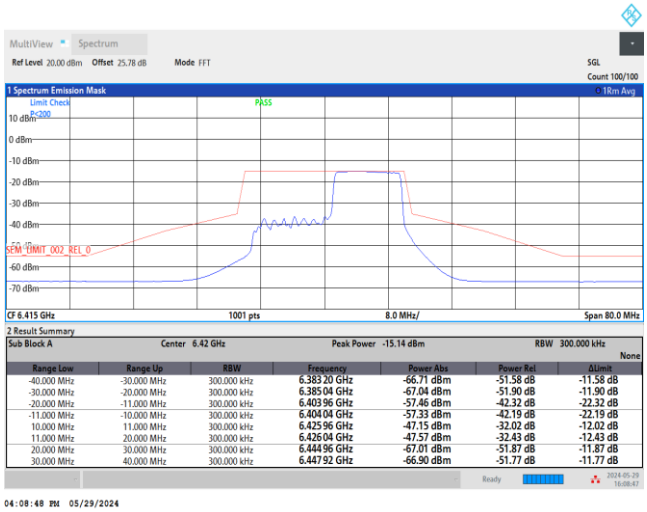
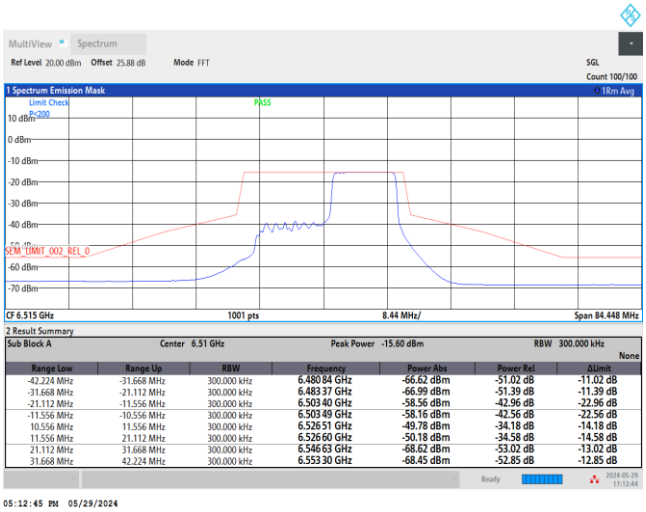
EUT Mode	802.11ax HE20 106RU54

