FCC RF Test Report

APPLICANT	:	Xiaomi Communications Co., Ltd.
EQUIPMENT	:	Mobile Phone
BRAND NAME	:	Xiaomi
MODEL NAME	:	A301XM
FCC ID	:	2AFZZND5R
STANDARD	:	47 CFR Part 2, 27
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	:	Jun. 14, 2023

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 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. (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 A. TEST RESULTS OF CONDUCTED TEST

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG351205-01C	Rev. 01	Initial issue of report	Jul. 04, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (5G NR n41)	EIRP < 2Watt		
3.5	N/A	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§27.53(m)(4)	Conducted Band Edge Measurement (5G NR n41)	§27.53(m)(4)	PASS	-
3.8	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (5G NR n41)	< $55+10\log_{10}$(P[Watts])	PASS	-
3.9	§2.1055	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§27.54		Within Authorized Band		

Note: only 20M BW and Power/EIRP are assessed in this report, all the other test results are leveraged from original report FG351205I which is issued separately.

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

Xiaomi Communications Co., Ltd.
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

1.2 Manufacturer

Xiaomi Communications Co., Ltd.
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	Xiaomi
Model Name	A301XM
FCC ID	2AFZZND5R
IMEI Code	Conducted: 869272060010084/86927060010092 Radiation: 869272060000721/869272060000739
HW Version	P2.0
SW Version	MIUI 14
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	5G NR n41 : 2496 MHz ~ 2690 MHz
Rx Frequency	5G NR n41 : 2496 MHz ~ 2690 MHz
Bandwidth	n41 : 20MHz / 30MHz / 40MHz / 50MHz / 60MHz / 80MHz / 90MHz / 100MHz
SCS	30kHz
Antenna Gain	**<Ant. 1>** n41: -4.5 dBi **<Ant. 2>** n41: -4.7 dBi **<Ant. 3>** n41: -6.2 dBi **<Ant. 4>** n41: -1.5 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 n41 for Ant. 4.
2. 5G NR n41 supports SA mode only.

1.5 Modification of EUT

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

1.6 Maximum ERP/EIRP Power and Emission Designator

5G NR n41		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	2506.02 ~ 2679.99	0.2307	18M1G7D	0.1807	18M2W7D
30	2511.00 ~ 2674.98	0.2371	-	0.1726	-
40	2516.01 ~ 2670.00	0.2323	-	0.1750	-
50	2521.02 ~ 2664.99	0.2323	-	0.1742	-
60	2526.00 ~ 2659.98	0.2259	-	0.1750	-
80	2536.02 ~ 2649.99	0.2371	-	0.1766	-
90	2541.00 ~ 2644.98	0.2333	-	0.1774	-
100	2546.01 ~ 2640.00	0.2377	-	0.1936	-

Note: only 20M BW and Power/EIRP are assessed in this report, all the other test results are leveraged from original report FG351205I which is issued separately.

1.7 Testing Location

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

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH01-SZ	AUDIX	E3	6.2009-8-24

1.9 Applicable Standards

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

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

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items 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 (Y plane) were recorded in this report.

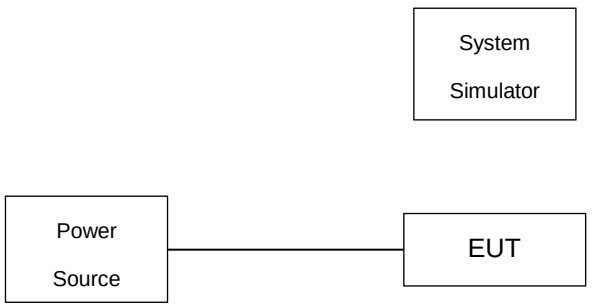
The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.

	X Plane	Y Plane	Z Plane
Orthogonal Planes of EUT			

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 n41	20M, 30M, 40M, 50M, 60M, 80M, 90M ,100M	All Modulations	1RB, Full RB	L, M, H
Peak-to-Average Ratio	5G n41	20M	PI/2 BPSK, QPSK	1RB, Full RB	M
E.I.R.P	5G n41	20M, 30M, 40M, 50M, 60M, 80M, 90M ,100M	All Modulations	1RB, Full RB	L, M, H
26dB and 99% Bandwidth	5G n41	20M	QPSK, 16QAM, 64QAM, 256QAM	Full RB	M
Conducted Band Edge	5G n41	20M	PI/2 BPSK, QPSK	1RB, Full RB	L, H
Conducted Spurious Emission	5G n41	20M	PI/2 BPSK, QPSK	1RB	L, M, H
Frequency Stability	5G n41	20M	QPSK	Full RB	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 = 3.88V; Low Voltage =3.60V; High Voltage =4.47V.
3. All test items are based on engineering evaluation.

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.

The EUT has been configuration operated in a manner tended to maximize its emission characteristics in a typical application.

2.3 Support Unit used in test configuration and system

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	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 2.99 dB and 10dB attenuator.

Example :

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

= 2.99 + 10 = 12.99 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n41 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100	Channel	509202	518598	528000
	Frequency	2546.01	2592.99	2640
90	Channel	508200	518598	528996
	Frequency	2541	2592.99	2644.98
80	Channel	507204	518598	529998
	Frequency	2536.02	2592.99	2649.99
60	Channel	505200	518598	531996
	Frequency	2526	2592.99	2659.98
50	Channel	504204	518598	532998
	Frequency	2521.02	2592.99	2664.99
40	Channel	503202	518598	534000
	Frequency	2516.01	2592.99	2670
30	Channel	502200	518598	534996
	Frequency	2511	2592.99	2674.98
20	Channel	501204	518598	535998
	Frequency	2506.02	2592.99	2679.99

