

FCC RF Test Report

APPLICANT : Guangdong OPPO Mobile Telecommunications Corp., Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : OPPO
MODEL NAME : CPH2689
FCC ID : R9C-OP24222
STANDARD : 47 CFR Part 27 Subpart Q
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S) : Oct. 15, 2024 ~ Oct. 23, 2024

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



Sporton International Inc. (ShenZhen)

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People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG491807H	Rev. 01	Initial issue of report	Nov. 12, 2024

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)(3)	EIRP	EIRP < 1W (30dBm)	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 25.58 dB at 10122.360 MHz

Conformity Assessment Condition:

- 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.
- 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

Guangdong OPPO Mobile Telecommunications Corp., Ltd.

NO.18 HaiBin Road, Wusha Village, Chang'an Town, DongGuan City, Guangdong Province, P.R. China

1.2 Manufacturer

Guangdong OPPO Mobile Telecommunications Corp., Ltd.

NO.18 HaiBin Road, Wusha Village, Chang'an Town, DongGuan City, Guangdong Province, P.R. China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	OPPO
Model Name	CPH2689
FCC ID	R9C-OP24222
IMEI Code	Conducted : 863233070025799/863233070025781 Radiation : 863233070022531/863233070022523
HW Version	11
SW Version	ColorOS 15.0
EUT Stage	Production Unit

1.4 Product Specification of Equipment Under Test

Product Feature	
Tx/Rx Frequency	5G NR n77: 3450 MHz ~ 3550 MHz 5G NR n78: 3450 MHz ~ 3550 MHz
SCS	30kHz
Bandwidth	n77/n78(30kHz): 20 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100MHz
Antenna Gain	<Ant. 0> 5G NR n77: 0.3 dBi 5G NR n78: 0.3 dBi <Ant. 6> 5G NR n77: -4.4 dBi 5G NR n78: -4.4 dBi <Ant. 8> 5G NR n77: 0.5 dBi 5G NR n78: 0.5 dBi <Ant. 9> 5G NR n77: 2.0 dBi 5G NR n78: 2.0 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 for Antenna 9.
2. 5G NR n77/n78 support SA and NSA mode. The whole testing has assessed SA mode for n78 by referring to the higher conducted power for conducted test items.
3. The device supports HPUE mode for 5G NR n78.
4. All the supported EN-DC combinations are verified conducted power, only the EN-DC combination with highest power are shown in the report.
5. The EN-DC mode combination could be referred to the product spec.

1.5 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		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	3460.02 ~ 3540.00	0.2612	18M2G7D	0.2371	18M2W7D
30	3465.00 ~ 3534.99	0.2636	27M8G7D	0.2377	27M9W7D
40	3470.01 ~ 3529.98	0.2576	37M8G7D	0.2344	37M9W7D
50	3475.02 ~ 3525.00	0.2547	47M4G7D	0.2333	47M5W7D
60	3480.00 ~ 3519.99	0.2588	57M8G7D	0.2344	57M8W7D
70	3485.01 ~ 3514.98	0.2636	67M5G7D	0.2382	67M6W7D
80	3490.02 ~ 3510.00	0.2673	77M5G7D	0.2432	77M6W7D
90	3495.00 ~ 3504.99	0.2661	87M6G7D	0.2415	87M7W7D
100	3500.01	0.3258	97M3G7D	0.2871	97M5W7D

5G NR n78		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	3460.02 ~ 3540.00	0.6295	18M2G7D	0.5610	18M2W7D
30	3465.00 ~ 3534.99	0.631	27M8G7D	0.5715	27M9W7D
40	3470.01 ~ 3529.98	0.6266	37M8G7D	0.5689	37M9W7D
50	3475.02 ~ 3525.00	0.6124	47M4G7D	0.5546	47M5W7D
60	3480.00 ~ 3519.99	0.6237	57M8G7D	0.5689	57M8W7D
70	3485.01 ~ 3514.98	0.6368	67M5G7D	0.5768	67M6W7D
80	3490.02 ~ 3510.00	0.6397	77M5G7D	0.5861	77M6W7D
90	3495.00 ~ 3504.99	0.6531	87M6G7D	0.5834	87M7W7D
100	3500.01	0.6607	97M3G7D	0.5768	97M5W7D

Note:

- 5G NR Band n78 overlaps the entire frequency range of Band n77, and n78 power > n77 power, therefore the conducted test results of n78 provided in this report cover n77.
- 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. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

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

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH01-SZ	CN1256	421272

1.8 Test Software

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

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 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.

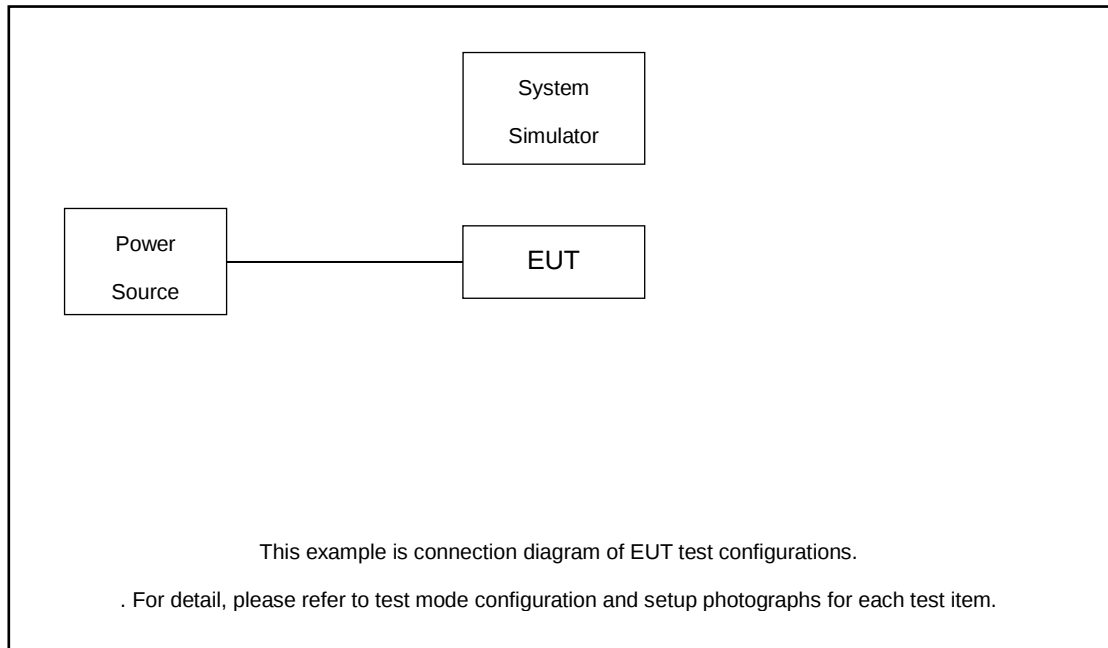
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

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

Note:

- 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.
- Frequency Stability: Normal Voltage = 4.0V ; Low Voltage = 3.60V.; High Voltage = 4.53V

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	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.

Following shows an offset computation example with cable loss 8.9 dB

Example :

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

= 8.9 (dB)

2.5 Frequency List of Low/Middle/High Channels

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
20	Channel	630668	633334	636000
	Frequency	3460.02	3500.01	3540

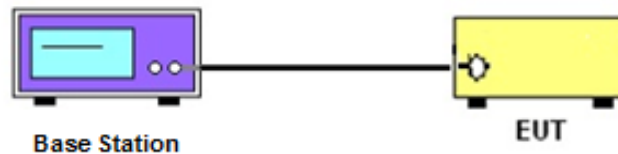
3 Conducted Test Items

3.1 Measuring Instruments

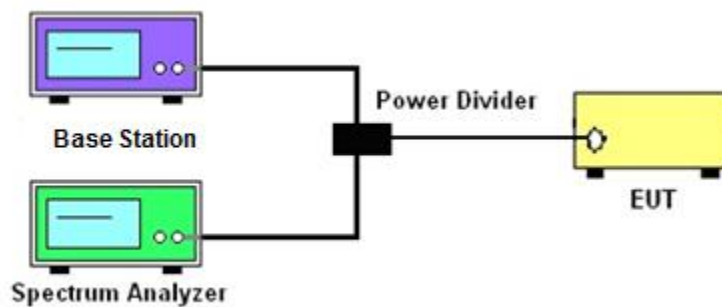
See list of measuring instruments of this test report.

3.2 Test Setup

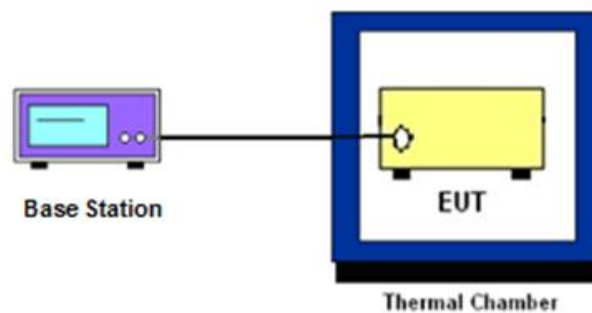
3.2.1 Conducted Output Power



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)(3)

Mobile devices are limited to 1Watt (30 dBm) EIRP. Mobile devices operating in these bands must employ a means for limiting power to the minimum necessary for successful communications

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 $\geq 1\%$ 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 ≥ 500 KHz.
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

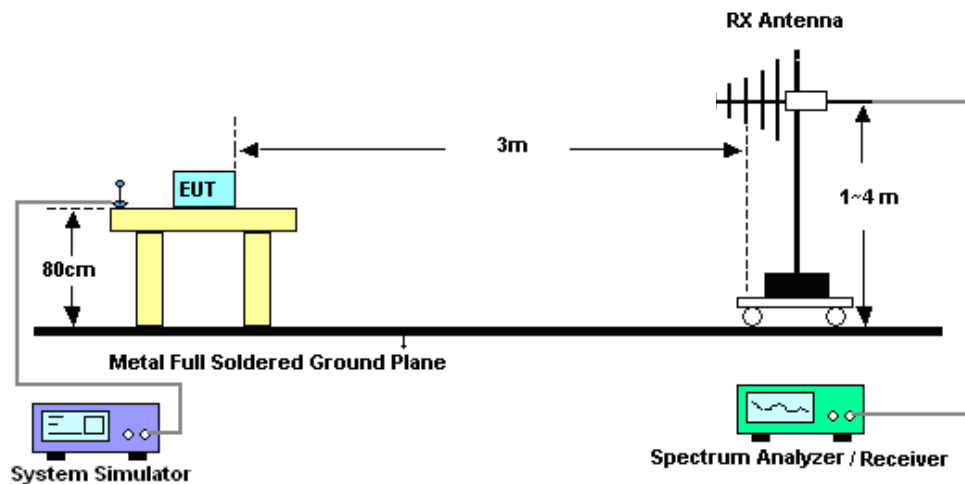
See list of measuring instruments of this test report.