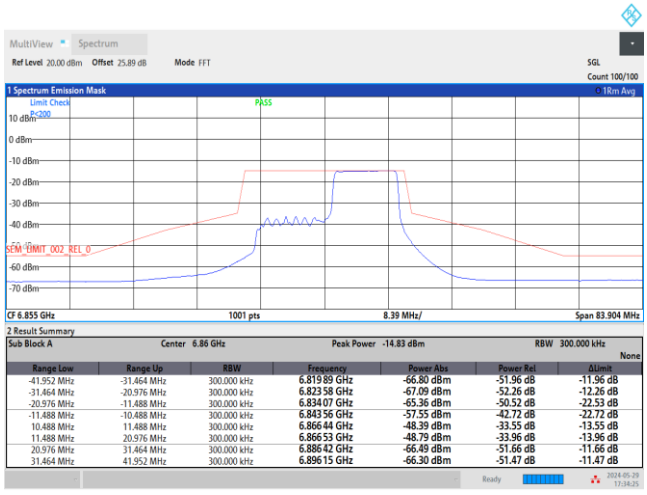
Plot on Channel 6415 MHz



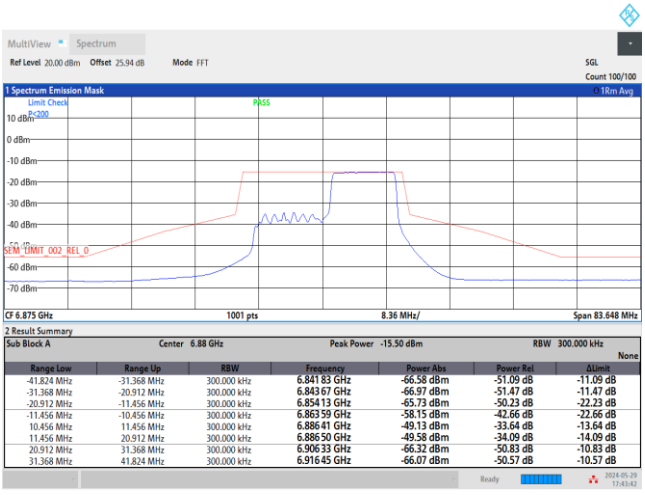
Plot on Channel 6515 MHz



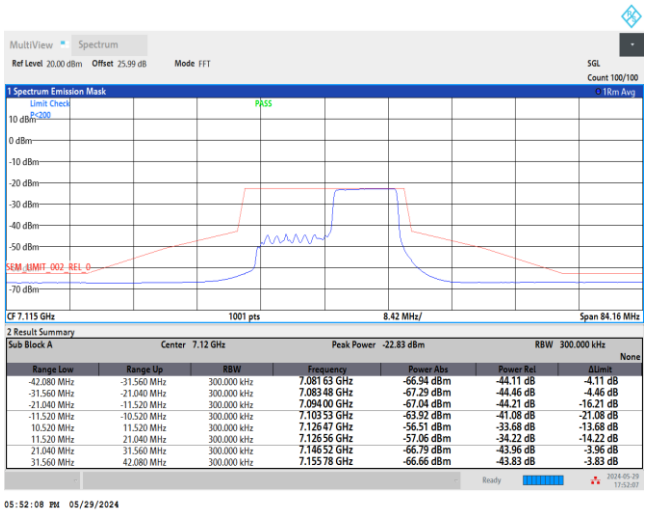
Plot on Channel 6855 MHz



Plot on Channel 6875 MHz

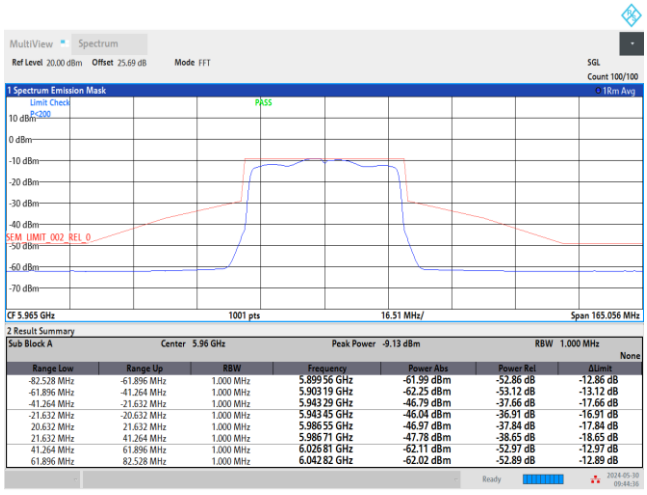


Plot on Channel 7115 MHz



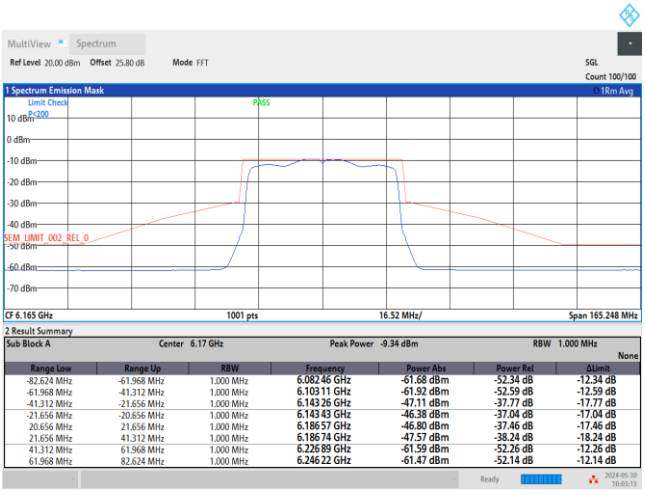
EUT Mode :	802.11ax HE40 Full RU

Plot on Channel 5965 MHz



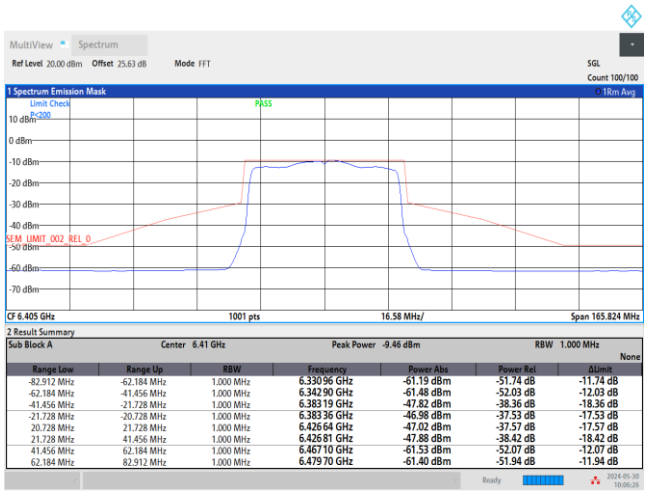
09:44:36 AM 05/30/2024

Plot on Channel 6165 MHz



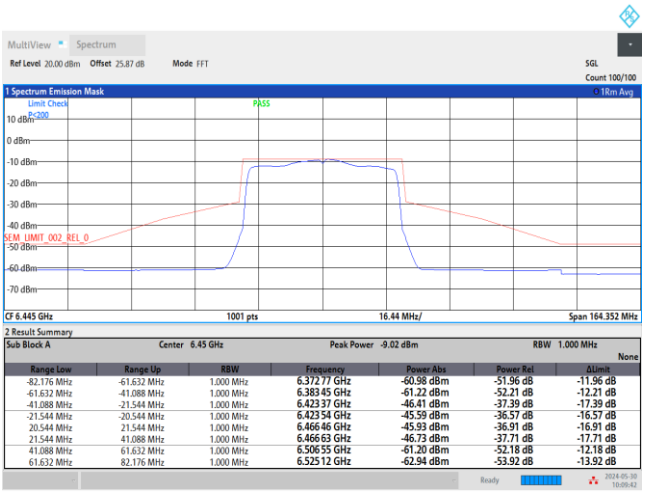
10:03:14 AM 05/30/2024

Plot on Channel 6405 MHz



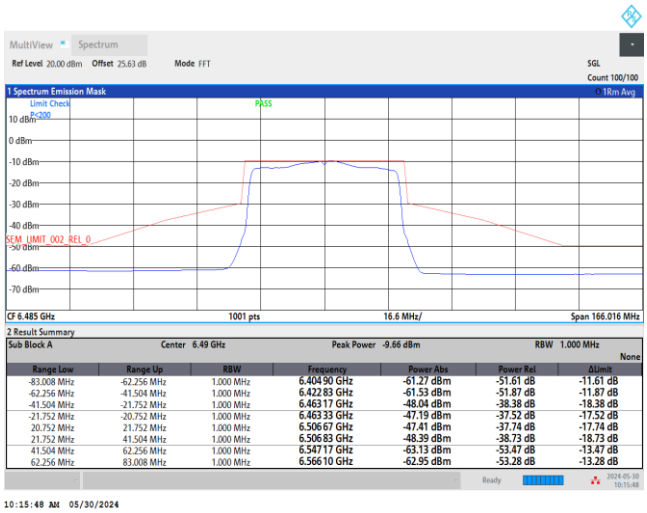
10:06:27 AM 05/30/2024

Plot on Channel 6445 MHz

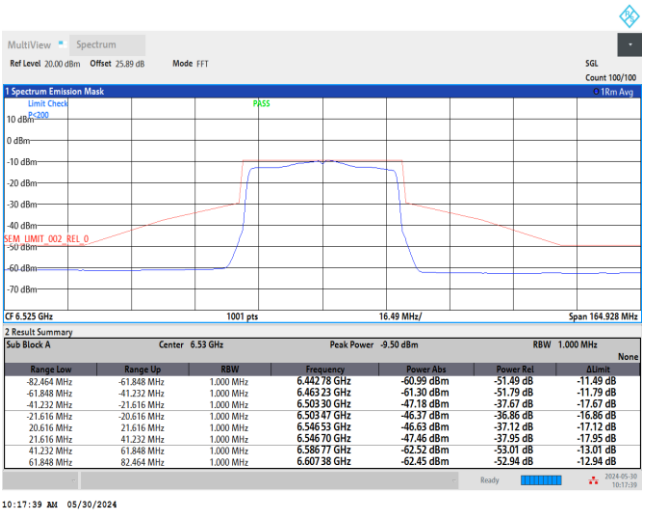


10:09:43 AM 05/30/2024

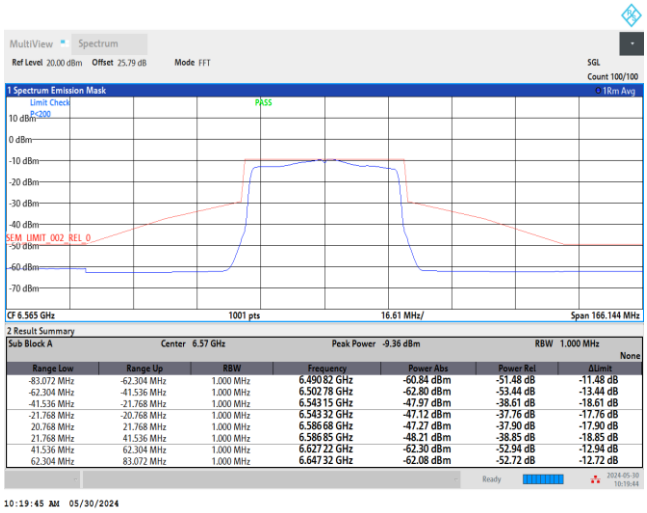
Plot on Channel 6485 MHz



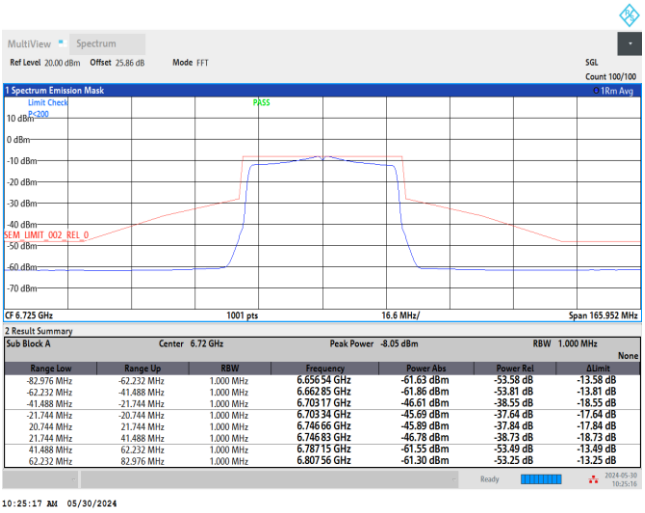
Plot on Channel 6525 MHz



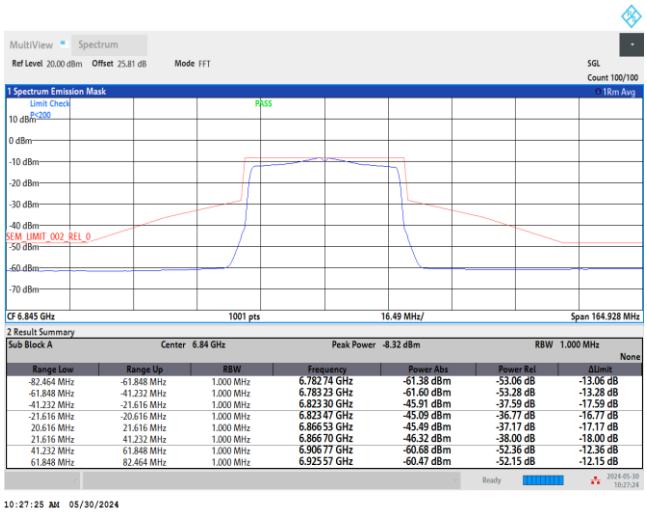
Plot on Channel 6565 MHz



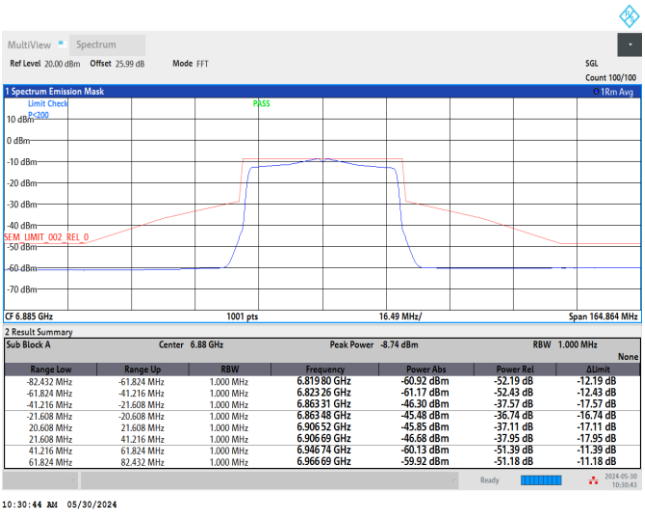
Plot on Channel 6725 MHz



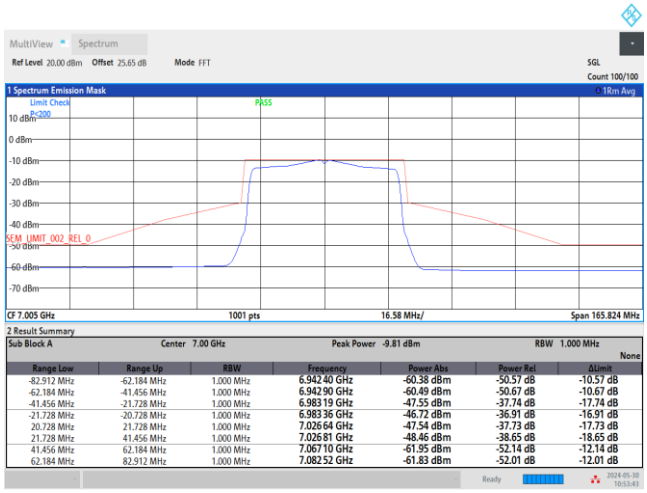
Plot on Channel 6845 MHz



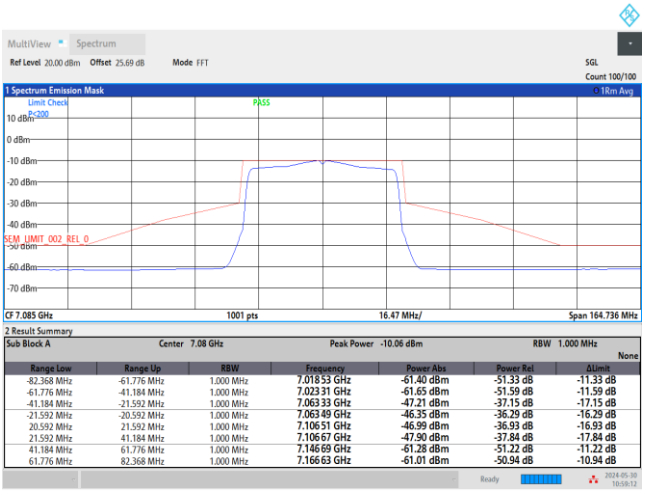
Plot on Channel 6885 MHz



Plot on Channel 7005 MHz

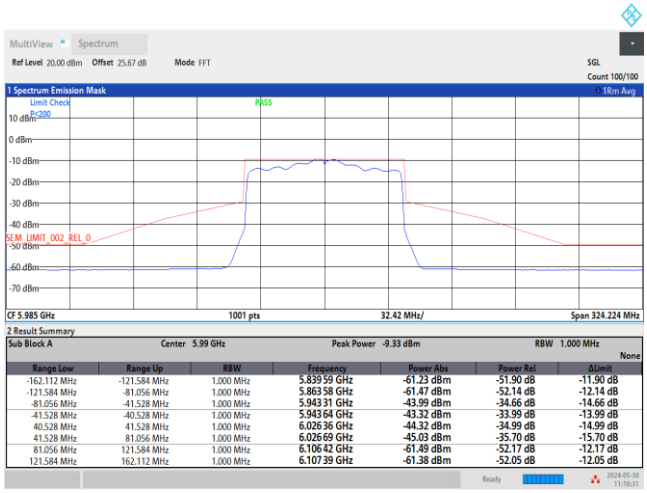


Plot on Channel 7085 MHz



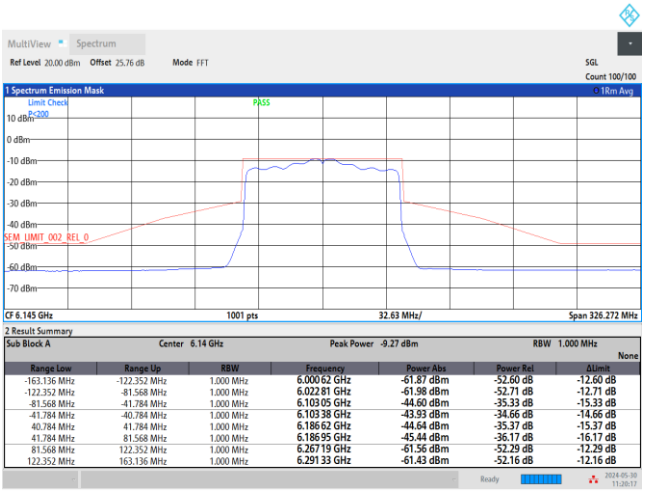
EUT Mode :	802.11ax HE80 Full RU

Plot on Channel 5985 MHz



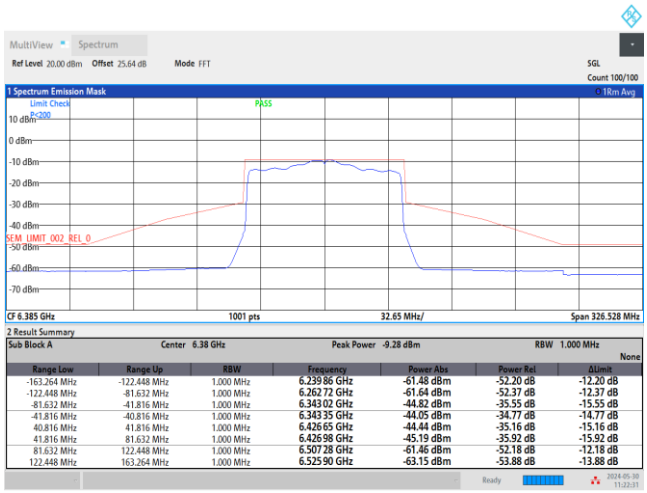
11:10:32 AM 05/30/2024

Plot on Channel 6145 MHz



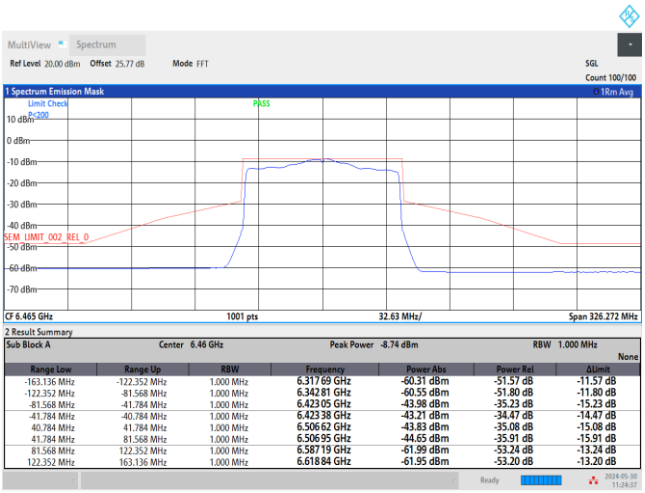
11:20:17 AM 05/30/2024

Plot on Channel 6385 MHz



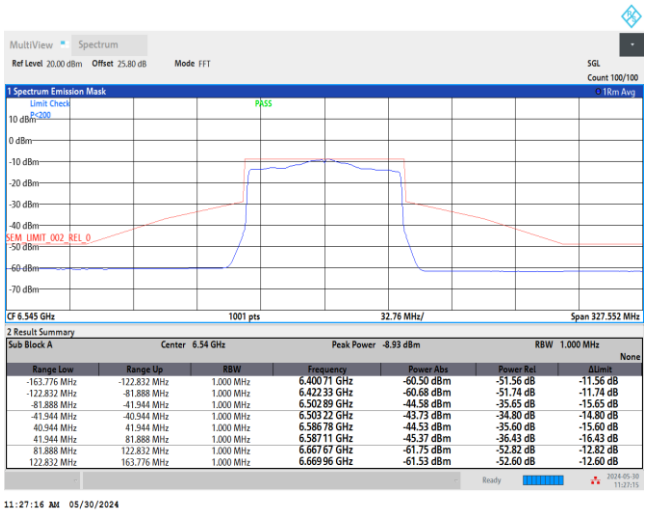
11:22:32 AM 05/30/2024

Plot on Channel 6465 MHz

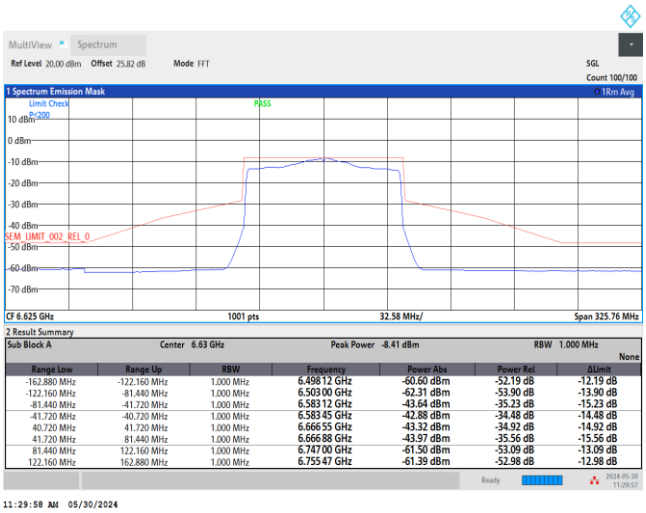


11:24:38 AM 05/30/2024

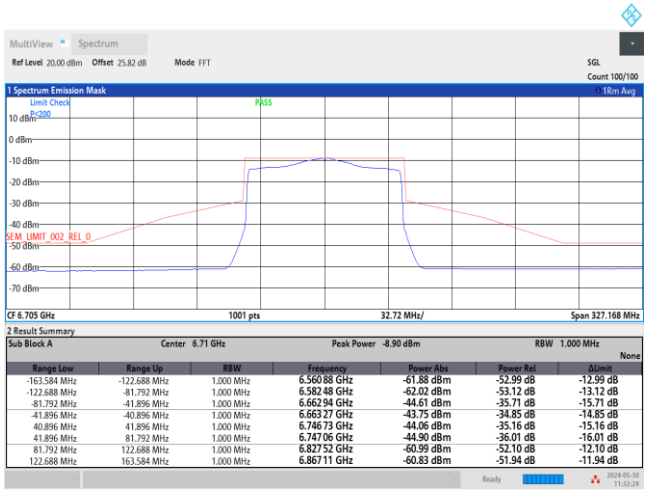
Plot on Channel 6545 MHz



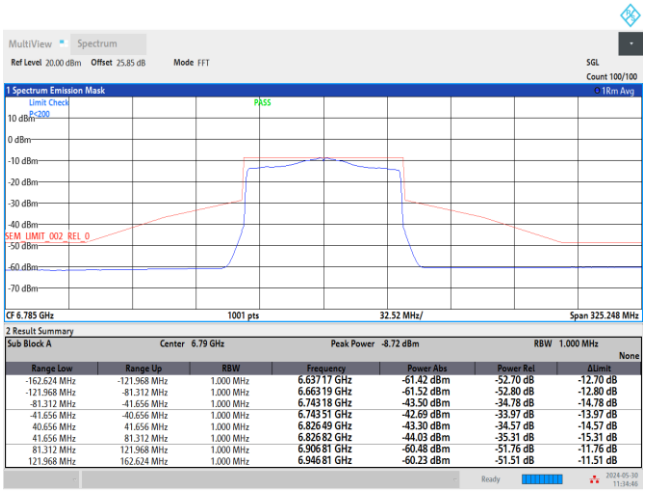
Plot on Channel 6625 MHz



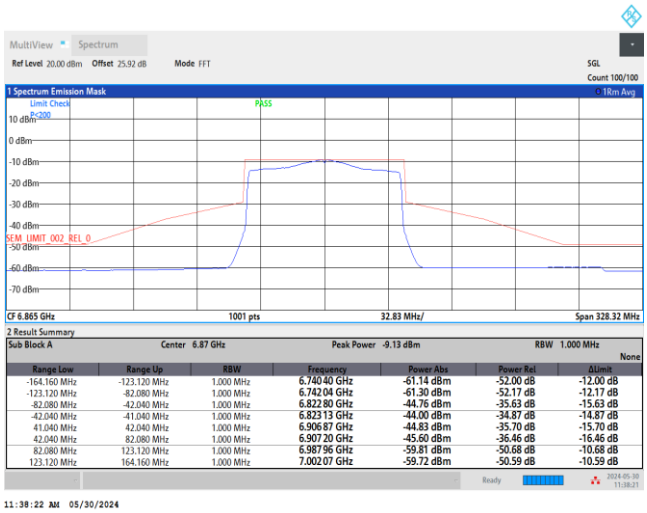
Plot on Channel 6705 MHz



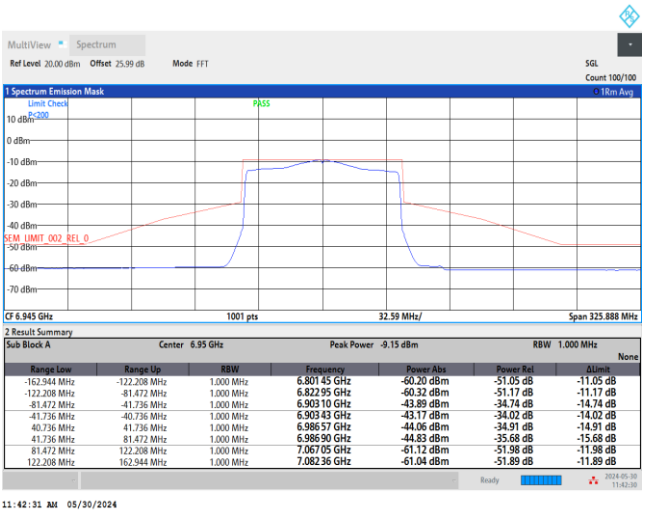
Plot on Channel 6785 MHz



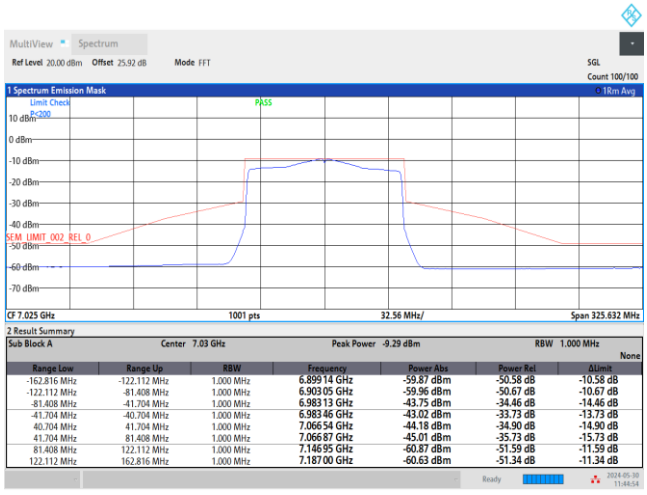
Plot on Channel 6865 MHz



Plot on Channel 6945 MHz

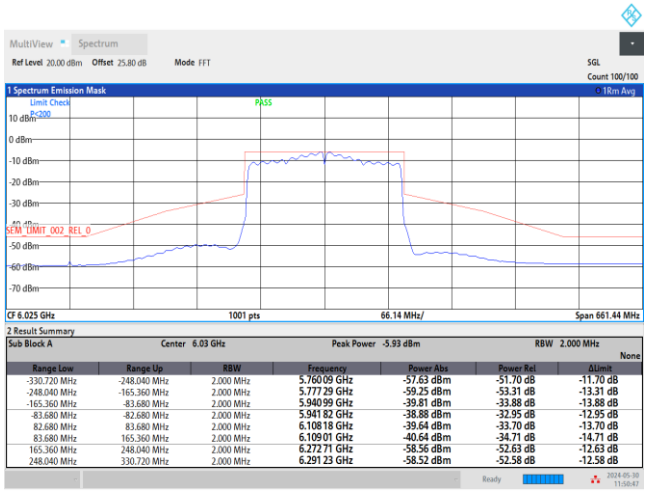


Plot on Channel 7025 MHz



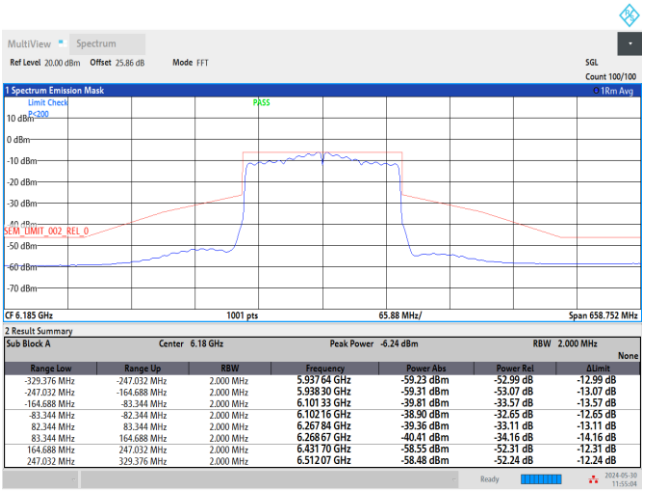
EUT Mode :	802.11ax HE160 Full RU

Plot on Channel 6025 MHz



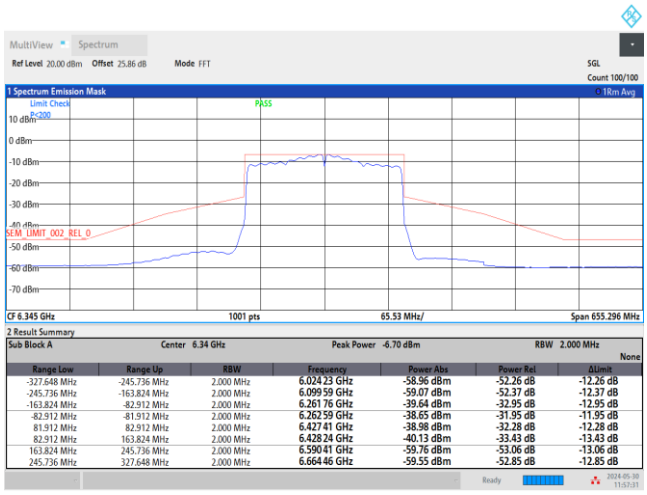
11:50:48 AM 05/30/2024

Plot on Channel 6185 MHz



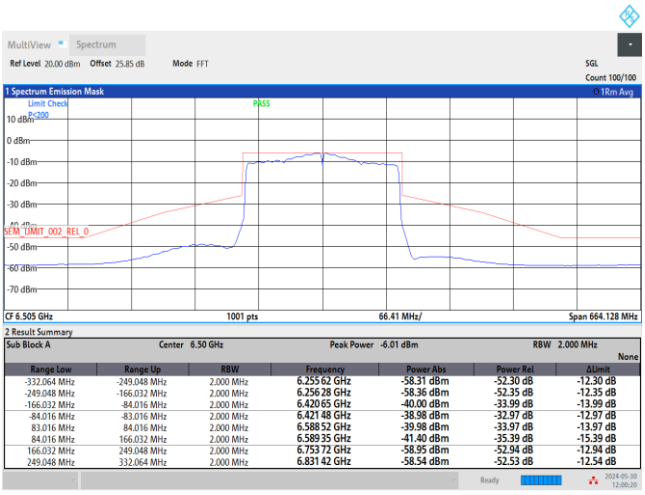
11:55:04 AM 05/30/2024

Plot on Channel 6345 MHz



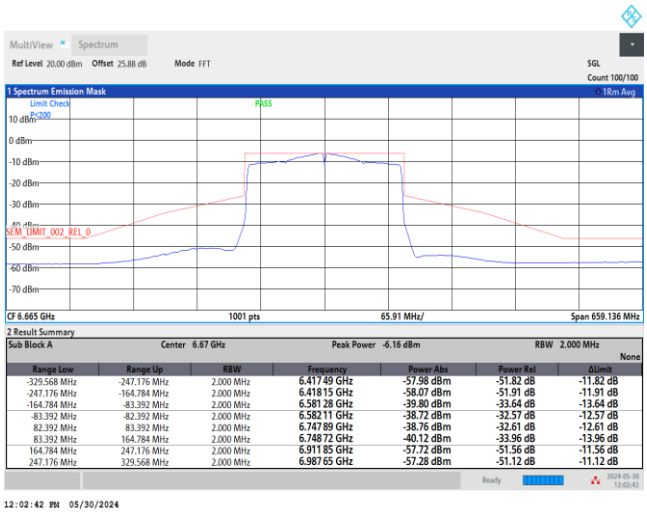
11:57:31 AM 05/30/2024

Plot on Channel 6505 MHz

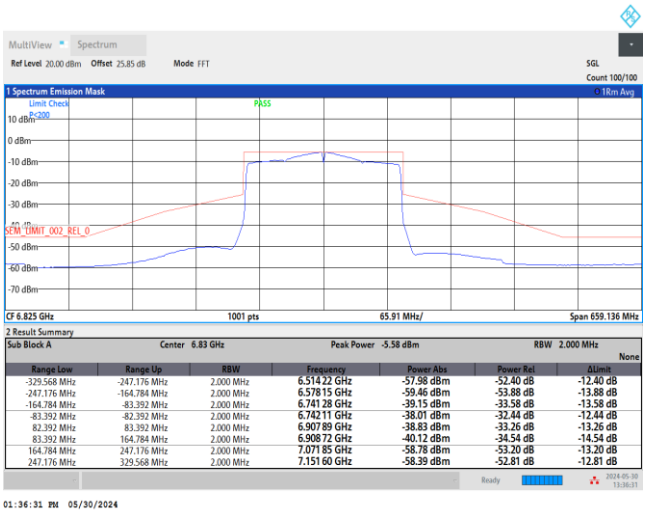


12:00:20 PM 05/30/2024

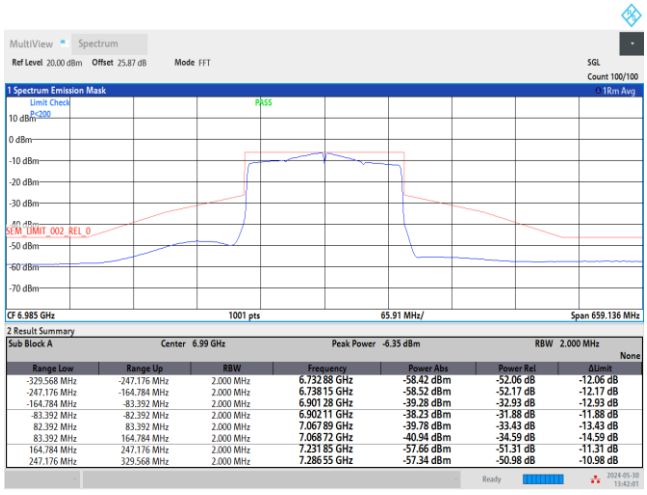
Plot on Channel 6665 MHz



Plot on Channel 6825 MHz



Plot on Channel 6985 MHz



3.5 Contention Based Protocol

3.5.1 Limit of Contention Based Protocol

<FCC 14-30 CFR 15.407>

