RF MEASUREMENT REPORT

FCC ID:	XMR2023RG520NNA
Applicant:	Quectel Wireless Solutions Co., Ltd
Product:	5G Sub-6 GHz LGA Module
Model No.:	RG520N-NA
Brand Name:	Quectel
FCC Rule(s):	Part 27 Subpart L
Result:	Complies
Received Date:	2024-01-23
Test Date:	2024-01-23 ~ 2024-02-08

Reviewed By: Sunny Sun

Approved By: Robin Wu

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.26-2015. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
2401RSU047-U2	V01	Initial Report	2024-03-18	Valid

Note: This report is prepared for FCC Class II permissive supplement to FCC ID: XMR2023RG520NNA enable 5G NR n70 via SW.

CONTENTS

1. Genneral Information

1.1. Applicant

Quectel Wireless Solutions Co., Ltd

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

1.2. Manufacturer

Quectel Wireless Solutions Co., Ltd

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong)				
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China				
	Laboratory Location (Suzhou - SIP)				
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen)				
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan)				
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: 3261				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	5G Sub-6 GHz LGA Module
Model No.	RG520N-NA
Brand Name	Quectel
IMEI	Conducted Measurement 1: 863109050294995 Conducted Measurement 2: 863109050298111 Conducted Measurement 3: 863109050295893 Radiated Measurement: 863109050298590
3GPP Specification	LTE Band 2/4/5/7/12/13/14/17/25/26/29/30/38/41/42/43/46/48/66/71 NR SA/NSA Band n2/5/7/12/13/14/25/26/29/30/38/41/48/66/70/71/77/78
Temperature Operating Range	-30 ~ 75 °C
Power Supply Rating	3.3 ~ 4.4Vdc, typical 3.8Vdc
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

NR Specification	
TX Frequency Range	n70: 1695 ~ 1710 MHz
RX Frequency Range	n70: 1995 ~ 2020 MHz
Modulation	UL up to 256QAM & DL up to 256QAM
Support Bandwidth	5, 10, 15MHz
Power Class	3

1.6. Description of Available Antennas

Technology	Frequency Range (MHz)	Antenna Type	MaxPeak Gain (dBi)
n70	1695 ~ 1710	Dipole	1.37

Note 1: All antenna information (Antenna type and Peak Gain) is provided by the manufacturer.

Note 2: The typical antennas used to calculate the ERP (EIRP).

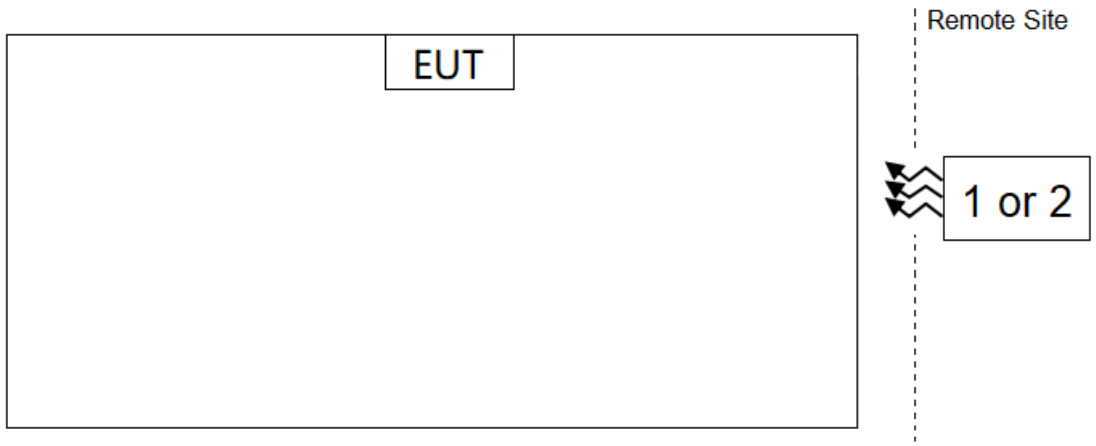
1.7. Test Methodology

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

- ANSI C63.26:2015
- FCC CFR 47 Part 27
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP

2. Test Configuration

2.1. Test System Connection Diagram



Product		Manufacturer	Model No.
1	UXM 5G Wireless Test Platform	Keysight	E7515B
2	Radio Communication Test Station	Anritsu	MT8000A

2.2. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20% ~ 75%RH

3. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2024-09-17	WZ-AC2
Horn Antenna	ETS	3117	MRTSUE06257	1 year	2024-09-23	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2024-11-04	WZ-AC2
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2025-01-11	WZ-AC2
Preamplifier	EMCI	EMC051845SE	MRTSUE06987	1 year	2024-09-07	WZ-AC2
Active Loop Antenna	Schwarzbeck	FMZB 1519-60 D	MRTSUE07076	1 year	2024-12-04	WZ-AC2
Passive Magentic TX Loop Antenna	Schwarzbeck	Cable loop EN 303417	MRTSUE07087	N/A	N/A	WZ-AC2
Test loop antenna	MRT	d-2m	MRTSUE11131	N/A	N/A	WZ-AC2
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2024-05-15	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2024-05-23	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2024-10-11	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2024-05-07	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2024-04-20	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2024-10-25	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11263	1 year	2024-11-07	WZ-AC2
Temperature Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2024-09-27	WZ-TR3
Vibration Test System	DongLing	ES-1-150	MRTSUE06206	1 year	2024-07-02	WZ-TR3
Thermohygrometer	testo	608-H1	MRTSUE11268	1 year	2024-12-14	WZ-TR3
USB Power Sensor	Agilent	U2021XA	MRTSUE06030	1 year	2024-09-27	WZ-SR6
Thermohygrometer	testo	608-H1	MRTSUE06362	1 year	2024-02-14	WZ-SR6
				1 year	2025-02-04	
Shielding Room	HUAMING	WZ-SR6	MRTSUE06443	N/A	N/A	WZ-SR6
Signal Analyzer	Keysight	N9020B	MRTSUE06583	1 year	2024-09-27	WZ-SR6
Signal Generator	Keysight	N5173B	MRTSUE06606	1 year	2024-10-23	WZ-SR6
5G Wireless Test Platform	Keysight	E7515B	MRTSUE06942	1 year	2024-02-29	WZ-SR6
				1 year	2025-02-03	
Radio Communication Test Station	Anritsu	MT8000A	MRTSUE06961	1 year	2024-06-29	WZ-SR6
Directional Coupler	MVE	MVE4912-10	MRTSUE07051	1 year	2024-08-23	WZ
Attenuator	MVE	MVE2365	MRTSUE07070	1 year	2024-11-27	WZ
Attenuator	MVE	MVE2365	MRTSUE07071	1 year	2024-11-27	WZ

Software	Version	Function
EMI V3	V3.0.0	EMI Test Software
Controller_MF 7802	1.02	RE Antenna & Turntable
UXM 5G Automation Toolset	V 7.3	License 4G & 5G
UCTS	V 6.23.217.99	license 3G & 4G & 5G
Agilent Power Analyzer/Agilent Power Panel	VR03.09.00	Power

4. Decision Rules and Measurement Uncertainty

4.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Radiated Spurious Emissions
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Coaxial: 9kHz~30MHz: 2.61dB Coplanar: 9kHz~30MHz: 2.62dB Horizontal: 30MHz~200MHz: 3.79dB 200MHz~1GHz: 3.91dB 1GHz~40GHz: 4.99dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.21dB 1GHz~40GHz: 4.90dB
Conducted Spurious Emissions
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.47dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.66dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 69.28kHz
Frequency Stability
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 8.04Hz

5. Test Result

5.1. Summary

FCC Part Section(s)	Test Description	Test Condition	Verdict
2.1049	Occupied Bandwidth	Conducted	Pass
27.54	Frequency Stability		Pass
27.50(d)(4)	Equivalent (Isotropic) Radiated Power		Pass
27.50(d)(5)	Peak to Average Ratio		Pass
27.53(h)	Band Edge		Pass
27.53(h)	Transmitter Spurious Emission		
27.53(h)	Transmitter Spurious Emission	Radiated	Pass

Notes:

1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2) All supported modulation types were evaluated. The worst-case emission of modulation was selected. Therefore, the Frequency Stability, Channel Band Edge, Conducted & Radiated Spurious Emission were presented worst-case in the test report.
3) For radiated emission tests, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
4) The worst-case scenario for all measurements is based on an engineering evaluation and QPSK was observed as the worst one and set for all conducted and radiated. Output power measurements were measured on DFT-s PI/2 BPSK, DFT-s QPSK, DFT-s 16QAM, DFT-s 64QAM, DFT-s 256QAM, and CP QPSK modulations.

5.2. Occupied Bandwidth Measurement

5.2.1. Test Limit

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

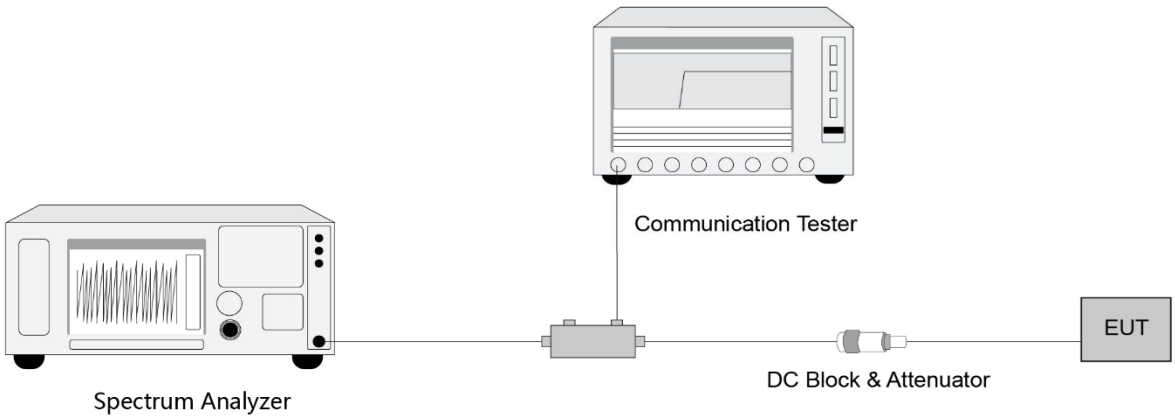
5.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.4.4

5.2.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency
2. RBW = The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW
3. VBW ≥ 3 × RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace to stabilize
8. Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

5.2.4. Test Setup



5.2.5. Test Result

Refer to Appendix A.1.

