

TEST REPORT



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1. Report No : DRTFCC2302-0009

2. Customer

- Name (FCC) : LG Electronics USA / Name (IC) : LG ELECTRONICS INC.
- Address (FCC) : 111 Sylvan Avenue North Building Englewood Cliffs New Jersey United States 07632
Address (IC) : 222, LG-ro, Jinwi-myeon Pyeongtaek-si, Gyeonggi-do 451-713 Korea (Republic Of)

3. Use of Report : FCC & IC Certification

4. Product Name / Model Name : NAD module / TM15FNNATY0
FCC ID : BEJTM15FNNATY0
IC : 2703H-TM15FNNATY0

5. FCC Regulation(s): Part 22, 24, 27

IC Standard(s): RSS-Gen Issue 5, 130 Issue 2, 132 Issue 4, 133 Issue 6, 139 Issue 4

Test Method used: KDB971168 D01v03, ANSI/TIA-603-E-2016, ANSI C63.26-2015

6. Date of Test : 2022.12.26 ~ 2023.02.22

7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

8. Testing Environment : See appended test report.

9. Test Result : Refer to the attached Test Result

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

This test report is not related to KOLAS accreditation.

Affirmation	Tested by	Technical Manager
	Name : JaeHyeok Bang (Signature)	Name : JaeJin Lee (Signature)

2023 . 02 . 24 .

Dt&C Co., Ltd.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

Test Report Version

Test Report No.	Date	Description	Revised by	Reviewed by
DRTFCC2302-0009	Feb. 24, 2023	Initial issue	JaeHyeok Bang	JaeJin Lee

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1. GENERAL INFORMATION

FCC Classification	PCS Licensed Transmitter (PCB)
FCC ID	BEJTM15FNNATY0
IC	2703H-TM15FNNATY0
Product Name	NAD module
Model Name	TM15FNNATY0
Add Model Name	-
PMN(Product Marketing Name)	TM15FNNATY0
FVIN(Firmware Version Identification Number)	5G.NAD.06a
EUT Serial Number	No specified
Supplying power	DC 3.90 V
Waveform	CP-OFDM, DFT-S-OFDM
Modulation type	$\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM
Channel Bandwidth(MHz)	NR Band n12: 15, 10, 5 NR Band n5: 20, 15, 10, 5 NR Band n66: 40, 20, 15, 10, 5 NR Band n2: 20, 15, 10, 5
Antenna Information	Antenna Type: PIFA Antenna Gain(including path loss between conducted test feeding point and antenna feeding point) ANT1: -1.15 dBi (n12), -1.82 dBi (n5), 0.18 dBi (n66), 1.88 dBi (n2) ANT2: -1.43 dBi (n12), -0.01 dBi (n5), -0.55 dBi (n66), 0.17 dBi (n2)

NR Frequency Band	Channel Bandwidth (MHz)	Modulation	TX Frequency (MHz)	Emission Designator	Conducted Output Power		ERP	
					Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
n12	15	$\pi/2$ BPSK	706.5 ~ 708.5	13M4G7D	24.51	0.282	22.38	0.173
n12	15	QPSK	706.5 ~ 708.5	13M4G7D	24.35	0.272	22.22	0.167
n12	15	16QAM	706.5 ~ 708.5	13M4W7D	24.34	0.272	21.39	0.138
n12	15	64QAM	706.5 ~ 708.5	13M4W7D	22.39	0.173	20.04	0.101
n12	15	256QAM	706.5 ~ 708.5	13M4W7D	20.28	0.107	17.98	0.063
n12	10	$\pi/2$ BPSK	704 ~ 711	8M92G7D	24.21	0.264	22.05	0.160
n12	10	QPSK	704 ~ 711	8M96G7D	24.13	0.259	21.86	0.153
n12	10	16QAM	704 ~ 711	8M93W7D	23.62	0.230	20.85	0.122
n12	10	64QAM	704 ~ 711	8M91W7D	21.92	0.156	19.38	0.087
n12	10	256QAM	704 ~ 711	8M94W7D	19.76	0.095	17.68	0.059
n12	5	$\pi/2$ BPSK	701.5 ~ 713.5	4M48G7D	24.59	0.288	22.37	0.173
n12	5	QPSK	701.5 ~ 713.5	4M49G7D	24.39	0.275	22.31	0.170
n12	5	16QAM	701.5 ~ 713.5	4M47W7D	23.86	0.243	21.44	0.139
n12	5	64QAM	701.5 ~ 713.5	4M47W7D	22.12	0.163	19.74	0.094
n12	5	256QAM	701.5 ~ 713.5	4M49W7D	20.66	0.116	18.24	0.067
n5	20	$\pi/2$ BPSK	834 ~ 839	17M8G7D	24.14	0.259	21.39	0.138
n5	20	QPSK	834 ~ 839	17M8G7D	24.18	0.262	21.13	0.130
n5	20	16QAM	834 ~ 839	17M8W7D	23.69	0.234	20.24	0.106
n5	20	64QAM	834 ~ 839	17M8W7D	22.00	0.158	18.80	0.076
n5	20	256QAM	834 ~ 839	17M8W7D	20.08	0.102	16.95	0.050
n5	15	$\pi/2$ BPSK	831.5 ~ 841.5	13M4G7D	24.09	0.256	21.36	0.137
n5	15	QPSK	831.5 ~ 841.5	13M4G7D	24.24	0.265	20.98	0.125
n5	15	16QAM	831.5 ~ 841.5	13M4W7D	23.20	0.209	20.07	0.102
n5	15	64QAM	831.5 ~ 841.5	13M4W7D	21.58	0.144	18.78	0.076
n5	15	256QAM	831.5 ~ 841.5	13M4W7D	20.07	0.102	16.78	0.048
n5	10	$\pi/2$ BPSK	829 ~ 844	8M94G7D	24.09	0.256	21.14	0.130
n5	10	QPSK	829 ~ 844	8M96G7D	24.10	0.257	21.05	0.127
n5	10	16QAM	829 ~ 844	8M92W7D	23.08	0.203	20.02	0.100
n5	10	64QAM	829 ~ 844	8M92W7D	21.30	0.135	19.10	0.081
n5	10	256QAM	829 ~ 844	8M92W7D	19.57	0.091	16.76	0.047
n5	5	$\pi/2$ BPSK	826.5 ~ 846.5	4M48G7D	24.01	0.252	20.94	0.124
n5	5	QPSK	826.5 ~ 846.5	4M47G7D	24.05	0.254	20.88	0.122
n5	5	16QAM	826.5 ~ 846.5	4M48W7D	23.51	0.224	19.72	0.094
n5	5	64QAM	826.5 ~ 846.5	4M49W7D	21.89	0.155	18.79	0.076
n5	5	256QAM	826.5 ~ 846.5	4M47W7D	20.38	0.109	16.42	0.044

NR Frequency Band	Channel Bandwidth (MHz)	Modulation	TX Frequency (MHz)	Emission Designator	Conducted Output Power		EIRP	
					Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
n66	40	$\pi/2$ BPSK	1 730 ~ 1 760	38M4G7D	24.41	0.276	27.92	0.619
n66	40	QPSK	1 730 ~ 1 760	38M4G7D	24.21	0.264	27.73	0.593
n66	40	16QAM	1 730 ~ 1 760	38M4W7D	23.44	0.221	27.21	0.526
n66	40	64QAM	1 730 ~ 1 760	38M4W7D	21.83	0.152	25.19	0.330
n66	40	256QAM	1 730 ~ 1 760	38M4W7D	19.78	0.095	23.36	0.217
n66	20	$\pi/2$ BPSK	1 720 ~ 1 770	17M9G7D	24.17	0.261	28.17	0.656
n66	20	QPSK	1 720 ~ 1 770	17M9G7D	24.16	0.261	27.89	0.615
n66	20	16QAM	1 720 ~ 1 770	17M9W7D	23.13	0.206	26.90	0.490
n66	20	64QAM	1 720 ~ 1 770	17M9W7D	21.66	0.147	25.82	0.382
n66	20	256QAM	1 720 ~ 1 770	17M9W7D	19.86	0.097	23.65	0.232
n66	15	$\pi/2$ BPSK	1 717.5 ~ 1 772.5	13M4G7D	24.09	0.256	28.13	0.650
n66	15	QPSK	1 717.5 ~ 1 772.5	13M4G7D	24.35	0.272	27.93	0.621
n66	15	16QAM	1 717.5 ~ 1 772.5	13M4W7D	23.37	0.217	26.95	0.495
n66	15	64QAM	1 717.5 ~ 1 772.5	13M4W7D	21.62	0.145	25.44	0.350
n66	15	256QAM	1 717.5 ~ 1 772.5	13M4W7D	19.85	0.097	23.70	0.234
n66	10	$\pi/2$ BPSK	1 715 ~ 1 775	8M93G7D	24.29	0.269	27.87	0.612
n66	10	QPSK	1 715 ~ 1 775	8M95G7D	24.07	0.255	27.45	0.556
n66	10	16QAM	1 715 ~ 1 775	8M94W7D	23.34	0.216	26.98	0.499
n66	10	64QAM	1 715 ~ 1 775	8M96W7D	21.65	0.146	25.21	0.332
n66	10	256QAM	1 715 ~ 1 775	8M93W7D	19.57	0.091	23.48	0.223
n66	5	$\pi/2$ BPSK	1 712.5 ~ 1 777.5	4M48G7D	24.43	0.277	27.96	0.625
n66	5	QPSK	1 712.5 ~ 1 777.5	4M48G7D	24.26	0.267	27.47	0.558
n66	5	16QAM	1 712.5 ~ 1 777.5	4M48W7D	23.31	0.214	26.89	0.489
n66	5	64QAM	1 712.5 ~ 1 777.5	4M47W7D	22.03	0.160	25.46	0.352
n66	5	256QAM	1 712.5 ~ 1 777.5	4M47W7D	19.71	0.094	23.49	0.223
n2	20	$\pi/2$ BPSK	1 860 ~ 1 900	17M9G7D	24.18	0.262	27.78	0.600
n2	20	QPSK	1 860 ~ 1 900	17M9G7D	24.09	0.256	27.17	0.521
n2	20	16QAM	1 860 ~ 1 900	17M9W7D	23.55	0.226	25.93	0.392
n2	20	64QAM	1 860 ~ 1 900	17M8W7D	21.94	0.156	24.85	0.305
n2	20	256QAM	1 860 ~ 1 900	17M8W7D	19.72	0.094	22.91	0.195
n2	15	$\pi/2$ BPSK	1 857.5 ~ 1 902.5	13M4G7D	24.45	0.279	26.34	0.431
n2	15	QPSK	1 857.5 ~ 1 902.5	13M4G7D	24.13	0.259	26.31	0.428
n2	15	16QAM	1 857.5 ~ 1 902.5	13M4W7D	23.30	0.214	25.13	0.326
n2	15	64QAM	1 857.5 ~ 1 902.5	13M4W7D	21.71	0.148	23.54	0.226
n2	15	256QAM	1 857.5 ~ 1 902.5	13M4W7D	19.75	0.094	21.72	0.149
n2	10	$\pi/2$ BPSK	1 855 ~ 1 905	8M91G7D	24.24	0.265	26.39	0.436
n2	10	QPSK	1 855 ~ 1 905	8M95G7D	24.26	0.267	26.72	0.470
n2	10	16QAM	1 855 ~ 1 905	8M92W7D	23.25	0.211	25.60	0.363
n2	10	64QAM	1 855 ~ 1 905	8M95W7D	21.78	0.151	24.06	0.255
n2	10	256QAM	1 855 ~ 1 905	8M94W7D	19.64	0.092	23.44	0.221
n2	5	$\pi/2$ BPSK	1 852.5 ~ 1 907.5	4M47G7D	24.71	0.296	26.30	0.427
n2	5	QPSK	1 852.5 ~ 1 907.5	4M47G7D	24.13	0.259	26.37	0.434
n2	5	16QAM	1 852.5 ~ 1 907.5	4M48W7D	23.57	0.228	25.56	0.360
n2	5	64QAM	1 852.5 ~ 1 907.5	4M48W7D	21.80	0.151	24.32	0.270
n2	5	256QAM	1 852.5 ~ 1 907.5	4M48W7D	20.50	0.112	21.92	0.156

2. INTRODUCTION

2.1. EUT DESCRIPTION

This device supports the following capabilities:

Multi-Band LTE, LTE up-link carrier aggregation and 5G NR(FR1)

5G NR supports SCS 15 kHz for FDD Band and SCS 30 kHz for TDD Band.

2.2. TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+21 °C ~ +26 °C
▪ Relative Humidity	42 % ~ 46 %

2.3. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.4. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

Parameter	Measurement uncertainty
Radiated Disturbance (Below 1 GHz)	4.8 dB (The confidence level is about 95 %, $k = 2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.0 dB (The confidence level is about 95 %, $k = 2$)
Radiated Disturbance (Above 18 GHz)	5.2 dB (The confidence level is about 95 %, $k = 2$)

2.5. TEST FACILITY

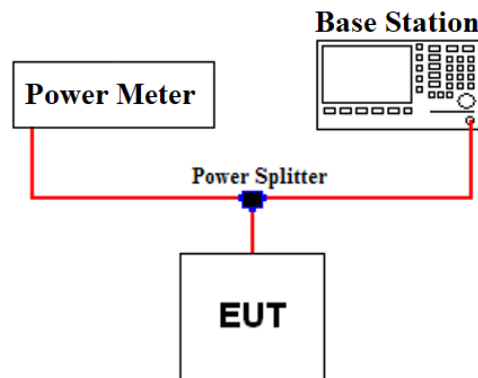
Dt&C Co., Ltd.		
The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042.		
The test site complies with the requirements of Part 2.948 according to ANSI C63.4-2014.		
- FCC & IC MRA Designation No. : KR0034		
- ISED#: 5740A		
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3. DESCRIPTION OF TESTS

3.1. Maximum Output Power

Conducted Output Power

Test Set-up



Limit

- NA

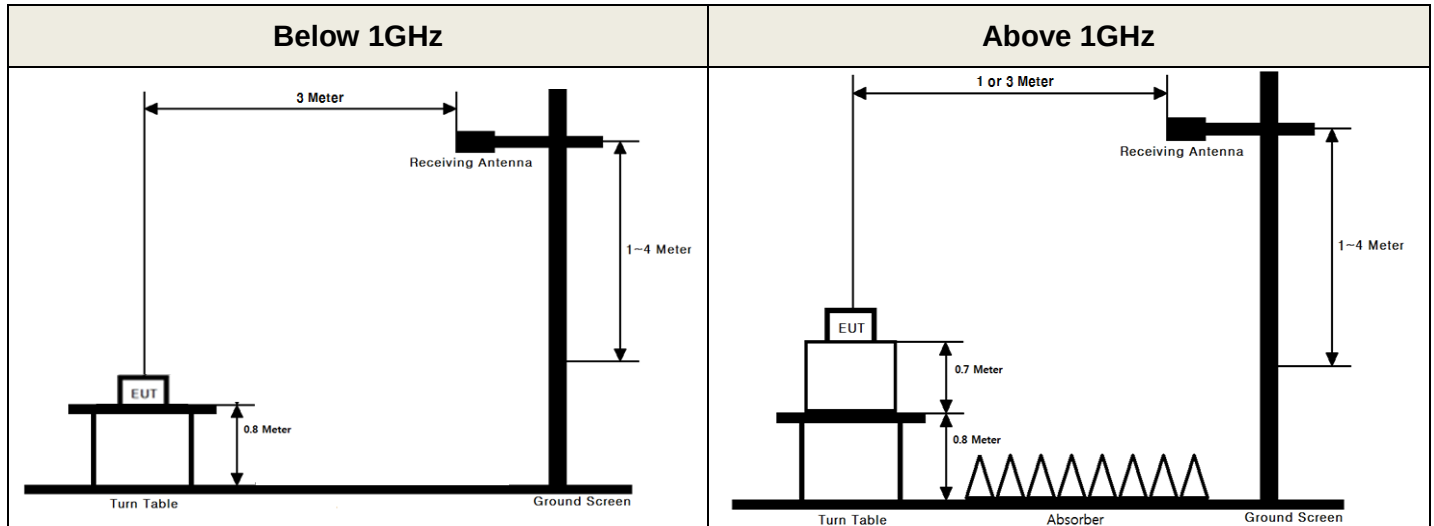
Test Procedure

- KDB971168 D01v03 - Section 5.2.4
- ANSI C63.26-2015 – Section 5.2.4.2

The average conducted output powers were measured using an average power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

ERP & EIRP (Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up



These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed 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 1 GHz, the absorbers are removed.

Test Procedure

- ANSI/TIA-603-E-2016 - Section 2.2.17
- KDB971168 D01v03 - Section 5.2.2
- ANSI C63.26-2015 – Section 5.2.4.4.1

Test setting

1. Set span to 2 x to 3 x the OBW.
2. Set RBW = 1 % to 5 % of the OBW.
3. Set VBW $\geq$ 3 x RBW.
4. Set number of points in sweep $\geq$ 2 x span / RBW.
5. Sweep time:
 - 1) Set = auto-couple, or
 - 2) Set $\geq$ [10 x (number of points in sweep) x (transmission period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
6. Detector = power averaging (rms).
7. If the EUT can be configured to transmit continuously, then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).
9. 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 multiple symbols, 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.

10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

The receiver antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured.

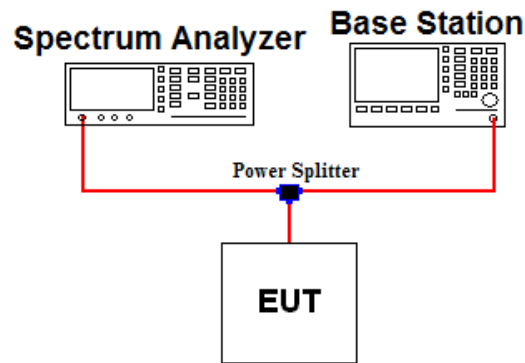
The ERP/EIRP is calculated using the following formula:

ERP/EIRP = The conducted power at the substitute antenna's terminal [dBm] + Substitute Antenna gain [dBd for ERP , dBi for EIRP]

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn antenna and an isotropic antenna are taken into consideration.

3.2. PEAK TO AVERAGE RATIO

Test set-up



Test Procedure

- KDB971168 D01v03 - Section 5.7.2
- ANSI C63.26-2015 – Section 5.2.3.4

A peak to average ratio measurement is performed at the conducted port of the EUT.

The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The present of time the signal spends at or above the level defines the probability for that particular power level.

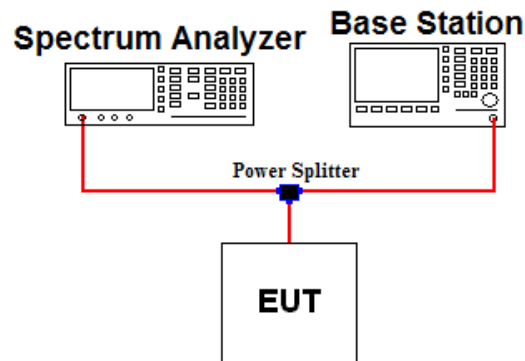
Test setting

The spectrum Analyzer`s CCDF measurement function is enabled.

1. Set resolution/measurement bandwidth $\geq$ OBW or specified reference bandwidth.
2. Set the number of counts to a value that stabilizes the measured CCDF curve.
3. Set the measurement interval as follows:
 - 1) For continuous transmissions, set to the greater of $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$ or 1 ms.
 - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.
 - 3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
4. Record the maximum PAPR level associated with a probability of 0.1 %.
5. The peak power level is calculated form the sum of the PAPR value from step d) to the measured average power.

3.3. OCCUPIED BANDWIDTH

Test set-up



Test Procedure

- KDB971168 D01v03 - Section 4.3
- ANSI C63.26-2015 – Section 5.4.4

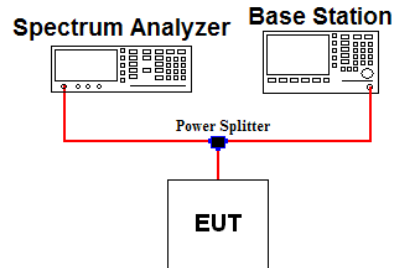
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

Test setting

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. $RBW = 1\% \sim 5\%$ of the expected OBW & $VBW \geq 3 \times RBW$
3. Detector = Peak
4. Trance mode = Max hold
5. Sweep = Auto couple
6. The trace was allowed to stabilize
7. If necessary, step 2 ~ 6 were repeated after changing the RBW such that it would be within $1\% \sim 5\%$ of the 99 % occupied bandwidth observed in step 6.

3.4. BAND EDGE EMISSIONS AT ANTENNA TERMINAL

Test set-up



Test Procedure

- KDB971168 D01v03 - Section 6
- ANSI C63.26-2015 – Section 5.7

All out of band emissions are measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its lowest and highest channel with all bandwidths, modulations and RB configurations.

Test setting

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW $\geq 1\%$ of the emission bandwidth or Specified bandwidth
4. VBW $\geq 3 \times$ RBW
5. Detector = RMS & Trace mode = Max hold
6. Sweep time = Auto couple or 1 s for band edge
7. Number of sweep point $\geq 2 \times$ span / RBW
8. The trace was allowed to stabilize

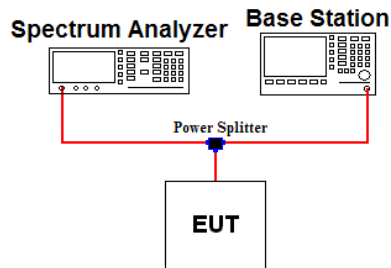
Note 1: Per Part 22.917(b)(1) / 24.238(b) / 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions 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 emission are attenuated at least 26 dB below the transmitter power.

Note 2: Per Part 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

3.5. SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

Test set-up



Test Procedure

- KDB971168 D01v03 - Section 6
- ANSI C63.26-2015 – Section 5.7

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its low, middle, high channel with all bandwidths, modulations and RB configurations. The spectrum is scanned from 9 kHz up to a frequency including its 10th harmonic.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB.

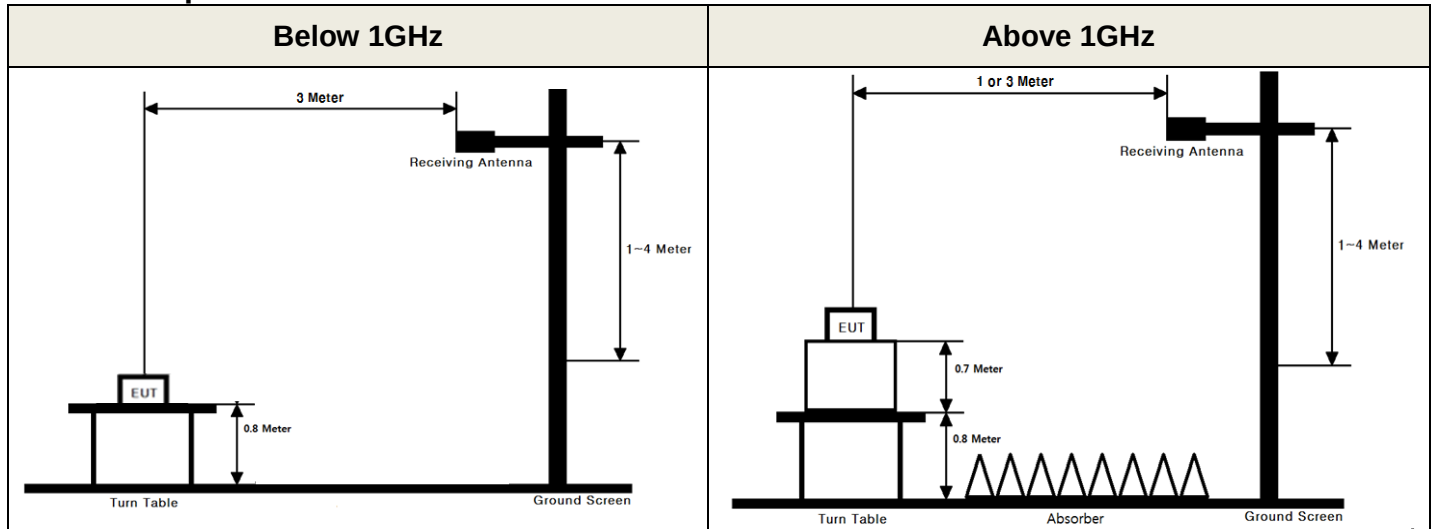
Test setting

1. RBW = 100 kHz(Below 1 GHz) or 1 MHz(Above 1 GHz) & VBW $\geq 3 \times$ RBW (Refer to Note 1)
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point $\geq 2 \times$ span / RBW
5. The trace was allowed to stabilize

Note 1: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1GHz.

3.6. UNDESIRABLE EMISSIONS

Test Set-up



These measurements were performed at 3 test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5 meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1 GHz absorbers are placed 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 1 GHz, the absorbers are removed.

Test Procedure

- KDB971168 D01v03 - Section 6
- ANSI C63.26-2015 – Section 5.5
- ANSI/TIA-603-E-2016 - Section 2.2.12

Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW $\geq 3 \times$ RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point $\geq 2 \times$ span / RBW
5. The trace was allowed to stabilize

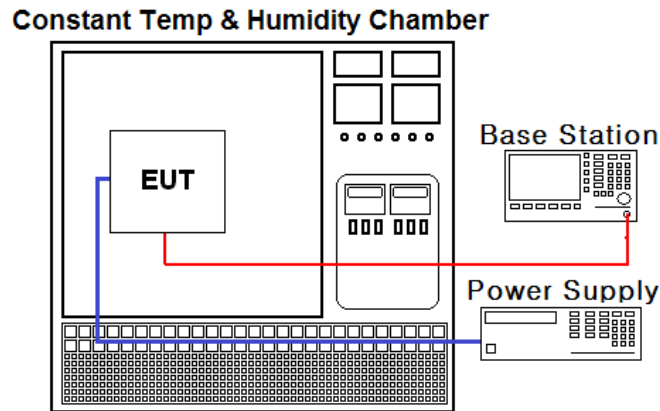
The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration. This measurement was performed with the EUT oriented in 3 orthogonal axis.

3.7. FREQUENCY STABILITY

Test Set-up



Test Procedure

- KDB971168 D01v03 - Section 9
- ANSI/TIA-603-E-2016

The frequency stability of the transmitter is measured by:

a.) **Temperature:**

The temperature is varied from -30 °C to +50 °C using an environmental chamber.

b.) **Primary Supply Voltage:**

The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification:

Part 24.235, Part 27.54, RSS-130[4.5], RSS-132[5.4], RSS-139[5.4]: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Part 22.355: The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

RSS-133[4.5]: The carrier frequency shall not depart from the reference frequency, in excess of ± 2.5 ppm for mobile stations and ± 1.0 ppm for base stations.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature.
(20 °C to provide a reference)
2. The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C.
A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	22/12/16	23/12/16	MY50410163
Spectrum Analyzer	KEYSIGHT	N9030B	22/12/16	23/12/16	MY55480168
Spectrum Analyzer	Agilent Technologies	N9020A	22/06/24	23/06/24	US47360812
DC power supply	Agilent Technologies	66332A	22/06/24	23/06/24	US37474125
DC power supply	DIGITAL	DPR-303D	22/06/24	23/06/24	2090097
Multimeter	FLUKE	17B+	22/12/16	23/12/16	36390701WS
Resistive Divider	Clear Microwave	D240	22/09/27	23/09/27	1
Resistive Divider	Clear Microwave	D240	22/09/27	23/09/27	2
Temp & Humi	SJ Science	SJ-TH-S50	22/03/08	23/03/08	U5542113
Radio Communication Analyzer	KEYSIGHT	E7515B	22/06/24	23/06/24	MY60192461
Radio Communication Analyzer	KEYSIGHT	E7515B	22/12/16	23/12/16	MY58300723
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2496A MA2490A	22/12/16	23/12/16	1338004 1249303
Attenuator	Aeroflex/Weinschel	86-20-11	22/06/24	23/06/24	432
Thermohygrometer	BODYCOM	BJ5478	22/12/16	23/12/16	120612-1
Thermohygrometer	BODYCOM	BJ5478	22/12/16	23/12/16	120612-2
Signal Generator	Rohde Schwarz	SMBV100A	22/12/16	23/12/16	255571
Signal Generator	ANRITSU	MG3695C	22/12/16	23/12/16	173501
Loop Antenna	ETS-Lindgren	6502	22/12/16	24/12/16	00226186
Bilog Antenna	Schwarzbeck	VULB 9160	22/12/16	23/12/16	3362
Dipole Antenna	Schwarzbeck	UHA9105	22/12/16	24/12/16	2262
HORN ANT	ETS	3117	22/12/16	23/12/16	00140394
HORN ANT	A.H.Systems	SAS-574	22/06/24	23/06/24	155
PreAmplifier	H.P	8447D	22/12/16	23/12/16	2944A07774
PreAmplifier	Agilent	8449B	22/06/24	23/06/24	3008A02108
PreAmplifier	A.H.Systems Inc.	PAM-1840VH	22/06/24	23/06/24	163
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	22/06/24	23/06/24	7
High-pass filter	Wainwright	WHKX10-2838-3300-18000-60SS	22/06/24	23/06/24	2
High-pass filter	Wainwright	WHKX6-6320-8000-26500-40CC	22/06/24	23/06/24	2
Cable	HUBER+SUHNER	SUCOFLEX100	23/01/04	24/01/04	M-1
Cable	HUBER+SUHNER	SUCOFLEX100	23/01/04	24/01/04	M-2
Cable	Junkosah	MWX241/B	23/01/04	24/01/04	M-3
Cable	Junkosah	MWX221	23/01/04	24/01/04	M-4
Cable	Junkosah	MWX221	23/01/04	24/01/04	M-5
Cable	DTNC	Cable	23/01/04	24/01/04	M-6
Cable	JUNFLON	J12J101757-00	23/01/04	24/01/04	M-7
Cable	HUBER+SUHNER	SUCOFLEX104	23/01/04	24/01/04	M-8
Cable	HUBER+SUHNER	SUCOFLEX106	23/01/04	24/01/04	M-9
Cable	Junkosah	MWX342	23/01/04	24/01/04	RFC-72
Cable	A.H.System Inc	SAC-40G-1.5	23/01/04	24/01/04	RFC-104

Note1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017.

Note2: The cable is not a regular calibration item, so it has been calibrated by Dt&C itself.

