

Ericsson AB

RF TEST REPORT

Report Type:

RF report

PRODUCT NAME:

Radio 2203 B2 B25

REPORT NUMBER:

230901312SHA-001

ISSUE DATE:

October 12, 2023

DOCUMENT CONTROL NUMBER:

TTRFFCC Part 24_V1 © 2018 Intertek



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Manufacturer: Ericsson AB
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FCC ID: TA8AKRC161489-1

IC: 287AB-AS1614891

SUMMARY:

The equipment is tested according to the following standard(s) or Specification:

FCC CFR 47 Part 24: PERSONAL COMMUNICATIONS SERVICES

ISED RSS-133 Issue 6: 2 GHz Personal Communications Services

PREPARED BY: _____ **REVIEWED BY:** _____

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TEST REPORT

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Revision History

Report No.	Version	Description	Issued Date
230901312SHA-001	Rev. 01	Initial issue of report	October 12, 2023

Measurement result summary

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Max Output Power and Peak to Average Power Ratio and EIRP	24.232(a) 2.1046	RSS-133 6.4	Pass
Occupied Bandwidth	24.238(b) 2.1049	RSS-GEN 6.6	Pass
Unwanted Emissions at Band Edge	24.238(b) 2.1051	RSS-133 6.5	Pass
Conducted Unwanted Emission	24.238(b) 2.1051	RSS-133 6.5	Pass
Frequency Stability	24.235	RSS-133 6.3	Pass

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Description:	Remote Radio Unit
Product name:	Radio 2203 B2 B25
Product number:	KRC 161 489/1
HVIN	AS1614891
Serial Number(s)	TD3R109405
Rating:	36V DC
Software Version:	PIS: CXP9013268/9_R91DE, UP: CXP9024418/15_R84A20
Hardware Version:	R1G
Sample received date:	September 21, 2023
Date of test:	September 21, 2023 ~ September 26, 2023

1.2 Technical Specification

Frequency Range:	B2: TX: 1930-1990 MHz, RX: 1850-1910 MHz B25: TX: 1930-1995 MHz, RX: 1850-1915 MHz
Number of Antenna ports:	2 TX/RX
Supported RAT:	SR/MR: LTE, WCDMA, NR
Max RF bandwidth (IBW):	B2: 60 MHz; B25: 65 MHz
Supported Number of Carriers:	Maximum 5 carriers per port
Supported modulation:	WCDMA: QPSK, 16QAM, 64QAM NR/LTE: QPSK, 16QAM, 64QAM, 256QAM
Supported Channel Bandwidth:	WCDMA: 5MHz LTE: 1.4, 3, 5, 10, 15, 20 MHz NR: 5, 10, 15, 20, 25, 30, 35, 40 MHz
Declaration output power:	Maximum 5W per port

1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address 1:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Address 2:	No. 5 Lize East Street, Ericsson Tower, Chaoyang District, Beijing 100102 P.R.C.
Telephone:	+86 21 61278200
Telefax:	+86 21 54262353
The test facility is recognized, certified, or accredited by these organizations:	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Related documents

FCC Part 24 (2021)
FCC Part 2 (2021)
ISED RSS-133 issue 6 January 2018
ANSI C63.26:2015
KDB 971168 D01 v03r01
KDB 662911 D01 v02r01
SRSP-510

2.2 Product Information

The Equipment Under Test (EUT) is an Ericsson Radio Unit working in the wireless communications services 1930-1995MHz which provides communication connections to network in WCDMA/LTE/NR modes and MSR modes. The Radio 2203 B2 B25 operates from a -48V DC.

The EUT includes 2 TX/RX ports and it can be configured to transmit in MIMO mode, and MIMO mode was used for measurements as the worst configuration. The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

A full technical description can be found in the Manufacturer's documentation.

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2.3 Configuration Description

The following settings were used to represent all traffic scenarios. The output power was measured on the bottom, middle and top channel of all applicable antenna ports. By measuring the output power of QPSK, 16QAM, 64QAM, 256QAM on one of the antenna ports, it was determined that QPSK for NR was the worst-case modulation schemes and were used for all testing.

Complete testing was carried out on the worst-case antenna port which was established as being the highest output power from the 2 measured ports on worst case modulation scheme. This antenna port was Port A for all modes.

The settings below were used for all measurements unless otherwise noted:

NR

Configuration	No. of Carriers	NR Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
NR-1C	1NR	25	1942.5	1962.5	1982.5
NR-1C	1NR	30	1945.0	1962.5	1980.0
NR-1C	1NR	35	1947.5	1962.5	1977.5
NR-1C	1NR	40	1950.0	1962.5	1975.0

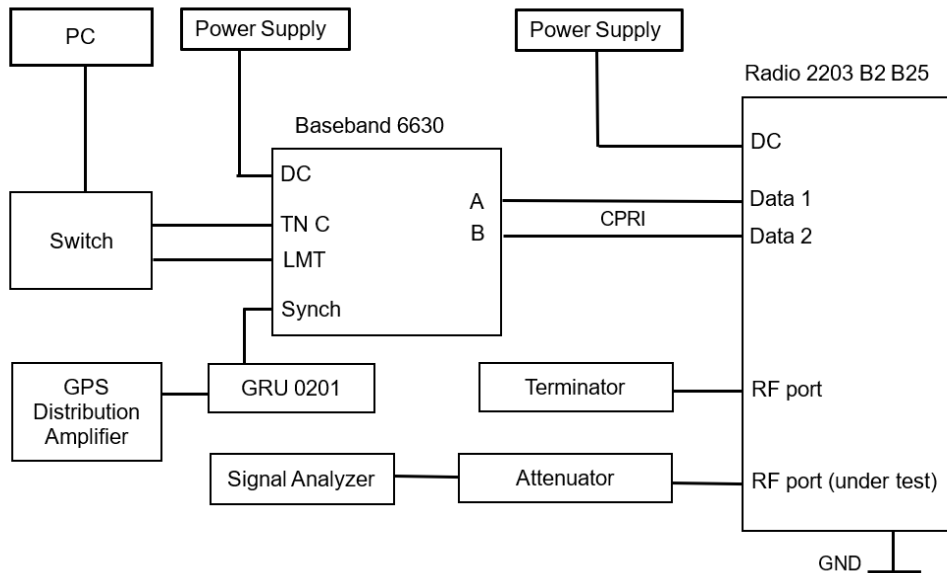
NR

Configuration	No. of Carriers	NR Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
NR-1C-BE	1NR	25	1942.5	-	1982.5
NR-1C-BE	1NR	30	1945.0	-	1980.0
NR-1C-BE	1NR	35	1947.5	-	1977.5
NR-1C-BE	1NR	40	1950.0	-	1975.0

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2.4 Test Setup

Conducted Measurement:



No.	Auxiliary Equipment	Product Number / Model Type	Version
1	PC	PowerEdge R230	-
2	DC Power Supply	N8737A	-
3	Baseband 6630	KDU 137 848/1	R2H
4	GRU 02 01	NCD 901 41/1	R1D
5	GPS Distribution Amplifier	58536A	-
6	Switch	LS-S5024E-CN	-
7	Terminator	60Z150/01020605006	-

Proper Attenuator will be chosen to use in relative test case. And the cable loss of specified Attenuator with connect cable will be calibrated before test for relative frequency range and the worst reading will be used as offset in the relative test case.

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2.5 Test environment condition:

Test items	Temperature	Humidity
Max Output Power and Peak to Average Power Ratio and EIRP	23°C	54% RH
Occupied Bandwidth		
Unwanted Emissions at Band Edge		
Conducted Unwanted Emission		
Frequency Stability	Please refer to clause 7	

2.6 Instrument list

RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030A	EC1046	2024.4.7
<input checked="" type="checkbox"/>	Humiture meter	托普	CEEC-WR16H-50W	EC1053	2024.8.28
<input checked="" type="checkbox"/>	DC Power Supply	Keysight	N8737A	US23B3304A	N/A
<input checked="" type="checkbox"/>	40dB Attenuator	Aeroflex	57-40-33	SK389	N/A
<input checked="" type="checkbox"/>	40dB Attenuator	SHX	2.92TS50	21041401	N/A
<input checked="" type="checkbox"/>	Network Analyzer	Keysight	E5071C	MY46631193	2023.10.17
<input checked="" type="checkbox"/>	Network Analyzer	R&S	ZNA43	100948	2024.3.15
<input checked="" type="checkbox"/>	Climatic Chamber	赛宝	117	EC1052	2024.9.19

2.7 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Maximum output power	0.73dB
Occupied Bandwidth	0.88%
Unwanted Emissions at Band Edge	3.03dB
Conducted Unwanted Emission	3.03dB
Frequency stability	0.77 x 10 ⁻⁷

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3 Maximum Output Power and Peak to Average Power Ratio and EIRP

Test result: Pass

3.1 Limit

Output Power: Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotopically radiated power (EIRP) with an antenna height up to 300 meters HAAT
Peak to Average Ratio: ≤ 13 dB

3.2 Measurement Procedure

The EUT was configured to transmit on maximum power and proper modulation. The transmitter power shall be measured in terms of a root-mean-square (RMS) average value. In case of the EUT was configured to MIMO mode, since the EUT transmits on all antennas simultaneously in the same frequency range, using the Measure-and-Sum approach, the output power at all antennas were tested, and the total output power were then summed mathematically in linear power units according to FCC KDB 662911 D01.

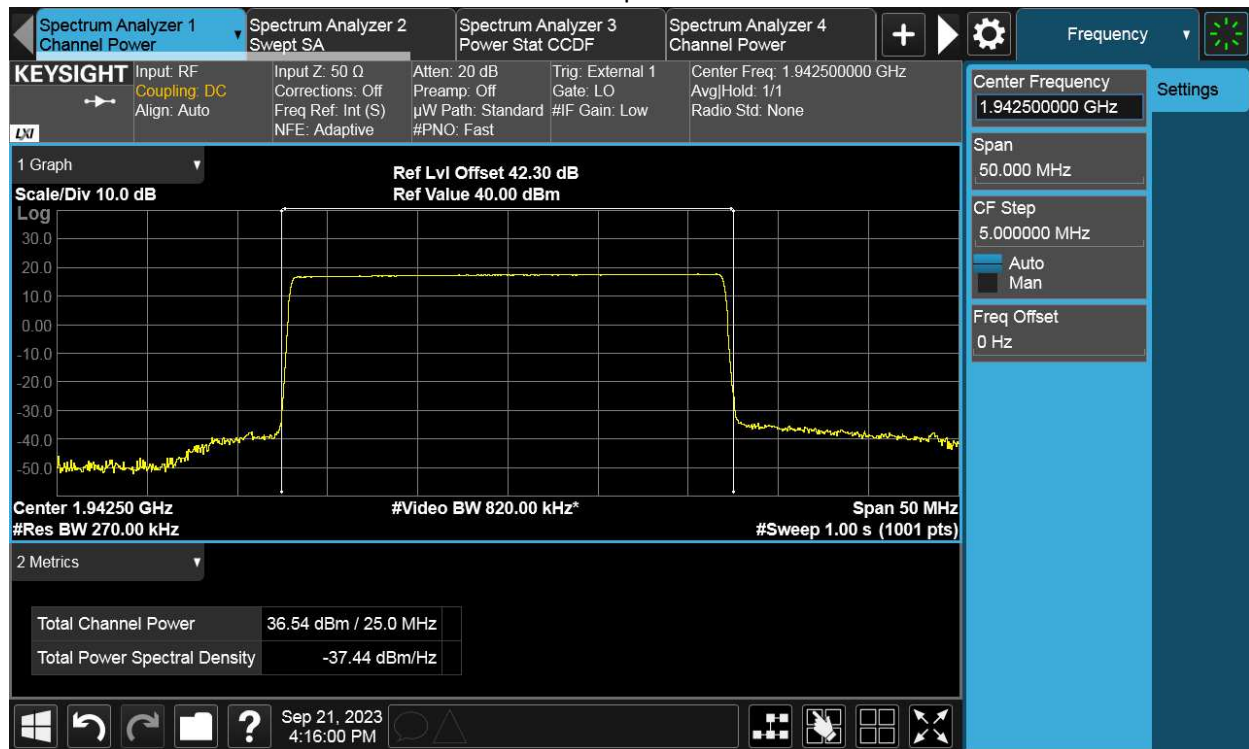
A peak to average ratio measurement is performed at the conducted ports of the EUT for single carrier for single RAT mode. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) was used and 0.1% probability value recorded.