5.3. Frequency Stability Measurement

5.3.1. Test Limit

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

5.3.2. Test Procedure

ANSI C63.26-2015 - Section 5.6.3

5.3.3. Test Setting

1. Use the occupied bandwidth function of the instrument and record the low edge for low channel occupancy bandwidth and the high edge for high channel occupancy bandwidth.
2. Change the temperature of equipment and repeat Steps 1.
3. Change the Voltage of equipment and repeat Steps 1.
4. Use the frequency error function of the instrument and record the frequency error.
5. Change the temperature of equipment and repeat Steps 4.
6. Change the Voltage of equipment and repeat Steps 4.

Frequency Stability Under Temperature Variations:

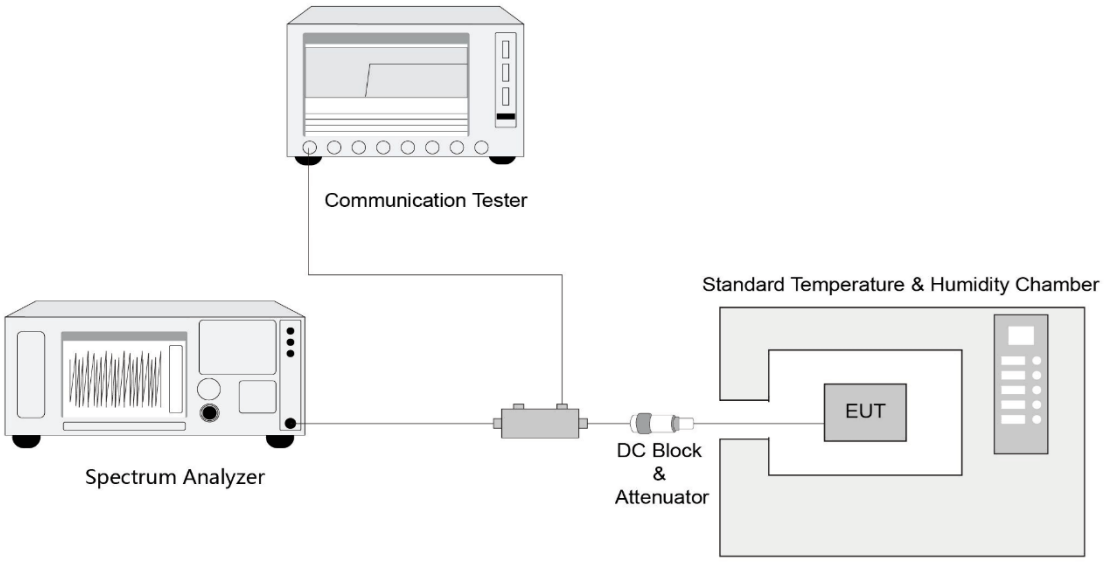
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, recordthe maximum frequency change.

5.3.4. Test Setup



5.3.5. Test Result

Refer to Appendix A.2.

5.4. Equivalent Isotropically Radiated Power Measurement

5.4.1. Test Limit

The EIRP of mobile transmitters must not exceed 1 watt for n70.

5.4.2. Test Procedure

ANSI C63.26-2015 - Section 5.2.4.2

5.4.3. Test Setting

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

EIRP & EIRP Measurement

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

ERP or EIRP = P_{Meas} + G_T

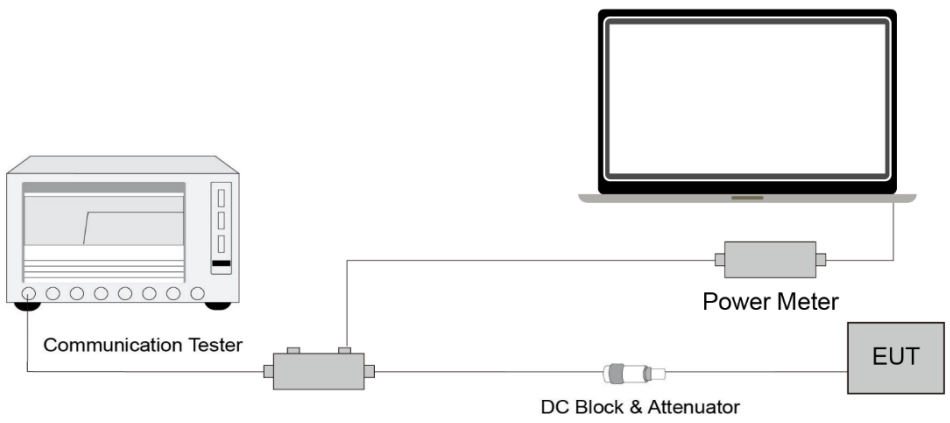
where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

5.4.4. Test Setup



5.4.5. Test Result

Refer to Appendix A.3.

5.5. Peak to Average Ratio Measurement

5.5.1. Test Limit

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.
In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

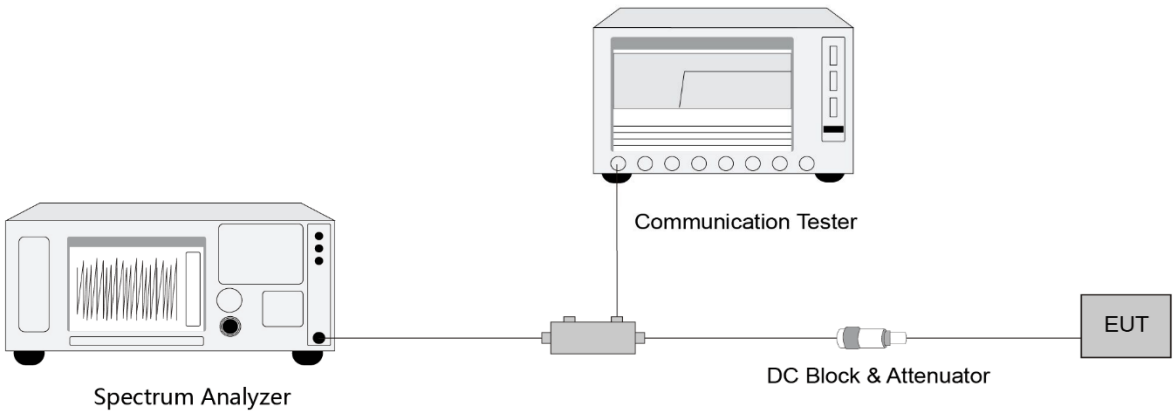
5.5.2. Test Procedure

ANSI C63.26-2015 - Section 5.2.3.4 (CCDF).

5.5.3. Test Setting

1. Set the resolution / measurement bandwidth ≥ signal's occupied bandwidth
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Record the maximum PARR level associated with a probability of 0.1%

5.5.4. Test Setup



5.5.5. Test Result

Refer to Appendix A.4.

5.6. Band Edge Measurement

5.6.1. Test Limit

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz 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.

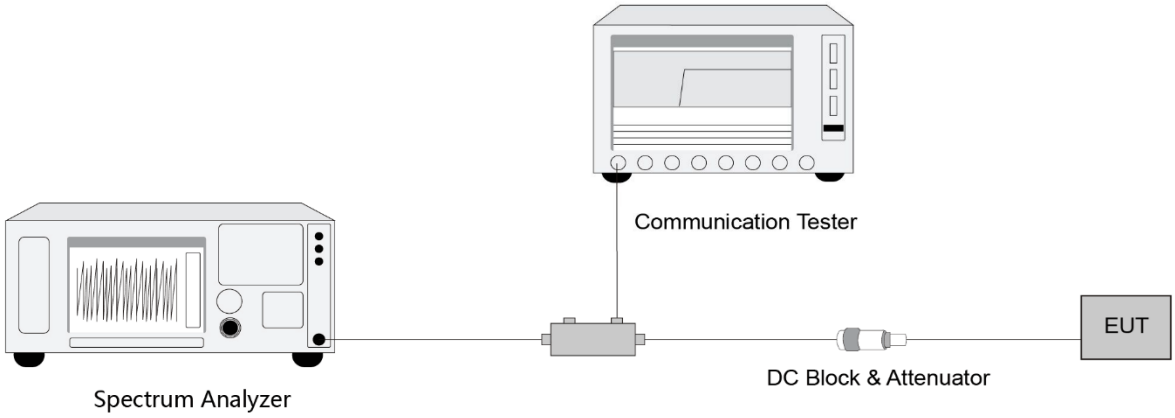
5.6.2. Test Procedure

ANSI C63.26-2015 - Section 5.7

5.6.3. Test Setting

1. Set the analyzer frequency to low or high channel
2. RBW ≥ The nominal RBW shall be in the range of 1% of the anticipated OBW (in the 1MHz band immediately outside and adjacent to the band edge). For improvement of the accuracy in the measurement of the average power of a noise-like emission, a RBW narrower than the specified reference bandwidth can be used (generally limited to no less than 1% of the OBW), provided that a subsequent integration is performed over the full required measurement bandwidth. This integration should be performed using the spectrum analyzer’s band power functions.
3. VBW ≥ 3*RBW
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to “free run.”
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

5.6.4. Test Setup



5.6.5. Test Result

Refer to Appendix A.5.

5.7. Conducted Spurious Emissions Measurement

5.7.1. Test Limit

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz 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.

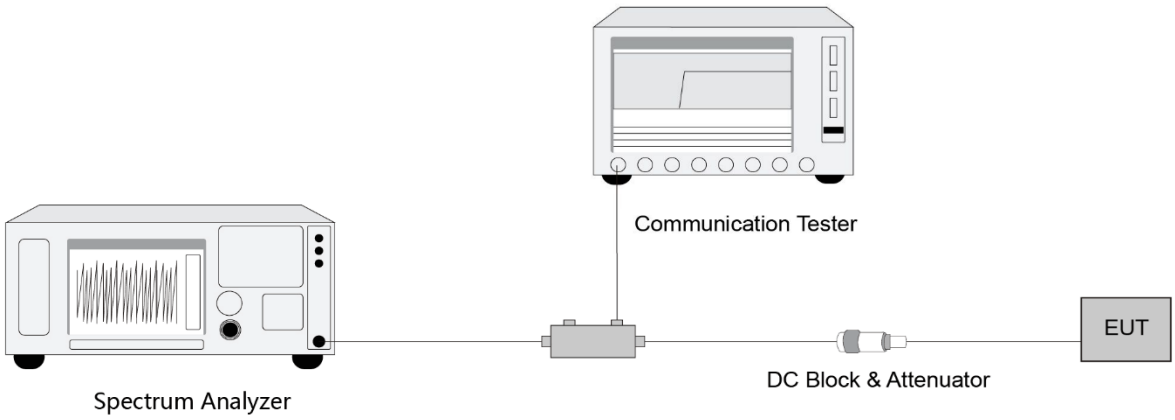
5.7.2. Test Procedure

ANSI C63.26-2015 - Section 5.7

5.7.3. Test Setting

1. Set the analyzer frequency to low, mid, high channel.
2. RBW = 1MHz
3. VBW ≥ 3*RBW
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to “free run.”
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power.
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

5.7.4. Test Setup



5.7.5. Test Result

Refer to Appendix A.6.

