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DATE: 20 February 2017

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

FCC Radio Test Report

For

Corning Optical Communication Wireless

Equipment under test:

ONE- Optical Network Evolution Wireless Platform

MRU (Mid Power Remote Unit)

(WCS Section 2350-2360MHz Band)

Tested by: _____
M. Zohar

Approved by: _____
D. Shidlowsky

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TESTING Cert No.1152.01

Measurement/Technical Report for

Corning Optical Communication Wireless

ONE- Optical Network Evolution Wireless Platform

FCC ID: OJF1MRU23CR

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 971168 D03 v01 and
KDB 935210 D05 v01r01

Substitution Method used as in ANSI/TIA-603-D: 2010

Application for Certification
prepared by:

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

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1. General Information

1.1 Administrative Information

Manufacturer:	Corning Optical Communication Wireless
Manufacturer's Address:	13221 Woodland Park Rd., Suite #400 Herndon, VA. 20171 U.S.A. Tel: +1-541-758-2880 Fax: +1-703-848-0260
Manufacturer's Representative:	Habib Riazi
Equipment Under Test (E.U.T):	ONE- Optical Network Evolution Wireless Platform
Equipment Model No.:	MRU (Mid Power Remote Unit)
Equipment Serial No.:	1015382132
Date of Receipt of E.U.T:	January 22, 2017
Start of Test:	January 22, 2017
End of Test:	February 2, 2017
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. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-3006, R-2729, T-1877, G-245.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025A-1, IC 4025A-2.

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

Mid Power Remote Unit for Neutral Host Solution.

Modular architecture supports LTE700, ESMR+CELL, PCS, AWS, WCS

Integrated 2.5 GHz expansion ready

Composite Output Power
AWS: 34dBm
PCS, WCS: 33dBm
700, ESMR & CELL: 30dBm

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in KDB 971168 D03 v01 and KDB 935210 D05 v01r01. 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 22, EN 55022, ANSI C63.4)
0.15 – 30 MHz:
Expanded Uncertainty (95% Confidence, K=2):
± 3.44 dB

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000MHz:
Expanded Uncertainty (95% Confidence, K=2):
± 4.98 dB

2. System Test Configuration

2.1 Justification

The test setup was configured to closely resemble the standard installation.
The EUT consists of the MRU (Mid-Power Remote Module) which is connected with the head-end ONE equipment using fiber optic cable.
The RF 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 EUT, while the EUT output was connected to the spectrum analyzer.
The system was tested under maximum gain conditions.
Testing was performed on the following configuration:

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

2.2 EUT Exercise Software

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

2.3 Special Accessories

No special accessories were needed in order to achieve compliance.

2.4 Equipment Modifications

No modifications were needed in order to achieve compliance.

2.5 Configuration of Tested System

Product Name	ONE Wireless Platform
Model Name	MRU (Mid Power Remote Unit)
Working voltage	100-240VAC/50-60Hz 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	~33.0 dBm
Antenna Gain	12.5dBi
DATA rate	N/A
Modulation BW	10.0MHz
DC Voltage and DC current applied to the final amplifying device	1.4A @ 28VDC

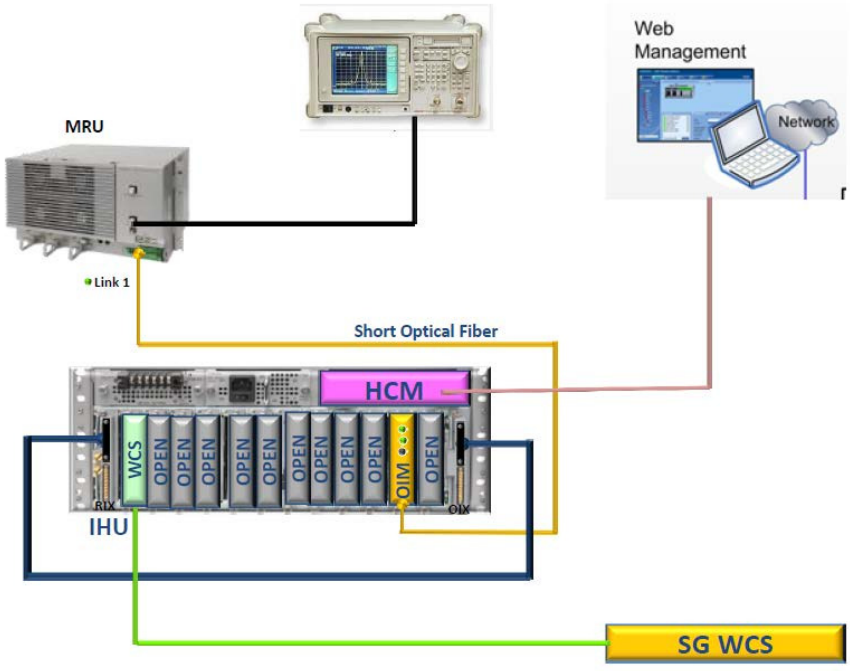

Figure 1. Test Set-Up – Conducted

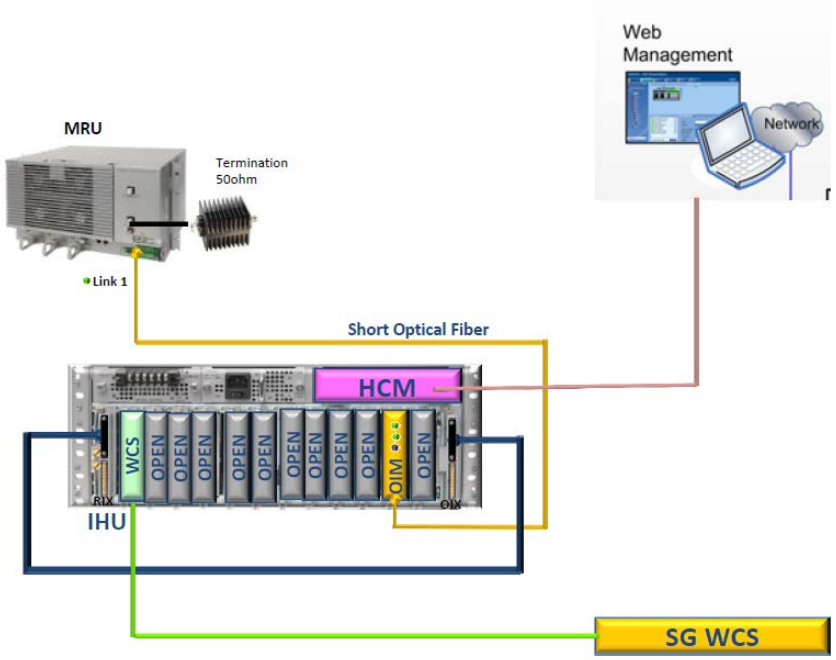

Figure 2. Test Set-Up - Radiated

3. Test Set-up Photos

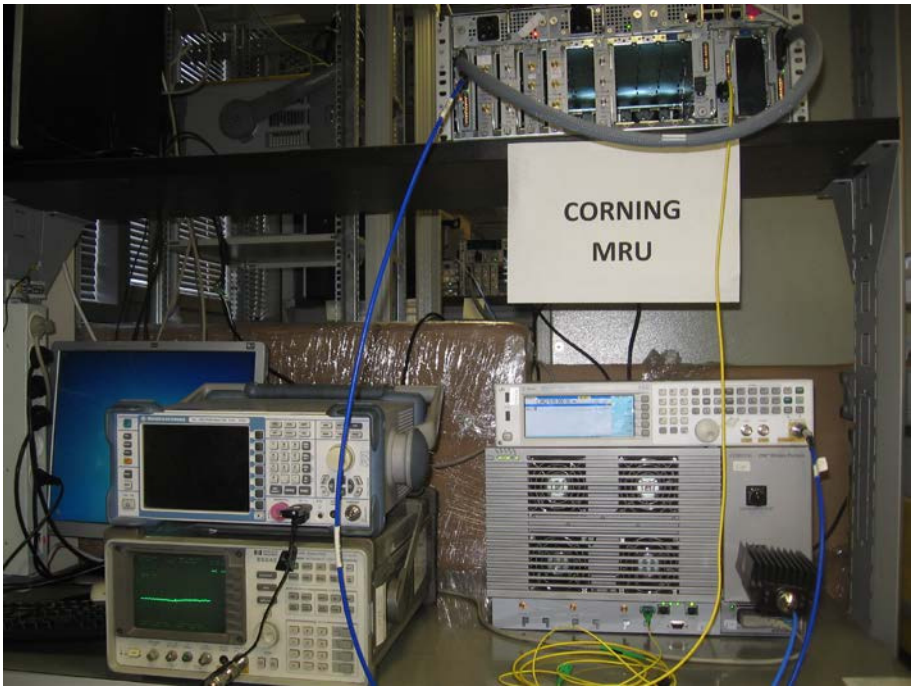

Figure 3. Conducted Emission From Antenna Port Tests

Figure 4. Radiated Emission Test

Figure 5. Radiated Emission Test

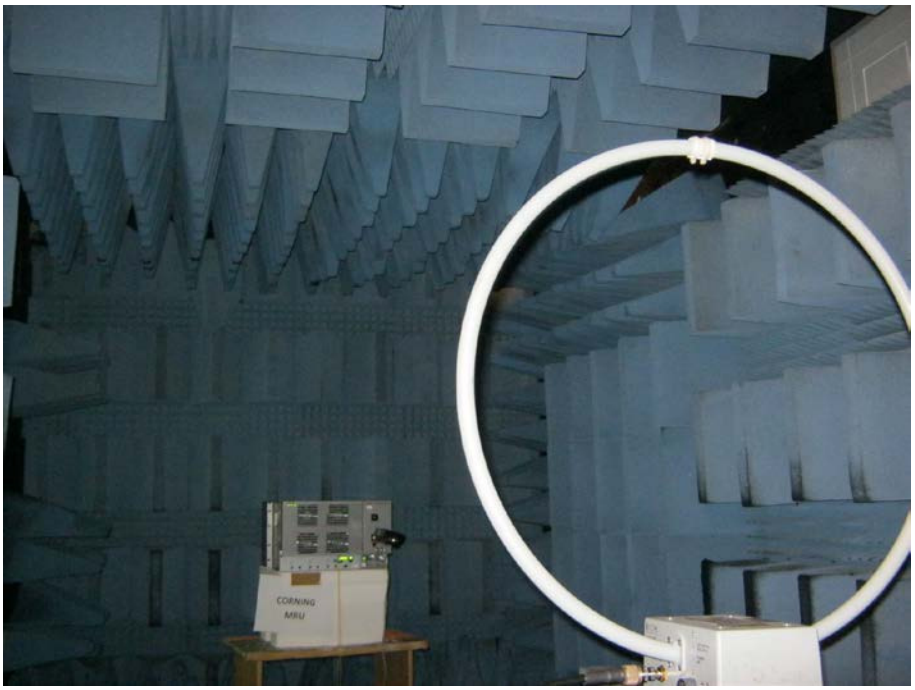

Figure 6. Radiated Emission Test

Figure 7. Radiated Emission Test

Figure 8. Radiated Emission Test

Figure 9. Intermodulation Conducted Emission Test

4. Peak Output Power & Booster Gain

4.1 Test Specification

FCC Part 27, Subpart C, Section 27.50(a)(ii)
KDB 935210 D05 v01r01, Section 3.5

4.2 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=40.5 dB). The E.U.T. RF output was modulated. 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	Reading	Antenna Gain	EIRP	Limit	Margin
	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
64QAM	2355.0	33.6	12.5	46.1	63.0	-16.9
16QAM	2355.0	33.7	12.5	46.2	63.0	-16.8
QPSK	2355.0	33.6	12.5	46.1	63.0	-16.9

Figure 10 Peak Output Power

Modulation	Operation Frequency (MHz)	Input Level (dBm)	Output Level (dBm)	Booster Gain (dB)
64QAM	2355.0	0.0	33.6	33.6
16QAM	2355.0	0.0	33.7	33.7
QPSK	2355.0	0.0	33.6	33.6

Figure 11 Booster Gain

JUDGEMENT: Passed by 16.8 dB

See additional information in *Figure 12* to *Figure 14*.

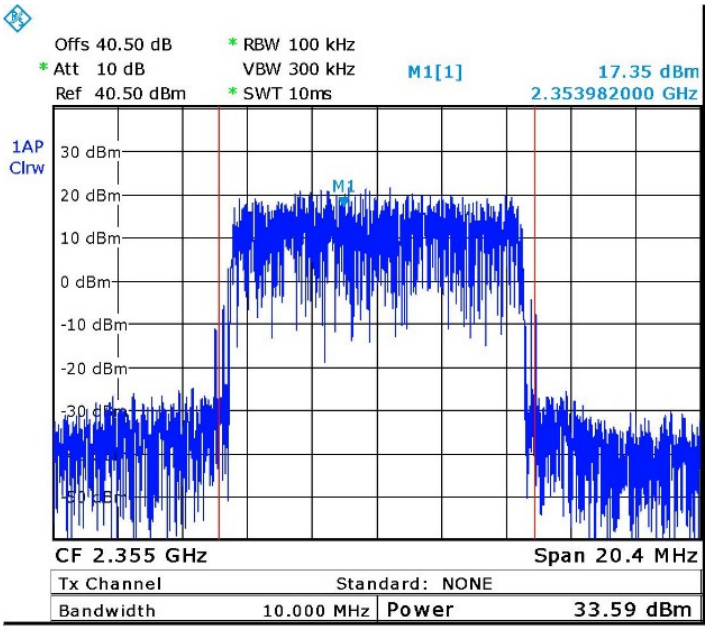

Figure 12. — 2355.0 MHz –64QAM

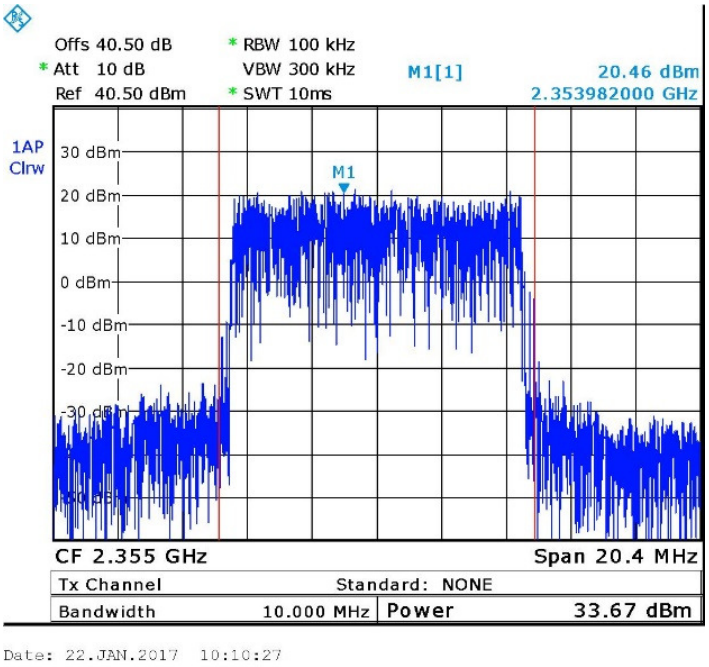

Figure 13. — 2355.0 MHz –16QAM

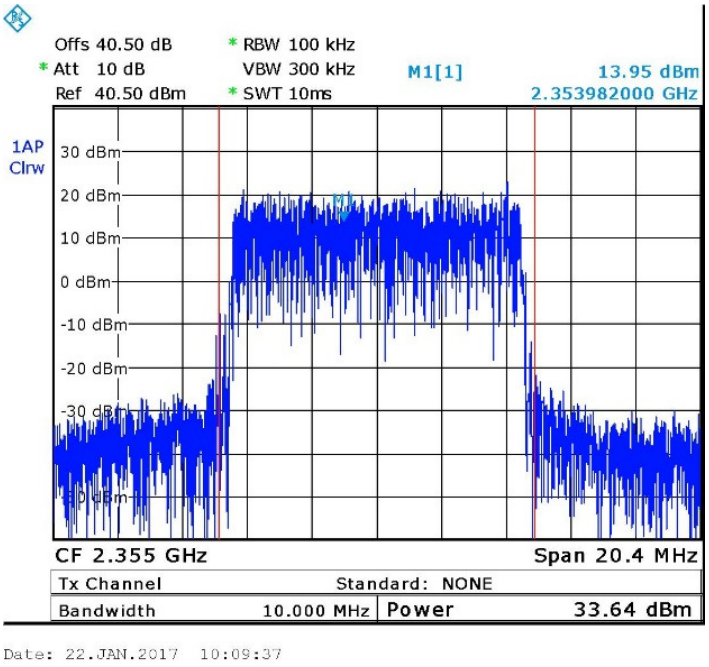

Figure 14. — 2355.0 MHz QPSK

4.5 Test Equipment Used; Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
Vector Signal Generator	Agilent	N5182A	MY48180244	August 2, 2016	November 2, 2019
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	August 8, 2016	August 8, 2017

Figure 15 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=40.5 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 1000 kHz RBW. The output power level was measured at each modulation.

