



DATE: 20 December 2020

**I.T.L. (PRODUCT TESTING) LTD.
FCC Radio Test Report**

For

Corning Optical Communication Wireless

Equipment under test:

**ONE - Optical Network Evolution Wireless
Platform**

MRU (Mid Power Remote Unit)

(LTE700 Section)

Tested by:

M. Zohar

Approved by:

D. Shidlowky

This report must not be reproduced, except in full, without the written permission of I.T.L. (Product Testing) Ltd.

This report relates only to items tested.



Measurement/Technical Report for Corning Optical Communication Wireless ONE - Optical Network Evolution Wireless Platform

FCC ID: OJF1MRU70CR

This report concerns: Original Grant:
 Class II change: X
 Class I change:

Equipment type: B21 - Part 20 Industrial Booster (CMRS)

Limits used: 47CFR Parts 2; 27

Measurement procedure used is KDB 935210 D05 v01r03 April 2019, KDB 971168 D03 v01 and ANSI IEEE C63.26-2015

Substitution Method used as in ANSI TIA-603-E-2016

Application for Certification
prepared by:

D. Shidlowsky
ITL (Product Testing) Ltd.
1 Bat Sheva St.
Lod 7120101
Israel
e-mail davids@iltglobal.org

Applicant for this device:

(different from "prepared by")

Isaac Nissan
Corning Optical Communication Wireless
8253 1st Street
Vienna, VA 22812
U.S.A.
Tel: +1-703 855-1773
e-mail: NissanI@corning.com



TABLE OF CONTENTS

1	GENERAL INFORMATION	4
1.1	Administrative Information	4
1.2	List of Accreditations	5
1.3	Product Description	6
1.4	Test Methodology	6
1.5	Test Facility	6
1.6	Measurement Uncertainty	6
2	SYSTEM TEST CONFIGURATION	7
2.1	Justification	7
2.2	EUT Exercise Software	7
2.3	Special Accessories	7
2.4	Equipment Modifications	7
2.5	Configuration of Tested System	8
3	TEST SET-UP PHOTOS	9
4	RF POWER OUTPUT	12
4.1	Test Specification	12
4.2	Test Procedure	12
4.3	Test Limit	12
4.4	Test Results	12
4.5	Test Equipment Used; RF Power Output	41
5	OCCUPIED BANDWIDTH	42
5.1	Test Specification	42
5.2	Test Procedure	42
5.3	Test Limit	42
5.4	Test Results	42
5.5	Test Equipment Used; Occupied Bandwidth	99
6	SPURIOUS EMISSIONS AT ANTENNA TERMINALS	100
6.1	Test Specification	100
6.2	Test Procedure	100
6.3	Test Limit	100
6.4	Test Results	100
6.5	Test Equipment Used; Spurious Emissions at Antenna Terminals	145
7	SPURIOUS RADIATED EMISSION	146
7.1	Test Specification	146
7.2	Test Procedure	146
7.3	Test Limit	147
7.4	Test Results	147
7.5	Test Instrumentation Used; Radiated Measurements	148
8	APPENDIX A - CORRECTION FACTORS	149
8.1	Correction factors for RF OATS Cable 35m	149
8.2	Correction factors for RF OATS Cable 10m	150
8.3	Correction factors for Horn Antenna	151
8.4	Correction factors for Horn Antenna	152
8.5	Correction factors for Log Periodic Antenna	153
8.6	Correction factors for Biconical Antenna	154
8.7	Correction factors for ACTIVE LOOP ANTENNA	155



1 General Information

1.1 Administrative Information

Manufacturer:	Corning Optical Communication Wireless
Manufacturer's Address:	8253 1st Street Vienna, VA 22812 U.S.A. Tel: +1-703 855-1773
Manufacturer's Representative:	Isaac Nissan
Equipment Under Test (E.U.T):	ONE - Optical Network Evolution Wireless Platform
Equipment Model No.:	MRU (Mid Power Remote Unit)
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	September 01, 2020
Start of Test:	September 01, 2020
End of Test:	November 12, 2020
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St, Lod, Israel 7116002
Test Specifications:	FCC Parts 2; 27



1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by/registered with the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation Number is IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-20025, R-2729, T-20028, G-20068.
5. Department of Innovation, Science and Economic Development (ISED) Canada, CAB identifier: IL1002.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.



1.3 Product Description

Modular 7 band Enabled Mid Power Neutral Host Solution –

Supported modular frequency bands

700, ESMR+CELL, PCS, AWS, WCS

Integrated 2.5 GHz expansion ready

Composite Output Power

AWS: 34dBm

PCS, WCS: 33dBm

700, ESMR & CELL: 30dBm

Specifications

100% Modularity

NEBS Class 2 Compliant

Small Footprint – 6 Rack Units

Highlights:

Extended ONE platform design Diversity

100% modular component design

Composite output power: 2W

Small Compact Form Factor (6U)

Non-Service Impacting Upgrades

Lower initial deployment costs

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in KDB 935210 D05 v01r03 April 2019, KDB 971168 D03 v01 and ANSI/TIA-603-E-2016. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

Both conducted and radiated emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation Number is IL1005.

1.6 Measurement Uncertainty

Conducted Emission (CISPR 11, EN 55011, CISPR 32, EN 55032, ANSI C63.4)

0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 3.44 dB

Radiated Emission (CISPR 11, EN 55011, CISPR 32, EN 55032, ANSI C63.4) for open site 30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 4.98 dB



2 System Test Configuration

2.1 *Justification*

1. The E.U.T was originally FCC certified on 01/24/2017. It originally supported cellular 3G & 4G technology.
2. Currently the manufacturer has made the following C2PC changes:
Enabling the use of 5G technology via software changes only with the same operation bands. No changes have been made to the hardware.
3. The following tests were performed: RF Output Power, Occupied Bandwidth and Spurious Emissions.
4. The EUT meets the requirements of a C2PC.

2.2 *EUT Exercise Software*

The Element Management System ver. 2.0 used for commands delivery. These commands are used to enable/disable the EUT transmission. EUT Embedded SW versions is mru_da64_20_02.bin.

2.3 *Special Accessories*

No special accessories were needed in order to achieve compliance.

2.4 *Equipment Modifications*

No modifications were necessary in order to achieve compliance.

2.5 Configuration of Tested System

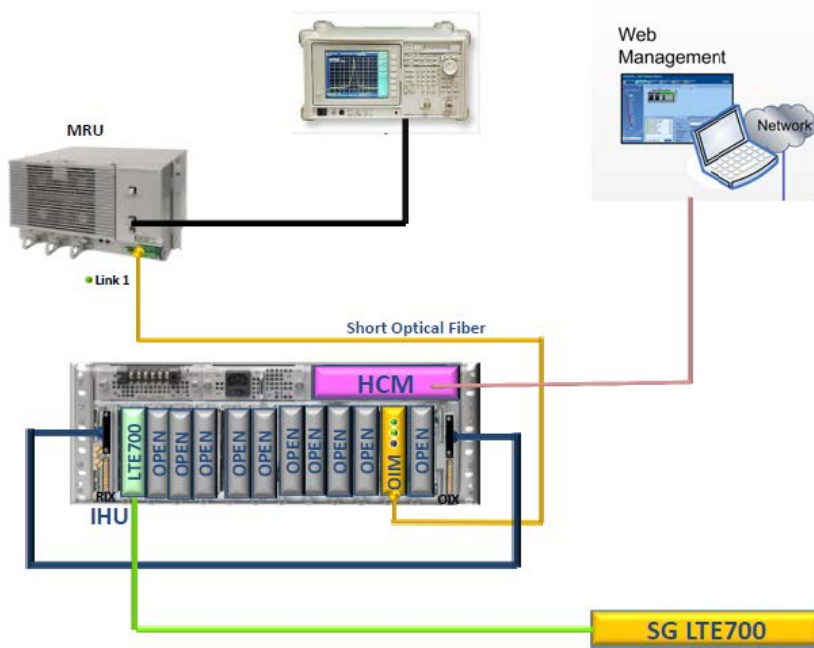


Figure 1. Conducted Test Set-Up

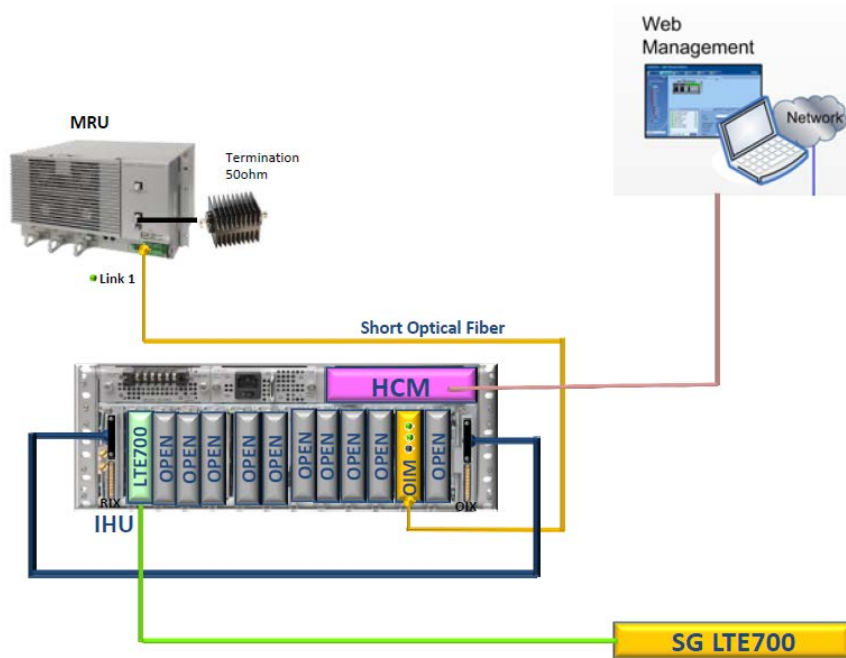


Figure 2. Radiated Test Set-Up

3 Test Set-Up Photos

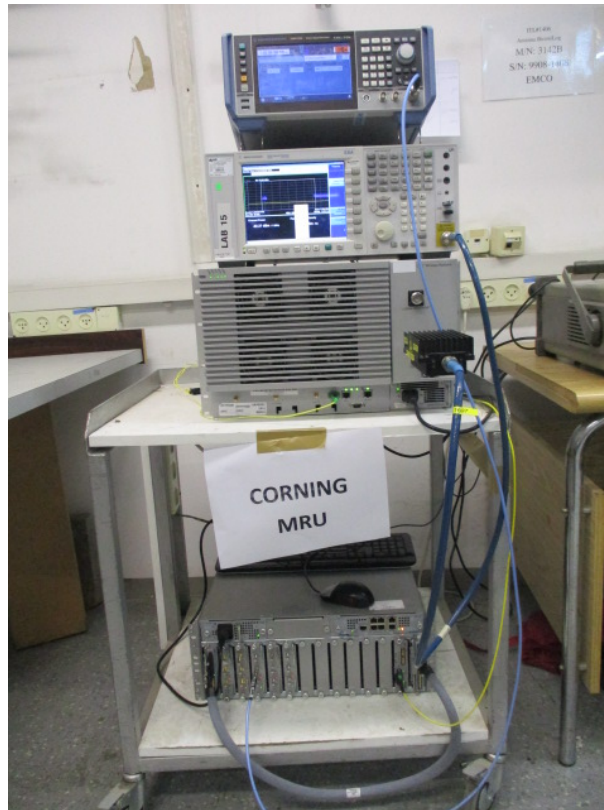


Figure 3. Conducted Emission From Antenna Port Tests

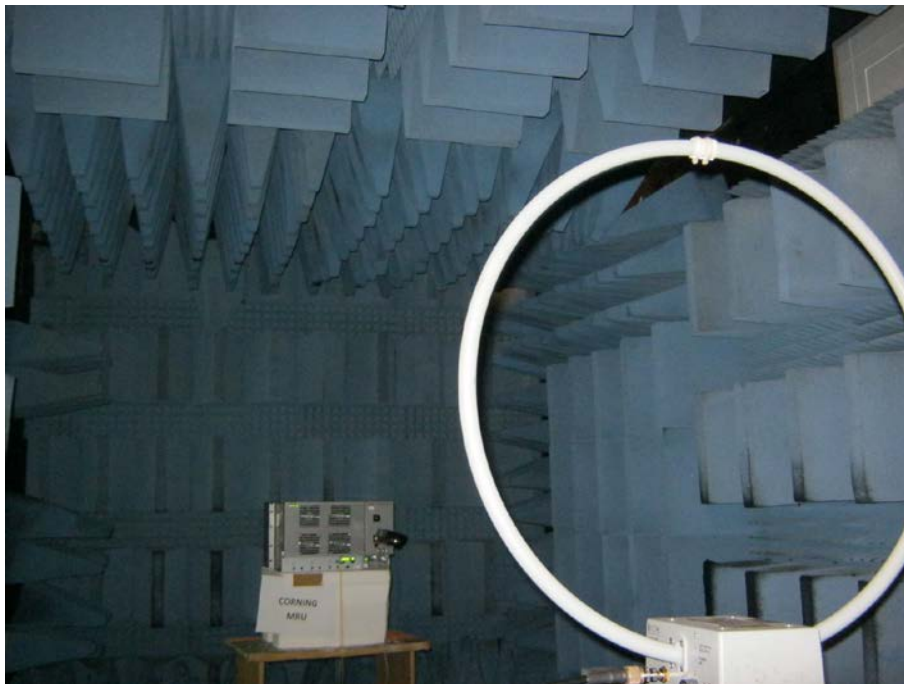


Figure 4. Radiated Emission Test 9kHz - 30MHz



Figure 5. Radiated Emission Test 30 - 200 MHz



Figure 6. Radiated Emission Test 200 - 1000MHz



Figure 7. Radiated Emission Test 1-10GHz



4 RF Power Output

4.1 Test Specification

FCC Part 27, Subpart C (27.50)

4.2 Test Procedure

(Temperature (22°C)/ Humidity (60%RH))

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (41.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

4.3 Test Limit

Peak Power Output must not exceed 1000W (60 dBm).

4.4 Test Results

JUDGEMENT: Passed

See additional information in Table 1 to Table 4 and Figure 8 to Figure 139.

