TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 27** **47 CFR FCC Part 2**
Report No.:	RFBCUN-WTW-P23030714
FCC ID:	H8N46116A
Product:	5G small cell
Brand:	ASKEY
Model No.:	NR xCell 46116A
Received Date:	2023/4/10
Test Date:	2023/5/2 ~ 2023/5/12
Issued Date:	2023/6/26
Applicant:	ASKEY COMPUTER CORP.
Address:	10F, NO. 119, JIANKANG RD., ZHONGHE DIST., NEW TAIPEI CITY 23585, TAIWAN, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN
FCC Registration / Designation Number:	788550 / TW0003

Approved by: Jeremy Lin , **Date:** **2023/6/26**

Jeremy Lin / Project Engineer

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Prepared by : Pettie Chen / Senior Specialist

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBCUN-WTW-P23030714	Original release.	2023/6/26

1 Certificate

Product:	5G small cell
Brand:	ASKEY
Test Model:	NR xCell 46116A
Sample Status:	Engineering sample
Applicant:	ASKEY COMPUTER CORP.
Test Date:	2023/5/2 ~ 2023/5/12
Standard:	47 CFR FCC Part 27 47 CFR FCC Part 2
Measurement procedure:	ANSI/TIA/EIA-603-E 2016 ANSI C63.26-2015 KDB 971168 D01 Power Meas License Digital Systems v03r01 KDB 971168 D02 Misc Rev Approv License Devices v02r02 KDB 662911 D01 Multiple Transmitter Output v02r01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 27 47 CFR FCC Part 2			
Standard / Clause	Test Item	Result	Remark
FCC 47 CFR Part 2.1046 FCC 47 CFR Part 27.50(j)	Effective Radiated Power and Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
FCC 47 CFR Part 27.50(d)	Peak to Average Ratio	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1049	Bandwidth	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1051 FCC 47 CFR Part 27.53(l)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 27.53(l)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -38.72 dB at 60.07 MHz
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 27.53(l)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -26.37 dB at 7440.00 MHz
FCC 47 CFR Part 2.1055 FCC 47 CFR Part 27.54	Frequency Stability	Pass	Meet the requirement of limit.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3.59 dB
	30 MHz ~ 1 GHz	3.60 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	5G small cell
Brand	ASKEY
Test Model	NR xCell 46116A
Status of EUT	Engineering sample
Power Supply Rating	12Vdc or 48Vdc (Adapter)

Note:

1. EUT Overview.

Band / Bandwidth	TX Frequency Range (MHz)	Max. EIRP Power		
		QPSK	64QAM	256QAM
For Part 27O				
n77 (Channel Bandwidth 40MHz)	3720.00-3960.00	3184.198mW (35.03dBm)	3169.567mW (35.01dBm)	3162.278mW (35.00dBm)
n77 (Channel Bandwidth 50MHz)	3725.01-3954.99	3176.874mW (35.02dBm)	3169.567mW (35.01dBm)	3162.278mW (35.00dBm)
n77 (Channel Bandwidth 60MHz)	3730.02-3949.98	3273.407mW (35.15dBm)	3155.005mW (34.99dBm)	3133.286mW (34.96dBm)
n77 (Channel Bandwidth 70MHz)	3735.00-3945.00	3184.198mW (35.03dBm)	3176.874mW (35.02dBm)	3155.005mW (34.99dBm)
n77 (Channel Bandwidth 80MHz)	3740.01-3939.99	3235.937mW (35.10dBm)	3176.874mW (35.02dBm)	3162.278mW (35.00dBm)
n77 (Channel Bandwidth 90MHz)	3745.02-3934.98	3221.069mW (35.08dBm)	3155.005mW (34.99dBm)	3140.509mW (34.97dBm)
n77 (Channel Bandwidth 100MHz)	3750.00-3930.00	3265.878mW (35.14dBm)	3221.069mW (35.08dBm)	3198.895mW (35.05dBm)
Band / Bandwidth	TX Frequency Range (MHz)	Emission Designator		
		QPSK	64QAM	256QAM
For Part 27O				
n77 (Channel Bandwidth 40MHz)	3720.00-3960.00	37M8G7D	37M8D7W	37M8D7W
n77 (Channel Bandwidth 50MHz)	3725.01-3954.99	47M5G7D	47M4D7W	47M4D7W
n77 (Channel Bandwidth 60MHz)	3730.02-3949.98	57M8G7D	57M8D7W	57M9D7W
n77 (Channel Bandwidth 70MHz)	3735.00-3945.00	67M4G7D	67M5D7W	67M5D7W
n77 (Channel Bandwidth 80MHz)	3740.01-3939.99	77M4G7D	77M4D7W	77M4D7W
n77 (Channel Bandwidth 90MHz)	3745.02-3934.98	87M4G7D	87M4D7W	87M4D7W
n77 (Channel Bandwidth 100MHz)	3750.00-3930.00	97M4G7D	97M4D7W	97M4D7W

2. The EUT contains following accessory devices and PoE.

AC Adapter 1	Brand	FLYPOWER
	Model	PS65B120Y5000S
	AC Input	100-240Vac~, 15A, 50/60Hz
	DC Output	12.0Vdc, 5.0A
AC Adapter 2	Brand	Sunny
	Model	SYS1649-6548-T2
	AC Input	100-240Vac~, 15A, 50/60Hz
	DC Output	48.0Vdc, 1.35A
Bracket	Brand	LUNG TENG
	Model	MOD-SCE2200-Wall_Ceiling_Ploe-Mount-Sub
Power cord	Brand	WELL SHIN
	Model	1961-0048
PoE (Support unit)	Brand	CERiO
	Model	FPOE-DXG

3. The EUT device does not support 16QAM modulation and only supports Full RB mode.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Type	Antenna Gain(dBi)			Connector Type
	Frequency (MHz)	Ant 1	Ant 2	
Dipole	3300	5.54	4.80	I-PEX
	3550	4.79	5.05	
	3700	4.71	5.79	
	3800	5.14	6.20	

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	X-axis/ Y-axis/ Z-axis Worst Condition: Z-axis

For NR n77 (3700-3980 MHz)

Test Item	EUT Configure Mode	Tested Channel	Channel Bandwidth	Modulation	Mode
EIRP	A	648000 (3720.00 MHz) 656000 (3840.00 MHz) 664000 (3960.00 MHz)	40 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	648334 (3725.01 MHz) 656000 (3840.00 MHz) 663666 (3954.99 MHz)	50 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	648668 (3730.02 MHz) 656000 (3840.00 MHz) 663332 (3949.98 MHz)	60 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649000 (3735.00 MHz) 656000 (3840.00 MHz) 663000 (3945.00 MHz)	70 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649334 (3740.01 MHz) 656000 (3840.00 MHz) 662666 (3939.99 MHz)	80 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649668 (3745.02 MHz) 656000 (3840.00 MHz) 662332 (3934.98 MHz)	90 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	650000 (3750.00 MHz) 656000 (3840.00 MHz) 662000 (3930.00 MHz)	100 MHz	QPSK / 64QAM / 256QAM	Full RB
Modulation Characteristics	A	656000 (3840.00 MHz)	100 MHz	QPSK / 64QAM / 256QAM	Full RB
Frequency Stability	A	648000 (3720.00 MHz) 664000 (3960.00 MHz)	40 MHz	QPSK	Full RB
	A	648334 (3725.01 MHz) 663666 (3954.99 MHz)	50 MHz	QPSK	Full RB
	A	648668 (3730.02 MHz) 663332 (3949.98 MHz)	60 MHz	QPSK	Full RB
	A	649000 (3735.00 MHz) 663000 (3945.00 MHz)	70 MHz	QPSK	Full RB
	A	649334 (3740.01 MHz) 662666 (3939.99 MHz)	80 MHz	QPSK	Full RB
	A	649668 (3745.02 MHz) 662332 (3934.98 MHz)	90 MHz	QPSK	Full RB
	A	650000 (3750.00 MHz) 662000 (3930.00 MHz)	100 MHz	QPSK	Full RB

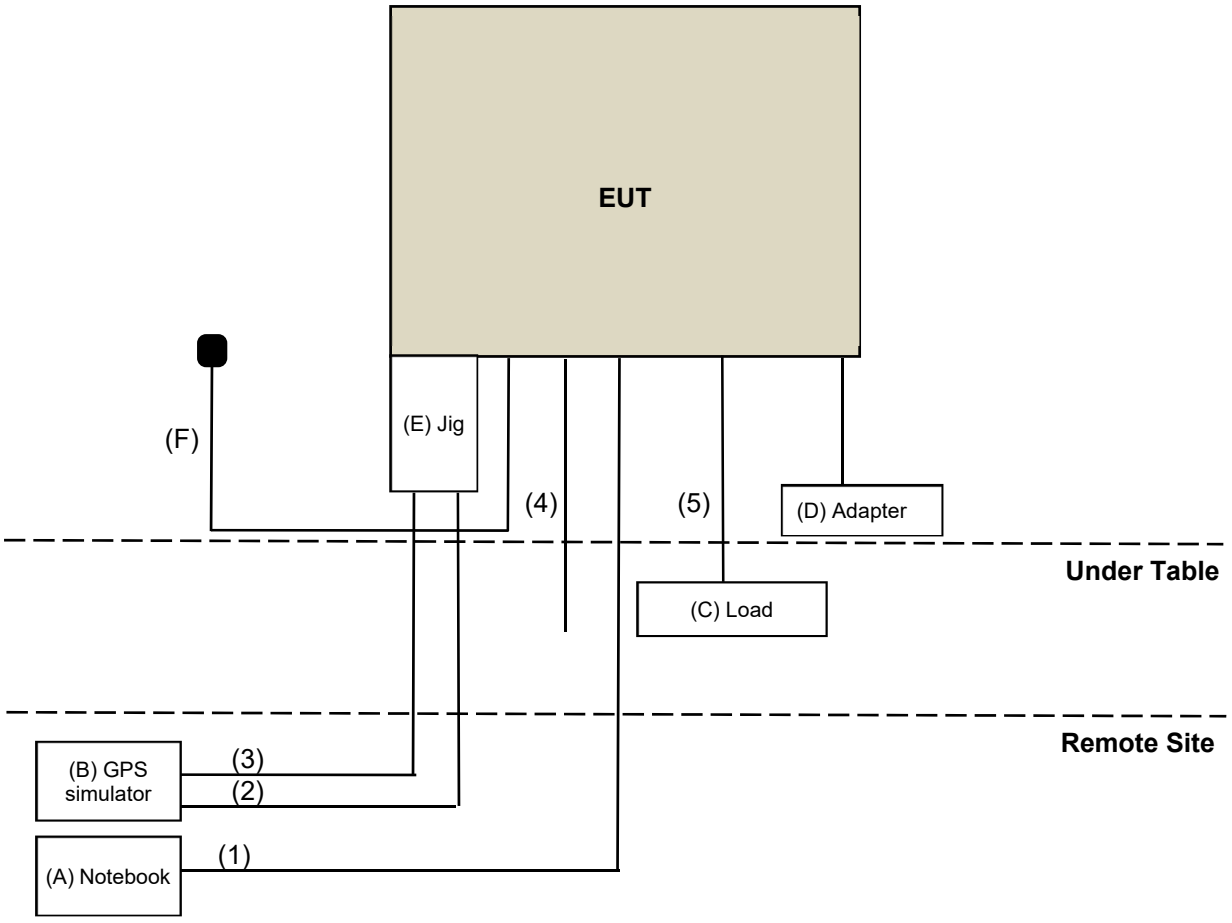
Test Item	EUT Configure Mode	Tested Channel	Channel Bandwidth	Modulation	Mode
Occupied Bandwidth	A	648000 (3720.00 MHz) 656000 (3840.00 MHz) 664000 (3960.00 MHz)	40 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	648334 (3725.01 MHz) 656000 (3840.00 MHz) 663666 (3954.99 MHz)	50 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	648668 (3730.02 MHz) 656000 (3840.00 MHz) 663332 (3949.98 MHz)	60 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649000 (3735.00 MHz) 656000 (3840.00 MHz) 663000 (3945.00 MHz)	70 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649334 (3740.01 MHz) 656000 (3840.00 MHz) 662666 (3939.99 MHz)	80 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649668 (3745.02 MHz) 656000 (3840.00 MHz) 662332 (3934.98 MHz)	90 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	650000 (3750.00 MHz) 656000 (3840.00 MHz) 662000 (3930.00 MHz)	100 MHz	QPSK / 64QAM / 256QAM	Full RB
Peak to Average Ratio	A	648000 (3720.00 MHz) 656000 (3840.00 MHz) 664000 (3960.00 MHz)	40 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	648334 (3725.01 MHz) 656000 (3840.00 MHz) 663666 (3954.99 MHz)	50 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	648668 (3730.02 MHz) 656000 (3840.00 MHz) 663332 (3949.98 MHz)	60 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649000 (3735.00 MHz) 656000 (3840.00 MHz) 663000 (3945.00 MHz)	70 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649334 (3740.01 MHz) 656000 (3840.00 MHz) 662666 (3939.99 MHz)	80 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	649668 (3745.02 MHz) 656000 (3840.00 MHz) 662332 (3934.98 MHz)	90 MHz	QPSK / 64QAM / 256QAM	Full RB
	A	650000 (3750.00 MHz) 656000 (3840.00 MHz) 662000 (3930.00 MHz)	100 MHz	QPSK / 64QAM / 256QAM	Full RB

Test Item	EUT Configure Mode	Tested Channel	Channel Bandwidth	Modulation	Mode
Conducted Emission	A	648000 (3720.00 MHz) 656000 (3840.00 MHz) 664000 (3960.00 MHz)	40 MHz	QPSK	Full RB
	A	648334 (3725.01 MHz) 656000 (3840.00 MHz) 663666 (3954.99 MHz)	50 MHz	QPSK	Full RB
	A	648668 (3730.02 MHz) 656000 (3840.00 MHz) 663332 (3949.98 MHz)	60 MHz	QPSK	Full RB
	A	649000 (3735.00 MHz) 656000 (3840.00 MHz) 663000 (3945.00 MHz)	70 MHz	QPSK	Full RB
	A	649334 (3740.01 MHz) 656000 (3840.00 MHz) 662666 (3939.99 MHz)	80 MHz	QPSK	Full RB
	A	649668 (3745.02 MHz) 656000 (3840.00 MHz) 662332 (3934.98 MHz)	90 MHz	QPSK	Full RB
	A	650000 (3750.00 MHz) 656000 (3840.00 MHz) 662000 (3930.00 MHz)	100 MHz	QPSK	Full RB
RE Below 1GHz	A, B	648000 (3720.00 MHz)	40 MHz	QPSK	Full RB
RE Above 1GHz	A	648000 (3720.00 MHz) 656000 (3840.00 MHz) 664000 (3960.00 MHz)	40 MHz	QPSK	Full RB
	A	648668 (3730.02 MHz) 656000 (3840.00 MHz) 663332 (3949.98 MHz)	60 MHz	QPSK	Full RB
	A	650000 (3750.00 MHz) 656000 (3840.00 MHz) 662000 (3930.00 MHz)	100 MHz	QPSK	Full RB
EUT Configure Mode	Mode	Power			
	A	Power from Adapter 1			
	B	Power from Adapter 2			

3.4 Test Program Used and Operation Descriptions

There is no need to controlling software during the test, and the EUT can be paired with the 5G Wireless Test Platforms to test the connection when it is powered on.

3.5 Connection Diagram of EUT and Peripheral Devices



3.6 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Notebook	NA	NA	NA	NA	Supplied by applicant
B	GPS simulator	T&E Communication LTD.	GSG-5	201062	NA	Provided by Lab
C	Load	NA	NA	NA	NA	Provided by Lab
D	Adapter	FLYPOWER	PS65B120Y5000S	NA	NA	Accessory (Test Mode A)
		Sunny	SYS1649-6548-T2	NA	NA	Accessory (Test Mode B)
E	Jig	NA	NA	NA	NA	Supplied by applicant
F	GPS ANT	NA	NA	NA	NA	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	RJ-45 Cable	1	6	N	N	Provided by Lab
2	RF Cable	1	6	N	N	Provided by Lab
3	RF Cable	1	6	N	N	Provided by Lab
4	Fiber optic cable	1	3	N	N	Provided by Lab
5	RJ-45 Cable	1	1.5	N	N	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer KEYSIGHT	N9030B	MY57140488	2023/3/6	2024/3/5
5G Wireless Test Platforms Keysight	E7515B	MY60102114	2022/5/20	2023/5/19
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/5/5

4.2 Modulation Characteristics

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer KEYSIGHT	N9030B	MY57140488	2023/3/6	2024/3/5
5G Wireless Test Platforms Keysight	E7515B	MY60102114	2022/5/20	2023/5/19
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/5/2 ~ 2023/5/4

4.3 Peak to Average Ratio

Refer to section 4.2 to get information of the instruments.

4.4 Bandwidth

Refer to section 4.2 to get information of the instruments.

4.5 Conducted Spurious Emissions

Refer to section 4.2 to get information of the instruments.

