FCC RF Test Report

APPLICANT	:	OnePlus Technology (Shenzhen) Co.,Ltd.
EQUIPMENT	:	Mobile Phone
BRAND NAME	:	ONEPLUS
MODEL NAME	:	CPH2419, CPH2417
FCC ID	:	2ABZ2-AA497
STANDARD	:	47 CFR Part 2, 27
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	:	May 27, 2022 ~ Jun. 17, 2022

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

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

Jason Jia

Approved by: Jason Jia

ACCREDITED
Cert #5145.01

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People's Republic of China

TABLE OF CONTENTS

REVISION HISTORY **3**

SUMMARY OF TEST RESULT **4**

1 GENERAL DESCRIPTION **5**

1.1 Applicant 5
1.2 Manufacturer 5
1.3 Product Feature of Equipment Under Test 5
1.4 Product Specification of Equipment Under Test 6
1.5 Modification of EUT 6
1.6 Maximum EIRP Power and Emission Designator 7
1.7 Testing Location 8
1.8 Test Software 9
1.9 Applicable Standards 9

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **10**

2.1 Test Mode 10
2.2 Connection Diagram of Test System 11
2.3 Support Unit used in test configuration and system 12
2.4 Measurement Results Explanation Example 12
2.5 Frequency List of Low/Middle/High Channels 13

3 CONDUCTED TEST ITEMS **15**

3.1 Measuring Instruments 15
3.2 Test Setup 15
3.3 Test Result of Conducted Test 15
3.4 Conducted Output Power and EIRP 16
3.5 Peak-to-Average Ratio 17
3.6 Occupied Bandwidth 18
3.7 Conducted Band Edge 19
3.8 Conducted Spurious Emission 20
3.9 Frequency Stability 21

4 RADIATED TEST ITEMS **22**

4.1 Measuring Instruments 22
4.2 Test Setup 22
4.3 Test Result of Radiated Test 23
4.4 Radiated Spurious Emission 24

5 LIST OF MEASURING EQUIPMENT **25**

6 UNCERTAINTY OF EVALUATION **26**

APPENDIX A. TEST RESULTS OF CONDUCTED TEST

APPENDIX B. TEST RESULTS OF RADIATED TEST

APPENDIX C. TEST SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG251121H	Rev. 01	Initial issue of report	Jul. 08, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (5G NR n7) (5G NR n41, n38)	EIRP < 2Watt		
3.5	N/A	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§27.53(m)(4)	Conducted Band Edge Measurement (5G NR n7) (5G NR n41, n38)	§27.53(m)(4)	PASS	-
3.8	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (5G NR n7) (5G NR n41, n38)	< $55+10\log_{10}$(P[Watts])	PASS	-
3.9	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within Authorized Band	PASS	-
4.4	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (5G NR n7) (5G NR n41, n38)	< $55+10\log_{10}$(P[Watts])	PASS	Under limit 26.11 dB at 10365.600 MHz

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

OnePlus Technology (Shenzhen) Co.,Ltd.
18C02, 18C03, 18C04, 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, China.

1.2 Manufacturer

OnePlus Technology (Shenzhen) Co.,Ltd.
18C02, 18C03, 18C04, 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, China.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	ONEPLUS
Model Name	CPH2419, CPH2417
FCC ID	2ABZ2-AA497
IMEI Code	Conducted : 861677060020347 Radiation : 861677060027938
HW Version	2AA495-0
SW Version	CPH2419_11_A.03
EUT Stage	Production Unit

Remark:

1. Only 5G NR bands are tested in this report, all the other RF bands are tested in the other reports separately.
2. The different model name is for different market purpose.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz
Rx Frequency	5G NR n7 : 2620 MHz ~ 2690 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz
SCS	n7: 15kHz n38, n41: 30kHz
Bandwidth	n7(SA/NSA): 5MHz / 10MHz / 15MHz / 20MHz / 25MHz / 30MHz / 40MHz n38(SA): 20MHz / 30MHz / 40MHz n41(SA/NSA): 20MHz / 30MHz / 40MHz / 50MHz / 60MHz / 70MHz / 80MHz / 90MHz / 100MHz
Antenna Type	Fixed Internal Antenna
Antenna Gain	**<Ant. 2>** n7: -3.0 dBi n38: -3.0 dBi n41: -3.0 dBi **<Ant. 3>** n7: -2.0 dBi n38: -2.0 dBi n41: -2.0 dBi **<Ant. 5>** n7: -3.0 dBi n41: -3.0 dBi **<Ant. 6>** n7: -3.0 dBi n41: -3.0 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Note:

1. The maximum EIRP is calculated from max output power and max antenna gain, only the maximum EIRP of n7/n38/n41 for Ant.3 and n41_UL MIMO for Ant. 3+5 are shown in the report.
2. 5G NR n41 supports UL MIMO mode, and only supports CP-OFDM modulation in UL MIMO mode.
3. 5G NR Bands support SA and NSA mode. The whole testing has assessed NSA mode for n7 and SA mode for n41 by referring to the higher conducted power for conducted test items.
4. For NSA mode of all EN-DC combination, we only show the combination of the maximum power among all NSA combinations in the report.
5. The EN-DC mode combination could be referred to the SAR report.
6. 5G NR n41 supports HPUE.
7. 5G NR n41 MIMO Antenna gain for completely uncorrelated = Maximum (Ant.3 Gain, Ant.5 Gain).
8. For n41 MIMO mode, the conducted BE/Spurious are tested at single antenna port and add 10*log(N_{ANT}) according to KDB 662911 D01.

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 n7 (EN DC_5A-n7A)		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)
5	2502.5 ~ 2567.5	0.1094	4M48G7D	0.0869	4M50W7D
10	2505.0 ~ 2565.0	0.1074	9M28G7D	0.0881	9M30W7D
15	2507.5 ~ 2562.5	0.1143	14M1G7D	0.0925	14M1W7D
20	2510.0 ~ 2560.0	0.1130	18M9G7D	0.0920	18M9W7D
25	2512.5 ~ 2557.5	0.1148	23M7G7D	0.0935	23M7W7D
30	2515.0 ~ 2555.0	0.1132	28M6G7D	0.0914	28M6W7D
40	2520.0 ~ 2550.0	0.1197	38M7G7D	0.0920	38M6W7D

5G NR n38		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	2580.0 ~ 2610.0	0.1291	18M2G7D	0.1047	18M2W7D
30	2585.0 ~ 2605.0	0.1306	27M8G7D	0.1079	27M9W7D
40	2590.0 ~ 2600.0	0.1406	37M9G7D	0.1140	37M8W7D

5G NR n41		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	2506.02 ~ 2679.99	0.2366	18M2G7D	0.1871	18M2W7D
30	2511.00 ~ 2674.98	0.2388	27M8G7D	0.1928	27M9W7D
40	2516.01 ~ 2670.00	0.2410	37M9G7D	0.1923	37M8W7D
50	2521.02 ~ 2664.99	0.2366	47M4G7D	0.1892	47M6W7D
60	2526.00 ~ 2659.98	0.2323	57M9G7D	0.1879	57M9W7D
70	2531.01 ~ 2655.00	0.2218	67M6G7D	0.1807	67M6W7D
80	2536.02 ~ 2649.99	0.2203	77M5G7D	0.1770	77M6W7D
90	2541.00 ~ 2644.98	0.2193	87M6G7D	0.1791	87M6W7D
100	2546.01 ~ 2640.00	0.2535	97M5G7D	0.2023	97M7W7D

5G NR n41_UL MIMO		QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	2506.02 ~ 2679.99	0.1748	18M2G7D	0.1510	18M3W7D
30	2511.00 ~ 2674.98	0.1671	27M8G7D	0.1443	27M9W7D
40	2516.01 ~ 2670.00	0.1653	37M8G7D	0.1493	37M9W7D
50	2521.02 ~ 2664.99	0.1600	47M5G7D	0.1420	47M5W7D
60	2526.00 ~ 2659.98	0.1572	57M8G7D	0.1401	57M9W7D
70	2531.01 ~ 2655.00	0.1519	67M6G7D	0.1361	67M6W7D
80	2536.02 ~ 2649.99	0.1540	77M5G7D	0.1371	77M6W7D
90	2541.00 ~ 2644.98	0.1576	87M6G7D	0.1393	87M7W7D
100	2546.01 ~ 2640.00	0.1764	97M6G7D	0.1512	97M7W7D

Note:

1. 5G NR Band n41 overlaps the entire frequency range of Band n38. Therefore, the conducted test results provided in this report covers Band n41 as well as Band n38.
2. All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

1.7 Testing Location

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

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

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	CN1256	421272

1.8 Test Software

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

1.9 Applicable Standards

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

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

Remark:

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

2 Test Configuration of Equipment Under Test

2.1 Test Mode

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

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

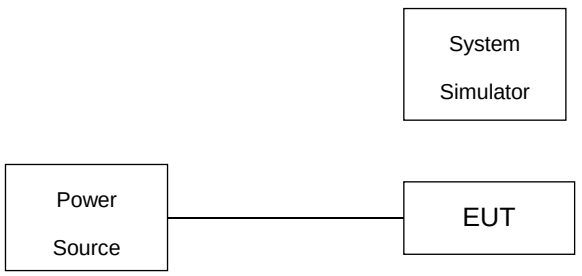
The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.

	X Plane	Y Plane	Z Plane
Orthogonal Planes of EUT			

Test Items	5G NR	Bandwidth (MHz)										Modulation					RB #		Test Channel		
		5	10/15	20	25	30	40	50	60	70-90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256 QAM	1	Full	L	M	H
Max. Output Power	n7	v	v	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n38	-	-	v	-	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n41	-	-	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	n41 MIMO	-	-	v	-	v	v	v	v	v	v		v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	n7			v				-	-	-	-	v	v				v	v	v	v	v
	n41	-	-	v	-							v	v				v	v	v	v	v
	n41 MIMO	-	-	v	-								v				v	v	v	v	v
26dB and 99% Bandwidth	n7	v	v	v	v	v	v	-	-	-	-	v	v	v	v	v		v		v	
	n41	-	-	v	-	v	v	v	v	v	v	v	v	v	v	v		v		v	
	n41 MIMO	-	-	v	-	v	v	v	v	v	v		v	v	v	v		v		v	
Conducted Band Edge	n7	v		v			v	-	-	-	-	v	v				v	v	v		v
	n41	-	-	v	-				v		v	v	v				v	v	v		v
	n41 MIMO	-	-	v	-				v		v		v				v	v	v		v

Test Items	5G NR	Bandwidth (MHz)										Modulation					RB #		Test Channel		
		5	10/ 15	20	25	30	40	50	60	70-90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256 QAM	1	Full	L	M	H
Conducted Spurious Emission	n7	v		v			v	-	-	-	-	v	v				v		v	v	v
	n41	-	-	v	-				v		v	v	v				v		v	v	v
	n41 MIMO	-	-	v	-				v		v		v				v		v	v	v
Frequency Stability	n7			v				-	-	-	-		v					v		v	
	n41	-	-	v	-								v					v		v	
	n41 MIMO	-	-	v	-								v					v		v	
E.R.P / E.I.R.P	n7	v	v	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n38	-	-	v	-	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n41	-	-	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	n41 MIMO	-	-	v	-	v	v	v	v	v	v		v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n7	Worst Case																	v	v	v
	n41	Worst Case																	v	v	v
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. Based on engineering evaluation, only the worst modulations test results are shown in the report. 5. Nominal Voltage: 7.78Vdc, Maximum Voltage: 8.96Vdc, Minimum Voltage: 6Vdc																				

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.	LBase Station	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
3.	Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

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

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 8.0 dB.

Example :

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

= 8.0 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n7 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	528000	531000	534000
	Frequency	2520	2535	2550
30	Channel	527000	531000	535000
	Frequency	2515	2535	2555
25	Channel	526500	531000	535500
	Frequency	2512.5	2535	2557.5
20	Channel	526000	531000	536000
	Frequency	2510	2535	2560
15	Channel	525500	531000	536500
	Frequency	2507.5	2535	2562.5
10	Channel	525000	531000	537000
	Frequency	2505	2535	2565
5	Channel	524500	531000	537500
	Frequency	2502.5	2535	2567.5

5G NR n38 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	518000	519000	520000
	Frequency	2590	2595	2600
30	Channel	517000	519000	521000
	Frequency	2585	2595	2605
20	Channel	516000	519000	522000
	Frequency	2580	2595	2610

5G NR n41 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	509202	518598	528000
	Frequency	2546.01	2592.99	2640
90	Channel	508200	518598	528996
	Frequency	2541	2592.99	2644.98
80	Channel	507204	518598	529998
	Frequency	2536.02	2592.99	2649.99
70	Channel	506202	518598	531000
	Frequency	2531.01	2592.99	2655
60	Channel	505200	518598	531996
	Frequency	2526	2592.99	2659.98
50	Channel	504204	518598	532998
	Frequency	2521.02	2592.99	2664.99
40	Channel	503202	518598	534000
	Frequency	2516.01	2592.99	2670
30	Channel	502200	518598	534996
	Frequency	2511	2592.99	2674.98
20	Channel	501204	518598	535998
	Frequency	2506.02	2592.99	2679.99

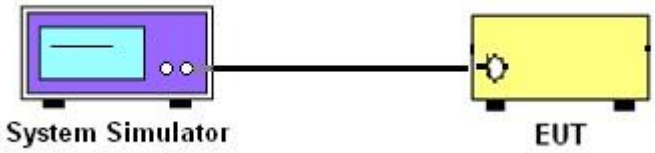
3 Conducted Test Items

3.1 Measuring Instruments

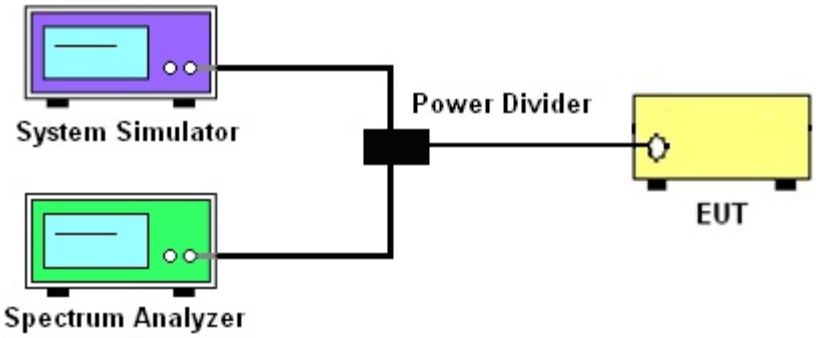
See list of measuring instruments of this test report.