For PSD in any 5MHz the equation: $10\log\left(\frac{5MHz}{1MHz}\right) = 7dB$. This factor was added to the test results in 1MHz. The total results were compared to the PSD 5MHz limit as detailed below.

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

Modulation	Operation Frequency	Reading	Antenna Gain	EIRP	Limit	Margin
	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
64QAM	2355.0	34.7	12.5	47.2	56.0	-8.8
16QAM	2355.0	34.0	12.5	46.5	56.0	-9.5
QPSK	2355.0	34.3	12.5	46.8	56.0	-9.2

Figure 16 1 MHz - Average Power Spectral Density

Modulation	Operation Frequency	Reading	Antenna Gain	EIRP	Limit	Margin
	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
64QAM	2355.0	41.7	12.5	54.2	63.0	-8.8
16QAM	2355.0	41.0	12.5	53.5	63.0	-9.5
QPSK	2355.0	41.3	12.5	53.8	63.0	-9.2

Figure 17 5 MHz - Average Power Spectral Density

JUDGEMENT: Passed by 8.8 dB

See additional information in *Figure 18* to *Figure 20.*

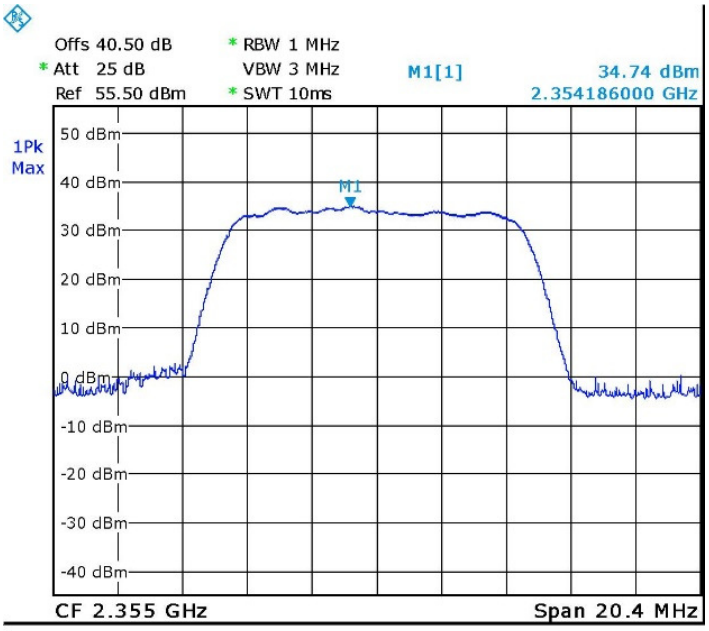

Figure 18. — 2355.0 MHz –64QAM

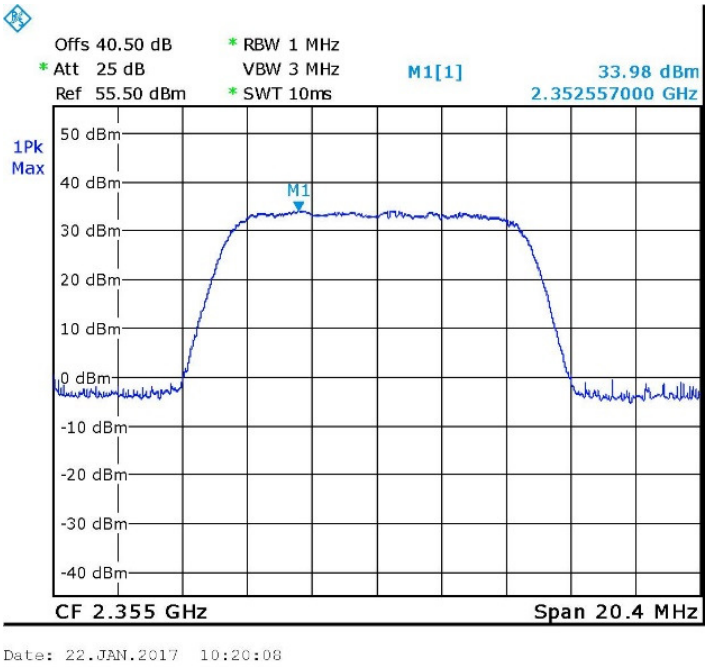

Figure 19. — 2355.0 MHz –16QAM

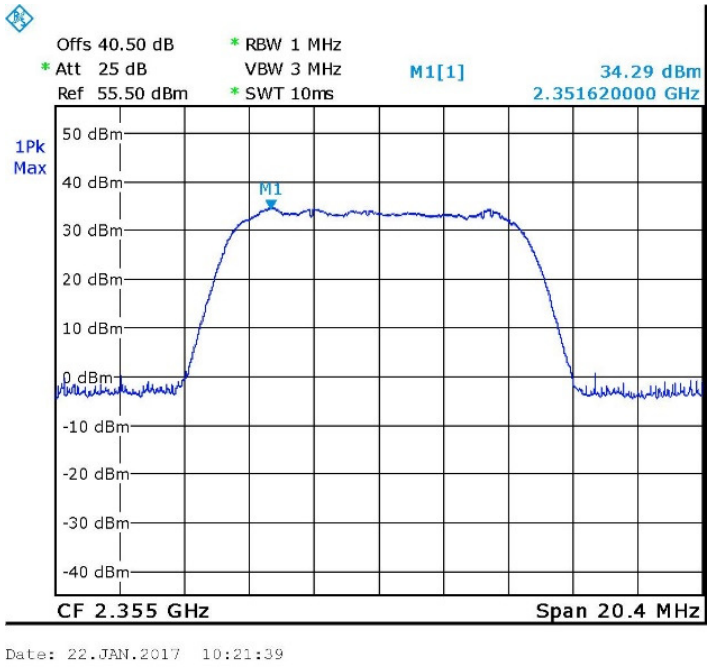

Figure 20. — 2355.0 MHz QPSK

5.5 Test Equipment Used; Average Power Spectral Density

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
Vector Signal Generator	Agilent	N5182A	MY48180244	August 2, 2016	November 2, 2019
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	August 8, 2016	August 8, 2017

Figure 21 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

Modulation	Operation Frequency	0.1% PAPR	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
64QAM	2355.0	8.4	13.0	-4.6
16QAM	2355.0	8.4	13.0	-4.6
QPSK	2355.0	8.6	13.0	-4.4

Figure 22 Test Results Peak to Average Power Ratio

JUDGEMENT: Passed

For additional information see *Figure 23* to *Figure 25*.

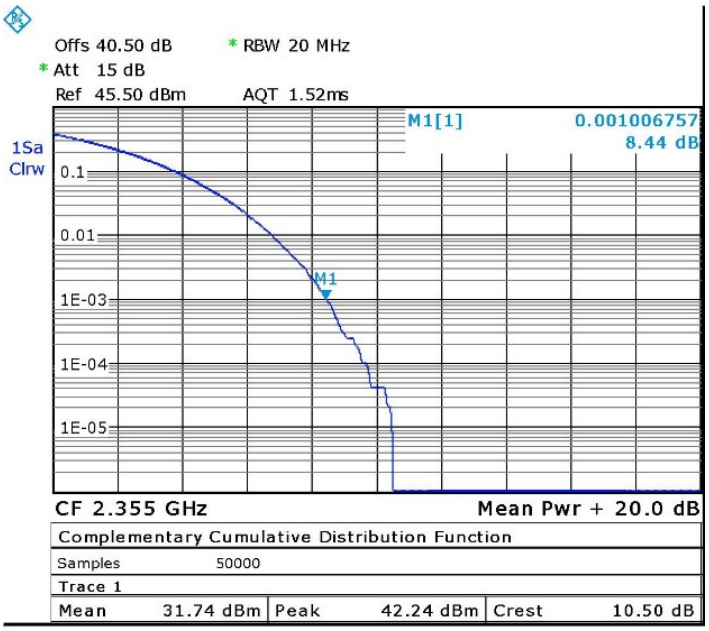

Figure 23. —64QAM, 2355.0 MHz

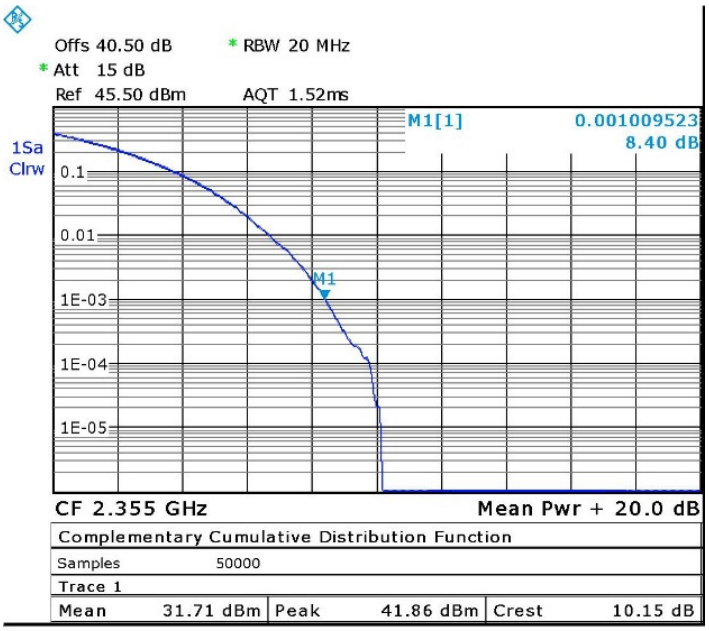

Figure 24. — 16QAM, 2355.0 MHz

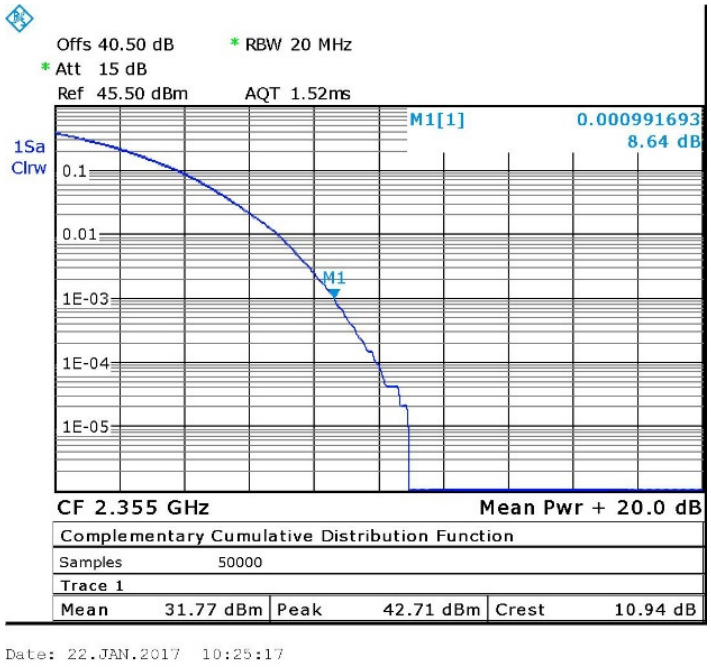

Figure 25. — QPSK, 2355.0 MHz

6.5 Test Equipment Used; 0.1% PAPR

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
Vector Signal Generator	Agilent	N5182A	MY48180244	August 2, 2016	November 2, 2019
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	August 8, 2016	August 8, 2017

Figure 26 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 an external attenuator and an 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	Port	Operating Frequency	Reading
	(Input/ Output)	(MHz)	(MHz)
64QAM	Input	2355.0	9.0
64QAM	Output	2355.0	8.9
16QAM	Input	2355.0	8.9
16QAM	Output	2355.0	8.9
QPSK	Input	2355.0	9.0
QPSK	Output	2355.0	8.9

