

N41(80M)_DFT-s-
OFDM BPSK Edge 1RB Left Low CH



N41(80M)_DFT-s-
OFDM BPSK Edge 1RB Left Low CH



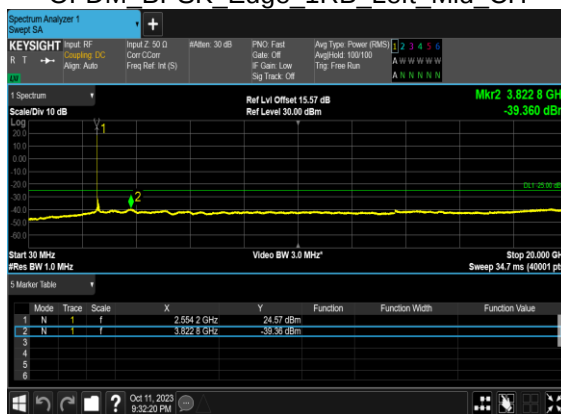
N41(80M)_DFT-s-
OFDM QPSK Edge 1RB Left Low CH



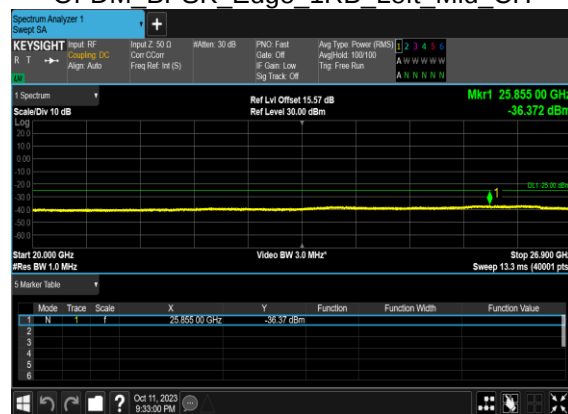
N41(80M)_DFT-s-
OFDM QPSK Edge 1RB Left Low CH



N41(80M)_DFT-s-
OFDM BPSK Edge 1RB Left Mid CH



N41(80M)_DFT-s-
OFDM BPSK Edge 1RB Left Mid CH



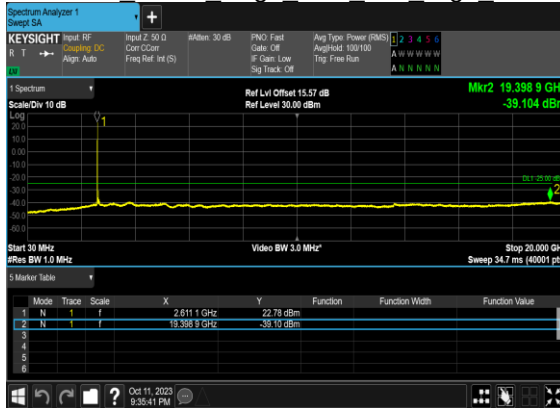
N41(80M)_DFT-s-
OFDM QPSK Edge 1RB Left Mid CH



N41(80M)_DFT-s-
OFDM QPSK Edge 1RB Left Mid CH



N41(80M)_DFT-s-
OFDM BPSK Edge 1RB Left High CH



N41(80M)_DFT-s-
OFDM BPSK Edge 1RB Left High CH



N41(80M)_DFT-s-
OFDM QPSK Edge 1RB Left High CH



N41(80M)_DFT-s-
OFDM QPSK Edge 1RB Left High CH



N41(100M)_DFT-s-
OFDM BPSK Edge 1RB Left Low CH



N41(100M)_DFT-s-
OFDM BPSK Edge 1RB Left Low CH



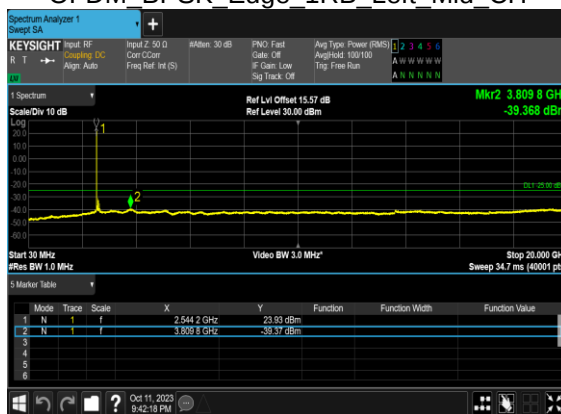
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OFDM QPSK Edge 1RB Left Low CH



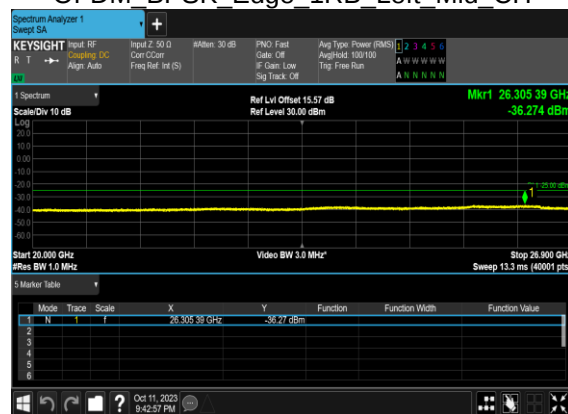
N41(100M)_DFT-s-
OFDM QPSK Edge 1RB Left Low CH