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Status Note 1
2.1046	-	Conducted Output Power	N/A	Conducted	C
2.1049	RSS-Gen[6.7]	Occupied Bandwidth	N/A		C
24.232(d) 27.50(d.5)	RSS-130 [4.6] RSS-132 [5.4] RSS-133 [6.4] RSS-139 [5.5]	Peak to Average Ratio	< 13 dB		C
2.1051 22.917(a) 24.238(a) 27.53(g) 27.53(h)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [5.6]	Band Edge / Conducted Spurious Emissions	> 43 + 10log ₁₀ (P) dB at Band edge and for all out-of-band emissions		C
2.1055 22.355 24.235 27.54	RSS-130 [4.5] RSS-132 [5.3] RSS-133 [6.3] RSS-139 [5.4]	Frequency Stability	Refer to section 3.7 of this report.		C
27.50(c.9)	RSS-130 [4.6]	Radiated Output Power (n12)	For mobile equipment: < 30 Watts max. ERP	Radiated	C Note2
22.913(a.5)	RSS-132 [5.4]	Radiated Output Power (n5)	For mobile equipment: < 7 Watts max. ERP		C Note2
27.50(d.4)	RSS-139 [5.5]	Radiated Output Power (B66)	For mobile equipment: < 1 Watts max. EIRP		C Note2
24.232(c)	RSS-133 [6.4]	Radiated Output Power (n2)	For mobile equipment: < 2 Watts max. EIRP		C Note2
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [5.6]	Undesirable Emissions	> 43 + 10log ₁₀ (P) dB for all out-of-band emissions		C Note2

Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable

Note 2: This test item was performed in three orthogonal EUT positions and the worst case data was reported.

This device has the antenna switch that allows for radiated transmission from one of two antennas for the LTE FDD Band. Radiated emissions were performed on both antenna and the worst case data was reported.

Note 3: The DFT-s-OFDM and CP-OFDM waveforms were investigated, and worst case(DFT-s-OFDM) configuration results are reported.

6. SAMPLE CALCULATION

A. Emission Designator

NR Band n12($\pi/2$ BPSK)

Emission Designator = **13M4G7D**

OBW = 13.418 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

NR Band n12(QPSK)

Emission Designator = **13W4G7D**

OBW = 13.433 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

NR Band n12(16QAM)

Emission Designator = **13M4W7D**

OBW = 13.437 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

NR Band n12(64QAM)

Emission Designator = **13M4W7D**

OBW = 13.402 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

NR Band n12(256QAM)

Emission Designator = **13M4W7D**

OBW = 13.373 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

B. For substitution method

- 1) The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1 GHz respectively above ground.
- 2) The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
- 3) During the test, the turn table is rotated until the maximum signal is found.
- 4) Record the field strength meter's level. (ex. Spectrum reading level is -8.5 dBm)
- 5) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 6) Increase the signal generator output till the field strength meter's level is equal to the item (4).
(ex. Signal generator level is -18.04 dBm)
- 7) The gain of the cable and amplifier between the signal generator and terminals of substituted antenna is 46.92 dB at test frequency.
- 8) Record the level at substituted antenna terminal. (ex. 28.88dBm)
- 9) The result is calculated as below;

$$\text{EIRP(dBm)} = \text{LEVLE@ANTENNA TERMINAL} + \text{TX Antenna Gain (dBi)}$$

$$\text{ERP(dBm)} = \text{LEVLE@ANTENNA TERMINAL} + \text{TX Antenna Gain (dBd)}$$

$$\text{Where, TX Antenna Gain (dBd)} = \text{TX Antenna Gain (dBi)} - 2.15 \text{ dB}$$

7. TEST DATA

7.1. OCCUPIED BANDWIDTH

- Plots of the EUT's Occupied Bandwidth are shown in Clause 8.1

7.2. PEAK TO AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown in Clause 8.2

7.3. BAND EDGE EMISSIONS (Conducted)

- Plots of the EUT's Band Edge Emissions are shown in Clause 8.3

7.4. SPURIOUS AND HARMONICS EMISSIONS (Conducted)

- Plots of the EUT's Spurious Emissions are shown in Clause 8.4

7.5. Conducted Output Power

- Test Notes

- 1) This is device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the below table.
- 2) Unit: dBm

7.5.1. NR Band n12

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size & Allocation								
			1 RB					MID RB			Full RB
			edge left	inner left	Mid	inner right	edge right	Low	Mid	High	
15	706.5	$\pi/2$ BPSK	23.56	24.41	24.14	23.78	22.66	23.49	24.36	23.33	23.43
		QPSK	23.24	24.29	24.17	23.97	22.88	23.44	24.35	23.28	23.33
		16QAM	22.32	23.30	23.11	22.99	21.99	22.50	23.38	22.35	22.34
		64QAM	21.82	21.76	21.67	21.52	21.54	21.92	21.89	21.79	21.79
		256QAM	20.28	20.27	20.20	20.15	20.11	19.85	19.83	19.79	19.77
	708.5	$\pi/2$ BPSK	23.46	24.51	24.43	24.03	23.00	23.40	24.28	23.23	23.30
		QPSK	23.22	24.22	24.16	23.77	22.77	23.34	24.30	23.25	23.33
		16QAM	23.32	24.34	24.18	23.74	22.71	22.41	23.25	22.12	22.31
		64QAM	22.39	22.38	22.24	21.85	21.88	22.06	21.96	21.79	21.89
		256QAM	19.81	19.83	19.66	19.27	19.31	19.98	19.86	19.79	19.81
10	704	$\pi/2$ BPSK	22.71	24.08	23.94	23.68	22.52	23.28	24.21	23.13	23.25
		QPSK	23.03	24.03	23.97	23.85	22.91	23.14	24.12	23.08	23.19
		16QAM	22.11	23.06	22.99	22.94	21.98	22.17	23.11	22.15	22.20
		64QAM	21.27	21.27	21.28	21.20	21.17	21.60	21.58	21.56	21.63
		256QAM	19.54	19.56	19.55	19.51	19.51	19.76	19.72	19.69	19.73
	711	$\pi/2$ BPSK	23.04	24.20	24.12	23.68	22.49	23.12	24.01	22.92	22.98
		QPSK	23.24	24.13	24.13	23.87	22.93	23.15	24.08	22.95	23.05
		16QAM	22.67	23.62	23.54	23.30	22.21	22.28	23.21	21.99	21.94
		64QAM	21.92	21.86	21.74	21.51	21.55	21.71	21.59	21.45	21.69
		256QAM	19.74	19.76	19.69	19.52	19.49	19.65	19.52	19.43	19.62
5	701.5	$\pi/2$ BPSK	23.38	24.40	24.59	24.50	23.06	23.34	24.28	23.19	23.09
		QPSK	23.12	24.14	24.26	24.01	23.01	23.32	24.23	23.16	23.22
		16QAM	22.52	23.54	23.49	23.38	22.30	22.21	23.19	22.10	22.20
		64QAM	21.77	21.76	21.68	21.67	21.63	21.80	21.71	21.68	21.78
		256QAM	19.73	19.76	19.70	19.63	19.62	19.85	19.82	19.72	19.66
	707.5	$\pi/2$ BPSK	23.60	24.39	24.40	23.97	23.02	23.27	24.28	23.16	23.26
		QPSK	23.25	24.39	24.39	24.19	23.10	23.23	24.22	23.23	23.19
		16QAM	22.88	23.86	23.76	23.70	22.76	22.11	23.20	22.06	22.19
		64QAM	22.02	22.08	22.12	22.03	22.04	21.73	21.74	21.64	21.73
		256QAM	20.59	20.56	20.59	20.49	20.50	19.70	19.74	19.64	19.69
	713.5	$\pi/2$ BPSK	23.01	23.67	23.80	23.76	22.29	23.05	23.94	22.84	22.94
		QPSK	22.91	23.98	23.85	23.65	22.53	23.14	24.06	22.89	23.00
		16QAM	21.60	22.56	22.30	22.18	21.14	22.05	22.92	21.82	21.90
		64QAM	21.52	21.46	21.26	21.16	21.12	21.49	21.37	21.20	21.54
		256QAM	20.59	20.66	20.53	20.43	20.27	19.52	19.47	19.35	19.34

7.5.2. NR Band n5

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size & Allocation								
			1 RB					MID RB			Full RB
			edge left	inner left	Mid	inner right	edge right	Low	Mid	High	
20	834	π/2 BPSK	22.21	23.44	23.64	23.95	22.98	22.64	23.68	22.81	22.73
		QPSK	22.28	23.34	23.62	23.97	22.92	22.58	23.78	22.73	22.69
		16QAM	21.63	22.59	23.24	23.69	22.63	21.38	22.69	21.94	21.79
		64QAM	20.89	20.84	21.56	22.00	21.94	20.79	21.19	21.39	21.20
		256QAM	18.34	18.36	18.99	19.50	19.55	18.88	19.25	19.39	19.22
	836.5	π/2 BPSK	22.00	22.95	23.64	23.77	22.75	22.41	23.73	22.90	22.73
		QPSK	22.02	23.03	23.56	24.02	23.01	22.45	23.73	22.88	22.70
		16QAM	20.97	21.95	22.53	23.14	22.15	21.31	22.63	21.84	21.62
		64QAM	20.79	20.67	21.22	21.70	21.69	20.93	21.21	21.38	21.16
		256QAM	18.56	18.54	19.10	19.55	19.53	18.93	19.17	19.39	19.18
	839	π/2 BPSK	22.33	23.16	23.99	24.14	23.15	22.64	23.81	23.12	22.73
		QPSK	22.29	23.28	23.72	24.18	23.24	22.66	23.87	23.18	22.76
		16QAM	21.58	22.57	23.05	23.49	22.52	21.62	22.83	22.10	21.74
		64QAM	20.49	20.66	21.13	21.68	21.64	21.18	21.32	21.67	21.31
		256QAM	19.01	19.14	19.53	20.05	20.08	19.13	19.25	19.55	19.31
15	831.5	π/2 BPSK	21.70	22.93	23.45	23.59	22.65	22.20	23.26	22.58	22.36
		QPSK	22.24	23.26	23.61	24.08	22.97	22.12	23.33	22.51	22.39
		16QAM	20.90	21.91	22.24	22.60	21.55	21.09	22.27	21.57	21.40
		64QAM	20.59	20.62	21.06	21.27	21.29	20.67	20.85	21.11	20.90
		256QAM	18.63	18.58	18.92	19.29	19.32	18.62	18.89	19.12	18.88
	836.5	π/2 BPSK	21.66	22.71	23.29	23.65	22.78	22.36	23.54	22.68	22.55
		QPSK	22.16	23.17	23.57	23.88	22.86	22.37	23.53	22.69	22.55
		16QAM	21.04	22.11	22.44	22.81	21.75	21.29	22.48	21.67	21.59
		64QAM	20.83	20.80	21.16	21.54	21.49	20.75	20.88	21.03	21.00
		256QAM	18.79	18.84	19.20	19.50	19.51	18.89	19.05	19.23	19.03
	841.5	π/2 BPSK	22.63	23.62	23.81	24.09	23.26	22.78	23.86	23.14	22.93
		QPSK	22.70	23.71	23.96	24.24	23.27	22.76	23.90	23.13	22.88
		16QAM	21.62	22.59	22.76	23.20	22.09	21.65	22.76	21.99	21.90
		64QAM	21.05	21.01	21.20	21.58	21.57	21.20	21.38	21.53	21.27
		256QAM	19.25	19.25	19.53	20.07	19.81	19.14	19.29	19.50	19.24
10	829	π/2 BPSK	22.34	22.33	22.32	22.30	22.29	22.29	22.32	22.31	22.32
		QPSK	21.90	22.92	23.13	23.35	22.60	22.20	23.31	22.36	22.27
		16QAM	21.27	22.28	22.48	22.60	21.62	21.26	22.36	21.38	21.20
		64QAM	20.66	20.67	20.78	20.99	21.09	20.53	20.63	20.67	20.75
		256QAM	18.09	18.14	18.34	18.46	18.48	18.44	18.56	18.52	18.78
	836.5	π/2 BPSK	22.07	23.17	23.27	23.40	22.33	22.28	23.30	22.41	22.26
		QPSK	22.10	23.17	23.40	23.64	22.54	22.34	23.36	22.49	22.28
		16QAM	21.40	22.35	22.59	22.77	21.78	21.35	22.40	21.49	21.16
		64QAM	20.66	20.65	20.90	21.11	21.06	20.80	20.80	20.88	20.84
		256QAM	18.64	18.69	19.03	19.07	19.07	18.68	18.72	18.84	18.81
	844	π/2 BPSK	22.84	23.73	23.98	24.09	23.09	22.75	23.77	22.83	22.81
		QPSK	22.63	23.59	23.85	24.10	23.03	22.64	23.80	22.84	22.81
		16QAM	21.53	22.54	22.77	23.08	22.05	21.67	22.74	21.91	21.90
		64QAM	20.82	20.85	21.17	21.28	21.30	21.27	21.28	21.29	21.30
		256QAM	19.02	19.15	19.35	19.57	19.57	19.28	19.33	19.47	19.32

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size & Allocation								
			1 RB					MID RB			Full RB
			edge left	inner left	Mid	inner right	edge right	Low	Mid	High	
5	826.5	$\pi/2$ BPSK	21.56	22.80	22.99	22.93	21.93	21.94	22.96	21.96	21.93
		QPSK	21.62	22.73	22.87	22.81	21.76	21.97	22.98	21.95	21.97
		16QAM	20.27	21.28	21.33	21.32	20.38	20.91	21.98	20.87	20.81
		64QAM	20.21	20.26	20.25	20.29	20.34	20.31	20.34	20.31	20.54
		256QAM	19.49	19.44	19.51	19.55	19.71	18.34	18.35	18.33	18.46
	836.5	$\pi/2$ BPSK	22.37	23.43	23.69	23.74	22.52	22.36	23.43	22.45	22.39
		QPSK	22.44	23.38	23.48	23.52	22.52	22.42	23.40	22.50	22.37
		16QAM	21.27	22.34	22.38	22.43	21.47	21.44	22.43	21.56	21.44
		64QAM	21.03	21.05	21.11	21.13	21.17	20.80	20.86	20.96	20.88
		256QAM	19.09	19.10	19.25	19.22	19.27	19.03	19.04	19.16	18.91
	846.5	$\pi/2$ BPSK	23.14	23.86	24.01	23.82	22.87	22.85	23.90	23.02	22.84
		QPSK	22.85	24.05	24.03	23.87	22.88	22.87	23.85	22.95	22.79
		16QAM	22.48	23.43	23.36	23.51	22.56	21.83	22.79	21.87	21.78
		64QAM	21.68	21.69	21.59	21.89	21.86	21.32	21.32	21.49	21.38
		256QAM	20.21	20.26	20.23	20.33	20.38	19.36	19.35	19.35	19.30

7.5.3. NR Band n66

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size & Allocation								
			1 RB					MID RB			Full RB
			edge left	inner left	Mid	inner right	edge right	Low	Mid	High	
40	1 730	π/2 BPSK	22.80	23.89	24.06	23.97	22.76	23.00	24.13	23.14	23.18
		QPSK	22.74	23.89	24.09	23.99	22.86	22.97	24.19	23.13	23.14
		16QAM	21.84	22.97	23.21	23.09	21.95	22.05	23.19	22.10	22.07
		64QAM	21.19	21.22	21.54	21.31	21.31	21.46	21.55	21.51	21.58
		256QAM	19.52	19.53	19.31	19.72	19.49	19.33	19.47	19.56	19.54
	1 760	π/2 BPSK	23.27	24.41	23.90	23.45	22.50	23.00	23.85	22.63	22.91
		QPSK	23.20	24.21	23.83	23.61	22.54	23.03	23.86	22.67	22.84
		16QAM	22.26	23.44	23.13	22.78	21.75	21.88	22.70	21.54	21.78
		64QAM	21.80	21.83	21.44	21.20	21.19	21.50	21.31	21.12	21.29
		256QAM	19.44	19.49	19.34	18.83	18.81	19.40	19.24	19.03	19.12
20	1 720	π/2 BPSK	23.05	23.98	24.03	24.02	23.06	22.91	24.13	23.11	22.94
		QPSK	22.71	23.76	23.93	24.10	22.96	22.93	24.16	23.27	23.03
		16QAM	21.28	22.44	22.47	22.62	21.55	22.03	22.96	21.96	22.02
		64QAM	21.00	21.09	21.07	21.23	21.22	21.46	21.42	21.63	21.49
		256QAM	19.77	19.65	19.80	19.77	19.86	19.33	19.23	19.40	19.34
	1 745	π/2 BPSK	22.97	23.95	24.17	23.72	22.88	23.15	24.10	23.02	22.99
		QPSK	23.08	24.12	24.00	23.83	22.79	23.15	24.02	22.92	23.04
		16QAM	22.06	23.13	22.91	22.68	21.63	22.02	22.98	21.75	22.05
		64QAM	21.52	21.42	21.37	21.20	21.17	21.66	21.52	21.47	21.47
		256QAM	19.68	19.67	19.58	19.40	19.33	19.54	19.40	19.33	19.35
	1 770	π/2 BPSK	22.64	23.69	23.46	23.59	22.18	22.63	23.52	22.33	22.48
		QPSK	22.66	23.69	23.49	23.40	22.29	22.63	23.54	22.33	22.55
		16QAM	21.63	22.57	22.29	22.08	21.03	21.56	22.42	21.25	21.57
		64QAM	21.27	21.23	20.88	20.77	20.68	21.15	20.94	20.80	21.05
		256QAM	19.23	19.19	18.91	18.58	18.65	18.94	18.77	18.66	18.89
15	1 717.5	π/2 BPSK	22.93	23.91	23.59	23.64	23.18	23.04	24.05	23.05	23.06
		QPSK	22.70	23.78	23.86	23.85	22.72	23.02	24.08	23.00	23.08
		16QAM	21.77	22.84	22.82	22.81	21.80	21.99	23.08	22.01	22.03
		64QAM	21.18	21.25	21.33	21.37	21.32	21.48	21.51	21.48	21.47
		256QAM	19.74	19.70	19.74	19.85	19.80	19.30	19.41	19.41	19.42
	1 745	π/2 BPSK	23.24	23.97	24.00	23.92	22.93	23.15	24.09	22.98	23.07
		QPSK	23.33	24.35	24.26	24.12	22.98	23.16	24.08	22.92	23.05
		16QAM	21.95	23.09	22.93	22.90	21.72	22.05	23.01	21.85	22.00
		64QAM	21.49	21.51	21.41	21.24	21.26	21.59	21.62	21.49	21.51
		256QAM	19.72	19.66	19.55	19.41	19.47	19.45	19.42	19.35	19.58
	1 772.5	π/2 BPSK	22.29	23.81	23.12	23.55	22.33	22.46	23.41	22.31	22.42
		QPSK	22.36	23.40	23.19	23.04	22.05	22.49	23.39	22.32	22.40
		16QAM	22.37	23.37	23.18	23.08	22.04	21.32	22.29	21.18	21.40
		64QAM	21.33	21.32	21.10	21.03	21.11	21.02	20.94	20.77	20.84
		256QAM	18.70	18.66	18.44	18.41	18.36	18.90	18.74	18.73	18.71

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size & Allocation								
			1 RB					MID RB			Full RB
			edge left	inner left	Mid	inner right	edge right	Low	Mid	High	
10	1 715	$\pi/2$ BPSK	22.59	23.77	23.87	23.76	22.88	22.80	23.88	22.95	22.92
		QPSK	22.83	23.86	23.93	24.02	22.96	22.91	23.94	23.03	22.92
		16QAM	22.15	23.15	23.23	23.34	22.26	21.84	22.93	21.97	21.79
		64QAM	21.46	21.51	21.52	21.62	21.65	21.22	21.29	21.33	21.35
		256QAM	19.31	19.30	19.31	19.39	19.40	19.08	19.21	19.17	19.26
	1 745	$\pi/2$ BPSK	23.42	24.09	24.29	24.07	22.86	23.00	24.04	22.96	23.02
		QPSK	23.01	24.07	24.06	24.00	22.98	22.92	24.03	22.96	23.01
		16QAM	21.88	22.93	23.06	22.93	21.92	21.92	22.93	21.89	22.01
		64QAM	21.12	21.10	21.16	21.01	21.04	21.43	21.41	21.34	21.46
		256QAM	19.28	19.44	19.33	19.36	19.16	19.30	19.57	19.26	19.41
	1 775	$\pi/2$ BPSK	22.09	23.08	23.21	23.66	22.66	22.31	23.35	22.25	22.33
		QPSK	22.38	23.51	23.44	23.42	22.43	22.30	23.40	22.31	22.41
		16QAM	21.23	22.28	22.22	22.19	21.13	21.29	22.31	21.24	21.28
		64QAM	21.15	21.19	21.20	21.15	21.13	20.87	20.79	20.84	20.90
		256QAM	18.78	18.76	18.75	18.82	18.80	18.76	18.74	18.78	18.70
5	1 712.5	$\pi/2$ BPSK	23.15	24.05	23.91	24.27	23.20	23.09	24.20	23.11	23.12
		QPSK	23.08	24.11	24.21	24.19	23.15	22.97	23.97	23.06	23.03
		16QAM	22.27	23.25	23.22	23.29	22.38	21.89	23.09	22.01	21.96
		64QAM	21.63	21.67	22.03	21.72	21.70	21.53	21.51	21.55	21.43
		256QAM	19.41	19.44	19.64	19.46	19.54	19.34	19.42	19.44	19.45
	1 745	$\pi/2$ BPSK	23.34	24.43	24.10	24.00	22.97	23.24	24.23	23.26	23.23
		QPSK	23.09	24.15	24.10	24.08	23.12	23.23	24.26	23.29	23.27
		16QAM	21.83	22.89	22.83	22.94	21.84	22.23	23.31	22.27	22.26
		64QAM	21.75	21.73	21.75	21.69	21.75	21.80	21.80	21.81	21.64
		256QAM	19.67	19.71	19.57	19.63	19.67	19.58	19.61	19.64	19.55
	1 777.5	$\pi/2$ BPSK	22.62	23.47	24.10	23.69	22.50	22.52	23.54	22.52	22.66
		QPSK	22.30	23.38	23.39	23.45	22.38	22.51	23.59	22.58	22.52
		16QAM	21.78	22.77	22.67	22.83	21.83	21.54	22.59	21.55	21.48
		64QAM	21.14	21.11	21.40	21.19	21.19	21.05	21.13	21.15	21.06
		256QAM	18.90	19.23	18.48	18.84	18.89	18.87	18.95	18.94	19.02

7.5.4. NR Band n2

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size & Allocation								
			1 RB					MID RB			Full RB
			edge left	inner left	Mid	inner right	edge right	Low	Mid	High	
20	1 860	$\pi/2$ BPSK	22.63	23.75	24.18	23.98	23.14	22.77	23.85	23.06	22.96
		QPSK	22.78	23.70	23.85	24.02	23.05	22.77	23.81	23.05	22.87
		16QAM	21.57	22.66	22.74	22.99	22.02	21.72	22.89	21.91	21.93
		64QAM	21.21	21.18	21.27	21.38	21.36	21.37	21.45	21.52	21.40
		256QAM	19.44	19.43	19.55	19.70	19.72	19.27	19.29	19.39	19.39
	1 880	$\pi/2$ BPSK	22.89	23.85	23.97	23.92	23.00	23.06	24.07	23.10	23.07
		QPSK	22.99	23.88	24.04	24.04	23.00	23.08	24.09	23.11	23.11
		16QAM	22.45	23.40	23.54	23.55	22.51	22.06	23.04	22.12	22.12
		64QAM	21.73	21.65	21.82	21.83	21.84	21.46	21.57	21.58	21.56
		256QAM	19.35	19.34	19.33	19.41	19.33	19.53	19.60	19.61	19.58
	1 900	$\pi/2$ BPSK	22.78	24.17	23.88	23.89	22.56	23.07	24.00	23.00	23.01
		QPSK	22.94	23.91	23.99	23.85	22.87	23.06	24.00	22.97	23.06
		16QAM	22.13	23.09	23.13	23.07	22.09	21.98	23.02	21.95	22.01
		64QAM	21.84	21.83	21.94	21.71	21.71	21.49	21.45	21.41	21.48
		256QAM	19.52	19.53	19.59	19.46	19.48	19.51	19.56	19.45	19.57
15	1 857.5	$\pi/2$ BPSK	22.76	23.87	23.83	24.07	23.11	22.75	23.84	22.93	22.80
		QPSK	22.88	23.84	23.94	24.00	23.08	22.81	23.82	22.98	22.85
		16QAM	21.64	22.65	22.78	22.91	21.87	21.88	22.87	22.00	21.87
		64QAM	21.12	21.16	21.20	21.29	21.27	21.33	21.38	21.42	21.40
		256QAM	19.64	19.65	19.56	19.70	19.61	19.26	19.31	19.40	19.39
	1 880	$\pi/2$ BPSK	22.99	24.09	24.45	24.35	22.99	23.07	24.05	23.12	23.07
		QPSK	22.71	23.66	23.89	23.93	22.92	23.06	24.09	23.12	23.11
		16QAM	21.88	22.90	22.97	23.00	21.95	22.07	23.09	22.18	22.07
		64QAM	21.58	21.63	21.71	21.70	21.68	21.57	21.65	21.68	21.54
		256QAM	19.42	19.49	19.61	19.63	19.59	19.52	19.58	19.59	19.61
	1 902.5	$\pi/2$ BPSK	23.11	24.38	24.04	23.89	22.90	23.06	24.02	23.04	23.05
		QPSK	23.09	24.13	24.10	24.01	22.96	23.04	24.02	22.98	23.04
		16QAM	22.30	23.28	23.30	23.28	22.29	22.06	23.04	22.08	22.00
		64QAM	21.15	21.17	20.98	21.05	21.16	21.59	21.69	21.50	21.56
		256QAM	19.71	19.70	19.68	19.67	19.75	19.54	19.52	19.48	19.56
10	1 855	$\pi/2$ BPSK	22.56	23.46	23.46	23.56	22.40	22.65	23.70	22.79	22.73
		QPSK	22.54	23.50	23.54	23.60	22.63	22.68	23.73	22.79	22.73
		16QAM	21.65	22.66	22.66	22.75	21.79	21.74	22.79	21.82	21.72
		64QAM	20.91	20.85	20.91	20.92	20.92	21.12	21.15	21.21	21.22
		256QAM	19.15	19.16	19.24	19.24	19.38	19.30	19.29	19.39	19.23
	1 880	$\pi/2$ BPSK	22.85	23.77	23.51	23.74	22.77	22.95	23.95	22.96	22.95
		QPSK	22.84	23.82	23.77	23.86	22.90	22.93	24.01	23.02	22.96
		16QAM	22.13	23.09	23.18	23.21	22.16	22.04	23.06	22.12	21.94
		64QAM	21.53	21.52	21.56	21.55	21.53	21.33	21.38	21.39	21.41
		256QAM	18.98	18.96	19.00	19.07	19.09	19.26	19.29	19.31	19.48
	1 905	$\pi/2$ BPSK	22.82	23.86	24.24	23.84	22.73	22.82	23.94	22.94	22.90
		QPSK	23.10	24.14	24.26	24.18	23.27	22.85	23.78	22.96	22.86
		16QAM	22.21	23.17	23.25	23.22	22.22	21.85	22.93	21.96	21.71
		64QAM	21.68	21.66	21.78	21.67	21.70	21.51	21.53	21.56	21.45
		256QAM	19.63	19.59	19.64	19.62	19.60	19.30	19.40	19.45	19.40

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size & Allocation								
			1 RB					MID RB			Full RB
			edge left	inner left	Mid	inner right	edge right	Low	Mid	High	
5	1 852.5	$\pi/2$ BPSK	23.03	23.46	23.74	23.62	22.99	22.70	23.71	22.77	22.79
		QPSK	22.56	23.53	23.60	23.61	22.65	22.73	23.79	22.77	22.80
		16QAM	21.83	22.94	22.99	22.95	21.96	21.65	22.62	21.62	21.68
		64QAM	21.12	21.21	21.17	21.23	21.23	21.22	21.24	21.28	21.29
		256QAM	19.21	19.20	19.32	19.27	19.36	19.25	19.28	19.40	19.19
	1 880	$\pi/2$ BPSK	23.10	23.86	24.71	23.90	22.91	22.97	23.96	22.98	23.02
		QPSK	22.81	24.05	24.13	24.10	22.93	22.96	24.01	22.97	22.93
		16QAM	22.55	23.47	23.52	23.57	22.67	21.82	22.83	21.91	21.87
		64QAM	21.78	21.80	21.79	21.79	21.77	21.38	21.43	21.39	21.45
		256QAM	20.23	20.26	20.29	20.37	20.41	19.41	19.57	19.43	19.39
	1 907.5	$\pi/2$ BPSK	22.66	23.71	23.56	23.97	22.64	22.98	23.98	22.98	22.96
		QPSK	22.68	23.80	23.90	23.85	22.69	22.93	24.03	23.03	22.96
		16QAM	21.37	22.32	22.36	22.36	21.37	21.91	22.95	21.94	21.86
		64QAM	21.26	21.30	21.26	21.27	21.25	21.32	21.36	21.35	21.54
		256QAM	20.50	20.45	20.46	20.36	20.35	19.37	20.50	19.34	19.40

7.6. EIRP

- Test Notes

- 1) This is device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the below table.