(d)(6) Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band must employ a contention-based protocol.

FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain. To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

Table 1. Criteria to determine number of times detection threshold test may be performed

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Tune incumbent and EUT transmissions ($f_{c1} = f_{c2}$)
$BW_{Inc} < BW_{EUT} \leq 2BW_{Inc}$	Once	Incumbent transmission is contained within BW_{EUT}
$2BW_{Inc} < BW_{EUT} \leq 4BW_{Inc}$	Twice. Incumbent transmission is contained within BW_{EUT}	Incumbent transmission is located as closely as possible to the lower edge and upper edge, respectively, of the EUT channel
$BW_{EUT} > 4BW_{Inc}$	Three times	Incumbent transmission is located as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel

where:

$BWEUT$: Transmission bandwidth of EUT signal

$BWInc$: Transmission bandwidth of the simulated incumbent signal (10 MHz wide AWGN signal)

$fc1$: Center frequency of EUT transmission

$fc2$: Center frequency of simulated incumbent signal

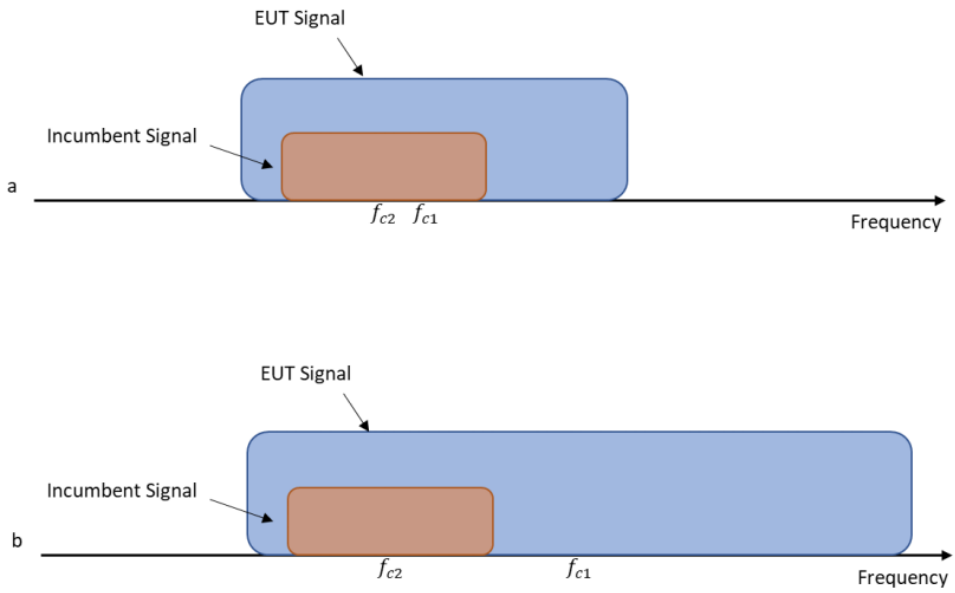


Figure 1. Two possible scenarios where a) center frequency of EUT transmission falls within incumbent's bandwidth, or b) outside of it

3.5.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.5.3 Test Procedures

The testing follows FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01.
Section I) Contention Based Protocol
Conducted method Step-by-Step Procedure, Conducted Setup

1. Configure the EUT to transmit with a constant duty cycle.
2. Set the operating parameters of the EUT including power level, operating frequency, modulation and bandwidth.
3. Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT.
4. Connect the output port of the EUT to the signal analyzer 2, as shown in test setup Figure 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.
5. Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters set at step two.
6. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
7. Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT as shown in test setup Figure 2.
8. Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.

9. Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
10. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
11. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 5, choose a different center frequency for the AWGN signal and repeat the process.
12. For the contention-based protocol test where only one channel in each supported sub-band needs to be tested. The narrowest and widest bandwidth in each channel shall be measured EUT was driven in MIMO mode, the interferer level was injected to both chains to monitor the performance, while the interferer level is determined according the lowest antenna gain among both antennas (i.e, lower interferer level).

