RF MEASUREMENT REPORT

FCC ID:	XMR2023RG520FNA
Applicant:	Quectel Wireless Solutions Co., Ltd
Product:	5G Sub-6 GHz LGA Module
Model No.:	RG520F-NA
Brand Name:	Quectel
FCC Rule Part(s):	Part 96
Result:	Complies
Received Date:	2023-05-11
Test Date:	2023-05-13 ~ 2023-06-08

Reviewed By: Sunny Sun

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2305RSU024-U6	Rev. 01	Initial Report	2023-07-01	Valid

Note: RG520F-NA and RG520N-NA share the same chipset baseline, same software and hardware design, support same bands, the difference is on software enable or disable modem features like some ENDC/CA combs. This application for certification is leveraging the data reuse procedures from KDB 484596 based on reference FCC ID “XMR2023RG520NNA” to cover this variant and assessing the output power, band edge, radiated spurious emissions.

Test Item	Reuse Data Description
Occupied Bandwidth	Refer to FCC ID: XMR2023RG520NNA
Frequency Stability	Refer to FCC ID: XMR2023RG520NNA
Equivalent (Isotropic) Radiated Power	Make Spot Check
Peak to Average Ratio	Refer to FCC ID: XMR2023RG520NNA
End User Device Additional Requirement	Refer to FCC ID: XMR2023RG520NNA
Band Edge	Make Spot Check
Spurious Emission	Make Spot Check
Remark: This application resued the following bands test data of the original FCC ID: XMR2023RG520NNA LTE Band: Band 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 30, 38, 41, 48, 66, 71 NR Bands: n2, n5, n7, n12, n13, n14, n25, n26, n30, n38, n41, n48, n66, n71, n77, n78	

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1. General Information

1.1. Applicant

Quectel Wireless Solutions Company Limited

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

1.2. Manufacturer

Quectel Wireless Solutions Company Limited

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: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	5G Sub-6 GHz LGA Module
Model No.	RG520F-NA
Brand Name	Quectel
IMEI	Conducted Measurement 1: 864766050012138 Conducted Measurement 2: 864766050012534 Radiated Measurement 1: 864766050012070 Radiated Measurement 2: 864766050012716
E-UTRA Band	Band 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 30, 38, 41, 42, 43, 48, 66, 71
5G NR Band	n2, n5, n7, n12, n13, n14, n25, n26, n30, n38, n41, n48, n66, n71, n77, n78
5G NR NSA Band	n2, n5, n7, n12, n13, n14, n25, n26, n30, n38, n41, n48, n66, n71, n77, n78
Operating Temperature	-30 ~ 75 °C
Power Type	3.3 ~ 4.4Vdc, typical 3.8Vdc
Remark: The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.	

1.5. Radio Specification under Testing

TDD T_X & R_X Frequency Range	n48: 3550 ~ 3700 MHz
SCS for NR cell	30kHz
Support Bandwidth	10MHz, 20MHz, 30MHz, 40MHz
Modulation	UL up to 256QAM, DL up to 256QAM
Device Type	End User Device

1.6. Description of Available Antennas

Technology	Frequency Range (MHz)	Antenna Type	MaxPeak Gain (dBi)
n48	3550 ~ 3700	Dipole	0.58

Note: The typical antennas use 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 Part 96
- 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

1.8. Device Capabilities

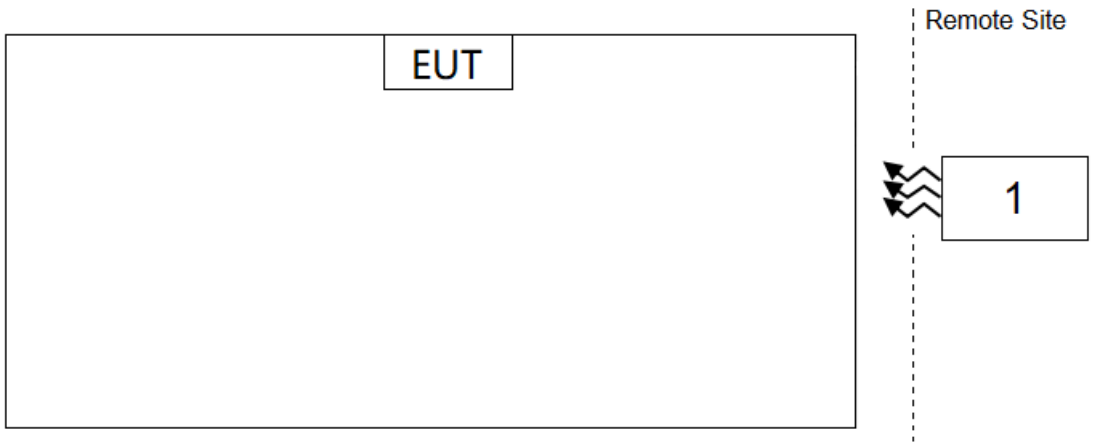
PI/2 BPSK modulation applied for 5G NR band frequencies and has the same tune up power as QPSK modulations.

The DFT-s-OFDM and CP-OFDM waveforms were investigated, and DFT-s-OFDM was found to be the worst case.

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 PI/2 BPSK modulations.

2. Test Configuration

2.1. Test System Connection Diagram



Product		Manufacturer	Model No.
1	5G Wireless Test Platform	Keysight	E7515B

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
Signal Generator	Keysight	E8257D	MRTSUE06453	1 year	2024-05-23	SIP-SR1
Thermohygrometer	testo	622	MRTSUE06629	1 year	2024-01-03	SIP-SR1
5G Wireless Test Platform	Keysight	E7515B	MRTSUE06903	1 year	2023-10-25	SIP-SR1
Signal Generator	Keysight	E8257D	MRTSUE06904	1 year	2023-10-25	SIP-SR1
DC POWER MODULE	Keysight	N6743B	MRTSUE06905	N/A	N/A	SIP-SR1
DC POWER MODULE	Keysight	N6743B	MRTSUE06906	N/A	N/A	SIP-SR1
Low-Profile Modular Power System Mainframe	Keysight	N6700C	MRTSUE06907	N/A	N/A	SIP-SR1
FR1 Switching Unit	Keysight	C8880A	MRTSUE06908	N/A	N/A	SIP-SR1
Signal Analyzer	Keysight	N9021B	MRTSUE06915	1 year	2023-12-28	SIP-SR1
Temperature Chamber	BAOYT	BYG-80CL	MRTSUE06932	1 year	2024-02-12	SIP-SR1
Shielding Room	MIX-BEP	SIP-SR1	MRTSUE06948	N/A	N/A	SIP-SR1
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2023-11-27	WZ-AC2
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2023-09-29	WZ-AC1/WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2024-05-23	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2023-11-27	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2023-10-13	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
Horn Antenna	ETS	3117	MRTSUE06257	1 year	2023-09-18	WZ-AC1/WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2023-11-05	WZ-AC1/WZ-AC2
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2024-01-12	WZ-AC1/WZ-AC2
Preamplifier	EMCI	EMC051845SE	MRTSUE06987	1 year	2023-09-08	WZ-AC1/WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2023-11-01	WZ-AC2
Directional Coupler	ar	DC7200A	MRTSUE06147	N/A	N/A	SIP
Directional Coupler	ar	DC6080A	MRTSUE06148	N/A	N/A	SIP
Directional Coupler	narda	4226-10	MRTSUE06564	1 year	2023-10-10	SIP
Directional Coupler	PULSAR	CS10-23-436/20	MRTSUE06846	1 year	2024-06-01	SIP
Directional Coupler	PULSAR	CS10-23-436/20	MRTSUE06848	1 year	2024-06-01	SIP
Attenuator	MVE	MVE2213	MRTSUE11055	1 year	2024-06-08	SIP
Attenuator	MVE	MVE2213	MRTSUE11056	1 year	2024-06-08	SIP
Attenuator	MVE	MVE2213	MRTSUE11057	1 year	2024-06-08	SIP
Attenuator	MVE	MVE2213	MRTSUE11058	1 year	2024-06-08	SIP
Attenuator	MVE	MVE2213	MRTSUE11059	1 year	2024-06-08	SIP
Attenuator	MVE	MVE2213	MRTSUE11060	1 year	2024-06-08	SIP

Software	Version	Manufacturer	Function	Date	Location
EMI V3	V 3.0.0	QuieTek	EMI Test Software	2010.01	EMC-WZ
Controller_MF 7802	1.02	MF	RE Antenna & Turntable	2015-07-05	EMC-WZ-AC2

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)): Horizontal: 9kHz ~ 300MHz: 5.04dB 300MHz ~ 1GHz: 4.95dB 1GHz ~ 40GHz: 6.40dB Vertical: 9kHz ~ 300MHz: 5.24dB 300MHz ~ 1GHz: 6.03dB 1GHz ~ 40GHz: 6.40dB
Conducted Spurious Emissions
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB

5. Test Result

5.1. Summary

FCC Part Section(s)	Test Description	Test Condition	Verdict
96.41(b)	Equivalent Isotropic Radiated Power	Conducted	Pass
96.41(e)	Band Edge Emissions		Pass
2.1053, 96.41(e)	Spurious Emissions	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 ofthe system to connect the EUT to the analyzer at all frequencies of interest.
2) The worst-case emission of modulation was selected. Therefore, the Band Edge, 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.

5.2. Equivalent Isotropically Radiated Power Measurement

5.2.1. Test Limit

The maximum effective isotropic radiated power (EIRP) End User Device is 23dBm/10MHz

5.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.2.4.4.2 & 5.2.5.5

5.2.3. Test Setting

When the fundamental condition for average power measurements cannot be realized (i.e., the EUT can not be configured to transmit at full-power on a continuous basis (i.e., duty cycle < 98%) and the instrumentation cannot be configured to measure only during active full-power transmissions), then thefollowing procedure can be used if the EUT duty cycle is constant (i.e., duty cycle variations are less thanor equal to ±2%).

a) Set span to 2 × to 3 × the OBW.

b) Set RBW = 1% to 5% of the OBW.

c) Set VBW ≥ 3 × RBW.

d) Set number of measurement points in sweep ≥ 2 × span / RBW.

e) Sweep time:

1) Set = auto-couple, or

2) Set ≥ [10 × (number of points in sweep) × (transmission symbol period)] for single sweep (automation-compatible) measurement.

f) Detector = power averaging (rms).

g) Set sweep trigger to “free run.”

h) 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.

i) Using the marker function to identify the maximum PSD.

j) Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25%.

