FCC RF Test Report

APPLICANT	:	Sonim Technologies, Inc.
EQUIPMENT	:	5G Feature Phone
BRAND NAME	:	Sonim
MODEL NAME	:	X320(S1303),X320(S1403),X320(S1301),X320(S1401), X320(S1302),X320(S1402),X320(S1304),X320(S1404), X320(S1305),X320(S1405),X320(S1310),X320(S1410)
FCC ID	:	WYPS13030
STANDARD	:	47 CFR Part 96
CLASSIFICATION	:	Citizens Band End User Devices (CBE)
EQUIPMENT TYPE	:	End User Equipment
TEST DATE(S)	:	Jul. 17, 2024 ~ Aug. 19, 2024

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26 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. (Shenzhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.01

Sporton International Inc. (ShenZhen)

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People's Republic of China

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Appendix B. Test Results of Radiated Test

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History of this test report

Report No.	Version	Description	Issued Date
FG462605L	01	Initial issue of report	Sep. 14, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
-	§96.41	Peak-to-Average Ratio	Not Applicable	Not applicable for End User Devices
3.3	§96.41	Maximum E.I.R.P	Pass	-
		Maximum Power Spectral Density	Not Applicable	Not applicable for End User Devices
3.4	§2.1049 §96.41	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §96.41	Conducted Band Edge Measurement Adjacent Channel Leakage Ratio	Pass	-
3.6	§2.1051 §96.41	Conducted Spurious Emission	Pass	
3.7	§2.1055	Frequency Stability for Temperature & Voltage	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 3.10 dB at 7202.36 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

Sonim Technologies, Inc.
4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA

1.2 Manufacturer

Sonim Technologies, Inc.
4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	5G Feature Phone
Brand Name	Sonim
Model Name	X320(S1303),X320(S1403),X320(S1301),X320(S1401),X320(S1302), X320(S1402),X320(S1304),X320(S1404),X320(S1305),X320(S1405), X320(S1310),X320(S1410)
FCC ID	WYPS13030
Tx/Rx Frequency	5G NR n48/n77/n78: 3550 MHz ~ 3700 MHz
SCS	30kHz
Bandwidth	n48: 10 / 20 / 30 / 40MHz n77/78: 10 / 15 / 20 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100MHz
Antenna Gain	<Ant.2> 5G NR n48/77/78: 0.7 dBi <Ant.5> 5G NR n48/77/78: -3.3 dBi <Ant.6> 5G NR n48/77/78: 0.1 dBi <Ant.7> 5G NR n48/77/78: -1.6 dBi
Type of Modulation	DFT-s-OFDM (PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM) CP-OFDM (QPSK / 16QAM / 64QAM / 256QAM)
IMEI Code	Conducted: 016562000004862/016562000009549 Radiation: 016562000018276/016562000025875
HW Version	V1.0
SW Version	X32.0-01-14.0-19.01.00
EUT Stage	Identical Prototype

Remark:

1. The maximum EIRP is calculated from max output power and antenna gain, only the maximum EIRP of Ant. 6 is shown in the report.
2. 5G NR n48 support SA mode, n77/n78 support SA & NSA mode. The whole testing has assessed NSA mode by referring to the higher conducted power for conducted test items.
3. 5G NR n77 support HPUE mode.
4. All the supported EN-DC combinations are verified conducted power, only the EN-DC combination with highest power are shown in the report.
5. The EN-DC mode combination could be referred to the product spec.

1.4 Maximum EIRP Power and Emission Designator

5G NR n48		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)
10	3555.00~3694.98	0.1687	8M58G7D	0.1380	8M59W7D
20	3560.01~3690.00	0.1782	18M2G7D	0.1459	18M2W7D
30	3564.99~3684.99	0.1791	27M8G7D	0.1560	27M8W7D
40	3570.00~3679.98	0.1795	37M8G7D	0.1538	37M9W7D

EN DC_2A-n77A		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)
10	3555.00 ~ 3694.98	0.1832	8M58G7D	0.1452	8M59W7D
15	3557.52 ~ 3692.49	0.1786	13M6G7D	0.1507	13M6W7D
20	3560.01 ~ 3690.00	0.1832	18M2G7D	0.1524	18M2W7D
30	3565.02 ~ 3684.99	0.1849	27M8G7D	0.1574	27M8W7D
40	3570.00 ~ 3679.98	0.1841	37M8G7D	0.1607	37M9W7D
50	3575.01 ~ 3675.00	0.1746	47M6G7D	0.1466	47M6W7D
60	3580.02 ~ 3669.99	0.1734	57M9G7D	0.1442	57M9W7D
70	3585.00 ~ 3664.98	0.1816	67M6G7D	0.1493	67M6W7D
80	3590.01 ~ 3660.00	0.1803	77M6G7D	0.1449	77M6W7D
90	3595.02 ~ 3654.99	0.1774	87M4G7D	0.1459	87M7W7D
100	3600.00 ~ 3649.98	0.1854	97M5G7D	0.1462	97M6W7D

EN DC_2A-n78A		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)
10	3555.00 ~ 3694.98	0.1795	8M58G7D	0.1486	8M59W7D
15	3557.52 ~ 3692.49	0.1803	13M6G7D	0.1500	13M6W7D
20	3560.01 ~ 3690.00	0.1799	18M2G7D	0.1538	18M2W7D
30	3565.02 ~ 3684.99	0.1803	27M8G7D	0.1567	27M8W7D
40	3570.00 ~ 3679.98	0.1803	37M8G7D	0.1567	37M9W7D
50	3575.01 ~ 3675.00	0.1766	47M6G7D	0.1445	47M6W7D
60	3580.02 ~ 3669.99	0.1778	57M9G7D	0.1419	57M9W7D
70	3585.00 ~ 3664.98	0.1786	67M6G7D	0.1466	67M6W7D
80	3590.01 ~ 3660.00	0.1782	77M6G7D	0.1479	77M6W7D
90	3595.02 ~ 3654.99	0.1791	87M4G7D	0.1476	87M7W7D
100	3600.00 ~ 3649.98	0.1807	97M5G7D	0.1469	97M6W7D

Note:

1. 5G NR Band n77 overlaps the entire frequency range of Band n78/n48 for Part 96, and n77 power > n78/n48 power, therefore the conducted test results of n77 provided in this report cover n78/n48.
2. All modulations have been tested, and only the worst test results of PSK & QAM are shown in the report.

1.5 Testing Site

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-SZ	CN1256	421272

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-SZ	AUDIX	E3	6.2009-8-24

1.7 Applied Standards

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

- ANSI C63.26-2015
- 47 CFR Part 96
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 940660 D01 Part 96 CBRS v03
- 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

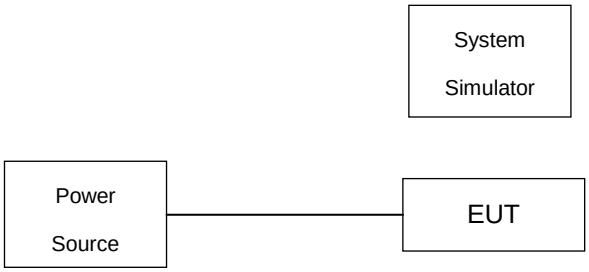
2.1 Test Mode

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.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

Test Items	5G NR	Bandwidth (MHz)												Modulation					RB #		Test Channel		
		10	15	20	25	30	40	50	60	70	80	90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256 QAM	1	Full	L	M	H
Max. Output Power	n48	v	-	v	-	v	v	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n77	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	n78	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Adjacent Channel Leakage Ratio	n77	v			-			v					v	v	v				v	v	v	v	v
26dB and 99% Bandwidth	n77	v	v	v	-	v	v	v	v	v	v	v	v		v	v	v	v		v		v	
Conducted Band Edge	n77	v			-			v					v	v	v				v	v	v	v	v
Conducted Spurious Emission	n77	v			-			v					v	v	v				v		v	v	v
Frequency Stability	n77			v	-										v					v		v	
E.I.R.P	n48	v	-	v	-	v	v	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n77	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	n78	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n77	Worst Case																			v	v	v
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. 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. 4. Based on engineering evaluation, only the worst modulations test results are shown in the report. 5. Frequency Stability：Normal Voltage = 3.85V ；Low Voltage =3.60V.；High Voltage =4.40V																						

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

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8821C	Fcc DoC	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 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.

Following shows an offset computation example with cable loss 8.9dB.

Example :

Offset(dB) = RF cable loss(dB).

= 8.9 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n48 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	638000	641666	645332
	Frequency	3570	3624.99	3679.98
30	Channel	637666	641666	645666
	Frequency	3564.99	3624.99	3684.99
20	Channel	637334	641666	646000
	Frequency	3560.01	3624.99	3690
10	Channel	637000	641666	646332
	Frequency	3555	3624.99	3694.98

5G n77/n78 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	640000	641666	643332
	Frequency	3600	3624.99	3649.98
90	Channel	639668	641666	643666
	Frequency	3595.02	3624.99	3654.99
80	Channel	639334	641666	644000
	Frequency	3590.01	3624.99	3660
70	Channel	639000	641666	644332
	Frequency	3585.00	3624.99	3664.98
60	Channel	638668	641666	644666
	Frequency	3580.02	3624.99	3669.99
50	Channel	638334	641666	645000
	Frequency	3575.01	3624.99	3675
40	Channel	638000	641666	645332
	Frequency	3570	3624.99	3679.98
30	Channel	637668	641666	645666
	Frequency	3565.02	3624.99	3684.99
20	Channel	637334	641666	646000
	Frequency	3560.01	3624.99	3690
15	Channel	637168	641666	646166
	Frequency	3557.52	3624.99	3692.49
10	Channel	637000	641666	646332
	Frequency	3555	3624.99	3694.98

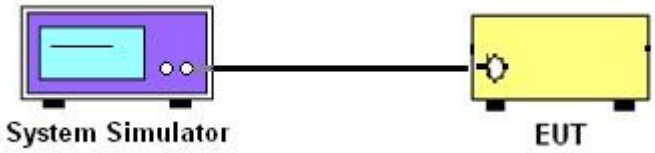
3 Conducted Test Items

3.1 Measuring Instruments

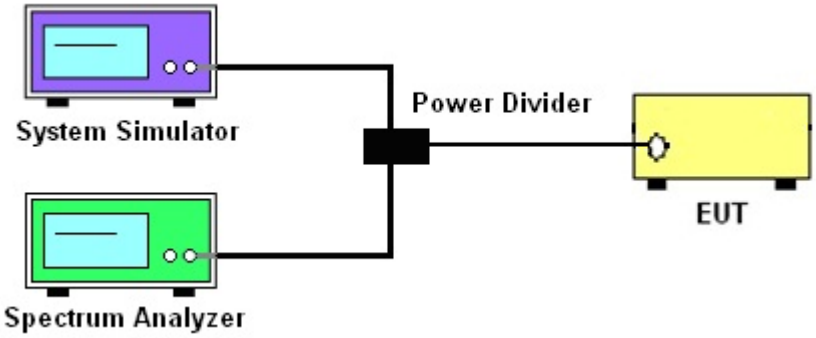
See list of measuring instruments of this test report.

3.1.1 Test Setup

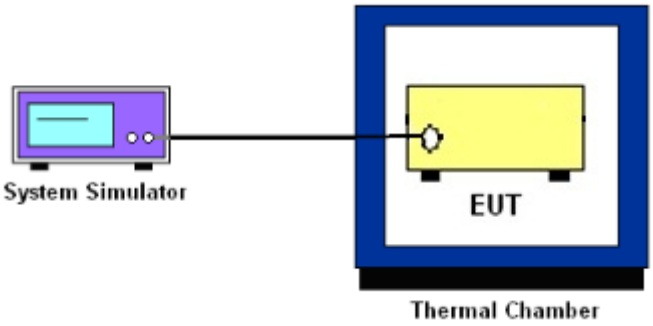
3.1.2 Conducted Output Power / ACLR



3.1.3 EIRP, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power

3.2.1 Description of the Conducted Output Power Measurement

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

3.2.2 Test Procedures

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

3.3 EIRP

3.3.1 Description of the EIRP Measurement

EIRP limits for CBRS equipment as below table:

Device		Maximum EIRP (dBm/10 MHz)	Maximum PSD (dBm/MHz)
Applied	**End User Device**	23	n/a
☐	**Category A CBSD**	30	20
☐	**Category B CBSD**	47	37

Remark:

1. The worst case EIRP shown in this section is found with LTE operating only using 1RB. As such, the EIRP/10MHz and full channel EIRP values will be identical since 1RB is fully contained within all available channel bandwidths for LTE Band 48 (i.e. 5, 10, 15, 20MHz)

3.3.2 Test Procedures for EIRP

1. Establishing a communications link with the call box (Base station) to measure the Maximum conducted power, the parameters were set to force the EUT transmitting at maximum output power level. Use the average power measurement function to measure total channel power of each channel bandwidth (per ANSI C63.26-2015 Section 5.2.1)

2. Determining ERP and/or EIRP from conducted RF output power measurements (Per ANSI C63.26-2015 Section 5.2.5.5)

   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

3.4 Occupied Bandwidth

3.4.1 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.

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. 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.
3. 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.
4. Set the detection mode to peak, and the trace mode to max hold.
5. 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)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. 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.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Conducted Band Edge

3.5.1 Description of Conducted Band Edge Measurement

Part 96.41 (e) (1) (ii)

For End User Devices the emission limits outside the fundamental are as follows:

Within 0 MHz to B MHz above and below the assigned channel ≤ −13 dBm/MHz

Greater than B MHz above and below the assigned channel ≤ −25 dBm/MHz

where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device.

Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

Part 96.41 (e) (2)

For CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used
5. Offset has included the duty factor for LTE Band 48. Duty factor =10 log (1/x), where x is the measured duty cycle.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.6 Conducted Spurious Emission

3.6.1 Description of Conducted Spurious Emission Measurement

96.41 (e)(2)

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. 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.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is −40dBm/MHz.

3.7 Frequency Stability

3.7.1 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. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency

3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. 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.
3. 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.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

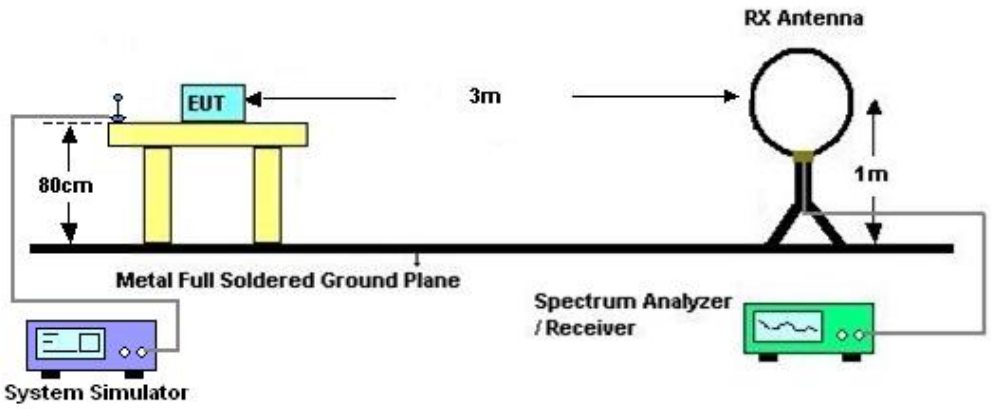
4 Radiated Test Items

4.1 Measuring Instruments

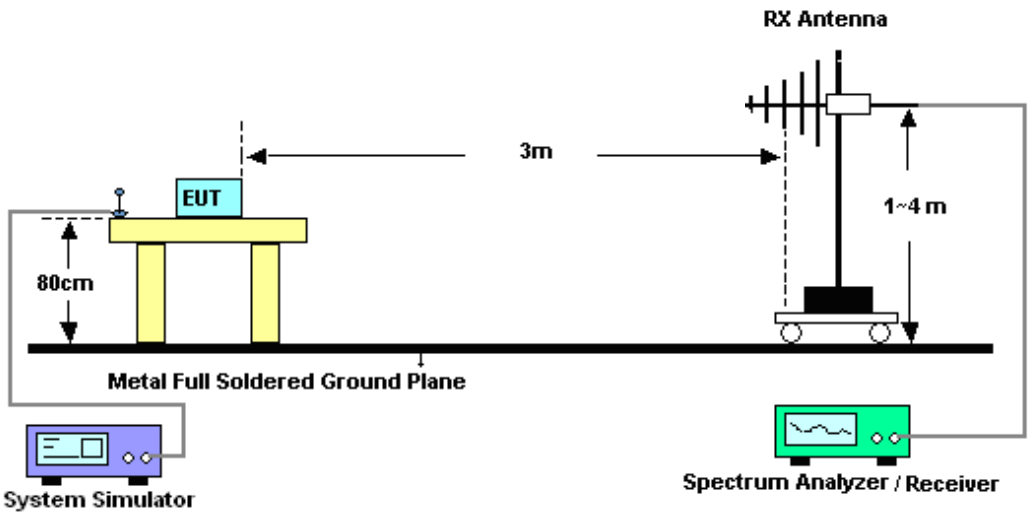
See list of measuring instruments of this test report.

4.2 Test Setup

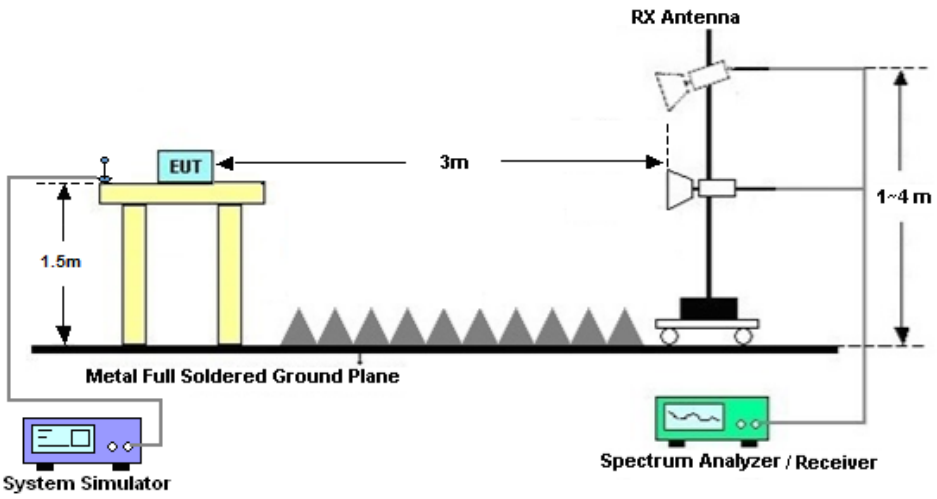
4.2.1 For radiated test below 30MHz



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

4.4.1 Description of Radiated Spurious Emission Measurement

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 must be attenuated below the transmitter power (P) by a factor of at least -40dBm / MHz.

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

4.4.2 Test Procedures

1. 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.
2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
   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
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
   The limit line is −40dBm/MHz

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 09, 2024	Jul. 17, 2024~ Jul. 21, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
DC Power Supply	TTI	PL330P	290070	Max 32V，3A	Oct. 16, 2023	Jul. 17, 2024~ Jul. 21, 2024	Oct. 15, 2024	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04 265	60.06.020.007 7	0.4GHz~26.5GHz	Dec. 25, 2023	Jul. 17, 2024~ Jul. 21, 2024	Dec. 24, 2024	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 03, 2024	Jul. 17, 2024~ Jul. 21, 2024	Jul. 02, 2025	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Oct. 18, 2023	Aug. 19, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 03, 2024	Aug. 19, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2E	101141	9kHz~30MHz	Dec. 29, 2023	Aug. 19, 2024	Dec. 28, 2024	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 09 2024	Aug. 19, 2024	May 08, 2025	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Jul. 06, 2024	Aug. 19, 2024	Jul. 05, 2025	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Jul. 04, 2024	Aug. 19, 2024	Jul. 03, 2025	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2023	Aug. 19, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P-R	1943528	1GHz~18GHz	Oct. 18, 2023	Aug. 19, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 03, 2024	Aug. 19, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY57280136	500MHz~26.5GHz	Jul. 03, 2024	Aug. 19, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
AC Power Source	APC	AFV-S-600B	F119050019	N/A	Oct. 18, 2023	Aug. 19, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Aug. 19, 2024	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Aug. 19, 2024	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required

6 Measurement Uncertainty

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.012 MHz
Conducted Power	±1.34 dB
Conducted Power Density	±1.32 dB
Peak to Average Ratio	±1.34 dB
Frequency Stability	±1.3 Hz

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.1 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.9 dB

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

Appendix A. Test Results of Conducted Test

Test Engineer :	Khan Zhen	**Temperature :**	24~26℃
		Relative Humidity :	50~53%

Software Version: 23.06.1602

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Transmitter Conducted Output Power And EIRP, (G_T - L_C)=0.1dB

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power(dBm)	EIRP (dBm)	EIRP (W)
48	30	10	637000	3555	DFT-s-OFDM QPSK	1@1	22.17	22.27	0.1687
48	30	10	637000	3555	DFT-s-OFDM 16 QAM	1@1	21.3	21.4	0.1380
48	30	10	641666	3624.99	DFT-s-OFDM QPSK	1@1	21.85	21.95	0.1567
48	30	10	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	20.82	20.92	0.1236
48	30	10	646332	3694.98	DFT-s-OFDM QPSK	1@1	21.81	21.91	0.1552
48	30	10	646332	3694.98	DFT-s-OFDM 16 QAM	1@1	20.86	20.96	0.1247
48	30	20	637334	3560.01	DFT-s-OFDM QPSK	1@1	22.41	22.51	0.1782
48	30	20	637334	3560.01	DFT-s-OFDM 16 QAM	1@1	21.54	21.64	0.1459
48	30	20	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.08	22.18	0.1652
48	30	20	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.19	21.29	0.1346
48	30	20	646000	3690	DFT-s-OFDM QPSK	1@1	21.87	21.97	0.1574
48	30	20	646000	3690	DFT-s-OFDM 16 QAM	1@1	21	21.1	0.1288
48	30	30	637668	3565.02	DFT-s-OFDM QPSK	1@1	22.43	22.53	0.1791
48	30	30	637668	3565.02	DFT-s-OFDM 16 QAM	1@1	21.83	21.93	0.1560
48	30	30	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.3	22.4	0.1738
48	30	30	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.53	21.63	0.1455
48	30	30	645666	3684.99	DFT-s-OFDM QPSK	1@1	22.09	22.19	0.1656
48	30	30	645666	3684.99	DFT-s-OFDM 16 QAM	1@1	21.27	21.37	0.1371
48	30	40	638000	3570	DFT-s-OFDM PI/2 BPSK	50@25	22.25	22.35	0.1718
48	30	40	638000	3570	DFT-s-OFDM PI/2 BPSK	1@1	22.44	22.54	0.1795
48	30	40	638000	3570	DFT-s-OFDM PI/2 BPSK	1@104	22.39	22.49	0.1774
48	30	40	638000	3570	DFT-s-OFDM QPSK	50@25	22.28	22.38	0.1730
48	30	40	638000	3570	DFT-s-OFDM QPSK	1@1	22.38	22.48	0.1770
48	30	40	638000	3570	DFT-s-OFDM QPSK	1@104	22.37	22.47	0.1766
48	30	40	638000	3570	DFT-s-OFDM 16 QAM	50@25	21.42	21.52	0.1419
48	30	40	638000	3570	DFT-s-OFDM 16 QAM	1@1	21.77	21.87	0.1538
48	30	40	638000	3570	DFT-s-OFDM 16 QAM	1@104	21.45	21.55	0.1429
48	30	40	638000	3570	DFT-s-OFDM 64 QAM	50@25	19.97	20.07	0.1016
48	30	40	638000	3570	DFT-s-OFDM 64 QAM	1@1	20.18	20.28	0.1067
48	30	40	638000	3570	DFT-s-OFDM 64 QAM	1@104	19.93	20.03	0.1007
48	30	40	638000	3570	DFT-s-OFDM 256 QAM	50@25	17.87	17.97	0.0627
48	30	40	638000	3570	DFT-s-OFDM 256 QAM	1@1	18.02	18.12	0.0649
48	30	40	638000	3570	DFT-s-OFDM 256 QAM	1@104	17.71	17.81	0.0604

48	30	40	638000	3570	CP-OFDM QPSK	53@26	20.93	21.03	0.1268
48	30	40	638000	3570	CP-OFDM QPSK	1@1	21.15	21.25	0.1334
48	30	40	638000	3570	CP-OFDM QPSK	1@104	20.84	20.94	0.1242
48	30	40	641666	3624.99	DFT-s-OFDM PI/2 BPSK	50@25	22.12	22.22	0.1667
48	30	40	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@1	22.35	22.45	0.1758
48	30	40	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@104	21.87	21.97	0.1574
48	30	40	641666	3624.99	DFT-s-OFDM QPSK	50@25	22.09	22.19	0.1656
48	30	40	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.36	22.46	0.1762
48	30	40	641666	3624.99	DFT-s-OFDM QPSK	1@104	21.89	21.99	0.1581
48	30	40	641666	3624.99	DFT-s-OFDM 16 QAM	50@25	21.08	21.18	0.1312
48	30	40	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.45	21.55	0.1429
48	30	40	641666	3624.99	DFT-s-OFDM 16 QAM	1@104	20.97	21.07	0.1279
48	30	40	641666	3624.99	DFT-s-OFDM 64 QAM	50@25	19.6	19.7	0.0933
48	30	40	641666	3624.99	DFT-s-OFDM 64 QAM	1@1	19.83	19.93	0.0984
48	30	40	641666	3624.99	DFT-s-OFDM 64 QAM	1@104	19.47	19.57	0.0906
48	30	40	641666	3624.99	DFT-s-OFDM 256 QAM	50@25	17.54	17.64	0.0581
48	30	40	641666	3624.99	DFT-s-OFDM 256 QAM	1@1	17.7	17.8	0.0603
48	30	40	641666	3624.99	DFT-s-OFDM 256 QAM	1@104	17.2	17.3	0.0537
48	30	40	641666	3624.99	CP-OFDM QPSK	53@26	20.62	20.72	0.1180
48	30	40	641666	3624.99	CP-OFDM QPSK	1@1	20.79	20.89	0.1227
48	30	40	641666	3624.99	CP-OFDM QPSK	1@104	20.39	20.49	0.1119
48	30	40	645332	3679.98	DFT-s-OFDM PI/2 BPSK	50@25	22.04	22.14	0.1637
48	30	40	645332	3679.98	DFT-s-OFDM PI/2 BPSK	1@1	21.98	22.08	0.1614
48	30	40	645332	3679.98	DFT-s-OFDM PI/2 BPSK	1@104	22.09	22.19	0.1656
48	30	40	645332	3679.98	DFT-s-OFDM QPSK	50@25	22.01	22.11	0.1626
48	30	40	645332	3679.98	DFT-s-OFDM QPSK	1@1	22.01	22.11	0.1626
48	30	40	645332	3679.98	DFT-s-OFDM QPSK	1@104	22.04	22.14	0.1637
48	30	40	645332	3679.98	DFT-s-OFDM 16 QAM	50@25	21.04	21.14	0.1300
48	30	40	645332	3679.98	DFT-s-OFDM 16 QAM	1@1	21.14	21.24	0.1330
48	30	40	645332	3679.98	DFT-s-OFDM 16 QAM	1@104	21.15	21.25	0.1334
48	30	40	645332	3679.98	DFT-s-OFDM 64 QAM	50@25	19.51	19.61	0.0914
48	30	40	645332	3679.98	DFT-s-OFDM 64 QAM	1@1	19.46	19.56	0.0904
48	30	40	645332	3679.98	DFT-s-OFDM 64 QAM	1@104	19.68	19.78	0.0951
48	30	40	645332	3679.98	DFT-s-OFDM 256 QAM	50@25	17.51	17.61	0.0577
48	30	40	645332	3679.98	DFT-s-OFDM 256 QAM	1@1	17.29	17.39	0.0548
48	30	40	645332	3679.98	DFT-s-OFDM 256 QAM	1@104	17.4	17.5	0.0562
48	30	40	645332	3679.98	CP-OFDM QPSK	53@26	20.56	20.66	0.1164
48	30	40	645332	3679.98	CP-OFDM QPSK	1@1	20.39	20.49	0.1119
48	30	40	645332	3679.98	CP-OFDM QPSK	1@104	20.56	20.66	0.1164

