



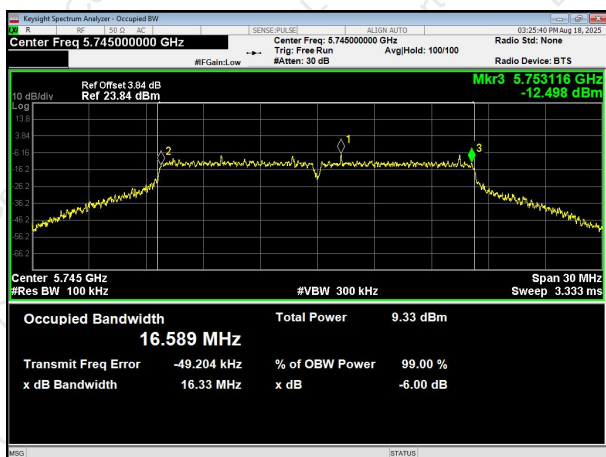
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 5V
Test Band :	5.8G		

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	6dB Limit (kHz)	Result
802.11a	5745	16.33	16.75	>500	Pass
	5785	16.308	16.72		
	5825	16.355	16.72		
802.11n20	5745	17.581	17.91	>500	Pass
	5785	17.583	17.87		
	5825	17.618	17.86		
802.11n40	5755	36.367	36.41	>500	Pass
	5795	36.329	36.38		