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

$$\text{ERP or EIRP} = P_{Meas} + G_T \quad (1)$$

where

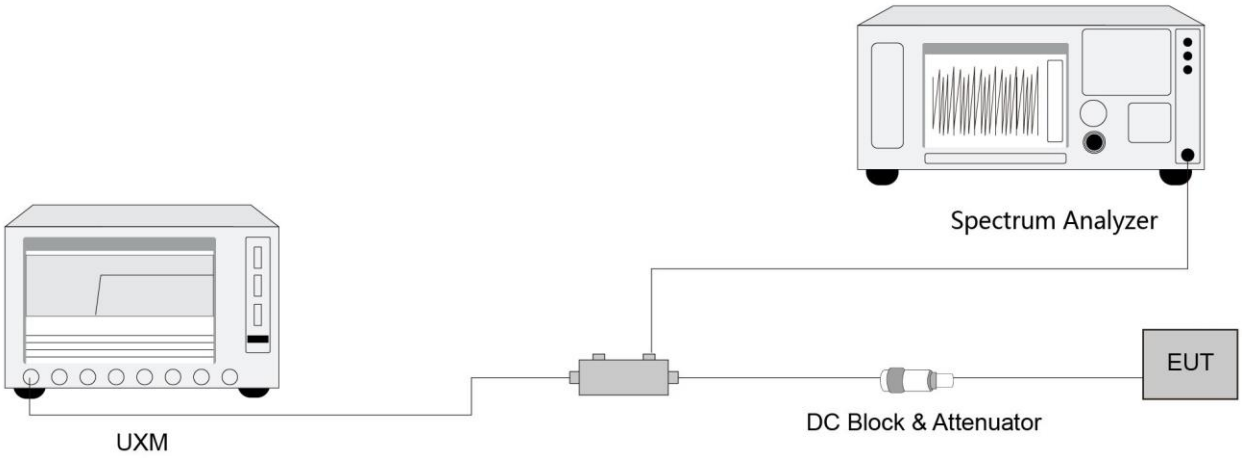
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

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)

For devices utilizing multiple antennas, see 6.4 for guidance with respect to determining the effective array transmit antenna gain term to be used in the above equation.

5.2.4. Test Setup



5.2.5. Test Result

Refer to Appendix A.1.

5.3. Band Edge Measurement

5.3.1. Test Limit

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated, and the worst-case configuration results are reported in this section.

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed −25 dBm/MHz.

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/Mhz.

5.3.2. Test Procedure

ANSI C63.26-2015 - Section5.7

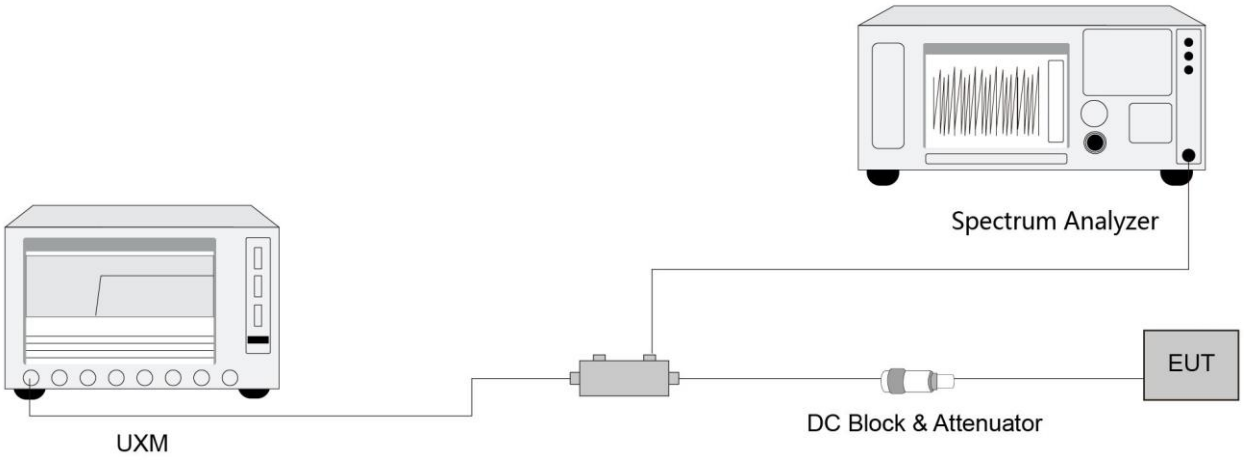
5.3.3. Test Setting

1. Set the analyzer frequency to low, middle, 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.

9. Used power integration whenusing a measurement bandwidth smaller than the specified bandwidth.

5.3.4. Test Setup



5.3.5. Test Result

Refer to Appendix A.2.

5.4. Radiated Spurious Emissions Measurement

5.4.1. Test Limit

Out of band emissions: The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

E (dBμV/m) = EIRP (dBm) - 20 log D + 104.8; where D is the measurement distance in meters. The emission limit equal to 55.3dBμV/m.

5.4.2. Test Procedure

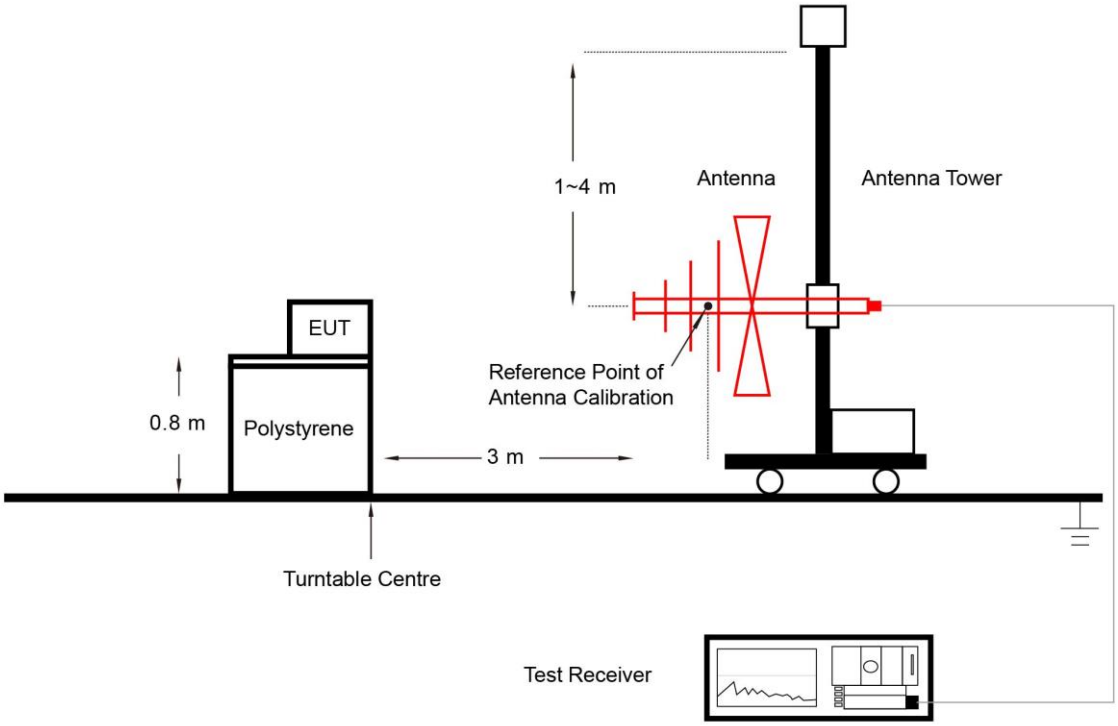
ANSI C63.26-2015 - Section 5.2.7 & 5.5

5.4.3. Test Setting

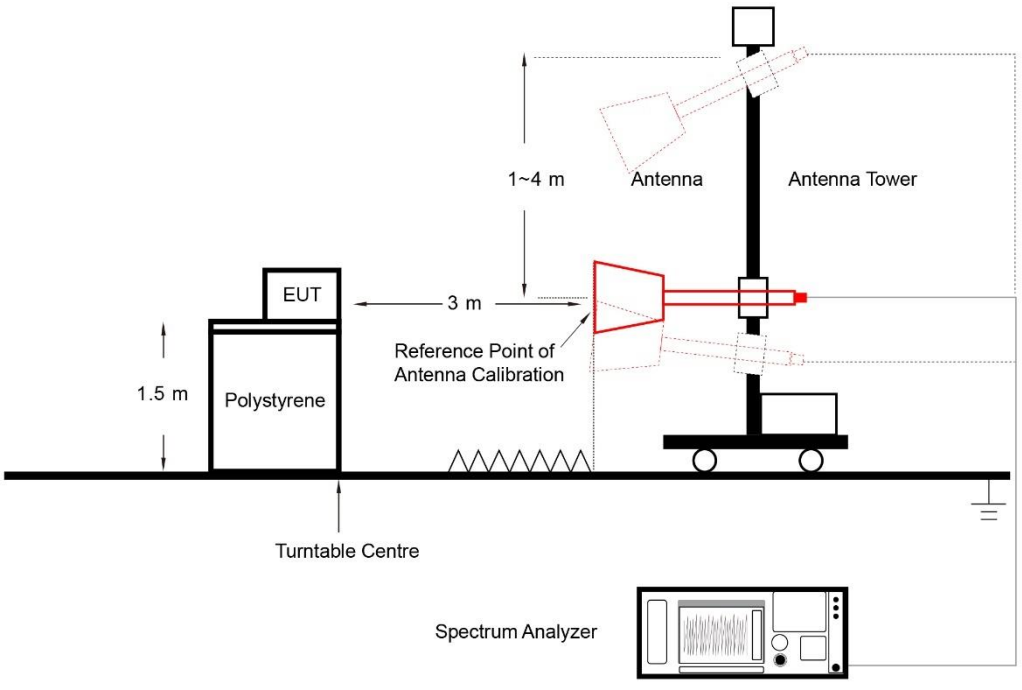
1. RBW = 1MHz
2. VBW ≥ 3*RBW
3. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period)
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

5.4.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.4.5. Test Result

Refer to Appendix A.3.

