

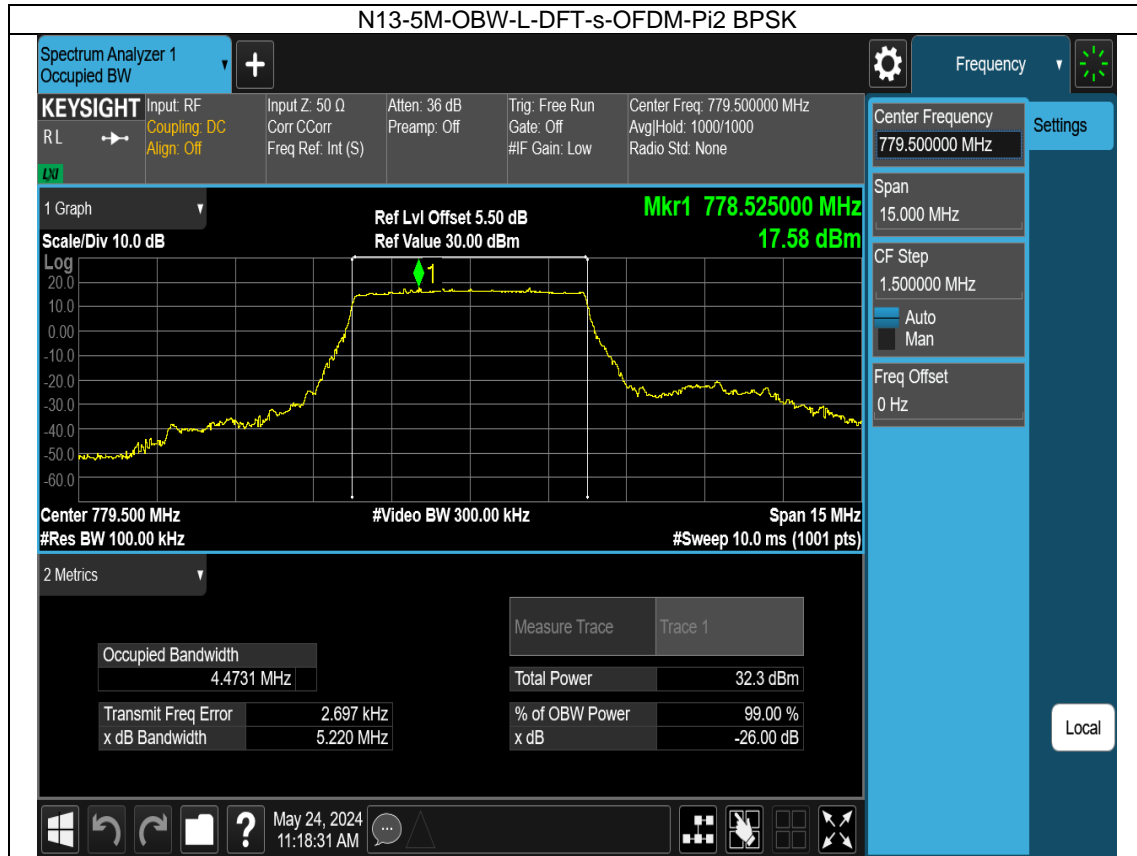
99% & 26dB Bandwidth

Test Result

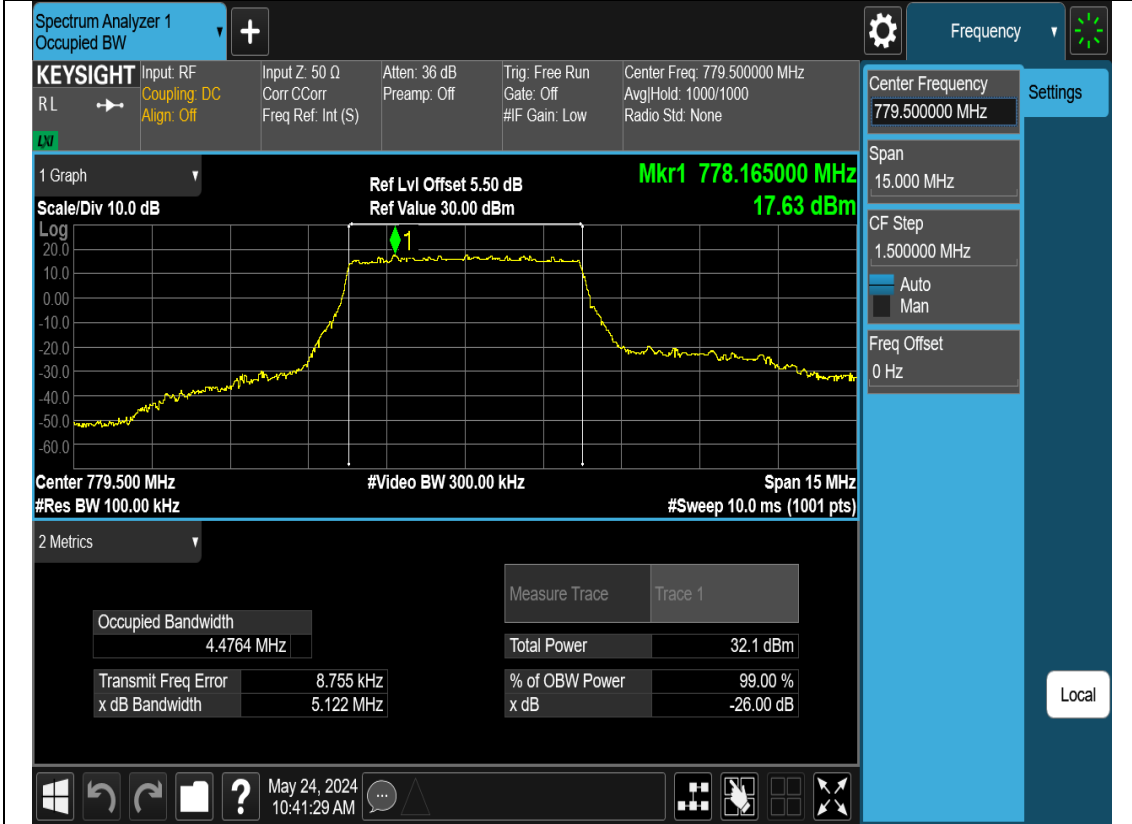
5G NR n13 SCS=15kHz 5MHz						
Modulation	CH	RB Allocation	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
DFT-s-OFDM PI/2 BPSK	Low CH	Outer_Full	4.473	5.220	/	Pass
DFT-s-OFDM QPSK		Outer_Full	4.476	5.122	/	Pass
DFT-s-OFDM 16QAM		Outer_Full	4.470	5.079	/	Pass
DFT-s-OFDM 64QAM		Outer_Full	4.496	5.176	/	Pass
DFT-s-OFDM 256QAM		Outer_Full	4.471	5.107	/	Pass
CP-OFDM QPSK		Outer_Full	4.493	5.126	/	Pass
CP-OFDM 16QAM		Outer_Full	4.483	5.155	/	Pass
CP-OFDM 64QAM		Outer_Full	4.482	5.202	/	Pass
CP-OFDM 256QAM		Outer_Full	4.485	5.148	/	Pass
DFT-s-OFDM PI/2 BPSK		Middle CH	Outer_Full	4.508	5.245	/
DFT-s-OFDM QPSK	Outer_Full		4.484	5.081	/	Pass
DFT-s-OFDM 16QAM	Outer_Full		4.492	5.246	/	Pass
DFT-s-OFDM 64QAM	Outer_Full		4.509	5.191	/	Pass
DFT-s-OFDM 256QAM	Outer_Full		4.498	5.173	/	Pass
CP-OFDM QPSK	Outer_Full		4.503	5.164	/	Pass
CP-OFDM 16QAM	Outer_Full		4.523	5.138	/	Pass
CP-OFDM 64QAM	Outer_Full		4.505	5.170	/	Pass
CP-OFDM 256QAM	Outer_Full		4.505	5.193	/	Pass
DFT-s-OFDM PI/2 BPSK	High CH		Outer_Full	4.524	5.303	/
DFT-s-OFDM QPSK		Outer_Full	4.502	5.294	/	Pass
DFT-s-OFDM 16QAM		Outer_Full	4.481	5.138	/	Pass
DFT-s-OFDM 64QAM		Outer_Full	4.504	5.161	/	Pass
DFT-s-OFDM 256QAM		Outer_Full	4.491	5.141	/	Pass
CP-OFDM QPSK		Outer_Full	4.524	5.260	/	Pass
CP-OFDM 16QAM		Outer_Full	4.490	5.089	/	Pass
CP-OFDM 64QAM		Outer_Full	4.523	5.221	/	Pass
CP-OFDM 256QAM		Outer_Full	4.492	5.132	/	Pass

5G NR n13 SCS=15kHz 10MHz						
Modulation	CH	RB Allocation	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
DFT-s-OFDM PI/2 BPSK	Middle CH	Outer_Full	8.944	9.715	/	Pass
DFT-s-OFDM QPSK		Outer_Full	8.931	9.657	/	Pass
DFT-s-OFDM 16QAM		Outer_Full	8.938	9.571	/	Pass
DFT-s-OFDM 64QAM		Outer_Full	8.951	9.793	/	Pass
DFT-s-OFDM 256QAM		Outer_Full	8.933	9.738	/	Pass
CP-OFDM QPSK		Outer_Full	8.940	9.725	/	Pass
CP-OFDM 16QAM		Outer_Full	9.305	10.05	/	Pass
CP-OFDM 64QAM		Outer_Full	9.293	10.07	/	Pass
CP-OFDM 256QAM		Outer_Full	9.301	10.05	/	Pass

