



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

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

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



TABLE OF CONTENTS

1	GENERAL INFORMATION -----	5
1.1	Administrative Information.....	5
1.2	List of Accreditations	6
1.3	Product Description	7
1.4	Test Methodology	7
1.5	Test Facility	7
1.6	Measurement Uncertainty	7
2	SYSTEM TEST CONFIGURATION -----	8
2.1	Justification	8
2.2	EUT Exercise Software	8
2.3	Special Accessories	8
2.4	Equipment Modifications	8
2.5	Configuration of Tested System	9
3	TEST SET-UP PHOTOS -----	11
4	RF POWER OUTPUT -----	14
4.1	Test Specification	14
4.2	Test Procedure	14
4.3	Test Limit	14
4.4	Test Results.....	14
4.5	Test Equipment Used; RF Power Output.....	35
5	BAND EDGE SPECTRUM -----	36
5.1	Test Specification	36
5.2	Test Procedure	36
5.3	Test Limit	36
5.4	Test Results.....	36
5.5	Test Equipment Used; Band Edge Spectrum	49
6	PEAK TO AVERAGE POWER RATIO -----	50
6.1	Test Specification	50
6.2	Test Procedure	50
6.3	Test Limit	50
6.4	Test Results.....	50
6.5	Test Equipment Used; 0.1% PAPR.....	71
7	OCCUPIED BANDWIDTH -----	72
7.1	Test Specification	72
7.2	Test Procedure	72
7.3	Test Limit	72
7.4	Test Results.....	72
7.5	Test Equipment Used; Occupied Bandwidth.....	113
8	SPURIOUS EMISSIONS AT ANTENNA TERMINALS -----	114
8.1	Test Specification	114
8.2	Test Procedure	114
8.3	Test Limit	114
8.4	Test Results.....	114
8.5	Test Equipment Used; Spurious Emissions at Antenna Terminals.....	147
9	SPURIOUS RADIATED EMISSION -----	148
9.1	Test Specification	148
9.2	Test Procedure	148
9.3	Test Limit	149
9.4	Test Results.....	149
9.5	Test Instrumentation Used; Radiated Measurements.....	150



10	OUT-OF-BAND REJECTION	151
10.1	Test Specification	151
10.2	Test Procedure	151
10.3	Test Limit	151
10.4	Test Results	151
10.5	Test Equipment Used; Out-of-Band Rejection	152
11	APPENDIX A - CORRECTION FACTORS	153
11.1	Correction factors for RF OATS Cable 35m	153
11.2	Correction factors for RF OATS Cable 10m	154
11.3	Correction factors for Horn Antenna	155
11.4	Correction factors for Horn Antenna	156
11.5	Correction factors for Log Periodic Antenna	157
11.6	Correction factors for Biconical Antenna	158
11.7	Correction factors for ACTIVE LOOP ANTENNA	159