Appendix A - Test Result

A.1 Equivalent Isotropically Radiated Power Test Result

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Date	2023/05/13	Test Band	n48_SA

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm/10MHz)	EIRP (dBm/ 10MHz)	Limit (dBm/ 10MHz)
DFT-s OFDM PI/2 BPSK						
3555	10	12	6	21.78	22.36	<23.00
		1	1	21.56	22.14	<23.00
		1	22	21.72	22.30	<23.00
		24	0	21.27	21.85	<23.00
		1	23	21.32	21.90	<23.00
		1	0	21.23	21.81	<23.00
3624.99	10	12	6	21.17	21.75	<23.00
		1	1	21.08	21.66	<23.00
		1	22	21.07	21.65	<23.00
		24	0	20.70	21.28	<23.00
		1	23	20.52	21.10	<23.00
		1	0	20.61	21.19	<23.00
3694.98	10	12	6	22.01	22.59	<23.00
		1	1	22.03	22.61	<23.00
		1	22	21.97	22.55	<23.00
		24	0	21.45	22.03	<23.00
		1	23	21.30	21.88	<23.00
		1	0	21.31	21.89	<23.00
3560.01	20	25	12	22.03	22.61	<23.00
		1	1	21.82	22.40	<23.00
		1	49	21.93	22.51	<23.00
		50	0	18.98	19.56	<23.00
		1	50	21.43	22.01	<23.00
		1	0	21.41	21.99	<23.00
Note: The EIRP (dBm/10MHz) = Output Power (dBm/10MHz) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm/10MHz)	EIRP (dBm/ 10MHz)	Limit (dBm/ 10MHz)
DFT-s OFDM PI/2 BPSK						
3624.99	20	25	12	21.34	21.92	<23.00
		1	1	21.32	21.90	<23.00
		1	49	21.22	21.80	<23.00
		50	0	18.32	18.90	<23.00
		1	50	20.73	21.31	<23.00
		1	0	20.90	21.48	<23.00
3690	20	25	12	22.11	22.69	<23.00
		1	1	22.02	22.60	<23.00
		1	49	21.97	22.55	<23.00
		50	0	19.09	19.67	<23.00
		1	50	21.51	22.09	<23.00
		1	0	21.64	22.22	<23.00
3565.02	30	36	18	20.84	21.42	<23.00
		1	1	21.99	22.57	<23.00
		1	76	21.91	22.49	<23.00
		75	0	17.19	17.77	<23.00
		1	77	21.44	22.02	<23.00
		1	0	21.43	22.01	<23.00
3624.99	30	36	18	20.27	20.85	<23.00
		1	1	21.38	21.96	<23.00
		1	76	21.26	21.84	<23.00
		75	0	16.57	17.15	<23.00
		1	77	20.81	21.39	<23.00
		1	0	21.04	21.62	<23.00
3684.99	30	36	18	20.97	21.55	<23.00
		1	1	22.21	22.79	<23.00
		1	76	22.19	22.77	<23.00
		75	0	17.39	17.97	<23.00
		1	77	21.74	22.32	<23.00
		1	0	21.51	22.09	<23.00
Note: The EIRP (dBm/10MHz) = Output Power (dBm/10MHz) + Antenna Gain (dBi)						

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm/10MHz)	EIRP (dBm/ 10MHz)	Limit (dBm/ 10MHz)
DFT-s OFDM PI/2 BPSK						
3570	40	50	25	19.41	19.99	<23.00
		1	1	21.81	22.39	<23.00
		1	104	22.04	22.62	<23.00
		100	0	16.00	16.58	<23.00
		1	105	21.47	22.05	<23.00
		1	0	21.34	21.92	<23.00
3624.99	40	50	25	18.88	19.46	<23.00
		1	1	21.41	21.99	<23.00
		1	104	21.51	22.09	<23.00
		100	0	15.50	16.08	<23.00
		1	105	21.02	21.60	<23.00
		1	0	21.13	21.71	<23.00
3679.98	40	50	25	19.56	20.14	<23.00
		1	1	22.11	22.69	<23.00
		1	104	22.12	22.70	<23.00
		100	0	16.17	16.75	<23.00
		1	105	21.66	22.24	<23.00
		1	0	21.66	22.24	<23.00
Note: The EIRP (dBm/10MHz) = Output Power (dBm/10MHz) + Antenna Gain (dBi)						

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Date	2023/05/15	Test Band	n48_UL MIMO

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)		Total Power (dBm)	EIRP (dBm)	Limit (dBm)
				Port 0	Port 3			
CP OFDM QPSK								
3555	10	12	6	15.89	15.87	18.89	19.47	<23.00
		1	1	15.81	15.85	18.84	19.42	<23.00
		1	22	15.75	16.00	18.89	19.47	<23.00
		24	0	14.36	14.41	17.40	17.98	<23.00
		1	23	14.30	14.45	17.39	17.97	<23.00
		1	0	14.48	14.41	17.46	18.04	<23.00
3624.99	10	12	6	16.25	15.99	19.13	19.71	<23.00
		1	1	16.45	16.08	19.28	19.86	<23.00
		1	22	16.00	16.09	19.06	19.64	<23.00
		24	0	14.64	14.48	17.57	18.15	<23.00
		1	23	14.50	14.51	17.52	18.10	<23.00
		1	0	14.72	14.40	17.57	18.15	<23.00
3694.98	10	12	6	16.14	16.32	19.24	19.82	<23.00
		1	1	15.92	16.33	19.14	19.72	<23.00
		1	22	15.91	16.30	19.12	19.70	<23.00
		24	0	14.60	14.83	17.73	18.31	<23.00
		1	23	14.85	14.60	17.74	18.32	<23.00
		1	0	14.67	14.88	17.79	18.37	<23.00
3560.01	20	25	12	16.13	16.20	19.18	19.76	<23.00
		1	1	16.26	16.22	19.25	19.83	<23.00
		1	49	16.09	16.15	19.13	19.71	<23.00
		51	0	12.09	12.04	15.08	15.66	<23.00
		1	50	14.65	14.71	17.69	18.27	<23.00
		1	0	14.73	14.75	17.75	18.33	<23.00

Note 1: Total Power (dBm) = $10*\log\{10^{\wedge(\text{Port 0 Output Power} / 10)} + 10^{\wedge(\text{Port 1 Output Power} / 10)}\}$

Note 2: The EIRP (dBm/10MHz) = Output Power (dBm/10MHz) + Antenna Gain (dBi)

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)		Total Power (dBm)	EIRP (dBm)	Limit (dBm)
				Port 0	Port 3			
CP OFDM QPSK								
3624.99	20	25	12	16.29	16.14	19.23	19.81	<23.00
		1	1	16.37	16.11	19.25	19.83	<23.00
		1	49	16.22	16.23	19.24	19.82	<23.00
		51	0	12.28	12.04	15.17	15.75	<23.00
		1	50	14.75	14.67	17.72	18.30	<23.00
		1	0	14.93	14.67	17.81	18.39	<23.00
3690	20	25	12	16.11	16.33	19.23	19.81	<23.00
		1	1	16.19	16.27	19.24	19.82	<23.00
		1	49	16.28	16.35	19.33	19.91	<23.00
		51	0	12.14	12.27	15.22	15.80	<23.00
		1	50	14.71	14.84	17.79	18.37	<23.00
		1	0	14.73	14.89	17.82	18.40	<23.00
3565.02	30	36	18	14.63	14.61	17.63	18.21	<23.00
		1	1	16.29	16.23	19.27	19.85	<23.00
		1	76	16.11	16.27	19.20	19.78	<23.00
		78	0	10.25	10.22	13.25	13.83	<23.00
		1	77	14.64	14.75	17.71	18.29	<23.00
		1	0	14.80	14.77	17.80	18.38	<23.00
3624.99	30	39	19	14.92	14.68	17.81	18.39	<23.00
		1	1	16.45	16.20	19.34	19.92	<23.00
		1	76	16.29	16.24	19.28	19.86	<23.00
		78	0	10.50	10.33	13.43	14.01	<23.00
		1	77	14.71	14.76	17.75	18.33	<23.00
		1	0	15.10	14.85	17.99	18.57	<23.00
3684.99	30	39	19	14.74	14.89	17.83	18.41	<23.00
		1	1	16.26	16.34	19.31	19.89	<23.00
		1	76	16.31	16.41	19.37	19.95	<23.00
		78	0	10.33	10.43	13.39	13.97	<23.00
		1	77	14.82	14.92	17.88	18.46	<23.00
		1	0	14.84	14.98	17.92	18.50	<23.00

Note 1: Total Power (dBm) = $10*\log\{10^{(\text{Port 0 Output Power} / 10)} + 10^{(\text{Port 1 Output Power} / 10)}\}$

Note 2: The EIRP (dBm/10MHz) = Output Power (dBm/10MHz) + Antenna Gain (dBi)

Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)		Total Power (dBm)	EIRP (dBm)	Limit (dBm)
				Port 0	Port 3			
CP OFDM QPSK								
3570	40	53	26	13.30	13.30	16.31	16.89	<23.00
		1	1	16.32	16.18	19.26	19.84	<23.00
		1	104	16.47	16.15	19.32	19.90	<23.00
		106	0	8.94	8.92	11.94	12.52	<23.00
		1	105	14.94	14.69	17.83	18.41	<23.00
		1	0	14.76	14.69	17.74	18.32	<23.00
3624.99	40	53	26	13.62	13.42	16.53	17.11	<23.00
		1	1	16.49	16.15	19.33	19.91	<23.00
		1	104	16.34	16.45	19.41	19.99	<23.00
		106	0	9.29	9.03	12.17	12.75	<23.00
		1	105	14.72	15.00	17.87	18.45	<23.00
		1	0	14.96	14.64	17.81	18.39	<23.00
3679.98	40	53	26	13.45	13.56	16.52	17.10	<23.00
		1	1	16.27	16.37	19.33	19.91	<23.00
		1	104	16.39	16.52	19.47	20.05	<23.00
		106	0	9.09	9.14	12.13	12.71	<23.00
		1	105	14.77	14.97	17.88	18.46	<23.00
		1	0	14.80	14.96	17.89	18.47	<23.00

Note 1: Total Power (dBm) = $10*\log\{10^{\wedge(\text{Port 0 Output Power} / 10)} + 10^{\wedge(\text{Port 1 Output Power} / 10)}\}$

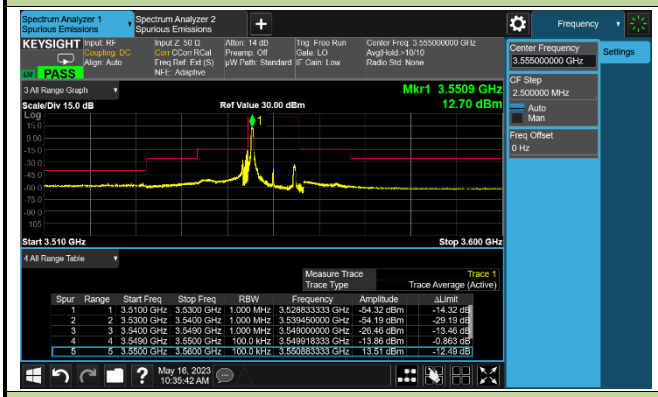
Note 2: The EIRP (dBm/10MHz) = Output Power (dBm/10MHz) + Antenna Gain (dBi)