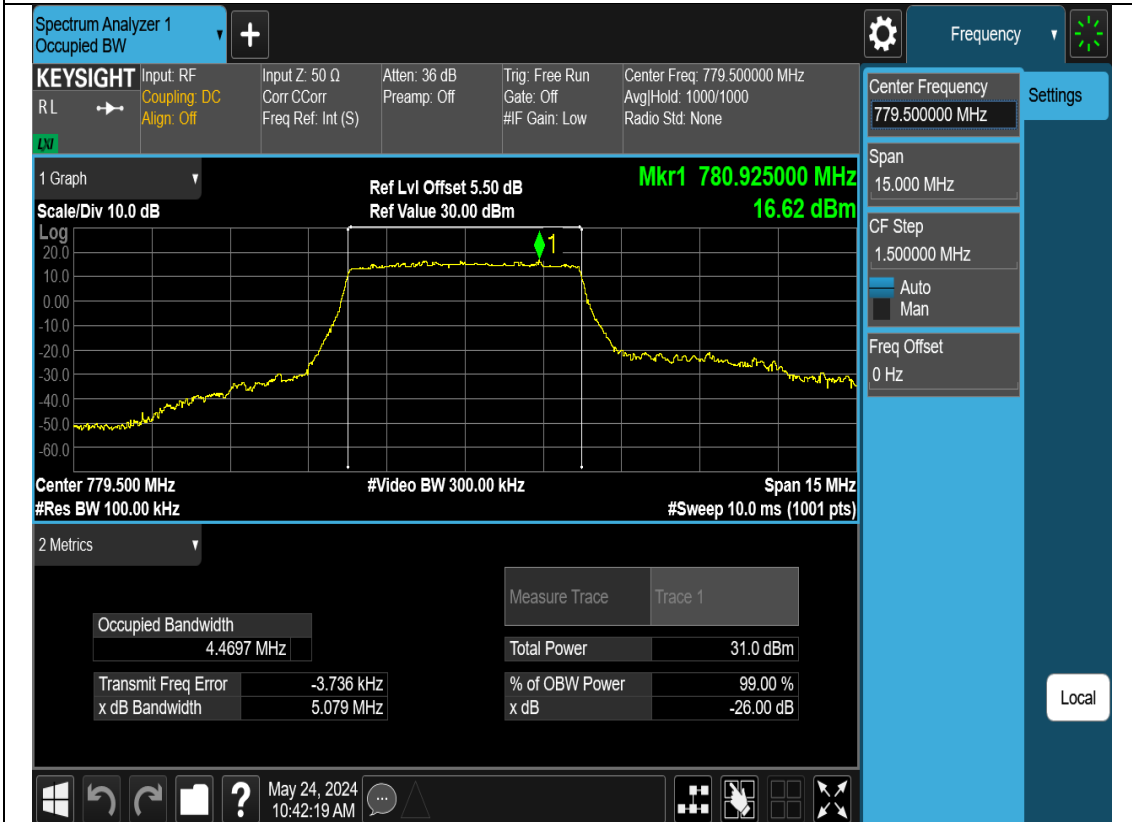
Test graph



N13-5M-OBW-L-DFT-s-OFDM-QPSK



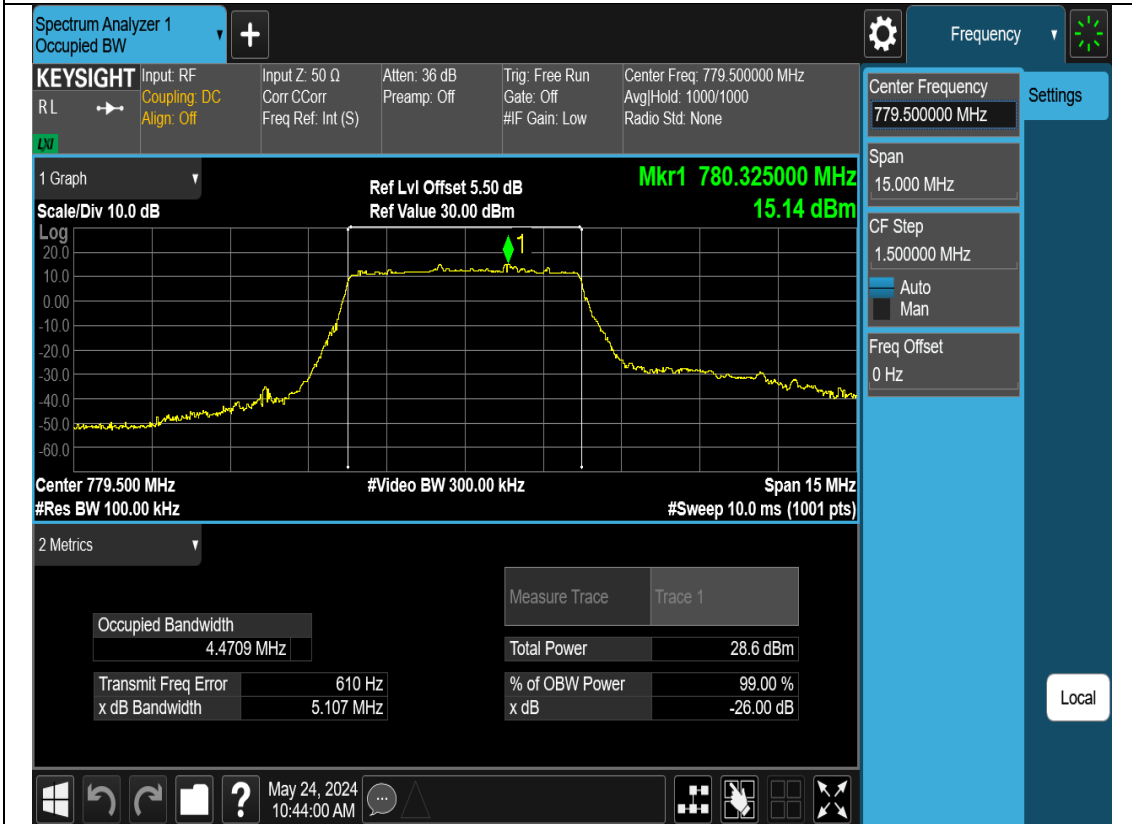
N13-5M-OBW-L-DFT-s-OFDM-16QAM



N13-5M-OBW-L-DFT-s-OFDM-64QAM



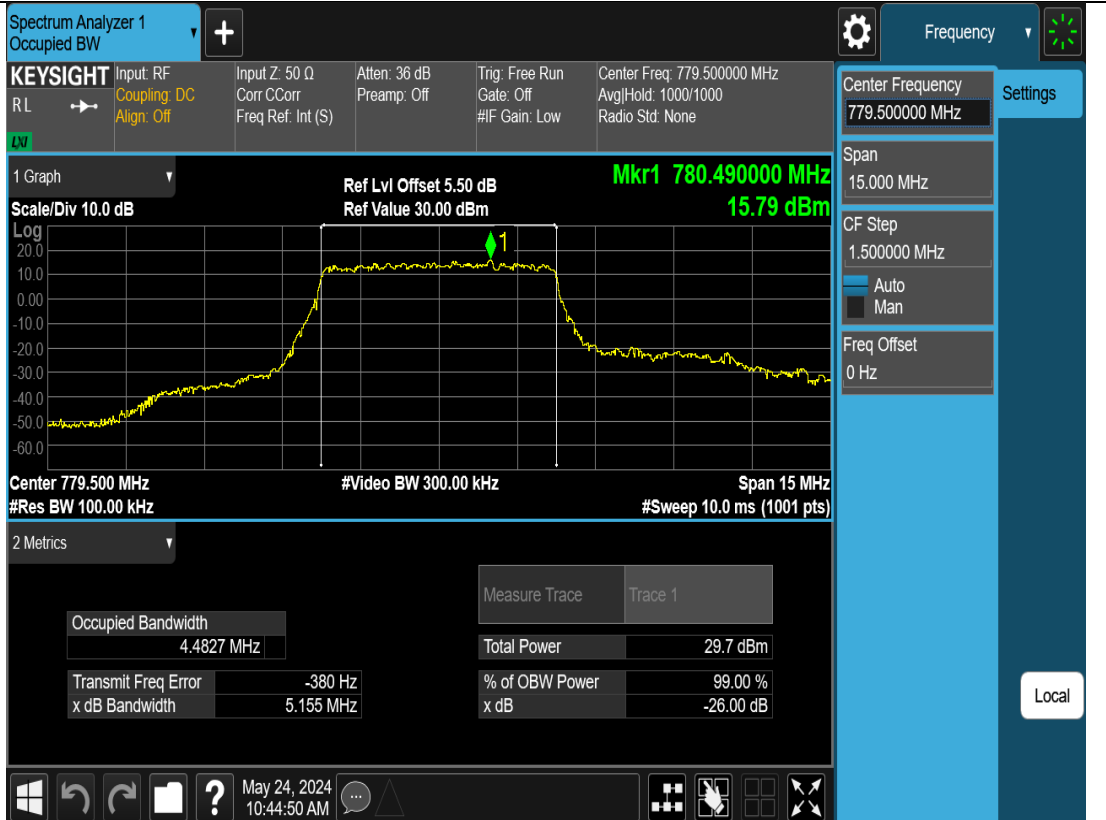
N13-5M-OBW-L-DFT-s-OFDM-256QAM



N13-5M-OBW-L-CP-OFDM-QPSK



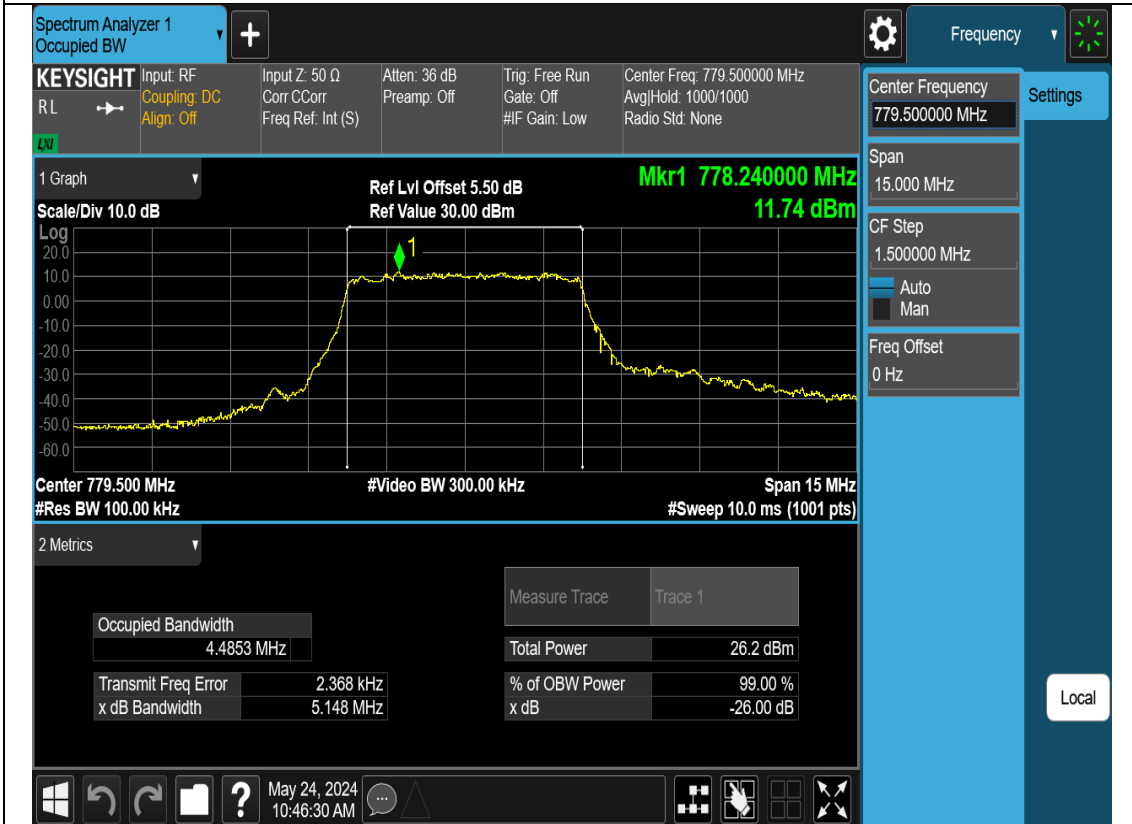
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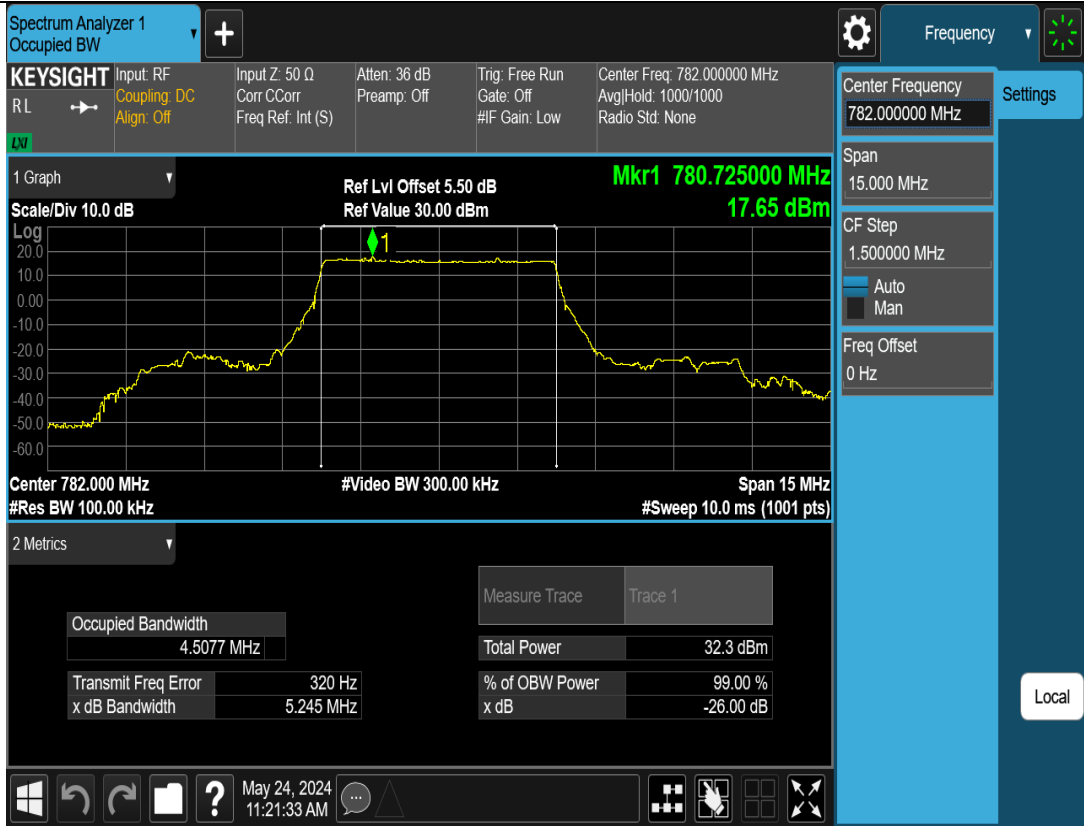
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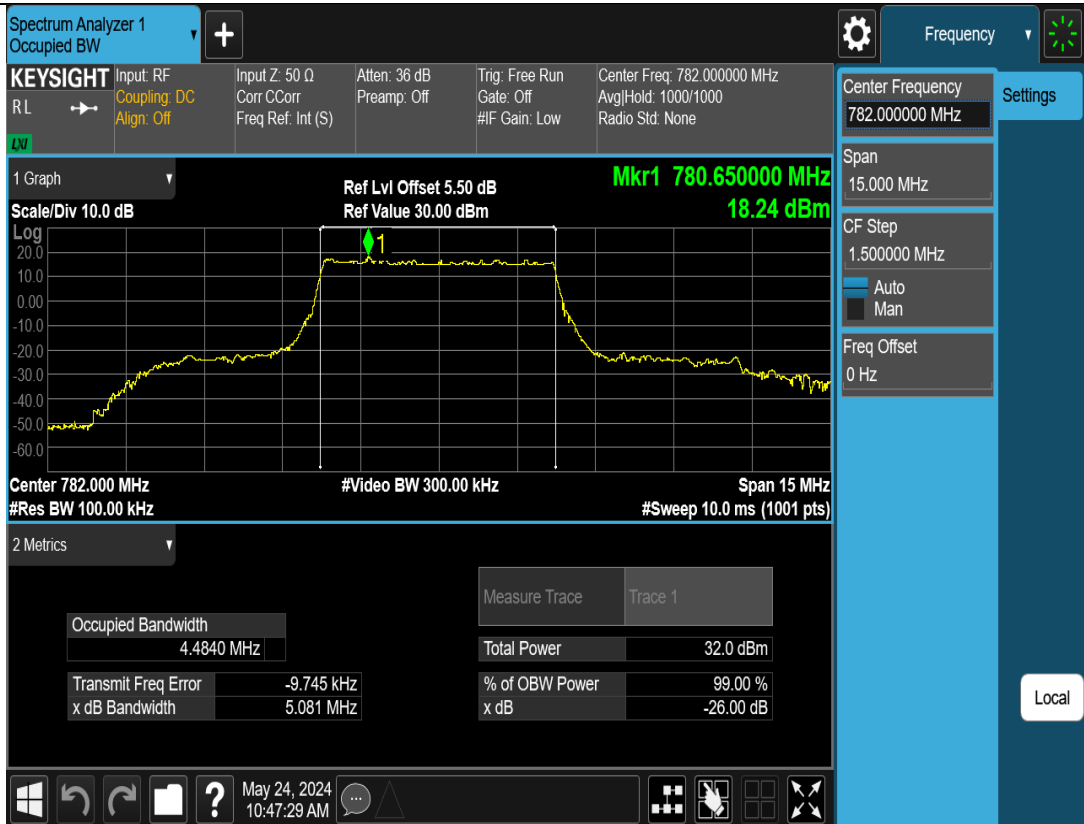
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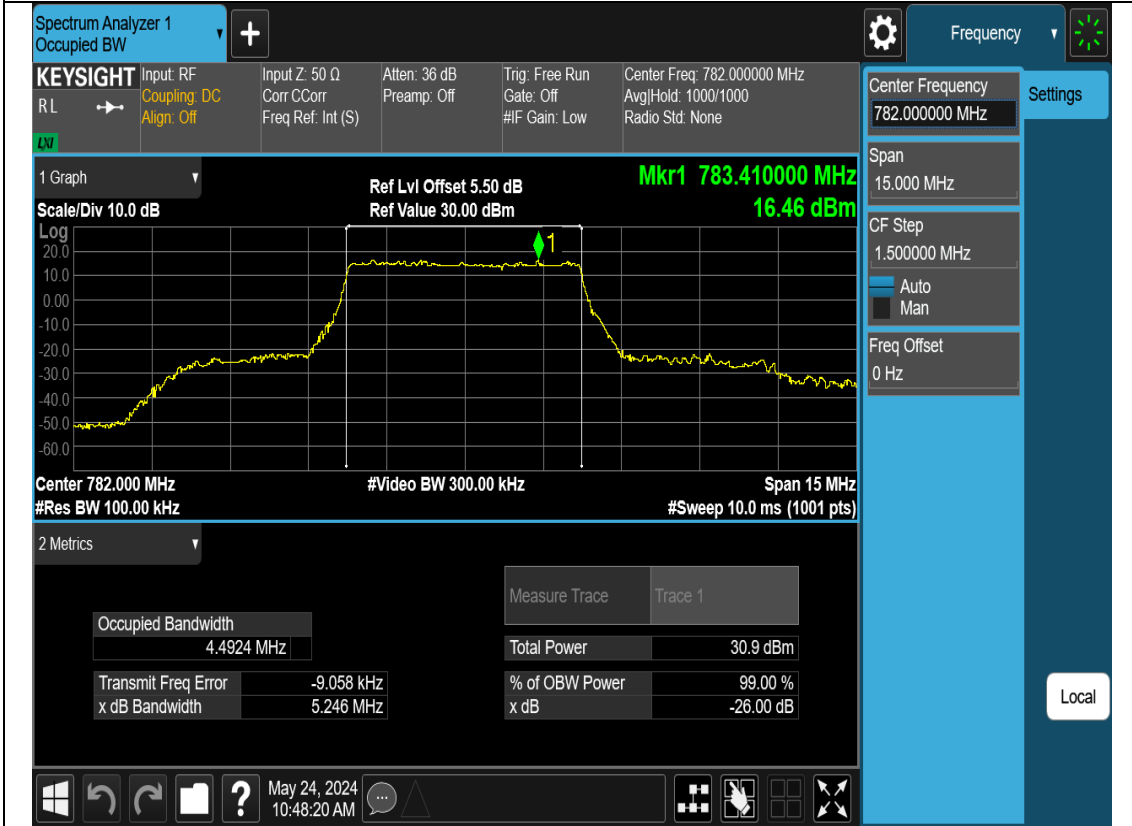
N13-5M-OBW-M-DFT-s-OFDM-Pi2 BPSK



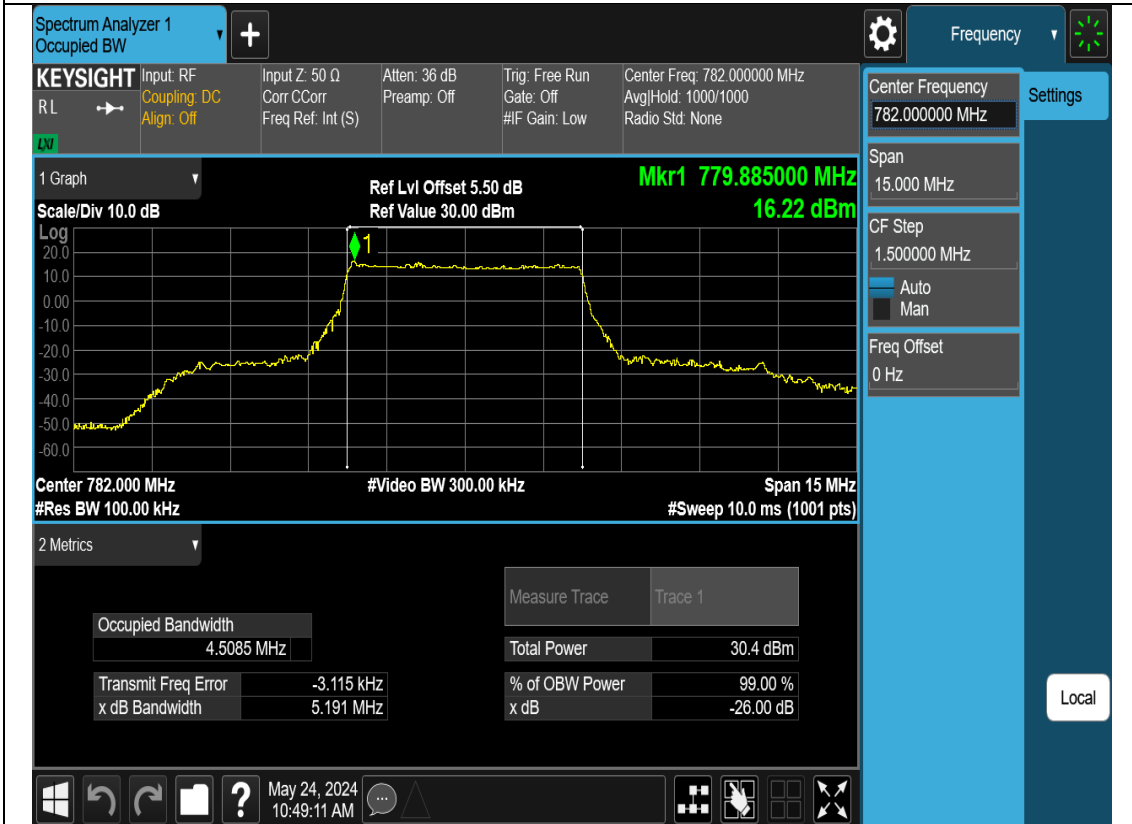
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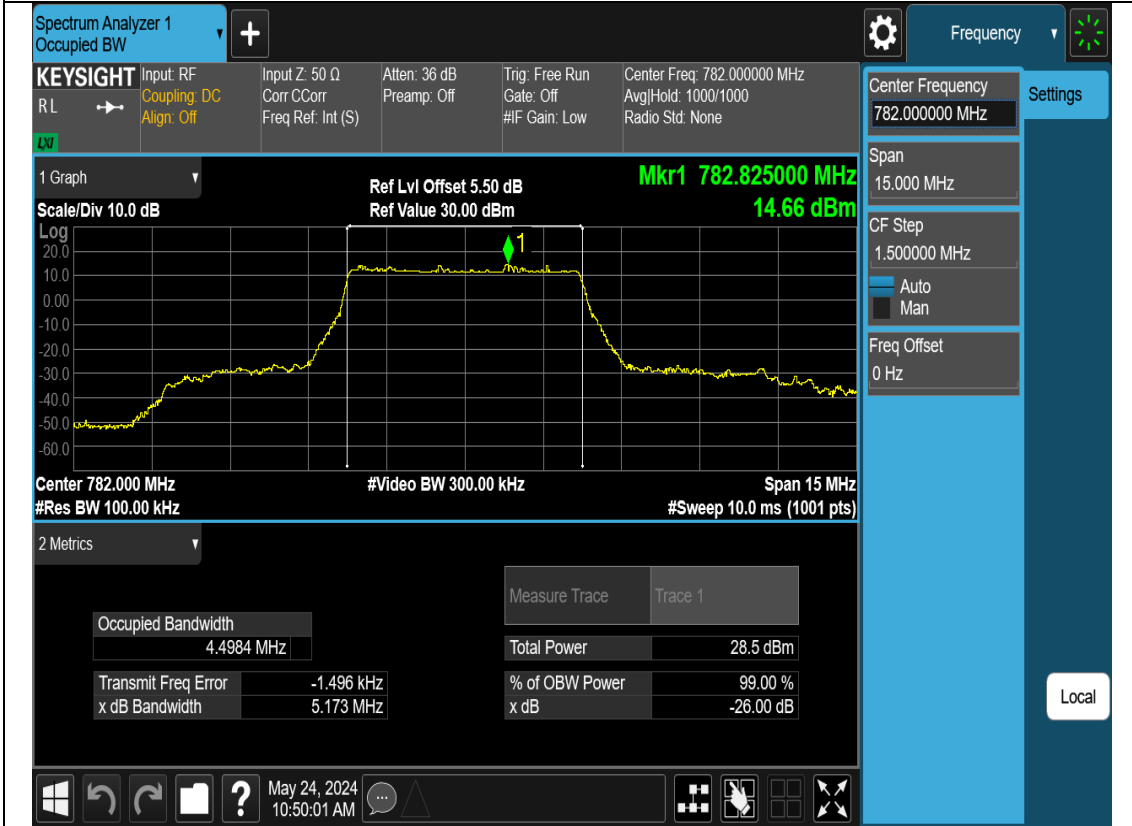
N13-5M-OBW-M-DFT-s-OFDM-16QAM