Software Version: 23.06.1602

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LTE Band: 2, LTE BW: 10M, LTE ARFCN: Mid

Transmitter Conducted Output Power And EIRP, (G_T - L_C)=0.1dB

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power(dBm)	EIRP (dBm)	EIRP (W)
77	30	10	637000	3555	DFT-s-OFDM QPSK	1@1	22.53	22.63	0.1832
77	30	10	637000	3555	DFT-s-OFDM 16 QAM	1@1	21.52	21.62	0.1452
77	30	10	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.1	22.2	0.1660
77	30	10	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.24	21.34	0.1361
77	30	10	646332	3694.98	DFT-s-OFDM QPSK	1@1	21.86	21.96	0.1570
77	30	10	646332	3694.98	DFT-s-OFDM 16 QAM	1@1	21.06	21.16	0.1306
77	30	15	637168	3557.52	DFT-s-OFDM QPSK	1@1	22.42	22.52	0.1786
77	30	15	637168	3557.52	DFT-s-OFDM 16 QAM	1@1	21.68	21.78	0.1507
77	30	15	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.1	22.2	0.1660
77	30	15	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.22	21.32	0.1355
77	30	15	646166	3692.49	DFT-s-OFDM QPSK	1@1	21.99	22.09	0.1618
77	30	15	646166	3692.49	DFT-s-OFDM 16 QAM	1@1	21.14	21.24	0.1330
77	30	20	637334	3560.01	DFT-s-OFDM QPSK	1@1	22.53	22.63	0.1832
77	30	20	637334	3560.01	DFT-s-OFDM 16 QAM	1@1	21.73	21.83	0.1524
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.32	22.42	0.1746
77	30	20	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.45	21.55	0.1429
77	30	20	646000	3690	DFT-s-OFDM QPSK	1@1	22.13	22.23	0.1671
77	30	20	646000	3690	DFT-s-OFDM 16 QAM	1@1	21.27	21.37	0.1371
77	30	30	637668	3565.02	DFT-s-OFDM QPSK	1@1	22.57	22.67	0.1849
77	30	30	637668	3565.02	DFT-s-OFDM 16 QAM	1@1	21.87	21.97	0.1574
77	30	30	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.35	22.45	0.1758
77	30	30	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.53	21.63	0.1455
77	30	30	645666	3684.99	DFT-s-OFDM QPSK	1@1	21.76	21.86	0.1535
77	30	30	645666	3684.99	DFT-s-OFDM 16 QAM	1@1	20.88	20.98	0.1253
77	30	40	638000	3570	DFT-s-OFDM QPSK	1@1	22.55	22.65	0.1841
77	30	40	638000	3570	DFT-s-OFDM 16 QAM	1@1	21.96	22.06	0.1607
77	30	40	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.54	22.64	0.1837
77	30	40	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.78	21.88	0.1542
77	30	40	645332	3679.98	DFT-s-OFDM QPSK	1@1	21.78	21.88	0.1542
77	30	40	645332	3679.98	DFT-s-OFDM 16 QAM	1@1	20.79	20.89	0.1227
77	30	50	638334	3575.01	DFT-s-OFDM QPSK	1@1	22.32	22.42	0.1746
77	30	50	638334	3575.01	DFT-s-OFDM 16 QAM	1@1	21.56	21.66	0.1466
77	30	50	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.09	22.19	0.1656

77	30	50	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.23	21.33	0.1358
77	30	50	645000	3675	DFT-s-OFDM QPSK	1@1	21.61	21.71	0.1483
77	30	50	645000	3675	DFT-s-OFDM 16 QAM	1@1	20.82	20.92	0.1236
77	30	60	638668	3580.02	DFT-s-OFDM QPSK	1@1	22.29	22.39	0.1734
77	30	60	638668	3580.02	DFT-s-OFDM 16 QAM	1@1	21.49	21.59	0.1442
77	30	60	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.11	22.21	0.1663
77	30	60	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.36	21.46	0.1400
77	30	60	644666	3669.99	DFT-s-OFDM QPSK	1@1	21.7	21.8	0.1514
77	30	60	644666	3669.99	DFT-s-OFDM 16 QAM	1@1	20.92	21.02	0.1265
77	30	70	639000	3585	DFT-s-OFDM QPSK	1@1	22.49	22.59	0.1816
77	30	70	639000	3585	DFT-s-OFDM 16 QAM	1@1	21.64	21.74	0.1493
77	30	70	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.27	22.37	0.1726
77	30	70	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.38	21.48	0.1406
77	30	70	644332	3664.98	DFT-s-OFDM QPSK	1@1	21.93	22.03	0.1596
77	30	70	644332	3664.98	DFT-s-OFDM 16 QAM	1@1	21.02	21.12	0.1294
77	30	80	639334	3590.01	DFT-s-OFDM QPSK	1@1	22.46	22.56	0.1803
77	30	80	639334	3590.01	DFT-s-OFDM 16 QAM	1@1	21.51	21.61	0.1449
77	30	80	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.2	22.3	0.1698
77	30	80	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.31	21.41	0.1384
77	30	80	644000	3660	DFT-s-OFDM QPSK	1@1	22.1	22.2	0.1660
77	30	80	644000	3660	DFT-s-OFDM 16 QAM	1@1	21.21	21.31	0.1352
77	30	90	639668	3595.02	DFT-s-OFDM QPSK	1@1	22.39	22.49	0.1774
77	30	90	639668	3595.02	DFT-s-OFDM 16 QAM	1@1	21.54	21.64	0.1459
77	30	90	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.39	22.49	0.1774
77	30	90	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.47	21.57	0.1435
77	30	90	643666	3654.99	DFT-s-OFDM QPSK	1@1	22.2	22.3	0.1698
77	30	90	643666	3654.99	DFT-s-OFDM 16 QAM	1@1	21.37	21.47	0.1403
77	30	100	640000	3600	DFT-s-OFDM PI/2 BPSK	135@67	22.13	22.23	0.1671
77	30	100	640000	3600	DFT-s-OFDM PI/2 BPSK	1@1	22.58	22.68	0.1854
77	30	100	640000	3600	DFT-s-OFDM PI/2 BPSK	1@271	21.45	21.55	0.1429
77	30	100	640000	3600	DFT-s-OFDM QPSK	135@67	22.18	22.28	0.1690
77	30	100	640000	3600	DFT-s-OFDM QPSK	1@1	22.54	22.64	0.1837
77	30	100	640000	3600	DFT-s-OFDM QPSK	1@271	21.49	21.59	0.1442
77	30	100	640000	3600	DFT-s-OFDM 16 QAM	135@67	21.32	21.42	0.1387
77	30	100	640000	3600	DFT-s-OFDM 16 QAM	1@1	21.55	21.65	0.1462
77	30	100	640000	3600	DFT-s-OFDM 16 QAM	1@271	20.58	20.68	0.1169
77	30	100	640000	3600	DFT-s-OFDM 64 QAM	135@67	19.66	19.76	0.0946
77	30	100	640000	3600	DFT-s-OFDM 64 QAM	1@1	20.11	20.21	0.1050
77	30	100	640000	3600	DFT-s-OFDM 64 QAM	1@271	18.95	19.05	0.0804
77	30	100	640000	3600	DFT-s-OFDM 256 QAM	135@67	17.77	17.87	0.0612
77	30	100	640000	3600	DFT-s-OFDM 256 QAM	1@1	18.15	18.25	0.0668

77	30	100	640000	3600	DFT-s-OFDM 256 QAM	1@271	17.18	17.28	0.0535
77	30	100	640000	3600	CP-OFDM QPSK	137@68	20.78	20.88	0.1225
77	30	100	640000	3600	CP-OFDM QPSK	1@1	21.05	21.15	0.1303
77	30	100	640000	3600	CP-OFDM QPSK	1@271	20.21	20.31	0.1074
77	30	100	641666	3624.99	DFT-s-OFDM PI/2 BPSK	135@67	21.93	22.03	0.1596
77	30	100	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@1	22.37	22.47	0.1766
77	30	100	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@271	21.65	21.75	0.1496
77	30	100	641666	3624.99	DFT-s-OFDM QPSK	135@67	21.93	22.03	0.1596
77	30	100	641666	3624.99	DFT-s-OFDM QPSK	1@1	22.43	22.53	0.1791
77	30	100	641666	3624.99	DFT-s-OFDM QPSK	1@271	21.7	21.8	0.1514
77	30	100	641666	3624.99	DFT-s-OFDM 16 QAM	135@67	21.07	21.17	0.1309
77	30	100	641666	3624.99	DFT-s-OFDM 16 QAM	1@1	21.55	21.65	0.1462
77	30	100	641666	3624.99	DFT-s-OFDM 16 QAM	1@271	20.79	20.89	0.1227
77	30	100	641666	3624.99	DFT-s-OFDM 64 QAM	135@67	19.6	19.7	0.0933
77	30	100	641666	3624.99	DFT-s-OFDM 64 QAM	1@1	20.05	20.15	0.1035
77	30	100	641666	3624.99	DFT-s-OFDM 64 QAM	1@271	19.27	19.37	0.0865
77	30	100	641666	3624.99	DFT-s-OFDM 256 QAM	135@67	17.64	17.74	0.0594
77	30	100	641666	3624.99	DFT-s-OFDM 256 QAM	1@1	17.97	18.07	0.0641
77	30	100	641666	3624.99	DFT-s-OFDM 256 QAM	1@271	17.1	17.2	0.0525
77	30	100	641666	3624.99	CP-OFDM QPSK	137@68	20.56	20.66	0.1164
77	30	100	641666	3624.99	CP-OFDM QPSK	1@1	21.06	21.16	0.1306
77	30	100	641666	3624.99	CP-OFDM QPSK	1@271	20.28	20.38	0.1091
77	30	100	643332	3649.98	DFT-s-OFDM PI/2 BPSK	135@67	21.76	21.86	0.1535
77	30	100	643332	3649.98	DFT-s-OFDM PI/2 BPSK	1@1	22.23	22.33	0.1710
77	30	100	643332	3649.98	DFT-s-OFDM PI/2 BPSK	1@271	21.71	21.81	0.1517
77	30	100	643332	3649.98	DFT-s-OFDM QPSK	135@67	21.78	21.88	0.1542
77	30	100	643332	3649.98	DFT-s-OFDM QPSK	1@1	22.25	22.35	0.1718
77	30	100	643332	3649.98	DFT-s-OFDM QPSK	1@271	21.71	21.81	0.1517
77	30	100	643332	3649.98	DFT-s-OFDM 16 QAM	135@67	20.93	21.03	0.1268
77	30	100	643332	3649.98	DFT-s-OFDM 16 QAM	1@1	21.31	21.41	0.1384
77	30	100	643332	3649.98	DFT-s-OFDM 16 QAM	1@271	20.79	20.89	0.1227
77	30	100	643332	3649.98	DFT-s-OFDM 64 QAM	135@67	19.37	19.47	0.0885
77	30	100	643332	3649.98	DFT-s-OFDM 64 QAM	1@1	19.63	19.73	0.0940
77	30	100	643332	3649.98	DFT-s-OFDM 64 QAM	1@271	19.29	19.39	0.0869
77	30	100	643332	3649.98	DFT-s-OFDM 256 QAM	135@67	17.3	17.4	0.0550
77	30	100	643332	3649.98	DFT-s-OFDM 256 QAM	1@1	17.62	17.72	0.0592
77	30	100	643332	3649.98	DFT-s-OFDM 256 QAM	1@271	17.12	17.22	0.0527
77	30	100	643332	3649.98	CP-OFDM QPSK	137@68	20.35	20.45	0.1109
77	30	100	643332	3649.98	CP-OFDM QPSK	1@1	20.91	21.01	0.1262
77	30	100	643332	3649.98	CP-OFDM QPSK	1@271	20.33	20.43	0.1104

