

MEASUREMENT REPORT

FCC PART 24 & 27

FCC ID: 2AD8UAHFID01

Application: Nokia Solutions and Networks, OY

Application Type: Class II Permissive Change

Product: AirScale Indoor Radio ASiR-pRRH

Model No.: AHFID

Brand Name: Nokia

FCC Rule Part(s): Part 24 Subpart E, Part 27 Subpart L

Test Procedure(s): ANSI C63.26-2015

Test Date: October 23, 2020 ~ April 06, 2021

Reviewed By: Paddy Chen
(Paddy Chen)

Approved By: Chenz Ker
(Chenz Ker)



The test results relate only to the samples tested.

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

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2006TW0002-U5	Rev. 01	Initial Report	04-21-2021	Valid

Note: This report is prepared for FCC Class II permissive supplement to MRT Original report No. 2006TW0002-U2, added 5G NR & LTE concurrent mode and related data.

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General Information

Applicant:	Nokia Solutions and Networks, OY
Applicant Address:	2000 W. Lucent Lane, Naperville, Illinois, United States, 60563
Manufacturer:	Nokia Solutions and Networks, OY
Manufacturer Address:	2000 W. Lucent Lane, Naperville, Illinois, United States, 60563
Test Site:	MRT Technology (Taiwan) Co., Ltd
Test Site Address:	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Fuxing Rd., Taoyuan, Taiwan (R.O.C)

- MRT facility is a FCC registered (Reg. No. TW3261) test facility with the site description report on file and is designated by the FCC as an Accredited Test Film.
- MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (TAF) under the American Association for Laboratory Accreditation Program (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Taiwan, EU and TELEC Rules.

1.1. Scope

1.2. MRT Test Location

The map displays the New Taipei City area, with a red pin marking the location of No. 38, Fuxing 2nd Rd, Guishan District. Key features include:

- Districts:** Bali District (八里區), Luzhu District (蘆竹區), Linkou District (林口區), Guishan District (龜山區), Taishan District (泰山區), Xinzhuang District (新莊區), Wugu District (五股區), Luzhou District (蘆洲區), Beitou District (北投區), Shilin District (士林區), Shilin Night Market (士林夜市), Sanchong District (三重區), Datong District (大同區), Zhongzheng District (中正區), Wanhu District (萬華區), and Yonghe District (永和區).
- Roads:** Major roads are shown in orange and yellow, including Highway 1 (101), Highway 2 (102), Highway 3 (103), Highway 4 (104), Highway 5 (105), Highway 6 (106), Highway 7 (107), Highway 8 (108), Highway 9 (109), Highway 10 (110), Highway 11 (111), Highway 12 (112), Highway 13 (113), Highway 14 (114), Highway 15 (115), Highway 16 (116), Highway 17 (117), Highway 18 (118), Highway 19 (119), Highway 20 (120), Highway 21 (121), Highway 22 (122), Highway 23 (123), Highway 24 (124), Highway 25 (125), Highway 26 (126), Highway 27 (127), Highway 28 (128), Highway 29 (129), Highway 30 (130), Highway 31 (131), Highway 32 (132), Highway 33 (133), Highway 34 (134), Highway 35 (135), Highway 36 (136), Highway 37 (137), Highway 38 (138), Highway 39 (139), Highway 40 (140), Highway 41 (141), Highway 42 (142), Highway 43 (143), Highway 44 (144), Highway 45 (145), Highway 46 (146), Highway 47 (147), Highway 48 (148), Highway 49 (149), Highway 50 (150), Highway 51 (151), Highway 52 (152), Highway 53 (153), Highway 54 (154), Highway 55 (155), Highway 56 (156), Highway 57 (157), Highway 58 (158), Highway 59 (159), Highway 60 (160), Highway 61 (161), Highway 62 (162), Highway 63 (163), Highway 64 (164), Highway 65 (165), Highway 66 (166), Highway 67 (167), Highway 68 (168), Highway 69 (169), Highway 70 (170), Highway 71 (171), Highway 72 (172), Highway 73 (173), Highway 74 (174), Highway 75 (175), Highway 76 (176), Highway 77 (177), Highway 78 (178), Highway 79 (179), Highway 80 (180), Highway 81 (181), Highway 82 (182), Highway 83 (183), Highway 84 (184), Highway 85 (185), Highway 86 (186), Highway 87 (187), Highway 88 (188), Highway 89 (189), Highway 90 (190), Highway 91 (191), Highway 92 (192), Highway 93 (193), Highway 94 (194), Highway 95 (195), Highway 96 (196), Highway 97 (197), Highway 98 (198), Highway 99 (199), Highway 100 (200).
- Landmarks:** Taiwan Taoyuan International Airport (臺灣桃園國際機場), Taoyuan International Baseball Stadium (桃園國際棒球場), and the Taoyuan International Baseball Stadium (Lamigo全壘主场).
- Geography:** The map shows the coastline of the city, with the Tamsui River (淡水河) and the Keelung River (基隆河) flowing through the area.

2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	AirScale Indoor Radio ASiR-pRRH
Model No.:	AHFID
Brand Name:	Nokia
Test Device Serial No.:	NH204300255
Hardware Version:	A102
Software Version:	FL18A
Voltage Range:	PoE: 52 ~ 57Vdc
Operating Band (s):	5G NR n66, LTE B66
Modulation Type:	QPSK, 16QAM, 64QAM, 256QAM
T _x Frequency Range:	n66: 2110 ~ 2180 MHz
R _x Frequency Range:	n66: 1710 ~ 1780 MHz
Max EIRP Power:	<u>LTE + NR Mode:</u> 5 + 5MHz: 32.58dBm; 20 + 20MHz: 32.51dBm; 20 + 5MHz: 32.29dBm <u>NR + LTE Mode:</u> 5 + 5MHz: 32.53dBm; 20 + 20MHz: 32.37dBm; 20 + 5MHz: 32.49dBm
Emission Designator:	Refer to Section 2.2
Antenna Specification:	Refer to Section 2.3

2.2. Emission Designator

n66 & LTE Band 66		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
LTE+NR							
5 + 5	2115.0~2175.0	9M47G7D	--	1.8113	9M46W7D	--	1.6482
20 + 5	2122.5 ~ 2167.5	23M7G7D	--	1.6444	23M7W7D	--	1.6943
20 + 20	2130.0~2160.0	38M3G7D	--	1.7824	38M3W7D	--	1.6331
NR+LTE							
5 + 5	2115.0~2175.0	9M46G7D	--	1.7906	9M43W7D	--	1.5101
5 + 20	2122.5 ~ 2167.5	23M7G7D	--	1.7742	23M7W7D	--	1.6788
20 + 20	2130.0~2160.0	38M3G7D	--	1.7258	38M3W7D	--	1.5382

n66 & LTE Band 66		64QAM			256QAM		
BW (MHz)	Freq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
LTE+NR							
5 + 5	2115.0~2175.0	9M44W7D	--	1.5453	9M46W7D	--	1.4060
20 + 5	2122.5 ~ 2167.5	23M6W7D	--	1.5560	23M6W7D	--	1.3428
20 + 20	2130.0~2160.0	38M2W7D	--	1.6218	38M4W7D	--	1.4191
NR+LTE							
5 + 5	2115.0~2175.0	9M45W7D	--	1.5996	9M45W7D	--	1.2764
5 + 20	2122.5 ~ 2167.5	23M6W7D	--	1.6482	23M6W7D	--	1.4223
20 + 20	2130.0~2160.0	38M3W7D	--	1.6218	38M2W7D	--	1.4060

2.3. Description of Available Antennas

Band Support	Antenna Type	Model	Antenna Gain
n66	Omni Internal Antenna	6744	ANT 0: 5.5dBi ANT 1: 4.8dBi

2.4. Test Mode Detail

Test Item	Channel Bandwidth	Modulation
Equivalent Isotropically Radiated Power	<u>LTE + NR Mode:</u> 5 + 5MHz; 20 + 20MHz; 20 + 5MHz <u>NR + LTE Mode:</u> 5 + 5MHz; 20 + 20MHz; 20 + 5MHz	QPSK, 16QAM, 64QAM, 256QAM
Emission Bandwidth		QPSK, 16QAM, 64QAM, 256QAM
Band Edge Measurements		QPSK

Note: There are a few different possible carrier and BW combinations that have been evaluated. Representative Minimum + Maximum carrier and BW configurations are included in this report as it is representative of all other possible configurations

2.5. 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 2, Part 24, Part 27
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP

2.6. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.7. Test Environment Condition

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

3. DESCRIPTION of TEST

3.1. Evaluation Procedure

The measurement procedure described in the document titled “American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services (ANSI C63.26-2015) was used in the measurement.

Deviation from measurement procedure.....None

3.2. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable

containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, which produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. TEST EQUIPMENT CALIBRATION DATE

Radiated Emissions

Instrument	Brand	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2021/10/05
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2021/04/27
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2021/04/24
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2021/04/24
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2021/04/24
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2021/04/24
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2021/03/24
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2021/03/25
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2021/11/02
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2021/07/14
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2021/06/16
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2021/05/28

Conducted Test Equipment

Instrument	Brand	Type No.	Asset No.	Cali. Interval	Cali. Due Date
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	1 year	2021/04/24
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2021/11/02
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2021/07/11
Temperature & Humidity Chamber	TEN BILLION	TTH-B3UP	MRTTWA00036	1 year	2021/06/10
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2021/05/28

Software	Version	Function
EMI Software	V3	EMI Test Software

5. 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 $k = 2$.