4.6 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Test Receiver KEYSIGHT	N9038A	MY55420137	2023/5/3	2024/5/2
Spectrum Analyzer R&S	FSW43	101867	2022/12/30	2023/12/29
Loop Antenna TESEQ	HLA 6121	45745	2022/7/27	2023/7/26
Loop Antenna EMCI	EM-6879	269	2022/9/19	2023/9/18
Pre-amplifier EMCI	EMC001340	980201	2022/9/23	2023/9/22
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2023/1/7	2024/1/6
Preamplifier Agilent	8447D	2944A10638	2023/5/7	2024/5/6
Bi_Log Antenna Schwarbeck	VULB9168	9168-160	2022/10/20	2023/10/19
RF Coaxial Cable WOKEN	8D-FB	Cable-CH9-01	2023/5/7	2024/5/6

Notes:

1. The test was performed in HY - 966 chamber 4.
2. Tested Date: 2023/5/12

4.7 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Horn Antenna Schwarzbeck	9120D	9120D-1169	2022/11/13	2023/11/12
Preamplifier Agilent	8449B	3008A02367	2023/2/15	2024/2/14
RF Coaxial Cable HUBER+SUHNER&EMCI	SUCOFLEX 104& EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	2023/1/7	2024/1/6
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	2023/1/7	2024/1/6
RF FLITER MICRO-TRONICS	BRM50716	060	2023/1/11	2024/1/10
RF FLITER MICRO-TRONICS	BRM17690	004	2023/1/11	2024/1/10
Pre-Ammlifier EMCI	EMC 184045	980116	2022/10/1	2023/9/30
Horn Antenna Schwarzbeck	BBHA 9170	9170-480	2022/11/13	2023/11/12
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170243	2022/11/13	2023/11/12
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	2022/7/9	2023/7/8
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2022/7/9	2023/7/8
Boresight antenna tower fixture BV	BAF-02	5	NA	NA

Notes:

1. The test was performed in HY - 966 chamber 4.
2. Tested Date: 2023/5/12

4.8 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
3-channel DC power supply JIN YIH Technology	ODP3033	ODP30332128138	N/A	N/A
Digital Multimeter Fluke	87-III	70360742	2022/6/23	2023/6/22
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	101544	2022/5/9	2023/5/8
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	2022/12/27	2023/12/26
5G Wireless Test Platforms Keysight	E7515B	MY60102114	2022/5/20	2023/5/19

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/5/2 ~ 2023/5/4

5 Limits of Test Items

5.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

For NR n77 (3700-3980 MHz):

The power of each fixed or base station transmitting in the 3700-3980 MHz band, located in any geographic location other than any geographic location described under FCC Part 27.50(j)(1), with an EIRP limit of 1640 W/MHz . This limit applies to the total power of all antenna elements in any given sector of the base station.

5.2 Modulation Characteristics

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

5.3 Peak to Average Ratio

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.

5.4 Bandwidth

According to FCC 47 CFR part 2.1049, 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% of the total mean power radiated by a given emission.

5.5 Conducted Spurious Emissions

For NR n77 (3700-3980 MHz):

According to FCC 47 CFR part 27.53(l), for base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this paragraph (l)(1) 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.
Note: The device has MIMO function, so the limit of conducted spurious emissions need to be reduced by $10\log(Numbers_{ANT})$ according to FCC KDB 662911 D01 guidance.

5.6 Radiated Spurious Emissions below 1GHz

For NR n77 (3700-3980 MHz):

According to FCC 47 CFR part 27.53(l), for mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

5.7 Radiated Spurious Emissions above 1GHz

For NR n77 (3700-3980 MHz):

According to FCC 47 CFR part 27.53(l), for mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

5.8 Frequency Stability

For NR n77 (3700-3980 MHz):

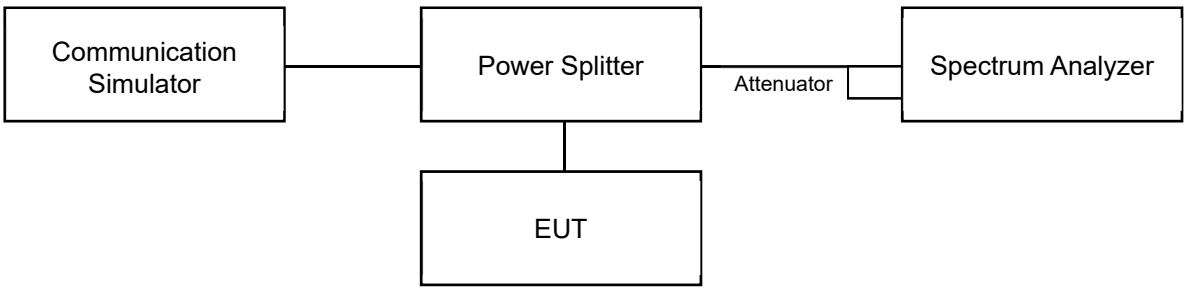
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

6 Test Arrangements

6.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

6.1.1 Test Setup

Conducted Power Measurement:



6.1.2 Test Procedure

Conducted Power Measurement:

The EUT is configured by test software or key-in commands to set data modulation and maximum power using WWAN technology and link to spectrum analyzer measurements. Set the EUT to transmit under low, middle and high channel and record the power level shown on spectrum analyzer. Power measurements use detector average (rms).

Measurement method refers to ANSI C63.26 section 5.2.4.4.

a. Set span to 1.5 × 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. Set Sweep time = auto-couple.
f. Detector = power averaging (rms).
g. Set sweep trigger to “free run.”
h. Trace average at least 100 traces in power averaging (rms) mode.
i. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band or channel power measurement function with band/channel limits set equal to the OBW band edges.
j. If Duty cycle < 98%, Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.

Maximum EIRP / ERP

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

$EIRP = P_{Meas} + G_T$

$ERP = P_{Meas} + G_T - 2.15$

where

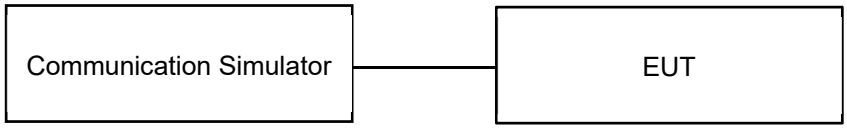
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

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)

6.2 Modulation Characteristics

6.2.1 Test Setup

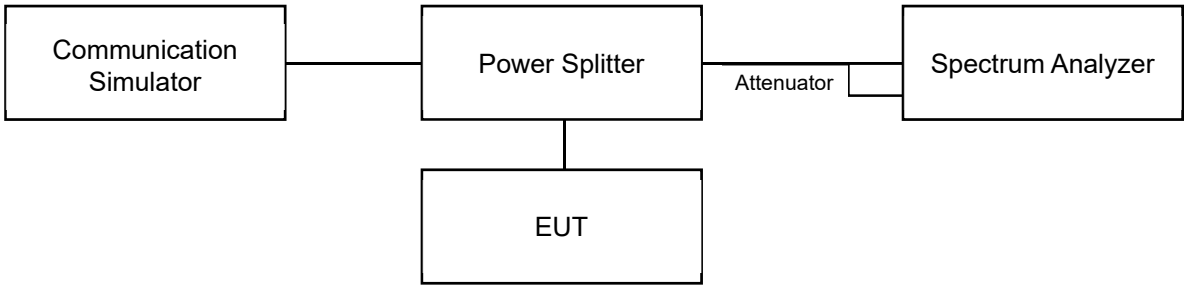


6.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, the frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

6.3 Peak to Average Ratio

6.3.1 Test Setup

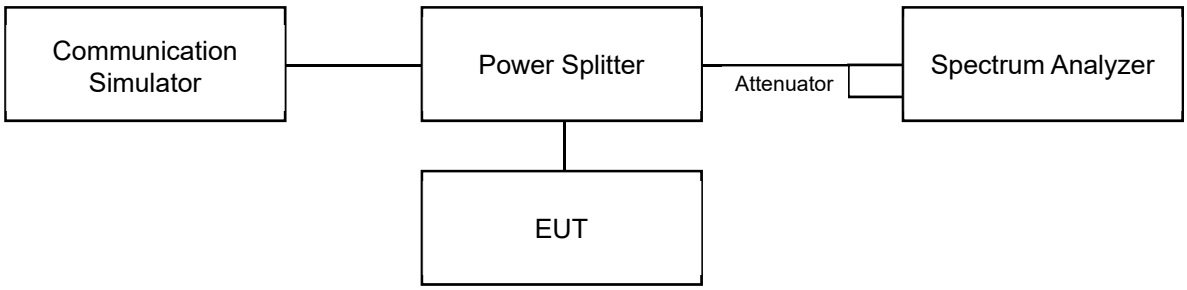


6.3.2 Test Procedure

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
b. Set the number of counts to a value that stabilizes the measured CCDF curve;
c. Record the maximum PAPR level associated with a probability of 0.1%.

6.4 Bandwidth

6.4.1 Test Setup



6.4.2 Test Procedure

For the 26 dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

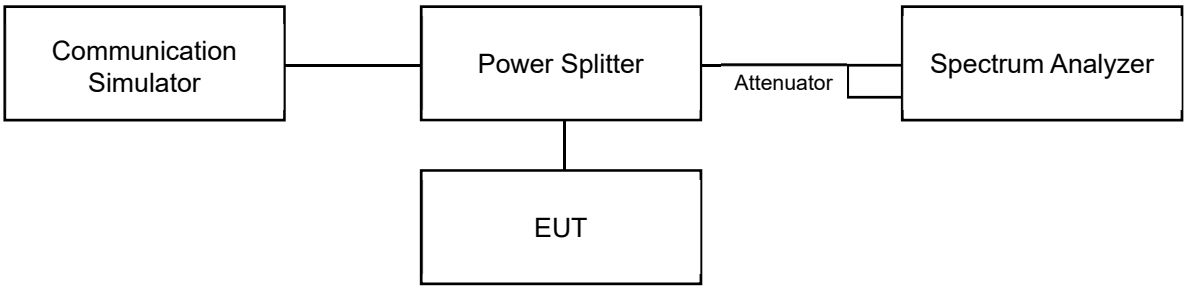
a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d. The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e. Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f. Determine the following reference values: 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).
g. Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
h. 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 amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
i. The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d. The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e. Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f. Determine the reference value by either of the following:
g. 1) 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).
h. 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
i. Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
j. If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).
k. 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 amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers. The spectral envelope can cross the "−X dB amplitude" at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the "−X dB amplitude."
l. The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.5 Conducted Spurious Emissions

6.5.1 Test Setup



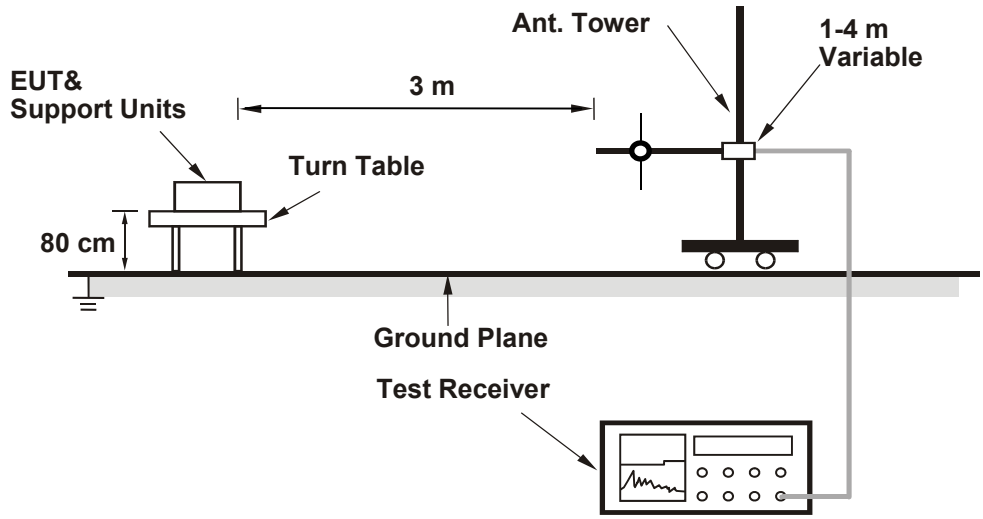
6.5.2 Test Procedure

a. Measurement refer to ANSI C63.26 section 5.7.
b. All measurements were done at 3 channels: low, middle and high operational frequency range.
c. Measuring frequency range is from 9 kHz up to the tenth harmonic of the hightest fundamental frequency or to 40 GHz, whichever is lower. 20 dB attenuation pad is connected with spectrum.
d. The fundamental frequency above 1 GHz, the spectrum set RBW = 1 MHz, VBW = 3 MHz, Detector = Average.
e. The fundamental frequency below 1 GHz, the spectrum set RBW ≥ 100 kHz, VBW ≥ 3 x RBW, Detector = Average.
f. Measuring frequency band edge, narrow RBW (no less than 1% of the OBW) is used for conducted emission measurement.

6.6 Radiated Spurious Emissions below 1GHz

6.6.1 Test Setup

For radiated emission 30 MHz to 1 GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.6.2 Test Procedure

The EUT is configured by test software or key-in commands to set data modulation and maximum power using WWAN technology.

a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7

e. EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

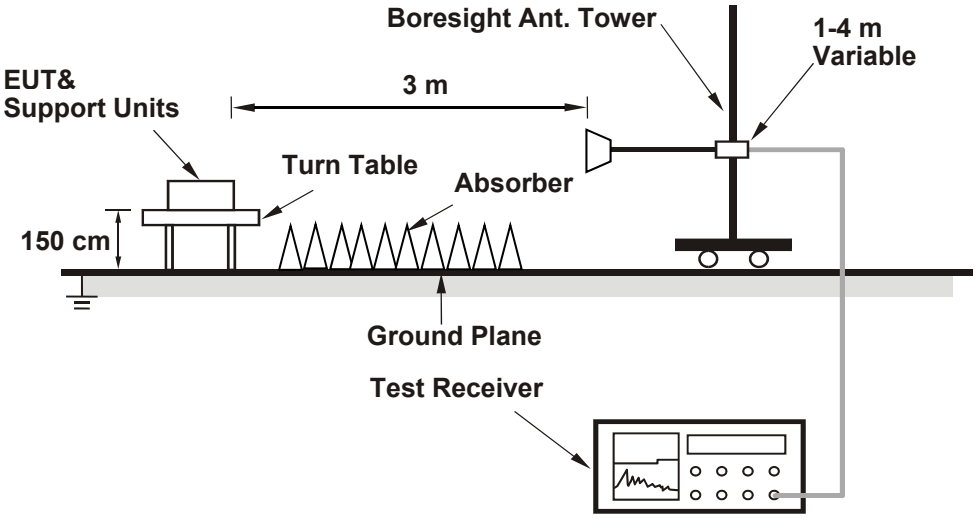
Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

6.7 Radiated Spurious Emissions above 1GHz

6.7.1 Test Setup

For radiated emission above 1 GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.7.2 Test Procedure

The EUT is configured by test software or key-in commands to set data modulation and maximum power using WWAN technology.

a. In the semi-anechoic chamber, EUT placed on the 1.5 m height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7

e. EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

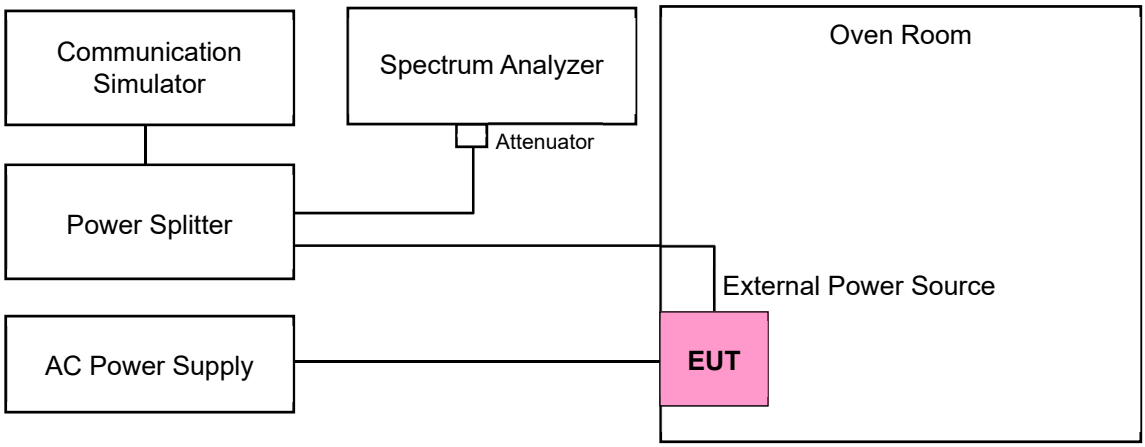
f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.

6.8 Frequency Stability

6.8.1 Test Setup



6.8.2 Test Procedure

The EUT is configured by test software or key-in commands to set data modulation and maximum power using WWAN technology.

