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DATE: 22 June 2020

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

FCC Radio Test Report

For

Corning Optical Communication Wireless

Equipment under test:

ONE Distributed Antenna System

Remote Extender Unit RXU2325

(WCS Section 2350-2360MHz Band)

Tested by: _____
M. Zohar

Approved by: _____
D. Shidlowsky

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Measurement/Technical Report for
Corning Optical Communication Wireless

ONE Distributed Antenna System

FCC ID: OJF1RXUN

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 and ANSI IEEE C63.26-2015

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

Application for Certification prepared by:

D. Shidlowsky
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Applicant for this device: (different from "prepared by")

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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 Street Vienna, VA 22812 U.S.A. Tel: +1-703 855-1773
Manufacturer's Representative:	Isaac Nissan
Equipment Under Test (E.U.T):	ONE Distributed Antenna System
Equipment Model No.:	Remote Extender Unit RXU2325
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	February 02, 2020
Start of Test:	February 06, 2020
End of Test:	June 15, 2020 (See Note below)
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St, Lod, Israel 7116002
Test Specifications:	FCC Parts 2; 27

Note: Spurious radiated emission testing was performed on April 13, 2020.

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

The RxU2325 is an add-on module which plugs into the RAU (either RAU5x, RAU5 or RAU4) and enables support for two additional bands: 2.3 GHz WCS and 2.5 GHz LTE (TDD).

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in KDB 935210 D05 v01r03 April 2019 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

The E.U.T. was previously tested for FCC certification as follows:
The EUT consists of the RXU2325 installed in RAU5X
The E.U.T. has been fully tested receiving signals from the RAU5X.
The test setup was configured to closely resemble the standard installation.
All source signals are represented in the setup by appropriate signal generators.
An "Exercise" SW on the computer was used to enable / disable transmission of the RAU5x, while the EUT output was connected to the spectrum analyzer.
All channels transmitted during the testing.
There is neither an intermediate amplified nor donor antenna in the uplink.
All components included in the UL path are connected by cables.
Presently the following tests were performed in order to allow the use of 5G:
RF output power, occupied bandwidth, and spurious emissions.

2.2 EUT Exercise Software

rxut_ab64_37_50

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	ONE Distributed Antenna System
Model Name	RXU 2325
Working voltage	48.0VDC
Mode of operation	Industrial Booster for WCS band
Modulations	64QAM, 16QAM, 256
Assigned Frequency Range	2345.0MHz-2360.0MHz
Operation Frequency Range	2345.0MHz-2360.0MHz
Transmit power	~20.0dBm
Antenna Gain	12.5 dBi
DATA rate	N/A
Modulation BW	10.0MHz