Frequency Stability

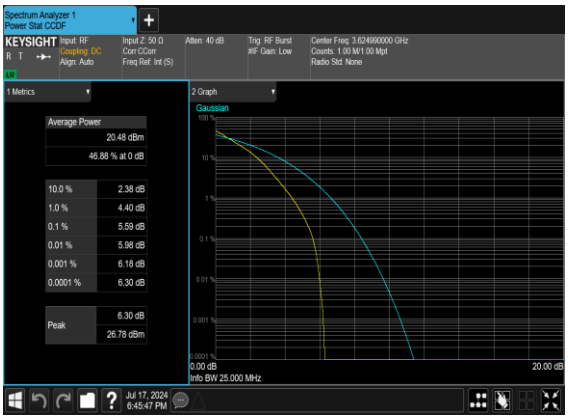
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0046	**PASS**	NV
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0063	**PASS**	LV
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0026	**PASS**	HV
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0065	**PASS**	-30℃
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0058	**PASS**	-20℃
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0063	**PASS**	-10℃
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0051	**PASS**	0℃
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0065	**PASS**	10℃
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0046	**PASS**	20℃
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0045	**PASS**	30℃
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0039	**PASS**	40℃
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	0.0044	**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	641666	3624.99	DFT-s-OFDM PI/2 BPSK	50@0	4.34	13	**PASS**
77	30	20	641666	3624.99	DFT-s-OFDM QPSK	50@0	5.59	13	**PASS**

B2_N77(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

B2_N77(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

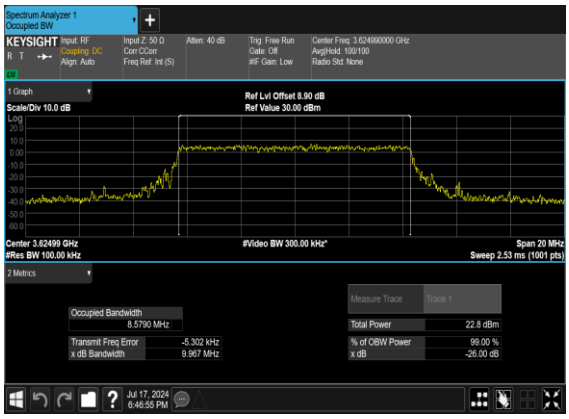


Occupied Bandwidth

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
77	30	10	641666	3624.99	CP-OFDM QPSK	24@0	8.579	9.967
77	30	10	641666	3624.99	CP-OFDM 16 QAM	24@0	8.5782	9.772
77	30	10	641666	3624.99	CP-OFDM 64 QAM	24@0	8.5913	9.593
77	30	10	641666	3624.99	CP-OFDM 256 QAM	24@0	8.5655	9.657
77	30	15	641666	3624.99	CP-OFDM QPSK	38@0	13.595	14.8
77	30	15	641666	3624.99	CP-OFDM 16 QAM	38@0	13.566	14.62
77	30	15	641666	3624.99	CP-OFDM 64 QAM	38@0	13.574	14.56
77	30	15	641666	3624.99	CP-OFDM 256 QAM	38@0	13.604	14.46
77	30	20	641666	3624.99	CP-OFDM QPSK	51@0	18.21	19.71
77	30	20	641666	3624.99	CP-OFDM 16 QAM	51@0	18.209	19.43
77	30	20	641666	3624.99	CP-OFDM 64 QAM	51@0	18.211	20.79
77	30	20	641666	3624.99	CP-OFDM 256 QAM	51@0	18.215	19.04
77	30	30	641666	3624.99	CP-OFDM QPSK	78@0	27.814	29.34
77	30	30	641666	3624.99	CP-OFDM 16 QAM	78@0	27.813	30.03
77	30	30	641666	3624.99	CP-OFDM 64 QAM	78@0	27.83	29.13
77	30	30	641666	3624.99	CP-OFDM 256 QAM	78@0	27.797	28.91
77	30	40	641666	3624.99	CP-OFDM QPSK	106@0	37.82	39.44
77	30	40	641666	3624.99	CP-OFDM 16 QAM	106@0	37.888	39.71
77	30	40	641666	3624.99	CP-OFDM 64 QAM	106@0	37.873	39.49
77	30	40	641666	3624.99	CP-OFDM 256 QAM	106@0	37.879	39.31
77	30	50	641666	3624.99	CP-OFDM QPSK	133@0	47.553	49.17
77	30	50	641666	3624.99	CP-OFDM 16 QAM	133@0	47.465	49.21

77	30	50	641666	3624.99	CP-OFDM 64 QAM	133@0	47.491	48.98
77	30	50	641666	3624.99	CP-OFDM 256 QAM	133@0	47.629	49.36
77	30	60	641666	3624.99	CP-OFDM QPSK	162@0	57.872	59.73
77	30	60	641666	3624.99	CP-OFDM 16 QAM	162@0	57.921	59.92
77	30	60	641666	3624.99	CP-OFDM 64 QAM	162@0	57.928	60.02
77	30	60	641666	3624.99	CP-OFDM 256 QAM	162@0	57.903	59.69
77	30	70	641666	3624.99	CP-OFDM QPSK	189@0	67.574	71.62
77	30	70	641666	3624.99	CP-OFDM 16 QAM	189@0	67.442	69.59
77	30	70	641666	3624.99	CP-OFDM 64 QAM	189@0	67.566	69.8
77	30	70	641666	3624.99	CP-OFDM 256 QAM	189@0	67.578	70.14
77	30	80	641666	3624.99	CP-OFDM QPSK	217@0	77.636	79.96
77	30	80	641666	3624.99	CP-OFDM 16 QAM	217@0	77.558	79.87
77	30	80	641666	3624.99	CP-OFDM 64 QAM	217@0	77.597	79.81
77	30	80	641666	3624.99	CP-OFDM 256 QAM	217@0	77.64	79.95
77	30	90	641666	3624.99	CP-OFDM QPSK	245@0	87.407	90.21
77	30	90	641666	3624.99	CP-OFDM 16 QAM	245@0	87.593	90.33
77	30	90	641666	3624.99	CP-OFDM 64 QAM	245@0	87.613	90.24
77	30	90	641666	3624.99	CP-OFDM 256 QAM	245@0	87.714	90.18
77	30	100	641666	3624.99	CP-OFDM QPSK	273@0	97.478	101.5
77	30	100	641666	3624.99	CP-OFDM 16 QAM	273@0	97.548	100.4
77	30	100	641666	3624.99	CP-OFDM 64 QAM	273@0	97.517	100.5
77	30	100	641666	3624.99	CP-OFDM 256 QAM	273@0	97.618	100.7

B2_N77(10M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



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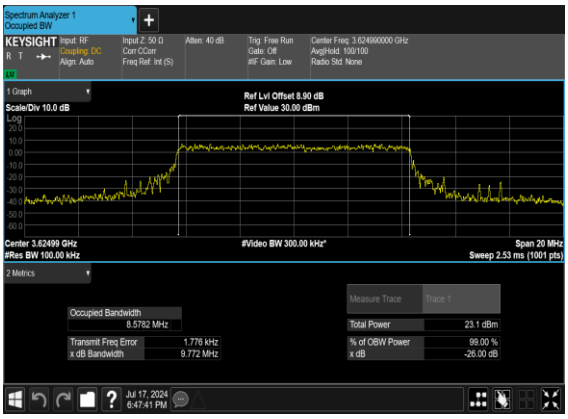

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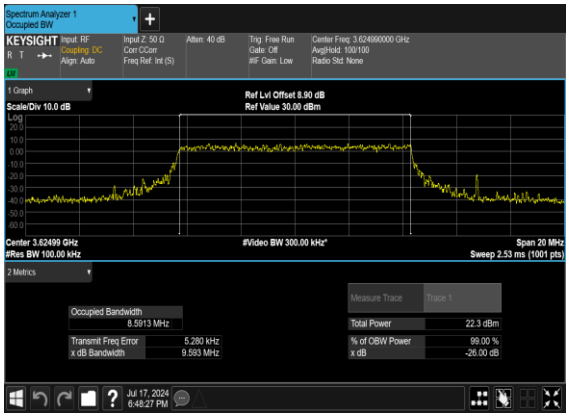

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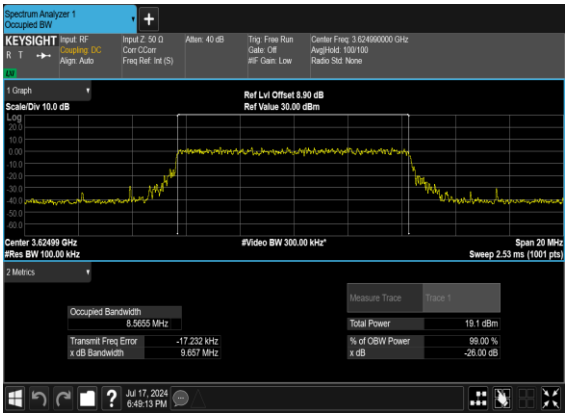
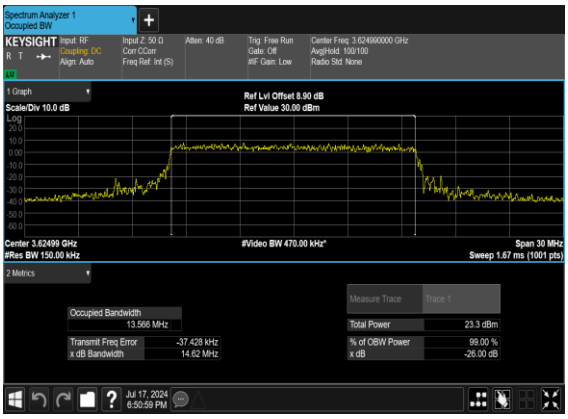


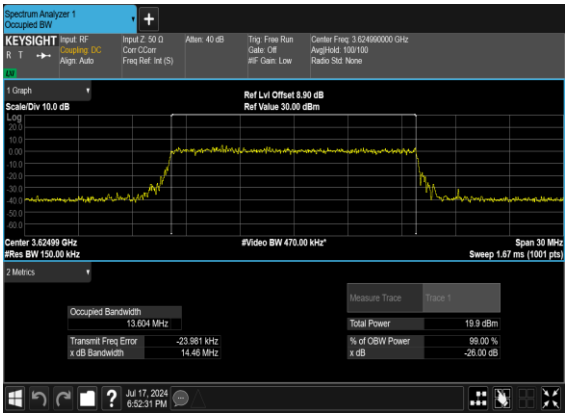
B2_N77(15M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

B2_N77(15M)_CP-OFDM_16QAM_Outer_Full_Mid_CH

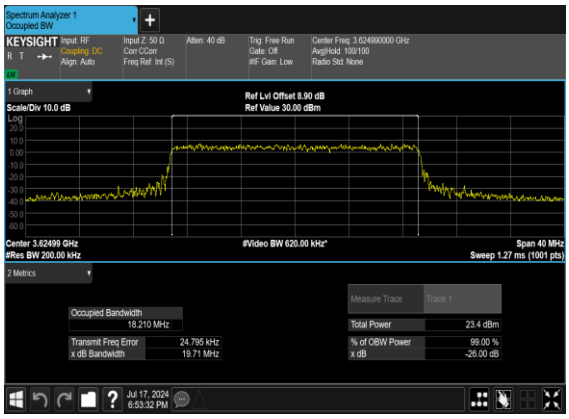


B2_N77(15M)_CP-OFDM_64QAM_Outer_Full_Mid_CH

B2_N77(15M)_CP-OFDM_256QAM_Outer_Full_Mid_CH



B2_N77(20M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



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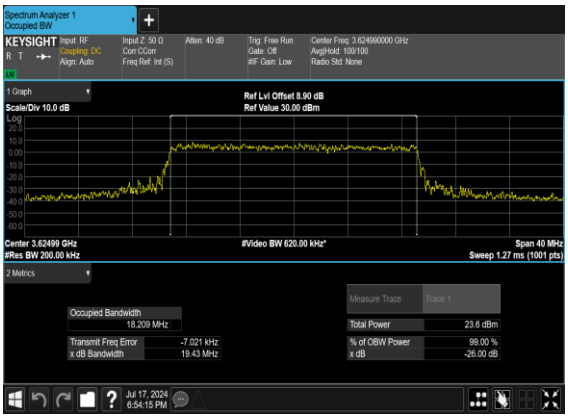

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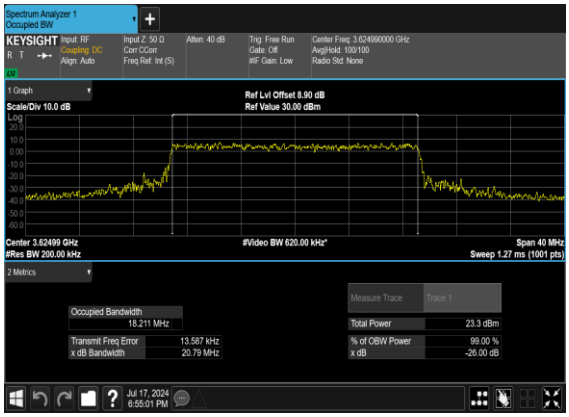

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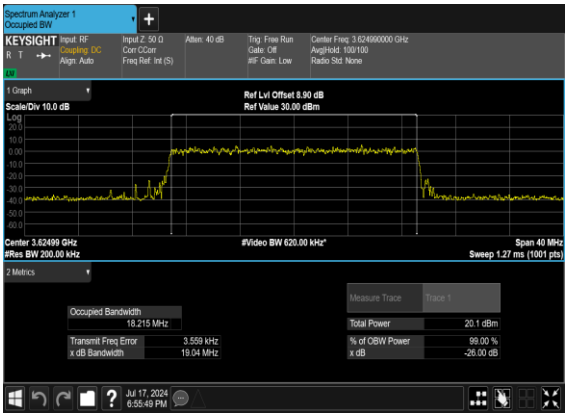
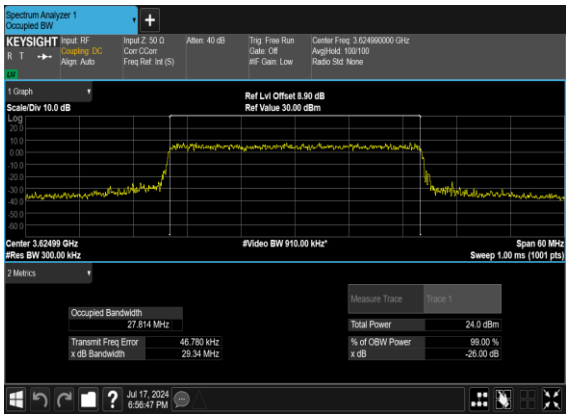


