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DATE: 27 January 2020

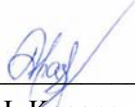
I.T.L. (PRODUCT TESTING) LTD.
FCC Radio Test Report
For

Corning Optical Communication Wireless
Equipment under test:

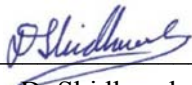
Building Wireless System (BWS) v1.0

Low Power Radio (LPR)
(WCS Section 2350-2360MHz Band)

Tested by: _____


I. Kaganovich

Approved by: _____


D. Shidlowsky

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This report relates only to items tested.



ISRAEL TESTING LABORATORIES
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Measurement/Technical Report for

Corning Optical Communication Wireless

Building Wireless System (BWS) v1.0

FCC ID: OJF1LFR

This report concerns:

Original Grant: X

Class II change:

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
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1. General Information

1.1 Administrative Information

Manufacturer:	Corning Optical Communication Wireless
Manufacturer's Address:	8253 1 st Street Vienna, VA 22182 U.S.A. Tel: +1-703-855-1773
Manufacturer's Representative:	Isaac Nissan
Equipment Under Test (E.U.T):	Building Wireless System (BWS) v1.0
Equipment Model No.:	Low Power Radio (LPR)
Equipment Serial No.:	704A055003
Date of Receipt of E.U.T:	October 3, 2019
Start of Test:	October 3, 2019
End of Test:	December 24, 2019
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 IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. 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**

Corning's BWS™ platform 1.0 is the first fully-digital, end-to-end in-building cellular solution, for medium size venues.

Corning's Low Power Radio (LPR) units are the end-point antennas connected by optical cable to the BWS system Digital Router Unit (DRU) (distribution/routing of RF samples via CPRI stream), and to the system Power Supply Unit (PSU) for power.

LPR is the first release of Corning's fully-digital radio remote unit, providing plug-and-play, cost-effective processing, minimizing power loss and noise.

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

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)
0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):
± 3.44 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

- 2.1.1 The test setup was configured to closely resemble the standard installation.
- 2.1.2 The EUT consists of the LPR (Low-Power Remote Module) which is connected with the head-end ICRAN equipment (BBU and DRU) using fiber optic cable.
- 2.1.3 The RF source signals are represented in the setup by BBU unit.
- 2.1.4 An “Exercise” SW on the computer was used to enable/disable transmission of the EUT, while the EUT output was connected to the spectrum analyzer.
- 2.1.5 The system was tested under maximum gain conditions.
- 2.1.6 Only peak power testing was done on the both ports, all other testing was performed 1 port (see customer declaration on following page regarding the identical ports).
- 2.1.7 Testing was performed on the following configuration:

Frequency Range (MHz)		
Service/Band	Downlink (DL)	Technology
WCS	2350-2360	LTE

2.2 EUT Exercise Software

vHCM SW ver. 1.0 used for commands delivery. These commands are used to enable/disable the EUT transmission.

EUT Embedded SW versions are:

DRU ver dru_d719_10_25

LPR ver LPR_D803_01.63

2.3 Special Accessories

No special accessories were needed in order to achieve compliance.

2.4 Equipment Modifications

No modifications were needed in order to achieve compliance.



CORNING

Declaration

Date: December 25, 2019

RE: Corning Optical Communication Wireless

P/N: LPR-3C-2A2P2W-10

FCC ID: OJF1LPR

I hereby declare that the MIMO stream 1 and MIMO stream 2 of the LPR-3C-2A2P2W-10 have the identical RF chain including antenna gain of 2dBi.

Authorized Signature:

Printed Name:

Isaac Nissan

2.5 Configuration of Tested System

Product Name	Building Wireless System (BWS) v1.0
Model Name	Low Power Radio (LPR)
Working voltage	100-240VAC/ 48VDC
Mode of operation	Industrial Booster for WCS band
Modulations	64QAM, 16QAM, QPSK
Assigned Frequency Range	2345.0MHz-2360.0MHz
Operating Frequency Range	2350.0MHz -2360.0MHz
Transmit power	~15.0 dBm
Antenna Gain	2dBi
DATA rate	N/A
Modulation BW	5MHz, 10.0MHz
DC Voltage and DC current applied to the final amplifying device	36-60VDC, (nominal voltage 48V)/ 2A

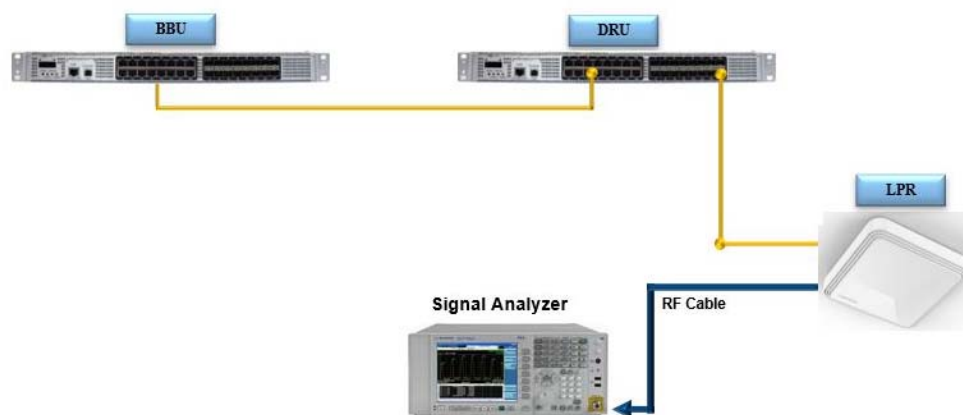


Figure 1. Test Set-Up – Conducted

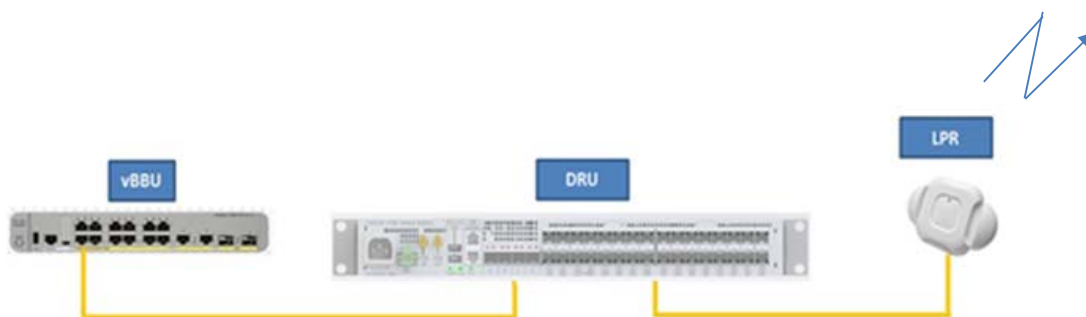


Figure 2. Test Set-Up - Radiated

3. Test Set-Up Photos



Figure 3. Conducted Test Set-Up



Figure 4. Radiated Emission Test, 0.009-30MHz



Figure 5. Radiated Emission Test, 30-200MHz

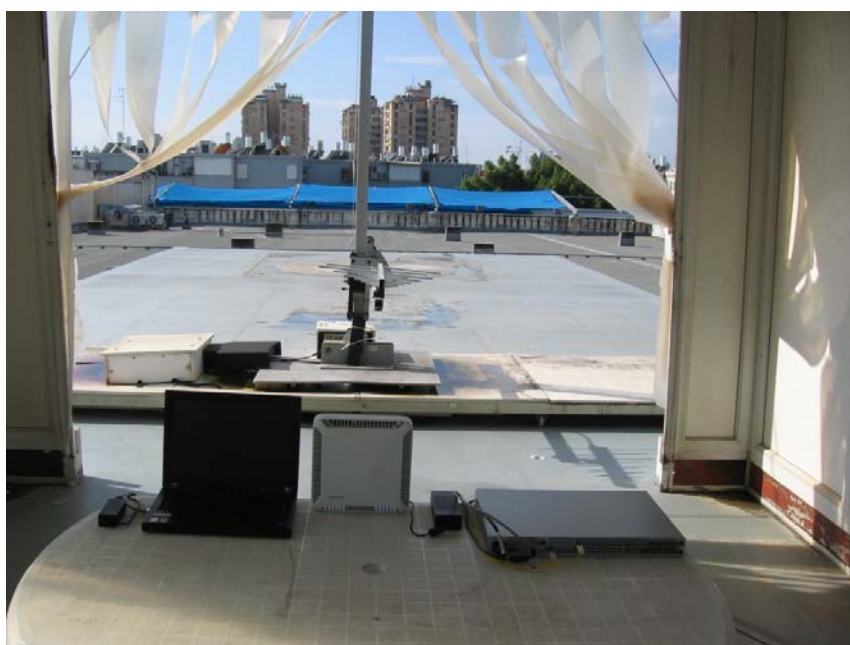


Figure 6. Radiated Emission Test, 200-1000MHz



Figure 7. Radiated Emission Test, 1-18GHz



Figure 8. Radiated Emission Test, 18-26.5GHz

4. Peak Output Power & Booster Gain

4.1 Test Specification

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

4.2 Test Procedure

(Temperature (22°C)/Humidity (40%RH))

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through 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 2000 Watts (63dBm).

4.4 Test Results

Modulation	Operation Frequency	Port1 Reading	Port1 Reading	Port2 Reading	Port2 Reading	EIRP*	Limit	Margin
	(MHz)	(dBm)	(Watts)	(dBm)	(Watts)	(dBm)	(dBm)	(dB)
QPSK	2352.5	16.9	0.049	16.9	0.049	21.91	63.0	-41.09
	2355.0	16.9	0.049	16.9	0.049	21.91	63.0	-41.09
	2357.5	17	0.050	17	0.050	22.01	63.0	-40.99
16QAM	2352.5	16.8	0.048	16.9	0.049	21.86	63.0	-41.14
	2355.0	16.9	0.049	16.9	0.049	21.91	63.0	-41.09
	2357.5	17	0.050	17	0.050	22.01	63.0	-40.99
64QAM	2352.5	17.3	0.054	16.9	0.049	22.11	63.0	-40.89
	2355.0	17.3	0.054	16.8	0.048	22.07	63.0	-40.93
	2357.5	17.5	0.056	17	0.050	22.27	63.0	-40.73

Figure 9 Peak Output Power, 5MHz BW

Modulation	Operation Frequency	Port1 Reading	Port1 Reading	Port2 Reading	Port2 Reading	EIRP*	Limit	Margin
	(MHz)	(dBm)	(Watts)	(dBm)	(Watts)	(dBm)	(dBm)	(dB)
QPSK	2355.0	16.9	0.049	16.9	0.049	21.91	63.0	-41.09
16QAM	2355.0	16.9	0.049	16.9	0.049	21.91		-41.09
64QAM	2355.0	17.3	0.054	16.9	0.049	22.11		-40.89

