FCC RF Test Report

APPLICANT	:	Nokia Shanghai Bell Co., Ltd.
EQUIPMENT	:	Nokia FastMile 5G Receiver High Gain
BRAND NAME	:	Nokia
MODEL NAME	:	5G16-A
FCC ID	:	2ADZR5G16A
STANDARD	:	47 CFR Part 2, and 90(S)
CLASSIFICATION	:	PCS Licensed Transmitter (PCB)
TEST DATE(S)	:	Apr. 24, 2023 ~ May 30, 2023

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

This report contains data that were produced under subcontract by Sporton International Inc. (Shenzhen)

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

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG341901I	Rev. 01	Initial issue of report	Jun. 20, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	—	Report only	-
3.2	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	—	Report only	-
3.3	§2.1051 §90.691	Emission masks – In-band emissions	< $50+10\log_{10}$(P[Watts])	PASS	-
3.4	§2.1051 §90.691	Emission masks – Out of band emissions	< $43+10\log_{10}$(P[Watts])	PASS	-
3.5	§2.1053 §90.691	Field Strength of Spurious Radiation	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 46.52 dB at 2440.00 MHz
3.6	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-

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

Nokia Shanghai Bell Co., Ltd.
388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

1.2 Manufacturer

Nokia Solutions and Networks Oy
Karakaari 7, 02610 Espoo, Finland

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Nokia FastMile 5G Receiver High Gain
Brand Name	Nokia
Model Name	5G16-A
FCC ID	2ADZR5G16A
IMEI Code	Conducted: 355231280005044/355231280005259/355231280005390 Radiation: 35523128005010/35523128005200
HW Version	3TG02369Axxx, x:A~Z
SW Version	5GReceiver-HG-2_D230200B31T0001E0147
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	814 ~ 824 MHz
Rx Frequency	859 ~ 869 MHz
SCS / Bandwidth	15kHz : 5MHz / 10MHz / 15MHz / 20MHz 30kHz: 10MHz / 15MHz / 20MHz
Antenna Gain	Ant. 4: 2.39 dBi Ant. 5: 2.23 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Note:

1. Only the maximum output power of Ant. 4 is shown in the report.
2. 5G NR n26 only support SA mode.
3. 5G NR n26 support SCS 15kHz and 30kHz. According to the maximum power, full test 15kHz to cover 30kHz.

1.5 Modification of EUT

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

1.6 Maximum Conducted Power and Emission Designator

5G NR n26 – SCS 15kHz		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power(W)	Emission Designator (99%OBW)	Maximum Conducted power(W)	Emission Designator (99%OBW)
5	816.5 ~ 821.5	0.2333	4M46G7D	0.1986	4M46W7D
10	819	0.2323	9M27G7D	0.1954	9M28W7D
15	821.5	0.2307	14M1G7D	0.1995	14M1W7D
20	824	0.2350	18M9G7D	0.1991	18M9W7D

1.7 Testing Site

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

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

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.	03CH04-KS	AUDIX	E3	6.2009-8-24al

1.9 Applied Standards

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

- 47 CFR Part 2, 90(S)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

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

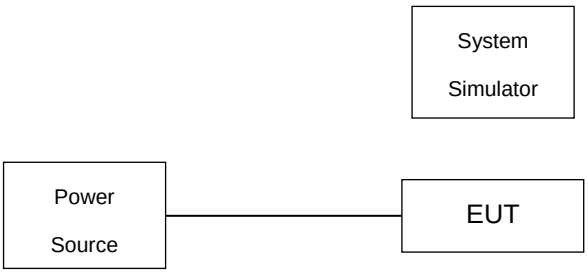
2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is 30 MHz to 9000 MHz.

Test Items	Band	Bandwidth (MHz)				Modulation					RB #			Test Channel		
		5	10	15	20	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	n26	v	v	v	v	v	v	v	v	v	v		v	v	v	v
Peak to Average Ratio	n26		v			v	v				v		v		v	
26dB and 99% Bandwidth	n26	v	v			v	v	v	v	v			v		v	
				v	v	v	v	v	v	v			v		v	
Emission masks In-band emissions	n26	v				v	v				v		v	v		v
			v			v	v				v		v		v	
					v	v	v				v		v		v	
Emission masks – Out of band emissions	n26	v				v	v				v			v	v	v
			v			v	v				v				v	
					v	v	v				v				v	
Frequency Stability	n26		v				v						v		v	
Radiated Spurious Emission	n26	Worst Case													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. 5G n26 transmit frequency for part22 rule is 824MHz-849MHz, for part90 rule is 814MHz-824MHz. ERP over 15MHz bandwidth complies the ERP limit line of part22 rule, therefore ERP of the partial frequency spectrum which falls within part 22 also complies. 4. Frequency Stability：Normal Voltage = 54V；Low Voltage =48V；High Voltage =57V;															

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

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

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	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 between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

The following shows an offset computation example with RF cable loss 7.6dB.

Example :

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

= 7.6 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n26 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	-	164800	-
	Frequency	-	824	-
15	Channel	-	164300	-
	Frequency	-	821.5	-
10	Channel	-	163800	-
	Frequency	-	819	-
5	Channel	163300	163800	164300
	Frequency	816.5	819	821.5

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

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

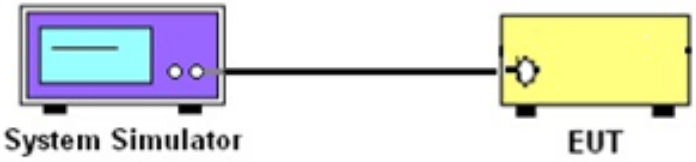
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 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.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Please refer to Appendix A.

3.2 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.2.1 Description of (Occupied) Bandwidth Limitations Measurement

The 99% 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 emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

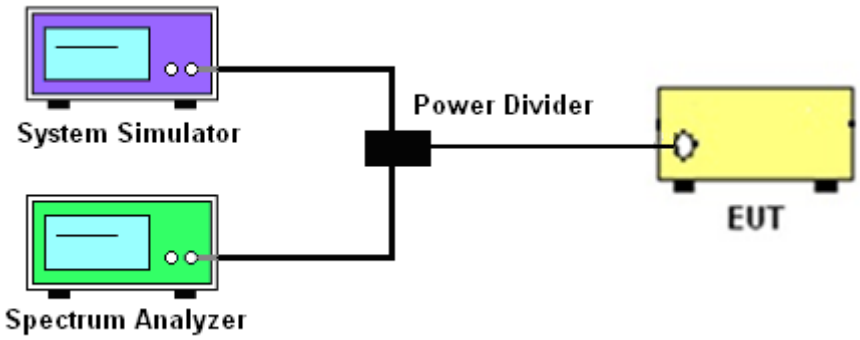
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

3.2.4 Test Setup



3.2.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

Please refer to Appendix A.

