



TEST REPORT

No. 25T04Z100627-003

for

Japan Radio Co., Ltd.

Product Name: CBRS eNodeB

Model Name: JRL-1411

FCC ID: CKEJRL-1411

with

Hardware Version: JRL-1411

Software Version: JR_1.1.1

Issued Date: 2025-07-02

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
25T04Z100627-003	Rev.0	1 st edition	2025-07-02

Note: the latest revision of the test report supersedes all previous version.

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China 100191

Location 2: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.4. Project Data

Testing Start Date: 2025-04-30

Testing End Date: 2025-05-30

1.5. Signature



Dong Yuan

(Prepared this test report)



Zhou Yu

(Reviewed this test report)



Zhao Hui Lin

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: Japan Radio Co., Ltd.
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2.2. Manufacturer Information

Company Name: Japan Radio Co., Ltd.
Address: 3000 Scott Blvd, Suite 212, Santa Clara, California 95054, United States
Contact: Yuji Kinoshita
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Tel.: +81-49-257-6468
Fax: +81-49-257-6214

3. Equipment Under Test (EUT)

3.1. About EUT(*)

Description	CBRS eNodeB Base Station
Model Name	JRL-1411
CBSD Category	Category A
Antenna Gain	3dBi
Supported Channel bandwidth	LTE:10/20MHz
Maximum Output Power	conducted 24dBm per port for 20MHz bandwidth, 21dbm per port for 10MHz bandwidth
Number of Antenna ports	4
Frequency range	LTE B48 3550MHz-3700MHz
Type of modulation	QPSK, 16QAM, 64QAM, 256QAM
Extreme Temperature	-30/+50°C
Normal Voltage	12V DC

(*): Declared by applicant.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN	HW Version	SW Version	Date of receipt
UT01a	1202000466241RB0004	JRL-1411	JR_1.1.1	2025-04-08
UT02a	1202000466241RB0007	JRL-1411	JR_1.1.1	2025-04-08

UT02a was used for radiated spurious emission test and UT01a was used for other test cases.

*EUT ID: is used to identify the test sample in the lab internally.

3.3. General Description

The Equipment Under Test (EUT) JRL-1411 is a LTE Base Station which provides communication connections to 3550-3700 MHz network. The EUT operates from a 12V DC supply. The EUT includes 4 TX/RX ports. It can operate in LTE single RAT mode. It can be configured to transmit in 2*2 MIMO mode which was used for measurements as the worst configuration. The complete testing was performed with the EUT transmitting at rated maximum RF power unless otherwise stated. A full technical description can be found in the Manufacturer's documentation.

3.4. Configuration Description

The following settings were used to represent all traffic scenarios. The output power was measured on the bottom, middle and top channel of both applicable antenna ports. By measuring the output power of QPSK, 16QAM, 64QAM and 256QAM for LTE on all of the antenna ports, it was determined that 64QAM was the worst case modulation scheme and was used for all testing. Complete testing was carried out on the worst case antenna port which was established as being the highest output power from the applicable measured ports on worst case modulation scheme. This antenna port was Port 3 for LTE single RAT mode.

The settings below were used for all measurements unless otherwise noted:

Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
	Bottom	Middle	Top



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10MHz	3555	3625	3695
20MHz	3560	3625	3690

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters are supplied by the customer, which are the bases of testing. CAICT is not responsible for the accuracy of customer supplied technical information that may affect the test results (for example, antenna gain and loss of customer supplied cable).