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

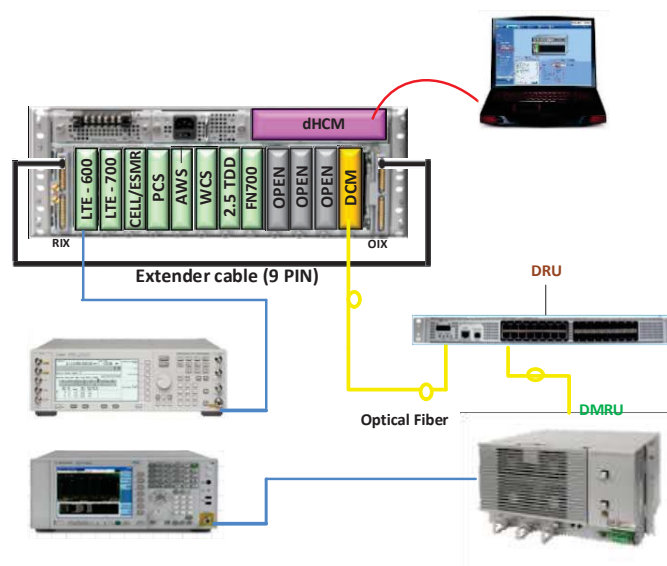


Figure 1. Conducted Test Set-Up

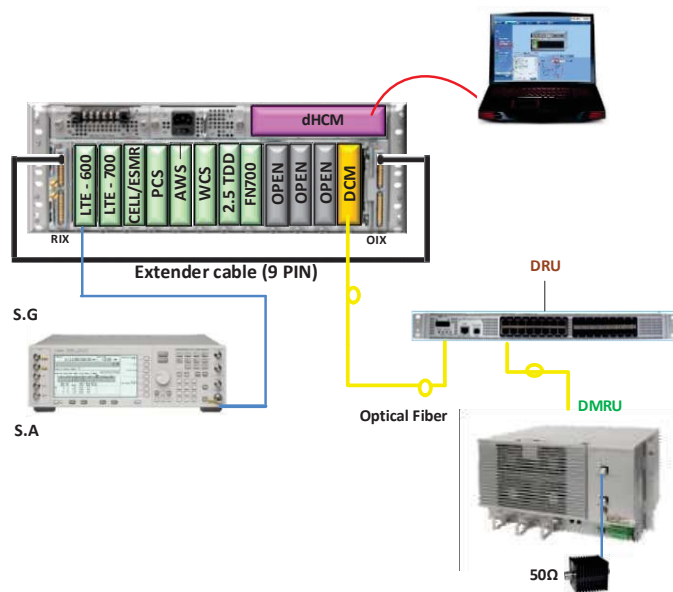


Figure 2. Radiated Test Set-Up

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



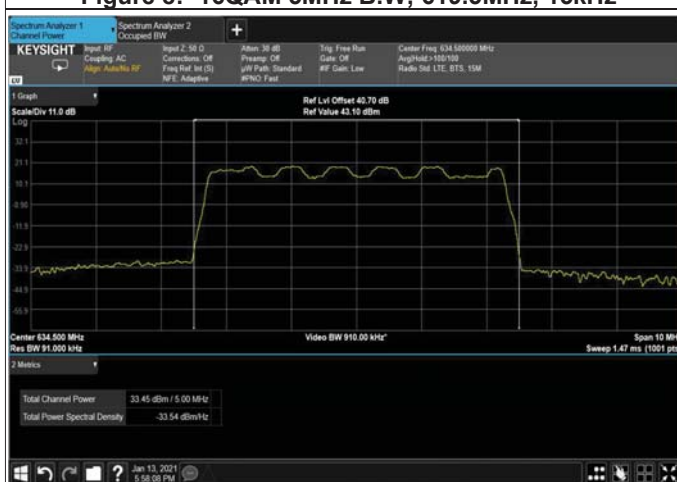
Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(dBm)
256QAM	5	15	619.5	33.94
		30		33.98
		15	634.5	33.74
		30		33.67
		15	649.5	32.47
		30		32.25
	10	15	622.0	32.93
		30		32.61
		30	634.5	32.56
		15		32.50
		15	647.0	32.78
		30		33.03