5.8. Radiated Spurious Emissions Measurement

5.8.1. Test Limit

Out of band emissions: The powerof any emission outside of theauthorized operating frequency ranges must be attenuated below the transmitting power (P) by a factorof at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

E (dBμV/m) = EIRP (dBm) - 20 log D + 104.8; where D is the measurement distance in meters. The emission limit equal to 82.3dBμV/m.

5.8.2. Test Procedure

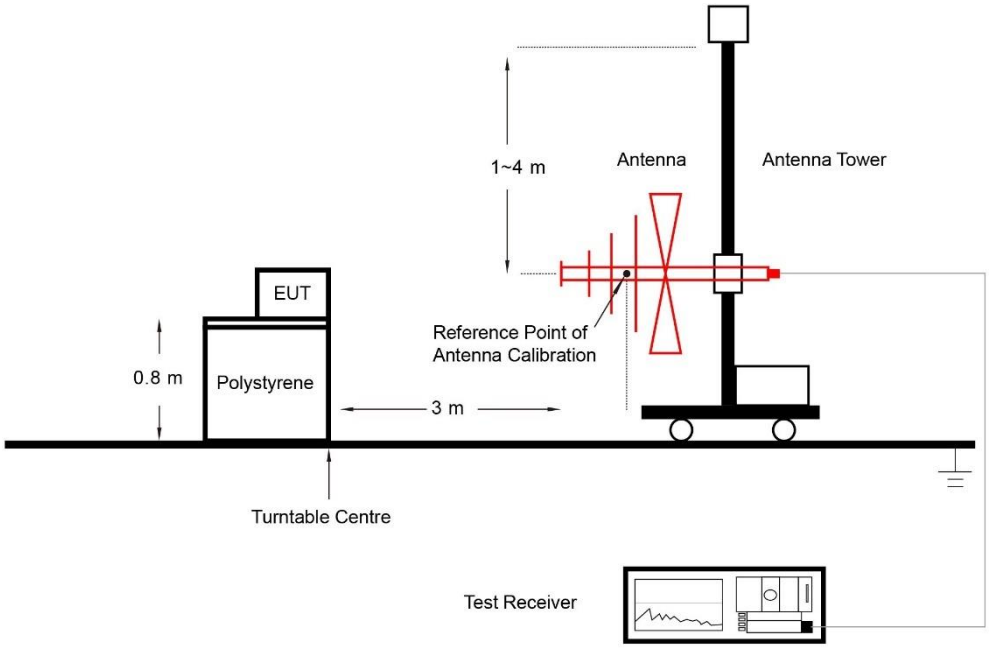
ANSI C63.26-2015 - Section 5.2.7 & 5.5

5.8.3. Test Setting

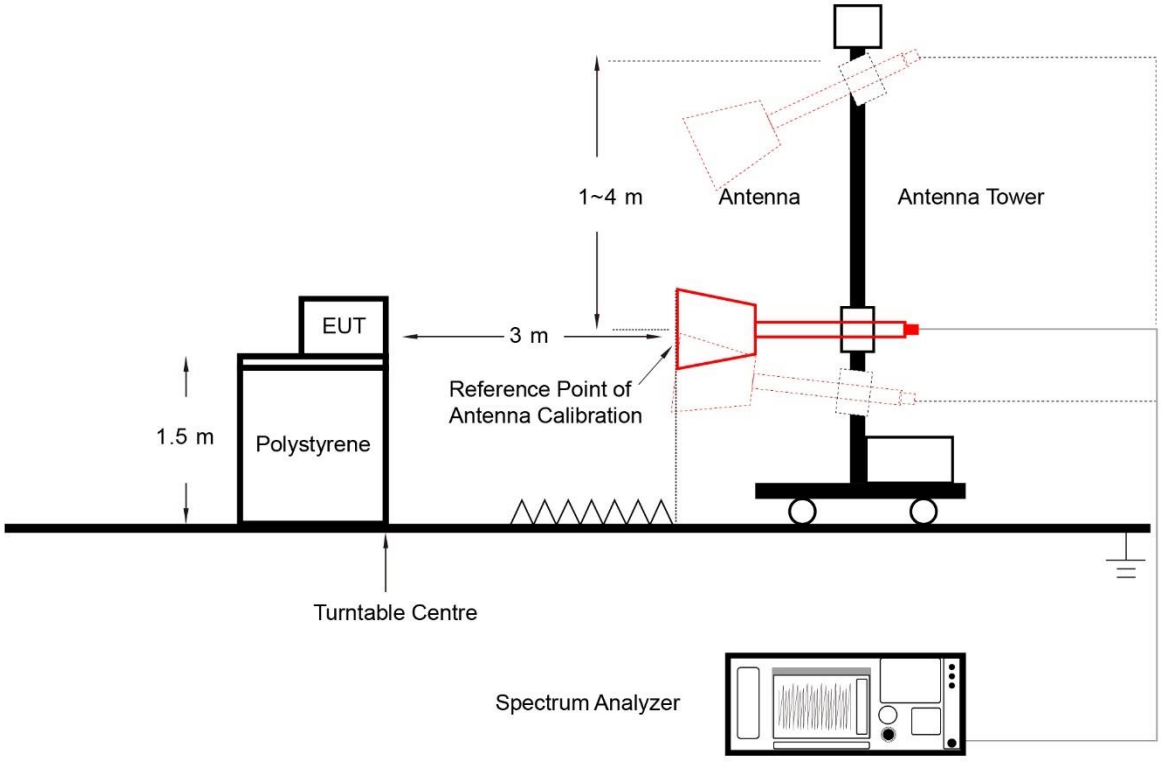
1. RBW = 100KHz or 1MHz
2. VBW≥ 3*RBW
3. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period)
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

5.8.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.8.5. Test Result

Refer to Appendix A.7.

Appendix A - Test Result

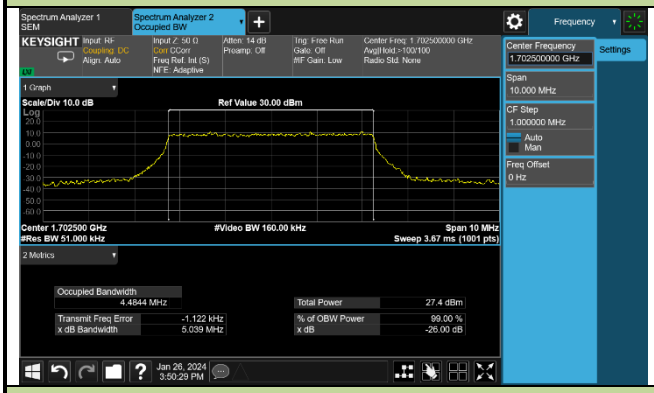
A.1 Occupied Bandwidth Test Result

Test Site	WZ-SR6	Test Engineer	Lucas Wang
Test Date	2024-01-26	Test Band	n70

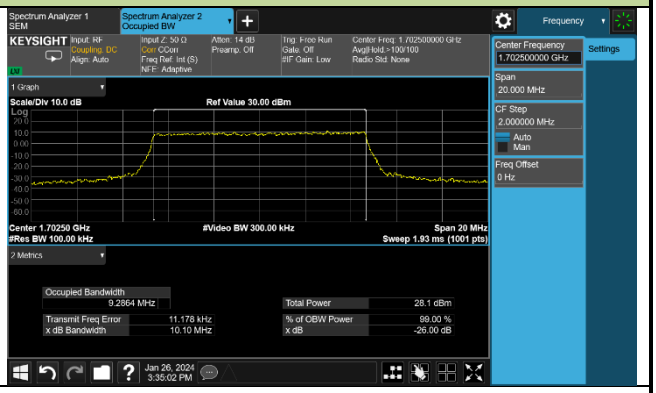
Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
CP-OFDM QPSK		
1702.5	5	4.4844
1702.5	10	9.2864
1702.5	15	14.101
CP-OFDM 16QAM		
1702.5	5	4.4795
1702.5	10	9.2933
1702.5	15	14.102
CP-OFDM 64QAM		
1702.5	5	4.4757
1702.5	10	9.2927
1702.5	15	14.132
CP-OFDM 256QAM		
1702.5	5	4.4817
1702.5	10	9.3058
1702.5	15	14.115

