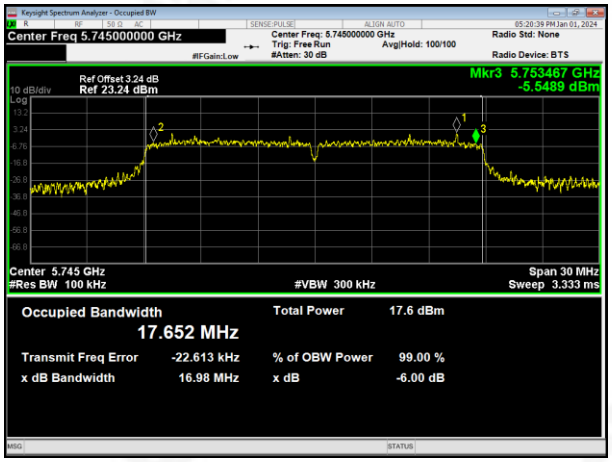
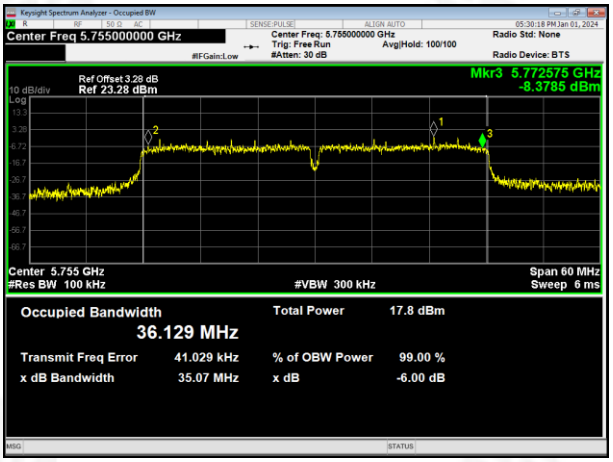
5.8G Test plot

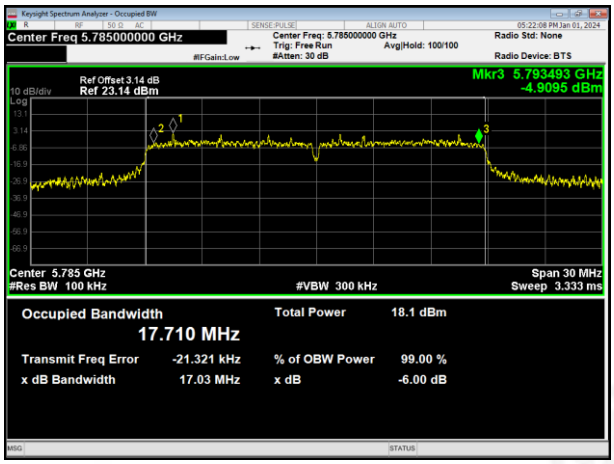
(802.11n20) 6dB Bandwidth plot on channel 149



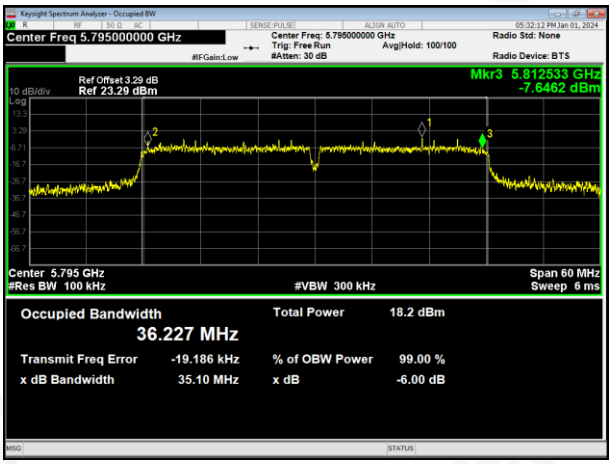
(802.11n40) 6dB Bandwidth plot on channel 151



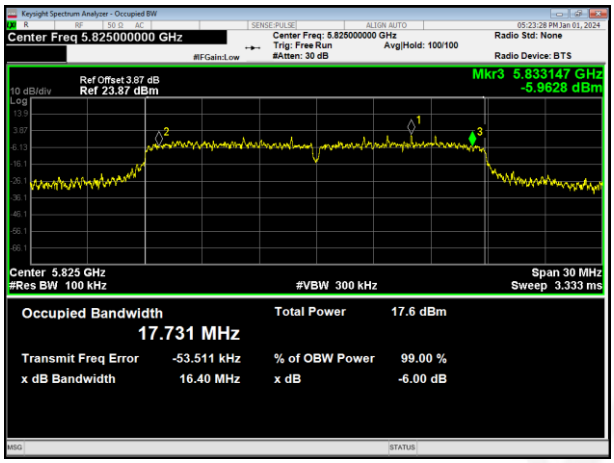
(802.11n20) 6dB Bandwidth plot on channel 157



(802.11n40) 6dB Bandwidth plot on channel 159

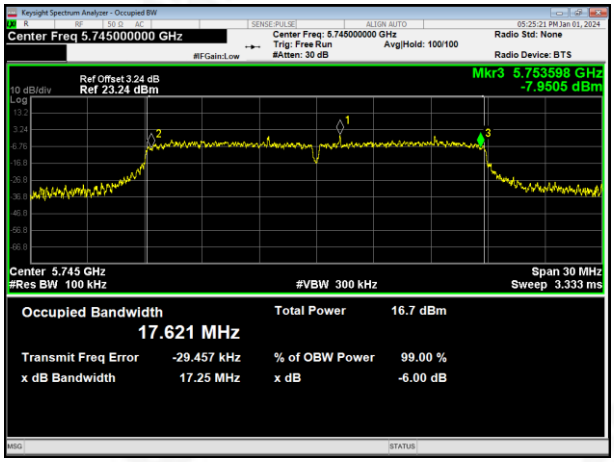


(802.11n20) 6dB Bandwidth plot on channel 165

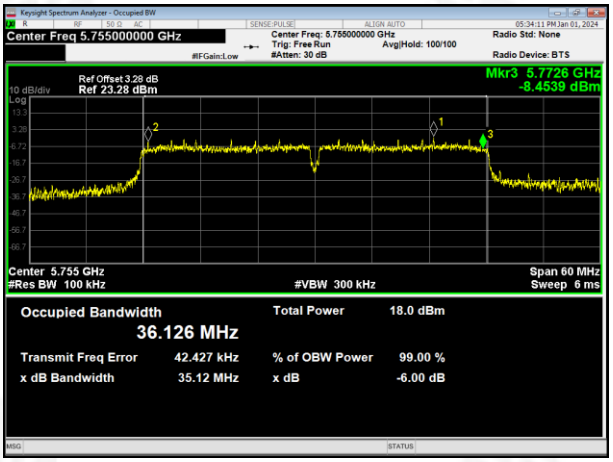


5.8G Test plot

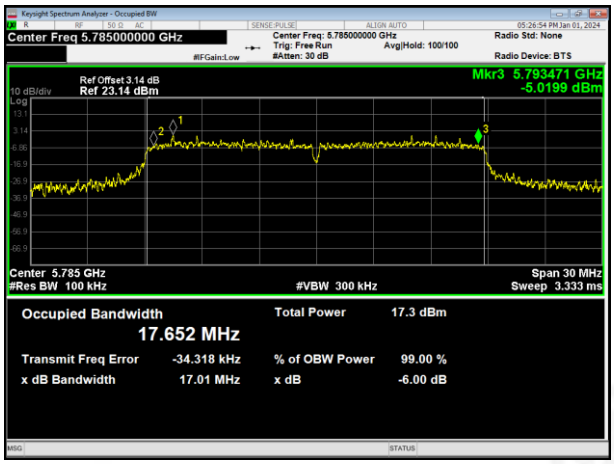
(802.11ac20) 6dB Bandwidth plot on channel 149



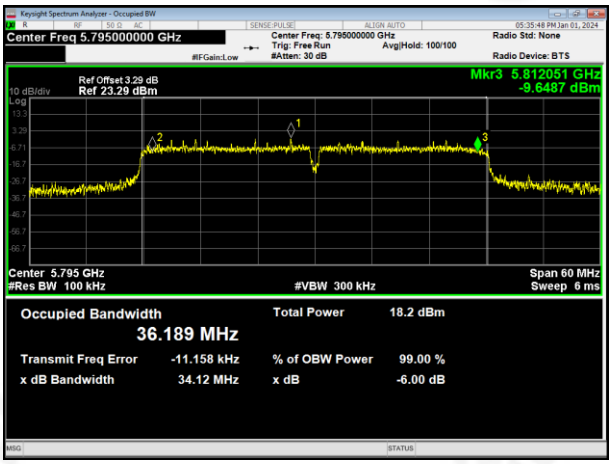
(802.11ac40) PSD plot on channel 151



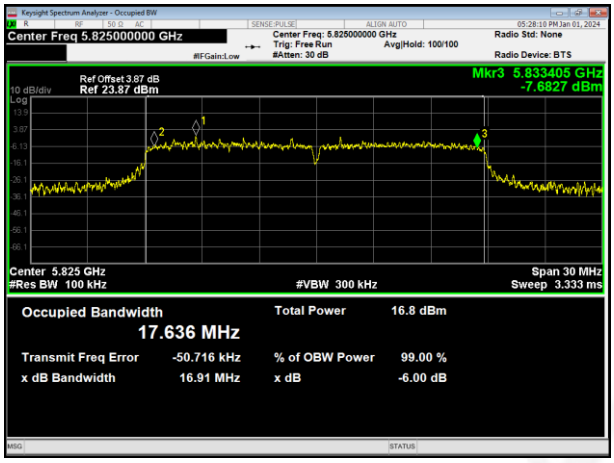
(802.11ac20) 6dB Bandwidth plot on channel 157



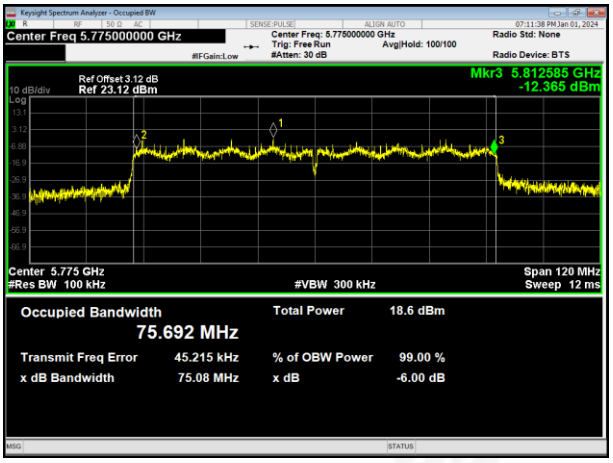
(802.11ac40) PSD plot on channel 159



(802.11ac20) 6dB Bandwidth plot on channel 165



(802.11ac80) PSD plot on channel 155



7.MAXIMUM CONDUCTED OUTPUT POWER

7.1 PPLIED PROCEDURES / LIMIT

According to FCC §15.407
The maximum conduced output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW
5725~5850	1W

7.2 TEST PROCEDURE

The EUT was directly connected to the Power meter

1. Device Configuration
If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).
a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.
b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

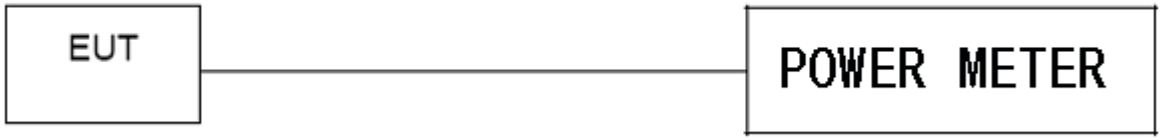
2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)
Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.1 However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).
a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:
• The EUT transmits continuously (or with a duty cycle ≥ 98 percent).
• Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.
(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.
(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold) shall be applied if the conditions of (i) and (ii) cannot be achieved.
b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 19V
Test Band :	5.2G		

802.11 a Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH36	5180	8.207	2.42	10.627	23.98	Pass
CH40	5200	9.456	2.42	11.876	23.98	Pass
CH48	5240	9.736	2.42	12.156	23.98	Pass
802.11 n20 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH36	5180	8.752	2.55	11.302	23.98	Pass
CH40	5200	8.951	2.55	11.501	23.98	Pass
CH48	5240	9.112	2.55	11.662	23.98	Pass
802.11 n40 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH38	5190	7.329	2.56	9.889	23.98	Pass
CH46	5230	7.639	2.56	10.199	23.98	Pass
802.11 ac20 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH36	5180	8.017	2.56	10.577	23.98	Pass
CH40	5200	7.927	2.56	10.487	23.98	Pass
CH48	5240	8.148	2.56	10.708	23.98	Pass
802.11 ac40 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH38	5190	7.340	4.16	11.500	23.98	Pass
CH46	5230	6.688	4.16	10.848	23.98	Pass
802.11 ac80 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH42	5210	5.297	6.23	11.527	23.98	Pass
Note: duty cycle Factor see page 86.						

Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 19V
Test Band :	5.8G		

802.11 a Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH149	5745	9.951	2.43	12.381	30	Pass
CH157	5785	11.008	2.43	13.438	30	Pass
CH165	5825	8.640	2.43	11.07	30	Pass
802.11 n20 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH149	5745	9.684	2.53	12.214	30	Pass
CH157	5785	9.901	2.53	12.431	30	Pass
CH165	5825	9.707	2.53	12.237	30	Pass
802.11 n40 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH151	5755	8.364	4.21	12.574	30	Pass
CH159	5795	8.748	4.21	12.958	30	Pass
802.11 ac20 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH149	5745	8.916	2.52	11.436	30	Pass
CH157	5785	9.168	2.52	11.688	30	Pass
CH165	5825	8.676	2.52	11.196	30	Pass
802.11 ac40 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH151	5755	8.335	4.12	12.455	30	Pass
CH159	5795	8.248	4.12	12.368	30	Pass
802.11 ac80 Mode						
Test Channel	Frequency (MHz)	Output power (dBm)	duty cycle Factor (dB)	Total power (dBm)	Limit (dBm)	Result
CH155	5775	6.983	6.26	13.243	30	Pass
Note: duty cycle Factor see page 90.						

8.OUT OF BAND EMISSIONS

8.1 APPLICABLE STANDARD

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(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)

(i) 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.

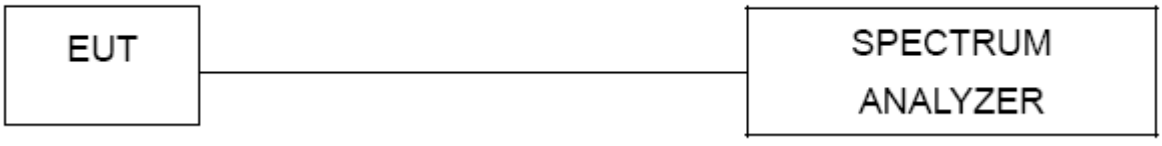
8.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

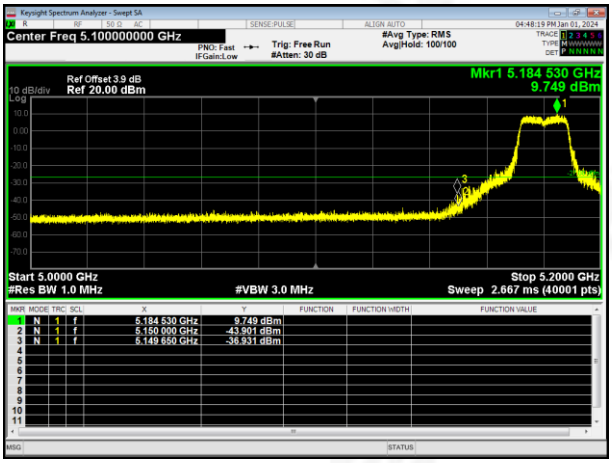
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

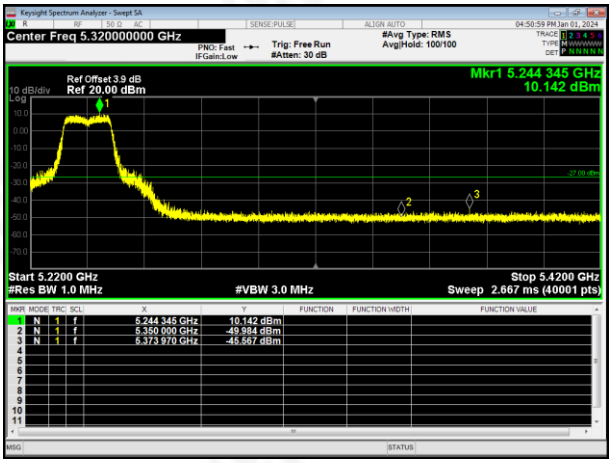
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage：	DC 19V
Test band：	5.2G	Antenna gain：	3.79dBi