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

7 Test Results of Test Item

7.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

Input Power:	120 Vac, 60Hz	Environmental Conditions:	21°C, 70% RH	Tested By:	James Yang

NR Band 77_Full power (dBm)					
BW	Channel	Chain	QPSK	64QAM	256QAM
100 MHz	650000 3750MHz	0	23.46	23.38	23.40
		1	23.39	23.34	23.28
		Total Power	26.44	26.37	26.35
		E.I.R.P.	35.14	35.07	35.05
		Power Setting	240		
	656000 3840MHz	0	23.40	23.33	23.35
		1	23.34	23.37	23.31
		Total Power	26.38	26.36	26.34
		E.I.R.P.	35.08	35.06	35.04
		Power Setting	240		
	662000 3930MHz	0	23.42	23.38	23.28
		1	23.38	23.35	23.34
		Total Power	26.41	26.38	26.32
		E.I.R.P.	35.11	35.08	35.02
		Power Setting	240		
BW	Channel	Chain	QPSK	64QAM	256QAM
90 MHz	649668 3745.02MHz	0	23.31	23.28	23.23
		1	23.43	23.21	23.18
		Total Power	26.38	26.26	26.22
		E.I.R.P.	35.08	34.96	34.92
		Power Setting	240		
	656000 3840MHz	0	23.30	23.31	23.23
		1	23.35	23.25	23.29
		Total Power	26.34	26.29	26.27
		E.I.R.P.	35.04	34.99	34.97
		Power Setting	240		
	662332 3934.98MHz	0	23.30	23.29	23.27
		1	23.28	23.24	23.23
		Total Power	26.30	26.28	26.26
		E.I.R.P.	35.00	34.98	34.96
		Power Setting	240		

*EIRP (dBm) = Conducted Output Power (dBm) + Directional Gain (dBi)

*Directional Gain (dBi) = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)^2/2] = 10 log[($10^{5.14/20}$ +$10^{6.2/20}$)^2/2] = 8.7 dBi

NR Band 77_Full power (dBm)					
BW	Channel	Chain	QPSK	64QAM	256QAM
80 MHz	649334 3740.01MHz	0	23.32	23.26	23.20
		1	23.38	23.36	23.22
		Total Power	26.36	26.32	26.22
		E.I.R.P.	35.06	35.02	34.92
		Power Setting	240		
	656000 3840MHz	0	23.40	23.33	23.37
		1	23.23	23.28	23.21
		Total Power	26.33	26.32	26.30
		E.I.R.P.	35.03	35.02	35.00
		Power Setting	240		
	662666 3939.99MHz	0	23.35	23.29	23.26
		1	23.43	23.28	23.24
		Total Power	26.40	26.30	26.26
		E.I.R.P.	35.10	35.00	34.96
		Power Setting	240		
BW	Channel	Chain	QPSK	64QAM	256QAM
70 MHz	649000 3735MHz	0	23.32	23.30	23.23
		1	23.25	23.24	23.22
		Total Power	26.30	26.28	26.24
		E.I.R.P.	35.00	34.98	34.94
		Power Setting	240		
	656000 3840MHz	0	23.26	23.26	23.30
		1	23.32	23.30	23.25
		Total Power	26.30	26.29	26.29
		E.I.R.P.	35.00	34.99	34.99
		Power Setting	240		
	663000 3945MHz	0	23.22	23.26	23.30
		1	23.41	23.35	23.23
		Total Power	26.33	26.32	26.28
		E.I.R.P.	35.03	35.02	34.98
		Power Setting	240		

*EIRP (dBm) = Conducted Output Power (dBm) + Directional Gain (dBi)

*Directional Gain (dBi) = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 10 log[$(10^{5.14/20} + 10^{6.2/20})^2/2$] = 8.7 dBi

NR Band 77_Full power (dBm)					
BW	Channel	Chain	QPSK	64QAM	256QAM
60 MHz	648668 3730.02MHz	0	23.25	23.26	23.21
		1	23.33	23.27	23.26
		Total Power	26.30	26.28	26.25
		E.I.R.P.	35.00	34.98	34.95
		Power Setting	240		
	656000 3840MHz	0	23.28	23.32	23.21
		1	23.34	23.24	23.28
		Total Power	26.32	26.29	26.26
		E.I.R.P.	35.02	34.99	34.96
		Power Setting	240		
	663332 3949.98MHz	0	23.41	23.27	23.26
		1	23.46	23.26	23.22
		Total Power	26.45	26.28	26.25
		E.I.R.P.	35.15	34.98	34.95
		Power Setting	240		
BW	Channel	Chain	QPSK	64QAM	256QAM
50 MHz	648334 3725.01MHz	0	23.34	23.25	23.19
		1	23.25	23.23	23.26
		Total Power	26.31	26.25	26.24
		E.I.R.P.	35.01	34.95	34.94
		Power Setting	240		
	656000 3840MHz	0	23.36	23.26	23.25
		1	23.24	23.28	23.26
		Total Power	26.31	26.28	26.27
		E.I.R.P.	35.01	34.98	34.97
		Power Setting	240		
	663666 3954.99MHz	0	23.34	23.28	23.31
		1	23.27	23.32	23.26
		Total Power	26.32	26.31	26.30
		E.I.R.P.	35.02	35.01	35.00
		Power Setting	240		

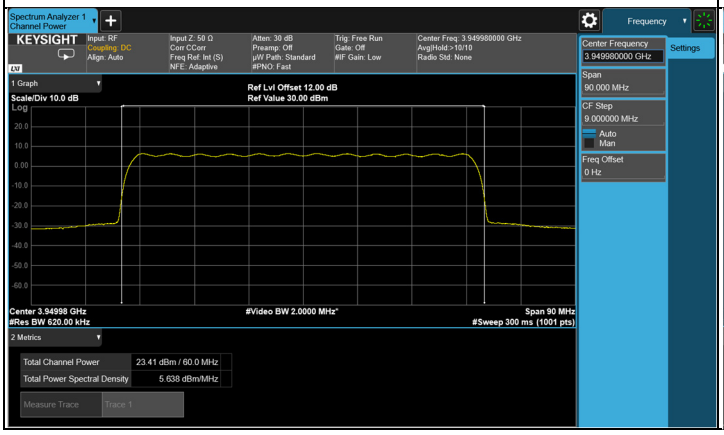
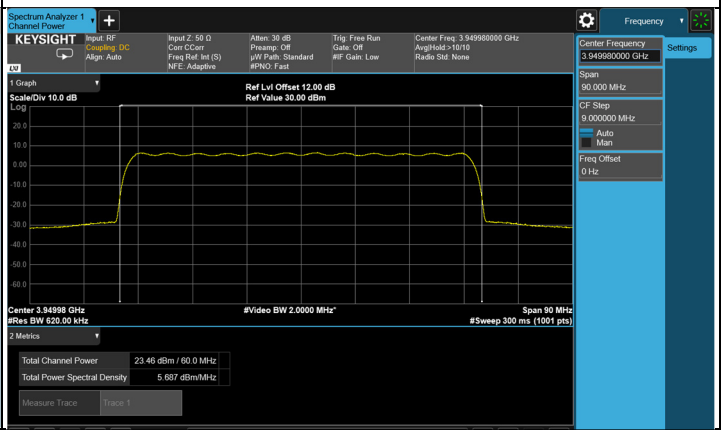
*EIRP (dBm) = Conducted Output Power (dBm) + Directional Gain (dBi)

*Directional Gain (dBi) = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 10 log[$(10^{5.14/20} + 10^{6.2/20})^2/2$] = 8.7 dBi

NR Band 77_Full power (dBm)					
BW	Channel	Chain	QPSK	64QAM	256QAM
40 MHz	648000 3720MHz	0	23.27	23.21	23.20
		1	23.33	23.34	23.32
		Total Power	26.31	26.29	26.27
		E.I.R.P.	35.01	34.99	34.97
		Power Setting	240		
	656000 3840MHz	0	23.31	23.34	23.26
		1	23.33	23.25	23.30
		Total Power	26.33	26.31	26.29
		E.I.R.P.	35.03	35.01	34.99
		Power Setting	240		
	664000 3960MHz	0	23.37	23.32	23.28
		1	23.26	23.27	23.29
		Total Power	26.33	26.31	26.30
		E.I.R.P.	35.03	35.01	35.00
		Power Setting	240		

*EIRP (dBm) = Conducted Output Power (dBm) + Directional Gain (dBi)

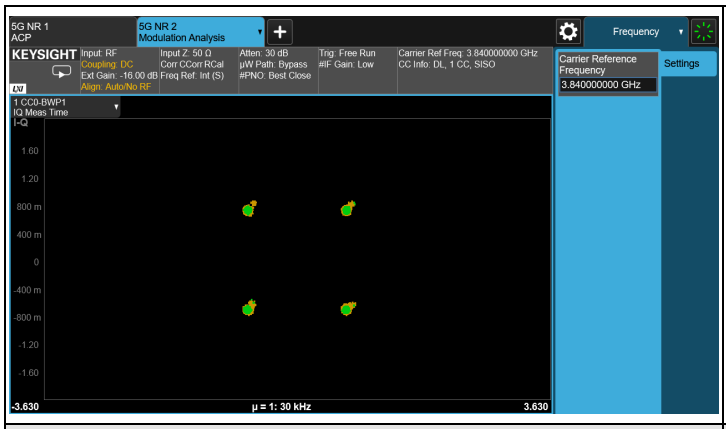
*Directional Gain (dBi) = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)^2/2] = 10 log[($10^{5.14/20}$ +$10^{6.2/20}$)^2/2] = 8.7 dBi

Spectrum Plot of Worst Value	
BW: 60 MHz (Ch 663332, 3949.98MHz)	
Chain 0	Chain 1
	

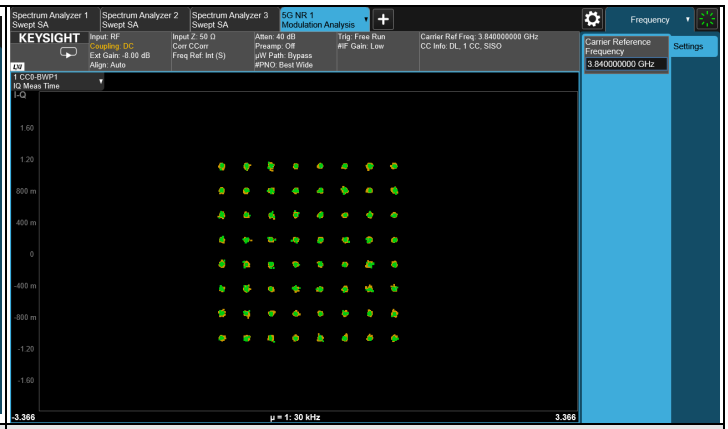
7.2 Modulation Characteristics

Input Power:	120 Vac, 60Hz	Environmental Conditions:	21°C, 70% RH	Tested By:	James Yang

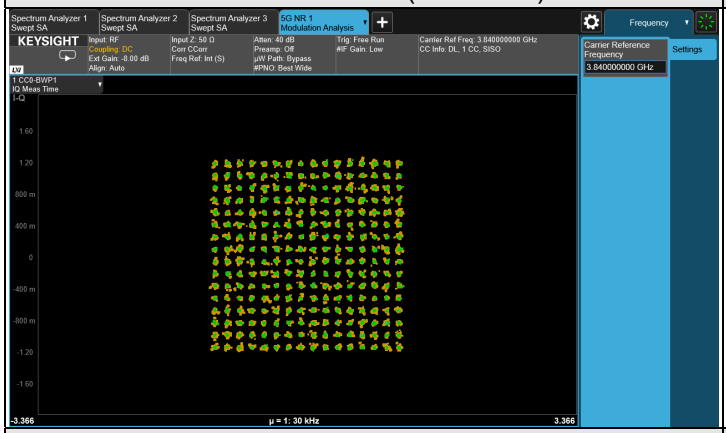
NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 100 MHz



QPSK CH 656000 (3840 MHz)



64QAM CH 656000 (3840 MHz)



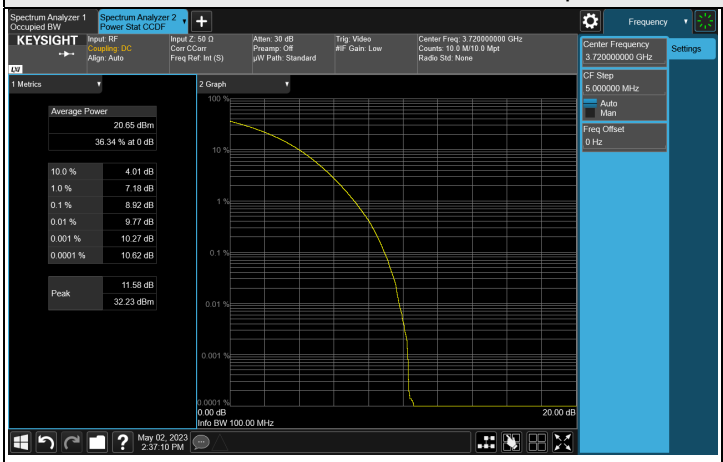
256QAM CH 656000 (3840 MHz)

7.3 Peak to Average Ratio

Input Power:	120 Vac, 60Hz	Environmental Conditions:	21°C, 70% RH	Tested By:	James Yang

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 40 MHz

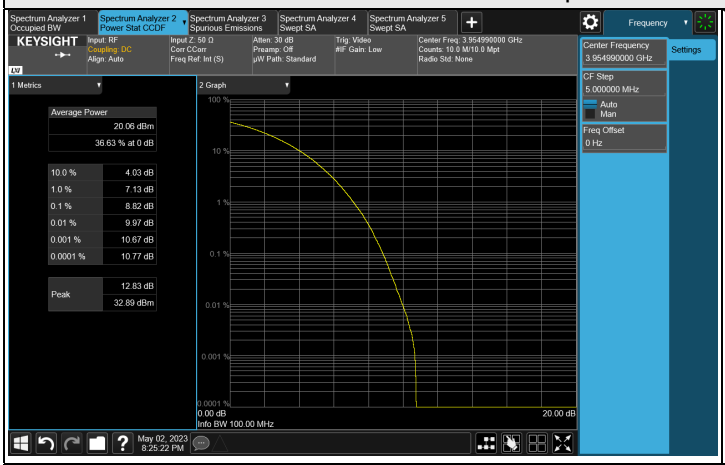
Channel	Frequency (MHz)	Peak to Average Ratio (dB)						Limit
		Chain 0			Chain 1			
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM	
648000	3720	8.87	8.53	8.47	8.92	8.61	8.59	13.00
656000	3840	8.83	8.65	8.48	8.74	8.64	8.51	
664000	3960	8.56	8.72	8.70	8.90	8.71	8.70	

Spectrum Plot of Worst Value	
	
Chain 1 QPSK CH 648000 (3720 MHz)	

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 50 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)						Limit
		Chain 0			Chain 1			
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM	
648334	3725.01	8.63	8.60	8.75	8.68	8.50	8.63	13.00
656000	3840	8.81	8.78	8.66	8.51	8.43	8.62	
663666	3954.99	8.53	8.61	8.82	8.67	8.60	8.61	

Spectrum Plot of Worst Value

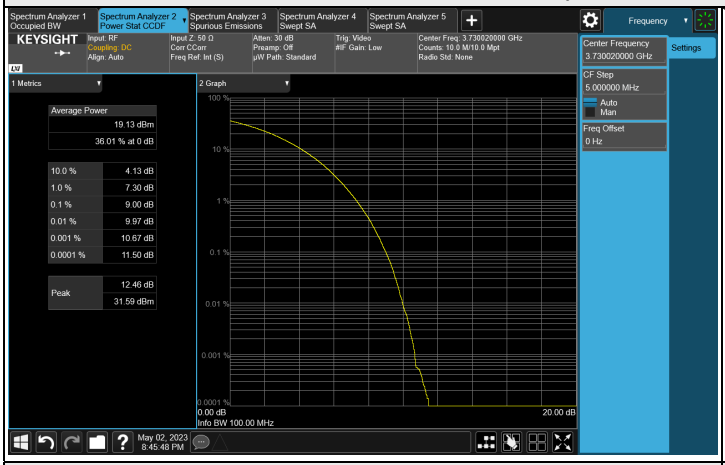


Chain 0 256QAM CH 663666 (3954.99 MHz)

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 60 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)						Limit
		Chain 0			Chain 1			
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM	
648668	3730.02	9.00	8.72	8.57	8.83	8.73	8.60	13.00
656000	3840	8.67	8.84	8.63	8.87	8.66	8.92	
663332	3949.98	8.50	8.56	8.48	8.54	8.61	8.86	

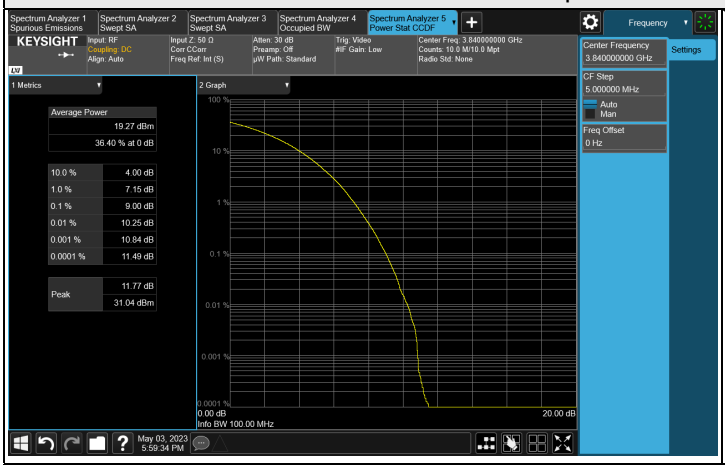
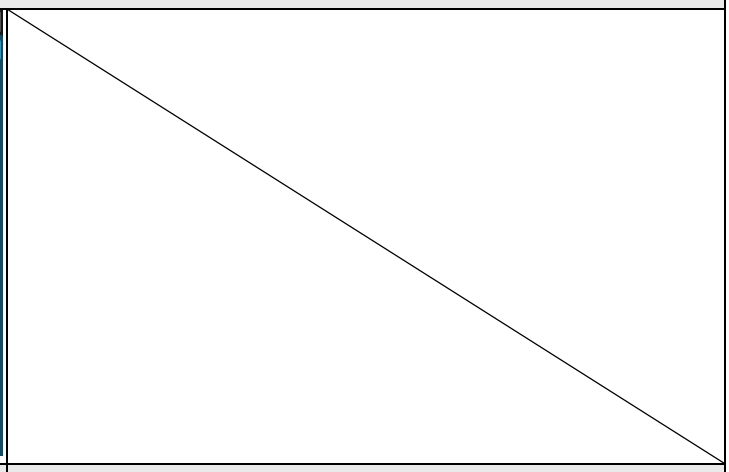
Spectrum Plot of Worst Value



Chain 0 QPSK CH 648668 (3730.02 MHz)

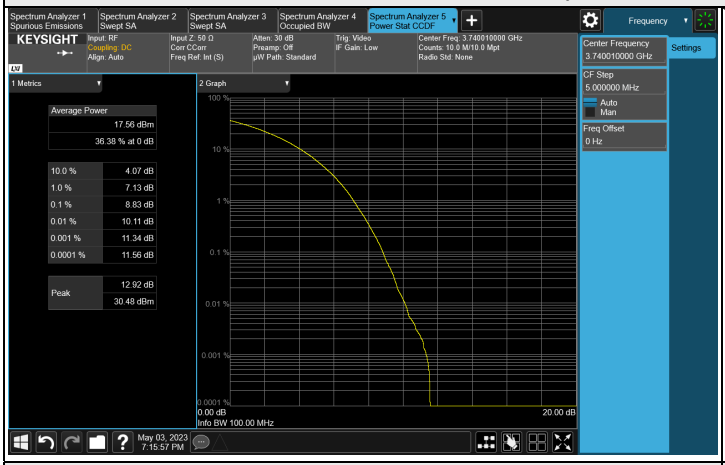
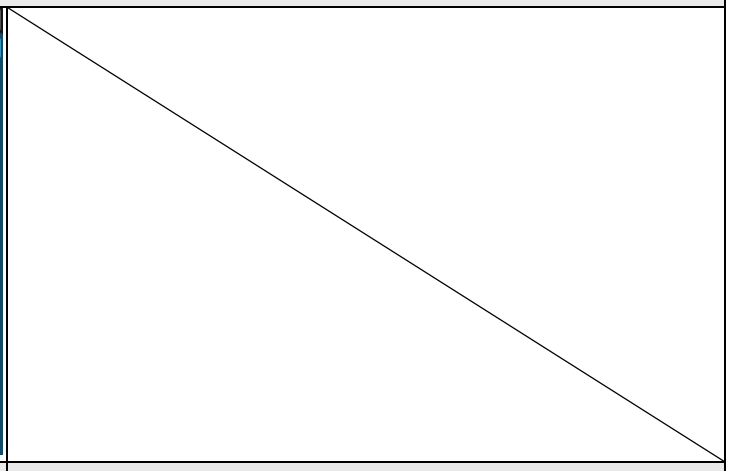
NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 70 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)						Limit
		Chain 0			Chain 1			
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM	
649000	3735	8.68	8.85	8.57	8.64	8.82	8.85	13.00
656000	3840	8.83	9.00	8.98	8.67	8.60	8.83	
663000	3945	8.90	8.72	8.73	8.72	8.87	8.76	

