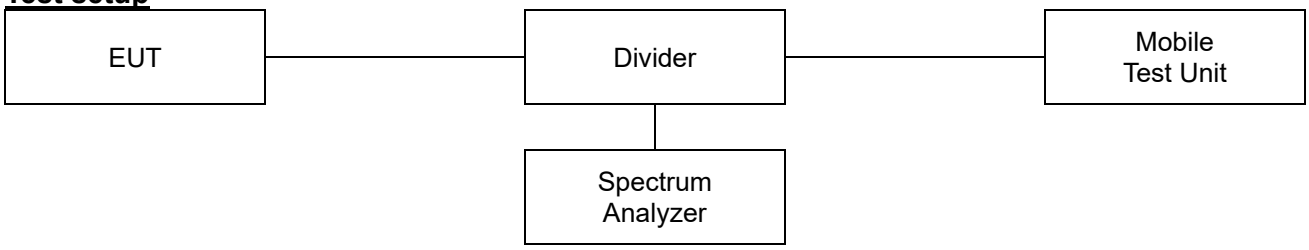
7.3. Band Edge Emissions at Antenna Terminal

Test setup



Limit

According to §27.53(l)(2),

The following emission limits apply to stations transmitting in the 3700-3980 ㎒ band:

(2) For mobile operations in the 3700-3980 ㎒ band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 ㏈m/㎒.

According to §27.53(n)(2),

The following emission limits apply to stations transmitting in the 3450-3550 ㎒ band:

For mobile operations in the 3450-3550 ㎒ band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 ㏈m/㎒.

Test procedure

971168 D01 v03r01 - Section 6

ANSI C63.26-2015 – Section 5.7

Test settings

1) Start and stop frequency were set such that the band edge would be placed in the center of the plot
2) Span was set large enough so as to capture all out of band emissions near the band edge.
3) Set the RBW > 1% of the emission bandwidth.
4) Set the VBW ≥ 3 x RBW.
5) Set the number of sweep points ≥ 2 x Span/RBW
6) Detector = RMS
7) Trace mode = trace average
8) Sweep time should be auto for peak detection. For RMS detection the sweep time should be set as follows:
   a) If the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) x (symbol period) (e.g., by a factor of 10 x symbol period x number of points) Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols.
   b) If the device cannot transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) x (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time
   c) If the device cannot be configured to transmit continuously (duty cycle > 98%), and a free-running sweep must be used, set the sweep time so that the

averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).

d) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%), set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time < (transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold art necessary to ensure that the maximum power is measured.

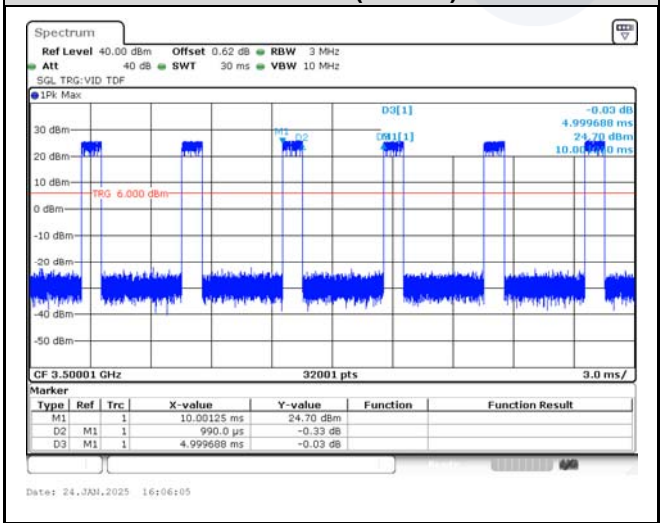
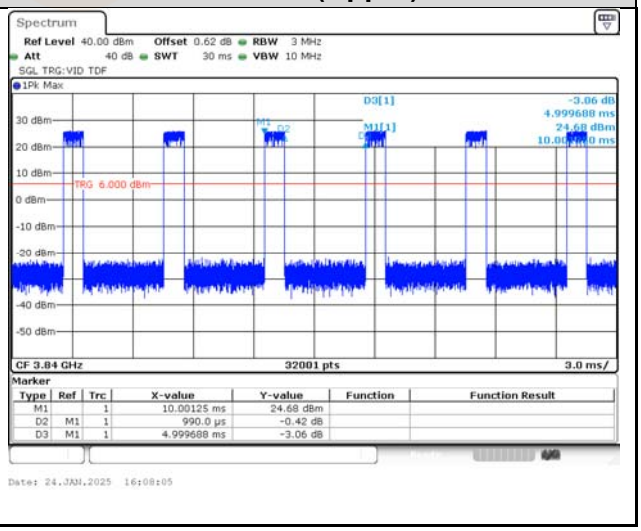
9) Allow trace to fully stabilize.

Notes:

1. Per 27.53(l)(2), Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 ㎑. In the bands between 1 and 5 ㎒ removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 ㎑. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 ㏈ below the transmitter power.
2. Per 27.53(n)(2), Compliance with this paragraph (n)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.
   However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 ㎑. In the bands between 1 and 5 ㎒ removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 ㎑. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 ㏈ below the transmitter power.
3. The EUT was setup to maximum output power as its lowest and highest channel with all bandwidth, modulation and RB configurations.
4. Duty cycle factor

Period (㎳)	On time (㎳)	Duty cycle		Duty Cycle Factor (㏈)
		(Linear)	(%)	
5.00 0	0.990 0	19.80	19.80	7.03
5.00 0	0.990 0	19.80	19.80	7.03

1) Duty cycle (Linear) = Ton time / Period
2) DCF (Duty cycle factor) = 10log(1/duty cycle)
3) Offset(㏈) = RF cable loss(㏈) + Divider(㏈) + Duty Cycle Factor(㏈)

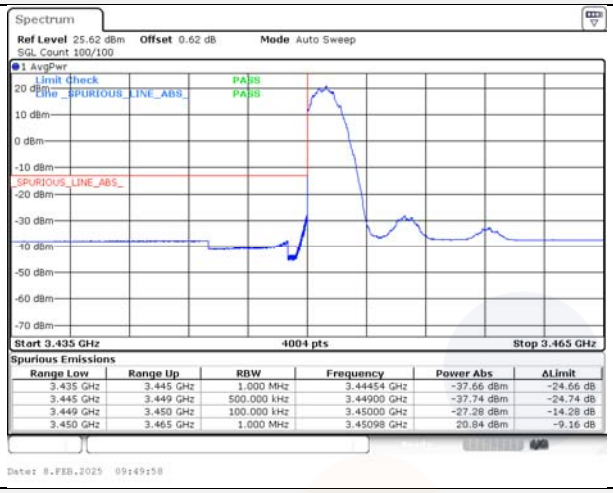
NR n77/78 (Lower)	NR n77 (Upper)
	