3.5.4 Test Setup

Conducted Setup

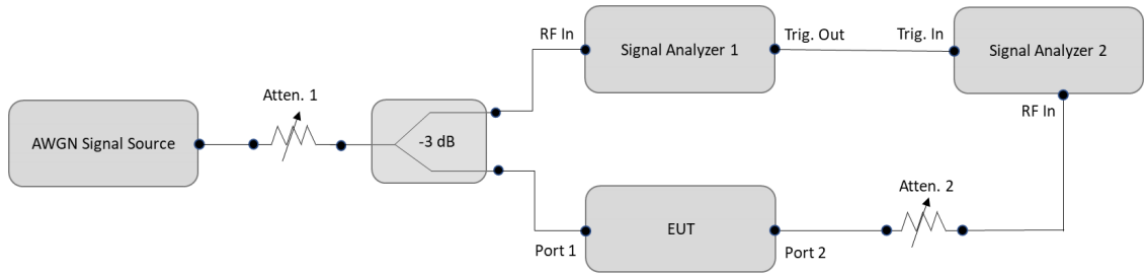


Figure 2. Contention-based protocol test setup, conducted method Step-by-Step Procedure, Conducted Setup

3.5.5 Support Unit used in test configuration and system

Instrument	Brand Name	Model No.	Characteristics
WLAN AP	ASUS	GT-AXE11000	Dual Band AP
Notebook	Acer	N15C1	LAN

3.5.6 Minimum Antenna gain for Contention Based Protocol Test

CBP Antenna Gain	<UNII-5>: 0.45 dBi <UNII-6>: 0.34 dBi <UNII-7>: 0.13 dBi <UNII-8>: 0.08 dBi

Note: The CBP antenna gain is considering the minimum gain from closed mode as worse case.

3.5.7 Test Summary of Contention Based Protocol Test

Test Engineer :	Kai Liao	Temperature :	27.4~28.8℃
		Relative Humidity :	47.7~53.7%

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 5	6135	20	6135	-81.22	100	-62	-81.67	19.67
					Result: Stop Transmission			
				-83.22	< 90	-62	-83.67	21.67
					Result: Minimal Operation			
				-84.22	0	-62	-84.67	22.67
					Result: Normal Operation			
	6185	160	6110	-81.27	100	-62	-81.72	19.72
					Result: Stop Transmission			
				-84.27	< 90	-62	-84.72	22.72
					Result: Minimal Operation			
				-85.27	0	-62	-85.72	23.72
					Result: Normal Operation			
			6185	-77.33	100	-62	-77.78	15.78
					Result: Stop Transmission			
				-78.33	< 90	-62	-78.78	16.78
					Result: Minimal Operation			
				-79.33	0	-62	-79.78	17.78
					Result: Normal Operation			
			6260	-81.21	100	-62	-81.66	19.66
					Result: Stop Transmission			
				-84.21	< 90	-62	-84.66	22.66
					Result: Minimal Operation			
				-85.21	0	-62	-85.66	23.66
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (0.45 dBi).

Note 2: The antenna gain has included the path loss between RF connector and antenna.

Note 3: Margin = Regulated Threshold level - Adjusted Power.

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 6	6455	20	6455	-83.31	100	-62	-83.65	21.65
					Result: Stop Transmission			
				-85.31	< 90	-62	-85.65	23.65
					Result: Minimal Operation			
				-86.31	0	-62	-86.65	24.65
					Result: Normal Operation			
	6505	160	6430	-82.33	100	-62	-82.67	20.67
					Result: Stop Transmission			
				-84.33	< 90	-62	-84.67	22.67
					Result: Minimal Operation			
				-85.33	0	-62	-85.67	23.67
					Result: Normal Operation			
			6505	-77.50	100	-62	-77.84	15.84
					Result: Stop Transmission			
				-79.50	< 90	-62	-79.84	17.84
					Result: Minimal Operation			
				-80.50	0	-62	-80.84	18.84
					Result: Normal Operation			
			6580	-81.48	100	-62	-81.82	19.82
					Result: Stop Transmission			
				-84.48	< 90	-62	-84.82	22.82
					Result: Minimal Operation			
				-85.48	0	-62	-85.82	23.82
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (0.34 dBi).

Note 2: The antenna gain has included the path loss between RF connector and antenna.

Note 3: Margin = Regulated Threshold level - Adjusted Power.

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 7	6695	20	6695	-84.52	100	-62	-84.65	22.65
					Result: Stop Transmission			
				-85.52	< 90	-62	-85.65	23.65
					Result: Minimal Operation			
				-86.52	0	-62	-86.65	24.65
					Result: Normal Operation			
	6665	160	6590	-83.45	100	-62	-83.58	21.58
					Result: Stop Transmission			
				-85.45	< 90	-62	-85.58	23.58
					Result: Minimal Operation			
				-86.45	0	-62	-86.58	24.58
					Result: Normal Operation			
			6665	-79.45	100	-62	-79.58	17.58
					Result: Stop Transmission			
				-80.45	< 90	-62	-80.58	18.58
					Result: Minimal Operation			
				-81.45	0	-62	-81.58	19.58
					Result: Normal Operation			
			6740	-83.39	100	-62	-83.52	21.52
					Result: Stop Transmission			
				-85.39	< 90	-62	-85.52	23.52
					Result: Minimal Operation			
				-86.39	0	-62	-86.52	24.52
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (0.13 dBi).

Note 2: The antenna gain has included the path loss between RF connector and antenna.

Note 3: Margin = Regulated Threshold level - Adjusted Power.

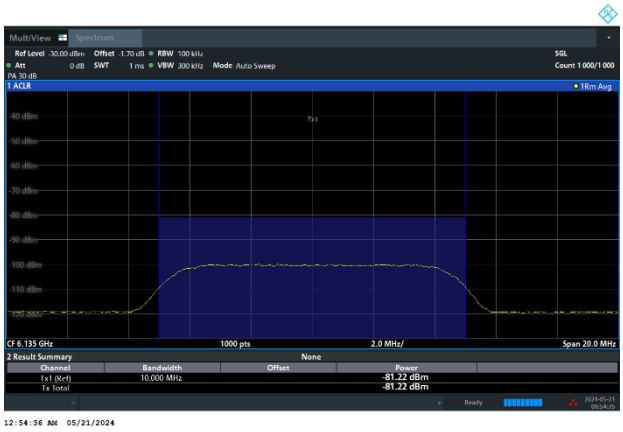
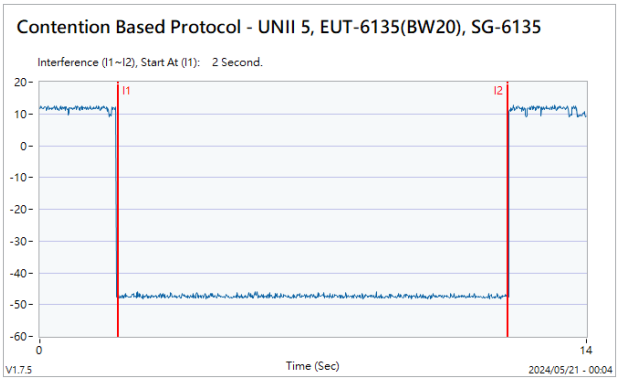
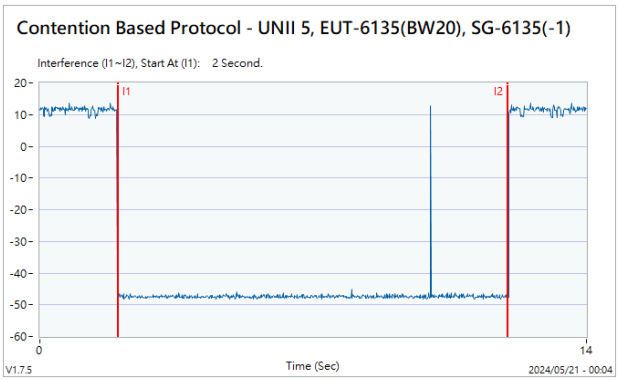
Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 8	7015	20	7015	-81.60	100	-62	-81.68	19.68
					Result: Stop Transmission			
				-82.60	< 90	-62	-82.68	20.68
					Result: Minimal Operation			
				-83.60	0	-62	-83.68	21.68
					Result: Normal Operation			
	6985	160	6910	-76.96	100	-62	-77.04	15.04
					Result: Stop Transmission			
				-78.96	< 90	-62	-79.04	17.04
					Result: Minimal Operation			
				-79.96	0	-62	-80.04	18.04
					Result: Normal Operation			
			6985	-71.79	100	-62	-71.87	9.87
					Result: Stop Transmission			
				-72.79	< 90	-62	-72.87	10.87
					Result: Minimal Operation			
				-73.79	0	-62	-73.87	11.87
					Result: Normal Operation			
			7060	-75.69	100	-62	-75.77	13.77
					Result: Stop Transmission			
				-78.69	< 90	-62	-78.77	16.77
					Result: Minimal Operation			
				-79.69	0	-62	-79.77	17.77
					Result: Normal Operation			

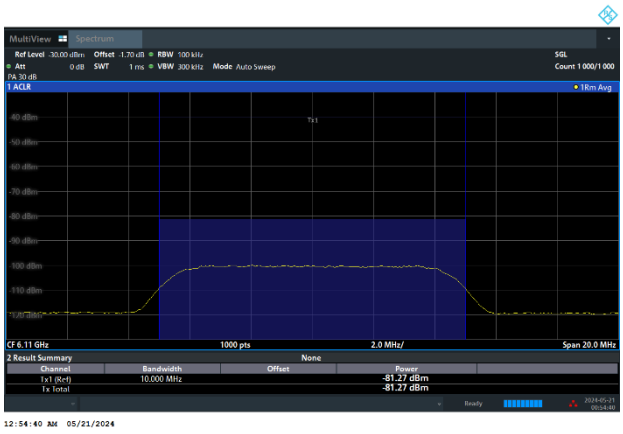
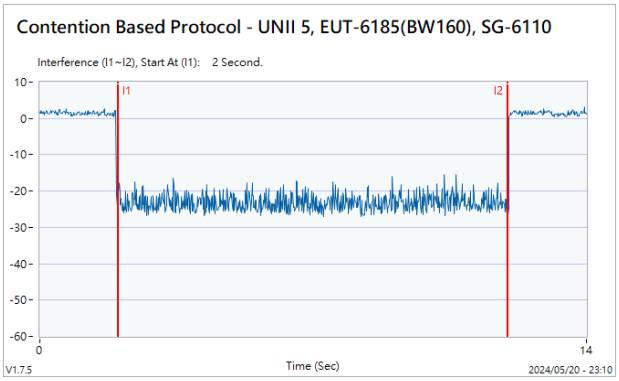
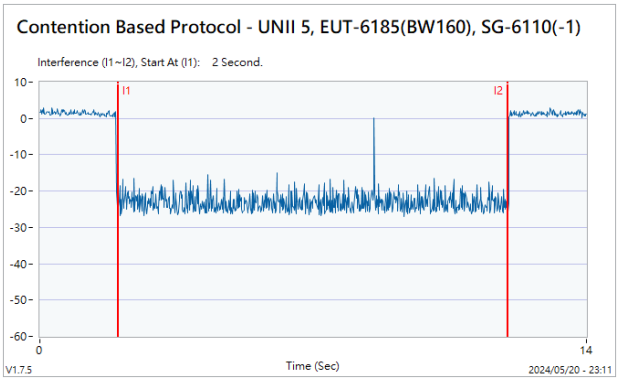
Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (0.08 dBi).

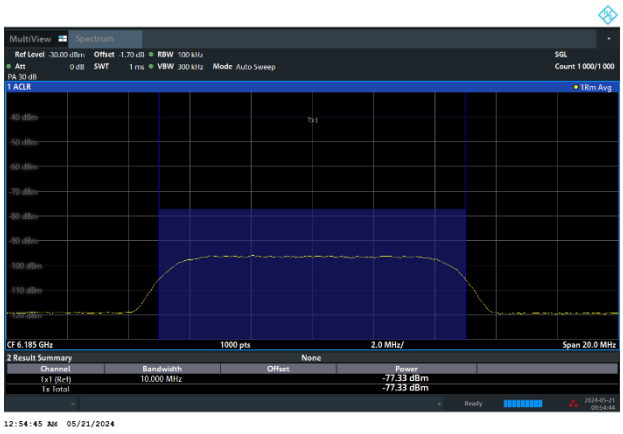
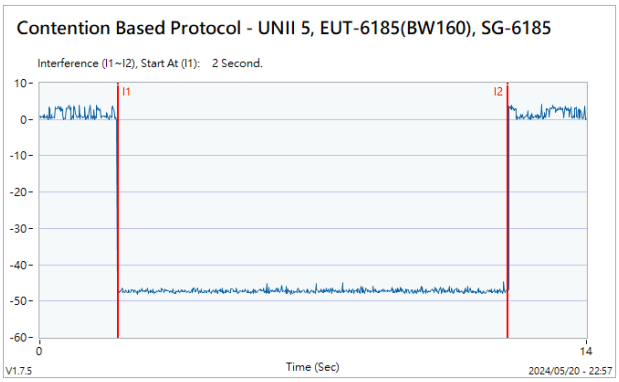
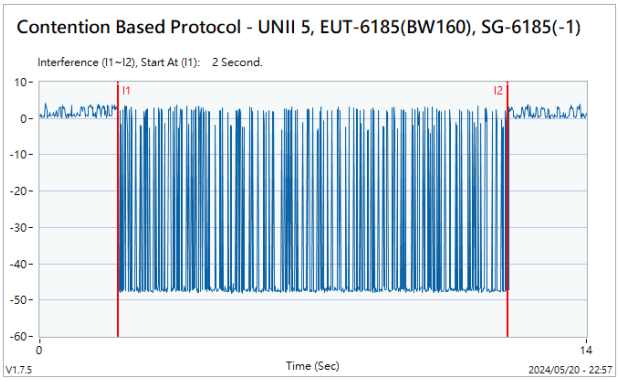
Note 2: The antenna gain has included the path loss between RF connector and antenna.

