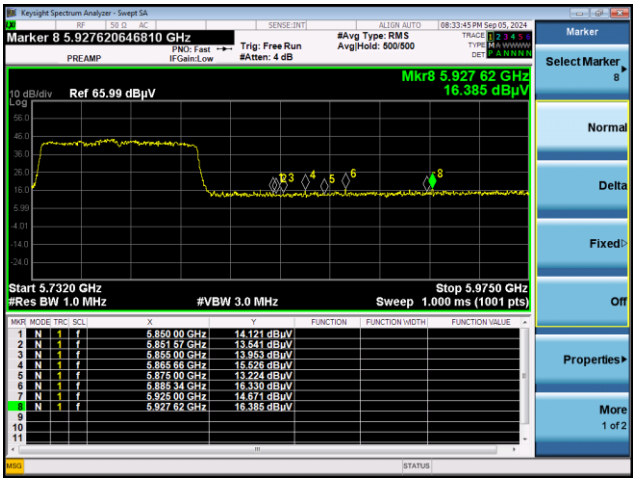
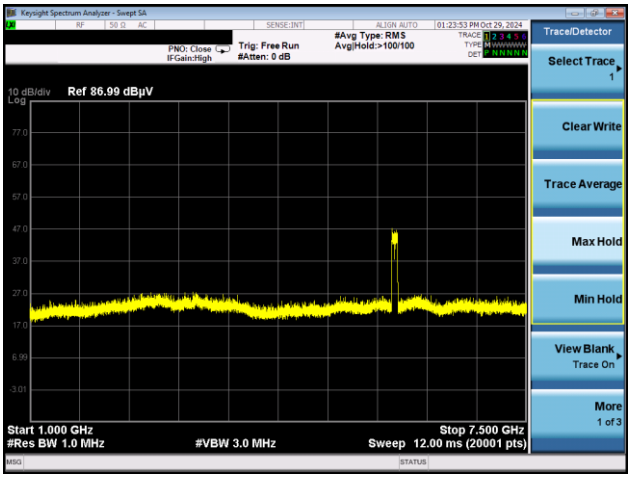
Middle channel Band edge (Peak) - Band 3

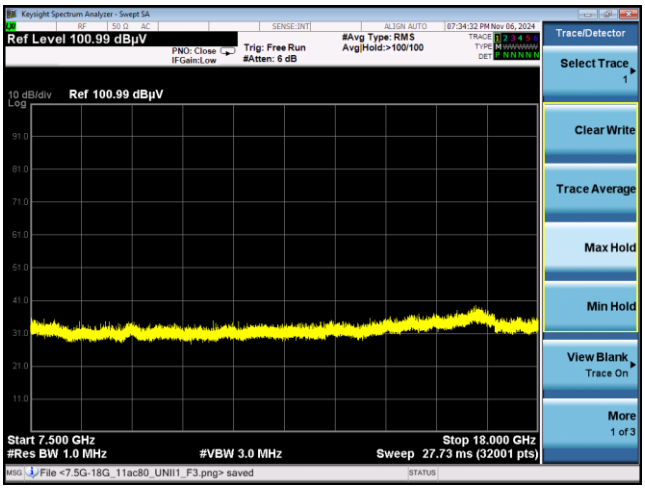
Middle channel Band edge (Peak) - Band 3



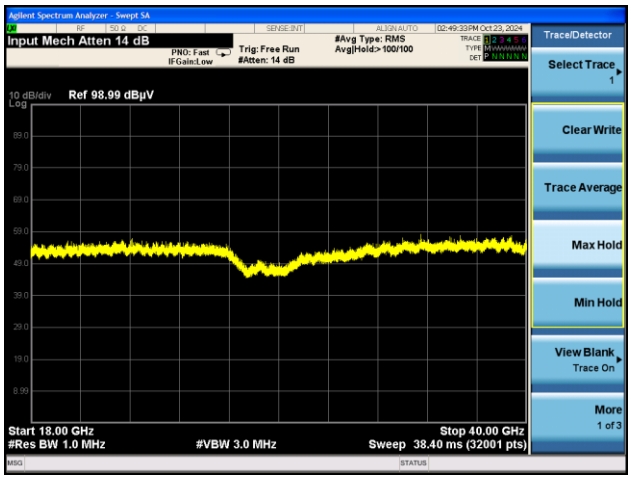
Radiated Spurious Emissions



1 ㎓ ~ 7.5 ㎓



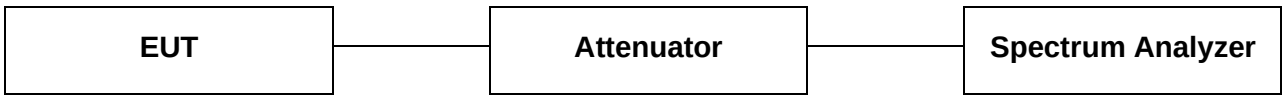
7.5 ㎓ ~ 18 ㎓



3 ㎓ ~ 18 ㎓

3. 26 dB Bandwidth & 99 % Bandwidth

3.1. Test Setup



3.2. Limit

None; for reporting purpose only.

3.3. Test Procedure

3.3.1. 26 dB Bandwidth

1. This measurement settings are specified in section Ⅱ.C.1 of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW = approximately 1 % of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. 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 %.

3.3.2. 99 % Bandwidth

3.3.2.1 FCC

1. This measurement settings are specified in section Ⅱ.D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set center frequency to the nominal EUT channel center frequency.
3. Set span = 1.5 times to 5.0 times the OBW.
4. Set RBW = 1 % to 5 % of the OBW.
5. Set VBW ≥ 3 x RBW.
6. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
7. Use the 99 % power bandwidth function of the instrument (if available).
8. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % occupied bandwidth is the difference between these two frequencies.

In the result,

- DFS requirements are not applicable in the 5 150 ㎒ ~ 5 250 ㎒.

3.3.2.2 IC

● The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

● The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x ㏈ bandwidth if the device is not transmitting continuously.

● The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the actual occupied / x ㏈ bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99 % emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99 % emission bandwidth).

3.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 180	36	6 Mbps	22.029	16.833
	5 220	44		22.009	17.021
	5 240	48		22.049	16.971
U-NII 3	5 745	149		22.149	17.141
	5 785	157		22.069	17.231
	5 805	161		22.109	17.220

Test mode: 11n_HT20

Band	Frequency (㎒)	Ch.	Data Rate	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 180	36	MCS0	22.029	18.295
	5 220	44		21.989	18.015
	5 240	48		21.969	17.999
U-NII 3	5 745	149		22.309	18.134
	5 785	157		22.049	18.097
	5 805	161		22.038	18.127

Test mode: 11n_HT40

Band	Frequency (㎒)	Ch.	Data Rate	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 190	38	MCS0	41.619	37.251
	5 230	46		41.619	37.138
U-NII 3	5 755	151		41.899	37.297
	5 795	159		41.939	36.767

Test mode: 11ac_VHT80

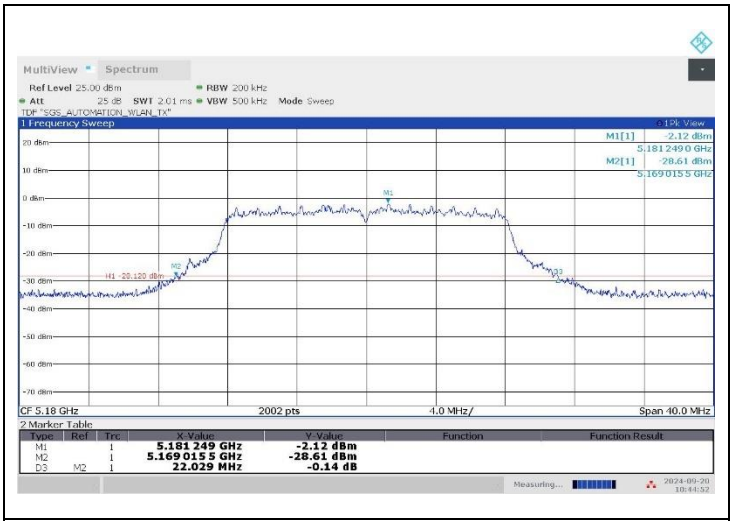
Band	Frequency (㎒)	Ch.	Data Rate	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 210	42	MCS0	84.918	77.086
U-NII 3	5 775	155		84.518	81.567

- Test plots

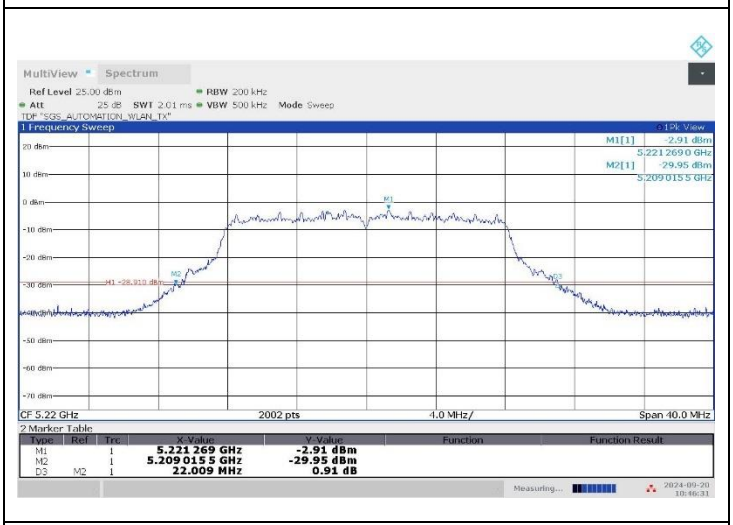
26 dB Bandwidth

11a (Band 1)

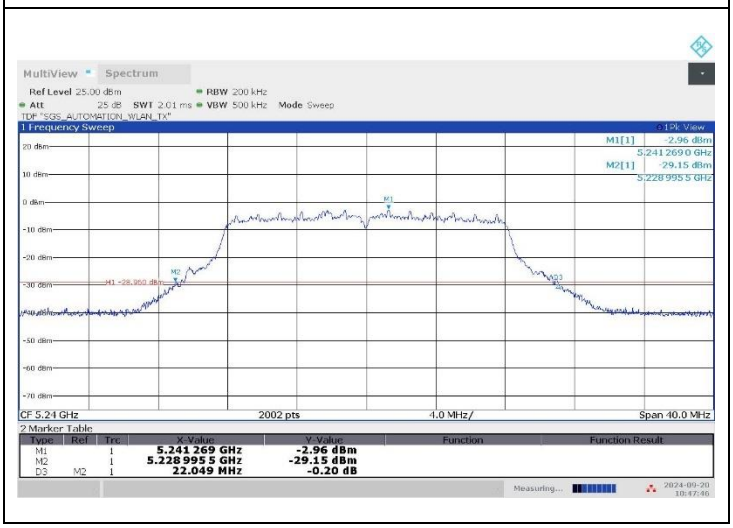
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

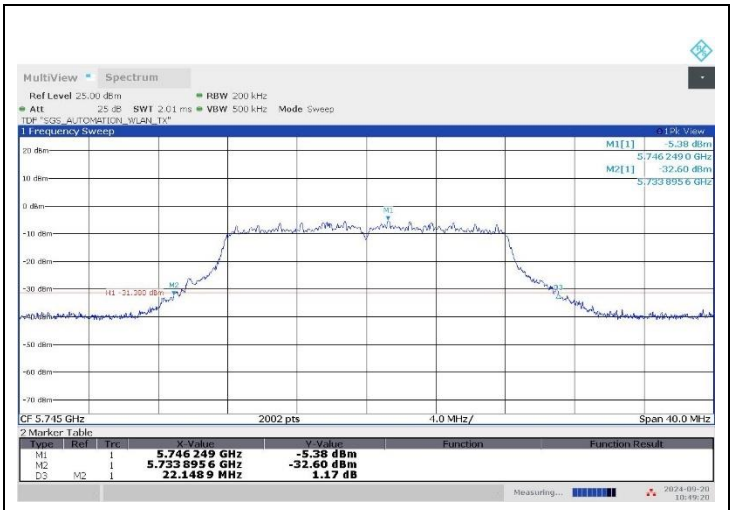


High Channel
(5 240 ㎒)

