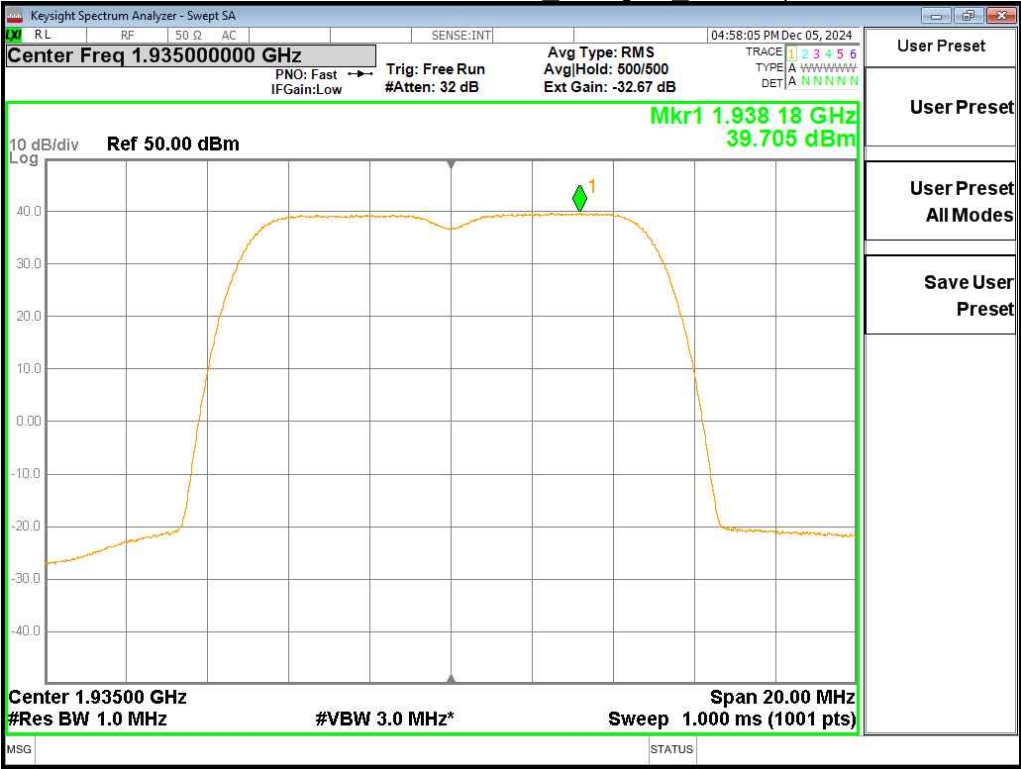


LTE 1C 5 MHz + NR 1C 5 MHz_64QAM_Lowest, Port 4



LTE 1C 5 MHz + NR 1C 5 MHz_256QAM_Lowest, Port 4



Test mode :
 LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz

Channel	Port	PSD (dBm/MHz)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	35.40	35.77	35.46	35.45
	2	35.19	35.47	35.25	35.29
	3	35.25	35.63	35.38	35.34
	4	35.41	35.70	35.42	35.47
Middle	1	35.45	35.45	35.52	35.55
	2	35.22	35.33	35.28	35.30
	3	35.32	35.31	35.36	35.29
	4	35.44	35.40	35.42	35.43
highest	1	35.42	35.81	35.52	35.46
	2	35.24	35.50	35.38	35.20
	3	35.35	35.61	35.41	35.28
	4	35.51	35.71	35.49	35.43

See next pages for actual measured spectrum plots.

LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz_QPSK Middle, Port 1



LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz 16QAM Highest, Port 1



LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz_64QAM_Middle, Port 1



LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz_256QAM_Middle, Port 1



4.4 Peak-to-average power ratio (PAPR)

Test Overview :

The peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedures :

KDB 971168 D01 v03r01 – Section 5.7

ANSI C63.26-2015 – Section 5.2.3.4

Test Settings :

Center frequency = the highest, middle and the lowest channels

- a) The signal analyzer's CCDF function is enabled.
- b) Measurement BW $\geq$ OBW or specified reference bandwidth
- c) The measurement interval was set depending on the type of signal analyzed.
- d) Record 0.1% probability value.
- e) Allow trace to fully stabilize

Test Notes :

1. All modes of operation were investigated and the worst case configuration results are reported in this section.
2. The port with Peak-to-average power i.e. worst case port per modulation has been highlighted in the following Peak-to-average power tables.

Limit :

PAPR < 13 dBm

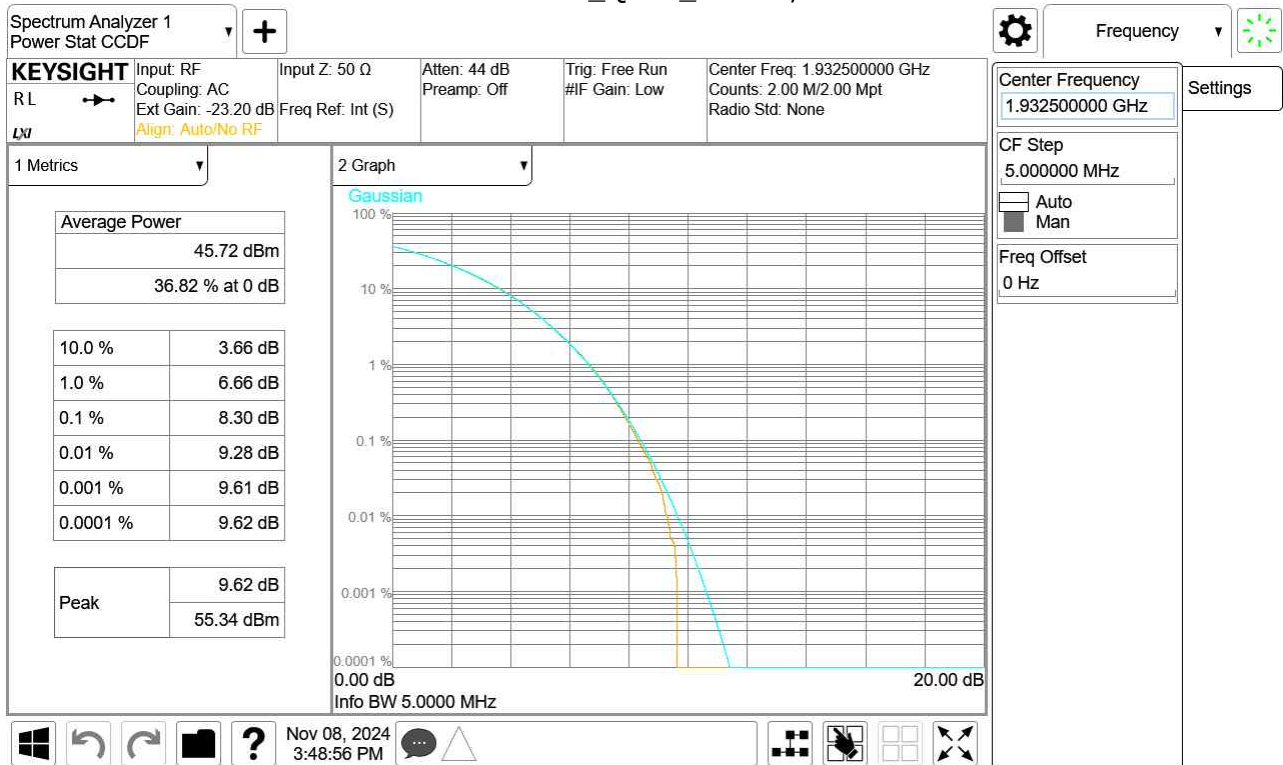
Test Data :

Test mode : LTE 1C 5 MHz

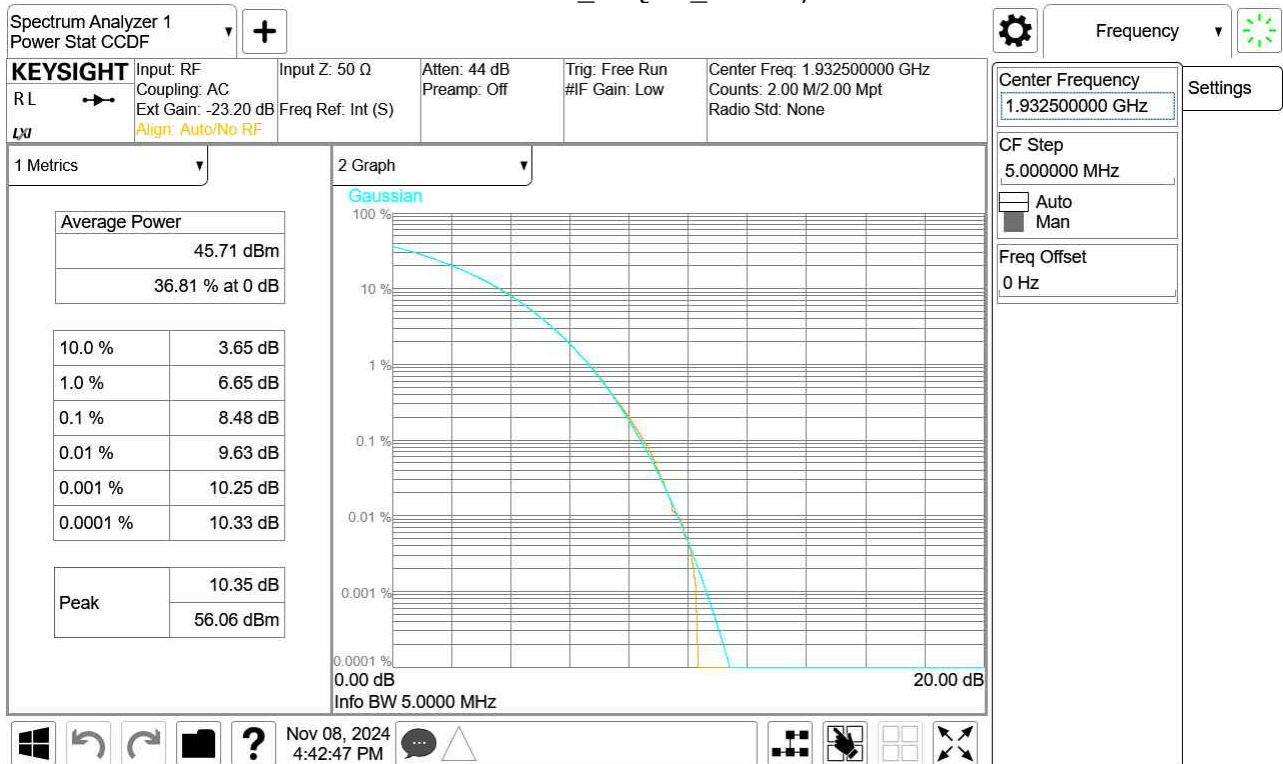
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	8.30	8.47	8.34	8.41
	2	8.30	8.49	8.36	8.39
	3	8.30	8.40	8.46	8.45
	4	8.27	8.48	8.45	8.35
Middle	1	8.29	8.39	8.35	8.39
	2	8.30	8.46	8.44	8.45
	3	8.30	8.53	8.36	8.34
	4	8.27	8.55	8.36	8.38
highest	1	8.30	8.45	8.35	8.37
	2	8.28	8.34	8.34	8.36
	3	8.25	8.54	8.40	8.35
	4	8.28	8.55	8.41	8.32

See next pages for actual measured spectrum plots.

LTE 1C 5 MHz_QPSK_Lowest, Port 1



LTE 1C 5 MHz_16QAM_Lowest, Port 4



LTE 1C 5 MHz_64QAM_Lowest, Port 3



LTE 1C 5 MHz_256QAM_Lowest, Port 3

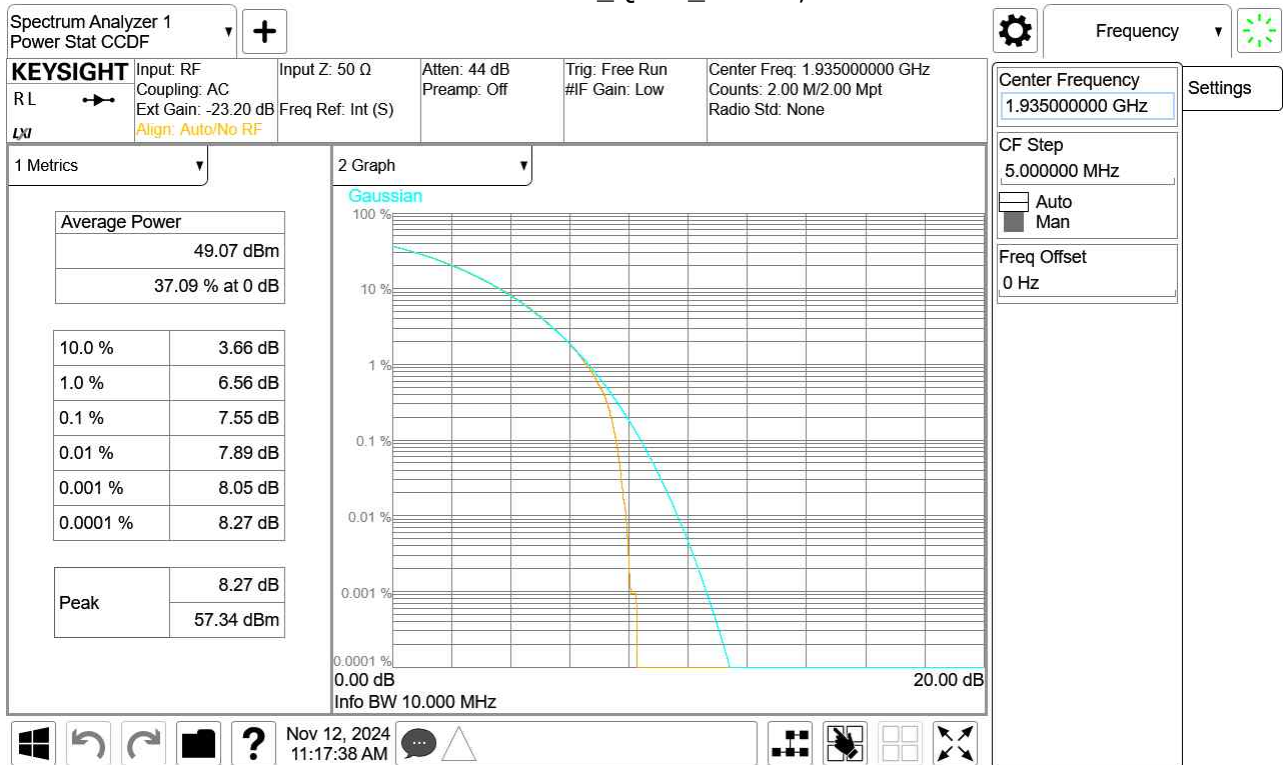


Test mode : LTE 1C 10 MHz

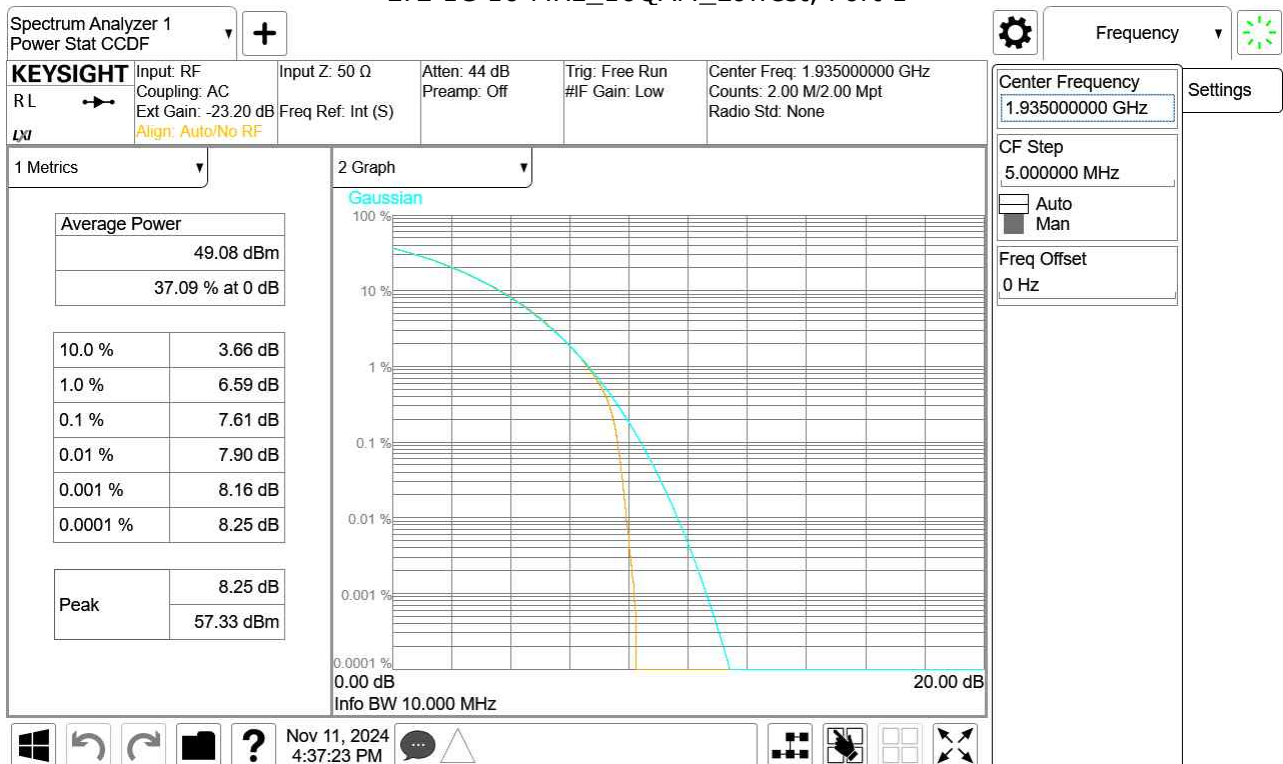
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.55	7.61	7.56	7.55
	2	7.55	7.59	7.54	7.54
	3	7.53	7.61	7.55	7.54
	4	7.54	7.60	7.54	7.57
Middle	1	7.53	7.58	7.52	7.52
	2	7.53	7.57	7.52	7.53
	3	7.54	7.58	7.51	7.53
	4	7.53	7.57	7.52	7.52
highest	1	7.52	7.57	7.50	7.51
	2	7.53	7.55	7.50	7.51
	3	7.54	7.57	7.52	7.52
	4	7.52	7.56	7.51	7.51

See next pages for actual measured spectrum plots.

