FCC RF Test Report

APPLICANT	:	**Quectel Wireless Solutions Co., Ltd.**
EQUIPMENT	:	**5G Sub-6 GHz LGA Module**
BRAND NAME	:	**Quectel**
MODEL NAME	:	**RG500L-NA**
FCC ID	:	**XMR2023RG500LNA**
STANDARD	:	**47 CFR Part 2, Part 27 Subpart Q**
CLASSIFICATION	:	**PCS Licensed Transmitter (PCB)**
TEST DATE(S)	:	**Feb. 08, 2023 ~ Mar. 20, 2023**

We, Sporton International Inc. (KunShan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (KunShan), the test report shall not be reproduced except in full.

Approved by: Jason Jia

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)
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People's Republic of China

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG2D0201N	Rev. 01	Initial issue of report	Jun. 02, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	—	Report Only	-
3.5	§27.50 (k)(4)	Peak-to-Average Ratio	<13dB	PASS	
3.6	§27.50 (k)(3)	EIRP	EIRP < 1W (30dBm)	PASS	-
3.7	§2.1049	Occupied Bandwidth	—	Report Only	-
3.8	§2.1051 §27.53 (n)(2)	Conducted Band Edge Measurement	-13dBm/MHz	PASS	-
3.9	§2.1051 §27.53 (n)(2)	Conducted Spurious Emission	-13dBm/MHz	PASS	-
3.10	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within the band	PASS	-
4.4	§2.1053 §27.53 (n)(2)	Radiated Spurious Emission	-13dBm/MHz	PASS	Under limit 47.64 dB at 13824.000 MHz

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

1.2 Manufacturer

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	5G Sub-6 GHz LGA Module
Brand Name	Quectel
Model Name	RG500L-NA
FCC ID	XMR2023RG500LNA
IMEI Code	Conducted : 860815050004316 Radiation : 860815050004233
HW Version	R1.0
SW Version	RG500LNAAAR04A02E32_OCPU
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Product Feature	
Tx/Rx Frequency	5G NR n77: 3450 MHz ~ 3550 MHz 5G NR n78: 3450 MHz ~ 3550 MHz
SCS	30kHz
Bandwidth	n77: 10 / 15 / 20 / 40 / 50 / 60 / 80 / 90 / 100MHz n78: 10 / 15 / 20 / 25 / 30 / 40 / 50 / 60 / 80 / 90 / 100MHz
Antenna Gain	<Ant.0 / Ant.6> 5G NR n77: -4.29 dBi 5G NR n78: -4.29 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

1. 5G NR n77/n78 support UL MIMO mode for Antenna port (0+6).
2. 5G NR n77/n78 SISO mode only support Antenna port 0, not support Antenna port 6.
3. 5G NR n77/n78 UL_MIMO mode only supports CP-OFDM Modulation, the MIMO mode is completely uncorrelated, so the directional gain is selected the maximum gain among all antennas.
4. For MIMO mode, the conducted Bandedge/Spurious are tested at single antenna port and add 10*log(N_{ANT}) according to KDB 662911 D01, only the worst MIMO Ant.0 is shown in the report.
5. 5G NR n77/n78 support SA and NSA mode. The whole testing has assessed SA mode for n78 by referring to the higher conducted power for conducted test items.
6. The device supports HPUE mode for 5G NR n77/n78.
7. 5G NR n78 cover n77 due to the n78 power > n77 power.
8. All the supported EN-DC combinations are verified conducted power, only the EN-DC combination with highest power are shown in the report.
9. The EN-DC mode combination could be referred to the product spec.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum Conducted Power and Emission Designator

5G NR n77		PI/2 BPSK / QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3455.01 ~ 3544.98	0.4064	8M56G7D	0.2606	8M60W7D
15	3457.50 ~ 3542.49	0.4074	13M5G7D	0.2606	13M6W7D
20	3460.02 ~ 3540.00	0.4083	18M2G7D	0.2559	18M2W7D
40	3470.01 ~ 3529.98	0.3656	37M8G7D	0.2582	37M9W7D
50	3475.02 ~ 3525.00	0.3882	47M4G7D	0.2618	47M5W7D
60	3480.00 ~ 3519.99	0.3681	57M8G7D	0.2588	57M8W7D
80	3490.02 ~ 3510.00	0.3648	77M4G7D	0.2606	77M5W7D
90	3495.00 ~ 3504.99	0.3491	87M3G7D	0.2630	87M4W7D
100	3500.01	0.4111	97M4G7D	0.2594	97M4W7D

5G NR n77 UL MIMO		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3455.01 ~ 3544.98	0.3475	8M71G7D	0.2564	8M75W7D
15	3457.50 ~ 3542.49	0.3483	13M6G7D	0.2518	13M6W7D
20	3460.02 ~ 3540.00	0.3436	18M3G7D	0.2541	18M3W7D
40	3470.01 ~ 3529.98	0.3289	37M8G7D	0.2582	37M9W7D
50	3475.02 ~ 3525.00	0.3420	47M8G7D	0.2541	47M8W7D
60	3480.00 ~ 3519.99	0.3281	58M0G7D	0.2576	58M4W7D
80	3490.02 ~ 3510.00	0.3177	77M4G7D	0.2541	78M5W7D
90	3495.00 ~ 3504.99	0.3083	87M6G7D	0.2588	87M6W7D
100	3500.01	0.3540	97M7G7D	0.2606	98M1W7D

5G NR n78		PI/2 BPSK / QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3455.01 ~ 3544.98	0.4102	8M56G7D	0.2649	8M60W7D
15	3457.50 ~ 3542.49	0.4093	13M5G7D	0.2673	13M6W7D
20	3460.02 ~ 3540.00	0.4018	18M2G7D	0.2618	18M2W7D
25	3462.51 ~ 3537.48	0.3776	23M2G7D	0.2642	23M2W7D
30	3465.00 ~ 3534.99	0.3767	27M8G7D	0.2594	27M9W7D
40	3470.01 ~ 3529.98	0.3622	37M8G7D	0.2649	37M9W7D
50	3475.02 ~ 3525.00	0.3873	47M4G7D	0.2679	47M5W7D
60	3480.00 ~ 3519.99	0.3724	57M8G7D	0.2606	57M8W7D
80	3490.02 ~ 3510.00	0.3698	77M4G7D	0.2673	77M5W7D
90	3495.00 ~ 3504.99	0.3516	87M3G7D	0.2698	87M4W7D
100	3500.01	0.4207	97M4G7D	0.2649	97M4W7D

5G NR n78 UL MIMO		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3455.01 ~ 3544.98	0.3565	8M71G7D	0.2825	8M75W7D
15	3457.50 ~ 3542.49	0.3548	13M6G7D	0.2871	13M6W7D
20	3460.02 ~ 3540.00	0.3483	18M3G7D	0.2825	18M3W7D
25	3462.51 ~ 3537.48	0.3327	23M2G7D	0.2748	23M2W7D
30	3465.00 ~ 3534.99	0.3365	27M8G7D	0.2825	28M0W7D
40	3470.01 ~ 3529.98	0.3357	37M8G7D	0.2831	37M9W7D
50	3475.02 ~ 3525.00	0.3565	47M8G7D	0.2799	47M8W7D
60	3480.00 ~ 3519.99	0.3396	58M0G7D	0.2825	58M4W7D
80	3490.02 ~ 3510.00	0.3304	77M4G7D	0.2831	78M5W7D
90	3495.00 ~ 3504.99	0.3350	87M6G7D	0.2891	87M6W7D
100	3500.01	0.3758	97M7G7D	0.2924	98M1W7D

Note:

1. 5G NR Band n78 overlaps the entire frequency range of Band n77, and n78 power > n77 power, therefore the conducted test results of n78 provided in this report cover n77.
2. All modulations have been tested, and only the worst test results of PSK & QAM are shown in the report.

1.7 Testing Site

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24al

1.9 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, Part 27 Subpart Q
- ANSI C63.26-2015
- FCC KDB 971168 Power Meas License Digital Systems D01 v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

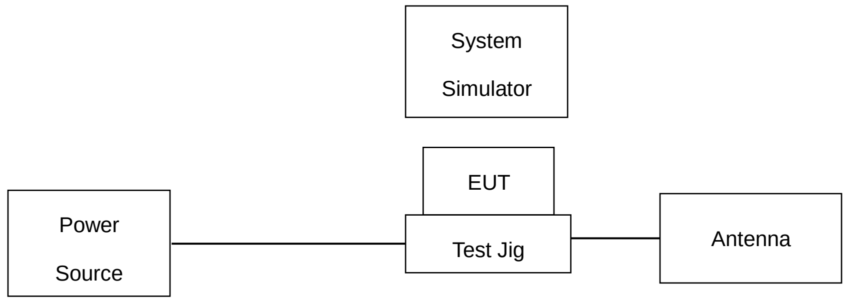
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Cases	Band	Bandwidth (MHz)	Modulation	RB #	Test Channel
		eg. 5M, 10M, 15M, 20M	eg. PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1RB, Full RB	L/M/H
Max. Output Power	5G n77	10M, 15M, 20M, 40M, 50M, 60M, 80M, 90M ,100M	All Modulations	1RB, Full RB	L, M, H
	5G n78	10M, 15M, 20M, 25M, 30M, 40M, 50M, 60M, 80M, 90M ,100M	All Modulations	1RB, Full RB	L, M, H
E.I.R.P	5G n77	10M, 15M, 20M, 40M, 50M, 60M, 80M, 90M ,100M	All Modulations	1RB, Full RB	L, M, H
	5G n78	10M, 15M, 20M, 25M, 30M, 40M, 50M, 60M, 80M, 90M ,100M	All Modulations	1RB, Full RB	L, M, H
Peak-to-Average Ratio	5G n78	100M	PI/2 BPSK, QPSK	1RB, Full RB	M
26dB and 99% Bandwidth	5G n78	10M, 15M, 20M, 25M, 30M, 40M, 50M, 60M, 80M, 90M ,100M	QPSK, 16QAM, 64QAM, 256QAM	Full RB	M
Conducted Band Edge	5G n78	10M, 50M, 100M	PI/2 BPSK, QPSK	1RB, Full RB	L, H
Conducted Spurious Emission	5G n78	10M, 50M, 100M	PI/2 BPSK, QPSK	1RB	L, M, H
Frequency Stability	5G n78	20M	QPSK	Full RB	M
Radiated Spurious Emission	5G n78	Worst case from maximum power			M

Note:
1. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.
2. Frequency Stability: Normal Voltage = 3.8V ; Low Voltage =3.3V.; High Voltage =4.3V.

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	Base Station	Anritsu	MT8820/8821	N/A	N/A	Unshielded, 1.8 m
3.	Adapter	N/A	N/A	N/A	N/A	N/A
4.	Test Jig	N/A	N/A	N/A	N/A	N/A
5.	Antenna	N/A	N/A	N/A	N/A	N/A

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6.5 dB and 20dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 6.5 + 20 = 26.5 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G n77/n78 Channel and Frequency List for SCS 30kHz				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	-	633334	-
	Frequency	-	3500.01	-
90	Channel	633000	633334	633666
	Frequency	3495	3500.01	3504.99
80	Channel	632668	633334	634000
	Frequency	3490.02	3500.01	3510
60	Channel	632000	633334	634666
	Frequency	3480	3500.01	3519.99
50	Channel	631668	633334	635000
	Frequency	3475.02	3500.01	3525
40	Channel	631334	633334	635332
	Frequency	3470.01	3500.01	3529.98
30	Channel	631000	633334	635666
	Frequency	3465	3500.01	3534.99
25	Channel	630834	633334	635832
	Frequency	3462.51	3500.01	3537.48
20	Channel	630668	633334	636000
	Frequency	3460.02	3500.01	3540
15	Channel	630500	633334	636166
	Frequency	3457.5	3500.01	3542.49
10	Channel	630334	633334	636332
	Frequency	3455.01	3500.01	3544.98

Note: 5G NR n77 doesn't support BW 25M/30M.

3 Conducted Test Items

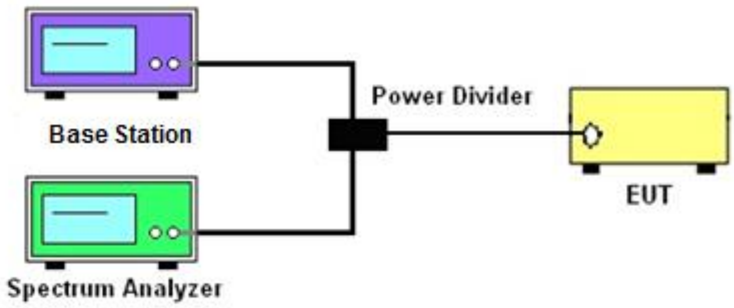
3.1 Measuring Instruments

See list of measuring instruments of this test report.