Conducted Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 2.65dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 9kHz ~ 30MHz: 3.92dB 30MHz ~ 1GHz: 4.25dB 1GHz ~ 18GHz: 4.40dB

6. TEST RESULT

6.1. Summary

FCC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046; 24.232(a)(2) 27.50(d)(2)	Equivalent Isotropically Radiated Power	Refer to Section 6.2	Conducted & Radiated	Pass	Section 6.2
2.1049	Emission Bandwidth	Refer to Section 6.3	Conducted	Pass	Section 6.3
24.238(a) 27.53(h)	Band Edge Measurements	Refer to Section 6.4		Pass	Section 6.4

Notes:

- 1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) The Emission Bandwidth, Channel Band-edge were presented the worst test data of modulation & antenna port in the test report.

6.2. Equivalent Isotropically Radiated Power Measurement

6.2.1. Test Limit

The Radiated Equivalent Isotropically Power shall be according to the specific rule Part 24.232(a)(2) & 27.50(d)(2) that are limited to EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

6.2.2. Test Procedures Used

KDB 971168 D01v03r01 - Section 5.2.4 & 5.8

ANSI C63.26-2015 - Section 5.2.4.2 & 5.2.7

6.2.3. Test Setting

Average Power Measurement

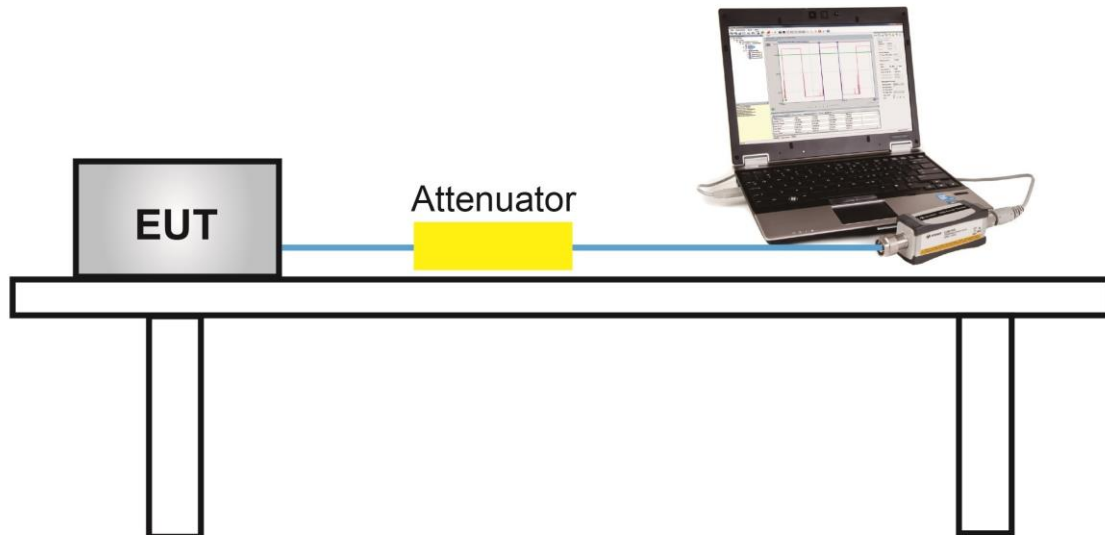
Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the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

Radiated Equivalent Isotropically Power Measurement

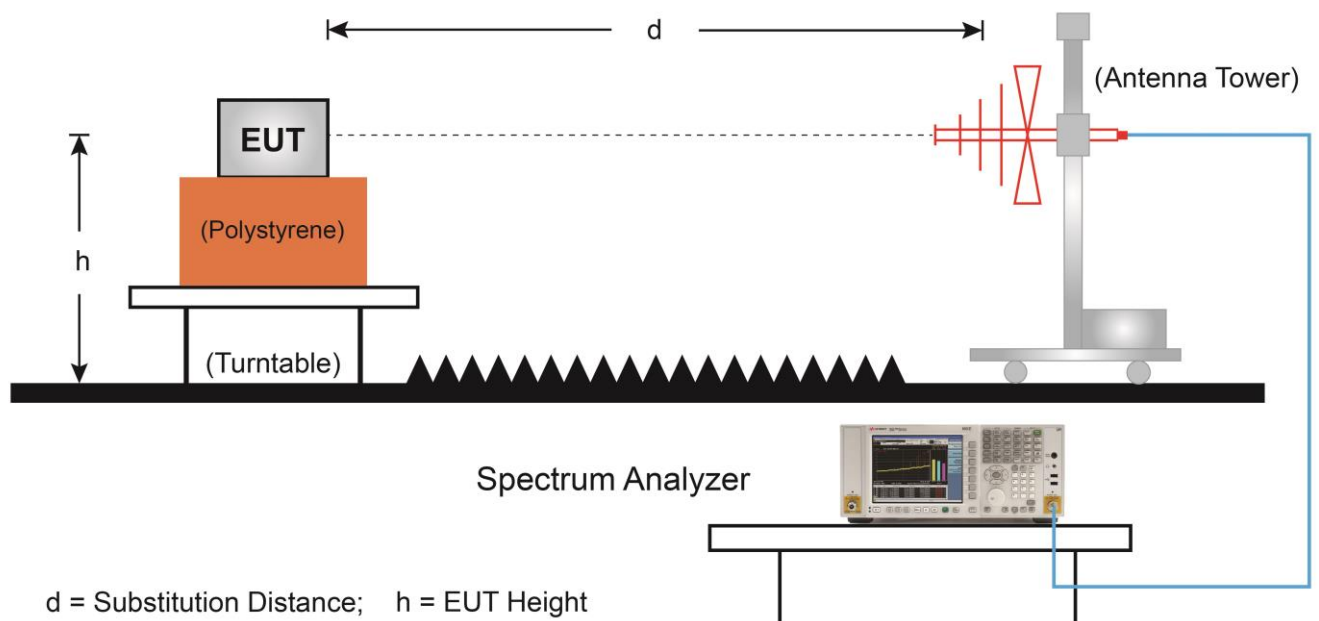
1. $RBW \geq OBW$
2. $VBW \geq 3 \times RBW$
3. Sweep time $\geq 10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})$
4. Detector = power averaging (rms)
5. Set sweep trigger to "free run"
6. If the EUT can be configured to transmit continuously, then set the trigger to free run
7. 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
8. The trace was allowed to stabilize
9. Use the peak marker function to determine the peak amplitude level.
10. $EIRP = \text{Output Power Level of S.G} - T_x \text{ Cable Loss} + \text{Antenna Gain of Substitution Antenna}.$

6.2.4. Test Setup

Conducted Measurement of Output Power



Radiated Measurement of Equivalent Isotropically Radiated Power



6.2.5. Test Result

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2021/02/01 ~ 2021/04/06
Test Configuration	Band 66 Concurrent Mode - LTE + NR		

Frequency (MHz)	Channel Bandwidth (MHz)	Ant 0 Power (dBm)	Ant 1 Power (dBm)	Total Power (dBm)
QPSK				
2112.5+2117.5	5+5	23.12	22.94	26.04
2142.5+2147.5	5+5	23.18	23.20	26.20
2172.5+2177.5	5+5	23.35	23.32	26.35
2120.0+2132.5	20+5	23.03	22.59	25.83
2142.5+2155.0	20+5	22.91	22.52	25.73
2165.0+2177.5	20+5	22.95	22.78	25.88
2120.0+2140.0	20+20	23.51	23.01	26.28
2135.0+2155.0	20+20	23.25	23.10	26.19
2150.0+2170.0	20+20	23.24	23.62	26.44
16QAM				
2112.5+2117.5	5+5	23.49	23.05	26.29
2142.5+2147.5	5+5	23.15	23.25	26.21
2172.5+2177.5	5+5	23.24	23.30	26.28
2120.0+2132.5	20+5	23.02	22.69	25.87
2142.5+2155.0	20+5	23.09	23.01	26.06
2165.0+2177.5	20+5	22.98	22.80	25.90
2120.0+2140.0	20+20	23.32	23.01	26.18
2135.0+2155.0	20+20	23.22	22.98	26.11
2150.0+2170.0	20+20	23.22	23.56	26.40

64QAM				
2112.5+2117.5	5+5	23.61	23.05	26.35
2142.5+2147.5	5+5	23.21	23.40	26.32
2172.5+2177.5	5+5	23.30	23.41	26.37
2120.0+2132.5	20+5	23.06	22.72	25.90
2142.5+2155.0	20+5	23.29	23.07	26.19
2165.0+2177.5	20+5	22.84	22.81	25.84
2120.0+2140.0	20+20	23.34	23.04	26.20
2135.0+2155.0	20+20	23.25	23.07	26.17
2150.0+2170.0	20+20	23.26	23.55	26.42
256QAM				
2112.5+2117.5	5+5	23.52	23.04	26.30
2142.5+2147.5	5+5	23.15	23.27	26.22
2172.5+2177.5	5+5	23.22	23.37	26.31
2120.0+2132.5	20+5	23.01	22.58	25.81
2142.5+2155.0	20+5	23.21	23.01	26.12
2165.0+2177.5	20+5	22.91	22.86	25.90
2120.0+2140.0	20+20	23.32	23.06	26.20
2135.0+2155.0	20+20	23.20	23.02	26.12
2150.0+2170.0	20+20	23.22	23.54	26.39