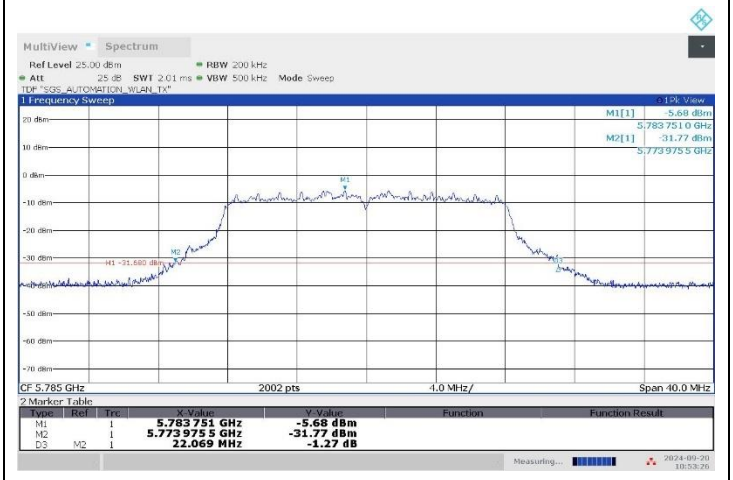


11a (Band 3)

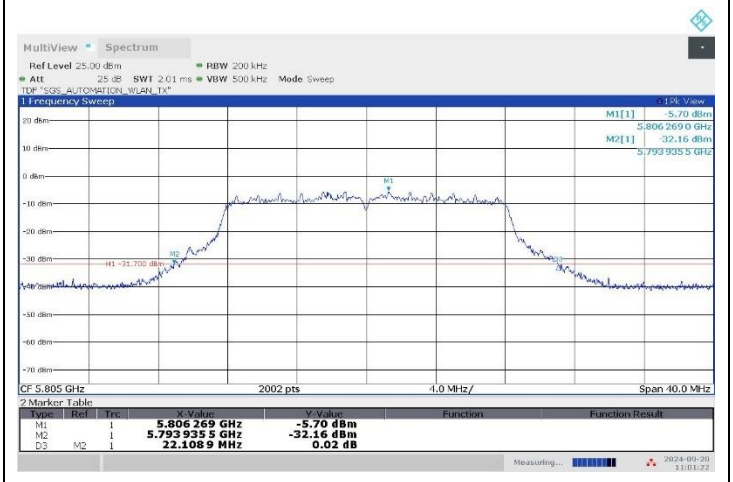
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

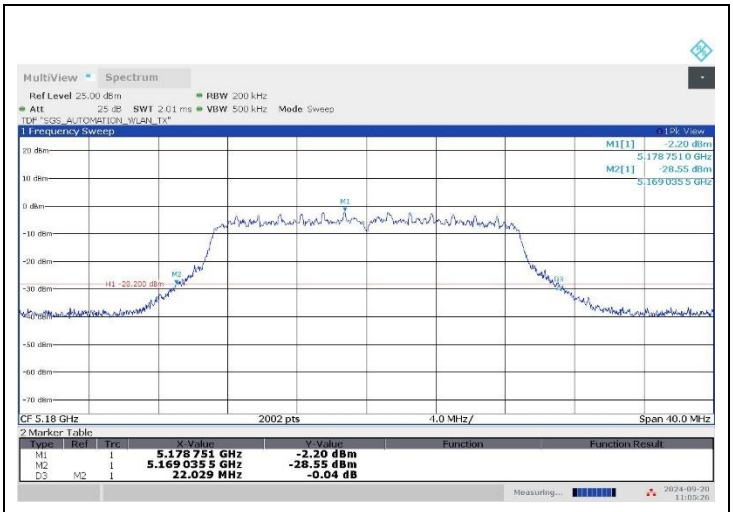


High Channel
(5 805 ㎒)

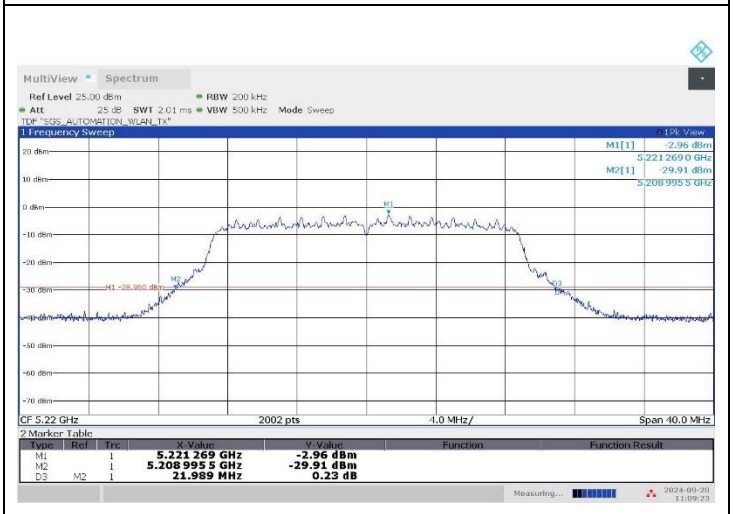


11n_HT20 (Band 1)

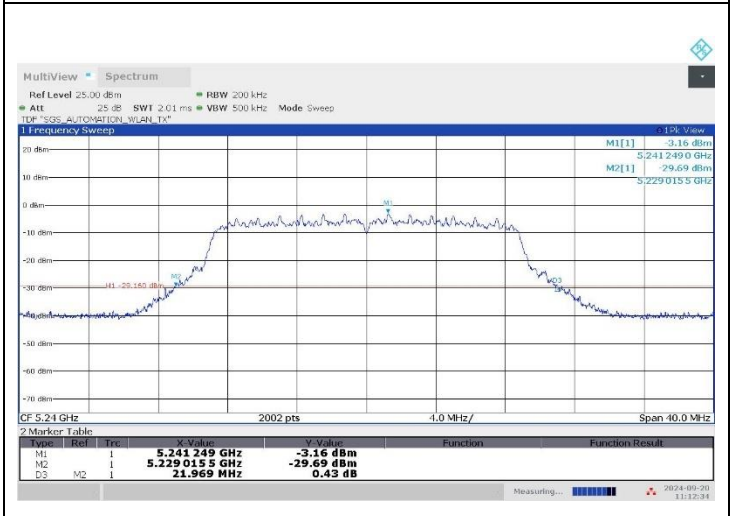
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

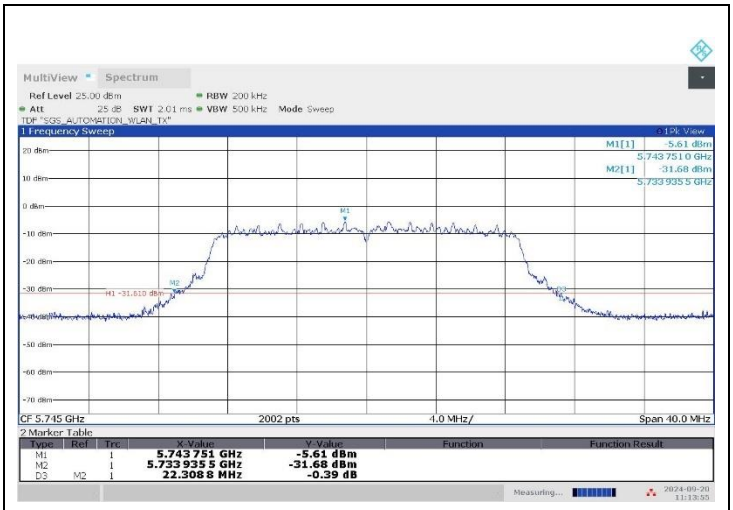


High Channel
(5 240 ㎒)

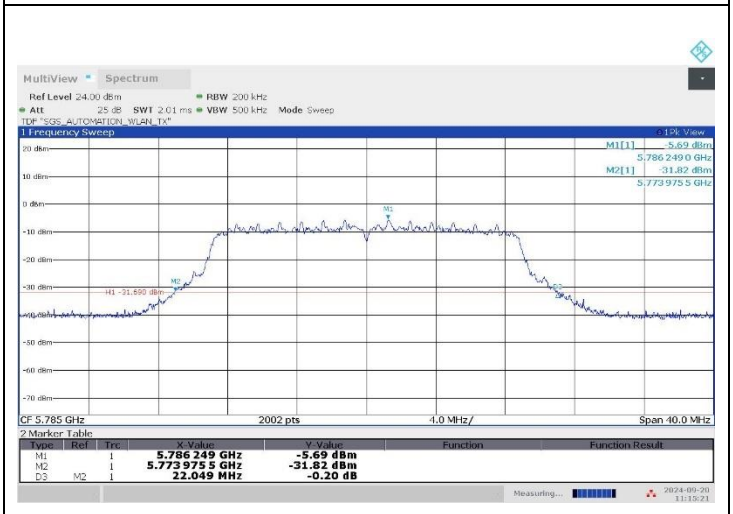


11n_HT20 (Band 3)

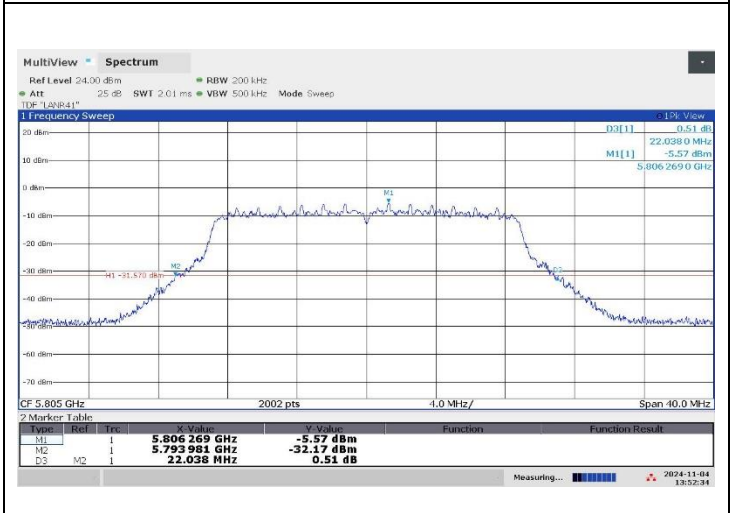
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

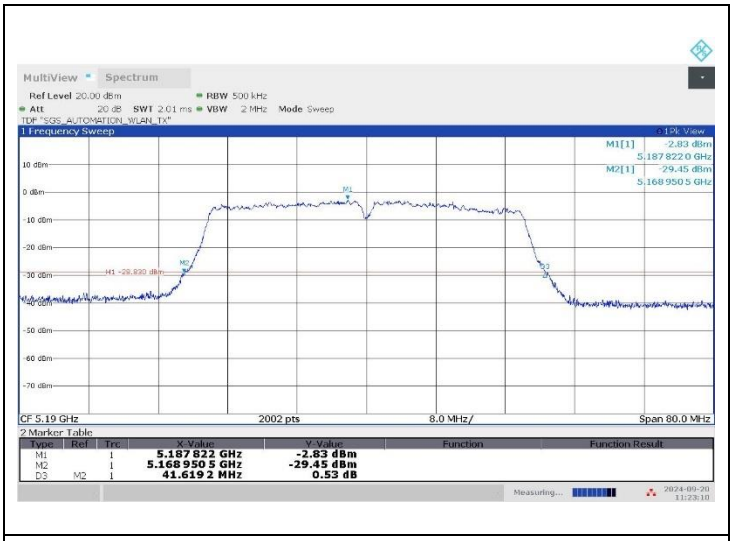


High Channel
(5 805 ㎒)

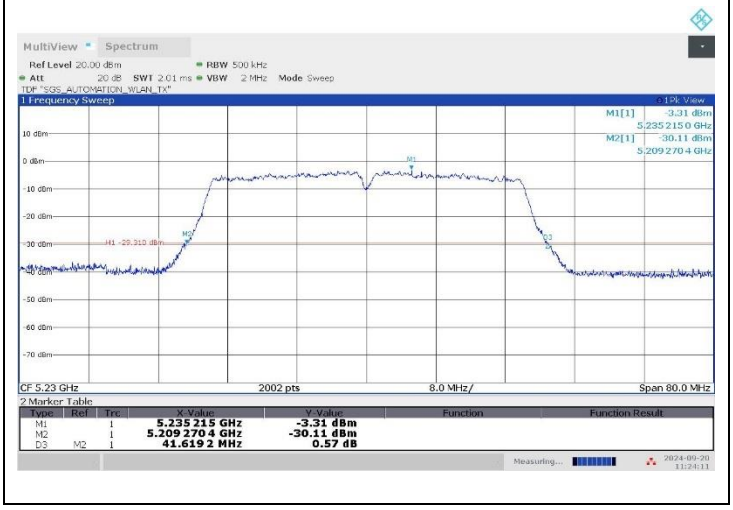


11n_HT40 (Band 1)