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (dBm)	
16QAM	5	15	730.5	29.12	
		30	730.5	29.06	
		15	743.0	29.62	
		30	743.0	29.92	
		15	755.5	29.12	
		30	755.5	29.86	
	10	10	15	733.0	29.42
			30	733.0	29.63
			60	733.0	29.85
			15	743.0	29.88
			30	743.0	29.07
			60	743.0	29.11
			15	753.0	29.29
			30	753.0	29.33
			60	753.0	29.59
	15	15	15	735.5	29.94
			30	735.5	29.00
			60	735.5	29.13
			15	743.0	29.17
			30	743.0	29.33
			60	743.0	29.22
			15	750.5	30.34
			30	750.5	29.79
			60	750.5	29.02
	20	20	15	738.0	29.55
			30	738.0	29.10
			60	738.0	29.17
			15	743.0	29.00
			30	743.0	29.20
			60	743.0	29.31
			15	748.0	29.31
			30	748.0	29.62
			60	748.0	30.16

Table 1 RF Power Output 16QAM



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (dBm)	
64QAM	5	15	730.5	29.27	
		30	730.5	29.58	
		15	743.0	29.74	
		30	743.0	30.30	
		15	755.5	29.99	
		30	755.5	29.21	
	10	10	15	733.0	30.52
			30	733.0	29.76
			60	733.0	29.28
			15	743.0	29.95
			30	743.0	30.24
			60	743.0	30.24
			15	753.0	29.50
			30	753.0	30.49
			60	753.0	29.09
	15	15	15	735.5	29.04
			30	735.5	30.14
			60	735.5	30.17
			15	743.0	29.32
			30	743.0	29.05
			60	743.0	29.25
			15	750.5	29.54
			30	750.5	29.76
			60	750.5	29.92
	20	20	15	738.0	29.28
			30	738.0	29.45
			60	738.0	29.77
			15	743.0	30.16
			30	743.0	29.55
			60	743.0	29.00
			15	748.0	29.55
			30	748.0	29.26
			60	748.0	29.73

Table 2 RF Power Output 64QAM



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (dBm)	
256QAM	5	15	730.5	29.65	
		30	730.5	29.40	
		15	743.0	29.14	
		30	743.0	29.16	
		15	755.5	29.22	
		30	755.5	29.15	
	10	10	15	733.0	29.70
			30	733.0	29.53
			60	733.0	29.66
			15	743.0	29.40
			30	743.0	29.10
			60	743.0	29.12
			15	753.0	29.33
			30	753.0	29.37
			60	753.0	29.42
	15	15	15	735.5	29.92
			30	735.5	30.39
			60	735.5	29.85
			15	743.0	29.50
			30	743.0	29.67
			60	743.0	29.63
			15	750.5	29.12
			30	750.5	29.46
			60	750.5	29.63
	20	20	15	738.0	29.56
			30	738.0	29.55
			60	738.0	29.64
			15	743.0	30.56
			30	743.0	29.68
			60	743.0	29.81
			15	748.0	29.54
			30	748.0	29.43
			60	748.0	29.44

Table 3 RF Power Output 256QAM

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (dBm)	
QPSK	5	15	730.5	29.10	
		30	730.5	29.26	
		15	743.0	29.80	
		30	743.0	30.00	
		15	755.5	29.80	
		30	755.5	29.93	
	10	10	15	733.0	29.25
			30	733.0	30.04
			60	733.0	29.88
			15	743.0	29.81
			30	743.0	29.87
			60	743.0	29.23
			15	753.0	30.00
			30	753.0	29.08
			60	753.0	28.68
	15	15	15	735.5	29.04
			30	735.5	29.34
			60	735.5	30.00
			15	743.0	30.01
			30	743.0	29.30
			60	743.0	29.01
			15	750.5	30.47
			30	750.5	30.31
			60	750.5	29.87
	20	20	15	738.0	29.39
			30	738.0	29.55
			60	738.0	29.65
			15	743.0	29.32
			30	743.0	29.54
			60	743.0	29.65
			15	748.0	29.91
			30	748.0	29.55
			60	748.0	29.36