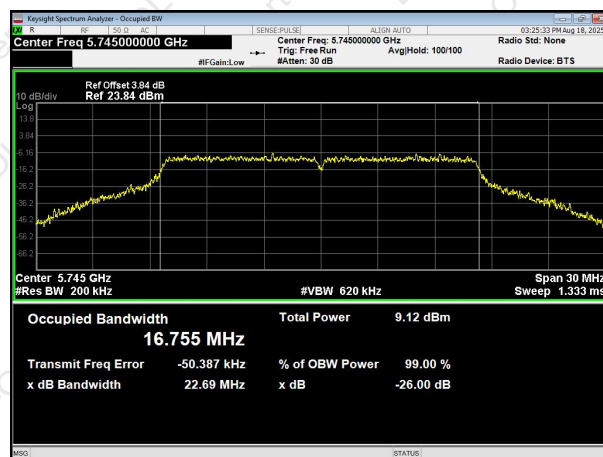
802.11a

6dB Bandwidth plot on channel 149

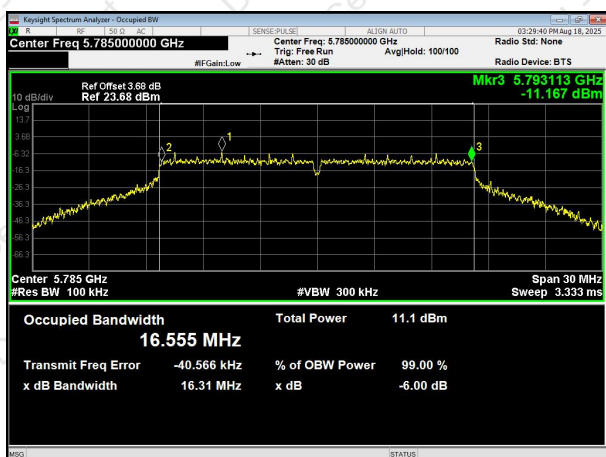


802.11a

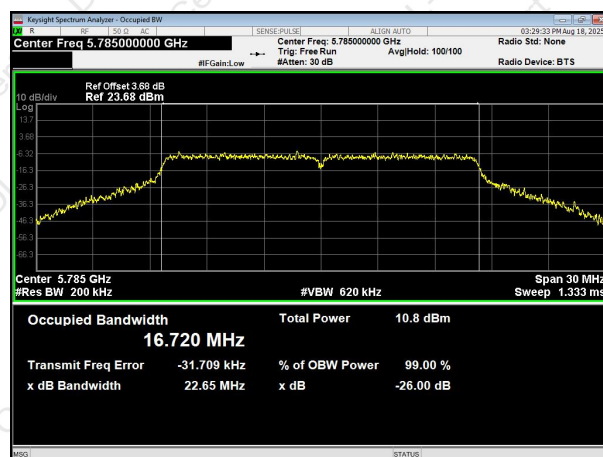
26dB Bandwidth plot on channel 149



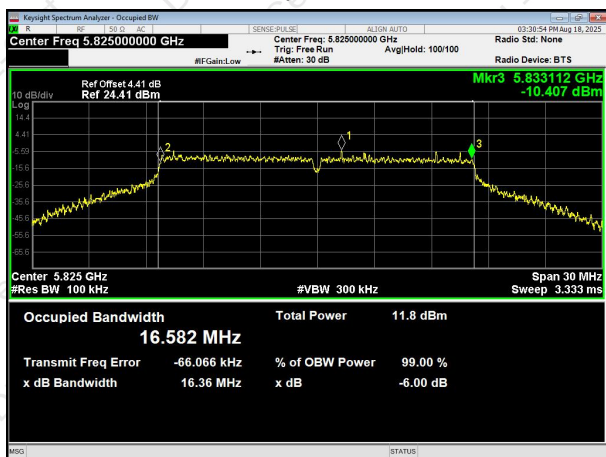
6dB Bandwidth plot on channel 157



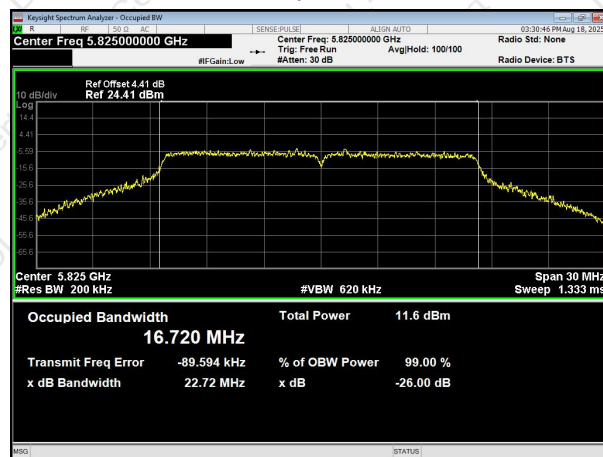
26dB Bandwidth plot on channel 157



6dB Bandwidth plot on channel 165



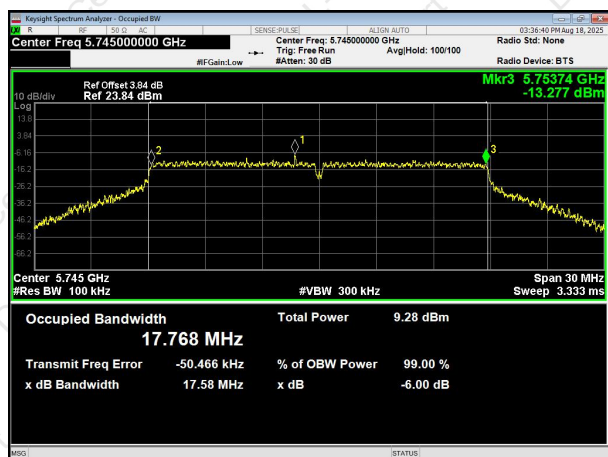
26dB Bandwidth plot on channel 165





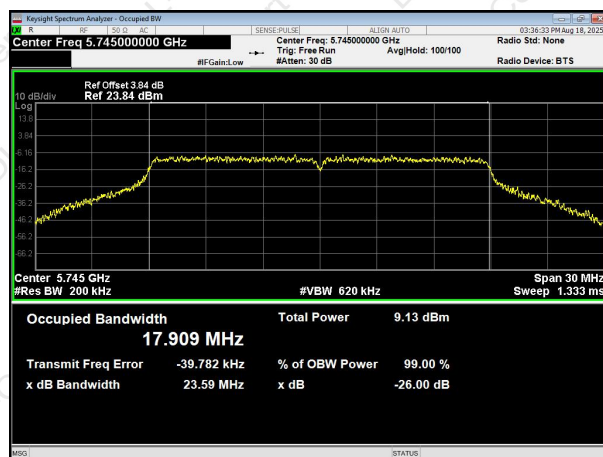
802.11n20

6dB Bandwidth plot on channel 149

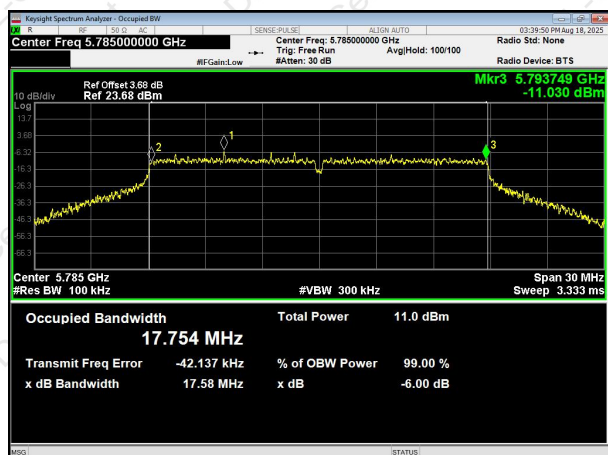


802.11n20

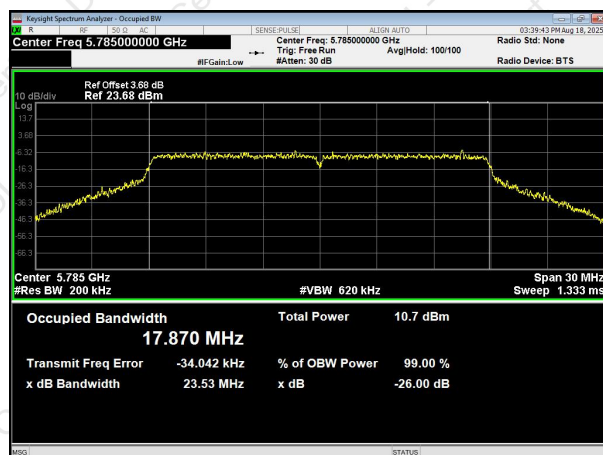
26dB Bandwidth plot on channel 149



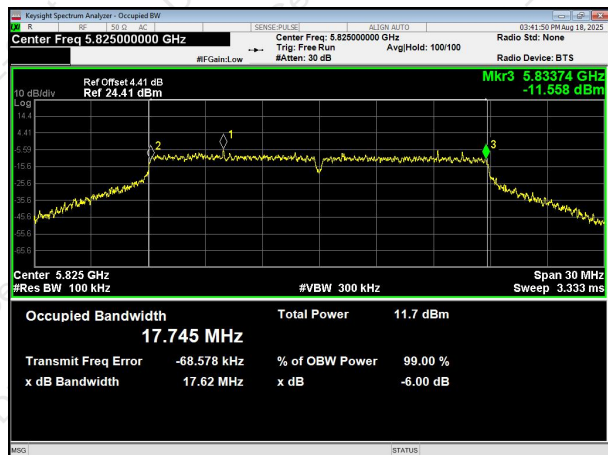
6dB Bandwidth plot on channel 157



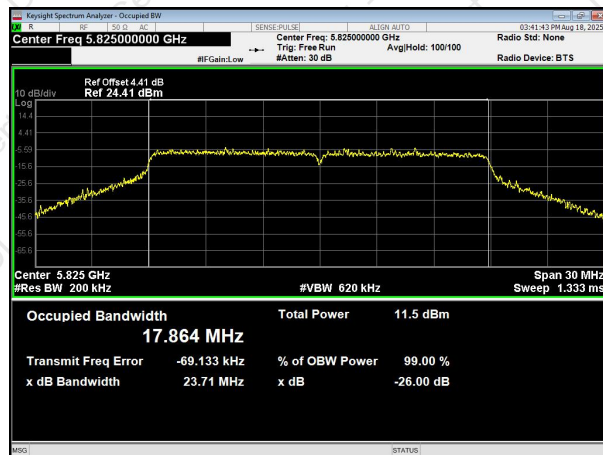
26dB Bandwidth plot on channel 157



6dB Bandwidth plot on channel 165



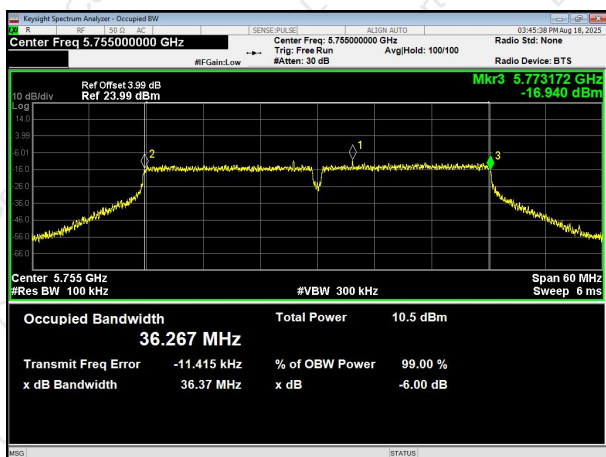
26dB Bandwidth plot on channel 165





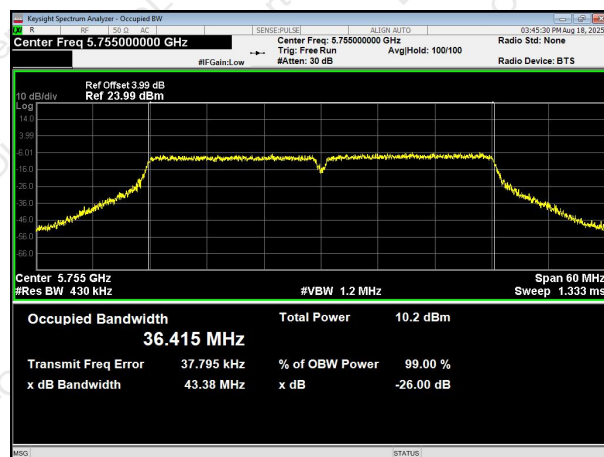
802.11n40

6dB Bandwidth plot on channel 151

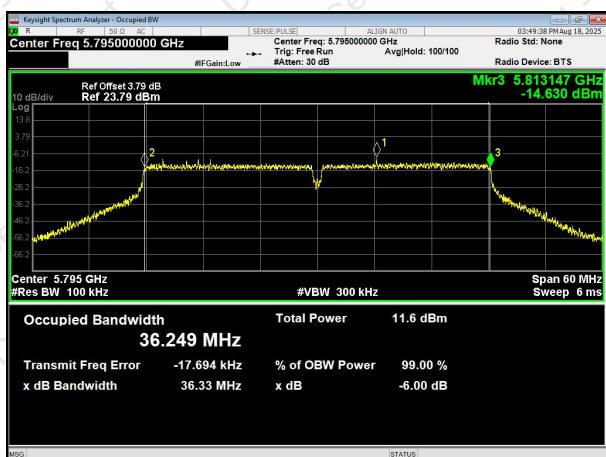


802.11n40

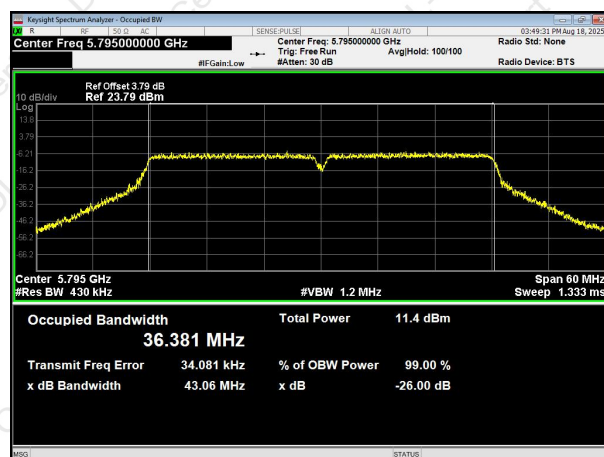
26dB Bandwidth plot on channel 151



6dB Bandwidth plot on channel 159



26dB Bandwidth plot on channel 159





7. MAXIMUM CONDUCTED OUTPUT POWER

7.1 PPLIED PROCEDURES / LIMIT

According to FCC §15.407 (a)(1) & (a)(3)(i)

The maximum conducted output power should not exceed:

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

7.2 TEST PROCEDURE

According 789033 D02 General UNII Test Procedures New Rules v02r01.