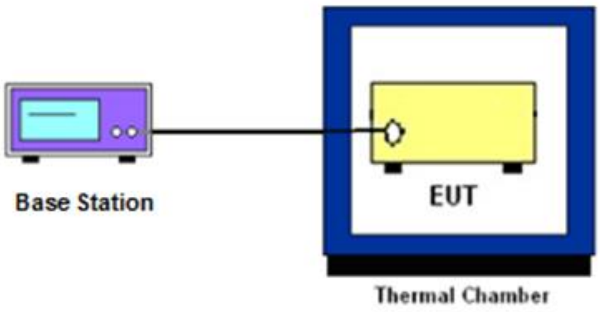
3.2 Test Setup

3.2.1 Conducted Output Power

3.2.2 Peak-to-Average Ratio, Occupied / 26dB Bandwidth, Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power Measurement

3.4.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument’s resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 EIRP

3.6.1 Description of EIRP Limit

§ 27.50 (k)(3)

Mobile devices are limited to 1Watt (30 dBm) EIRP. Mobile devices operating in these bands must employ a means for limiting power to the minimum necessary for successful communications

3.6.2 Test Procedures

1. According to KDB 412172 D01 Power Approach,
2. EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

   P_T = transmitter output power in dBm

   G_T = gain of the transmitting antenna in dBi

   L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.7 Occupied Bandwidth

3.7.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (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.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the "-26 dB down amplitude" as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "–X dB down amplitude" determined in step 6. If a marker is below this "-X dB down amplitude" value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.8 Conducted Band Edge Measurement

3.8.1 Description of Conducted Band Edge Measurement

§ 27.53 (n)(2)

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

Compliance with this paragraph 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, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW ≥ 1% EBW but limited to a maximum of 200 kHz in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz and 5 MHz removed from the band edge, set RBW ≥ 500KHz.
6. Beyond the 5 MHz removed from the band edge, set RBW = 1MHz.
7. Set spectrum analyzer with RMS detector.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. Checked that all the results comply with the emission limit line.

3.9 Conducted Spurious Emission Measurement

3.9.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges shall not exceed −13 dBm/MHz.

It is measured by means of a calibrated spectrum analyzer and scanned from 9 kHz up to a frequency including its 10th harmonic.

3.9.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. Checked that all the results comply with the emission limit line.

3.10 Frequency Stability Measurement

3.10.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block.

3.10.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.10.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5.
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

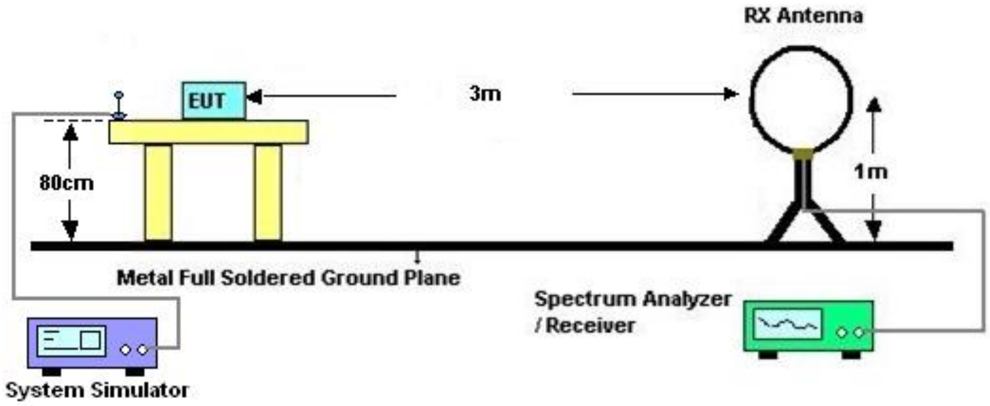
4 Radiated Test Items

4.1 Measuring Instruments

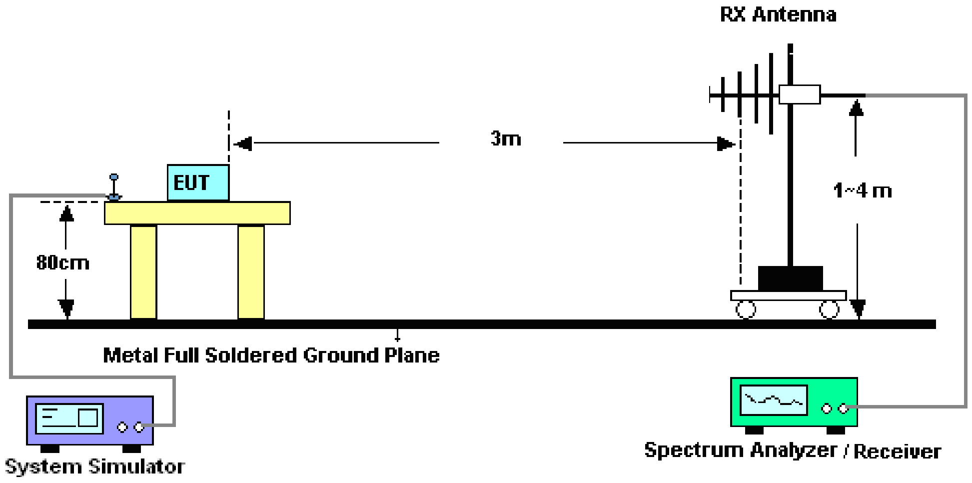
See list of measuring instruments of this test report.

4.2 Test Setup

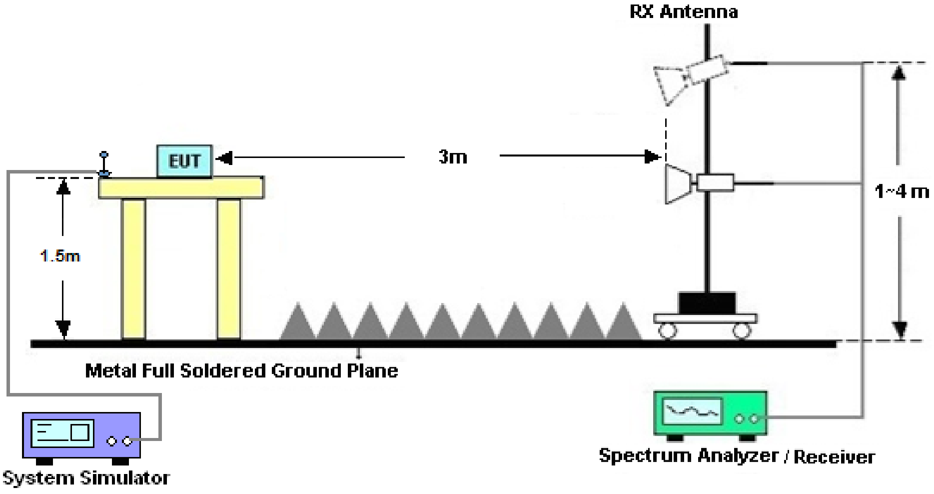
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.

4.4 Radiated Spurious Emission Measurement

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI/TIA-603-E. The power of any emission outside of the authorized operating frequency ranges shall not exceed −13 dBm/MHz.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
   EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
   ERP (dBm) = EIRP - 2.15
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	Feb. 08, 2023~ Feb. 13, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Feb. 08, 2023~ Feb. 13, 2023	NCR	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 15, 2022	Feb. 08, 2023~ Feb. 13, 2023	Jul. 14, 2023	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Mar. 20, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Mar. 20, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24, 2022	Mar. 20, 2023	May 23, 2023	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	Mar. 20, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Mar. 20, 2023	Jan. 07, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	May 24, 2022	Mar. 20, 2023	May 23, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40G GA	060728	18~40GHz	Jan. 05, 2023	Mar. 20, 2023	Jan. 04, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18G A	060840	1Ghz-18Ghz	Oct. 12, 2022	Mar. 20, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Mar. 20, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 20, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 20, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 20, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	**±0.46 dB**
Conducted Emissions	**±0.48 dB**
Occupied Channel Bandwidth	**±0.1 %**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.3 dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8 dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8 dB**

----------- THE END -----------

Appendix A. Test Results of Conducted Test

Test Engineer :	Smile Wang	Temperature :	22~23℃
		Relative Humidity :	40~42%

Conducted Output Power(Average power) and EIRP

5G NR n77_Ant.0

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP (W)		
Channel				633334	633334	633334		L	M	H
Frequency (MHz)				3500.01	3500.01	3500.01				
100	PI/2 BPSK	1	1		26.14		-4.29		0.1531	
100	QPSK	1	1		25.26		-4.29		0.1250	
100	QPSK	1	137		26.02		-4.29		0.1489	
100	QPSK	1	271		25.24		-4.29		0.1245	
100	QPSK	135	0		24.90		-4.29		0.1151	
100	QPSK	135	67		26.08		-4.29		0.1510	
100	QPSK	135	138		24.73		-4.29		0.1107	
100	QPSK	270	0		24.89		-4.29		0.1148	
100	16QAM	1	1		24.14		-4.29		0.0966	
100	64QAM	1	1		22.52		-4.29		0.0665	
100	256QAM	1	1		20.97		-4.29		0.0466	
Channel				633000	633334	633668	Gain	EIRP (W)		
Frequency (MHz)				3495	3500.01	3505.02				
90	PI/2 BPSK	1	1	25.35	25.36	25.43	-4.29	0.1276	0.1279	0.1300
90	QPSK	1	1	25.13	25.22	25.21	-4.29	0.1213	0.1239	0.1236
90	16QAM	1	1	24.10	24.15	24.20	-4.29	0.0957	0.0968	0.0979
Channel				632668	633334	634000	Gain	EIRP (W)		
Frequency (MHz)				3490.02	3500.01	3510				
80	PI/2 BPSK	1	1	25.59	25.60	25.62	-4.29	0.1349	0.1352	0.1358
80	QPSK	1	1	25.02	25.13	25.17	-4.29	0.1183	0.1213	0.1225
80	16QAM	1	1	23.99	24.06	24.16	-4.29	0.0933	0.0948	0.0971
Channel				632000	633334	634668	Gain	EIRP (W)		
Frequency (MHz)				3480	3500.01	3520.02				
60	PI/2 BPSK	1	1	25.63	25.63	25.66	-4.29	0.1361	0.1361	0.1371
60	QPSK	1	1	25.16	25.03	25.04	-4.29	0.1222	0.1186	0.1189
60	16QAM	1	1	24.13	23.96	24.03	-4.29	0.0964	0.0927	0.0942
Channel				631668	633334	635000	Gain	EIRP (W)		
Frequency (MHz)				3475.02	3500.01	3525				
50	PI/2 BPSK	1	1	25.83	25.78	25.89	-4.29	0.1426	0.1409	0.1445
50	QPSK	1	1	25.21	25.13	25.03	-4.29	0.1236	0.1213	0.1186
50	16QAM	1	1	24.18	24.06	24.02	-4.29	0.0975	0.0948	0.0940

Channel				631334	633334	635334	Gain	EIRP (W)		
Frequency (MHz)				3470.01	3500.01	3530.01				
40	PI/2 BPSK	1	1	25.53	25.55	25.63	-4.29	0.1330	0.1337	0.1361
40	QPSK	1	1	25.09	25.07	25.13	-4.29	0.1202	0.1197	0.1213
40	16QAM	1	1	24.06	24.00	24.12	-4.29	0.0948	0.0935	0.0962
Channel				630668	633334	636000	Gain	EIRP (W)		
Frequency (MHz)				3460.02	3500.01	3540				
20	PI/2 BPSK	1	1	25.91	25.62	26.11	-4.29	0.1452	0.1358	0.1521
20	QPSK	1	1	25.11	25.03	25.09	-4.29	0.1208	0.1186	0.1202
20	16QAM	1	1	24.08	23.96	24.08	-4.29	0.0953	0.0927	0.0953
Channel				630500	633334	636168	Gain	EIRP (W)		
Frequency (MHz)				3457.5	3500.01	3542.52				
15	PI/2 BPSK	1	1	25.97	25.88	26.10	-4.29	0.1472	0.1442	0.1517
15	QPSK	1	1	25.04	25.06	25.17	-4.29	0.1189	0.1194	0.1225
15	16QAM	1	1	24.01	23.99	24.16	-4.29	0.0938	0.0933	0.0971
Channel				630334	633334	636334	Gain	EIRP (W)		
Frequency (MHz)				3455.01	3500.01	3545.01				
10	PI/2 BPSK	1	1	26.00	25.97	26.09	-4.29	0.1483	0.1472	0.1514
10	QPSK	1	1	25.19	25.20	25.03	-4.29	0.1230	0.1233	0.1186
10	16QAM	1	1	24.16	24.13	24.02	-4.29	0.0971	0.0964	0.0940