B2_N77(30M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



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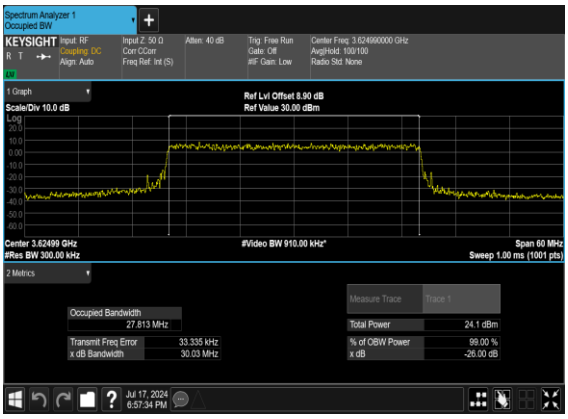

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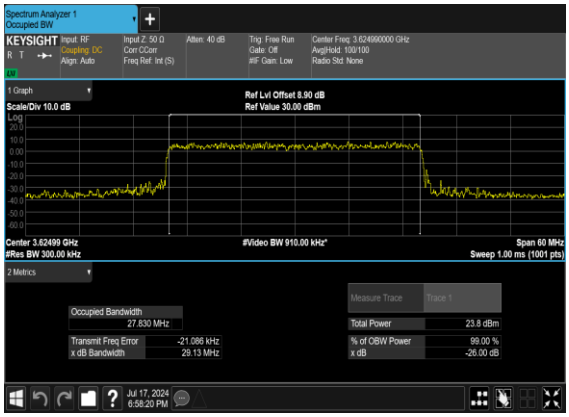

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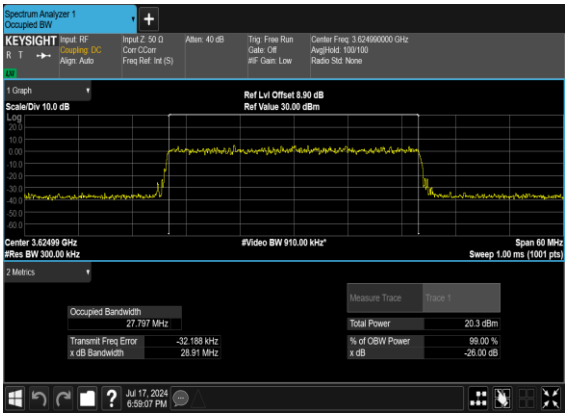
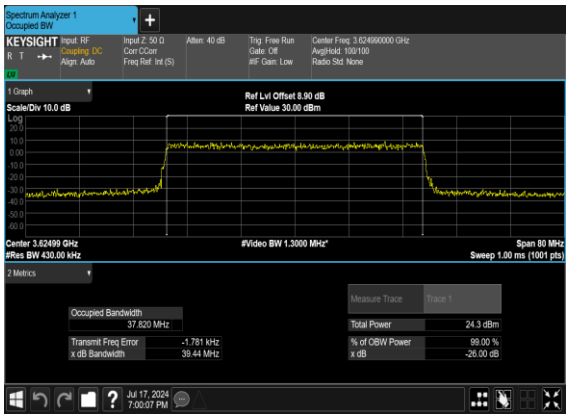
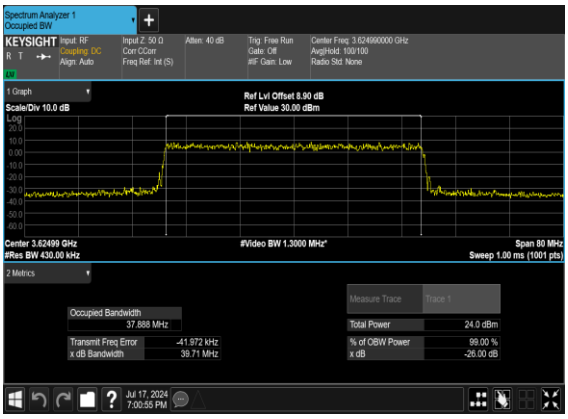


B2_N77(40M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



B2_N77(40M)_CP-OFDM_16QAM_Outer_Full_Mid_CH



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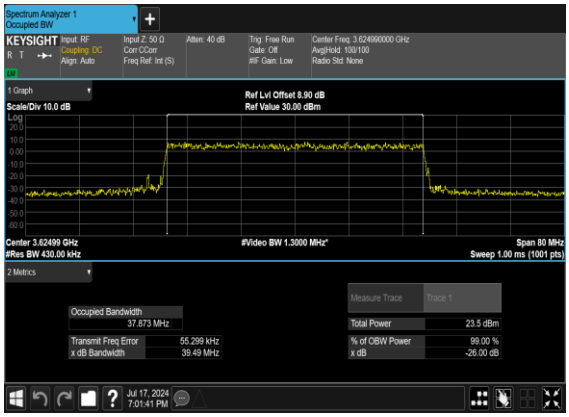

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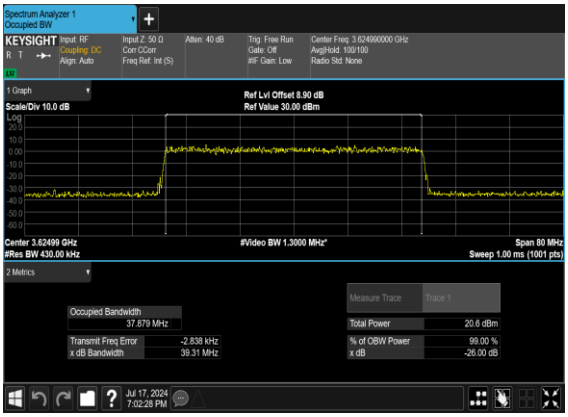
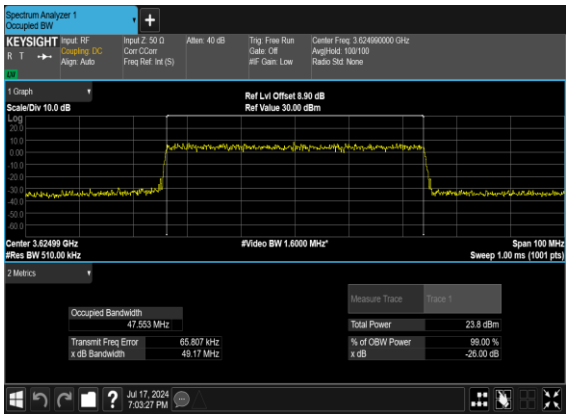
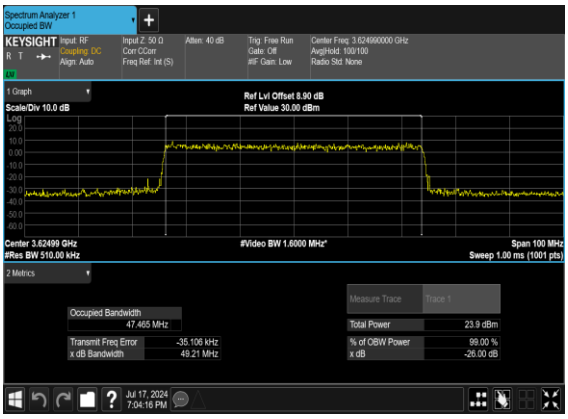


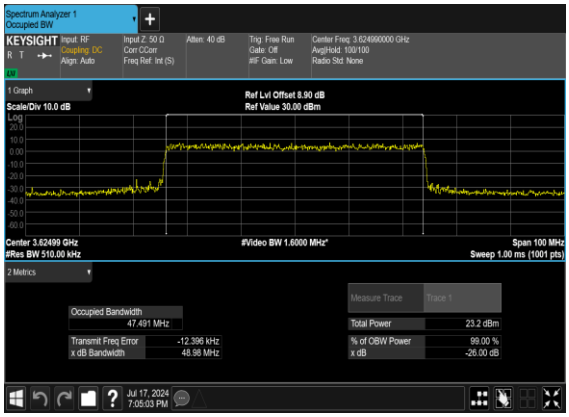
B2_N77(50M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



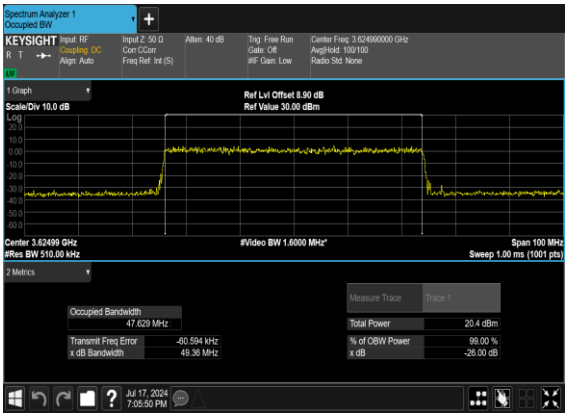
B2_N77(50M)_CP-OFDM_16QAM_Outer_Full_Mid_CH



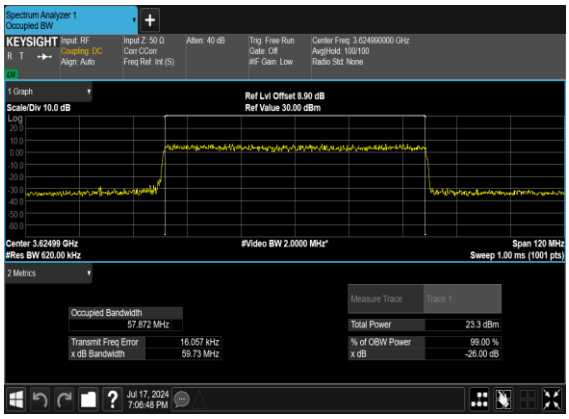
B2_N77(50M)_CP-OFDM_64QAM_Outer_Full_Mid_CH



B2_N77(50M)_CP-OFDM_256QAM_Outer_Full_Mid_CH



B2_N77(60M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



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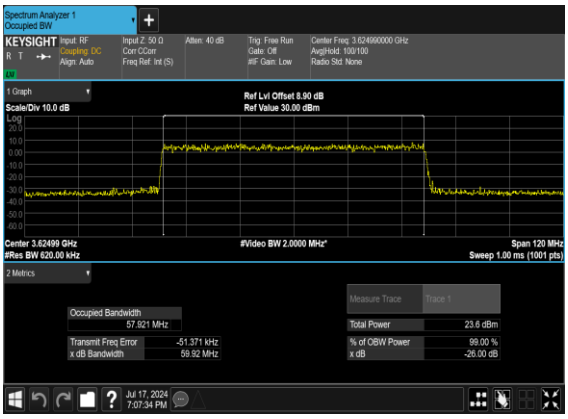
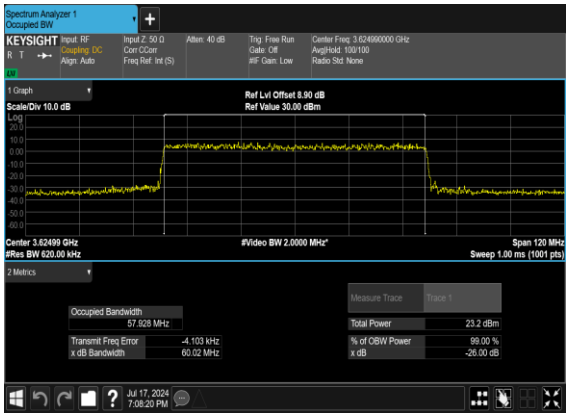


B2_N77(60M)_CP-OFDM_64QAM_Outer_Full_Mid_CH



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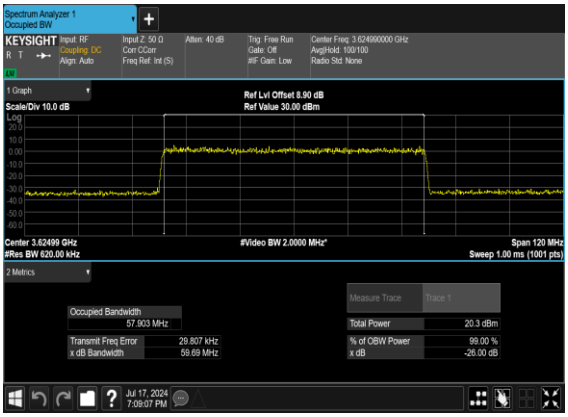
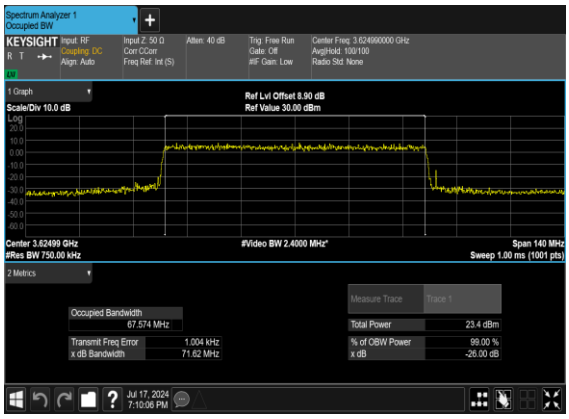