Test results

Test mode: 5G NR n77/78 (Lower)(PC2) DFT-s OFDM

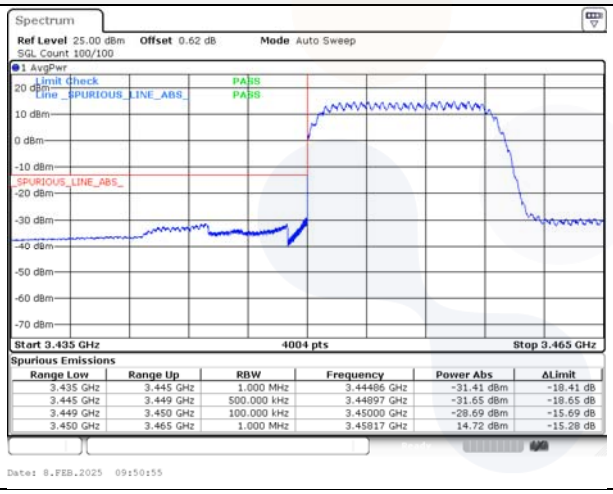
10M BW QPSK

Low channel 1RB



High channel 1RB

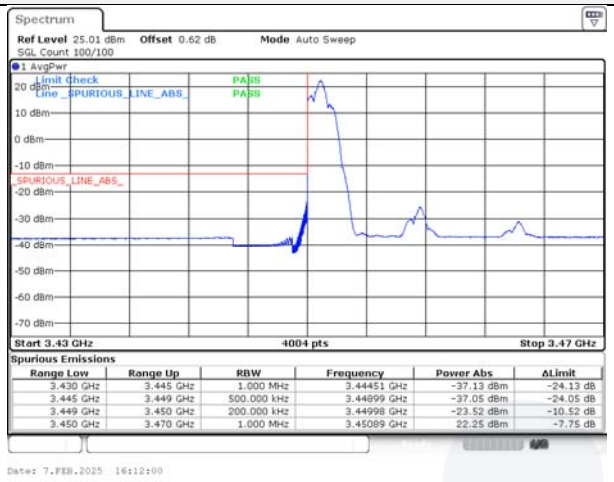
Low channel FRB



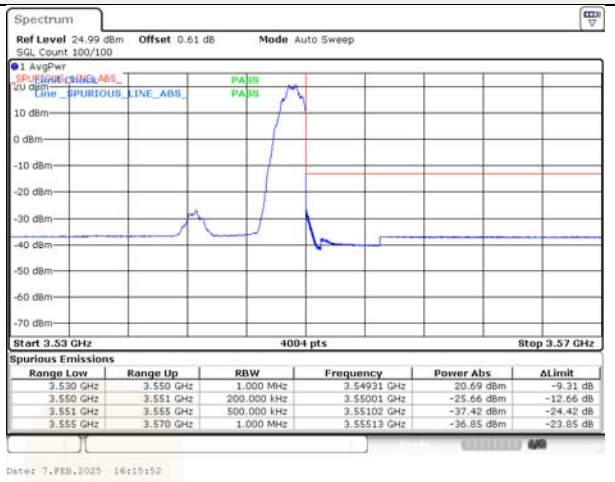
High channel FRB

15M BW QPSK

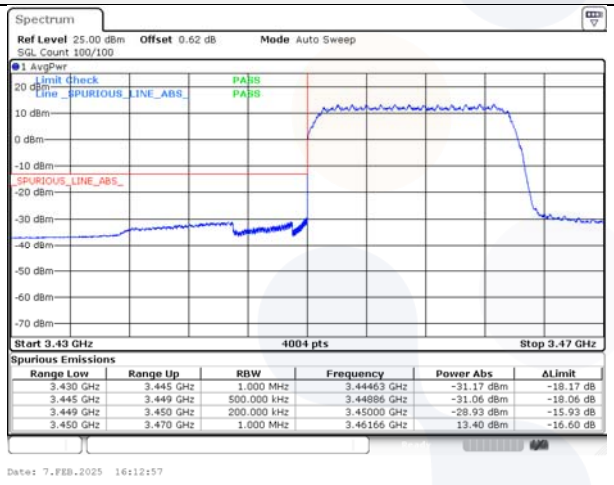
Low channel 1RB



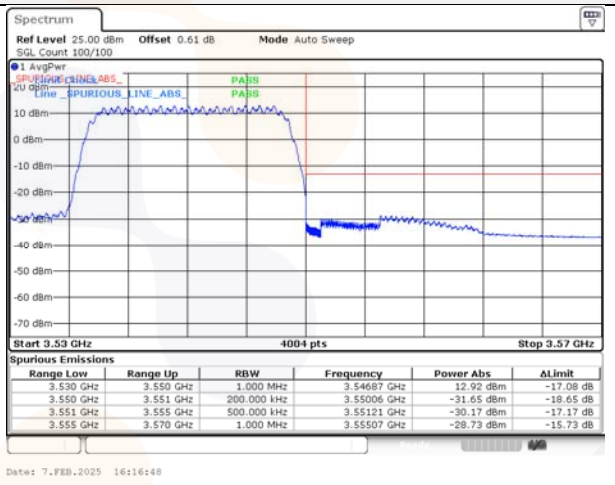
High channel 1RB



Low channel FRB

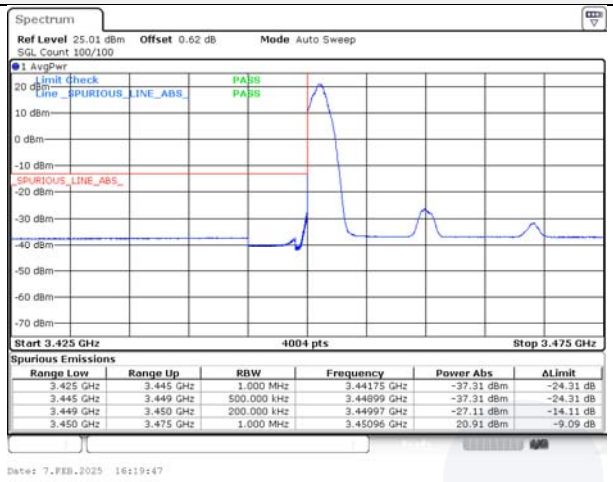


High channel FRB

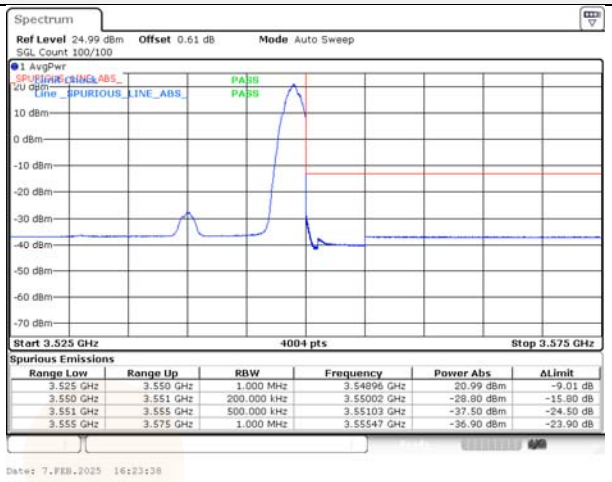


20M BW QPSK

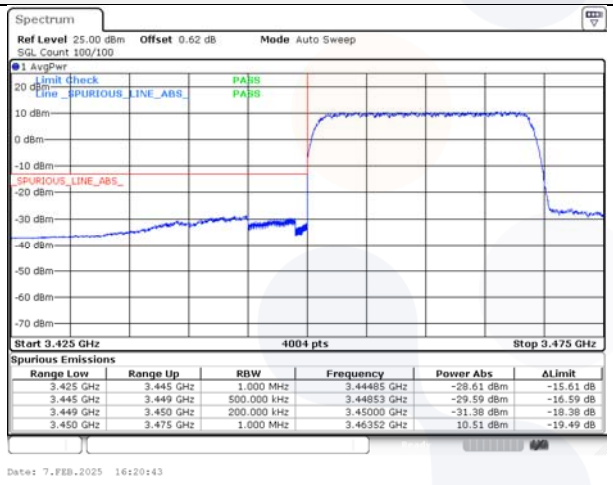
Low channel 1RB



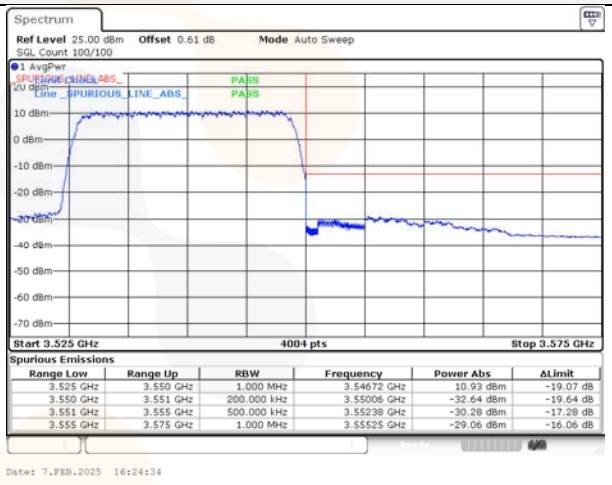
High channel 1RB



Low channel FRB

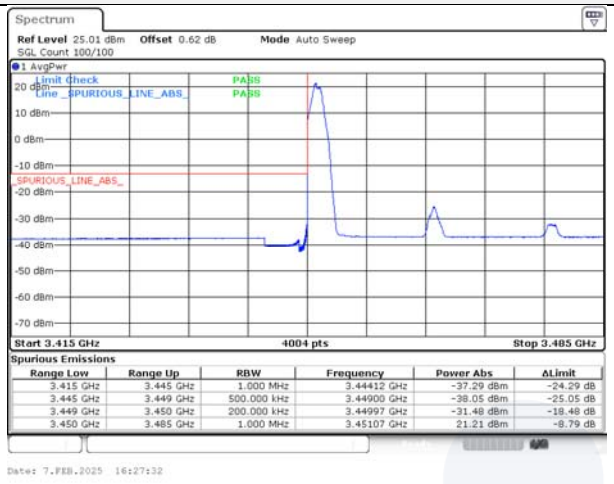


High channel FRB

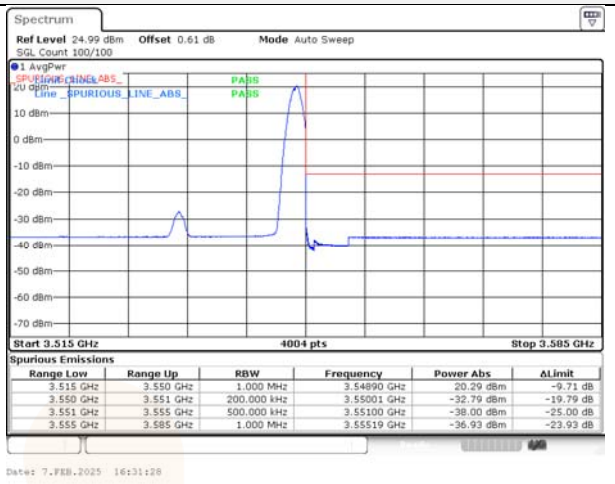


30M BW QPSK

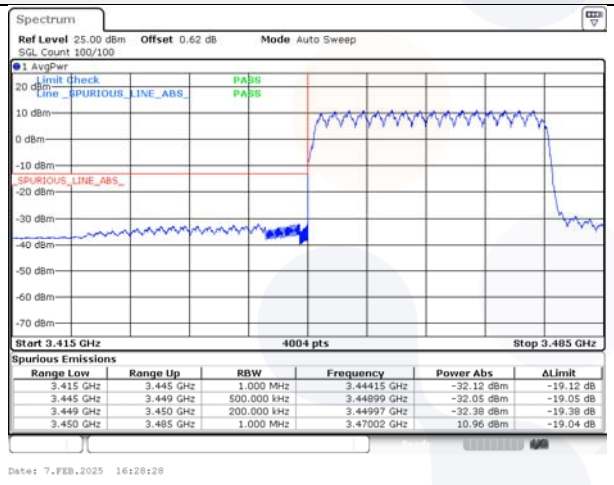