N41(100M)_DFT-s-
OFDM BPSK Edge 1RB Left Mid CH



N41(100M)_DFT-s-
OFDM BPSK Edge 1RB Left Mid CH



N41(100M)_DFT-s-
OFDM QPSK Edge 1RB Left Mid CH



N41(100M)_DFT-s-
OFDM QPSK Edge 1RB Left Mid CH



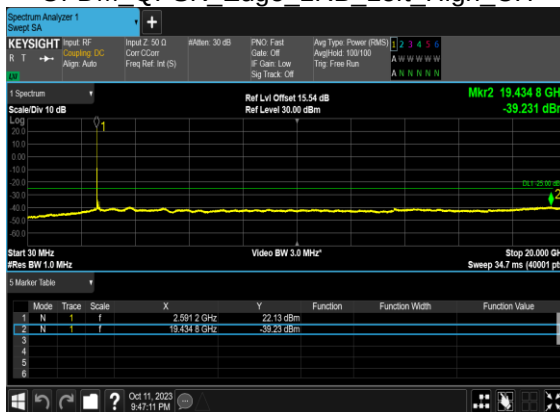
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OFDM BPSK Edge 1RB Left High CH



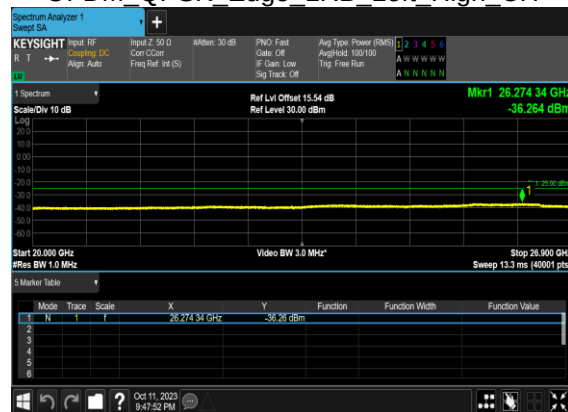
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OFDM BPSK Edge 1RB Left High CH



N41(100M)_DFT-s-
OFDM QPSK Edge 1RB Left High CH



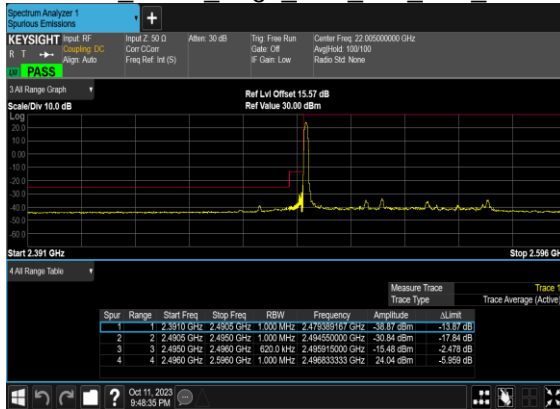
N41(100M)_DFT-s-
OFDM QPSK Edge 1RB Left High CH



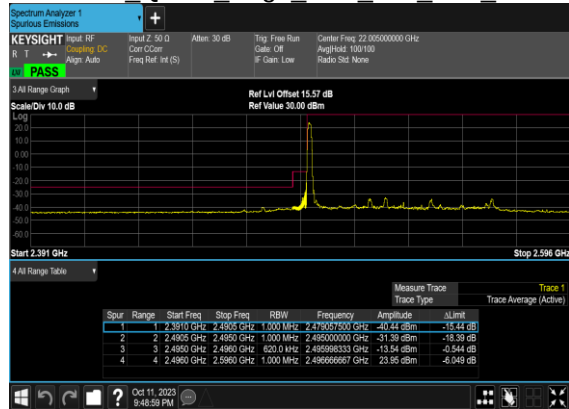
Conducted Band Edge

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
41	30	60	505200	2526.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
41	30	60	505200	2526.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
41	30	60	505200	2526.0	DFT-s-OFDM BPSK	162@0	see graph	PASS
41	30	60	505200	2526.0	DFT-s-OFDM QPSK	162@0	see graph	PASS
41	30	60	531996	2659.98	DFT-s-OFDM BPSK	1@161	see graph	PASS
41	30	60	531996	2659.98	DFT-s-OFDM QPSK	1@161	see graph	PASS
41	30	60	531996	2659.98	DFT-s-OFDM BPSK	162@0	see graph	PASS
41	30	60	531996	2659.98	DFT-s-OFDM QPSK	162@0	see graph	PASS
41	30	80	507204	2536.02	DFT-s-OFDM BPSK	1@0	see graph	PASS
41	30	80	507204	2536.02	DFT-s-OFDM QPSK	1@0	see graph	PASS
41	30	80	507204	2536.02	DFT-s-OFDM BPSK	216@0	see graph	PASS
41	30	80	507204	2536.02	DFT-s-OFDM QPSK	216@0	see graph	PASS
41	30	80	529998	2649.99	DFT-s-OFDM BPSK	1@216	see graph	PASS
41	30	80	529998	2649.99	DFT-s-OFDM QPSK	1@216	see graph	PASS
41	30	80	529998	2649.99	DFT-s-OFDM BPSK	216@0	see graph	PASS
41	30	80	529998	2649.99	DFT-s-OFDM QPSK	216@0	see graph	PASS
41	30	100	509202	2546.01	DFT-s-OFDM BPSK	1@0	see graph	PASS
41	30	100	509202	2546.01	DFT-s-OFDM QPSK	1@0	see graph	PASS
41	30	100	509202	2546.01	DFT-s-OFDM BPSK	270@0	see graph	PASS
41	30	100	509202	2546.01	DFT-s-OFDM QPSK	270@0	see graph	PASS
41	30	100	528000	2640.0	DFT-s-OFDM BPSK	1@272	see graph	PASS
41	30	100	528000	2640.0	DFT-s-OFDM QPSK	1@272	see graph	PASS
41	30	100	528000	2640.0	DFT-s-OFDM BPSK	270@0	see graph	PASS
41	30	100	528000	2640.0	DFT-s-OFDM QPSK	270@0	see graph	PASS