Spectrum Plot of Worst Value	
	
Chain 0 64QAM CH 656000 (3840 MHz)	

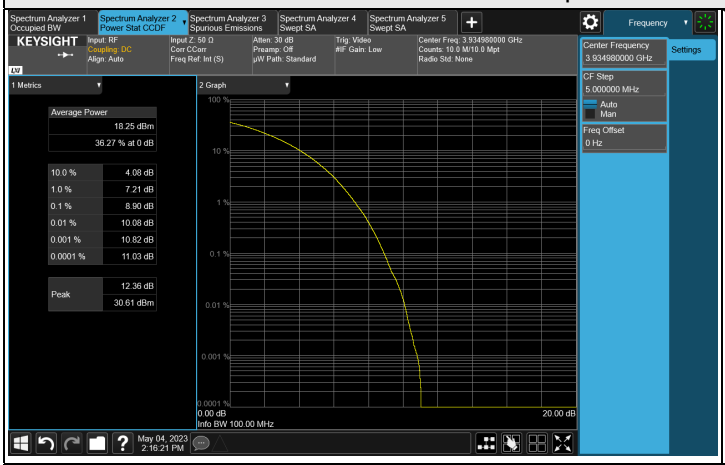
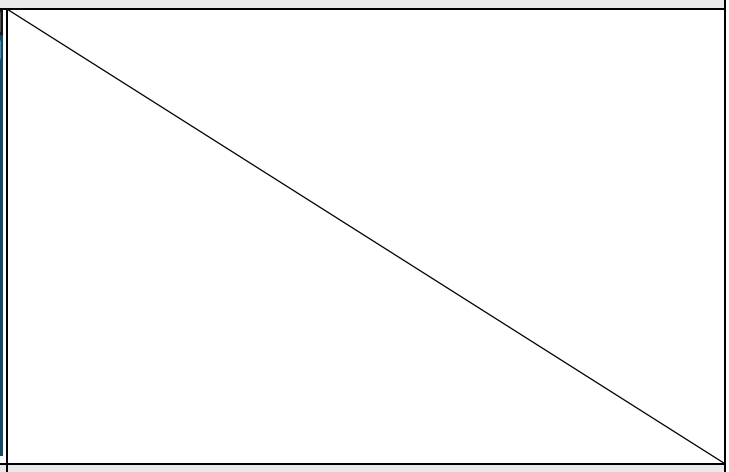
NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 80 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)						Limit
		Chain 0			Chain 1			
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM	
649334	3740.01	8.54	8.41	8.83	8.66	8.37	8.61	13.00
656000	3840	8.56	8.67	8.76	8.36	8.80	8.60	
662666	3939.99	8.35	8.50	8.51	8.61	8.47	8.62	

Spectrum Plot of Worst Value	
	
Chain 0 256QAM CH 649334 (3740.01 MHz)	

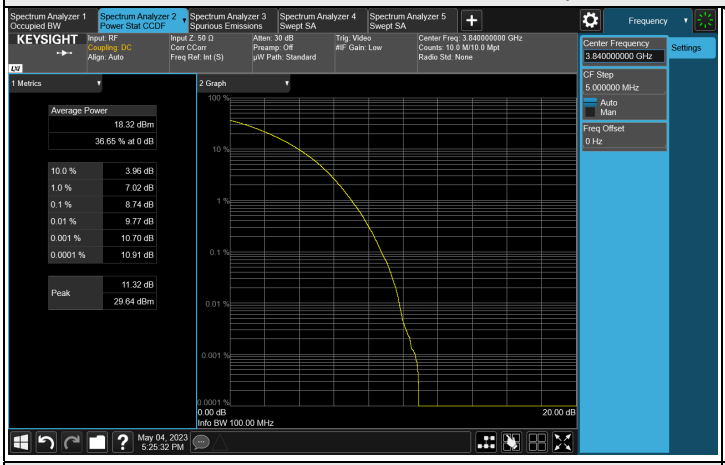
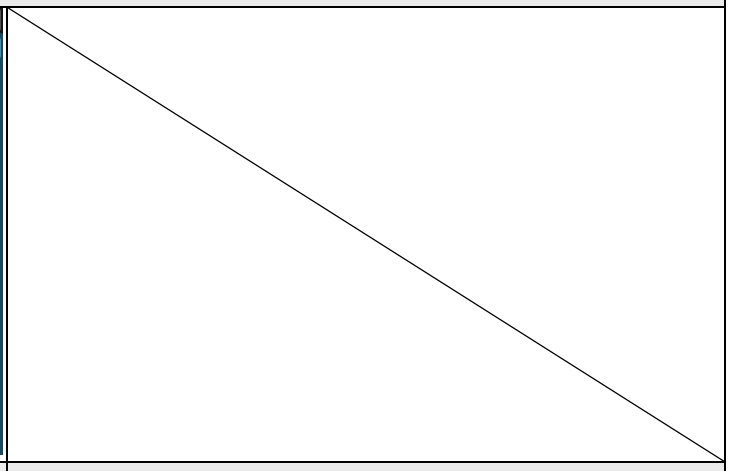
NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 90 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)						Limit
		Chain 0			Chain 1			
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM	
649668	3745.02	8.50	8.40	8.64	8.55	8.64	8.49	13.00
656000	3840	8.57	8.52	8.68	8.62	8.79	8.59	
662332	3934.98	8.40	8.61	8.73	8.69	8.90	8.54	

Spectrum Plot of Worst Value	
	
Chain 1 64QAM CH 662332 (3934.98 MHz)	

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 100 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)						Limit
		Chain 0			Chain 1			
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM	
650000	3750	8.55	8.66	8.68	8.62	8.59	8.64	13.00
656000	3840	8.74	8.72	8.53	8.51	8.69	8.60	
662000	3930	8.54	8.72	8.71	8.66	8.51	8.72	

Spectrum Plot of Worst Value	
	
Chain 0 QPSK CH 656000 (3840 MHz)	

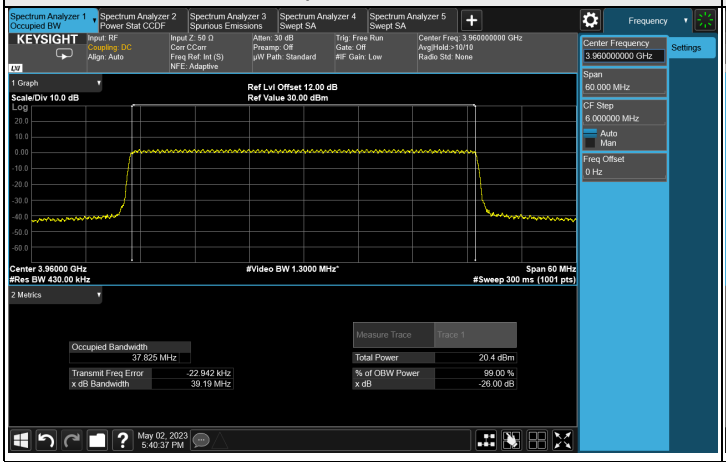
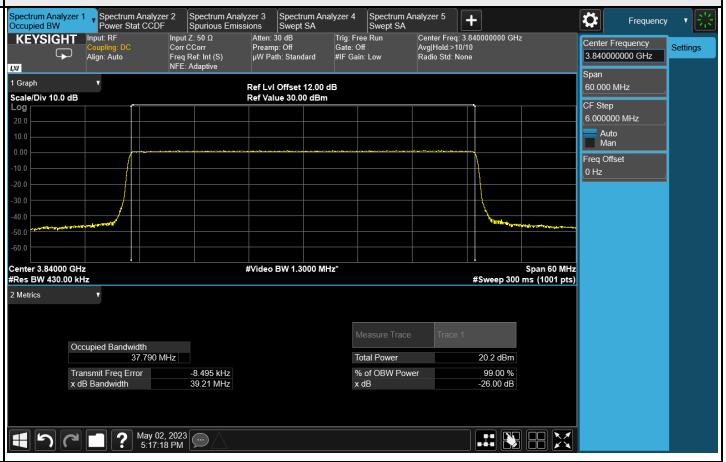
7.4 Bandwidth

Input Power:	120 Vac, 60Hz	Environmental Conditions:	21°C, 70% RH	Tested By:	James Yang

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 40 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
648000	3720	37.812	37.782	37.786	37.814	37.813	37.797
656000	3840	37.790	37.802	37.811	37.799	37.782	37.799
664000	3960	37.825	37.736	37.784	37.764	37.800	37.813

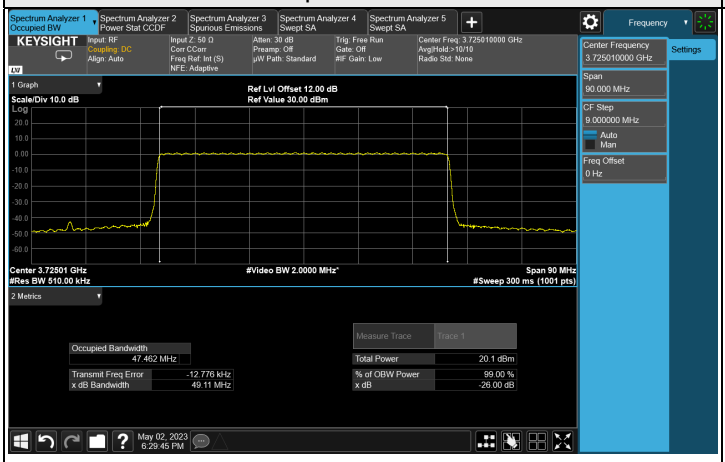
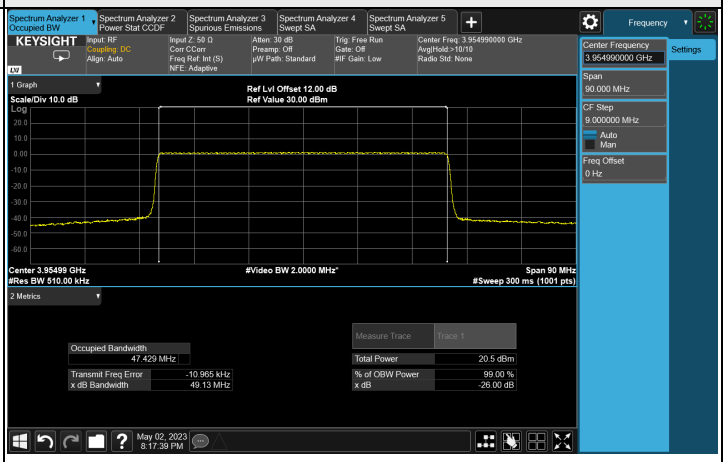
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
648000	3720	39.20	39.19	39.20	39.19	39.20	39.21
656000	3840	39.21	39.20	39.20	39.21	39.21	39.19
664000	3960	39.19	39.14	39.19	39.19	39.19	39.19

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
Chain 0 QPSK CH 664000 (3960 MHz)	Chain 0 QPSK CH 656000 (3840 MHz)

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 50 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
648334	3725.01	47.434	47.400	47.329	47.462	47.427	47.395
656000	3840	47.411	47.436	47.437	47.428	47.425	47.426
663666	3954.99	47.429	47.406	47.420	47.432	47.441	47.409

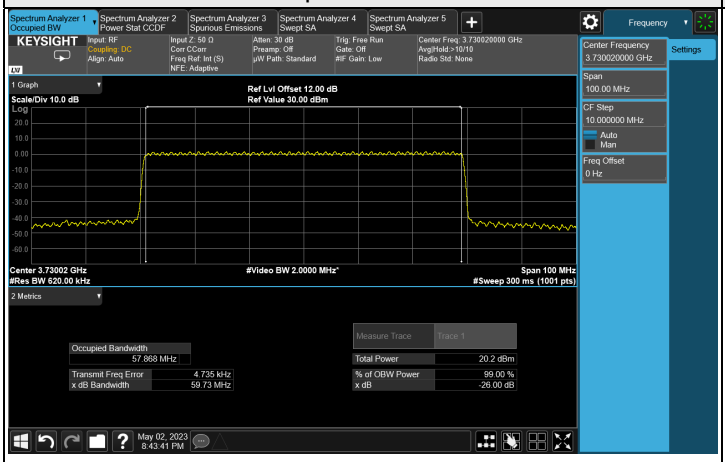
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
648334	3725.01	49.11	49.11	49.12	49.11	49.10	49.12
656000	3840	49.11	49.11	49.11	49.11	49.10	49.11
663666	3954.99	49.13	49.11	49.12	49.12	49.12	49.13

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
Chain 1 QPSK CH 648334 (3725.01 MHz)	Chain 0 QPSK CH 663666 (3954.99 MHz)

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 60 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
648668	3730.02	57.794	57.822	57.868	57.840	57.801	57.731
656000	3840	57.807	57.744	57.780	57.767	57.809	57.815
663332	3949.98	57.789	57.772	57.783	57.826	57.808	57.761

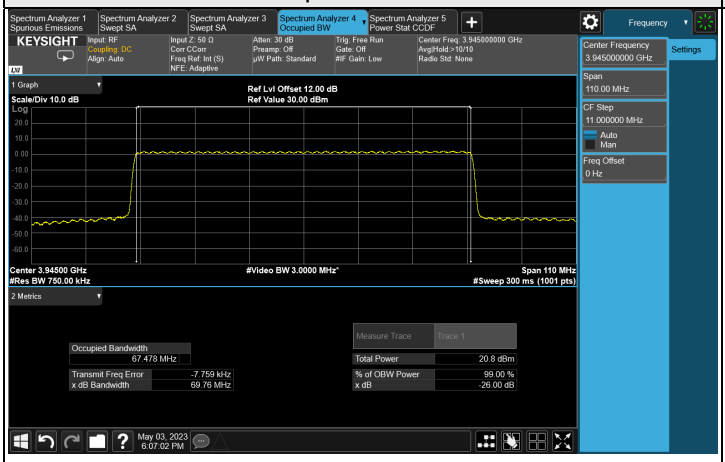
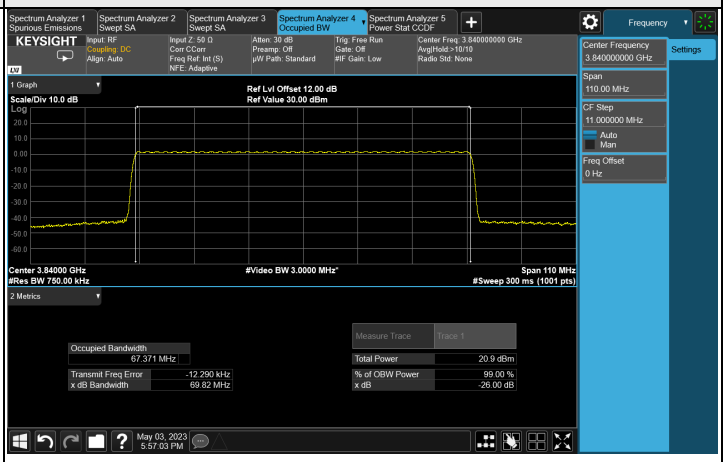
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
648668	3730.02	59.76	59.74	59.73	59.75	59.75	59.75
656000	3840	59.79	59.78	59.79	59.78	59.78	59.78
663332	3949.98	59.79	59.79	59.79	59.78	59.79	59.78

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
Chain 0 256QAM CH 648668 (3730.02 MHz)	Chain 0 256QAM CH 663332 (3949.98 MHz)

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 70 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
649000	3735	67.435	67.407	67.350	67.387	67.463	67.356
656000	3840	67.412	67.371	67.353	67.400	67.418	67.377
663000	3945	67.439	67.383	67.478	67.420	67.408	67.397

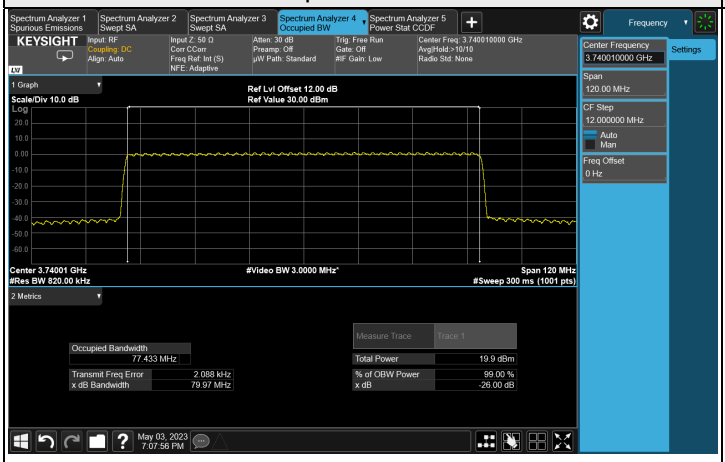
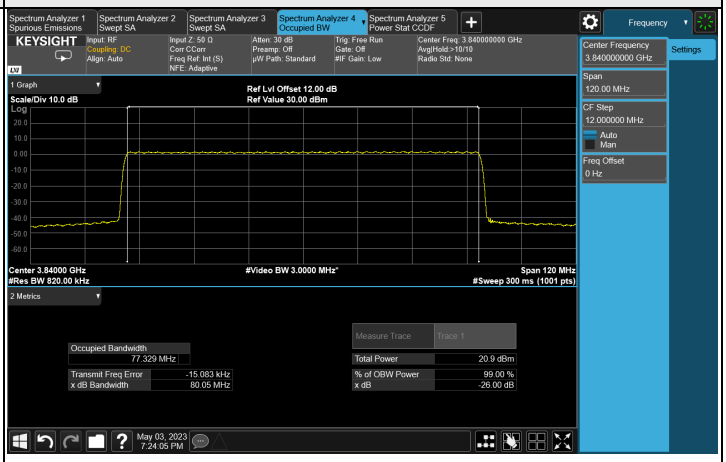
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
649000	3735	69.75	69.73	69.79	69.77	69.72	69.80
656000	3840	69.80	69.82	69.81	69.81	69.80	69.81
663000	3945	69.80	69.76	69.76	69.79	69.81	69.79