Low channel 1RB



High channel 1RB



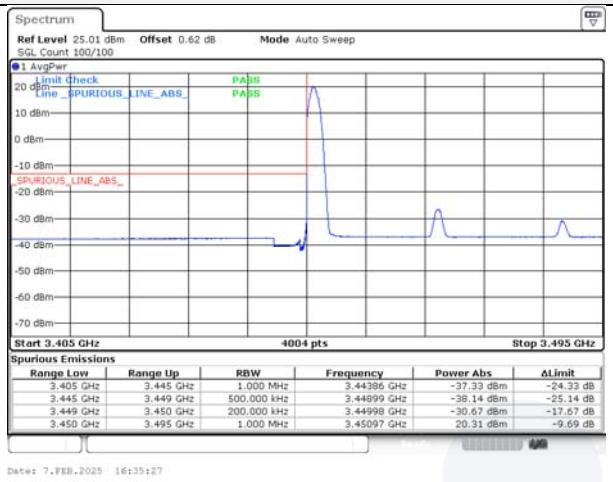
Low channel FRB



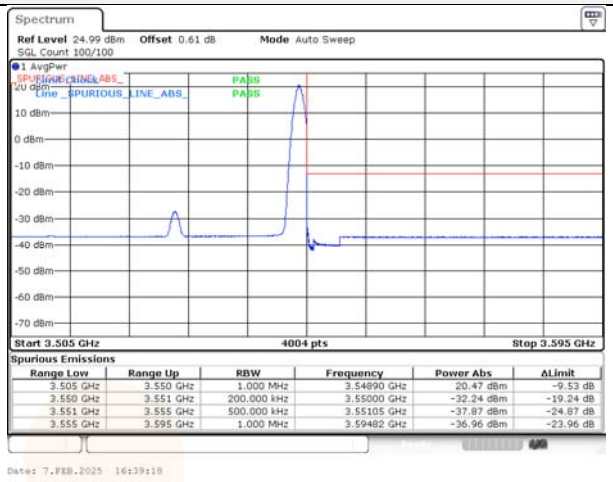
High channel FRB

40M BW QPSK

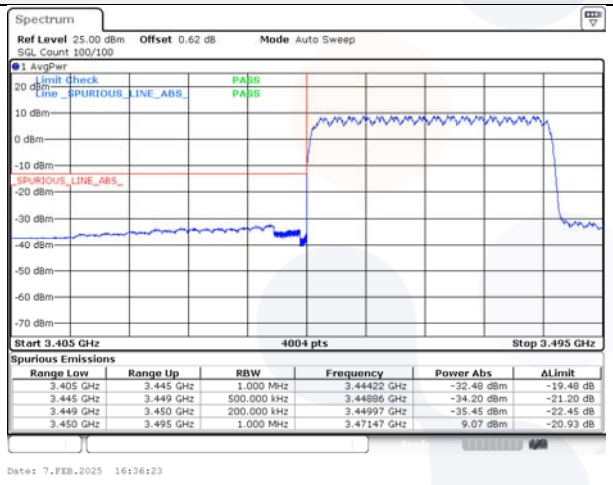
Low channel 1RB



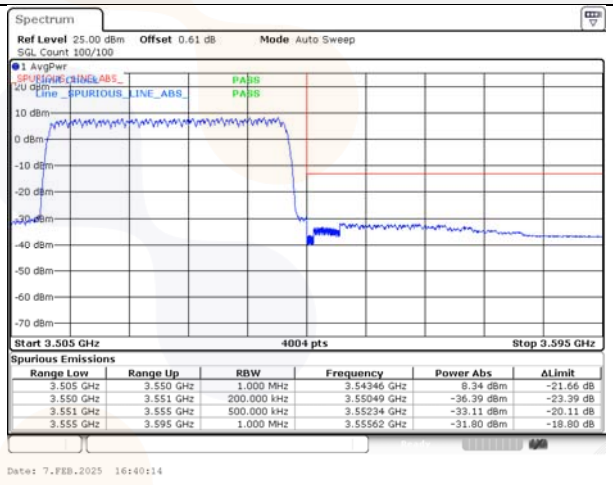
High channel 1RB



Low channel FRB

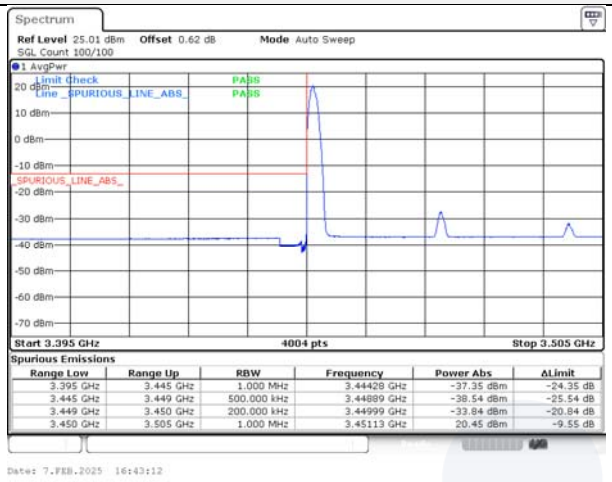


High channel FRB

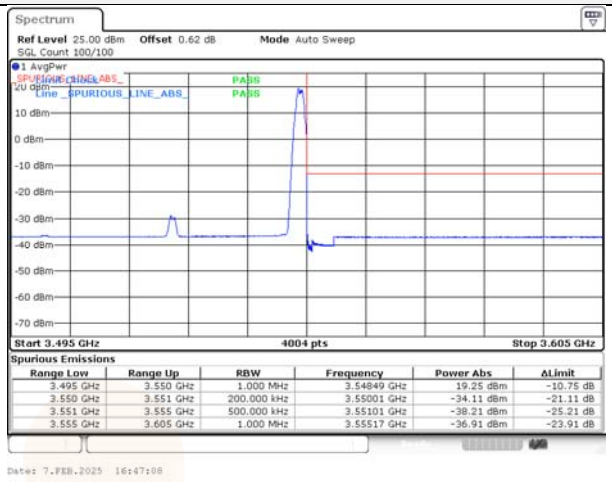


50M BW QPSK

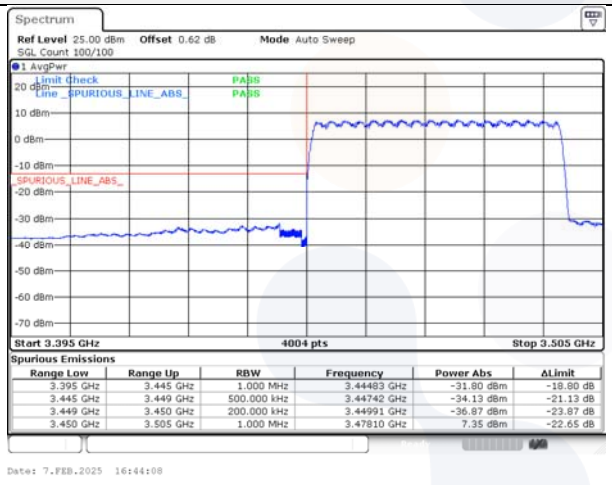
Low channel 1RB



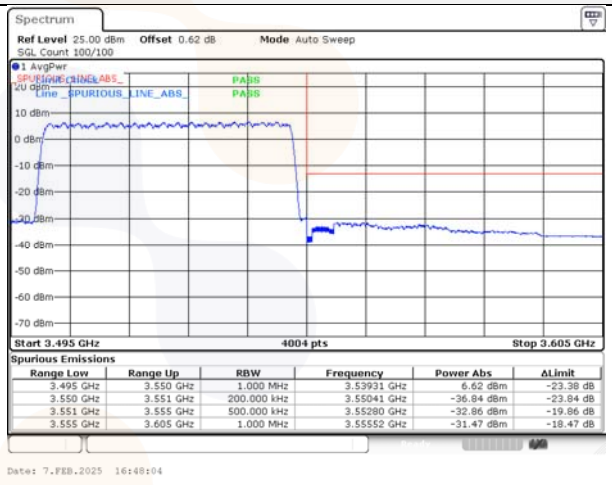
High channel 1RB



Low channel FRB



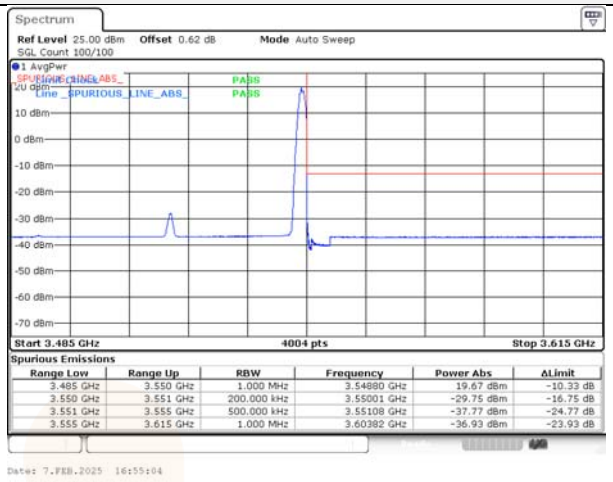
High channel FRB



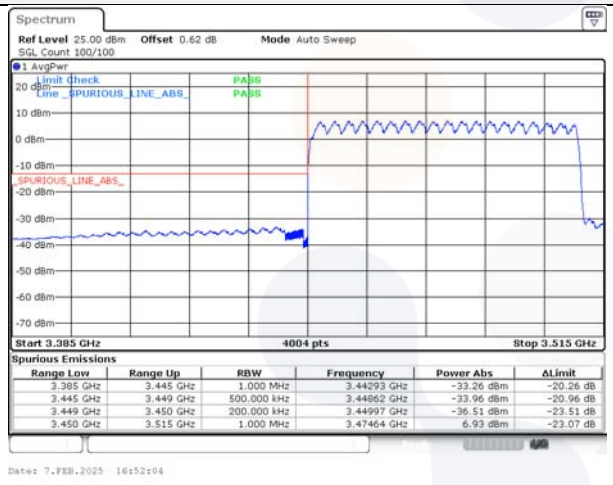
60M BW QPSK

Low channel 1RB

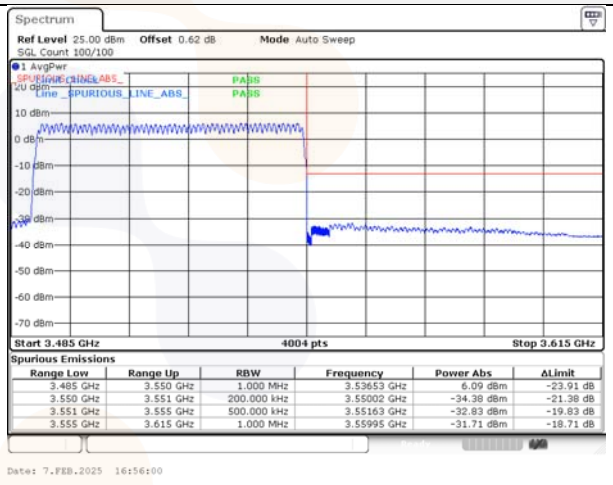
High channel 1RB



Low channel FRB

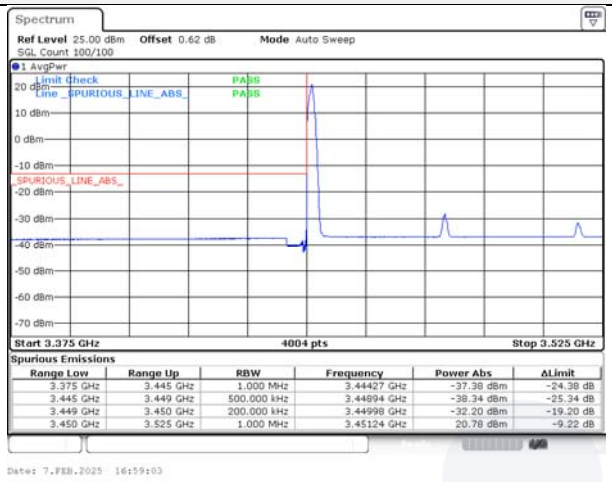


High channel FRB