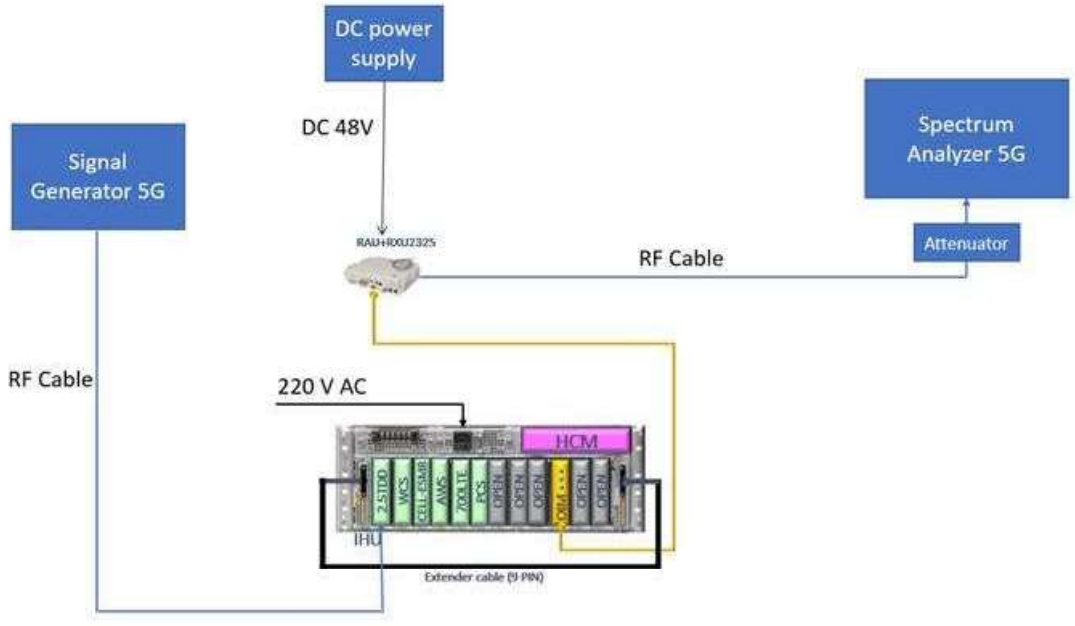

Figure 1. Conducted Test Set-Up

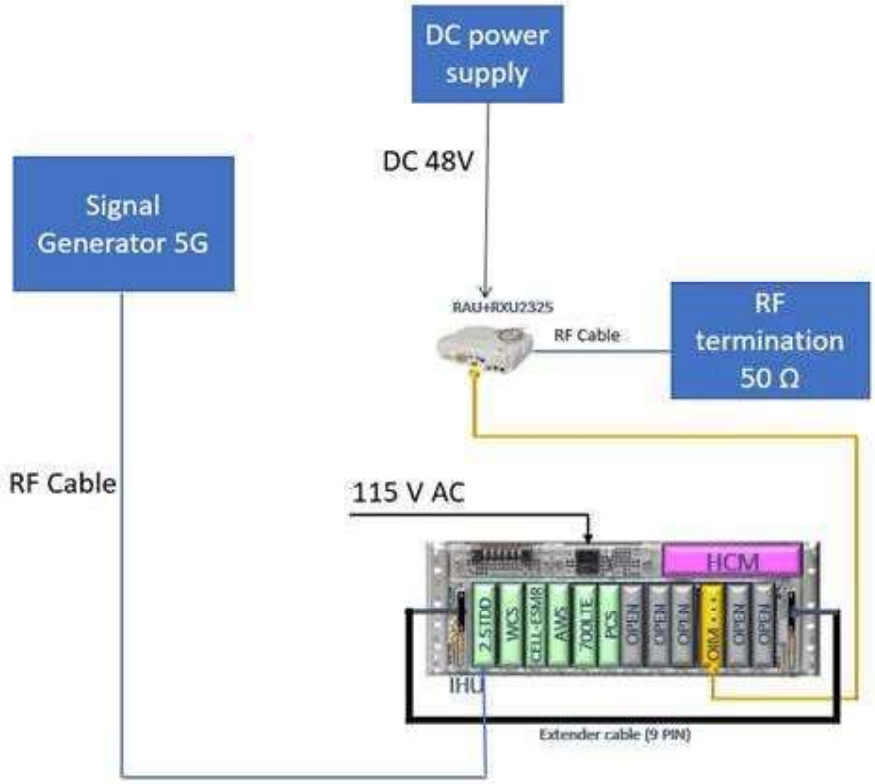

Figure 2. Radiated Test Set-Up

3 Test Set-Up Photos

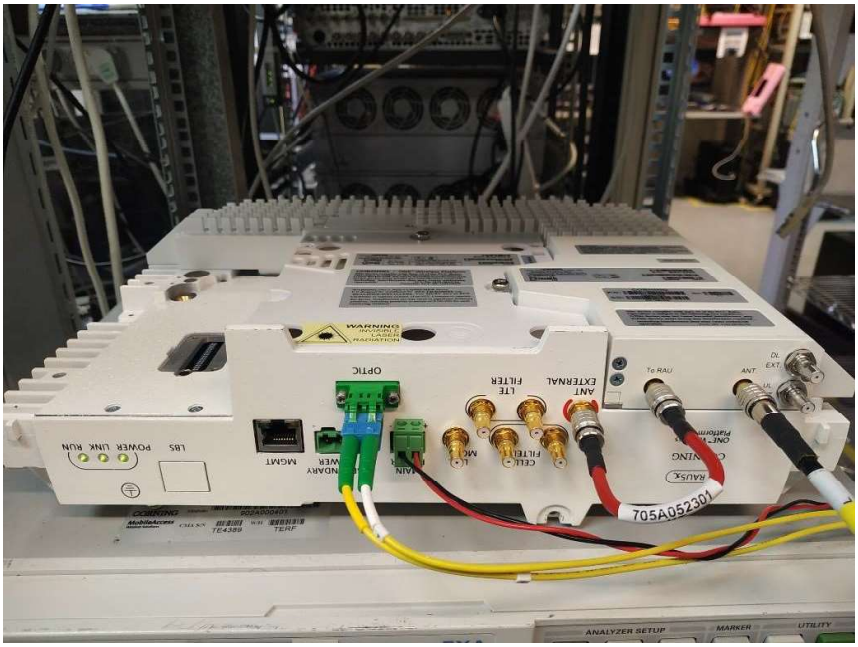

Figure 3. Conducted Emission From Antenna Port Tests

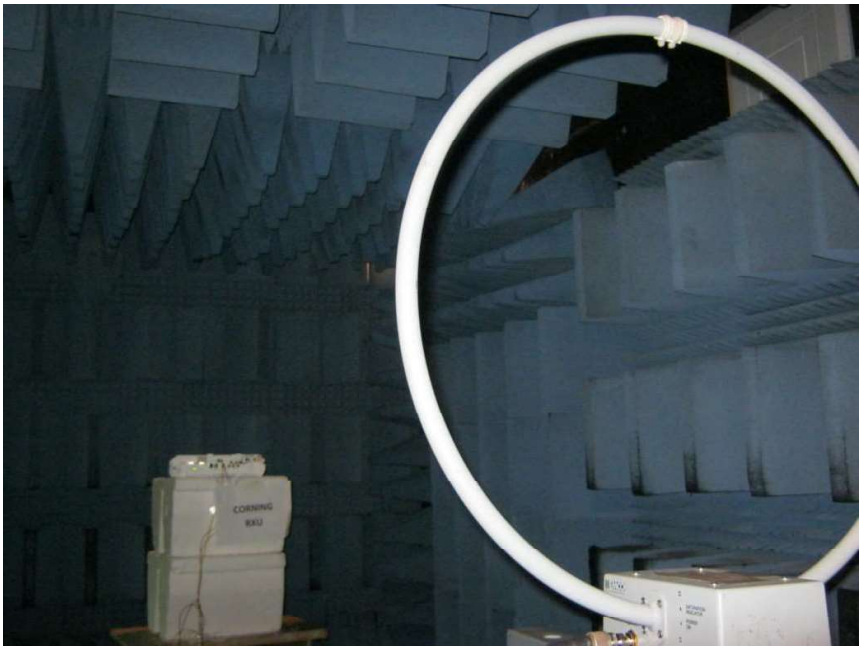

Figure 4. Radiated Emission Test 9kHz - 30MHz

Figure 5. Radiated Emission Test 30 - 200 MHz

Figure 6. Radiated Emission Test 200 - 1000MHz

Figure 7. Radiated Emission Test 1-18GHz

Figure 8. Radiated Emission Test 18-26.5GHz

4 RF Power Output

4.1 Test Specification

FCC Part 27, Subpart C (27.50) (a)(ii)

4.2 Test Procedure

(Temperature (22°C)/ Humidity (30%RH))

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (31.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

4.3 Test Limit

The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition. The limit is calculated to be 63.0 dBm.

4.4 Test Results

JUDGEMENT: Passed

See additional information in Table 1 and Figure 9 to Figure 17.