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
Chain 0 256QAM CH 663000 (3945 MHz)	Chain 0 64QAM CH 656000 (3840 MHz)

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 80 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
649334	3740.01	77.433	77.351	77.327	77.347	77.430	77.350
656000	3840	77.379	77.372	77.424	77.329	77.409	77.346
662666	3939.99	77.358	77.381	77.417	77.399	77.357	77.366

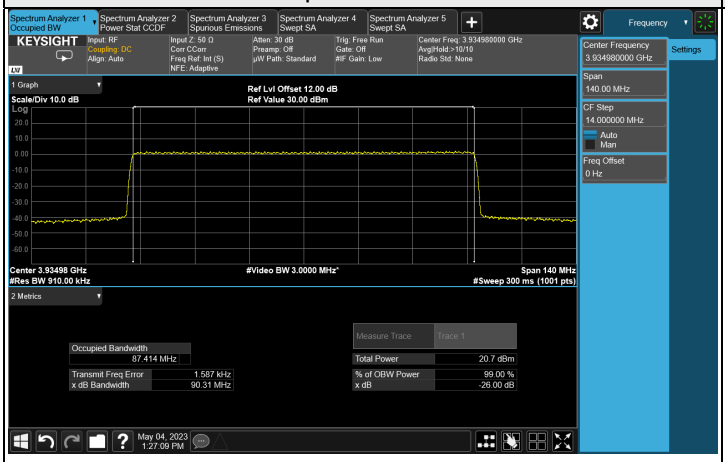
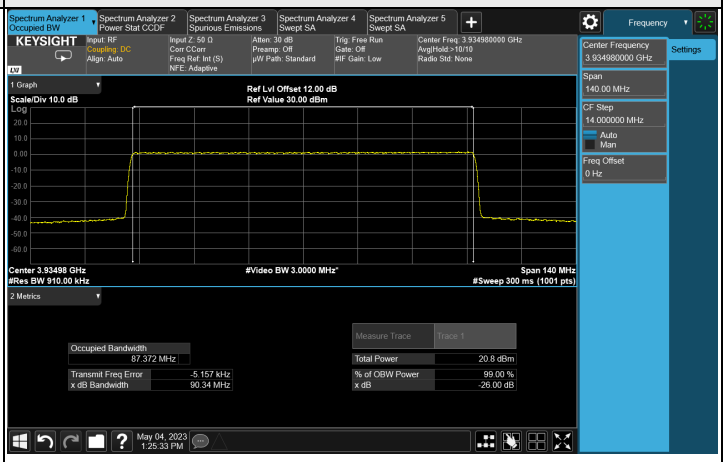
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
649334	3740.01	79.97	80.03	80.04	80.02	79.99	79.96
656000	3840	80.02	80.04	80.02	80.05	80.01	80.04
662666	3939.99	80.03	80.04	80.01	80.02	80.02	80.01

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
Chain 0 QPSK CH 649334 (3740.01 MHz)	Chain 1 QPSK CH 656000 (3840 MHz)

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 90 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
649668	3745.02	87.302	87.281	87.278	87.280	87.302	87.288
656000	3840	87.345	87.341	87.338	87.339	87.369	87.357
662332	3934.98	87.373	87.408	87.380	87.372	87.375	87.414

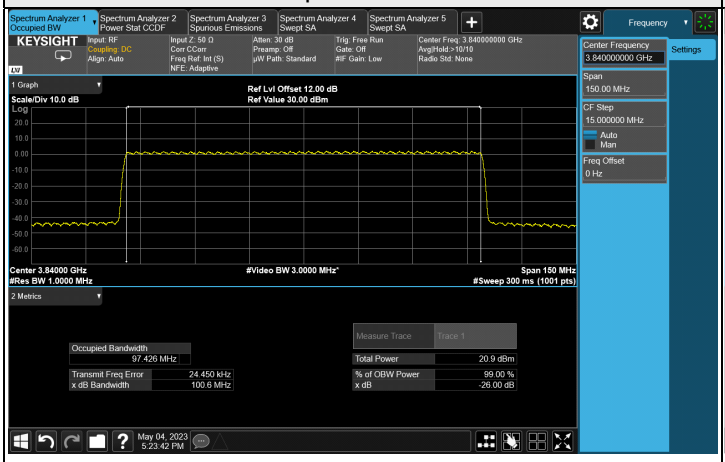
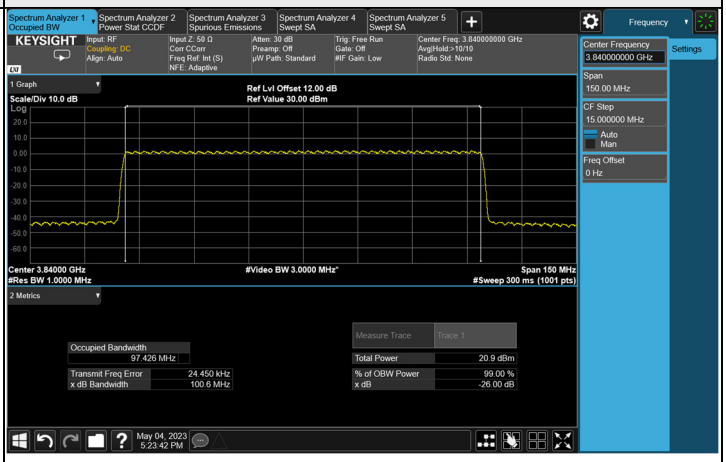
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
649668	3745.02	90.30	90.30	90.29	90.28	90.31	90.21
656000	3840	90.33	90.34	90.33	90.33	90.32	90.31
662332	3934.98	90.33	90.32	90.33	90.34	90.33	90.31

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
Chain 1 256QAM CH 662332 (3934.98 MHz)	Chain 1 QPSK CH 662332 (3934.98 MHz)

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 100 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
650000	3750	97.393	97.348	97.353	97.391	97.304	97.333
656000	3840	97.426	97.389	97.383	97.376	97.328	97.327
662000	3930	97.360	97.355	97.396	97.386	97.356	97.364

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
650000	3750	100.50	100.50	100.50	100.50	100.60	100.50
656000	3840	100.60	100.60	100.60	100.60	100.60	100.60
662000	3930	100.60	100.60	100.60	100.60	100.60	100.60

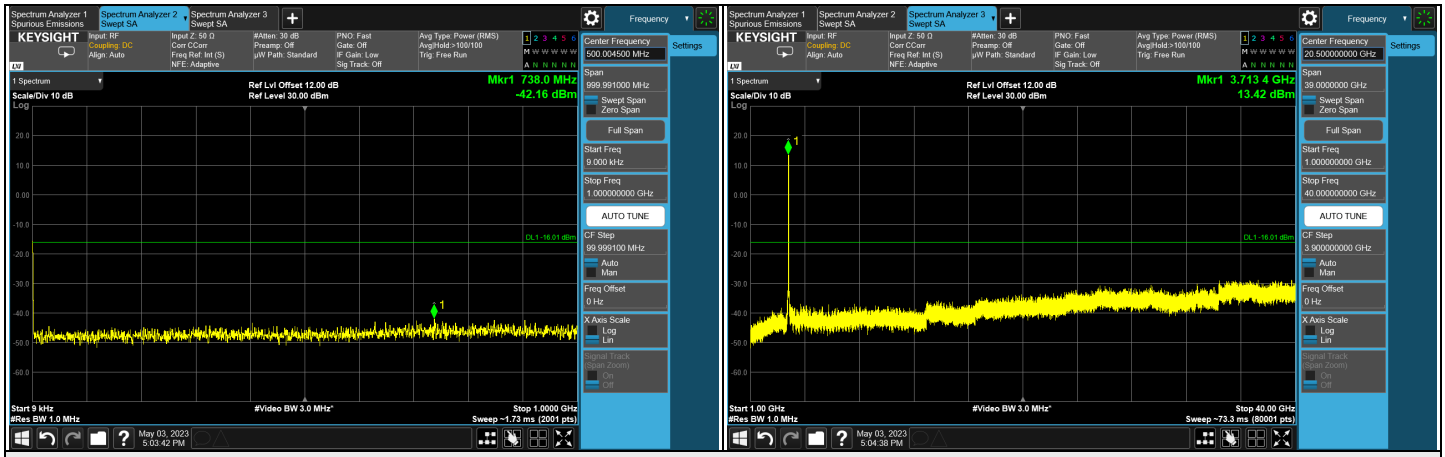
Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
Chain 0 QPSK CH 656000 (3840 MHz)	Chain 0 QPSK CH 656000 (3840 MHz)

7.5 Conducted Spurious Emissions

Input Power:	120 Vac, 60Hz	Environmental Conditions:	21°C, 70% RH	Tested By:	James Yang

NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 40 MHz

Chain 0



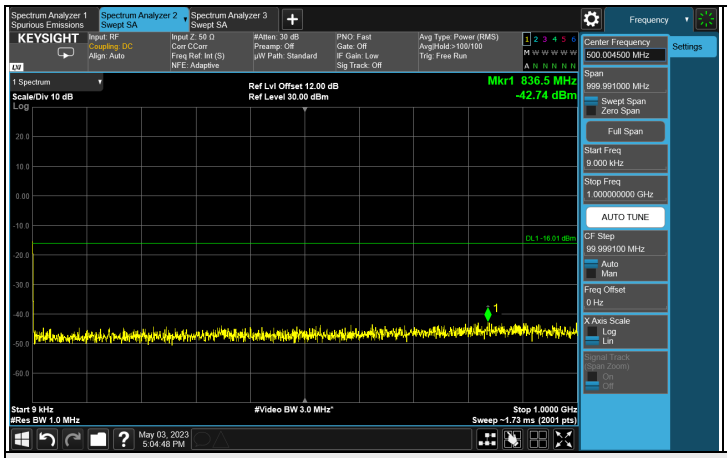
CH 648000 (3720.00 MHz)

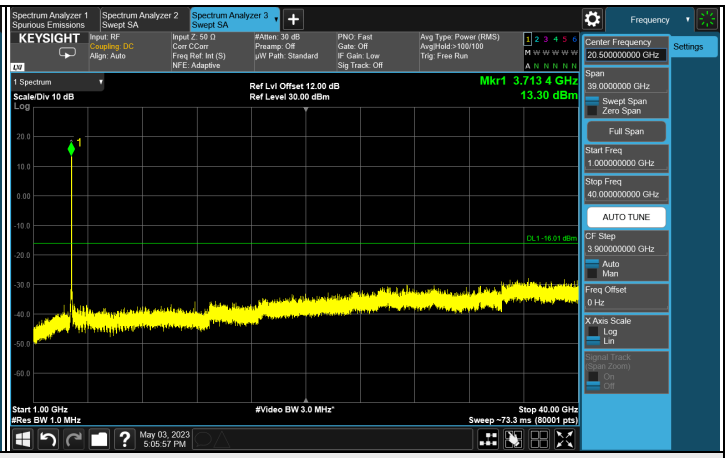
CH 656000 (3840.00 MHz)

CH 664000 (3960.00 MHz)

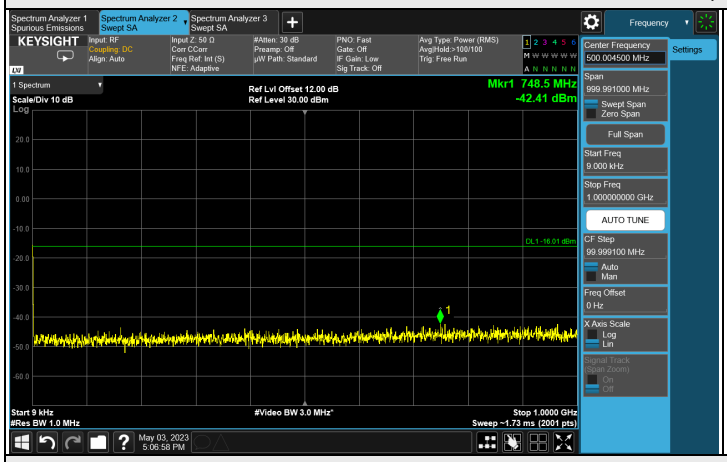
*The 9kHz signal over the limit is from Spectrum.

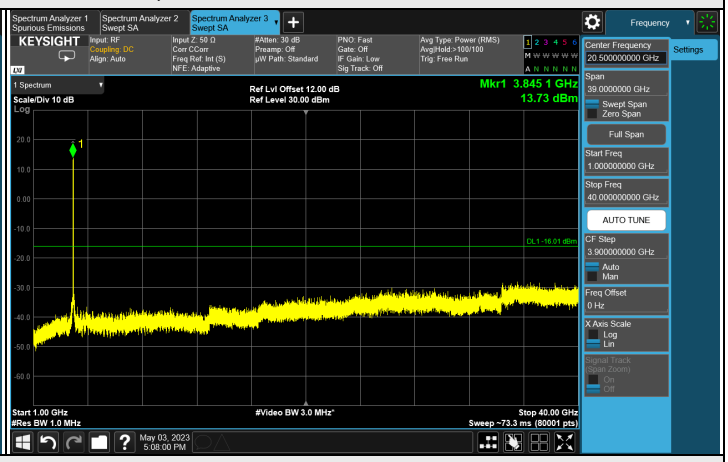
Chain 1



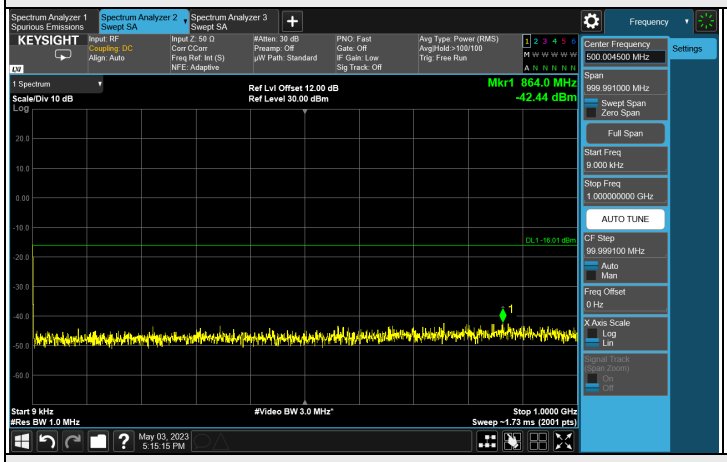


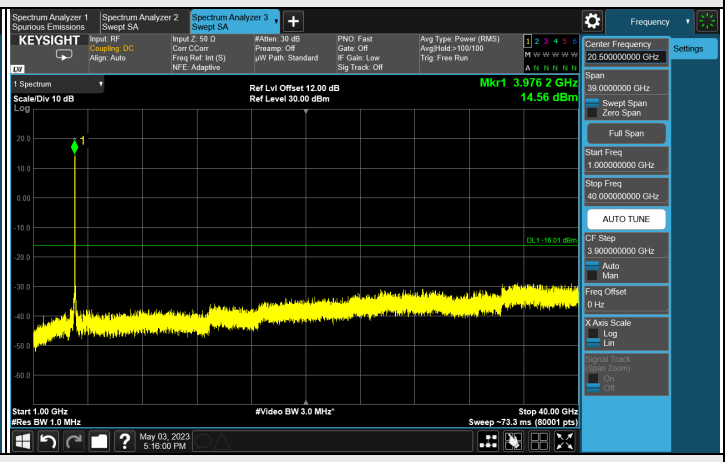
CH 648000 (3720.00 MHz)





CH 656000 (3840.00 MHz)

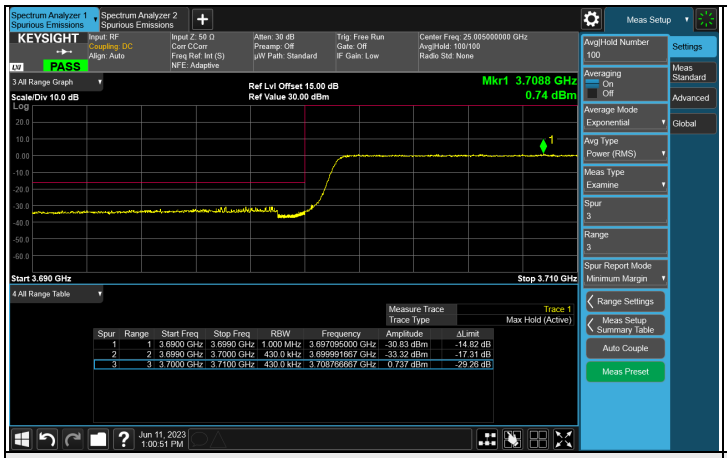




CH 664000 (3960.00 MHz)

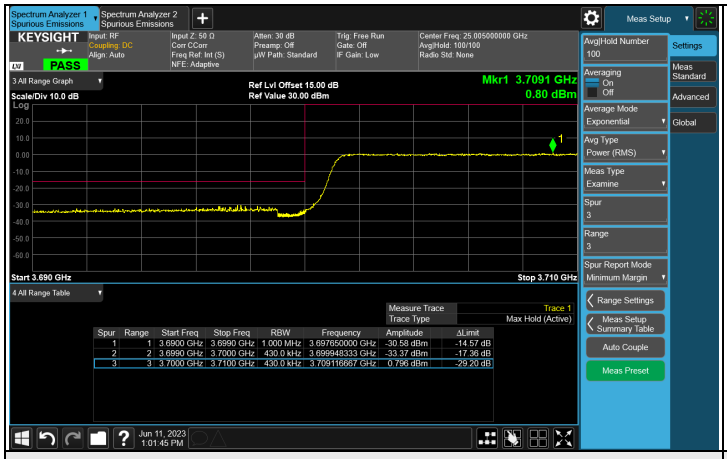
*The 9kHz signal over the limit is from Spectrum.