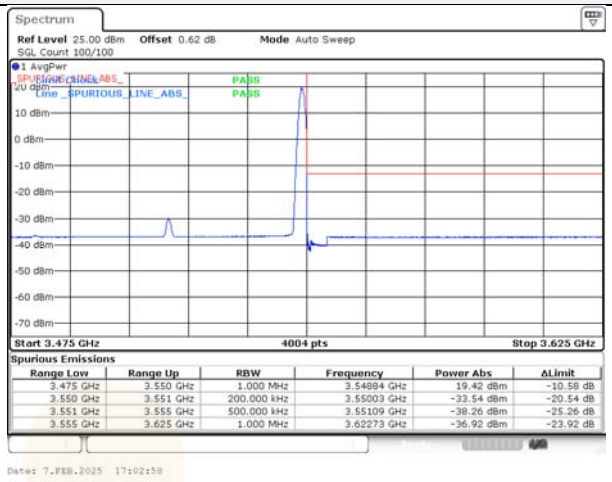


70M BW QPSK

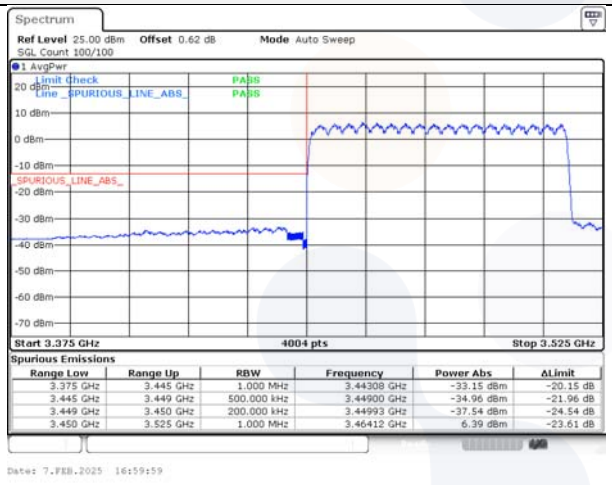
Low channel 1RB



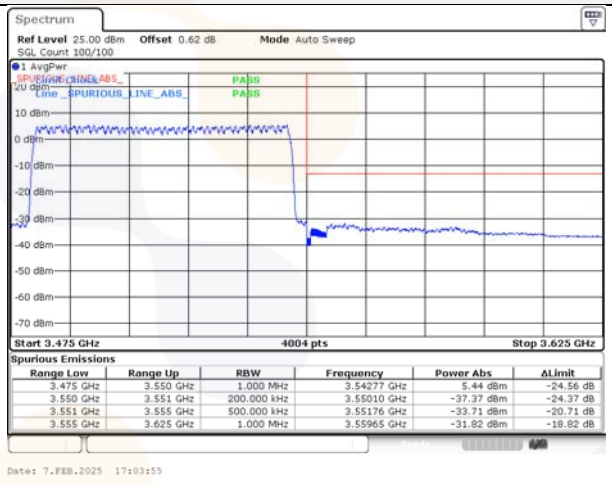
High channel 1RB



Low channel FRB

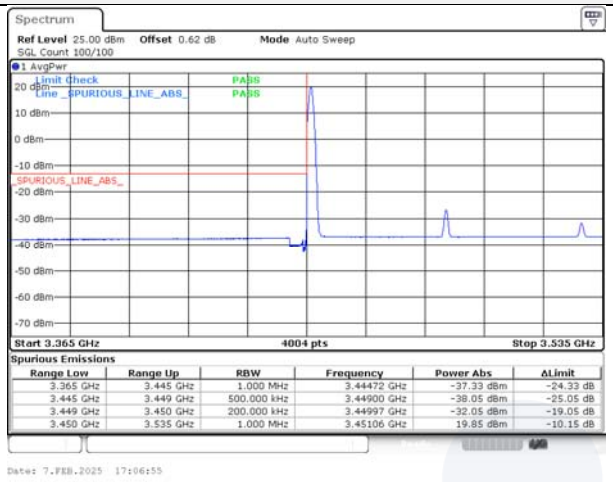


High channel FRB

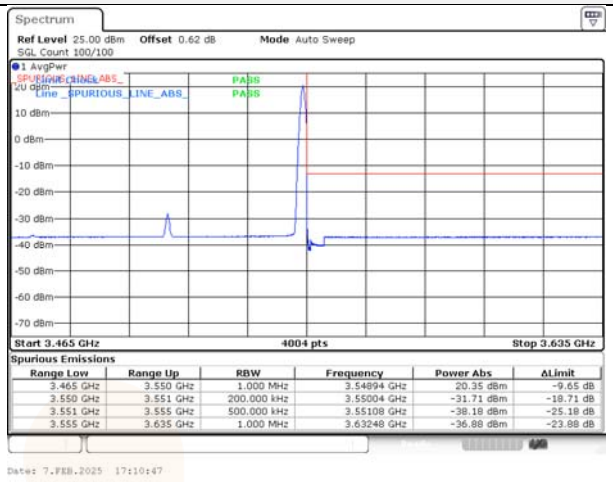


80M BW QPSK

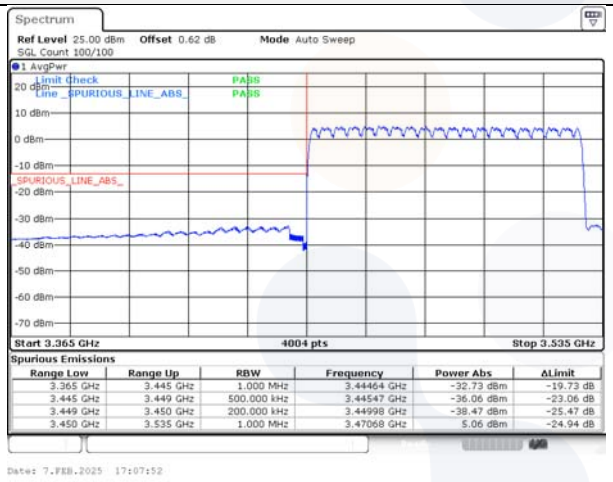
Low channel 1RB



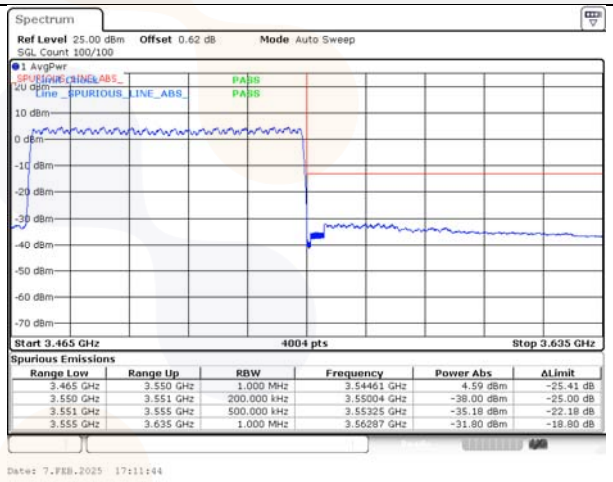
High channel 1RB



Low channel FRB

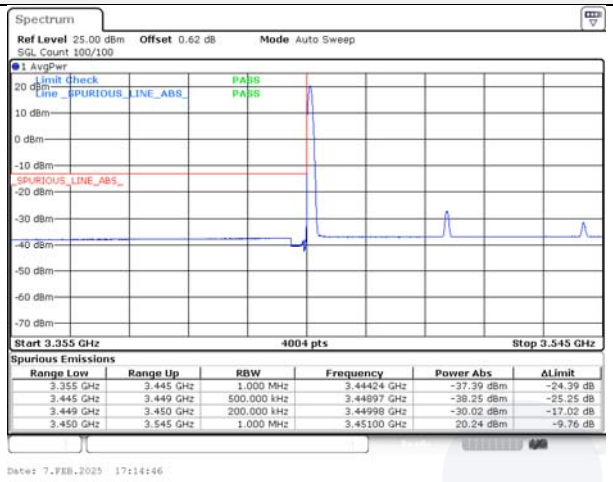


High channel FRB

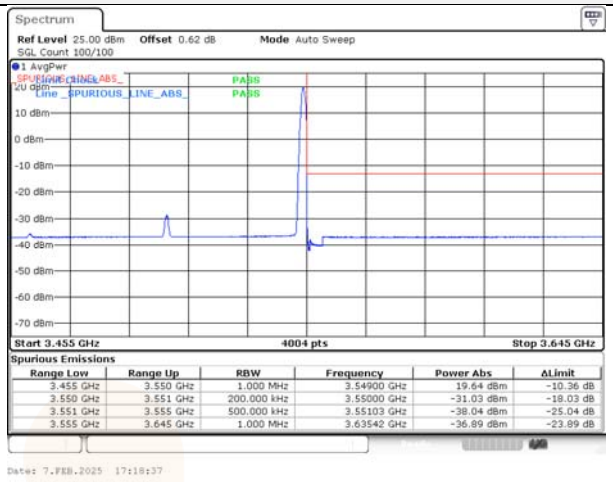


90M BW QPSK

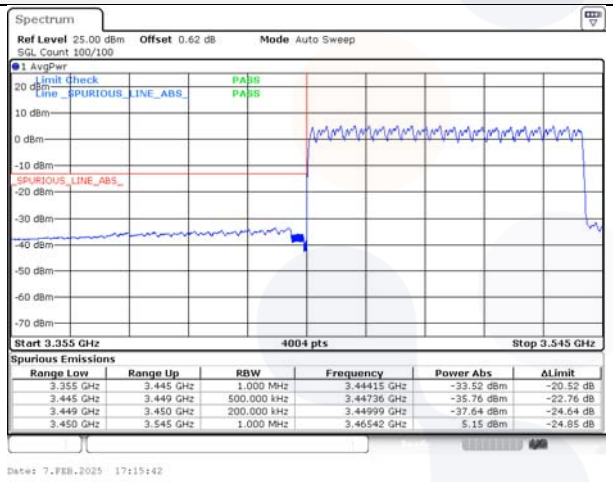
Low channel 1RB



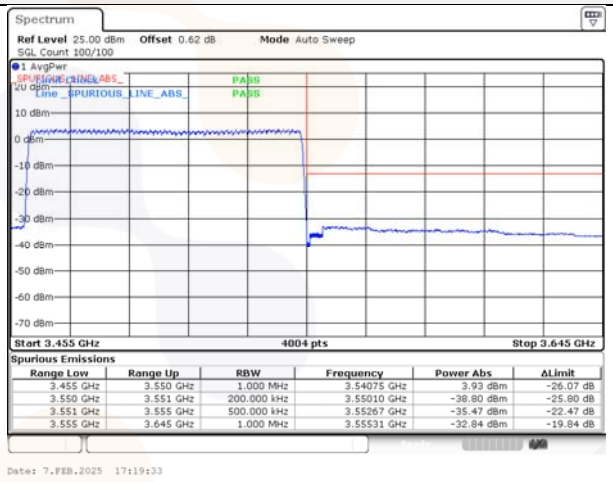
High channel 1RB



Low channel FRB

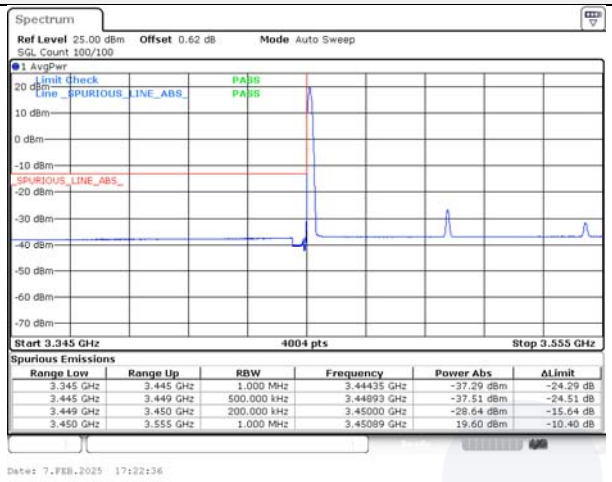


High channel FRB

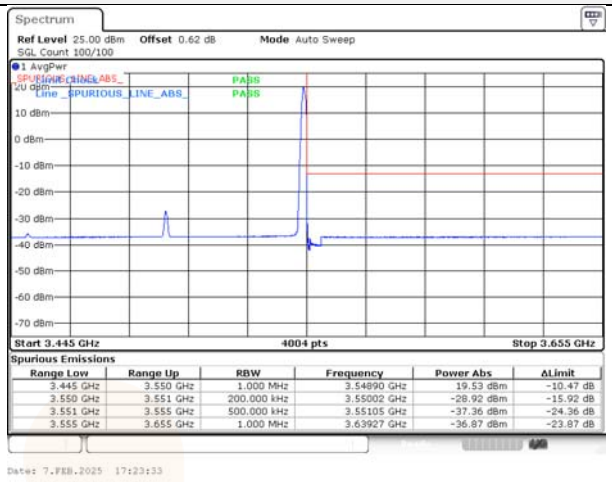


100M BW QPSK

