



DATE: 8 March 2021

**I.T.L. (PRODUCT TESTING)
LTD.**

FCC Radio Test Report

For

Corning Optical Communication Wireless

Equipment under test:

Corning Everon 6000 DAS - dMRU

dMRU Medium Power Modular Unit

(LTE 600MHZ)

Tested by:

M. Zohar

Approved by:

D. Shidlowsky

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This report relates only to items tested.



Measurement/Technical Report for Corning Optical Communication Wireless

Corning Everon 6000 DAS - dMRU

dMRU Medium Power Modular Unit

(LTE 600MHZ)

FCC ID: OJFDMRUDPAM67

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

Equipment type: Part 20 Industrial Booster (CMRS)

Limits used: 47CFR Parts 2; 27

Measurement procedure used is KDB 935210 D05 v01r04 April 2020 and
ANSI IEEE C63.26-2015

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

Application for Certification
prepared by:

R. Pinchuck
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 Avenue
Vienna, VA 22812
U.S.A.
Tel: +1-703 855-1773
e-mail: NissanI@corning.com



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1 General Information

1.1 Administrative Information

Manufacturer:	Corning Optical Communication Wireless
Manufacturer's Address:	8253 1st Avenue Vienna, VA 22812 U.S.A. Tel: +1-703 855-1773
Manufacturer's Representative:	Isaac Nissan
Equipment Under Test (E.U.T):	Corning Everon 6000 DAS - dMRU
Equipment Model No.:	dMRU Medium Power Modular Unit
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	November 1, 2020
Start of Test:	November 2, 2020
End of Test:	February 07, 2021
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**

DMRU - Digital Medium-power Remote Unit.

The MRU is a medium power modular remote antenna unit with a single antenna port.

The Output power for the lower bands: 600/700 MHz Low/700 MHz High/FirstNet, 800/850 MHz is 33 dBm and the output power for the medium bands EAWS, PCS, WCS and 2.5GHz TDD is 37dBm.

The MRU modular structure and integrated high-performance cavity based multiplexing functionalities, enable setups of up to 6 RF modules, for a variety of licensed frequency bands within a single cabinet.

The MRU also provides CBRS/C-Band ready RF interface for future field upgrades.

1.4 **Test Methodology**

Both conducted and radiated testing were performed according to the procedures in KDB 935210 D05 v01r04 April 2020 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

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site:

30-1000MHz:
Expanded Uncertainty (95% Confidence, K=2):
 ± 4.96 dB

1 GHz to 6 GHz
Expanded Uncertainty (95% Confidence, K=2):
 ± 5.19 dB

>6 GHz
Expanded Uncertainty (95% Confidence, K=2):
 ± 5.51 dB



2 System Test Configuration

2.1 *Justification*

The dMRU is a repeater supporting a broad range of cellular generations: 3G, 4G and 5G in the CELL-ESMR band.

Evaluation was performed at the low, mid and high channels each one defined per the operation BW.

Evaluation was performed at 115VAC as the nominal power source.

Conducted tests were performed with an external attenuator connected to the spectrum analyzer.

Radiated emission tests were performed with a 50Ω termination connected to the E.U.T output terminal.

2.2 *EUT Exercise Software*

The Element Management System ver. 1.4 used for commands delivery. These commands are used to enable/disable the EUT transmission. SW Ver. is 1.4.

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

Product Name	Corning Everon 6000 DAS - dMRU
Model Name	dMRU medium power modular remote unit (LTE 600MHZ PAM)
Working voltage(rated)	48 VDC, 115/230 VAC
Mode of operation	Repeater Booster supporting 5G
Modulations	16QAM, 64QAM, 256QAM, QPSK
Frequency Range	LTE 600MHZ (DL: 617-652, UL:663-698)
Transmit power	~34 dBm (Max) per band
DATA rate	N/A
Modulation BW	5; 10; 15; 20MHz
DC Voltage applied to final RF stage band board (Driver and PA)	28.5V
DC Current applied to final RF stage band board (Driver and PA)	1.7A

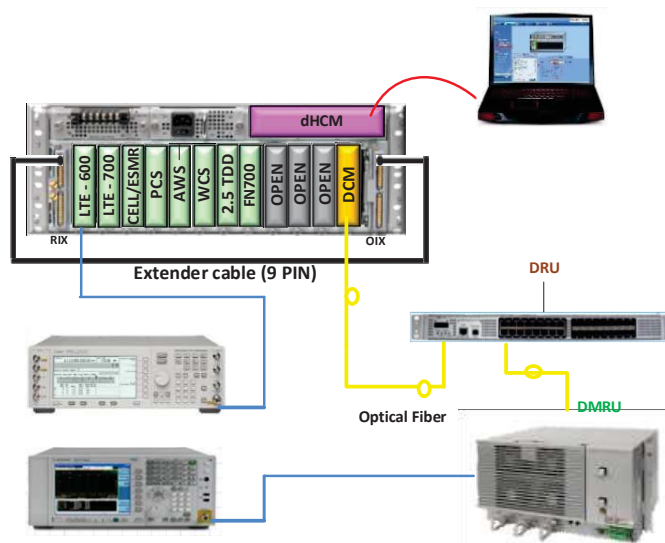


Figure 1. Conducted Test Set-Up

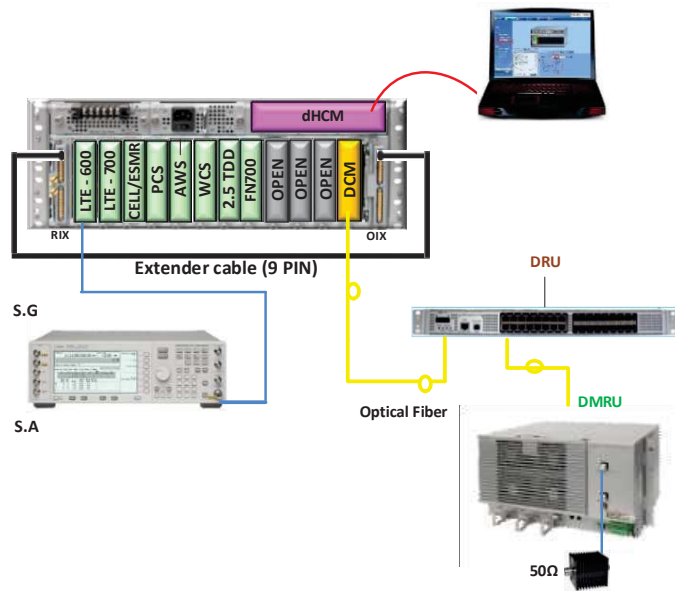


Figure 2. Radiated Test Set-Up

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 1.0 - 8.0GHz



4 RF Power Output

4.1 Test Specification

FCC Part 27, Subpart C , Section 50(c)

4.2 Test Procedure

(Temperature (20°C)/ Humidity (48%RH))

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator 40.7 dB) and an appropriate coaxial cable. 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 103.



Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(dBm)
16QAM	5	15	619.5	33.49
		30		33.84
		15	634.5	33.45
		30		34.06
		15	649.5	32.55
		30		32.39
	10	15	622.0	32.65
		30		32.62
		30	634.5	32.77
		15		32.95
		15	647.0	32.83
		30		33.18
	15	15	624.5	33.47
		30		33.42
		15	634.5	33.31
		30		33.25
		15	644.5	33.65
		30		33.43
	20	15	627.0	33.83
		30		34.34
		15	634.5	33.97
		30		34.10
		15	642.0	33.24
		30		32.88

Table 1 RF Power Output 16QAM



Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(dBm)
64QAM	5	15	619.5	33.65
		30		34.04
		15	634.5	33.55
		30		33.51
		15	649.5	32.28
		30		32.14
	10	15	622.0	32.64
		30		32.76
		30	634.5	32.70
		15		32.70
		15	647.0	33.10
		30		32.75
	15	15	624.5	33.51
		30		33.51
		15	634.5	33.30
		30		33.31
		15	644.5	33.64
		30		33.74
	20	15	627.0	33.63
		30		33.73
		15	634.5	33.92
		30		33.73
		15	642.0	33.15
		30		33.28

Table 2 RF Power Output 64QAM



Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(dBm)
256QAM	5	15	619.5	33.94
		30		33.98
		15	634.5	33.74
		30		33.67
		15	649.5	32.47
		30		32.25
	10	15	622.0	32.93
		30		32.61
		30	634.5	32.56
		15		32.50
		15	647.0	32.78
		30		33.03
	15	15	624.5	33.42
		30		33.48
		15	634.5	33.11
		30		33.29
		15	644.5	33.70
		30		33.74
	20	15	627.0	33.37
		30		33.79
		15	634.5	33.74
		30		33.95
		15	642.0	33.38
		30		33.18

Table 3 RF Power Output 256QAM



Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(dBm)
QPSK	5	15	619.5	33.55
		30		33.68
		15	634.5	33.42
		30		33.95
		15	649.5	32.72
		30		32.62
	10	15	622.0	32.85
		30		32.87
		30	634.5	33.07
		15		32.89
		15	647.0	32.95
		30		32.92
	15	15	624.5	33.12
		30		33.53
		15	634.5	33.04
		30		33.22
		15	644.5	33.06
		30		33.39
	20	15	627.0	34.23
		30		34.31
		15	634.5	34.19
		30		34.17
		15	642.0	32.93
		30		32.93