3.3 Emissions Mask Measurement

3.3.1 Description of Emissions Mask Measurement

Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of FCC Part 90.691.(a):

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + 10 $Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

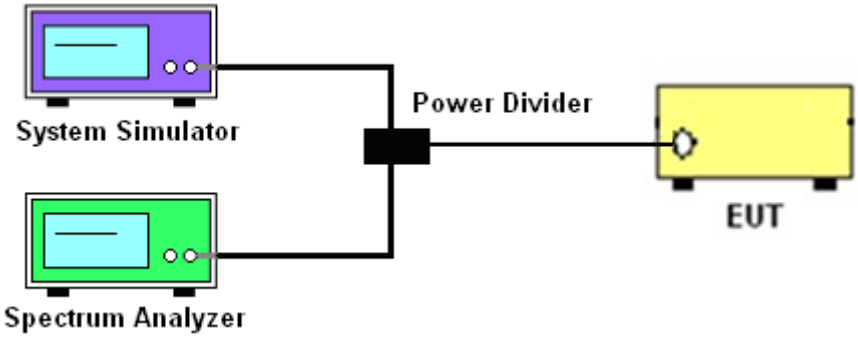
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The emissions mask of low and high channels for the highest RF powers were measured.
3. The measured RBW and the VBW set 3 times of RBW are then set in spectrum analyzer, and the RBW correction factor 10log (1% of OBW/measured RBW)(dB) was compensated, if required.
4. The test results were shown below plots with a correction offset factor including cable loss, insertion loss of power divider.

3.3.4 Test Setup



3.3.5 Test Result (Plots) of Conducted Emissions Mask

Please refer to Appendix A.

3.4 Emissions Mask – Out Of Band Emissions Measurement

3.4.1 Description of Conducted Emissions Out of band emissions measurement

The power of any emission FCC Part 90.691 (a)(2) on any frequency removed from the assigned frequency by out of the authorized bandwidth at least 43 + 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.

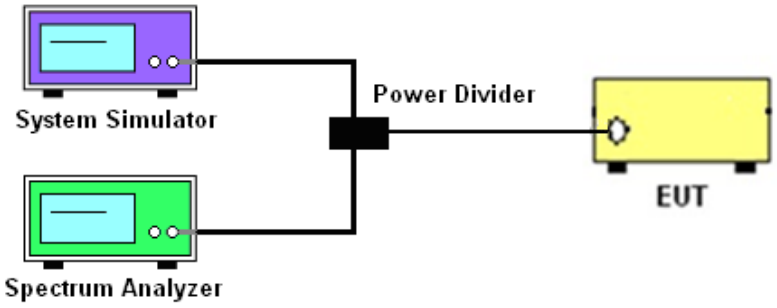
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

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, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

3.4.4 Test Setup



3.4.5 Test Result (Plots) of Conducted Emission

Please refer to Appendix A.

3.5 Field Strength of Spurious Radiation Measurement

3.5.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI/TIA-603-E. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

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 $43+10\log_{10}(P[Watts])$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.5.2 Measuring Instruments

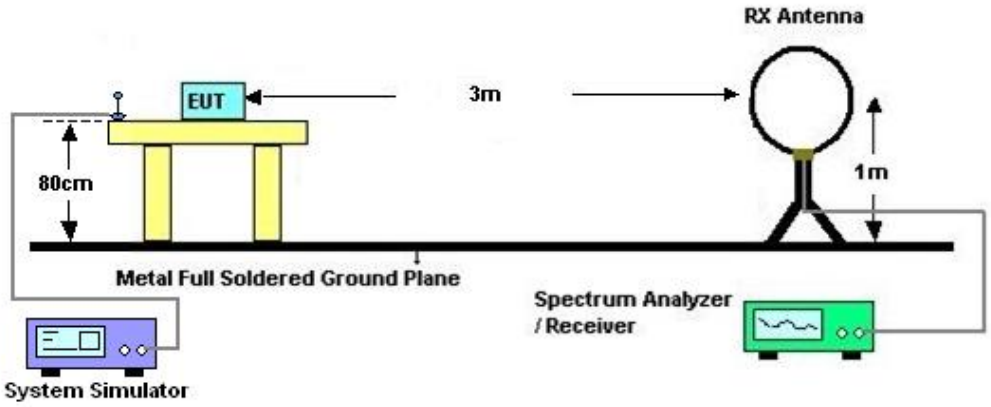
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

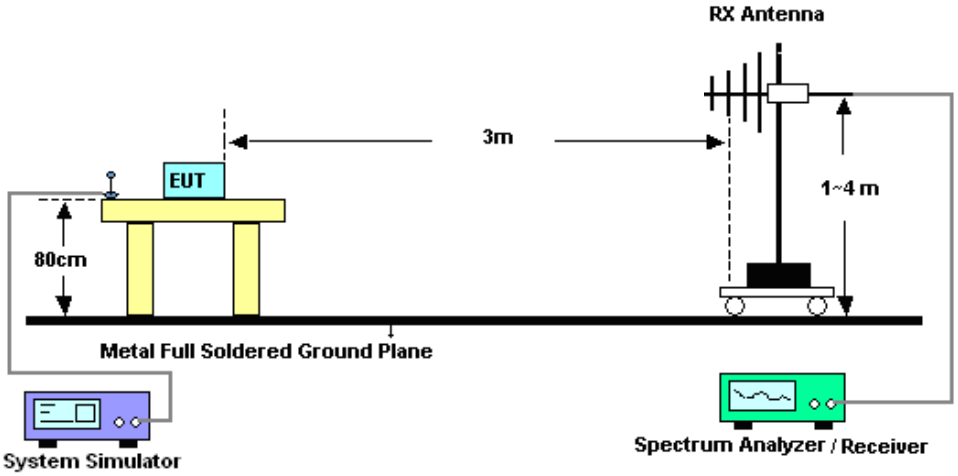
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

3.5.4 Test Setup

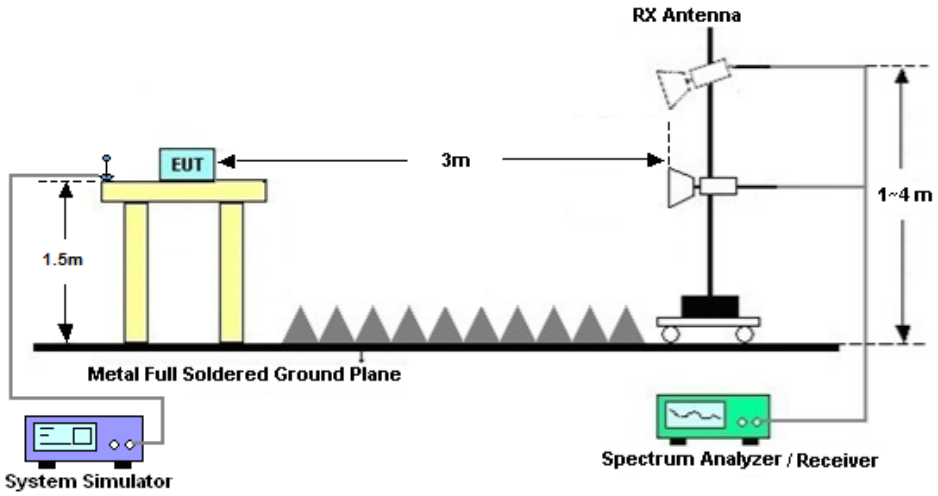
For radiated test from 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



3.5.5 Test Result of Field Strength of Spurious Radiated

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.

3.6 Frequency Stability Measurement

3.6.1 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 according to FCC Part 90.213.