B2_N77(70M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



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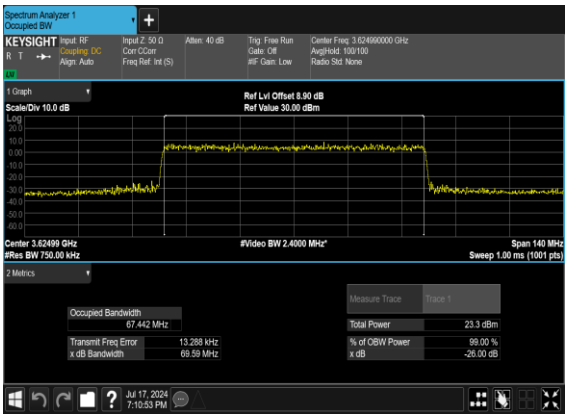
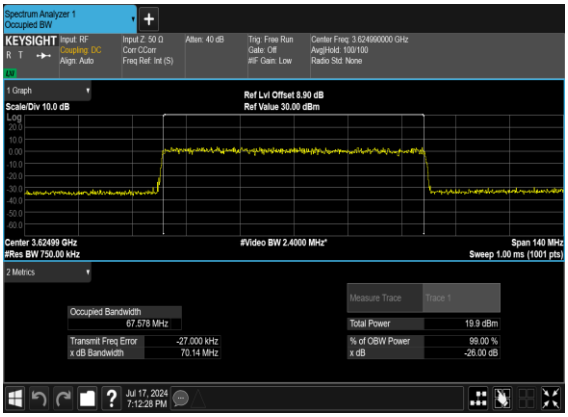
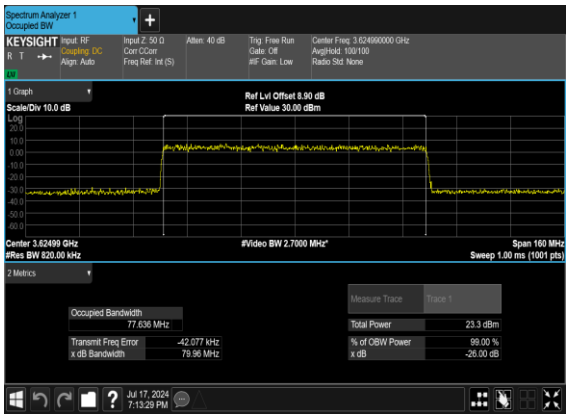


B2_N77(70M)_CP-OFDM_64QAM_Outer_Full_Mid_CH

B2_N77(70M)_CP-OFDM_256QAM_Outer_Full_Mid_CH



B2_N77(80M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



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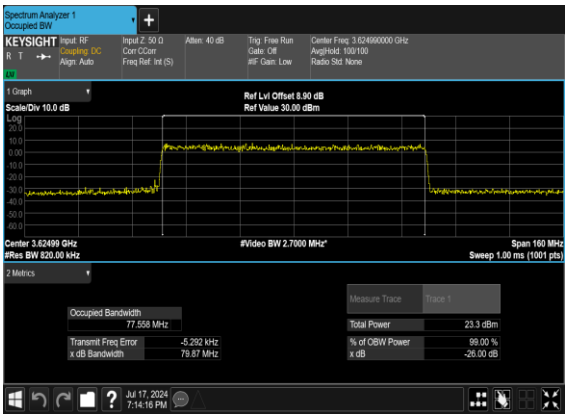
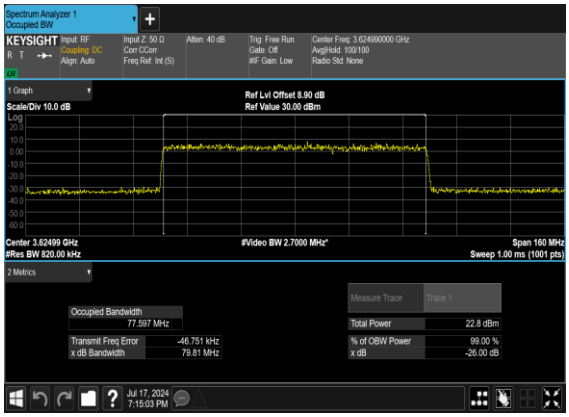
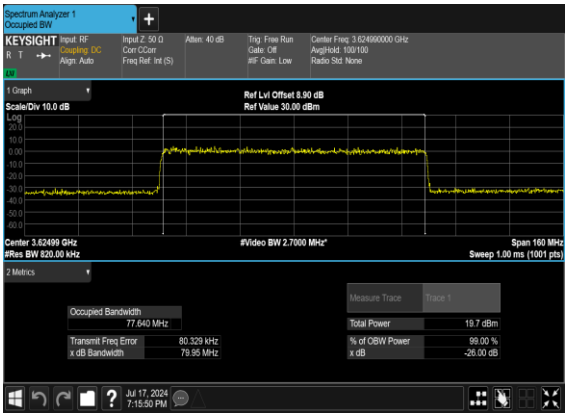


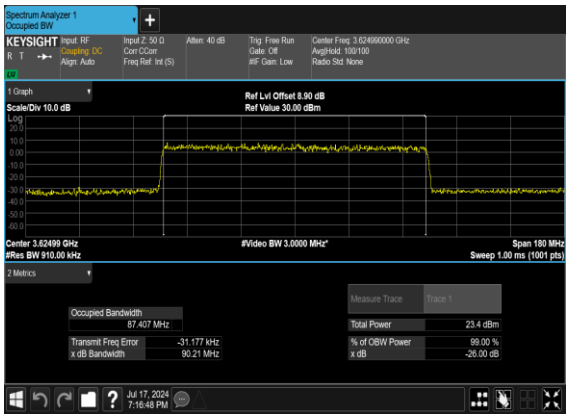
B2_N77(80M)_CP-OFDM_64QAM_Outer_Full_Mid_CH



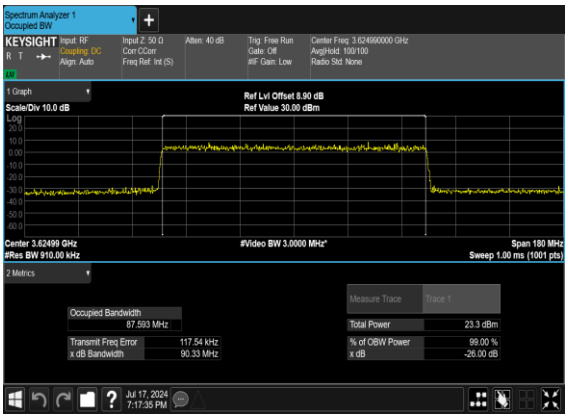
B2_N77(80M)_CP-OFDM_256QAM_Outer_Full_Mid_CH



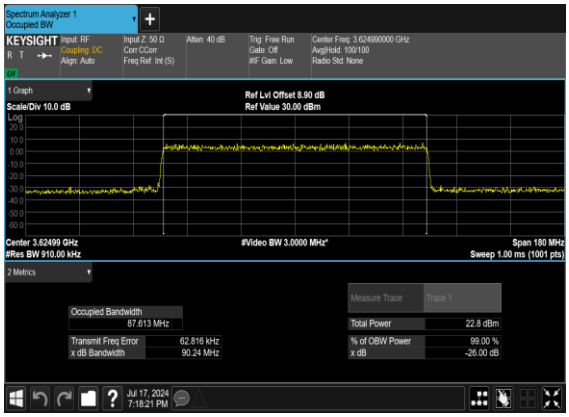
B2_N77(90M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



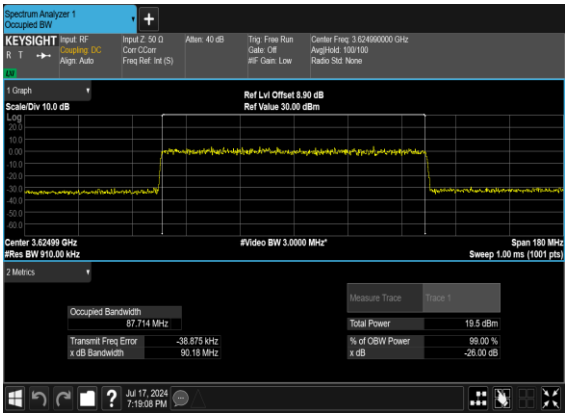
B2_N77(90M)_CP-OFDM_16QAM_Outer_Full_Mid_CH



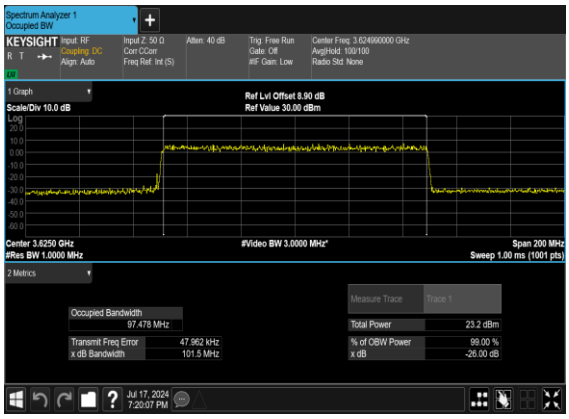
B2_N77(90M)_CP-OFDM_64QAM_Outer_Full_Mid_CH



B2_N77(90M)_CP-OFDM_256QAM_Outer_Full_Mid_CH

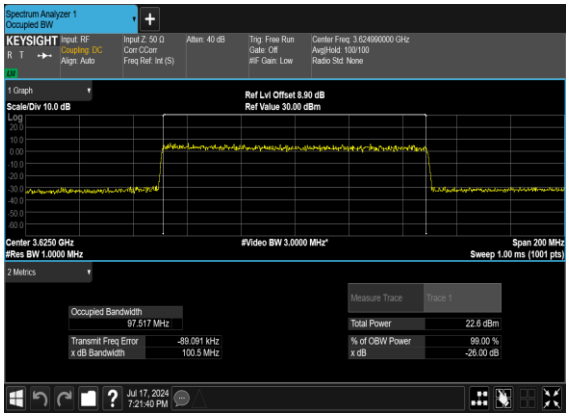


B2_N77(100M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

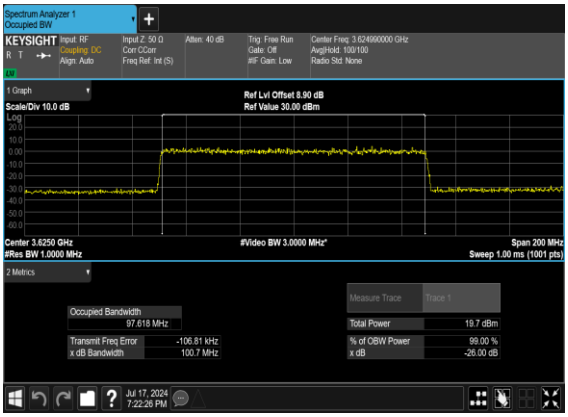


B2_N77(100M)_CP-OFDM_16QAM_Outer_Full_Mid_CH

B2_N77(100M)_CP-OFDM_64QAM_Outer_Full_Mid_CH



B2_N77(100M)_CP-OFDM_256QAM_Outer_Full_Mid_CH



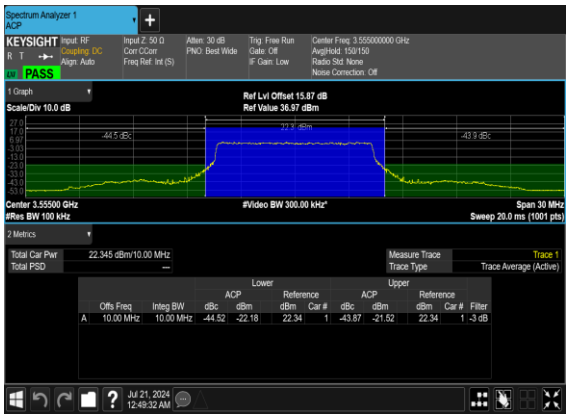
Adjacent Channel Leakage Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Lower Margin	Upper Margin	Result	Verdict
77	30	10	637000	3555.0	DFT-s-OFDM PI/2 BPSK	24@0	-13.86	-13.41	**see graph**	PASS
77	30	10	637000	3555.0	DFT-s-OFDM PI/2 BPSK	1@0	-12.0	-24.26	**see graph**	PASS
77	30	10	637000	3555.0	DFT-s-OFDM PI/2 BPSK	1@23	-24.35	-10.83	**see graph**	PASS
77	30	10	637000	3555.0	DFT-s-OFDM QPSK	24@0	-12.24	-13.07	**see graph**	PASS
77	30	10	637000	3555.0	DFT-s-OFDM QPSK	1@0	-11.3	-24.69	**see graph**	PASS
77	30	10	637000	3555.0	DFT-s-OFDM QPSK	1@23	-24.27	-10.83	**see graph**	PASS
77	30	10	641666	3624.99	DFT-s-OFDM PI/2 BPSK	24@0	-13.8	-12.99	**see graph**	PASS
77	30	10	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@0	-9.0	-16.52	**see graph**	PASS
77	30	10	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@23	-19.62	-10.1	**see graph**	PASS
77	30	10	641666	3624.99	DFT-s-OFDM QPSK	24@0	-11.43	-14.59	**see graph**	PASS
77	30	10	641666	3624.99	DFT-s-OFDM QPSK	1@0	-12.83	-20.93	**see graph**	PASS
77	30	10	641666	3624.99	DFT-s-OFDM QPSK	1@23	-17.22	-9.29	**see graph**	PASS
77	30	10	646332	3694.98	DFT-s-OFDM PI/2 BPSK	24@0	-14.36	-13.73	**see graph**	PASS
77	30	10	646332	3694.98	DFT-s-OFDM PI/2 BPSK	1@0	-10.81	-18.2	**see graph**	PASS
77	30	10	646332	3694.98	DFT-s-OFDM PI/2 BPSK	1@23	-19.07	-10.86	**see graph**	PASS
77	30	10	646332	3694.98	DFT-s-OFDM QPSK	24@0	-13.0	-13.73	**see graph**	PASS
77	30	10	646332	3694.98	DFT-s-OFDM QPSK	1@0	-10.4	-18.76	**see graph**	PASS
77	30	10	646332	3694.98	DFT-s-OFDM QPSK	1@23	-18.94	-10.58	**see graph**	PASS
77	30	50	638334	3575.01	DFT-s-OFDM PI/2 BPSK	128@0	-12.0	-13.12	**see graph**	PASS
77	30	50	638334	3575.01	DFT-s-OFDM PI/2 BPSK	1@0	-12.67	-13.26	**see graph**	PASS