99% Bandwidth – CP OFDM QPSK

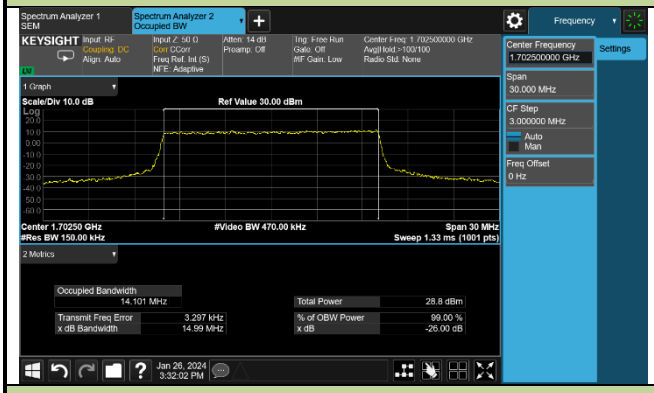
5MHz Channel Bandwidth



10MHz Channel Bandwidth

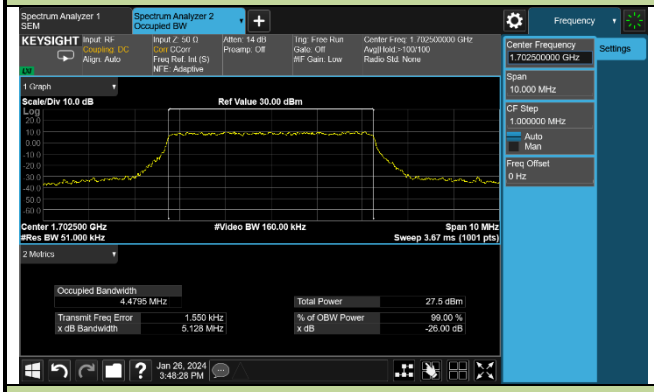


15MHz Channel Bandwidth

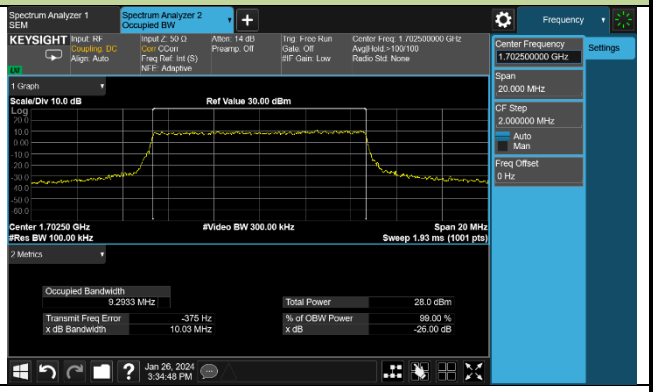


99% Bandwidth – CP OFDM 16QAM

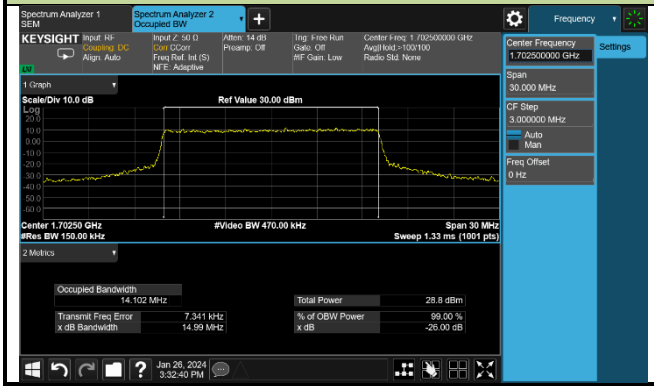
5MHz Channel Bandwidth

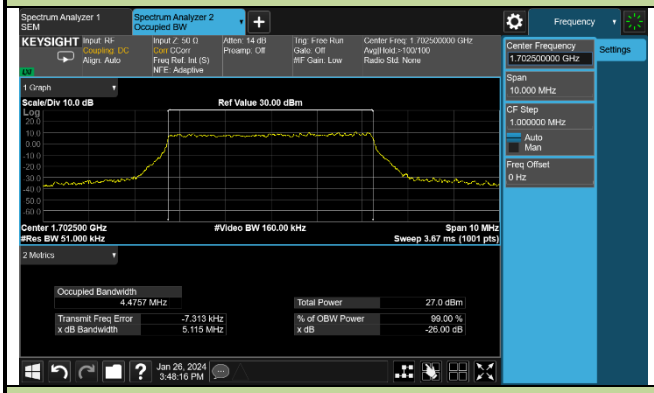
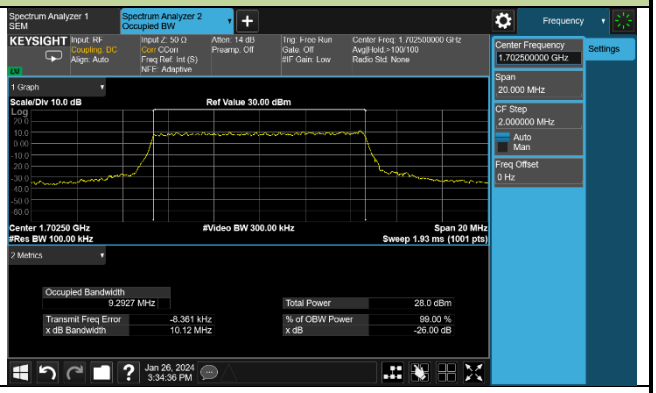
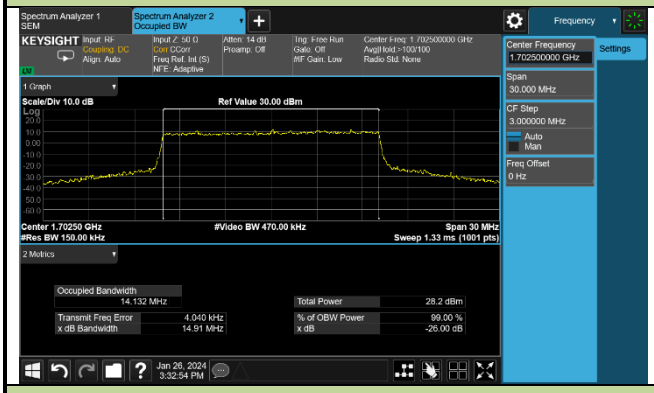


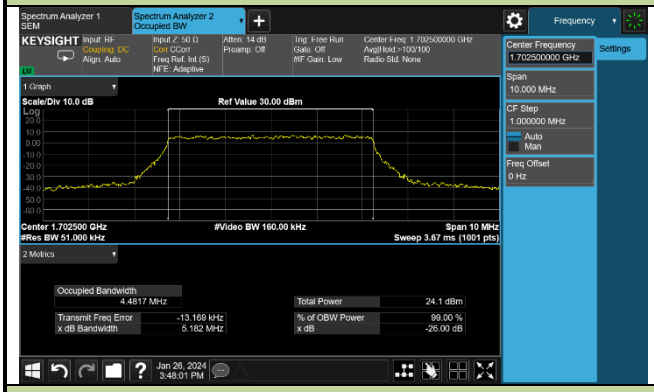
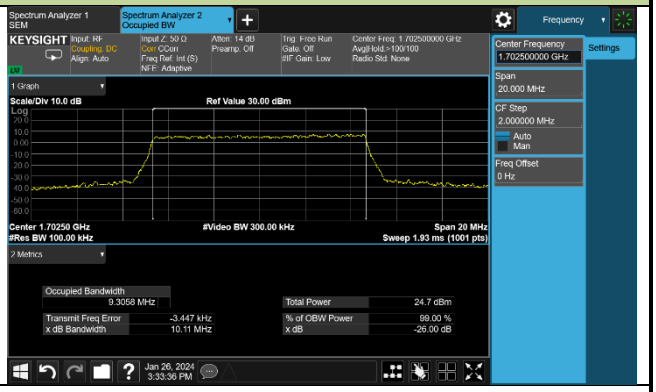
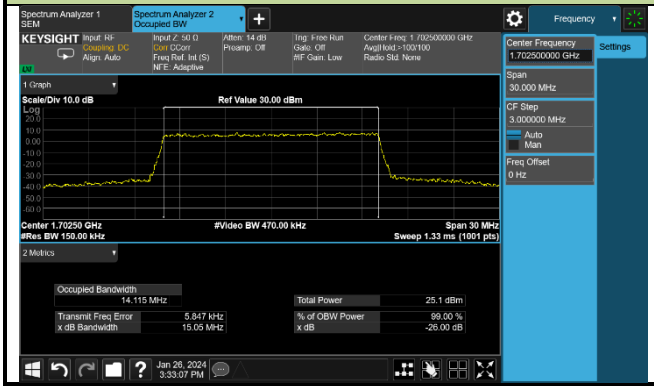
10MHz Channel Bandwidth



15MHz Channel Bandwidth



99% Bandwidth – CP OFDM 64QAM	
5MHz Channel Bandwidth	10MHz Channel Bandwidth
	
15MHz Channel Bandwidth	
	

99% Bandwidth – CP OFDM 256QAM	
5MHz Channel Bandwidth	10MHz Channel Bandwidth
	
15MHz Channel Bandwidth	
	

A.2 Frequency Stability Test Result

Test Site	WZ-TR3	Test Engineer	Lucas Wang
Test Date	2024-02-08	Test Band	n70

Voltage	Temp (°C)	Frequency Range (MHz)		Delta (Hz)	Frequency stability (ppm)	Within Authorized Frequency Block
		1695	1710			
		f_L	f_H			
Normal	+ 20 (Ref)	1695.0700	1709.9000	0.00	0.0000	Pass
	+ 50	1695.0700	1709.9000	-0.63	-0.0004	Pass
	+ 40	1695.0700	1709.9000	-2.48	-0.0015	Pass
	+ 30	1695.0700	1709.9000	-3.54	-0.0021	Pass
	+ 10	1695.0700	1709.9000	-1.54	-0.0009	Pass
	0	1695.0700	1709.9000	-0.47	-0.0003	Pass
	- 10	1695.0700	1709.9000	-1.66	-0.0010	Pass
	- 20	1695.0700	1709.9000	1.24	0.0007	Pass
	- 30	1695.0700	1709.9000	0.91	0.0005	Pass
15%	+ 20	1695.0700	1709.9000	2.32	0.0014	Pass
-15%	+ 20	1695.0700	1709.9000	-2.11	-0.0012	Pass

