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, Part 27 Subpart Q**
CLASSIFICATION	**:**	**PCS Licensed Transmitter (PCB)**
TEST DATE(S)	**:**	**Apr. 24, 2023 ~ Jun. 16, 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.

Approved by: Jason Jia

Cert #5145.02

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG341901L	Rev. 01	Initial issue of report	Jun. 20, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	—	Report Only	-
3.5	§27.50 (k)(4)	Peak-to-Average Ratio	<13dB	PASS	
3.6	§27.50 (k)(2)	EIRP	EIRP < 1640W	PASS	-
3.7	§2.1049	Occupied Bandwidth	—	Report Only	-
3.8	§2.1051 §27.53 (n)(2)	Conducted Band Edge Measurement	-13dBm/MHz	PASS	-
3.9	§2.1051 §27.53 (n)(2)	Conducted Spurious Emission	-13dBm/MHz	PASS	-
3.10	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within the band	PASS	-
4.4	§2.1053 §27.53 (n)(2)	Radiated Spurious Emission	-13dBm/MHz	PASS	Under limit 31.15 dB at 6900.000 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

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 Product 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 : 355231280005390 Radiation : 35523128005200
HW Version	3TG02369Axxx, x:A~Z
SW Version	5GReceiver-HG-2_D230200B31T0001E0147
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Product Feature	
Tx/Rx Frequency	5G NR n77/78: 3450 MHz ~ 3550 MHz
SCS	15kHz, 30kHz
Bandwidth	n77/n78(15kHz): 10 / 15 / 20 / 25 / 30 / 40 / 50MHz n77/n78(30kHz): 10 / 15 / 20 / 25 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100MHz
Antenna Gain	**<Ant. 0>** 5G NR n77/n78: 18.01 dBi **<Ant. 1>** 5G NR n77/n78: 17.99 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

1. The maximum EIRP is calculated from max output power and max antenna gain, only the maximum EIRP is shown in the report, 5G NR n77/n78 SISO mode for Ant.1, UL MIMO mode for Ant(0+1).
2. The device supports HPUE mode for 5G NR n78. (Power class 2).
3. The device supports HPUE mode for 5G NR n77. (Power class 2 for SISO mode & Power class 1.5 for UL MIMO mode)
4. 5G NR Band supports SA and NSA mode. According to the maximum power between SA and NSA

mode, SA covers NSA mode for 5G NR n77 covers n78.

5. 5G NR n77/n78 UL_MIMO mode is completely uncorrelated, so the directional gain is selected the maximum gain among all antennas.
6. For UL MIMO mode, the conducted BE/Spurious are tested at single antenna port and add 10*log(NANT) according to KDB 662911 D01.
7. All the supported EN-DC combinations are verified conducted power, only the EN-DC combination with highest power are shown in the report.
8. The EN-DC mode combination could be referred to the product spec.

1.5 Modification of EUT

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

1.6 Maximum EIRP Power and Emission Designator

5G NR n77/n78 SA for SCS 15kHz		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	3455.01 ~ 3544.995	26.3027	9M27G7D	20.5116	9M31W7D
15	3457.50 ~ 3542.49	26.7917	14M1G7D	20.8449	14M1W7D
20	3460.005 ~ 3540.00	26.9153	18M9G7D	20.7970	19M0W7D
25	3462.51 ~ 3537.495	27.2898	23M8G7D	20.7014	23M8W7D
30	3465.00 ~ 3534.99	27.2270	28M6G7D	21.1349	28M6W7D
40	3470.01 ~ 3529.995	27.0396	38M6G7D	21.2814	38M6W7D
50	3475.005 ~ 3525.00	28.0543	48M2G7D	21.5278	48M2W7D
5G NR n77/n78 SA for SCS 30kHz		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	3455.01 ~ 3544.98	26.0615	8M58G7D	20.4644	8M57W7D
15	3457.50 ~ 3542.49	26.5461	13M6G7D	20.4174	13M6W7D
20	3460.02 ~ 3540.00	26.1216	18M2G7D	20.7014	18M2W7D
25	3462.51 ~ 3537.48	26.3027	23M2G7D	20.7014	23M2W7D
30	3465.00 ~ 3534.99	26.1818	27M8G7D	20.7014	27M9W7D
40	3470.01 ~ 3529.98	26.2422	37M9G7D	20.7014	37M8W7D
50	3475.02 ~ 3525.00	26.6686	47M4G7D	20.7491	47M5W7D
60	3480.00 ~ 3519.99	26.5461	57M9G7D	20.8449	57M9W7D
70	3485.01 ~ 3514.98	26.5461	67M4G7D	20.8930	67M4W7D
80	3490.02 ~ 3510.00	27.5423	77M5G7D	20.8930	77M5W7D
90	3495.00 ~ 3504.99	27.1644	87M4G7D	21.2814	87M4W7D

100	3500.01	27.6058	97M5G7D	21.4783	97M5W7D

5G NR n77/n78 UL MIMO for SCS 15kHz		**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	3455.01 ~ 3544.995	48.7528	9M28G7D	38.3707	9M30W7D
15	3457.50 ~ 3542.49	49.6592	14M1G7D	38.9045	14M1W7D
20	3460.005 ~ 3540.00	50.1187	18M9G7D	38.9942	18M9W7D
25	3462.51 ~ 3537.495	49.7737	23M7G7D	38.8150	23M8W7D
30	3465.00 ~ 3534.99	49.8884	28M7G7D	39.0841	28M6W7D
40	3470.01 ~ 3529.995	50.0035	38M7G7D	39.1742	38M6W7D
50	3475.005 ~ 3525.00	52.7230	48M3G7D	40.3645	48M2W7D
5G NR n77/n78 UL MIMO for SCS 30kHz		**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	3455.01 ~ 3544.98	49.5450	8M57G7D	39.4457	8M59W7D
15	3457.50 ~ 3542.49	49.6592	13M6G7D	39.5367	13M6W7D
20	3460.02 ~ 3540.00	50.3501	18M2G7D	39.8107	18M3W7D
25	3462.51 ~ 3537.48	49.4311	23M2G7D	39.2645	23M2W7D
30	3465.00 ~ 3534.99	50.1187	27M8G7D	39.9025	27M9W7D
40	3470.01 ~ 3529.98	50.0035	37M8G7D	39.9025	37M9W7D
50	3475.02 ~ 3525.00	50.9331	47M5G7D	39.9945	47M6W7D
60	3480.00 ~ 3519.99	50.1187	58M0G7D	40.4576	58M2W7D
70	3485.01 ~ 3514.98	51.6416	67M5G7D	40.0867	67M5W7D
80	3490.02 ~ 3510.00	51.4044	77M6G7D	40.3645	77M5W7D
90	3495.00 ~ 3504.99	51.1682	87M6G7D	40.7380	87M6W7D
100	3500.01	52.6017	97M4G7D	40.1791	97M4W7D

Note:

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

1.7 Testing Site

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

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

Note: Test data subcontracted: conducted test items in section 3.4 ~ 3.10 of this report.

1.8 Test Software

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

1.9 Applied Standards

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

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

Remark:

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

2 Test Configuration of Equipment Under Test

2.1 Test Mode

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

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

Test Cases	Band	Bandwidth (MHz)	Modulation	RB #	Test Channel
		eg. 5M, 10M, 15M, 20M	eg. QPSK, 16QAM, 64QAM	1RB, Partial RB, Full RB	L/M/H
Max. Output Power	5G n77/n78 (15kHz)	10M, 15M, 20M, 25M, 30M, 40M, 50M	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1RB, Full RB	L, M, H
	5G n77/n78 (30kHz)	10M, 15M, 20M, 25M, 30M, 40M, 50M, 60M, 70M, 80M, 90M, 100M	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1RB, Full RB	L, M, H
Peak-to-Average Ratio	5G n77	20M	PI/2 BPSK, QPSK	1RB, Full RB	L, M, H
E.I.R.P	5G n77 (15kHz)	10M, 15M, 20M, 25M, 30M, 40M, 50M	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1RB, Full RB	L, M, H
	5G n77 (30kHz)	10M, 15M, 20M, 25M, 30M, 40M, 50M, 60M, 70M, 80M, 90M, 100M	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1RB, Full RB	L, M, H
26dB and 99% Bandwidth	5G n77 (15kHz)	10M, 15M, 20M, 25M, 30M, 40M, 50M	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	Full RB	M
	5G n77 (30kHz)	10M, 15M, 20M, 25M, 30M, 40M, 50M, 60M, 70M, 80M, 90M, 100M	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	Full RB	M
Conducted Band Edge	5G n77 (15kHz)	10M, 25M, 50M	PI/2 BPSK, QPSK	1RB, Full RB	L, H
	5G n77 (30kHz)	10M, 50M, 100M	PI/2 BPSK, QPSK	1RB, Full RB	L, H
Conducted Spurious Emission	5G n77 (15kHz)	10M, 25M, 50M	PI/2 BPSK, QPSK	1RB	L, M, H
	5G n77 (30kHz)	10M, 50M, 100M	PI/2 BPSK, QPSK	1RB	L, M, H
Frequency Stability	5G n77	20M	QPSK	Full RB	M
Radiated Spurious Emission	5G n77	Worst case			M

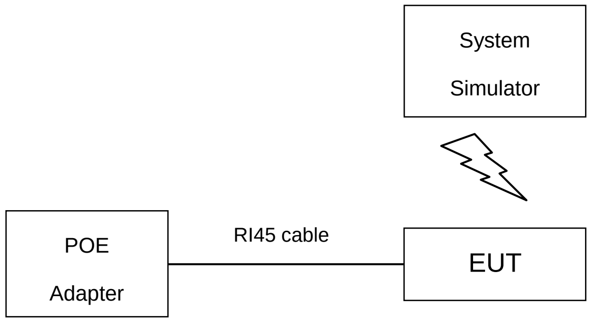
Note:

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. Based on engineering evaluation, only the worst modulations test results are shown in the report.

3. 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.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

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

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

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 8.69 dB and 10dB attenuator.

Example :

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

= 8.69 + 10 = 18.69 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G n77/n78 Channel and Frequency List for SCS 15kHz				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
50	Channel	631667	633334	635000
	Frequency	3475.005	3500.01	3525
40	Channel	631334	633334	635333
	Frequency	3470.01	3500.01	3529.995
30	Channel	631000	633334	635666
	Frequency	3465	3500.01	3534.99
25	Channel	630834	633334	635833
	Frequency	3462.51	3500.01	3537.495
20	Channel	630667	633334	636000
	Frequency	3460.005	3500.01	3540
15	Channel	630500	633334	636166
	Frequency	3457.5	3500.01	3542.49
10	Channel	630334	633334	636333
	Frequency	3455.01	3500.01	3544.995

5G n77/n78 Channel and Frequency List for SCS 30kHz				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	-	633334	-
	Frequency	-	3500.01	-
90	Channel	633000	633334	633666
	Frequency	3495	3500.01	3504.99
80	Channel	632668	633334	634000
	Frequency	3490.02	3500.01	3510
70	Channel	632334	633334	634332
	Frequency	3485.01	3500.01	3514.98
60	Channel	632000	633334	634666
	Frequency	3480	3500.01	3519.99
50	Channel	631668	633334	635000
	Frequency	3475.02	3500.01	3525
40	Channel	631334	633334	635332
	Frequency	3470.01	3500.01	3529.98
30	Channel	631000	633334	635666
	Frequency	3465	3500.01	3534.99
25	Channel	630834	633334	635832
	Frequency	3462.51	3500.01	3537.48
20	Channel	630668	633334	636000
	Frequency	3460.02	3500.01	3540
15	Channel	630500	633334	636166
	Frequency	3457.5	3500.01	3542.49
10	Channel	630334	633334	636332
	Frequency	3455.01	3500.01	3544.98

3 Conducted Test Items

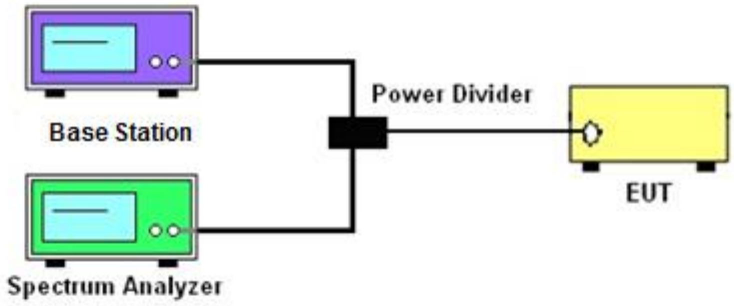
3.1 Measuring Instruments

See list of measuring instruments of this test report.

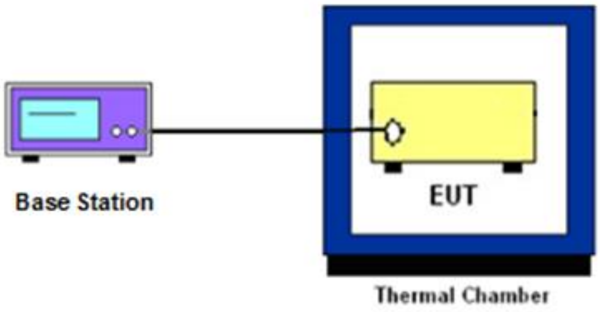
3.2 Test Setup

3.2.1 Conducted Output Power

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



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power Measurement

3.4.1 Description of the Conducted Output Power Measurement

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

3.4.2 Test Procedures

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

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

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

3.5.2 Test Procedures

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

3.6 EIRP

3.6.1 Description of EIRP Limit

§ 27.50 (k)(2)

Fixed devices are limited to 1640 Watt EIRP.