3.2 Test Setup

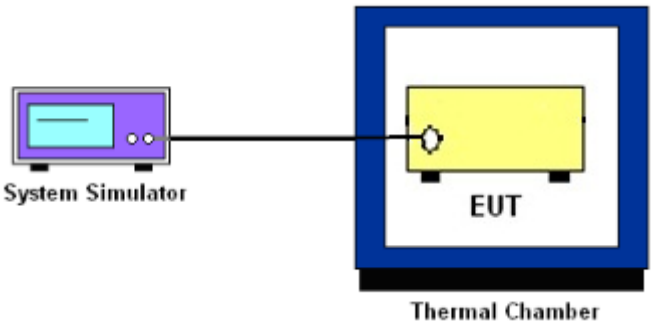
3.2.1 Conducted Output Power



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



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and EIRP

3.4.1 Description of the Conducted Output Power Measurement and EIRP Measurement

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

The EIRP of mobile transmitters must not exceed 2 Watts for 5G NR n7, n38 and n41.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

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

3.4.2 Test Procedures

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

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

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

3.5.2 Test Procedures

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

3.6 Occupied Bandwidth

3.6.1 Description of Occupied Bandwidth Measurement

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

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

3.6.2 Test Procedures

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

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

27.53(m)(4)

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

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1%/2% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Offset has included the duty factor for Band n41. Duty factor =10 log (1/x), where x is the measured duty cycle.
9. Checked that all the results comply with the emission limit line.

   Example:

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

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

   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
10. For 5G NR n7/n38/n41, the other 40 dB, and 55 dB have additionally applied same calculation above.
11. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

For 5G NR n7/n38/n41:

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

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

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Offset has included the duty factor for Band n41. Duty factor =10 log (1/x), where x is the measured duty cycle.
9. Taking the record of maximum spurious emission.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
12. For 5G NR n7/n38/n41
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55+ 10log(P)] (dB)
    = [30+ 10log(P)] (dBm) - [55+ 10log(P)] (dB)
    = -25dBm.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

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

3.9.3 Test Procedures for Voltage Variation

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

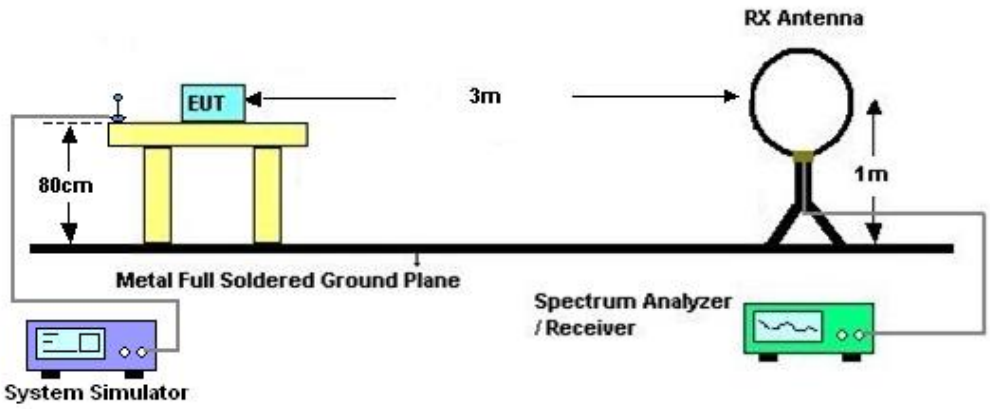
4 Radiated Test Items

4.1 Measuring Instruments

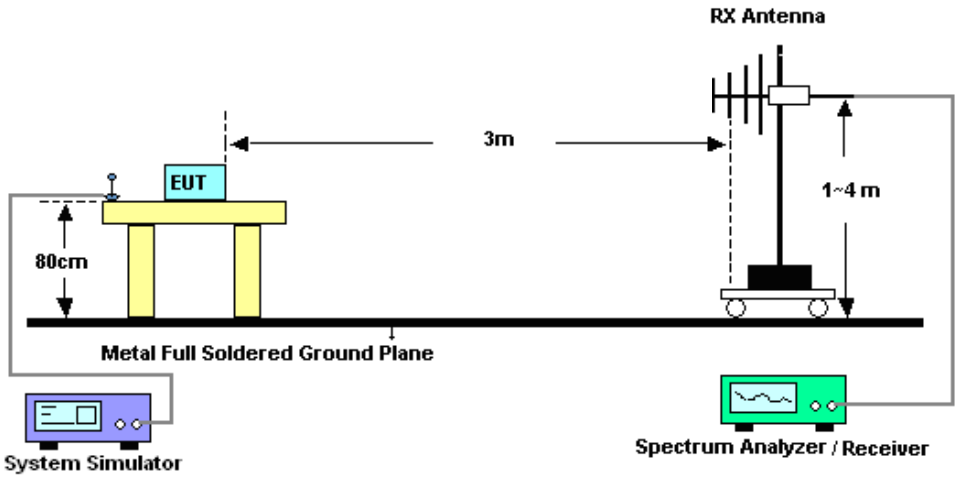
See list of measuring instruments of this test report.

4.2 Test Setup

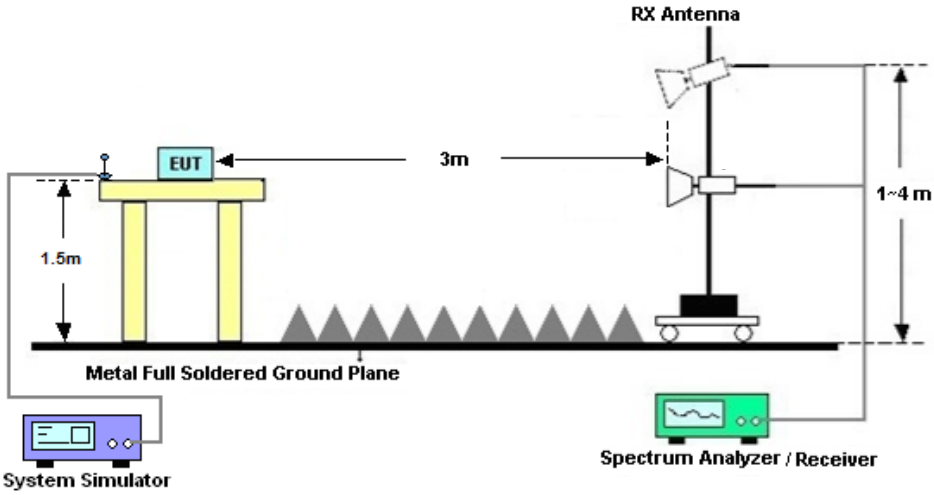
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

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

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For 5G NR n7/n38/n41

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 55 + 10 log (P) dB.

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.
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.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
13. For 5G NR n7/n38/n41:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

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. 07, 2022	May 27, 2022~ Jun. 17, 2022	Apr. 06, 2023	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04 265	60.06.020.007 7	0.4GHz~26.5GHz	Dec. 25, 2021	May 27, 2022~ Jun. 17, 2022	Dec. 24, 2022	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 14, 2021	May 27, 2022~ Jun. 17, 2022	Jul. 13, 2022	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 27, 2021	Jun. 17, 2022	Dec. 26, 2022	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2021	Jun. 17, 2022	Jun. 21, 2022	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 22, 2021	Jun. 17, 2022	Oct. 21, 2022	Radiation (03CH01-SZ
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Sep. 28, 2021	Jun. 17, 2022	Sep. 27, 2022	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Jul. 15, 2021	Jun. 17, 2022	Jul. 14, 2022	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 10, 2022	Jun. 17, 2022	Apr. 09, 2023	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 06, 2022	Jun. 17, 2022	Apr. 05, 2023	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P-R	1943528	1GHz~18GHz	Oct. 22, 2021	Jun. 17, 2022	Oct. 21, 2022	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 13, 2021	Jun. 17, 2022	Jul. 12, 2022	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jun. 17, 2022	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jun. 17, 2022	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jun. 17, 2022	NCR	Radiation (03CH01-SZ)

NCR: No Calibration Required

6 Uncertainty of Evaluation

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))	2.48dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.53dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.02dB

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

Appendix A. Test Results of Conducted Test

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

Software Version: 22.02.041801

FR1 N7(ANT3)

LTE Band: 5(ANT1), LTE BW: 10M, LTE ARFCN: Mid

Conducted Output Power and EIRP (gain=-2.0dBi)

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power (dBm)	EIRP (dBm)	EIRP (W)
7	15	5	524500	2502.5	DFT-s-OFDM QPSK	1@1	22.34	20.34	0.1081
7	15	5	524500	2502.5	DFT-s-OFDM 16 QAM	1@1	21.39	19.39	0.0869
7	15	5	531000	2535	DFT-s-OFDM QPSK	1@1	22.37	20.37	0.1089
7	15	5	531000	2535	DFT-s-OFDM 16 QAM	1@1	21.38	19.38	0.0867
7	15	5	537500	2567.5	DFT-s-OFDM QPSK	1@1	22.39	20.39	0.1094
7	15	5	537500	2567.5	DFT-s-OFDM 16 QAM	1@1	21.38	19.38	0.0867
7	15	10	525000	2505	DFT-s-OFDM QPSK	1@1	22.31	20.31	0.1074
7	15	10	525000	2505	DFT-s-OFDM 16 QAM	1@1	21.45	19.45	0.0881
7	15	10	531000	2535	DFT-s-OFDM QPSK	1@1	22.28	20.28	0.1067
7	15	10	531000	2535	DFT-s-OFDM 16 QAM	1@1	21.37	19.37	0.0865
7	15	10	537000	2565	DFT-s-OFDM QPSK	1@1	22.3	20.3	0.1072
7	15	10	537000	2565	DFT-s-OFDM 16 QAM	1@1	21.42	19.42	0.0875
7	15	15	525500	2507.5	DFT-s-OFDM QPSK	1@1	22.48	20.48	0.1117
7	15	15	525500	2507.5	DFT-s-OFDM 16 QAM	1@1	21.58	19.58	0.0908
7	15	15	531000	2535	DFT-s-OFDM QPSK	1@1	22.58	20.58	0.1143
7	15	15	531000	2535	DFT-s-OFDM 16 QAM	1@1	21.66	19.66	0.0925
7	15	15	536500	2562.5	DFT-s-OFDM QPSK	1@1	22.5	20.5	0.1122
7	15	15	536500	2562.5	DFT-s-OFDM 16 QAM	1@1	21.58	19.58	0.0908
7	15	20	526000	2510	DFT-s-OFDM QPSK	1@1	22.48	20.48	0.1117
7	15	20	526000	2510	DFT-s-OFDM 16 QAM	1@1	21.61	19.61	0.0914
7	15	20	531000	2535	DFT-s-OFDM QPSK	1@1	22.51	20.51	0.1125
7	15	20	531000	2535	DFT-s-OFDM 16 QAM	1@1	21.56	19.56	0.0904
7	15	20	536000	2560	DFT-s-OFDM QPSK	1@1	22.53	20.53	0.1130
7	15	20	536000	2560	DFT-s-OFDM 16 QAM	1@1	21.64	19.64	0.0920
7	15	25	526500	2512.5	DFT-s-OFDM QPSK	1@1	22.48	20.48	0.1117
7	15	25	526500	2512.5	DFT-s-OFDM 16 QAM	1@1	21.59	19.59	0.0910

7	15	25	531000	2535	DFT-s-OFDM QPSK	1@1	22.6	20.6	0.1148
7	15	25	531000	2535	DFT-s-OFDM 16 QAM	1@1	21.71	19.71	0.0935
7	15	25	535500	2557.5	DFT-s-OFDM QPSK	1@1	22.59	20.59	0.1146
7	15	25	535500	2557.5	DFT-s-OFDM 16 QAM	1@1	21.66	19.66	0.0925
7	15	30	527000	2515	DFT-s-OFDM QPSK	1@1	22.49	20.49	0.1119
7	15	30	527000	2515	DFT-s-OFDM 16 QAM	1@1	21.59	19.59	0.0910
7	15	30	531000	2535	DFT-s-OFDM QPSK	1@1	22.54	20.54	0.1132
7	15	30	531000	2535	DFT-s-OFDM 16 QAM	1@1	21.56	19.56	0.0904
7	15	30	535000	2555	DFT-s-OFDM QPSK	1@1	22.54	20.54	0.1132
7	15	30	535000	2555	DFT-s-OFDM 16 QAM	1@1	21.61	19.61	0.0914
7	15	40	528000	2520	DFT-s-OFDM PI/2 BPSK	108@54	22.04	20.04	0.1009
7	15	40	528000	2520	DFT-s-OFDM PI/2 BPSK	1@1	22.11	20.11	0.1026
7	15	40	528000	2520	DFT-s-OFDM PI/2 BPSK	1@214	22.11	20.11	0.1026
7	15	40	528000	2520	DFT-s-OFDM QPSK	108@54	22.11	20.11	0.1026
7	15	40	528000	2520	DFT-s-OFDM QPSK	1@1	21.39	19.39	0.0869
7	15	40	528000	2520	DFT-s-OFDM QPSK	1@214	21.91	19.91	0.0979
7	15	40	528000	2520	DFT-s-OFDM 16 QAM	108@54	21.06	19.06	0.0805
7	15	40	528000	2520	DFT-s-OFDM 16 QAM	1@1	20.28	18.28	0.0673
7	15	40	528000	2520	DFT-s-OFDM 16 QAM	1@214	20.84	18.84	0.0766
7	15	40	528000	2520	DFT-s-OFDM 64 QAM	108@54	19.47	17.47	0.0558
7	15	40	528000	2520	DFT-s-OFDM 64 QAM	1@1	18.81	16.81	0.0480
7	15	40	528000	2520	DFT-s-OFDM 64 QAM	1@214	19.46	17.46	0.0557
7	15	40	528000	2520	DFT-s-OFDM 256 QAM	108@54	18.03	16.03	0.0401
7	15	40	528000	2520	DFT-s-OFDM 256 QAM	1@1	17.34	15.34	0.0342
7	15	40	528000	2520	DFT-s-OFDM 256 QAM	1@214	17.6	15.6	0.0363
7	15	40	528000	2520	CP-OFDM QPSK	108@54	21	19	0.0794
7	15	40	528000	2520	CP-OFDM QPSK	1@1	20.84	18.84	0.0766
7	15	40	528000	2520	CP-OFDM QPSK	1@214	21.07	19.07	0.0807
7	15	40	531000	2535	DFT-s-OFDM PI/2 BPSK	108@54	22.16	20.16	0.1038
7	15	40	531000	2535	DFT-s-OFDM PI/2 BPSK	1@1	22.03	20.03	0.1007
7	15	40	531000	2535	DFT-s-OFDM PI/2 BPSK	1@214	22.25	20.25	0.1059
7	15	40	531000	2535	DFT-s-OFDM QPSK	108@54	22.5	20.5	0.1122
7	15	40	531000	2535	DFT-s-OFDM QPSK	1@1	22.45	20.45	0.1109
7	15	40	531000	2535	DFT-s-OFDM QPSK	1@214	22.78	20.78	0.1197