Figure 27 Occupied Bandwidth

JUDGEMENT: Passed

See additional information in *Figure 28* to *Figure 33.*

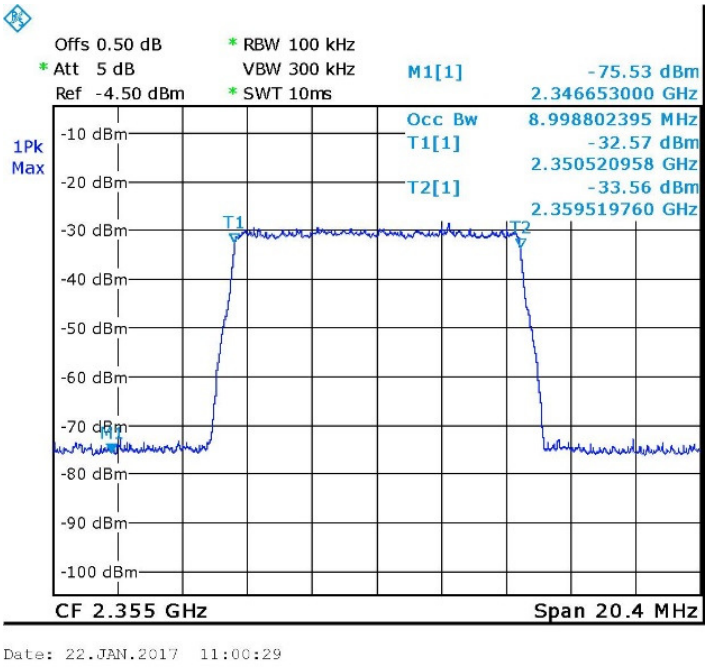

Figure 28 Occupied Bandwidth INPUT, 64QAM

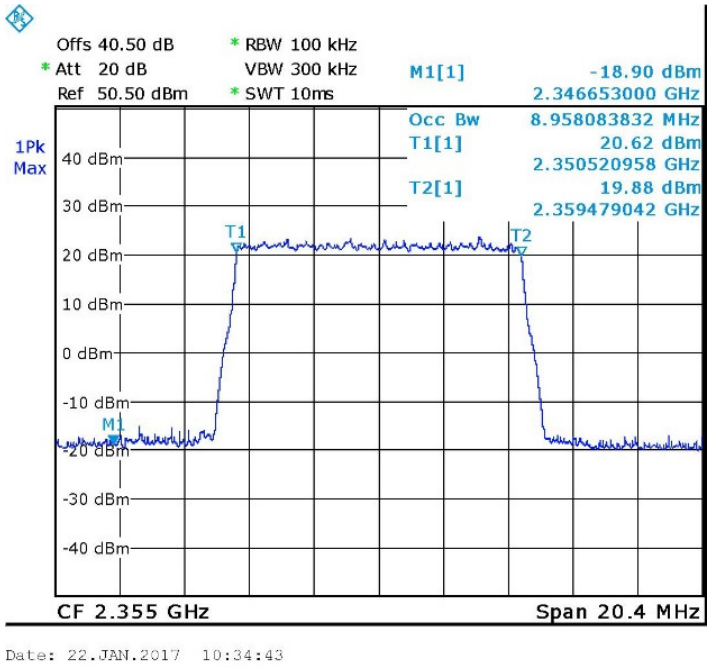

Figure 29 Occupied Bandwidth OUTPUT, 64QAM

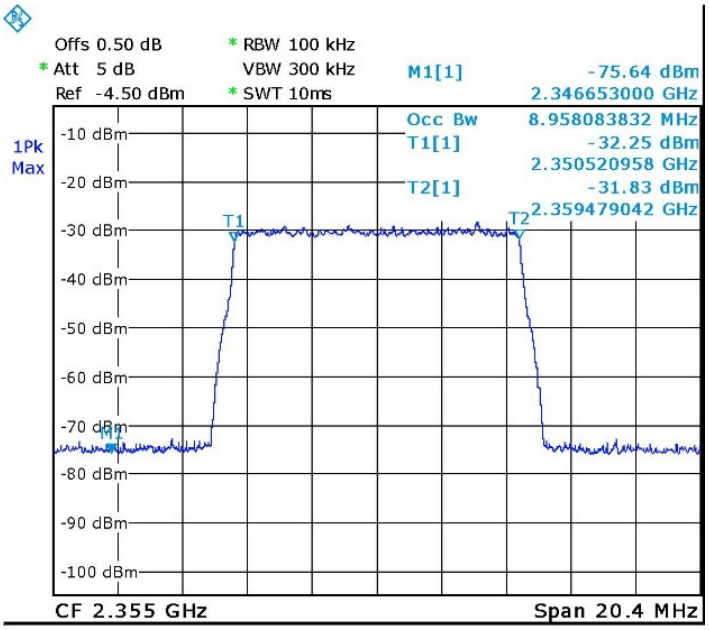

Figure 30 Occupied Bandwidth INPUT, 16QAM

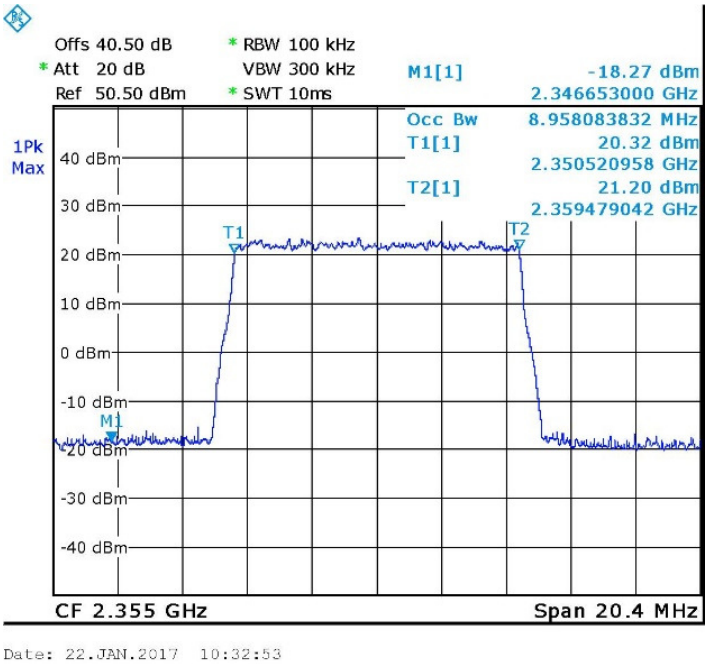

Figure 31 Occupied Bandwidth OUTPUT, 16QAM

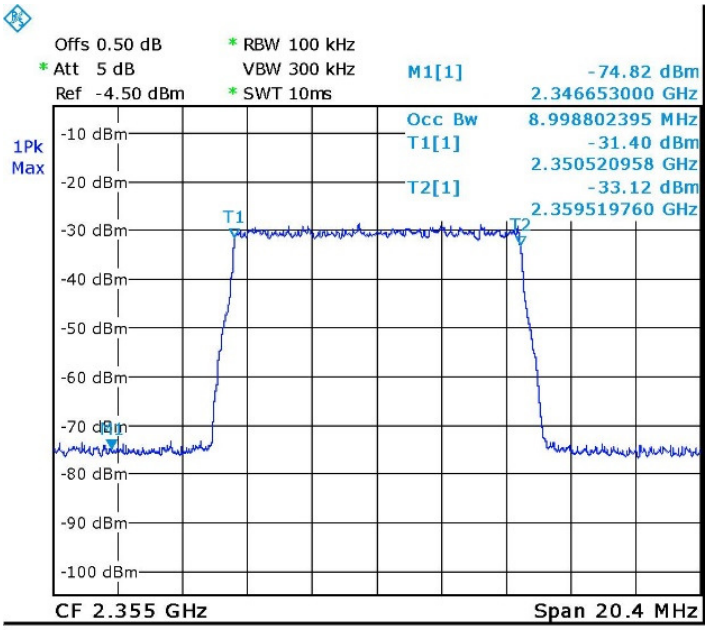

Figure 32 Occupied Bandwidth INPUT, QPSK

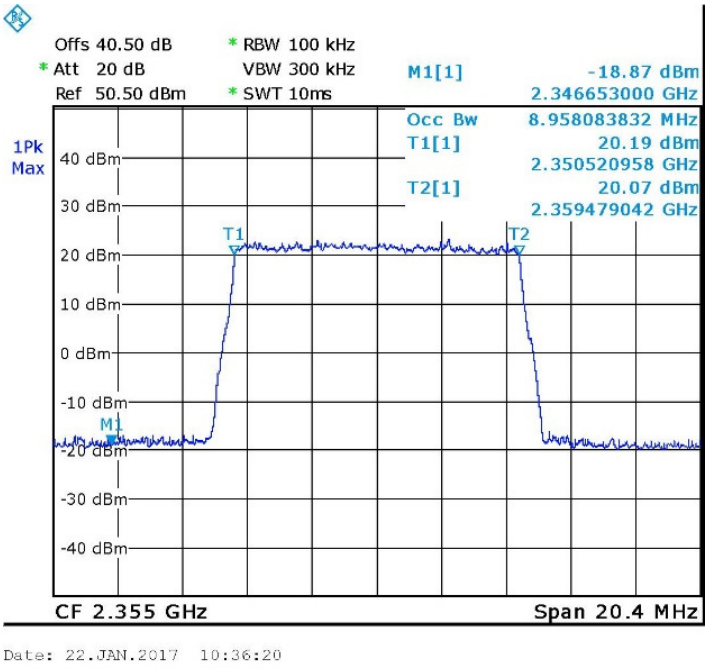

Figure 33 Occupied Bandwidth OUTPUT, QPSK

7.5 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
Vector Signal Generator	Agilent	N5182A	MY48180244	August 2, 2016	November 2, 2019
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	August 8, 2016	August 8, 2017

Figure 34 Test Equipment Used

8. Spurious Emissions at Antenna Terminals

8.1 Test Specification

FCC Part 27, Section: 53(a)(1)

8.2 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 (max loss 37.0 dB).

Testing was performed in the 9K-24GHz frequency band without band edges tests, and for each modulation separately.

8.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (2345-2360 MHz) must be attenuated below the transmitting power (P) by a factor of at least as specified in this section.

Frequency Band (MHz)	Calculated Factor (dBc)
f<2285.0	75+10*log(2)=78.0
2285.0MHz<f<2287.5MHz	72+10*log(2)=75.0
2287.5MHz<f<2300.0MHz	70+10*log(2)=73.0
2300.0MHz<f<2305.0MHz	43+10*log(2)=46.0
2305.0MHz<f<2320.0MHz	43+10*log(2)=46.0
2320.0MHz<f<2345.0MHz	75+10*log(2)=78.0
2345.0MHz<f<2360.0MHz	43+10*log(2)=46.0
2360.0MHz<f<2362.50MHz	43+10*log(2)=46.0
2362.5MHz<f<2365.0MHz	55+10*log(2)=58.0
2365.0MHz<f<2367.5MHz	70+10*log(2)=73.0
2367.5MHz<f<2370.0MHz	72+10*log(2)= 75.0
2370.0<f	75+10*log(2)= 78.0

Figure 35 Mask Limit Table

8.4 Test Results

JUDGEMENT: Passed

See additional information in *Figure 36* to *Figure 68*.