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2021/02/01 ~ 2021/04/06
Test Configuration	Band 66 Concurrent Mode - NR + LTE		

Frequency (MHz)	Channel Bandwidth (MHz)	Ant 0 Power (dBm)	Ant 1 Power (dBm)	Total Power (dBm)
QPSK				
2112.5+2117.5	5+5	23.24	23.55	26.41
2142.5+2147.5	5+5	23.12	23.37	26.26
2172.5+2177.5	5+5	23.26	23.36	26.32
2112.5+2125.0	5+20	22.85	22.15	25.52
2135.0+2147.5	5+20	22.72	22.62	25.68
2157.5+2170.0	5+20	22.97	22.99	25.99
2120.0+2140.0	20+20	23.11	23.54	26.34
2135.0+2155.0	20+20	23.15	23.36	26.27
2150.0+2170.0	20+20	23.62	23.28	26.46
16QAM				
2112.5+2117.5	5+5	23.11	23.51	26.32
2142.5+2147.5	5+5	23.12	23.48	26.31
2172.5+2177.5	5+5	23.21	23.32	26.28
2112.5+2125.0	5+20	22.90	22.20	25.57
2135.0+2147.5	5+20	22.78	22.72	25.76
2157.5+2170.0	5+20	22.88	22.53	25.72
2120.0+2140.0	20+20	23.08	23.41	26.26
2135.0+2155.0	20+20	23.11	23.34	26.24
2150.0+2170.0	20+20	23.55	23.31	26.44

64QAM				
2112.5+2117.5	5+5	23.15	23.62	26.40
2142.5+2147.5	5+5	23.20	23.46	26.34
2172.5+2177.5	5+5	23.28	23.34	26.32
2112.5+2125.0	5+20	23.13	22.56	25.86
2135.0+2147.5	5+20	22.81	22.62	25.73
2157.5+2170.0	5+20	23.01	22.95	25.99
2120.0+2140.0	20+20	23.19	23.44	26.33
2135.0+2155.0	20+20	23.16	23.39	26.29
2150.0+2170.0	20+20	23.55	23.25	26.41
256QAM				
2112.5+2117.5	5+5	23.10	23.57	26.35
2142.5+2147.5	5+5	23.11	23.40	26.27
2172.5+2177.5	5+5	23.20	23.35	26.29
2112.5+2125.0	5+20	23.22	22.66	25.96
2135.0+2147.5	5+20	22.72	22.68	25.71
2157.5+2170.0	5+20	22.85	22.46	25.67
2120.0+2140.0	20+20	23.15	23.40	26.29
2135.0+2155.0	20+20	23.15	23.32	26.25
2150.0+2170.0	20+20	23.57	23.28	26.44

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2021/02/01 ~ 2021/04/06
Test Configuration	Band 66 Concurrent Mode - LTE + NR		

Frequency (MHz)	Channel Bandwidth (MHz)	Reading Level (dBm)	Factor (dB)	EIRP (dBm)	Limit (dBm)
QPSK					
2112.5+2117.5	5+5	25.50	6.04	31.54	< 62.15
2142.5+2147.5	5+5	26.19	6.39	32.58	< 62.15
2172.5+2177.5	5+5	25.38	6.30	31.68	< 62.15
2120.0+2132.5	20+5	25.37	6.14	31.51	< 62.15
2142.5+2155.0	20+5	25.77	6.39	32.16	< 62.15
2165.0+2177.5	20+5	25.37	6.36	31.73	< 62.15
2120.0+2140.0	20+20	25.33	6.23	31.56	< 62.15
2135.0+2155.0	20+20	26.12	6.39	32.51	< 62.15
2150.0+2170.0	20+20	25.22	6.42	31.64	< 62.15
16QAM					
2112.5+2117.5	5+5	25.17	6.04	31.21	< 62.15
2142.5+2147.5	5+5	25.78	6.39	32.17	< 62.15
2172.5+2177.5	5+5	25.22	6.30	31.52	< 62.15
2120.0+2132.5	20+5	25.15	6.14	31.29	< 62.15
2142.5+2155.0	20+5	25.90	6.39	32.29	< 62.15
2165.0+2177.5	20+5	24.90	6.36	31.26	< 62.15
2120.0+2140.0	20+20	25.80	6.23	32.03	< 62.15
2135.0+2155.0	20+20	24.25	6.39	30.64	< 62.15
2150.0+2170.0	20+20	25.71	6.42	32.13	< 62.15

64QAM					
2112.5+2117.5	5+5	25.85	6.04	31.89	< 62.15
2142.5+2147.5	5+5	25.33	6.39	31.72	< 62.15
2172.5+2177.5	5+5	25.49	6.30	31.79	< 62.15
2120.0 +2132.5	20+5	24.99	6.14	31.13	< 62.15
2142.5 +2155.0	20+5	25.53	6.39	31.92	< 62.15
2165.0 +2177.5	20+5	24.91	6.36	31.27	< 62.15
2120.0+2140.0	20+20	25.87	6.23	32.10	< 62.15
2135.0+2155.0	20+20	25.01	6.39	31.40	< 62.15
2150.0+2170.0	20+20	24.90	6.42	31.32	< 62.15
256QAM					
2112.5+2117.5	5+5	25.19	6.04	31.23	< 62.15
2142.5+2147.5	5+5	24.95	6.39	31.34	< 62.15
2172.5+2177.5	5+5	25.18	6.30	31.48	< 62.15
2120.0 +2132.5	20+5	25.09	6.14	31.23	< 62.15
2142.5 +2155.0	20+5	24.89	6.39	31.28	< 62.15
2165.0 +2177.5	20+5	24.63	6.36	30.99	< 62.15
2120.0+2140.0	20+20	24.99	6.23	31.22	< 62.15
2135.0+2155.0	20+20	24.62	6.39	31.01	< 62.15
2150.0+2170.0	20+20	25.10	6.42	31.52	< 62.15

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2021/02/01 ~ 2021/04/06
Test Configuration	Band 66 Concurrent Mode - NR + LTE		

Frequency (MHz)	Channel Bandwidth (MHz)	Reading Level (dBm)	Factor (dB)	EIRP (dBm)	Limit (dBm)
QPSK					
2112.5+2117.5	5+5	25.75	6.04	31.79	< 62.15
2142.5+2147.5	5+5	26.14	6.39	32.53	< 62.15
2172.5+2177.5	5+5	25.43	6.30	31.73	< 62.15
2112.5+2125.0	5+20	26.35	6.14	32.49	< 62.15
2135.0+2147.5	5+20	25.58	6.39	31.97	< 62.15
2157.5+2170.0	5+20	25.24	6.36	31.60	< 62.15
2120.0+2140.0	20+20	25.27	6.23	31.50	< 62.15
2135.0+2155.0	20+20	25.44	6.39	31.83	< 62.15
2150.0+2170.0	20+20	25.95	6.42	32.37	< 62.15
16QAM					
2112.5+2117.5	5+5	25.75	6.04	31.79	< 62.15
2142.5+2147.5	5+5	24.53	6.39	30.92	< 62.15
2172.5+2177.5	5+5	25.01	6.30	31.31	< 62.15
2112.5+2125.0	5+20	25.84	6.14	31.98	< 62.15
2135.0+2147.5	5+20	24.56	6.39	30.95	< 62.15
2157.5+2170.0	5+20	25.89	6.36	32.25	< 62.15
2120.0+2140.0	20+20	24.93	6.23	31.16	< 62.15
2135.0+2155.0	20+20	25.31	6.39	31.70	< 62.15
2150.0+2170.0	20+20	25.45	6.42	31.87	< 62.15

64QAM					
2112.5+2117.5	5+5	25.49	6.04	31.53	< 62.15
2142.5+2147.5	5+5	25.65	6.39	32.04	< 62.15
2172.5+2177.5	5+5	24.91	6.30	31.21	< 62.15
2112.5 +2125.0	5+20	25.23	6.14	31.37	< 62.15
2135.0 +2147.5	5+20	25.60	6.39	31.99	< 62.15
2157.5 +2170.0	5+20	25.81	6.36	32.17	< 62.15
2120.0+2140.0	20+20	24.89	6.23	31.12	< 62.15
2135.0+2155.0	20+20	25.57	6.39	31.96	< 62.15
2150.0+2170.0	20+20	25.68	6.42	32.10	< 62.15
256QAM					
2112.5+2117.5	5+5	25.02	6.04	31.06	< 62.15
2142.5+2147.5	5+5	24.43	6.39	30.82	< 62.15
2172.5+2177.5	5+5	24.60	6.30	30.90	< 62.15
2112.5 +2125.0	5+20	25.19	6.14	31.33	< 62.15
2135.0 +2147.5	5+20	24.31	6.39	30.70	< 62.15
2157.5 +2170.0	5+20	25.17	6.36	31.53	< 62.15
2120.0+2140.0	20+20	25.16	6.23	31.39	< 62.15
2135.0+2155.0	20+20	25.09	6.39	31.48	< 62.15
2150.0+2170.0	20+20	24.90	6.42	31.32	< 62.15