Low Channel
(5 190 ㎒)

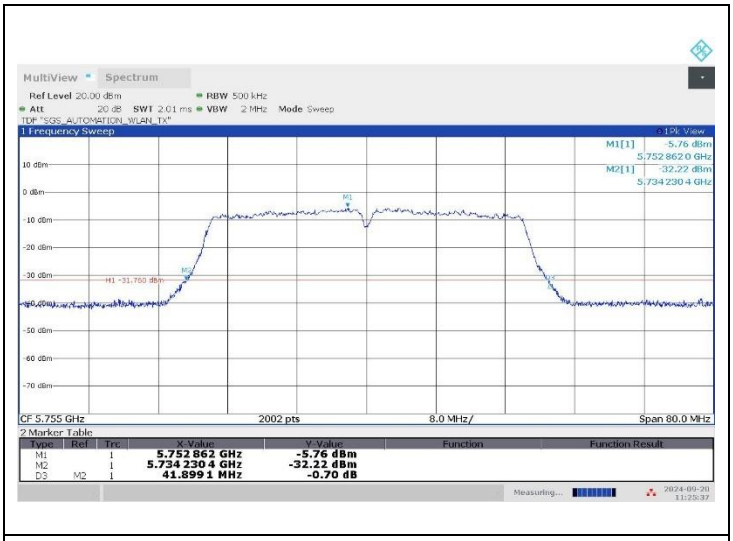


High Channel
(5 230 ㎒)

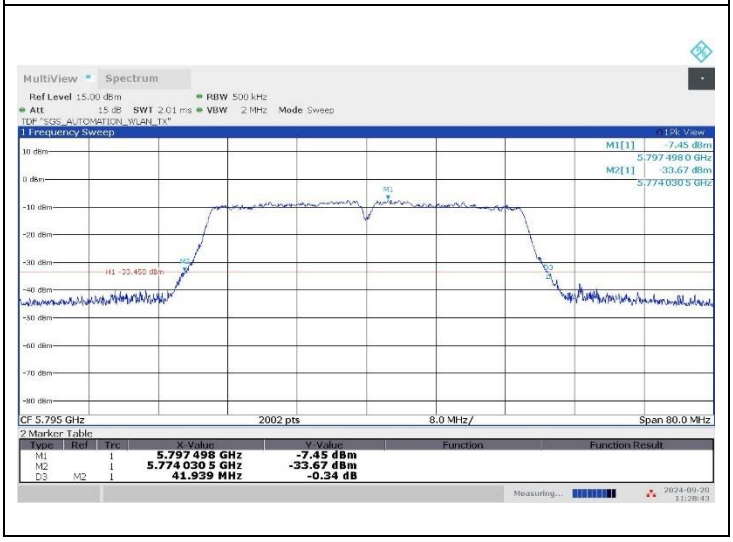


11n_HT40 (Band 3)

Low Channel
(5 755 ㎒)

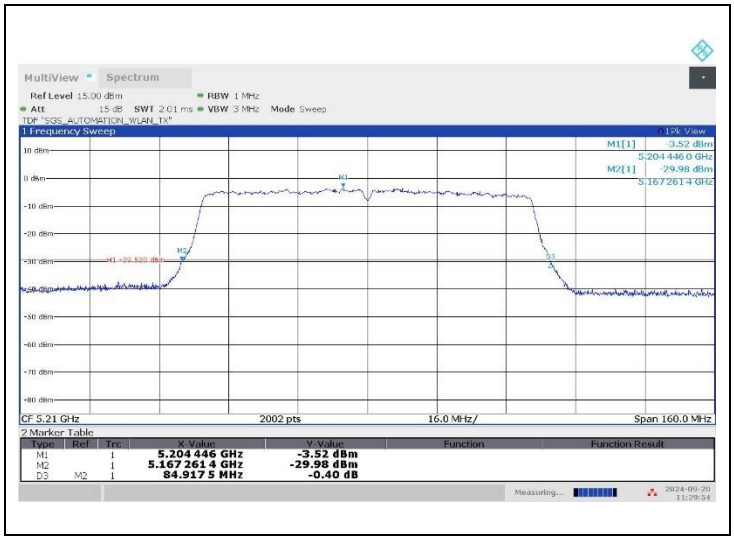


High Channel
(5 795 ㎒)



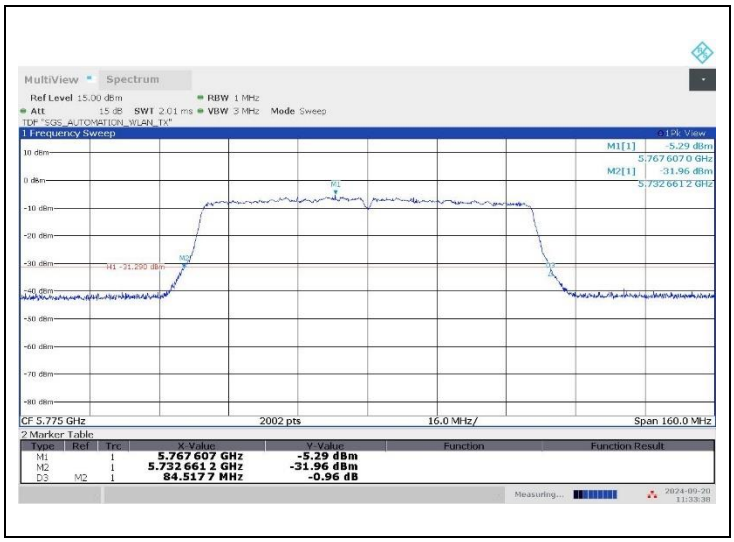
11ac_VHT80 (Band 1)

Middle Channel
(5 210 ㎒)



11ac_VHT80 (Band 3)

Middle Channel
(5 775 ㎒)

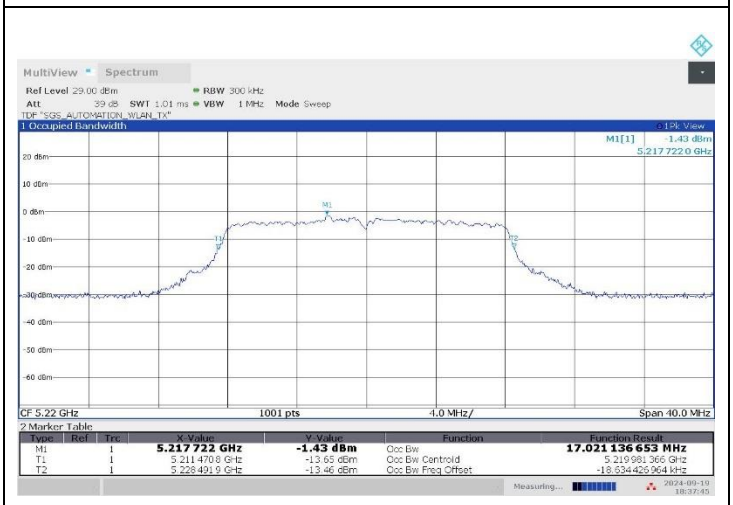


99 % Bandwidth

11a (Band 1)

Low Channel
(5 180 ㎒)

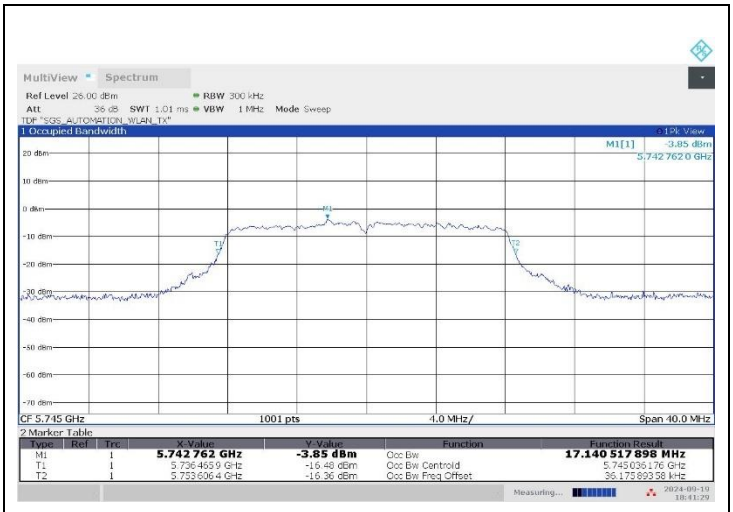
Middle Channel
(5 220 ㎒)



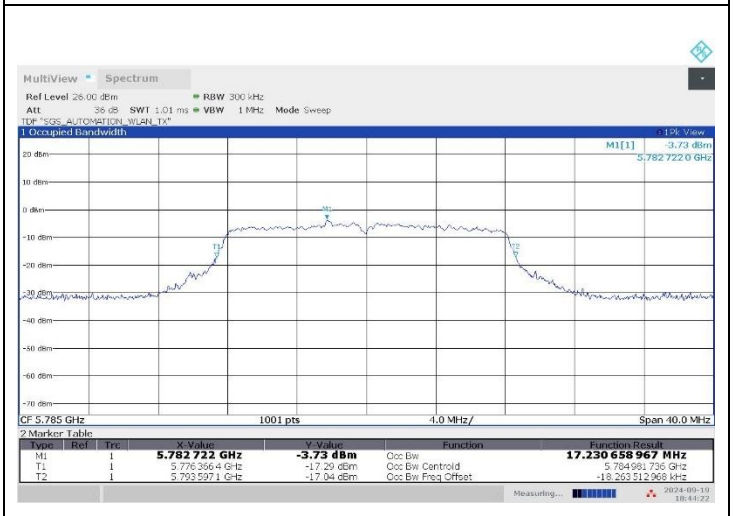
High Channel
(5 240 ㎒)

11a (Band 3)

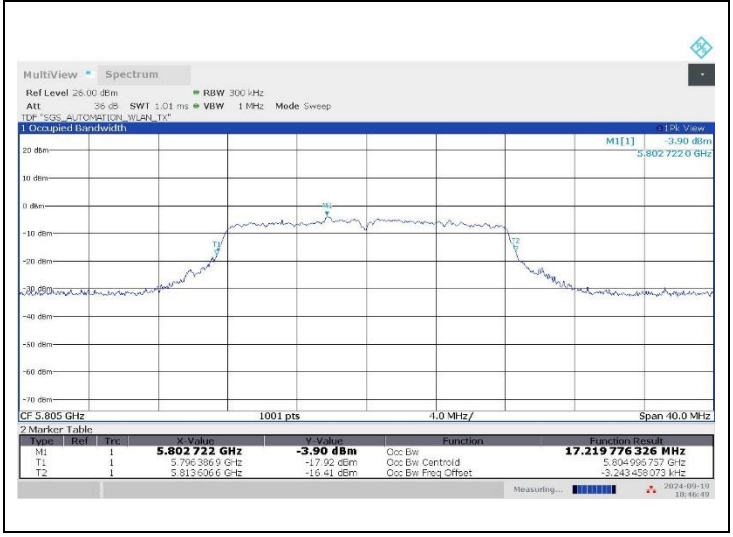
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

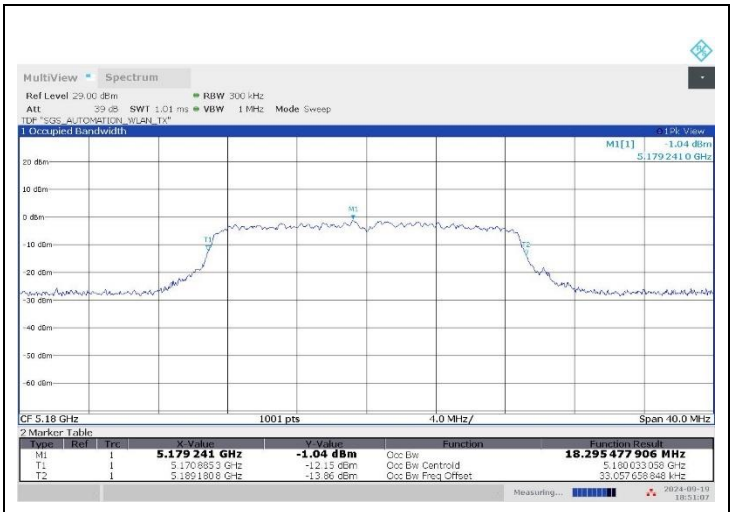


High Channel
(5 805 ㎒)

