FCC RF Test Report

APPLICANT	: iMozen Group INC.
EQUIPMENT	: Handheld mobile computer
BRAND NAME	: iMozen Group INC.
MODEL NAME	: TC605AN
FCC ID	: SPYTC605AN
STANDARD	: 47 CFR Part 2, Part 27 Subpart Q
CLASSIFICATION	: PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	: Dec. 11, 2023 ~ Dec. 28, 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.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG3N219-02L	Rev. 01	Initial issue of report	Jan. 11, 2024

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 45.11 dB at 13824.00 MHz

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

iMozen Group INC.
6 F., No. 288, Sec. 6, Civic Blvd., Xinyi Dist., Taipei City 110417, Taiwan (R.O.C.)

1.2 Manufacturer

iMozen Group INC.
6 F., No. 288, Sec. 6, Civic Blvd., Xinyi Dist., Taipei City 110417, Taiwan (R.O.C.)

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Handheld mobile computer
Brand Name	iMozen Group INC.
Model Name	TC605AN
FCC ID	SPYTC605AN
IMEI Code	Conducted : 352149450707620 Radiation : 352149450708743/352149450708750
HW Version	V4
SW Version	ST6919A_20231220121856
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: 20 / 30 / 40 / 60 / 80 /100MHz n78: 20 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100MHz
Antenna Gain	**<Ant. 5>** 5G NR n77: 0.86 dBi 5G NR n78: 0.86 dBi **<Ant. 6>** 5G NR n77: -1.85 dBi 5G NR n78: -1.85 dBi **<Ant. 8>** 5G NR n77: 2.62 dBi 5G NR n78: 2.62 dBi **<Ant. 9>** 5G NR n77: 1.22 dBi 5G NR n78: 1.22 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

1. The maximum EIRP is calculated from max output power and max antenna gain, only the maximum EIRP is shown in the report, 5G NR n77/n78 mode for Ant. 8, UL MIMO mode for Ant.(8+5).
2. 5G NR n77/n78 support UL MIMO mode for Ant(8+5), and only supports CP-OFDM Modulation, the MIMO mode is completely uncorrelated, so the directional gain is selected the maximum gain among all antennas.
3. For UL MIMO mode, the conducted BE/Spurious are tested at single antenna port and add 10*log(N_{ANT}) according to KDB 662911 D01.
4. 5G NR n77/n78 support SA and NSA mode. According to the maximum power between SA and NSA mode, SA covers NSA mode, and 5G NR n77 covers n78 for BW 20/30/40/60/80/100MHz, and full test BW 50/70/90MHz for n78.
5. The device supports HPUE(Power class 2) mode for 5G NR n77/n78.
6. All the supported EN-DC combinations are verified conducted power, only the EN-DC combination with highest power are shown in the report.
7. 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 EIRP Power and Emission Designator

5G NR n77 SA		PI/2 BPSK / QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	3460.02 ~ 3540.00	0.5754	18M2G7D	0.4508	18M3W7D
30	3465.00 ~ 3534.99	0.6026	27M8G7D	0.4699	27M9W7D
40	3470.01 ~ 3529.98	0.6053	37M9G7D	0.4699	37M9W7D
60	3480.00 ~ 3519.99	0.5585	57M9G7D	0.4345	57M9W7D
80	3490.02 ~ 3510.00	0.5585	77M5G7D	0.4385	77M6W7D
100	3500.01	0.6067	97M5G7D	0.4227	97M7W7D

5G NR n78 SA		PI/2 BPSK / QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	3460.02 ~ 3540.00	0.5689	18M2G7D	0.4375	18M3W7D
30	3465.00 ~ 3534.99	0.5768	27M8G7D	0.4477	27M9W7D
40	3470.01 ~ 3529.98	0.5861	37M9G7D	0.4550	37M9W7D
50	3475.02 ~ 3525.00	0.5370	47M4G7D	0.4198	47M6W7D
60	3480.00 ~ 3519.99	0.5470	57M9G7D	0.4266	57M9W7D
70	3485.01 ~ 3514.98	0.5445	67M4G7D	0.4246	67M6W7D
80	3490.02 ~ 3510.00	0.5445	77M5G7D	0.4236	77M6W7D
90	3495.00 ~ 3504.99	0.5458	87M3G7D	0.4227	87M5W7D
100	3500.01	0.5875	97M5G7D	0.4130	97M7W7D

5G NR n77 UL MIMO		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	3460.02 ~ 3540.00	0.5148	18M3G7D	0.4514	18M3W7D
30	3465.00 ~ 3534.99	0.5085	27M9G7D	0.4692	27M9W7D
40	3470.01 ~ 3529.98	0.5275	37M8G7D	0.4659	37M9W7D
60	3480.00 ~ 3519.99	0.4880	57M9G7D	0.4359	57M9W7D
80	3490.02 ~ 3510.00	0.4894	77M3G7D	0.4323	77M5W7D
100	3500.01	0.5287	97M7G7D	0.4136	97M8W7D

5G NR n78 UL MIMO		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	3460.02 ~ 3540.00	0.5010	18M3G7D	0.4359	18M3W7D
30	3465.00 ~ 3534.99	0.5102	27M9G7D	0.4477	27M9W7D
40	3470.01 ~ 3529.98	0.5106	37M8G7D	0.4566	37M9W7D
50	3475.02 ~ 3525.00	0.4715	47M6G7D	0.4122	47M6W7D
60	3480.00 ~ 3519.99	0.4805	57M9G7D	0.4259	57M9W7D
70	3485.01 ~ 3514.98	0.4826	67M2G7D	0.4228	67M6W7D
80	3490.02 ~ 3510.00	0.4827	77M3G7D	0.4276	77M5W7D
90	3495.00 ~ 3504.99	0.4818	87M5G7D	0.4207	87M6W7D
100	3500.01	0.5170	97M7G7D	0.4108	97M8W7D

Note:

1. 5G NR Band n77 overlaps the entire frequency range of Band n78, and n77 power > n78 power, therefore the conducted test results of n77 provided in this report cover n78 except Bandwidth 50/70/90MHz.
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	Manufacture	Name	Version
1.	TH01-KS	SPORTON	FCC_5GNR_China_2 01027	1.0
2.	03CH04-KS	AUDIX	E3	210616

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.

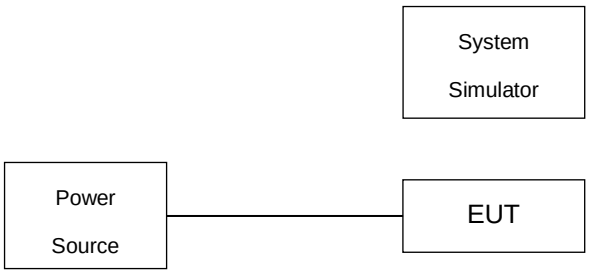
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (X Plane)

Test Cases	Band	Bandwidth (MHz)	Modulation	RB #	Test Channel
		eg. 5M, 10M, 15M, 20M	eg. PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1RB, Partial RB, Full RB	L/M/H
Max. Output Power	5G n77	20M, 30M, 40M, 60M, 80M, 100M	All Modulations	1RB , Full RB	L, M, H
	5G n78	20M, 30M, 40M, 50M, 60M, 70M, 80M, 90M ,100M	All Modulations	1RB, Full RB	L, M, H
Peak-to-Average Ratio	5G n77	20M	PI/2 BPSK, QPSK	1RB, Full RB	M
	5G n78	50M	PI/2 BPSK, QPSK	1RB, Full RB	M
E.I.R.P	5G n77	20M, 30M, 40M, 60M, 80M, 100M	All Modulations	1RB , Full RB	L, M, H
	5G n78	20M, 30M, 40M, 50M, 60M, 70M, 80M, 90M ,100M	All Modulations	1RB, Full RB	L, M, H
26dB and 99% Bandwidth	5G n77	20M, 30M, 40M, 60M, 80M, 100M	QPSK, 16QAM, 64QAM, 256QAM	Full RB	M
	5G n78	50M, 70M, 90M	QPSK, 16QAM, 64QAM, 256QAM	Full RB	M
Conducted Band Edge	5G n77	20M, 60M, 100M	PI/2 BPSK, QPSK	1RB, Full RB	L, H
	5G n78	50M, 70M, 90M	PI/2 BPSK, QPSK	1RB, Full RB	L, H
Conducted Spurious Emission	5G n77	20M, 60M, 100M	PI/2 BPSK, QPSK	1RB	L, M, H
	5G n78	50M, 70M, 90M	PI/2 BPSK, QPSK	1RB	L, M, H
Frequency Stability	5G n77	20M	QPSK	Full RB	M
	5G n78	50M	QPSK	Full RB	M
Radiated Spurious Emission	5G n77	Worst case from maximum power			M
	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 = 3.87V ; Low Voltage =3.6V.; High Voltage =4.2V.

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.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m

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 16.91 dB and 10dB attenuator.

Example :

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

= 16.91 + 10 = 26.91 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G n77/n78 Channel and Frequency List				
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
70	Channel	632334	633334	634332
	Frequency	3485.01	3500.01	3514.98
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
20	Channel	630668	633334	636000
	Frequency	3460.02	3500.01	3540

Note: n77 does not support bandwidth 50/70/90MHz.

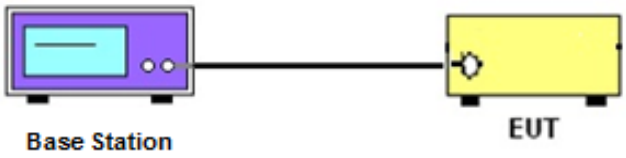
3 Conducted Test Items

3.1 Measuring Instruments

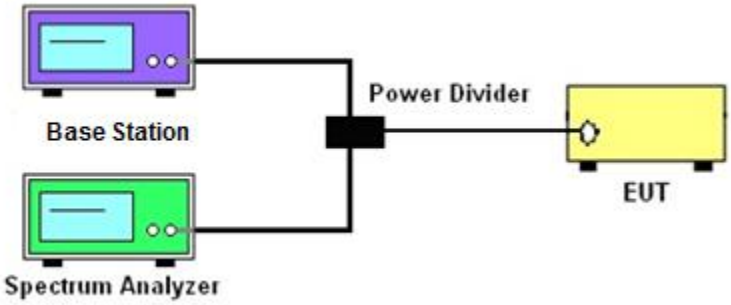
See list of measuring instruments of this test report.

3.2 Test Setup

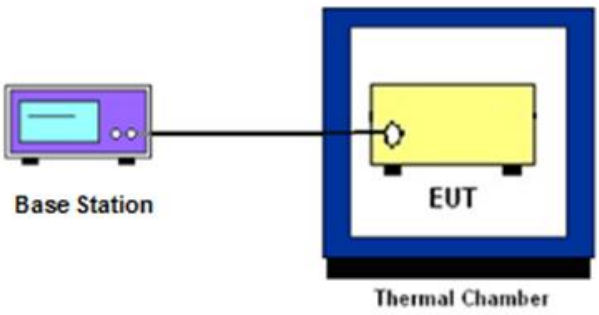
3.2.1 Conducted Output Power



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 10^{th} 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.

