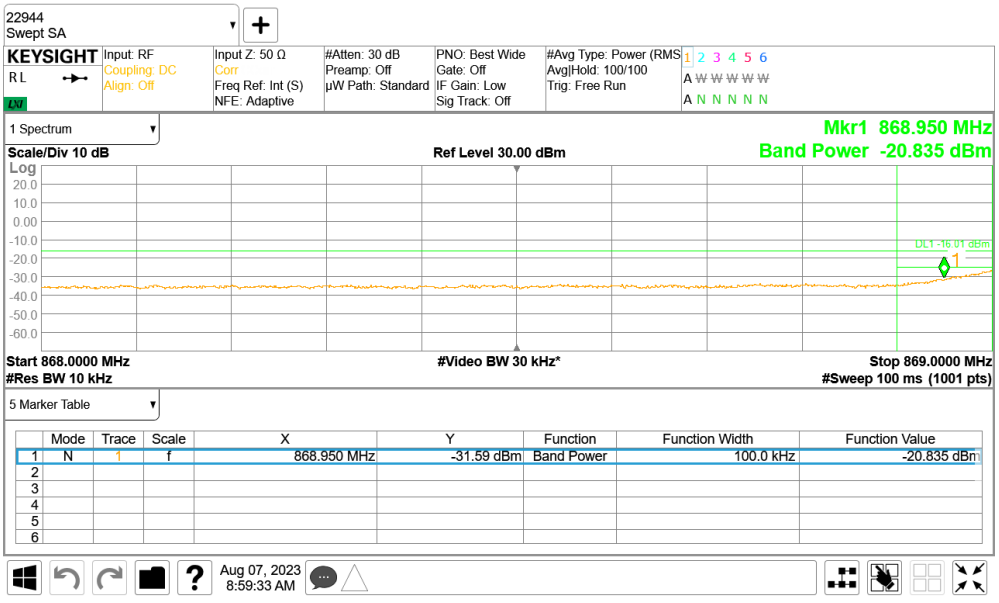
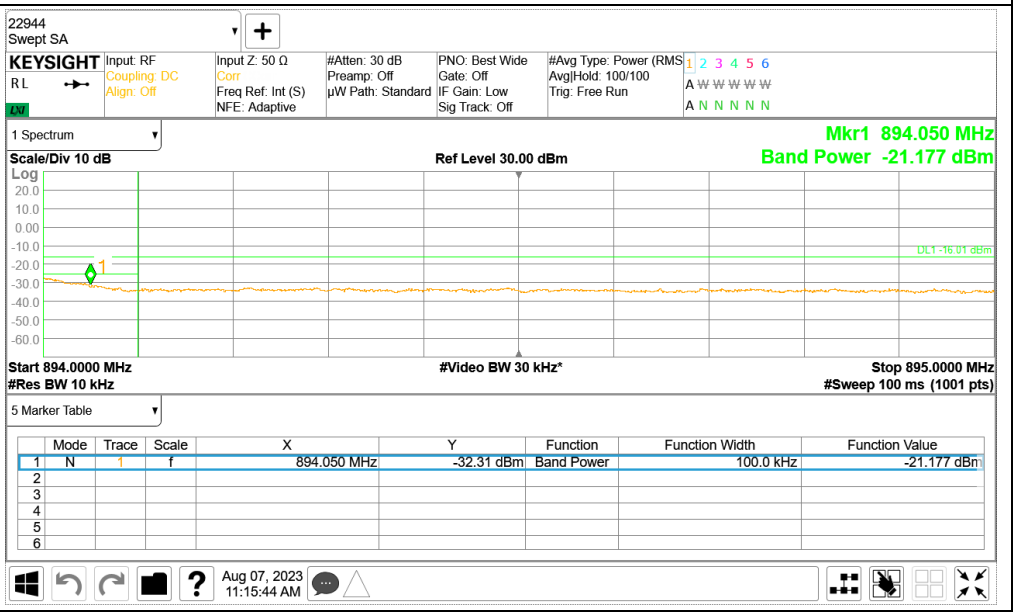
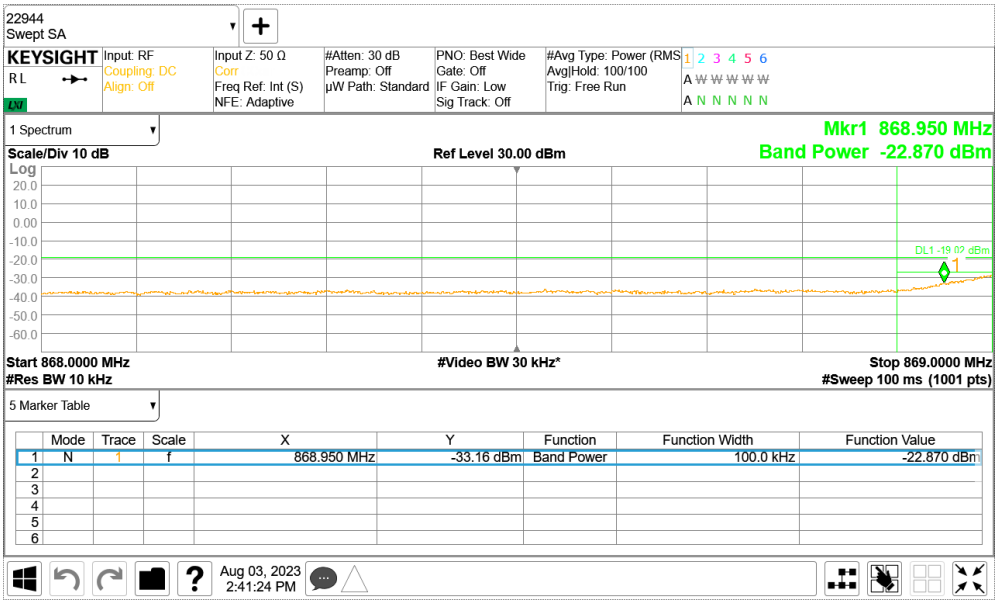
8.4.2. WORST PLOT OF OUT OF BAND EMISSIONS (BAND EDGE)

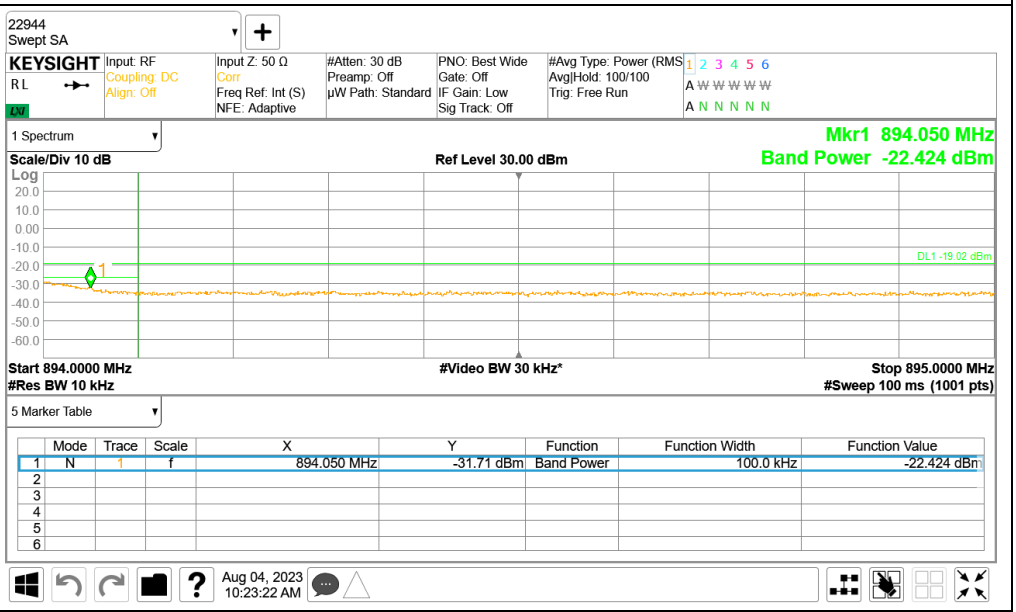
5G NR n5 20 MHz (1 Carrier) – 2TX

ANT 1 / 16QAM / Low Channel	
Low	

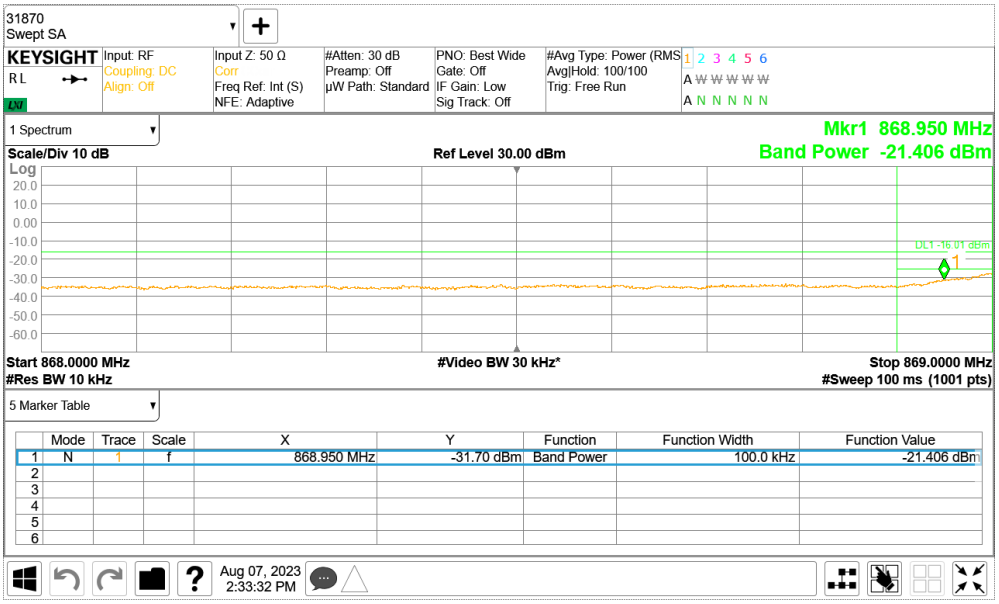
ANT 1 / 64QAM / High Channel	
High	

5G NR n5 20 MHz (1 Carrier) – 4TX

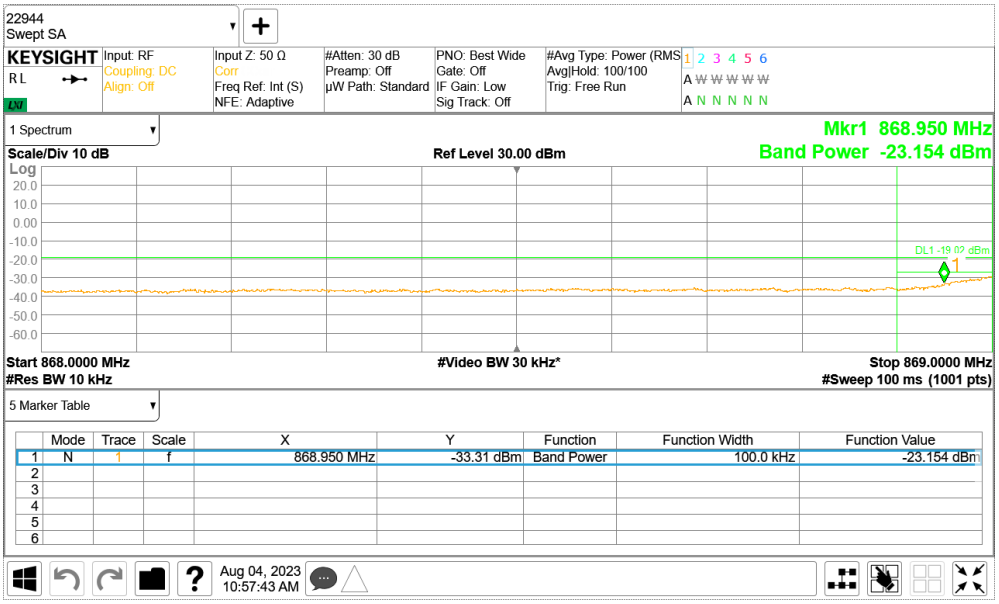
ANT 1 / 16QAM / Low Channel	
Low	

ANT 3 / 256QAM / High Channel	
High	

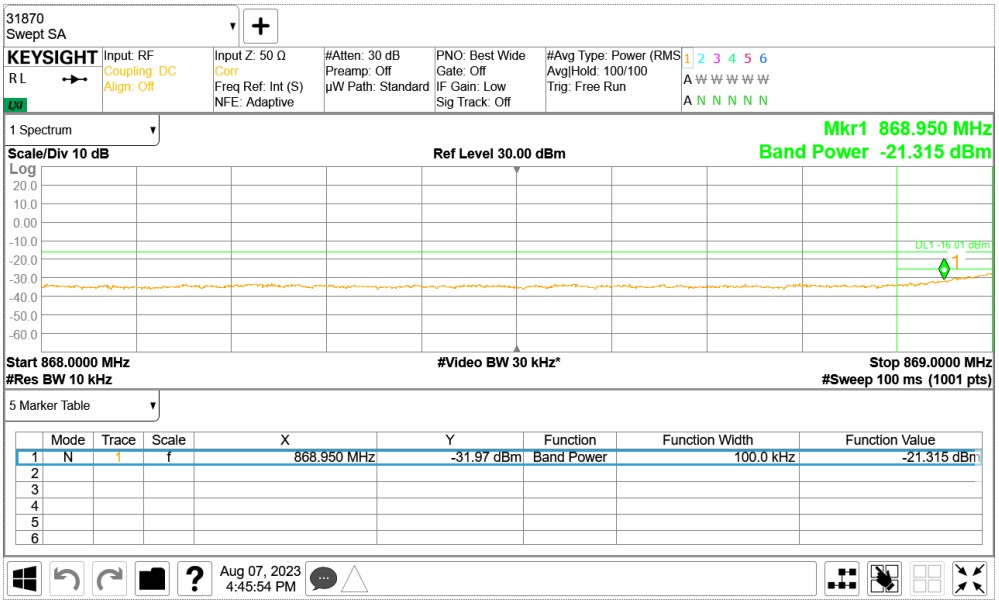
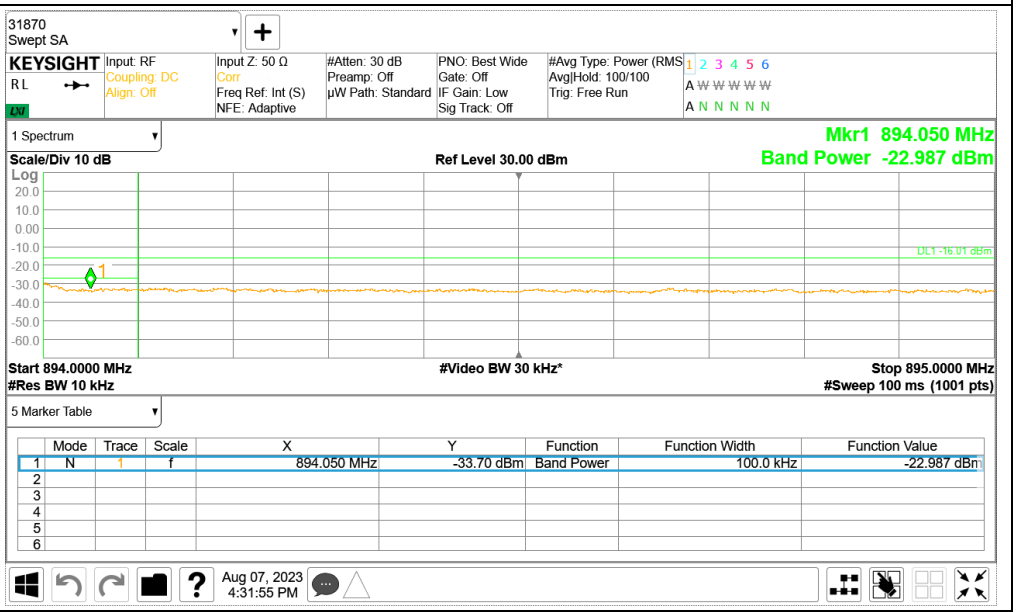
5G NR n5 20 MHz 1C + 5G NR n5 5 MHz 1C (2 Carrier) – 2TX – Contiguous

ANT 1 / 16QAM / Mid Channel	
Low	
ANT 1 / 256QAM / Mid Channel	
High	

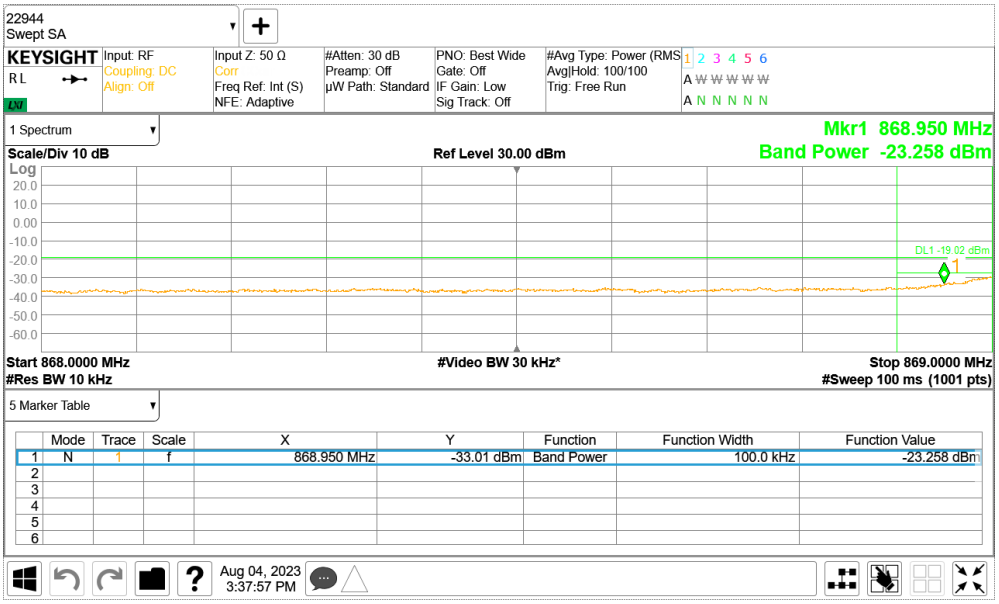
5G NR n5 20 MHz 1C + 5G NR n5 5 MHz 1C (2 Carrier) – 4TX – Contiguous

ANT 4 / QPSK / Mid Channel	
Low	
ANT 1 / 256QAM / Mid Channel	
High	

5G NR n5 20 MHz 1C + LTE B5 5 MHz 1C (2 Carrier) – 2TX - Contiguous

ANT 1 / 16QAM / Mid Channel	
Low	
ANT 1 / QPSK / Mid Channel	
High	

5G NR n5 20 MHz 1C + LTE B5 5 MHz 1C (2 Carrier) – 4TX - Contiguous

ANT 4 / QPSK / Mid Channel	
Low	
ANT 1 / QPSK / Mid Channel	
High	

8.5. OUT OF BAND EMISSIONS (SPURIOUS)

RULE PART(S)

FCC : §2.1051 §22.917

LIMITS

§22.917

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows:

(1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). 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 dB below the transmitter power.

(2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.

(c) Alternative out of band emission limit. Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.