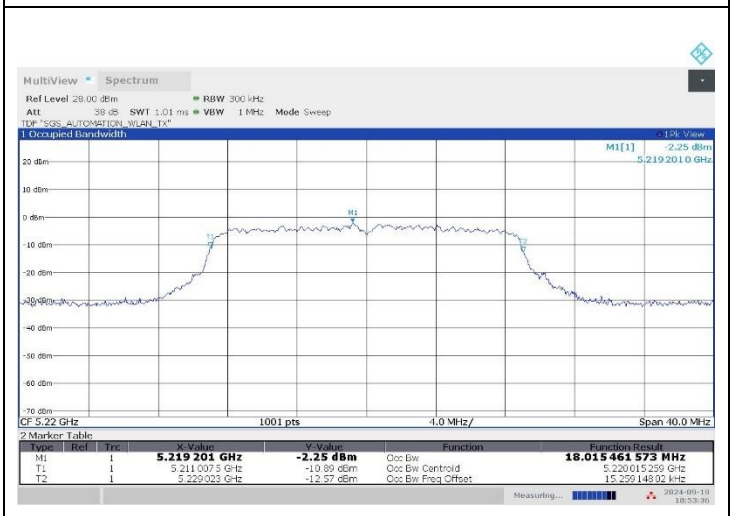


11n_HT20 (Band 1)

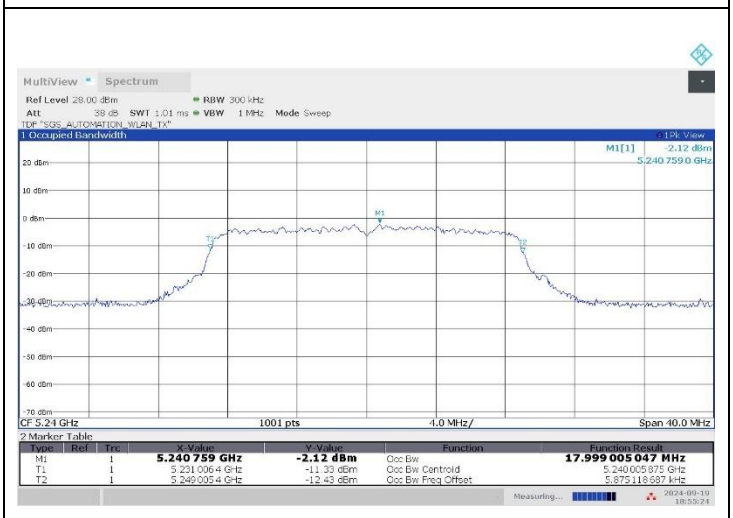
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

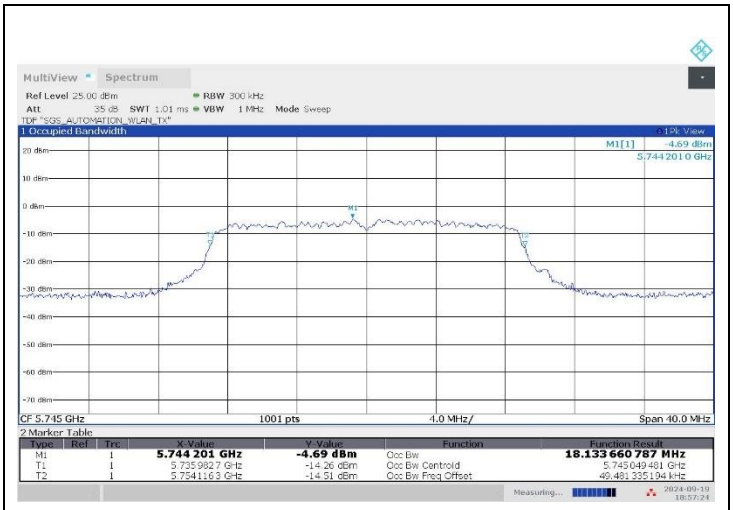


High Channel
(5 240 ㎒)

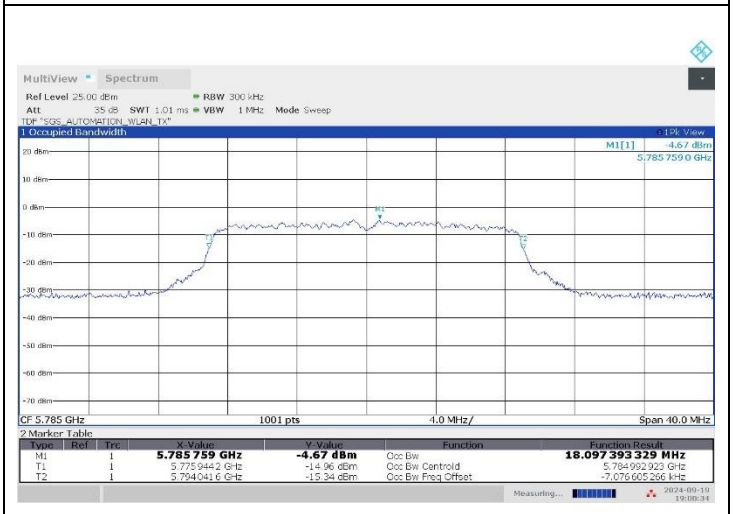


11n_HT20 (Band 3)

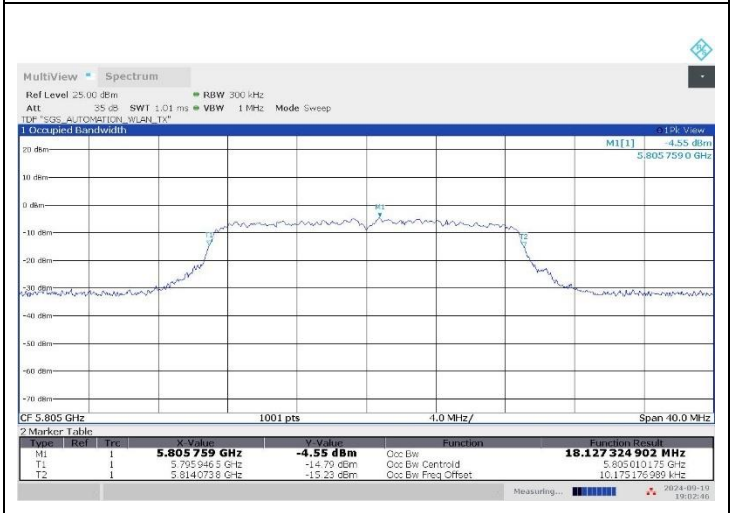
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

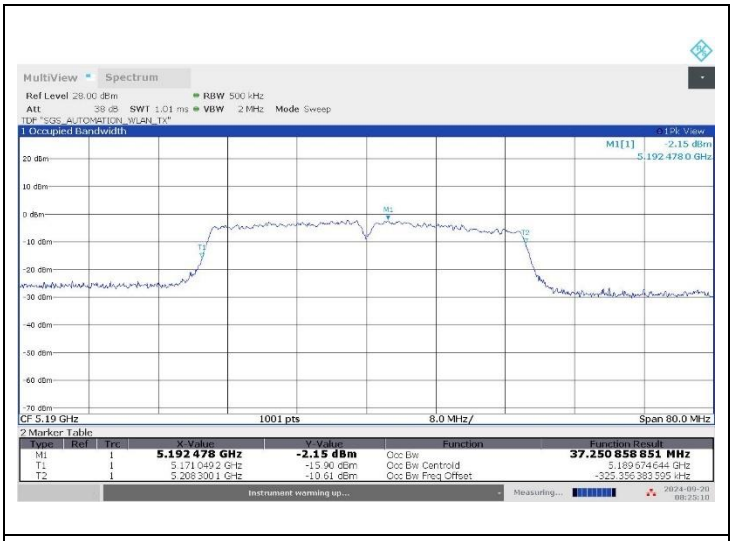


High Channel
(5 805 ㎒)

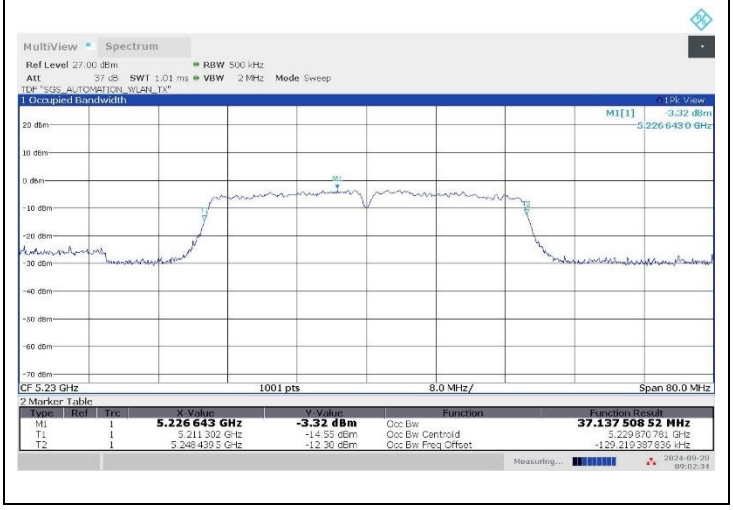


11n_HT40 (Band 1)

Low Channel
(5 190 ㎒)

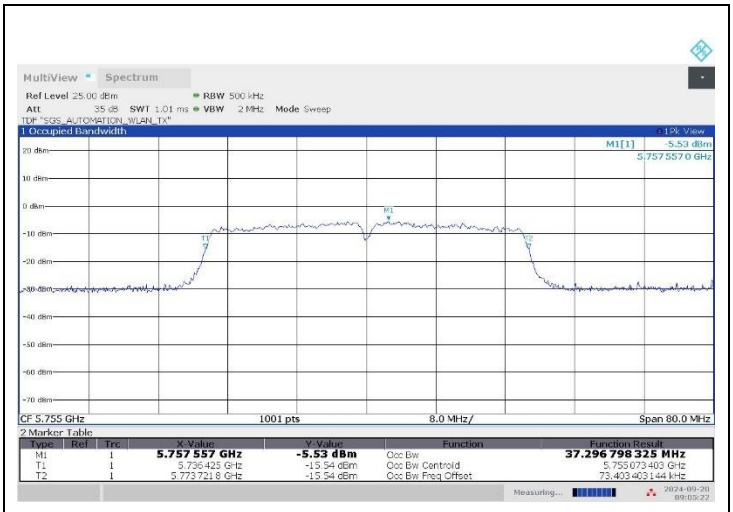


High Channel
(5 230 ㎒)

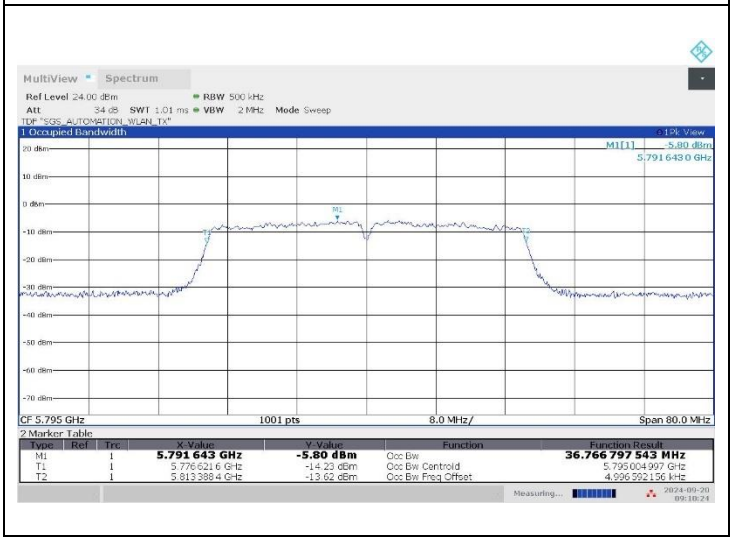


11n_HT40 (Band 3)

Low Channel
(5 755 ㎒)