Table 4 RF Power Output QPSK

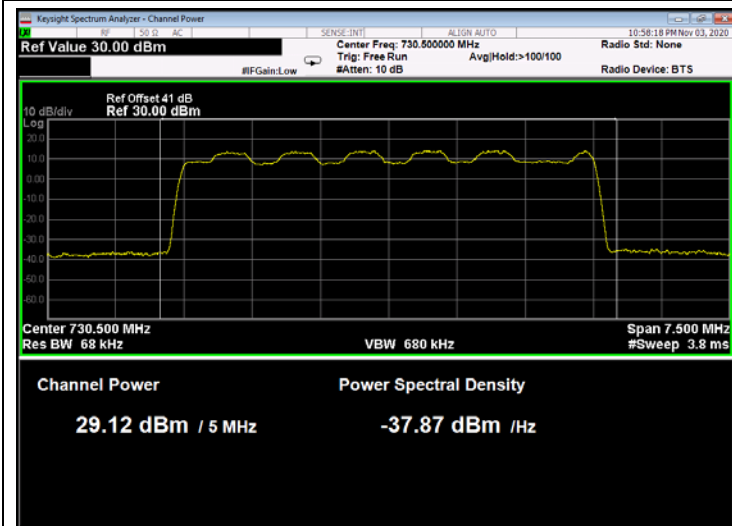


Figure 8: 16QAM 5MHz B.W.; 730.5MHz, 15kHz

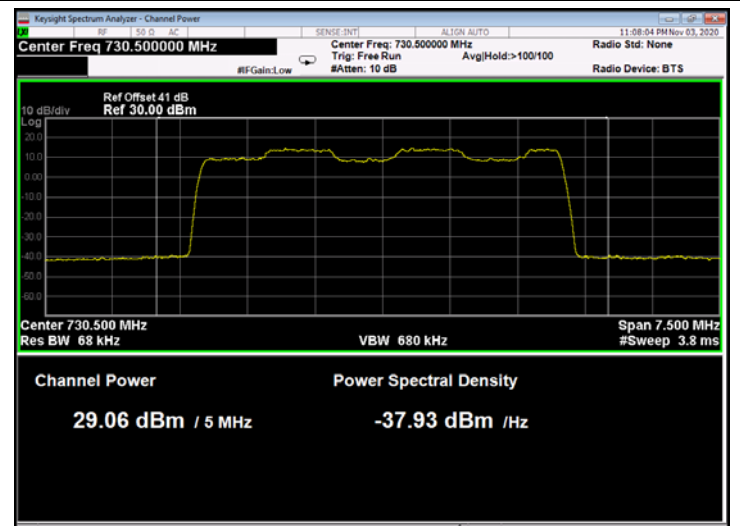


Figure 9: 16QAM 5MHz B.W.; 730.5MHz, 30kHz

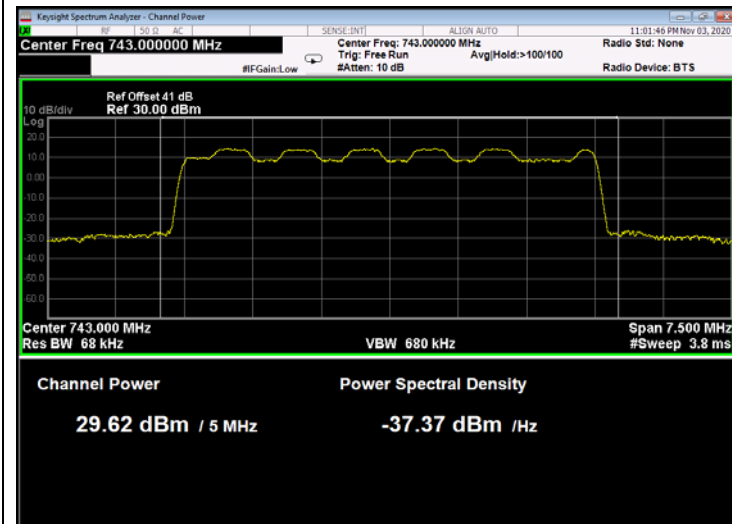


Figure 10: 16QAM 5MHz B.W.; 743.0MHz, 15kHz

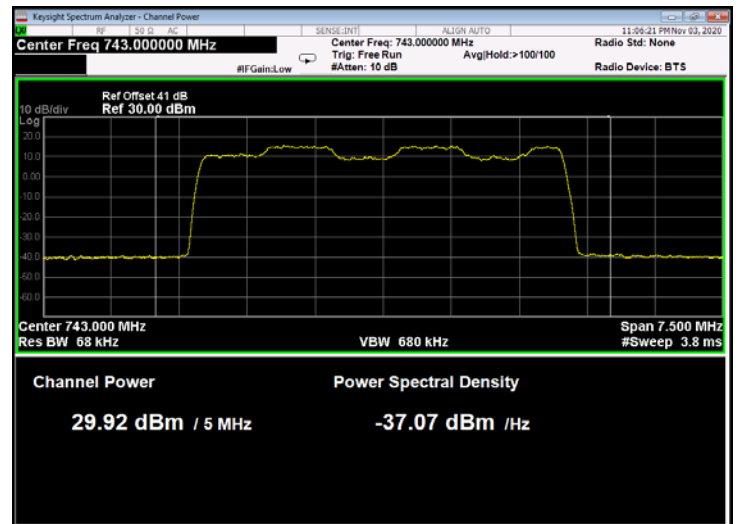


Figure 11: 16QAM 5MHz B.W.; 743.0MHz, 30kHz

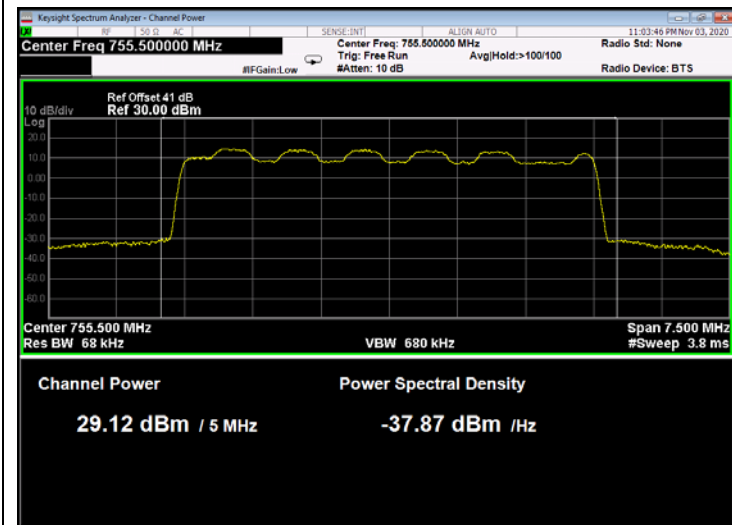


Figure 12: 16QAM 5MHz B.W.; 755.5MHz, 15kHz

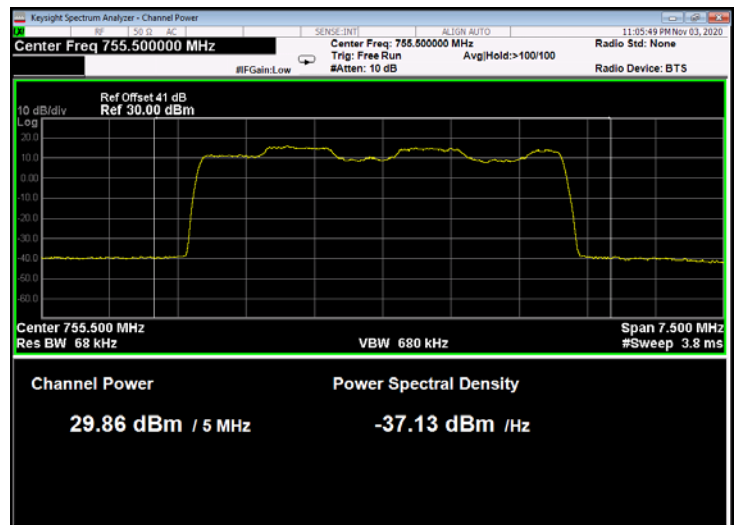


Figure 13: 16QAM 5MHz; 755.5MHz, 30kHz

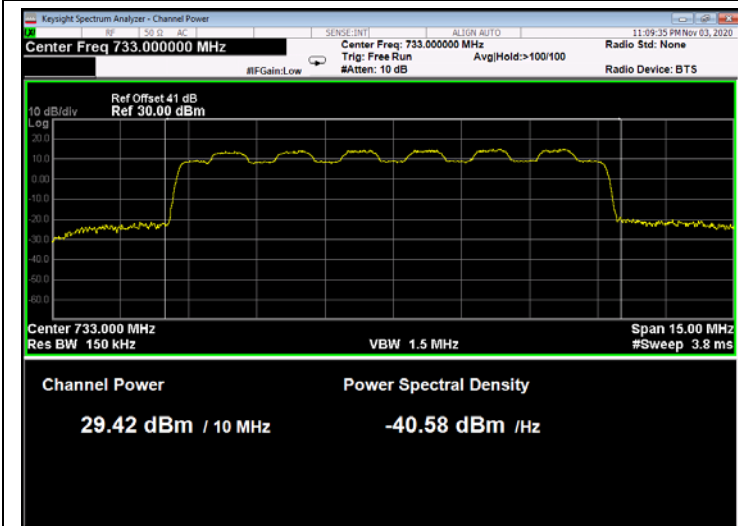


Figure 14: 16QAM 10MHz B.W.; 733.0MHz, 15kHz

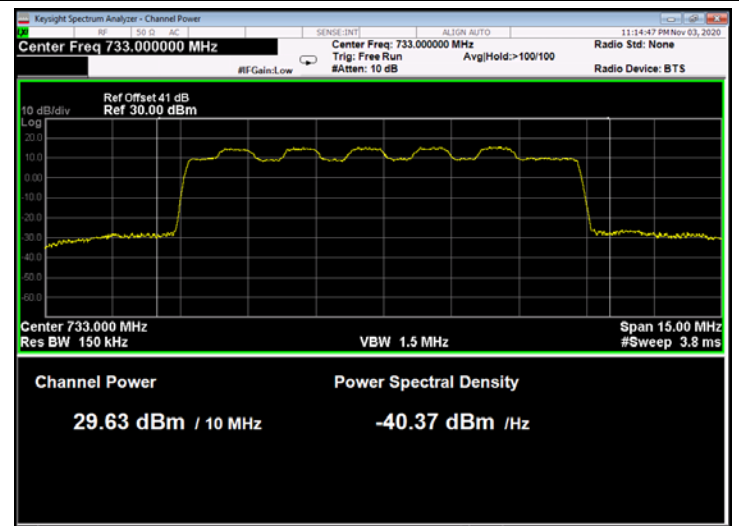


Figure 15: 16QAM 10MHz B.W.; 733.0MHz, 30kHz

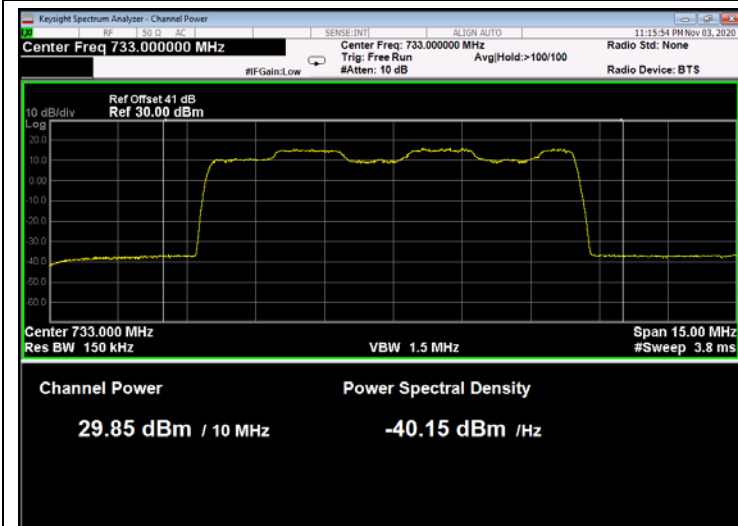


Figure 16: 16QAM 10MHz B.W.; 733.0MHz, 60kHz

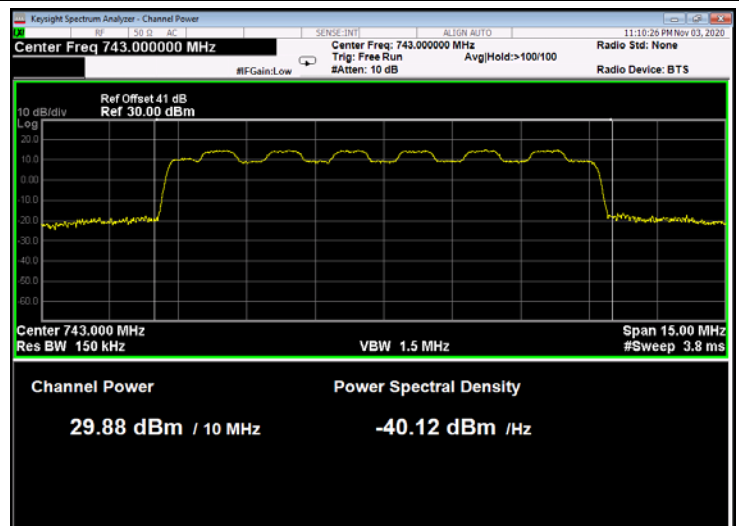


Figure 17: 16QAM 10MHz B.W.; 743.0MHz, 15kHz

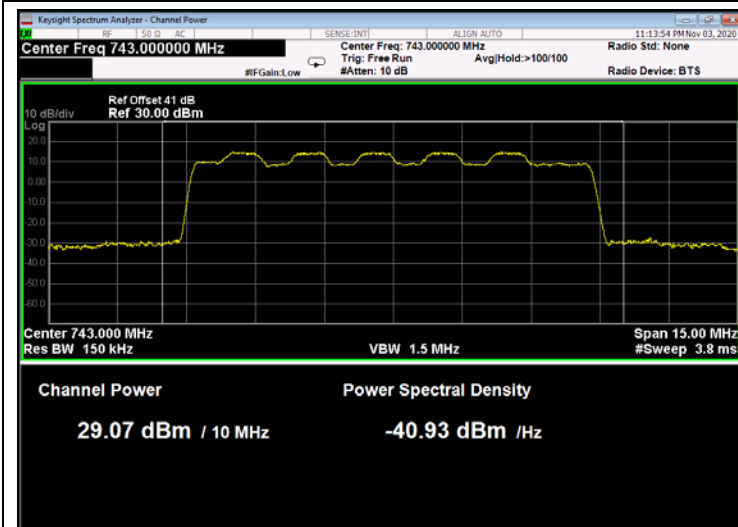


Figure 18: 16QAM 10MHz B.W.; 743.0MHz, 30kHz

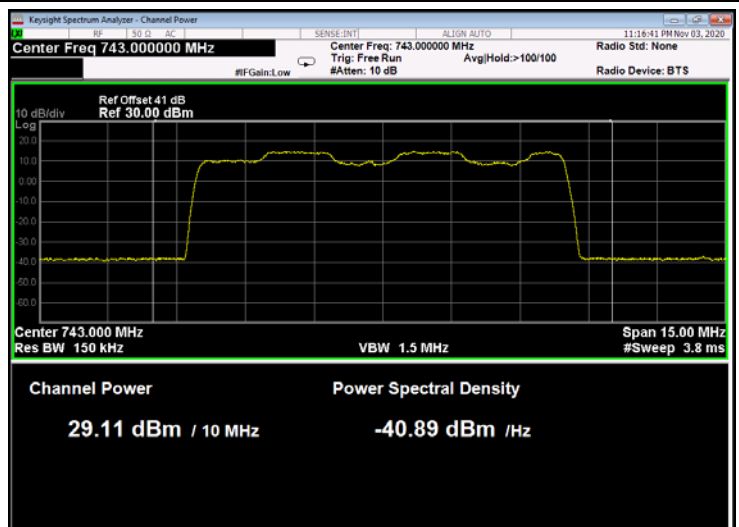


Figure 19: 16QAM 10MHz B.W.; 743.0MHz, 60kHz

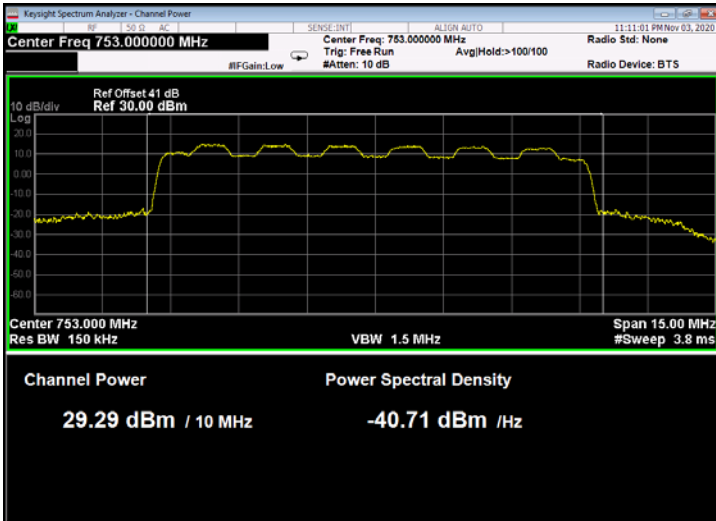


Figure 20: 16QAM 10MHz B.W.; 753.0MHz, 15kHz

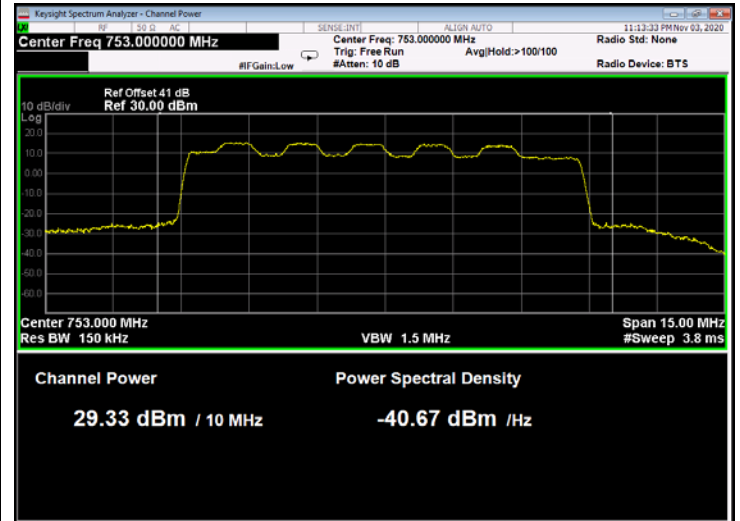


Figure 21: 16QAM 10MHz B.W.; 753.0MHz, 30kHz