3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

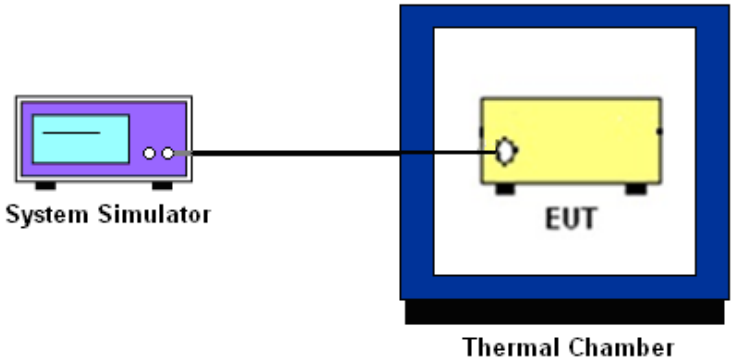
3.6.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. 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.

3.6.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 20±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 for other than hand carried battery equipment.
3. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the
4. battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

3.6.5 Test Setup



3.6.6 Test Result of Temperature Variation

Please refer to Appendix A.

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	Apr. 24, 2023	Apr. 05, 2024	Conducted (TH01-SZ)
DC Power Supply	TTI	PL330P	290070	Max 32V，3A	Oct. 17, 2022	Apr. 24, 2023	Oct. 16, 2023	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04265	60.06.020.0077	0.4GHz~26.5GHz	Dec. 25, 2022	Apr. 24, 2023	Dec. 24, 2023	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 07, 2022	Apr. 24, 2023	Jul. 06, 2023	Conducted (TH01-SZ)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	May 30, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Apr. 09, 2023	May 30, 2023	Apr. 08, 2024	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	May 30, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 11, 2022	May 30, 2023	Jul. 10, 2023	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)

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 %

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

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

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

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

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

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

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

Appendix A. Test Results of Conducted Test

Test Engineer :	Jung Guo	**Temperature :**	21~23℃
		Relative Humidity :	45~51%

Software Version: 23.04.1202

FR1 N26(ANT4)

Transmitter Conducted Output Power

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power(dBm)	Conducted Power (W)
26	15	5	163300	816.5	DFT-s-OFDM QPSK	1@1	23.68	0.2333
26	15	5	163300	816.5	DFT-s-OFDM 16 QAM	1@1	22.98	0.1986
26	15	5	163800	819	DFT-s-OFDM QPSK	1@1	23.59	0.2286
26	15	5	163800	819	DFT-s-OFDM 16 QAM	1@1	22.92	0.1959
26	15	5	164300	821.5	DFT-s-OFDM QPSK	1@1	23.66	0.2323
26	15	5	164300	821.5	DFT-s-OFDM 16 QAM	1@1	22.98	0.1986
26	15	10	163800	819	DFT-s-OFDM QPSK	1@1	23.66	0.2323
26	15	10	163800	819	DFT-s-OFDM 16 QAM	1@1	22.91	0.1954
26	15	15	164300	821.5	DFT-s-OFDM QPSK	1@1	23.63	0.2307
26	15	15	164300	821.5	DFT-s-OFDM 16 QAM	1@1	23	0.1995
26	15	20	164800	824	DFT-s-OFDM PI/2 BPSK	50@25	23.59	0.2286
26	15	20	164800	824	DFT-s-OFDM PI/2 BPSK	1@1	23.63	0.2307
26	15	20	164800	824	DFT-s-OFDM PI/2 BPSK	1@104	23.42	0.2198
26	15	20	164800	824	DFT-s-OFDM QPSK	50@25	23.6	0.2291
26	15	20	164800	824	DFT-s-OFDM QPSK	1@1	23.71	0.2350
26	15	20	164800	824	DFT-s-OFDM QPSK	1@104	23.58	0.2280
26	15	20	164800	824	DFT-s-OFDM 16 QAM	50@25	22.95	0.1972
26	15	20	164800	824	DFT-s-OFDM 16 QAM	1@1	22.99	0.1991
26	15	20	164800	824	DFT-s-OFDM 16 QAM	1@104	22.91	0.1954
26	15	20	164800	824	DFT-s-OFDM 64 QAM	50@25	21.44	0.1393
26	15	20	164800	824	DFT-s-OFDM 64 QAM	1@1	21.36	0.1368
26	15	20	164800	824	DFT-s-OFDM 64 QAM	1@104	21.26	0.1337
26	15	20	164800	824	DFT-s-OFDM 256 QAM	50@25	19.37	0.0865
26	15	20	164800	824	DFT-s-OFDM 256 QAM	1@1	19.33	0.0857
26	15	20	164800	824	DFT-s-OFDM 256 QAM	1@104	19.3	0.0851
26	15	20	164800	824	CP-OFDM QPSK	53@26	22.39	0.1734
26	15	20	164800	824	CP-OFDM QPSK	1@1	22.37	0.1726
26	15	20	164800	824	CP-OFDM QPSK	1@104	22.36	0.1722

Frequency Stability

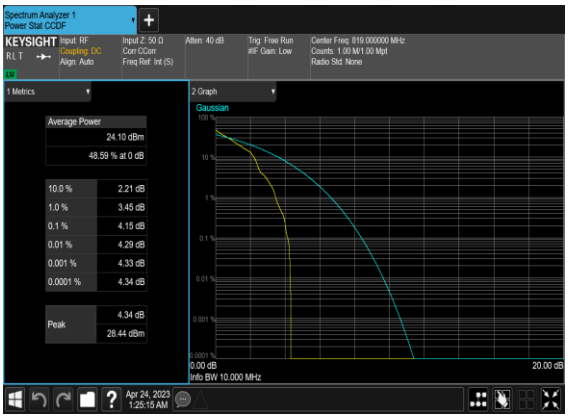
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0059	**PASS**	NV
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0025	**PASS**	LV
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0037	**PASS**	HV
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0034	**PASS**	-30℃
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0051	**PASS**	-20℃
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0026	**PASS**	-10℃
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0064	**PASS**	0℃
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0044	**PASS**	10℃
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0059	**PASS**	20℃
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0066	**PASS**	30℃
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0054	**PASS**	40℃
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	0.0051	**PASS**	50℃

Peak to Average Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
26	15	10	163800	819.0	DFT-s-OFDM PI/2 BPSK	50@0	4.31	13	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM PI/2 BPSK	1@0	4.15	13	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	5.54	13	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM QPSK	1@0	5.07	13	**PASS**

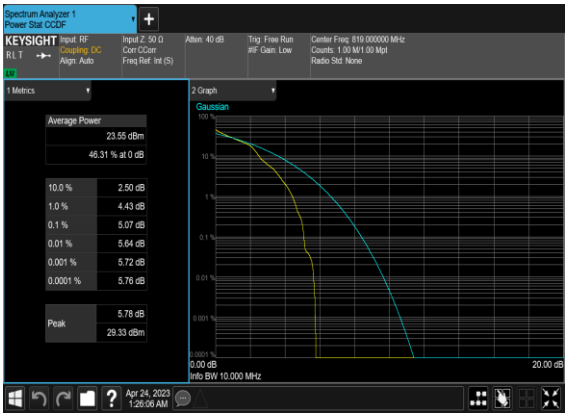
N26(10M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