5G NR n77 UL MIMO

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP (W)		
Channel				633334	633334	633334		L	M	H
Frequency (MHz)				3500.01	3500.01	3500.01				
100	QPSK	1	1		25.43		-4.29		0.1300	
100	QPSK	1	137		25.49		-4.29		0.1318	
100	QPSK	1	271		23.84		-4.29		0.0902	
100	QPSK	135	0		23.73		-4.29		0.0879	
100	QPSK	135	69		25.24		-4.29		0.1245	
100	QPSK	135	138		23.54		-4.29		0.0841	
100	QPSK	270	0		23.68		-4.29		0.0869	
100	16QAM	1	1		24.16		-4.29		0.0971	
100	64QAM	1	1		22.54		-4.29		0.0668	
100	256QAM	1	1		19.67		-4.29		0.0345	
Channel				633000	633334	633668	Gain	EIRP (W)		
Frequency (MHz)				3495	3500.01	3505.02				
90	QPSK	1	1	24.82	24.89	24.83	-4.29	0.1130	0.1148	0.1132
90	16QAM	1	1	24.13	24.05	24.11	-4.29	0.0964	0.0946	0.0959
Channel				632668	633334	634000	Gain	EIRP (W)		
Frequency (MHz)				3490.02	3500.01	3510				
80	QPSK	1	1	25.02	24.95	24.98	-4.29	0.1183	0.1164	0.1172
80	16QAM	1	1	24.05	24.03	24.01	-4.29	0.0946	0.0942	0.0938
Channel				632000	633334	634668	Gain	EIRP (W)		
Frequency (MHz)				3480	3500.01	3520.02				
60	QPSK	1	1	25.16	25.09	25.14	-4.29	0.1222	0.1202	0.1216
60	16QAM	1	1	24.11	24.00	24.03	-4.29	0.0959	0.0935	0.0942
Channel				631668	633334	635000	Gain	EIRP (W)		
Frequency (MHz)				3475.02	3500.01	3525				
50	QPSK	1	1	25.34	25.28	25.32	-4.29	0.1274	0.1256	0.1268
50	16QAM	1	1	24.05	23.99	23.95	-4.29	0.0946	0.0933	0.0925
Channel				631334	633334	635334	Gain	EIRP (W)		
Frequency (MHz)				3470.01	3500.01	3530.01				
40	QPSK	1	1	25.08	25.04	25.17	-4.29	0.1199	0.1189	0.1225
40	16QAM	1	1	24.12	24.05	24.09	-4.29	0.0962	0.0946	0.0955
Channel				630668	633334	636000	Gain	EIRP (W)		
Frequency (MHz)				3460.02	3500.01	3540				
20	QPSK	1	1	25.29	25.25	25.36	-4.29	0.1259	0.1247	0.1279
20	16QAM	1	1	24.05	24.01	23.98	-4.29	0.0946	0.0938	0.0931
Channel				630500	633334	636168	Gain	EIRP (W)		
Frequency (MHz)				3457.5	3500.01	3542.52				
15	QPSK	1	1	25.42	25.35	25.38	-4.29	0.1297	0.1276	0.1285
15	16QAM	1	1	23.99	24.00	24.01	-4.29	0.0933	0.0935	0.0938
Channel				630334	633334	636334	Gain	EIRP (W)		
Frequency (MHz)				3455.01	3500.01	3545.01				
10	QPSK	1	1	25.38	25.41	25.39	-4.29	0.1285	0.1294	0.1288
10	16QAM	1	1	24.06	24.01	24.09	-4.29	0.0948	0.0938	0.0955

5G NR n78_Ant.0

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP （W）		
Channel				633334	633334	633334	Gain	L	M	H
Frequency (MHz)				3500.01	3500.01	3500.01				
100	PI/2 BPSK	1	1		26.18		-4.29		0.1545	
100	QPSK	1	1		25.26		-4.29		0.1250	
100	QPSK	1	137		26.24		-4.29		0.1567	
100	QPSK	1	271		25.26		-4.29		0.1250	
100	QPSK	135	0		25.08		-4.29		0.1199	
100	QPSK	135	67		26.06		-4.29		0.1503	
100	QPSK	135	138		24.96		-4.29		0.1167	
100	QPSK	270	0		24.89		-4.29		0.1148	
100	16QAM	1	1		24.23		-4.29		0.0986	
100	64QAM	1	1		22.61		-4.29		0.0679	
100	256QAM	1	1		20.96		-4.29		0.0465	
Channel				633000	633334	633668	Gain	EIRP （W）		
Frequency (MHz)				3495	3500.01	3505.02				
90	PI/2 BPSK	1	1	25.41	25.39	25.46	-4.29	0.1294	0.1288	0.1309
90	QPSK	1	1	25.13	25.22	25.24	-4.29	0.1213	0.1239	0.1245
90	16QAM	1	1	24.19	24.31	24.27	-4.29	0.0977	0.1005	0.0995
Channel				632668	633334	634000	Gain	EIRP （W）		
Frequency (MHz)				3490.02	3500.01	3510				
80	PI/2 BPSK	1	1	25.55	25.64	25.68	-4.29	0.1337	0.1365	0.1377
80	QPSK	1	1	25.21	25.03	25.11	-4.29	0.1236	0.1186	0.1208
80	16QAM	1	1	24.27	24.12	24.14	-4.29	0.0995	0.0962	0.0966
Channel				632000	633334	634668	Gain	EIRP （W）		
Frequency (MHz)				3480	3500.01	3520.02				
60	PI/2 BPSK	1	1	25.67	25.64	25.71	-4.29	0.1374	0.1365	0.1387
60	QPSK	1	1	25.03	25.07	25.11	-4.29	0.1186	0.1197	0.1208
60	16QAM	1	1	24.09	24.16	24.14	-4.29	0.0955	0.0971	0.0966
Channel				631668	633334	635000	Gain	EIRP （W）		
Frequency (MHz)				3475.02	3500.01	3525				
50	PI/2 BPSK	1	1	25.86	25.79	25.88	-4.29	0.1435	0.1413	0.1442
50	QPSK	1	1	25.20	25.19	25.15	-4.29	0.1233	0.1230	0.1219
50	16QAM	1	1	24.26	24.28	24.18	-4.29	0.0993	0.0998	0.0975
Channel				631334	633334	635334	Gain	EIRP （W）		
Frequency (MHz)				3470.01	3500.01	3530.01				
40	PI/2 BPSK	1	1	25.52	25.50	25.59	-4.29	0.1327	0.1321	0.1349
40	QPSK	1	1	25.17	25.13	25.03	-4.29	0.1225	0.1213	0.1186
40	16QAM	1	1	24.23	24.22	24.06	-4.29	0.0986	0.0984	0.0948
Channel				631000	633334	635668	Gain	EIRP （W）		
Frequency (MHz)				3465	3500.01	3535.02				
30	PI/2 BPSK	1	1	25.67	25.65	25.76	-4.29	0.1374	0.1368	0.1403
30	QPSK	1	1	25.07	25.03	25.11	-4.29	0.1197	0.1186	0.1208
30	16QAM	1	1	24.13	24.12	24.14	-4.29	0.0964	0.0962	0.0966

Channel				630834	633334	635834	Gain	EIRP （W）		
Frequency (MHz)				3462.51	3500.01	3537.51				
25	PI/2 BPSK	1	1	25.65	25.63	25.77	-4.29	0.1368	0.1361	0.1406
25	QPSK	1	1	25.16	25.06	25.01	-4.29	0.1222	0.1194	0.1180
25	16QAM	1	1	24.22	24.15	24.04	-4.29	0.0984	0.0968	0.0944
Channel				630668	633334	636000	Gain	EIRP （W）		
Frequency (MHz)				3460.02	3500.01	3540				
20	PI/2 BPSK	1	1	25.76	25.88	26.04	-4.29	0.1403	0.1442	0.1496
20	QPSK	1	1	25.07	25.09	25.15	-4.29	0.1197	0.1202	0.1219
20	16QAM	1	1	24.13	24.18	24.18	-4.29	0.0964	0.0975	0.0975
Channel				630500	633334	636168	Gain	EIRP （W）		
Frequency (MHz)				3457.5	3500.01	3542.52				
15	PI/2 BPSK	1	1	25.95	25.86	26.12	-4.29	0.1466	0.1435	0.1524
15	QPSK	1	1	25.21	25.17	25.07	-4.29	0.1236	0.1225	0.1197
15	16QAM	1	1	24.27	24.26	24.10	-4.29	0.0995	0.0993	0.0957
Channel				630334	633334	636334	Gain	EIRP （W）		
Frequency (MHz)				3455.01	3500.01	3545.01				
10	PI/2 BPSK	1	1	25.95	25.93	26.13	-4.29	0.1466	0.1459	0.1528
10	QPSK	1	1	25.08	25.14	25.00	-4.29	0.1199	0.1216	0.1178
10	16QAM	1	1	24.14	24.23	24.03	-4.29	0.0966	0.0986	0.0942

5G NR n78 UL MIMO

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP （W）		
Channel				633334	633334	633334		L	M	H
Frequency (MHz)				3500.01	3500.01	3500.01				
100	QPSK	1	1		25.56		-4.29		0.1340	
100	QPSK	1	137		25.52		-4.29		0.1327	
100	QPSK	1	271		24.53		-4.29		0.1057	
100	QPSK	135	0		24.25		-4.29		0.0991	
100	QPSK	135	67		25.75		-4.29		0.1400	
100	QPSK	135	138		24.05		-4.29		0.0946	
100	QPSK	270	0		24.17		-4.29		0.0973	
100	16QAM	1	1		24.66		-4.29		0.1089	
100	64QAM	1	1		23.21		-4.29		0.0780	
100	256QAM	1	1		20.14		-4.29		0.0385	
Channel				633000	633334	633668	Gain	EIRP （W）		
Frequency (MHz)				3495	3500.01	3505.02				
90	QPSK	1	1	25.25	25.18	25.20	-4.29	0.1247	0.1227	0.1233
90	16QAM	1	1	24.61	24.52	24.58	-4.29	0.1076	0.1054	0.1069
Channel				632668	633334	634000	Gain	EIRP （W）		
Frequency (MHz)				3490.02	3500.01	3510				
80	QPSK	1	1	25.19	25.14	25.11	-4.29	0.1230	0.1216	0.1208
80	16QAM	1	1	24.52	24.44	24.36	-4.29	0.1054	0.1035	0.1016
Channel				632000	633334	634668	Gain	EIRP （W）		
Frequency (MHz)				3480	3500.01	3520.02				
60	QPSK	1	1	25.31	25.16	25.26	-4.29	0.1265	0.1222	0.1250
60	16QAM	1	1	24.36	24.51	24.44	-4.29	0.1016	0.1052	0.1035
Channel				631668	633334	635000	Gain	EIRP （W）		
Frequency (MHz)				3475.02	3500.01	3525				
50	QPSK	1	1	25.52	25.36	25.49	-4.29	0.1327	0.1279	0.1318
50	16QAM	1	1	24.35	24.47	24.39	-4.29	0.1014	0.1042	0.1023
Channel				631334	633334	635334	Gain	EIRP （W）		
Frequency (MHz)				3470.01	3500.01	3530.01				
40	QPSK	1	1	25.26	25.14	25.21	-4.29	0.1250	0.1216	0.1236
40	16QAM	1	1	24.52	24.33	24.18	-4.29	0.1054	0.1009	0.0975
Channel				631000	633334	635668	Gain	EIRP （W）		
Frequency (MHz)				3465	3500.01	3535.02				
30	QPSK	1	1	25.27	25.19	25.21	-4.29	0.1253	0.1230	0.1236
30	16QAM	1	1	24.51	24.44	24.47	-4.29	0.1052	0.1035	0.1042
Channel				630834	633334	635834	Gain	EIRP （W）		
Frequency (MHz)				3462.51	3500.01	3537.51				
25	QPSK	1	1	25.22	25.15	25.19	-4.29	0.1239	0.1219	0.1230
25	16QAM	1	1	24.13	24.28	24.39	-4.29	0.0964	0.0998	0.1023

Channel				630668	633334	636000	Gain	EIRP （W）		
Frequency (MHz)				3460.02	3500.01	3540				
20	QPSK	1	1	25.42	25.31	25.36	-4.29	0.1297	0.1265	0.1279
20	16QAM	1	1	24.38	24.47	24.51	-4.29	0.1021	0.1042	0.1052
Channel				630500	633334	636168	Gain	EIRP （W）		
Frequency (MHz)				3457.5	3500.01	3542.52				
15	QPSK	1	1	25.50	25.43	25.46	-4.29	0.1321	0.1300	0.1309
15	16QAM	1	1	24.55	24.58	24.40	-4.29	0.1062	0.1069	0.1026
Channel				630334	633334	636334	Gain	EIRP （W）		
Frequency (MHz)				3455.01	3500.01	3545.01				
10	QPSK	1	1	25.52	25.48	25.34	-4.29	0.1327	0.1315	0.1274
10	16QAM	1	1	24.30	24.39	24.51	-4.29	0.1002	0.1023	0.1052

FR1 n78

Peak to Average Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
78	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	270@0	10.15	13	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@0	6.64	13	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	270@0	10.43	13	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	8.08	13	**PASS**

N78(100M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

N78(100M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH

N78(100M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

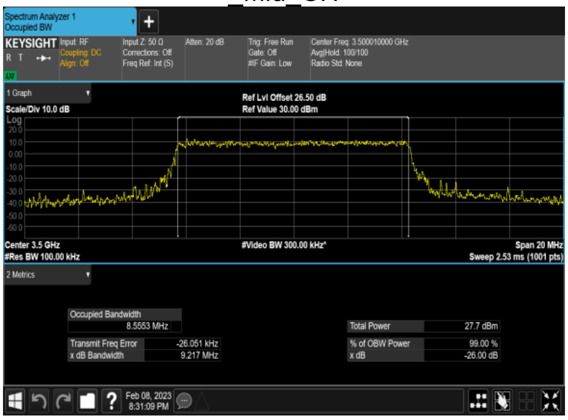
N78(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH

Occupied Bandwidth

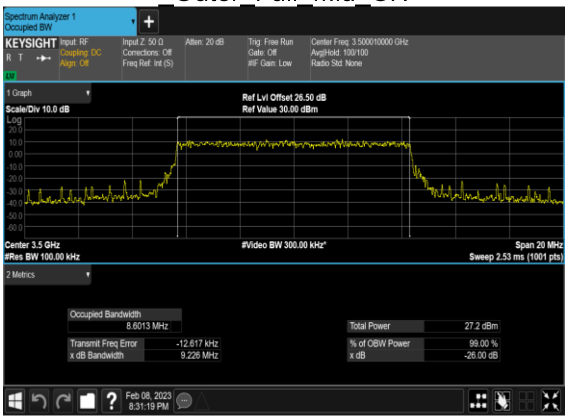
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
78	30	10	633334	3500.01	CP-OFDM QPSK	24@0	8.5553	9.217
78	30	10	633334	3500.01	CP-OFDM 16 QAM	24@0	8.6013	9.226
78	30	10	633334	3500.01	CP-OFDM 64 QAM	24@0	8.5608	9.128
78	30	10	633334	3500.01	CP-OFDM 256 QAM	24@0	8.5781	9.369
78	30	15	633334	3500.01	CP-OFDM QPSK	38@0	13.501	14.37
78	30	15	633334	3500.01	CP-OFDM 16 QAM	38@0	13.564	14.46
78	30	15	633334	3500.01	CP-OFDM 64 QAM	38@0	13.577	14.31
78	30	15	633334	3500.01	CP-OFDM 256 QAM	38@0	13.562	14.42
78	30	20	633334	3500.01	CP-OFDM QPSK	51@0	18.17	19.13
78	30	20	633334	3500.01	CP-OFDM 16 QAM	51@0	18.144	19.12
78	30	20	633334	3500.01	CP-OFDM 64 QAM	51@0	18.179	19.14
78	30	20	633334	3500.01	CP-OFDM 256 QAM	51@0	18.176	19.09
78	30	25	633334	3500.01	CP-OFDM QPSK	65@0	23.202	23.98
78	30	25	633334	3500.01	CP-OFDM 16 QAM	65@0	23.222	24.18
78	30	25	633334	3500.01	CP-OFDM 64 QAM	65@0	23.191	24.18
78	30	25	633334	3500.01	CP-OFDM 256 QAM	65@0	23.13	24.14
78	30	30	633334	3500.01	CP-OFDM QPSK	78@0	27.786	28.77
78	30	30	633334	3500.01	CP-OFDM 16 QAM	78@0	27.816	28.71
78	30	30	633334	3500.01	CP-OFDM 64 QAM	78@0	27.855	28.89
78	30	30	633334	3500.01	CP-OFDM 256 QAM	78@0	27.803	28.92
78	30	40	633334	3500.01	CP-OFDM QPSK	106@0	37.77	39.37
78	30	40	633334	3500.01	CP-OFDM 16 QAM	106@0	37.707	39.23
78	30	40	633334	3500.01	CP-OFDM 64 QAM	106@0	37.793	39.05
78	30	40	633334	3500.01	CP-OFDM 256 QAM	106@0	37.919	39.08
78	30	50	633334	3500.01	CP-OFDM QPSK	133@0	47.4	49.44
78	30	50	633334	3500.01	CP-OFDM 16 QAM	133@0	47.451	49.42
78	30	50	633334	3500.01	CP-OFDM 64 QAM	133@0	47.419	49.34
78	30	50	633334	3500.01	CP-OFDM 256 QAM	133@0	47.432	49.26
78	30	60	633334	3500.01	CP-OFDM QPSK	162@0	57.815	59.79
78	30	60	633334	3500.01	CP-OFDM 16 QAM	162@0	57.774	59.67

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
78	30	60	633334	3500.01	CP-OFDM 64 QAM	162@0	57.848	59.84
78	30	60	633334	3500.01	CP-OFDM 256 QAM	162@0	57.774	59.65
78	30	80	633334	3500.01	CP-OFDM QPSK	217@0	77.434	79.77
78	30	80	633334	3500.01	CP-OFDM 16 QAM	217@0	77.394	79.92
78	30	80	633334	3500.01	CP-OFDM 64 QAM	217@0	77.308	79.9
78	30	80	633334	3500.01	CP-OFDM 256 QAM	217@0	77.451	79.93
78	30	90	633334	3500.01	CP-OFDM QPSK	245@0	87.289	90.15
78	30	90	633334	3500.01	CP-OFDM 16 QAM	245@0	87.218	90.14
78	30	90	633334	3500.01	CP-OFDM 64 QAM	245@0	87.412	90.03
78	30	90	633334	3500.01	CP-OFDM 256 QAM	245@0	87.252	90.34
78	30	100	633334	3500.01	CP-OFDM QPSK	273@0	97.412	100.5
78	30	100	633334	3500.01	CP-OFDM 16 QAM	273@0	97.417	100.5
78	30	100	633334	3500.01	CP-OFDM 64 QAM	273@0	97.3	100.4
78	30	100	633334	3500.01	CP-OFDM 256 QAM	273@0	97.419	100.5

N78(10M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

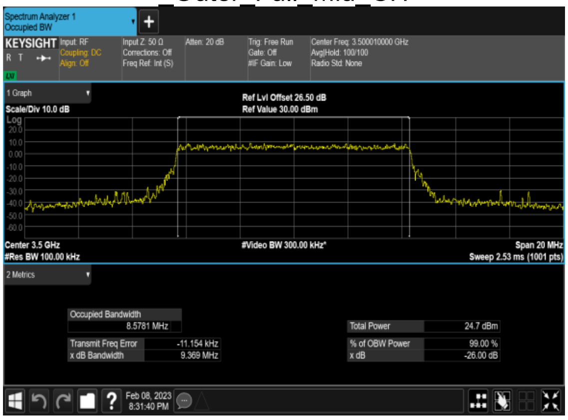


N78(10M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

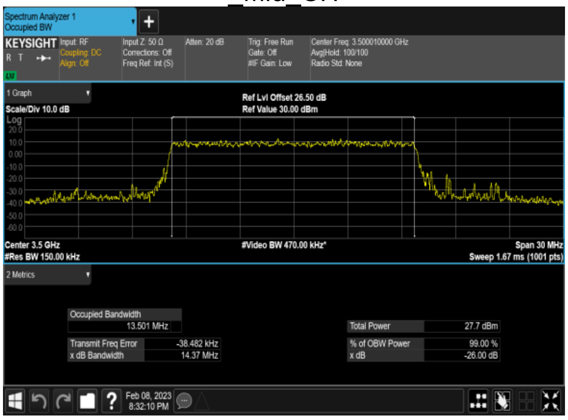


N78(10M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

N78(10M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

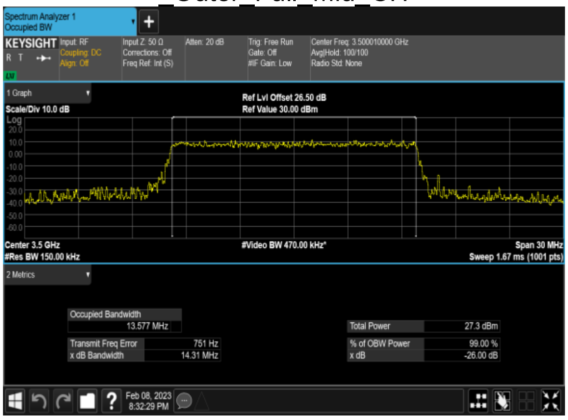


N78(15M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



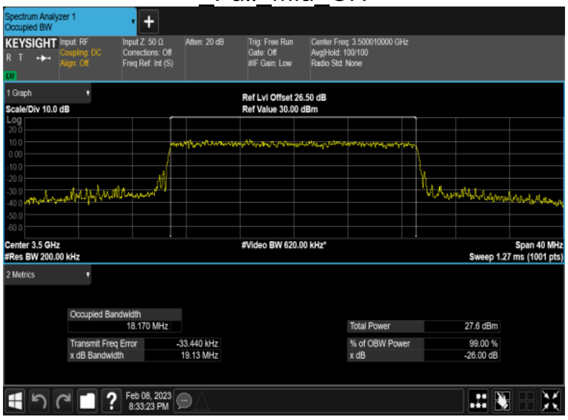
N78(15M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

N78(15M)_CP-OFDM_64 QAM _Outer_Full_Mid_CH

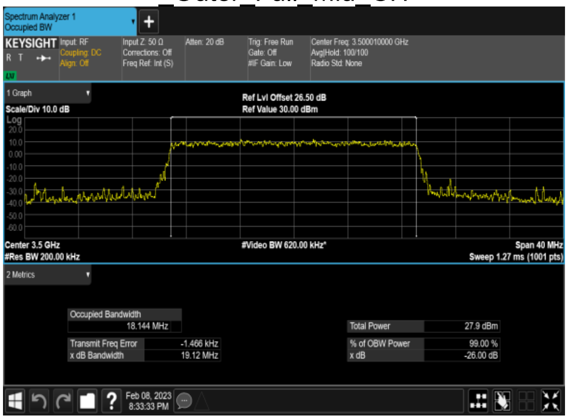


N78(15M)_CP-OFDM_256 QAM _Outer_Full_Mid_CH

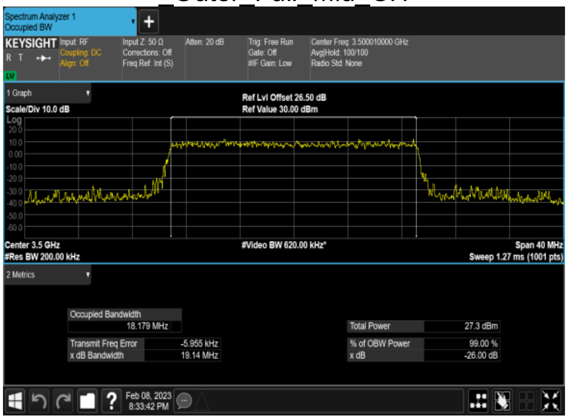
N78(20M)_CP-OFDM_QPSK_Outer _Full_Mid_CH



N78(20M)_CP-OFDM_16 QAM _Outer_Full_Mid_CH

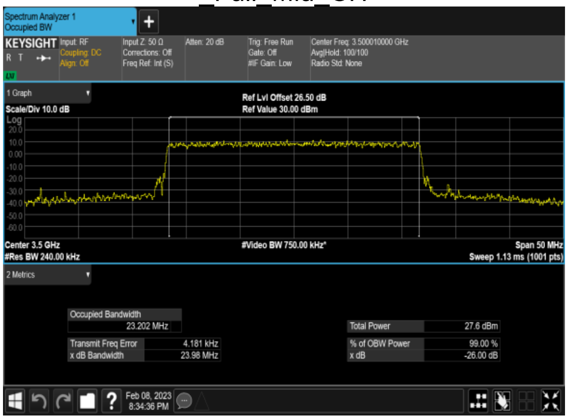


N78(20M)_CP-OFDM_64 QAM _Outer_Full_Mid_CH



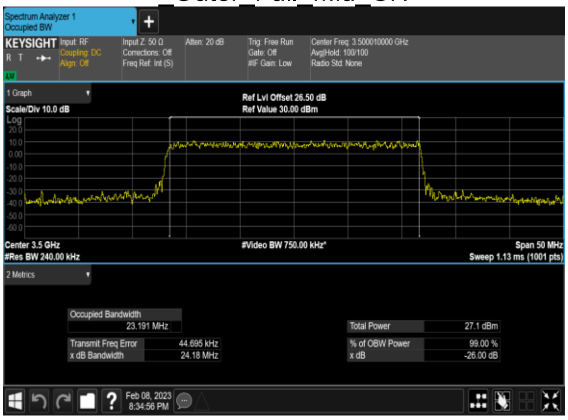
N78(20M)_CP-OFDM_256 QAM _Outer_Full_Mid_CH

