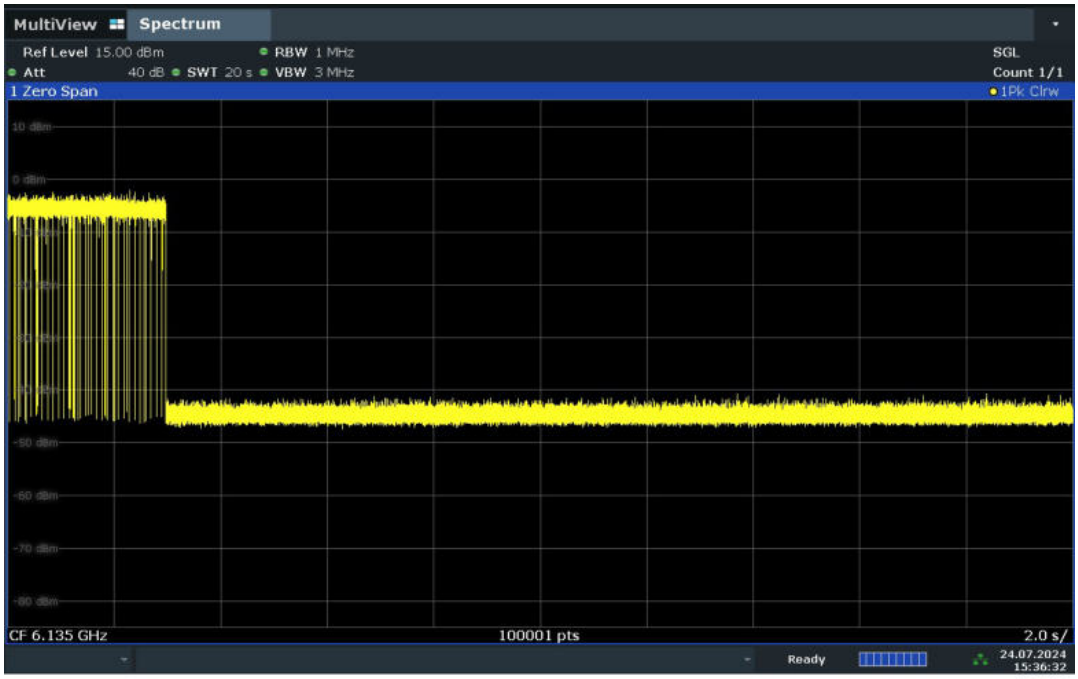
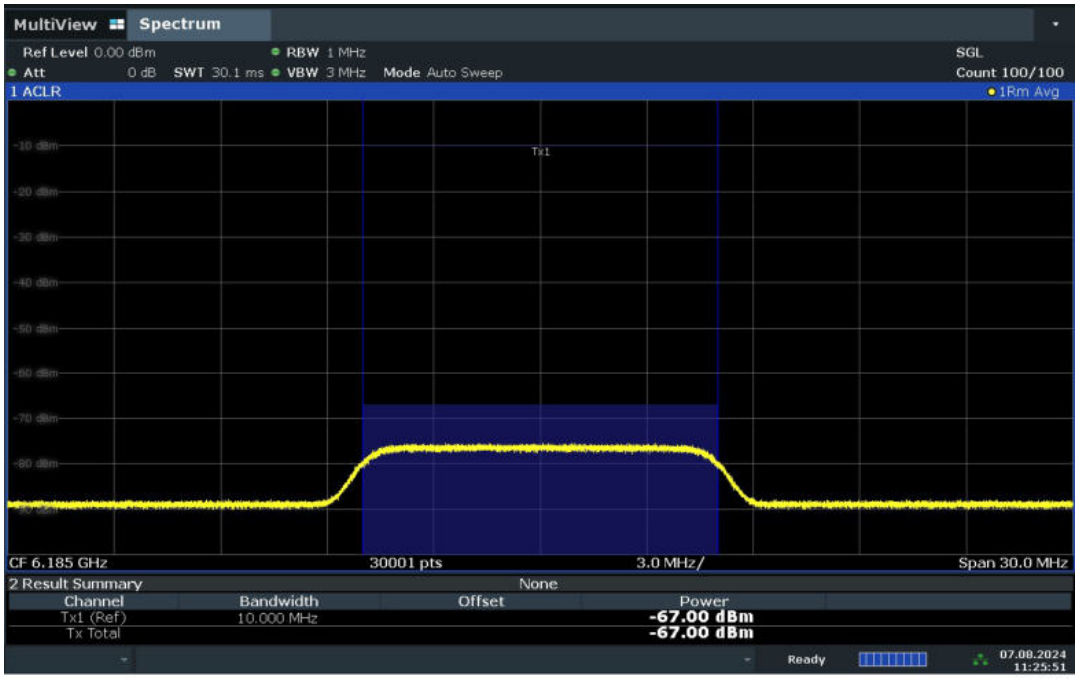


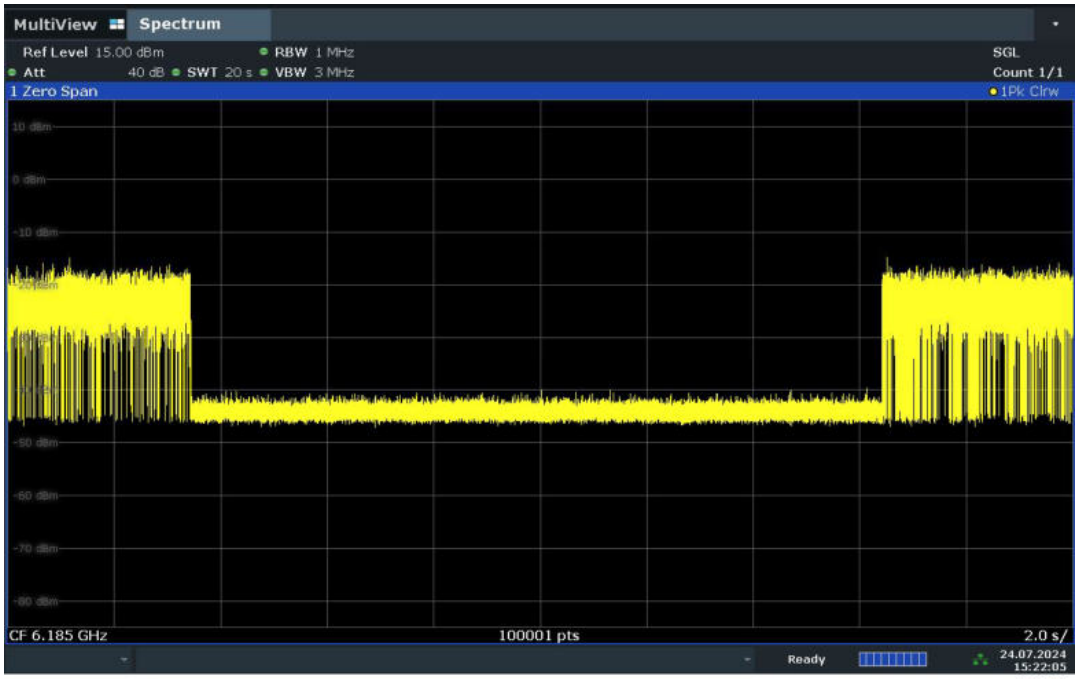
15:36:32 24.07.2024

Contention Based Protocol 802.11ax-HE20 (ch6135MHz-ceased transmission)



11:25:52 07.08.2024

Contention Based Protocol 802.11ax-HE160 (ch6185MHz-middle-AWGN Signal Level)



15:22:05 24.07.2024

Contention Based Protocol 802.11ax-HE160 (ch6185MHz-middle-ceased transmission)

A.7. In-Band Emissions

Measurement Limit and Method:

1. Take nominal bandwidth as reference channel bandwidth provided that 26 dB emission bandwidth is always larger than nominal bandwidth

2. Measure the power spectral density (which will be used for emissions mask reference) using the following procedure:

a) Set the span to encompass the entire 26 dB EBW of the signal.

b) Set RBW = same RBW used for 26 dB EBW measurement.

c) Set VBW ⩾ 3 X RBW

d) Number of points in sweep ⩾ [2 X span / RBW].

e) Sweep time = auto.

f) Detector = RMS (i.e., power averaging)

g) Trace average at least 100 traces in power averaging (rms) mode.

h) Use the peak search function on the instrument to find the peak of the spectrum.

3. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:

a. Suppressed by 20 dB at 1 MHz outside of the channel edge. (The channel edge is defined as the 26-dB point on either side of the carrier center frequency.)

b. Suppressed by 28 dB at one channel bandwidth from the channel center.

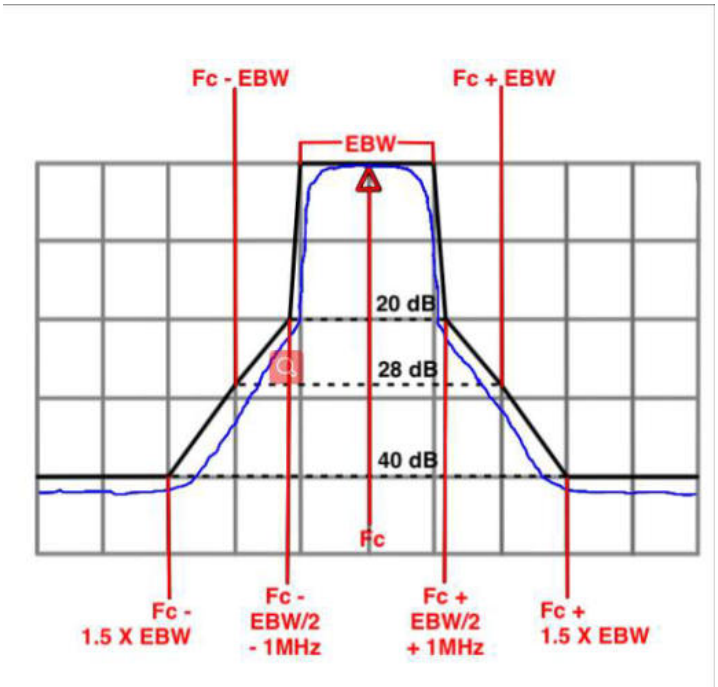
c. Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.

4. Adjust the span to encompass the entire mask as necessary.

5. Clear trace.

6. Trace average at least 100 traces in power averaging (rms) mode.

7. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask.



Generic Emission Mask

The measurement is made according to KDB 987594.

Measurement Results:

TestMode	Antenna	Channel	Result	Limit	Verdict
11AX20SISO	Ant2	5955	See test graph	See test graph	PASS
		6175	See test graph	See test graph	PASS
		6415	See test graph	See test graph	PASS
		6435	See test graph	See test graph	PASS
		6475	See test graph	See test graph	PASS
		6515	See test graph	See test graph	PASS
		6535	See test graph	See test graph	PASS
		6695	See test graph	See test graph	PASS
		6855	See test graph	See test graph	PASS
		6875	See test graph	See test graph	PASS
		6895	See test graph	See test	PASS

				graph	
		6995	See test graph	See test graph	PASS
		7115	See test graph	See test graph	PASS
11AX40SISO	Ant2	5965	See test graph	See test graph	PASS
		6165	See test graph	See test graph	PASS
		6405	See test graph	See test graph	PASS
		6445	See test graph	See test graph	PASS
		6485	See test graph	See test graph	PASS
		6525	See test graph	See test graph	PASS
		6565	See test graph	See test graph	PASS
		6685	See test graph	See test graph	PASS
		6845	See test graph	See test graph	PASS
		6885	See test graph	See test graph	PASS
		6925	See test graph	See test graph	PASS
		6965	See test graph	See test graph	PASS
		7085	See test graph	See test graph	PASS
11AX80SISO	Ant2	5985	See test graph	See test graph	PASS
		6145	See test graph	See test graph	PASS
		6385	See test graph	See test graph	PASS
		6465	See test graph	See test graph	PASS
		6545	See test graph	See test graph	PASS
		6625	See test graph	See test graph	PASS

		6705	See test graph	See test graph	PASS
		6785	See test graph	See test graph	PASS
		6865	See test graph	See test graph	PASS
		6945	See test graph	See test graph	PASS
		7025	See test graph	See test graph	PASS
11AX160SISO	Ant2	6025	See test graph	See test graph	PASS
		6185	See test graph	See test graph	PASS
		6345	See test graph	See test graph	PASS
		6505	See test graph	See test graph	PASS
		6665	See test graph	See test graph	PASS
		6825	See test graph	See test graph	PASS
		6985	See test graph	See test graph	PASS

Test Graphs

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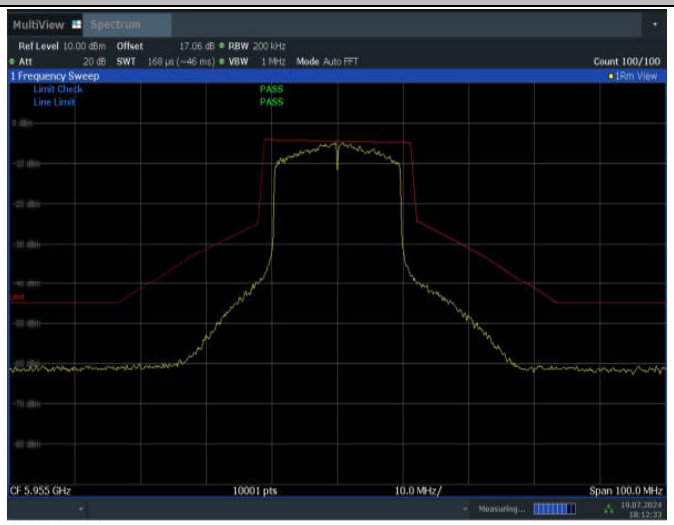
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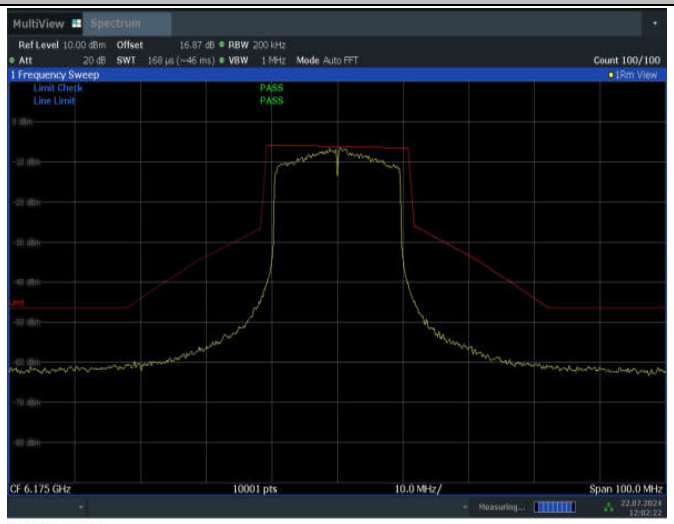
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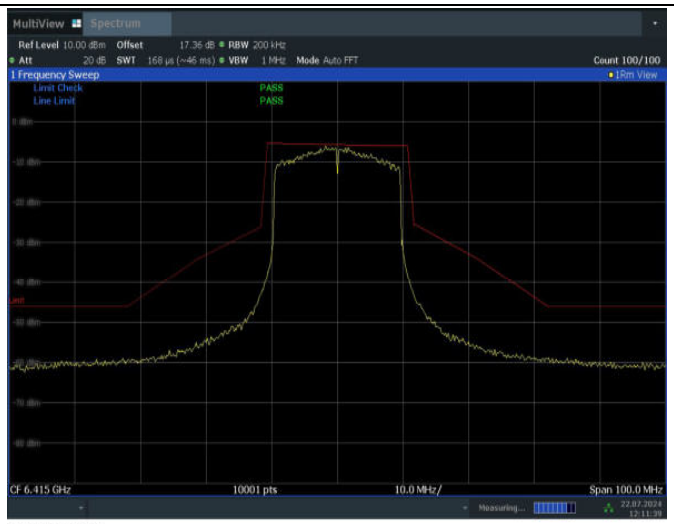

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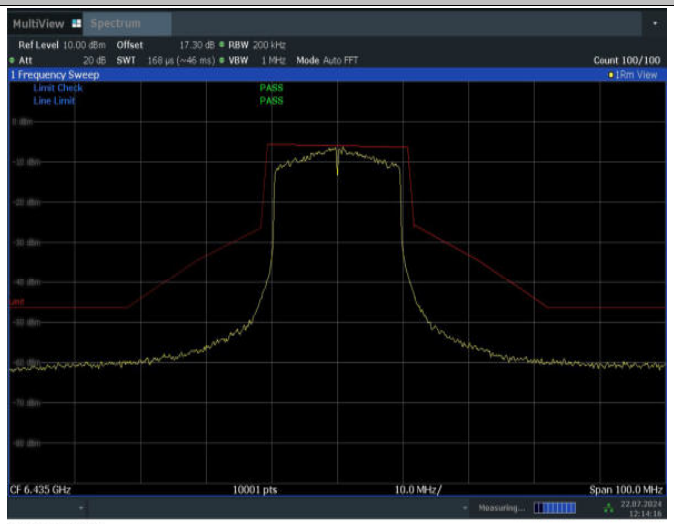

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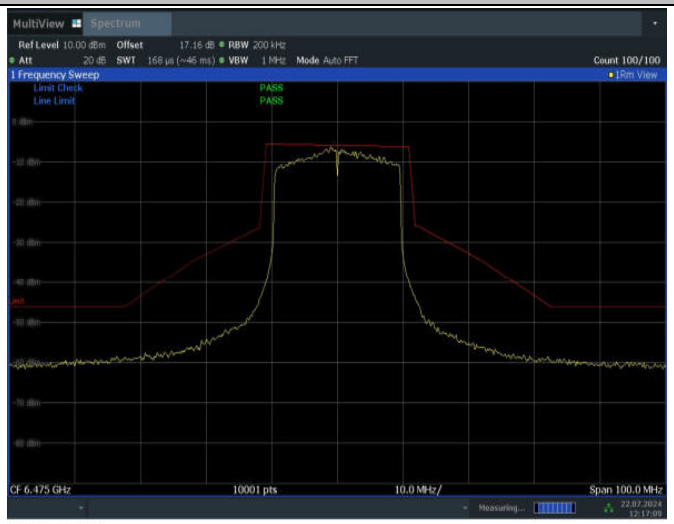