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 96	CITIZENS BROADBAND RADIO SERVICE	10-1-23 Edition
ANSI 63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band	v02r01
KDB 940660 D01	CERTIFICATION AND TEST PROCEDURES FOR CITIZENS BROADBAND RADIO SERVICE DEVICES AUTHORIZED UNDER PART 96	v03 October 29, 2020

5. Laboratory Environment

Control room / conducted chamber did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 M
Ground system resistance	< 0.5

Semi-anechoic chamber did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 M
Ground system resistance	< 0.5
Normalised site attenuation (NSA)	< ± 3.5 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz

6. Summary Of Test Result

Items	Test Name	Clause in FCC rules	Verdict
1	Maximum Output Power and PAPR	96.41(b) (g), 2.1046	Pass
2	Occupied Bandwidth	96.41(e), 2.1049	Pass
3	Transmitter unwanted emissions at Band Edge	96.41(e), 2.1051	Pass
4	Transmitter unwanted emissions - Conducted Spurious Emission	96.41(e), 2.1051	Pass
5	Radiated Spurious Emission	96.41(e) 2.1051	Pass
6	Frequency Stability	2.1055	Pass

7. Test Equipment Utilized

NO.	Description	Type	Series Number	Manufacture	Cal. Due Date	Cal. Interval
1	Power Supply	HMC8042	035542452	ROHDE&SCHWARZ	2026-03-06	1 year
2	20dB Attenuator	53AS120-K20	74842	Rosenberger	-	1 year
3	PXA Signal Analyzer	N9030B	MY57142378	Keysight	2026-02-20	1 year
4	Climate Chamber	GPS-4	0010-003512	Espec	2026-03-13	1 year
5	Test Receiver	ESU26	100376	ROHDE&SCHWARZ	2025-06-06	1 year
6	Antenna	VULB9163	01177	Schwarzbeck	2025-11-19	1 year
7	Antenna	3117	00119021	ETS-Lindgren	2025-09-18	1 year
8	Test Receiver	FSV40	101047	ROHDE&SCHWARZ	2025-07-18	1 year
9	Antenna	LB-180400-25-C-KF	2110084000006	A-INFO	2026-05-15	2 years

Note: All equipment is in valid calibration period when used.

8. Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Discipline	Measurement Uncertainty
Conducted Maximum Peak Output Power	0.68dB
Occupied Bandwidth	439.79kHz
Conducted Unwanted Emissions	4.5dB
Frequency Stability	11Hz
Radiated Spurious Emissions	30MHz-1GHz: 5.73dB, k=2 1GHz-18GHz: 5.58dB, k=2 18GHz-40GHz: 3.37dB, k=2

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.

Annex A: Measurement Results

A.1 Maximum Output Power and Peak to Average Power Ratio

A.1.1 Reference

FCC CFR 47 Part 96, Clause 96.41(b), 96.41(g)

FCC CFR 47 Part 2, Clause 2.1046

A.1.2 Method of Measurements

During the process of testing, the EUT was configured to transmit on maximum power and proper modulation. The transmitter power shall be measured in terms of a root-mean-square (RMS) average value. In case of the EUT was configured to MIMO mode, since the EUT transmits on all antennas simultaneously in the same frequency range, using the Measure-and-Sum approach, spectra are measured at each output of the EUT at the required resolution bandwidth. The individual spectra are then summed mathematically in linear power units according to FCC KDB 662911 D01.

A peak to average ratio measurement is performed at the conducted ports of the EUT for single carrier for single RAT mode. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) was used and 0.1% probability value recorded.

A.1.3 Limit

Maximum EIRP: $\leq 30\text{dBm}/10\text{MHz}$

Maximum PSD: $\leq 20\text{dBm}/\text{MHz}$

PAPR: $\leq 13\text{dB}$

A.1.4 Measurement result

Configuration NR-MIMO-1C, 10MHz

Port	Channel position	Modulation	PAPR (dB)	Conducted Power (dBm)	Conducted PSD (dBm/10MHz)	Conducted PSD (dBm/MHz)	Calculated EIRP (dBm)	Calculated PSD (dBm/10MHz)	Calculated PSD (dBm/1MHz)
1	Bottom	64QAM	7.25	21.14	21.01	13.22	27.46	27.30	19.59
2	Bottom	64QAM	7.38	21.74	21.56	13.91			
3	Bottom	64QAM	7.24	21.95	21.75	13.98	27.84	27.61	19.86
4	Bottom	64QAM	7.25	21.71	21.45	13.71			
1	Middle	64QAM	7.34	21.06	20.72	12.38	27.05	26.68	18.72
2	Middle	64QAM	7.33	21.02	20.62	13.01			
3	Middle	64QAM	7.36	21.03	20.77	13.09	27.16	26.96	19.30
4	Middle	64QAM	7.31	21.27	21.13	13.48			
1	Top	64QAM	7.24	19.62	19.02	10.39	26.39	26.02	17.96
2	Top	64QAM	7.28	21.03	20.82	13.09			
3	Top	64QAM	7.23	21.61	21.46	13.62	27.63	27.44	19.64
4	Top	64QAM	7.33	21.63	21.39	13.63			