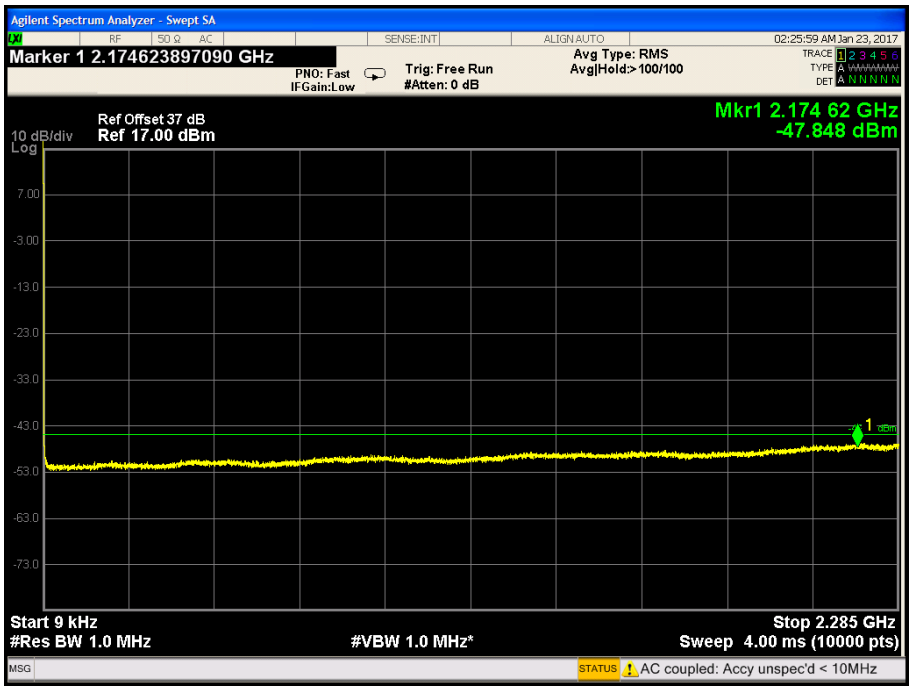

Figure 36. — 0.009 MHz-2285.0MHz –64QAM

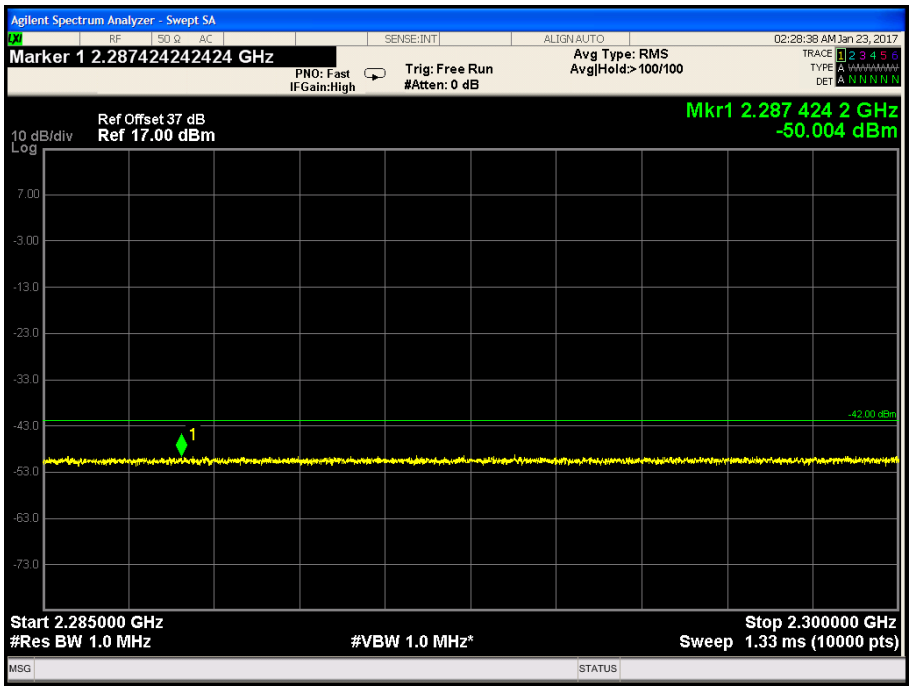

Figure 37. — 2285.0 MHz-2300.0 MHz –64QAM

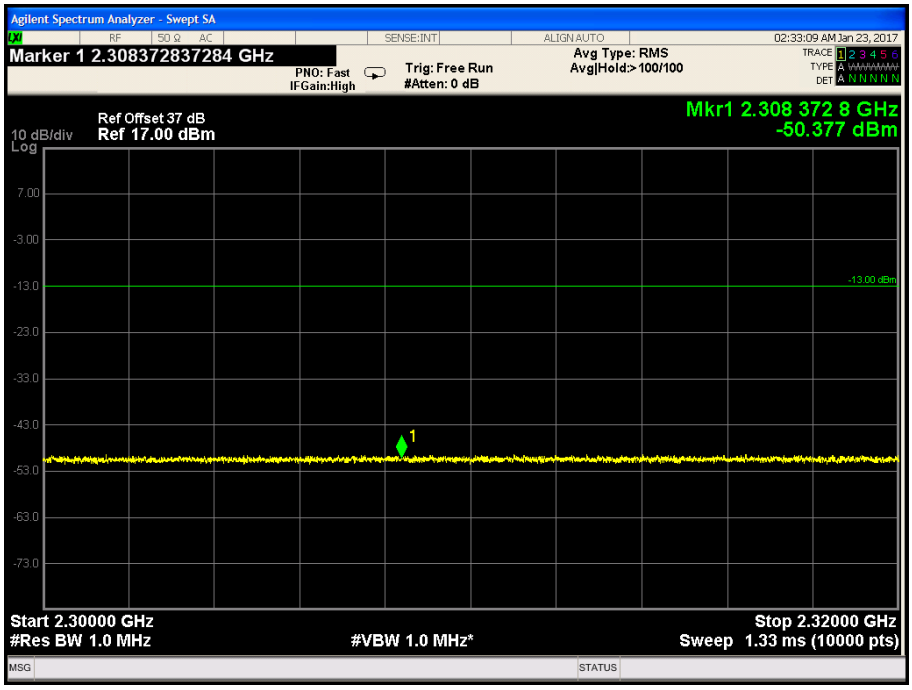

Figure 38. — 2300.0 MHz-2320.0 MHz –64QAM

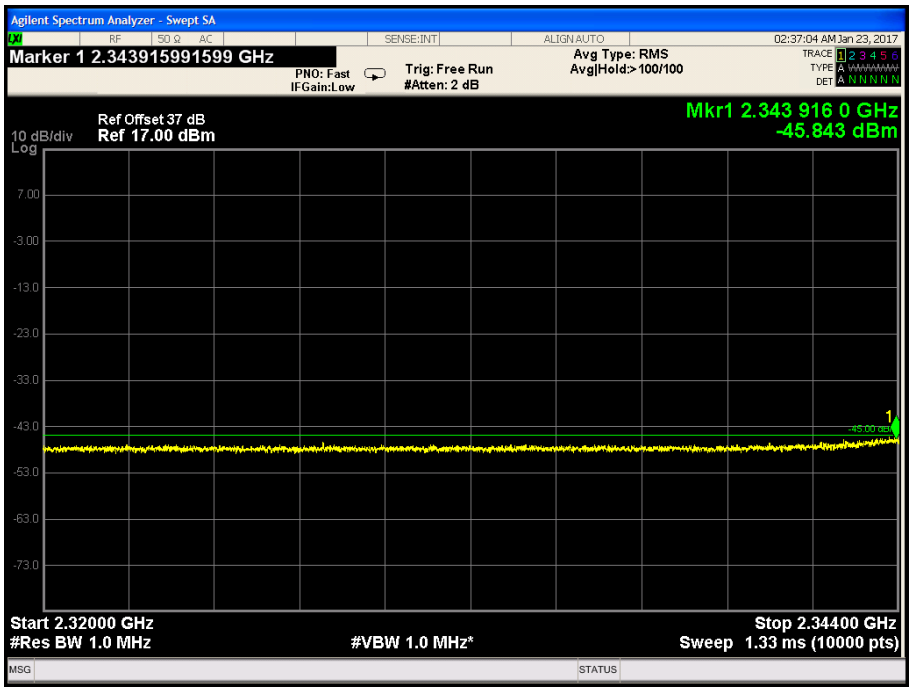

Figure 39. — 2320.0 MHz-2344.0 MHz – 64QAM

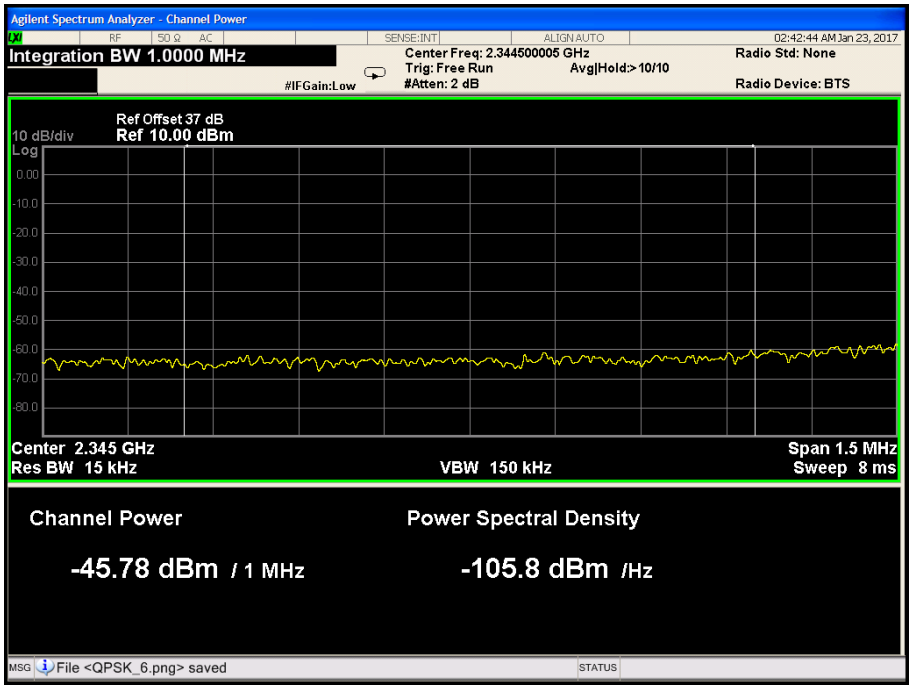

Figure 40. — 2344.0 MHz-2345.0 MHz – 64QAM

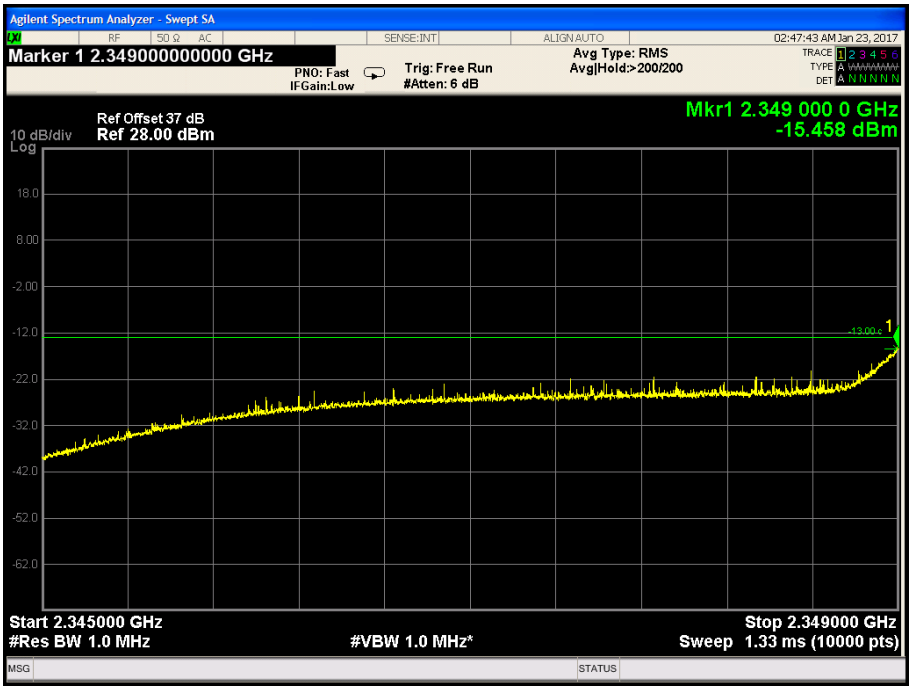

Figure 41. — 2345.0 MHz-2349.0 MHz –64QAM

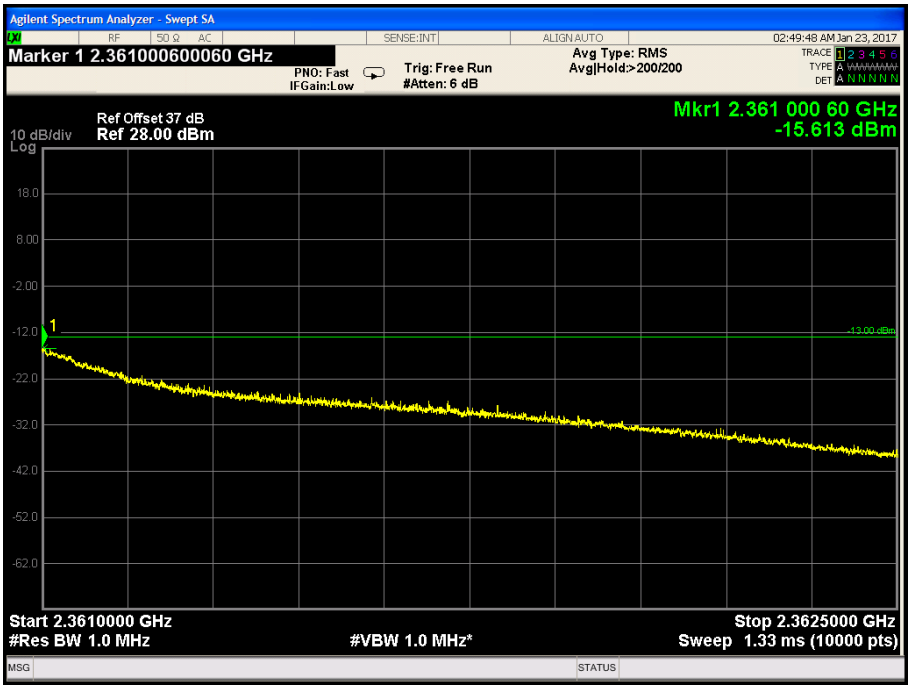

Figure 42. — 2361.0 MHz-2362.5 MHz –64QAM

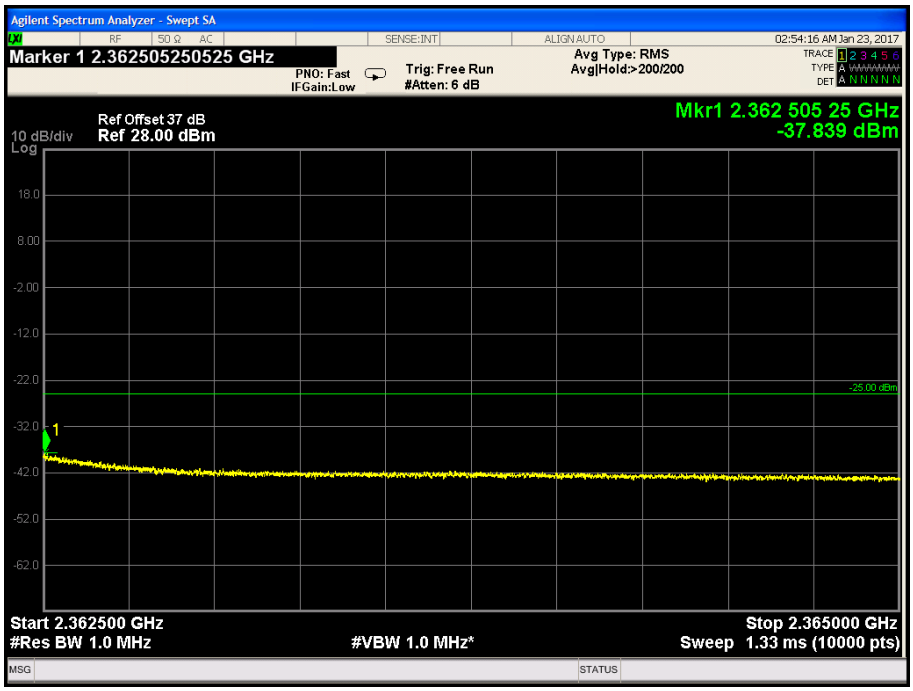

Figure 43. — 2362.5 MHz-2365.0 MHz –64QAM

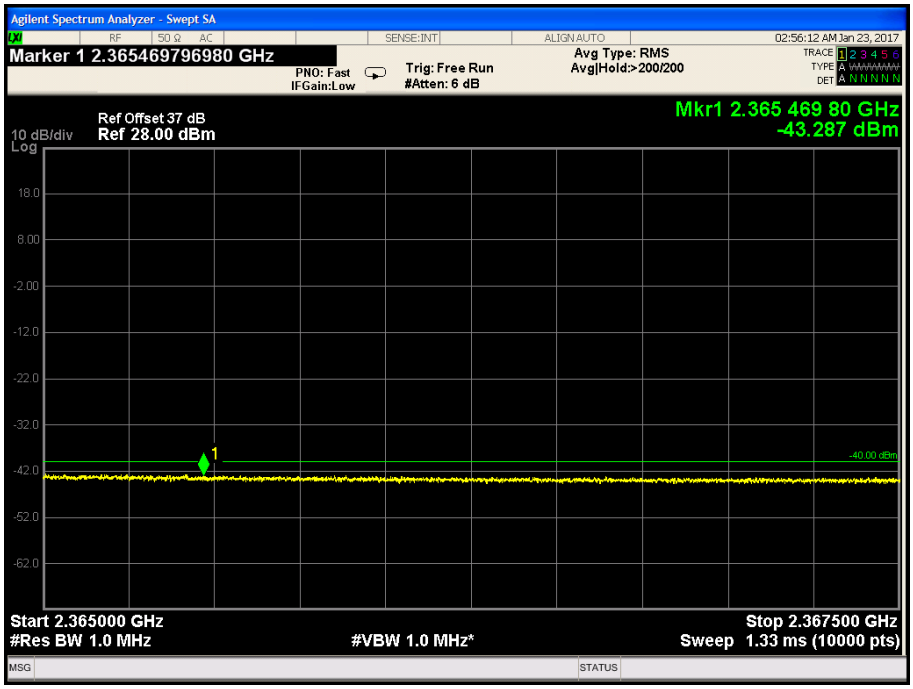

Figure 44. — 2365.0 MHz-2367.5 MHz –64QAM

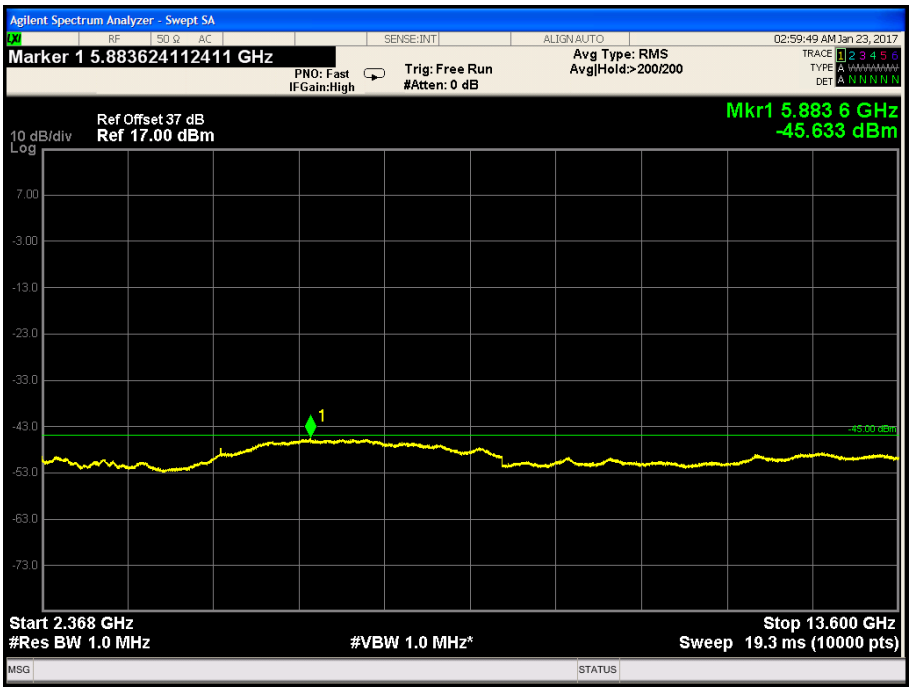

Figure 45. — 2367.5 MHz-13,600.0 MHz –64QAM

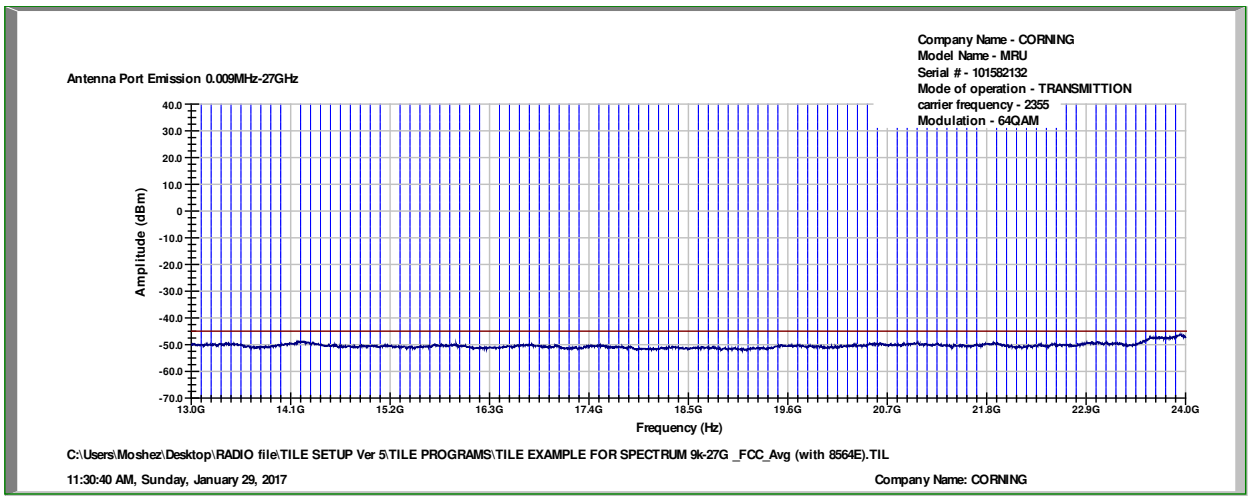

Figure 46. —13,000.0 MHz-24,000MHz –64QAM

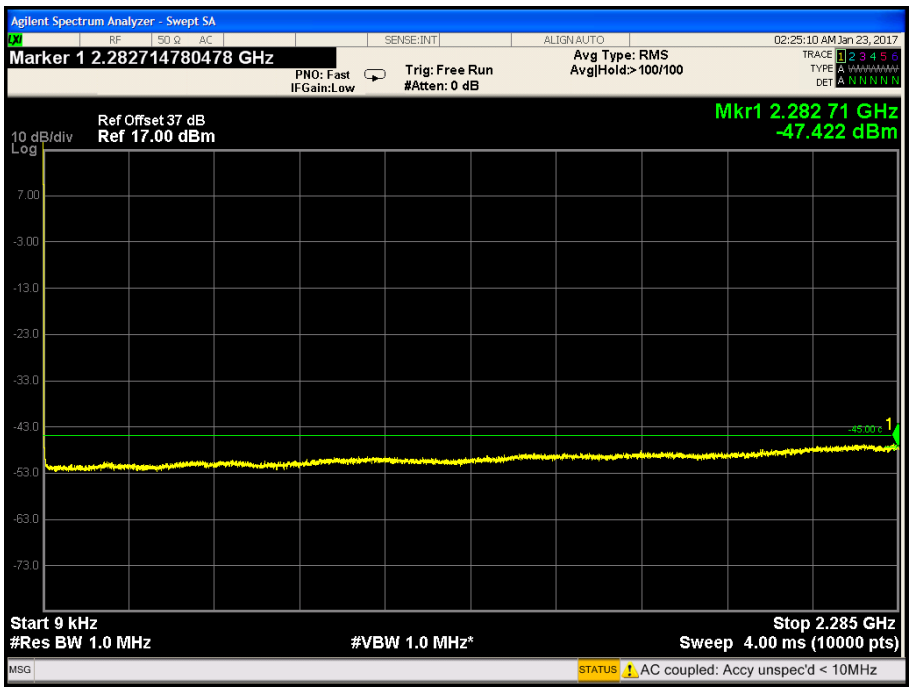

Figure 47. — 0.009 MHz-2285.0 MHz – 16QAM

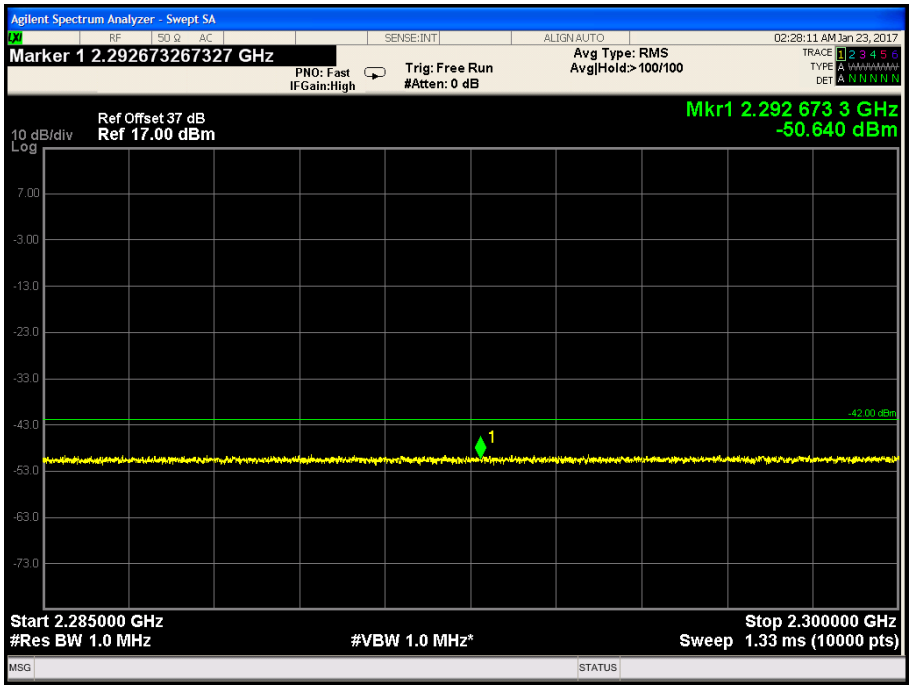