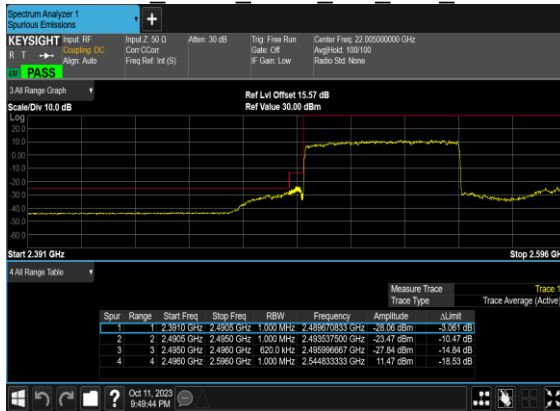
N41(60M)_DFT-s-
OFDM BPSK Edge 1RB Left Low CH



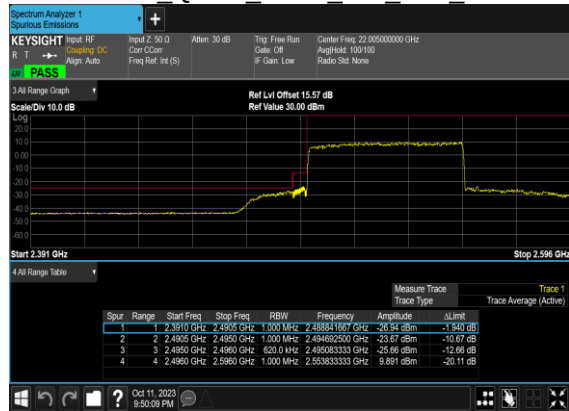
N41(60M)_DFT-s-
OFDM QPSK Edge 1RB Left Low CH



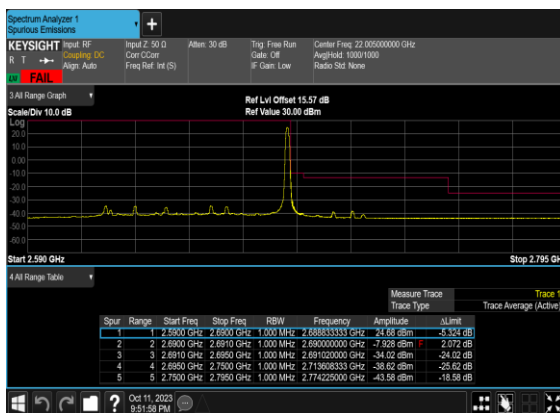
N41(60M)_DFT-s-
OFDM BPSK Outer Full Low CH



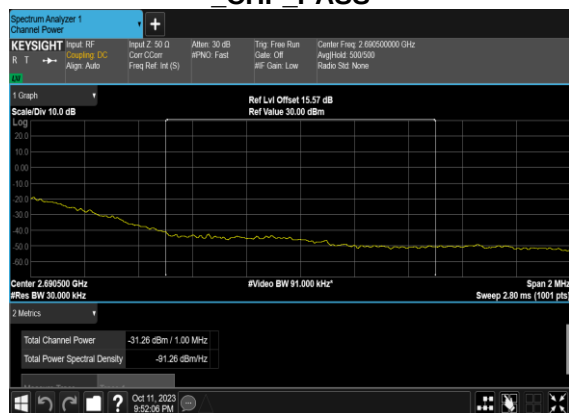
N41(60M)_DFT-s-
OFDM QPSK Outer Full Low CH



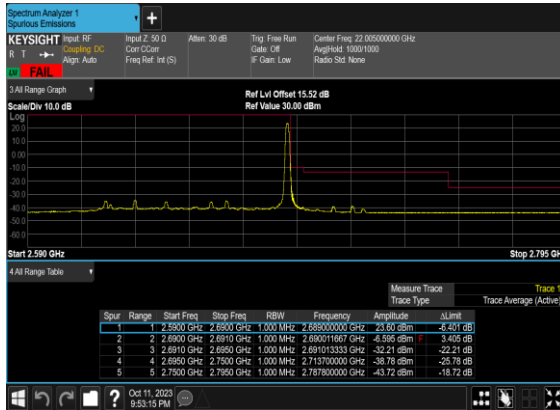
N41(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Right_High_CH



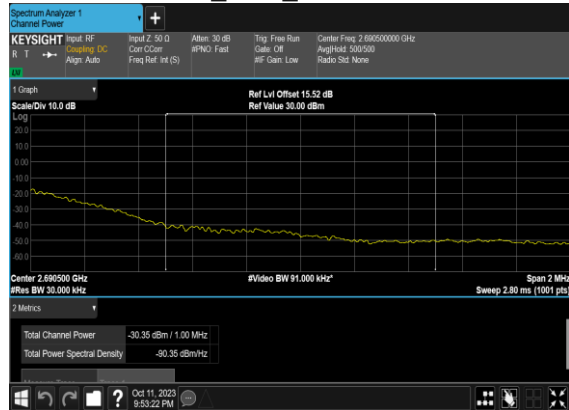
N41(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Right_High_CH
_CHP_PASS



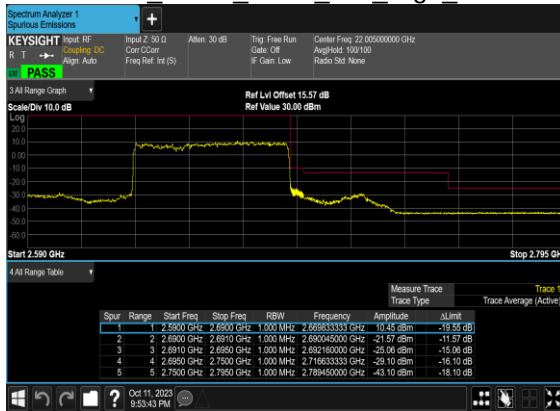
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OFDM_QPSK_Edge_1RB_Right_High_CH