Table 4 RF Power Output QPSK

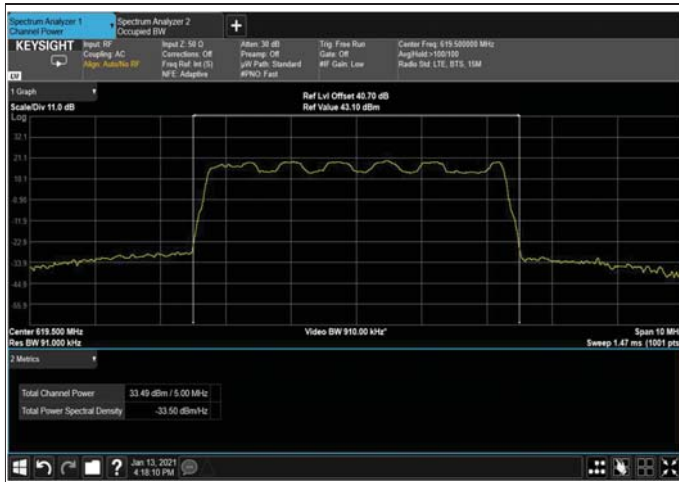


Figure 8: 16QAM 5MHz B.W; 619.5MHz, 15kHz



Figure 9: 16QAM 5MHz B.W; 619.5MHz, 30kHz



Figure 10: 16QAM 5MHz B.W; 634.5MHz, 15kHz

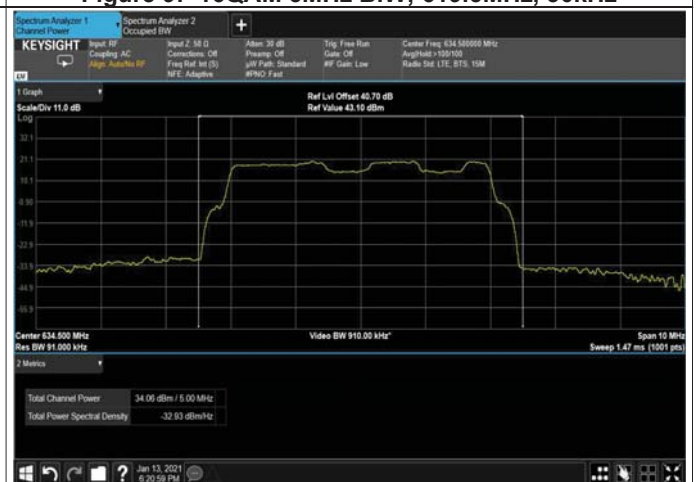


Figure 11: 16QAM 5MHz B.W; 634.5MHz, 30kHz



Figure 12: 16QAM 5MHz B.W; 649.5MHz, 15kHz



Figure 13: 16QAM 5MHz B.W; 649.5MHz, 30kHz



Figure 14: 16QAM 10MHz B.W; 622.0MHz, 15kHz



Figure 15: 16QAM 10MHz B.W; 622.0MHz, 30kHz



Figure 16: 16QAM 10MHz B.W; 634.5MHz, 15kHz



Figure 17: 16QAM 10MHz B.W; 634.5MHz, 30kHz



Figure 18: 16QAM 10MHz B.W; 647.0MHz, 15kHz

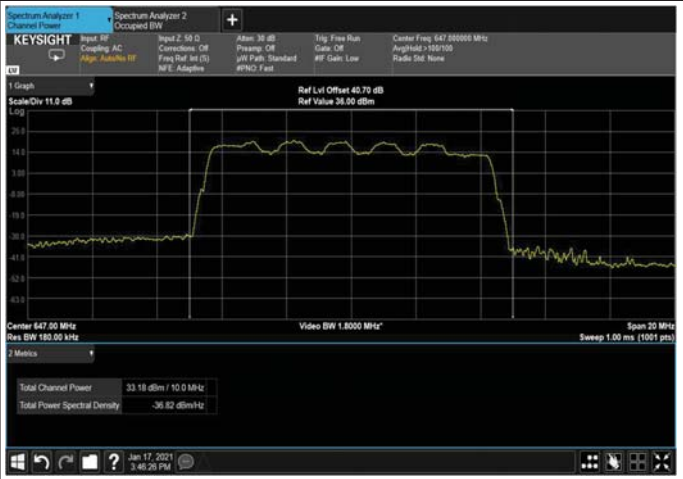


Figure 19: 16QAM 10MHz B.W; 647.0MHz, 30kHz

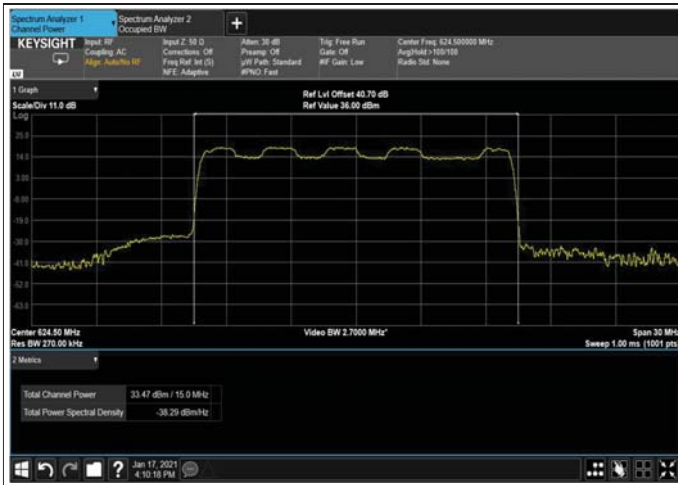


Figure 20: 16QAM 15MHz B.W; 624.5MHz, 15kHz

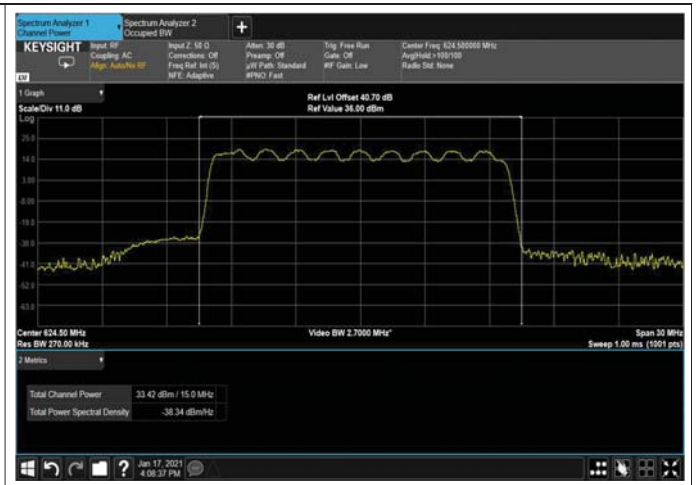


Figure 21: 16QAM 15MHz B.W; 624.5MHz, 30kHz



Figure 22: 16QAM 15MHz B.W; 634.5MHz, 15kHz



Figure 23: 16QAM 15MHz B.W; 634.5MHz, 30 kHz



Figure 24: 16QAM 15MHz B.W; 644.5MHz, 15kHz

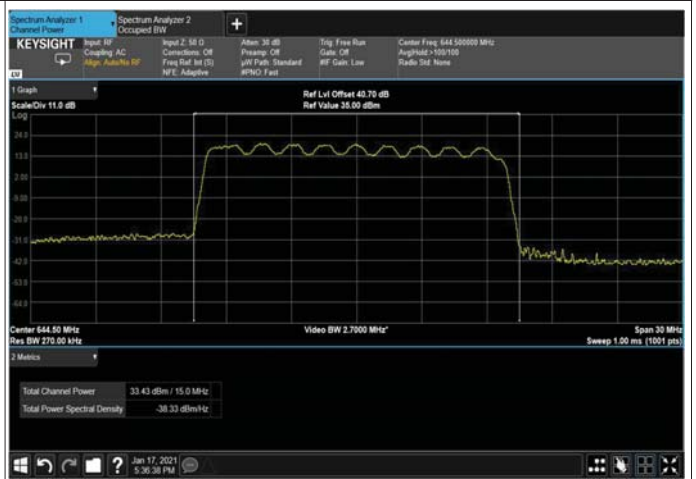


Figure 25: 16QAM 15MHz B.W; 644.5MHz, 30kHz

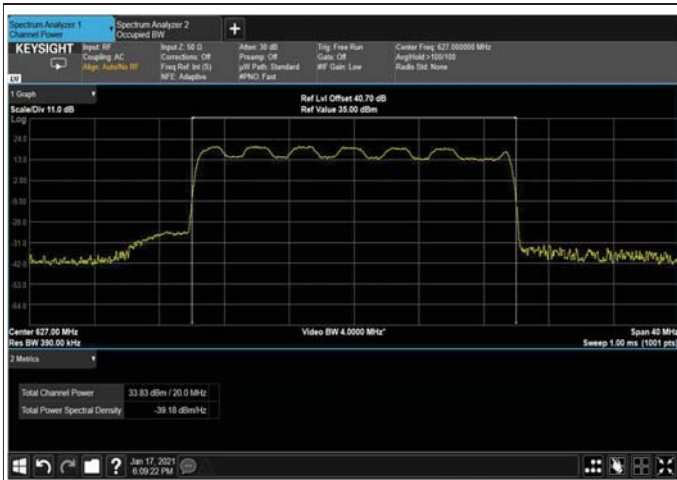


Figure 26: 16QAM 20MHz B.W; 627.0MHz, 15 kHz



Figure 27: 16QAM 20MHz B.W; 627.0MHz, 30kHz



Figure 28: 16QAM 20MHz B.W; 634.5MHz, 15kHz



Figure 29: 16QAM 20MHz B.W; 634.5MHz, 30kHz



Figure 30: 16QAM 20MHz B.W; 642.0MHz, 15kHz



Figure 31: 16QAM 20MHz B.W; 642.0MHz, 30kHz

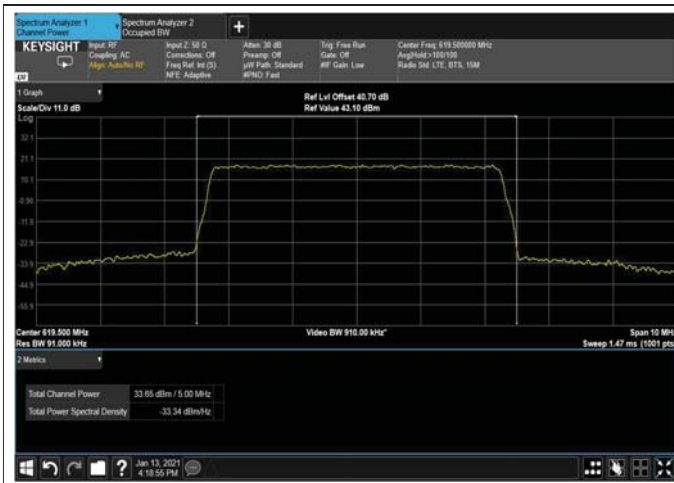


Figure 32: 64QAM 5MHz B.W; 619.5MHz, 15kHz

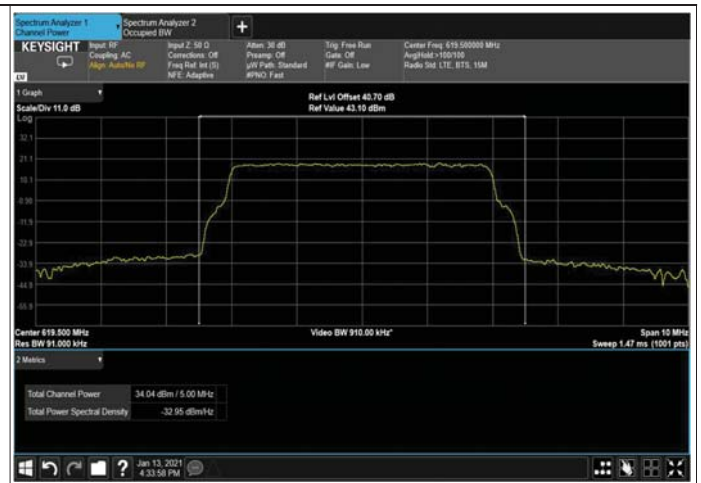


Figure 33: 64QAM 5MHz B.W; 619.5MHz, 30kHz



Figure 34: 64QAM 5MHz B.W; 634.5MHz, 15kHz



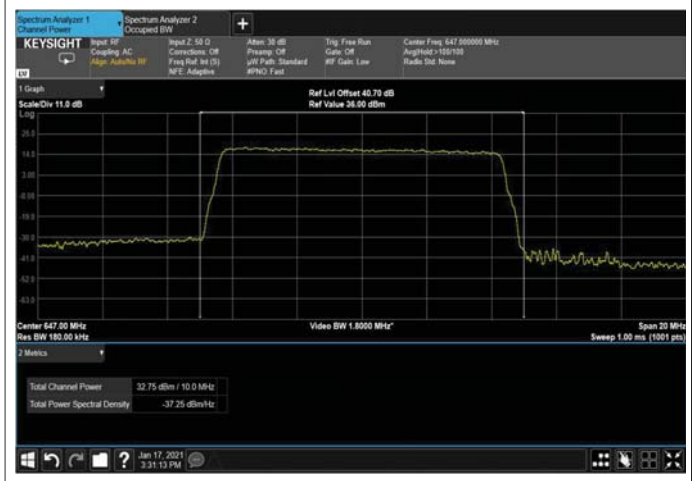
Figure 35: 64QAM 5MHz B.W; 634.5MHz, 30kHz