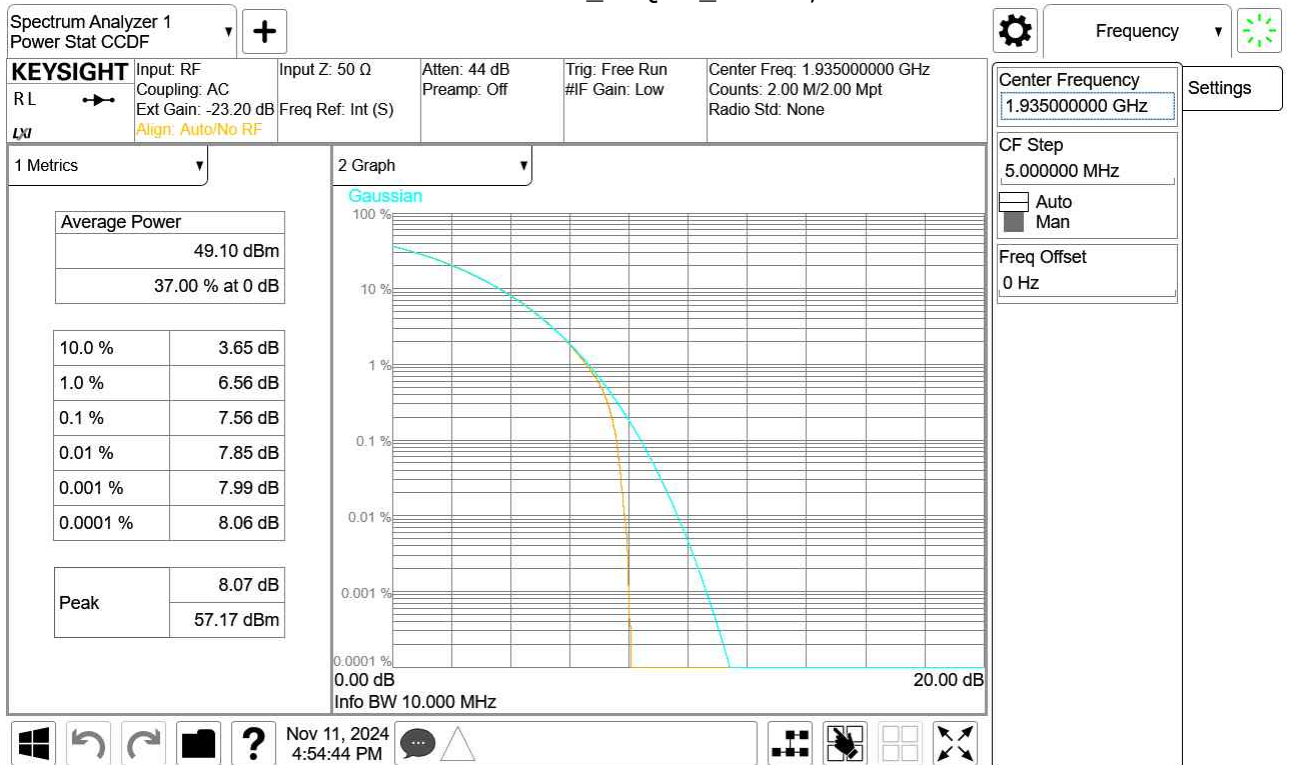
LTE 1C 10 MHz_QPSK_Lowest, Port 1



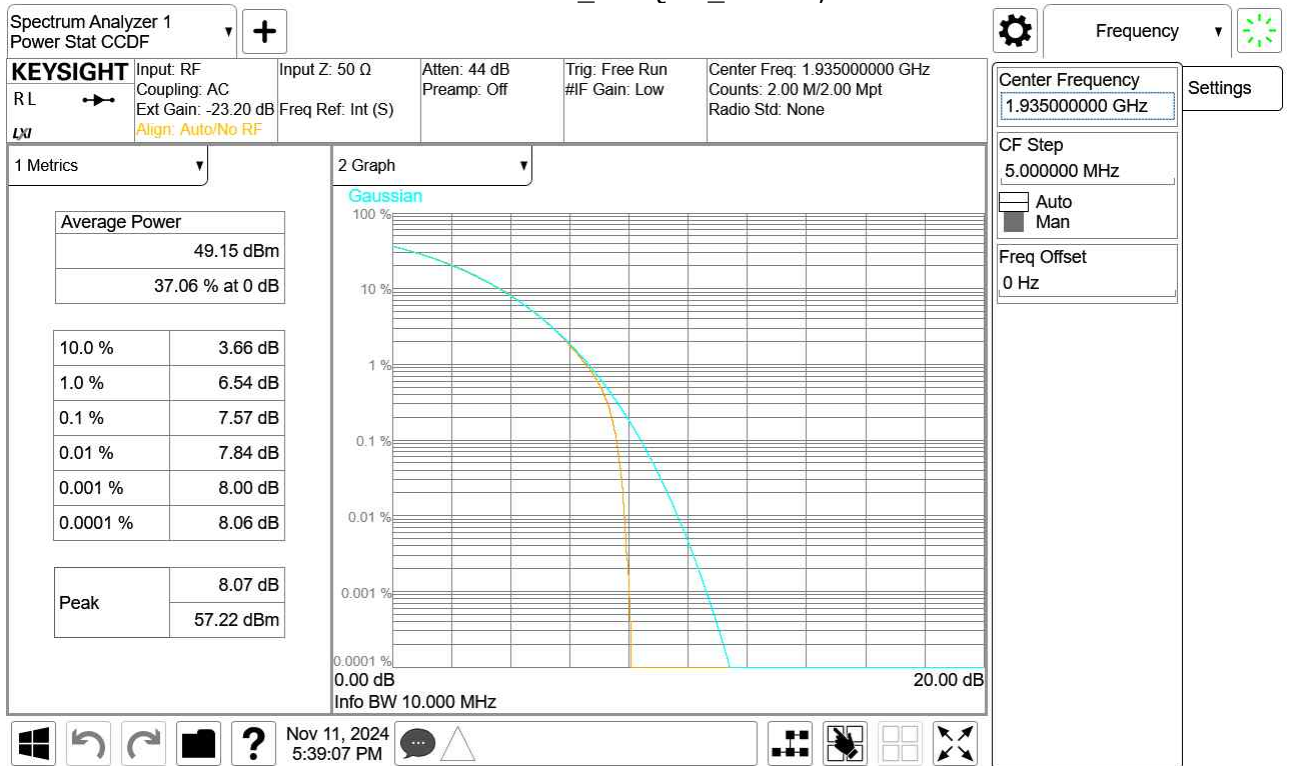
LTE 1C 10 MHz_16QAM_Lowest, Port 1



LTE 1C 10 MHz_64QAM_Lowest, Port 1



LTE 1C 10 MHz_256QAM_Lowest, Port 4

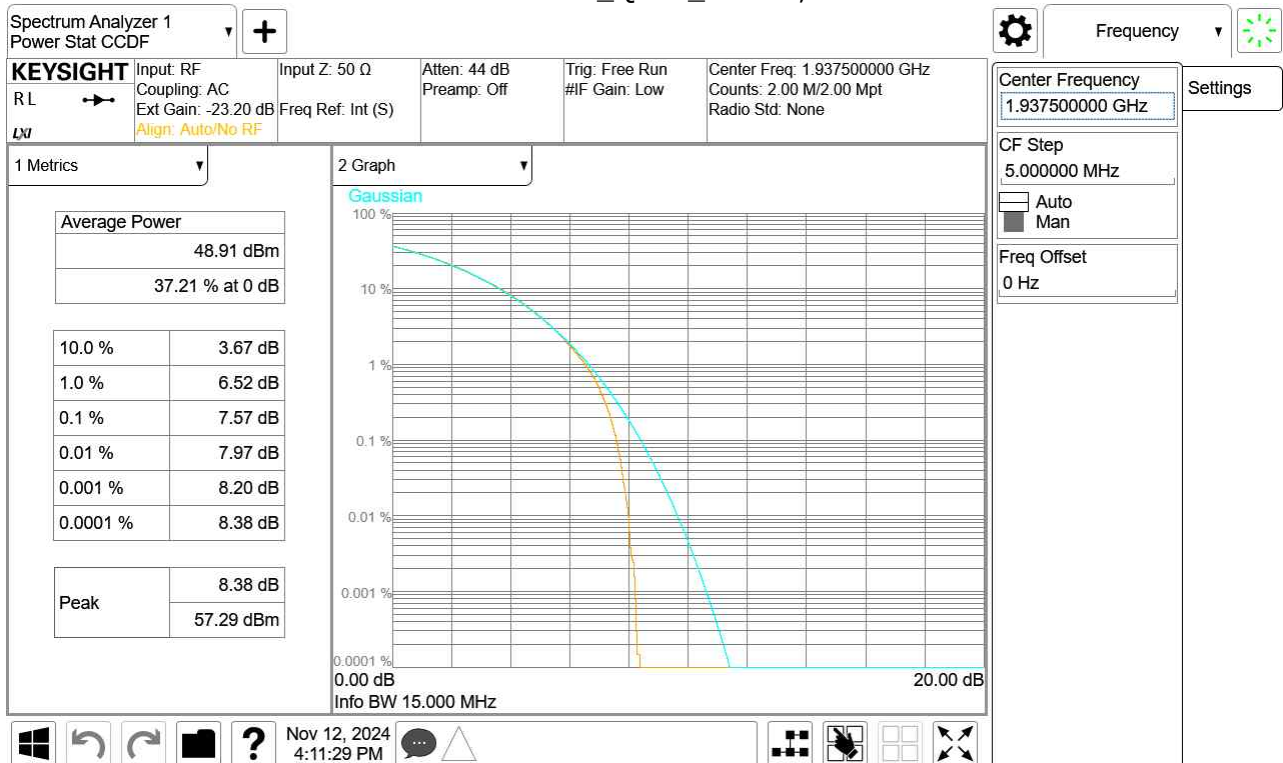


Test mode : LTE 1C 15 MHz

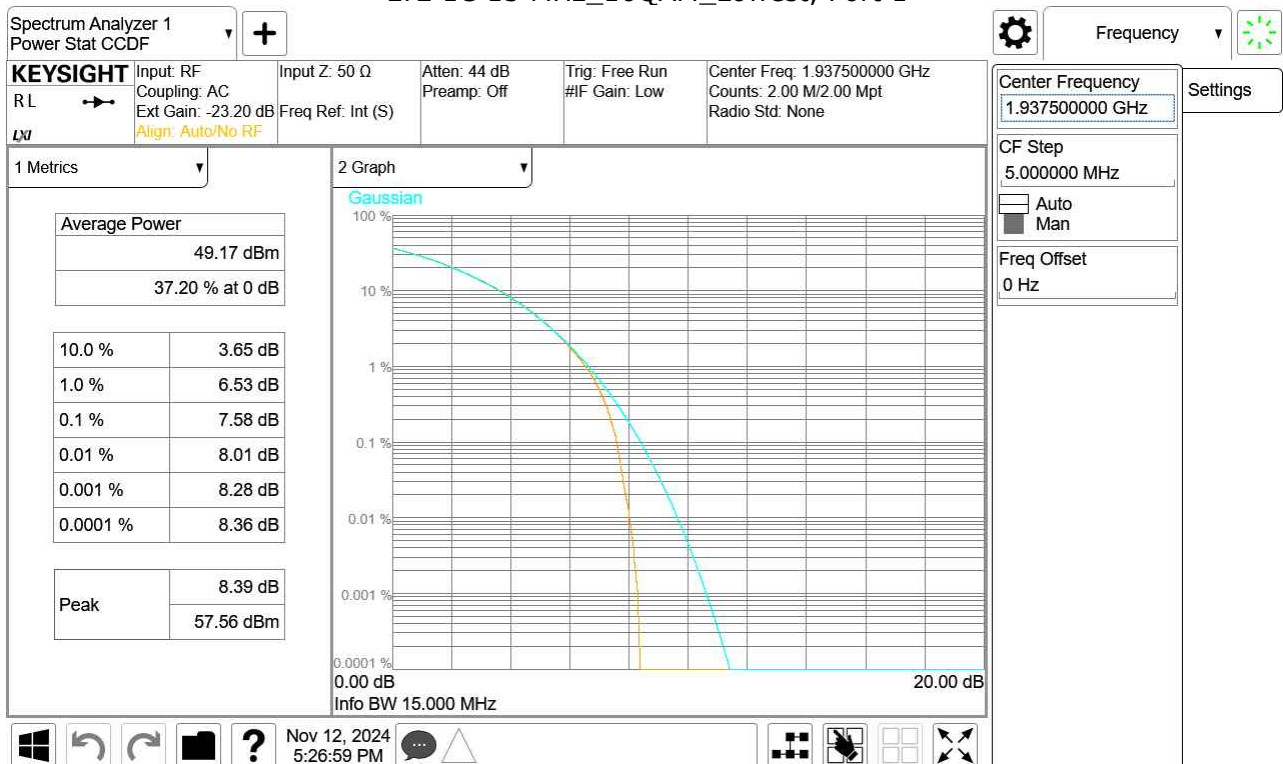
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.56	7.58	7.58	7.55
	2	7.54	7.54	7.55	7.52
	3	7.57	7.56	7.57	7.56
	4	7.56	7.55	7.58	7.56
Middle	1	7.45	7.47	7.44	7.45
	2	7.45	7.47	7.45	7.46
	3	7.47	7.46	7.46	7.45
	4	7.45	7.46	7.45	7.46
highest	1	7.46	7.45	7.45	7.46
	2	7.46	7.46	7.46	7.48
	3	7.46	7.46	7.46	7.48
	4	7.46	7.47	7.46	7.47

See next pages for actual measured spectrum plots.