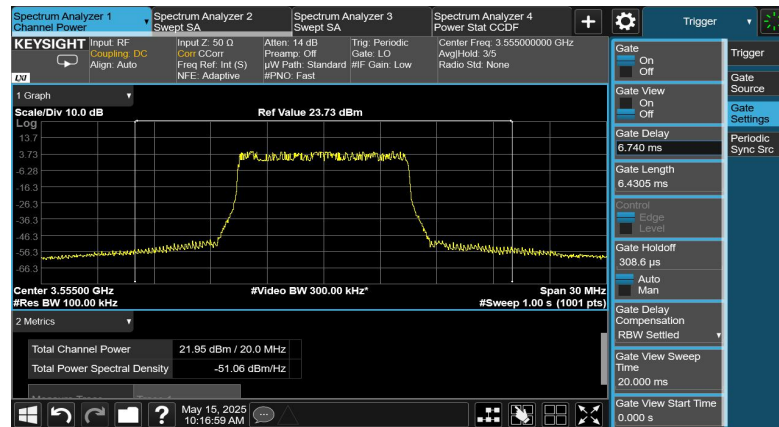
Port	Channel position	Modulation	PAPR (dB)	Conducted Power (dBm)	Conducted PSD (dBm/10MHz)	Conducted PSD (dBm/MHz)	Calculated EIRP (dBm)	Calculated PSD (dBm/10MHz)	Calculated PSD (dBm/MHz)
3	Middle	QPSK	7.36	21.26	21.13	12.19	27.27	27.14	18.20
3	Middle	16QAM	7.29	21.37	21.18	13.21	27.38	27.19	19.22
3	Middle	256QAM	7.28	21.33	21.19	12.18	27.34	27.20	18.19

Configuration NR-MIMO-1C, 20MHz

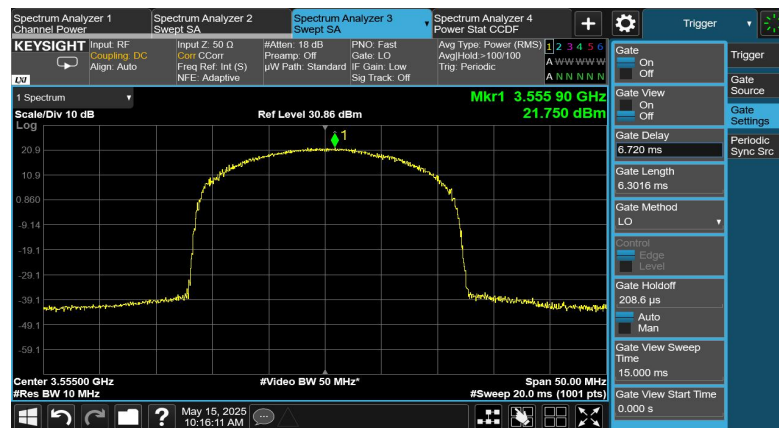
Port	Channel position	Modulation	PAPR (dB)	Conducted Power (dBm)	Conducted PSD (dBm/10MHz)	Conducted PSD (dBm/MHz)	Calculated EIRP (dBm)	Calculated PSD (dBm/10MHz)	Calculated PSD (dBm/1MHz)
1	Bottom	64QAM	7.19	23.55	21.31	12.06	29.94	27.66	18.25
2	Bottom	64QAM	7.21	24.28	21.96	12.41			
3	Bottom	64QAM	7.18	24.42	22.04	12.52	30.40	28.02	18.46
4	Bottom	64QAM	7.21	24.35	21.98	12.38			
1	Middle	64QAM	7.15	23.56	21.20	12.51	29.65	27.38	18.52
2	Middle	64QAM	7.18	23.71	21.54	12.51			
3	Middle	64QAM	7.21	24.43	22.05	12.54	30.24	28.06	18.50
4	Middle	64QAM	7.22	24.03	22.04	12.43			
1	Top	64QAM	7.18	22.69	20.42	10.82	29.38	27.07	17.55
2	Top	64QAM	7.21	23.95	21.61	12.15			
3	Top	64QAM	7.13	24.18	22.03	12.42	30.31	28.04	18.44
4	Top	64QAM	7.14	24.41	22.03	12.44			