3.3 Measurement result

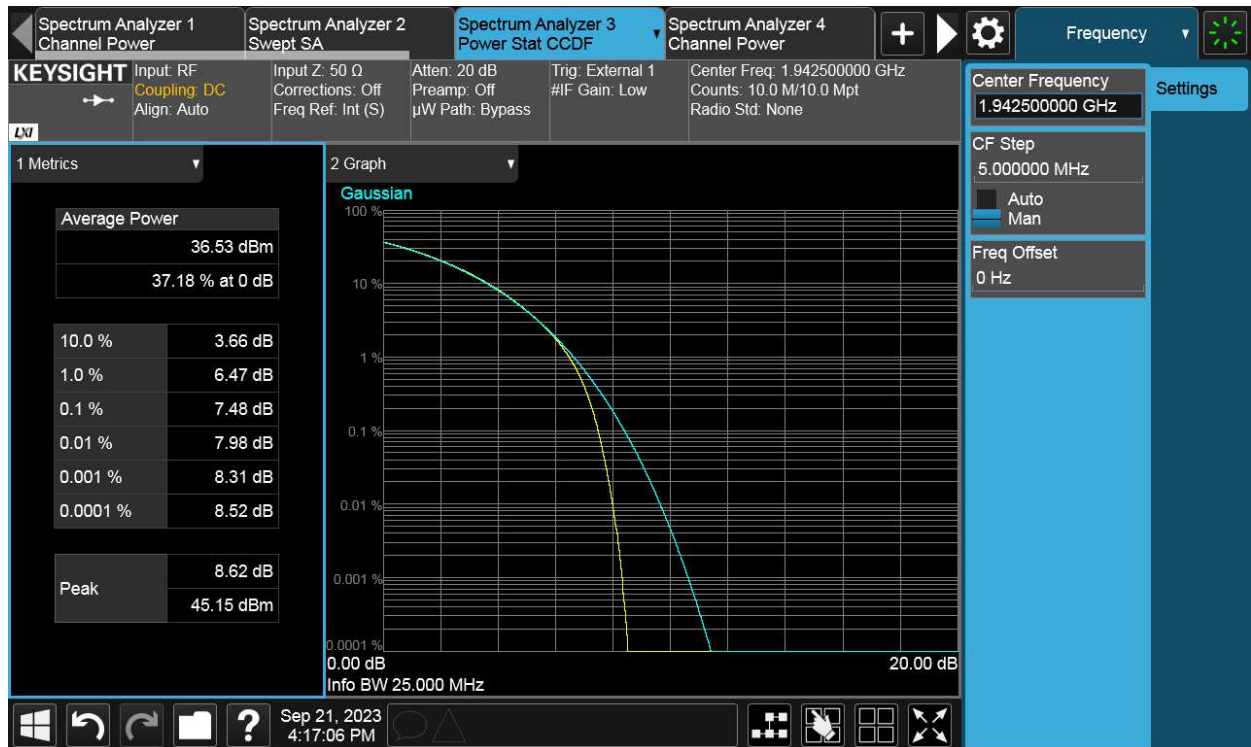
NR-1C

Antenna Port	NR Modulation	NR Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	QPSK	25	36.54	23.34	7.48	36.65	23.34	7.22	36.65	23.25	7.28
B	QPSK	25	36.55	23.41	7.53	36.67	23.30	7.23	36.67	23.25	7.28
Total conducted power			39.56	26.39	-	39.67	26.33	-	39.67	26.26	-
EIRP limit			-	62.15	13.00	-	62.15	13.00	-	62.15	13.00
Max antenna gain			-	35.76	-	-	35.82	-	-	35.89	-