EUT Measurement using a Power Meter (PM)

a) Method PM (Measurement using an RF average power meter):

(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:

- The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
- The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in II.B.

(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

(iv) Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log (1/0.25)$ if the duty cycle is 25%).

b) Method PM-G (Measurement using a gated RF average power meter):

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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 chapter 7.4, Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V

Test Mode	Frequency (MHz)	Output Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Result
802.11 a	5180	4.365	0.00	4.365	23.98	Pass
	5200	3.526	0.00	3.526	23.98	Pass
	5240	3.332	0.00	3.332	23.98	Pass
802.11 n20	5180	4.374	0.00	4.374	23.98	Pass
	5200	3.497	0.00	3.497	23.98	Pass
	5240	3.282	0.00	3.282	23.98	Pass
802.11 n40	5190	4.319	0.00	4.319	23.98	Pass
	5230	3.154	0.00	3.154	23.98	Pass

Note: Total Power = Output Power + Duty Cycle Factor.

Test Mode	Frequency (MHz)	Output Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Result
802.11 a	5745	5.399	0.10	5.499	30	Pass
	5785	5.142	0.10	5.242	30	Pass
	5825	5.892	0.10	5.992	30	Pass
802.11 n20	5745	5.398	0.00	5.398	30	Pass
	5785	5.13	0.00	5.13	30	Pass
	5825	5.849	0.00	5.849	30	Pass
802.11 n40	5755	5.499	0.00	5.499	30	5755
	5795	5.716	0.00	5.716	30	5795

Note: Total Power = Output Power + Duty Cycle Factor.