4.2 Test Setup

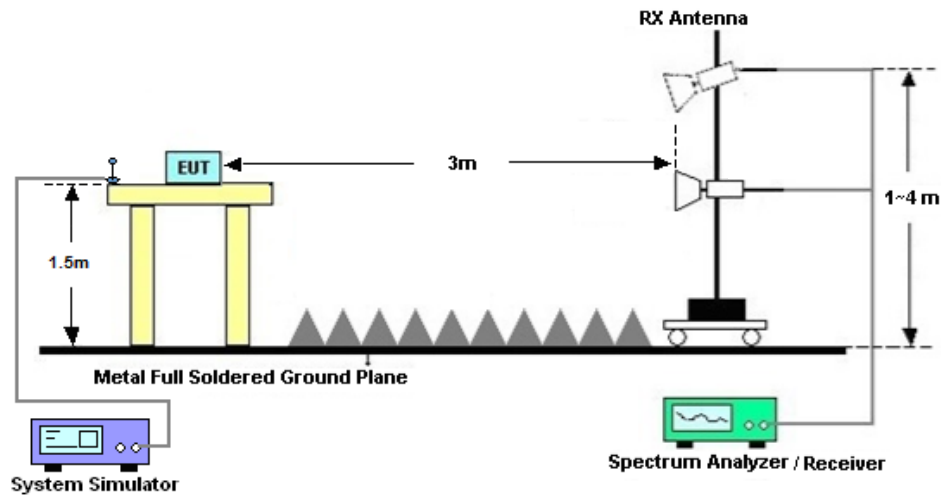
4.2.1 For radiated test below 30MHz



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 C63.26. 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.
$$\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$$
$$\text{ERP (dBm)} = \text{EIRP} - 2.15$$
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
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 27, 2023	Oct. 15, 2024	Dec. 26, 2024	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2E	101141	9kHz~30MHz	Dec. 29, 2023	Oct.15, 2024	Dec. 28, 2024	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 18,2023	Oct. 15, 2024	Oct. 17,2024	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Oct. 24, 2023	Oct.15, 2024	Oct. 23, 2025	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 04, 2024	Oct. 15, 2024	Jul. 03, 2025	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 09,2024	Oct.15, 2024	Apr. 08,2025	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 09, 2024	Oct. 15, 2024	Apr. 08, 2025	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P-R	1943528	1GHz~18GHz	Oct. 18,2023	Oct.15, 2024	Oct. 17,2024	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 03, 2024	Oct. 15, 2024	Jul. 02, 2025	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	Oct. 18,2023	Oct.15, 2024	Oct. 17,2024	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Oct. 15, 2024	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Oct.15, 2024	NCR	Radiation (03CH01-SZ)
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 09, 2024	Oct. 23, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
DC Power Supply	TTI	PL330P	290070	Max 32V , 3A	Oct. 15, 2024	Oct. 23, 2024	Oct. 14, 2025	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04 265	60.06.020.007 7	0.4GHz~26.5GHz	Dec. 25, 2023	Oct. 23, 2024	Dec. 24, 2024	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 03, 2024	Oct. 23, 2024	Jul. 02, 2025	Conducted (TH01-SZ)

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.48 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.53 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.02 dB
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----- THE END -----



Appendix A. Test Results of Conducted Test

Test Engineer :	Fly Liang	Temperature :	22~23°C
		Relative Humidity :	40~42%



Software Version: 23.06.1602

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Transmitter Conducted Output Power And EIRP, (G_T - L_c)=2.0dB

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power(dBm)	EIRP (dBm)	EIRP (W)
77	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@1	22.17	24.17	0.2612
77	30	20	630668	3460.02	DFT-s-OFDM 16 QAM	1@1	21.75	23.75	0.2371
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@1	21.98	23.98	0.2500
77	30	20	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.52	23.52	0.2249
77	30	20	636000	3540	DFT-s-OFDM QPSK	1@1	22.09	24.09	0.2564
77	30	20	636000	3540	DFT-s-OFDM 16 QAM	1@1	21.63	23.63	0.2307
77	30	30	631000	3465	DFT-s-OFDM QPSK	1@1	22.07	24.07	0.2553
77	30	30	631000	3465	DFT-s-OFDM 16 QAM	1@1	21.66	23.66	0.2323
77	30	30	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.05	24.05	0.2541
77	30	30	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.58	23.58	0.2280
77	30	30	635666	3534.99	DFT-s-OFDM QPSK	1@1	22.21	24.21	0.2636
77	30	30	635666	3534.99	DFT-s-OFDM 16 QAM	1@1	21.76	23.76	0.2377
77	30	40	631334	3470.01	DFT-s-OFDM QPSK	1@1	22.11	24.11	0.2576
77	30	40	631334	3470.01	DFT-s-OFDM 16 QAM	1@1	21.7	23.7	0.2344
77	30	40	633334	3500.01	DFT-s-OFDM QPSK	1@1	22	24	0.2512
77	30	40	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.61	23.61	0.2296
77	30	40	635332	3529.98	DFT-s-OFDM QPSK	1@1	22.08	24.08	0.2559
77	30	40	635332	3529.98	DFT-s-OFDM 16 QAM	1@1	21.67	23.67	0.2328
77	30	50	631668	3475.02	DFT-s-OFDM QPSK	1@1	22.06	24.06	0.2547
77	30	50	631668	3475.02	DFT-s-OFDM 16 QAM	1@1	21.68	23.68	0.2333
77	30	50	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.03	24.03	0.2529
77	30	50	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.57	23.57	0.2275
77	30	50	635000	3525	DFT-s-OFDM QPSK	1@1	21.93	23.93	0.2472
77	30	50	635000	3525	DFT-s-OFDM 16 QAM	1@1	21.53	23.53	0.2254
77	30	60	632000	3480	DFT-s-OFDM QPSK	1@1	22.13	24.13	0.2588
77	30	60	632000	3480	DFT-s-OFDM 16 QAM	1@1	21.7	23.7	0.2344
77	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.06	24.06	0.2547
77	30	60	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.62	23.62	0.2301
77	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@1	21.96	23.96	0.2489
77	30	60	634666	3519.99	DFT-s-OFDM 16 QAM	1@1	21.54	23.54	0.2259
77	30	70	632334	3485.01	DFT-s-OFDM QPSK	1@1	22.2	24.2	0.2630
77	30	70	632334	3485.01	DFT-s-OFDM 16 QAM	1@1	21.77	23.77	0.2382
77	30	70	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.21	24.21	0.2636
77	30	70	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.75	23.75	0.2371
77	30	70	634332	3514.98	DFT-s-OFDM QPSK	1@1	22.12	24.12	0.2582



77	30	70	634332	3514.98	DFT-s-OFDM 16 QAM	1@1	21.75	23.75	0.2371
77	30	80	632668	3490.02	DFT-s-OFDM QPSK	1@1	22.22	24.22	0.2642
77	30	80	632668	3490.02	DFT-s-OFDM 16 QAM	1@1	21.86	23.86	0.2432
77	30	80	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.27	24.27	0.2673
77	30	80	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.83	23.83	0.2415
77	30	80	634000	3510	DFT-s-OFDM QPSK	1@1	22.22	24.22	0.2642
77	30	80	634000	3510	DFT-s-OFDM 16 QAM	1@1	21.83	23.83	0.2415
77	30	90	633000	3495	DFT-s-OFDM QPSK	1@1	22.2	24.2	0.2630
77	30	90	633000	3495	DFT-s-OFDM 16 QAM	1@1	21.79	23.79	0.2393
77	30	90	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.25	24.25	0.2661
77	30	90	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.83	23.83	0.2415
77	30	90	633666	3504.99	DFT-s-OFDM QPSK	1@1	22.22	24.22	0.2642
77	30	90	633666	3504.99	DFT-s-OFDM 16 QAM	1@1	21.78	23.78	0.2388
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	135@67	23.04	25.04	0.3192
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.22	24.22	0.2642
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@271	22.12	24.12	0.2582
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	135@67	23.13	25.13	0.3258
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.26	24.26	0.2667
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@271	22.12	24.12	0.2582
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	135@67	22.58	24.58	0.2871
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.87	23.87	0.2438
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@271	21.65	23.65	0.2317
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	135@67	22.07	24.07	0.2553
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@1	21.35	23.35	0.2163
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@271	21.27	23.27	0.2123
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	135@67	21.13	23.13	0.2056
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@1	20.07	22.07	0.1611
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@271	19.97	21.97	0.1574
77	30	100	633334	3500.01	CP-OFDM QPSK	137@68	22.02	24.02	0.2523
77	30	100	633334	3500.01	CP-OFDM QPSK	1@1	21.16	23.16	0.2070
77	30	100	633334	3500.01	CP-OFDM QPSK	1@271	21.16	23.16	0.2070



Software Version: 23.06.1602

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Transmitter Conducted Output Power And EIRP, (G_T - L_c)=2dB

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power(dBm)	EIRP (dBm)	EIRP (W)
78	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@1	25.99	27.99	0.6295
78	30	20	630668	3460.02	DFT-s-OFDM 16 QAM	1@1	25.49	27.49	0.5610
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.78	27.78	0.5998
78	30	20	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.38	27.38	0.5470
78	30	20	636000	3540	DFT-s-OFDM QPSK	1@1	25.99	27.99	0.6295
78	30	20	636000	3540	DFT-s-OFDM 16 QAM	1@1	25.49	27.49	0.5610
78	30	30	631000	3465	DFT-s-OFDM QPSK	1@1	25.97	27.97	0.6266
78	30	30	631000	3465	DFT-s-OFDM 16 QAM	1@1	25.54	27.54	0.5675
78	30	30	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.84	27.84	0.6081
78	30	30	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.41	27.41	0.5508
78	30	30	635666	3534.99	DFT-s-OFDM QPSK	1@1	26	28	0.6310
78	30	30	635666	3534.99	DFT-s-OFDM 16 QAM	1@1	25.57	27.57	0.5715
78	30	40	631334	3470.01	DFT-s-OFDM QPSK	1@1	25.97	27.97	0.6266
78	30	40	631334	3470.01	DFT-s-OFDM 16 QAM	1@1	25.55	27.55	0.5689
78	30	40	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.83	27.83	0.6067
78	30	40	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.38	27.38	0.5470
78	30	40	635332	3529.98	DFT-s-OFDM QPSK	1@1	25.9	27.9	0.6166
78	30	40	635332	3529.98	DFT-s-OFDM 16 QAM	1@1	25.53	27.53	0.5662
78	30	50	631668	3475.02	DFT-s-OFDM QPSK	1@1	25.86	27.86	0.6109
78	30	50	631668	3475.02	DFT-s-OFDM 16 QAM	1@1	25.44	27.44	0.5546
78	30	50	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.87	27.87	0.6124
78	30	50	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.42	27.42	0.5521
78	30	50	635000	3525	DFT-s-OFDM QPSK	1@1	25.78	27.78	0.5998
78	30	50	635000	3525	DFT-s-OFDM 16 QAM	1@1	25.36	27.36	0.5445
78	30	60	632000	3480	DFT-s-OFDM QPSK	1@1	25.95	27.95	0.6237
78	30	60	632000	3480	DFT-s-OFDM 16 QAM	1@1	25.55	27.55	0.5689
78	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.88	27.88	0.6138
78	30	60	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.45	27.45	0.5559
78	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@1	25.85	27.85	0.6095
78	30	60	634666	3519.99	DFT-s-OFDM 16 QAM	1@1	25.42	27.42	0.5521
78	30	70	632334	3485.01	DFT-s-OFDM QPSK	1@1	26.04	28.04	0.6368
78	30	70	632334	3485.01	DFT-s-OFDM 16 QAM	1@1	25.59	27.59	0.5741
78	30	70	633334	3500.01	DFT-s-OFDM QPSK	1@1	26	28	0.6310
78	30	70	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.61	27.61	0.5768
78	30	70	634332	3514.98	DFT-s-OFDM QPSK	1@1	25.96	27.96	0.6252