3.6.2 Test Procedures

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

   P_T = transmitter output power in dBm

   G_T = gain of the transmitting antenna in dBi

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

3.7 Occupied Bandwidth

3.7.1 Description of Occupied Bandwidth Measurement

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

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

3.7.2 Test Procedures

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

3.8 Conducted Band Edge Measurement

3.8.1 Description of Conducted Band Edge Measurement

§ 27.53 (n)(2)

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

Compliance with this paragraph is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.

3.8.2 Test Procedures

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

3.9 Conducted Spurious Emission Measurement

3.9.1 Description of Conducted Spurious Emission Measurement

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

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

3.9.2 Test Procedures

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

3.10 Frequency Stability Measurement

3.10.1 Description of Frequency Stability Measurement

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

3.10.2 Test Procedures for Temperature Variation

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

3.10.3 Test Procedures for Voltage Variation

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

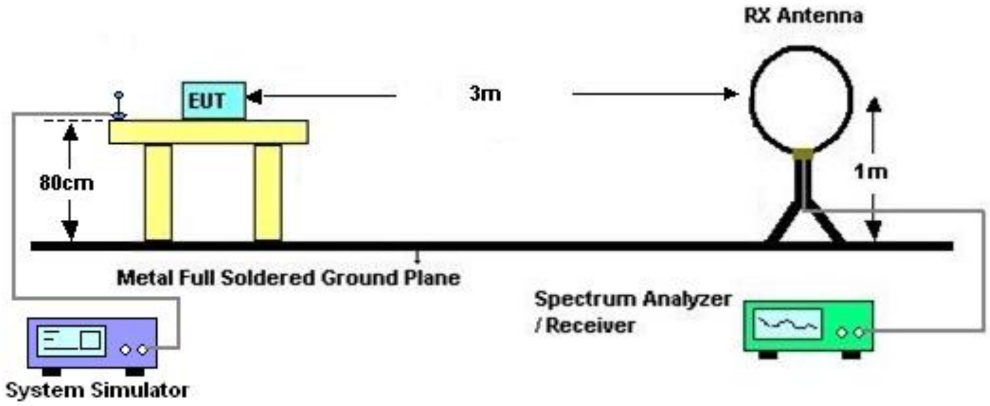
4 Radiated Test Items

4.1 Measuring Instruments

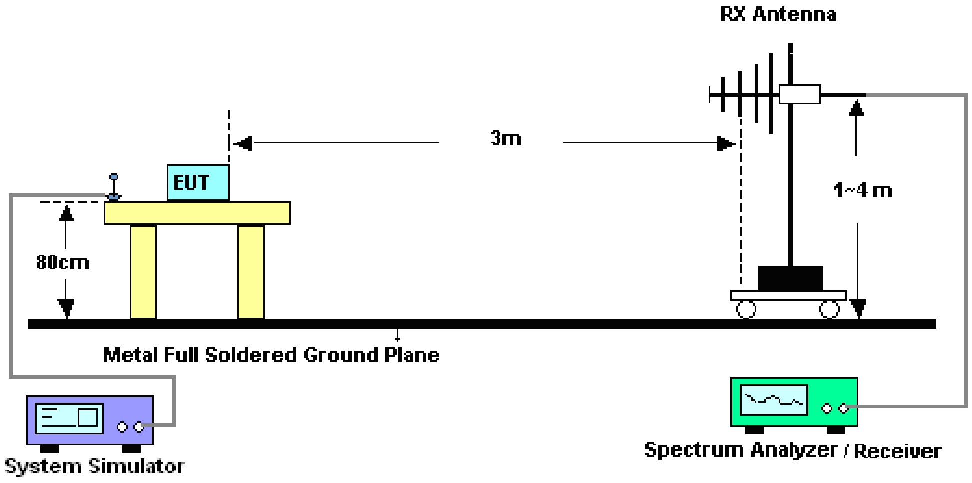
See list of measuring instruments of this test report.

4.2 Test Setup

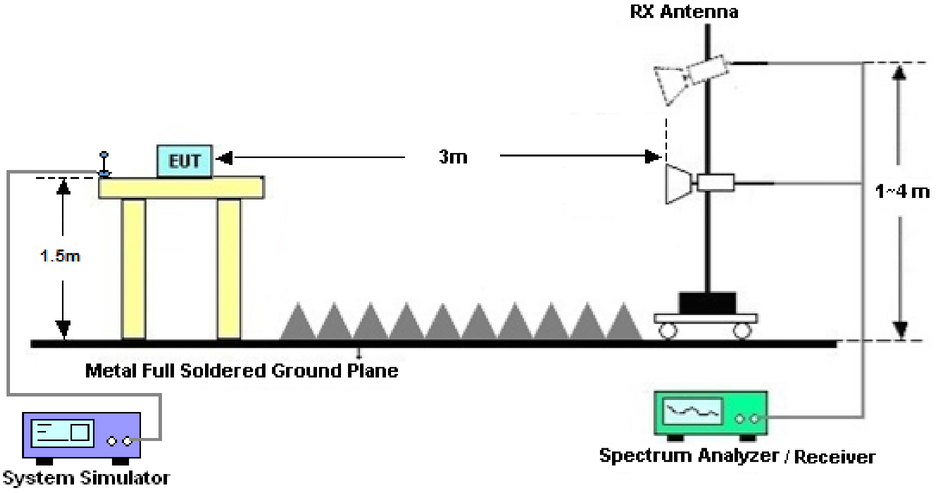
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

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

Please refer to Appendix B.

4.4 Radiated Spurious Emission Measurement

4.4.1 Description of Radiated Spurious Emission

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

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

4.4.2 Test Procedures

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

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 06, 2023	Apr. 24, 2023~ Jun. 16, 2023	Apr. 05, 2024	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04 265	60.06.020.0077	0.4GHz~26.5GHz	Dec. 25, 2022	Apr. 24, 2023~ Jun. 16, 2023	Dec. 24, 2023	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 07, 2022	Apr. 24, 2023~ Jun. 16, 2023	Jul. 06, 2023	Conducted (TH01-SZ)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Jun. 02, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Jun. 02, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Apr. 09, 2023	Jun. 02, 2023	Apr. 08, 2024	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	Jun. 02, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Jun. 02, 2023	Jan. 07, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 11, 2022	Jun. 02, 2023	Jul. 10, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40G GA	060728	18~40GHz	Jan. 05, 2023	Jun. 02, 2023	Jan. 04, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18G A	060840	1Ghz-18Ghz	Oct. 12, 2022	Jun. 02, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Jun. 02, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jun. 02, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jun. 02, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jun. 02, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Measurement Uncertainty

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

Uncertainty of Conducted Measurement

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

FR1 N77 (ANT1) – SCS 15kHz

Transmitter Conducted Output Power And EIRP, (G_T - L_C)=17.99dB

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power(dBm)	EIRP (dBm)	EIRP (W)
77	15	10	630334	3455.01	DFT-s-OFDM QPSK	1@1	26.21	44.2	26.3027
77	15	10	630334	3455.01	DFT-s-OFDM 16 QAM	1@1	25.13	43.12	20.5116
77	15	10	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.17	44.16	26.0615
77	15	10	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.03	43.02	20.0447
77	15	10	636333	3544.995	DFT-s-OFDM QPSK	1@1	26.2	44.19	26.2422
77	15	10	636333	3544.995	DFT-s-OFDM 16 QAM	1@1	24.9	42.89	19.4536
77	15	15	630500	3457.5	DFT-s-OFDM QPSK	1@1	26.29	44.28	26.7917
77	15	15	630500	3457.5	DFT-s-OFDM 16 QAM	1@1	25.2	43.19	20.8449
77	15	15	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.17	44.16	26.0615
77	15	15	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	24.98	42.97	19.8153
77	15	15	636166	3542.49	DFT-s-OFDM QPSK	1@1	26.15	44.14	25.9418
77	15	15	636166	3542.49	DFT-s-OFDM 16 QAM	1@1	25.08	43.07	20.2768
77	15	20	630667	3460.005	DFT-s-OFDM QPSK	1@1	26.31	44.3	26.9153
77	15	20	630667	3460.005	DFT-s-OFDM 16 QAM	1@1	25.19	43.18	20.7970
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.26	44.25	26.6073
77	15	20	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.01	43	19.9526
77	15	20	636000	3540	DFT-s-OFDM QPSK	1@1	26.18	44.17	26.1216
77	15	20	636000	3540	DFT-s-OFDM 16 QAM	1@1	25.09	43.08	20.3236
77	15	25	630834	3462.51	DFT-s-OFDM QPSK	1@1	26.37	44.36	27.2898
77	15	25	630834	3462.51	DFT-s-OFDM 16 QAM	1@1	25.17	43.16	20.7014
77	15	25	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.21	44.2	26.3027
77	15	25	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.08	43.07	20.2768
77	15	25	635833	3537.495	DFT-s-OFDM QPSK	1@1	26.15	44.14	25.9418
77	15	25	635833	3537.495	DFT-s-OFDM 16 QAM	1@1	25.04	43.03	20.0909
77	15	30	631000	3465	DFT-s-OFDM QPSK	1@1	26.36	44.35	27.2270
77	15	30	631000	3465	DFT-s-OFDM 16 QAM	1@1	25.26	43.25	21.1349
77	15	30	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.29	44.28	26.7917
77	15	30	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.17	43.16	20.7014
77	15	30	635666	3534.99	DFT-s-OFDM QPSK	1@1	26.31	44.3	26.9153

77	15	30	635666	3534.99	DFT-s-OFDM 16 QAM	1@1	25.08	43.07	20.2768
77	15	40	631334	3470.01	DFT-s-OFDM QPSK	1@1	26.33	44.32	27.0396
77	15	40	631334	3470.01	DFT-s-OFDM 16 QAM	1@1	25.29	43.28	21.2814
77	15	40	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.31	44.3	26.9153
77	15	40	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.21	43.2	20.8930
77	15	40	635333	3529.995	DFT-s-OFDM QPSK	1@1	26.27	44.26	26.6686
77	15	40	635333	3529.995	DFT-s-OFDM 16 QAM	1@1	25.12	43.11	20.4644
77	15	50	631667	3475.005	DFT-s-OFDM PI/2 BPSK	135@67	26.24	44.23	26.4850
77	15	50	631667	3475.005	DFT-s-OFDM PI/2 BPSK	1@1	26.49	44.48	28.0543
77	15	50	631667	3475.005	DFT-s-OFDM PI/2 BPSK	1@268	26.04	44.03	25.2930
77	15	50	631667	3475.005	DFT-s-OFDM QPSK	135@67	26.26	44.25	26.6073
77	15	50	631667	3475.005	DFT-s-OFDM QPSK	1@1	26.46	44.45	27.8612
77	15	50	631667	3475.005	DFT-s-OFDM QPSK	1@268	26	43.99	25.0611
77	15	50	631667	3475.005	DFT-s-OFDM 16 QAM	135@67	25.34	43.33	21.5278
77	15	50	631667	3475.005	DFT-s-OFDM 16 QAM	1@1	25.25	43.24	21.0863
77	15	50	631667	3475.005	DFT-s-OFDM 16 QAM	1@268	24.92	42.91	19.5434
77	15	50	631667	3475.005	DFT-s-OFDM 64 QAM	135@67	23.4	41.39	13.7721
77	15	50	631667	3475.005	DFT-s-OFDM 64 QAM	1@1	23.64	41.63	14.5546
77	15	50	631667	3475.005	DFT-s-OFDM 64 QAM	1@268	23.23	41.22	13.2434
77	15	50	631667	3475.005	DFT-s-OFDM 256 QAM	135@67	20.81	38.8	7.5858
77	15	50	631667	3475.005	DFT-s-OFDM 256 QAM	1@1	21.25	39.24	8.3946
77	15	50	631667	3475.005	DFT-s-OFDM 256 QAM	1@268	20.88	38.87	7.7090
77	15	50	631667	3475.005	CP-OFDM QPSK	135@67	24.85	42.84	19.2309
77	15	50	631667	3475.005	CP-OFDM QPSK	1@1	24.98	42.97	19.8153
77	15	50	631667	3475.005	CP-OFDM QPSK	1@268	24.59	42.58	18.1134
77	15	50	633334	3500.01	DFT-s-OFDM PI/2 BPSK	135@67	26.25	44.24	26.5461
77	15	50	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	26.49	44.48	28.0543
77	15	50	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@268	26	43.99	25.0611
77	15	50	633334	3500.01	DFT-s-OFDM QPSK	135@67	26.21	44.2	26.3027
77	15	50	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.37	44.36	27.2898
77	15	50	633334	3500.01	DFT-s-OFDM QPSK	1@268	25.99	43.98	25.0035
77	15	50	633334	3500.01	DFT-s-OFDM 16 QAM	135@67	25.2	43.19	20.8449
77	15	50	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.26	43.25	21.1349
77	15	50	633334	3500.01	DFT-s-OFDM 16 QAM	1@268	24.93	42.92	19.5884
77	15	50	633334	3500.01	DFT-s-OFDM 64 QAM	135@67	23.35	41.34	13.6144