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading	Antenna Gain	EIRP	Limit	Margin
	(MHz)	(kHz)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
16QAM	10	15	2355.0	20.74	12.5	33.24	63.0	-26.8
		30		20.81		33.31	63.0	-26.7
		60		20.91		33.41	63.0	-26.6
64QAM	10	15	2355.0	20.93	12.5	33.43	63.0	-26.6
		30		20.80		33.30	63.0	-26.7
		60		20.79		33.29	63.0	-26.7
256QAM	10	15	2355.0	20.99	12.5	33.49	63.0	-26.5
		30		20.86		33.36	63.0	-26.6
		60		21.01		33.51	63.0	-26.5

Table 1 RF Power Output 16QAM; 64QAM; 256QAM

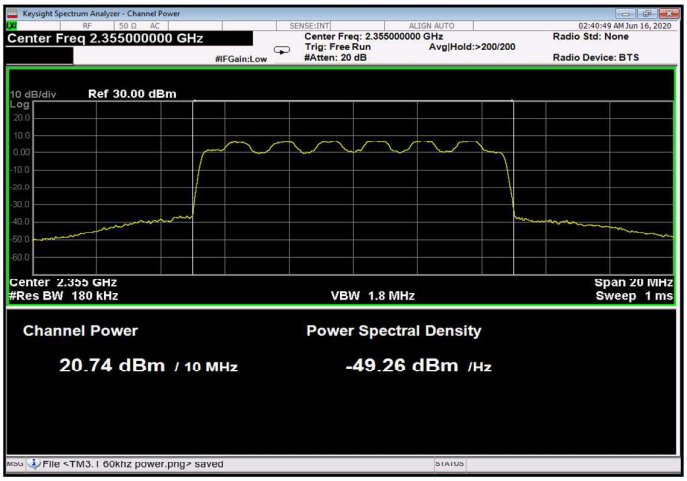

Figure 9: 16QAM 10MHz B.W.; 2355.0MHz, 15kHz

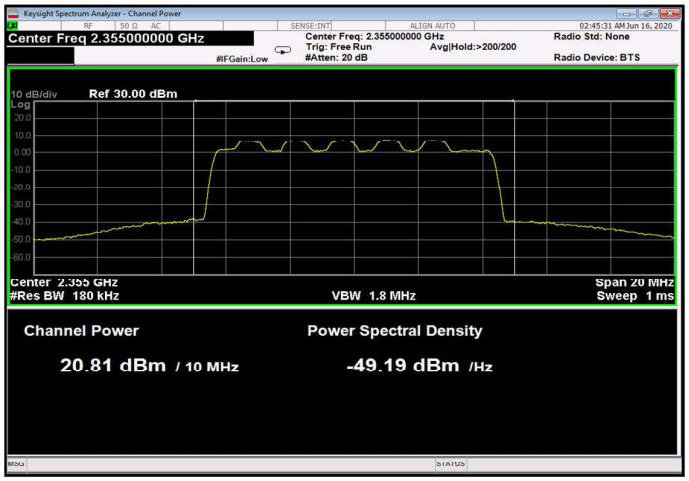

Figure 10: 16QAM 10MHz B.W.; 2355.0MHz, 30kHz

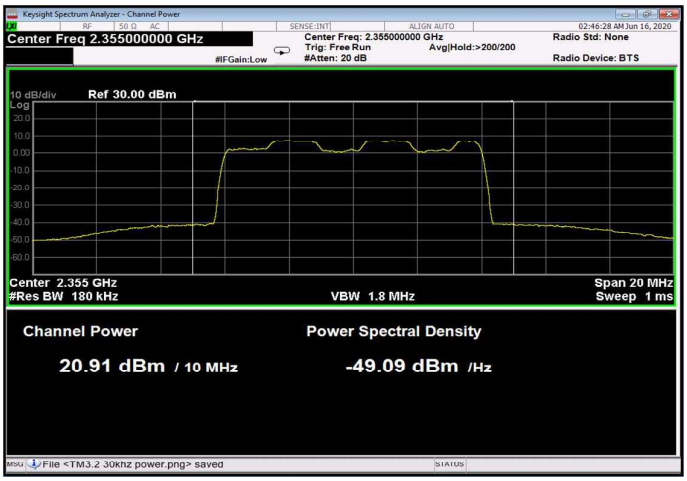

Figure 11: 16QAM 10MHz B.W.; 2355.0MHz, 60kHz

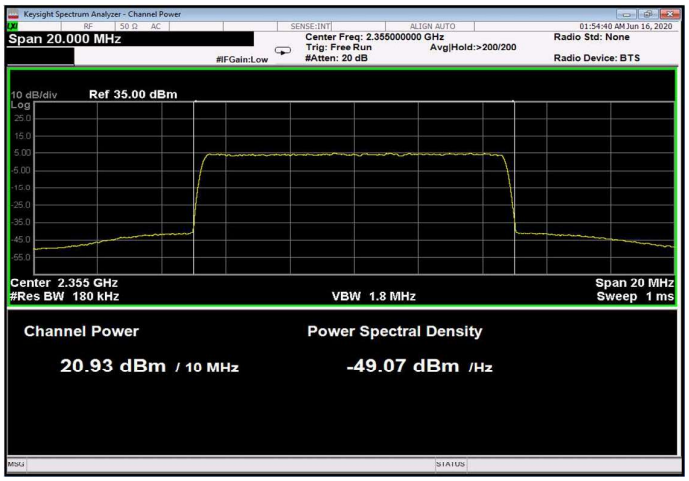

Figure 12: 64QAM 10MHz B.W.; 2355.0MHz, 15kHz

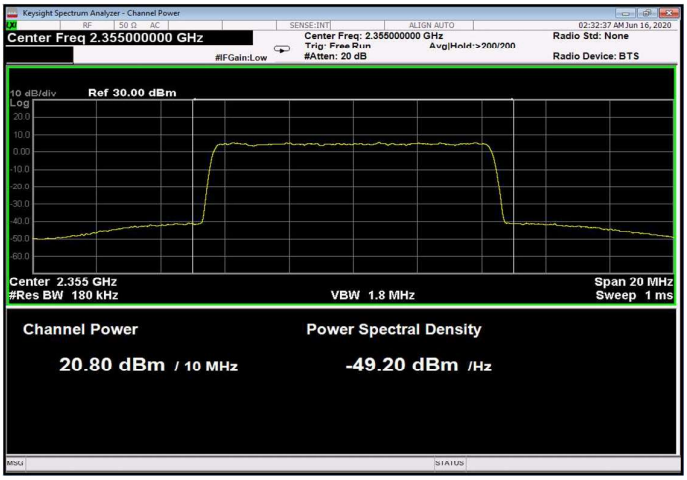

Figure 13: 64QAM 10MHz B.W.; 2355.0MHz, 30kHz

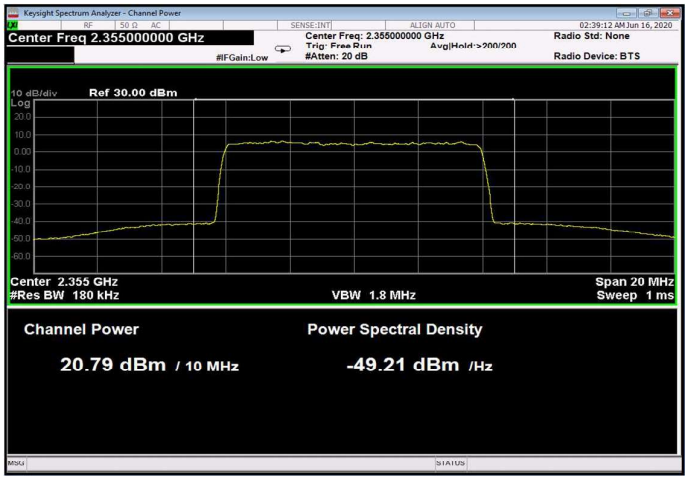