6.3. Emission Bandwidth

6.3.1. Test Limit

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.3.2. Test Procedure

KDB 971168 D01v03r01 - Section 4.1 & 4.2

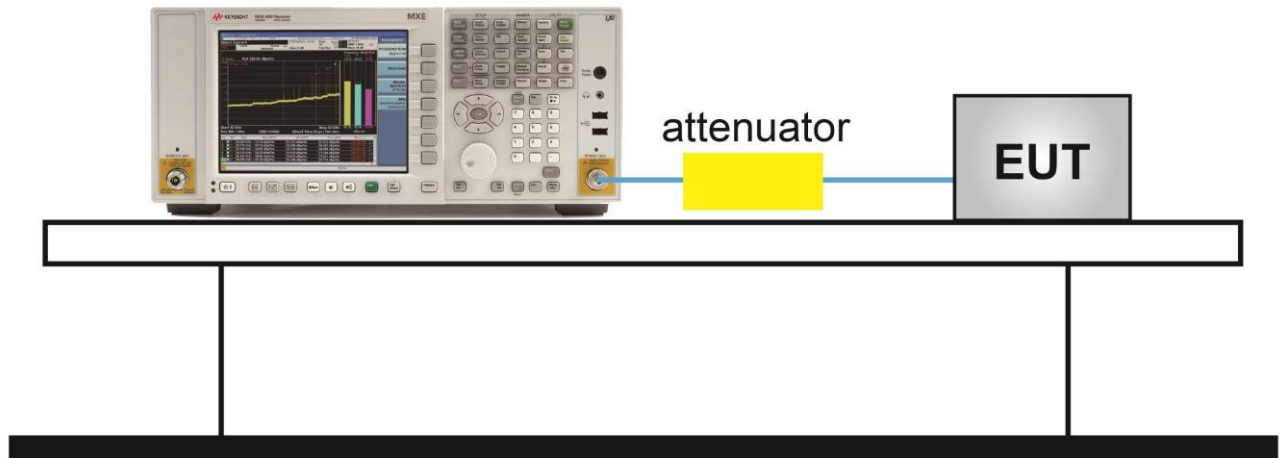
ANSI C63.26-2015 - Section 5.4.3 & 5.4.4

6.3.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency;
2. RBW = The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW;
3. VBW $\geq 3 \times$ RBW;
4. Detector = Peak;
5. Trace mode = max hold;
6. Sweep = auto couple;
7. Allow the trace to stabilize;
8. 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 26 dB below the reference level

6.3.4. Test Setup

Spectrum Analyzer



6.3.5. Test Result

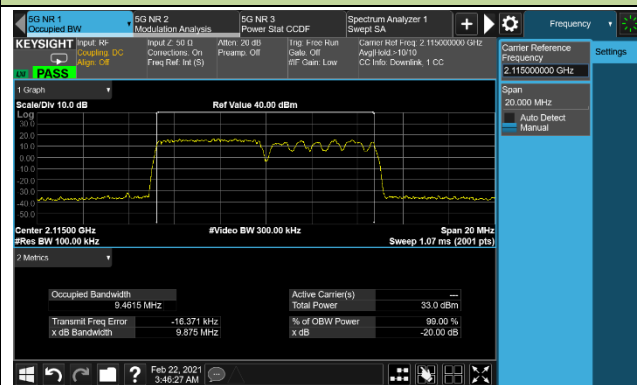
Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2021/02/01 ~ 2021/04/06
Test Configuration	Band 66 Concurrent Mode - LTE + NR		

Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK		
2112.5+2117.5	5+5	9.46
2142.5+2147.5	5+5	9.47
2172.5+2177.5	5+5	9.46
2120.0+2132.5	20+5	23.65
2142.5+2155.0	20+5	23.74
2165.0+2177.5	20+5	23.74
2120.0+2140.0	20+20	38.33
2135.0+2155.0	20+20	38.29
2150.0+2170.0	20+20	38.33
16QAM		
2112.5+2117.5	5+5	9.45
2142.5+2147.5	5+5	9.46
2172.5+2177.5	5+5	9.46
2120.0+2132.5	20+5	23.70
2142.5+2155.0	20+5	23.66
2165.0+2177.5	20+5	23.70
2120.0+2140.0	20+20	38.26
2135.0+2155.0	20+20	38.24
2150.0+2170.0	20+20	38.31

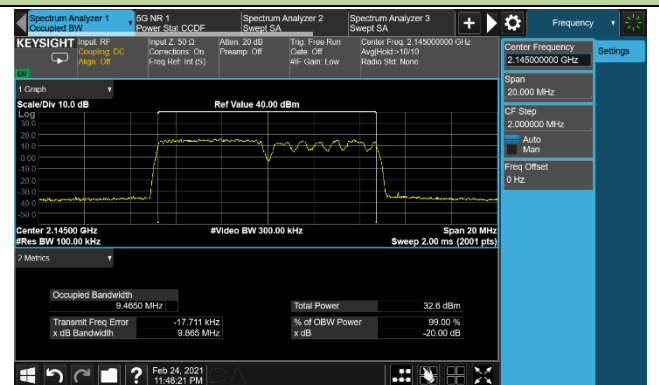
64QAM		
2112.5+2117.5	5+5	9.44
2142.5+2147.5	5+5	9.43
2172.5+2177.5	5+5	9.43
2120.0+2132.5	20+5	23.62
2142.5+2155.0	20+5	23.62
2165.0+2177.5	20+5	23.61
2120.0+2140.0	20+20	38.21
2135.0+2155.0	20+20	38.17
2150.0+2170.0	20+20	38.24
256QAM		
2112.5+2117.5	5+5	9.45
2142.5+2147.5	5+5	9.45
2172.5+2177.5	5+5	9.46
2120.0+2132.5	20+5	23.61
2142.5+2155.0	20+5	23.60
2165.0+2177.5	20+5	23.60
2120.0+2140.0	20+20	38.19
2135.0+2155.0	20+20	38.21
2150.0+2170.0	20+20	38.42