7.6.1. NR Band n12

<Test case: ANT 1>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	ERP (dBm)	EIRP (W)
15	706.5	$\pi/2$ BPSK	1/77	H	23.09	-0.71	22.38	0.173
		QPSK		H	22.93	-0.71	22.22	0.167
		16QAM		H	22.09	-0.71	21.38	0.137
		64QAM		H	20.41	-0.71	19.70	0.093
		256QAM		H	18.69	-0.71	17.98	0.063
	708.5	$\pi/2$ BPSK	1/77	H	22.89	-0.70	22.19	0.166
		QPSK		H	22.83	-0.70	22.13	0.163
		16QAM		H	22.09	-0.70	21.39	0.138
		64QAM		H	20.74	-0.70	20.04	0.101
		256QAM		H	18.57	-0.70	17.87	0.061
10	704	$\pi/2$ BPSK	1/50	H	22.13	-0.71	21.42	0.139
		QPSK		H	22.05	-0.71	21.34	0.136
		16QAM		H	21.12	-0.71	20.41	0.110
		64QAM		H	19.47	-0.71	18.76	0.075
		256QAM		H	18.16	-0.71	17.45	0.056
	711	$\pi/2$ BPSK	1/50	H	22.75	-0.70	22.05	0.160
		QPSK		H	22.56	-0.70	21.86	0.153
		16QAM		H	21.55	-0.70	20.85	0.122
		64QAM		H	20.08	-0.70	19.38	0.087
		256QAM		H	18.38	-0.70	17.68	0.059
5	701.5	$\pi/2$ BPSK	1/23	H	22.36	-0.72	21.64	0.146
		QPSK		H	22.18	-0.72	21.46	0.140
		16QAM		H	21.55	-0.72	20.83	0.121
		64QAM		H	20.01	-0.72	19.29	0.085
		256QAM		H	18.63	-0.72	17.91	0.062
	707.5	$\pi/2$ BPSK	1/23	H	23.07	-0.70	22.37	0.173
		QPSK		H	23.01	-0.70	22.31	0.170
		16QAM		H	22.14	-0.70	21.44	0.139
		64QAM		H	20.44	-0.70	19.74	0.094
		256QAM		H	18.94	-0.70	18.24	0.067
	713.5	$\pi/2$ BPSK	1/23	H	22.71	-0.69	22.02	0.159
		QPSK		H	22.65	-0.69	21.96	0.157
		16QAM		H	21.76	-0.69	21.07	0.128
		64QAM		H	20.35	-0.69	19.66	0.092
		256QAM		H	18.39	-0.69	17.70	0.059

<Test case: ANT 2>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
15	706.5	$\pi/2$ BPSK	1/77	H	22.10	-0.71	21.39	0.138
		QPSK		H	21.86	-0.71	21.15	0.130
		16QAM		H	21.13	-0.71	20.42	0.110
		64QAM		H	19.52	-0.71	18.81	0.076
		256QAM		H	17.59	-0.71	16.88	0.049

7.6.2. NR Band n5

<Test case: ANT 1>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	ERP (dBm)	EIRP (W)
20	834	$\pi/2$ BPSK	1/53	H	21.85	-0.64	21.21	0.132
		QPSK		H	21.52	-0.64	20.88	0.122
		16QAM		H	20.88	-0.64	20.24	0.106
		64QAM		H	19.35	-0.64	18.71	0.074
		256QAM		H	17.59	-0.64	16.95	0.050
	836.5	$\pi/2$ BPSK	1/53	H	22.04	-0.65	21.39	0.138
		QPSK		H	21.78	-0.65	21.13	0.130
		16QAM		H	20.79	-0.65	20.14	0.103
		64QAM		H	19.45	-0.65	18.80	0.076
		256QAM		H	17.39	-0.65	16.74	0.047
	839	$\pi/2$ BPSK	1/53	H	21.78	-0.66	21.12	0.129
		QPSK		H	21.60	-0.66	20.94	0.124
		16QAM		H	20.82	-0.66	20.16	0.104
		64QAM		H	19.37	-0.66	18.71	0.074
		256QAM		H	17.22	-0.66	16.56	0.045
15	831.5	$\pi/2$ BPSK	1/39	H	21.99	-0.63	21.36	0.137
		QPSK		H	21.31	-0.63	20.68	0.117
		16QAM		H	20.70	-0.63	20.07	0.102
		64QAM		H	19.29	-0.63	18.66	0.073
		256QAM		H	17.41	-0.63	16.78	0.048
	836.5	$\pi/2$ BPSK	1/39	H	21.71	-0.65	21.06	0.128
		QPSK		H	21.61	-0.65	20.96	0.125
		16QAM		H	20.70	-0.65	20.05	0.101
		64QAM		H	19.43	-0.65	18.78	0.076
		256QAM		H	17.24	-0.65	16.59	0.046
	841.5	$\pi/2$ BPSK	1/39	H	21.68	-0.67	21.01	0.126
		QPSK		H	21.65	-0.67	20.98	0.125
		16QAM		H	20.73	-0.67	20.06	0.101
		64QAM		H	19.39	-0.67	18.72	0.074
		256QAM		H	16.78	-0.67	16.11	0.041
10	829	$\pi/2$ BPSK	1/50	H	21.76	-0.62	21.14	0.130
		QPSK		H	21.40	-0.62	20.78	0.120
		16QAM		H	20.41	-0.62	19.79	0.095
		64QAM		H	19.17	-0.62	18.55	0.072
		256QAM		H	17.24	-0.62	16.62	0.046
	836.5	$\pi/2$ BPSK	1/50	H	21.75	-0.65	21.10	0.129
		QPSK		H	21.70	-0.65	21.05	0.127
		16QAM		H	20.52	-0.65	19.87	0.097
		64QAM		H	19.40	-0.65	18.75	0.075
		256QAM		H	17.41	-0.65	16.76	0.047
	844	$\pi/2$ BPSK	1/50	H	21.75	-0.68	21.07	0.128
		QPSK		H	21.55	-0.68	20.87	0.122
		16QAM		H	20.70	-0.68	20.02	0.100
		64QAM		H	19.78	-0.68	19.10	0.081
		256QAM		H	16.92	-0.68	16.24	0.042

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	ERP (dBm)	EIRP (W)
5	826.5	$\pi/2$ BPSK	1/13	H	20.99	-0.61	20.38	0.109
		QPSK		H	20.57	-0.61	19.96	0.099
		16QAM		H	19.90	-0.61	19.29	0.085
		64QAM		H	18.58	-0.61	17.97	0.063
		256QAM		H	16.59	-0.61	15.98	0.040
	836.5	$\pi/2$ BPSK	1/13	H	21.58	-0.65	20.93	0.124
		QPSK		H	21.53	-0.65	20.88	0.122
		16QAM		H	20.37	-0.65	19.72	0.094
		64QAM		H	19.18	-0.65	18.53	0.071
		256QAM		H	17.07	-0.65	16.42	0.044
	846.5	$\pi/2$ BPSK	1/13	H	21.63	-0.69	20.94	0.124
		QPSK		H	21.51	-0.69	20.82	0.121
		16QAM		H	20.41	-0.69	19.72	0.094
		64QAM		H	19.48	-0.69	18.79	0.076
		256QAM		H	16.71	-0.69	16.02	0.040

<Test case: ANT 2>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	ERP (dBm)	EIRP (W)
20	834	$\pi/2$ BPSK	1/53	H	21.35	-0.64	20.71	0.118
		QPSK		H	21.07	-0.64	20.43	0.110
		16QAM		H	20.23	-0.64	19.59	0.091
		64QAM		H	19.02	-0.64	18.38	0.069
		256QAM		H	17.11	-0.64	16.47	0.044
	836.5	$\pi/2$ BPSK	1/53	H	21.47	-0.65	20.82	0.121
		QPSK		H	21.25	-0.65	20.60	0.115
		16QAM		H	20.44	-0.65	19.79	0.095
		64QAM		H	19.38	-0.65	18.73	0.075
		256QAM		H	17.01	-0.65	16.36	0.043
	839	$\pi/2$ BPSK	1/53	H	21.22	-0.66	20.56	0.114
		QPSK		H	21.04	-0.66	20.38	0.109
		16QAM		H	20.19	-0.66	19.53	0.090
		64QAM		H	18.53	-0.66	17.87	0.061
		256QAM		H	16.86	-0.66	16.20	0.042

7.6.3. NR Band n66

<Test case: ANT 1>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
40	1 730	$\pi/2$ BPSK	1/1	V	22.20	5.72	27.92	0.619
		QPSK		V	22.01	5.72	27.73	0.593
		16QAM		V	21.49	5.72	27.21	0.526
		64QAM		V	19.47	5.72	25.19	0.330
		256QAM		V	17.64	5.72	23.36	0.217
	1 760	$\pi/2$ BPSK	1/1	V	20.50	5.38	25.88	0.387
		QPSK		V	20.31	5.38	25.69	0.371
		16QAM		V	20.00	5.38	25.38	0.345
		64QAM		V	18.21	5.38	23.59	0.229
		256QAM		V	16.13	5.38	21.51	0.142
20	1 720	$\pi/2$ BPSK	1/1	V	22.34	5.83	28.17	0.656
		QPSK		V	22.06	5.83	27.89	0.615
		16QAM		V	20.95	5.83	26.78	0.476
		64QAM		V	19.99	5.83	25.82	0.382
		256QAM		V	17.82	5.83	23.65	0.232
	1 745	$\pi/2$ BPSK	1/1	V	21.67	5.56	27.23	0.528
		QPSK		V	21.56	5.56	27.12	0.515
		16QAM		V	20.93	5.56	26.49	0.446
		64QAM		V	19.24	5.56	24.80	0.302
		256QAM		V	17.12	5.56	22.68	0.185
	1 770	$\pi/2$ BPSK	1/1	V	22.46	5.27	27.73	0.593
		QPSK		V	22.20	5.27	27.47	0.558
		16QAM		V	21.63	5.27	26.90	0.490
		64QAM		V	19.73	5.27	25.00	0.316
		256QAM		V	18.37	5.27	23.64	0.231
15	1 717.5	$\pi/2$ BPSK	1/1	V	22.27	5.86	28.13	0.650
		QPSK		V	22.07	5.86	27.93	0.621
		16QAM		V	21.07	5.86	26.93	0.493
		64QAM		V	19.58	5.86	25.44	0.350
		256QAM		V	17.84	5.86	23.70	0.234
	1 745	$\pi/2$ BPSK	1/1	V	21.24	5.56	26.80	0.479
		QPSK		V	20.98	5.56	26.54	0.451
		16QAM		V	20.87	5.56	26.43	0.440
		64QAM		V	18.79	5.56	24.35	0.272
		256QAM		V	16.55	5.56	22.11	0.163
	1 772.5	$\pi/2$ BPSK	1/1	V	22.87	5.24	28.11	0.647
		QPSK		V	22.52	5.24	27.76	0.597
		16QAM		V	21.71	5.24	26.95	0.495
		64QAM		V	20.18	5.24	25.42	0.348
		256QAM		V	18.37	5.24	23.61	0.230

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
10	1 715	$\pi/2$ BPSK	1/1	V	21.98	5.89	27.87	0.612
		QPSK		V	21.56	5.89	27.45	0.556
		16QAM		V	21.09	5.89	26.98	0.499
		64QAM		V	19.32	5.89	25.21	0.332
		256QAM		V	17.59	5.89	23.48	0.223
	1 745	$\pi/2$ BPSK	1/1	V	20.81	5.56	26.37	0.434
		QPSK		V	20.45	5.56	26.01	0.399
		16QAM		V	19.80	5.56	25.36	0.344
		64QAM		V	17.51	5.56	23.07	0.203
		256QAM		V	16.61	5.56	22.17	0.165
	1 775	$\pi/2$ BPSK	1/1	V	22.20	5.21	27.41	0.551
		QPSK		V	22.11	5.21	27.32	0.540
		16QAM		V	20.87	5.21	26.08	0.406
		64QAM		V	19.83	5.21	25.04	0.319
		256QAM		V	17.83	5.21	23.04	0.201
5	1 712.5	$\pi/2$ BPSK	1/1	V	22.05	5.91	27.96	0.625
		QPSK		V	21.56	5.91	27.47	0.558
		16QAM		V	20.98	5.91	26.89	0.489
		64QAM		V	19.55	5.91	25.46	0.352
		256QAM		V	17.58	5.91	23.49	0.223
	1 745	$\pi/2$ BPSK	1/1	V	20.49	5.56	26.05	0.403
		QPSK		V	20.17	5.56	25.73	0.374
		16QAM		V	19.94	5.56	25.50	0.355
		64QAM		V	18.05	5.56	23.61	0.230
		256QAM		V	16.44	5.56	22.00	0.158
	1 777	$\pi/2$ BPSK	1/1	V	21.98	5.18	27.16	0.520
		QPSK		V	21.61	5.18	26.79	0.478
		16QAM		V	20.64	5.18	25.82	0.382
		64QAM		V	19.29	5.18	24.47	0.280
		256QAM		V	17.02	5.18	22.20	0.166

<Test case: ANT 2>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
20	1 720	$\pi/2$ BPSK	1/1	V	21.50	5.83	27.33	0.541
		QPSK		V	21.22	5.83	27.05	0.507
		16QAM		V	20.10	5.83	25.93	0.392
		64QAM		V	18.92	5.83	24.75	0.299
		256QAM		V	17.35	5.83	23.18	0.208

7.6.4. NR Band n2

<Test case: ANT 1>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
20	1 860	$\pi/2$ BPSK	1/53	H	23.09	4.69	27.78	0.600
		QPSK		H	22.48	4.69	27.17	0.521
		16QAM		H	21.24	4.69	25.93	0.392
		64QAM		H	20.16	4.69	24.85	0.305
		256QAM		H	18.22	4.69	22.91	0.195
	1 880	$\pi/2$ BPSK	1/53	H	21.19	4.56	25.75	0.376
		QPSK		H	21.08	4.56	25.64	0.366
		16QAM		H	19.97	4.56	24.53	0.284
		64QAM		H	18.62	4.56	23.18	0.208
		256QAM		H	16.48	4.56	21.04	0.127
	1 900	$\pi/2$ BPSK	1/53	H	22.26	4.42	26.68	0.466
		QPSK		H	22.16	4.42	26.58	0.455
		16QAM		H	21.45	4.42	25.87	0.386
		64QAM		H	19.75	4.42	24.17	0.261
		256QAM		H	17.51	4.42	21.93	0.156
15	1 857.5	$\pi/2$ BPSK	1/39	H	19.52	4.71	24.23	0.265
		QPSK		H	19.50	4.71	24.21	0.264
		16QAM		H	18.32	4.71	23.03	0.201
		64QAM		H	17.22	4.71	21.93	0.156
		256QAM		H	15.85	4.71	20.56	0.114
	1 880	$\pi/2$ BPSK	1/39	H	21.04	4.56	25.60	0.363
		QPSK		H	20.99	4.56	25.55	0.359
		16QAM		H	20.35	4.56	24.91	0.310
		64QAM		H	18.62	4.56	23.18	0.208
		256QAM		H	16.79	4.56	21.35	0.136
	1 902.5	$\pi/2$ BPSK	1/39	H	21.91	4.43	26.34	0.431
		QPSK		H	21.88	4.43	26.31	0.428
		16QAM		H	20.70	4.43	25.13	0.326
		64QAM		H	19.11	4.43	23.54	0.226
		256QAM		H	17.29	4.43	21.72	0.149
10	1 855	$\pi/2$ BPSK	1/26	H	21.66	4.73	26.39	0.436
		QPSK		H	21.99	4.73	26.72	0.470
		16QAM		H	20.87	4.73	25.60	0.363
		64QAM		H	19.33	4.73	24.06	0.255
		256QAM		H	18.71	4.73	23.44	0.221
	1 880	$\pi/2$ BPSK	1/26	H	20.98	4.56	25.54	0.358
		QPSK		H	20.86	4.56	25.42	0.348
		16QAM		H	19.86	4.56	24.42	0.277
		64QAM		H	18.09	4.56	22.65	0.184
		256QAM		H	16.63	4.56	21.19	0.132
	1 905	$\pi/2$ BPSK	1/26	H	21.60	4.43	26.03	0.401
		QPSK		H	21.43	4.43	25.86	0.385
		16QAM		H	20.64	4.43	25.07	0.321
		64QAM		H	19.58	4.43	24.01	0.252
		256QAM		H	18.54	4.43	22.97	0.198

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
5	1 852.5	$\pi/2$ BPSK	1/12	H	21.56	4.74	26.30	0.427
		QPSK		H	21.63	4.74	26.37	0.434
		16QAM		H	20.82	4.74	25.56	0.360
		64QAM		H	19.58	4.74	24.32	0.270
		256QAM		H	17.18	4.74	21.92	0.156
	1 880	$\pi/2$ BPSK	1/12	H	21.24	4.56	25.80	0.380
		QPSK		H	20.99	4.56	25.55	0.359
		16QAM		H	19.98	4.56	24.54	0.284
		64QAM		H	18.59	4.56	23.15	0.207
		256QAM		H	16.39	4.56	20.95	0.124
	1 907.5	$\pi/2$ BPSK	1/12	H	21.37	4.44	25.81	0.381
		QPSK		H	21.31	4.44	25.75	0.376
		16QAM		H	20.36	4.44	24.80	0.302
		64QAM		H	18.80	4.44	23.24	0.211
		256QAM		H	17.40	4.44	21.84	0.153

<Test case: ANT 2>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
20	1 860	$\pi/2$ BPSK	1/53	H	22.08	4.69	26.77	0.475
		QPSK		H	21.68	4.69	26.37	0.434
		16QAM		H	21.05	4.69	25.74	0.375
		64QAM		H	19.68	4.69	24.37	0.274
		256QAM		H	16.86	4.69	21.55	0.143

7.7. UNDESIRABLE EMISSIONS (Radiated)

- Test Notes

- 1) This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported.
- 2) ENDC mode operation were investigated and the worst case configuration results are reported.
- 3) The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter.
No other spurious and harmonic emissions were reported greater than listed emissions.
- 4) Limit Calculation for $n2/66/12/5 = 43 + 10 \log_{10} (P[\text{Watts}])$

7.7.1. NR Band n12

<Test case: ANT 1>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
15	706.5	$\pi/2$ BPSK	1/77	1 426.60	H	-47.05	3.17	-43.88	-13.00	30.88
				2 140.01	H	-60.60	2.91	-57.69	-13.00	44.69
				4 279.85	V	-54.90	7.13	-47.77	-13.00	34.77
		QPSK	1/77	1 426.68	H	-47.36	3.17	-44.19	-13.00	31.19
				2 140.01	H	-60.75	2.91	-57.84	-13.00	44.84
				4 279.91	V	-55.80	7.13	-48.67	-13.00	35.67
		16QAM	1/77	1 426.64	H	-47.71	3.17	-44.54	-13.00	31.54
				2 140.06	H	-61.64	2.91	-58.73	-13.00	45.73
				4 279.81	V	-56.99	7.13	-49.86	-13.00	36.86
		64QAM	1/77	1 426.62	H	-49.21	3.17	-46.04	-13.00	33.04
				2 140.21	H	-62.63	2.91	-59.72	-13.00	46.72
				4 279.79	V	-57.00	7.13	-49.87	-13.00	36.87
		256QAM	1/77	1 426.60	H	-51.45	3.17	-48.28	-13.00	35.28
				2 140.10	H	-63.54	2.91	-60.63	-13.00	47.63
				4 280.49	V	-64.49	7.13	-57.36	-13.00	44.36
	708.5	$\pi/2$ BPSK	1/77	1 430.76	H	-48.32	3.21	-45.11	-13.00	32.11
				2 146.09	H	-57.53	2.92	-54.61	-13.00	41.61
				4 292.00	V	-55.22	7.10	-48.12	-13.00	35.12
		QPSK	1/77	1 430.58	H	-48.64	3.21	-45.43	-13.00	32.43
				2 146.00	H	-57.74	2.92	-54.82	-13.00	41.82
				4 292.02	V	-56.81	7.10	-49.71	-13.00	36.71
		16QAM	1/77	1 430.70	H	-49.30	3.21	-46.09	-13.00	33.09
				2 146.07	H	-58.23	2.92	-55.31	-13.00	42.31
				4 291.90	V	-57.38	7.10	-50.28	-13.00	37.28
		64QAM	1/77	1 430.69	H	-50.90	3.21	-47.69	-13.00	34.69
				2 146.01	H	-59.33	2.92	-56.41	-13.00	43.41
				4 291.98	V	-60.60	7.10	-53.50	-13.00	40.50
		256QAM	1/77	1 430.73	H	-52.00	3.21	-48.79	-13.00	35.79
				2 145.98	H	-62.04	2.92	-59.12	-13.00	46.12
				4 291.96	V	-64.19	7.10	-57.09	-13.00	44.09

<Test case: ANT 2>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
15	706.5	$\pi/2$ BPSK	1/77	1 426.55	H	-45.05	3.17	-41.88	-13.00	28.88
				2 139.87	H	-60.58	2.91	-57.67	-13.00	44.67
				4 280.24	V	-56.65	7.13	-49.52	-13.00	36.52
		QPSK	1/77	1 426.65	H	-45.49	3.17	-42.32	-13.00	29.32
				2 140.06	H	-60.63	2.91	-57.72	-13.00	44.72
				4 280.04	V	-57.75	7.13	-50.62	-13.00	37.62
		16QAM	1/77	1 426.73	H	-46.56	3.17	-43.39	-13.00	30.39
				2 140.15	H	-60.79	2.91	-57.88	-13.00	44.88
				4 280.13	V	-58.61	7.13	-51.48	-13.00	38.48
		64QAM	1/77	1 426.74	H	-47.26	3.17	-44.09	-13.00	31.09
				2 139.93	H	-63.52	2.91	-60.61	-13.00	47.61
				4 280.05	V	-59.83	7.13	-52.70	-13.00	39.70
		256QAM	1/77	1 426.42	H	-49.67	3.16	-46.51	-13.00	33.51
				2 139.94	H	-64.95	2.91	-62.04	-13.00	49.04
				4 279.89	V	-63.81	7.13	-56.68	-13.00	43.68

7.7.2. NR Band n5

<Test case: ANT 1>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
15	834	$\pi/2$ BPSK	1/53	1 668.16	H	-53.41	3.99	-49.42	-13.00	36.42
				2 502.22	H	-63.75	3.52	-60.23	-13.00	47.23
				4 170.32	H	-56.84	7.08	-49.76	-13.00	36.76
		QPSK	1/53	1 668.14	H	-53.45	3.99	-49.46	-13.00	36.46
				2 502.38	H	-64.03	3.52	-60.51	-13.00	47.51
				4 170.22	H	-57.25	7.08	-50.17	-13.00	37.17
		16QAM	1/53	1 668.09	H	-54.17	3.99	-50.18	-13.00	37.18
				2 502.39	H	-64.06	3.52	-60.54	-13.00	47.54
				4 170.54	H	-57.75	7.08	-50.67	-13.00	37.67
		64QAM	1/53	1 668.05	H	-56.25	3.99	-52.26	-13.00	39.26
				2 502.36	H	-64.96	3.52	-61.44	-13.00	48.44
				4 170.31	H	-57.11	7.08	-50.03	-13.00	37.03
		256QAM	1/53	1 668.32	H	-59.05	3.99	-55.06	-13.00	42.06
				2 501.98	H	-65.54	3.52	-62.02	-13.00	49.02
				4 170.34	H	-61.61	7.08	-54.53	-13.00	41.53
	836.5	$\pi/2$ BPSK	1/53	1 673.29	H	-54.16	3.97	-50.19	-13.00	37.19
				2 509.66	H	-61.04	3.58	-57.46	-13.00	44.46
				4 182.74	H	-50.84	7.10	-43.74	-13.00	30.74
		QPSK	1/53	1 673.18	H	-54.18	3.98	-50.20	-13.00	37.20
				2 509.81	H	-61.25	3.58	-57.67	-13.00	44.67
				4 183.04	H	-51.10	7.10	-44.00	-13.00	31.00
		16QAM	1/53	1 673.29	H	-55.57	3.97	-51.60	-13.00	38.60
				2 509.68	H	-62.13	3.58	-58.55	-13.00	45.55
				4 182.83	H	-52.43	7.10	-45.33	-13.00	32.33
		64QAM	1/53	1 673.18	H	-57.36	3.98	-53.38	-13.00	40.38
				2 510.00	H	-63.47	3.58	-59.89	-13.00	46.89
				4 182.84	H	-57.13	7.10	-50.03	-13.00	37.03
		256QAM	1/53	1 673.22	H	-59.84	3.97	-55.87	-13.00	42.87
				2 510.01	H	-64.31	3.58	-60.73	-13.00	47.73
				4 182.88	H	-58.88	7.10	-51.78	-13.00	38.78

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
15	839	$\pi/2$ BPSK	1/53	1 677.98	H	-54.35	3.96	-50.39	-13.00	37.39
				2 517.20	H	-60.59	3.63	-56.96	-13.00	43.96
				4 195.46	H	-50.31	7.12	-43.19	-13.00	30.19
		QPSK	1/53	1 677.94	H	-54.61	3.96	-50.65	-13.00	37.65
				2 517.28	H	-60.73	3.63	-57.10	-13.00	44.10
				4 195.45	H	-52.08	7.12	-44.96	-13.00	31.96
		16QAM	1/53	1 678.36	H	-55.81	3.96	-51.85	-13.00	38.85
				2 517.25	H	-61.64	3.63	-58.01	-13.00	45.01
				4 195.23	H	-53.78	7.12	-46.66	-13.00	33.66
		64QAM	1/53	1 678.23	H	-57.82	3.96	-53.86	-13.00	40.86
				2 517.10	H	-62.66	3.63	-59.03	-13.00	46.03
				4 195.56	H	-57.54	7.12	-50.42	-13.00	37.42
		256QAM	1/53	1 678.03	H	-59.12	3.96	-55.16	-13.00	42.16
				2 517.31	H	-64.69	3.64	-61.05	-13.00	48.05
				4 195.82	H	-59.69	7.12	-52.57	-13.00	39.57

<Test case: ANT 2>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
20	834	$\pi/2$ BPSK	1/53	1 668.21	H	-52.28	3.99	-48.29	-13.00	35.29
				2 502.49	H	-62.44	3.52	-58.92	-13.00	45.92
				4 170.28	H	-56.72	7.08	-49.64	-13.00	36.64
		QPSK	1/53	1 668.27	H	-52.66	3.99	-48.67	-13.00	35.67
				2 502.18	H	-62.59	3.52	-59.07	-13.00	46.07
				4 170.40	H	-57.02	7.08	-49.94	-13.00	36.94
		16QAM	1/53	1 668.22	H	-53.53	3.99	-49.54	-13.00	36.54
				2 502.22	H	-62.83	3.52	-59.31	-13.00	46.31
				4 170.26	H	-57.60	7.08	-50.52	-13.00	37.52
		64QAM	1/53	1 668.38	H	-55.04	3.99	-51.05	-13.00	38.05
				2 502.22	H	-63.63	3.52	-60.11	-13.00	47.11
				4 170.49	H	-59.19	7.08	-52.11	-13.00	39.11
		256QAM	1/53	1 668.12	H	-58.14	3.99	-54.15	-13.00	41.15
				2 502.48	H	-64.69	3.52	-61.17	-13.00	48.17
				4 170.42	H	-61.37	7.08	-54.29	-13.00	41.29
	836.5	$\pi/2$ BPSK	1/53	1 673.15	H	-53.58	3.98	-49.60	-13.00	36.60
				2 509.61	H	-60.49	3.57	-56.92	-13.00	43.92
				4 182.82	H	-52.11	7.10	-45.01	-13.00	32.01
		QPSK	1/53	1 672.99	H	-53.57	3.98	-49.59	-13.00	36.59
				2 509.72	H	-60.58	3.58	-57.00	-13.00	44.00
				4 182.99	H	-52.71	7.10	-45.61	-13.00	32.61
		16QAM	1/53	1 673.20	H	-54.37	3.98	-50.39	-13.00	37.39
				2 509.78	H	-61.33	3.58	-57.75	-13.00	44.75
				4 182.84	H	-55.08	7.10	-47.98	-13.00	34.98
		64QAM	1/53	1 673.08	H	-56.61	3.98	-52.63	-13.00	39.63
				2 509.76	H	-63.18	3.58	-59.60	-13.00	46.60
				4 182.86	H	-58.63	7.10	-51.53	-13.00	38.53
		256QAM	1/53	1 673.02	H	-59.44	3.98	-55.46	-13.00	42.46
				2 509.77	H	-64.68	3.58	-61.10	-13.00	48.10
				4 182.99	H	-58.76	7.10	-51.66	-13.00	38.66

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
15	839	$\pi/2$ BPSK	1/53	1 678.08	H	-56.31	3.96	-52.35	-13.00	39.35
				2 517.14	H	-59.40	3.63	-55.77	-13.00	42.77
				4 195.35	H	-50.44	7.12	-43.32	-13.00	30.32
		QPSK	1/53	1 678.16	H	-56.38	3.96	-52.42	-13.00	39.42
				2 517.30	H	-59.52	3.63	-55.89	-13.00	42.89
				4 195.39	H	-51.30	7.12	-44.18	-13.00	31.18
		16QAM	1/53	1 678.19	H	-57.19	3.96	-53.23	-13.00	40.23
				2 517.41	H	-59.94	3.64	-56.30	-13.00	43.30
				4 195.37	H	-52.26	7.12	-45.14	-13.00	32.14
		64QAM	1/53	1 678.04	H	-58.99	3.96	-55.03	-13.00	42.03
				2 517.21	H	-61.37	3.63	-57.74	-13.00	44.74
				4 195.56	H	-57.06	7.12	-49.94	-13.00	36.94
		256QAM	1/53	1 678.15	H	-61.40	3.96	-57.44	-13.00	44.44
				2 517.31	H	-63.35	3.64	-59.71	-13.00	46.71
				4 195.45	H	-59.13	7.12	-52.01	-13.00	39.01

7.7.3. NR Band n66

<Test case: ANT 1>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
40	1 730	$\pi/2$ BPSK	1/1	3 421.51	H	-63.48	7.99	-55.49	-13.00	42.49
				5 132.17	H	-67.14	9.87	-57.27	-13.00	44.27
		QPSK	1/1	3 421.77	H	-63.70	7.99	-55.71	-13.00	42.71
				5 132.42	H	-65.84	9.87	-55.97	-13.00	42.97
		16QAM	1/1	3 421.77	H	-64.44	7.99	-56.45	-13.00	43.45
				5 132.35	H	-66.78	9.87	-56.91	-13.00	43.91
		64QAM	1/1	3 421.81	H	-64.89	7.99	-56.90	-13.00	43.90
				5 132.77	H	-67.38	9.87	-57.51	-13.00	44.51
		256QAM	1/1	3 421.57	H	-65.30	7.99	-57.31	-13.00	44.31
				5 132.54	H	-67.85	9.87	-57.98	-13.00	44.98
	1 745	$\pi/2$ BPSK	1/1	3 451.53	H	-64.86	8.08	-56.78	-13.00	43.78
				5 177.33	H	-64.92	9.90	-55.02	-13.00	42.02
		QPSK	1/1	3 451.63	H	-64.90	8.08	-56.82	-13.00	43.82
				5 177.46	H	-65.35	9.90	-55.45	-13.00	42.45
		16QAM	1/1	3 451.67	H	-65.31	8.08	-57.23	-13.00	44.23
				5 177.32	H	-65.77	9.90	-55.87	-13.00	42.87
		64QAM	1/1	3 451.46	H	-65.79	8.08	-57.71	-13.00	44.71
				5 177.55	H	-66.77	9.90	-56.87	-13.00	43.87
		256QAM	1/1	3 451.90	H	-65.98	8.09	-57.89	-13.00	44.89
				5 177.59	H	-67.67	9.90	-57.77	-13.00	44.77
	1 760	$\pi/2$ BPSK	1/1	3 481.52	H	-62.59	8.17	-54.42	-13.00	41.42
				5 222.70	H	-66.59	9.92	-56.67	-13.00	43.67
		QPSK	1/1	3 481.76	H	-62.82	8.17	-54.65	-13.00	41.65
				5 222.51	H	-66.61	9.92	-56.69	-13.00	43.69
		16QAM	1/1	3 481.76	H	-63.58	8.17	-55.41	-13.00	42.41
				5 222.87	H	-67.86	9.92	-57.94	-13.00	44.94
		64QAM	1/1	3 481.45	H	-64.52	8.17	-56.35	-13.00	43.35
				5 220.28	H	-67.85	9.92	-57.93	-13.00	44.93
		256QAM	1/1	3 481.46	H	-65.13	8.17	-56.96	-13.00	43.96
				5 222.14	H	-67.63	9.92	-57.71	-13.00	44.71
20	1720	$\pi/2$ BPSK	1/1	3 421.52	H	-64.35	7.99	-56.36	-13.00	43.36
				5 132.26	H	-65.12	9.87	-55.25	-13.00	42.25
		QPSK	1/1	3 421.23	H	-65.32	7.99	-57.33	-13.00	44.33
				5 132.80	H	-65.35	9.87	-55.48	-13.00	42.48
		16QAM	1/1	3 421.41	H	-65.46	7.99	-57.47	-13.00	44.47
				5 132.04	H	-65.41	9.87	-55.54	-13.00	42.54
		64QAM	1/1	3 421.40	H	-65.42	7.99	-57.43	-13.00	44.43
				5 131.93	H	-66.29	9.87	-56.42	-13.00	43.42
		256QAM	1/1	3 421.59	H	-66.22	7.99	-58.23	-13.00	45.23
				5 132.02	H	-67.28	9.87	-57.41	-13.00	44.41