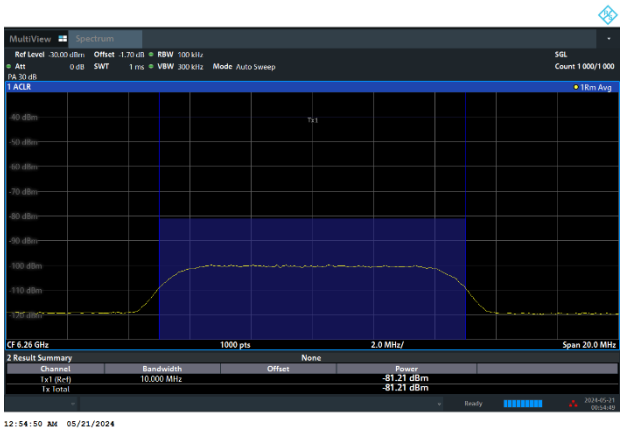
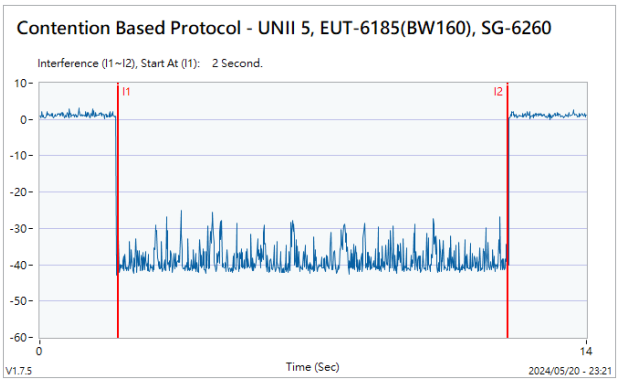
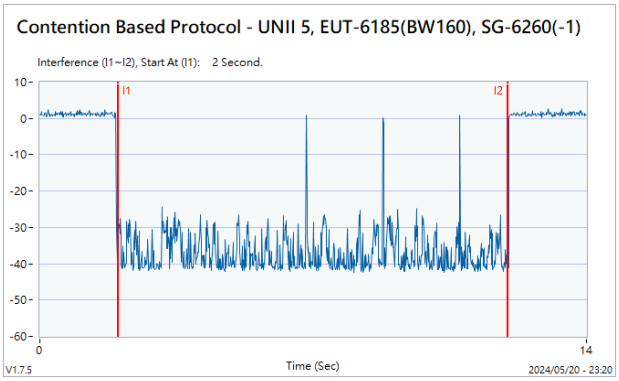
Note 3: Margin = Regulated Threshold level - Adjusted Power.

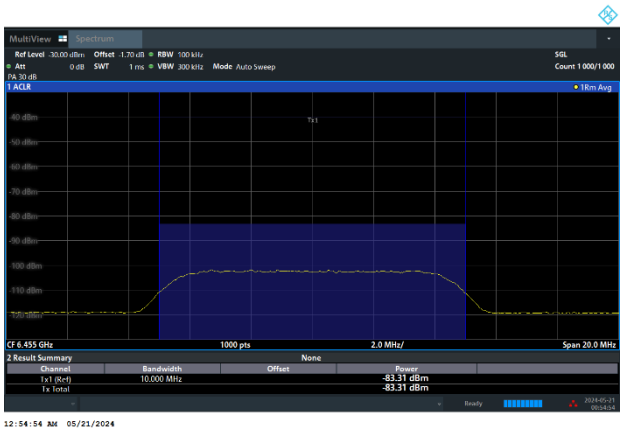
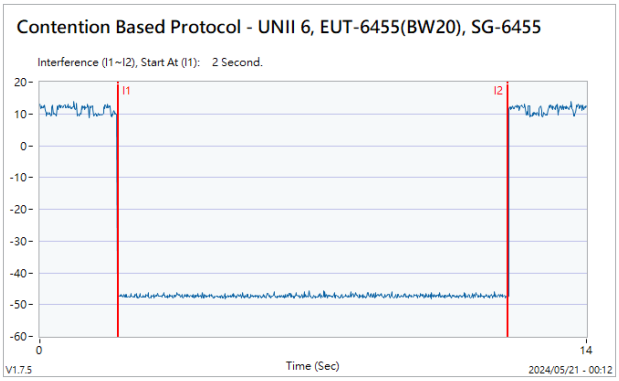
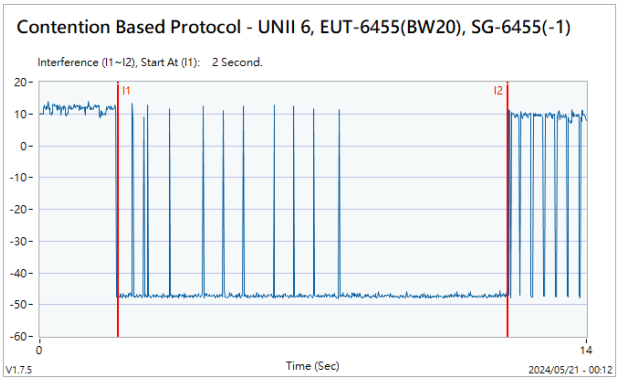
3.5.8 Test Plots of Contention Based Protocol Test

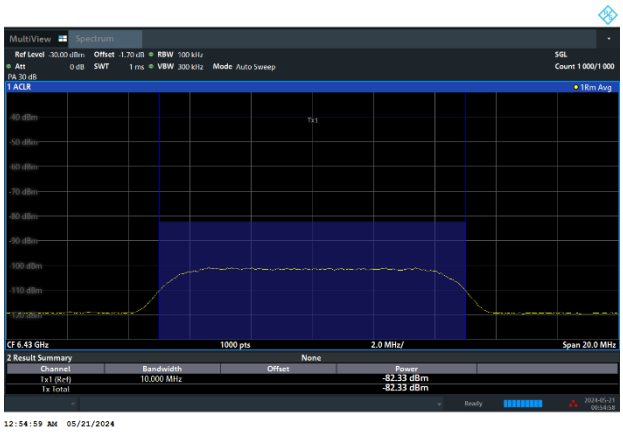
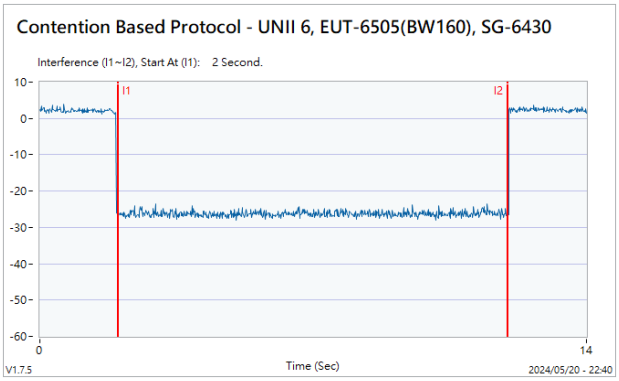
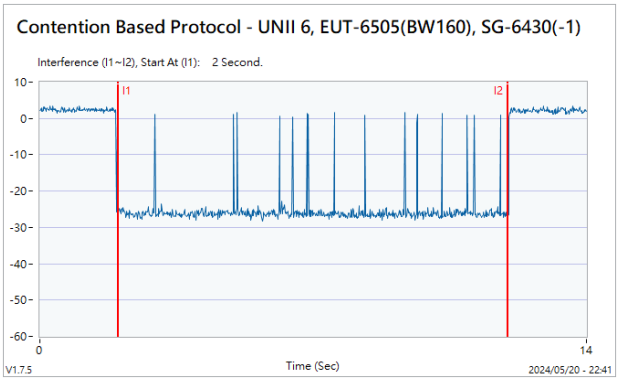
<table>
<tr><th colspan="2">Contention Based Protocol Result Plots on U-NII 5 (AWGN Interference)</th></tr>
<tr><td>802.11ax (HE20) / 6135MHz
Threshold Level (TL) = -81.22dBm</td><td>802.11ax (HE20) / CH37
Test result is pass due to no transmission occur.</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>802.11ax (HE20) / 6135MHz
Threshold Level (TL) = -82.22dBm</td><td>802.11ax (HE20) / CH37
Transmit when the interferer is 1dB lower.</td></tr>
<tr><td></td><td> 
</td></tr>
</table>

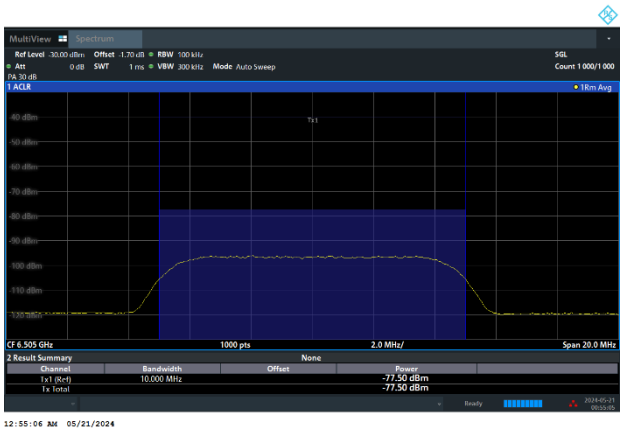
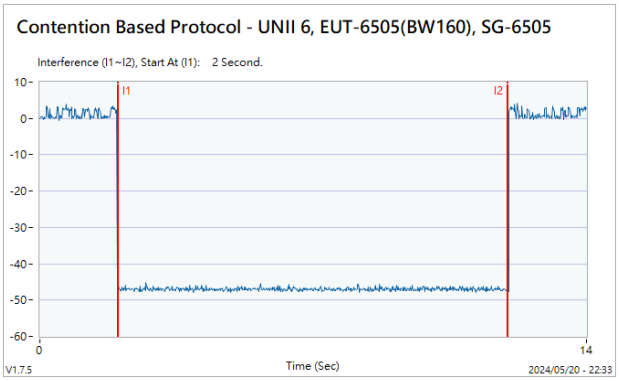
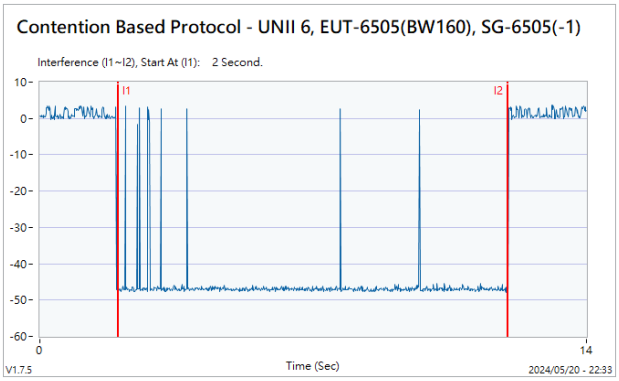
Contention Based Protocol Result Plots on U-NII 5 (AWGN Interference)	
802.11ax (HE160) / 6110MHz (Lower edge) Threshold Level (TL) = -81.27dBm	802.11ax (HE160) / CH47 (Lower edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6110MHz (Lower edge) Threshold Level (TL) = -82.27dBm	802.11ax (HE160) / CH47 (Lower edge) Transmit when the interferer is 1dB lower.
	

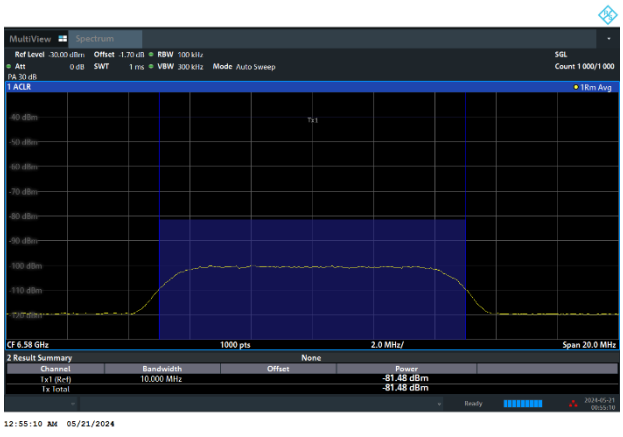
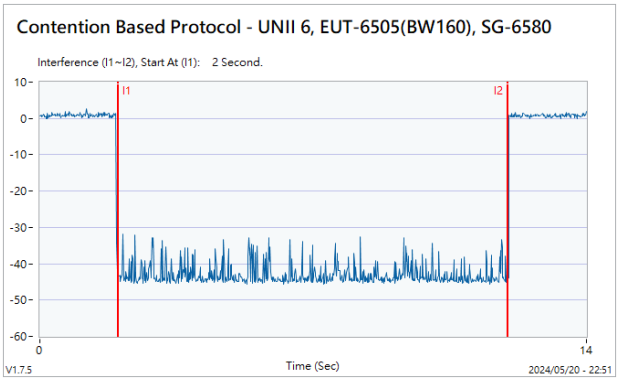
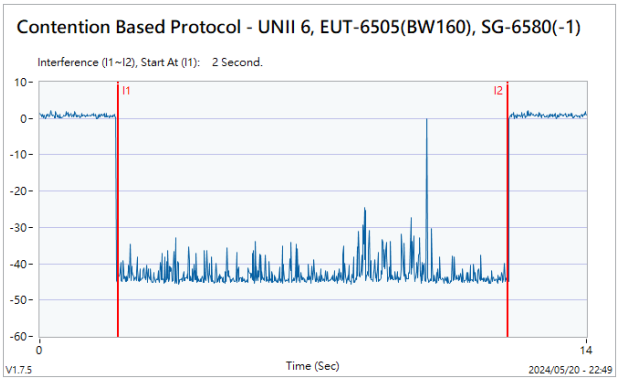
Contention Based Protocol Result Plots on U-NII 5 (AWGN Interference)	
802.11ax (HE160) / 6185MHz (Middle) Threshold Level (TL) = -77.33dBm	802.11ax (HE160) / CH47 (Middle) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6185MHz (Middle) Threshold Level (TL) = -78.33dBm	802.11ax (HE160) / CH47 (Middle) Transmit when the interferer is 1dB lower.
	