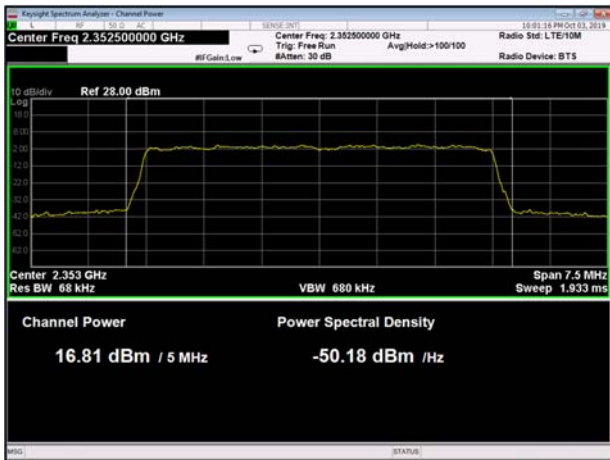
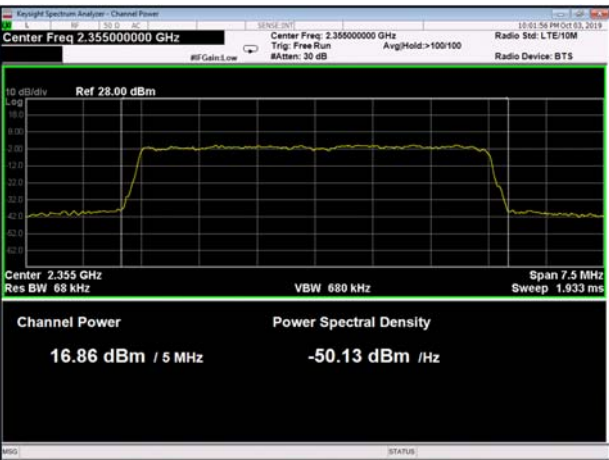
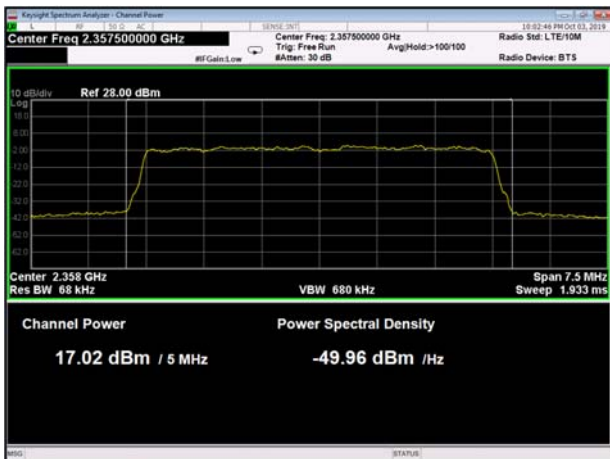
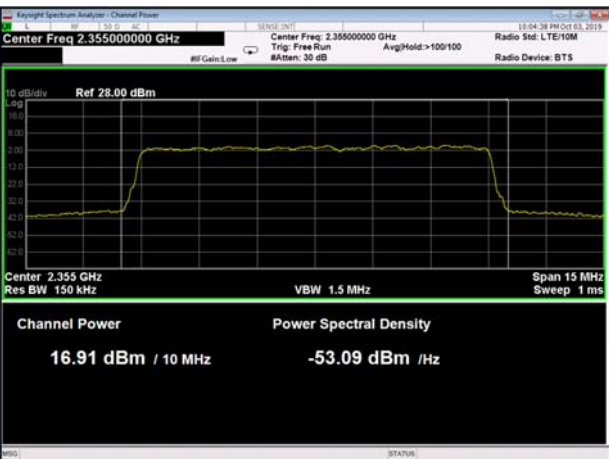
Figure 10 Peak Output Power, 10MHz BW

*Note – EIRP was calculated by adding both Port readings in W, then converting to dBm and adding the antenna gain.

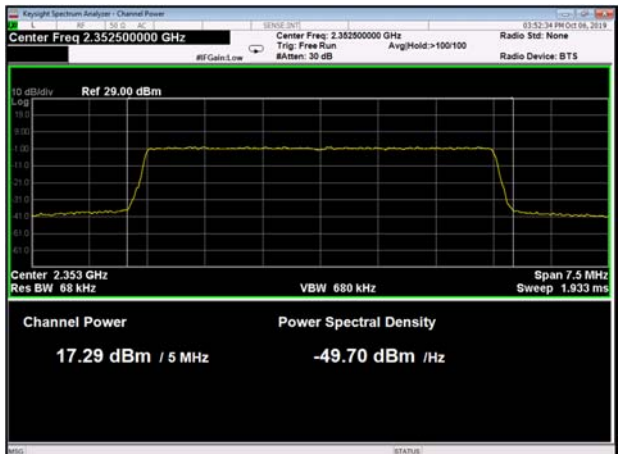
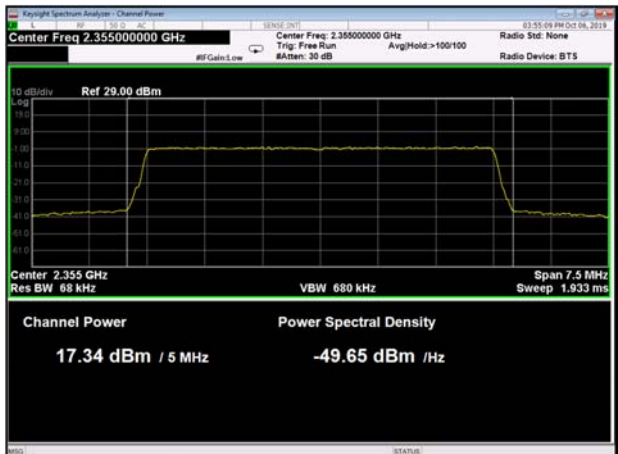
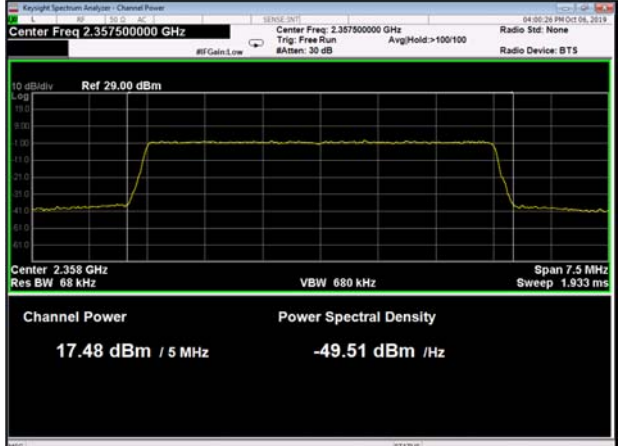
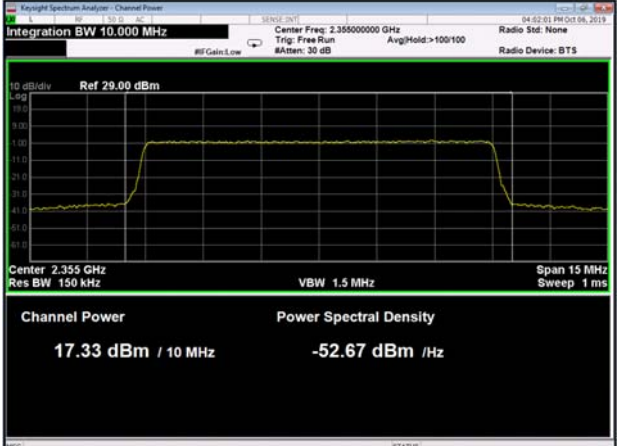
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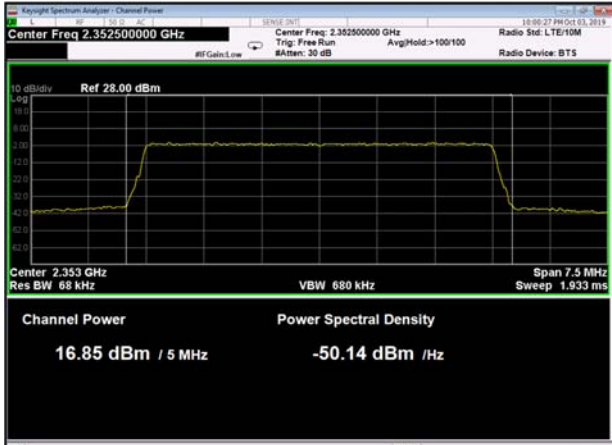
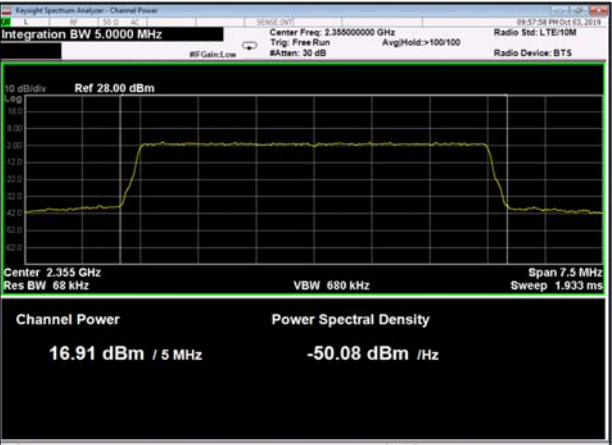
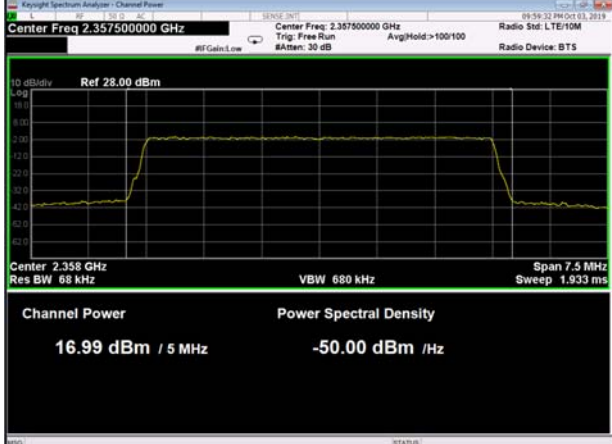
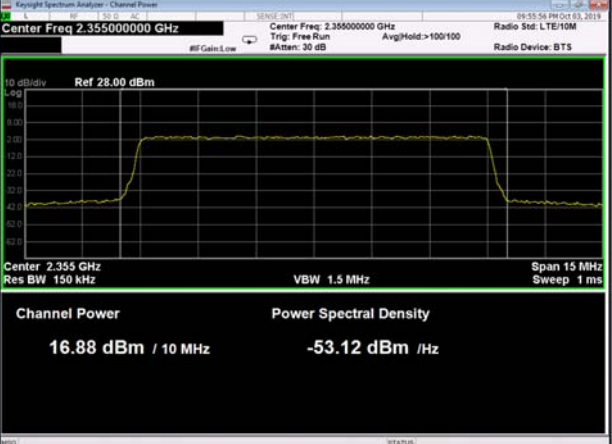
See additional information in Figure 11 to Figure 34.