N78(25M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

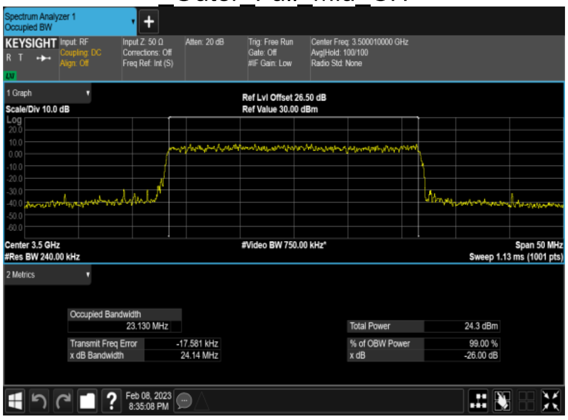


N78(25M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

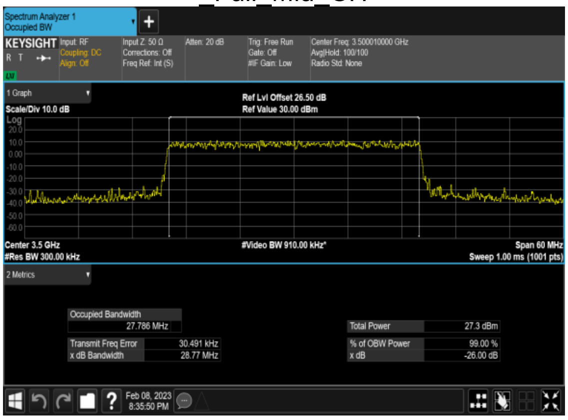
N78(25M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



N78(25M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

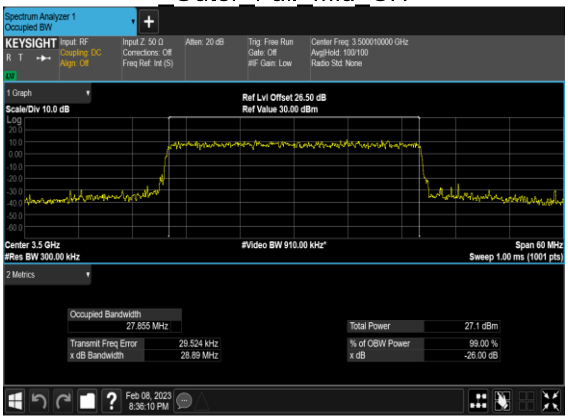


N78(30M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

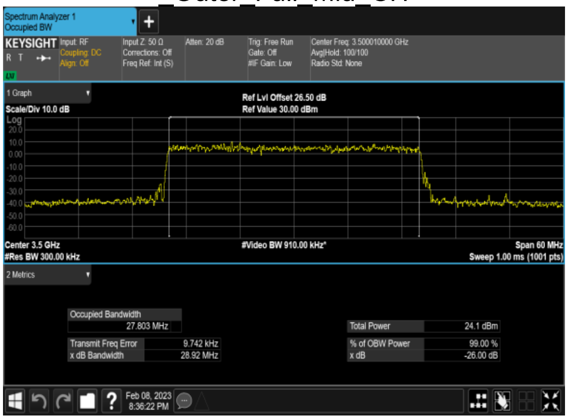


N78(30M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

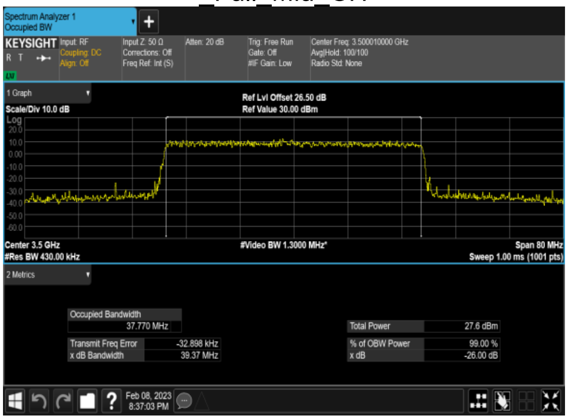
N78(30M)_CP-OFDM_64 QAM
_Outer_Full_Mid_CH



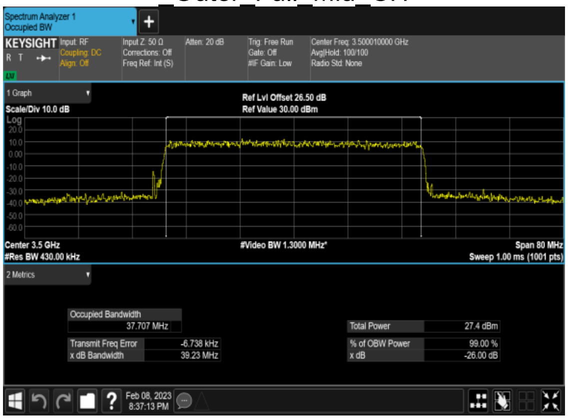
N78(30M)_CP-OFDM_256 QAM
_Outer_Full_Mid_CH



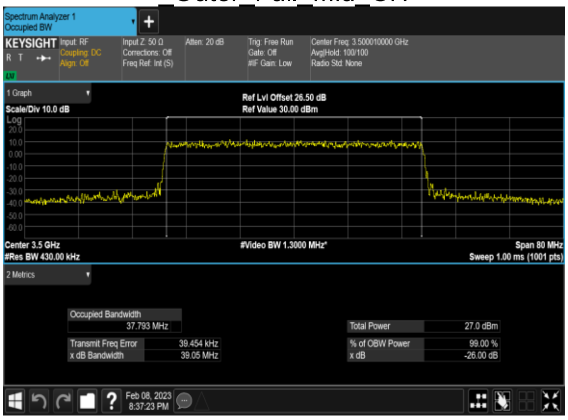
N78(40M)_CP-OFDM_QPSK_Outer
_Full_Mid_CH



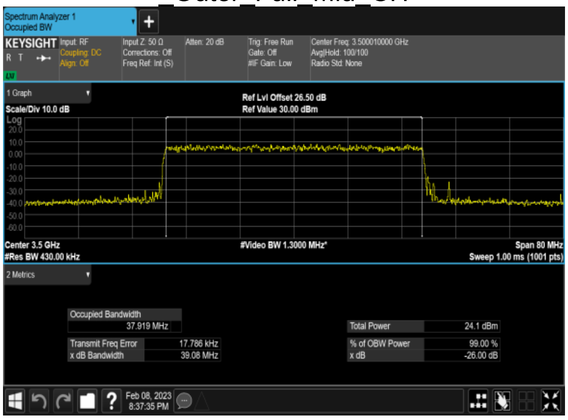
N78(40M)_CP-OFDM_16 QAM
_Outer_Full_Mid_CH



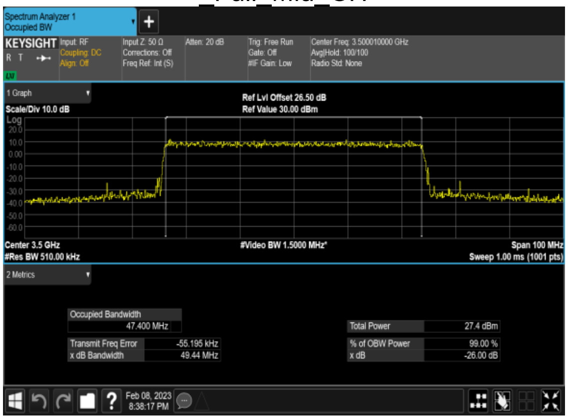
N78(40M)_CP-OFDM_64 QAM
_Outer_Full_Mid_CH



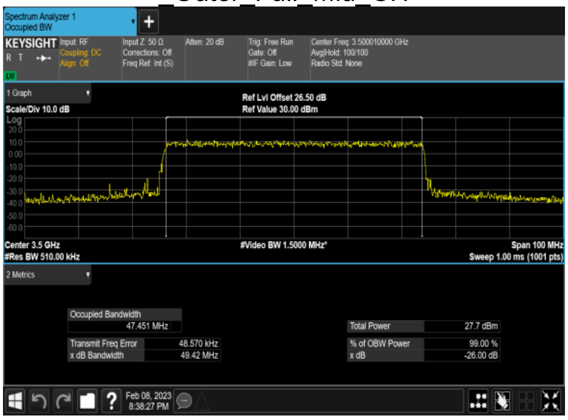
N78(40M)_CP-OFDM_256 QAM
_Outer_Full_Mid_CH



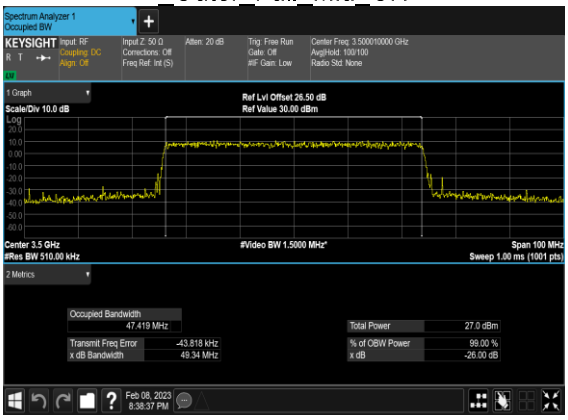
N78(50M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



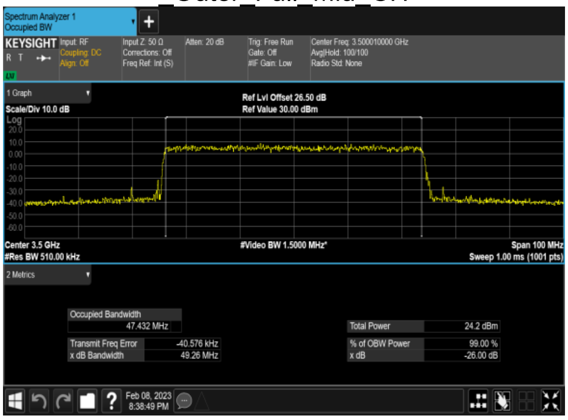
N78(50M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



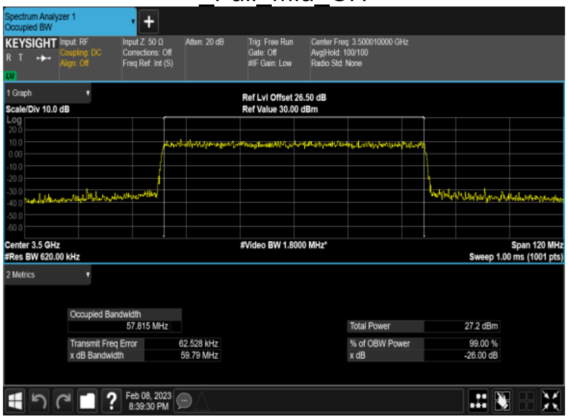
N78(50M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



N78(50M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

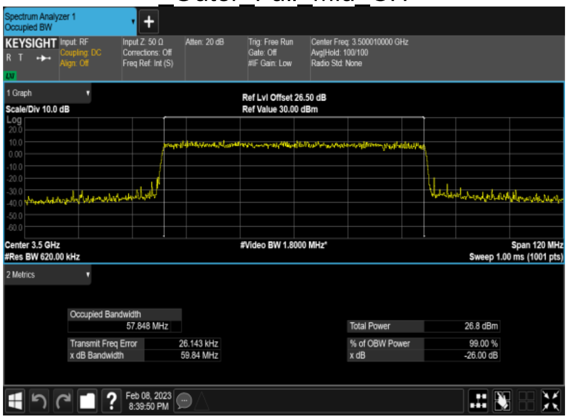


N78(60M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

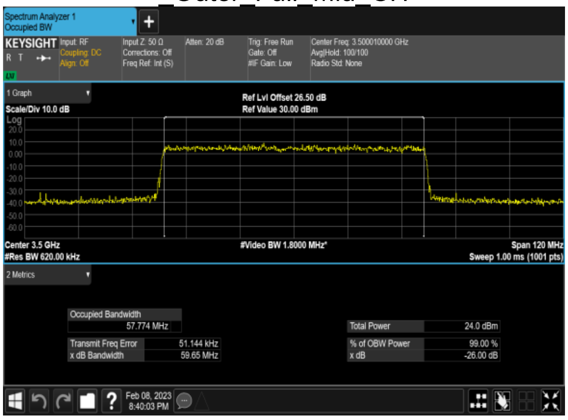


N78(60M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

N78(60M)_CP-OFDM_64 QAM _Outer_Full_Mid_CH

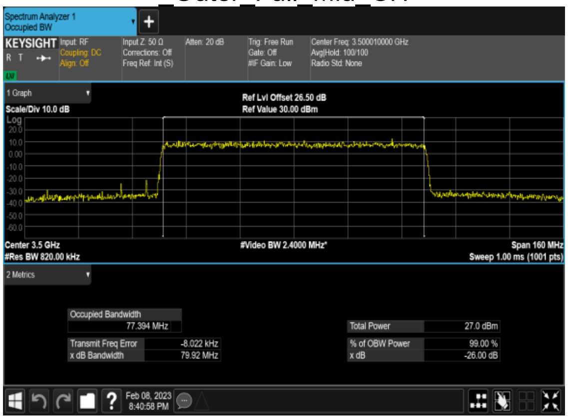


N78(60M)_CP-OFDM_256 QAM _Outer_Full_Mid_CH

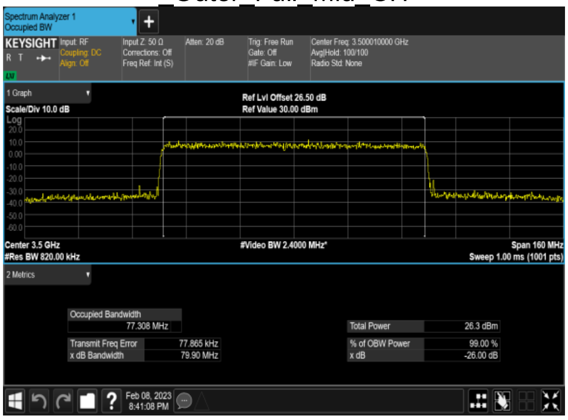


N78(80M)_CP-OFDM_QPSK_Outer _Full_Mid_CH

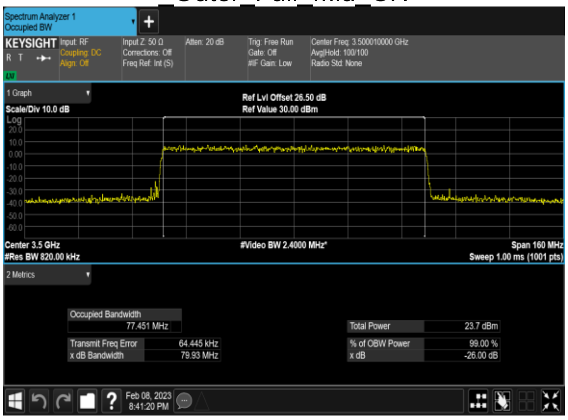
N78(80M)_CP-OFDM_16 QAM _Outer_Full_Mid_CH