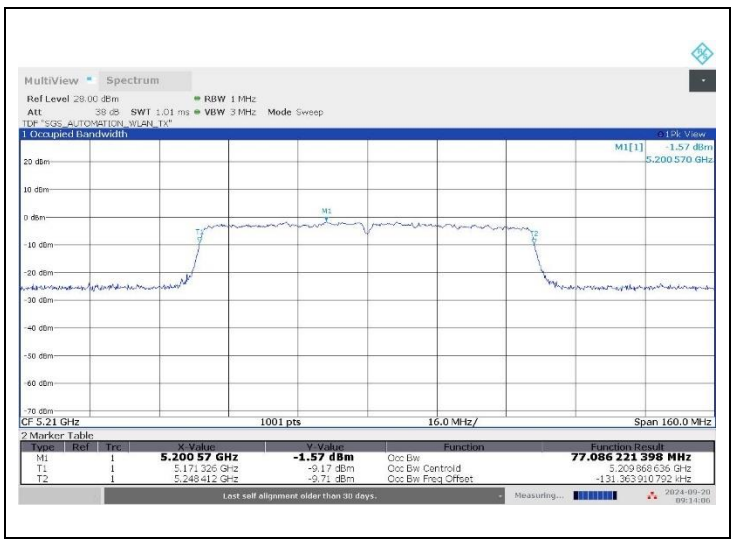


High Channel
(5 795 ㎒)



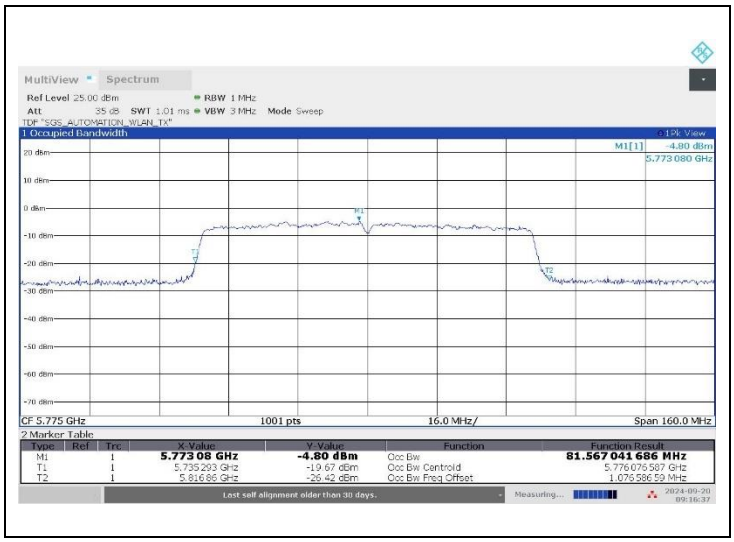
11ac_VHT80 (Band 1)

Middle Channel
(5 210 ㎒)



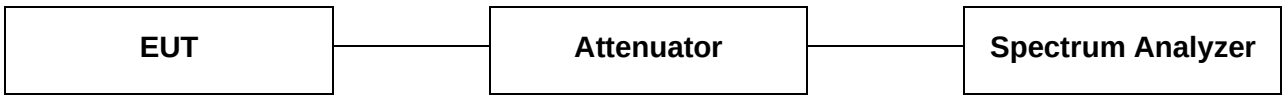
11ac_VHT80 (Band 3)

Middle Channel
(5 775 ㎒)



4. 6 dB Bandwidth

4.1. Test Setup



4.2. Limit

4.2.1. FCC

According to §15.407(e), within the 5.725-5.85 ㎓ band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 ㎑.

4.2.2. IC

According to RSS-247 Issue 3, 6.2.4.2, for equipment operating in the band 5 725-5 850 ㎒, the 6 dB bandwidth shall be at least 500 ㎑.

4.3. Test Procedure

1. This measurement settings are specified in section Ⅱ.C.2 of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW = 100 ㎑.
3. Set the video bandwidth (VBW) ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. 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.

4.4. Test Result

Ambient temperature : (23 ± 1) ℃

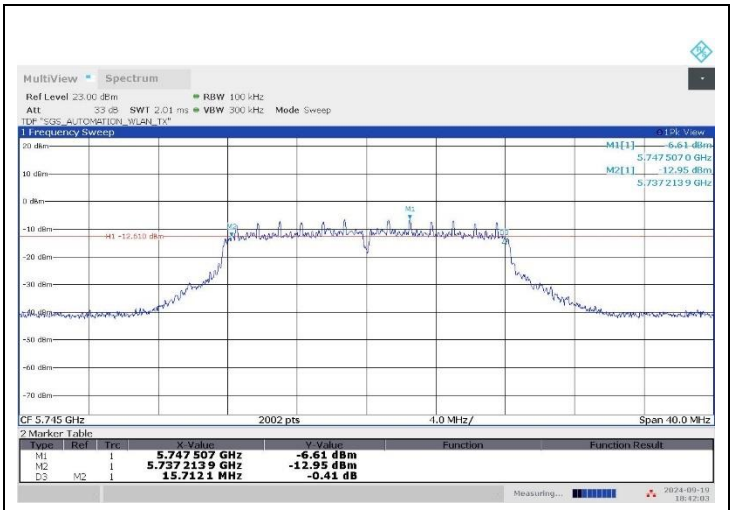
Relative humidity : 47 % R.H.

Band	Mode	Frequency (㎒)	Ch.	Data Rate	6 ㏈ Bandwidth (㎒)	Minimum Bandwidth (㎑)
U-NII 3	11a	5 745	149	6 Mbps	15.712	500
		5 785	157		15.572	
		5 805	161		15.592	
	11n_HT20	5 745	149	MCS0	16.592	
		5 785	157		16.572	
		5 805	161		16.592	
	11n_HT40	5 755	151	MCS0	35.222	
		5 795	159		35.422	
	11ac_VHT80	5 775	155	MCS0	75.322	

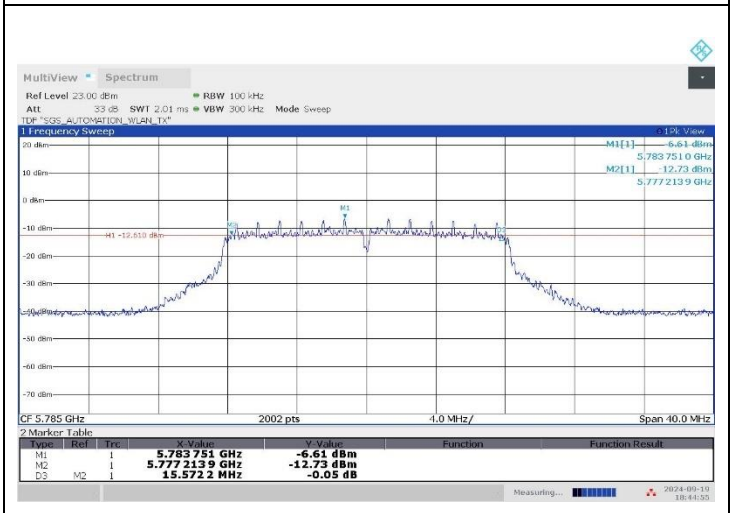
- Test plots

11a (Band 3)

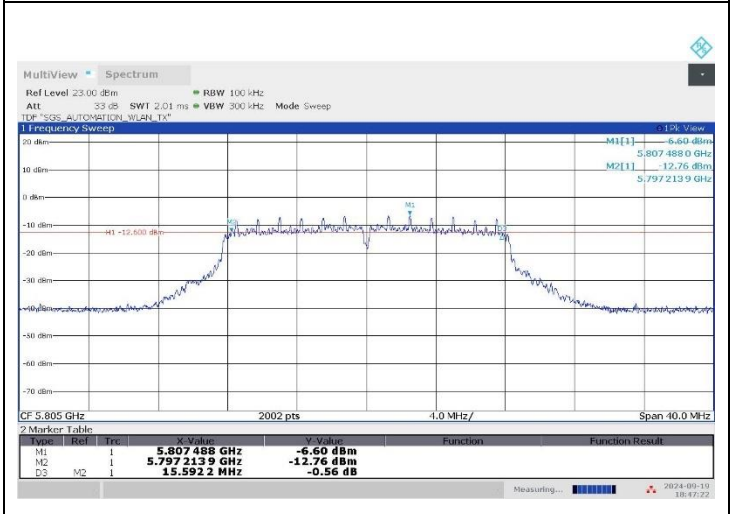
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

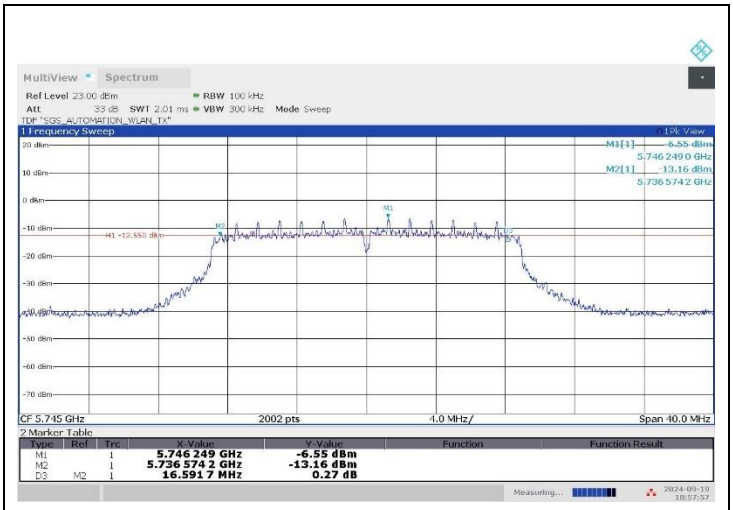


High Channel
(5 805 ㎒)

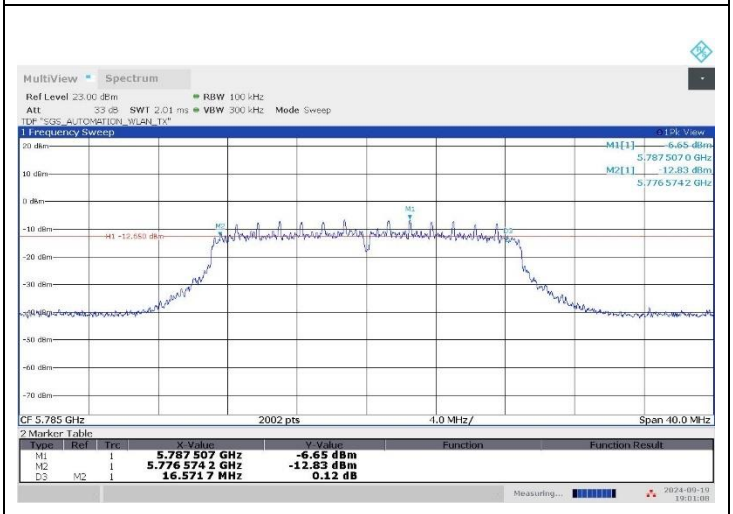


11n_HT20 (Band 3)

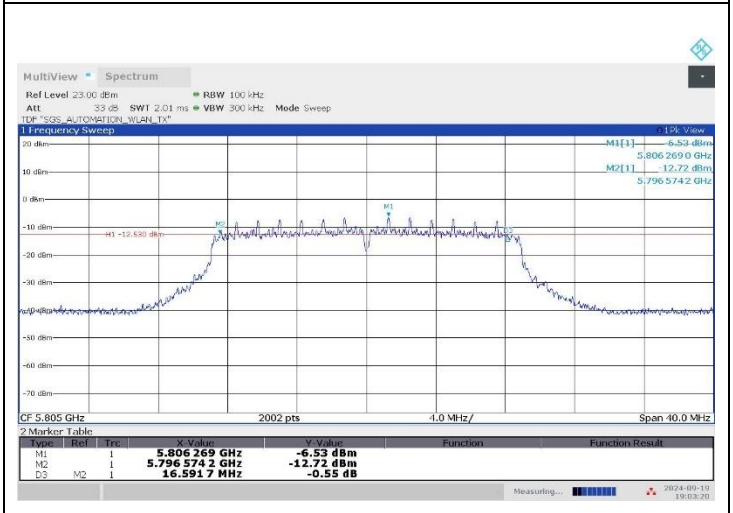
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