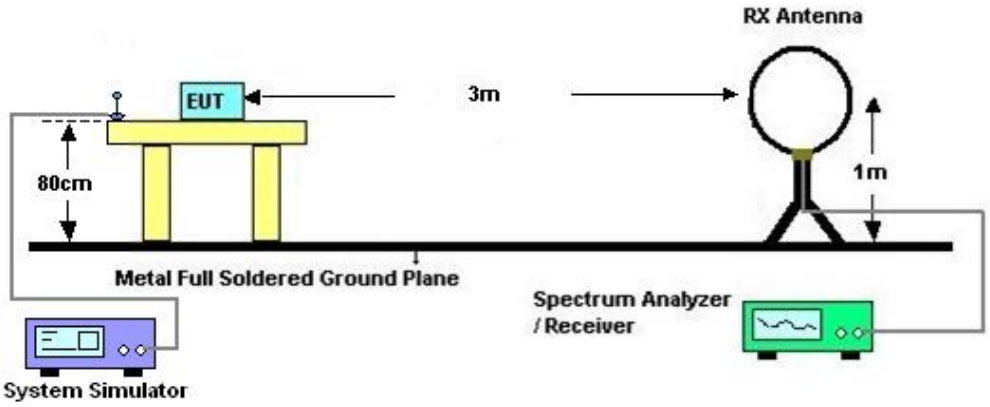
4 Radiated Test Items

4.1 Measuring Instruments

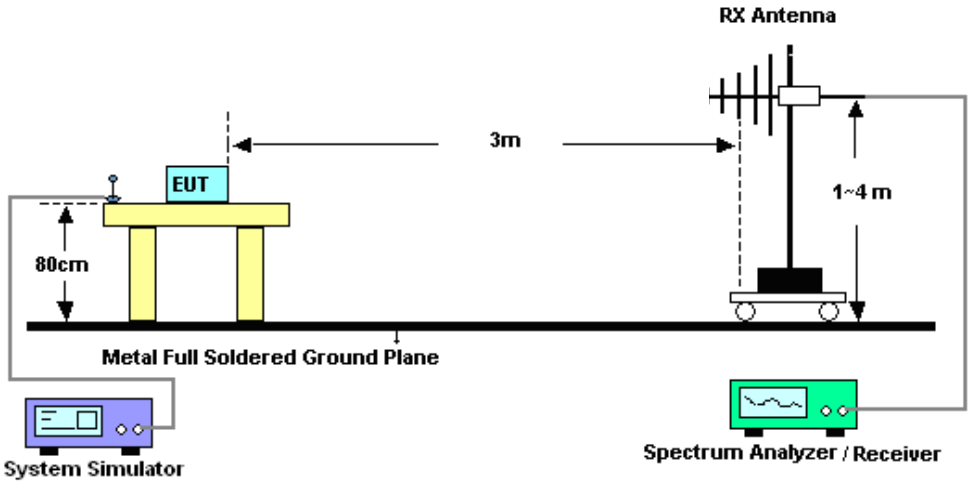
See list of measuring instruments of this test report.

4.2 Test Setup

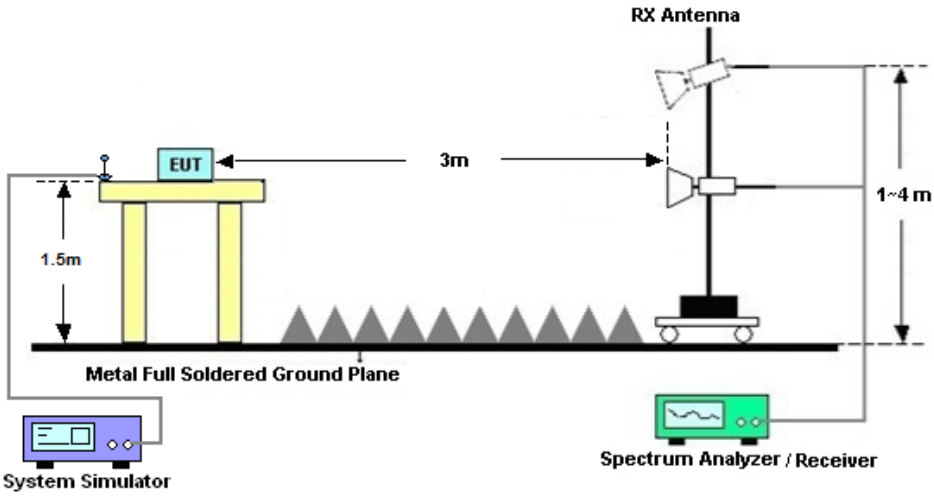
4.2.1 For radiated test below 30MHz



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 C63.26. 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. 11, 2023	Dec. 11, 2023~ Dec. 28, 2023	Oct. 10, 2024	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Dec. 11, 2023~ Dec. 28, 2023	NCR	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 06, 2023	Dec. 11, 2023~ Dec. 28, 2023	Jul. 05, 2024	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 10, 2023	Dec. 19, 2023	Oct. 09, 2024	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 11 2023	Dec. 19, 2023	Sep. 10, 2024	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Apr. 09, 2023	Dec. 19, 2023	Apr. 08, 2024	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 10, 2023	Dec. 19, 2023	Oct. 09, 2024	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Dec. 19, 2023	Jan. 07, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 06, 2023	Dec. 19, 2023	Jul. 05, 2024	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2023	Dec. 19, 2023	Jan. 04, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 10, 2023	Dec. 19, 2023	Oct. 09, 2024	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 10, 2023	Dec. 19, 2023	Oct. 09, 2024	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 19, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 19, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 19, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Measurement Uncertainty

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

Conducted Spurious Emission & Bandedge	**±2.26 dB**
Occupied Channel Bandwidth	**±0.1%**
Conducted Power	**±0.46 dB**
Peak to Average Ratio	**±0.46 dB**
Frequency Stability	**±0.4 Hz**

Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.82**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.56**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.54**

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

Appendix A. Test Results of Conducted Test

Test Engineer :	Jung Kuo	**Temperature :**	22~23℃
		Relative Humidity :	40~42%

Software Version: 23.06.1602

FR1 N77(ANT8)

Transmitter Conducted Output Power And EIRP,(G_T - L_C)=2.62dB

NR Band	SCS	BandWidth	Arfcn	Freq(MHz)	Modulation	RB	Conducted Power(dBm)	EIRP(dBm)	EIRP(W)
77	30	20	630668	3460.02	DFT-s-OFDM PI/2 BPSK	1@1	24.9	27.52	0.5649
77	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@1	24.88	27.5	0.5623
77	30	20	630668	3460.02	DFT-s-OFDM 16 QAM	1@1	23.82	26.44	0.4406
77	30	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	24.82	27.44	0.5546
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@1	24.82	27.44	0.5546
77	30	20	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	23.75	26.37	0.4335
77	30	20	636000	3540	DFT-s-OFDM PI/2 BPSK	1@1	24.98	27.6	0.5754
77	30	20	636000	3540	DFT-s-OFDM QPSK	1@1	24.94	27.56	0.5702
77	30	20	636000	3540	DFT-s-OFDM 16 QAM	1@1	23.92	26.54	0.4508
77	30	30	631000	3465	DFT-s-OFDM PI/2 BPSK	1@1	25.05	27.67	0.5848
77	30	30	631000	3465	DFT-s-OFDM QPSK	1@1	25.01	27.63	0.5794
77	30	30	631000	3465	DFT-s-OFDM 16 QAM	1@1	23.97	26.59	0.4560
77	30	30	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	25	27.62	0.5781
77	30	30	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.02	27.64	0.5808
77	30	30	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	23.97	26.59	0.4560
77	30	30	635666	3534.99	DFT-s-OFDM PI/2 BPSK	1@1	25.18	27.8	0.6026
77	30	30	635666	3534.99	DFT-s-OFDM QPSK	1@1	25.14	27.76	0.5970
77	30	30	635666	3534.99	DFT-s-OFDM 16 QAM	1@1	24.1	26.72	0.4699
77	30	40	631334	3470.01	DFT-s-OFDM PI/2 BPSK	1@1	25.12	27.74	0.5943
77	30	40	631334	3470.01	DFT-s-OFDM QPSK	1@1	25.09	27.71	0.5902
77	30	40	631334	3470.01	DFT-s-OFDM 16 QAM	1@1	24	26.62	0.4592
77	30	40	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	25.06	27.68	0.5861
77	30	40	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.07	27.69	0.5875
77	30	40	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	24.02	26.64	0.4613
77	30	40	635332	3529.98	DFT-s-OFDM PI/2 BPSK	1@1	25.2	27.82	0.6053
77	30	40	635332	3529.98	DFT-s-OFDM QPSK	1@1	25.2	27.82	0.6053
77	30	40	635332	3529.98	DFT-s-OFDM 16 QAM	1@1	24.1	26.72	0.4699
77	30	60	632000	3480	DFT-s-OFDM PI/2 BPSK	1@1	24.73	27.35	0.5433
77	30	60	632000	3480	DFT-s-OFDM QPSK	1@1	24.8	27.42	0.5521

77	30	60	632000	3480	DFT-s-OFDM 16 QAM	1@1	23.73	26.35	0.4315
77	30	60	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	24.8	27.42	0.5521
77	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@1	24.85	27.47	0.5585
77	30	60	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	23.76	26.38	0.4345
77	30	60	634666	3519.99	DFT-s-OFDM PI/2 BPSK	1@1	24.78	27.4	0.5495
77	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@1	24.76	27.38	0.5470
77	30	60	634666	3519.99	DFT-s-OFDM 16 QAM	1@1	23.66	26.28	0.4246
77	30	80	632668	3490.02	DFT-s-OFDM PI/2 BPSK	1@1	24.85	27.47	0.5585
77	30	80	632668	3490.02	DFT-s-OFDM QPSK	1@1	24.81	27.43	0.5534
77	30	80	632668	3490.02	DFT-s-OFDM 16 QAM	1@1	23.65	26.27	0.4236
77	30	80	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	24.84	27.46	0.5572
77	30	80	633334	3500.01	DFT-s-OFDM QPSK	1@1	24.77	27.39	0.5483
77	30	80	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	23.74	26.36	0.4325
77	30	80	634000	3510	DFT-s-OFDM PI/2 BPSK	1@1	24.85	27.47	0.5585
77	30	80	634000	3510	DFT-s-OFDM QPSK	1@1	24.82	27.44	0.5546
77	30	80	634000	3510	DFT-s-OFDM 16 QAM	1@1	23.8	26.42	0.4385
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	135@67	25.11	27.73	0.5929
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	25.21	27.83	0.6067
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@271	24.98	27.6	0.5754
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	135@67	24.85	27.47	0.5585
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@1	24.76	27.38	0.5470
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@271	24.66	27.28	0.5346
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	135@67	23.63	26.25	0.4217
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	23.64	26.26	0.4227
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@271	23.62	26.24	0.4207
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	135@67	22.13	24.75	0.2985
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@1	22.06	24.68	0.2938
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@271	21.8	24.42	0.2767
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	135@67	20.11	22.73	0.1875
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@1	20.18	22.8	0.1905
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@271	20.07	22.69	0.1858
77	30	100	633334	3500.01	CP-OFDM QPSK	137@68	23.16	25.78	0.3784
77	30	100	633334	3500.01	CP-OFDM QPSK	1@1	23.27	25.89	0.3882
77	30	100	633334	3500.01	CP-OFDM QPSK	1@271	23.11	25.73	0.3741

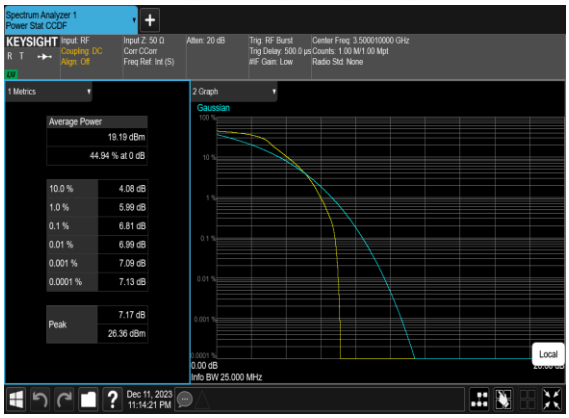
Frequency Stability

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
77	30	20	633334	3500.01	DFT-s-OFDM QPS	50@0	-0.0021	**PASS**	NV
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0025	**PASS**	LV
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0012	**PASS**	HV
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0011	**PASS**	-30℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0024	**PASS**	-20℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0035	**PASS**	-10℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0024	**PASS**	0℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	-0.0017	**PASS**	10℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0036	**PASS**	20℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0024	**PASS**	30℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0014	**PASS**	40℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0084	**PASS**	50℃