8. CONDUCTED 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) For transmitters operating in the 5.725-5.85 GHz band:

(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

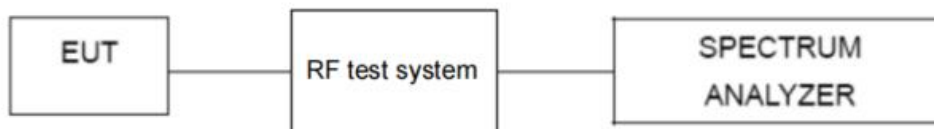
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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

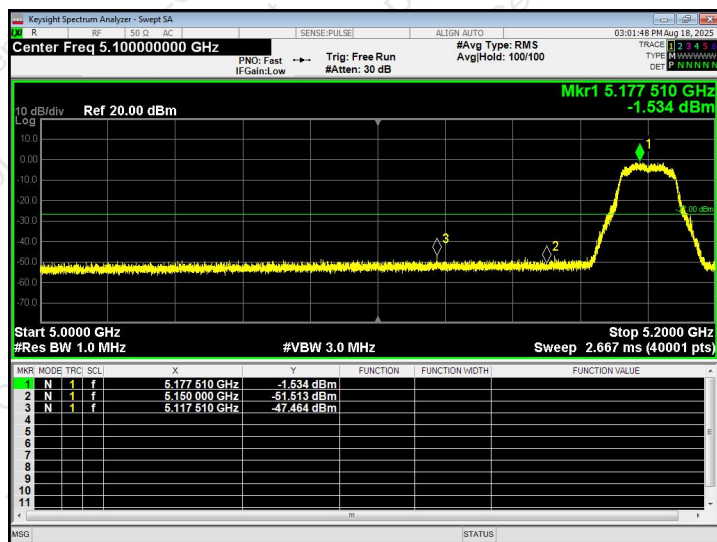
The EUT tested system was configured as the statements of chapter 8.5, Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

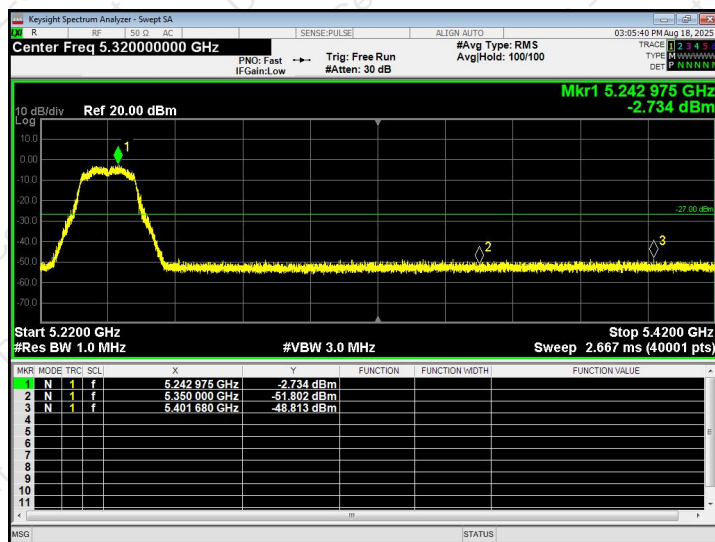
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test band :	5.2G	Antenna gain :	2.45dBi(The gain value of antenna is tested uniformly)