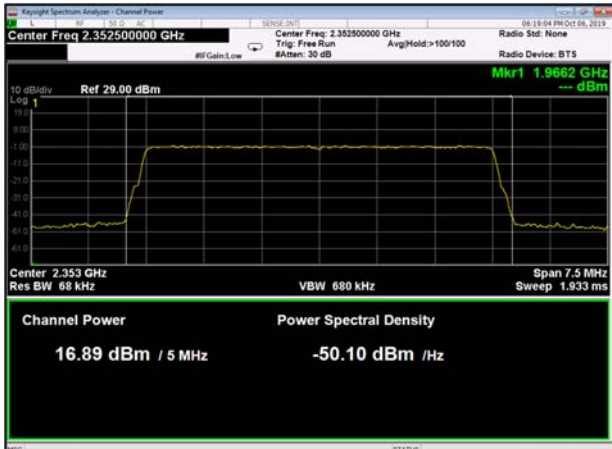
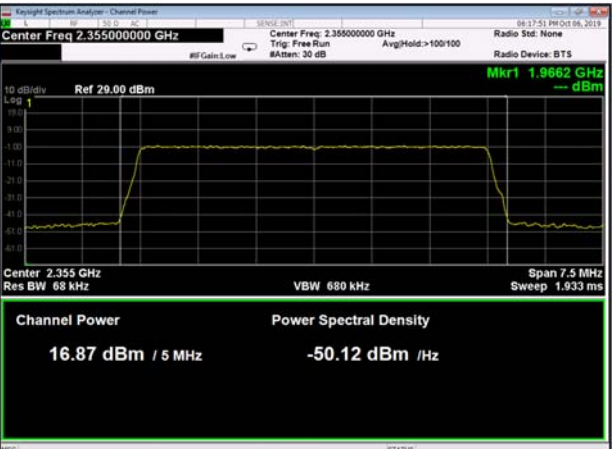
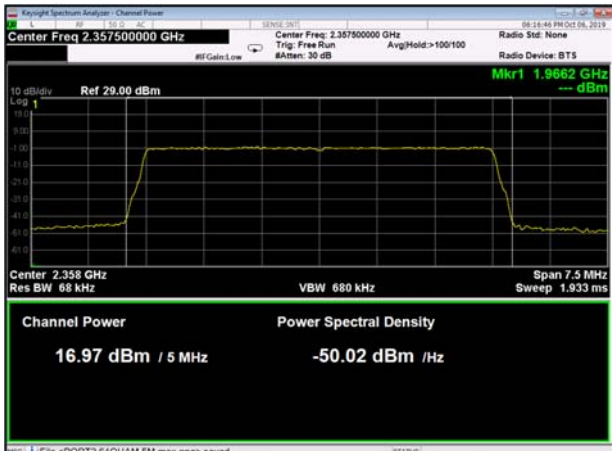
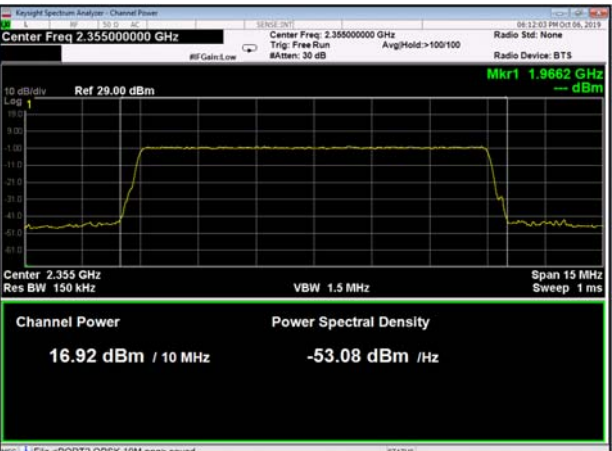


Antenna PORT	1
Modulation	16QAM
	
Figure 11 5MHz BW, 2352.5MHz	Figure 12 5MHz BW, 2355MHz
	
Figure 13 5MHz BW, 2357.5MHz	Figure 14 10MHz BW, 2355MHz



Antenna PORT	1
Modulation	64QAM
	
Figure 15 5MHz BW, 2352.5MHz	Figure 16 5MHz BW, 2355MHz
	
Figure 17 5MHz BW, 2357.5MHz	Figure 18 10MHz BW, 2355MHZ

Antenna PORT	1
Modulation	QPSK
 Figure 19 5MHz BW, 2352.5MHz	 Figure 20 5MHz BW, 2355MHz
 Figure 21 5MHz BW, 2357.5MHz	 Figure 22 10MHz BW, 2355MHz

Antenna PORT	2
Modulation	16QAM
 Center Freq 2.352500000 GHz Center Freq: 2.352500000 GHz Trig: Free Run AvgHold: >100/100 Radio Std: None Radio Device: BTS Ref 29.00 dBm Mkr1 1.9662 GHz --- dBm 10 dB/div Log 1 Center 2.353 GHz Res BW 68 kHz VBW 680 kHz Span 7.5 MHz Sweep 1.933 ms Channel Power 16.89 dBm / 5 MHz Power Spectral Density -50.10 dBm / Hz	 Center Freq 2.355000000 GHz Center Freq: 2.355000000 GHz Trig: Free Run AvgHold: >100/100 Radio Std: None Radio Device: BTS Ref 29.00 dBm Mkr1 1.9662 GHz --- dBm 10 dB/div Log 1 Center 2.355 GHz Res BW 68 kHz VBW 680 kHz Span 7.5 MHz Sweep 1.933 ms Channel Power 16.87 dBm / 5 MHz Power Spectral Density -50.12 dBm / Hz
Figure 23 5MHz BW, 2352.5MHz	Figure 24 5MHz BW, 2355MHz
 Center Freq 2.357500000 GHz Center Freq: 2.357500000 GHz Trig: Free Run AvgHold: >100/100 Radio Std: None Radio Device: BTS Ref 29.00 dBm Mkr1 1.9662 GHz --- dBm 10 dB/div Log 1 Center 2.358 GHz Res BW 68 kHz VBW 680 kHz Span 7.5 MHz Sweep 1.933 ms Channel Power 16.97 dBm / 5 MHz Power Spectral Density -50.02 dBm / Hz	 Center Freq 2.355000000 GHz Center Freq: 2.355000000 GHz Trig: Free Run AvgHold: >100/100 Radio Std: None Radio Device: BTS Ref 29.00 dBm Mkr1 1.9662 GHz --- dBm 10 dB/div Log 1 Center 2.355 GHz Res BW 150 kHz VBW 1.5 MHz Span 15 MHz Sweep 1 ms Channel Power 16.92 dBm / 10 MHz Power Spectral Density -53.08 dBm / Hz
Figure 25 5MHz BW, 2357.5MHz	Figure 26 10MHz BW, 2355MHz