N26(10M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH



N26(10M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

N26(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH

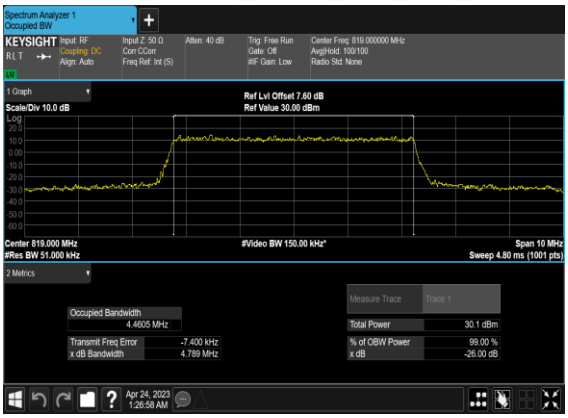


Occupied Bandwidth

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
26	15	5	163800	819.0	DFT-s-OFDM PI/2 BPSK	25@0	4.4521	4.762
26	15	5	163800	819.0	DFT-s-OFDM QPSK	25@0	4.4605	4.789
26	15	5	163800	819.0	CP-OFDM QPSK	25@0	4.4633	4.788
26	15	5	163800	819.0	CP-OFDM 16 QAM	25@0	4.458	4.798
26	15	5	163800	819.0	CP-OFDM 64 QAM	25@0	4.4647	4.788
26	15	5	163800	819.0	CP-OFDM 256 QAM	25@0	4.4627	4.781
26	15	10	163800	819.0	DFT-s-OFDM PI/2 BPSK	50@0	8.8888	9.385
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	8.9146	9.349
26	15	10	163800	819.0	CP-OFDM QPSK	52@0	9.273	9.714
26	15	10	163800	819.0	CP-OFDM 16 QAM	52@0	9.2672	9.719
26	15	10	163800	819.0	CP-OFDM 64 QAM	52@0	9.279	9.706
26	15	10	163800	819.0	CP-OFDM 256 QAM	52@0	9.2765	9.724
26	15	15	164300	821.5	DFT-s-OFDM PI/2 BPSK	75@0	13.357	13.96
26	15	15	164300	821.5	DFT-s-OFDM QPSK	75@0	13.375	13.93
26	15	15	164300	821.5	CP-OFDM QPSK	79@0	14.094	14.63
26	15	15	164300	821.5	CP-OFDM 16 QAM	79@0	14.096	14.67
26	15	15	164300	821.5	CP-OFDM 64 QAM	79@0	14.085	14.68
26	15	15	164300	821.5	CP-OFDM 256 QAM	79@0	14.071	14.64
26	15	20	164800	824.0	DFT-s-OFDM PI/2 BPSK	100@0	17.869	18.58
26	15	20	164800	824.0	DFT-s-OFDM QPSK	100@0	17.876	18.56
26	15	20	164800	824.0	CP-OFDM QPSK	106@0	18.903	19.74
26	15	20	164800	824.0	CP-OFDM 16 QAM	106@0	18.912	19.58
26	15	20	164800	824.0	CP-OFDM 64 QAM	106@0	18.909	19.6
26	15	20	164800	824.0	CP-OFDM 256 QAM	106@0	18.9	19.66

N26(5M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

N26(5M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



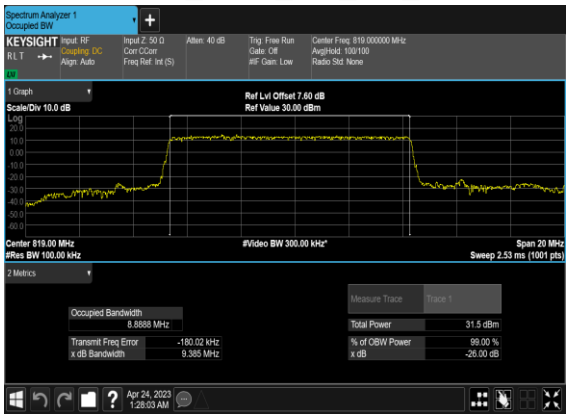
N26(5M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

N26(5M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

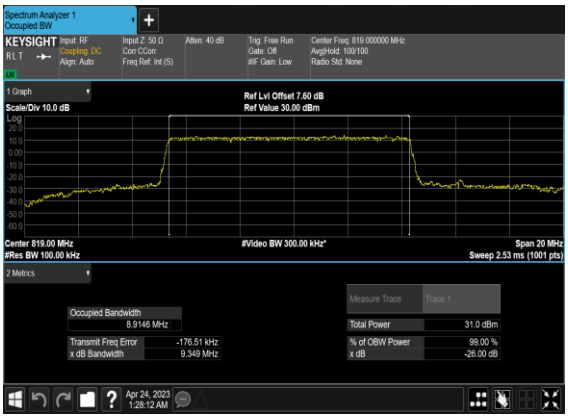
N26(5M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

N26(5M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

N26(10M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



N26(10M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



N26(10M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

N26(10M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

N26(10M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

N26(10M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

N26(15M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

N26(15M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

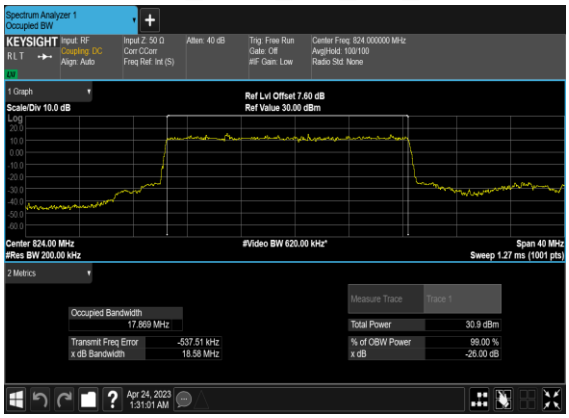
N26(15M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

N26(15M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

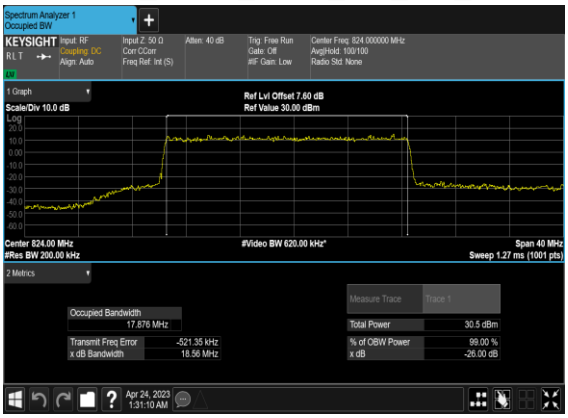
N26(15M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

N26(15M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

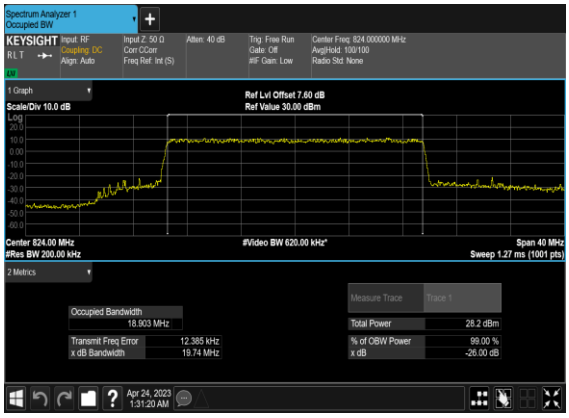
N26(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