Chain 0



CH 648000 (3720.00 MHz)	CH 664000 (3960.00 MHz)

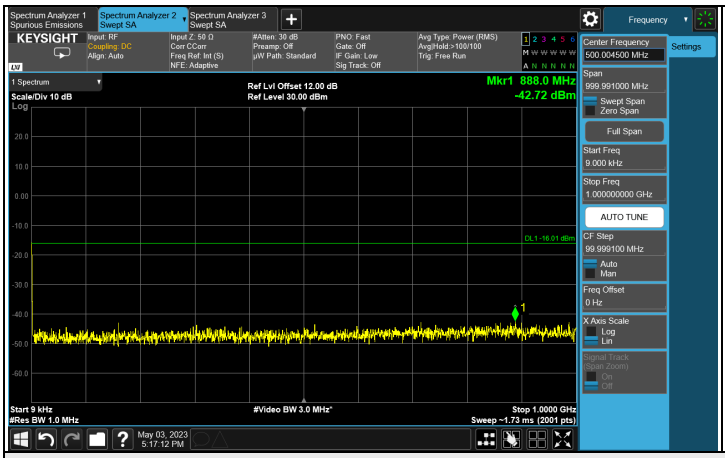
Chain 1

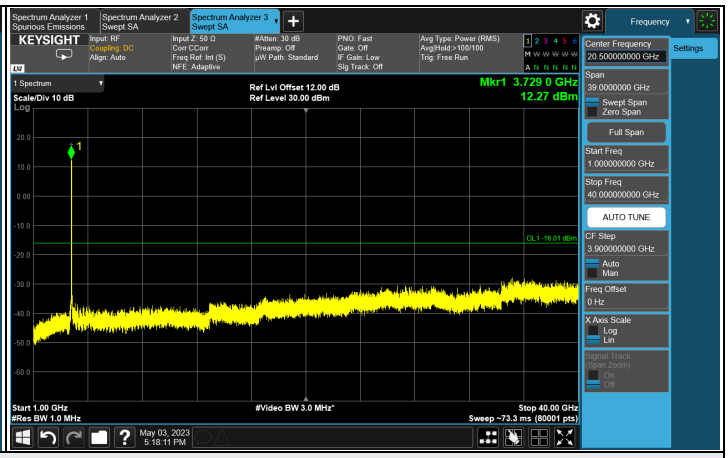


CH 648000 (3720.00 MHz)	CH 664000 (3960.00 MHz)

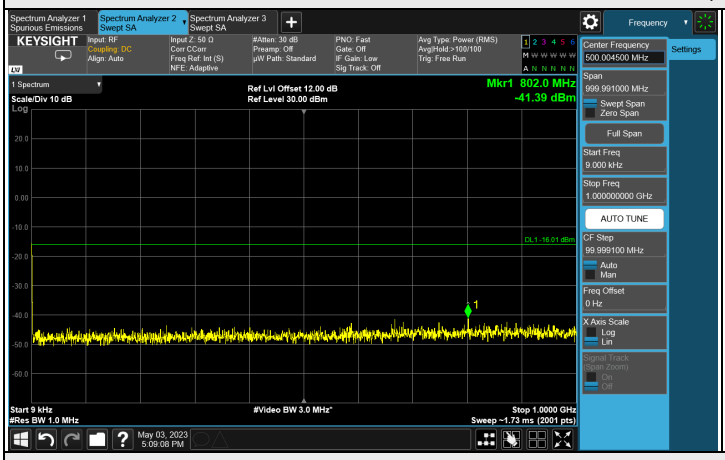
NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 50 MHz

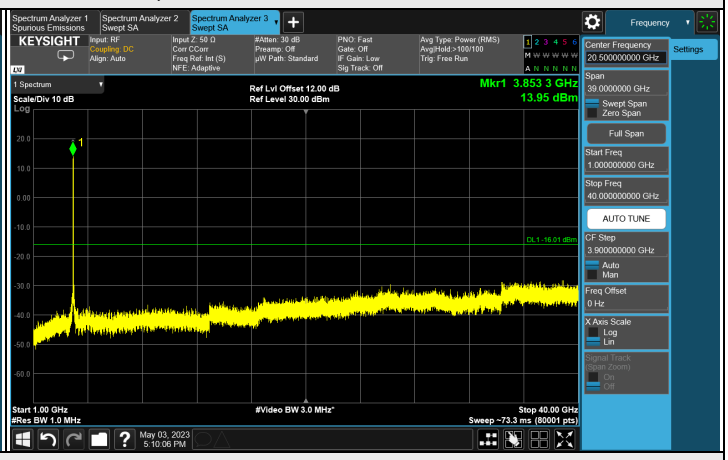
Chain 0



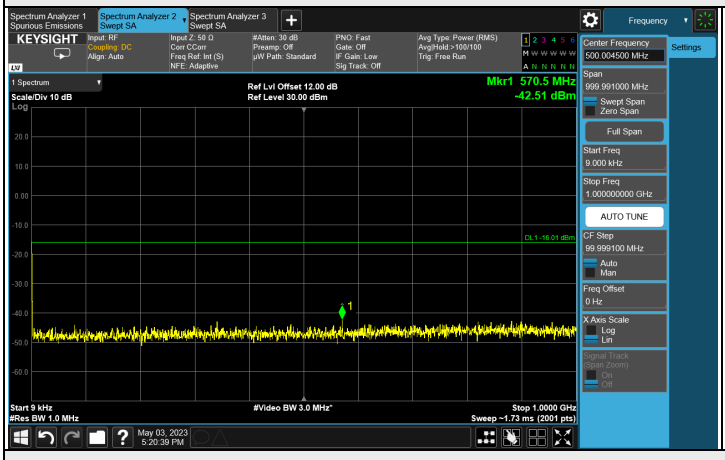


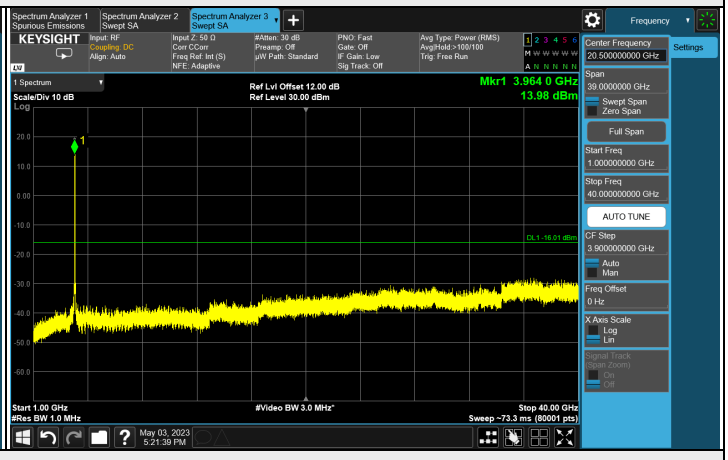
CH 648334 (3725.01 MHz)





CH 656000 (3840.00 MHz)

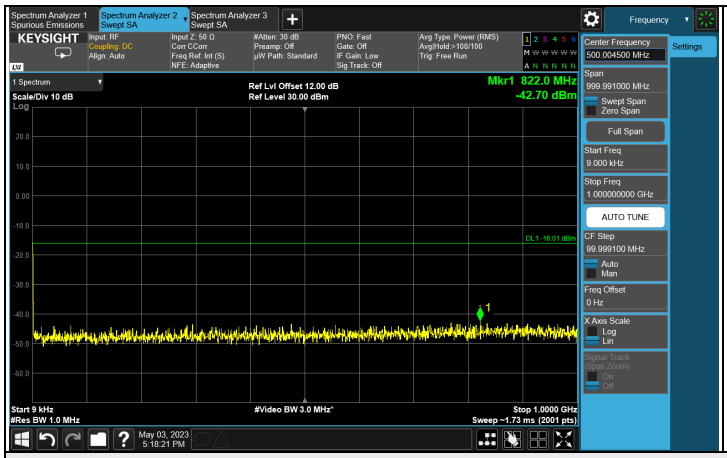


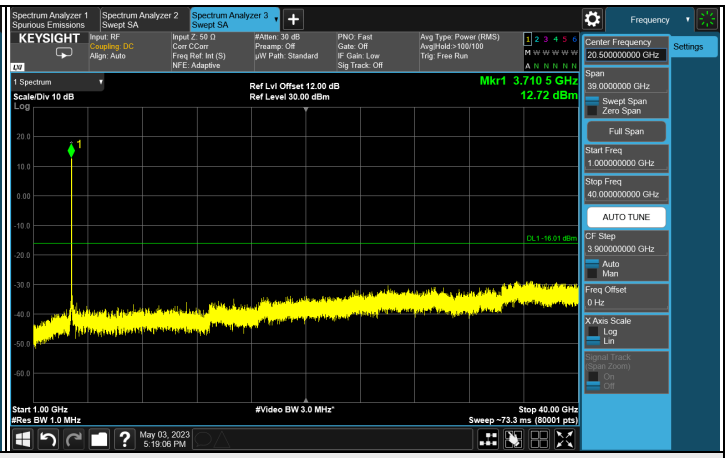


CH 663666 (3954.99 MHz)

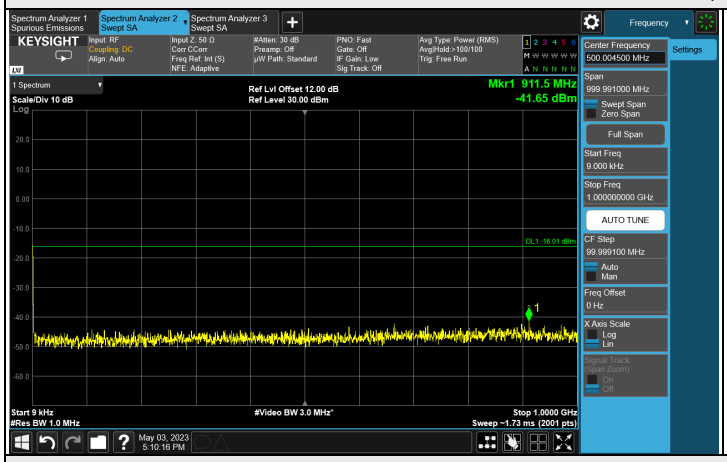
*The 9kHz signal over the limit is from Spectrum.

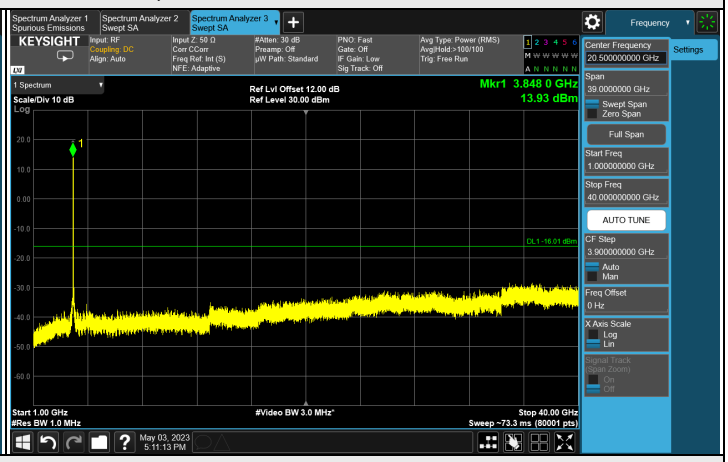
Chain 1



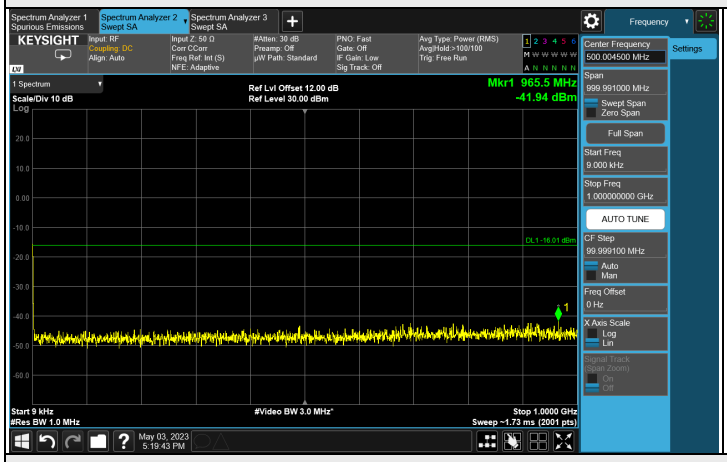


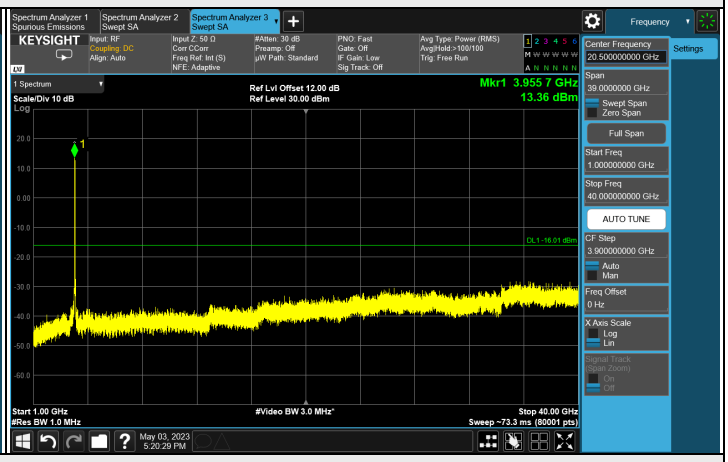
CH 648334 (3725.01 MHz)





CH 656000 (3840.00 MHz)

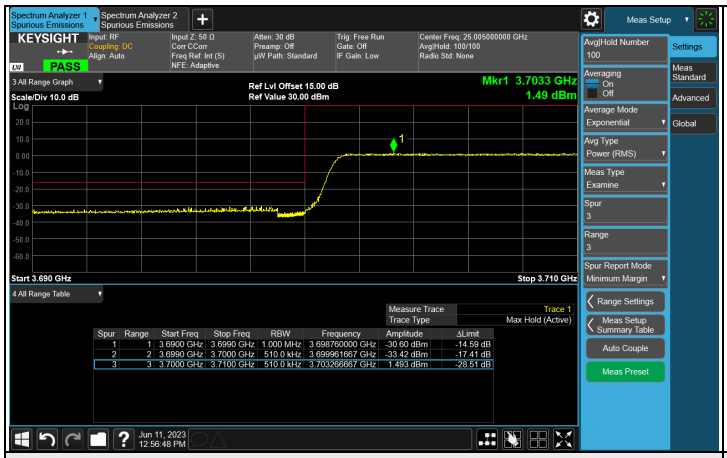




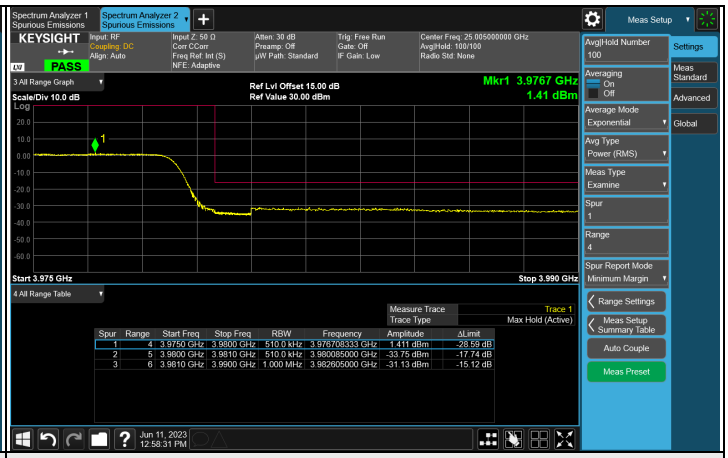
CH 663666 (3954.99 MHz)

*The 9kHz signal over the limit is from Spectrum.