5+5MHz Channel Bandwidth - QPSK

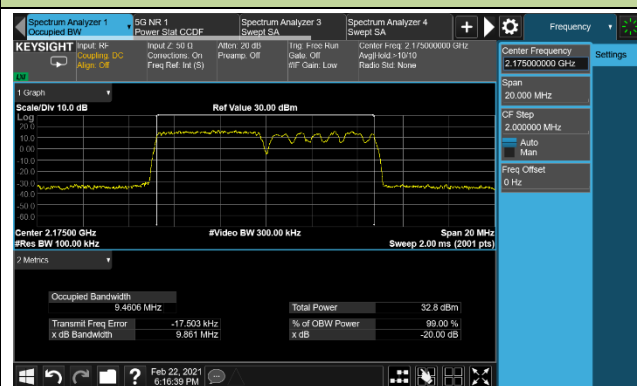
2112.5+2117.5 MHz



2142.5+2147.5 MHz

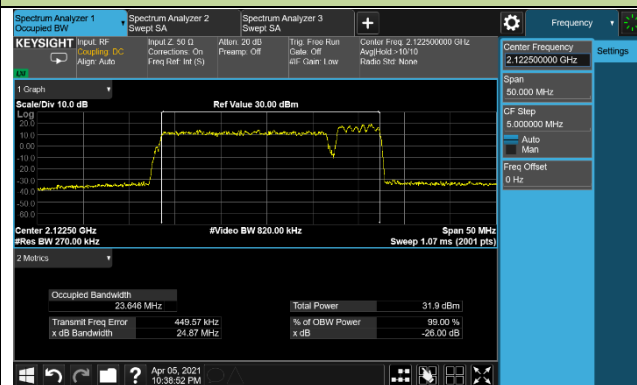


2172.5+2177.5 MHz

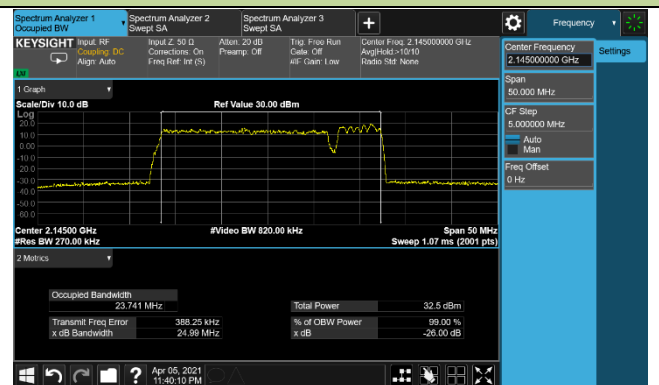


20+5MHz Channel Bandwidth - QPSK

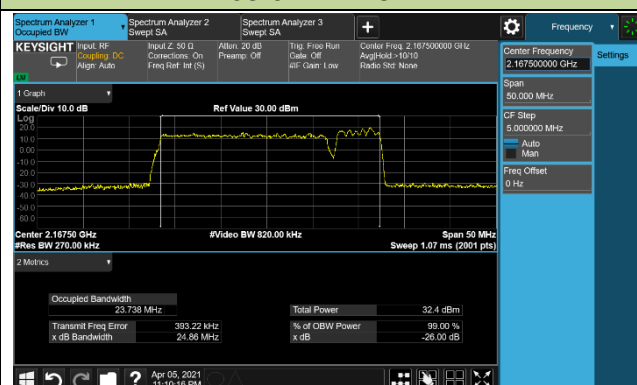
2120.0+2132.5 MHz



2142.5+2155.0 MHz

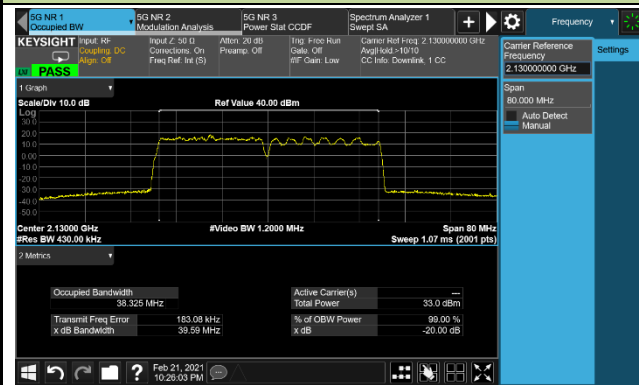


2165.0+2177.5 MHz

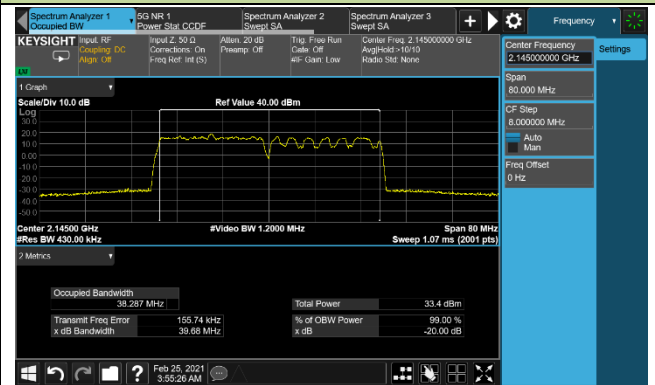


20+20MHz Channel Bandwidth - QPSK

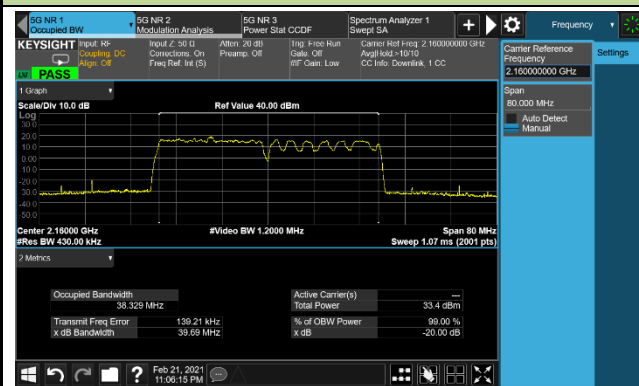
2120+2140 MHz



2135+2155 MHz

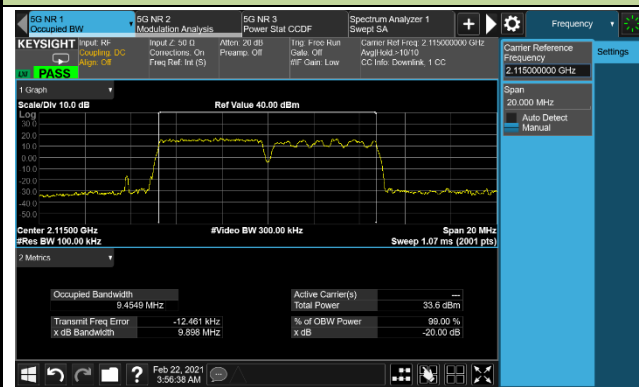


2150+2170 MHz

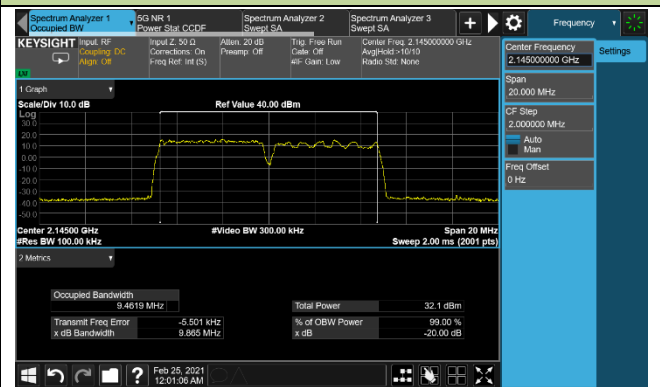


5+5MHz Channel Bandwidth -16QAM

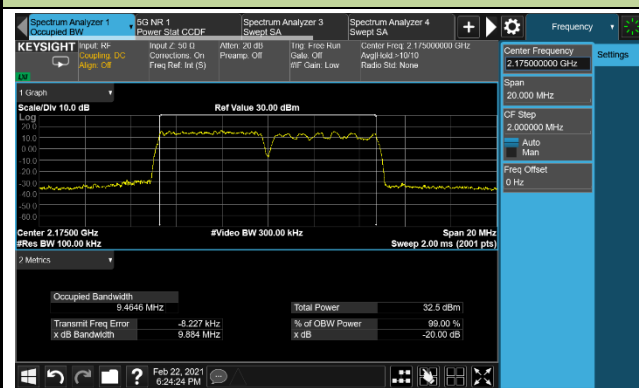
2112.5+2117.5 MHz



2142.5+2147.5 MHz

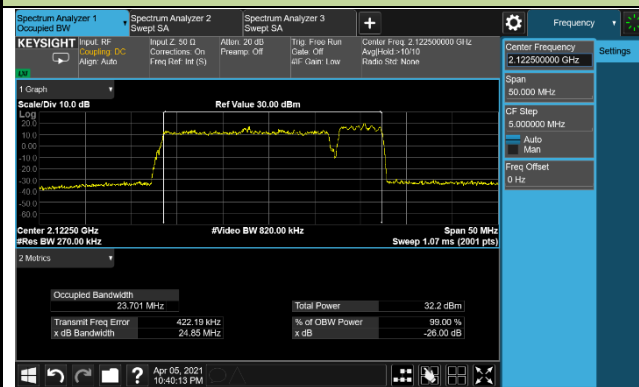


2172.5+2177.5 MHz

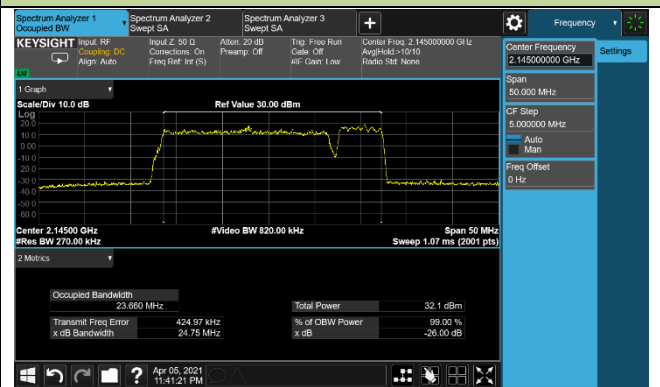


20+5 MHz Channel Bandwidth - 16QAM

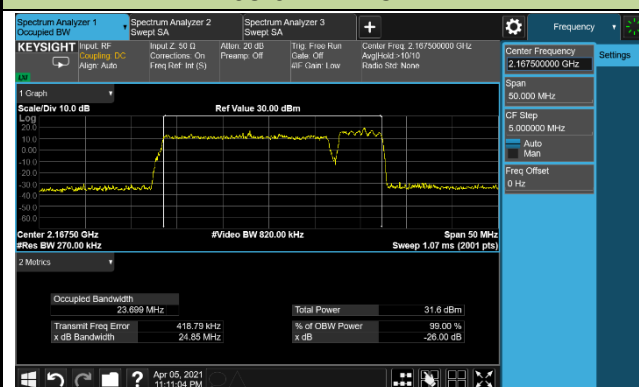
2120.0+2132.5 MHz



2142.5+2155.0 MHz

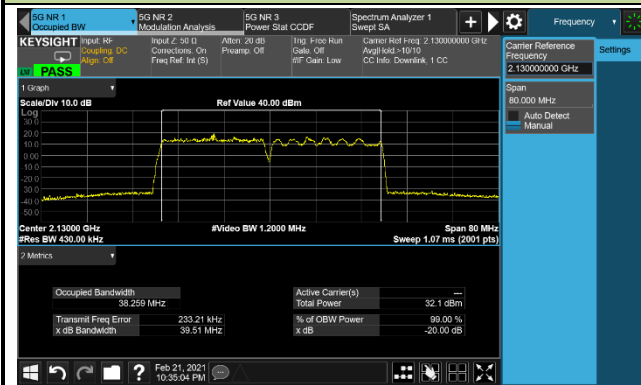


2165.0+2177.5 MHz

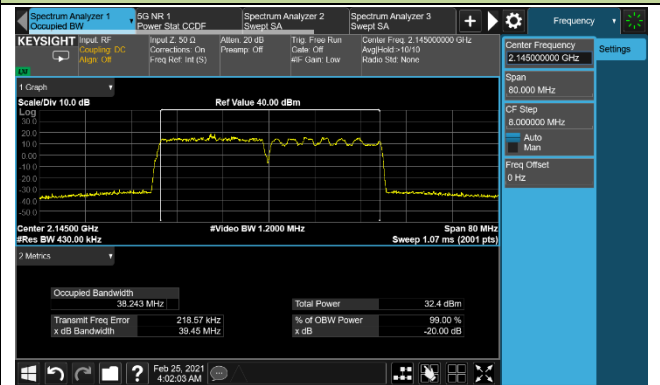


20+20MHz Channel Bandwidth - 16QAM

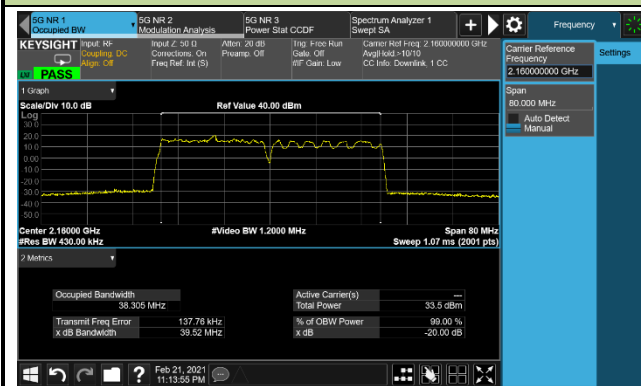
2120+2140 MHz