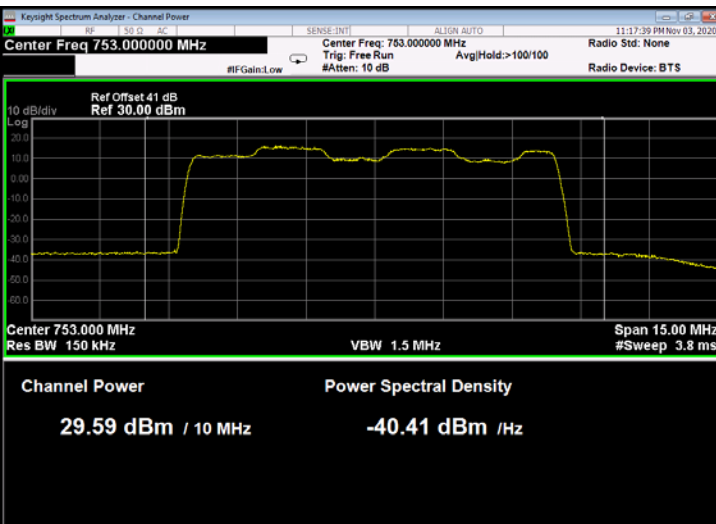


Figure 22: 16QAM 10MHz B.W.; 753.0MHz, 60kHz

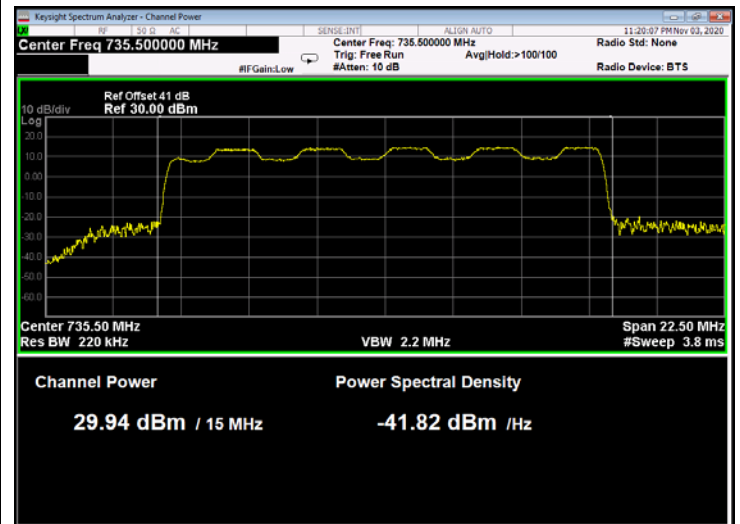


Figure 23: 16QAM 15MHz B.W.; 735.5MHz, 15kHz

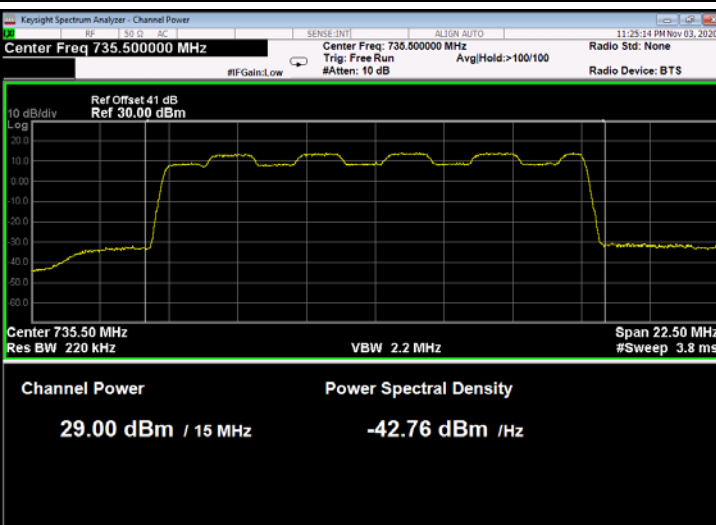


Figure 24: 16QAM 15MHz B.W.; 735.5MHz, 30kHz

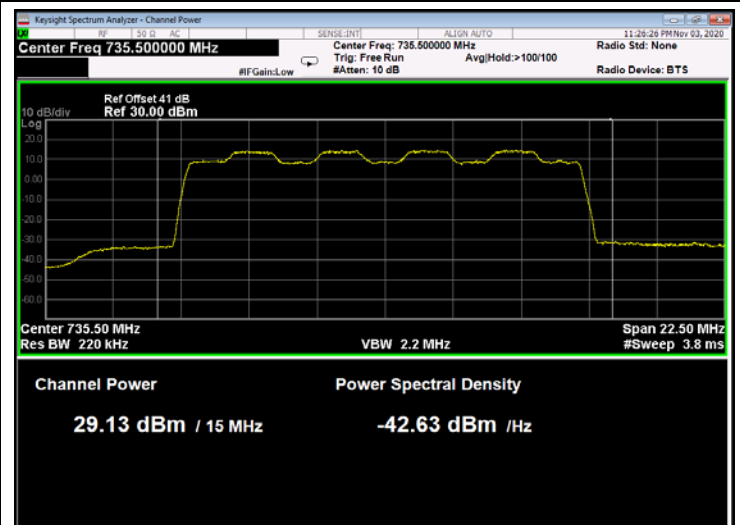


Figure 25: 16QAM 10MHz B.W.; 735.5MHz, 60kHz

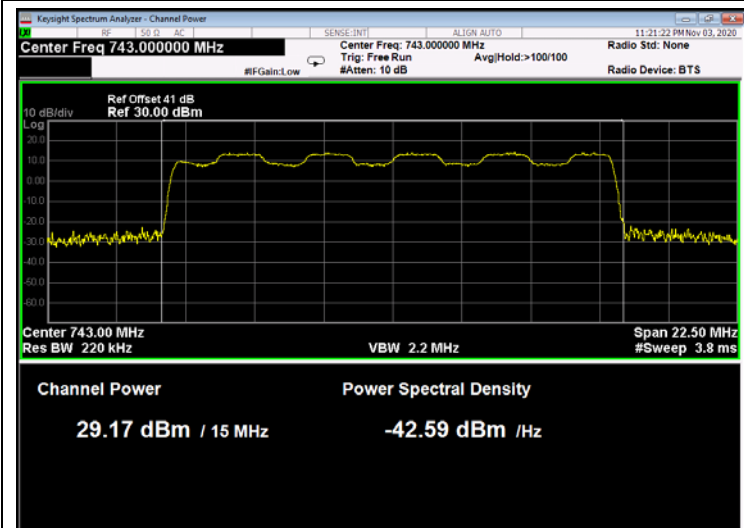


Figure 26: 16QAM 15MHz B.W.; 743.0MHz, 15kHz

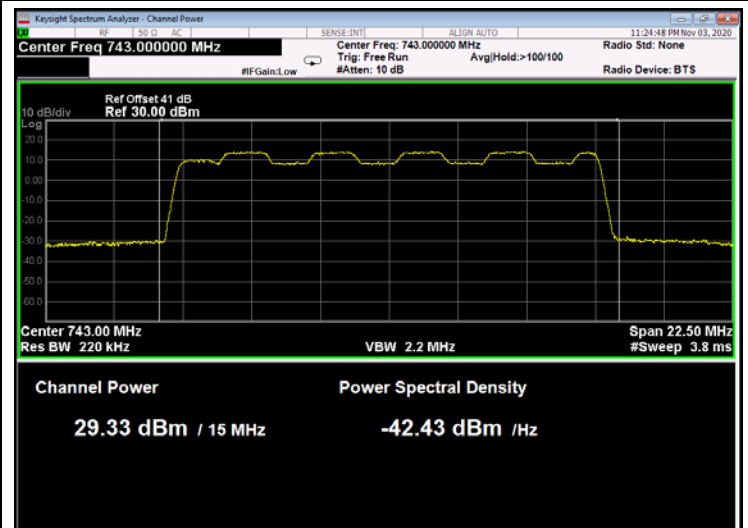


Figure 27: 16QAM 15MHz B.W.; 743.0MHz, 30kHz

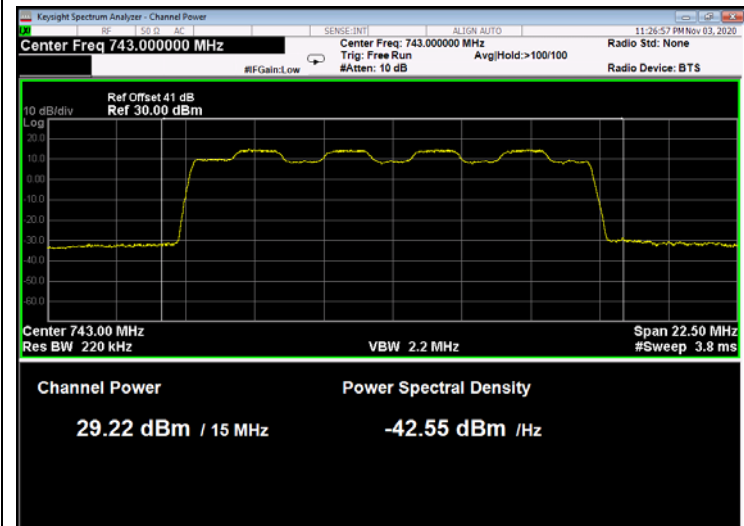


Figure 28: 16QAM 15MHz B.W.; 743.0MHz, 60kHz

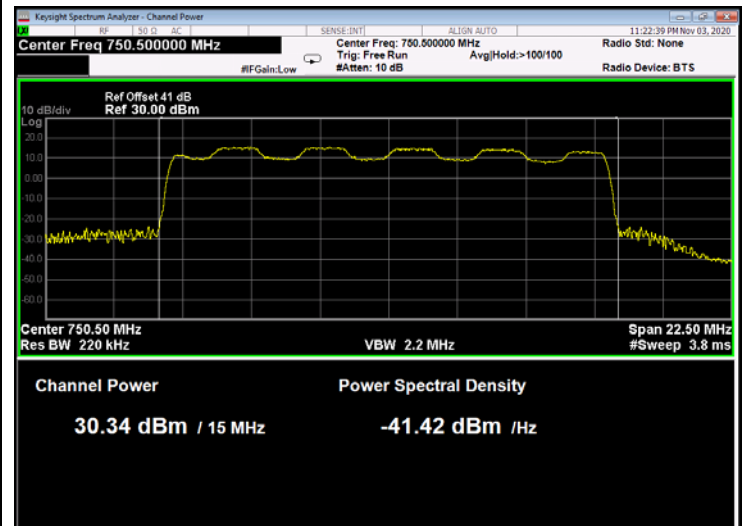


Figure 29: 16QAM 15MHz B.W.; 750.5MHz, 15kHz

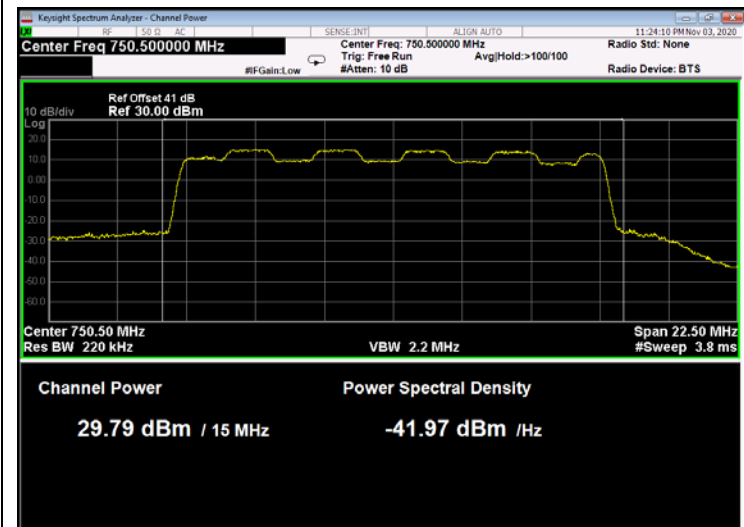


Figure 30: 16QAM 15MHz B.W.; 750.5MHz, 30kHz

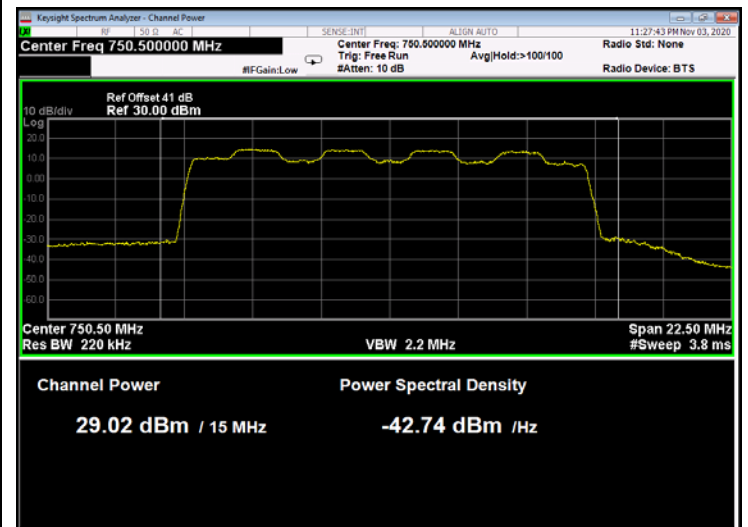


Figure 31: 16QAM 15MHz B.W.; 750.5MHz, 60kHz

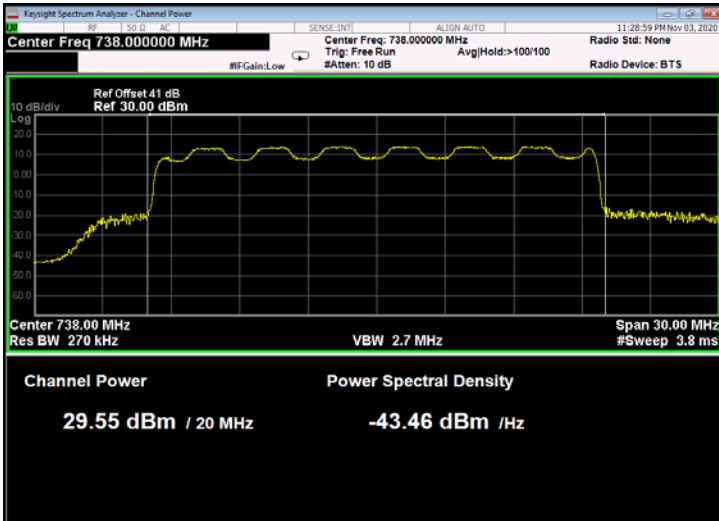


Figure 32: 16QAM 20MHz B.W.; 738.0MHz, 15kHz

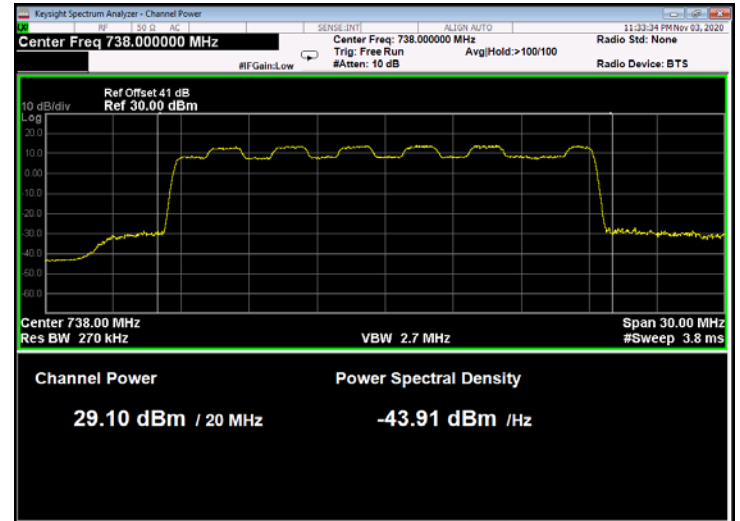


Figure 33: 16QAM 20MHz B.W.; 738.0MHz, 30kHz

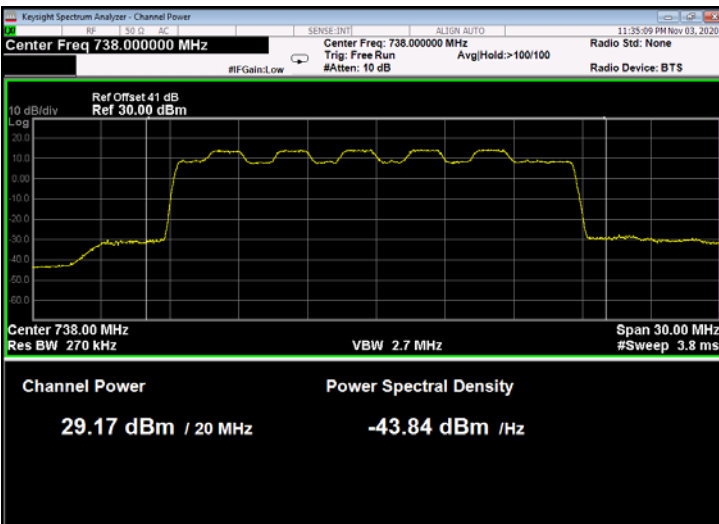


Figure 34: 16QAM 20MHz B.W.; 738.0MHz, 60kHz

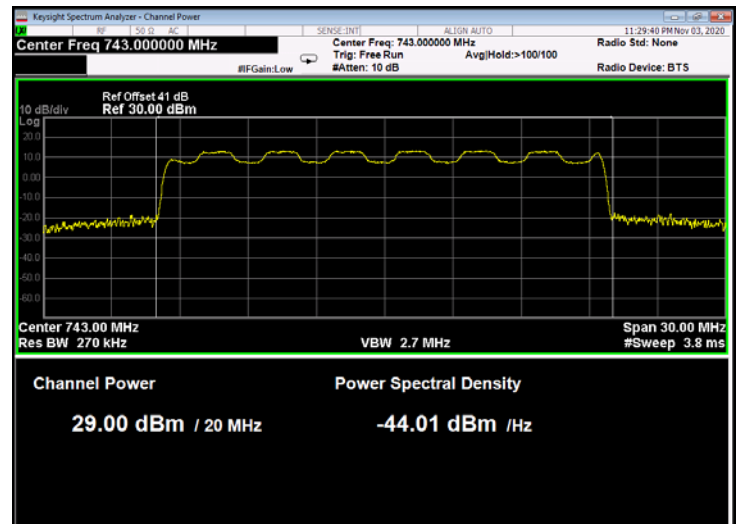


Figure 35: 16QAM 20MHz B.W.; 743.0MHz, 15kHz