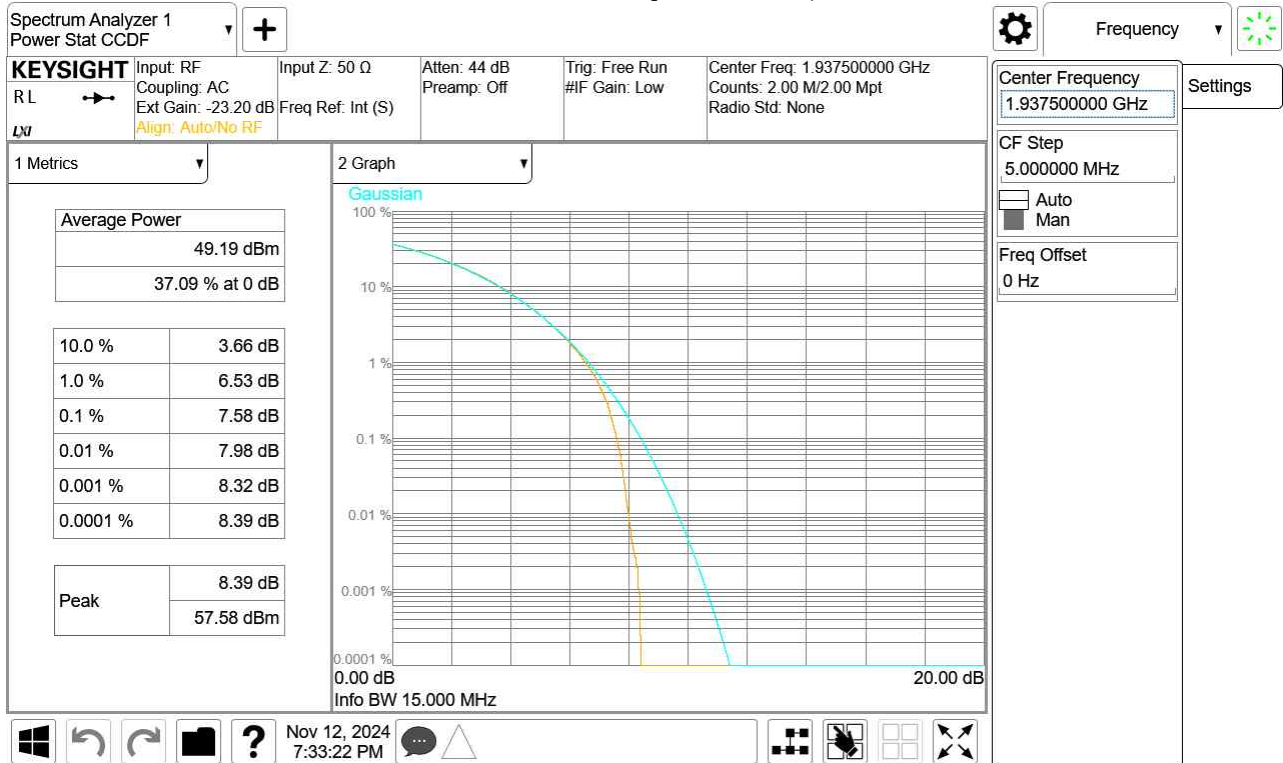
LTE 1C 15 MHz_QPSK_Lowest, Port 3



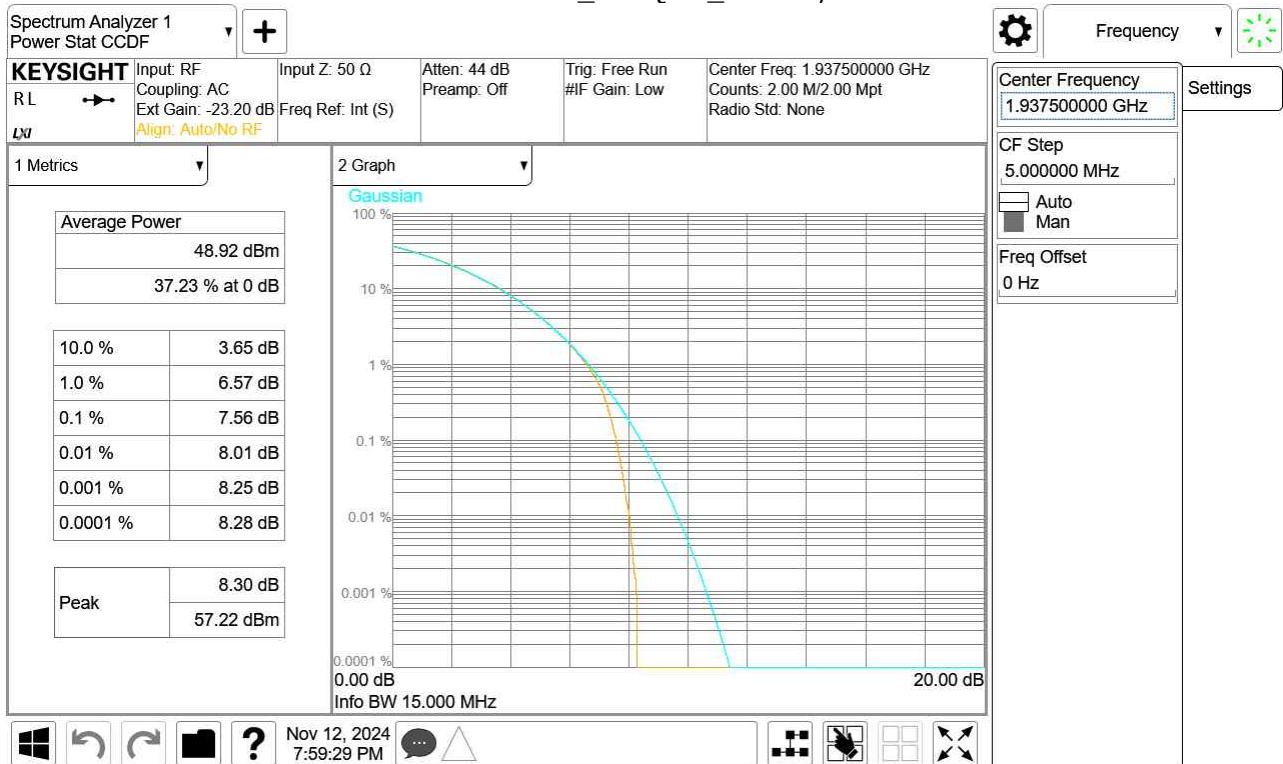
LTE 1C 15 MHz_16QAM_Lowest, Port 1



LTE 1C 15 MHz_64QAM_Lowest, Port 1



LTE 1C 15 MHz_256QAM_Lowest, Port 3

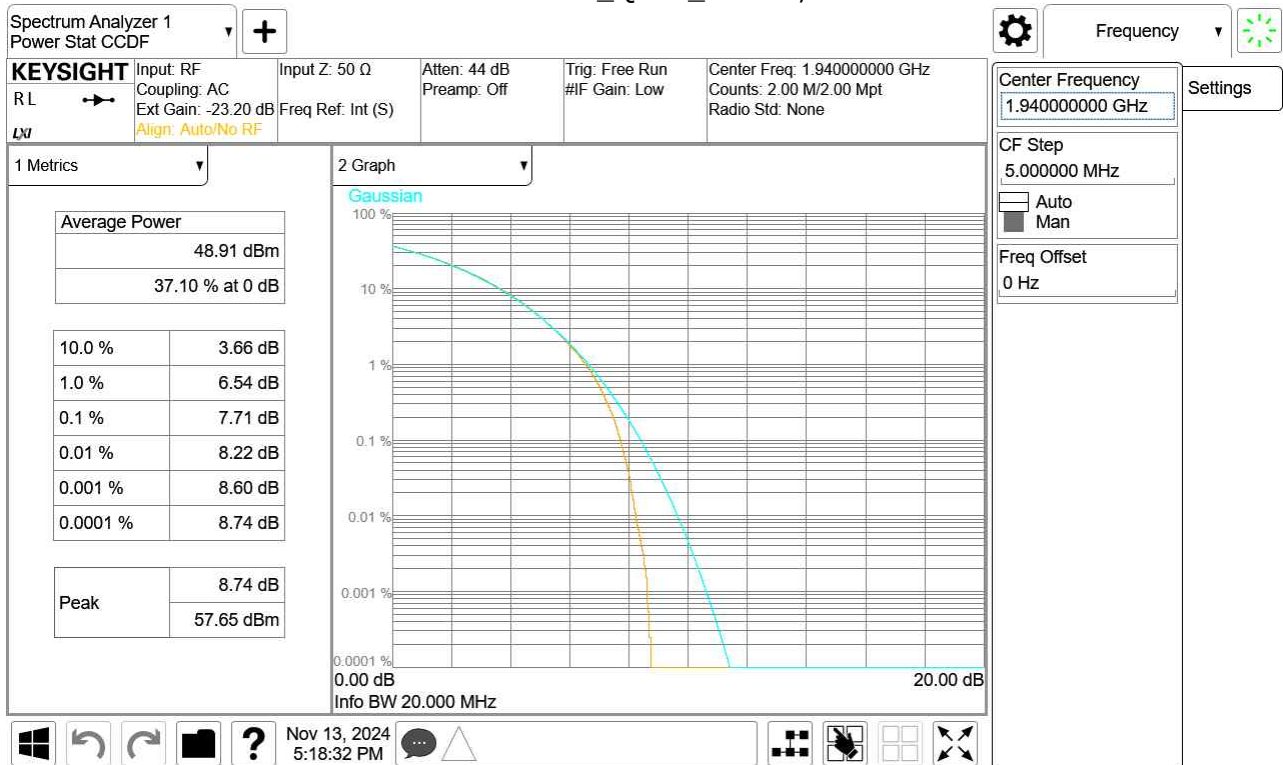


Test mode : LTE 1C 20 MHz

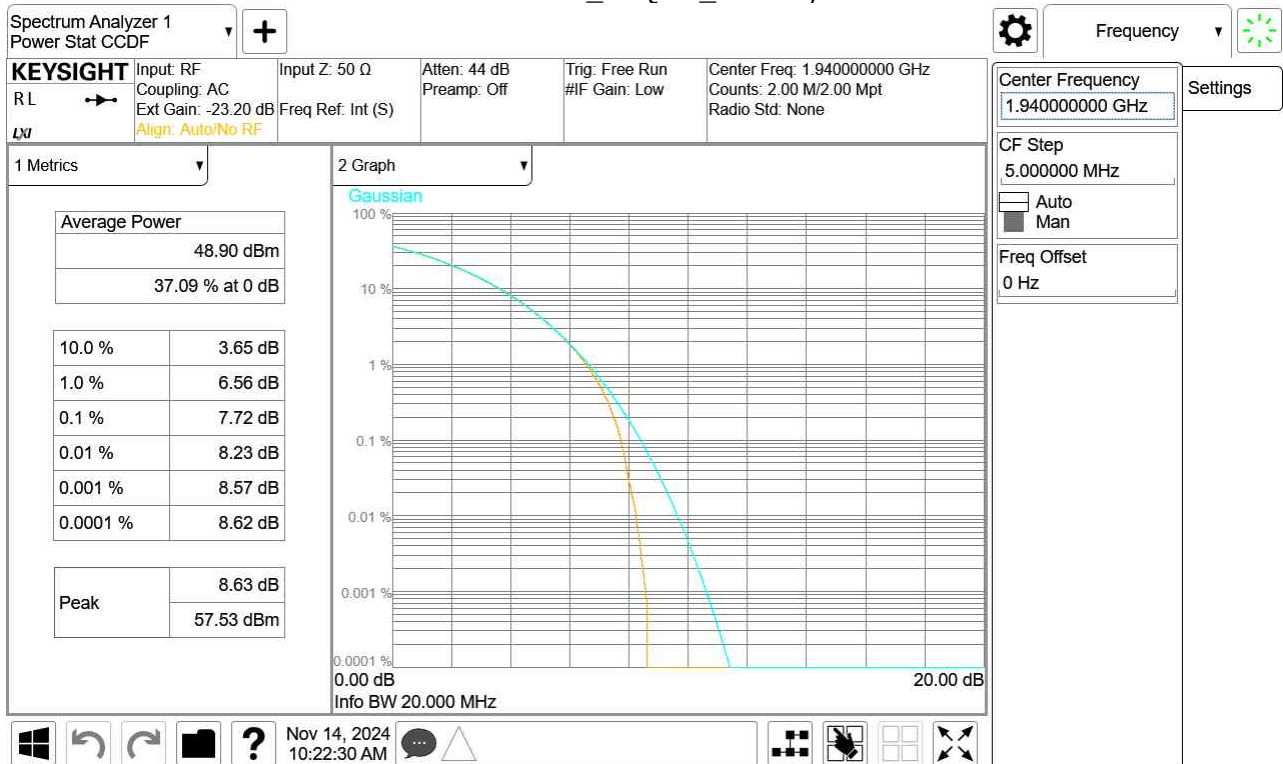
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.71	7.72	7.72	7.69
	2	7.67	7.69	7.69	7.67
	3	7.68	7.70	7.71	7.69
	4	7.70	7.72	7.72	7.67
Middle	1	7.56	7.58	7.55	7.55
	2	7.60	7.58	7.55	7.54
	3	7.55	7.58	7.56	7.54
	4	7.56	7.57	7.55	7.54
highest	1	7.58	7.59	7.57	7.55
	2	7.57	7.58	7.55	7.55
	3	7.57	7.59	7.59	7.55
	4	7.57	7.57	7.56	7.55

See next pages for actual measured spectrum plots.

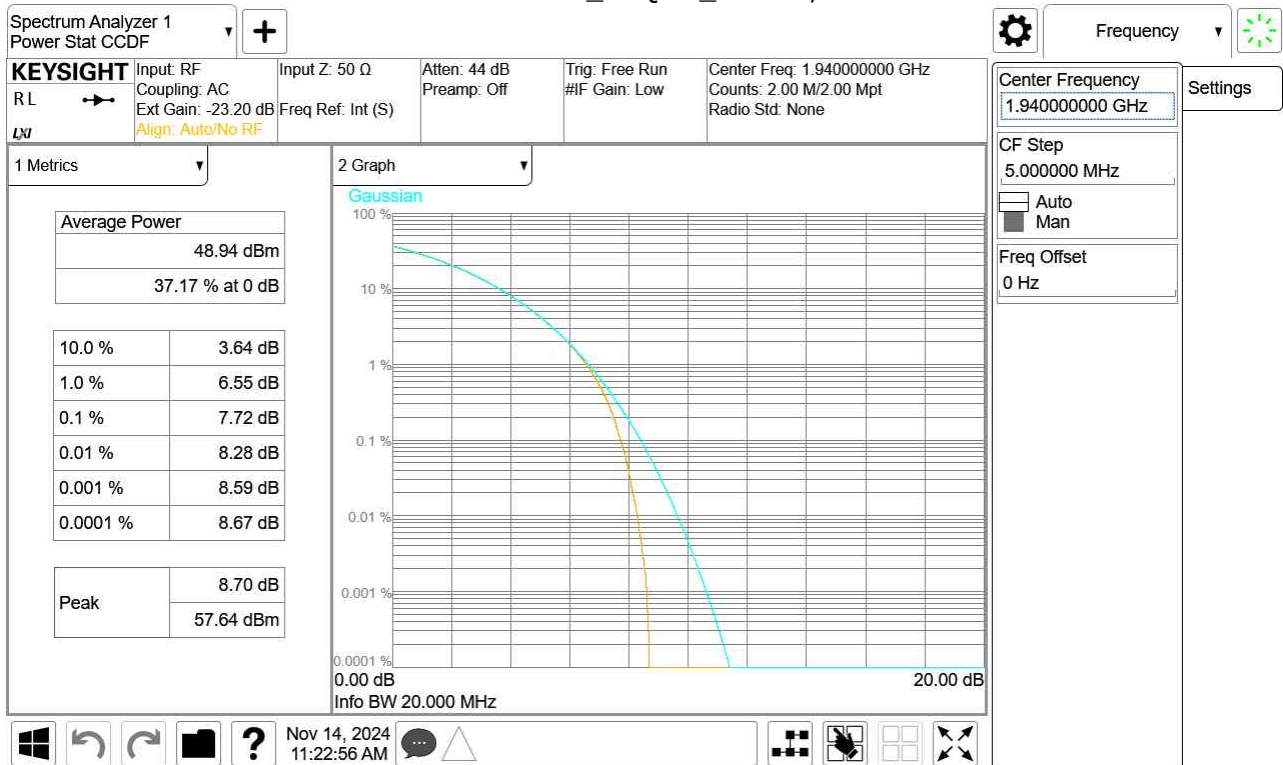
LTE 1C 20 MHz_QPSK_Lowest, Port 1



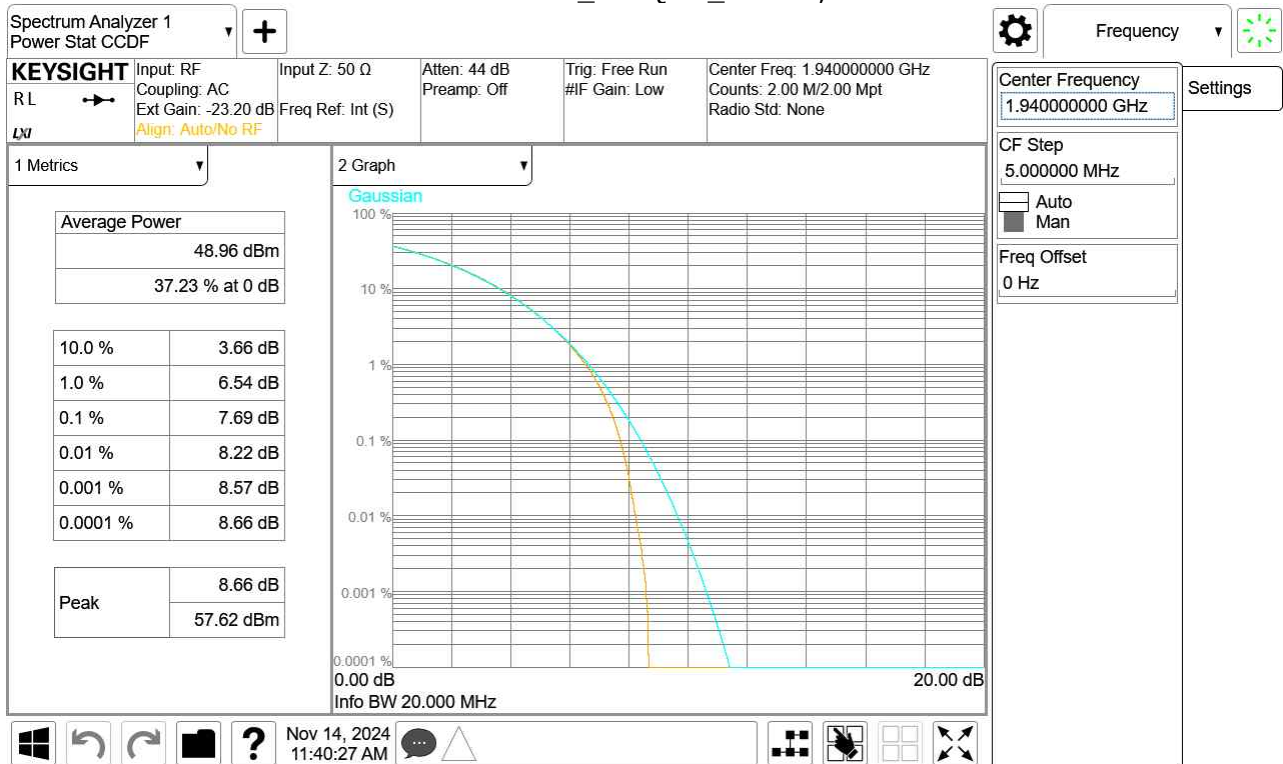
LTE 1C 20 MHz_16QAM_Lowest, Port 1



LTE 1C 20 MHz_64QAM_Lowest, Port 1



LTE 1C 20 MHz_256QAM_Lowest, Port 1

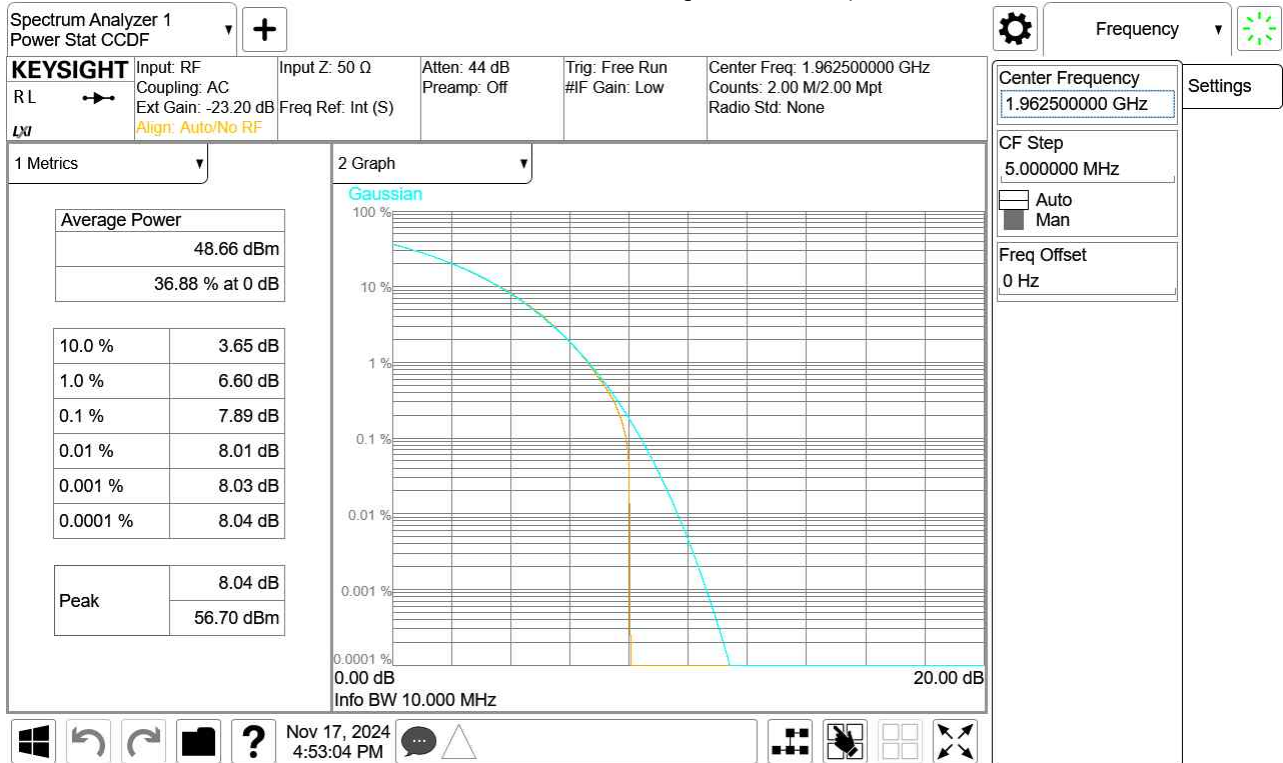


Test mode : LTE 2C 5 MHz + 5 MHz

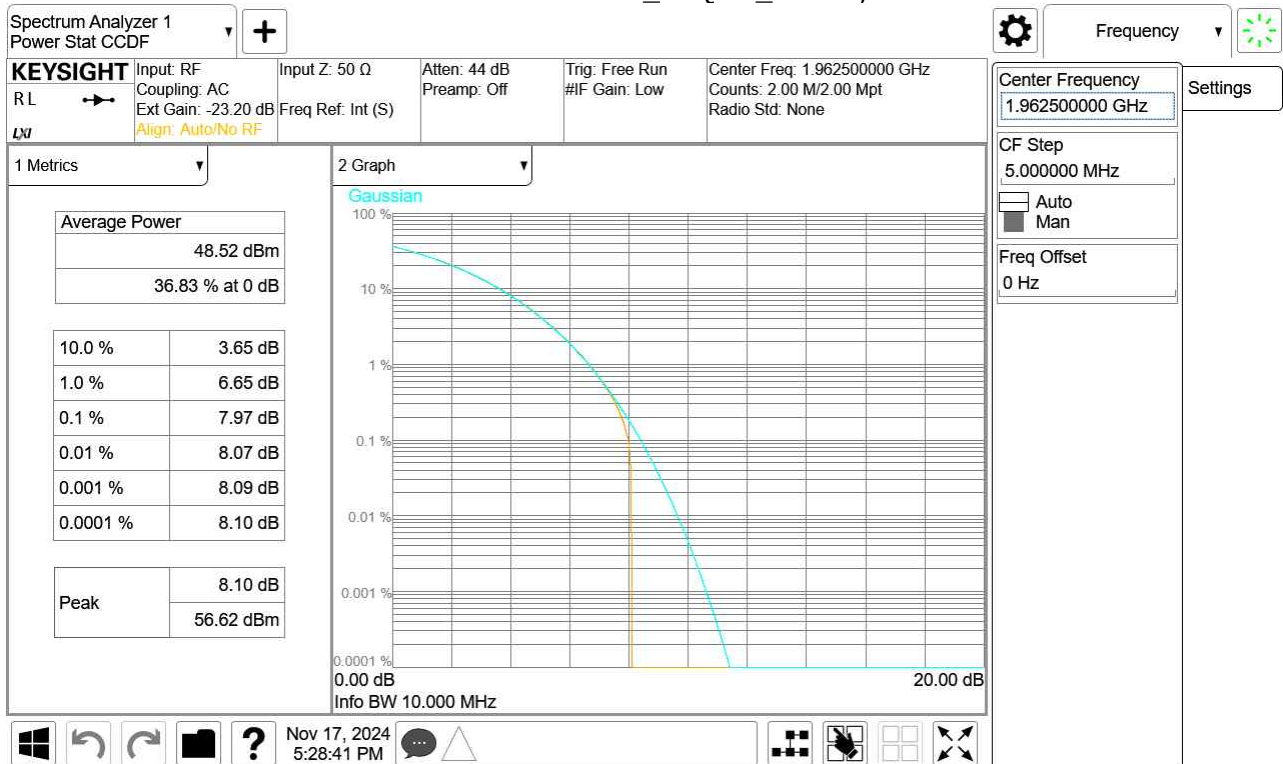
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.85	7.94	7.85	7.85
	2	7.85	7.92	7.84	7.84
	3	7.87	7.92	7.87	7.86
	4	7.85	7.91	7.87	7.85
Middle	1	7.88	7.94	7.87	7.87
	2	7.88	7.96	7.90	7.87
	3	7.87	7.93	7.86	7.86
	4	7.89	7.97	7.88	7.86
highest	1	7.87	7.94	7.88	7.87
	2	7.87	7.93	7.85	7.83
	3	7.89	7.93	7.88	7.85
	4	7.89	7.93	7.89	7.85