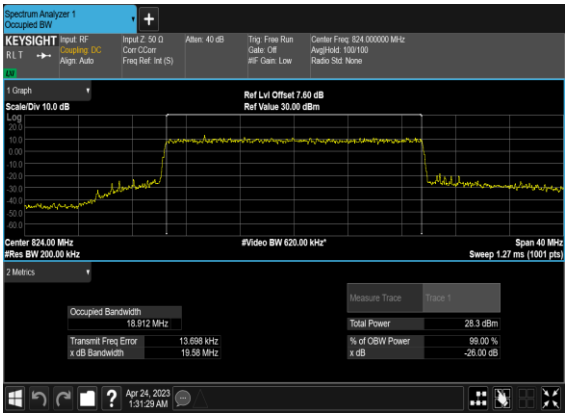
N26(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



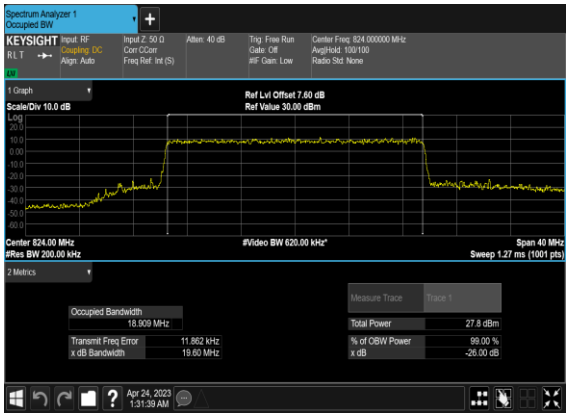
N26(20M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



N26(20M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N26(20M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

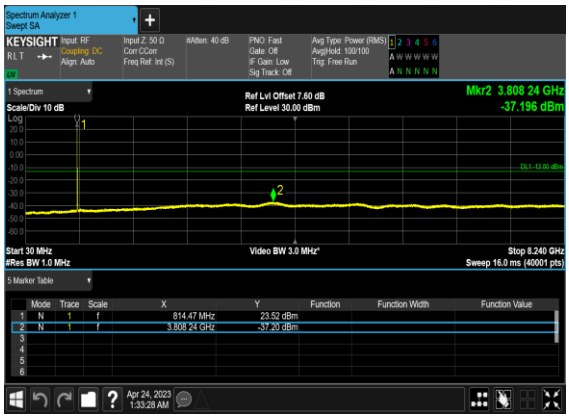


N26(20M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

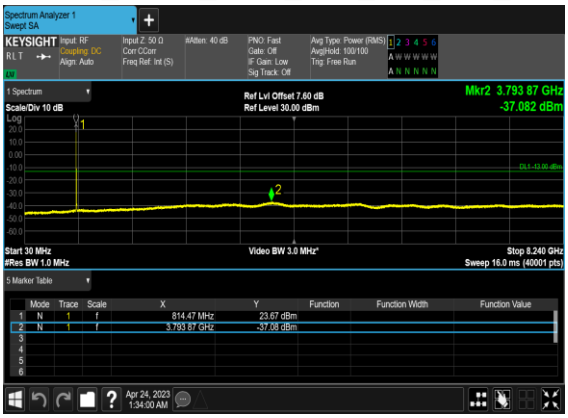
Conducted Spurious Emissions

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
26	15	5	163300	816.5	DFT-s-OFDM BPSK	1@0	see graph	**---**
26	15	5	163300	816.5	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
26	15	5	163300	816.5	DFT-s-OFDM QPSK	1@0	see graph	**---**
26	15	5	163300	816.5	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
26	15	5	163800	819.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
26	15	5	163800	819.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
26	15	5	163800	819.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
26	15	5	163800	819.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
26	15	5	164300	821.5	DFT-s-OFDM BPSK	1@0	see graph	**---**
26	15	5	164300	821.5	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
26	15	5	164300	821.5	DFT-s-OFDM QPSK	1@0	see graph	**---**
26	15	5	164300	821.5	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
26	15	10	163800	819.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
26	15	10	163800	819.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
26	15	20	164800	824.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
26	15	20	164800	824.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
26	15	20	164800	824.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
26	15	20	164800	824.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**

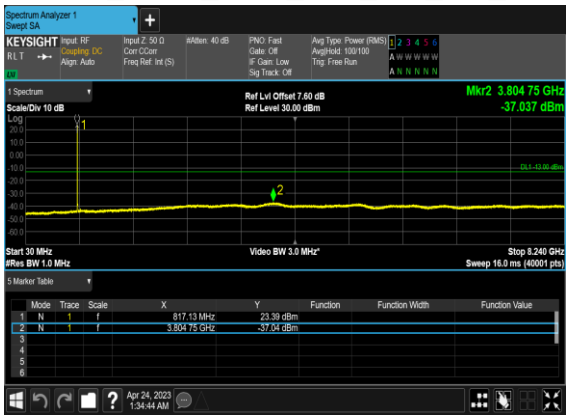
N26(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



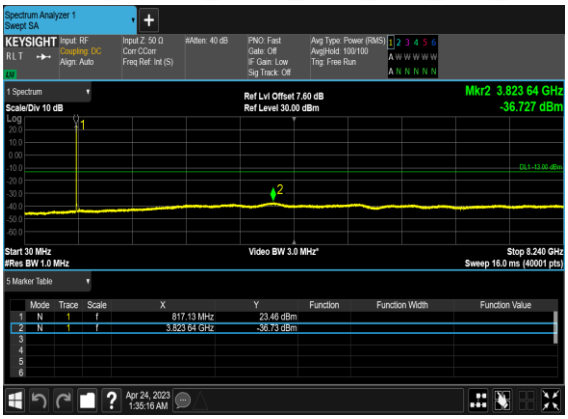
N26(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



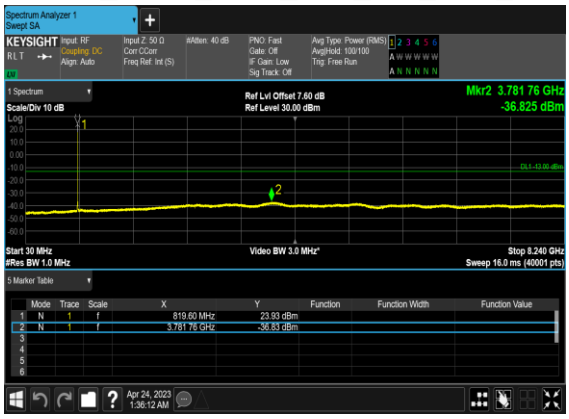
N26(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



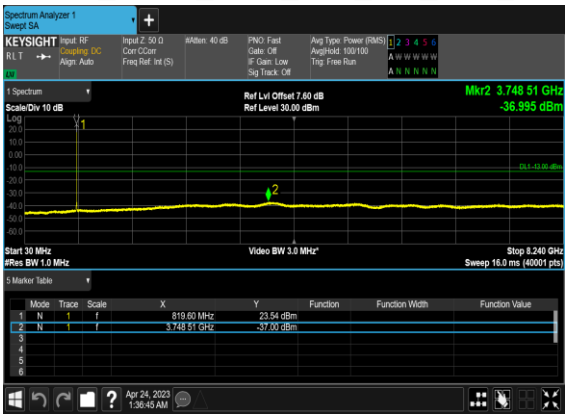
N26(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