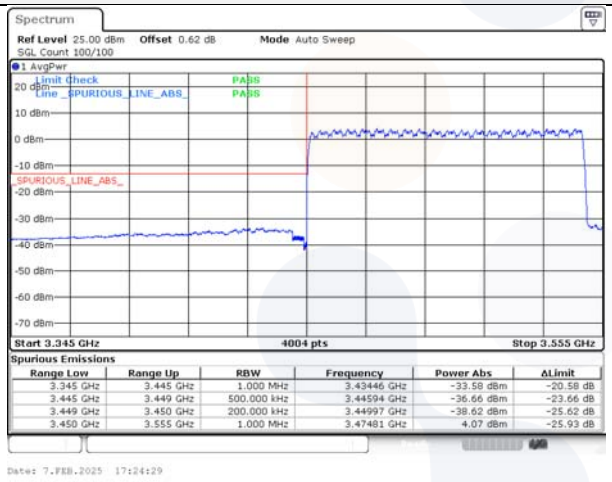
Middle channel Lower 1RB



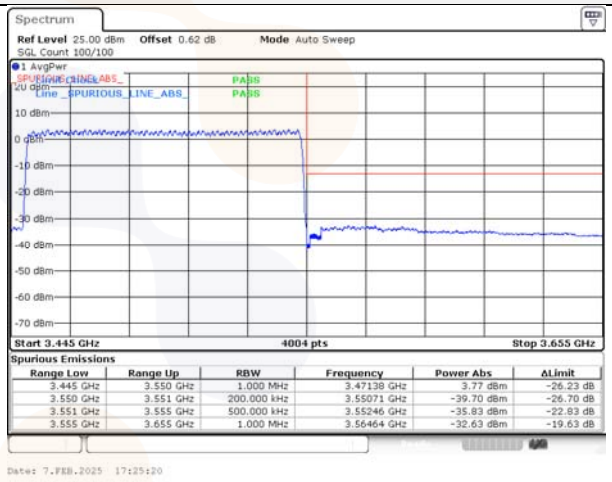
Middle channel Upper 1RB



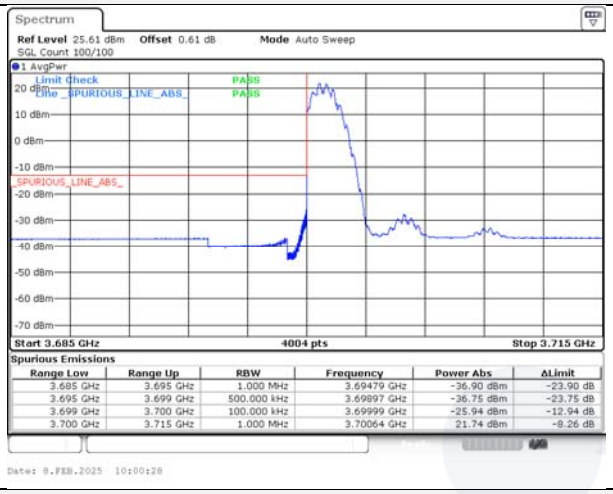
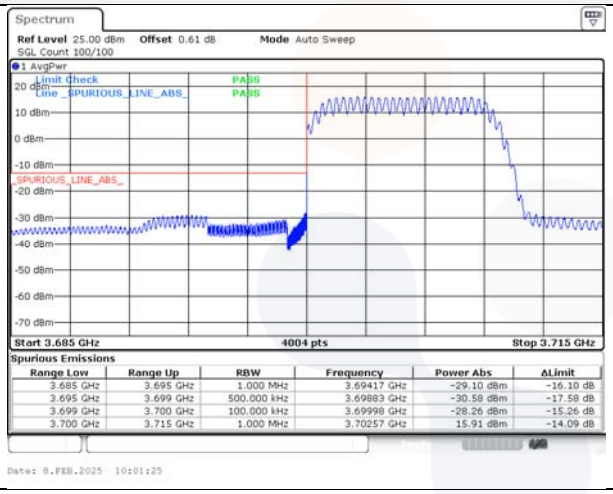
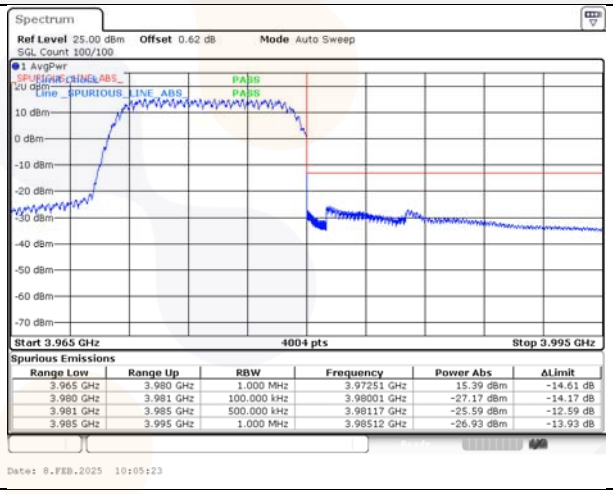
Middle channel Lower FRB



Middle channel Upper FRB

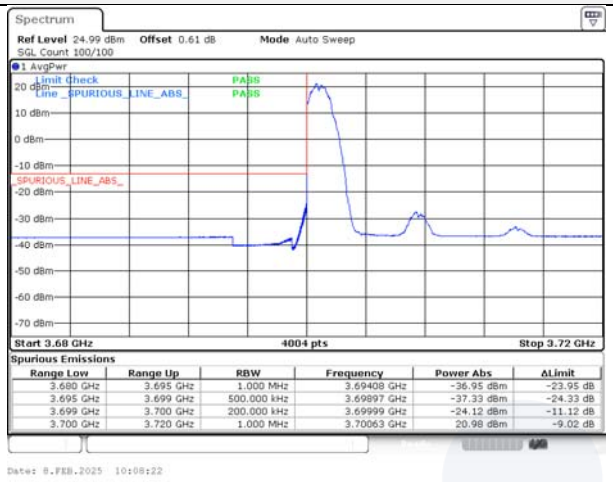


Test mode: 5G NR n77 (Upper)(PC2) DFT-s OFDM

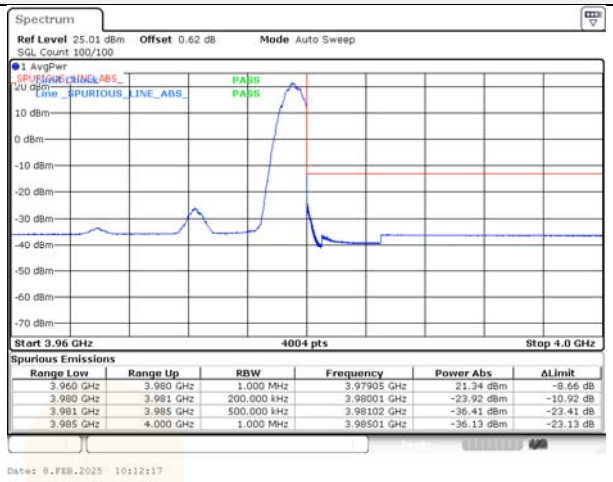
10M BW QPSK	
Low channel 1RB	**High channel 1RB**
	
Low channel FRB	**High channel FRB**
	

15M BW QPSK

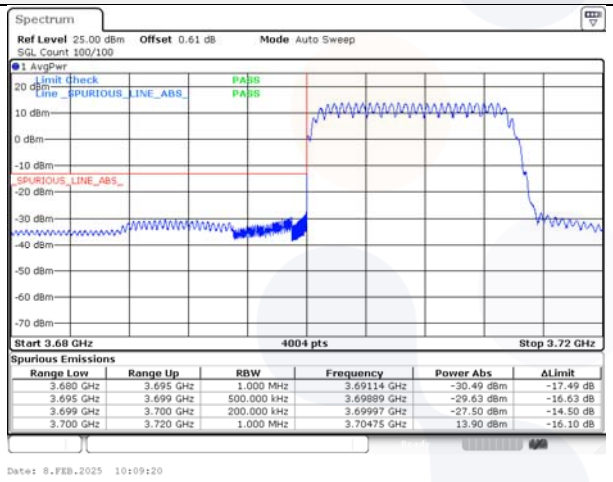
Low channel 1RB



High channel 1RB



Low channel FRB



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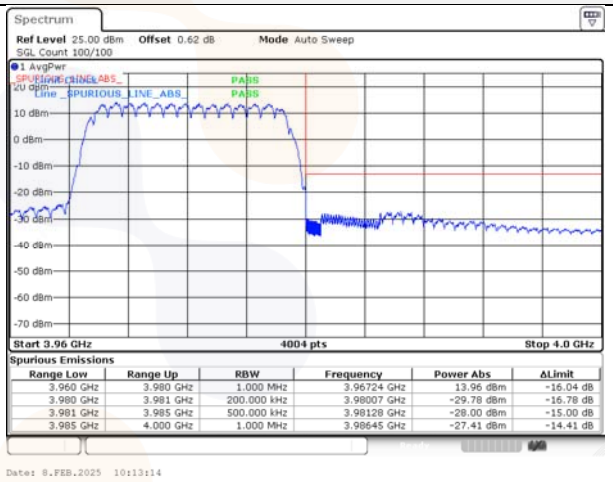

20M BW QPSK

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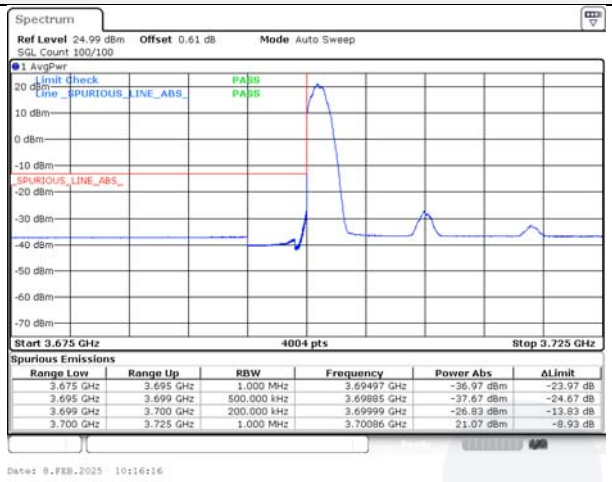