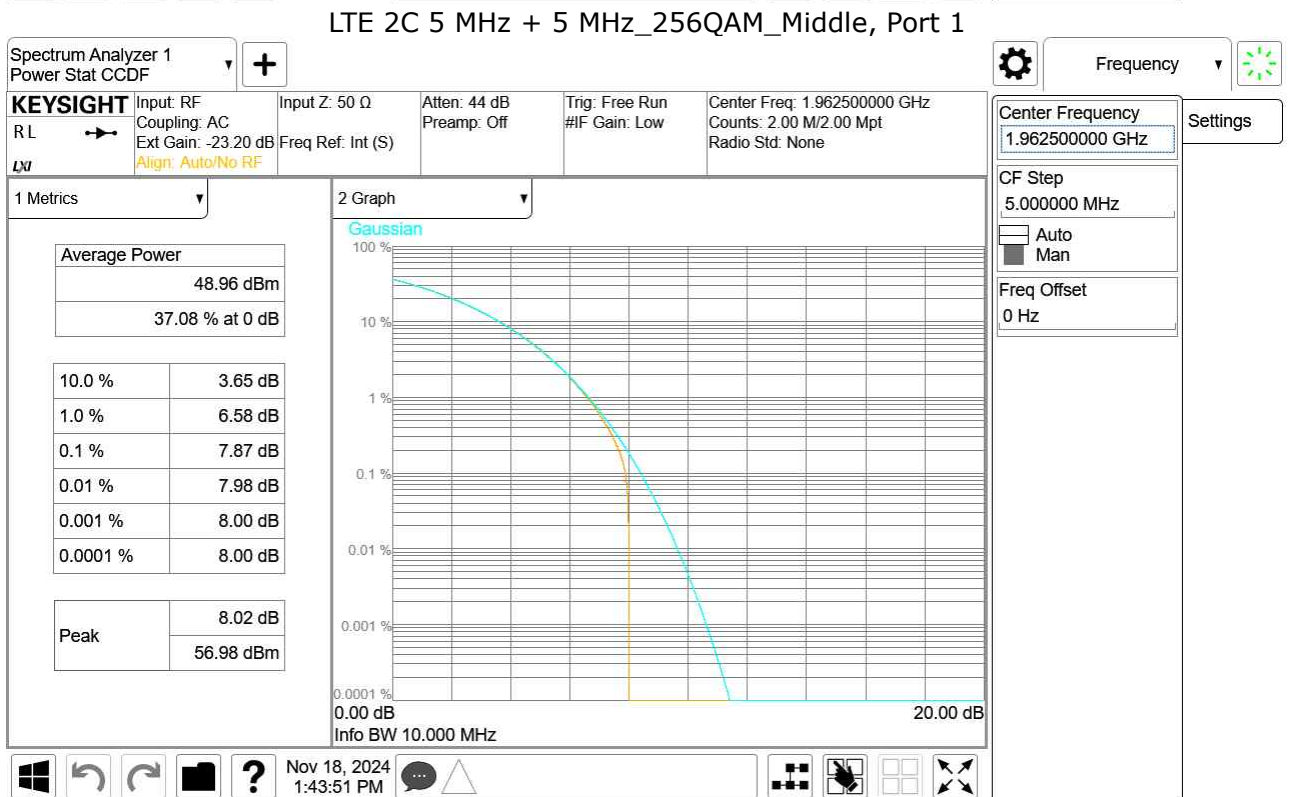
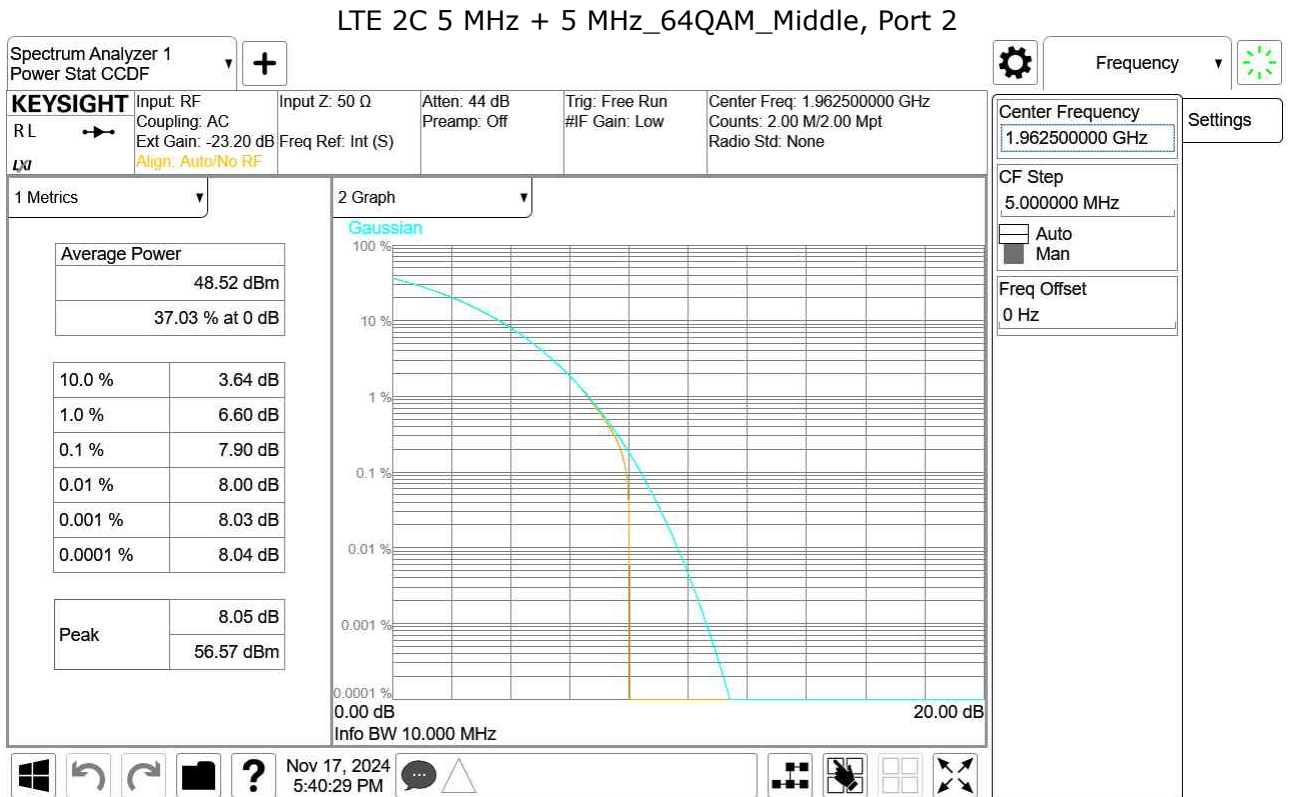
See next pages for actual measured spectrum plots.

LTE 2C 5 MHz + 5 MHz_QPSK_Middle, Port 4



LTE 2C 5 MHz + 5 MHz_16QAM_Middle, Port 4



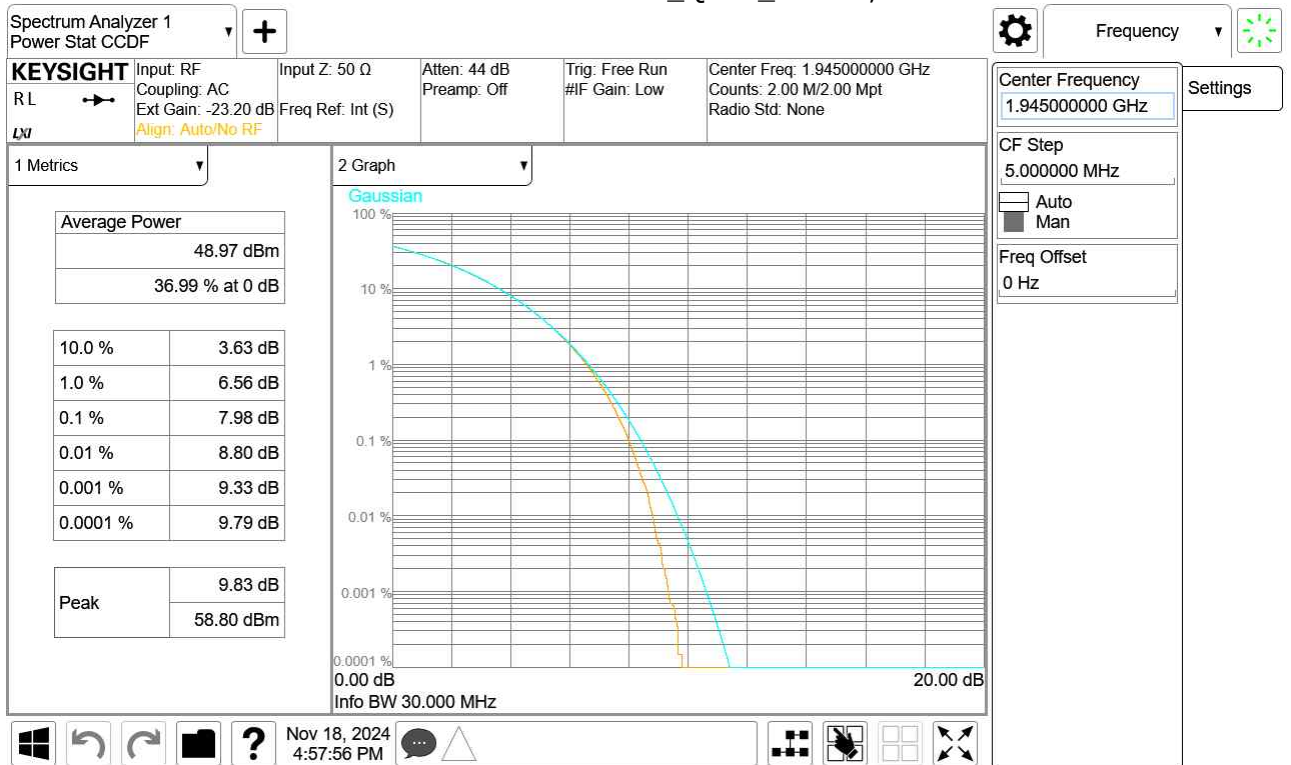


Test mode : LTE 2C 10 MHz + 20 MHz

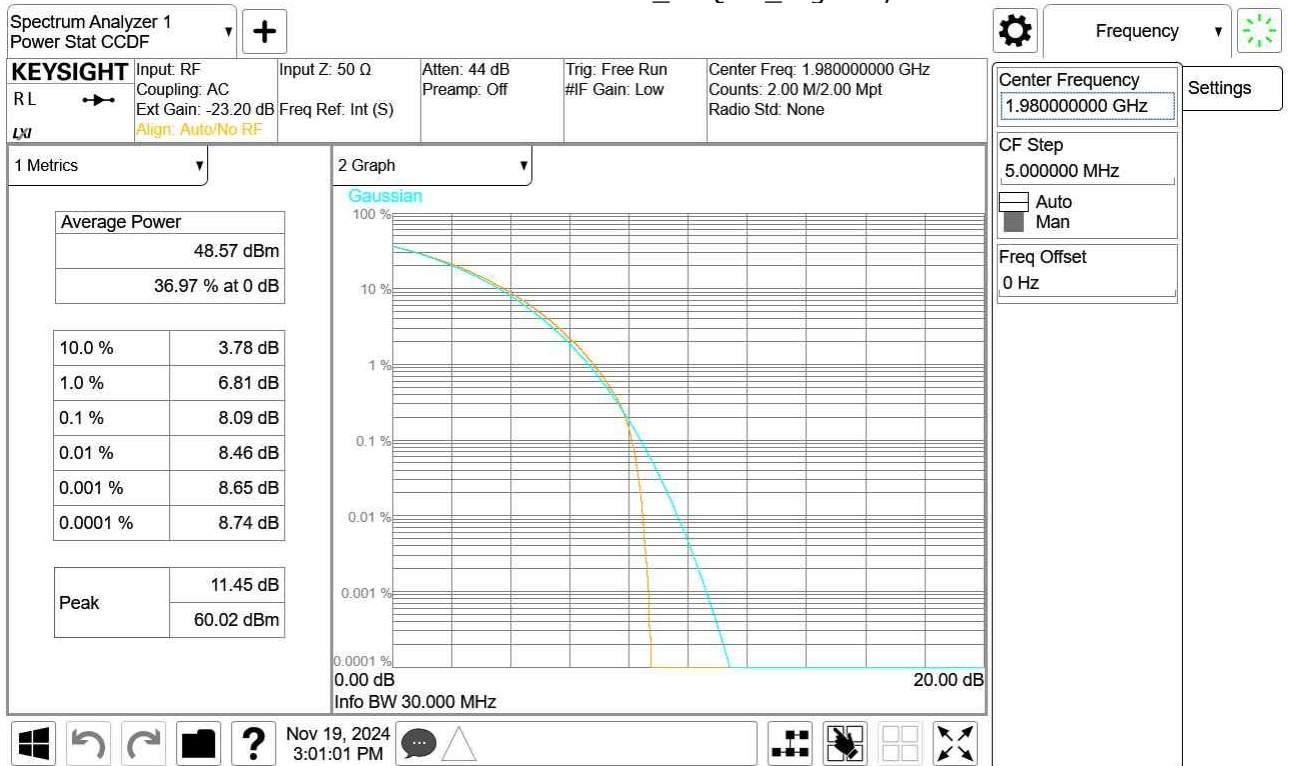
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.97	7.99	7.99	7.97
	2	7.94	7.96	7.98	7.97
	3	7.97	7.99	8.00	7.96
	4	7.98	8.02	8.00	7.99
Middle	1	7.82	7.86	7.84	7.83
	2	7.82	7.86	7.82	7.83
	3	7.85	7.86	7.85	7.83
	4	7.83	7.87	7.84	7.83
highest	1	7.84	8.02	7.84	7.85
	2	7.83	7.89	7.84	7.84
	3	7.84	8.09	7.90	7.82
	4	7.87	7.86	7.83	7.84

See next pages for actual measured spectrum plots.

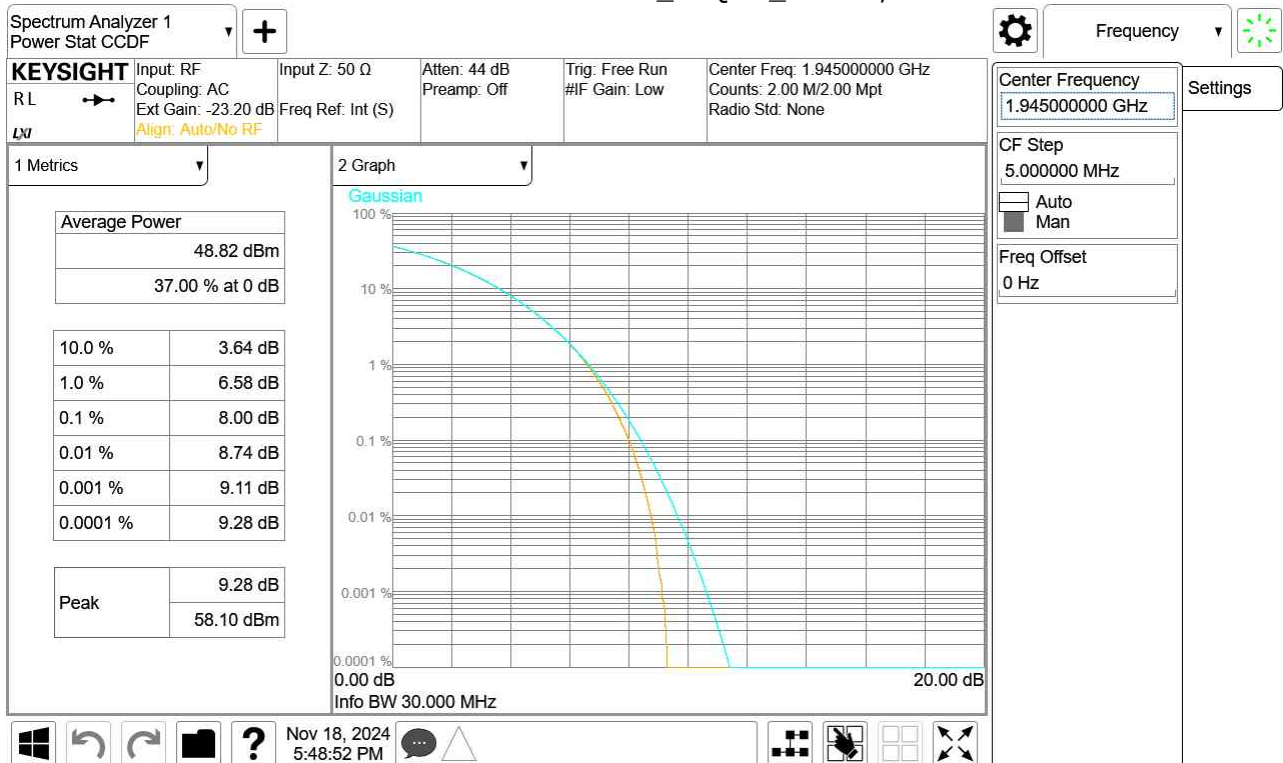
LTE 2C 10 MHz + 20 MHz_QPSK_Lowest, Port 4