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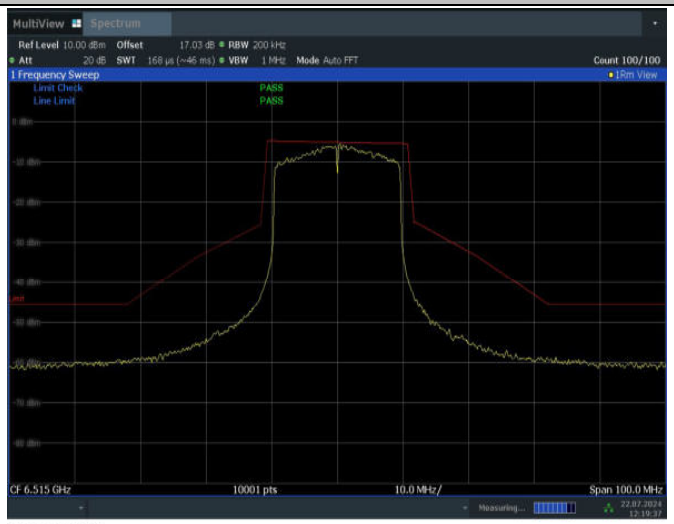
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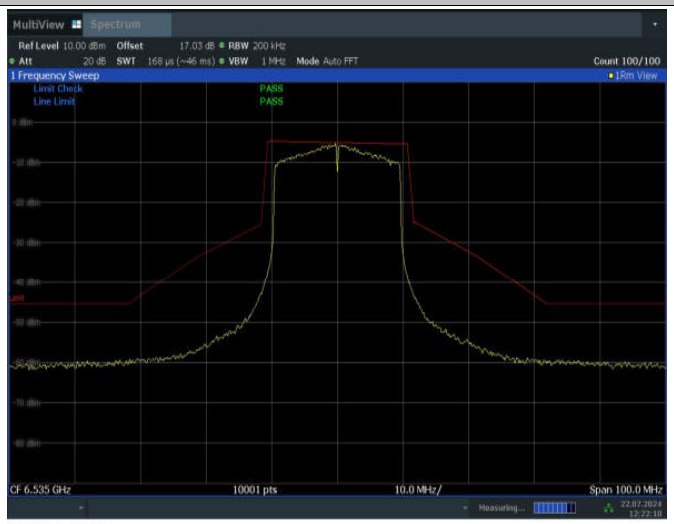
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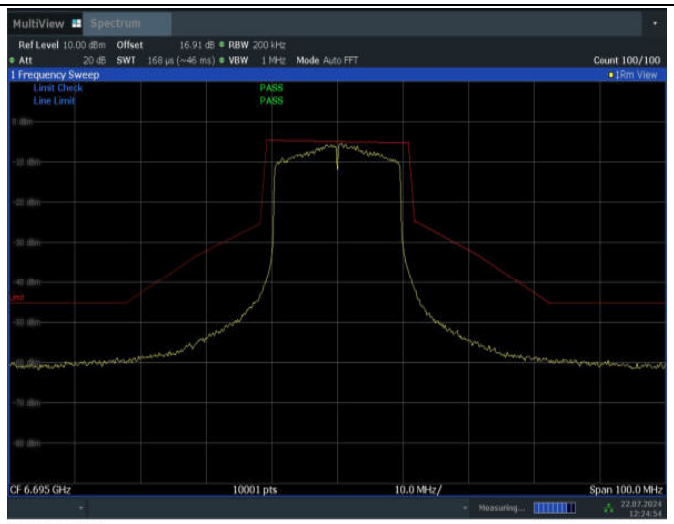

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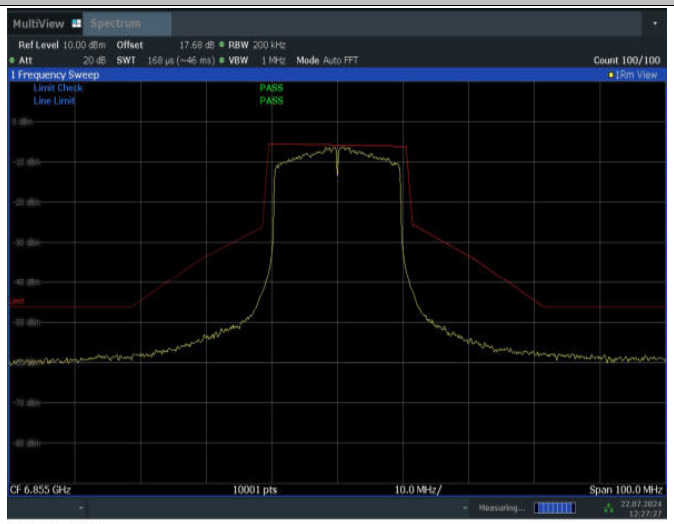

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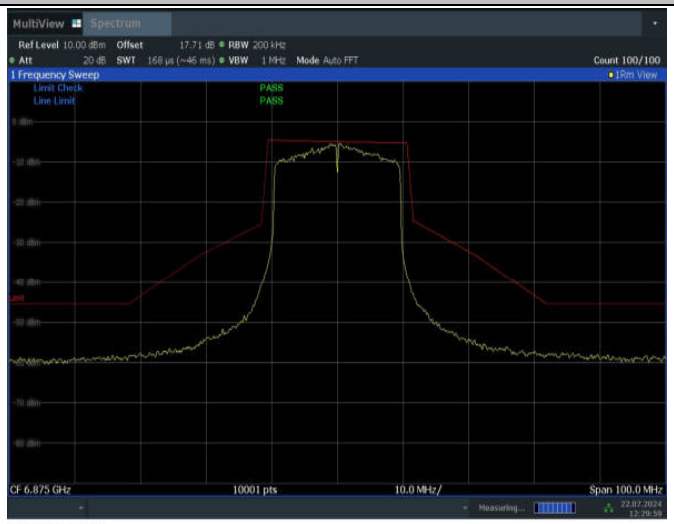

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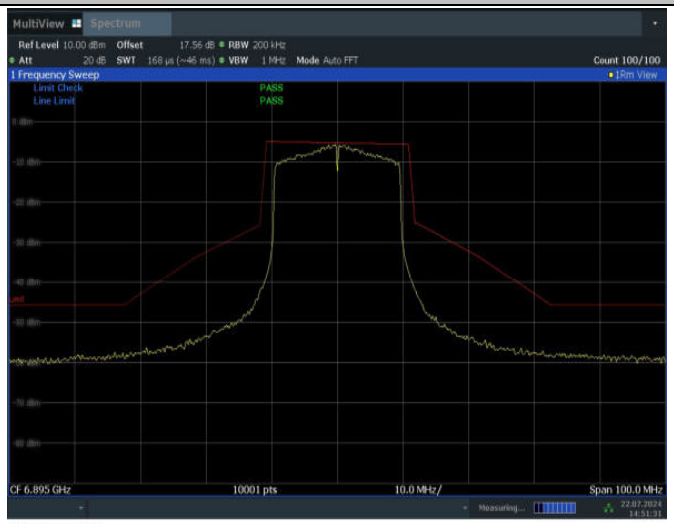 14:51:32 22.07.2024
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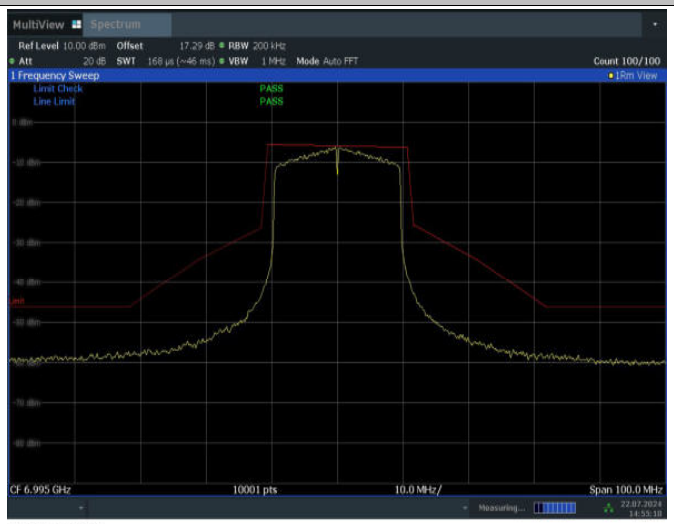 14:55:11 22.07.2024
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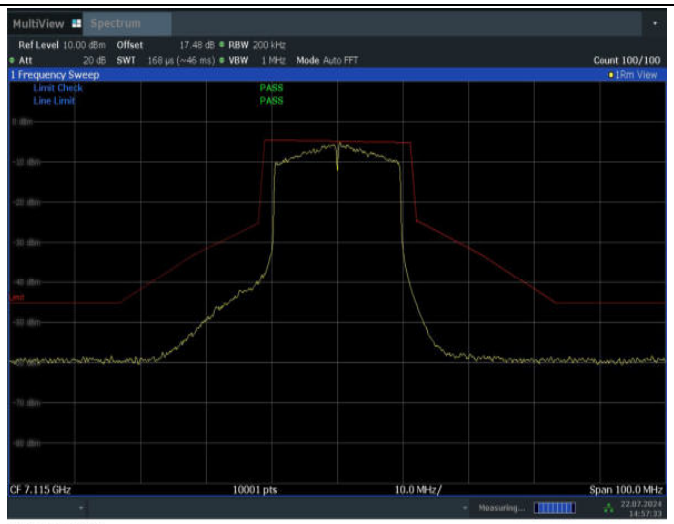

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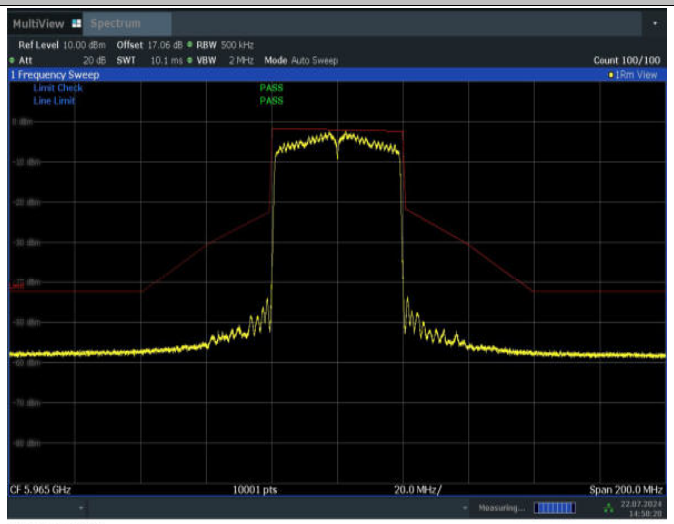

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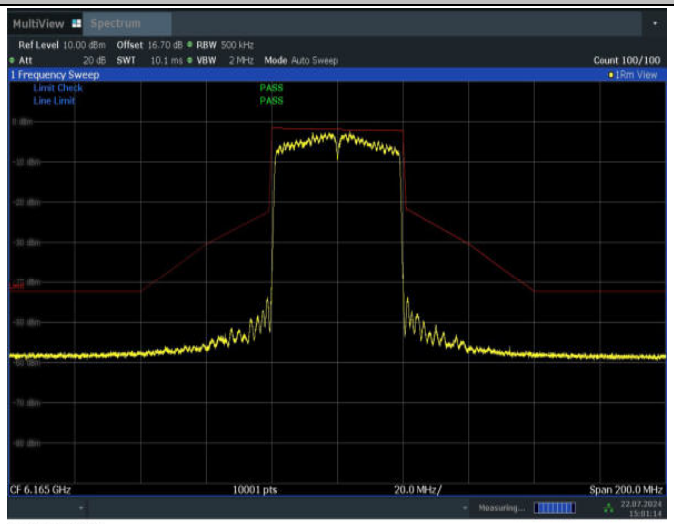

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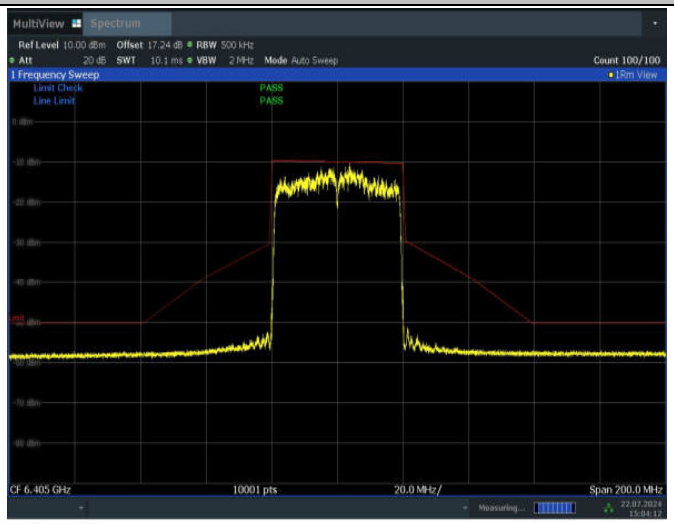 15:04:13 22.07.2024
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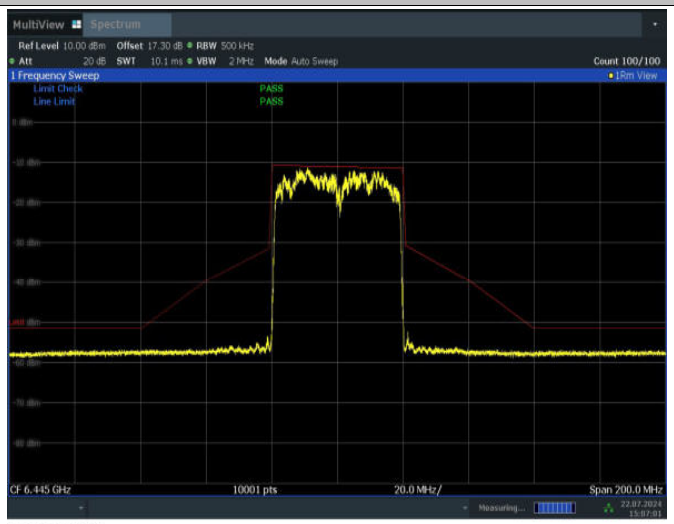 15:07:02 22.07.2024
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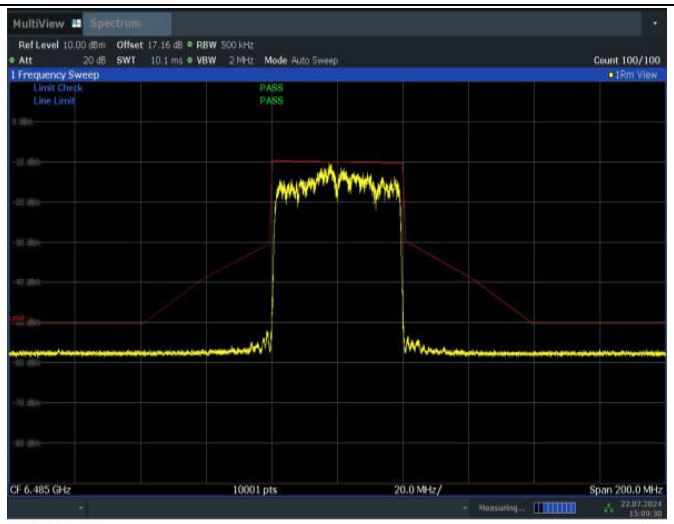

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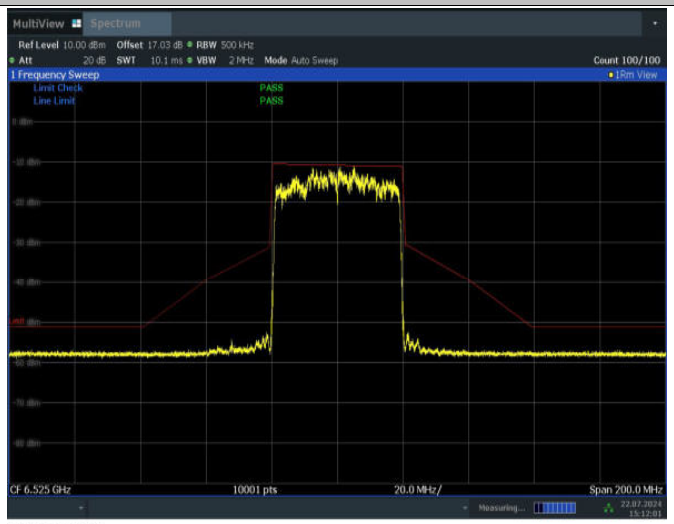

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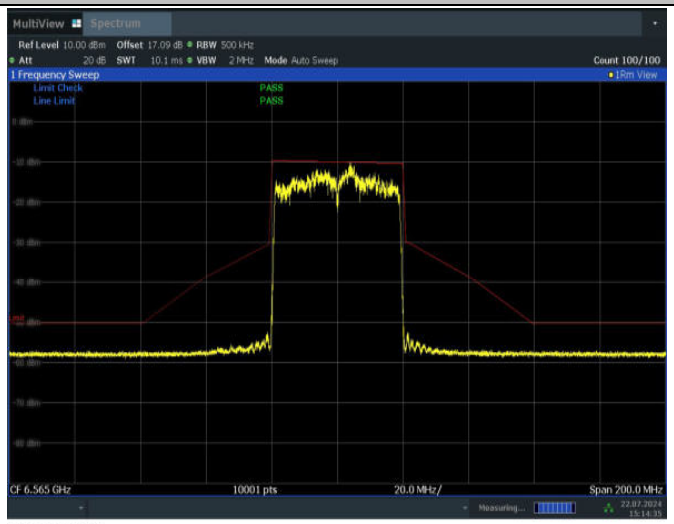

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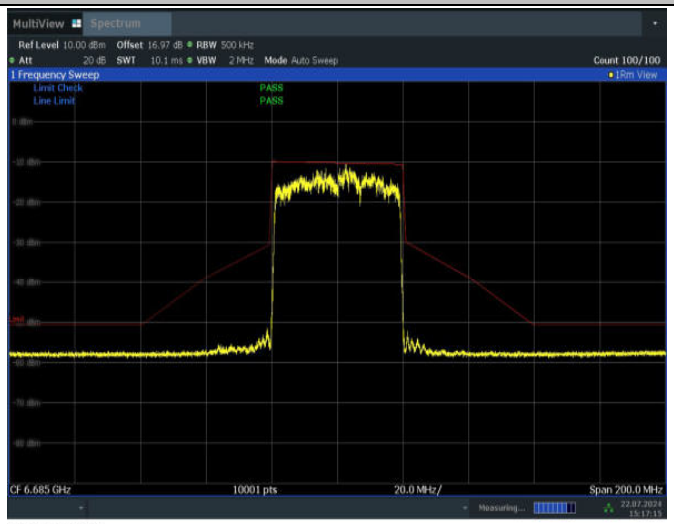
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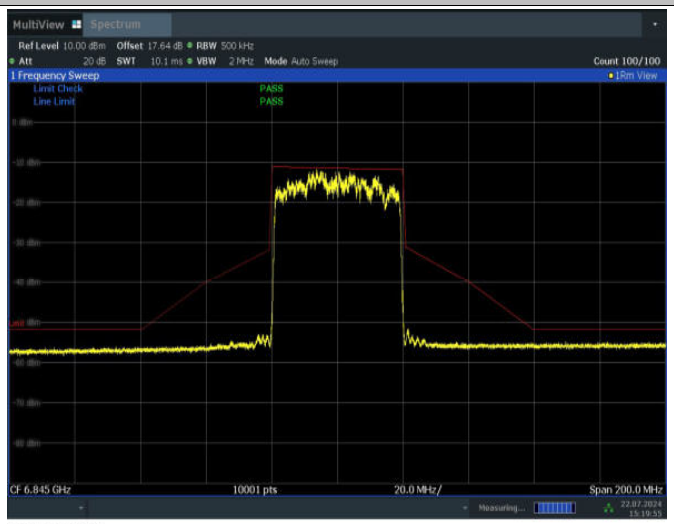
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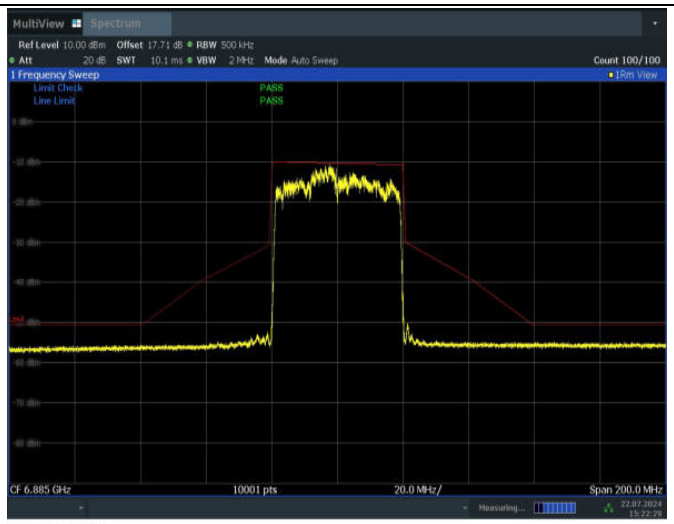

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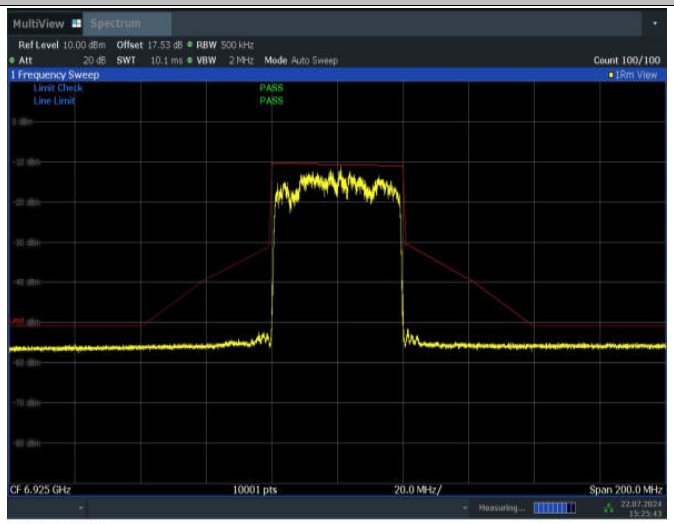

