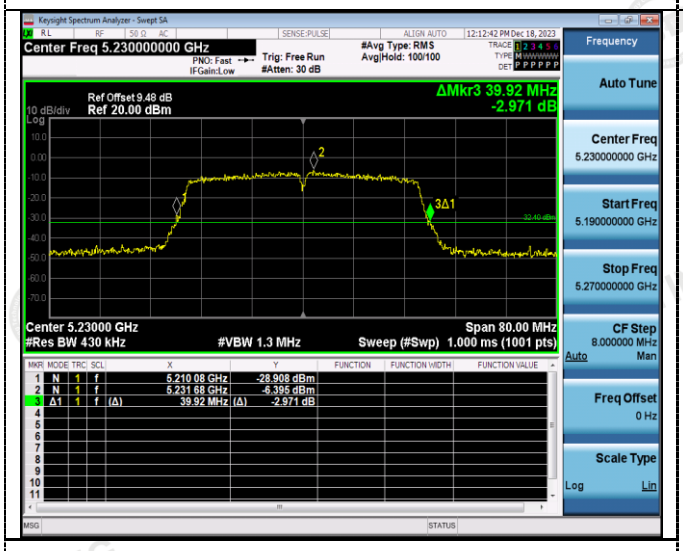



CH38

802.11ac(HT80)




CH42




CH46

## 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**

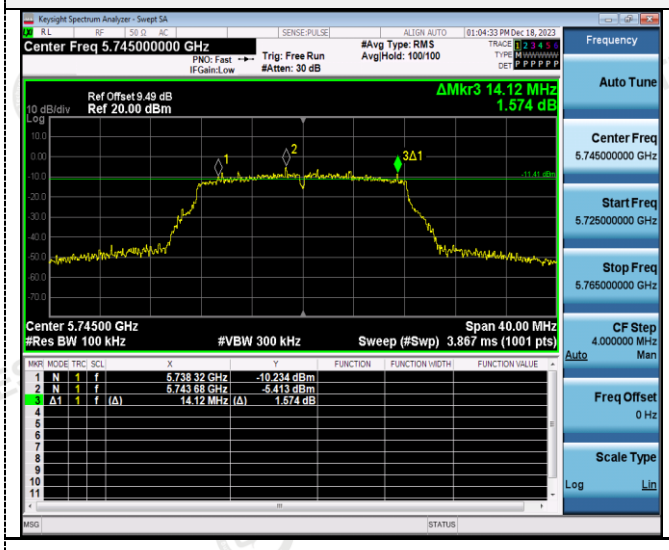
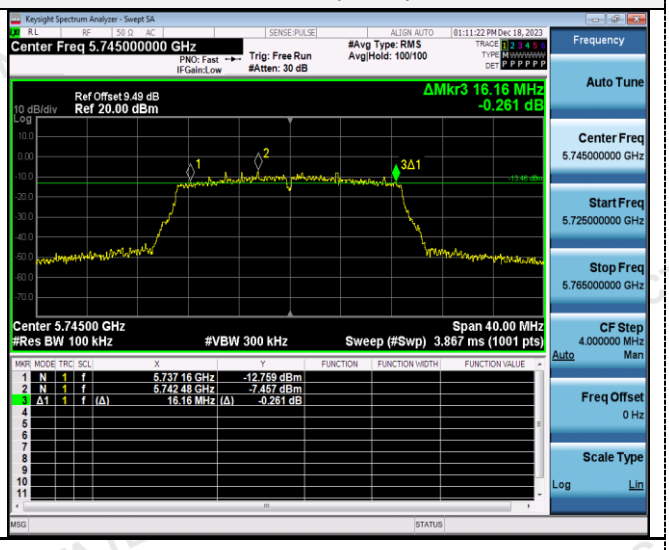
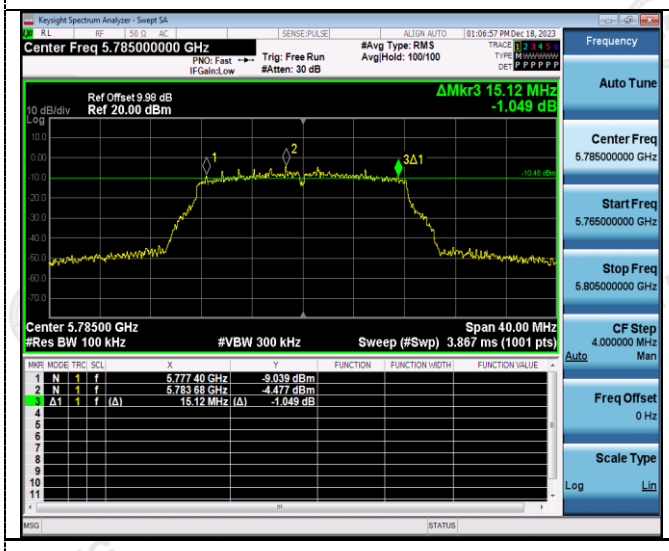
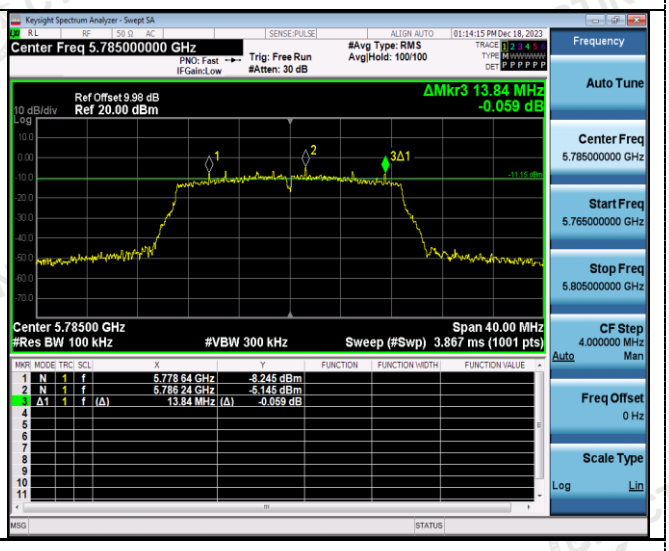
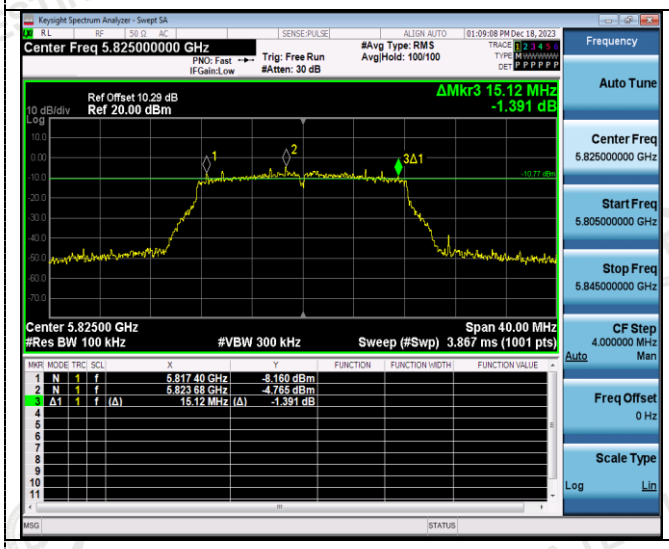
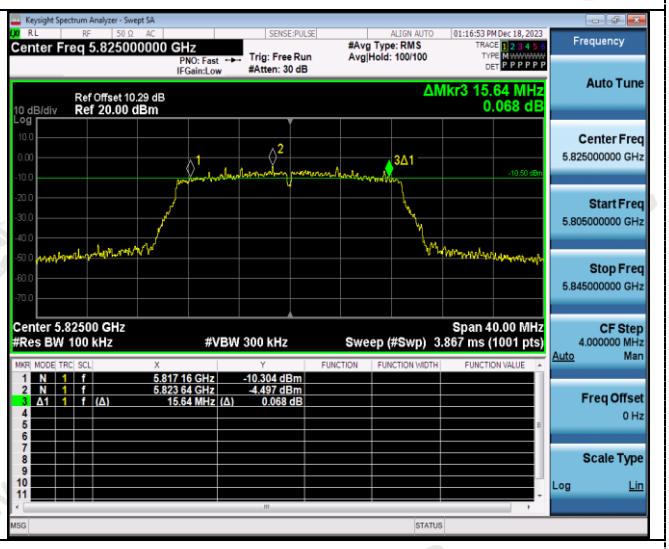
| Type | Bands | Channel | 6dB Bandwidth (MHz) | Limit (KHz) | Result |
|---|---|---|---|---|---|
| 802.11a | U-NII 3 | 149 | 14.120 | ≥500KHz | Pass |
| | | 157 | 15.120 | | |
| | | 165 | 15.120 | | |
| 802.11n(HT20) | U-NII 3 | 149 | 16.160 | | |
| | | 157 | 13.840 | | |
| | | 165 | 15.640 | | |
| 802.11n(HT40) | U-NII 3 | 151 | 35.040 | | |
| | | 159 | 35.040 | | |
| 802.11ac(HT20) | U-NII 3 | 149 | 13.840 | | |
| | | 157 | 13.720 | | |
| | | 165 | 15.120 | | |
| 802.11ac(HT40) | U-NII 3 | 151 | 35.120 | | |
| | | 159 | 35.040 | | |
| 802.11ac(HT80) | U-NII 3 | 155 | 75.040 | | |