(d) Interference caused by out of band emissions. If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

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TEST PROCEDURE

Section 5.7.4 of ANSI C63.26:

Spurious unwanted emission measurements

a) Set the spectrum analyzer start frequency to the lowest frequency generated by the EUT, without going below 9 kHz, and the stop frequency to the lower frequency covered by the measurements previously performed in 5.7.3. As an alternative, the stop frequency can be set to the value specified in 5.1.1, depending on the EUT operating range, if the resulting plot can clearly demonstrate compliance for all frequencies not addressed by the out-of-band emissions measurements performed as per 5.7.3.

b) When using an average power (rms) detector, ensure that the number of points in the sweep $\geq$ 2 × (span / RBW). This may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the spectrum analyzer capabilities. This requirement does not apply to peak-detected power measurements. When average power is specified by the applicable regulation, a peak-detector can be utilized for preliminary measurements to accommodate wider frequency spans. Any emissions found in the preliminary measurement to exceed the applicable limit(s) shall be further examined using a power averaging (rms) detector with the minimum number of measurement points as defined above.

c) The sweep time should be set to auto-couple for performing peak-detector measurements. For measurements that use a power averaging (rms) detector, the sweep time shall be set as described for out-of-band emissions measurements in item d) of 5.7.3.

d) Identify and measure the highest spurious emission levels in each frequency range. It is not necessary to re-measure the out-of-band emissions as a part of this test. Record the frequencies and amplitudes corresponding to the measured emissions and capture the data plots.

e) Repeat step b) through step d) for the upper spurious emission frequency range if not already captured by a wide span measurement performed as per the alternative provided in step a). The upper frequency for this measurement is defined in 5.1.1 as a function of the EUT operating range.

f) Compare the results with the corresponding limit in the applicable regulation.

g) The test report shall include the data plots of the measuring instrument display and the measured data.

NOTE:

1) In 9 kHz to 30 MHz frequency rage, RBW narrower than reference bandwidth(100 kHz) is used. So following correction factor is applied.

Fomular: *10 log [(reference bandwidth)/(resolution bandwidth)]*

a) 9 kHz to 150 kHz applied 1 kHz RBW: 10 log (100 kHz / 1 kHz) = 20 dB

b) 150 kHz to 30 MHz applied 10 kHz RBW: 10 log (100 kHz / 10 kHz) = 10 dB

2) For all frequencies below 869 MHz and above 894 MHz, correction has been added to the limit for each port according to KDB 662911 D01 v02r01.

- 2TX MIMO correction: 10 log(N_{ANT}) = 10 log(2) =3.01 dB
- 2TX MIMO Limit : -13 dBm – 3.01 dB = -16.01 dBm
- 4TX MIMO correction: 10 log(N_{ANT}) = 10 log(4) =6.02 dB
- 4TX MIMO Limit : -13 dBm – 6.02 dB = -19.02 dBm

RESULTS

See the following pages.

8.5.1. CONDUCTED SPURIOUS EMISSIONS RESULT

5G NR n5 20 MHz (1 Carrier) – 2TX

ANT	Modulation	CH	Result (dBm)				
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 868 MHz	895 MHz ~ 1 GHz	1 GHz ~ 10 GHz
1	QPSK	L	-40.94	-36.74	-23.85	-26.43	***-19.57***
		M	-41.84	-36.81	-23.94	-24.91	-20.14
		H	-41.68	***-36.33***	***-23.40***	***-23.86***	-20.58
	16QAM	L	-40.26	-36.23	-24.98	-27.07	-19.88
		M	-40.10	-36.56	-24.53	-25.86	-20.07
		H	-39.79	-36.49	-24.10	-24.59	-19.99
	64QAM	L	-41.35	-36.95	-25.22	-26.99	-19.83
		M	-41.06	-36.29	-23.33	-24.98	-19.99
		H	-41.02	-36.16	-23.66	***-24.04***	-20.22
	256QAM	L	-42.02	-36.35	-24.43	-26.50	***-19.78***
		M	-41.46	***-36.11***	-24.14	-25.82	-20.15
		H	-41.80	-36.16	***-23.25***	-24.41	-19.86
2	QPSK	L	***-39.50***	-41.45	-24.97	-27.86	-20.57
		M	-40.10	-42.04	-25.76	-26.98	-20.81
		H	-39.88	-41.86	-25.71	-25.10	-20.26
	16QAM	L	-38.89	-40.89	-25.79	-28.30	-20.03
		M	***-38.62***	-41.00	-25.48	-26.96	-20.73
		H	-38.75	-40.73	-26.09	-25.69	-20.23
	64QAM	L	-40.00	-41.80	-26.02	-27.91	-20.38
		M	-39.79	-41.36	-26.22	-26.79	-20.82
		H	-39.39	-41.48	-25.74	-25.32	-19.84
	256QAM	L	-40.65	-41.49	-25.49	-27.93	-20.36
		M	-40.29	-41.39	-26.18	-26.89	-20.52
		H	-40.54	-41.77	-26.13	-25.27	-20.34

5G NR n5 20 MHz (1 Carrier) – 4TX

ANT	Modulation	CH	Result (dBm)				
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 868 MHz	895 MHz ~ 1 GHz	1 GHz ~ 10 GHz
1	QPSK	L	-43.55	***-35.75***	***-26.93***	-28.74	-24.21
		M	-42.93	-36.09	-28.19	-28.69	-24.56
		H	-45.75	-35.90	-28.57	***-27.71***	-24.42
	16QAM	L	-42.11	-35.70	-27.61	-29.63	-24.11
		M	-43.68	-35.78	-27.22	-28.79	-24.18
		H	-43.95	-35.69	-28.10	-27.60	-24.56
	64QAM	L	-41.12	-36.00	-28.04	-29.55	-23.92
		M	-43.99	-35.67	-27.95	-28.63	-24.30
		H	-45.21	-35.89	-28.66	-27.75	-24.87
	256QAM	L	-41.18	***-35.58***	-27.27	-29.22	-24.05
		M	-45.34	-35.72	-28.01	-28.36	-24.45
		H	-45.49	-35.68	-28.55	***-27.39***	-24.55
2	QPSK	L	-43.95	-45.74	-27.53	-30.33	-24.72
		M	***-41.49***	-46.01	-28.66	-29.64	-24.81
		H	-44.12	-45.99	-28.93	-28.50	-24.63
	16QAM	L	-40.53	-45.06	-27.89	-30.34	-24.04
		M	-41.98	-44.68	-28.35	-29.96	-24.72
		H	-43.12	-45.32	-29.20	-27.58	-24.50
	64QAM	L	***-40.06***	-45.98	-28.44	-30.69	-24.60
		M	-42.89	-45.56	-29.23	-29.74	-24.93
		H	-43.22	-45.98	-29.48	-28.39	-24.37
	256QAM	L	-40.47	-45.64	-28.74	-30.44	-24.50
		M	-42.59	-45.56	-29.00	-29.78	-24.80
		H	-44.59	-45.83	-29.84	-28.29	-24.68

ANT	Modulation	CH	Result (dBm)				
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 868 MHz	895 MHz ~ 1 GHz	1 GHz ~ 10 GHz
3	QPSK	L	-43.89	-47.09	-28.82	-30.16	***-23.34***
		M	-42.13	-47.39	-28.20	-30.23	-23.65
		H	-45.70	-47.69	-29.51	-28.92	-23.84
	16QAM	L	-41.36	-47.07	-28.49	-29.07	-23.47
		M	-43.47	-47.03	***-26.77***	-30.13	-23.43
		H	-44.06	-47.03	-28.47	-29.45	-23.49
	64QAM	L	-40.64	-47.39	-28.36	-30.39	-23.35
		M	-43.80	-47.12	-29.34	-30.16	-23.60
		H	-45.49	-47.28	-28.28	-28.58	-23.71
	256QAM	L	-42.01	-47.37	-26.94	-29.56	-23.28
		M	-44.40	-47.57	-28.96	-30.20	-23.43
		H	-45.45	-47.29	-28.92	-29.01	-23.61
4	QPSK	L	-44.27	-48.01	-27.73	-29.07	-23.97
		M	-43.32	-48.06	-28.28	-28.45	-23.44
		H	-46.19	-48.57	-27.96	-28.01	-23.97
	16QAM	L	-42.28	-47.46	-27.86	-29.96	-23.67
		M	-43.29	-47.66	-27.89	-28.77	-23.52
		H	-44.86	-47.72	-27.96	-28.03	-23.79
	64QAM	L	-41.96	-47.93	-28.37	-29.60	-23.45
		M	-44.09	-48.28	-28.50	-28.67	-24.01
		H	-44.92	-48.57	-28.06	-27.74	-23.79
	256QAM	L	-42.31	-48.20	-28.21	-29.26	-23.70
		M	-43.63	-47.73	-28.14	-28.52	***-23.11***
		H	-45.65	-48.25	-27.67	-28.07	-24.38

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5G NR n5 20 MHz 1C + 5G NR n5 5 MHz 1C (2 Carrier) – 2TX – Contiguous

ANT	Modulation	CH	Result (dBm)				
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 868 MHz	895 MHz ~ 1 GHz	1 GHz ~ 10 GHz
1	QPSK	M	-42.17	***-35.98***	***-23.47***	***-24.03***	***-21.45***
	16QAM	M	-41.98	-35.64	-25.16	-24.25	***-20.94***
	64QAM	M	-42.71	-35.79	***-23.69***	-24.12	-21.10
	256QAM	M	-42.75	***-35.46***	-24.61	***-23.74***	-21.11
2	QPSK	M	***-41.24***	-42.84	-25.28	-26.02	-21.85
	16QAM	M	***-40.16***	-42.41	-25.55	-26.04	-21.81
	64QAM	M	-41.46	-42.92	-24.84	-25.66	-21.93
	256QAM	M	-40.31	-42.88	-25.51	-25.36	-21.64

5G NR n5 20 MHz 1C + 5G NR n5 5 MHz 1C (2 Carrier) – 4TX – Contiguous

ANT	Modulation	CH	Result (dBm)				
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 868 MHz	895 MHz ~ 1 GHz	1 GHz ~ 10 GHz
1	QPSK	M	-46.40	***-35.17***	-27.48	***-26.87***	-25.32
	16QAM	M	-44.31	-34.98	-27.50	-27.07	-25.51
	64QAM	M	-45.52	-35.02	-27.53	***-26.61***	-25.39
	256QAM	M	-44.65	***-34.74***	-27.83	-27.36	-25.52
2	QPSK	M	-45.40	-46.69	-28.37	-28.47	-25.77
	16QAM	M	-44.28	-46.43	-28.42	-28.29	-25.98
	64QAM	M	***-43.54***	-46.46	-28.07	-28.39	-26.04
	256QAM	M	-44.25	-46.73	-27.96	-27.94	-25.74
3	QPSK	M	-46.36	-48.12	-27.48	-28.46	***-24.40***
	16QAM	M	-43.73	-48.06	-28.09	-28.83	***-24.26***
	64QAM	M	-44.20	-48.24	-27.66	-29.05	-24.61
	256QAM	M	-44.27	-48.21	-27.89	-28.18	-24.33
4	QPSK	M	***-45.12***	-48.88	***-27.00***	-27.74	-24.62
	16QAM	M	-44.48	-48.61	-27.09	-27.53	-24.68
	64QAM	M	-45.03	-49.03	***-26.45***	-27.67	-24.52
	256QAM	M	-44.37	-48.52	-26.87	-27.51	-24.40

5G NR n5 20 MHz 1C + LTE B5 5 MHz 1C (2 Carrier) – 2TX - Contiguous

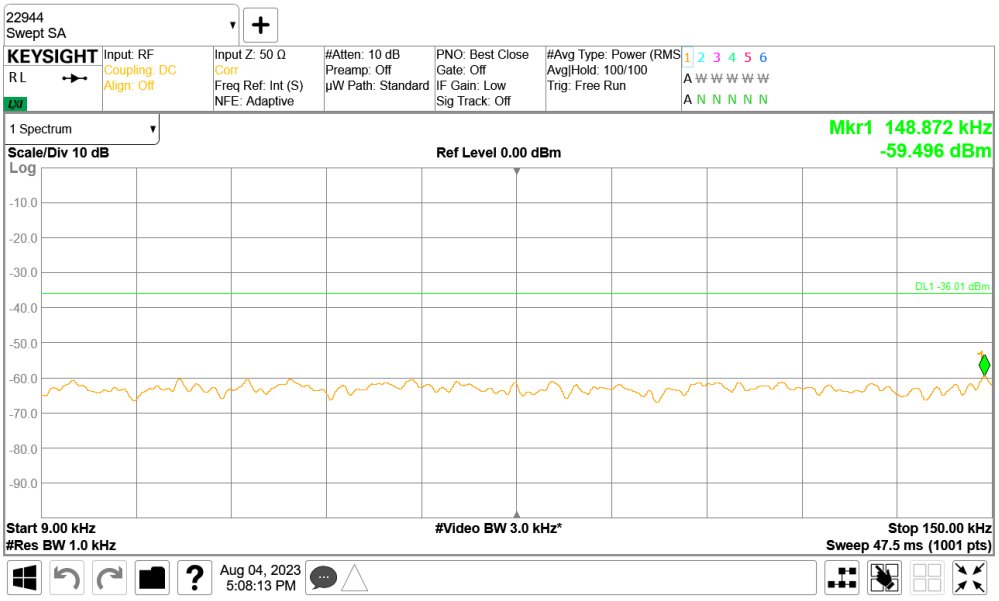
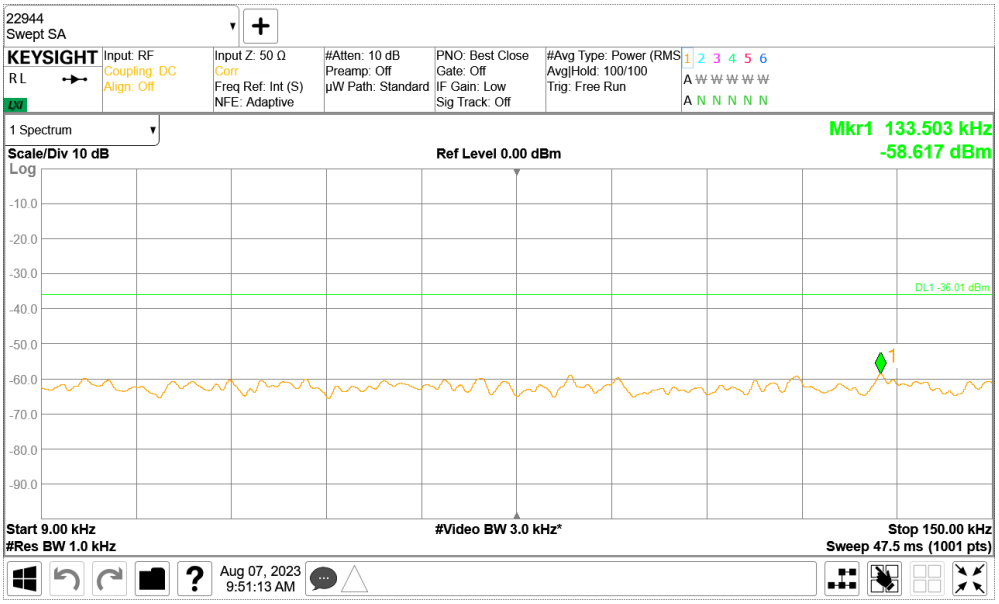
ANT	Modulation	CH	Result (dBm)				
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 868 MHz	895 MHz ~ 1 GHz	1 GHz ~ 10 GHz
1	QPSK	M	-42.85	***-35.62***	***-24.58***	***-23.27***	***-21.05***
	16QAM	M	-40.95	-35.95	***-24.09***	-24.50	***-20.95***
	64QAM	M	-42.28	-36.05	-24.79	***-24.01***	-21.44
	256QAM	M	-42.11	***-35.65***	-24.33	-24.71	-21.29
2	QPSK	M	***-40.45***	-42.76	-25.68	-25.17	-21.70
	16QAM	M	***-39.71***	-42.07	-24.97	-25.21	-21.82
	64QAM	M	-41.01	-42.98	-25.58	-26.16	-21.88
	256QAM	M	-40.92	-42.76	-25.79	-26.20	-22.01

5G NR n5 20 MHz 1C + LTE B5 5 MHz 1C (2 Carrier) – 4TX - Contiguous

ANT	Modulation	CH	Result (dBm)				
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 868 MHz	895 MHz ~ 1 GHz	1 GHz ~ 10 GHz
1	QPSK	M	-44.90	***-34.89***	-27.15	***-26.97***	-25.42
	16QAM	M	-44.90	-34.94	-28.01	-27.30	-25.52
	64QAM	M	-45.13	-35.22	-27.29	-27.78	-25.46
	256QAM	M	-46.16	***-34.83***	-27.48	***-26.97***	-25.02
2	QPSK	M	***-44.00***	-46.90	-27.46	-28.80	-25.76
	16QAM	M	-43.95	-46.16	-27.52	-27.87	-25.76
	64QAM	M	***-43.43***	-47.01	-27.90	-28.18	-25.79
	256QAM	M	-44.27	-46.00	-27.90	-28.40	-25.63
3	QPSK	M	-44.66	-48.22	***-26.84***	-28.37	-25.12
	16QAM	M	-43.87	-47.74	-27.88	-28.92	-24.50
	64QAM	M	-43.73	-47.85	-27.53	-28.95	-24.39
	256QAM	M	-45.26	-47.98	-27.50	-28.86	***-24.12***
4	QPSK	M	-45.75	-49.22	-27.04	-28.25	***-24.72***
	16QAM	M	-44.99	-48.41	-27.60	-28.06	-24.70
	64QAM	M	-45.55	-48.87	-26.84	-28.05	-24.48
	256QAM	M	-45.03	-48.91	***-26.45***	-28.03	-24.27

8.5.2. WORST PLOT OF OUT OF BAND EMISSIONS (SPURIOUS)

5G NR n5 20 MHz (1 Carrier) – 2TX

ANT 2 / QPSK / Low channel	
9 kHz ~ 150 kHz	
ANT 2 / 16QAM / Mid channel	
9 kHz ~ 150 kHz	