N13-5M-OBW-M-DFT-s-OFDM-64QAM



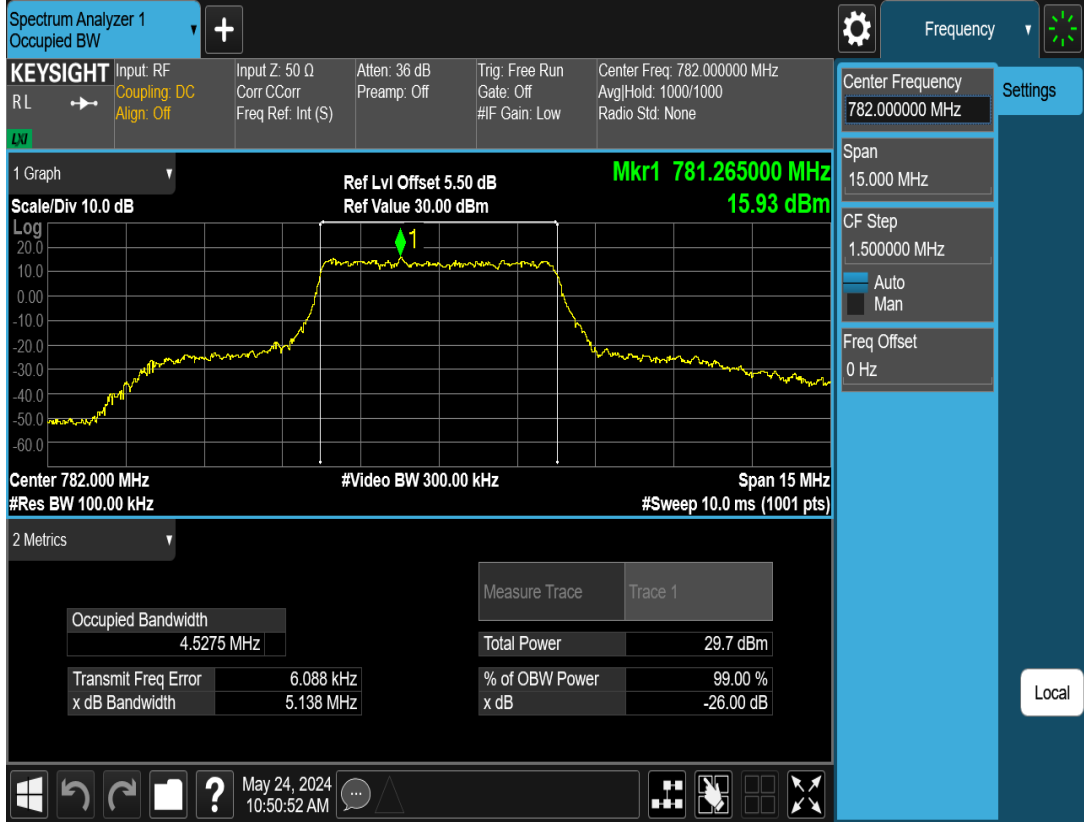
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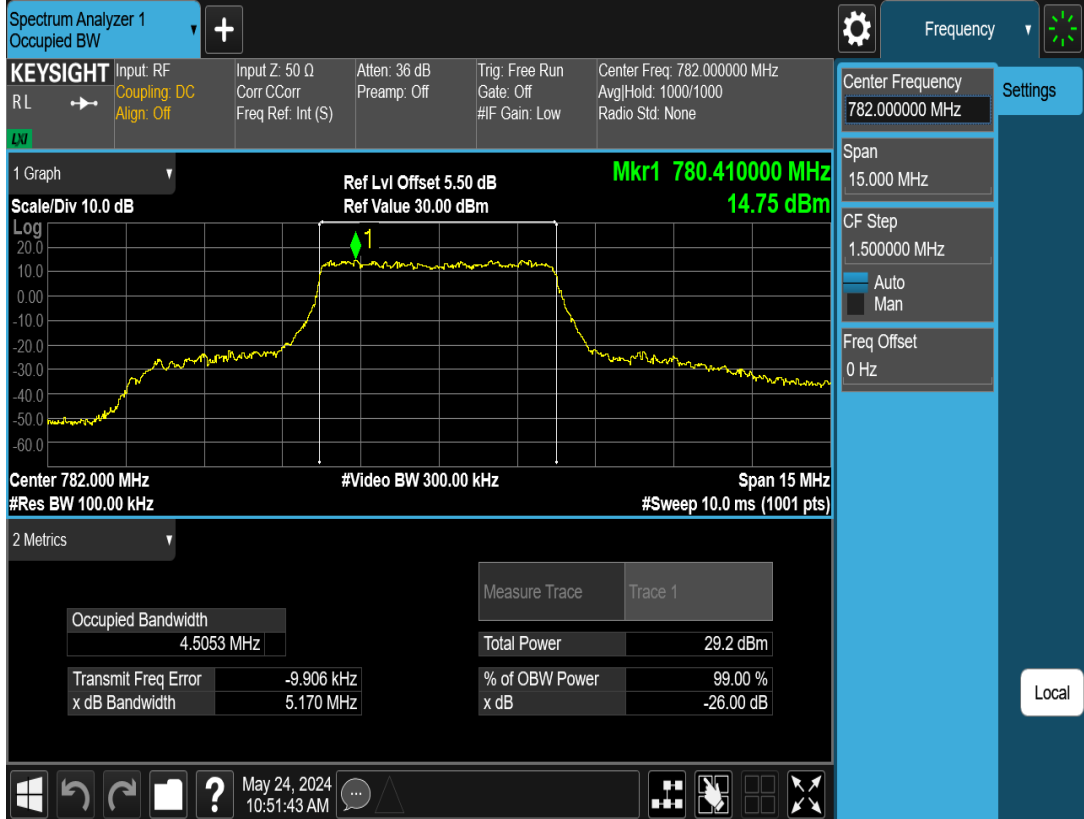
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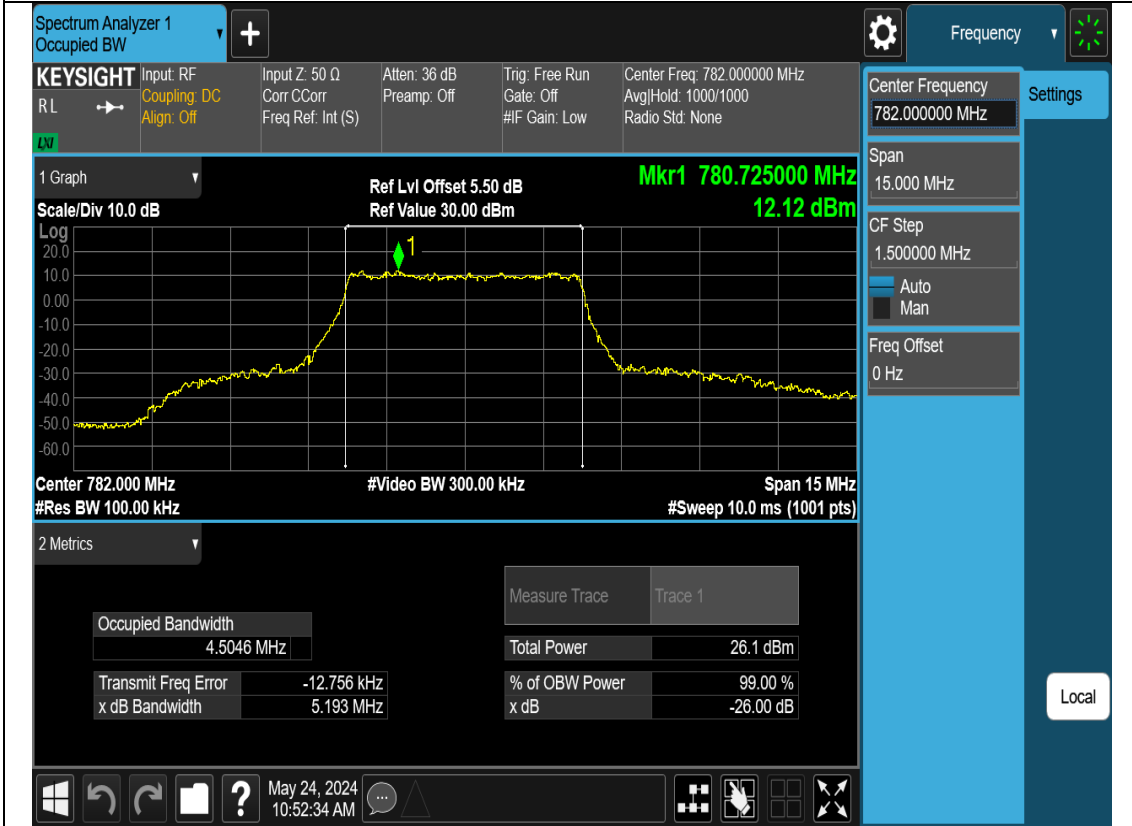
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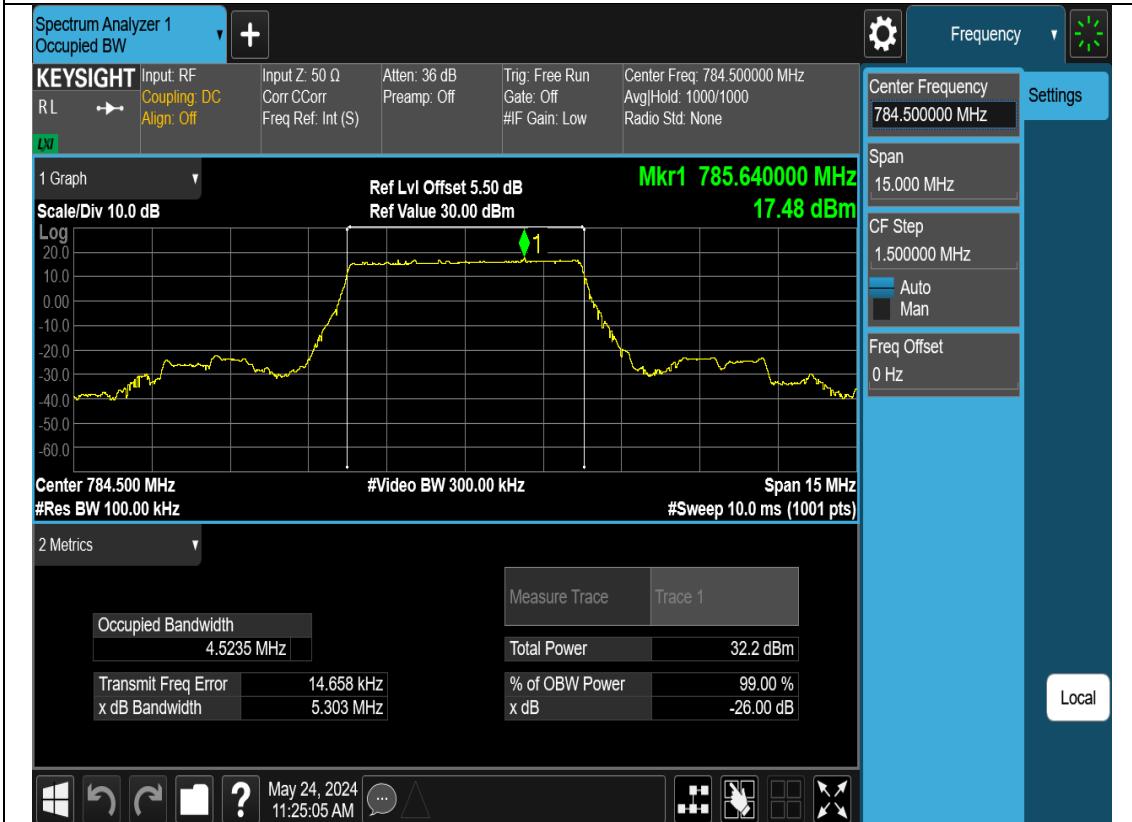
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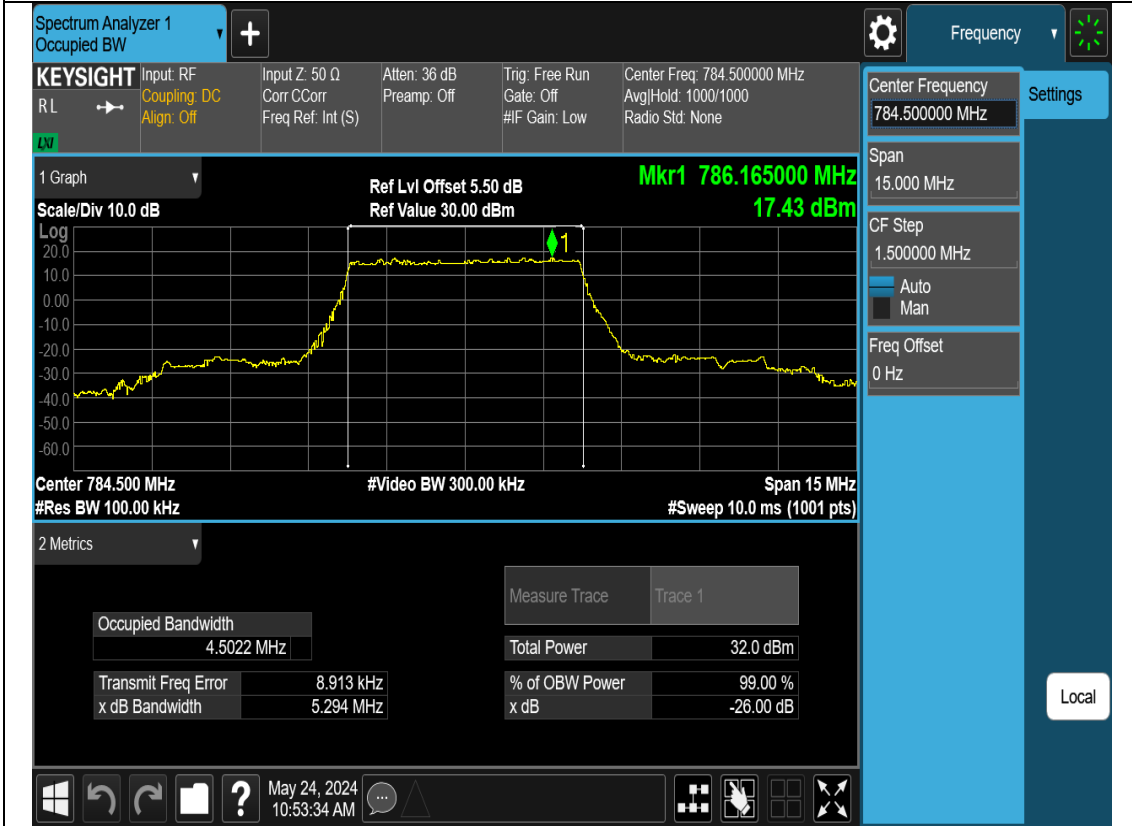
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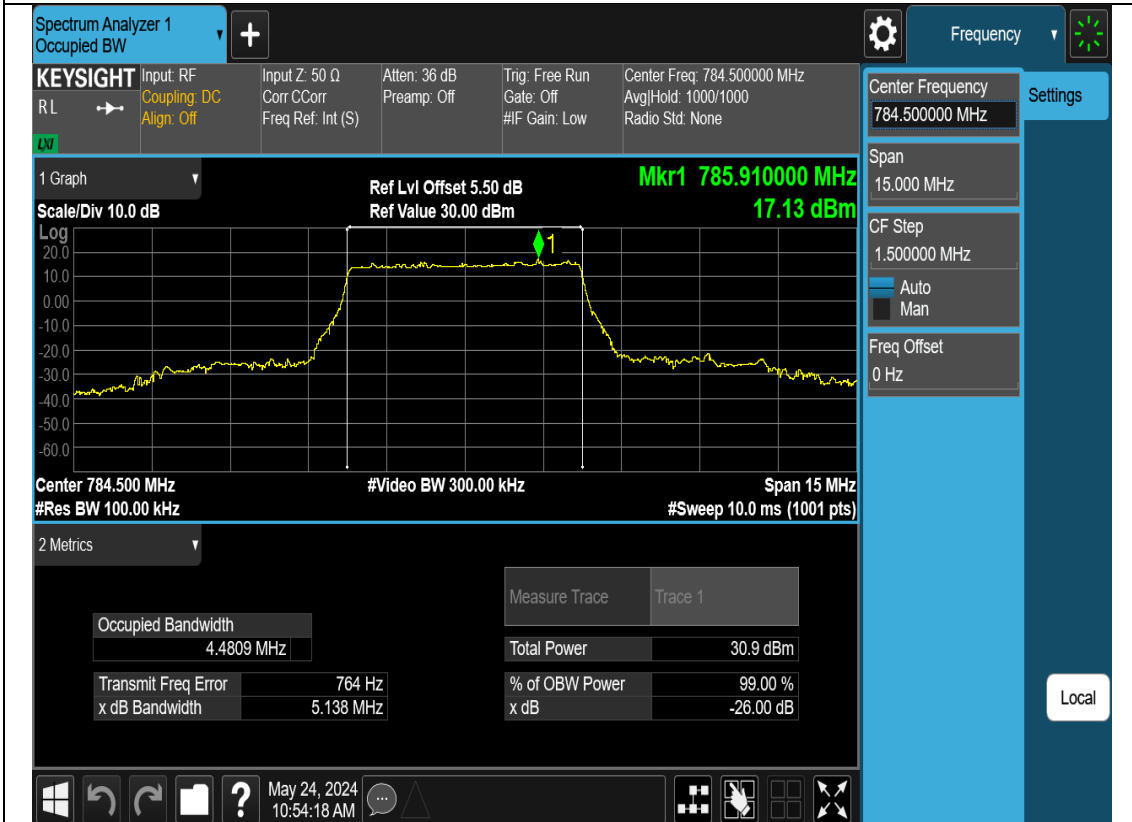
N13-5M-OBW-H-DFT-s-OFDM-Pi2 BPSK



N13-5M-OBW-H-DFT-s-OFDM-QPSK



N13-5M-OBW-H-DFT-s-OFDM-16QAM



N13-5M-OBW-H-DFT-s-OFDM-64QAM

Spectrum Analyzer 1
Occupied BW

KEYSIGHT Input: RF
R L Coupling: DC
Align: Off

Input Z: 50 Ω
Corr: CCorr
Freq Ref: Int (S)

Atten: 36 dB
Preamp: Off

Trig: Free Run
Gate: Off
#F Gain: Low

Center Freq: 784.500000 MHz
Avg/Hold: 1000/1000
Radio Std: None

Center Frequency: 784.500000 MHz
Span: 15.000 MHz
CF Step: 1.500000 MHz
Auto Man
Freq Offset: 0 Hz

1 Graph
Scale/Div 10.0 dB
Log
Ref Lvl Offset 5.50 dB
Ref Value 30.00 dBm
Mkr1 785.760000 MHz
15.80 dBm

Center 784.500 MHz
#Res BW 100.00 kHz
#Video BW 300.00 kHz
Span 15 MHz
#Sweep 10.0 ms (1001 pts)

2 Metrics

Measure Trace		Trace 1	
Occupied Bandwidth	4.5035 MHz	Total Power	30.3 dBm
Transmit Freq Error	3.657 kHz	% of OBW Power	99.00 %
x dB Bandwidth	5.161 MHz	x dB	-26.00 dB

May 24, 2024 10:55:09 AM

N13-5M-OBW-H-DFT-s-OFDM-256QAM

Spectrum Analyzer 1
Occupied BW

KEYSIGHT Input: RF
R L Coupling: DC
Align: Off

Input Z: 50 Ω
Corr: CCorr
Freq Ref: Int (S)

Atten: 36 dB
Preamp: Off

Trig: Free Run
Gate: Off
#F Gain: Low

Center Freq: 784.500000 MHz
Avg/Hold: 1000/1000
Radio Std: None

Center Frequency: 784.500000 MHz
Span: 15.000 MHz
CF Step: 1.500000 MHz
Auto Man
Freq Offset: 0 Hz

1 Graph
Scale/Div 10.0 dB
Log
Ref Lvl Offset 5.50 dB
Ref Value 30.00 dBm
Mkr1 785.325000 MHz
15.15 dBm

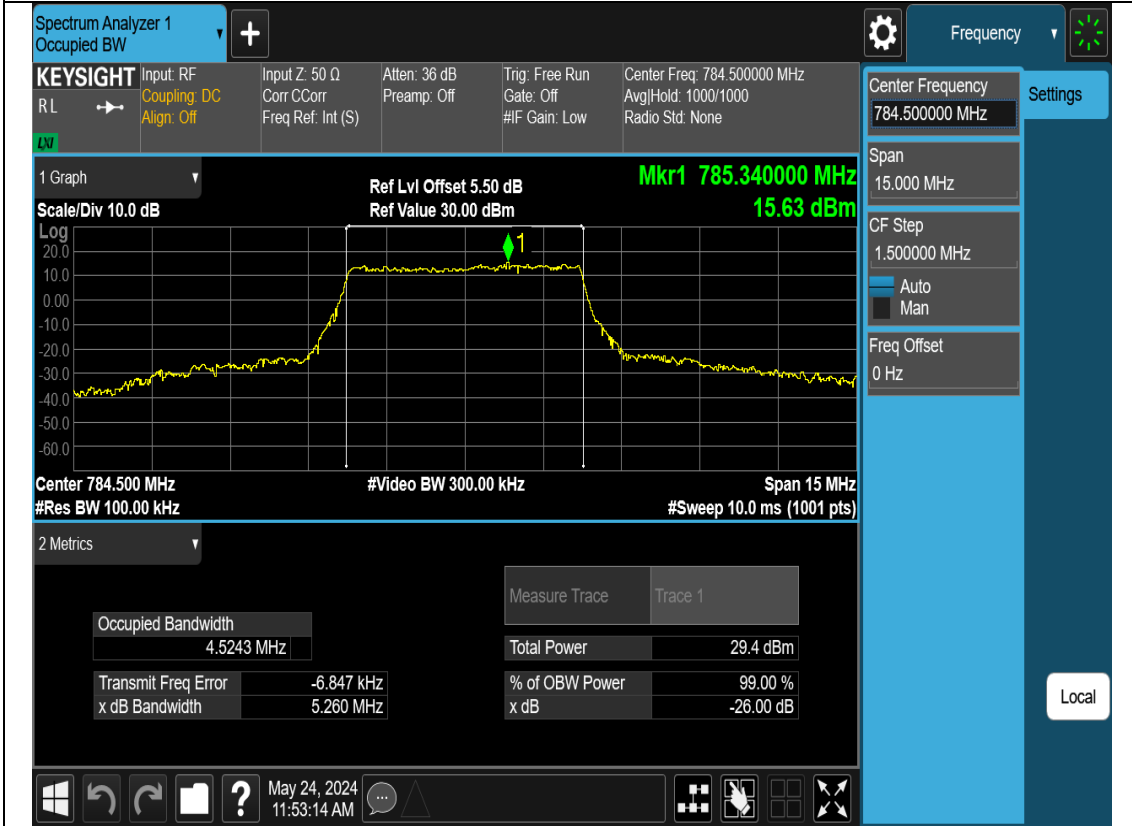
Center 784.500 MHz
#Res BW 100.00 kHz
#Video BW 300.00 kHz
Span 15 MHz
#Sweep 10.0 ms (1001 pts)