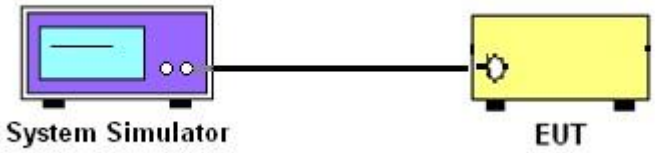
3 Conducted Test Items

3.1 Measuring Instruments

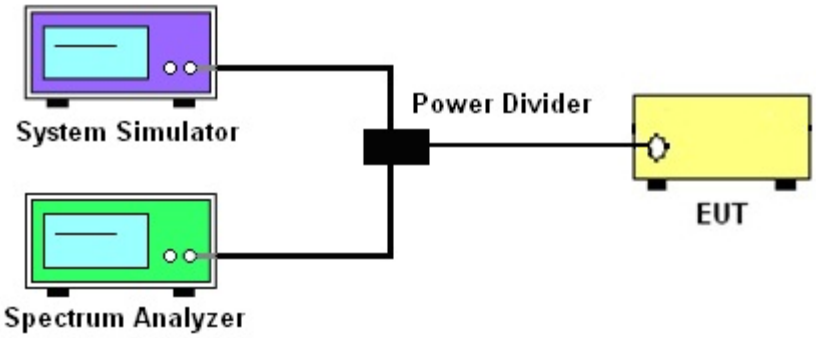
See list of measuring instruments of this test report.

3.2 Test Setup

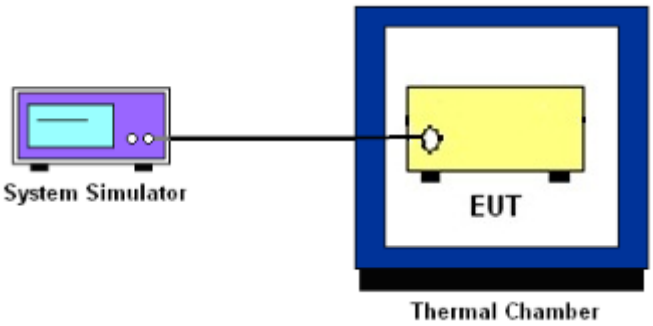
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted 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 and EIRP

3.4.1 Description of the Conducted Output Power Measurement and EIRP 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.

The EIRP of mobile transmitters must not exceed 2 Watts for 5G NR n41.

According to KDB 412172 D01 Power Approach,

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

3.4.2 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 Occupied Bandwidth

3.6.1 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.

3.6.2 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.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

27.53(m)(4)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

3.7.2 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 in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.

   Example:

   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

   = P(W)- [43 + 10log(P)] (dB)

   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
9. For 5G NR n41, the other 40 dB, and 55 dB have additionally applied same calculation above.
10. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For 5G NR n41:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

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 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. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
11. For 5G NR n41
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55+ 10log(P)] (dB)
    = [30+ 10log(P)] (dBm) - [55+ 10log(P)] (dB)
    = -25dBm.

3.9 Frequency Stability

3.9.1 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.

3.9.2 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.

3.9.3 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 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. 06, 2023	Jun. 14, 2023	Apr. 05, 2024	Conducted (TH01-SZ)
DC Power Supply	TTI	PL330P	290070	Max 32V，3A	Oct. 17, 2022	Jun. 14, 2023	Oct. 16, 2023	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04265	60.06.020.0077	0.4GHz~26.5GHz	Dec. 25, 2022	Jun. 14, 2023	Dec. 24, 2023	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 07, 2022	Jun. 14, 2023	Jul. 06, 2023	Conducted (TH01-SZ)

NCR: No Calibration Required

5 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

Test Item	Uncertainty
Conducted Power	**±1.34 dB**
Conducted Emissions	**±1.34 dB**
Occupied Channel Bandwidth	**±0.13 %**

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

Appendix A. Test Results of Conducted Test

Test Engineer :	Jason Zhang	**Temperature :**	24~26℃
		Relative Humidity :	50~53%

Software Version: 23.04.1201

FR1 N41 (ANT4)

Transmitter Conducted Output Power And EIRP, (G_T-L_C)=-1.5dB

NR Band	SCS	Band Width	Arfcn	Freq(MHz)	Modulation	RB	Conducted Power(dBm)	EIRP(dBm)	EIRP(W)
41	30	100	509202	2546.01	DFT-s-OFDM PI/2 BPSK	135@67	25.20	23.7	0.2344
41	30	100	509202	2546.01	DFT-s-OFDM PI/2 BPSK	1@1	25.04	23.54	0.2259
41	30	100	509202	2546.01	DFT-s-OFDM PI/2 BPSK	1@271	25.26	23.76	0.2377
41	30	100	509202	2546.01	DFT-s-OFDM QPSK	135@67	25.23	23.73	0.2360
41	30	100	509202	2546.01	DFT-s-OFDM QPSK	1@1	25.12	23.62	0.2301
41	30	100	509202	2546.01	DFT-s-OFDM QPSK	1@271	25.24	23.74	0.2366
41	30	100	509202	2546.01	DFT-s-OFDM 16 QAM	135@67	24.37	22.87	0.1936
41	30	100	509202	2546.01	DFT-s-OFDM 16 QAM	1@1	24.00	22.5	0.1778
41	30	100	509202	2546.01	DFT-s-OFDM 16 QAM	1@271	24.04	22.54	0.1795
41	30	100	509202	2546.01	DFT-s-OFDM 64 QAM	135@67	22.86	21.36	0.1368
41	30	100	509202	2546.01	DFT-s-OFDM 64 QAM	1@1	23.06	21.56	0.1432
41	30	100	509202	2546.01	DFT-s-OFDM 64 QAM	1@271	23.06	21.56	0.1432
41	30	100	509202	2546.01	DFT-s-OFDM 256 QAM	135@67	20.83	19.33	0.0857
41	30	100	509202	2546.01	DFT-s-OFDM 256 QAM	1@1	20.78	19.28	0.0847
41	30	100	509202	2546.01	DFT-s-OFDM 256 QAM	1@271	20.82	19.32	0.0855
41	30	100	509202	2546.01	CP-OFDM QPSK	137@68	23.80	22.3	0.1698
41	30	100	509202	2546.01	CP-OFDM QPSK	1@1	23.80	22.3	0.1698
41	30	100	509202	2546.01	CP-OFDM QPSK	1@271	23.58	22.08	0.1614
41	30	100	518598	2592.99	DFT-s-OFDM PI/2 BPSK	135@67	25.17	23.67	0.2328
41	30	100	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.07	23.57	0.2275
41	30	100	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@271	25.21	23.71	0.2350
41	30	100	518598	2592.99	DFT-s-OFDM QPSK	135@67	25.22	23.72	0.2355
41	30	100	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.06	23.56	0.2270
41	30	100	518598	2592.99	DFT-s-OFDM QPSK	1@271	25.19	23.69	0.2339
41	30	100	518598	2592.99	DFT-s-OFDM 16 QAM	135@67	24.31	22.81	0.1910
41	30	100	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	23.98	22.48	0.1770
41	30	100	518598	2592.99	DFT-s-OFDM 16 QAM	1@271	24.00	22.5	0.1778
41	30	100	518598	2592.99	DFT-s-OFDM 64 QAM	135@67	22.80	21.3	0.1349