Channel position B



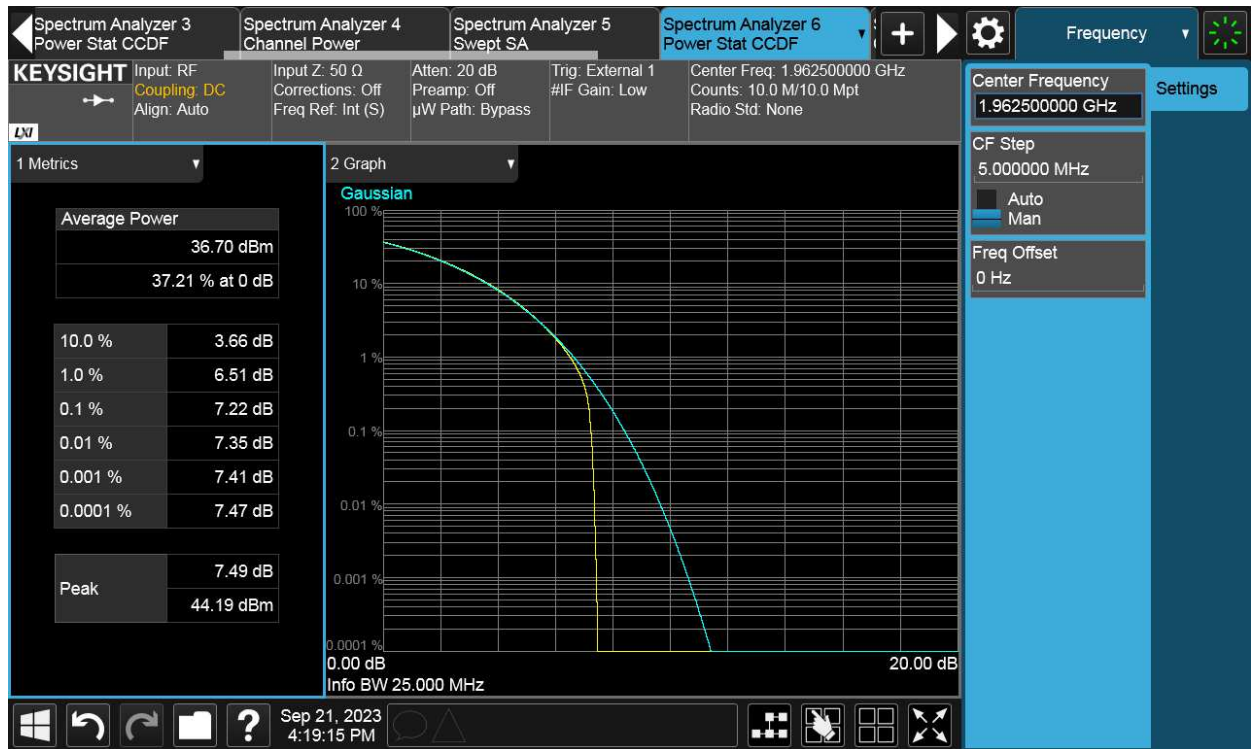
TEST REPORT



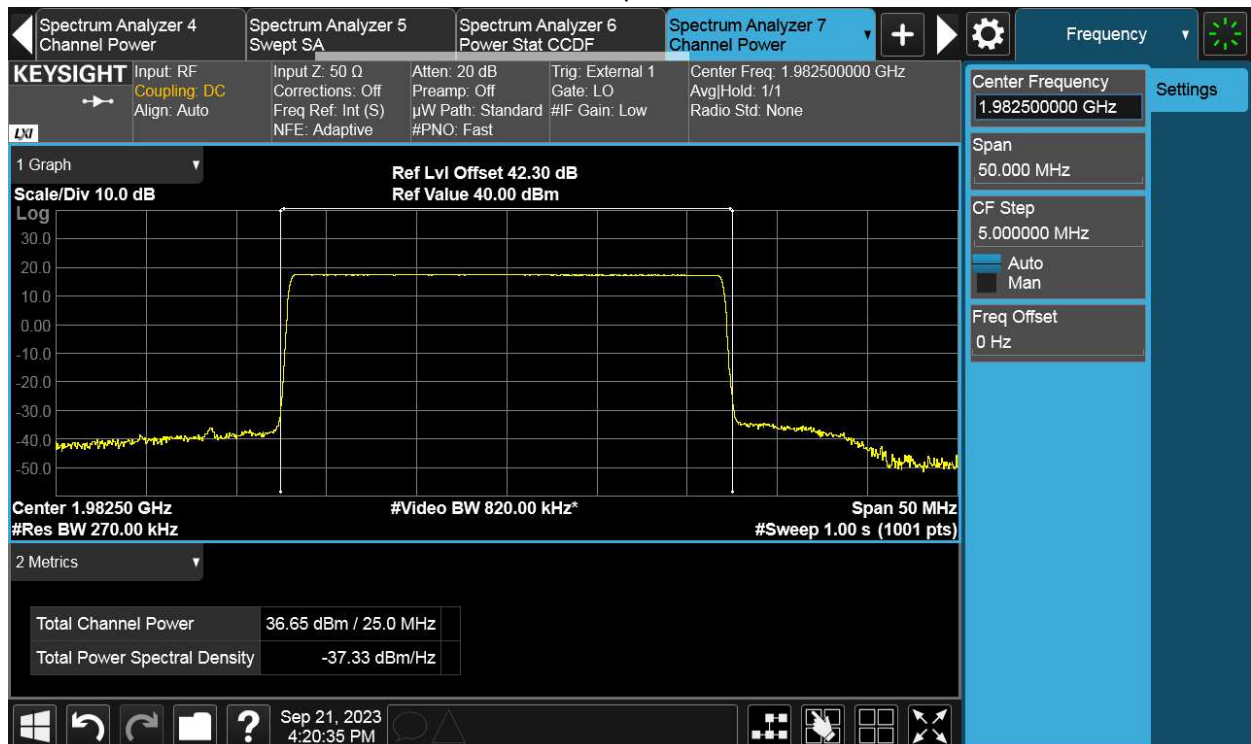
Channel position M



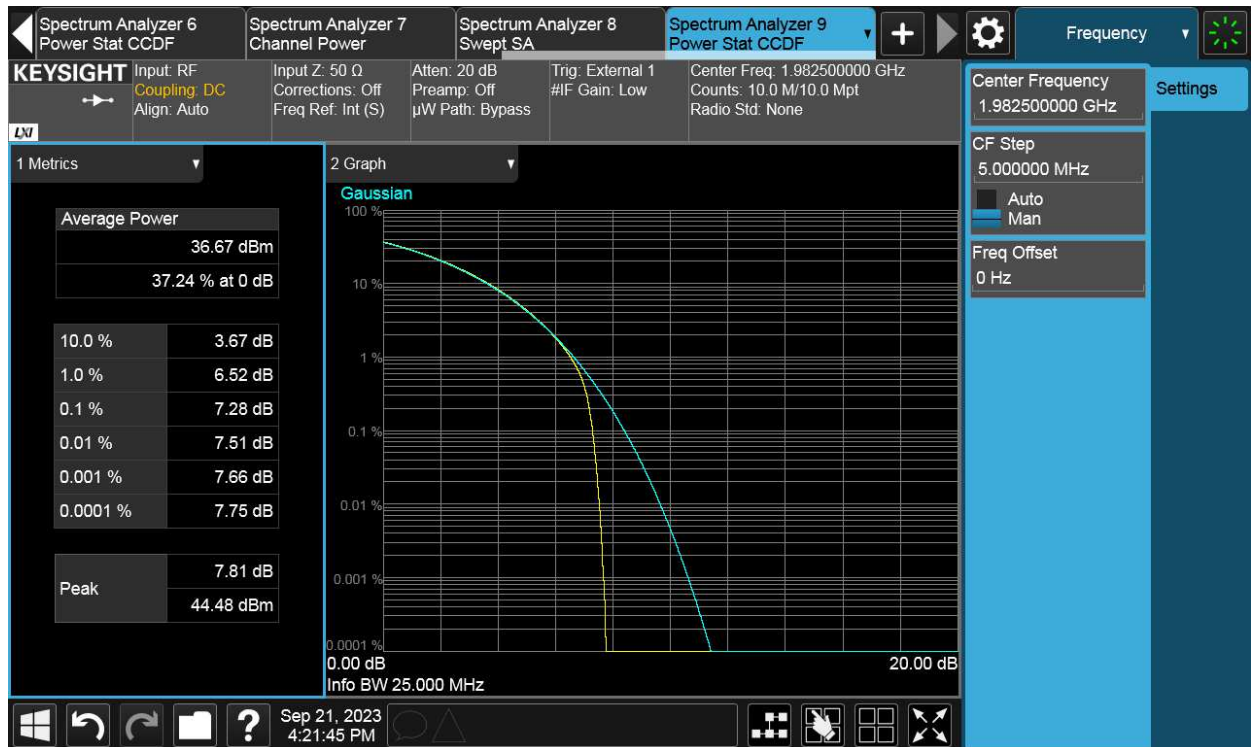
TEST REPORT



Channel position T



TEST REPORT

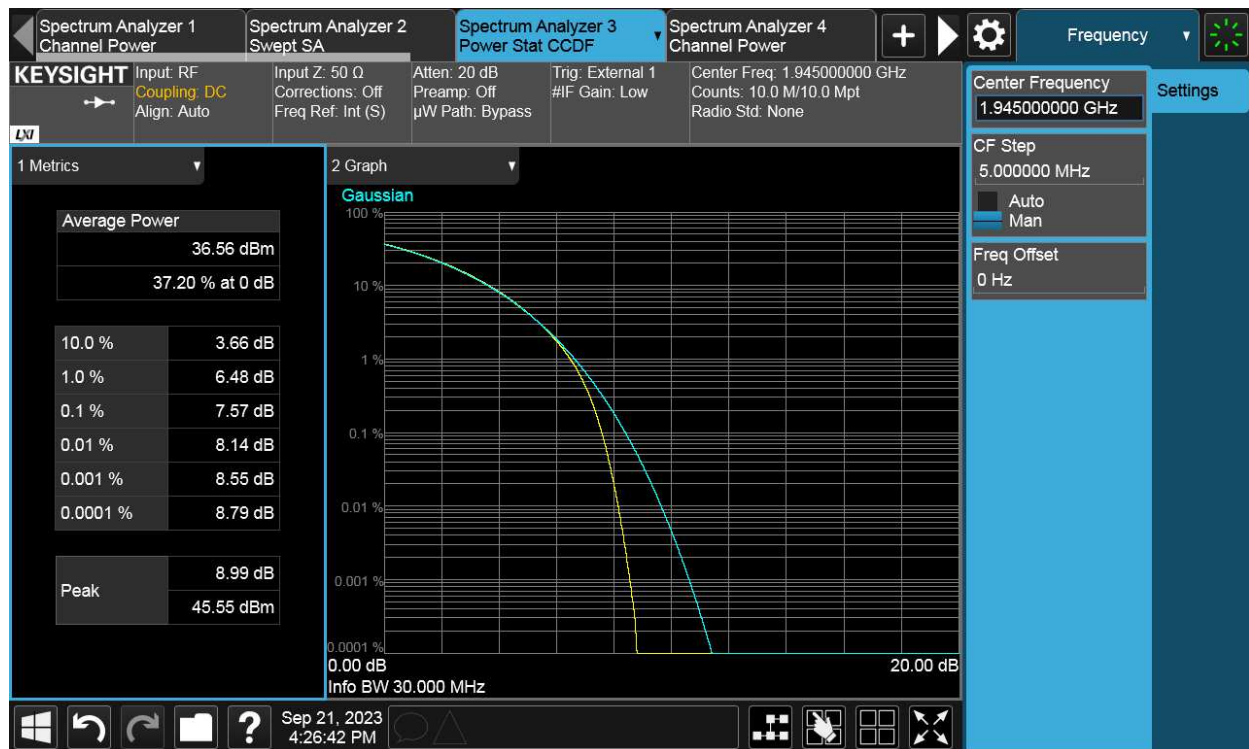


Antenna Port	NR Modulation	NR Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	QPSK	30	36.59	22.61	7.57	36.75	22.58	7.26	36.71	22.50	7.30
B	QPSK	30	36.50	22.55	7.62	36.58	22.37	7.25	36.60	22.39	7.29
Total conducted power			39.56	25.59	-	39.68	25.49	-	39.67	25.46	-
EIRP limit			-	62.15	13.00	-	62.15	13.00	-	62.15	13.00
Max antenna gain			-	36.56	-	-	36.66	-	-	36.69	-