Chain 0

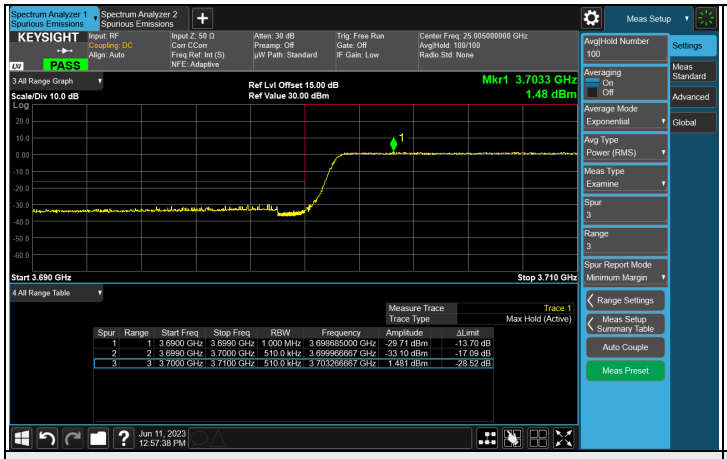


CH 648334 (3725.01 MHz)

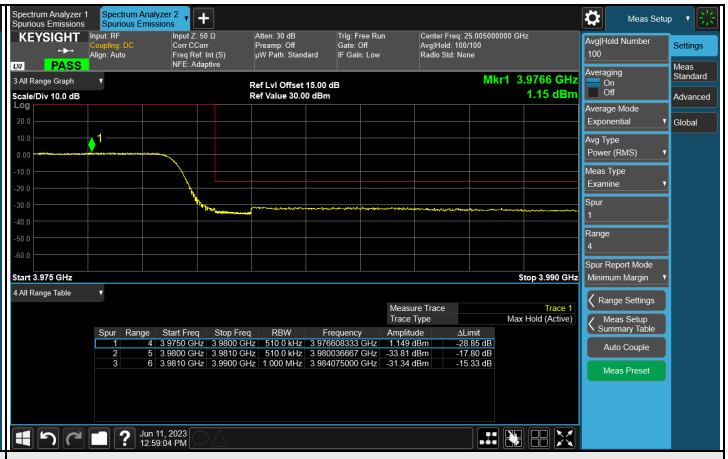


CH 663666 (3954.99 MHz)

Chain 1



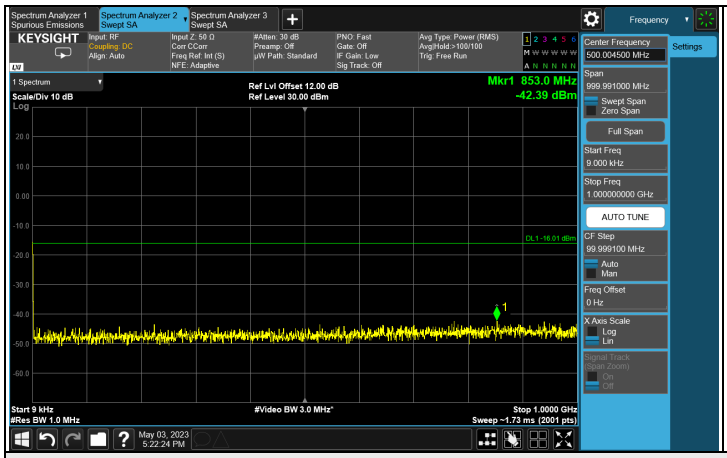
CH 648334 (3725.01 MHz)

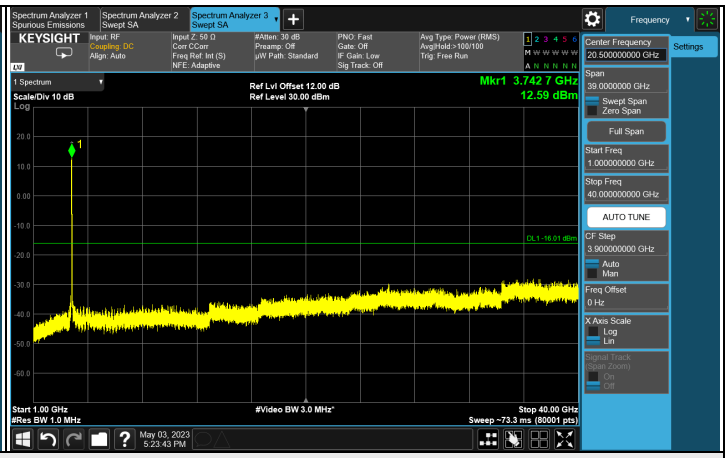


CH 663666 (3954.99 MHz)

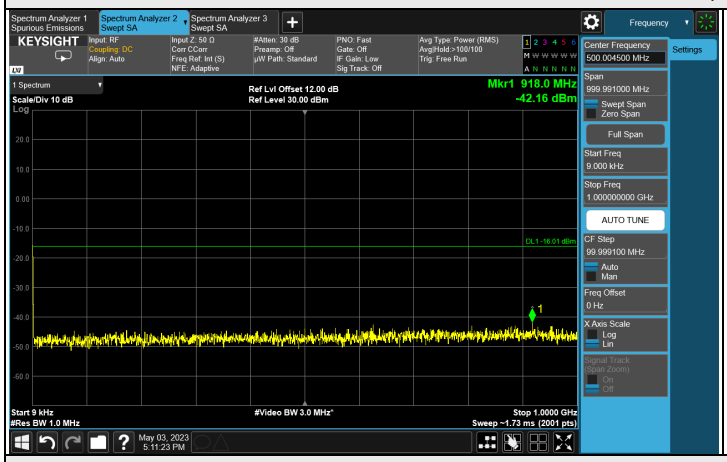
NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 60 MHz

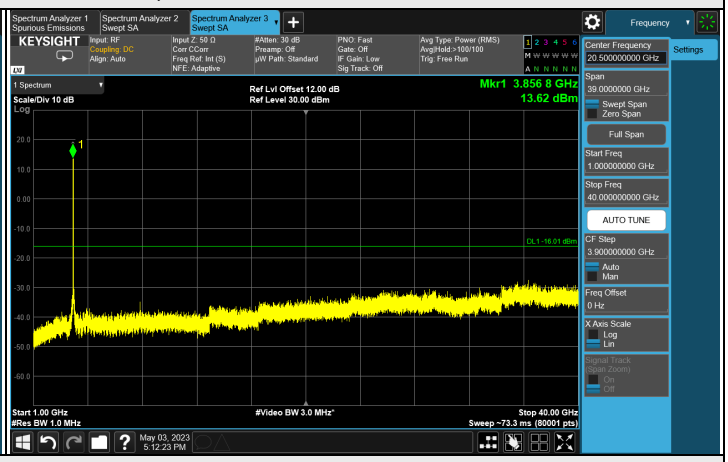
Chain 0



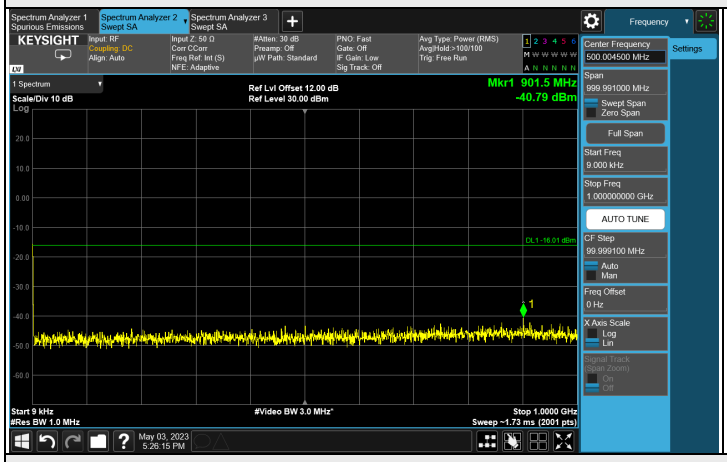


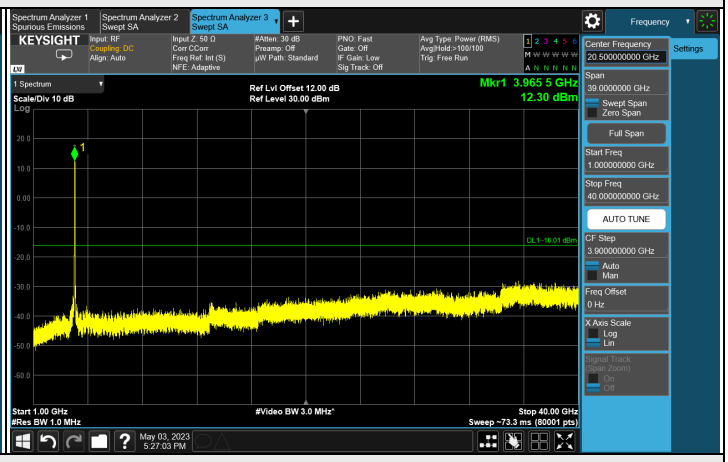
CH 648668 (3730.02 MHz)





CH 656000 (3840.00 MHz)

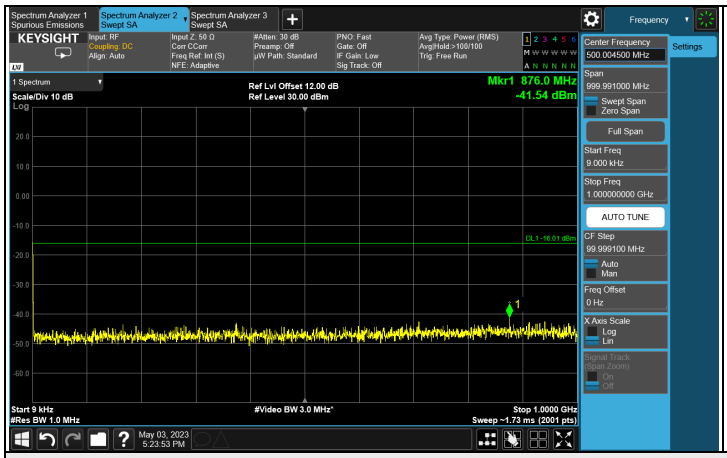


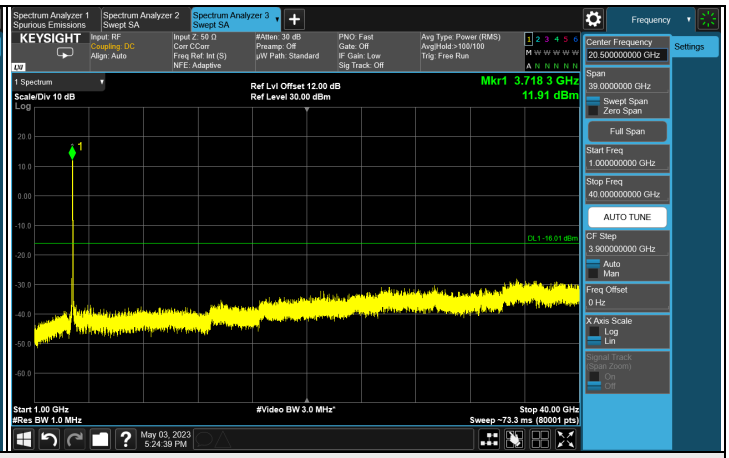


CH 663332 (3949.98 MHz)

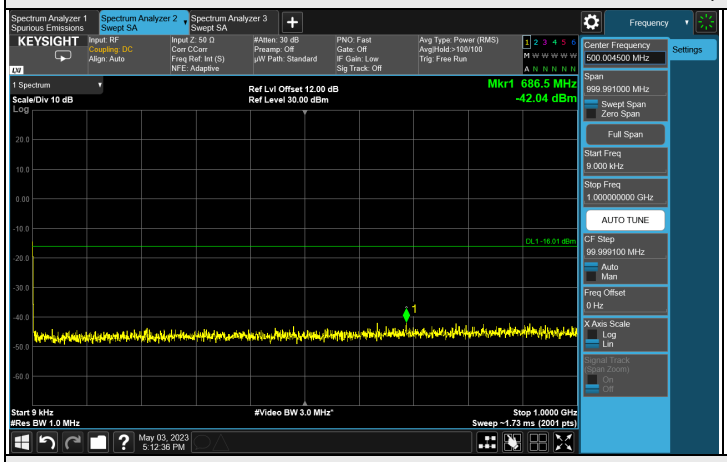
*The 9kHz signal over the limit is from Spectrum.

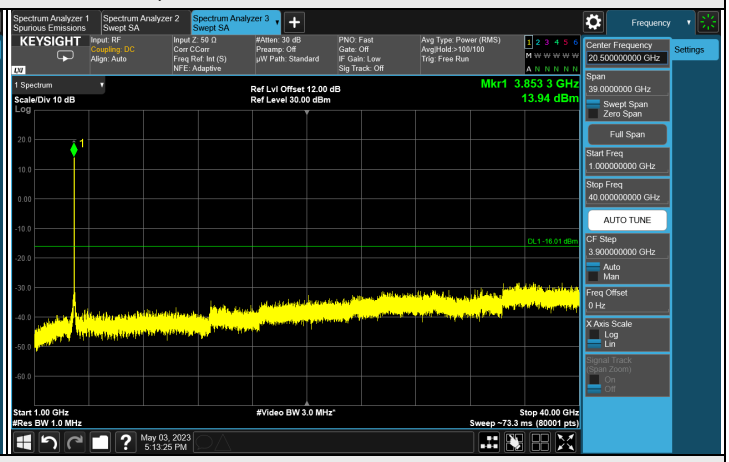
Chain 1



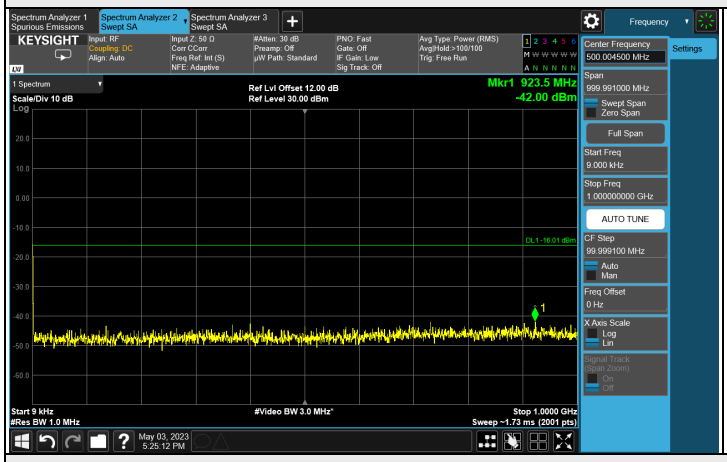


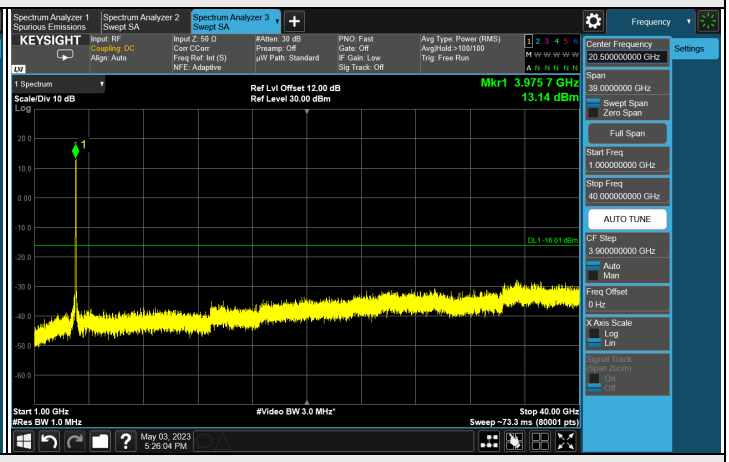
CH 648668 (3730.02 MHz)





CH 656000 (3840.00 MHz)

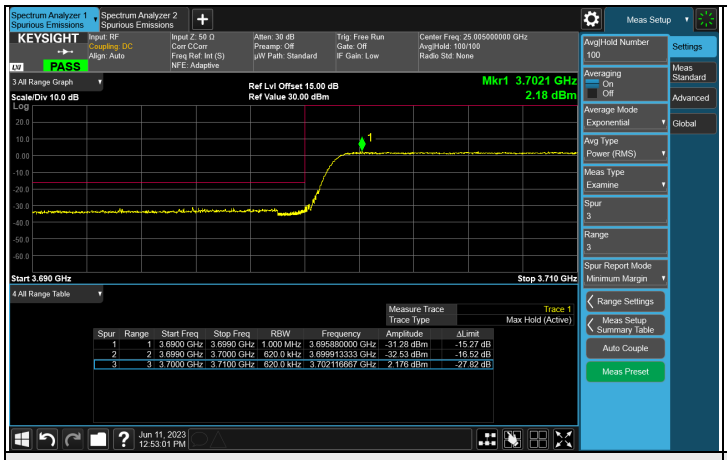




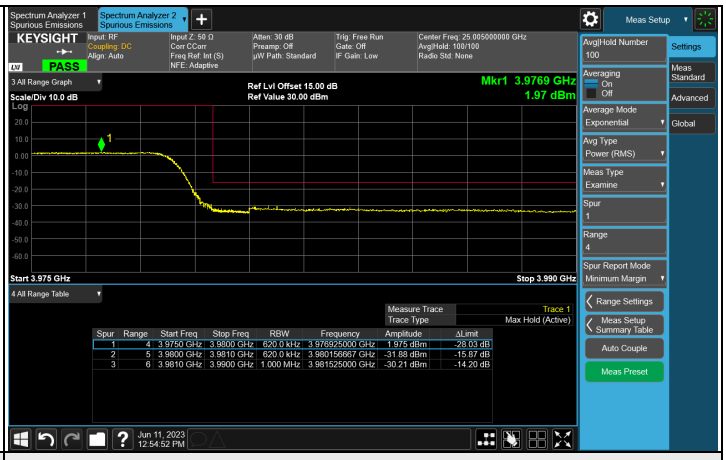
CH 663332 (3949.98 MHz)

*The 9kHz signal over the limit is from Spectrum.