5.180~5.240 GHz

(802.11a) Band Edge, Left Side

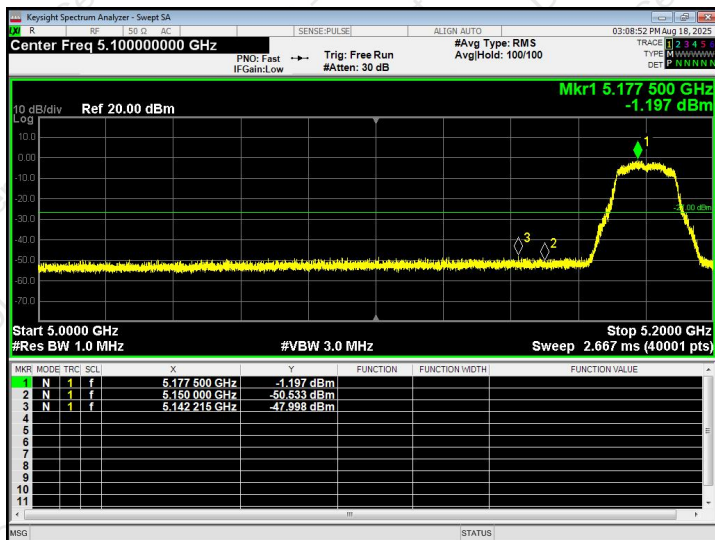


(802.11a) Band Edge, Right Side

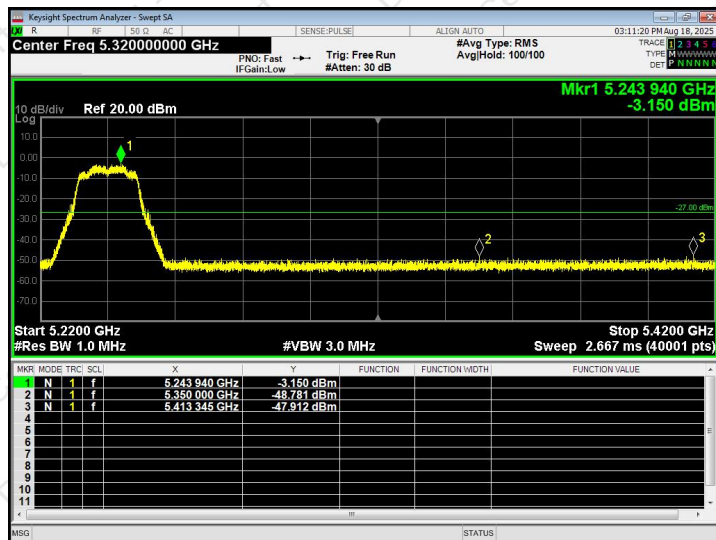




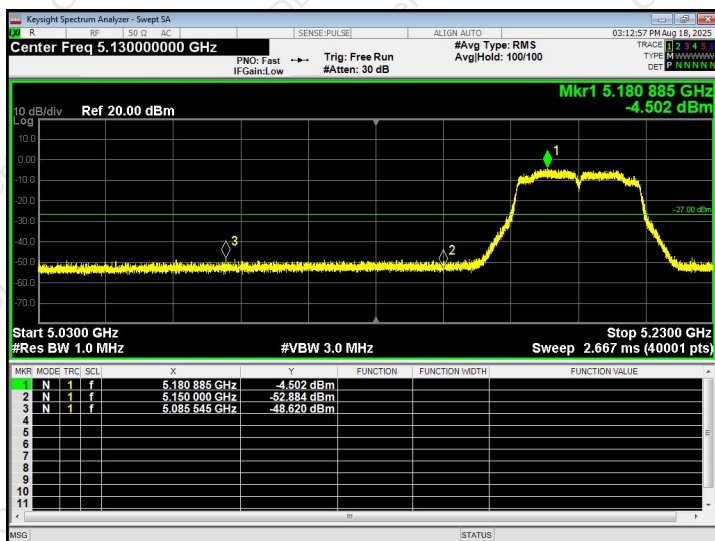
(802.11n20) Band Edge, Left Side



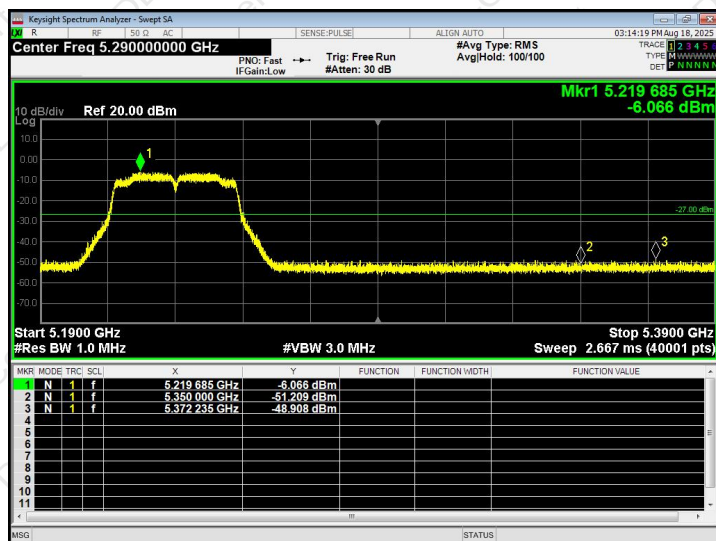
(802.11n20) Band Edge, Right Side



(802.11n40) Band Edge, Left Side



(802.11n40) Band Edge, Right Side



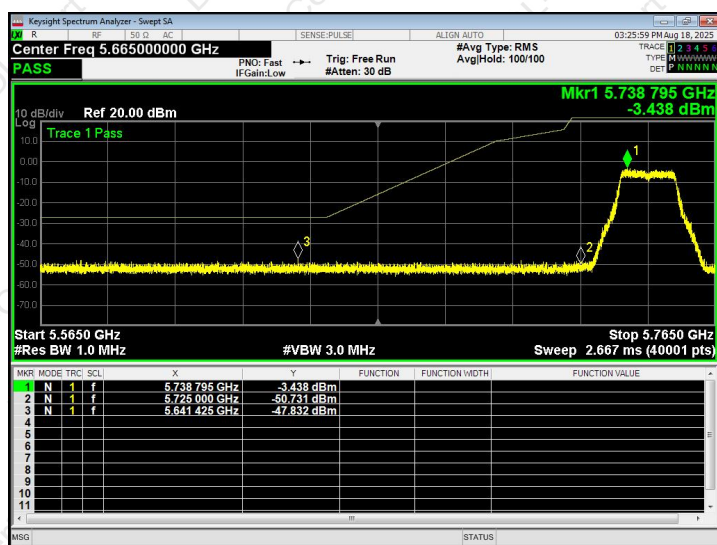
Note: The scattered points plus the gain are less than the limit, and the test results meet the standard requirements



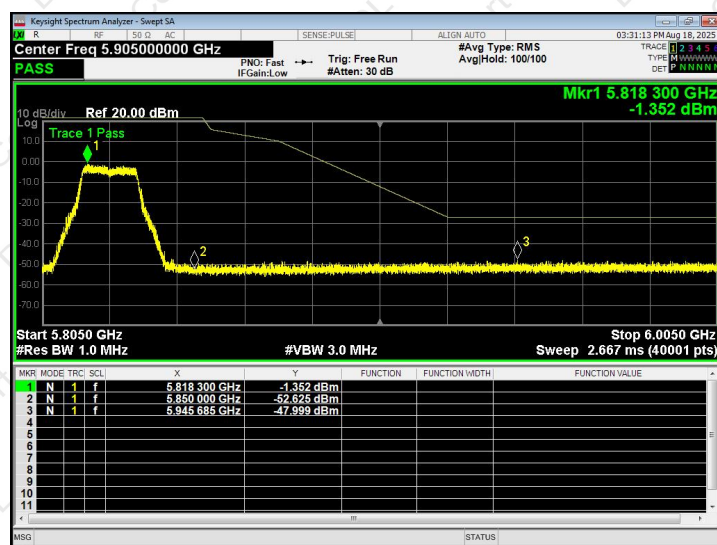
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test band :	5.8G	Antenna gain :	2.75dBi(The gain value of antenna is tested uniformly)

5.745~5.825 GHz

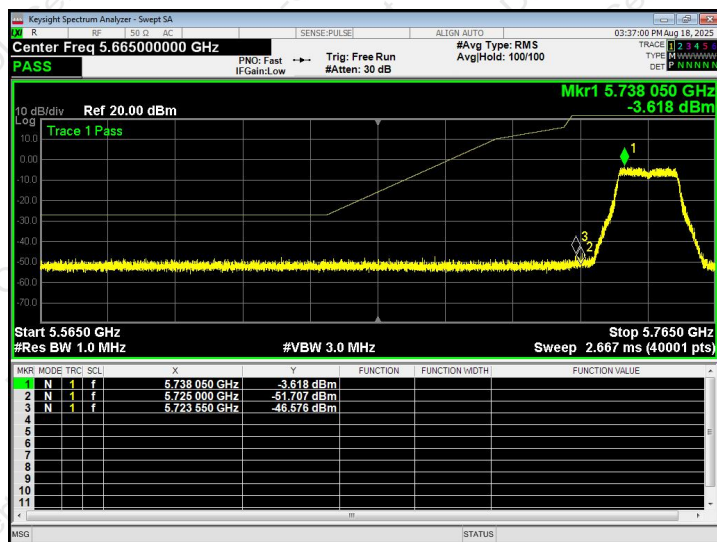
(802.11a) Band Edge, Left Side



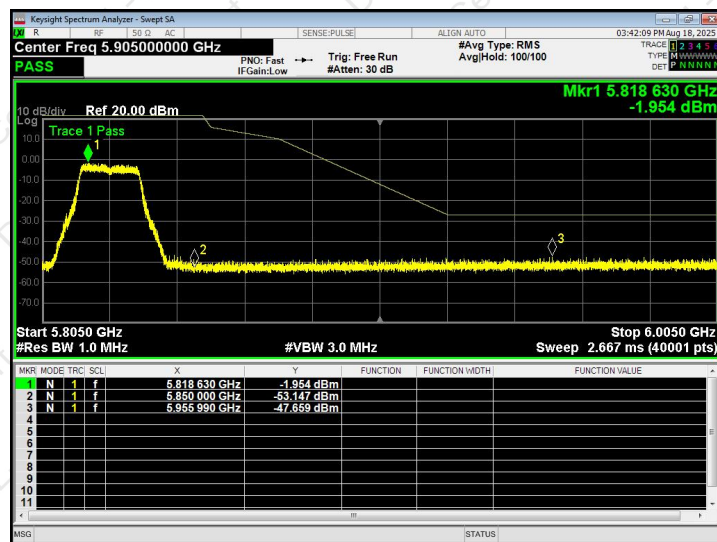
(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Left Side