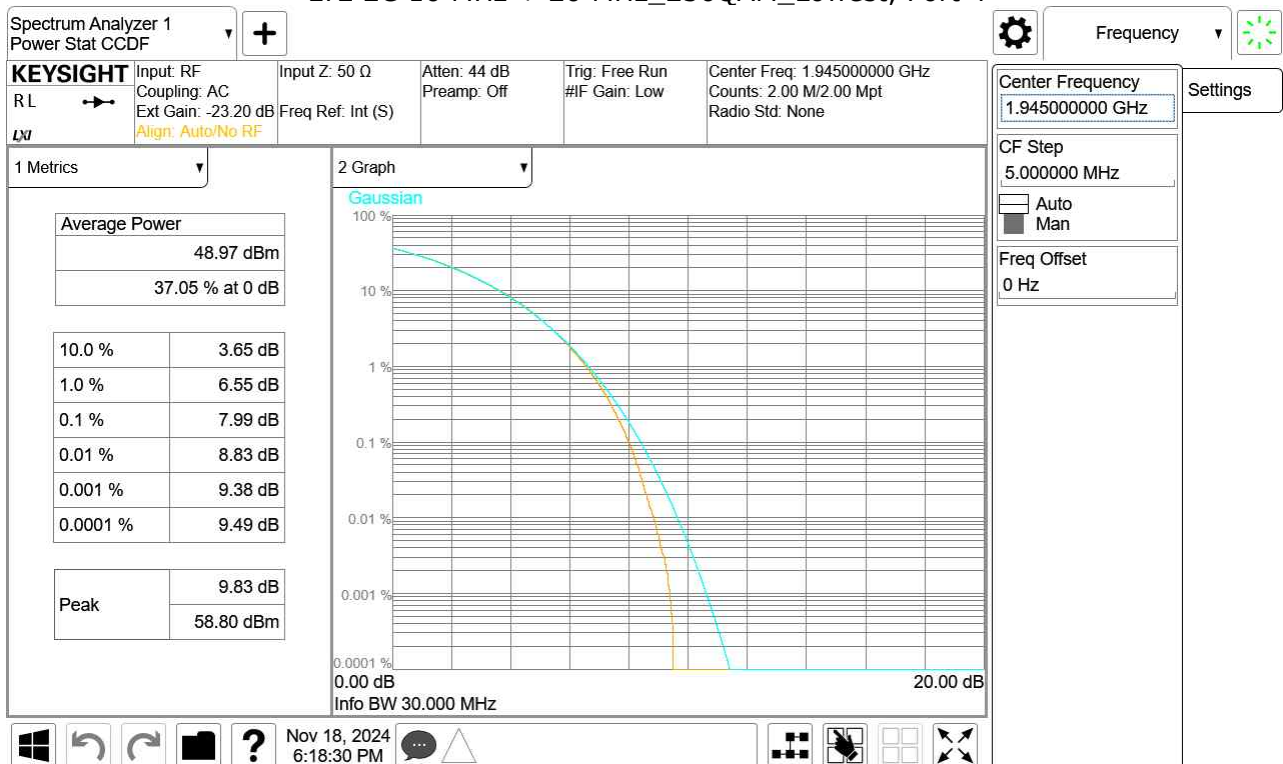
LTE 2C 10 MHz + 20 MHz_16QAM_Highest, Port 3



LTE 2C 10 MHz + 20 MHz_64QAM_Lowest, Port 3



LTE 2C 10 MHz + 20 MHz_256QAM_Lowest, Port 4

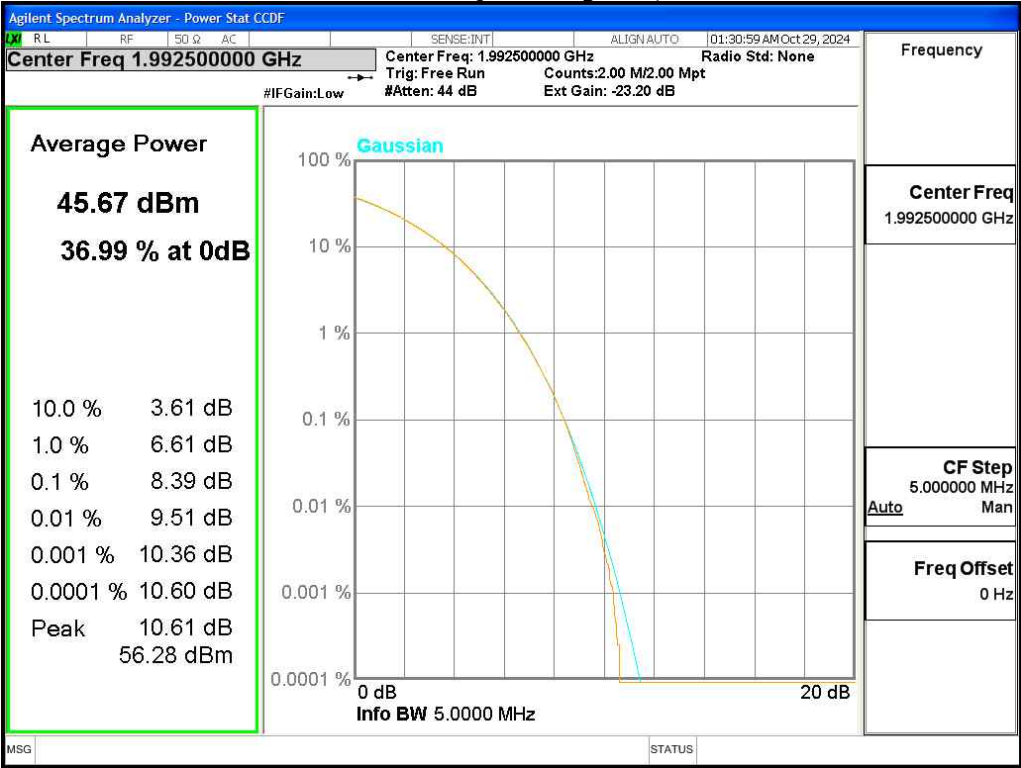


Test mode : NR 1C 5 MHz

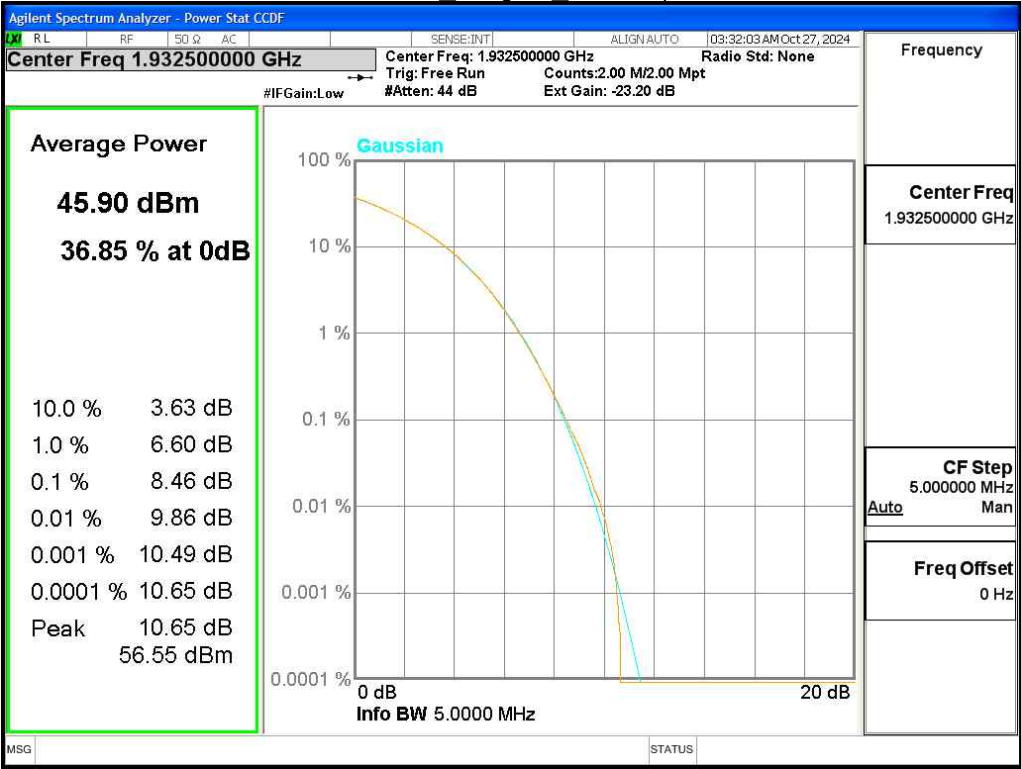
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	8.33	8.46	8.39	8.38
	2	8.34	8.43	8.38	8.41
	3	8.37	8.43	8.36	8.41
	4	8.35	8.44	8.40	8.43
Middle	1	8.36	8.42	8.37	8.41
	2	8.37	8.42	8.38	8.46
	3	8.35	8.45	8.37	8.41
	4	8.34	8.43	8.36	8.42
highest	1	8.39	8.43	8.35	8.42
	2	8.37	8.43	8.37	8.41
	3	8.39	8.44	8.37	8.43
	4	8.39	8.44	8.40	8.41

See next pages for actual measured spectrum plots.

NR 1C 5 MHz_QPSK_Highest, Port 1



NR 1C 5 MHz_16QAM_Lowest, Port 1

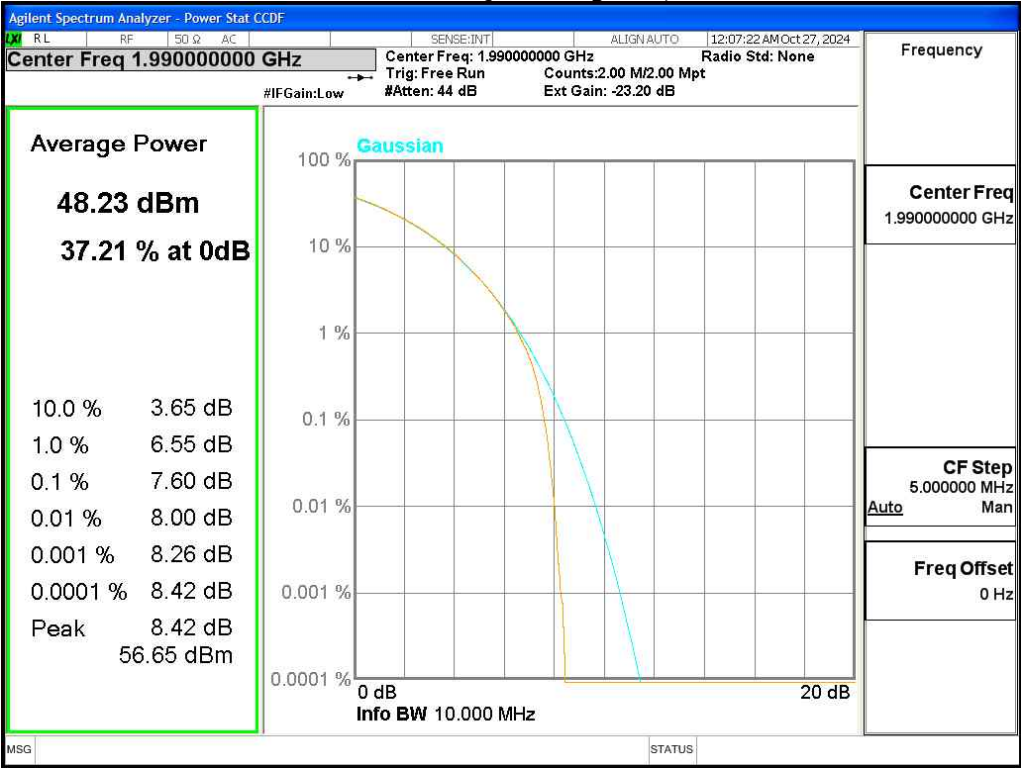


Test mode : NR 1C 10 MHz

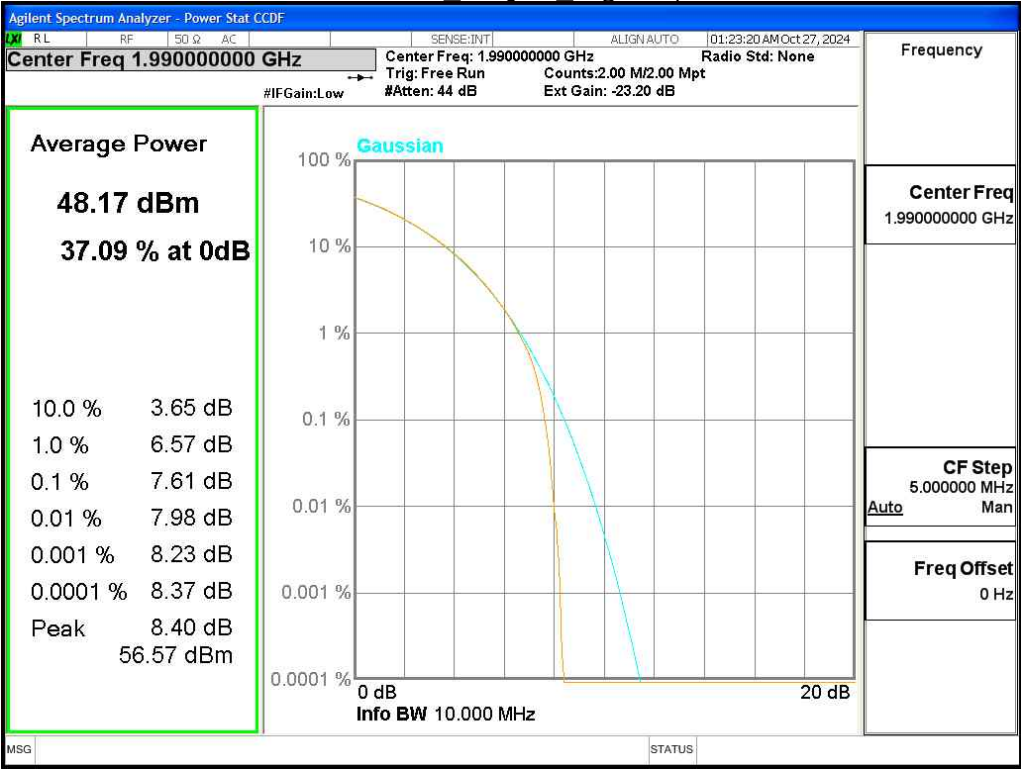
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.54	7.59	7.54	7.59
	2	7.55	7.57	7.55	7.58
	3	7.56	7.58	7.55	7.59
	4	7.56	7.58	7.56	7.59
Middle	1	7.57	7.53	7.53	7.56
	2	7.52	7.53	7.58	7.58
	3	7.56	7.57	7.58	7.58
	4	7.52	7.55	7.57	7.58
highest	1	7.51	7.53	7.60	7.61
	2	7.59	7.60	7.60	7.60
	3	7.60	7.61	7.61	7.61
	4	7.59	7.60	7.61	7.60

See next pages for actual measured spectrum plots.