Figure 14: 64QAM 10MHzC.S; 2355.0MHz, 60kHz

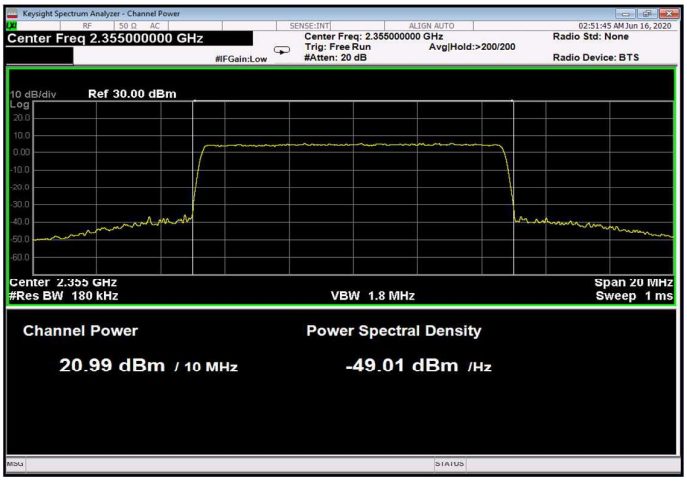

Figure 15: 256QAM 10MHz B.W.; 2355.0MHz, 15kHz

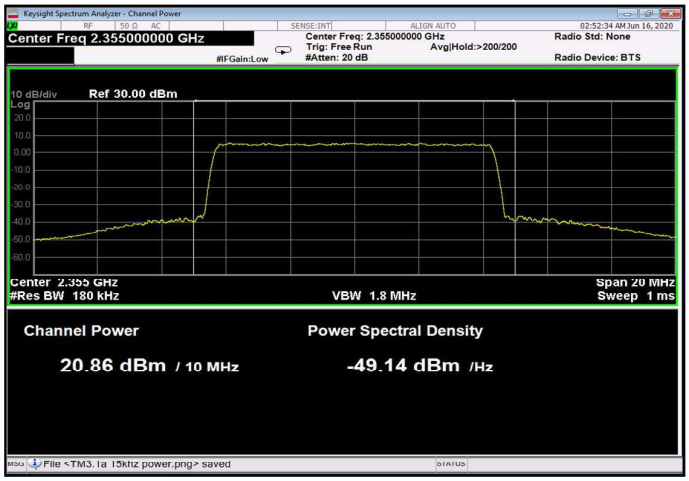

Figure 16: 256QAM 10MHz B.W.; 2355.0MHz, 30kHz

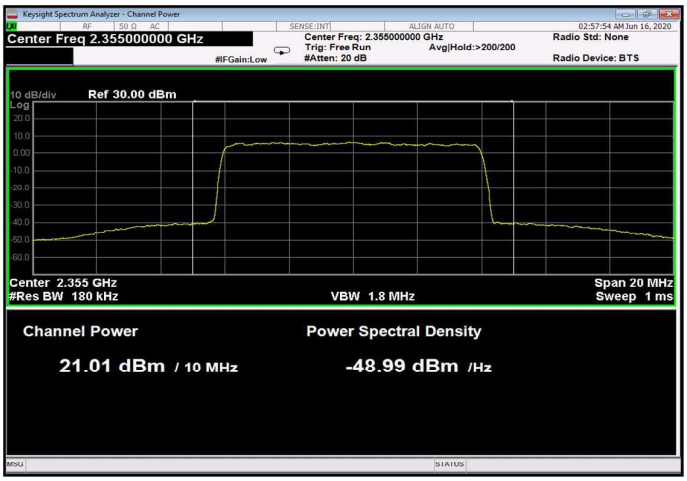

Figure 17: 256QAM 10MHz B.W.; 2355.0MHz, 60kHz

4.5 Test Equipment Used; RF Power Output

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Agilent Technologies	N9010A	MY52220686	28 November 2018	28 November 2020
EXG Vector Signal Generator	Agilent Technologies	N5172B	MY51350437	03 December 2018	03 December 2020
30 dB Attenuator	MCL	BW-S30W5	533	24 December 2019	24 December 2020

Table 2 Test Equipment Used

5 Occupied Bandwidth

5.1 Test Specification

FCC Part 2, Section 1049

5.2 Test Procedure

(Temperature (24°C)/ Humidity (35%RH))
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable. The spectrum analyzer was set to proper resolution B.W.
OBW function (99%) was employed for this evaluation.
Occupied bandwidth measured was repeated for each modulation.