2 Metrics

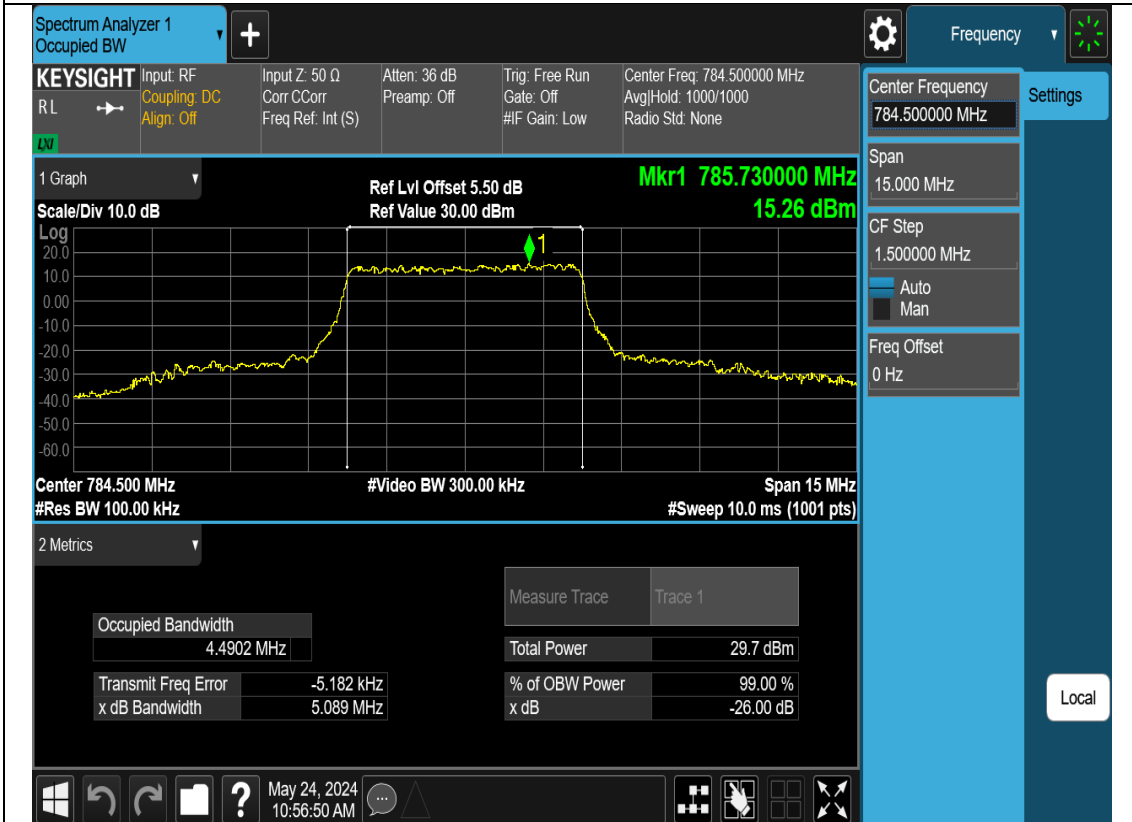
Measure Trace		Trace 1	
Occupied Bandwidth	4.4914 MHz	Total Power	28.4 dBm
Transmit Freq Error	6.560 kHz	% of OBW Power	99.00 %
x dB Bandwidth	5.141 MHz	x dB	-26.00 dB

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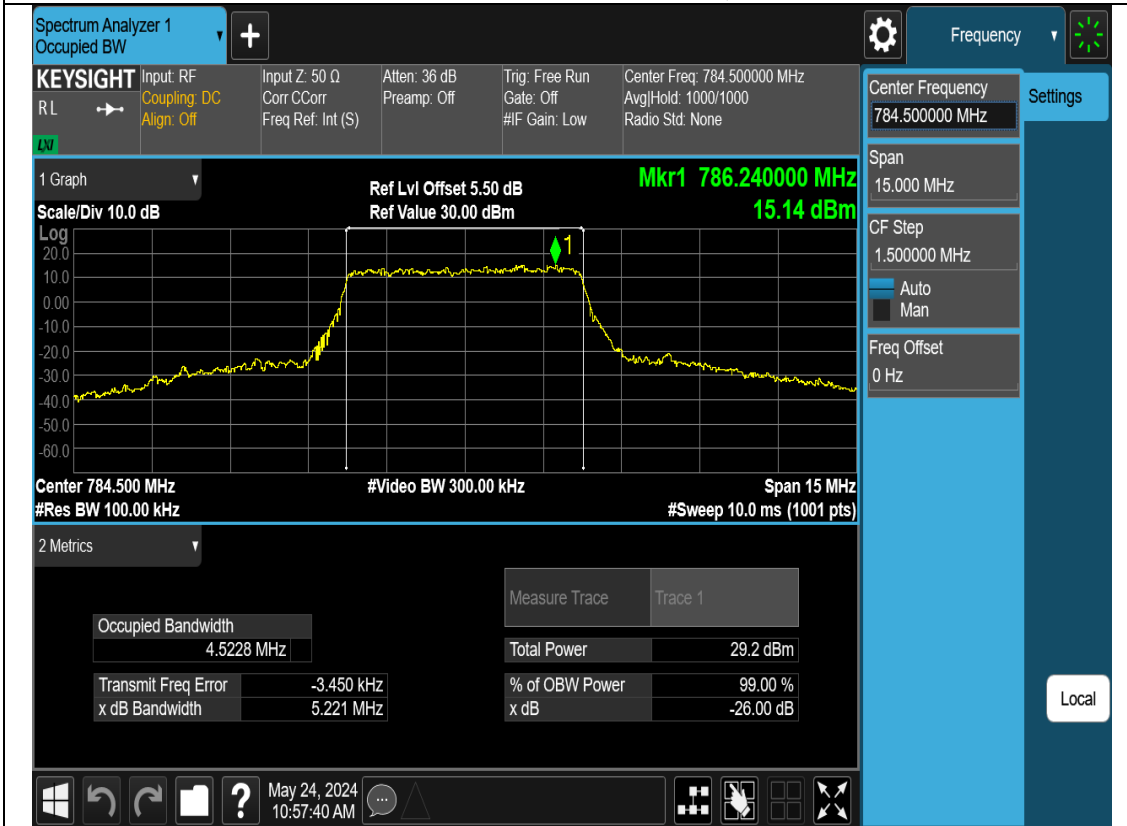
N13-5M-OBW-H-CP-OFDM-QPSK