<Test case: ANT 2>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1 720	$\pi/2$ BPSK	1/1	3 421.38	H	-63.97	7.99	-55.98	-13.0	42.98
				5 132.21	H	-64.14	9.87	-54.27	-13.0	41.27
		QPSK	1/1	3 421.42	H	-64.01	7.99	-56.02	-13.0	43.02
				5 132.09	H	-64.17	9.87	-54.30	-13.0	41.30
		16QAM	1/1	3 421.39	H	-64.32	7.99	-56.33	-13.0	43.33
				5 135.43	H	-67.65	9.87	-57.78	-13.0	44.78
		64QAM	1/1	3 421.35	H	-64.37	7.99	-56.38	-13.0	43.38
				5 135.81	H	-67.69	9.87	-57.82	-13.0	44.82
		256QAM	1/1	3 421.22	H	-64.77	7.99	-56.78	-13.0	43.78
				5 131.93	H	-67.04	9.87	-57.17	-13.0	44.17

7.7.4. NR Band n2

<Test case: ANT 1>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1 860	$\pi/2$ BPSK	1/53	3 720.07	H	-51.96	8.22	-43.74	-13.00	30.74
				5 580.45	H	-64.34	10.19	-54.15	-13.00	41.15
		QPSK	1/53	3 720.01	H	-52.93	8.22	-44.71	-13.00	31.71
				5 580.40	H	-64.89	10.19	-54.70	-13.00	41.70
		16QAM	1/53	3 720.16	H	-54.28	8.22	-46.06	-13.00	33.06
				5 580.41	H	-65.45	10.19	-55.26	-13.00	42.26
		64QAM	1/53	3 720.18	H	-56.21	8.22	-47.99	-13.00	34.99
				5 580.16	H	-66.14	10.19	-55.95	-13.00	42.95
		256QAM	1/53	3 720.18	H	-56.21	8.22	-47.99	-13.00	34.99
				5 580.16	H	-66.14	10.19	-55.95	-13.00	42.95
	1 880	$\pi/2$ BPSK	1/53	3 760.03	H	-52.44	8.27	-44.17	-13.00	31.17
				5 640.30	H	-61.10	10.25	-50.85	-13.00	37.85
		QPSK	1/53	3 760.13	H	-53.42	8.27	-45.15	-13.00	32.15
				5 640.32	H	-62.01	10.25	-51.76	-13.00	38.76
		16QAM	1/53	3 760.02	H	-54.38	8.27	-46.11	-13.00	33.11
				5 640.24	H	-63.21	10.25	-52.96	-13.00	39.96
		64QAM	1/53	3 760.15	H	-55.39	8.27	-47.12	-13.00	34.12
				5 640.18	H	-64.65	10.25	-54.40	-13.00	41.40
		256QAM	1/53	3 760.15	H	-55.39	8.27	-47.12	-13.00	34.12
				5 640.18	H	-64.65	10.25	-54.40	-13.00	41.40
	1 900	$\pi/2$ BPSK	1/53	3 800.11	H	-56.49	8.37	-48.12	-13.00	35.12
				5 700.19	H	-64.28	10.34	-53.94	-13.00	40.94
		QPSK	1/53	3 799.96	H	-56.92	8.37	-48.55	-13.00	35.55
				5 700.60	H	-64.30	10.34	-53.96	-13.00	40.96
		16QAM	1/53	3 800.01	H	-58.22	8.37	-49.85	-13.00	36.85
				5 700.35	H	-65.21	10.34	-54.87	-13.00	41.87
		64QAM	1/53	3 799.99	H	-59.40	8.37	-51.03	-13.00	38.03
				5 700.24	H	-66.25	10.34	-55.91	-13.00	42.91
		256QAM	1/53	3 799.99	H	-59.40	8.37	-51.03	-13.00	38.03
				5 700.24	H	-66.25	10.34	-55.91	-13.00	42.91

<Test case: ANT 2>

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1 860	$\pi/2$ BPSK	1/53	3 720.03	H	-52.51	8.22	-44.29	-13.00	31.29
				5 580.42	H	-62.88	10.19	-52.69	-13.00	39.69
		QPSK	1/53	3 720.12	H	-52.53	8.22	-44.31	-13.00	31.31
				5 580.33	H	-62.98	10.19	-52.79	-13.00	39.79
		16QAM	1/53	3 720.10	H	-52.99	8.22	-44.77	-13.00	31.77
				5 579.98	H	-64.17	10.19	-53.98	-13.00	40.98
		64QAM	1/53	3 720.04	H	-55.83	8.22	-47.61	-13.00	34.61
				5 579.97	H	-64.20	10.19	-54.01	-13.00	41.01
		256QAM	1/53	3 720.18	H	-56.21	8.22	-47.99	-13.00	34.99
				5 580.16	H	-65.30	10.19	-55.11	-13.00	42.11

ENDC MODE: NR n2 + LTE B5

Channel Bandwidth (MHz)	Frequency (MHz)	Modulation	RB size/offset	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1 860	$\pi/2$ BPSK	1/53	3 720.03	H	-51.62	8.22	-43.40	-13.00	30.40
				5 580.20	H	-63.39	10.19	-53.20	-13.00	40.20
		QPSK	1/53	3 720.17	H	-52.03	8.22	-43.81	-13.00	30.81
				5 580.18	H	-64.11	10.19	-53.92	-13.00	40.92
		16QAM	1/53	3 720.17	H	-52.46	8.22	-44.24	-13.00	31.24
				5 580.12	H	-63.82	10.19	-53.63	-13.00	40.63
		64QAM	1/53	3 720.15	H	-53.83	8.22	-45.61	-13.00	32.61
				5 580.26	H	-64.88	10.19	-54.69	-13.00	41.69
		256QAM	1/53	3 720.11	H	-55.80	8.22	-47.58	-13.00	34.58
				5 580.19	H	-65.94	10.19	-55.75	-13.00	42.75

7.8. FREQUENCY STABILITY

- Test Notes

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

7.8.1. NR Band n12

OPERATING FREQUENCY : 707.5 MHz
REFERENCE VOLTAGE : 3.90 V DC
LIMIT(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation	
				(%)	(ppm)
100 %	3.90	+20(Ref)	707,499,998	-0.000 000 283	-0.002 8
100 %		-30	707,500,002	0.000 000 283	0.002 8
100 %		-20	707,499,997	-0.000 000 424	-0.004 2
100 %		-10	707,500,037	0.000 005 230	0.052 3
100 %		0	707,499,996	-0.000 000 565	-0.005 7
100 %		+10	707,500,002	0.000 000 226	0.002 3
100 %		+20	707,500,004	0.000 000 565	0.005 7
100 %		+30	707,499,998	-0.000 000 283	-0.002 8
100 %		+40	707,499,999	-0.000 000 141	-0.001 4
100 %		+50	707,500,004	0.000 000 565	0.005 7
115 %	4.49	+20	707,499,930	-0.000 009 894	-0.098 9
85 %	3.32	+20	707,499,994	-0.000 000 848	-0.008 5

7.8.2. NR Band n5

OPERATING FREQUENCY : 836.5 MHz
 REFERENCE VOLTAGE : 3.90 VDC
 LIMIT(FCC) : $\pm 0.000\ 25\ %$ or $2.5\ \text{ppm}$
 LIMIT(IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation	
				(%)	(ppm)
100 %	3.90	+20(Ref)	836,500,005	0.000 000 598	0.006 0
100 %		-30	836,500,003	0.000 000 359	0.003 6
100 %		-20	836,499,997	-0.000 000 359	-0.003 6
100 %		-10	836,499,999	-0.000 000 120	-0.001 2
100 %		0	836,499,996	-0.000 000 478	-0.004 8
100 %		+10	836,499,996	-0.000 000 478	-0.0048
100 %		+20	836,499,997	-0.000 000 418	-0.004 2
100 %		+30	836,499,996	-0.000 000 513	-0.005 1
100 %		+40	836,500,001	0.000 000 120	0.001 2
100 %		+50	836,500,003	0.000 000 359	0.003 6
115 %	4.49	+20	836,499,994	-0.000 000 717	-0.007 2
85 %	3.32	+20	836,500,018	0.000 002 152	0.021 5

7.8.3. NR Band n66

OPERATING FREQUENCY : 1 745 MHz
 REFERENCE VOLTAGE : 3.90 VDC
 LIMIT(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation	
				(%)	(ppm)
100 %	3.90	+20(Ref)	1,744,999,985	-0.000 000 860	-0.008 6
100 %		-30	1,744,999,992	-0.000 000 458	-0.004 6
100 %		-20	1,745,000,004	0.000 000 229	0.002 3
100 %		-10	1,744,999,989	-0.000 000 630	-0.006 3
100 %		0	1,745,000,006	0.000 000 344	0.0034
100 %		+10	1,744,999,991	-0.000 000 516	-0.005 2
100 %		+20	1,744,999,994	-0.000 000 344	-0.003 4
100 %		+30	1,744,999,997	-0.000 000 172	-0.001 7
100 %		+40	1,745,000,006	0.000 000 344	0.003 4
100 %		+50	1,744,999,991	-0.000 000 516	-0.005 2
115 %	4.49	+20	1,745,000,003	0.000 000 172	0.001 7
85 %	3.32	+20	1,745,000,006	0.000 000 344	0.003 4

7.8.4. NR Band n2

OPERATING FREQUENCY : 1 880 MHz
 REFERENCE VOLTAGE : 3.90 VDC
 LIMIT(FCC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
 LIMIT(IC) : $\pm 0.000\ 25\ \%$ or $2.5\ \text{ppm}$

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQ (Hz)	Deviation	
				(%)	(ppm)
100 %	3.90	+20(Ref)	1,880,000,003	0.000 000 160	+0.001 6
100 %		-30	1,880,000,010	0.000 000 516	+0.005 2
100 %		-20	1,880,000,002	0.000 000 092	+0.000 9
100 %		-10	1,880,000,006	0.000 000 319	+0.003 2
100 %		0	1,880,000,012	0.000 000 636	+0.006 4
100 %		+10	1,880,000,004	0.000 000 213	+0.002 1
100 %		+20	1,880,000,008	0.000 000 451	+0.004 5
100 %		+30	1,880,000,005	0.000 000 266	+0.002 7
100 %		+40	1,880,000,018	0.000 000 957	+0.009 6
100 %		+50	1,880,000,006	0.000 000 316	+0.003 2
115 %	4.49	+20	1,879,999,996	-0.000 000 213	-0.002 1
85 %	3.32	+20	1,880,000,012	0.000 000 638	+0.006 4

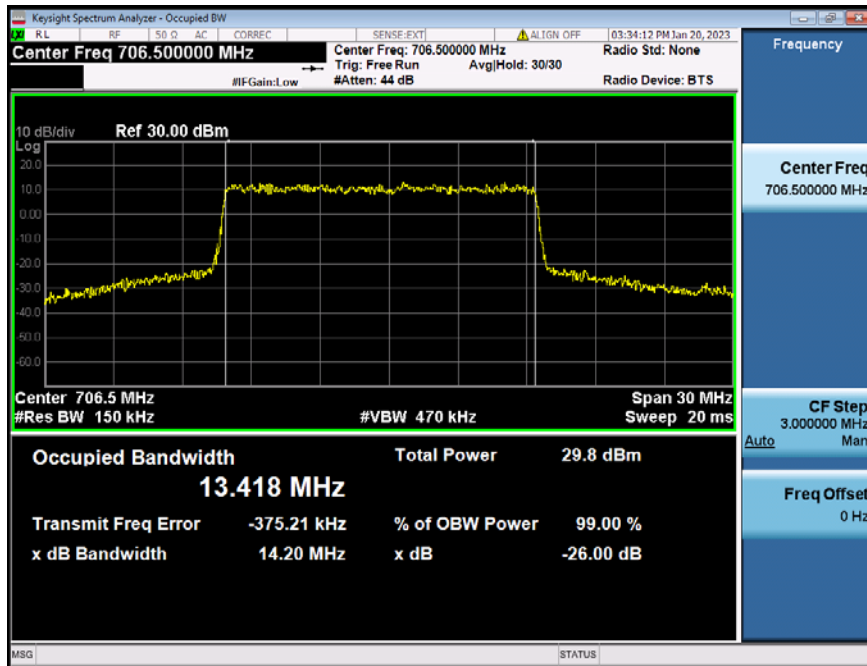
8. TEST PLOTS

- Test Notes:

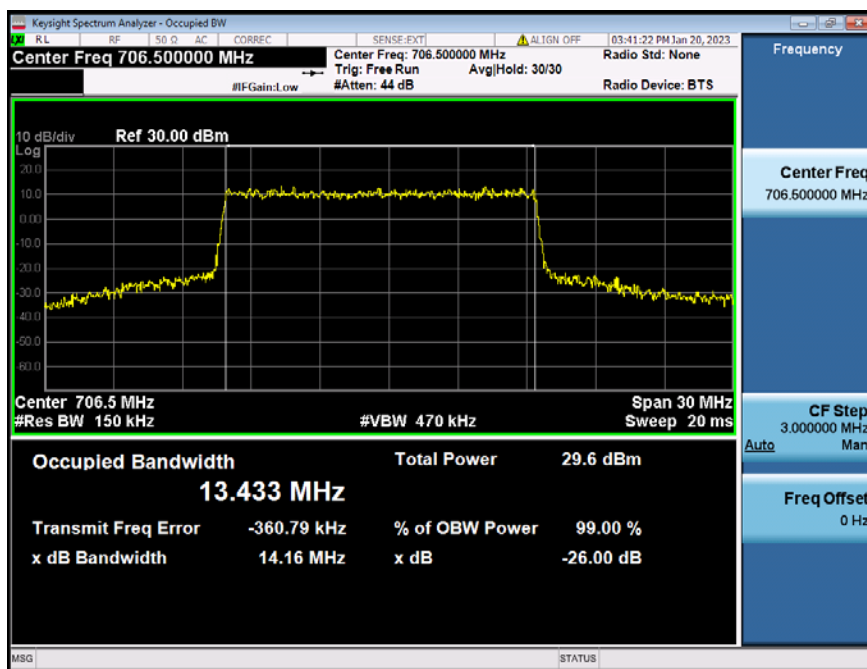
All bandwidths, RB configurations, and modulations were investigated.
The worst case test results are reported.

8.1. OCCUPIED BANDWIDTH

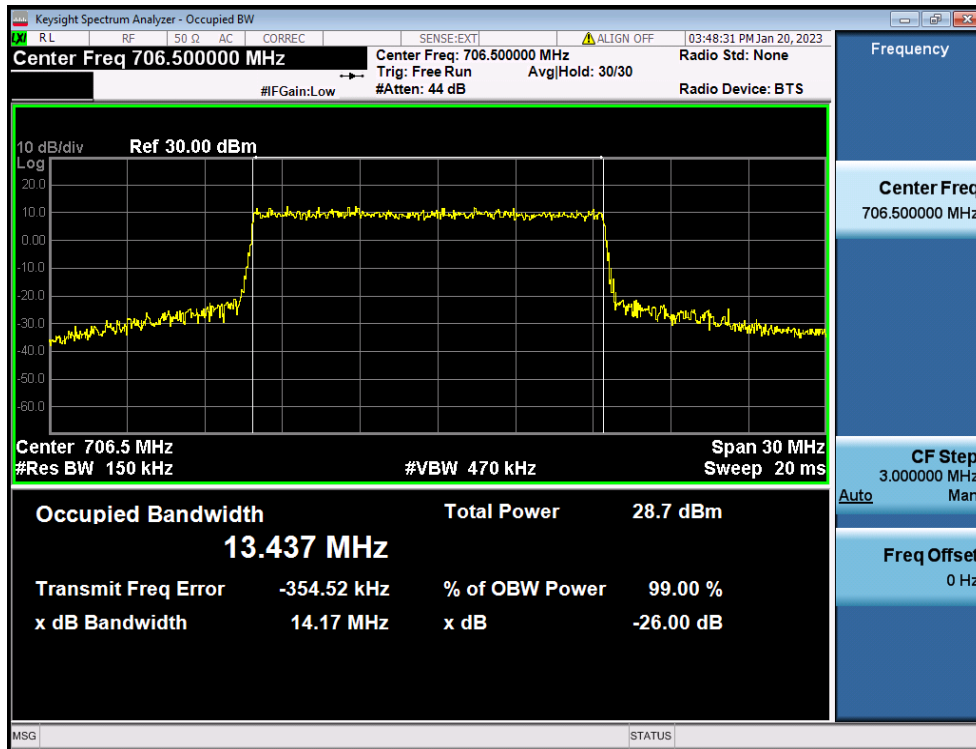
8.1.1. NR Band 12



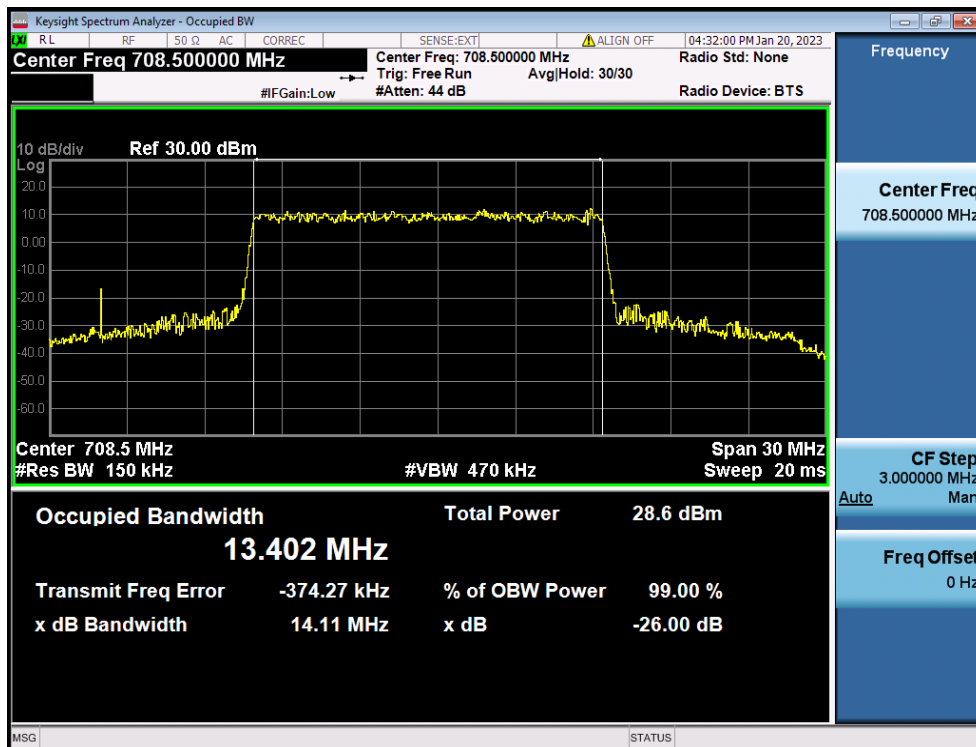
15 MHz / $\pi/2$ BPSK / FULL RB Size



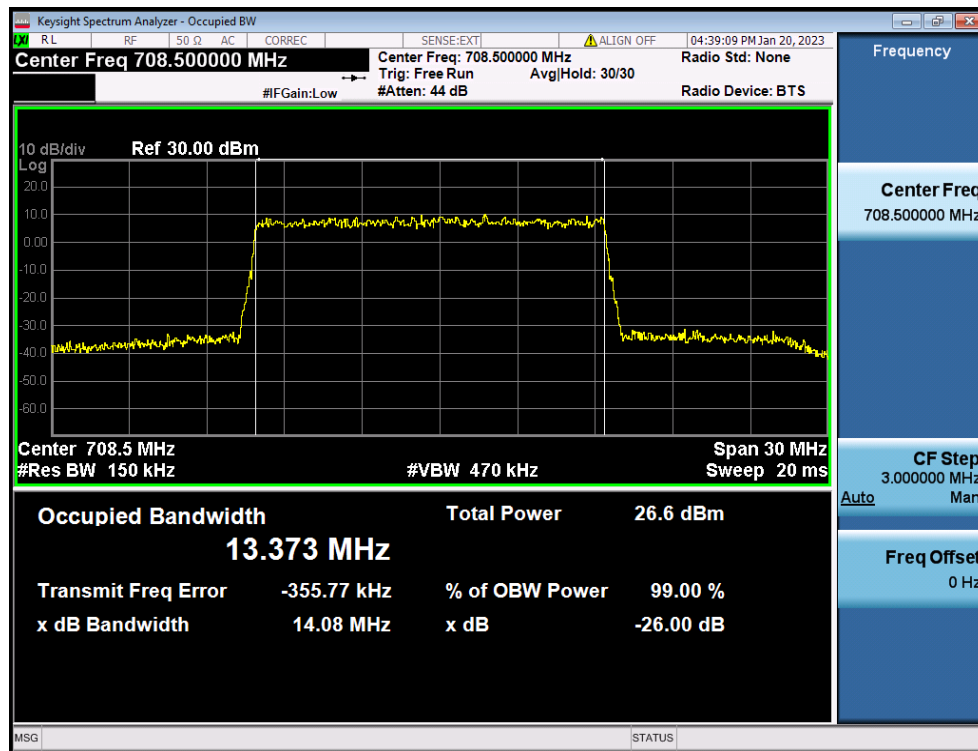
15 MHz / QPSK / FULL RB Size



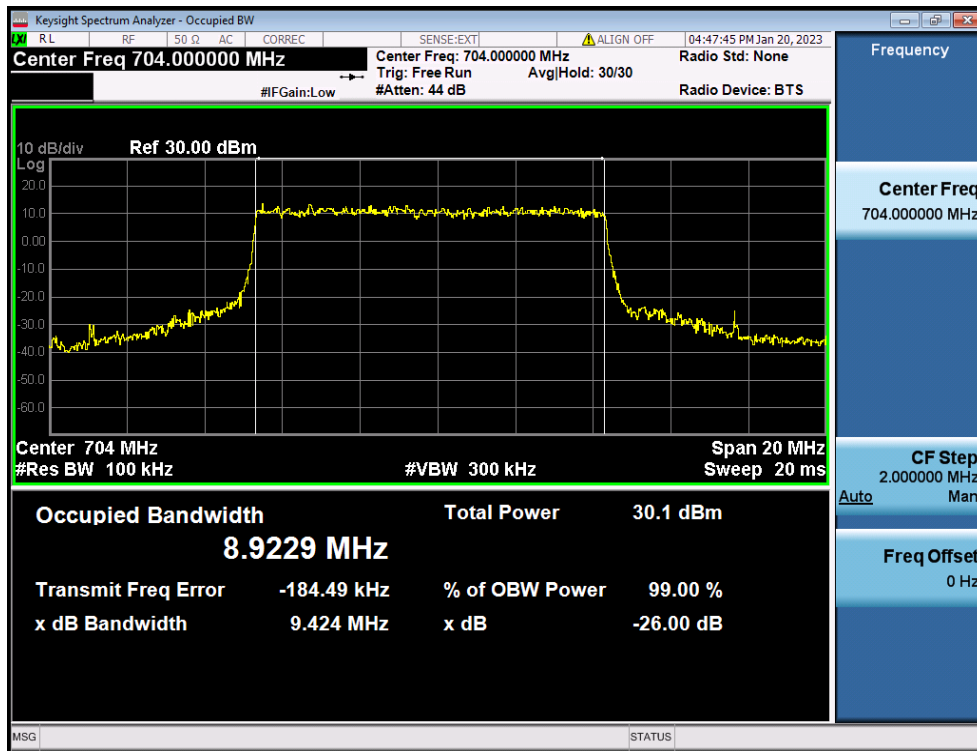
15 MHz / 16QAM / FULL RB Size



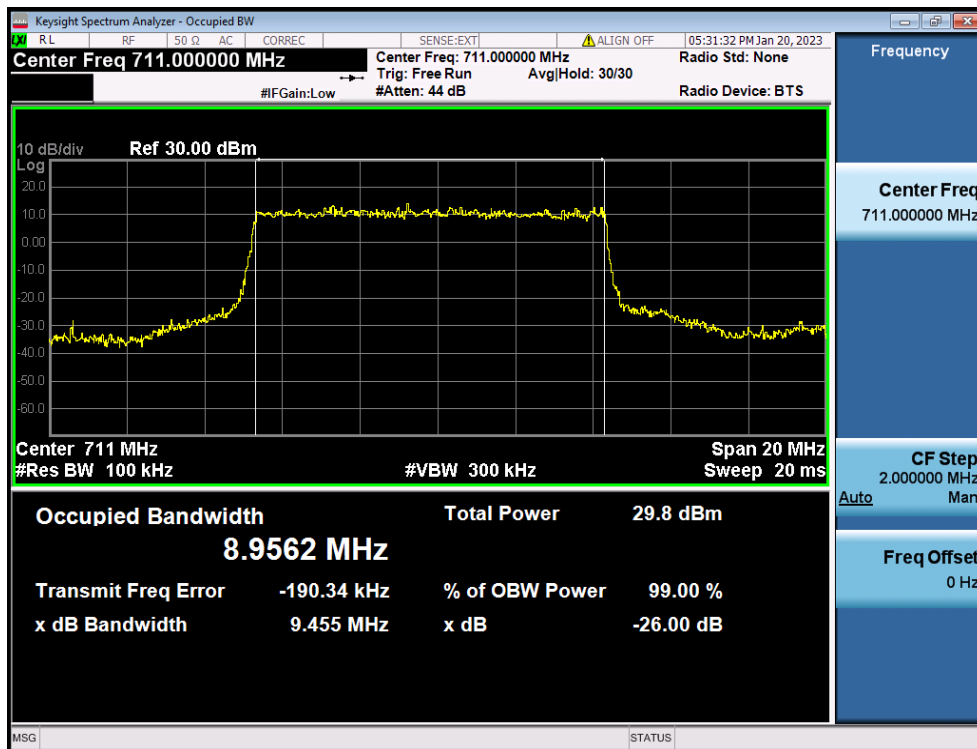
15 MHz / 64QAM / FULL RB Size



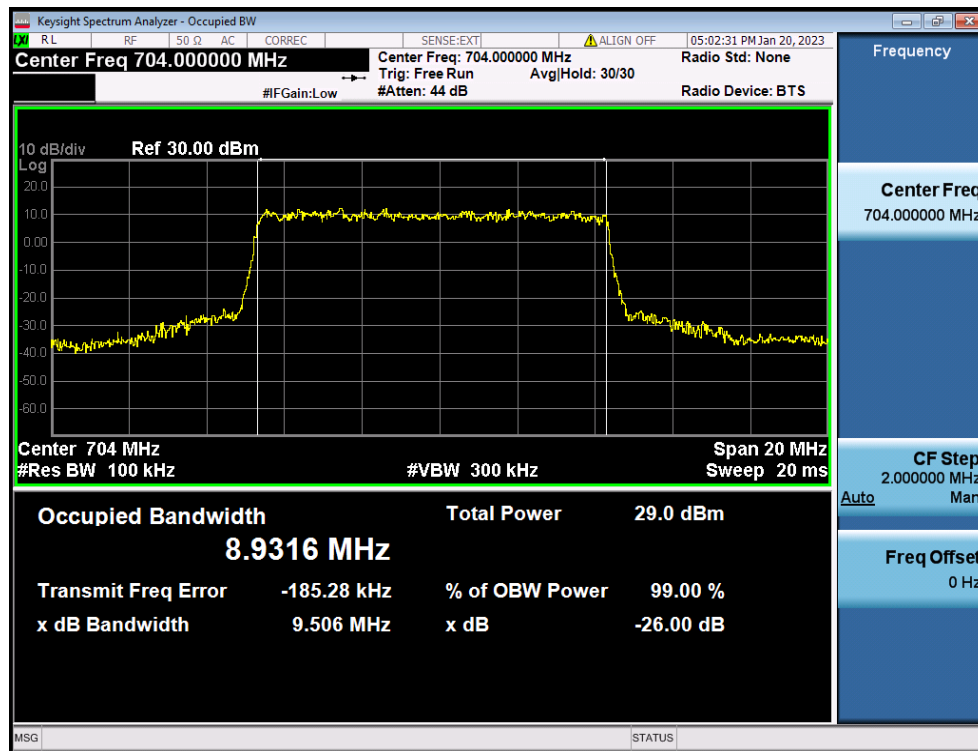
15 MHz / 256QAM / FULL RB Size



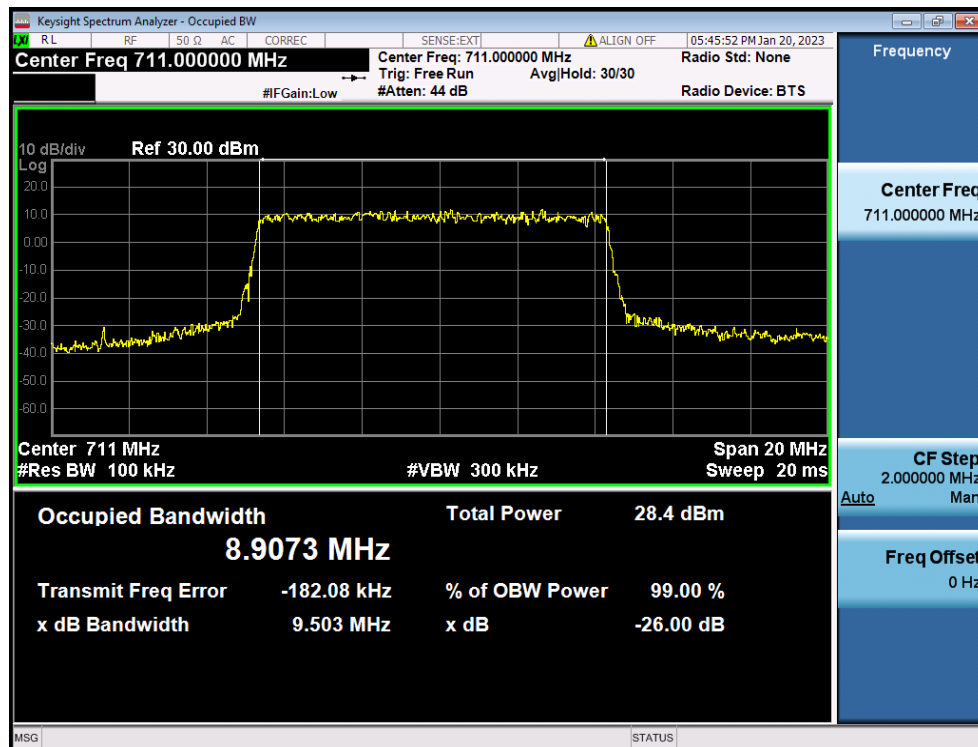
10 MHz / $\pi/2$ BPSK / FULL RB Size



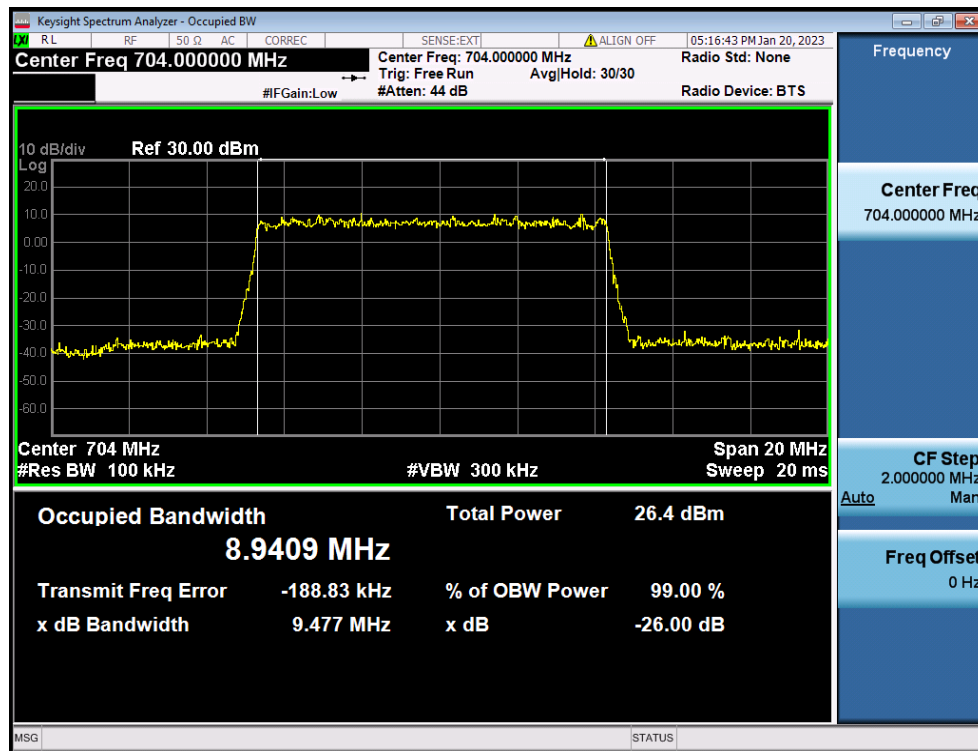
10 MHz / QPSK / FULL RB Size



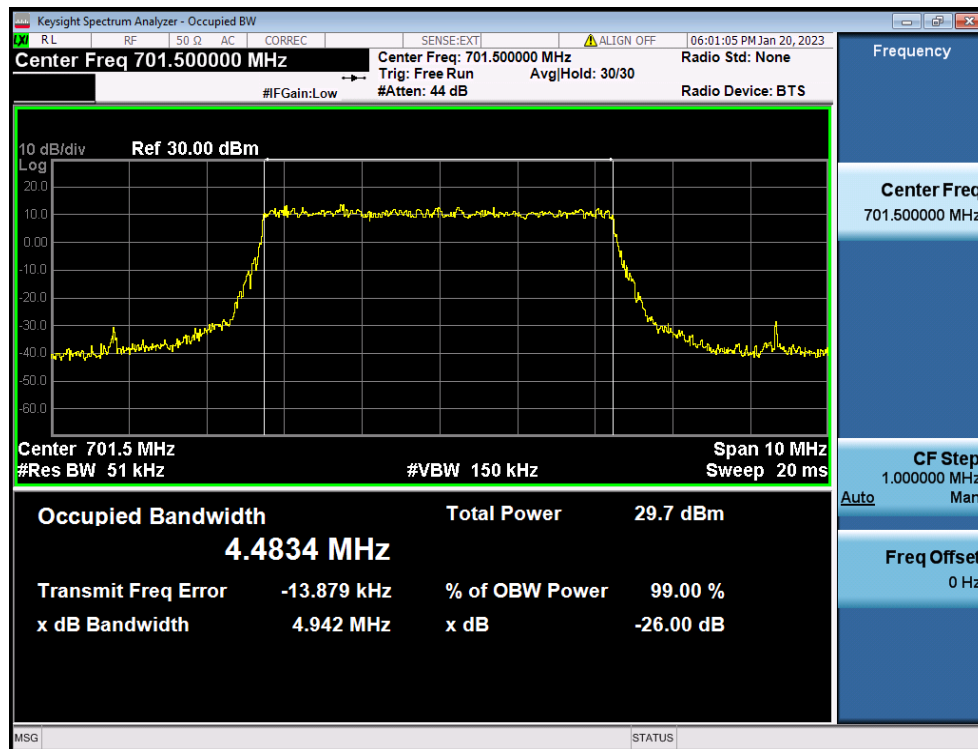
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10 MHz / 64QAM / FULL RB Size