Figure 48 — 2285.0 MHz-2300.0MHz - 16QAM

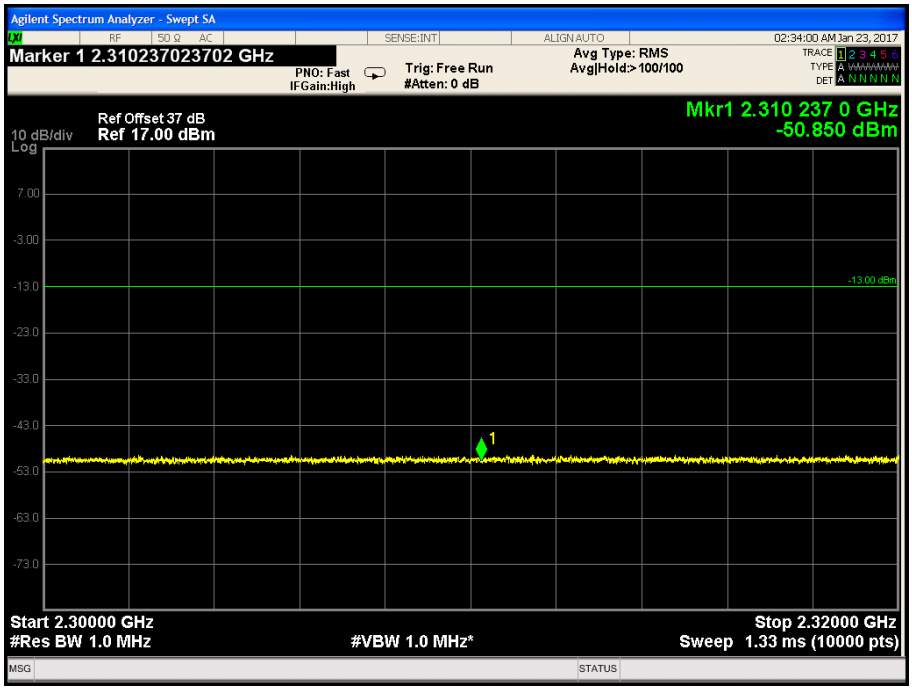

Figure 49. — 2300.0MHz -2320.0 MHz - 16QAM

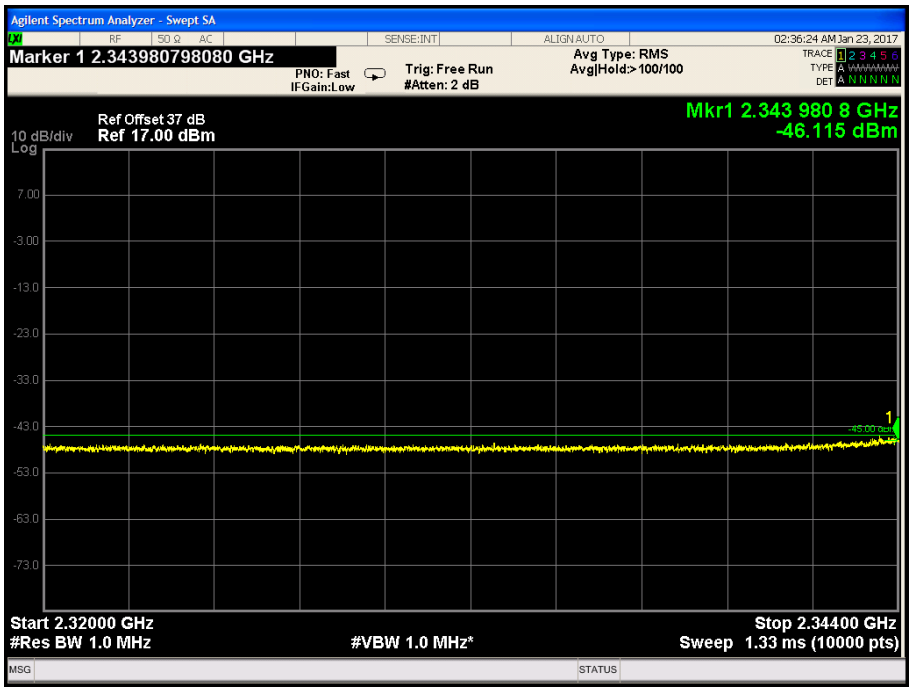

Figure 50. — 2320.0 MHz-2344.0 MHz - 16QAM

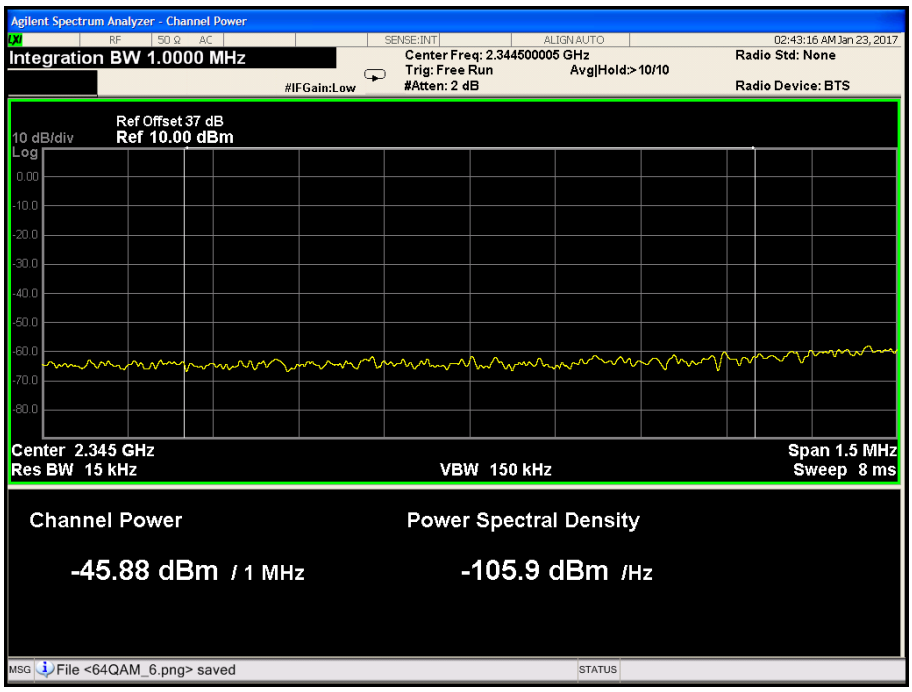

Figure 51. — 2344.0 MHz-2345.0 MHz - 16QAM

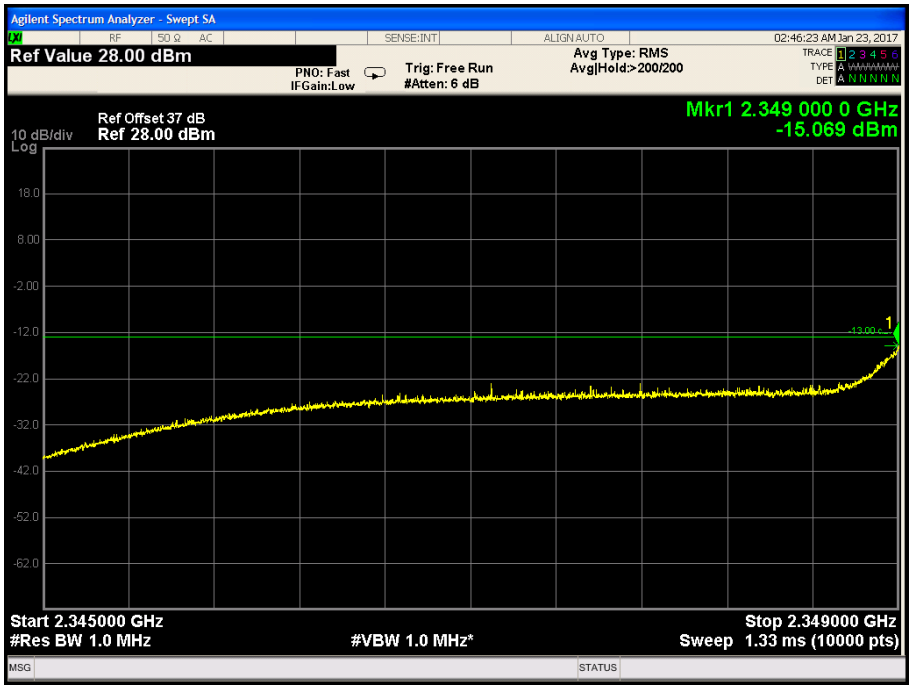

Figure 52. — 2345.0 MHz-2349.0 MHz - 16QAM

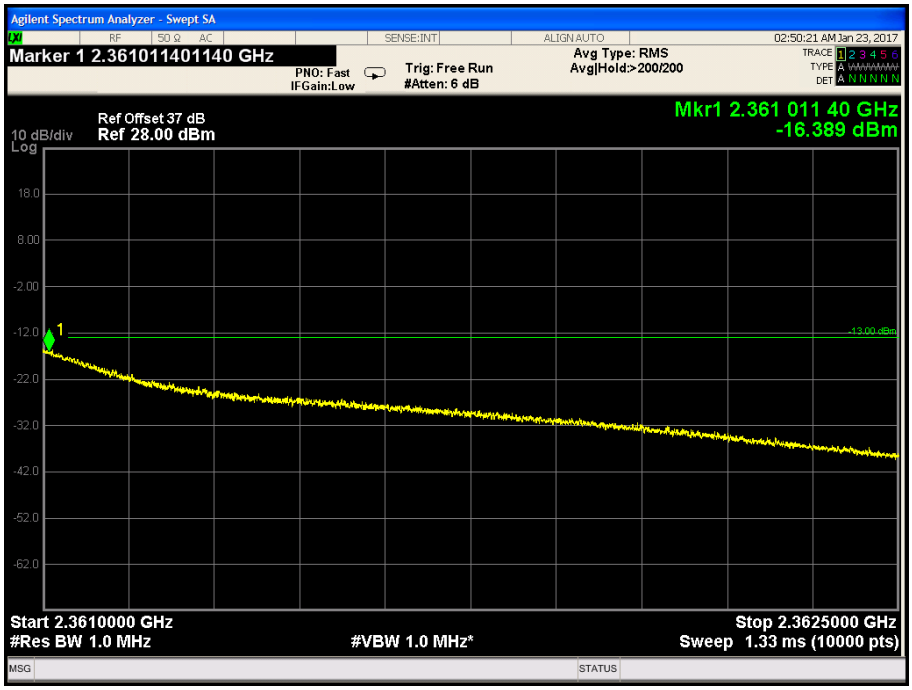

Figure 53. — 2361.0 MHz-2362.5 MHz - 16QAM

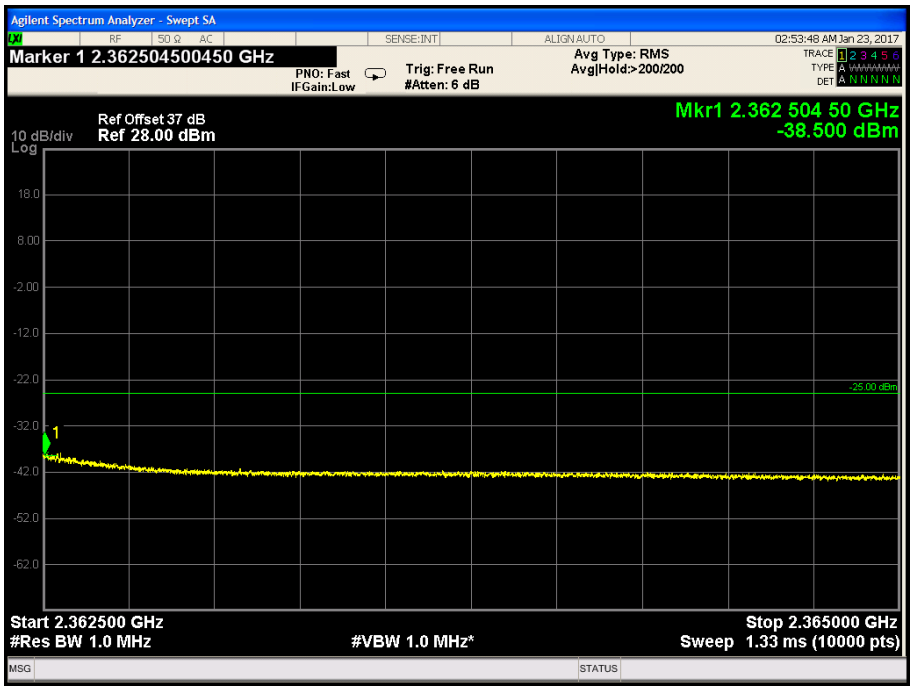

Figure 54. — 2362.5 MHz-2365.0 MHz - 16QAM

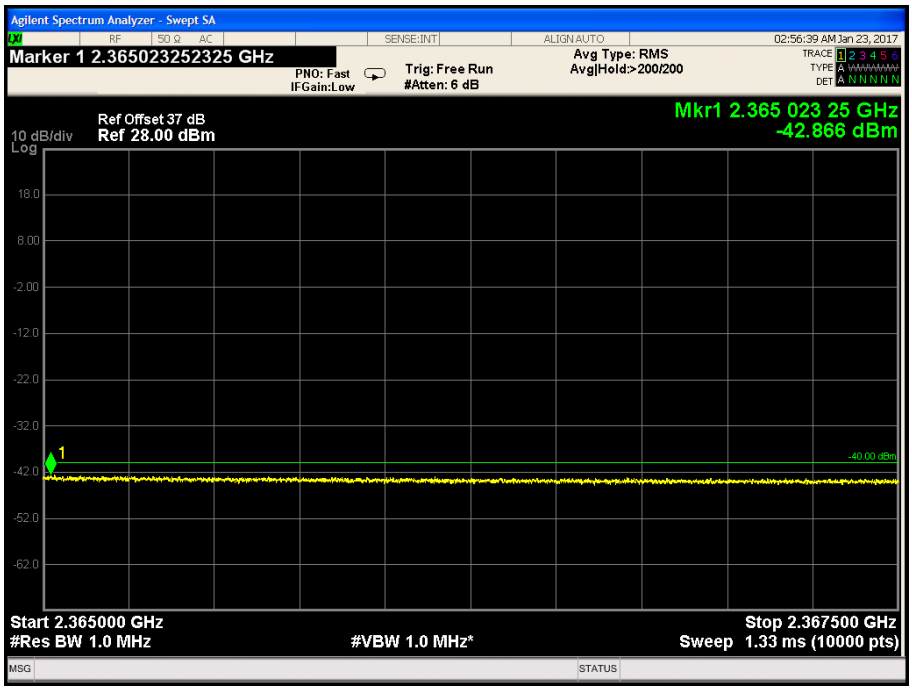

Figure 55. — 2365.0 MHz-2367.5 MHz - 16QAM

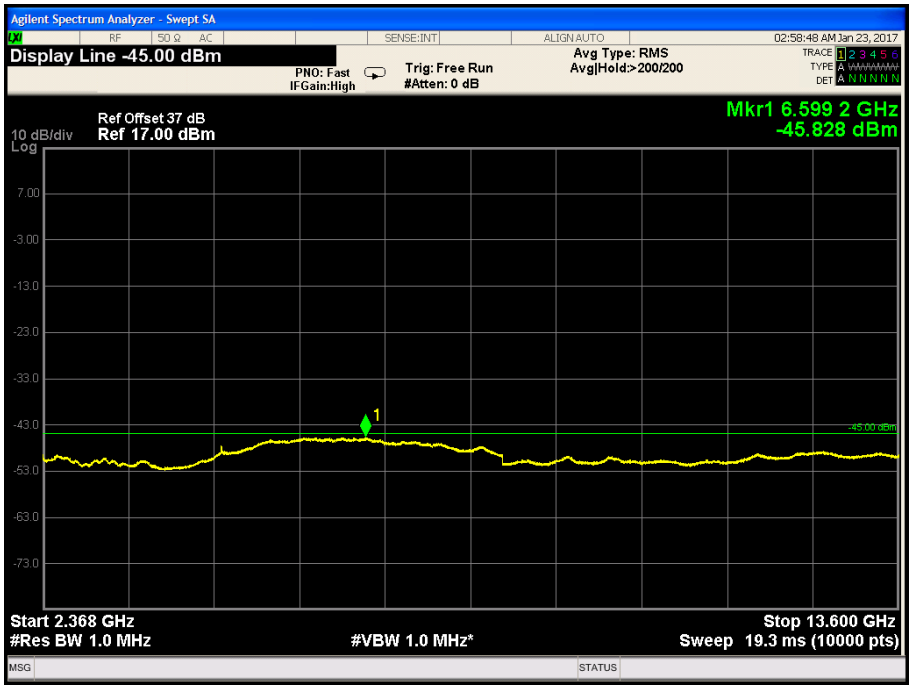

Figure 56. — 2367.5 MHz-13,600.0 MHz - 16QAM

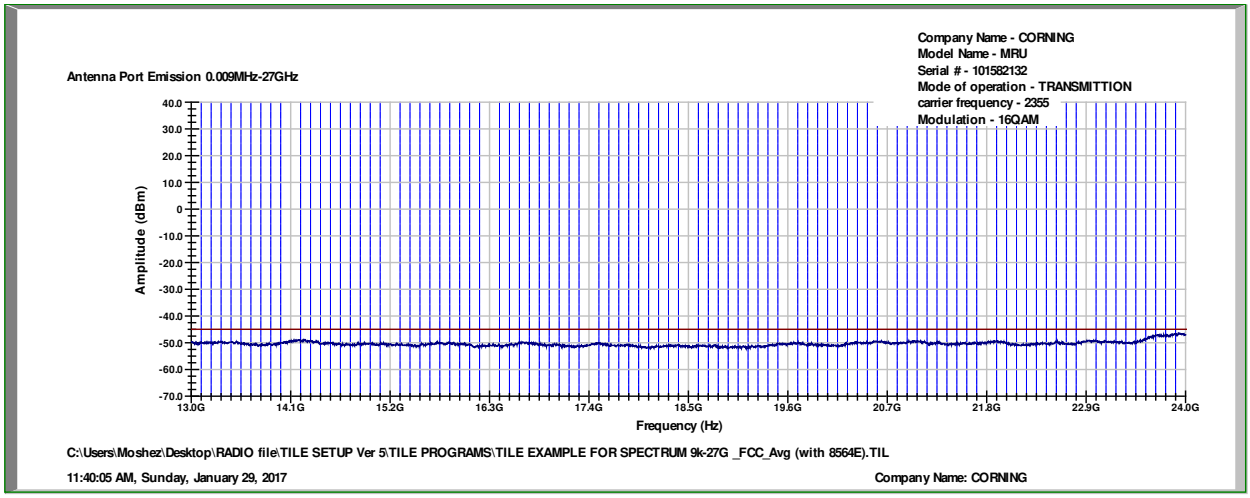

Figure 57. —13,000.0 MHz-24,000MHz - 16QAM

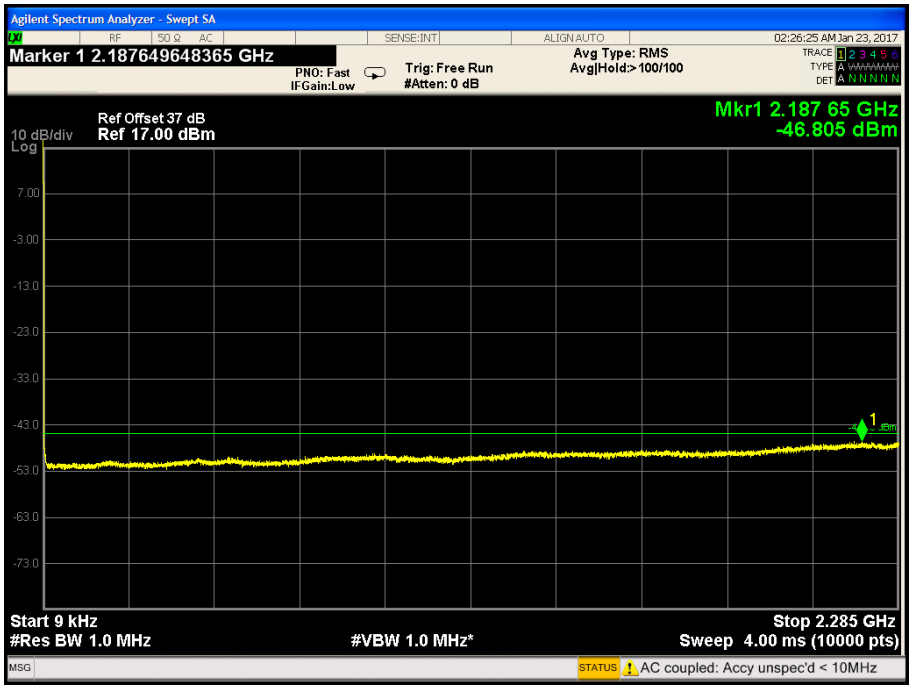

Figure 58. — 0.009 MHz-2285.0MHz – QPSK

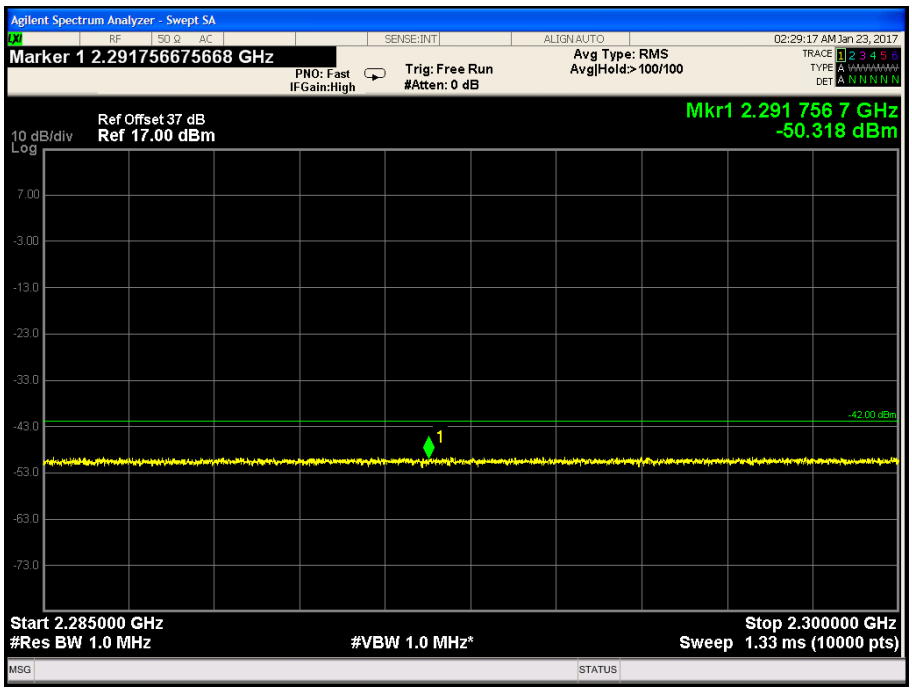

Figure 59. — 2285.0 MHz- 2300.0MHz- QPSK

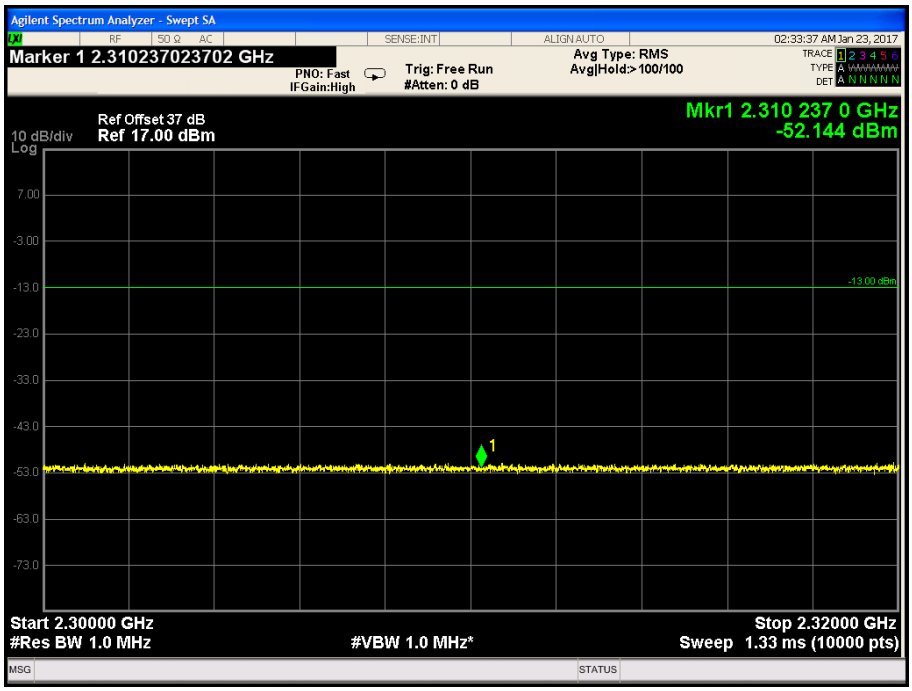

Figure 60. — 2300.0MHz -2320.0 MHz – QPSK