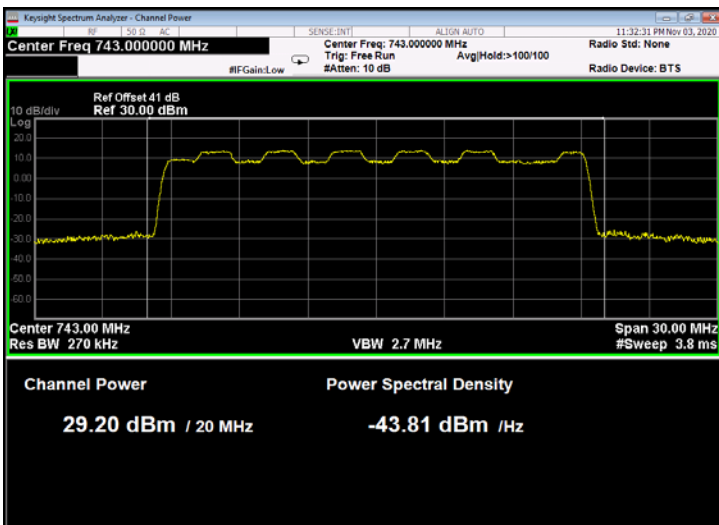


Figure 36: 16QAM 20MHz B.W.; 743.0MHz, 30kHz

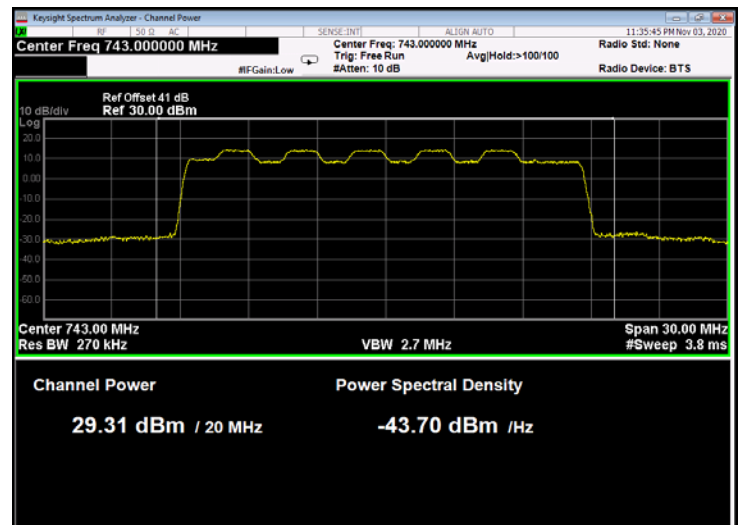


Figure 37: 16QAM 20MHz B.W.; 743.0MHz, 60kHz

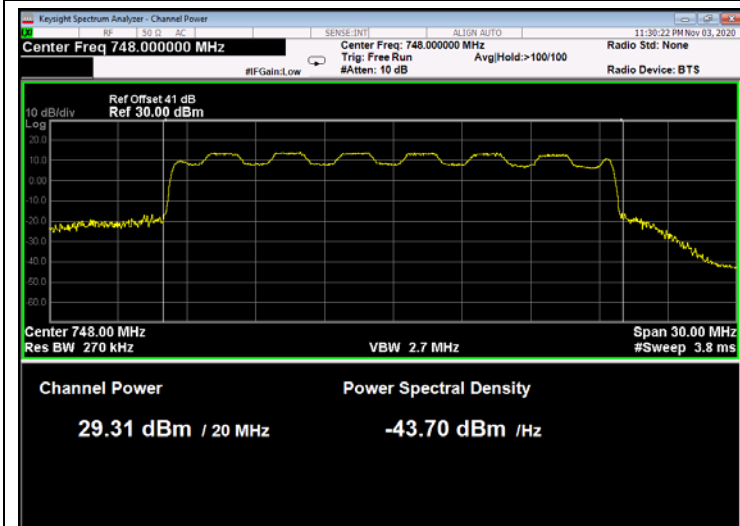


Figure 38: 16QAM 20MHz B.W.; 748.0MHz, 15kHz

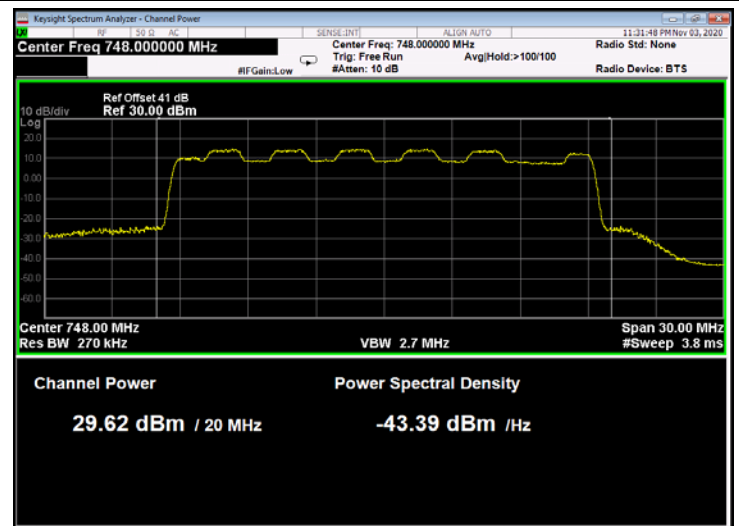


Figure 39: 16QAM 20MHz B.W.; 748.0MHz, 30kHz

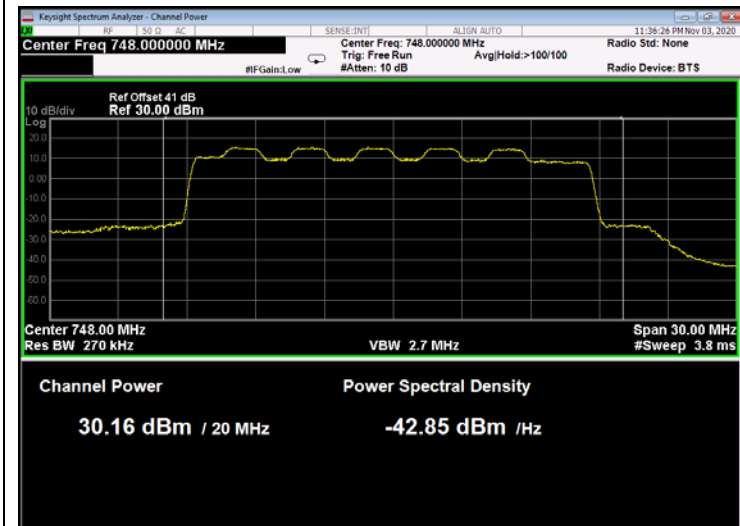


Figure 40: 16QAM 20MHz B.W.; 748.0MHz, 60kHz

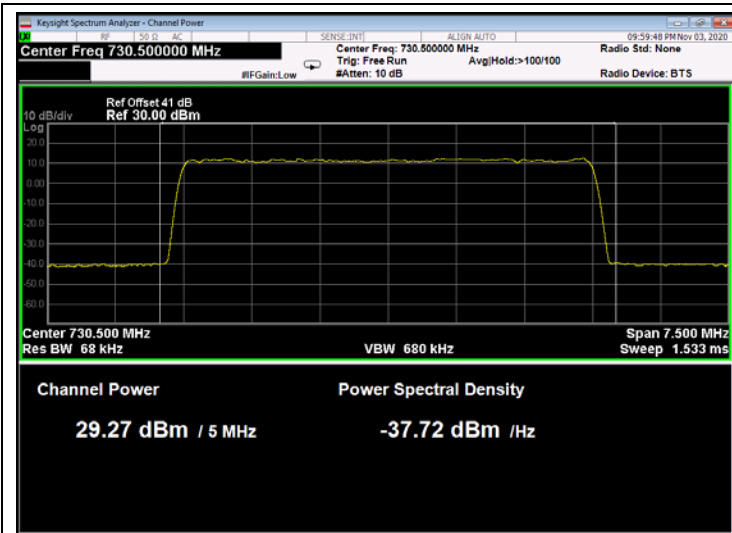


Figure 41: 64QAM 5MHz B.W.; 730.5MHz, 15kHz

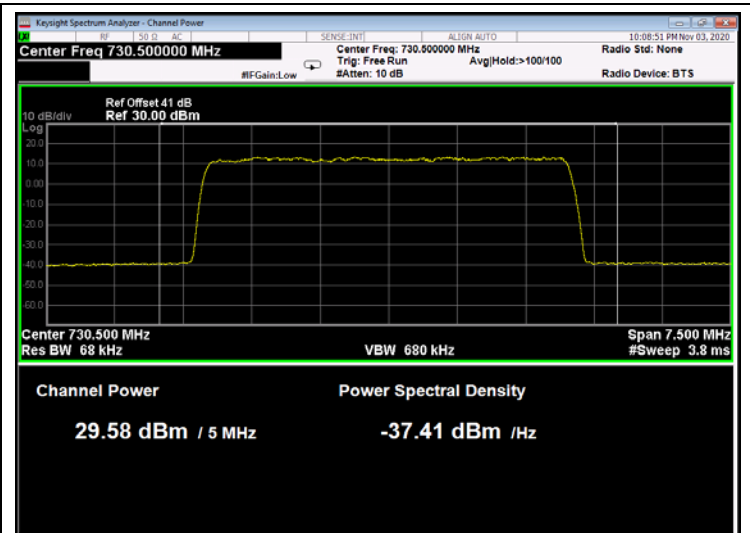


Figure 42: 64QAM 5MHz B.W.; 730.5MHz, 30kHz

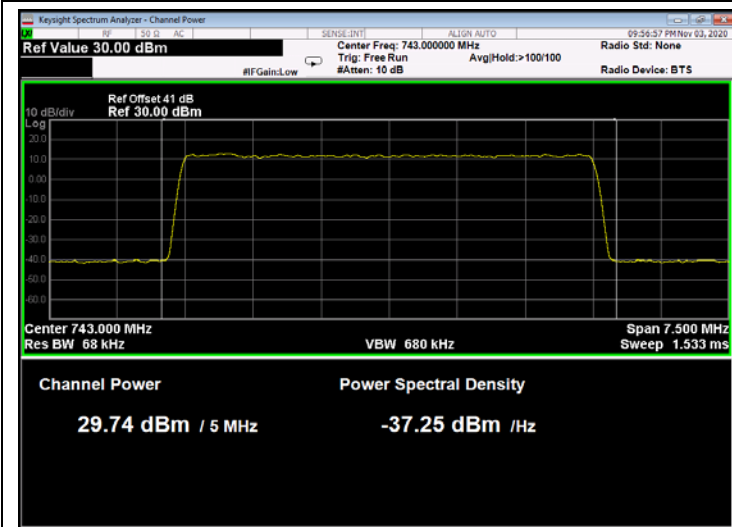


Figure 43: 64QAM 5MHz B.W.; 743.0MHz, 15kHz

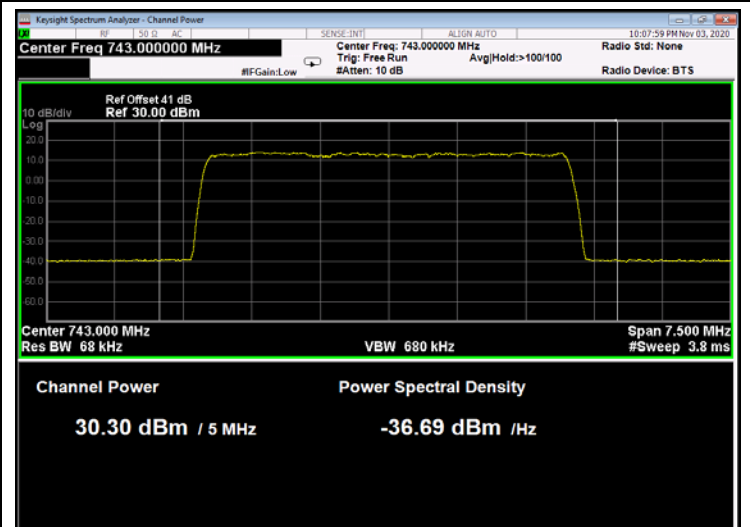


Figure 44: 64QAM 5MHz B.W.; 743.0MHz, 30kHz

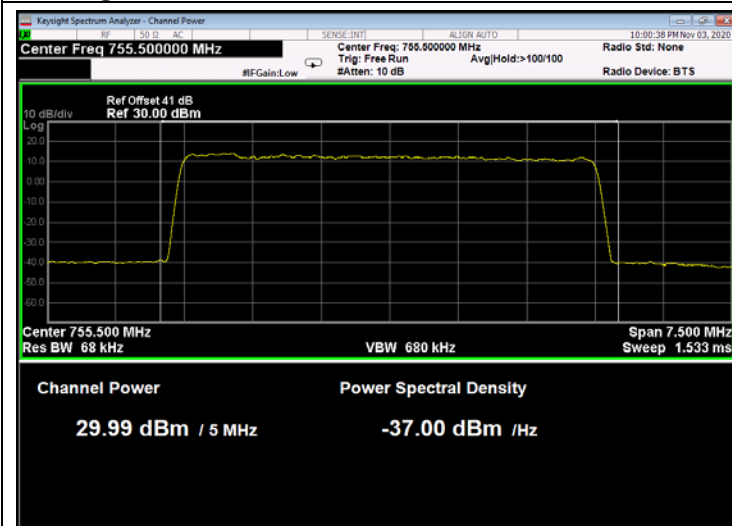


Figure 45: 64QAM 5MHz B.W.; 755.5MHz, 15kHz

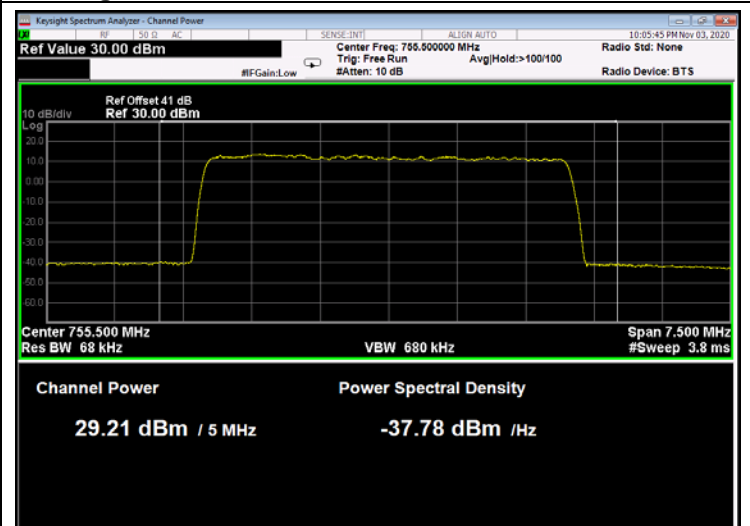


Figure 46: 64QAM 5MHz B.W.; 755.5MHz, 30kHz

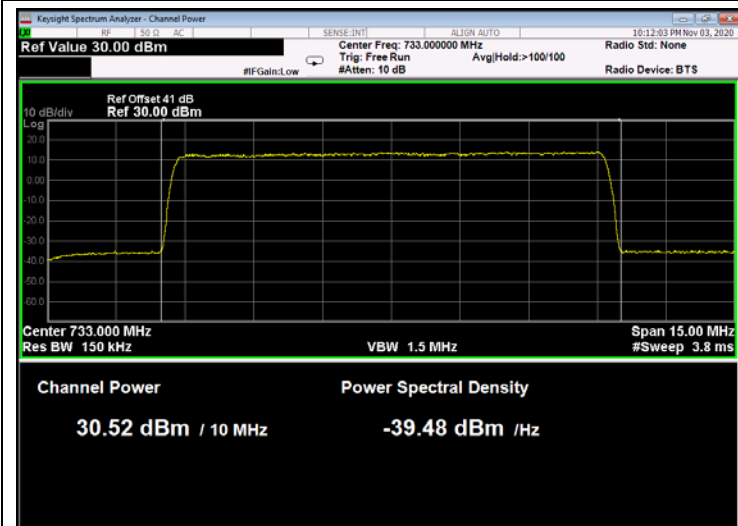


Figure 47: 64QAM 10MHz B.W.; 733.0MHz, 15kHz

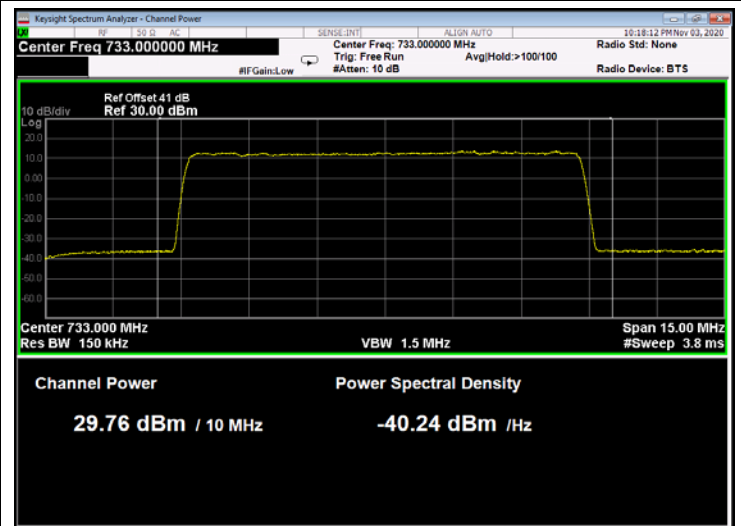


Figure 48: 64QAM 10MHz B.W.; 733.0MHz, 30kHz

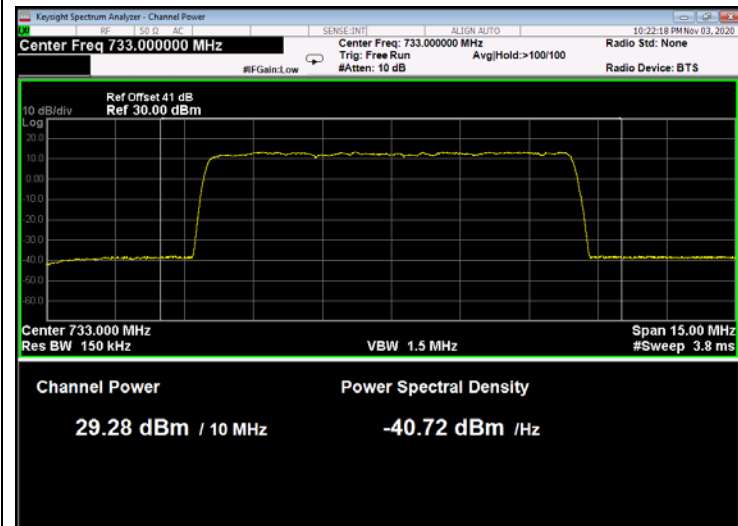


Figure 49: 64QAM 10MHz B.W.; 733.0MHz, 60kHz