	15	15	624.5	33.42
		30		33.48
		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

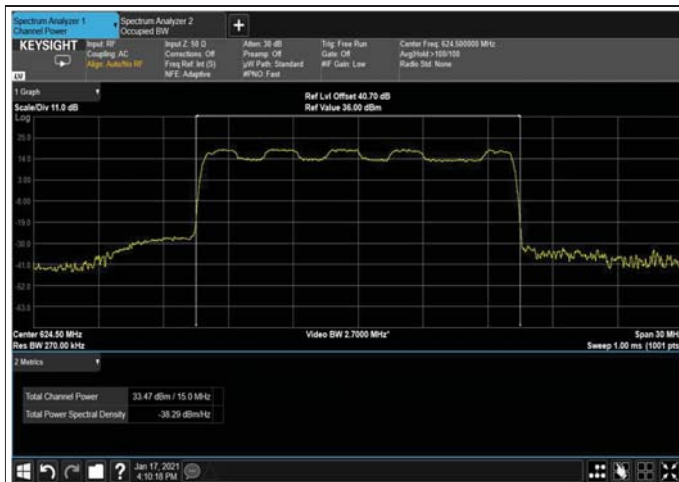


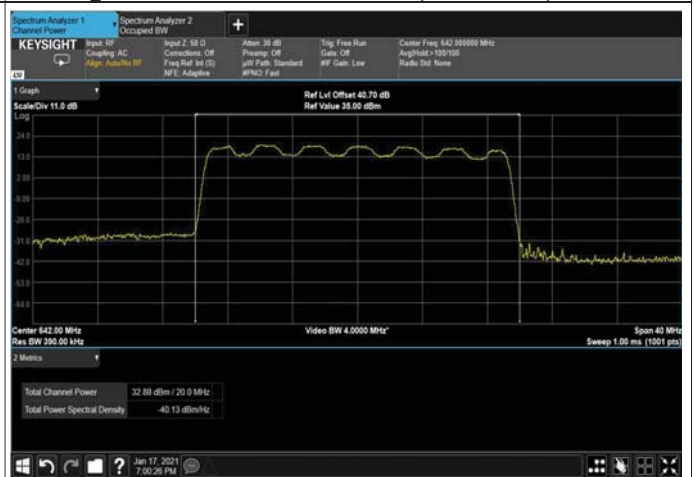
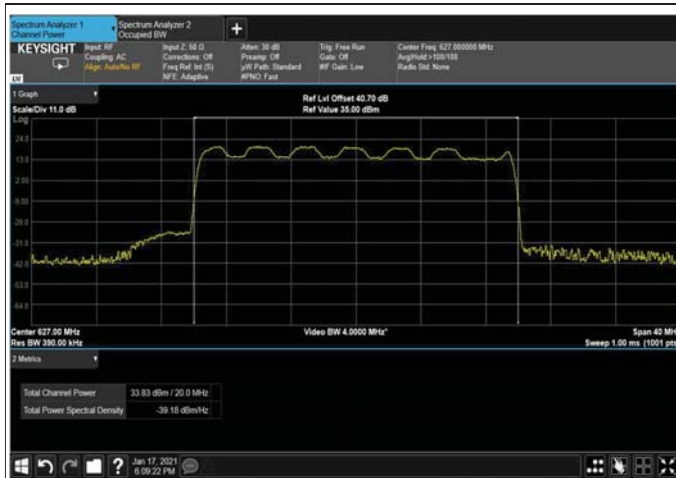
Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(dBm)
QPSK	5	15	619.5	33.55
		30		33.68
		15	634.5	33.42
		30		33.95
		15	649.5	32.72
		30		32.62
	10	15	622.0	32.85
		30		32.87
		30	634.5	33.07
		15		32.89
		15	647.0	32.95
		30		32.92
	15	15	624.5	33.12
		30		33.53
		15	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