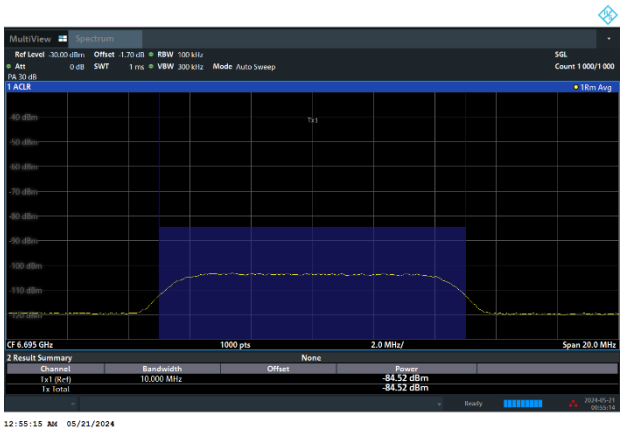
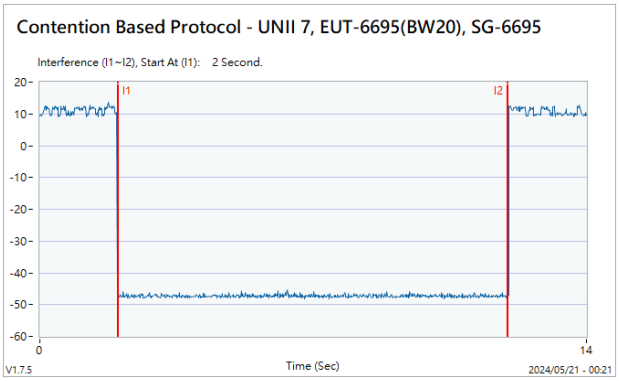
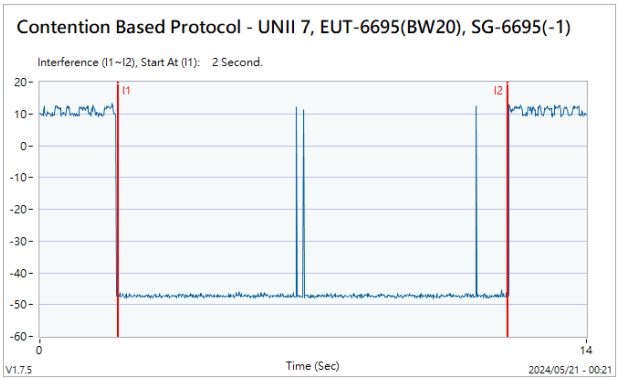
Contention Based Protocol Result Plots on U-NII 5 (AWGN Interference)	
802.11ax (HE160) / 6260MHz (Upper edge) Threshold Level (TL) = -81.21dBm	802.11ax (HE160) / CH47 (Upper edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6260MHz (Upper edge) Threshold Level (TL) = -82.21dBm	802.11ax (HE160) / CH47 (Upper edge) Transmit when the interferer is 1dB lower.
	

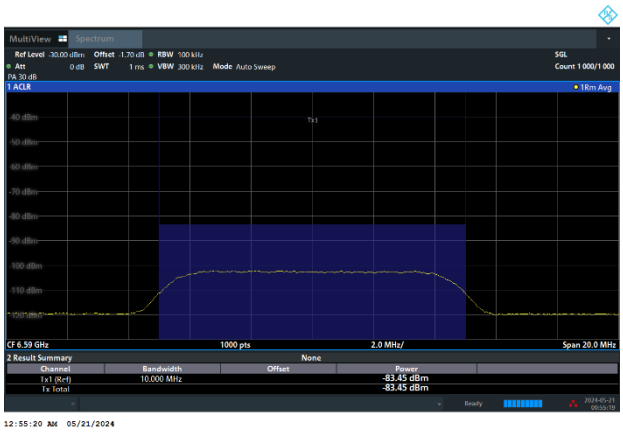
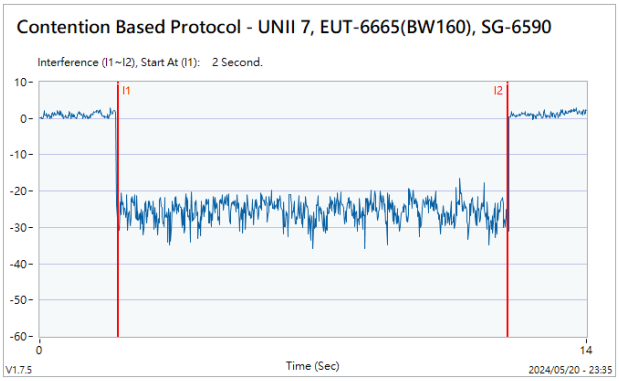
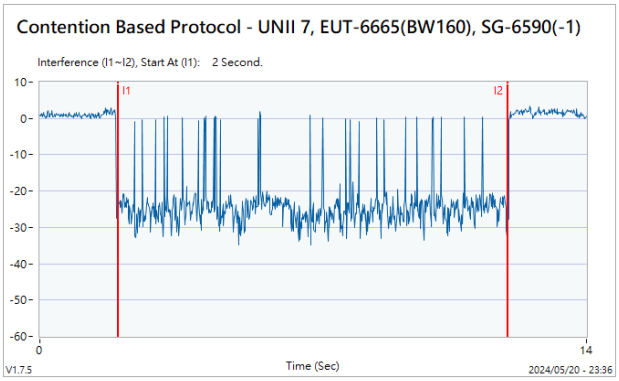
Contention Based Protocol Result Plots on U-NII 6 (AWGN Interference)	
802.11ax (HE20) / 6455MHz Threshold Level (TL) = -83.31dBm	802.11ax (HE20) / CH101 Test result is pass due to no transmission occur.
	
802.11ax (HE20) / 6455MHz Threshold Level (TL) = -84.31dBm	802.11ax (HE20) / CH101 Transmit when the interferer is 1dB lower.
	

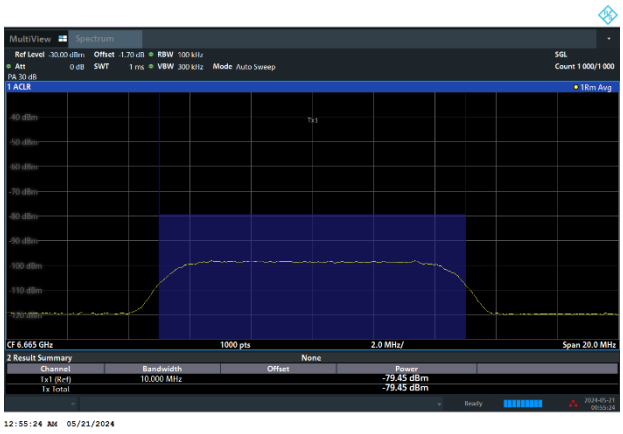
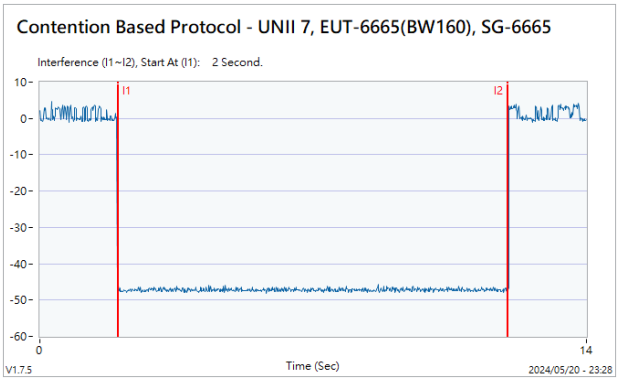
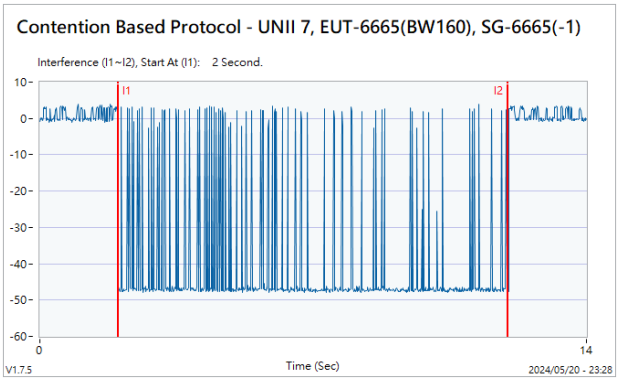
Contention Based Protocol Result Plots on U-NII 6 (AWGN Interference)	
802.11ax (HE160) / 6430MHz (Lower edge) Threshold Level (TL) = -82.33dBm	802.11ax (HE160) / CH111 (Lower edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6430MHz (Lower edge) Threshold Level (TL) = -83.33dBm	802.11ax (HE160) / CH111 (Lower edge) Transmit when the interferer is 1dB lower.
	

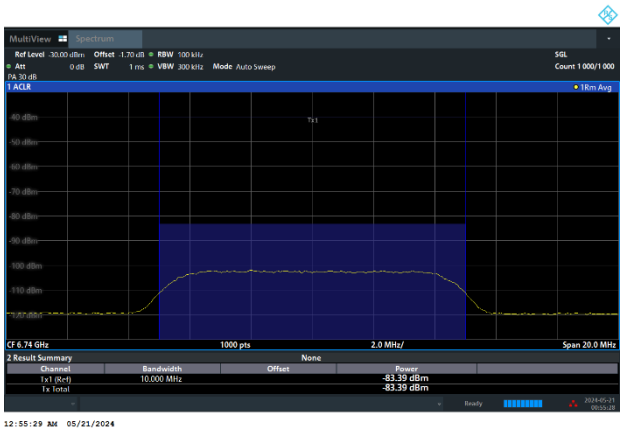
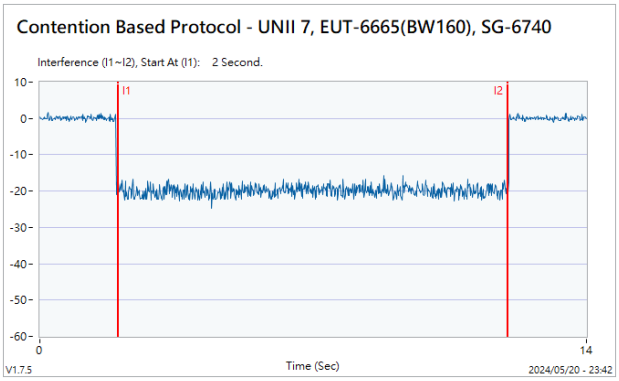
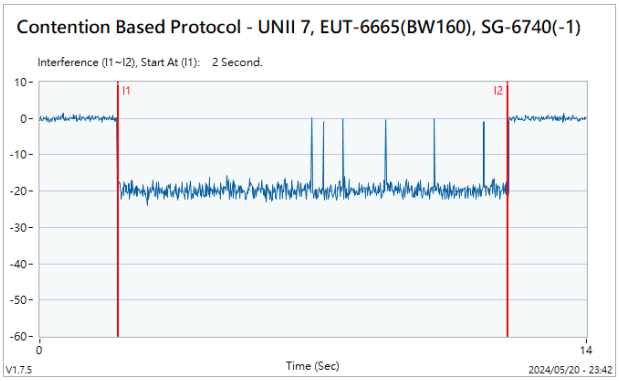
Contention Based Protocol Result Plots on U-NII 6 (AWGN Interference)	
802.11ax (HE160) / 6505MHz (Middle) Threshold Level (TL) = -77.50dBm	802.11ax (HE160) / CH111 (Middle) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6505MHz (Middle) Threshold Level (TL) = -78.50dBm	802.11ax (HE160) / CH111 (Middle) Transmit when the interferer is 1dB lower.
	

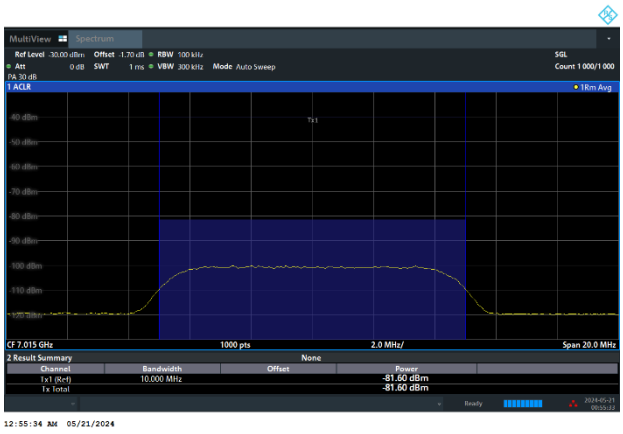
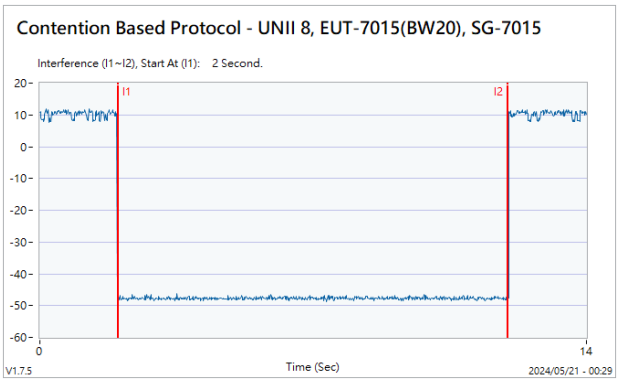
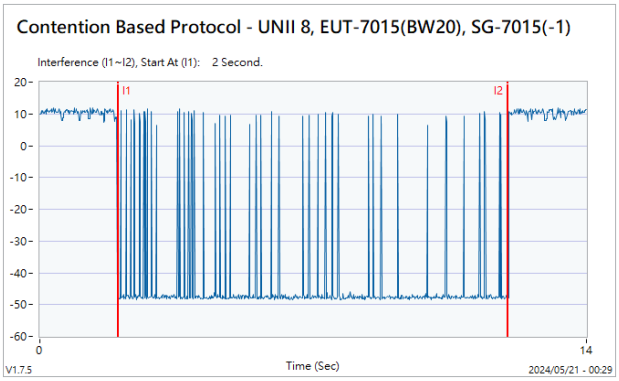
Contention Based Protocol Result Plots on U-NII 6 (AWGN Interference)	
802.11ax (HE160) / 6580MHz (Upper edge) Threshold Level (TL) = -81.48dBm	802.11ax (HE160) / CH111 (Upper edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6580MHz (Upper edge) Threshold Level (TL) = -82.48dBm	802.11ax (HE160) / CH111 (Upper edge) Transmit when the interferer is 1dB lower.
	