7	15	40	531000	2535	DFT-s-OFDM 16 QAM	108@54	21.48	19.48	0.0887
7	15	40	531000	2535	DFT-s-OFDM 16 QAM	1@1	21.4	19.4	0.0871
7	15	40	531000	2535	DFT-s-OFDM 16 QAM	1@214	21.64	19.64	0.0920
7	15	40	531000	2535	DFT-s-OFDM 64 QAM	108@54	20.04	18.04	0.0637
7	15	40	531000	2535	DFT-s-OFDM 64 QAM	1@1	20.21	18.21	0.0662
7	15	40	531000	2535	DFT-s-OFDM 64 QAM	1@214	20.39	18.39	0.0690
7	15	40	531000	2535	DFT-s-OFDM 256 QAM	108@54	18.07	16.07	0.0405
7	15	40	531000	2535	DFT-s-OFDM 256 QAM	1@1	17.52	15.52	0.0356
7	15	40	531000	2535	DFT-s-OFDM 256 QAM	1@214	17.7	15.7	0.0372
7	15	40	531000	2535	CP-OFDM QPSK	108@54	21.03	19.03	0.0800
7	15	40	531000	2535	CP-OFDM QPSK	1@1	21.07	19.07	0.0807
7	15	40	531000	2535	CP-OFDM QPSK	1@214	21.12	19.12	0.0817
7	15	40	534000	2550	DFT-s-OFDM PI/2 BPSK	108@54	22.18	20.18	0.1042
7	15	40	534000	2550	DFT-s-OFDM PI/2 BPSK	1@1	22.09	20.09	0.1021
7	15	40	534000	2550	DFT-s-OFDM PI/2 BPSK	1@214	22.29	20.29	0.1069
7	15	40	534000	2550	DFT-s-OFDM QPSK	108@54	22.02	20.02	0.1005
7	15	40	534000	2550	DFT-s-OFDM QPSK	1@1	22.02	20.02	0.1005
7	15	40	534000	2550	DFT-s-OFDM QPSK	1@214	21.3	19.3	0.0851
7	15	40	534000	2550	DFT-s-OFDM 16 QAM	108@54	20.8	18.8	0.0759
7	15	40	534000	2550	DFT-s-OFDM 16 QAM	1@1	20.93	18.93	0.0782
7	15	40	534000	2550	DFT-s-OFDM 16 QAM	1@214	20.25	18.25	0.0668
7	15	40	534000	2550	DFT-s-OFDM 64 QAM	108@54	19.17	17.17	0.0521
7	15	40	534000	2550	DFT-s-OFDM 64 QAM	1@1	19.5	17.5	0.0562
7	15	40	534000	2550	DFT-s-OFDM 64 QAM	1@214	18.86	16.86	0.0485
7	15	40	534000	2550	DFT-s-OFDM 256 QAM	108@54	18.15	16.15	0.0412
7	15	40	534000	2550	DFT-s-OFDM 256 QAM	1@1	17.5	15.5	0.0355
7	15	40	534000	2550	DFT-s-OFDM 256 QAM	1@214	17.67	15.67	0.0369
7	15	40	534000	2550	CP-OFDM QPSK	108@54	21.16	19.16	0.0824
7	15	40	534000	2550	CP-OFDM QPSK	1@1	21.09	19.09	0.0811
7	15	40	534000	2550	CP-OFDM QPSK	1@214	20.86	18.86	0.0769

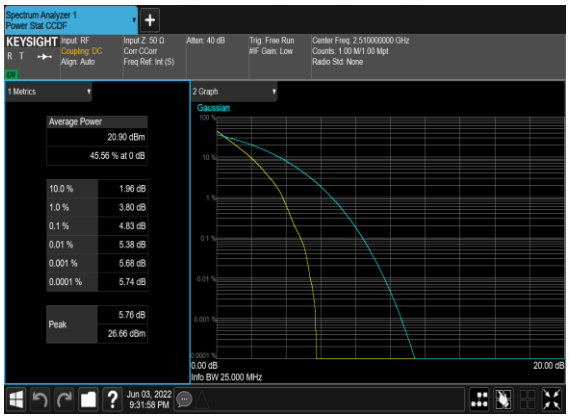
Frequency Stability

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00544	**PASS**	NV
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00269	**PASS**	LV
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00527	**PASS**	HV
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00027	**PASS**	-30℃
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00528	**PASS**	-20℃
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00665	**PASS**	-10℃
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00353	**PASS**	0℃
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00679	**PASS**	10℃
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00425	**PASS**	20℃
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00419	**PASS**	30℃
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00561	**PASS**	40℃
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	0.00463	**PASS**	50℃

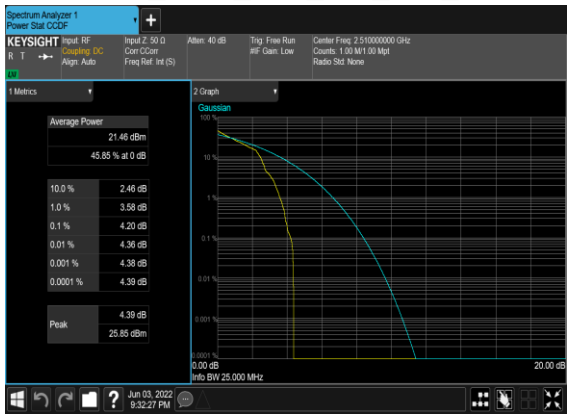
Peak to Average Radio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
7	15	20	526000	2510.0	DFT-s-OFDM PI/2 BPSK	100@0	4.83	13	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM PI/2 BPSK	1@0	4.2	13	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM QPSK	100@0	5.49	13	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM QPSK	1@0	6.08	13	**PASS**
7	15	20	531000	2535.0	DFT-s-OFDM PI/2 BPSK	100@0	4.52	13	**PASS**
7	15	20	531000	2535.0	DFT-s-OFDM PI/2 BPSK	1@0	3.76	13	**PASS**
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	5.65	13	**PASS**
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	1@0	6.09	13	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM PI/2 BPSK	100@0	4.67	13	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM PI/2 BPSK	1@0	3.93	13	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM QPSK	100@0	5.49	13	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM QPSK	1@0	6.3	13	**PASS**

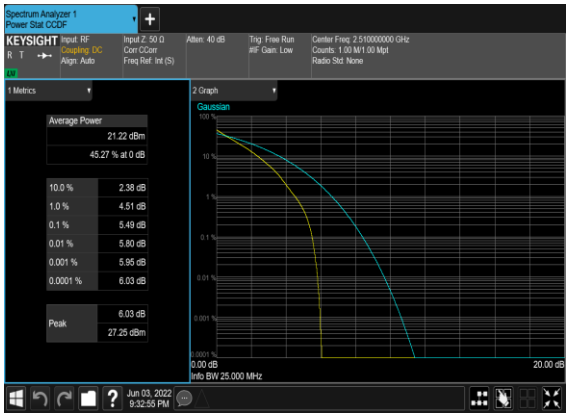
B5_N7(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Low_CH



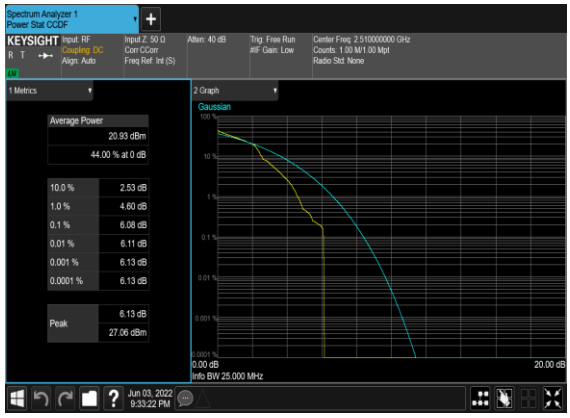
B5_N7(20M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Low_CH



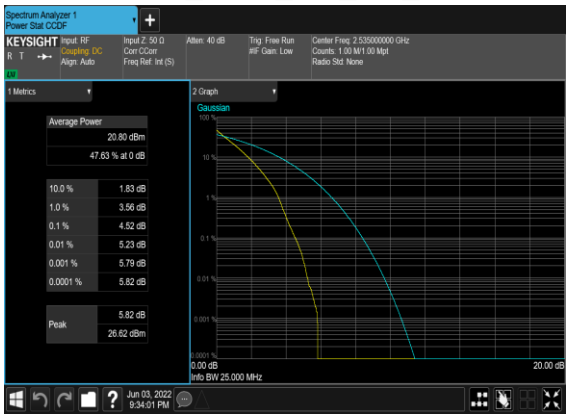
B5_N7(20M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH



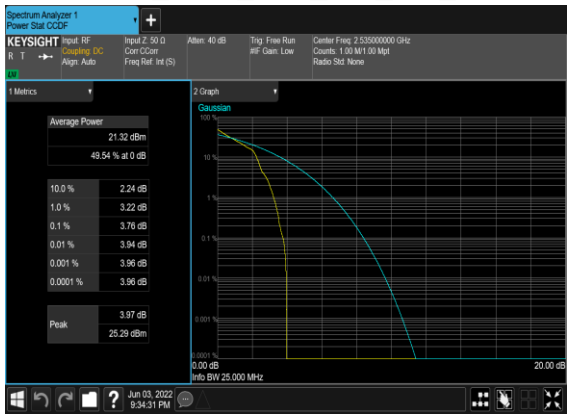
B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