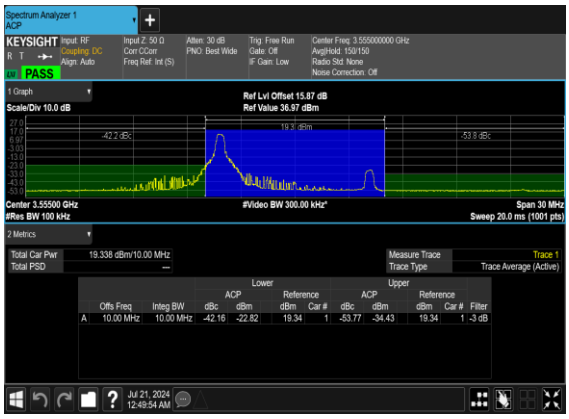
77	30	50	638334	3575.01	DFT-s-OFDM PI/2 BPSK	1@132	-13.63	-12.09	**see graph**	PASS
77	30	50	638334	3575.01	DFT-s-OFDM QPSK	128@0	-10.84	-12.08	**see graph**	PASS
77	30	50	638334	3575.01	DFT-s-OFDM QPSK	1@0	-11.23	-12.35	**see graph**	PASS
77	30	50	638334	3575.01	DFT-s-OFDM QPSK	1@132	-14.05	-11.87	**see graph**	PASS
77	30	50	641666	3624.99	DFT-s-OFDM PI/2 BPSK	128@0	-11.58	-12.83	**see graph**	PASS
77	30	50	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@0	-11.95	-12.52	**see graph**	PASS
77	30	50	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@132	-12.33	-10.54	**see graph**	PASS
77	30	50	641666	3624.99	DFT-s-OFDM QPSK	128@0	-10.25	-11.74	**see graph**	PASS
77	30	50	641666	3624.99	DFT-s-OFDM QPSK	1@0	-12.35	-12.65	**see graph**	PASS
77	30	50	641666	3624.99	DFT-s-OFDM QPSK	1@132	-12.81	-10.76	**see graph**	PASS
77	30	50	645000	3675.0	DFT-s-OFDM PI/2 BPSK	128@0	-12.3	-12.88	**see graph**	PASS
77	30	50	645000	3675.0	DFT-s-OFDM PI/2 BPSK	1@0	-12.98	-12.71	**see graph**	PASS
77	30	50	645000	3675.0	DFT-s-OFDM PI/2 BPSK	1@132	-12.1	-10.07	**see graph**	PASS
77	30	50	645000	3675.0	DFT-s-OFDM QPSK	128@0	-11.06	-12.02	**see graph**	PASS
77	30	50	645000	3675.0	DFT-s-OFDM QPSK	1@0	-12.58	-12.48	**see graph**	PASS
77	30	50	645000	3675.0	DFT-s-OFDM QPSK	1@132	-11.63	-9.68	**see graph**	PASS
77	30	100	640000	3600.0	DFT-s-OFDM PI/2 BPSK	270@0	-10.43	-13.71	**see graph**	PASS
77	30	100	640000	3600.0	DFT-s-OFDM PI/2 BPSK	1@0	-10.21	-13.4	**see graph**	PASS
77	30	100	640000	3600.0	DFT-s-OFDM PI/2 BPSK	1@272	-10.34	-7.93	**see graph**	PASS
77	30	100	640000	3600.0	DFT-s-OFDM QPSK	270@0	-8.82	-12.87	**see graph**	PASS
77	30	100	640000	3600.0	DFT-s-OFDM QPSK	1@0	-10.94	-13.48	**see graph**	PASS
77	30	100	640000	3600.0	DFT-s-OFDM QPSK	1@272	-9.7	-7.43	**see graph**	PASS

77	30	100	641666	3624.99	DFT-s-OFDM PI/2 BPSK	270@0	-9.12	-12.33	**see graph**	PASS
77	30	100	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@0	-9.91	-11.92	**see graph**	PASS
77	30	100	641666	3624.99	DFT-s-OFDM PI/2 BPSK	1@272	-9.16	-6.43	**see graph**	PASS
77	30	100	641666	3624.99	DFT-s-OFDM QPSK	270@0	-7.68	-11.59	**see graph**	PASS
77	30	100	641666	3624.99	DFT-s-OFDM QPSK	1@0	-10.09	-12.54	**see graph**	PASS
77	30	100	641666	3624.99	DFT-s-OFDM QPSK	1@272	-9.6	-7.02	**see graph**	PASS
77	30	100	643332	3649.98	DFT-s-OFDM PI/2 BPSK	270@0	-7.61	-10.53	**see graph**	PASS
77	30	100	643332	3649.98	DFT-s-OFDM PI/2 BPSK	1@0	-6.61	-8.04	**see graph**	PASS
77	30	100	643332	3649.98	DFT-s-OFDM PI/2 BPSK	1@272	-9.96	-7.44	**see graph**	PASS
77	30	100	643332	3649.98	DFT-s-OFDM QPSK	270@0	-6.17	-9.92	**see graph**	PASS
77	30	100	643332	3649.98	DFT-s-OFDM QPSK	1@0	-7.97	-8.76	**see graph**	PASS
77	30	100	643332	3649.98	DFT-s-OFDM QPSK	1@272	-10.21	-7.61	**see graph**	PASS

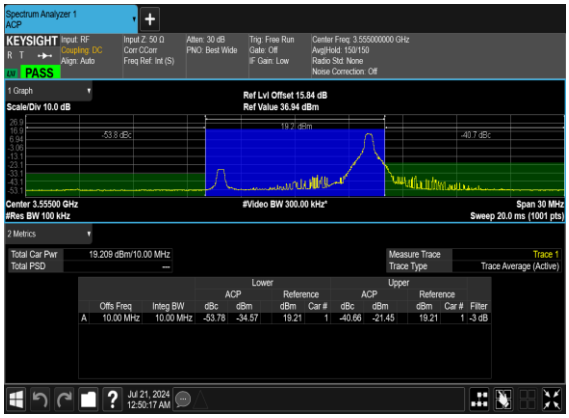
B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Low_CH



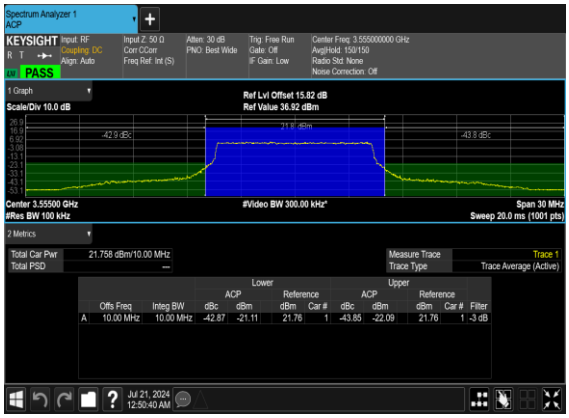
B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Low_CH



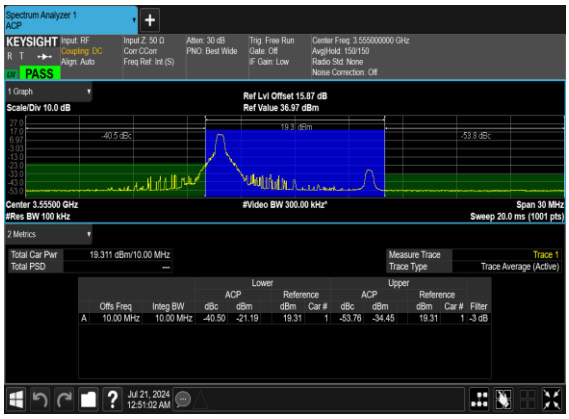
B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Right_Low_CH



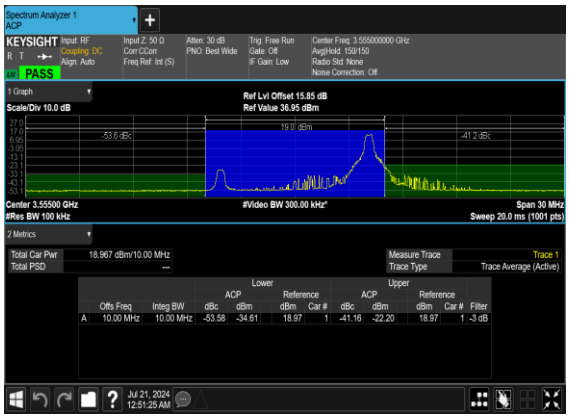
B2_N77(10M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH



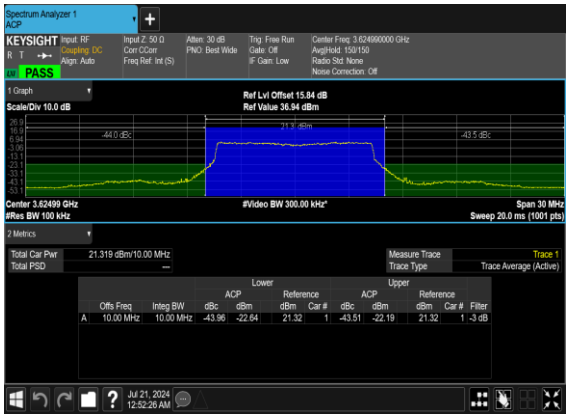
B2_N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



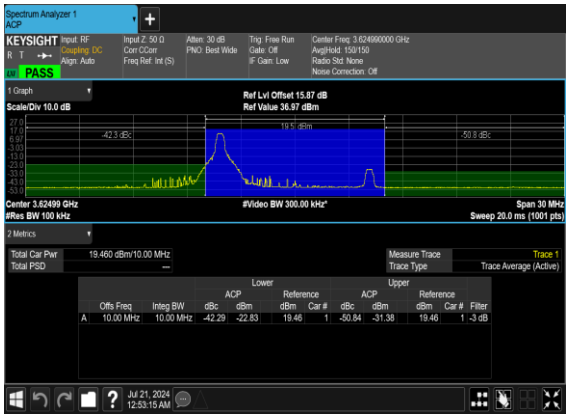
B2_N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_Low_CH



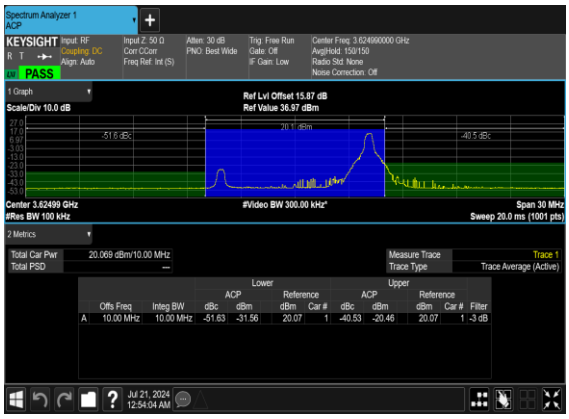
B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



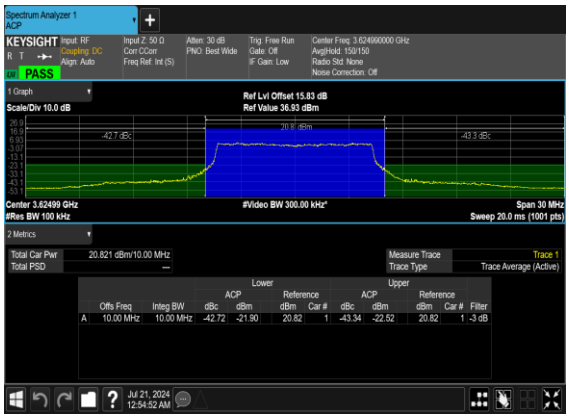
B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH



B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Right_Mid_CH

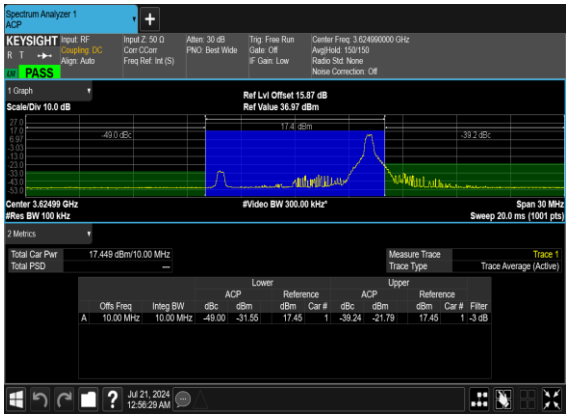


B2_N77(10M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



B2_N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH

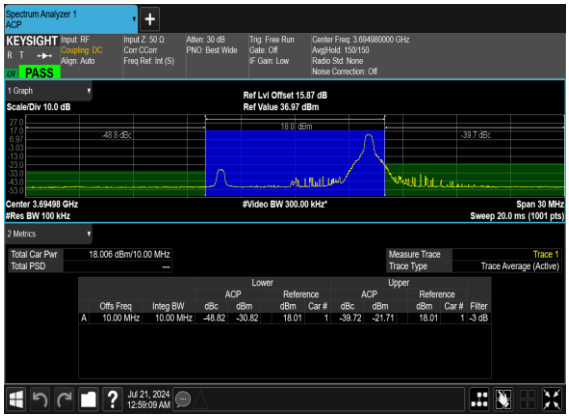
B2_N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_Mid_CH