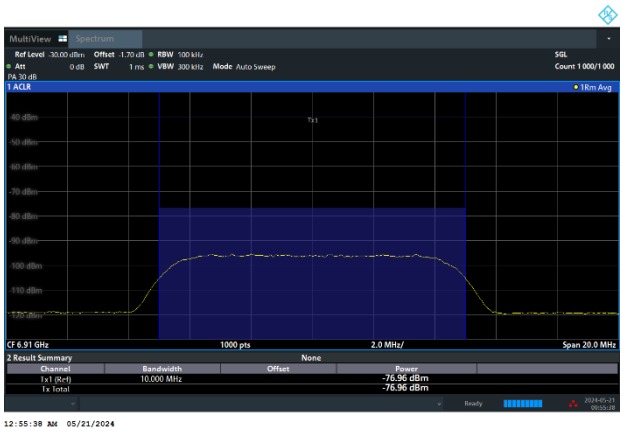
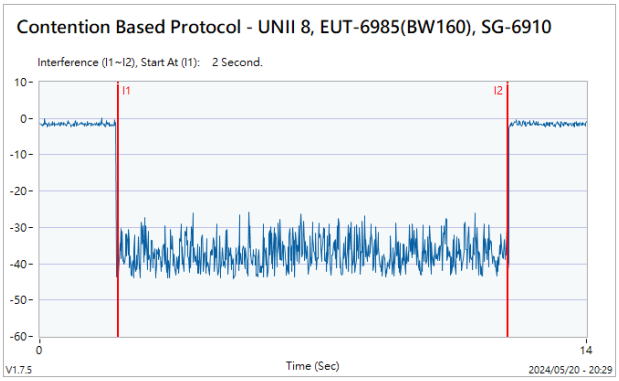
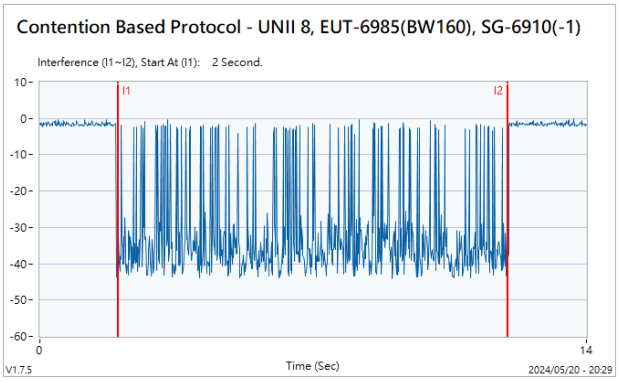
Contention Based Protocol Result Plots on U-NII 7 (AWGN Interference)	
802.11ax (HE20) / 6695MHz Threshold Level (TL) = -84.52dBm	802.11ax (HE20) / CH149 Test result is pass due to no transmission occur.
	
802.11ax (HE20) / 6695MHz Threshold Level (TL) = -85.52dBm	802.11ax (HE20) / CH149 Transmit when the interferer is 1dB lower.
	

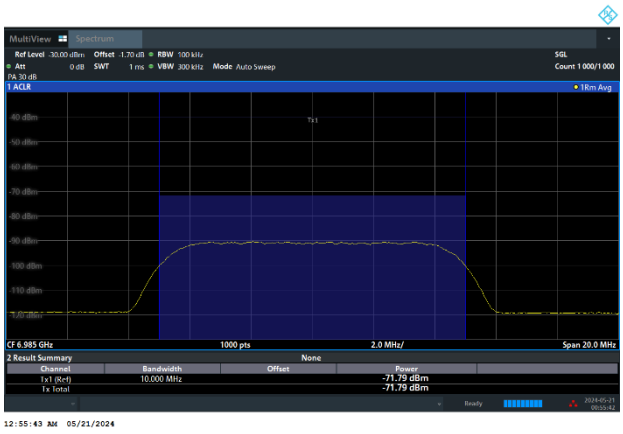
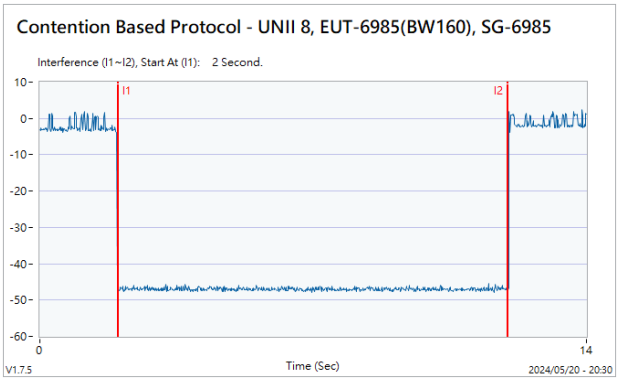
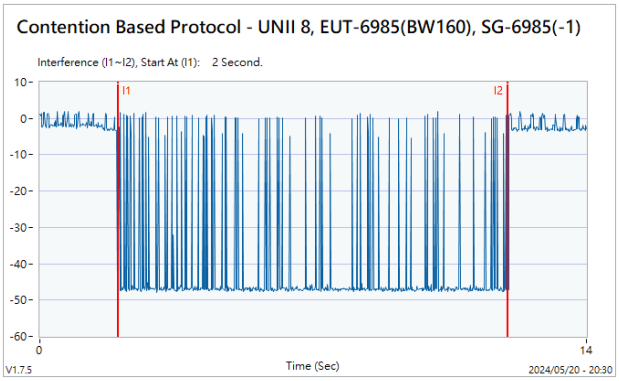
Contention Based Protocol Result Plots on U-NII 7 (AWGN Interference)	
802.11ax (HE160) / 6590MHz (Lower edge) Threshold Level (TL) = -83.45dBm	802.11ax (HE160) / CH143 (Lower edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6590MHz (Lower edge) Threshold Level (TL) = -84.45dBm	802.11ax (HE160) / CH143 (Lower edge) Transmit when the interferer is 1dB lower.
	

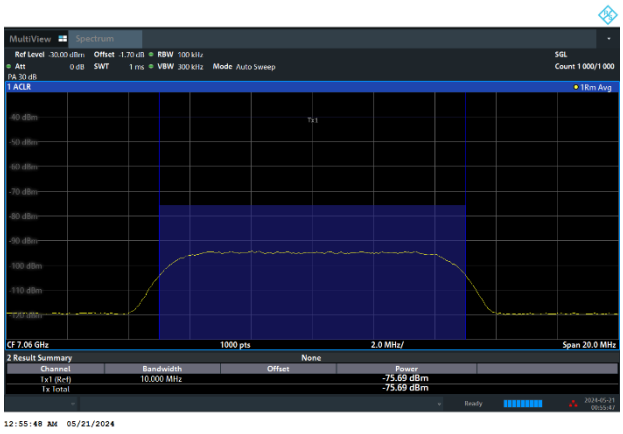
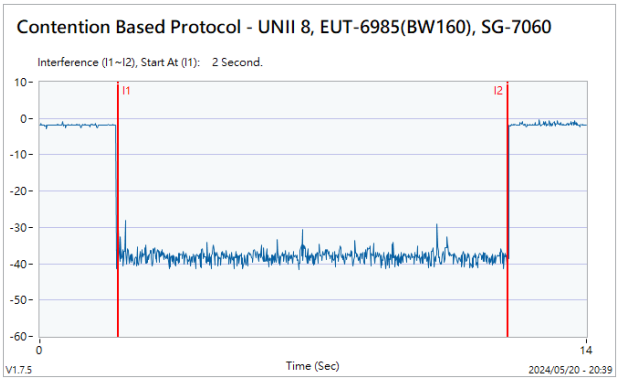
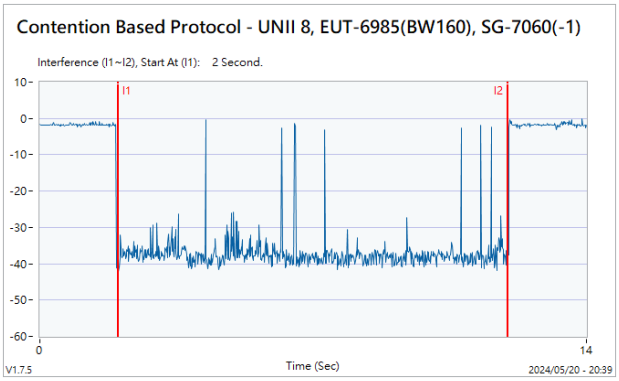
Contention Based Protocol Result Plots on U-NII 7 (AWGN Interference)	
802.11ax (HE160) / 6665MHz (Middle) Threshold Level (TL) = -79.45dBm	802.11ax (HE160) / CH143 (Middle) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6665MHz (Middle) Threshold Level (TL) = -80.45dBm	802.11ax (HE160) / CH143 (Middle) Transmit when the interferer is 1dB lower.
	

Contention Based Protocol Result Plots on U-NII 7 (AWGN Interference)	
802.11ax (HE160) / 6740MHz (Upper edge) Threshold Level (TL) = -83.39dBm	802.11ax (HE160) / CH143 (Upper edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6740MHz (Upper edge) Threshold Level (TL) = -84.39dBm	802.11ax (HE160) / CH143 (Upper edge) Transmit when the interferer is 1dB lower.
	

Contention Based Protocol Result Plots on U-NII 8 (AWGN Interference)	
802.11ax (HE20) / 7015MHz Threshold Level (TL) = -81.60dBm	802.11ax (HE20) / CH213 Test result is pass due to no transmission occur.
	
802.11ax (HE20) / 7015MHz Threshold Level (TL) = -82.60dBm	802.11ax (HE20) / CH213 Transmit when the interferer is 1dB lower.
	

Contention Based Protocol Result Plots on U-NII 8 (AWGN Interference)	
802.11ax (HE160) / 6910MHz (Lower edge) Threshold Level (TL) = -76.96dBm	802.11ax (HE160) / CH207 (Lower edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6910MHz (Lower edge) Threshold Level (TL) = -77.96dBm	802.11ax (HE160) / CH207 (Lower edge) Transmit when the interferer is 1dB lower.
	

Contention Based Protocol Result Plots on U-NII 8 (AWGN Interference)	
802.11ax (HE160) / 6985MHz (Middle) Threshold Level (TL) = -71.79dBm	802.11ax (HE160) / CH207 (Middle) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6985MHz (Middle) Threshold Level (TL) = -72.79dBm	802.11ax (HE160) / CH207 (Middle) Transmit when the interferer is 1dB lower.
	

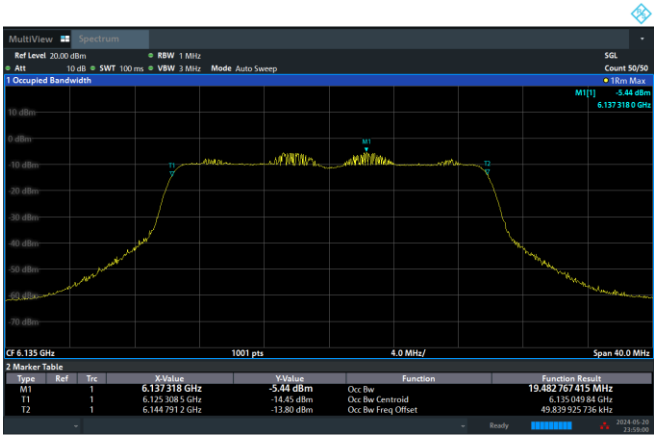
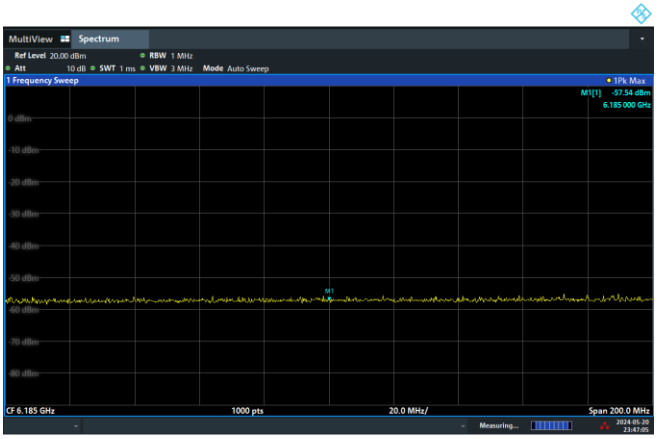
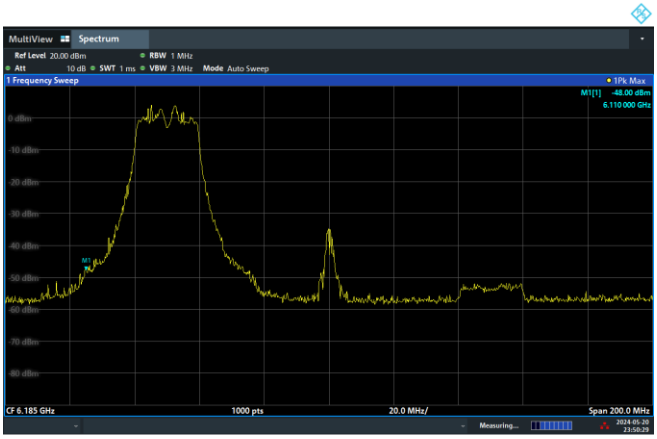
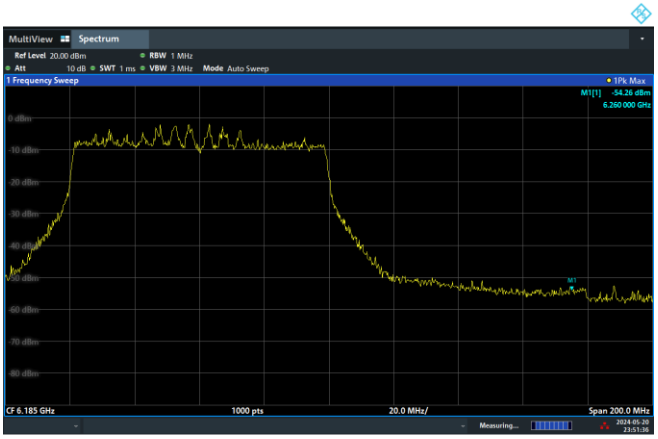
Contention Based Protocol Result Plots on U-NII 8 (AWGN Interference)	
802.11ax (HE160) / 7060MHz (Upper edge) Threshold Level (TL) = -75.69dBm	802.11ax (HE160) / CH207 (Upper edge) Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 7060MHz (Upper edge) Threshold Level (TL) = -76.69dBm	802.11ax (HE160) / CH207 (Upper edge) Transmit when the interferer is 1dB lower.
	

CBP verify with frequency domain plots

The device does not support channel puncturing with regards to Contention Based Protocol.

The entire bandwidth 160MHz stops transmission after the incumbent signal appears.

Otherwise, the entire 80MHz bandwidth is reduced to 20MHz or 80MHz.

Before incumbent injected on 160MHz channel	After 10MHz incumbent injected on center of channel, the entire 160MHz bandwidth stops transmission.
	
After 10MHz incumbent injected on bottom of channel, the EUT bandwidth is reduced from 160MHz to 20MHz channel.	After 10MHz incumbent injected on top of channel, the EUT bandwidth is reduced from 160MHz to 80MHz channel.
	

3.6 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.6.1 Limit of Unwanted Emissions

(1) For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of −27 dBm/MHz.

