4.5 Emission Bandwidth (26dB Bandwidth)

Limit

N/A

Test Procedure

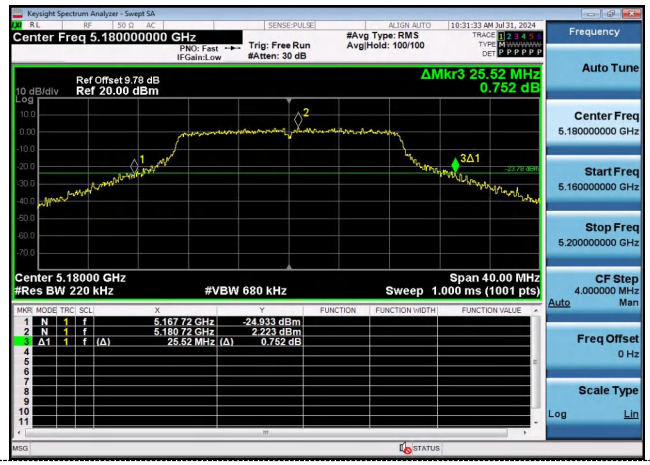
1. Set resolution bandwidth (RBW) = approximately 1 % of the EBW.
2. Set the video bandwidth (VBW) > RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW / EBW ratio is approximately 1 %.

Test Configuration

Test Results

Type	Bands	Channel	26dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	U-NII 1	36	24.040	N/A	Pass
		40	23.480		
		48	24.440		
802.11n(HT20)	U-NII 1	36	25.520		
		40	25.480		
		48	24.760		
802.11n(HT40)	U-NII 1	38	44.880		
		46	45.440		
802.11ac(VHT20)	U-NII 1	36	25.080		
		40	25.560		
		48	25.200		
802.11ac(VHT40)	U-NII 1	38	45.440		
		46	46.880		

Test plot as follows:

802.11a	*802.11n(HT20)*
	
CH36	*CH36*
	
CH40	*CH40*
	
CH48	*CH48*

802.11n(HT40)	*802.11ac*(VHT20)
	
CH38	*CH36*
	
CH46	*CH40*
	
	CH48

802.11ac(VHT40)	
	