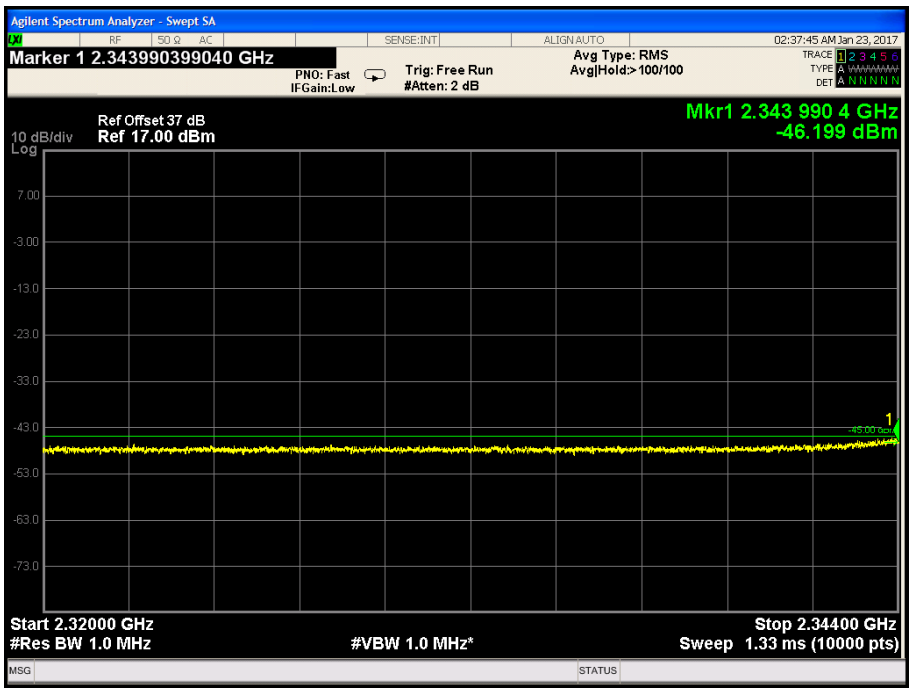

Figure 61. — 2320.0 MHz-2344.0 MHz – QPSK

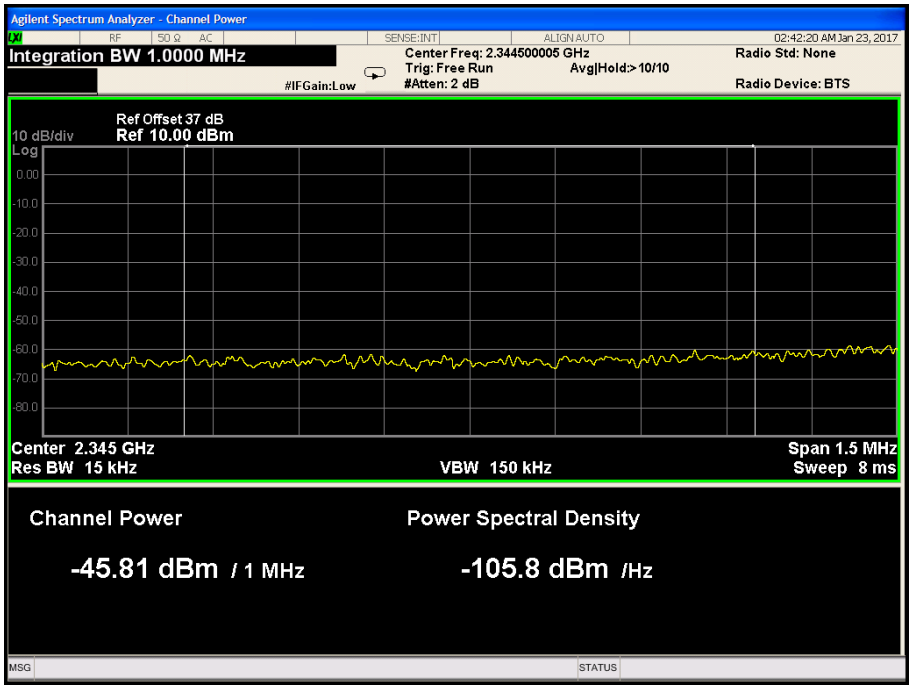

Figure 62. — 2344.0 MHz-2345MHz – QPSK

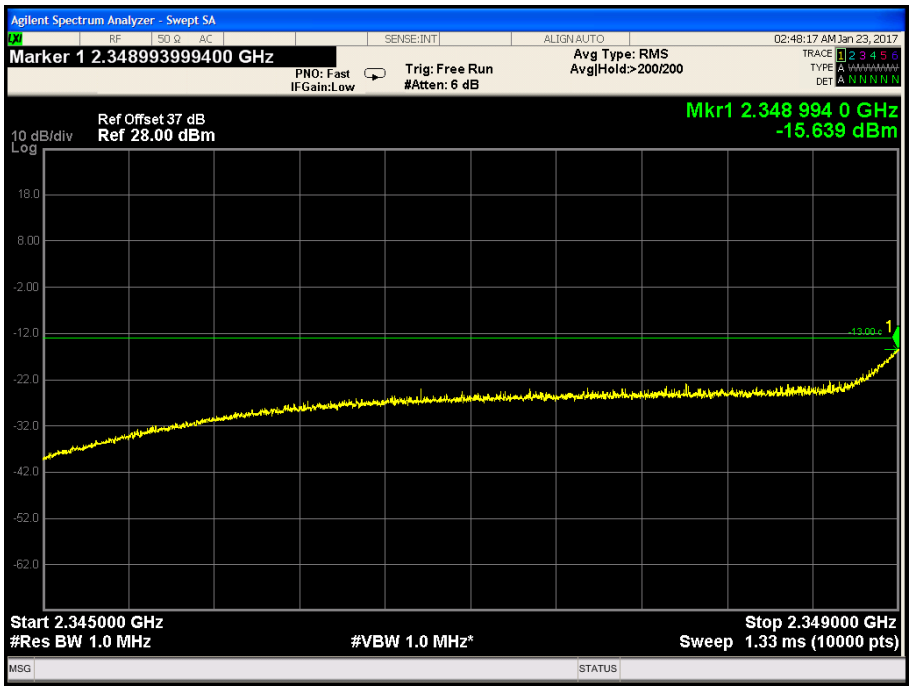

Figure 63. — 2345.0 MHz-2349.0MHz – QPSK

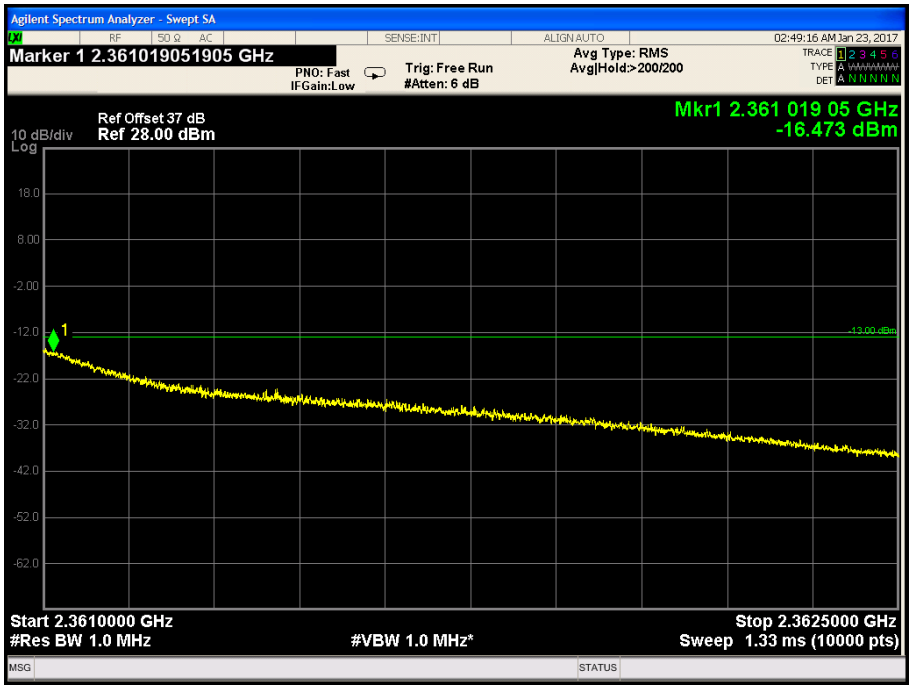

Figure 64.—2361.0 MHz-2362.5MHz – QPSK

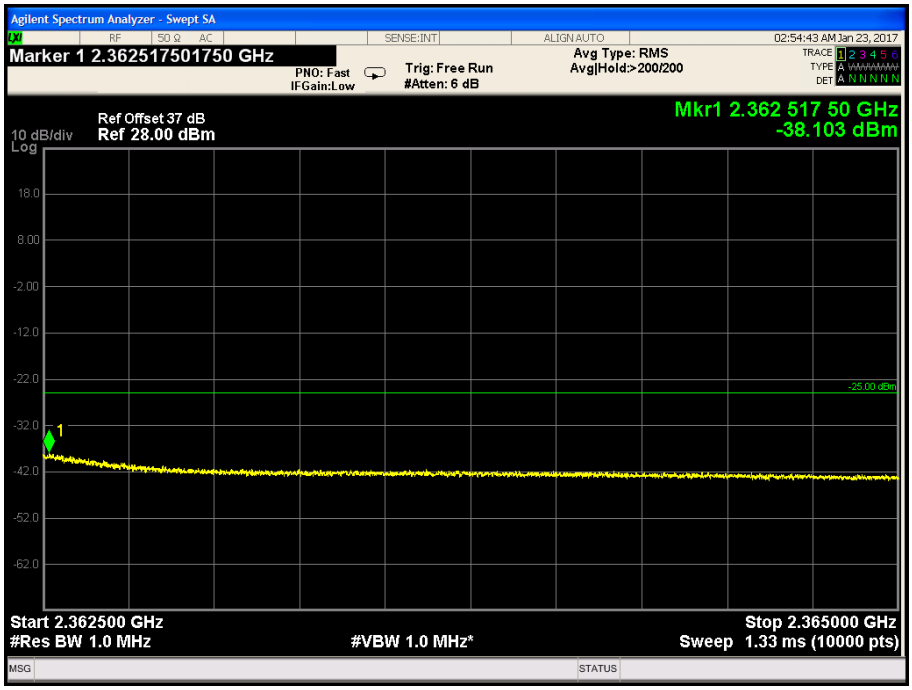

Figure 65. — 2362.5 MHz-2365.0 MHz – QPSK

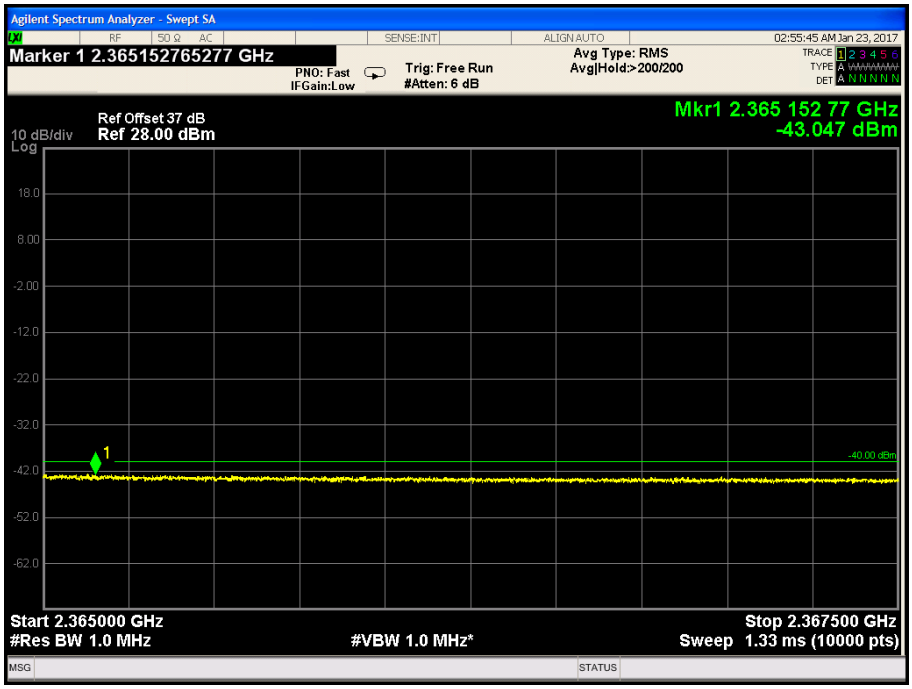

Figure 66. — 2365.0 MHz-2367.5 MHz – QPSK

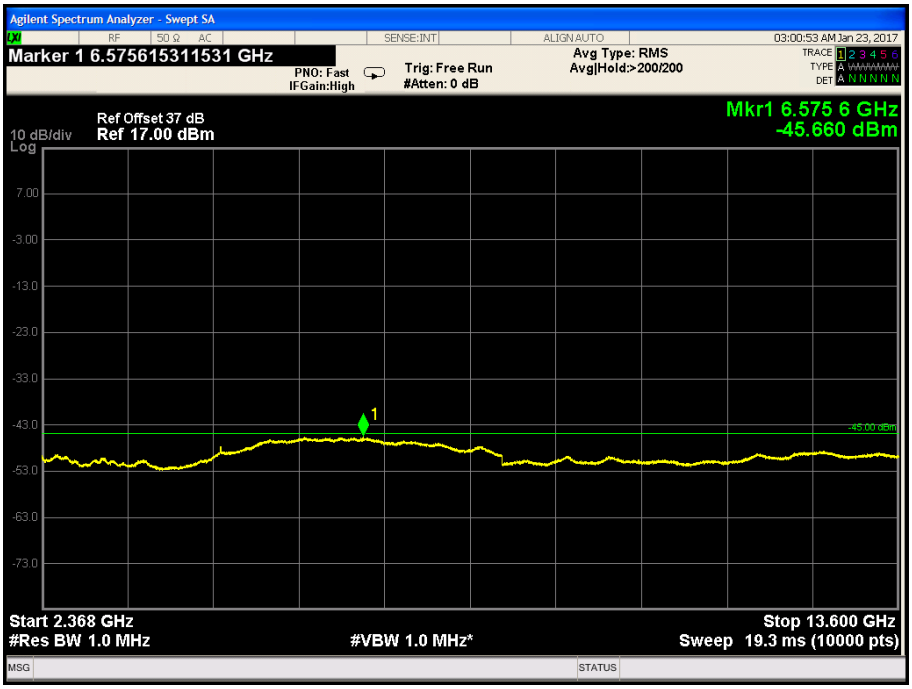

Figure 67. — 2367.5 MHz-13,600.0 MHz – QPSK

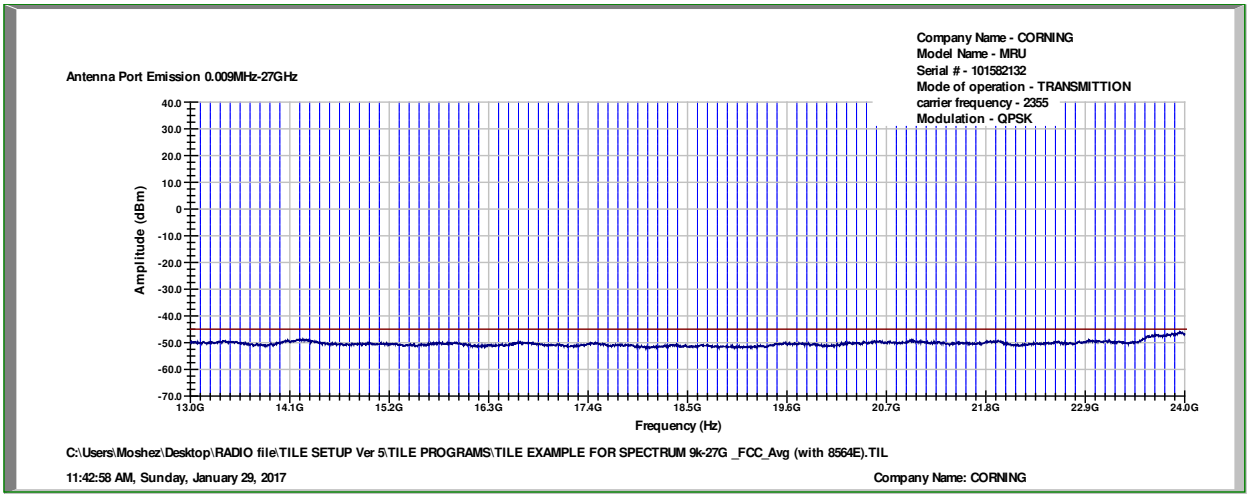

Figure 68. —13,000.0 MHz-24,000MHz – QPSK

8.5 Test Equipment Used; Out of Band Emission at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	HP	8564E	3442A00275	March 10, 2016	March 10, 2017
Vector Signal Generator	Agilent	N5182A	MY48180244	August 2, 2016	November 2, 2019
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	August 8, 2016	November 8, 2017
30dB Attenuator	MCL	BW-S30W5	533	July 5, 2016	July 5, 2017