Figure 36: 64QAM 5MHz B.W; 649.5MHz, 15kHz



Figure 37: 64QAM 5MHz B.W; 649.5MHz, 30kHz



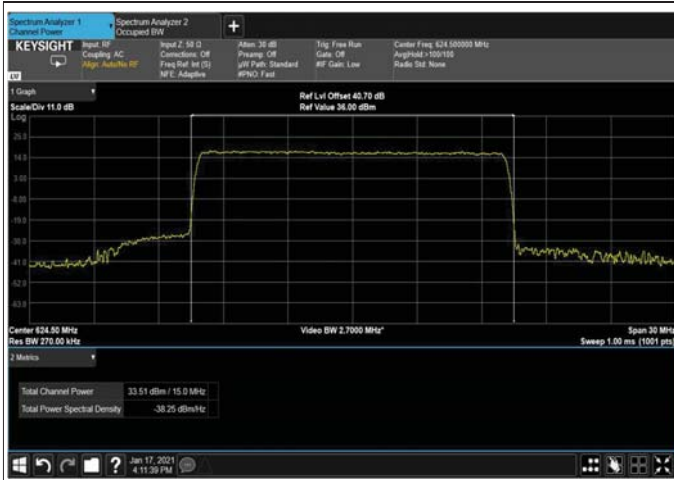


Figure 44: 64QAM 15MHz B.W; 624.5MHz, 15kHz

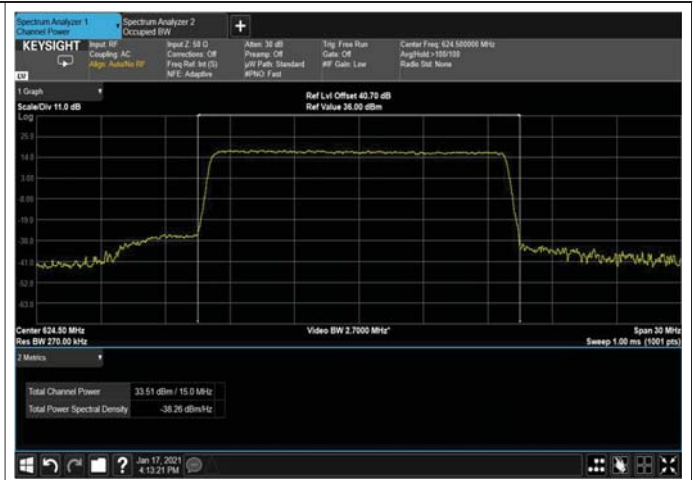


Figure 45: 64QAM 15MHz B.W; 624.5MHz, 30kHz



Figure 46: 64QAM 15MHz B.W; 634.5MHz, 15kHz

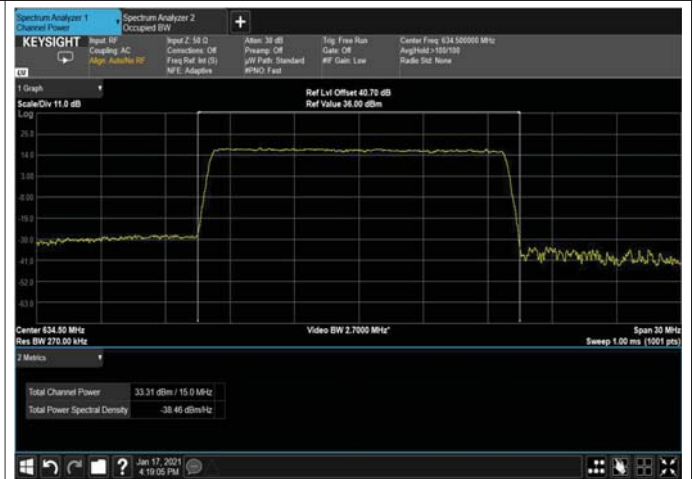


Figure 47: 64QAM 15MHz B.W; 634.5MHz, 30kHz



Figure 48: 64QAM 15MHz B.W; 644.5MHz, 15kHz



Figure 49: 64QAM 15MHz B.W; 644.5MHz, 30kHz

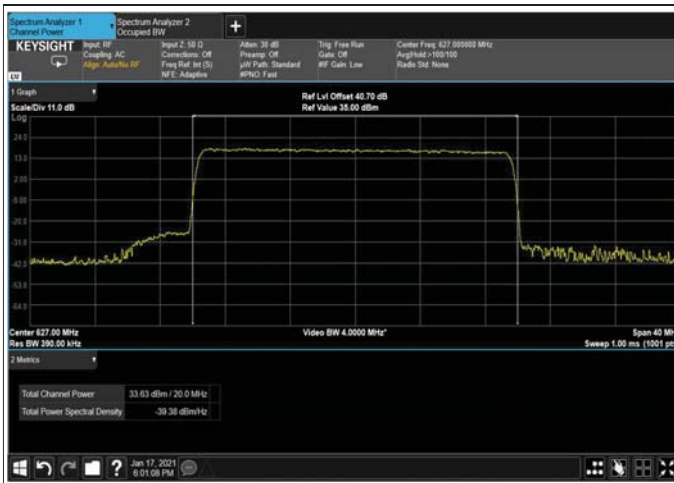


Figure 50: 64QAM 20MHz B.W; 627.0MHz, 15kHz



Figure 51: 64QAM 20MHz B.W; 627.0MHz, 30kHz



Figure 52: 64QAM 20MHz B.W; 634.5MHz, 15kHz

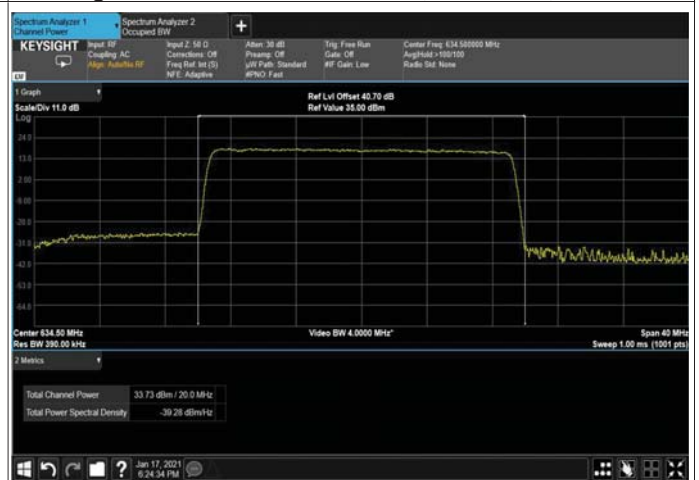


Figure 53: 64QAM 20MHz B.W; 634.5MHz, 30kHz



Figure 54: 64QAM 20MHz B.W; 642.0MHz, 15kHz



Figure 55: 64QAM 20MHz B.W; 642.0MHz, 30kHz

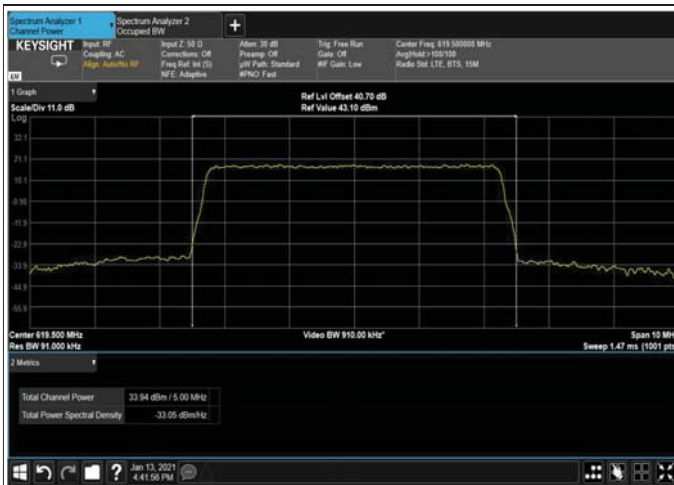


Figure 56: 256QAM 5MHz B.W; 619.5MHz, 15kHz

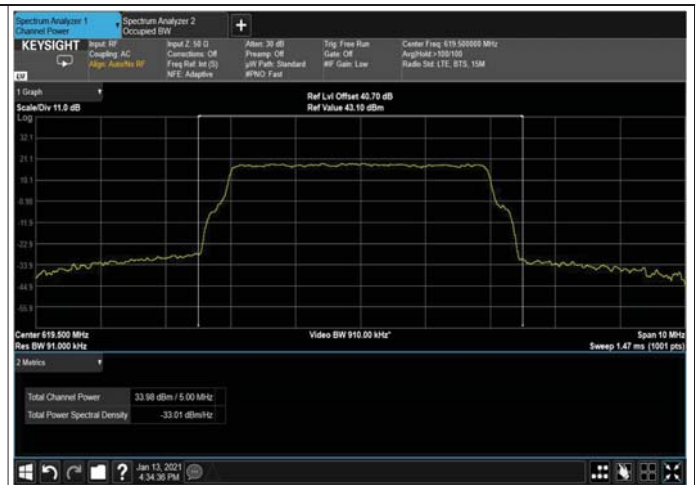


Figure 57: 256QAM 5MHz B.W; 619.5MHz, 30kHz



Figure 58: 256QAM 5MHz B.W; 634.5MHz, 15kHz

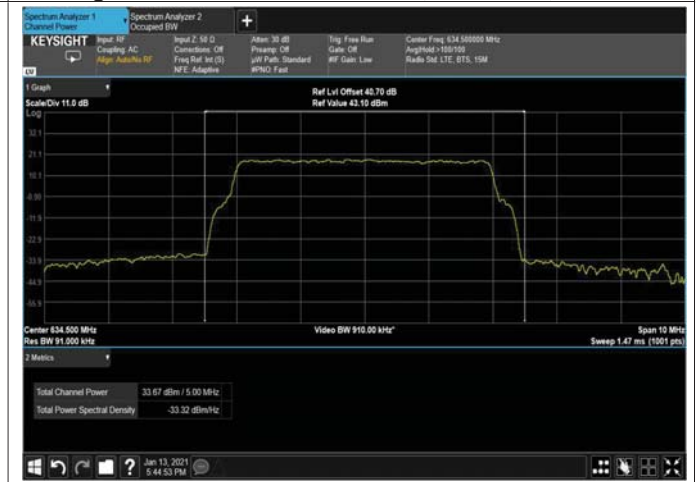


Figure 59: 256QAM 5MHz B.W; 634.5MHz, 30kHz



Figure 60: 256QAM 5MHz B.W; 649.5MHz, 15kHz



Figure 61: 256QAM 10MHz B.W; 649.5MHz, 30kHz



Figure 62: 256QAM 10MHz B.W; 622.0MHz, 15kHz

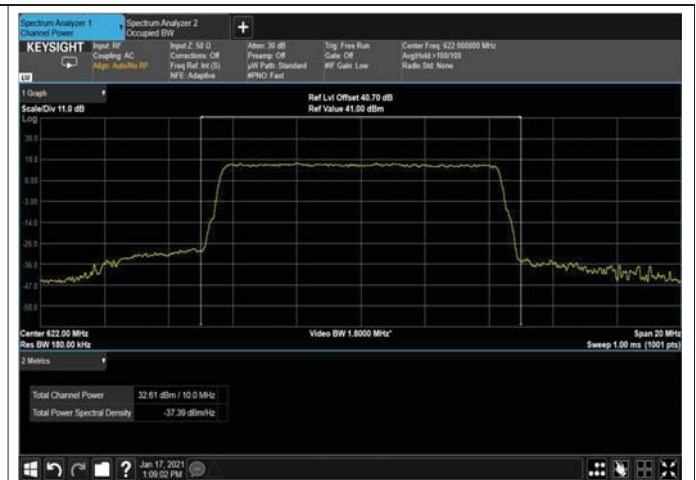


Figure 63: 256QAM 10MHz B.W; 622.0MHz, 30kHz



Figure 64: 256QAM 10MHz B.W; 634.5MHz, 15kHz



Figure 65: 256QAM 10MHz B.W; 634.5MHz, 30kHz