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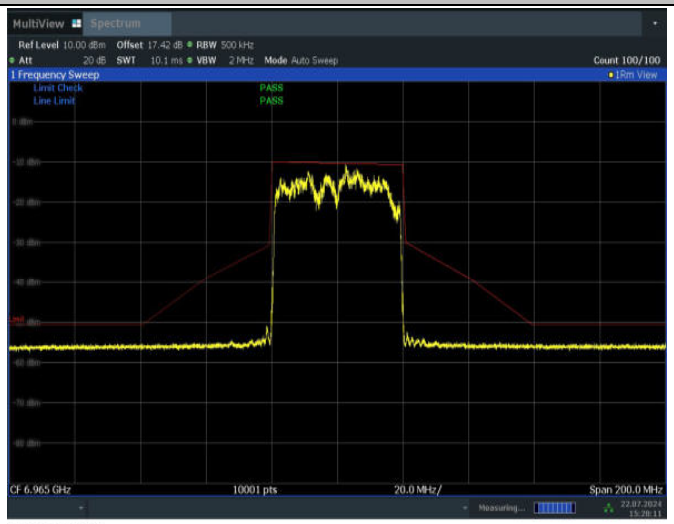

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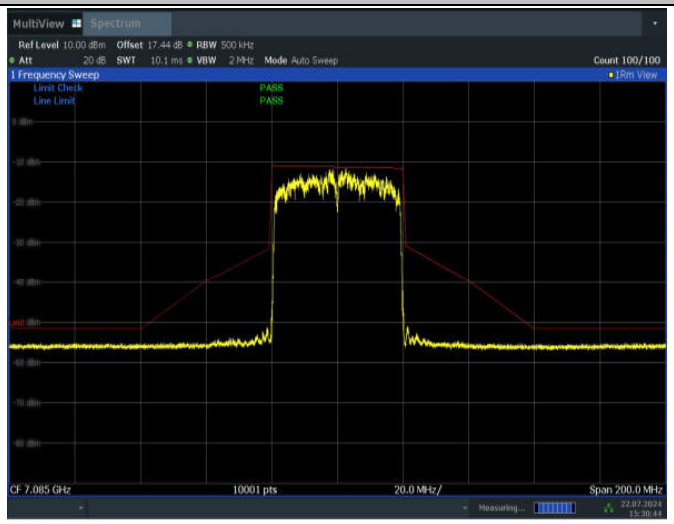
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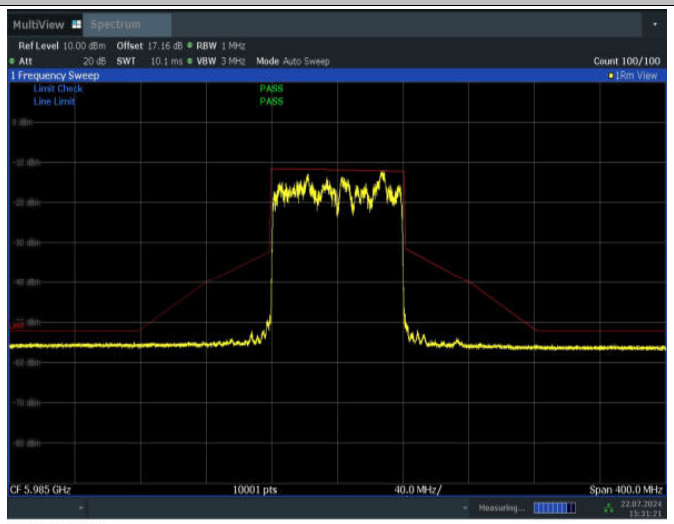
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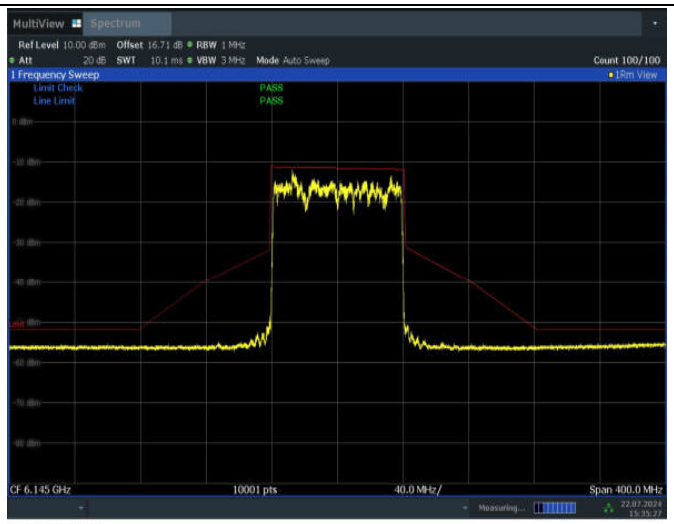

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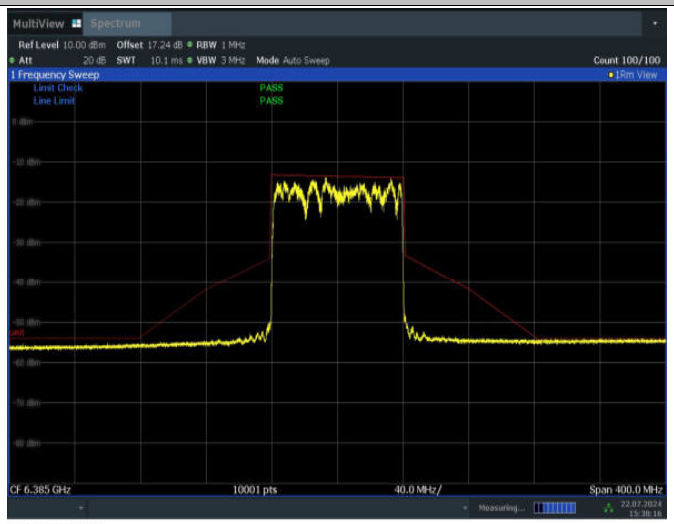

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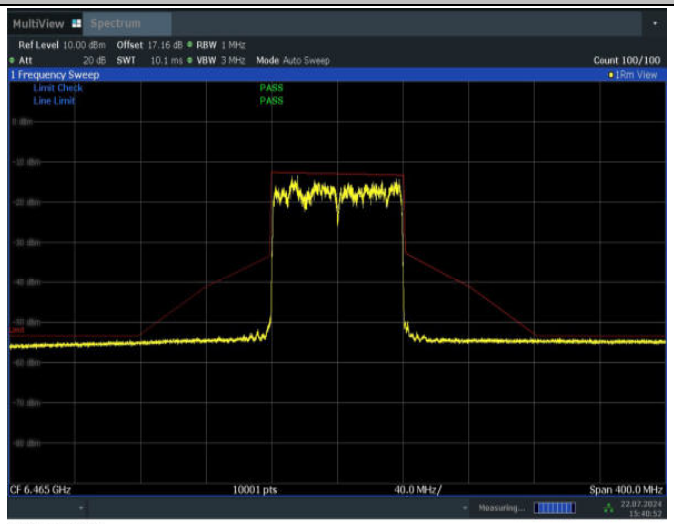

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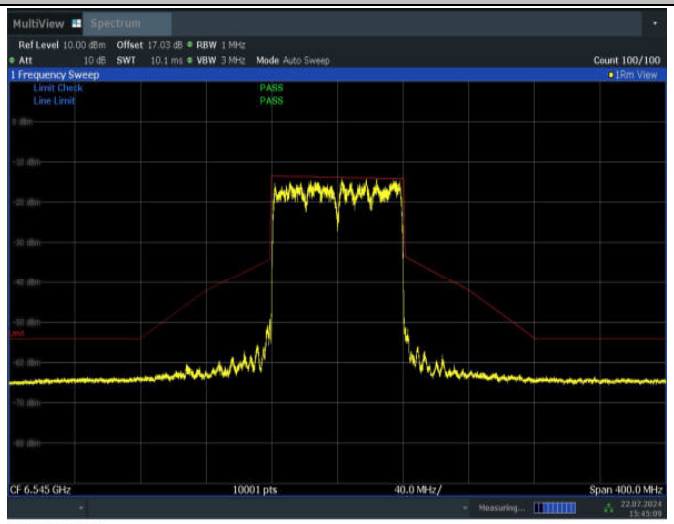
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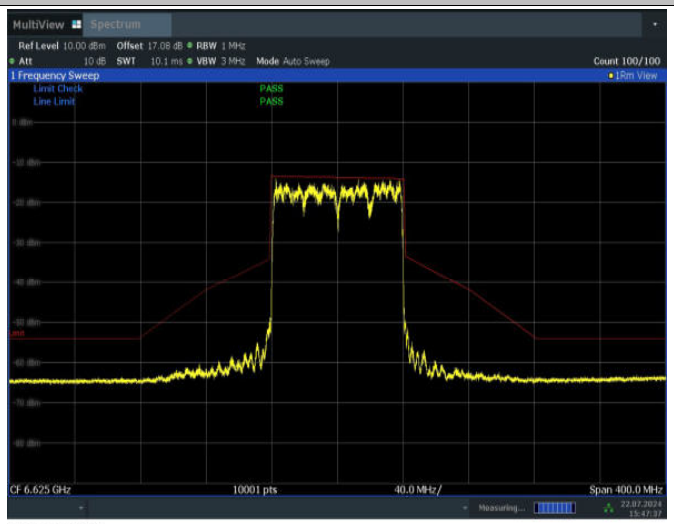
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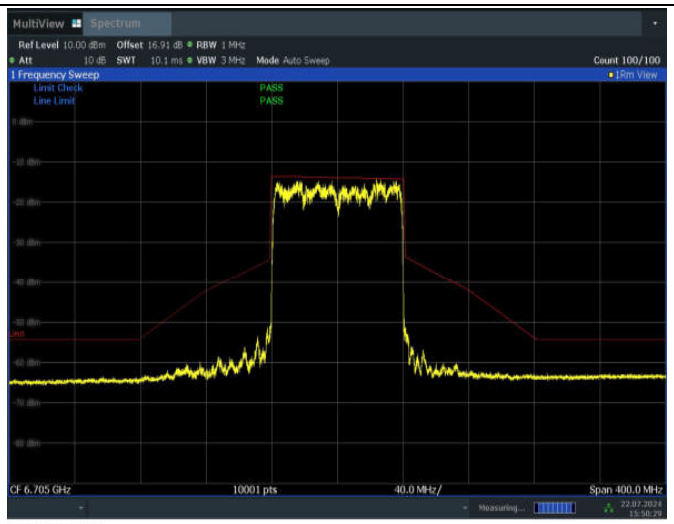

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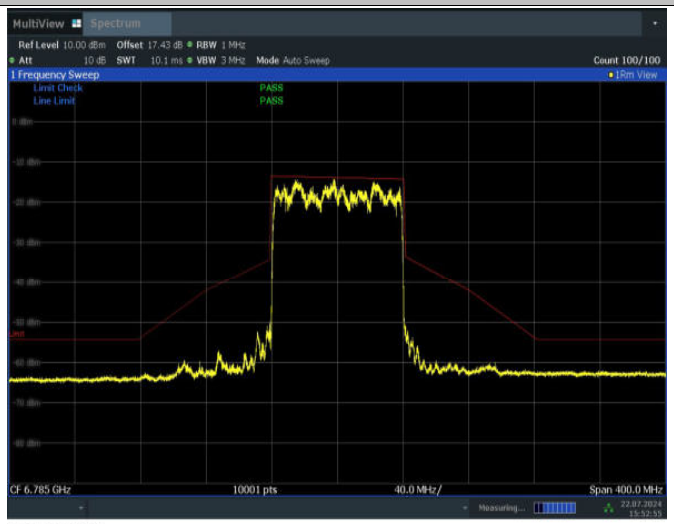

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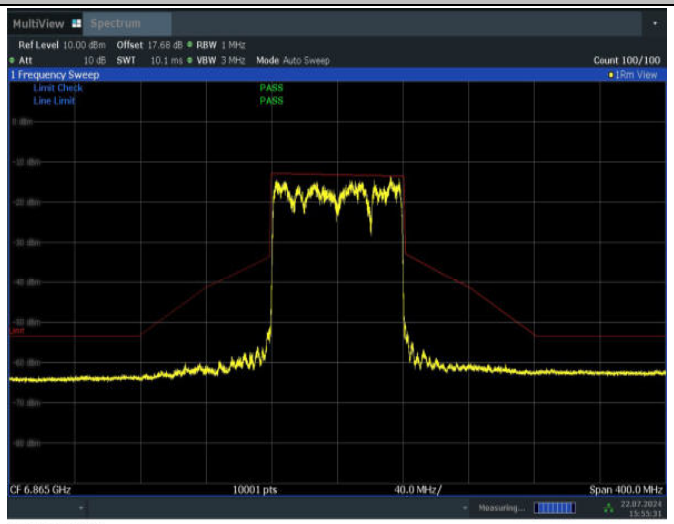

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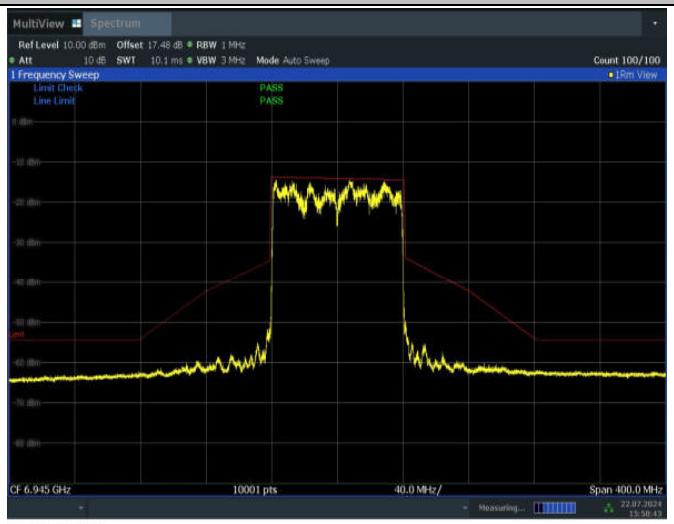
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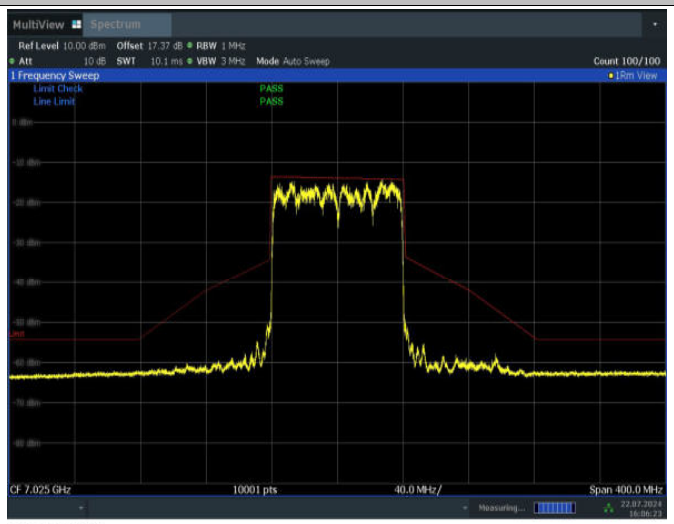
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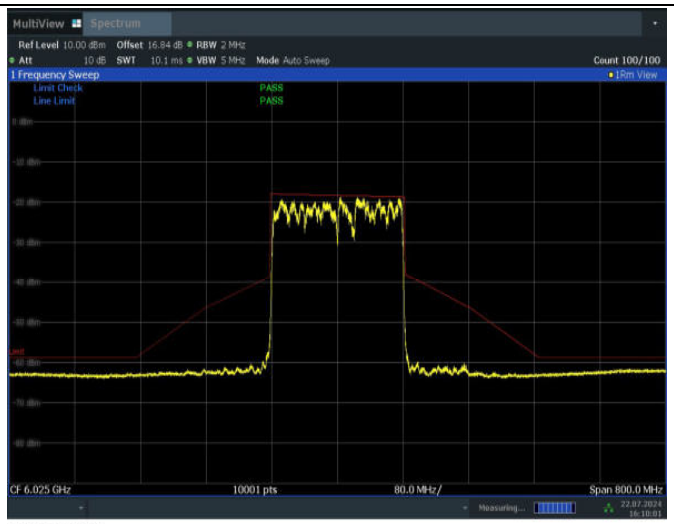

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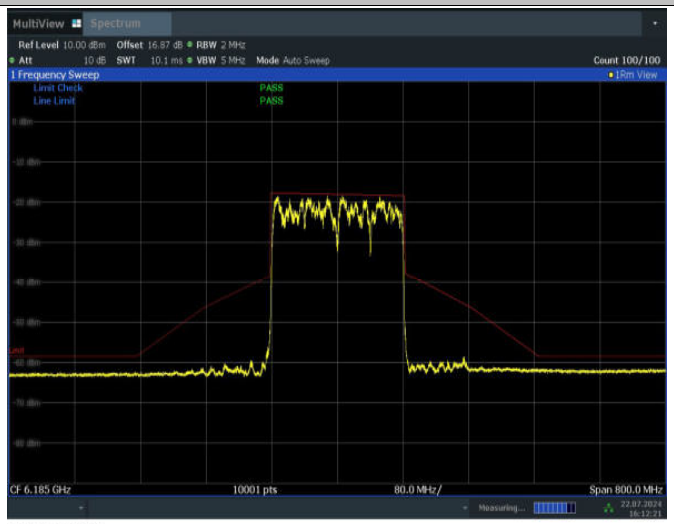

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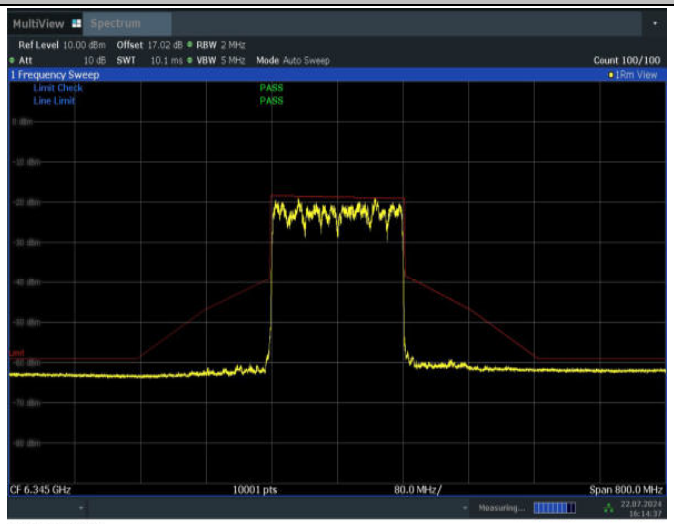