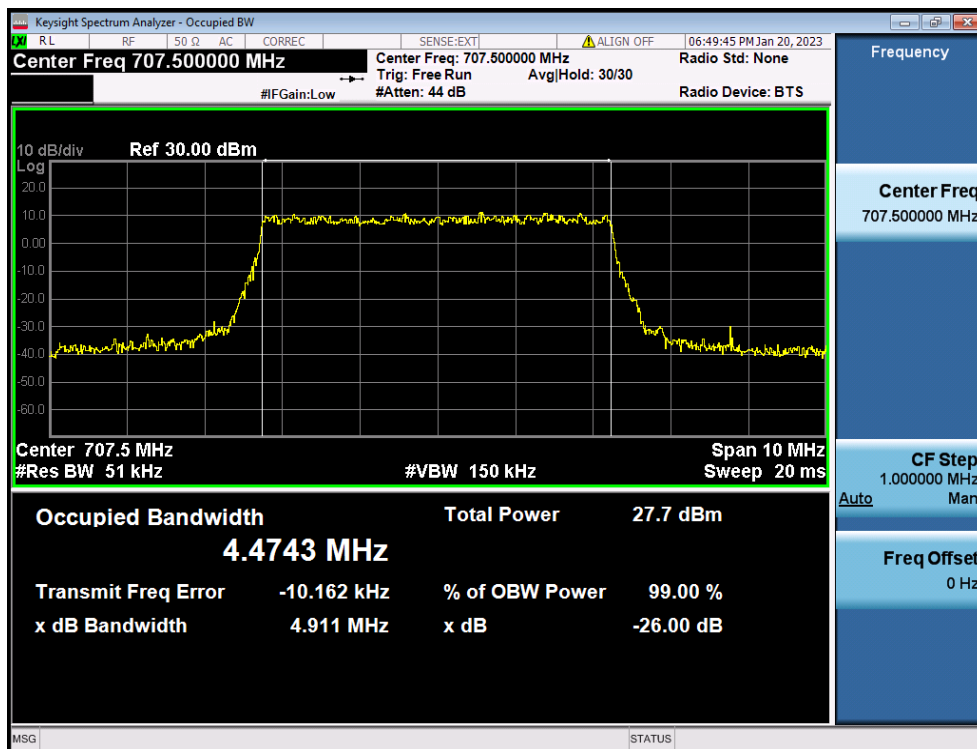
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5 MHz / $\pi/2$ BPSK / FULL RB Size