Channel position B



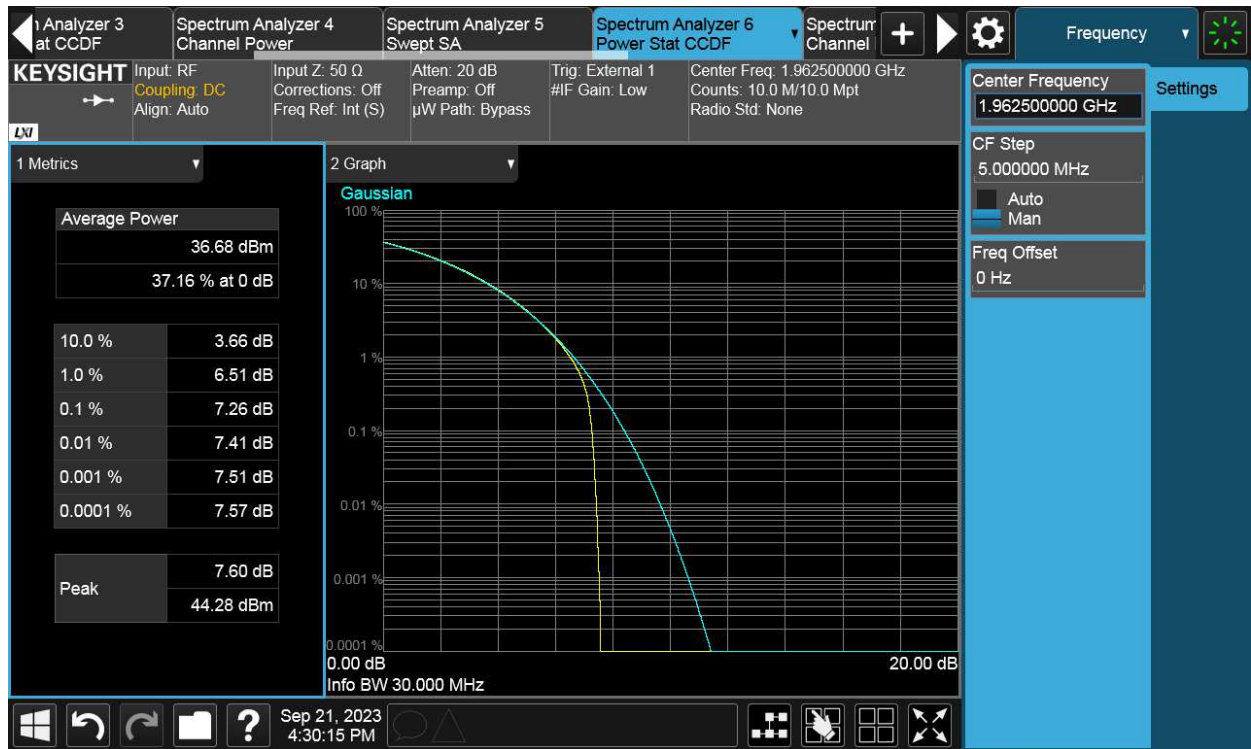
TEST REPORT



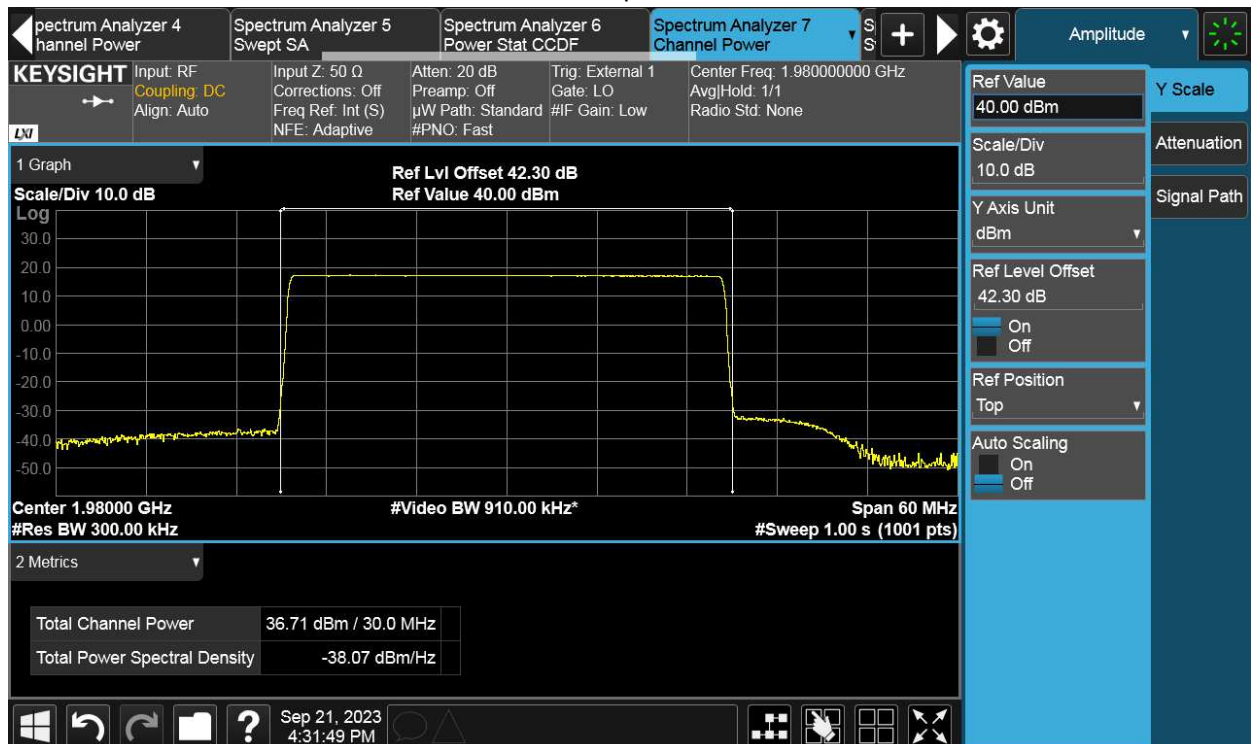
Channel position M



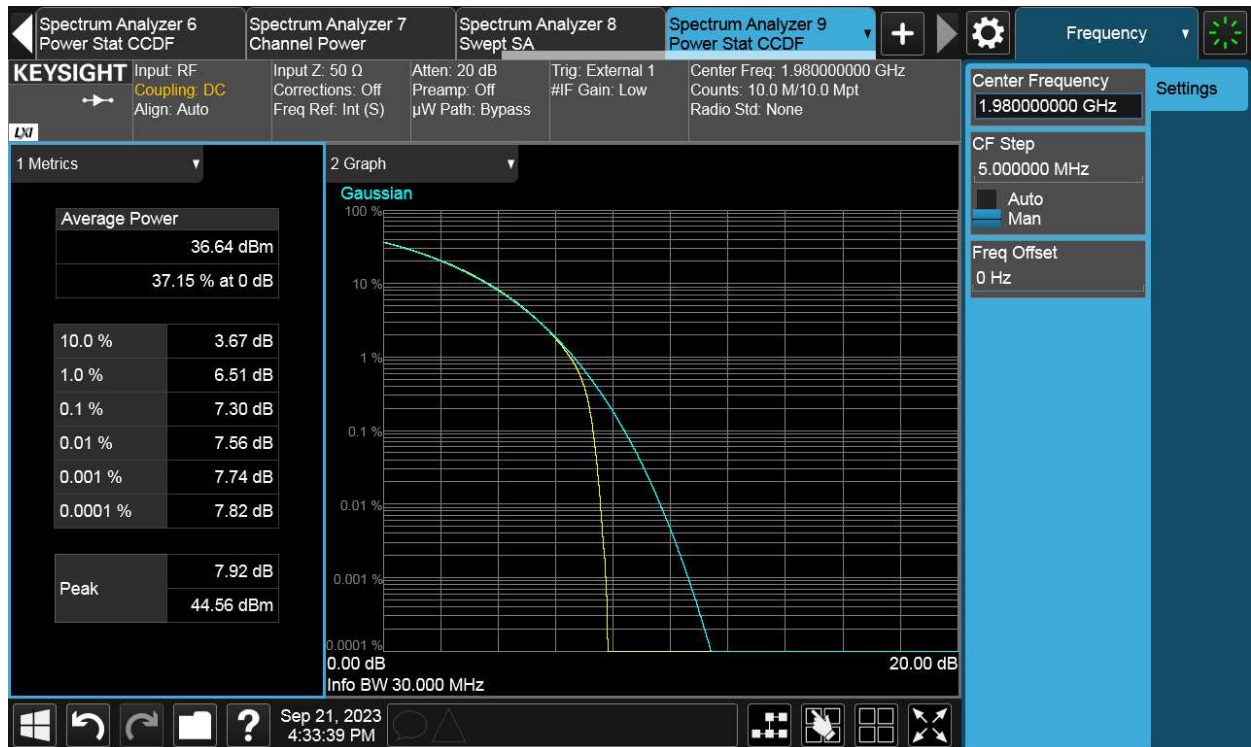
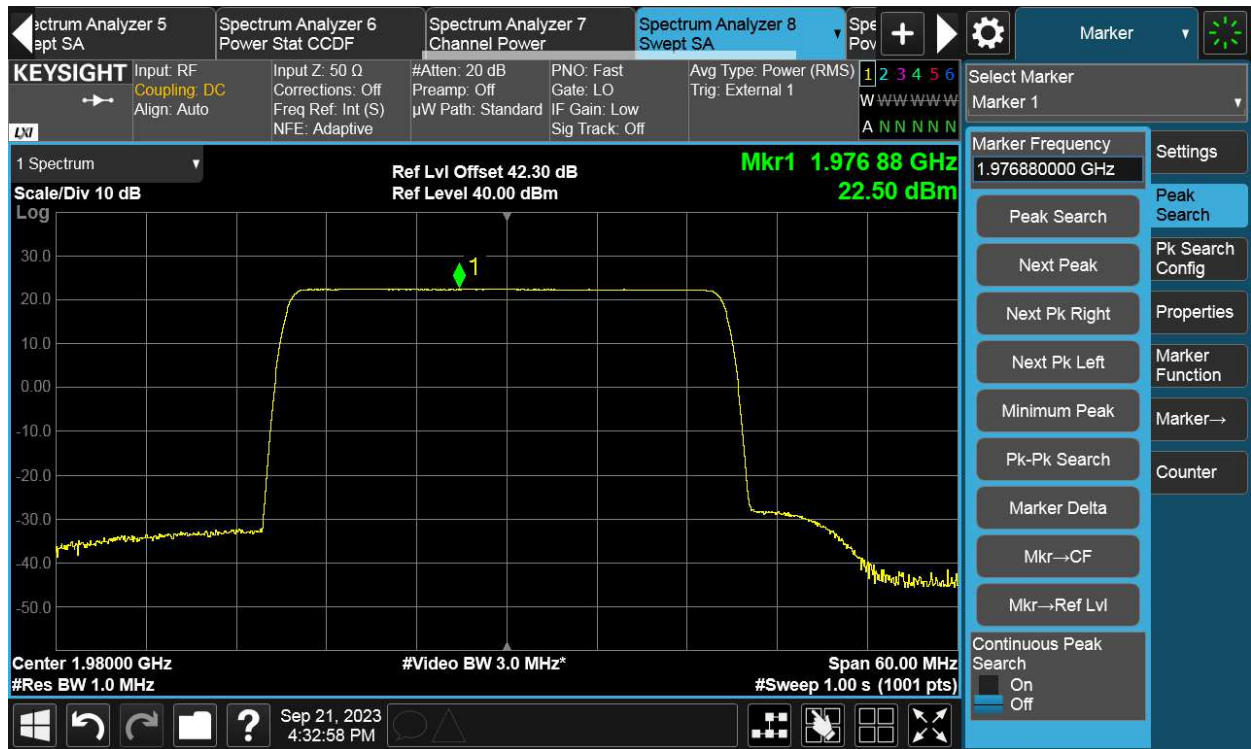
TEST REPORT



Channel position T

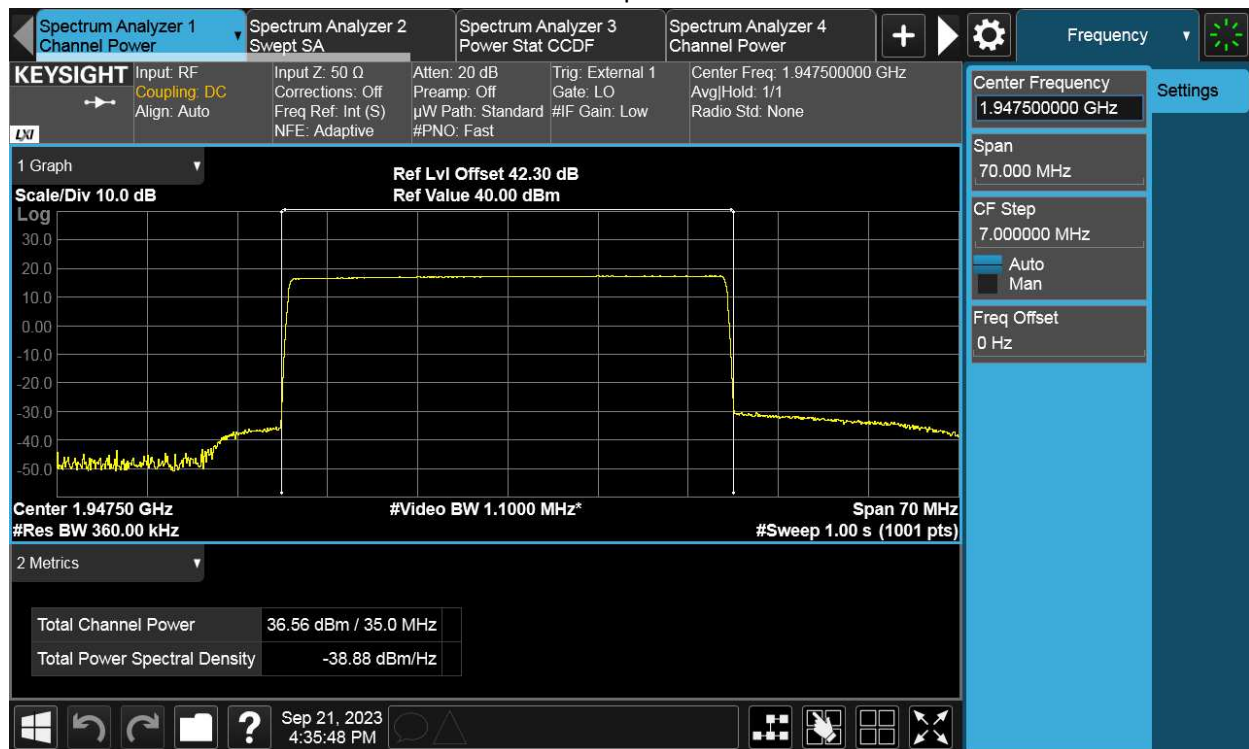


TEST REPORT

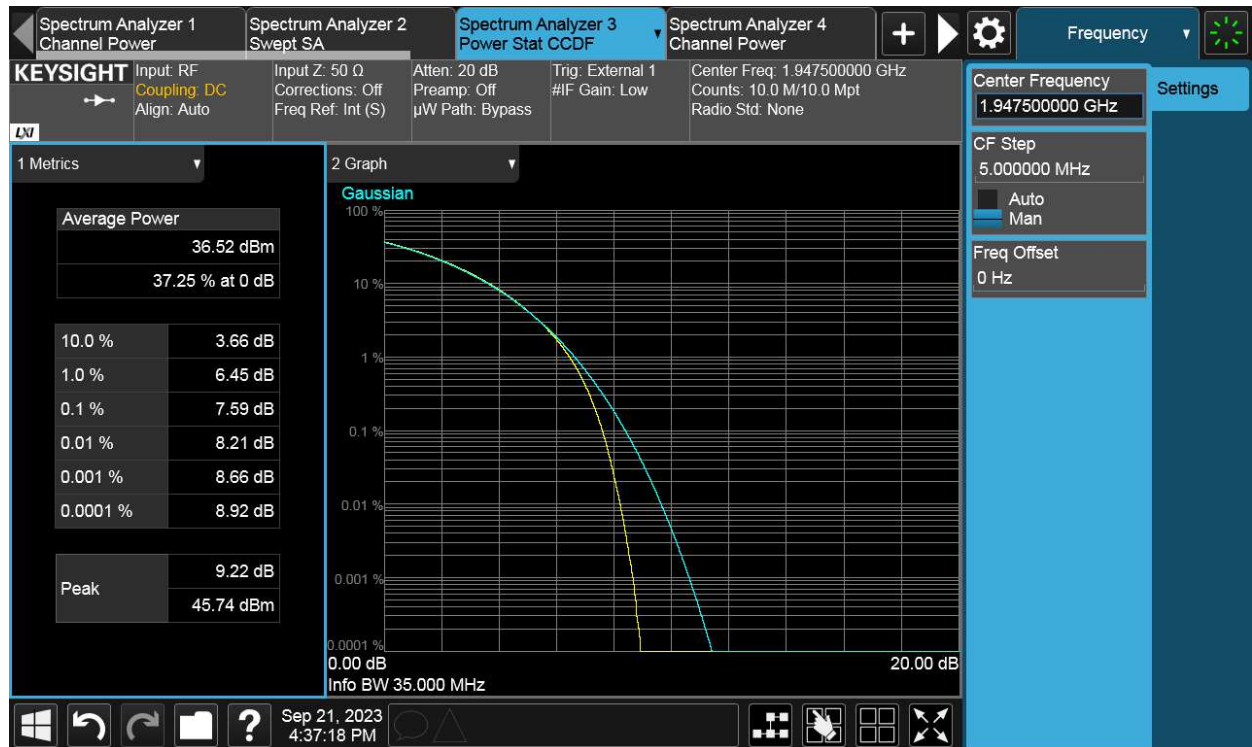


Antenna Port	NR Modulation	NR Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	QPSK	35	36.56	21.81	7.59	36.67	21.79	7.24	36.66	21.80	7.29
B	QPSK	35	36.57	21.85	7.61	36.57	21.70	7.24	36.60	21.73	7.27
Total conducted power			39.58	24.84	-	39.63	24.76	-	39.64	24.78	-
EIRP limit			-	62.15	13.00	-	62.15	13.00	-	62.15	13.00
Max antenna gain			-	37.31	-	-	37.39	-	-	37.37	-