2135+2155 MHz

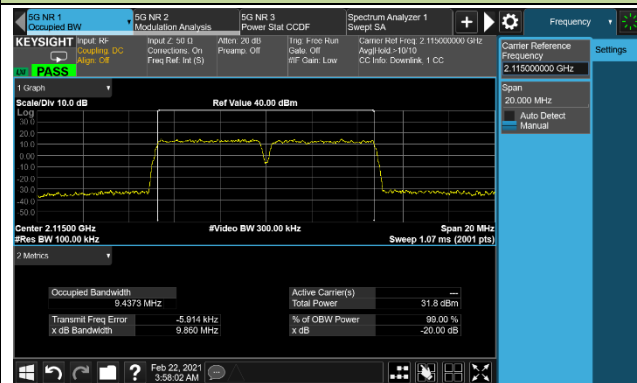


2150+2170 MHz

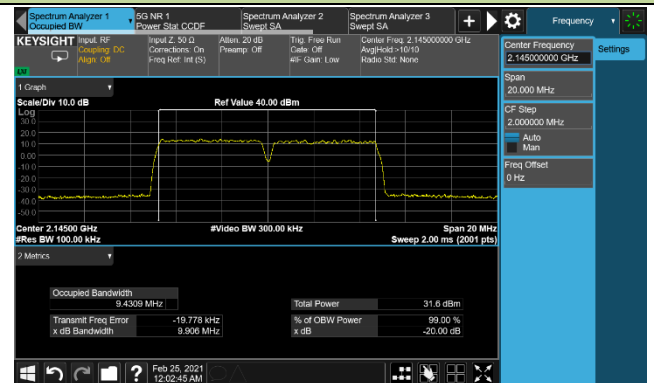


5+5MHz Channel Bandwidth - 64QAM

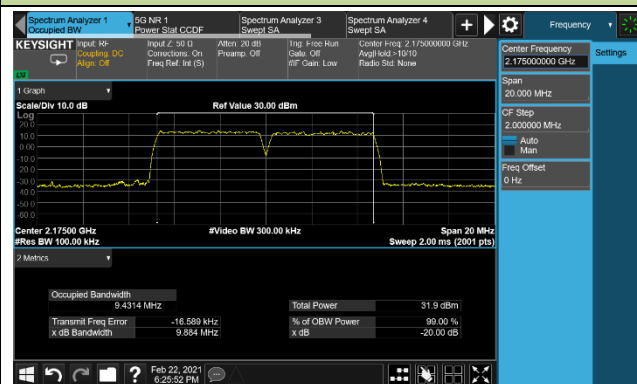
2112.5+2117.5 MHz



2142.5+2147.5 MHz

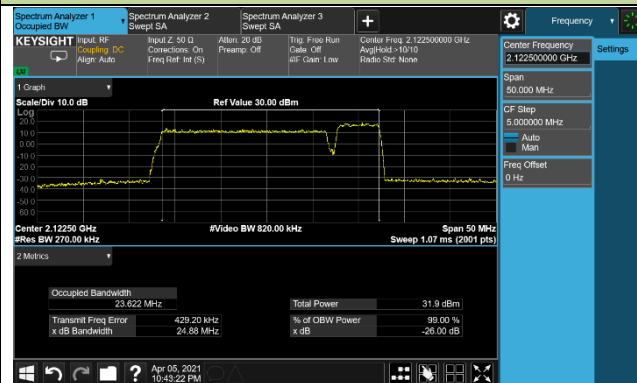


2172.5+2177.5 MHz

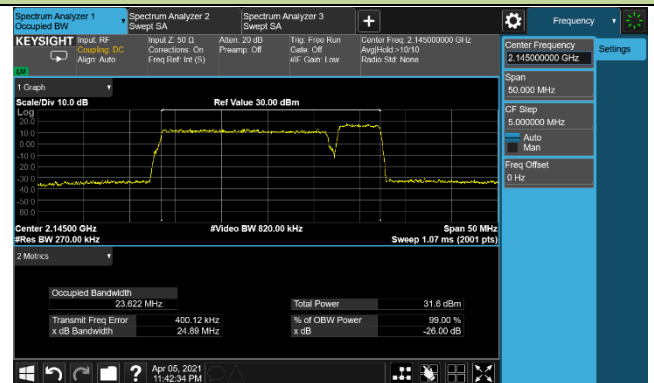


20+5 MHz Channel Bandwidth - 64QAM

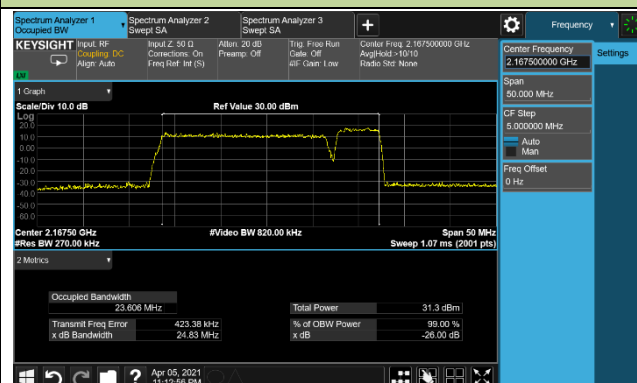
2120.0+2132.5 MHz



2142.5+2155.0 MHz

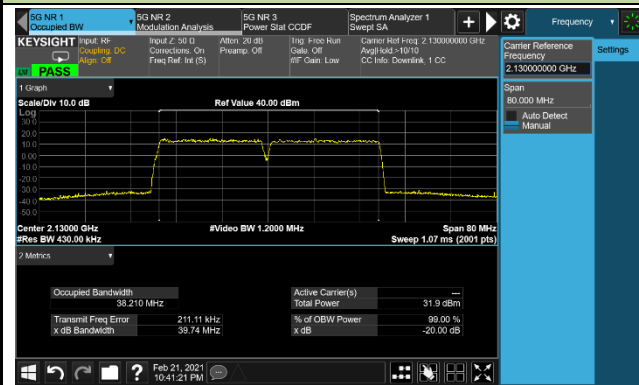


2165.0+2177.5 MHz



20+20MHz Channel Bandwidth - 64QAM

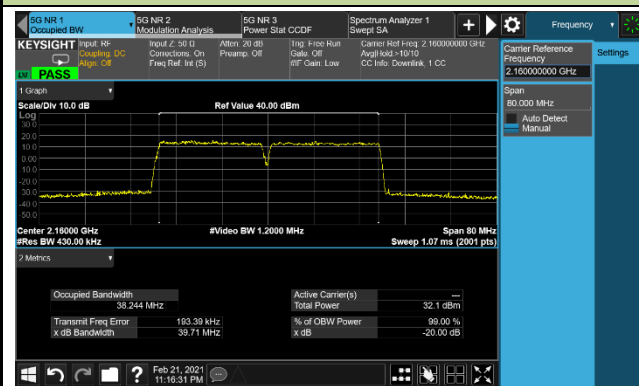
2120+2140 MHz



2135+2155 MHz

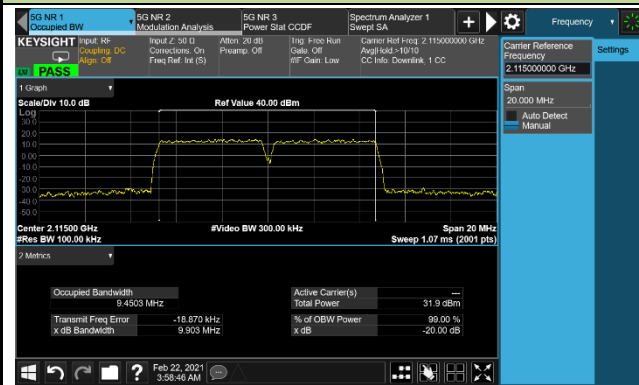


2150+2170 MHz

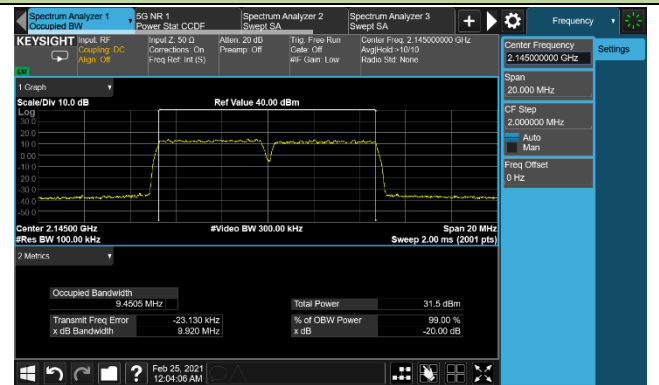


5+5MHz Channel Bandwidth - 256QAM

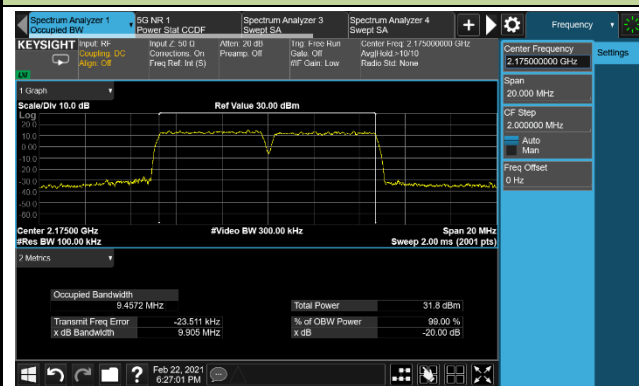
2112.5+2117.5 MHz



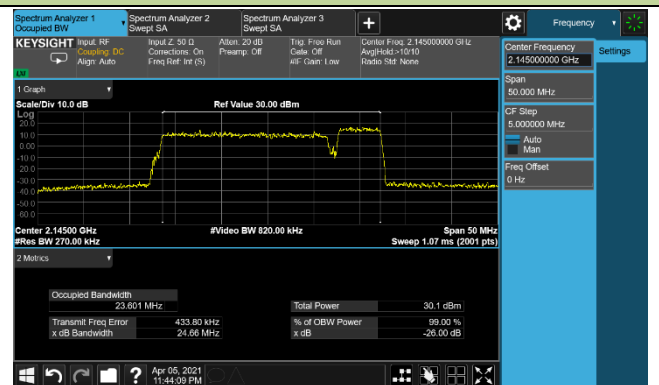
2142.5+2147.5 MHz



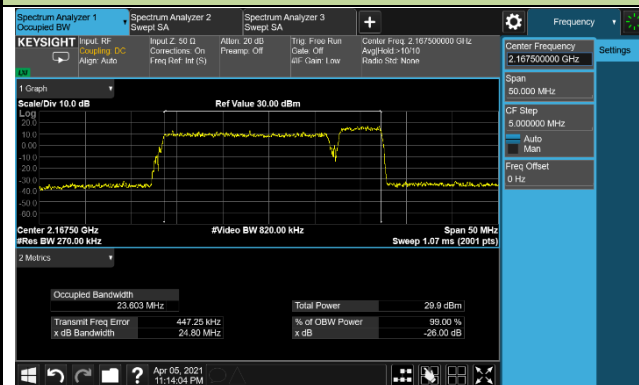
2172.5+2177.5 MHz



2142.5+2155.0 MHz

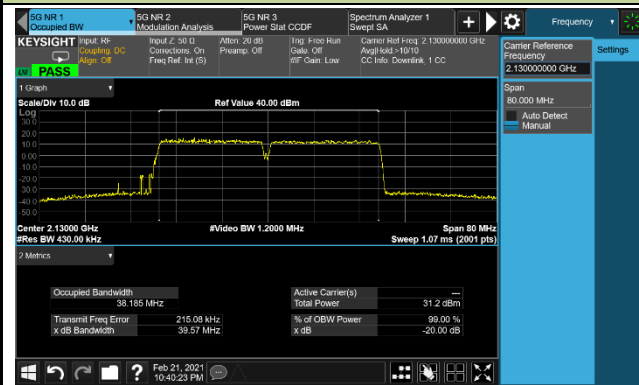


2165.0+2177.5 MHz

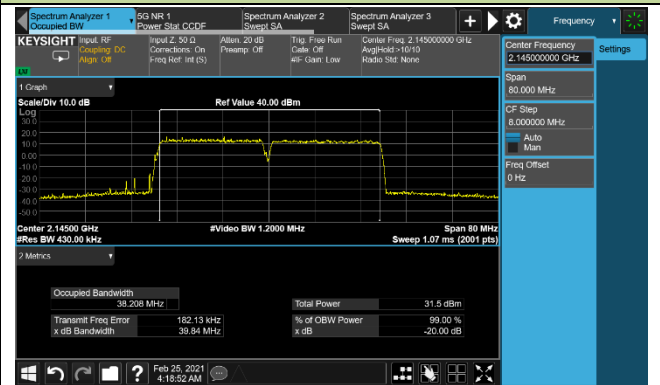


20+20MHz Channel Bandwidth - 256QAM

2120+2140 MHz



2135+2155 MHz



2150+2170 MHz