41	30	100	518598	2592.99	DFT-s-OFDM 64 QAM	1@1	23.02	21.52	0.1419
41	30	100	518598	2592.99	DFT-s-OFDM 64 QAM	1@271	23.07	21.57	0.1435
41	30	100	518598	2592.99	DFT-s-OFDM 256 QAM	135@67	20.78	19.28	0.0847
41	30	100	518598	2592.99	DFT-s-OFDM 256 QAM	1@1	20.75	19.25	0.0841
41	30	100	518598	2592.99	DFT-s-OFDM 256 QAM	1@271	20.86	19.36	0.0863
41	30	100	518598	2592.99	CP-OFDM QPSK	137@68	23.76	22.26	0.1683
41	30	100	518598	2592.99	CP-OFDM QPSK	1@1	23.68	22.18	0.1652
41	30	100	518598	2592.99	CP-OFDM QPSK	1@271	23.73	22.23	0.1671
41	30	100	528000	2640	DFT-s-OFDM PI/2 BPSK	135@67	25.11	23.61	0.2296
41	30	100	528000	2640	DFT-s-OFDM PI/2 BPSK	1@1	25.09	23.59	0.2286
41	30	100	528000	2640	DFT-s-OFDM PI/2 BPSK	1@271	25.22	23.72	0.2355
41	30	100	528000	2640	DFT-s-OFDM QPSK	135@67	25.13	23.63	0.2307
41	30	100	528000	2640	DFT-s-OFDM QPSK	1@1	25.07	23.57	0.2275
41	30	100	528000	2640	DFT-s-OFDM QPSK	1@271	25.16	23.66	0.2323
41	30	100	528000	2640	DFT-s-OFDM 16 QAM	135@67	24.31	22.81	0.1910
41	30	100	528000	2640	DFT-s-OFDM 16 QAM	1@1	23.92	22.42	0.1746
41	30	100	528000	2640	DFT-s-OFDM 16 QAM	1@271	24.18	22.68	0.1854
41	30	100	528000	2640	DFT-s-OFDM 64 QAM	135@67	22.76	21.26	0.1337
41	30	100	528000	2640	DFT-s-OFDM 64 QAM	1@1	22.98	21.48	0.1406
41	30	100	528000	2640	DFT-s-OFDM 64 QAM	1@271	23.25	21.75	0.1496
41	30	100	528000	2640	DFT-s-OFDM 256 QAM	135@67	20.81	19.31	0.0853
41	30	100	528000	2640	DFT-s-OFDM 256 QAM	1@1	20.70	19.2	0.0832
41	30	100	528000	2640	DFT-s-OFDM 256 QAM	1@271	21.00	19.5	0.0891
41	30	100	528000	2640	CP-OFDM QPSK	137@68	23.76	22.26	0.1683
41	30	100	528000	2640	CP-OFDM QPSK	1@1	23.56	22.06	0.1607
41	30	100	528000	2640	CP-OFDM QPSK	1@271	23.84	22.34	0.1714
41	30	20	501204	2506.02	DFT-s-OFDM PI/2 BPSK	1@1	25.05	23.55	0.2265
41	30	20	501204	2506.02	DFT-s-OFDM QPSK	1@1	25.09	23.59	0.2286
41	30	20	501204	2506.02	DFT-s-OFDM 16 QAM	1@1	23.90	22.4	0.1738
41	30	20	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.13	23.63	0.2307
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.07	23.57	0.2275
41	30	20	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	23.99	22.49	0.1774
41	30	20	535998	2679.99	DFT-s-OFDM PI/2 BPSK	1@1	25.00	23.5	0.2239
41	30	20	535998	2679.99	DFT-s-OFDM QPSK	1@1	24.98	23.48	0.2228