Channel position B



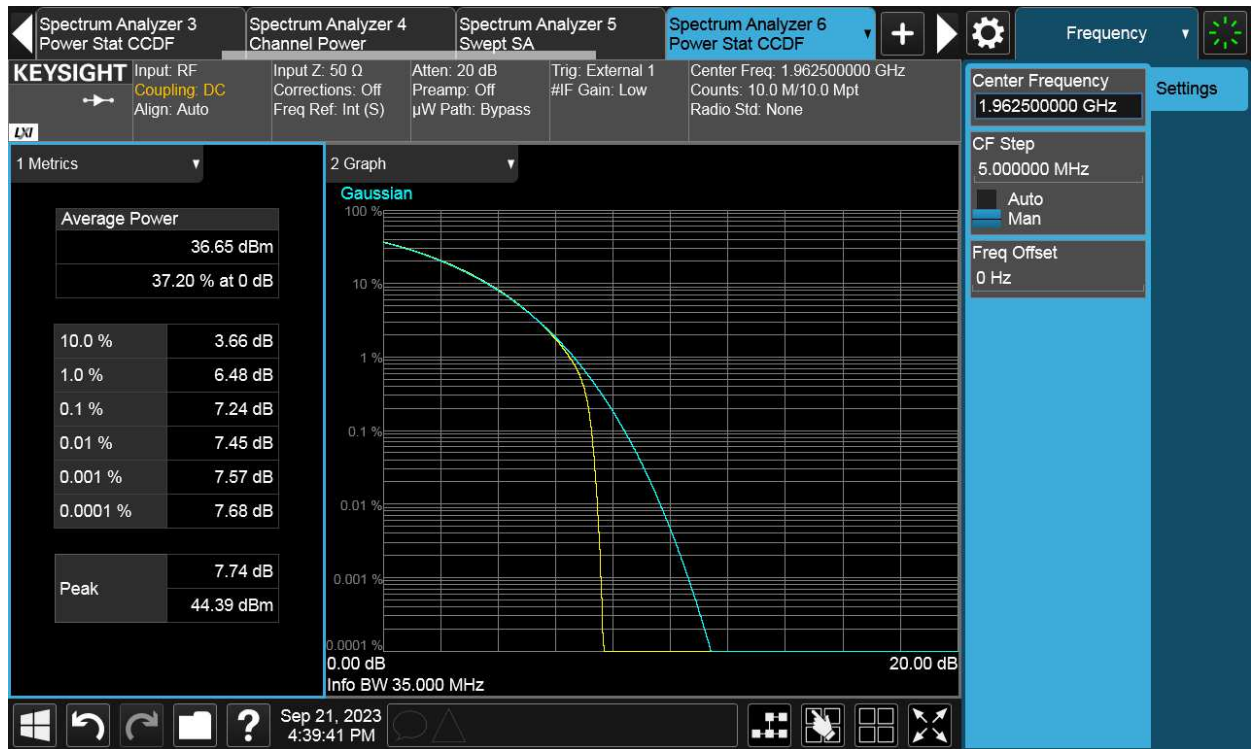
TEST REPORT



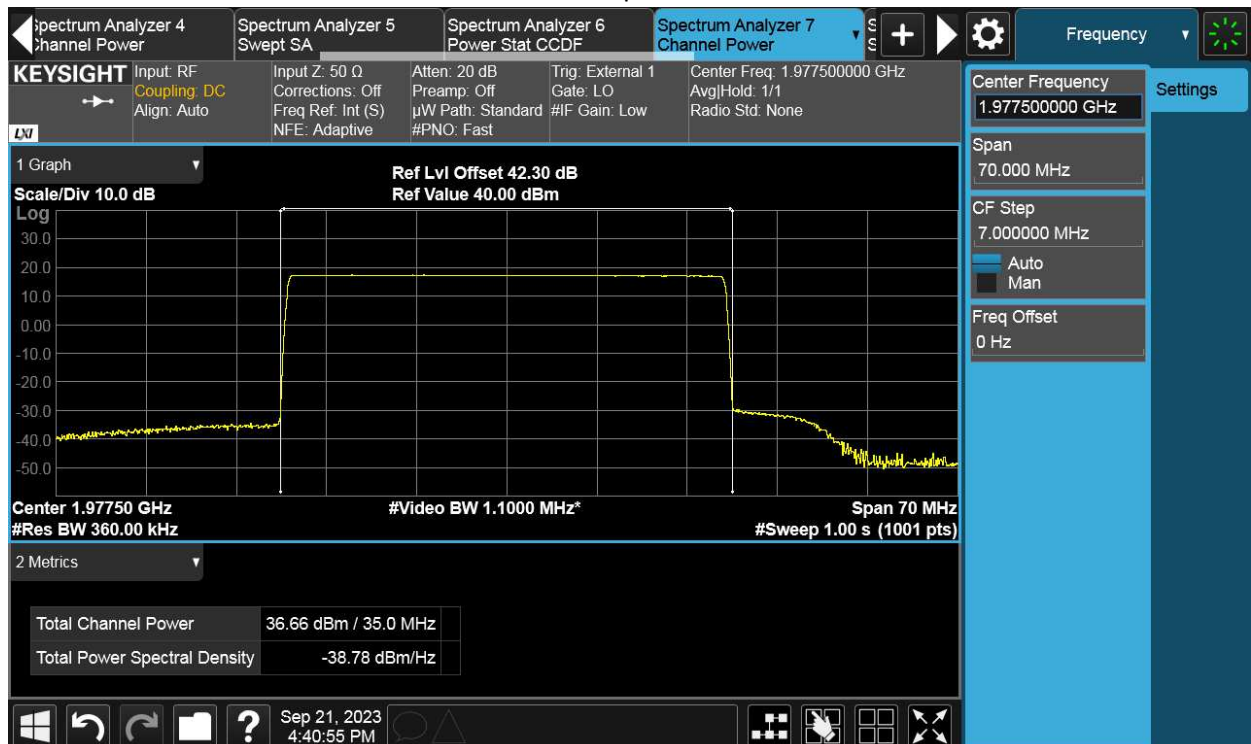
Channel position M



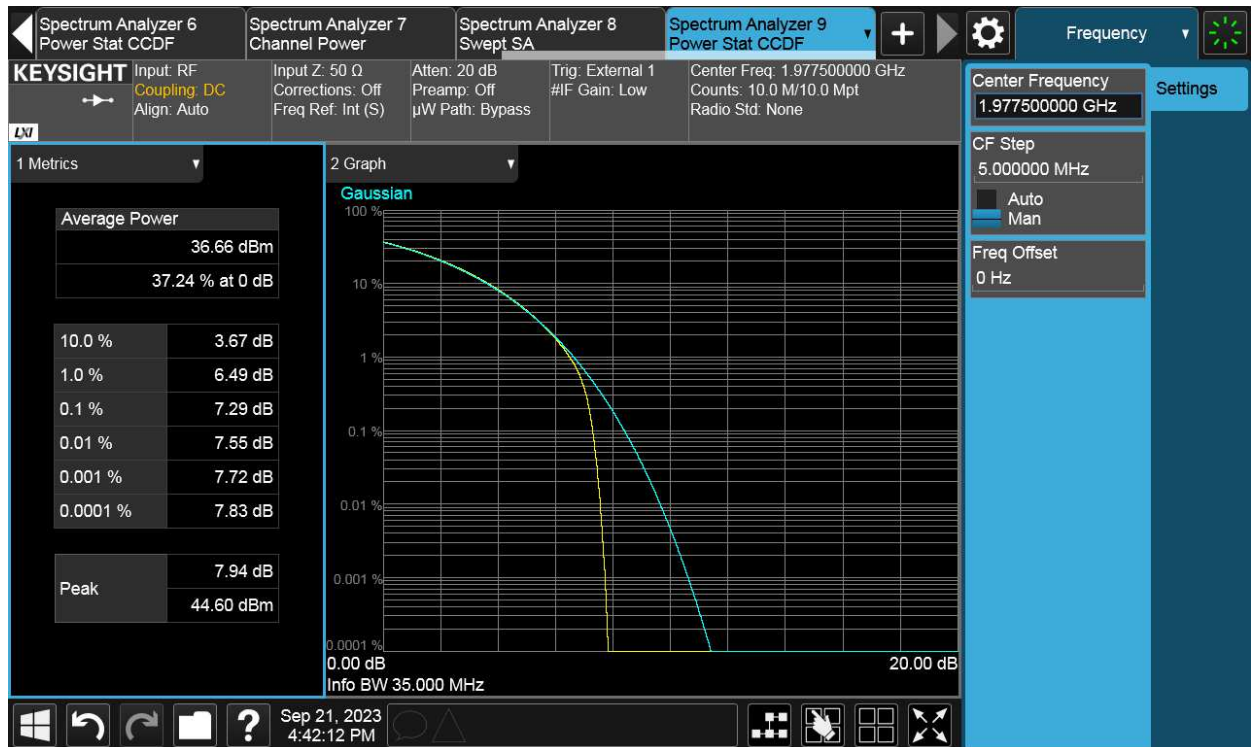
TEST REPORT



Channel position T

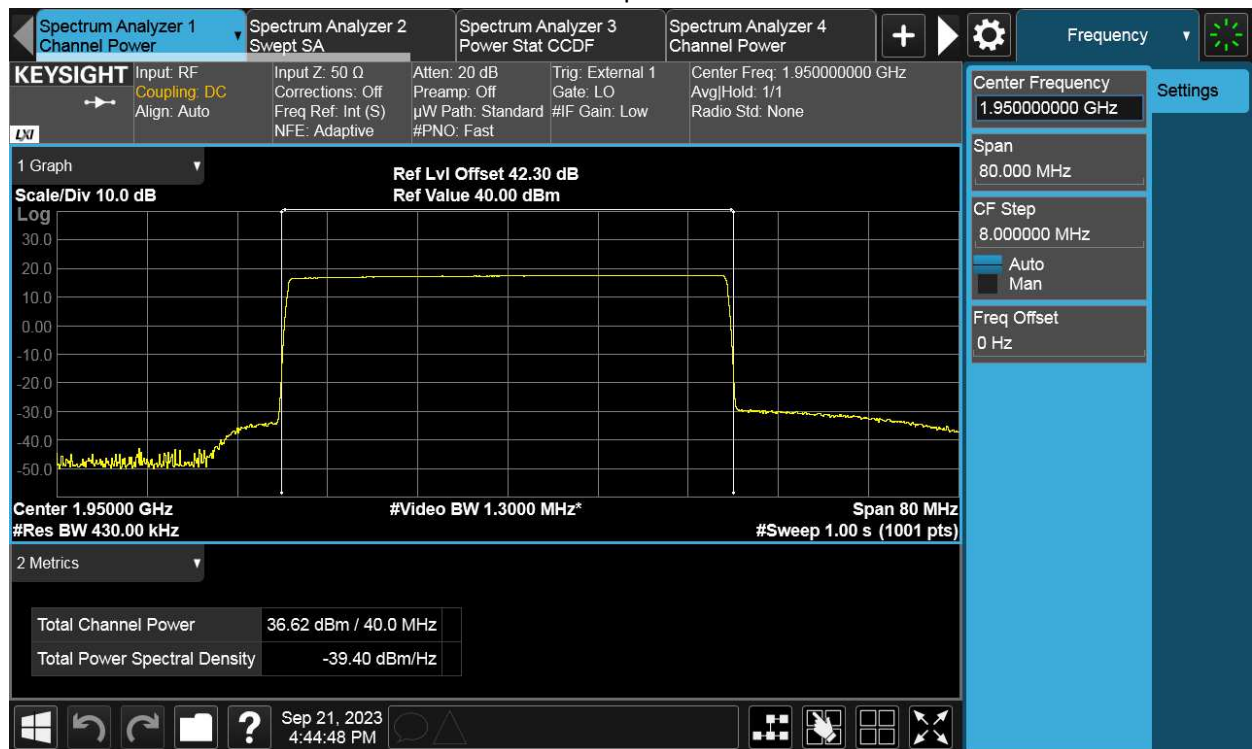


TEST REPORT

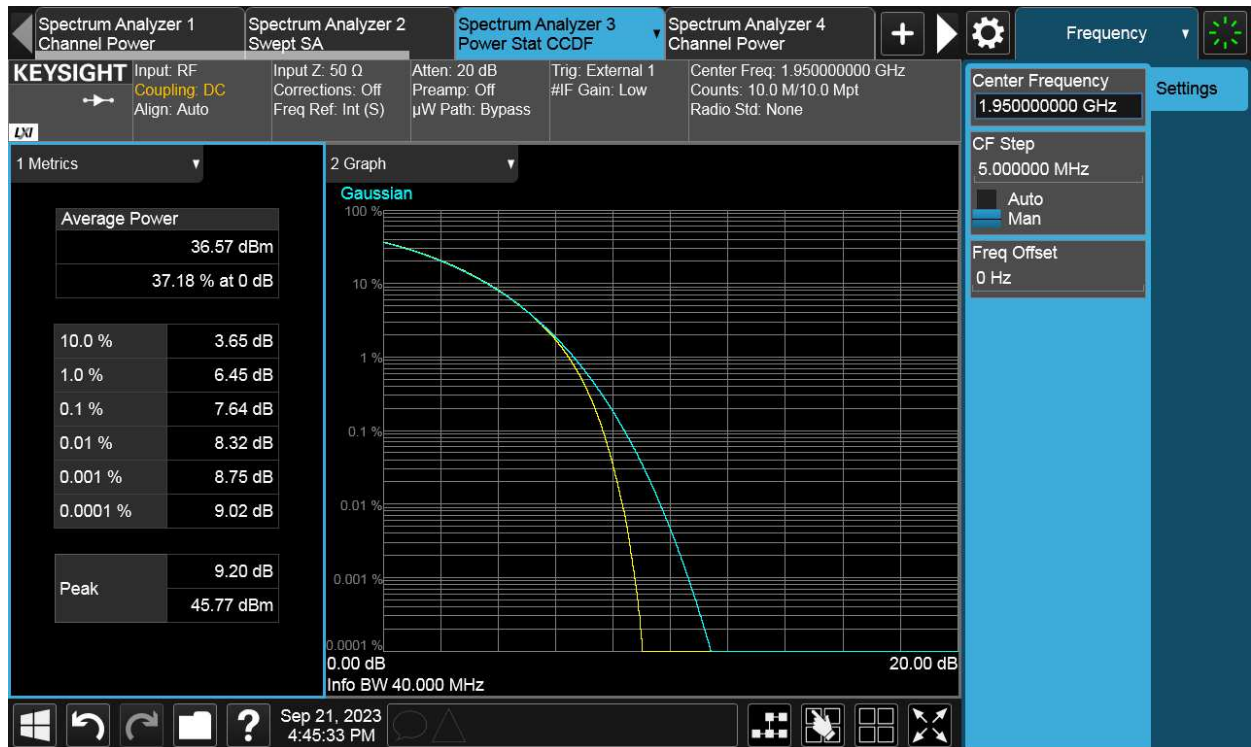


Antenna Port	NR Modulation	NR Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	QPSK	40	36.62	21.25	7.64	36.74	21.28	7.28	36.72	21.24	7.28
B	QPSK	40	36.56	21.28	7.67	36.62	21.26	7.29	36.60	21.11	7.28
Total conducted power			39.60	24.28	-	39.69	24.28	-	39.67	24.19	-
EIRP limit			-	62.15	13.00	-	62.15	13.00	-	62.15	13.00