77	15	50	633334	3500.01	DFT-s-OFDM 64 QAM	1@1	23.42	41.41	13.8357
77	15	50	633334	3500.01	DFT-s-OFDM 64 QAM	1@268	23.15	41.14	13.0017
77	15	50	633334	3500.01	DFT-s-OFDM 256 QAM	135@67	20.76	38.75	7.4989
77	15	50	633334	3500.01	DFT-s-OFDM 256 QAM	1@1	21.04	39.03	7.9983
77	15	50	633334	3500.01	DFT-s-OFDM 256 QAM	1@268	20.77	38.76	7.5162
77	15	50	633334	3500.01	CP-OFDM QPSK	135@67	24.64	42.63	18.3231
77	15	50	633334	3500.01	CP-OFDM QPSK	1@1	25.03	43.02	20.0447
77	15	50	633334	3500.01	CP-OFDM QPSK	1@268	24.7	42.69	18.5780
77	15	50	635000	3525	DFT-s-OFDM PI/2 BPSK	135@67	26.27	44.26	26.6686
77	15	50	635000	3525	DFT-s-OFDM PI/2 BPSK	1@1	26.37	44.36	27.2898
77	15	50	635000	3525	DFT-s-OFDM PI/2 BPSK	1@268	26.12	44.11	25.7632
77	15	50	635000	3525	DFT-s-OFDM QPSK	135@67	26.27	44.26	26.6686
77	15	50	635000	3525	DFT-s-OFDM QPSK	1@1	26.27	44.26	26.6686
77	15	50	635000	3525	DFT-s-OFDM QPSK	1@268	26.05	44.04	25.3513
77	15	50	635000	3525	DFT-s-OFDM 16 QAM	135@67	25.25	43.24	21.0863
77	15	50	635000	3525	DFT-s-OFDM 16 QAM	1@1	25.16	43.15	20.6538
77	15	50	635000	3525	DFT-s-OFDM 16 QAM	1@268	25.02	43.01	19.9986
77	15	50	635000	3525	DFT-s-OFDM 64 QAM	135@67	23.3	41.29	13.4586
77	15	50	635000	3525	DFT-s-OFDM 64 QAM	1@1	23.46	41.45	13.9637
77	15	50	635000	3525	DFT-s-OFDM 64 QAM	1@268	23.33	41.32	13.5519
77	15	50	635000	3525	DFT-s-OFDM 256 QAM	135@67	20.81	38.8	7.5858
77	15	50	635000	3525	DFT-s-OFDM 256 QAM	1@1	20.99	38.98	7.9068
77	15	50	635000	3525	DFT-s-OFDM 256 QAM	1@268	20.82	38.81	7.6033
77	15	50	635000	3525	CP-OFDM QPSK	135@67	24.82	42.81	19.0985
77	15	50	635000	3525	CP-OFDM QPSK	1@1	24.86	42.85	19.2752
77	15	50	635000	3525	CP-OFDM QPSK	1@268	24.74	42.73	18.7499

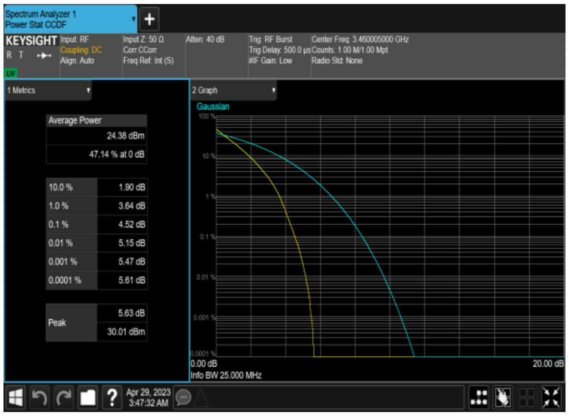
Frequency Stability

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0023	**PASS**	NV
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0026	**PASS**	LV
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0064	**PASS**	HV
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0046	**PASS**	-30℃
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0048	**PASS**	-20℃
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0068	**PASS**	-10℃
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0045	**PASS**	0℃
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0053	**PASS**	10℃
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0023	**PASS**	20℃
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0062	**PASS**	30℃
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0053	**PASS**	40℃
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	0.0053	**PASS**	50℃

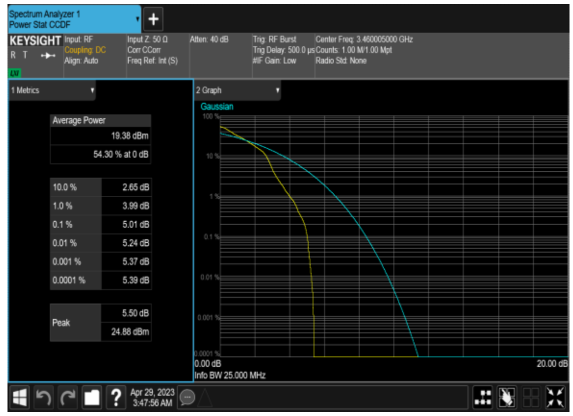
Peak to Average Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
77	15	20	630667	3460.005	DFT-s-OFDM PI/2 BPSK	100@0	4.52	13	**PASS**
77	15	20	630667	3460.005	DFT-s-OFDM PI/2 BPSK	1@0	5.01	13	**PASS**
77	15	20	630667	3460.005	DFT-s-OFDM QPSK	100@0	5.76	13	**PASS**
77	15	20	630667	3460.005	DFT-s-OFDM QPSK	1@0	5.97	13	**PASS**
77	15	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	100@0	4.55	13	**PASS**
77	15	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@0	5.58	13	**PASS**
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	5.76	13	**PASS**
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	1@0	6.12	13	**PASS**
77	15	20	636000	3540.0	DFT-s-OFDM PI/2 BPSK	100@0	4.51	13	**PASS**
77	15	20	636000	3540.0	DFT-s-OFDM PI/2 BPSK	1@0	5.11	13	**PASS**
77	15	20	636000	3540.0	DFT-s-OFDM QPSK	100@0	5.72	13	**PASS**
77	15	20	636000	3540.0	DFT-s-OFDM QPSK	1@0	6.29	13	**PASS**

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



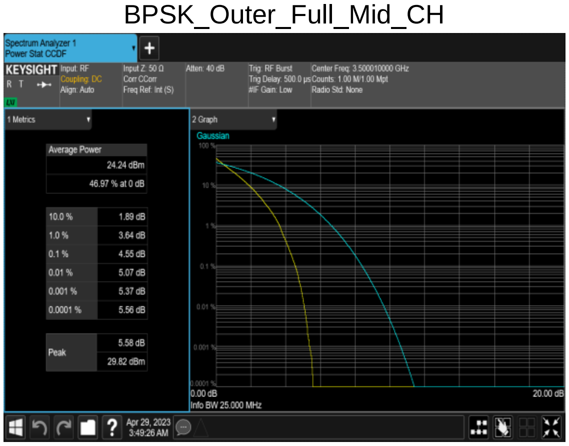
N77(20M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Low_CH



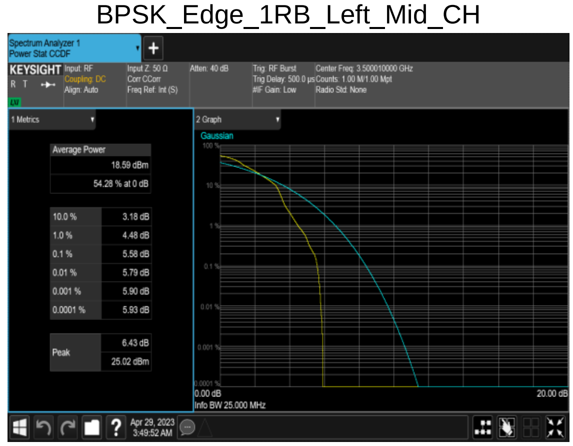
N77(20M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH

N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH

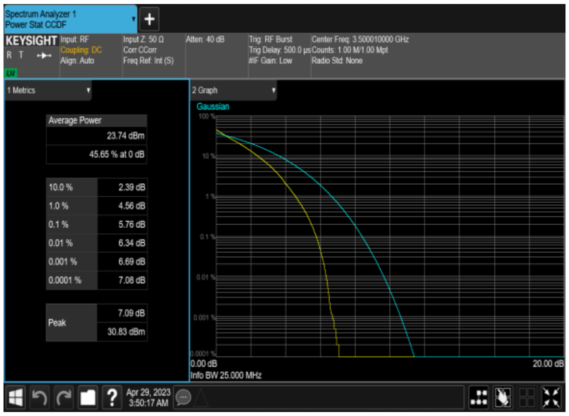
N77(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



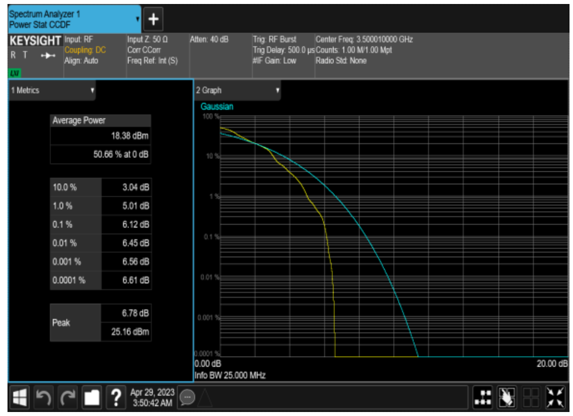
N77(20M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH



N77(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



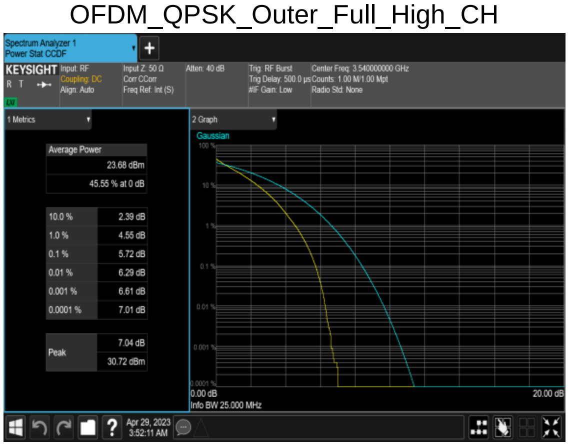
N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



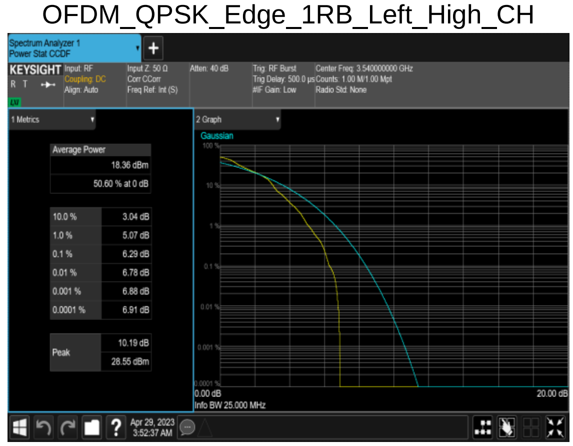
N77(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_High_CH

N77(20M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_High_CH

N77(20M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH



N77(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH

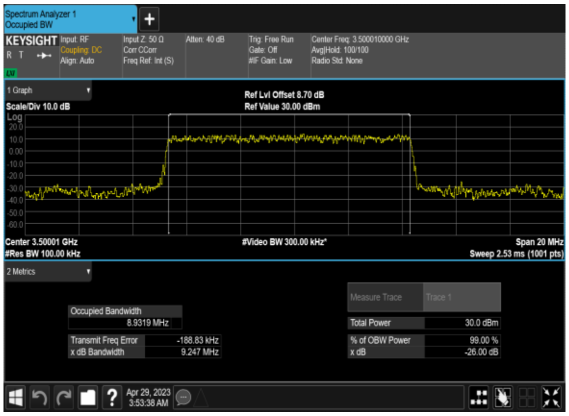


Occupied Bandwidth

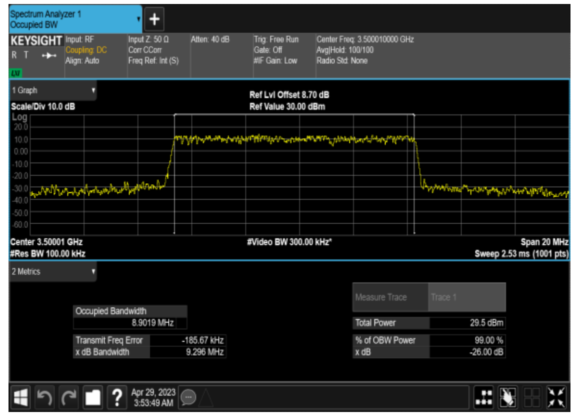
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
77	15	10	633334	3500.01	DFT-s-OFDM PI/2 BPSK	50@0	8.9319	9.247
77	15	10	633334	3500.01	DFT-s-OFDM QPSK	50@0	8.9019	9.296
77	15	10	633334	3500.01	CP-OFDM QPSK	52@0	9.2719	9.78
77	15	10	633334	3500.01	CP-OFDM 16 QAM	52@0	9.2832	9.592
77	15	10	633334	3500.01	CP-OFDM 64 QAM	52@0	9.2844	9.702
77	15	10	633334	3500.01	CP-OFDM 256 QAM	52@0	9.3088	9.582
77	15	15	633334	3500.01	DFT-s-OFDM PI/2 BPSK	75@0	13.389	13.91
77	15	15	633334	3500.01	DFT-s-OFDM QPSK	75@0	13.367	13.83
77	15	15	633334	3500.01	CP-OFDM QPSK	79@0	14.094	14.68
77	15	15	633334	3500.01	CP-OFDM 16 QAM	79@0	14.119	14.67
77	15	15	633334	3500.01	CP-OFDM 64 QAM	79@0	14.1	14.91
77	15	15	633334	3500.01	CP-OFDM 256 QAM	79@0	14.041	14.62
77	15	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	100@0	17.893	18.52
77	15	20	633334	3500.01	DFT-s-OFDM QPSK	100@0	17.83	18.47
77	15	20	633334	3500.01	CP-OFDM QPSK	106@0	18.936	19.62
77	15	20	633334	3500.01	CP-OFDM 16 QAM	106@0	18.953	19.62
77	15	20	633334	3500.01	CP-OFDM 64 QAM	106@0	18.895	19.56
77	15	20	633334	3500.01	CP-OFDM 256 QAM	106@0	18.913	19.66
77	15	25	633334	3500.01	DFT-s-OFDM PI/2 BPSK	128@0	22.861	23.63
77	15	25	633334	3500.01	DFT-s-OFDM QPSK	128@0	22.813	23.6
77	15	25	633334	3500.01	CP-OFDM QPSK	133@0	23.759	24.53
77	15	25	633334	3500.01	CP-OFDM 16 QAM	133@0	23.742	24.52
77	15	25	633334	3500.01	CP-OFDM 64 QAM	133@0	23.746	24.51
77	15	25	633334	3500.01	CP-OFDM 256 QAM	133@0	23.732	24.52