A.3 Equivalent Isotropically Radiated Power Test Result

Test Site	WZ-SR6	Test Engineer	Lucas Wang
Test Date	2024-01-26	Test Band	n70

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM PI/2 BPSK						
1697.5	5	12	6	23.88	25.25	< 30.00
		1	1	23.91	25.28	< 30.00
		1	23	23.93	25.30	< 30.00
		25	0	23.34	24.71	< 30.00
		1	24	23.40	24.77	< 30.00
		1	0	23.40	24.77	< 30.00
1702.5	5	12	6	23.85	25.22	< 30.00
		1	1	23.86	25.23	< 30.00
		1	23	23.89	25.26	< 30.00
		25	0	23.34	24.71	< 30.00
		1	24	23.38	24.75	< 30.00
		1	0	23.36	24.73	< 30.00
1707.5	5	12	6	23.83	25.20	< 30.00
		1	1	23.89	25.26	< 30.00
		1	23	23.82	25.19	< 30.00
		25	0	23.36	24.73	< 30.00
		1	24	23.42	24.79	< 30.00
		1	0	23.34	24.71	< 30.00
1700.0	10	25	12	23.84	25.21	< 30.00
		1	1	23.80	25.17	< 30.00
		1	50	23.92	25.29	< 30.00
		50	0	23.35	24.72	< 30.00
		1	51	23.32	24.69	< 30.00
		1	0	23.40	24.77	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM PI/2 BPSK						
1702.5	10	25	12	23.86	25.23	< 30.00
		1	1	23.81	25.18	< 30.00
		1	50	23.87	25.24	< 30.00
		50	0	23.36	24.73	< 30.00
		1	51	23.31	24.68	< 30.00
		1	0	23.40	24.77	< 30.00
1705.0	10	25	12	23.85	25.22	< 30.00
		1	1	23.95	25.32	< 30.00
		1	50	23.77	25.14	< 30.00
		50	0	23.35	24.72	< 30.00
		1	51	23.31	24.68	< 30.00
		1	0	23.23	24.60	< 30.00
1702.5	15	36	18	23.89	25.26	< 30.00
		1	1	23.89	25.26	< 30.00
		1	77	23.98	25.35	< 30.00
		75	0	23.45	24.82	< 30.00
		1	78	23.40	24.77	< 30.00
		1	0	23.45	24.82	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM QPSK						
1697.5	5	12	6	23.78	25.15	< 30.00
		1	1	23.82	25.19	< 30.00
		1	23	23.84	25.21	< 30.00
		25	0	22.86	24.23	< 30.00
		1	24	22.83	24.20	< 30.00
		1	0	22.87	24.24	< 30.00
1702.5	5	12	6	23.78	25.15	< 30.00
		1	1	23.94	25.31	< 30.00
		1	23	23.85	25.22	< 30.00
		25	0	22.80	24.17	< 30.00
		1	24	22.94	24.31	< 30.00
		1	0	22.89	24.26	< 30.00
1707.5	5	12	6	23.82	25.19	< 30.00
		1	1	23.86	25.23	< 30.00
		1	23	23.76	25.13	< 30.00
		25	0	22.84	24.21	< 30.00
		1	24	22.87	24.24	< 30.00
		1	0	22.81	24.18	< 30.00
1700.0	10	25	12	23.94	25.31	< 30.00
		1	1	23.81	25.18	< 30.00
		1	50	23.84	25.21	< 30.00
		50	0	22.84	24.21	< 30.00
		1	51	22.78	24.15	< 30.00
		1	0	22.89	24.26	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM QPSK						
1702.5	10	25	12	23.83	25.20	< 30.00
		1	1	23.93	25.30	< 30.00
		1	50	23.84	25.21	< 30.00
		50	0	22.85	24.22	< 30.00
		1	51	22.77	24.14	< 30.00
		1	0	22.85	24.22	< 30.00
1705.0	10	25	12	23.84	25.21	< 30.00
		1	1	23.87	25.24	< 30.00
		1	50	23.74	25.11	< 30.00
		50	0	22.84	24.21	< 30.00
		1	51	22.74	24.11	< 30.00
		1	0	22.73	24.10	< 30.00
1702.5	15	36	18	23.89	25.26	< 30.00
		1	1	23.86	25.23	< 30.00
		1	77	23.96	25.33	< 30.00
		75	0	22.91	24.28	< 30.00
		1	78	22.88	24.25	< 30.00
		1	0	22.95	24.32	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM 16QAM						
1697.5	5	12	6	22.99	24.36	< 30.00
		1	1	22.86	24.23	< 30.00
		1	23	22.93	24.30	< 30.00
		25	0	21.87	23.24	< 30.00
		1	24	21.90	23.27	< 30.00
		1	0	21.95	23.32	< 30.00
1702.5	5	12	6	22.97	24.34	< 30.00
		1	1	22.82	24.19	< 30.00
		1	23	22.86	24.23	< 30.00
		25	0	21.86	23.23	< 30.00
		1	24	21.85	23.22	< 30.00
		1	0	21.90	23.27	< 30.00
1707.5	5	12	6	23.01	24.38	< 30.00
		1	1	22.91	24.28	< 30.00
		1	23	22.77	24.14	< 30.00
		25	0	21.81	23.18	< 30.00
		1	24	21.82	23.19	< 30.00
		1	0	21.78	23.15	< 30.00
1700.0	10	25	12	22.96	24.33	< 30.00
		1	1	22.82	24.19	< 30.00
		1	50	22.89	24.26	< 30.00
		50	0	21.85	23.22	< 30.00
		1	51	21.82	23.19	< 30.00
		1	0	21.87	23.24	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM 16QAM						
1702.5	10	25	12	22.92	24.29	< 30.00
		1	1	22.87	24.24	< 30.00
		1	50	22.86	24.23	< 30.00
		50	0	21.86	23.23	< 30.00
		1	51	21.82	23.19	< 30.00
		1	0	21.84	23.21	< 30.00
1705.0	10	25	12	22.93	24.30	< 30.00
		1	1	22.84	24.21	< 30.00
		1	50	22.77	24.14	< 30.00
		50	0	21.87	23.24	< 30.00
		1	51	21.83	23.20	< 30.00
		1	0	21.71	23.08	< 30.00
1702.5	15	36	18	22.95	24.32	< 30.00
		1	1	22.83	24.20	< 30.00
		1	77	22.93	24.30	< 30.00
		75	0	21.99	23.36	< 30.00
		1	78	21.83	23.20	< 30.00
		1	0	21.92	23.29	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM 64QAM						
1697.5	5	12	6	21.42	22.79	< 30.00
		1	1	21.56	22.93	< 30.00
		1	23	21.58	22.95	< 30.00
		25	0	21.38	22.75	< 30.00
		1	24	21.54	22.91	< 30.00
		1	0	21.59	22.96	< 30.00
1702.5	5	12	6	21.42	22.79	< 30.00
		1	1	21.51	22.88	< 30.00
		1	23	21.52	22.89	< 30.00
		25	0	21.35	22.72	< 30.00
		1	24	21.56	22.93	< 30.00
		1	0	21.55	22.92	< 30.00
1707.5	5	12	6	21.32	22.69	< 30.00
		1	1	21.53	22.90	< 30.00
		1	23	21.52	22.89	< 30.00
		25	0	21.28	22.65	< 30.00
		1	24	21.45	22.82	< 30.00
		1	0	21.49	22.86	< 30.00
1700.0	10	25	12	21.40	22.77	< 30.00
		1	1	21.53	22.90	< 30.00
		1	50	21.45	22.82	< 30.00
		50	0	21.37	22.74	< 30.00
		1	51	21.50	22.87	< 30.00
		1	0	21.46	22.83	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM 64QAM						
1702.5	10	25	12	21.35	22.72	< 30.00
		1	1	21.50	22.87	< 30.00
		1	50	21.60	22.97	< 30.00
		50	0	21.37	22.74	< 30.00
		1	51	21.46	22.83	< 30.00
		1	0	21.47	22.84	< 30.00
1705.0	10	25	12	21.38	22.75	< 30.00
		1	1	21.53	22.90	< 30.00
		1	50	21.47	22.84	< 30.00
		50	0	21.37	22.74	< 30.00
		1	51	21.51	22.88	< 30.00
		1	0	21.47	22.84	< 30.00
1702.5	15	36	18	21.44	22.81	< 30.00
		1	1	21.58	22.95	< 30.00
		1	77	21.68	23.05	< 30.00
		75	0	21.46	22.83	< 30.00
		1	78	21.55	22.92	< 30.00
		1	0	21.68	23.05	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM 256QAM						
1697.5	5	12	6	19.36	20.73	< 30.00
		1	1	18.76	20.13	< 30.00
		1	23	18.80	20.17	< 30.00
		25	0	19.24	20.61	< 30.00
		1	24	18.73	20.10	< 30.00
		1	0	18.80	20.17	< 30.00
1702.5	5	12	6	19.32	20.69	< 30.00
		1	1	18.85	20.22	< 30.00
		1	23	18.87	20.24	< 30.00
		25	0	19.27	20.64	< 30.00
		1	24	18.82	20.19	< 30.00
		1	0	18.87	20.24	< 30.00
1707.5	5	12	6	19.34	20.71	< 30.00
		1	1	18.88	20.25	< 30.00
		1	23	18.80	20.17	< 30.00
		25	0	19.23	20.60	< 30.00
		1	24	18.75	20.12	< 30.00
		1	0	18.80	20.17	< 30.00
1700.0	10	25	12	19.33	20.70	< 30.00
		1	1	18.81	20.18	< 30.00
		1	50	18.77	20.14	< 30.00
		50	0	19.35	20.72	< 30.00
		1	51	18.79	20.16	< 30.00
		1	0	18.75	20.12	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
DFT-s OFDM 256QAM						
1702.5	10	25	12	19.26	20.63	< 30.00
		1	1	18.77	20.14	< 30.00
		1	50	18.75	20.12	< 30.00
		50	0	19.31	20.68	< 30.00
		1	51	18.78	20.15	< 30.00
		1	0	18.75	20.12	< 30.00
1705.0	10	25	12	19.28	20.65	< 30.00
		1	1	18.79	20.16	< 30.00
		1	50	18.77	20.14	< 30.00
		50	0	19.33	20.70	< 30.00
		1	51	18.79	20.16	< 30.00
		1	0	18.76	20.13	< 30.00
1702.5	15	36	18	19.36	20.73	< 30.00
		1	1	18.81	20.18	< 30.00
		1	77	18.96	20.33	< 30.00
		75	0	19.41	20.78	< 30.00
		1	78	18.82	20.19	< 30.00
		1	0	18.93	20.30	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
CP OFDM QPSK						
1697.5	5	13	6	22.37	23.74	< 30.00
		1	1	22.22	23.59	< 30.00
		1	23	22.30	23.67	< 30.00
		25	0	20.84	22.21	< 30.00
		1	24	20.79	22.16	< 30.00
		1	0	20.83	22.20	< 30.00
1702.5	5	13	6	22.43	23.80	< 30.00
		1	1	22.31	23.68	< 30.00
		1	23	22.35	23.72	< 30.00
		25	0	20.89	22.26	< 30.00
		1	24	20.85	22.22	< 30.00
		1	0	20.90	22.27	< 30.00
1707.5	5	13	6	22.37	23.74	< 30.00
		1	1	22.35	23.72	< 30.00
		1	23	22.27	23.64	< 30.00
		25	0	20.81	22.18	< 30.00
		1	24	20.76	22.13	< 30.00
		1	0	20.77	22.14	< 30.00
1700.0	10	26	13	22.33	23.70	< 30.00
		1	1	22.25	23.62	< 30.00
		1	50	22.31	23.68	< 30.00
		52	0	20.91	22.28	< 30.00
		1	51	20.79	22.16	< 30.00
		1	0	20.75	22.12	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

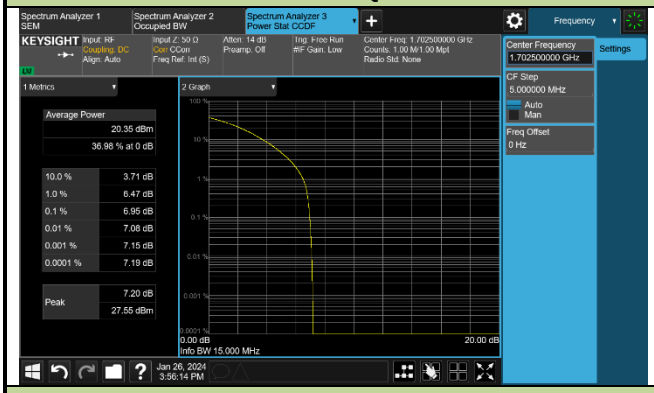
Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
CP OFDM QPSK						
1702.5	10	26	13	22.33	23.70	< 30.00
		1	1	22.25	23.62	< 30.00
		1	50	22.19	23.56	< 30.00
		52	0	20.88	22.25	< 30.00
		1	51	20.76	22.13	< 30.00
		1	0	20.73	22.10	< 30.00
1705.0	10	26	13	22.35	23.72	< 30.00
		1	1	22.24	23.61	< 30.00
		1	50	22.23	23.60	< 30.00
		52	0	20.86	22.23	< 30.00
		1	51	20.76	22.13	< 30.00
		1	0	20.74	22.11	< 30.00
1702.5	15	39	19	22.40	23.77	< 30.00
		1	1	22.34	23.71	< 30.00
		1	77	22.50	23.87	< 30.00
		79	0	20.96	22.33	< 30.00
		1	78	20.88	22.25	< 30.00
		1	0	20.99	22.36	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)						