N78(80M)_CP-OFDM_64 QAM _Outer_Full_Mid_CH

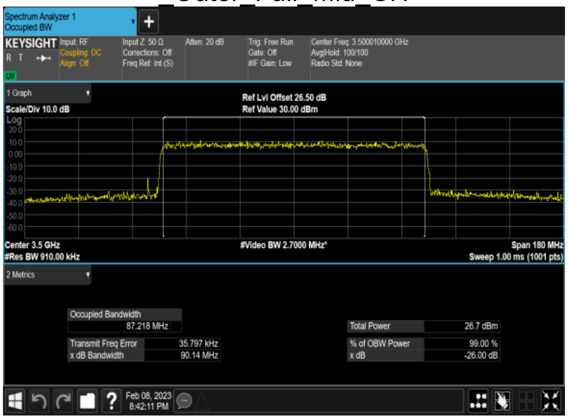


N78(80M)_CP-OFDM_256 QAM _Outer_Full_Mid_CH

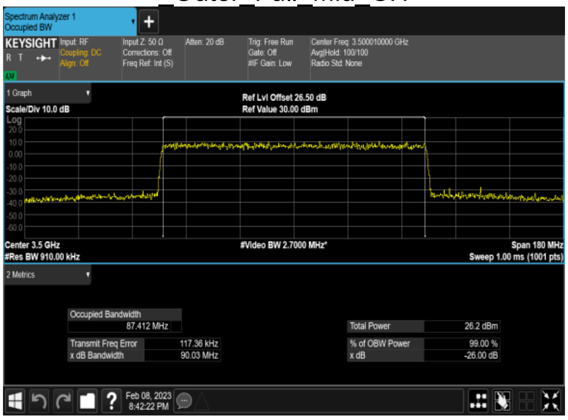


N78(90M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

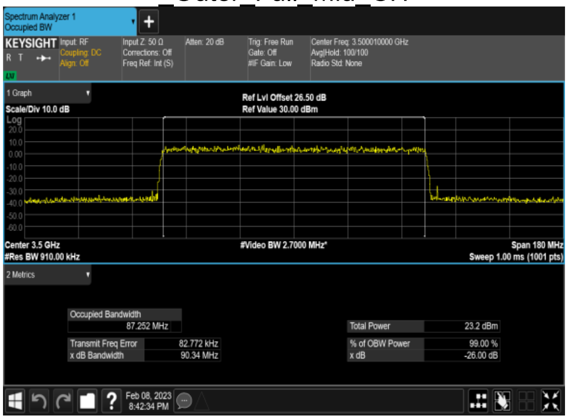
N78(90M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



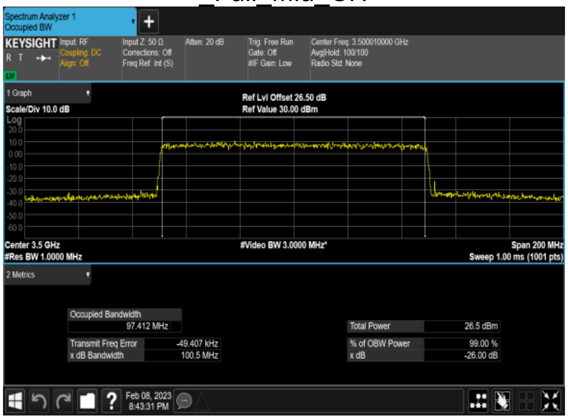
N78(90M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



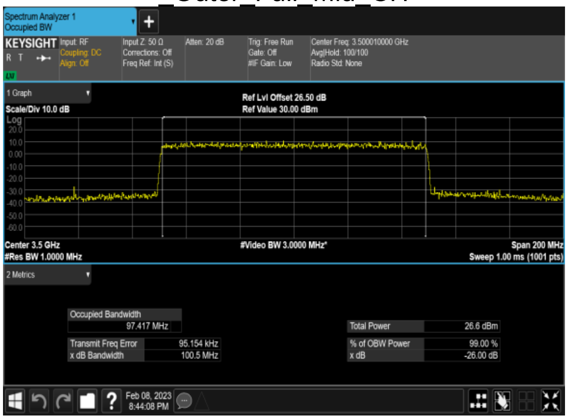
N78(90M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



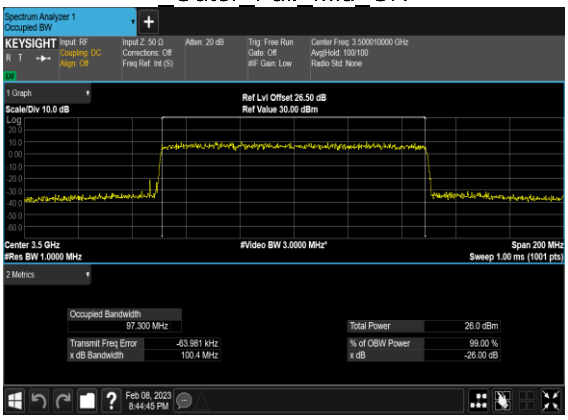
N78(100M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



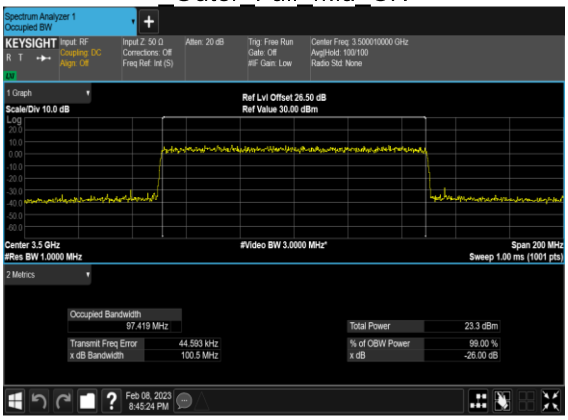
N78(100M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N78(100M)_CP-OFDM_64 QAM _Outer_Full_Mid_CH



N78(100M)_CP-OFDM_256 QAM _Outer_Full_Mid_CH

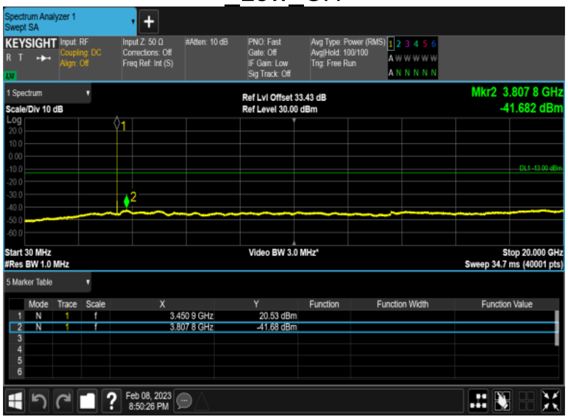


Conducted Spurious Emissions

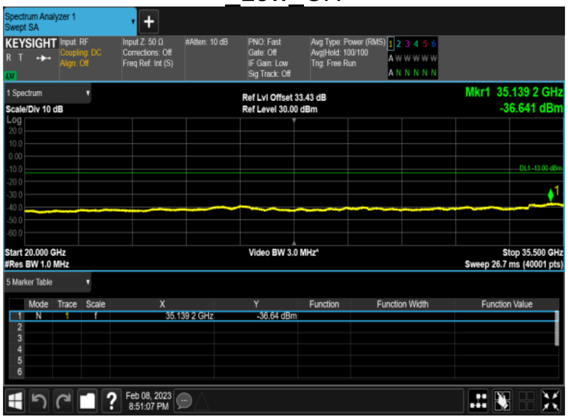
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
78	30	10	630334	3455.01	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	10	630334	3455.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	10	630334	3455.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	10	630334	3455.01	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	10	630334	3455.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	10	630334	3455.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	10	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	10	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	10	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	10	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	10	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	10	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	10	636332	3544.98	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	10	636332	3544.98	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	10	636332	3544.98	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	10	636332	3544.98	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	10	636332	3544.98	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	10	636332	3544.98	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	50	631668	3475.02	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	50	631668	3475.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	50	631668	3475.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	50	631668	3475.02	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	50	631668	3475.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	50	631668	3475.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	50	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	50	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	50	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	50	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	50	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	50	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
78	30	50	635000	3525.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
78	30	50	635000	3525.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	50	635000	3525.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	50	635000	3525.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
78	30	50	635000	3525.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	50	635000	3525.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**---**
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**

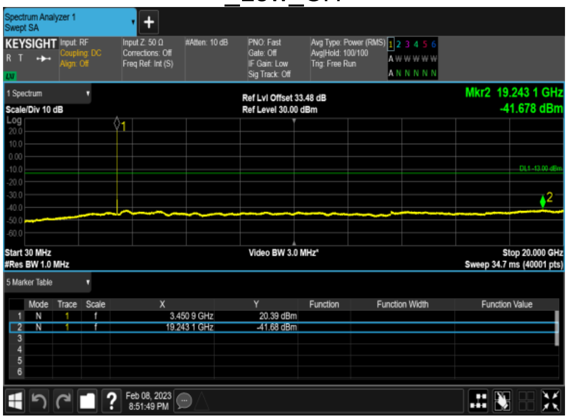
N78(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Low_CH



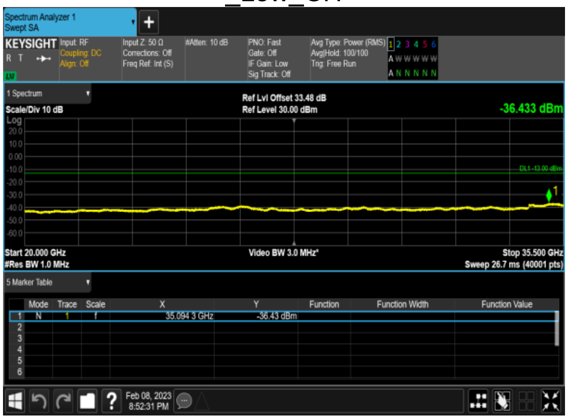
N78(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Low_CH



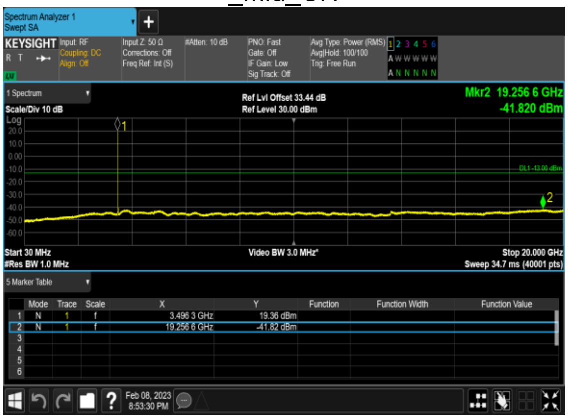
N78(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Low_CH



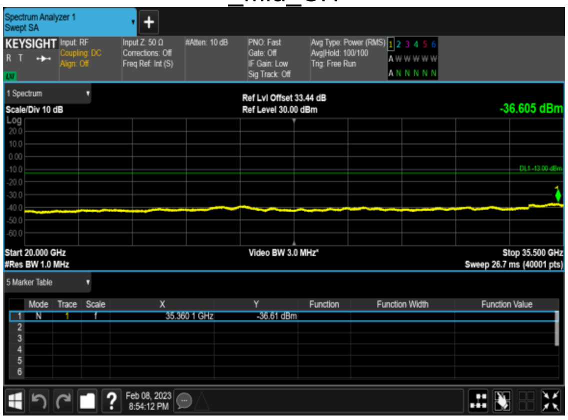
N78(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Low_CH