B5_N7(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

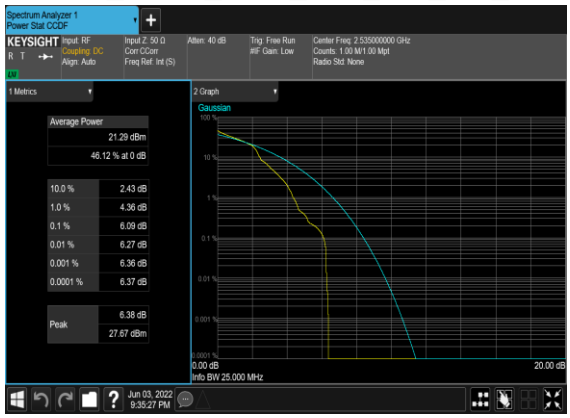


B5_N7(20M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH

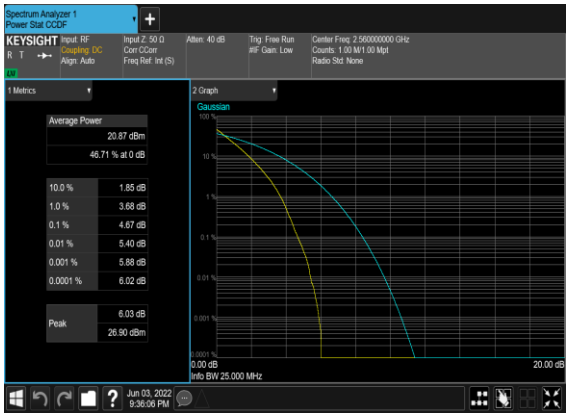


B5_N7(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH

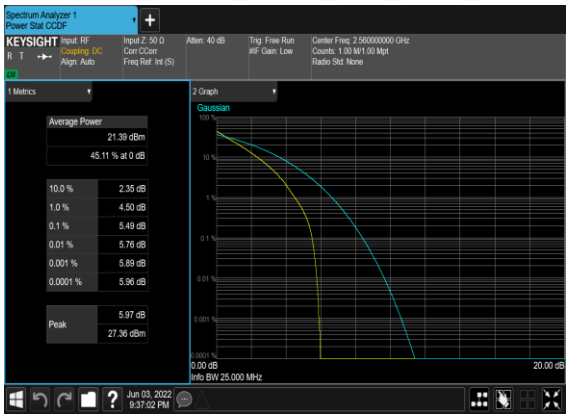


B5_N7(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_High_CH

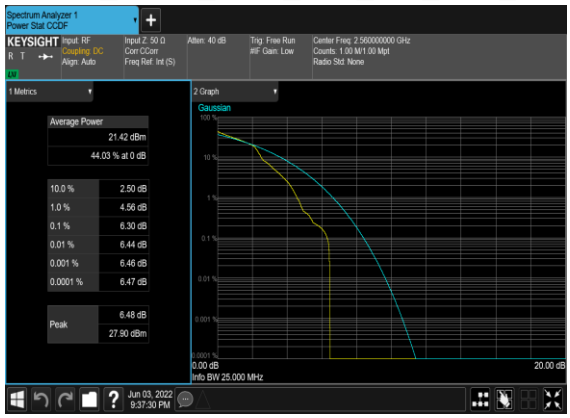


B5_N7(20M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_High_CH

B5_N7(20M)_DFT-s-OFDM_QPSK_Outer_Full_High_CH



B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



Occupied Bandwidth

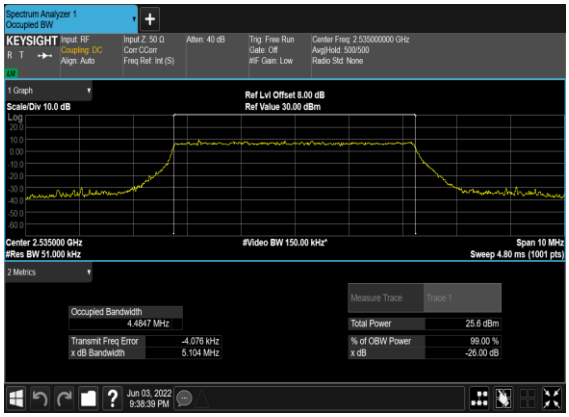
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB OBW (MHz)
7	15	5	531000	2535.0	DFT-s-OFDM PI/2 BPSK	25@0	4.4647	4.975
7	15	5	531000	2535.0	DFT-s-OFDM QPSK	25@0	4.4708	4.903
7	15	5	531000	2535.0	CP-OFDM QPSK	25@0	4.4847	5.104
7	15	5	531000	2535.0	CP-OFDM 16 QAM	25@0	4.4974	5.091
7	15	5	531000	2535.0	CP-OFDM 64 QAM	25@0	4.4837	5.149
7	15	5	531000	2535.0	CP-OFDM 256 QAM	25@0	4.4725	5.165
7	15	10	531000	2535.0	DFT-s-OFDM PI/2 BPSK	50@0	8.8947	9.642
7	15	10	531000	2535.0	DFT-s-OFDM QPSK	50@0	8.9152	9.674
7	15	10	531000	2535.0	CP-OFDM QPSK	52@0	9.2833	10.08
7	15	10	531000	2535.0	CP-OFDM 16 QAM	52@0	9.2643	10.04
7	15	10	531000	2535.0	CP-OFDM 64 QAM	52@0	9.2748	9.989
7	15	10	531000	2535.0	CP-OFDM 256 QAM	52@0	9.2984	10.06
7	15	15	531000	2535.0	DFT-s-OFDM PI/2 BPSK	75@0	13.396	14.23
7	15	15	531000	2535.0	DFT-s-OFDM QPSK	75@0	13.382	14.17
7	15	15	531000	2535.0	CP-OFDM QPSK	79@0	14.09	14.94
7	15	15	531000	2535.0	CP-OFDM 16 QAM	79@0	14.111	14.99
7	15	15	531000	2535.0	CP-OFDM 64 QAM	79@0	14.125	14.98
7	15	15	531000	2535.0	CP-OFDM 256 QAM	79@0	14.072	14.94
7	15	20	531000	2535.0	DFT-s-OFDM PI/2 BPSK	100@0	17.867	18.85
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	100@0	17.851	18.83
7	15	20	531000	2535.0	CP-OFDM QPSK	106@0	18.924	20.0
7	15	20	531000	2535.0	CP-OFDM 16 QAM	106@0	18.944	19.97
7	15	20	531000	2535.0	CP-OFDM 64 QAM	106@0	18.924	19.81
7	15	20	531000	2535.0	CP-OFDM 256 QAM	106@0	18.945	19.93
7	15	25	531000	2535.0	DFT-s-OFDM PI/2 BPSK	128@0	22.839	23.93

7	15	25	531000	2535.0	DFT-s-OFDM QPSK	128@0	22.881	23.94
7	15	25	531000	2535.0	CP-OFDM QPSK	133@0	23.716	24.87
7	15	25	531000	2535.0	CP-OFDM 16 QAM	133@0	23.711	24.76
7	15	25	531000	2535.0	CP-OFDM 64 QAM	133@0	23.721	24.78
7	15	25	531000	2535.0	CP-OFDM 256 QAM	133@0	23.749	24.76
7	15	30	531000	2535.0	DFT-s-OFDM PI/2 BPSK	160@0	28.549	29.63
7	15	30	531000	2535.0	DFT-s-OFDM QPSK	160@0	28.555	29.74
7	15	30	531000	2535.0	CP-OFDM QPSK	160@0	28.539	29.78
7	15	30	531000	2535.0	CP-OFDM 16 QAM	160@0	28.538	29.61
7	15	30	531000	2535.0	CP-OFDM 64 QAM	160@0	28.516	29.87
7	15	30	531000	2535.0	CP-OFDM 256 QAM	160@0	28.553	29.81
7	15	40	531000	2535.0	DFT-s-OFDM PI/2 BPSK	216@0	38.51	39.96
7	15	40	531000	2535.0	DFT-s-OFDM QPSK	216@0	38.663	40.13
7	15	40	531000	2535.0	CP-OFDM QPSK	216@0	38.511	39.98
7	15	40	531000	2535.0	CP-OFDM 16 QAM	216@0	38.498	39.96
7	15	40	531000	2535.0	CP-OFDM 64 QAM	216@0	38.561	39.9
7	15	40	531000	2535.0	CP-OFDM 256 QAM	216@0	38.493	40.15

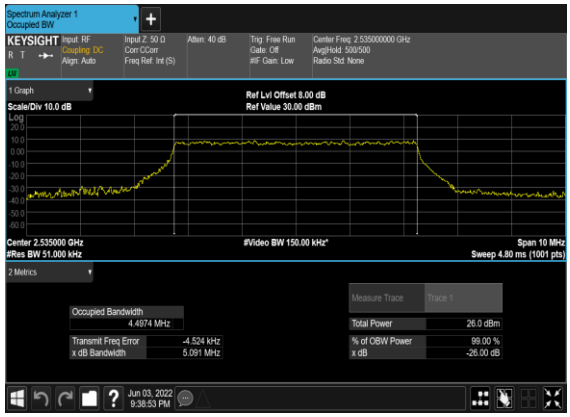
B5_N7(5M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

B5_N7(5M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

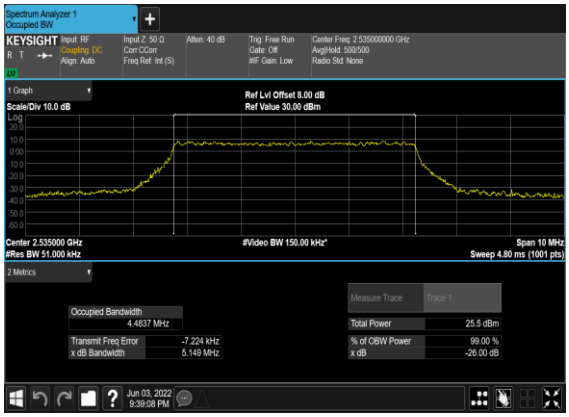
B5_N7(5M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



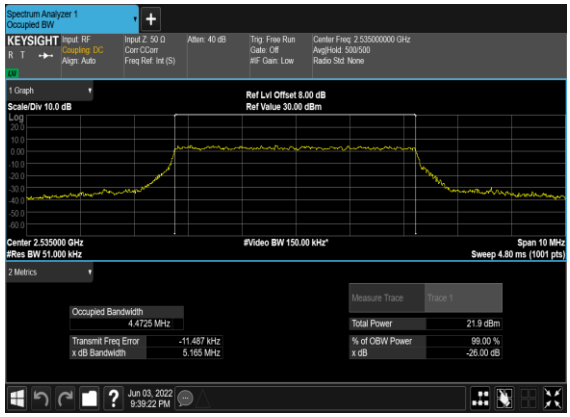
B5_N7(5M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



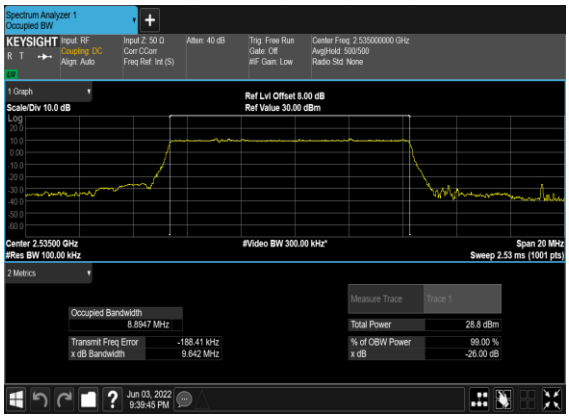
B5_N7(5M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



B5_N7(5M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH

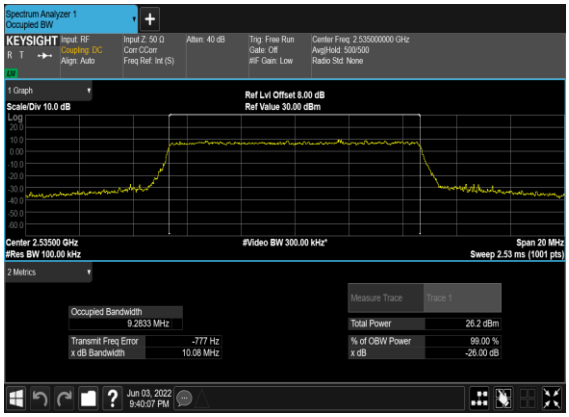


B5_N7(10M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

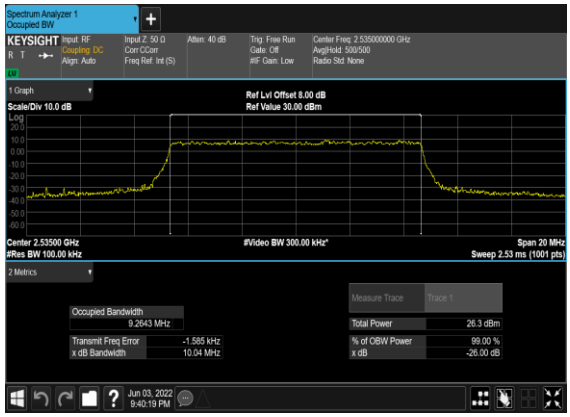


B5_N7(10M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

B5_N7(10M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

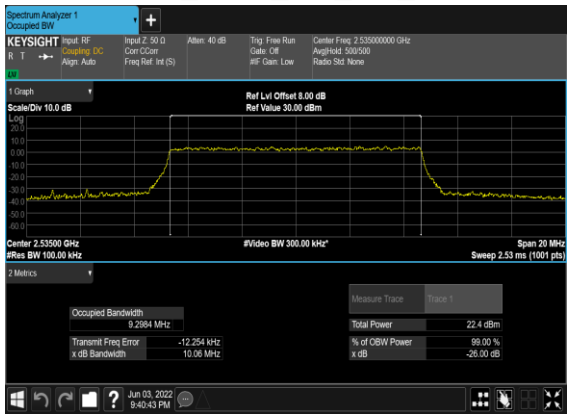


B5_N7(10M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

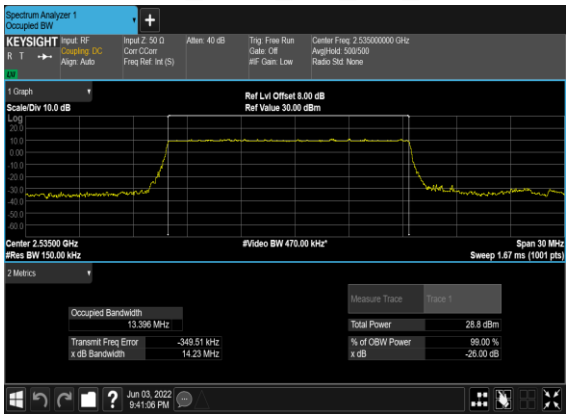


B5_N7(10M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH

B5_N7(10M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



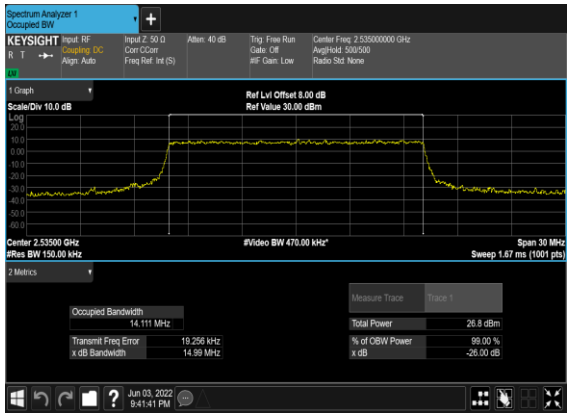
B5_N7(15M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



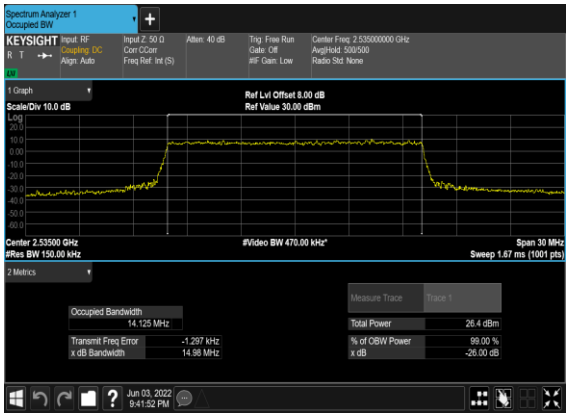
B5_N7(15M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