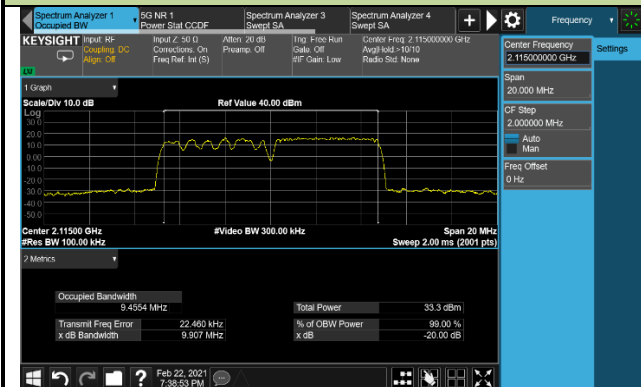
Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2021/02/01 ~ 2021/04/06
Test Configuration	Band 66 Concurrent Mode - NR + LTE		

Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK		
2112.5+2117.5	5+5	9.46
2142.5+2147.5	5+5	9.45
2172.5+2177.5	5+5	9.44
2112.5+2125.0	5+20	23.61
2135.0+2147.5	5+20	23.58
2157.5+2170.0	5+20	23.67
2120.0+2140.0	20+20	38.26
2135.0+2155.0	20+20	38.19
2150.0+2170.0	20+20	38.32
16QAM		
2112.5+2117.5	5+5	9.43
2142.5+2147.5	5+5	9.42
2172.5+2177.5	5+5	9.42
2112.5+2125.0	5+20	23.63
2135.0+2147.5	5+20	23.63
2157.5+2170.0	5+20	23.66
2120.0+2140.0	20+20	38.22
2135.0+2155.0	20+20	38.21
2150.0+2170.0	20+20	38.27

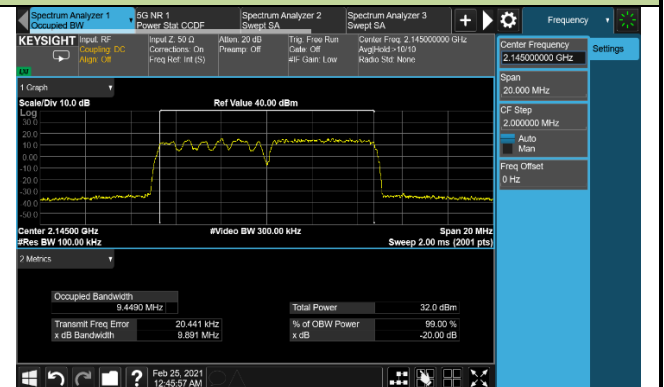
64QAM		
2112.5+2117.5	5+5	9.43
2142.5+2147.5	5+5	9.44
2172.5+2177.5	5+5	9.45
2112.5+2125.0	5+20	23.61
2135.0+2147.5	5+20	23.60
2157.5+2170.0	5+20	23.59
2120.0+2140.0	20+20	38.20
2135.0+2155.0	20+20	38.22
2150.0+2170.0	20+20	38.28
256QAM		
2112.5+2117.5	5+5	9.44
2142.5+2147.5	5+5	9.44
2172.5+2177.5	5+5	9.45
2112.5+2125.0	5+20	23.59
2135.0+2147.5	5+20	23.51
2157.5+2170.0	5+20	23.58
2120.0+2140.0	20+20	38.19
2135.0+2155.0	20+20	38.23
2150.0+2170.0	20+20	38.24