6dB Attenuator	Weinschel Associates	WA 40-6-34	568	July 6, 2016	July 6, 2017

Figure 69 Test Equipment Used

9. Band Edge Spectrum

9.1 Test Specification

FCC Part 27, Section 53(a)(1)

9.2 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 (40.5 dB).
The spectrum analyzer RBW was set to at least 1% from OBW.
The evaluation was repeated for all modulations.

9.3 Test Limit

The power of any emission in the 1 MHz bands immediately outside and adjacent to the channel blocks (2350-2360MHz) was attenuated below the transmitting power (P) by a factor of at least 43 +10 log (P) dB , yielding – 13dBm.

9.4 Test Results

Modulation	Operation Frequency	Band Edge Frequency	Reading	Limit	Margin
	(MHz)	(MHz)	(dBm)	(dBm)	(dB)
64QAM	2355.0	2350.0	-15.8	-13.0	-2.8
	2355.0	2360.0	-19.0	-13.0	-6.0
16QAM	2355.0	2350.0	-16.7	-13.0	-3.7
	2355.0	2360.0	-17.6	-13.0	-4.6
QPSK	2355.0	2350.0	-15.8	-13.0	-2.8
	2355.0	2360.0	-18.3	-13.0	-5.3

Figure 70 Band Edge Spectrum Results

JUDGEMENT: Passed by 2.8 dB

See additional information in *Figure 71* to *Figure 76*.