Peak to Average Ratio

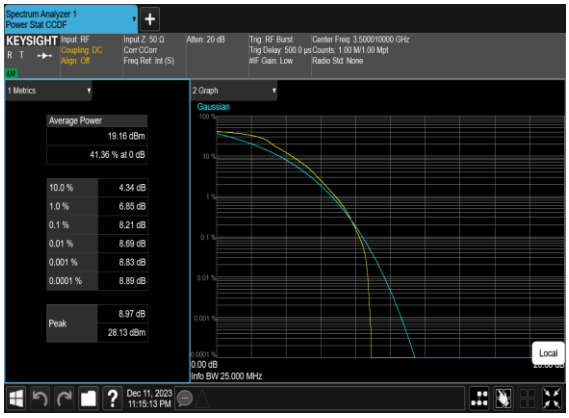
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
77	30	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	50@0	6.81	13	**PASS**
77	30	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@0	7.21	13	**PASS**
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	8.21	13	**PASS**
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@0	9.14	13	**PASS**

N77(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

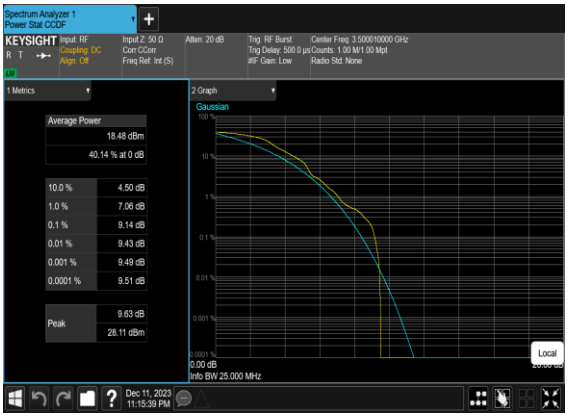


N77(20M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH

N77(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



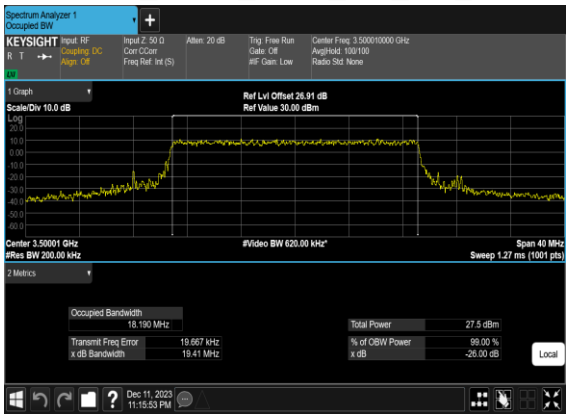
N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



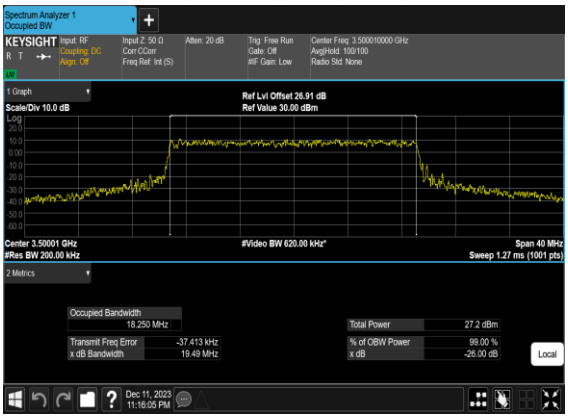
Occupied Bandwidth

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	18.19	19.41
77	30	20	633334	3500.01	CP-OFDM 16 QAM	51@0	18.25	19.49
77	30	20	633334	3500.01	CP-OFDM 64 QAM	51@0	18.185	20.03
77	30	20	633334	3500.01	CP-OFDM 256 QAM	51@0	18.181	19.27
77	30	30	633334	3500.01	CP-OFDM QPSK	78@0	27.818	29.75
77	30	30	633334	3500.01	CP-OFDM 16 QAM	78@0	27.738	29.58
77	30	30	633334	3500.01	CP-OFDM 64 QAM	78@0	27.869	29.09
77	30	30	633334	3500.01	CP-OFDM 256 QAM	78@0	27.805	29.33
77	30	40	633334	3500.01	CP-OFDM QPSK	106@0	37.874	39.23
77	30	40	633334	3500.01	CP-OFDM 16 QAM	106@0	37.914	39.71
77	30	40	633334	3500.01	CP-OFDM 64 QAM	106@0	37.833	39.48
77	30	40	633334	3500.01	CP-OFDM 256 QAM	106@0	37.822	39.27
77	30	60	633334	3500.01	CP-OFDM QPSK	162@0	57.88	60.31
77	30	60	633334	3500.01	CP-OFDM 16 QAM	162@0	57.845	59.87
77	30	60	633334	3500.01	CP-OFDM 64 QAM	162@0	57.934	59.89
77	30	60	633334	3500.01	CP-OFDM 256 QAM	162@0	57.867	59.92
77	30	80	633334	3500.01	CP-OFDM QPSK	217@0	77.459	79.94
77	30	80	633334	3500.01	CP-OFDM 16 QAM	217@0	77.613	79.92
77	30	80	633334	3500.01	CP-OFDM 64 QAM	217@0	77.469	79.84
77	30	80	633334	3500.01	CP-OFDM 256 QAM	217@0	77.326	80.01
77	30	100	633334	3500.01	CP-OFDM QPSK	273@0	97.523	100.4
77	30	100	633334	3500.01	CP-OFDM 16 QAM	273@0	97.503	100.7
77	30	100	633334	3500.01	CP-OFDM 64 QAM	273@0	97.389	100.6
77	30	100	633334	3500.01	CP-OFDM 256 QAM	273@0	97.677	100.8

N77(20M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

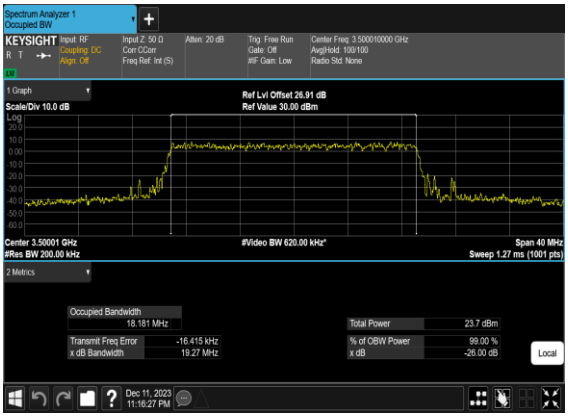


N77(20M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

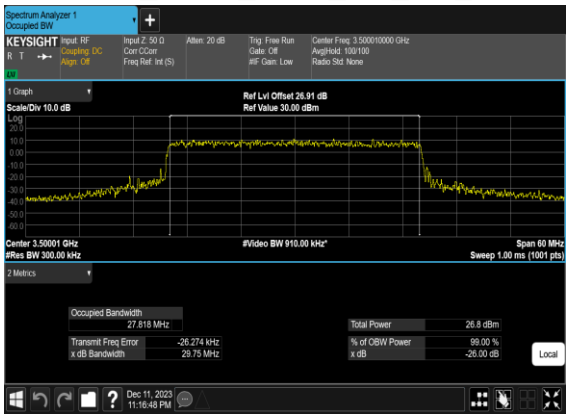


N77(20M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

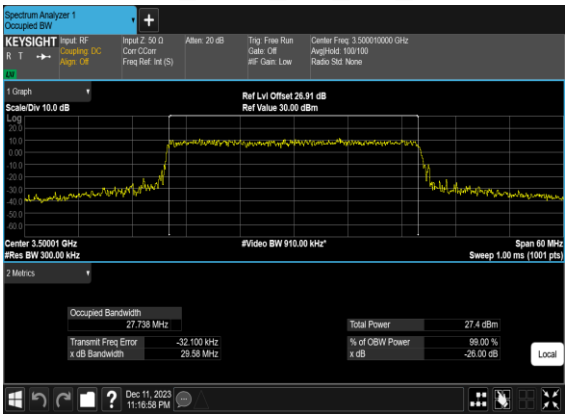
N77(20M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



N77(30M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

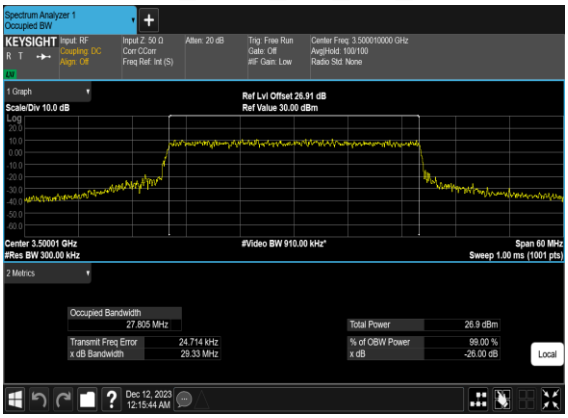


N77(30M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

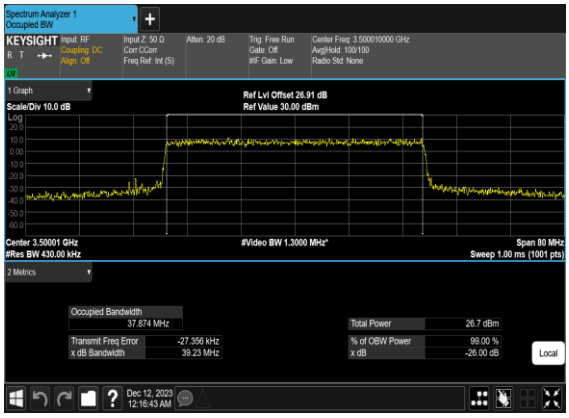


N77(30M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

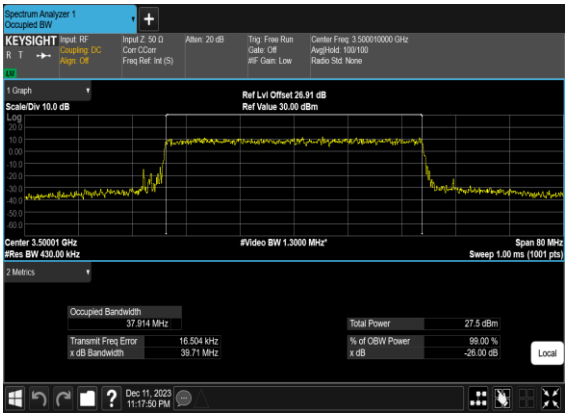
N77(30M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



N77(40M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



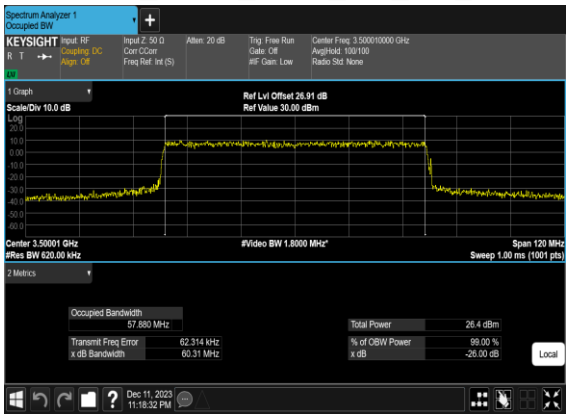
N77(40M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