CH38	
	
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

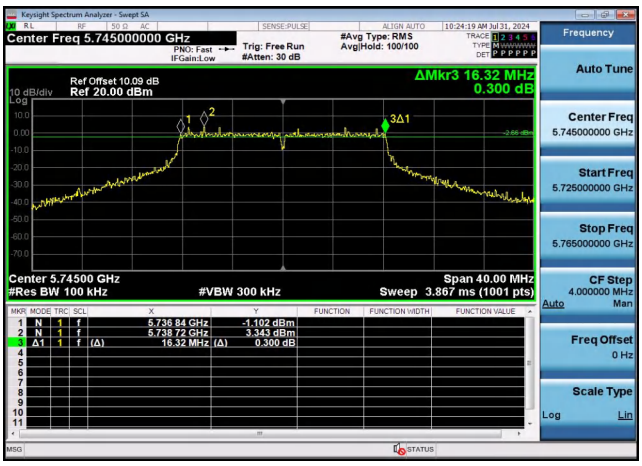
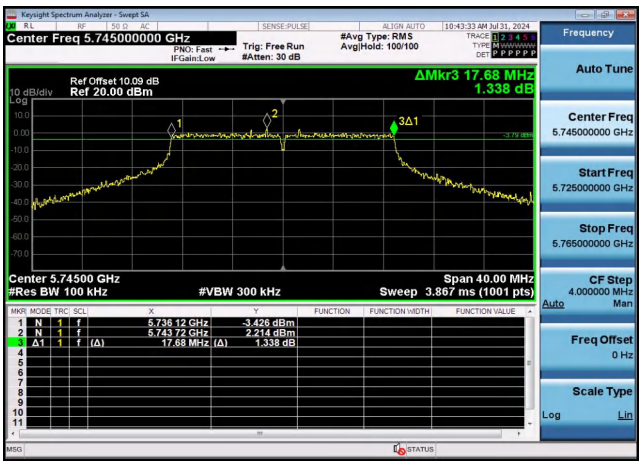
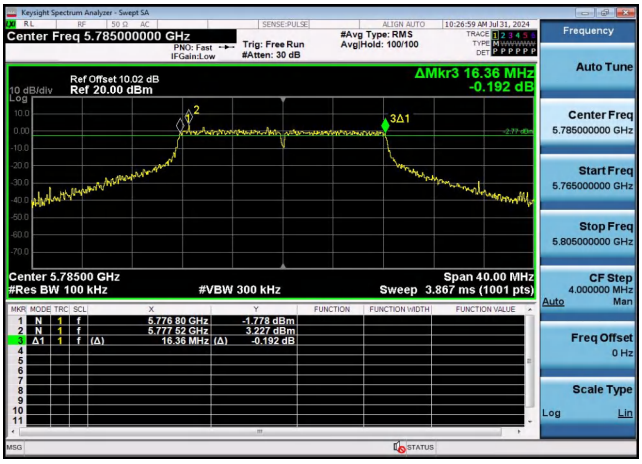
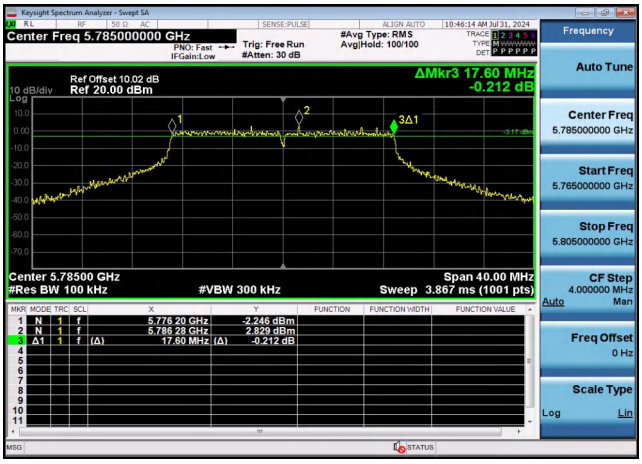
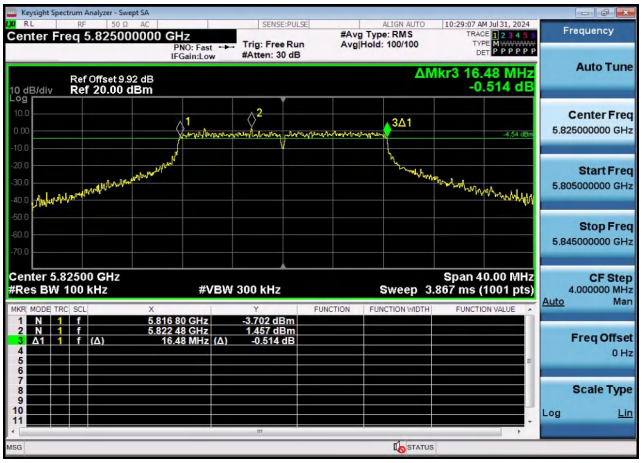
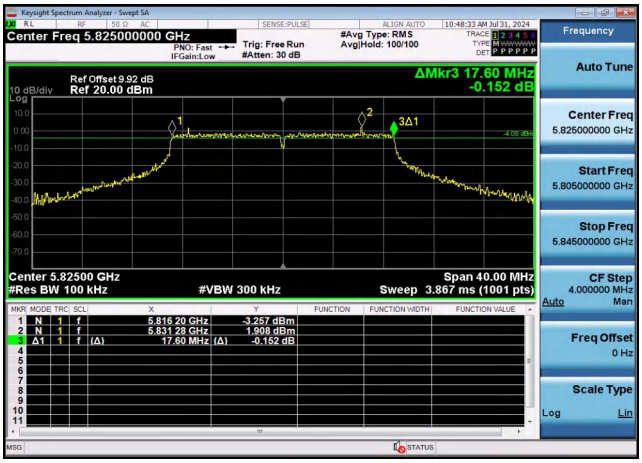
1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