Max antenna gain			-	37.87	-	-	37.87	-	-	37.96	-

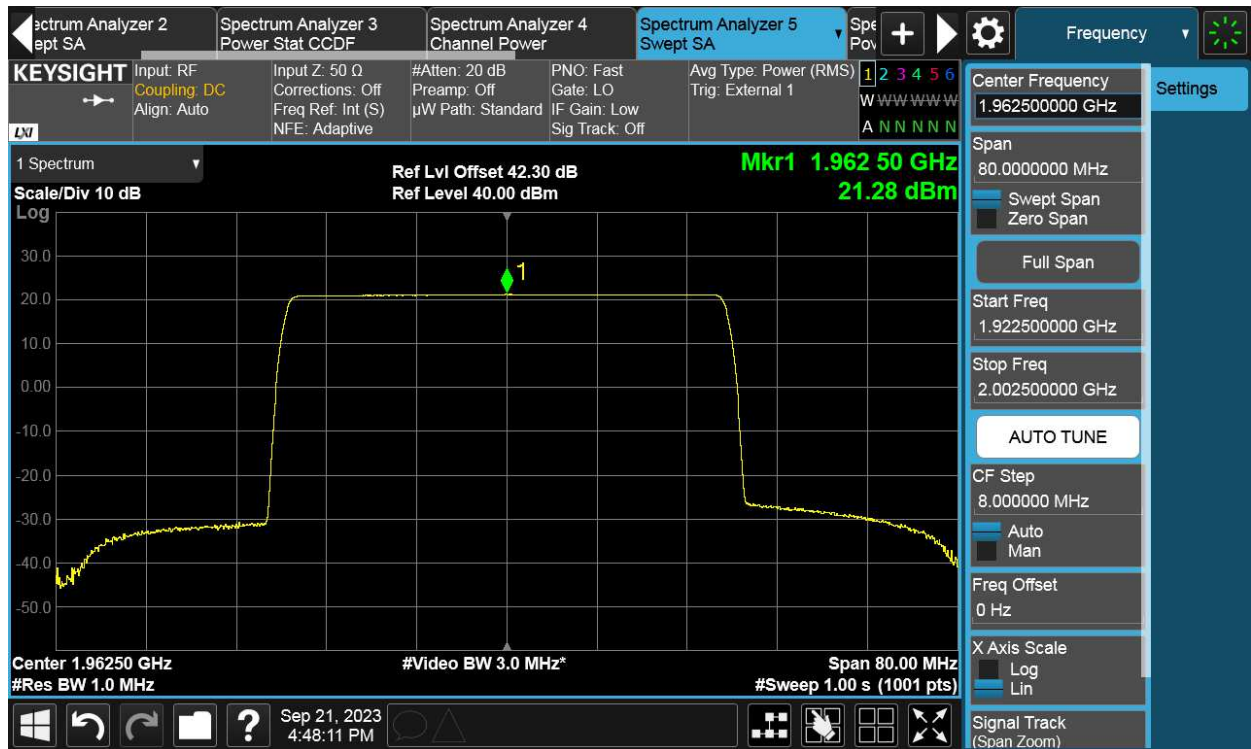
Channel position B



TEST REPORT



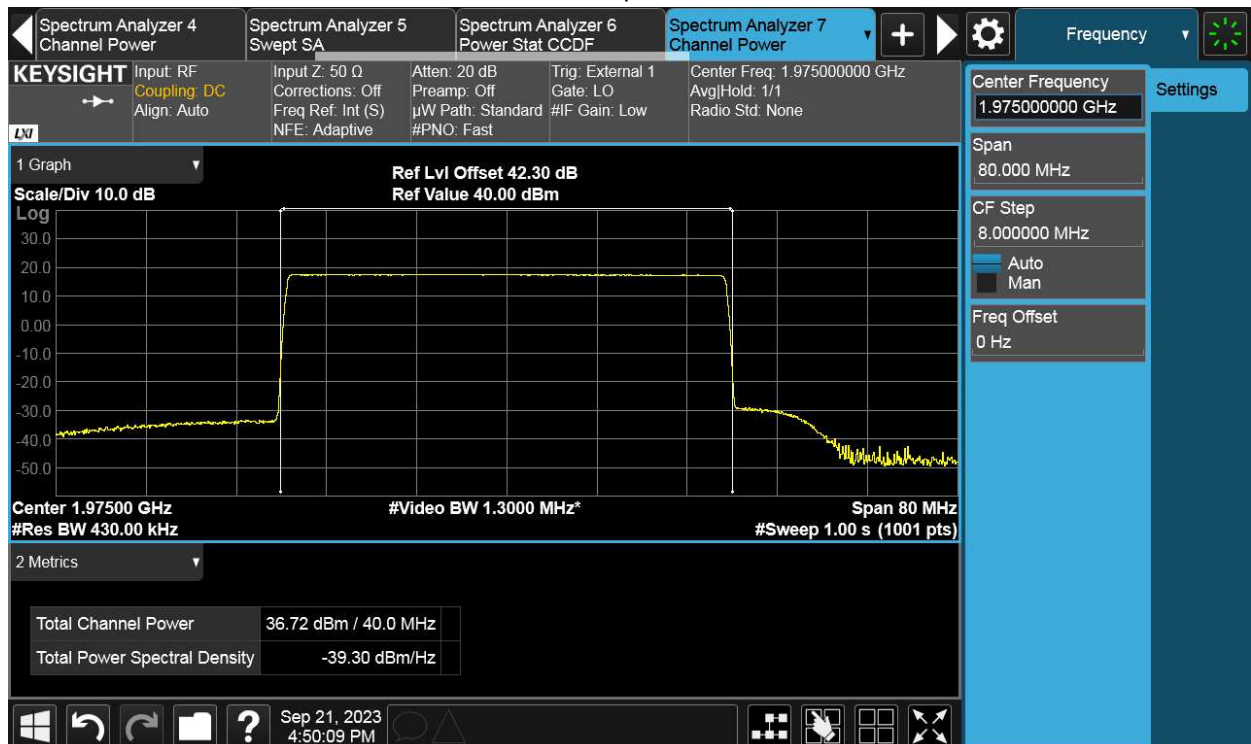
Channel position M



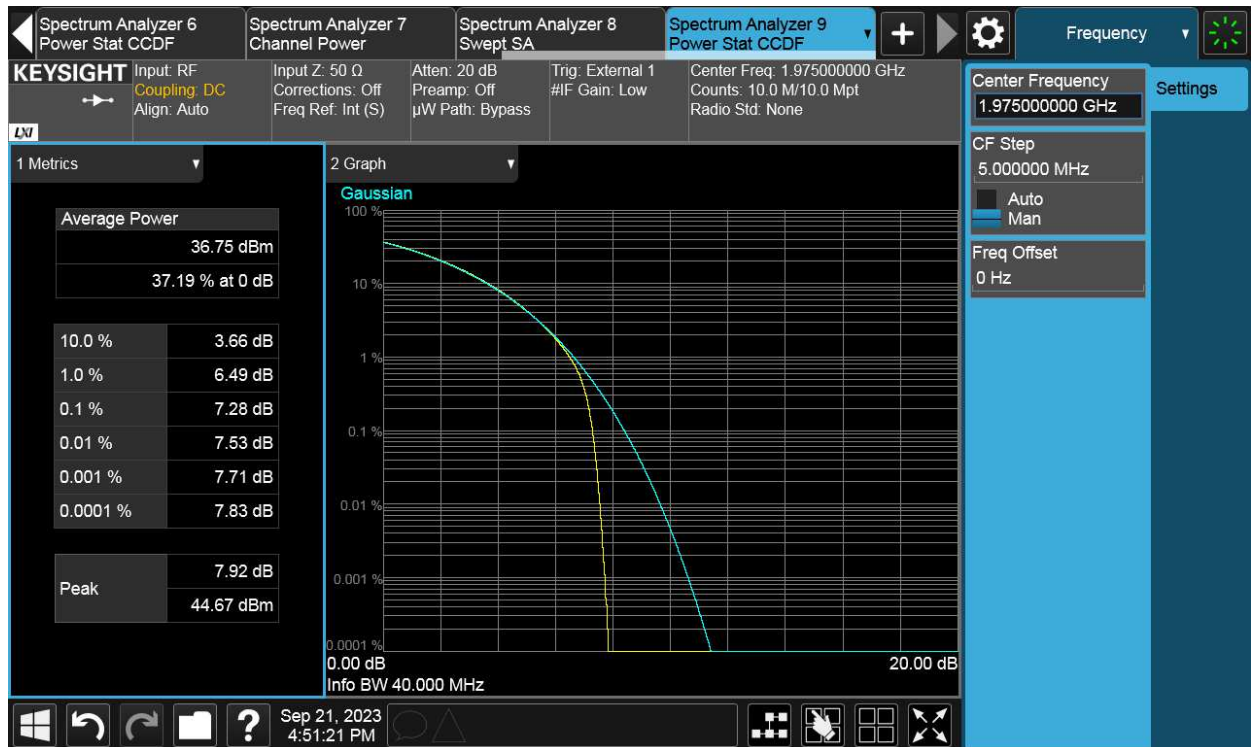
TEST REPORT



Channel position T



TEST REPORT



TEST REPORT**4 Occupied Bandwidth****Test result: Pass****4.1 Measurement Procedure**

The EUT was set to transmit at maximum power and testing was carried out on bottom, middle and top channels. Using the Occupied Bandwidth measurement function in the spectrum analyzer, the 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Clause 4.2.