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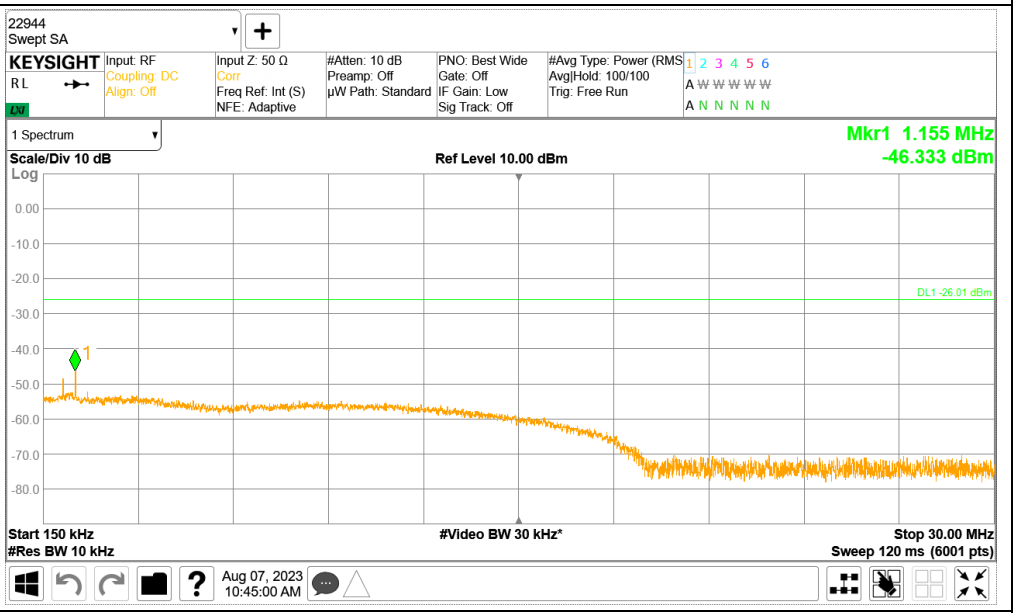
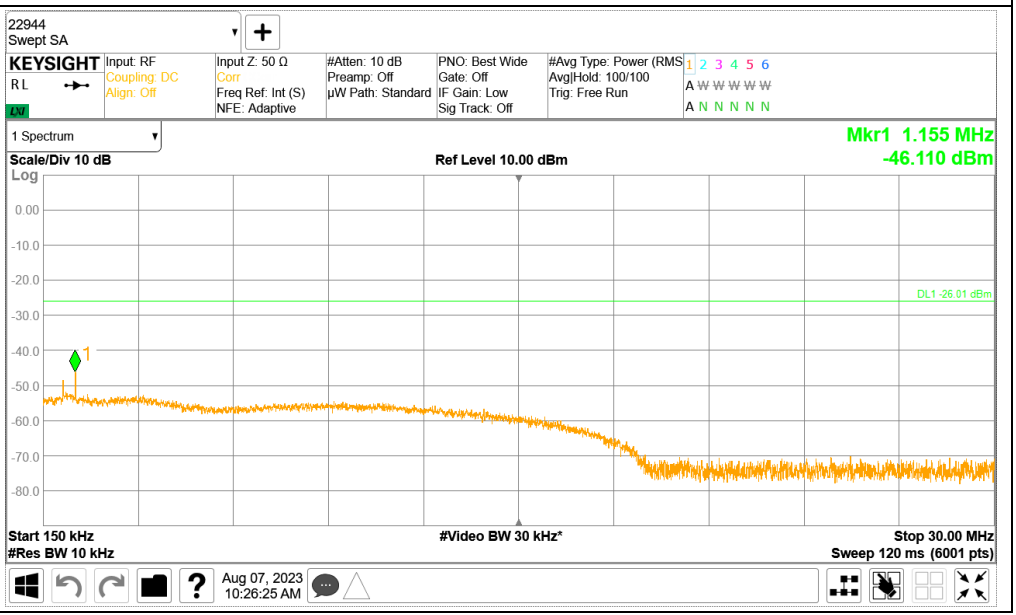
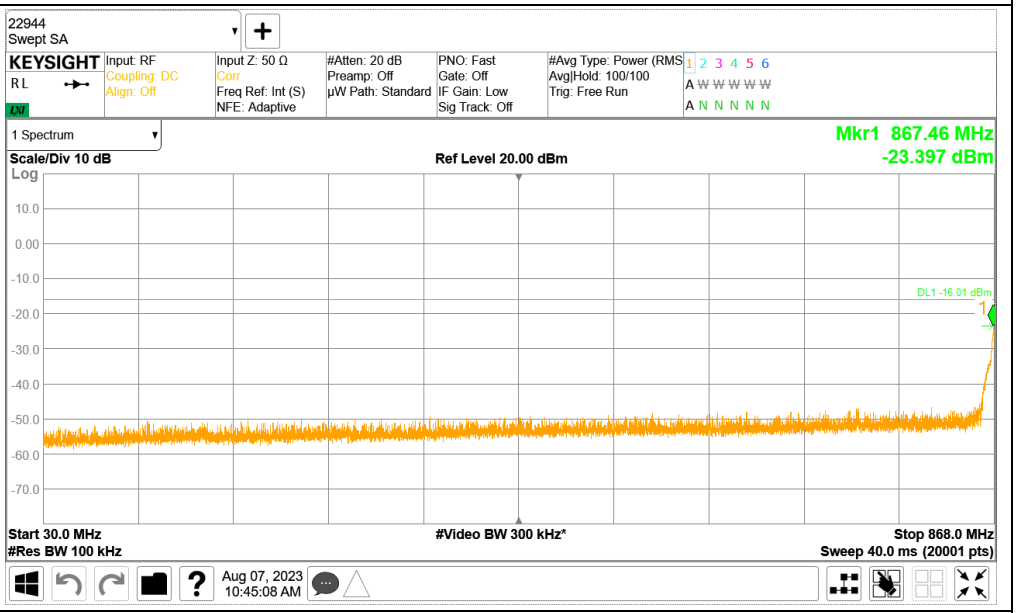
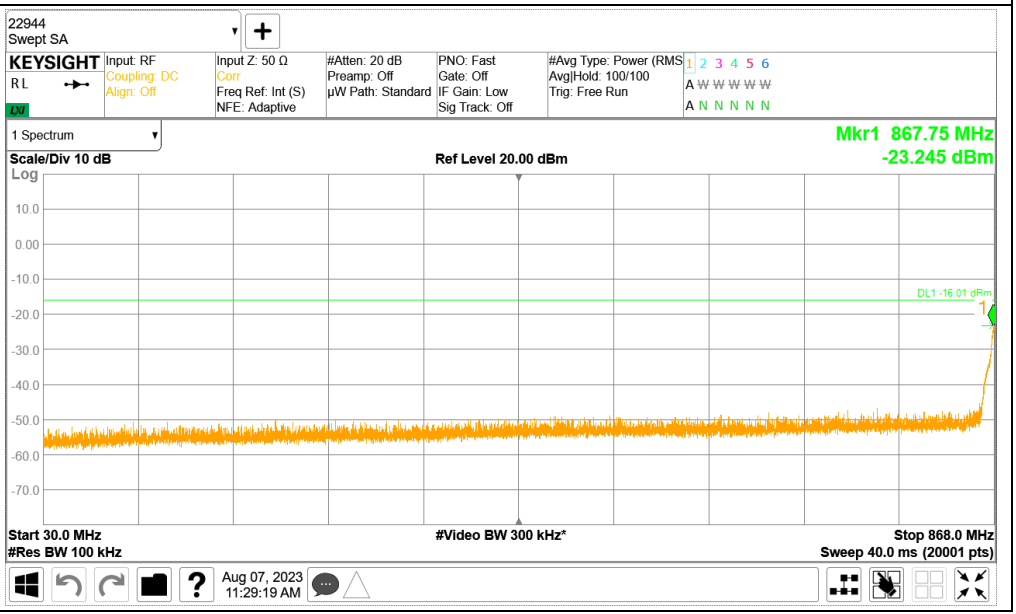
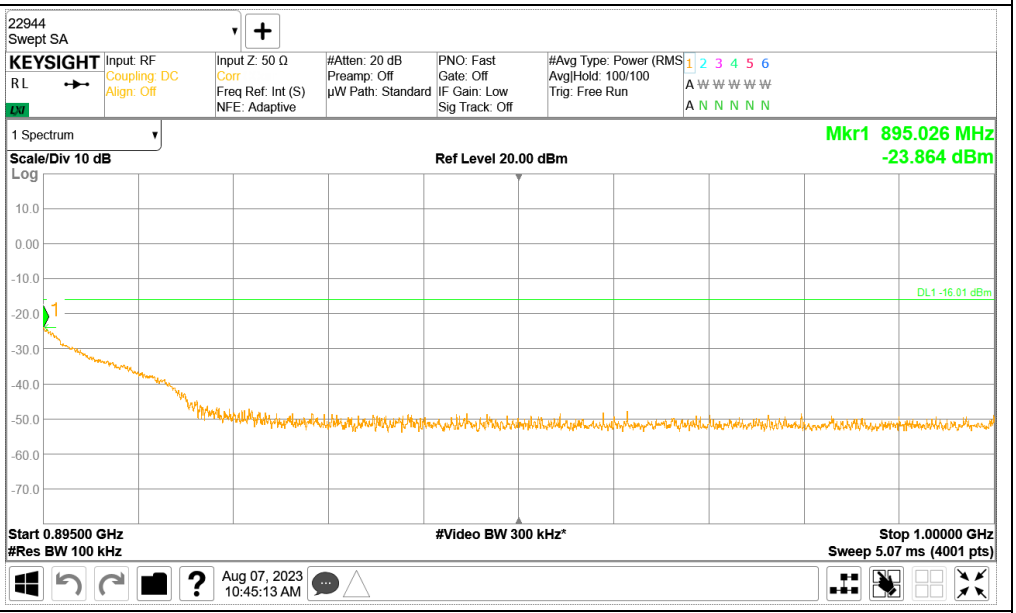
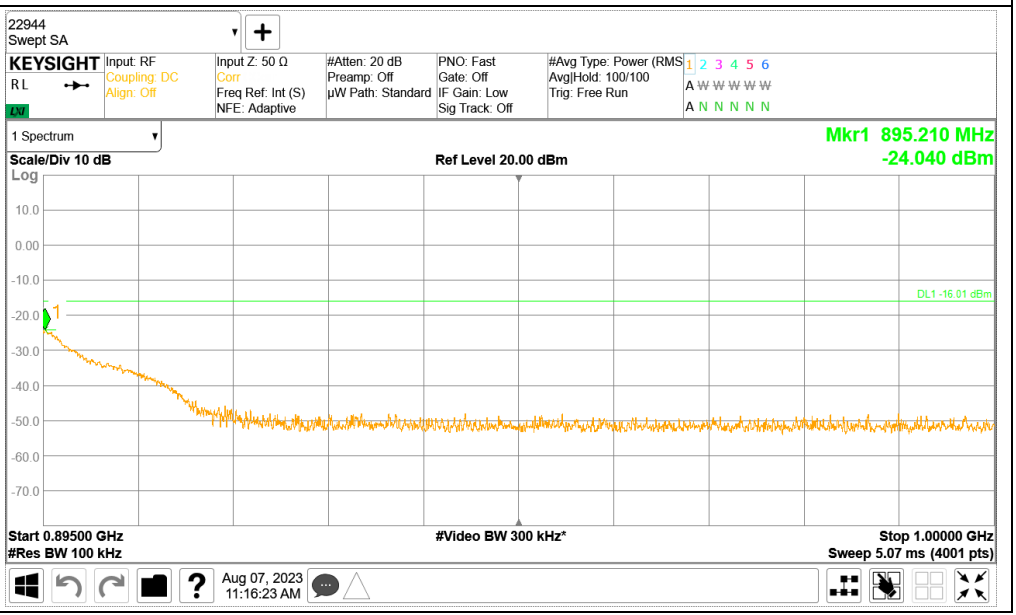
ANT 1 / QPSK / High channel	
150 kHz ~ 30 MHz	

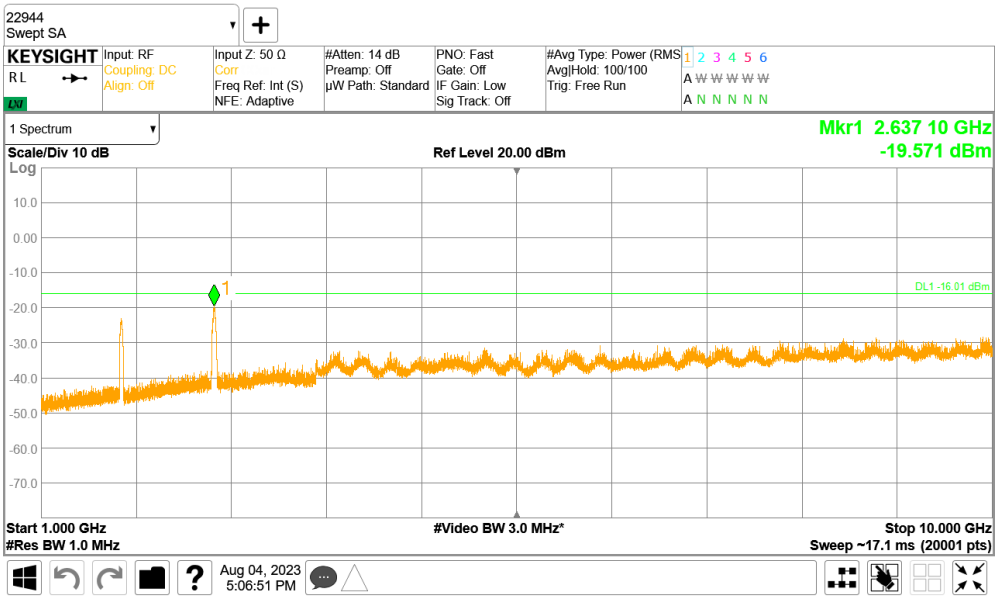
ANT 1 / 256QAM / Mid channel	
150 kHz ~ 30 MHz	

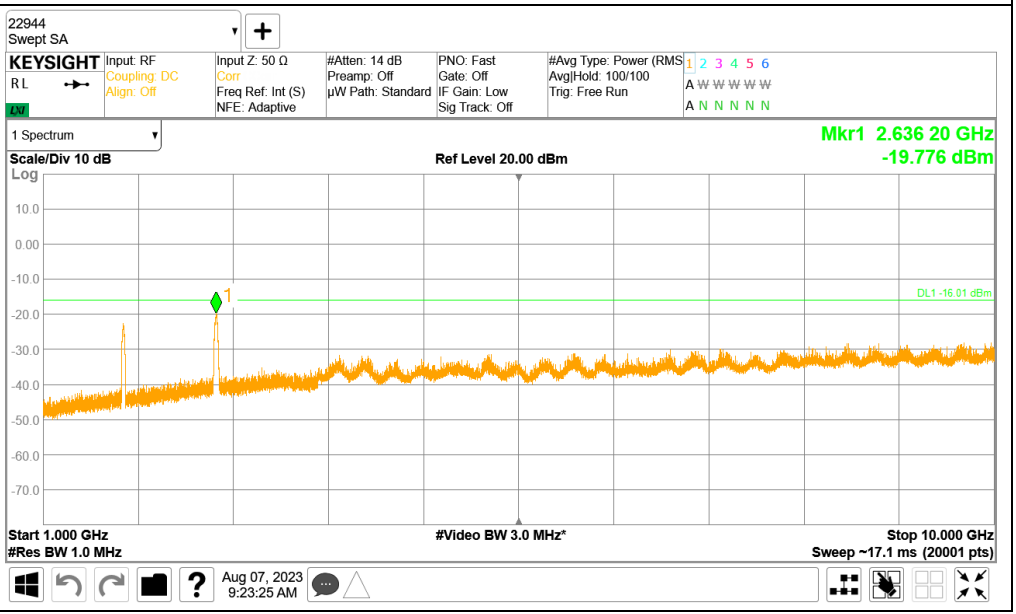
ANT 1 / QPSK / High channel	
30 MHz ~ 868 MHz	

ANT 1 / 256QAM / High channel	
30 MHz ~ 868 MHz	

ANT 1 / QPSK / High channel	
895 MHz ~ 1 GHz	

ANT 1 / 64QAM / High channel	
895 MHz ~ 1 GHz	

ANT 1 / QPSK / Low channel	
1 GHz ~ 10 GHz	

ANT 1 / 256QAM / Low channel	
1 GHz ~ 10 GHz	

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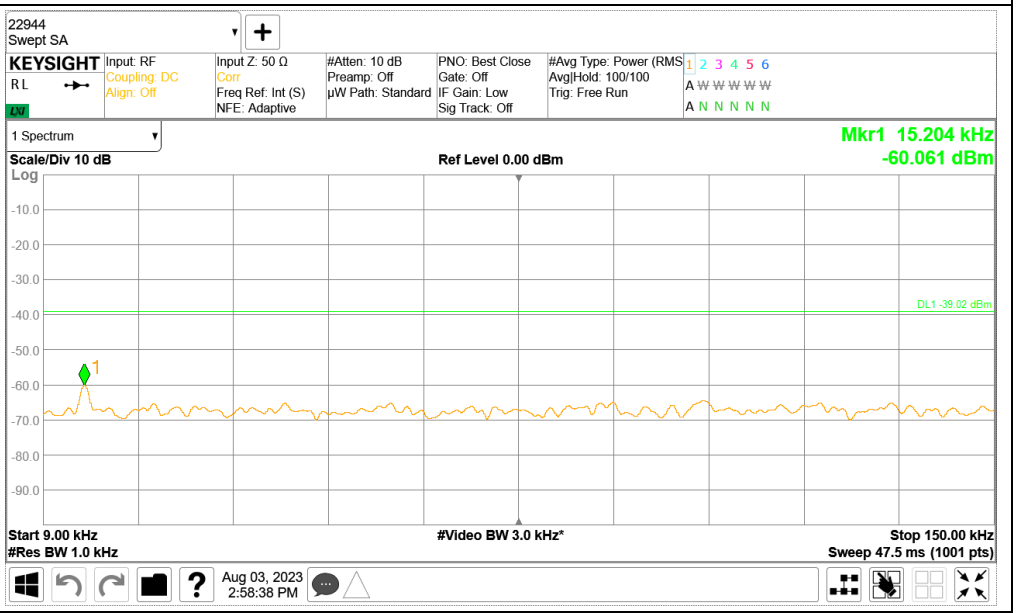
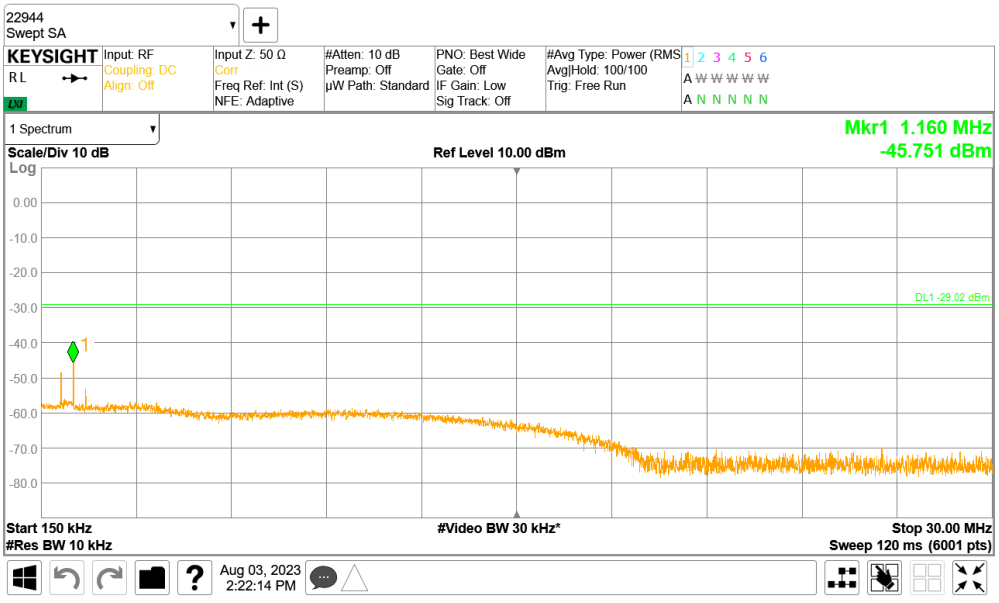
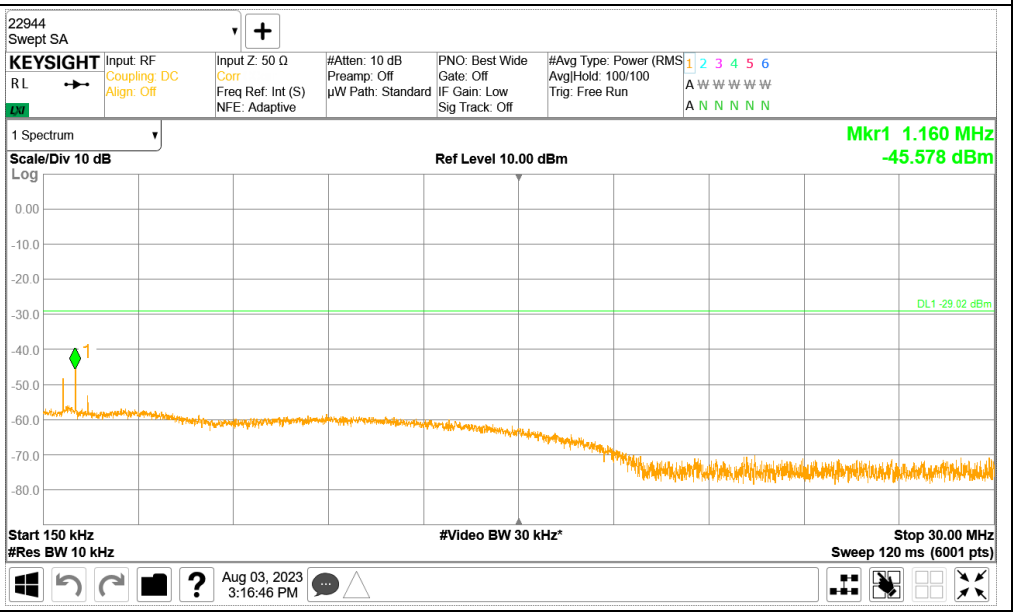
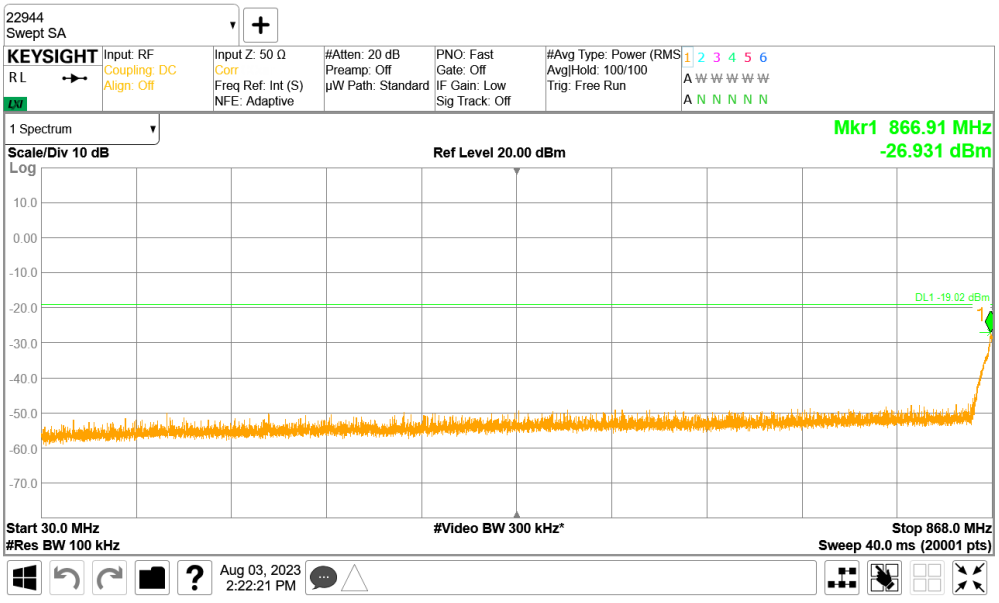
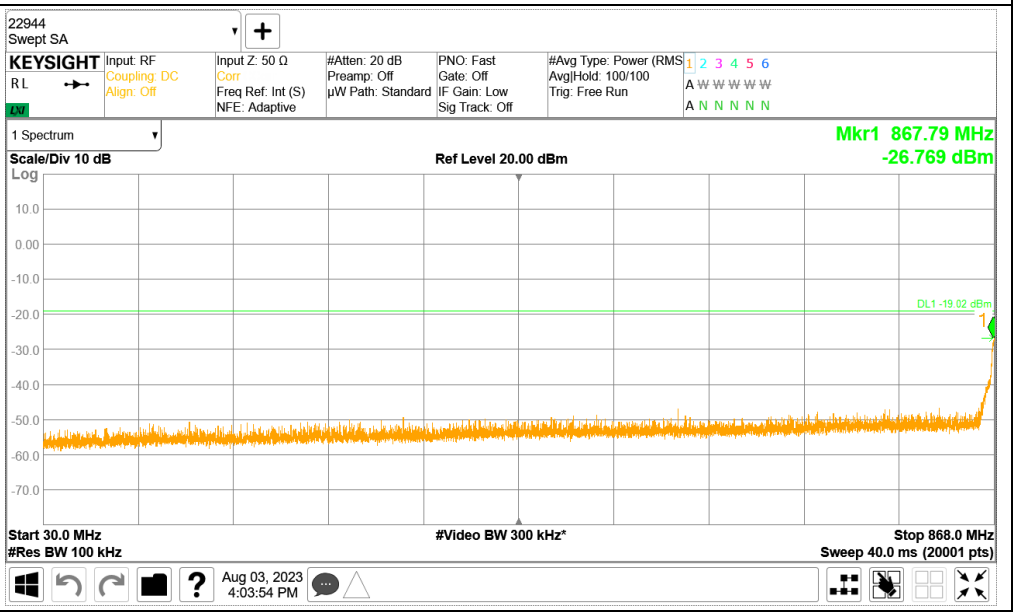
5G NR n5 20 MHz (1 Carrier) – 4TX