78	30	70	634332	3514.98	DFT-s-OFDM 16 QAM	1@1	25.55	27.55	0.5689
78	30	80	632668	3490.02	DFT-s-OFDM QPSK	1@1	26.06	28.06	0.6397
78	30	80	632668	3490.02	DFT-s-OFDM 16 QAM	1@1	25.66	27.66	0.5834
78	30	80	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.04	28.04	0.6368
78	30	80	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.68	27.68	0.5861
78	30	80	634000	3510	DFT-s-OFDM QPSK	1@1	26	28	0.6310
78	30	80	634000	3510	DFT-s-OFDM 16 QAM	1@1	25.6	27.6	0.5754
78	30	90	633000	3495	DFT-s-OFDM QPSK	1@1	26.08	28.08	0.6427
78	30	90	633000	3495	DFT-s-OFDM 16 QAM	1@1	25.65	27.65	0.5821
78	30	90	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.01	28.01	0.6324
78	30	90	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.64	27.64	0.5808
78	30	90	633666	3504.99	DFT-s-OFDM QPSK	1@1	26.15	28.15	0.6531
78	30	90	633666	3504.99	DFT-s-OFDM 16 QAM	1@1	25.66	27.66	0.5834
78	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	135@67	26.04	28.04	0.6368
78	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	26.09	28.09	0.6442
78	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@271	26.04	28.04	0.6368
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	135@67	26.2	28.2	0.6607
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.04	28.04	0.6368
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@271	25.93	27.93	0.6209
78	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	135@67	25.57	27.57	0.5715
78	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.61	27.61	0.5768
78	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@271	25.5	27.5	0.5623
78	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	135@67	24.59	26.59	0.4560
78	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@1	24.75	26.75	0.4732
78	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@271	24.68	26.68	0.4656
78	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	135@67	24.09	26.09	0.4064
78	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@1	23.89	25.89	0.3882
78	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@271	23.85	25.85	0.3846
78	30	100	633334	3500.01	CP-OFDM QPSK	137@68	24.94	26.94	0.4943
78	30	100	633334	3500.01	CP-OFDM QPSK	1@1	24.95	26.95	0.4955
78	30	100	633334	3500.01	CP-OFDM QPSK	1@271	24.95	26.95	0.4955

Frequency Stability

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0046	PASS	NV
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0022	PASS	LV
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0023	PASS	HV
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0040	PASS	-30°C
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0044	PASS	-20°C
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0049	PASS	-10°C
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0023	PASS	0°C
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0023	PASS	10°C
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0046	PASS	20°C
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0033	PASS	30°C
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0045	PASS	40°C
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0026	PASS	50°C

Peak to Average Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
78	30	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	50@0	4.38	13	PASS
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	5.5	13	PASS

N78(20M)_DFT-s-OFDM_PI_2-
BPSK_Outer_Full_Mid_CH



N78(20M)_DFT-s-
OFDM_QPSK_Outer_Full_Mid_CH

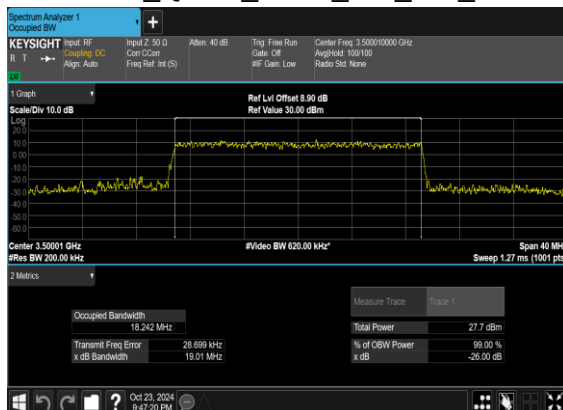


Occupied Bandwidth

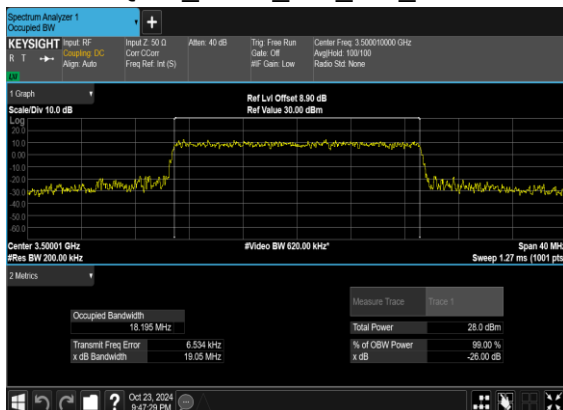
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
78	30	20	633334	3500.01	CP-OFDM QPSK	51@0	18.242	19.01
78	30	20	633334	3500.01	CP-OFDM 16 QAM	51@0	18.195	19.05
78	30	20	633334	3500.01	CP-OFDM 64 QAM	51@0	18.187	18.99
78	30	20	633334	3500.01	CP-OFDM 256 QAM	51@0	18.153	19.02
78	30	30	633334	3500.01	CP-OFDM QPSK	78@0	27.773	28.88
78	30	30	633334	3500.01	CP-OFDM 16 QAM	78@0	27.681	28.72
78	30	30	633334	3500.01	CP-OFDM 64 QAM	78@0	27.712	29.28
78	30	30	633334	3500.01	CP-OFDM 256 QAM	78@0	27.892	29.0
78	30	40	633334	3500.01	CP-OFDM QPSK	106@0	37.785	39.27
78	30	40	633334	3500.01	CP-OFDM 16 QAM	106@0	37.799	39.15
78	30	40	633334	3500.01	CP-OFDM 64 QAM	106@0	37.922	39.11
78	30	40	633334	3500.01	CP-OFDM 256 QAM	106@0	37.828	39.34
78	30	50	633334	3500.01	CP-OFDM QPSK	133@0	47.399	49.16
78	30	50	633334	3500.01	CP-OFDM 16 QAM	133@0	47.498	49.04
78	30	50	633334	3500.01	CP-OFDM 64 QAM	133@0	47.535	49.15
78	30	50	633334	3500.01	CP-OFDM 256 QAM	133@0	47.288	49.22
78	30	60	633334	3500.01	CP-OFDM QPSK	162@0	57.81	59.75
78	30	60	633334	3500.01	CP-OFDM 16 QAM	162@0	57.843	59.69
78	30	60	633334	3500.01	CP-OFDM 64 QAM	162@0	57.815	59.77
78	30	60	633334	3500.01	CP-OFDM 256 QAM	162@0	57.745	59.76
78	30	70	633334	3500.01	CP-OFDM QPSK	189@0	67.49	69.69
78	30	70	633334	3500.01	CP-OFDM 16 QAM	189@0	67.42	69.7
78	30	70	633334	3500.01	CP-OFDM 64 QAM	189@0	67.545	69.73
78	30	70	633334	3500.01	CP-OFDM 256 QAM	189@0	67.558	69.71
78	30	80	633334	3500.01	CP-OFDM QPSK	217@0	77.534	79.92
78	30	80	633334	3500.01	CP-OFDM 16 QAM	217@0	77.55	79.93
78	30	80	633334	3500.01	CP-OFDM 64 QAM	217@0	77.589	80.03
78	30	80	633334	3500.01	CP-OFDM 256 QAM	217@0	77.493	79.92
78	30	90	633334	3500.01	CP-OFDM QPSK	245@0	87.589	90.16
78	30	90	633334	3500.01	CP-OFDM 16 QAM	245@0	87.455	90.24
78	30	90	633334	3500.01	CP-OFDM 64 QAM	245@0	87.492	90.25
78	30	90	633334	3500.01	CP-OFDM 256 QAM	245@0	87.704	90.25
78	30	100	633334	3500.01	CP-OFDM QPSK	273@0	97.301	100.6
78	30	100	633334	3500.01	CP-OFDM 16 QAM	273@0	97.437	100.5
78	30	100	633334	3500.01	CP-OFDM 64 QAM	273@0	97.493	100.5
78	30	100	633334	3500.01	CP-OFDM 256 QAM	273@0	97.459	100.5



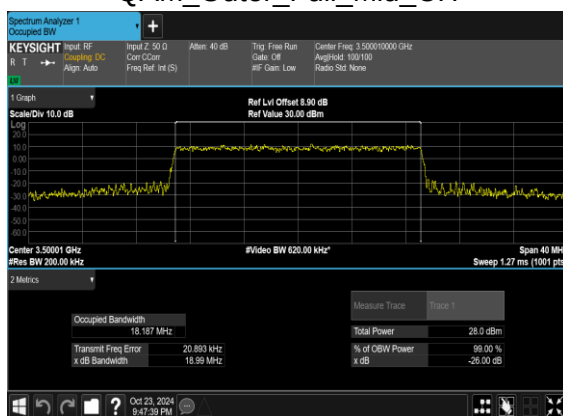
N78(20M)_CP-
OFDM_QPSK_Outer_Full_Mid_CH



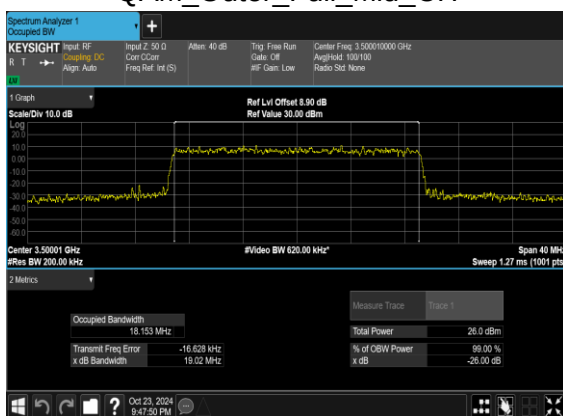
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QAM_Outer_Full_Mid_CH



N78(20M)_CP-OFDM_64
QAM_Outer_Full_Mid_CH

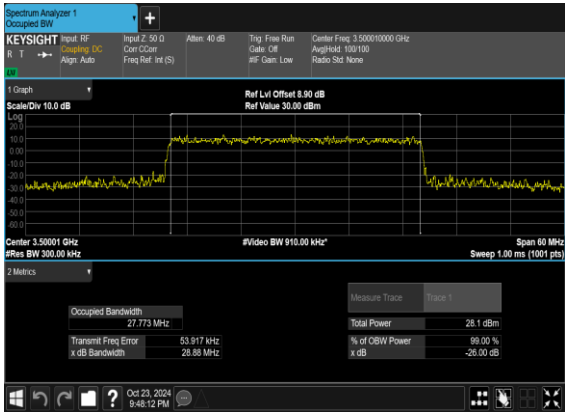


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QAM_Outer_Full_Mid_CH

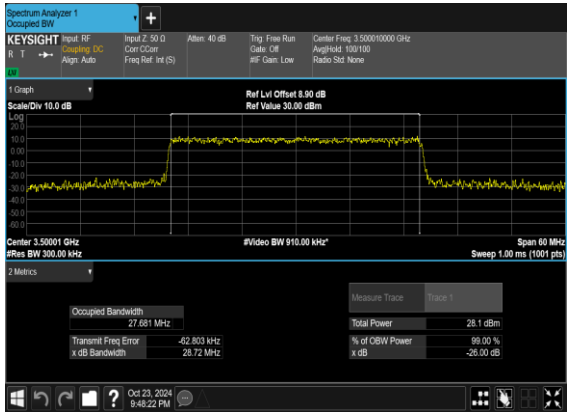




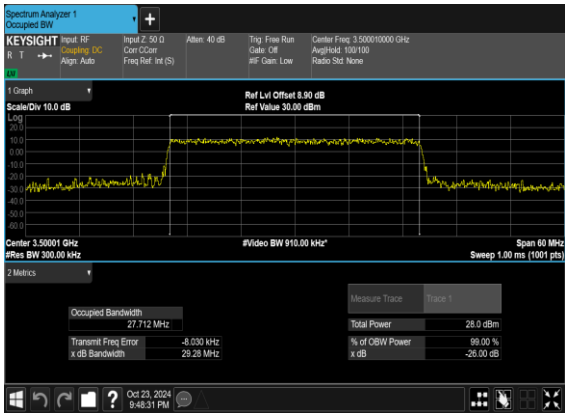
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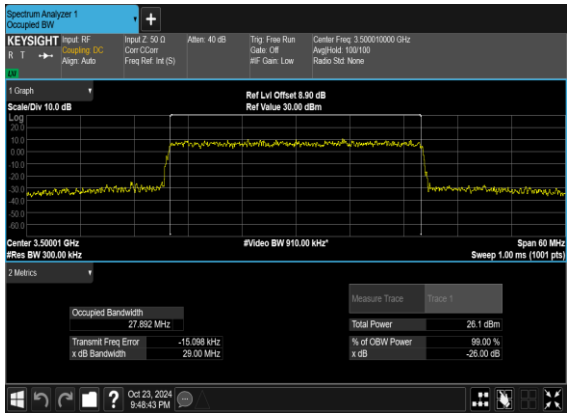
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QAM_Outer_Full_Mid_CH