41	30	20	535998	2679.99	DFT-s-OFDM 16 QAM	1@1	24.07	22.57	0.1807
41	30	30	502200	2511	DFT-s-OFDM PI/2 BPSK	1@1	24.96	23.46	0.2218
41	30	30	502200	2511	DFT-s-OFDM QPSK	1@1	25.25	23.75	0.2371
41	30	30	502200	2511	DFT-s-OFDM 16 QAM	1@1	23.83	22.33	0.1710
41	30	30	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.09	23.59	0.2286
41	30	30	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.09	23.59	0.2286
41	30	30	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	23.87	22.37	0.1726
41	30	30	534996	2674.98	DFT-s-OFDM PI/2 BPSK	1@1	25.01	23.51	0.2244
41	30	30	534996	2674.98	DFT-s-OFDM QPSK	1@1	25.13	23.63	0.2307
41	30	30	534996	2674.98	DFT-s-OFDM 16 QAM	1@1	23.86	22.36	0.1722
41	30	40	503202	2516.01	DFT-s-OFDM PI/2 BPSK	1@1	25.16	23.66	0.2323
41	30	40	503202	2516.01	DFT-s-OFDM QPSK	1@1	25.14	23.64	0.2312
41	30	40	503202	2516.01	DFT-s-OFDM 16 QAM	1@1	23.92	22.42	0.1746
41	30	40	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.12	23.62	0.2301
41	30	40	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.11	23.61	0.2296
41	30	40	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	23.93	22.43	0.1750
41	30	40	534000	2670	DFT-s-OFDM PI/2 BPSK	1@1	25.10	23.6	0.2291
41	30	40	534000	2670	DFT-s-OFDM QPSK	1@1	25.07	23.57	0.2275
41	30	40	534000	2670	DFT-s-OFDM 16 QAM	1@1	23.77	22.27	0.1687
41	30	50	504204	2521.02	DFT-s-OFDM PI/2 BPSK	1@1	25.03	23.53	0.2254
41	30	50	504204	2521.02	DFT-s-OFDM QPSK	1@1	25.05	23.55	0.2265
41	30	50	504204	2521.02	DFT-s-OFDM 16 QAM	1@1	23.91	22.41	0.1742
41	30	50	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.11	23.61	0.2296
41	30	50	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.16	23.66	0.2323
41	30	50	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	23.90	22.4	0.1738
41	30	50	532998	2664.99	DFT-s-OFDM PI/2 BPSK	1@1	24.94	23.44	0.2208
41	30	50	532998	2664.99	DFT-s-OFDM QPSK	1@1	24.93	23.43	0.2203
41	30	50	532998	2664.99	DFT-s-OFDM 16 QAM	1@1	23.77	22.27	0.1687
41	30	60	505200	2526	DFT-s-OFDM PI/2 BPSK	1@1	25.01	23.51	0.2244
41	30	60	505200	2526	DFT-s-OFDM QPSK	1@1	25.04	23.54	0.2259
41	30	60	505200	2526	DFT-s-OFDM 16 QAM	1@1	23.92	22.42	0.1746
41	30	60	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.01	23.51	0.2244
41	30	60	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.02	23.52	0.2249
41	30	60	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	23.93	22.43	0.1750

41	30	60	531996	2659.98	DFT-s-OFDM PI/2 BPSK	1@1	24.94	23.44	0.2208
41	30	60	531996	2659.98	DFT-s-OFDM QPSK	1@1	24.97	23.47	0.2223
41	30	60	531996	2659.98	DFT-s-OFDM 16 QAM	1@1	23.69	22.19	0.1656
41	30	80	507204	2536.02	DFT-s-OFDM PI/2 BPSK	1@1	25.10	23.6	0.2291
41	30	80	507204	2536.02	DFT-s-OFDM QPSK	1@1	25.12	23.62	0.2301
41	30	80	507204	2536.02	DFT-s-OFDM 16 QAM	1@1	23.97	22.47	0.1766
41	30	80	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.17	23.67	0.2328
41	30	80	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.25	23.75	0.2371
41	30	80	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	23.84	22.34	0.1714
41	30	80	529998	2649.99	DFT-s-OFDM PI/2 BPSK	1@1	25.03	23.53	0.2254
41	30	80	529998	2649.99	DFT-s-OFDM QPSK	1@1	25.05	23.55	0.2265
41	30	80	529998	2649.99	DFT-s-OFDM 16 QAM	1@1	23.87	22.37	0.1726
41	30	90	508200	2541	DFT-s-OFDM PI/2 BPSK	1@1	25.04	23.54	0.2259
41	30	90	508200	2541	DFT-s-OFDM QPSK	1@1	25.08	23.58	0.2280
41	30	90	508200	2541	DFT-s-OFDM 16 QAM	1@1	23.99	22.49	0.1774
41	30	90	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.16	23.66	0.2323
41	30	90	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.18	23.68	0.2333
41	30	90	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	23.95	22.45	0.1758
41	30	90	528996	2644.98	DFT-s-OFDM PI/2 BPSK	1@1	25.01	23.51	0.2244
41	30	90	528996	2644.98	DFT-s-OFDM QPSK	1@1	25.05	23.55	0.2265
41	30	90	528996	2644.98	DFT-s-OFDM 16 QAM	1@1	23.88	22.38	0.1730

Frequency Stability

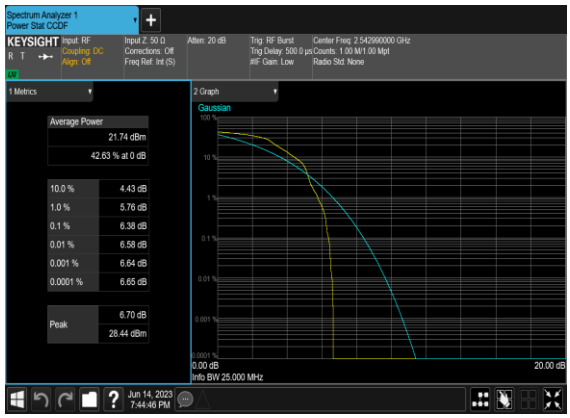
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0016	**PASS**	NV
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	-0.0021	**PASS**	LV
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0023	**PASS**	HV
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0018	**PASS**	-30℃
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0009	**PASS**	-20℃
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0017	**PASS**	-10℃
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0022	**PASS**	0℃
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0025	**PASS**	10℃
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0036	**PASS**	20℃
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	-0.0028	**PASS**	30℃
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0013	**PASS**	40℃
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	50@0	0.0024	**PASS**	50℃

Peak to Average Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
41	30	20	518598	2592.99	DFT-s-OFDM PI/2 BPSK	270@0	10.05	13	**PASS**
41	30	20	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@0	6.38	13	**PASS**
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	270@0	10.39	13	**PASS**
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	1@0	6.83	13	**PASS**