77	15	30	633334	3500.01	DFT-s-OFDM PI/2 BPSK	160@0	28.603	29.46
77	15	30	633334	3500.01	DFT-s-OFDM QPSK	160@0	28.572	29.49
77	15	30	633334	3500.01	CP-OFDM QPSK	160@0	28.473	29.45
77	15	30	633334	3500.01	CP-OFDM 16 QAM	160@0	28.491	29.46
77	15	30	633334	3500.01	CP-OFDM 64 QAM	160@0	28.571	29.54
77	15	30	633334	3500.01	CP-OFDM 256 QAM	160@0	28.524	29.61
77	15	40	633334	3500.01	DFT-s-OFDM PI/2 BPSK	216@0	38.582	39.84
77	15	40	633334	3500.01	DFT-s-OFDM QPSK	216@0	38.625	39.86
77	15	40	633334	3500.01	CP-OFDM QPSK	216@0	38.54	39.83
77	15	40	633334	3500.01	CP-OFDM 16 QAM	216@0	38.523	39.94
77	15	40	633334	3500.01	CP-OFDM 64 QAM	216@0	38.428	39.83
77	15	40	633334	3500.01	CP-OFDM 256 QAM	216@0	38.594	39.82
77	15	50	633334	3500.01	DFT-s-OFDM PI/2 BPSK	270@0	47.932	49.65
77	15	50	633334	3500.01	DFT-s-OFDM QPSK	270@0	48.232	49.76
77	15	50	633334	3500.01	CP-OFDM QPSK	270@0	48.122	49.82
77	15	50	633334	3500.01	CP-OFDM 16 QAM	270@0	48.242	49.75
77	15	50	633334	3500.01	CP-OFDM 64 QAM	270@0	48.087	49.67
77	15	50	633334	3500.01	CP-OFDM 256 QAM	270@0	48.231	49.72

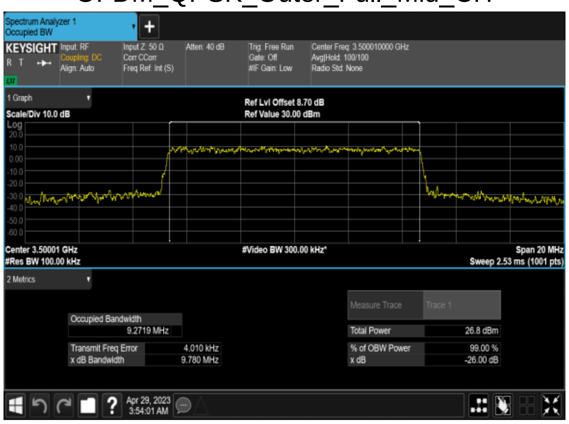
N77(10M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



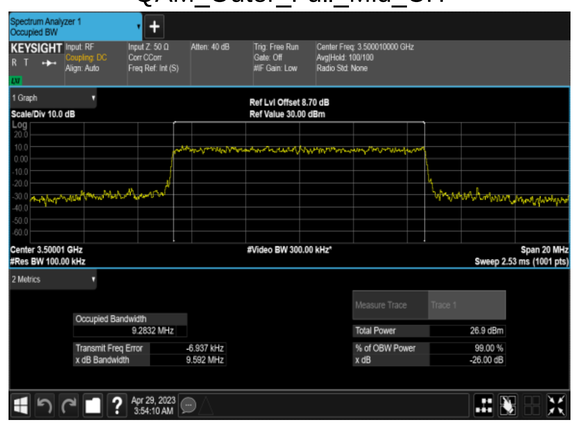
N77(10M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



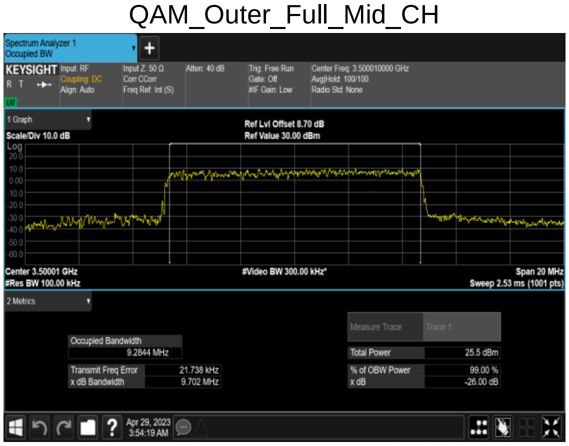
N77(10M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



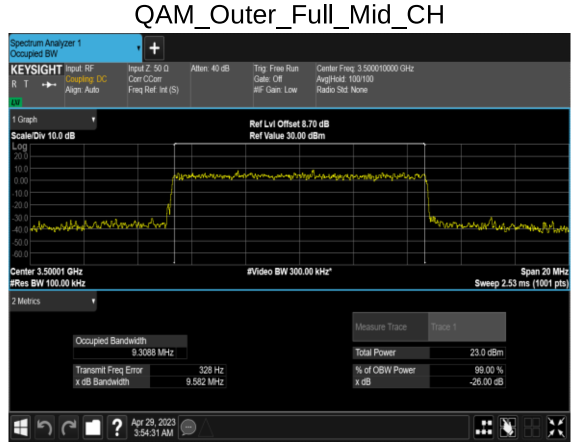
N77(10M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



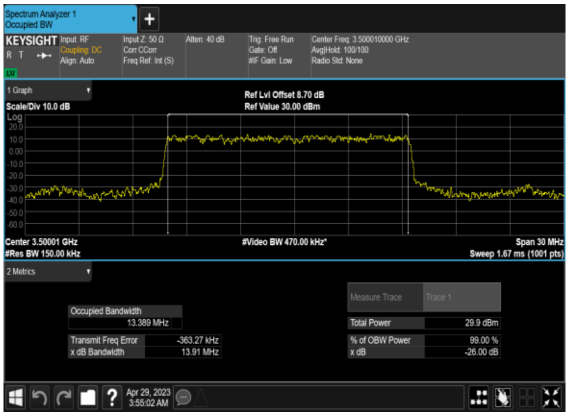
N77(10M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



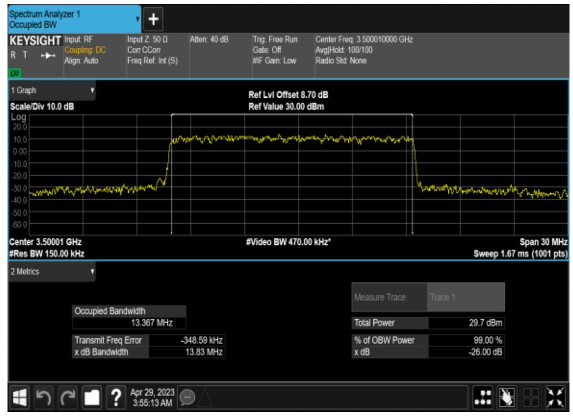
N77(10M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



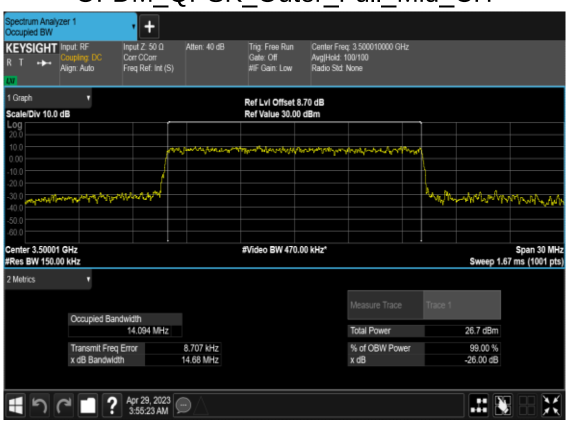
N77(15M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



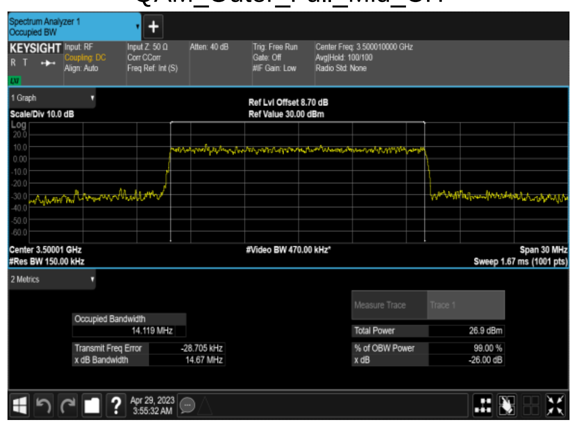
N77(15M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



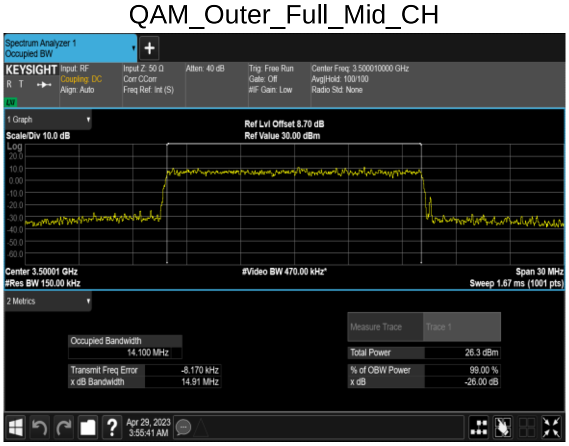
N77(15M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



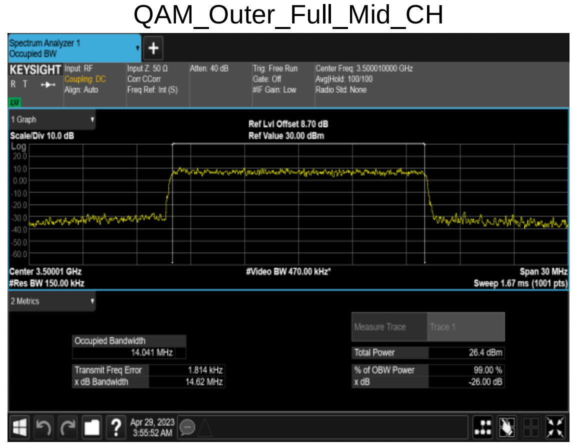
N77(15M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



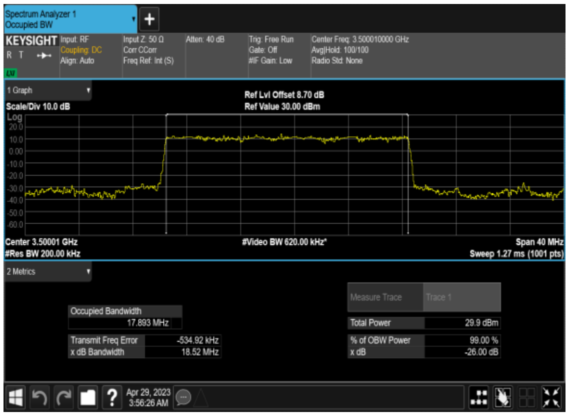
N77(15M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



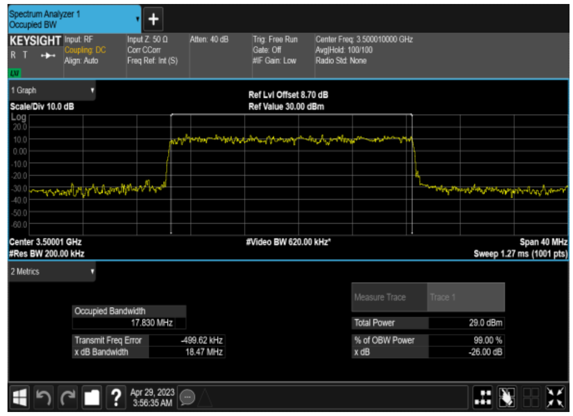
N77(15M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