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27 (RMS)	68.3
- 7 (Peak)	88.3

According 987594 D02 U-NII 6GHz EMC Measurement v01 section G:
Unwanted emissions outside of restricted bands are measured with a RMS detector.
In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

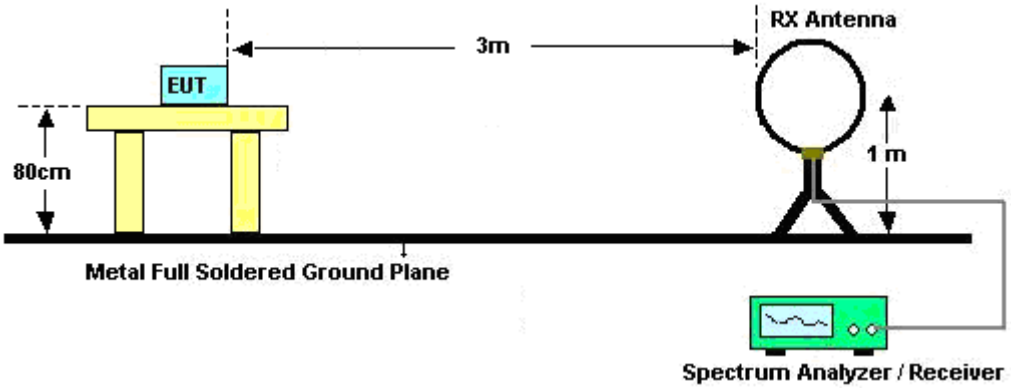
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

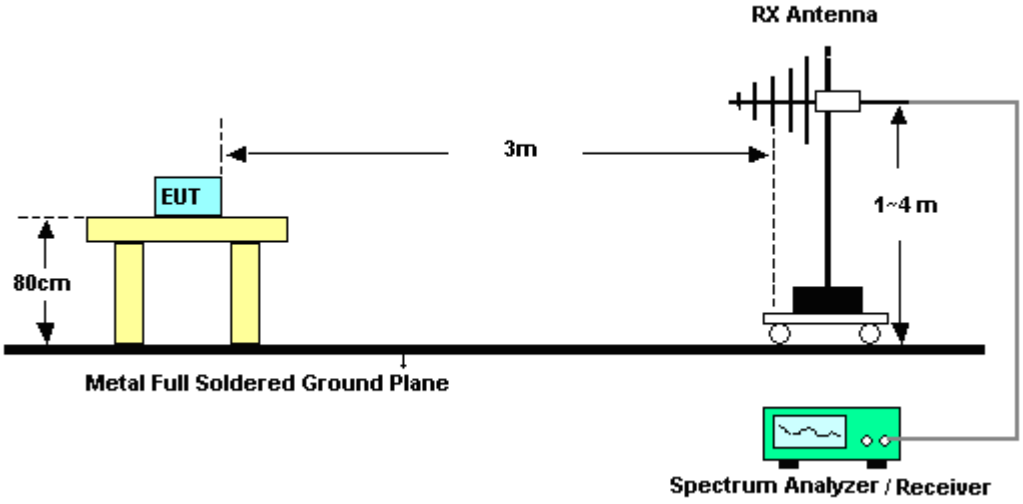
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
3. The EUT is set 3 meters away from the receiving antenna which is mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-“..

3.6.4 Test Setup

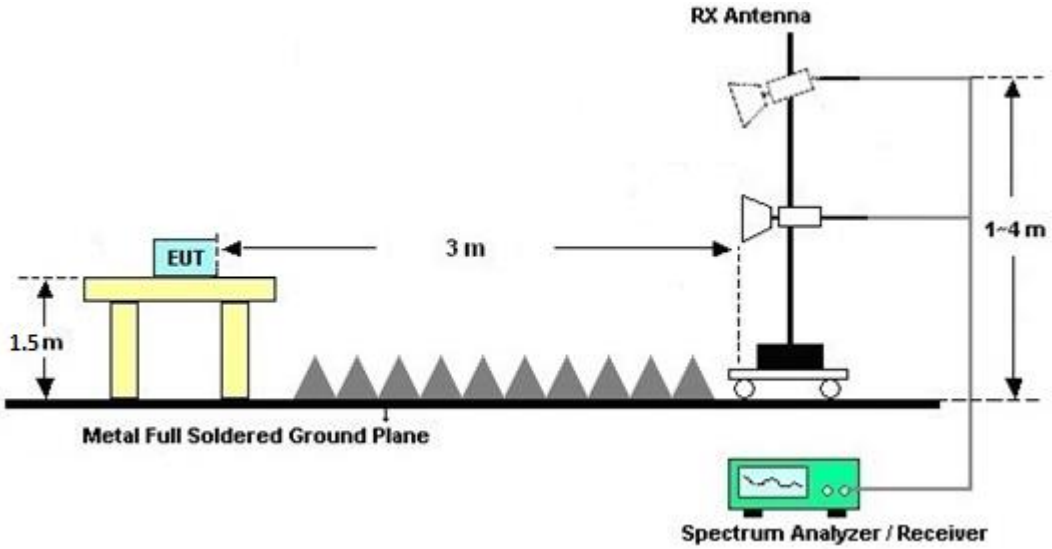
For radiated emissions below 30MHz



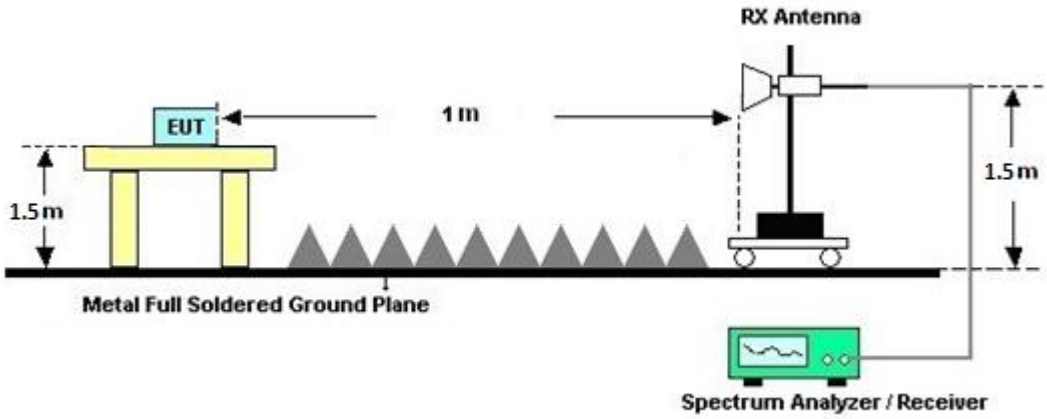
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.6.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.6.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.6.7 Duty Cycle

Please refer to Appendix E.

3.6.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.7 AC Conducted Emission Measurement

3.7.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

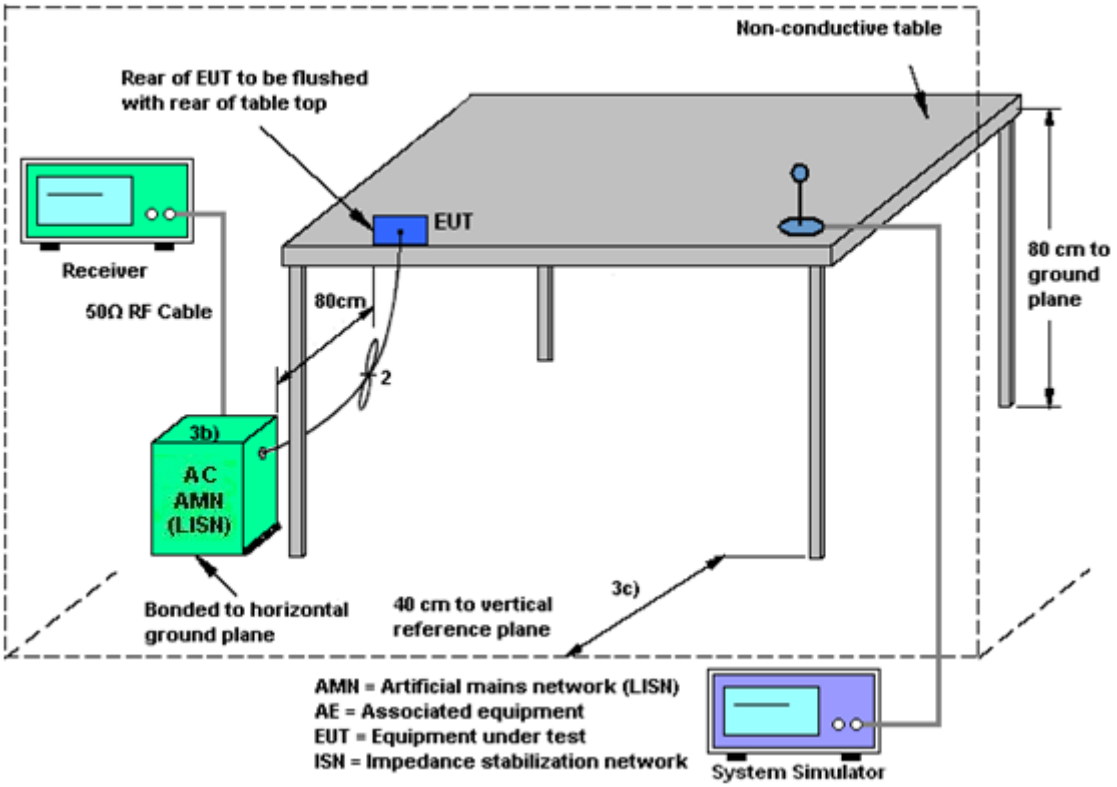
3.7.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.7.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.7.4 Test Setup



3.7.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.8 Antenna Requirements

3.8.1 Standard Applicable

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 rule.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Signal Generator (Interferer)	Rohde & Schwarz	SMW200A	109425	100kHz~7.5GHz	Dec. 20, 2023	May 20, 2024~ May 21,2024	Dec. 19, 2024	CBP (DF02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV3013	101549	10Hz~44GHz	Jan. 30, 2024	May 20, 2024~ May 21,2024	Jan. 29, 2025	CBP (DF02-HY))
Power Divider	Woken	2Way Divider	DCMB1KW7A2	0.5GHz-18GHz	Calibration from System	May 20, 2024~ May 21,2024	Calibration from System	CBP (DF02-HY)
Power Divider	Woken	0120A04051801 O	DCMB1CW3A7	0.5-18GHz	Calibration from System	May 20, 2024~ May 21,2024	Calibration from System	CBP (DF02-HY))
Power Divider	Woken	3Way SMA Power Divder Rated to 20W	STI08-0010 (#2)	2GHz-8GHz	Calibration from System	May 20, 2024~ May 21,2024	Calibration from System	CBP (DF02-HY)
Coupler	Woken	10dB 30W SMA	DOM5CIW3A1	0.5-18GHz	Calibration from System	May 20, 2024~ May 21,2024	Calibration from System	CBP (DF02-HY))
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 15, 2024~ May 28, 2024	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 06, 2023	May 15, 2024~ May 28, 2024	Dec. 05, 2024	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Oct. 26, 2023	May 15, 2024~ May 28, 2024	Oct. 25, 2024	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 22, 2023	May 15, 2024~ May 28, 2024	Nov. 21, 2024	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	May 15, 2024~ May 28, 2024	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Jul. 28, 2023	May 15, 2024~ May. 28, 2024	Jul. 27, 2024	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 28, 2023	May 15, 2024~ May 28, 2024	Dec. 27, 2024	Conduction (CO05-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 07, 2023	May 03, 2024~ Jun. 10, 2024	Nov. 06, 2024	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	17I00015SNO36 (NO:35_ 144)	10MHz~6GHz	Aug. 23, 2023	May 03, 2024~ Jun. 10, 2024	Aug. 22, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101466	10HZ~44GHZ	Jan. 24, 2024	May 03, 2024~ Jun. 10, 2024	Jan. 23, 2025	Conducted (TH05-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 08, 2023	May 15, 2024~ May 29, 2024	Dec. 07, 2024	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 07, 2023	May 15, 2024~ May 29, 2024	Oct. 06, 2024	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1223	18GHz-40GHz	Jul. 10, 2023	May 15, 2024~ May 29, 2024	Jul. 09, 2024	Radiation (03CH11-HY)
Preamplifier	EMEC	EM18G40G	060871	18GHz~40GHz	Aug. 30, 2023	May 15, 2024~ May 29, 2024	Aug. 29, 2024	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-01620	1GHz~18GHz	Aug. 17, 2023	May 15, 2024~ May 29, 2024	Aug. 16, 2024	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTM-303B	TP140325	N/A	Dec. 08, 2023	May 15, 2024~ May 29, 2024	Dec. 07, 2024	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Mar. 25, 2024	May 15, 2024~ May 29, 2024	Mar. 24, 2025	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055007	1GHz~18GHz	Jun. 14, 2023	May 15, 2024~ May 29, 2024	Jun. 13, 2024	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz~44GHz	Oct. 05, 2023	May 15, 2024~ May 29, 2024	Oct. 04, 2024	Radiation (03CH11-HY)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40SS	SN3	6.75GHz High Pass Filter	Sep. 11, 2023	May 15, 2024~ May 29, 2024	Sep. 10, 2024	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN3	3GHz High Pass Filter	Sep. 11, 2023	May 15, 2024~ May 29, 2024	Sep. 10, 2024	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN11	1.53GHz Low Pass Filter	Sep. 11, 2023	May 15, 2024~ May 29, 2024	Sep. 10, 2024	Radiation (03CH11-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz~40GHz	Mar. 06, 2024	May 15, 2024~ May 29, 2024	Mar. 05, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	30M~40G	Mar. 06, 2024	May 15, 2024~ May 29, 2024	Mar. 05, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	801595/2	30M~40G	Mar. 06, 2024	May 15, 2024~ May 22, 2024	Mar. 05, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804013/2	30M~40G	May 23, 2024	May 23, 2024~ May 29, 2024	May 22, 2025	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	May 15, 2024~ May 29, 2024	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	May 15, 2024~ May 29, 2024	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	May 15, 2024~ May 29, 2024	N/A	Radiation (03CH11-HY)
Software	Audix	N/A	RK-001053	N/A	N/A	May 15, 2024~ May 29, 2024	N/A	Radiation (03CH11-HY)

5 Measurement Uncertainty

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.5 dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.1 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.3 dB

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.3 dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.3 dB

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Ju Chang and Shiming Liu	Temperature:	21~25	°C
Test Date:	2024/05/03-2024/06/10	Relative Humidity:	51~54	%

TEST RESULTS DATA
26dB and 99% OBW

U-NII-5 MIMO										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		Emission Bandwidth Limit (MHz)	Pass /Fail
					Ant 8	Ant 9	Ant 8	Ant 9		
11a	6Mbps	2	001	5955	16.47	16.49	19.74	19.16	320.00	Pass
11a	6Mbps	2	002	5935	16.46	16.48	19.73	19.26	320.00	Pass
11a	6Mbps	2	045	6175	16.54	16.51	19.22	19.18	320.00	Pass
11a	6Mbps	2	093	6415	16.54	16.49	19.30	19.59	320.00	Pass