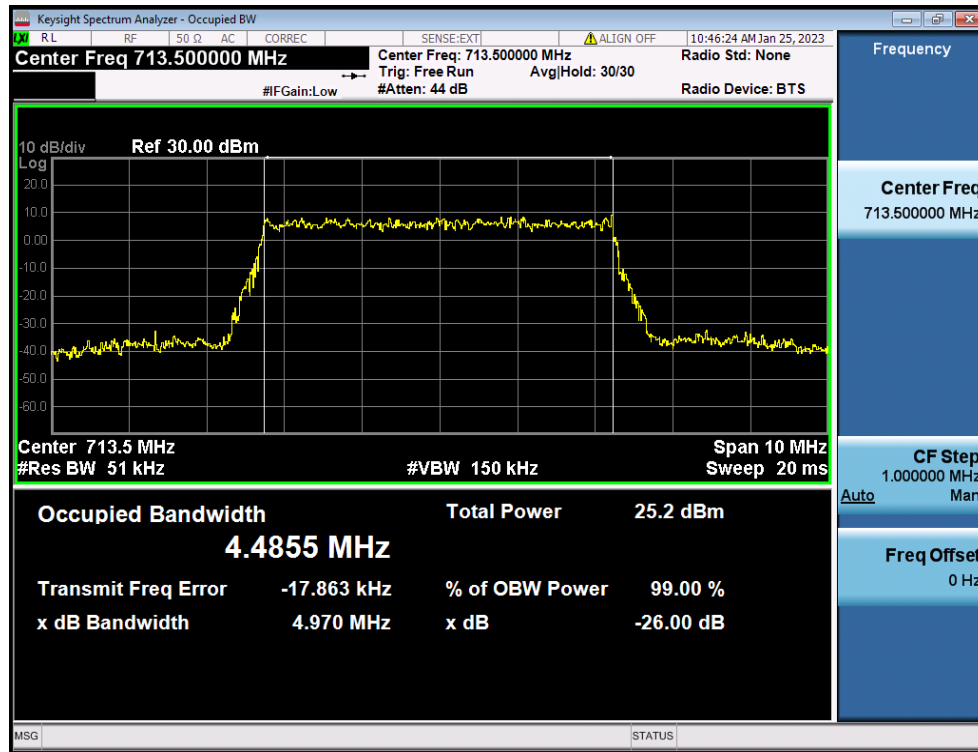
5 MHz / QPSK / FULL RB Size



5 MHz / 16QAM / FULL RB Size

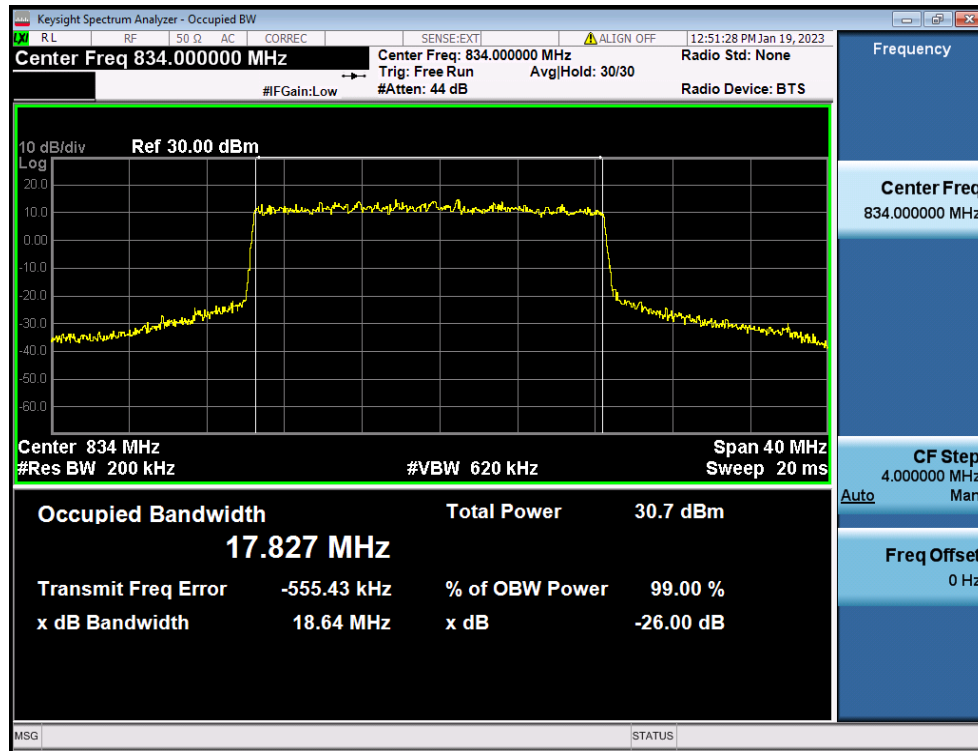


5 MHz / 64QAM / FULL RB Size

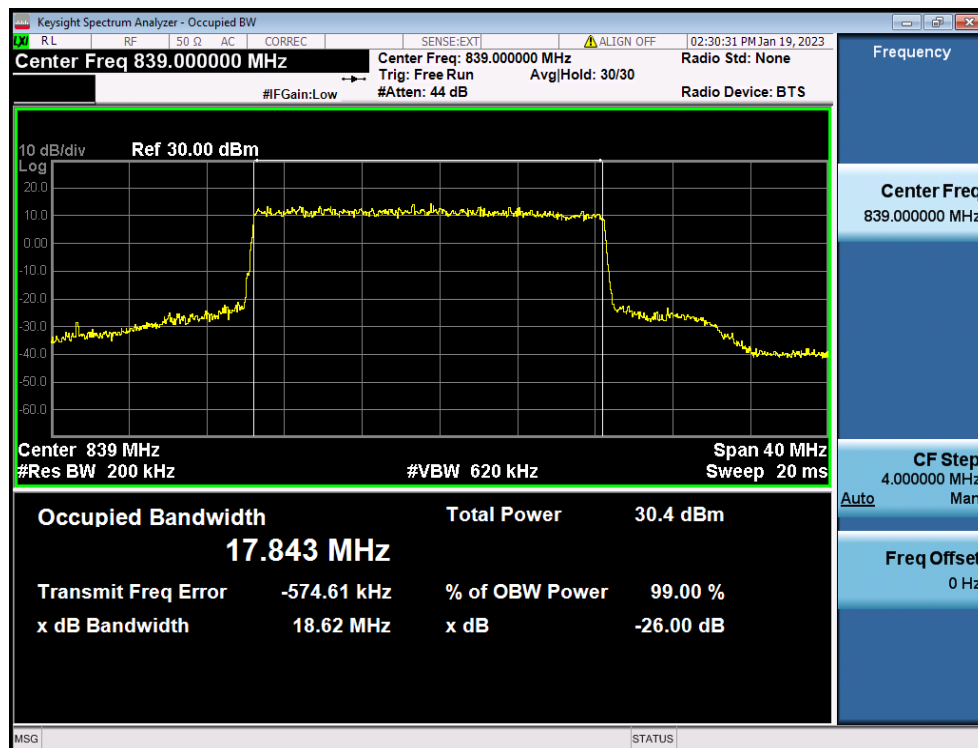


5 MHz / 256QAM / FULL RB Size

8.1.2. NR Band 5



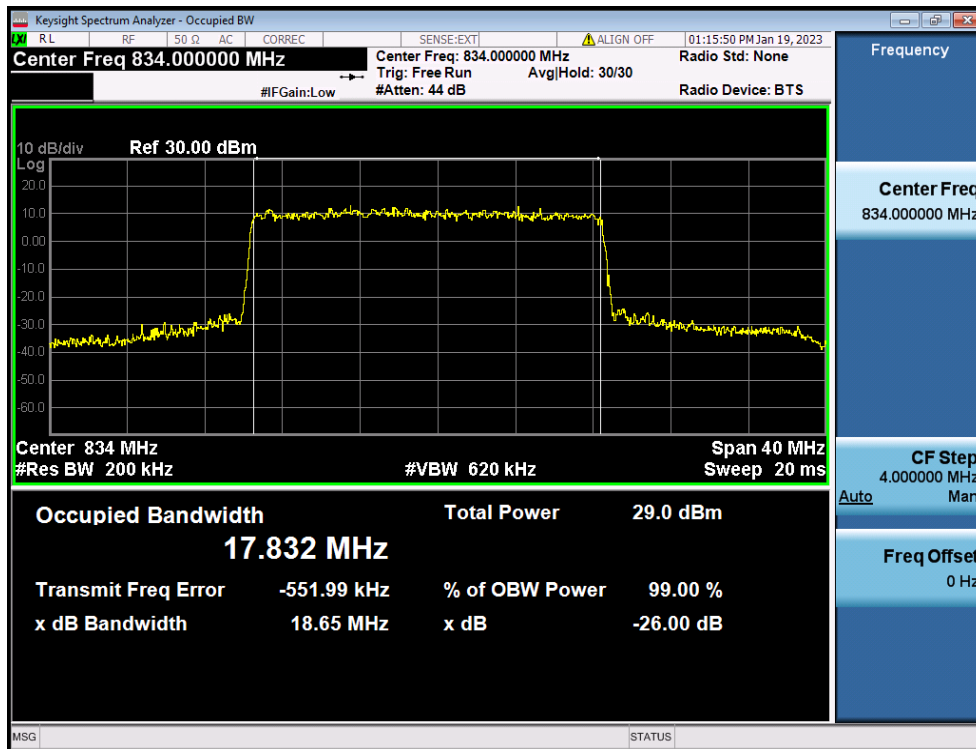
20 MHz / $\pi/2$ BPSK / FULL RB Size



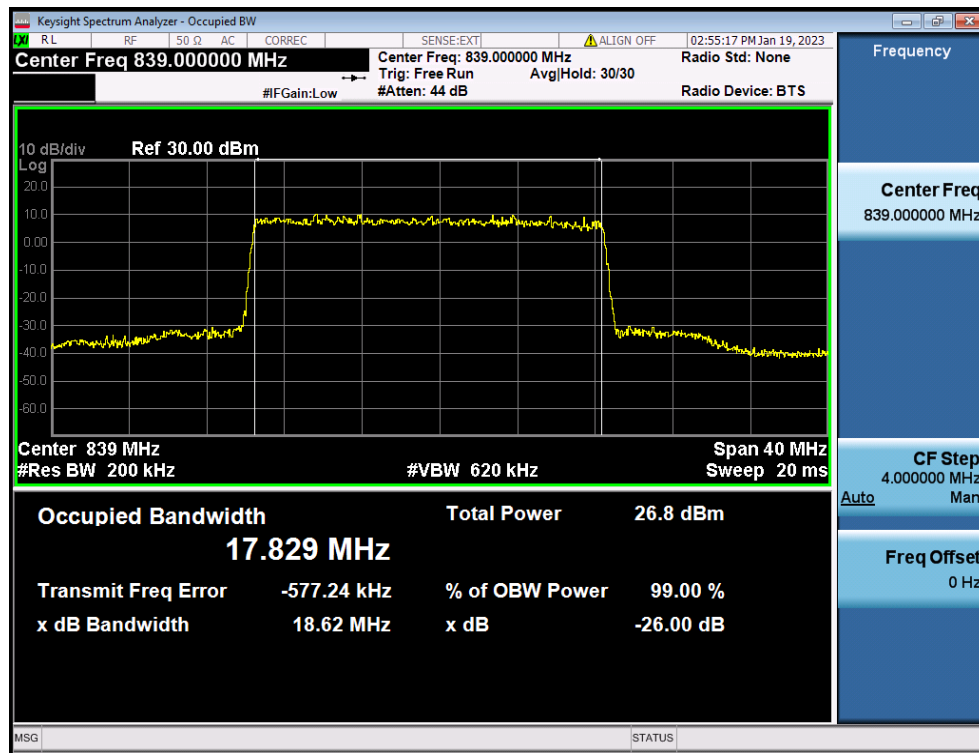
20 MHz / QPSK / FULL RB Size



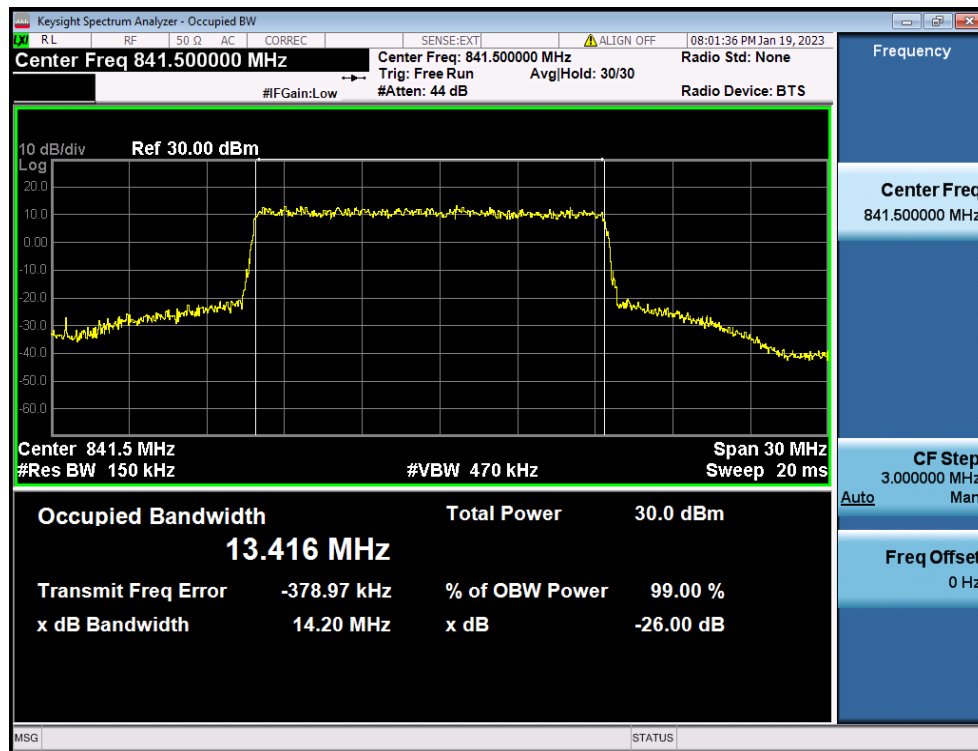
20 MHz / 16QAM / FULL RB Size



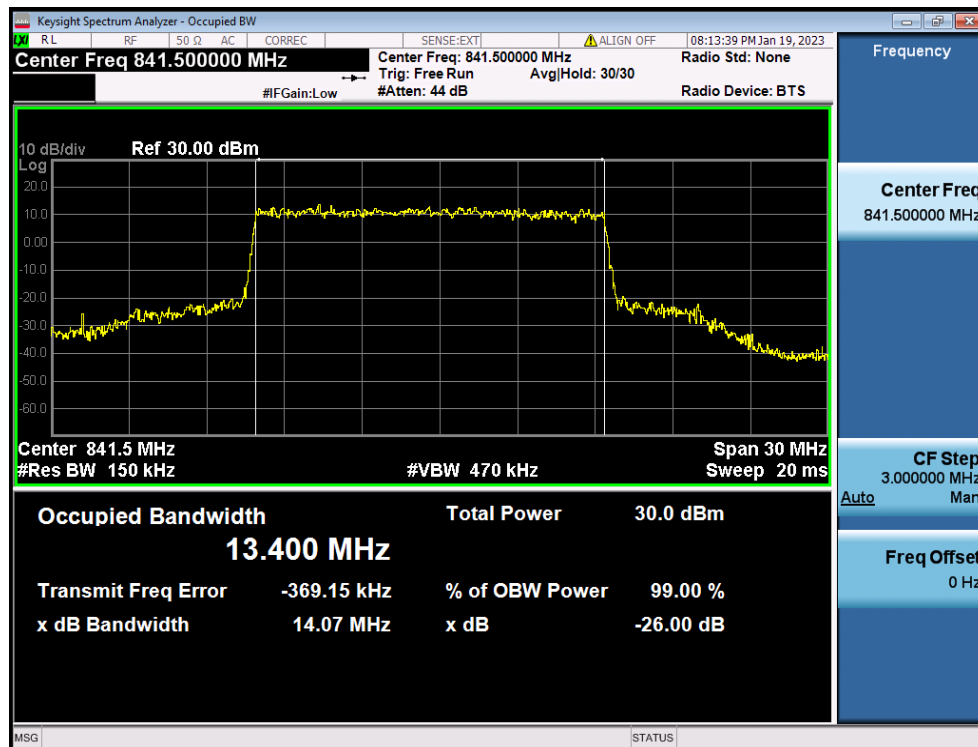
20 MHz / 64QAM / FULL RB Size



20 MHz / 256QAM / FULL RB Size



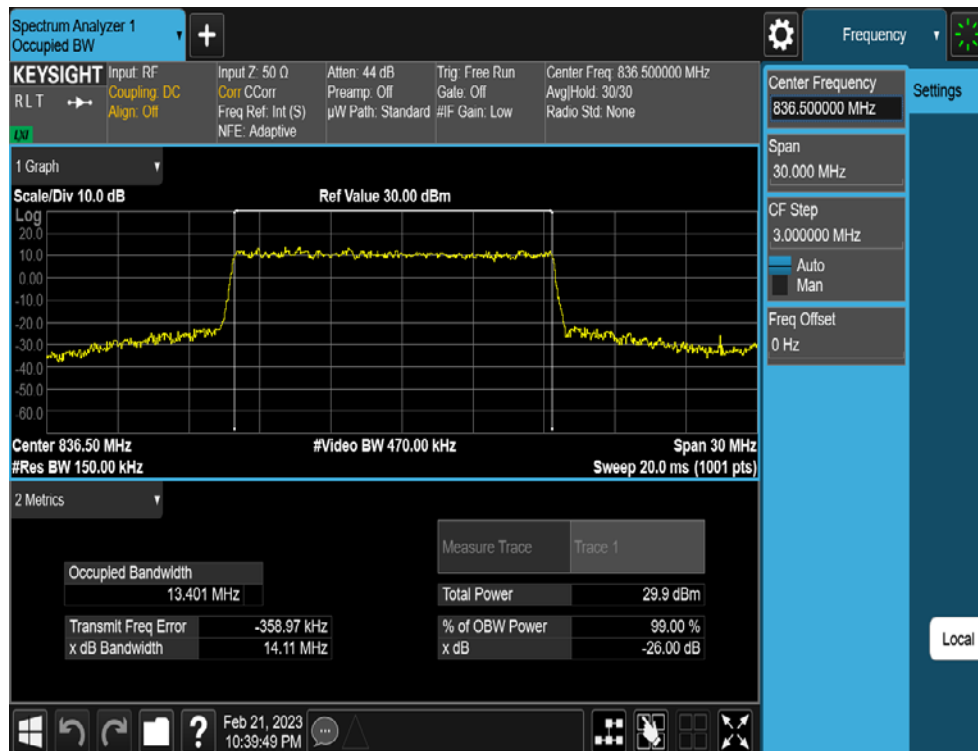
15 MHz / $\pi/2$ BPSK / FULL RB Size



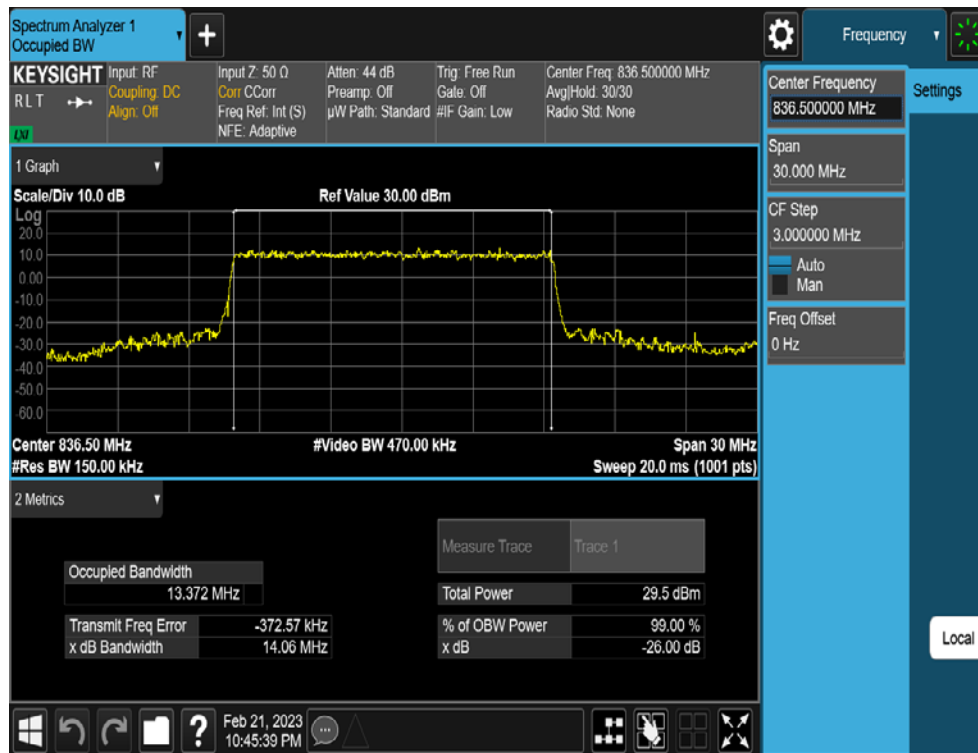
15 MHz / QPSK / FULL RB Size



15 MHz / 16QAM / FULL RB Size



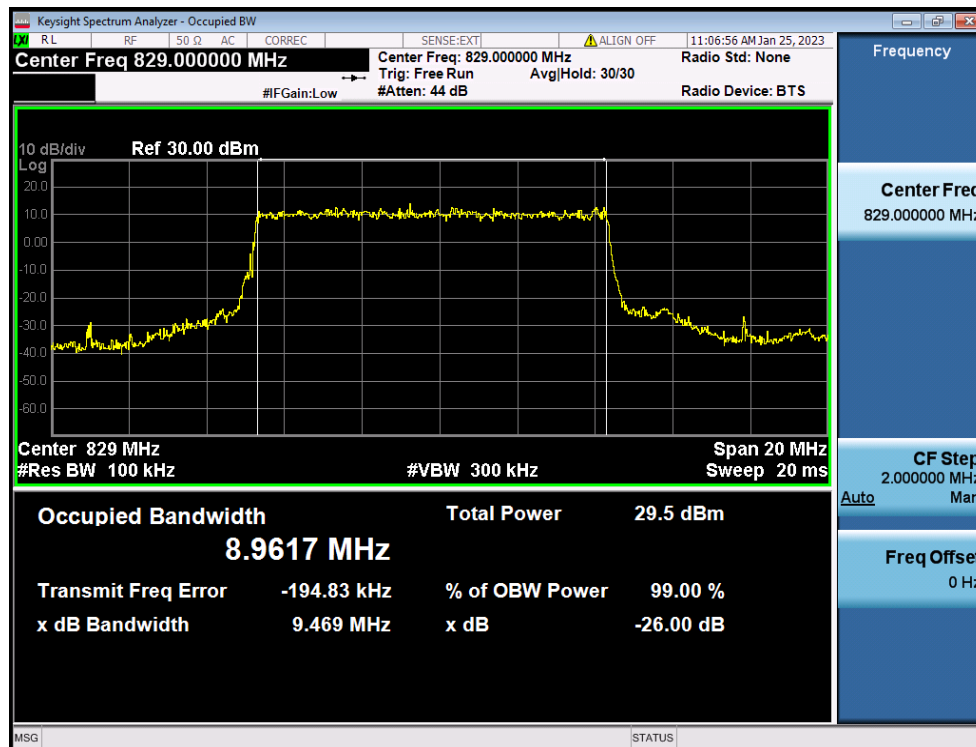
15 MHz / 64QAM / FULL RB Size



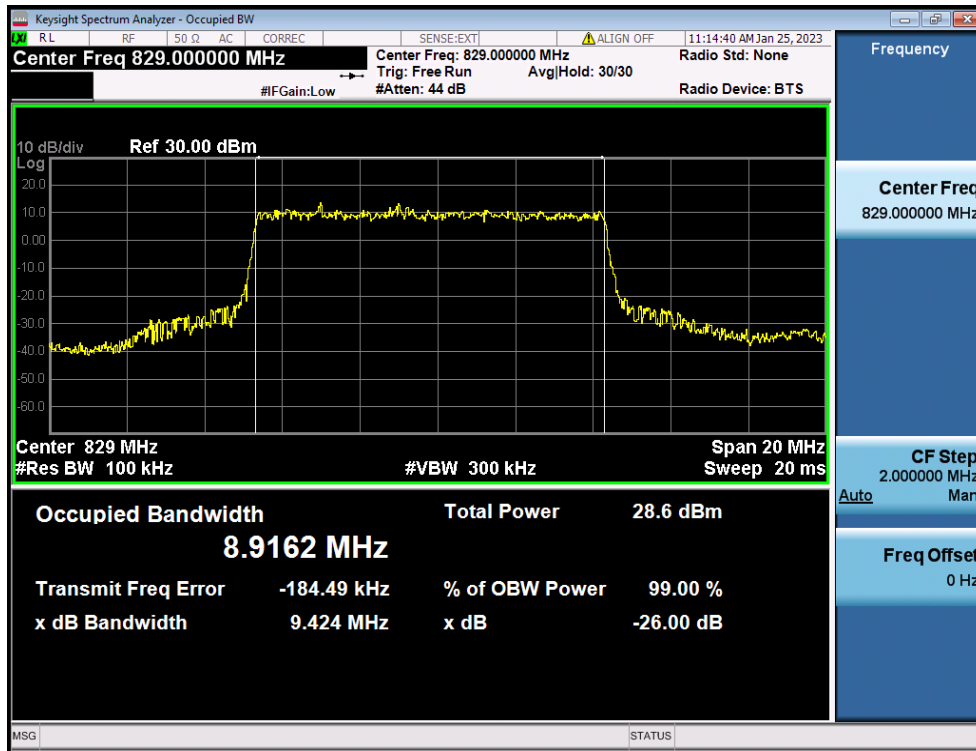
15 MHz / 256QAM / FULL RB Size



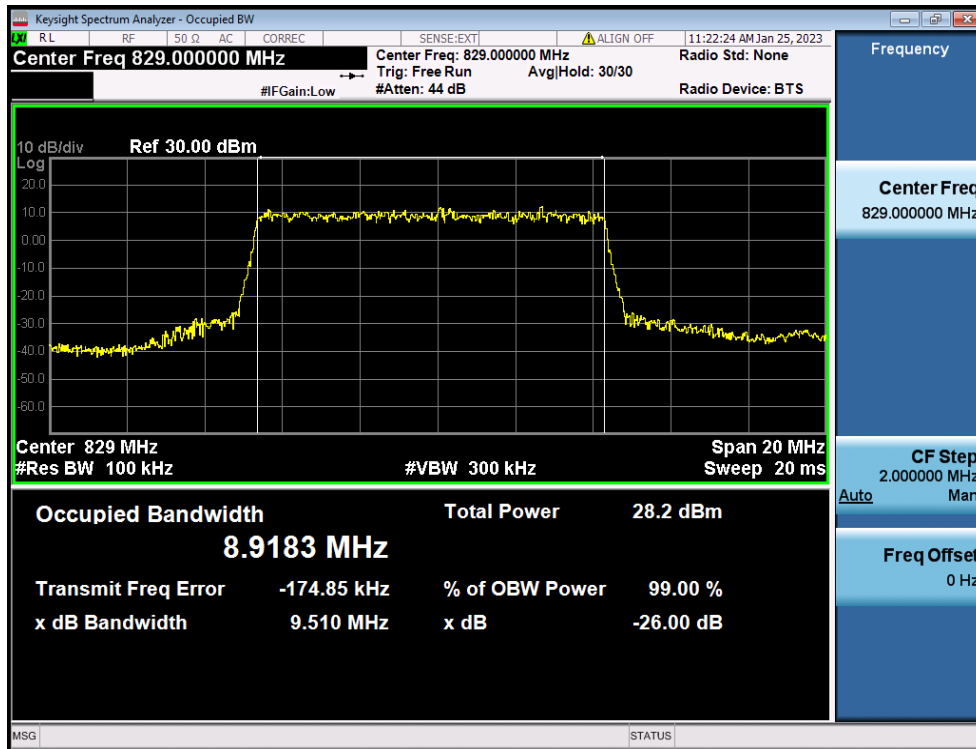
10 MHz / $\pi/2$ BPSK / FULL RB Size



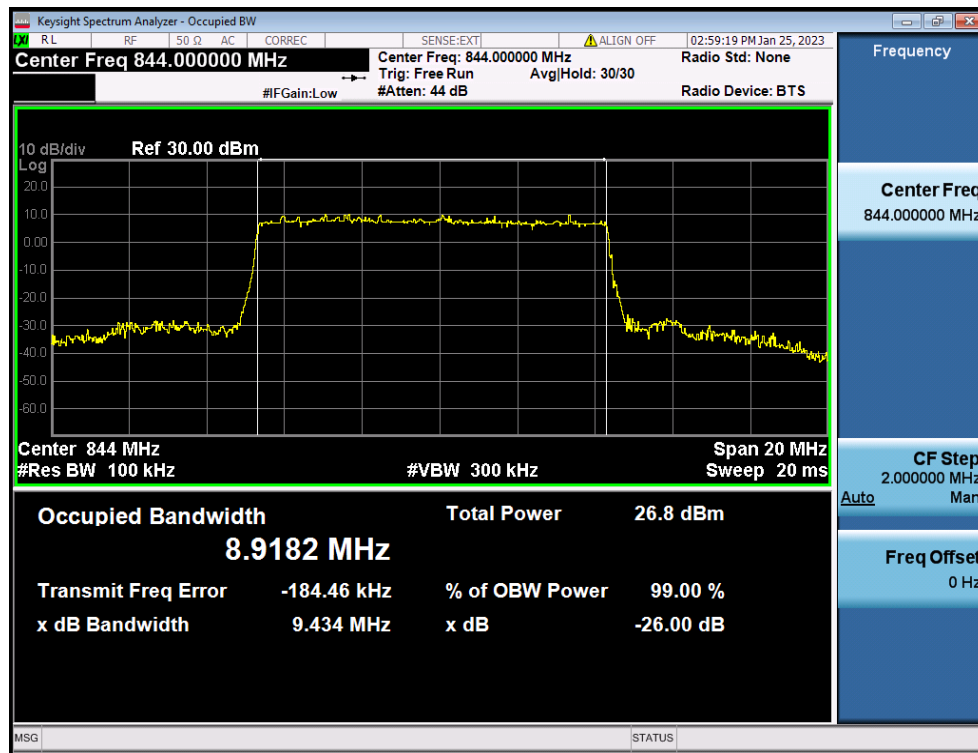
10 MHz / QPSK / FULL RB Size



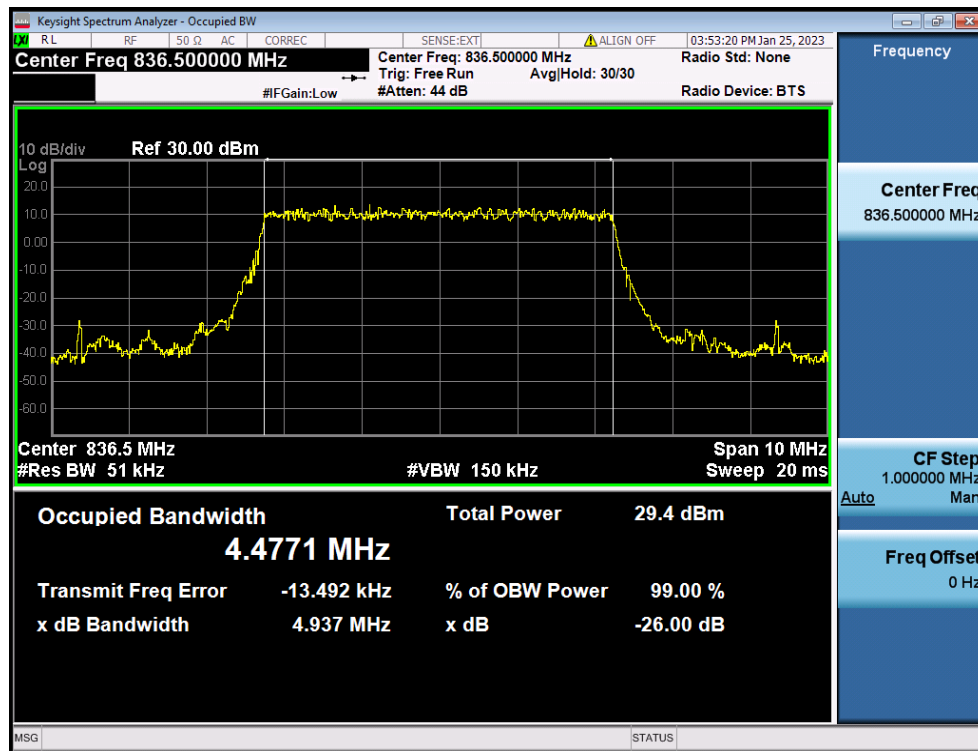
10 MHz / 16QAM / FULL RB Size



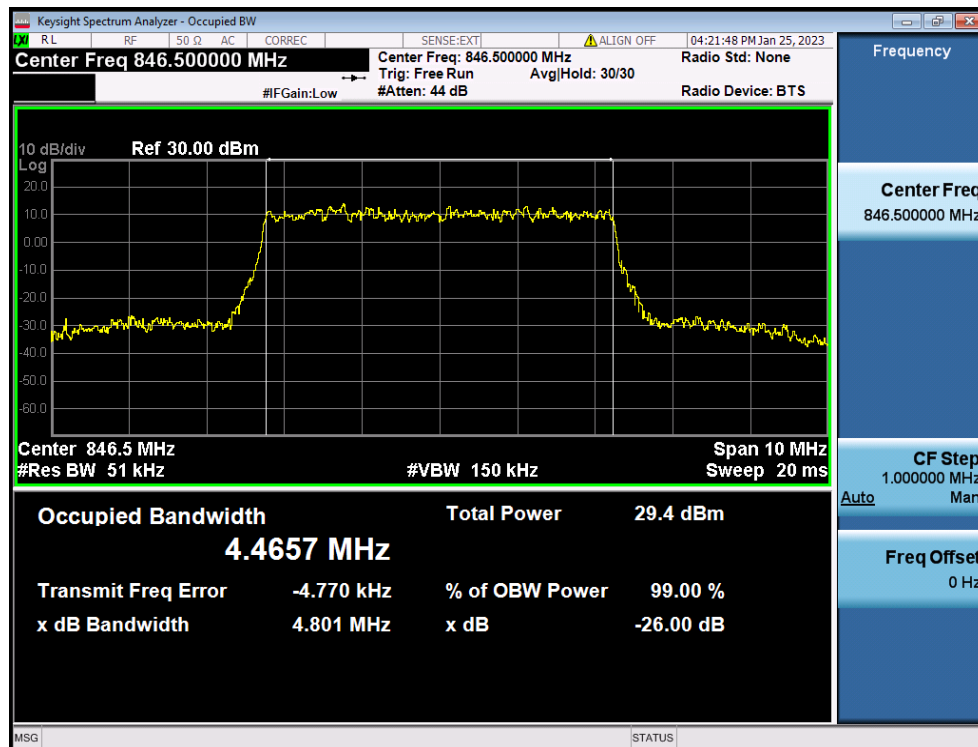
10 MHz / 64QAM / FULL RB Size



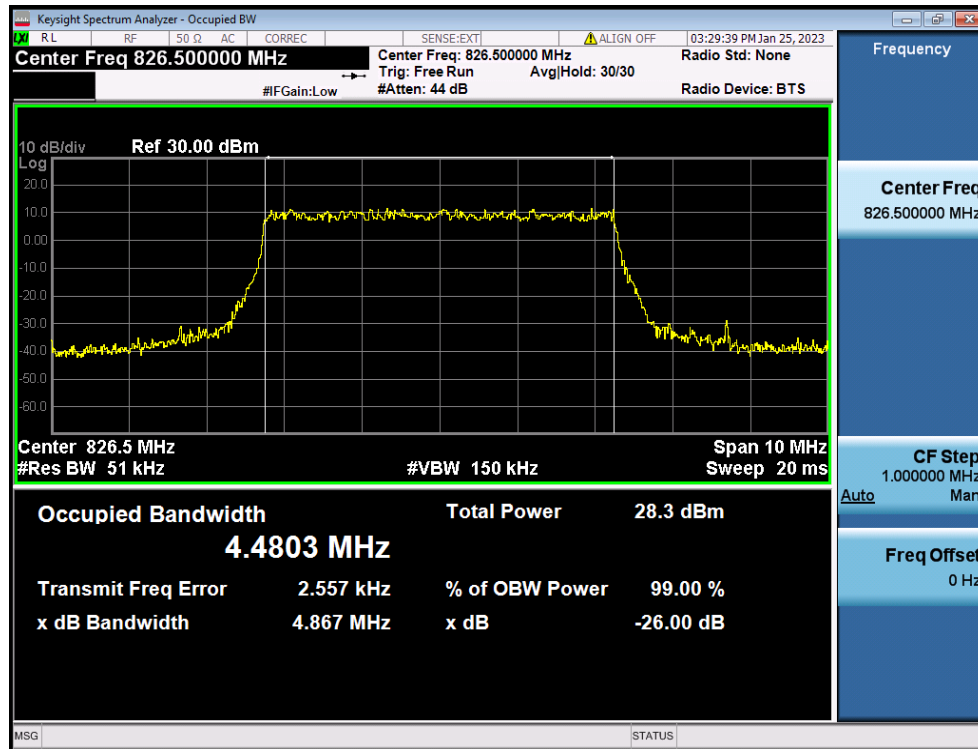
10 MHz / 256QAM / FULL RB Size



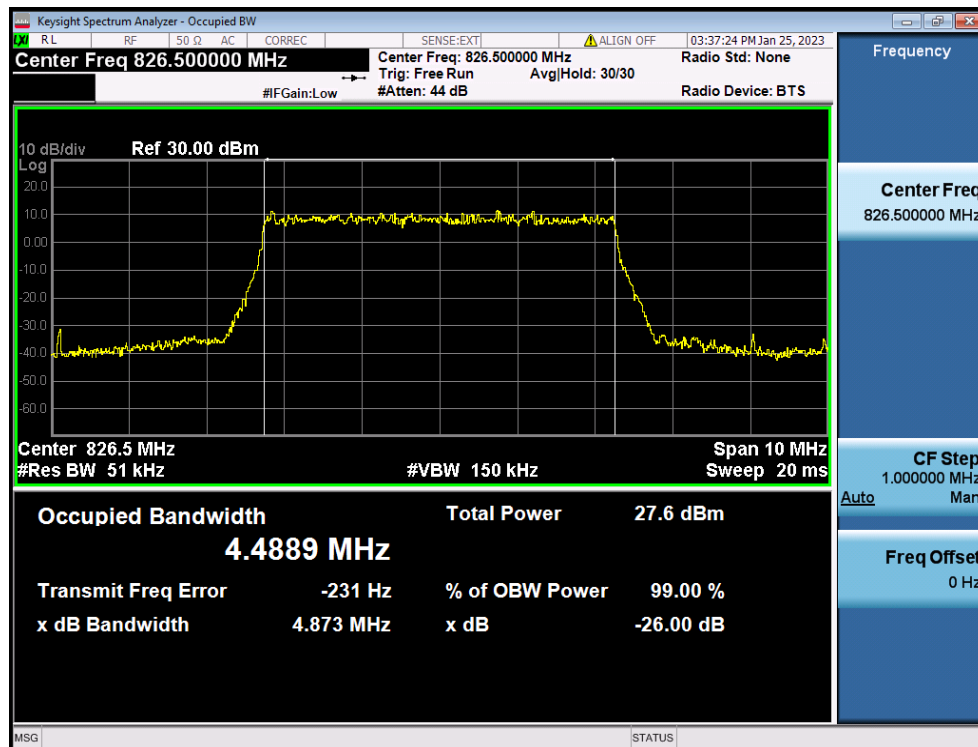
5 MHz / $\pi/2$ BPSK / FULL RB Size



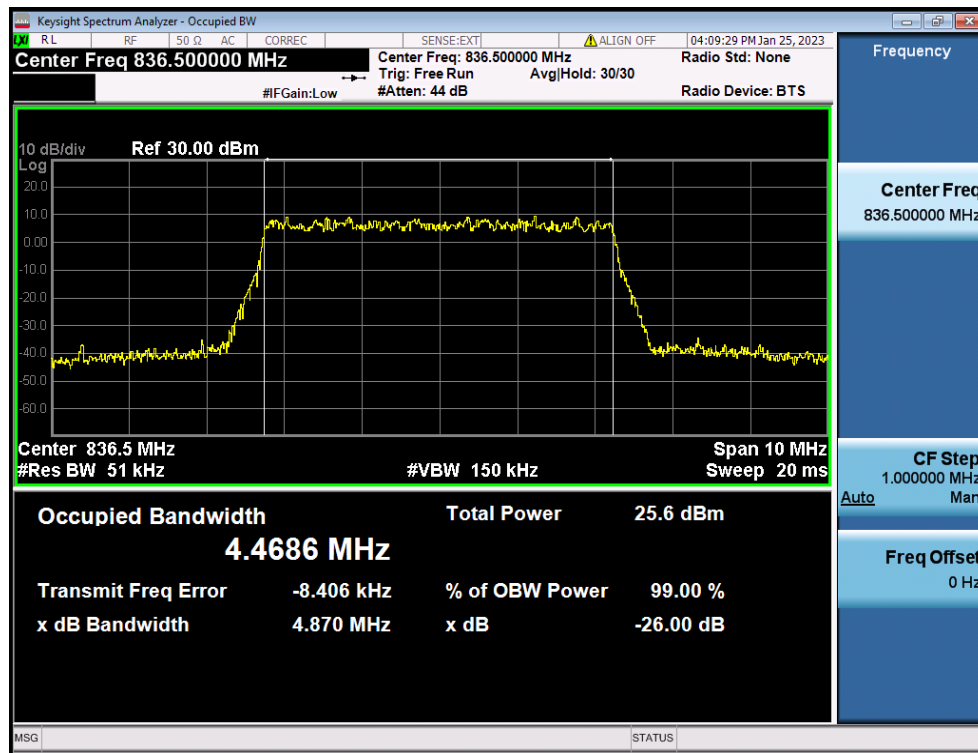
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5 MHz / 16QAM / FULL RB Size