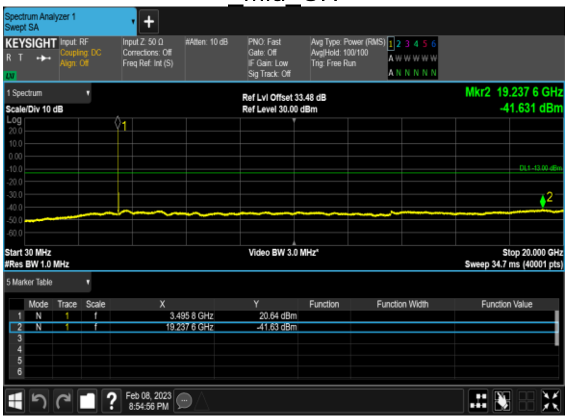
N78(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Mid_CH



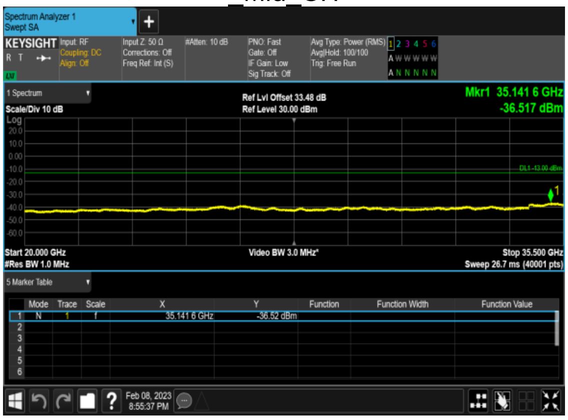
N78(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Mid_CH



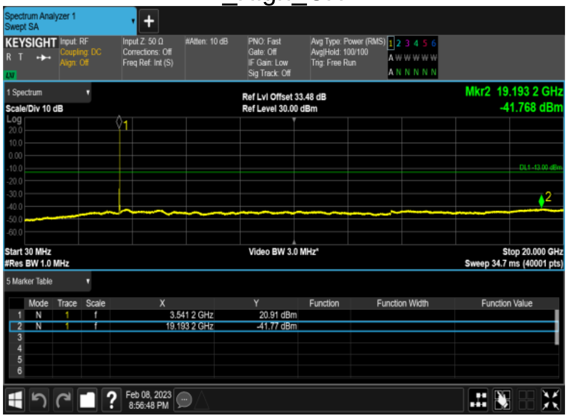
N78(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Mid_CH



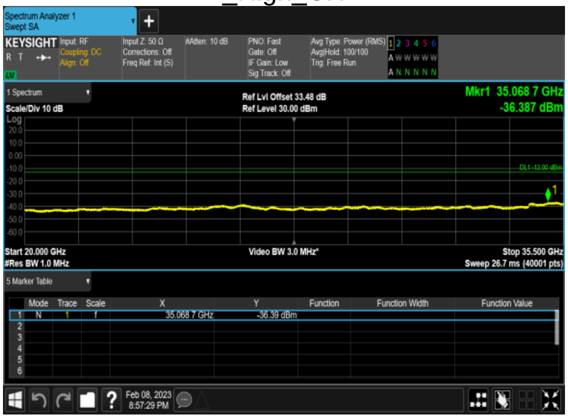
N78(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Mid_CH



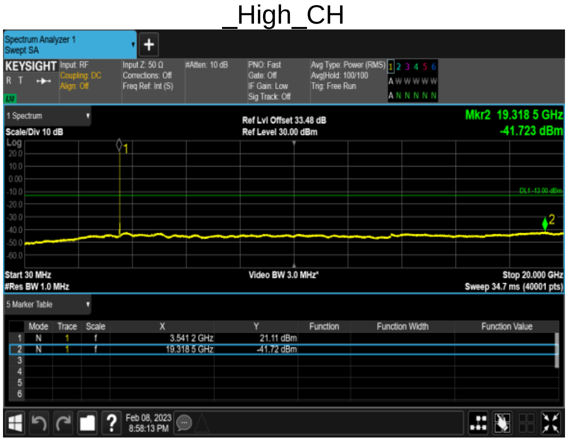
N78(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _High_CH



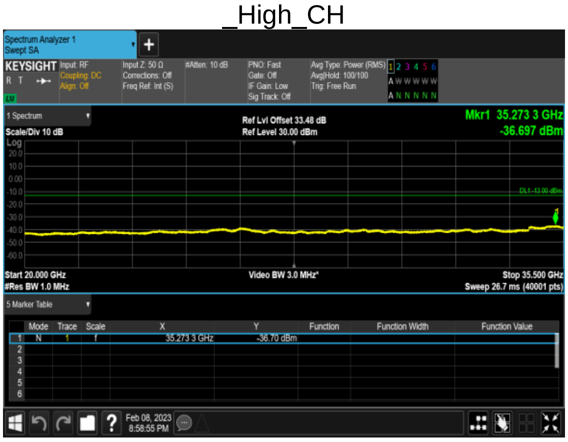
N78(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _High_CH



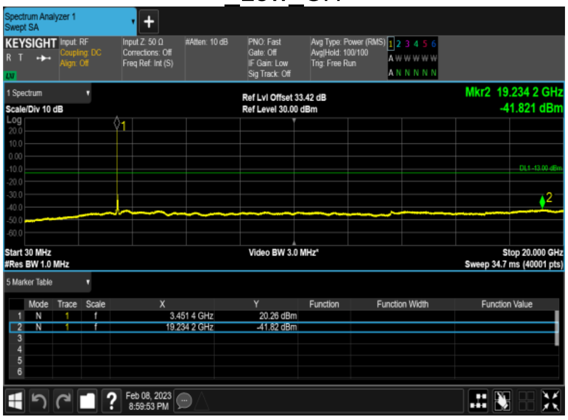
N78(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _High_CH



N78(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _High_CH

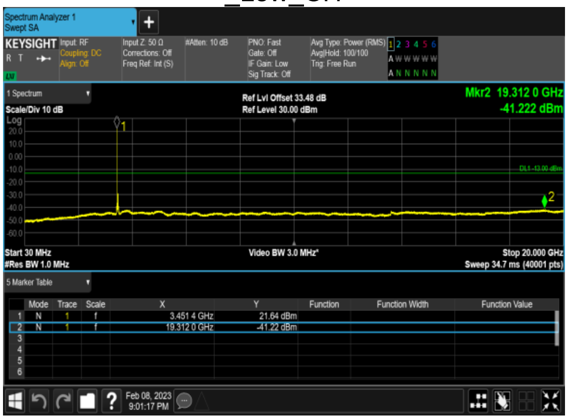


N78(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Low_CH

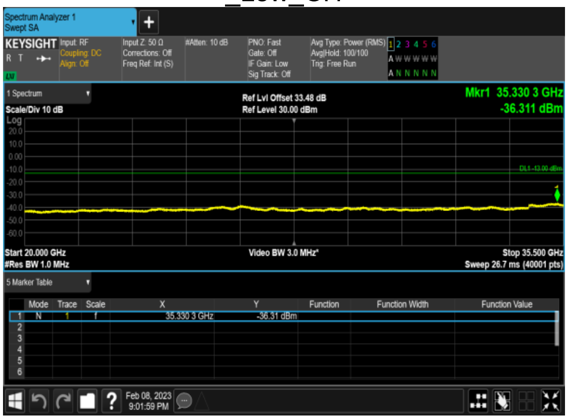


N78(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Low_CH

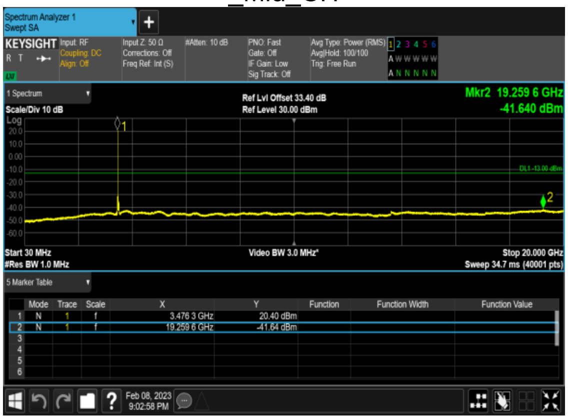
N78(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Low_CH



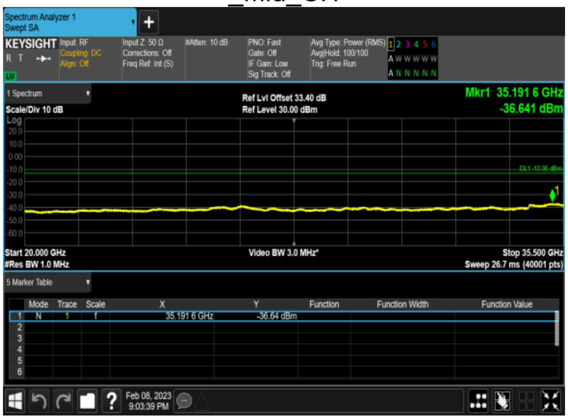
N78(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Low_CH



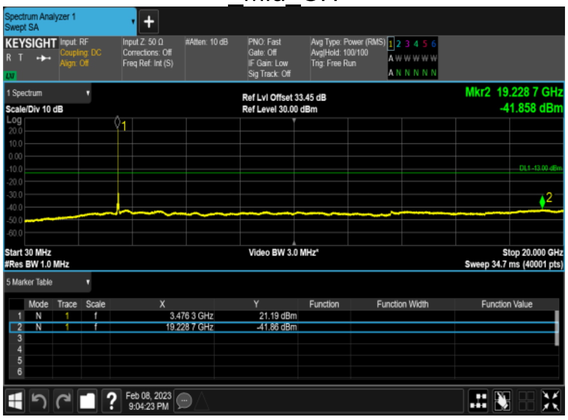
N78(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Mid_CH



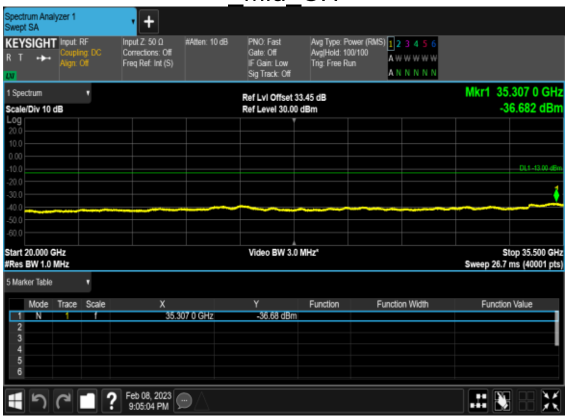
N78(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Mid_CH



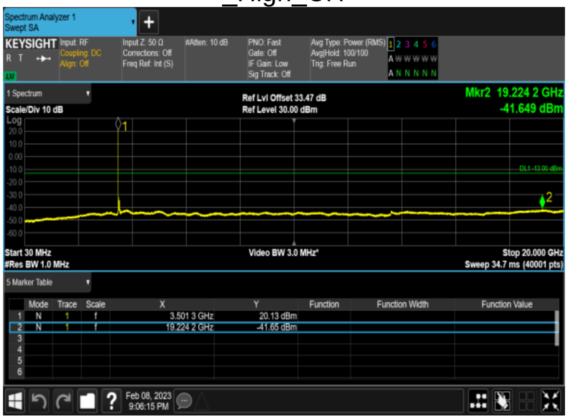
N78(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Mid_CH



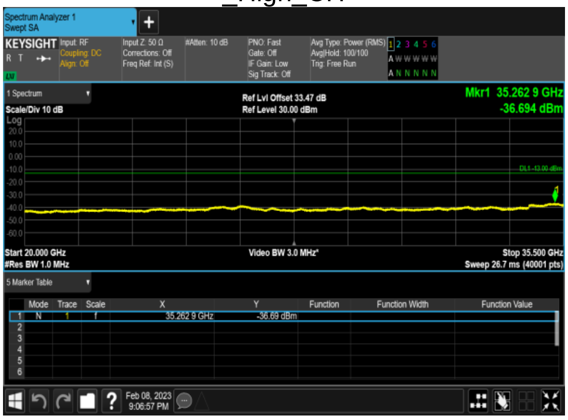
N78(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Mid_CH



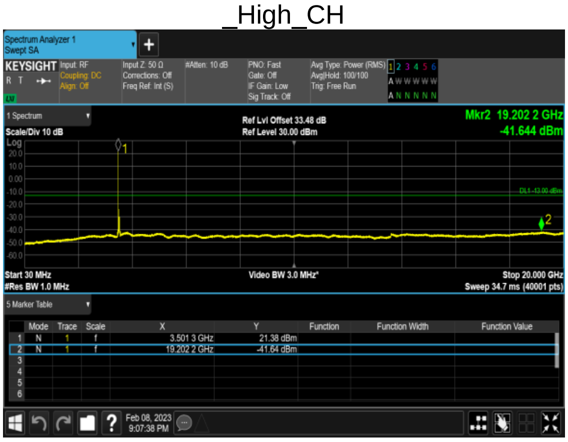
N78(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _High_CH