5.180~5.240 GHz

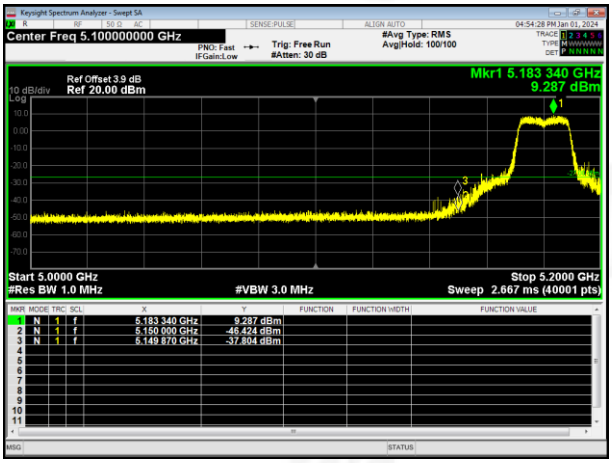
(802.11a) Band Edge, Left Side



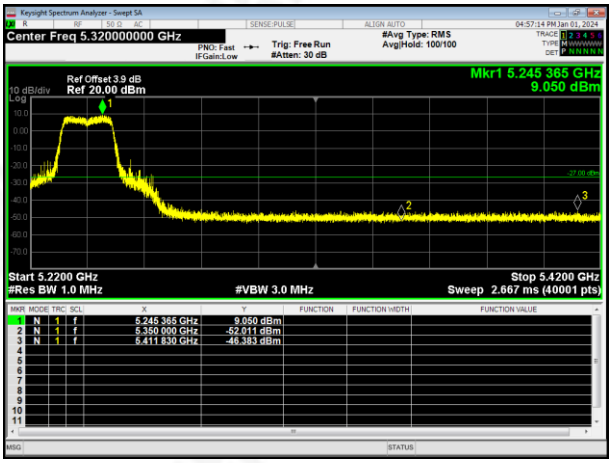
(802.11a) Band Edge, Right Side



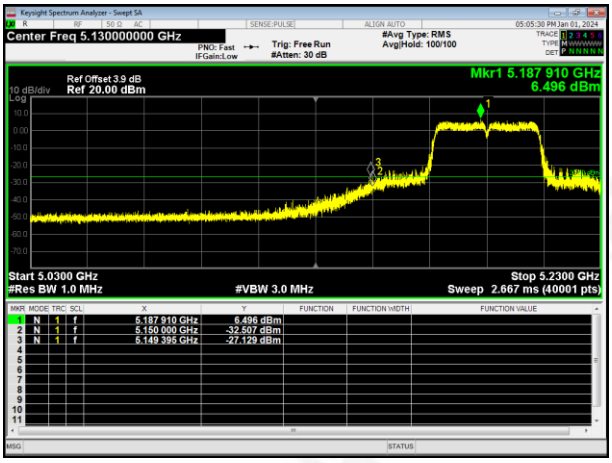
(802.11n20) Band Edge, Left Side



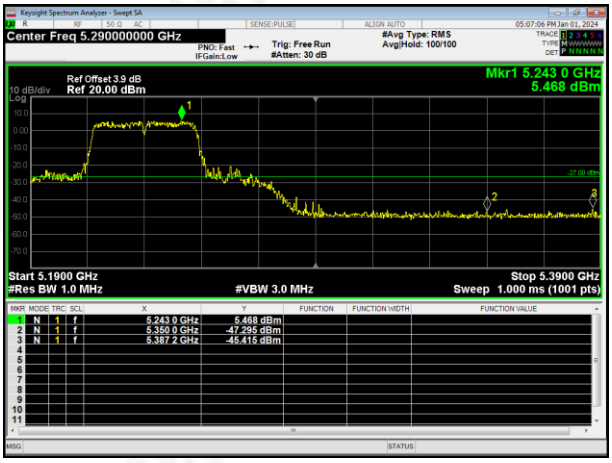
(802.11n20) Band Edge, Right Side



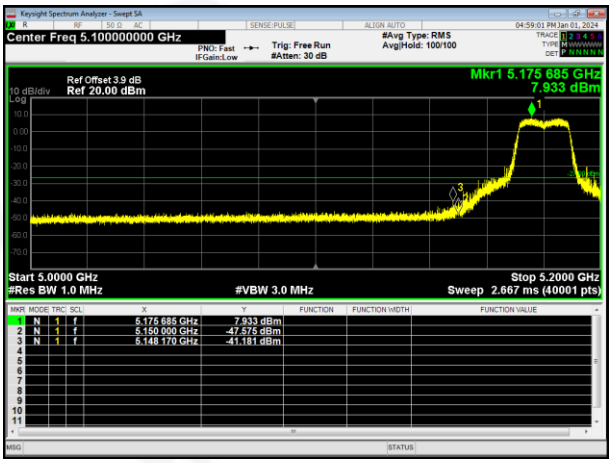
(802.11n40) Band Edge, Left Side



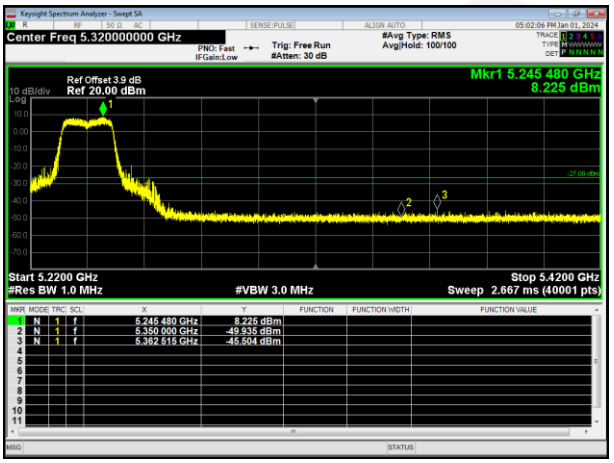
(802.11n40) Band Edge, Right Side



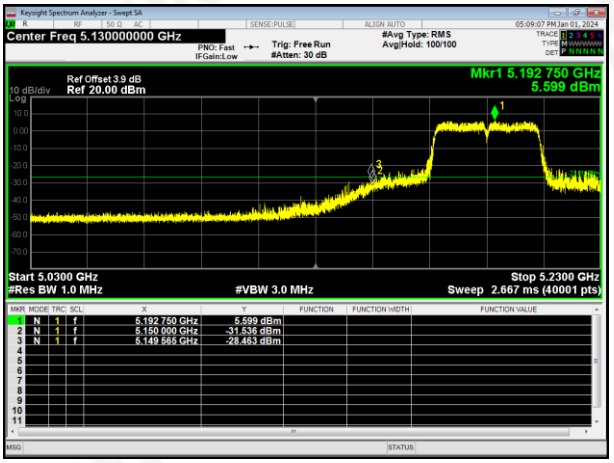
(802.11ac20) Band Edge, Left Side



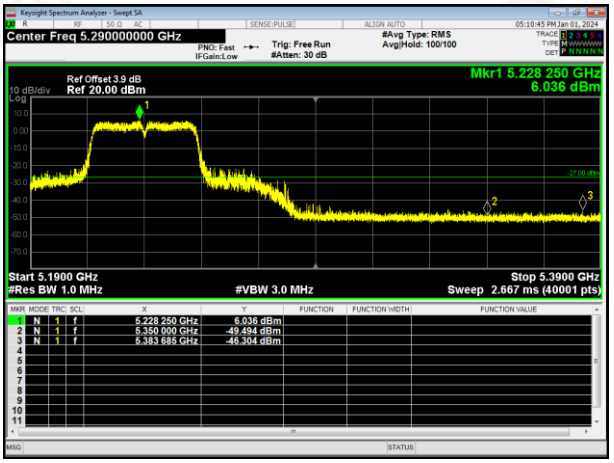
(802.11ac20) Band Edge, Right Side



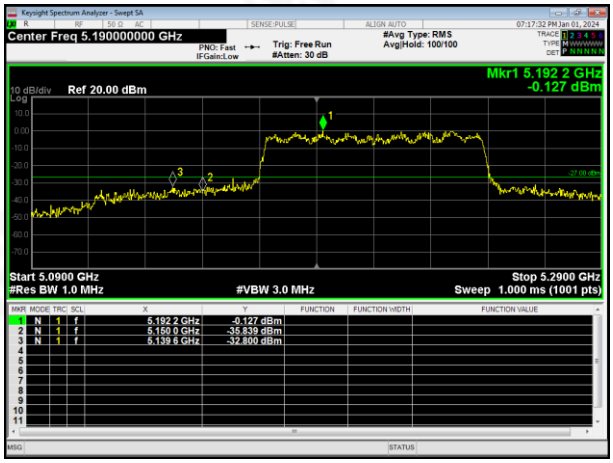
(802.11ac40) Band Edge, Left Side



(802.11ac40) Band Edge, Right Side



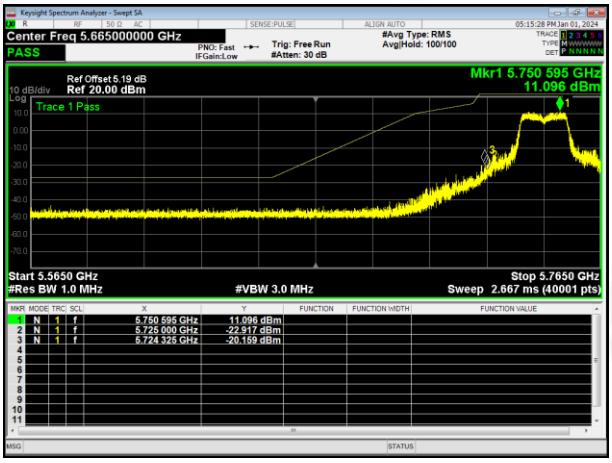
(802.11ac80) Band Edge, Left Side



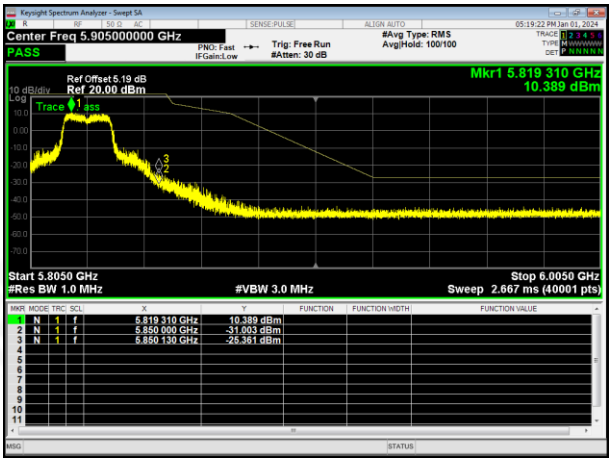
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage：	DC 19V
Test band：	5.8G	Antenna gain：	3.27dBi

5.745~5.825 GHz

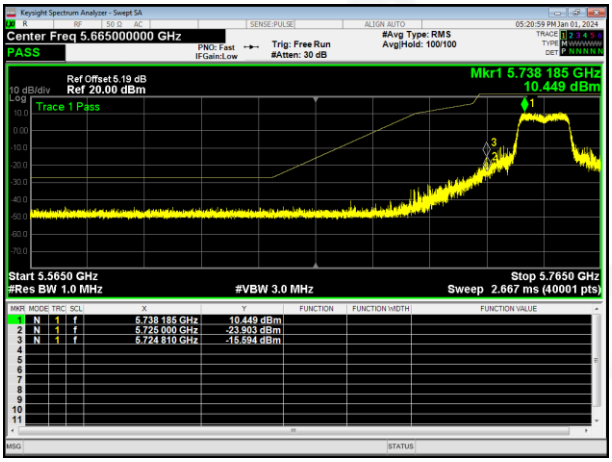
(802.11a) Band Edge, Left Side



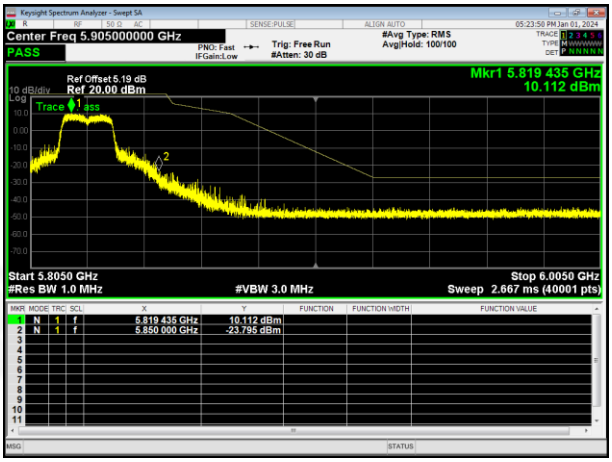
(802.11a) Band Edge, Right Side



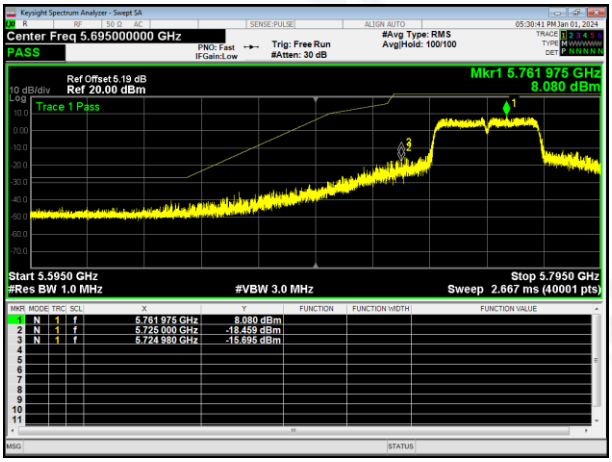
(802.11n20) Band Edge, Left Side



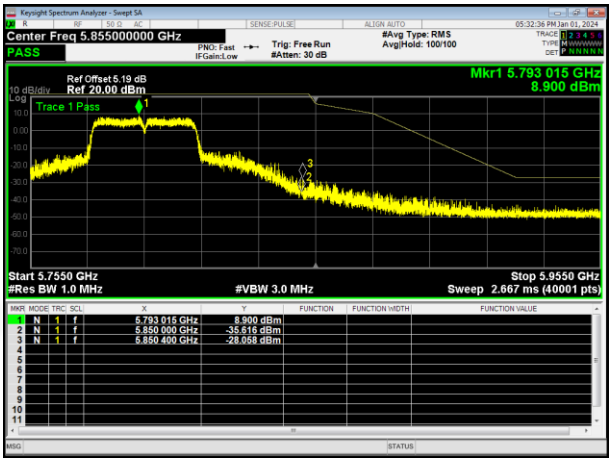
(802.11n20) Band Edge, Right Side



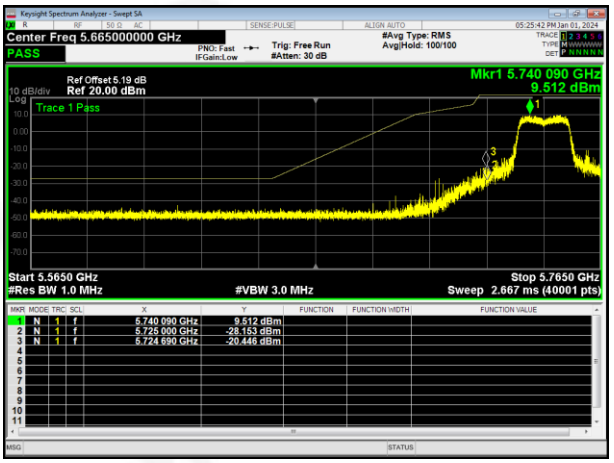
(802.11n40) Band Edge, Left Side



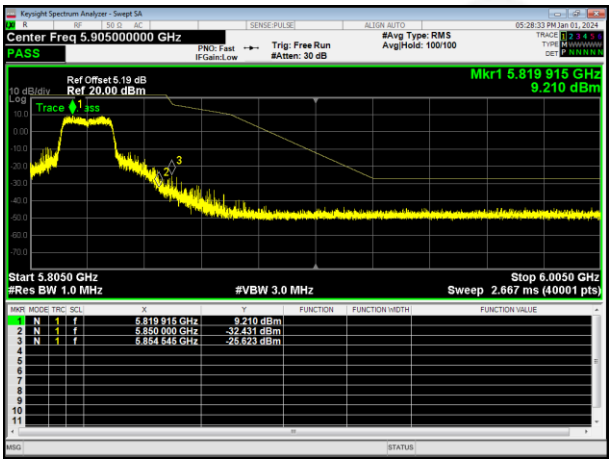
(802.11n40) Band Edge, Right Side



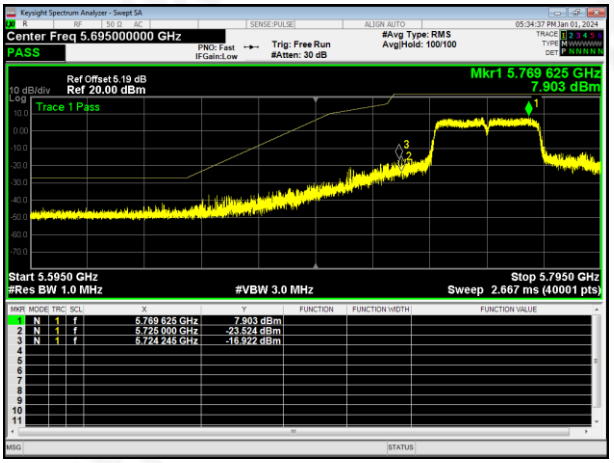
(802.11ac20) Band Edge, Left Side



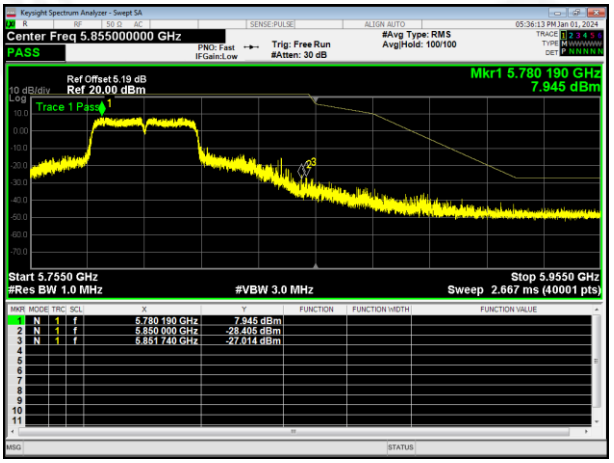
(802.11ac20) Band Edge, Right Side



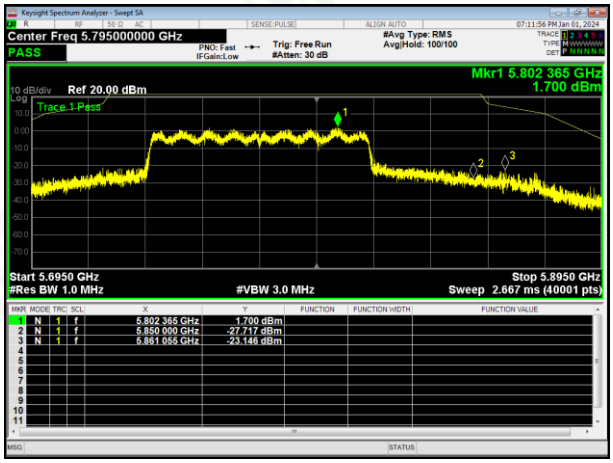
(802.11ac40) Band Edge, Left Side



(802.11ac40) Band Edge, Right Side



(802.11ac80) Band Edge, Left Side



9.SPURIOUS RF CONDUCTED EMISSIONS

9.1 CONFORMANCE LIMIT

Frequency Band (MHz)	Limit
5150 - 5250	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5250 - 5350	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5470 - 5725	Outside of the 5.47-5.725 GHz band: e.i.r.p. -27 dBm
5725 - 5850	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.