**ANT 2**

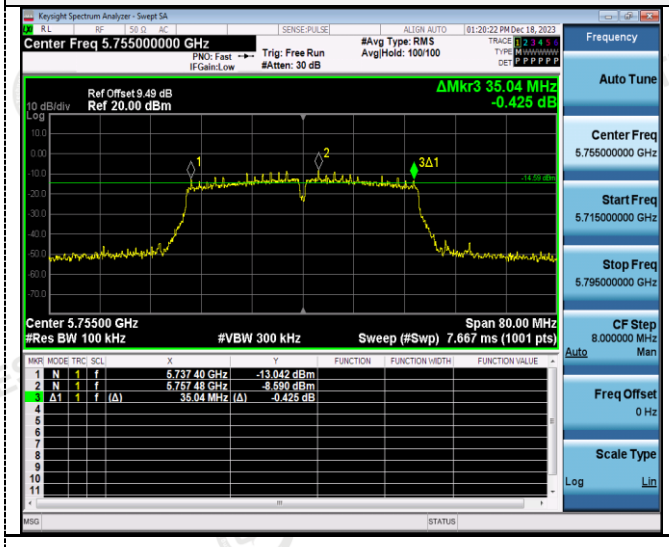
| Type | Bands | Channel | 6dB Bandwidth (MHz) | Limit (KHz) | Result |
|---|---|---|---|---|---|
| 802.11a | U-NII 3 | 149 | 13.120 | ≥500KHz | Pass |
| | | 157 | 15.120 | | |
| | | 165 | 12.920 | | |
| 802.11n(HT20) | U-NII 3 | 149 | 15.040 | | |
| | | 157 | 15.360 | | |
| | | 165 | 15.040 | | |
| 802.11n(HT40) | U-NII 3 | 151 | 35.040 | | |
| | | 159 | 35.040 | | |
| 802.11ac(HT20) | U-NII 3 | 149 | 13.000 | | |
| | | 157 | 15.440 | | |
| | | 165 | 14.680 | | |
| 802.11ac(HT40) | U-NII 3 | 151 | 35.040 | | |
| | | 159 | 35.120 | | |
| 802.11ac(HT80) | U-NII 3 | 155 | 72.640 | | |