Port	Channel position	Modulation	PAPR (dB)	Conducted Power (dBm)	Conducted PSD (dBm/10MHz)	Conducted PSD (dBm/MHz)	Calculated EIRP (dBm)	Calculated PSD (dBm/10MHz)	Calculated PSD (dBm/MHz)
3	Middle	QPSK	7.18	24.29	22.18	12.53	30.30	28.19	18.54
3	Middle	16QAM	7.22	24.23	22.27	12.51	30.24	28.28	18.52
3	Middle	256QAM	7.15	24.19	22.07	12.46	30.20	28.08	18.47

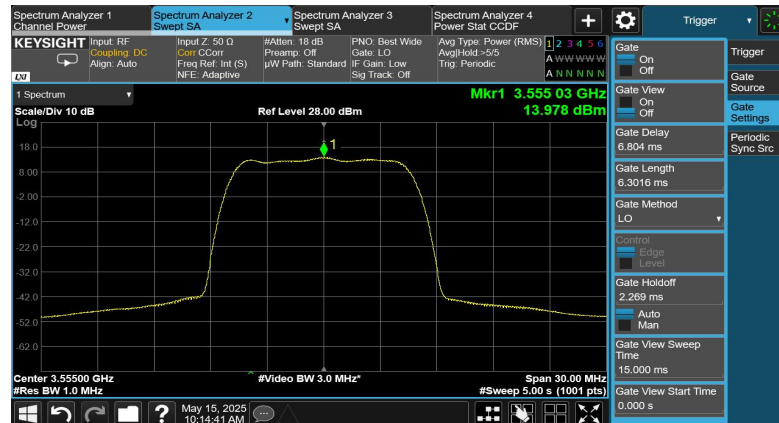
Port 3, 10MHz, Bottom Channel, 64QAM, Conducted Power (dBm)



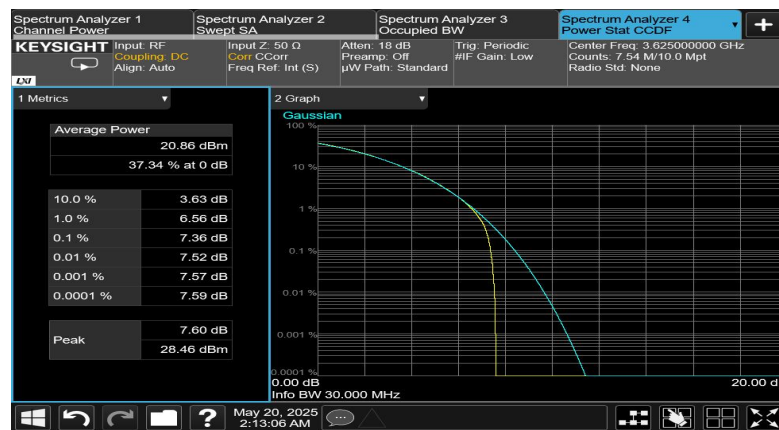
Port 3, 10MHz, Bottom Channel, 64QAM, Conducted PSD (dBm/10MHz)