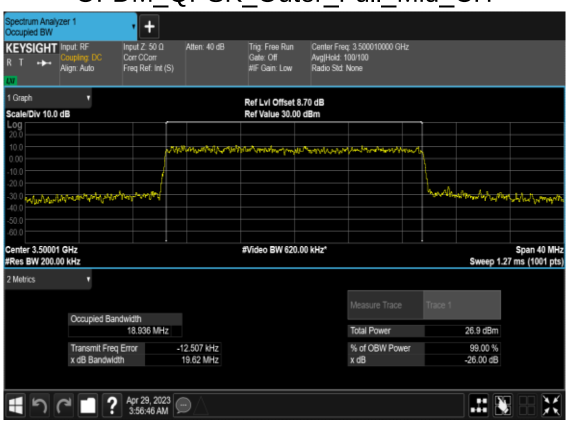
N77(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



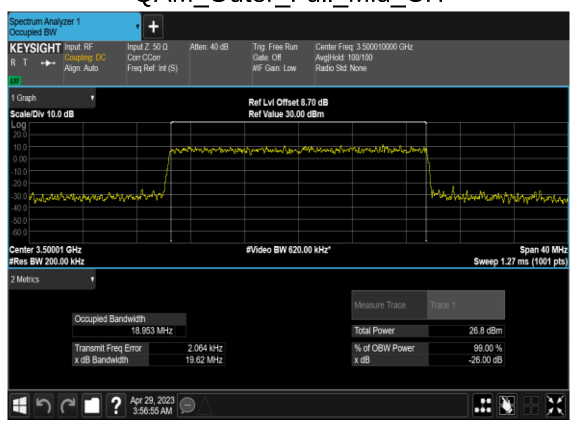
N77(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



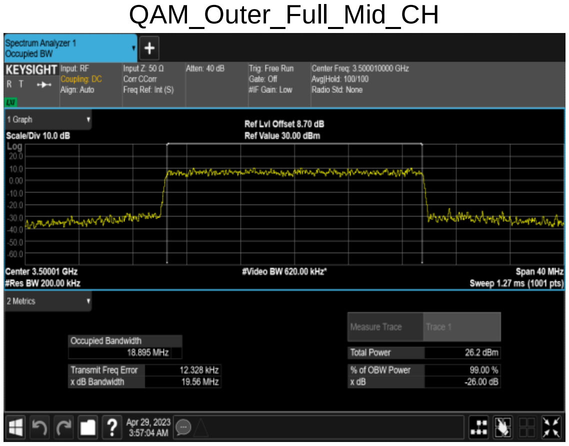
N77(20M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



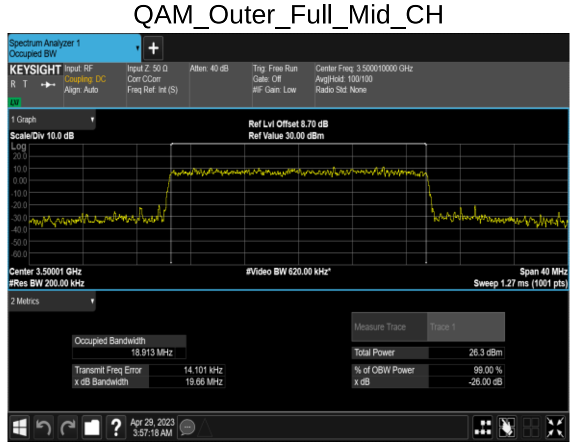
N77(20M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



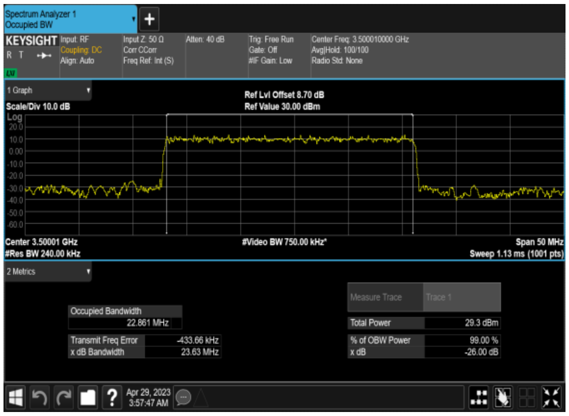
N77(20M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



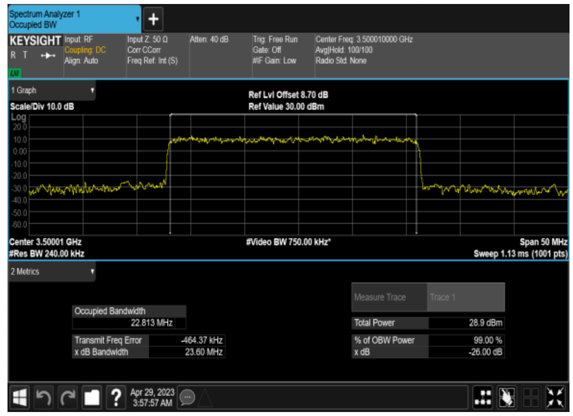
N77(20M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



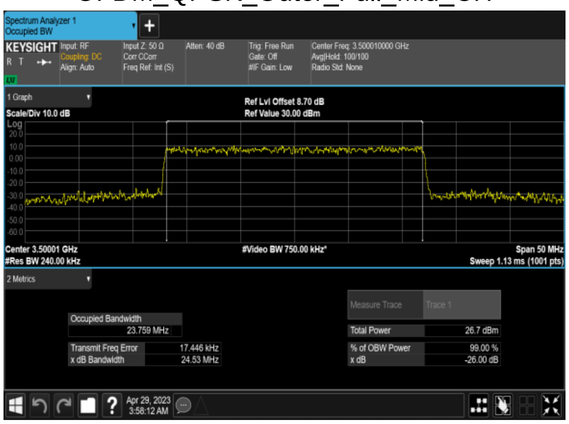
N77(25M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



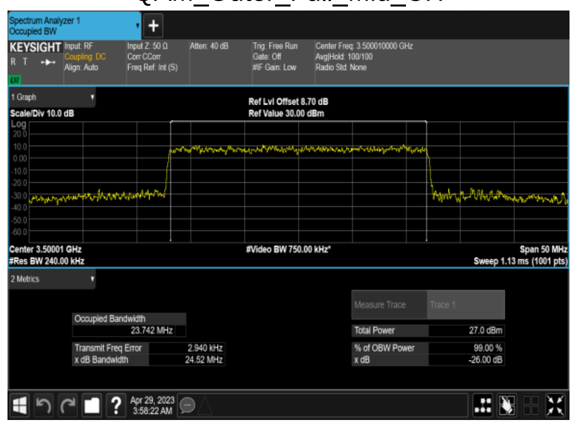
N77(25M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



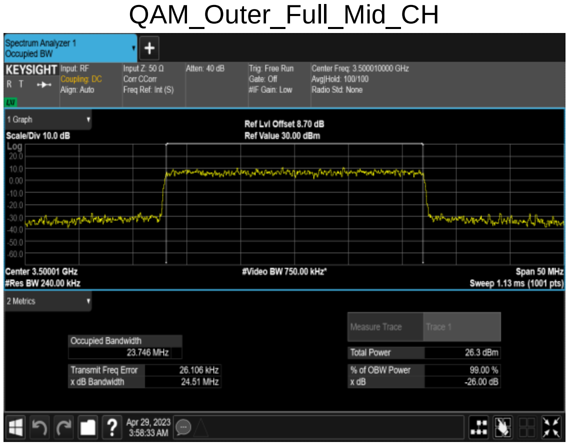
N77(25M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



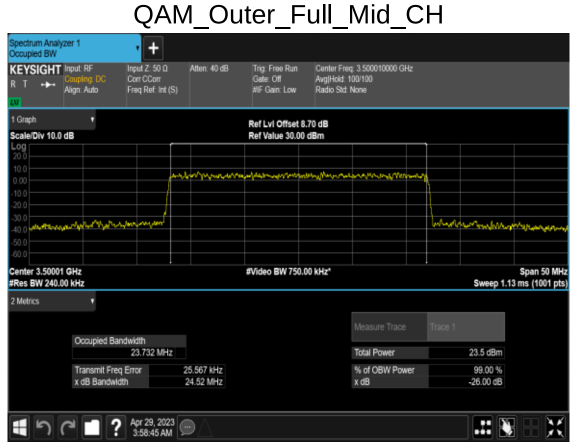
N77(25M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N77(25M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

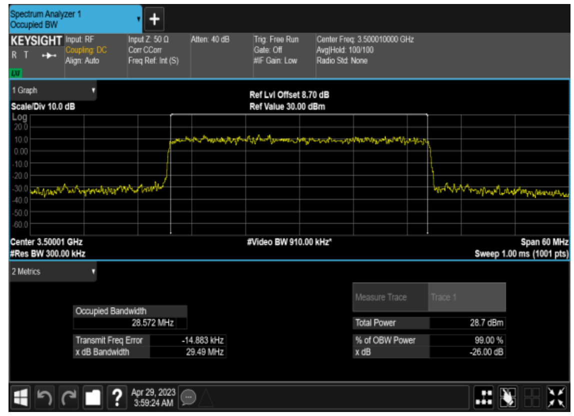


N77(25M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

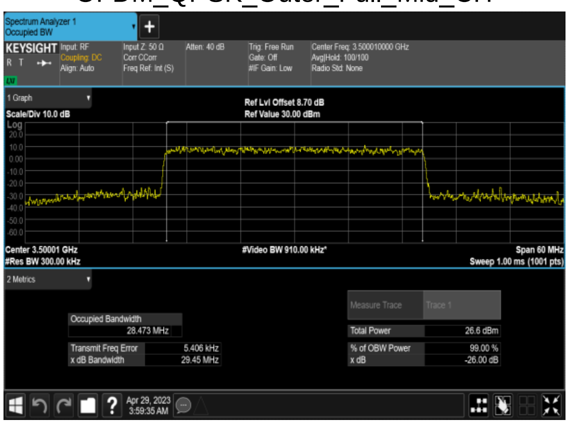


N77(30M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

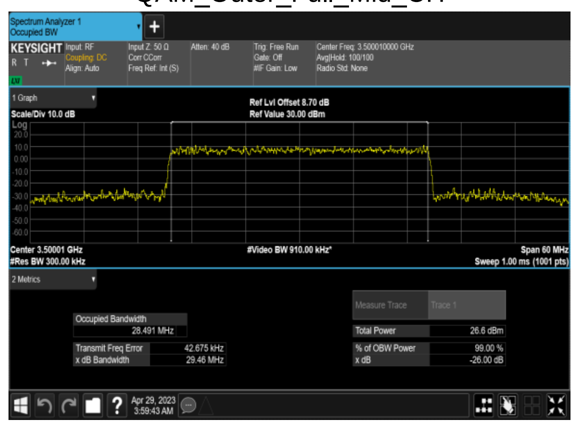
N77(30M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



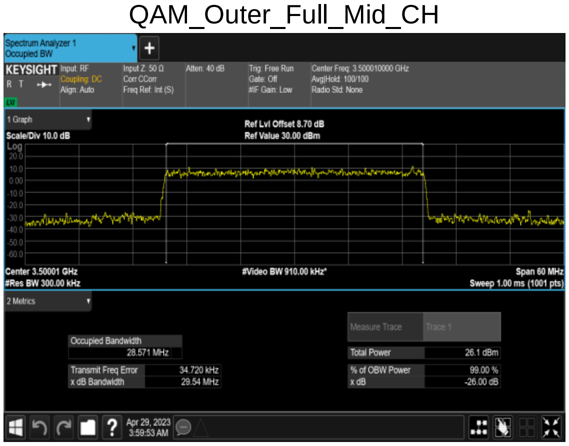
N77(30M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



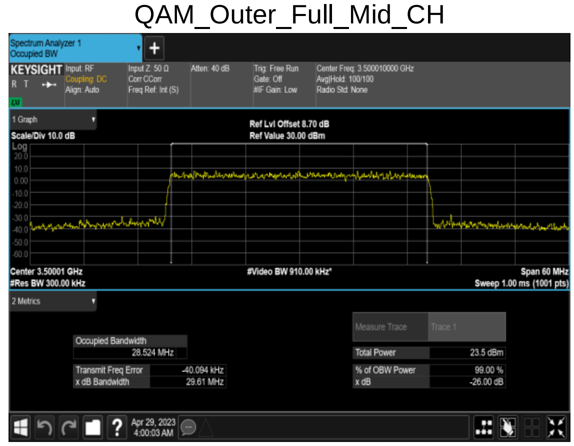
N77(30M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N77(30M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