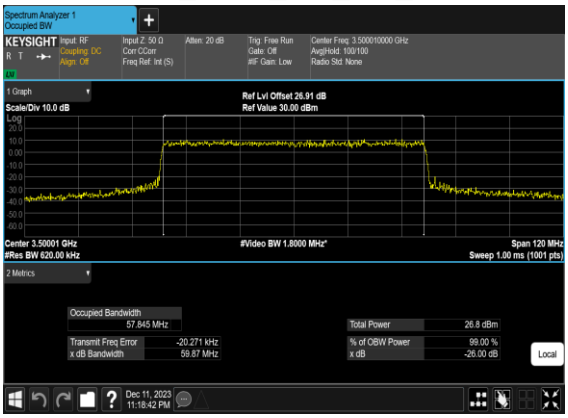
N77(40M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

N77(40M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

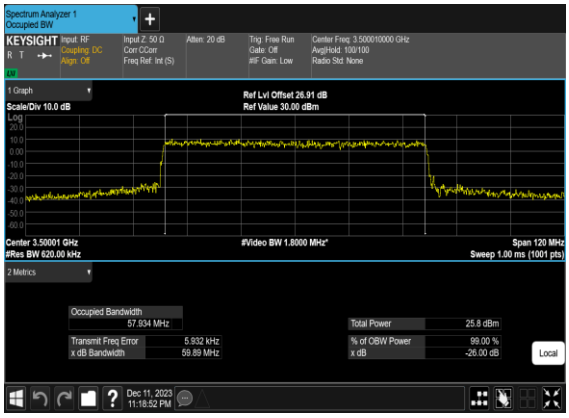
N77(60M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



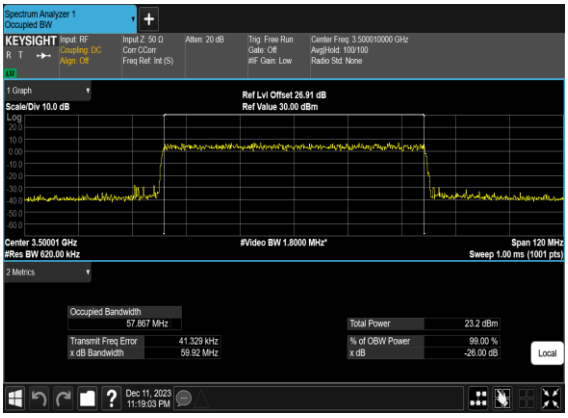
N77(60M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N77(60M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

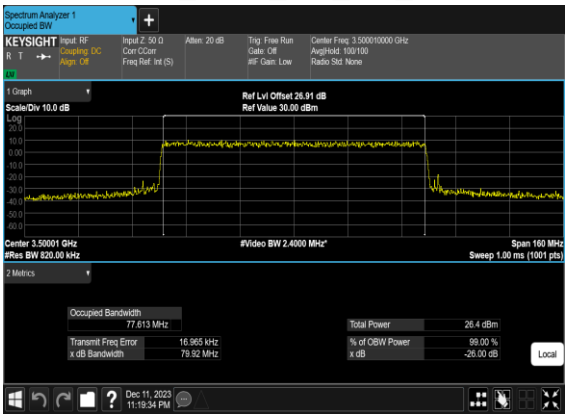


N77(60M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



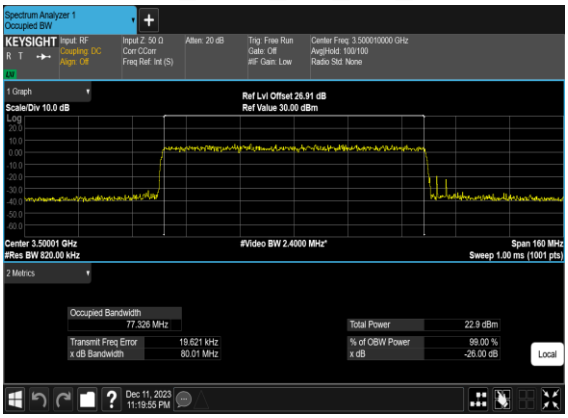
N77(80M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

N77(80M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

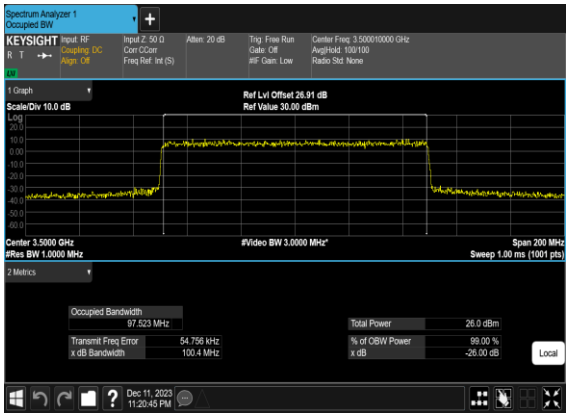


N77(80M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

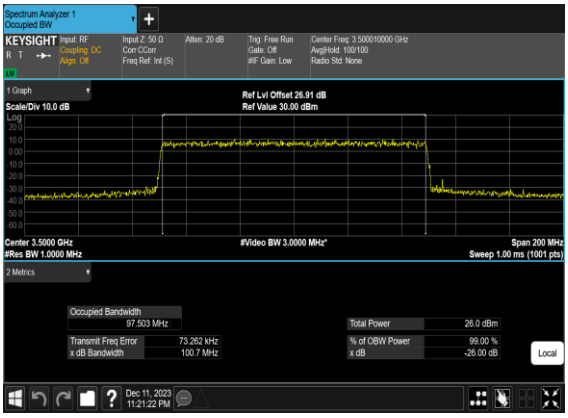
N77(80M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



N77(100M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

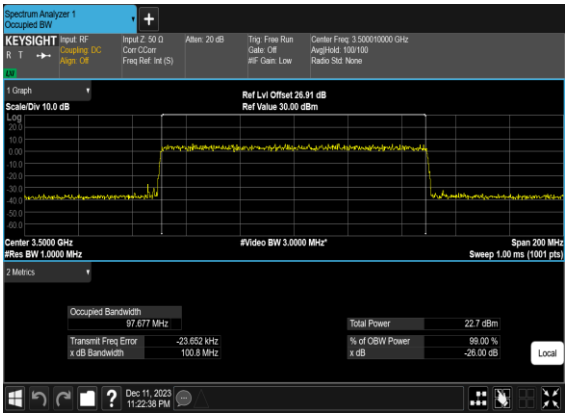


N77(100M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N77(100M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

N77(100M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

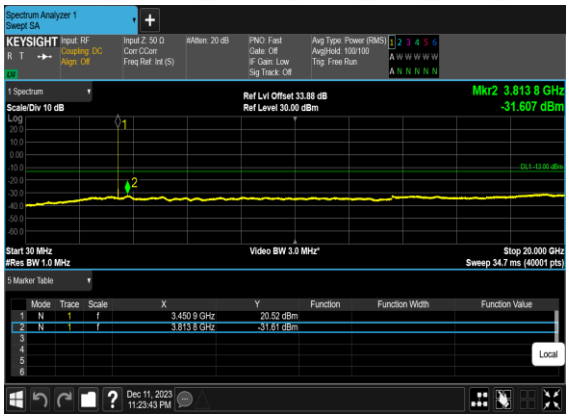


Conducted Spurious Emissions

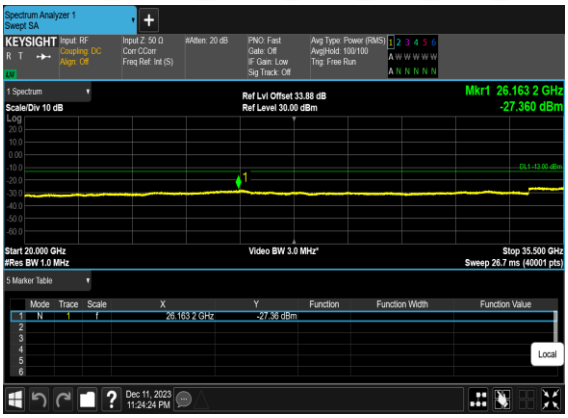
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
77	30	20	630668	3460.02	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	30	20	630668	3460.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	20	630668	3460.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	20	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	30	20	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	20	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	20	636000	3540.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	30	20	636000	3540.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	20	636000	3540.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	20	636000	3540.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	30	20	636000	3540.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	20	636000	3540.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	60	632000	3480.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	30	60	632000	3480.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	60	632000	3480.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**

77	30	60	632000	3480.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	30	60	632000	3480.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	60	632000	3480.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	60	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	30	60	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	60	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	60	634666	3519.99	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	30	60	634666	3519.99	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	60	634666	3519.99	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**

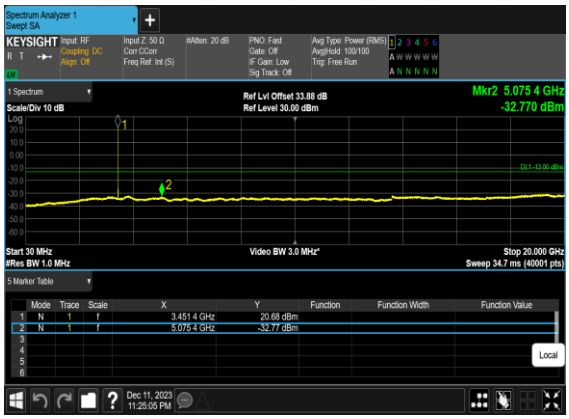
N77(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



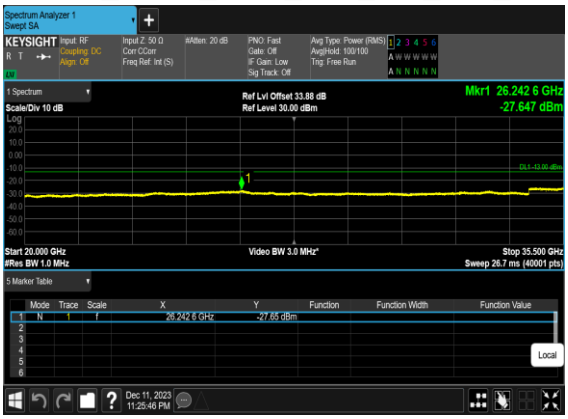
N77(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



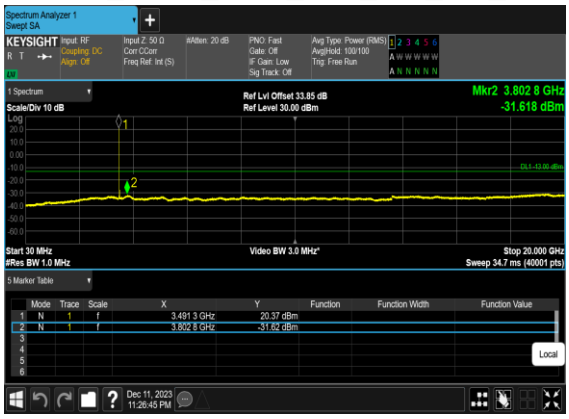
N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH

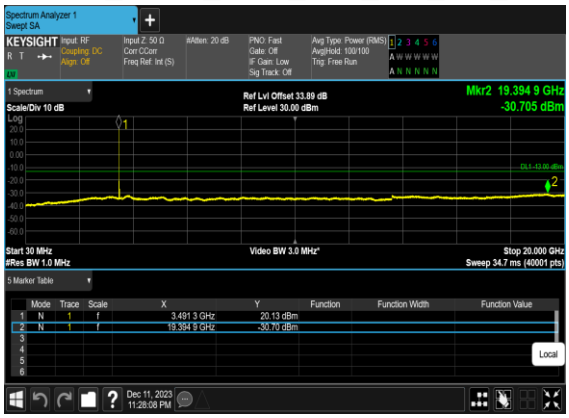


N77(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH

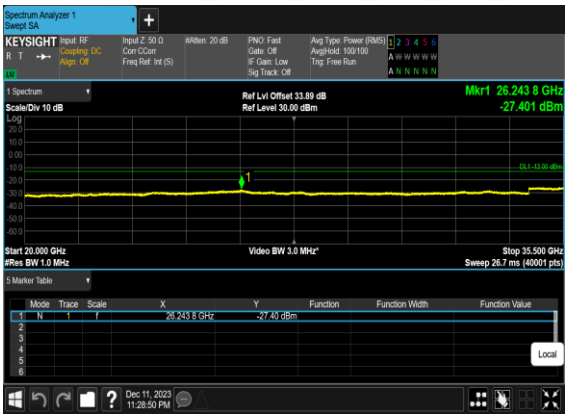


N77(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH

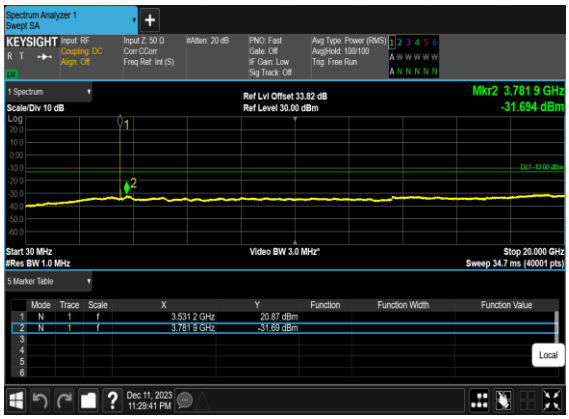
N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



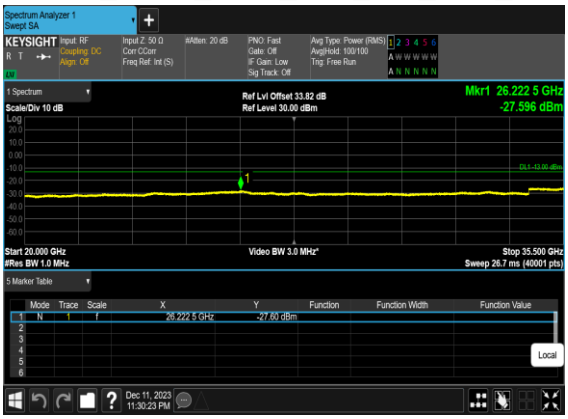
N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



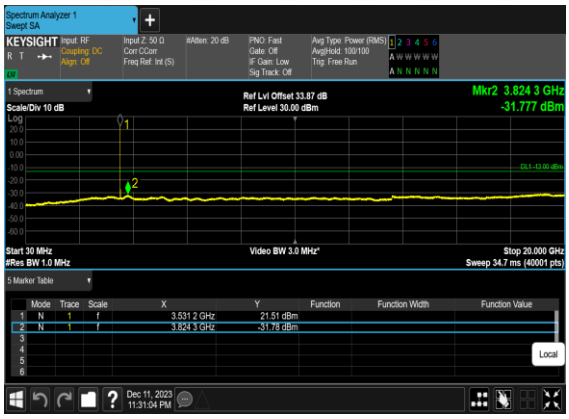
N77(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



N77(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH

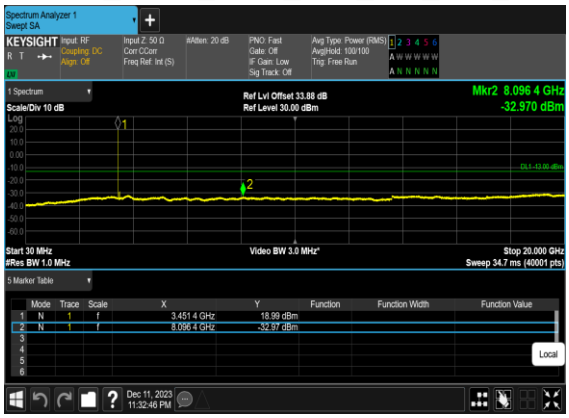


N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH

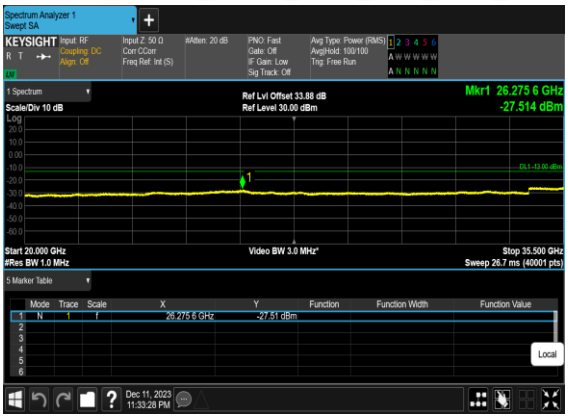


N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH

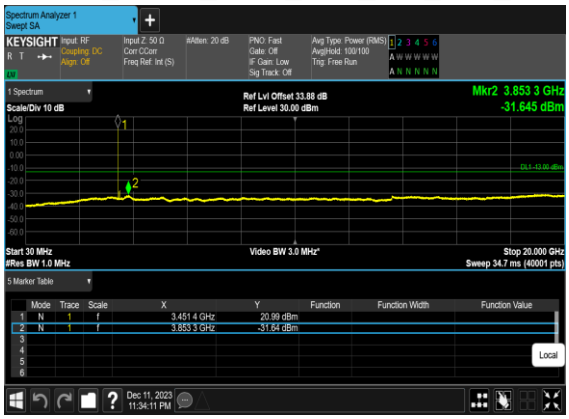
N77(60M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



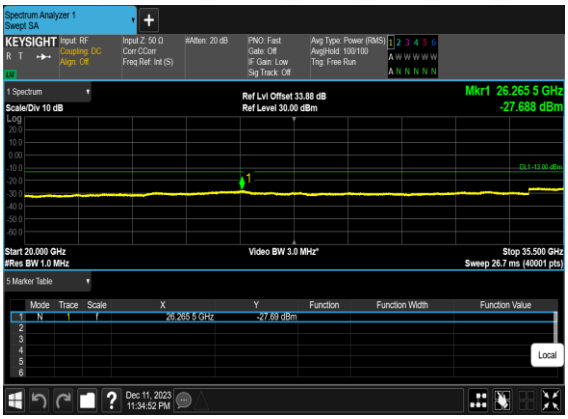
N77(60M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



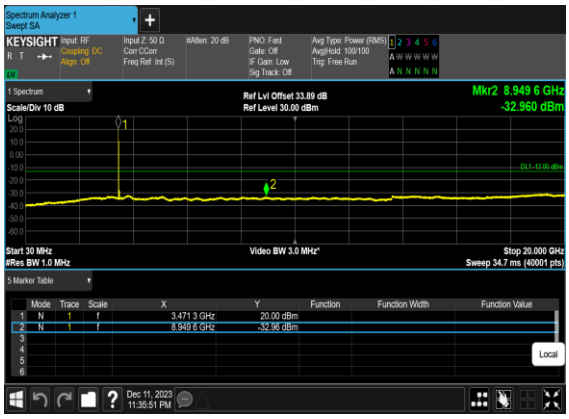
N77(60M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



N77(60M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH

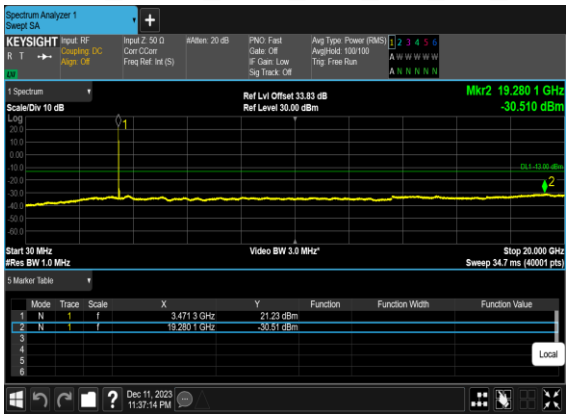


N77(60M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH

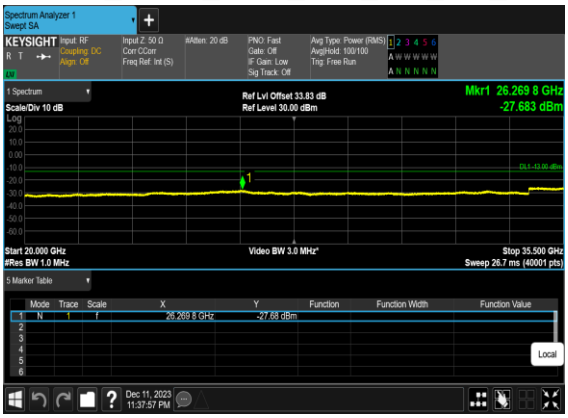


N77(60M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH

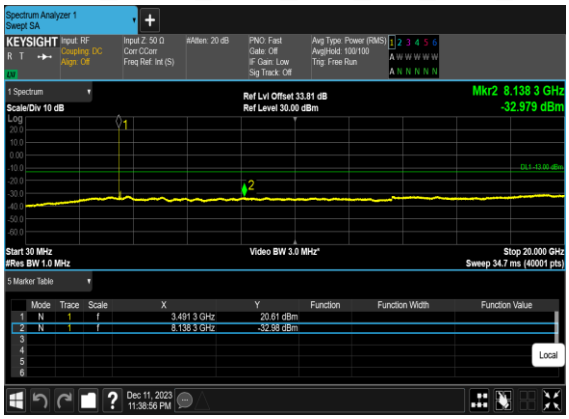
N77(60M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



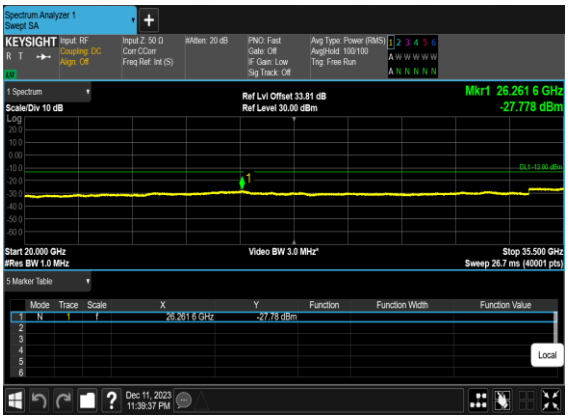
N77(60M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



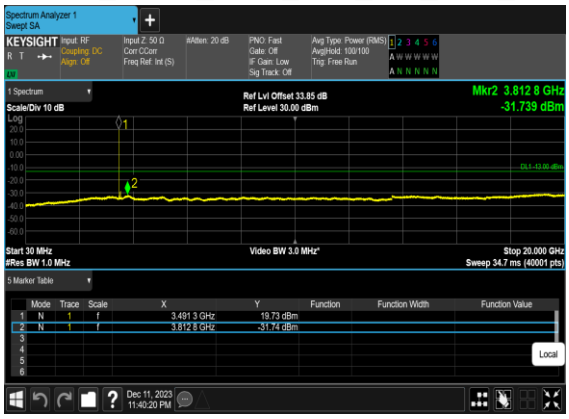
N77(60M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