A.2 Band Edge Test Result

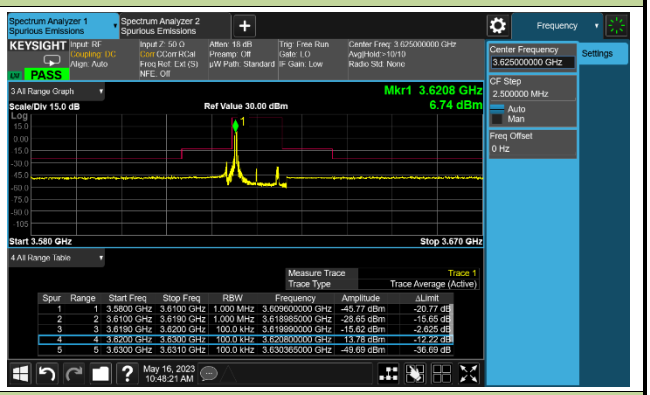
Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Date	2023/05/16	Test Band	n48_SA

10MHz Channel Bandwidth - 1RB

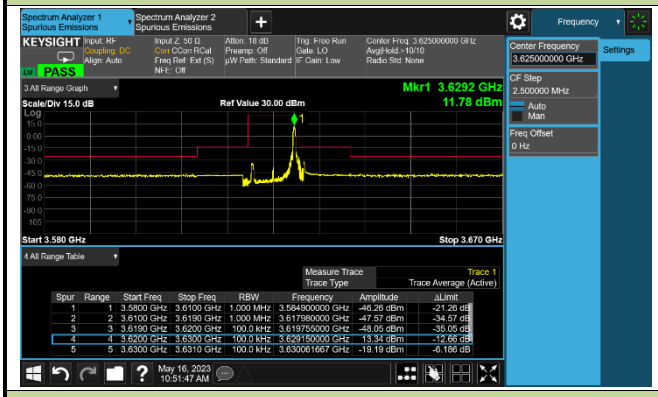
Low Channel ACP



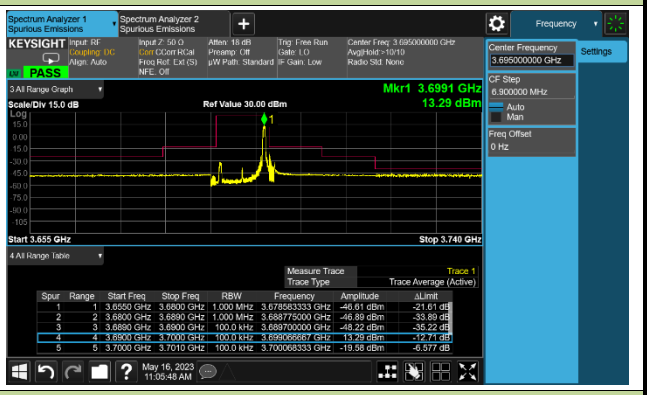
Middle Channel ACP - Low RB Position



Middle Channel ACP - High RB Position

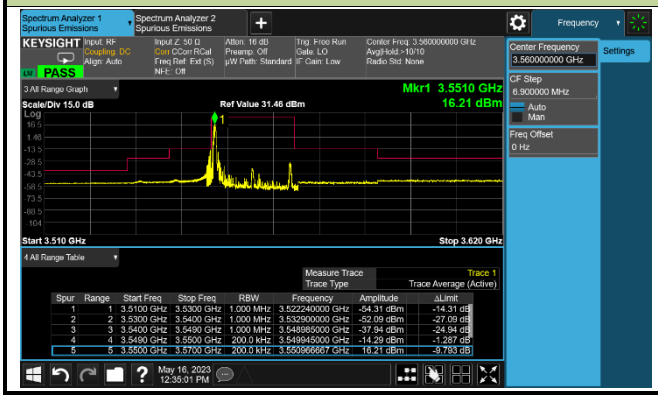


High Channel ACP

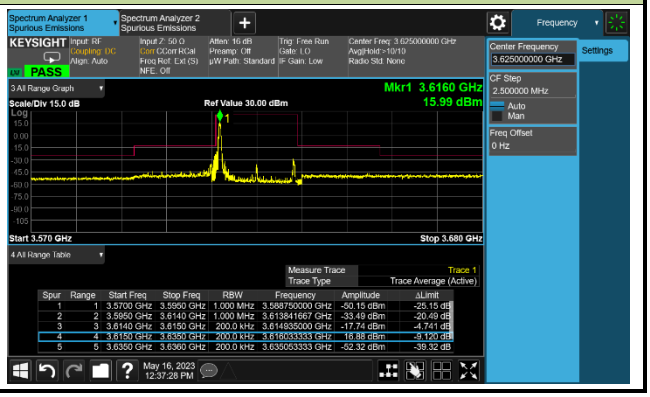


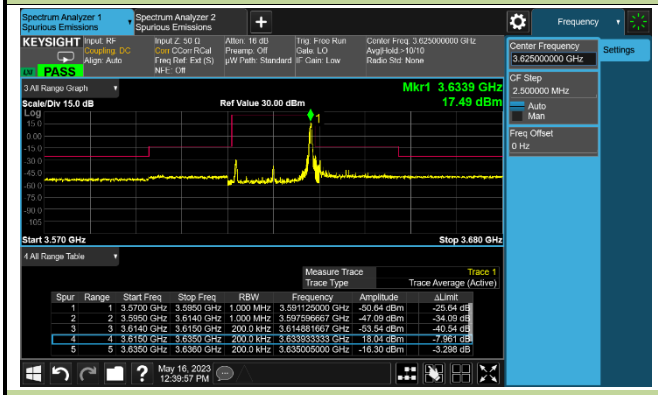
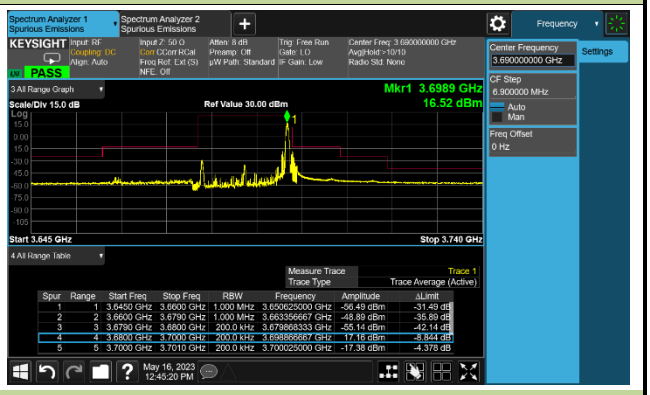
20MHz Channel Bandwidth - 1RB

Low Channel ACP

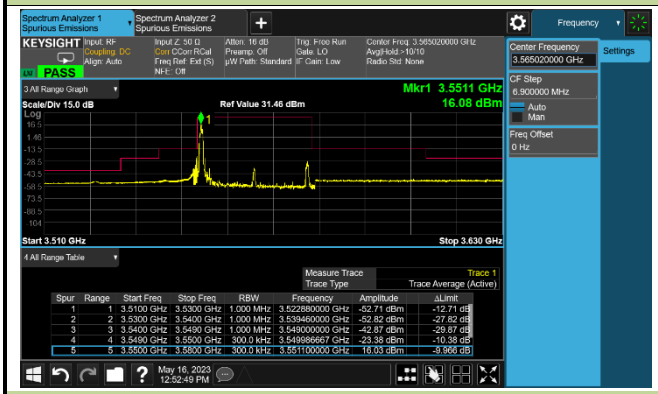
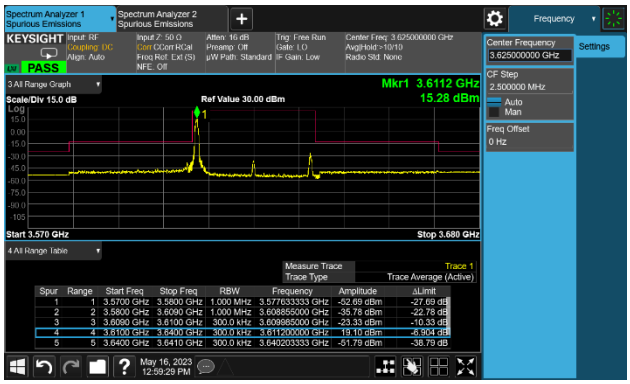
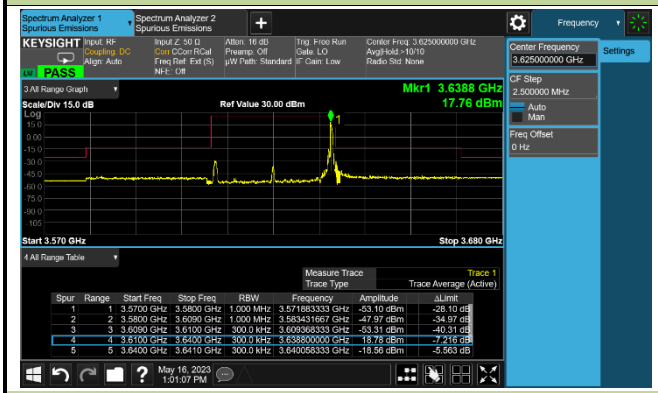
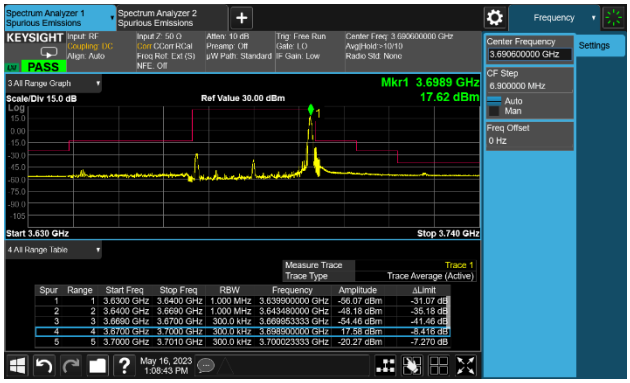