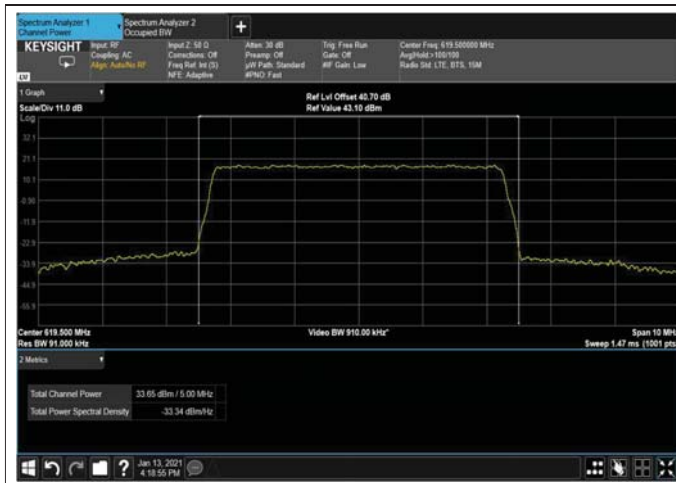




Figure 38: 64QAM 10MHz B.W; 622.0MHz, 15kHz



Figure 39: 64QAM 10MHz B.W; 622.0MHz, 30kHz

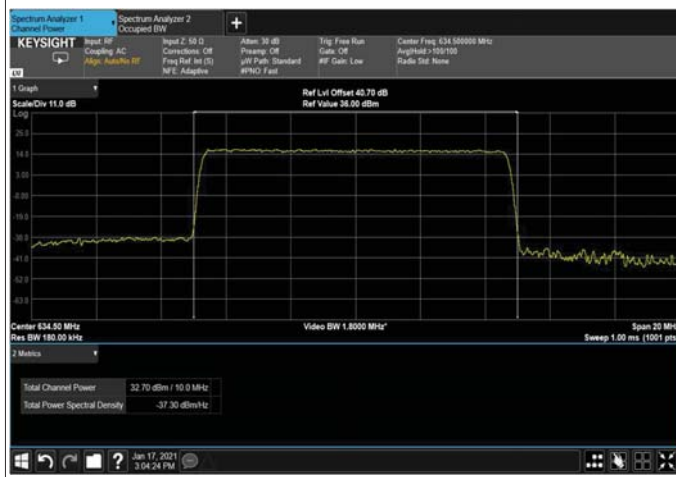


Figure 40: 64QAM 10MHz B.W; 634.5MHz, 15kHz



Figure 41: 64QAM 10MHz B.W; 634.5MHz, 30kHz



Figure 42: 64QAM 10MHz B.W; 647MHz, 15kHz



Figure 43: 64QAM 10MHz B.W; 647.0MHz, 30kHz



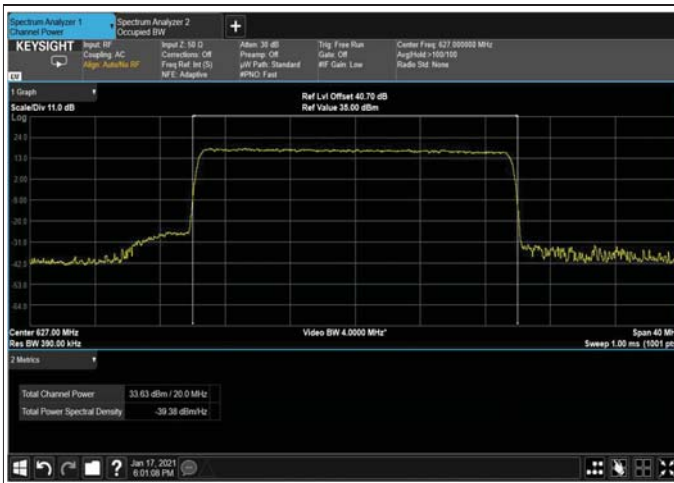


Figure 50: 64QAM 20MHz B.W; 627.0MHz, 15kHz



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

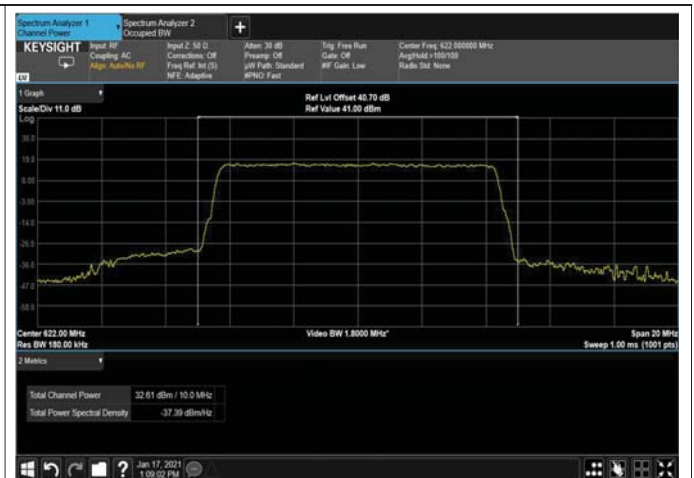






Figure 74: 256QAM 20MHz B.W; 627MHz, 15kHz