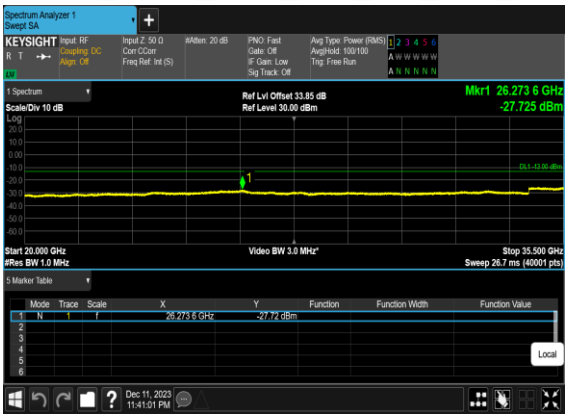
N77(60M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



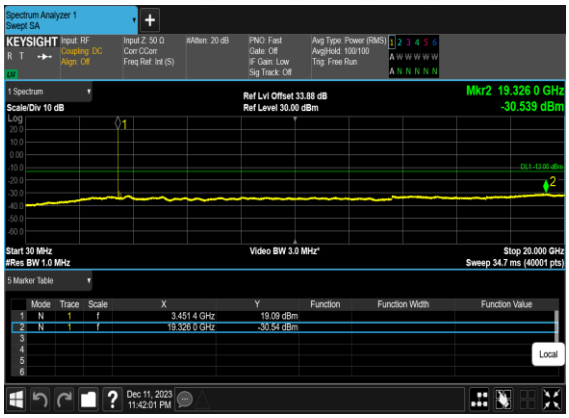
N77(60M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



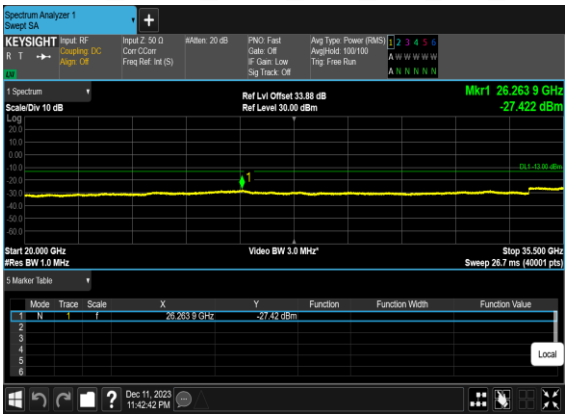
N77(60M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



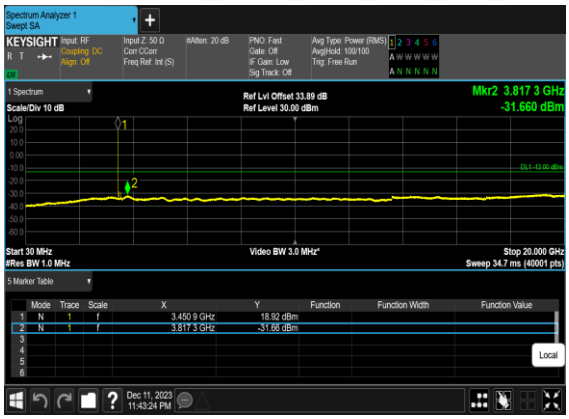
N77(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



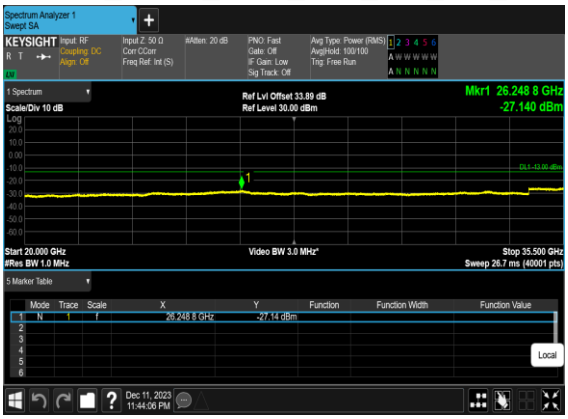
N77(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



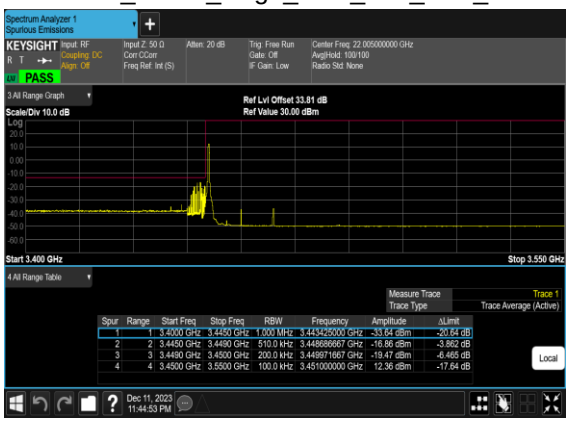
N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



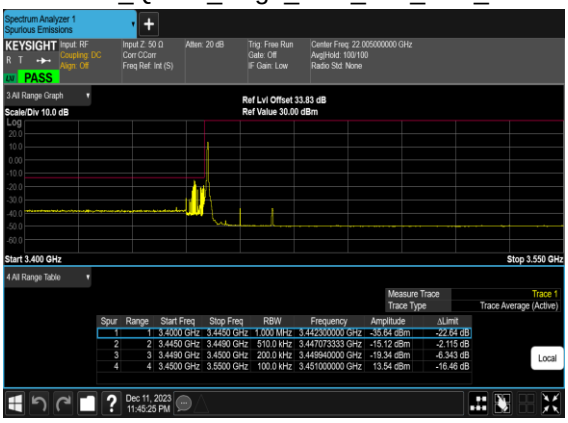
Conducted Band Edge

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
77	30	20	630668	3460.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	20	630668	3460.02	DFT-s-OFDM BPSK	50@0	see graph	**PASS**
77	30	20	630668	3460.02	DFT-s-OFDM QPSK	50@0	see graph	**PASS**
77	30	20	636000	3540.0	DFT-s-OFDM BPSK	1@50	see graph	**PASS**
77	30	20	636000	3540.0	DFT-s-OFDM QPSK	1@50	see graph	**PASS**
77	30	20	636000	3540.0	DFT-s-OFDM BPSK	50@0	see graph	**PASS**
77	30	20	636000	3540.0	DFT-s-OFDM QPSK	50@0	see graph	**PASS**
77	30	60	632000	3480.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	60	632000	3480.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	60	632000	3480.0	DFT-s-OFDM BPSK	162@0	see graph	**PASS**
77	30	60	632000	3480.0	DFT-s-OFDM QPSK	162@0	see graph	**PASS**
77	30	60	634666	3519.99	DFT-s-OFDM BPSK	1@161	see graph	**PASS**
77	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@161	see graph	**PASS**
77	30	60	634666	3519.99	DFT-s-OFDM BPSK	162@0	see graph	**PASS**
77	30	60	634666	3519.99	DFT-s-OFDM QPSK	162@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@272	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@272	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	270@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	270@0	see graph	**PASS**

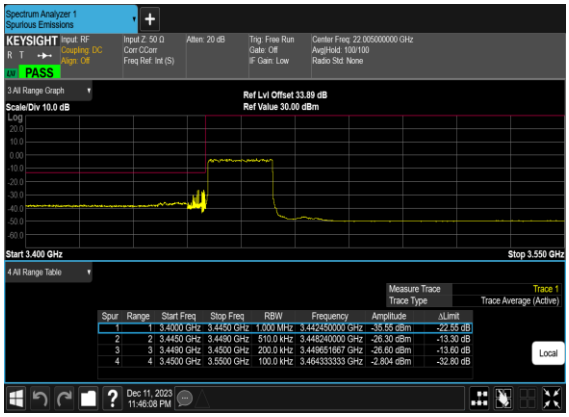
N77(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



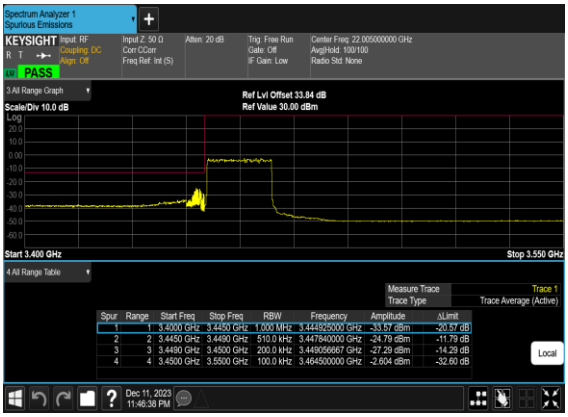
N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



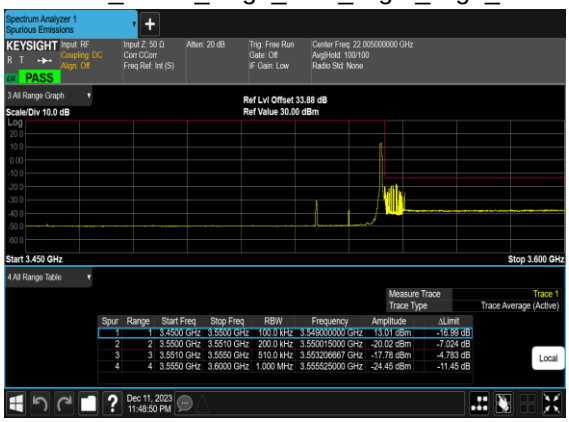
N77(20M)_DFT-s-OFDM_BPSK_Outer_Full_Low_CH



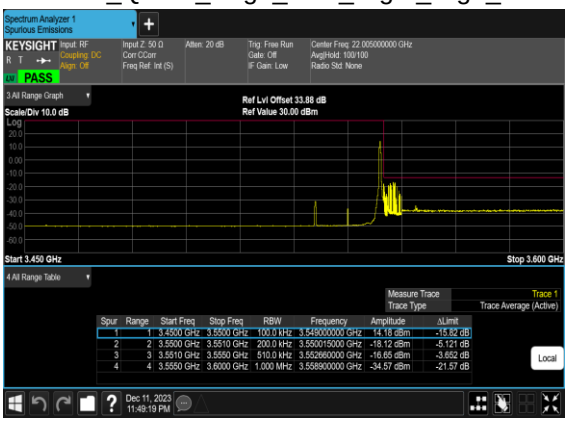
N77(20M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH



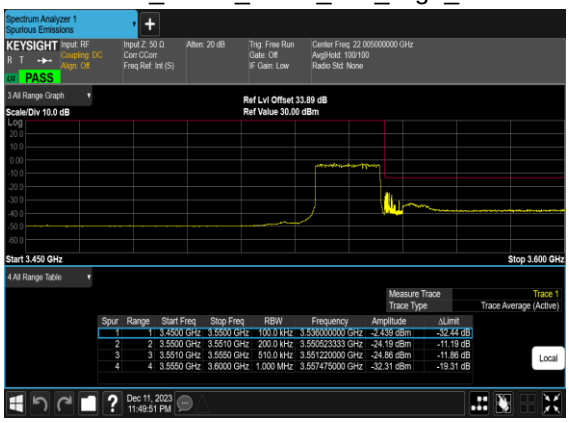
N77(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_High_CH



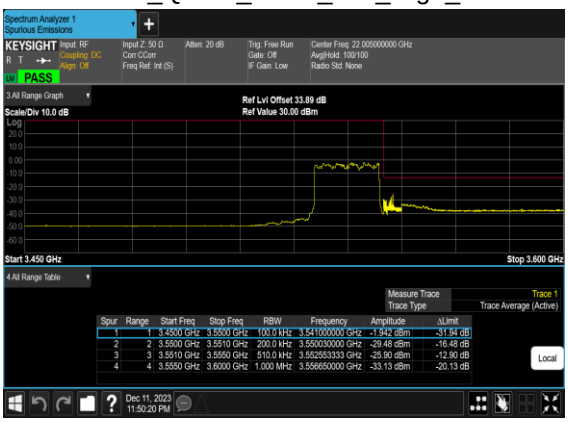
N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_High_CH