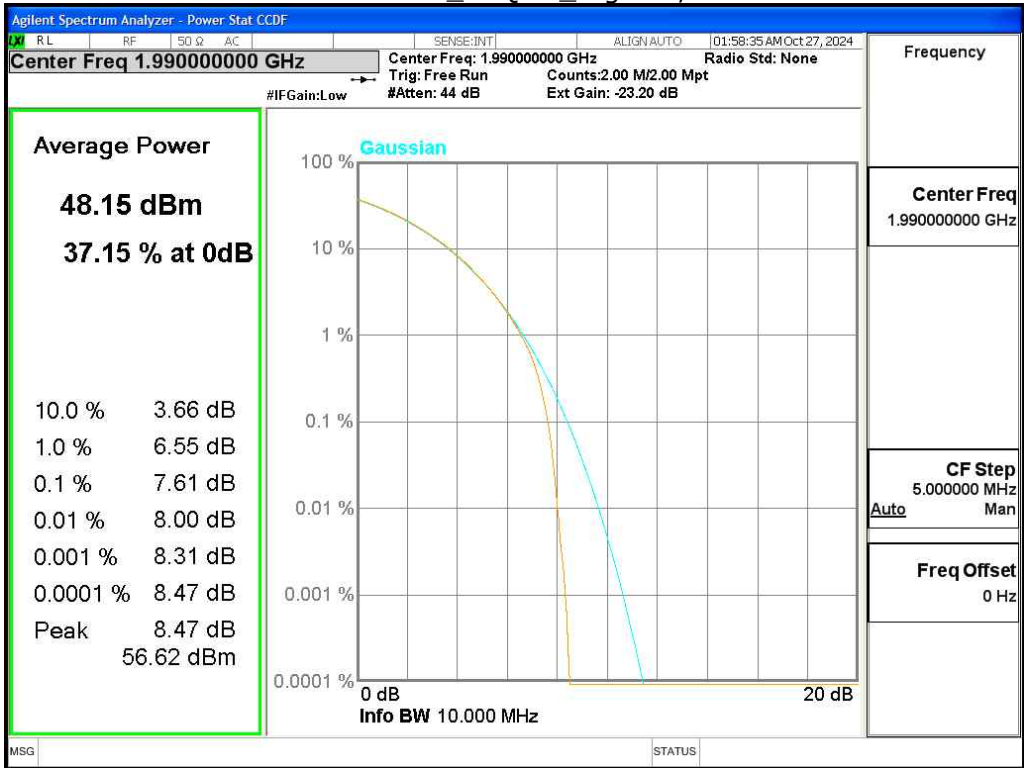
NR 1C 10 MHz_QPSK_Highest, Port 3



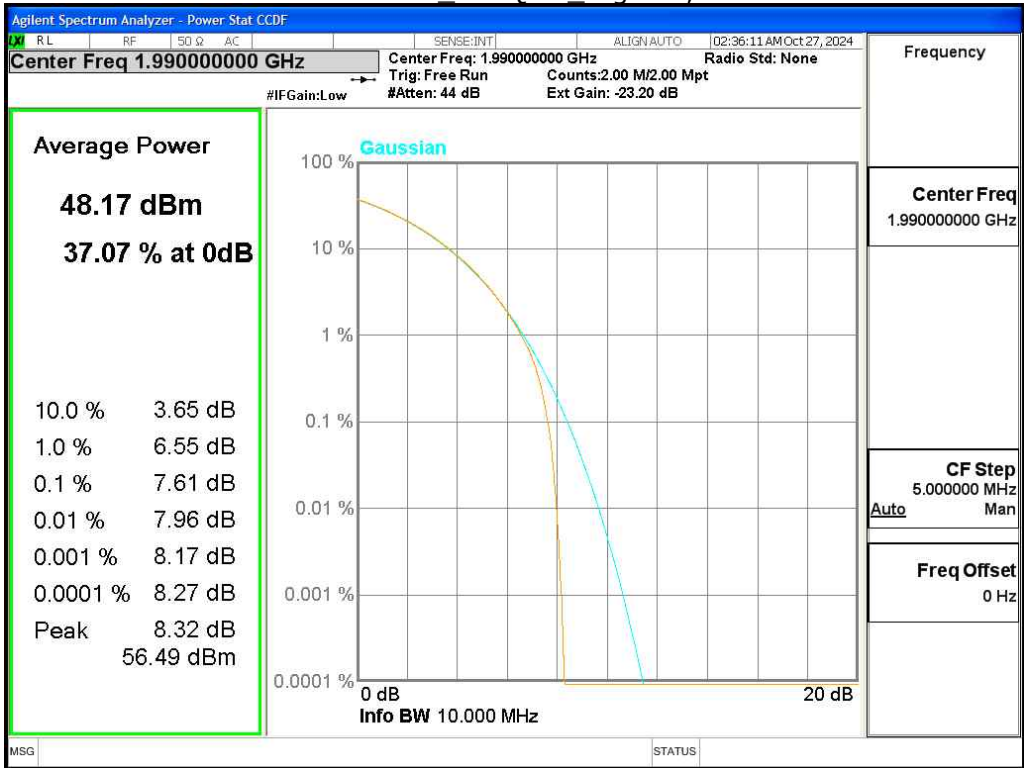
NR 1C 10 MHz_16QAM_Highest, Port 3



NR 1C 10 MHz_64QAM_Highest, Port 3



NR 1C 10 MHz_256QAM_Highest, Port 3

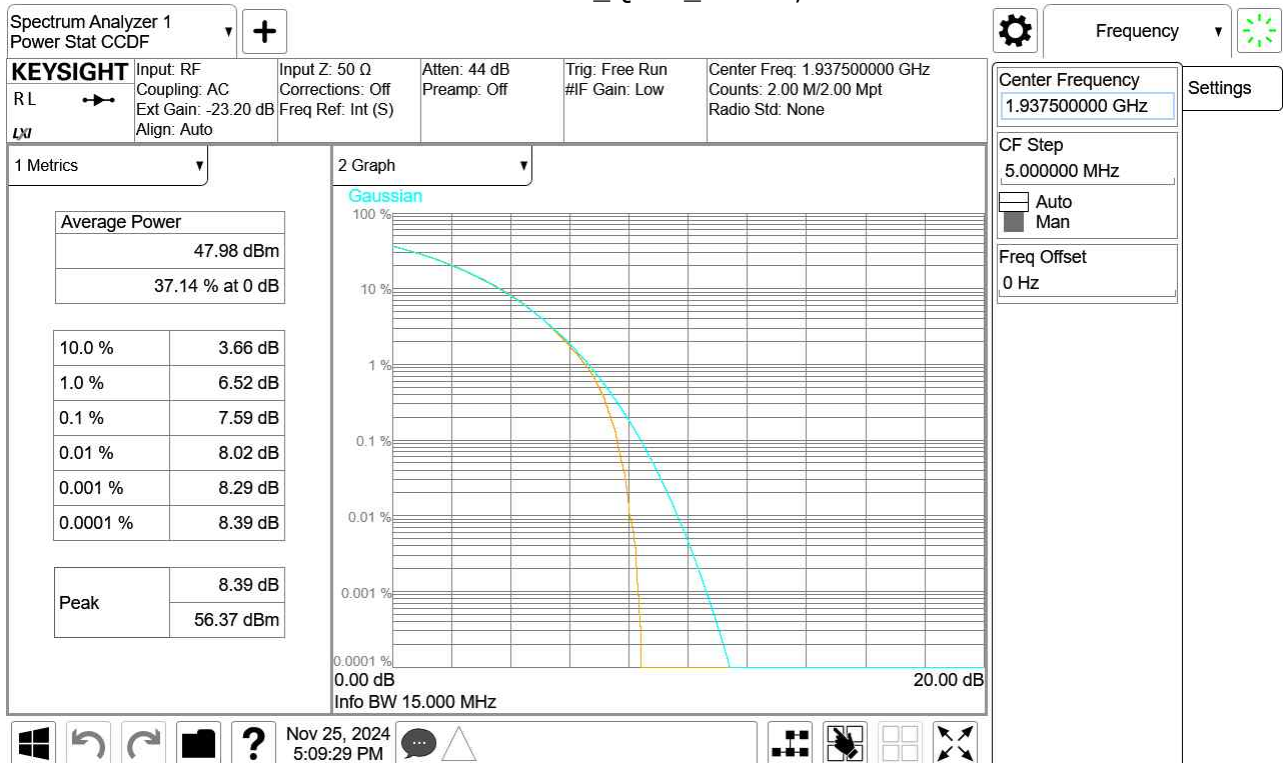


Test mode : NR 1C 15 MHz

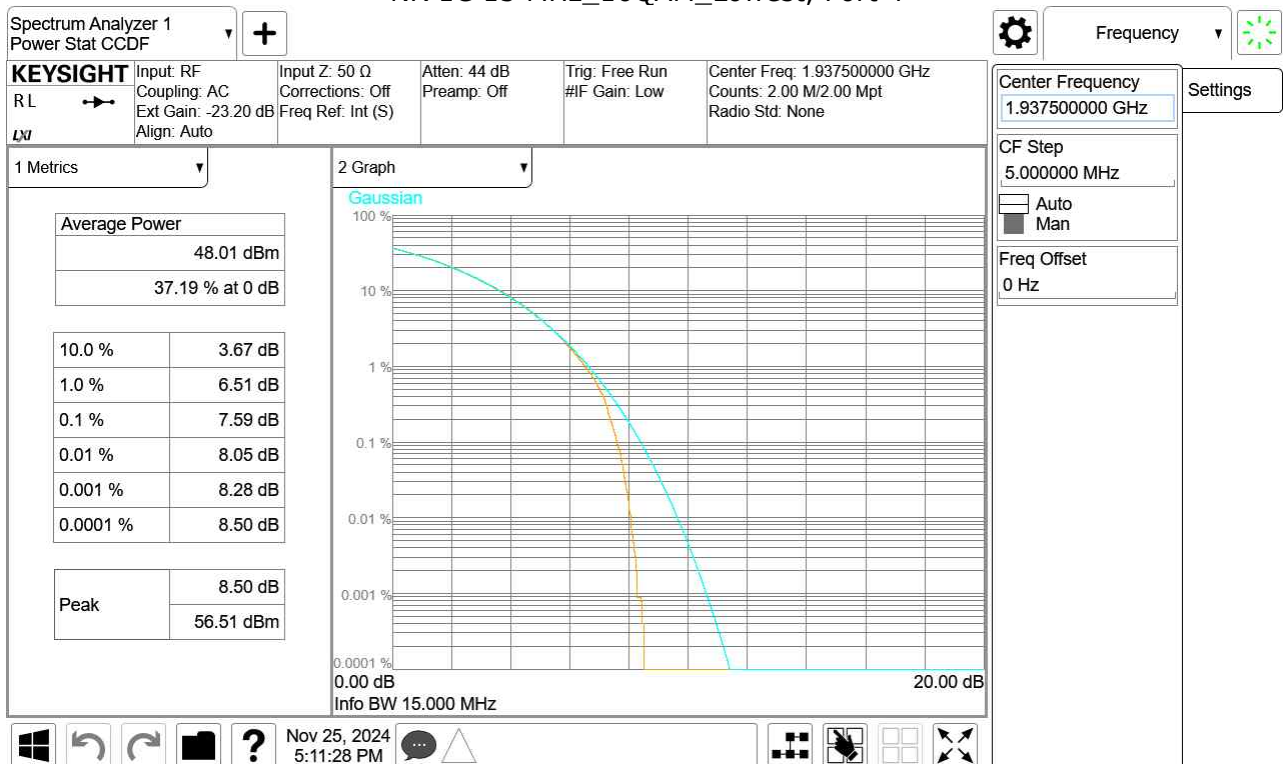
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.59	7.57	7.59	7.59
	2	7.59	7.56	7.58	7.57
	3	7.58	7.58	7.59	7.59
	4	7.55	7.59	7.58	7.62
Middle	1	7.48	7.46	7.47	7.46
	2	7.47	7.46	7.46	7.47
	3	7.47	7.47	7.47	7.47
	4	7.46	7.47	7.46	7.47
highest	1	7.44	7.43	7.48	7.46
	2	7.48	7.47	7.44	7.47
	3	7.44	7.46	7.47	7.47
	4	7.47	7.46	7.45	7.46

See next pages for actual measured spectrum plots.

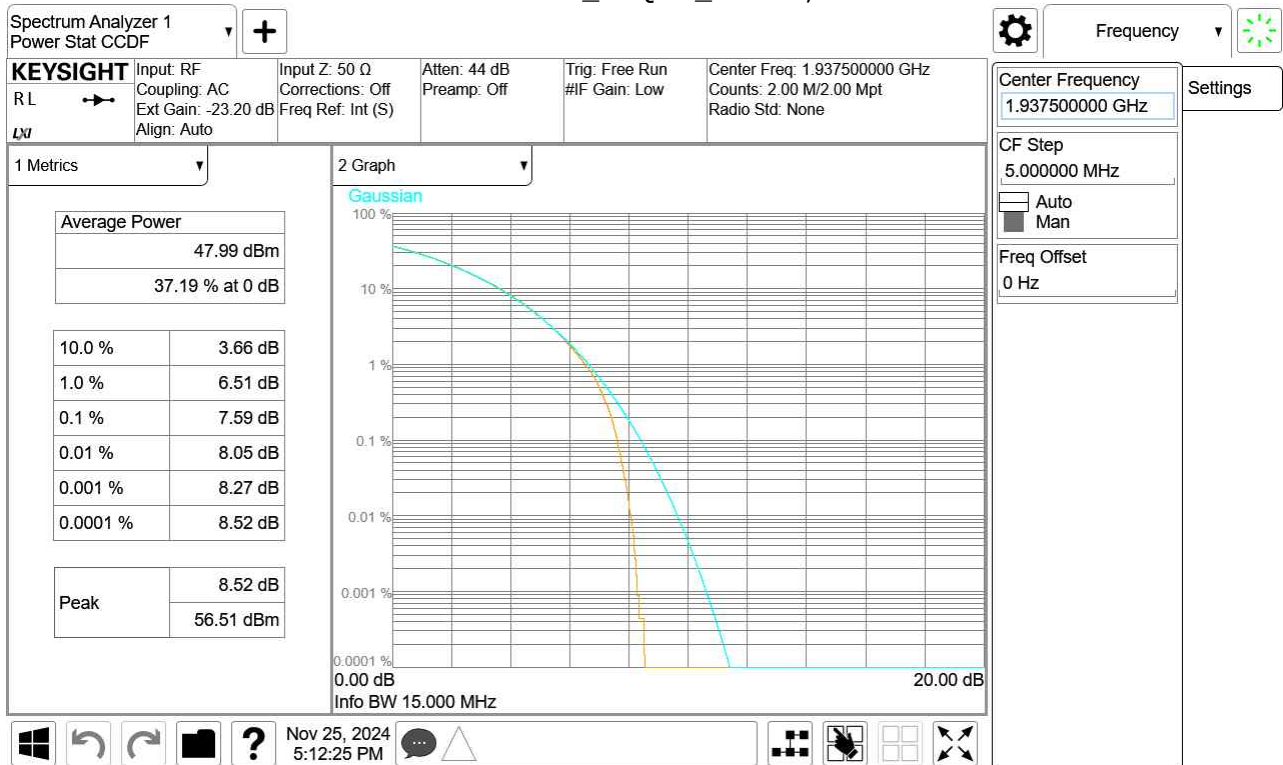
NR 1C 15 MHz_QPSK_Lowest, Port 1



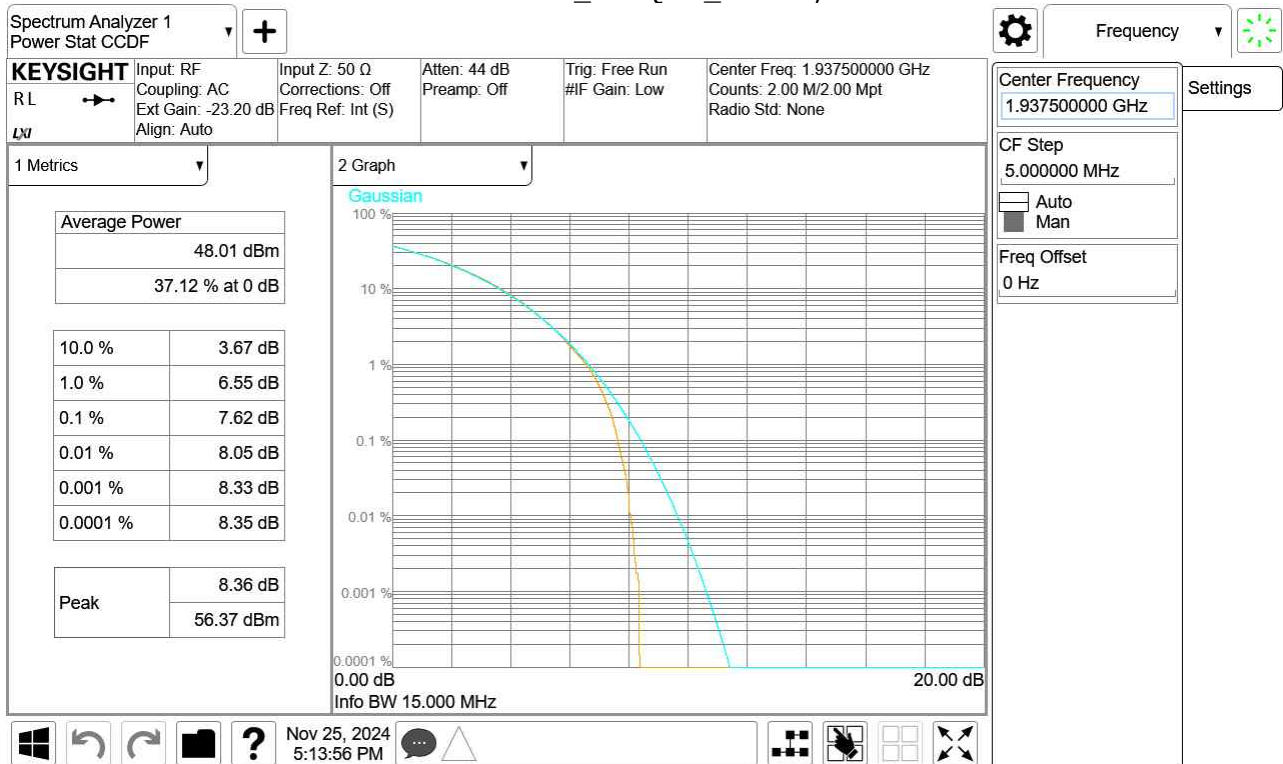
NR 1C 15 MHz_16QAM_Lowest, Port 4



NR 1C 15 MHz_64QAM_Lowest, Port 1



NR 1C 15 MHz_256QAM_Lowest, Port 4

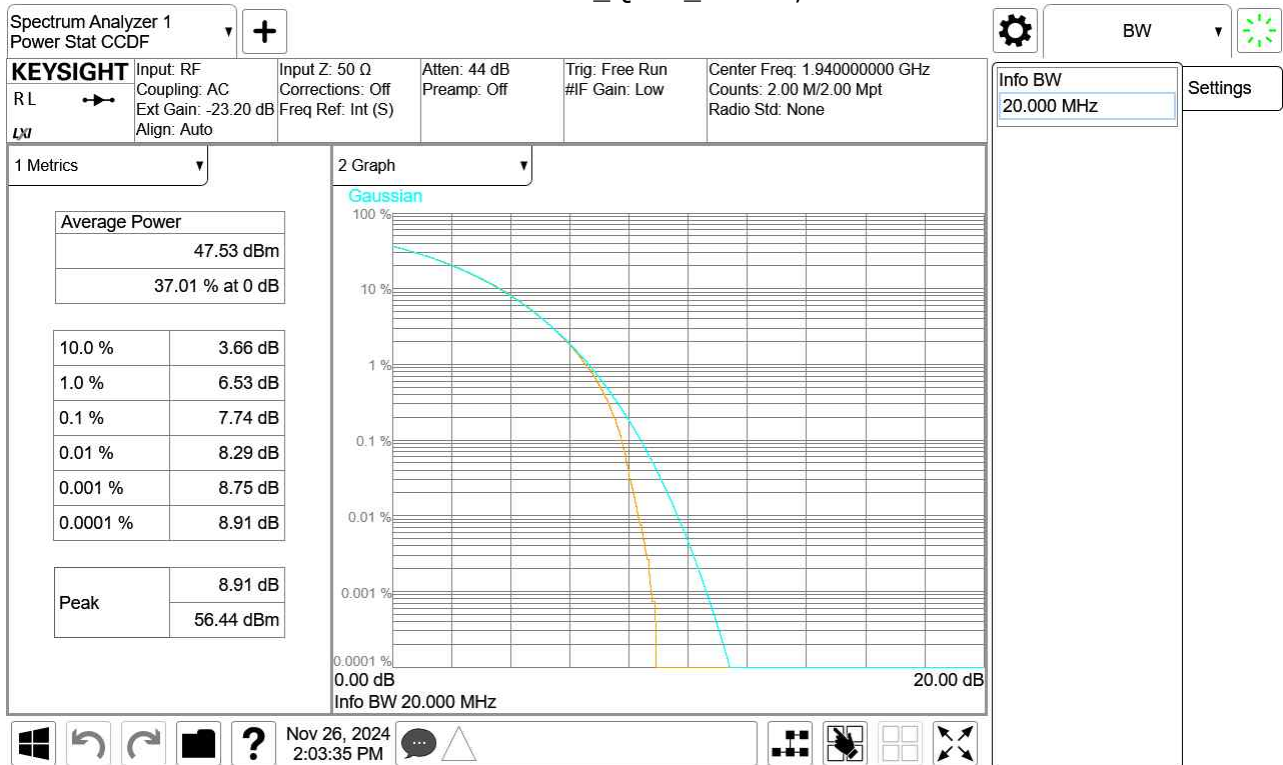


Test mode : NR 1C 20 MHz

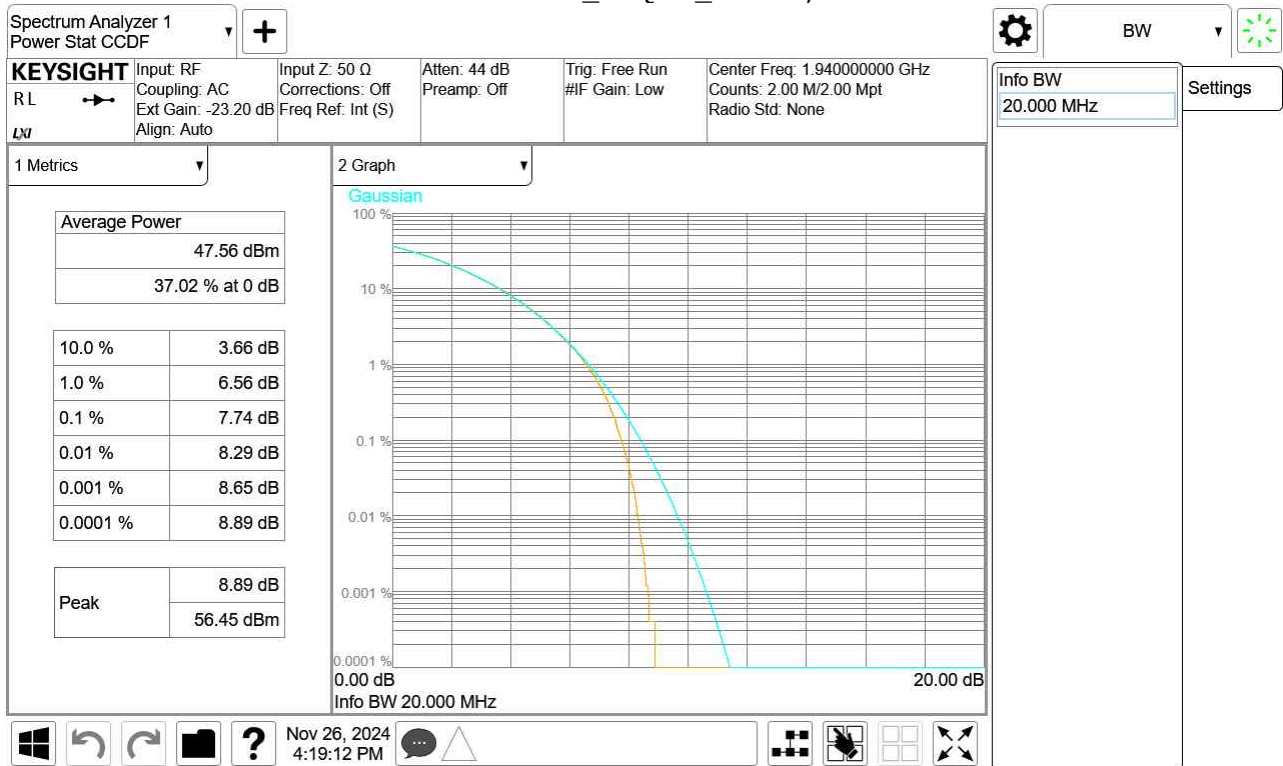
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.74	7.74	7.73	7.71
	2	7.69	7.73	7.70	7.69
	3	7.70	7.71	7.69	7.70
	4	7.74	7.71	7.71	7.74
Middle	1	7.55	7.54	7.55	7.55
	2	7.55	7.55	7.56	7.55
	3	7.55	7.57	7.56	7.57
	4	7.56	7.56	7.55	7.56
highest	1	7.57	7.58	7.57	7.59
	2	7.55	7.56	7.56	7.56
	3	7.58	7.58	7.58	7.58
	4	7.57	7.58	7.58	7.57

See next pages for actual measured spectrum plots.