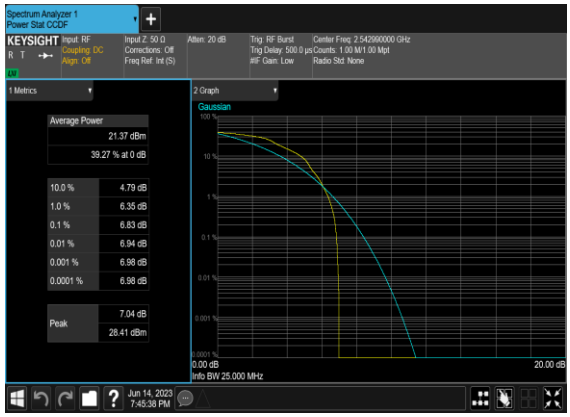
N41(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

N41(20M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH



N41(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

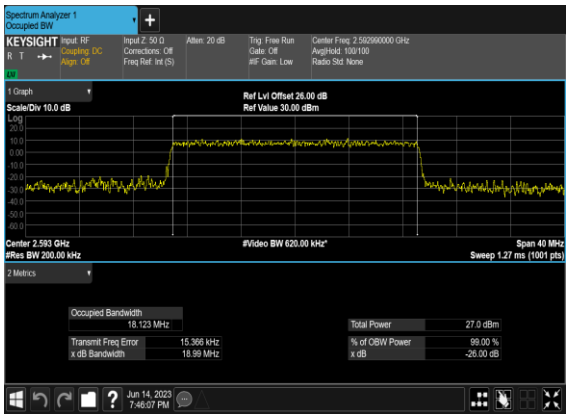
N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



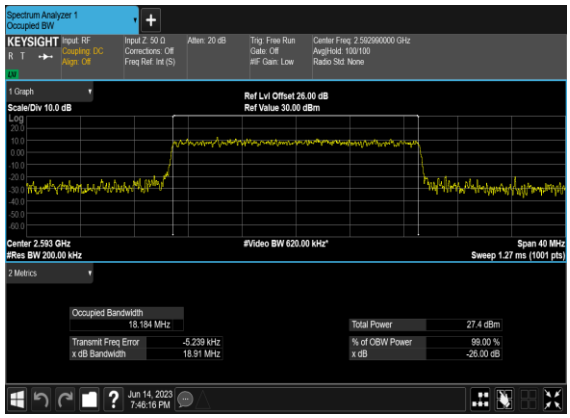
Occupied Bandwidth

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
41	30	20	518598	2592.99	CP-OFDM QPSK	51@0	18.123	18.99
41	30	20	518598	2592.99	CP-OFDM 16 QAM	51@0	18.184	18.91
41	30	20	518598	2592.99	CP-OFDM 64 QAM	51@0	18.225	18.91
41	30	20	518598	2592.99	CP-OFDM 256 QAM	51@0	18.217	18.91

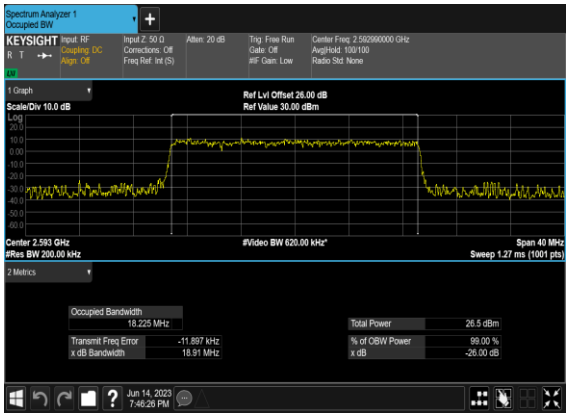
N41(20M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



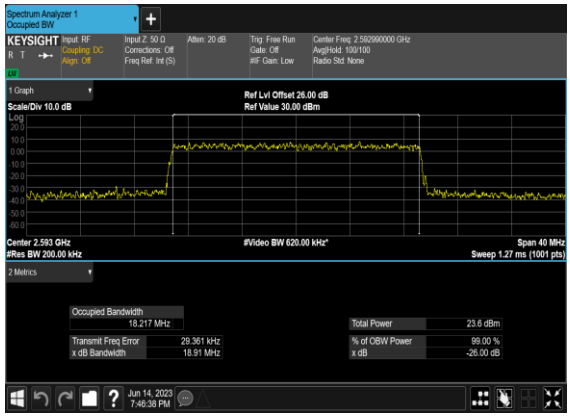
N41(20M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N41(20M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



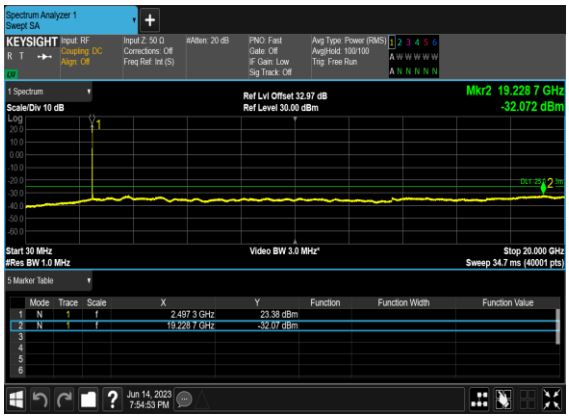
N41(20M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



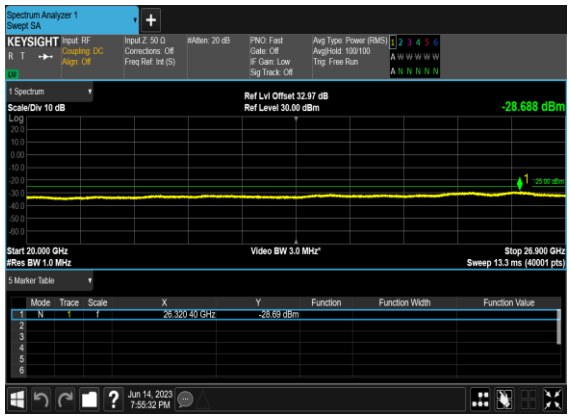
Conducted Spurious Emissions

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
41	30	20	501204	2506.02	DFT-s-OFDM BPSK	1@0	see graph	**---**
41	30	20	501204	2506.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
41	30	20	501204	2506.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
41	30	20	501204	2506.02	DFT-s-OFDM QPSK	1@0	see graph	**---**
41	30	20	501204	2506.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
41	30	20	501204	2506.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
41	30	20	518598	2592.99	DFT-s-OFDM BPSK	1@0	see graph	**---**
41	30	20	518598	2592.99	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
41	30	20	518598	2592.99	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	1@0	see graph	**---**
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
41	30	20	518598	2592.99	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
41	30	20	535998	2679.99	DFT-s-OFDM BPSK	1@0	see graph	**---**
41	30	20	535998	2679.99	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
41	30	20	535998	2679.99	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
41	30	20	535998	2679.99	DFT-s-OFDM QPSK	1@0	see graph	**---**
41	30	20	535998	2679.99	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
41	30	20	535998	2679.99	DFT-s-OFDM QPSK	1@0	see graph	**PASS**