5.3 Test Limit

N/A

5.4 Test Results

JUDGEMENT: Passed

See additional information in Table 3 to Table 4 and Figure 18 to Figure 35.

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
16 QAM	10	15	2355.0	9.2344
		30		8.5117
		60		7.8817
16 QAM	10	15	2355.0	9.3098
		30		8.5779
		60		7.8763
16 QAM	10	15	2355.0	9.2910
		30		8.5773
		60		7.8738

Table 3 Occupied Bandwidth 16QAM; 64QAM; 256QAM Input

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
16 QAM	10	15	2355.0	9.3431
		30		8.5466
		60		7.8724
16 QAM	10	15	2355.0	9.2979
		30		8.5746
		60		7.8660
16 QAM	10	15	2355.0	9.2793
		30		8.5754
		60		7.8689

Table 4 Occupied Bandwidth 16QAM; 64QAM; 256QAM Output

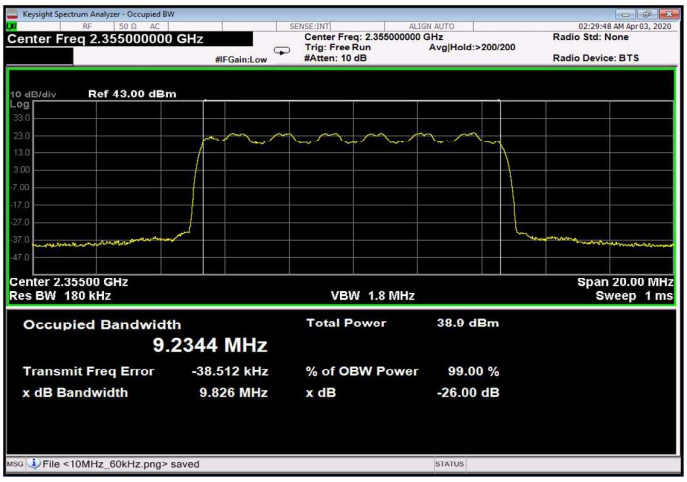

Figure 18: 16QAM 10MHz B.W.; 2355.0MHz, 15kHz Input

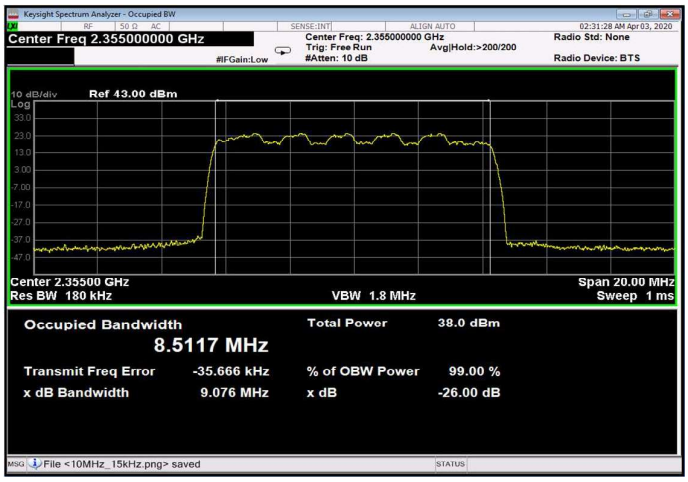

Figure 19: 16QAM 10MHz B.W.; 2355.0MHz, 30kHz Input

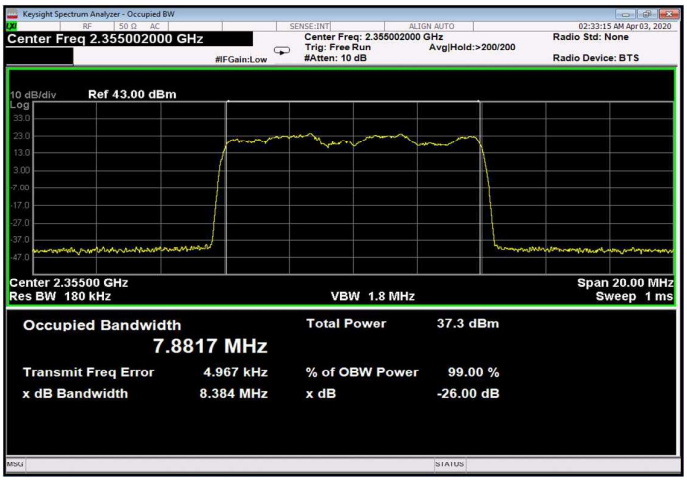

Figure 20: 16QAM 10MHz B.W.; 2355.0MHz, 60kHz Input

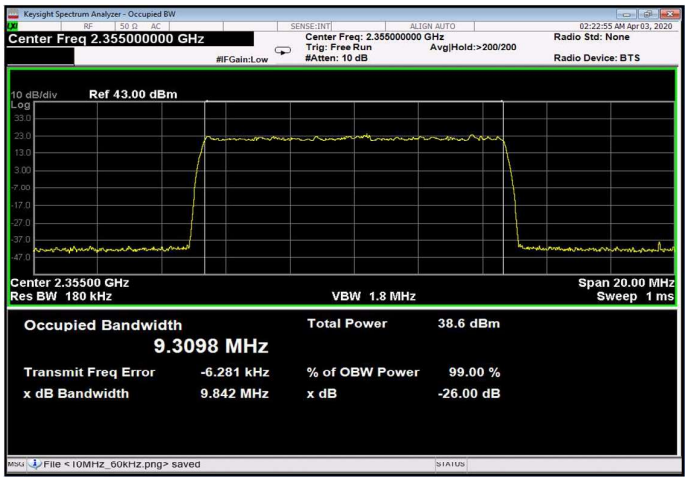

Figure 21: 64QAM 10MHz B.W.; 2355.0MHz, 16kHz Input

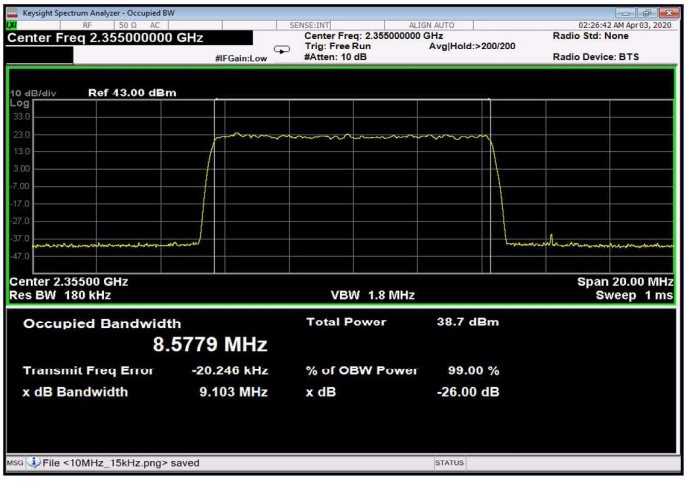

Figure 22: 64QAM 10MHz B.W.; 2355.0MHz, 30kHz Input

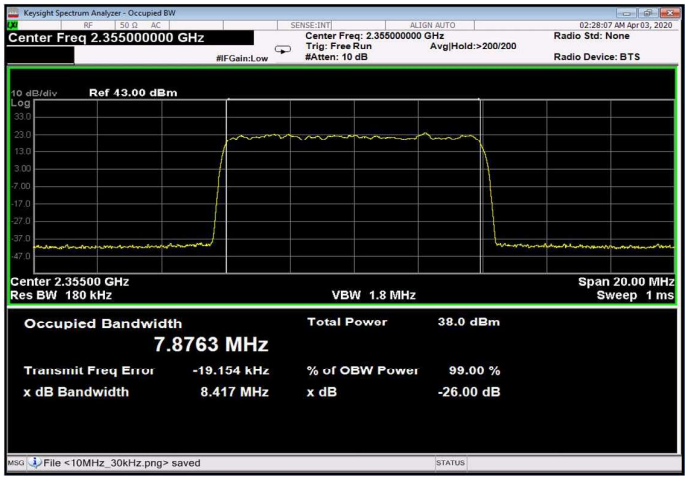

Figure 23: 64QAM 10MHz B.W.; 2355.0MHz, 60kHz Input

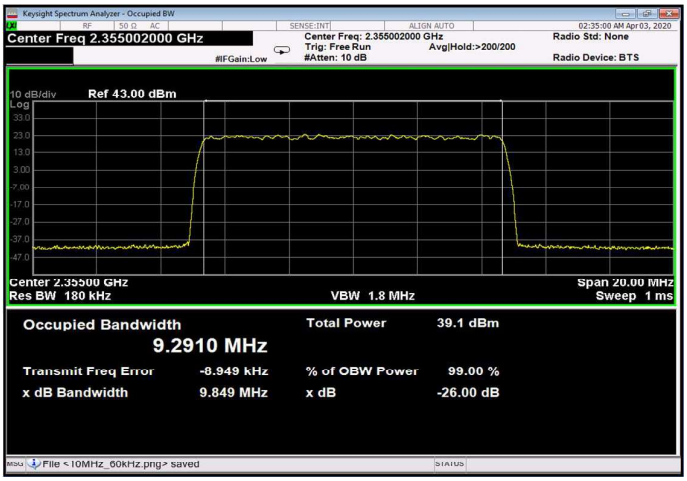

Figure 24: 256QAM 10MHz B.W.; 2355.0MHz, 15kHz Input

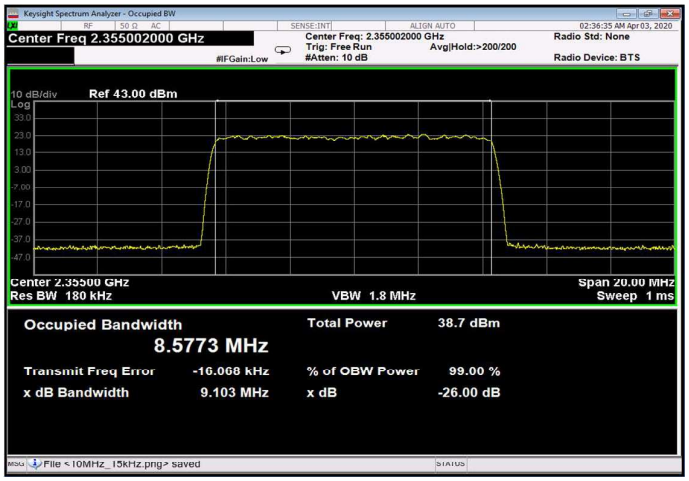