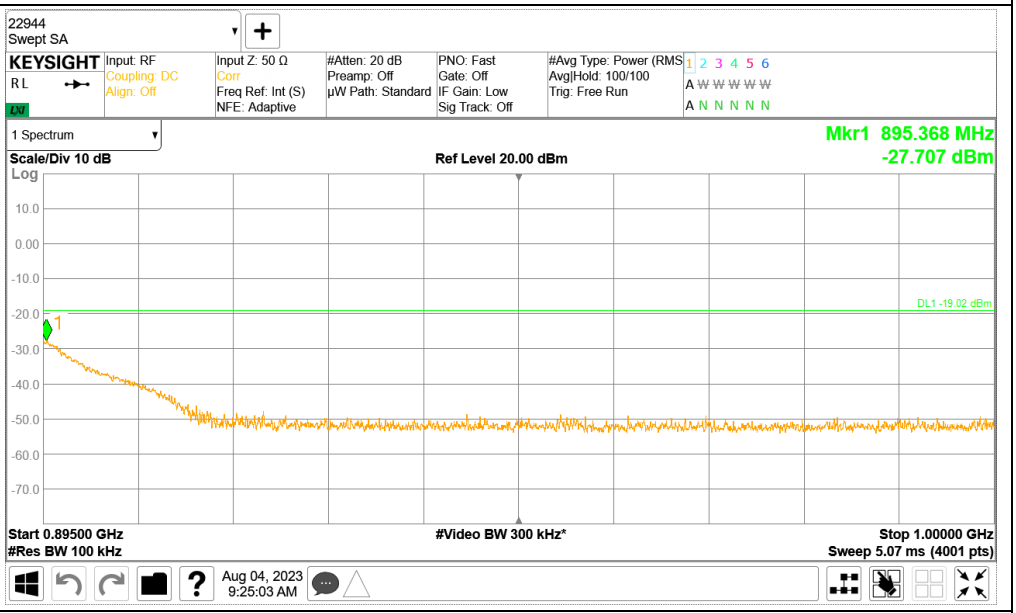
ANT 2 / QPSK / Mid channel	
9 kHz ~ 150 kHz	
ANT 2 / 64QAM / Low channel	
9 kHz ~ 150 kHz	

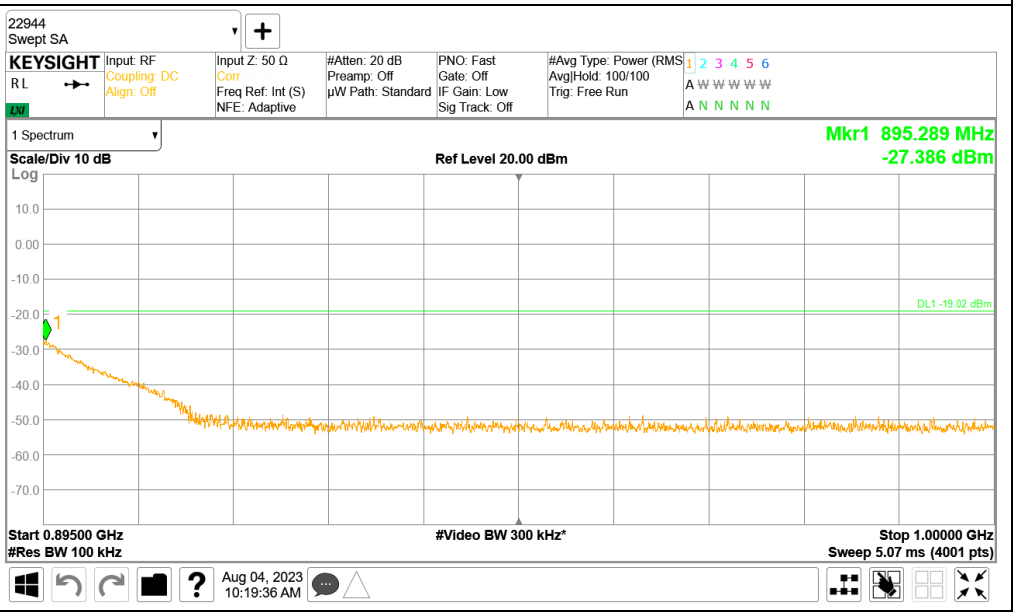
ANT 1 / QPSK / Low channel	
150 kHz ~ 30 MHz	

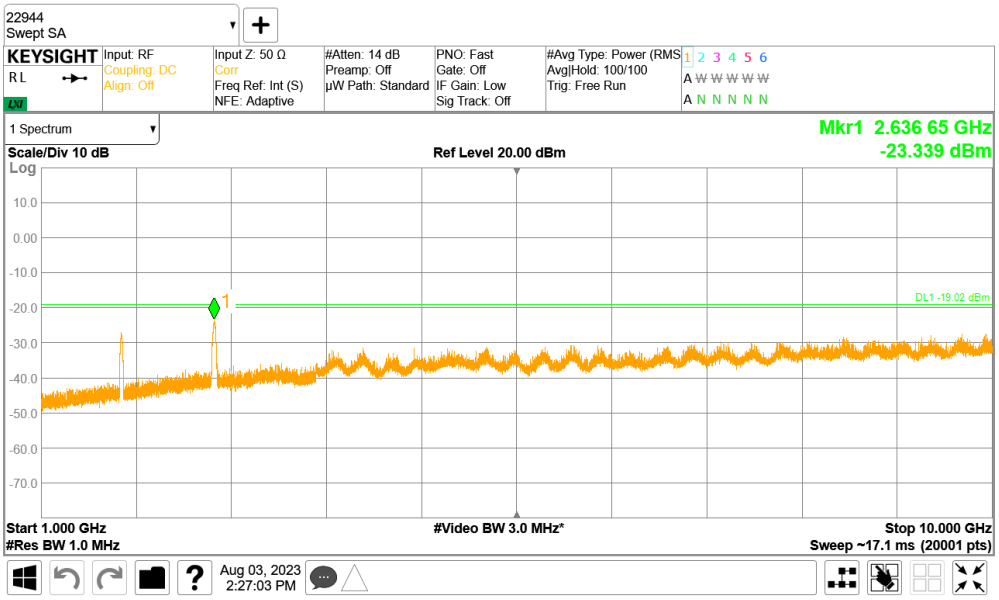
ANT 1 / 256QAM / Low channel	
150 kHz ~ 30 MHz	

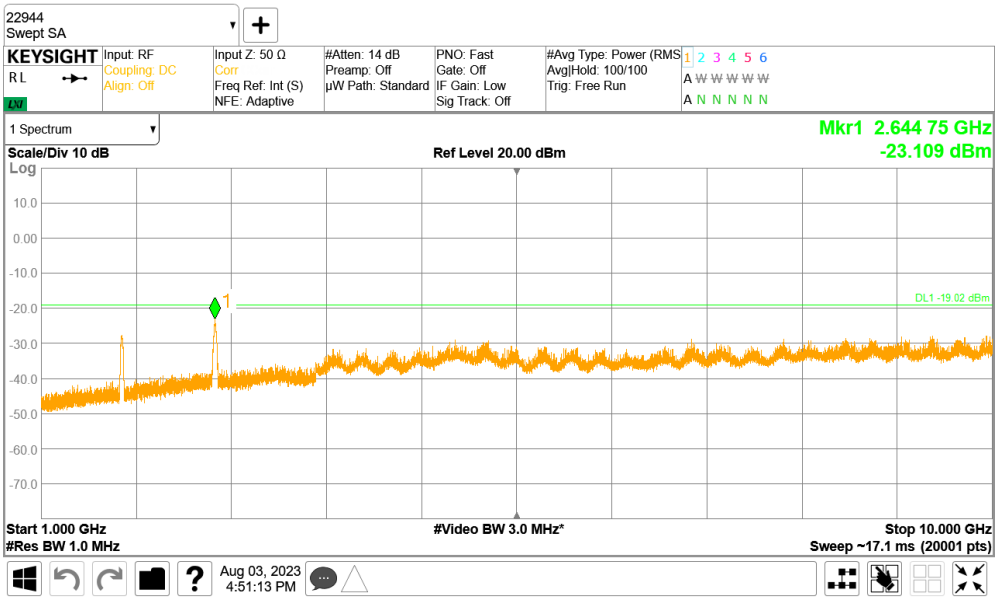
ANT 1 / QPSK / Low channel	
30 MHz ~ 868 MHz	

ANT 3 / 16QAM / Mid channel	
30 MHz ~ 868 MHz	

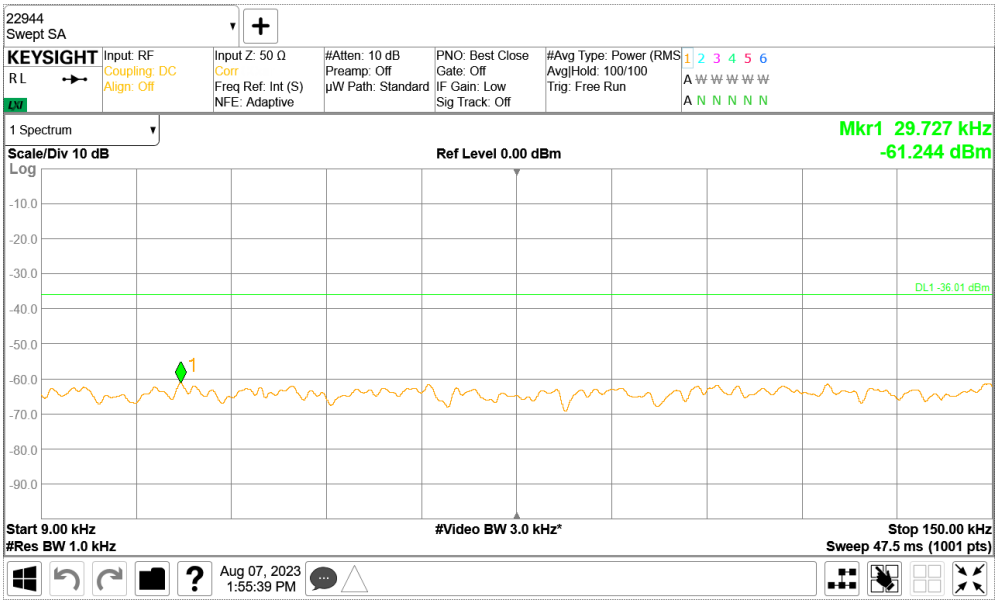
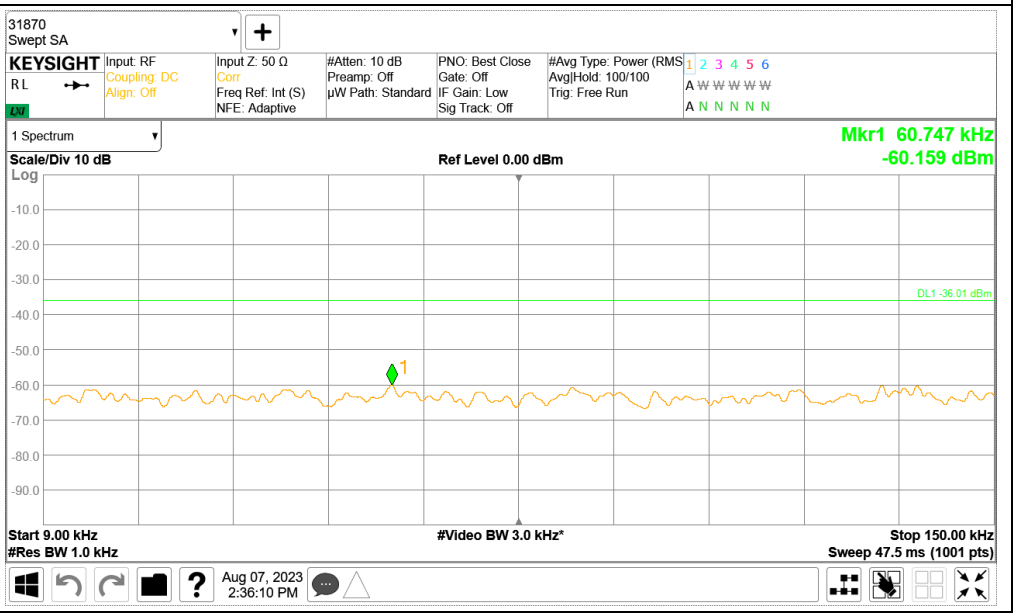
ANT 1 / QPSK / High channel	
895 MHz ~ 1 GHz	

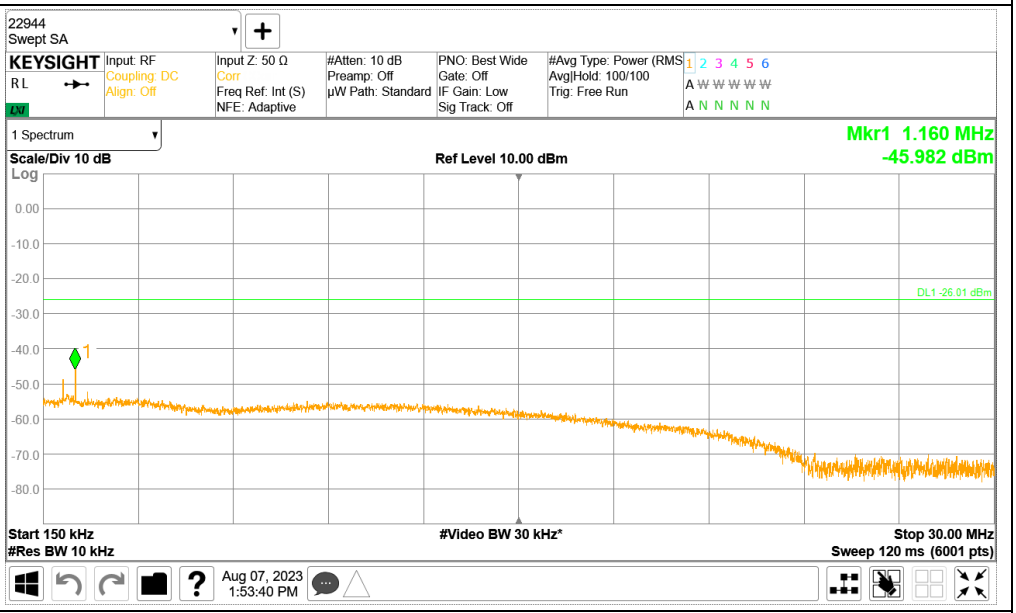
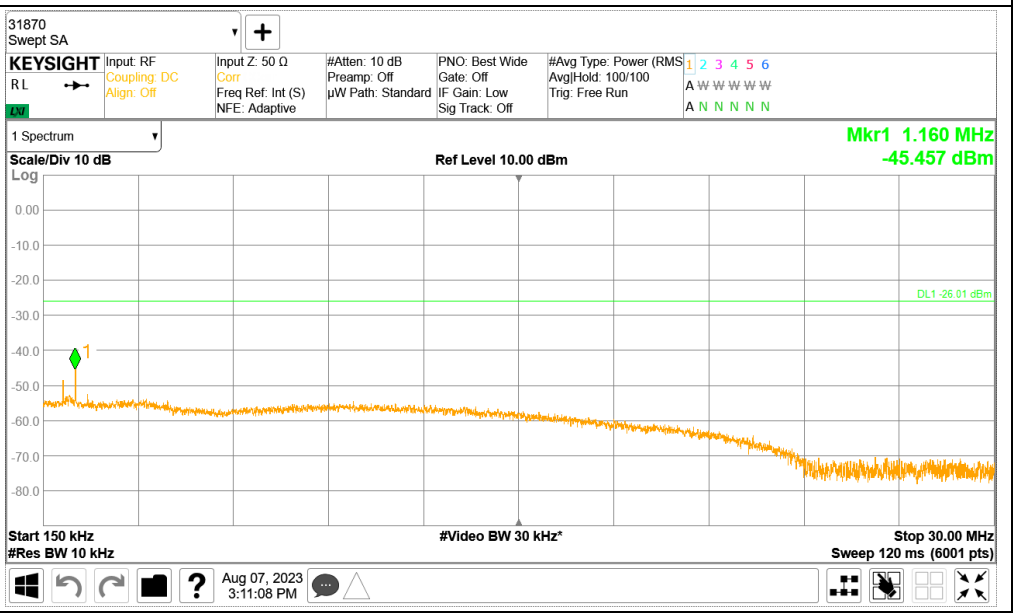
ANT 1 / 256QAM / High channel	
895 MHz ~ 1 GHz	