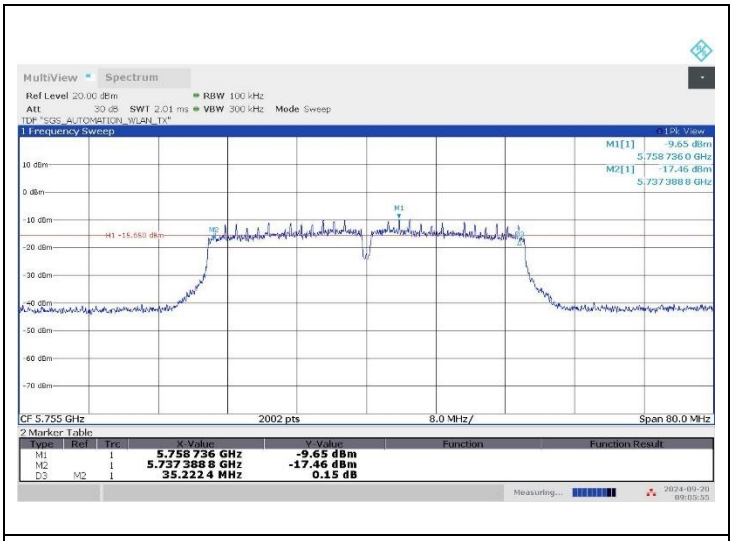


High Channel
(5 805 ㎒)

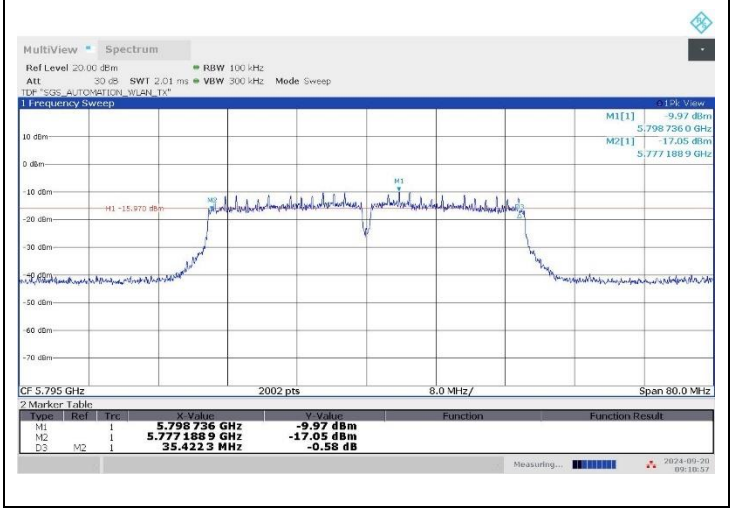


11n_HT40 (Band 3)

Low Channel
(5 755 ㎒)

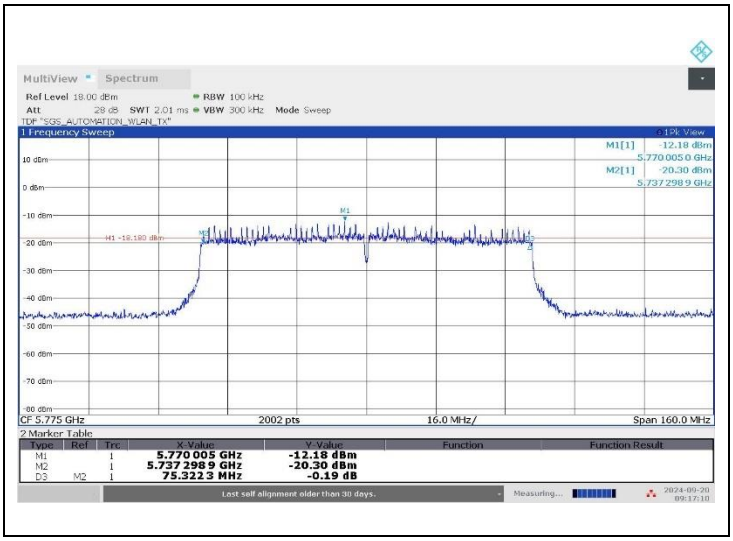


High Channel
(5 795 ㎒)



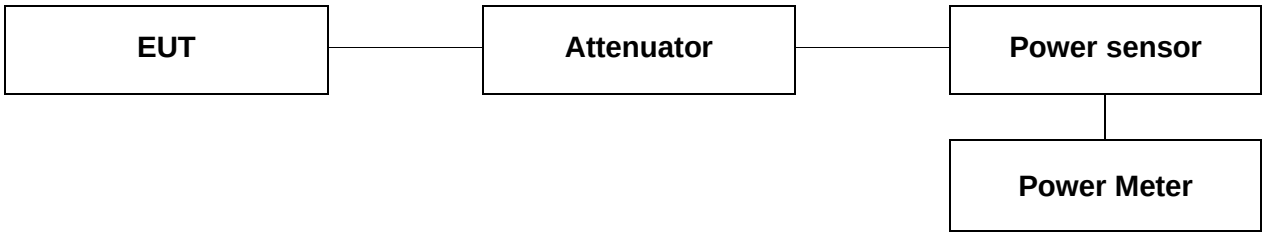
11ac_VHT80 (Band 3)

Middle Channel
(5 775 ㎒)



5. Maximum Conducted Output Power

5.1. Test Setup



5.2. Limit

5.2.1. FCC

According to 15.407(a)(1)(iv)

For client devices in the 5.15-5.25 ㎓ band, the maximum conducted output power over the frequency band of operation shall not exceed 250 ㎽ provided the maximum antenna gain does not exceed 6 ㏈i. In addition, the maximum power spectral density shall not exceed 11 ㏈ m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

According to 15.407(a)(3)

For the band 5.725-5.85 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 ㏈m in any 500-㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.2.2. IC

According to RSS-247 Issue 3,

6.2.1.1 Frequency band 5 150-5 250 ㎒

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 ㎽ or 1.76 + 10 $\log_{10}$B, ㏈m, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 ㏈ below the maximum permitted e.i.r.p. of 30 ㎽.

For other devices, the maximum e.i.r.p. shall not exceed 200 ㎽ or 10 + 10 $\log_{10}$B, ㏈m, whichever power is less. B is the 99 % emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 ㏈m in any 1.0 ㎒ band.

6.2.4.2 Frequency band 5 725-5 850 ㎒

For equipment operating in the band 5 725-5 850 ㎒, the minimum 6 ㏈ bandwidth shall be at least 500 ㎑. The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 ㏈m in any 500 ㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint[3] systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

5.3. Test Procedure

1. This measurement settings are specified in section Ⅱ.E.3.a of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. 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.

5.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test mode: 11a

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (㏈m)	Antenna Gain (㏈i)	E.I.R.P. (㏈m)
U-NII 1	5 180	6 Mbps	5.84	4.60	10.44
	5 220		5.82		10.42
	5 240		5.71		10.31
U-NII 3	5 745		3.18	3.50	6.68
	5 785		2.85		6.35
	5 805		3.11		6.61

Band	FCC Limit					
	Frequency (㎒)	Fixed Limit (㏈m)	Min. 26 ㏈ BW (㎒)	11+10LogB (㏈m)	Antenna Gain (㏈i)	Limit (㏈m)
U-NII 1	5 180	23.98			4.60	23.98
	5 220					
	5 240					
U-NII 3	5 745	30			3.50	30
	5 785					
	5 805					

Band	IC Limit					
	Frequency (㎒)	Fixed E.I.R.P. Limit (㏈m)	Min. 99 % BW (㎒)	1.76+10LogB (㏈m)	Antenna Gain (㏈i)	E.I.R.P. Limit (㏈m)
U-NII 1	5 180	14.77	16.833	14.02	4.60	14.02
	5 220					
	5 240					

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (㏈m)	Min. 99 % BW (㎒)	11+10LogB (㏈m)	Antenna Gain (㏈i)	Limit (㏈m)
U-NII 3	5 745	30			3.50	30
	5 785					
	5 805					

Remark;

1. E.I.R.P. (㏈m) = Average Power Result (㏈m) + Antenna Gain (㏈i)

Test mode: 11n_HT20

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 180	MCS0	5.86	4.60	10.46
	5 220		5.58		10.18
	5 240		5.52		10.12
U-NII 3	5 745		2.99	3.50	6.49
	5 785		2.72		6.22
	5 805		2.96		6.46

Band	FCC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	23.98			4.60	23.98
	5 220					
	5 240					
U-NII 3	5 745	30			3.50	30
	5 785					
	5 805					

Band	IC Limit					
	Frequency (㎒)	Fixed E.I.R.P. Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	E.I.R.P. Limit (dB m)
U-NII 1	5 180	14.77	17.999	14.31	4.60	14.31
	5 220					
	5 240					

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 3	5 745	30			3.50	30
	5 785					
	5 805					

Remark;

1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

Test mode: 11n_HT40

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 190	MCS0	5.58	4.60	10.18
	5 230		5.75		10.35
U-NII 3	5 755		3.08	3.50	6.58
	5 795		2.69		6.19

Band	FCC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 190	23.98			4.60	23.98
	5 230					
U-NII 3	5 755	30			3.50	30
	5 795					

Band	IC Limit					
	Frequency (㎒)	Fixed E.I.R.P. Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	E.I.R.P. Limit (dB m)
U-NII 1	5 190	14.77	37.138	17.46	4.60	14.77
	5 230					

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 3	5 755	30			3.50	30
	5 795					

Remark;

1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

Test mode: 11ac_VHT80

Band	Frequency (㎒)	Data Rate	Average Power (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 210	MCS0	6.12	4.60	10.72
U-NII 3	5 775		2.73	3.50	6.23

Band	FCC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 210	23.98			4.60	23.98
U-NII 3	5 775	30			3.50	30

Band	IC Limit					
	Frequency (㎒)	Fixed E.I.R.P. Limit (dB m)	Min. 99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	E.I.R.P. Limit (dB m)
U-NII 1	5 210	14.77	77.086	20.63	4.60	14.77

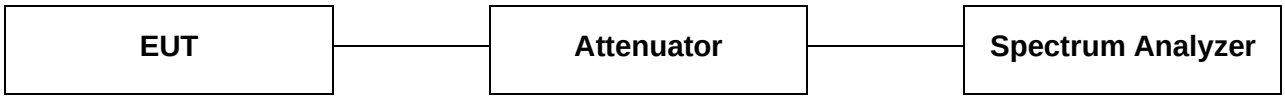
Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	Min. 99 % BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 3	5 755	30			3.50	30

Remark;

1. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

6. Maximum Power Spectral Density

6.1. Test Setup



6.2. Limit

6.2.1. FCC

According to 15.407(a)(1)(iv)

For client devices in the 5.15-5.25 ㎓ band, the maximum conducted output power over the frequency band of operation shall not exceed 250 ㎽ provided the maximum antenna gain does not exceed 6 ㏈i. In addition, the maximum power spectral density shall not exceed 11 ㏈ m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

According to 15.407(a)(3)

For the band 5.725-5.85 ㎓, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 ㏈m in any 500-㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

6.2.2. IC

According to RSS-247 Issue 3,

6.2.1.1 Frequency band 5 150-5 250 ㎒

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 ㎽ or 1.76 + 10 $\log_{10}$B, ㏈m, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 ㏈ below the maximum permitted e.i.r.p. of 30 ㎽.

For other devices, the maximum e.i.r.p. shall not exceed 200 ㎽ or 10 + 10 $\log_{10}$B, ㏈m, whichever power is less. B is the 99 % emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 ㏈m in any 1.0 ㎒ band.

6.2.4.2 Frequency band 5 725-5 850 ㎒

For equipment operating in the band 5 725-5 850 ㎒, the minimum 6 ㏈ bandwidth shall be at least 500 ㎑. The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 ㏈m in any 500 ㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint[3] systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

6.3. Test Procedure

1. This measurement settings are specified in section Ⅱ.F of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

2. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”. (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)

3. Use the peak search function on the instrument to find the peak of the spectrum and record its value.

4. Make the following adjustments to the peak value of the spectrum, if applicable:

   a) **If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.**
   b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 ㏈ to the final result to compensate for the difference between linear averaging and power averaging.