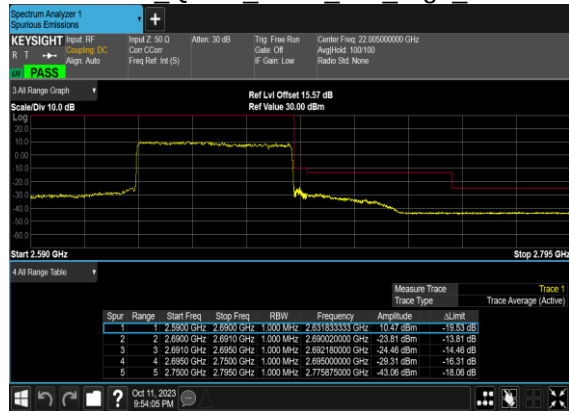
N41(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Right_High_CH
CHP_PASS



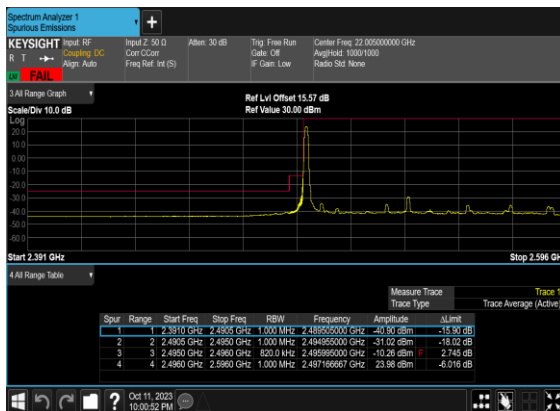
N41(60M)_DFT-s-
OFDM_BPSK_Outer_Full_High_CH



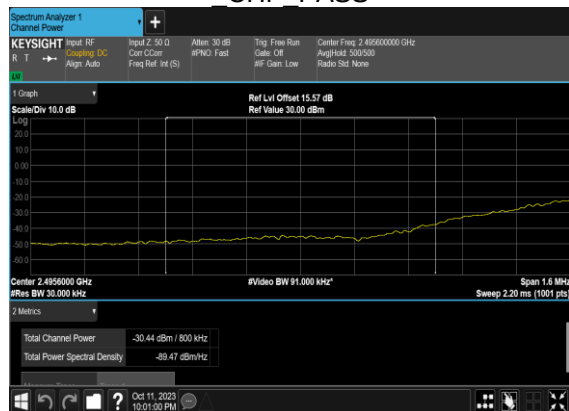
N41(60M)_DFT-s-
OFDM_QPSK_Outer_Full_High_CH



N41(80M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CH



N41(80M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CH
CHP_PASS



Spectrum Analyzer 1
Spurious Emissions

KEYSIGHT Input RF
Output DC
Align Auto

Input Z: 50 Ohm
Center Freq: 22,000,000,000 Hz
Amp/Hz: 1000/1000
Ratio SSB: None

Alt: 30 dB
Trig: Free Run
Gate: Off
IF Gain: Low

FAIL

3 All Range Graph
Scale/Div: 10.0 dBm
Log
Start: 2.391 GHz
Stop: 2.596 GHz
Ref Lvl Offset: 15.57 dBm
Ref Value: 30.00 dBm

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLvl
1	1	2.3910 GHz	2.4905 GHz	1.000 MHz	2.489520000 GHz	-20.95 dBm	-15.85 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494962500 GHz	-31.17 dBm	-18.17 dB
3	3	2.4950 GHz	2.4960 GHz	820.0 MHz	2.495993333 GHz	-8.476 dBm	-4.522 dB
4	4	2.4950 GHz	2.5960 GHz	1.000 MHz	2.497000000 GHz	-23.05 dBm	-8.353 dB

Trace Average (Active)

Spectrum Analyzer 1
Channel Power

KEYSIGHT Input: RF **Powering** DC
R T $\rightarrow$ Align Auto
Log

Input Z: 50 Ω
Core C: Core
#FNO: Fast
Trig: Free Run
Gate: Off
#F: Scan Low
Center Freq: 2.49560000 GHz
Avg/Hd: 300/500
Radio Std: None

1 Graph
Scale/Div: 10.0 dB
Log
Ref Lvl Offset: 15.57 dB
Ref Value: 30.00 dBm

Center: 2.49560000 GHz
#Res BW: 30.00 kHz
#Video BW: 91.000 kHz
Span: 1.5 MHz
Sweep: 2.20 ms (1001 pts)

2 Metrics

Total Channel Power	-28.94 dBm / 800 kHz
Total Power Spectral Density	-86.97 dBm/kHz

Oct 11, 2023
10:02:20 PM

Spectrum Analyzer 1
Spurious Emissions

KEYSIGHT Input Ref: R T → Comparing DC: Align Off

40 PASS

Input Z: 50 Ω Att: 30 dB Trig: Free Run Center Freq: 22.005000000 GHz
 Corr: CCR Gate: Off RF Gain: Low AegHz: 1000/1000
 Ref Ref: Int (S) Noise Ratio: 1000

1 All Range Graph

Scale/Div: 10.0 dB

Log

Ref Lvl Offset: 15.56 dB
 Ref Value: 30.00 dBm

Start 2.391 GHz Stop 2.596 GHz

4 All Range Table

Measure Trace Trace Type Trace Average (Active)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Avgmt
1	2	2.3501 GHz	2.3502 GHz	1.000 MHz	2.430213333 GHz	-29.35 dBm	-0.448 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494987500 GHz	-24.01 dBm	-11.01 dB
3	3	2.4980 GHz	2.4990 GHz	820.0 MHz	2.49851607 GHz	-22.07 dBm	-9.966 dB
4	2	2.4960 GHz	2.5960 GHz	1.000 MHz	2.573833333 GHz	6.925 dBm	-23.08 dB

Oct 12, 2023 1:44:13 PM

Spectrum Analyzer 1
Channel Power

KEYSIGHT Input: RF
Coupling: DC
ALC: Off

Input Z: 50 Ohm
Corr: C
Freq Ref: 100 MHz (S)

Att: 20 dB
#PNO: Fast

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

Center Freq: 2.480218333 GHz
Avg/Hd: 200/200
Radio Std: None

1 Graph

Scale/Div: 10.0 dB

Log

Ref Lvl Offset: 15.56 dB
Ref Value: 30.00 dBm

Center: 2.480218 GHz
#Res BW: 30.00 kHz

#Video BW: 91.000 kHz

Span: 2 MHz
Sweep: 2.80 ms (1001 pts)

2 Metrics

Total Channel Power	-57.77 dBm / 1.00 MHz
Total Power Spectral Density	-65.77 dBm/MHz

Oct 12, 2023
1:46:42 PM

The screenshot displays the Keysight Spectrum Analyzer interface. The top panel shows the input signal as a yellow trace on a grid. The bottom panel shows a table of spur measurements.