The measurement method is from KDB 971168 4.2:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

TEST REPORT

4.2 Measurement result

NR-1C

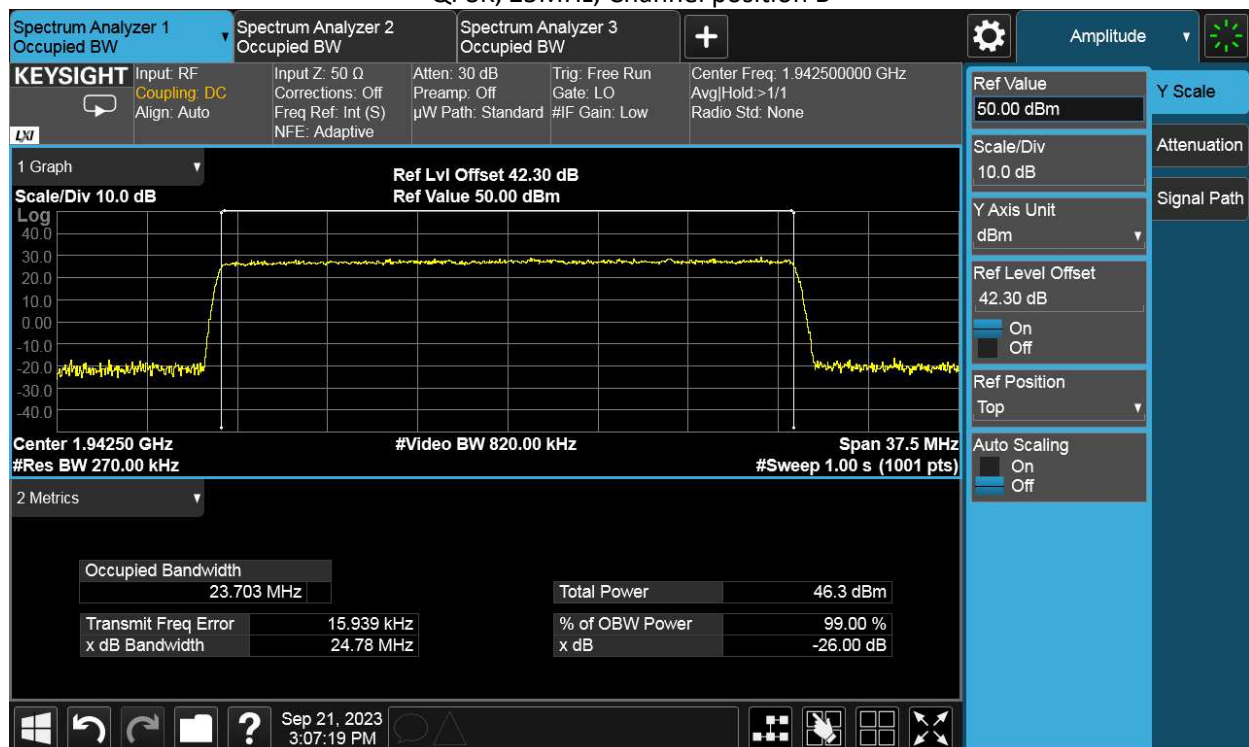
99% Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
A	QPSK	25MHz	23.703	23.716	23.712
A	QPSK	30MHz	28.517	28.534	28.522
A	QPSK	35MHz	33.497	33.511	33.506
A	QPSK	40MHz	38.498	38.514	38.544

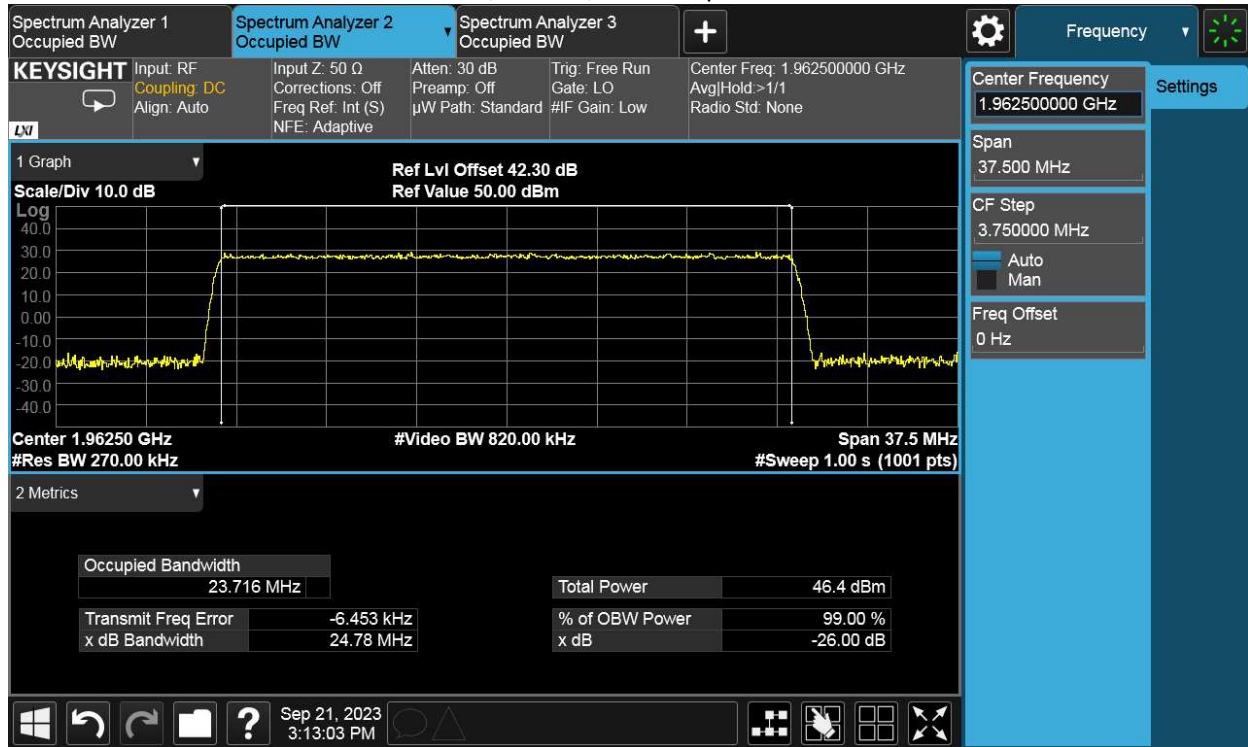
-26dBc Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
A	QPSK	25MHz	24.78	24.78	24.82
A	QPSK	30MHz	29.80	29.84	29.86
A	QPSK	35MHz	34.69	34.70	34.71
A	QPSK	40MHz	40.05	40.05	40.06