B5_N7(15M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

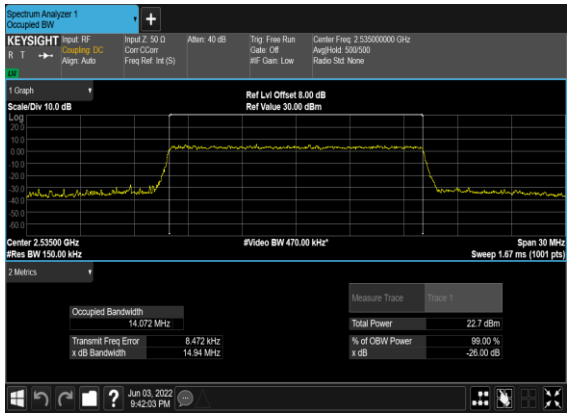
B5_N7(15M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



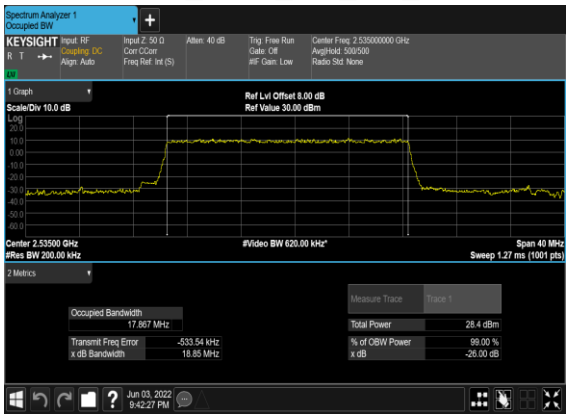
B5_N7(15M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



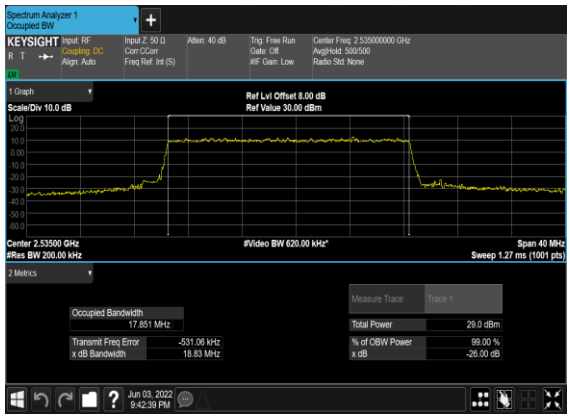
B5_N7(15M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



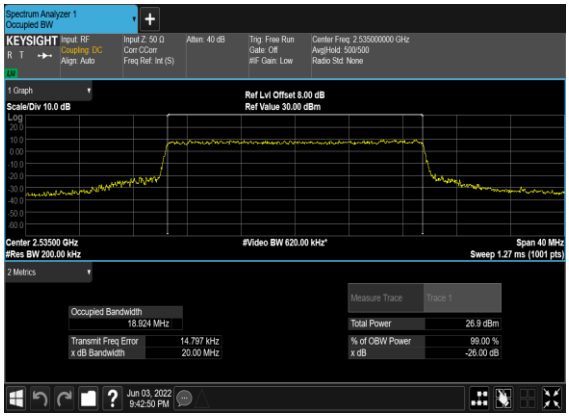
B5_N7(20M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



B5_N7(20M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

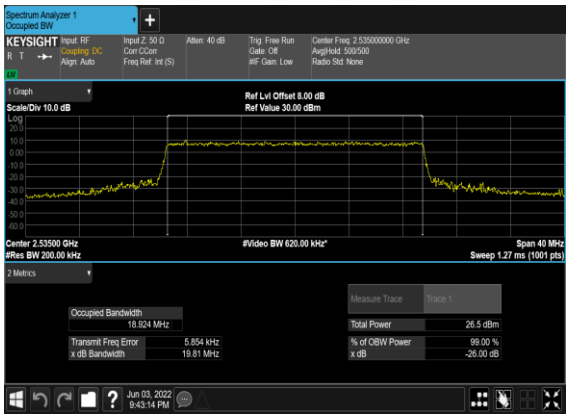


B5_N7(20M)_CP-OFDM_QPSK_Outer_Full_Mid_CH

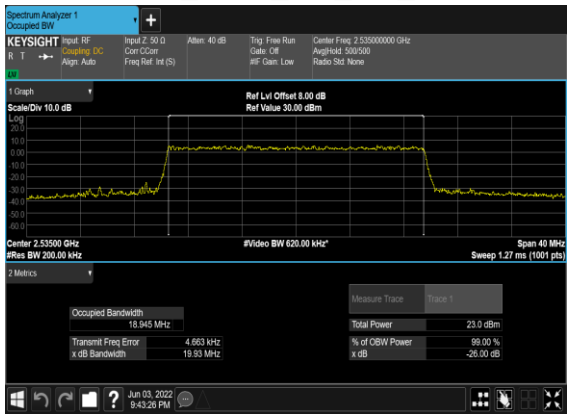


B5_N7(20M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH

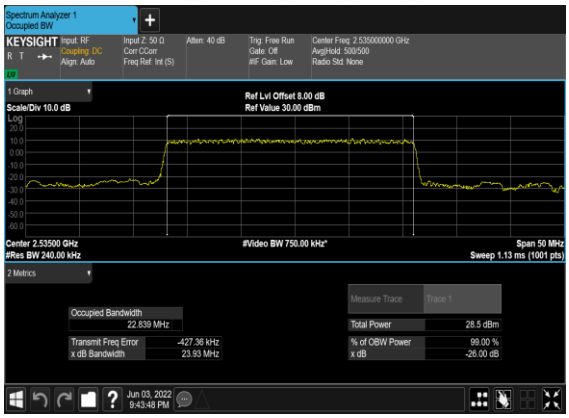
B5_N7(20M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



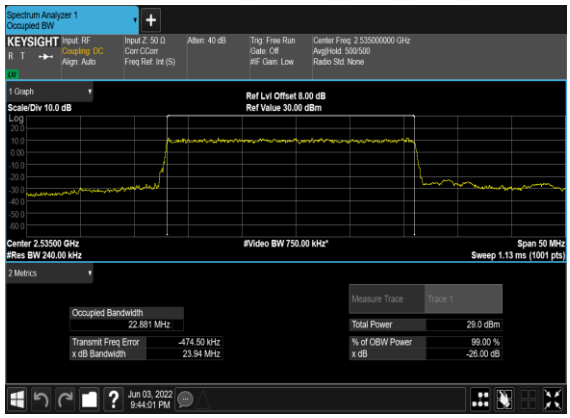
B5_N7(20M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



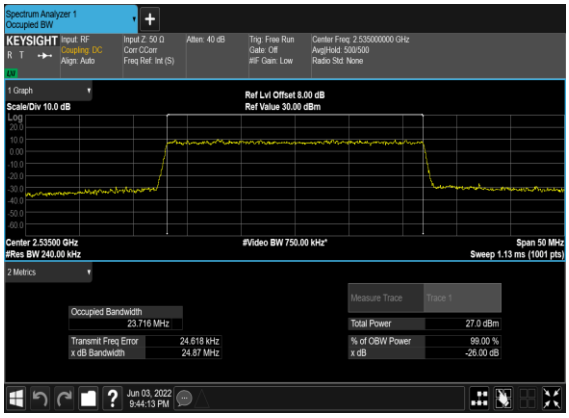
B5_N7(25M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



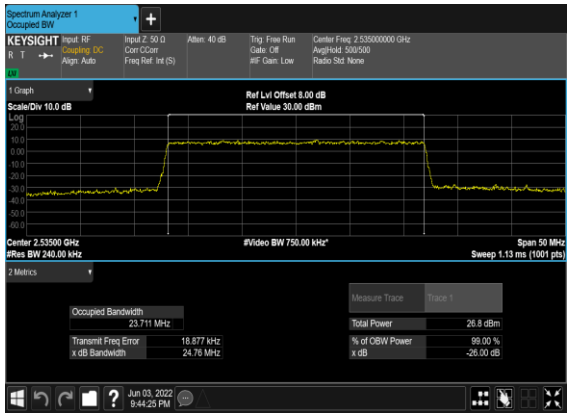
B5_N7(25M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



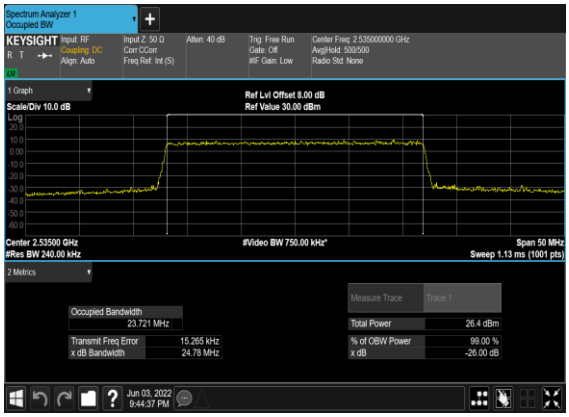
B5_N7(25M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



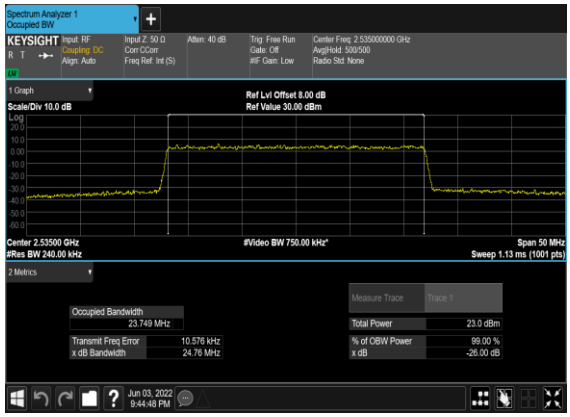
B5_N7(25M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



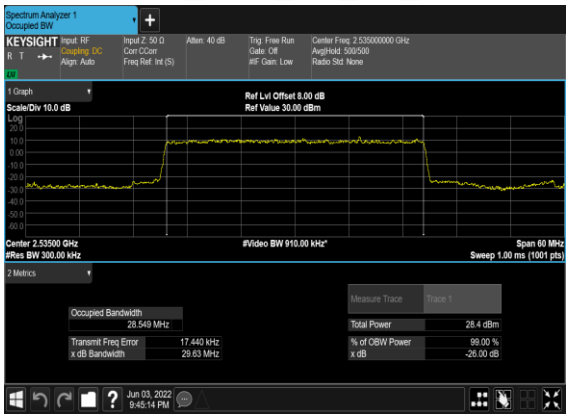
B5_N7(25M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



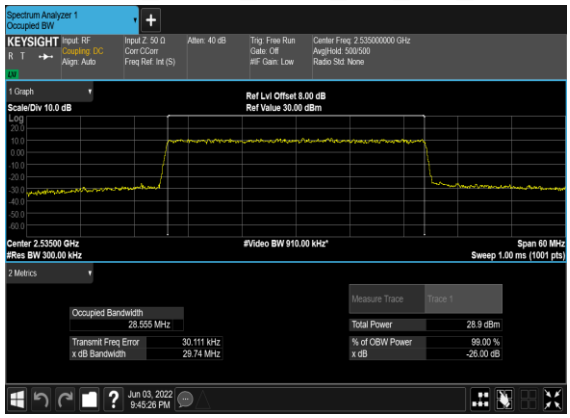
B5_N7(25M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



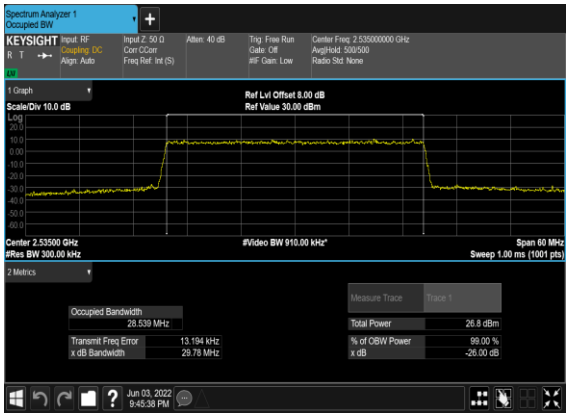
B5_N7(30M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



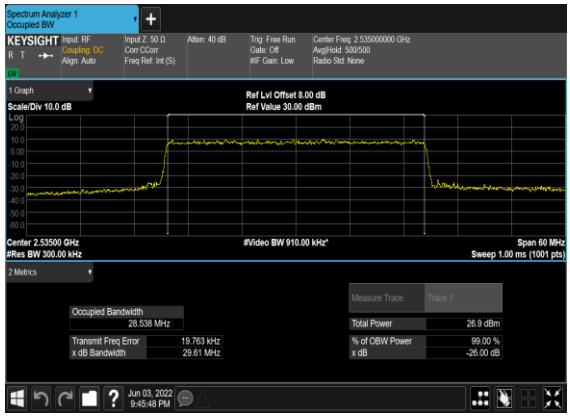
B5_N7(30M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



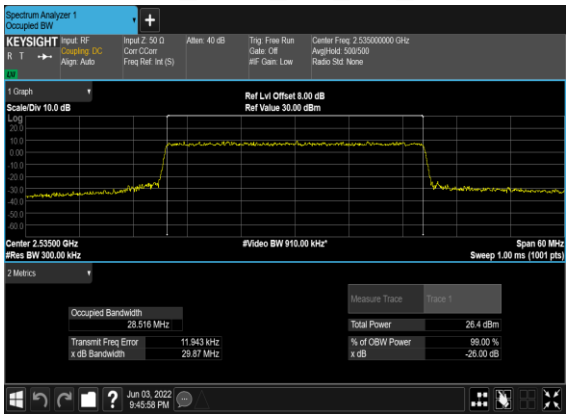
B5_N7(30M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