Test plot as follows:

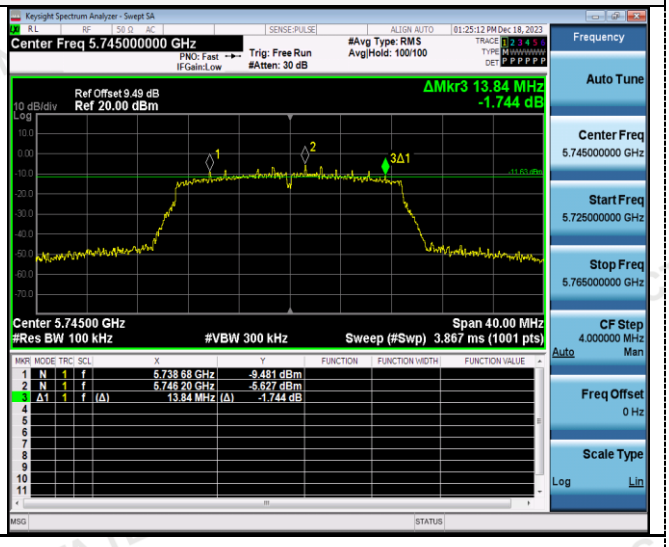
ANT 1

| *802.11a* | *802.11n(HT20)* |
|---|---|
|  |  |
| *CH149* | *CH149* |
|  |  |
| *CH157* | *CH157* |
|  |  |
| *CH165* | *CH165* |