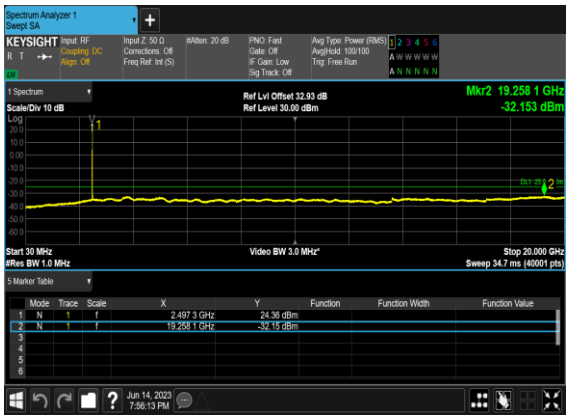
N41(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



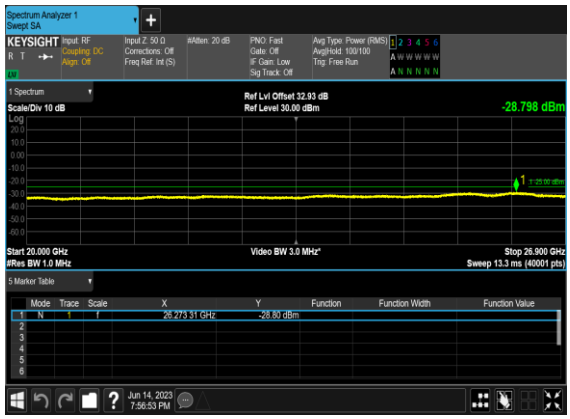
N41(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



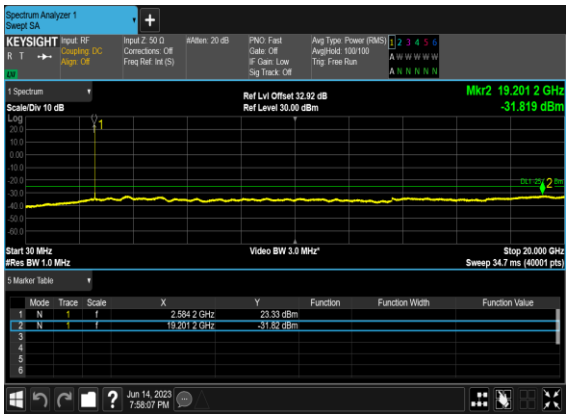
N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



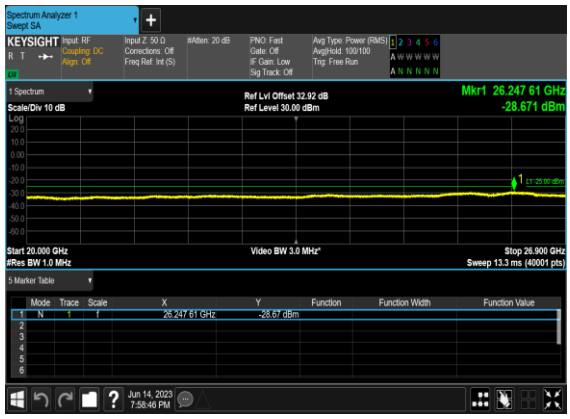
N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



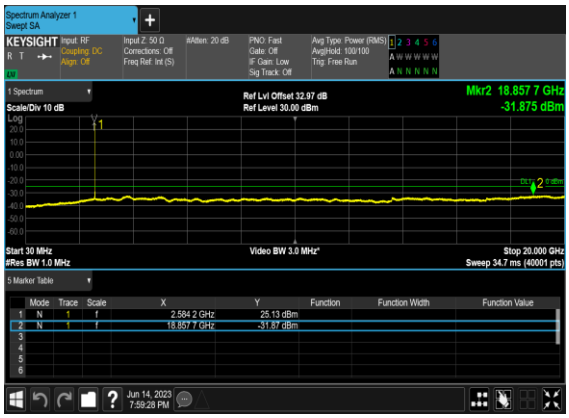
N41(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



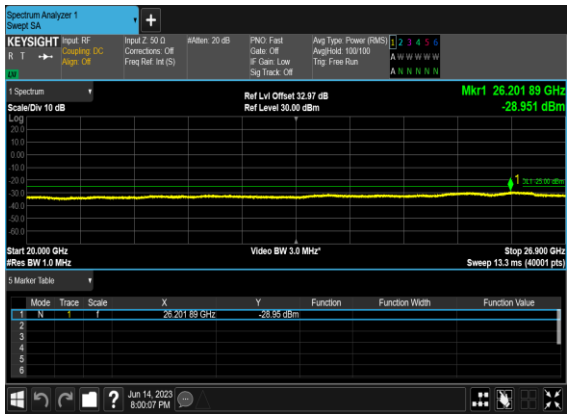
N41(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