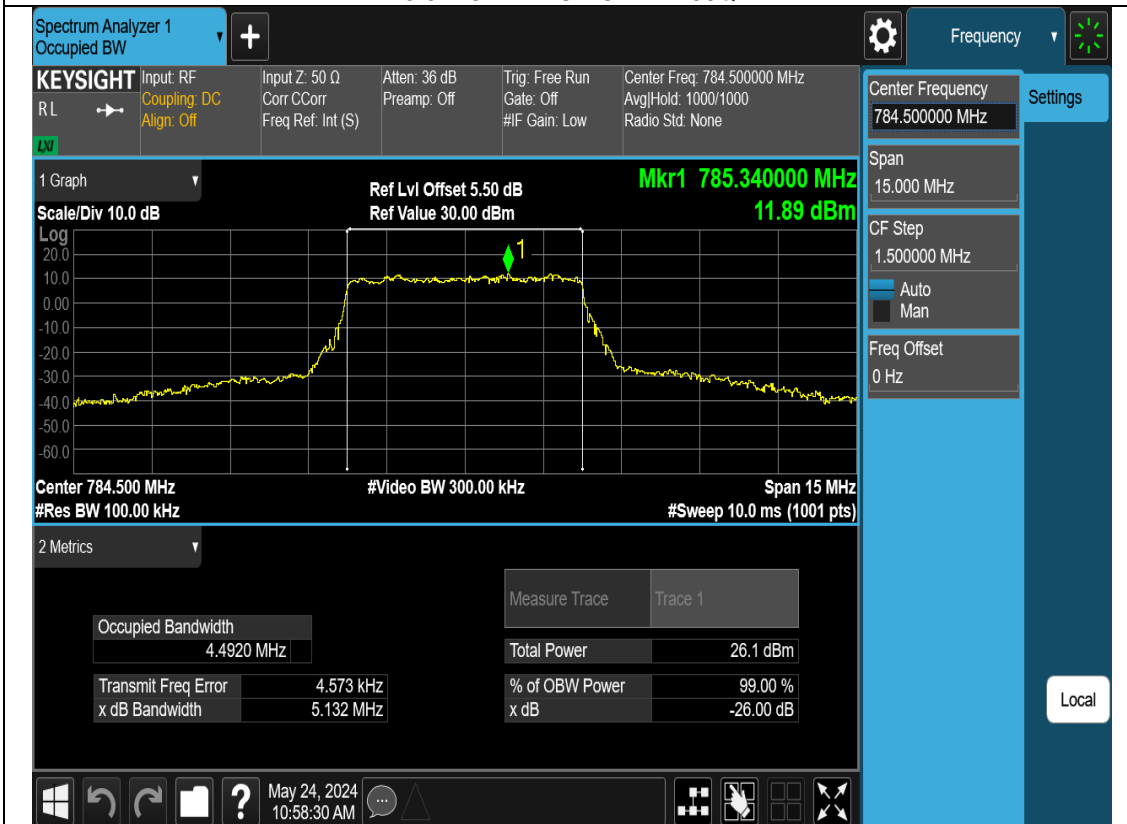
N13-5M-OBW-H-CP-OFDM-16QAM



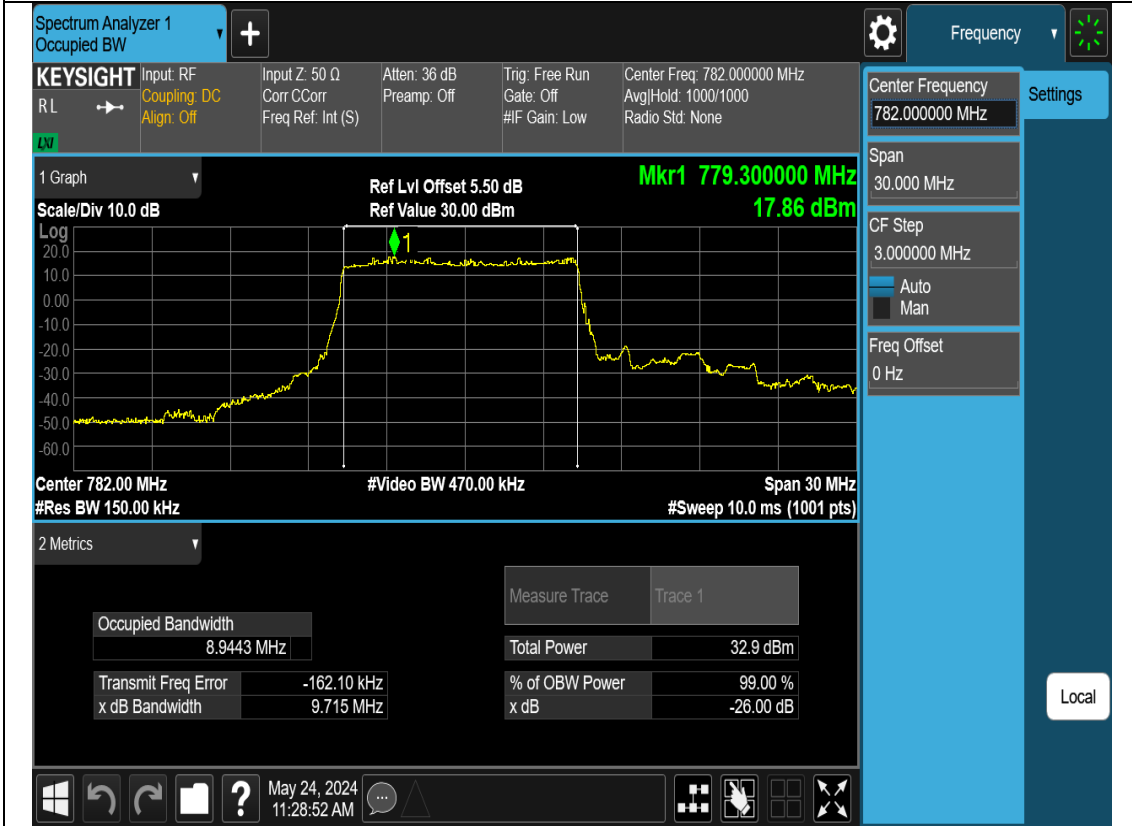
N13-5M-OBW-H-CP-OFDM-64QAM



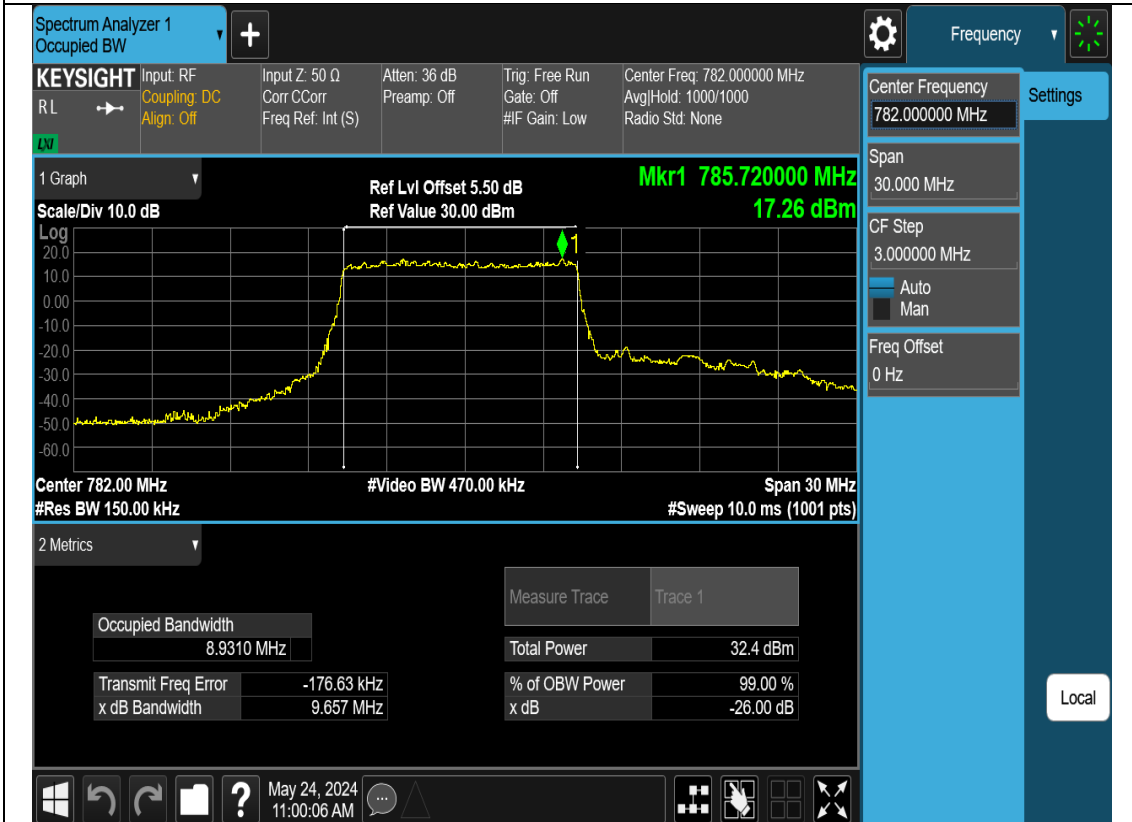
N13-5M-OBW-H-CP-OFDM-256QAM



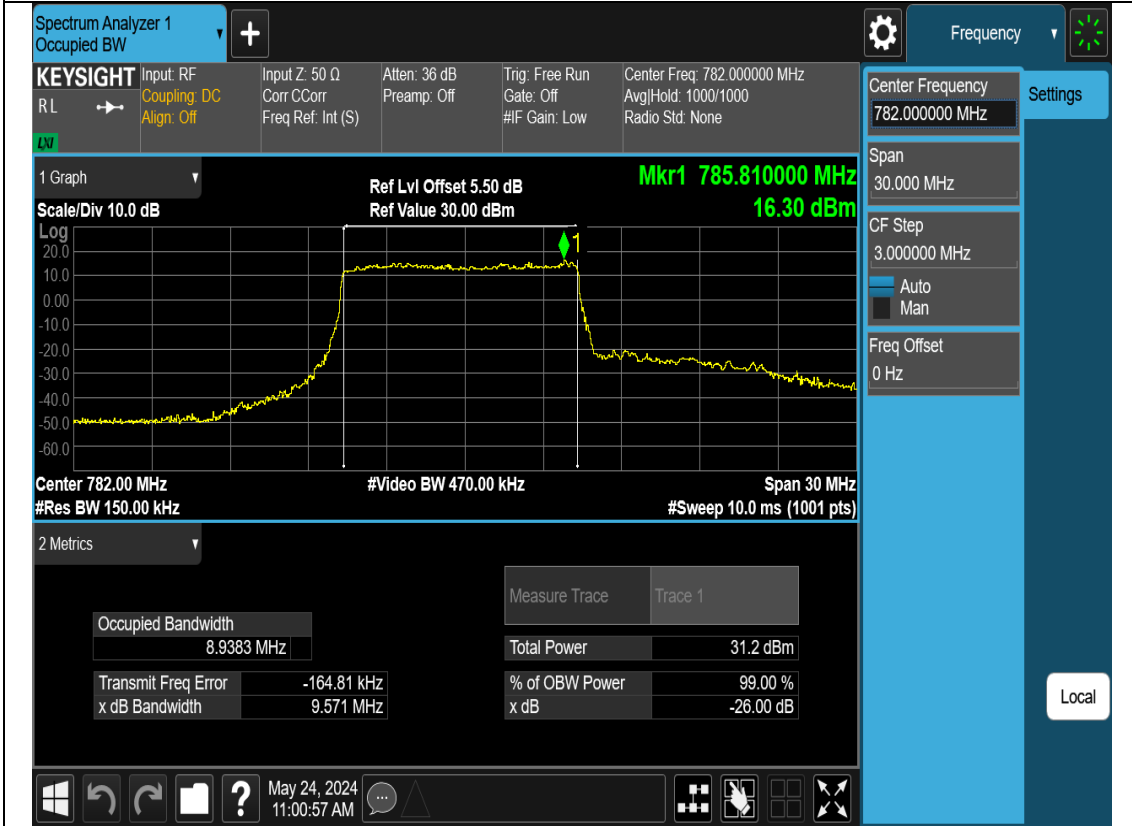
N13-10M-OBW-M-DFT-s-OFDM-Pi2 BPSK



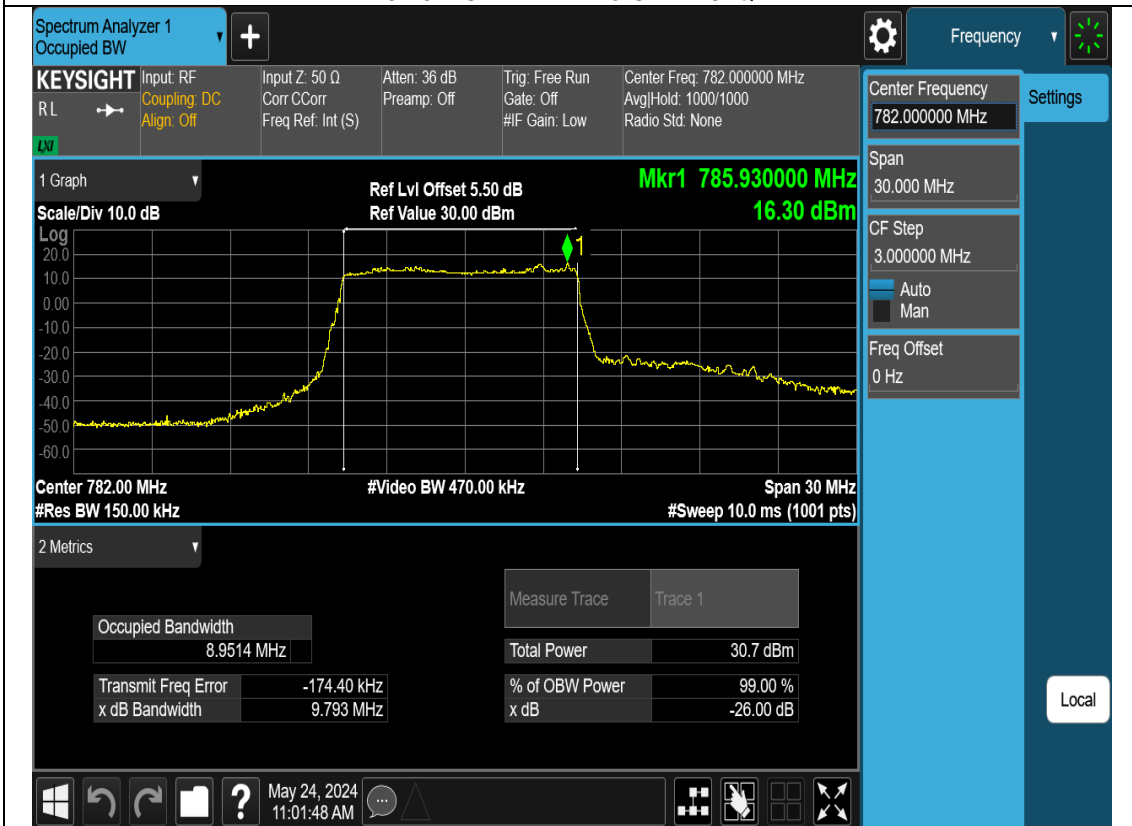
N13-10M-OBW-M-DFT-s-OFDM-QPSK



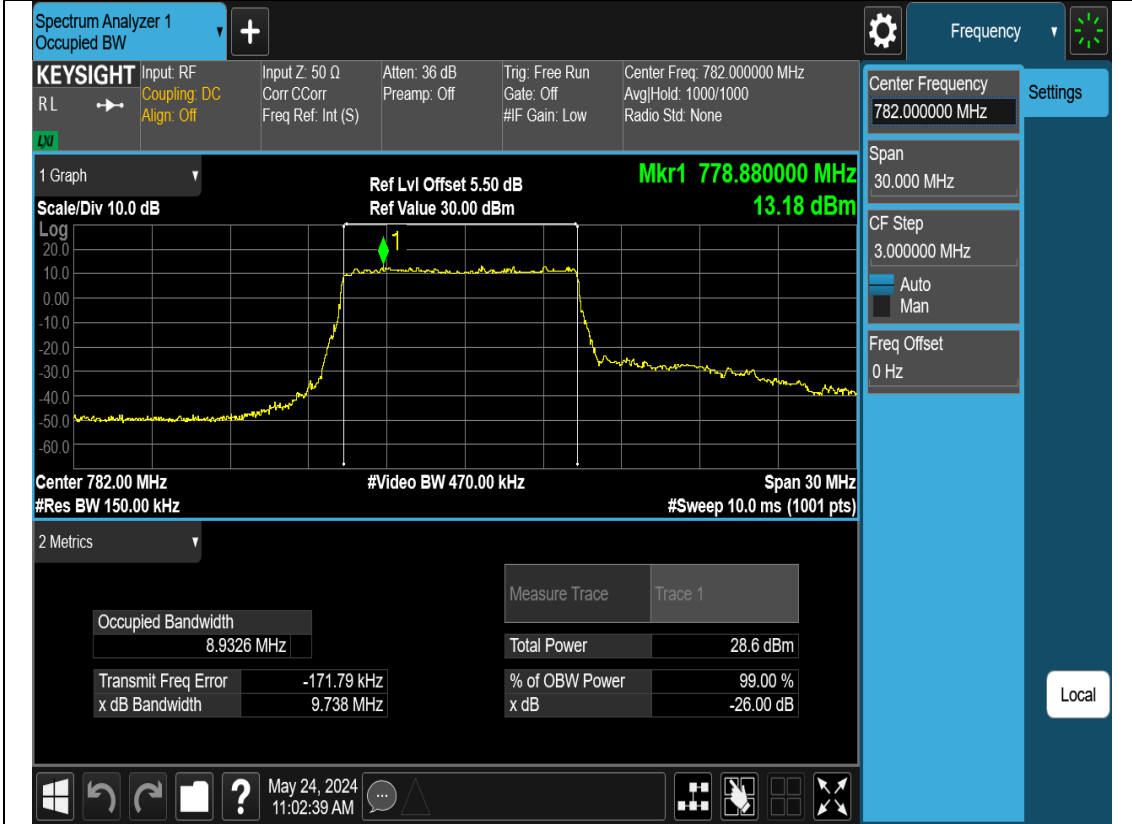
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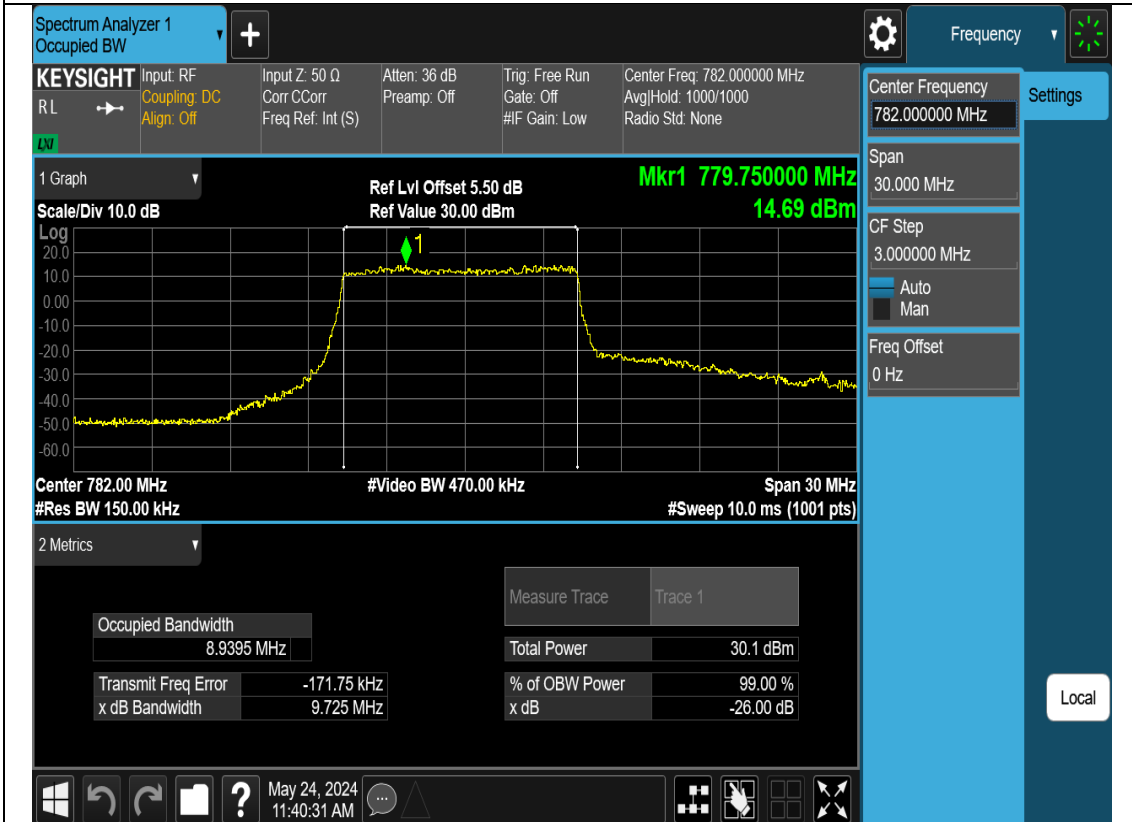
N13-10M-OBW-M-DFT-s-OFDM-64QAM



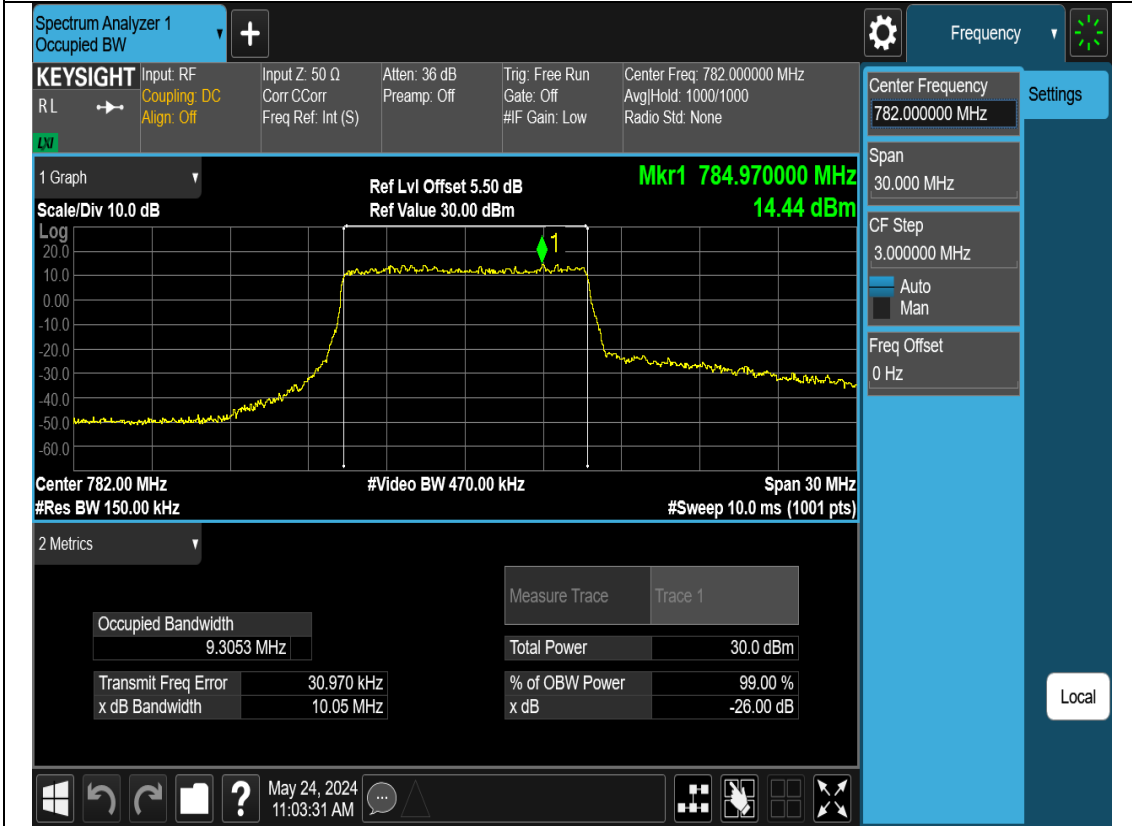
N13-10M-OBW-M-DFT-s-OFDM-256QAM



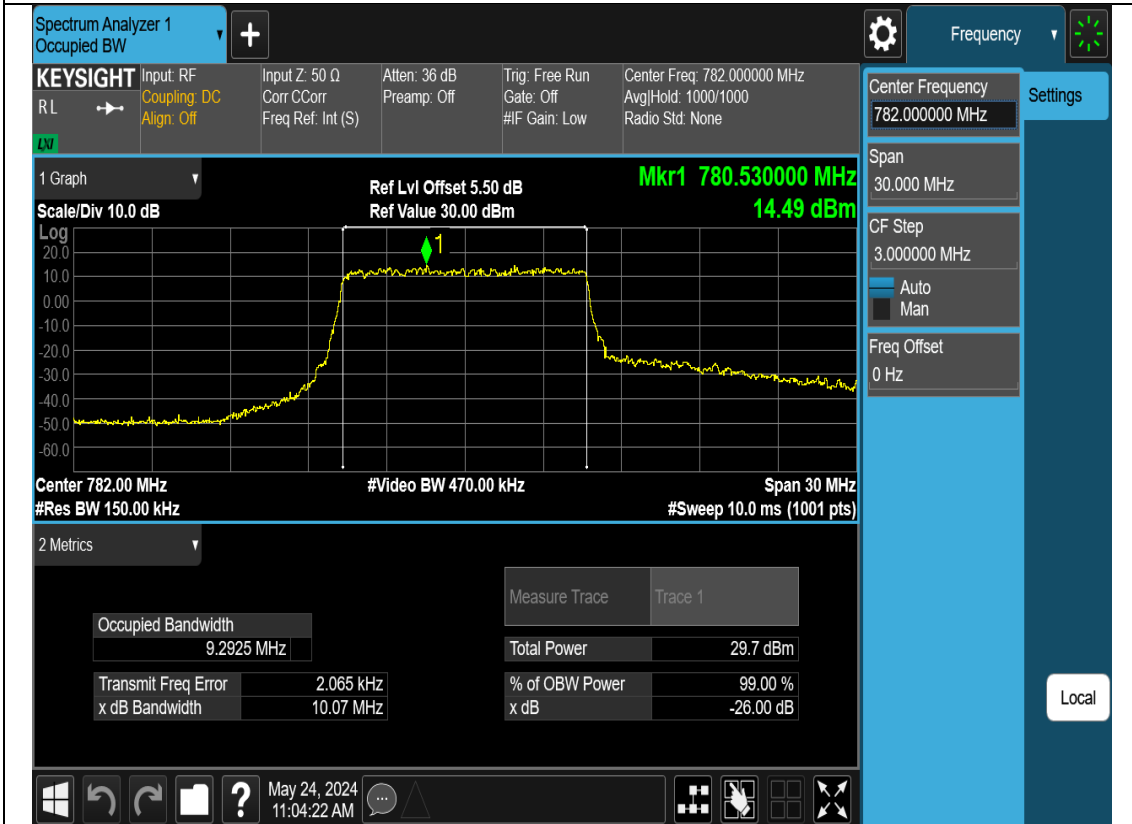
N13-10M-OBW-M-CP-OFDM-QPSK



N13-10M-OBW-M-CP-OFDM-16QAM



N13-10M-OBW-M-CP-OFDM-64QAM



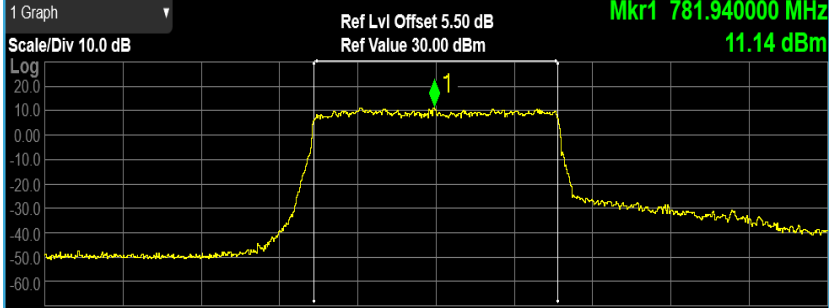
N13-10M-OBW-M-CP-OFDM-256QAM

Spectrum Analyzer 1
Occupied BW

KEYSIGHT Input RF
RL Coupling: DC
Align: Off
Input Z: 50 Ω
Corr: CCorr
Freq Ref: Int (S)
Atten: 36 dB
Preamp: Off
Trig: Free Run
Gate: Off
#F Gain: Low
Center Freq: 782.000000 MHz
Avg/Hold: 1000/1000
Radio Std: None

Frequency Settings

Center Frequency
782.000000 MHz
Span
30.000 MHz
CF Step
3.000000 MHz
Auto
Man
Freq Offset
0 Hz



Center 782.00 MHz #Video BW 470.00 kHz Span 30 MHz
#Res BW 150.00 kHz #Sweep 10.0 ms (1001 pts)

2 Metrics

Measure Trace		Trace 1	
Occupied Bandwidth	9.3010 MHz	Total Power	26.7 dBm
Transmit Freq Error	8.376 kHz	% of OBW Power	99.00 %
x dB Bandwidth	10.05 MHz	x dB	-26.00 dB

Local

Peak-Average Ratio

Test Result

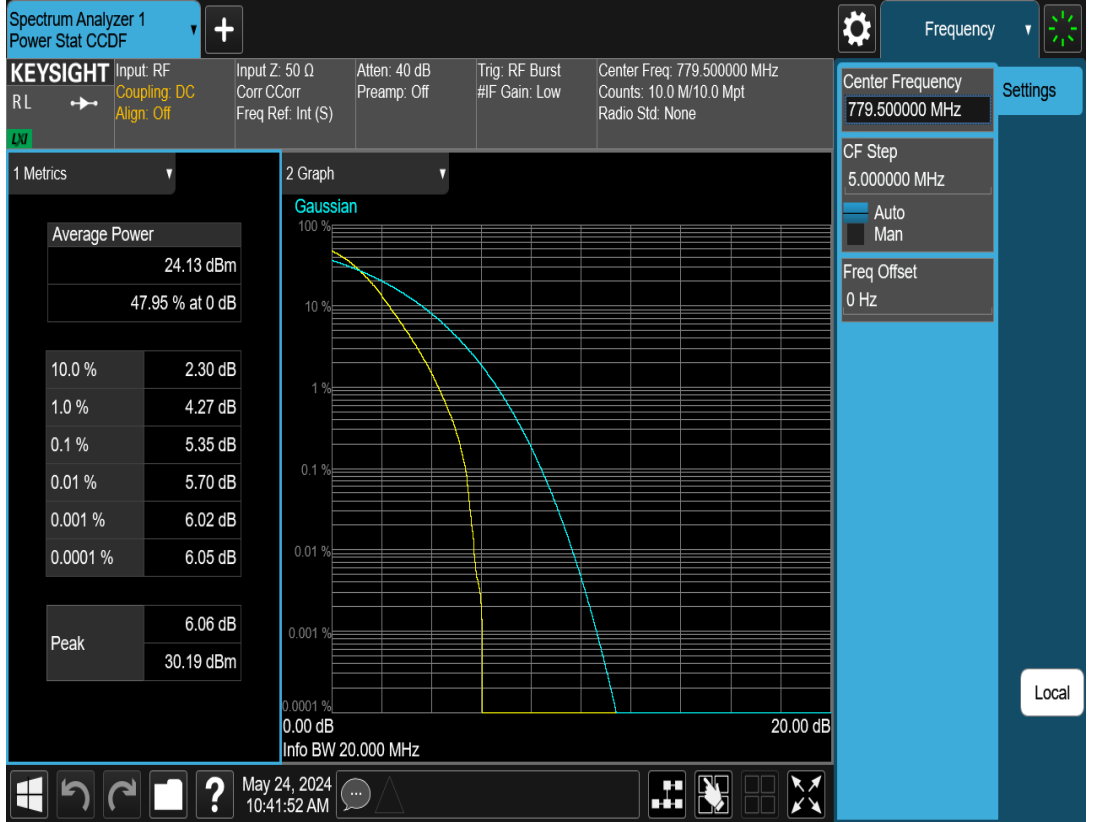
5G NR n13 SCS=15kHz 5MHz					
Modulation	CH	RB Allocation	Peak-Average Ratio (dB)	Limit	Verdict
DFT-s-OFDM PI/2 BPSK	Low CH	Outer_Full	3.80	<=13	Pass
DFT-s-OFDM QPSK		Outer_Full	5.35	<=13	Pass
DFT-s-OFDM 16QAM		Outer_Full	6.25	<=13	Pass
DFT-s-OFDM 64QAM		Outer_Full	6.34	<=13	Pass
DFT-s-OFDM 256QAM		Outer_Full	6.32	<=13	Pass
CP-OFDM QPSK		Outer_Full	7.41	<=13	Pass
CP-OFDM 16QAM		Outer_Full	7.47	<=13	Pass
CP-OFDM 64QAM		Outer_Full	7.28	<=13	Pass
CP-OFDM 256QAM		Outer_Full	8.20	<=13	Pass
DFT-s-OFDM PI/2 BPSK		Middle CH	Outer_Full	4.18	<=13
DFT-s-OFDM QPSK	Outer_Full		5.61	<=13	Pass
DFT-s-OFDM 16QAM	Outer_Full		6.45	<=13	Pass
DFT-s-OFDM 64QAM	Outer_Full		6.57	<=13	Pass
DFT-s-OFDM 256QAM	Outer_Full		6.47	<=13	Pass
CP-OFDM QPSK	Outer_Full		7.60	<=13	Pass
CP-OFDM 16QAM	Outer_Full		6.90	<=13	Pass
CP-OFDM 64QAM	Outer_Full		7.38	<=13	Pass
CP-OFDM 256QAM	Outer_Full		8.34	<=13	Pass
DFT-s-OFDM PI/2 BPSK	High CH		Outer_Full	4.47	<=13
DFT-s-OFDM QPSK		Outer_Full	5.29	<=13	Pass
DFT-s-OFDM 16QAM		Outer_Full	6.30	<=13	Pass
DFT-s-OFDM 64QAM		Outer_Full	6.55	<=13	Pass
DFT-s-OFDM 256QAM		Outer_Full	6.57	<=13	Pass
CP-OFDM QPSK		Outer_Full	7.18	<=13	Pass
CP-OFDM 16QAM		Outer_Full	7.33	<=13	Pass
CP-OFDM 64QAM		Outer_Full	7.74	<=13	Pass
CP-OFDM 256QAM		Outer_Full	7.97	<=13	Pass