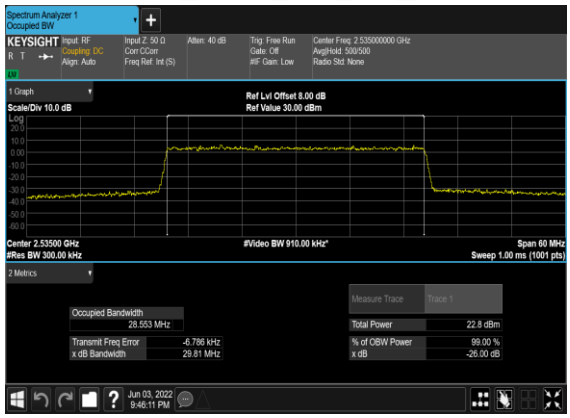
B5_N7(30M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



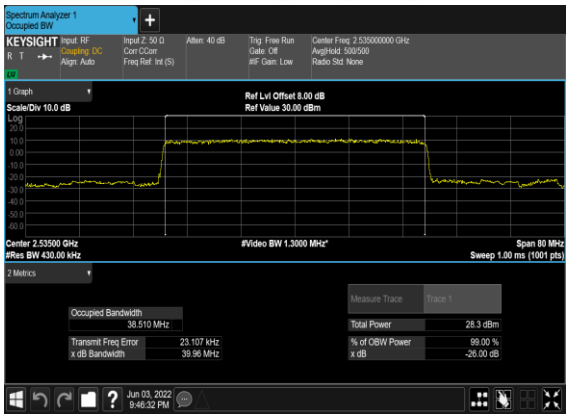
B5_N7(30M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



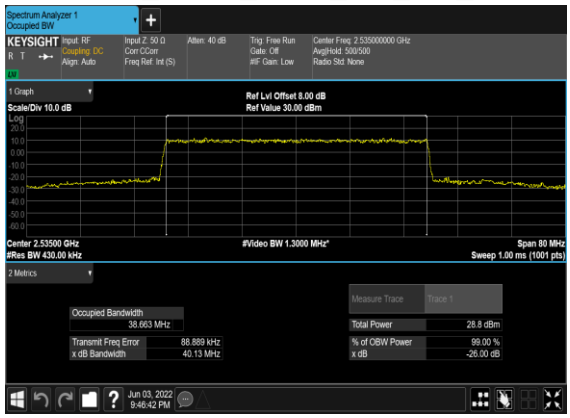
B5_N7(30M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



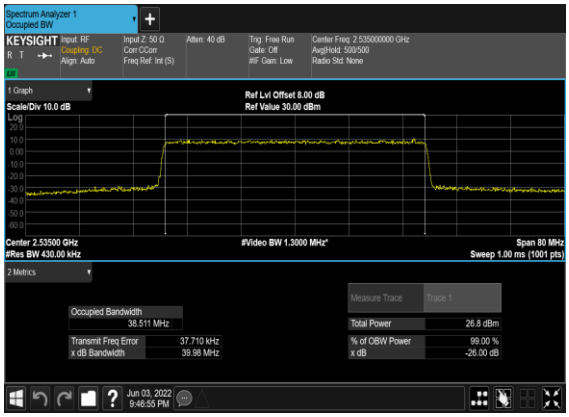
B5_N7(40M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH



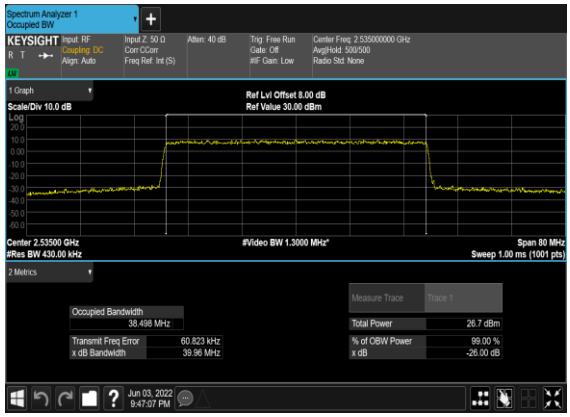
B5_N7(40M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



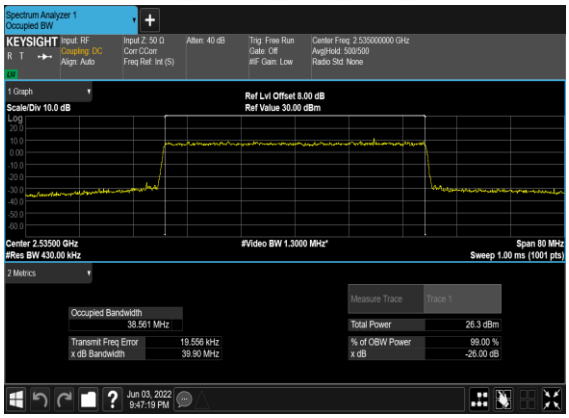
B5_N7(40M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



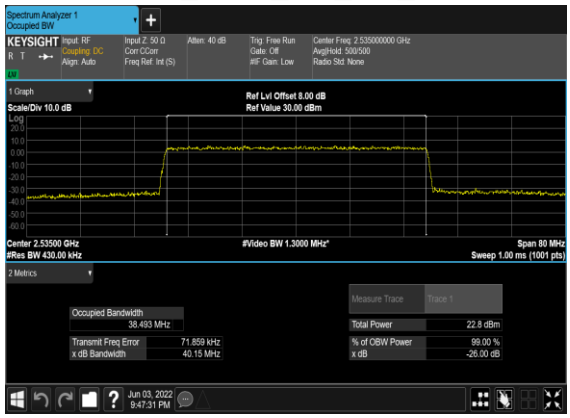
B5_N7(40M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



B5_N7(40M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



B5_N7(40M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



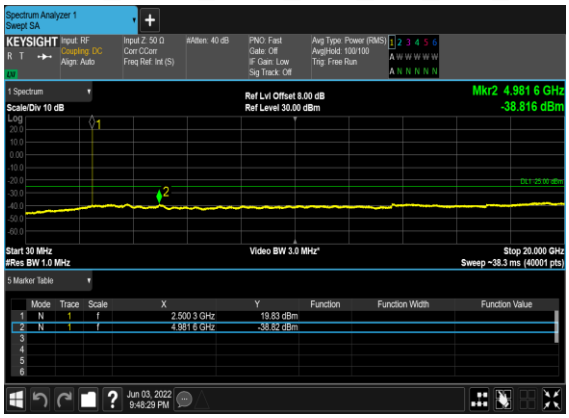
Conducted Spurious Emissions

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
7	15	5	524500	2502.5	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	5	524500	2502.5	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	5	524500	2502.5	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	5	524500	2502.5	DFT-s-OFDM QPSK	1@0	see graph	**---**
7	15	5	524500	2502.5	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	5	524500	2502.5	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	5	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	5	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	5	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	5	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
7	15	5	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	5	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	5	537500	2567.5	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	5	537500	2567.5	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	5	537500	2567.5	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	5	537500	2567.5	DFT-s-OFDM QPSK	1@0	see graph	**---**
7	15	5	537500	2567.5	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	5	537500	2567.5	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	20	526000	2510.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM QPSK	1@0	see graph	**---**

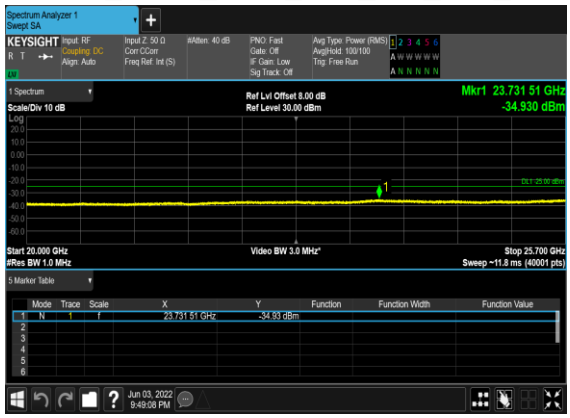
7	15	20	526000	2510.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	20	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	20	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	20	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	20	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	20	536000	2560.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
7	15	20	536000	2560.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	40	528000	2520.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	40	528000	2520.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	40	528000	2520.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	40	528000	2520.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
7	15	40	528000	2520.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	40	528000	2520.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	40	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	40	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	40	531000	2535.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	40	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**---**

7	15	40	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	40	531000	2535.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	40	534000	2550.0	DFT-s-OFDM BPSK	1@0	see graph	**---**
7	15	40	534000	2550.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	40	534000	2550.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	40	534000	2550.0	DFT-s-OFDM QPSK	1@0	see graph	**---**
7	15	40	534000	2550.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	40	534000	2550.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**

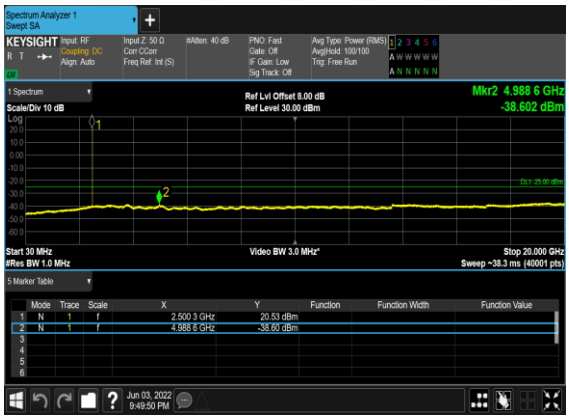
B5_N7(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



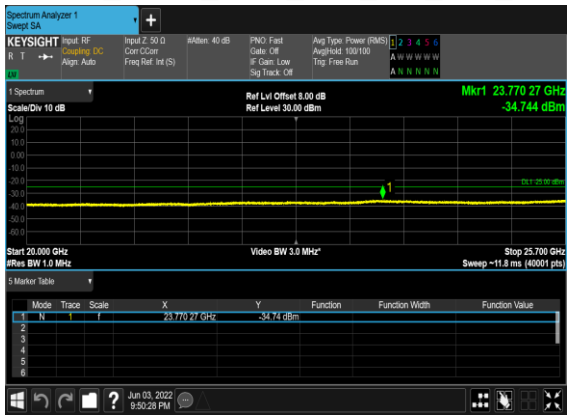
B5_N7(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



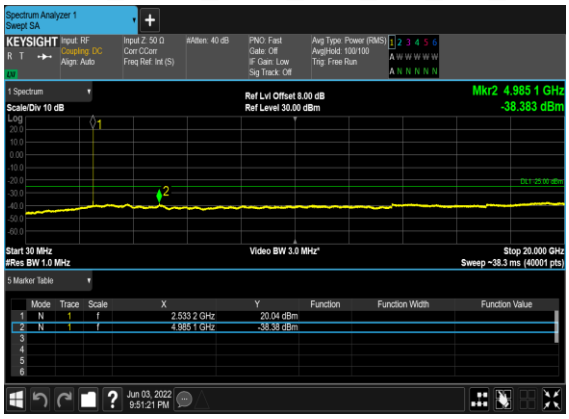
B5_N7(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



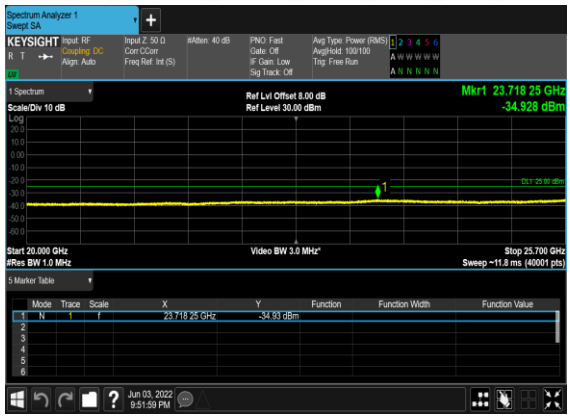
B5_N7(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



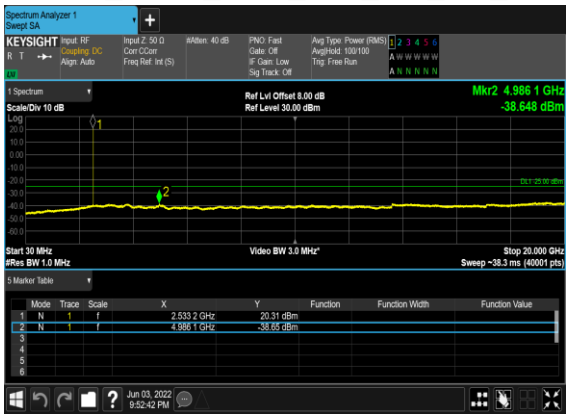
B5_N7(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



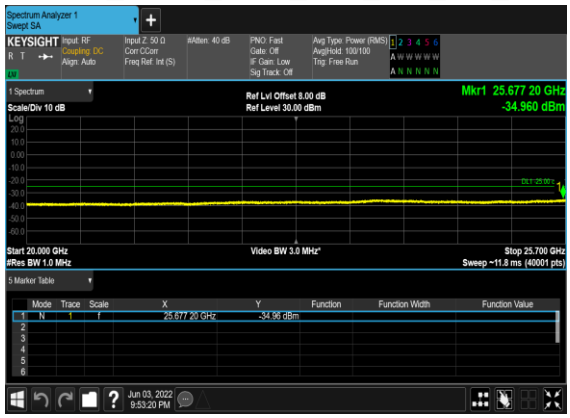
B5_N7(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



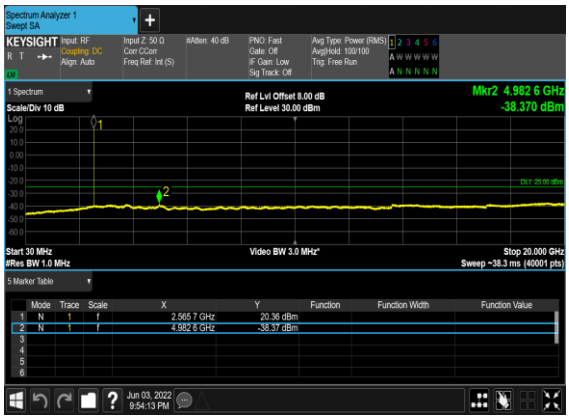
B5_N7(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