Middle Channel ACP - Low RB Position

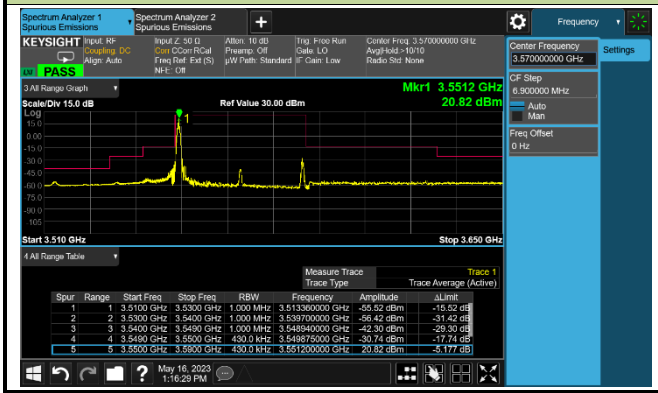
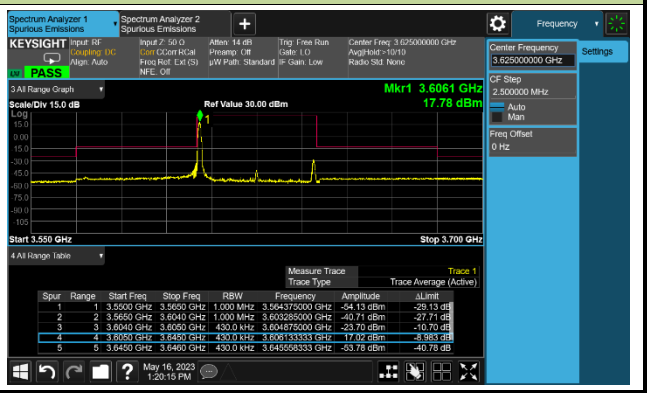


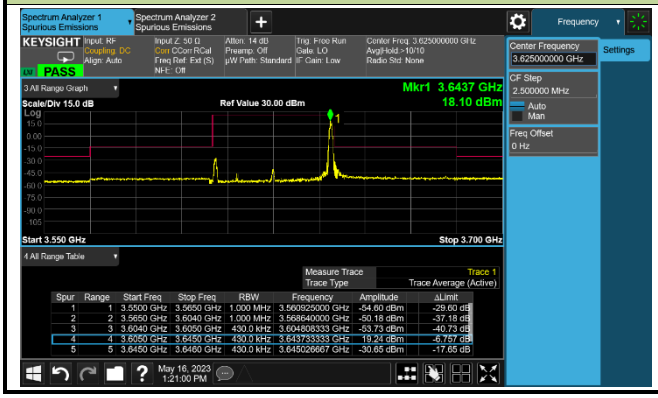
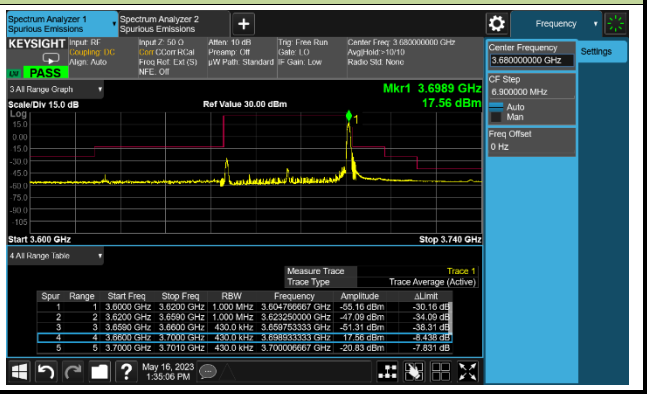
Middle Channel ACP - High RB Position	High Channel ACP
	

30MHz Channel Bandwidth - 1RB

Low Channel ACP	Middle Channel ACP - Low RB Position
	
Middle Channel ACP - High RB Position	**High Channel ACP**
	

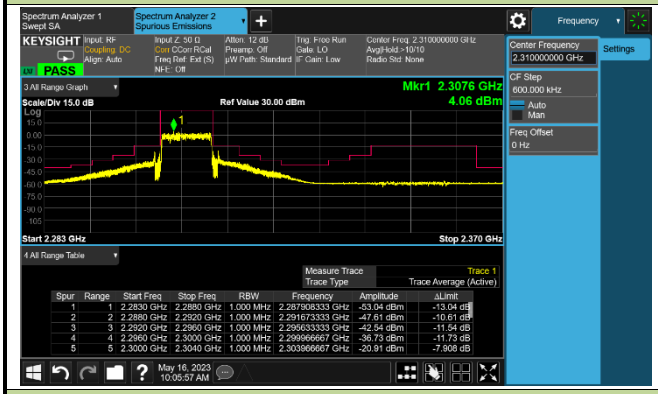
40MHz Channel Bandwidth - 1RB

Low Channel ACP	Middle Channel ACP - Low RB Position
	

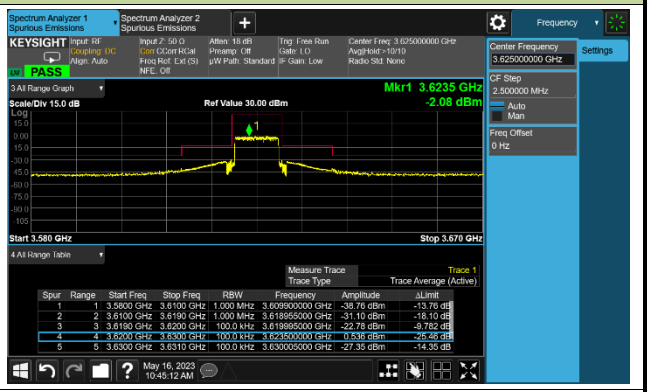
Middle Channel ACP - High RB Position	High Channel ACP
	

10MHz Channel Bandwidth - Full RB

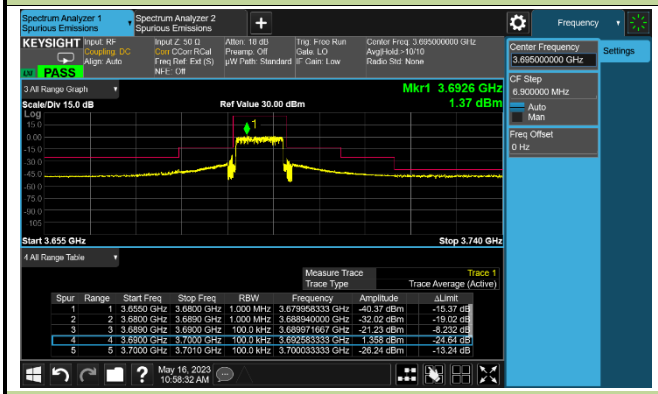
Low Channel ACP



Middle Channel ACP

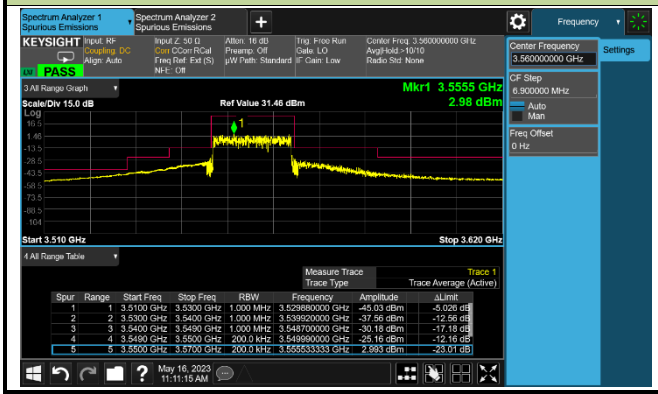


High Channel ACP

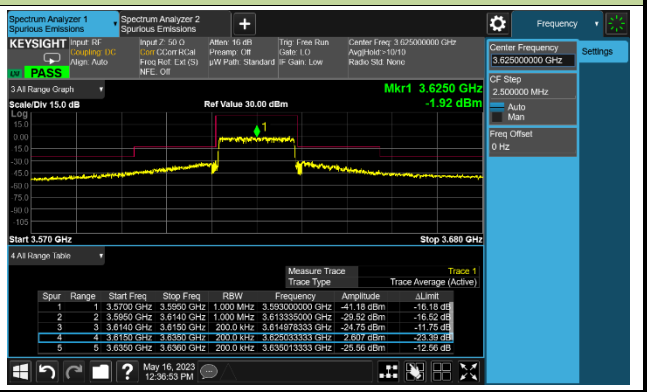


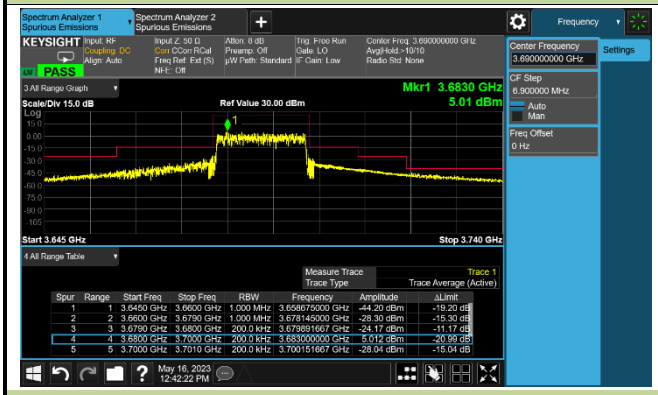
20MHz Channel Bandwidth - Full RB

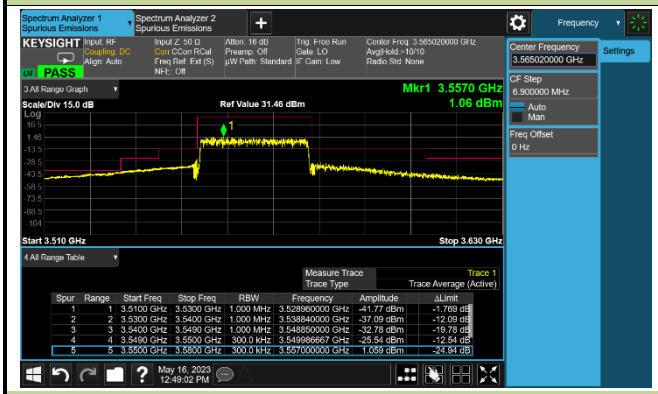
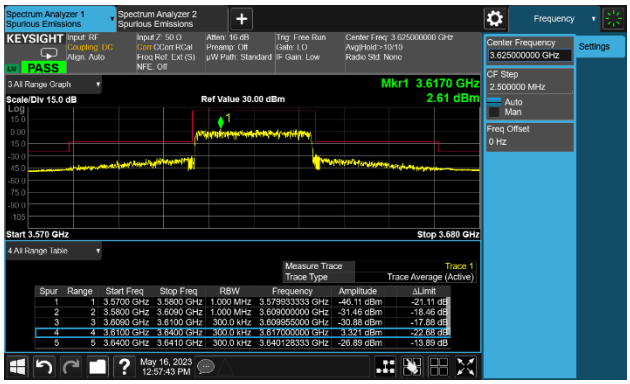
Low Channel ACP