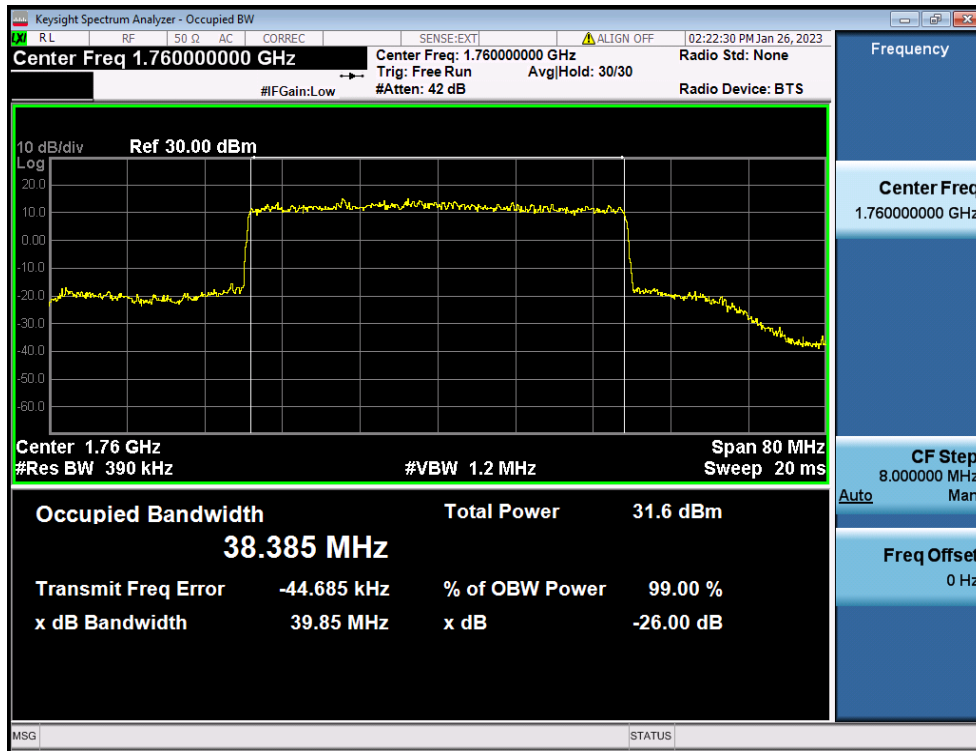


5 MHz / 64QAM / FULL RB Size

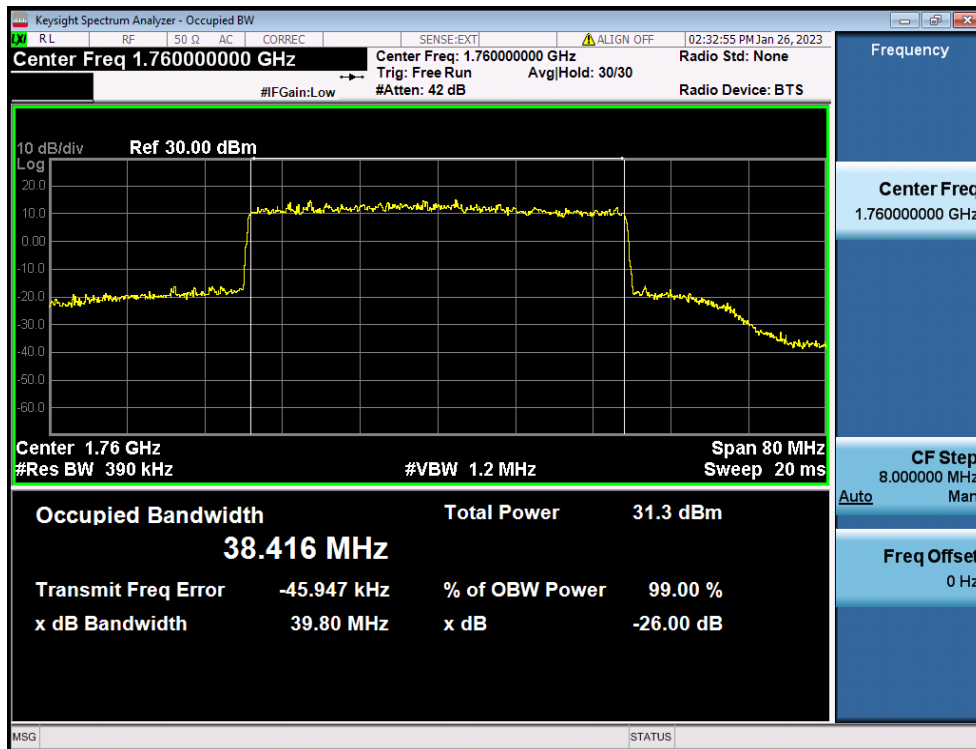


5 MHz / 256QAM / FULL RB Size

8.1.3. NR Band 66



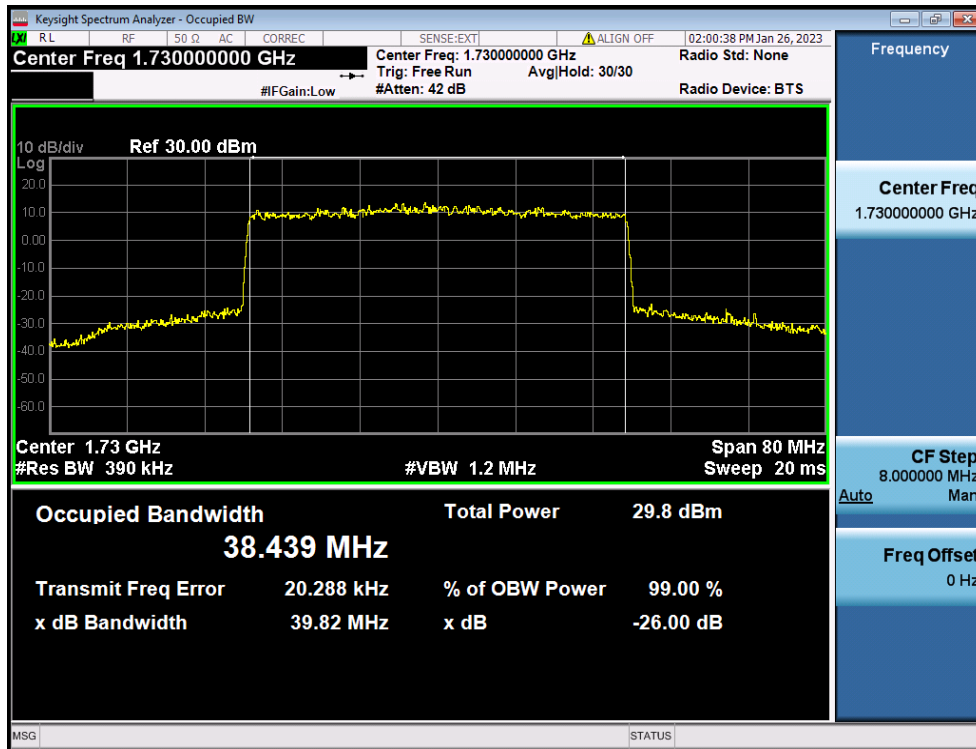
40 MHz / $\pi/2$ BPSK / FULL RB Size



40 MHz / QPSK / FULL RB Size



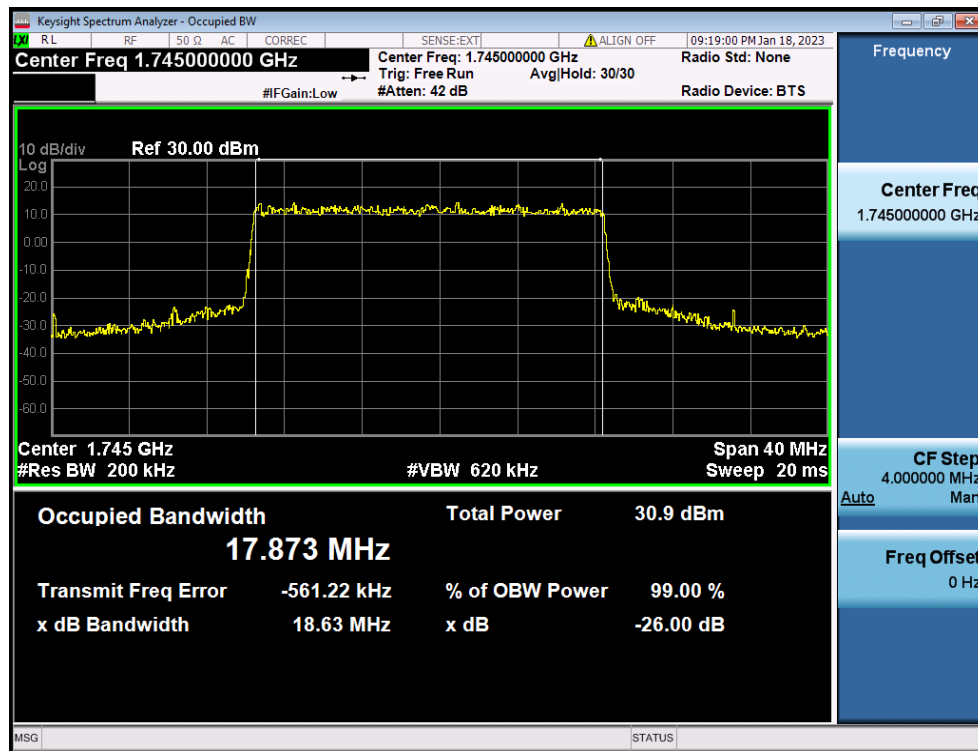
40 MHz / 16QAM / FULL RB Size



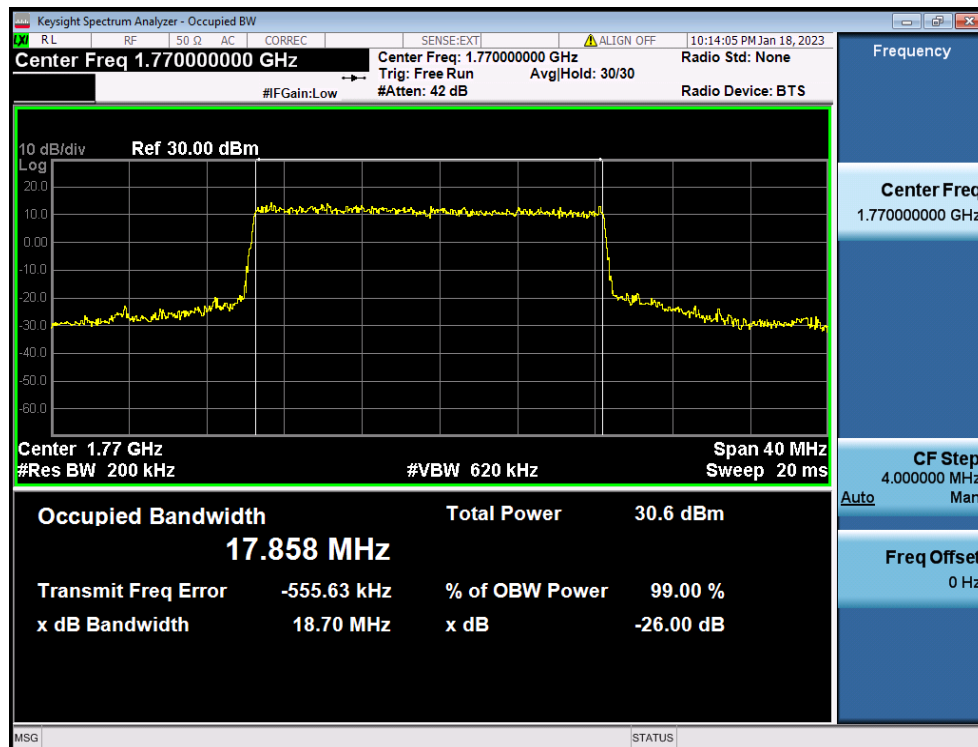
40 MHz / 64QAM / FULL RB Size



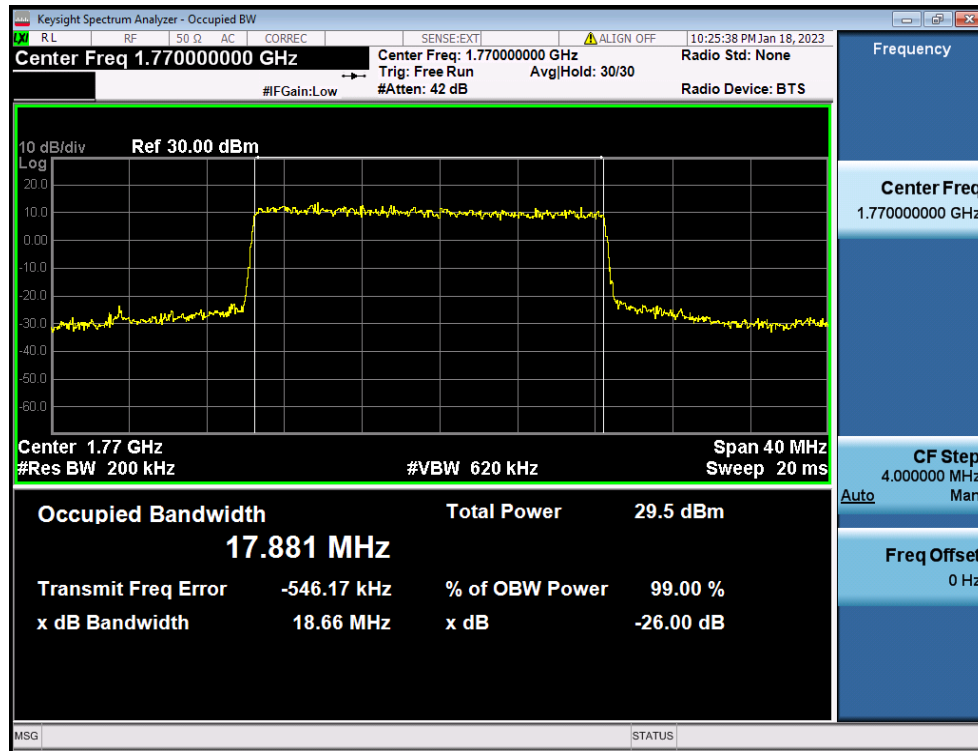
40 MHz / 256QAM / FULL RB Size



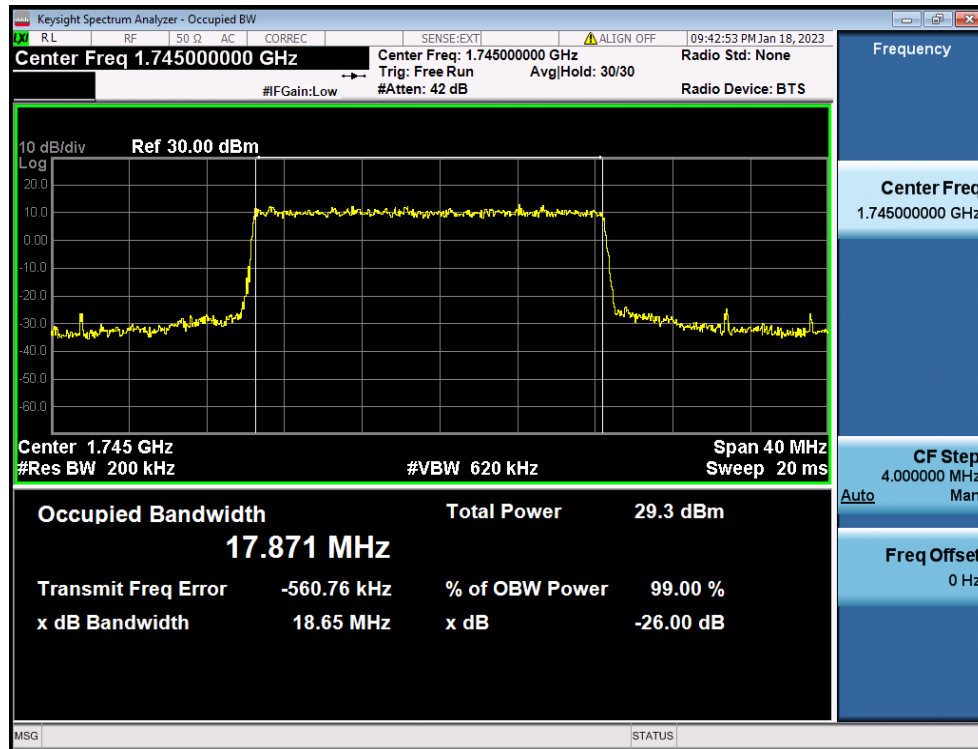
20 MHz / $\pi/2$ BPSK / FULL RB Size



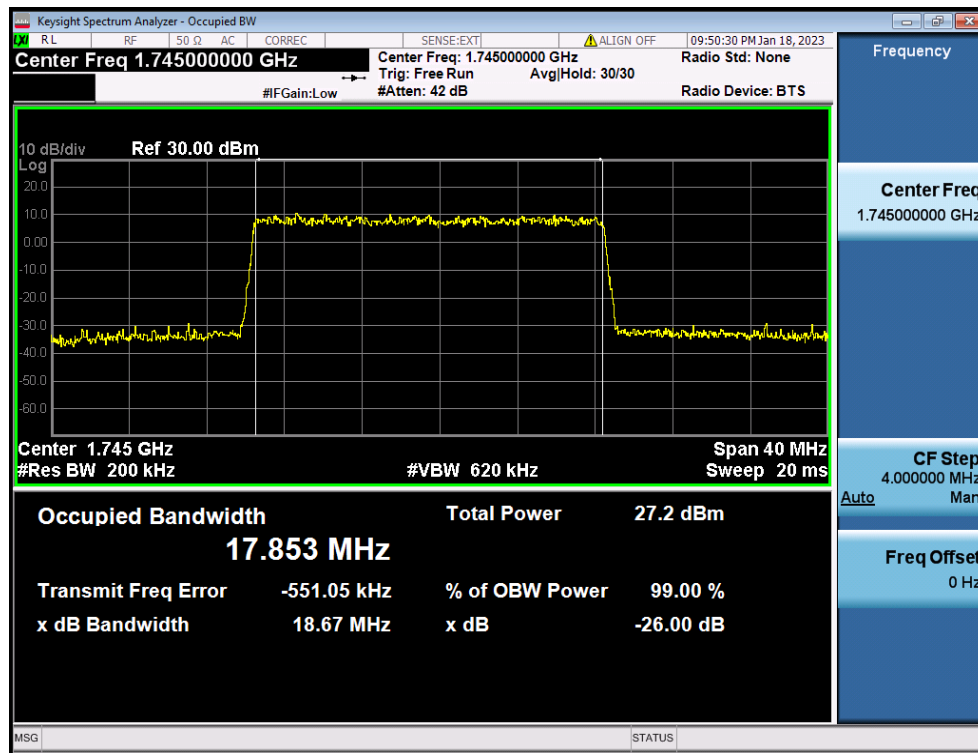
20 MHz / QPSK / FULL RB Size



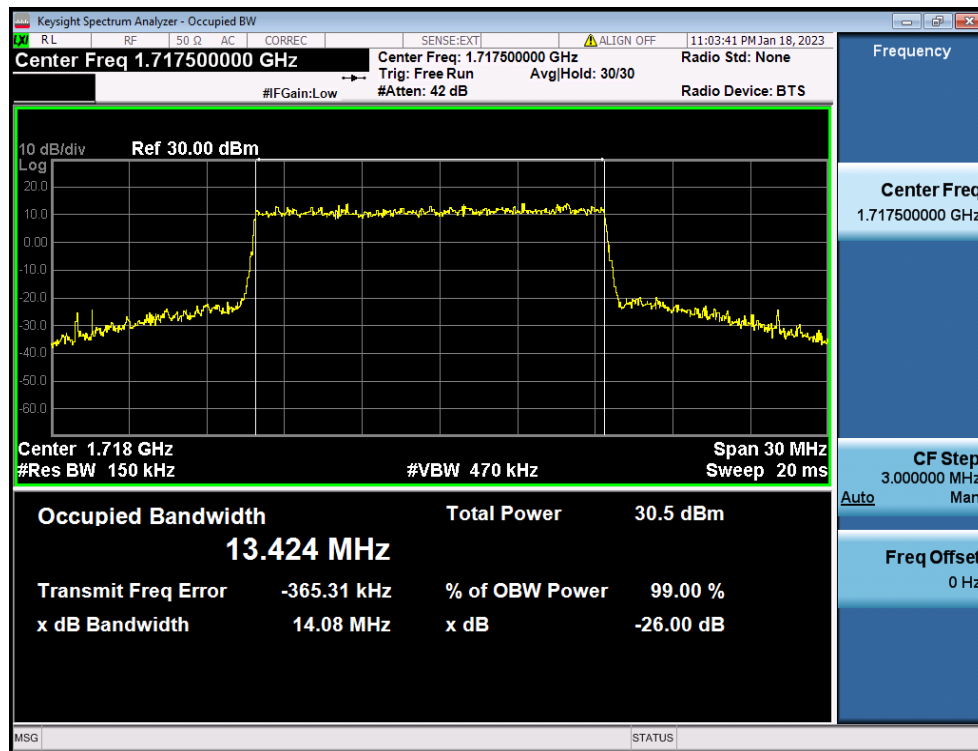
20 MHz / 16QAM / FULL RB Size



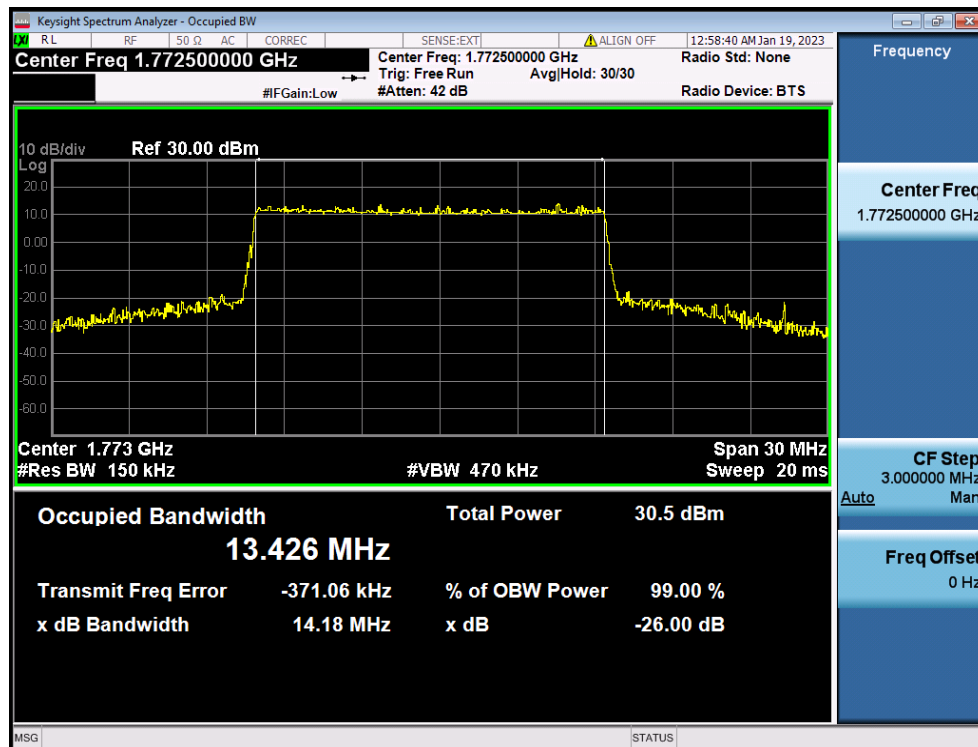
20 MHz / 64QAM / FULL RB Size



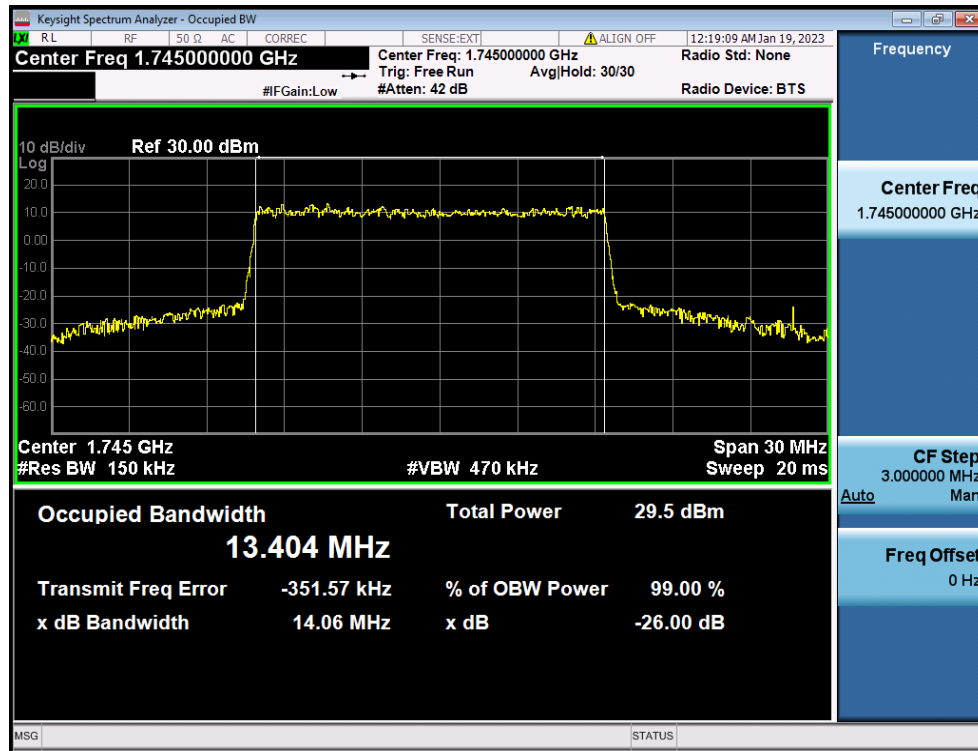
20 MHz / 256QAM / FULL RB Size



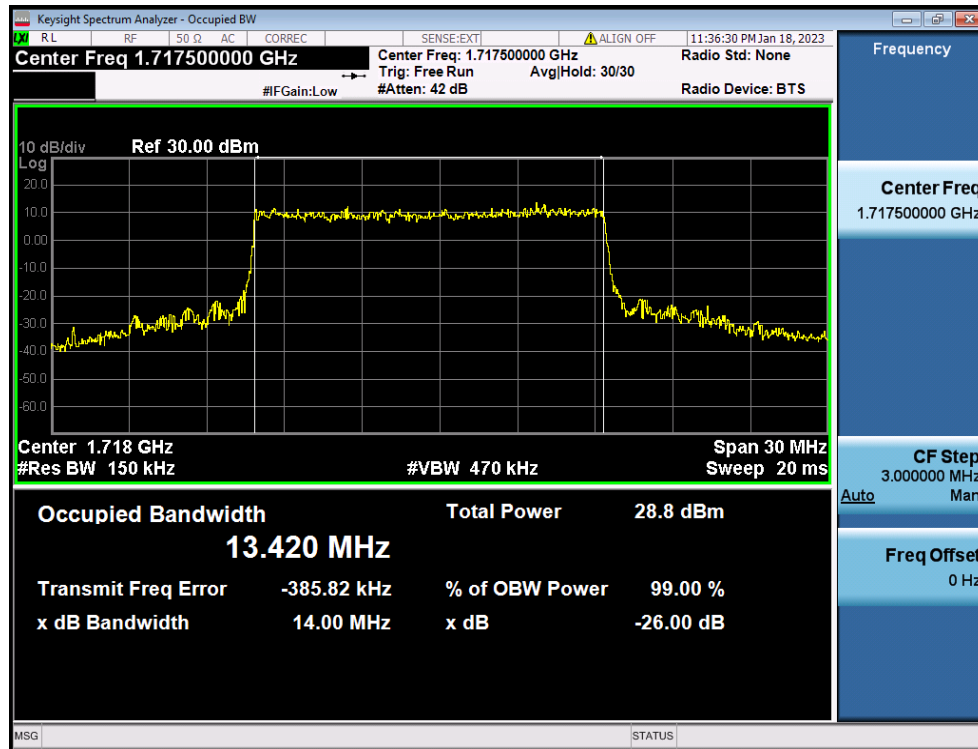
15 MHz / $\pi/2$ BPSK / FULL RB Size



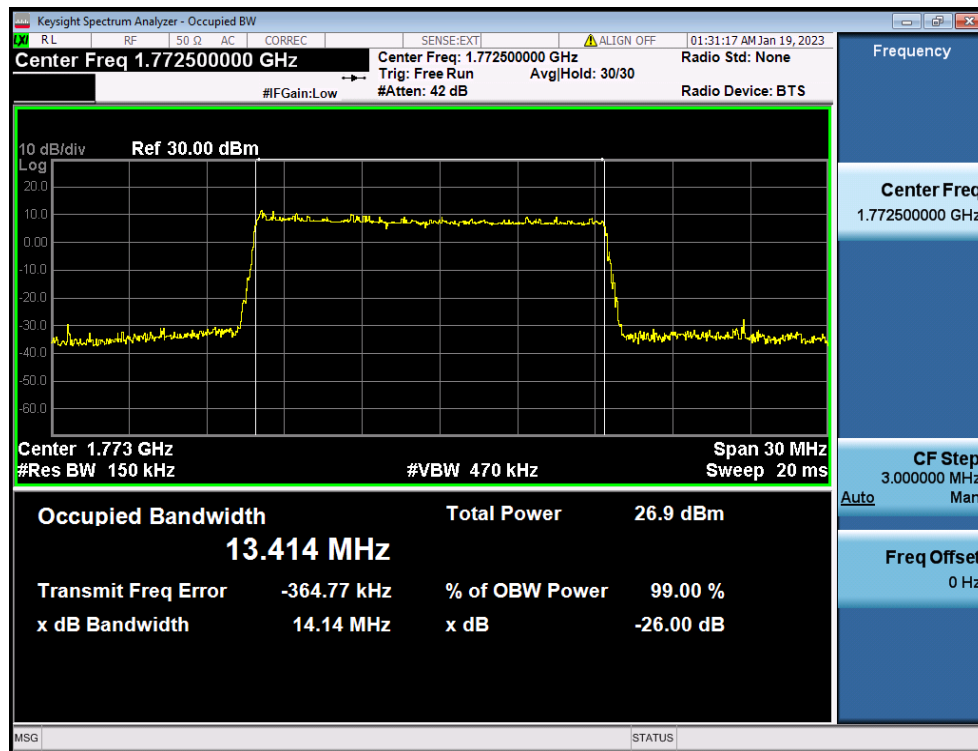
15 MHz / QPSK / FULL RB Size



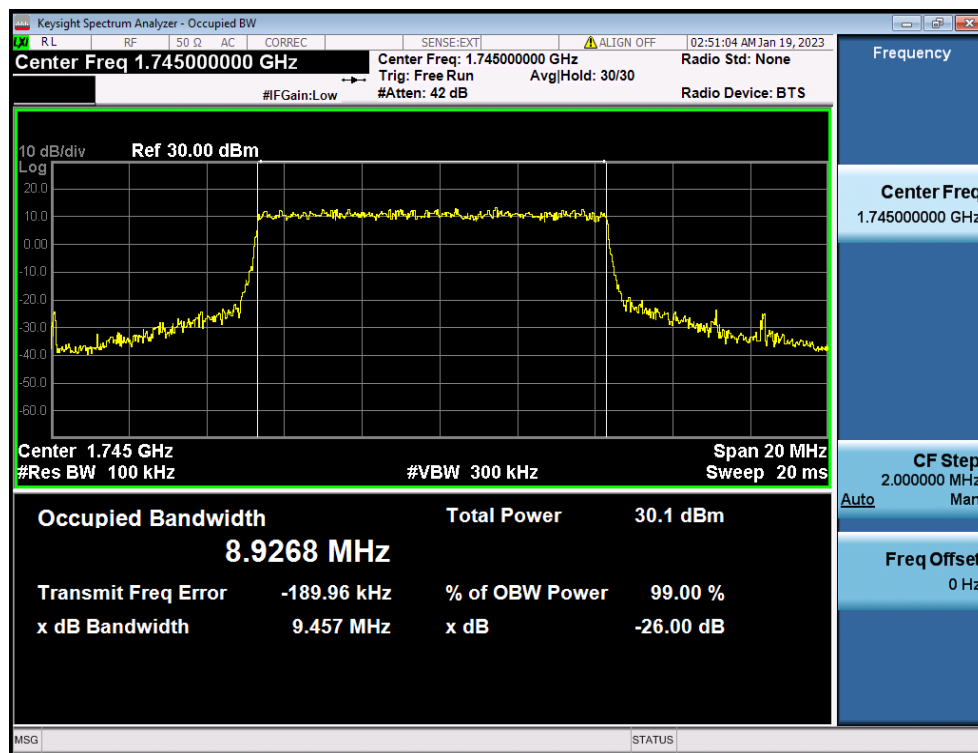
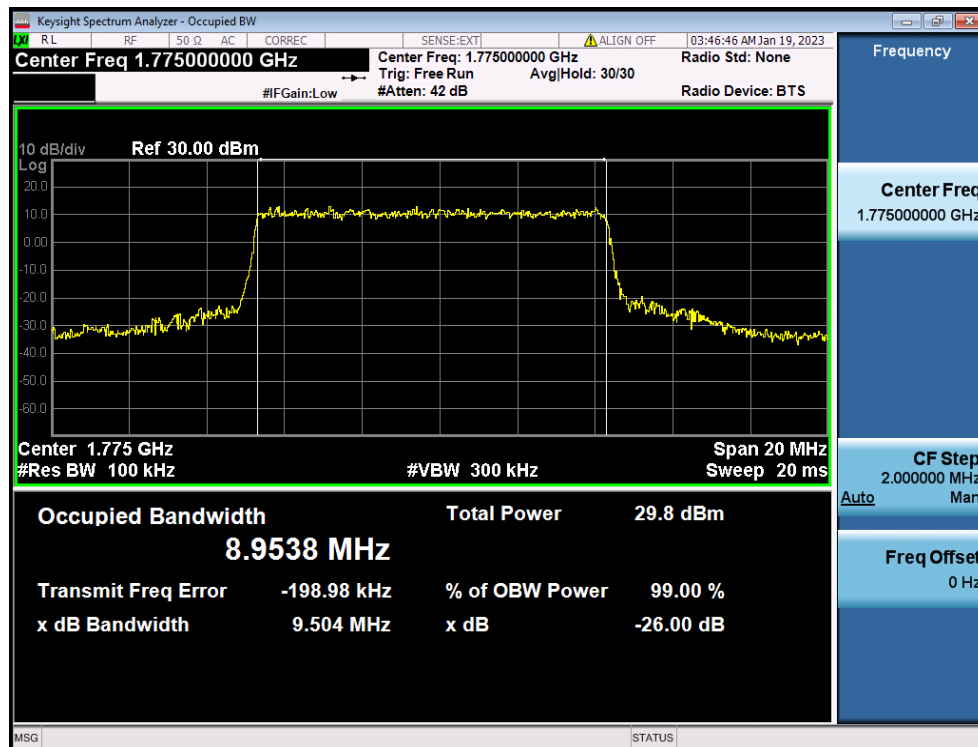
15 MHz / 16QAM / FULL RB Size