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

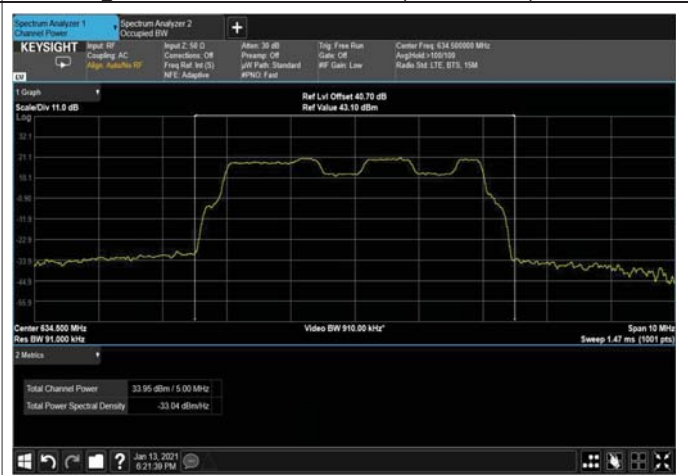




Figure 86: QPSK 10MHz B.W; 622.0MHz, 15kHz



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 98: QPSK 20MHz B.W; 627.0MHz, 15kHz

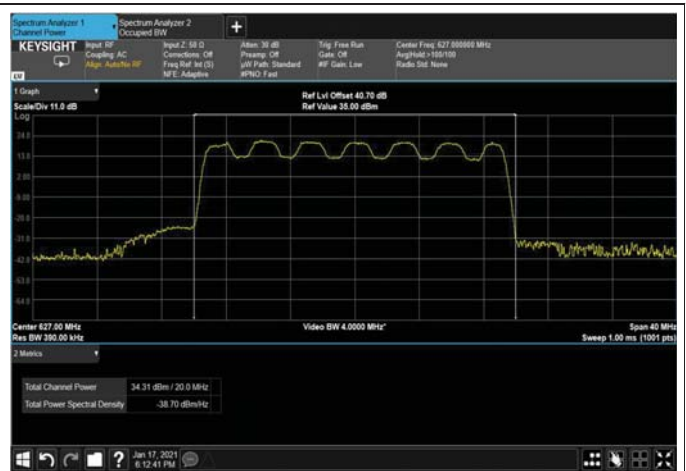


Figure 99: QPSK 20MHz B.W; 627MHz, 30kHz



Figure 100: QPSK 20MHz B.W; 634.5MHz, 15kHz

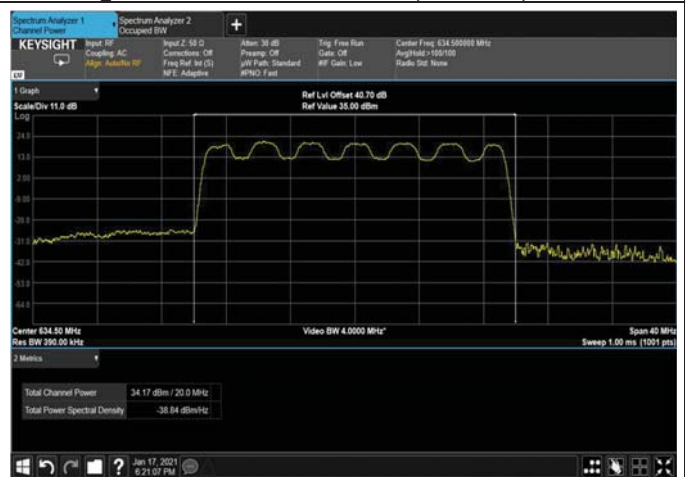


Figure 101: QPSK 20MHz B.W; 634.5MHz, 30kHz



Figure 102: QPSK 20MHz B.W; 642.0MHz, 15kHz



Figure 103: QPSK 20MHz B.W; 642MHz, 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