Figure 66: 256QAM 10MHz B.W; 647MHz, 15kHz



Figure 67: 256QAM 10MHz B.W; 647.0MHz, 30kHz

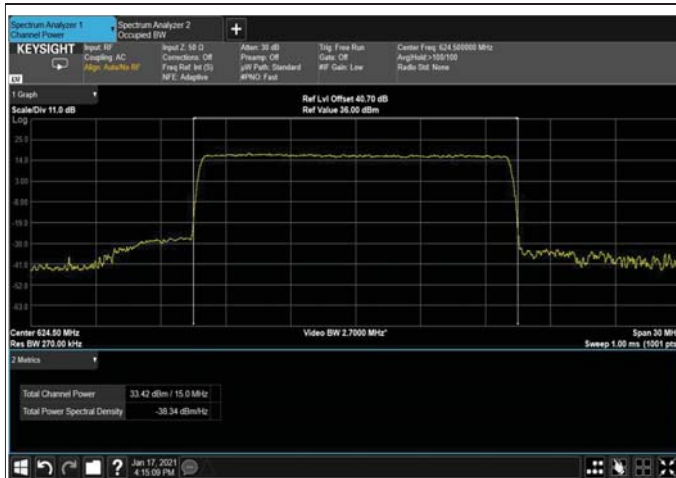




Figure 74: 256QAM 20MHz B.W; 627MHz, 15kHz

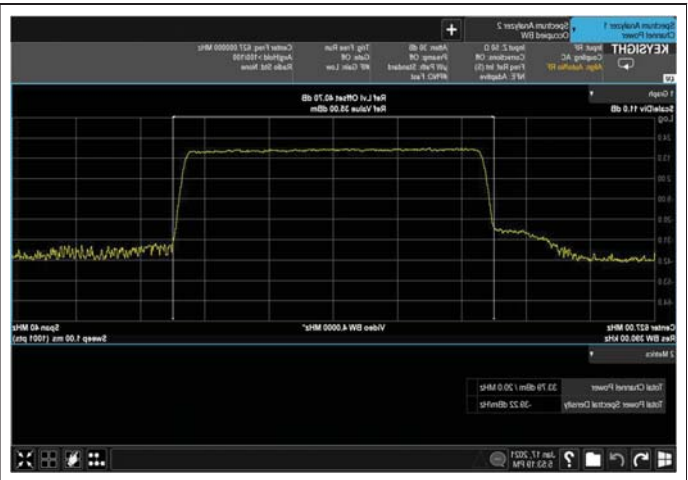


Figure 75: 256QAM 20MHz B.W; 627.0MHz, 30kHz



Figure 76: 256QAM 20MHz B.W; 634.5MHz, 15kHz



Figure 77: 256QAM 20MHz B.W; 634.5MHz, 30kHz



Figure 78: 256QAM 20MHz B.W; 642.0MHz, 15kHz

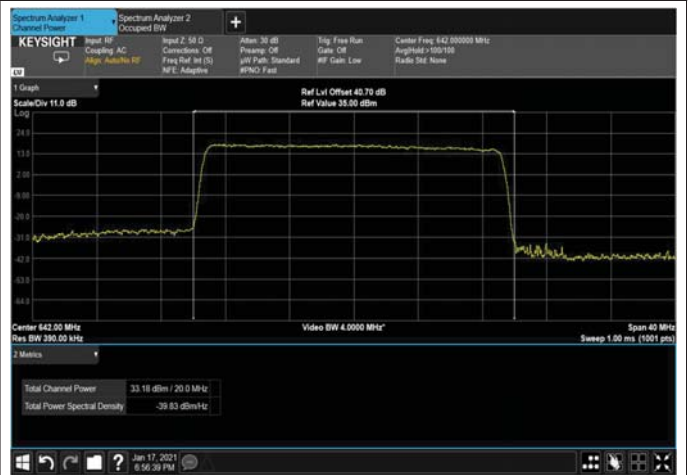


Figure 79: 256QAM 20MHz B.W; 642.0MHz, 30kHz



Figure 80: QPSK 5MHz B.W; 619.5MHz, 15kHz



Figure 81: QPSK 5MHz B.W; 619.5MHz, 30kHz

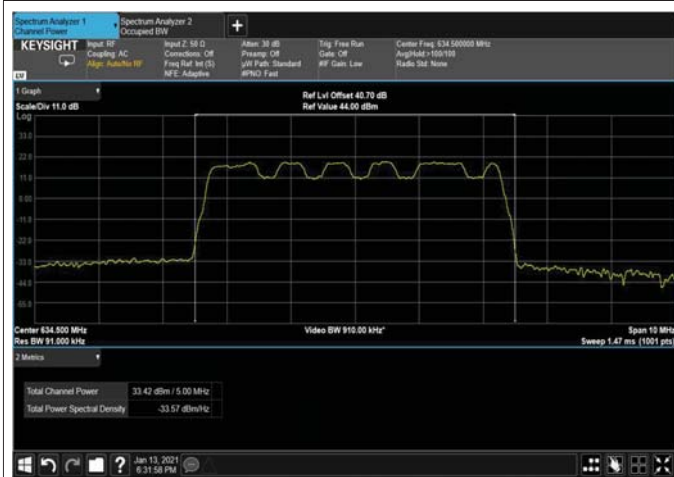


Figure 82: QPSK 5MHz B.W; 634.5MHz, 15kHz

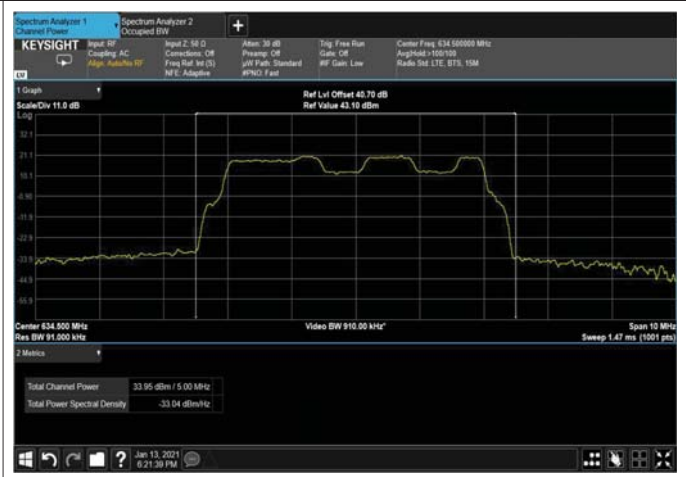


Figure 83: QPSK 5MHz B.W; 634.5MHz, 30kHz



Figure 84: QPSK 5MHz B.W; 649.5MHz, 15kHz



Figure 85: QPSK 5MHz B.W; 649.5MHz, 30kHz

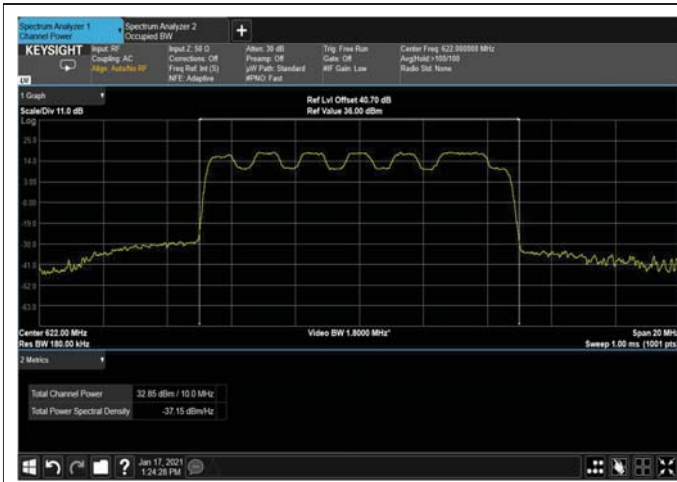


Figure 86: QPSK 10MHz B.W; 622.0MHz, 15kHz

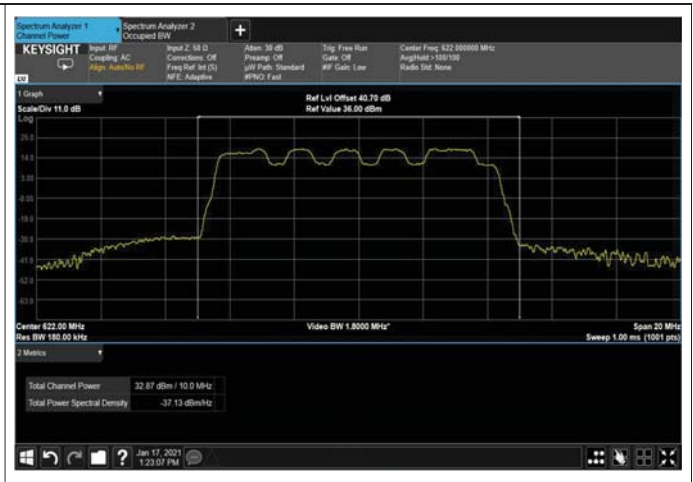


Figure 87: QPSK 1MHz B.W; 622.0MHz, 30kHz



Figure 88: QPSK 10MHz B.W; 634.5MHz, 15kHz



Figure 89: QPSK 10MHz B.W; 634.5MHz, 30kHz



Figure 90: QPSK 10MHz B.W; 647.0MHz, 15kHz



Figure 91: QPSK 10MHz B.W; 647.0MHz, 30kHz



Figure 92: QPSK 10MHz B.W; 624.5MHz, 15kHz



Figure 93: QPSK 15MHz B.W; 624.5MHz, 30kHz



Figure 94: QPSK 15MHz B.W; 634.5MHz, 15kHz

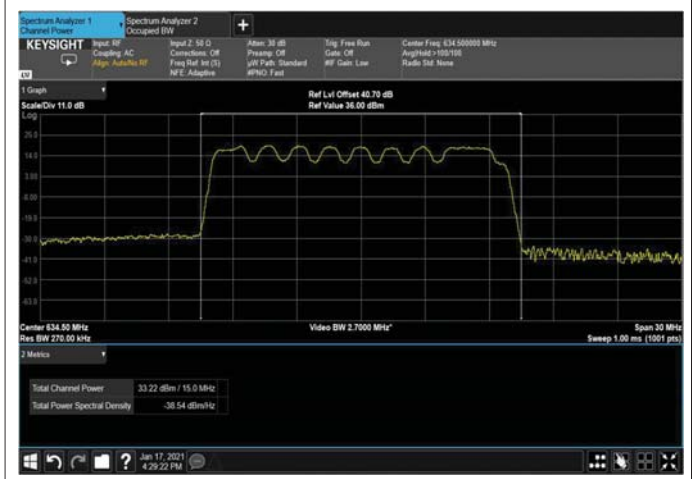


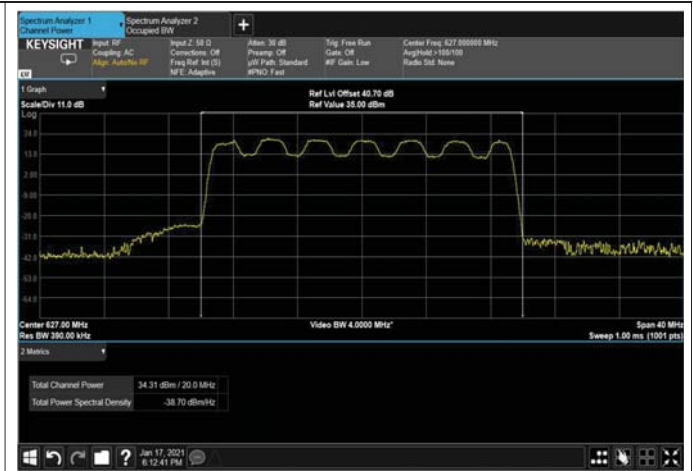
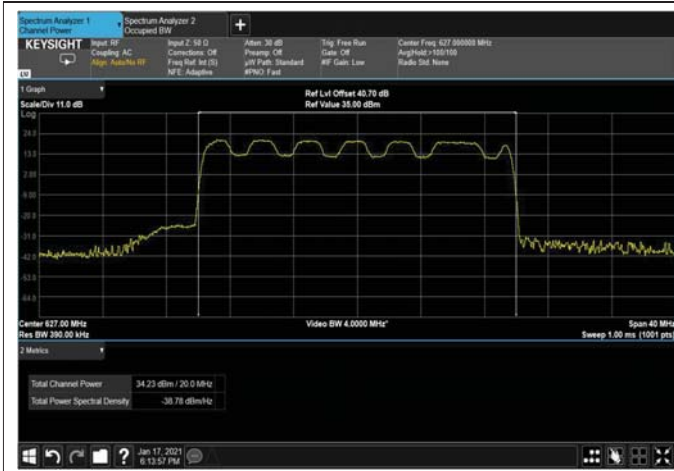
Figure 95: QPSK 15MHz B.W; 634.5MHz, 30kHz