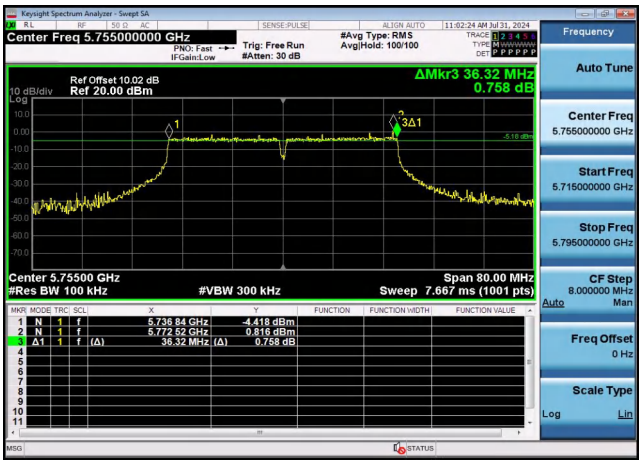
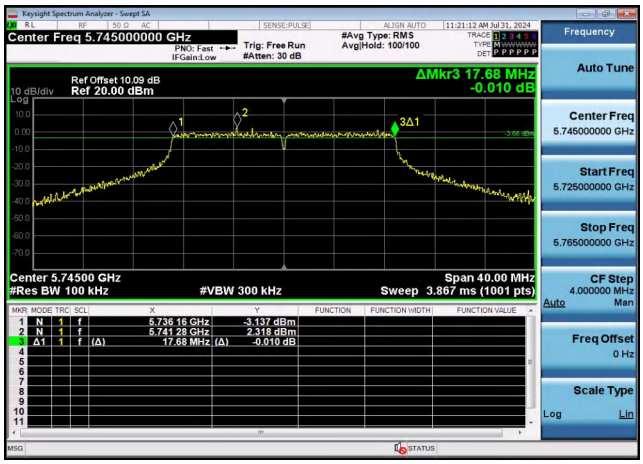
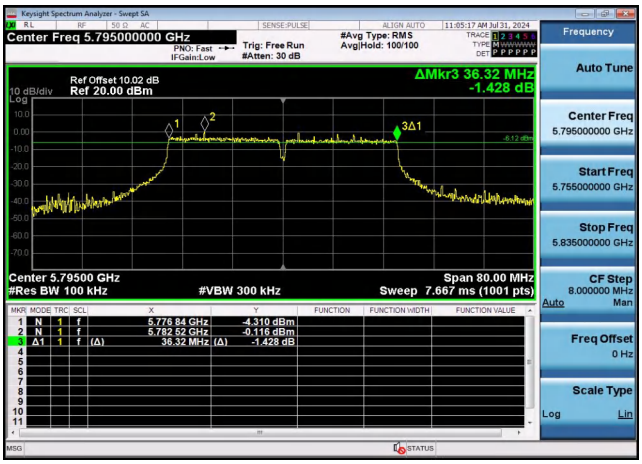
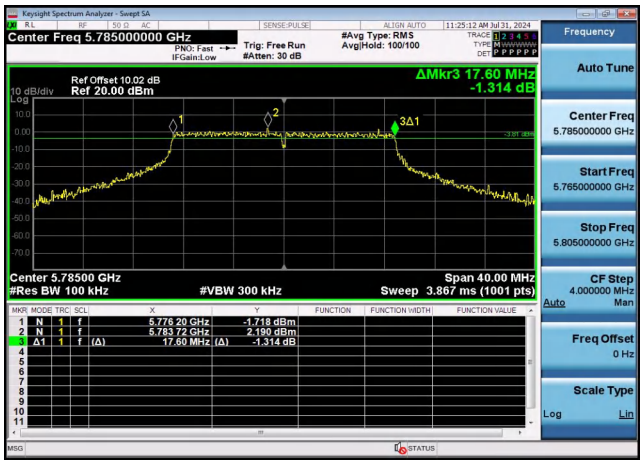
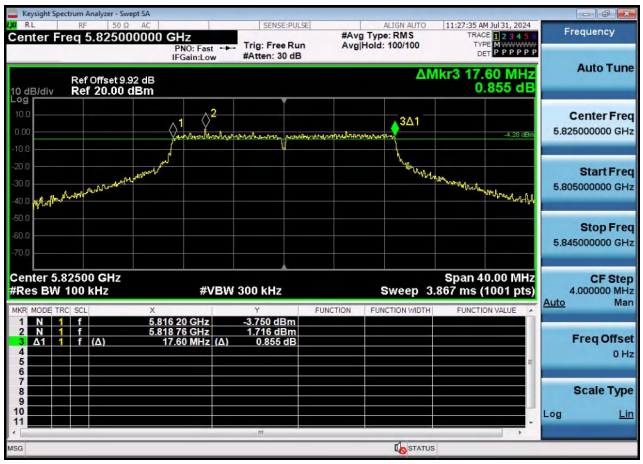
Test Configuration

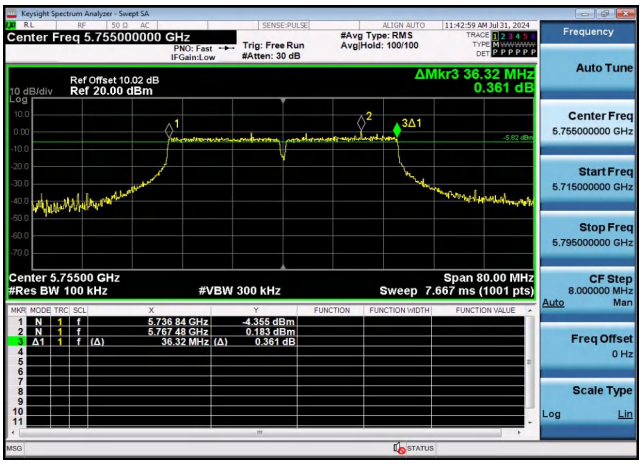
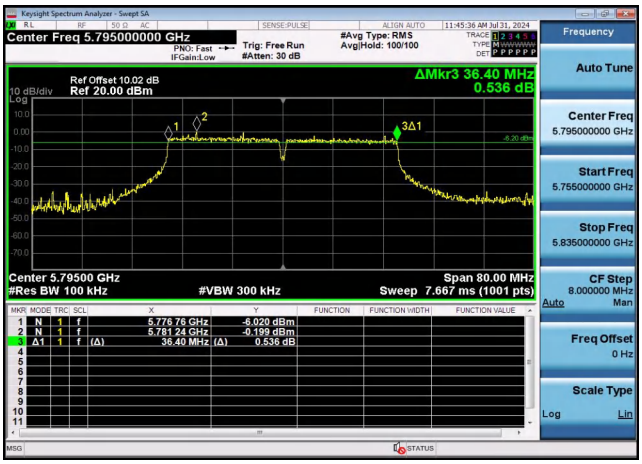
Test Results