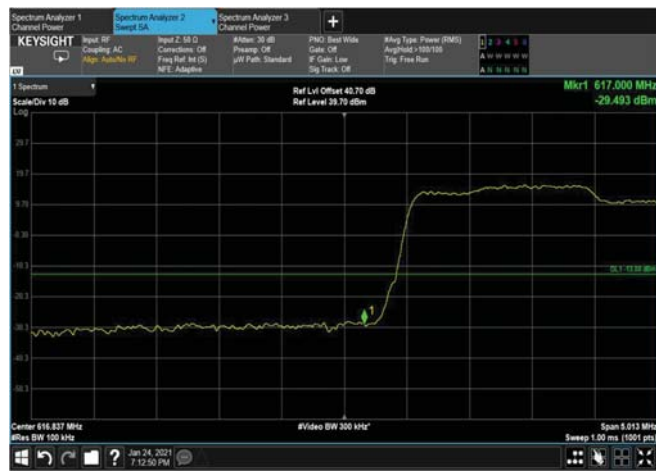


Figure 112: 16QAM 15MHz B.W.; 624.5MHz, 15kHz Lower Edge

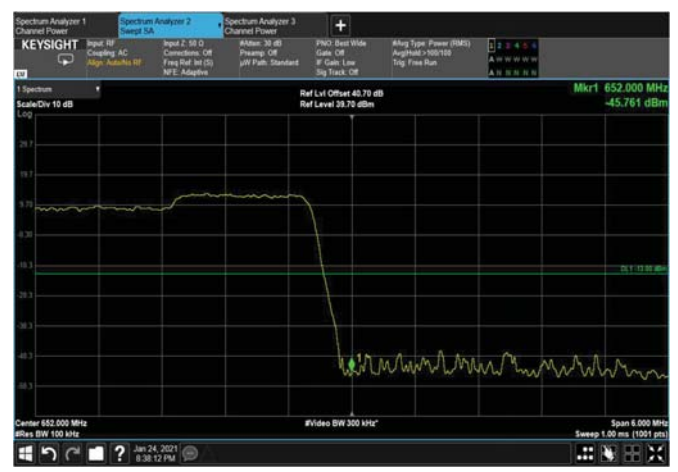


Figure 113: 16QAM 15MHz B.W.; 652.0MHz, 15kHz Upper Edge

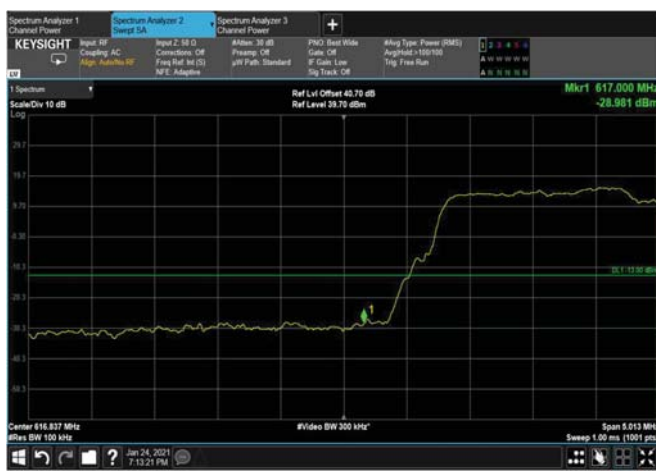


Figure 114: 16QAM 15MHz B.W.; 624.5MHz, 30kHz Lower Edge

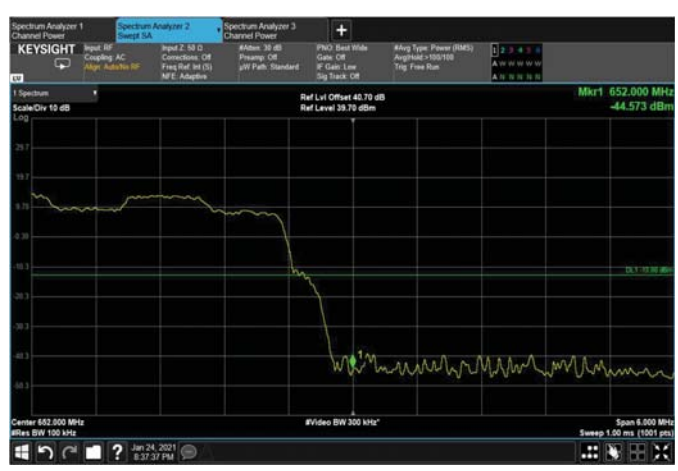


Figure 115: 16QAM 15MHz B.W.; 652.0MHz, 30kHz Upper Edge

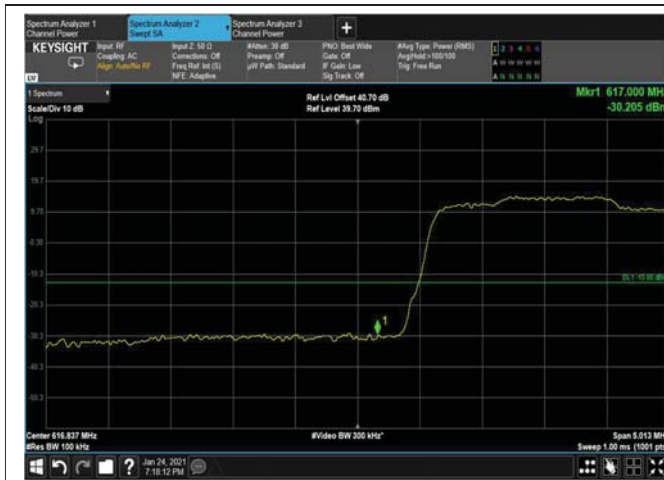


Figure 116: 16QAM 20MHz B.W.; 627.0MHz, 15kHz Lower Edge



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

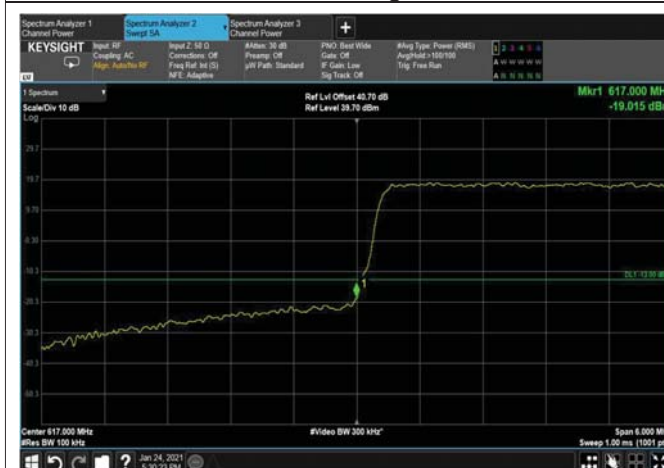