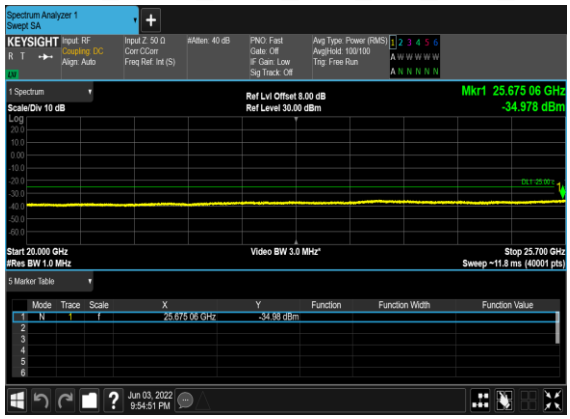
B5_N7(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



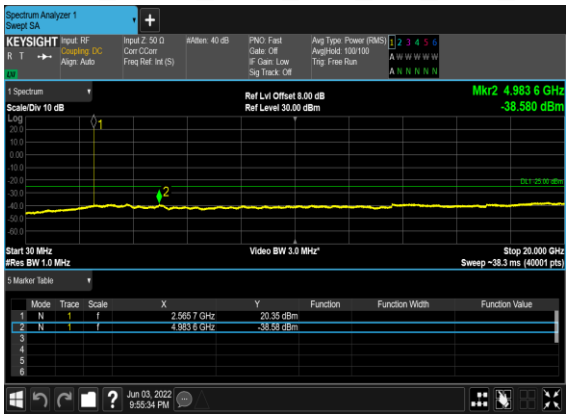
B5_N7(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



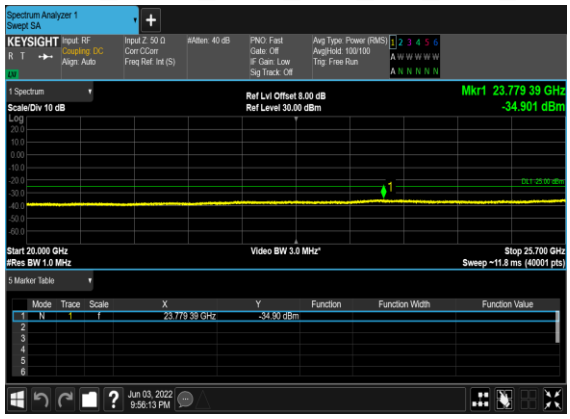
B5_N7(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



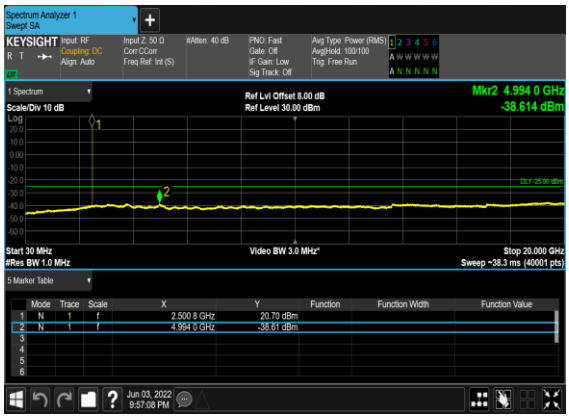
B5_N7(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



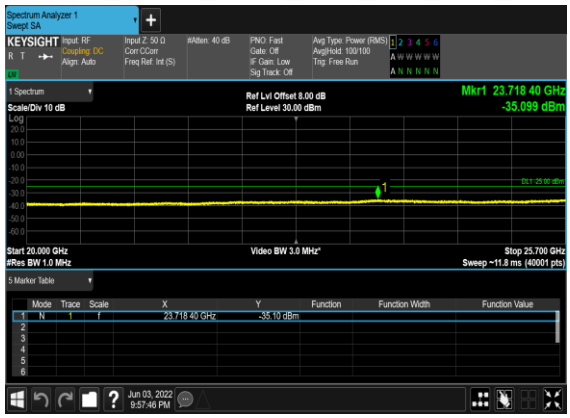
B5_N7(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



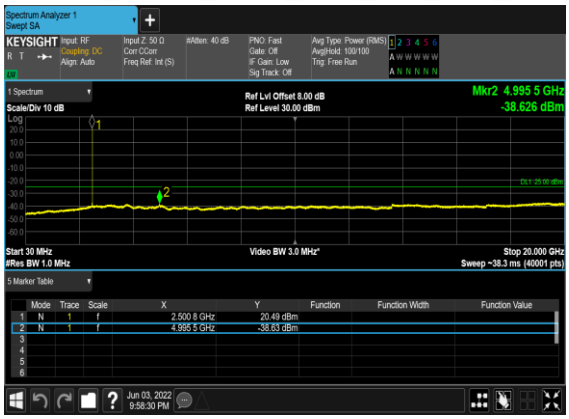
B5_N7(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



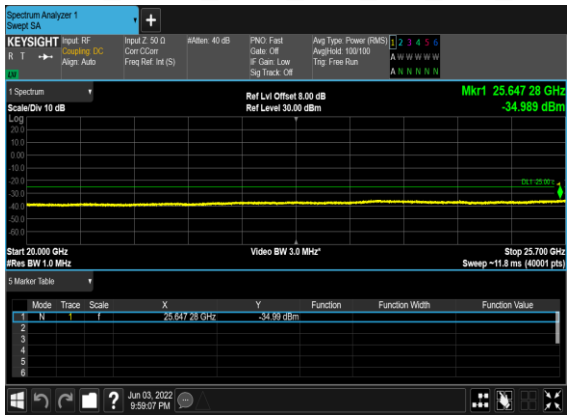
B5_N7(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



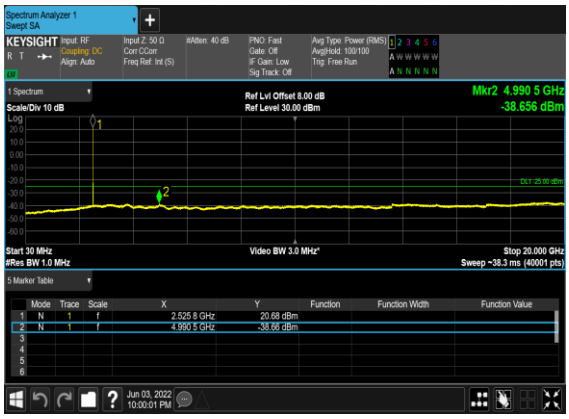
B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



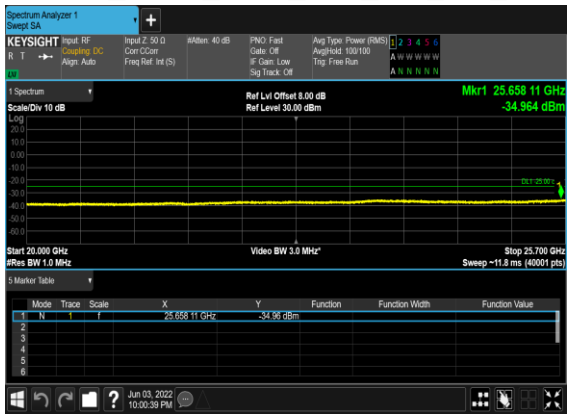
B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



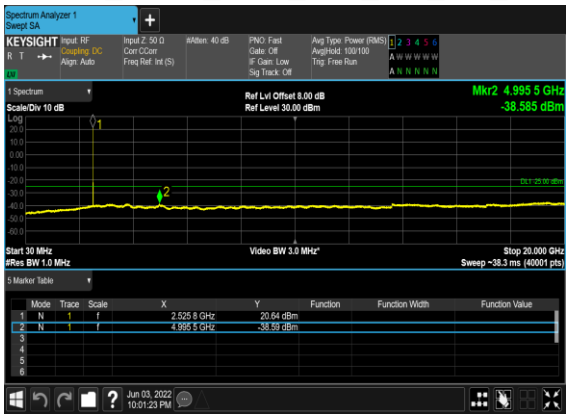
B5_N7(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



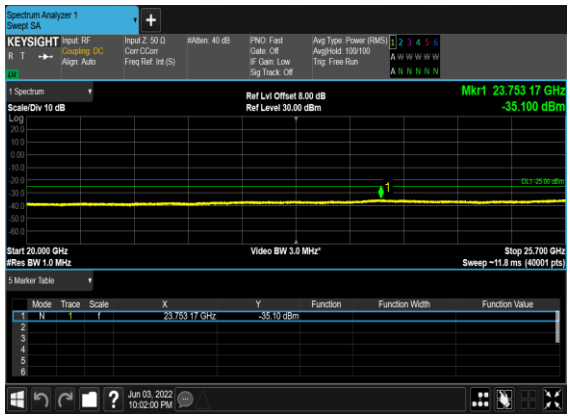
B5_N7(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



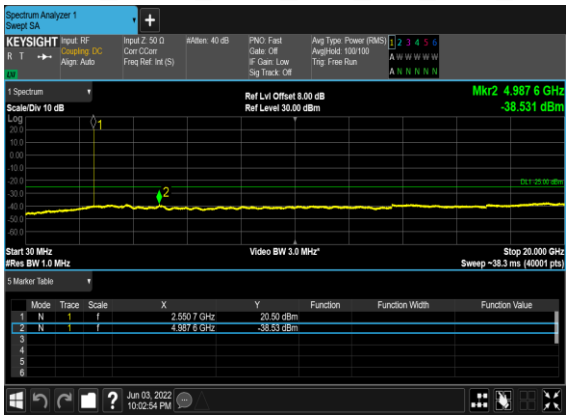
B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



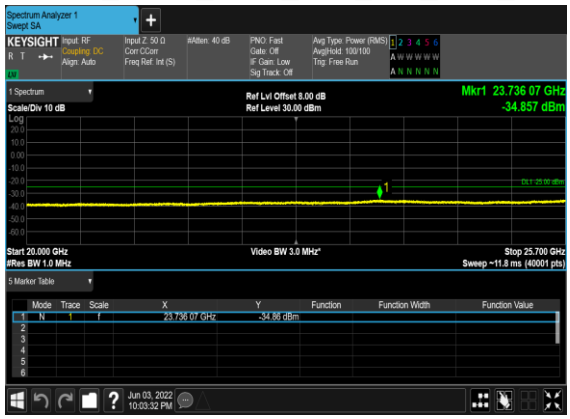
B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



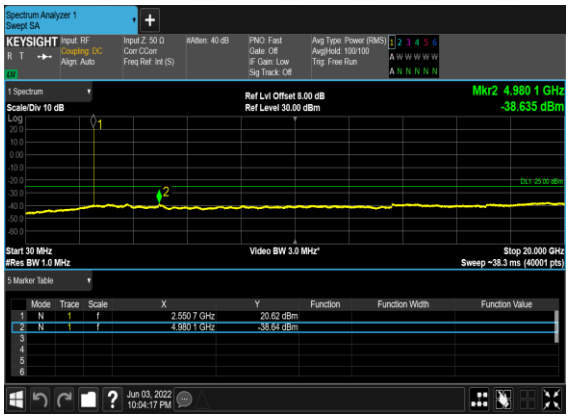
B5_N7(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



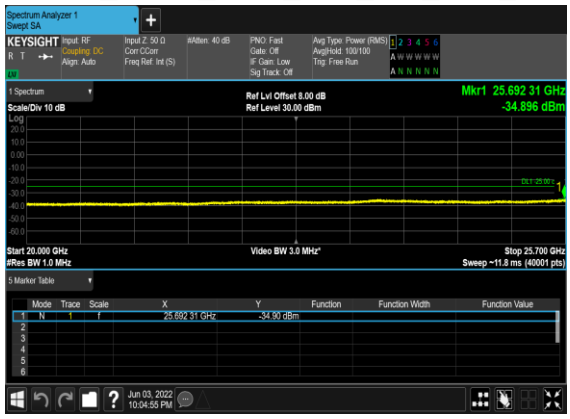
B5_N7(20M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



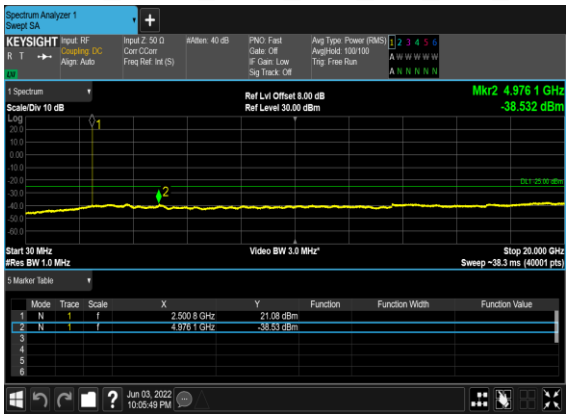
B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



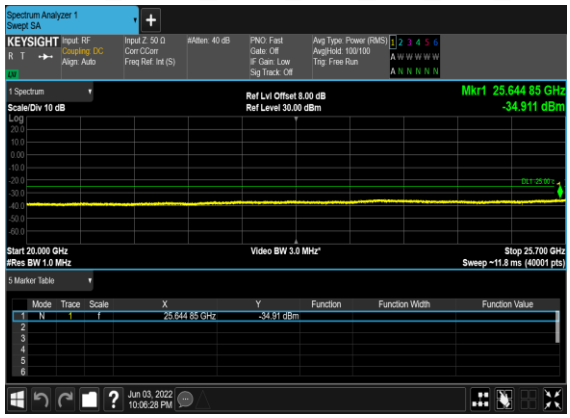
B5_N7(20M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