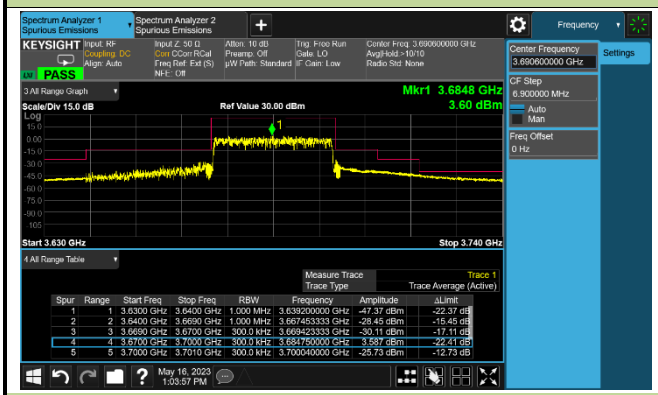


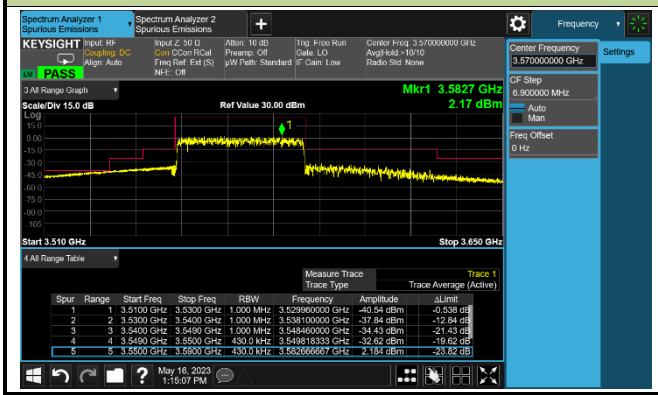
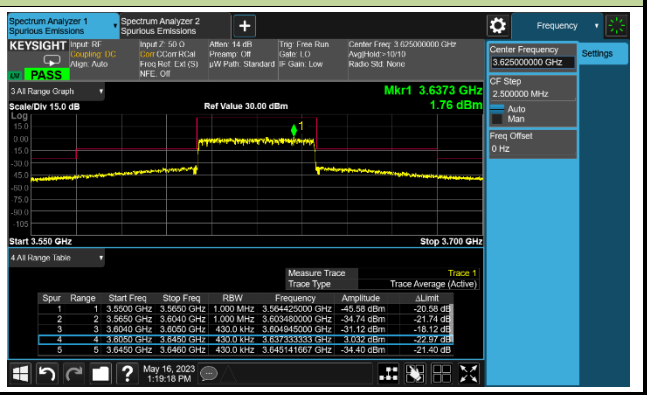
Middle Channel ACP

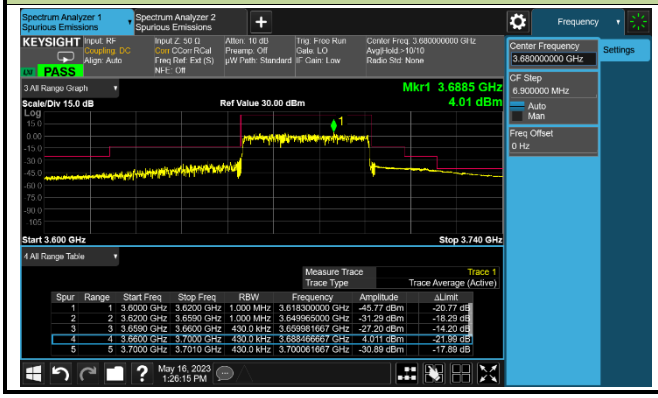


High Channel ACP	
	

30MHz Channel Bandwidth - Full RB	
Low Channel ACP	Middle Channel ACP
	

High Channel ACP	
	

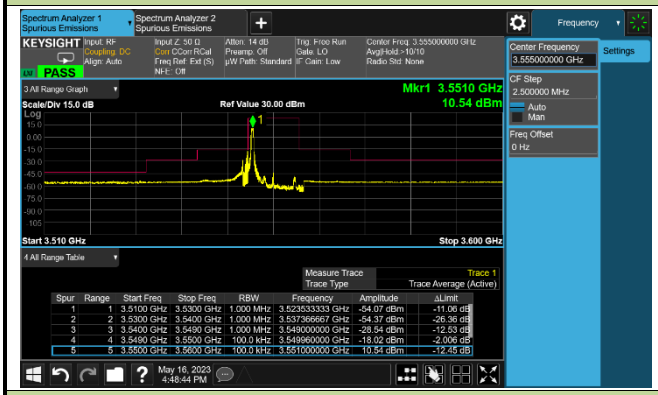
40MHz Channel Bandwidth - Full RB	
Low Channel ACP	MiddleChannel ACP
	

High Channel ACP	
	

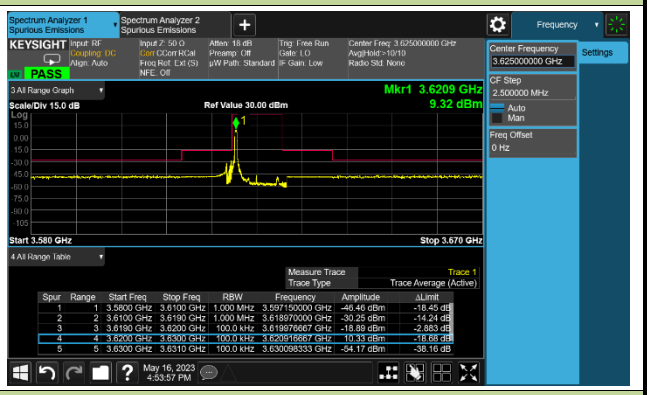
Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Date	2023/05/16	Test Band	n48_UL MIMO (Port 3)

10MHz Channel Bandwidth - 1RB

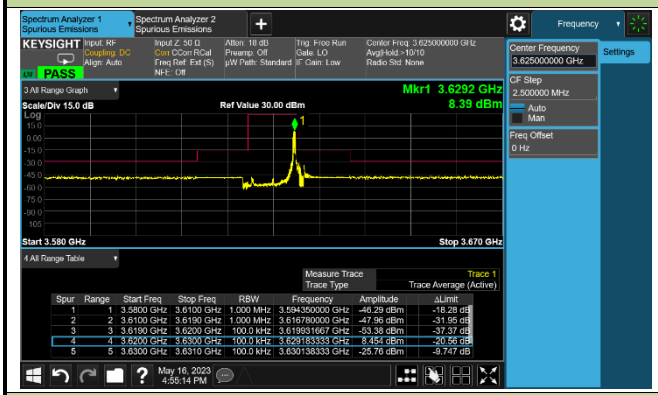
Low Channel ACP



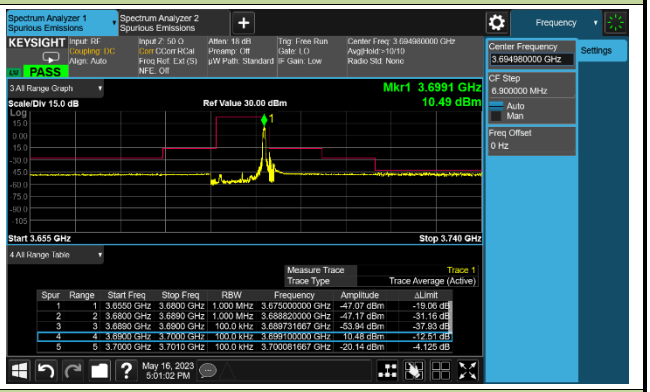
MiddleChannel ACP - Low RB Position



MiddleChannel ACP - High RB Position

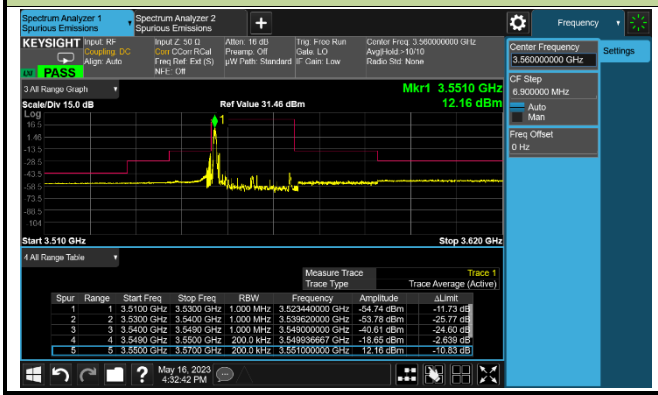


High Channel ACP

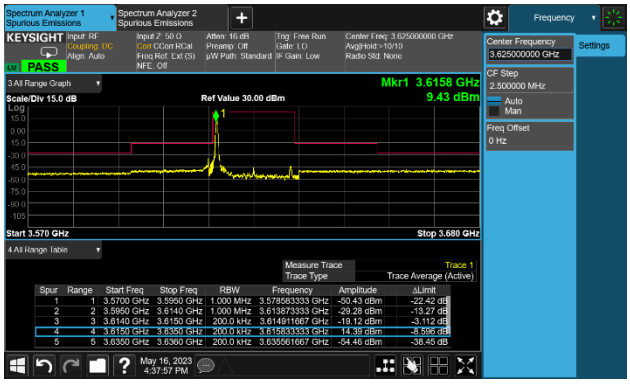


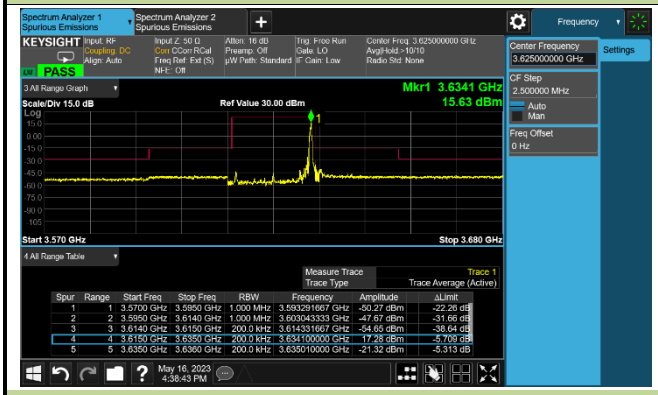
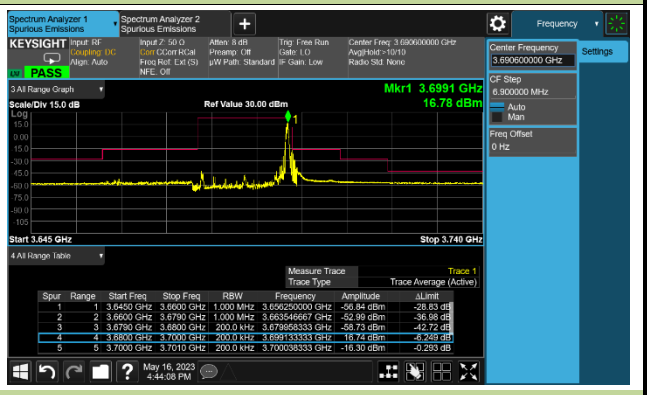
20MHz Channel Bandwidth - 1RB