Figure 120: 64QAM 5MHz B.W.; 617.0MHz, 15kHz Lower Edge



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

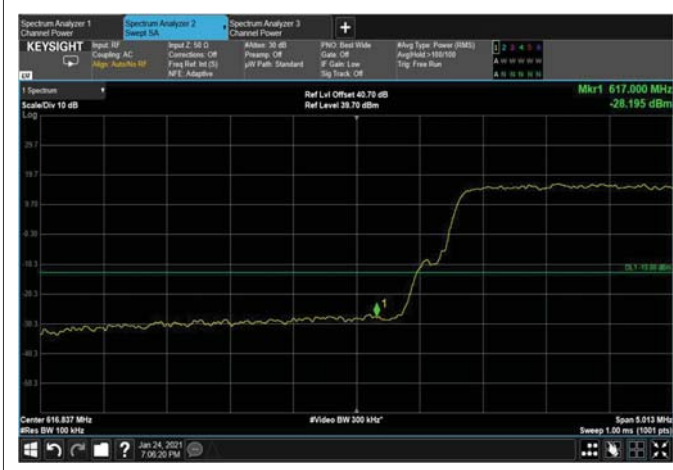


Figure 126: 64QAM 10MHz B.W.; 622.0MHz, 30kHz
Lower Edge

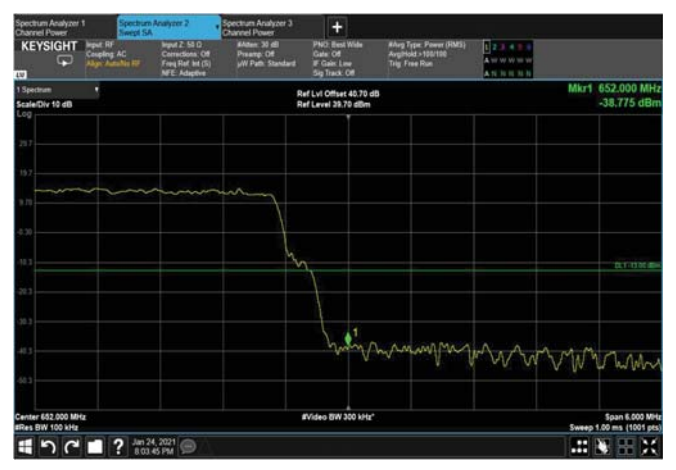


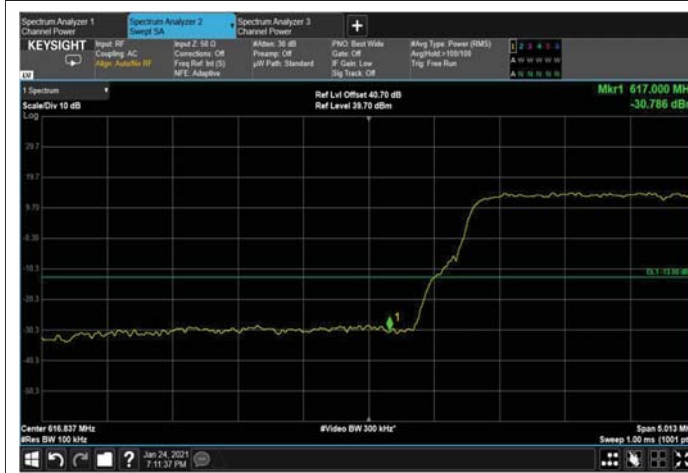
Figure 127: 64QAM 10MHz B.W.; 647.0MHz, 30kHz
Upper Edge



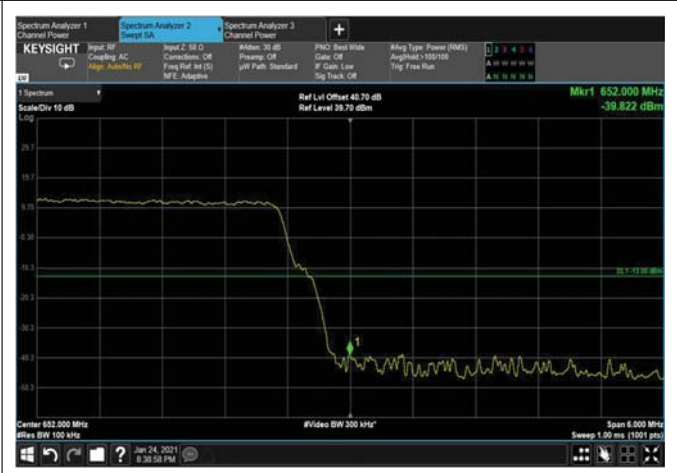
**Figure 128: 64QAM 15MHz B.W.; 624.5MHz, 15kHz
Lower Edge**



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



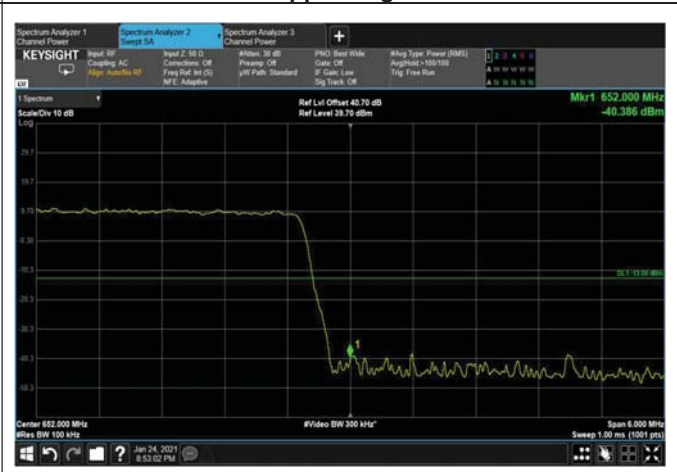
**Figure 130: 64QAM 15MHz B.W.; 624.5MHz, 30kHz
Lower Edge**