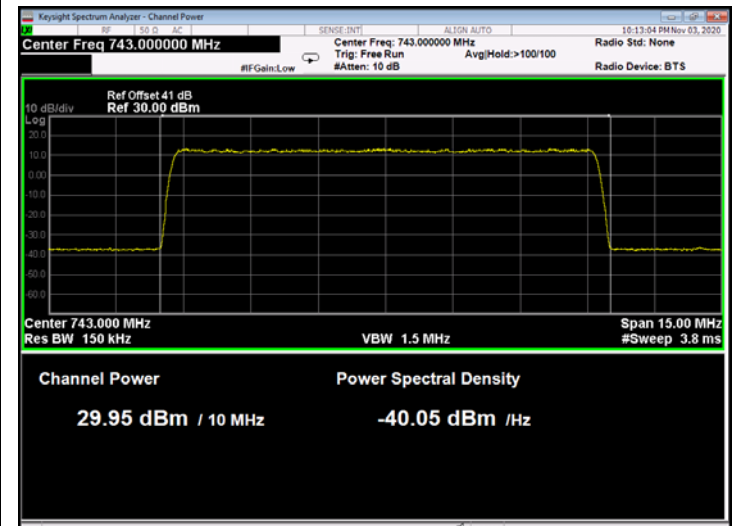


Figure 50: 64QAM 10MHz B.W.; 743.0MHz, 15kHz

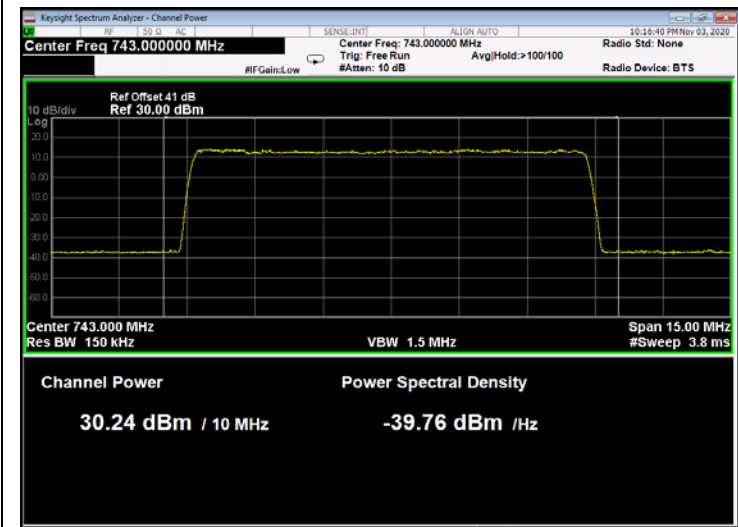


Figure 51: 64QAM 10MHz B.W.; 743.0MHz, 30kHz

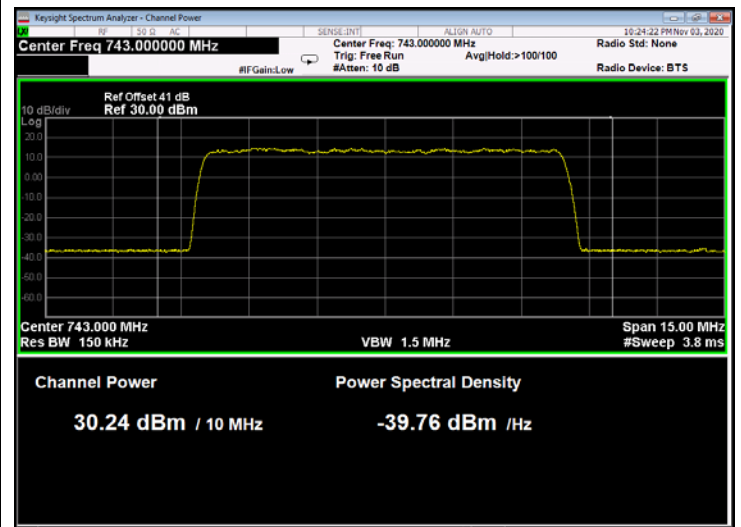


Figure 52: 64QAM 5MHz B.W.; 743.0MHz, 60kHz

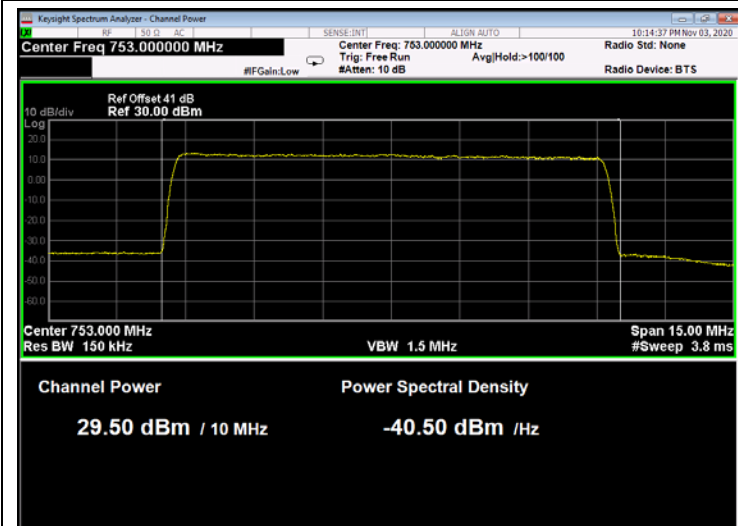


Figure 53: 64QAM 10MHz B.W.; 753.0MHz, 15kHz

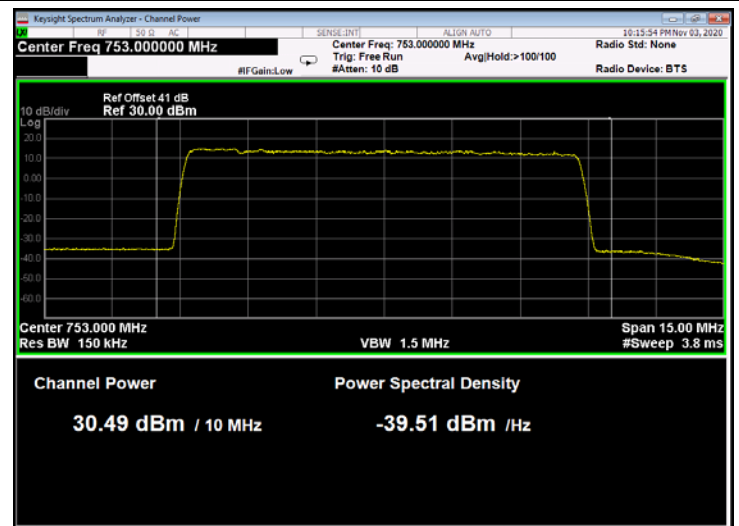


Figure 54: 64QAM 10MHz B.W.; 753.0MHz, 30kHz

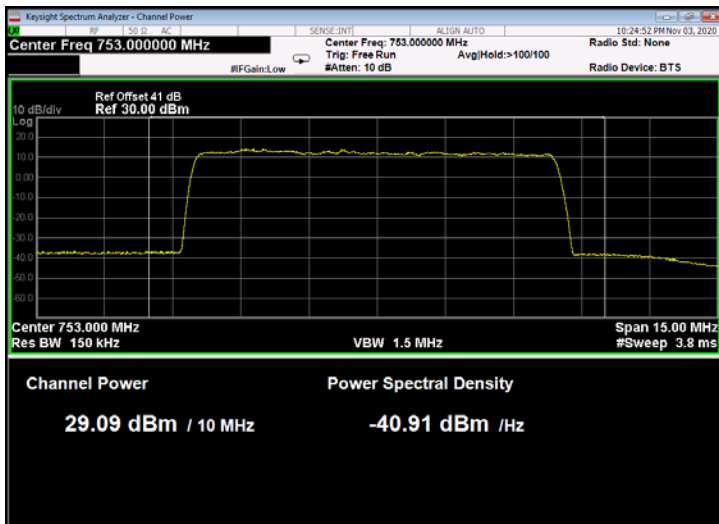


Figure 55: 64QAM 10MHz B.W.; 753.0MHz, 60kHz

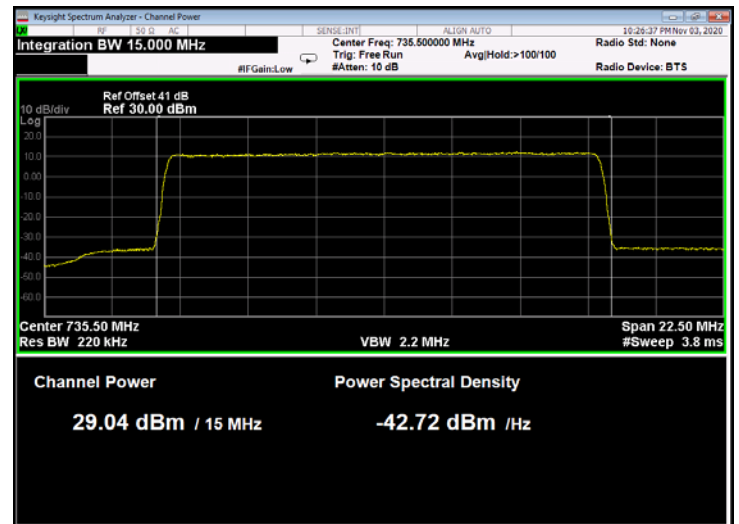


Figure 56: 64QAM 15MHz B.W.; 735.5MHz, 15kHz

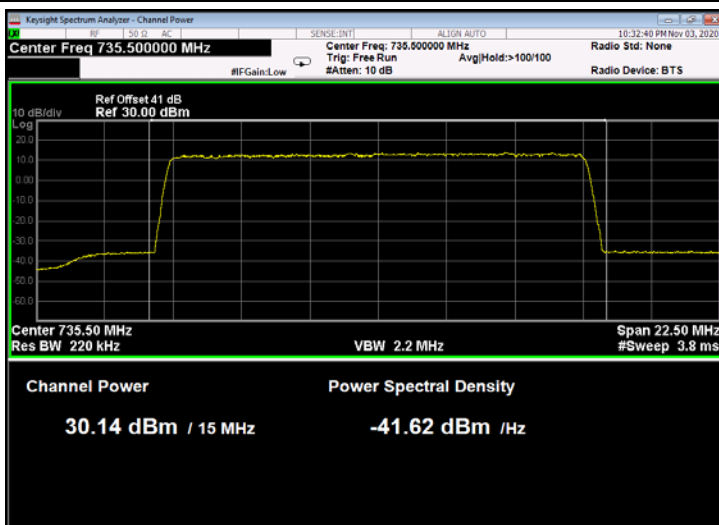


Figure 57: 64QAM 15MHz B.W.; 735.5MHz, 30kHz

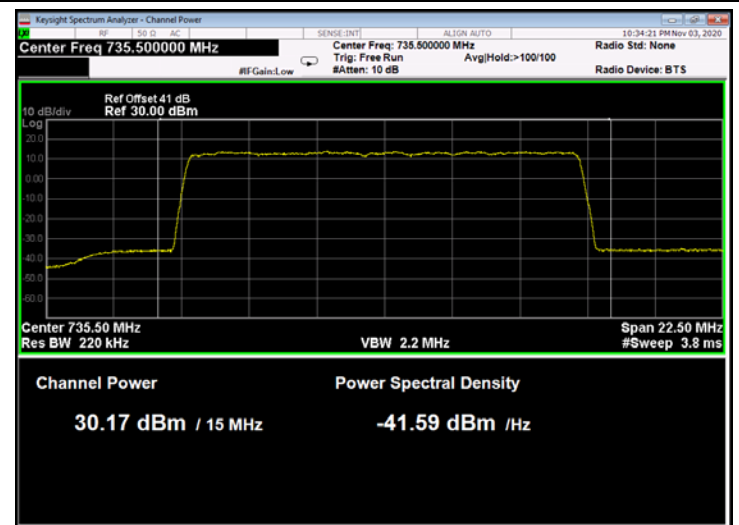


Figure 58: 64QAM 15MHz B.W.; 735.5MHz, 60kHz

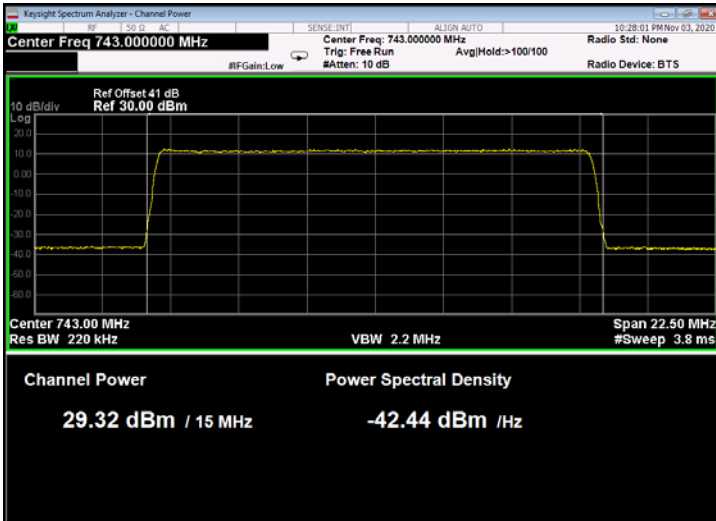


Figure 59: 64QAM 15MHz B.W.; 743.0MHz, 15kHz

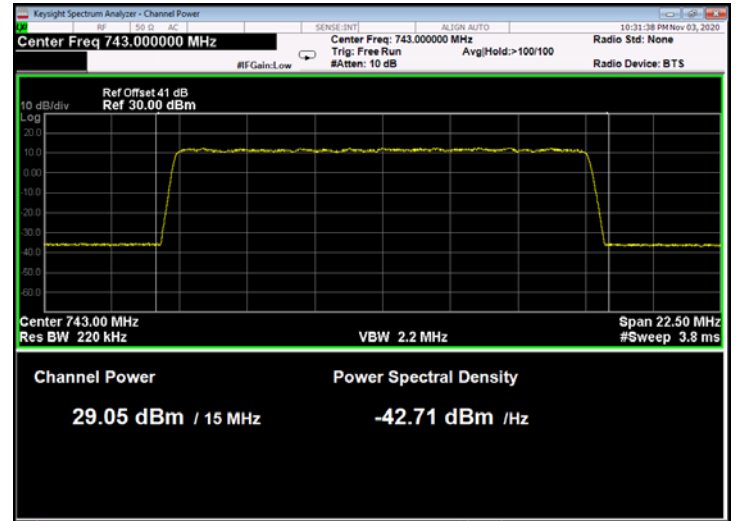


Figure 60: 64QAM 15MHz B.W.; 743.0MHz, 30kHz

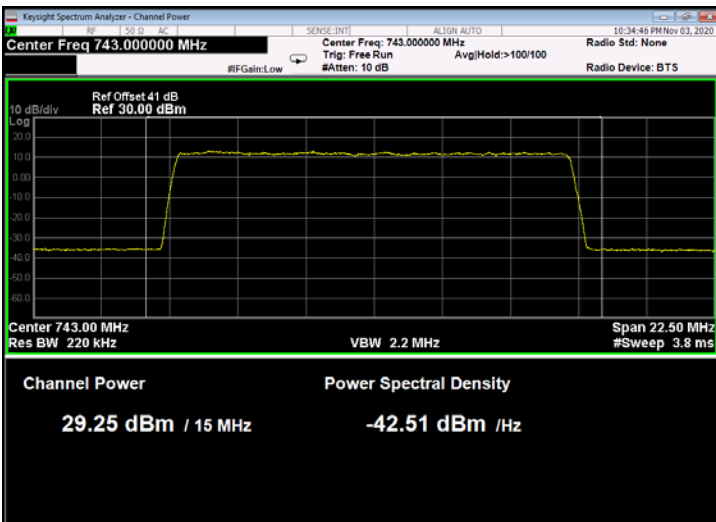


Figure 61: 64QAM 15MHz B.W.; 743.0MHz, 60kHz

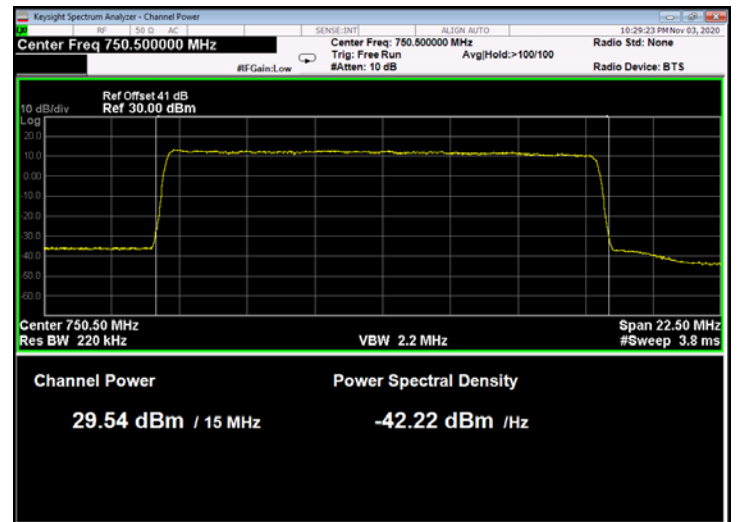


Figure 62: 64QAM 15MHz B.W.; 750.5MHz, 15kHz

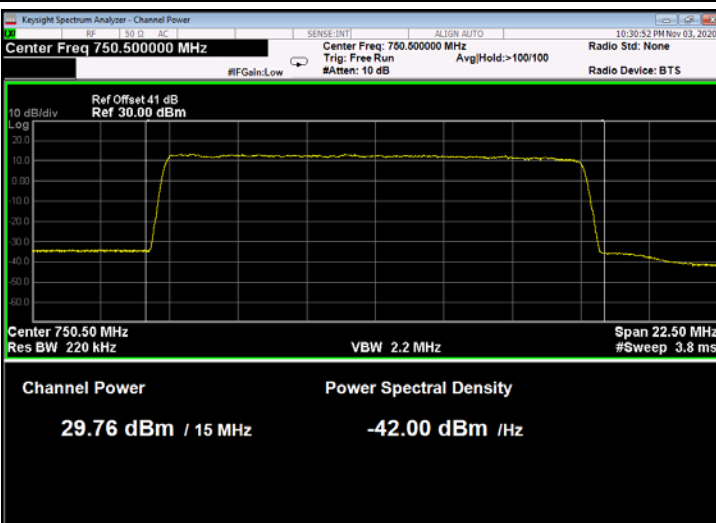


Figure 63: 64QAM 15MHz B.W.; 750.5MHz, 30kHz