Top Panel Settings:

- Input: RF
- Output: Creating DC
- Align: Auto
- Input 2: 50 Ω
- Core: CCR
- Attain: 30 dB
- Trigger: Free Run
- Gate: Off
- IF Gain: Low
- Center Freq: 22,000,000,000 GHz
- Amplitude: 100/100
- Radio Set: None

Scale/Div: 10.0 dB

Start: 2.391 GHz

Stop: 2.596 GHz

4 All Range Table

Measure Trace

Trace Type

Trace Average (Active)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Offset
1	2	2.3910 GHz	2.3930 GHz	1.000 MHz	2.391855500 GHz	-50.03 dBm	-5.932 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494857500 GHz	-26.06 dBm	-13.06 dB
3	2	2.4950 GHz	2.4960 GHz	820.0 kHz	2.495941667 GHz	-24.39 dBm	-11.39 dB
4	4	2.4950 GHz	2.5960 GHz	1.000 MHz	2.526000000 GHz	9.221 dBm	-20.78 dB

Spectrum Analyzer 1
Spurious Emissions

KEYSIGHT Input: RF
R T $\rightarrow$ **Coupling** DC
Align: Auto
IN PASS

3 dB Range Graph
Scale Div: 10.0 dB
Log
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0

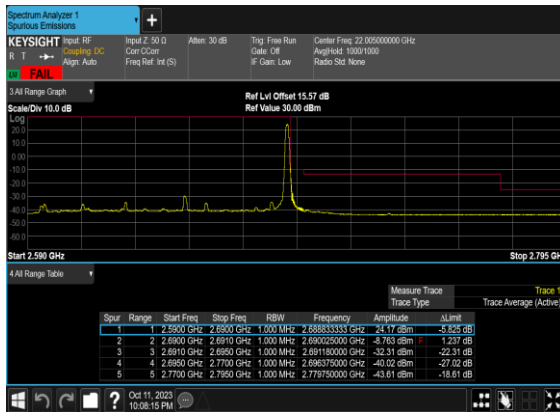
Ref Lvl Offset: 15.56 dB
Ref Value: 30.00 dBm

Start 2.590 GHz
Stop 2.795 GHz

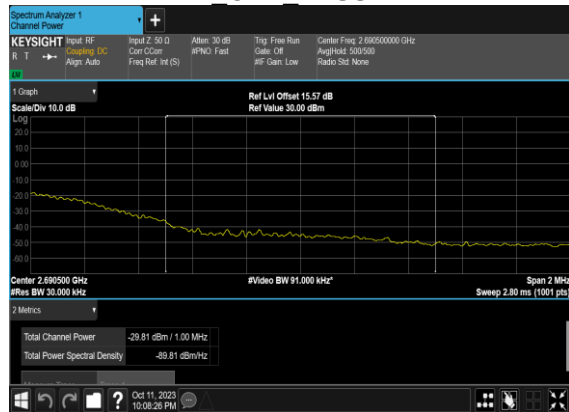
4 All Range Table

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	dBm
1	2	2.59000 GHz	2.69000 GHz	1.000 MHz	2.680026291 GHz	-26.174 dBm	-26.174 dBm
2	2	2.68000 GHz	2.69100 GHz	1.000 MHz	2.680011667 GHz	-40.719 dBm	-40.719 dBm
3	3	2.69100 GHz	2.69650 GHz	1.000 MHz	2.691013333 GHz	-33.730 dBm	-33.730 dBm
4	4	2.69650 GHz	2.71700 GHz	1.000 MHz	2.696878500 GHz	-40.735 dBm	-40.735 dBm
5	5	2.71700 GHz	2.79500 GHz	1.000 MHz	2.772166667 GHz	-43.630 dBm	-43.630 dBm

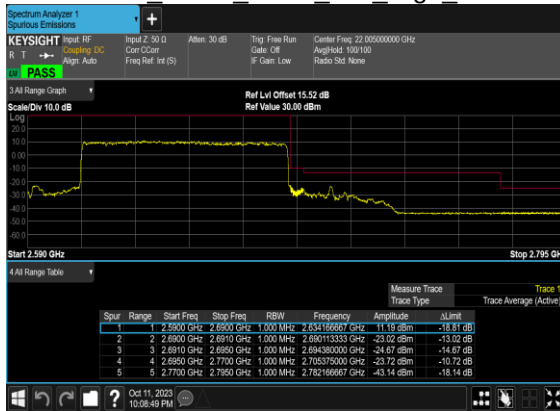
N41(80M)_DFT-s-
OFDM_QPSK_Edge_1RB_Right_High_CH



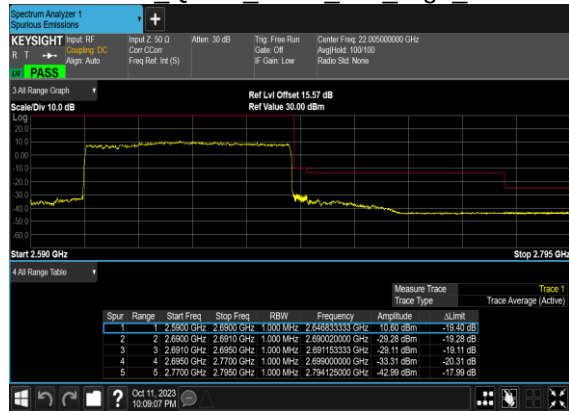
N41(80M)_DFT-s-
OFDM_QPSK_Edge_1RB_Right_High_CH
CHP PASS