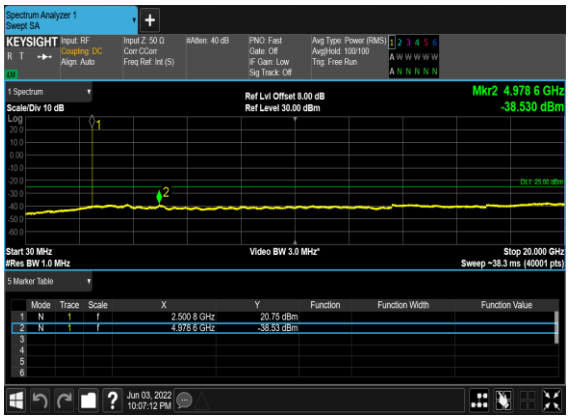
B5_N7(40M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



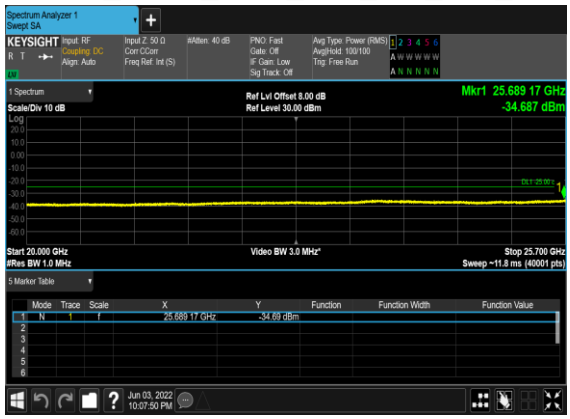
B5_N7(40M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



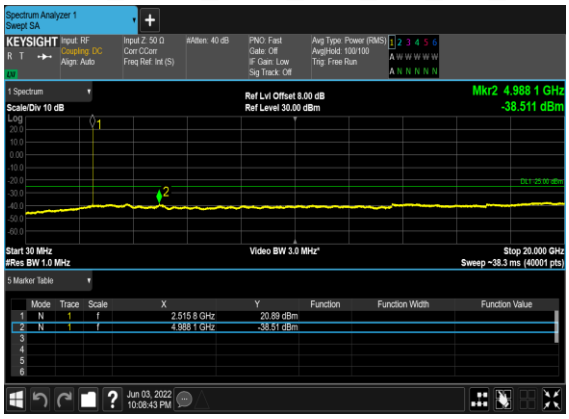
B5_N7(40M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



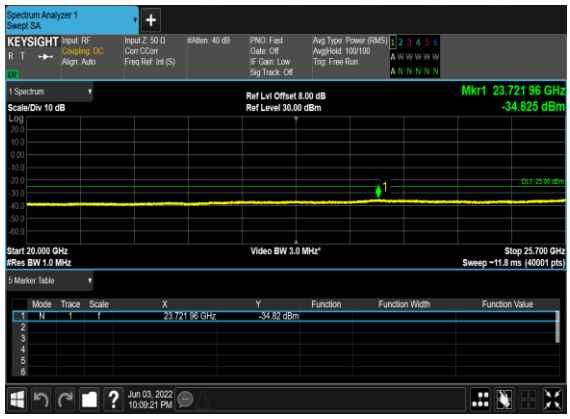
B5_N7(40M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH



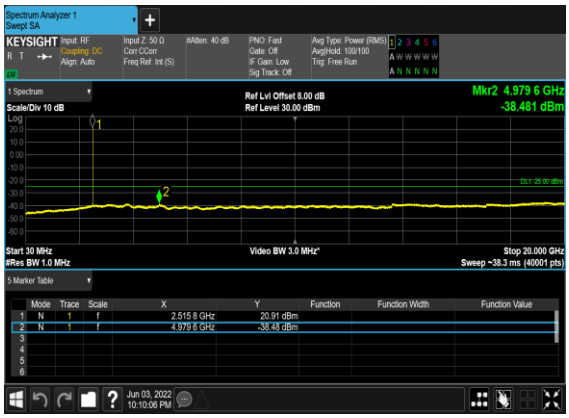
B5_N7(40M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



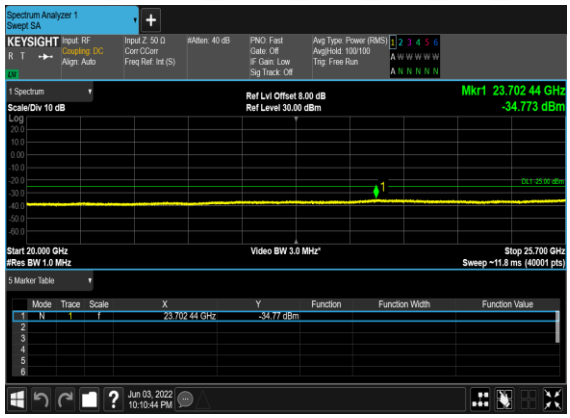
B5_N7(40M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



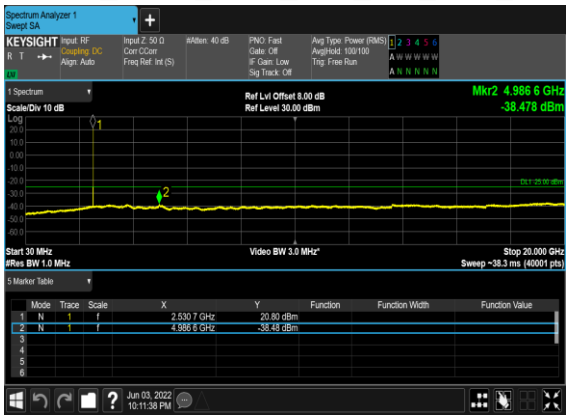
B5_N7(40M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



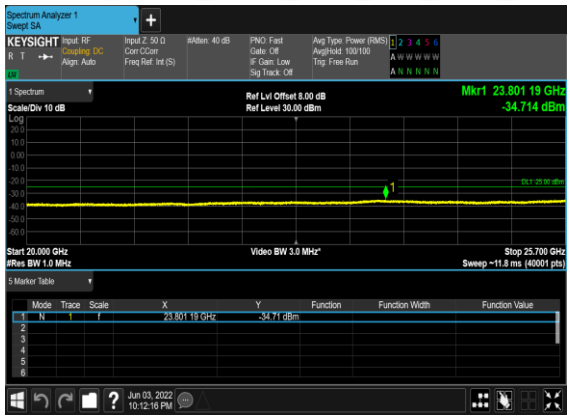
B5_N7(40M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



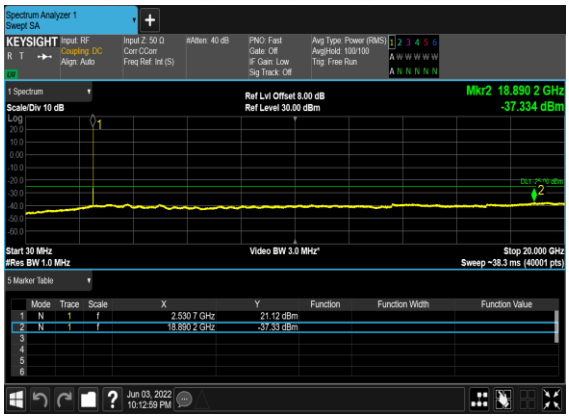
B5_N7(40M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



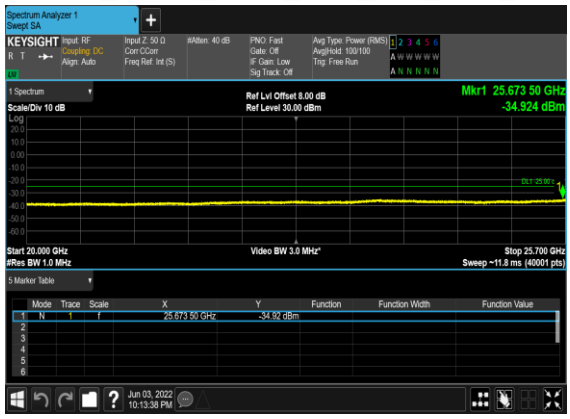
B5_N7(40M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_High_CH



B5_N7(40M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



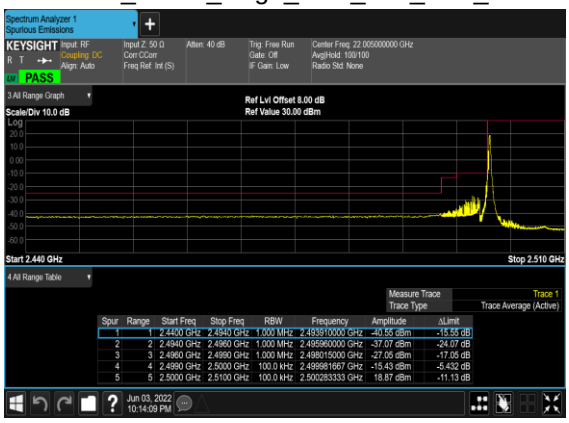
B5_N7(40M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_High_CH



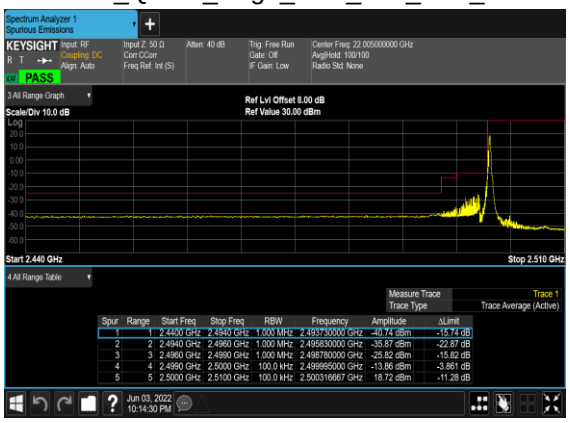
Conducted Band Edge

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
7	15	5	524500	2502.5	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	5	524500	2502.5	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	5	524500	2502.5	DFT-s-OFDM BPSK	25@0	see graph	**PASS**
7	15	5	524500	2502.5	DFT-s-OFDM QPSK	25@0	see graph	**PASS**
7	15	5	537500	2567.5	DFT-s-OFDM BPSK	1@24	see graph	**PASS**
7	15	5	537500	2567.5	DFT-s-OFDM QPSK	1@24	see graph	**PASS**
7	15	5	537500	2567.5	DFT-s-OFDM BPSK	25@0	see graph	**PASS**
7	15	5	537500	2567.5	DFT-s-OFDM QPSK	25@0	see graph	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM BPSK	100@0	see graph	**PASS**
7	15	20	526000	2510.0	DFT-s-OFDM QPSK	100@0	see graph	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM BPSK	1@105	see graph	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM QPSK	1@105	see graph	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM BPSK	100@0	see graph	**PASS**
7	15	20	536000	2560.0	DFT-s-OFDM QPSK	100@0	see graph	**PASS**
7	15	40	528000	2520.0	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
7	15	40	528000	2520.0	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
7	15	40	528000	2520.0	DFT-s-OFDM BPSK	216@0	see graph	**PASS**
7	15	40	528000	2520.0	DFT-s-OFDM QPSK	216@0	see graph	**PASS**
7	15	40	534000	2550.0	DFT-s-OFDM BPSK	1@215	see graph	**PASS**
7	15	40	534000	2550.0	DFT-s-OFDM QPSK	1@215	see graph	**PASS**
7	15	40	534000	2550.0	DFT-s-OFDM BPSK	216@0	see graph	**PASS**
7	15	40	534000	2550.0	DFT-s-OFDM QPSK	216@0	see graph	**PASS**

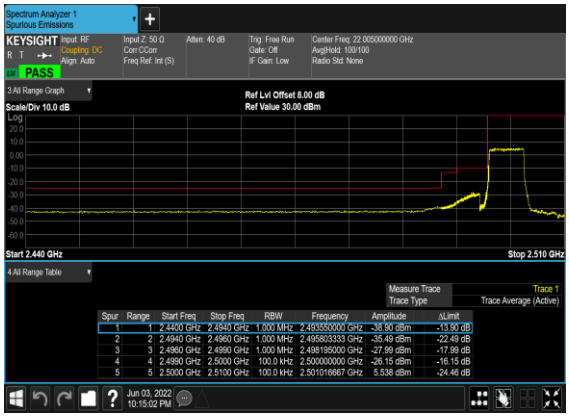
B5_N7(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Low_CH



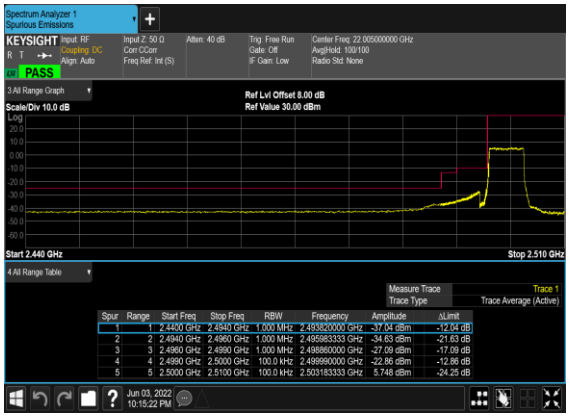
B5_N7(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Low_CH

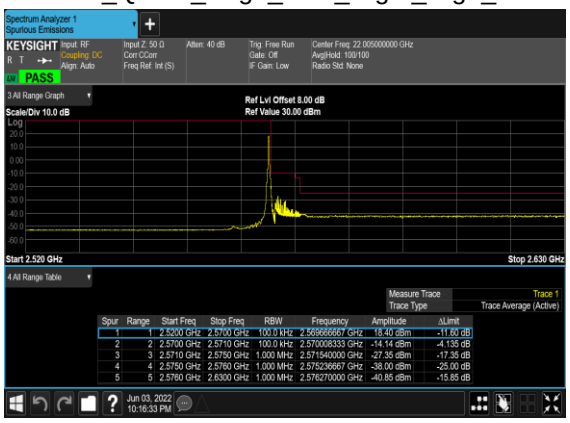


B5_N7(5M)_DFT-s-OFDM_BPSK_Outer_Full_Low_CH



B5_N7(5M)_DFT-s-OFDM_QPSK_Outer_Full_Low_CH



B5_N7(5M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_High_CH

B5_N7(5M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_High_CH