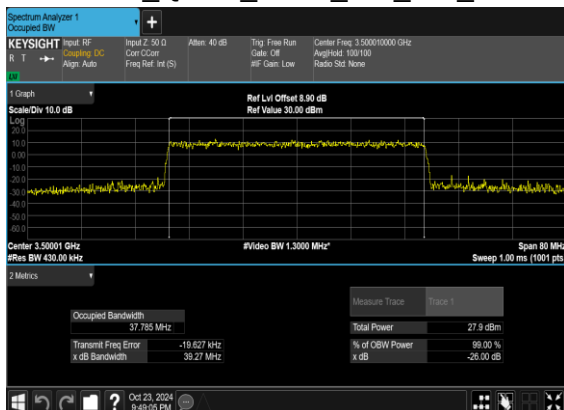
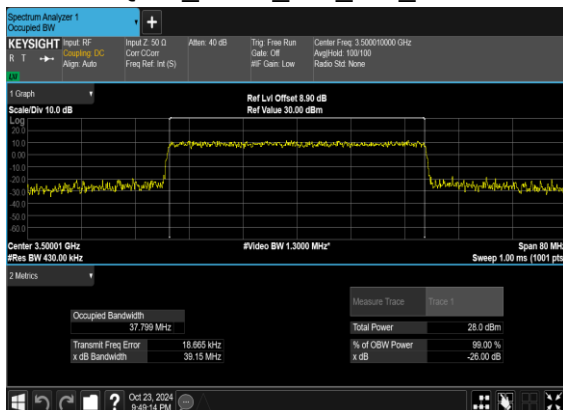
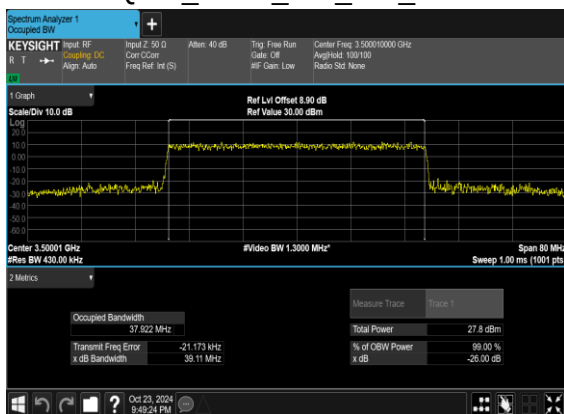
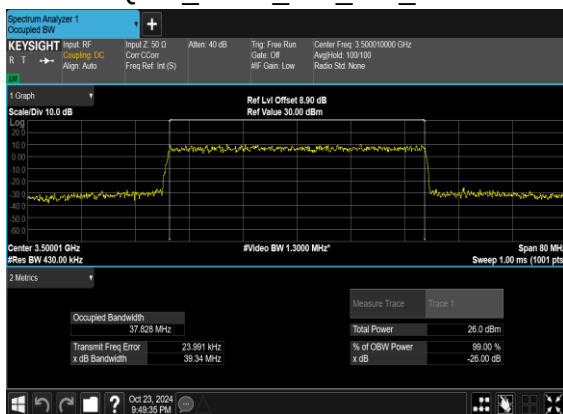


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QAM_Outer_Full_Mid_CH



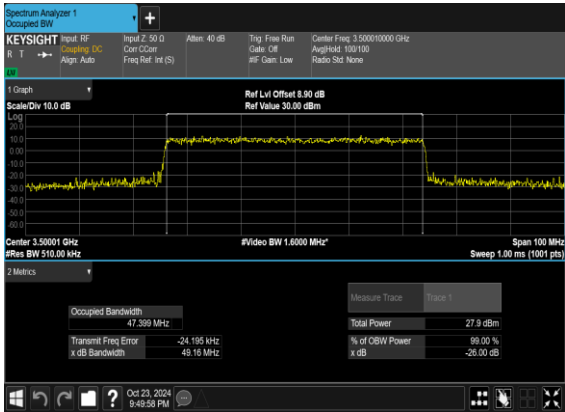
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QAM_Outer_Full_Mid_CH



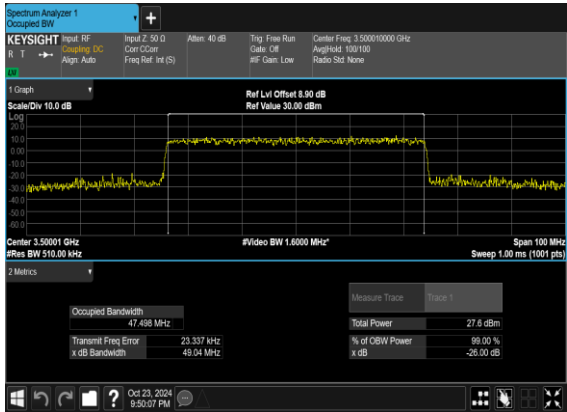
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QAM_Outer_Full_Mid_CHN78(40M)_CP-OFDM_64
QAM_Outer_Full_Mid_CHN78(40M)_CP-OFDM_256
QAM_Outer_Full_Mid_CH



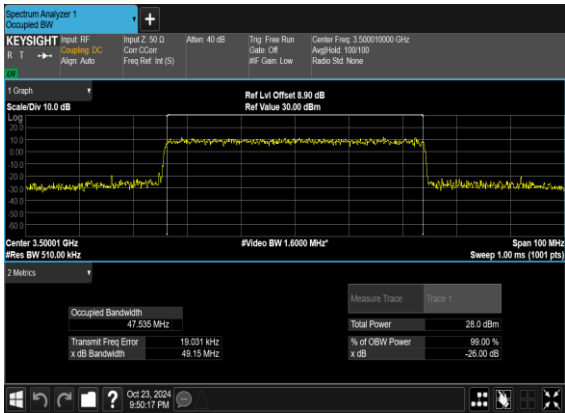
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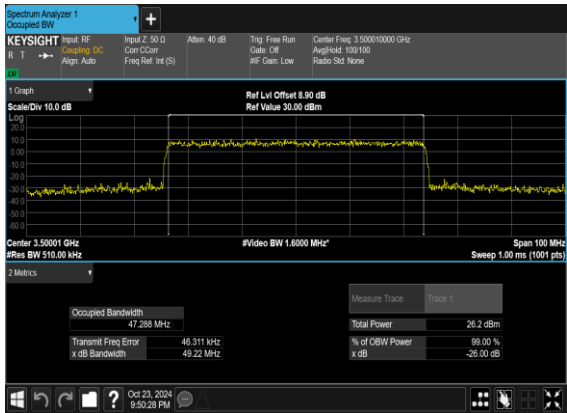
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QAM_Outer_Full_Mid_CH



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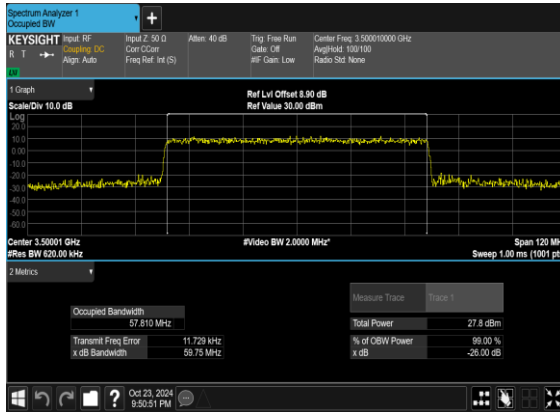


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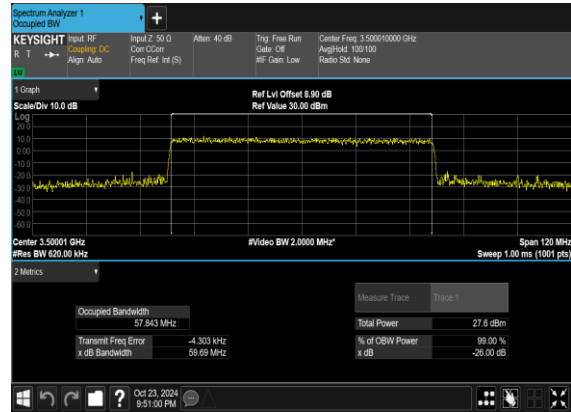




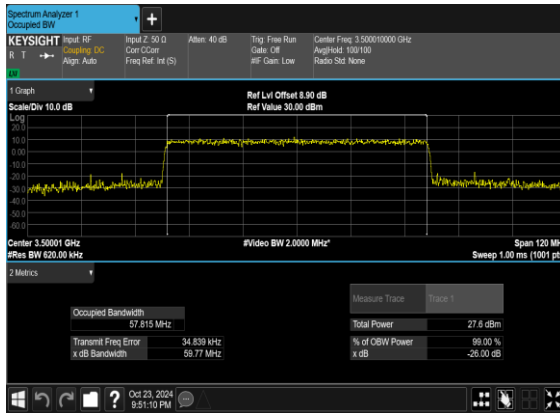
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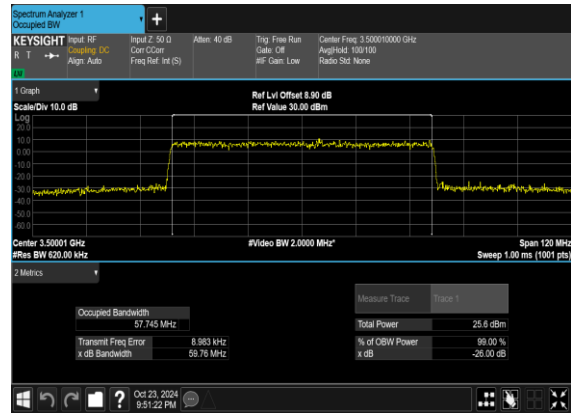
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QAM_Outer_Full_Mid_CH

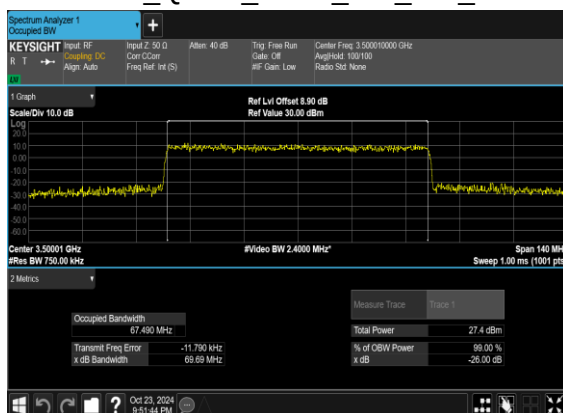
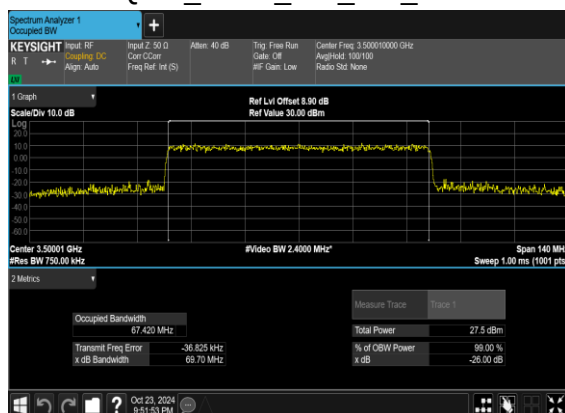
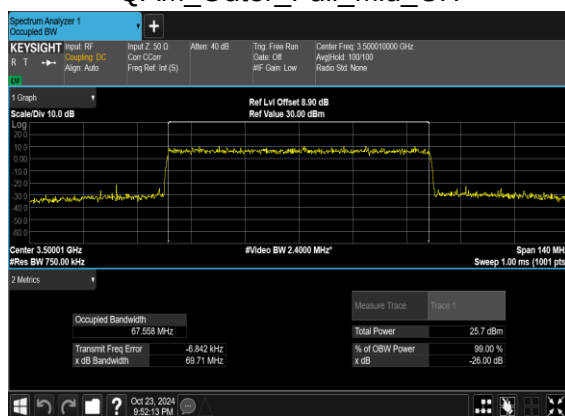