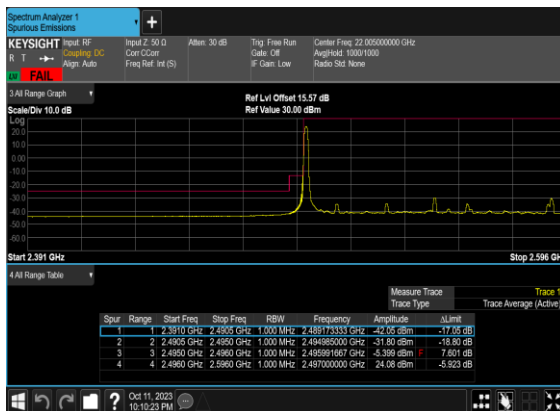
N41(80M)_DFT-s-
OFDM_BPSK_Outer_Full_High_CH



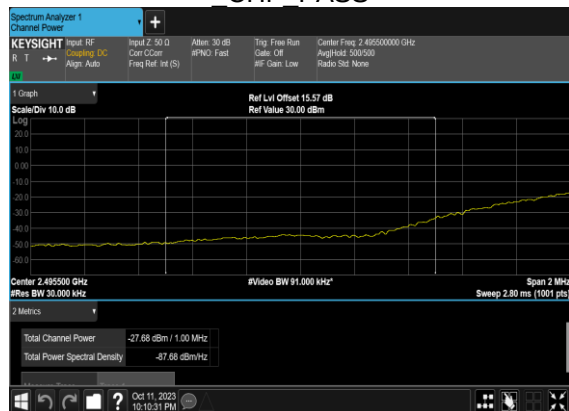
N41(80M)_DFT-s-
OFDM_QPSK_Outer_Full_High_CH



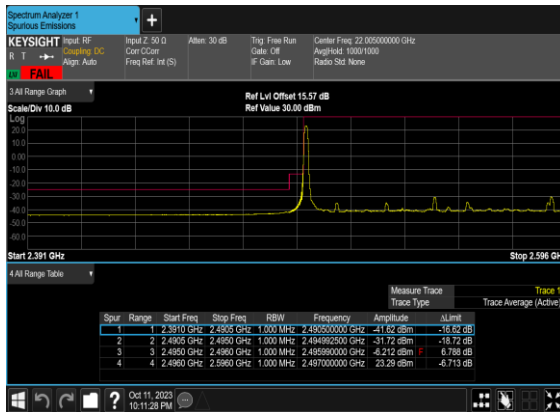
N41(100M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CH



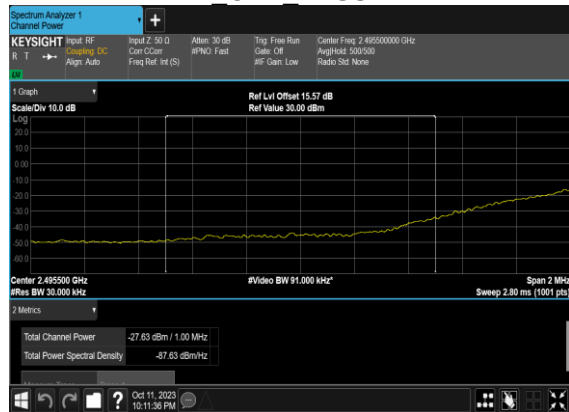
N41(100M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CH
CHP PASS



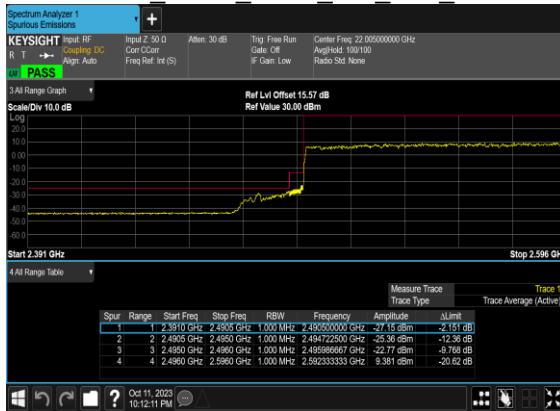
N41(100M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Low_CH



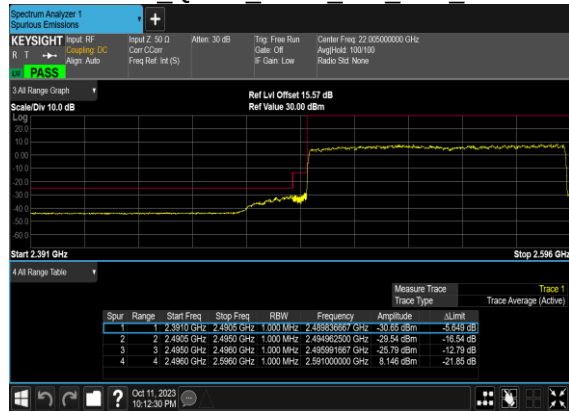
N41(100M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Low_CH
CHP PASS



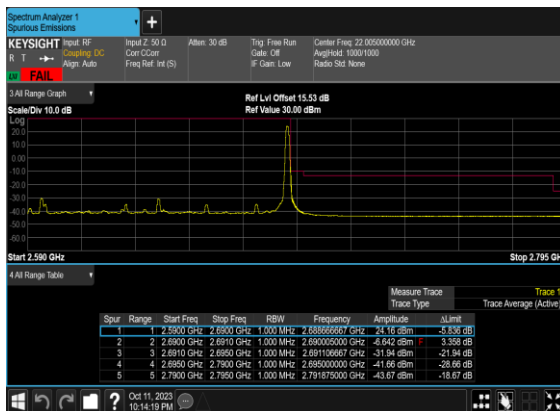
N41(100M)_DFT-s-
OFDM_BPSK_Outer_Full_Low_CH