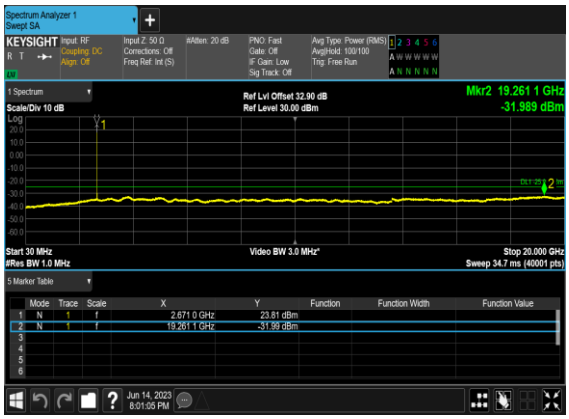
N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



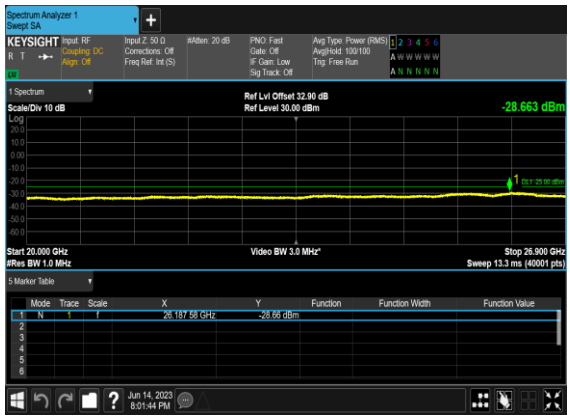
N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



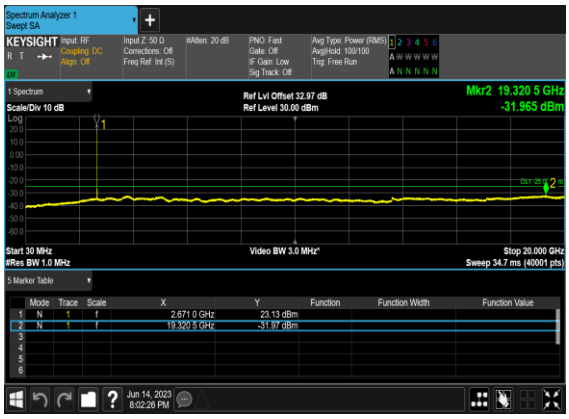
N41(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



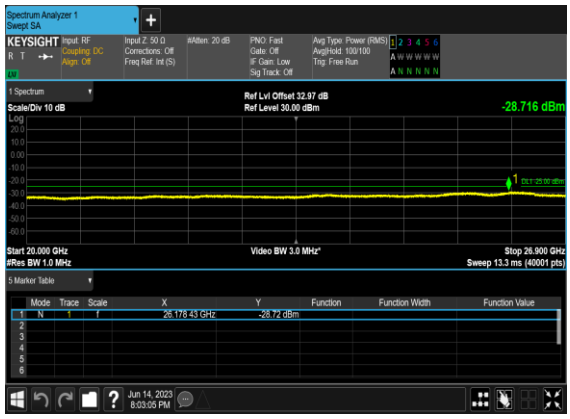
N41(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



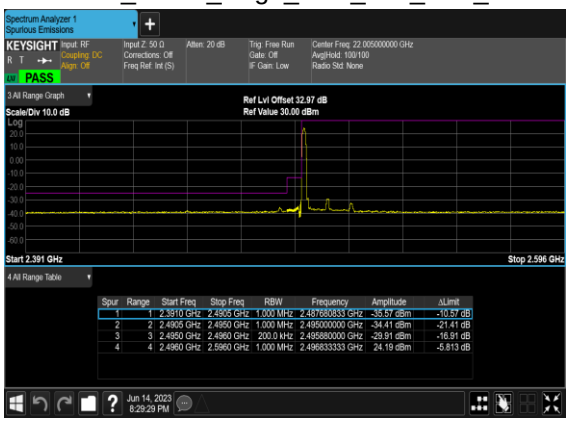
N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



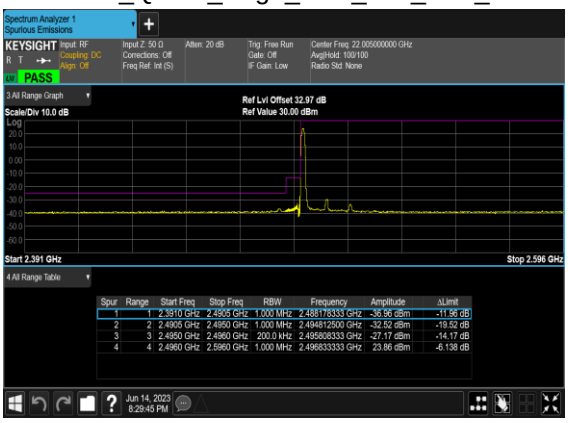
Conducted Band Edge

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
41	30	20	501204	2506.02	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
41	30	20	501204	2506.02	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
41	30	20	501204	2506.02	DFT-s-OFDM BPSK	50@0	see graph	**PASS**
41	30	20	501204	2506.02	DFT-s-OFDM QPSK	50@0	see graph	**PASS**
41	30	20	535998	2679.99	DFT-s-OFDM BPSK	1@50	see graph	**PASS**
41	30	20	535998	2679.99	DFT-s-OFDM QPSK	1@50	see graph	**PASS**
41	30	20	535998	2679.99	DFT-s-OFDM BPSK	50@0	see graph	**PASS**
41	30	20	535998	2679.99	DFT-s-OFDM QPSK	50@0	see graph	**PASS**

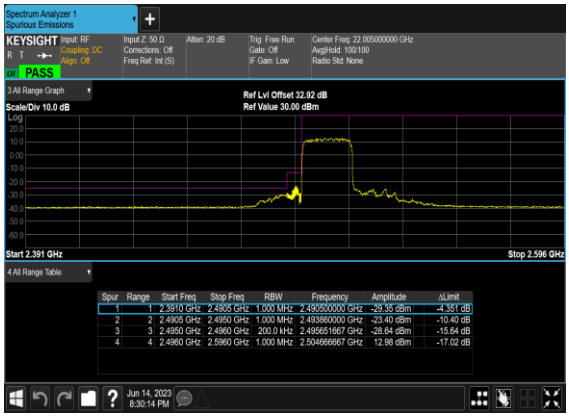
N41(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