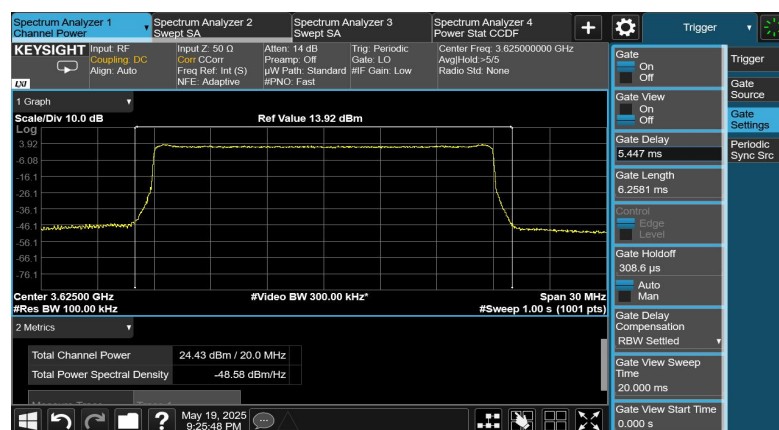
Port 3, 10MHz, Bottom Channel, 64QAM, Conducted PSD(dBm/MHz)



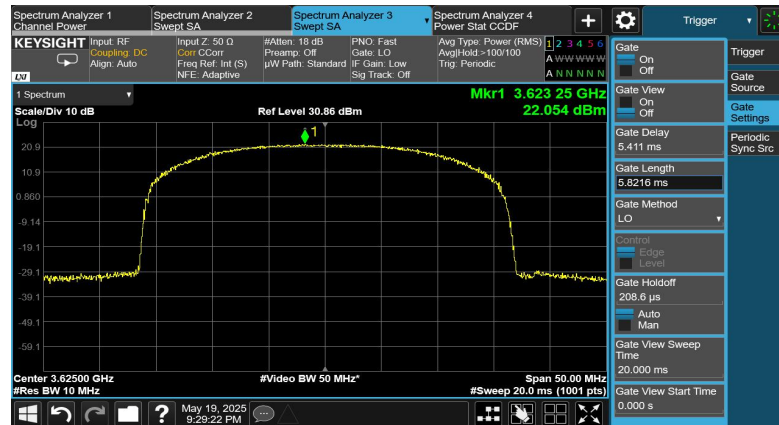
Port 3, 10MHz, Mid Channel, 64QAM, PAPR



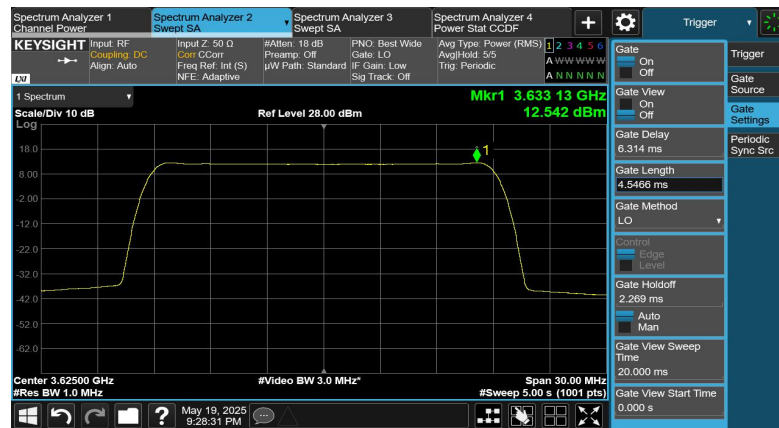
Port 3, 20MHz, Mid Channel, 64QAM, Conducted Power(dBm)



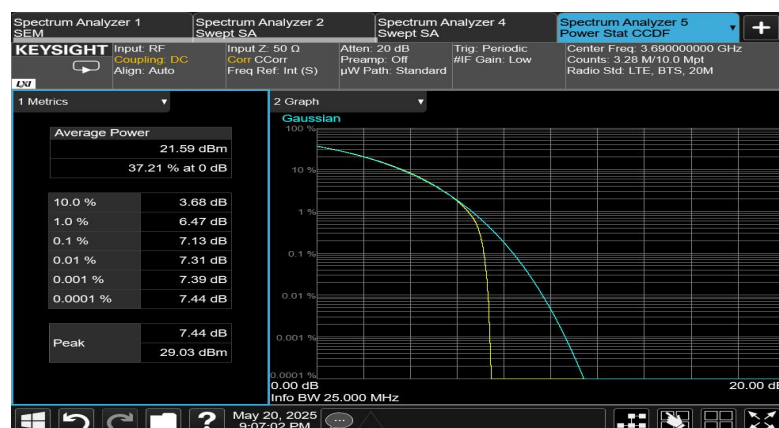
Port 3, 20MHz, Mid Channel, 64QAM, Conducted PSD(dBm/10MHz)