A.4 Peak to Average Ratio Test Result

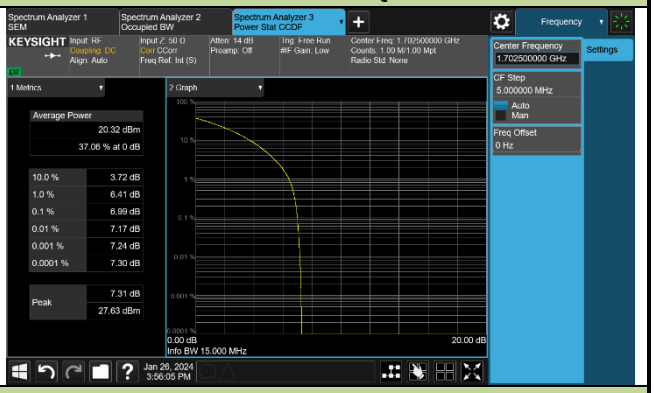
Test Site	WZ-SR6	Test Engineer	Lucas Wang
Test Date	2024-01-26	Test Band	n70_SA

Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
CP OFDM QPSK				
1702.5	15	6.95	≤ 13.00	Pass
CP OFDM 16QAM				
1702.5	15	6.99	≤ 13.00	Pass
CP OFDM 64QAM				
1702.5	15	7.53	≤ 13.00	Pass
CP OFDM 256QAM				
1702.5	15	8.42	≤ 13.00	Pass

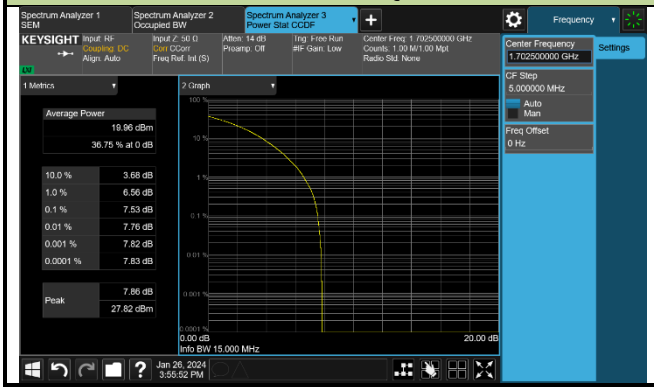
CP OFDM QPSK



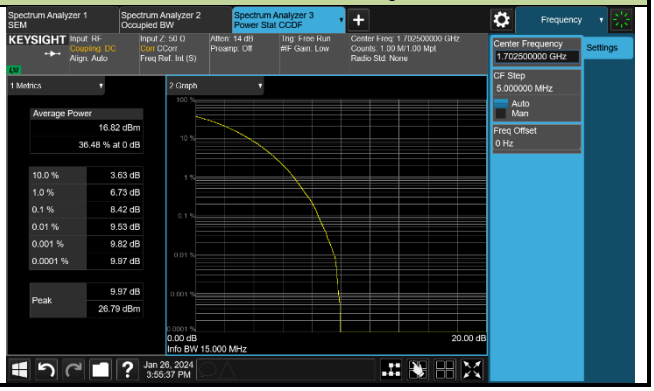
CP OFDM 16QAM



CP OFDM 64QAM



CP OFDM 256QAM

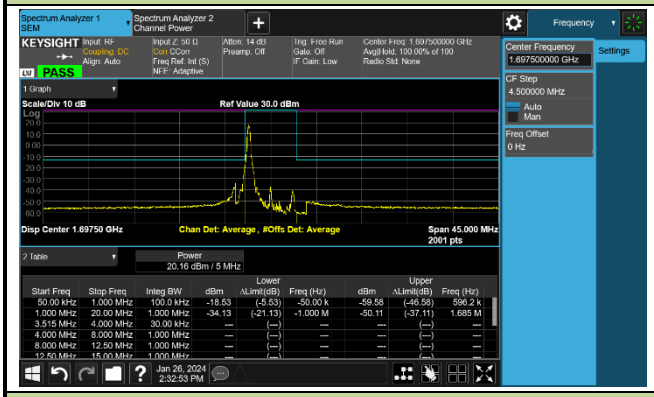


A.5 Band Edge Test Result

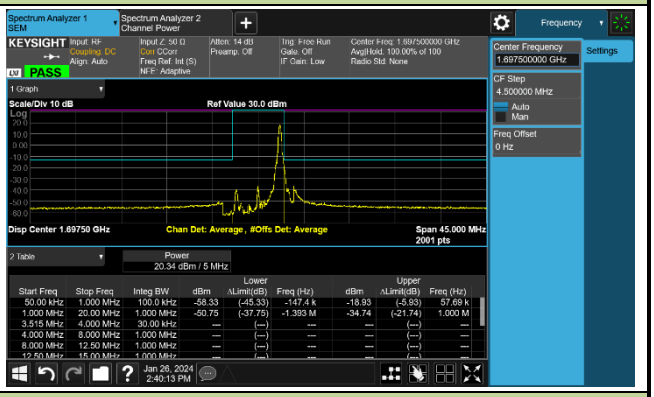
Test Site	WZ-SR6	Test Engineer	Lucas Wang
Test Date	2024-01-26	Test Band	n70 CP OFDM QPSK