Antenna PORT

2

Modulation

64QAM

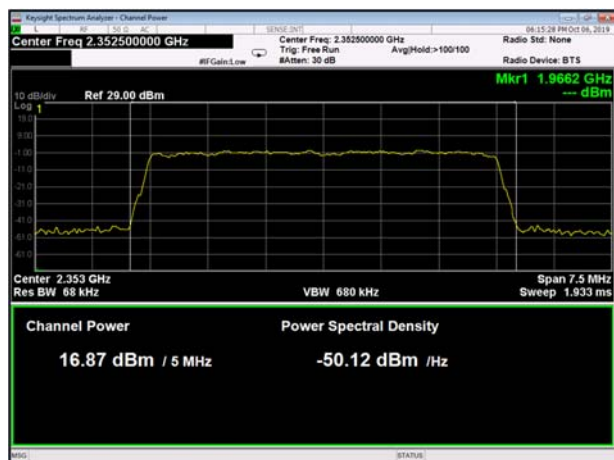


Figure 27 5MHz BW, 2352.5MHz

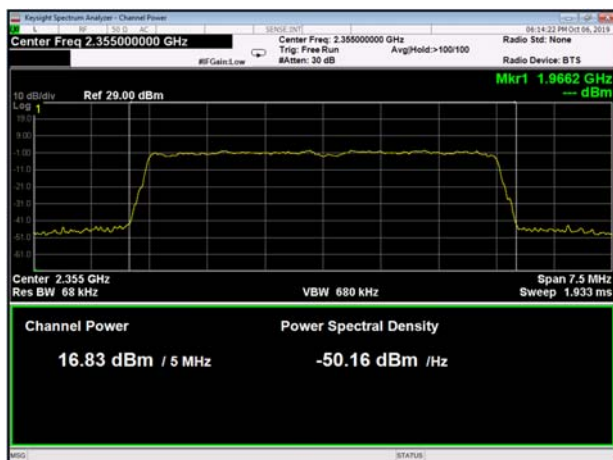


Figure 28 5MHz BW, 2355MHz

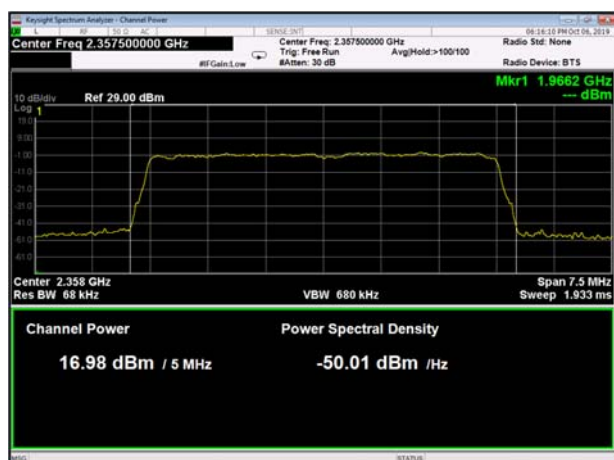


Figure 29 5MHz BW, 2357.5MHz

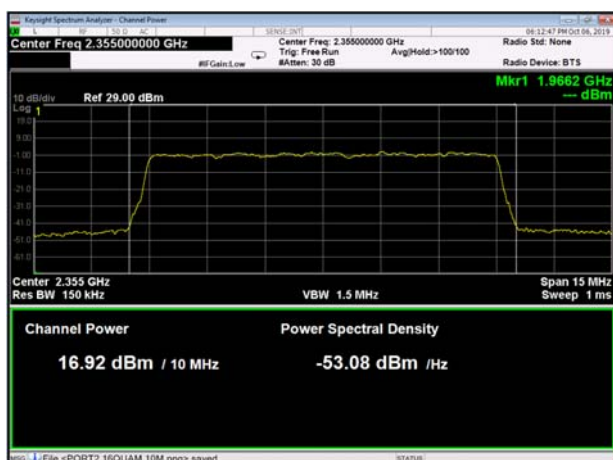
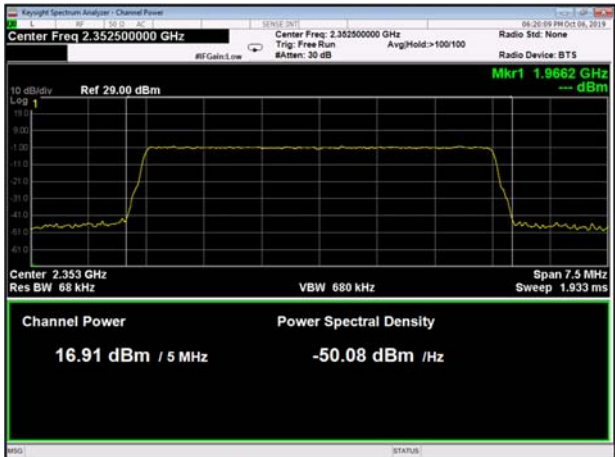
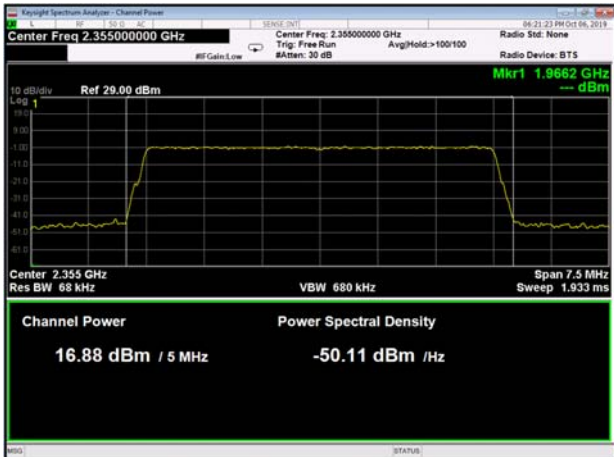
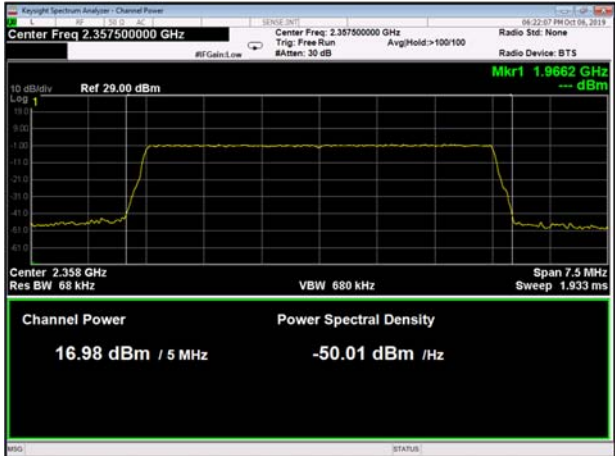
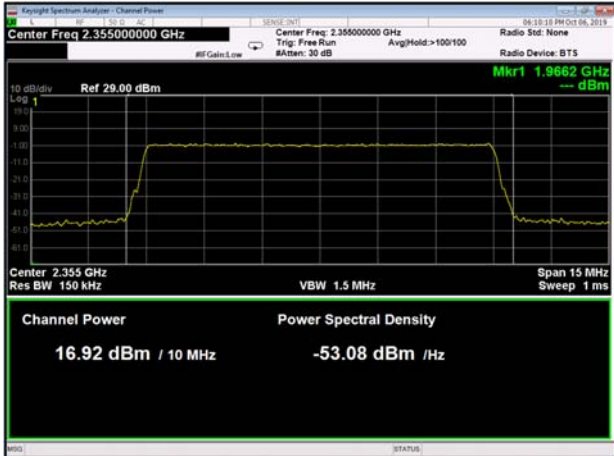


Figure 30 10MHz BW, 2355MHz



Antenna PORT	2
Modulation	QPSK
	
Figure 31 5MHz BW, 2352.5MHz	Figure 32 5MHz BW, 2355MHz
	
Figure 33 5MHz BW, 2357.5MHz	Figure 34 10MHz BW, 2355MHz



4.5 Test Equipment Used; Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	Agilent	N9010A	MY52220686	November 28, 2018	November 28, 2020
Vector Signal Generator	VIAVI	MTS 5800	WMNK00716 90263	July 1, 2018	July 1, 2021

Figure 35 Test Equipment Used

5. Average Power Spectral Density

5.1 Test Specification

FCC, Part 27, Subpart C, Section 27.50(a)(1)(A)

5.2 Test Procedure

(Temperature (22°C)/ Humidity (40%RH))

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (loss=31.7 dB). The E.U.T. RF output was modulated. Special attention was taken to prevent Spectrum Analyzer RF input overload. The Spectrum Analyzer was set to 1MHz RBW. The output power level was measured at each modulation.

In the next step RBW was set to 5MHz, power output level was measured at each modulation and compared to the limit.

5.3 Test Limit

Average PSD in any 1 MHz must not exceed 400 Watts (56dBm) and in any 5MHz, must not exceed 2000 Watts (63dBm).

5.4 Test Results

Band	Modulation	Operation Frequency	Reading	Antenna Gain	EIRP	Limit	Margin
		(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
WCS	QPSK	2352.5	11.1	2.0	13.1	56.0	-42.9
		2355.0	11.1		13.1		-42.9
		2357.5	11.5		13.5		-42.5
	16QAM	2352.5	9.7		11.7		-44.3
		2355.0	10.3		12.3		-43.7
		2357.5	11.9		13.9		-42.1
	64QAM	2352.5	11.0		13.0		-43.0
		2355.0	11.6		13.6		-42.4
		2357.5	11.6		13.6		-42.4

Figure 36 1 MHz - Average Power Spectral Density, 5MHz OBW

Band	Modulation	Operation Frequency	Reading	Antenna Gain	EIRP	Limit	Margin
		(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
WCS	64QAM	2355.0	8.2	2.0	10.2	56.0	-45.8
	16QAM	2355.0	8.4		10.4		-45.6
	QPSK	2355.0	8.7		10.7		-45.3

Figure 37 1 MHz - Average Power Spectral Density, 10MHz OBW

Band	Modulation	Operation Frequency	Reading	Antenna Gain	EIRP	Limit	Margin
		(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
WCS	QPSK	2352.5	16.4	2.0	18.4	63.0	-44.6
		2355.0	17.0		19.0		-44
		2357.5	17.6		19.6		-43.4
	16QAM	2352.5	16.4		18.4		-44.6
		2355.0	17.0		19.0		-44
		2357.5	17.4		19.4		-43.6
	64QAM	2352.5	17.4		19.4		-43.6
		2355.0	16.7		18.7		-44.3
		2357.5	17.2		19.2		-43.8

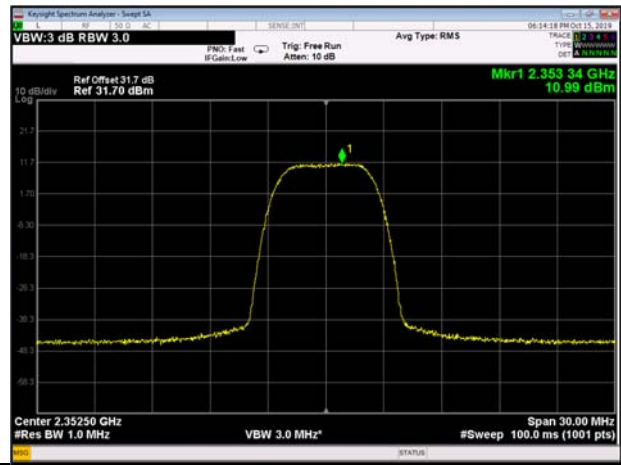
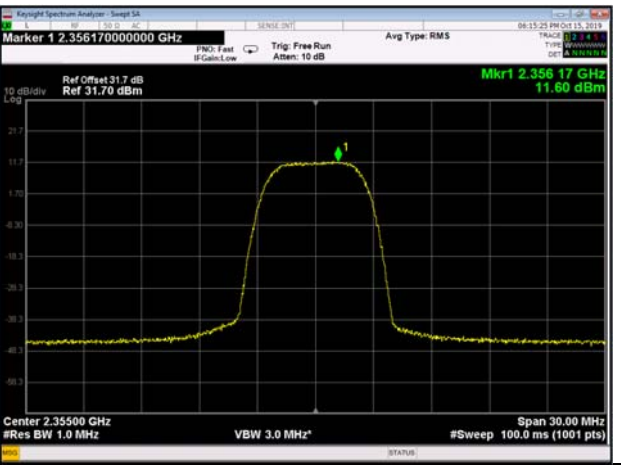
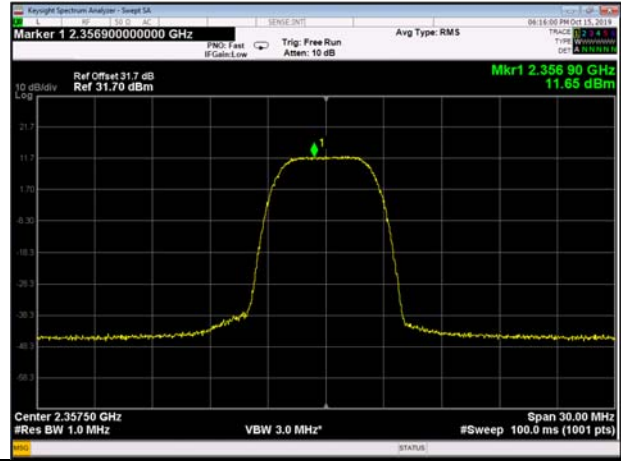
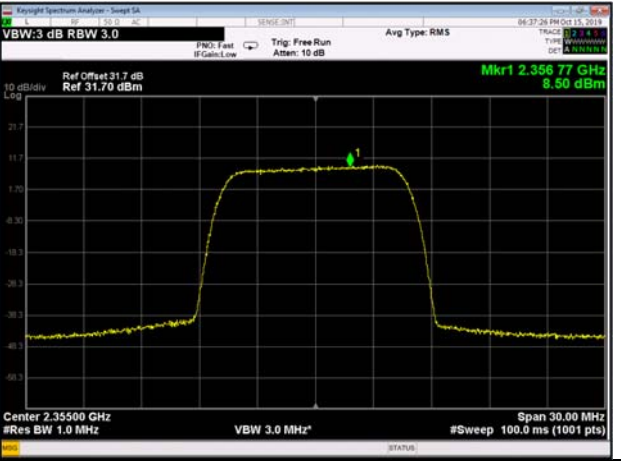
Figure 38 5 MHz - Average Power Spectral Density, 5MHz OBW

Band	Modulation	Operation Frequency	Reading	Antenna Gain	EIRP	Limit	Margin
		(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
WCS	64QAM	2355.0	14.8	2.0	16.8	63.0	-46.2
	16QAM	2355.0	14.1		16.1		-46.9
	QPSK	2355.0	15.0		17.0		-46.0