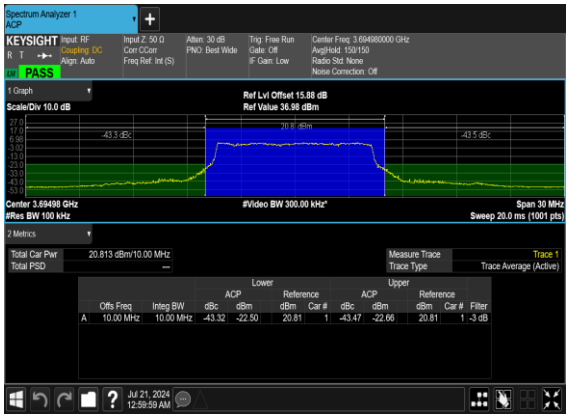
B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_High_CH

B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_High_CH

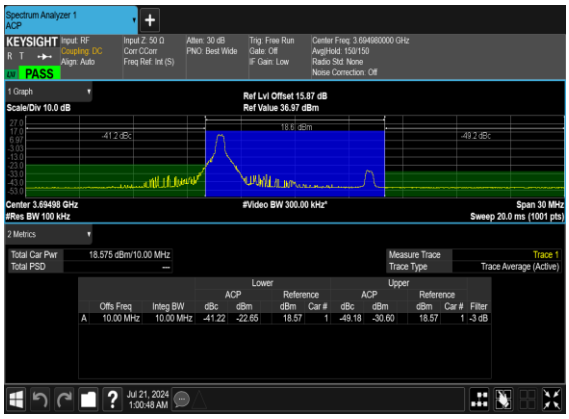
B2_N77(10M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Right_High_CH



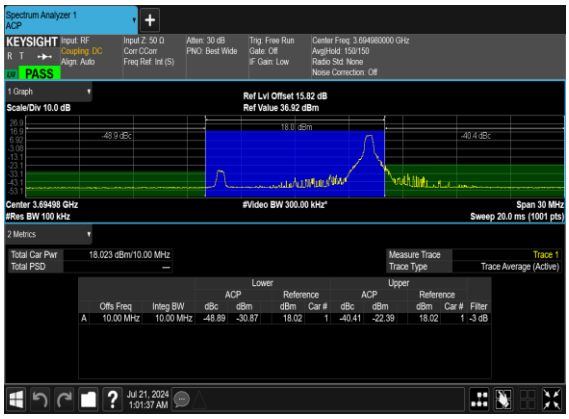
B2_N77(10M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH



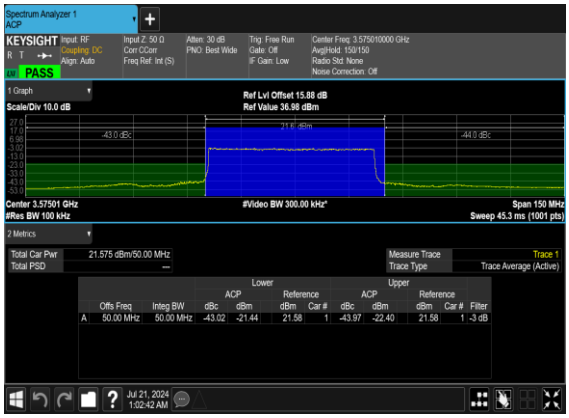
B2_N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



B2_N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_High_CH

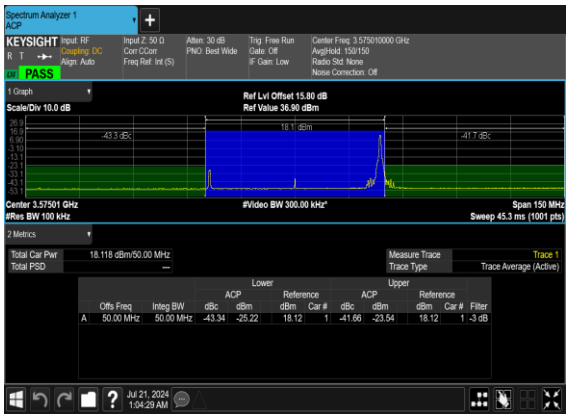


B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Low_CH

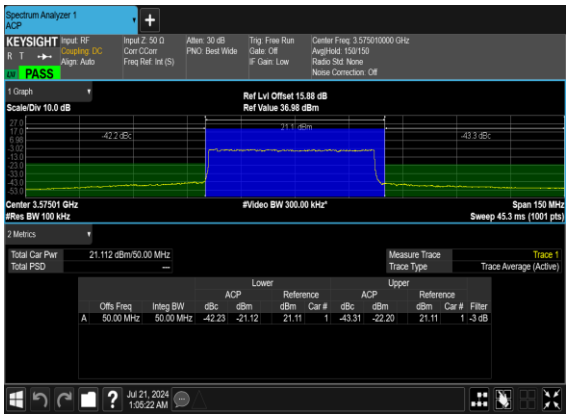


B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Low_CH

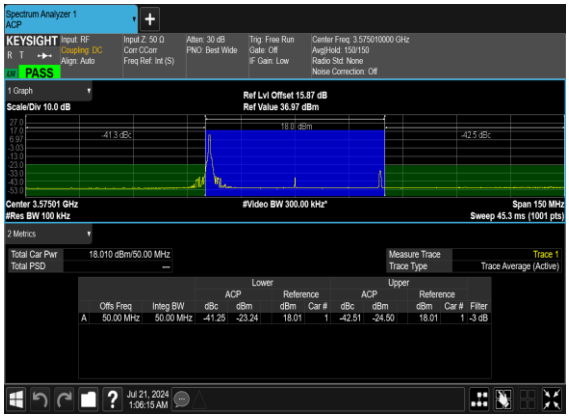
B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Right_Low_CH



B2_N77(50M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH

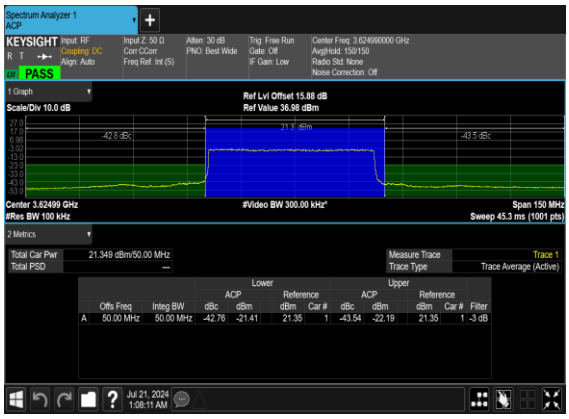


B2_N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH

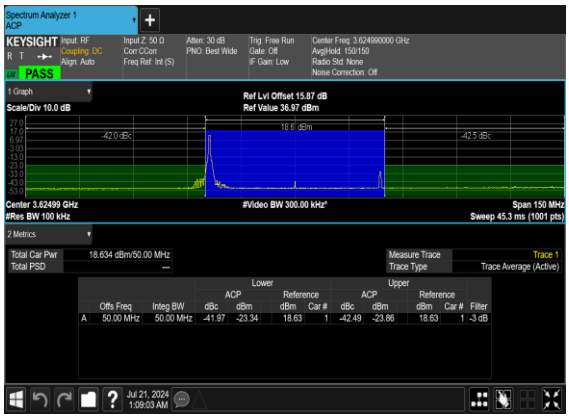


B2_N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_Low_CH

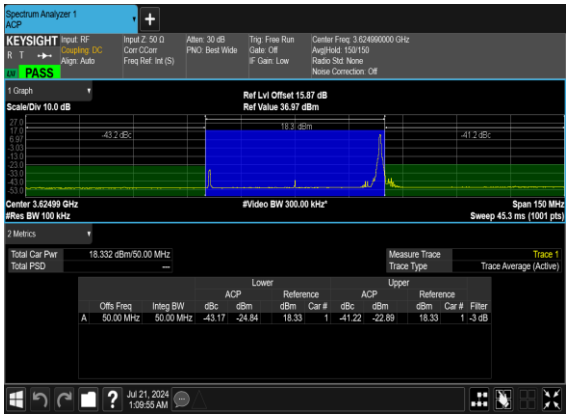
B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



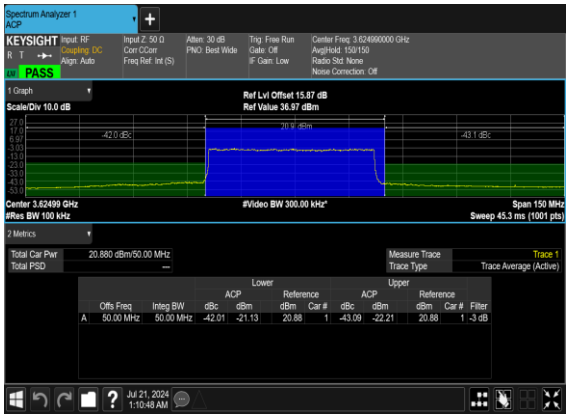
B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH



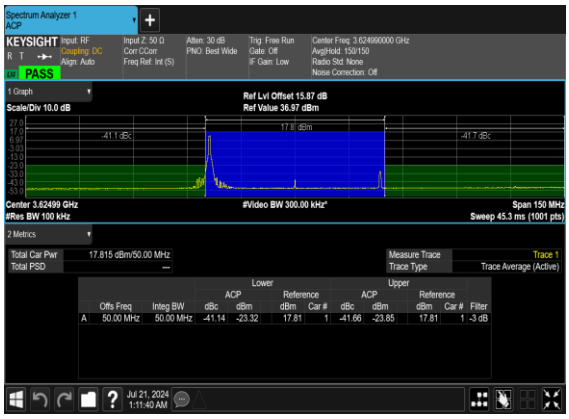
B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Right_Mid_CH



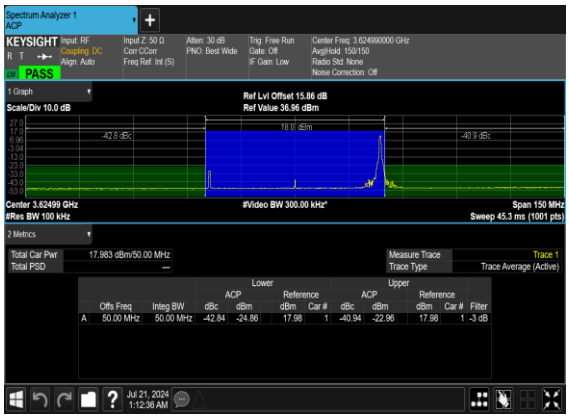
B2_N77(50M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



B2_N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH

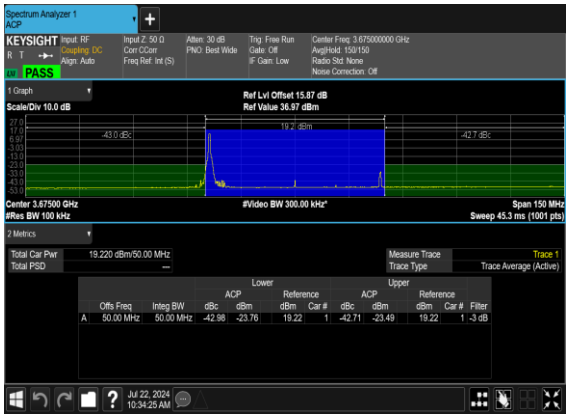


B2_N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_Mid_CH

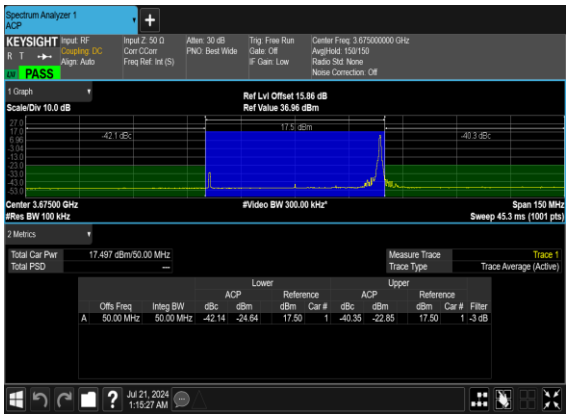


B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_High_CH

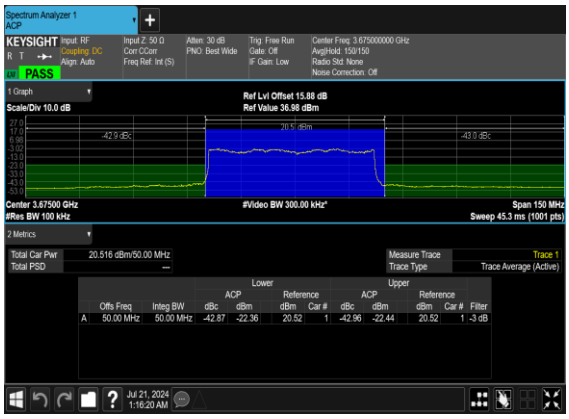
B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_High_CH



B2_N77(50M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Right_High_CH



B2_N77(50M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH



B2_N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH

B2_N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_High_CH