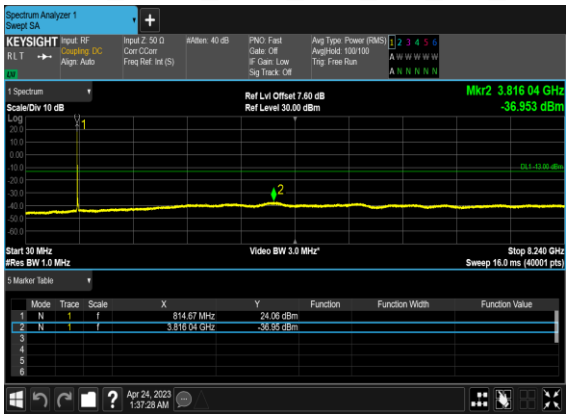
N26(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



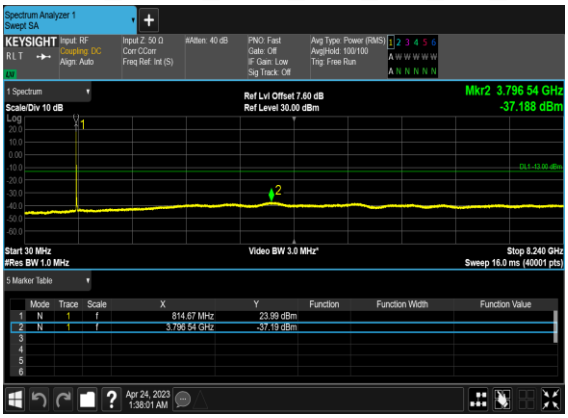
N26(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



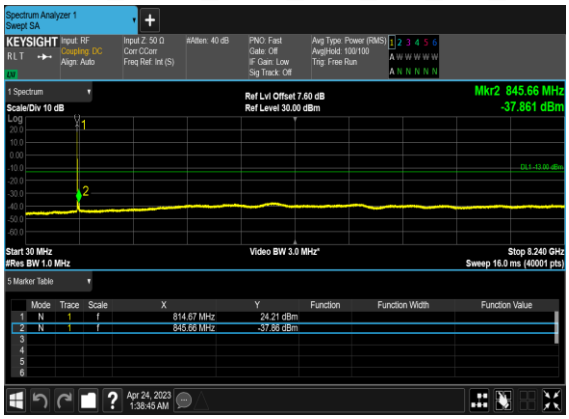
N26(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



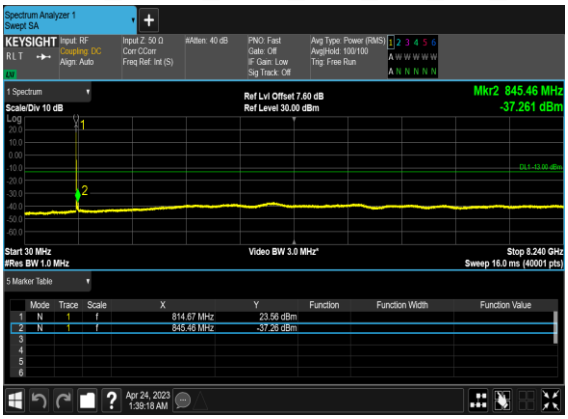
N26(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



N26(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



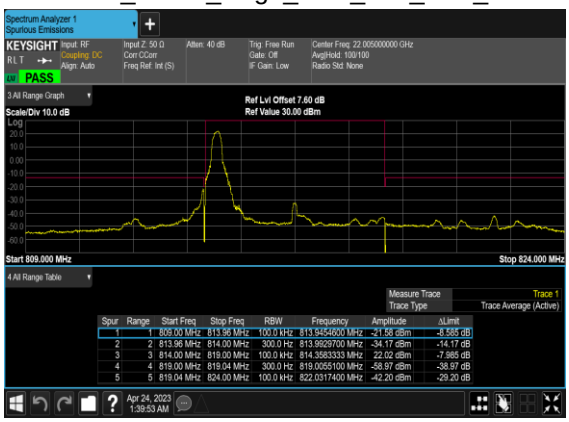
N26(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



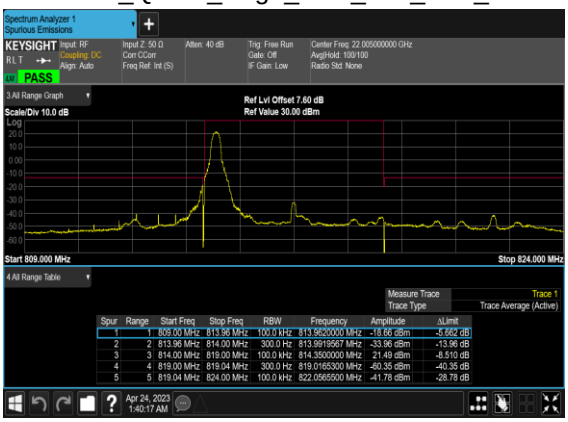
Conducted Band Edge

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
26	15	5	163300	816.5	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
26	15	5	163300	816.5	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
26	15	5	163300	816.5	DFT-s-OFDM BPSK	25@0	see graph	**PASS**
26	15	5	163300	816.5	DFT-s-OFDM QPSK	25@0	see graph	**PASS**
26	15	5	164300	821.5	DFT-s-OFDM BPSK	1@24	see graph	**PASS**
26	15	5	164300	821.5	DFT-s-OFDM QPSK	1@24	see graph	**PASS**
26	15	5	164300	821.5	DFT-s-OFDM BPSK	25@0	see graph	**PASS**
26	15	5	164300	821.5	DFT-s-OFDM QPSK	25@0	see graph	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM BPSK	1@51	see graph	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM QPSK	1@51	see graph	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM BPSK	50@0	see graph	**PASS**
26	15	10	163800	819.0	DFT-s-OFDM QPSK	50@0	see graph	**PASS**
26	15	20	164800	824.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
26	15	20	164800	824.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
26	15	20	164800	824.0	DFT-s-OFDM BPSK	1@105	see graph	**PASS**
26	15	20	164800	824.0	DFT-s-OFDM QPSK	1@105	see graph	**PASS**
26	15	20	164800	824.0	DFT-s-OFDM BPSK	100@0	see graph	**PASS**
26	15	20	164800	824.0	DFT-s-OFDM QPSK	100@0	see graph	**PASS**

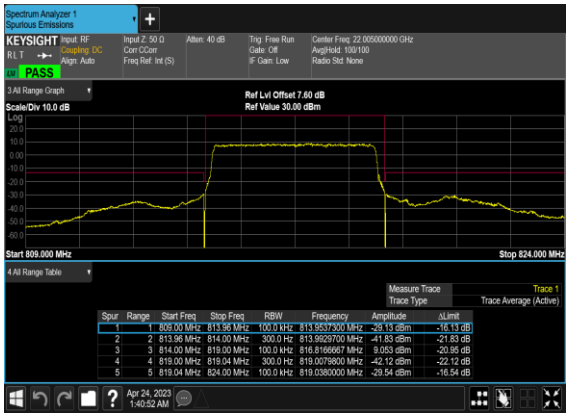
N26(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



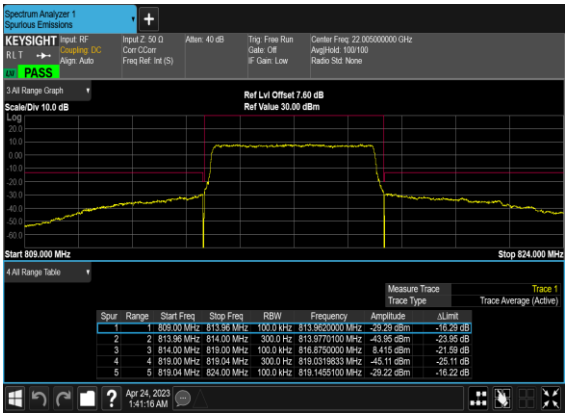
N26(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