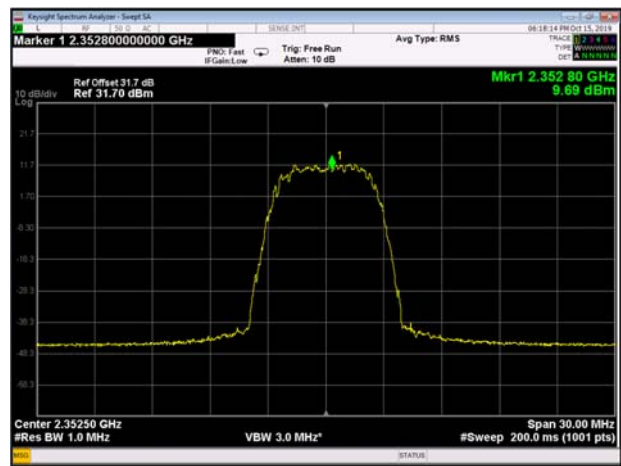
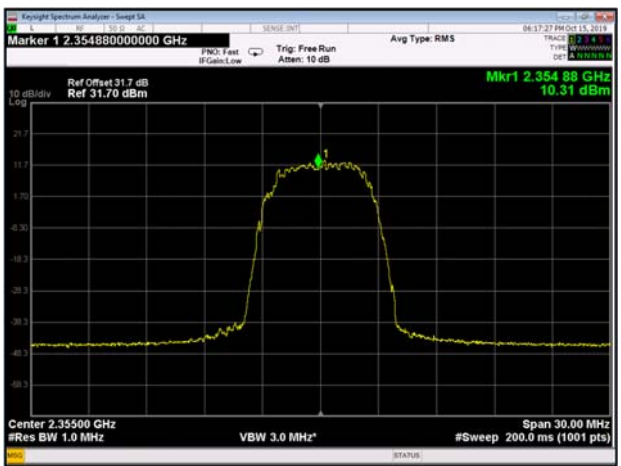
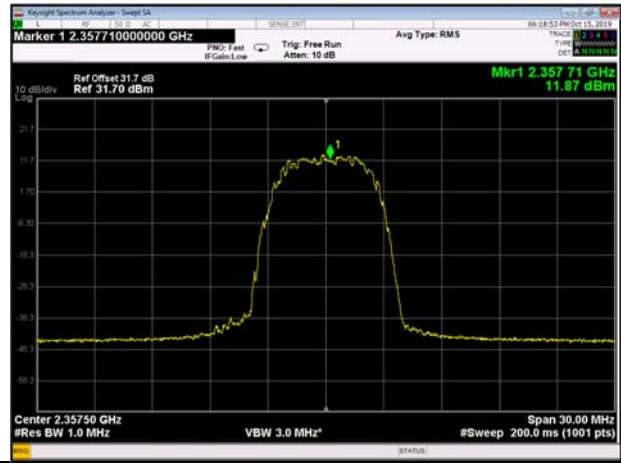
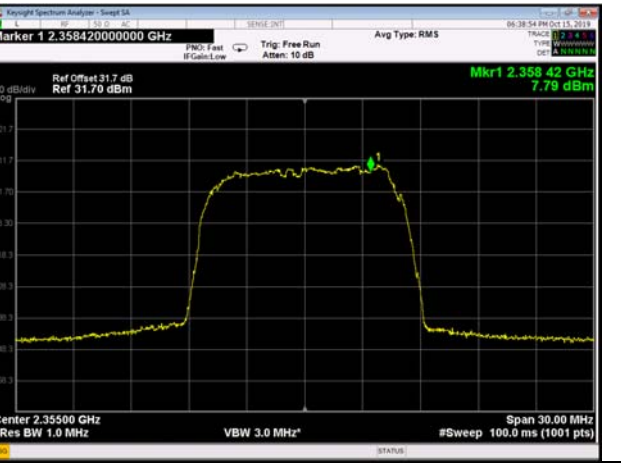
Figure 39 5 MHz - Average Power Spectral Density, 10MHz OBW

JUDGEMENT: Passed by 42.1 dB

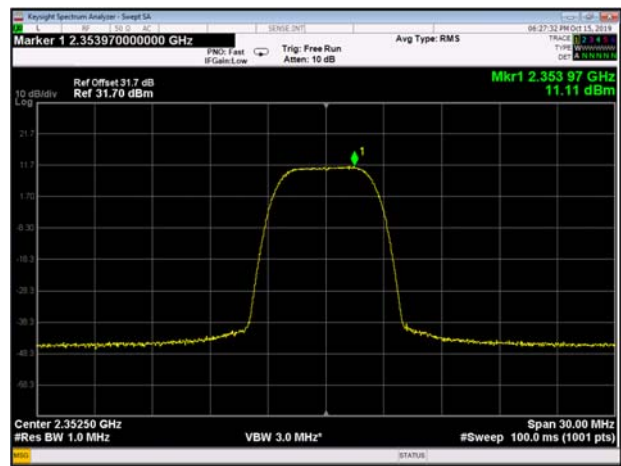
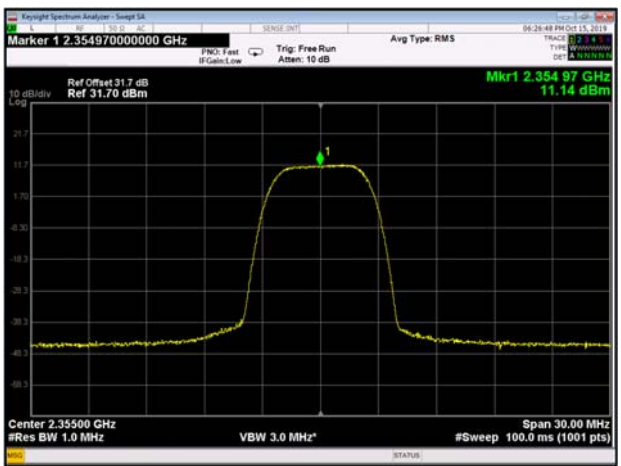
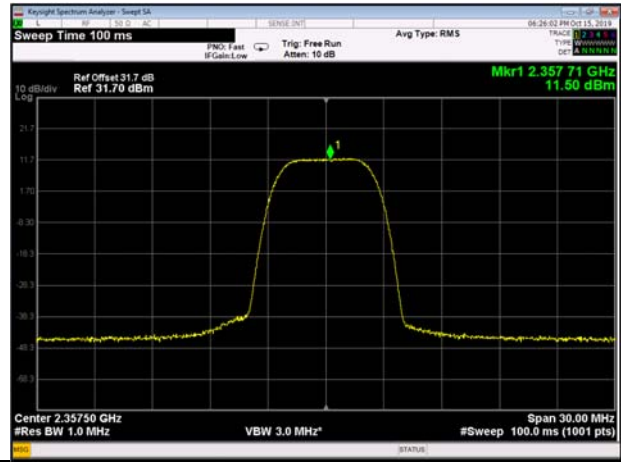
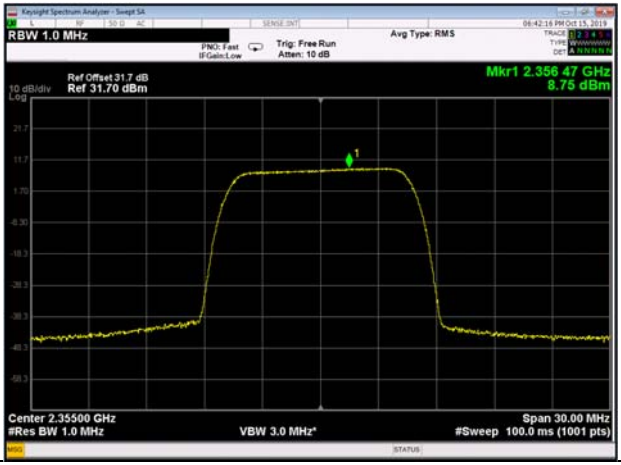
See additional information in *Figure 40 to Figure 63*.

RBW	1MHz
Antenna Port	1
Modulation	64QAM
	
Figure 40 5MHz BW, 2352.5MHz	Figure 41 5MHz BW, 2355MHz
	
Figure 42 5MHz BW, 2357.5MHz	Figure 43 10MHz BW, 2355MHz

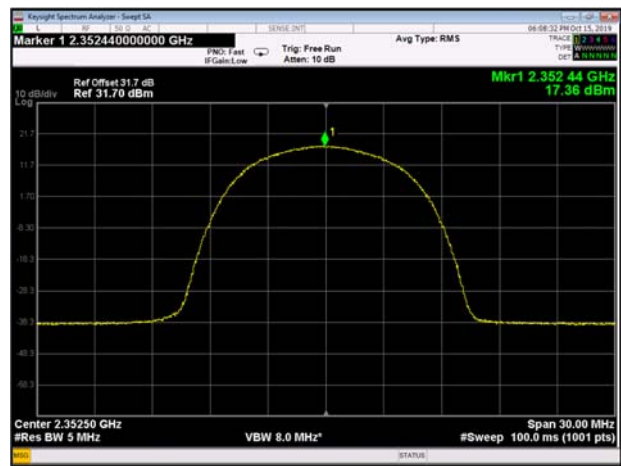
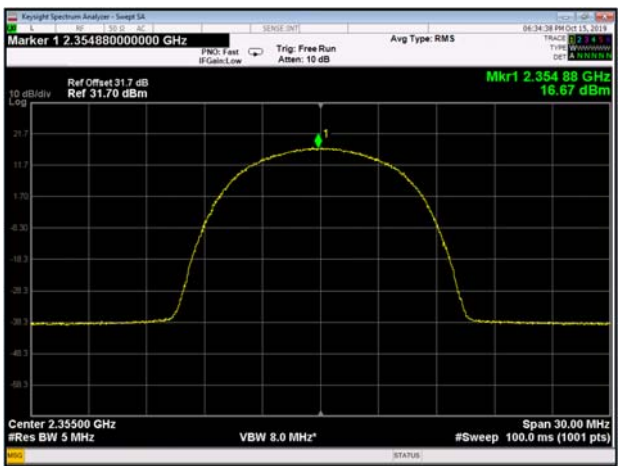
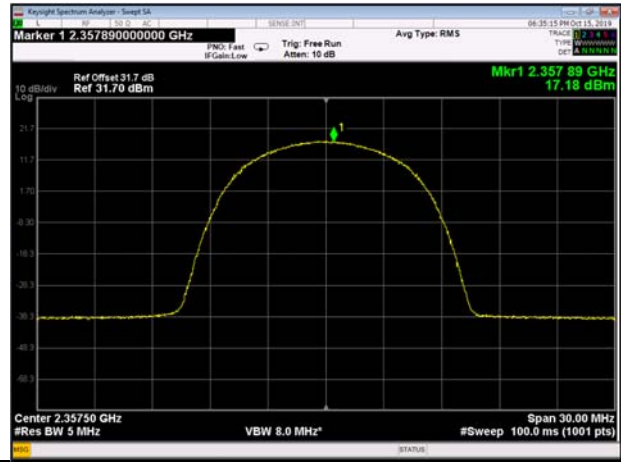
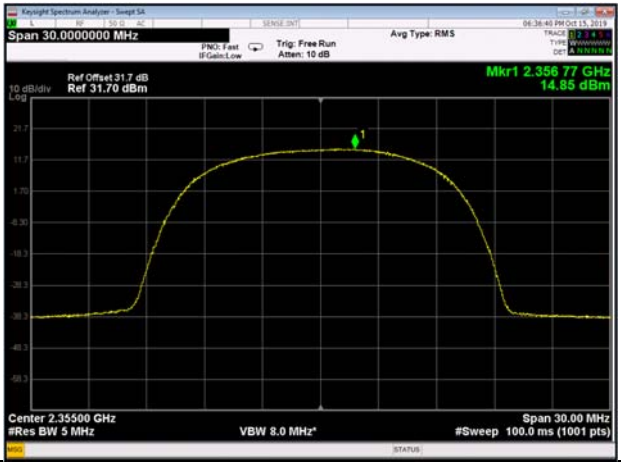