5. The result is the Maximum PSD over 1 ㎒ reference bandwidth.

6. For devices operating in the bands 5.15-5.25 ㎓, 5.25-5.35 ㎓, and 5.47-5.725 ㎓, the above procedures make use of 1 ㎒ RBW to satisfy directly the 1 ㎒ reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 ㎓, the rules specify a measurement bandwidth of 500 ㎑. Many spectrum analyzers do not have 500 ㎑ RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 ㎒, or 500 ㎑, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (*i.e.,* 1 ㎒, or 500 ㎑). If measurements are performed using a reduced resolution bandwidth (< 1 ㎒, or < 500 ㎑) and integrated over 1 ㎒, or 500 ㎑ bandwidth, the following adjustments to the procedures apply:

   a) Set RBW ≥ 1/*T*, where *T* is defined in section II.B.1.a).
   b) Set VBW ≥ 3 RBW.
   c) If measurement bandwidth of Maximum PSD is specified in 500 ㎑, add 10 log(500 ㎑/RBW) to the measured result, whereas RBW (< 500 ㎑) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
   d) If measurement bandwidth of Maximum PSD is specified in 1 ㎒, add 10 log(1 ㎒/RBW) to the measured result, whereas RBW (< 1 ㎒) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
   e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

6.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate	Measured PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 180	36	6 Mbps	-4.25	-	-4.25	4.60	11
	5 220	44		-4.66		-4.66		
	5 240	48		-4.56		-4.56		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Measured PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 745	149	6 Mbps	-9.77	-	-9.77	3.50	30
	5 785	157		-10.31		-10.31		
	5 805	161		-10.19		-10.19		

Remark;

1. Final PSD (dB m) = Measured PSD (dB m) + Duty Cycle Correction Factor (dB)

Test mode: 11n_HT20

Band	Frequency (㎒)	Ch.	Data Rate	Measured PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 180	36	MCS0	-5.33	0.63	-4.70	4.60	11
	5 220	44		-5.54		-4.91		
	5 240	48		-5.59		-4.96		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Measured PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 745	149	MCS0	-10.83	0.63	-10.20	3.50	30
	5 785	157		-11.21		-10.58		
	5 805	161		-10.77		-10.14		

Remark;

1. Final PSD (dB m) = Measured PSD (dB m) + Duty Cycle Correction Factor (dB)

Test mode: 11n_HT40

Band	Frequency (㎒)	Ch.	Data Rate	Measured PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 190	38	MCS0	-8.44	1.17	-7.27	4.60	11
	5 230	46		-8.41		-7.24		
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Measured PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 755	151	MCS0	-14.05	1.17	-12.88	3.50	30
	5 795	159		-14.84		-13.67		

Remark;

1. Final PSD (dB m) = Measured PSD (dB m) + Duty Cycle Correction Factor (dB)

Test mode: 11ac_VHT80

Band	Frequency (㎒)	Ch.	Data Rate	Measured PSD (dB m)	Duty Cycle Correction Factor (dB)	Final PSD (dB m)	Antenna Gain (dB i)	Limit (dB m/1 ㎒)
U-NII 1	5 210	42	MCS0	-12.37	2.32	-10.05	4.60	11
Band	**Frequency (㎒)**	**Ch.**	**Data Rate**	**Measured PSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PSD (dB m)**	**Antenna Gain (dB i)**	**Limit (dB m/500 ㎑)**
U-NII 3	5 775	155	MCS0	-18.73	2.32	-16.41	3.50	30

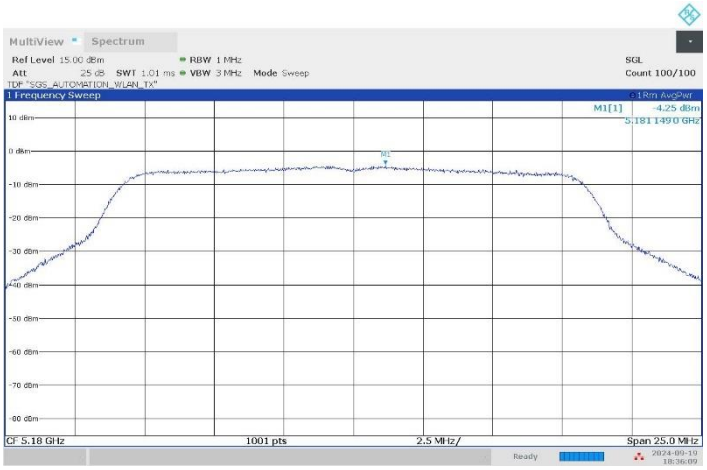
Remark;

1. Final PSD (dB m) = Measured PSD (dB m) + Duty Cycle Correction Factor (dB)

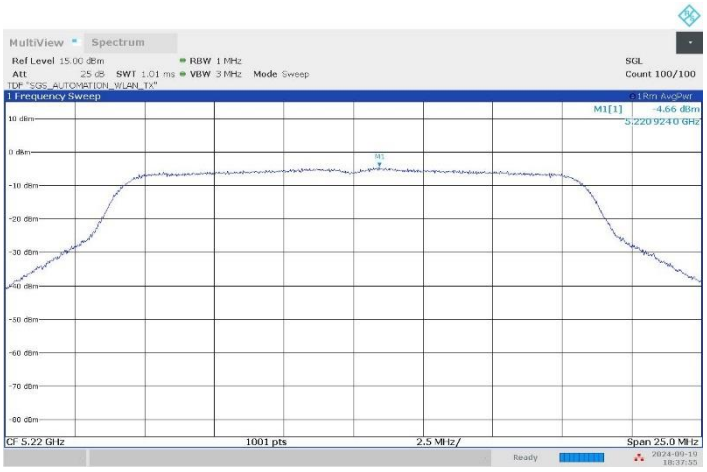
Test plots

11a (Band 1)

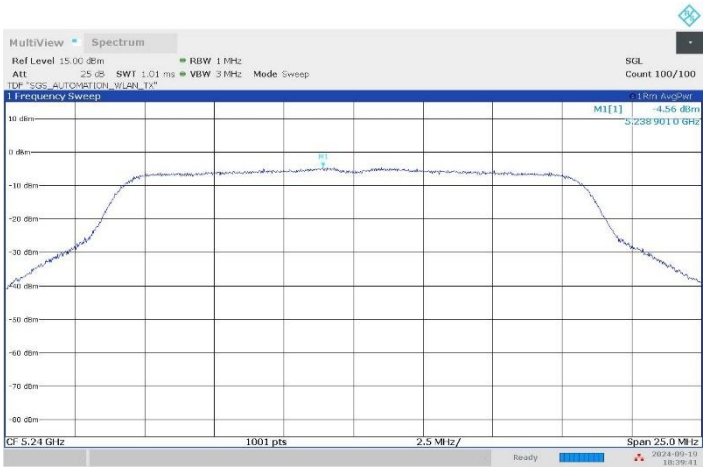
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

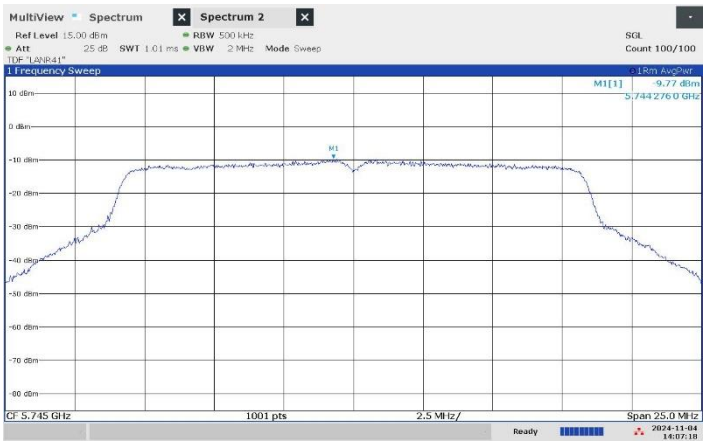


High Channel
(5 240 ㎒)

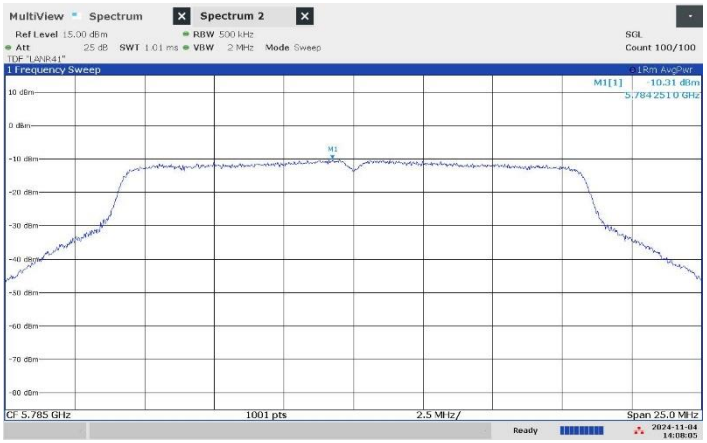


11a (Band 3)

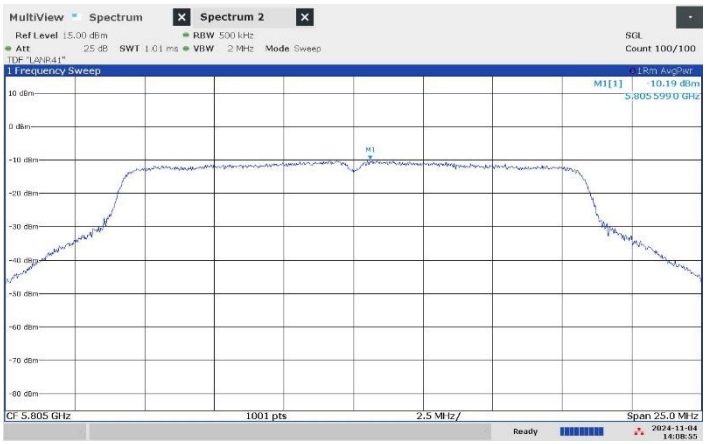
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

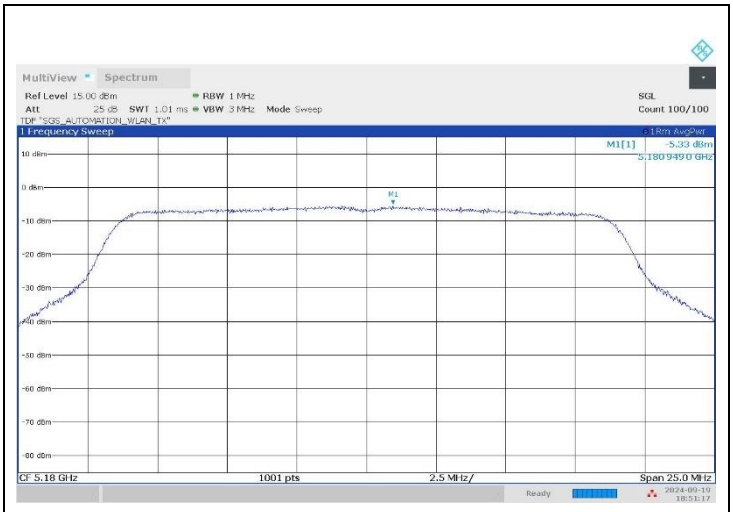


High Channel
(5 805 ㎒)

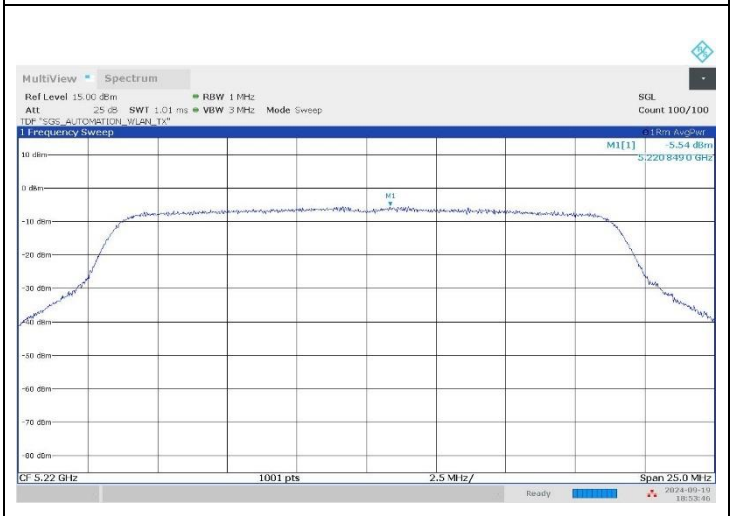


11n_HT20 (Band 1)