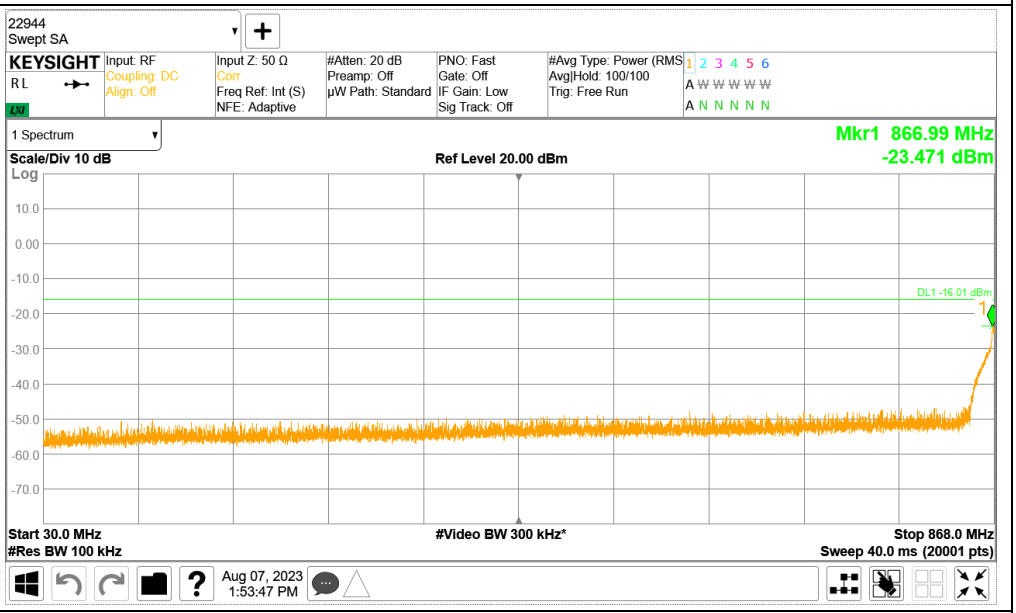
ANT 3 / QPSK / Low channel	
1 GHz ~ 10 GHz	

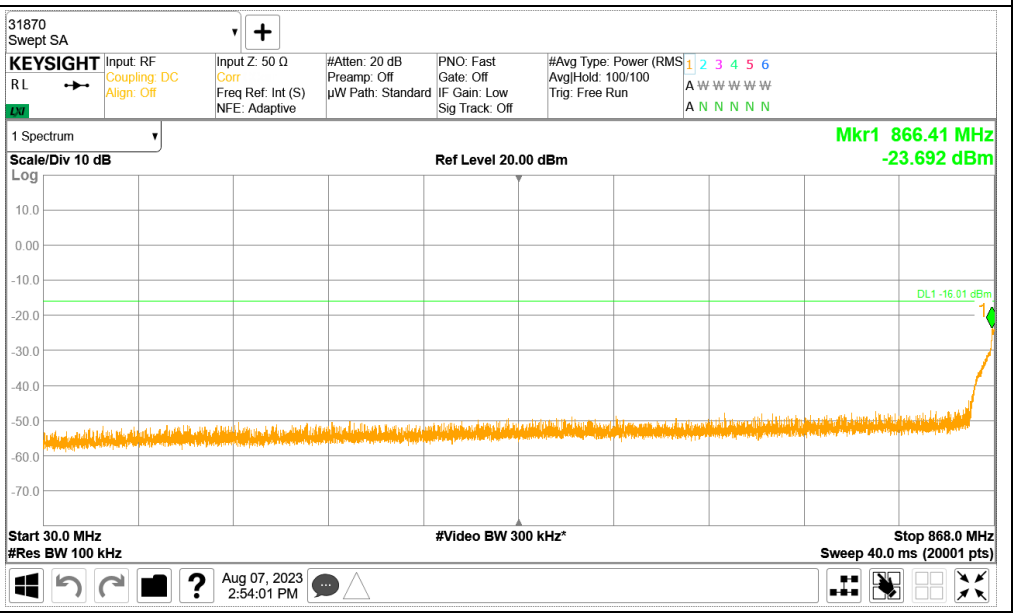
ANT 4 / 256QAM / Mid channel	
1 GHz ~ 10 GHz	

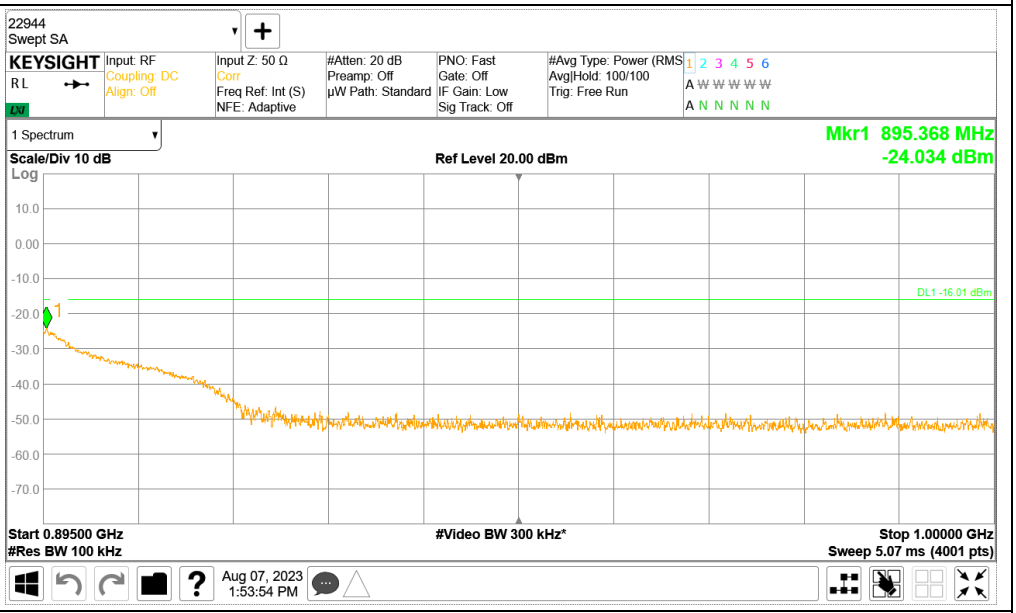
5G NR n5 20 MHz 1C + 5G NR n5 5 MHz 1C (2 Carrier) – 2TX – Contiguous

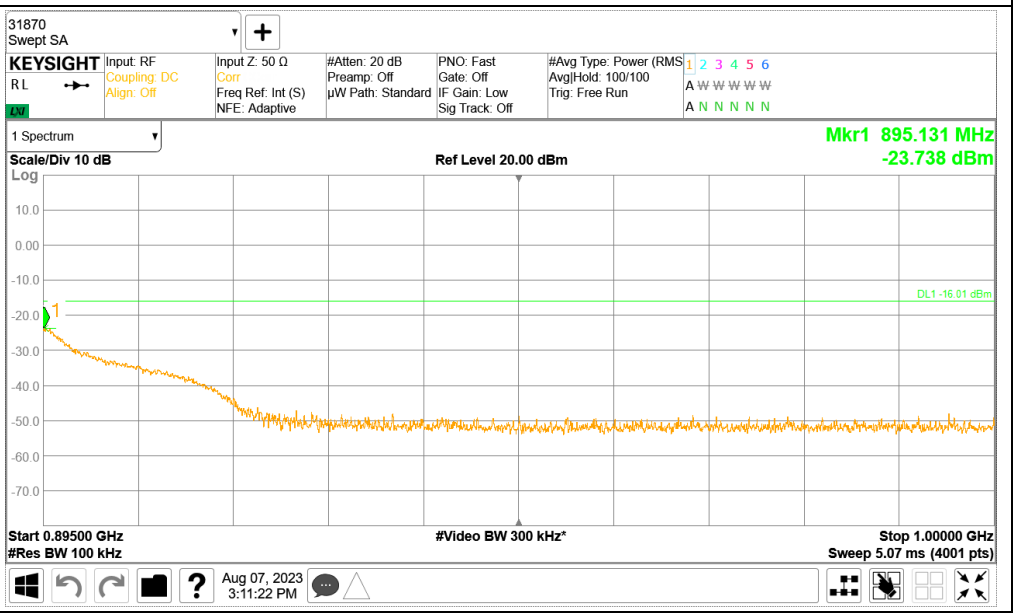
ANT 2 / QPSK / Mid channel	
9 kHz ~ 150 kHz	
ANT 2 / 16QAM / Mid channel	
9 kHz ~ 150 kHz	

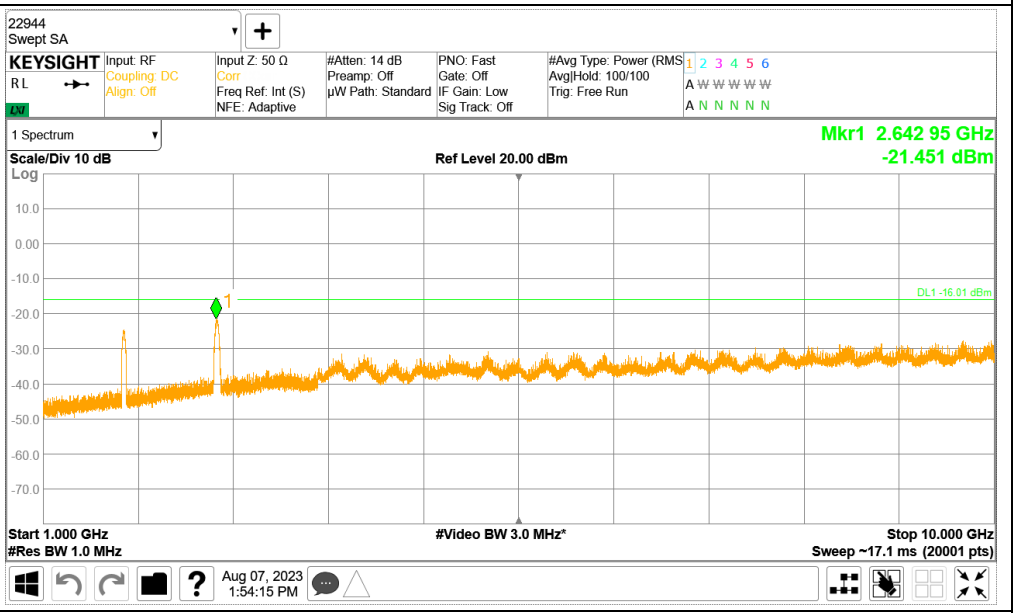
ANT 1 / QPSK / Mid channel	
150 kHz ~ 30 MHz	
ANT 1 / 256QAM / Mid channel	
150 kHz ~ 30 MHz	

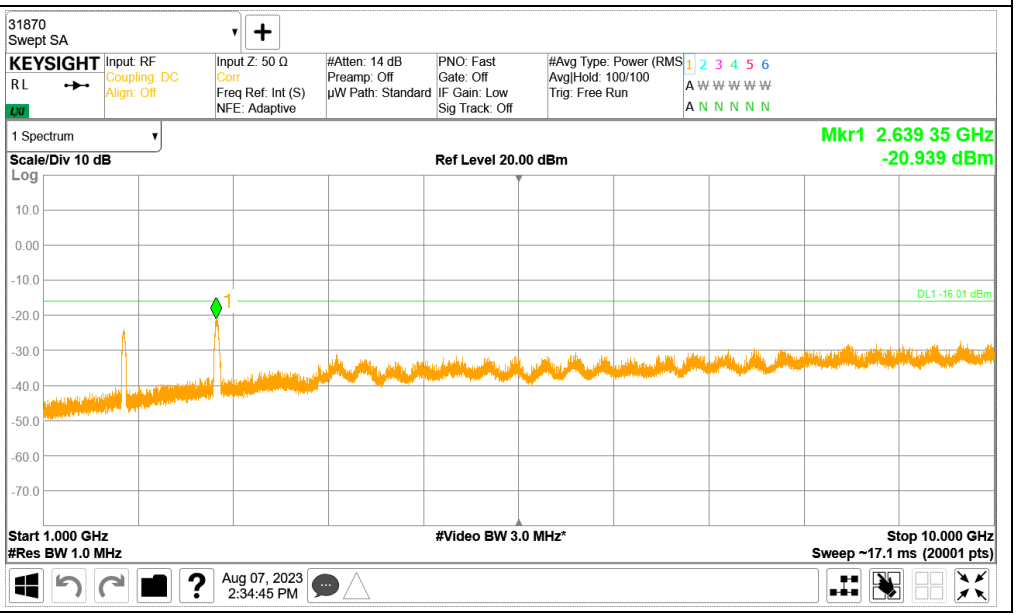
ANT 1 / QPSK / Mid channel	
30 MHz ~ 868 MHz	

ANT 1 / 64QAM / Mid channel	
30 MHz ~ 868 MHz	

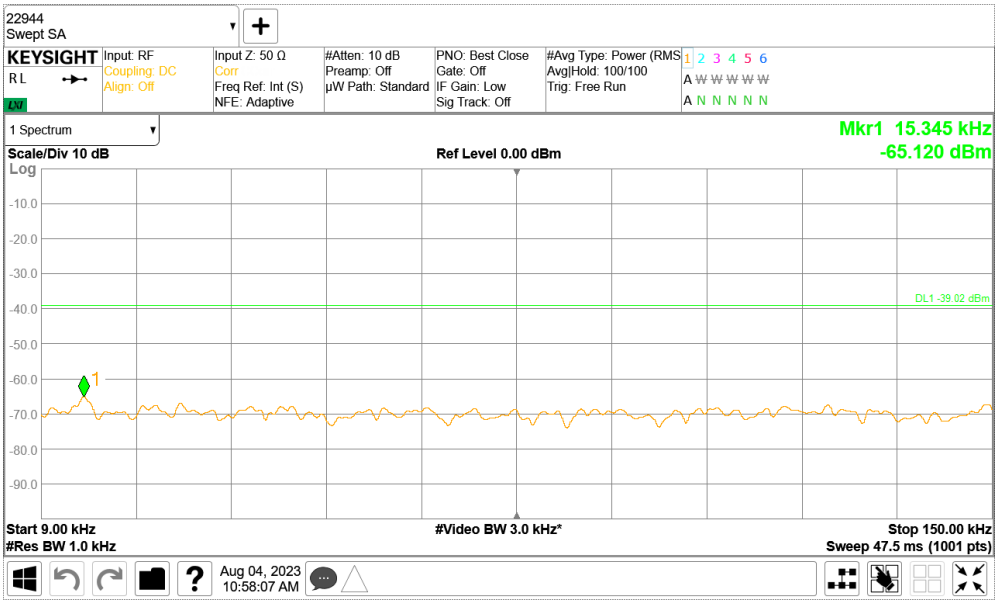
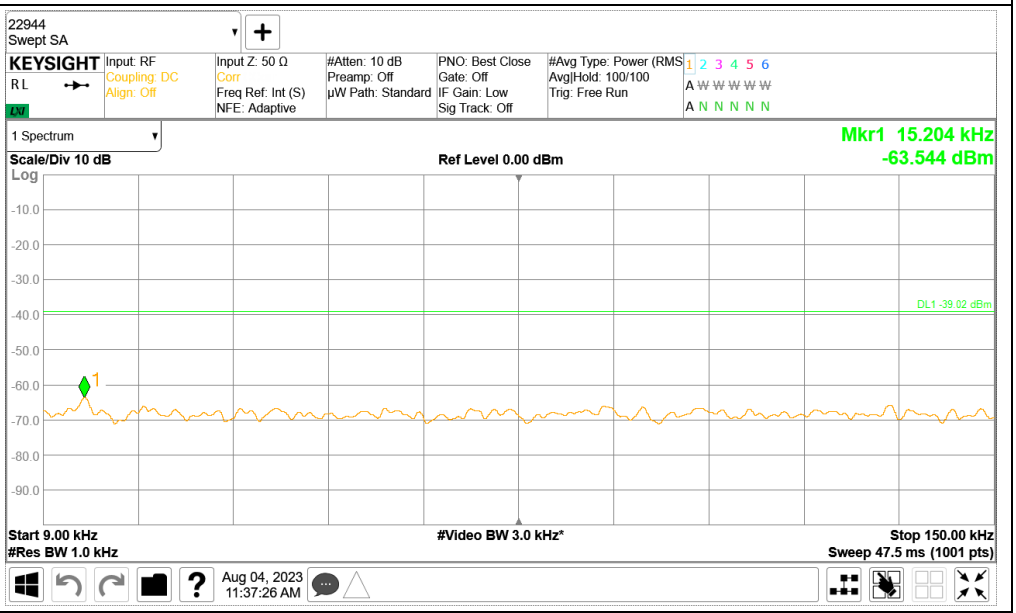
ANT 1 / QPSK / Mid channel	
895 MHz ~ 1 GHz	

ANT 1 / 256QAM / Mid channel	
895 MHz ~ 1 GHz	

ANT 1 / QPSK / Mid channel	
1 GHz ~ 10 GHz	

ANT 1 / 16QAM / Mid channel	
1 GHz ~ 10 GHz	

5G NR n5 20 MHz 1C + 5G NR n5 5 MHz 1C (2 Carrier) – 4TX – Contiguous

ANT 4 / QPSK / Mid channel	
9 kHz ~ 150 kHz	
ANT 2 / 64QAM / Mid channel	
9 kHz ~ 150 kHz	