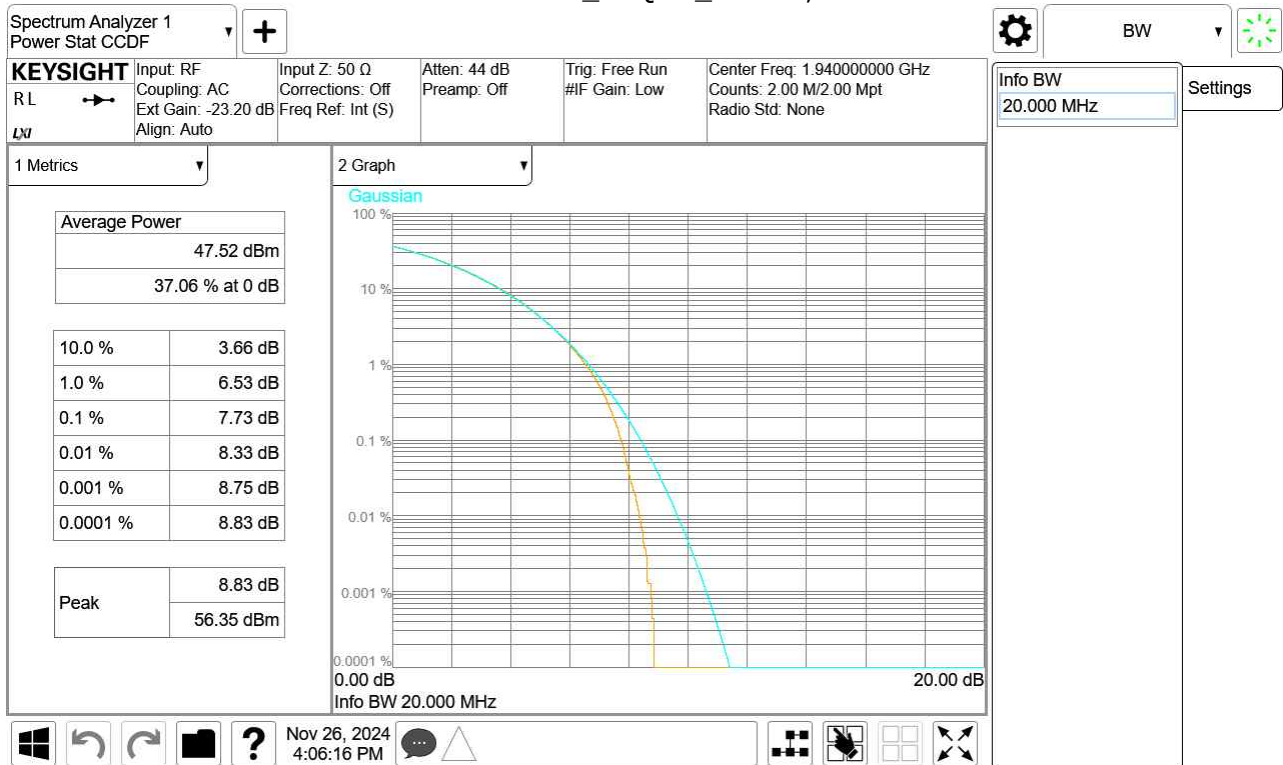
NR 1C 20 MHz_QPSK_Lowest, Port 1



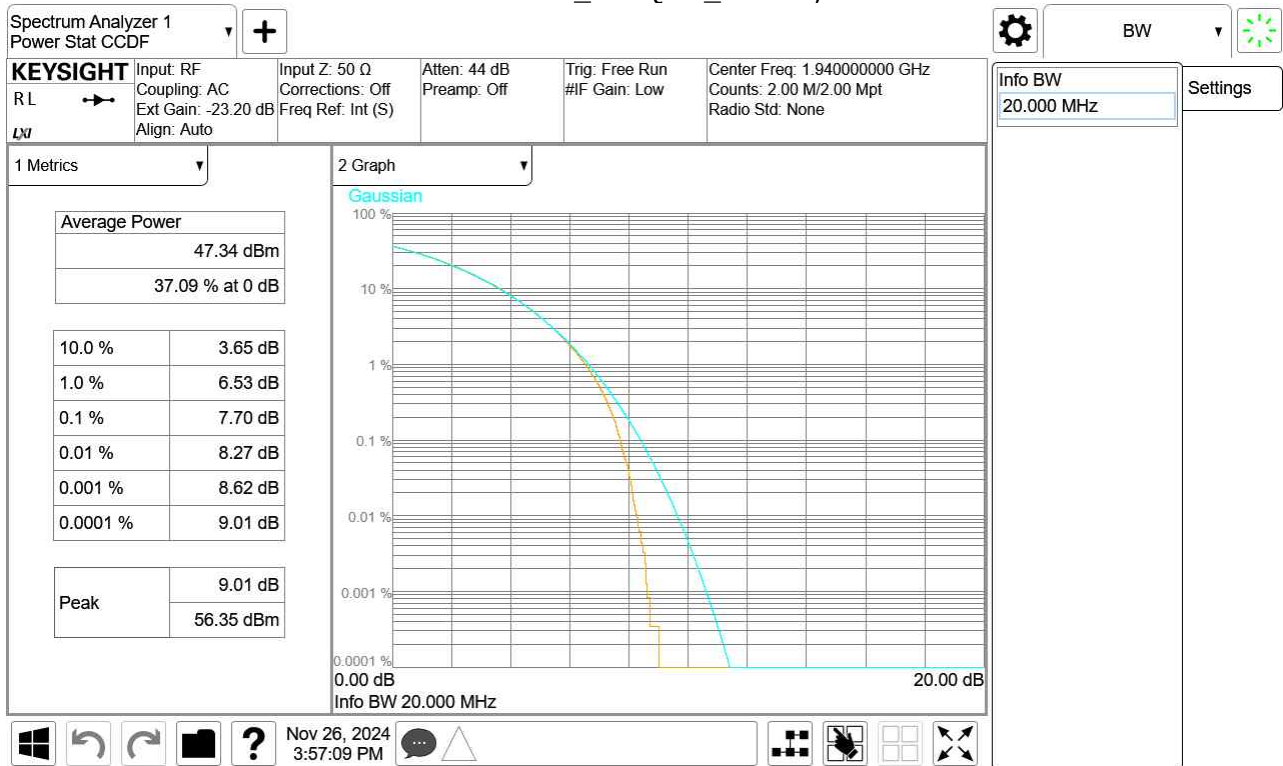
NR 1C 20 MHz_16QAM_Lowest, Port 1



NR 1C 20 MHz_64QAM_Lowest, Port 1



NR 1C 20 MHz_256QAM_Lowest, Port 3

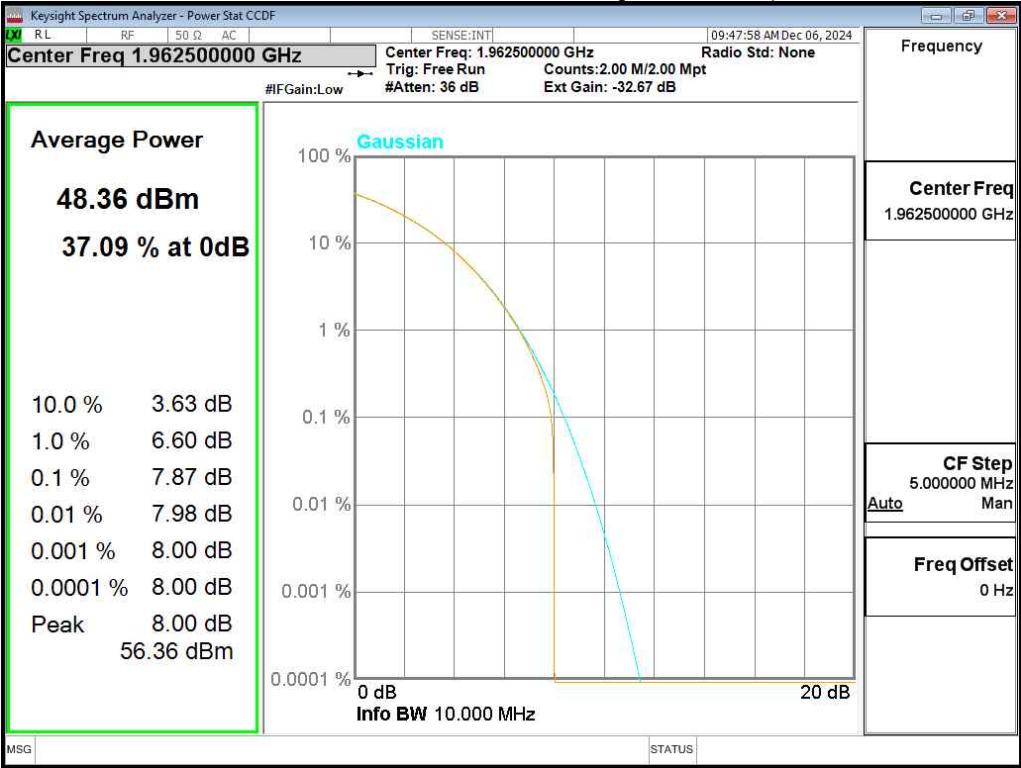


Test mode : LTE 1C 5 MHz + NR 1C 5 MHz

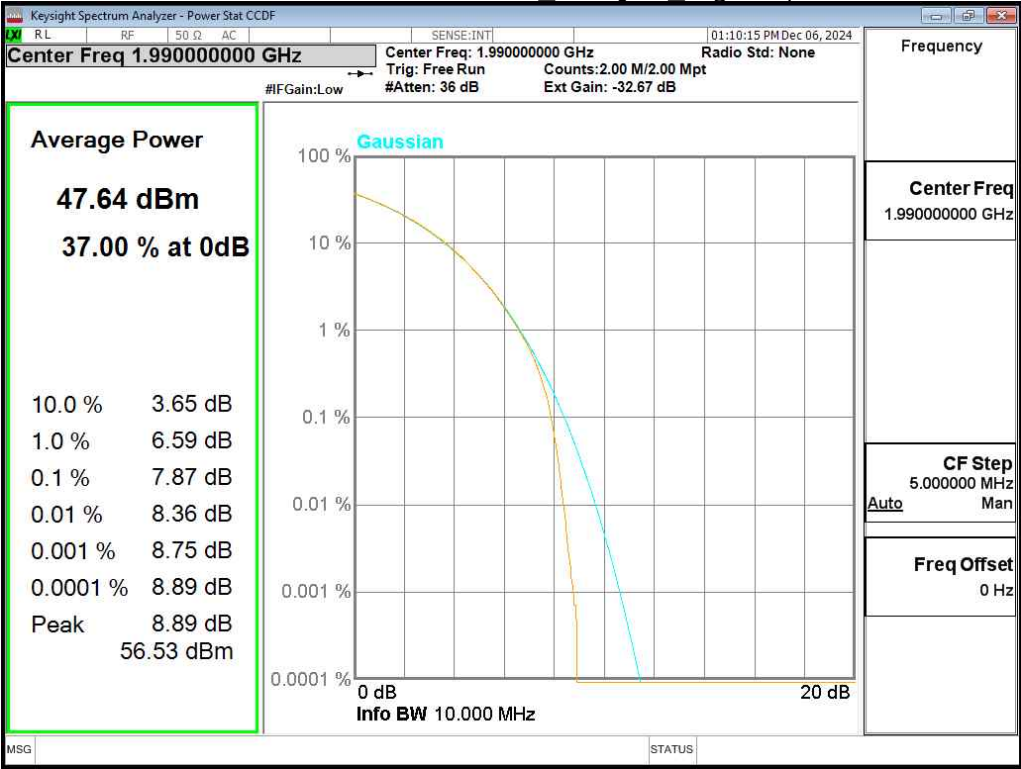
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	7.89	7.90	7.82	7.85
	2	7.87	7.92	7.82	7.84
	3	7.87	7.93	7.84	7.79
	4	7.87	7.91	7.83	7.82
Middle	1	7.89	7.90	7.87	7.84
	2	7.88	7.90	7.87	7.86
	3	7.86	7.89	7.84	7.83
	4	7.85	7.89	7.81	7.82
highest	1	7.86	7.89	7.82	7.86
	2	7.86	7.88	7.80	7.86
	3	7.87	7.86	7.83	7.86
	4	7.89	7.87	7.84	7.87

See next pages for actual measured spectrum plots.

LTE 1C 5 MHz + NR 1C 5 MHz_64QAM_Middle, Port 1



LTE 1C 5 MHz + NR 1C 5 MHz_256QAM_Highest, Port 4

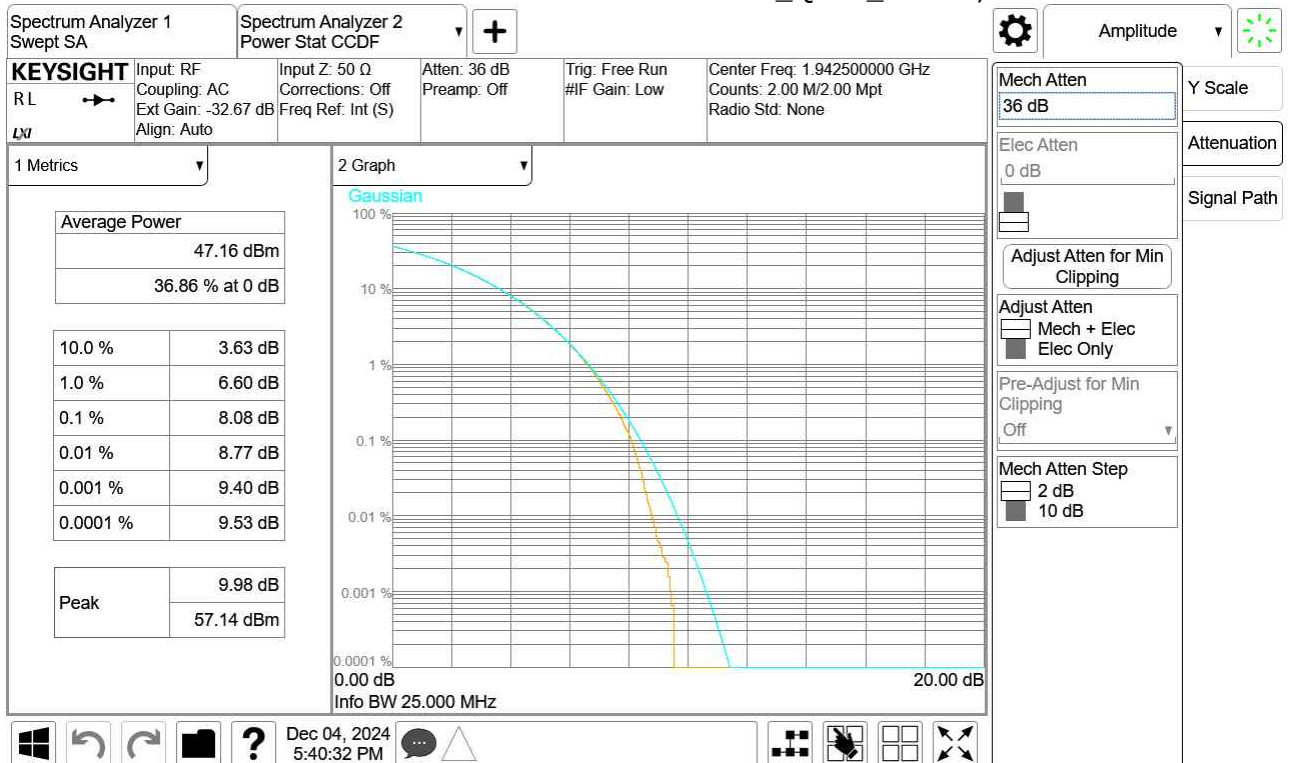


Test mode : LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz

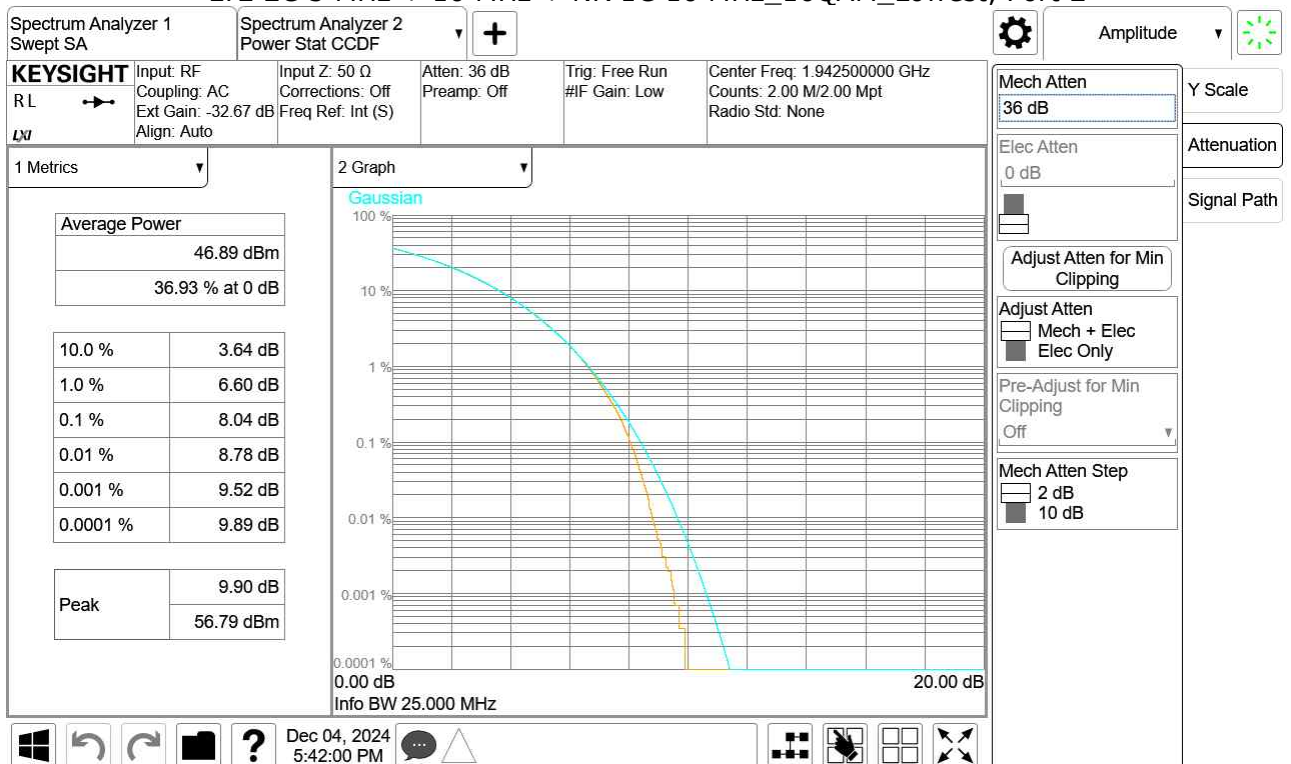
Channel	Port	PAPR (dB)			
		QPSK	16QAM	64QAM	256QAM
lowest	1	8.08	8.03	8.05	8.06
	2	8.05	8.04	8.05	8.07
	3	8.08	8.04	8.04	8.04
	4	8.05	8.04	8.05	8.07
Middle	1	7.99	7.99	7.98	8.00
	2	7.97	7.97	7.99	7.94
	3	7.95	7.95	7.99	7.97
	4	8.00	7.98	7.97	7.98
highest	1	7.96	7.96	7.97	7.95
	2	7.95	7.94	7.97	7.96
	3	7.95	7.96	7.97	7.97
	4	7.96	7.97	7.95	7.95

See next pages for actual measured spectrum plots.