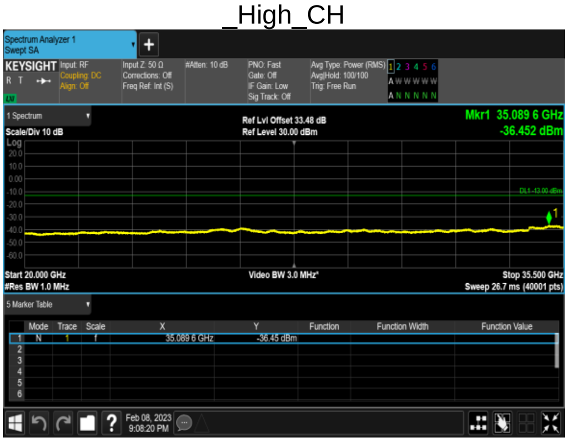
N78(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _High_CH



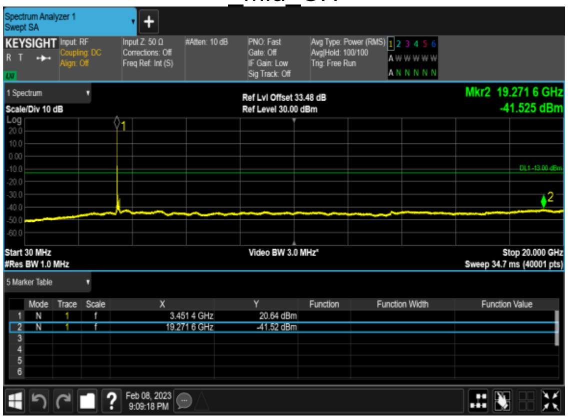
N78(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _High_CH



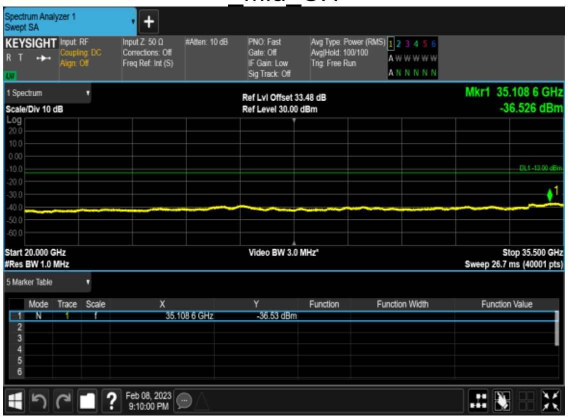
N78(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _High_CH



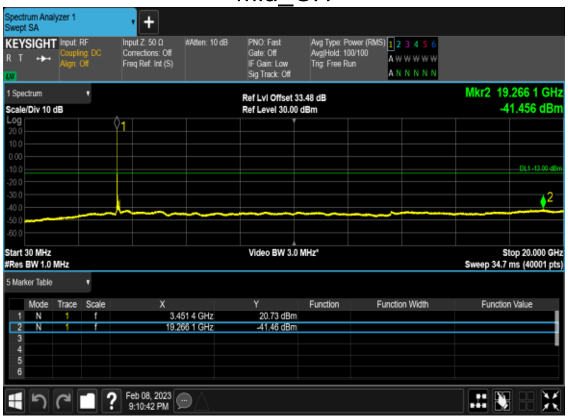
N78(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



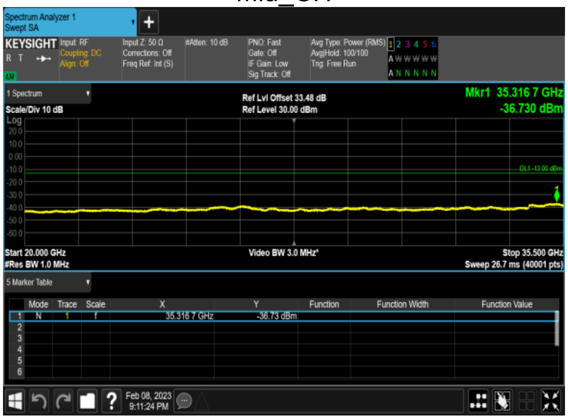
N78(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



N78(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



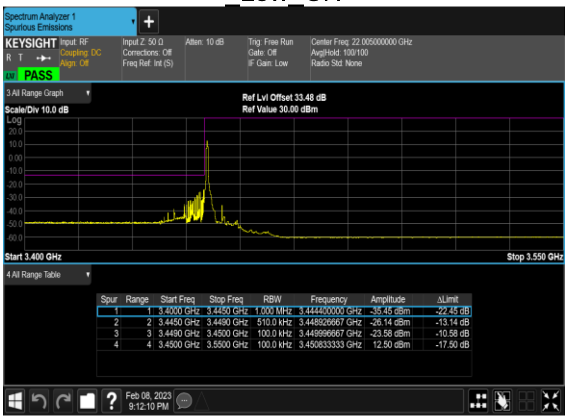
N78(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



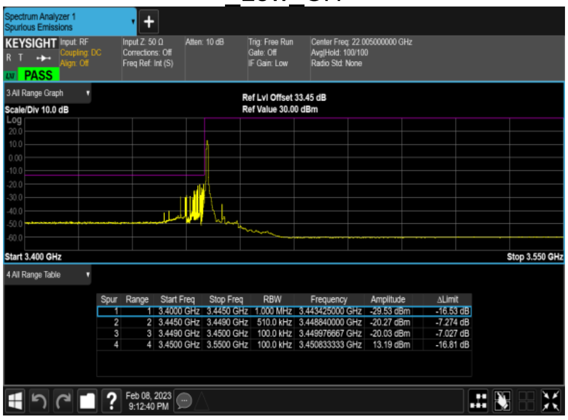
Conducted Band Edge

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
78	30	10	630334	3455.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	10	630334	3455.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	10	630334	3455.01	DFT-s-OFDM BPSK	24@0	see graph	**PASS**
78	30	10	630334	3455.01	DFT-s-OFDM QPSK	24@0	see graph	**PASS**
78	30	10	636332	3544.98	DFT-s-OFDM BPSK	1@23	see graph	**PASS**
78	30	10	636332	3544.98	DFT-s-OFDM QPSK	1@23	see graph	**PASS**
78	30	10	636332	3544.98	DFT-s-OFDM BPSK	24@0	see graph	**PASS**
78	30	10	636332	3544.98	DFT-s-OFDM QPSK	24@0	see graph	**PASS**
78	30	50	631668	3475.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	50	631668	3475.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	50	631668	3475.02	DFT-s-OFDM BPSK	128@0	see graph	**PASS**
78	30	50	631668	3475.02	DFT-s-OFDM QPSK	128@0	see graph	**PASS**
78	30	50	635000	3525.0	DFT-s-OFDM BPSK	1@132	see graph	**PASS**
78	30	50	635000	3525.0	DFT-s-OFDM QPSK	1@132	see graph	**PASS**
78	30	50	635000	3525.0	DFT-s-OFDM BPSK	128@0	see graph	**PASS**
78	30	50	635000	3525.0	DFT-s-OFDM QPSK	128@0	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@272	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@272	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	270@0	see graph	**PASS**
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	270@0	see graph	**PASS**

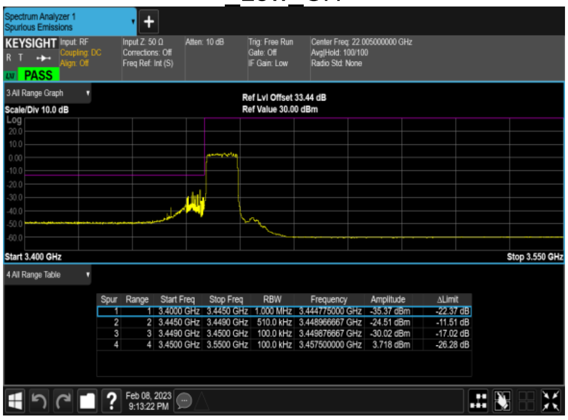
N78(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



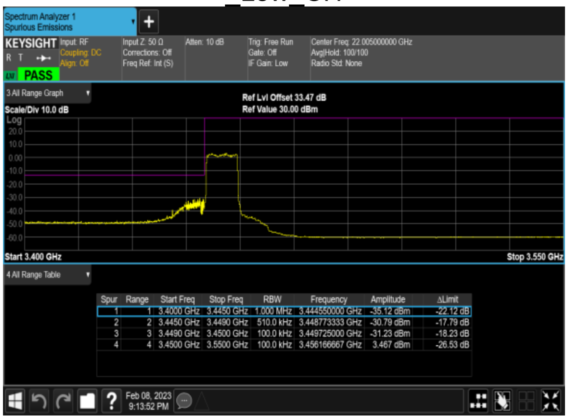
N78(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



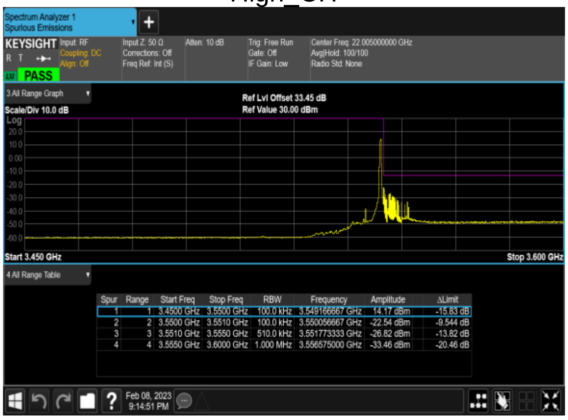
N78(10M)_DFT-s-OFDM_BPSK_Outer_Full_Low_CH



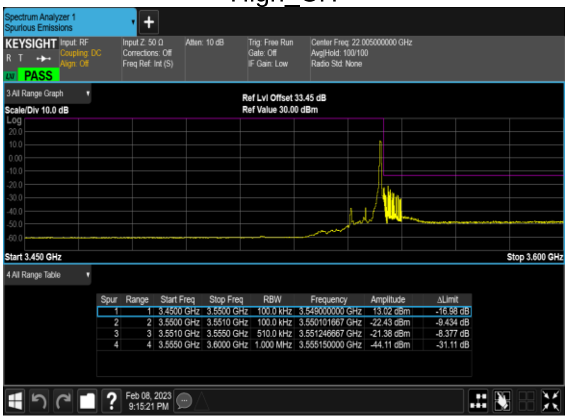
N78(10M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH



N78(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_High_CH



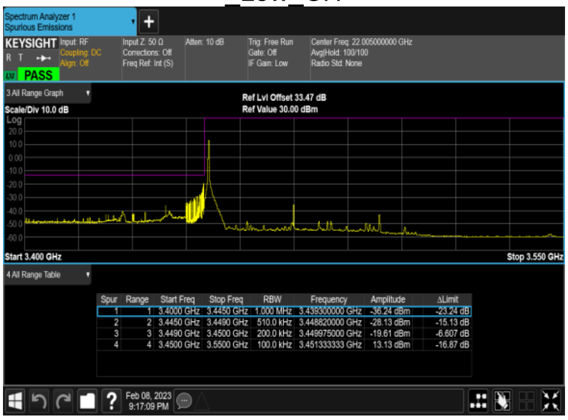
N78(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_High_CH



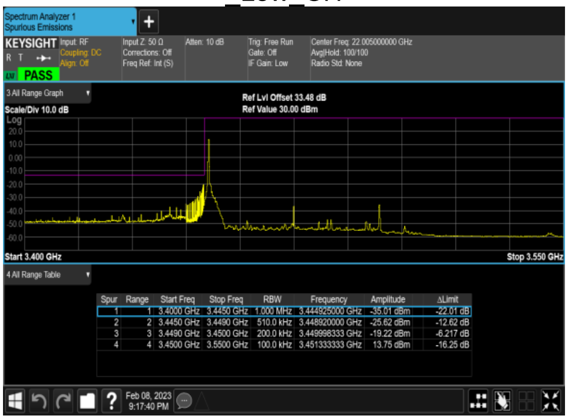
N78(10M)_DFT-s-OFDM_BPSK_Outer_Full _High_CH

N78(10M)_DFT-s-OFDM_QPSK_Outer_Full _High_CH

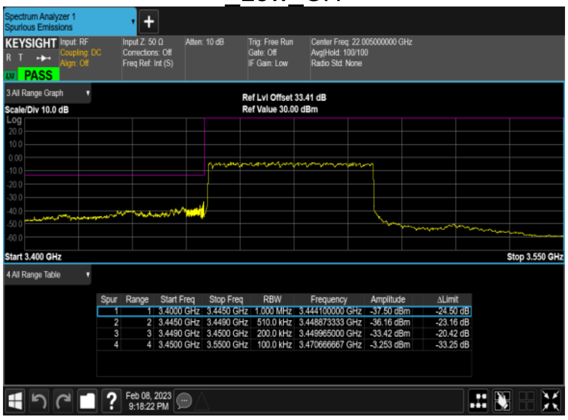
N78(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left _Low_CH



N78(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left _Low_CH



N78(50M)_DFT-s-OFDM_BPSK_Outer_Full _Low_CH



N78(50M)_DFT-s-OFDM_QPSK_Outer_Full _Low_CH