5G NR n13 SCS=15kHz 10MHz					
Modulation	CH	RB Allocation	Peak-Average Ratio (dB)	Limit	Verdict
DFT-s-OFDM PI/2 BPSK	Middle CH	Outer_Full	4.38	<=13	Pass
DFT-s-OFDM QPSK		Outer_Full	5.74	<=13	Pass
DFT-s-OFDM 16QAM		Outer_Full	6.44	<=13	Pass
DFT-s-OFDM 64QAM		Outer_Full	6.70	<=13	Pass
DFT-s-OFDM 256QAM		Outer_Full	6.68	<=13	Pass
CP-OFDM QPSK		Outer_Full	7.68	<=13	Pass
CP-OFDM 16QAM		Outer_Full	7.26	<=13	Pass
CP-OFDM 64QAM		Outer_Full	7.68	<=13	Pass
CP-OFDM 256QAM		Outer_Full	8.77	<=13	Pass

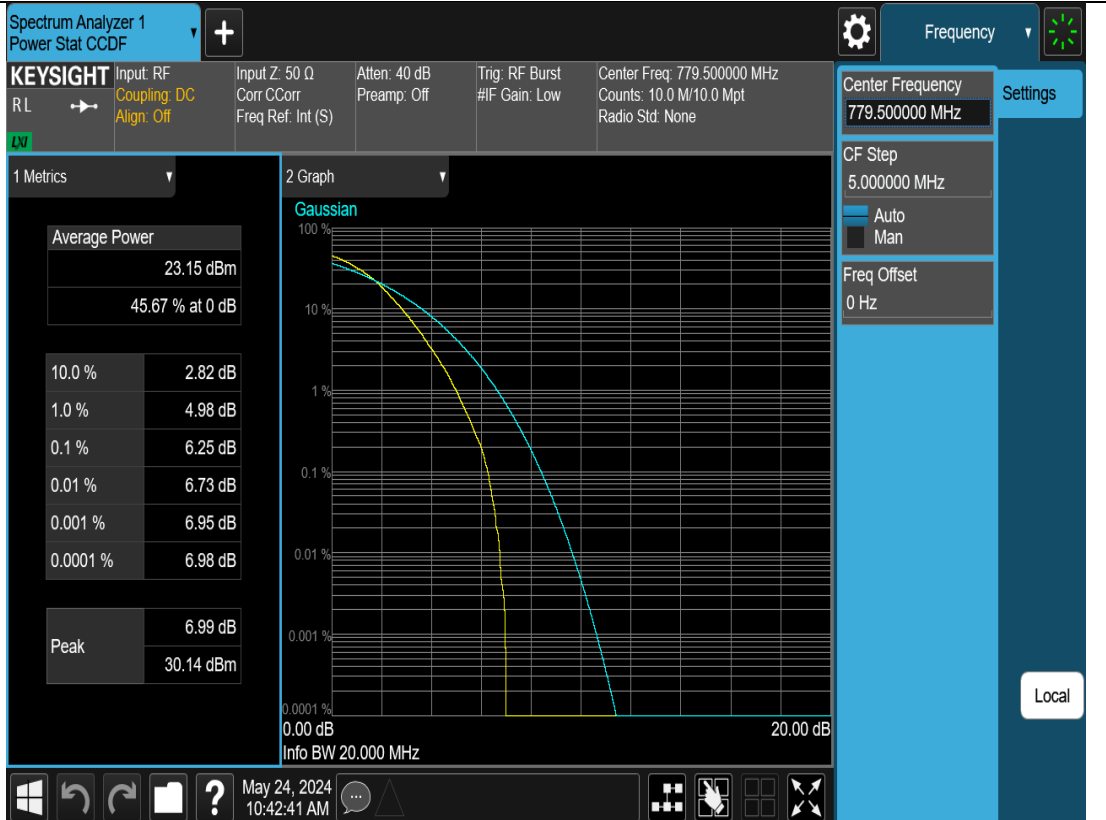
Test Graph



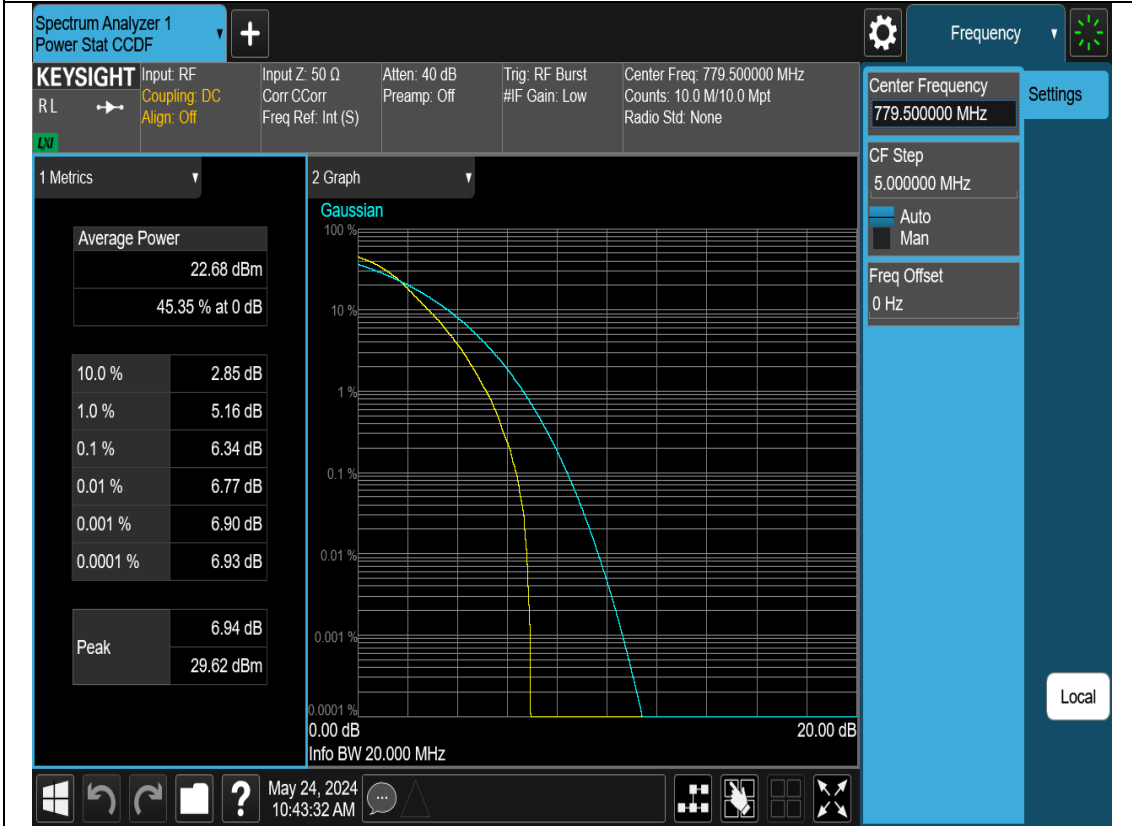
N13-5M-PAPR-L-DFT-s-OFDM-QPSK-Outer_Full



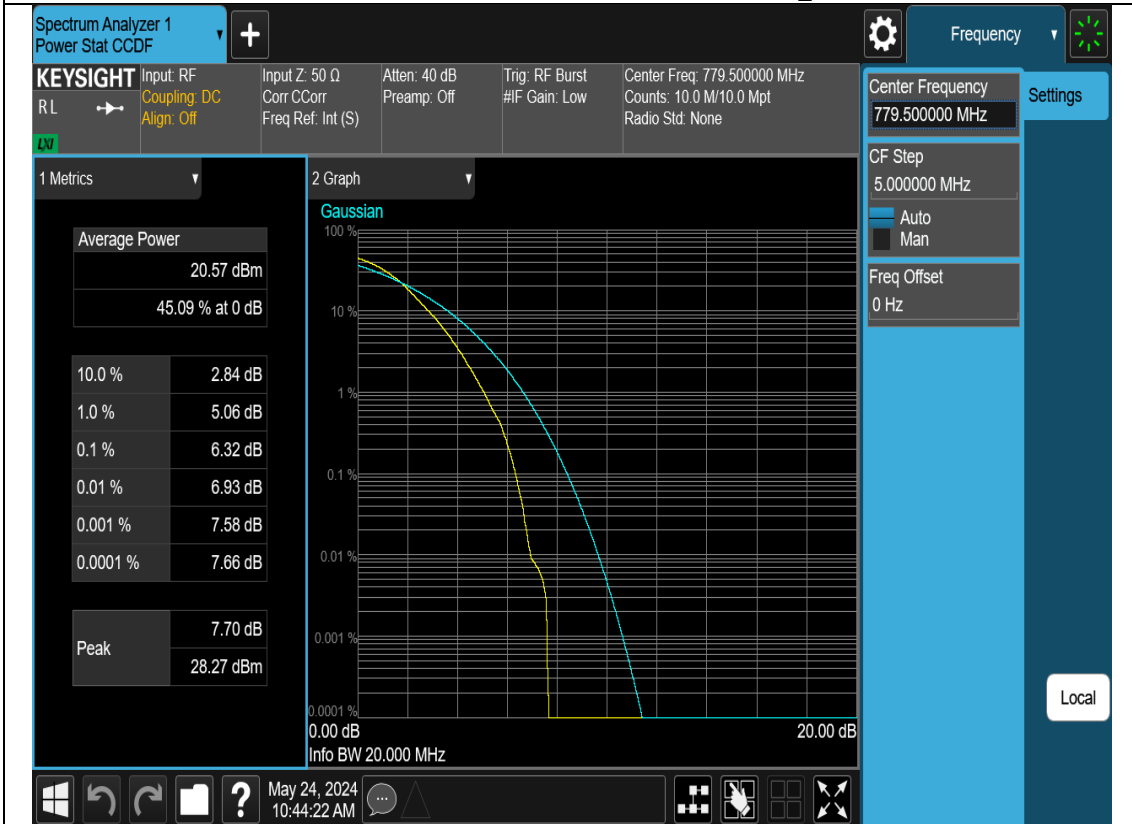
N13-5M-PAPR-L-DFT-s-OFDM-16QAM-Outer_Full



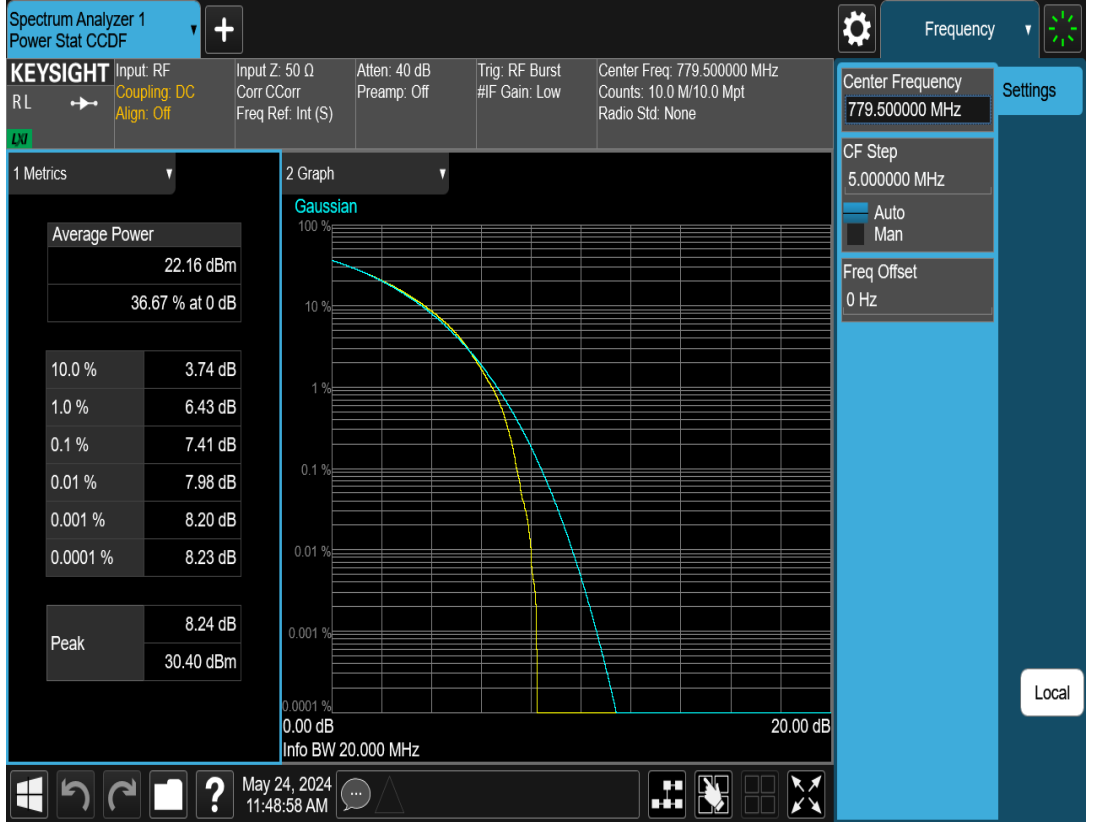
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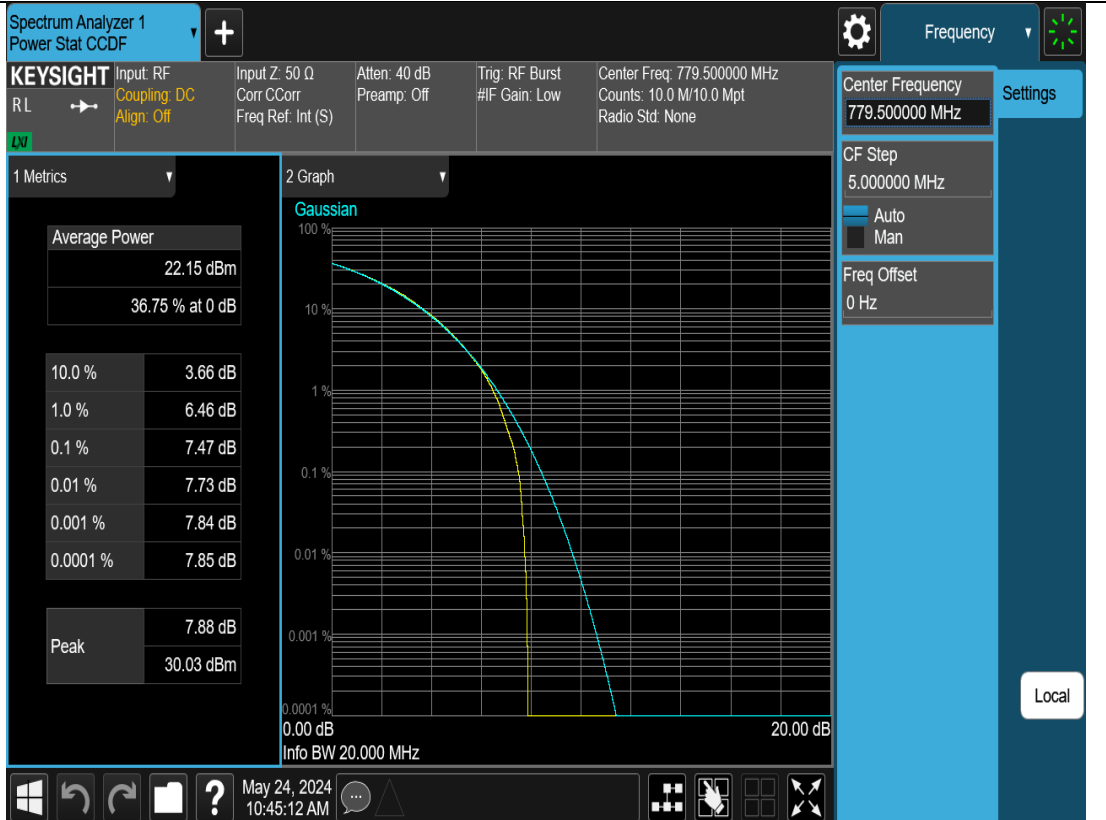
N13-5M-PAPR-L-DFT-s-OFDM-256QAM-Outer_Full