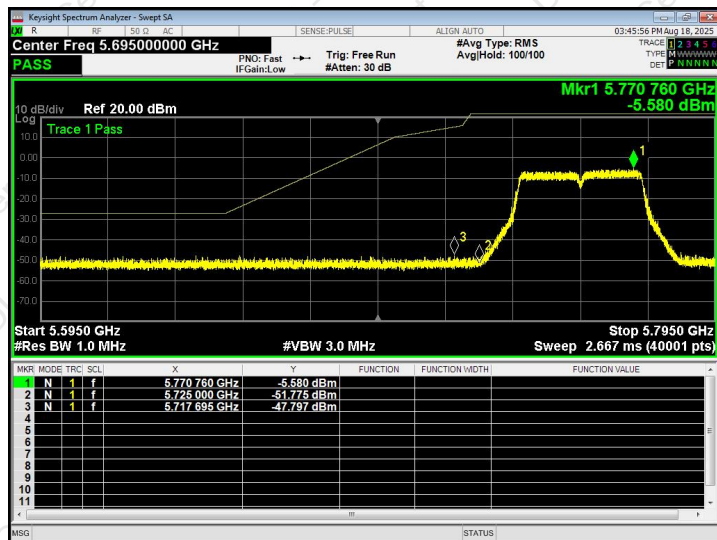


(802.11n20) Band Edge, Right Side

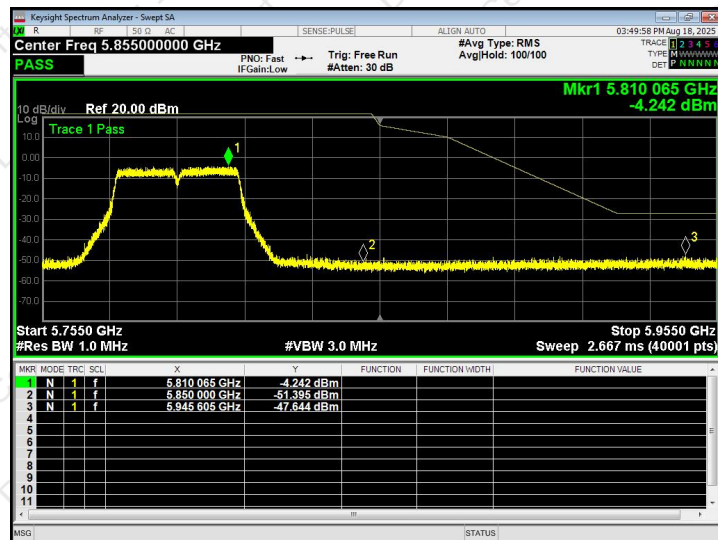




(802.11n40) Band Edge, Left Side



(802.11n40) Band Edge, Right Side



Note: The scattered points plus the gain are less than the limit, and the test results meet the standard requirements



9. FREQUENCY STABILITY MEASUREMENT

9.1 LIMIT

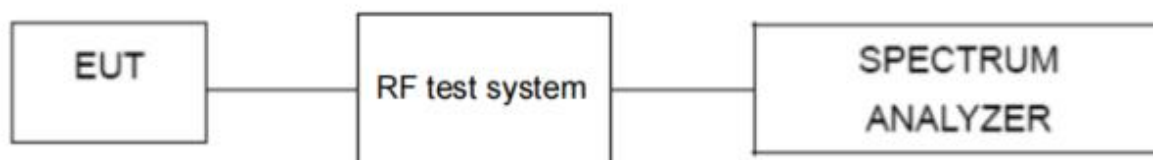
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be (IEEE 802.11n specification).

9.2 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. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm.
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.

9.3 TEST SETUP LAYOUT



9.4 EUT OPERATION DURING TEST

The EUT tested system was configured as the statements of chapter 10.3, Unless otherwise a special operating condition is specified in the follows during the testing.



9.5 TEST RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Note: Note: All channels have been tested, and only the worst test data is recorded in this report.			

Extreme temperature frequency stability:

Reference Frequency: 802.11a - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5179.978	-4.221
60	5	5179.986	-2.691
50	5	5179.975	-4.904
40	5	5179.984	-3.060
30	5	5179.986	-2.643
25	5	5179.980	-3.811
10	5	5179.978	-4.214
0	5	5179.980	-3.824
-10	5	5179.978	-4.301
-20	5	5179.968	-6.197

Reference Frequency: 802.11n20 - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5179.986	-2.721
60	5	5179.986	-2.664
50	5	5179.970	-5.743
40	5	5179.972	-5.500
30	5	5179.978	-4.325
25	5	5179.979	-4.000
10	5	5179.988	-2.373
0	5	5179.978	-4.245
-10	5	5179.987	-2.521
-20	5	5179.977	-4.401



Reference Frequency: 802.11n40 - 5190MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5189.987	-2.490
60	5	5189.974	-5.060
50	5	5189.988	-2.400
40	5	5189.979	-3.983
30	5	5189.981	-3.600
25	5	5189.990	-1.940
10	5	5189.981	-3.657
0	5	5189.971	-5.626
-10	5	5189.988	-2.236
-20	5	5189.974	-4.985

Reference Frequency: 802.11a - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5744.970	-5.146
60	5	5744.973	-4.760
50	5	5744.963	-6.463
40	5	5744.978	-3.771
30	5	5744.968	-5.591
25	5	5744.978	-3.760
10	5	5744.971	-5.106
0	5	5744.970	-5.195
-10	5	5744.965	-6.045
-20	5	5744.968	-5.654