*802.11n(HT40)*

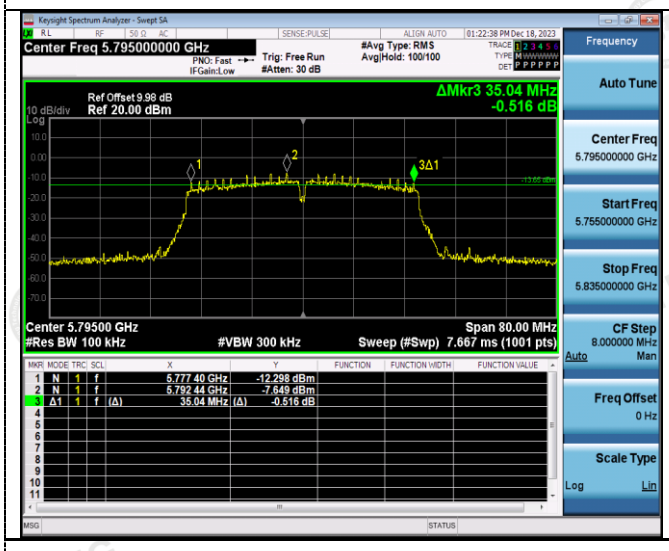


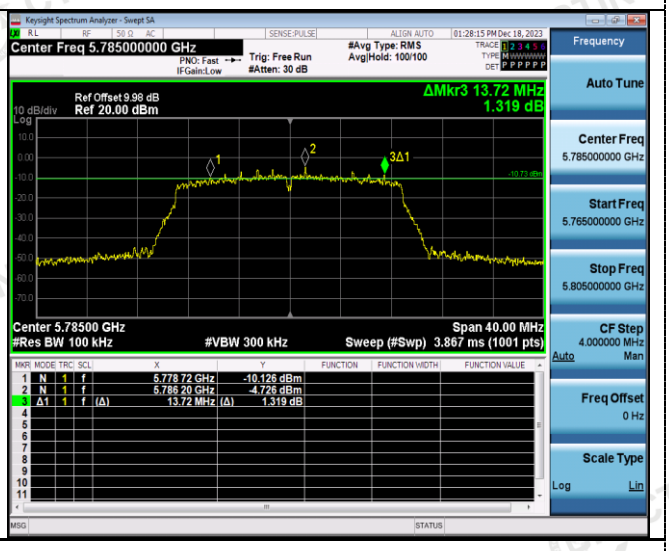

*802.11ac(HT20)*




*CH151*

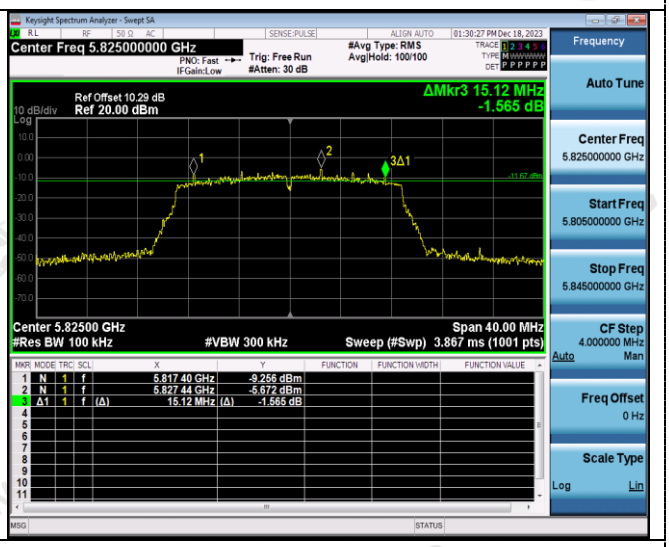
*CH149*



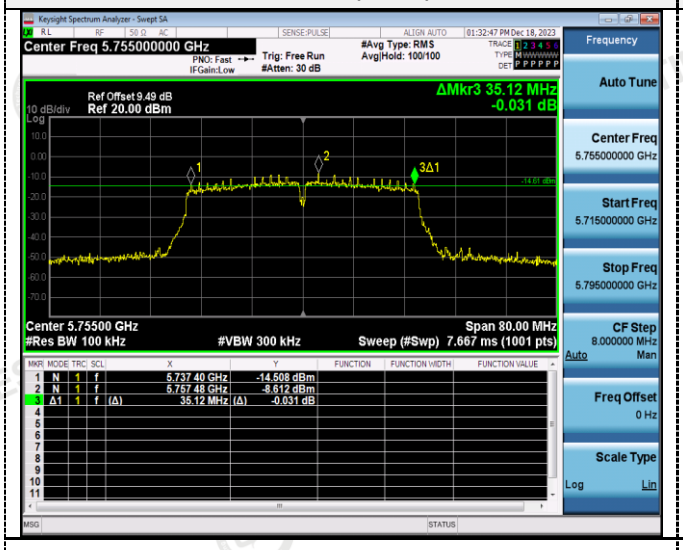

*CH159*

*CH157*



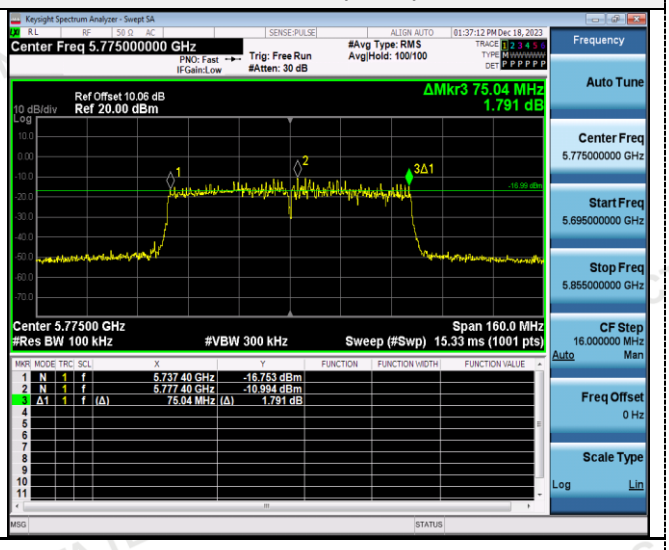

*CH165*

*802.11ac(HT40)*

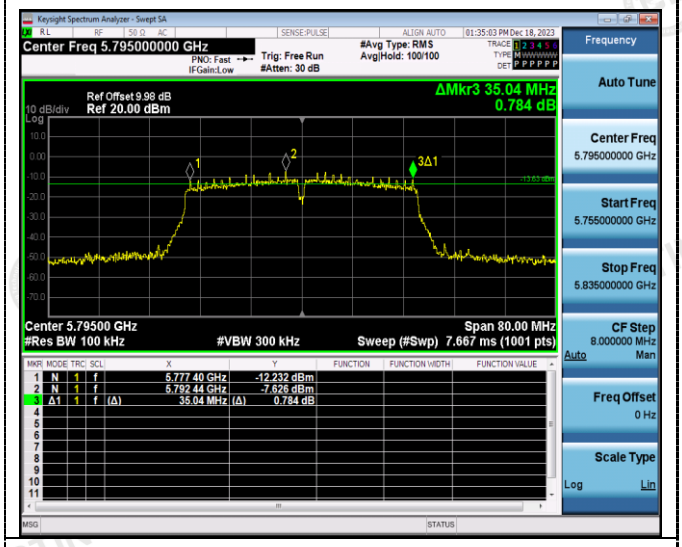



*CH151*

*802.11ac(HT80)*