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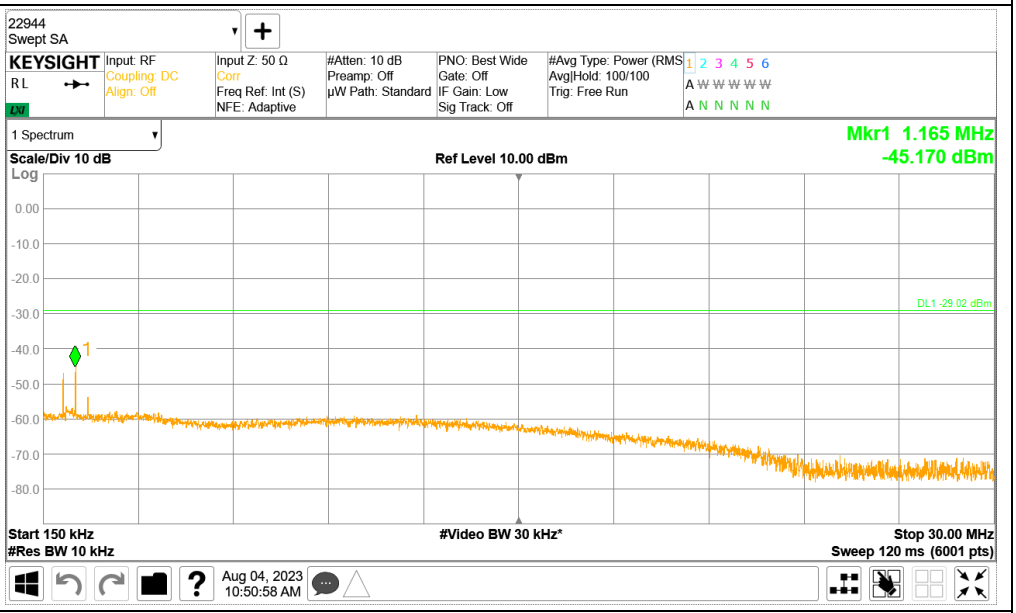
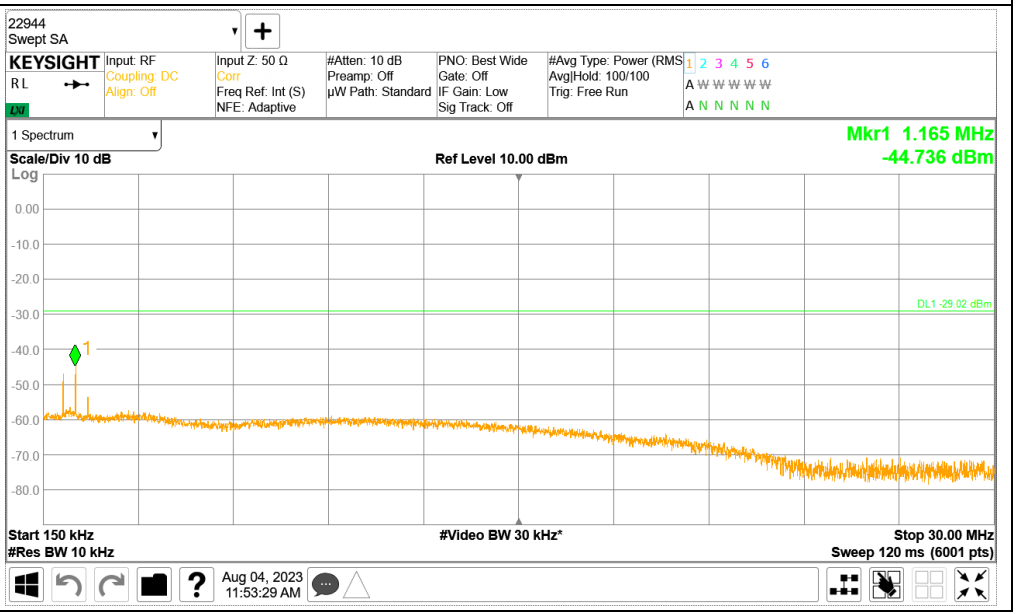
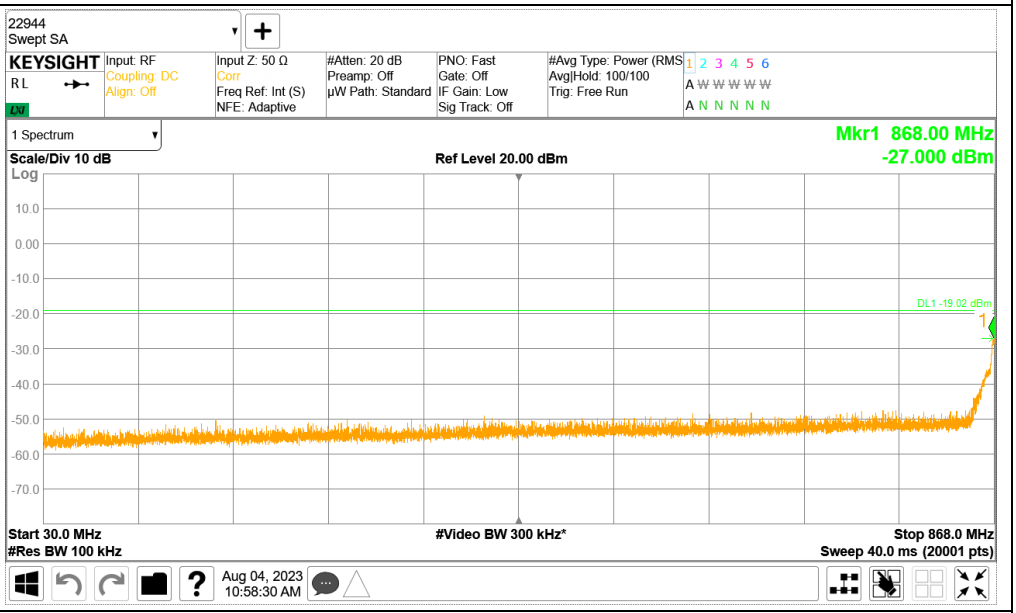
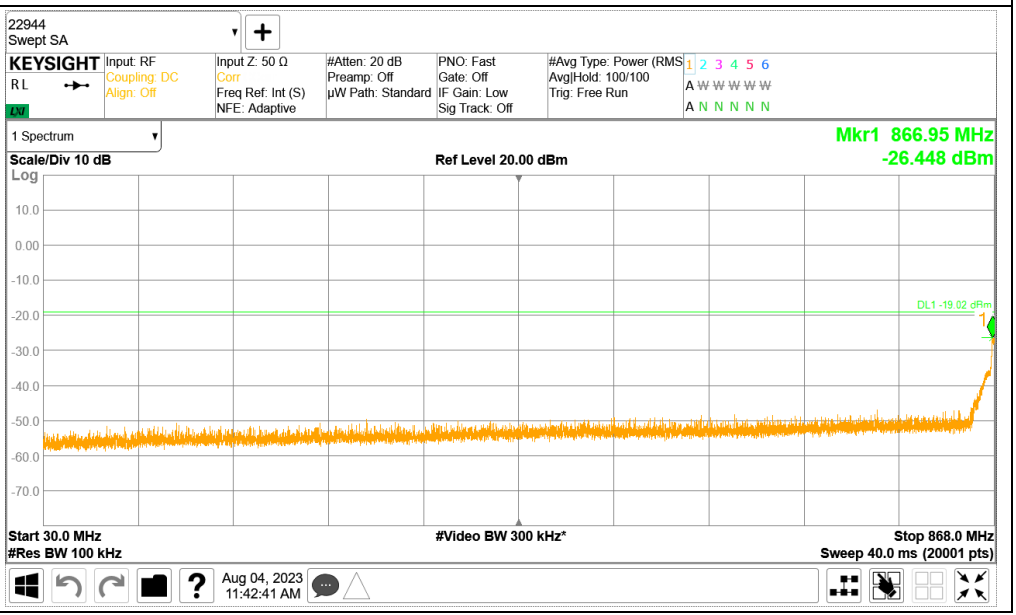
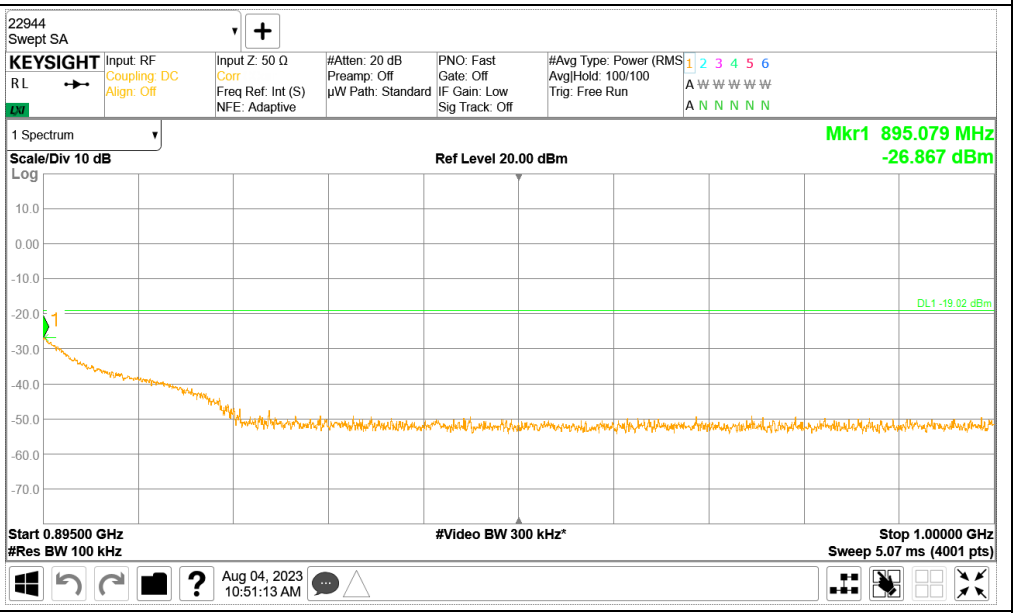
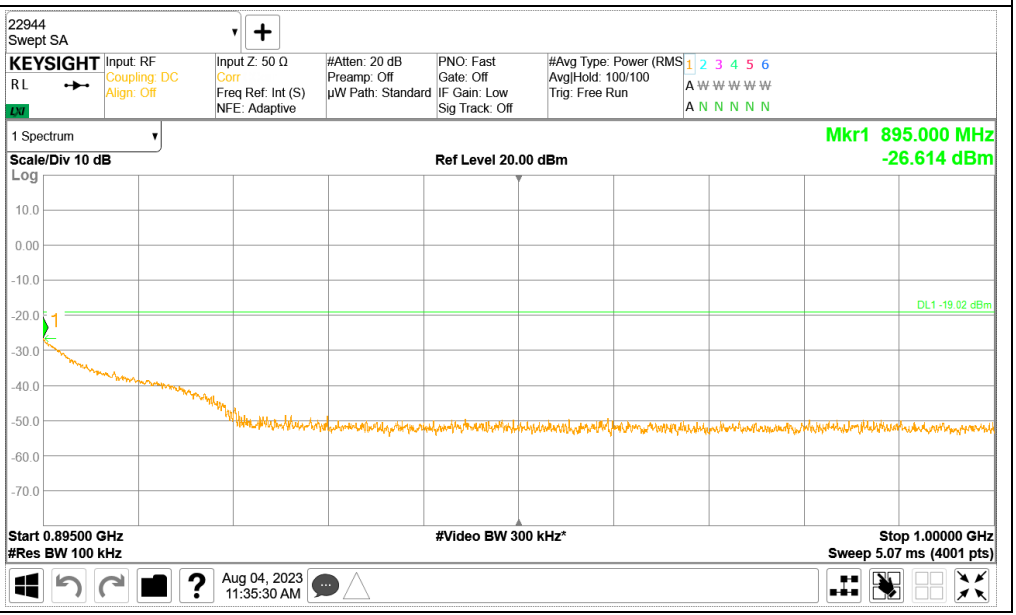
ANT 1 / QPSK / Mid channel	
150 kHz ~ 30 MHz	

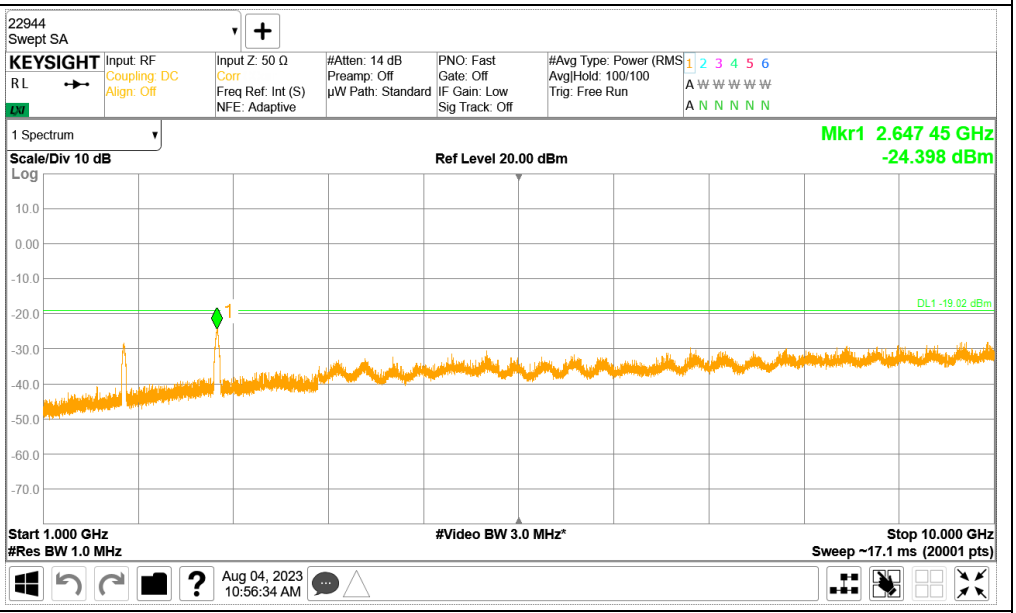
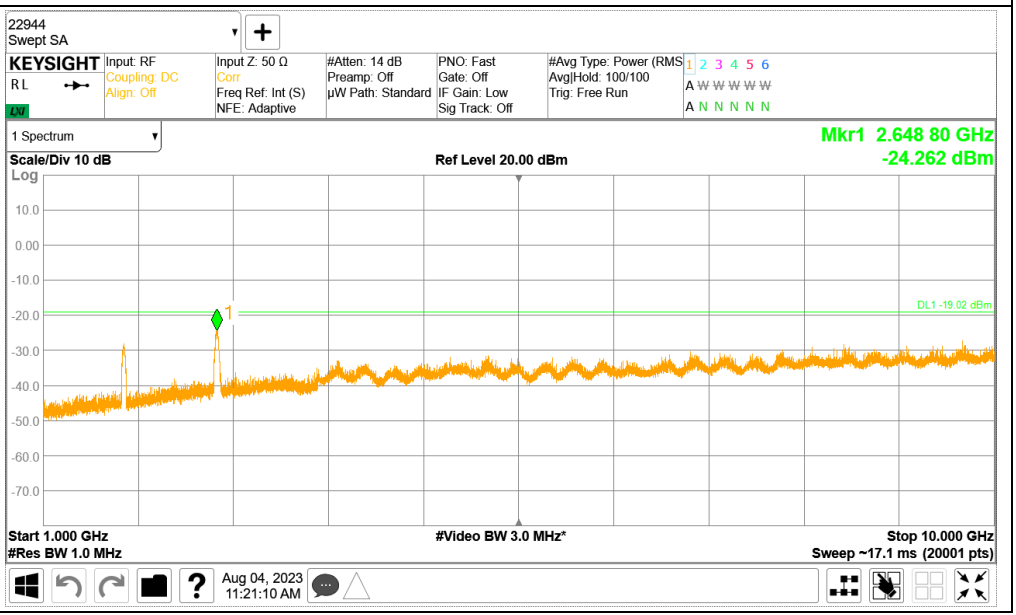
ANT 1 / 256QAM / Mid channel	
150 kHz ~ 30 MHz	

ANT 4 / QPSK / Mid channel	
30 MHz ~ 868 MHz	

ANT 4 / 64QAM / Mid channel	
30 MHz ~ 868 MHz	

ANT 1 / QPSK / Mid channel	
895 MHz ~ 1 GHz	

ANT 1 / 64QAM / Mid channel	
895 MHz ~ 1 GHz	

ANT 3 / QPSK / Mid channel	
1 GHz ~ 10 GHz	
ANT 3 / 16QAM / Mid channel	
1 GHz ~ 10 GHz	

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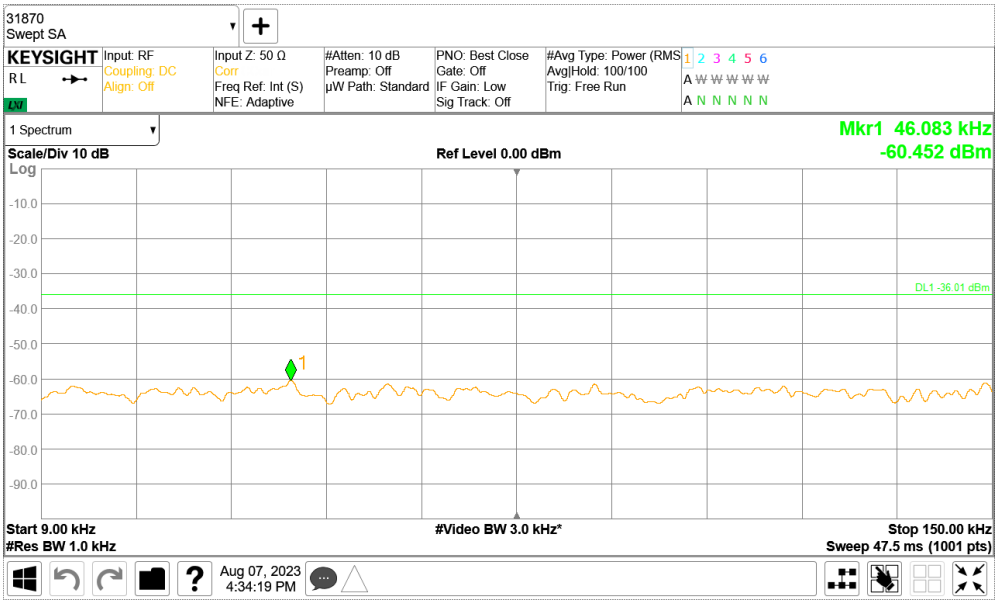
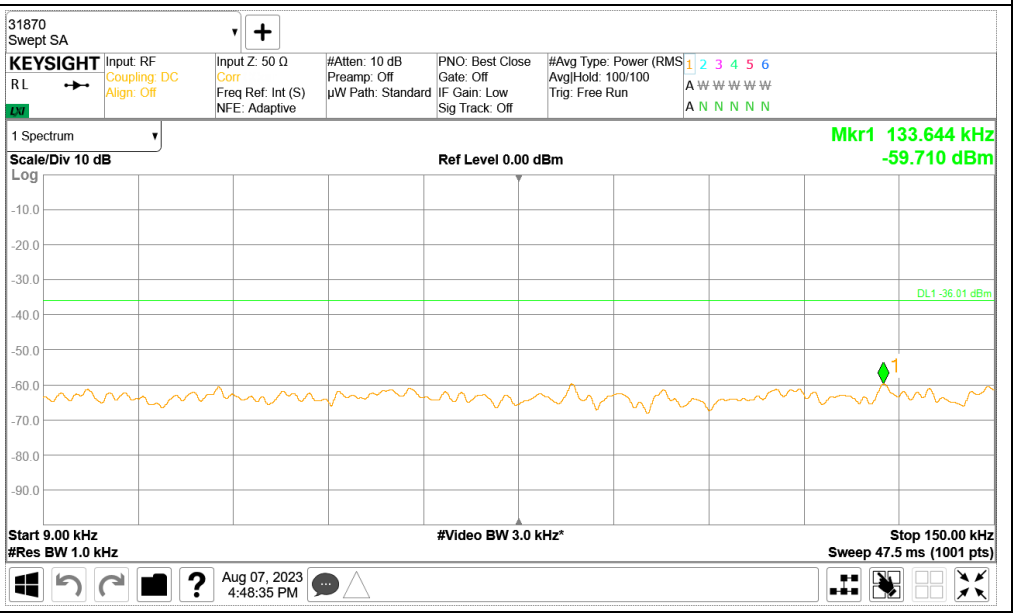
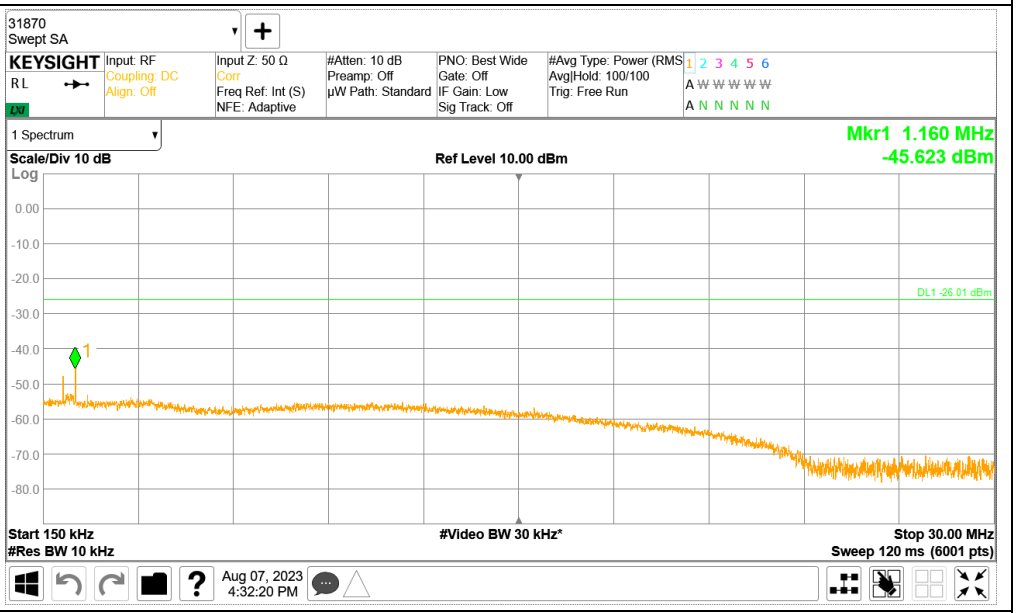
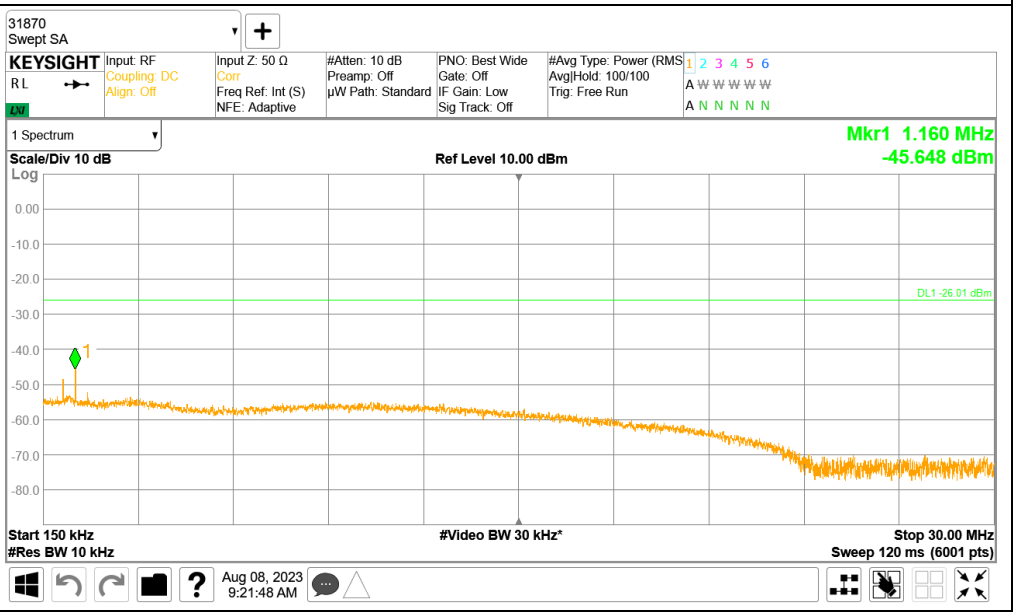
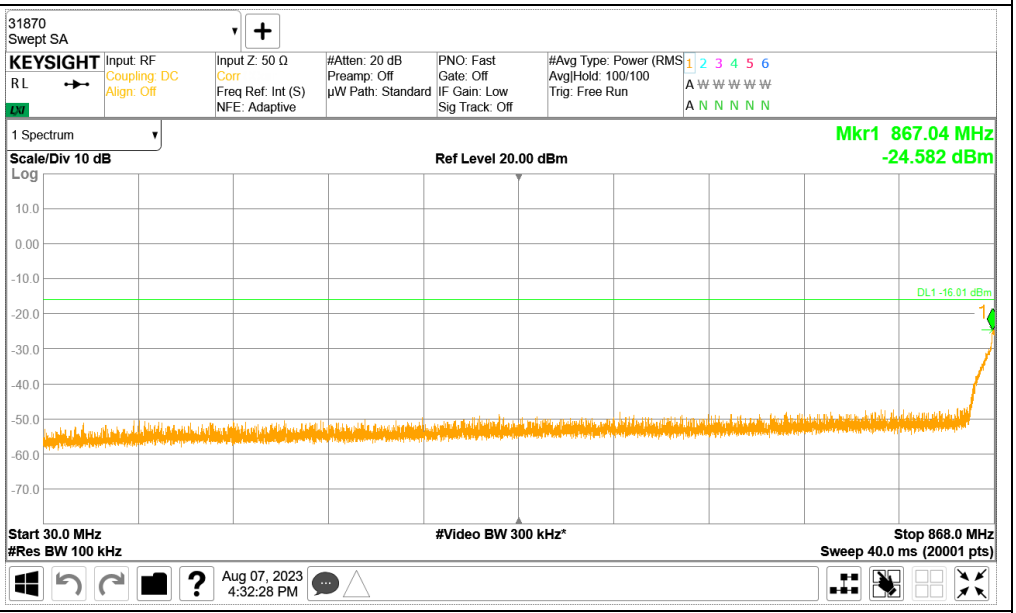
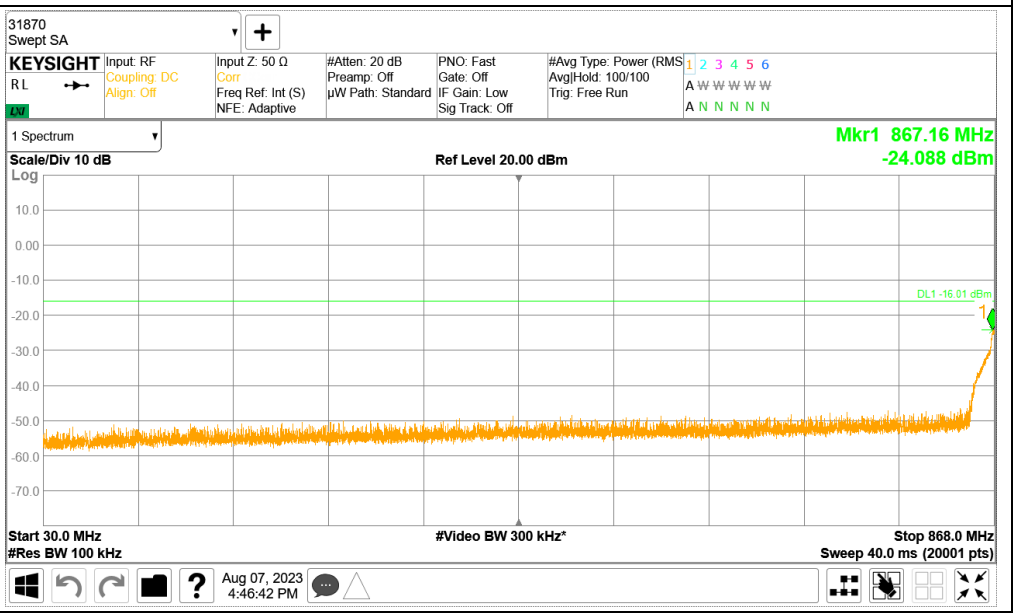
5G NR n5 20 MHz 1C + LTE B5 5 MHz 1C (2 Carrier) – 2TX - Contiguous