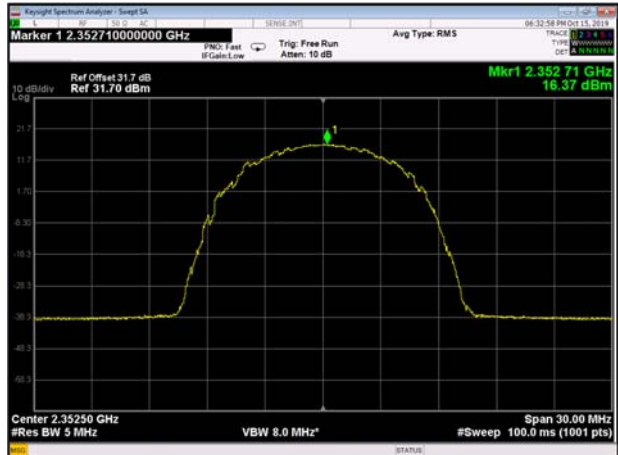
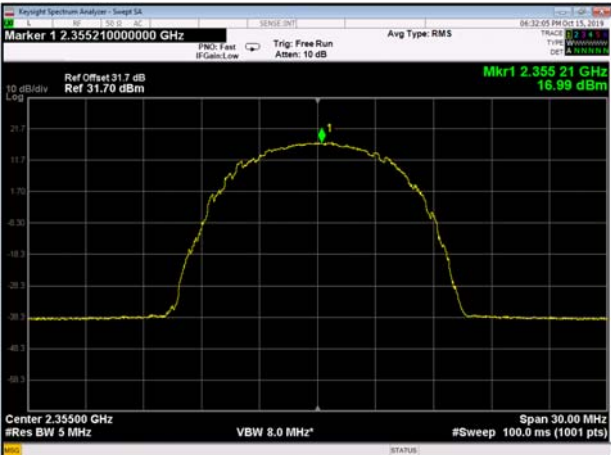
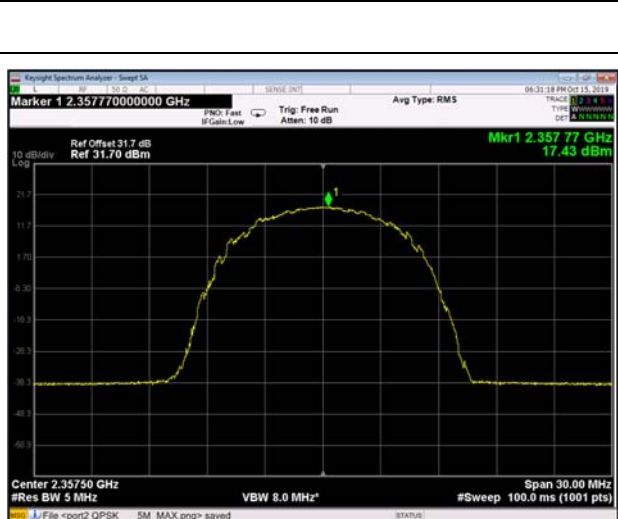
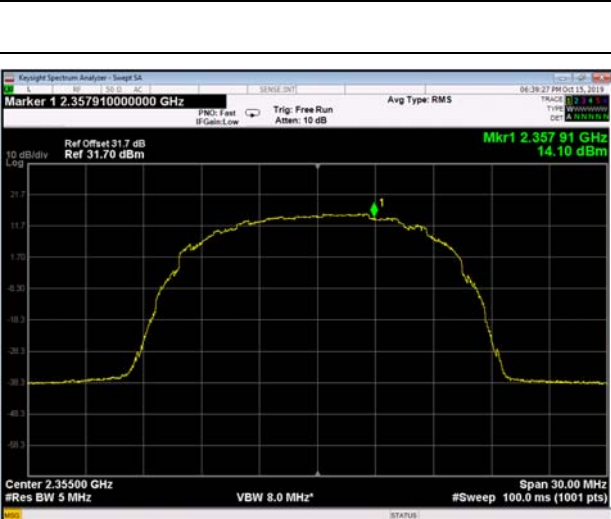
RBW	1MHz
Antenna Port	1
Modulation	16QAM
	
Figure 44 5MHz BW, 2352.5MHz	Figure 45 5MHz BW, 2355MHz
	
Figure 46 5MHz BW, 2357.5MHz	Figure 47 10MHz BW, 2355MHz

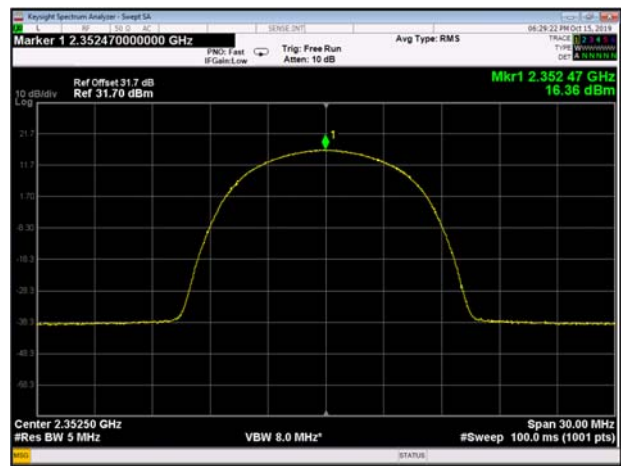
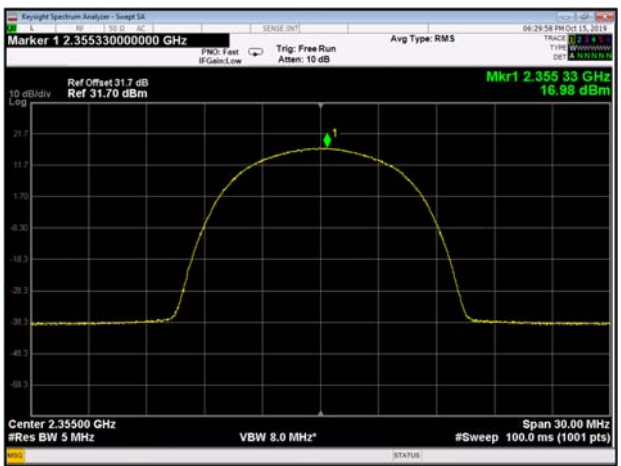
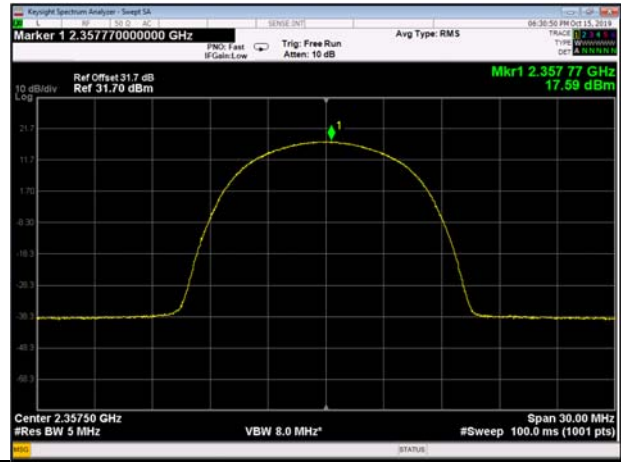
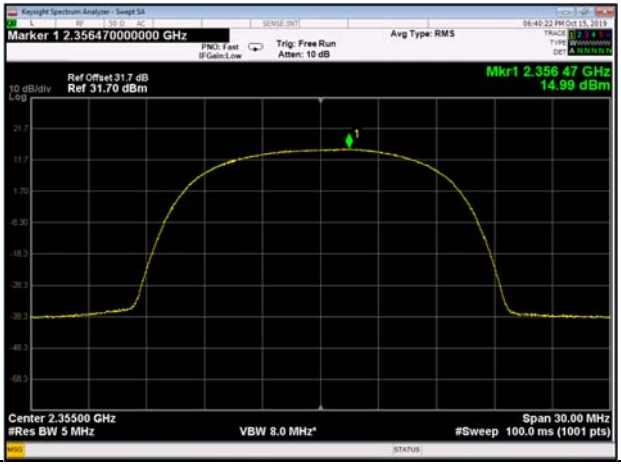


RBW	1MHz
Antenna Port	1
Modulation	QPSK
	
Figure 48 5MHz BW, 2352.5MHz	Figure 49 5MHz BW, 2355MHz
	
Figure 50 5MHz BW, 2357.5MHz	Figure 51 10MHz BW, 2355MHz



RBW	5MHz
Antenna Port	1
Modulation	64QAM
	
Figure 52 5MHz BW, 2352.5MHz	Figure 53 5MHz BW, 2355MHz
	
Figure 54 5MHz BW, 2357.5MHz	Figure 55 10MHz BW, 2355MHz

RBW	5MHz
Antenna Port	1
Modulation	16QAM
 KeySight Spectrum Analyzer - Swept SA Marker 1 2.352710000000 GHz Ref Offset 31.7 dB Ref 31.70 dBm Mkr1 2.352 71 GHz 16.37 dBm Center 2.35250 GHz #Res BW 5 MHz VBW 8.0 MHz* Span 30.00 MHz #Sweep 100.0 ms (1001 pts)	 KeySight Spectrum Analyzer - Swept SA Marker 1 2.355210000000 GHz Ref Offset 31.7 dB Ref 31.70 dBm Mkr1 2.355 21 GHz 16.99 dBm Center 2.35500 GHz #Res BW 5 MHz VBW 8.0 MHz* Span 30.00 MHz #Sweep 100.0 ms (1001 pts)
Figure 56 5MHz BW, 2352.5MHz	Figure 57 5MHz BW, 2355MHz
 KeySight Spectrum Analyzer - Swept SA Marker 1 2.357710000000 GHz Ref Offset 31.7 dB Ref 31.70 dBm Mkr1 2.357 77 GHz 17.43 dBm Center 2.35750 GHz #Res BW 5 MHz VBW 8.0 MHz* Span 30.00 MHz #Sweep 100.0 ms (1001 pts)	 KeySight Spectrum Analyzer - Swept SA Marker 1 2.357910000000 GHz Ref Offset 31.7 dB Ref 31.70 dBm Mkr1 2.357 91 GHz 14.10 dBm Center 2.35500 GHz #Res BW 5 MHz VBW 8.0 MHz* Span 30.00 MHz #Sweep 100.0 ms (1001 pts)
Figure 58 5MHz BW, 2357.5MHz	Figure 59 10MHz BW, 2355MHz

RBW	5MHz
Antenna Port	1
Modulation	QPSK
	
Figure 60 5MHz BW, 2352.5MHz	Figure 61 5MHz BW, 2355MHz
	
Figure 62 5MHz BW, 2357.5MHz	Figure 63 10MHz BW, 2355MHz



5.5 Test Equipment Used; Average Power Spectral Density

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	Agilent	N9010A	MY52220686	November 28, 2018	November 28, 2020
Vector Signal Generator	VIAVI	MTS 5800	WMNK00716 90263	July 1, 2018	July 1, 2021
Attenuator 10dB	Bird	8304-N10DB	-	December 24, 2018	December 31, 2019
Attenuator 20dB	Bird	8304-N20DB	-	December 24, 2018	December 31, 2019

Figure 64 Test Equipment Used

6. Peak to Average Power Ratio

6.1 Test Specification

FCC Part 27.50(a)(1)(B)

6.2 Test Procedure

(Temperature (22°C)/ Humidity (40%RH))

The method used is detailed in FCC KDB 971168 D03 v01

Measurements was using CCDF function for each modulation.