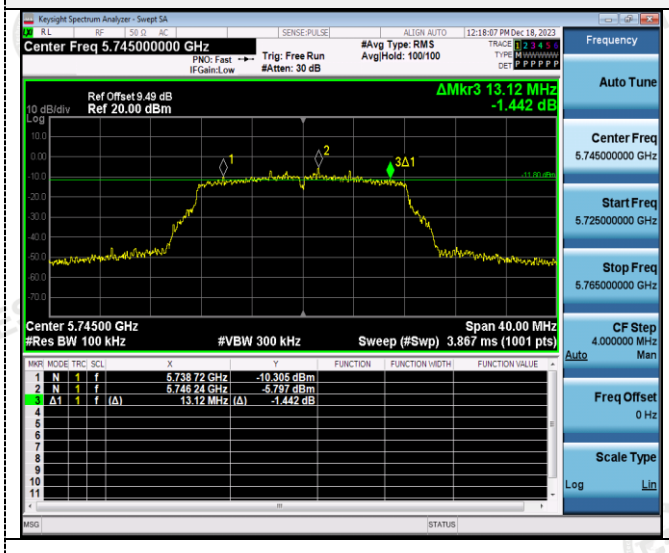

*CH155*



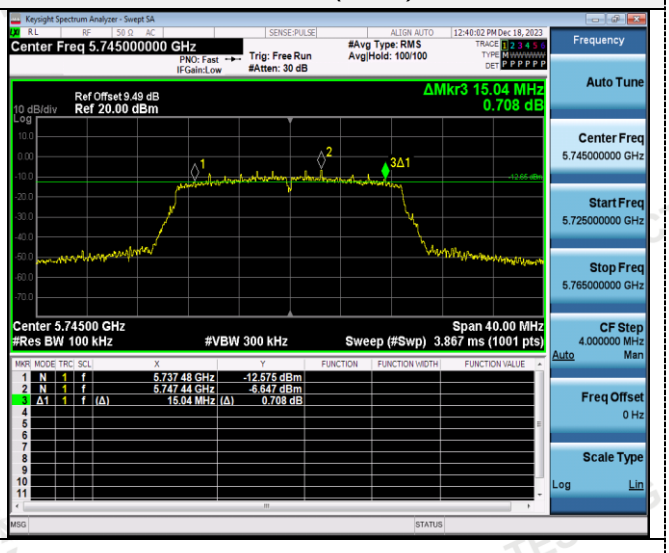

*CH159*

ANT 2

*802.11a*

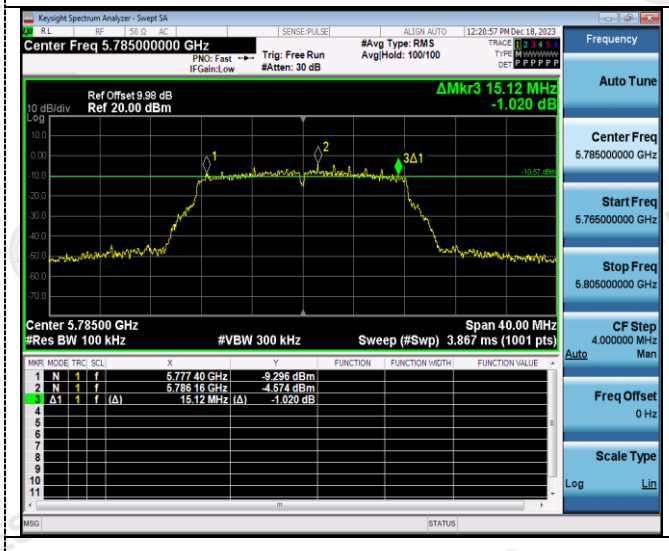


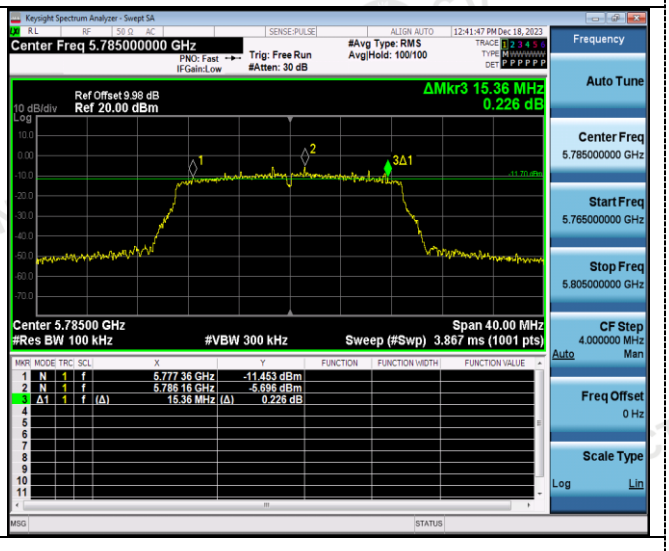

*802.11n(HT20)*




*CH149*

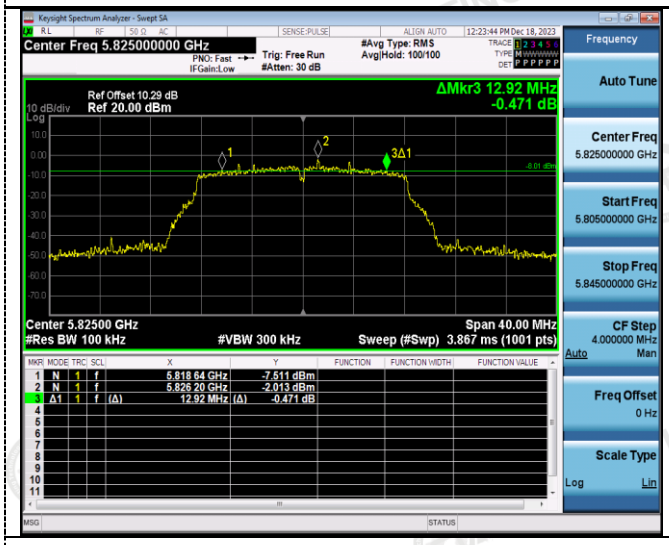
*CH149*

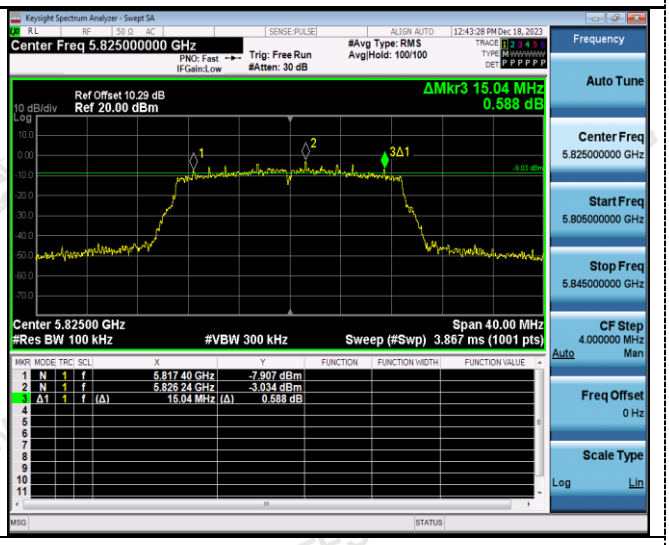



*CH157*

*CH157*

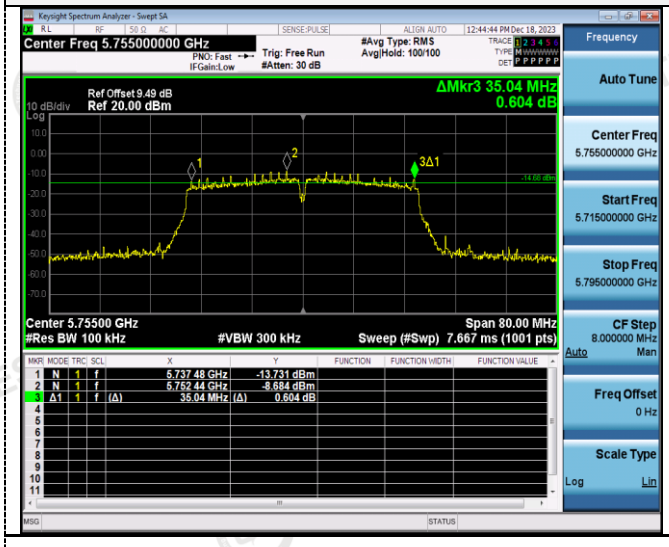