Low Channel ACP

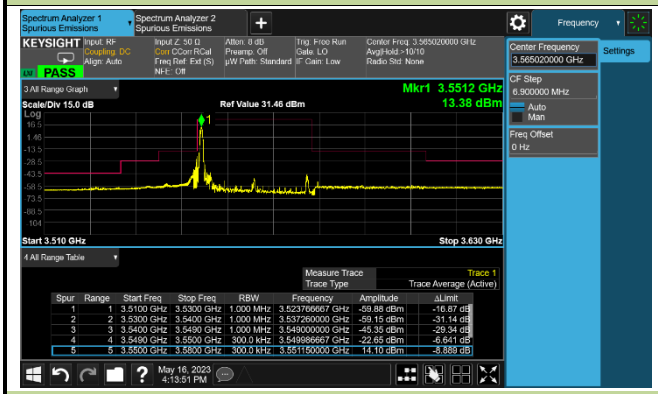
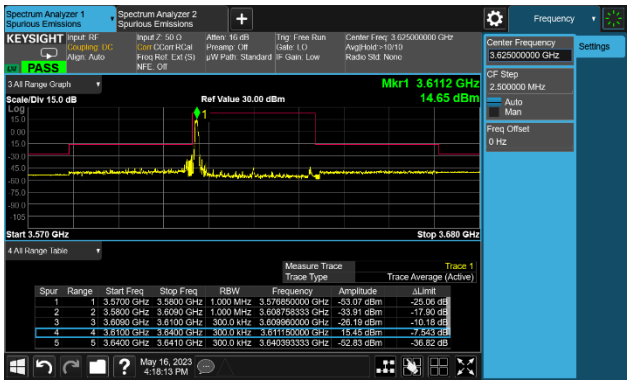


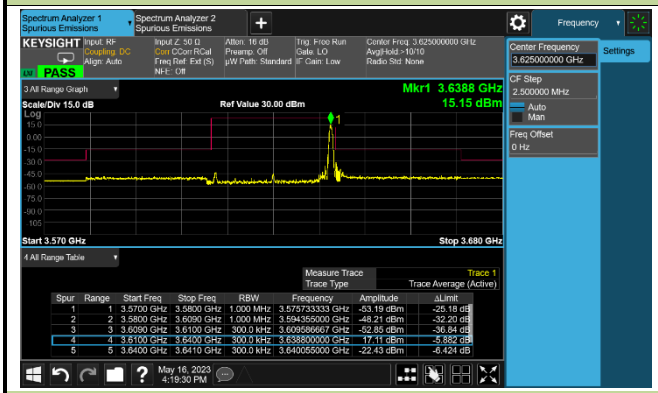
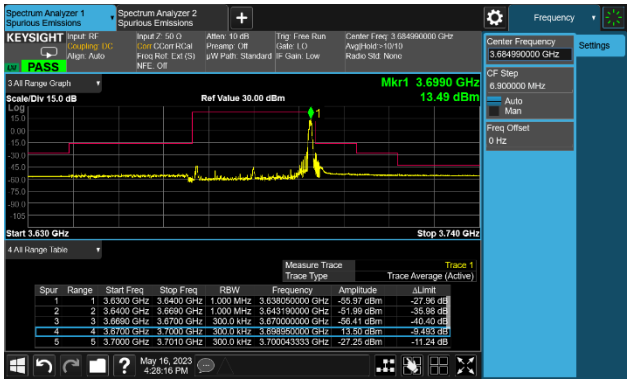
MiddleChannel ACP - Low RB Position



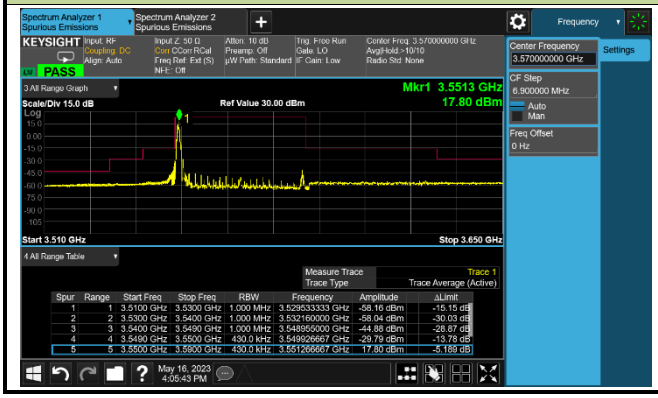
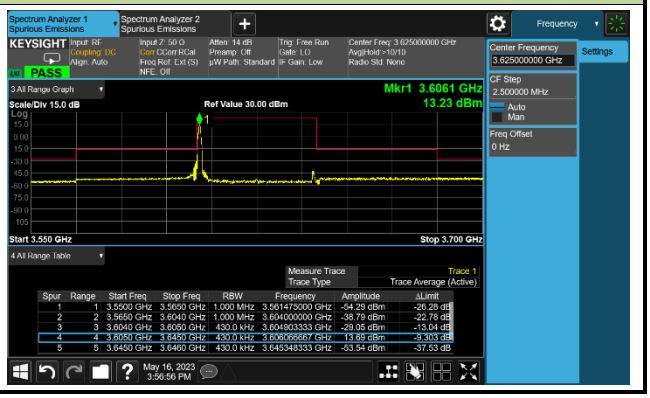
MiddleChannel ACP - High RB Position	High Channel ACP
	

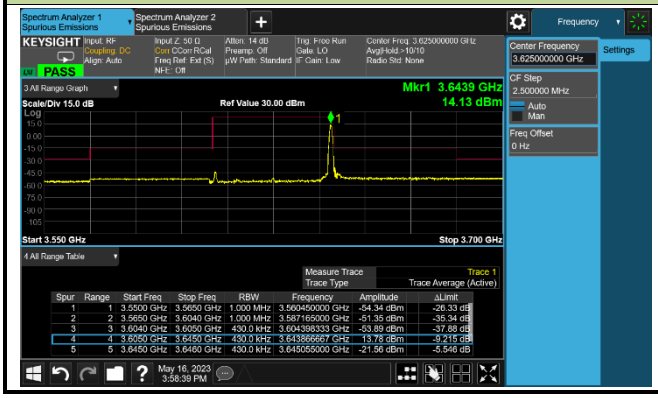
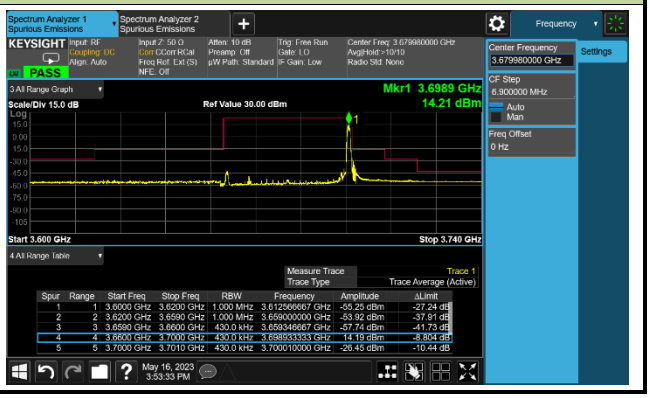
30MHz Channel Bandwidth - 1RB

Low Channel ACP	MiddleChannel ACP - Low RB Position
	

MiddleChannel ACP - High RB Position	High Channel ACP
	

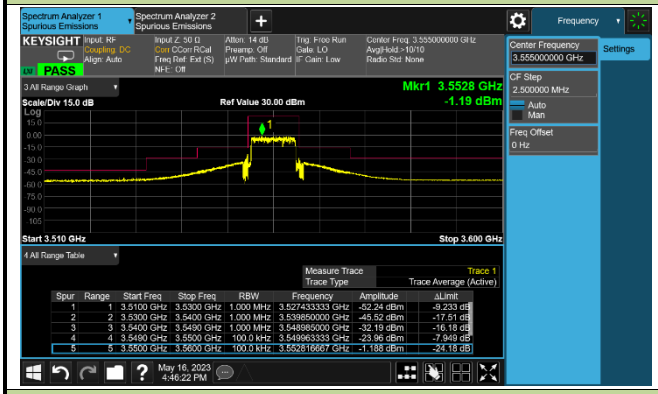
40MHz Channel Bandwidth - 1RB

Low Channel ACP	MiddleChannel ACP - Low RB Position
	

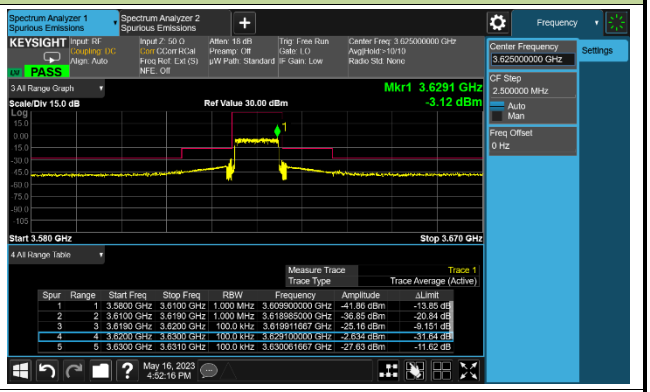
MiddleChannel ACP - High RB Position	High Channel ACP
	