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QAM_Outer_Full_Mid_CH



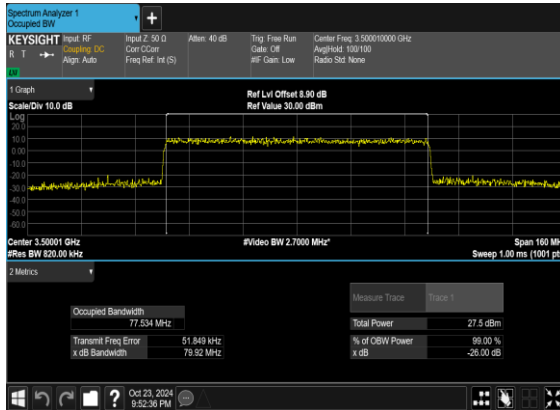
N78(60M)_CP-OFDM_256
QAM_Outer_Full_Mid_CH



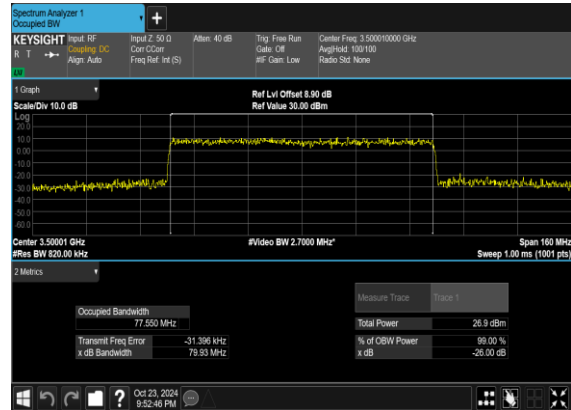
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QAM_Outer_Full_Mid_CHN78(70M)_CP-OFDM_64
QAM_Outer_Full_Mid_CHN78(70M)_CP-OFDM_256
QAM_Outer_Full_Mid_CH



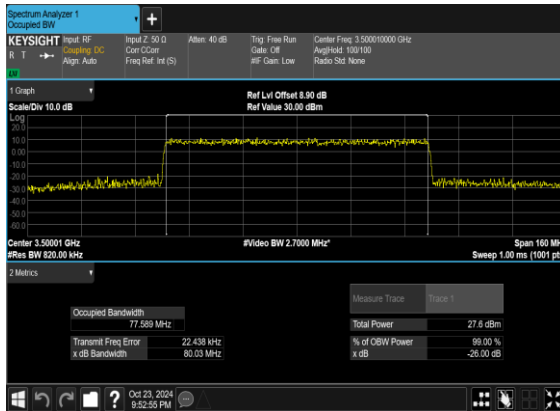
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OFDM_QPSK_Outer_Full_Mid_CH



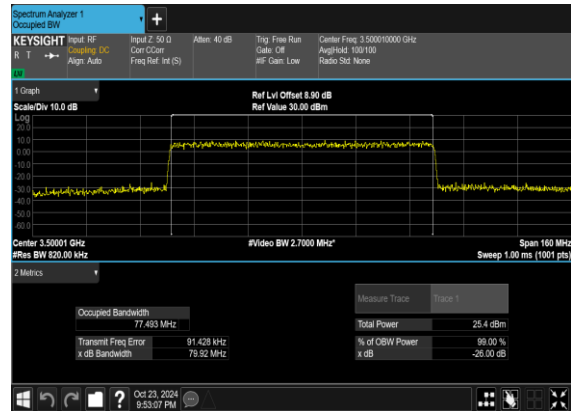
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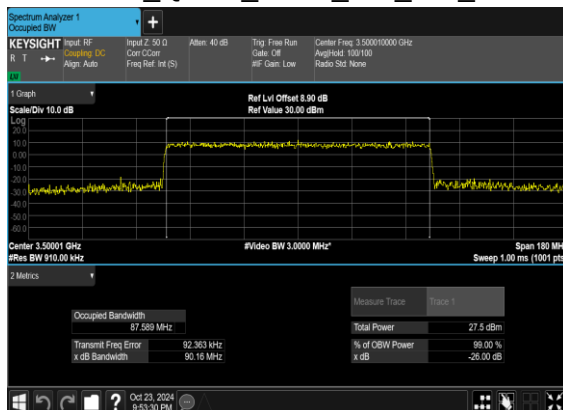
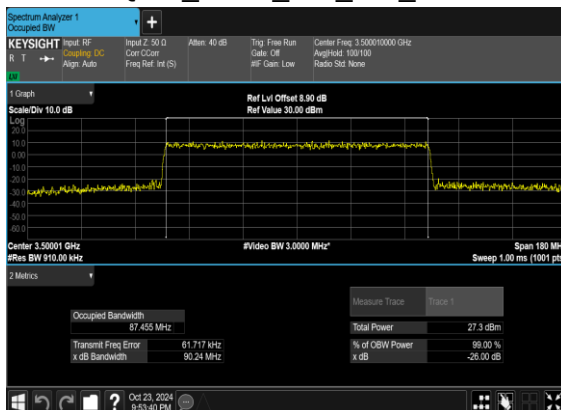
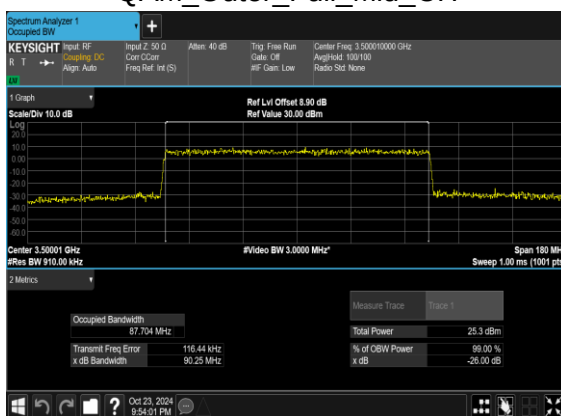


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QAM_Outer_Full_Mid_CH



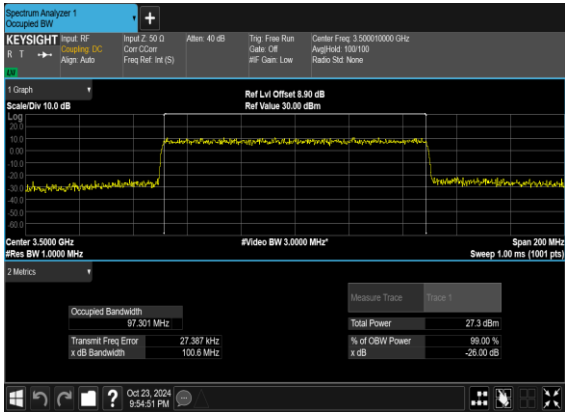
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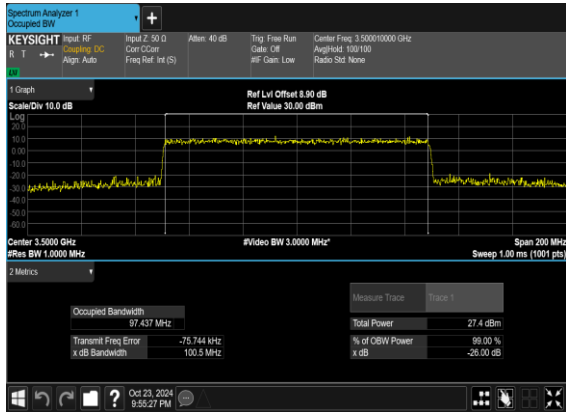
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QAM_Outer_Full_Mid_CHN78(90M)_CP-OFDM_64
QAM_Outer_Full_Mid_CHN78(90M)_CP-OFDM_256
QAM_Outer_Full_Mid_CH



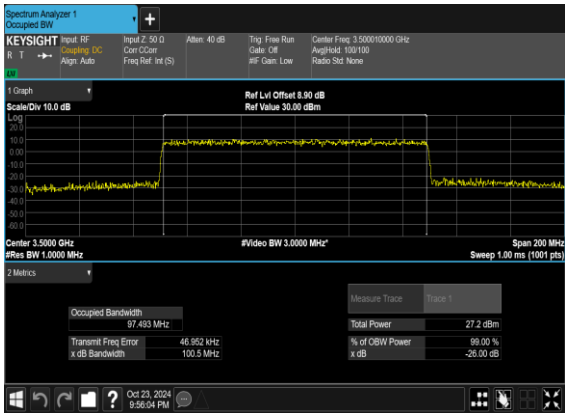
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OFDM_QPSK_Outer_Full_Mid_CH



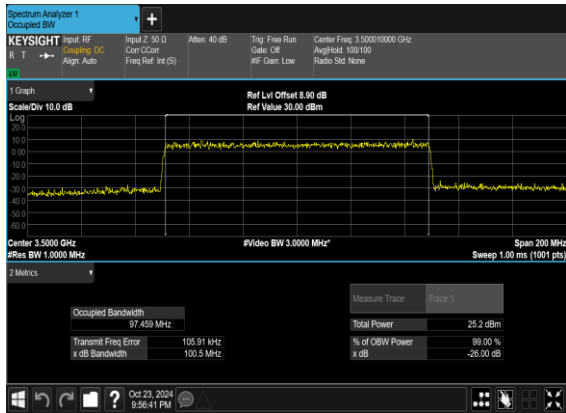
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QAM_Outer_Full_Mid_CH



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QAM_Outer_Full_Mid_CH



N78(100M)_CP-OFDM_256
QAM_Outer_Full_Mid_CH



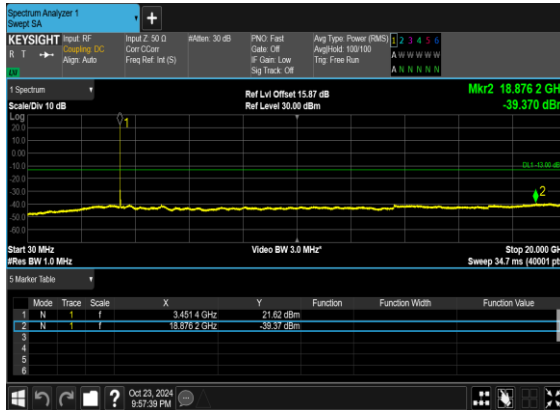


Conducted Spurious Emissions

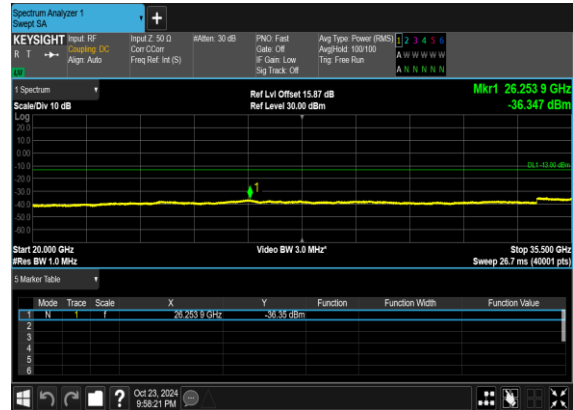
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
78	30	20	630668	3460.02	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	20	630668	3460.02	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	20	630668	3460.02	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	20	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	20	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	20	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	20	636000	3540.0	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	20	636000	3540.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	20	636000	3540.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	20	636000	3540.0	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	20	636000	3540.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	20	636000	3540.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	60	632000	3480.0	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	60	632000	3480.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	60	632000	3480.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	60	632000	3480.0	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	60	632000	3480.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	60	632000	3480.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	60	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	60	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	60	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	60	634666	3519.99	DFT-s-OFDM BPSK	1@0	see graph	---
78	30	60	634666	3519.99	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	60	634666	3519.99	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@0	see graph	PASS
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78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	---
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78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	---
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	PASS