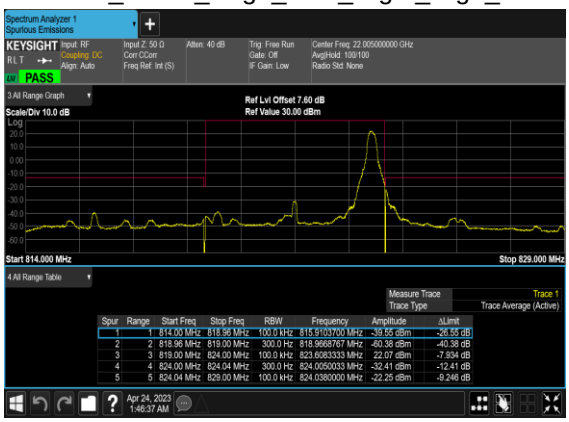
N26(5M)_DFT-s-OFDM_BPSK_Outer_Full_Low_CH



N26(5M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH



N26(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_High_CH



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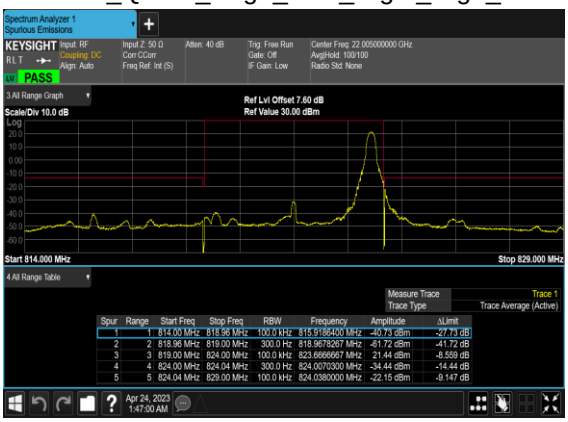
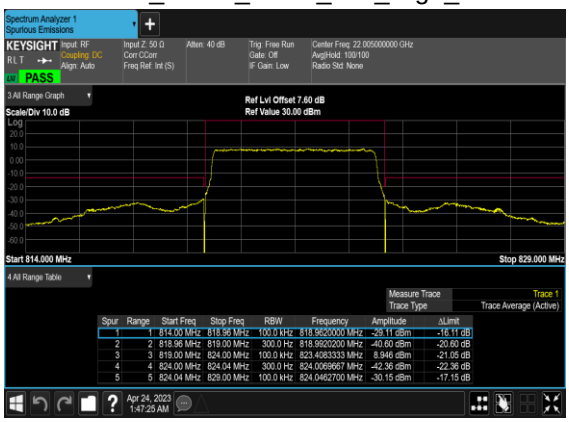
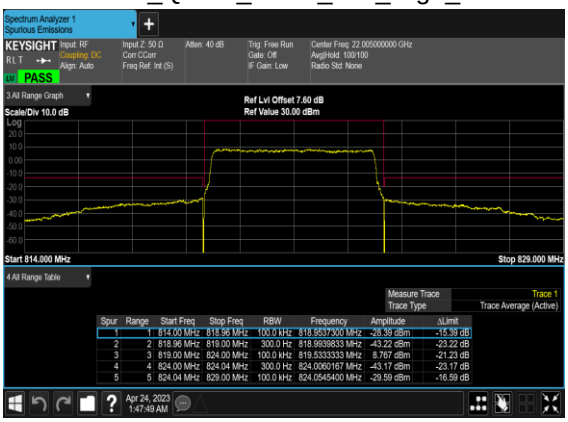


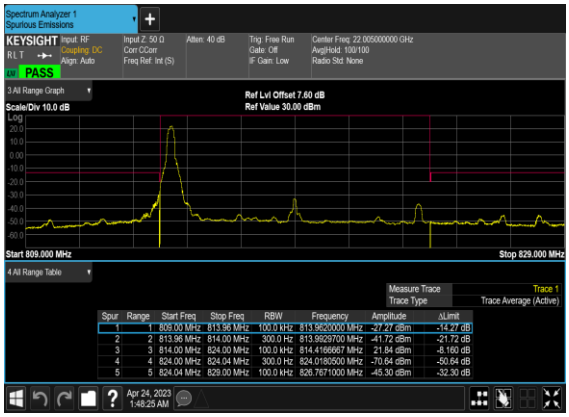
N26(5M)_DFT-s-OFDM_BPSK_Outer_Full_High_CH



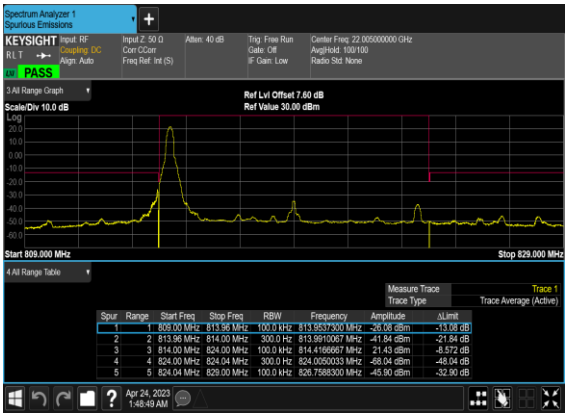
N26(5M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH



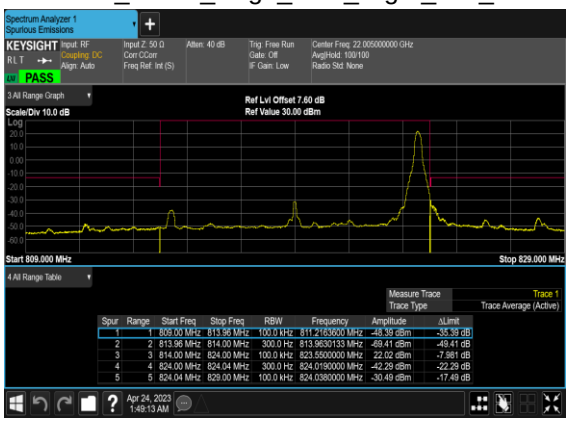
N26(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



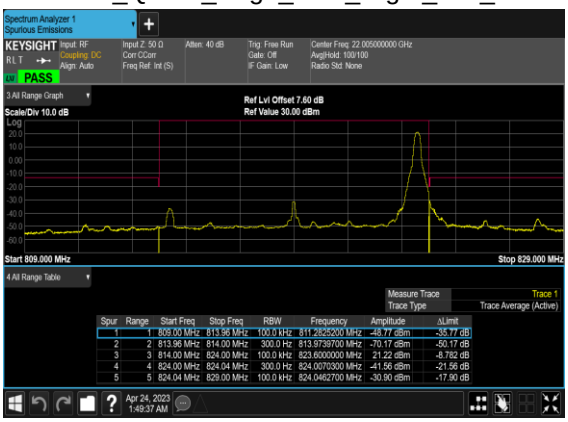
N26(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