**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

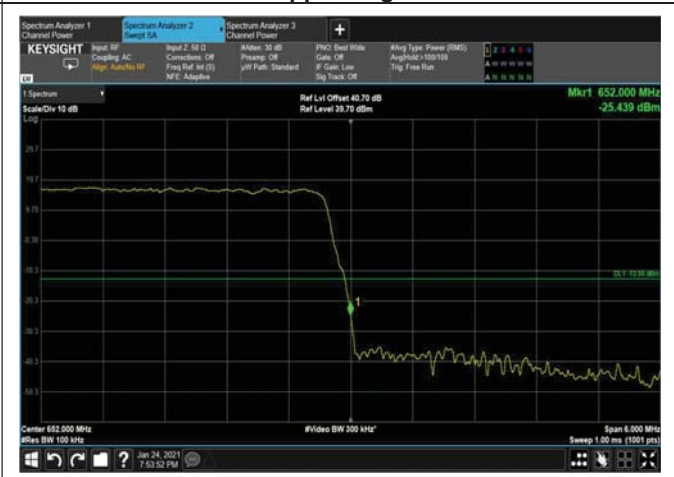


Figure 137: 256QAM 5MHz B.W.; 652.0MHz, 15kHz
Upper Edge



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

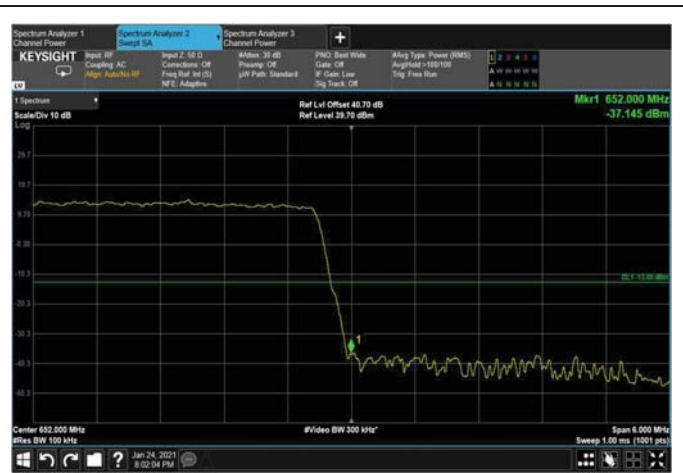


Figure 141: 256QAM 10MHz B.W.; 647.0MHz, 15kHz Upper Edge



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

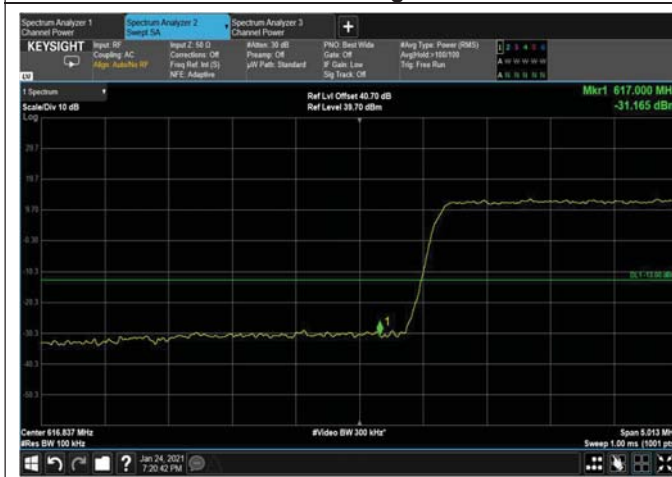


Figure 148: 256QAM 20MHz B.W.; 627.0MHz, 15kHz Lower Edge



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



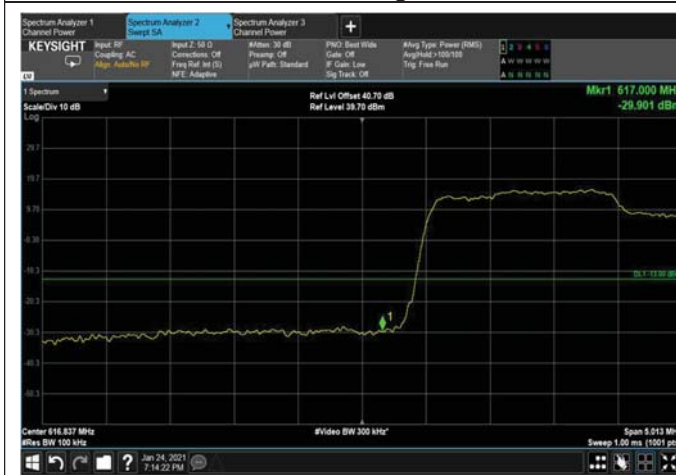
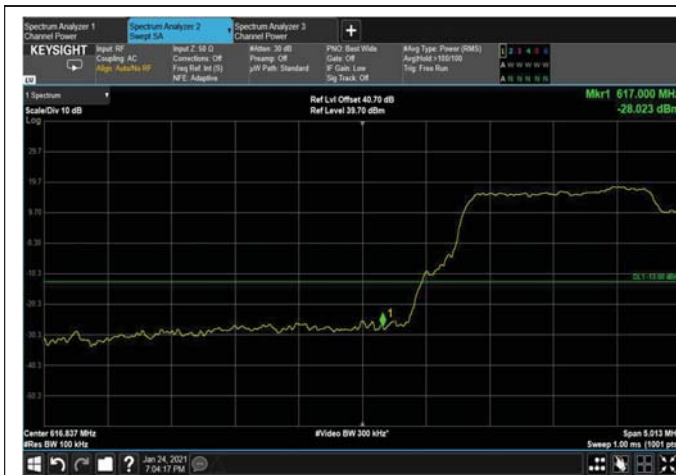




Figure 164: QPSK 20MHz B.W.; 627.0MHz, 15kHz Lower Edge



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-Sunier	SLLS210B	-	November 1, 2020	November 1, 2021

Table 10 Test Equipment Used