Figure 96: QPSK 15MHz B.W; 644.5MHz, 15kHz



Figure 97: QPSK 15MHz B.W; 644.5MHz, 30kHz





4.5 Test Equipment Used; RF Power Output

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Keysight	UXA N9040B	MY56080119	January 31, 2020	January 31, 2022
EXG Vector Signal Generator	Agilent Technologies	N5172B	MY53051952	January 17, 2019	January 17, 2022
40 dB Attenuator	Weinschel Associates	WA 39-40-33	-	November 1, 2020	November 1, 2021
RF Coaxial Cable	Huber-Suner	SLLS210B	-	November 1, 2020	November 1, 2021

Table 5 Test Equipment Used



5 Band Edge Spectrum

5.1 Test Specification

FCC Part 27, Subpart C , Section 53(g)

5.2 Test Procedure

(Temperature (20°C)/ Humidity (46%RH))

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (40.7 dB) and an appropriate coaxial cable. Special attention was taken to prevent Spectrum Analyzer RF input overload. RBW was set to suitable value

5.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (617-652 MHz) must be attenuated below the transmitting power (P) by a factor of at least $43 + \log (P)$ dB, yielding -13dBm .

5.4 Test Results

JUDGEMENT: Passed

See additional information in Table 6 to Table 9 and Figure 104 to Figure 167.



Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading	Limit
	(MHz)	(kHz)	(MHz)	(dBm)	(dBm)
16QAM	5	15	619.5	-22.412	-13.0
		30		-22.407	-13.0
		15	649.5	-25.133	-13.0
		30		-35.347	-13.0
	10	15	622.0	-27.228	-13.0
		30		-27.016	-13.0
		15	647.0	-38.312	-13.0
		30		-38.878	-13.0
	15	15	624.5	-29.493	-13.0
		30		-28.981	-13.0
		15	644.5	-45.761	-13.0
		30		-44.573	-13.0
	20	15	627.0	-30.205	-13.0
		30		-30.378	-13.0
		15	642.0	-44.973	-13.0
		30		-44.222	-13.0

Table 6 Band Edge Spectrum Results 16QAM

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading	Limit
	(MHz)	(kHz)	(MHz)	(dBm)	(dBm)
64QAM	5	15	619.5	-19.015	-13.0
		30		-22.664	-13.0
		15	649.5	-24.758	-13.0
		30		-37.007	-13.0
	10	15	622.0	-28.259	-13.0
		30		-28.195	-13.0
		15	647.0	-40.305	-13.0
		30		-38.775	-13.0
	15	15	624.5	-29.782	-13.0
		30		-30.786	-13.0
		15	644.5	-41.727	-13.0
		30		-39.822	-13.0
	20	15	627.0	-29.932	-13.0
		30		-31.246	-13.0
		15	642.0	-40.386	-13.0
		30		-42.488	-13.0

Table 7 Band Edge Spectrum Results 64QAM



Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading	Limit
	(MHz)	(kHz)	(MHz)	(dBm)	(dBm)
256QAM	5	15	619.5	-19.538	-13.0
		30		-21.471	-13.0
		15	649.5	-25.439	-13.0
		30		-36.973	-13.0
	10	15	622.0	-28.607	-13.0
		30		-27.846	-13.0
		15	647.0	-37.145	-13.0
		30		-41.512	-13.0
	15	15	624.5	-30.038	-13.0
		30		-30.143	-13.0
		15	644.5	-45.866	-13.0
		30		-44.330	-13.0
	20	15	627.0	-31.165	-13.0
		30		-30.033	-13.0
		15	642.0	-42.247	-13.0
		30		-42.911	-13.0

Table 8 Band Edge Spectrum Results 256QAM

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading	Limit
	(MHz)	(kHz)	(MHz)	(dBm)	(dBm)
QPSK	5	15	619.5	-22.946	-13.0
		30		-24.976	-13.0
		15	649.5	-26.015	-13.0
		30		-37.141	-13.0
	10	15	622.0	-29.548	-13.0
		30		-28.023	-13.0
		15	647.0	-41.062	-13.0
		30		-36.456	-13.0
	15	15	624.5	-29.901	-13.0
		30		-29.142	-13.0
		15	644.5	-39.952	-13.0
		30		-41.983	-13.0
	20	15	627.0	-31.035	-13.0
		30		-31.008	-13.0
		15	642.0	-45.175	-13.0
		30		-45.994	-13.0