*CH165*

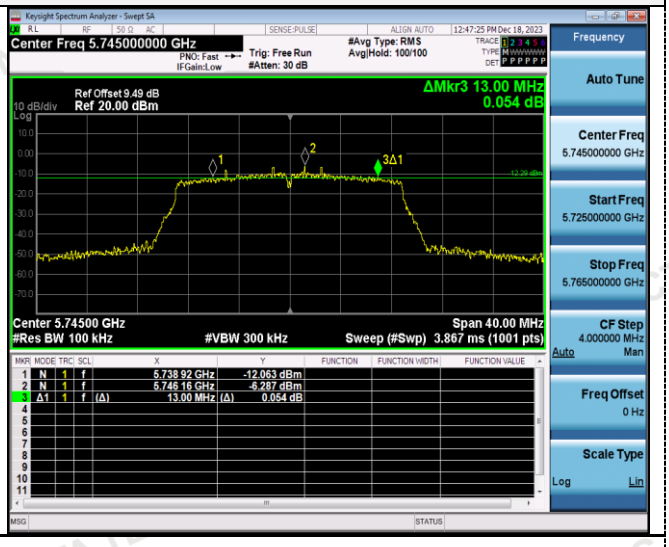
*CH165*

*802.11n(HT40)*

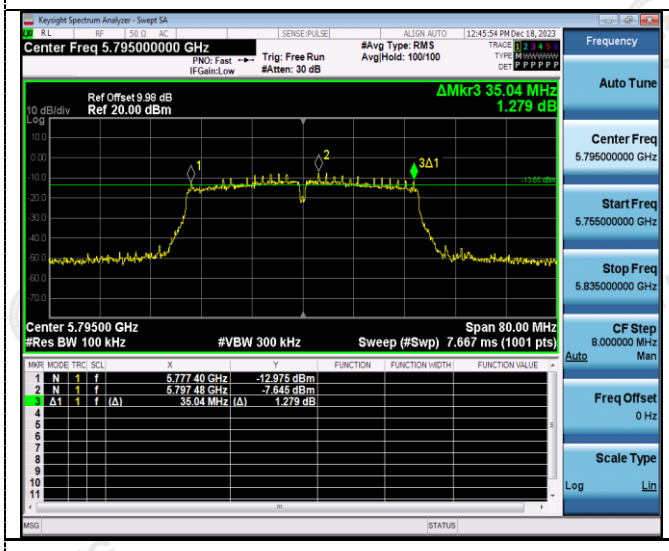



*CH151*

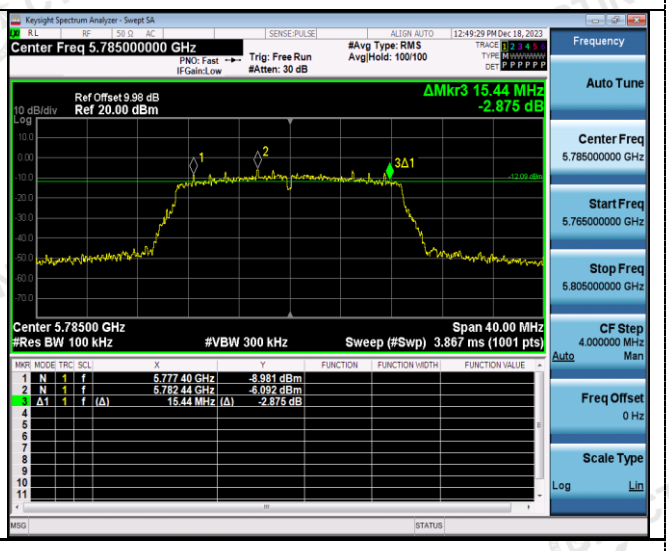
*802.11ac(HT20)*



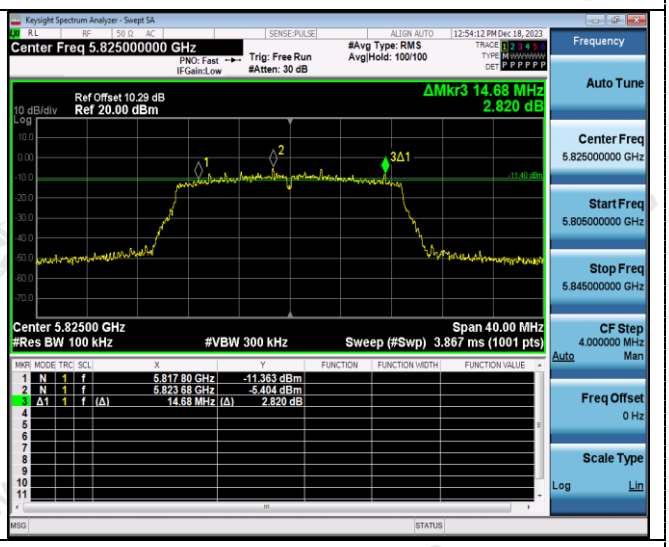

*CH149*




*CH159*

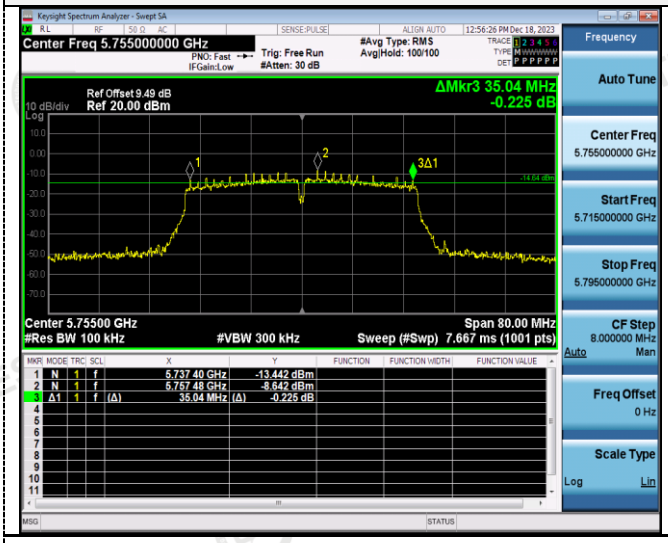



*CH157*



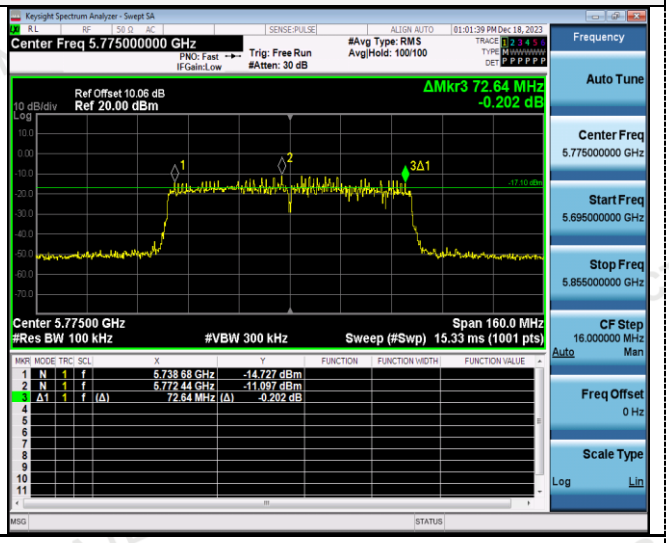

*CH165*

*802.11ac(HT40)*