6.3 Test Limit

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

6.4 Test Results

Band	Modulation	Operation Frequency	0.1% PAPR	Limit	Margin
		(MHz)	(dBm)	(dBm)	(dB)
WCS	QPSK	2352.5	8.3	13.0	4.7
		2355.0	8.4		4.6
		2357.5	8.4		4.6
	16QAM	2352.5	8.3		4.7
		2355.0	8.3		4.7
		2357.5	8.4		4.6
	64QAM	2352.5	8.3		4.7
		2355.0	8.3		4.7
		2357.5	8.3		4.7

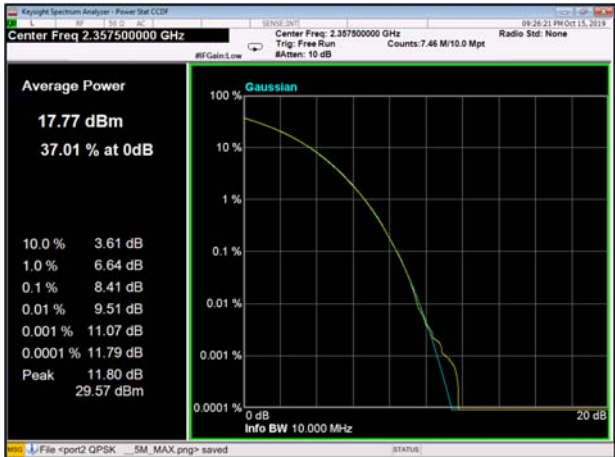
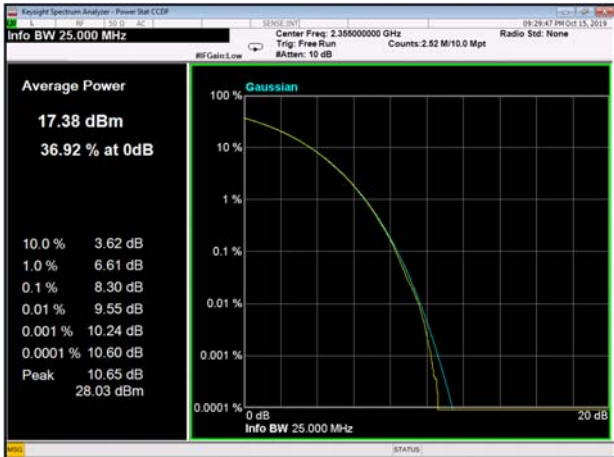
Table 1 Test Results Peak to Average Power Ratio, 5MHz BW

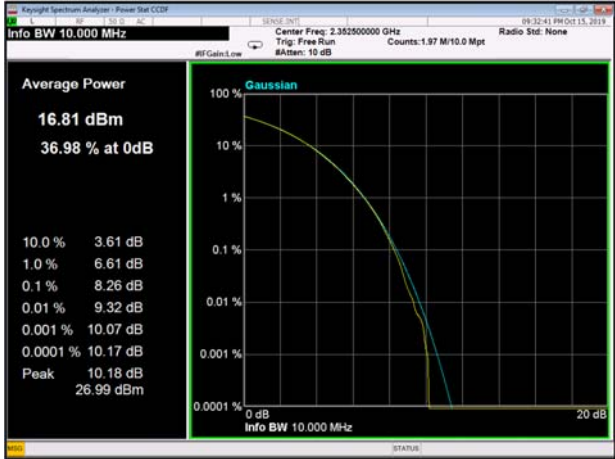
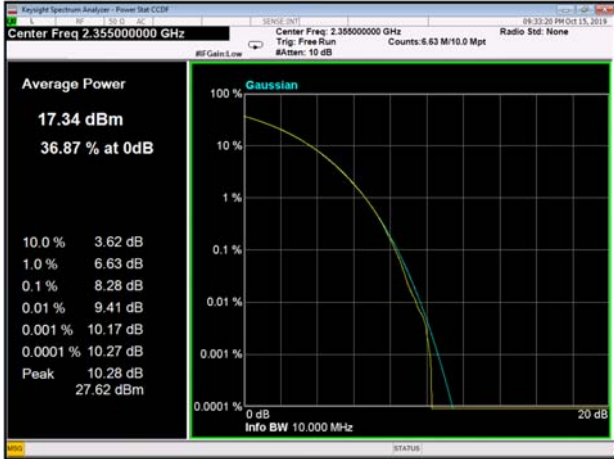
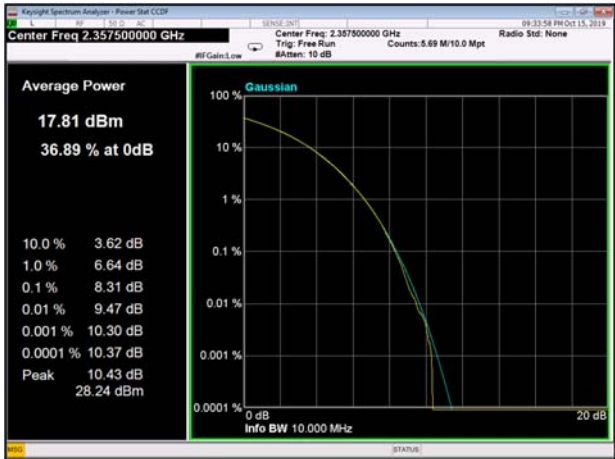
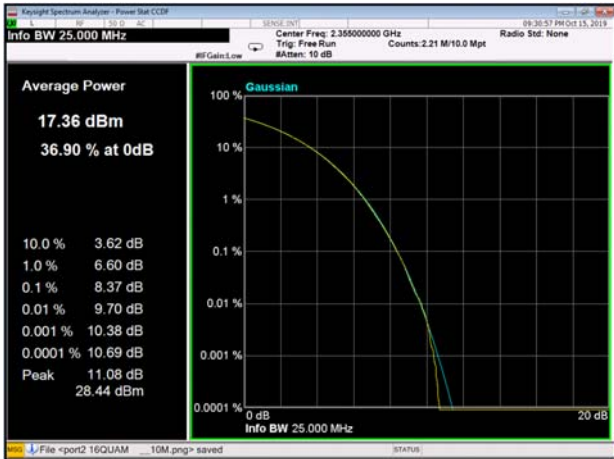
Band	Modulation	Operation Frequency	0.1% PAPR	Limit	Margin
		(MHz)	(dBm)	(dBm)	(dB)
WCS	QPSK	2355.0	8.4	13.0	4.6
	16QAM	2355.0	8.3		4.7
	64QAM	2355.0	8.4		4.6

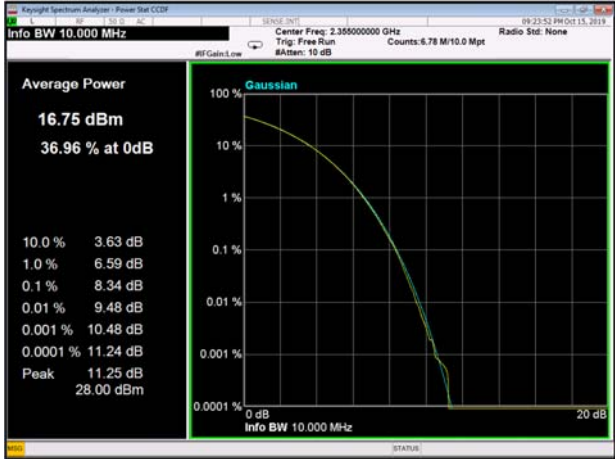
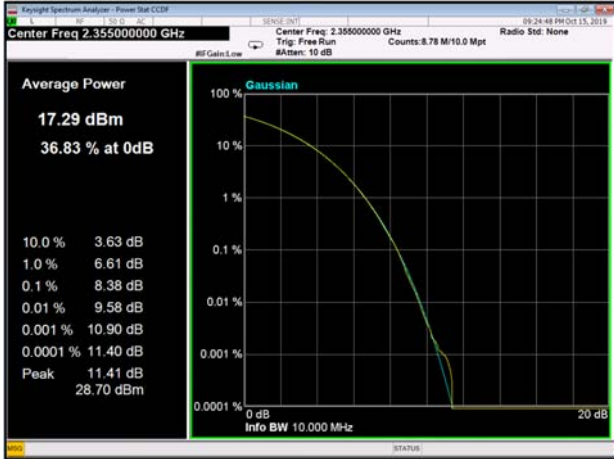
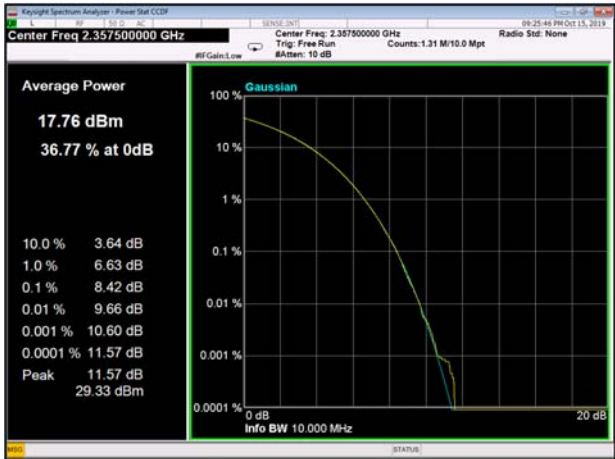
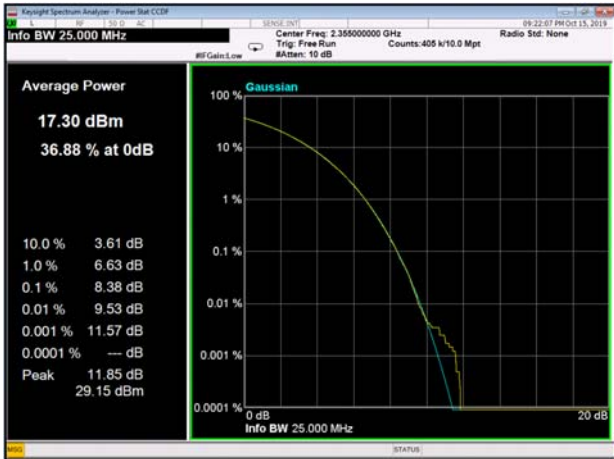
Table 2 Test Results Peak to Average Power Ratio, 10MHz BW

JUDGEMENT: Passed

For additional information see Figure 65 to Figure 76.