9.2 MEASURING INSTRUMENTS

The Measuring equipment is listed in the section 6.3 of this test report.

9.3 TEST SETUP

9.4 TEST PROCEDURE

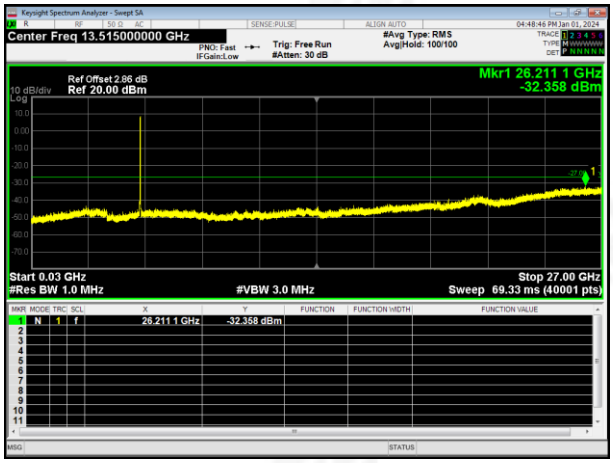
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=1MHz and VBW= 3MHz to measure the peak field strength, and measure frequency range from 30MHz to 26.5GHz.

9.5 TEST RESULTS

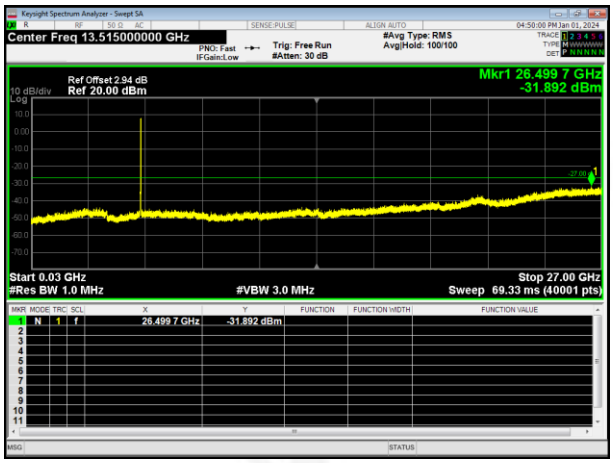
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage：	DC 19V
Test band：	5.2G & 5.8G		
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. And above 26.5GHz of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.			