Chain 0

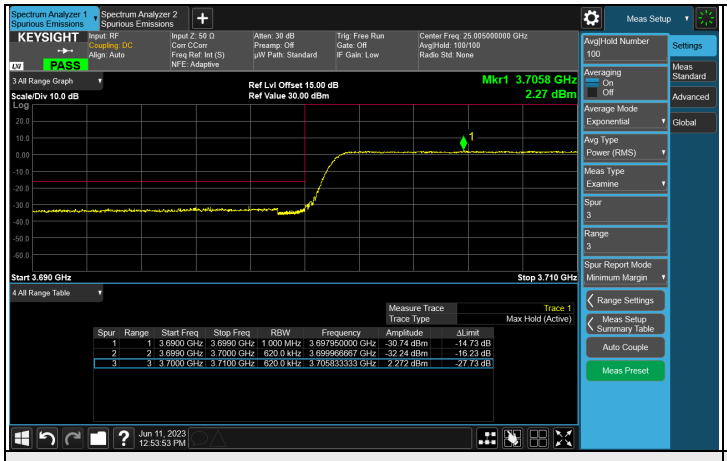


CH 648668 (3730.02 MHz)

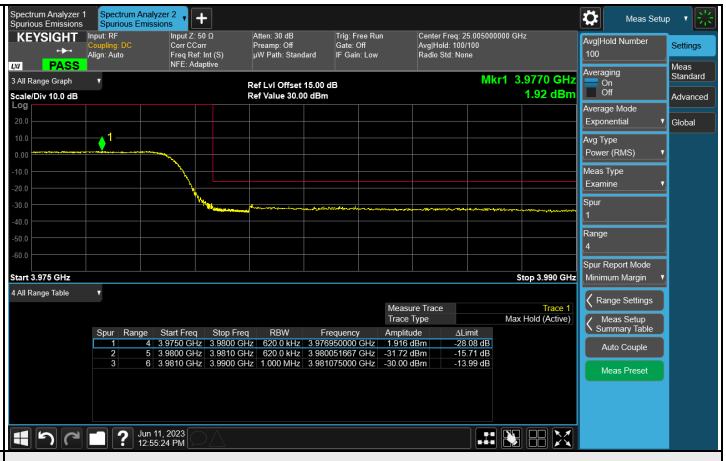


CH 663332 (3949.98 MHz)

Chain 1



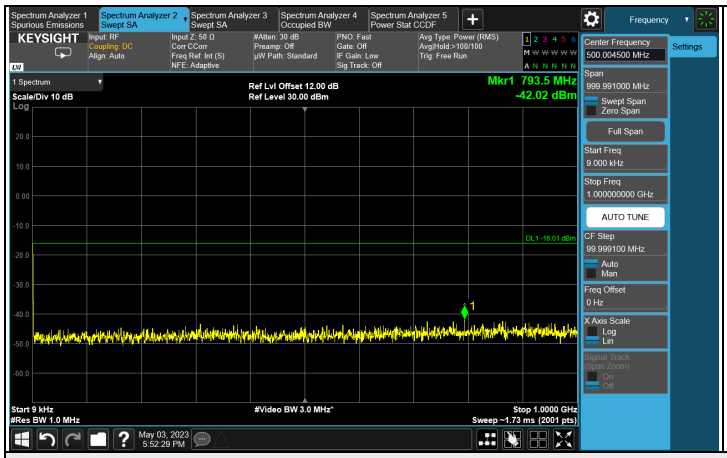
CH 648668 (3730.02 MHz)

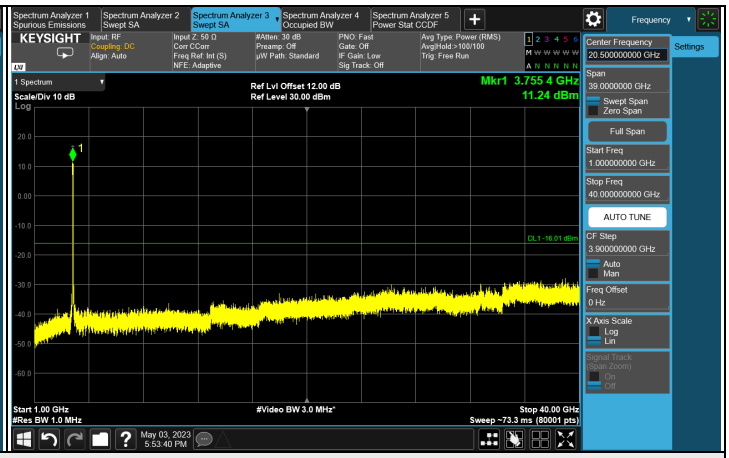


CH 663332 (3949.98 MHz)

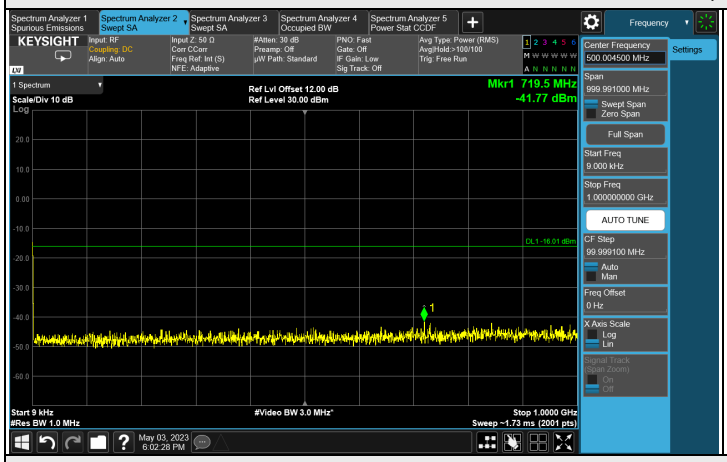
NR n77 (3700-3980 MHz) SCS 30 kHz, Channel Bandwidth: 70 MHz

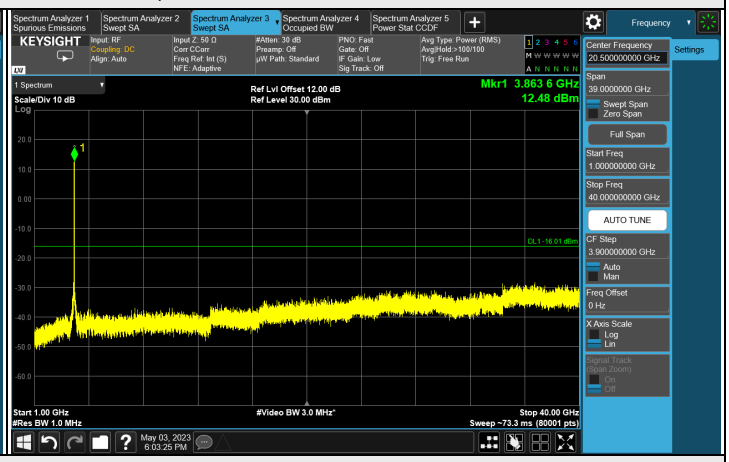
Chain 0



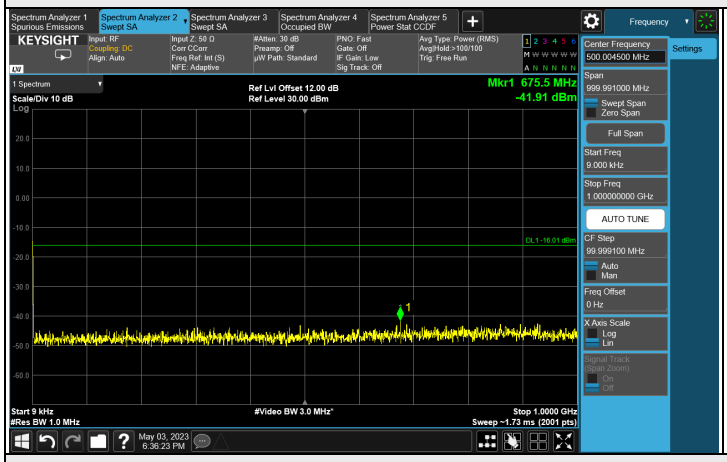


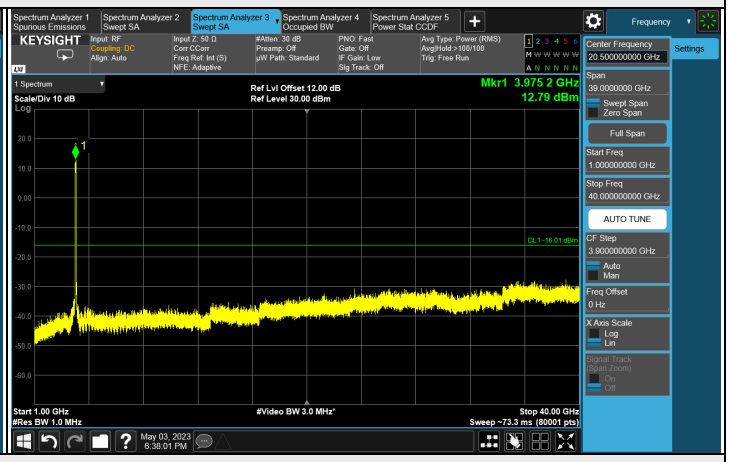
CH 649000 (3735.00 MHz)





CH 656000 (3840.00 MHz)

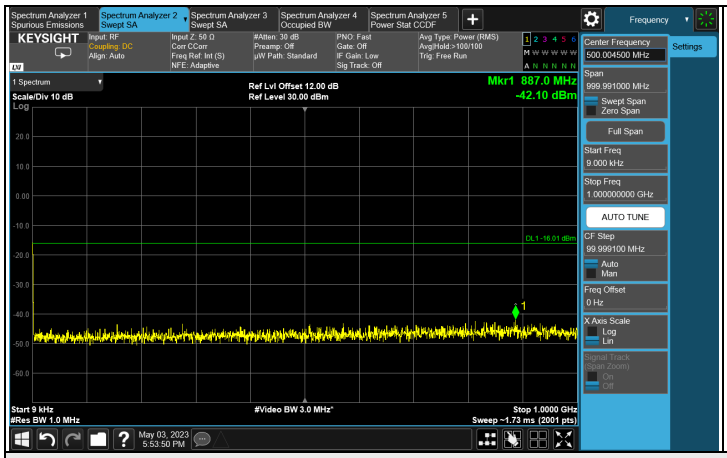


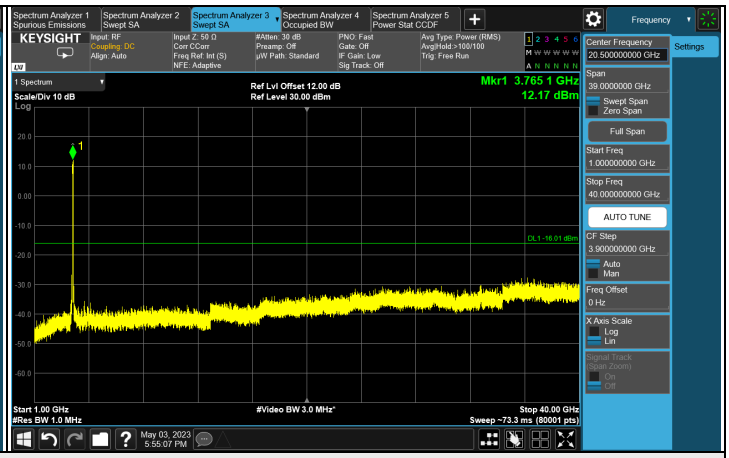


CH 663000 (3945.00 MHz)

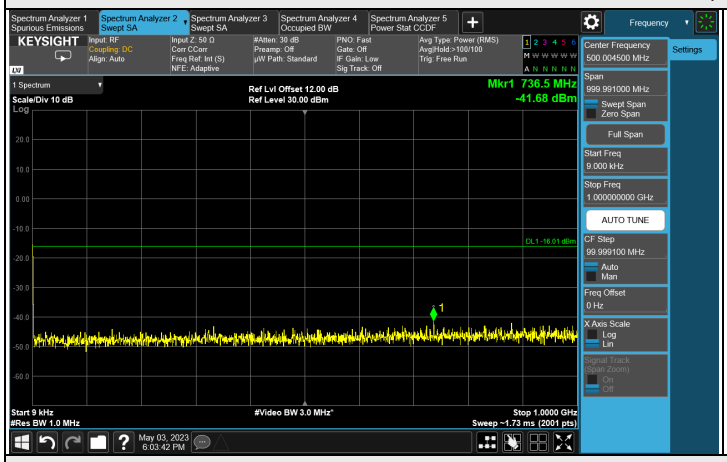
*The 9kHz signal over the limit is from Spectrum.

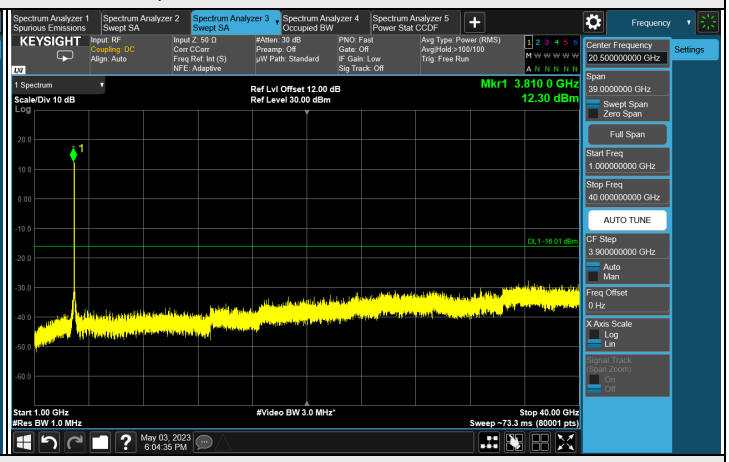
Chain 1



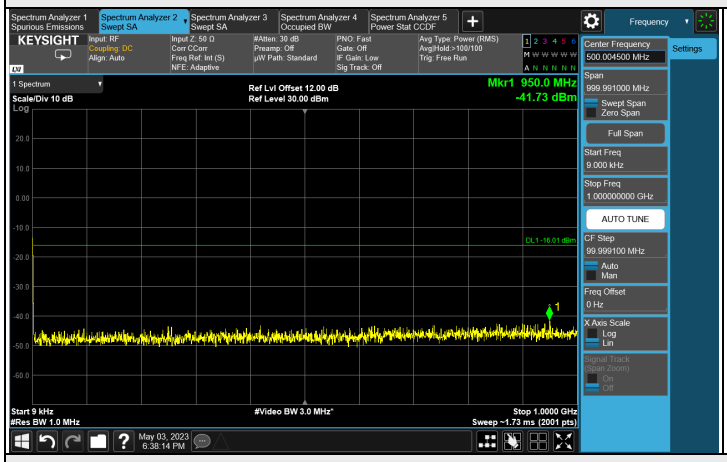


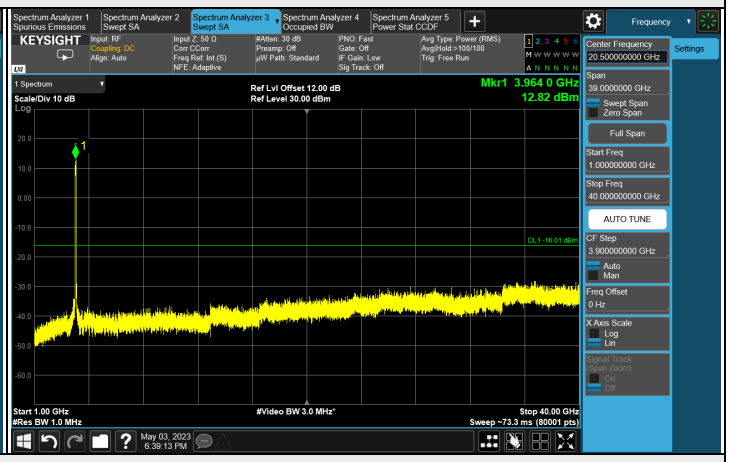
CH 649000 (3735.00 MHz)





CH 656000 (3840.00 MHz)

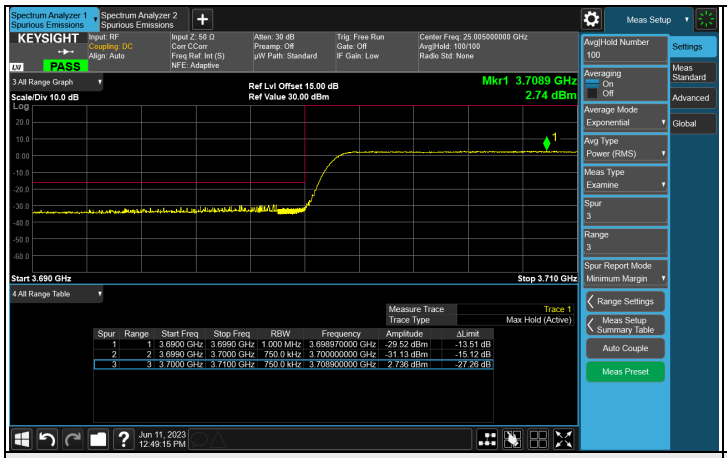




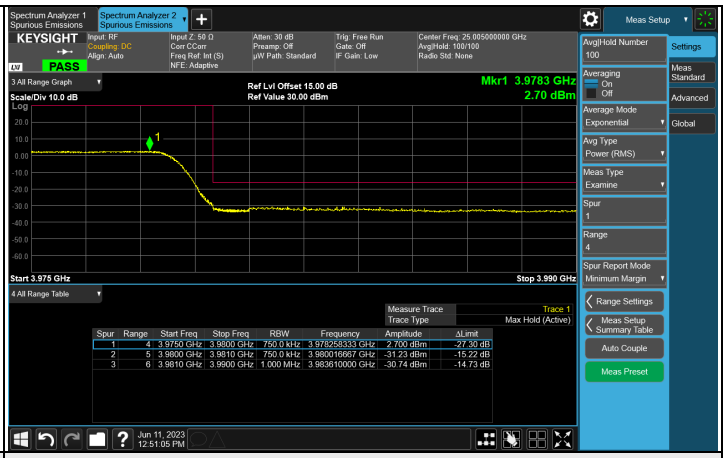
CH 663000 (3945.00 MHz)

*The 9kHz signal over the limit is from Spectrum.

Chain 0

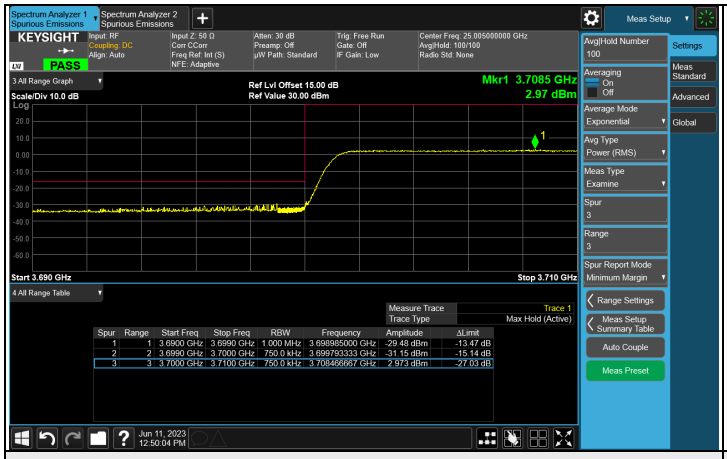


CH 649000 (3735.00 MHz)

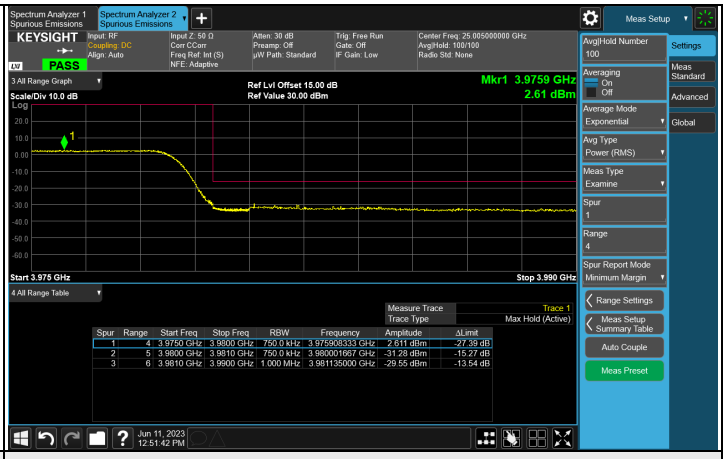


CH 663000 (3945.00 MHz)

Chain 1



CH 649000 (3735.00 MHz)



CH 663000 (3945.00 MHz)