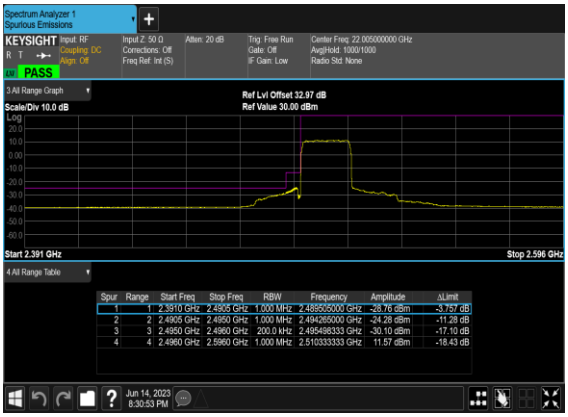
N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



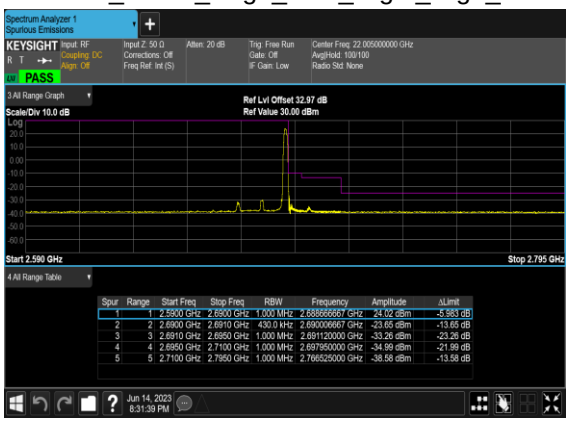
N41(20M)_DFT-s-OFDM_BPSK_Outer_Full_Low_CH



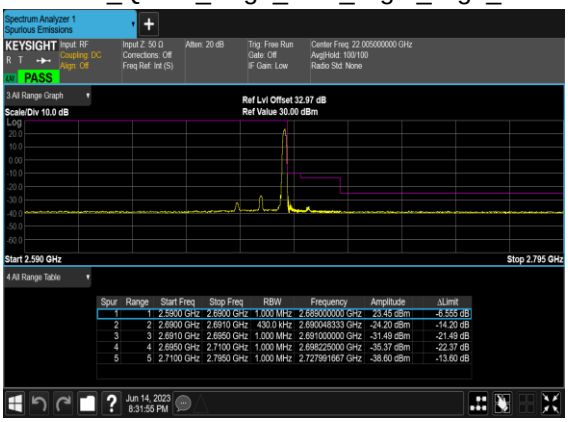
N41(20M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH



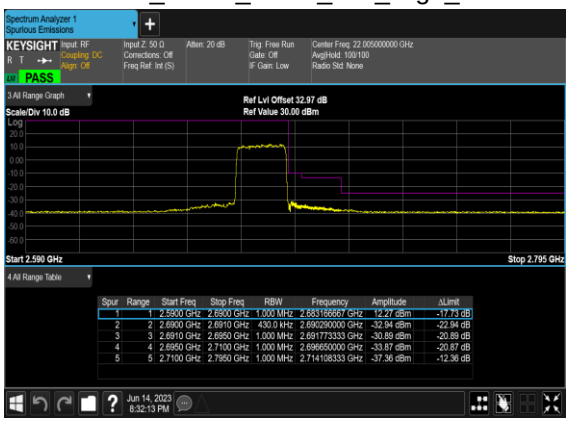
N41(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_High_CH



N41(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_High_CH

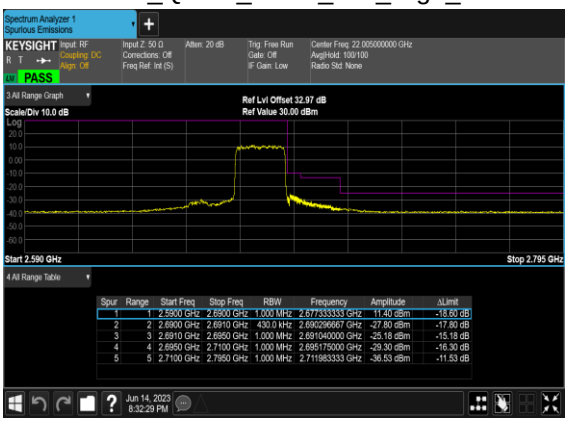


N41(20M)_DFT-s-OFDM_BPSK_Outer_Full_High_CH



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLimit
1	1	2.5900 GHz	2.6900 GHz	1.000 MHz	2.683155667 GHz	12.27 dBm	-17.73 dB
2	2	2.6900 GHz	2.6910 GHz	430.0 kHz	2.690290000 GHz	-32.94 dBm	-22.94 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691773333 GHz	-30.89 dBm	-20.89 dB
4	4	2.6950 GHz	2.7100 GHz	1.000 MHz	2.696650000 GHz	-33.87 dBm	-20.87 dB
5	5	2.7100 GHz	2.7950 GHz	1.000 MHz	2.714108333 GHz	-37.36 dBm	-12.36 dB

N41(20M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	ΔLimit
1	1	2.5900 GHz	2.6900 GHz	1.000 MHz	2.677333333 GHz	11.40 dBm	-18.60 dB
2	2	2.6900 GHz	2.6910 GHz	430.0 kHz	2.690296667 GHz	-27.80 dBm	-17.80 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691040000 GHz	-25.18 dBm	-15.18 dB
4	4	2.6950 GHz	2.7100 GHz	1.000 MHz	2.695175000 GHz	-29.30 dBm	-16.30 dB
5	5	2.7100 GHz	2.7950 GHz	1.000 MHz	2.711983333 GHz	-36.53 dBm	-11.53 dB