Reference Frequency: 802.11n20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5744.979	-3.679
60	5	5744.972	-4.830
50	5	5744.971	-5.124
40	5	5744.977	-4.074
30	5	5744.968	-5.511
25	5	5744.980	-3.549
10	5	5744.964	-6.325
0	5	5744.975	-4.417
-10	5	5744.975	-4.386
-20	5	5744.960	-6.915

Reference Frequency: 802.11n40 - 5755MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
70	5	5754.974	-4.469
60	5	5754.975	-4.344
50	5	5754.971	-5.043
40	5	5754.970	-5.185
30	5	5754.978	-3.788
25	5	5754.971	-5.123
10	5	5754.959	-7.097
0	5	5754.972	-4.886
-10	5	5754.961	-6.816
-20	5	5754.957	-7.467



Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Note: Note: All channels have been tested, and only the worst test data is recorded in this report.			

Extreme voltage frequency stability:

Reference Frequency: 802.11a - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5179.971	-5.553
25	5.25	5179.969	-5.979
25	5	5179.975	-4.810
25	4.75	5179.972	-5.423
25	4.25	5179.972	-5.350

Reference Frequency: 802.11n20 - 5180MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5179.986	-2.721
25	5.25	5179.988	-2.273
25	5	5179.966	-6.605
25	4.75	5179.978	-4.335
25	4.25	5179.975	-4.738

Reference Frequency: 802.11n40 - 5190MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5189.974	-5.048
25	5.25	5189.981	-3.599
25	5	5189.980	-3.942
25	4.75	5189.988	-2.331
25	4.25	5189.979	-4.087



Reference Frequency: 802.11a - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5744.975	-4.358
25	5.25	5744.979	-3.617
25	5	5744.980	-3.552
25	4.75	5744.980	-3.483
25	4.25	5744.970	-5.180

Reference Frequency: 802.11n20 - 5745MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5744.969	-5.426
25	5.25	5744.975	-4.389
25	5	5744.969	-5.439
25	4.75	5744.974	-4.531
25	4.25	5744.970	-5.227

Reference Frequency: 802.11n20 - 5755MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Deviation (ppm)
25	5.75	5754.963	-6.358
25	5.25	5754.970	-5.127
25	5	5754.977	-3.934
25	4.75	5754.964	-6.210
25	4.25	5754.977	-3.920



10. DUTY CYCLE

10.1 APPLIED PROCEDURES / LIMIT

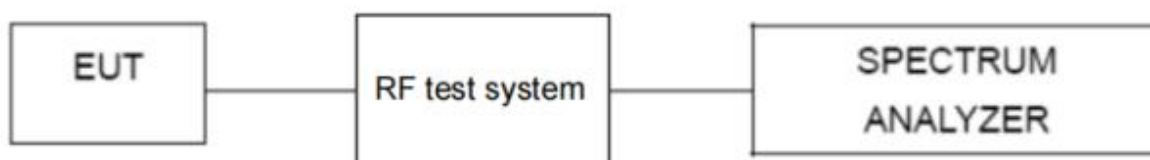
Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

- 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 $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
 - 3) Set $VBW \geq RBW$. 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 $T \leq 16.7 \mu s$.)

10.2 DEVIATION FROM STANDARD

No deviation.

10.3 TEST SETUP



10.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of chapter 11.3, Unless otherwise a special operating condition is specified in the follows during the testing.



10.5 TEST RESULTS

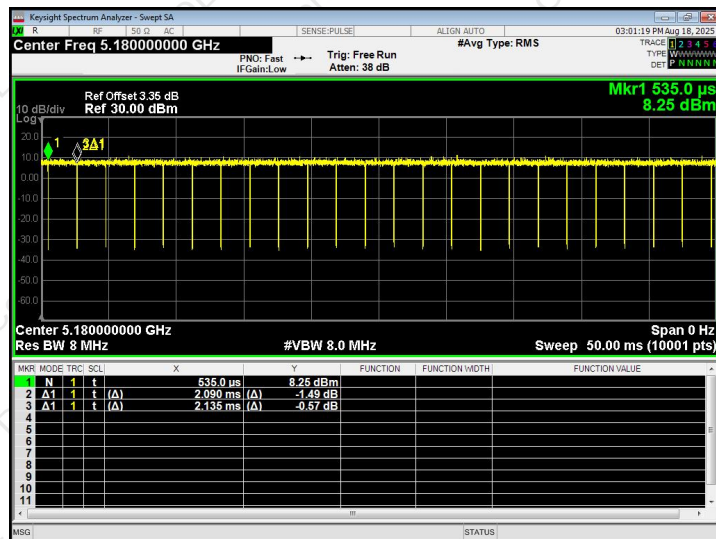
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 5V
Note: All channels have been tested, and only the worst test data is recorded in this report.			

5.2G				
Mode	Frequency (MHz)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Result
802.11a	5180	98.12	0	Pass
802.11n20	5180	99	0	Pass
802.11n40	5190	98.76	0	Pass
Duty Cycle= Ton /Total*100%				
Duty Cycle Correction Factor = 10log (1/Duty Cycle)				

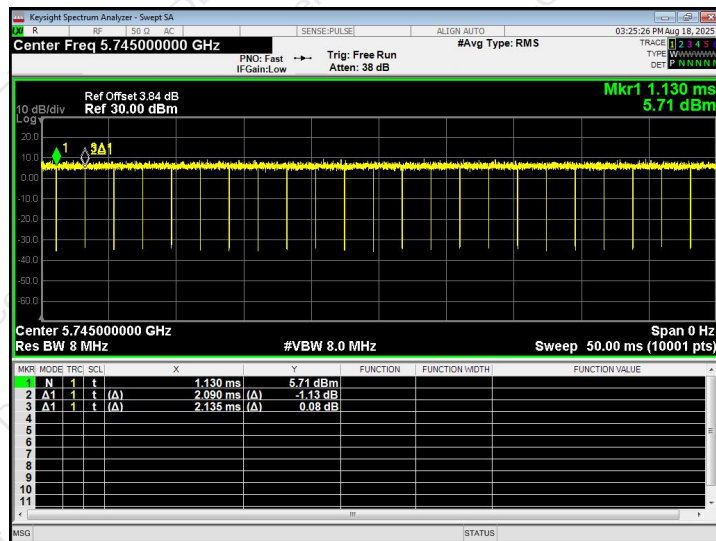
5.8G				
Mode	Frequency (MHz)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Result
802.11a	5745	97.66	0.1	Pass
802.11n20	5745	99	0	Pass
802.11n40	5755	98.75	0	Pass
Duty Cycle= Ton /Total*100%				
Duty Cycle Correction Factor = 10log (1/Duty Cycle)				