Table 9 Band Edge Spectrum Results QPSK

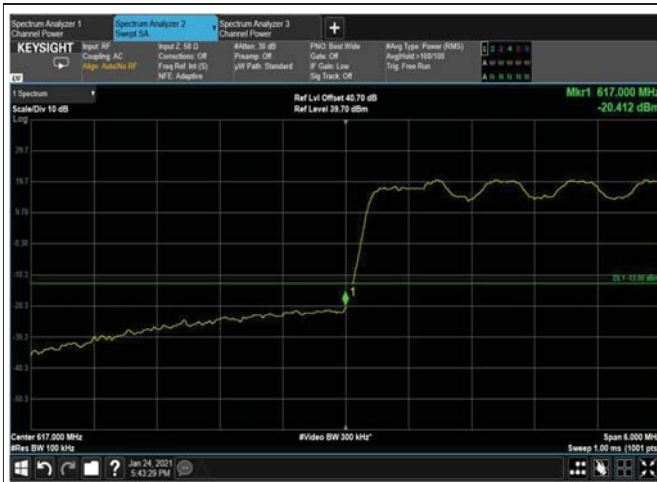


Figure 104: 16QAM 5MHz B.W.; 619.5MHz, 15kHz
Lower Edge



Figure 105: 16QAM 5MHz B.W.; 649.5MHz, 15kHz
Upper Edge



Figure 106: 16QAM 5MHz B.W.; 619.5MHz, 30kHz
Lower Edge



Figure 107: 16QAM 5MHz B.W.; 649.5MHz, 30kHz
Upper Edge



Figure 108: 16QAM 10MHz B.W.; 622.0MHz, 15kHz
Lower Edge



Figure 109: 16QAM 10MHz B.W.; 647.0MHz, 15kHz
Upper Edge

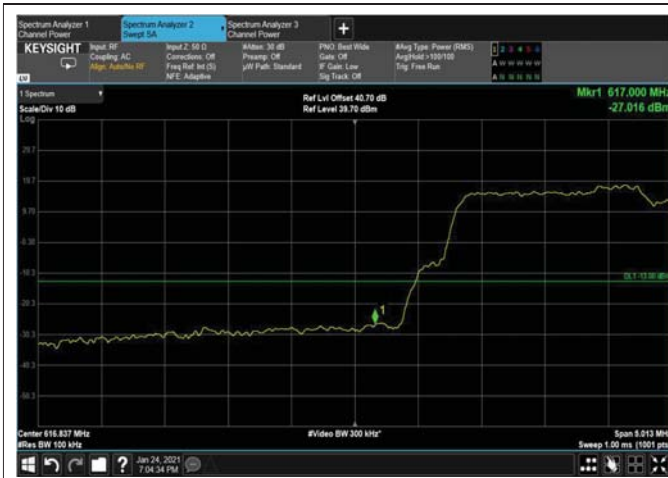


Figure 110: 16QAM 10MHz B.W.; 622.0MHz, 30kHz
Lower Edge

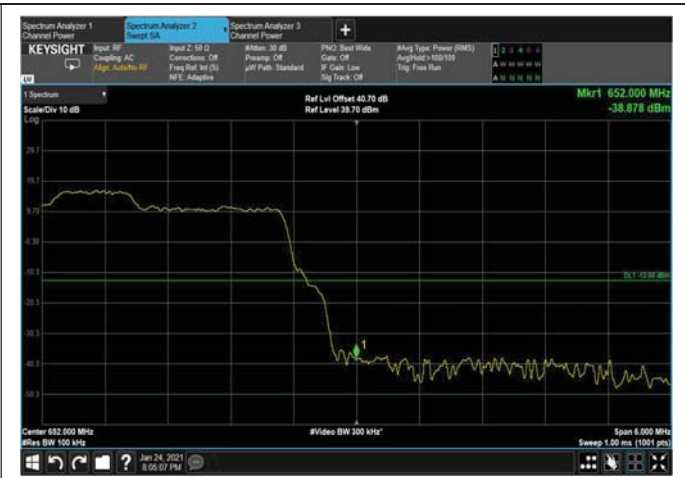


Figure 111: 16QAM 10MHz B.W.; 647.0MHz, 30kHz
Upper Edge



Figure 112: 16QAM 15MHz B.W.; 624.5MHz, 15kHz
Lower Edge

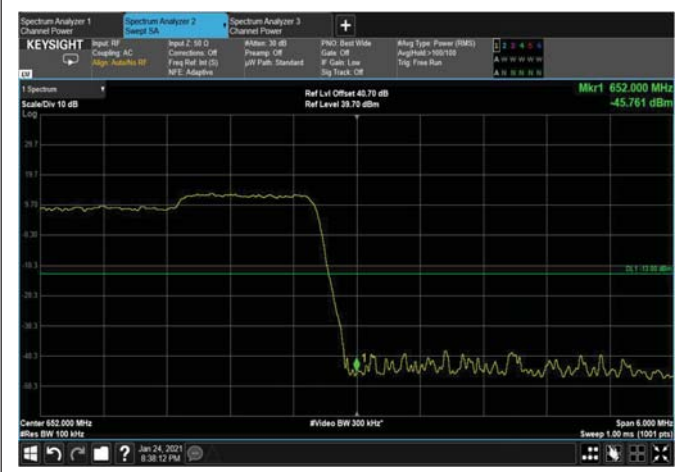


Figure 113: 16QAM 15MHz B.W.; 652.0MHz, 15kHz
Upper Edge

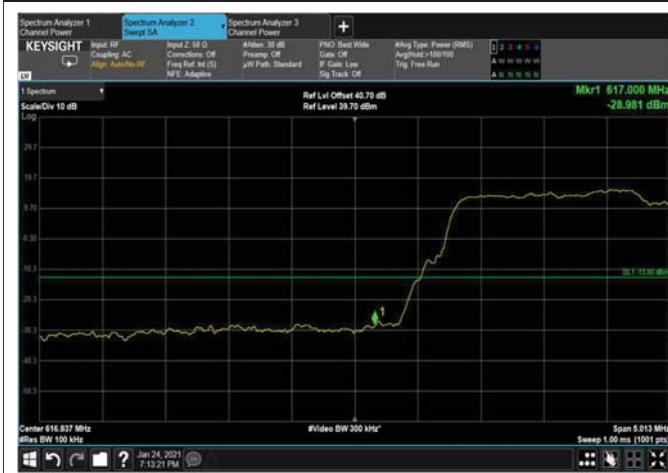


Figure 114: 16QAM 15MHz B.W.; 624.5MHz, 30kHz
Lower Edge



Figure 115: 16QAM 15MHz B.W.; 652.0MHz, 30kHz
Upper Edge

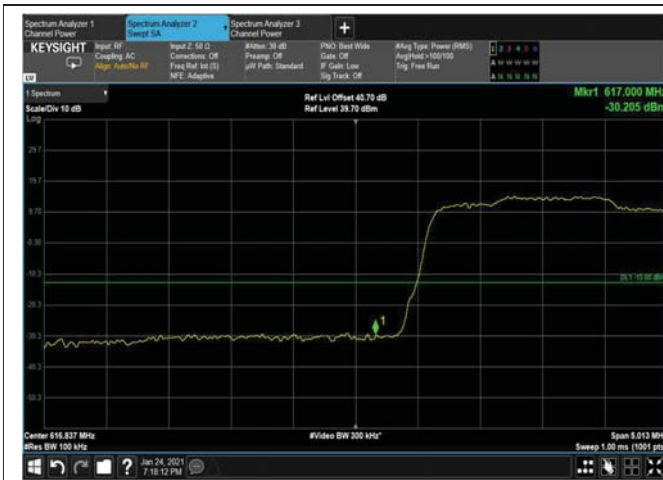


Figure 116: 16QAM 20MHz B.W.; 627.0MHz, 15kHz Lower Edge



Figure 117: 16QAM 20MHz B.W.; 642.0MHz, 15kHz Upper Edge



Figure 118: 16QAM 20MHz B.W.; 627.0MHz, 30kHz Lower Edge

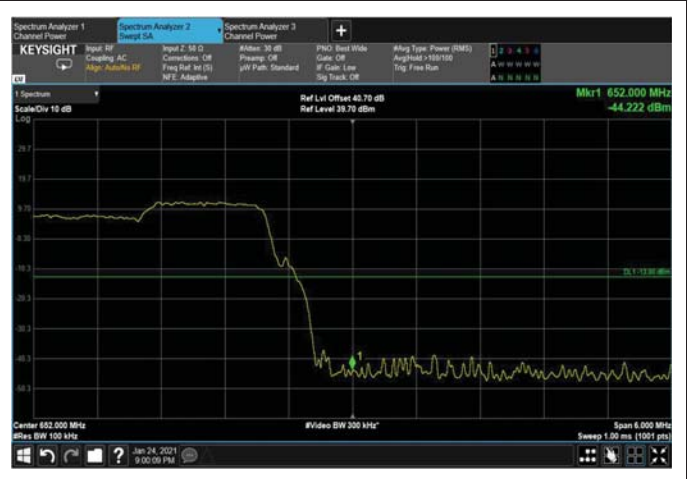


Figure 119: 16QAM 20MHz B.W.; 642.0MHz, 30kHz Upper Edge

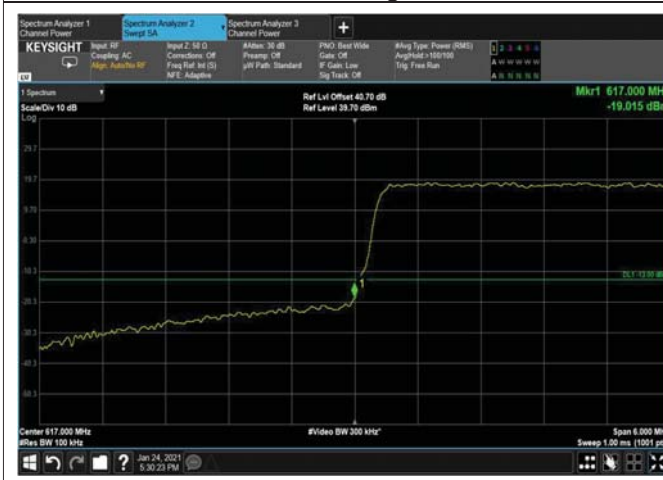


Figure 120: 64QAM 5MHz B.W.; 617.0MHz, 15kHz Lower Edge



Figure 121: 64QAM 5MHz B.W.; 652.0MHz, 15kHz Upper Edge



Figure 122: 64QAM 5MHz B.W.; 617.0MHz, 30kHz
Lower Edge



Figure 123: 16QAM 5MHz B.W.; 652.0MHz, 30kHz
Upper Edge

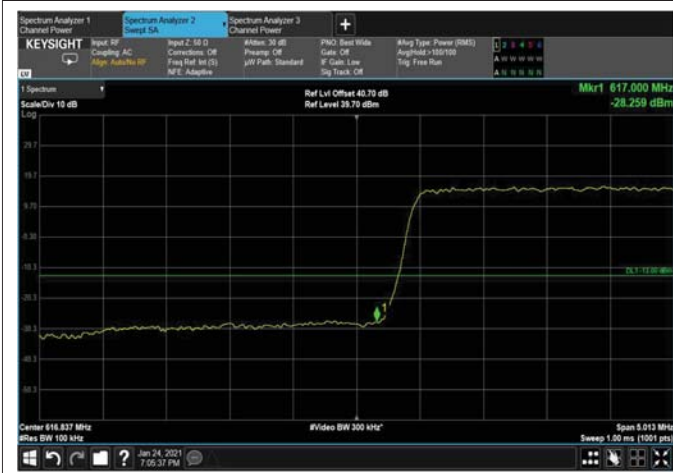


Figure 124: 64QAM 10MHz B.W.; 622.0MHz, 15kHz
Lower Edge

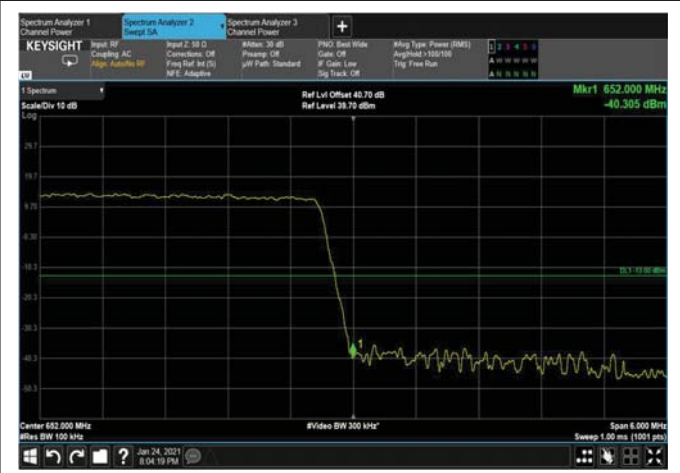


Figure 125: 64QAM 10MHz B.W.; 647.0MHz, 15kHz
Upper Edge

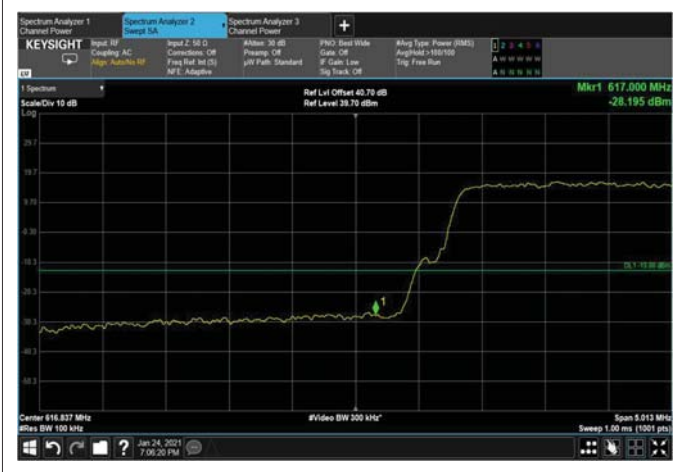


Figure 126: 64QAM 10MHz B.W.; 622.0MHz, 30kHz