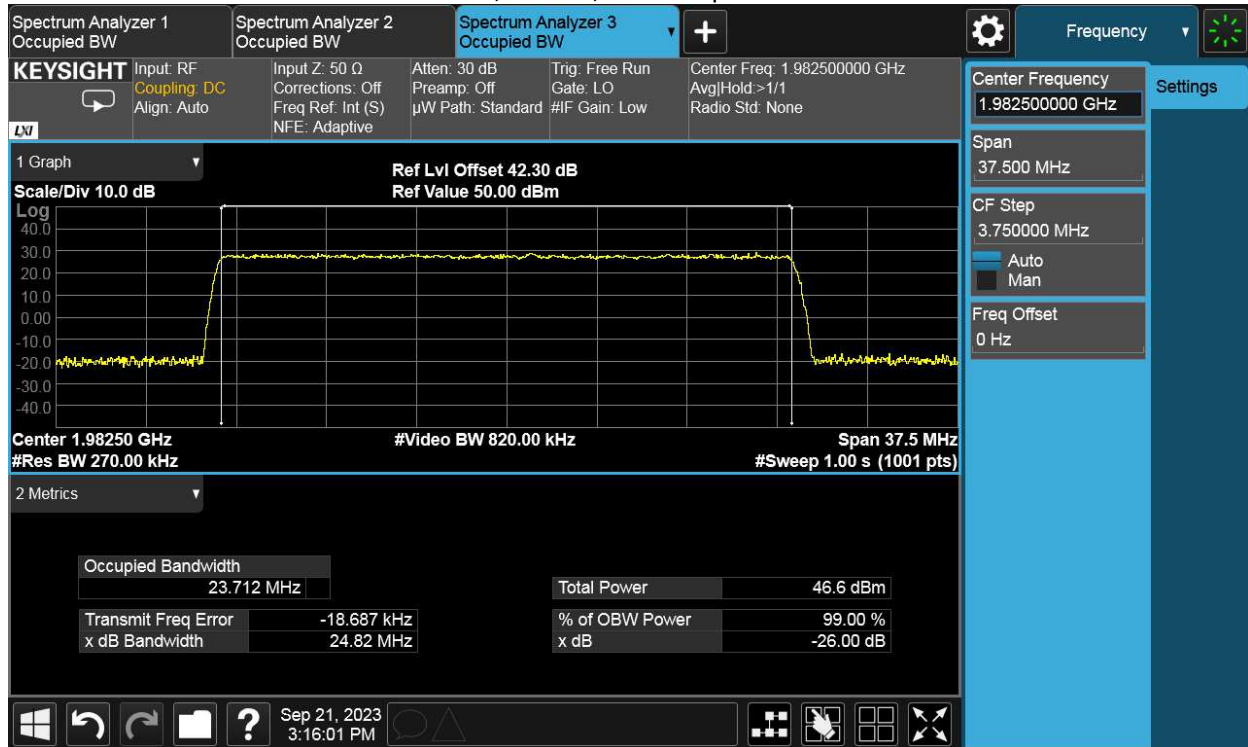
QPSK, 25MHz, Channel position B



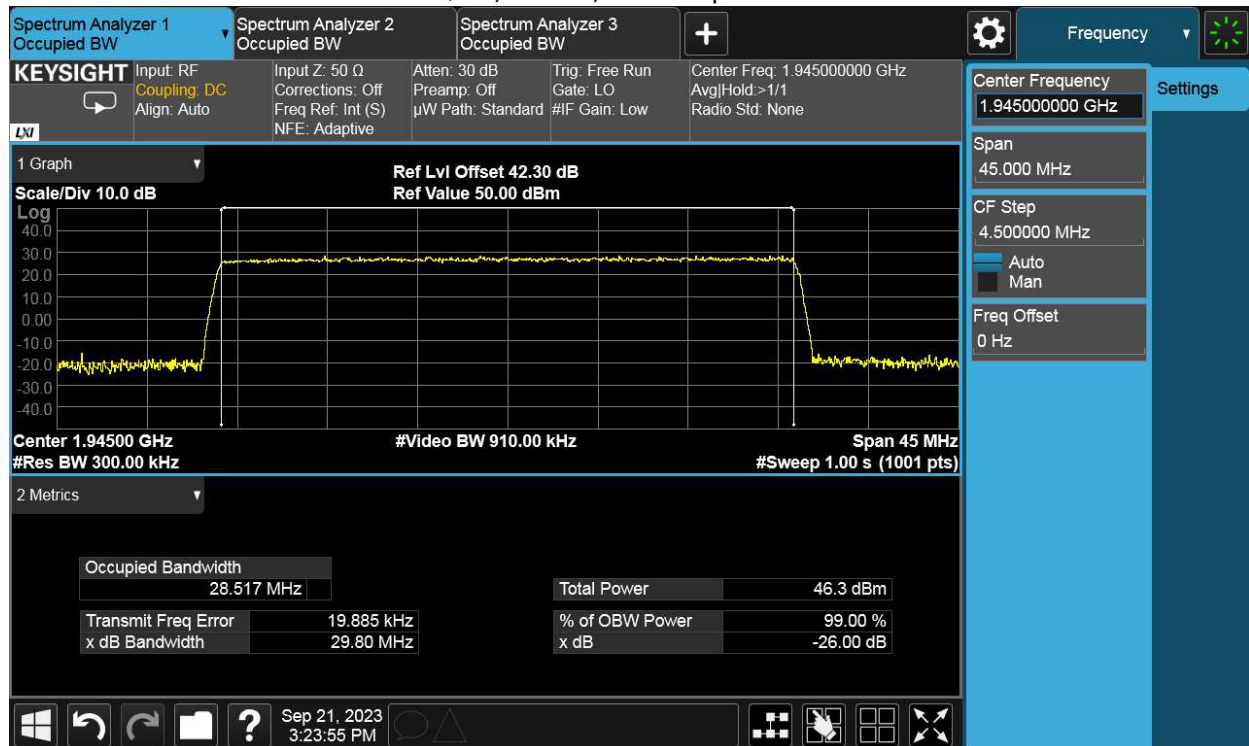
QPSK, 25MHz, Channel position M



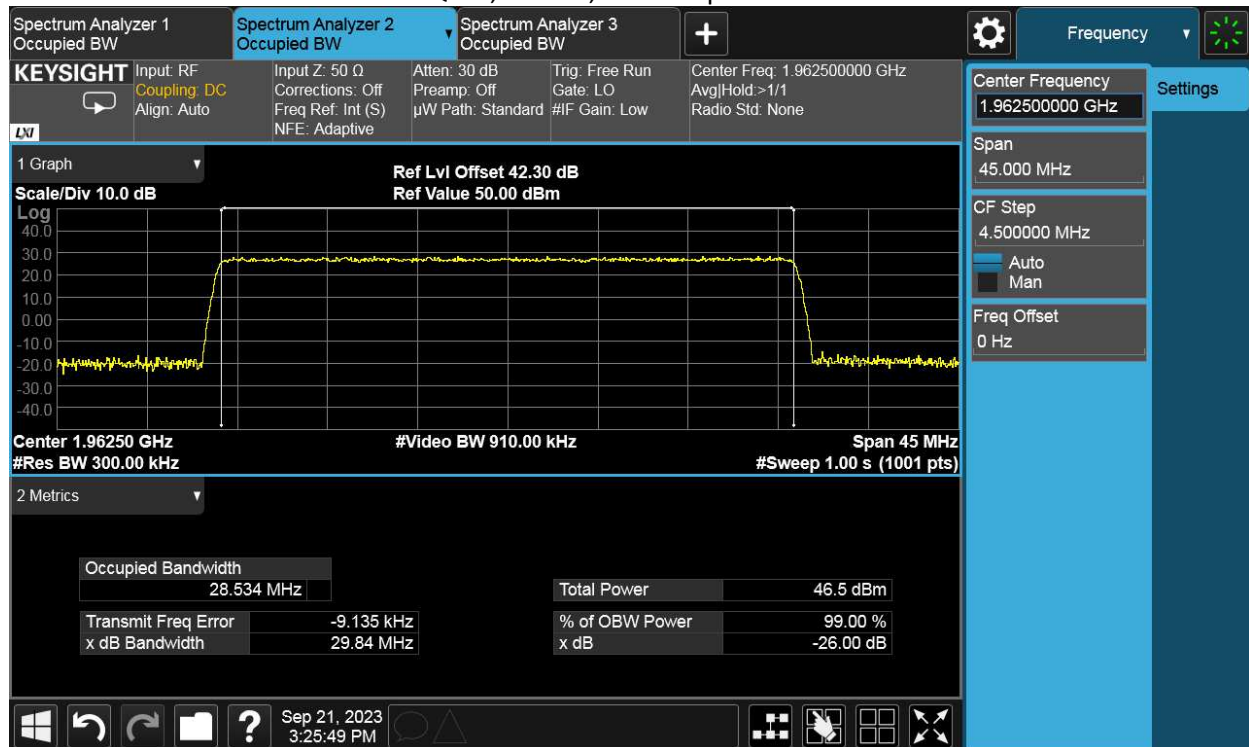
QPSK, 25MHz, Channel position T



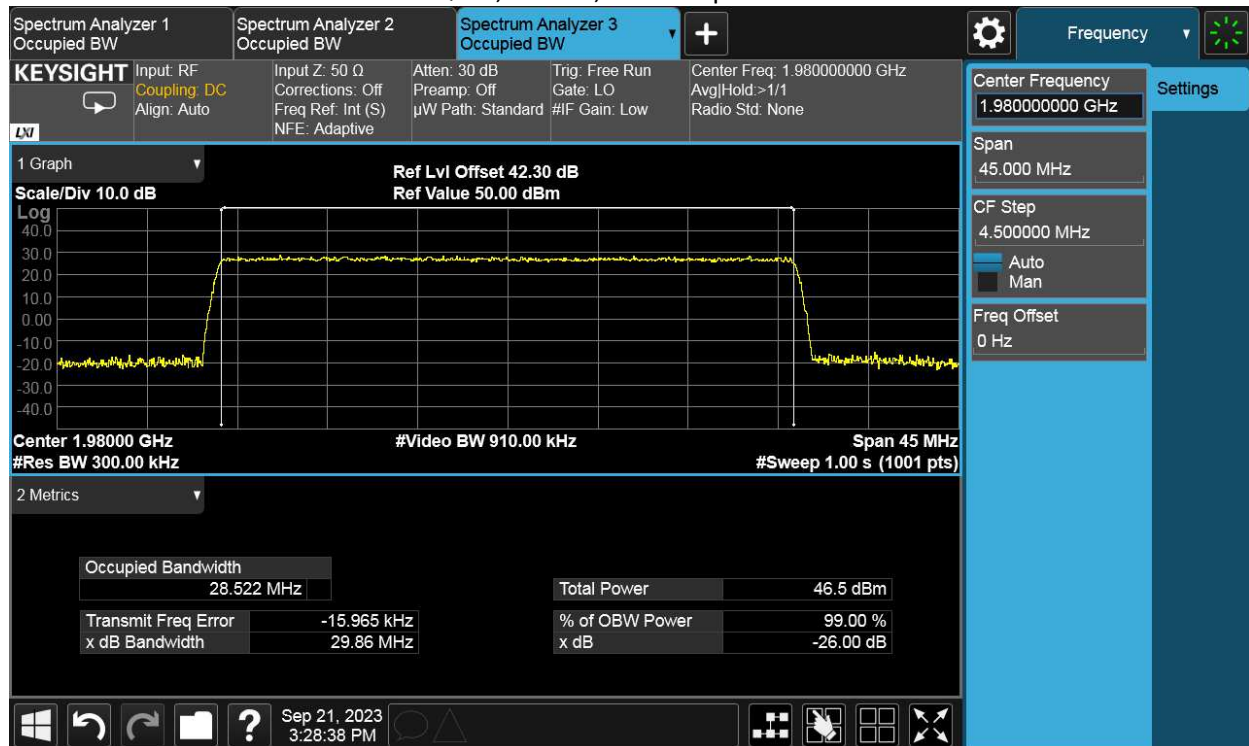
QPSK, 30MHz, Channel position B



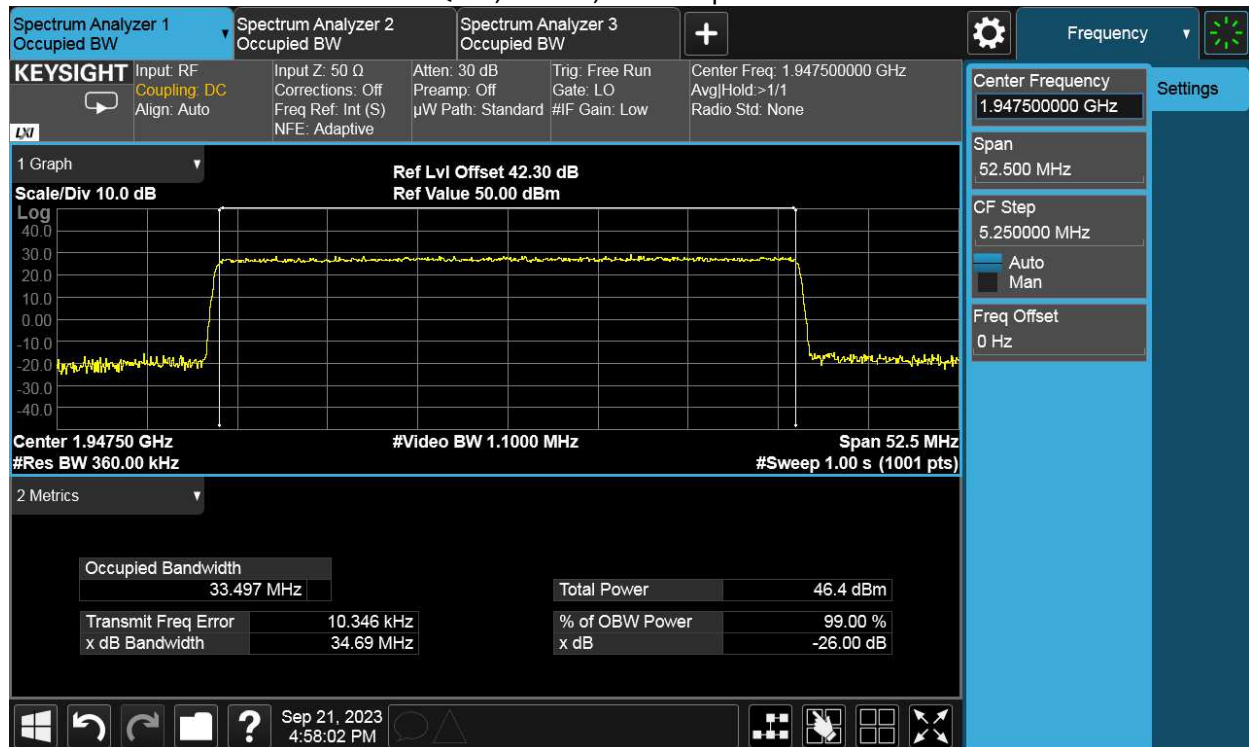
QPSK, 30MHz, Channel position M



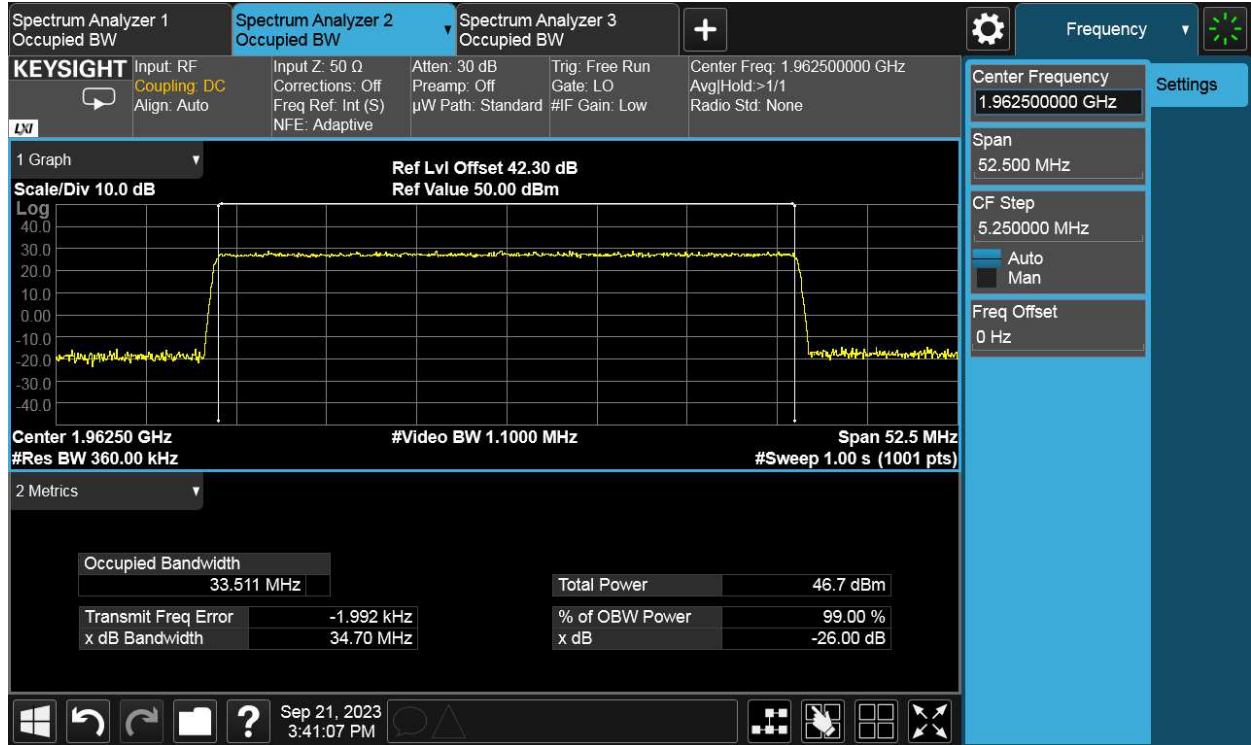
QPSK, 30MHz, Channel position T



QPSK, 35MHz, Channel position B



QPSK, 35MHz, Channel position M



QPSK, 35MHz, Channel position T