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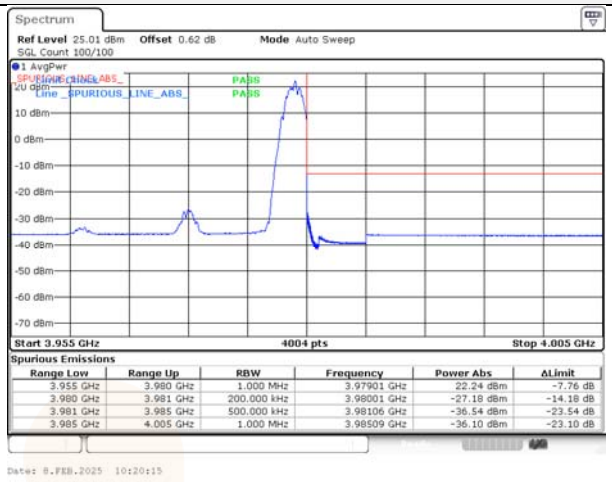
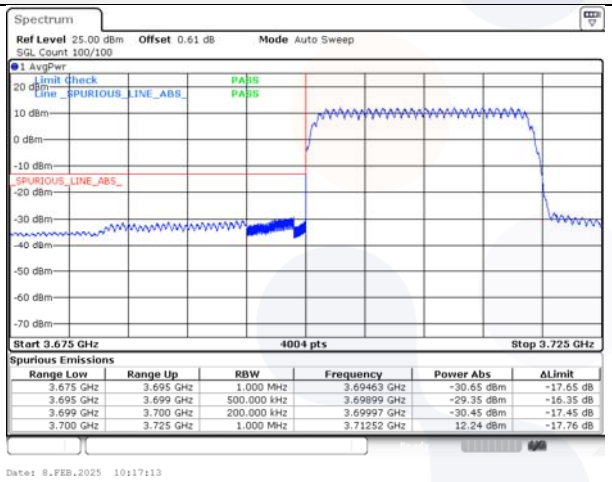


Low channel FRB



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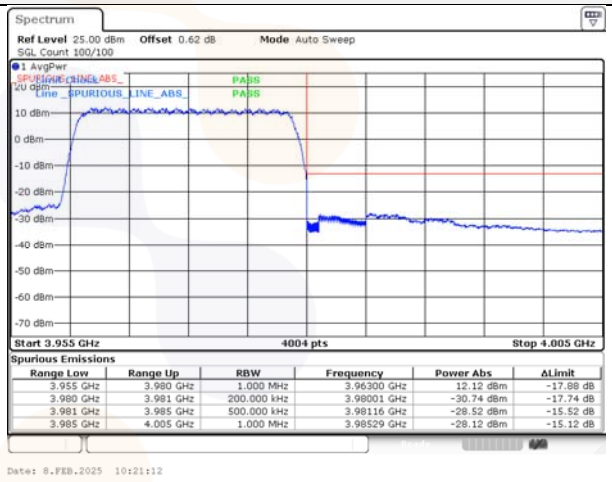

30M BW QPSK

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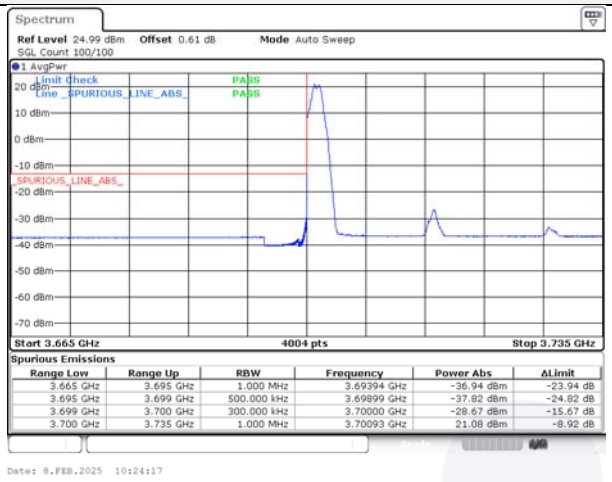
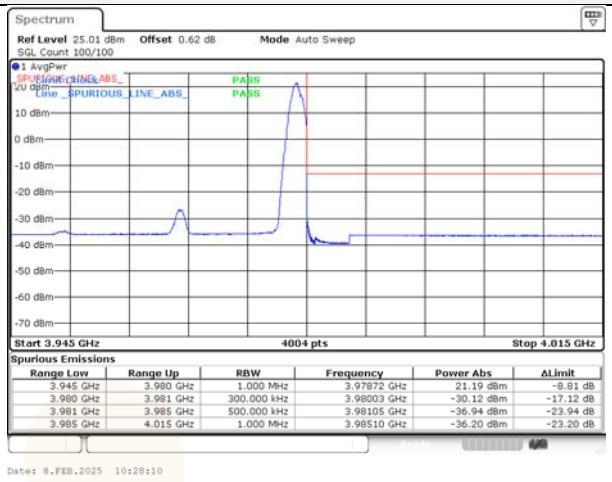


High channel 1RB



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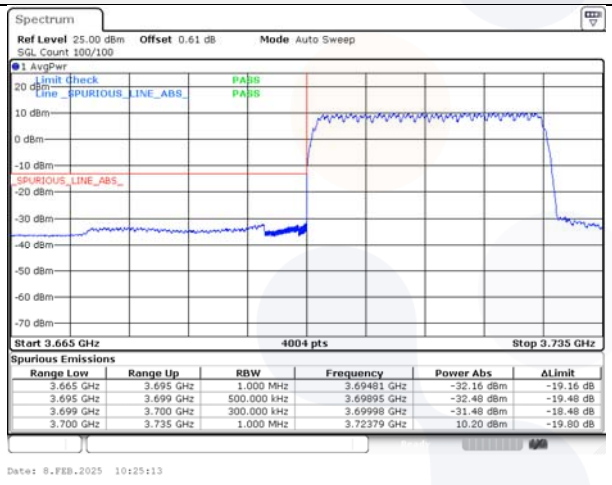

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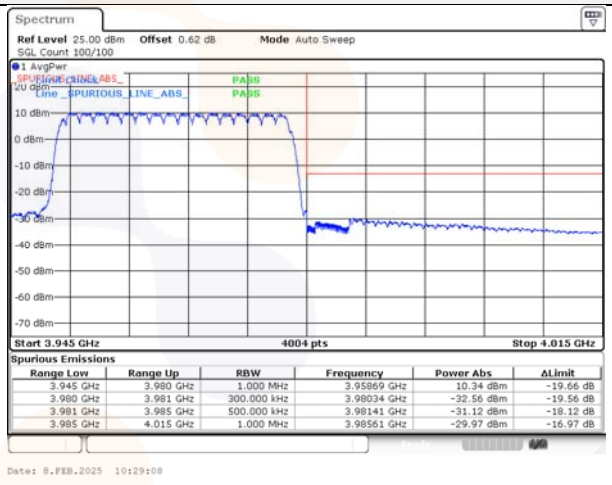

40M BW QPSK

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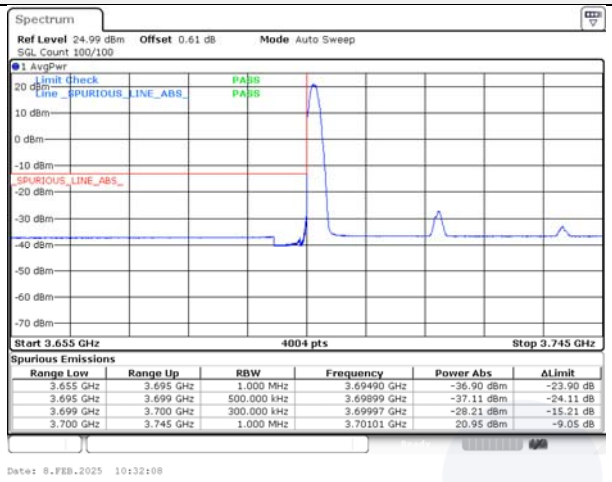

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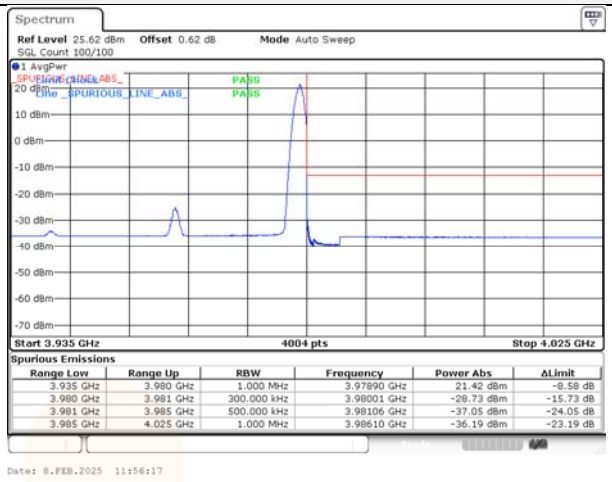
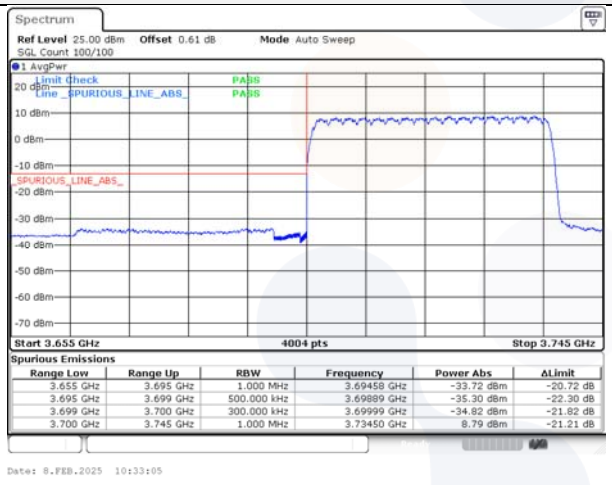