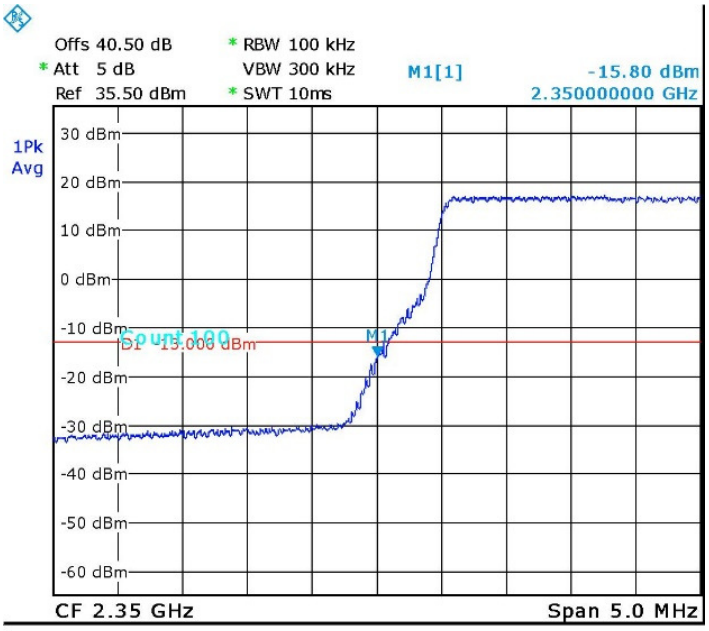

Figure 71. — Lower Block Edge -1MHz –64QAM

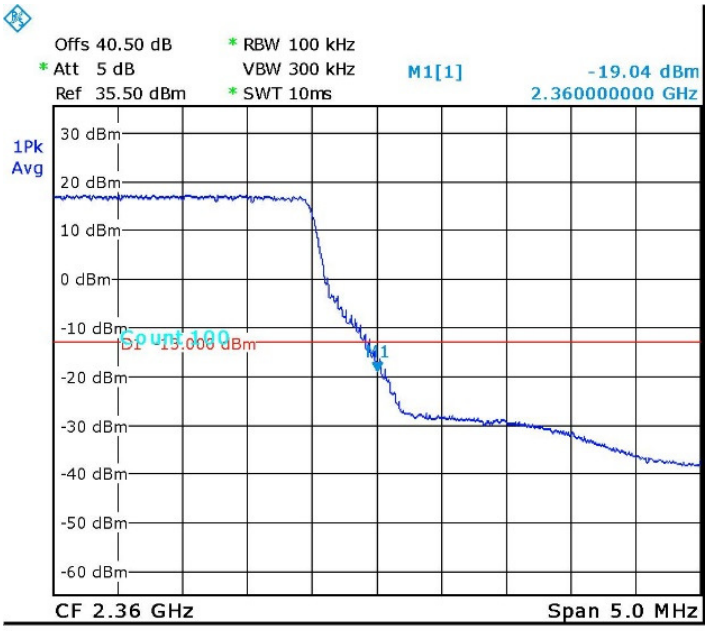

Figure 72. — Upper Band Edge +1MHz –64QAM

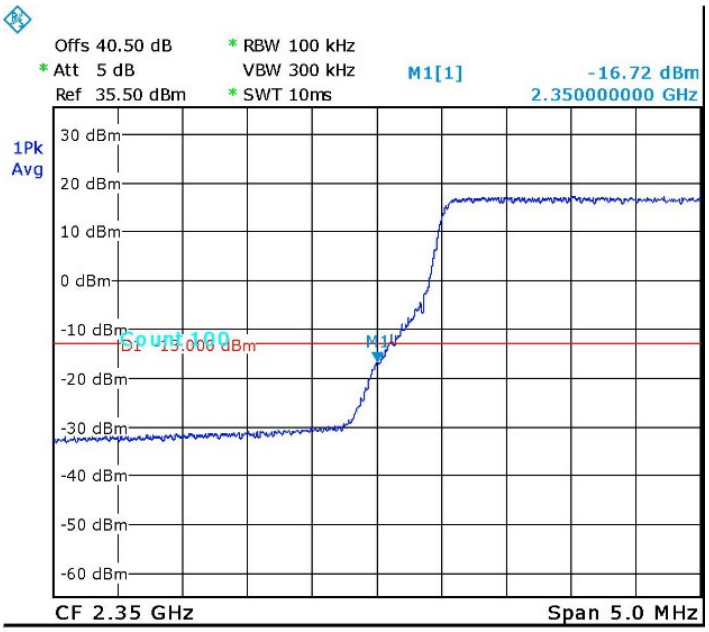

Figure 73. — Lower Block Edge -1MH – 16QAM

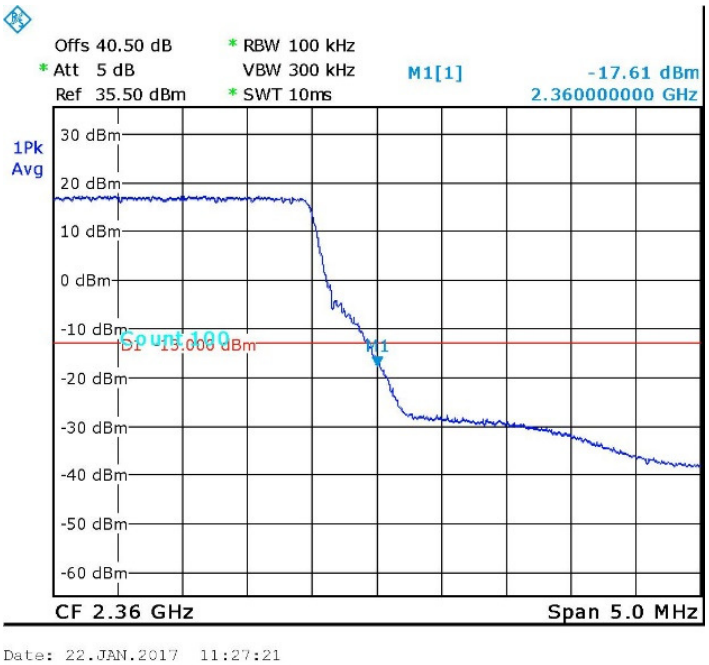

Figure 74. — Upper Band Edge +1MHz – 16QAM

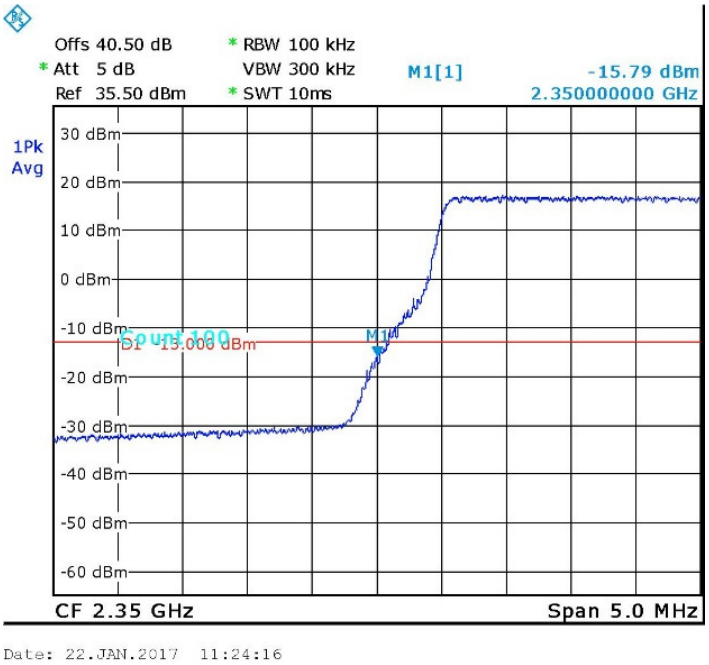

Figure 75. — Lower Block Edge -1MHz – QPSK

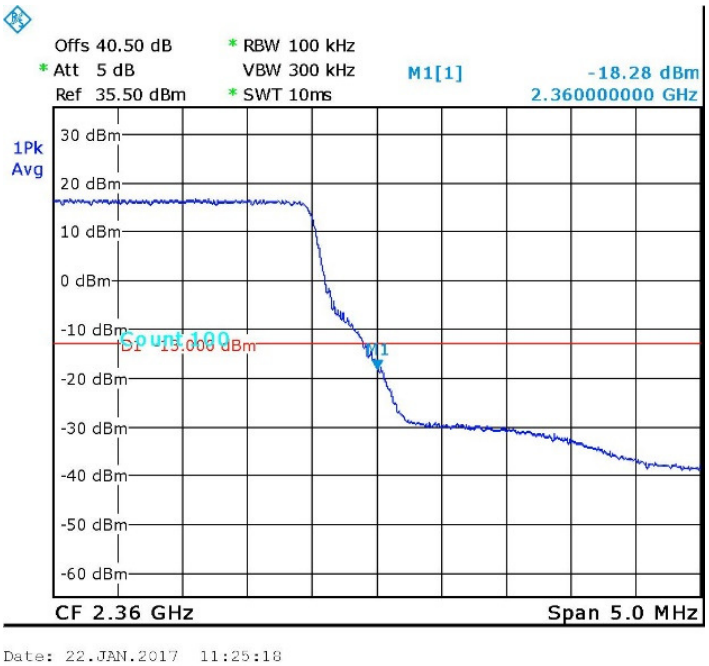

Figure 76. — Upper Band Edge +1MHz – QPSK

9.5 Test Equipment Used; Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
Vector Signal Generator	Agilent	N5182A	MY48180244	August 2, 2016	November 2, 2019
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	August 8, 2016	August 8, 2017

Figure 77 Test Equipment Used

10. Spurious Emissions (Radiated)

10.1 Test Specification

FCC Part 27, section 53(a)(1)

10.2 Test Procedure

(Temperature (23°C)/ Humidity (60%RH))

The test method was based on ANSI/TIA-603-D: 2010, Section 2.2.12 Unwanted Emissions: Radiated Spurious.

The E.U.T. operation mode and test set-up are as described in Section 2 of this report.

For measurements between 0.009MHz-30.0MHz:

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 0.009MHz-30MHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

For measurements between 30.0MHz-1.0GHz:

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The frequency range 30.0MHz -1.0GHz was scanned and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

For measurements between 1.0GHz-24.0GHz:

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 1.0GHz -24.0GHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator.
The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:

$P_d(dBm) = P_g(dBm) – Cable\ Loss\ (dB) + Substitution\ Antenna\ Gain\ (dBd)$

P_d = Dipole equivalent power (result).
P_g = Signal generator output level.

A Peak detector was using for this test.

The test was performed in one operation frequency (2355.0MHz) with all modulations.

Testing was performed when the RF port was connected to 50 Ω termination.

The table below describe only results with the highest radiation.

10.3 Test Limit

Frequency Band (MHz)	Calculated Factor (dBc)
f<2285.0	75+10*log(2)=78.0
2285.0MHz<f<2287.5MHz	72+10*log(2)=75.0
2287.5MHz<f<2300.0MHz	70+10*log(2)=73.0
2300.0MHz<f<2305.0MHz	43+10*log(2)=46.0
2305.0MHz<f<2320.0MHz	43+10*log(2)=46.0
2320.0MHz<f<2345.0MHz	75+10*log(2)=78.0
2345.0MHz<f<2360.0MHz	43+10*log(2)=46.0
2360.0MHz<f<2362.50MHz	43+10*log(2)=46.0
2362.5MHz<f<2365.0MHz	55+10*log(2)=58.0
2365.0MHz<f<2367.5MHz	70+10*log(2)=73.0
2367.5MHz<f<2370.0MHz	72+10*log(2)= 75.0
2370.0<f	75+10*log(2)= 78.0

Figure 78 Mask Limit Table

10.4 Test Results

modulation	Freq.	Pol.	Maximum Peak Level	Signal Generator RF Output	Cable Loss	Antenna Gain	Effective Radiated Power Level	Limit	Margin
	(MHz)	(V/H)	(dBµV/m)	(dBm)	(dB)	(dBd)	(dBm)	(dBm)	(dB)
64QAM	4710.0	V	35.0	-70.0	0.5	10.5	-60.0	-45.0	-15.0
	4710.0	H	34.4	-70.1	0.5	10.8	-59.8	-45.0	-14.8
16QAM	7065.0	V	44.8	-62.3	1.0	10.0	-53.3	-45.0	-8.3
	7065.0	H	39.9	-64.1	1.0	10.0	-55.1	-45.0	-10.1
QPSK	7065.0	V	41.2	-66.1	1.0	10.0	-57.1	-45.0	-12.1
	7065.0	H	41.0	-63.1	1.0	10.0	-54.1	-45.0	-9.1

Figure 79 Spurious Emission (Radiated)

JUDGEMENT; Passed by 8.3 dB

The E.U.T met the requirements of the FCC Part 27, Section 917; FCC Part 2.1053 specifications.

10.5 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EMI Receiver	HP	85422E	3906A00276	March 3, 2016	March 3, 2017
RF Filter Section	HP	85420E	3705A00248	March 3, 2016	March 3, 2017
EMI Receiver	R&S	ESCI7	100724	February 29, 2016	March 1, 2017
Spectrum Analyzer	HP	8593EM	3536A00120ADI	March 10, 2016	March 10, 2017
Active Loop Antenna	EMCO	6502	9506-2950	September 14, 2016	September 14, 2017
Antenna Biconical	EMCO	3110B	9912-3337	March 24, 2016	March 24, 2018
Antenna Log Periodic	EMCO	3146	9505-4081	April 23, 2016	April 23, 2017
Horn Antenna 1G-18G	ETS	3115	29845	May 19, 2015	May 19, 2018
Horn Antenna 18G-26G	ARA	SWH-28	1007	March 30, 2014	March 30, 2017
Low Noise Amplifier	Narda	LNA-DBS-0411N313	013	August 8, 2016	August 8, 2017
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 8, 2016	August 8, 2017
Vector Signal Generator	Agilent	N5182A	MY48180244	August 2, 2016	November 2, 2019
Semi Anechoic Civil Chamber	ETS	S81	SL 11643	N/A	N/A
Antenna Mast	ETS	2070-2	-	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

Figure 80 Test Equipment Used

11. Out-of-Band Rejection (WCS)

11.1 Test Specification

KDB 935210 D05 v01r01, Section 3.3

11.2 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 (max Loss= 40.5 dB).

The signal and spectrum analyzer frequency range was set to ±250% of the passband, Dwell time set to approximately 10msec.

RBW was set between 1% to 5% of the E.U.T passband and VBW set to ≥3*RBW.

11.3 Test Limit

N/A

11.4 Test Results

JUDGEMENT: Passed

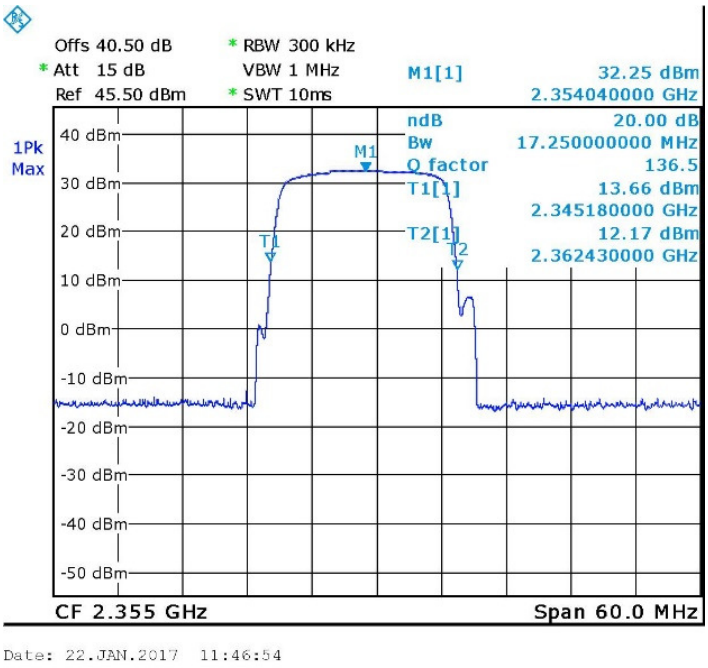

Figure 81. — Out-of-Band Rejection Plot

11.5 Test Equipment Used; Out-of-Band Rejection

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
Vector Signal Generator	Agilent	N5182A	MY48180244	August 2, 2016	November 2, 2019
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	August 8, 2016	August 8, 2017

Figure 82 Test Equipment Used

12. APPENDIX A - CORRECTION FACTORS

12.1 Correction factors for RF OATS Cable 35m ITL #1784

Frequency (MHz)	Cable loss (dB)
10.0	0.3
20.0	0.2
50.0	-0.1
100.0	-0.6
200.0	-1.2
500.0	-2.3
1000.0	-3.6

12.2 Correction factors for RF OATS Cable 10m

ITL #1794

Frequency(MHz)	Cable loss(dB)
10.0	-0.3
20.0	-0.3
50.0	-0.5
100.0	-0.7
200.0	-1.1
500.0	-1.8
1000.0	-2.7

12.3 Correction factors for RF cable for Semi Anechoic Chamber

FREQ (MHz)	LOSS (dB)
1000.0	1.5
2000.0	2.1
3000.0	2.7
4000.0	3.1
5000.0	3.5
6000.0	4.1
7000.0	4.6
8000.0	4.9
9000.0	5.7
10000.0	5.7
11000.0	6.1
12000.0	6.1
13000.0	6.2
14000.0	6.7
15000.0	7.4
16000.0	7.5
17000.0	7.9
18000.0	8.1
19000.0	8.8
20000.0	9.1

12.4 Correction factors for Horn Antenna

Model: SWH-28
at 1 meter range.

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
18.0	40.3	16.1
19.0	40.3	16.3
20.0	40.3	16.1
21.0	40.3	16.3
22.0	40.4	16.8
23.0	40.5	16.4
24.0	40.5	16.6
25.0	40.5	16.7
26.0	40.6	16.4

12.5 Correction factors for Horn ANTENNA

Model: 3115

Antenna serial number: 29845

3 meter range

f(GHz)	AF(dB/m)	GA(dB)
0.75	25	3
1G	23.5	7
1.5G	26	8
2G	29	7
2.5G	27.5	10
3G	30	10
3.5G	31.5	10
4G	32.5	9.5
4.5G	32.5	10.5
5G	33	10.5
5.5G	35	10.5
6G	36.5	9.5
6.5G	36.5	10
7G	37.5	10
7.5G	37.5	10
8G	37.5	11
8.5G	38	11
9G	37.5	11.5
9.5G	38	11.5
10G	38.5	11.5
10.5G	38.5	12
11G	38.5	12.5
11.5G	38.5	13
12G	38	13.5
12.5G	38.5	13
13G	40	12
13.5G	41	12
14G	40	13
14.5G	39	14
15G	38	15.5
15.5G	37.5	16
16G	37.5	16
16.5G	39	15
17G	40	15
17.5G	42	13.5
18G	42.5	13

12.6 Correction factors for Log Periodic Antenna EMCO, Model 3146, Serial #9505-4081

Frequency [MHz]	AF [dB/m]
200.0	11.47
250.0	12.06
300.0	14.77
400.0	15.77
500.0	18.01
600.0	18.84
700.0	20.93
800.0	21.27
900.0	22.44
1000.0	24.10

12.7 Correction factors for Biconical Antenna EMCO, Model 3110B, Serial #9912-3337

Frequency [MHz]	AF [dB/m]
30.0	14.18
35.0	13.95
40.0	12.84
45.0	11.23
50.0	11.10
60.0	10.39
70.0	9.34
80.0	9.02
90.0	9.31
100.0	8.95
120.0	11.53
140.0	12.20
160.0	12.56
180.0	13.49
200.0	15.27

12.8 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

f(MHz)	MAF(dBs/m)	AF(dB/m)
0.01	-33.1	18.4
0.02	-37.2	14.3
0.03	-38.2	13.3
0.05	-39.8	11.7
0.1	-40.1	11.4
0.2	-40.3	11.2
0.3	-40.3	11.2
0.5	-40.3	11.2
0.7	-40.3	11.2
1	-40.1	11.4
2	-40	11.5
3	-40	11.5
4	-40.1	11.4
5	-40.2	11.3
6	-40.4	11.1
7	-40.4	11.1
8	-40.4	11.1
9	-40.5	11
10	-40.5	11
20	-41.5	10
30	-43.5	8