RBW	5MHz
Antenna Port	1
Modulation	16QAM
	
Figure 65 5MHz BW, 2352.5MHz	Figure 66 5MHz BW, 2355MHz
	
Figure 67 5MHz BW, 2357.5MHz	Figure 68 10MHz BW, 2355MHZ

RBW	5MHz
Antenna Port	1
Modulation	64QAM
	
Figure 69 5MHz BW, 2352.5MHz	Figure 70 5MHz BW, 2355MHz
	
Figure 71 5MHz BW, 2357.5MHz	Figure 72 10MHz BW, 2355MHz

RBW	5MHz
Antenna Port	1
Modulation	QPSK
	
Figure 73 5MHz BW, 2352.5MHz	Figure 74 5MHz BW, 2355MHz
	
Figure 75 5MHz BW, 2357.5MHz	Figure 76 10MHz BW, 2355MHz



6.5 Test Equipment Used; 0.1% PAPR

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	Agilent	N9010A	MY52220686	November 28, 2018	November 28, 2020
Vector Signal Generator	VIAVI	MTS 5800	WMNK0071690263	July 1, 2018	July 1, 2021

Figure 77 Test Equipment Used

7. Occupied Bandwidth

7.1 Test Specification

FCC Part 2, Section 1049

7.2 Test Procedure

(Temperature (22°C)/ Humidity (40%RH))

The E.U.T. was set to the applicable test frequency with modulation. The E.U.T. antenna terminal was connected to the spectrum analyzer through appropriate coaxial cable. The OBW function (99%) was used for this evaluation. RBW was set to 100 kHz.

Occupied bandwidth measured was repeated for each modulation.

7.3 Test Limit

N/A

7.4 Test Results

Modulation	Operating Frequency [MHz]	Reading [MHz]
QPSK	2352.5	4.5
	2355.0	4.5
	2357.5	4.5
16QAM	2352.5	4.5
	2355.0	4.5
	2357.5	4.5
64QAM	2352.5	4.5
	2355.0	4.5
	2357.5	4.5

Figure 78 Occupied Bandwidth WCS, 5MHz OBW

Modulation	Operating Frequency [MHz]	Reading [MHz]
QPSK	2355	9.0
16QAM	2355	9.0
64QAM	2355	9.0

Figure 79 Occupied Bandwidth WCS, 10MHz OBW

JUDGEMENT: Passed

See additional information in *Figure 80* to *Figure 91*.



Antenna Port

1

Modulation

16QAM

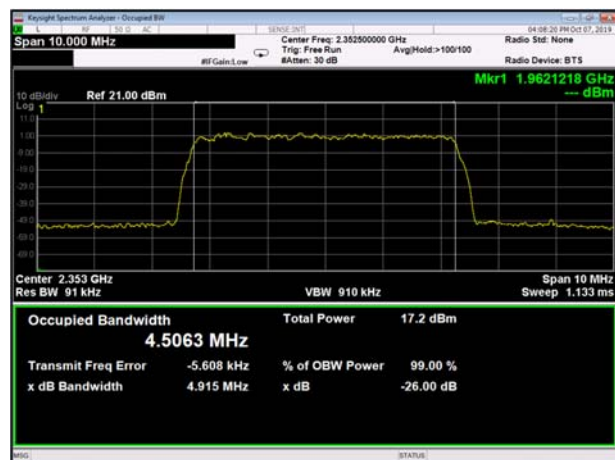


Figure 80 5MHz BW, 2352.5MHz

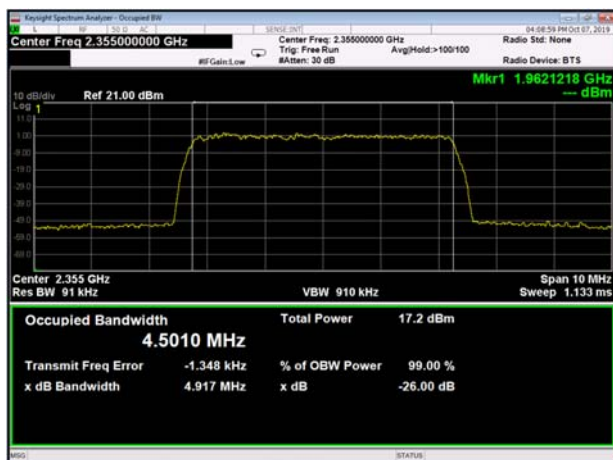


Figure 81 5MHz BW, 2355MHz

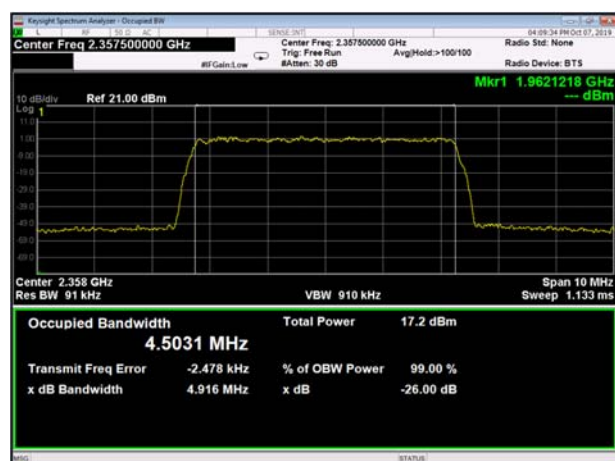


Figure 82 5MHz BW, 2357.5MHz

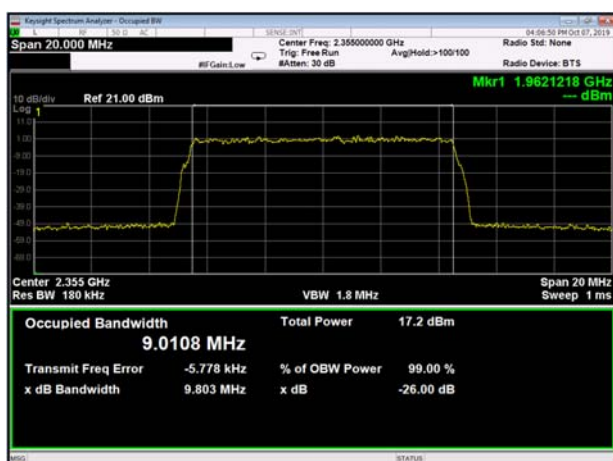
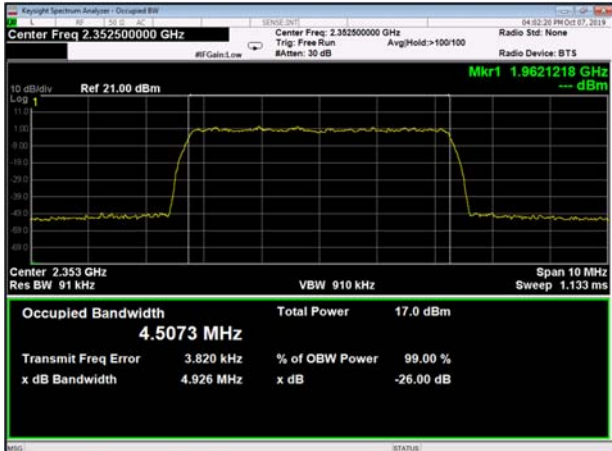
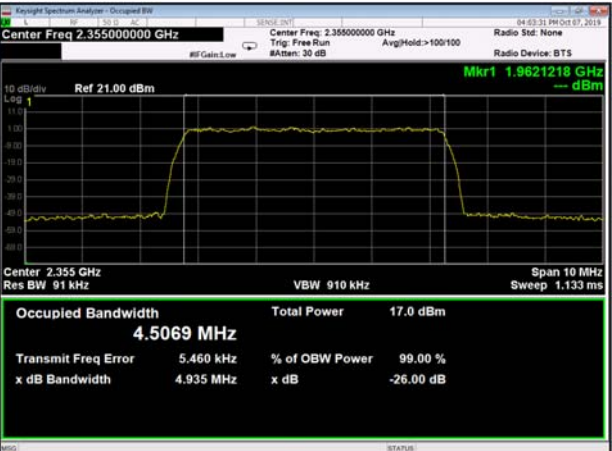
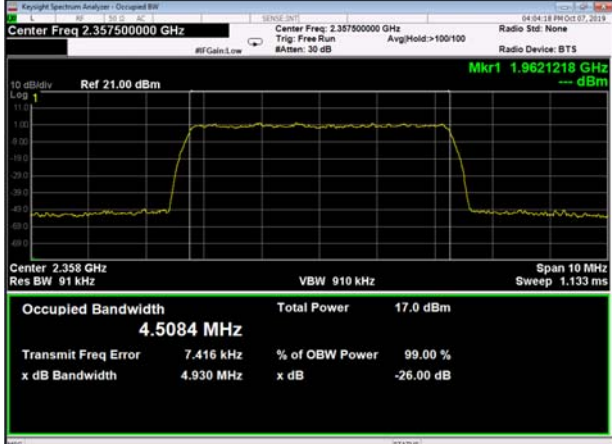
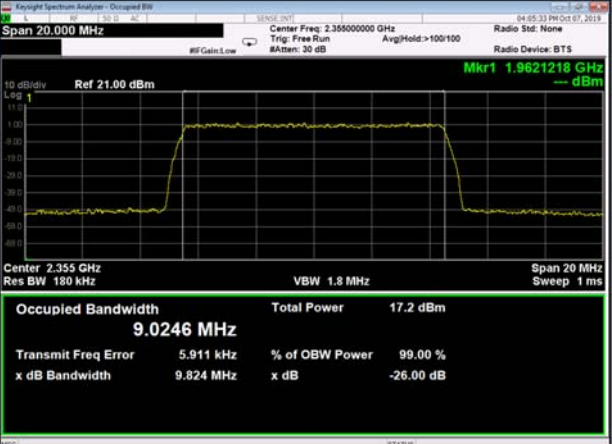


Figure 83 10MHz BW, 2355MHz

Antenna Port	1
Modulation	64QAM
Center Freq: 2.352500000 GHz Res BW: 91 kHz Span: 10 MHz Occupied Bandwidth: 4.5292 MHz Total Power: 17.3 dBm Transmit Freq Error: 3.587 kHz x dB Bandwidth: 4.957 MHz	Center Freq: 2.355000000 GHz Res BW: 91 kHz Span: 10 MHz Occupied Bandwidth: 4.5316 MHz Total Power: 17.1 dBm Transmit Freq Error: 5.615 kHz x dB Bandwidth: 4.930 MHz
Figure 84 5MHz BW, 2352.5MHz	Figure 85 5MHz BW, 2355MHz
Center Freq: 2.357500000 GHz Res BW: 91 kHz Span: 10 MHz Occupied Bandwidth: 4.5319 MHz Total Power: 17.1 dBm Transmit Freq Error: 2.396 kHz x dB Bandwidth: 4.944 MHz	Center Freq: 2.355000000 GHz Res BW: 180 kHz Span: 20 MHz Occupied Bandwidth: 9.0230 MHz Total Power: 17.2 dBm Transmit Freq Error: -251 Hz x dB Bandwidth: 9.849 MHz
Figure 86 5MHz BW, 2357.5MHz	Figure 87 10MHz BW, 2355MHz

Antenna Port	1
Modulation	QPSK
	
Figure 88 5MHz BW, 2352.5MHz	Figure 89 5MHz BW, 2355MHz
	
Figure 90 5MHz BW, 2357.5MHz	Figure 91 10MHz BW, 2355MHz



7.5 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	Agilent	N9010A	MY52220686	November 28, 2018	November 28, 2020
Vector Signal Generator	VIAVI	MTS 5800	WMNK0071690263	July 1, 2018	July 1, 2021

Figure 92 Test Equipment Used