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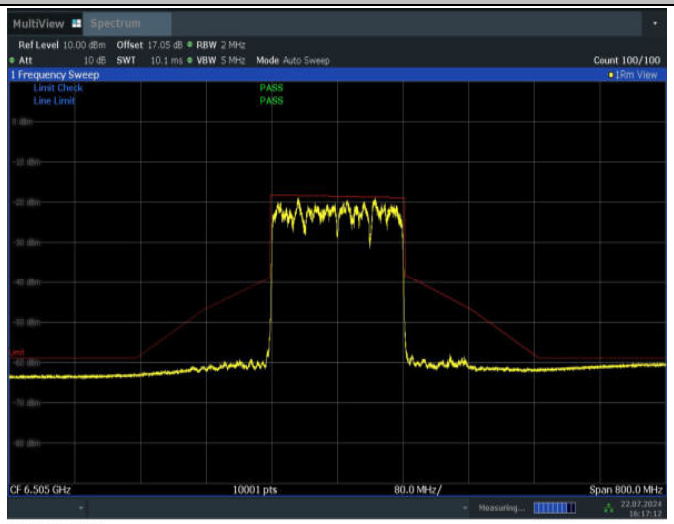
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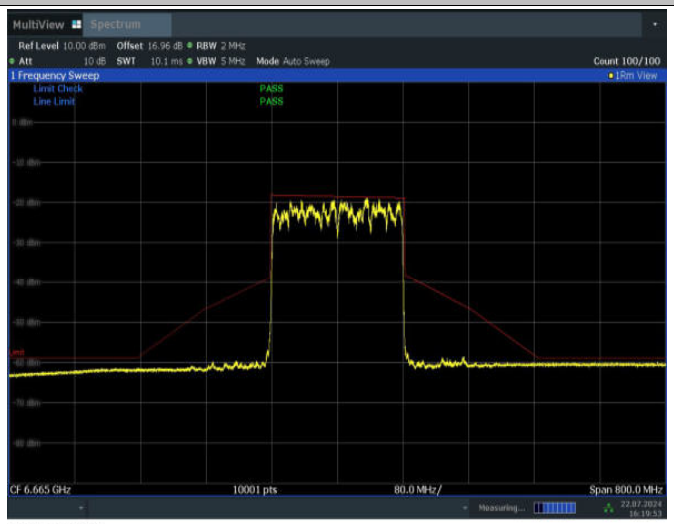
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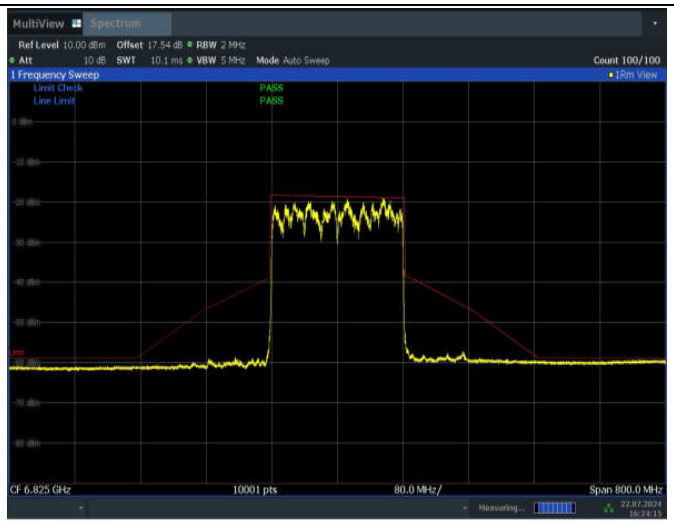

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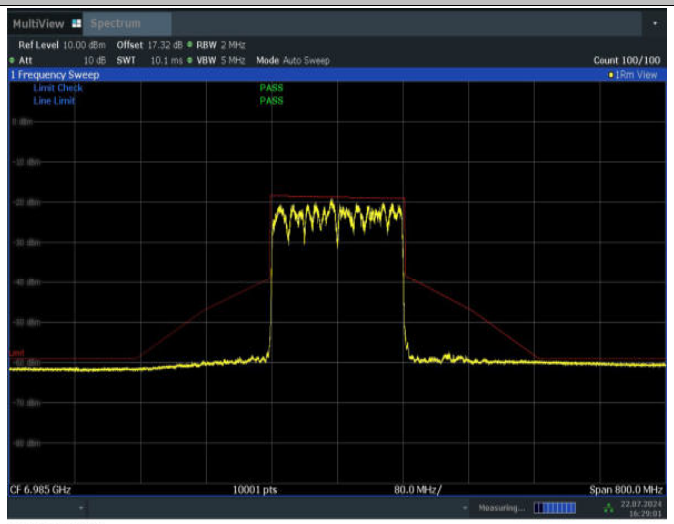

11ax-RU

Test Mode	Antenna	Frequency[MHz]	RU Size	RU Index	Result	Limit	Verdict
11AX20SISO	Ant2	5955	26Tone	RU0	See test graph	See test graph	PASS
			52Tone	RU37	See test graph	See test graph	PASS
			106Tone	RU53	See test graph	See test graph	PASS
		6175	26Tone	RU0	See test graph	See test graph	PASS
			52Tone	RU37	See test graph	See test graph	PASS
			106Tone	RU53	See test graph	See test graph	PASS
		6415	26Tone	RU0	See test graph	See test graph	PASS
			52Tone	RU37	See test graph	See test graph	PASS
			106Tone	RU53	See test graph	See test graph	PASS
		6435	26Tone	RU0	See test graph	See test graph	PASS
			52Tone	RU37	See test graph	See test graph	PASS
			106Tone	RU53	See test graph	See test graph	PASS
		6475	26Tone	RU0	See test graph	See test graph	PASS
			52Tone	RU37	See test graph	See test graph	PASS
			106Tone	RU53	See test graph	See test graph	PASS
		6515	26Tone	RU0	See test graph	See test graph	PASS
			52Tone	RU37	See test graph	See test graph	PASS
			106Tone	RU53	See test graph	See test graph	PASS
		6535	26Tone	RU8	See test graph	See test graph	PASS
			52Tone	RU40	See test graph	See test graph	PASS
			106Tone	RU54	See test graph	See test graph	PASS
		6695	26Tone	RU8	See test graph	See test graph	PASS
			52Tone	RU40	See test graph	See test graph	PASS
			106Tone	RU54	See test graph	See test graph	PASS
		6855	26Tone	RU8	See test graph	See test graph	PASS
			52Tone	RU40	See test graph	See test graph	PASS
			106Tone	RU54	See test graph	See test graph	PASS
		6875	26Tone	RU8	See test graph	See test graph	PASS
			52Tone	RU40	See test graph	See test graph	PASS
			106Tone	RU54	See test graph	See test graph	PASS
		6895	26Tone	RU8	See test graph	See test graph	PASS
			52Tone	RU40	See test graph	See test graph	PASS
			106Tone	RU54	See test graph	See test graph	PASS
		6995	26Tone	RU8	See test graph	See test graph	PASS
			52Tone	RU40	See test graph	See test graph	PASS
			106Tone	RU54	See test graph	See test graph	PASS
		7115	26Tone	RU8	See test graph	See test graph	PASS
			52Tone	RU40	See test graph	See test graph	PASS
			106Tone	RU54	See test graph	See test graph	PASS

Test Graphs

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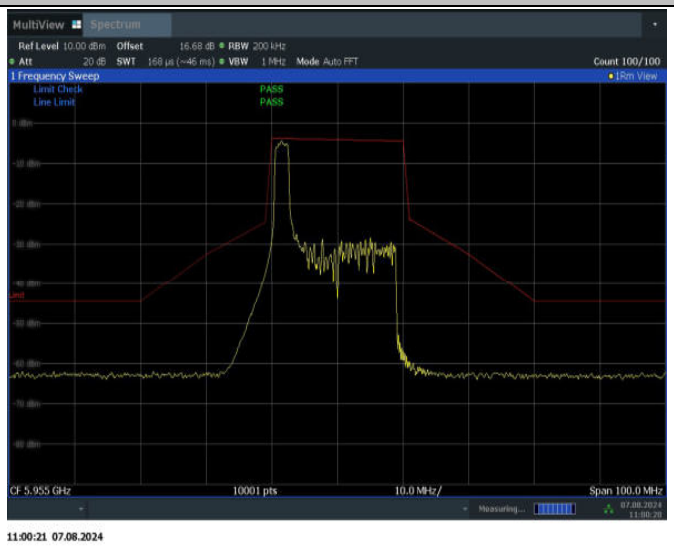
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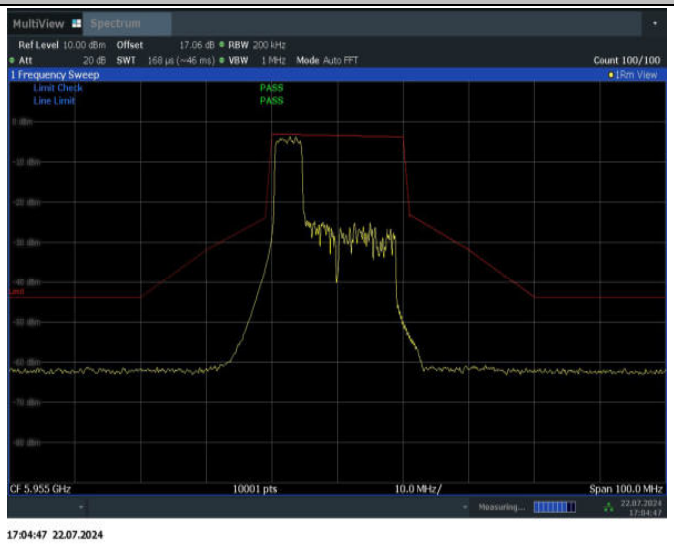
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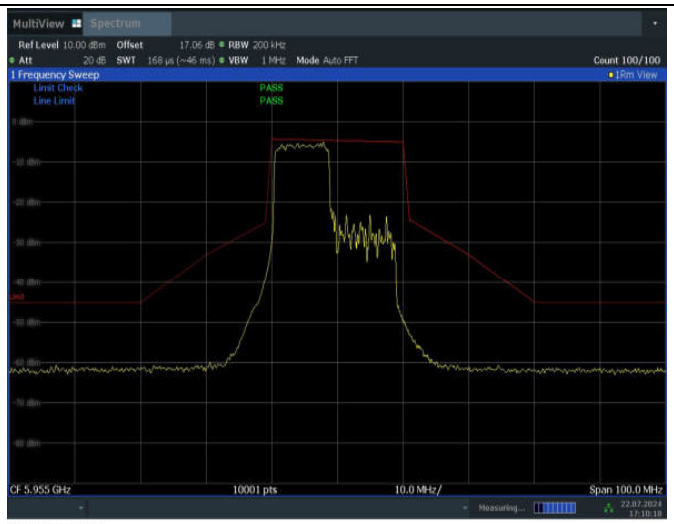

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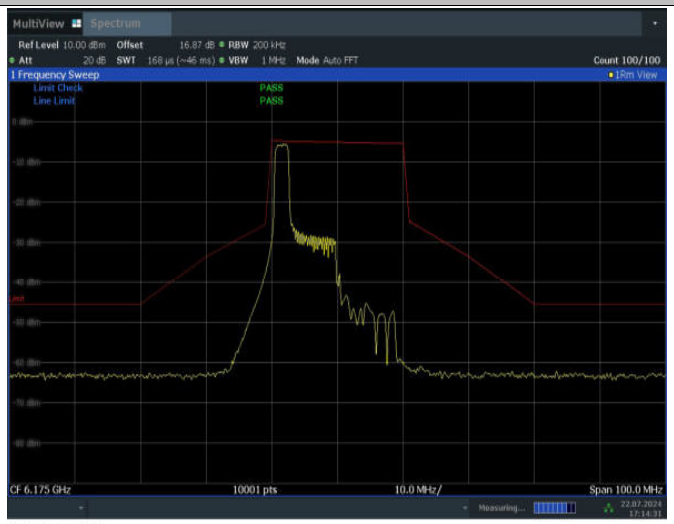

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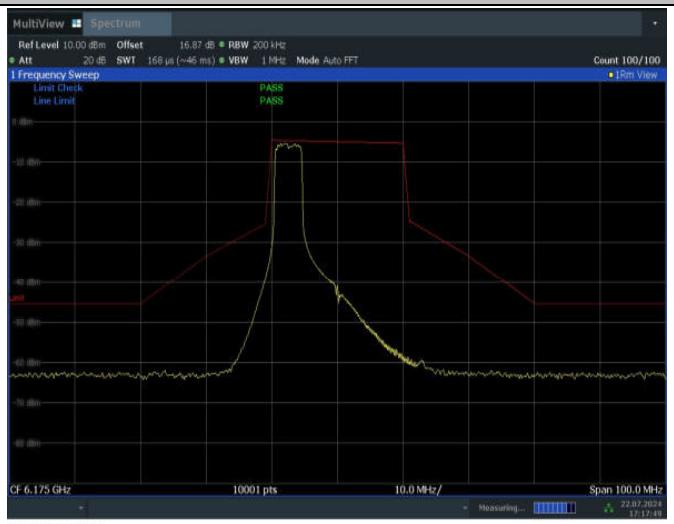

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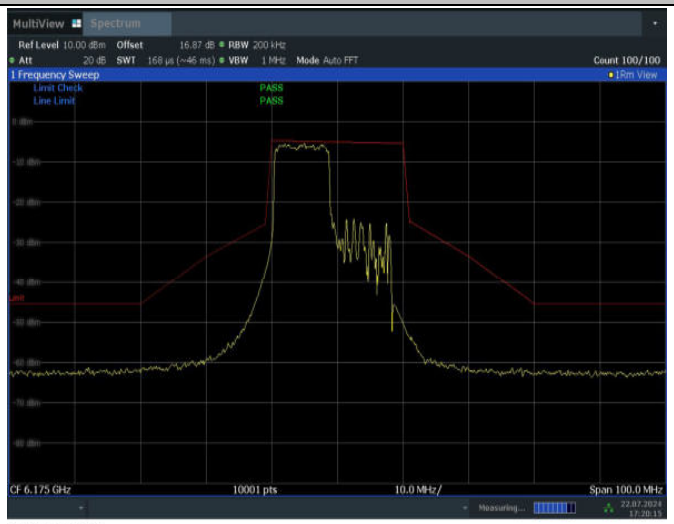
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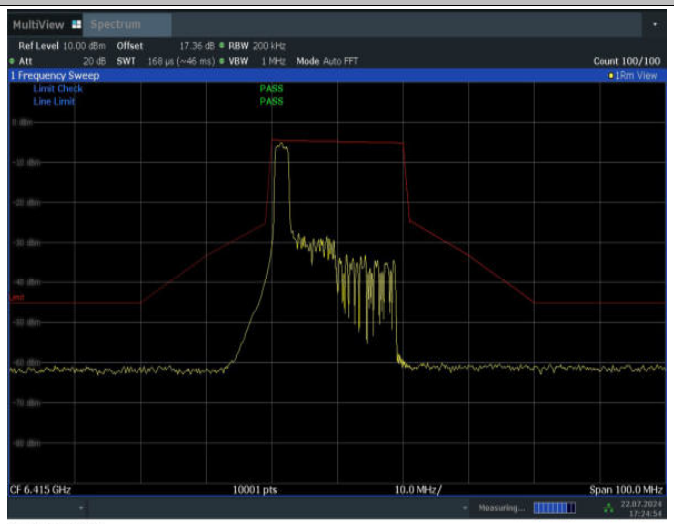
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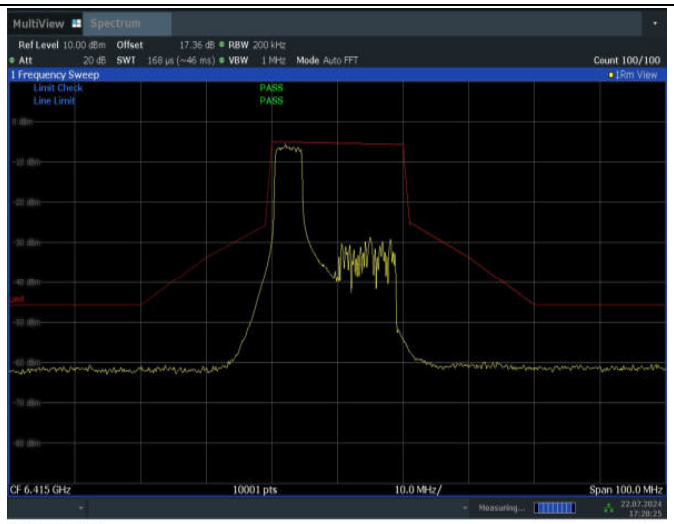

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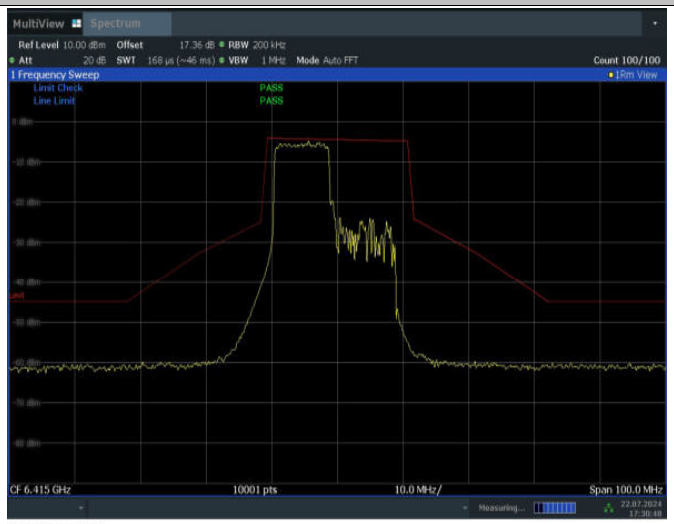

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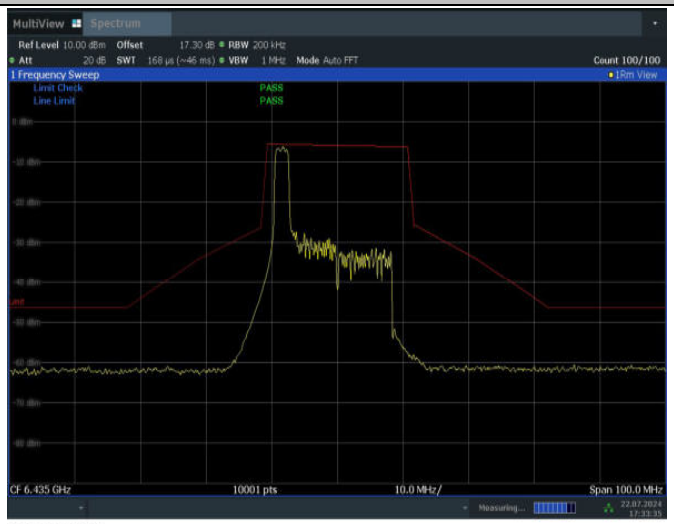

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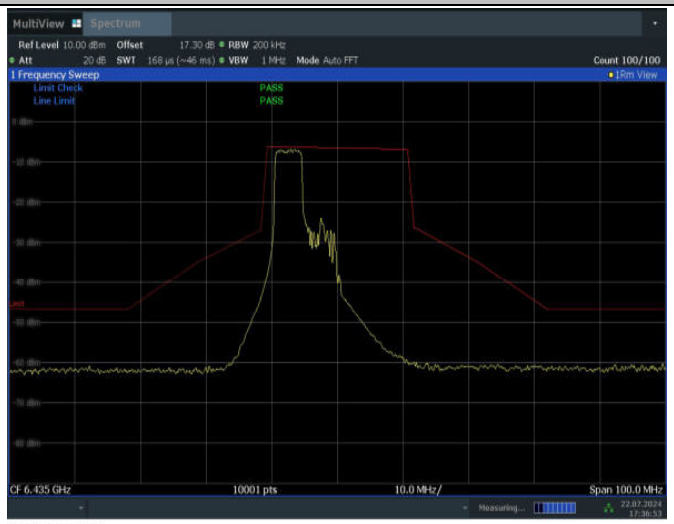 17:36:54 22.07.2024
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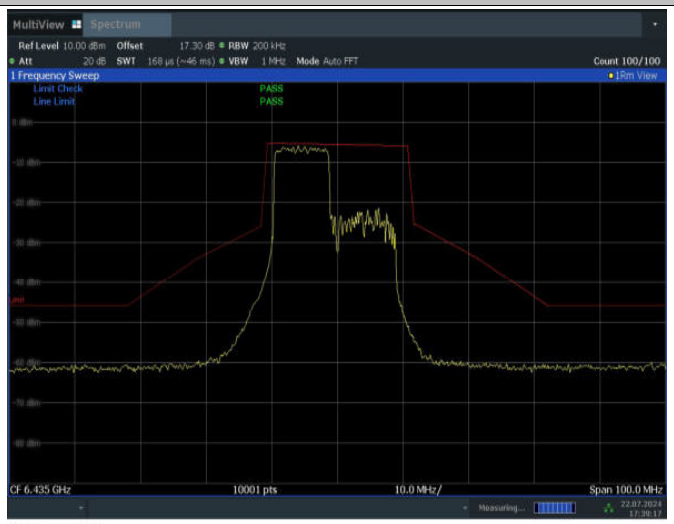 17:39:18 22.07.2024
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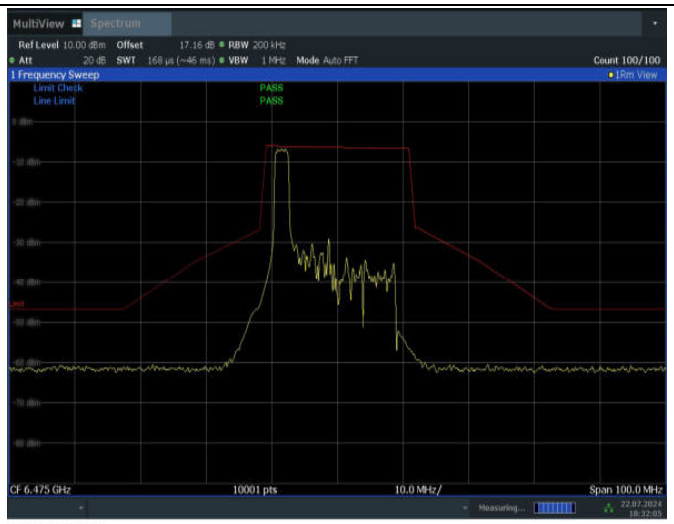