5.2G Test Plot

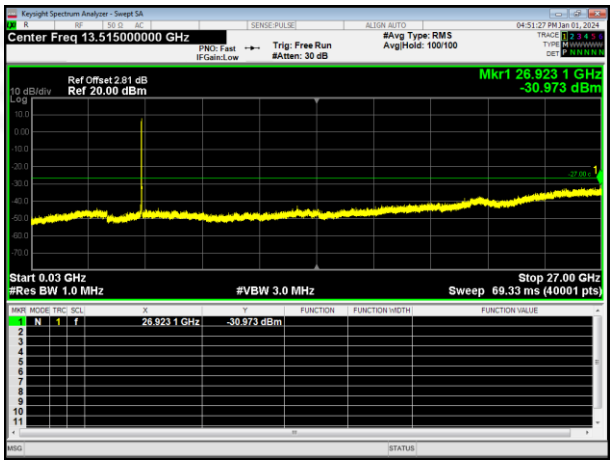
802.11a on channel 36



802.11a on channel 40

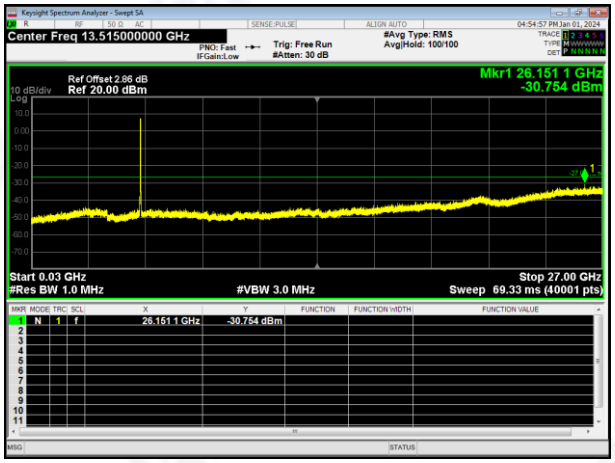


802.11a on channel 48

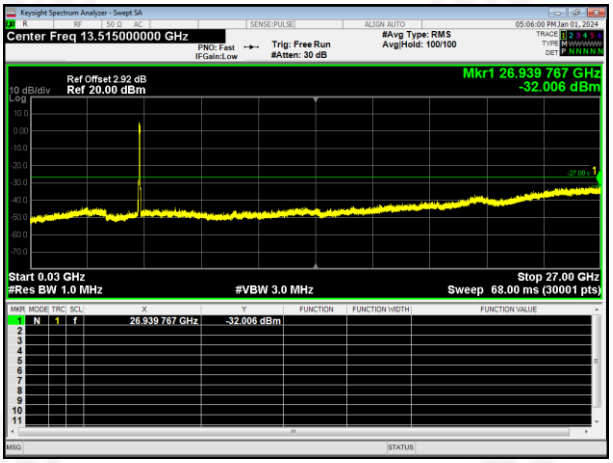


5.2G Test Plot

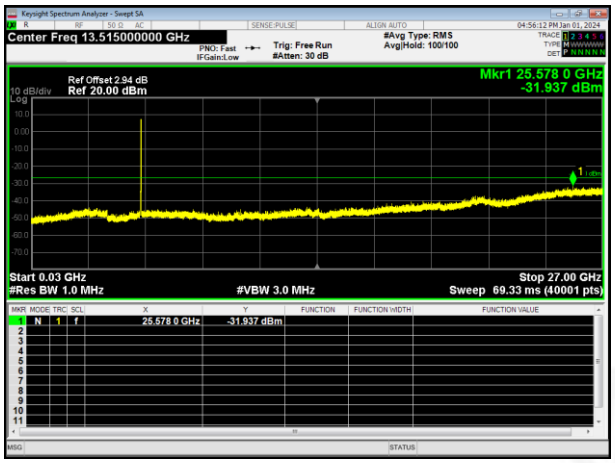
802.11n20 on channel 36



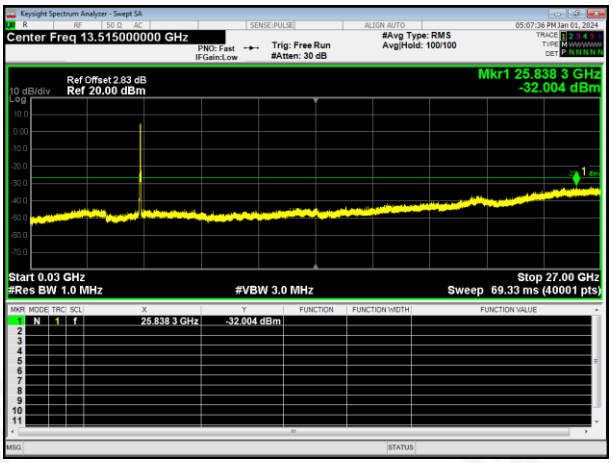
802.11n40 on channel 38



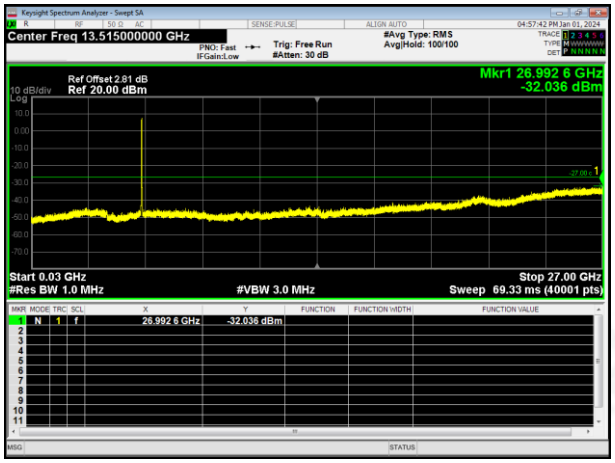
802.11n20 on channel 40



802.11n40 on channel 46

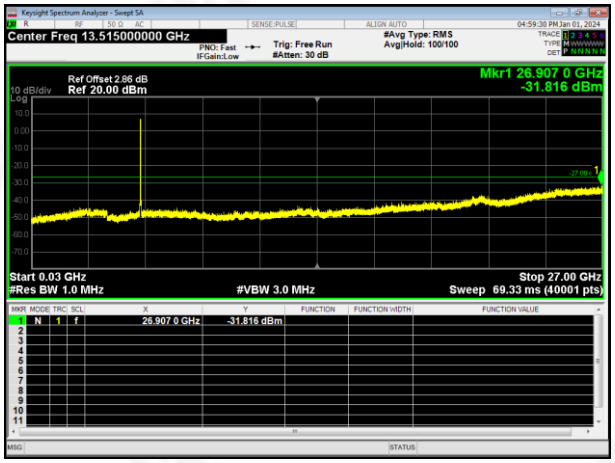


802.11n20 on channel 48

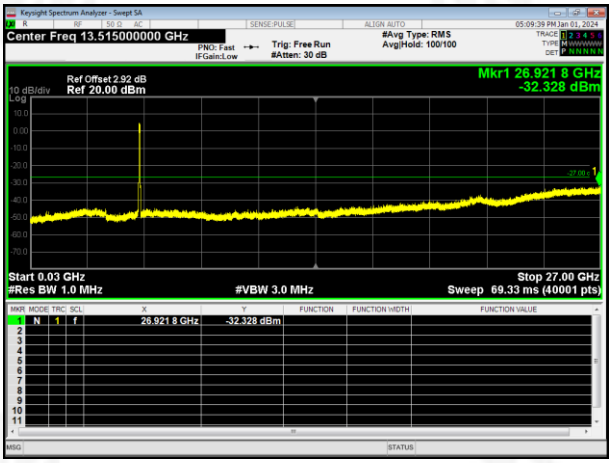


5.2G Test Plot

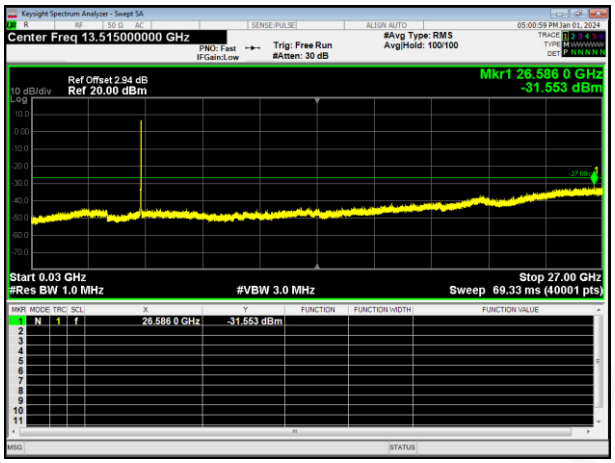
802.11ac20 on channel 36



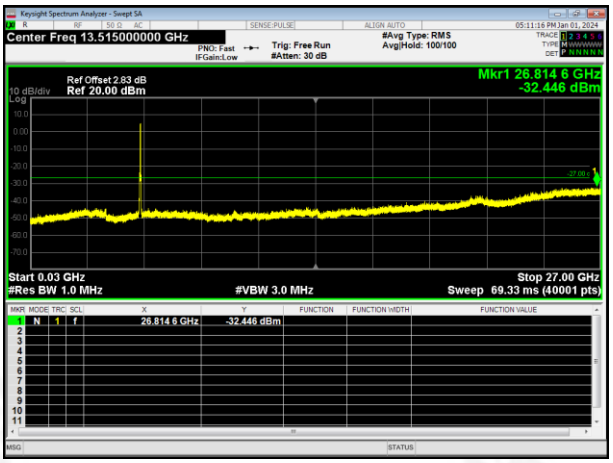
802.11ac40 on channel 46



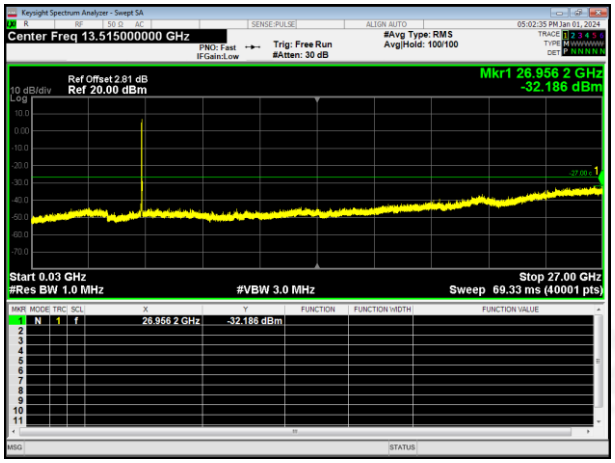
802.11ac20 on channel 40



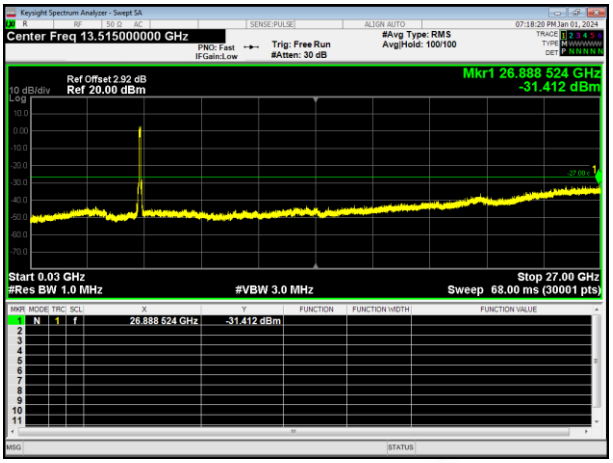
802.11ac40 on channel 46



802.11ac20 on channel 48

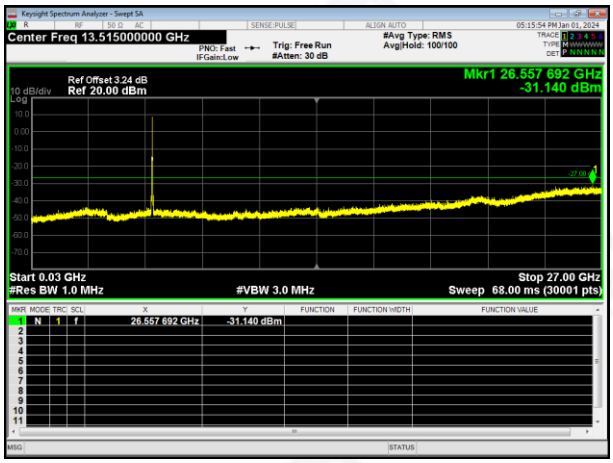


802.11ac80 on channel 42

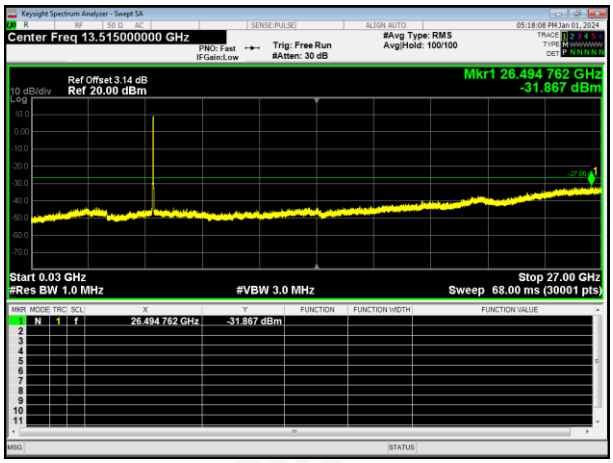


5.8G Test Plot

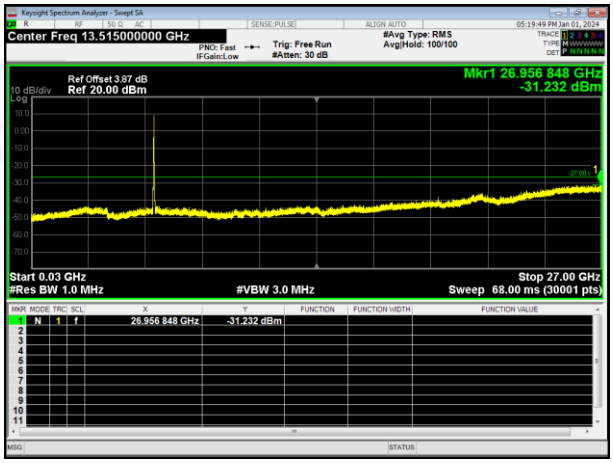
802.11a on channel 149



802.11a on channel 157

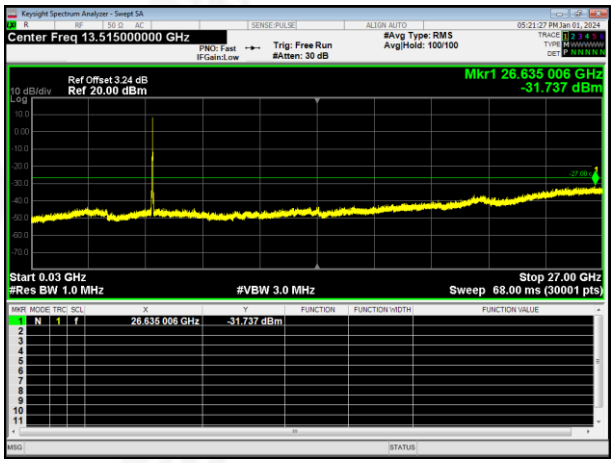


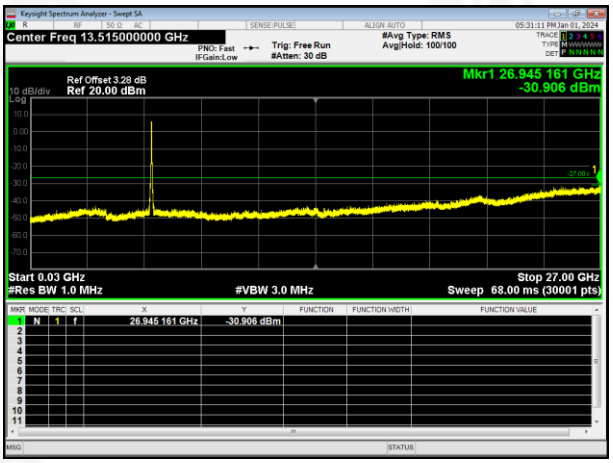
802.11a on channel 165



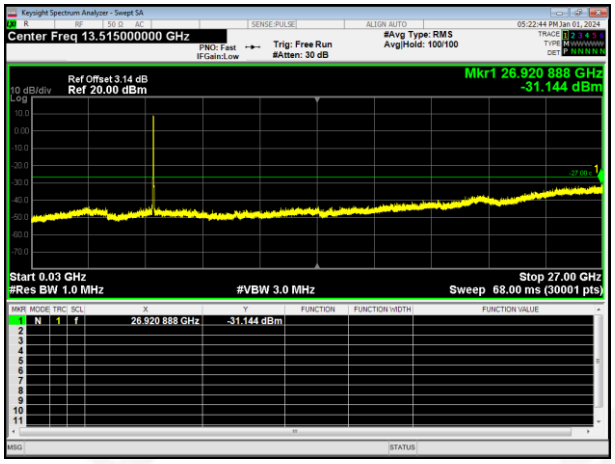
5.8G Test Plot

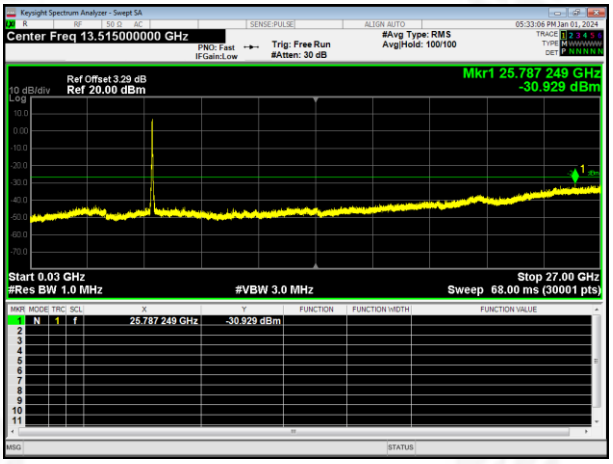
802.11n20 on channel 149



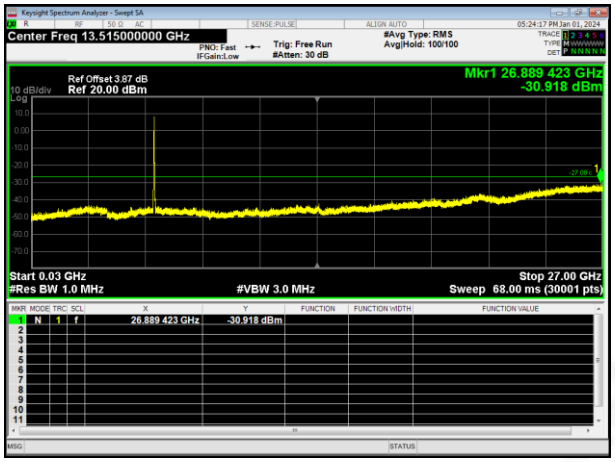


802.11n20 on channel 157



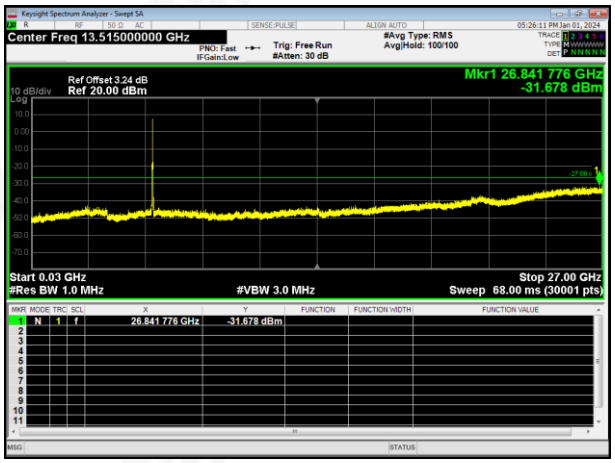


802.11n20 on channel 165

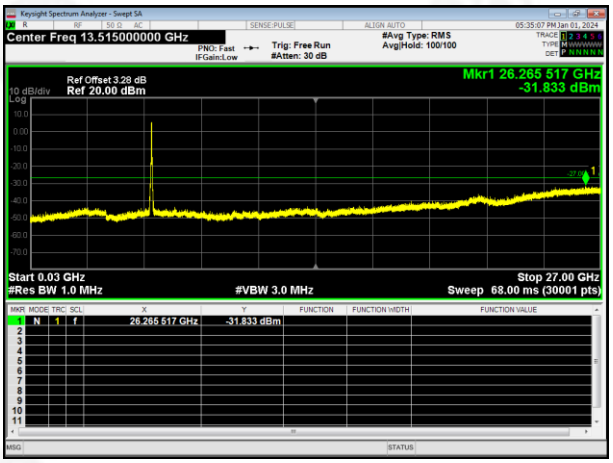


5.8G Test Plot

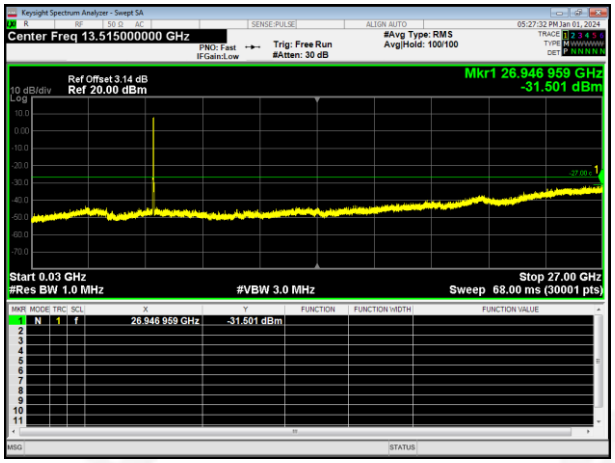
802.11ac20 on channel 149



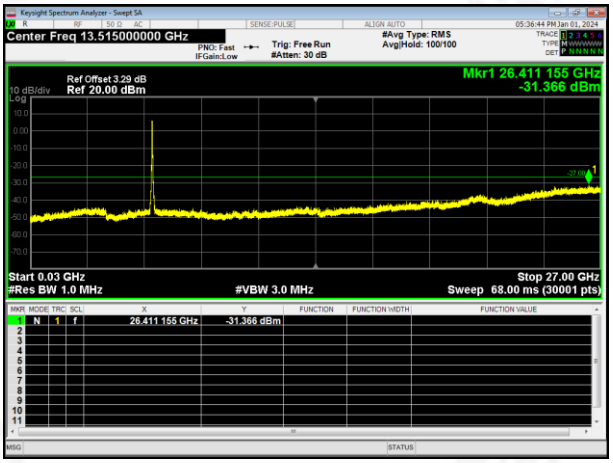
802.11ac40 on channel 159



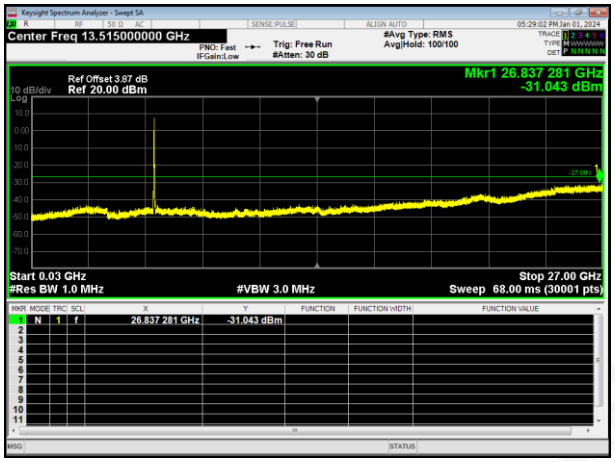
802.11ac20 on channel 157



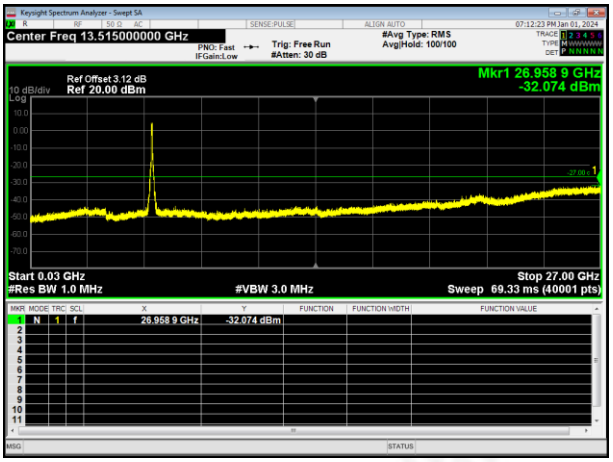
802.11ac40 on channel 159



802.11ac20 on channel 165



802.11ac40 on channel 155



10.Frequency Stability Measurement

10.1 LIMIT

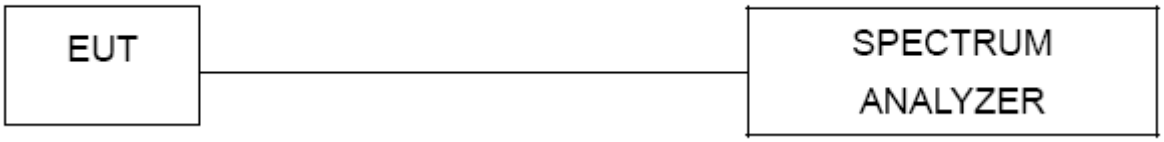
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

10.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

10.3 TEST SETUP LAYOUT



10.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

10.5 TEST RESULTS

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	DC 19V
Test Band ：	5.2G & 5.8G		
Note: All channels have been tested, and only the worst test data is recorded in this report.			

5.2G:

802.11a

Reference Frequency(Middle Channel): 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	56	0.01002
40	19	45	0.00766
30	19	33	0.00616
20	19	28	0.00459
10	19	24	0.00427
0	19	15	0.00279
-10	19	14	0.00271
-20	19	24	0.00408
-30	19	37	0.00630

802.11 n20

Reference Frequency(Middle Channel): 5180 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	62	0.01121
40	19	52	0.00918
30	19	42	0.00782
20	19	32	0.00587
10	19	23	0.00432
0	19	26	0.00483
-10	19	22	0.00414
-20	19	36	0.00656
-30	19	40	0.00787

802.11n40

Reference Frequency(Middle Channel): 5190MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	61	0.01087
40	19	52	0.00902
30	19	43	0.00779
20	19	44	0.00793
10	19	34	0.00621
0	19	22	0.00414
-10	19	36	0.00656
-20	19	43	0.00777
-30	19	51	0.00914

802.11ac20

Reference Frequency(Middle Channel): 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	57	0.00919
40	19	43	0.00694
30	19	31	0.00523
20	19	25	0.00382
10	19	24	0.00348
0	19	13	0.00171
-10	19	14	0.00193
-20	19	20	0.00328
-30	19	33	0.00527

802.11 ac40

Reference Frequency(Middle Channel): 5190 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	65	0.01058
40	19	52	0.00851
30	19	44	0.00707
20	19	33	0.00521
10	19	25	0.00362
0	19	27	0.00413
-10	19	23	0.00348
-20	19	38	0.00591
-30	19	45	0.00713

802.11ac80

Reference Frequency(Middle Channel): 5210MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	63	0.01057
40	19	52	0.00866
30	19	43	0.00711
20	19	41	0.00676
10	19	36	0.00589
0	19	32	0.0052
-10	19	34	0.00555
-20	19	43	0.00711
-30	19	52	0.00851

So, Frequency Stability Versus Input Voltage is:

802.11a