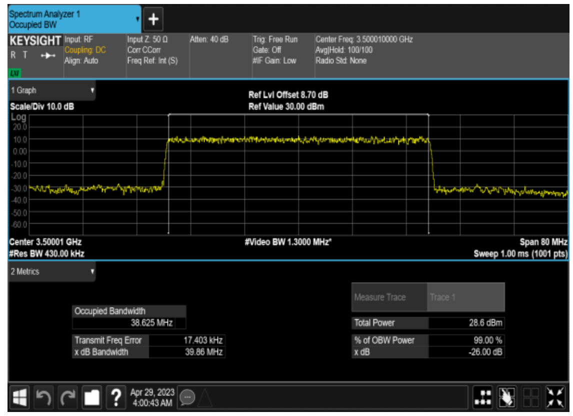


N77(30M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

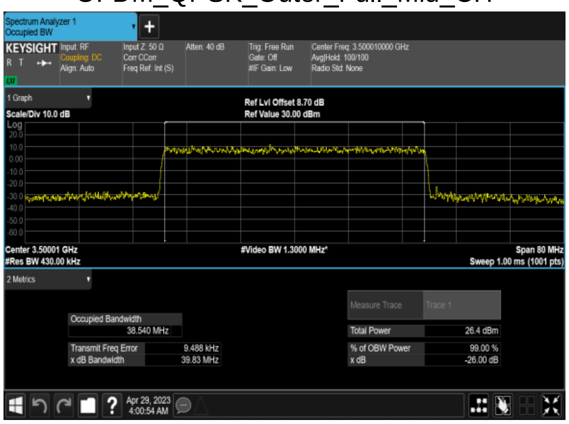


N77(40M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

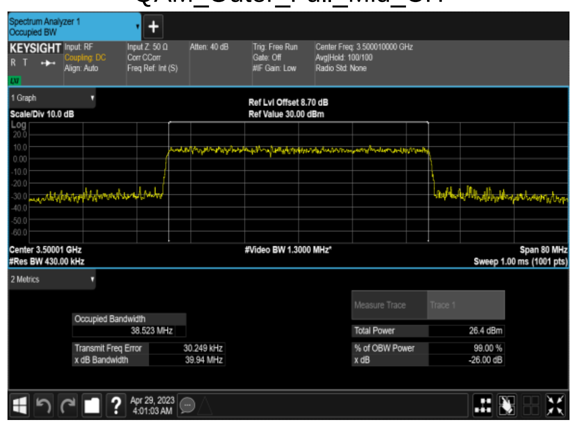
N77(40M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



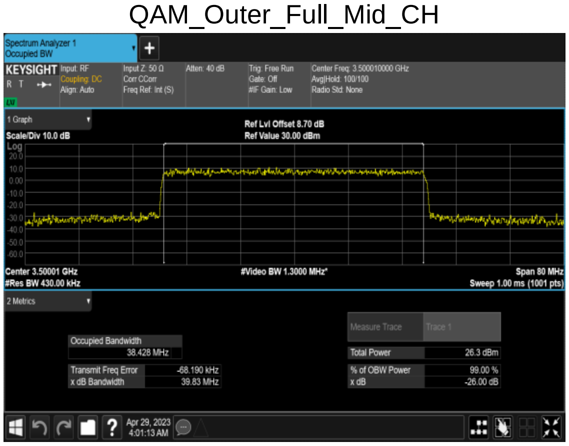
N77(40M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



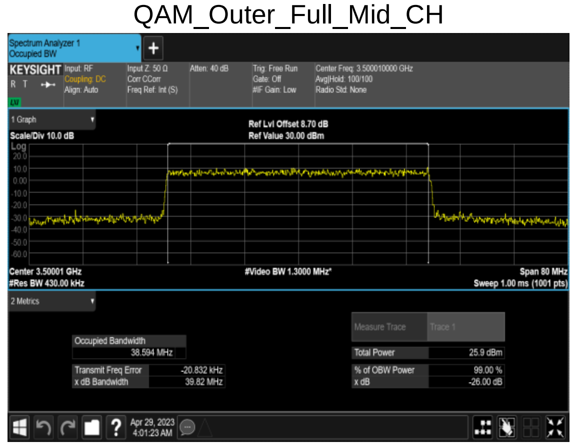
N77(40M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N77(40M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

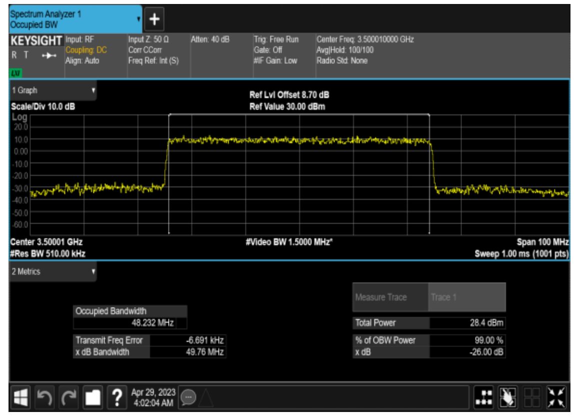


N77(40M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

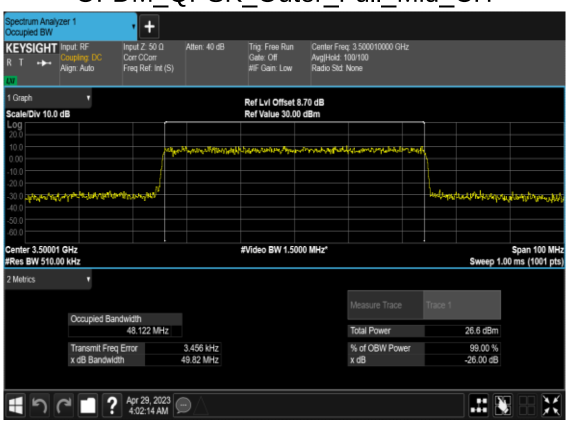


N77(50M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

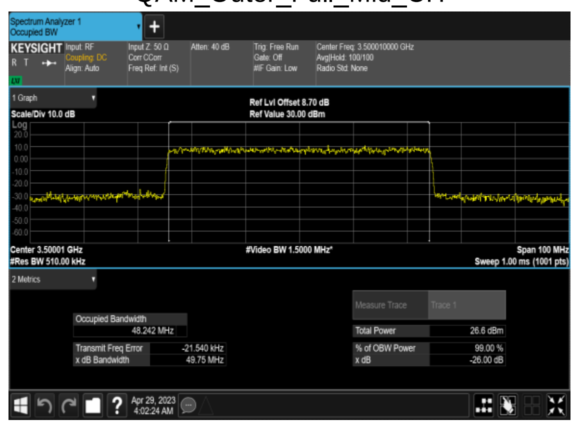
N77(50M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



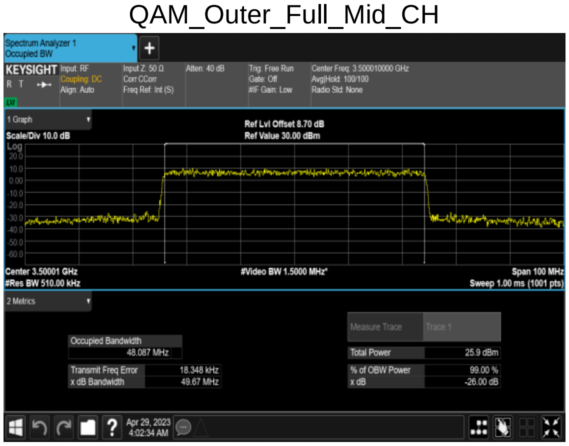
N77(50M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



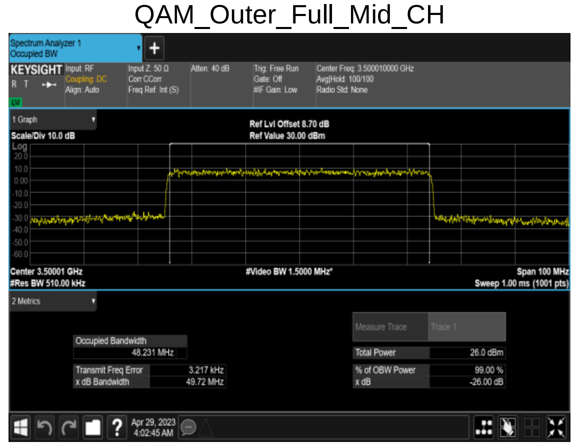
N77(50M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N77(50M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



N77(50M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



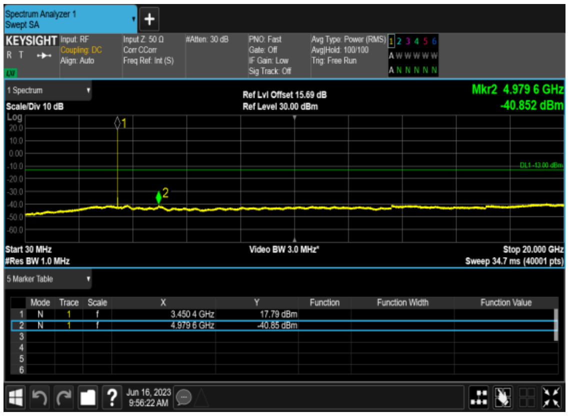
Conducted Spurious Emissions

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
77	15	10	630334	3455.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	10	630334	3455.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	10	630334	3455.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	10	630334	3455.01	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	15	10	630334	3455.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	10	630334	3455.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	10	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	10	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	10	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	10	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	15	10	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	10	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	10	636333	3544.995	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	10	636333	3544.995	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	10	636333	3544.995	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	10	636333	3544.995	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	15	10	636333	3544.995	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	10	636333	3544.995	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	25	630834	3462.51	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	25	630834	3462.51	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	25	630834	3462.51	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	25	630834	3462.51	DFT-s-OFDM QPSK	1@0	see graph	**---**

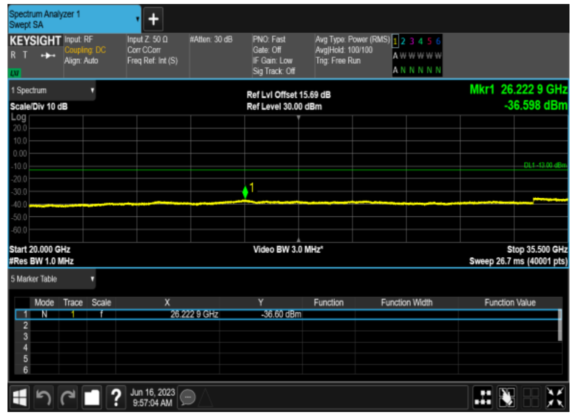
77	15	25	630834	3462.51	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	25	630834	3462.51	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	25	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	25	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	25	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	25	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	15	25	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	25	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	25	635833	3537.495	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	25	635833	3537.495	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	25	635833	3537.495	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	25	635833	3537.495	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	15	25	635833	3537.495	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	25	635833	3537.495	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	50	631667	3475.005	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	50	631667	3475.005	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	50	631667	3475.005	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	50	631667	3475.005	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	15	50	631667	3475.005	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	50	631667	3475.005	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	50	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	50	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	50	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	50	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**---**

77	15	50	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	50	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	50	635000	3525.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	15	50	635000	3525.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	50	635000	3525.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	50	635000	3525.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	15	50	635000	3525.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	50	635000	3525.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**

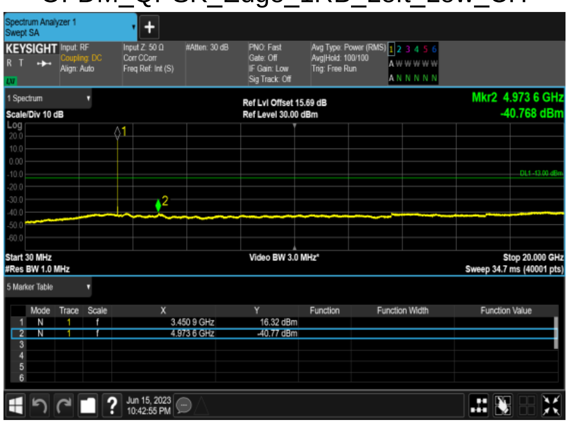
N77(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



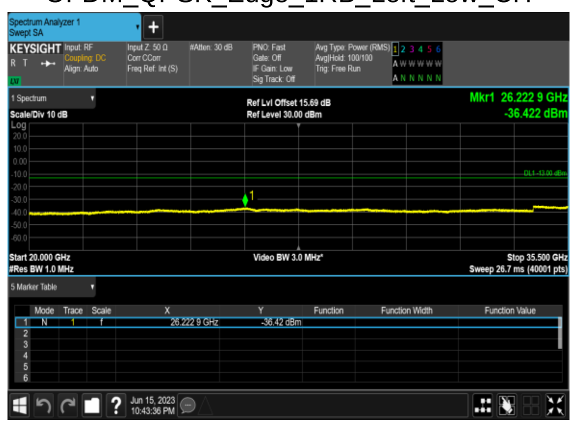
N77(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



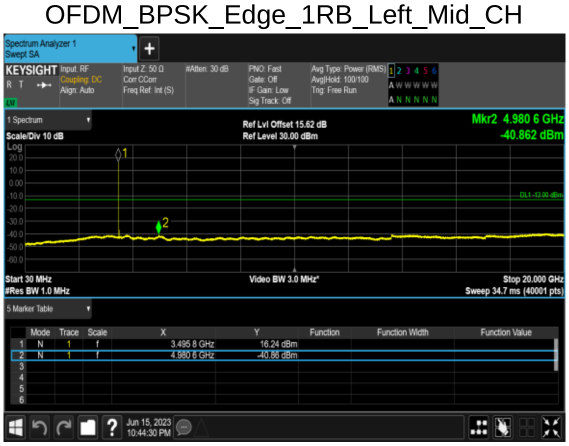
N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



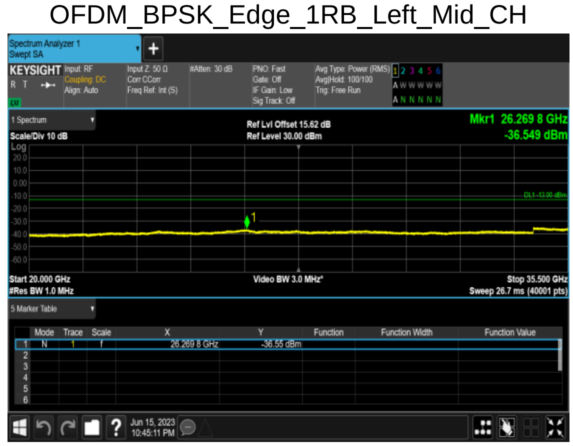
N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