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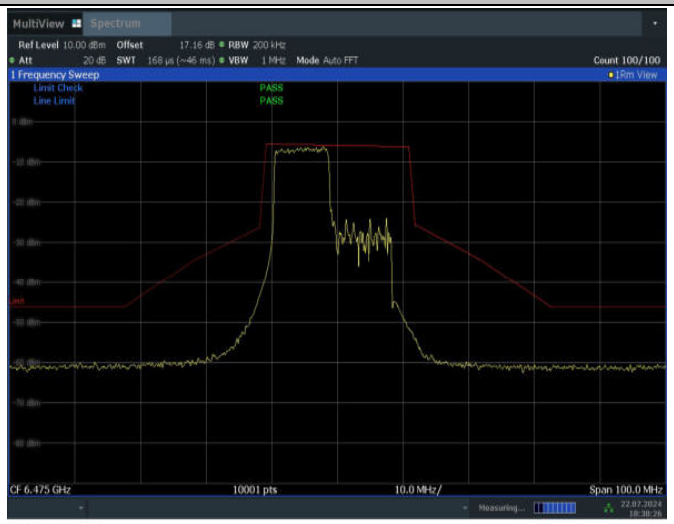

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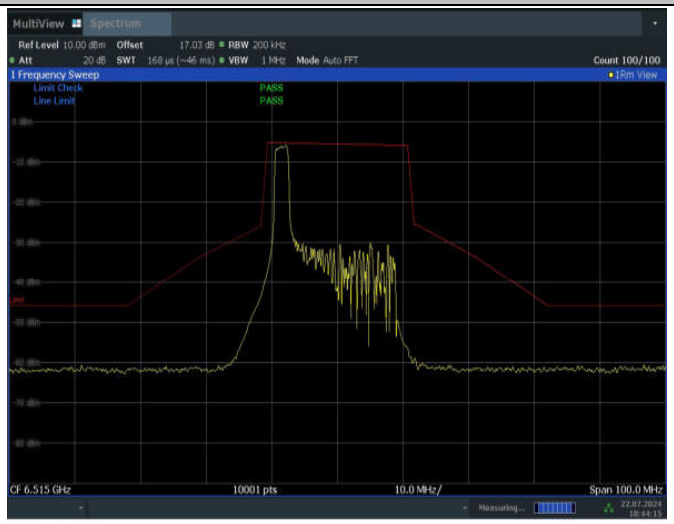
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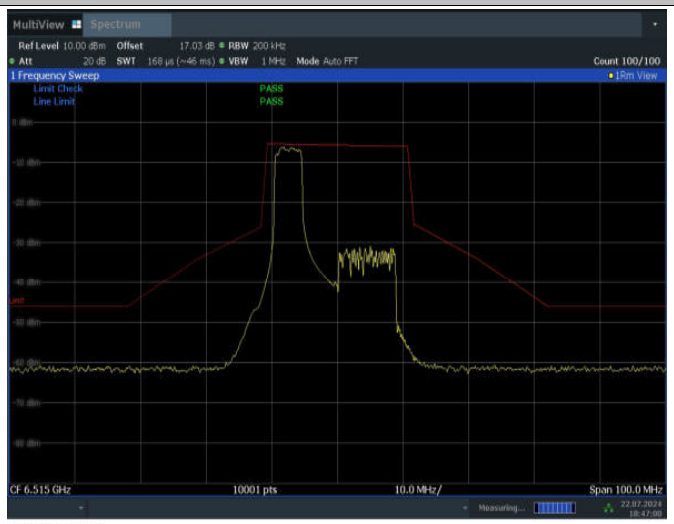
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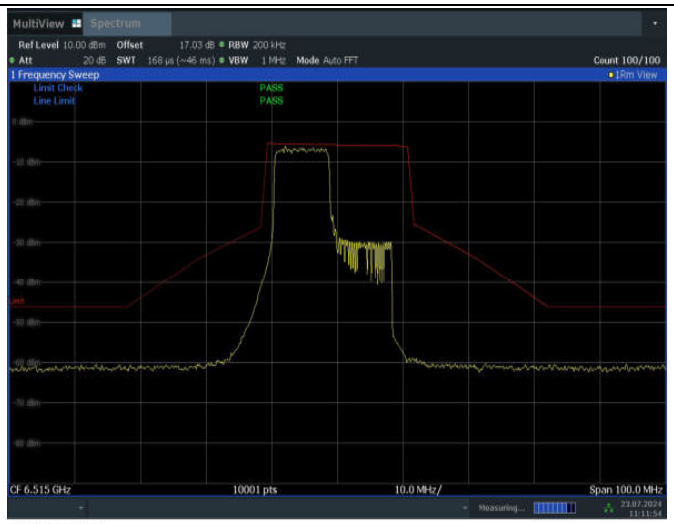

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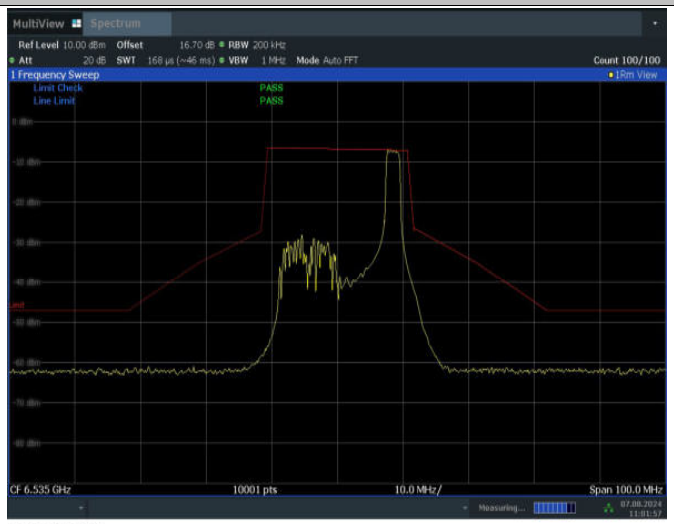

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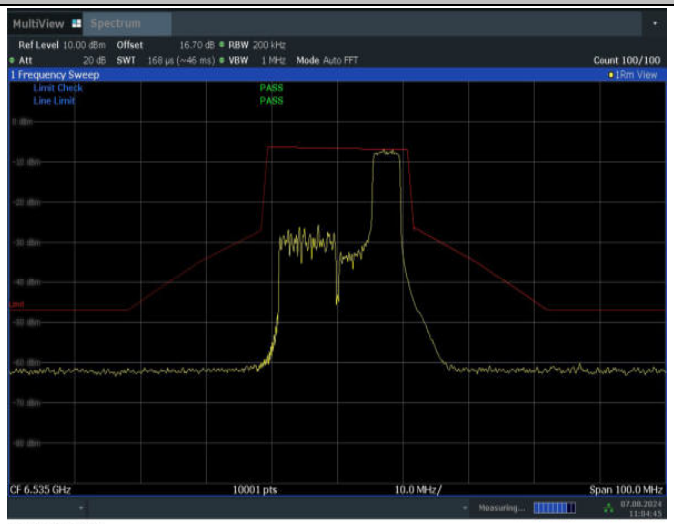

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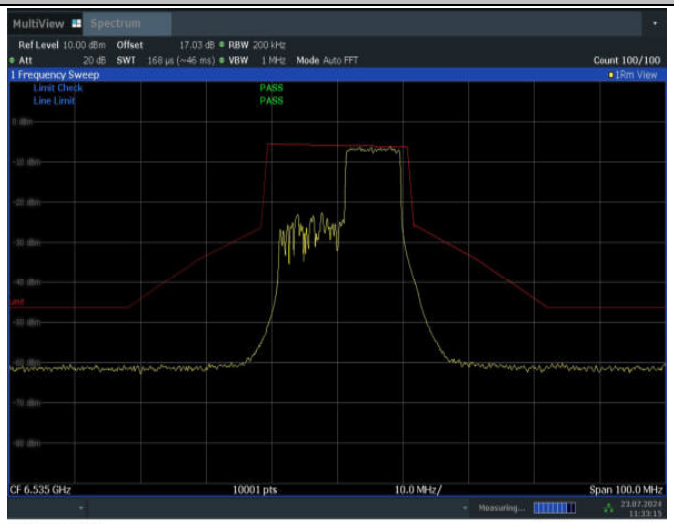
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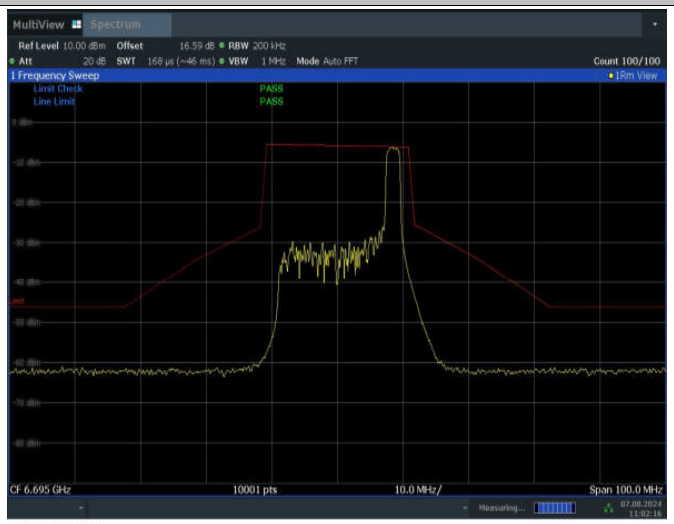
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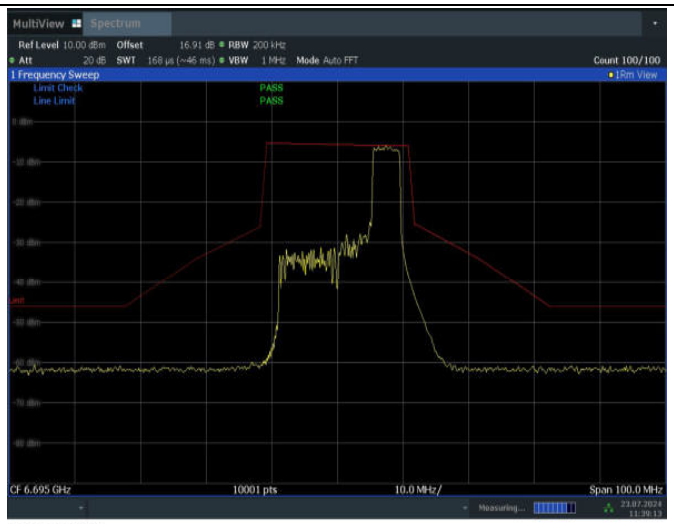

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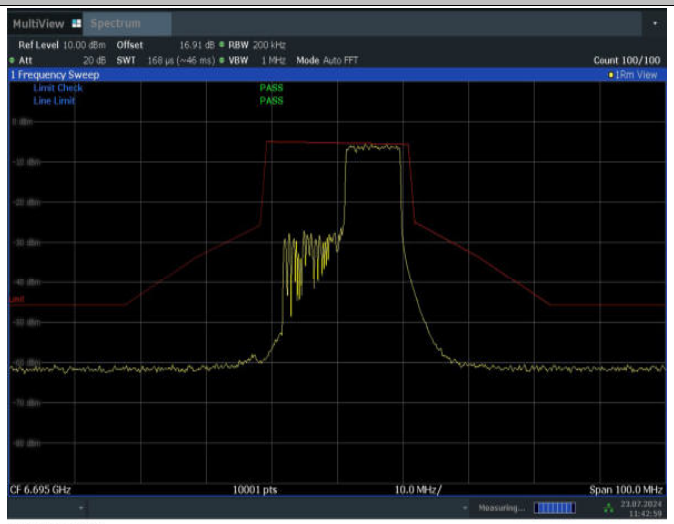

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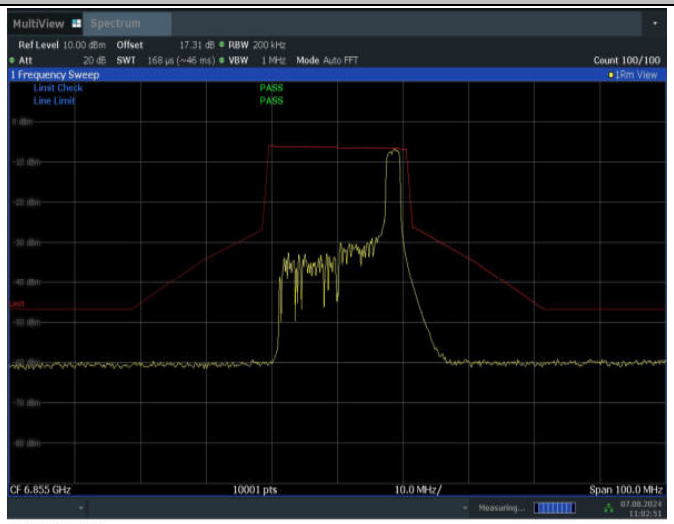

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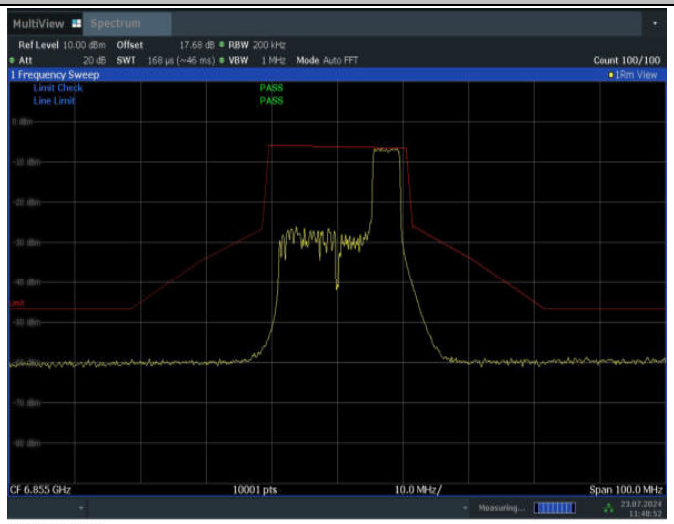
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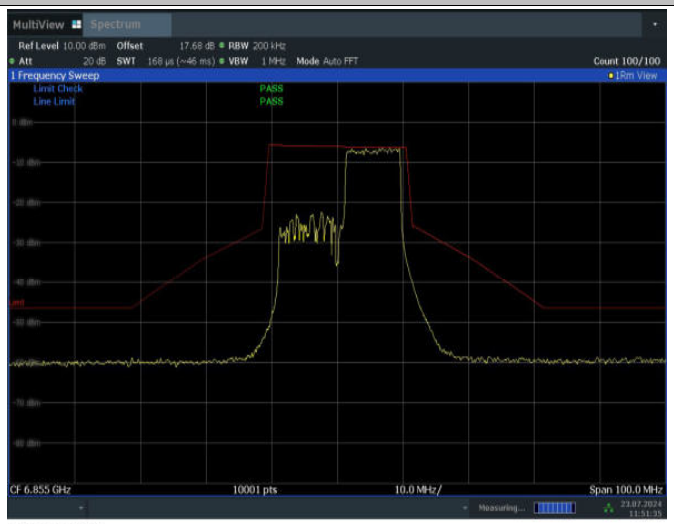
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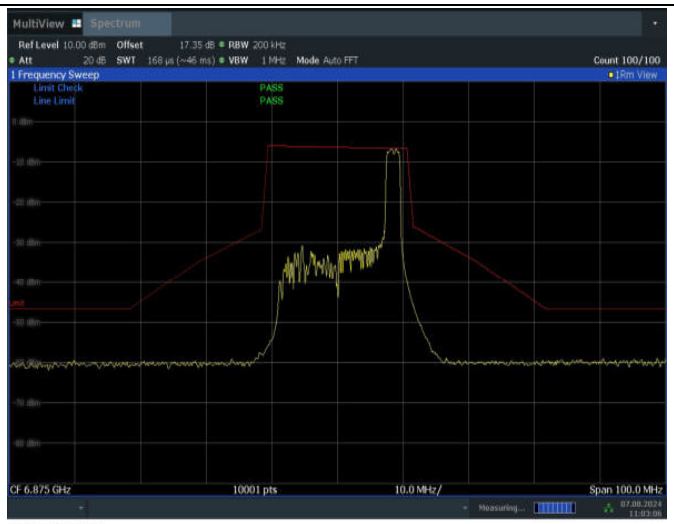

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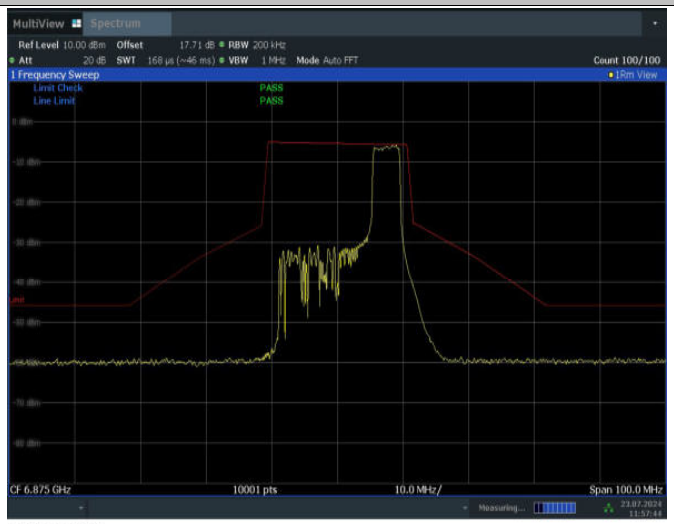

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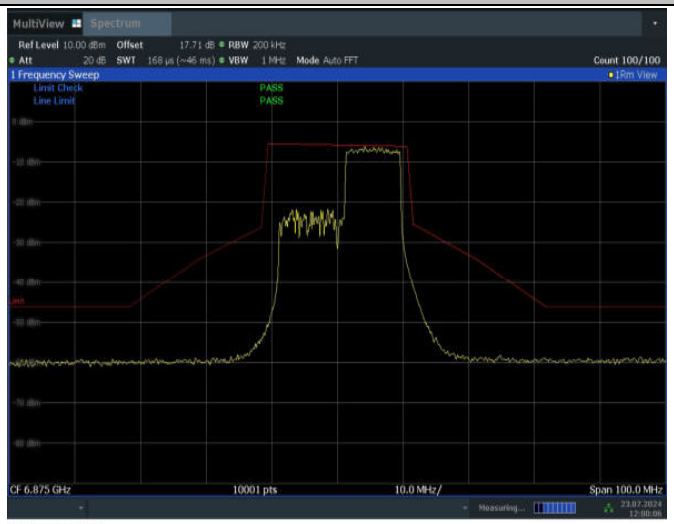