Lower Edge

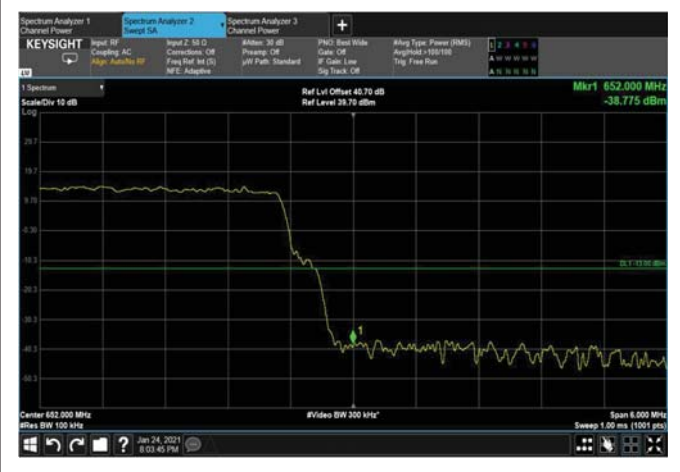


Figure 127: 64QAM 10MHz B.W.; 647.0MHz, 30kHz
Upper Edge



Figure 128: 64QAM 15MHz B.W.; 624.5MHz, 15kHz
Lower Edge

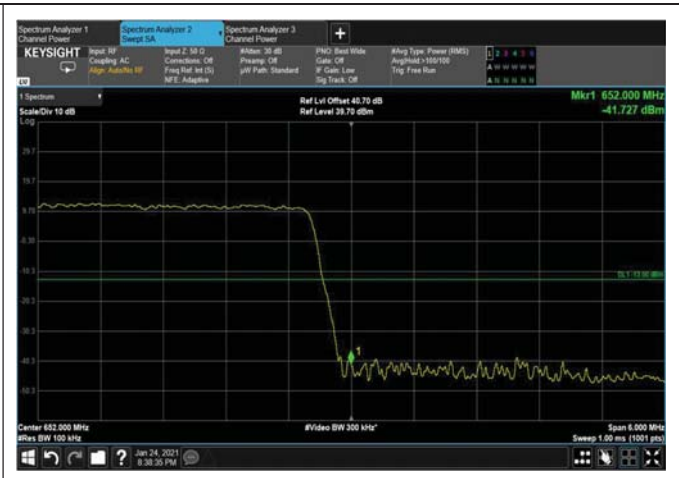


Figure 129: 64QAM 15MHz B.W.; 644.5MHz, 15kHz
Upper Edge



Figure 130: 64QAM 15MHz B.W.; 624.5MHz, 30kHz
Lower Edge

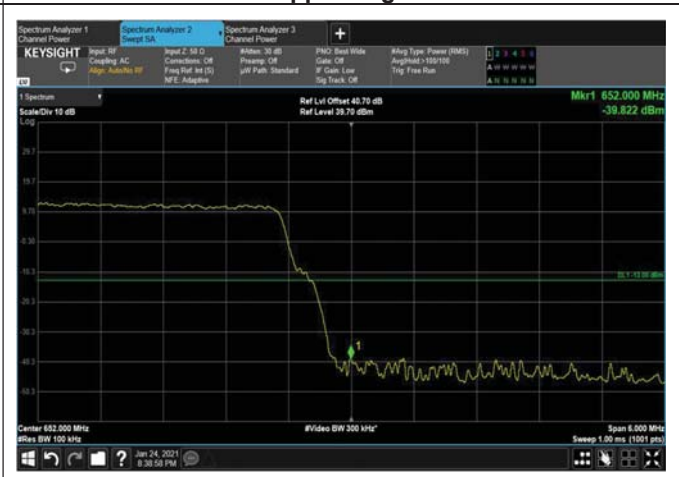


Figure 131: 64QAM 15MHz B.W.; 644.5MHz, 30kHz
Upper Edge



Figure 132: 64QAM 20MHz B.W.; 627.0MHz, 15kHz
Lower Edge



Figure 133: 64QAM 20MHz B.W.; 642.0MHz, 15kHz
Upper Edge

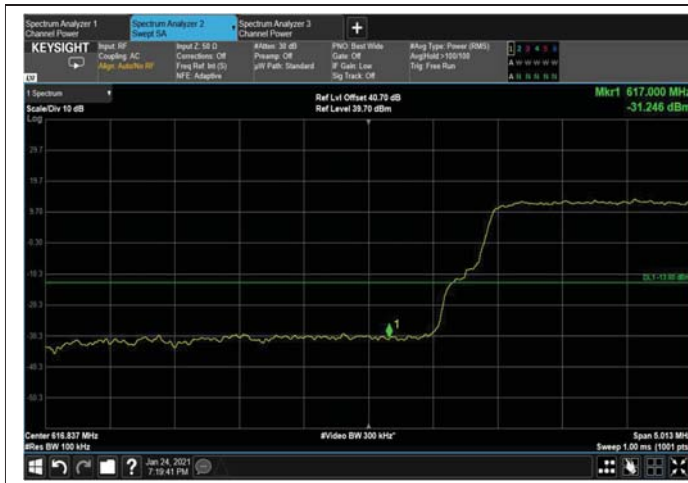


Figure 134: 64QAM 20MHz B.W.; 627.0MHz, 30kHz Lower Edge

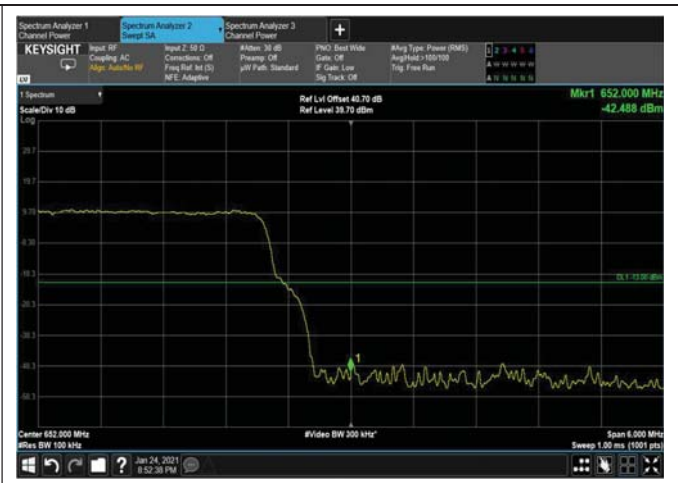


Figure 135: 64QAM 20MHz B.W.; 642.0MHz, 30kHz Upper Edge



Figure 136: 256QAM 5MHz B.W.; 617.0MHz, 15kHz Lower Edge

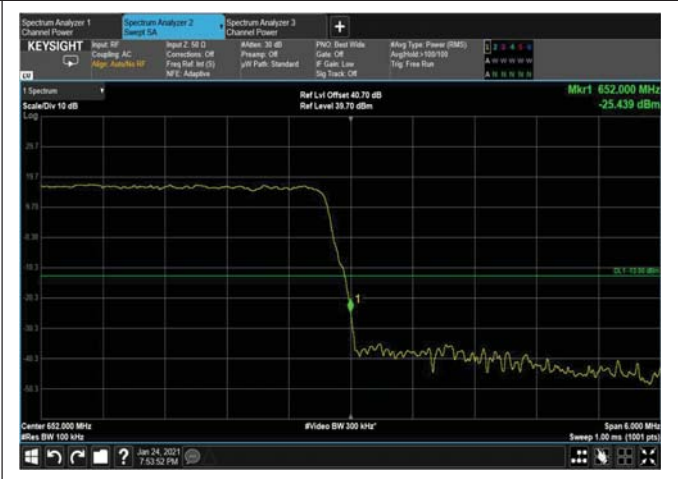


Figure 137: 256QAM 5MHz B.W.; 652.0MHz, 15kHz Upper Edge



Figure 138: 256QAM 5MHz B.W.; 617.0MHz, 30kHz Lower Edge



Figure 139: 256QAM 5MHz B.W.; 652.0MHz, 30kHz Upper Edge



Figure 140: 256QAM 10MHz B.W.; 622.0MHz, 15kHz Lower Edge

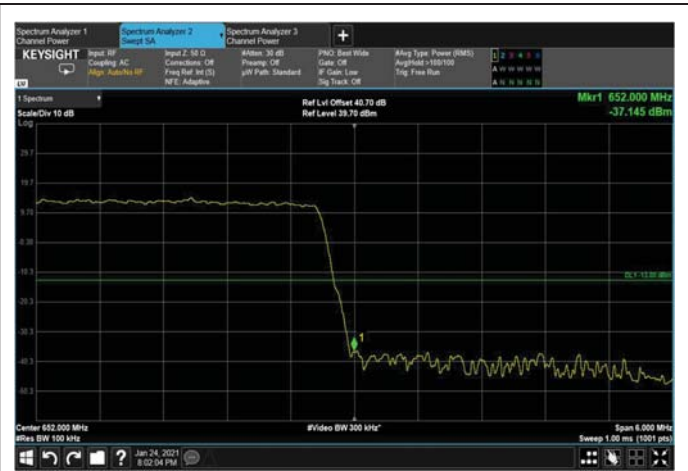


Figure 141: 256QAM 10MHz B.W.; 647.0MHz, 15kHz Upper Edge



Figure 142: 256QAM 10MHz B.W.; 622.0MHz, 30kHz Lower Edge

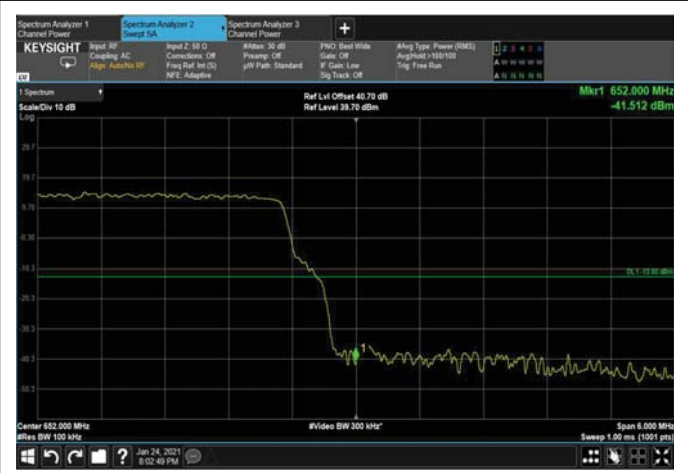


Figure 143: 256QAM 10MHz B.W.; 647.0MHz, 30kHz Upper Edge



Figure 144: 256QAM 15MHz B.W.; 624.5MHz, 15kHz Lower Edge

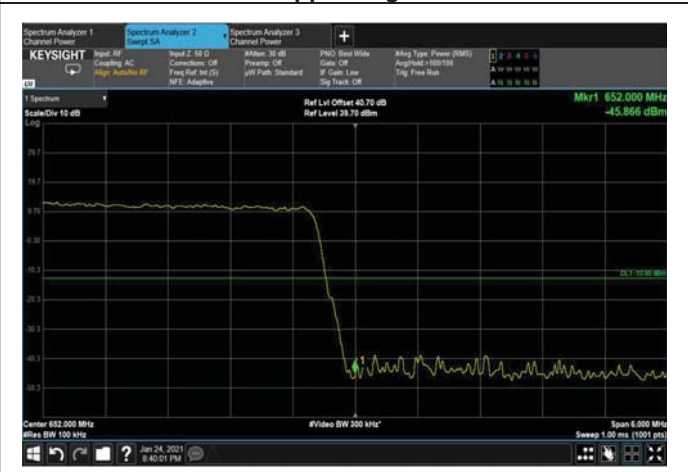


Figure 145: 256QAM 15MHz B.W.; 644.5MHz, 15kHz Upper Edge

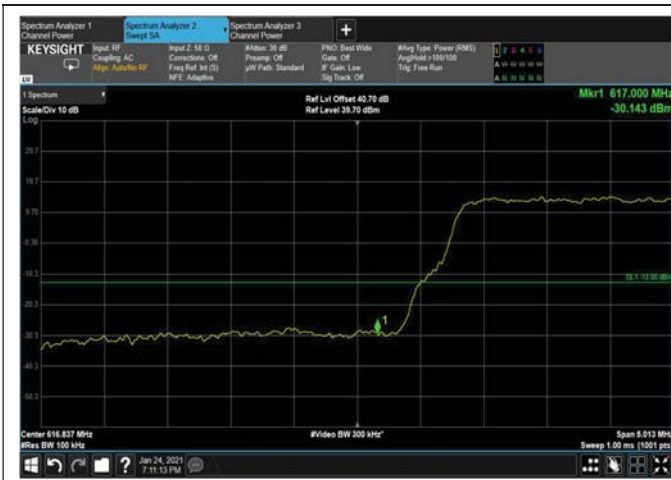


Figure 146: 256QAM 15MHz B.W.; 624.5MHz, 30kHz Lower Edge

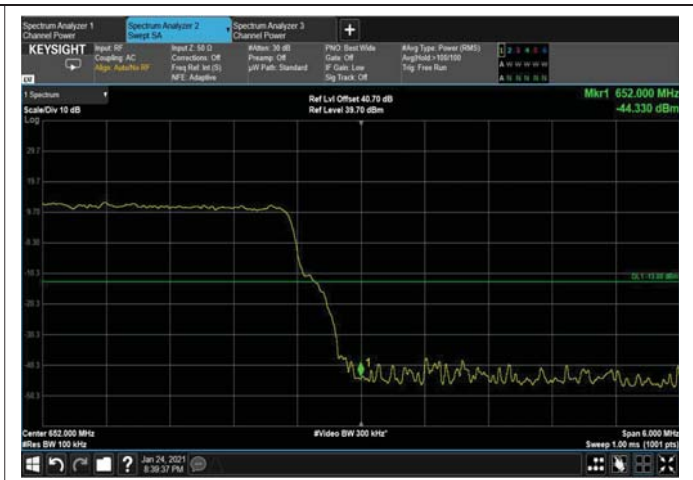


Figure 147: 256QAM 15MHz B.W.; 644.5MHz, 30kHz Upper Edge

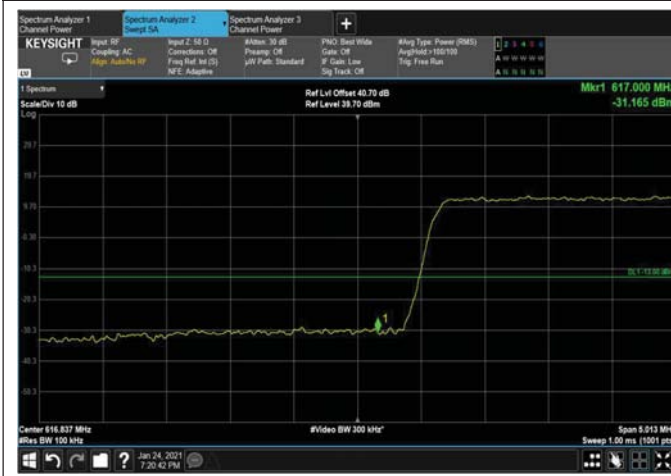


Figure 148: 256QAM 20MHz B.W.; 627.0MHz, 15kHz Lower Edge

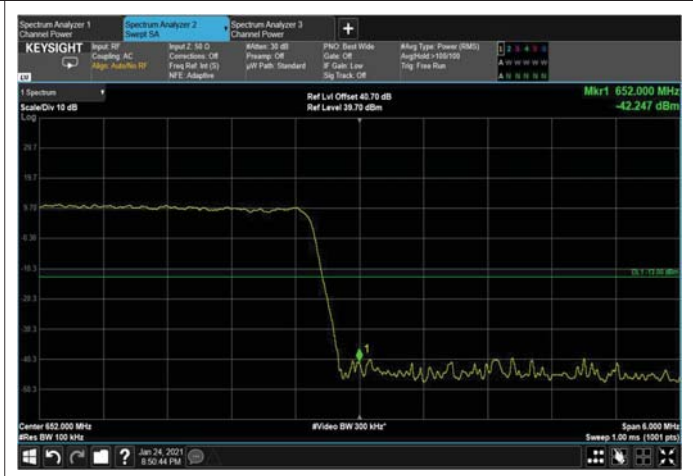