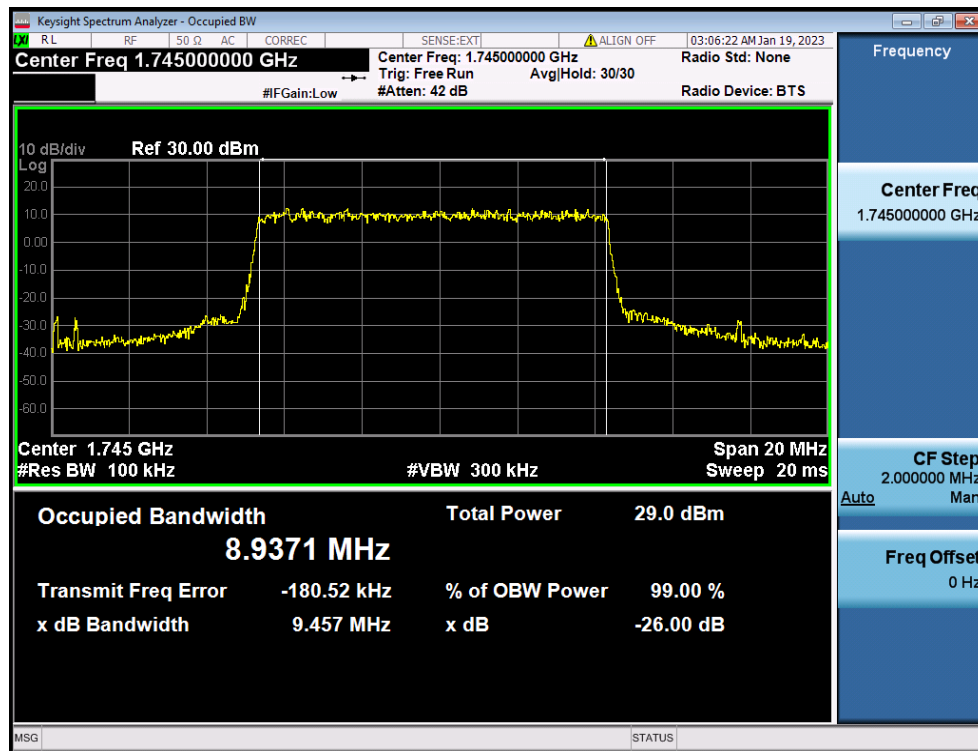
15 MHz / 64QAM / FULL RB Size



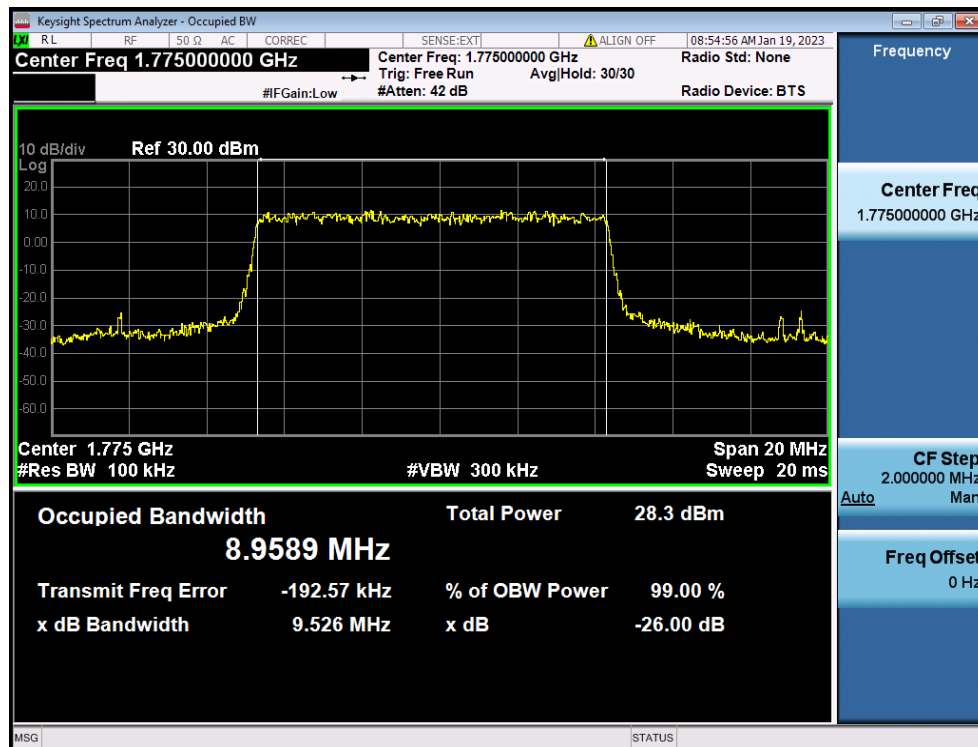
15 MHz / 256QAM / FULL RB Size

10 MHz / $\pi/2$ BPSK / FULL RB Size

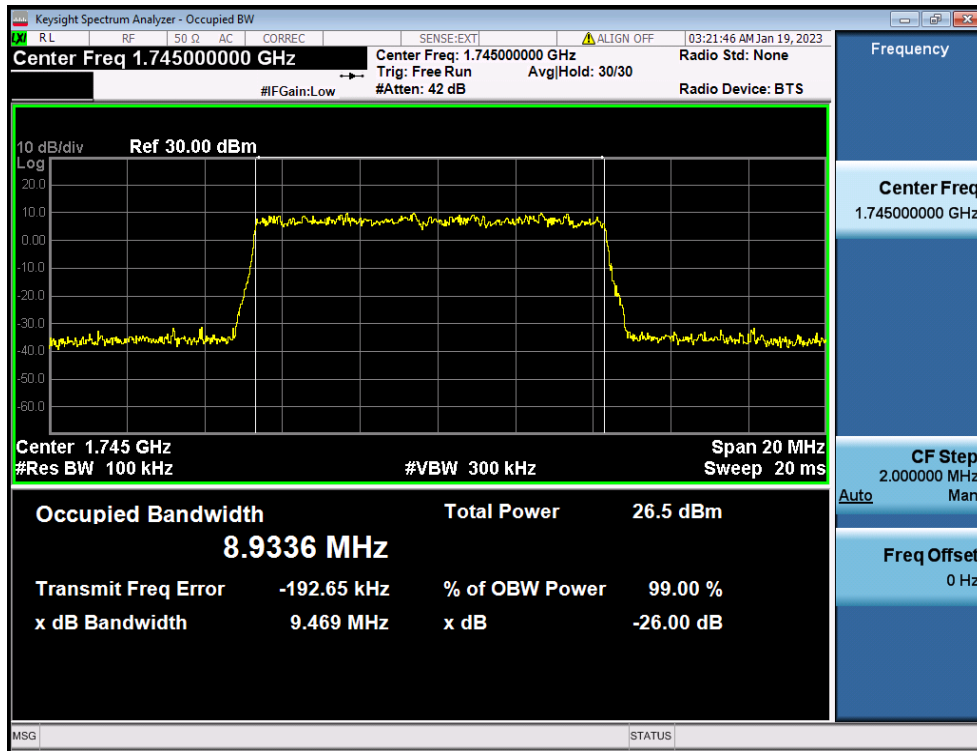
10 MHz / QPSK / FULL RB Size



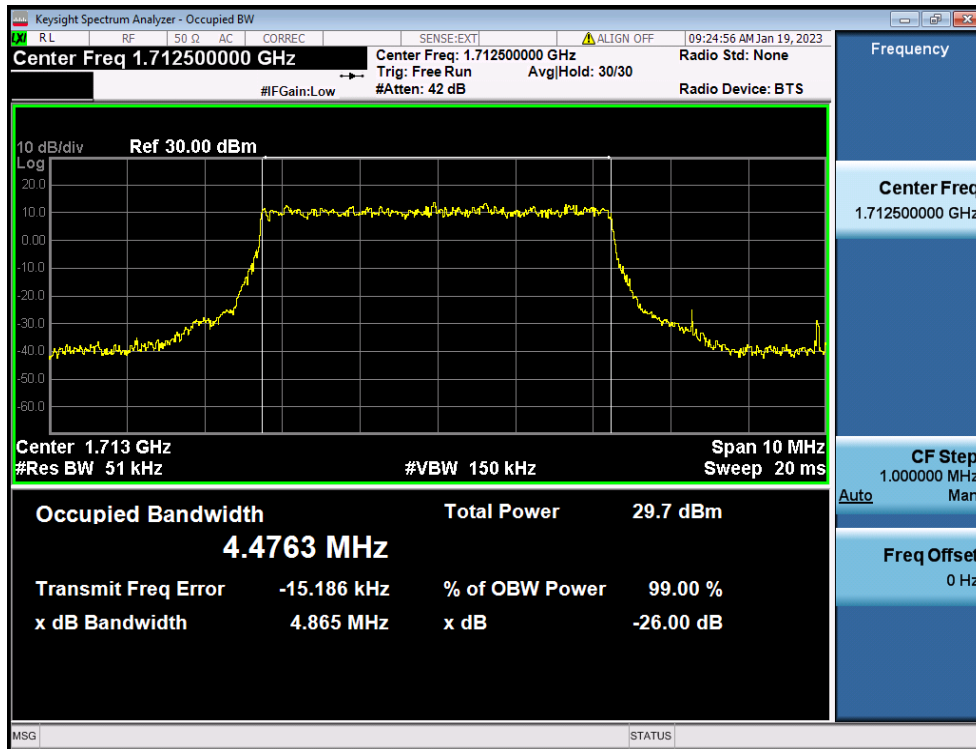
10 MHz / 16QAM / FULL RB Size



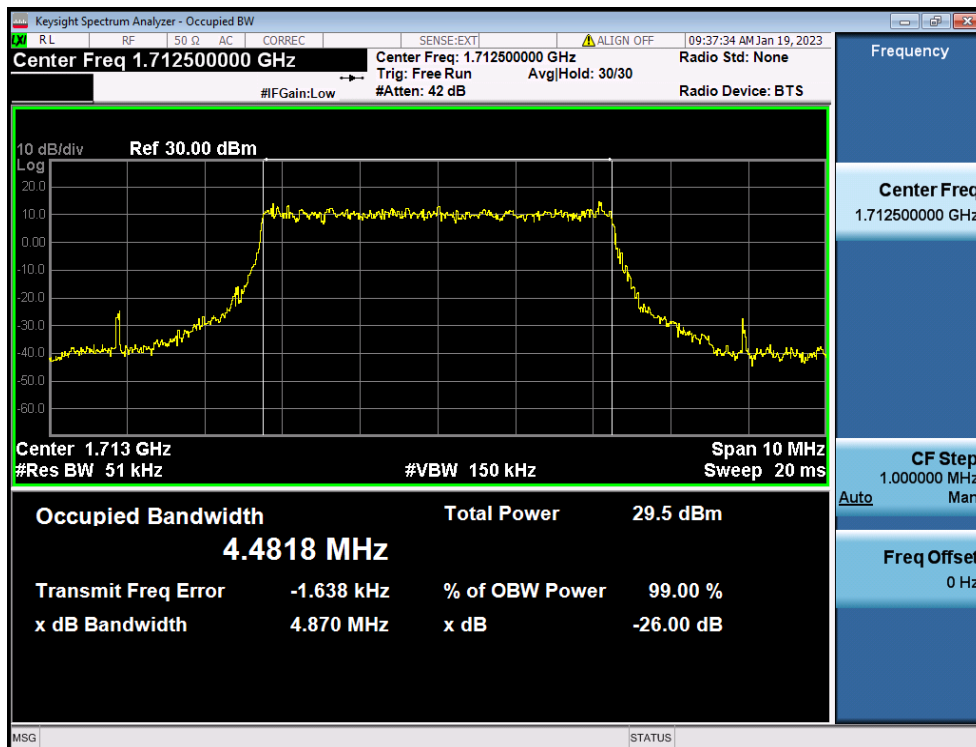
10 MHz / 64QAM / FULL RB Size



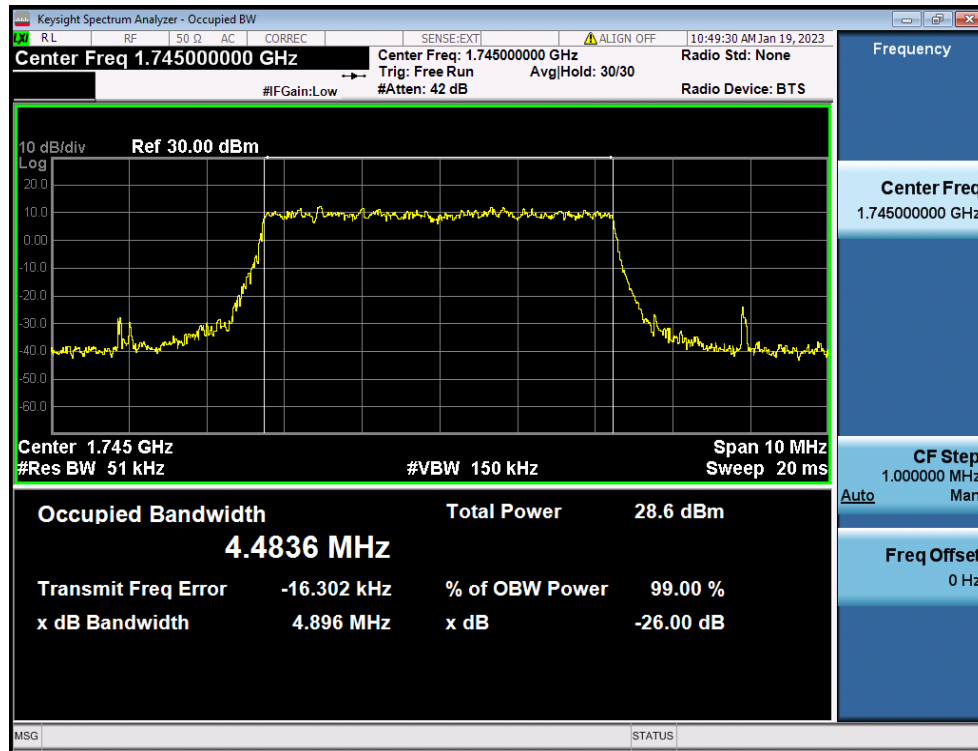
10 MHz / 256QAM / FULL RB Size



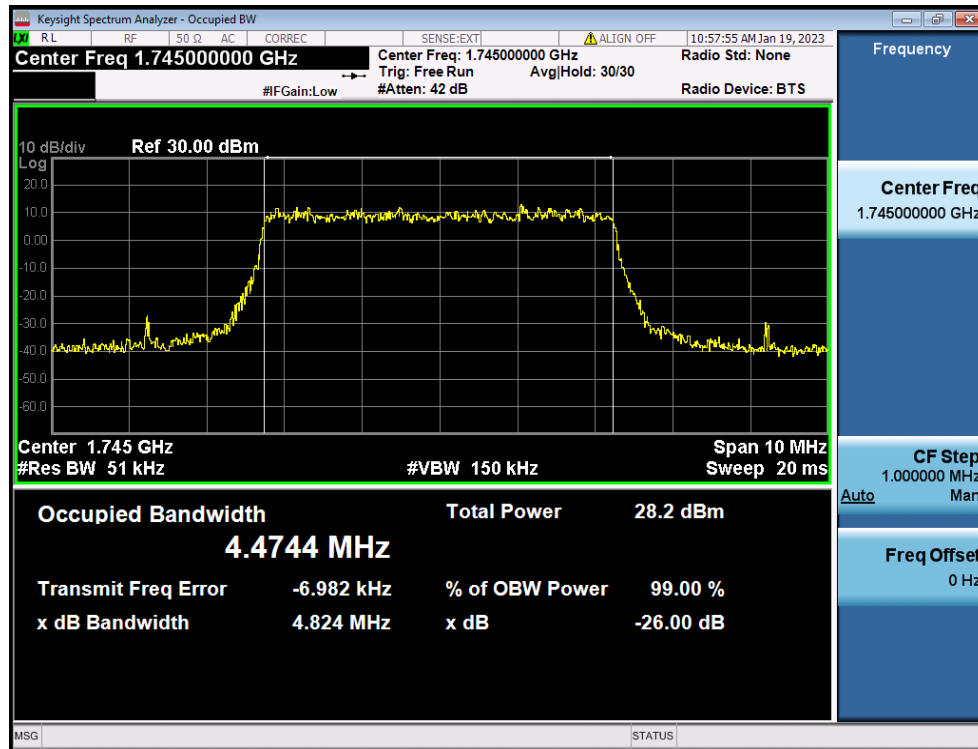
5 MHz / $\pi/2$ BPSK / FULL RB Size



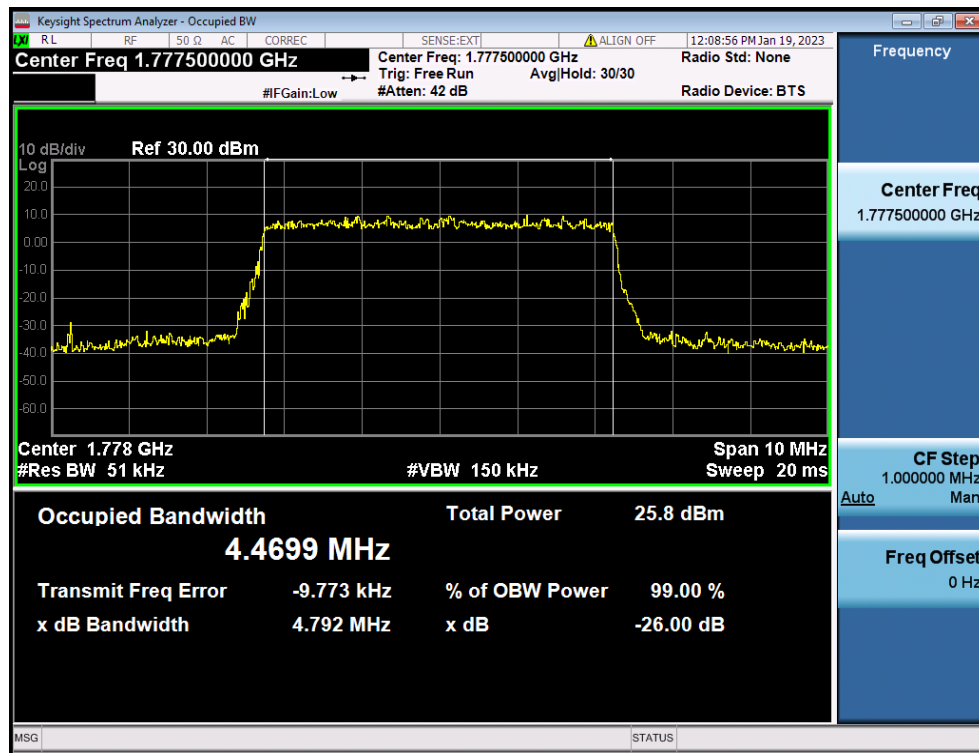
5 MHz / QPSK / FULL RB Size



5 MHz / 16QAM / FULL RB Size

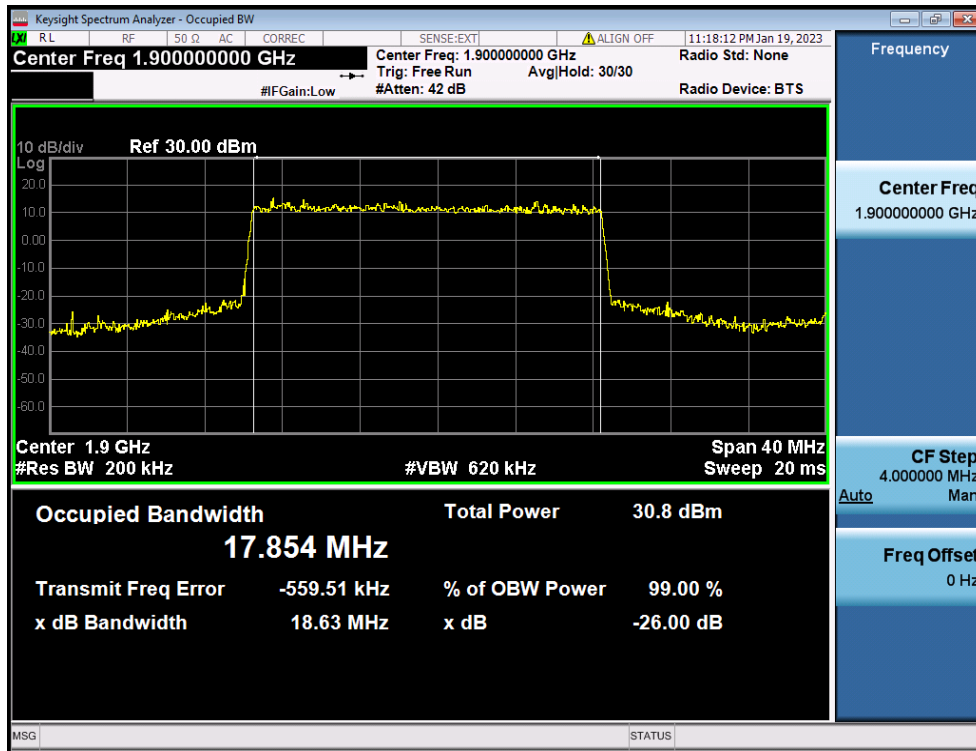


5 MHz / 64QAM / FULL RB Size

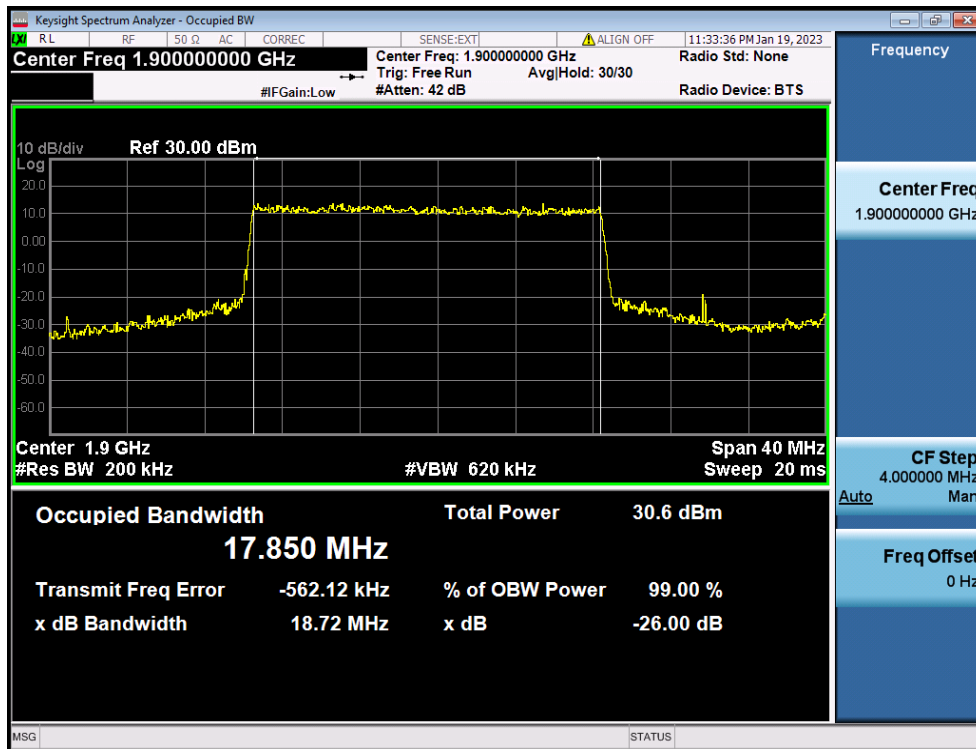


5 MHz / 256QAM / FULL RB Size

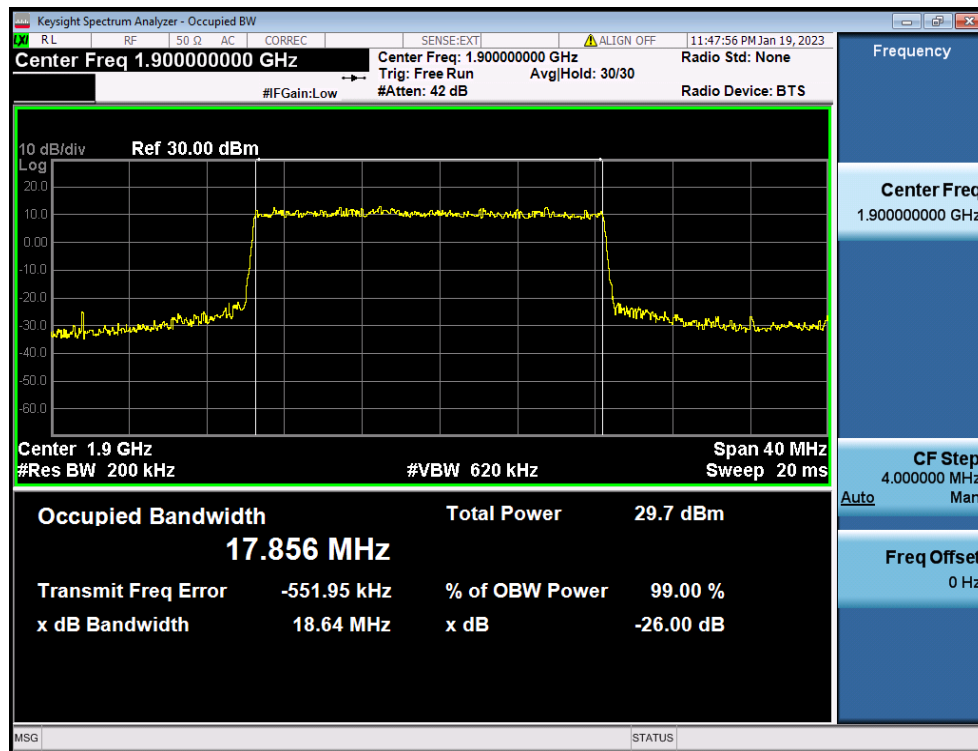
8.1.4. NR Band 2



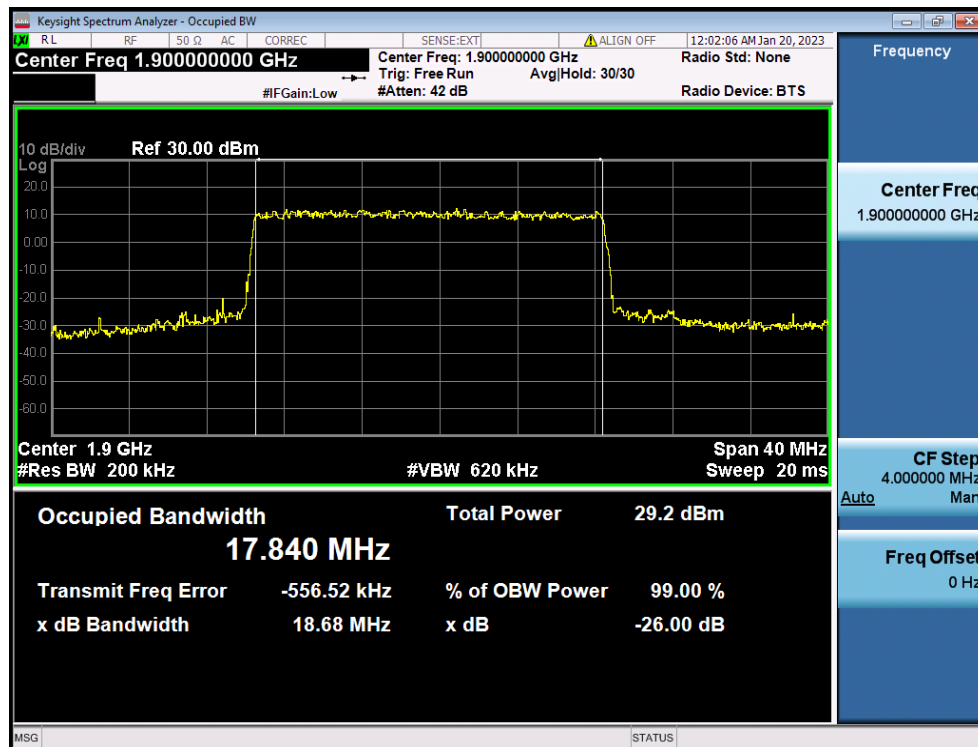
20 MHz / $\pi/2$ BPSK / FULL RB Size



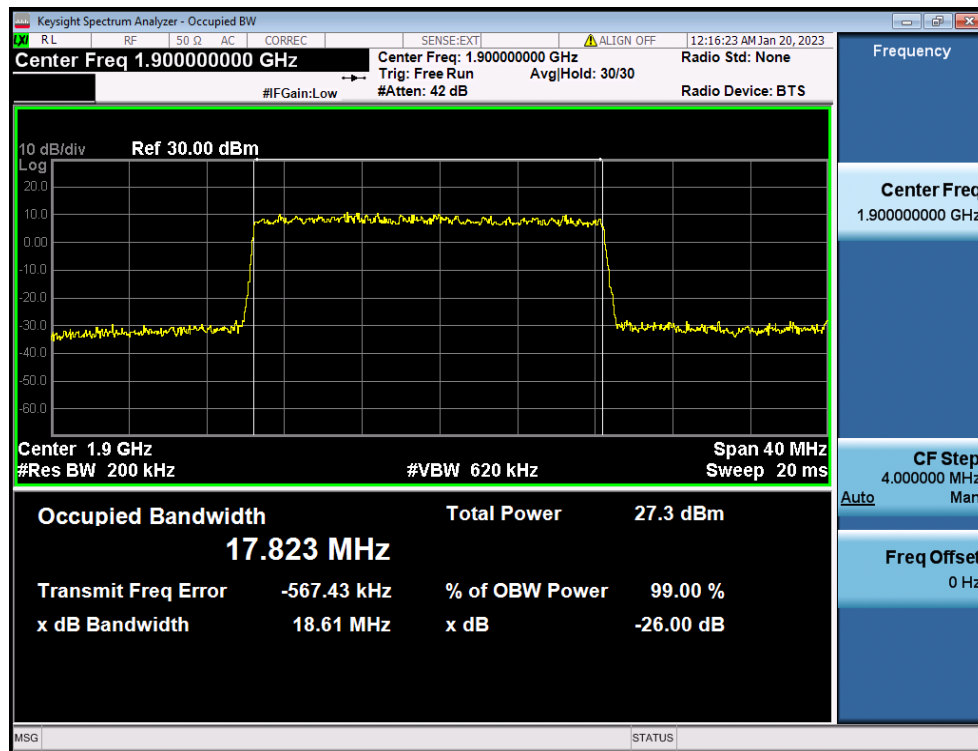
20 MHz / QPSK / FULL RB Size



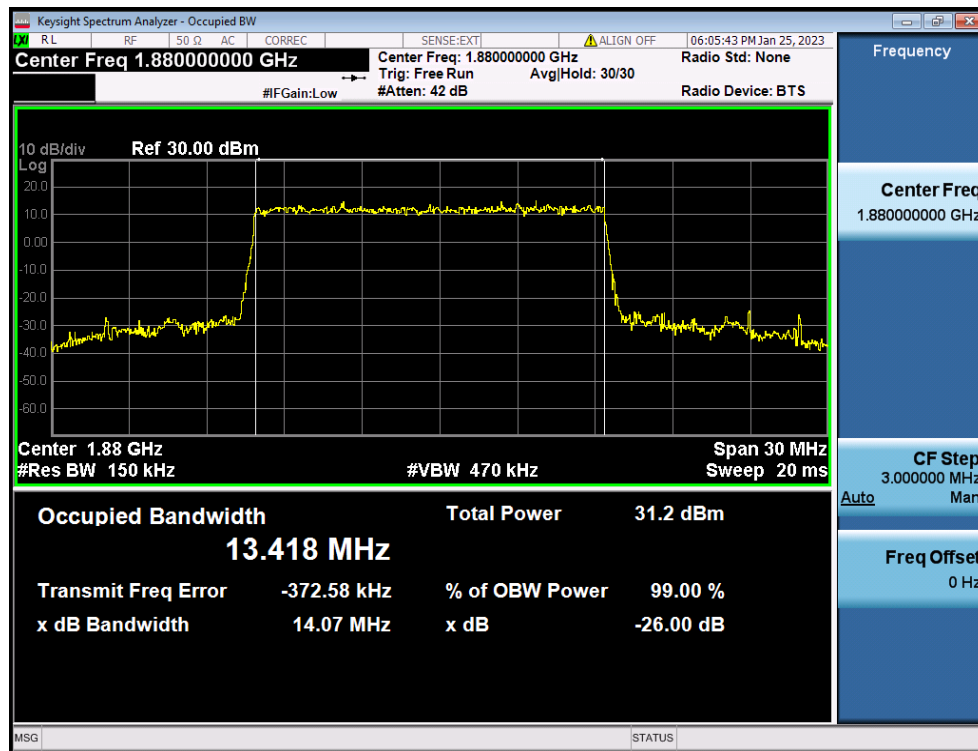
20 MHz / 16QAM / FULL RB Size



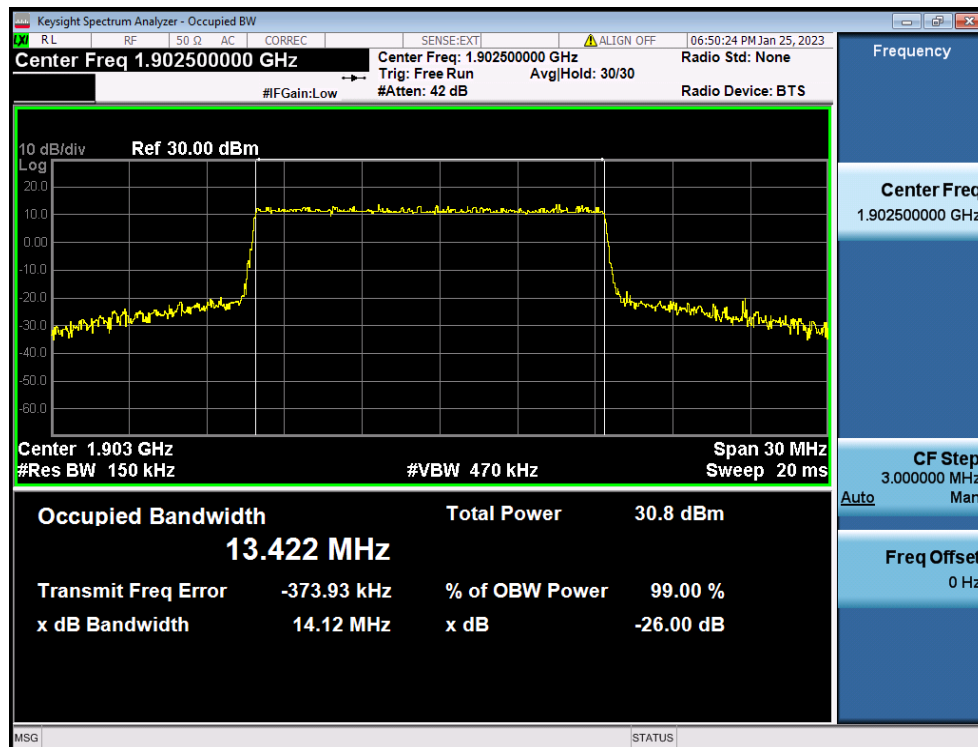
20 MHz / 64QAM / FULL RB Size



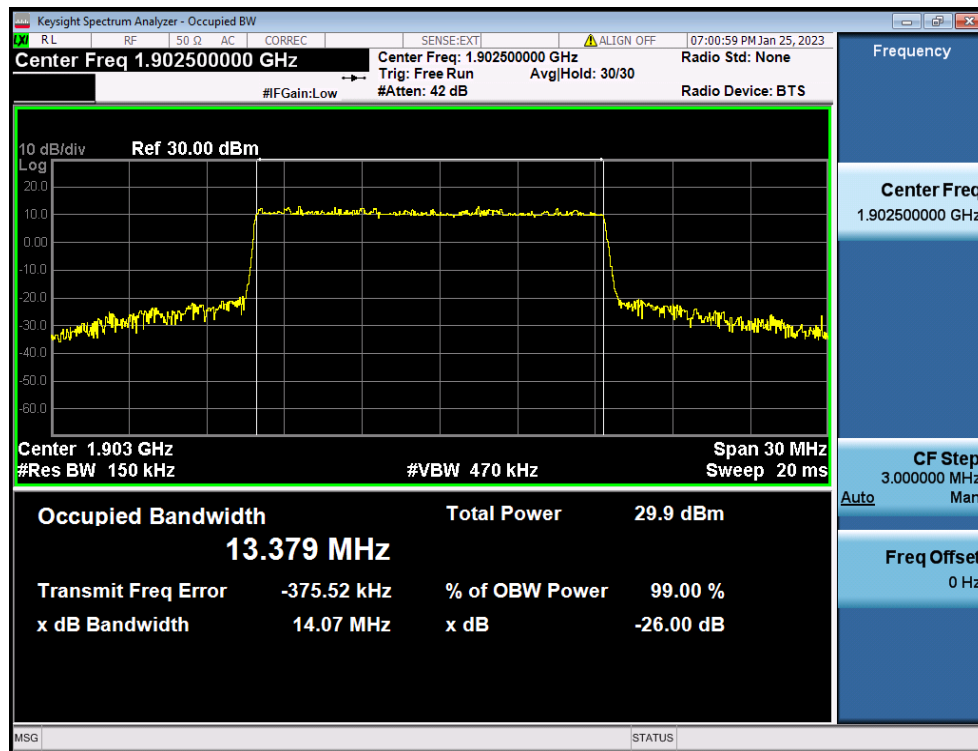
20 MHz / 256QAM / FULL RB Size



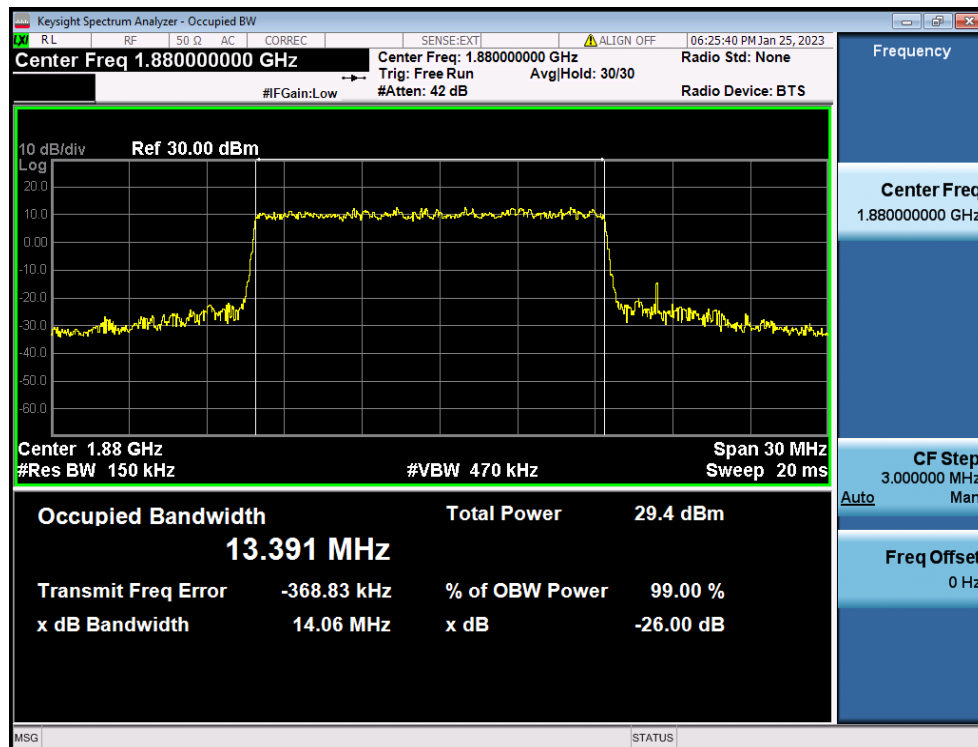
15 MHz / $\pi/2$ BPSK / FULL RB Size



15 MHz / QPSK / FULL RB Size



15 MHz / 16QAM / FULL RB Size



15 MHz / 64QAM / FULL RB Size