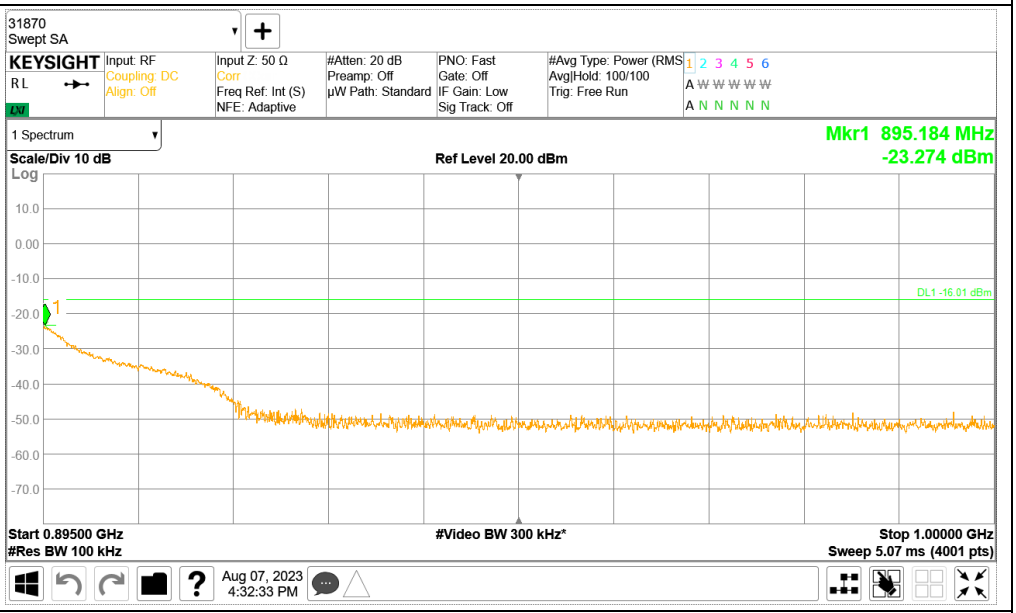
ANT 2 / QPSK / Mid channel	
9 kHz ~ 150 kHz	
ANT 2 / 16QAM / Mid channel	
9 kHz ~ 150 kHz	

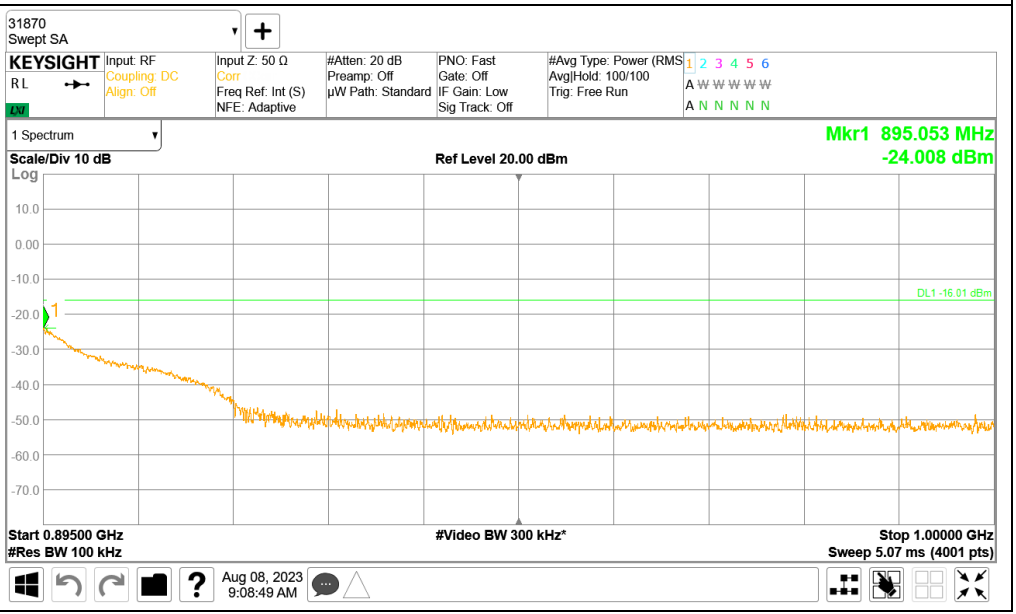
ANT 1 / QPSK / Mid channel	
150 kHz ~ 30 MHz	

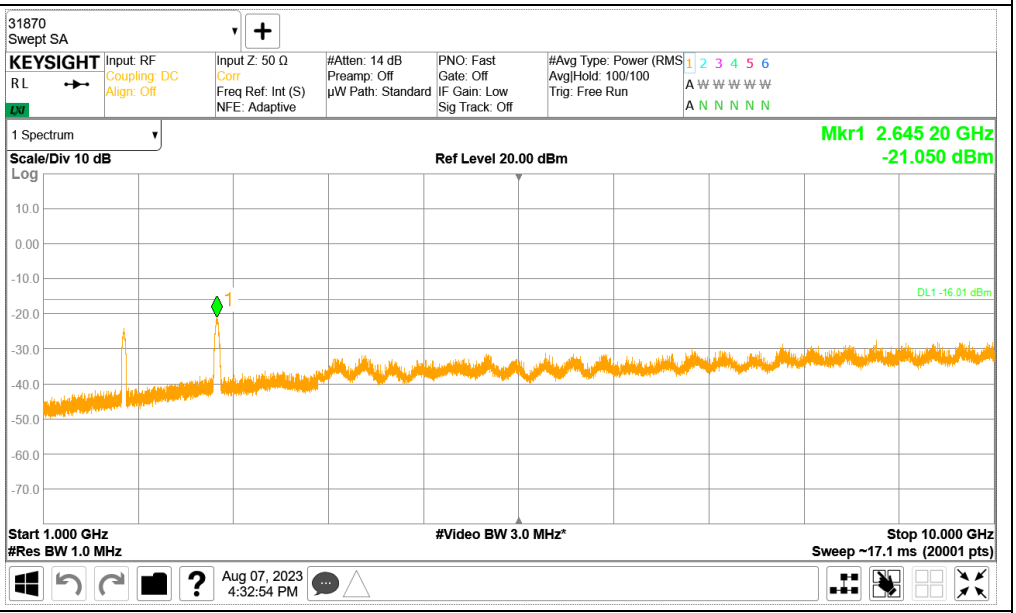
ANT 1 / 256QAM / Mid channel	
150 kHz ~ 30 MHz	

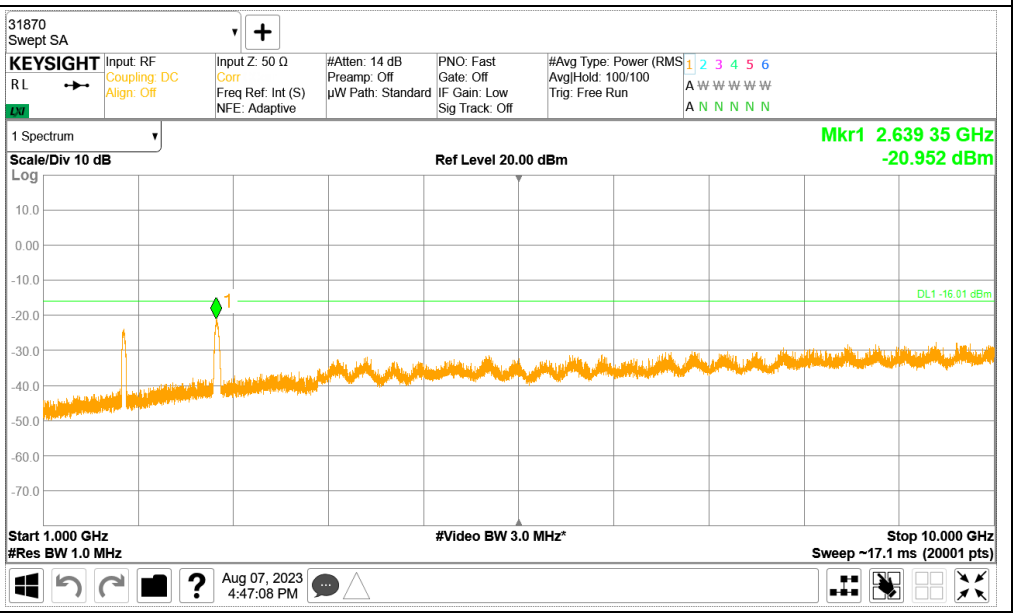
ANT 1 / QPSK / Mid channel	
30 MHz ~ 868 MHz	

ANT 1 / 16QAM / Mid channel	
30 MHz ~ 868 MHz	

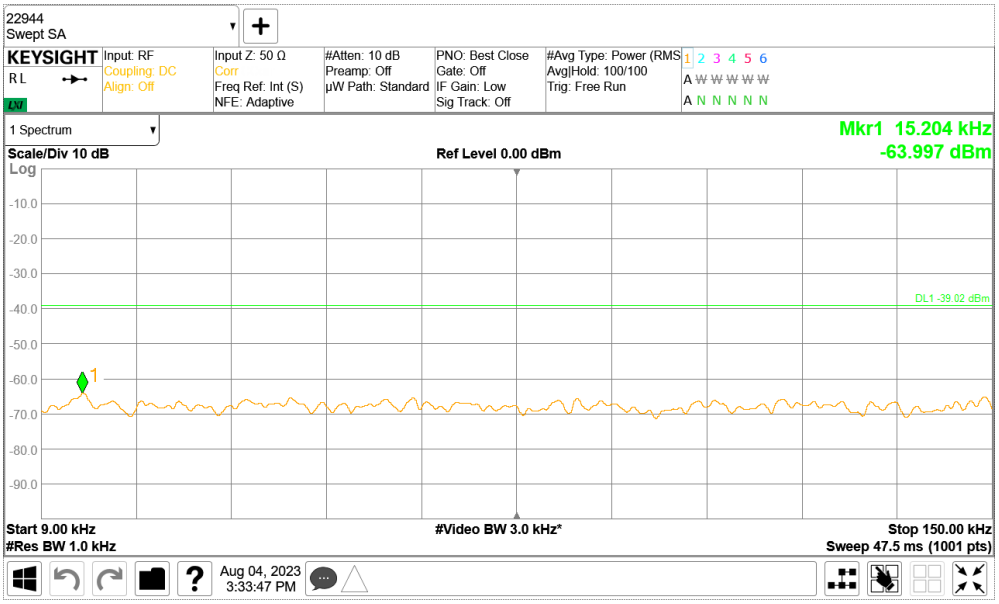
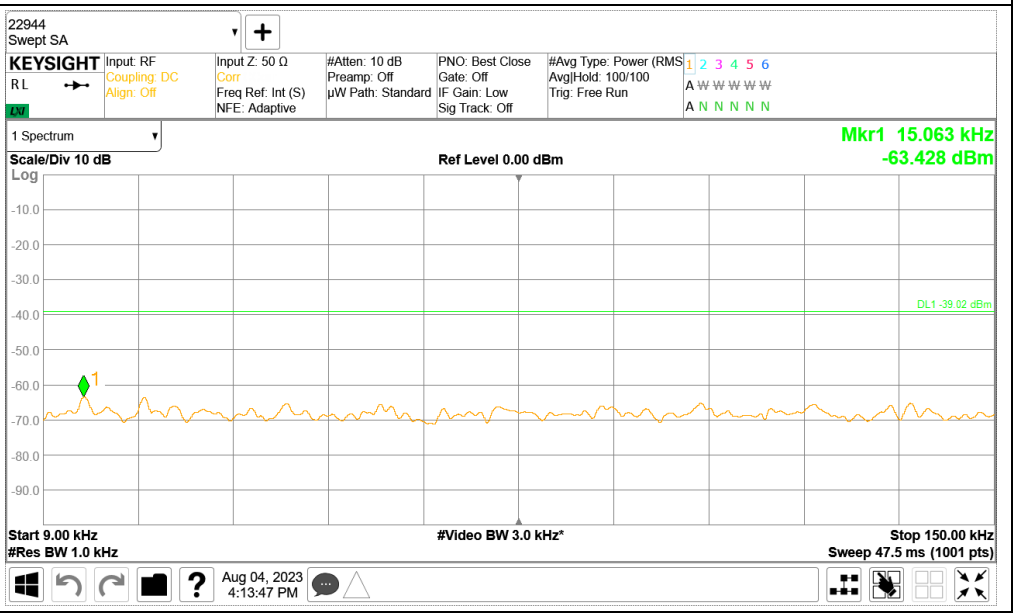
ANT 1 / QPSK / Mid channel	
895 MHz ~ 1 GHz	

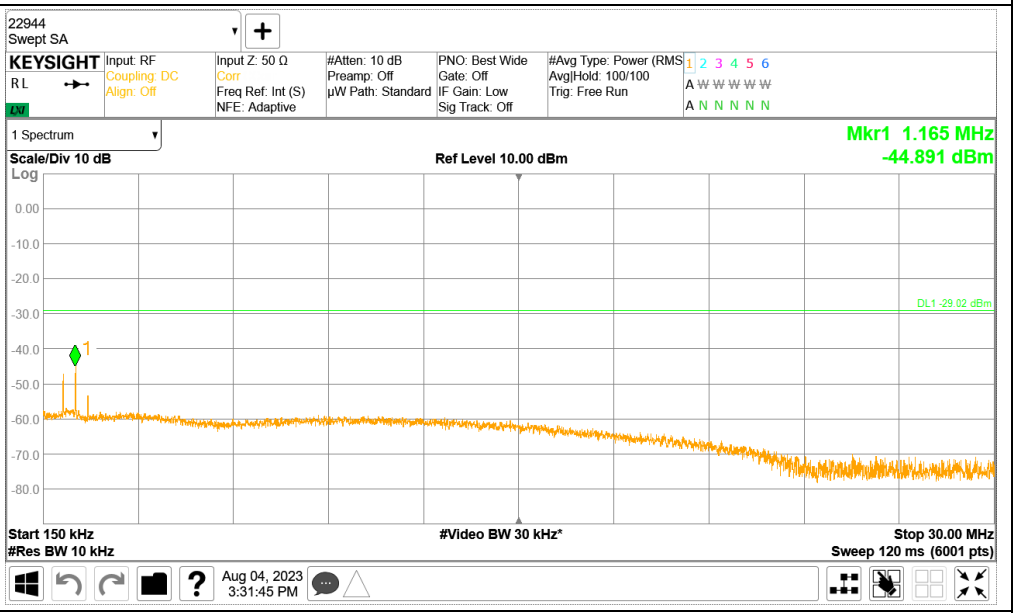
ANT 1 / 64QAM / Mid channel	
895 MHz ~ 1 GHz	