Low channel FRB



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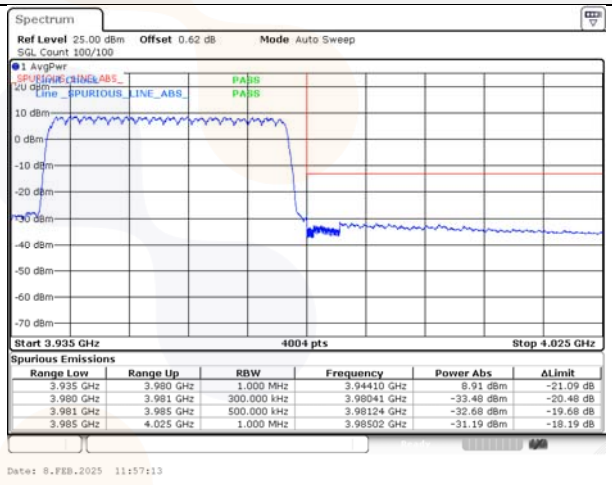
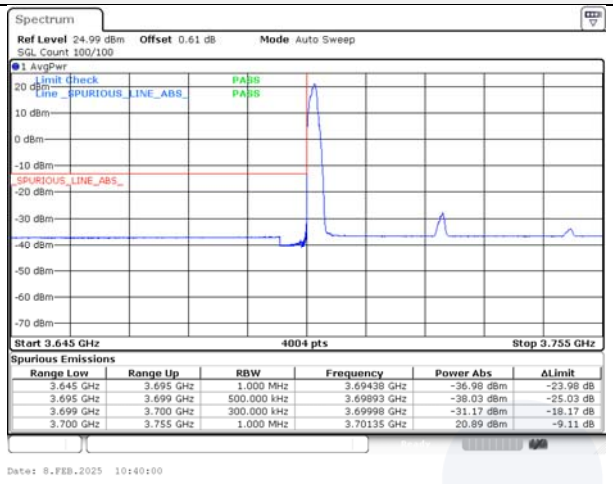
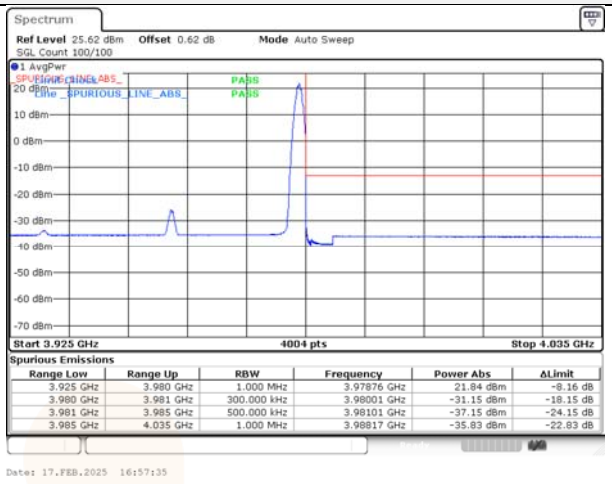


50M BW QPSK

Low channel 1RB



High channel 1RB



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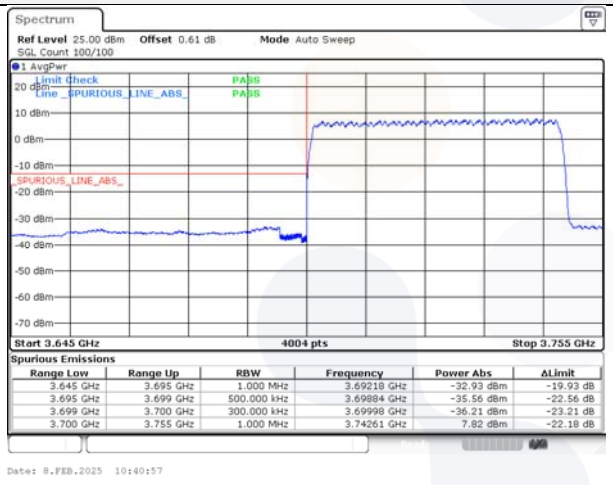

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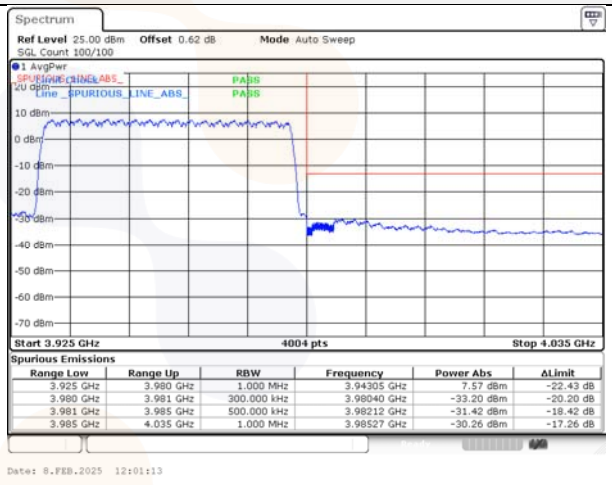

60M BW QPSK

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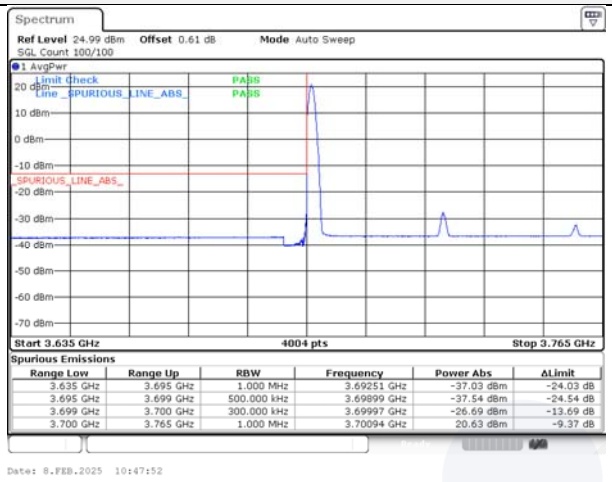

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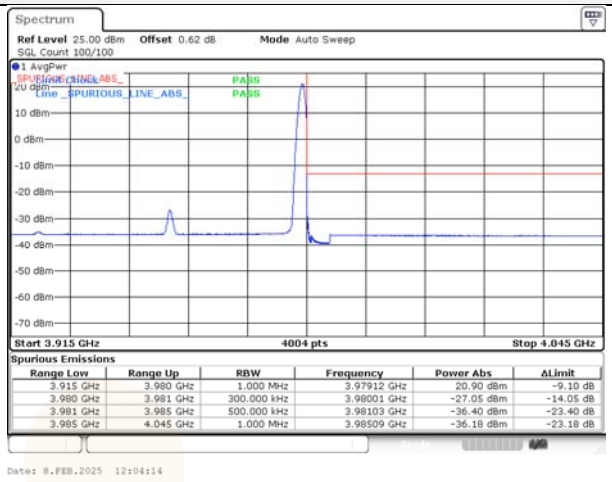

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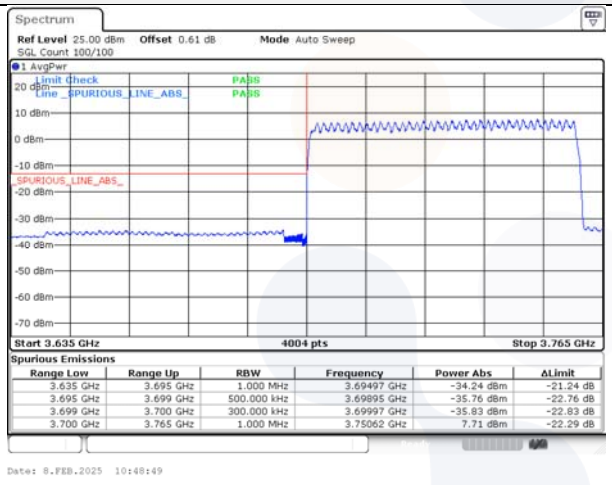

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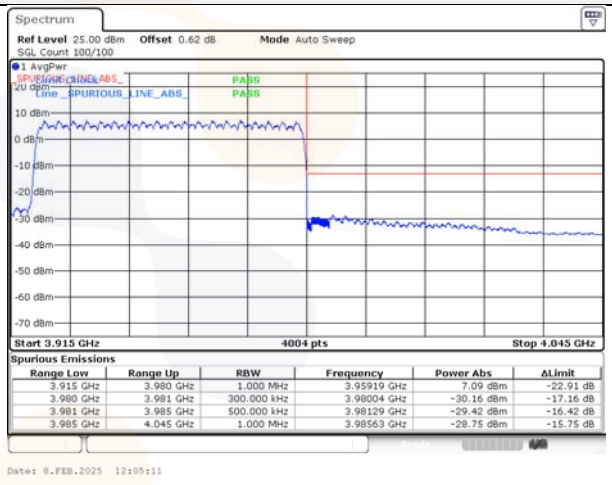

70M BW QPSK

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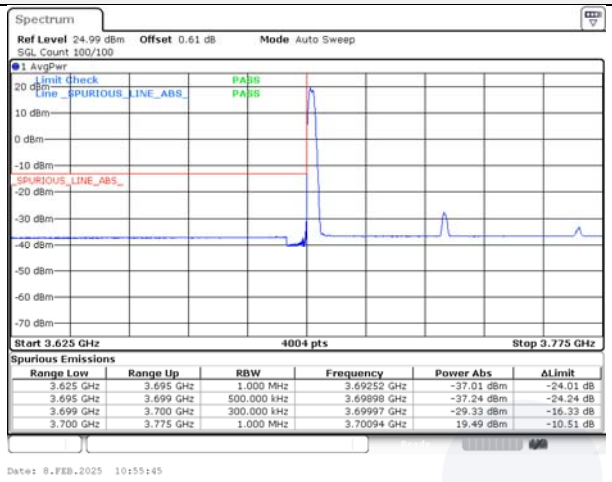

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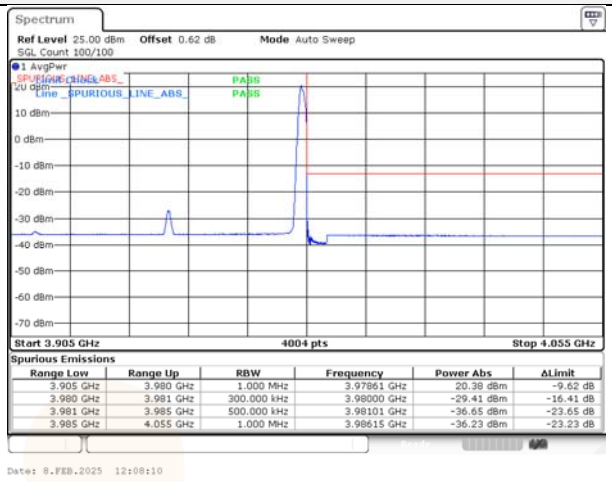