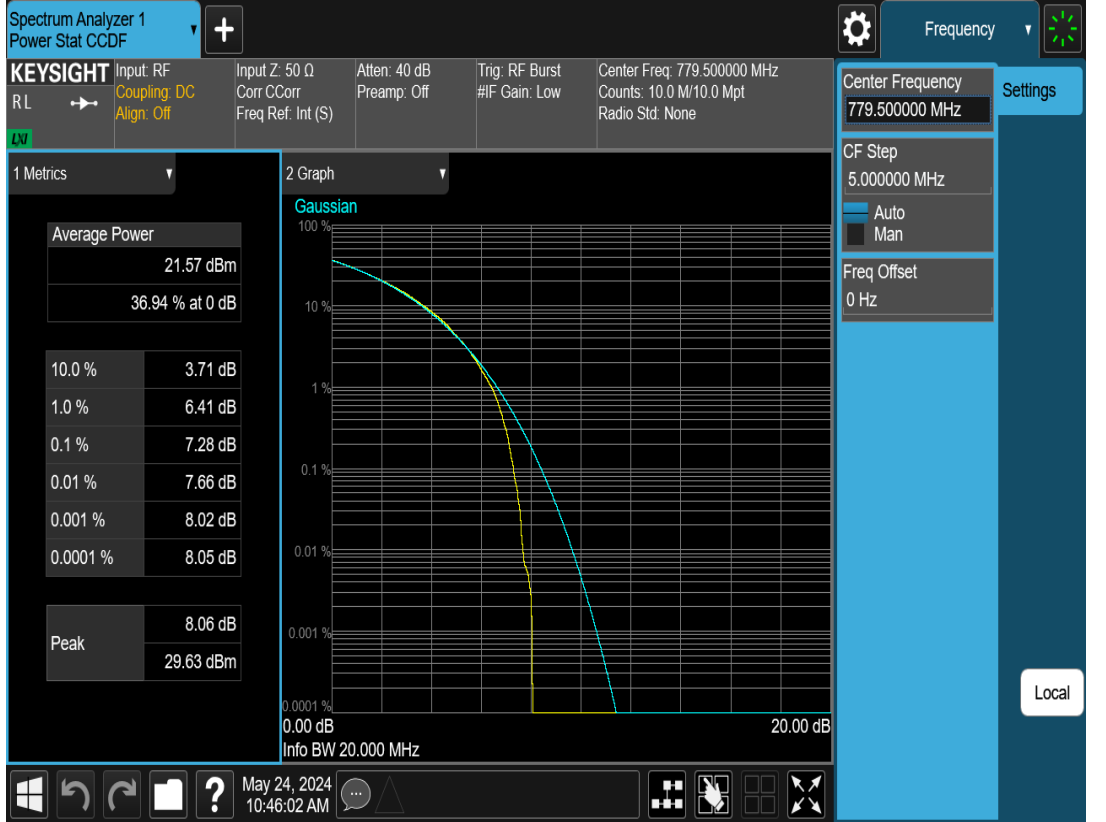
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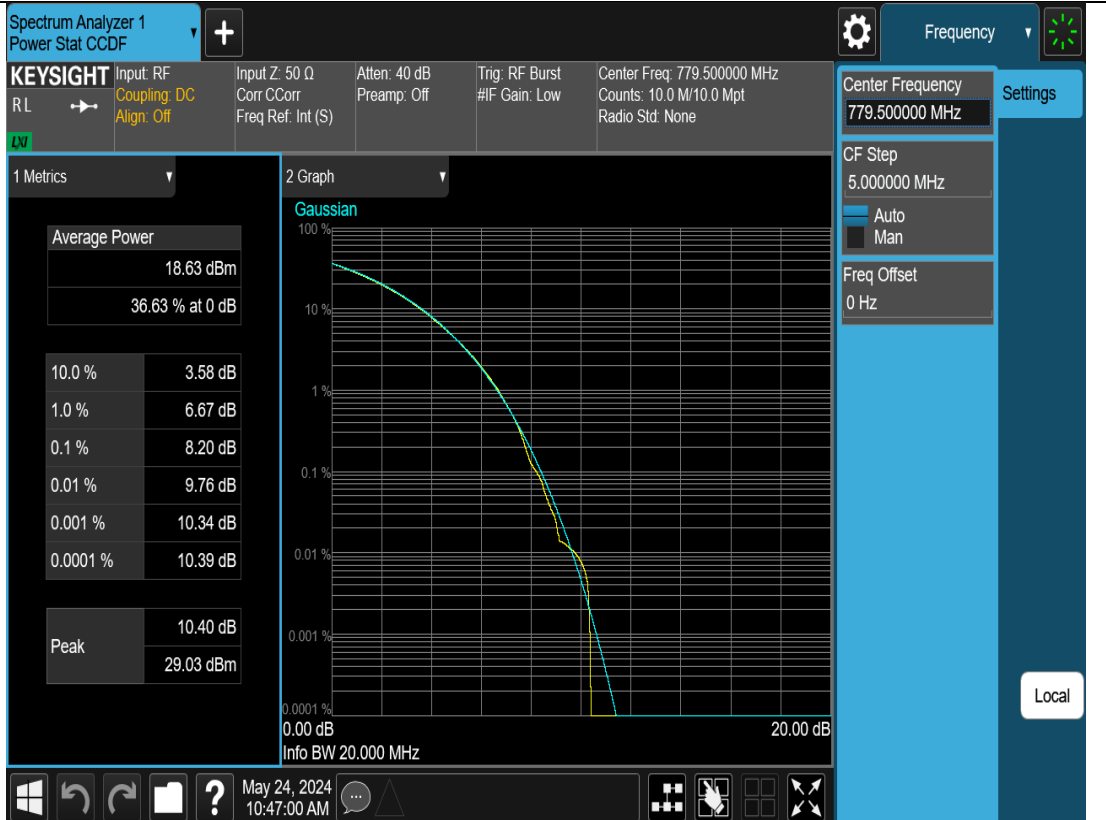
N13-5M-PAPR-L-CP-OFDM-16QAM-Outer_Full



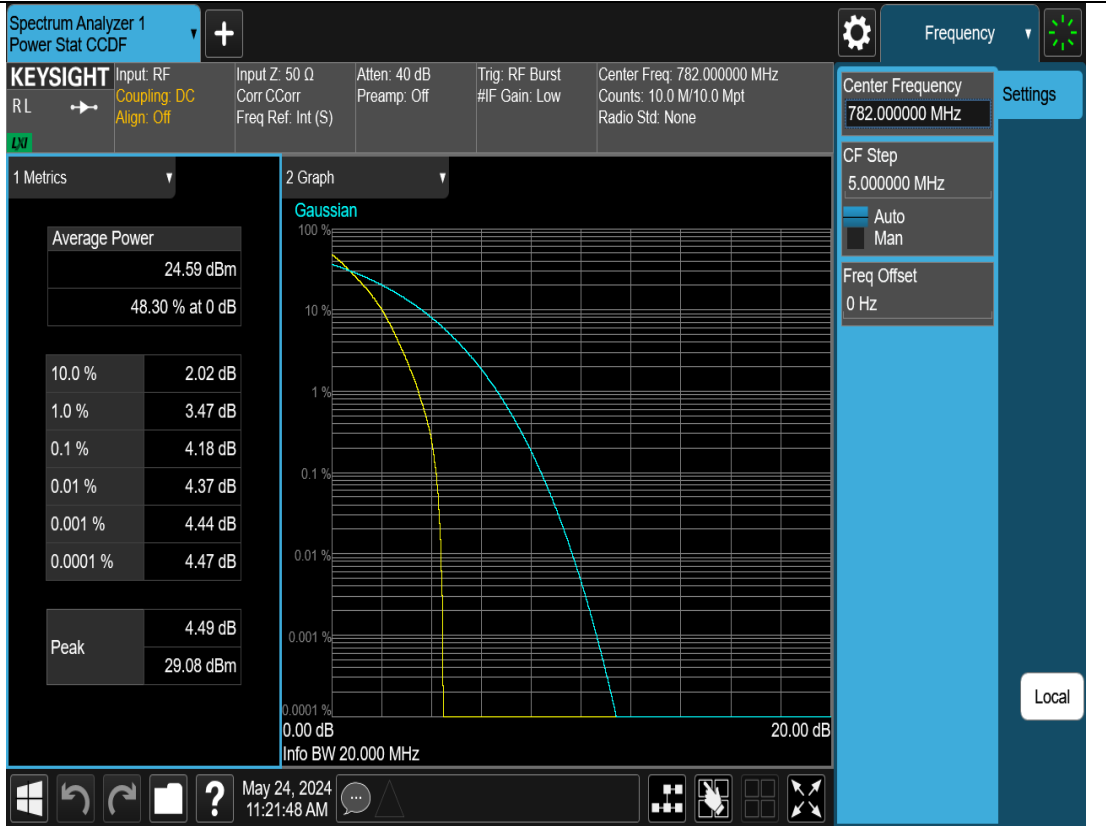
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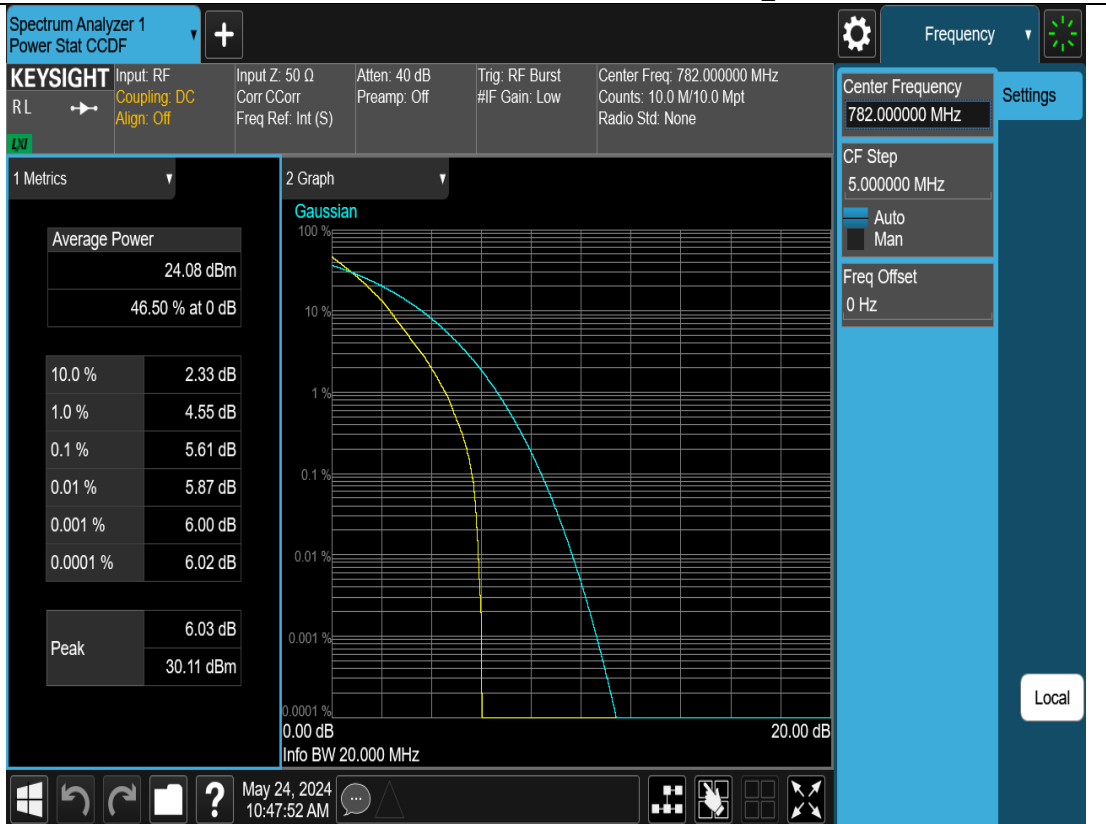
N13-5M-PAPR-L-CP-OFDM-256QAM-Outer_Full



N13-5M-PAPR-M-DFT-s-OFDM-Pi2 BPSK-Outer_Full



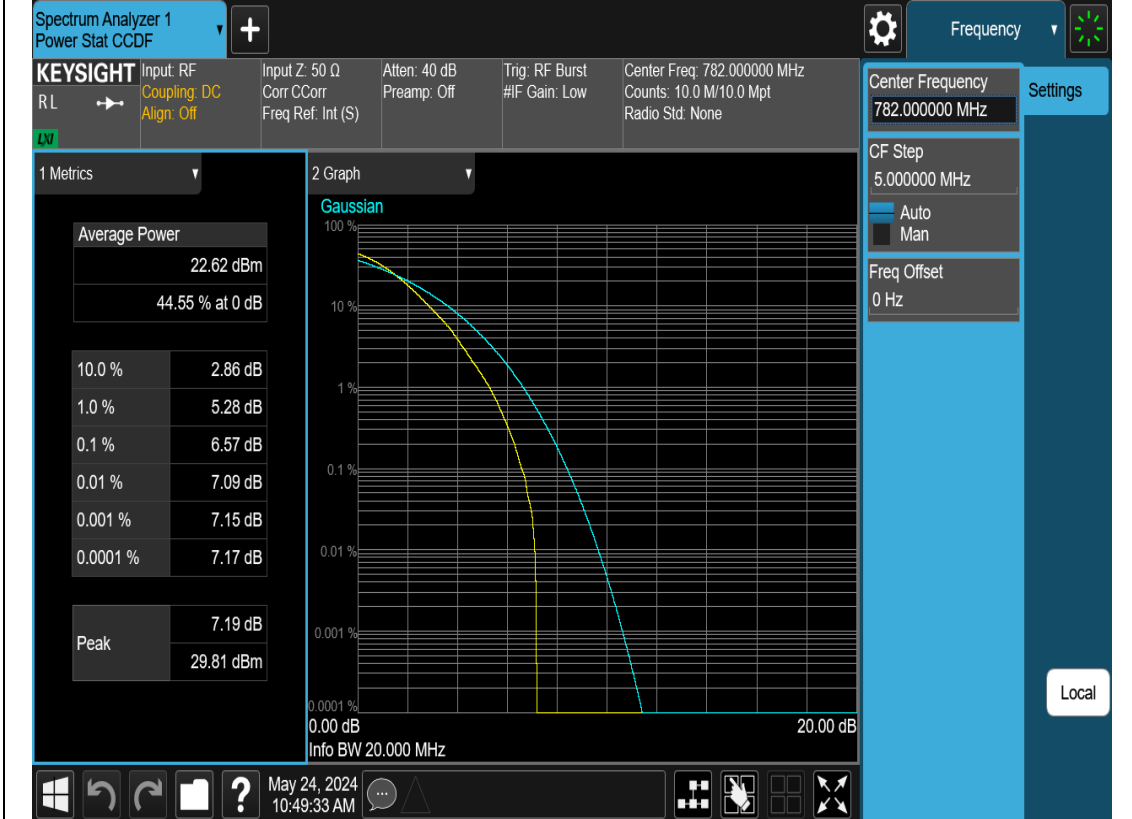
N13-5M-PAPR-M-DFT-s-OFDM-QPSK-Outer_Full



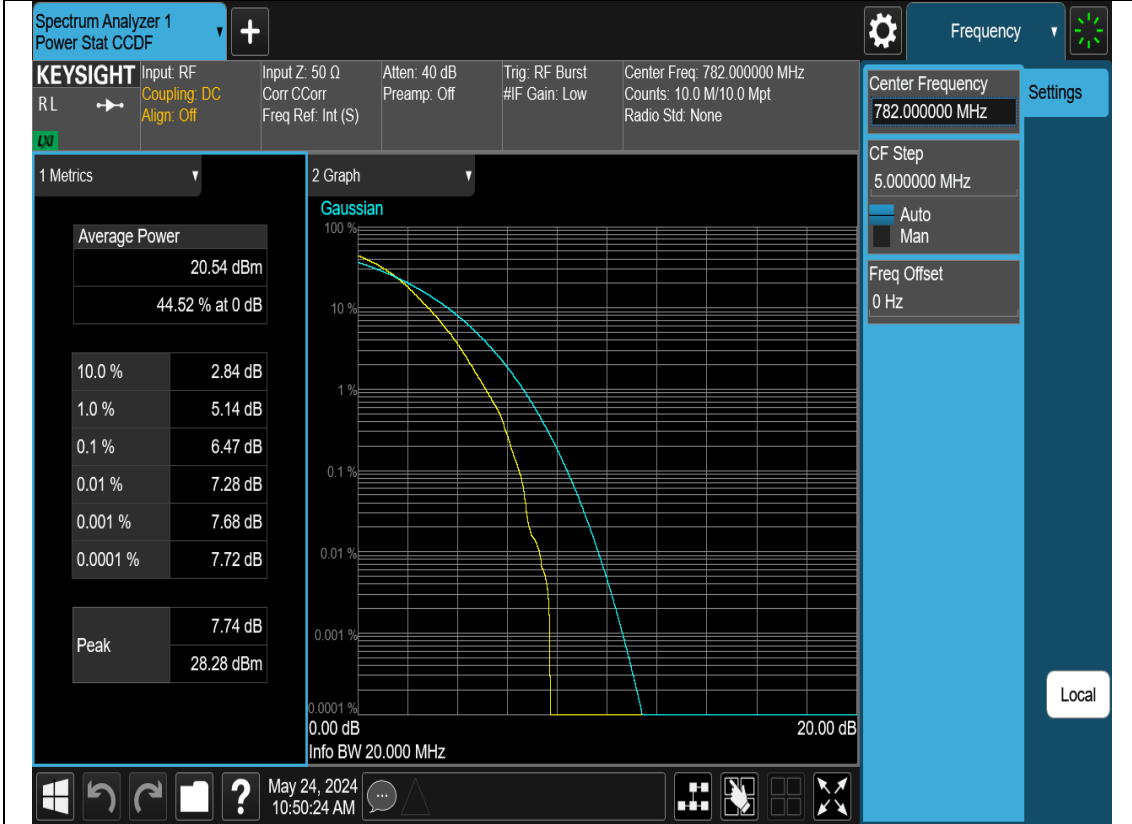
N13-5M-PAPR-M-DFT-s-OFDM-16QAM-Outer_Full