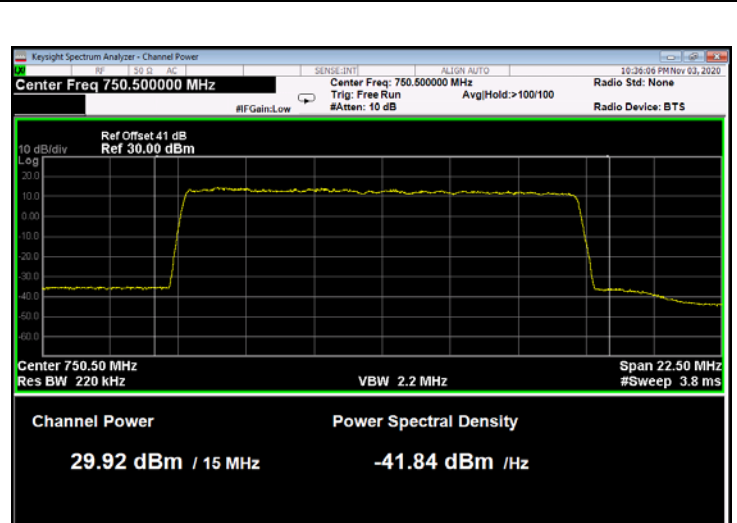


Figure 64: 64QAM 15MHz B.W.; 750.5MHz, 60kHz

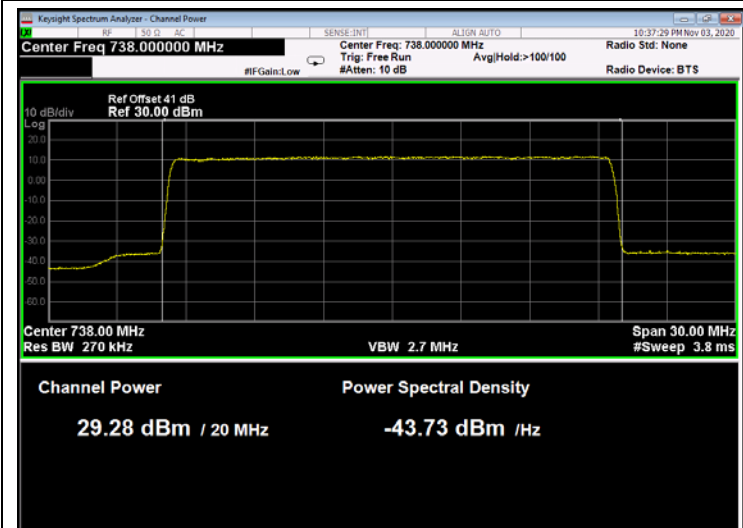


Figure 65: 64QAM 20MHz B.W.; 738.0MHz, 15kHz

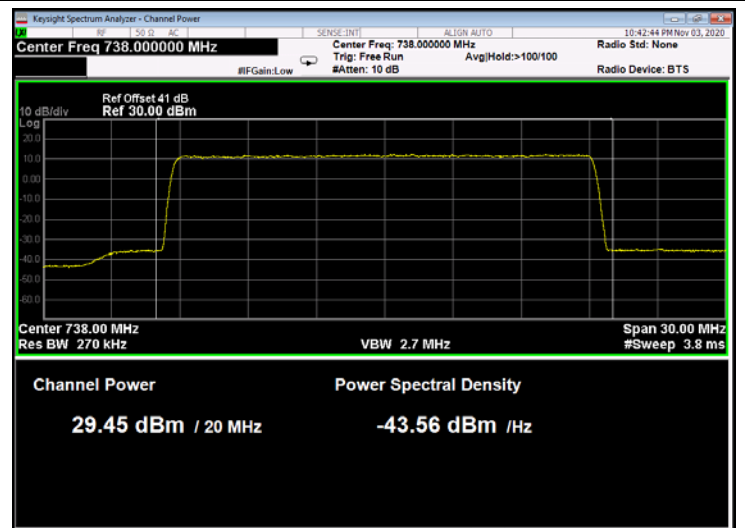


Figure 66: 64QAM 20MHz B.W.; 738.0MHz, 30kHz

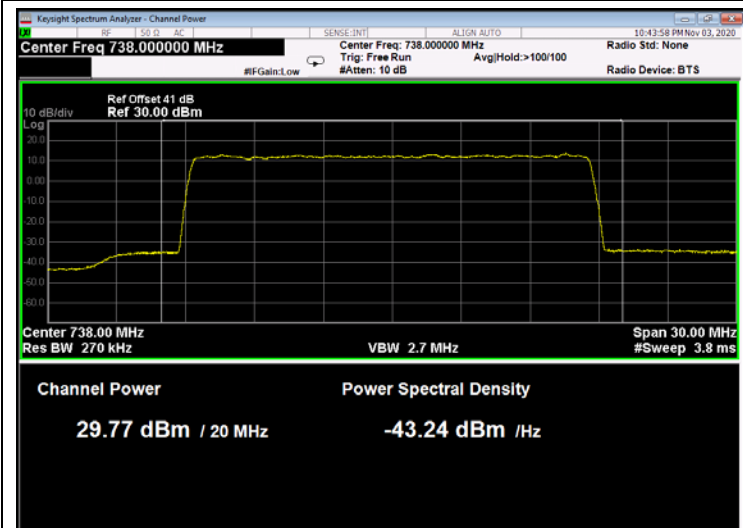


Figure 67: 64QAM 20MHz B.W.; 738.0MHz, 60kHz

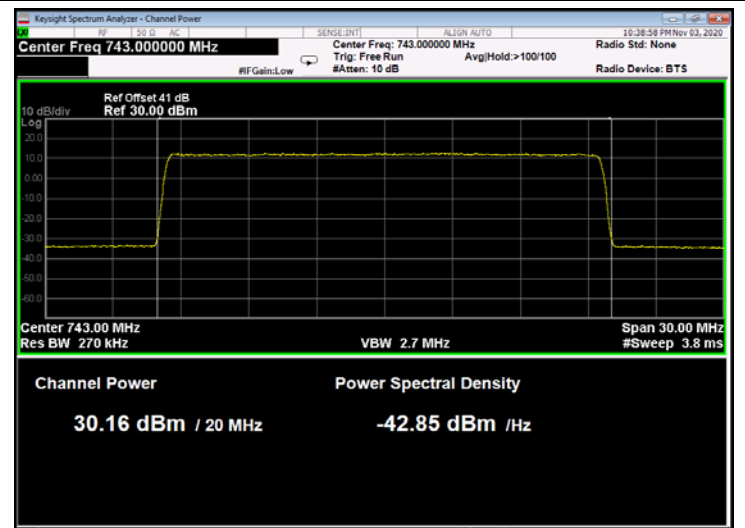


Figure 68: 64QAM 20MHz B.W.; 743.0MHz, 15kHz

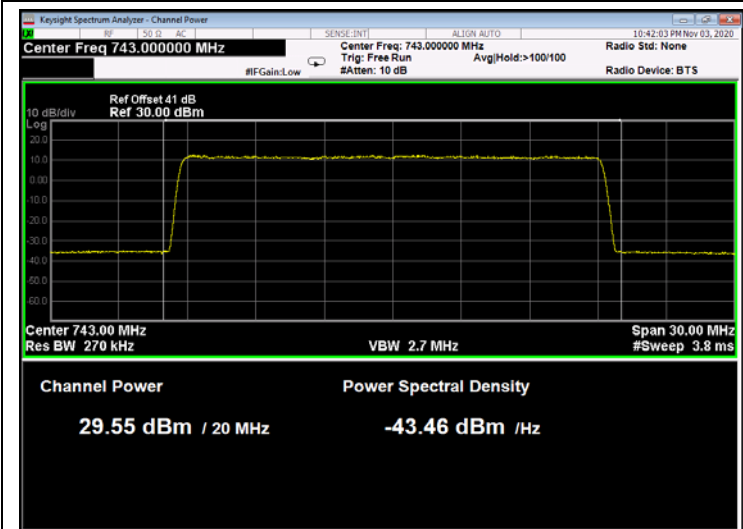


Figure 69: 64QAM 20MHz B.W.; 743.0MHz, 30kHz

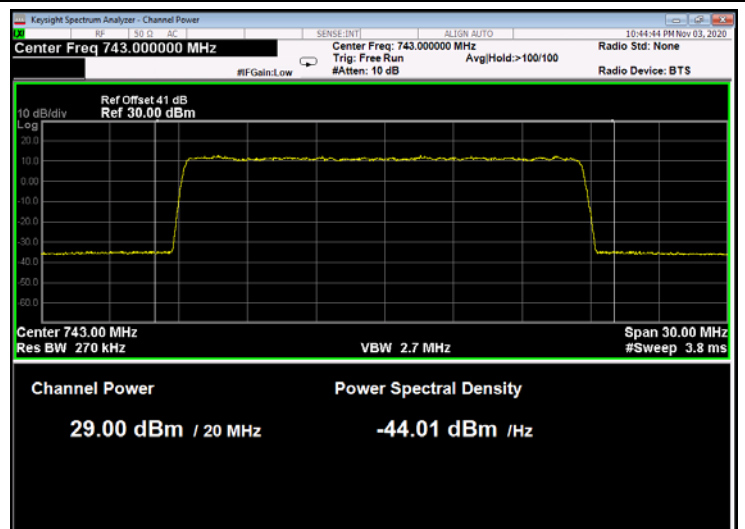


Figure 70: 64QAM 20MHz B.W.; 743.0MHz, 60kHz

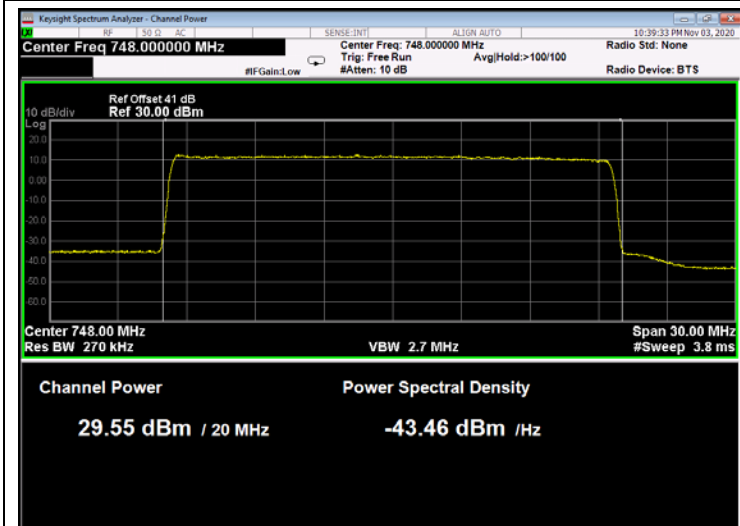


Figure 71: 64QAM 20MHz B.W.; 748.0MHz, 15kHz

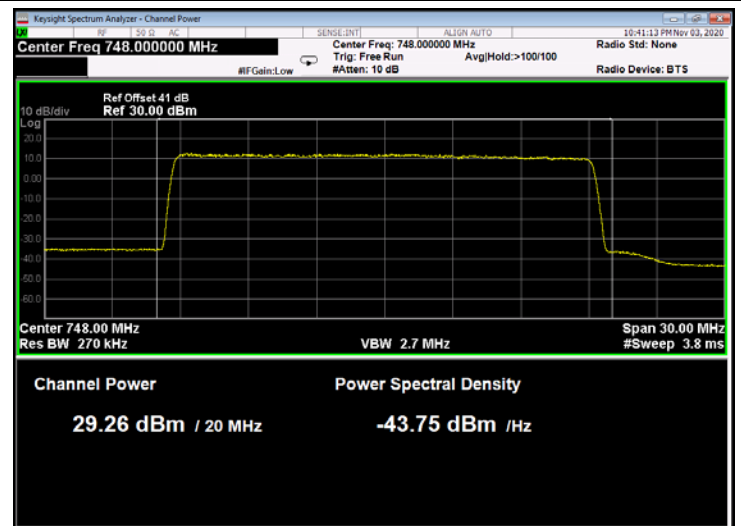


Figure 72: 64QAM 20MHz B.W.; 748.0MHz, 30kHz

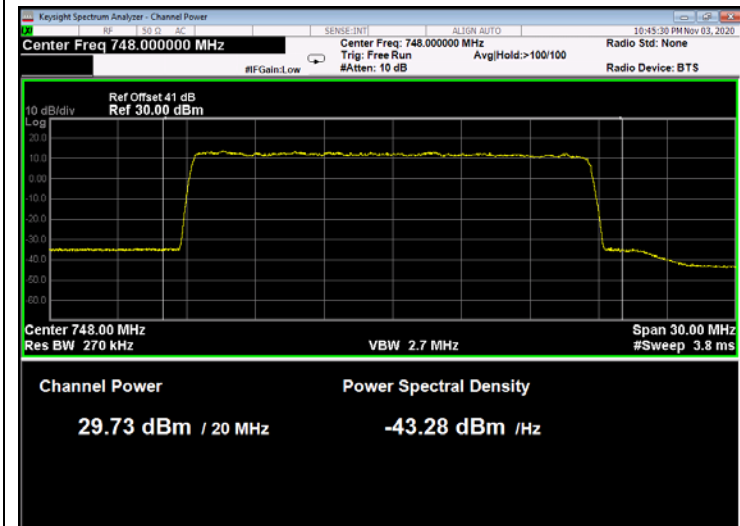


Figure 73: 64QAM 20MHz B.W.; 748.0MHz, 60kHz

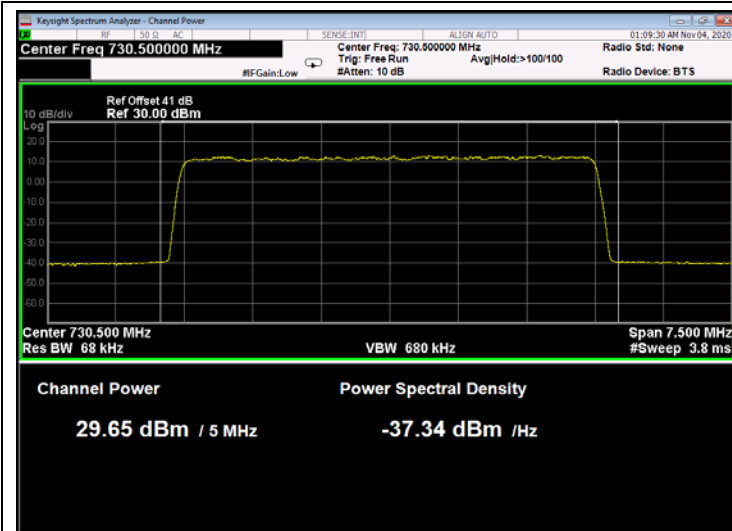


Figure 74: 256QAM 5MHz B.W.; 730.5.5MHz, 15kHz

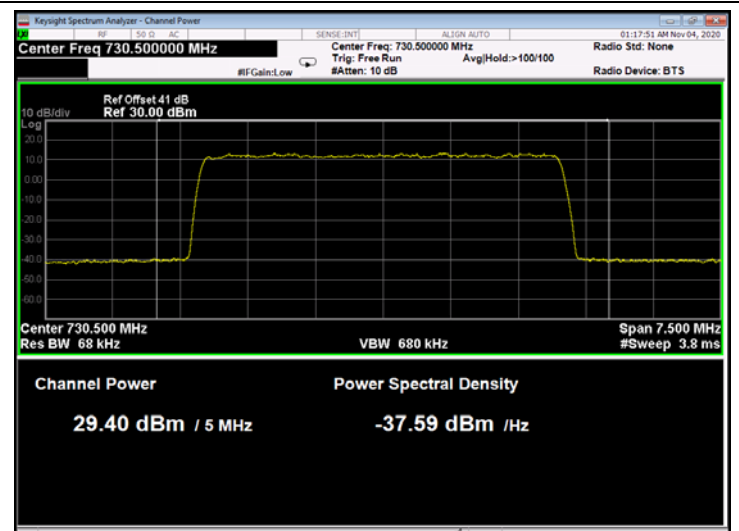


Figure 75: 256QAM 5MHz B.W.; 730.5MHz, 30kHz

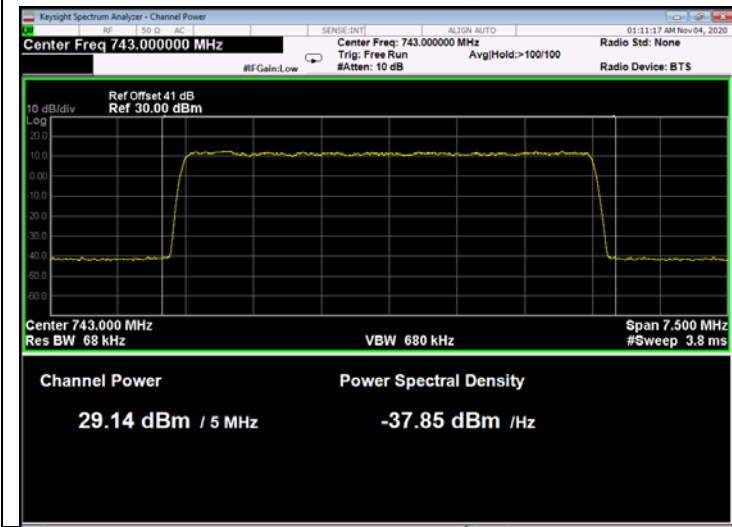


Figure 76: 256QAM 5MHz B.W.; 743.0MHz, 15kHz

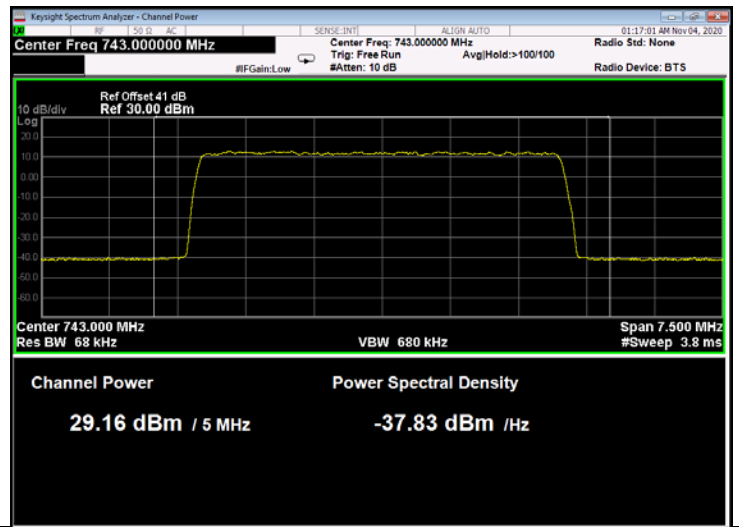


Figure 77: 256QAM 5MHz B.W.; 743.0MHz, 30kHz