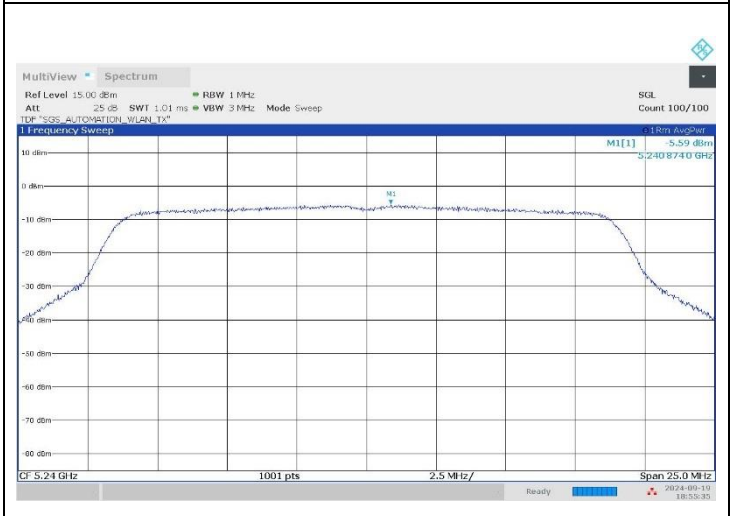
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

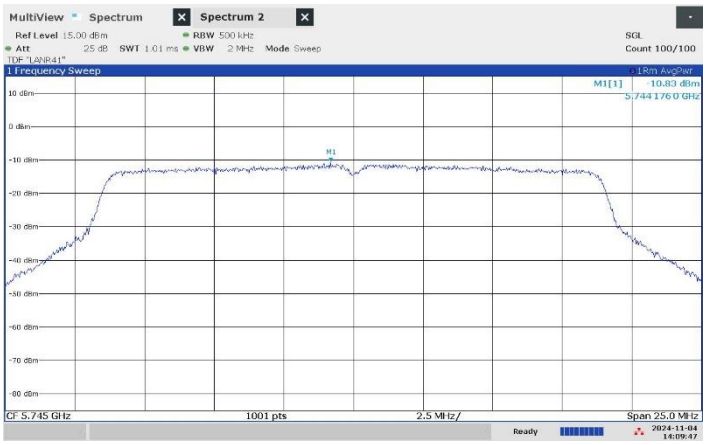


High Channel
(5 240 ㎒)

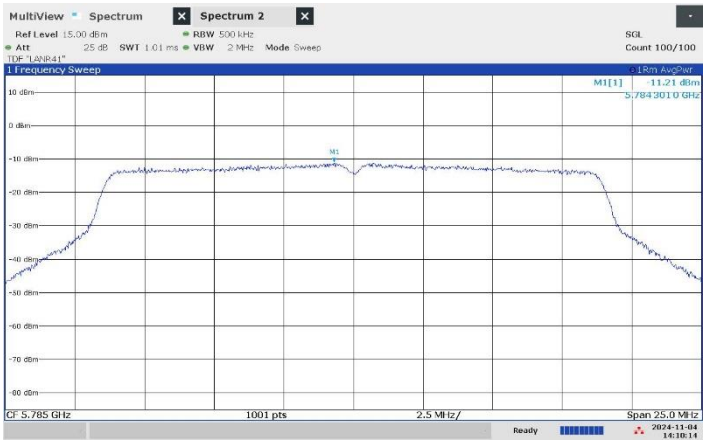


11n_HT20 (Band 3)

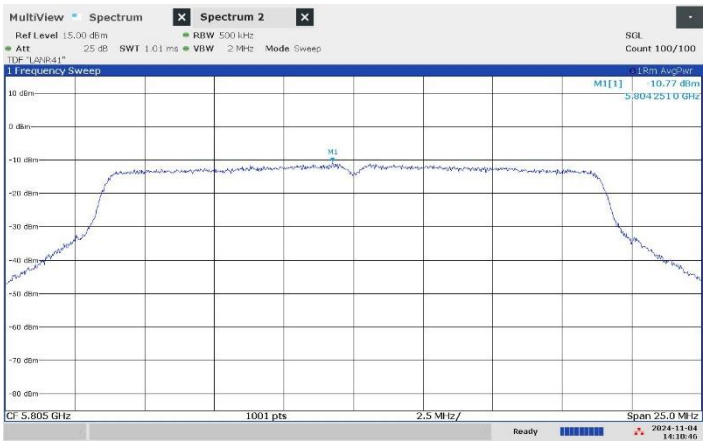
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

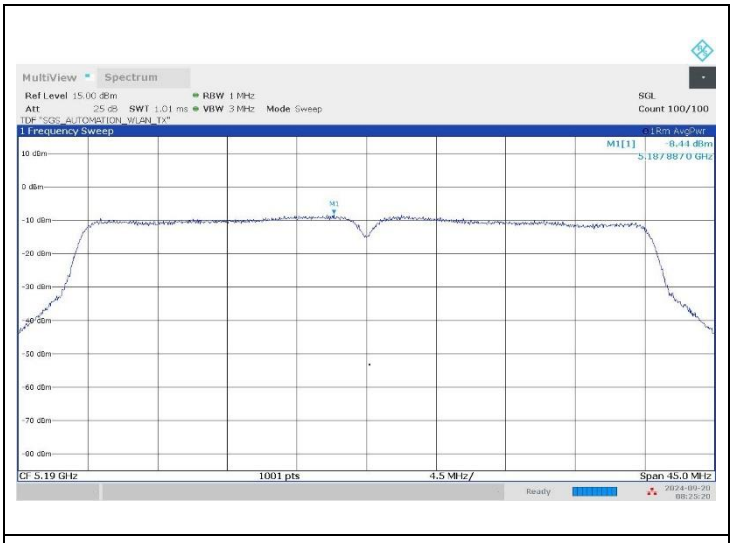


High Channel
(5 805 ㎒)

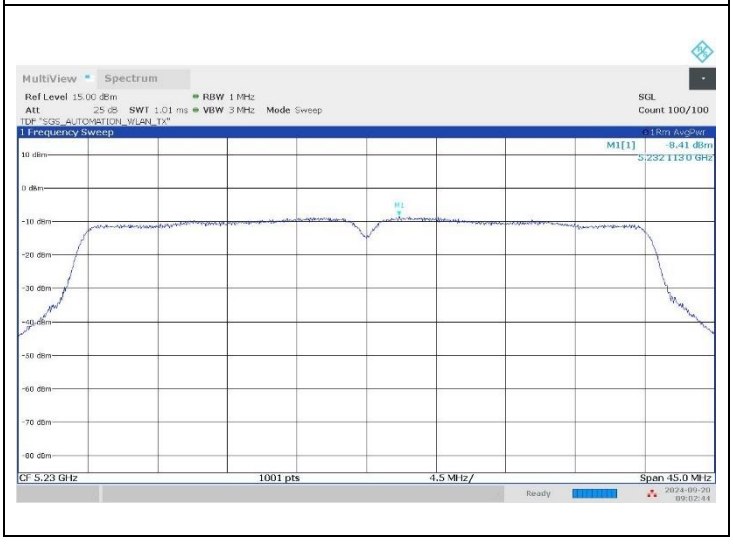


11n_HT40 (Band 1)

Low Channel
(5 190 ㎒)

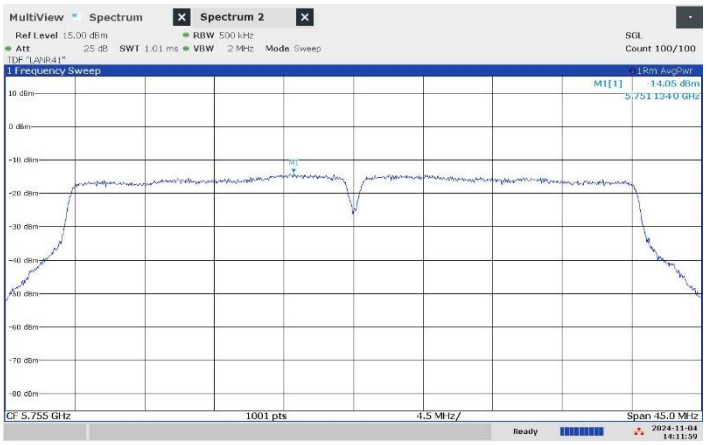


High Channel
(5 230 ㎒)

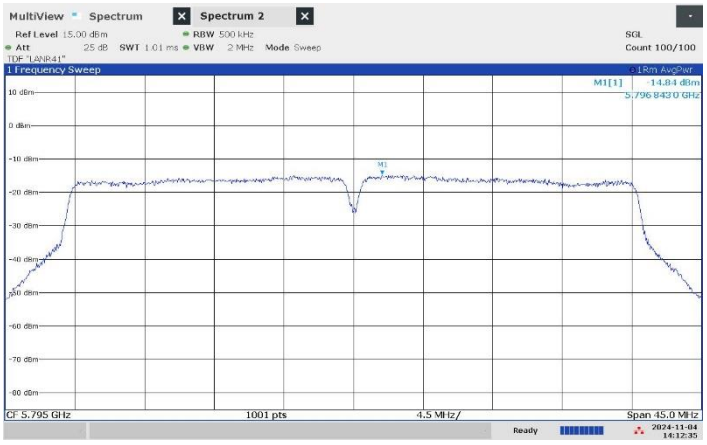


11n_HT40 (Band 3)

Low Channel
(5 755 ㎒)

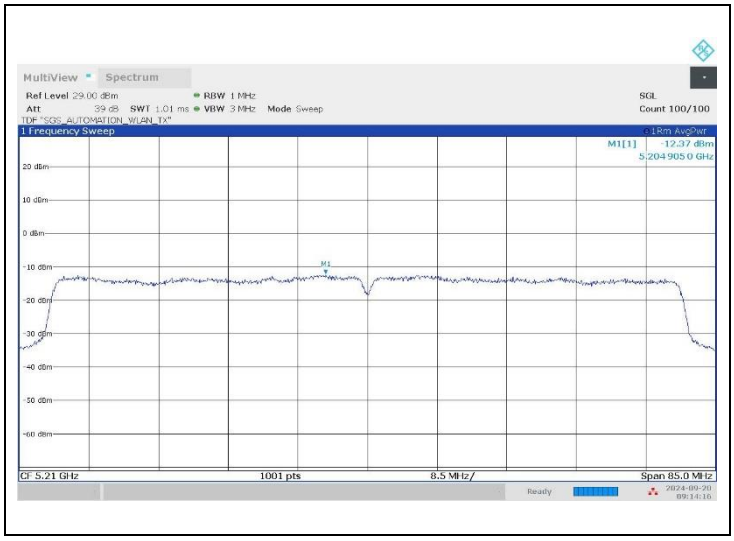


High Channel
(5 795 ㎒)



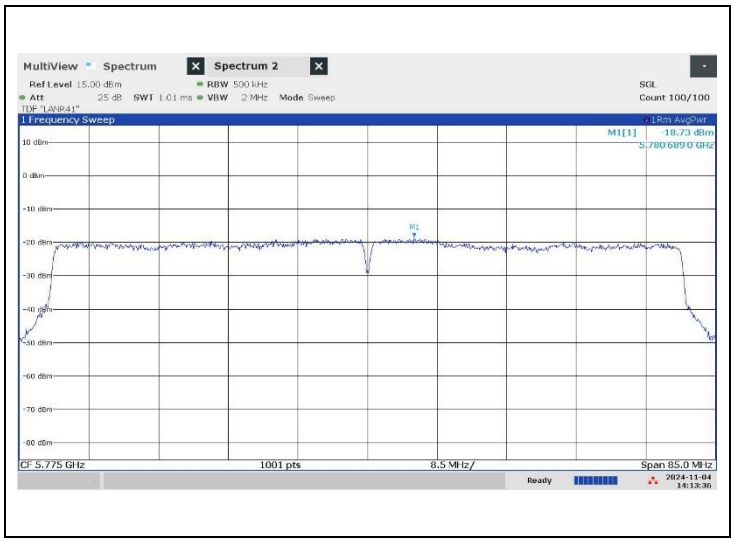
11ac_VHT80 (Band 1)

Middle Channel
(5 210 ㎒)



11ac_VHT80 (Band 3)

Middle Channel
(5 775 ㎒)



7. Antenna Requirement

7.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §15.203, 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 shall be considered sufficient to comply with the provisions of this section. 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. And according to FCC 47 CFR Section §15.407(a) If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.2. Antenna Connected Construction

Antenna used in this product is Internal Dielectric Chip Antenna and peak max gain of antenna as below.

Band	5 150 ㎒ ~ 5 250 ㎒	5 725 ㎒ ~ 5 850 ㎒
Mode	11a/n_HT20, HT40, 11ac_VHT20, VHT40, VHT80	
Gain (dB i)	4.60	3.50

- End of the Test Report -