Reference Frequency(Middle Channel): 5180 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	56	0.01002
40	19	45	0.00766
-30	19	33	0.00616

802.11n20

Reference Frequency(Middle Channel): 5180 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	62	0.01121
40	19	52	0.00918
-30	19	42	0.00782

802.11n40

Reference Frequency(Middle Channel): 5190 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	61	0.01087
40	19	52	0.00902
-30	19	51	0.00914

802.11ac20

Reference Frequency(Middle Channel): 5180 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	57	0.00919
40	19	43	0.00694
-30	19	33	0.00527

802.11ac40

Reference Frequency(Middle Channel): 5190 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	65	0.01058
40	19	52	0.00851
-30	19	45	0.00713

802.11ac80

Reference Frequency(Middle Channel): 5210 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	63	0.01057
40	19	52	0.00866
-30	19	52	0.00851

5.8G:

802.11a

Reference Frequency(Middle Channel): 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	46	0.00815
40	19	27	0.00757
30	19	36	0.00462
20	19	23	0.00419
10	19	14	0.00306
0	19	16	0.00324
-10	19	13	0.00342
-20	19	27	0.00443
-30	19	38	0.00632

802.11n20

Reference Frequency(Middle Channel): 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	42	0.00658
40	19	24	0.00534
30	19	32	0.00385
20	19	24	0.00347
10	19	13	0.00157
0	19	12	0.00139
-10	19	13	0.00157
-20	19	21	0.00295
-30	19	32	0.00543

802.11n40

Reference Frequency(Middle Channel): 5755MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	62	0.00953
40	19	54	0.00801
30	19	42	0.00725
20	19	44	0.00759
10	19	34	0.00587
0	19	32	0.00552
-10	19	34	0.00587
-20	19	42	0.00725
-30	19	51	0.00884

802.11ac20

Reference Frequency(Middle Channel): 5745 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	43	0.00709
40	19	51	0.00648
30	19	23	0.00375
20	19	26	0.00515
10	19	23	0.00374
0	19	26	0.00415
-10	19	22	0.00346
-20	19	36	0.00588
-30	19	26	0.00462

802.11ac40

Reference Frequency(Middle Channel): 5755MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	60	0.00675
40	19	55	0.00614
30	19	47	0.00341
20	19	45	0.00481
10	19	32	0.0034
0	19	26	0.00381
-10	19	38	0.00312
-20	19	43	0.00554
-30	19	54	0.00428

802.11ac80

Reference Frequency(Middle Channel): 5775MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	19	52	0.00866
40	19	41	0.00705
30	19	43	0.00711
20	19	41	0.00676
10	19	36	0.00589
0	19	32	0.0052
-10	19	34	0.00555
-20	19	32	0.0052
-30	19	52	0.00866

So, Frequency Stability Versus Input Voltage is:

802.11a

Reference Frequency(Middle Channel): 5745 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	46	0.00815
40	19	27	0.00757
-30	19	38	0.00632

802.11n20

Reference Frequency(Middle Channel): 5745 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	42	0.00658
40	19	24	0.00534
-30	19	32	0.00543

802.11n40

Reference Frequency(Middle Channel): 5755 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	62	0.00953
40	19	54	0.00801
-30	19	51	0.00884

802.11ac20

Reference Frequency(Middle Channel): 5745 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	43	0.00709
40	19	51	0.00648
-20	19	36	0.00588

802.11ac40

Reference Frequency(Middle Channel): 5755 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	60	0.00675
40	19	55	0.00614
-20	19	43	0.00554

802.11ac80

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
50	19	52	0.00866
40	19	41	0.00705
-30	19	52	0.00866

11. DUTY CYCLE

11.1 APPLIED PROCEDURES / LIMIT

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.

b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

1) Set the center frequency of the instrument to the center frequency of the transmission.

2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.

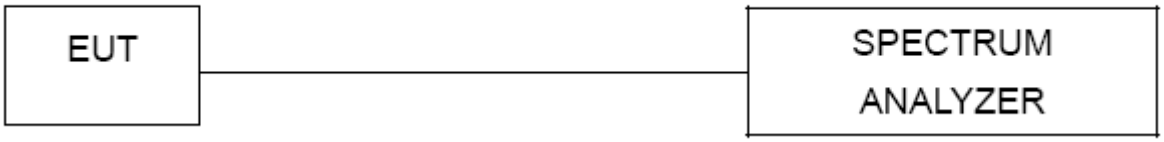
3) Set VBW ≥ RBW. Set detector = peak or average.

4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/*T* and the number of sweep points across duration *T* exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7$ μs.)

11.2 DEVIATION FROM STANDARD

No deviation.

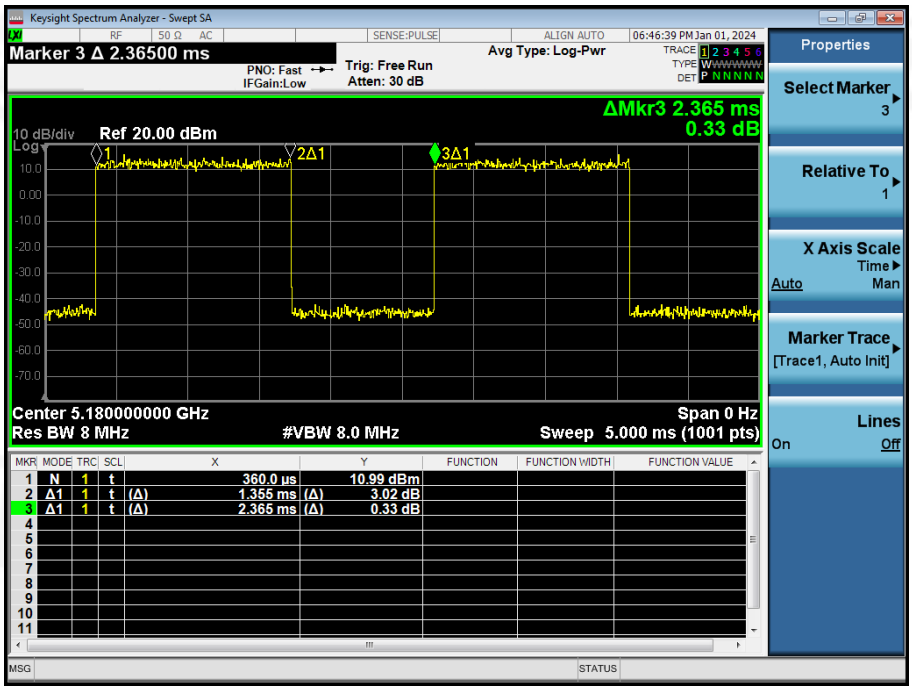
11.3 TEST SETUP



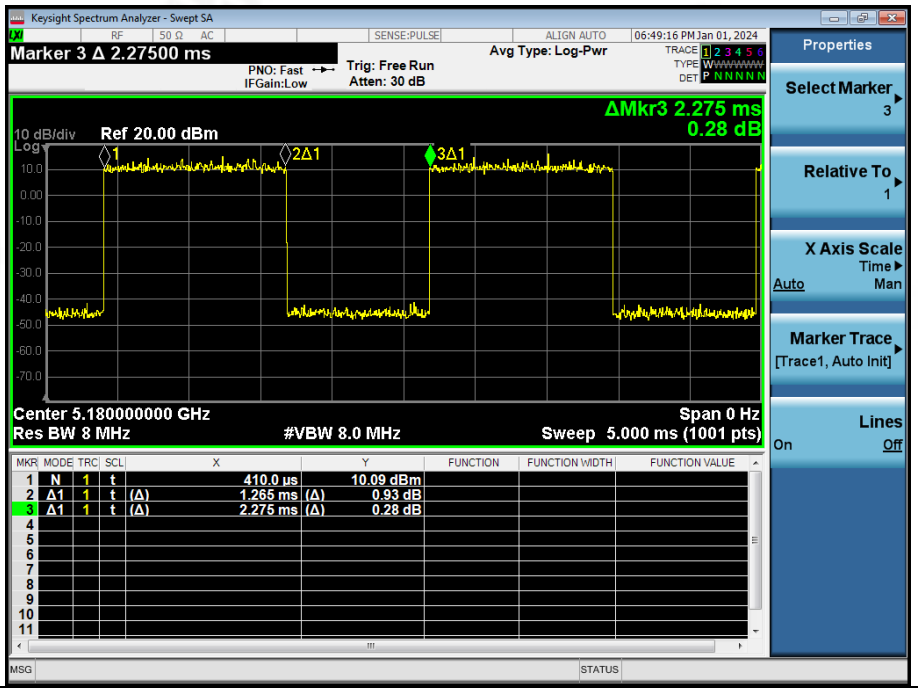
11.4 TEST RESULTS

5.2G				
Mode	Frequency (MHz)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Result
802.11a	5180	57.29	2.42	Pass
802.11n20	5180	55.60	2.55	Pass
802.11n40	5190	38.57	2.56	Pass
802.11ac20	5180	55.48	2.56	Pass
802.11ac40	5190	38.35	4.16	Pass
802.11ac80	5210	23.81	6.23	Pass

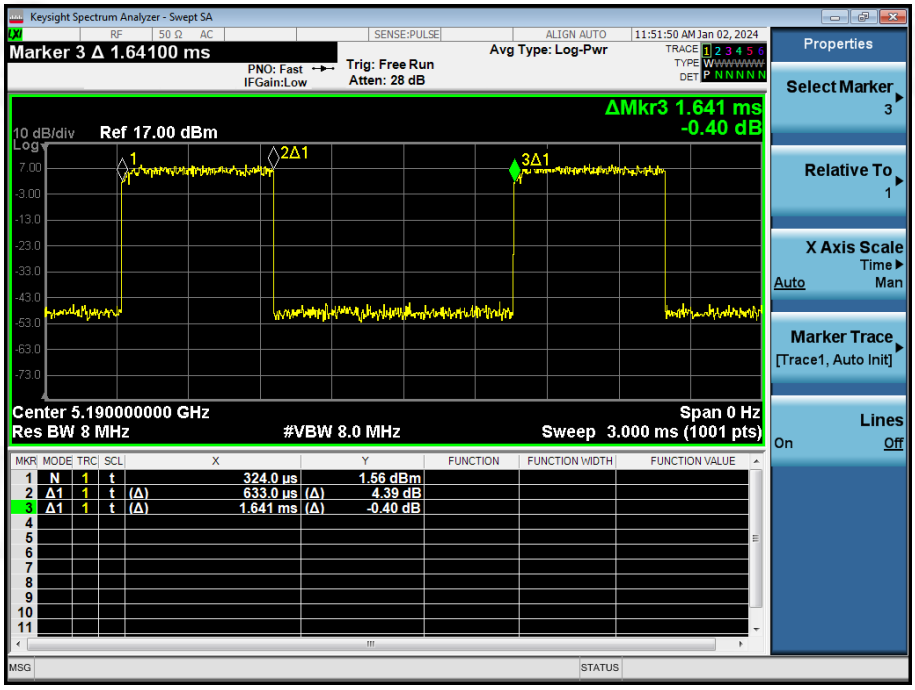
802.11a



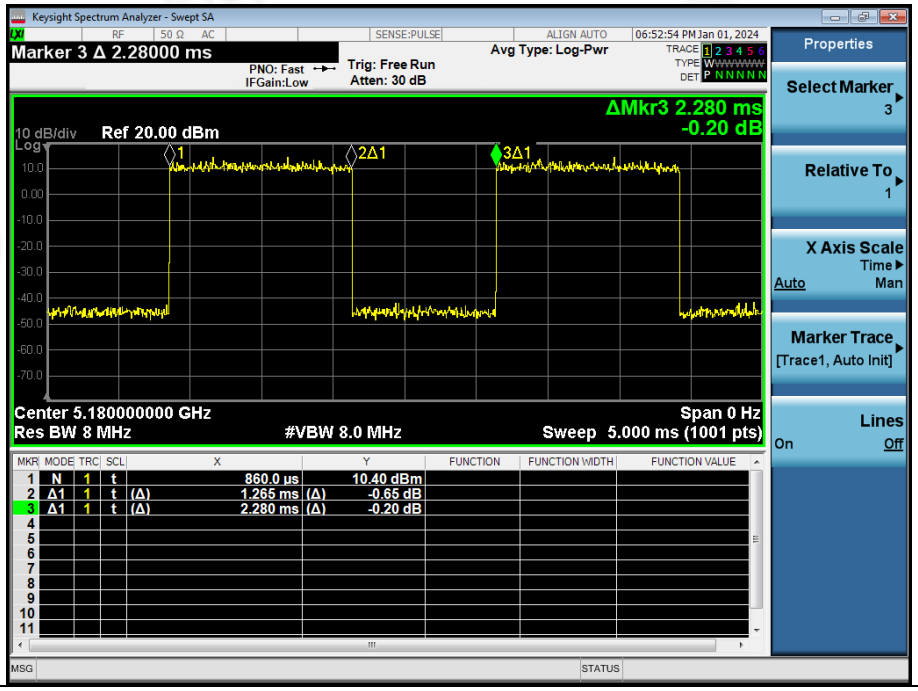
802.11n20



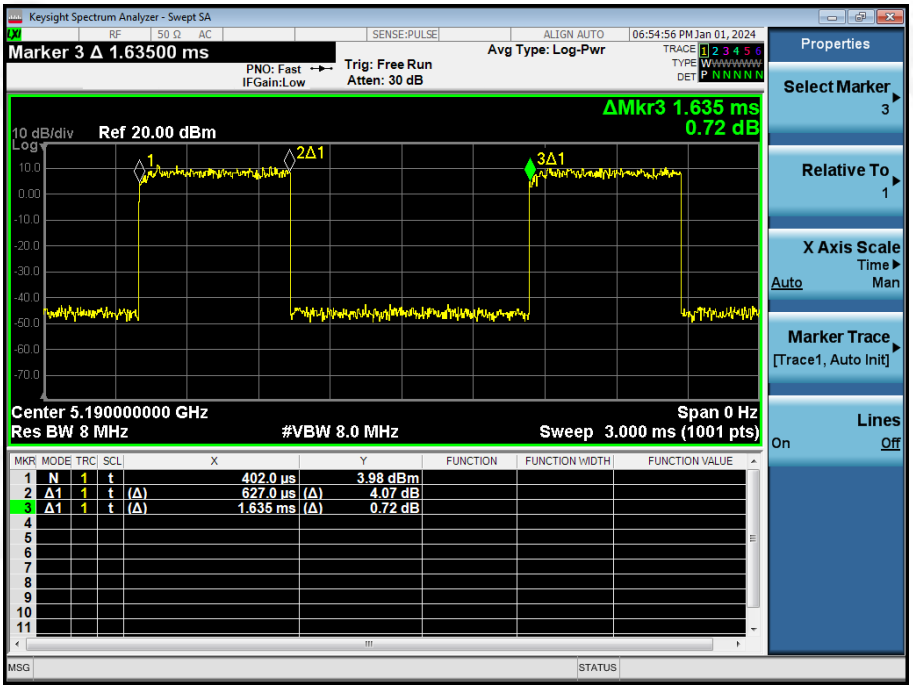
802.11n40



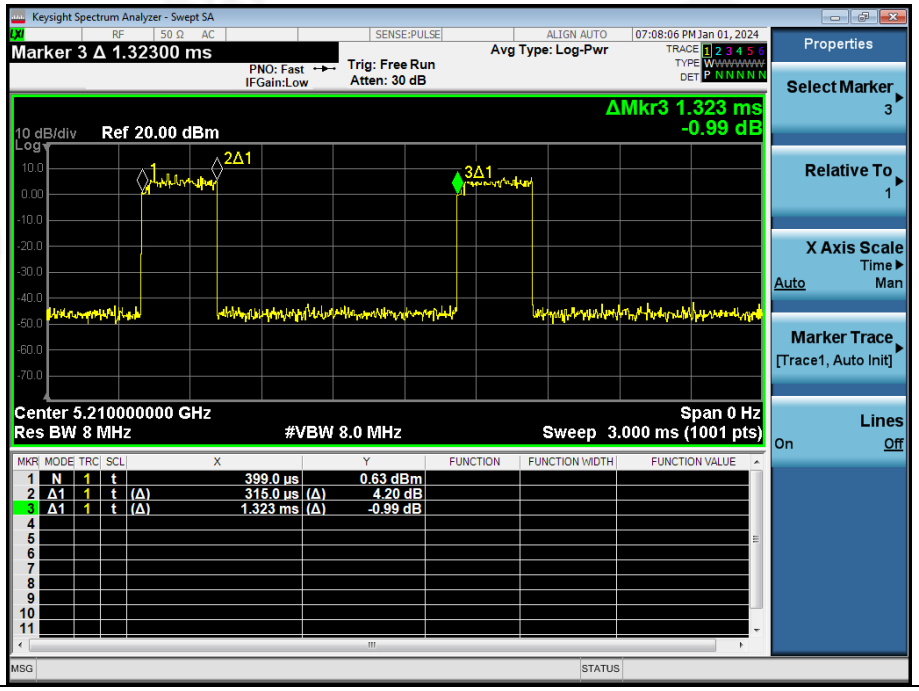
802.11ac20



802.11ac40



802.11ac80



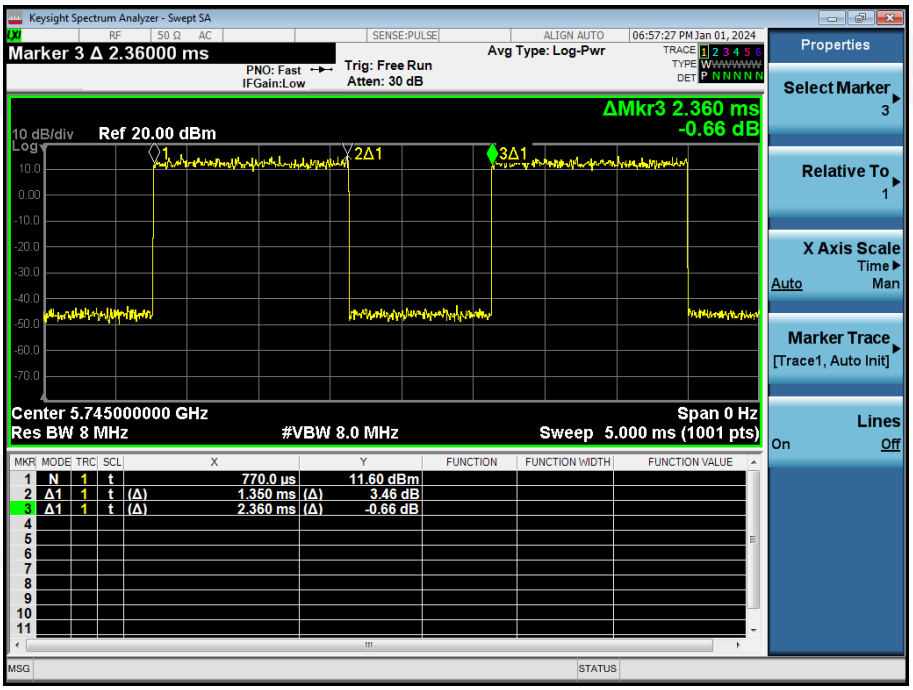
Note: All channel have been tested, and the report only reflects the worst case data.