Figure 149: 256QAM 20MHz B.W.; 642.0MHz, 15kHz Upper Edge



Figure 150: 256QAM 20MHz B.W.; 627.0MHz, 30kHz Lower Edge



Figure 151: 256QAM 20MHz B.W.; 642.0MHz, 30kHz Upper Edge

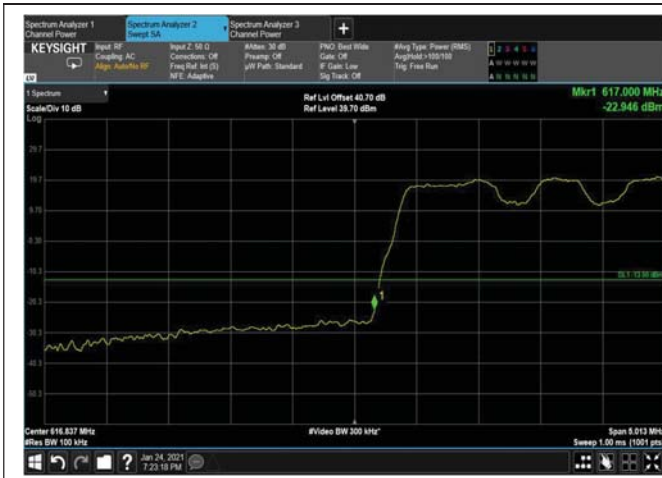


Figure 152: QPSK 5MHz B.W.; 617.0MHz, 15kHz Lower Edge

Figure 153: QPSK 5MHz B.W.; 652.0MHz, 5kHz Upper Edge

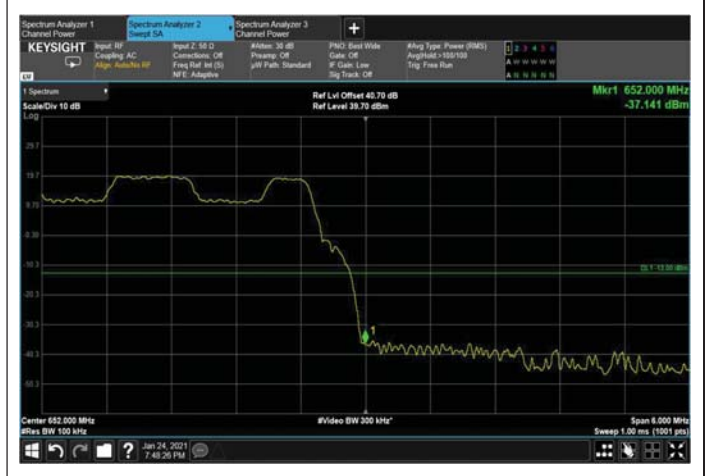
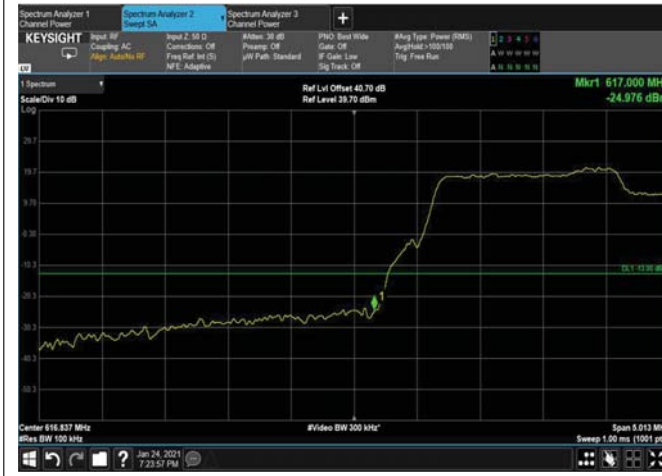


Figure 154: QPSK 5MHz B.W.; 617.0MHz, 30kHz Lower Edge

Figure 155: QPSK 5MHz B.W.; 652.0MHz, 30kHz Upper Edge

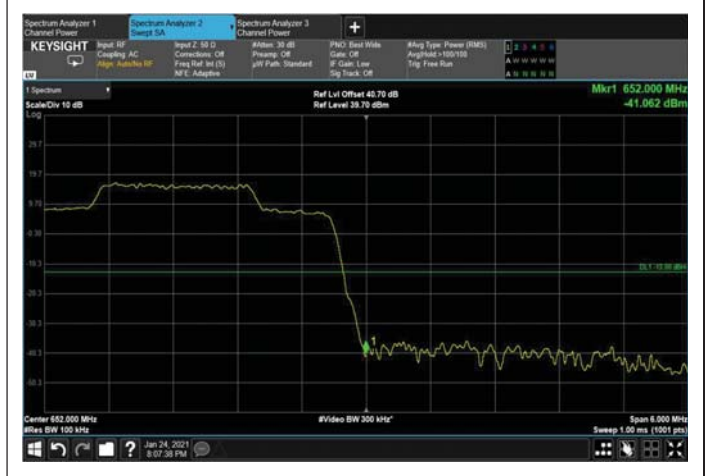
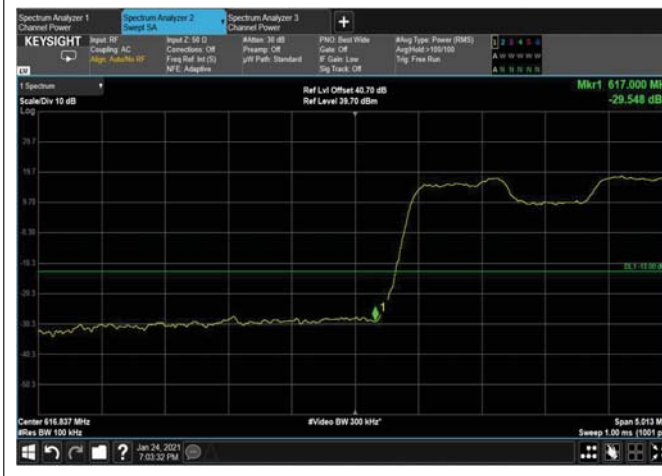


Figure 156: QPSK 10MHz B.W.; 622.0MHz, 15kHz Lower Edge

Figure 157: QPSK 10MHz B.W.; 647.0MHz, 15kHz Upper Edge

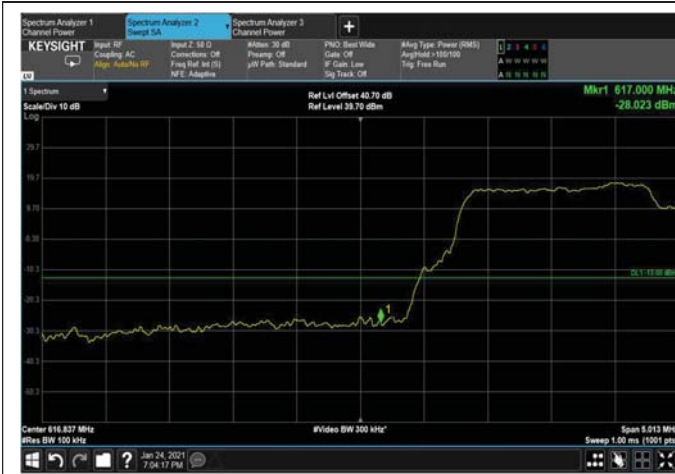


Figure 158: QPSK 10MHz B.W.; 622.0MHz, 30kHz
Lower Edge



Figure 159: QPSK 10MHz B.W.; 647.0MHz, 30kHz
Upper Edge



Figure 160: QPSK 15MHz B.W.; 617.0MHz, 15kHz
Lower Edge



Figure 161: QPSK 15MHz B.W.; 644.5MHz, 15kHz
Upper Edge



Figure 162: QPSK 15MHz B.W.; 617.0MHz, 30kHz
Lower Edge



Figure 163: QPSK 15MHz B.W.; 644.5MHz, 30kHz
Upper Edge



Figure 164: QPSK 20MHz B.W.; 627.0MHz, 15kHz Lower Edge

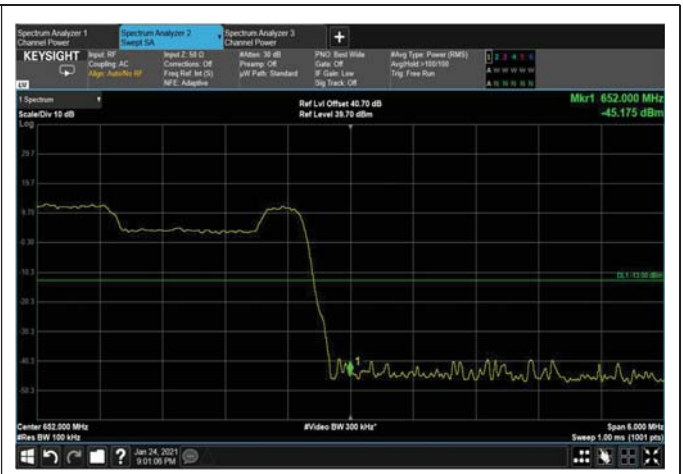


Figure 165: QPSK 20MHz B.W.; 642.0MHz, 15kHz Upper Edge



Figure 166: QPSK 20MHz B.W.; 627.0MHz, 30kHz Lower Edge



Figure 167: QPSK 20MHz B.W.; 642.0MHz, 30kHz Upper Edge

5.5 Test Equipment Used; Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Keysight	UXA N9040B	MY56080119	January 31, 2020	January 31, 2022
EXG Vector Signal Generator	Agilent Technologies	N5172B	MY53051952	January 17, 2019	January 17, 2022
40 dB Attenuator	Weinschel Associates	WA 39-40-33	-	November 1, 2020	November 1, 2021
RF Coaxial Cable	Huber-Suner	SLLS210B	-	November 1, 2020	November 1, 2021

Table 10 Test Equipment Used