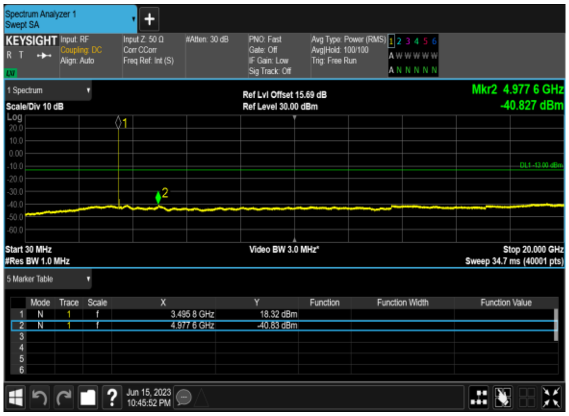
N77(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



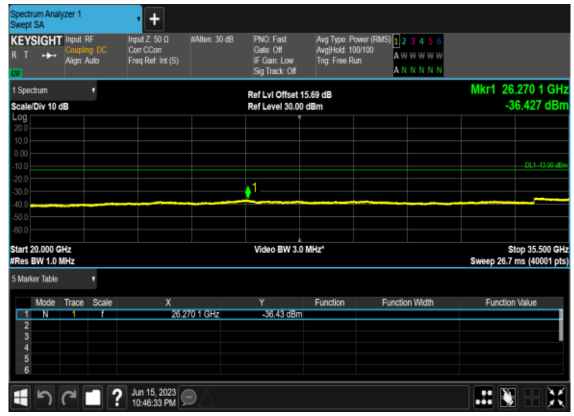
N77(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



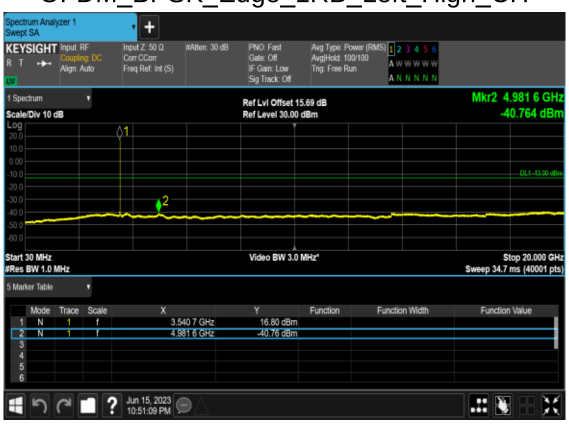
N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



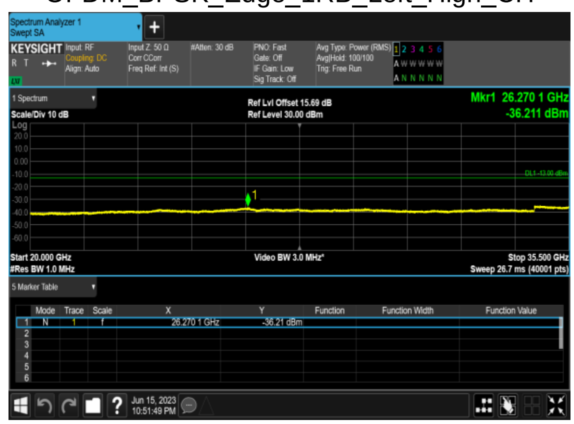
N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



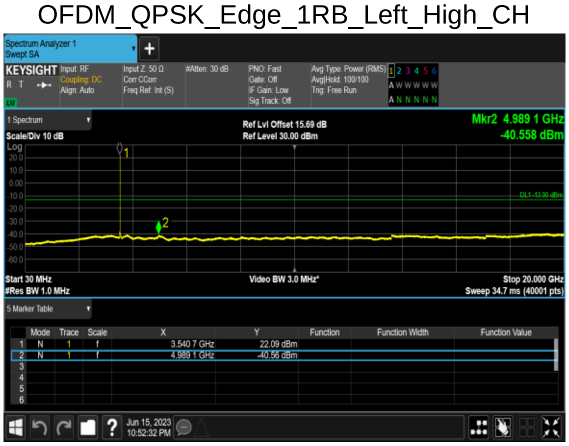
N77(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



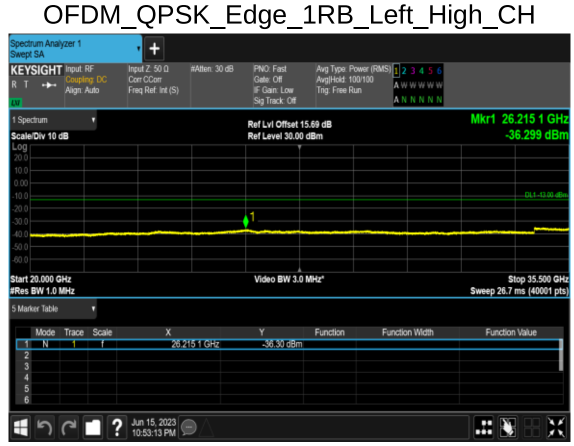
N77(10M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



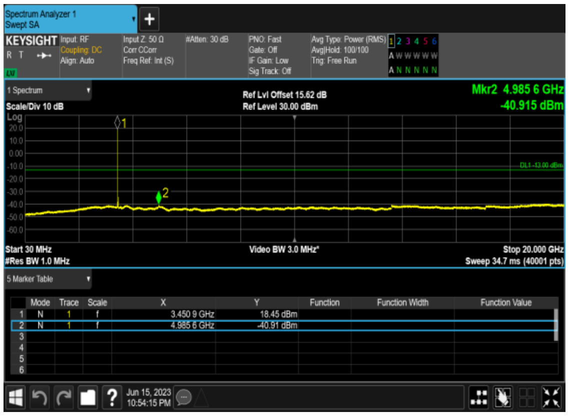
N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



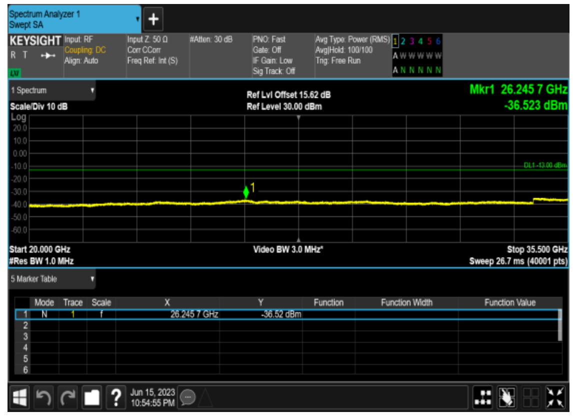
N77(10M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



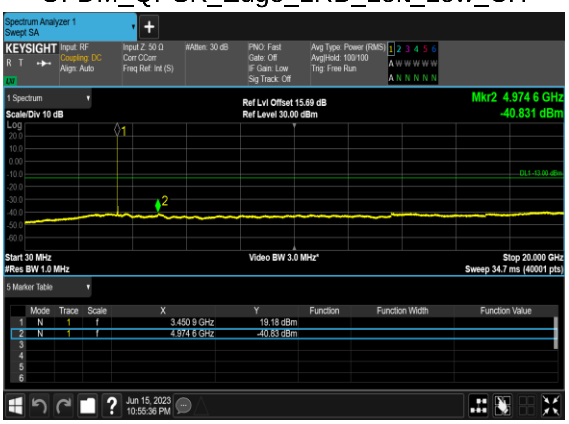
N77(25M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



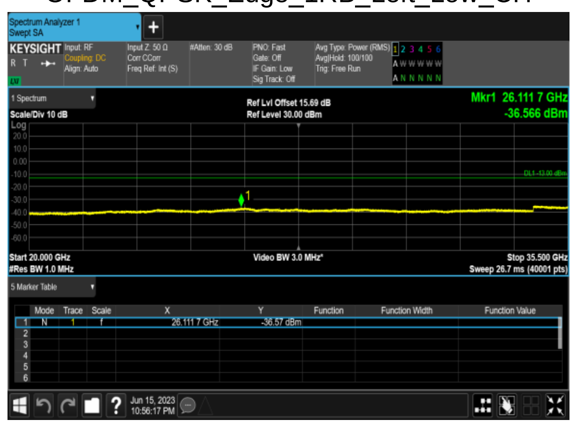
N77(25M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



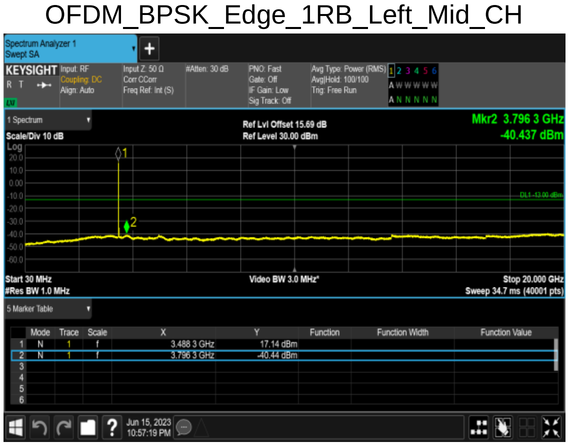
N77(25M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



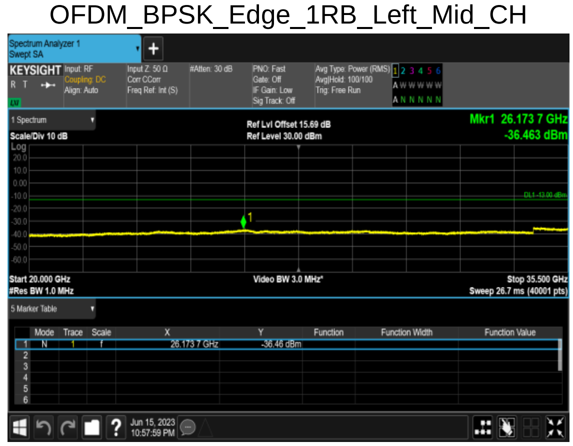
N77(25M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



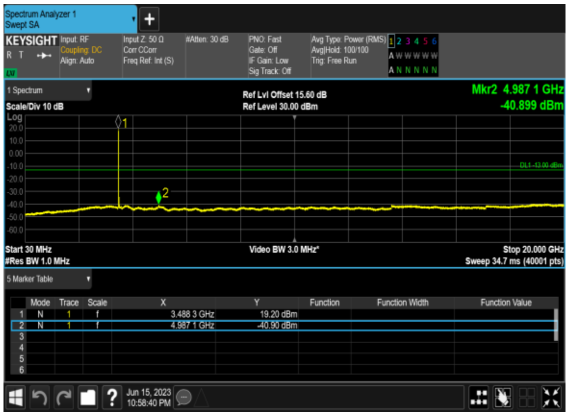
N77(25M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



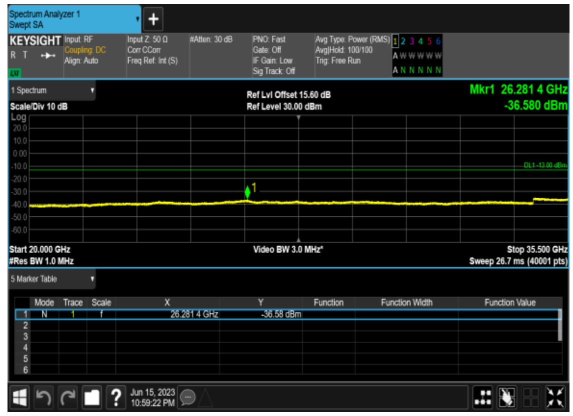
N77(25M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



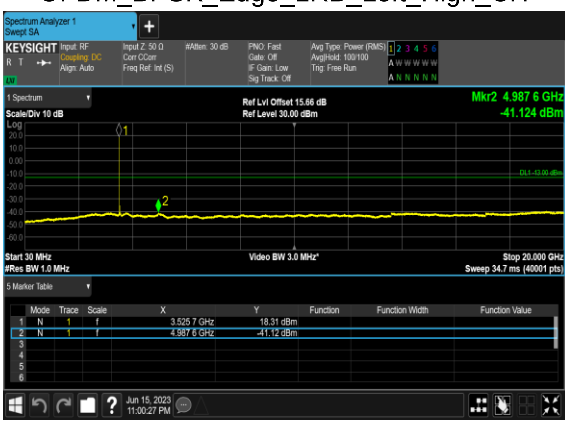
N77(25M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



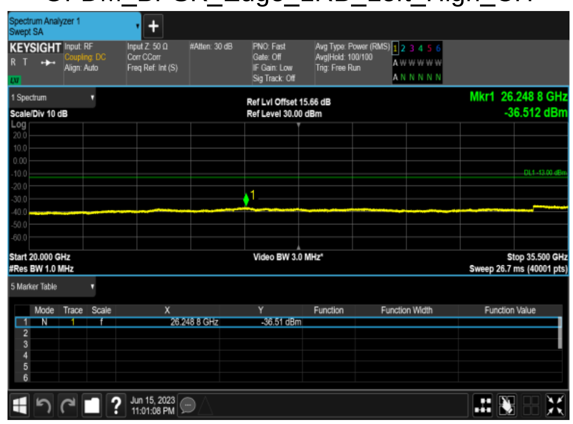
N77(25M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