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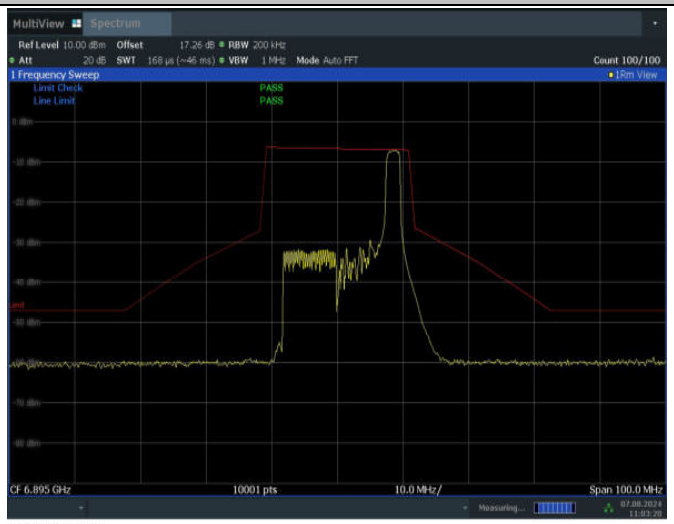
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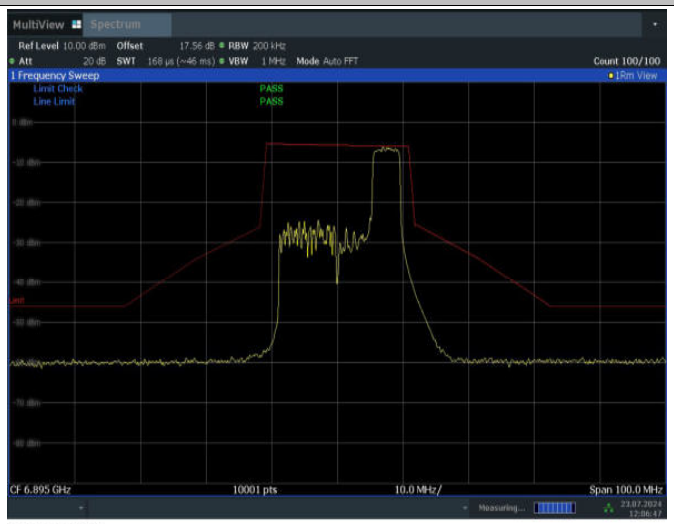
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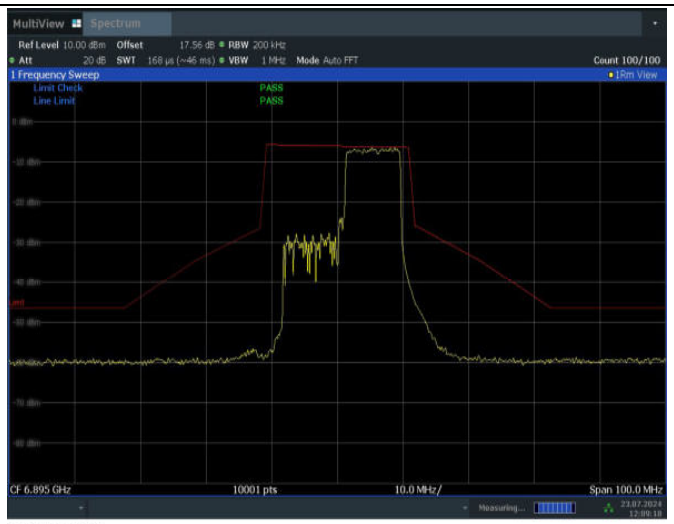

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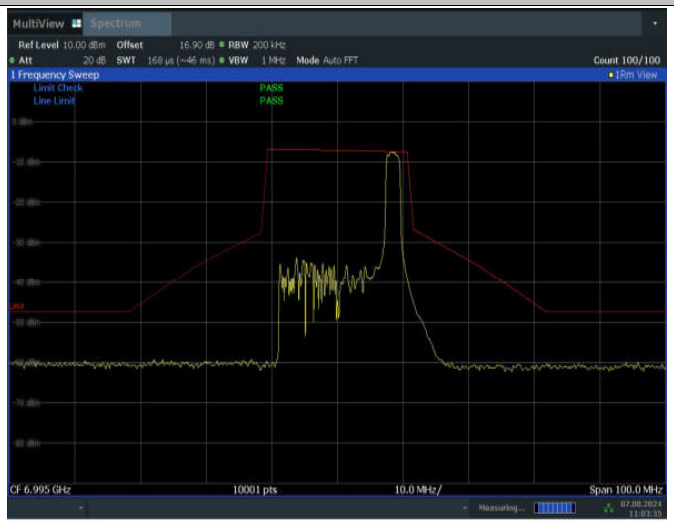

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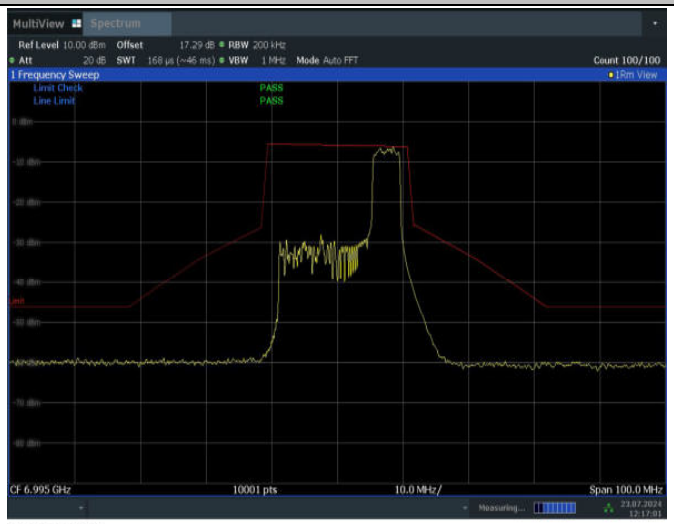

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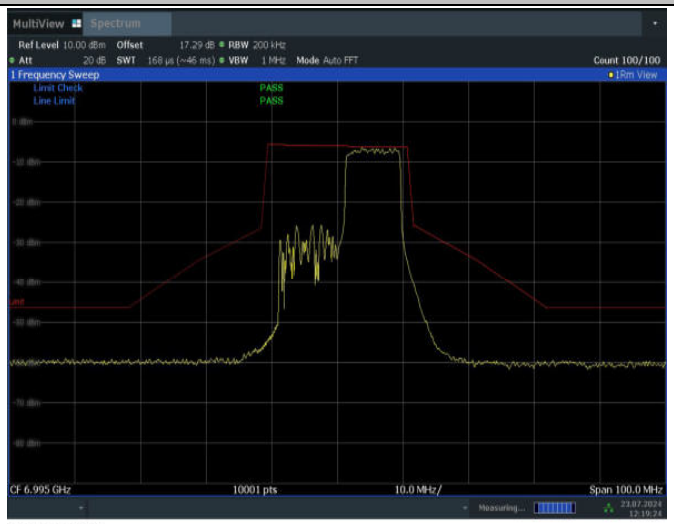
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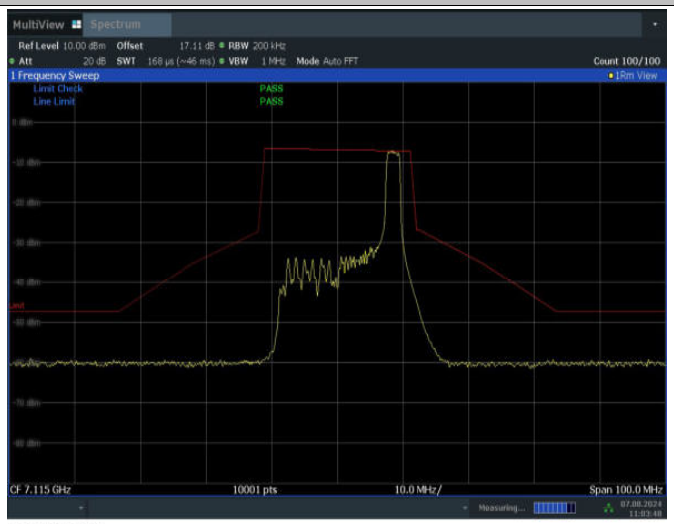
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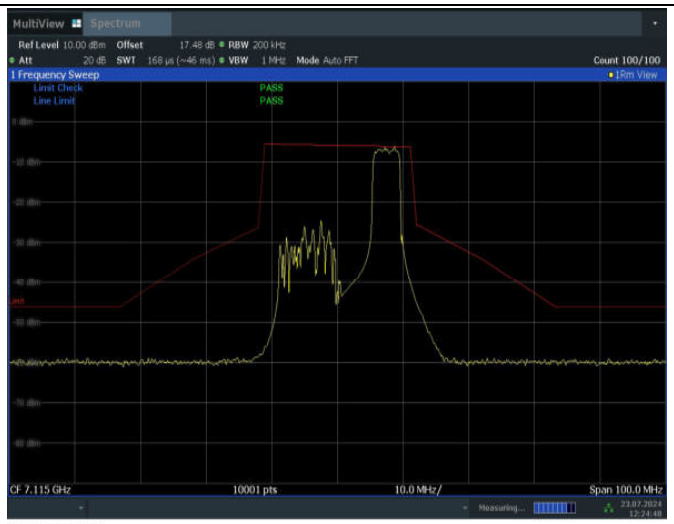

12:24:48 23.07.2024

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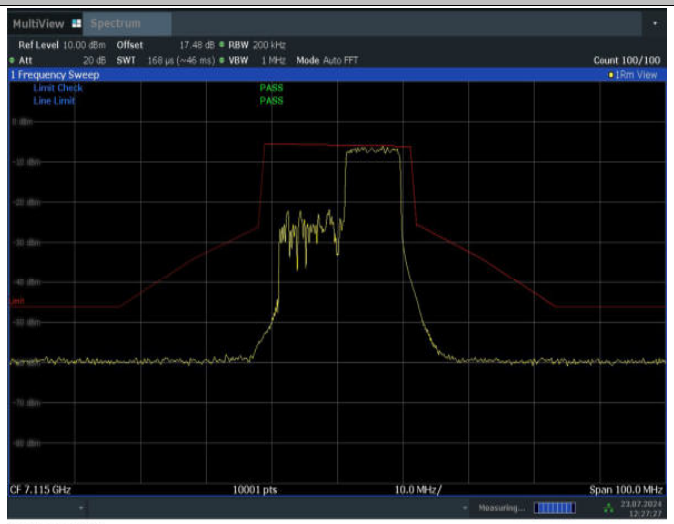


12:27:28 23.07.2024

A.8. Radiated Unwanted Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407	-27 dBm/MHz

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

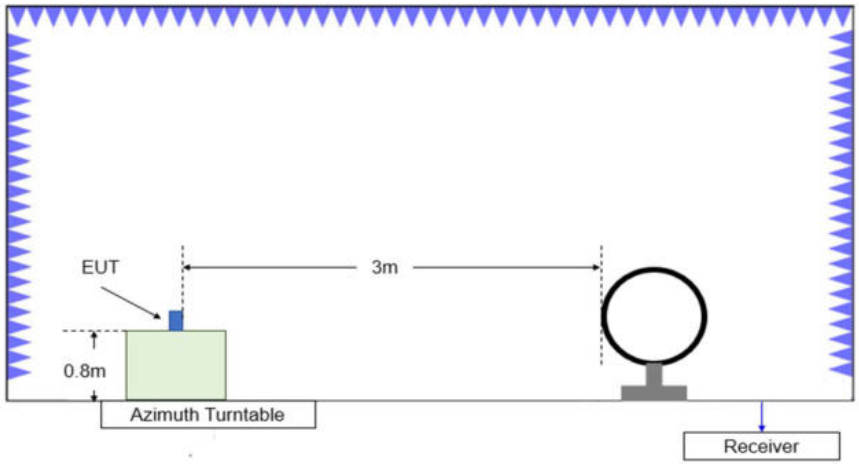
Limit in restricted band:

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)	Measurement distance(m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

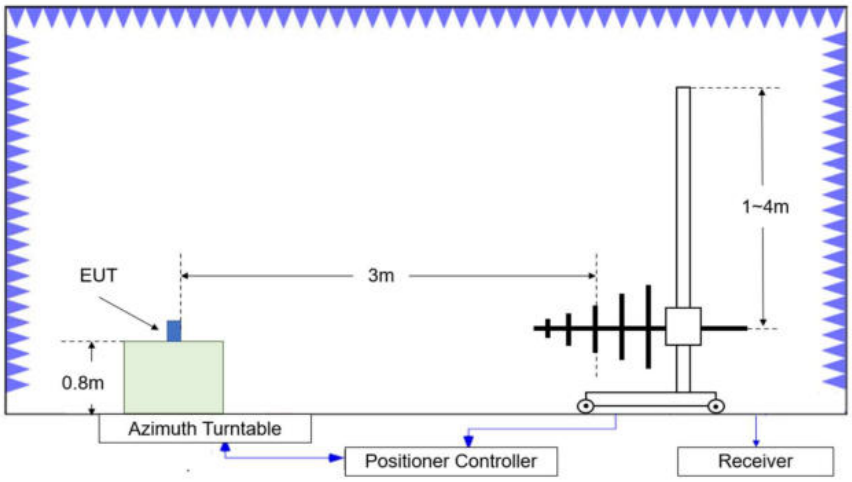
Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Note: When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor.

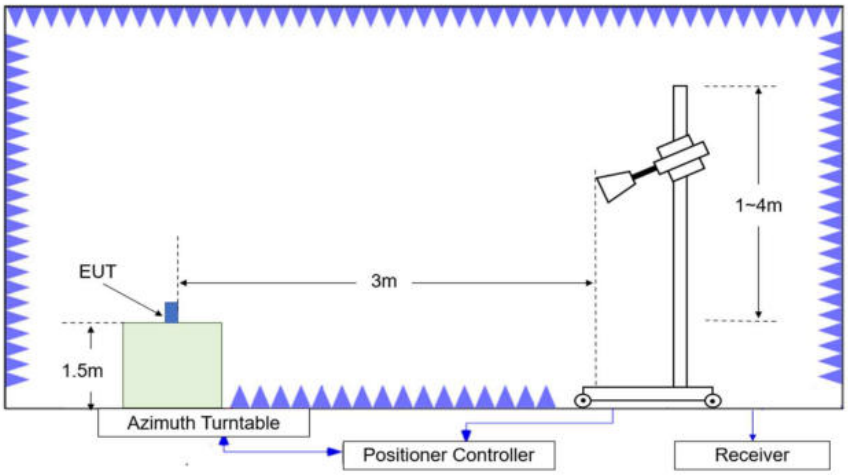
Test setup



Test Site Diagram (9kHz-30MHz)



Test Site Diagram (30MHz-1GHz)



Test Site Diagram (1GHz-40GHz)

Test Procedures

Radiated unwanted emissions from the EUT were measured according to ANSI C63.10.

Test setting

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100kHz/300kHz	5
1000-3000	1MHz/3MHz	15
3000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Sample Calculation

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result=P_{Mea}+$A_{Rpl=}$ P_{Mea}+Cable Loss+Antenna Factor

Test note

1. The EUT is operating at its maximum duty cycle and its maximum power control level.
2. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
3. Spurious emissions for all channels were investigated and almost the same below 1GHz. According to FCC 47 CFR §15.31, emission levels are not report much lower than the limit by over 20dB
4. Measurement frequencies were performed from 9 kHz to the 10th harmonic of highest fundamental frequency or 40GHz, whichever is lower.
5. Both full RU and partial RU spurious emission was tested. And the results are basically noises with no suspicious emission. In this case, the measurement results of full RU were reported and represented worst cases.
6. The low/mid/high channels of all working mode with different bandwidths were all tested, only the worst ones were reported.

Measurement Results:

AVERAGE Results:

802.11ax-20M

Channel 1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17941.050	40.08	-29.55	42.40	27.23	54.00	13.92	V
17977.950	39.98	-29.55	42.40	27.13	54.00	14.02	V
14497.200	34.85	-30.35	40.00	25.20	54.00	19.15	H
14488.200	34.66	-30.35	40.00	25.01	54.00	19.34	V
5910.098	40.66	-27.15	35.00	32.81	68.20	27.54	V
5901.740	40.60	-27.15	35.00	32.75	68.20	27.60	V

Channel 105

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17956.800	39.80	-29.55	42.40	26.95	54.00	14.20	V
17957.250	39.76	-29.55	42.40	26.91	54.00	14.24	V
14494.500	34.65	-30.35	40.00	25.00	54.00	19.35	V
14495.850	34.64	-30.35	40.00	24.99	54.00	19.36	V
11862.000	33.83	-32.13	38.85	27.11	54.00	20.17	H
12694.950	33.79	-31.50	39.40	25.89	54.00	20.21	H

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17967.150	40.20	-29.55	42.40	27.35	54.00	13.80	V
17960.850	40.00	-29.55	42.40	27.15	54.00	14.00	V
14497.650	34.76	-30.35	40.00	25.11	54.00	19.24	H
14498.100	34.63	-30.35	40.00	24.98	54.00	19.37	H
12675.600	33.68	-31.50	39.40	25.78	54.00	20.32	V
12699.900	33.65	-31.50	39.40	25.75	54.00	20.35	V

Channel 233

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17960.850	39.98	-29.55	42.40	27.13	54.00	14.02	H
17961.300	39.92	-29.55	42.40	27.07	54.00	14.08	H
14496.300	34.79	-30.35	40.00	25.14	54.00	19.21	V
14482.350	34.76	-30.35	40.00	25.11	54.00	19.24	H
7125.060	56.84	-25.93	37.10	45.67	68.20	11.36	V
7125.291	53.93	-25.93	37.10	42.76	68.20	14.27	V

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Channel 3

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17949.150	40.05	-29.55	42.40	27.20	54.00	13.95	V
17959.050	39.97	-29.55	42.40	27.12	54.00	14.03	V
14479.200	34.54	-30.35	40.00	24.89	54.00	19.46	H
14483.700	34.53	-30.35	40.00	24.88	54.00	19.47	H
5924.434	38.94	-27.15	35.00	31.09	68.20	29.26	V
5924.770	38.63	-27.15	35.00	30.78	68.20	29.57	V

Channel 107

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17984.250	40.08	-29.55	42.40	27.23	54.00	13.92	H
17989.650	40.03	-29.55	42.40	27.18	54.00	13.97	V
14499.450	34.80	-30.35	40.00	25.15	54.00	19.20	H
14480.550	34.69	-30.35	40.00	25.04	54.00	19.31	H
12696.300	33.93	-31.50	39.40	26.03	54.00	20.07	V
11860.650	33.67	-32.13	38.85	26.95	54.00	20.33	H

Channel 155

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17971.200	40.11	-29.55	42.40	27.26	54.00	13.89	V
17982.000	40.04	-29.55	42.40	27.19	54.00	13.96	V
14499.900	34.81	-30.35	40.00	25.16	54.00	19.19	H
14476.500	34.60	-30.35	40.00	24.95	54.00	19.40	H
11860.650	33.78	-32.13	38.85	27.06	54.00	20.22	H
12594.600	33.72	-31.43	39.20	25.95	54.00	20.28	V

Channel 227

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17992.800	40.07	-29.55	42.40	27.22	54.00	13.93	V
17966.700	39.99	-29.55	42.40	27.14	54.00	14.01	V
14488.650	34.84	-30.35	40.00	25.19	54.00	19.16	V
14481.450	34.79	-30.35	40.00	25.14	54.00	19.21	H
7129.152	44.98	-26.05	37.30	33.73	68.20	23.22	V
7128.459	44.94	-25.93	37.10	33.77	68.20	23.26	V