Duty Cycle= Ton /Total*100%

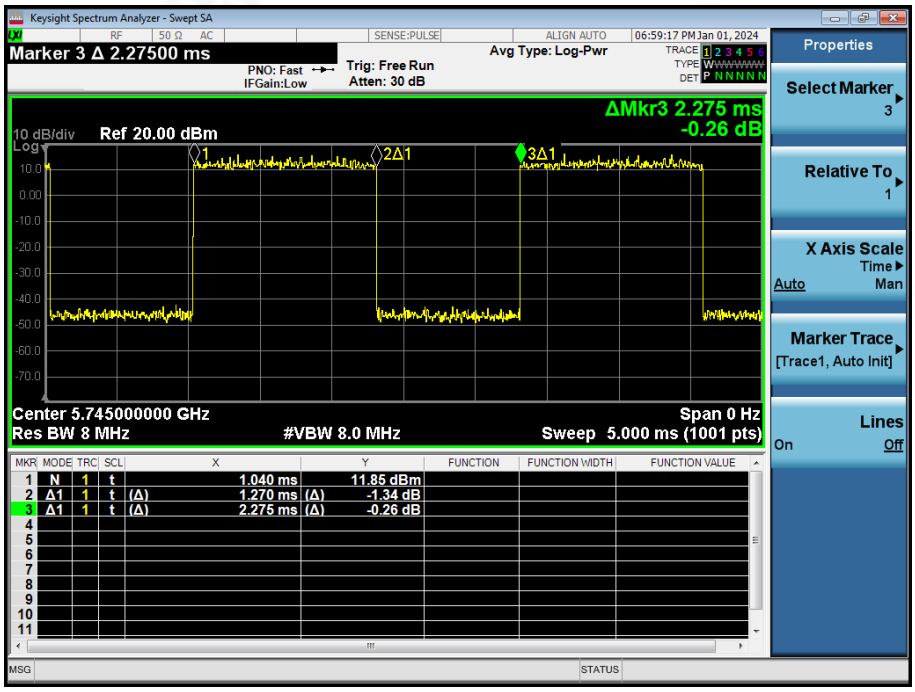
Duty Cycle Correction Factor = 10log (1/Duty Cycle)

5.8G				
Mode	Frequency (MHz)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Result
802.11a	5745	57.20	2.43	Pass
802.11n20	5745	55.82	2.53	Pass
802.11n40	5755	37.96	4.21	Pass
802.11ac20	5745	55.92	2.52	Pass
802.11ac40	5755	38.72	4.12	Pass
802.11ac80	5775	23.64	6.26	Pass

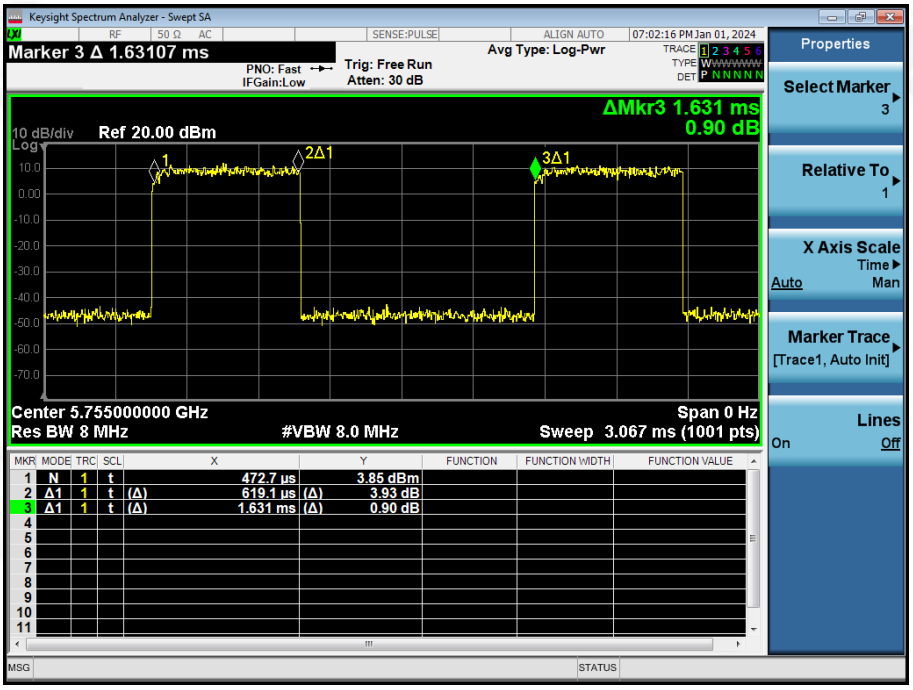
802.11a



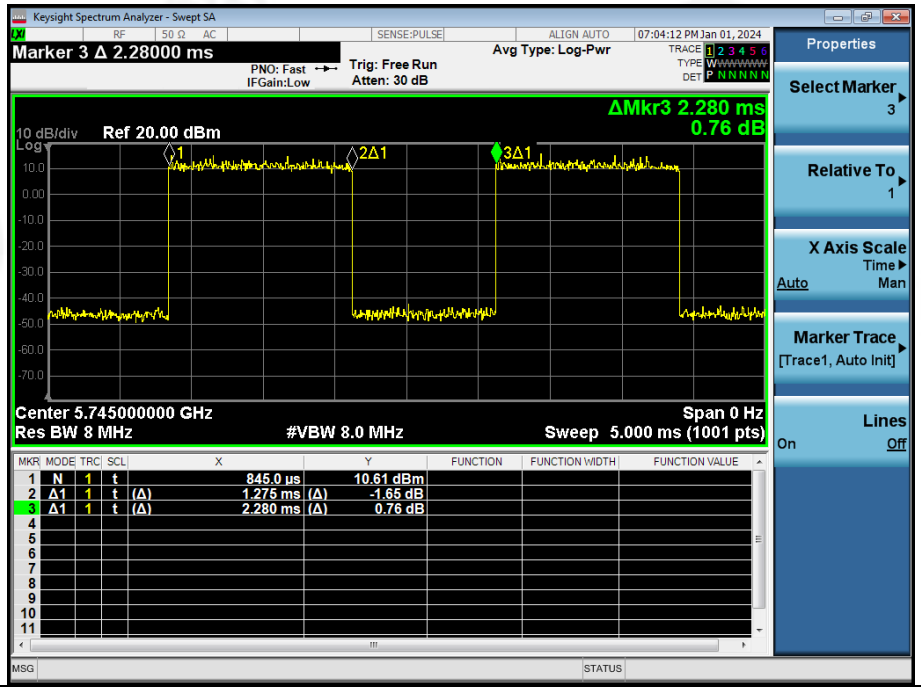
802.11n20



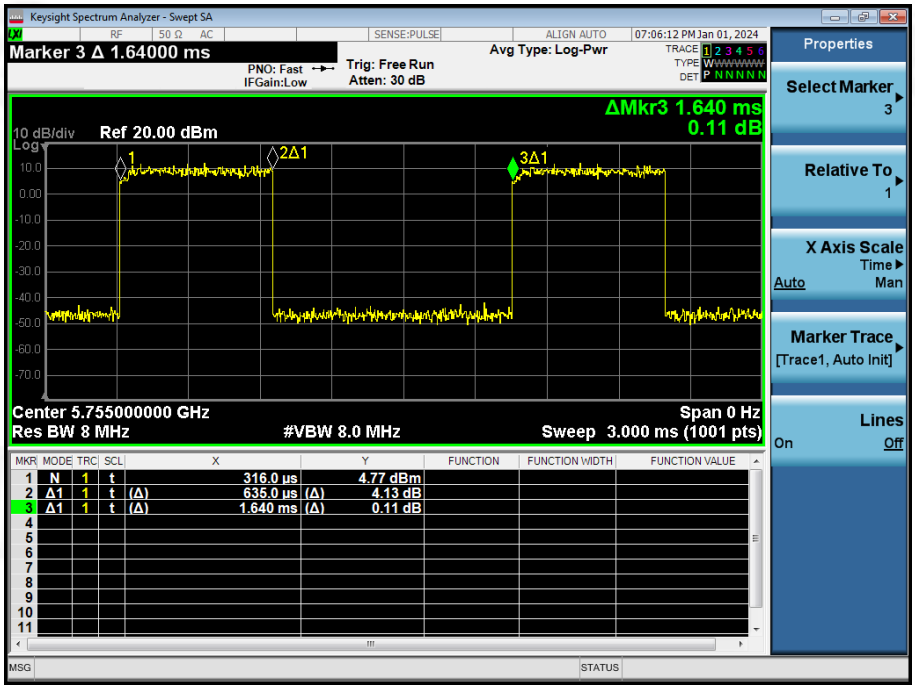
802.11n40



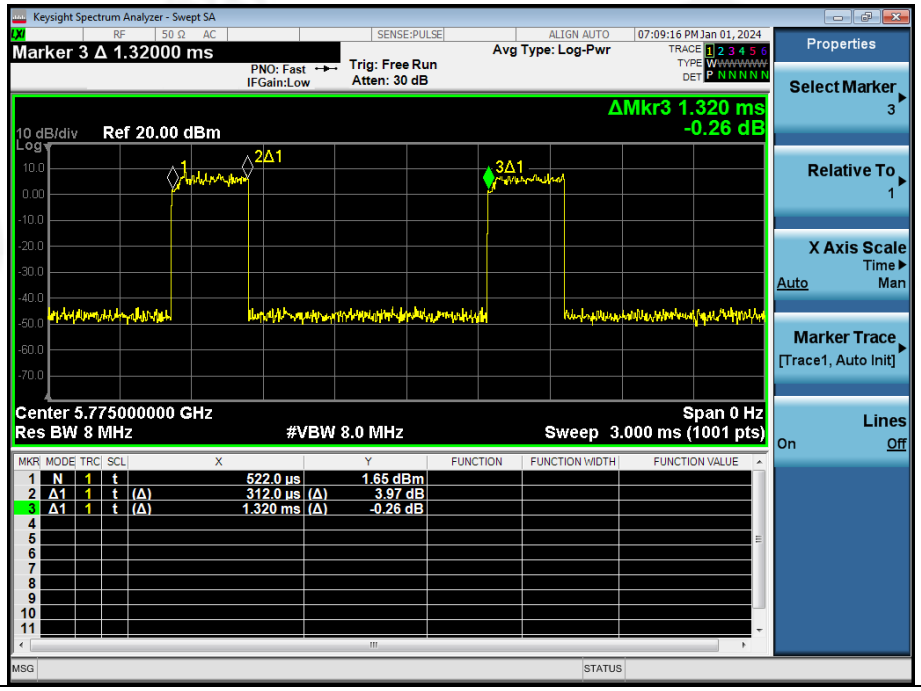
802.11ac20



802.11ac40



802.11ac80



Note: All channel have been tested, and the report only reflects the worst case data.

Duty Cycle= Ton /Total*100%

Duty Cycle Correction Factor = 10log (1/Duty Cycle)

12.ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
EUT Antenna:	
The antenna is FPC Antenna1, the best case gain of the antenna is 4.43dBi (Max), reference to the appendix II for details	

13. TEST SETUP PHOTO

Reference to the appendix I for details.

14. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

※※※※※ END OF REPORT ※※※※※