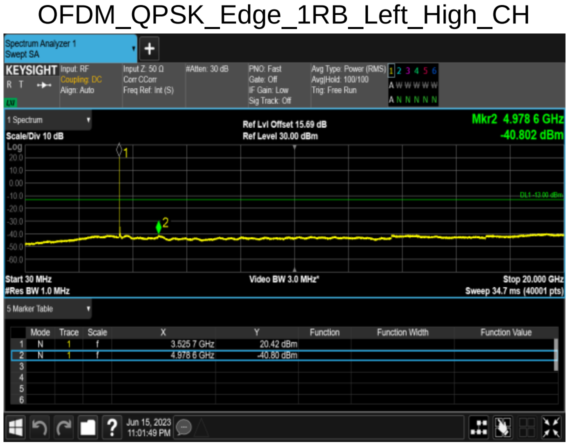
N77(25M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



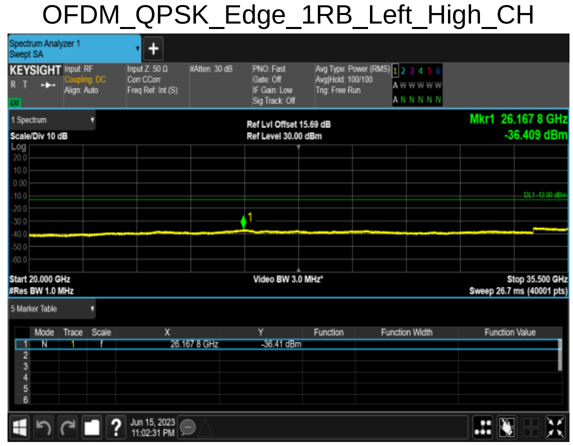
N77(25M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



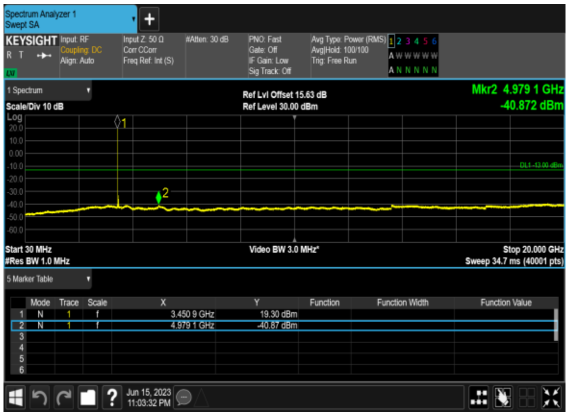
N77(25M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



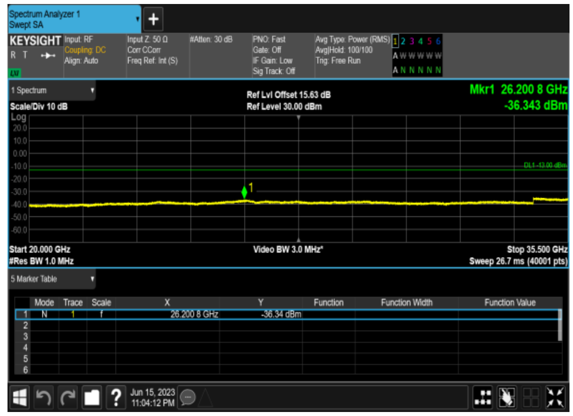
N77(25M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



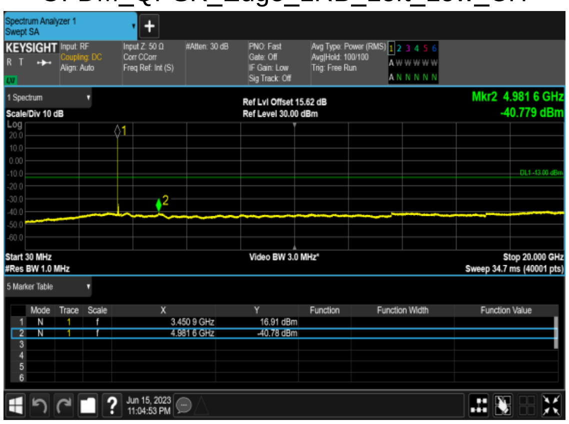
N77(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



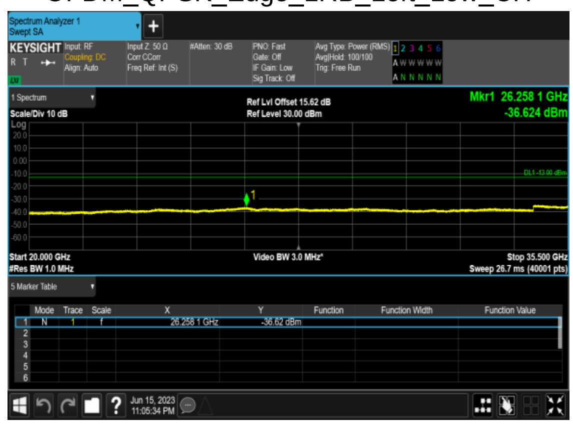
N77(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



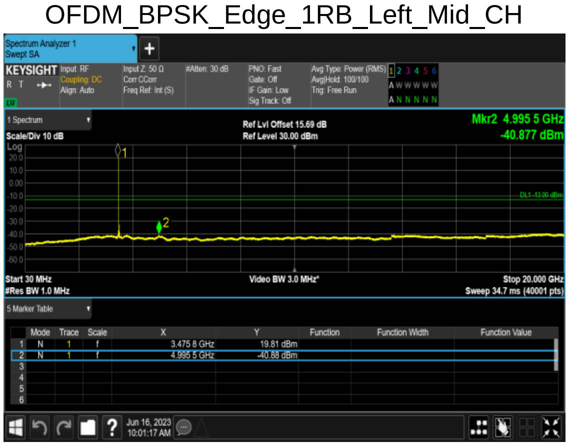
N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



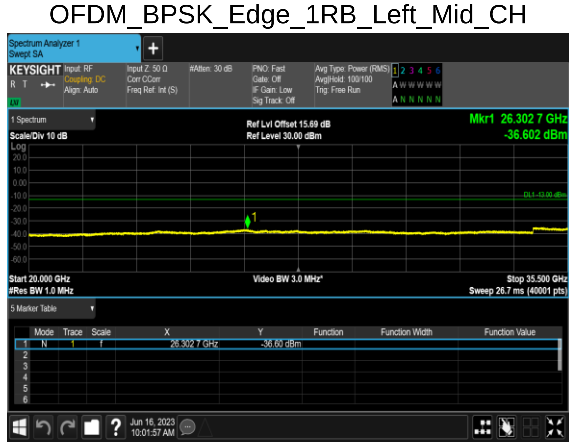
N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



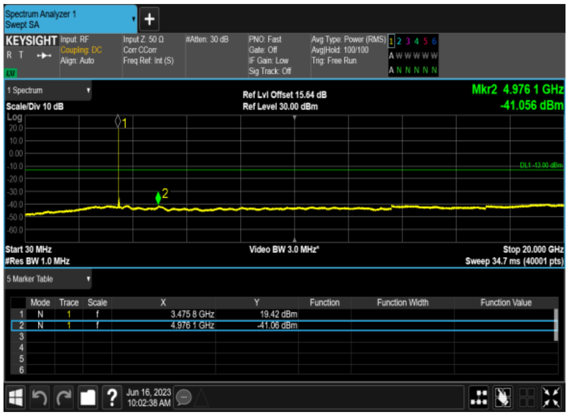
N77(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



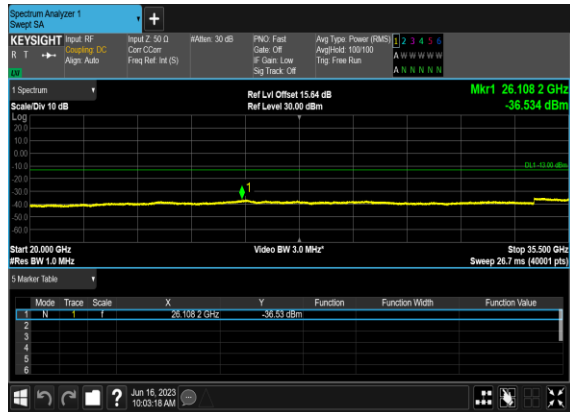
N77(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



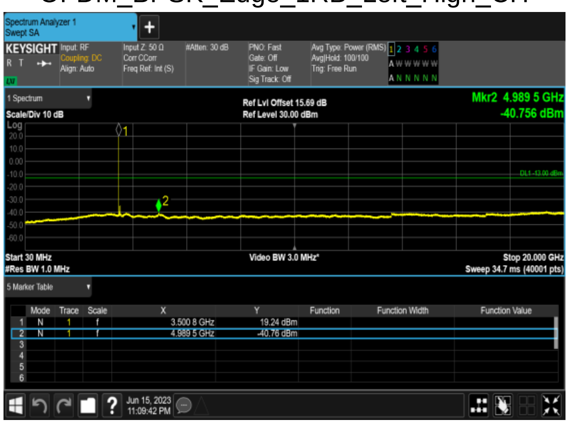
N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



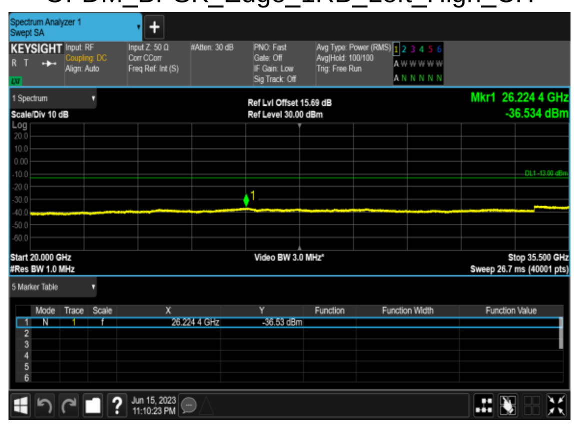
N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



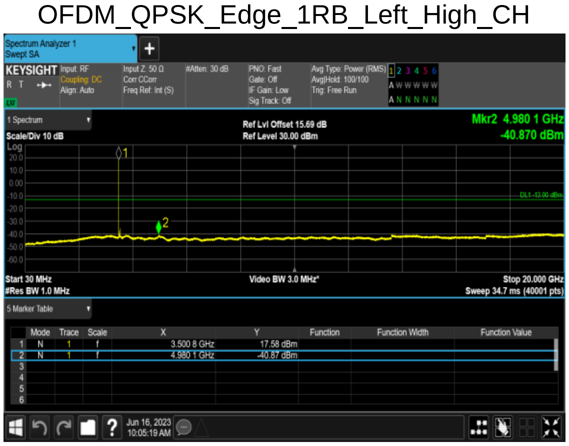
N77(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



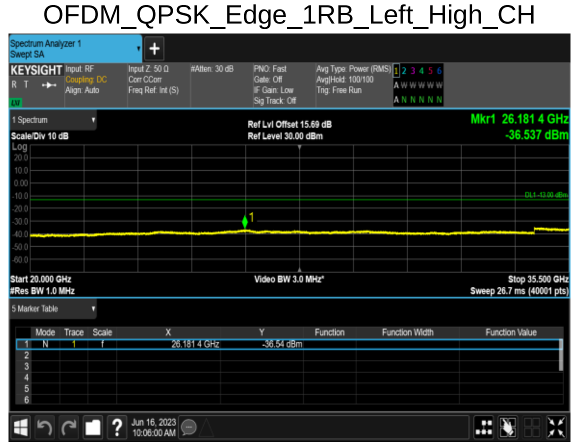
N77(50M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



N77(50M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



N77(50M)_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
77	15	10	630334	3455.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	10	630334	3455.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	10	630334	3455.01	DFT-s-OFDM BPSK	50@0	see graph	**PASS**
77	15	10	630334	3455.01	DFT-s-OFDM QPSK	50@0	see graph	**PASS**
77	15	10	636333	3544.995	DFT-s-OFDM BPSK	1@51	see graph	**PASS**
77	15	10	636333	3544.995	DFT-s-OFDM QPSK	1@51	see graph	**PASS**
77	15	10	636333	3544.995	DFT-s-OFDM BPSK	50@0	see graph	**PASS**
77	15	10	636333	3544.995	DFT-s-OFDM QPSK	50@0	see graph	**PASS**
77	15	25	630834	3462.51	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	25	630834	3462.51	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	25	630834	3462.51	DFT-s-OFDM BPSK	128@0	see graph	**PASS**
77	15	25	630834	3462.51	DFT-s-OFDM QPSK	128@0	see graph	**PASS**
77	15	25	635833	3537.495	DFT-s-OFDM BPSK	1@132	see graph	**PASS**
77	15	25	635833	3537.495	DFT-s-OFDM QPSK	1@132	see graph	**PASS**
77	15	25	635833	3537.495	DFT-s-OFDM BPSK	128@0	see graph	**PASS**
77	15	25	635833	3537.495	DFT-s-OFDM QPSK	128@0	see graph	**PASS**
77	15	50	631667	3475.005	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	15	50	631667	3475.005	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	15	50	631667	3475.005	DFT-s-OFDM BPSK	270@0	see graph	**PASS**
77	15	50	631667	3475.005	DFT-s-OFDM QPSK	270@0	see graph	**PASS**
77	15	50	635000	3525.0	DFT-s-OFDM BPSK	1@269	see graph	**PASS**
77	15	50	635000	3525.0	DFT-s-OFDM QPSK	1@269	see graph	**PASS**
77	15	50	635000	3525.0	DFT-s-OFDM BPSK	270@0	see graph	**PASS**
77	15	50	635000	3525.0	DFT-s-OFDM QPSK	270@0	see graph	**PASS**