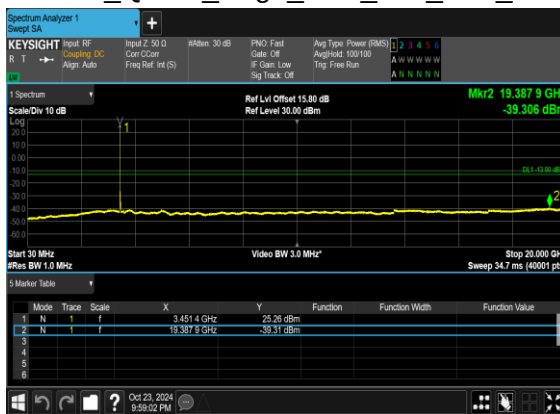
N78(20M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CH



N78(20M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CH

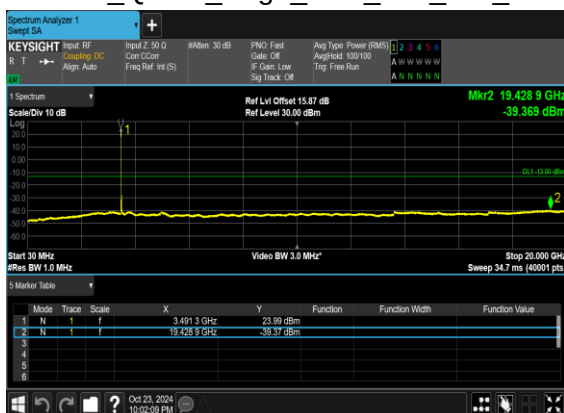


N78(20M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Low_CH



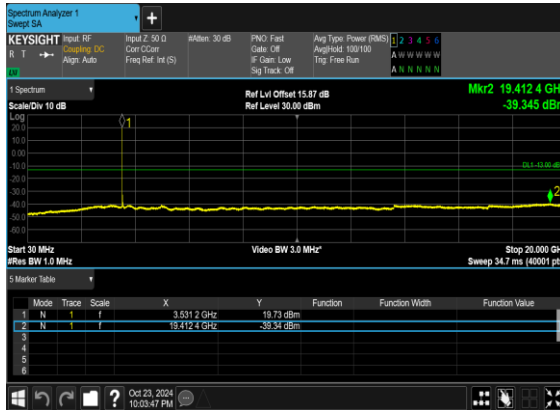
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OFDM_QPSK_Edge_1RB_Left_Low_CH



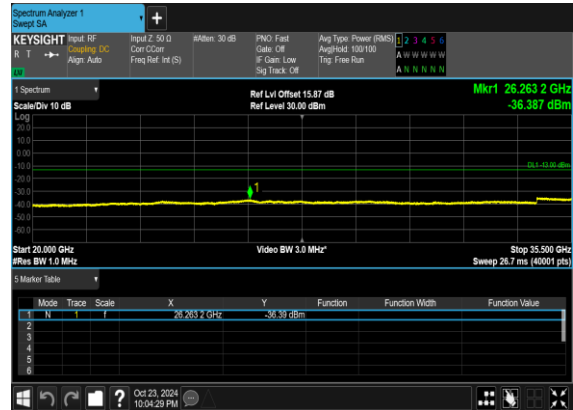
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OFDM_BPSK_Edge_1RB_Left_Mid_CHN78(20M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Mid_CHN78(20M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CHN78(20M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CH



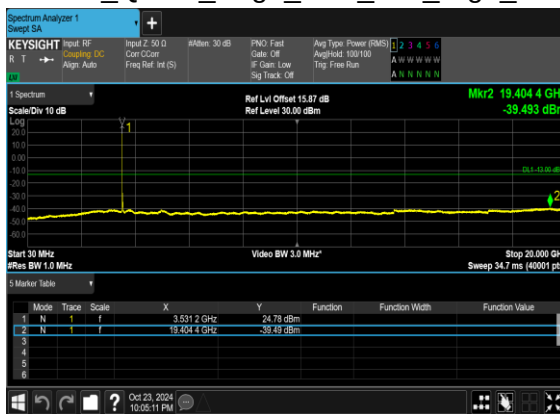
N78(20M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_High_CH



N78(20M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_High_CH

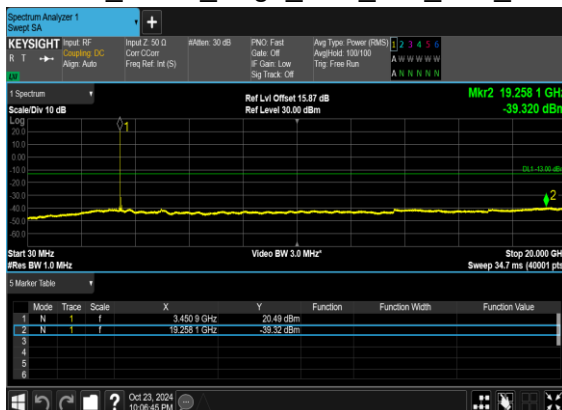
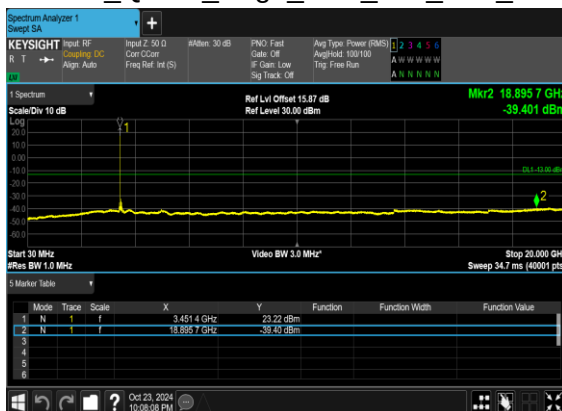


N78(20M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_High_CH



N78(20M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_High_CH

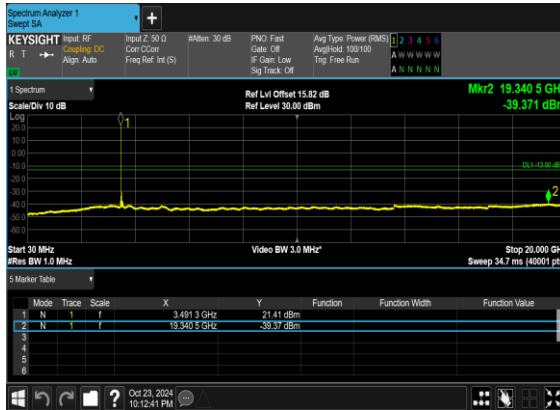


N78(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CHN78(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CHN78(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Low_CHN78(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Low_CH

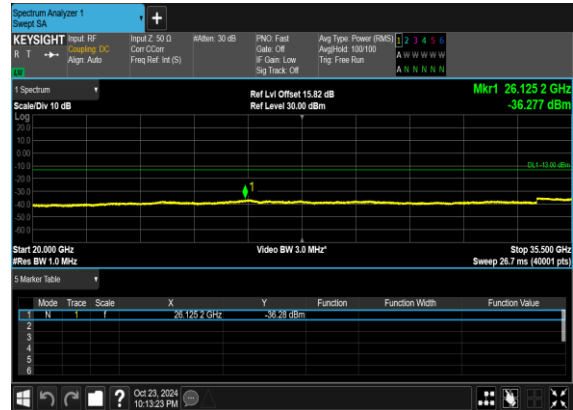
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OFDM_BPSK_Edge_1RB_Left_Mid_CHN78(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Mid_CHN78(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CHN78(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CH



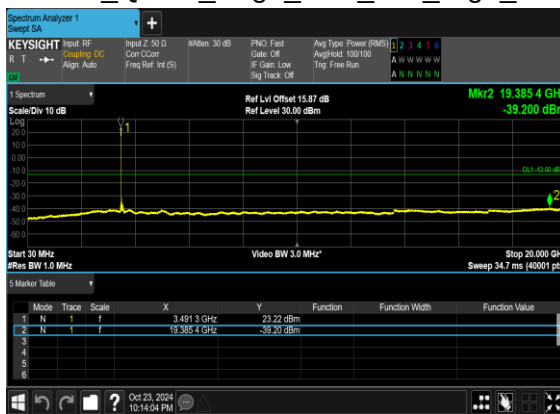
N78(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_High_CH



N78(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_High_CH

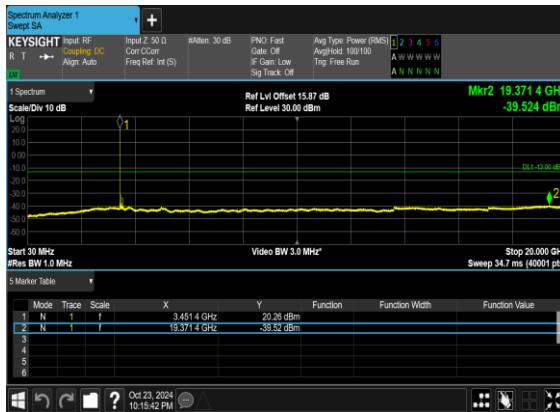
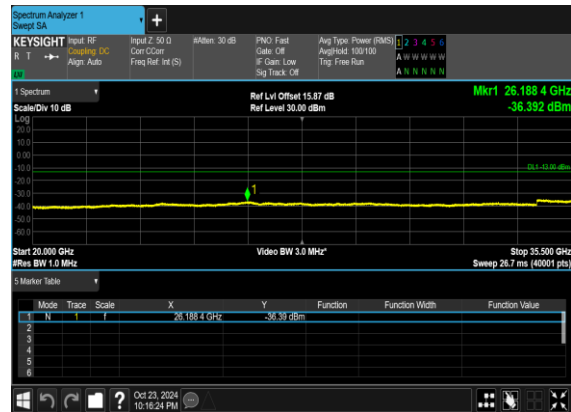
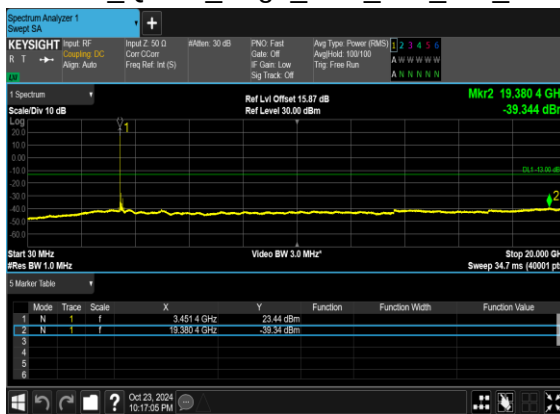
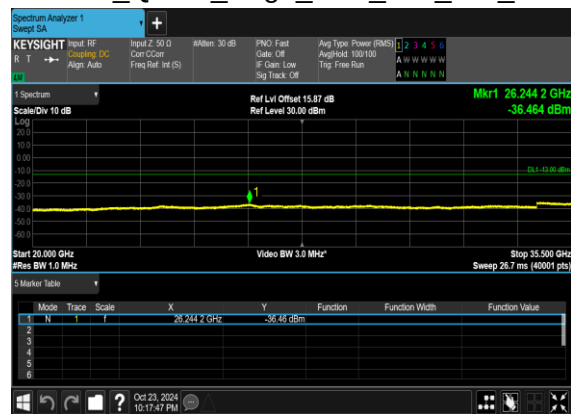