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Channel 7

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17958.150	40.04	-29.55	42.40	27.19	54.00	13.96	V
17973.900	40.00	-29.55	42.40	27.15	54.00	14.00	V
14498.550	34.86	-30.35	40.00	25.21	54.00	19.14	V
14498.100	34.85	-30.35	40.00	25.20	54.00	19.15	V
5924.602	49.21	-27.15	35.00	41.36	68.20	18.99	V
5924.280	48.56	-27.15	35.00	40.71	68.20	19.64	V

Channel 103

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17996.400	40.41	-29.55	42.40	27.56	54.00	13.59	H
17968.050	40.05	-29.55	42.40	27.20	54.00	13.95	V
14482.800	34.86	-30.35	40.00	25.21	54.00	19.14	H
14499.900	34.74	-30.35	40.00	25.09	54.00	19.26	V
11881.350	33.96	-32.63	38.80	27.79	54.00	20.04	V
11888.550	33.82	-32.63	38.80	27.65	54.00	20.18	H

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17973.900	40.05	-29.55	42.40	27.20	54.00	13.95	V
17961.750	40.03	-29.55	42.40	27.18	54.00	13.97	H
13257.900	34.84	-31.65	40.25	26.24	54.00	19.16	V
14493.600	34.81	-30.35	40.00	25.16	54.00	19.19	H
12697.200	33.99	-31.50	39.40	26.09	54.00	20.01	V
11850.300	33.83	-32.13	38.85	27.11	54.00	20.17	V

Channel 215

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17981.100	40.19	-29.55	42.40	27.34	54.00	13.81	H
17962.650	40.08	-29.55	42.40	27.23	54.00	13.92	H
14475.150	34.84	-30.35	40.00	25.19	54.00	19.16	V
13291.650	34.80	-31.62	40.30	26.12	54.00	19.20	V
7225.776	44.26	-25.94	37.40	32.80	68.20	23.94	H
7225.809	44.24	-25.94	37.40	32.78	68.20	23.96	V

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Channel 15

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17941.950	40.55	-29.55	42.40	27.70	54.00	13.45	V
17971.200	40.02	-29.55	42.40	27.17	54.00	13.98	V
14491.800	34.93	-30.35	40.00	25.28	54.00	19.07	V
13334.850	34.77	-31.26	40.40	25.63	54.00	19.23	V
5921.326	48.00	-27.15	35.00	40.15	68.20	20.20	V
5900.844	47.81	-27.15	35.00	39.96	68.20	20.39	V

Channel 207

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17961.300	40.41	-29.55	42.40	27.56	54.00	13.59	V
17969.850	40.10	-29.55	42.40	27.25	54.00	13.90	V
13302.000	34.87	-31.62	40.30	26.19	54.00	19.13	V
14495.850	34.77	-30.35	40.00	25.12	54.00	19.23	V
7142.781	47.08	-26.05	37.30	35.83	68.20	21.12	V
7133.607	46.46	-26.05	37.30	35.21	68.20	21.74	V

PEAK Results:

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Channel 1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17560.800	51.30	-29.62	42.20	38.72	88.20	36.90	H
17620.200	51.23	-29.77	42.25	38.75	88.20	36.97	V
13547.250	47.54	-31.46	40.55	38.45	88.20	40.66	V
13770.450	47.52	-31.06	40.90	37.68	88.20	40.68	V
5919.926	51.99	-27.15	35.00	44.14	88.20	36.21	H
5901.012	51.59	-27.15	35.00	43.74	88.20	36.61	V

Channel 105

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17582.400	51.57	-29.77	42.25	39.09	88.20	36.63	H
17986.500	50.91	-29.55	42.40	38.06	74.00	23.09	V
13920.750	47.88	-31.02	40.80	38.10	88.20	40.32	H
13732.200	47.65	-31.33	40.80	38.18	88.20	40.55	H
12516.300	45.00	-31.21	39.00	37.21	74.00	29.00	V
13065.750	44.88	-30.95	39.90	35.93	88.20	43.32	V

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17944.650	50.99	-29.55	42.40	38.14	74.00	23.01	V
17984.700	50.99	-29.55	42.40	38.14	74.00	23.01	V
13639.950	48.05	-31.48	40.65	38.88	88.20	40.15	V
13672.800	47.77	-31.08	40.70	38.15	88.20	40.43	V
12655.800	45.02	-31.89	39.30	37.61	74.00	28.98	V
12608.100	44.84	-31.43	39.20	37.07	74.00	29.16	H

Channel 233

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17377.200	50.74	-29.51	42.10	38.15	88.20	37.46	H
17505.450	50.73	-29.14	42.15	37.72	88.20	37.47	V
13738.050	47.97	-31.33	40.80	38.50	88.20	40.23	H
13768.200	47.87	-31.06	40.90	38.03	88.20	40.33	H
7125.060	68.17	-25.93	37.10	57.00	88.20	20.03	V
7125.588	66.44	-25.93	37.10	55.27	88.20	21.76	V

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Channel 3

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17962.200	51.87	-29.55	42.40	39.02	74.00	22.13	V
17994.150	51.02	-29.55	42.40	38.17	74.00	22.98	V
13745.700	47.58	-31.33	40.80	38.11	88.20	40.62	H
14085.000	47.35	-30.70	40.50	37.55	88.20	40.85	V
5923.202	44.66	-27.15	35.00	36.81	88.20	43.54	V
5924.770	44.66	-27.15	35.00	36.81	88.20	43.54	V

Channel 107

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17649.450	51.51	-29.80	42.30	39.01	88.20	36.69	H
17991.450	51.38	-29.55	42.40	38.53	74.00	22.62	H
13691.250	48.16	-31.08	40.70	38.54	88.20	40.04	V
13612.050	47.66	-31.29	40.60	38.35	88.20	40.54	V
12737.700	45.77	-31.94	39.50	38.21	88.20	42.43	V
12654.450	45.29	-31.89	39.30	37.88	74.00	28.71	V

Channel 155

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17963.550	51.04	-29.55	42.40	38.19	74.00	22.96	H
17996.400	50.87	-29.55	42.40	38.02	74.00	23.13	V
13771.800	48.10	-31.06	40.90	38.26	88.20	40.10	H
13580.550	47.82	-31.29	40.60	38.51	88.20	40.38	H
12688.200	45.10	-31.50	39.40	37.20	74.00	28.90	V
12804.300	44.91	-31.36	39.60	36.67	88.20	43.29	V

Channel 227

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17970.300	50.90	-29.55	42.40	38.05	74.00	23.10	V
17491.500	50.84	-29.14	42.15	37.83	88.20	37.36	H
13728.600	47.73	-31.33	40.80	38.26	88.20	40.47	V
13710.150	47.50	-31.08	40.70	37.88	88.20	40.70	V
7126.347	57.59	-25.93	37.10	46.42	88.20	30.61	V
7179.708	56.37	-25.94	37.40	44.91	88.20	31.83	V

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Channel 7

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17963.100	51.08	-29.55	42.40	38.23	74.00	22.92	H
17973.000	51.08	-29.55	42.40	38.23	74.00	22.92	V
14167.800	47.99	-30.97	40.40	38.56	88.20	40.21	V
14105.250	47.90	-30.70	40.50	38.10	88.20	40.30	H
5924.770	59.33	-27.15	35.00	51.48	88.20	28.87	V
5918.036	58.82	-27.15	35.00	50.97	88.20	29.38	V

Channel 103

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17995.950	51.63	-29.55	42.40	38.78	74.00	22.37	V
17498.700	50.82	-29.14	42.15	37.81	88.20	37.38	V
13703.850	48.34	-31.08	40.70	38.72	88.20	39.86	H
13783.950	47.89	-31.06	40.90	38.05	88.20	40.31	V
11849.850	45.02	-32.13	38.85	38.30	74.00	28.98	H
12174.300	45.00	-32.14	38.65	38.49	74.00	29.00	V

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17980.650	51.11	-29.55	42.40	38.26	74.00	22.89	H
17615.250	50.70	-29.77	42.25	38.22	88.20	37.50	V
13626.900	47.98	-31.48	40.65	38.81	88.20	40.22	V
13794.300	47.86	-31.06	40.90	38.02	88.20	40.34	V
12721.950	45.62	-31.50	39.40	37.72	88.20	42.58	H
12796.650	45.33	-31.36	39.60	37.09	88.20	42.87	V

Channel 215

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17985.150	51.13	-29.55	42.40	38.28	74.00	22.87	V
17658.450	50.95	-29.80	42.30	38.45	88.20	37.25	H
13734.000	47.60	-31.33	40.80	38.13	88.20	40.60	H
14091.750	47.55	-30.70	40.50	37.75	88.20	40.65	V
7151.658	56.20	-26.05	37.30	44.95	88.20	32.00	H
7225.479	55.76	-25.94	37.40	44.30	88.20	32.44	V

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Channel 15

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17965.800	51.41	-29.55	42.40	38.56	74.00	22.59	V
17618.850	51.39	-29.77	42.25	38.91	88.20	36.81	V
14175.900	48.10	-30.97	40.40	38.67	88.20	40.10	V
13623.300	48.00	-31.48	40.65	38.83	88.20	40.20	V
5921.326	62.41	-27.15	35.00	54.56	88.20	25.79	V
5921.130	62.10	-27.15	35.00	54.25	88.20	26.10	V

Channel 207

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17935.650	52.02	-29.55	42.40	39.17	74.00	21.98	H
17637.750	51.08	-29.80	42.30	38.58	88.20	37.12	V
13746.150	48.39	-31.33	40.80	38.92	88.20	39.81	V
13617.000	47.64	-31.48	40.65	38.47	88.20	40.56	H
7132.155	60.13	-26.05	37.30	48.88	88.20	28.07	V
7133.706	60.05	-26.05	37.30	48.80	88.20	28.15	V

Conclusion: PASS

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result=P_{Mea}+$A_{Rpl=}$ P_{Mea}+Cable Loss+Antenna Factor

Note: The measurement results showed here are worst cases

A.9. Band Edges Compliance

A9.1 Band Edges - Radiated

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407	-27 dBm/MHz

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)	Measurement distance(m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

The measurement is made according to ANSI C63.10-2013 and KDB 789033

Measurement Result for full RU:

Mode	Channel	Test Results	Conclusion
802.11ax 20M	CH1	Fig.1	P
	CH233	Fig.2	P
802.11ax 40M	CH3	Fig.3	P
	CH227	Fig.4	P
802.11ax 80M	CH7	Fig.5	P
	CH215	Fig.6	P
802.11ax 160M	CH15	Fig.7	P
	CH207	Fig.8	P

Measurement Result for Partial RU:

Mode	Channel	RU size and index	Test Results	Conclusion
802.11ax 20M	CH1	26RU-index0	Fig.9	P
	CH233	6RU-index8	Fig.10	P
802.11ax 40M	CH3	26RU-index0	Fig.11	P
	CH227	26RU-index17	Fig.12	P
802.11ax 80M	CH7	26RU-index0	Fig.13	P
	CH215	26RU-index36	Fig.14	P
802.11ax 160M	CH15	26RU-index0	Fig.15	P
	CH207	26RU-index72	Fig.16	P

Note1: All partial RU and full RU have been tested, in spurious domain there are basically noises with suspicious emission, thus only the full RU results were reported.

Conclusion: PASS

Test graphs as below:

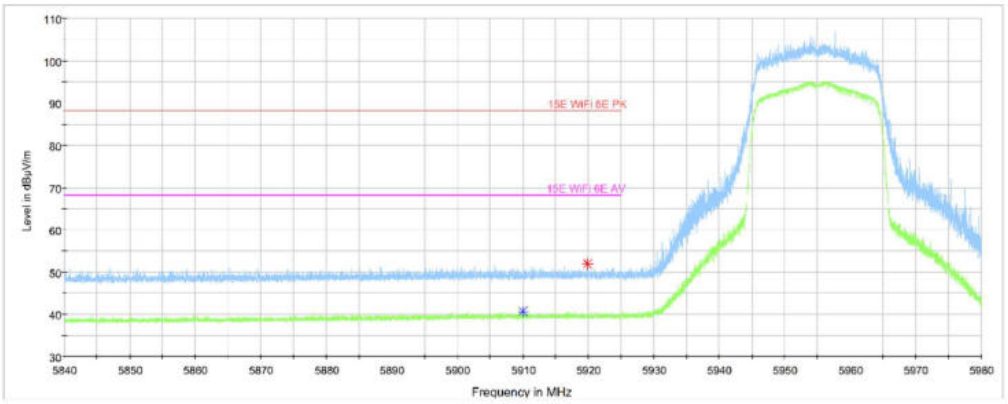

Fig.1 Band Edges (802.11ax 20M Ch1 full RU)

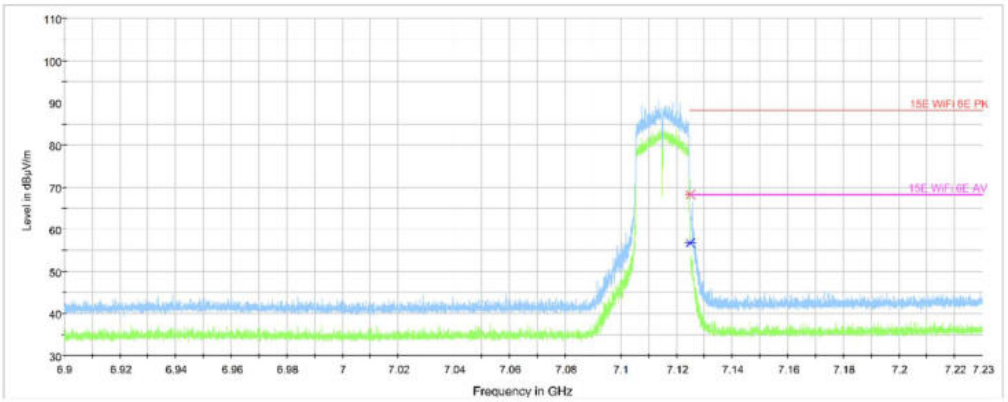

Fig.2 Band Edges (802.11ax 20M Ch233 full RU)

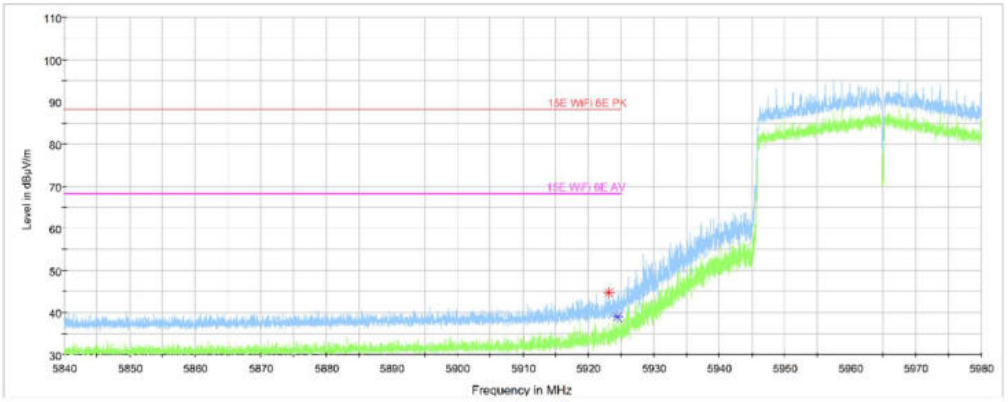

Fig.3 Band Edges (802.11ax 40M Ch3 full RU)

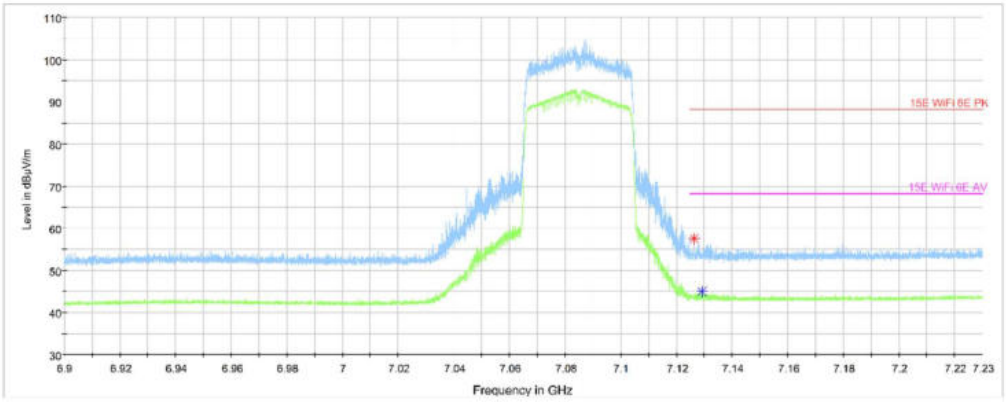

Fig.4 Band Edges (802.11ax 40M Ch227 full RU)

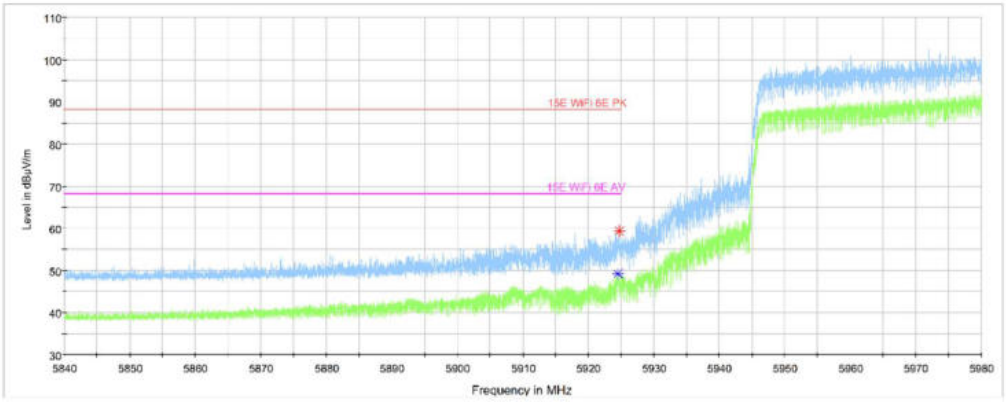

Fig.5 Band Edges (802.11ax 80M Ch7 full RU)

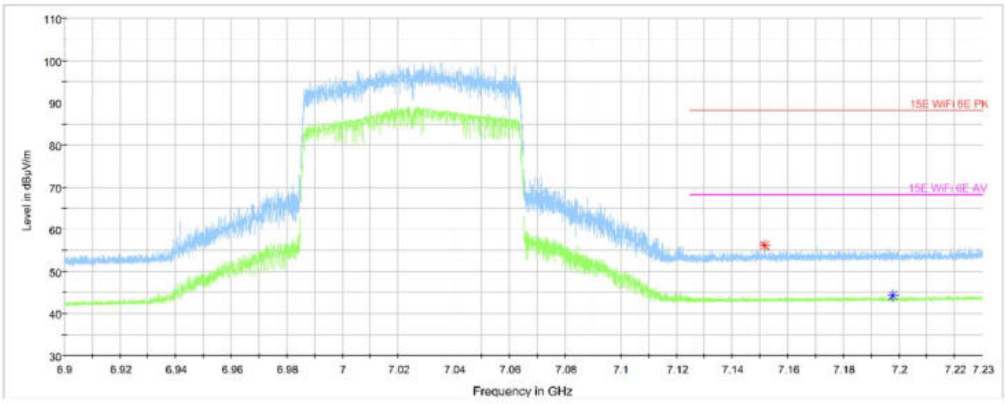

Fig.6 Band Edges (802.11ax 80M Ch215 full RU)