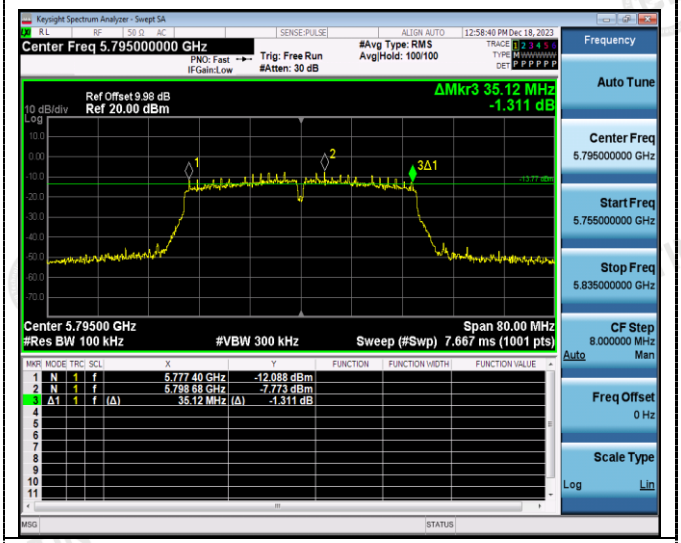



*CH151*

*802.11ac(HT80)*




*CH155*



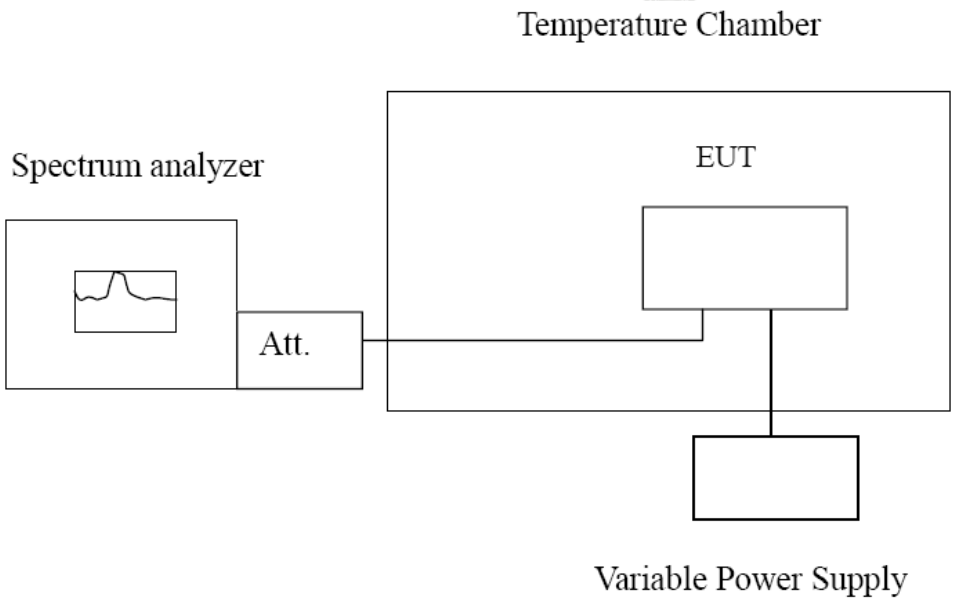

*CH159*

## 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℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

**Frequency Stability under Voltage Variations:**
Set chamber temperature to 20℃. 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.