N78(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_High_CH



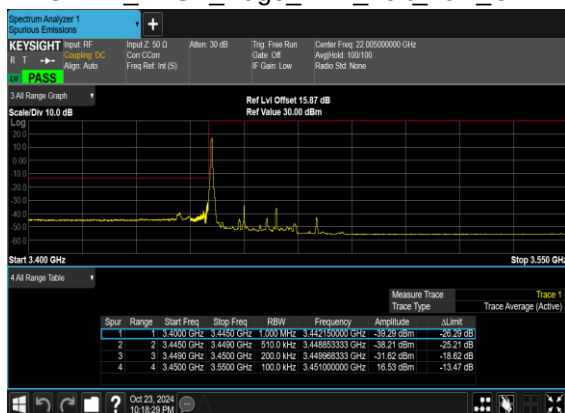
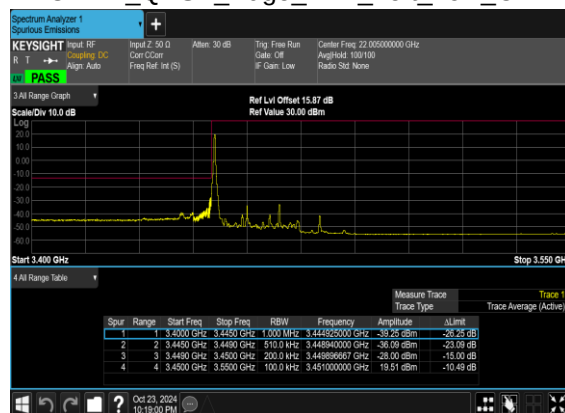
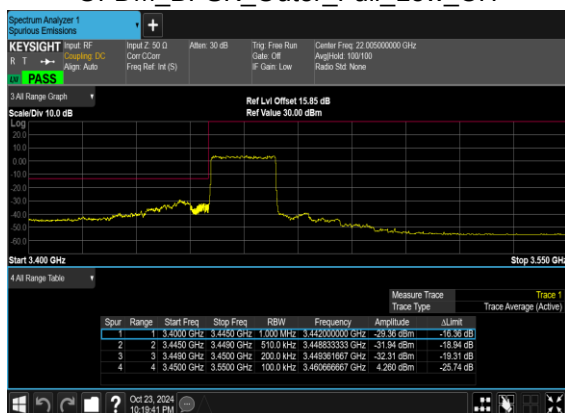
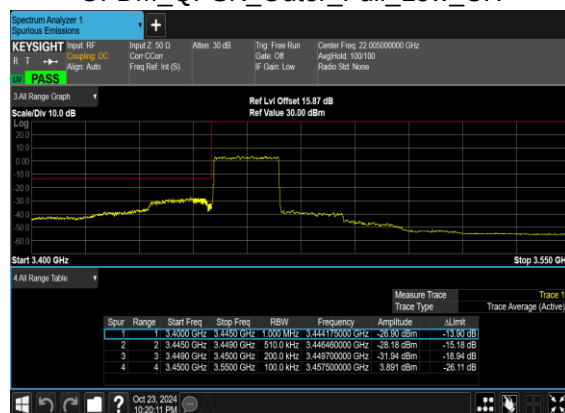
N78(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_High_CH

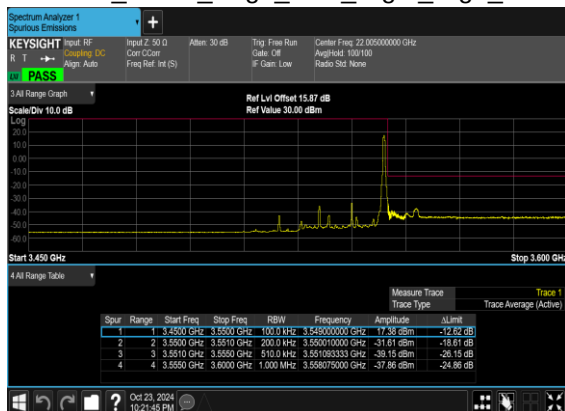
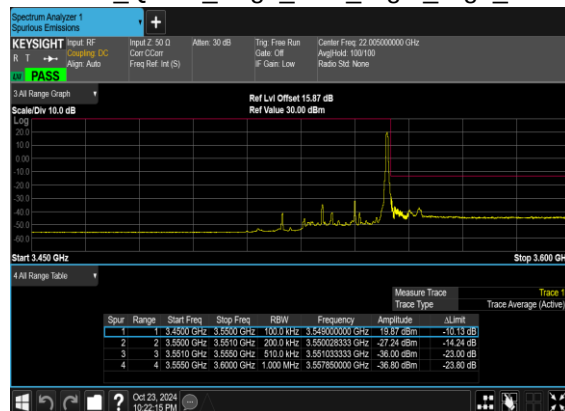
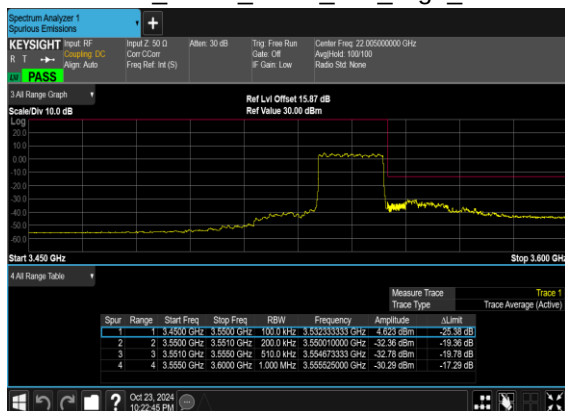
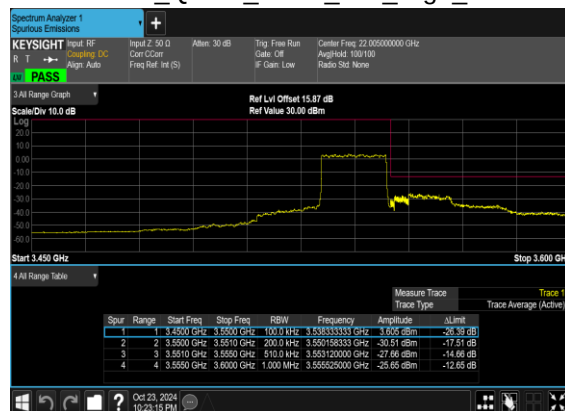


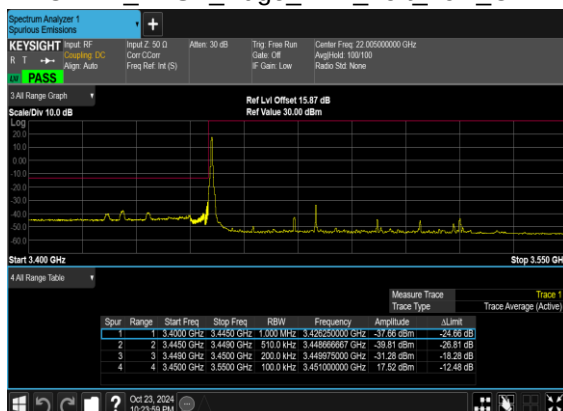
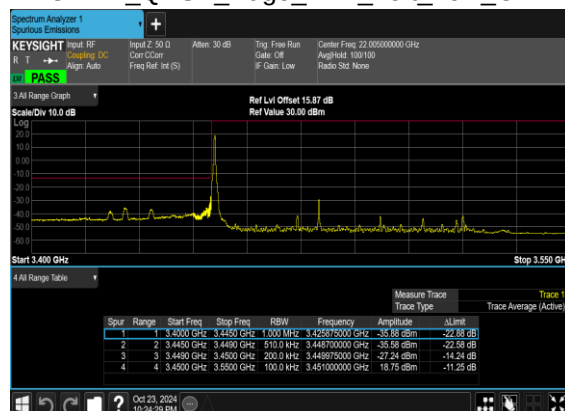
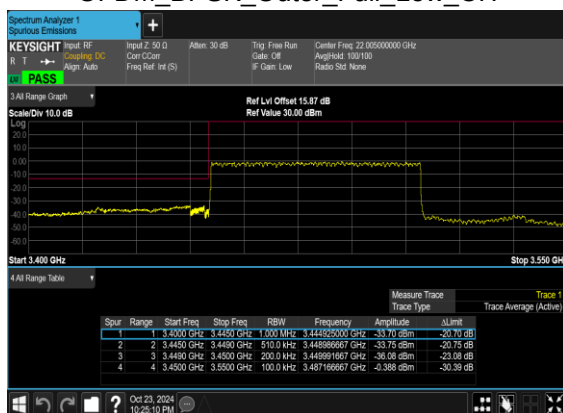
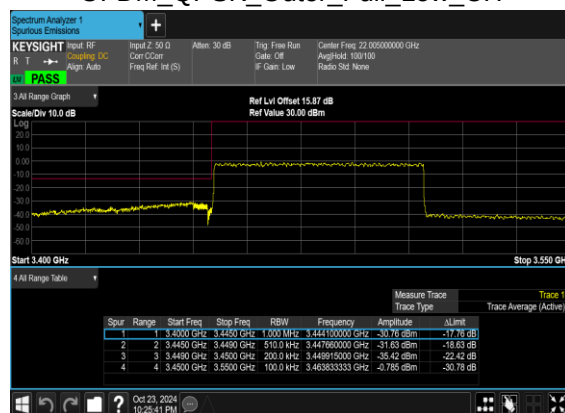
N78(100M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Mid_CHN78(100M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Mid_CHN78(100M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CHN78(100M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CH

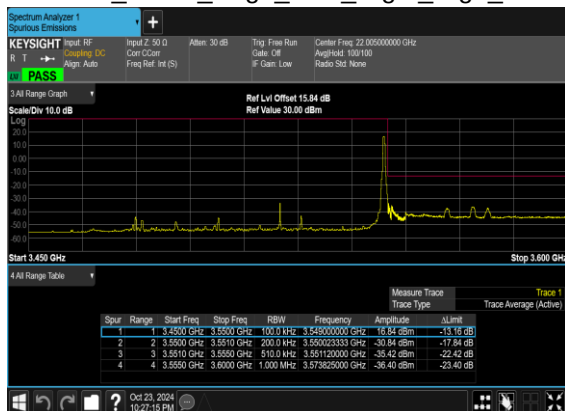
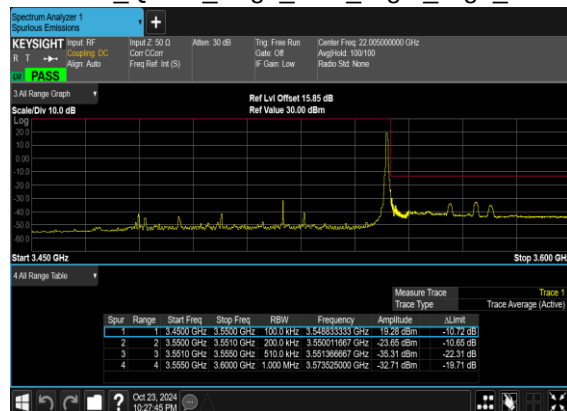
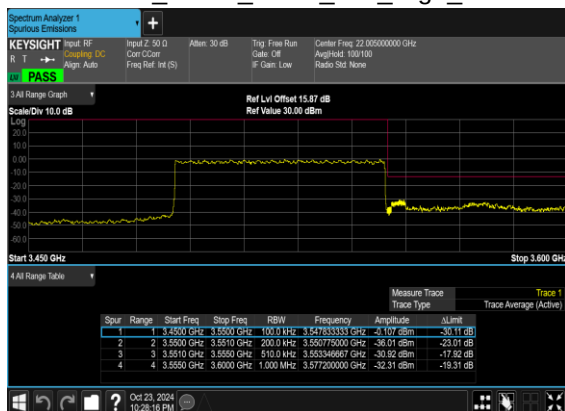
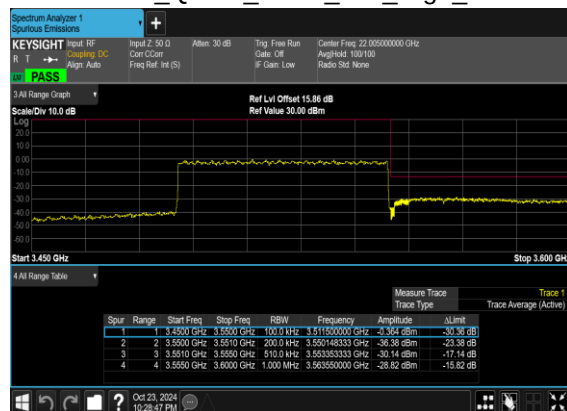
Conducted Band Edge