5MHz Channel Bandwidth - 1RB

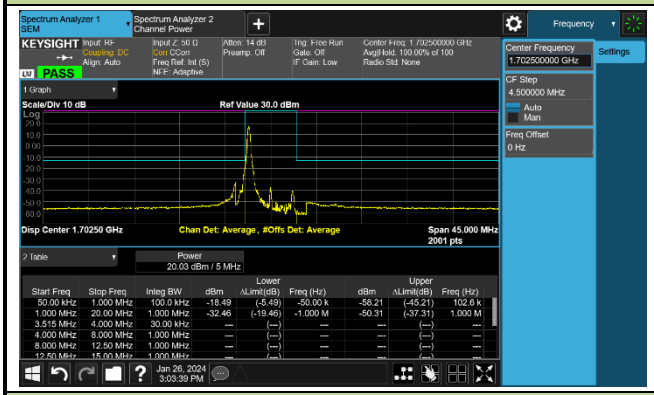
Low Channel ACP - Low RB Position



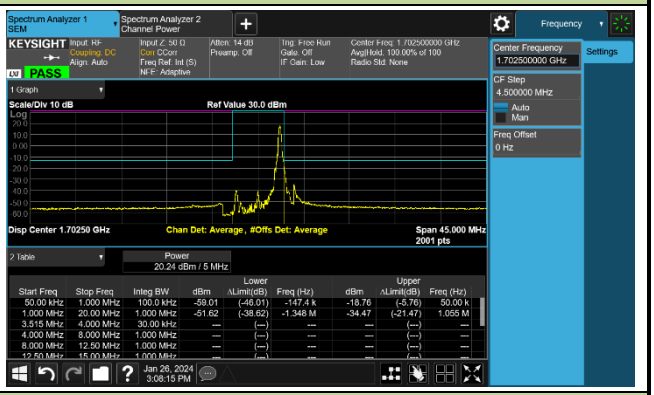
Low Channel ACP - High RB Position



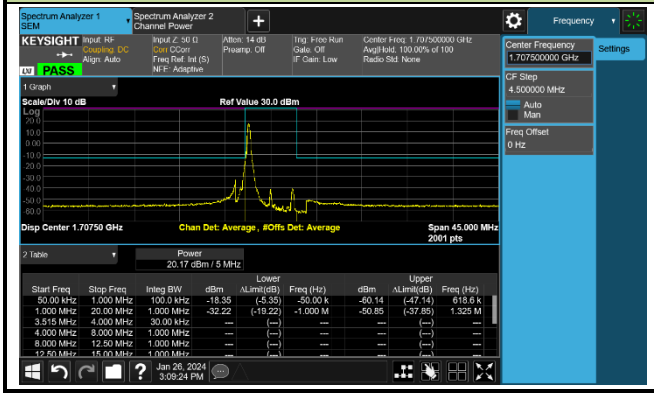
Middle Channel ACP - Low RB Position



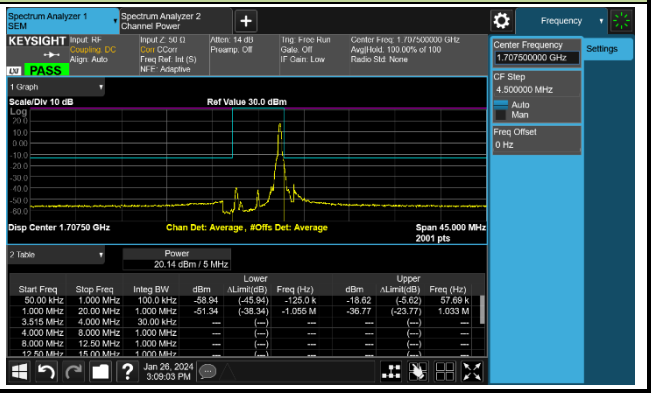
Middle Channel ACP - High RB Position

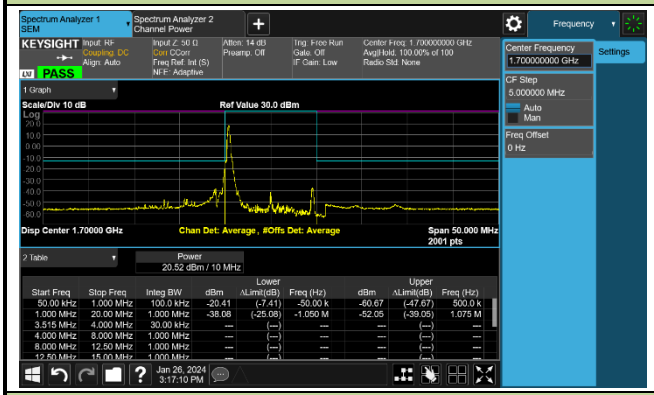
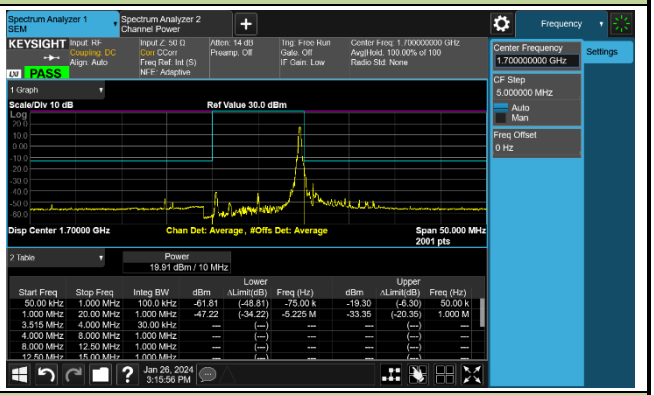
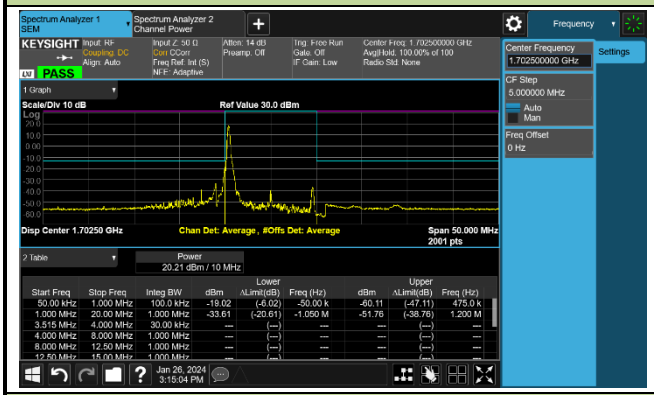
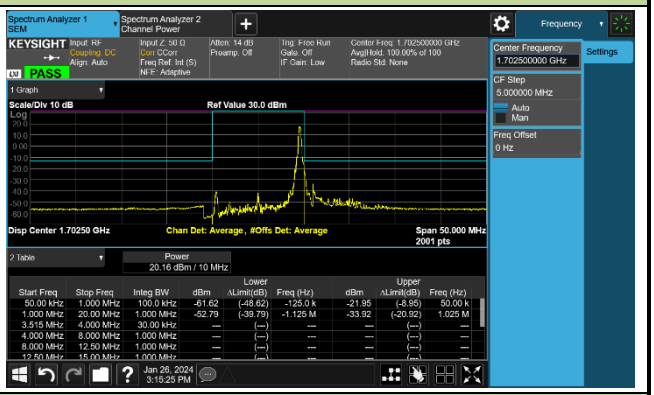
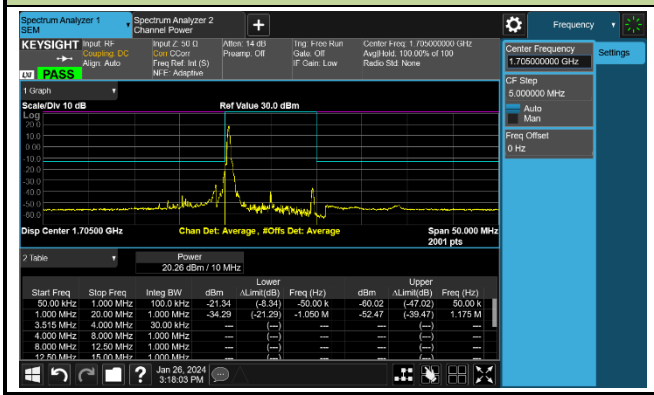
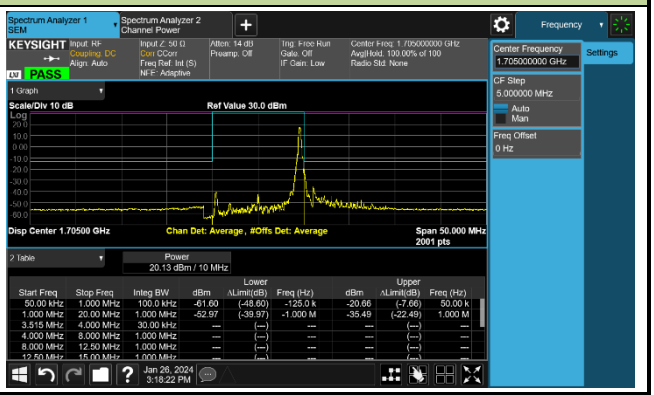


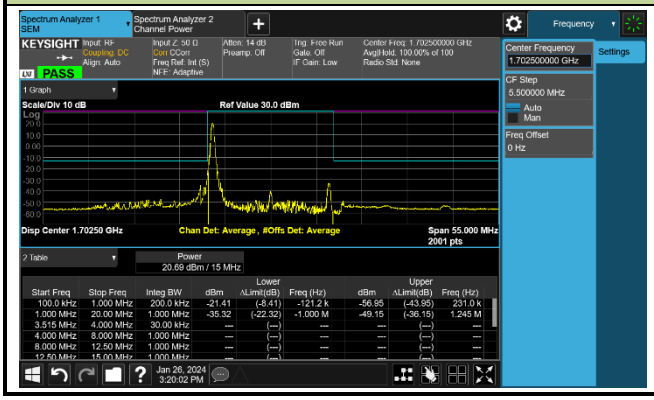
High Channel ACP - Low RB Position



High Channel ACP - High RB Position

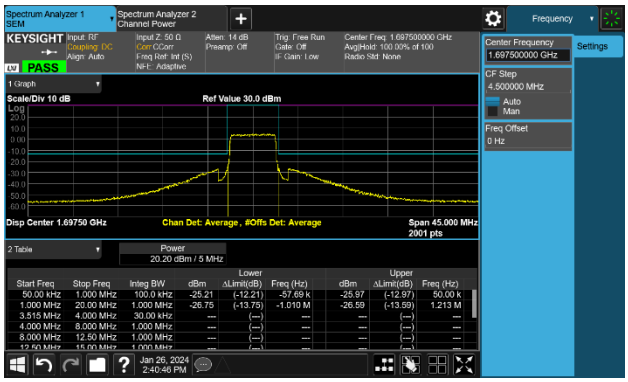


10MHz Channel Bandwidth - 1RB	
Low Channel ACP - Low RB Position	Low Channel ACP - High RB Position
	
Middle Channel ACP - Low RB Position	Middle Channel ACP - High RB Position
	
High Channel ACP - Low RB Position	High Channel ACP - High RB Position
	

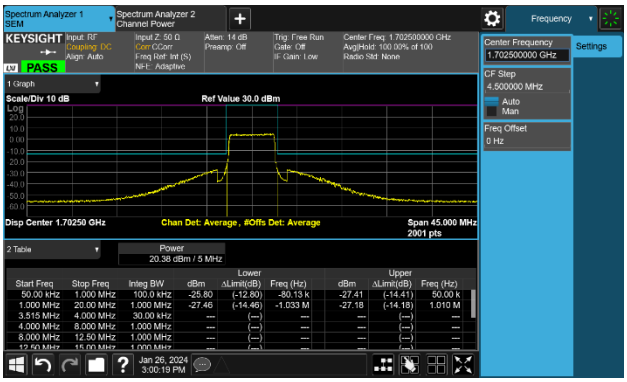
155MHz Channel Bandwidth - 1RB	
Middle Channel ACP - Low RB Position	Middle Channel ACP - High RB Position
	

5MHz Channel Bandwidth Full RB

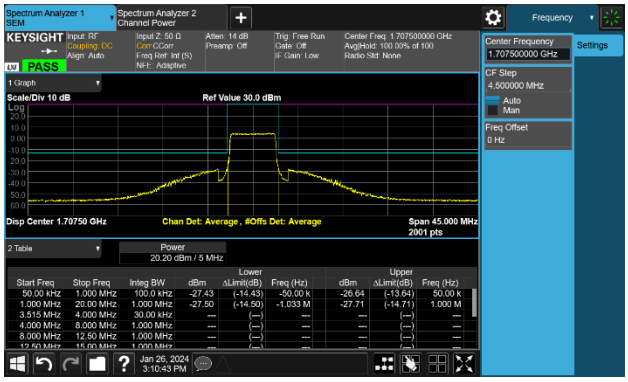
Low Channel ACP



Middle Channel ACP

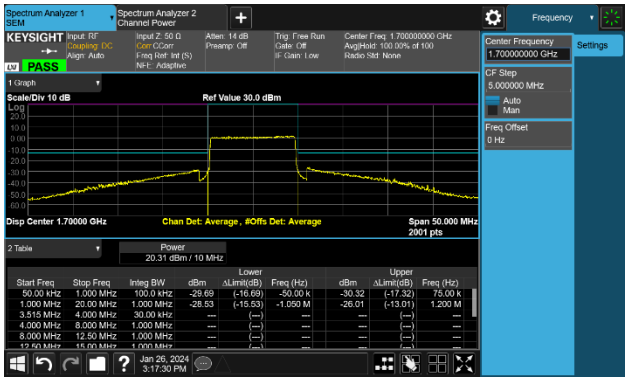


High Channel ACP

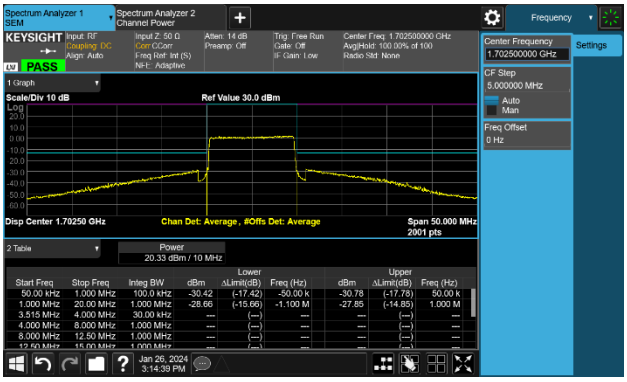


10MHz Channel Bandwidth Full RB

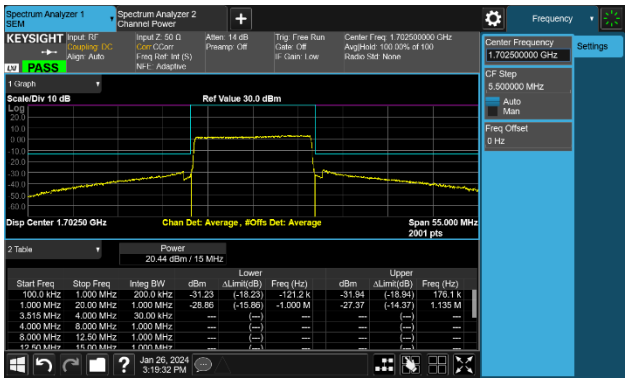
Low Channel ACP



Middle Channel ACP



High Channel ACP

15MHz Channel Bandwidth Full RB	
Middle Channel ACP	
	

A.6 Conducted Spurious Emissions Test Result

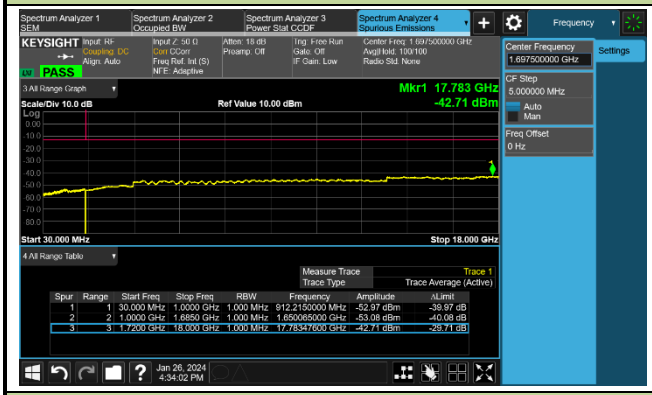
Test Site	WZ-SR6	Test Engineer	Lucas Wang
Test Date	2024-01-26	Test Band	n70, 1RB, CP OFDM QPSK