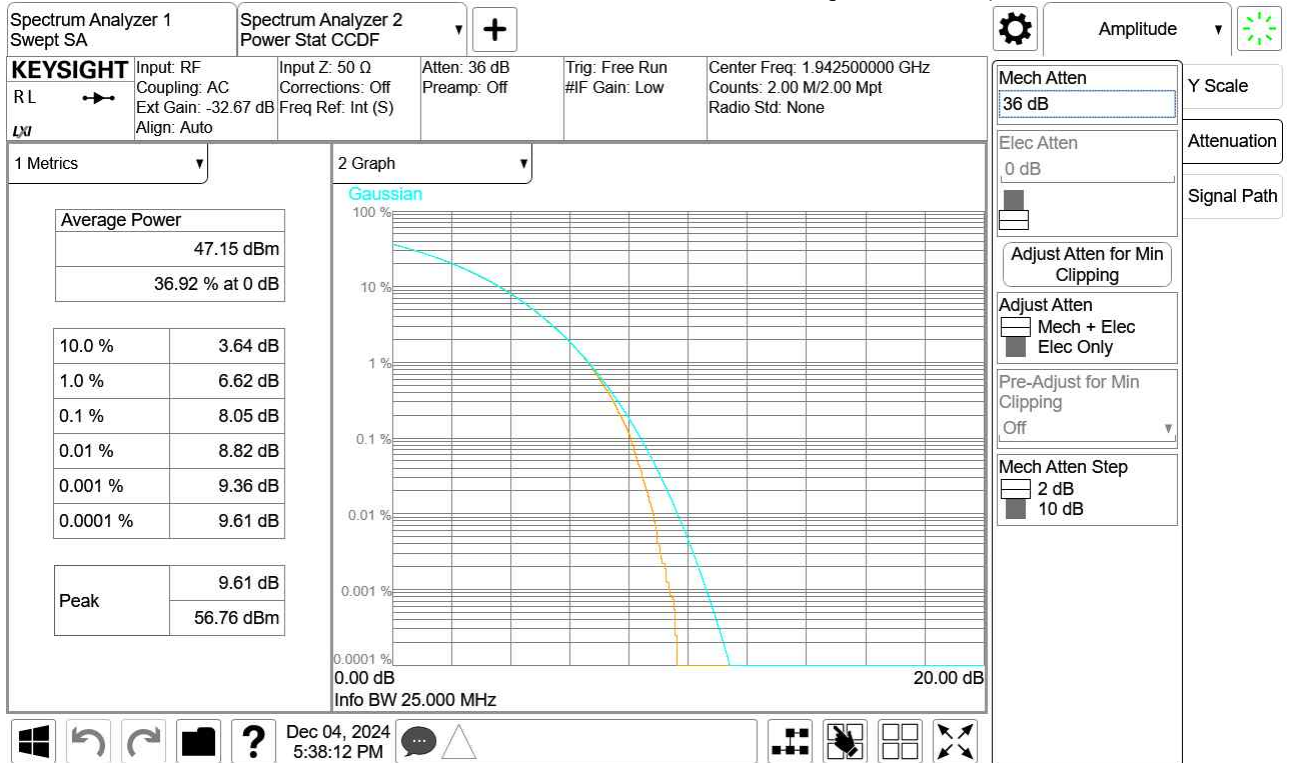
LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz_QPSK_Lowest, Port 1



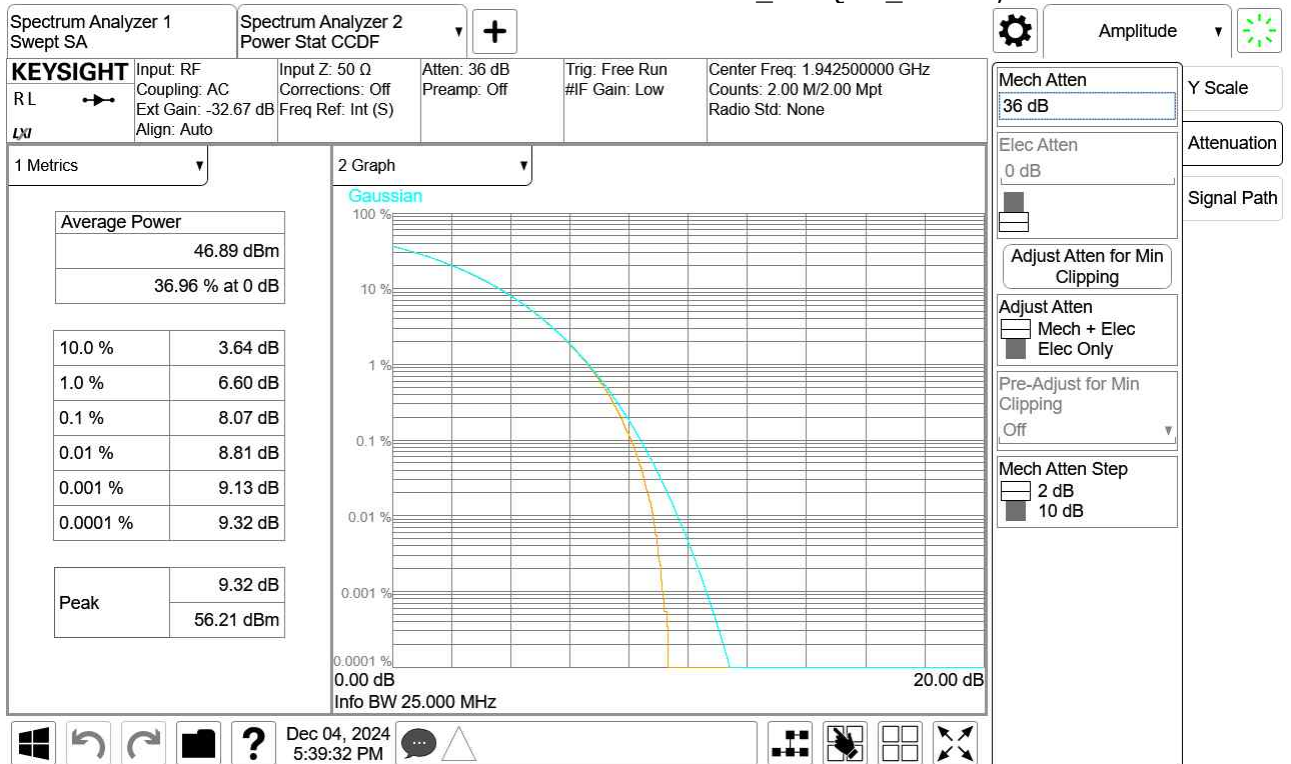
LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz_16QAM_Lowest, Port 2



LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz_64QAM_Lowest, Port 1



LTE 2C 5 MHz + 10 MHz + NR 1C 10 MHz_256QAM_Lowest, Port 2



4.5 Band Edge Emissions at Antenna Terminal

Test Procedures :

KDB 971168 D01 v03r01 – Section 6

KDB 662911 D01 v02r01 – Section E)3) Out-of-Band and Spurious Emission Measurements

a) Absolute Emission Limits

iii) Measure and add $10 \log(N_{\text{ANT}})$ dB

ANSI C63.26-2015 – Section 5.7.3

Test Settings :

Center frequency = Set a point 1MHz away from the operating band edge.

a) RBW = Please see test notes below.

b) $VBW \geq 3 \times RBW$

c) Detector = RMS

d) Sweep time = auto couple

e) Trace mode= trace average

f) Sweep point $\geq 2 \times \text{span} / RBW$

g) Allow trace to fully stabilize

h) Use the peak marker function to determine the maximum amplitude level.

Limit :

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P[\text{Watts}])$, where P is the transmitter power in Watts. The power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19.02 dBm $[-13 \text{ dBm} - 10 \log(4)]$ per KDB 662911 D01 v02r01 - section E)3) because the EUT operate as a 4 port MIMO transmitter.

Test note :

1. Compliance with this provision 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. 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. All modes of operation were investigated and the worst case configuration results are reported in this section.
3. The port with Band Edge Emissions i.e. worst case port per modulation has been highlighted in the following Band Edge Emissions tables.

Test Data :

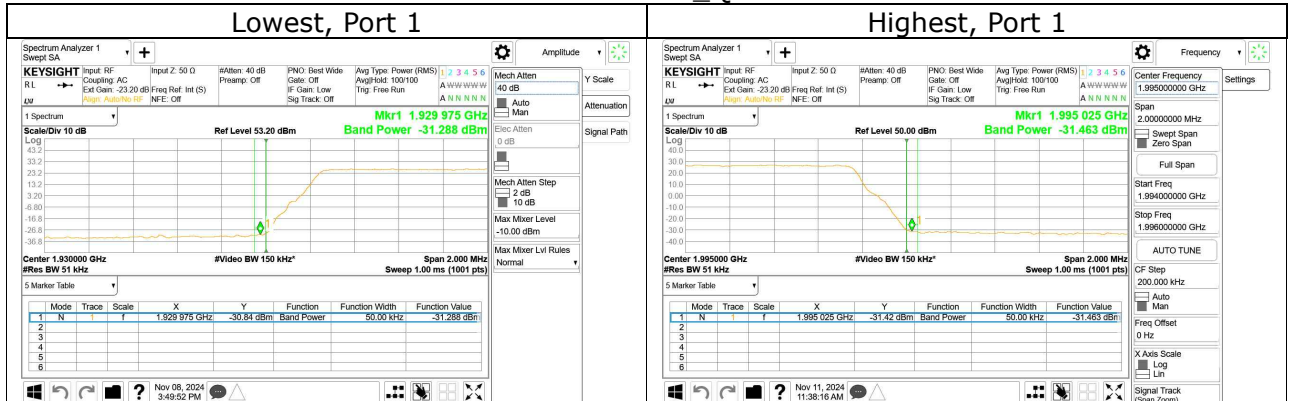
Test mode : LTE 1C 5 MHz

Channel	Port #	Measurement Range	Band edge (dBm)				Limit (dBm)
			QPSK	16QAM	64QAM	256QAM	
Lowest	1	1 929 MHz to 1 930 MHz	-31.29	-32.21	-31.57	-31.22	-19.02
	2		-32.68	-33.30	-31.59	-32.19	
	3		-32.46	-33.54	-30.82	-32.80	
	4		-32.37	-33.12	-30.75	-32.47	

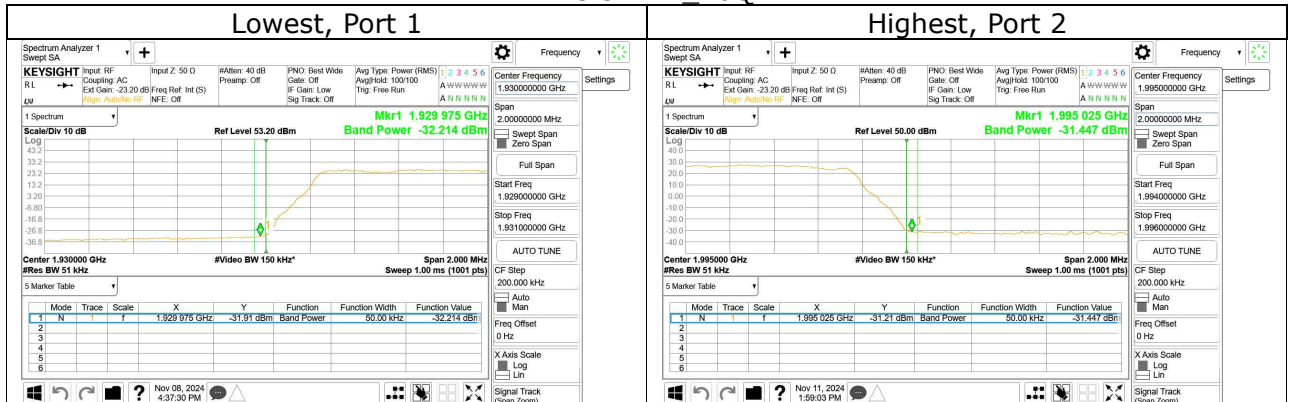
Channel	Port #	Measurement Range	Band edge (dBm)				Limit (dBm)
			QPSK	16QAM	64QAM	256QAM	
Highest	1	1 995 MHz to 1 996 MHz	-31.46	-32.56	-31.27	-33.22	-19.02
	2		-32.71	-31.45	-32.21	-32.66	
	3		-32.01	-33.03	-32.02	-31.74	
	4		-31.77	-33.12	-32.68	-33.20	

See next pages for actual measured spectrum plots.

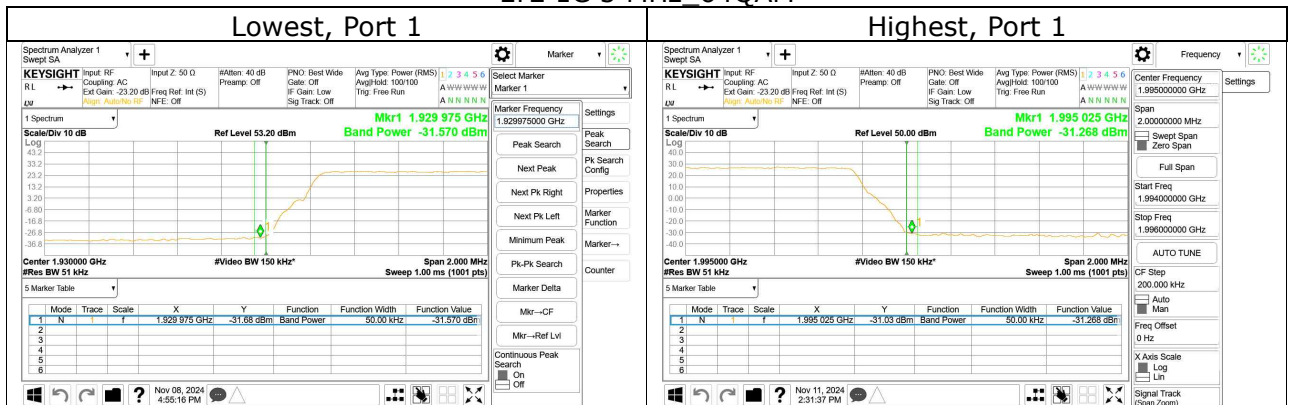
LTE 1C 5 MHz_QPSK



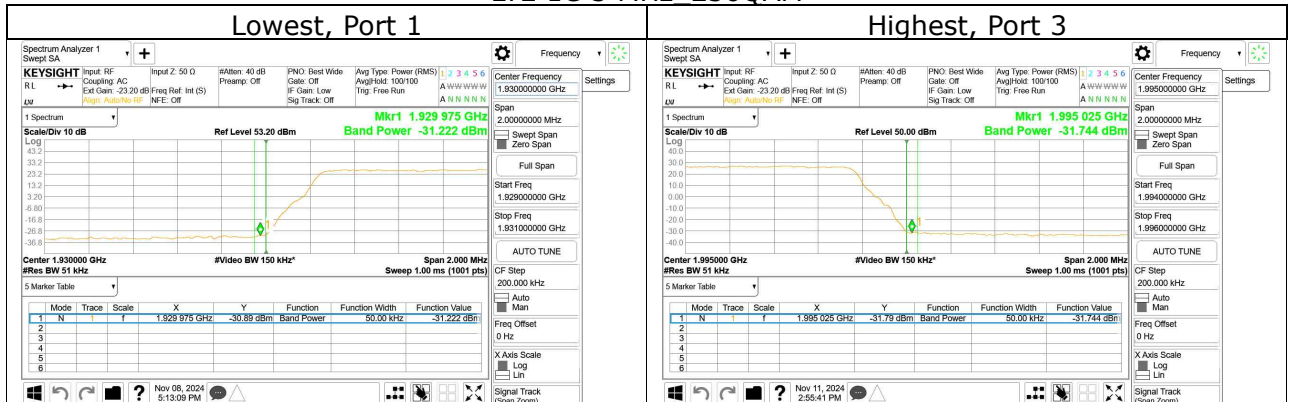
LTE 1C 5 MHz_16QAM



LTE 1C 5 MHz_64QAM



LTE 1C 5 MHz_256QAM



Test mode : LTE 1C 10 MHz

Channel	Port #	Measurement Range	Band edge (dBm)				Limit (dBm)
			QPSK	16QAM	64QAM	256QAM	
Lowest	1	1 929 MHz	-27.96	-27.93	-27.54	-27.68	-19.02
	2		-27.49	-28.84	-27.79	-28.08	
	3	1 930 MHz	-28.12	-28.24	-27.80	-26.83	
	4		-28.06	-28.69	-27.61	-27.91	

Channel	Port #	Measurement Range	Band edge (dBm)				Limit (dBm)
			QPSK	16QAM	64QAM	256QAM	
Highest	1	1 995 MHz	-28.03	-28.36	-27.79	-28.86	-19.02
	2		-28.17	-28.97	-28.57	-29.20	
	3	1 996 MHz	-29.20	-29.19	-28.77	-29.76	
	4		-28.93	-29.23	-28.97	-29.02	

See next pages for actual measured spectrum plots.