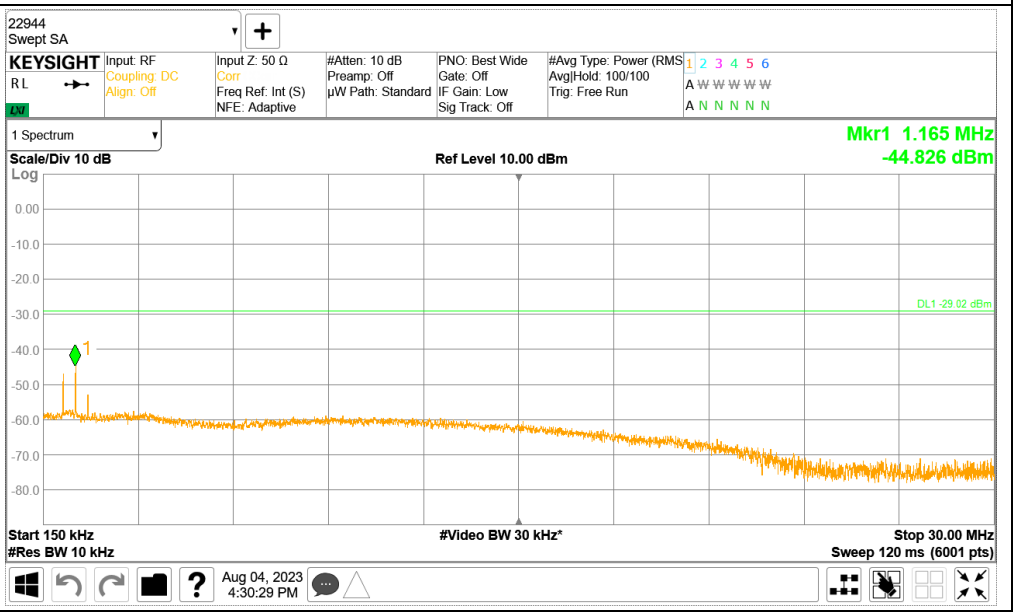
ANT 1 / QPSK / Mid channel	
1 GHz ~ 10 GHz	

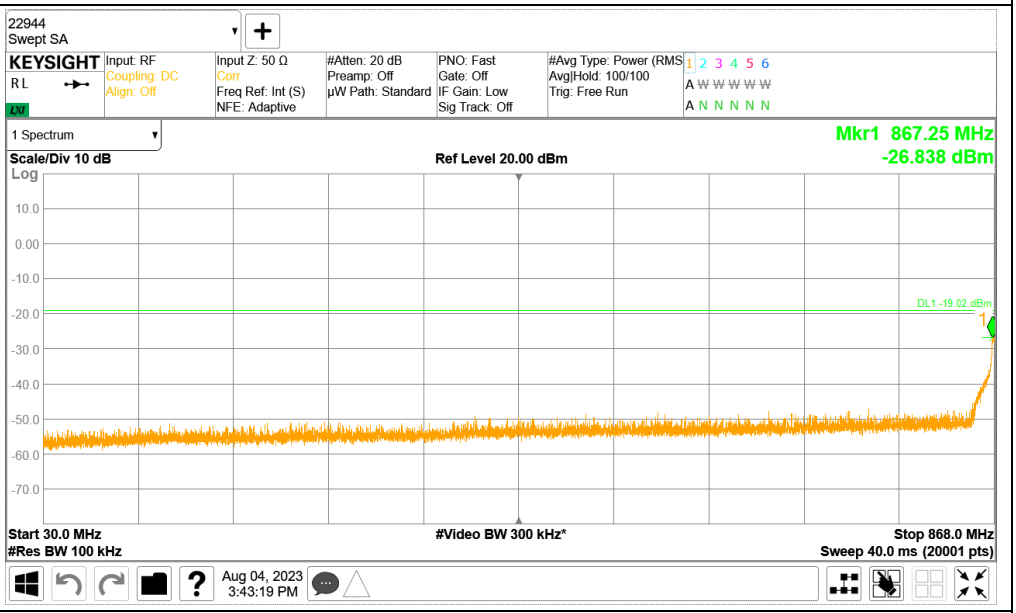
ANT 1 / 16QAM / Mid channel	
1 GHz ~ 10 GHz	

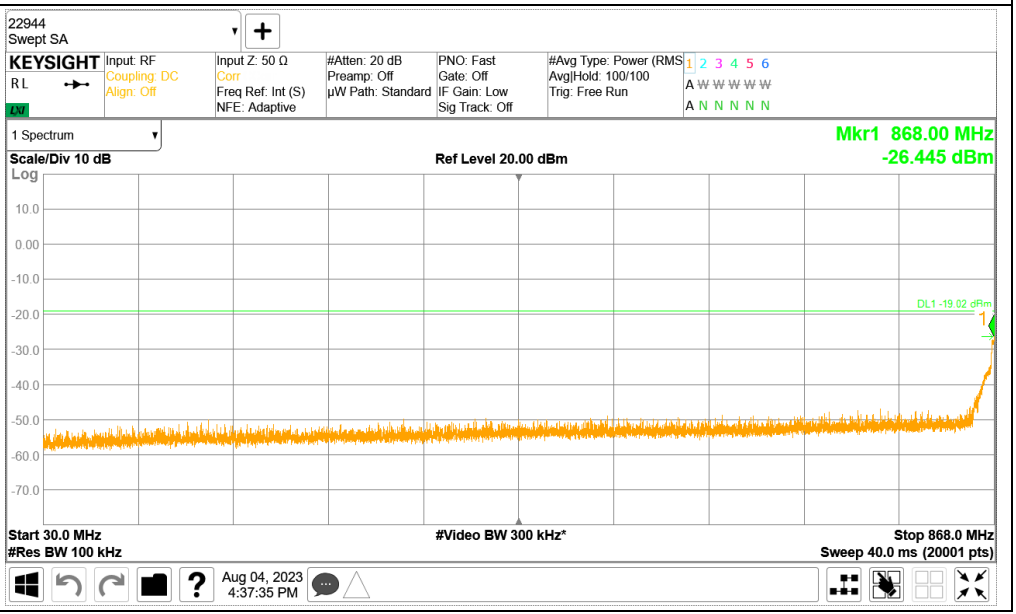
5G NR n5 20 MHz 1C + LTE B5 5 MHz 1C (2 Carrier) – 4TX - Contiguous

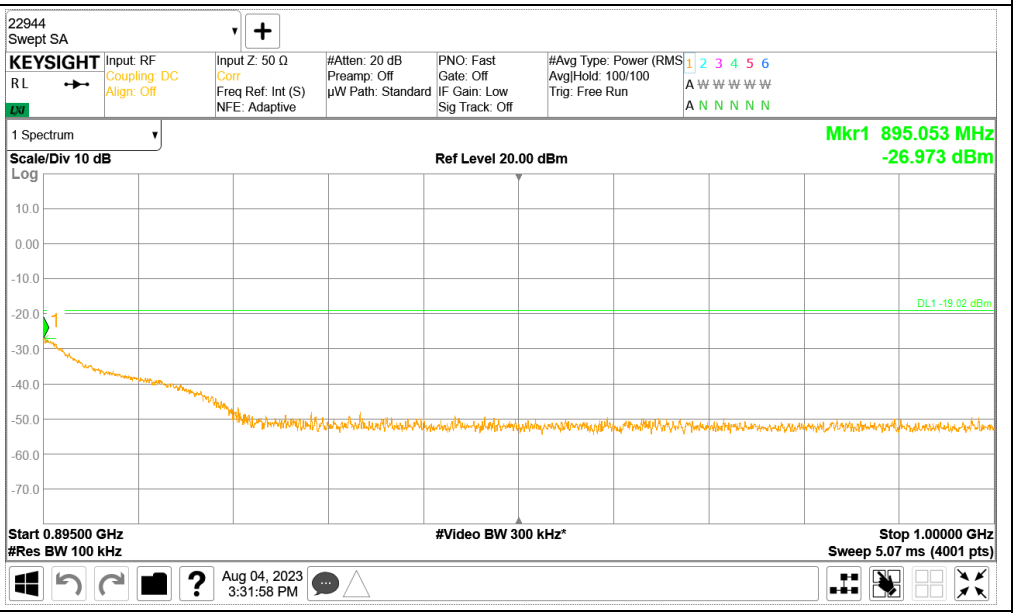
ANT 2 / QPSK / Mid channel	
9 kHz ~ 150 kHz	
ANT 2 / 64QAM / Mid channel	
9 kHz ~ 150 kHz	

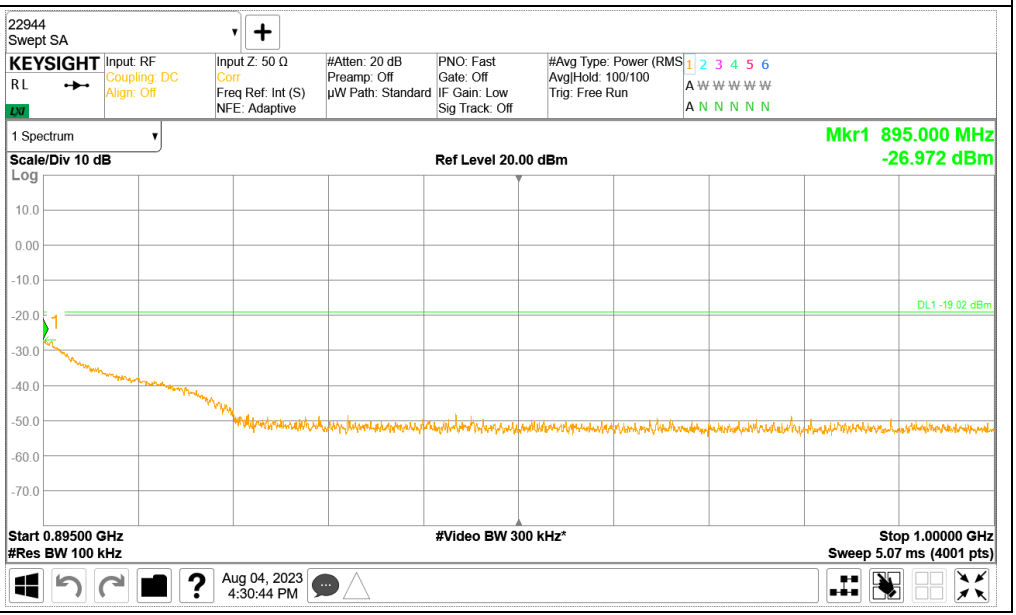
ANT 1 / QPSK / Mid channel	
150 kHz ~ 30 MHz	

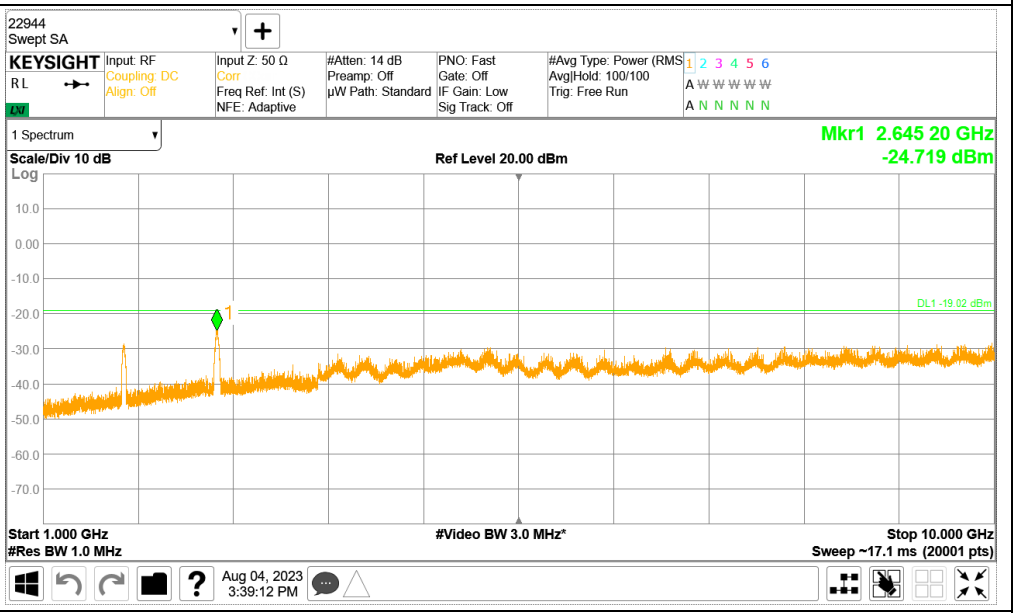
ANT 1 / 256QAM / Mid channel	
150 kHz ~ 30 MHz	

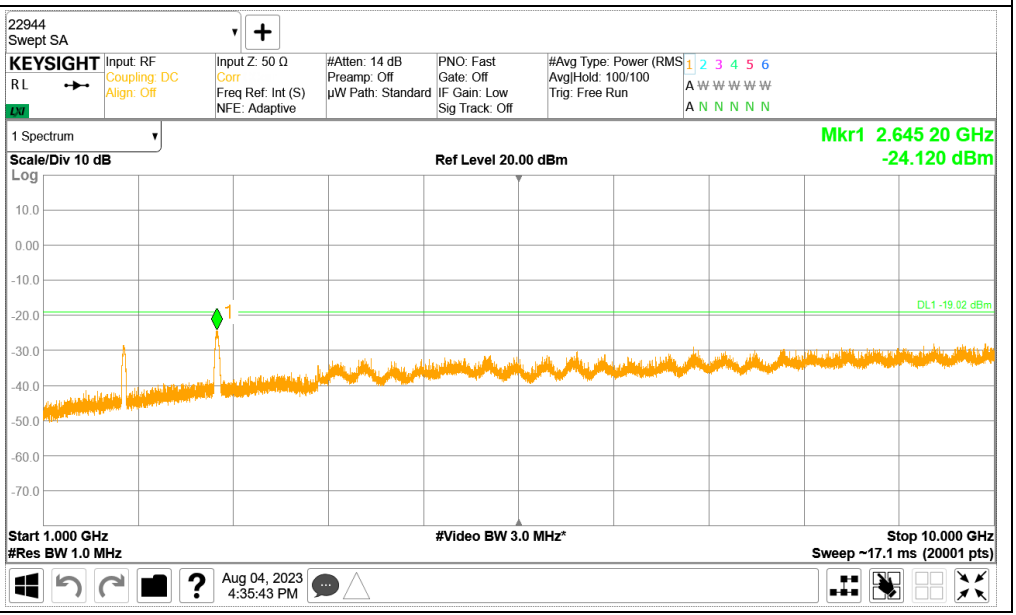
ANT 3 / QPSK / Mid channel	
30 MHz ~ 868 MHz	

ANT 4 / 256QAM / Mid channel	
30 MHz ~ 868 MHz	

ANT 1 / QPSK / Mid channel	
895 MHz ~ 1 GHz	

ANT 1 / 256QAM / Mid channel	
895 MHz ~ 1 GHz	

ANT 4 / QPSK / Mid channel	
1 GHz ~ 10 GHz	

ANT 3 / 256QAM / Mid channel	
1 GHz ~ 10 GHz	

8.6. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055

LIMITS

(a) The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

TEST PROCEDURE

According to the section 5.6.3, 5.6.4, 5.6.5 of ANSI C63.26

RESULTS

See the following pages.

8.6.1. FREQUENCY STABILITY RESULTS

5G NR n5 20 MHz (1 Carrier)

Reference Frequency : 881.5 MHz @ 20ºC				
Power Supply [Vdc]	Environment Temperature [℃]	Frequency Deviation Measureed with Time Elapse		
		Freqeucncy [Hz]	Deviation [Hz]	Delta [ppm]
-48.00	+ 50	881 500 001.733	-0.361	-0.0004
	+ 40	881 500 001.819	-0.447	-0.0005
	+ 30	881 500 001.924	-0.552	-0.0006
	+ 20	***881 500 001.372***	***0.000***	***0.0000***
	+ 10	881 500 001.665	-0.293	-0.0003
	0	881 500 001.463	-0.091	-0.0001
	-10	881 500 001.415	-0.043	0.0000
	-20	881 500 001.344	0.028	0.0000
	-30	881 500 001.214	0.158	0.0002
-55.20	+ 20	881 500 000.952	0.420	0.0005
-40.80	+ 20	881 500 001.108	0.264	0.0003

Note: The test results of the frequency stability shown above table are result for ANT 1.
The results of all ports are similar, and the worst of them has been reported.

8.7. RADIATED EMISSIONS

RULE PART(S)

FCC : §2.1053, §22.917

LIMIT

§22.917
The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows:

(1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). 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 dB below the transmitter power.

(2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.

(c) Alternative out of band emission limit. Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.

(d) Interference caused by out of band emissions. If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

UL KOREA, LTD. Suwon Laboratory FORM ID: FCC_22(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

TEST PROCEDURE

According to the section 5.5.4.2 of ANSI C63.26:

a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency.

b) Each emission under consideration shall be evaluated:

1) Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.

2) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.

3) Return the turntable to the azimuth where the highest emission amplitude level was observed.

4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.

5) Record the measured emission amplitude level and frequency using the appropriate RBW.

c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

d) ~ j) Omitted

k) Provide the complete measurement results as a part of the test report.

Note1. All transmitting ports were terminated.

Note2. The results of the Radiated Emission test are measured at the minimum margin (for conducted spurious data), and data values are attached only in the worst case.

Note3. For all radiated emissions, any emission outside of the operating frequency bands was not exceed the limit.

Note4. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible values was not recorded. (ANSI C63.26, clause 5.1.1., c)

RESULTS

See the following pages.

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8.7.1. SPURIOUS RADIATION RESULTS

5G NR n5 20 MHz QPSK (1 Carrier) – 2TX

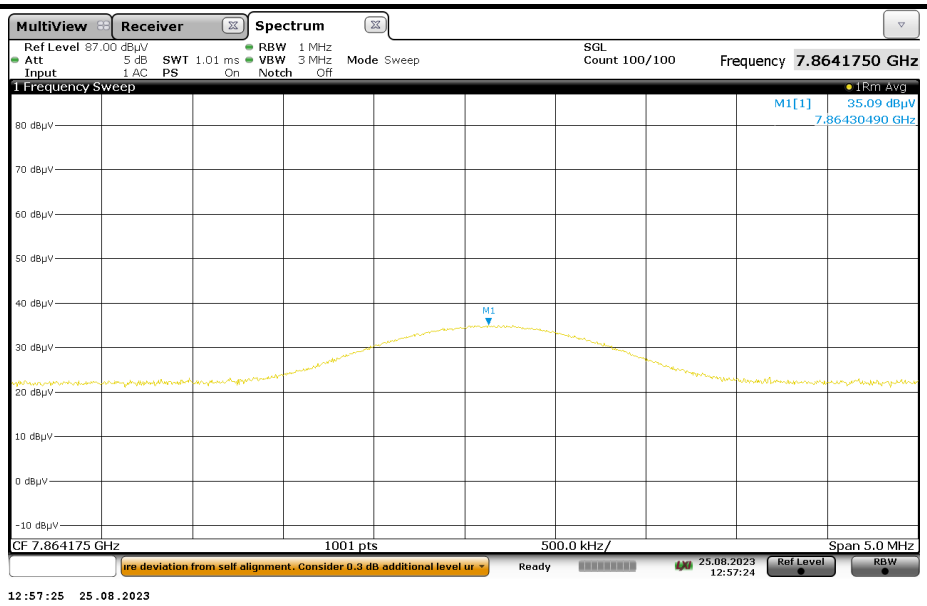
UL Verification Services, Inc.
Above 1GHz High Frequency Measurement

Company:	Samsung
Project #:	4790941127
Date:	2023-08-25
Test Engineer:	22944
Configuration:	RFV01U-D2A (EUT)
Location:	10m Chamber
Mode:	NR n5 QPSK 1C 20MHz Bandwidth Low Channel
Test Votage:	DC -48 V

f MHz	Measured Level (dBuV)	Ant. Pol. (H/V)	Distance (m)	Ant. Factor (dB/m)	Filter + Cable loss - Amp gain (dB)	Data Result (dBm)	Limit (dBm)	Delta (dB)	Notes
879									
7864.30	35.1	V	3.0	35.6	-26.4	-50.8	-13.0	-37.8	

Note1. Data Result = Measured Level + Ant. Factor + [Filter + Cable loss - Amp gain] - 95.2

Plot



Note. Only the worst case plot for Radiated Spurious Emissions.

END OF TEST REPORT