802.11a - 5180MHz



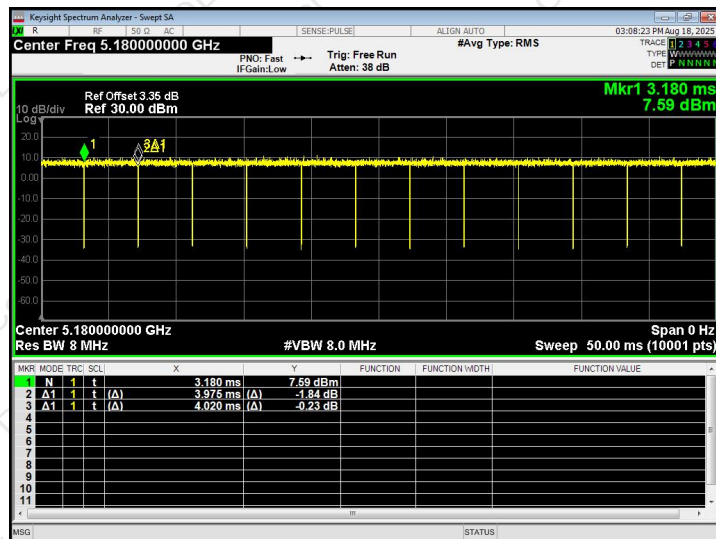
802.11a - 5745MHz



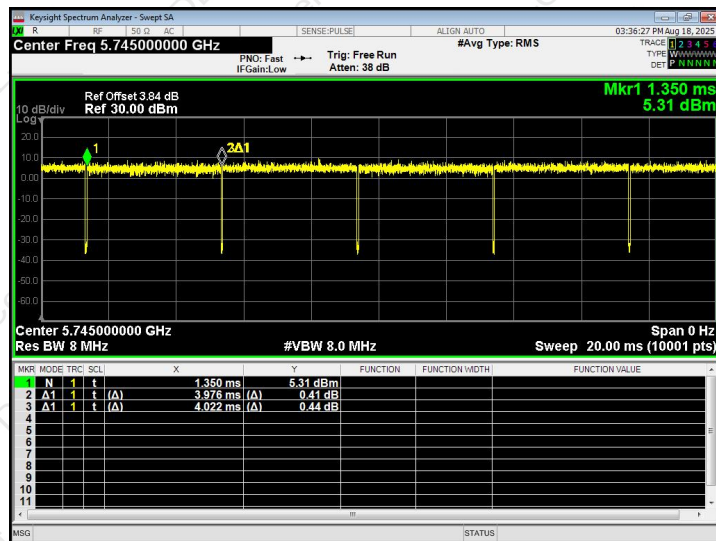
Note: All channel have been tested, and the report only reflects the worst case data.



802.11n20 - 5180MHz



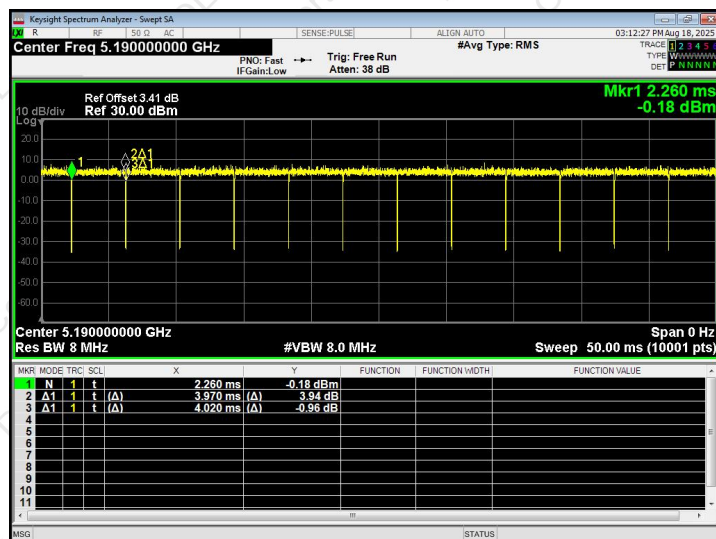
802.11n20 - 5745MHz



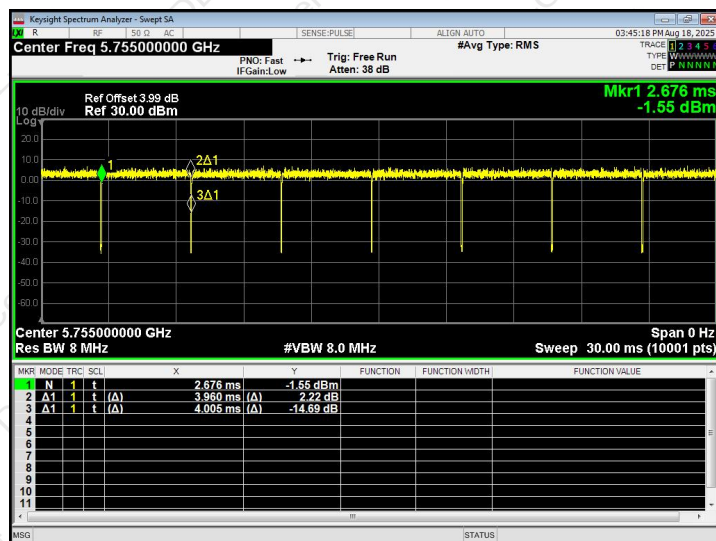
Note: All channel have been tested, and the report only reflects the worst case data.



802.11n40 - 5190MHz



802.11n40 - 5755MHz



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



11. 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 Antenna, the best case gain of the antenna is 5.2G is 2.45dBi&5.8 is 2.75, reference to the appendix II for details	



12. TEST SETUP PHOTO

Reference to the appendix I for details.

13. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

***** END OF REPORT *****