Type	Bands	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	U-NII 3	149	16.320	≥500KHz	Pass
		157	16.360		
		165	16.480		
802.11n(HT20)	U-NII 3	149	17.680		
		157	17.600		
		165	17.600		
802.11n(HT40)	U-NII 3	151	36.320		
		159	36.320		
802.11ac(VHT20)	U-NII 3	149	17.680		
		157	17.600		
		165	17.600		
802.11ac(VHT40)	U-NII 3	151	36.320		
		159	36.400		

Test plot as follows:

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

802.11n(HT40)	802.11ac(VHT20)
	
CH151	CH149
	
CH159	CH157
	
	CH165

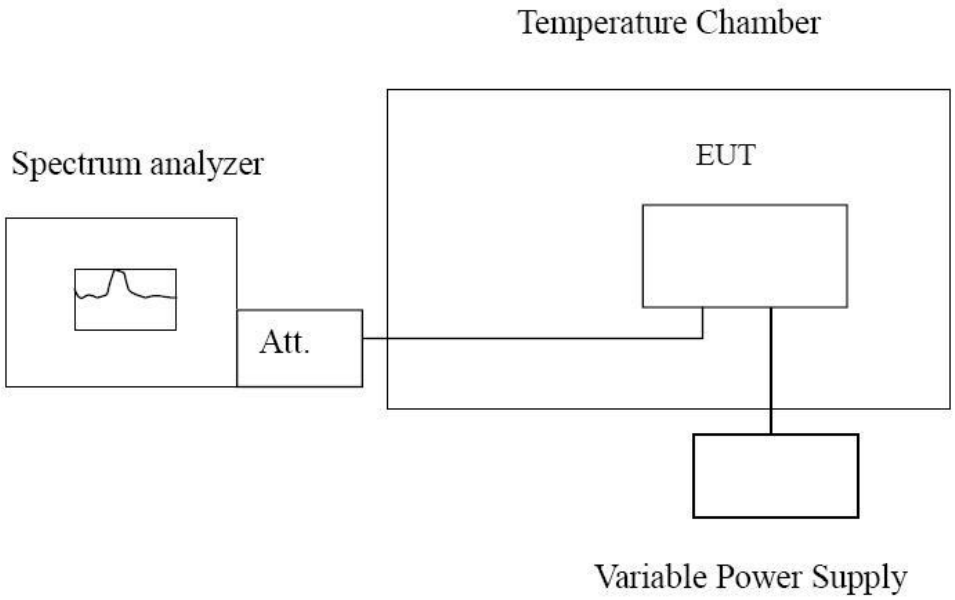
802.11ac(VHT40)	
	
CH151	
	
CH159	

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:

Reference Frequency: 802.11ac channel=36 frequency=5180MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	135.68	0.02619	Within the band of operation	Pass
	-20	153.24	0.02958		
	-10	195.24	0.03769		
	0	126.78	0.02447		
	10	146.69	0.02832		
	20	179.58	0.03467		
	30	146.25	0.02823		
	40	146.20	0.02822		
	50	130.08	0.02511		
13.2	20	181.61	0.03506		
10.8	20	173.24	0.03344		

Reference Frequency: 802.11ac channel=149 frequency=5745MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	174.32	0.03034	Within the band of operation	Pass
	-20	153.16	0.02666		
	-10	154.25	0.02685		
	0	148.98	0.02593		
	10	186.84	0.03252		
	20	172.51	0.03003		
	30	143.22	0.02493		
	40	163.27	0.02842		
	50	158.26	0.02755		
13.2	20	161.84	0.02817		
10.8	20	149.54	0.02603		

4.8 Automatically Discontinue Transmission

Standard Applicable

FCC CFR Title 47 Part 15 Subpart C Section 15.407(c):

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

Test Result:

Declared by applicants that the device will automatically discontinue transmission in case of either absence of information to transmit or operational failure.

4.9 Band edge for RF Conducted Emissions

Limit

1) For transmitters operating in the 5.15 – 5.25 GHz band: All emissions outside of the 5.15 – 5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

2) For transmitters operating solely in the 5.725 – 5.850 GHz band.