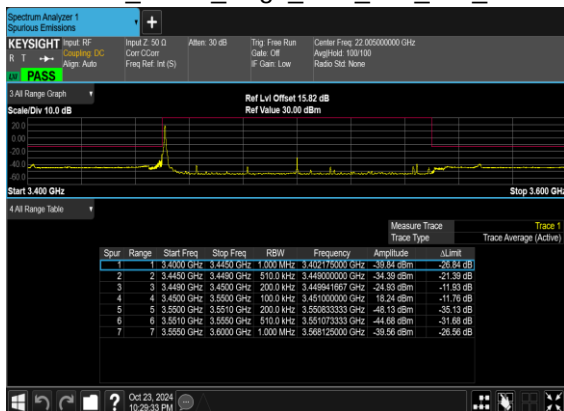
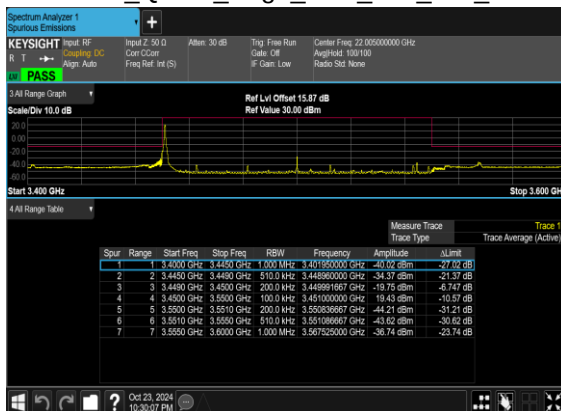
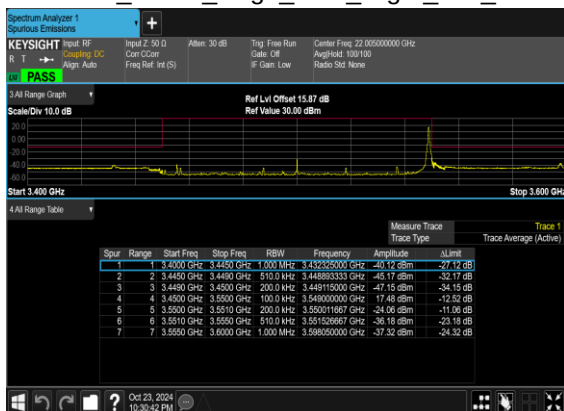
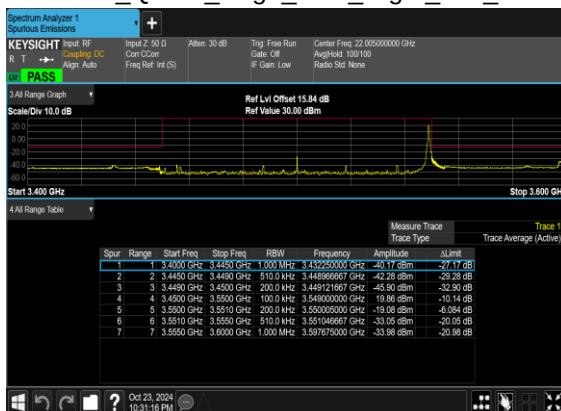
NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
78	30	20	630668	3460.02	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	20	630668	3460.02	DFT-s-OFDM BPSK	50@0	see graph	PASS
78	30	20	630668	3460.02	DFT-s-OFDM QPSK	50@0	see graph	PASS
78	30	20	636000	3540.0	DFT-s-OFDM BPSK	1@50	see graph	PASS
78	30	20	636000	3540.0	DFT-s-OFDM QPSK	1@50	see graph	PASS
78	30	20	636000	3540.0	DFT-s-OFDM BPSK	50@0	see graph	PASS
78	30	20	636000	3540.0	DFT-s-OFDM QPSK	50@0	see graph	PASS
78	30	60	632000	3480.0	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	60	632000	3480.0	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	60	632000	3480.0	DFT-s-OFDM BPSK	162@0	see graph	PASS
78	30	60	632000	3480.0	DFT-s-OFDM QPSK	162@0	see graph	PASS
78	30	60	634666	3519.99	DFT-s-OFDM BPSK	1@161	see graph	PASS
78	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@161	see graph	PASS
78	30	60	634666	3519.99	DFT-s-OFDM BPSK	162@0	see graph	PASS
78	30	60	634666	3519.99	DFT-s-OFDM QPSK	162@0	see graph	PASS
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	PASS
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	PASS
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@272	see graph	PASS
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@272	see graph	PASS
78	30	100	633334	3500.01	DFT-s-OFDM BPSK	270@0	see graph	PASS
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	270@0	see graph	PASS

N78(20M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CHN78(20M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Low_CHN78(20M)_DFT-s-
OFDM_BPSK_Outer_Full_Low_CHN78(20M)_DFT-s-
OFDM_QPSK_Outer_Full_Low_CH

N78(20M)_DFT-s-
OFDM_BPSK_Edge_1RB_Right_High_CHN78(20M)_DFT-s-
OFDM_QPSK_Edge_1RB_Right_High_CHN78(20M)_DFT-s-
OFDM_BPSK_Outer_Full_High_CHN78(20M)_DFT-s-
OFDM_QPSK_Outer_Full_High_CH

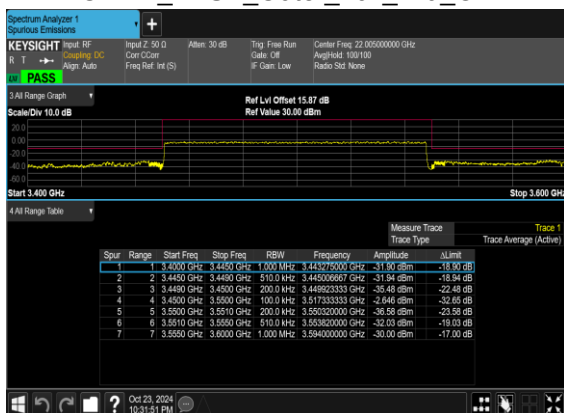
N78(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Low_CHN78(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Low_CHN78(60M)_DFT-s-
OFDM_BPSK_Outer_Full_Low_CHN78(60M)_DFT-s-
OFDM_QPSK_Outer_Full_Low_CH

N78(60M)_DFT-s-
OFDM_BPSK_Edge_1RB_Right_High_CHN78(60M)_DFT-s-
OFDM_QPSK_Edge_1RB_Right_High_CHN78(60M)_DFT-s-
OFDM_BPSK_Outer_Full_High_CHN78(60M)_DFT-s-
OFDM_QPSK_Outer_Full_High_CH

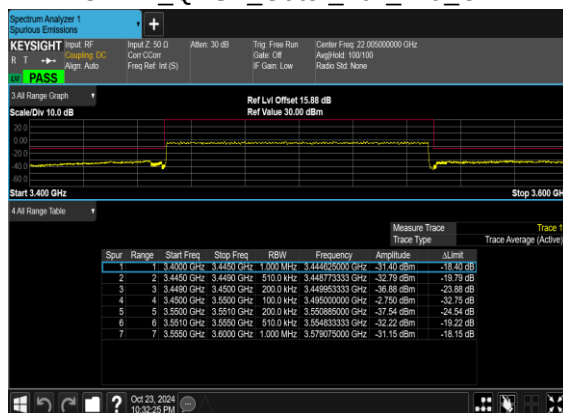
N78(100M)_DFT-s-
OFDM_BPSK_Edge_1RB_Left_Mid_CHN78(100M)_DFT-s-
OFDM_QPSK_Edge_1RB_Left_Mid_CHN78(100M)_DFT-s-
OFDM_BPSK_Edge_1RB_Right_Mid_CHN78(100M)_DFT-s-
OFDM_QPSK_Edge_1RB_Right_Mid_CH



N78(100M)_DFT-s-
OFDM_BPSK_Outer_Full_Mid_CH



N78(100M)_DFT-s-
OFDM_QPSK_Outer_Full_Mid_CH



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	HuaCong Liang	Temperature :	22~25°C
		Relative Humidity :	48~52%

RSE pre-scanned harmonic for different antennas, choose the worst antenna perform final test and record in the report.

5G NR n77 SA / LNR 100MHz / QPSK / ANT9									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	7582.36	-58.15	-13	-45.15	-66.46	-61.45	8.30	11.60	H
	11373.54	-55.28	-13	-42.28	-69.62	-56.80	10.48	12.00	H
	15164.72	-52.56	-13	-39.56	-70.65	-54.26	11.80	13.50	H
	7582.36	-58.31	-13	-45.31	-66.62	-61.61	8.30	11.60	V
	11373.54	-50.98	-13	-37.98	-69.4	-52.50	10.48	12.00	V
	15164.72	-52.41	-13	-39.41	-70.49	-54.11	11.80	13.50	V

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

EN-DC_7A_n77A / LTE 10MHz + NR 100MHz / QPSK / ANT5(LTE) & ANT9(NR)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
NR n77 Middle	6902.42	-54.62	-13	-41.62	-80.82	-57.92	8.30	11.60	H
	10353.63	-51.60	-13	-38.60	-82.82	-53.12	10.48	12.00	H
	13804.84	-50.01	-13	-37.01	-82.14	-51.71	11.80	13.50	H
	6902.42	-53.79	-13	-40.79	-81.27	-57.09	8.30	11.60	V
	10353.63	-49.13	-13	-36.13	-82.15	-50.65	10.48	12.00	V
	13804.84	-51.10	-13	-38.10	-82.04	-52.80	11.80	13.50	V
LTE Band7 Middle	5061.18	-56.70	-25	-31.70	-80.77	-62.26	7.14	12.70	H
	7591.77	-54.80	-25	-29.80	-81.43	-58.10	8.30	11.60	H
	10122.36	-51.66	-25	-26.66	-82.62	-53.18	10.48	12.00	H
	5061.18	-55.65	-25	-30.65	-80.93	-61.21	7.14	12.70	V
	7591.77	-54.98	-25	-29.98	-81.61	-58.28	8.30	11.60	V
	10122.36	-50.58	-25	-25.58	-82.59	-52.10	10.48	12.00	V

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

5G NR n78 SA / LNR 100MHz / QPSK / ANT9									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	7401.00	-57.98	-13	-44.98	-65.82	-61.28	8.30	11.60	H
	11101.50	-54.55	-13	-41.55	-68.93	-56.07	10.48	12.00	H
	14802.00	-52.94	-13	-39.94	-68.94	-54.64	11.80	13.50	H
	7401.00	-57.57	-13	-44.57	-65.38	-60.87	8.30	11.60	V
	11101.50	-52.66	-13	-39.66	-68.97	-54.18	10.48	12.00	V
	14802.00	-52.99	-13	-39.99	-69.27	-54.69	11.80	13.50	V

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

EN-DC_7A_n78A / LTE 10MHz + NR 100MHz / QPSK / ANT5(LTE) & ANT9(NR)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
NR n78 Middle	7401.00	-58.11	-13	-45.11	-65.95	-61.41	8.30	11.60	H
	11101.50	-54.88	-13	-41.88	-69.26	-56.40	10.48	12.00	H
	14802.00	-53.19	-13	-40.19	-69.19	-54.89	11.80	13.50	H
	7401.00	-57.65	-13	-44.65	-65.46	-60.95	8.30	11.60	V
	11101.50	-52.64	-13	-39.64	-68.95	-54.16	10.48	12.00	V
	14802.00	-53.02	-13	-40.02	-69.30	-54.72	11.80	13.50	V
LTE Band7 Middle	5061.18	-62.16	-25	-37.16	-65.19	-67.72	7.14	12.70	H
	7591.77	-58.96	-25	-33.96	-66.20	-62.26	8.30	11.60	H
	10122.36	-56.96	-25	-31.96	-67.96	-58.48	10.48	12.00	H
	5061.18	-61.01	-25	-36.01	-65.25	-66.57	7.14	12.70	V
	7591.77	-58.96	-25	-33.96	-66.2	-62.26	8.30	11.60	V
	10122.36	-55.84	-25	-30.84	-67.89	-57.36	10.48	12.00	V

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