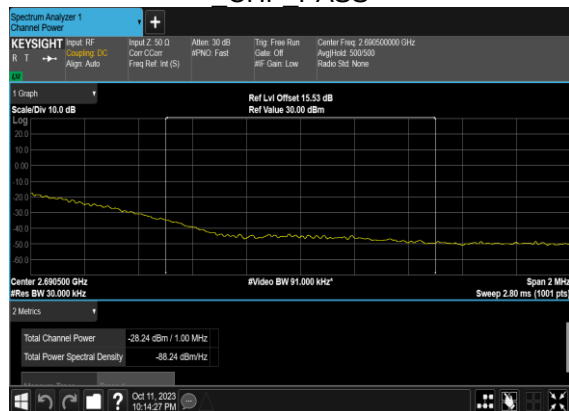
N41(100M)_DFT-s-
OFDM_QPSK_Outer_Full_Low_CH



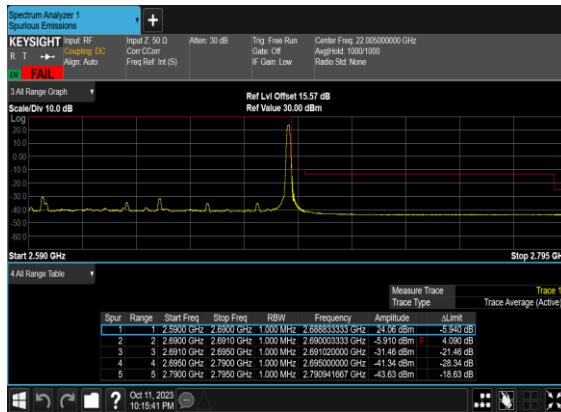
N41(100M)_DFT-s-
OFDM_BPSK_Edge_1RB_Right_High_CH



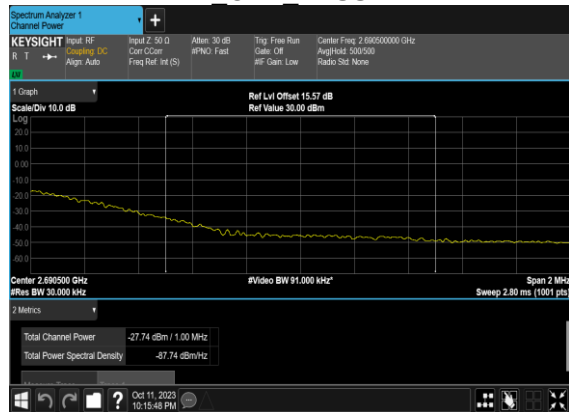
N41(100M)_DFT-s-
OFDM_BPSK_Edge_1RB_Right_High_CH
CHP PASS



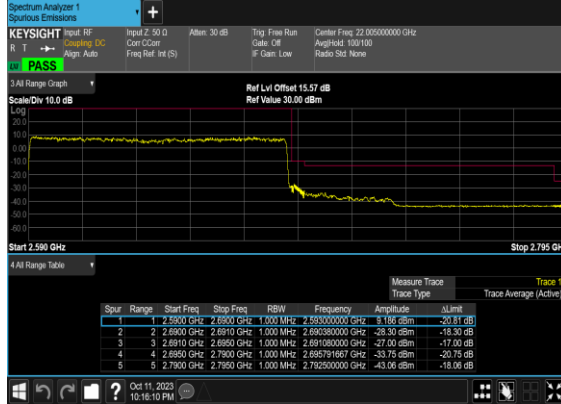
N41(100M)_DFT-s- OFDM_QPSK_Edge_1RB_Right_High_CH



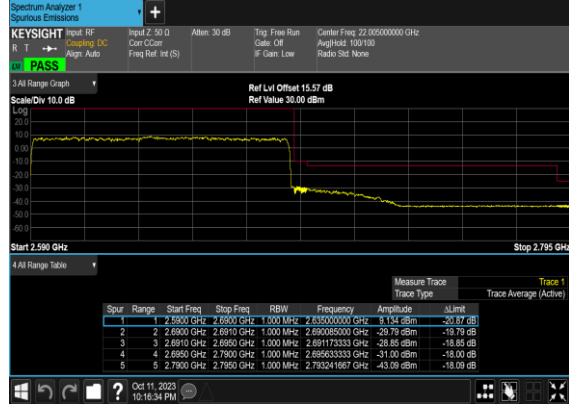
N41(100M)_DFT-s- OFDM_QPSK_Edge_1RB_Right_High_CH CHP PASS



N41(100M)_DFT-s- OFDM_BPSK_Outer_Full_High_CH



N41(100M)_DFT-s- OFDM_QPSK_Outer_Full_High_CH



Note: "CHP" means channel power integration method.