Figure 25: 256QAM 10MHz B.W.; 2355.0MHz, 30kHz Input

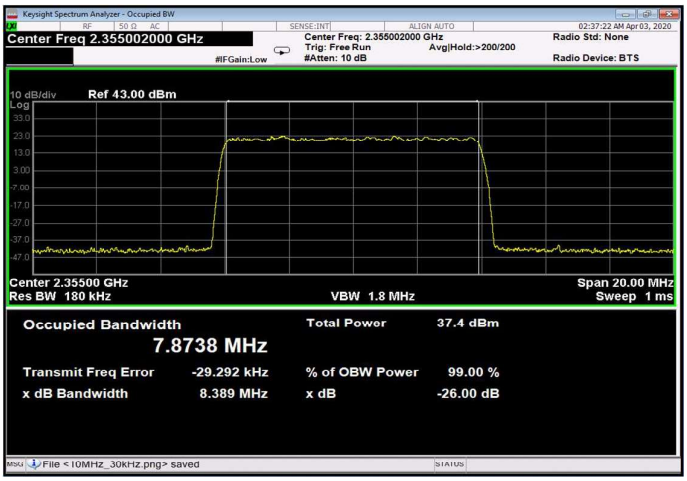

Figure 26: 256QAM 10MHz B.W.; 2355.0MHz, 60kHz Input

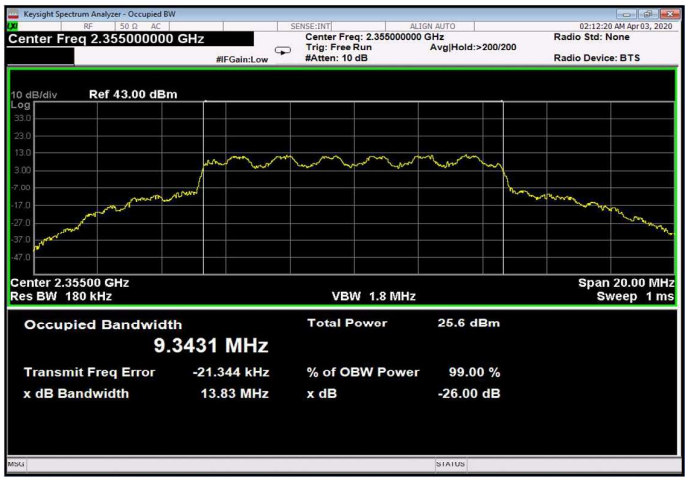

Figure 27: 16QAM 10MHz B.W.; 2355.0MHz, 15kHz Output

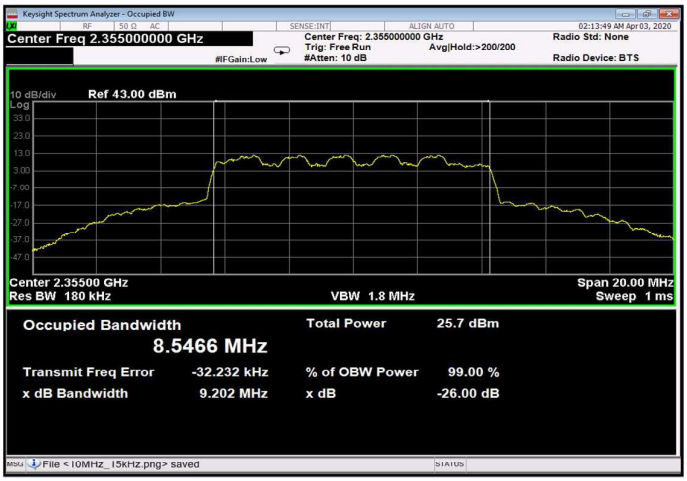

Figure 28: 16QAM 10MHz B.W.; 2355.0MHz, 30kHz Output

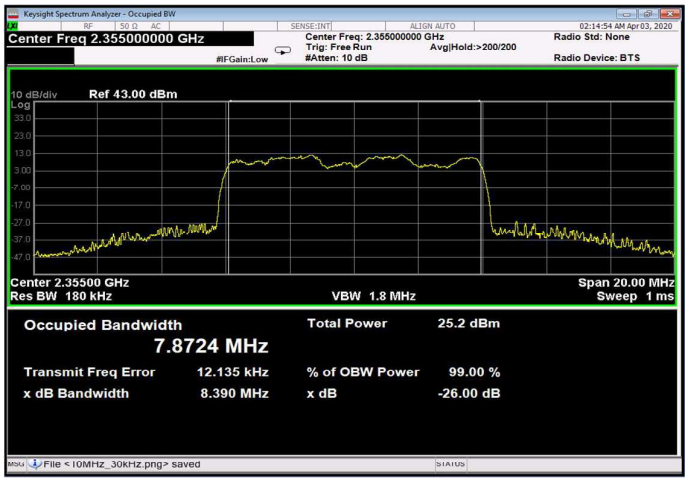

Figure 29: 16QAM 10MHz B.W.; 2355.0MHz, 60kHz Output

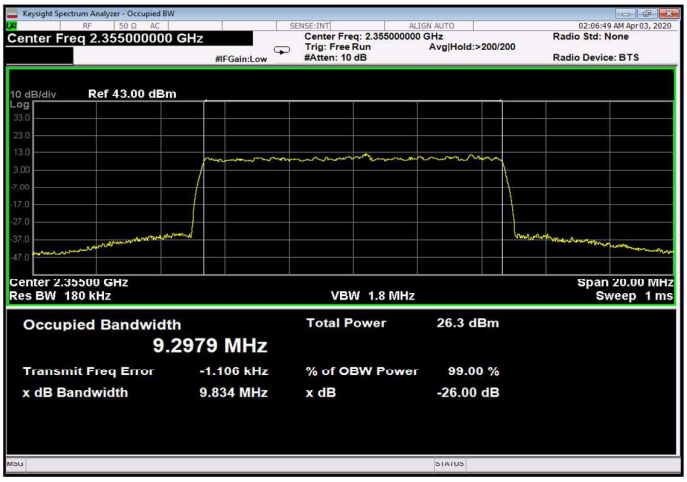

Figure 30: 64QAM 10MHz B.W.; 2355.0MHz, 15kHz Output

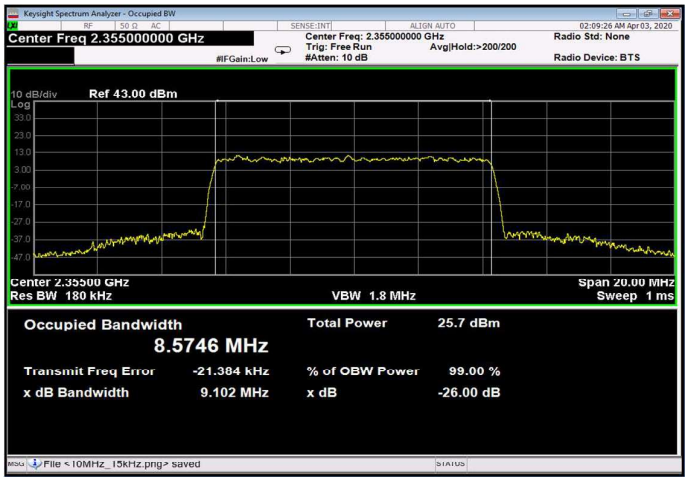

Figure 31: 64QAM 10MHz B.W.; 2355.0MHz, 30kHz Output

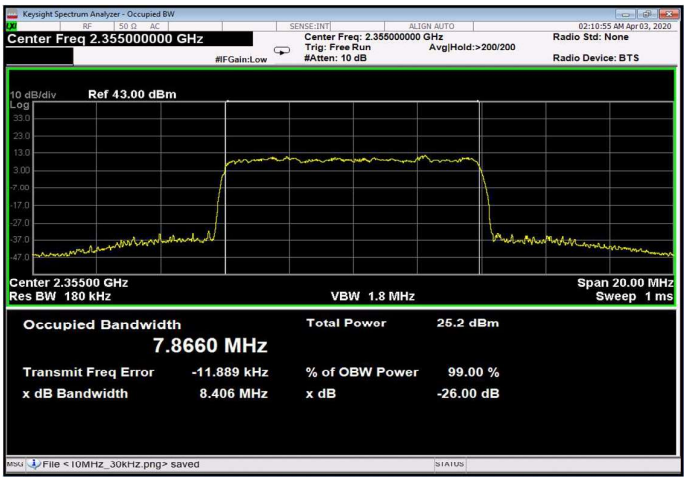