5+5MHz Channel Bandwidth - QPSK

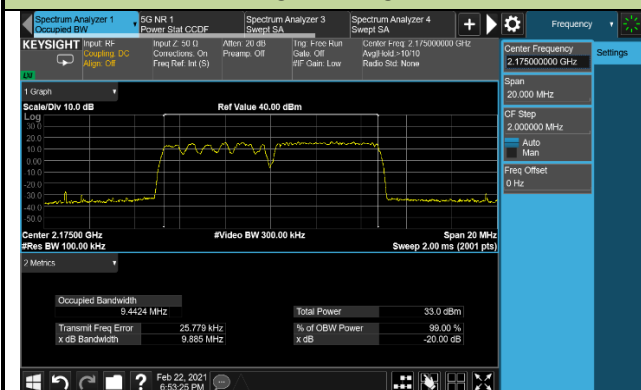
2112.5+2117.5 MHz



2142.5+2147.5 MHz

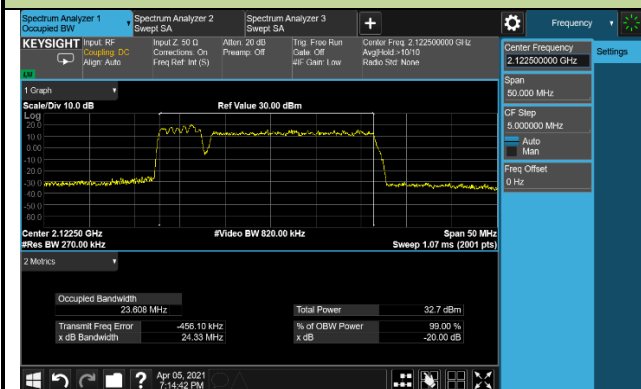


2172.5+2177.5 MHz

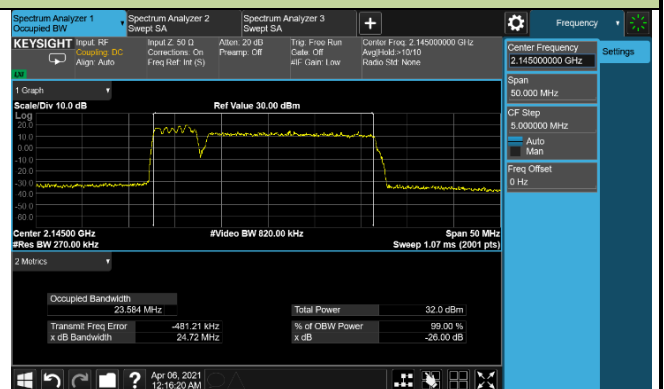


5+20MHz Channel Bandwidth - QPSK

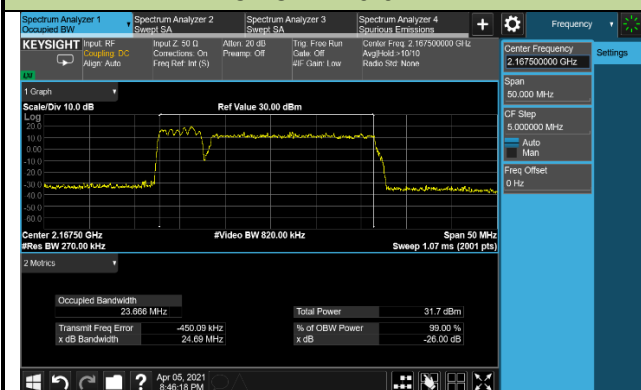
2112.5+2125.0 MHz



2135.0+2147.5 MHz

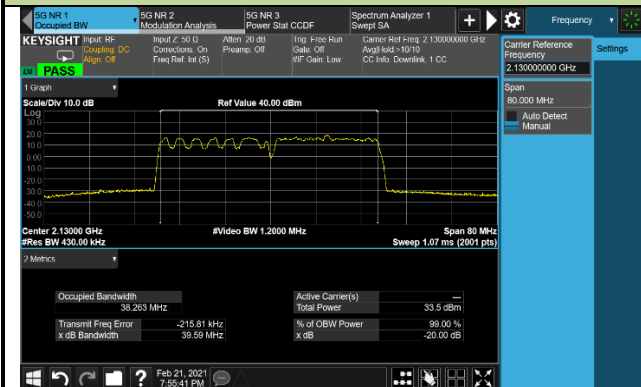


2157.5+2170.0 MHz

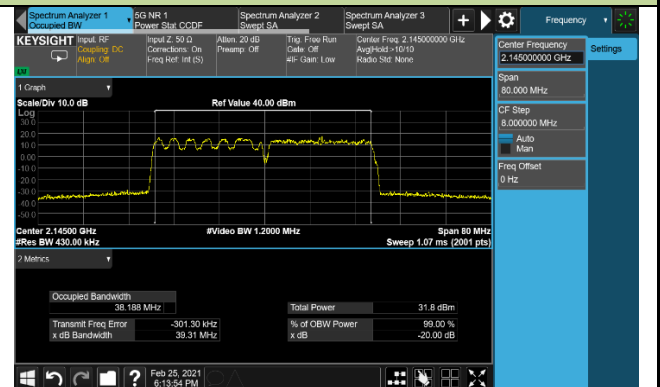


20+20MHz Channel Bandwidth - QPSK

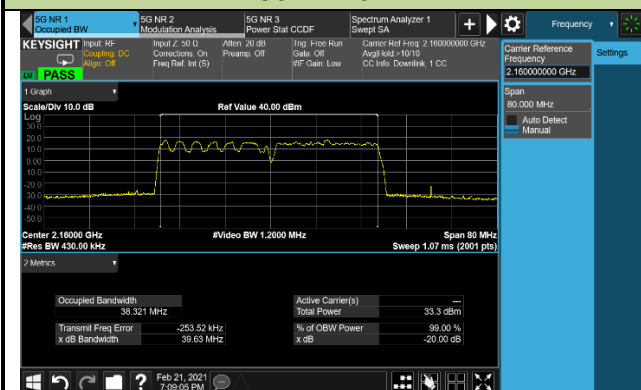
2120+2140 MHz



2135+2155 MHz

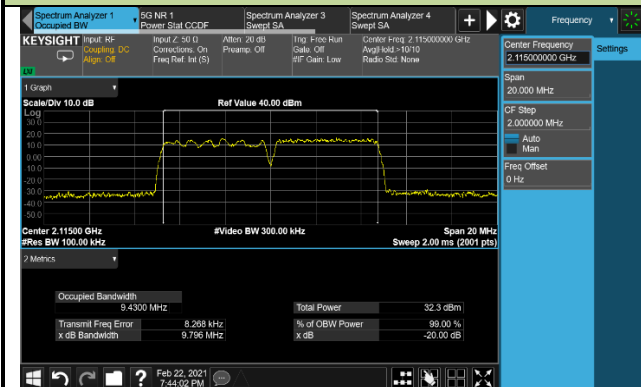


2150+2170 MHz

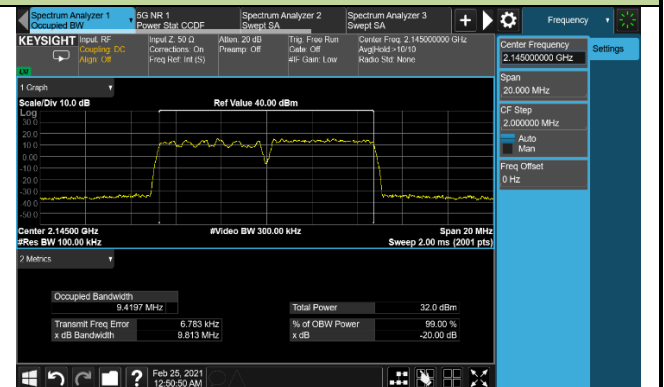


5+5MHz Channel Bandwidth -16QAM

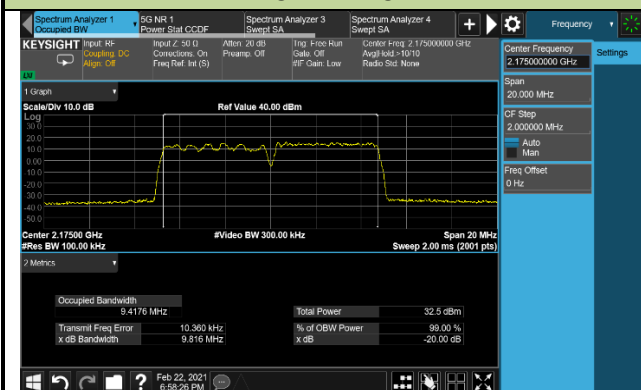
2112.5+2117.5 MHz



2142.5+2147.5 MHz

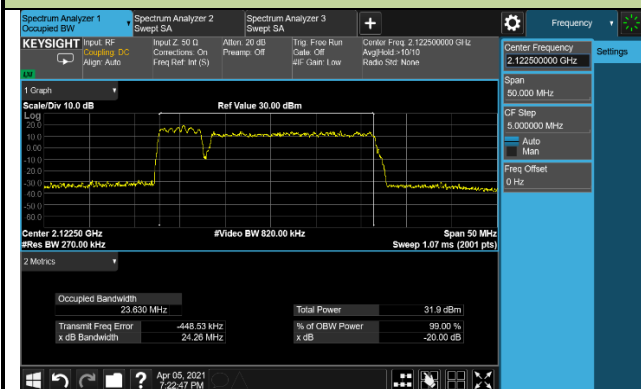


2172.5+2177.5 MHz

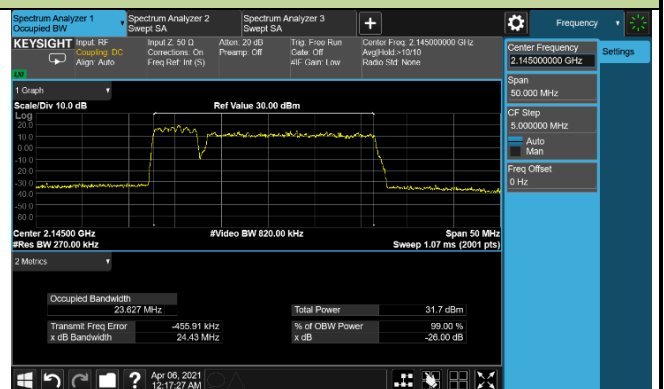


5+20 MHz Channel Bandwidth -16QAM

2112.5+2125.0 MHz



2135.0+2147.5 MHz



2157.5+2170.0 MHz