Channel Bandwidth (MHz)	Frequency (MHz)	Frequency Range (MHz)	Max Spurious Emissions (dBm)	Limit (dBm)	Result
5	1697.5	30 ~ 18000	-42.71	≤ -13.00	Pass
5	1702.5	30 ~ 18000	-42.83	≤ -13.00	Pass
5	1707.5	30 ~ 18000	-42.68	≤ -13.00	Pass
10	1700.0	30 ~ 18000	-42.83	≤ -13.00	Pass
10	1702.5	30 ~ 18000	-42.86	≤ -13.00	Pass
10	1705.0	30 ~ 18000	-42.50	≤ -13.00	Pass
15	1702.5	30 ~ 18000	-40.60	≤ -13.00	Pass

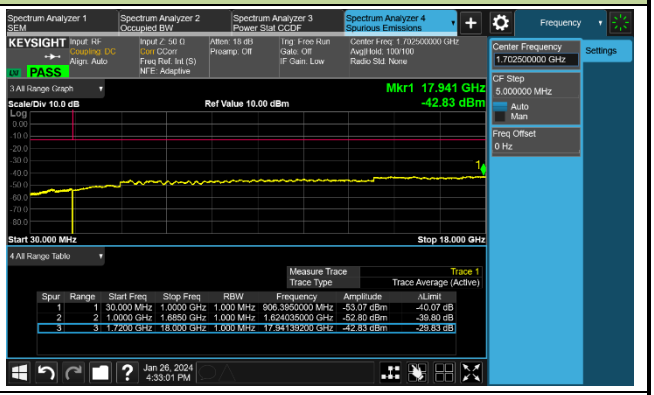
Note: The amplitude of Conducted Spurious emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

5MHz Channel Bandwidth

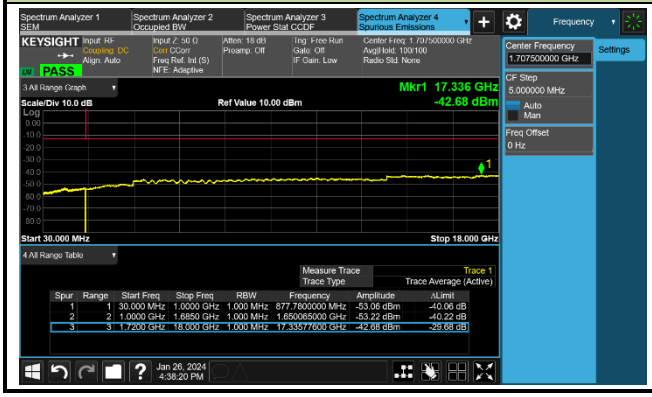
Low Channel

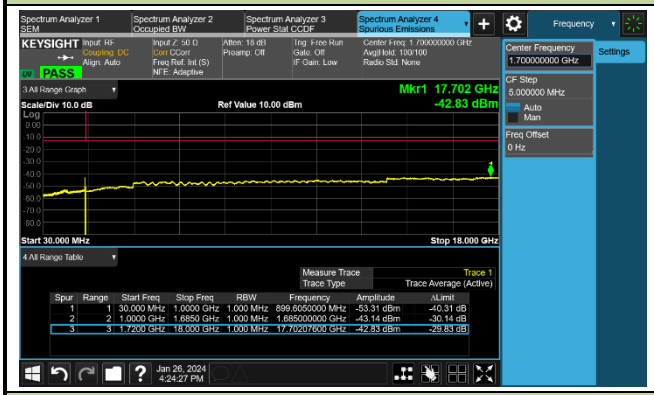
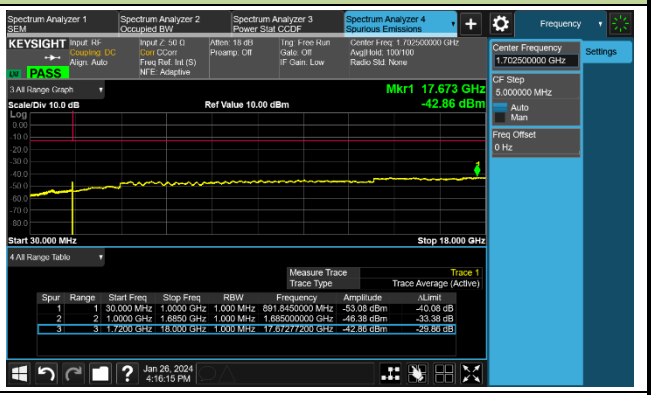
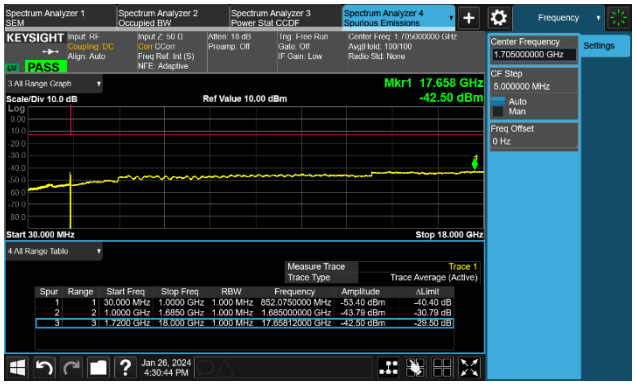
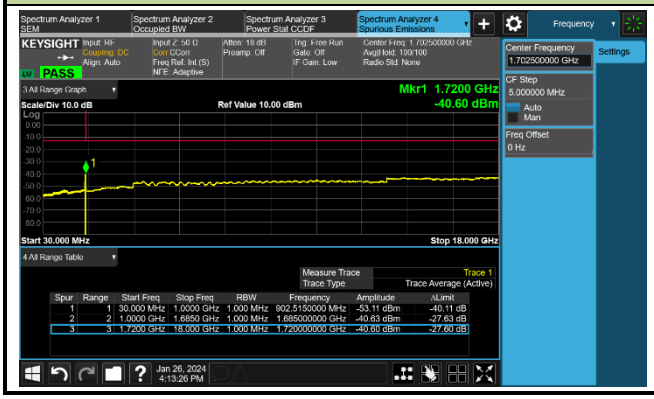


Middle Channel



High Channel



10MHz Channel Bandwidth	
Low Channel	Middle Channel
	
High Channel	
	
15MHz Channel Bandwidth	
Middle Channel	
	

A.7 Radiated Spurious Emissions Test Result

Test Site	WZ-AC2	Test Engineer	Frank Xue
Test Date	2024-01-31	Test Band	n70_SA, 5MHz Bandwidth, 1RB, CP OFDM QPSK

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Low Channel							
58.600	1.3	19.6	20.9	82.3	-61.4	Quasi-peak	Horizontal
1000.000	-5.3	33.2	27.9	82.3	-54.4	Quasi-peak	Horizontal
56.900	9.6	19.9	29.5	82.3	-52.8	Quasi-peak	Vertical
1000.000	-6.7	33.2	26.5	82.3	-55.8	Quasi-peak	Vertical
10877.000	32.8	16.3	49.1	82.3	-33.2	Peak	Horizontal
14430.000	31.7	20.1	51.8	82.3	-30.5	Peak	Horizontal
11497.500	31.9	17.6	49.5	82.3	-32.8	Peak	Vertical
14761.500	32.8	19.5	52.3	82.3	-30.0	Peak	Vertical
Middle Channel							
51.600	-1.8	20.5	18.7	82.3	-63.6	Quasi-peak	Horizontal
1000.000	-5.7	33.2	27.5	82.3	-54.8	Quasi-peak	Horizontal
54.900	9.3	20.2	29.5	82.3	-52.8	Quasi-peak	Vertical
1000.000	-6.9	33.2	26.3	82.3	-56.0	Quasi-peak	Vertical
12271.000	32.2	17.3	49.5	82.3	-32.8	Peak	Horizontal
14166.500	31.7	19.8	51.5	82.3	-30.8	Peak	Horizontal
11548.500	31.8	17.7	49.5	82.3	-32.8	Peak	Vertical
14549.000	32.1	19.7	51.8	82.3	-30.5	Peak	Vertical
High Channel							
56.700	-1.5	19.9	18.4	82.3	-63.9	Quasi-peak	Horizontal
1000.000	-7.3	33.2	25.9	82.3	-56.4	Quasi-peak	Horizontal
56.700	13.7	19.9	33.6	82.3	-48.7	Quasi-peak	Vertical
1000.000	-4.9	33.2	28.3	82.3	-54.0	Quasi-peak	Vertical
11514.500	32.6	17.3	49.9	82.3	-32.4	Peak	Horizontal
14515.000	32.5	19.6	52.1	82.3	-30.2	Peak	Horizontal
11574.000	31.9	17.7	49.6	82.3	-32.7	Peak	Vertical
14345.000	31.7	20.2	51.9	82.3	-30.4	Peak	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 2: The amplitude of Radiated transmitter spurious emissions (Frequency range from 9kHz to 30MHz and above 18GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the

permissible value. Therefore, the data is not presented in the report.

Note 3: The peak-detection value will always be equal to or greater than average-detection value. In a result, the peak-detection value measured by spectrum analyzer shall represent the worst-case results.

Appendix B - Test Setup Photograph

Refer to “2401RSU047-UT” file.

Appendix C - EUT Photograph

Refer to “2401RSU047-UE” file.

The End