Figure 32: 64QAM 10MHz B.W.; 2355.0MHz, 60kHz Output

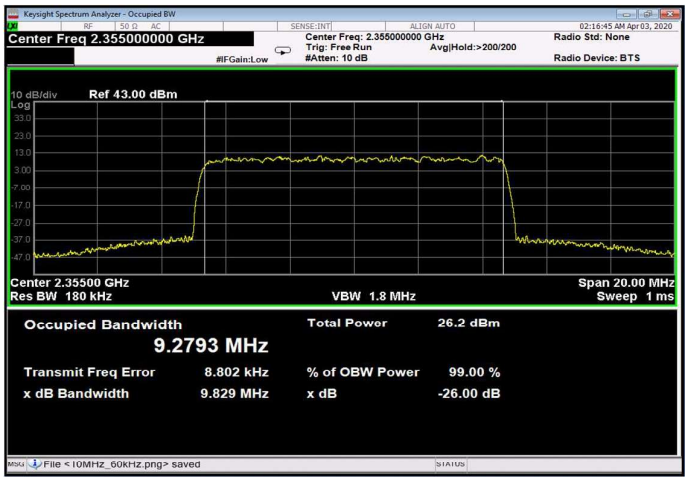

Figure 33: 256QAM 10MHz B.W.; 2355.0MHz, 15kHz Output

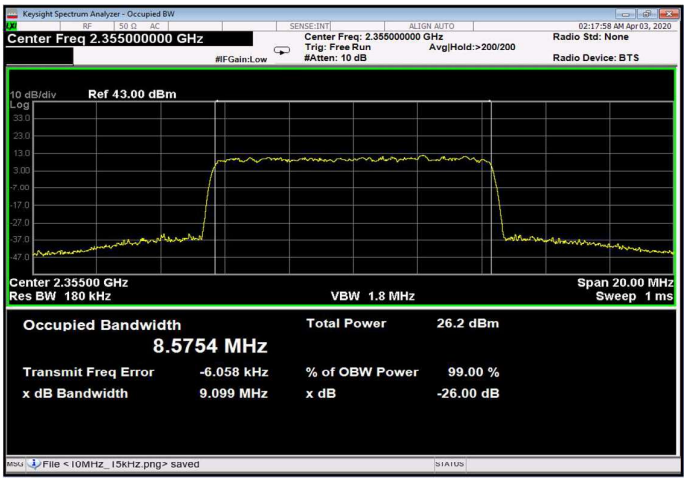

Figure 34: 256QAM 10MHz B.W.; 2355.0MHz, 30kHz Output

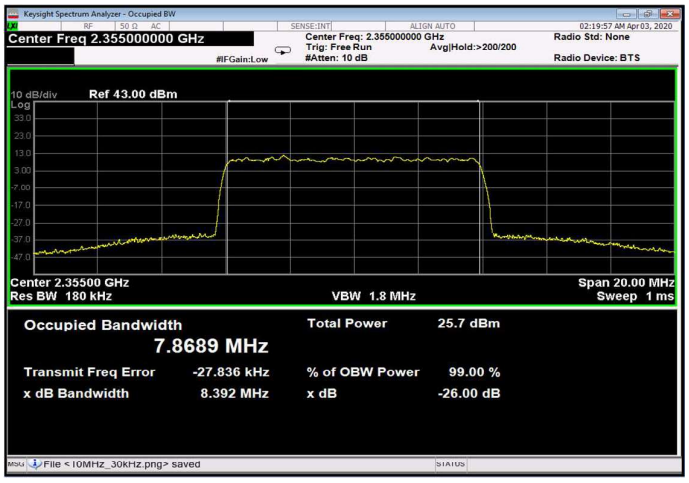

Figure 35: 256QAM 10MHz B.W.; 2355.0MHz, 60kHz Output

5.5 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Agilent Technologies	N9010A	MY52220686	28 November 2018	28 November 2020
EXG Vector Signal Generator	Agilent Technologies	N5172B	MY51350437	03 December 2018	03 December 2020
30 dB Attenuator	MCL	BW-S30W5	533	24 December 2019	24 December 2020

Table 5 Test Equipment Used