All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

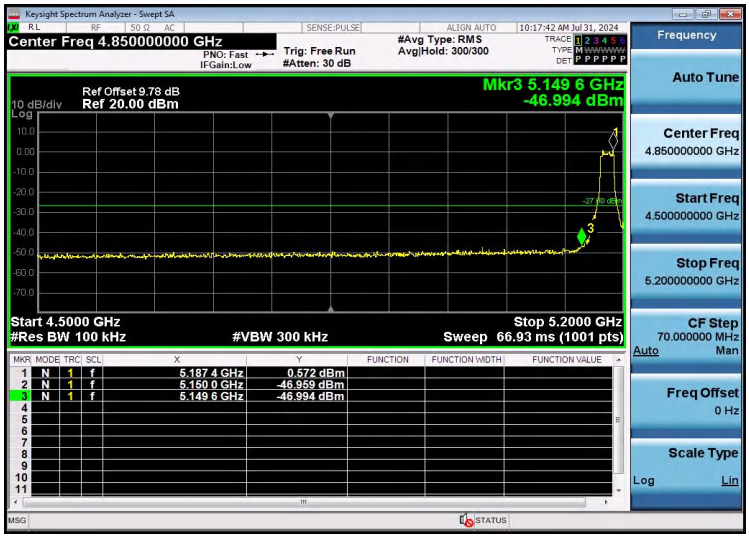
Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold.

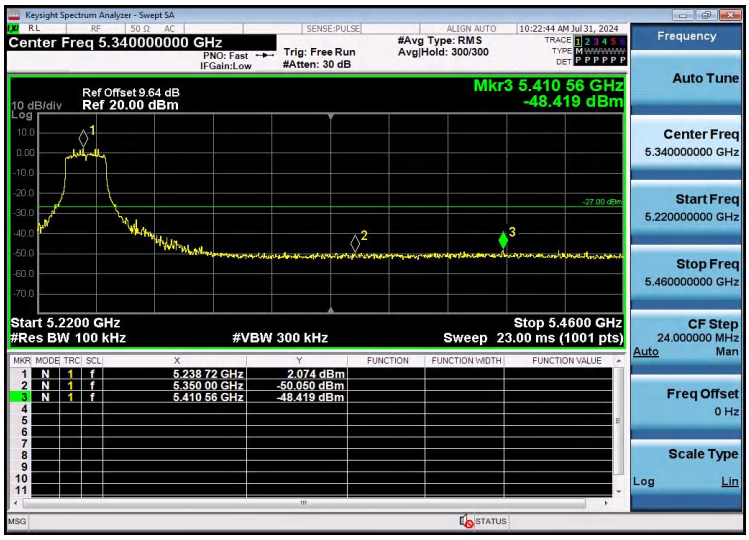
Test Configuration

Test Results

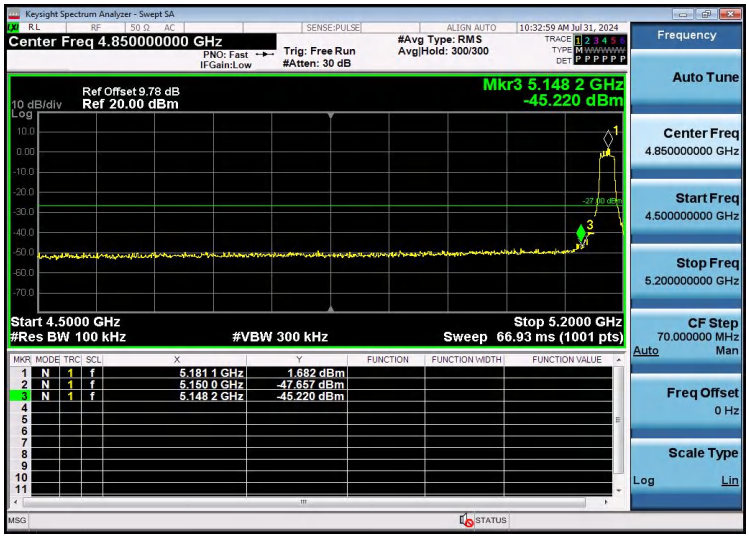
Test plot as follows:



11A-Ant1-5180-PASS

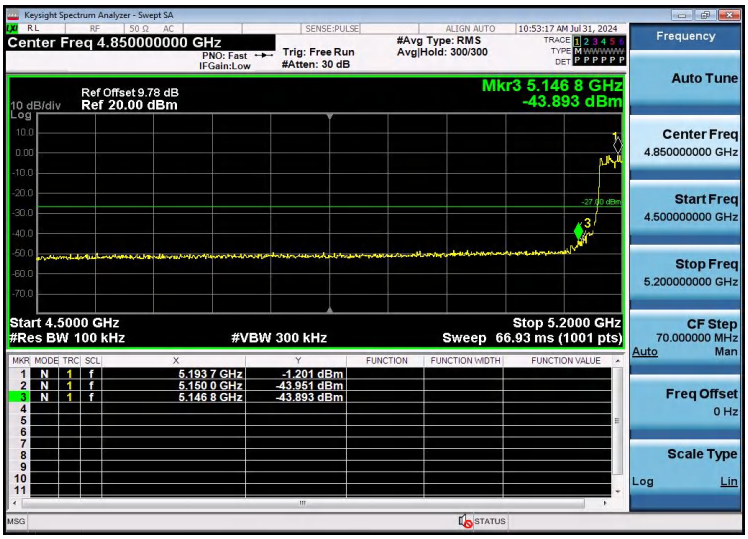


11A-Ant1-5240-PASS

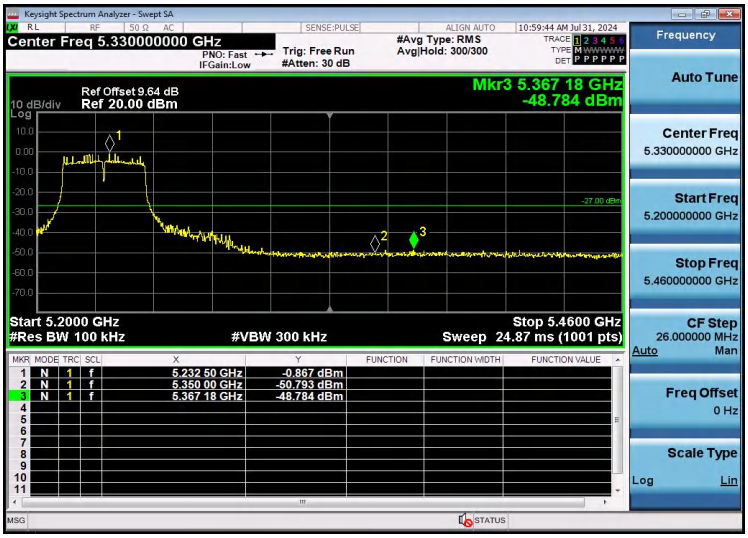


11N20SISO-Ant1-5180-PASS

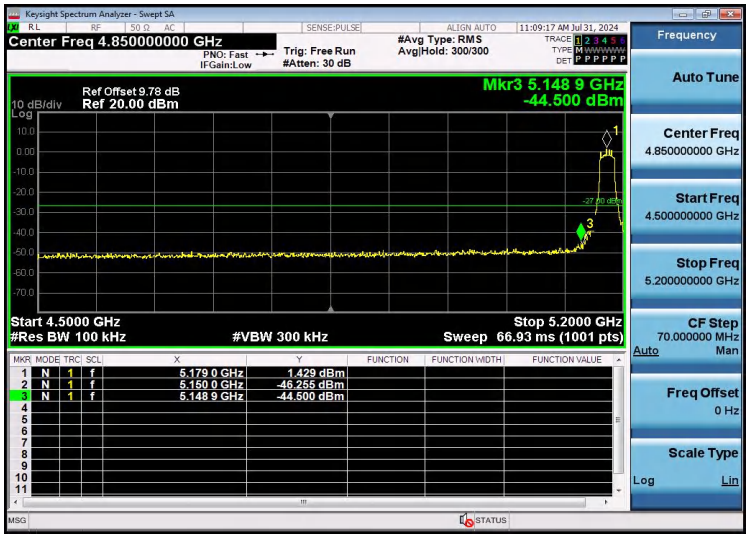
11N20SISO-Ant1-5240-PASS



11N40SISO-Ant1-5190-PASS

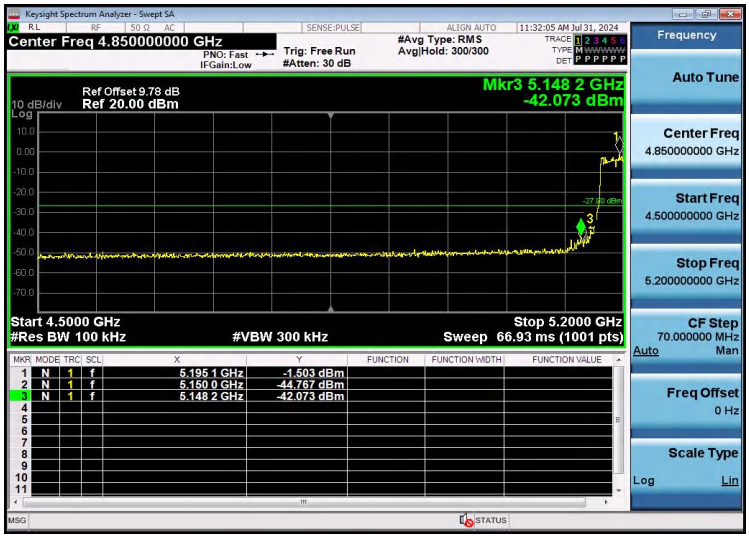


11N40SISO-Ant1-5230-PASS

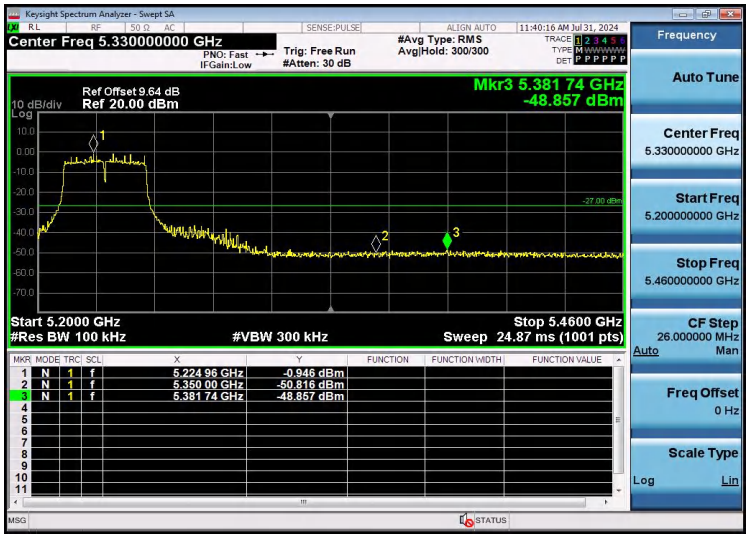


11AC20SISO-Ant1-5180-PASS