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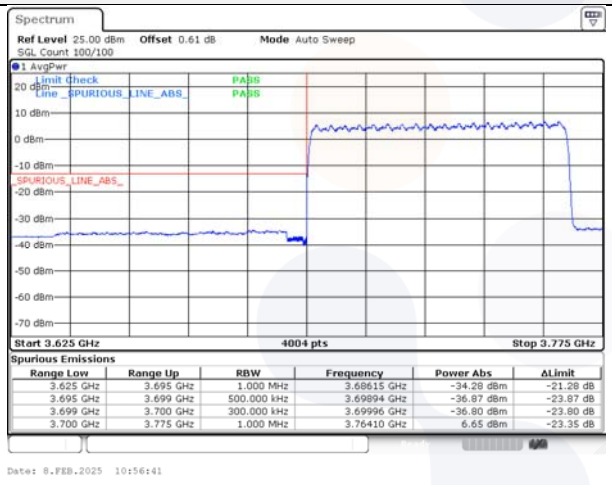

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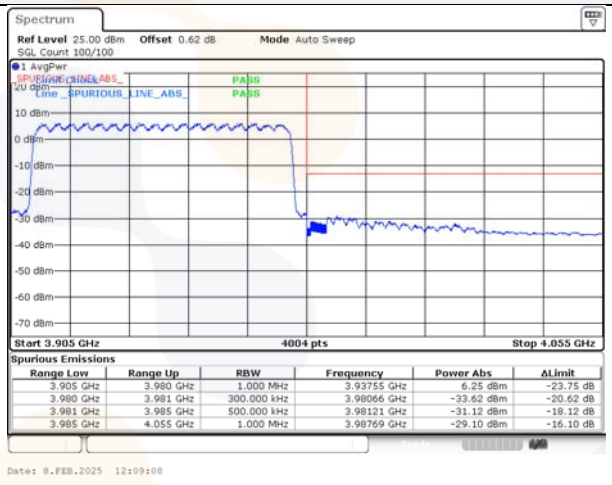
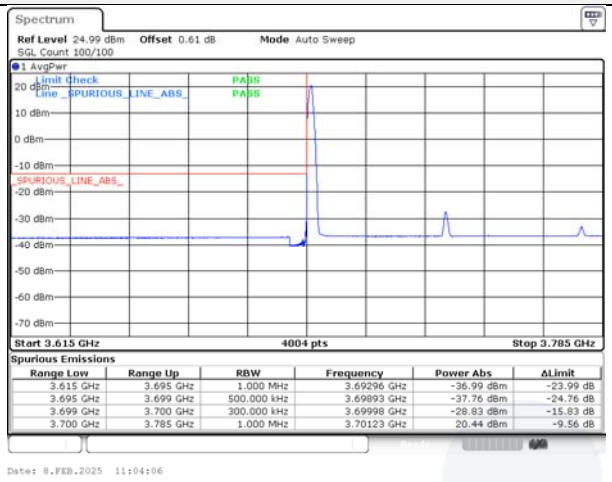


80M BW QPSK

Low channel 1RB



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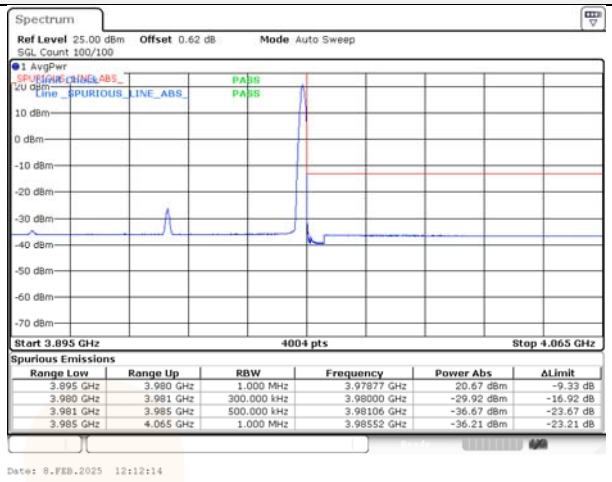

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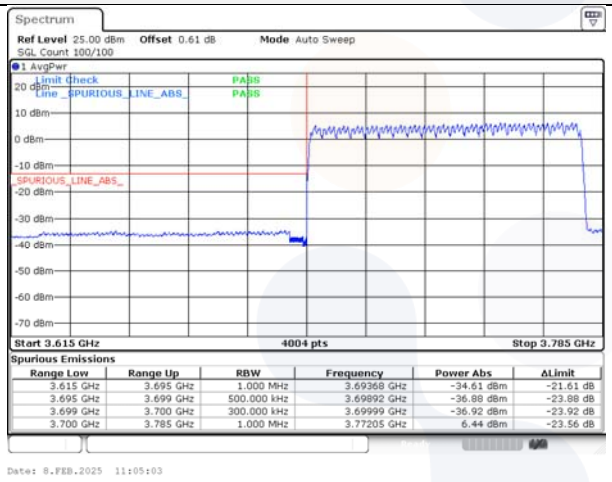
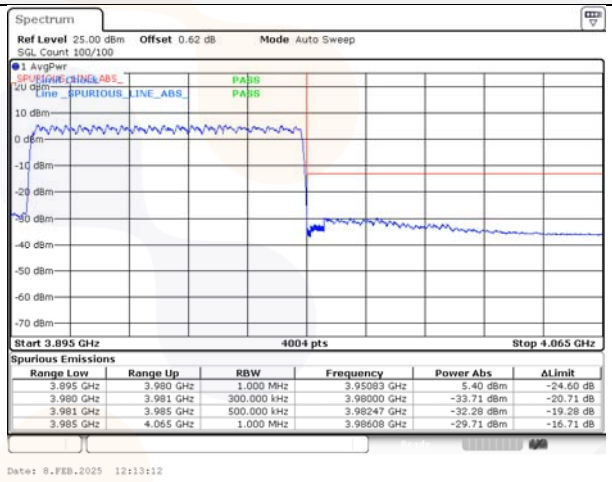
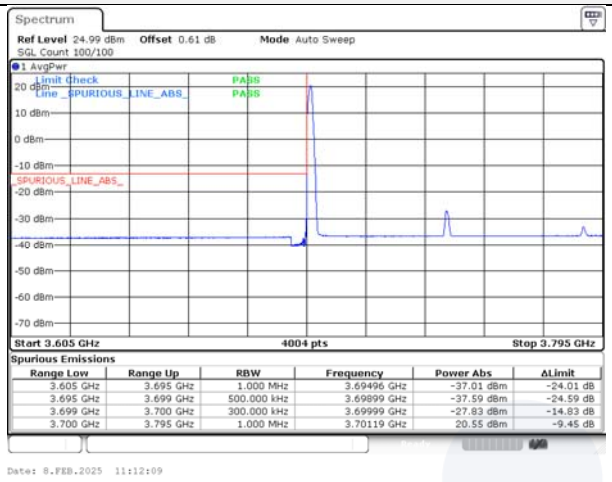


High channel FRB

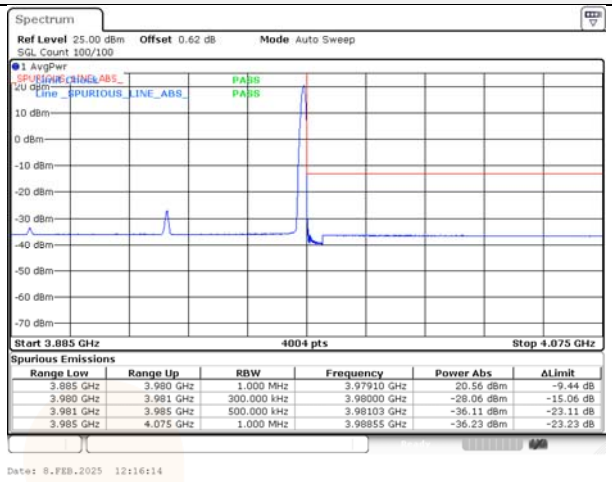


90M BW QPSK

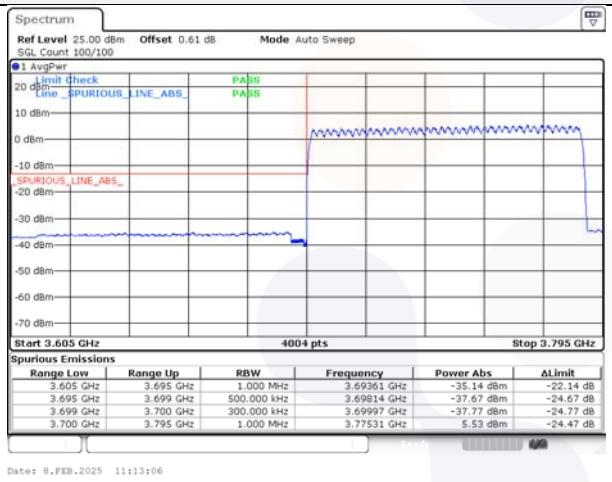
Low channel 1RB



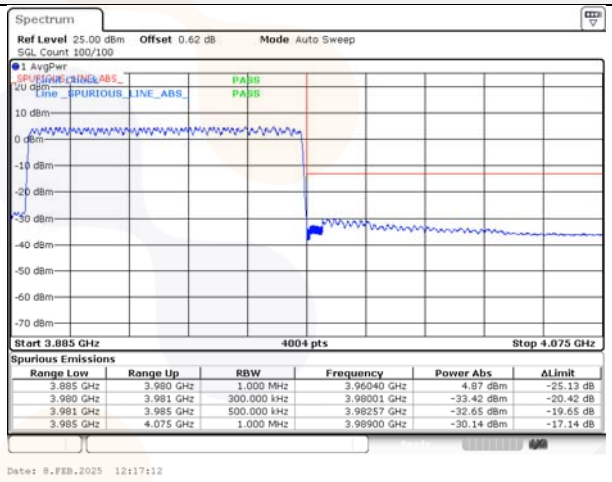
High channel 1RB



Low channel FRB



High channel FRB

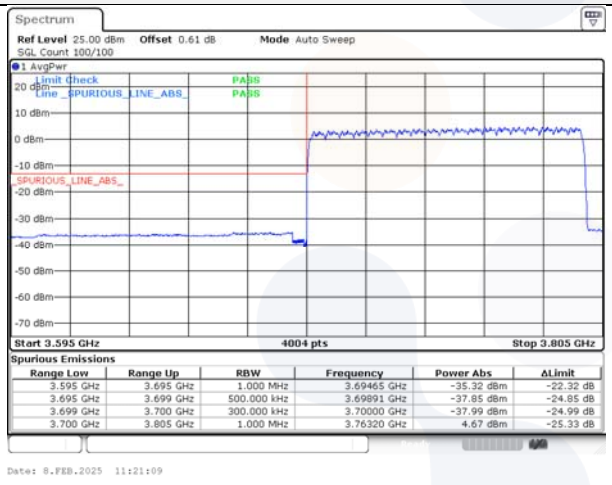


100M BW QPSK

Low channel 1RB

High channel 1RB

Low channel FRB



High channel FRB