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	Wenbo Xiao	Temperature :	22~25°C
		Relative Humidity :	48~52%

Note: RSE Pre-scanned harmonic for the different antenna combinations, we choose the worst antenna mode to perform final test.

n2 SA / NR 40MHz / QPSK(ANT1)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3721.84	-62.78	-13	-49.78	-79.32	-69.53	5.85	12.60	H
	5582.76	-60.94	-13	-47.94	-80.86	-66.74	7.30	13.10	H
	7443.68	-55.94	-13	-42.94	-80.44	-59.09	8.35	11.50	H
	3721.84	-63.94	-13	-50.94	-80.16	-70.69	5.85	12.60	V
	5582.76	-61.48	-13	-48.48	-81.24	-67.28	7.30	13.10	V
	7443.68	-55.64	-13	-42.64	-80.5	-58.79	8.35	11.50	V

n5 SA / NR 20MHz / QPSK (ANT0)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1654.5	-65.95	-13	-52.95	-73.86	-69.20	4.00	9.40	H
	2481.75	-63.24	-13	-50.24	-75.45	-66.81	4.88	10.60	H
	3309	-61.46	-13	-48.46	-76.65	-66.39	5.52	12.60	H
	1654.5	-66.10	-13	-53.10	-74.09	-69.35	4.00	9.40	V
	2481.75	-63.02	-13	-50.02	-75.29	-66.59	4.88	10.60	V
	3309	-61.74	-13	-48.74	-76.87	-66.67	5.52	12.60	V



EN-DC_7A_n5A / LTE 20MHz + NR 20MHz / QPSK (ANT1+0)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
NR n5 Middle	1654.5	-66.39	-13	-53.39	-74.30	-69.64	4.00	9.40	H
	2481.75	-62.37	-13	-49.37	-74.58	-65.94	4.88	10.60	H
	3309	-61.73	-13	-48.73	-76.92	-66.66	5.52	12.60	H
	1654.5	-66.29	-13	-53.29	-74.28	-69.54	4.00	9.40	V
	2481.75	-62.97	-13	-49.97	-75.24	-66.54	4.88	10.60	V
	3309	-61.81	-13	-48.81	-76.94	-66.74	5.52	12.60	V
LTE Band7 Middle	5061.18	-58.82	-25	-33.82	-78.37	-64.38	7.14	12.70	H
	7591.77	-55.09	-25	-30.09	-79.32	-58.39	8.30	11.60	H
	10122.36	-51.93	-25	-26.93	-79.61	-53.45	10.48	12.00	H
	5061.18	-59.26	-25	-34.26	-78.68	-64.82	7.14	12.70	V
	7591.77	-54.57	-25	-29.57	-79.3	-57.87	8.30	11.60	V
	10122.36	-52.83	-25	-27.83	-79.2	-54.35	10.48	12.00	V

n7 SA / NR 50MHz / QPSK (ANT1)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	5070.00	-59.80	-25	-34.80	-79.36	-65.36	7.14	12.70	H
	7605.00	-55.69	-25	-30.69	-79.90	-58.99	8.30	11.60	H
	10140.00	-52.65	-25	-27.65	-80.35	-54.17	10.48	12.00	H
	5070.00	-59.93	-25	-34.93	-79.35	-65.49	7.14	12.70	V
	7605.00	-55.09	-25	-30.09	-79.8	-58.39	8.30	11.60	V
	10140.00	-53.80	-25	-28.80	-80.21	-55.32	10.48	12.00	V

EN-DC_7A_n7A / LTE 20MHz + NR 50MHz / QPSK (ANT2+1)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
NR n7 Middle	5070.00	-59.67	-25	-34.67	-79.23	-65.23	7.14	12.70	H
	7605.00	-55.32	-25	-30.32	-79.53	-58.62	8.30	11.60	H
	10140.00	-52.46	-25	-27.46	-80.16	-53.98	10.48	12.00	H
	5070.00	-59.65	-25	-34.65	-79.07	-65.21	7.14	12.70	V
	7605.00	-54.80	-25	-29.80	-79.51	-58.10	8.30	11.60	V
	10140.00	-53.91	-25	-28.91	-80.32	-55.43	10.48	12.00	V
LTE Band7 Middle	5061.18	-59.67	-25	-34.67	-79.22	-65.23	7.14	12.70	H
	7591.77	-55.76	-25	-30.76	-79.99	-59.06	8.30	11.60	H
	10122.36	-52.60	-25	-27.60	-80.28	-54.12	10.48	12.00	H
	5061.18	-59.54	-25	-34.54	-78.96	-65.10	7.14	12.70	V
	7591.77	-54.90	-25	-29.90	-79.63	-58.20	8.30	11.60	V
	10122.36	-53.91	-25	-28.91	-80.28	-55.43	10.48	12.00	V



n41 SA / NR 100MHz / QPSK (ANT1)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	5089.00	-59.00	-25	-34.00	-78.60	-64.56	7.14	12.70	H
	7633.50	-54.58	-25	-29.58	-78.74	-57.88	8.30	11.60	H
	10178.00	-51.61	-25	-26.61	-79.34	-53.13	10.48	12.00	H
	5089.00	-59.53	-25	-34.53	-78.96	-65.09	7.14	12.70	V
	7633.50	-54.05	-25	-29.05	-78.74	-57.35	8.30	11.60	V
	10178.00	-53.15	-25	-28.15	-79.65	-54.67	10.48	12.00	V

EN-DC_41A_n7A / LTE 20MHz + NR 100MHz / QPSK (ANT2+1)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
NR n41 Middle	5089.00	-60.74	-25	-35.74	-80.06	-66.30	7.14	12.70	H
	7633.50	-55.04	-25	-30.04	-79.70	-58.34	8.30	11.60	H
	10178.00	-51.32	-25	-26.32	-79.78	-52.84	10.48	12.00	H
	5089.00	-61.12	-25	-36.12	-80.27	-66.68	7.14	12.70	V
	7633.50	-54.70	-25	-29.70	-79.89	-58.00	8.30	11.60	V
	10178.00	-52.65	-25	-27.65	-79.88	-54.17	10.48	12.00	V
LTE Band41 Middle	5177.18	-61.22	-25	-36.22	-80.46	-66.78	7.14	12.70	H
	7765.77	-55.25	-25	-30.25	-79.65	-58.55	8.30	11.60	H
	10354.36	-51.86	-25	-26.86	-80.37	-53.38	10.48	12.00	H
	5177.18	-62.00	-25	-37.00	-80.9	-67.56	7.14	12.70	V
	7765.77	-54.56	-25	-29.56	-79.61	-57.86	8.30	11.60	V
	10354.36	-52.59	-25	-27.59	-80.13	-54.11	10.48	12.00	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.