Port 3, 20MHz, Mid Channel, 64QAM, Conducted PSD(dBm/MHz)



Port 3, 20MHz, Top Channel, 64QAM, PAPR



A.2 Occupied Bandwidth

A.2.1 Reference

FCC CFR 47 Part 96, Clause 96.41(e)

FCC CFR 47 Part 2, Clause 2.1049

A.2.2 Method of Measurements

The EUT was set to transmit at maximum power and testing was carried out on bottom, middle and top channels. Using the Occupied Bandwidth measurement function in the spectrum analyzer, the 26dB bandwidth was measured in accordance with ANSI 63.26.

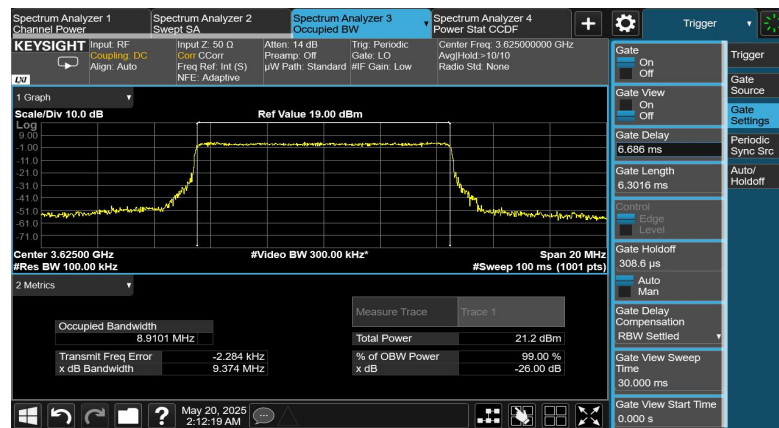
The measurement method is from ANSI 63.26:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

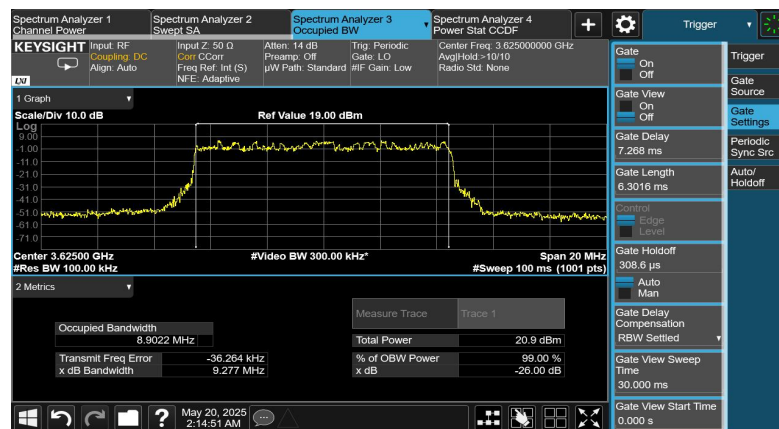
A.2.3 Measurement result

Port	Channel Position	BW(MHz)	99% Bandwidth (MHz)				26dB Bandwidth (MHz)			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
3	Middle	10	8.91	8.90	8.91	8.91	9.37	9.28	9.25	9.29
		20	17.81	17.80	17.84	17.82	18.46	18.44	18.43	18.44