10MHz Channel Bandwidth - Full RB

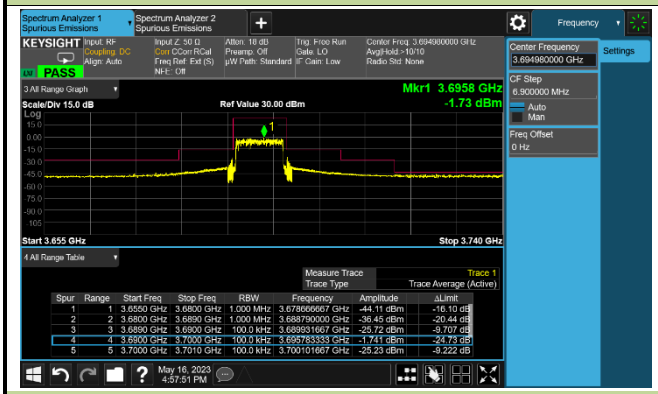
Low Channel ACP



Middle Channel ACP

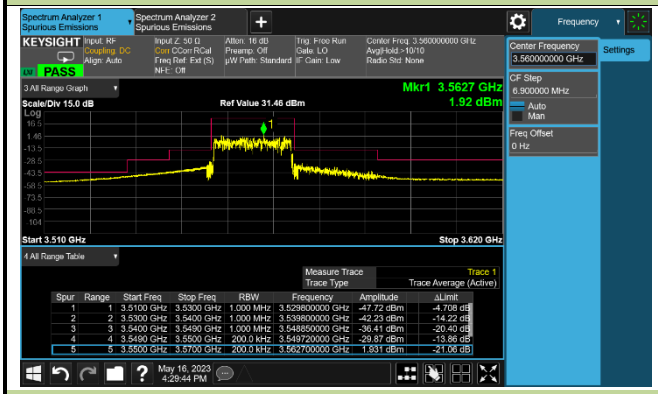


High Channel ACP

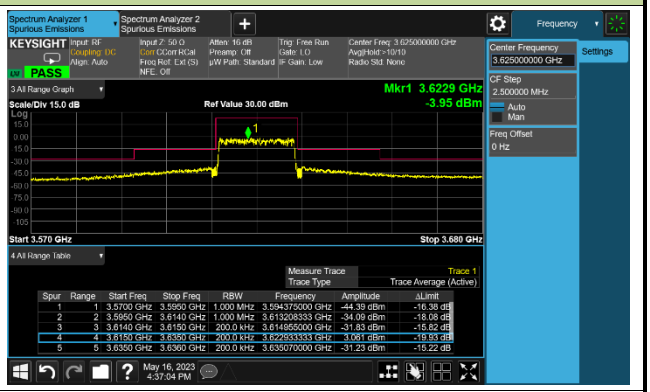


20MHz Channel Bandwidth - Full RB

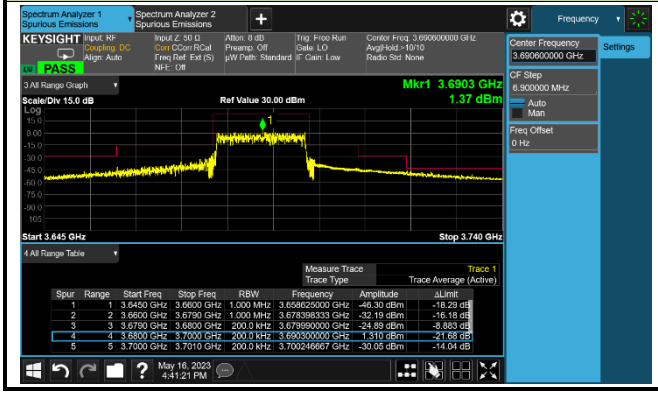
Low Channel ACP



Middle Channel ACP

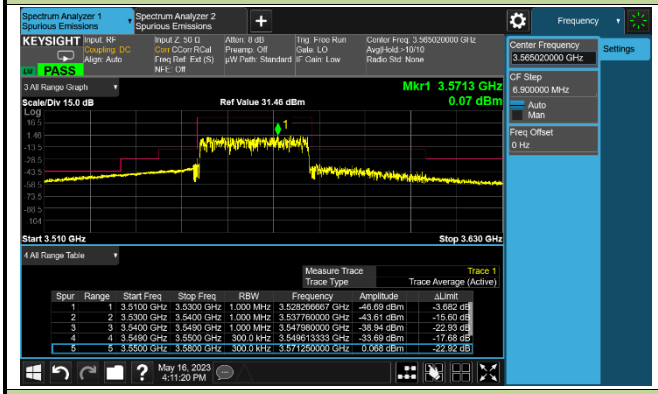


High Channel ACP

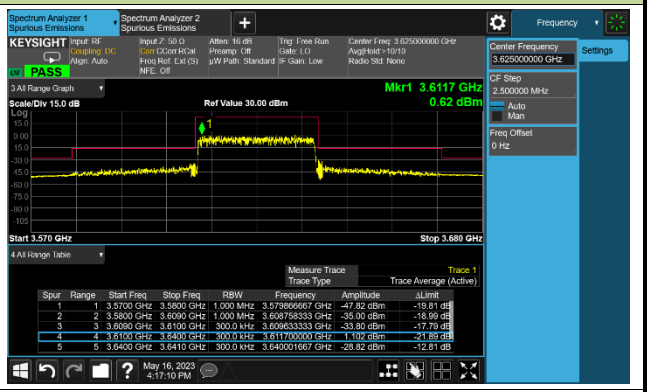


30MHz Channel Bandwidth - Full RB

Low Channel ACP



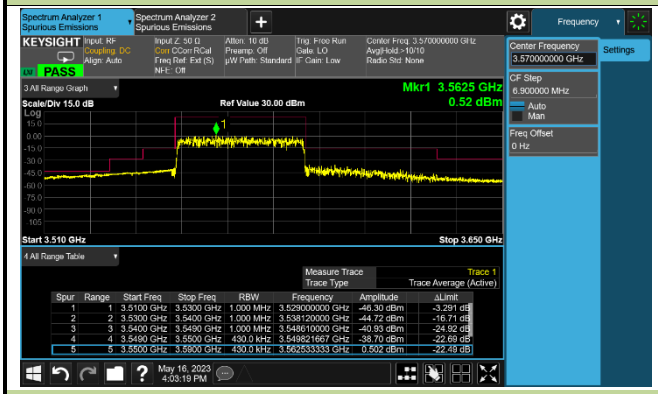
Middle Channel ACP



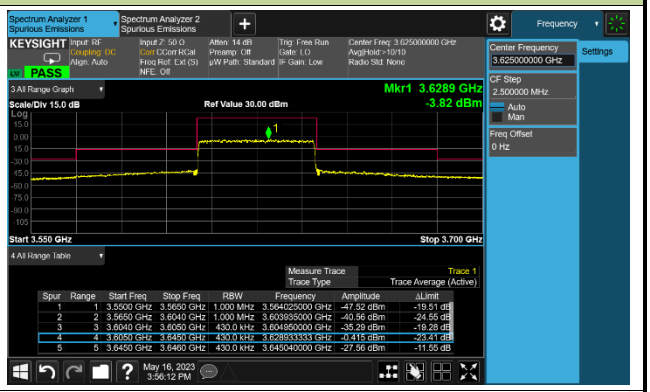
High Channel ACP

40MHz Channel Bandwidth - Full RB

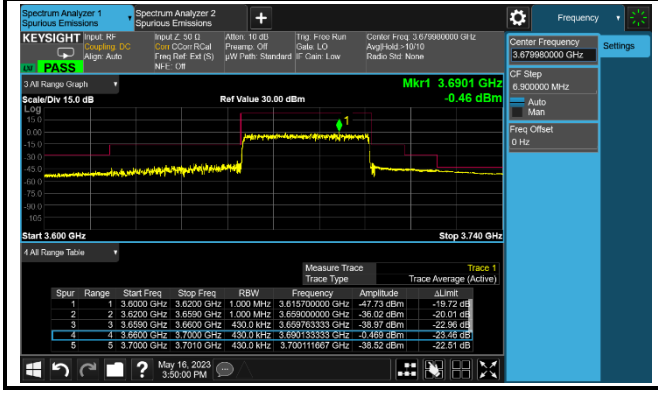
Low Channel ACP



Middle Channel ACP



High Channel ACP



A.3 Radiated Spurious Emissions Test Result

Test Site	WZ-AC2	Test Engineer	Bob Zhang
Test Date	2023/06/08	Test Band	n48_SA, 10MHz, 1RB

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Bottom Channel							
296.8	4.3	21.0	25.3	55.3	-30.0	Peak	Horizontal
817.6	3.8	30.0	33.8	55.3	-21.5	Peak	Horizontal
60.6	13.5	19.5	33.0	55.3	-22.3	Peak	Vertical
296.8	4.8	21.0	25.8	55.3	-29.5	Peak	Vertical
11514.5	33.3	17.2	50.5	55.3	-4.8	Peak	Horizontal
14744.5	32.4	19.7	52.1	55.3	-3.2	Peak	Horizontal
11735.5	32.0	17.7	49.7	55.3	-5.6	Peak	Vertical
14370.5	31.7	19.6	51.3	55.3	-4.0	Peak	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).							

Test Site	WZ-AC2	Test Engineer	Bob Zhang
Test Date	2023/06/08	Test Band	n48_MIMO, 10MHz, 1RB

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Bottom Channel							
296.8	6.3	21.0	27.3	55.3	-28.0	Peak	Horizontal
747.3	4.1	29.4	33.5	55.3	-21.8	Peak	Horizontal
60.1	14.0	19.6	33.6	55.3	-21.7	Peak	Vertical
296.8	8.4	21.0	29.4	55.3	-25.9	Peak	Vertical
9321.5	33.8	13.9	47.7	55.3	-7.6	Peak	Horizontal
14141.0	31.4	19.3	50.7	55.3	-4.6	Peak	Horizontal
11013.0	32.6	16.4	49.0	55.3	-6.3	Peak	Vertical
14107.0	32.9	19.2	52.1	55.3	-3.2	Peak	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor(dB/m).							

Appendix B - Test Setup Photograph

Refer to “2305RSU024-UT” file.

Appendix C - EUT Photograph

Refer to “2303RSU050-UE” file.

The End