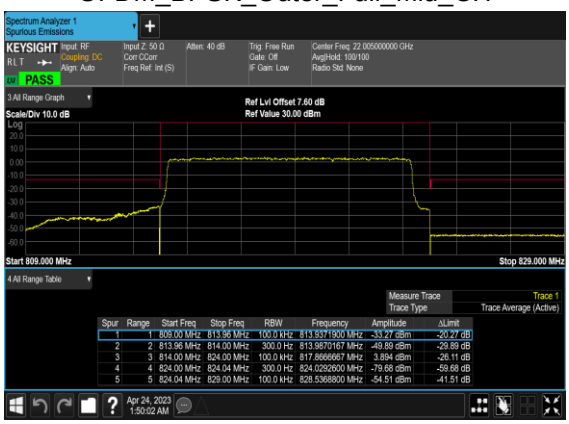
N26(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_Mid_CH



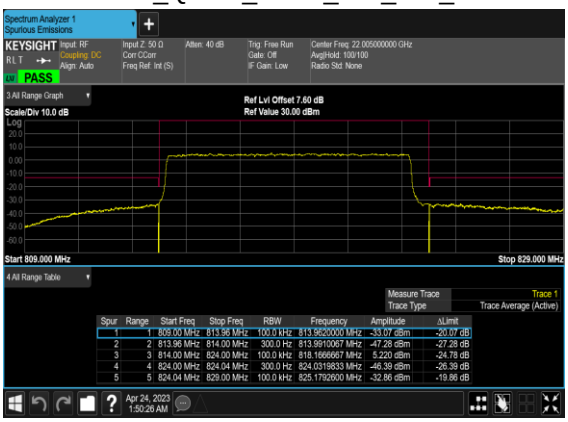
N26(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_Mid_CH



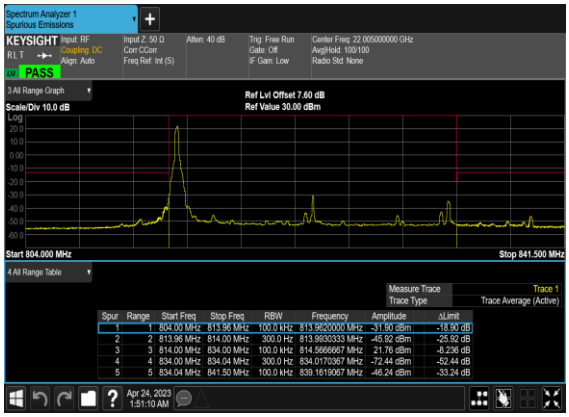
N26(10M)_DFT-s-OFDM_BPSK_Outer_Full_Mid_CH



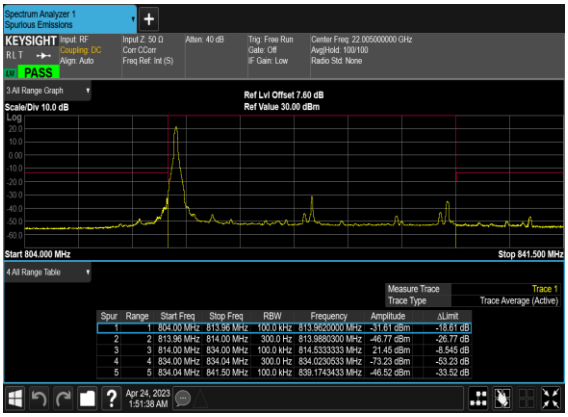
N26(10M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



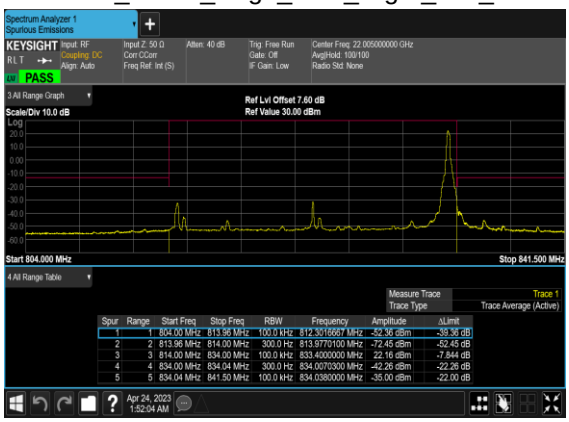
N26(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



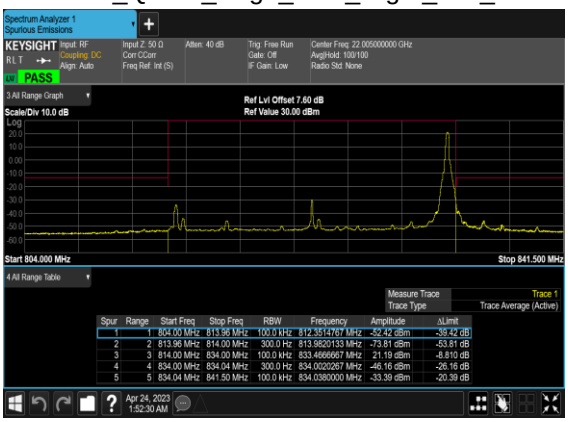
N26(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



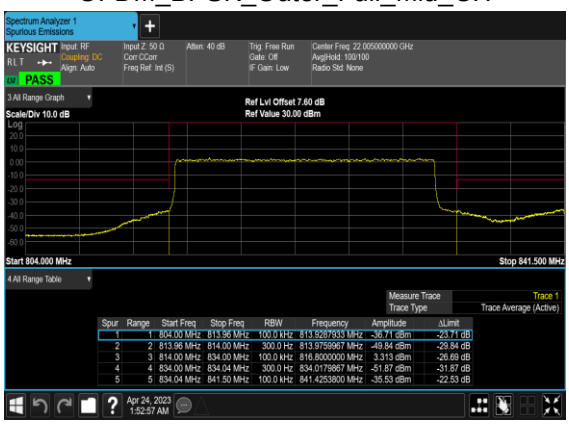
N26(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_Mid_CH



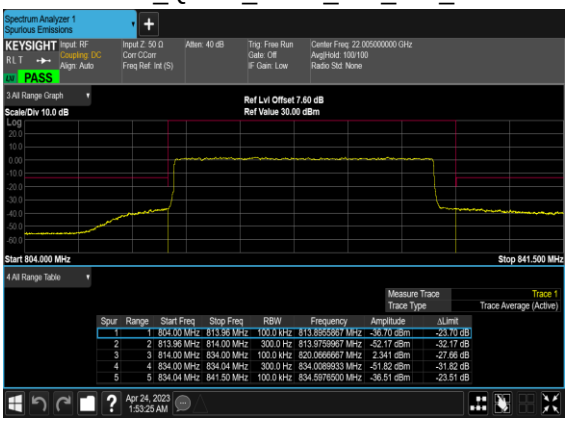
N26(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_Mid_CH



N26(20M)_DFT-s-OFDM_BPSK_Outer_Full_Mid_CH



N26(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

N26 SA / NR 20MHz / QPSK / Ant.4								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1632	-66.11	-13	-53.11	-73.08	1.58	10.70	H
	2440	-61.69	-13	-48.69	-69.94	2.102	12.50	H
	3256	-60.62	-13	-47.62	-69.51	2.856	13.90	H
	1632	-65.00	-13	-52.00	-71.97	1.58	10.70	V
	2440	-59.52	-13	-46.52	-67.77	2.10	12.50	V
	3256	-60.68	-13	-47.68	-69.57	2.86	13.90	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.