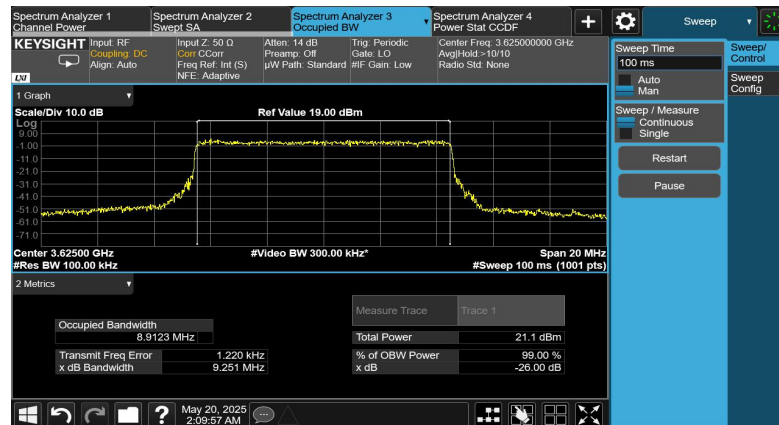
Port 1, 10MHz, Mid Channel, QPSK



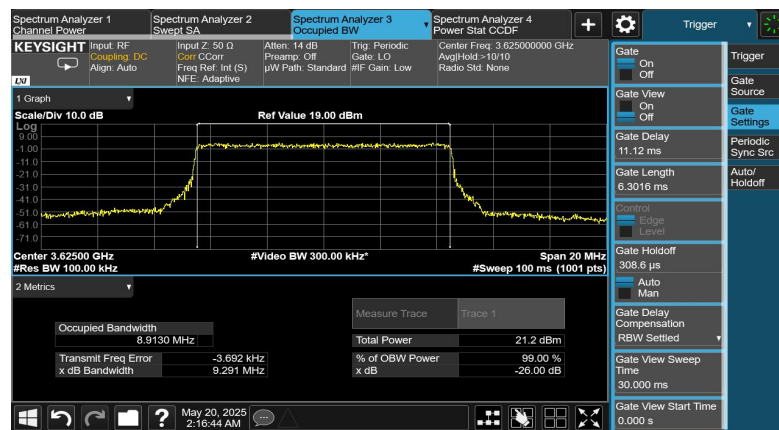
Port 1, 10MHz, Mid Channel, 16QAM



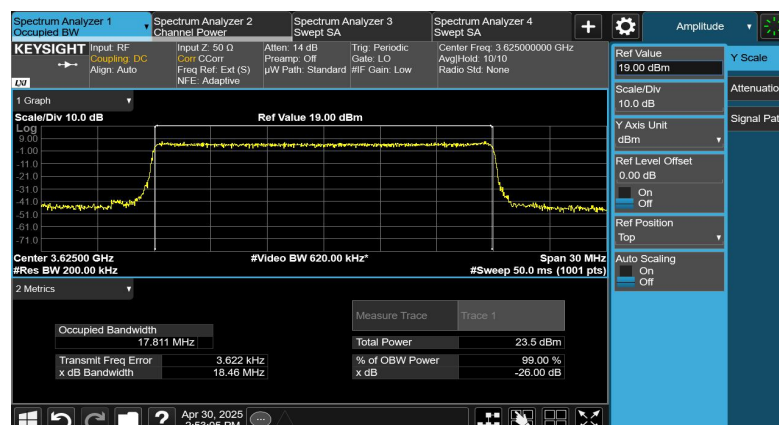
Port 1, 10MHz, Mid Channel, 64QAM



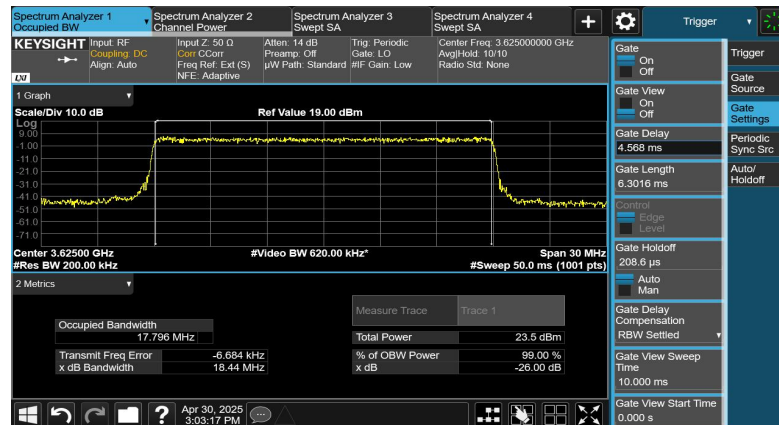
Port 1, 10MHz, Mid Channel, 256QAM



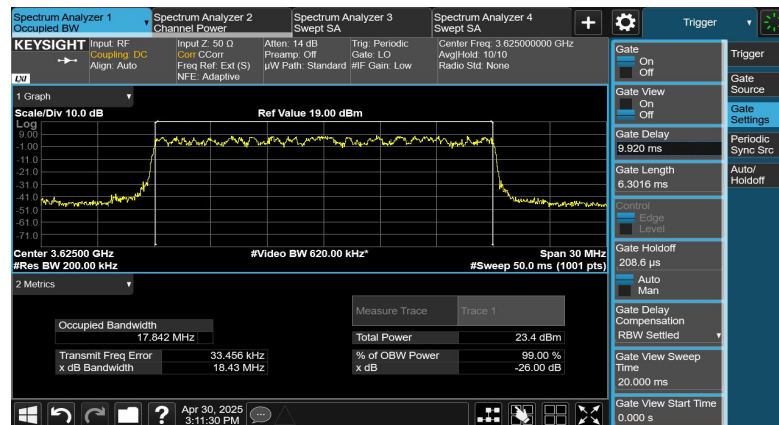
Port 1, 20MHz, Mid Channel, QPSK



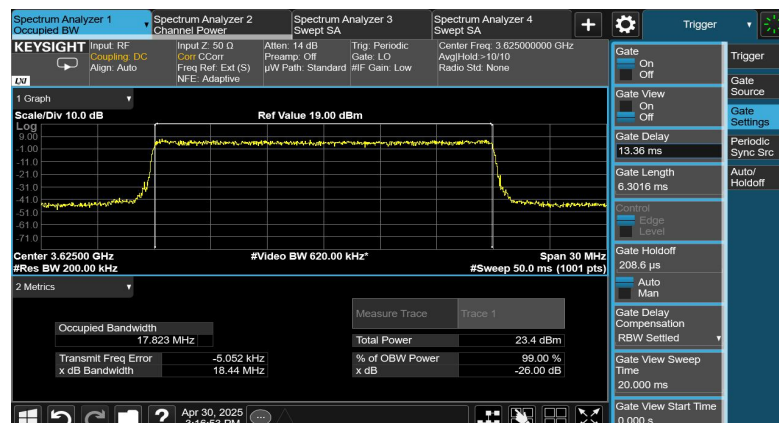
Port 1, 20MHz, Mid Channel, 16QAM



Port 1, 20MHz, Mid Channel, 64QAM



Port 1, 20MHz, Mid Channel, 256QAM



A.3 Transmitter unwanted emissions at Band Edge

A.3.1 Reference

FCC CFR 47 Part 96, Clause 96.41(e)

FCC CFR 47 Part 2, Clause 2.1051

A.3.2 Method of measurement

For channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth shall not exceed -13dBm/MHz within 0–10 megahertz above the upper SAS-assigned channel edge and within 0–10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dBm/MHz. The conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

In the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed.

For MIMO mode configurations, the limit was adjusted with a correction of -3.01dB [10Log(1/2)] by using the Measure and Add 10Log(N) dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports.

A.3.3 Measurement limit

0-10MHz from channel edge: $\leq -16.01\text{dBm/MHz}$

>10MHz from channel edge: $\leq -28.01\text{dBm/MHz}$

3530MHz-3540MHz and 3710MHz-3720MHz: $\leq -28.01\text{dBm/MHz}$

below 3530 MHz and above 3720 MHz: $\leq -43.01\text{dBm/MHz}$