**TEST RESULTS**

Record worst case as below:

Ant1:

| Reference Frequency: 802.11ac channel=36 frequency=5180MHz | | | | | |
|---|---|---|---|---|---|
| Voltage ( V ) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| AC 120 | -30 | 110.52 | 0.021336 | Within the band of operation | Pass |
| | -20 | 174.72 | 0.033730 | | |
| | -10 | 145.58 | 0.028104 | | |
| | 0 | 146.43 | 0.028268 | | |
| | 10 | 145.96 | 0.028178 | | |
| | 20 | 99.35 | 0.019180 | | |
| | 30 | 167.39 | 0.032315 | | |
| | 40 | 129.30 | 0.024961 | | |
| | 50 | 128.77 | 0.024859 | | |
| AC 132 | 25 | 195.64 | 0.037768 | | |
| AC 108 | 25 | 118.84 | 0.022942 | | |

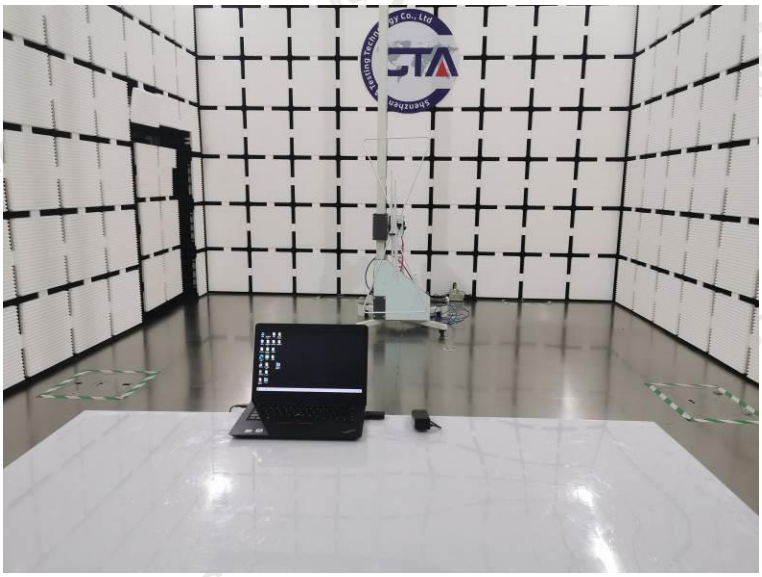
| Reference Frequency: 802.11ac channel=149 frequency=5745MHz | | | | | |
|---|---|---|---|---|---|
| Voltage ( V ) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| AC 120 | -30 | 135.62 | 0.023607 | Within the band of operation | Pass |
| | -20 | 129.26 | 0.022500 | | |
| | -10 | 167.12 | 0.029090 | | |
| | 0 | 169.88 | 0.029570 | | |
| | 10 | 136.27 | 0.023720 | | |
| | 20 | 144.80 | 0.025205 | | |
| | 30 | 116.82 | 0.020334 | | |
| | 40 | 168.44 | 0.029319 | | |
| | 50 | 160.77 | 0.027984 | | |
| AC 132 | 25 | 150.71 | 0.026233 | | |
| AC 108 | 25 | 129.94 | 0.022618 | | |

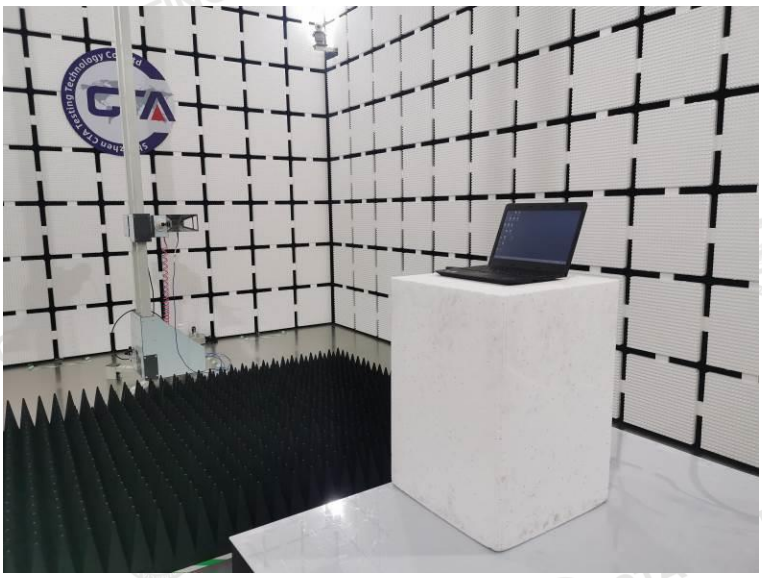
Ant2:

| Reference Frequency: 802.11ac channel=36 frequency=5180MHz | | | | | |
|---|---|---|---|---|---|
| Voltage ( V ) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| AC 120 | -30 | 110.43 | 0.021319 | Within the band of operation | Pass |
| | -20 | 174.80 | 0.033745 | | |
| | -10 | 145.59 | 0.028106 | | |
| | 0 | 146.60 | 0.028301 | | |
| | 10 | 146.05 | 0.028195 | | |
| | 20 | 99.77 | 0.019261 | | |
| | 30 | 167.57 | 0.032349 | | |
| | 40 | 129.70 | 0.025039 | | |
| | 50 | 128.85 | 0.024875 | | |
| AC 132 | 25 | 195.82 | 0.037803 | | |
| AC 108 | 25 | 118.72 | 0.022919 | | |

| Reference Frequency: 802.11ac channel=149 frequency=5745MHz | | | | | |
|---|---|---|---|---|---|
| Voltage ( V ) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| AC 120 | -30 | 135.54 | 0.023593 | Within the band of operation | Pass |
| | -20 | 129.60 | 0.022559 | | |
| | -10 | 167.37 | 0.029133 | | |
| | 0 | 169.67 | 0.029534 | | |
| | 10 | 136.63 | 0.023782 | | |
| | 20 | 144.74 | 0.025194 | | |
| | 30 | 116.54 | 0.020285 | | |
| | 40 | 168.42 | 0.029316 | | |
| | 50 | 160.61 | 0.027956 | | |
| AC 132 | 25 | 150.98 | 0.026280 | | |
| AC 108 | 25 | 129.55 | 0.022550 | | |

# 5 Test Setup Photos of the EUT





# 6 Photos of the EUT

Reference to the test report No. **CTA23113000201.**

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