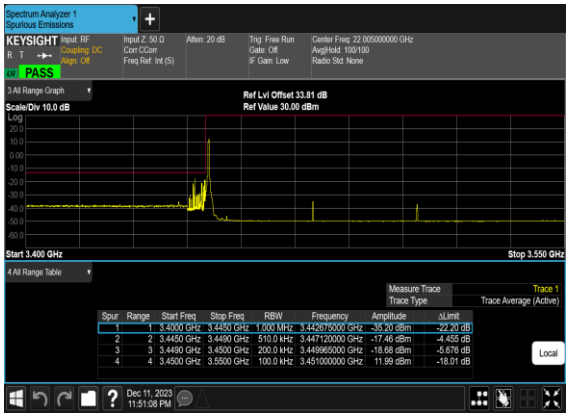
N77(20M)_DFT-s-OFDM_BPSK_Outer_Full_High_CH



N77(20M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH

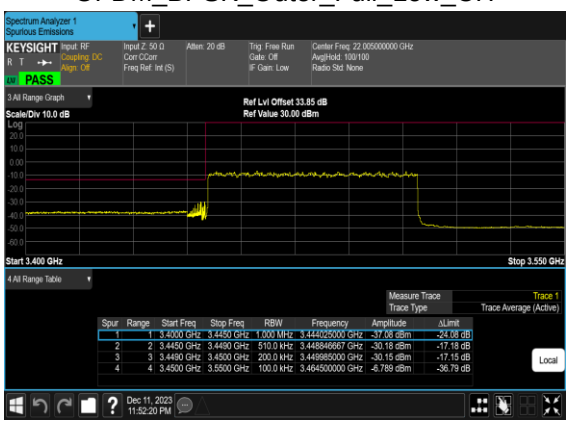


N77(60M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH

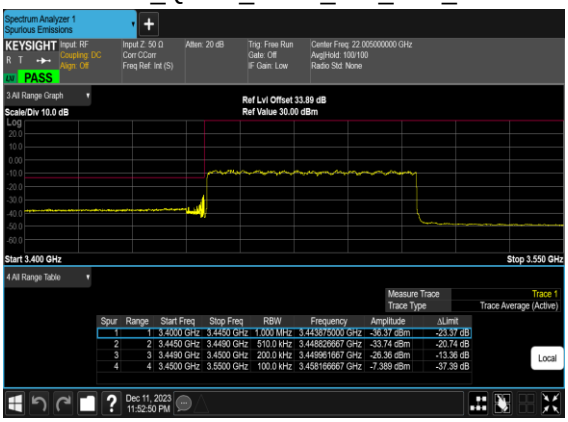


N77(60M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH

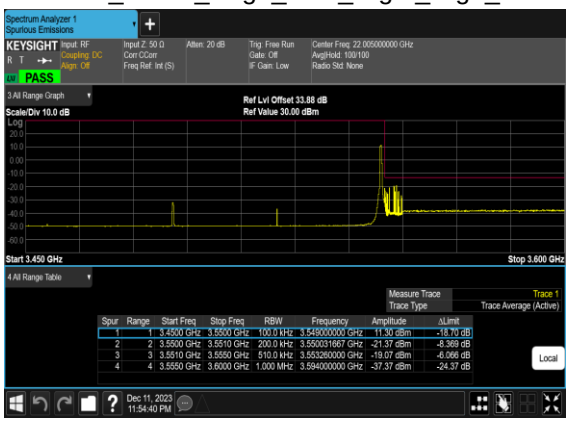
N77(60M)_DFT-s-OFDM_BPSK_Outer_Full_Low_CH



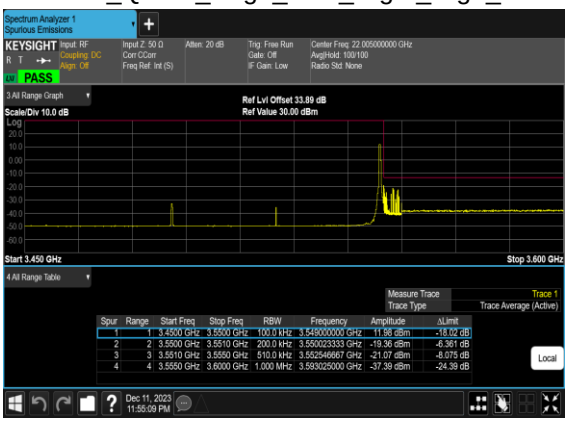
N77(60M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH



N77(60M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_High_CH

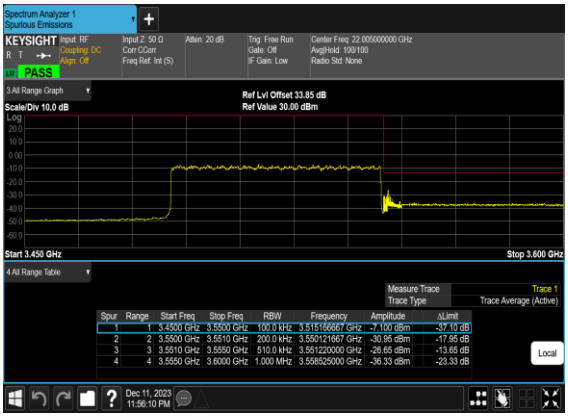


N77(60M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_High_CH



N77(60M)_DFT-s-OFDM_BPSK_Outer_Full_High_CH

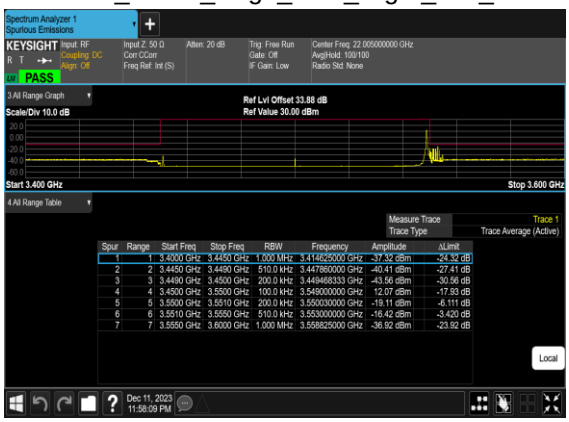
N77(60M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH



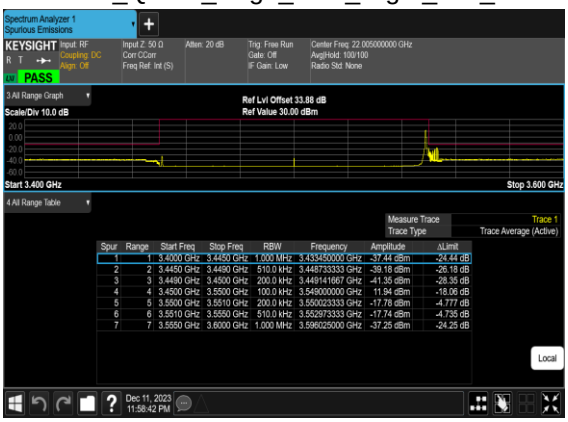
N77(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH

N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH

N77(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_Mid_CH

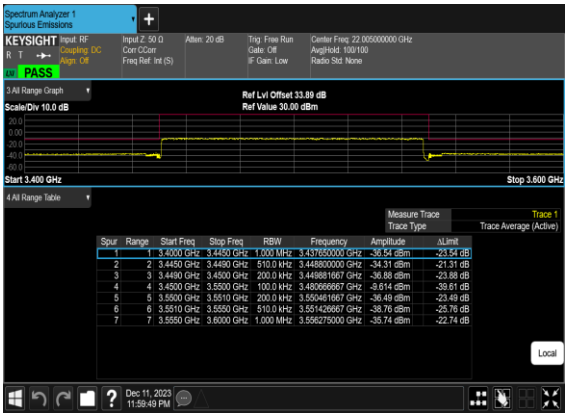


N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_Mid_CH



N77(100M)_DFT-s-OFDM_BPSK_Outer_Full_Mid_CH

N77(100M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



Software Version: 23.06.1602

FR1 N77 MIMO-ANT5+8

Transmitter Conducted Output Power And EIRP,(G_T - L_C)=2.62dB

NR Band	SCS	Band Width	Arfcn	Freq (MHz)	Modulation	RB	ANT8 Power (dBm)	ANT5 Power (dBm)	Conducted Power (dBm)	EIRP (dBm)	EIRP(W)
77	30	20	630668	3460.02	CP-OFDM QPSK	1@1	21.73	20.61	24.22	26.84	0.4826
77	30	20	630668	3460.02	CP-OFDM 16 QAM	1@1	20.94	20.35	23.67	26.29	0.4251
77	30	20	630668	3460.02	CP-OFDM 64 QAM	1@1	19.28	18.63	21.98	24.60	0.2882
77	30	20	633334	3500.01	CP-OFDM QPSK	1@1	21.67	20.52	24.14	26.76	0.4746
77	30	20	633334	3500.01	CP-OFDM 16 QAM	1@1	20.99	20.11	23.58	26.20	0.4171
77	30	20	633334	3500.01	CP-OFDM 64 QAM	1@1	19.35	18.46	21.94	24.56	0.2856
77	30	20	636000	3540	CP-OFDM QPSK	1@1	21.78	21.17	24.50	27.12	0.5148
77	30	20	636000	3540	CP-OFDM 16 QAM	1@1	20.93	20.9	23.93	26.55	0.4514
77	30	20	636000	3540	CP-OFDM 64 QAM	1@1	19.28	19.12	22.21	24.83	0.3042
77	30	30	631000	3465	CP-OFDM QPSK	1@1	21.9	20.79	24.39	27.01	0.5024
77	30	30	631000	3465	CP-OFDM 16 QAM	1@1	21.03	20.48	23.77	26.39	0.4359
77	30	30	631000	3465	CP-OFDM 64 QAM	1@1	19.4	18.73	22.09	24.71	0.2957
77	30	30	633334	3500.01	CP-OFDM QPSK	1@1	21.88	20.73	24.35	26.97	0.4981
77	30	30	633334	3500.01	CP-OFDM 16 QAM	1@1	21.04	20.4	23.74	26.36	0.4327
77	30	30	633334	3500.01	CP-OFDM 64 QAM	1@1	19.44	18.76	22.12	24.74	0.2981
77	30	30	635666	3534.99	CP-OFDM QPSK	1@1	21.81	21.02	24.44	27.06	0.5085
77	30	30	635666	3534.99	CP-OFDM 16 QAM	1@1	21.24	20.92	24.09	26.71	0.4692
77	30	30	635666	3534.99	CP-OFDM 64 QAM	1@1	19.59	19.2	22.41	25.03	0.3184
77	30	40	631334	3470.01	CP-OFDM QPSK	1@1	21.96	21.19	24.60	27.22	0.5275
77	30	40	631334	3470.01	CP-OFDM 16 QAM	1@1	21.21	20.89	24.06	26.68	0.4659
77	30	40	631334	3470.01	CP-OFDM 64 QAM	1@1	19.49	19.19	22.35	24.97	0.3143
77	30	40	633334	3500.01	CP-OFDM QPSK	1@1	21.83	21.16	24.52	27.14	0.5174
77	30	40	633334	3500.01	CP-OFDM 16 QAM	1@1	21.16	20.87	24.03	26.65	0.4621
77	30	40	633334	3500.01	CP-OFDM 64 QAM	1@1	19.49	19.13	22.32	24.94	0.3122
77	30	40	635332	3529.98	CP-OFDM QPSK	1@1	21.89	21.04	24.50	27.12	0.5148
77	30	40	635332	3529.98	CP-OFDM 16 QAM	1@1	21.22	20.57	23.92	26.54	0.4506
77	30	40	635332	3529.98	CP-OFDM 64 QAM	1@1	19.56	18.97	22.29	24.91	0.3094
77	30	60	632000	3480	CP-OFDM QPSK	1@1	21.59	20.89	24.26	26.88	0.4880
77	30	60	632000	3480	CP-OFDM 16 QAM	1@1	20.93	20.59	23.77	26.39	0.4359
77	30	60	632000	3480	CP-OFDM 64 QAM	1@1	19.25	18.89	22.08	24.70	0.2954