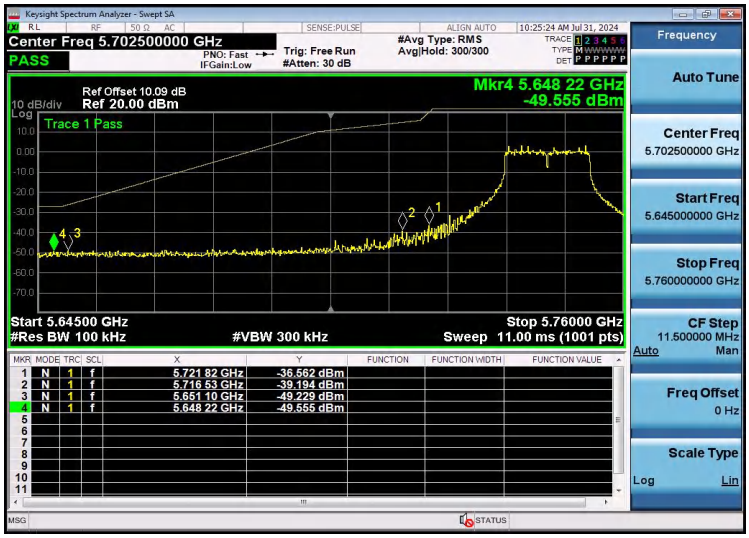
11AC20SISO-Ant1-5240-PASS



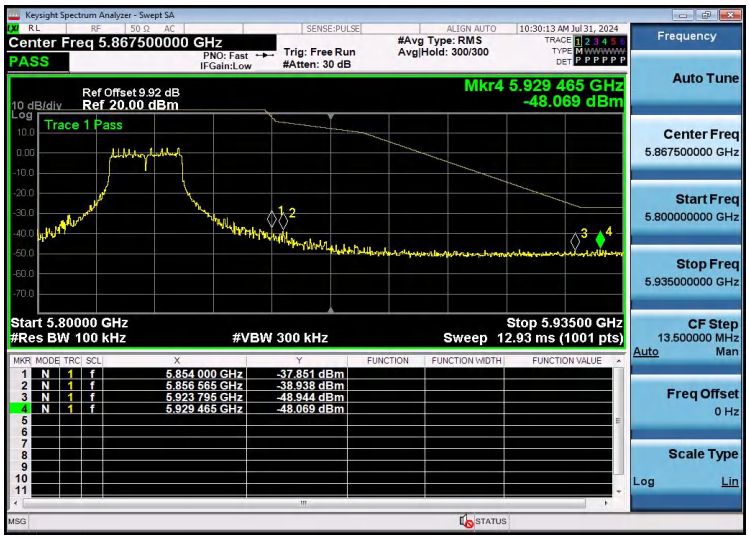
11AC40SISO-Ant1-5190-PASS



11AC40SISO-Ant1-5230-PASS

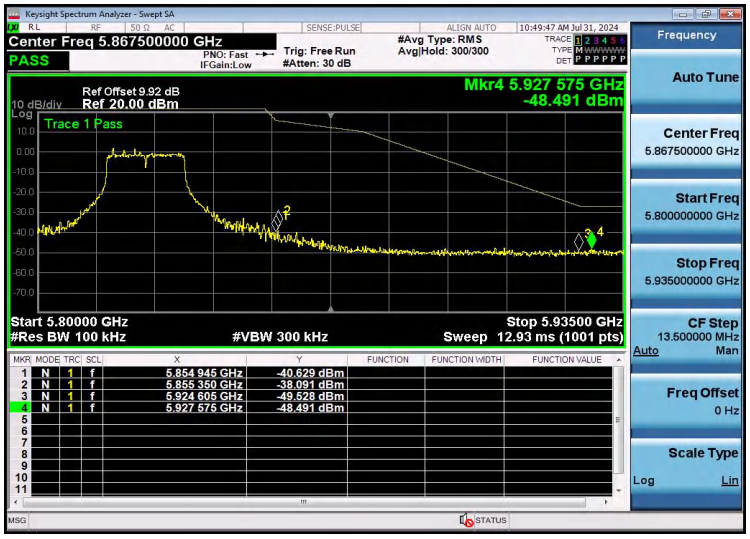


11A-Ant1-5745-PASS



11A-Ant1-5825-PASS

11N20SISO-Ant1-5745-PASS



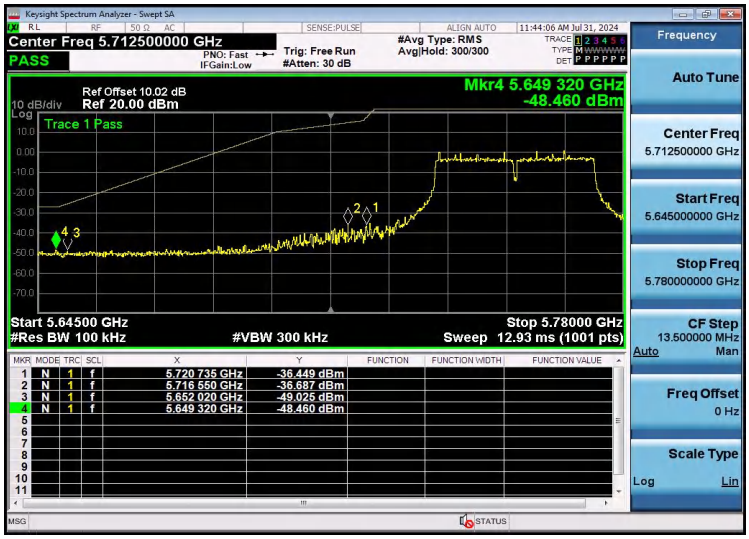
11N20SISO-Ant1-5825-PASS

11N40SISO-Ant1-5755-PASS