N13-5M-PAPR-M-DFT-s-OFDM-64QAM-Outer_Full



N13-5M-PAPR-M-DFT-s-OFDM-256QAM-Outer_Full



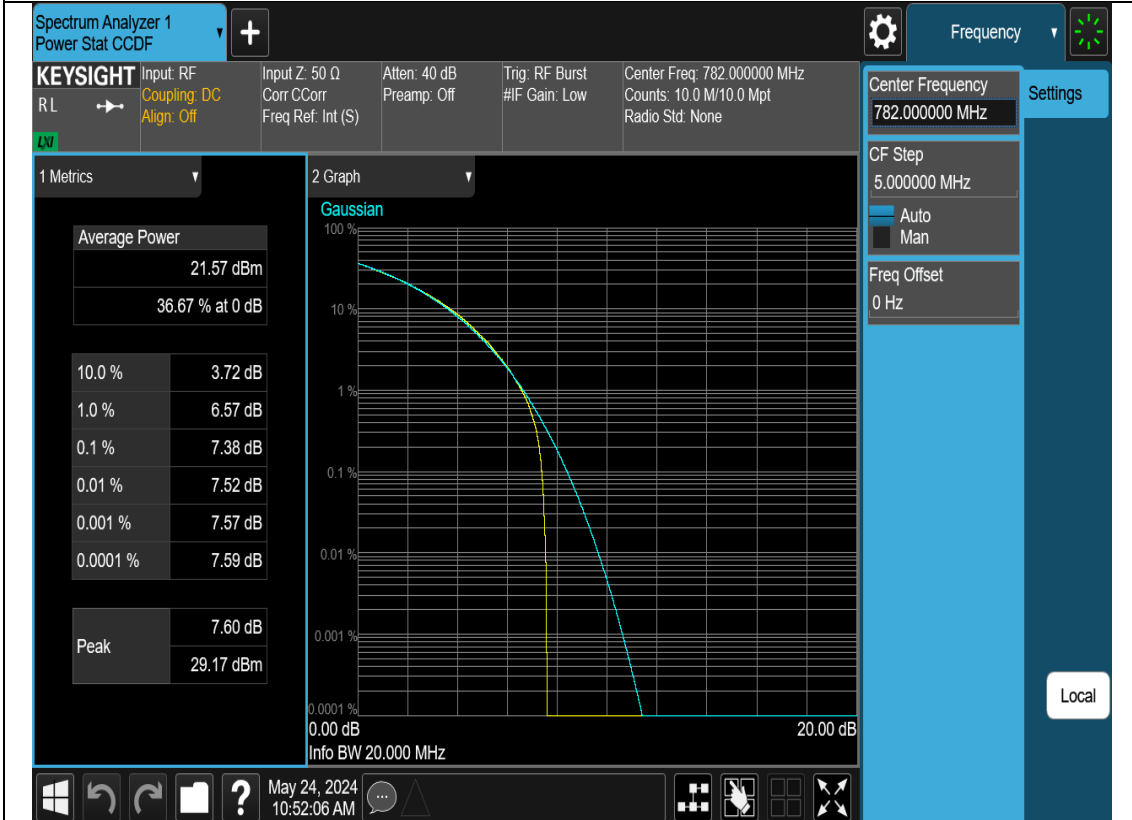
N13-5M-PAPR-M-CP-OFDM-QPSK-Outer_Full



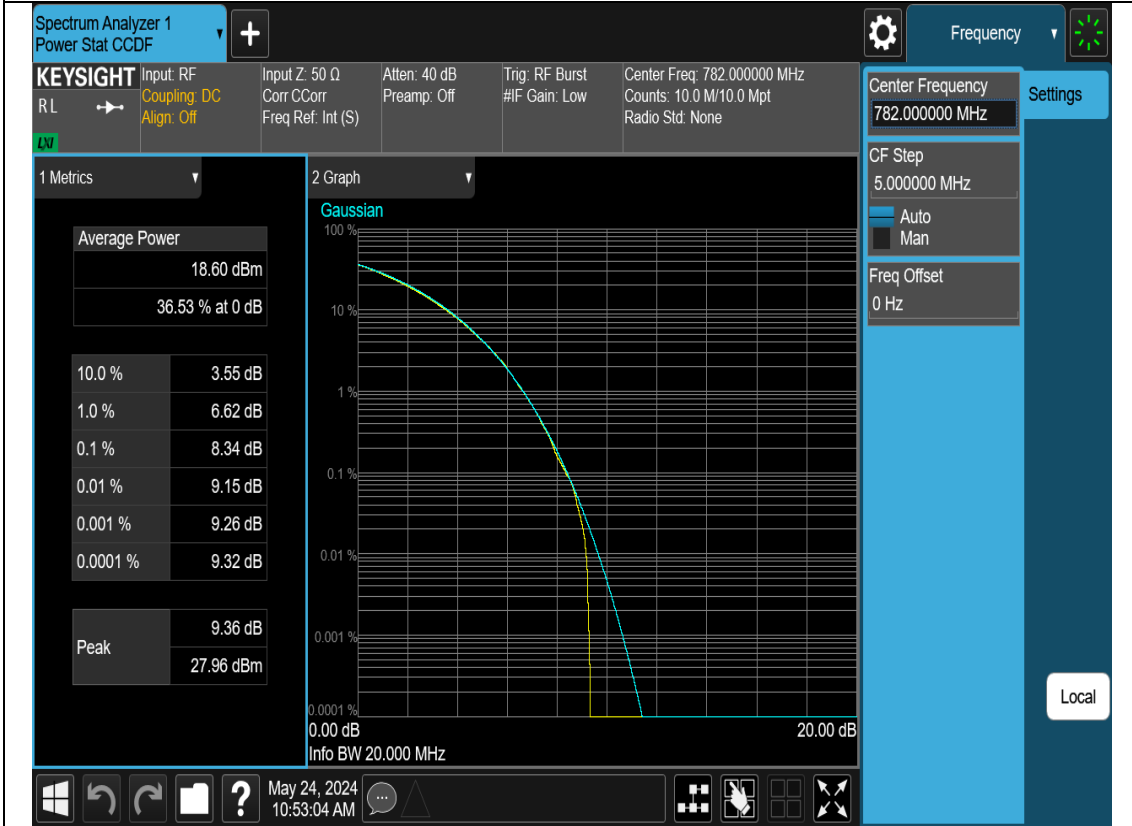
N13-5M-PAPR-M-CP-OFDM-16QAM-Outer_Full



N13-5M-PAPR-M-CP-OFDM-64QAM-Outer_Full



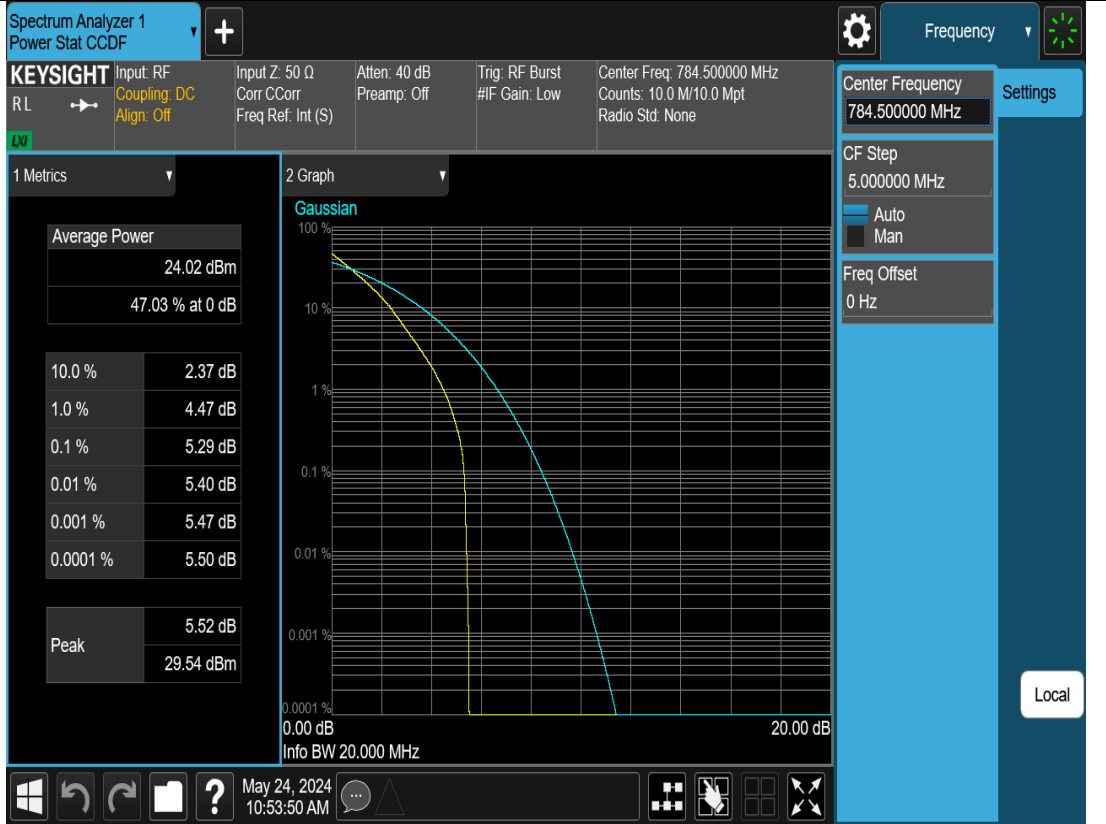
N13-5M-PAPR-M-CP-OFDM-256QAM-Outer_Full



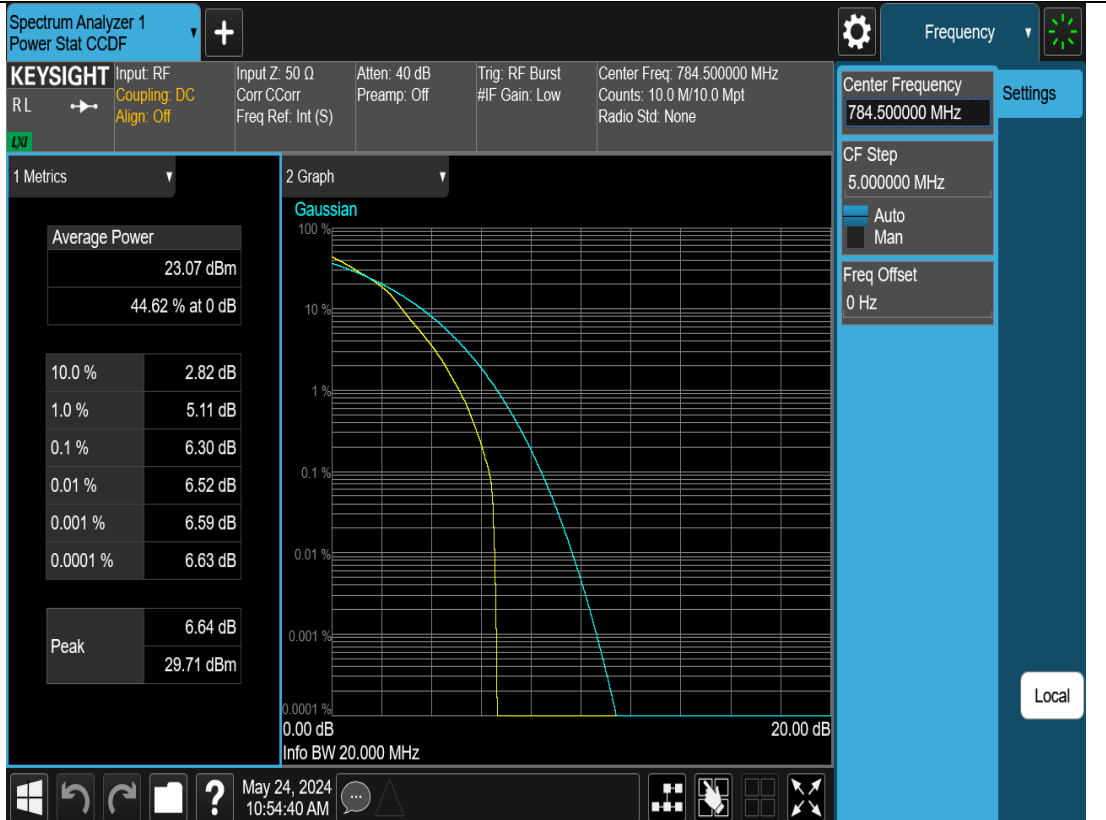
N13-5M-PAPR-H-DFT-s-OFDM-Pi2 BPSK-Outer_Full



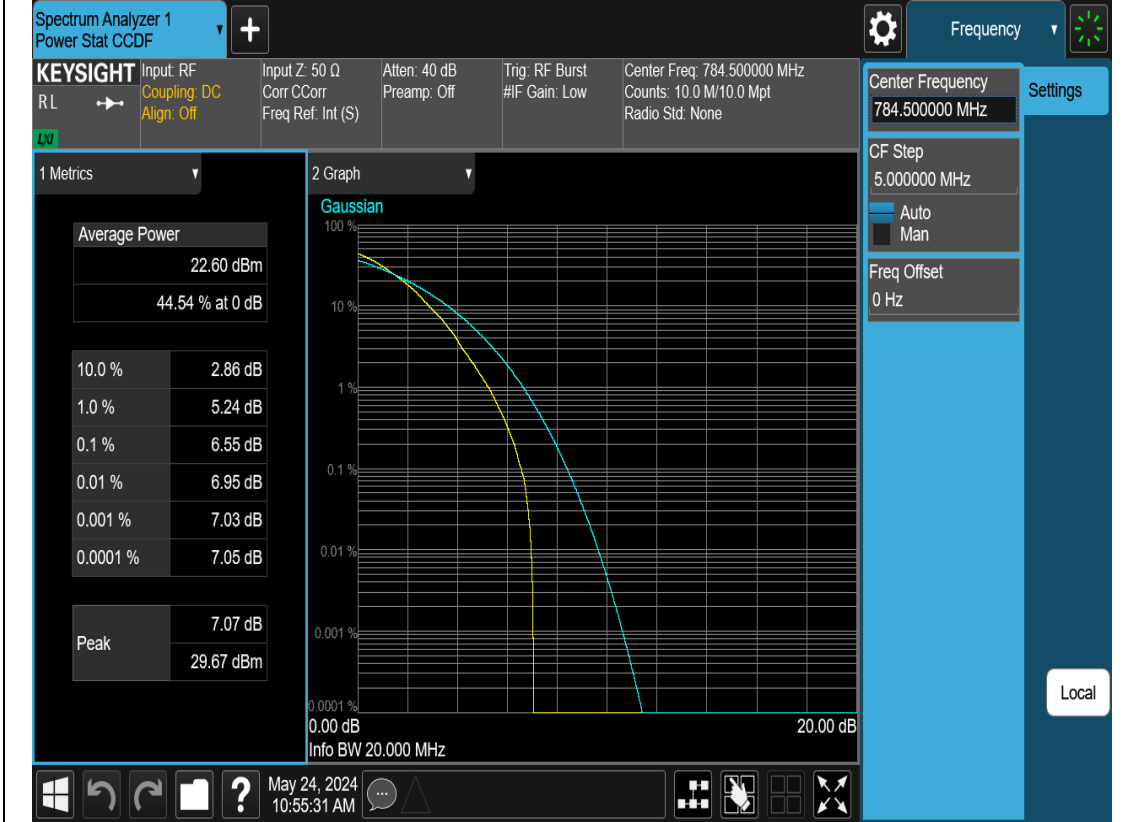
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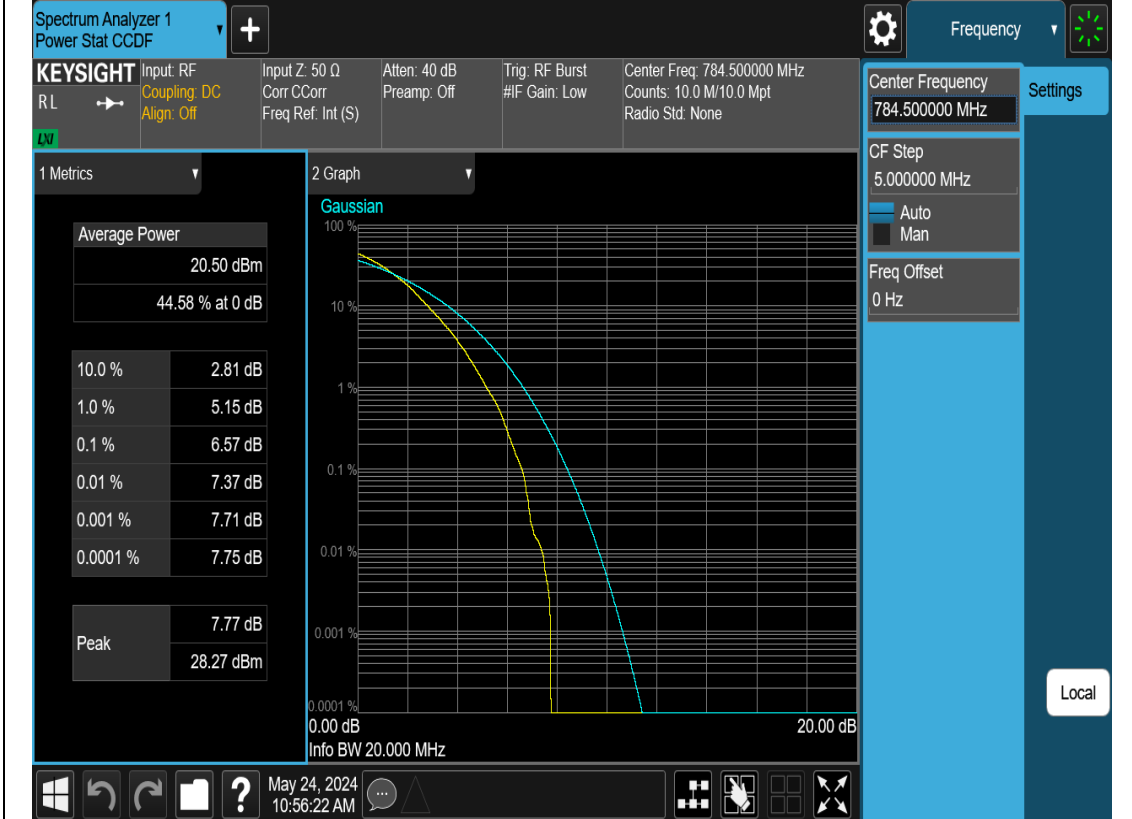
N13-5M-PAPR-H-DFT-s-OFDM-16QAM-Outer_Full



N13-5M-PAPR-H-DFT-s-OFDM-64QAM-Outer_Full



N13-5M-PAPR-H-DFT-s-OFDM-256QAM-Outer_Full



N13-5M-PAPR-H-CP-OFDM-QPSK-Outer_Full

Spectrum Analyzer 1
Power Stat CCDF

KEYSIGHT Input: RF
R L Coupling: DC
Align: Off

Input Z: 50 Ω
Corr: CCorr
Freq Ref: Int (S)

Atten: 40 dB
Preamp: Off

Trig: RF Burst
#IF Gain: Low

Center Freq: 784.500000 MHz
Counts: 10.0 M/10.0 Mpt
Radio Std: None

Center Frequency: 784.500000 MHz
CF Step: 5.000000 MHz
Freq Offset: 0 Hz

1 Metrics

Average Power
22.09 dBm
36.46 % at 0 dB

10.0 %	3.75 dB
1.0 %	6.52 dB
0.1 %	7.18 dB
0.01 %	7.33 dB
0.001 %	7.42 dB
0.0001 %	7.46 dB

Peak
7.48 dB
29.57 dBm

2 Graph
Gaussian

0.0001 %
0.001 %
0.01 %
0.1 %
1 %
10 %
100 %

0.00 dB
20.00 dB

Info BW 20.000 MHz

May 24, 2024 11:53:36 AM

Local

N13-5M-PAPR-H-CP-OFDM-16QAM-Outer_Full

Spectrum Analyzer 1
Power Stat CCDF

KEYSIGHT Input: RF
R L Coupling: DC
Align: Off

Input Z: 50 Ω
Corr: CCorr
Freq Ref: Int (S)

Atten: 40 dB
Preamp: Off

Trig: RF Burst
#IF Gain: Low

Center Freq: 784.500000 MHz
Counts: 10.0 M/10.0 Mpt
Radio Std: None

Center Frequency: 784.500000 MHz
CF Step: 5.000000 MHz
Freq Offset: 0 Hz

1 Metrics

Average Power
22.12 dBm
36.30 % at 0 dB

10.0 %	3.69 dB
1.0 %	6.61 dB
0.1 %	7.33 dB
0.01 %	7.48 dB
0.001 %	7.56 dB
0.0001 %	7.59 dB

Peak
7.62 dB
29.74 dBm

2 Graph
Gaussian

0.0001 %
0.001 %
0.01 %
0.1 %
1 %
10 %
100 %

0.00 dB
20.00 dB

Info BW 20.000 MHz

May 24, 2024 10:57:12 AM

Local

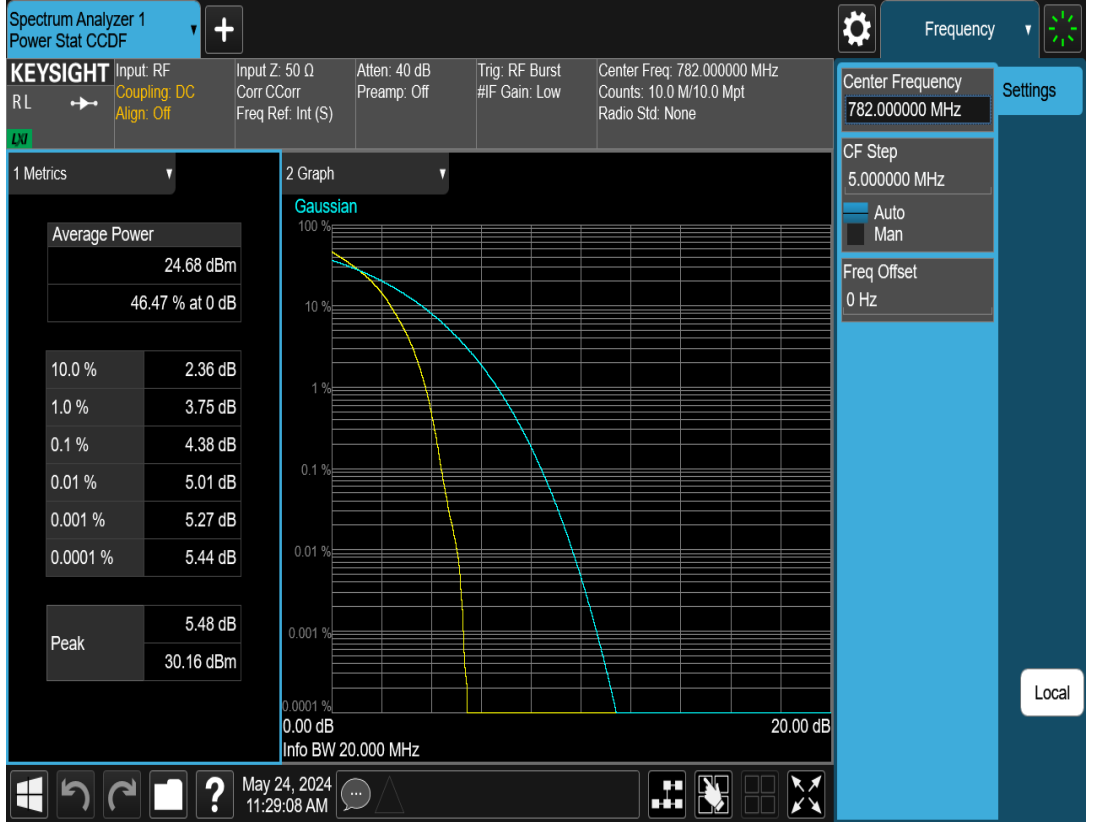
N13-5M-PAPR-H-CP-OFDM-64QAM-Outer_Full



N13-5M-PAPR-H-CP-OFDM-256QAM-Outer_Full



N13-10M-PAPR-M-DFT-s-OFDM-Pi2 BPSK-Outer_Full



N13-10M-PAPR-M-DFT-s-OFDM-QPSK-Outer_Full