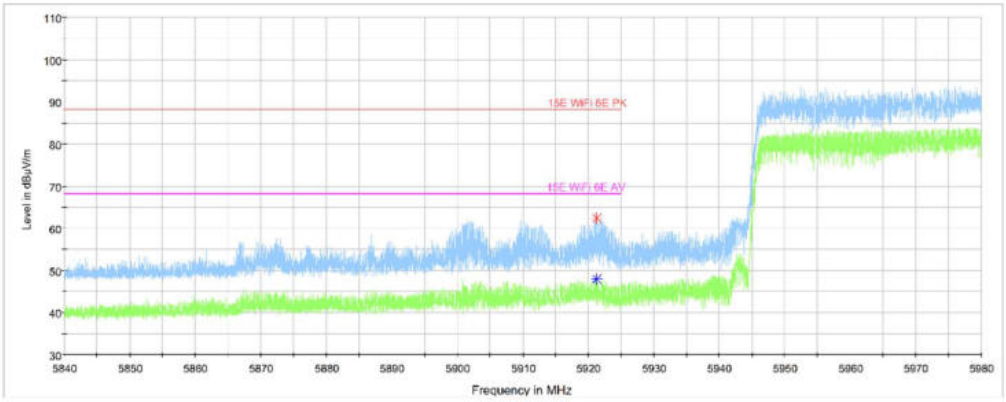

Fig.7 Band Edges (802.11ax 160M Ch15 full RU)

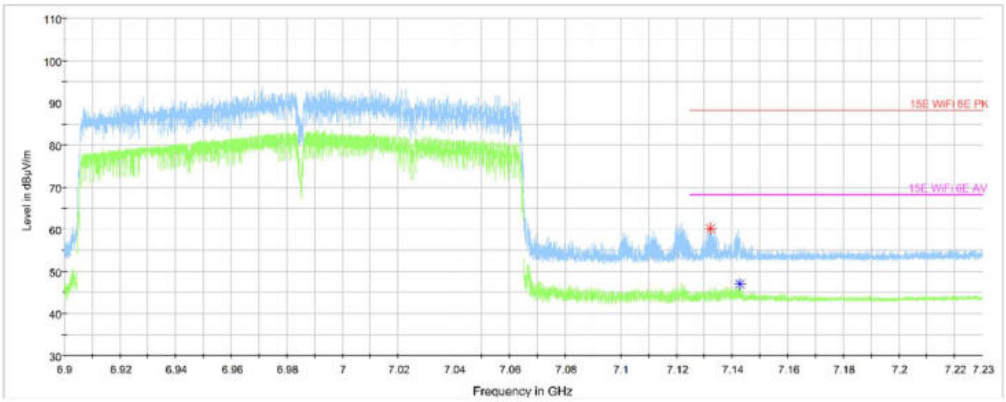

Fig.8 Band Edges (802.11ax 160M Ch207 full RU)

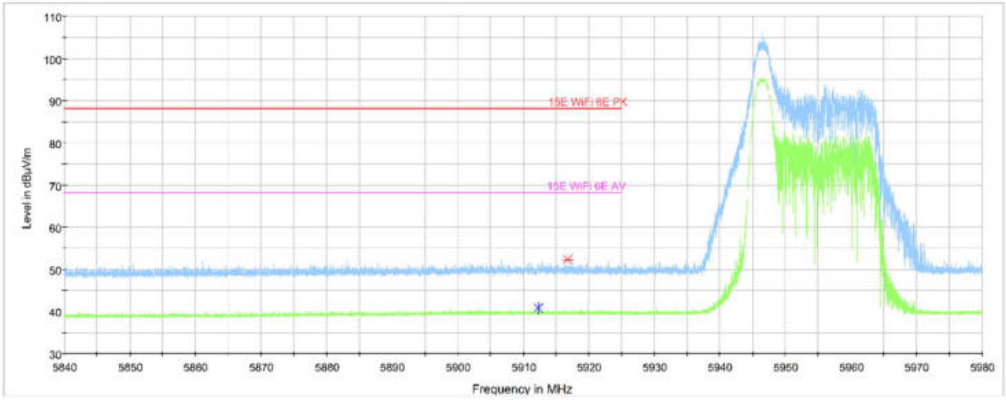

Fig.9 Band Edges (802.11ax 20M Ch1 partial RU)

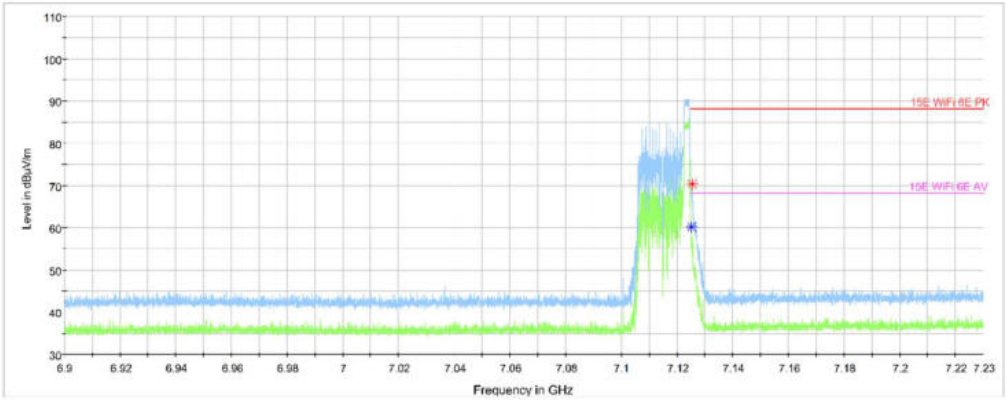

Fig.10 Band Edges (802.11ax 20M Ch233 partial RU)

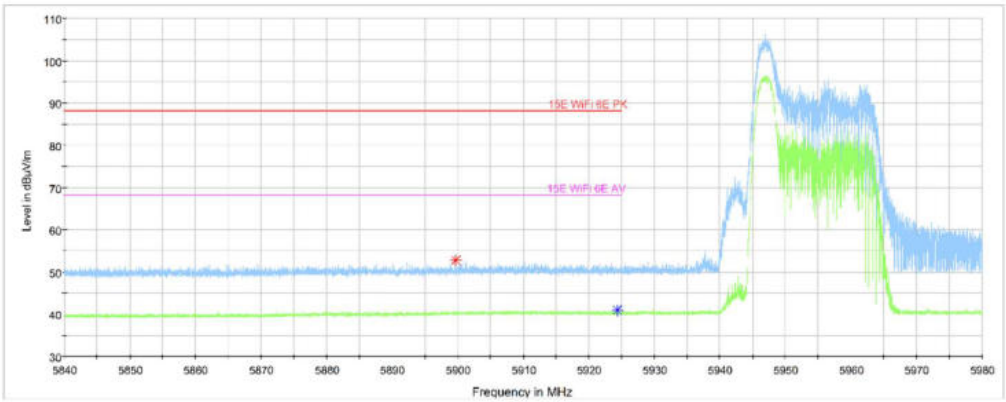

Fig.11 Band Edges (802.11ax 40M Ch3 partial RU)

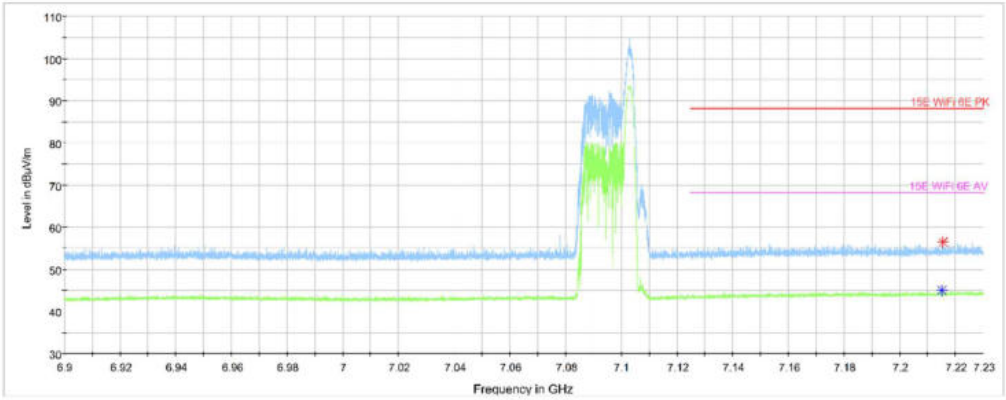

Fig.12 Band Edges (802.11ax 40M Ch227 partial RU)

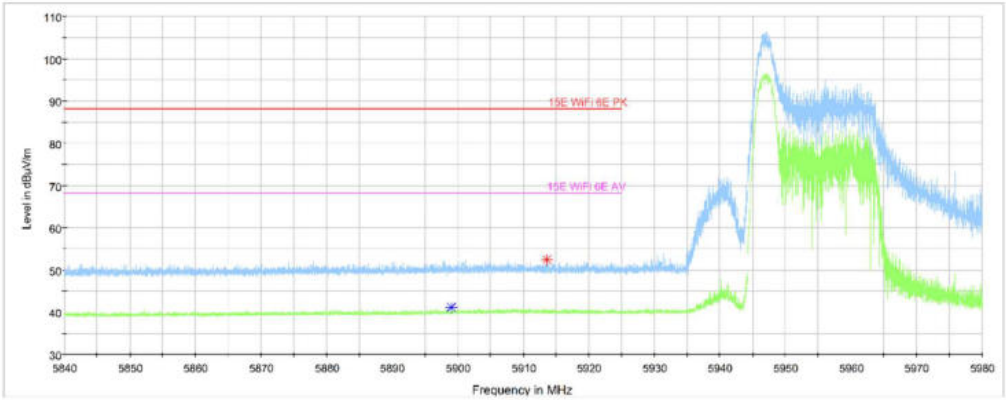

Fig.13 Band Edges (802.11ax 80M Ch7 partial RU)

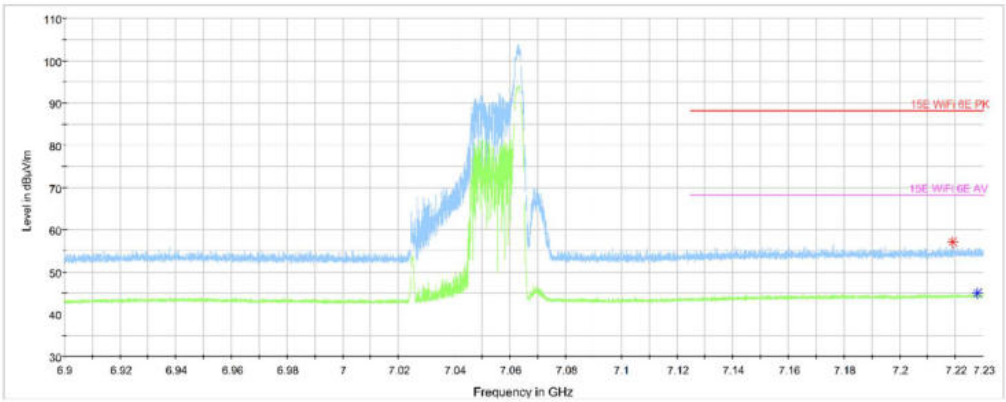

Fig.14 Band Edges (802.11ax 80M Ch215 partial RU)

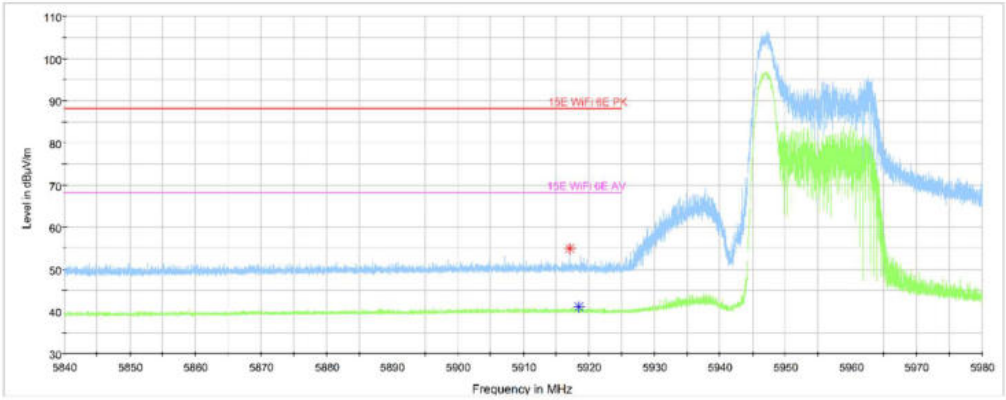

Fig.15 Band Edges (802.11ax 160M Ch15 partial RU)

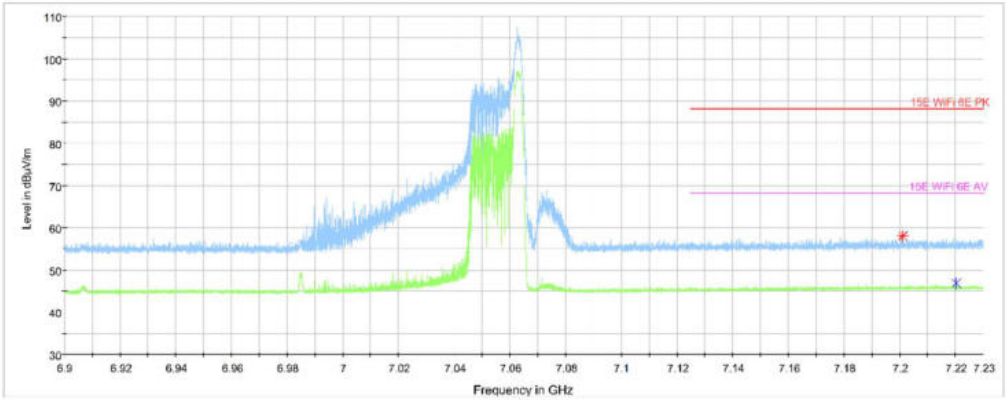

Fig.16 Band Edges (802.11ax 160M Ch207 partial RU)

A.10. AC Powerline Conducted Emission (150kHz- 30MHz)

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement uncertainty:

Expanded measurement uncertainty for this test item is U =3.08dB, k=2.

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11ax	Idle	
0.15 to 0.5	66 to 56	Fig.17	Fig.18	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11ax	Idle	
0.15 to 0.5	67 56 to 46	Fig.17	Fig.18	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: PASS

Test graphs as below:

Traffic:

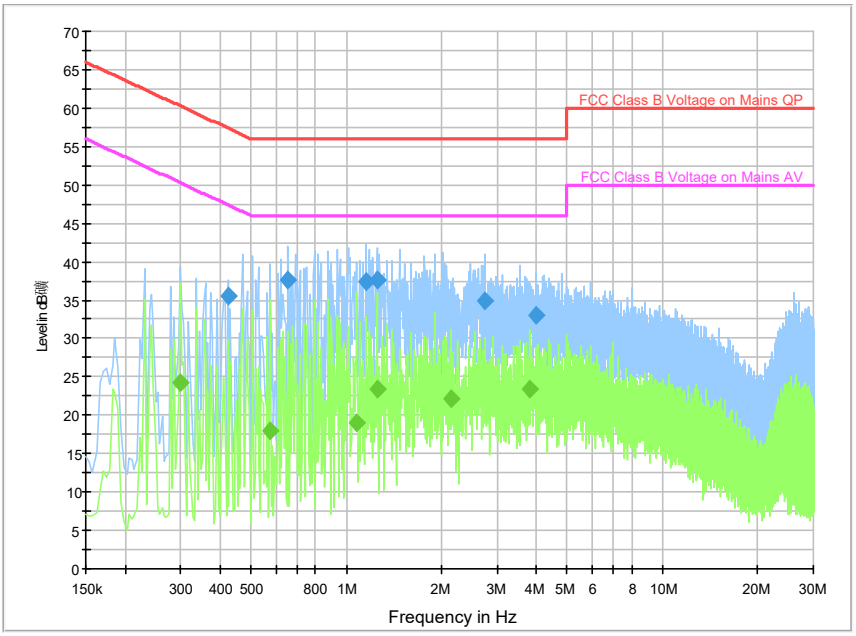

Fig.17 Conducted Emission (802.11ax, Ch1, TX)

Note1: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.422000	35.5	2000.0	9.000	On	L1	20.0	21.9	57.4
0.654000	37.6	2000.0	9.000	On	L1	20.0	18.4	56.0
1.154000	37.4	2000.0	9.000	On	L1	19.9	18.6	56.0
1.250000	37.6	2000.0	9.000	On	L1	19.9	18.4	56.0
2.738000	34.9	2000.0	9.000	On	L1	19.8	21.1	56.0
3.994000	33.0	2000.0	9.000	On	L1	19.8	23.0	56.0

Final Result 2

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.298000	24.1	2000.0	9.000	On	L1	19.9	26.2	50.3
0.574000	18.0	2000.0	9.000	On	L1	20.0	28.0	46.0
1.078000	19.1	2000.0	9.000	On	N	19.7	26.9	46.0
1.250000	23.4	2000.0	9.000	On	L1	19.9	22.6	46.0
2.142000	22.2	2000.0	9.000	On	L1	19.8	23.8	46.0
3.810000	23.3	2000.0	9.000	On	L1	19.8	22.7	46.0

Note2: The measurement results showed here are worst cases of the combinations of different cables and chargers

Idle:

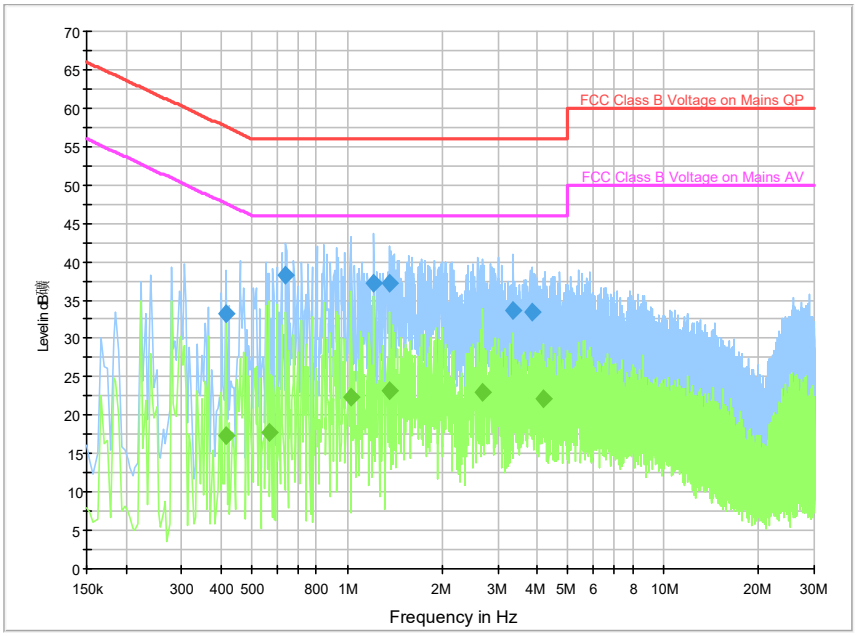

Fig.18 Conducted Emission(802.11ax, CH1 IDLE)

Note1: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.414000	33.3	2000.0	9.000	On	N	19.9	24.3	57.6
0.638000	38.2	2000.0	9.000	On	L1	20.0	17.8	56.0
1.218000	37.1	2000.0	9.000	On	L1	19.9	18.9	56.0
1.358000	37.1	2000.0	9.000	On	L1	19.9	18.9	56.0
3.362000	33.6	2000.0	9.000	On	L1	19.8	22.4	56.0
3.866000	33.4	2000.0	9.000	On	L1	19.8	22.6	56.0

Final Result 2

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.414000	17.3	2000.0	9.000	On	N	19.9	30.3	47.6
0.566000	17.8	2000.0	9.000	On	N	19.9	28.2	46.0
1.026000	22.3	2000.0	9.000	On	L1	19.9	23.7	46.0
1.358000	23.1	2000.0	9.000	On	L1	19.9	22.9	46.0
2.694000	23.0	2000.0	9.000	On	L1	19.8	23.0	46.0
4.158000	22.3	2000.0	9.000	On	L1	19.8	23.8	46.0

Note2: The measurement results showed here are worst cases of the combinations of different cables and chargers

A.11. Antenna Requirement

The antenna of the device is permanently attached. There are no provisions for connection to an external antenna.

The unit complies with the requirement of FCC Part 15.203.

ANNEX B: EUT parameters

Disclaimer: The antenna gain provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX C: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 23rd day of July 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2026

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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