11N40SISO-Ant1-5795-PASS

11AC20SISO-Ant1-5745-PASS

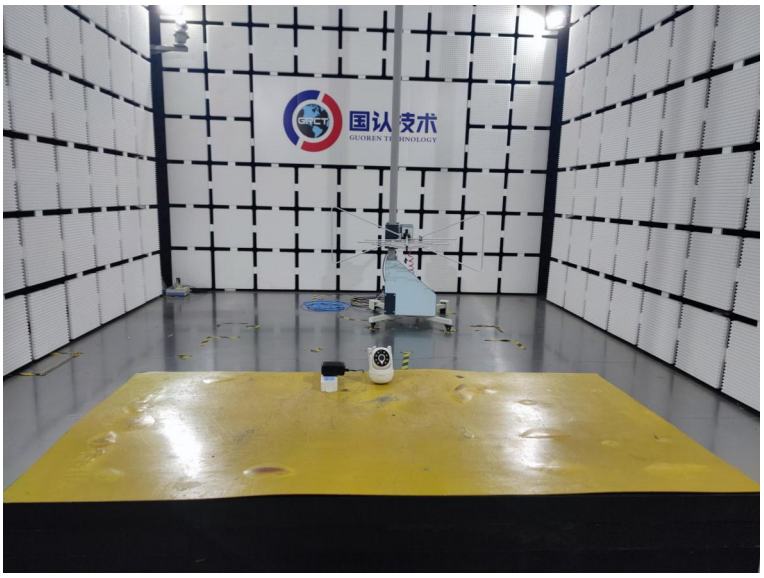
11AC20SISO-Ant1-5825-PASS

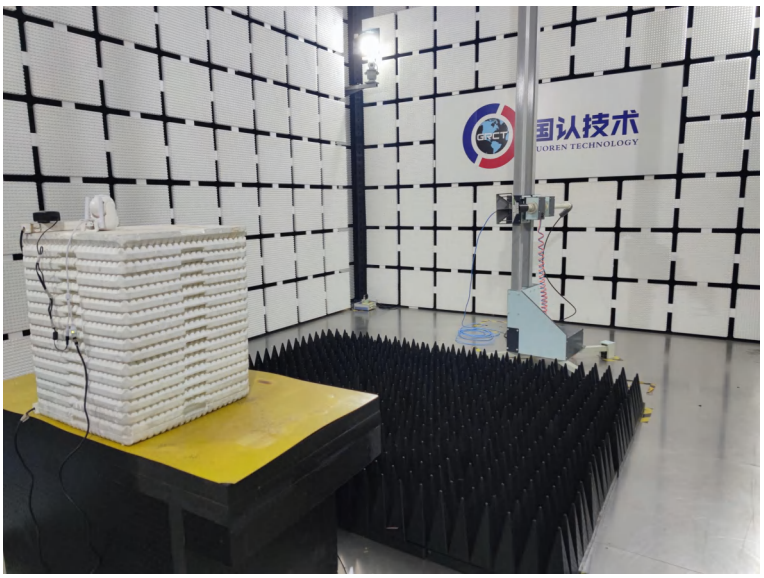


11AC40SISO-Ant1-5755-PASS

11AC40SISO-Ant1-5795-PASS

5 Test Setup Photos of the EUT





6 Photos of the EUT

Reference to the test report No. **GRCTR240702032-01.**

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