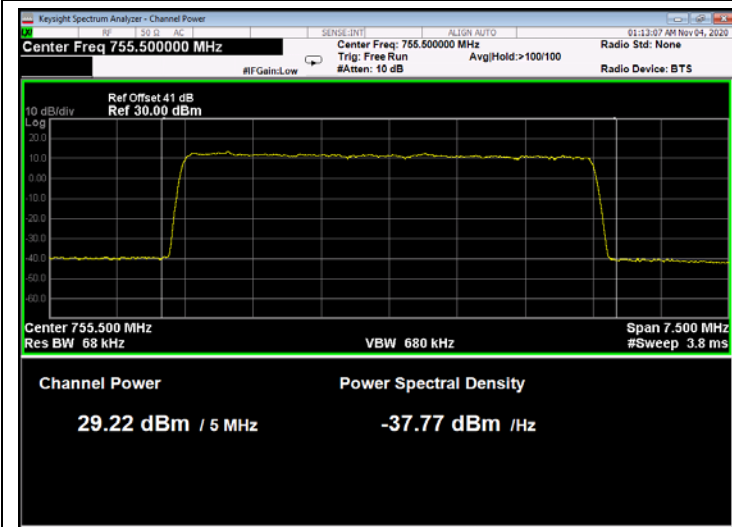


Figure 78: 256QAM 5MHz B.W.; 755.5MHz, 15kHz

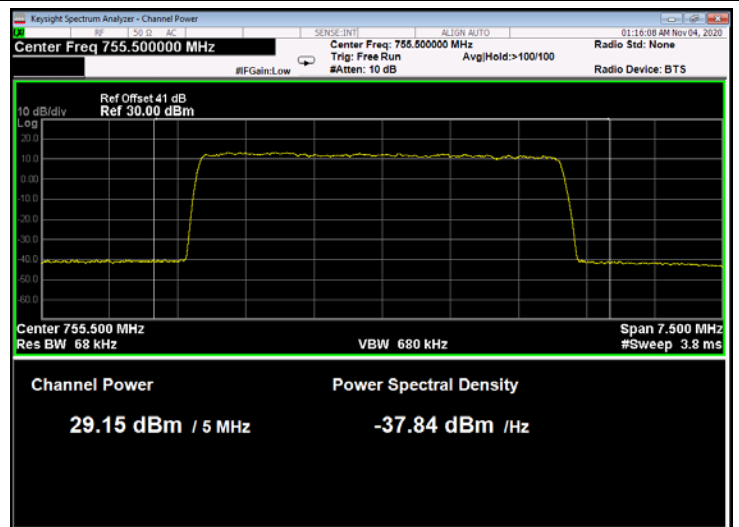


Figure 79: 256QAM 5MHz B.W.; 755.5MHz, 30kHz

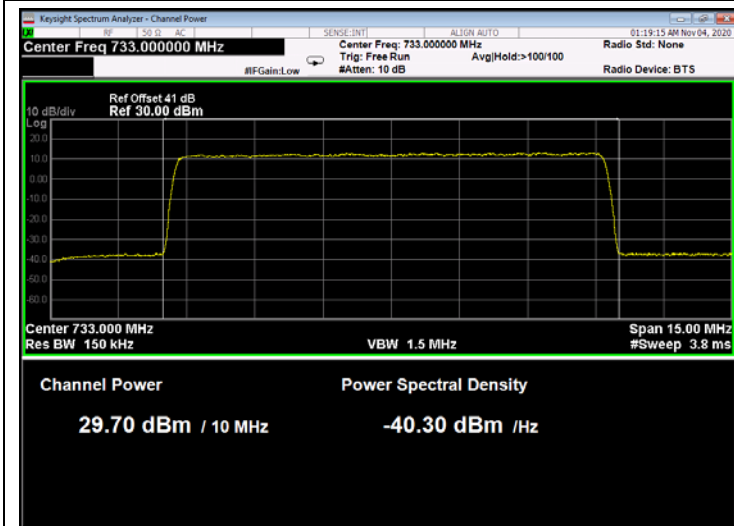


Figure 80: 256QAM 10MHz B.W.; 733.0MHz, 15kHz

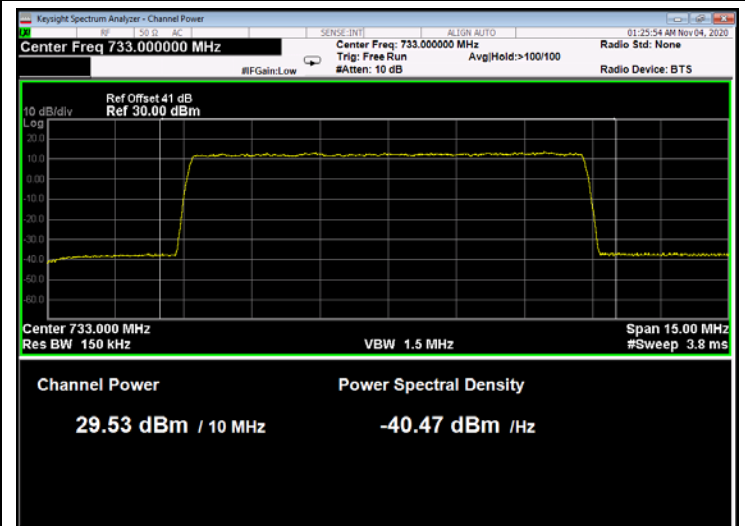


Figure 81: 256QAM 10MHz B.W.; 733.0MHz, 30kHz

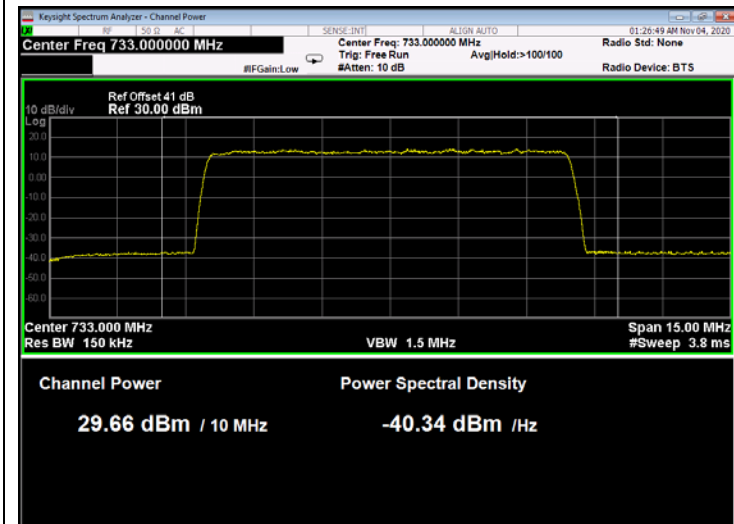


Figure 82: 256QAM 10MHz B.W.; 733.0MHz, 60kHz

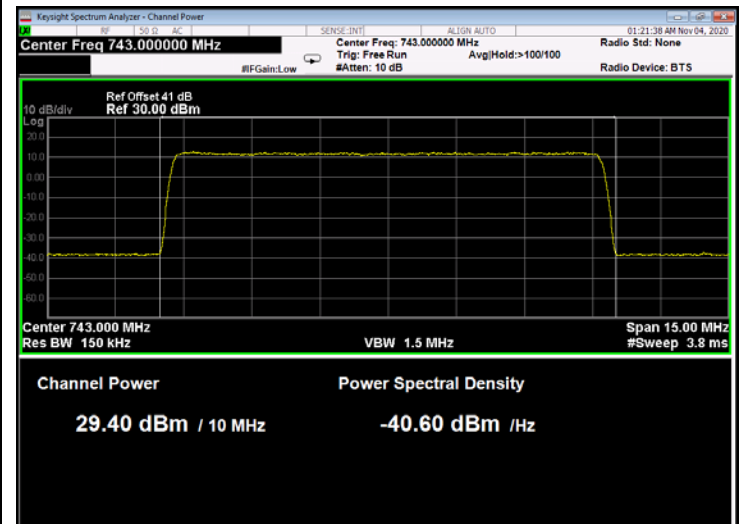


Figure 83: 256QAM 10MHz B.W.; 743.0MHz, 15kHz

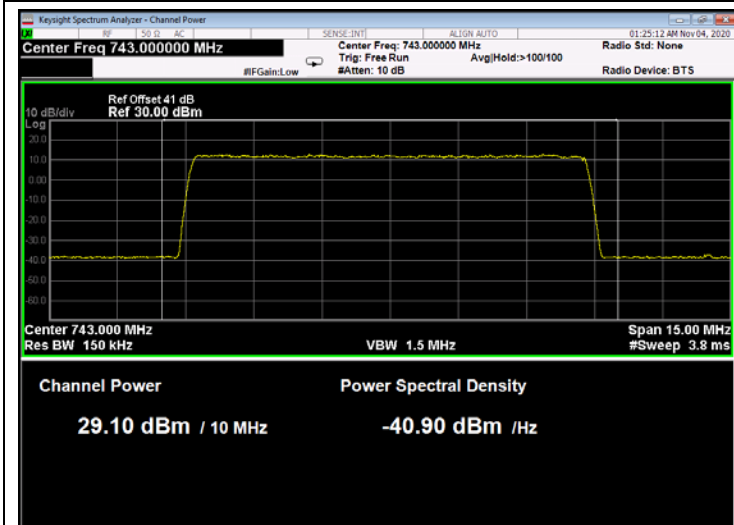


Figure 84: 256QAM 10MHz B.W.; 743.0MHz, 30kHz

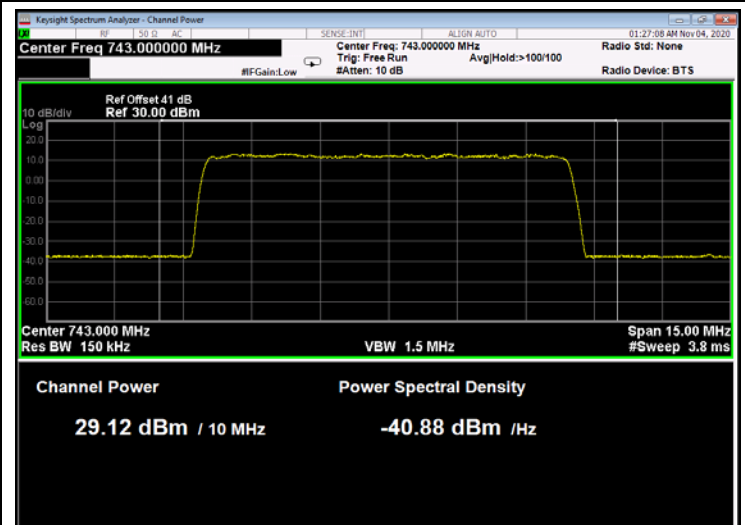


Figure 85: 256QAM 10MHz B.W.; 743.0MHz, 60kHz

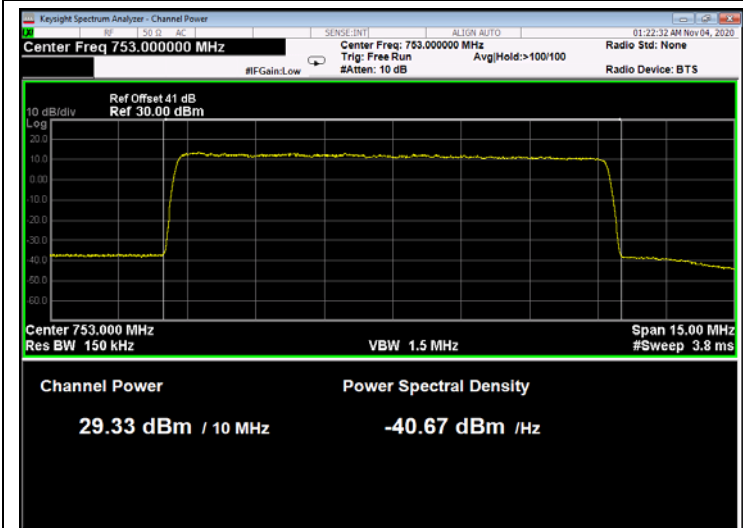


Figure 86: 256QAM 10MHz B.W.; 753.0MHz, 15kHz

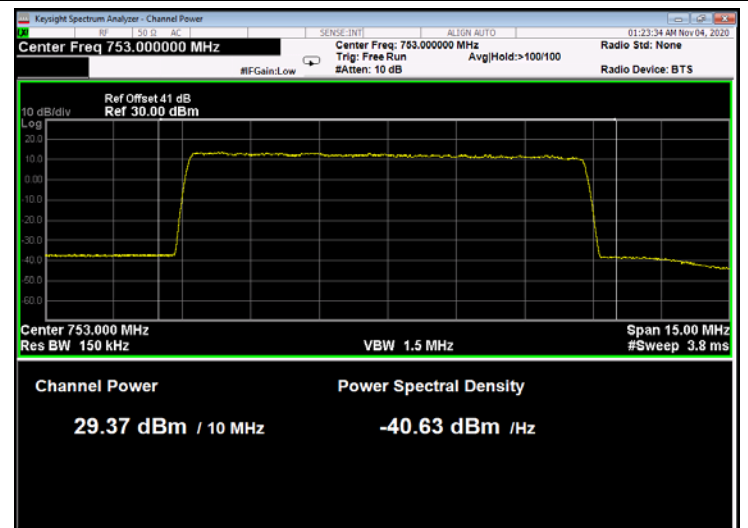


Figure 87: 256QAM 10MHz B.W.; 753.0MHz, 30kHz

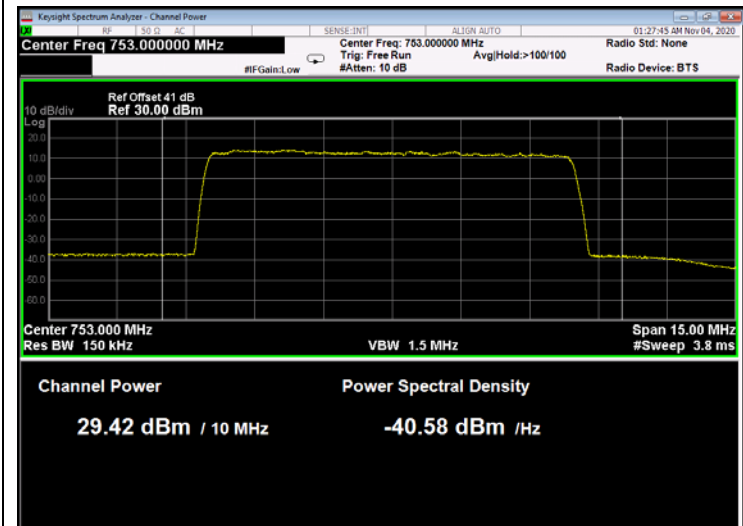


Figure 88: 256QAM 10MHz B.W.; 753.0MHz, 60kHz

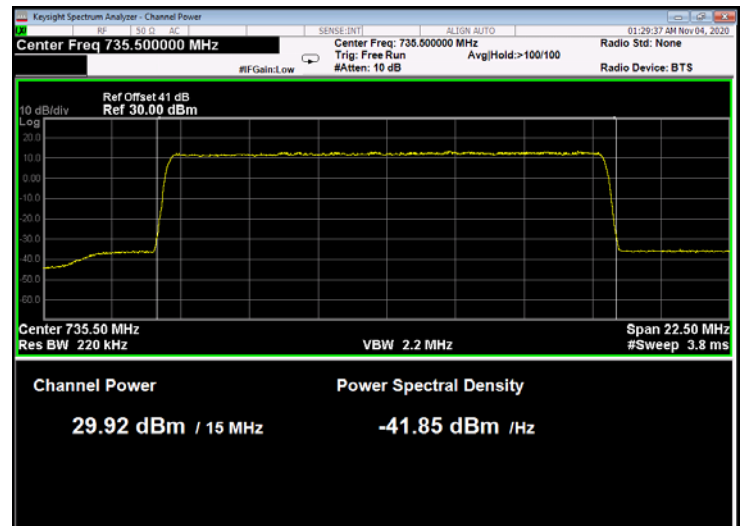


Figure 89: 256QAM 15MHz B.W.; 735.5MHz, 15kHz

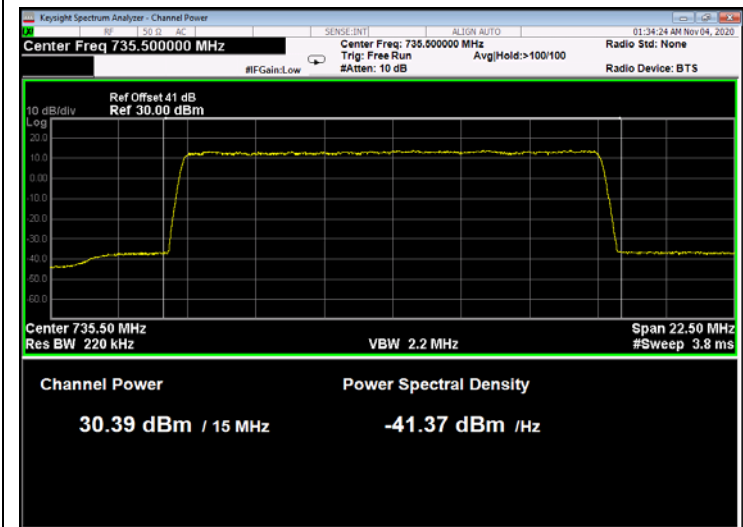


Figure 90: 256QAM 15MHz B.W.; 735.5MHz, 30kHz

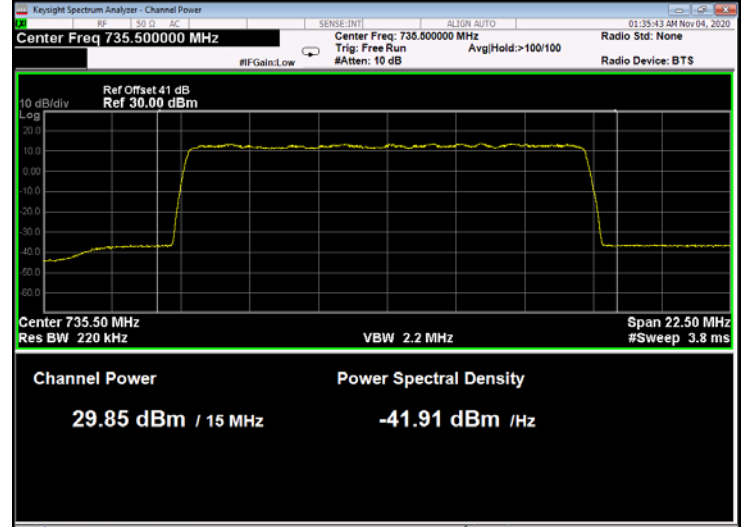


Figure 91: 256QAM 15MHz B.W.; 735.5MHz, 60kHz