77	30	60	633334	3500.01	CP-OFDM QPSK	1@1	21.56	20.9	24.25	26.87	0.4867
77	30	60	633334	3500.01	CP-OFDM 16 QAM	1@1	20.86	20.6	23.74	26.36	0.4327
77	30	60	633334	3500.01	CP-OFDM 64 QAM	1@1	19.24	18.93	22.10	24.72	0.2964
77	30	60	634666	3519.99	CP-OFDM QPSK	1@1	21.56	20.7	24.16	26.78	0.4766
77	30	60	634666	3519.99	CP-OFDM 16 QAM	1@1	20.88	20.37	23.64	26.26	0.4229
77	30	60	634666	3519.99	CP-OFDM 64 QAM	1@1	19.19	18.69	21.96	24.58	0.2869
77	30	80	632668	3490.02	CP-OFDM QPSK	1@1	21.5	21.02	24.28	26.90	0.4894
77	30	80	632668	3490.02	CP-OFDM 16 QAM	1@1	20.87	20.58	23.74	26.36	0.4323
77	30	80	632668	3490.02	CP-OFDM 64 QAM	1@1	19.2	18.83	22.03	24.65	0.2917
77	30	80	633334	3500.01	CP-OFDM QPSK	1@1	21.5	20.87	24.21	26.83	0.4816
77	30	80	633334	3500.01	CP-OFDM 16 QAM	1@1	20.77	20.52	23.66	26.28	0.4243
77	30	80	633334	3500.01	CP-OFDM 64 QAM	1@1	19.17	18.74	21.97	24.59	0.2878
77	30	80	634000	3510	CP-OFDM QPSK	1@1	21.51	20.85	24.20	26.82	0.4812
77	30	80	634000	3510	CP-OFDM 16 QAM	1@1	20.77	20.51	23.65	26.27	0.4239
77	30	80	634000	3510	CP-OFDM 64 QAM	1@1	19.14	18.83	22.00	24.62	0.2896
77	30	100	633334	3500.01	CP-OFDM QPSK	137@68	21.85	21.02	24.47	27.09	0.5111
77	30	100	633334	3500.01	CP-OFDM QPSK	1@1	21.97	21.2	24.61	27.23	0.5287
77	30	100	633334	3500.01	CP-OFDM QPSK	1@271	21.66	20.89	24.30	26.92	0.4923
77	30	100	633334	3500.01	CP-OFDM 16 QAM	137@68	20.75	19.92	23.37	25.99	0.3967
77	30	100	633334	3500.01	CP-OFDM 16 QAM	1@1	20.74	20.32	23.55	26.17	0.4136
77	30	100	633334	3500.01	CP-OFDM 16 QAM	1@271	20.51	20	23.27	25.89	0.3884
77	30	100	633334	3500.01	CP-OFDM 64 QAM	137@68	19.25	18.44	21.87	24.49	0.2815
77	30	100	633334	3500.01	CP-OFDM 64 QAM	1@1	19.05	18.62	21.85	24.47	0.2799
77	30	100	633334	3500.01	CP-OFDM 64 QAM	1@271	18.9	18.31	21.63	24.25	0.2658
77	30	100	633334	3500.01	CP-OFDM 256 QAM	137@68	16.32	15.83	19.09	21.71	0.1483
77	30	100	633334	3500.01	CP-OFDM 256 QAM	1@1	16.57	16.22	19.41	22.03	0.1595
77	30	100	633334	3500.01	CP-OFDM 256 QAM	1@271	16.29	15.87	19.10	21.72	0.1484

FR1 N77 MIMO-ANT5

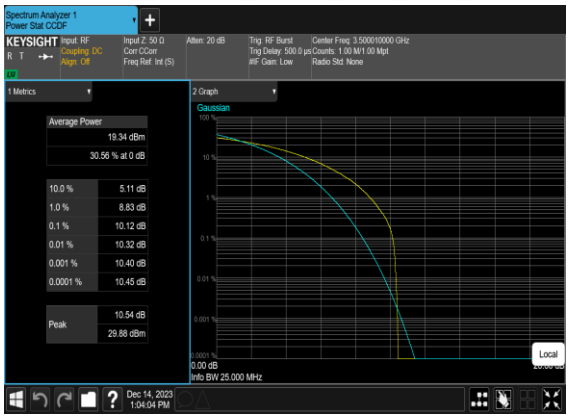
Frequency Stability

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	-0.0024	**PASS**	NV
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0024	**PASS**	LV
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0022	**PASS**	HV
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.011	**PASS**	-30℃
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0034	**PASS**	-20℃
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0045	**PASS**	-10℃
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0024	**PASS**	0℃
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0045	**PASS**	10℃
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0024	**PASS**	20℃
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0034	**PASS**	30℃
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0024	**PASS**	40℃
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	0.0034	**PASS**	50℃

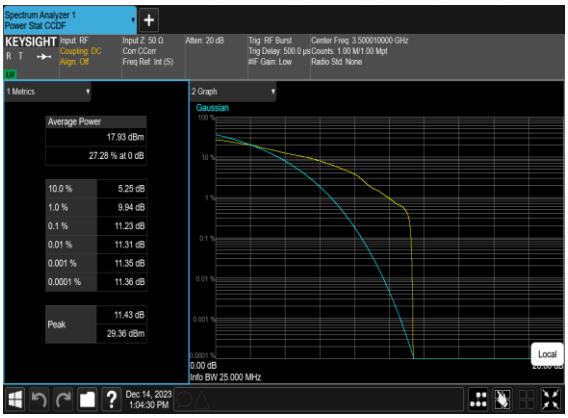
Peak to Average Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	10.12	13	**PASS**
77	30	20	633334	3500.01	CP-OFDM QPSK	1@0	11.23	13	**PASS**
77	30	20	633334	3500.01	CP-OFDM 16 QAM	51@0	10.12	13	**PASS**
77	30	20	633334	3500.01	CP-OFDM 16 QAM	1@0	10.89	13	**PASS**

N77(20M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



N77(20M)_CP-OFDM_QPSK_Edge_1RB_Left_Mid_CH



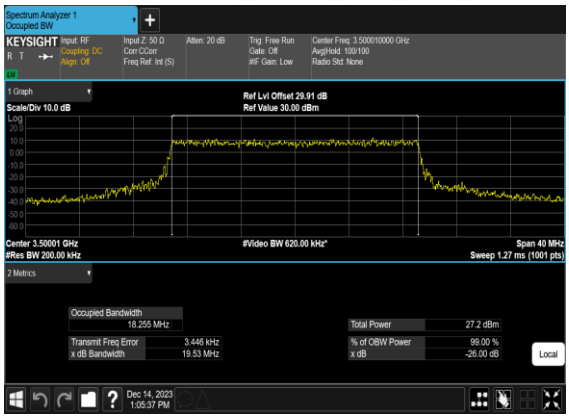
N77(20M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

N77(20M)_CP-OFDM_16 QAM_Edge_1RB_Left_Mid_CH

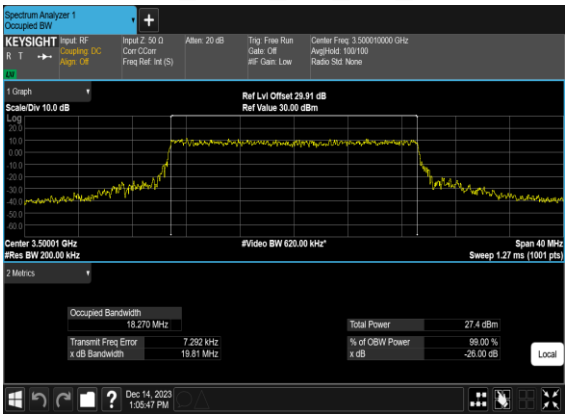
Occupied Bandwidth

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
77	30	20	633334	3500.01	CP-OFDM QPSK	51@0	18.255	19.53
77	30	20	633334	3500.01	CP-OFDM 16 QAM	51@0	18.27	19.81
77	30	20	633334	3500.01	CP-OFDM 64 QAM	51@0	18.22	19.25
77	30	20	633334	3500.01	CP-OFDM 256 QAM	51@0	18.242	19.28
77	30	30	633334	3500.01	CP-OFDM QPSK	78@0	27.858	29.15
77	30	30	633334	3500.01	CP-OFDM 16 QAM	78@0	27.908	29.1
77	30	30	633334	3500.01	CP-OFDM 64 QAM	78@0	27.743	29.38
77	30	30	633334	3500.01	CP-OFDM 256 QAM	78@0	27.832	29.34
77	30	40	633334	3500.01	CP-OFDM QPSK	106@0	37.794	39.37
77	30	40	633334	3500.01	CP-OFDM 16 QAM	106@0	37.873	39.35
77	30	40	633334	3500.01	CP-OFDM 64 QAM	106@0	37.839	40.42
77	30	40	633334	3500.01	CP-OFDM 256 QAM	106@0	37.819	39.32
77	30	60	633334	3500.01	CP-OFDM QPSK	162@0	57.91	60.11
77	30	60	633334	3500.01	CP-OFDM 16 QAM	162@0	57.93	59.74
77	30	60	633334	3500.01	CP-OFDM 64 QAM	162@0	57.763	59.74
77	30	60	633334	3500.01	CP-OFDM 256 QAM	162@0	57.89	60.11
77	30	80	633334	3500.01	CP-OFDM QPSK	217@0	77.334	79.95
77	30	80	633334	3500.01	CP-OFDM 16 QAM	217@0	77.466	79.9
77	30	80	633334	3500.01	CP-OFDM 64 QAM	217@0	77.284	79.96
77	30	80	633334	3500.01	CP-OFDM 256 QAM	217@0	77.515	79.93
77	30	100	633334	3500.01	CP-OFDM QPSK	273@0	97.624	100.5
77	30	100	633334	3500.01	CP-OFDM 16 QAM	273@0	97.542	100.5
77	30	100	633334	3500.01	CP-OFDM 64 QAM	273@0	97.753	100.5
77	30	100	633334	3500.01	CP-OFDM 256 QAM	273@0	97.536	100.6

N77(20M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

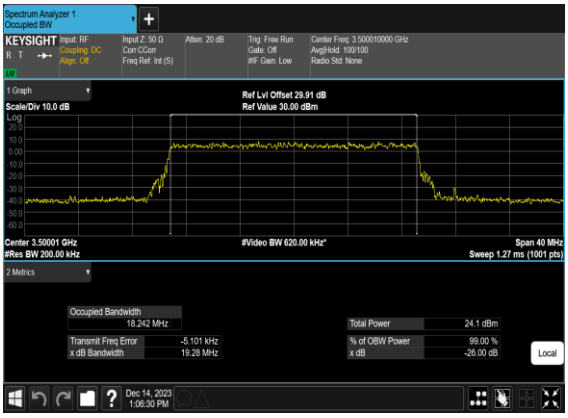


N77(20M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N77(20M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

N77(20M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



N77(30M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

N77(30M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH