DATE: 09 March 2010

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

FCC Radio Test Report

for

Runcom Technologies Ltd.

Equipment under test:

WiMAX Base Station

Outdoor Pico Base Station 3.5 GHz

Written by: _____

D. Shidlowsky, Documentation

Approved by: _____

A. Sharabi, Test Engineer

Approved by: _____

I. Raz, EMC Laboratory Manager

Measurement/Technical Report for

Runcom Technologies Ltd.

WiMAX Base Station

Outdoor Pico Base Station 3.5 GHz

FCC ID: XYMPICO351WDC

This report concerns:	Original Grant: X Class II change: Class I change:
Equipment type:	Licensed Non-Broadcast Transmitter
Limits used: 47CFR Part 90 Subpart Z	

Measurement procedure used is ANSI C63.4-2003.
Substitution Method used as in ANSI/TIA-603-B: 2002

Application for Certification prepared by:

Ishaishou Raz
ITL (Product Testing) Ltd.
Kfar Bin Nun
D.N. Shimshon 99780
Israel
e-mail sraz@itl.co.il

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

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Runcom Technologies Ltd.
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1. General Information

1.1 Administrative Information

Manufacturer:	Runcom Technologies Ltd.
Manufacturer's Address:	11 Moshe Levi St. Reshon Le Zion 75658 Israel Tel: +972-3-952-8440 Fax: +972-3-952-8805
Manufacturer's Representative:	Ronen Greenberg Moshe Efraim
Equipment Under Test (E.U.T):	WiMAX Base Station
Equipment Model No.:	Outdoor Pico Base Station 3.5 GHz
Part Number No.:	PICO-O-3.5-C-1W-DC
Date of Receipt of E.U.T:	03.12.09
Start of Test:	03.12.09
End of Test:	11.02.10*
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 90 Subpart Z

* All tests except frequency stability were performed between 03-15.12.09. Frequency stability testing was performed on 11.02.10.

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by 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.), Registration No. 90715.
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-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

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

Runcom's family of full outdoor Pico BSs consists of highly integrated WiMAX Base Stations that provide fast, flexible, cost-effective WiMAX network deployment solutions where increased capacity and coverage is required.

This uni-sector base station operates with omni or sectorized antennas, and provides 99.995% availability and carrier grade service.

Runcom Pico BS performs all the required capabilities of the Mobile BS next generation such as: WiMAX Modem PHY and MAC functions, SNMP based management protocol and fully supports the latest R6 interface over GRE tunneling towards the ASN-GW.

'All-in-one' architecture combined with simple, single-handed installation and fast rollout make these BSs an ideal solution for operators that want to get in on the ground floor of WiMAX deployment at significant CAPEX reductions and maximum return on their network deployment.

Based on Runcom's chip set architecture, Pico BSs provide adaptable solutions, allowing interoperability with other MSS devices as well as ASN-GW vendors.

The E.U.T. has two identical antenna ports. During the tests the secondary antenna port was terminated by 50 Ohm termination. According to the customer, only the primary RF antenna port is used in this configuration.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing 03 September 2009).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Conducted Emission
The uncertainty for this test is □2 dB.

Radiated Emission
The Open Site complies with the ±4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. System Test Configuration

2.1 Justification

The test setup was configured to closely resemble the standard installation.

2.2 EUT Exercise Software

The software is Embedded real time communication software using ThreadX Real Time Operating system. The SW application implements the 802.16e specification handling air communication, IP stack and management.

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

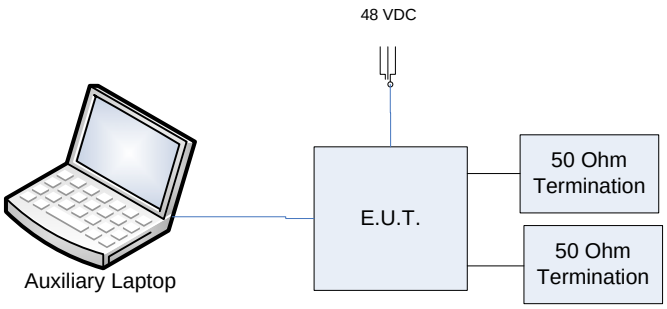


Figure 1. Radiated Emission Test Set-up

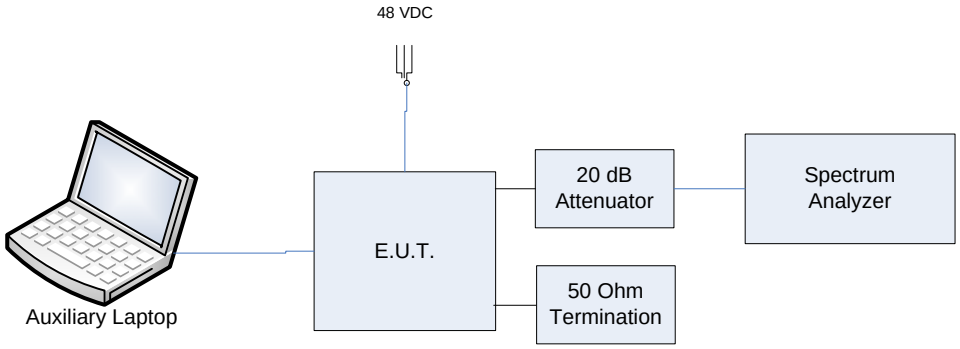


Figure 2. Conducted Emission From Antenna Ports Test Set-up

3. Test Set-up Photos

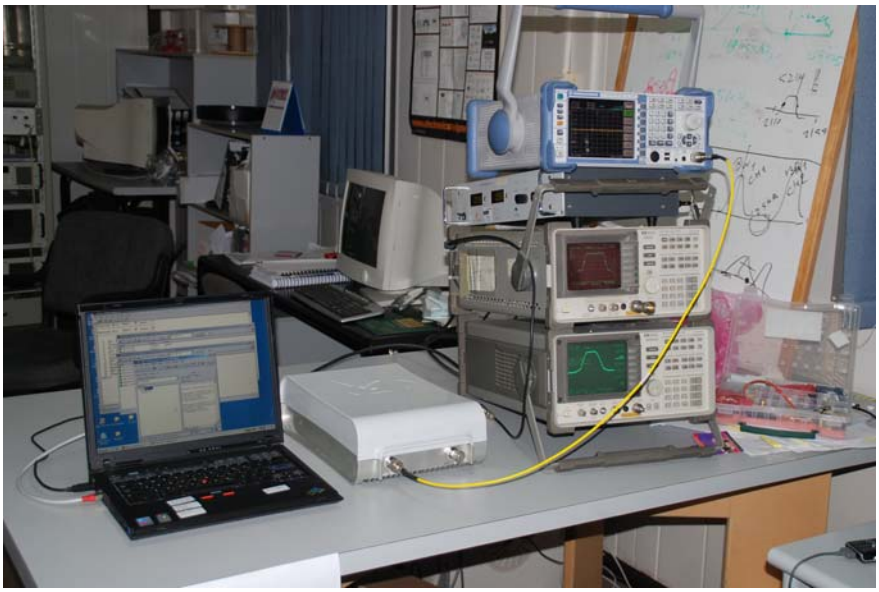


Figure 3. Conducted Emission From Antenna Port Tests

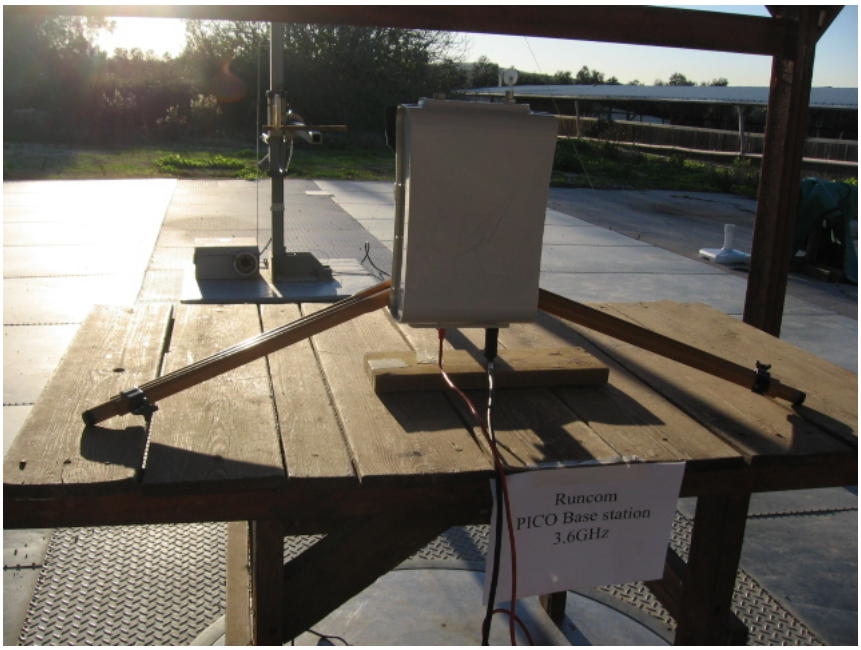


Figure 4. Radiated Emission Test

4. Maximum Peak Output Power 5 MHz Bandwidth

4.1 Test Specification

FCC Part 90, Subpart Z ,Section 90.1321

4.2 Test procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (1 dB). The E.U.T. RF output was OFDMA modulated with QPSK, 16QAM and 64QAM, at 5MHz BW.

Special attention was taken to prevent Spectrum Analyzer RF input overload. Tested frequencies: 3652.5 MHz, 3662.5 MHz and 3672.5 MHz.

According to 47 CFR Part 2 section § 2.1046 and Part 90 section § 90.1321, the maximum power of a base station shall not exceed 25 watts/25 MHz.

For 5MHz bandwidth the limit is 37dBm on single port.

Unit transmits at SISO mode and both of the RF heads are identical, so only one port was tested.

ANTENNA TYPE Dipole antenna with N type connector (Antenna Gain : 17dBi)

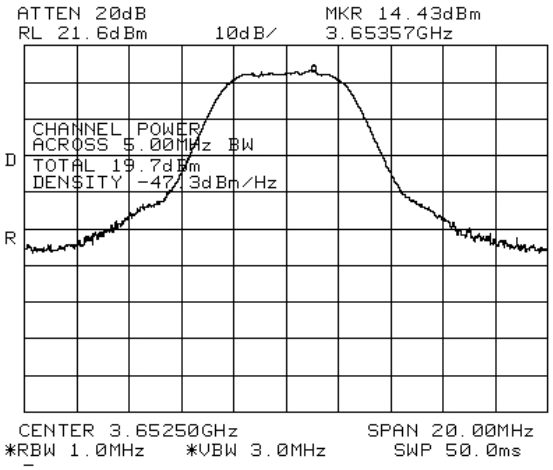


Figure 5.— 3652.50 MHz QPSK

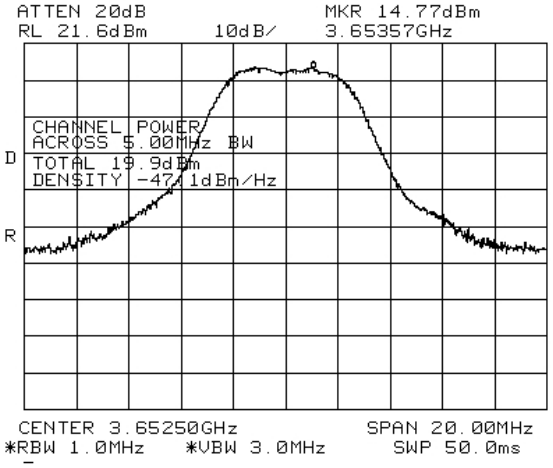


Figure 6.— 3652.50 MHz 16QAM

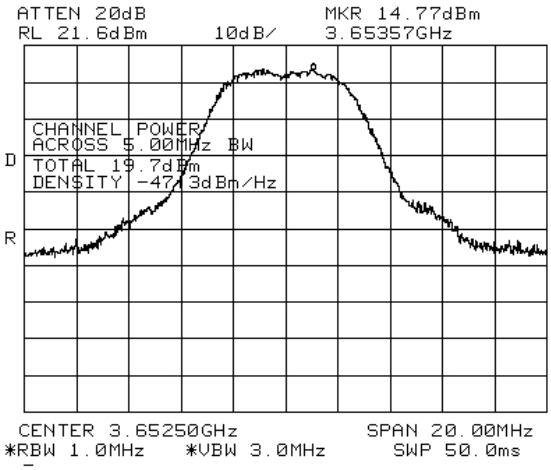


Figure 7.— 3652.50 MHz 64QAM

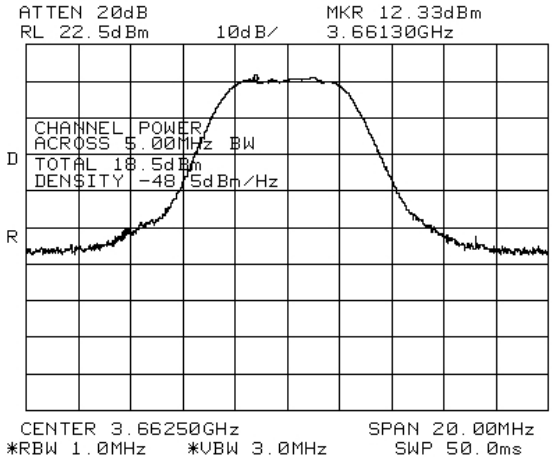


Figure 8.— 3662.50 MHz QPSK

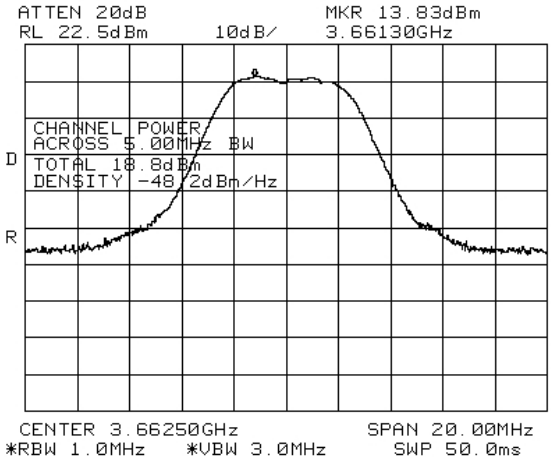


Figure 9.— 3662.50 MHz 16QAM

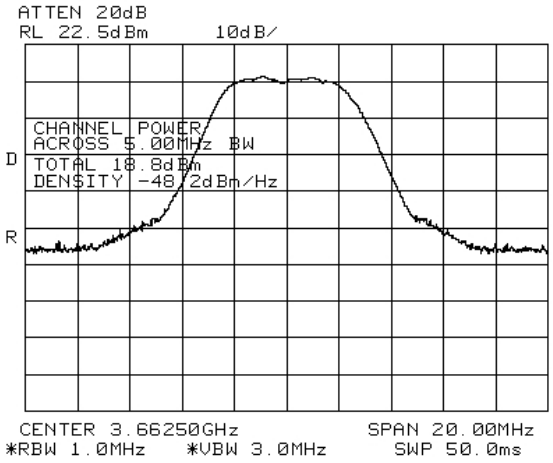


Figure 10.— 3662.50 MHz 64QAM

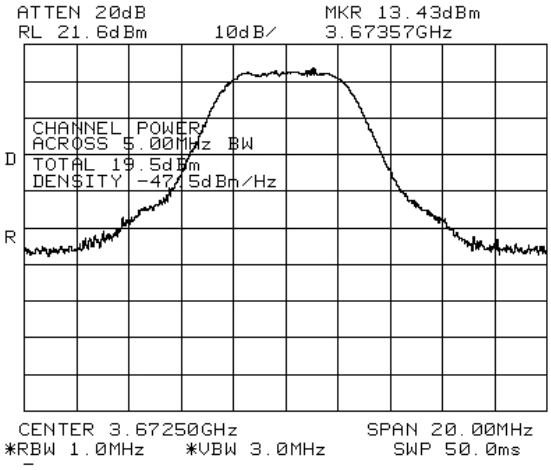


Figure 11.— 3672.50 MHz QPSK

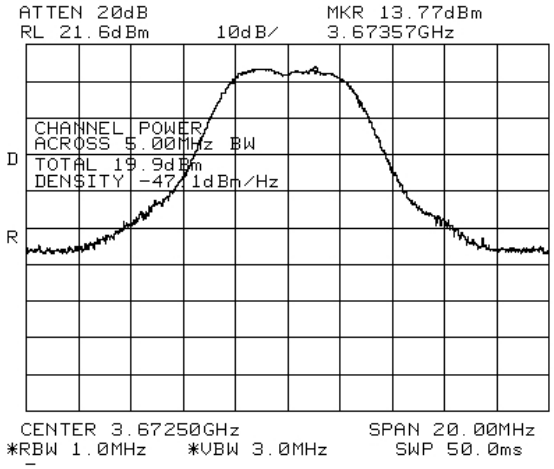


Figure 12.— 3672.50 MHz 16QAM

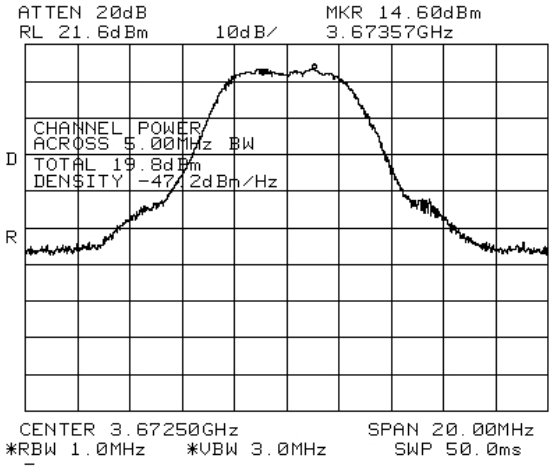


Figure 13.— 3672.50 MHz 64QAM

4.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90, Subpart Z, Section 90.1321

Operation Frequency (MHz)	Modulation	Reading (dBm)	Antenna Gain (dBi)	Maximum Peak Output Power (dBm)	Specification (dBm)	Margin (dB)
3652.50	QPSK	19.7	17	36.7	37.0	-0.3
	16QAM	19.9	17	36.9	37.0	-0.1
	64QAM	19.7	17	36.7	37.0	-0.3
3662.50	QPSK	18.5	17	35.5	37.0	-1.5
	16QAM	18.8	17	35.8	37.0	-1.2
	64QAM	18.8	17	35.8	37.0	-1.2
3672.50	QPSK	19.5	17	36.5	37.0	-0.5
	16QAM	19.9	17	36.9	37.0	-0.1
	64QAM	19.8	17	36.8	37.0	-0.2

Figure 14 Maximum Peak Power Output

JUDGEMENT: Passed by 0.1 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 10.05.10
Typed/Printed Name: A. Sharabi

4.4 Test Equipment Used.

Maximum Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8546E	3442A00275	December 15, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 15 Test Equipment Used

5. Maximum Peak Output Power 10 MHz Bandwidth

5.1 Test Specification

FCC Part 90, Subpart Z, Section 90.1321

5.2 Test procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (1 dB). The E.U.T. RF output was OFDMA modulated with QPSK, 16QAM and 64QAM, at 10MHz BW.

Special attention was taken to prevent Spectrum Analyzer RF input overload. Tested frequencies: 3655.0 MHz, 3665.0 MHz, 3670.0MHz

According to 47 CFR Part 2 section § 2.1046 and Part 90 section § 90.1321, the maximum power of a base station shall not exceed 25 watts/25 MHz.

For 10MHz bandwidth the limit is 40dBm on single port.

Unit transmits at SISO mode and both of the RF heads are identical, so only one port were tested.

ANTENNA TYPE Dipole antenna with N type connector (Setting Tx power:12dBm Antenna Gain :17dBi)

Results:

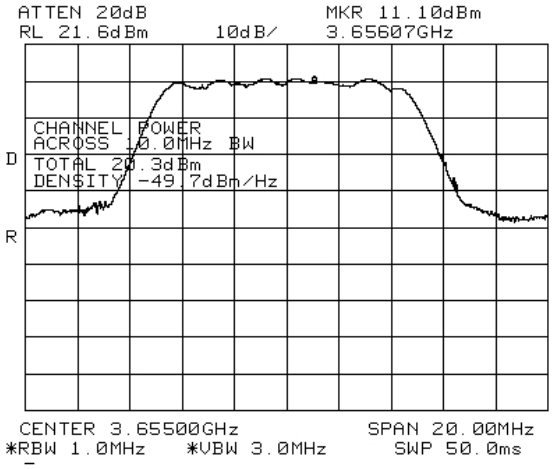


Figure 16.— 3655.00 MHz QPSK

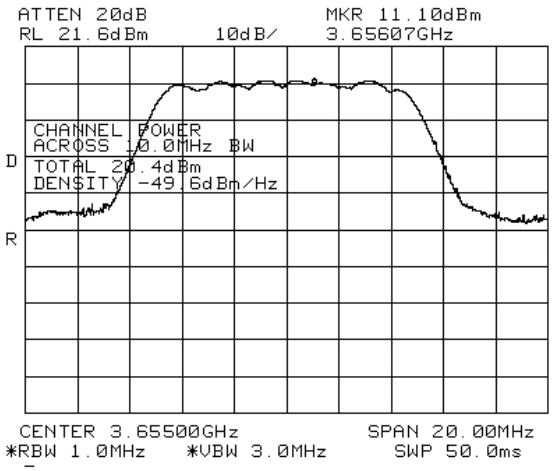


Figure 17.— 3655.00 MHz 16QAM

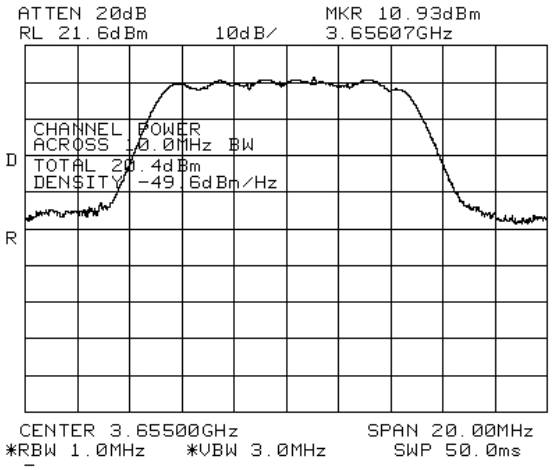


Figure 18.— 3655.00 MHz 64QAM

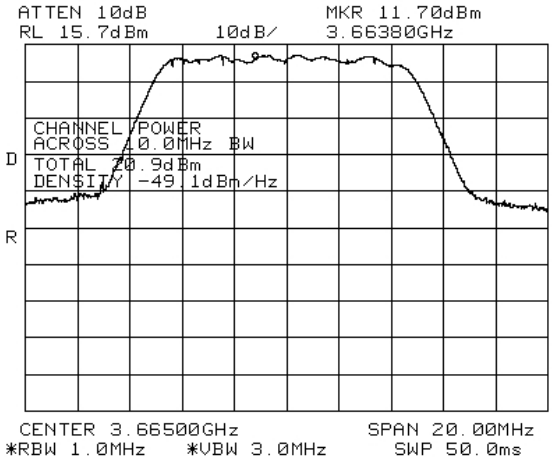


Figure 19.— 3665.00 MHz QPSK

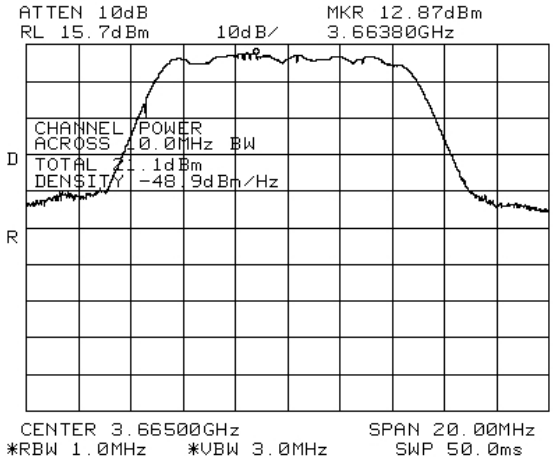


Figure 20.— 3665.00 MHz 16QAM

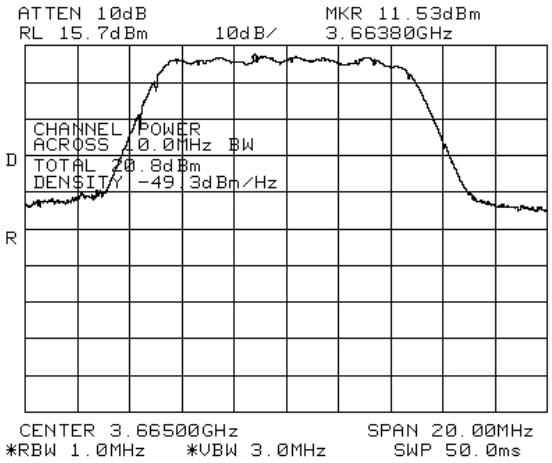


Figure 21.— 3665.00 MHz 64QAM

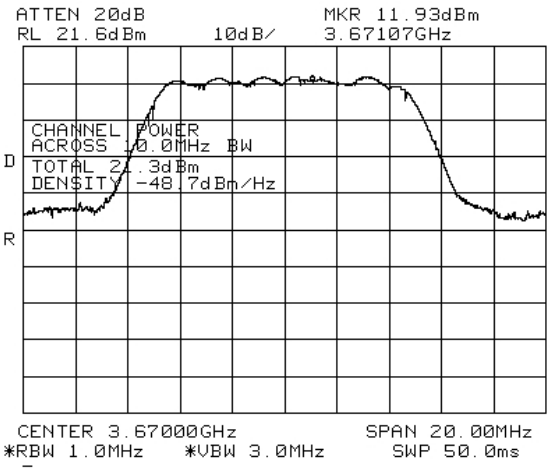


Figure 22.— 3670.00 MHz QPSK

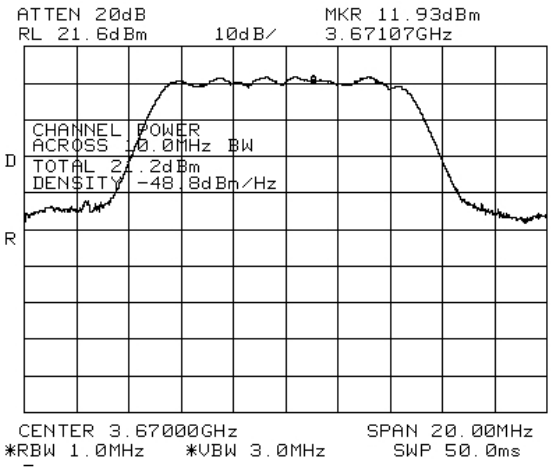


Figure 23.— 3670.00 MHz 16QAM

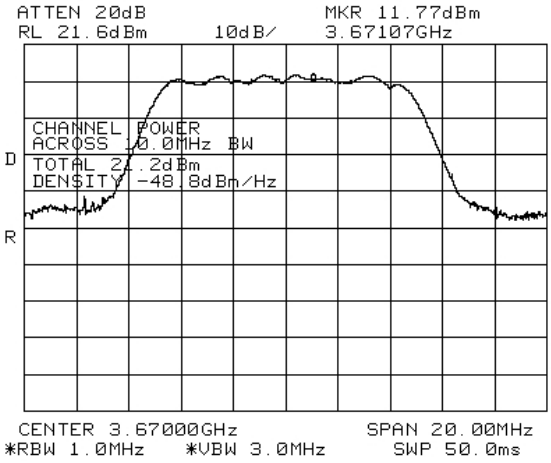


Figure 24.— 3670.00 MHz 64QAM

5.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90, Subpart Z, Section 90.1321

Operation Frequency (MHz)	Modulation	Reading (dBm)	Antenna Gain	Maximum Peak Power Output	Specification* (dBm)	Margin (dB)
3655.00	QPSK	20.3	17.0	37.3	40.0	-2.7
	16QAM	20.4	17.0	37.4	40.0	-2.6
	64QAM	20.4	17.0	37.4	40.0	-2.6
3665.00	QPSK	20.9	17.0	37.9	40.0	-2.1
	16QAM	21.1	17.0	38.1	40.0	-1.9
	64QAM	20.8	17.0	37.8	40.0	-2.2
3670.00	QPSK	21.3	17.0	38.3	40.0	-1.7
	16QAM	21.2	17.0	38.2	40.0	-1.8
	64QAM	21.2	17.0	38.2	40.0	-1.8

Figure 25 Maximum Peak Power Output

JUDGEMENT: Passed by 1.8 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 10.05.10
Typed/Printed Name: A. Sharabi

5.4 Test Equipment Used.

Maximum Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8546E	3442A00275	December 15, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 26 Test Equipment Used

6. Spectral Power Density 5 MHz Bandwidth

6.1 Test Specification

FCC Part 90, Subpart Z ,Section 90.1321

6.2 Test procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (1 dB). The E.U.T. RF output was OFDMA modulated with QPSK, 16QAM and 64QAM, at 5 MHz BW.

Special attention was taken to prevent Spectrum Analyzer RF input overload. Tested frequencies: 3652.5MHz, 3672.5MHz and 3697.5MHz.

According to 47 CFR Part 2 section § 2.1046 and Part 90 section § 90.1321, the maximum power of a base station shall not exceed 25 watts/25 MHz band.

The Spectral density limit is 30dBm EIRP for any 1 MHz slice of spectrum.

Unit transmits at SISO mode and both of the RF heads are identical, so only one port was tested.

ANTENNA TYPE Dipole antenna with N type connector (Antenna Gain : 17dBi)

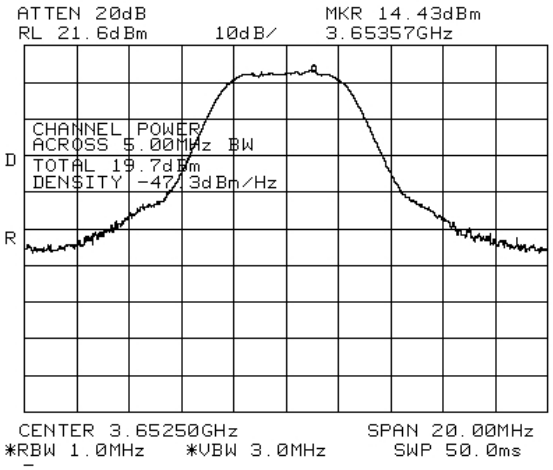


Figure 27.— 3652.50 MHz QPSK

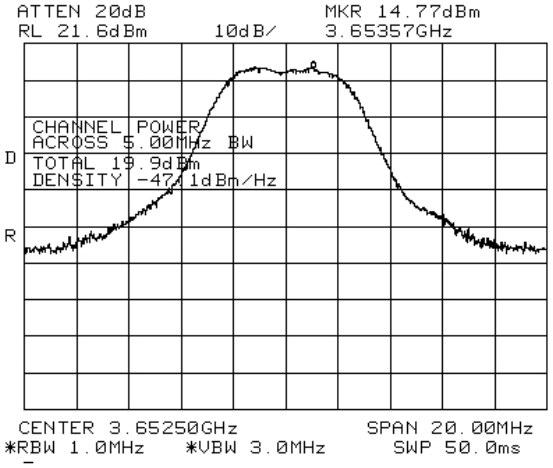


Figure 28.— 3652.50 MHz 16QAM

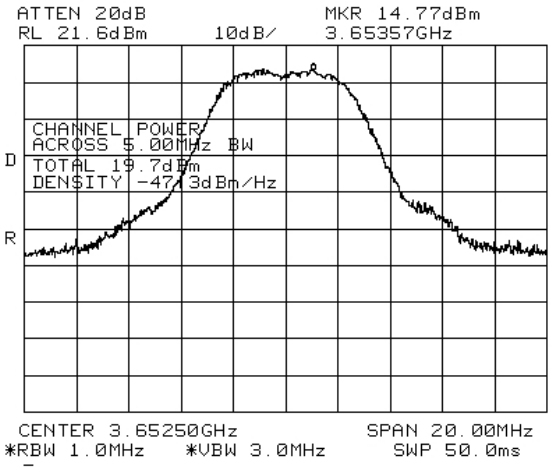


Figure 29.— 3652.50 MHz 64QAM

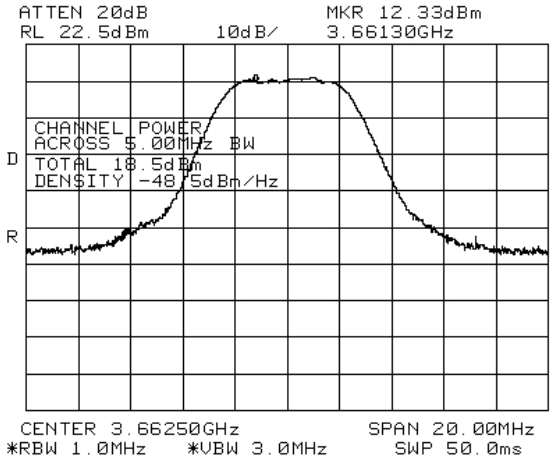


Figure 30.— 3662.50 MHz QPSK

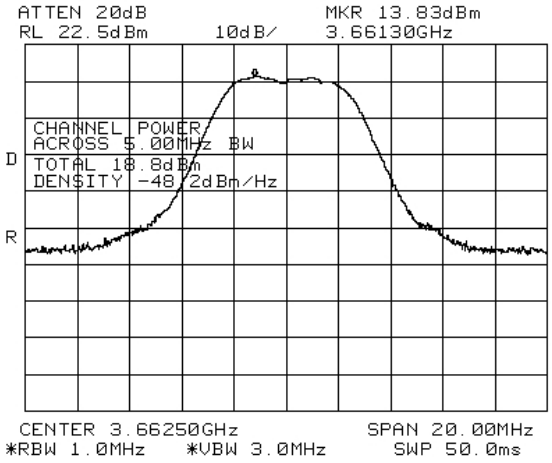


Figure 31.— 3662.50 MHz 16QAM

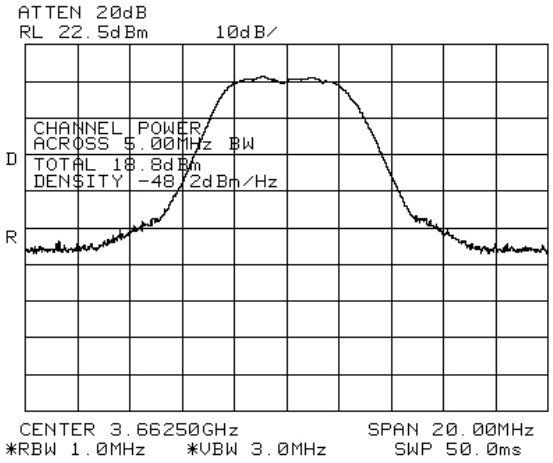


Figure 32.— 3662.50 MHz 64QAM

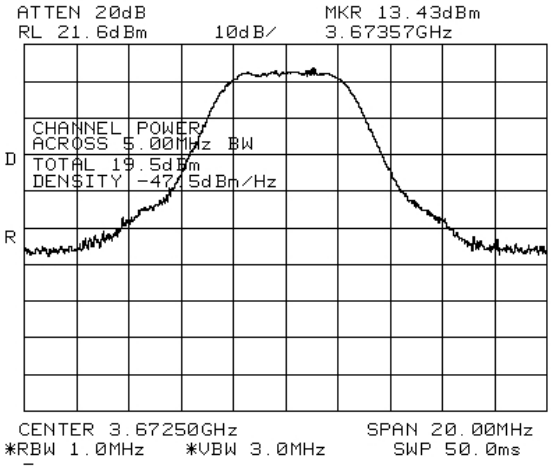


Figure 33.— 3672.50 MHz QPSK

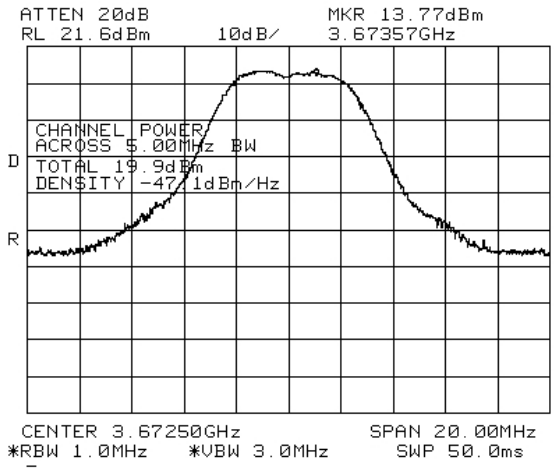


Figure 34.— 3672.50 MHz 16QAM

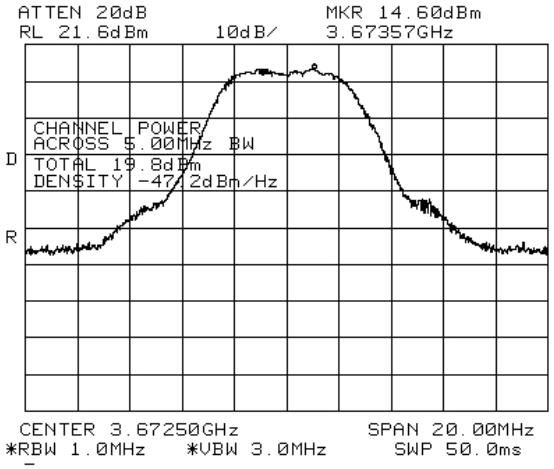


Figure 35.— 3672.50 MHz 64QAM

6.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90, Subpart Z, Section 90.1321

Operation Frequency (MHz)	Modulation	Reading* (dBm)	Antenna Gain (dBi)	Spectral Power Density (dBm)	Specification (dBm)	Margin (dB)
3625.50	QPSK	12.7	17.0	29.7	30.0	-0.3
	16QAM	12.9	17.0	29.9	30.0	-0.1
	64QAM	12.7	17.0	29.7	30.0	-0.3
3662.50	QPSK	11.5	17.0	28.5	30.0	-1.5
	16QAM	11.8	17.0	28.8	30.0	-1.2
	64QAM	11.8	17.0	28.8	30.0	-1.2
3672.50	QPSK	12.5	17.0	29.5	30.0	-0.5
	16QAM	12.9	17.0	29.9	30.0	-0.1
	64QAM	12.8	17.0	29.8	30.0	-0.2

*- Spectral power density, dBm/1MHz = Spectrum analyzer reading, dBm/Hz + 60 dB

Figure 36 Spectral Power Density

JUDGEMENT: Passed by 0.1 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 10.05.10
Typed/Printed Name: A. Sharabi

6.4 Test Equipment Used.

Spectral Power Density

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8546E	3442A00275	December 15, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 37 Test Equipment Used

7. Spectral Power Density 10 MHz Bandwidth

7.1 Test Specification

FCC Part 90, Subpart Z, Section 90.1321

7.2 Test procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (1 dB). The E.U.T. RF output was OFDMA modulated with QPSK, 16QAM and 64QAM, at 10MHz BW.

Special attention was taken to prevent Spectrum Analyzer RF input overload. Tested frequencies: 3655.0MHz,3665, 3670.0MHz

According to 47 CFR Part 2 section § 2.1046 and Part 90 section § 90.1321, the maximum power of a base station shall not exceed 25 watts/25 MHz.

For 10MHz bandwidth the limit is 40dBm on single port.

Unit transmits at SISO mode and both of the RF heads are identical, so only one port were tested.

ANTENNA TYPE Dipole antenna with N type connector (Setting Tx power:12dBm Antenna Gain :17dBi)

Results:

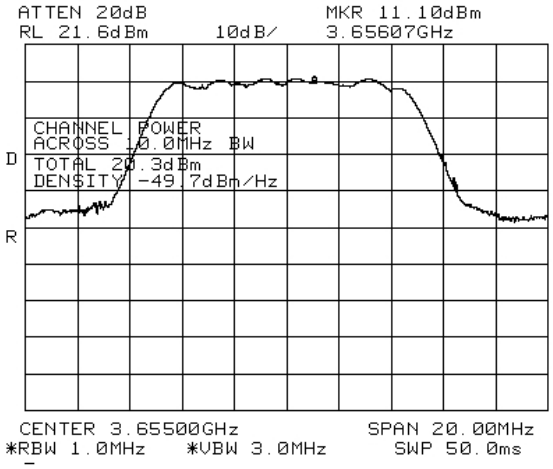


Figure 38.— 3655.00 MHz QPSK

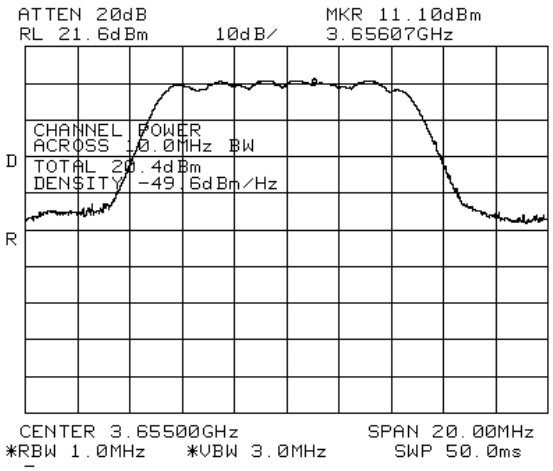


Figure 39.— 3655.00 MHz 16QAM

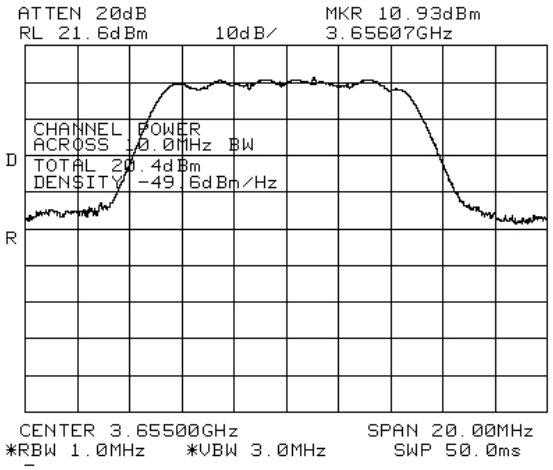


Figure 40.— 3655.00 MHz 64QAM

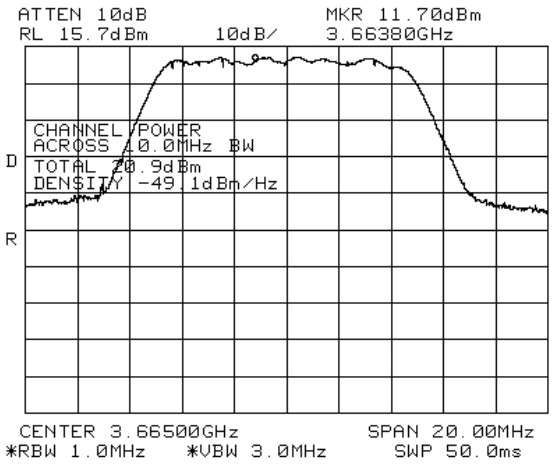


Figure 41.— 3665.00 MHz QPSK

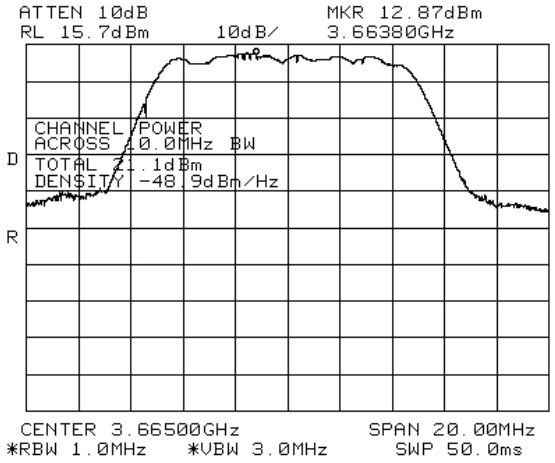


Figure 42.— 3665.00 MHz 16QAM

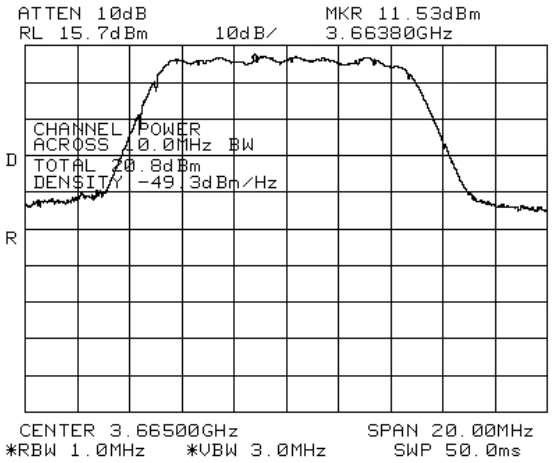


Figure 43.— 3665.00 MHz 64QAM

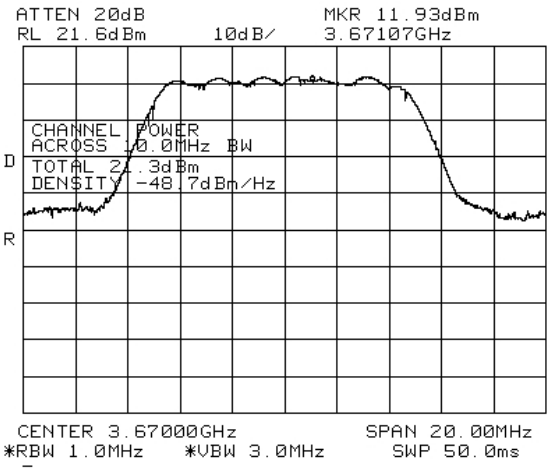


Figure 44.— 3670.00 MHz QPSK

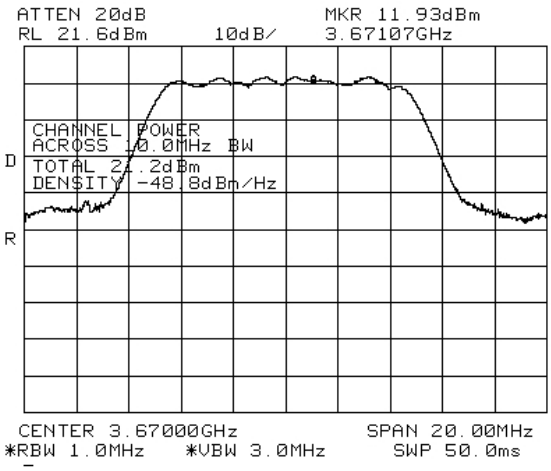


Figure 45.— 3670.00 MHz 16QAM

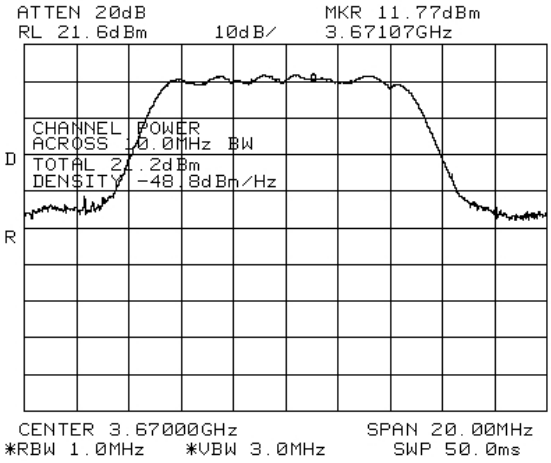


Figure 46.— 3670.00 MHz 64QAM

7.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90, Subpart Z, Section 90.1321

Operation Frequency (MHz)	Modulation	Reading* (dBm)	Antenna Gain	Spectral Power Density	Specification (dBm)	Margin (dB)
3655.00	QPSK	10.3	17.0	27.3	30.0	-2.7
	16QAM	10.4	17.0	27.4	30.0	-2.6
	64QAM	10.4	17.0	27.4	30.0	-2.6
3665.00	QPSK	10.9	17.0	27.9	30.0	-2.1
	16QAM	11.1	17.0	28.1	30.0	-1.9
	64QAM	10.7	17.0	27.7	30.0	-2.3
3670.00	QPSK	11.3	17.0	28.3	30.0	-1.7
	16QAM	11.2	17.0	28.2	30.0	-1.8
	64QAM	11.2	17.0	28.2	30.0	-1.8

*- Spectral power density, dBm/1 MHz = Spectrum analyzer reading, dBm/Hz + 60 dB

Figure 47 Spectral Power Density

JUDGEMENT: Passed by 1.7 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 10.05.10
Typed/Printed Name: A. Sharabi

7.4 Test Equipment Used.

Spectral Power Density

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8546E	3442A00275	December 15, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 48 Test Equipment Used

8. Occupied Bandwidth 5 MHz Bandwidth

8.1 Test Specification

FCC, Part 90, Section 90.209, Part 2, 2.1049

8.2 Test Procedure

The E.U.T. was set to the applicable test frequency with OFDMA modulations and 5MHZ bandwidth in the 3650-3675MHz band
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (at the output test) and an appropriate coaxial cable. The spectrum analyzer was set to proper resolution B.W.
The occupied bandwidth was determent as the 26dBc points of the transmitted signal.

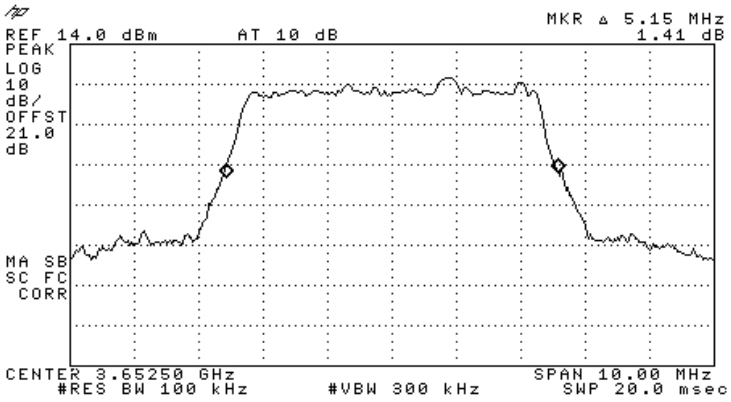


Figure 49.— 3652.50 MHz QPSK

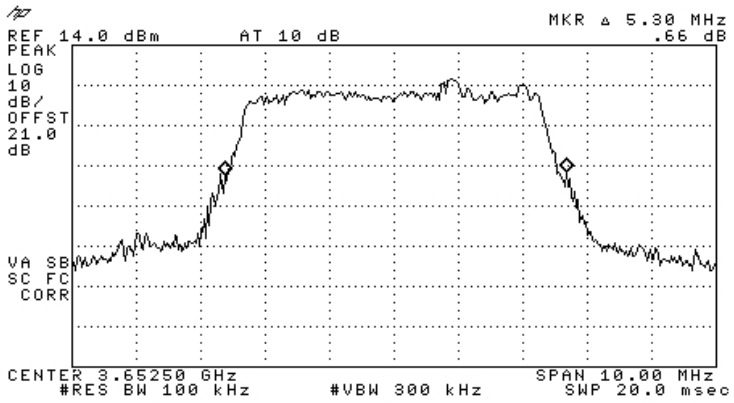


Figure 50.— 3652.50 MHz 16QAM

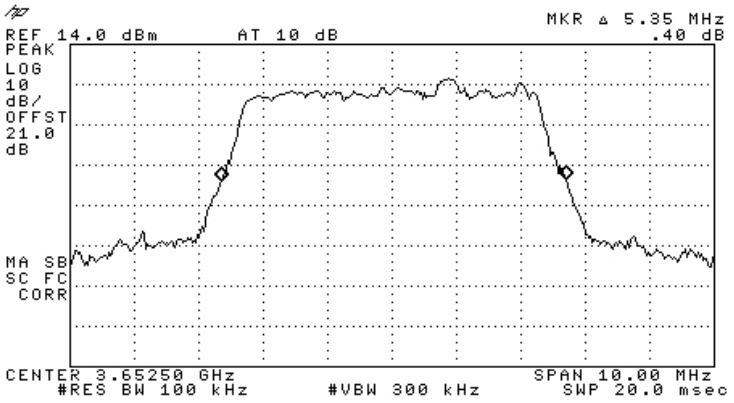


Figure 51.— 3652.50 MHz 64 QAM

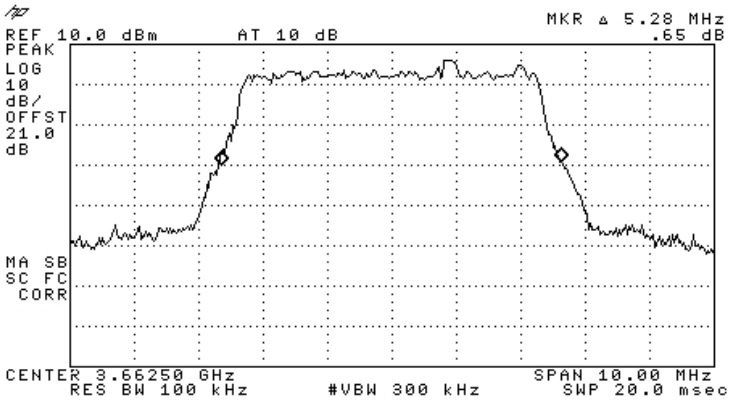


Figure 52.— 3662.50 MHz QPSK

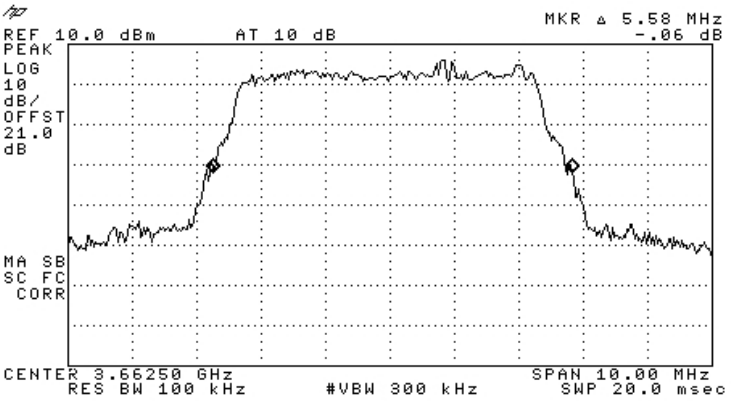


Figure 53.— 3662.50 MHz 16QAM

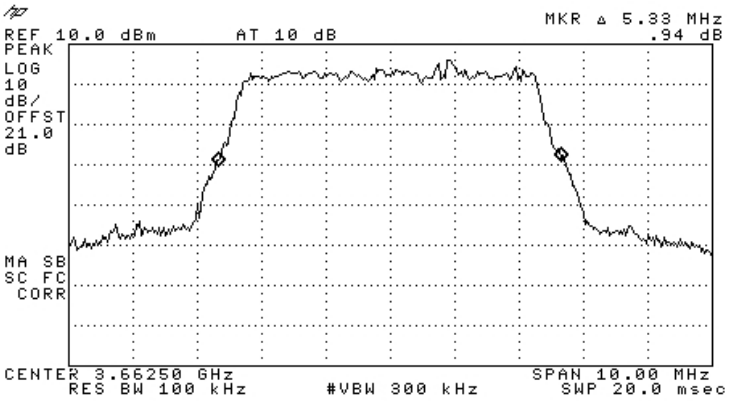


Figure 54.— 3662.50 MHz 64 QAM

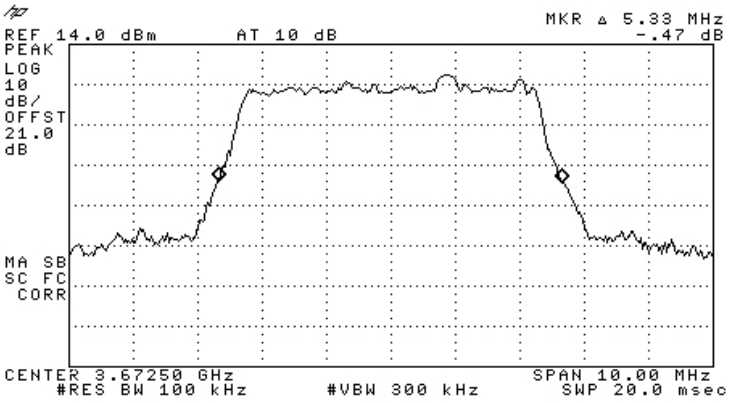


Figure 55.— 3672.50 MHz QPSK

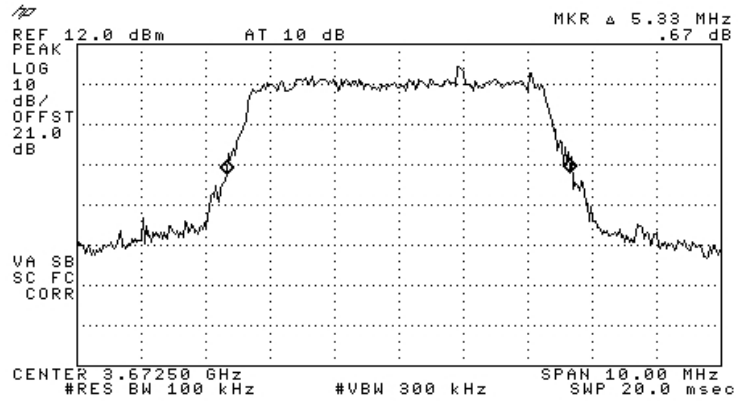


Figure 56.— 3672.50 MHz 16 QAM

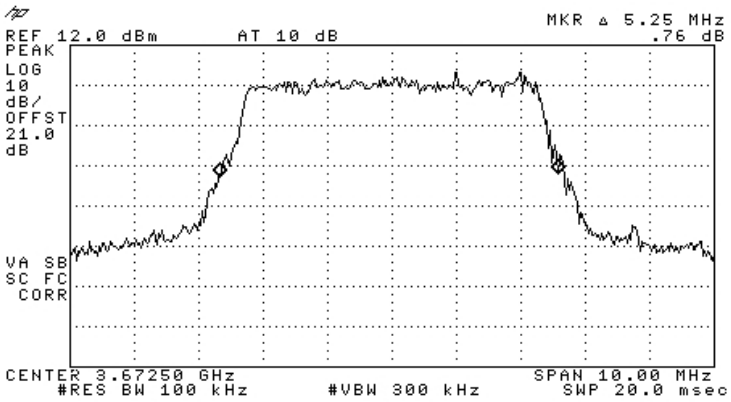


Figure 57.— 3672.50 MHz 64 QAM

8.3 Results Table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 2, Section 1049

Operating Frequency (MHz)	Modulation	Reading (26dBc) (MHz)
3652.50	QPSK	5.15
	16QAM	5.30
	64QAM	5.35
3662.50	QPSK	5.28
	16QAM	5.58
	64QAM	5.33
3672.50	QPSK	5.33
	16QAM	5.33
	64QAM	5.25

Figure 58 Occupied Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 10.05.10

Typed/Printed Name: A. Sharabi

8.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 59 Test Equipment Used

9. Occupied Bandwidth 10 MHz Bandwidth

9.1 Test Specification

FCC Part 90, Section 90.209, Part 2, Section 2.1049

9.2 Test Procedure

The E.U.T. was set to the applicable test frequency with OFDMA modulations and 10MHZ bandwidth in the 3650-3675MHz band
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (at the output test) and an appropriate coaxial cable. The spectrum analyzer was set to proper resolution B.W.
The occupied bandwidth was determent as the 26dBc points of the transmitted signal.

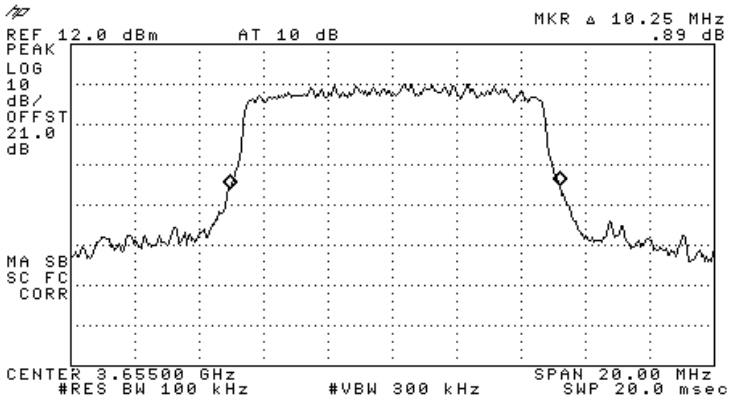


Figure 60.— 3655.00 MHz QPSK

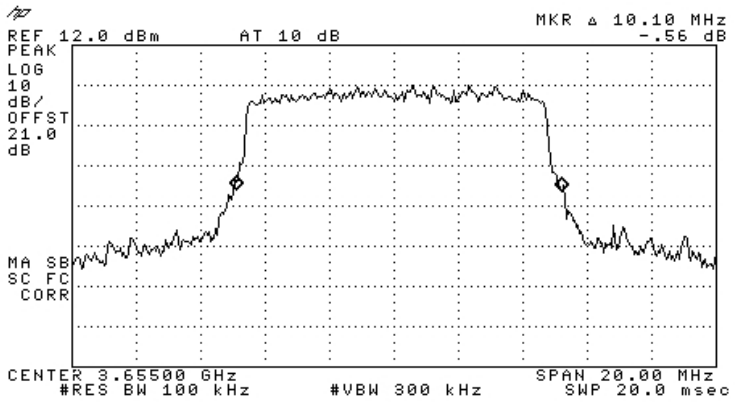


Figure 61.— 3655.00 MHz 16QAM

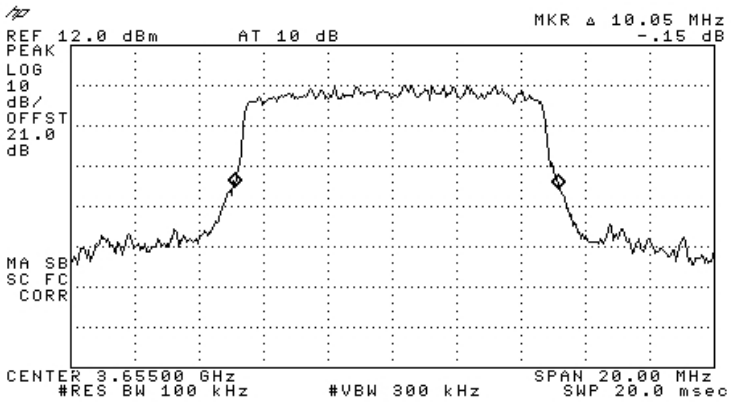


Figure 62.— 3655.00 MHz 64 QAM

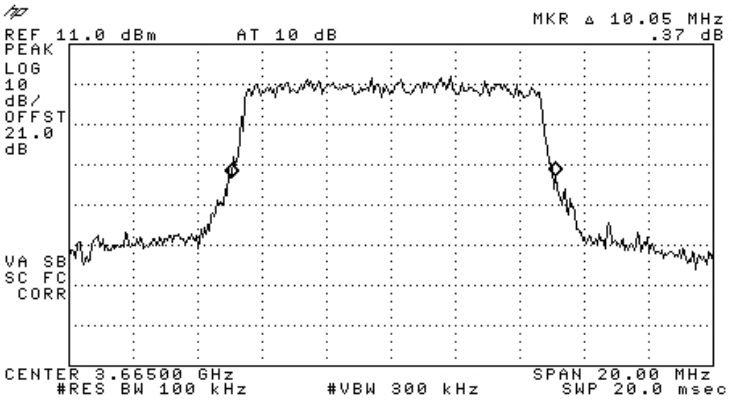


Figure 63.— 3665.00 MHz QPSK

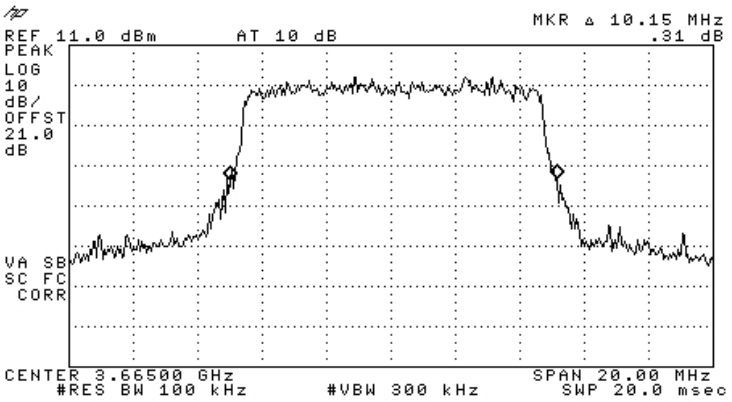


Figure 64.— 3665.00 MHz 16QAM

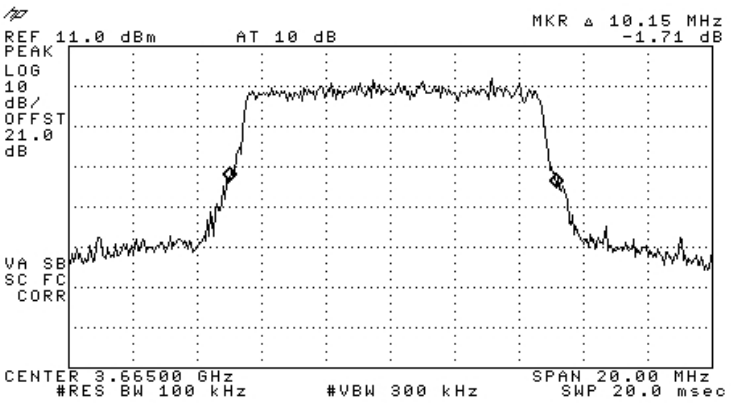


Figure 65.— 3665.00 MHz 64 QAM

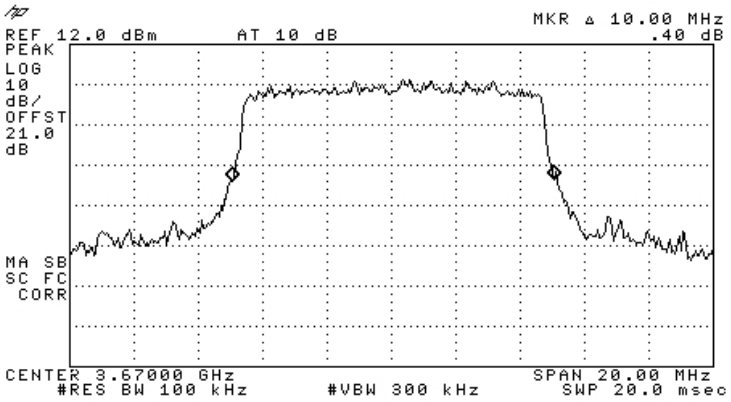


Figure 66.— 3670.00 MHz QPSK

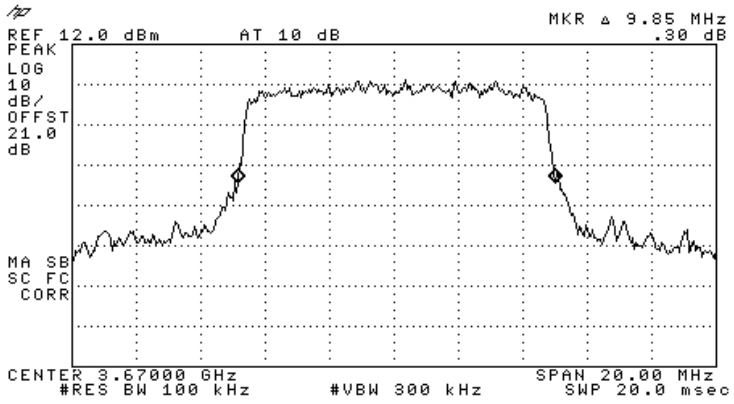


Figure 67.— 3670.00 MHz 16 QAM

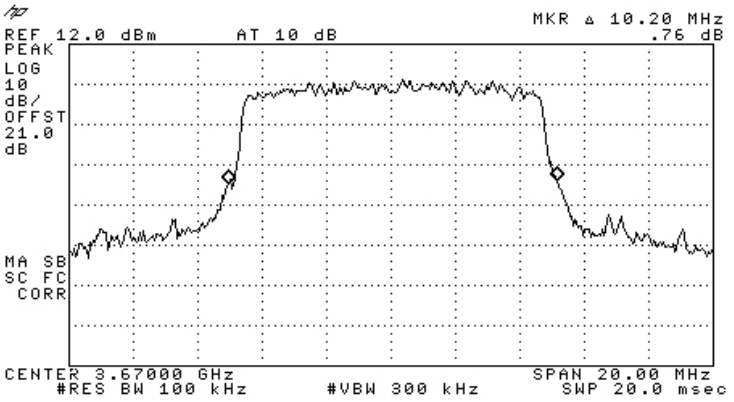


Figure 68.— 3670.00 MHz 64 QAM

9.3 Results Table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90, Section 90.209, Part 2, Section 2.1049

Operating Frequency (MHz)	Modulation	Reading (26dBc) (MHz)
3655.00	QPSK	10.25
	16QAM	10.10
	64QAM	10.05
3665.00	QPSK	10.05
	16QAM	10.15
	64QAM	10.15
3670.00	QPSK	10.00
	16QAM	9.85
	64QAM	10.20

Figure 69 Occupied Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 10.05.10

Typed/Printed Name: A. Sharabi

9.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 70 Test Equipment Used

10. Conducted Spurious Emissions 5 MHz Bandwidth

10.1 Test Specification

FCC Part 90 Section 90.1323

10.2 Test procedure

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at 43 + 10 log (P) dB The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (21.0 dB).

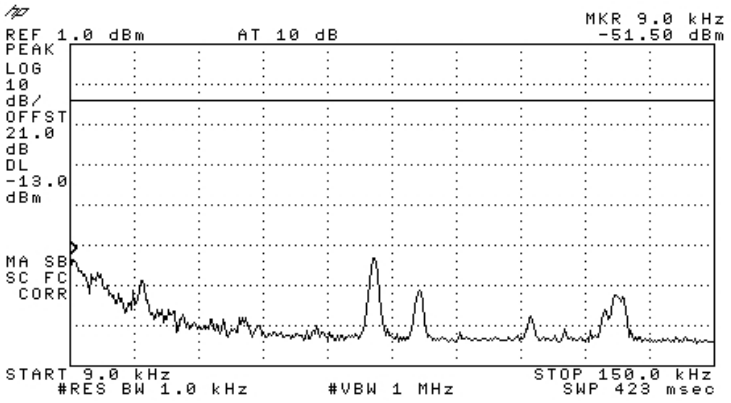


Figure 71.— 3652.50 MHz QPSK

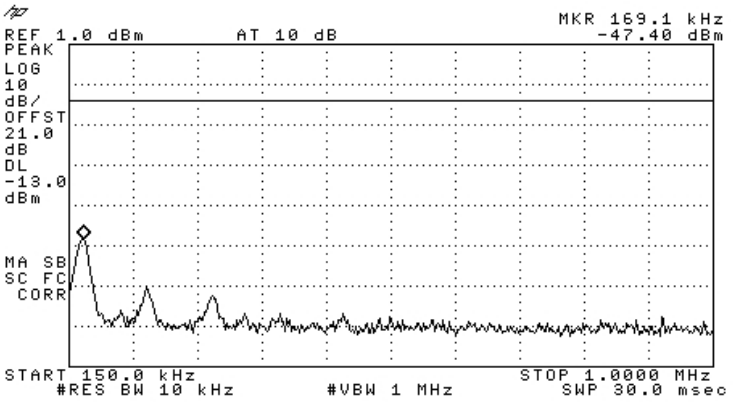


Figure 72.— 3652.50 MHz QPSK

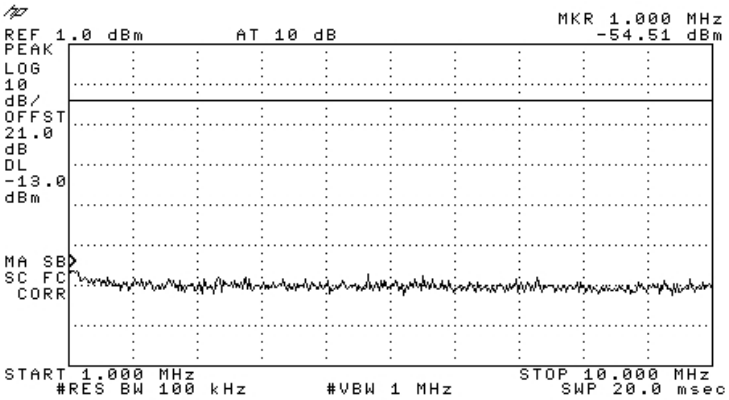


Figure 73.— 3652.50 MHz QPSK

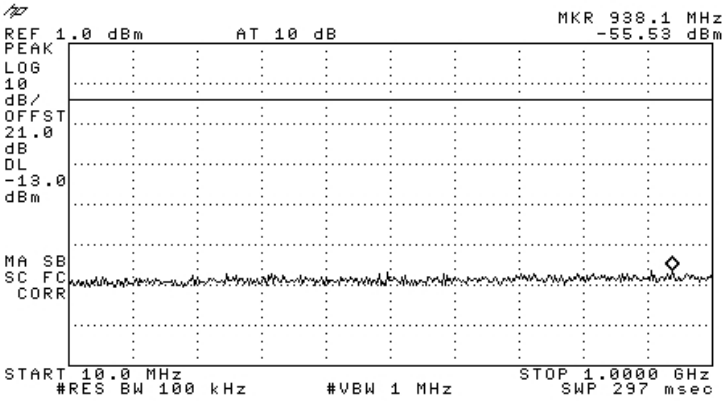


Figure 74.— 3652.50 MHz QPSK

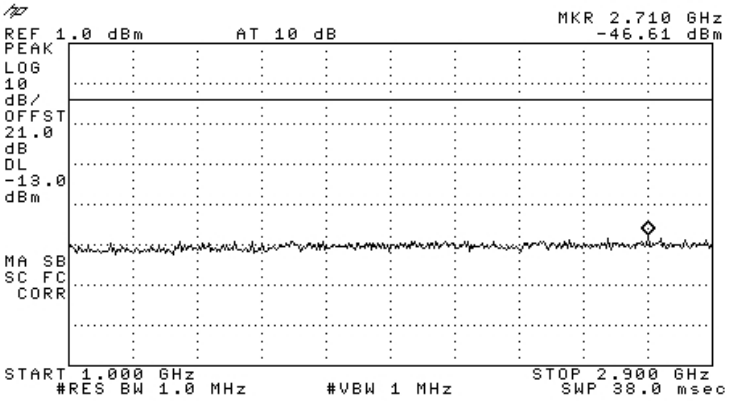


Figure 75.— 3652.50 MHz QPSK

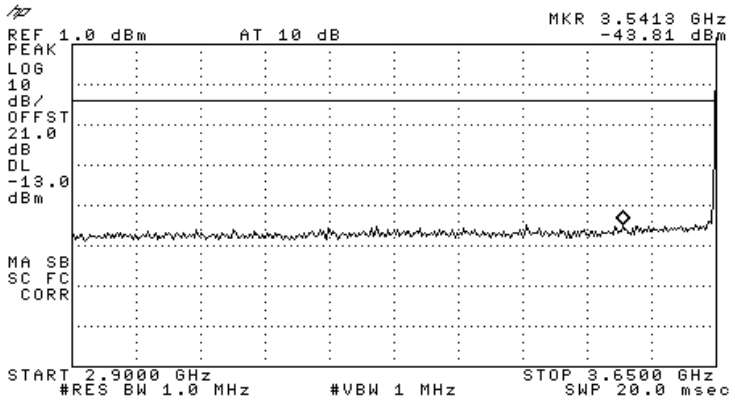


Figure 76.— 3652.50 MHz QPSK

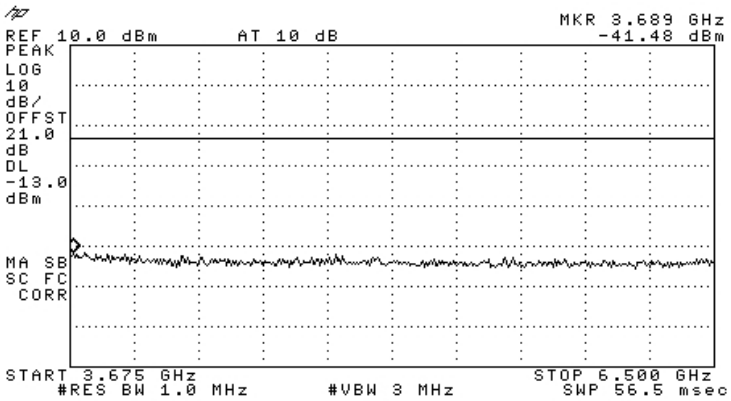


Figure 77.— 3652.50 MHz QPSK

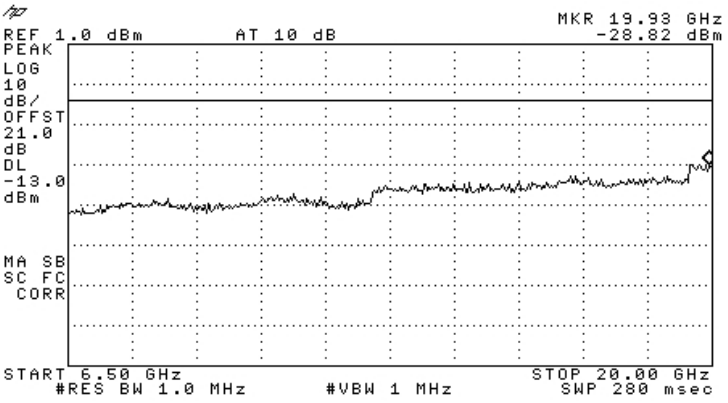


Figure 78.— 3652.50 MHz QPSK

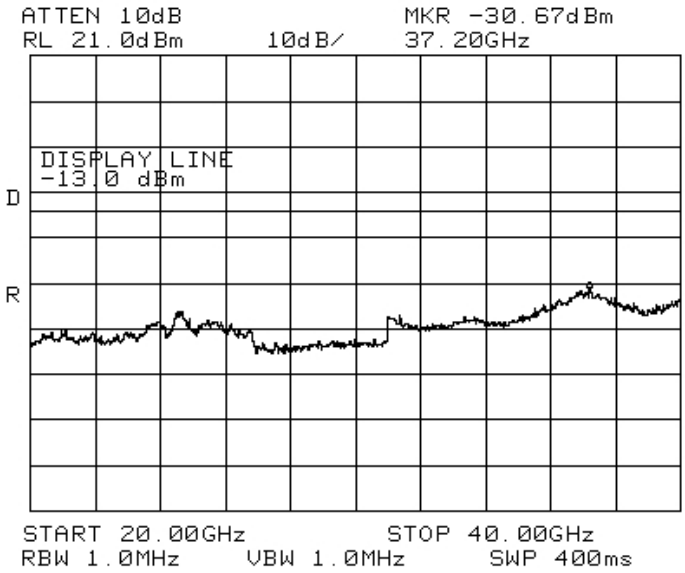


Figure 79.— 3652.50 MHz QPSK

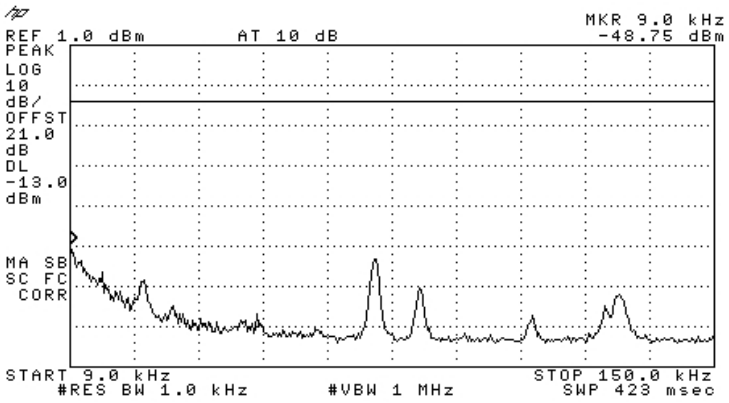


Figure 80.— 3652.50 MHz 16QAM

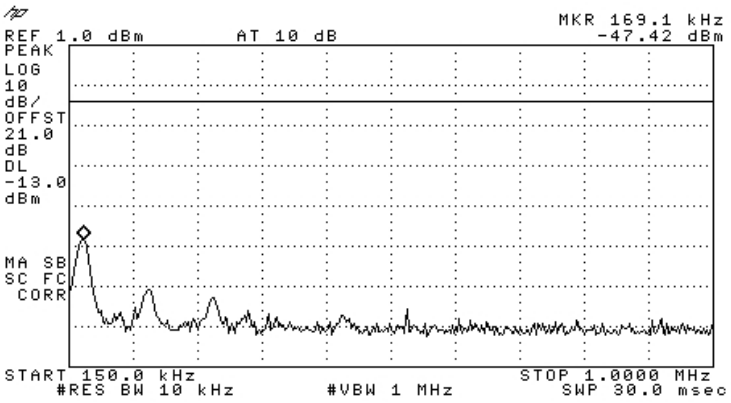


Figure 81.— 3652.50 MHz 16QAM

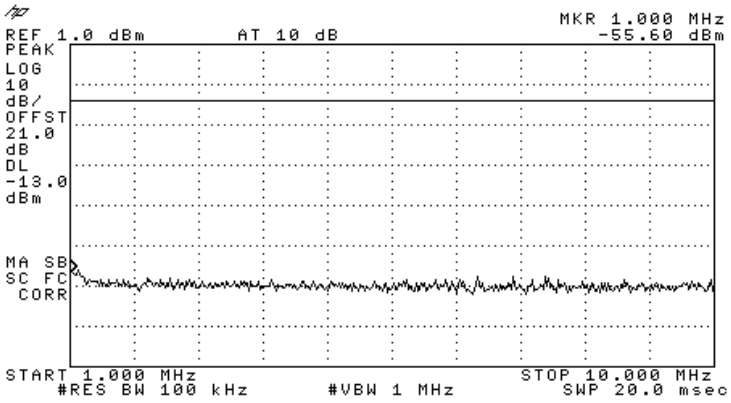


Figure 82.— 3652.50 MHz 16QAM

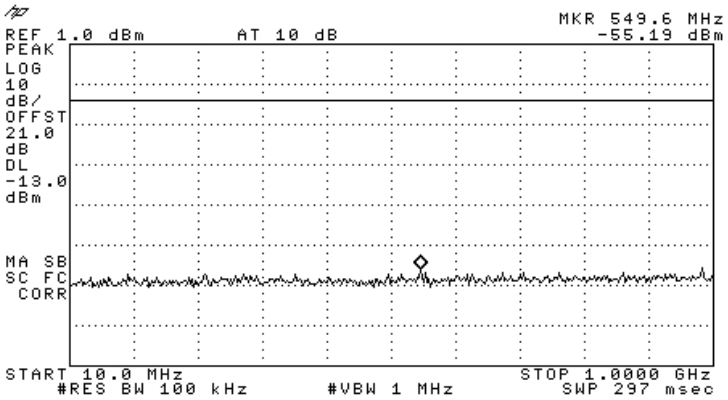


Figure 83.— 3652.50 MHz 16QAM

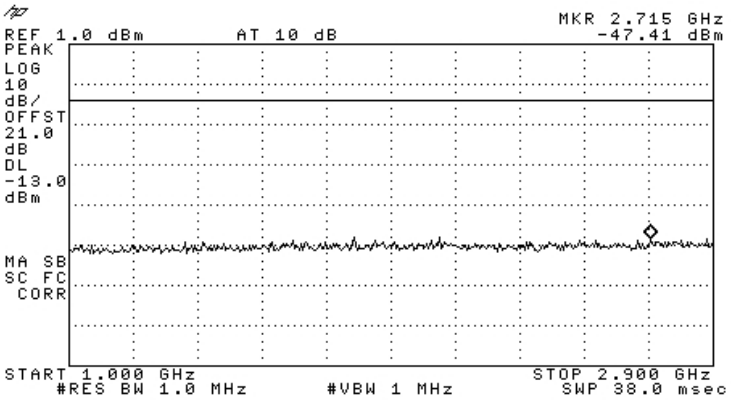


Figure 84.— 3652.50 MHz 16QAM

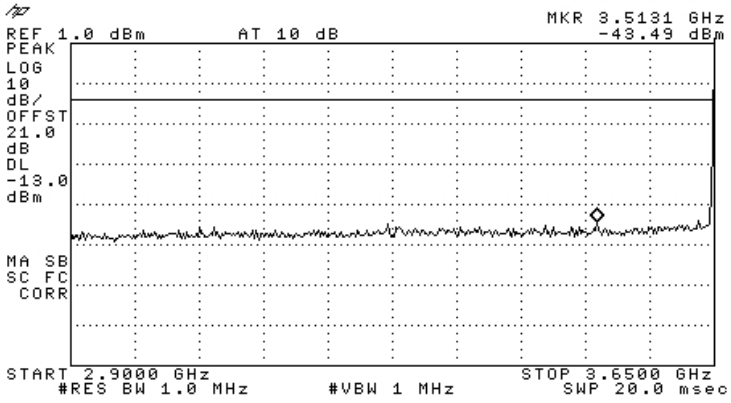


Figure 85.— 3652.50 MHz 16QAM

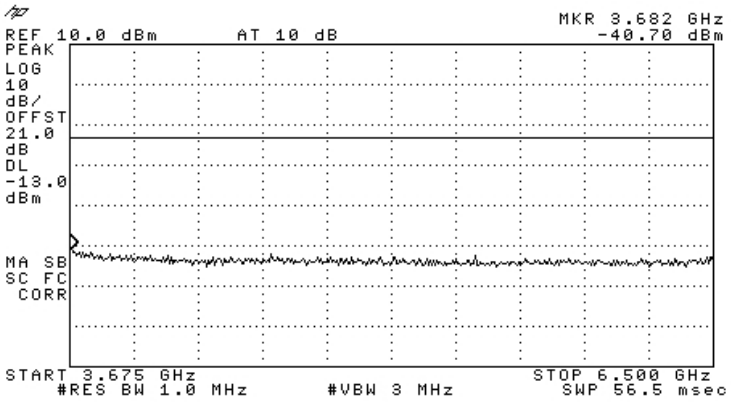


Figure 86.— 3652.50 MHz 16QAM

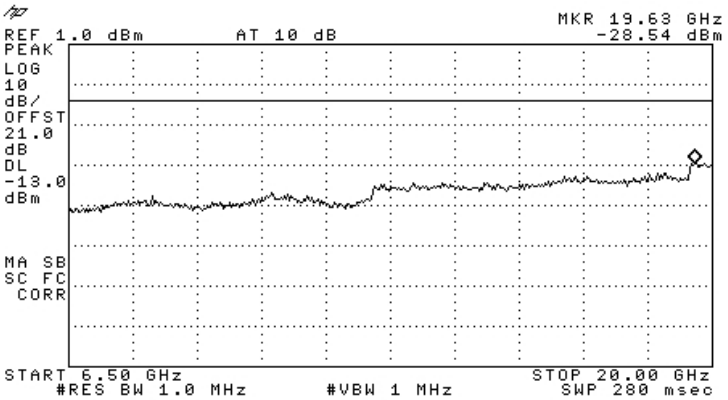


Figure 87.— 3652.50 MHz 16QAM

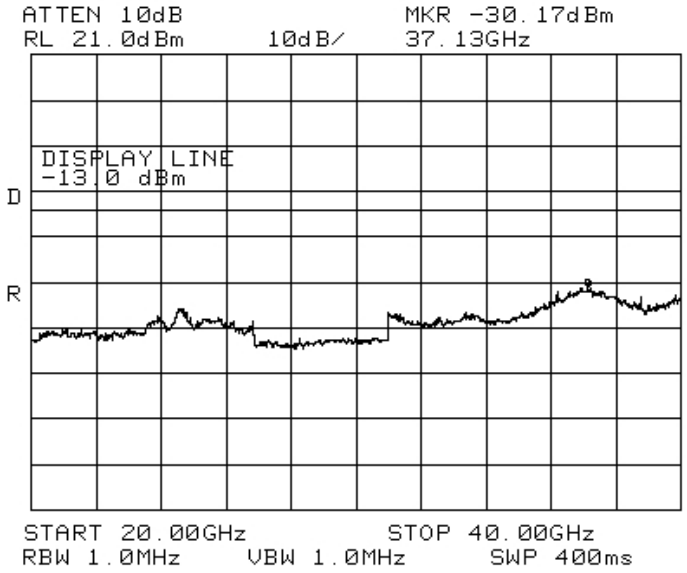


Figure 88.— 3652.50 MHz 16QAM

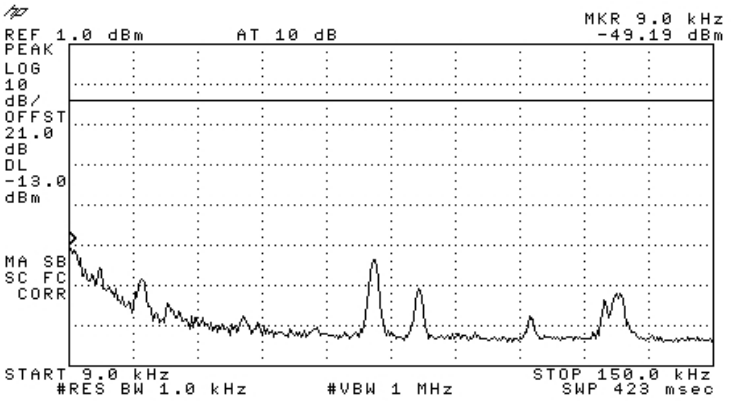


Figure 89.— 3652.50 MHz 64QAM

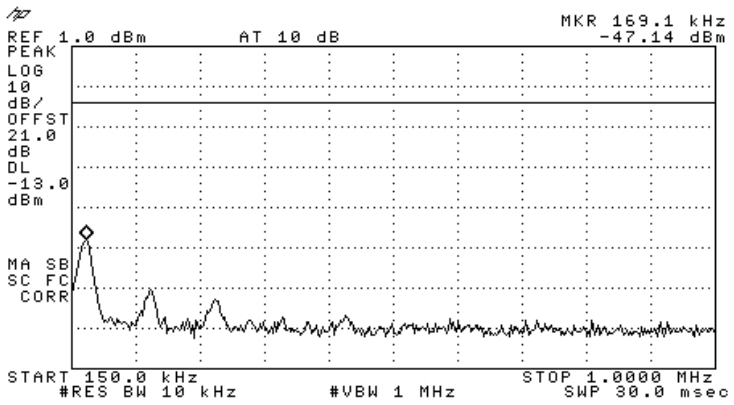


Figure 90.— 3652.50 MHz 64QAM

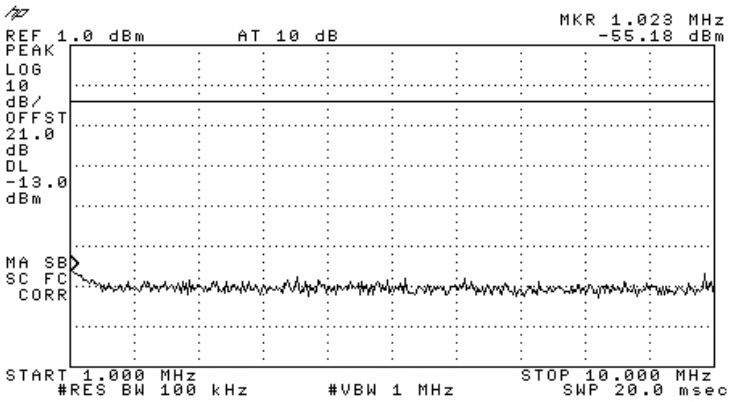


Figure 91.— 3652.50 MHz 64QAM

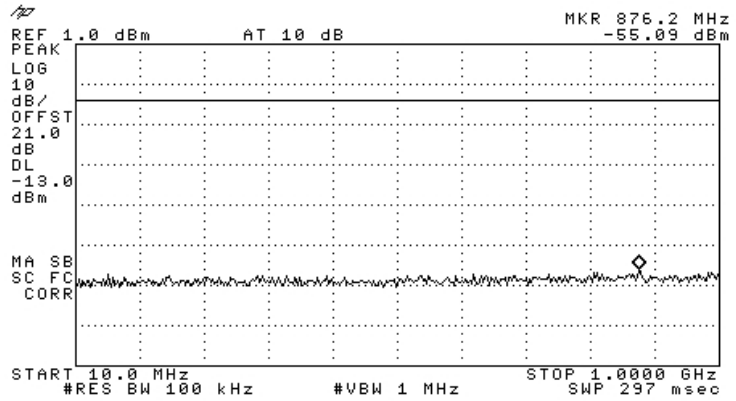


Figure 92.— 3652.50 MHz 64QAM

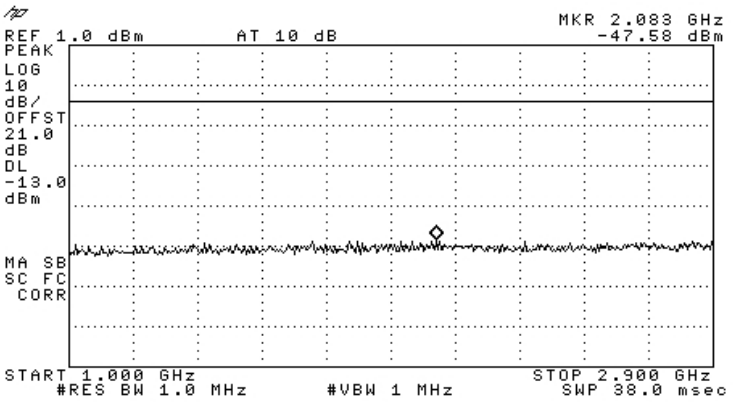


Figure 93.— 3652.50 MHz 64QAM

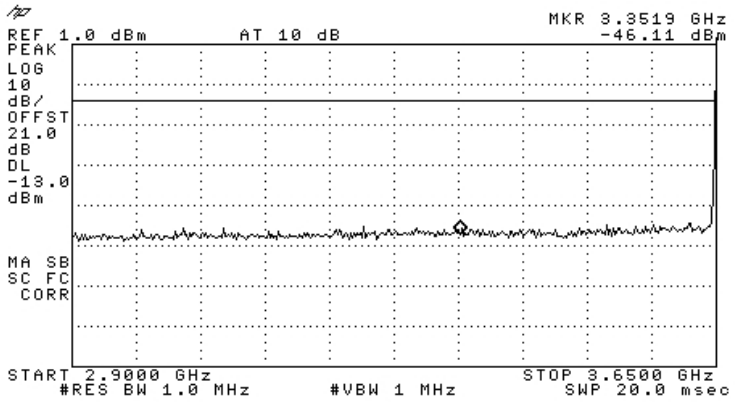


Figure 94.— 3652.50 MHz 64QAM

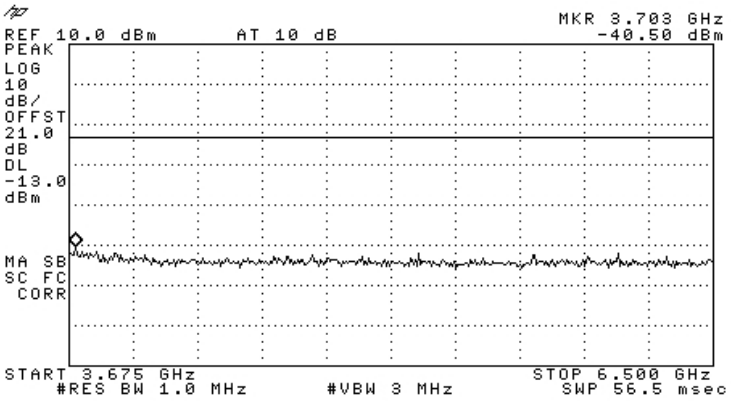


Figure 95.— 3652.50 MHz 64QAM

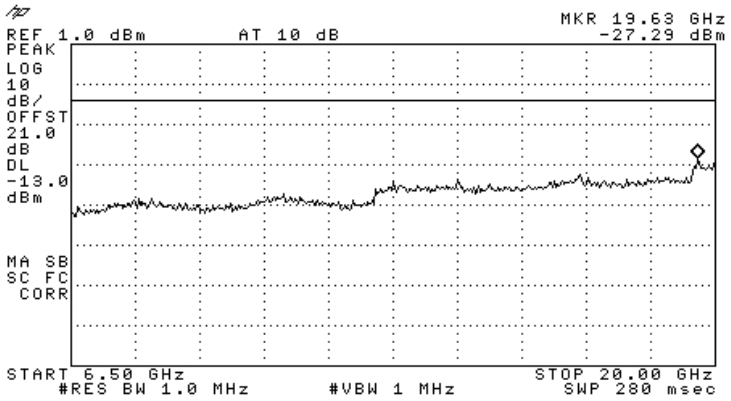


Figure 96.— 3652.50 MHz 64QAM

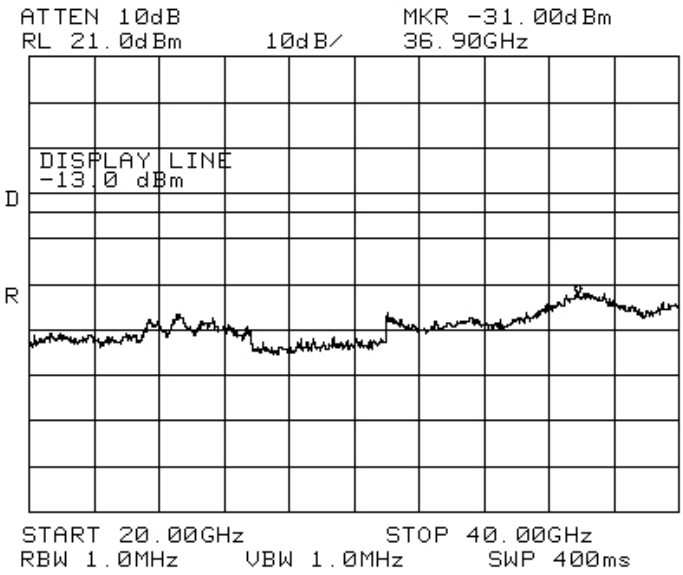


Figure 97.— 3652.50 MHz 64QAM

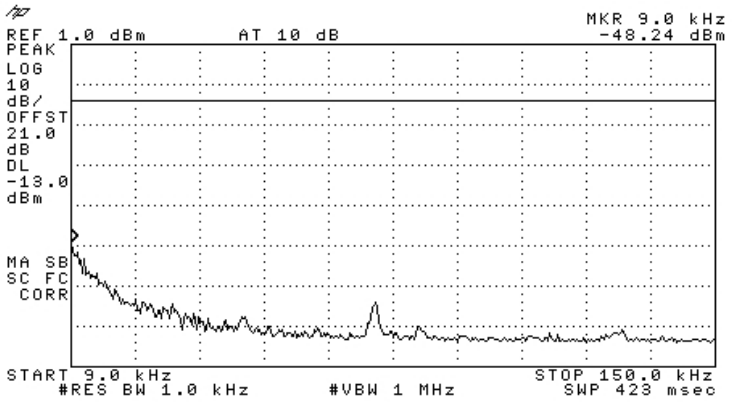


Figure 98.— 3662.50 MHz QPSK

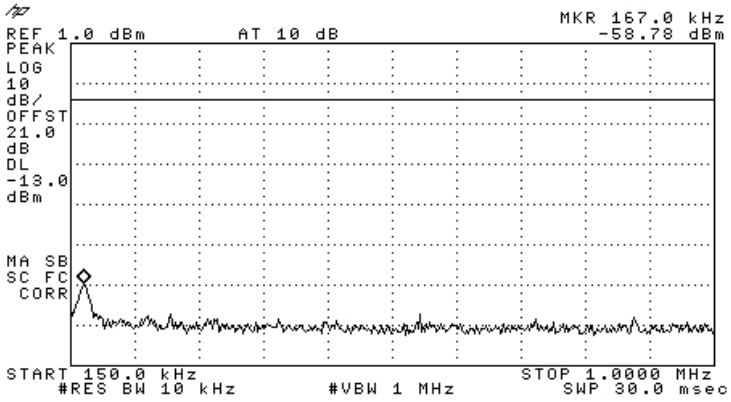


Figure 99.— 3662.50 MHz QPSK

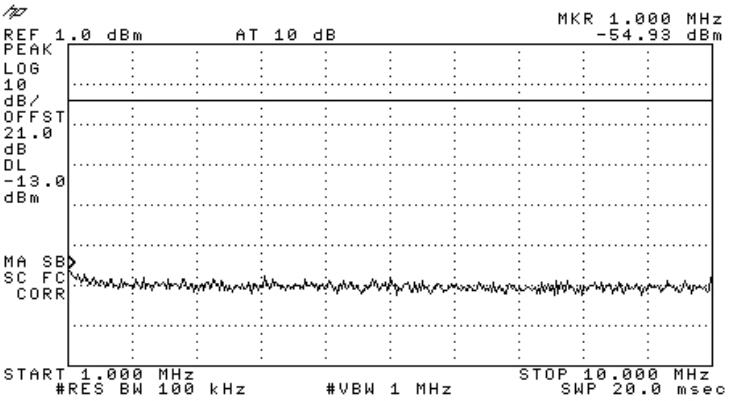


Figure 100.— 3662.50 MHz QPSK

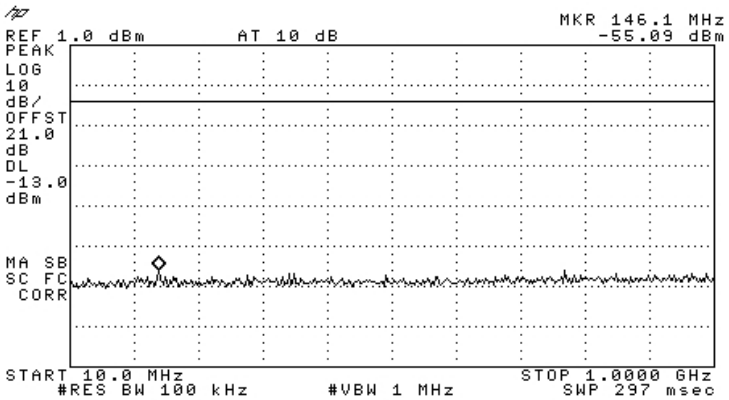


Figure 101.— 3662.50 MHz QPSK

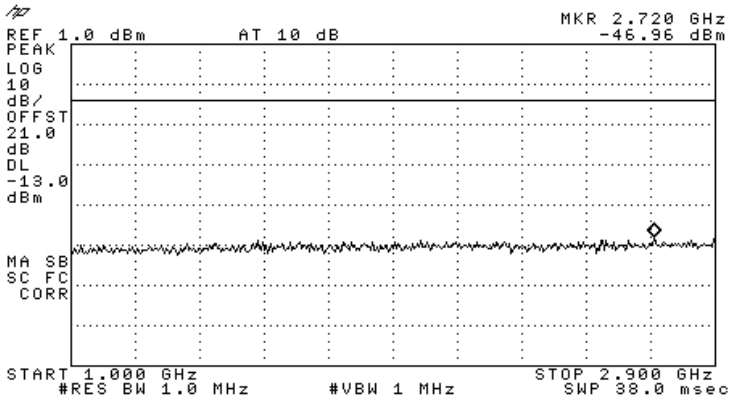


Figure 102.— 3662.50 MHz QPSK

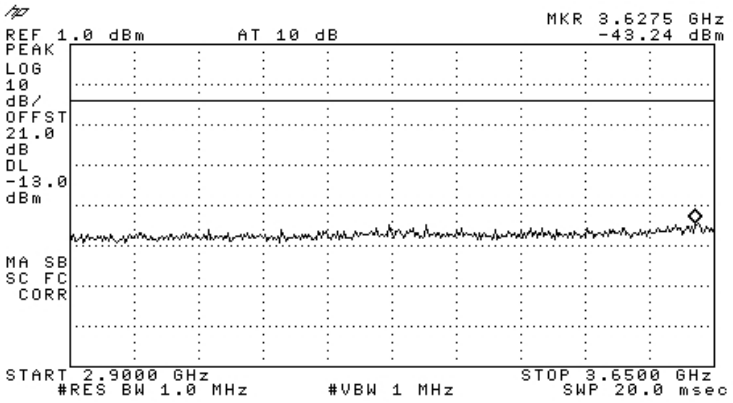


Figure 103.— 3662.50 MHz QPSK

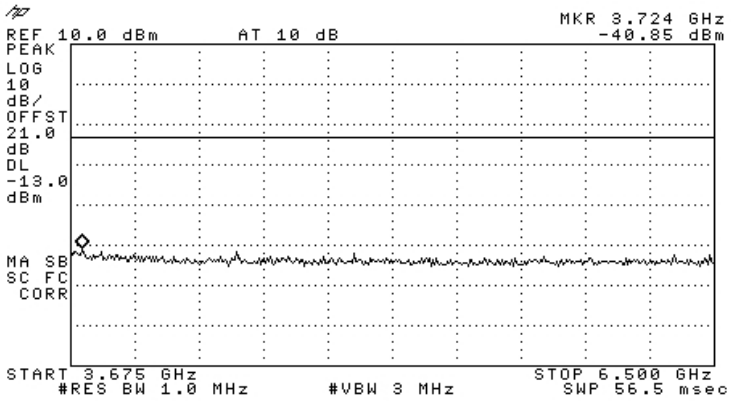


Figure 104.— 3662.50 MHz QPSK

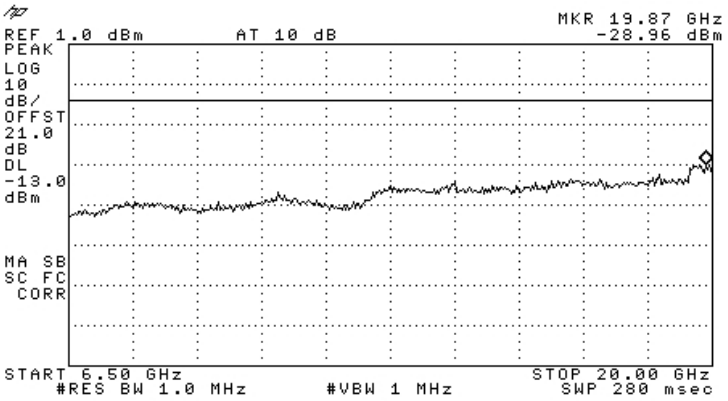


Figure 105.— 3662.50 MHz QPSK

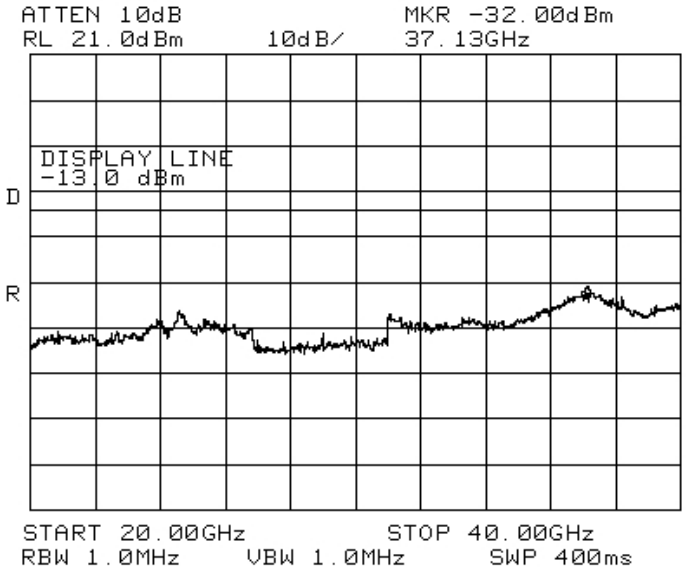


Figure 106.— 3662.50 MHz QPSK

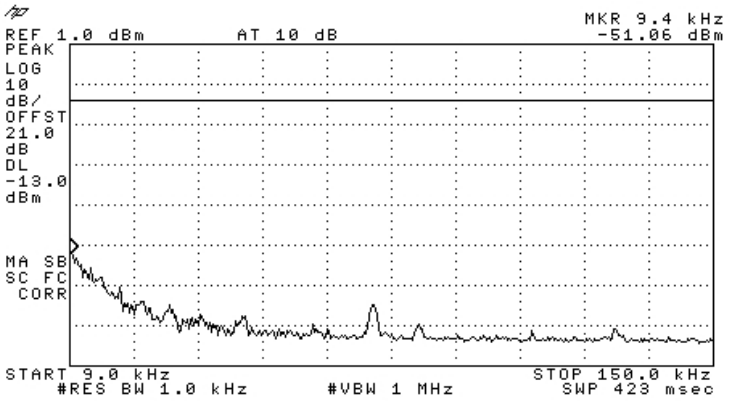


Figure 107.— 3662.50 MHz 16QAM

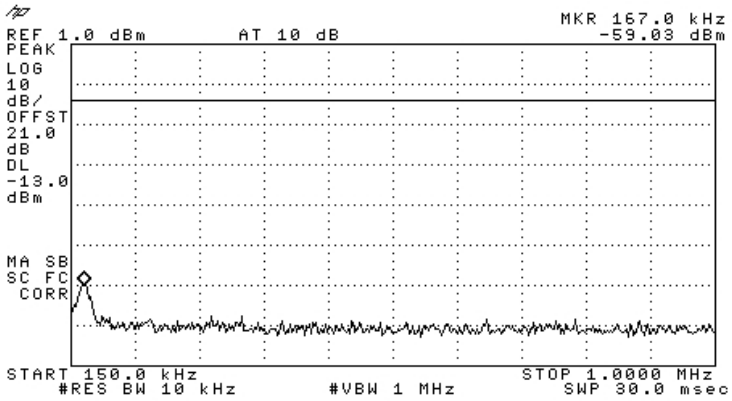


Figure 108.— 3662.50 MHz 16QAM

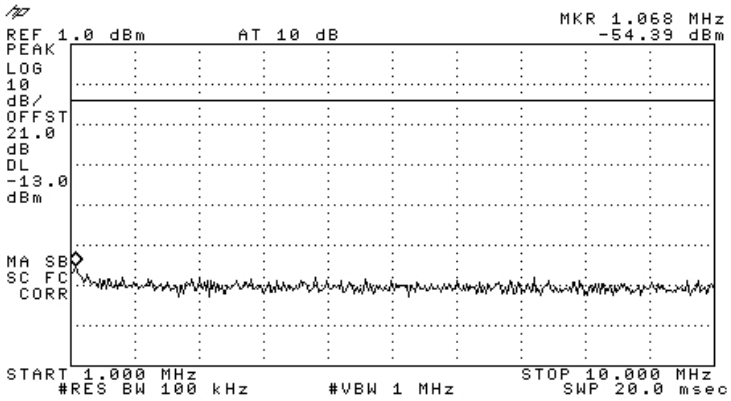


Figure 109.— 3662.50 MHz 16QAM

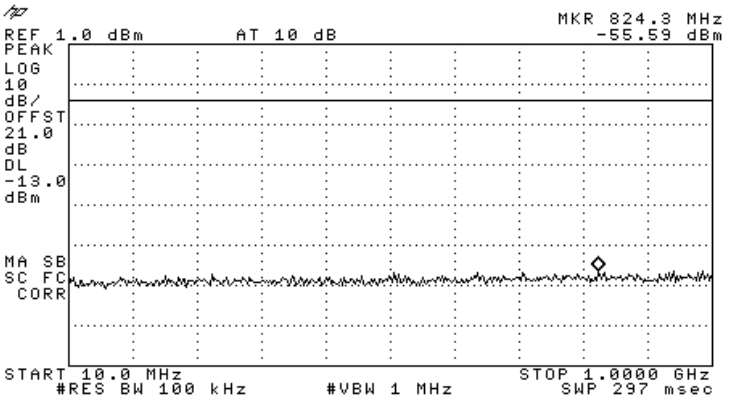


Figure 110.— 3662.50 MHz 16QAM

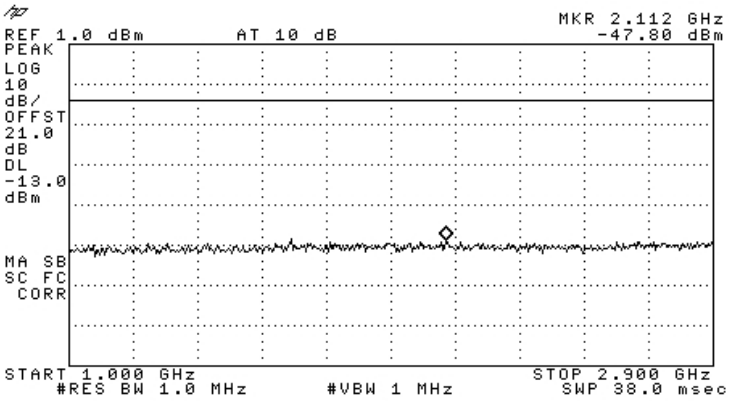


Figure 111.— 3662.50 MHz 16QAM

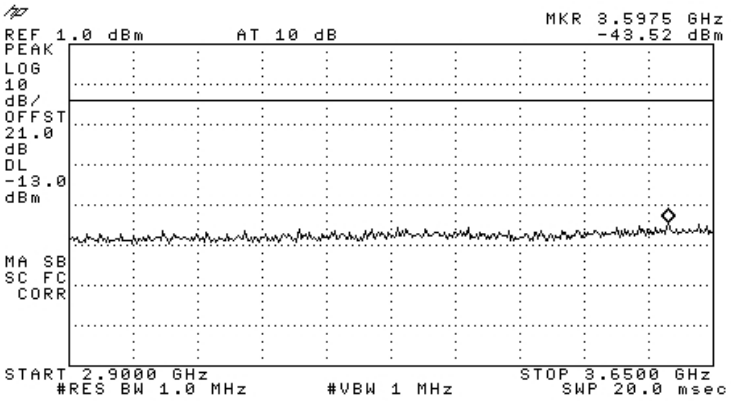


Figure 112.— 3662.50 MHz 16QAM

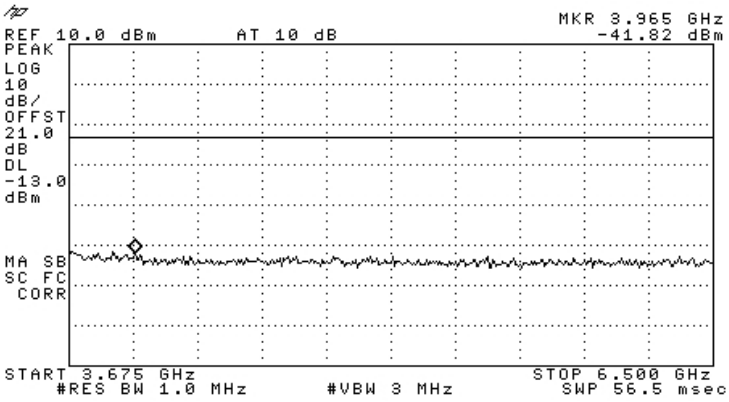


Figure 113.— 3662.50 MHz 16QAM

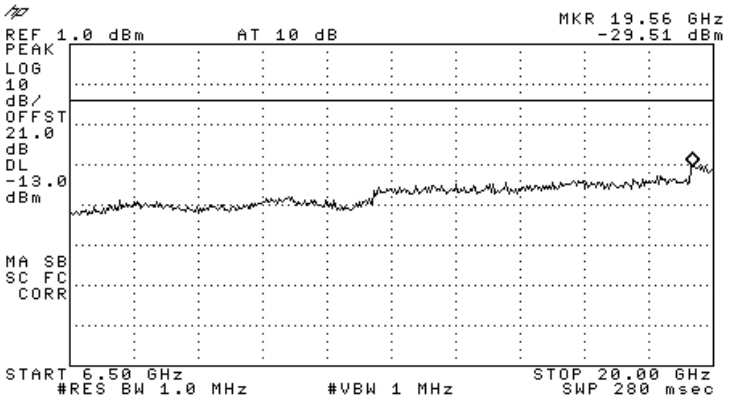


Figure 114.— 3662.50 MHz 16QAM

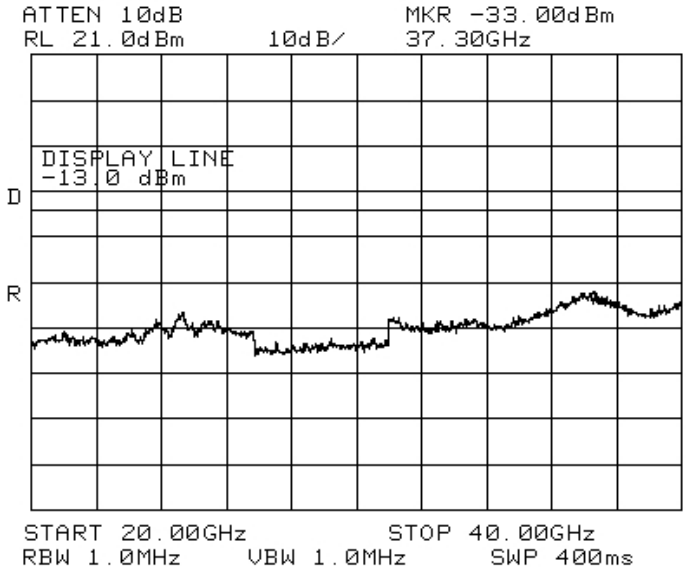


Figure 115.— 3662.50 MHz 16QAM

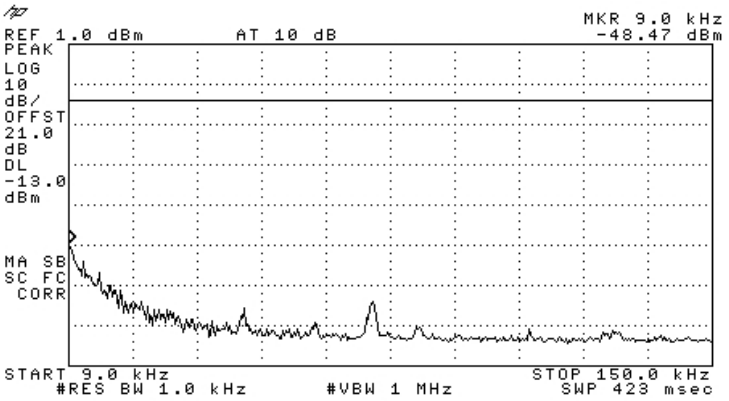


Figure 116.— 3662.50 MHz 64QAM

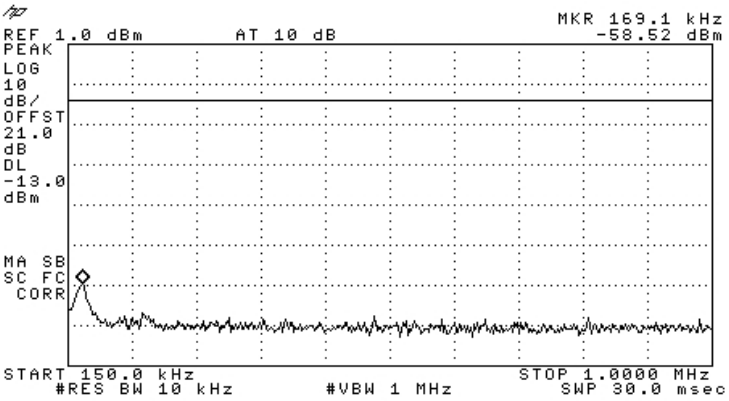


Figure 117.— 3662.50 MHz 64QAM

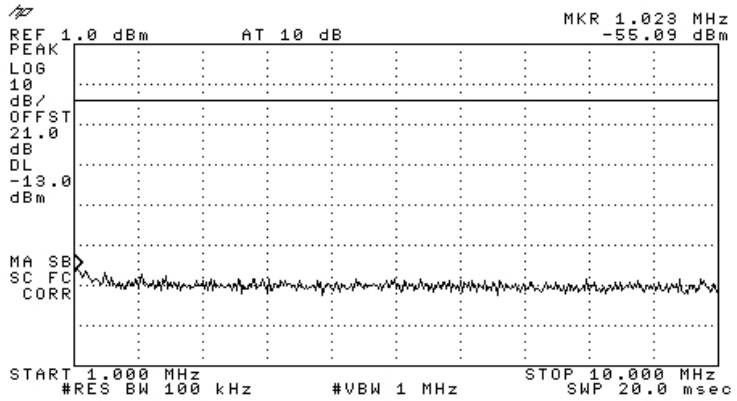


Figure 118.— 3662.50 MHz 64QAM

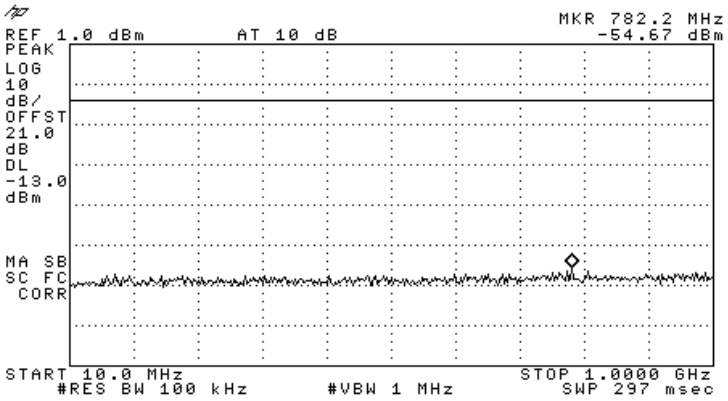


Figure 119.— 3662.50 MHz 64QAM

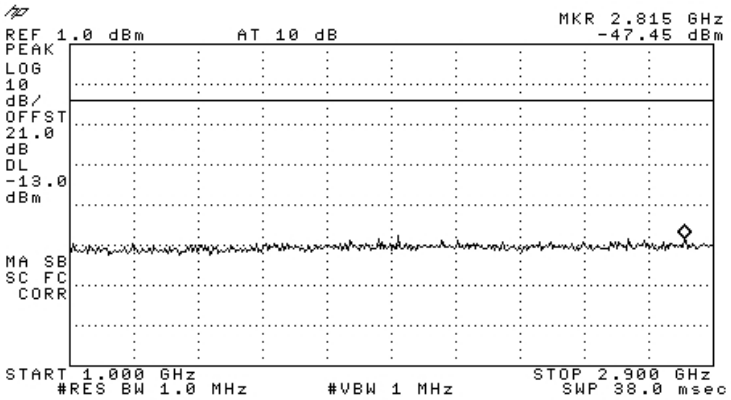


Figure 120.— 3662.50 MHz 64QAM

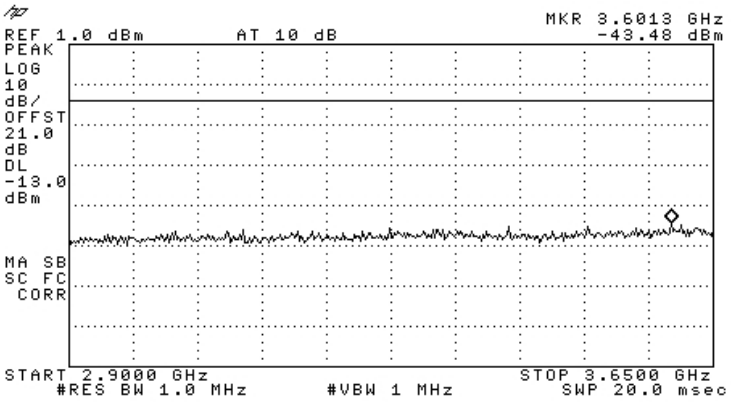


Figure 121.— 3662.50 MHz 64QAM

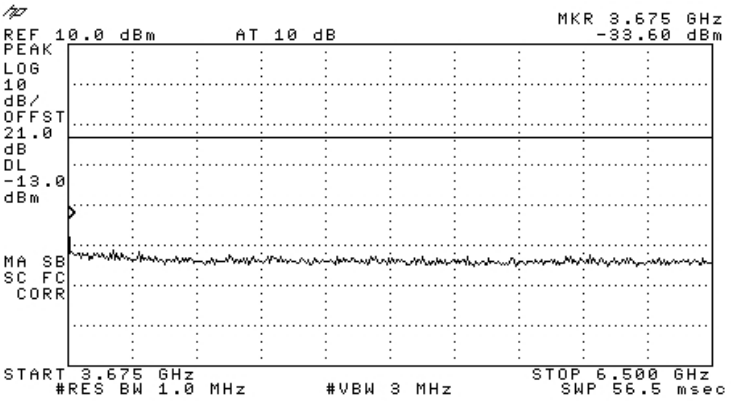


Figure 122.— 3662.50 MHz 64QAM

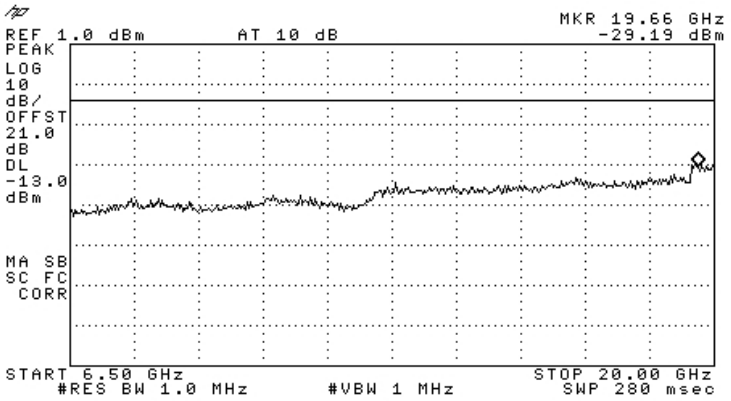


Figure 123.— 3662.50 MHz 64QAM

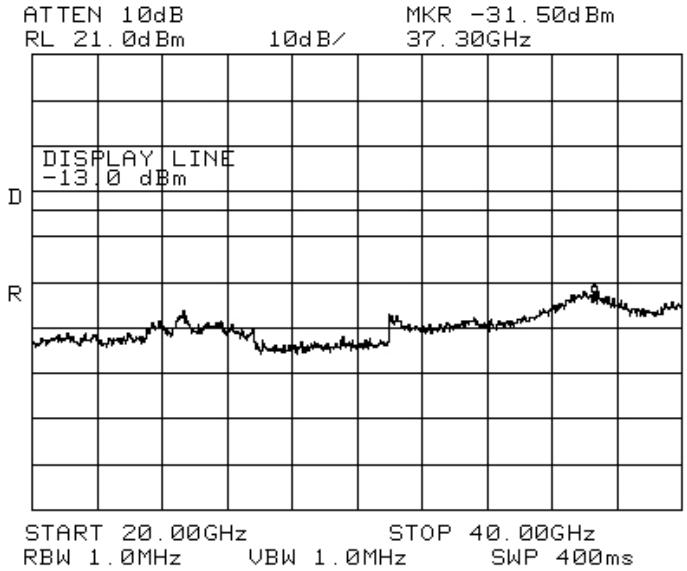


Figure 124.— 3662.50 MHz 64QAM

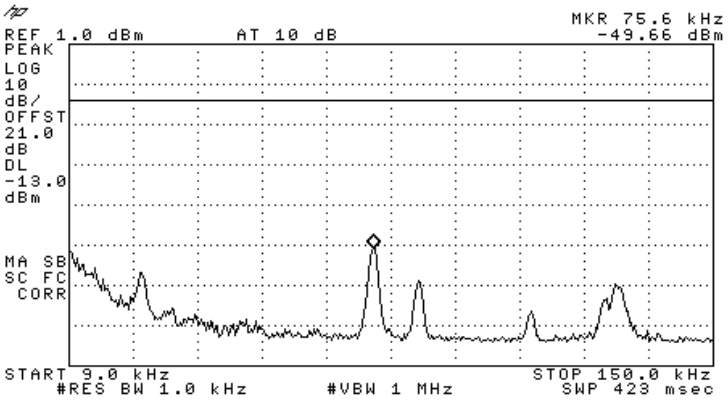


Figure 125.— 3672.50 MHz QPSK

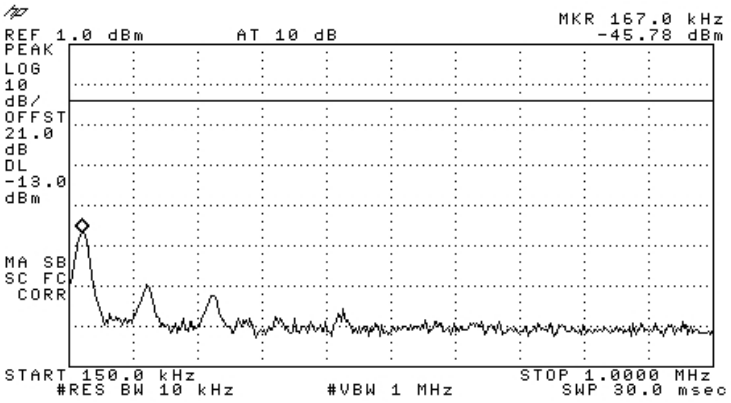


Figure 126.— 3672.50 MHz QPSK

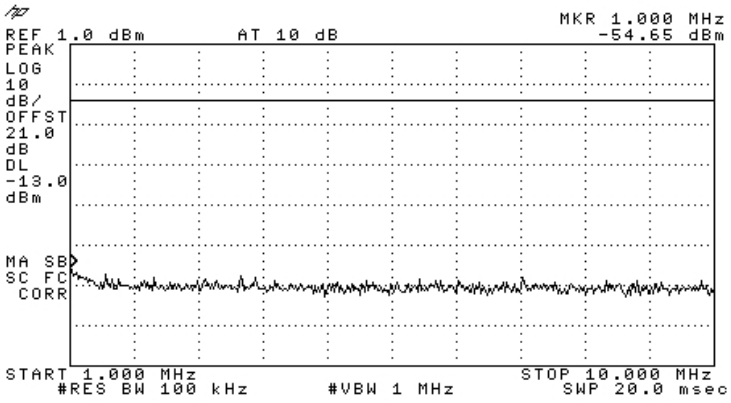


Figure 127.— 3672.50 MHz QPSK

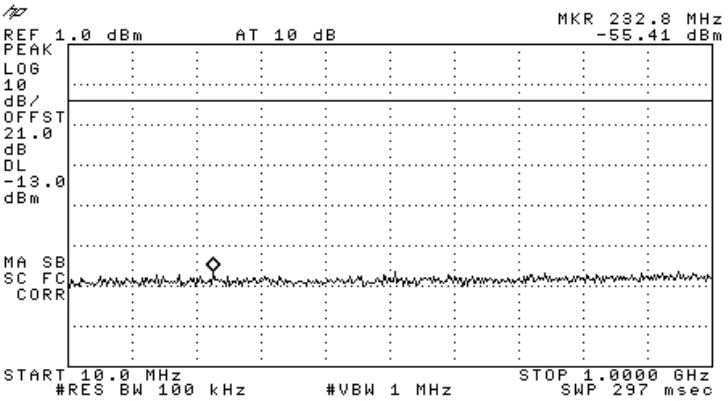


Figure 128.— 3672.50 MHz QPSK

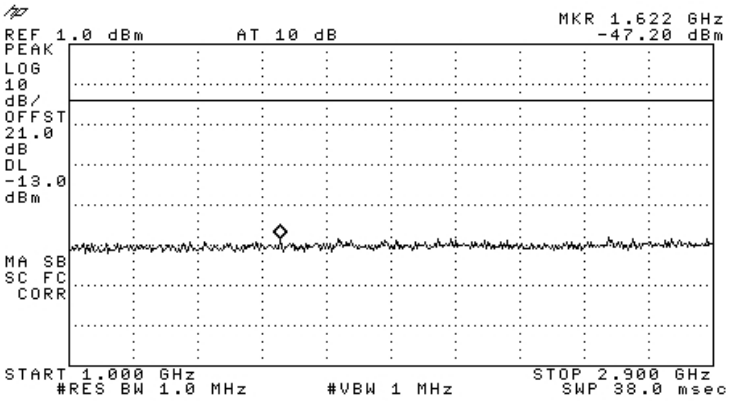


Figure 129.— 3672.50 MHz QPSK

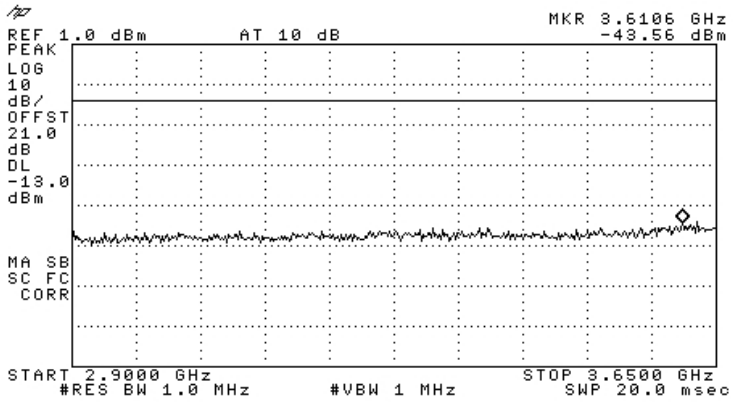


Figure 130.— 3672.50 MHz QPSK

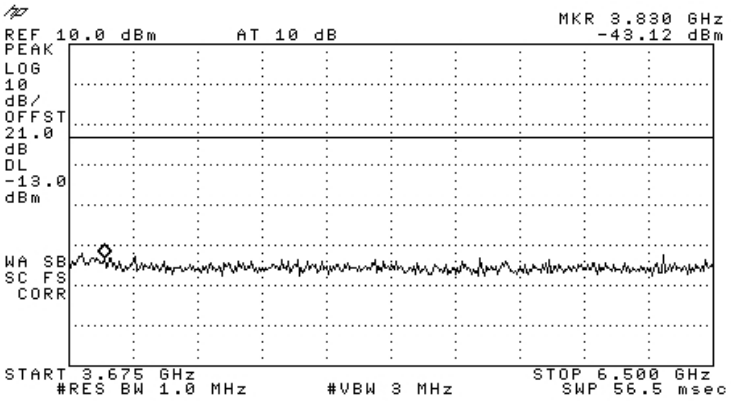


Figure 131.— 3672.50 MHz QPSK

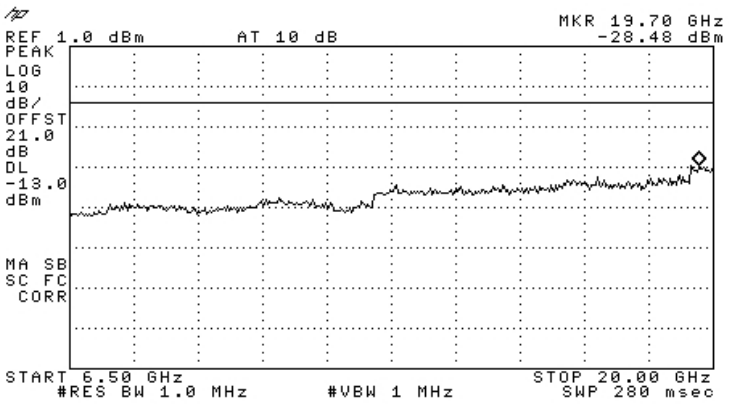


Figure 132.— 3672.50 MHz QPSK

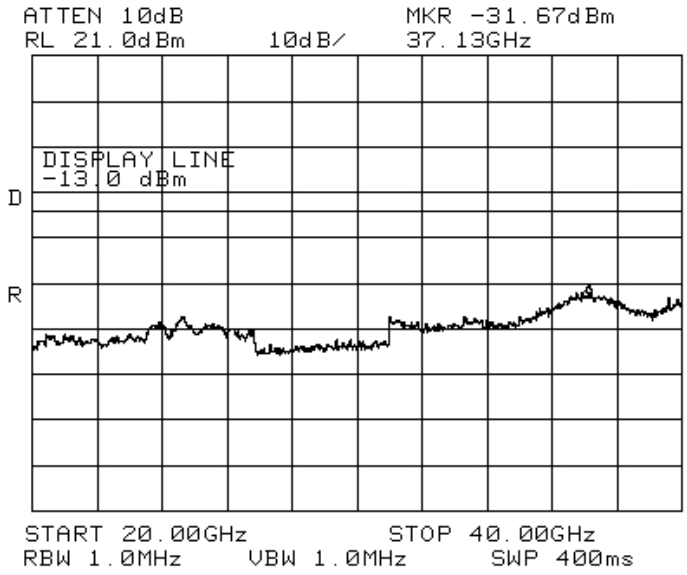


Figure 133.— 3672.50 MHz QPSK

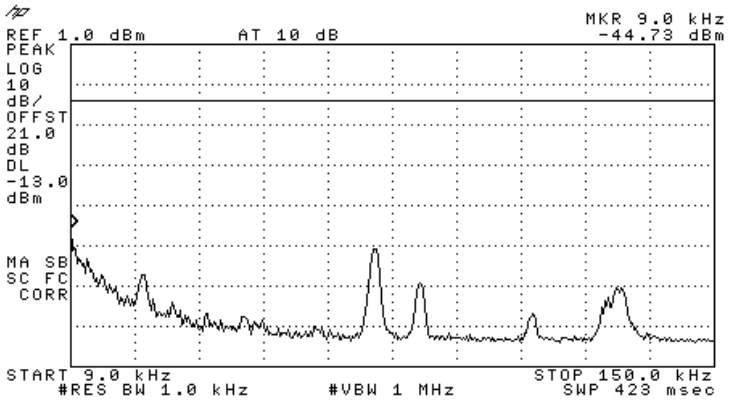


Figure 134.— 3672.50 MHz 16QAM

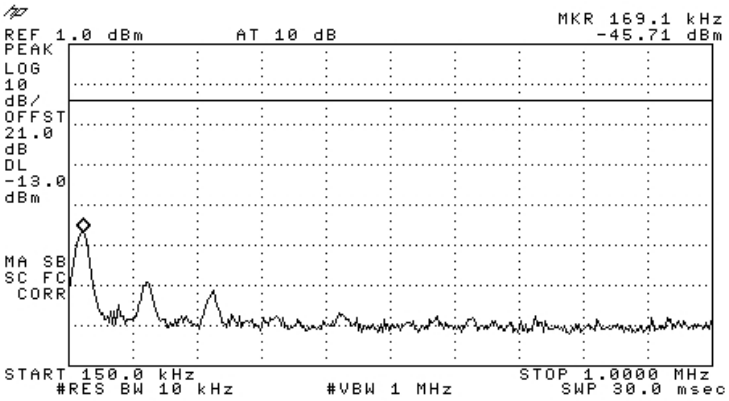


Figure 135.— 3672.50 MHz 16QAM

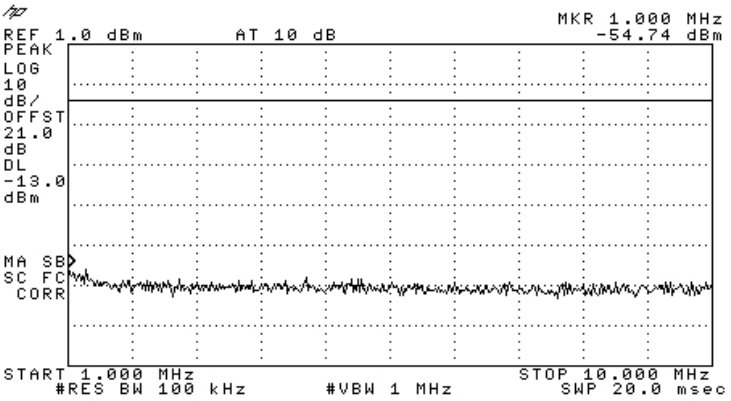


Figure 136.— 3672.50 MHz 16QAM

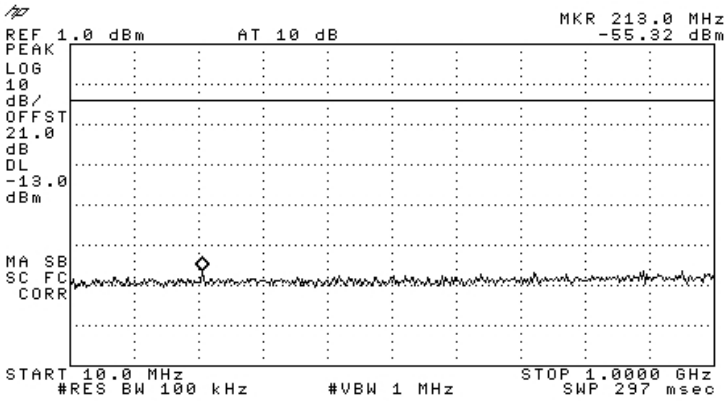


Figure 137.— 3672.50 MHz 16QAM

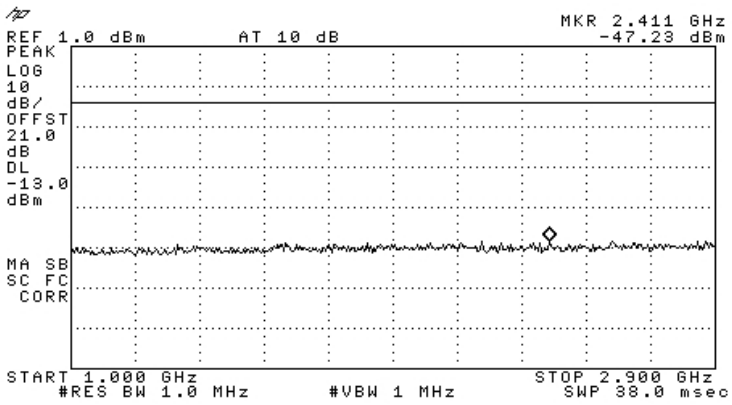


Figure 138.— 3672.50 MHz 16QAM

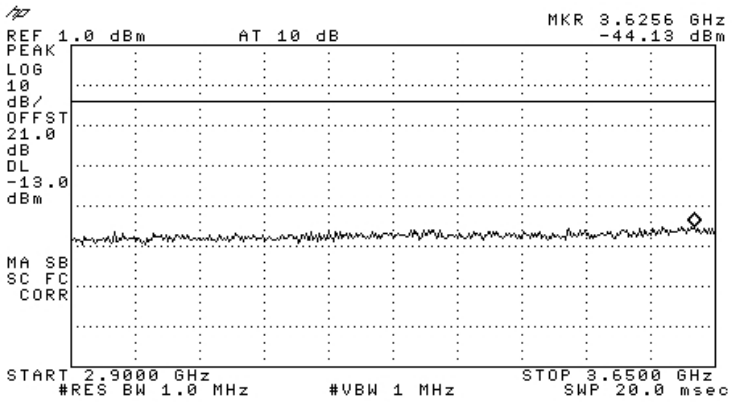


Figure 139.— 3672.50 MHz 16QAM

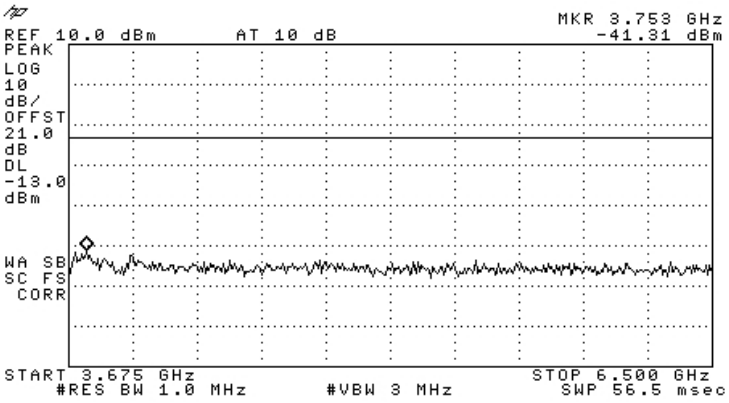


Figure 140.— 3672.50 MHz 16QAM

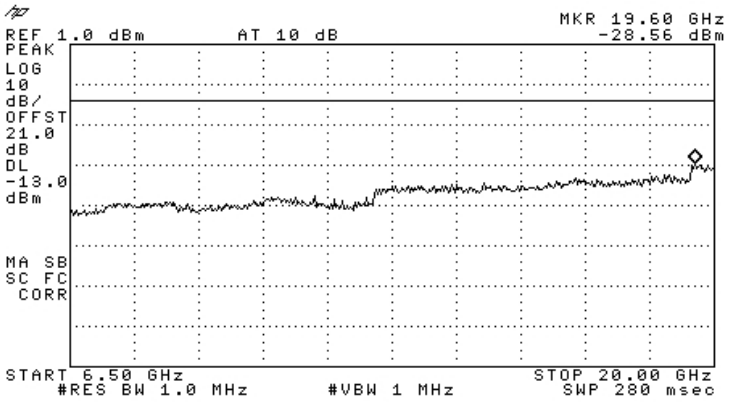


Figure 141.— 3672.50 MHz 16QAM

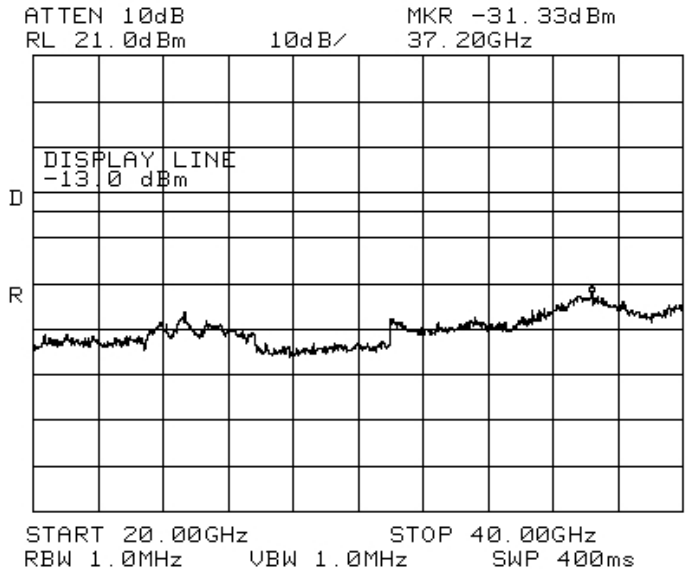


Figure 142.— 3672.50 MHz 16QAM

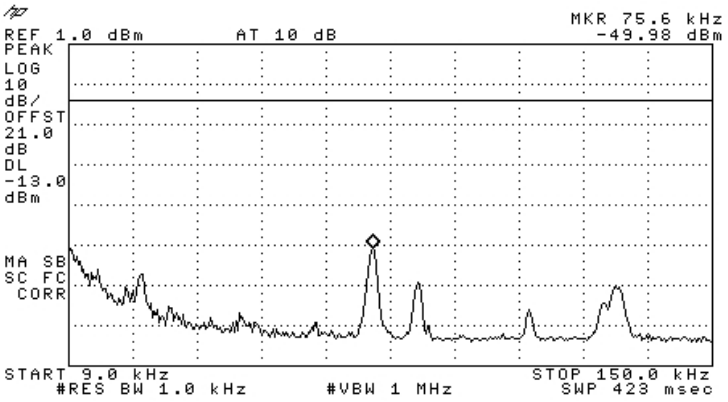


Figure 143.— 3672.50 MHz 64QAM

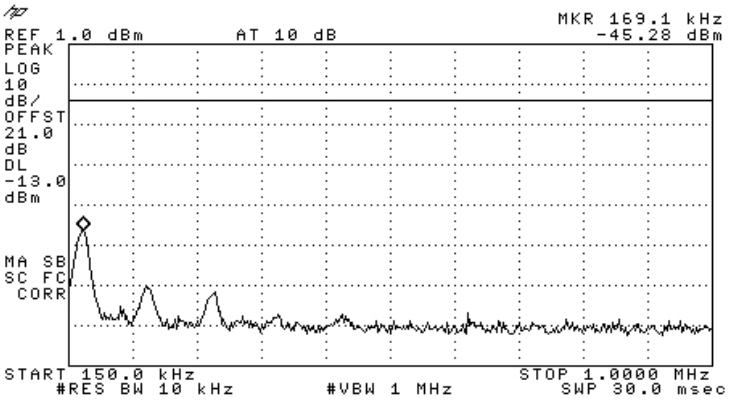


Figure 144.— 3672.50 MHz 64QAM

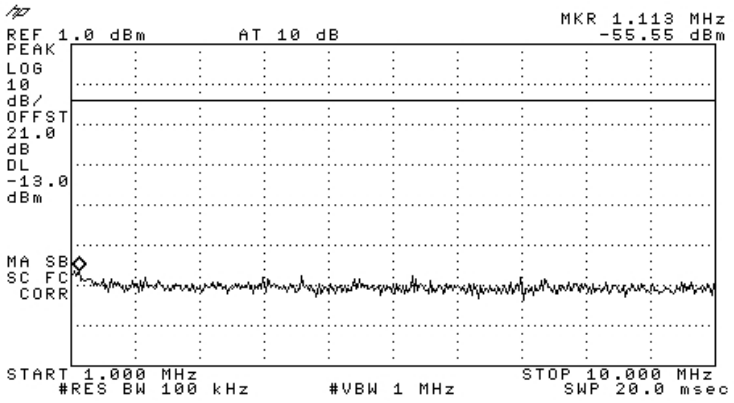


Figure 145.— 3672.50 MHz 64QAM

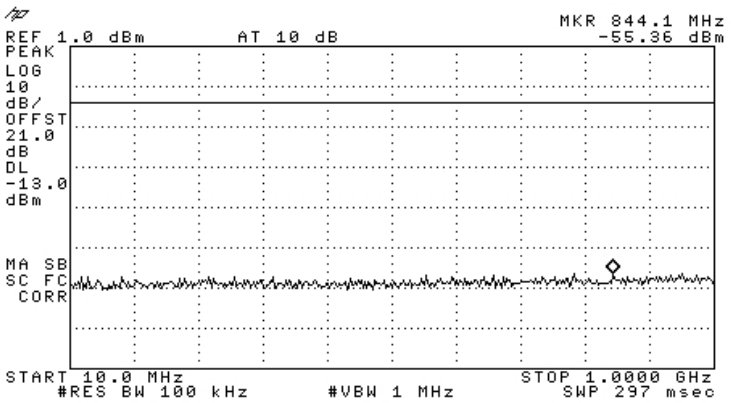


Figure 146.— 3672.50 MHz 64QAM

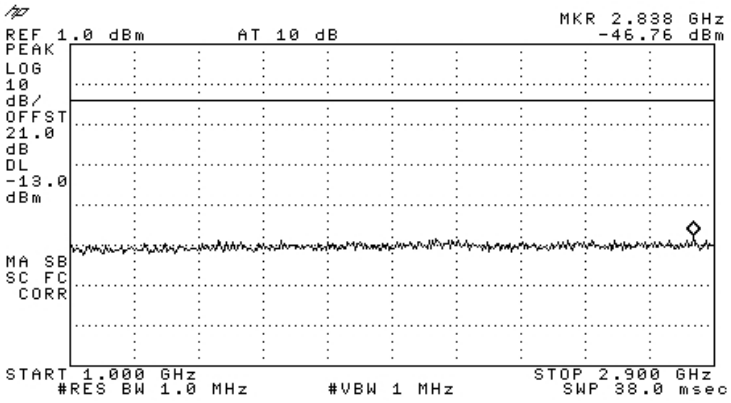


Figure 147.— 3672.50 MHz 64QAM

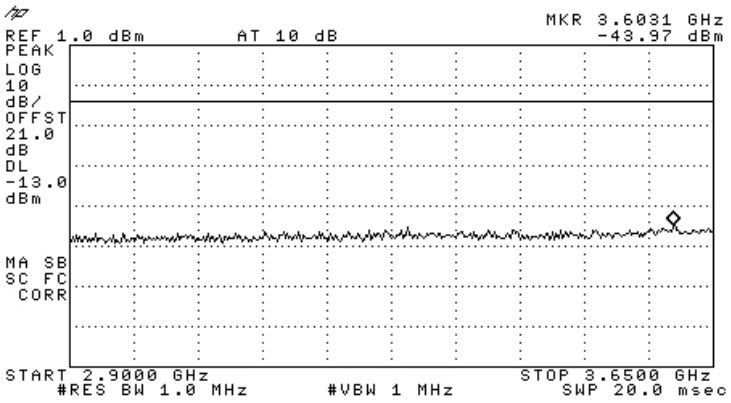


Figure 148.— 3672.50 MHz 64QAM

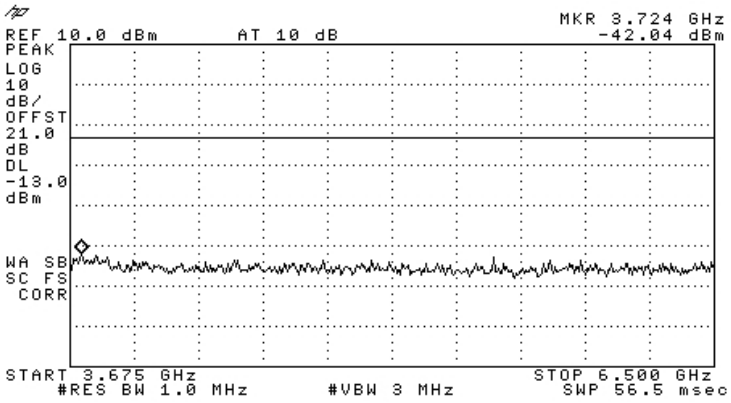


Figure 149.— 3672.50 MHz 64QAM

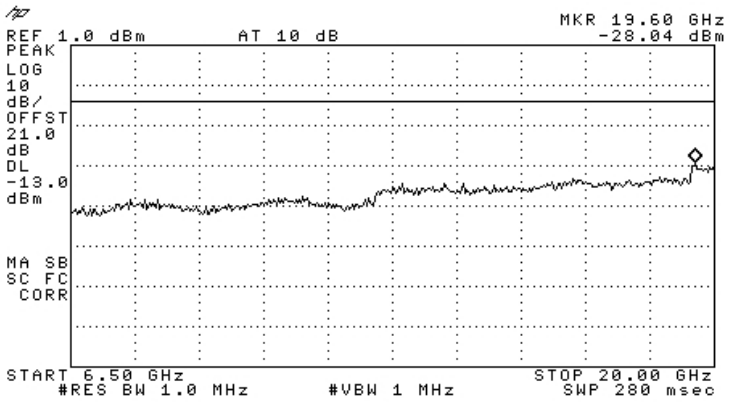


Figure 150.— 3672.50 MHz 64QAM

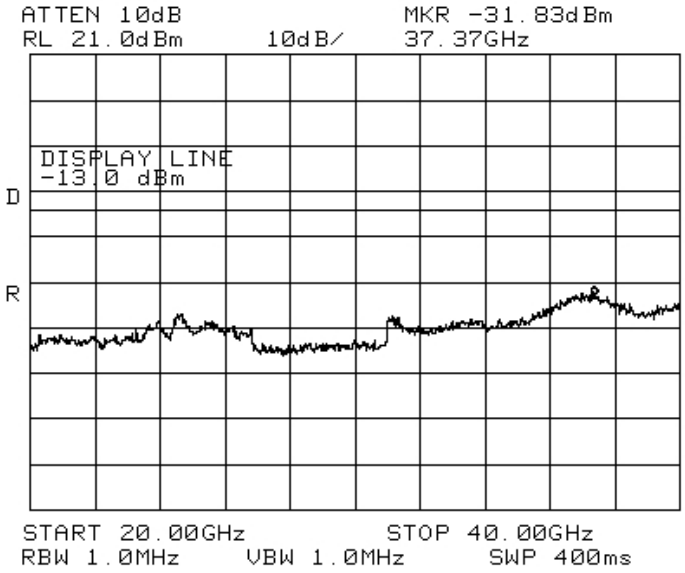


Figure 151.— 3672.50 MHz 64QAM

10.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90 Section 90.1323

Operation Frequency (MHz)		Reading (dBm)	Specification (dBm)	Margin (dB)
3652.50	QPSK	-28.8	-13.0	-15.8
	16QAM	-28.5	-13.0	-15.5
	64QAM	-27.3	-13.0	-14.3
3662.50	QPSK	-29.0	-13.0	-16.0
	16QAM	-29.5	-13.0	-16.5
	64QAM	-29.2	-13.0	-16.2
3672.50	QPSK	-28.5	-13.0	-15.5
	16QAM	-28.6	-13.0	-15.6
	64QAM	-28.0	-13.0	-15.0

Figure 152 Spurious Emissions at Antenna Terminals Results

JUDGEMENT: Passed by 14.3 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 10.05.10

Typed/Printed Name: A. Sharabi

10.4 Test Equipment Used.

Spurious Emissions at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Spectrum Analyzer	HP	8546E	3442A00275	December 15, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 153 Test Equipment Used

11. Conducted Spurious Emissions 10 MHz Bandwidth

11.1 Test Specification

FCC Part 90 Section 90.1323

11.2 Test procedure

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at 43 + 10 log (P) dB The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (21.0 dB).

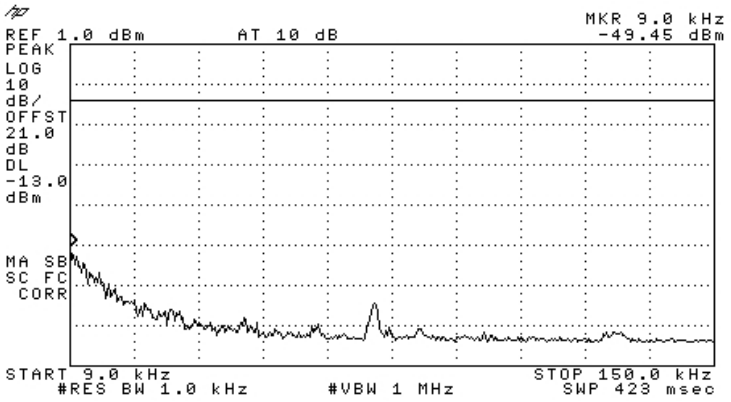


Figure 154.— 3655.00 MHz QPSK

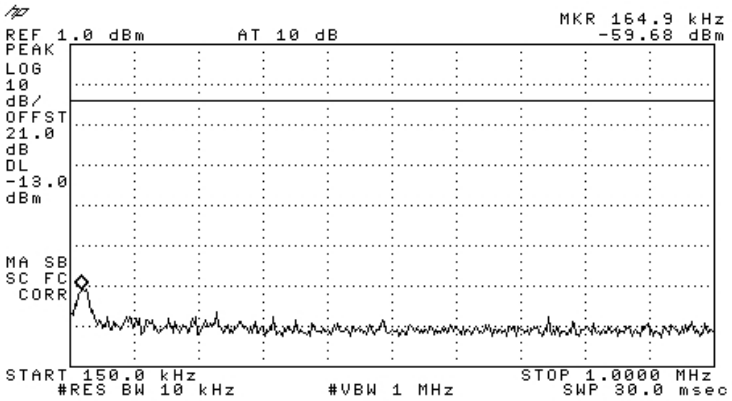


Figure 155.— 3655.00 MHz QPSK

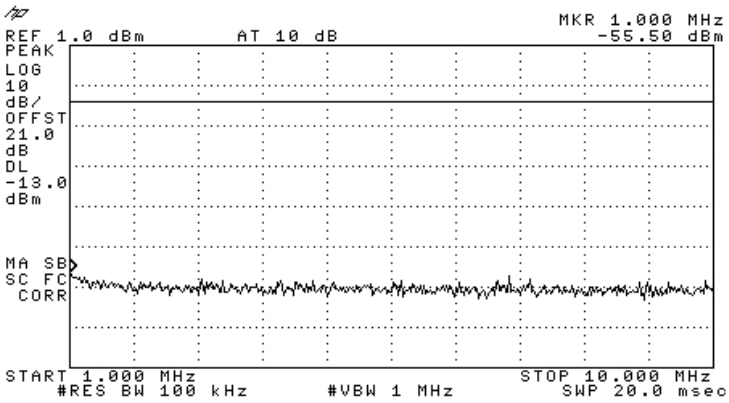


Figure 156.— 3655.00 MHz QPSK

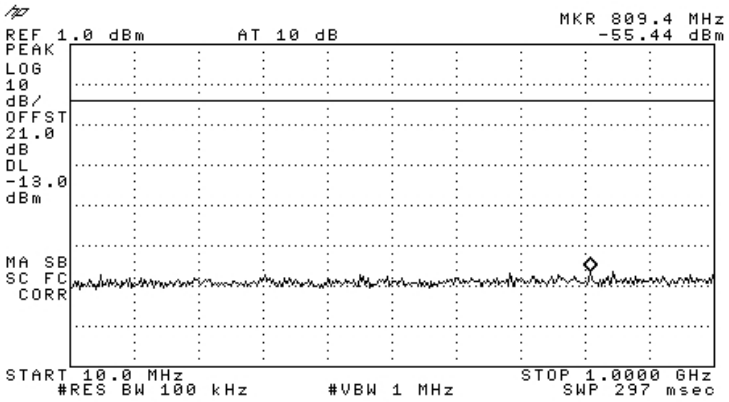


Figure 157.— 3655.00 MHz QPSK

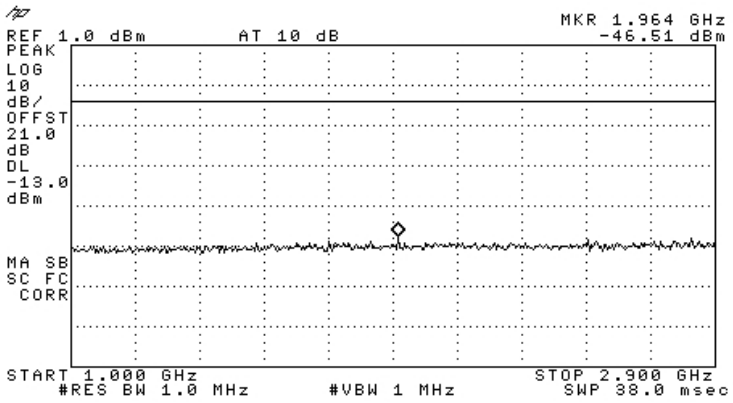


Figure 158.— 3655.00 MHz QPSK

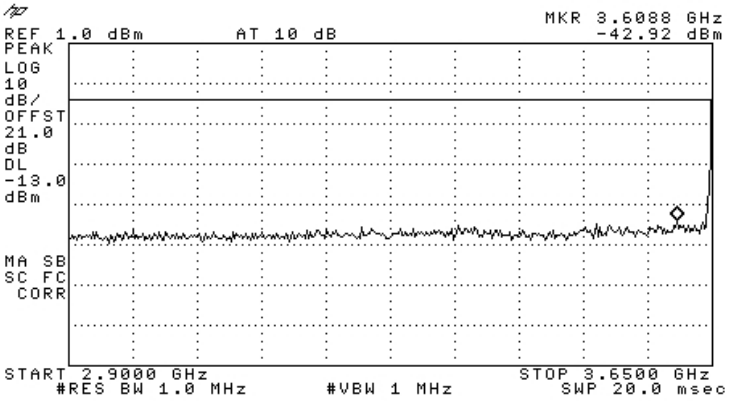


Figure 159.— 3655.00 MHz QPSK

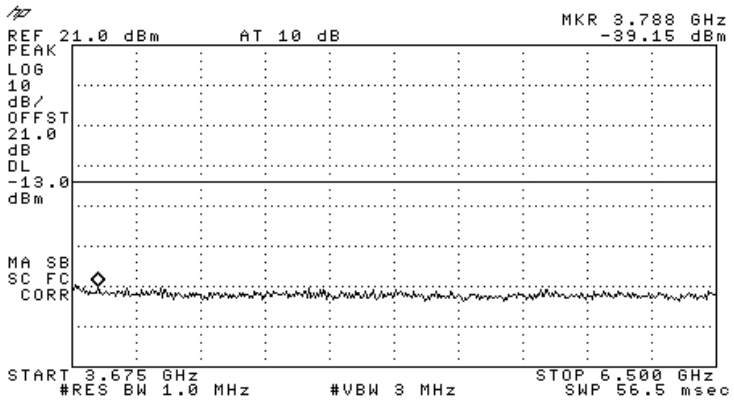


Figure 160.— 3655.00 MHz QPSK

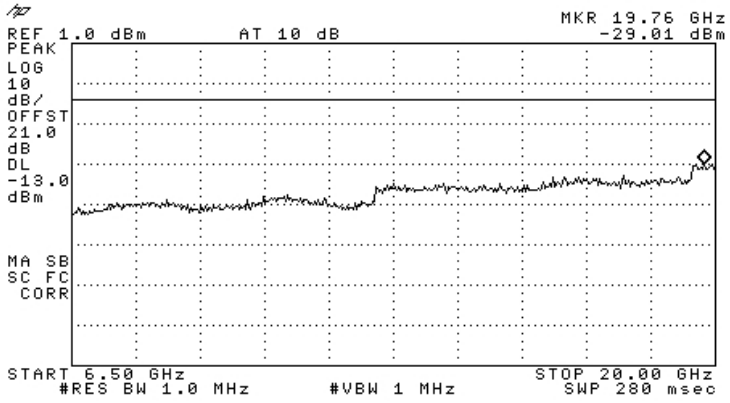


Figure 161.— 3655.00 MHz QPSK

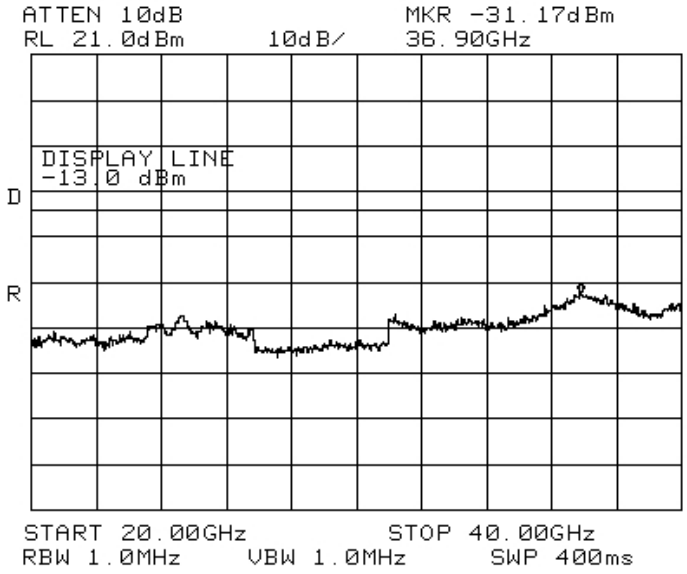


Figure 162.— 3655.00 MHz QPSK

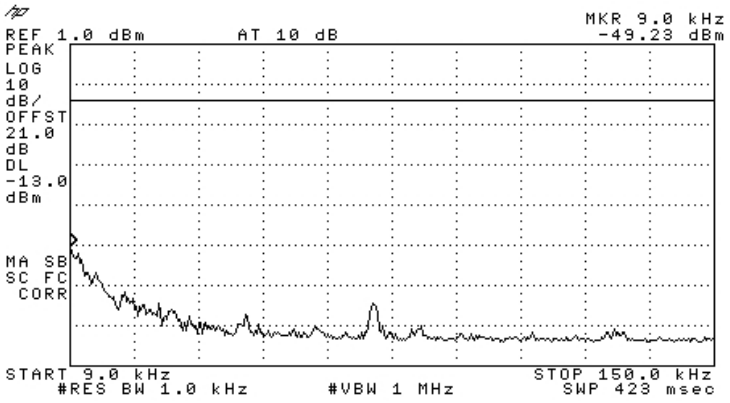


Figure 163.— 3655.00 MHz 16QAM

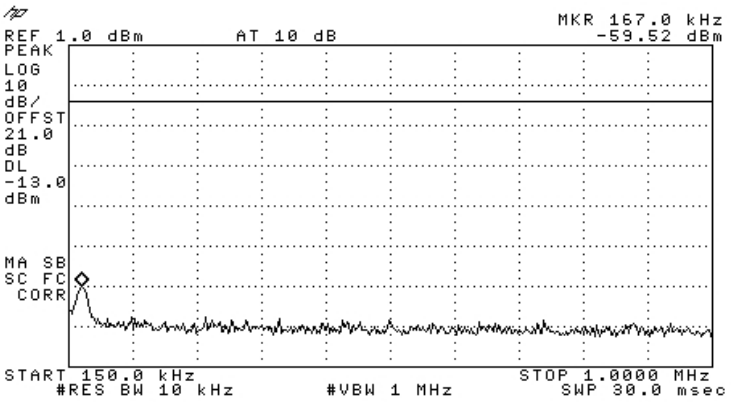


Figure 164.— 3655.00 MHz 16QAM

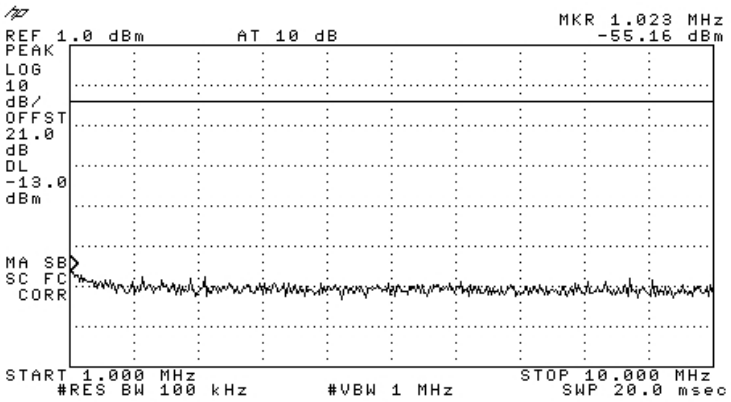


Figure 165.— 3655.00 MHz 16QAM

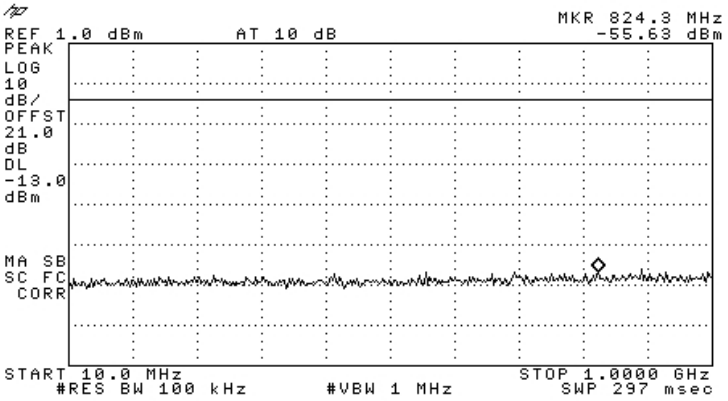


Figure 166.— 3655.00 MHz 16QAM

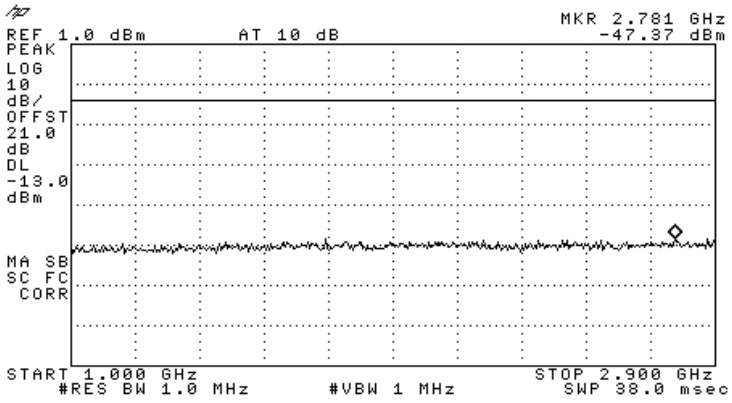


Figure 167.— 3655.00 MHz 16QAM

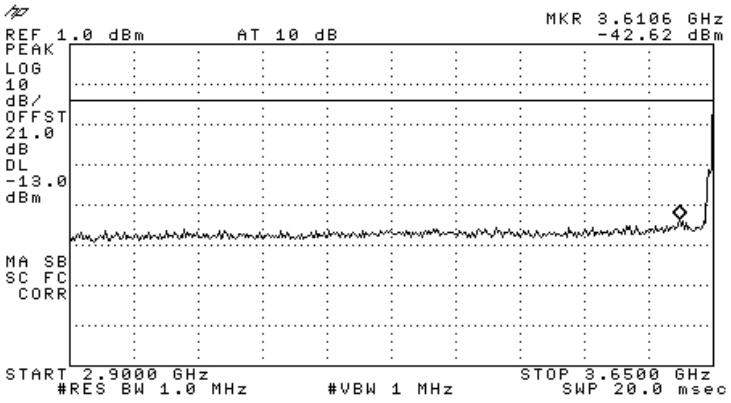


Figure 168.— 3655.00 MHz 16QAM

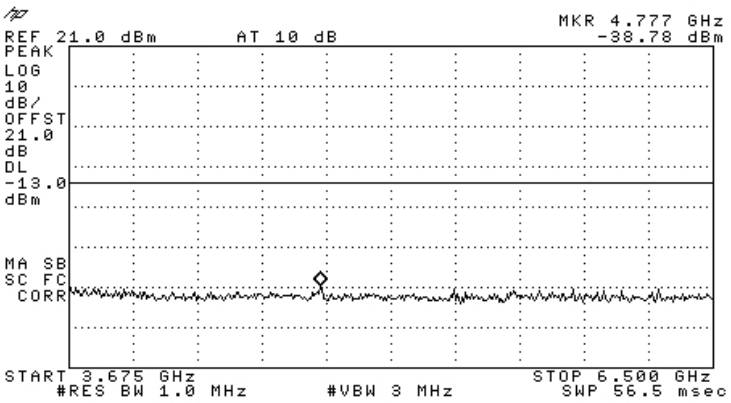


Figure 169.— 3655.00 MHz 16QAM

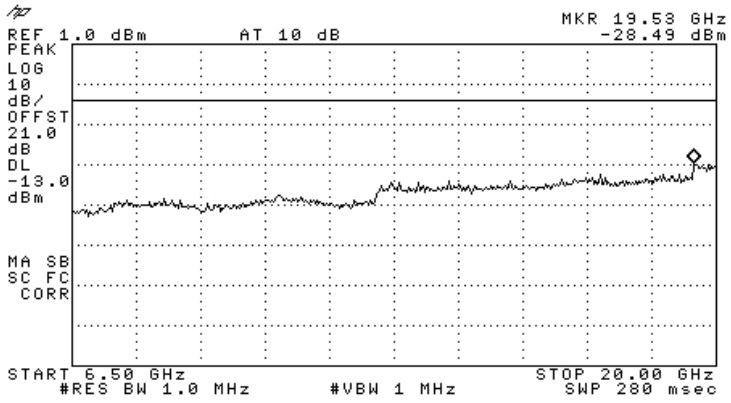


Figure 170.— 3655.00 MHz 16QAM

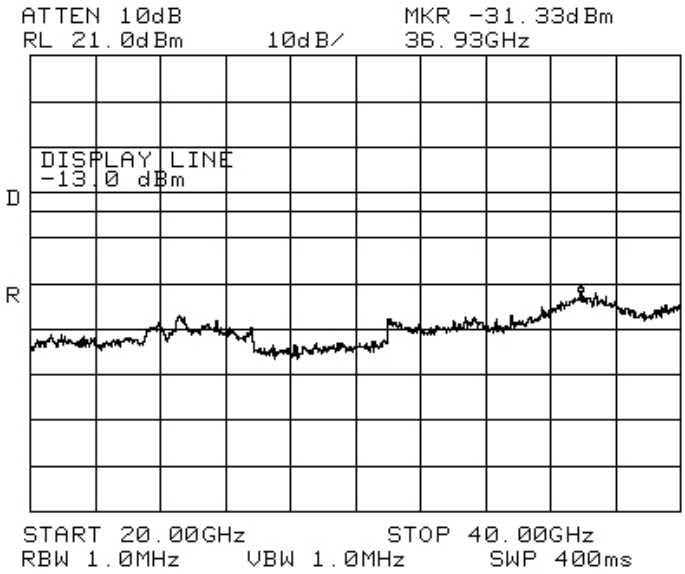


Figure 171.— 3655.00 MHz 16QAM

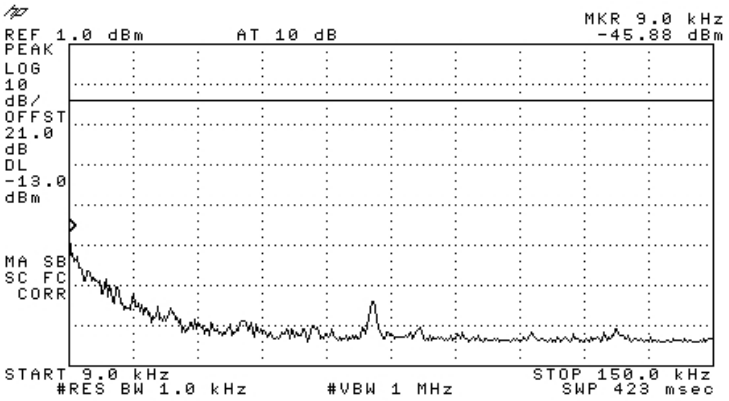


Figure 172.— 3655.00 MHz 64QAM

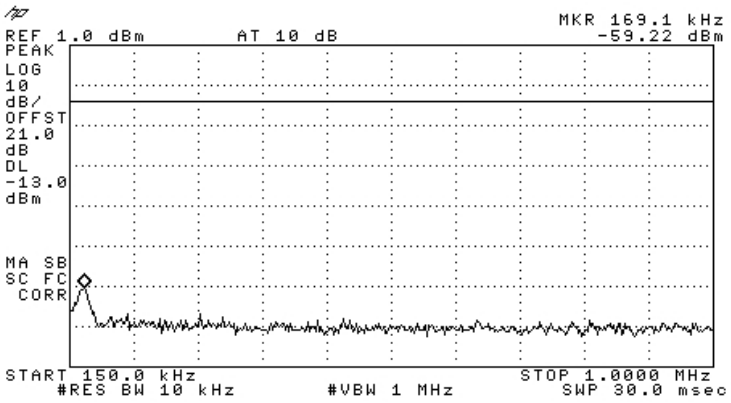


Figure 173.— 3655.00 MHz 64QAM

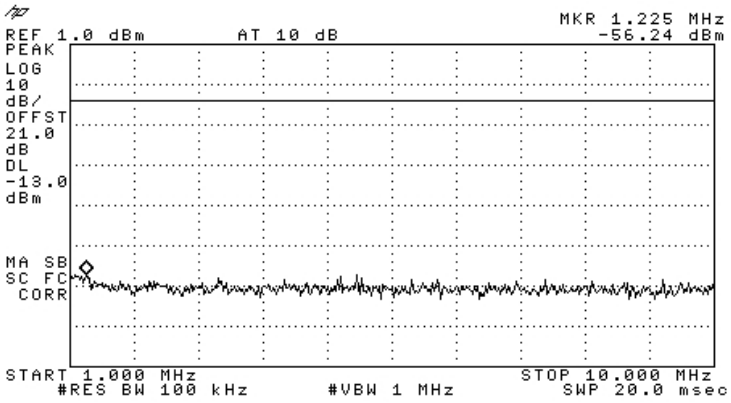


Figure 174.— 3655.00 MHz 64QAM

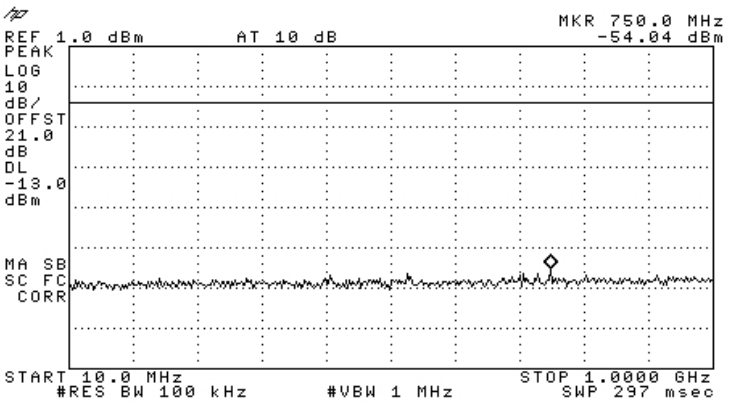


Figure 175.— 3655.00 MHz 64QAM

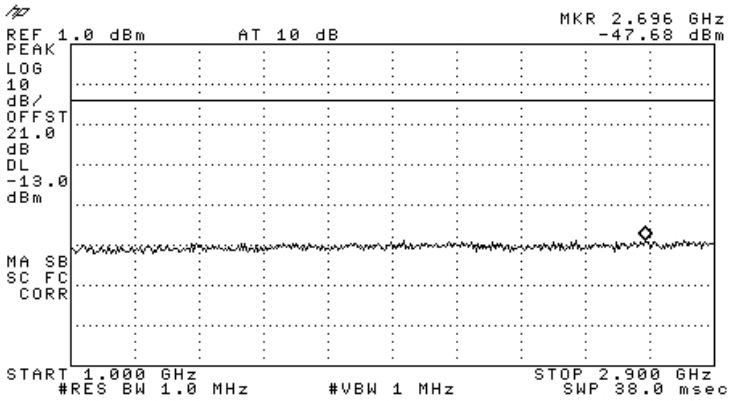


Figure 176.— 3655.00 MHz 64QAM

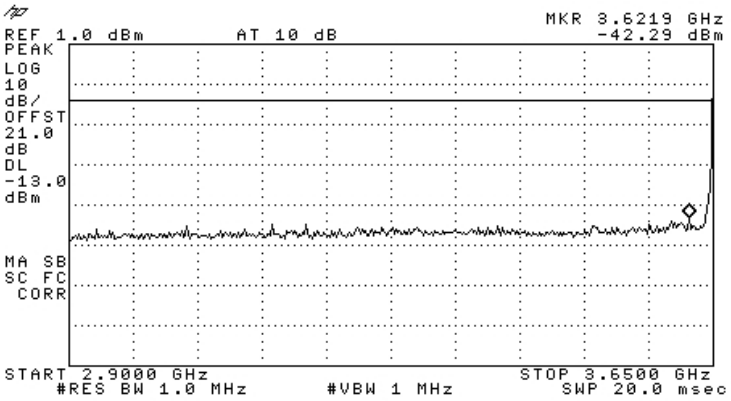


Figure 177.— 3655.00 MHz 64QAM

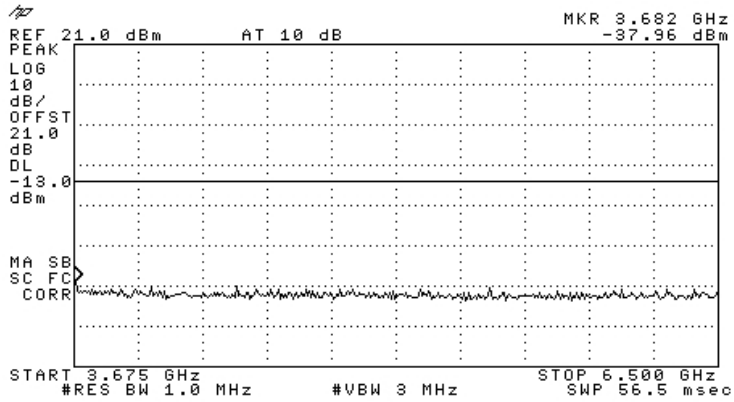


Figure 178.— 3655.00 MHz 64QAM

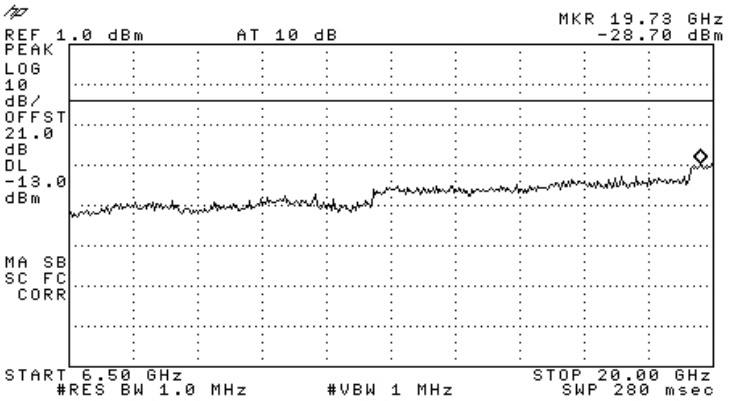


Figure 179.— 3655.00 MHz 64QAM

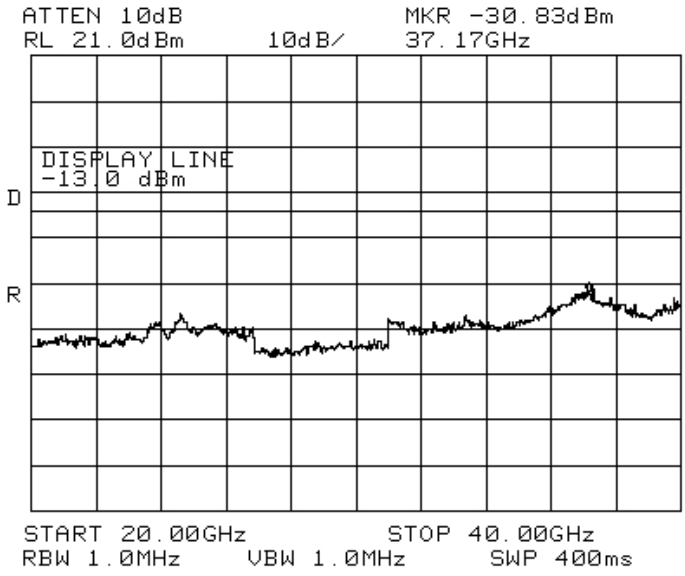


Figure 180.— 3655.00 MHz 64QAM

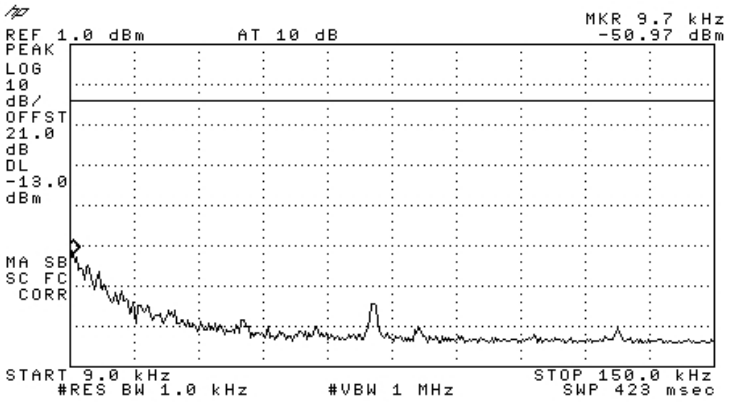


Figure 181.— 3665.00 MHz QPSK

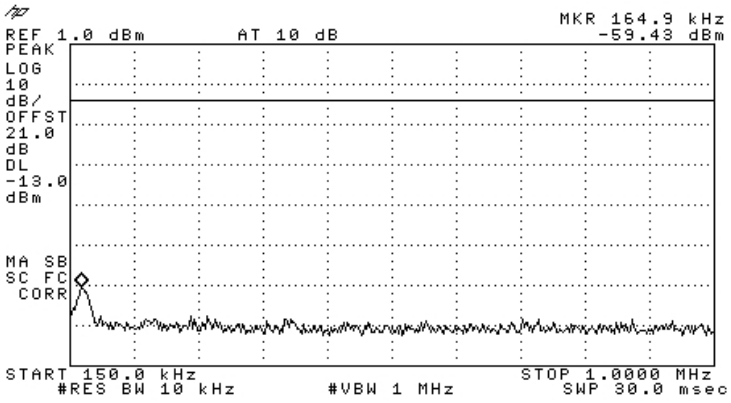


Figure 182.— 3665.00 MHz QPSK

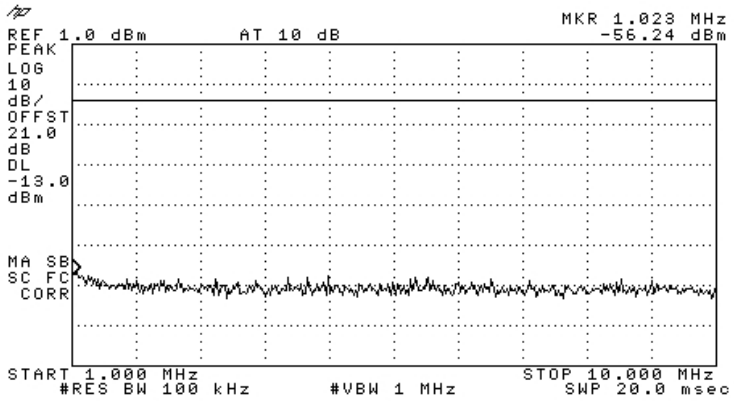


Figure 183.— 3665.00 MHz QPSK

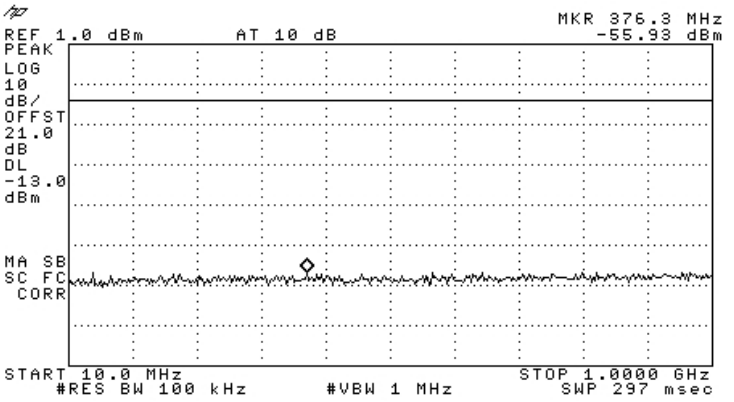


Figure 184.— 3665.00 MHz QPSK

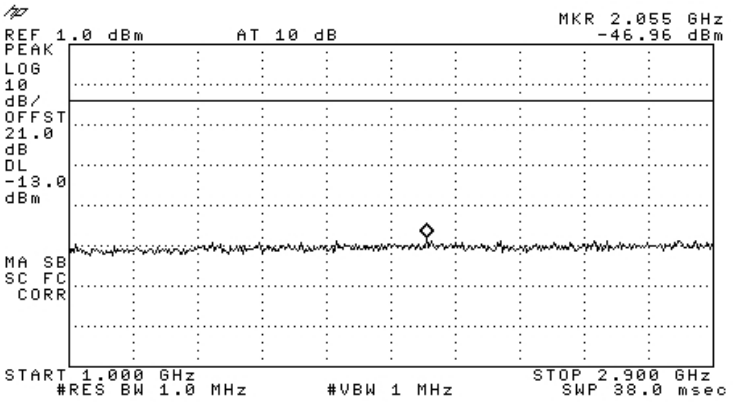


Figure 185.— 3665.00 MHz QPSK

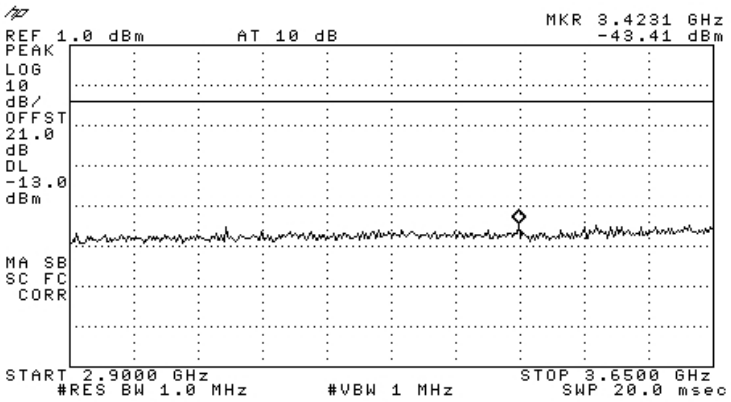


Figure 186.— 3665.00 MHz QPSK

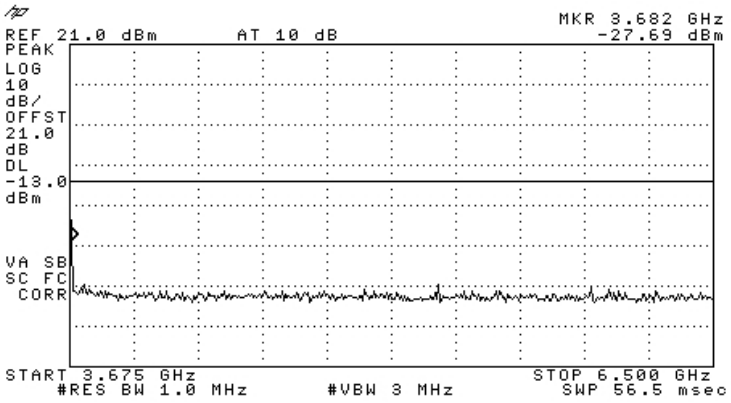


Figure 187.— 3665.00 MHz QPSK

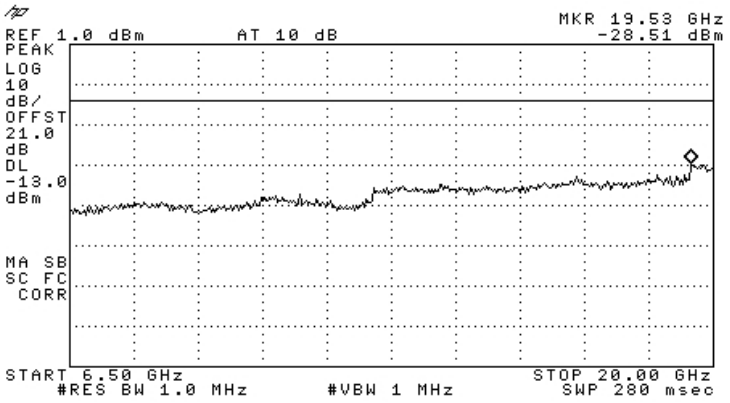


Figure 188.— 3665.00 MHz QPSK

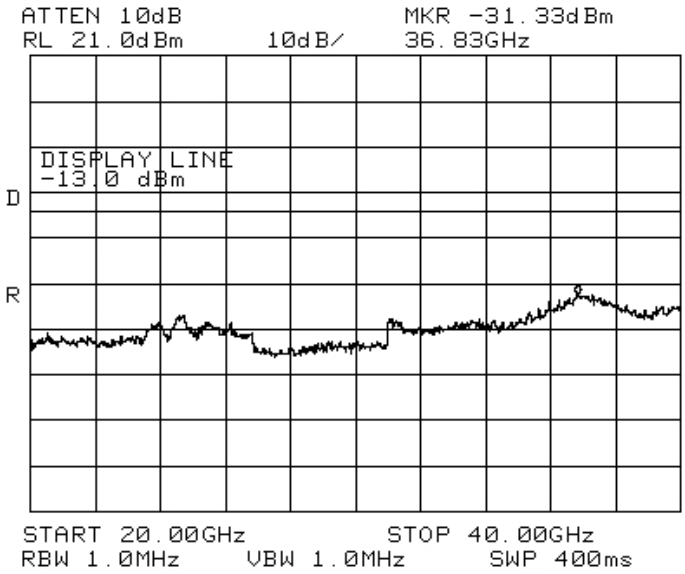


Figure 189.— 3665.00 MHz QPSK

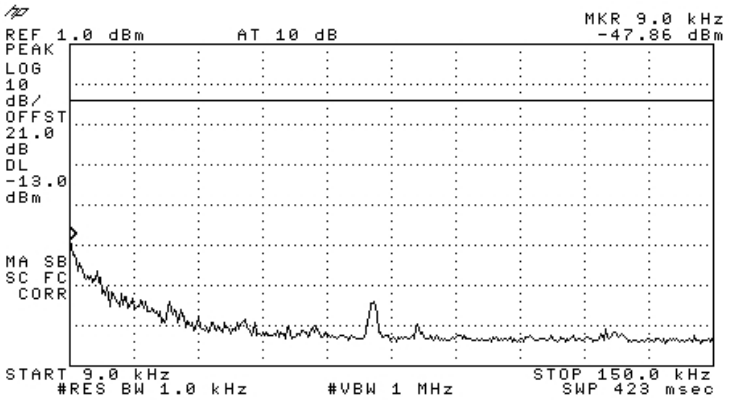


Figure 190.— 3665.00 MHz 16QAM

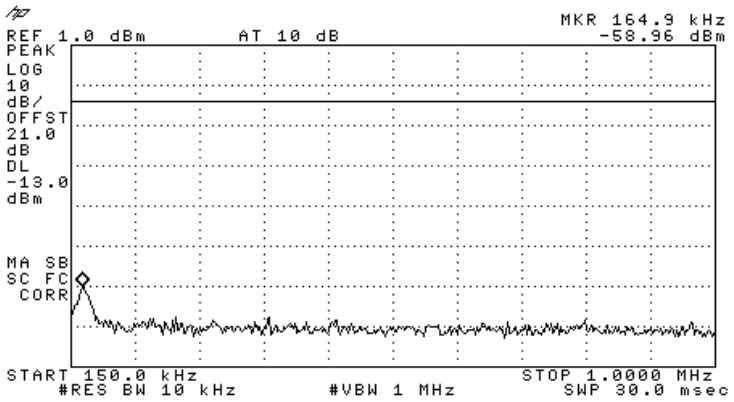


Figure 191.— 3665.00 MHz 16QAM

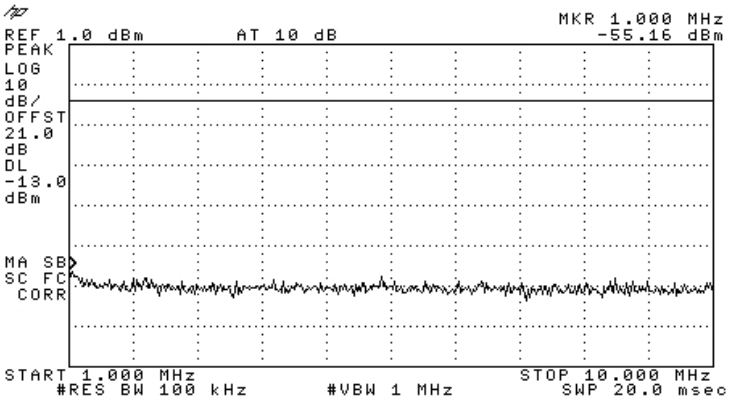


Figure 192.— 3665.00 MHz 16QAM

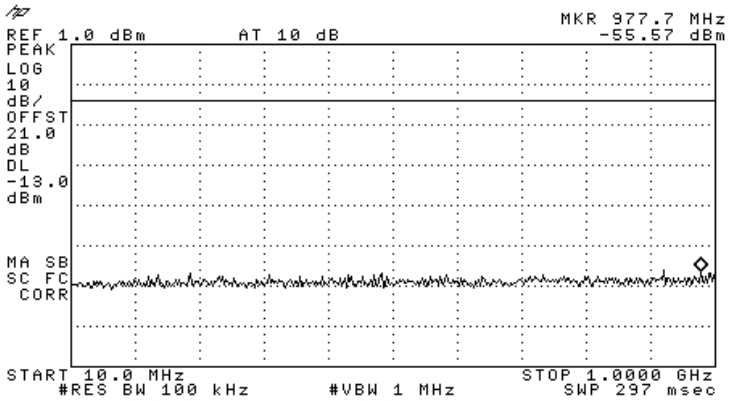


Figure 193.— 3665.00 MHz 16QAM

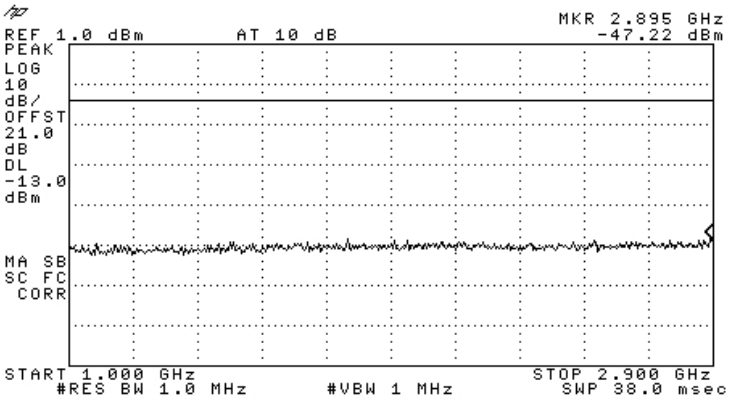


Figure 194.— 3665.00 MHz 16QAM

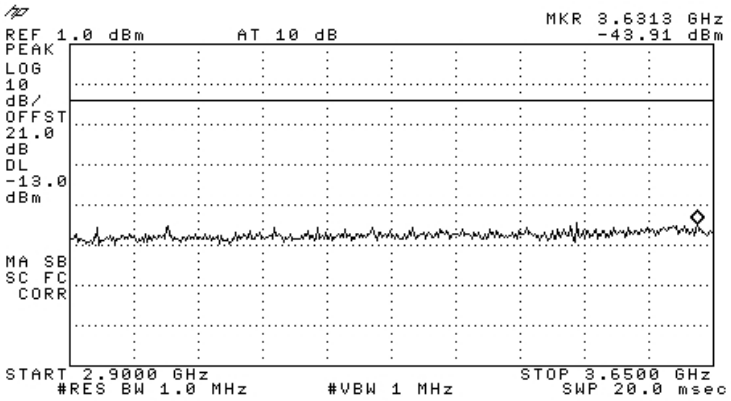


Figure 195.— 3665.00 MHz 16QAM

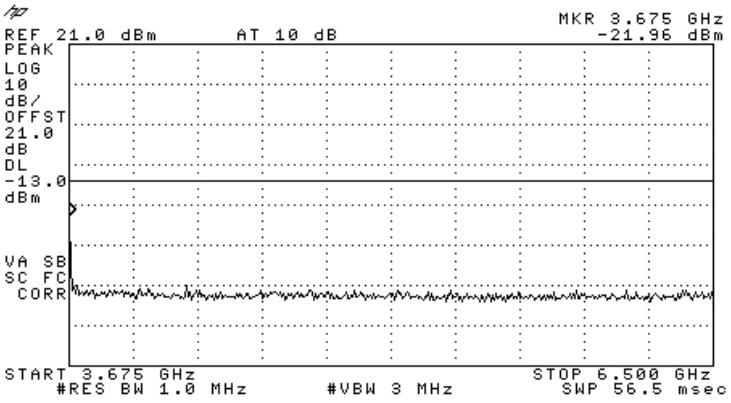


Figure 196.— 3665.00 MHz 16QAM

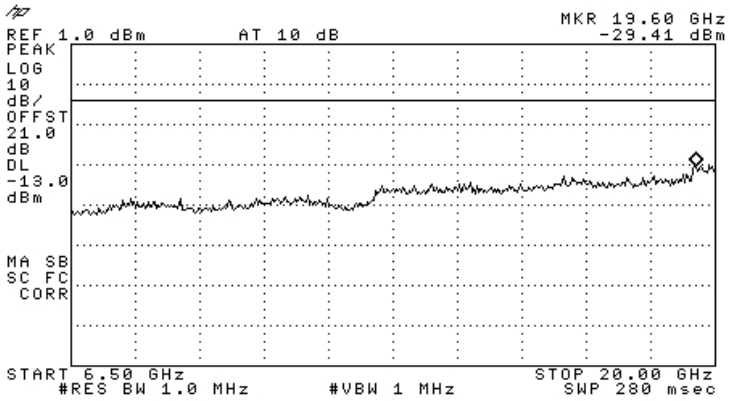


Figure 197.— 3665.00 MHz 16QAM

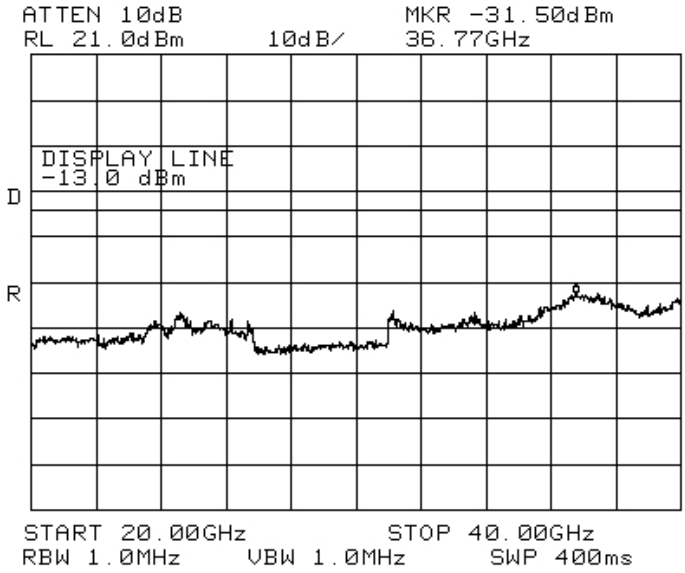


Figure 198.— 3665.00 MHz 16QAM

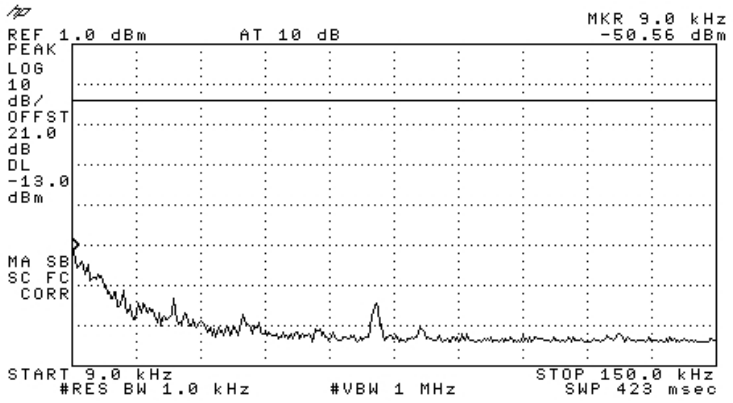


Figure 199.— 3665.00 MHz 64QAM

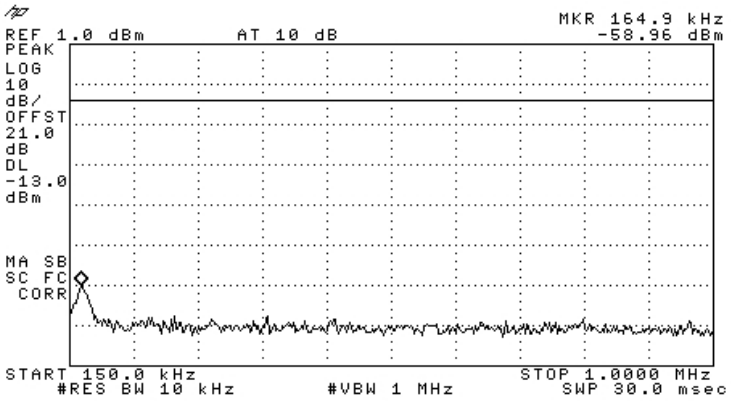


Figure 200.— 3665.00 MHz 64QAM

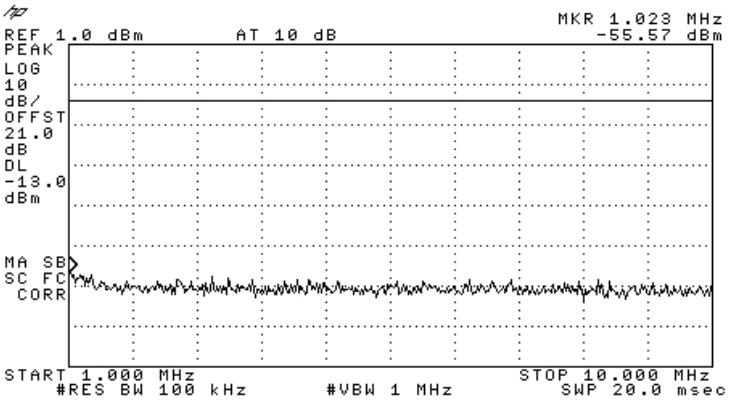


Figure 201.— 3665.00 MHz 64QAM

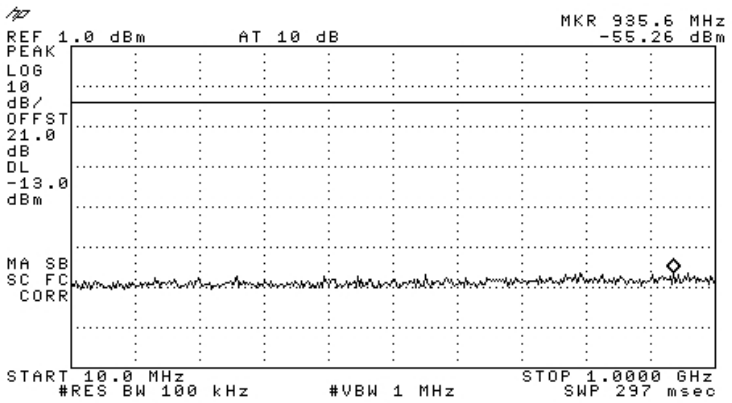


Figure 202.— 3665.00 MHz 64QAM

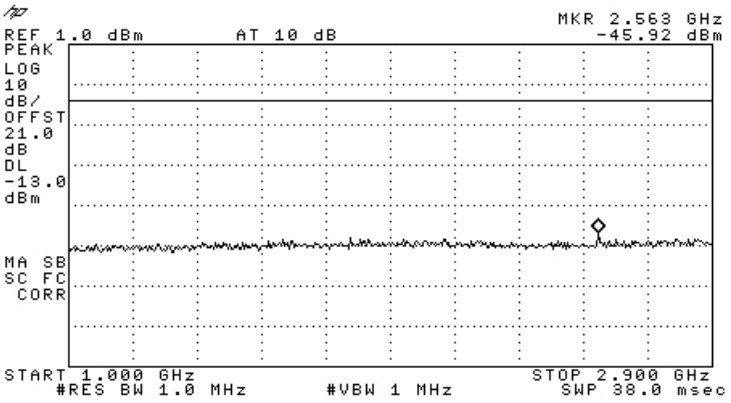


Figure 203.— 3665.00 MHz 64QAM

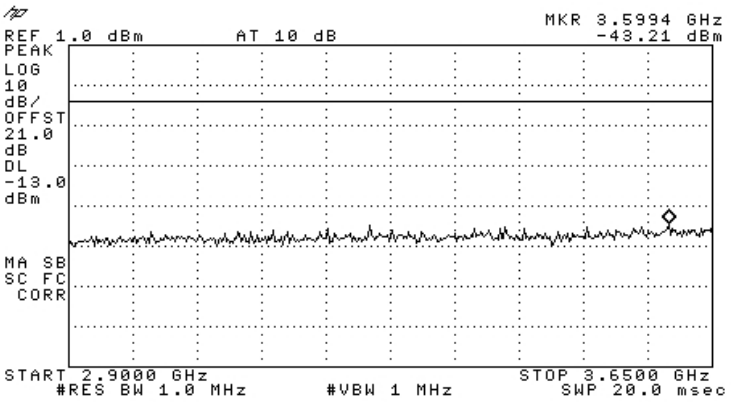


Figure 204.— 3665.00 MHz 64QAM

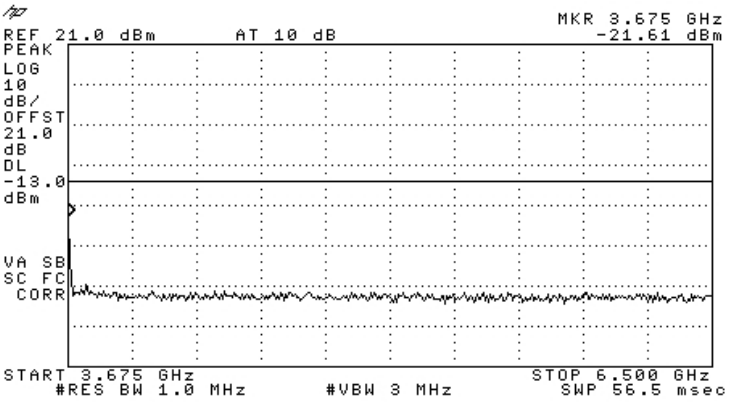


Figure 205.— 3665.00 MHz 64QAM

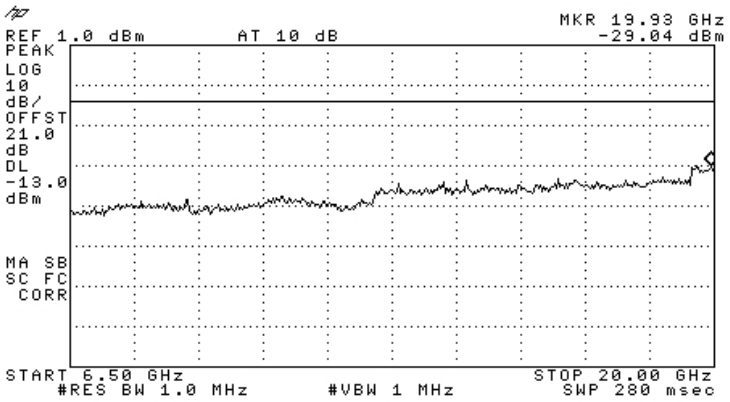


Figure 206.— 3665.00 MHz 64QAM

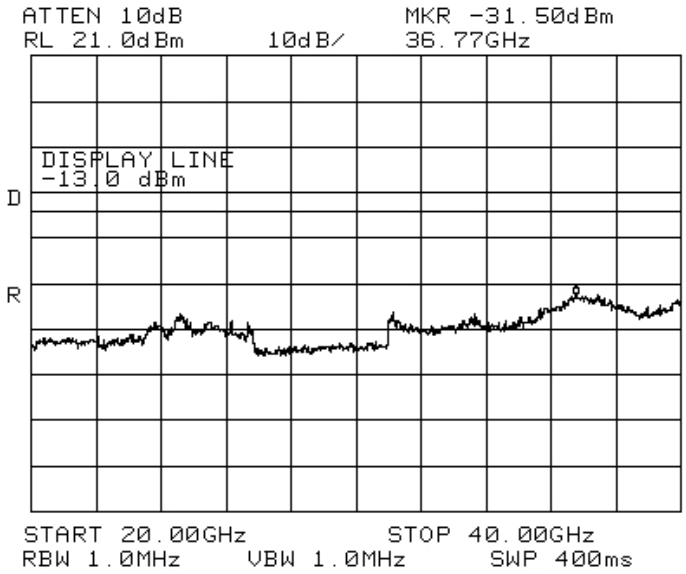


Figure 207.— 3665.00 MHz 64QAM

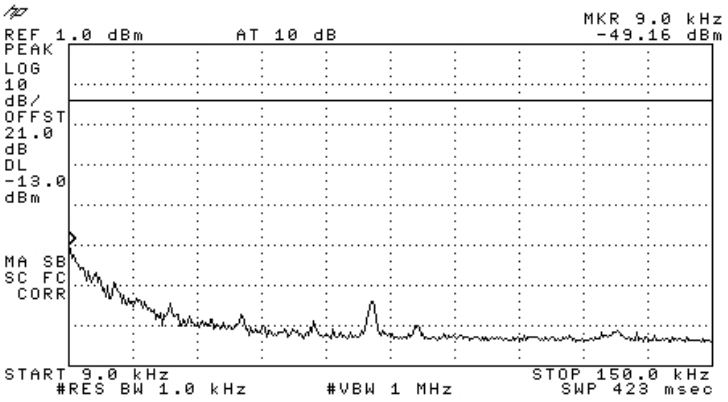


Figure 208.— 3670.00 MHz QPSK

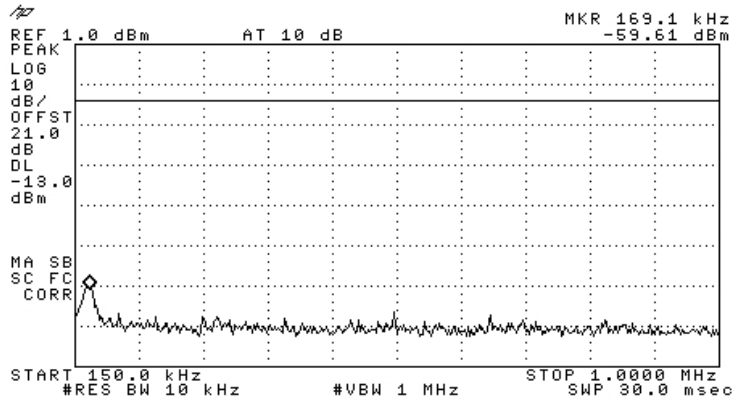


Figure 209.— 3670.00 MHz QPSK

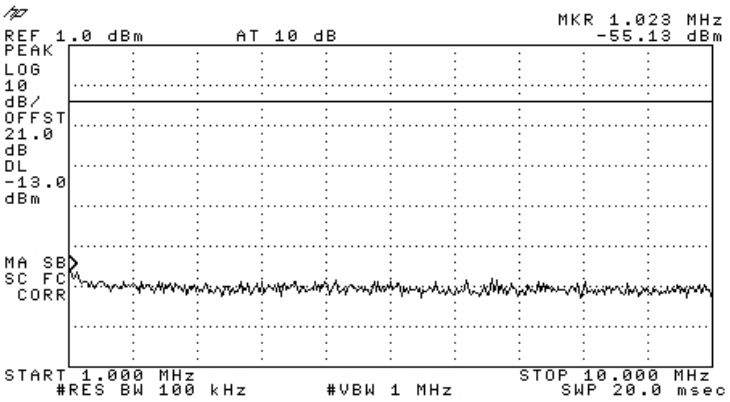


Figure 210.— 3670.00 MHz QPSK

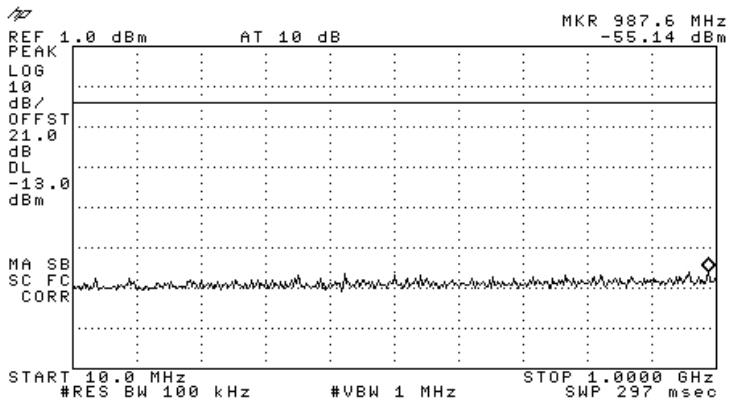


Figure 211.— 3670.00 MHz QPSK

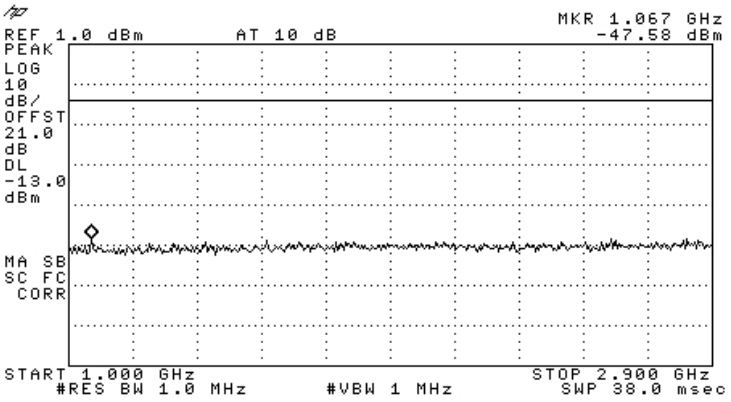


Figure 212.— 3670.00 MHz QPSK

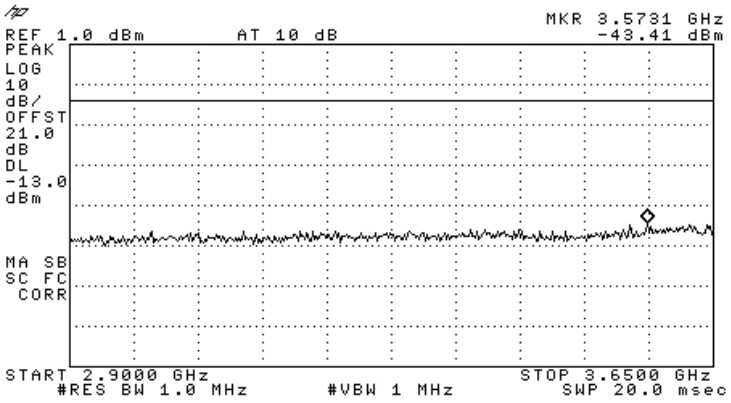


Figure 213.— 3670.00 MHz QPSK

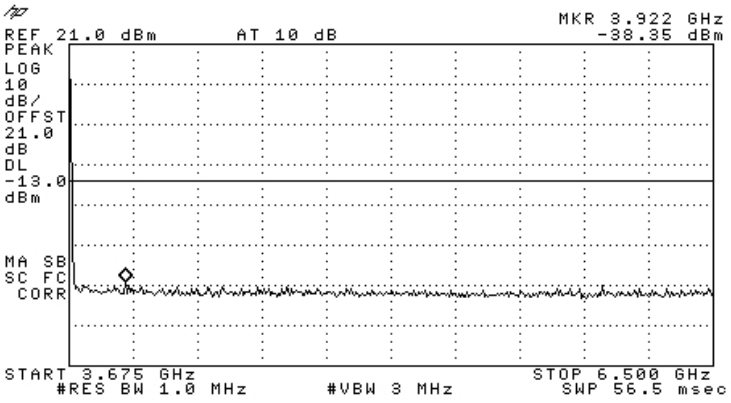


Figure 214.— 3670.00 MHz QPSK

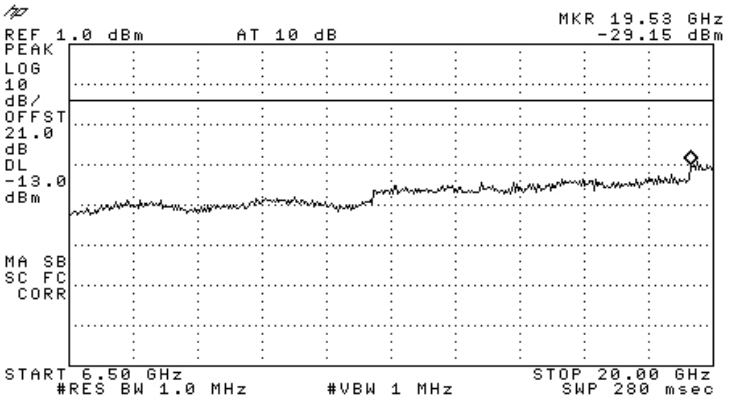


Figure 215.— 3670.00 MHz QPSK

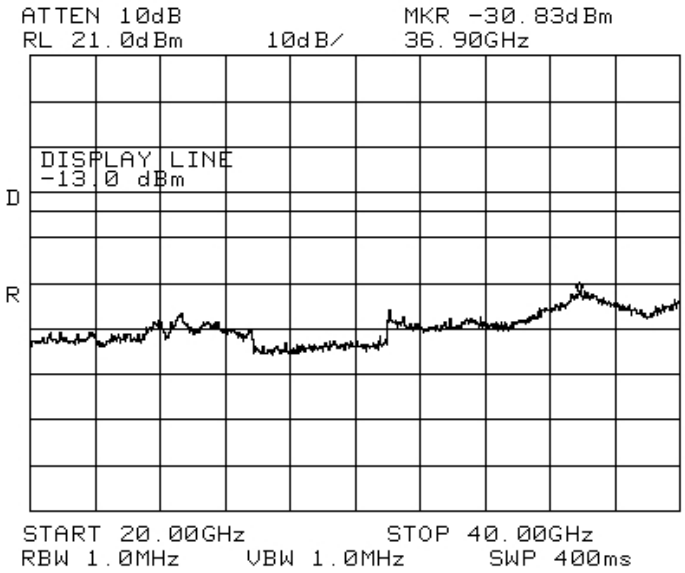


Figure 216.— 3670.00 MHz QPSK

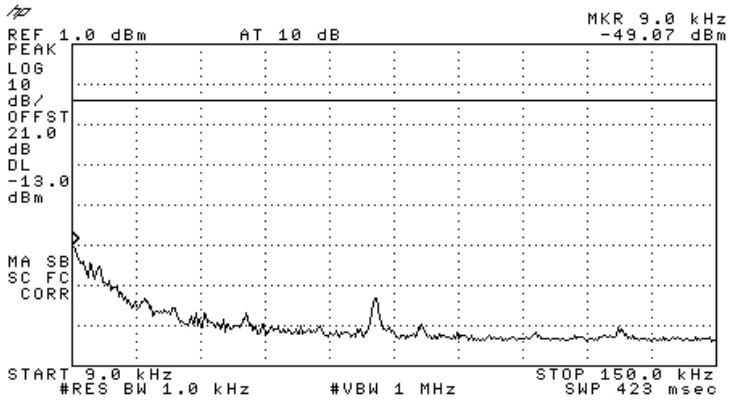


Figure 217.— 3670.00 MHz 16QAM

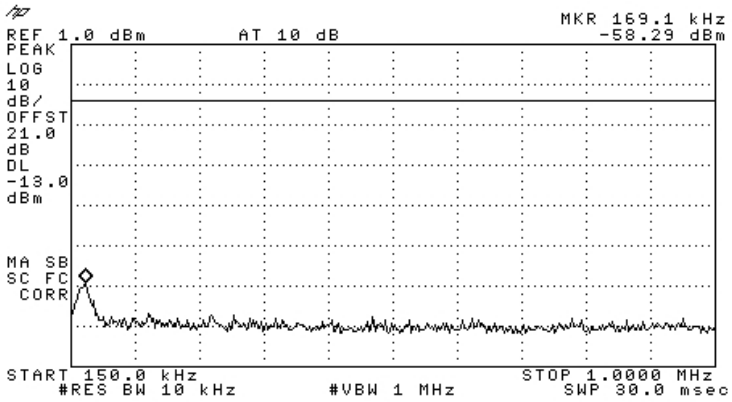


Figure 218.— 3670.00 MHz 16QAM

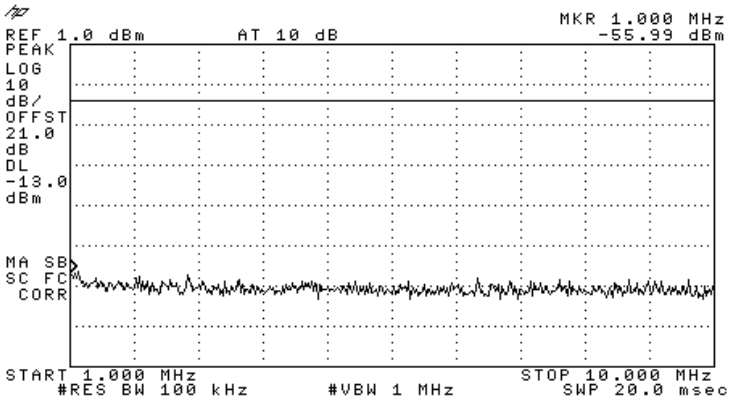


Figure 219.— 3670.00 MHz 16QAM

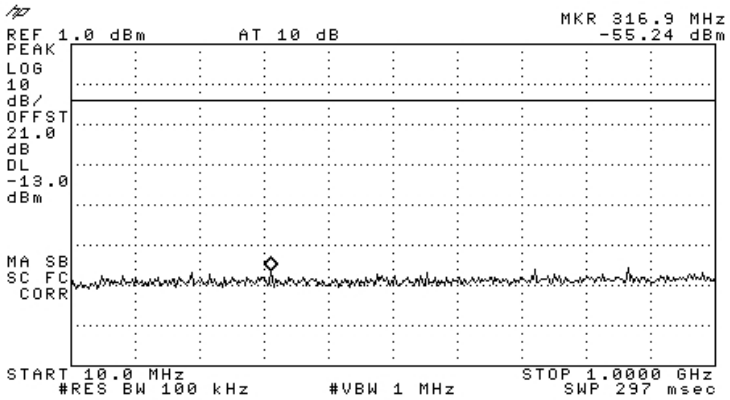


Figure 220.— 3670.00 MHz 16QAM

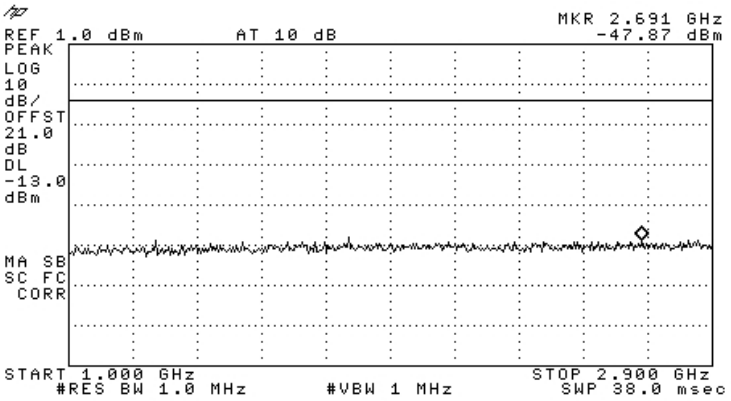


Figure 221.— 3670.00 MHz 16QAM

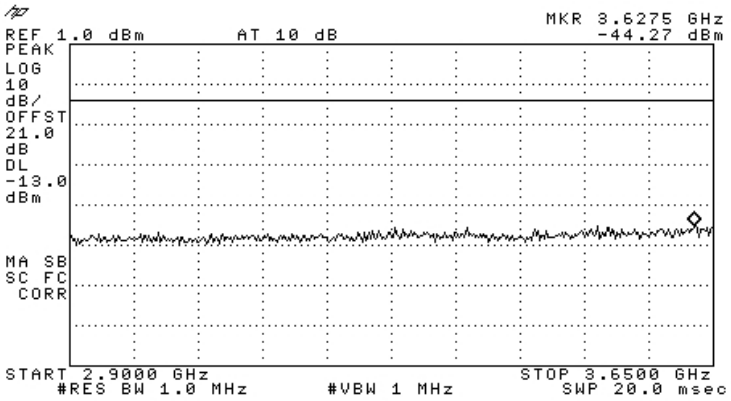


Figure 222.— 3670.00 MHz 16QAM

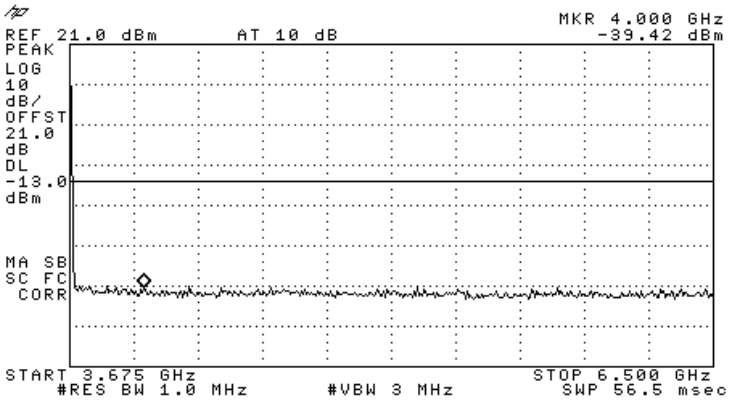


Figure 223.— 3670.00 MHz 16QAM

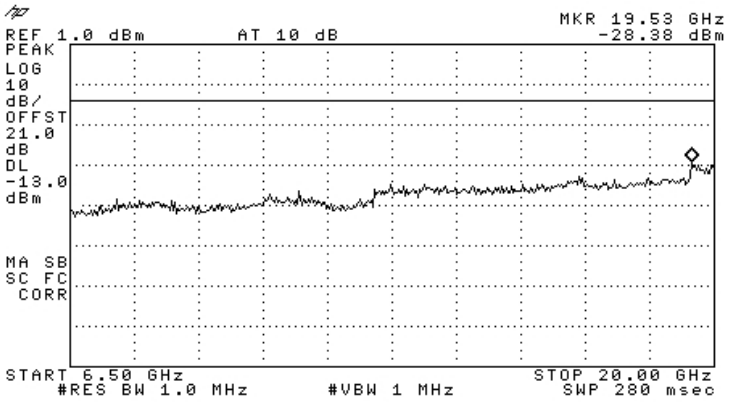


Figure 224.— 3670.00 MHz 16QAM

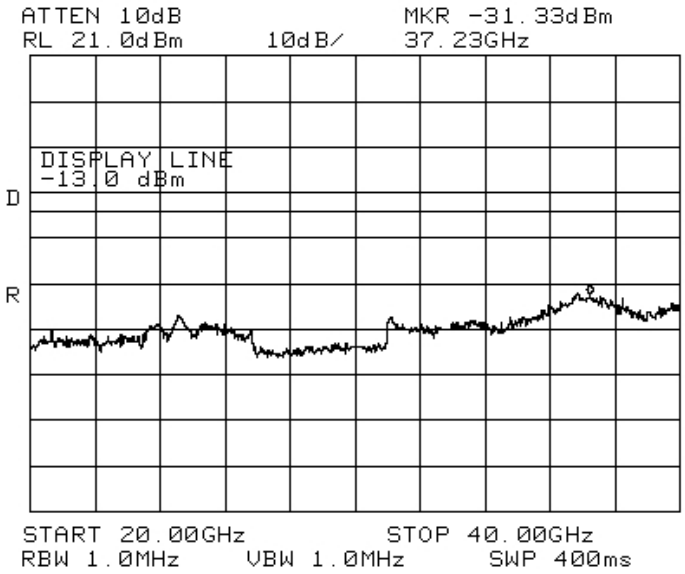


Figure 225.— 3670.00 MHz 16QAM

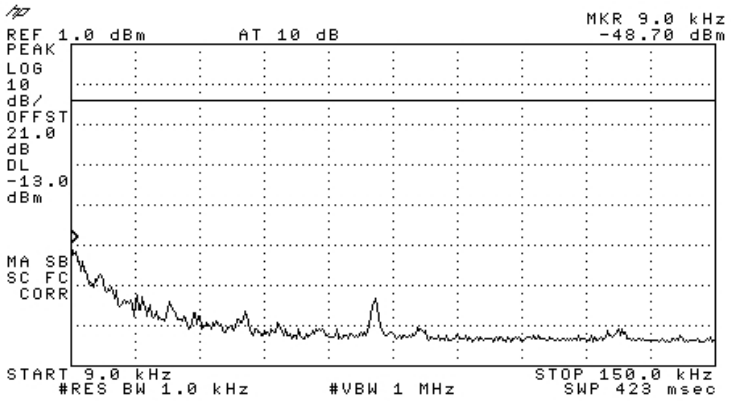


Figure 226.— 3670.00 MHz 64QAM

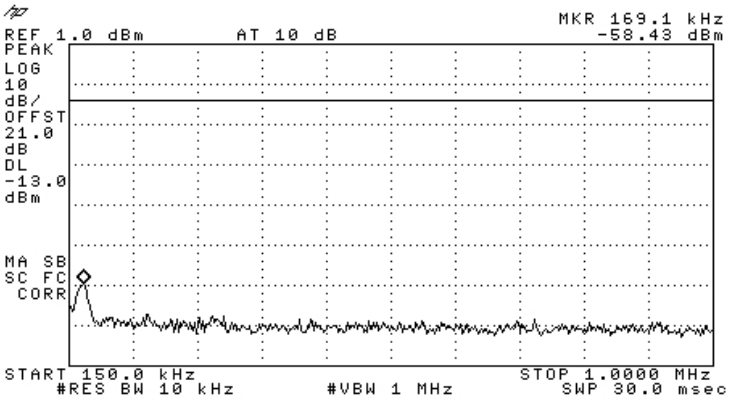


Figure 227.— 3670.00 MHz 64QAM

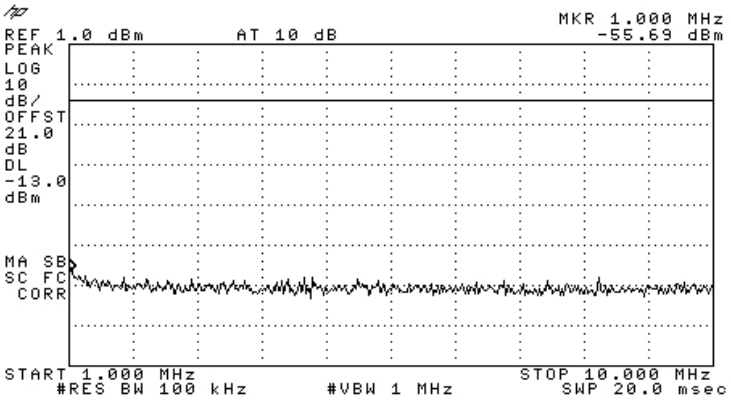


Figure 228.— 3670.00 MHz 64QAM

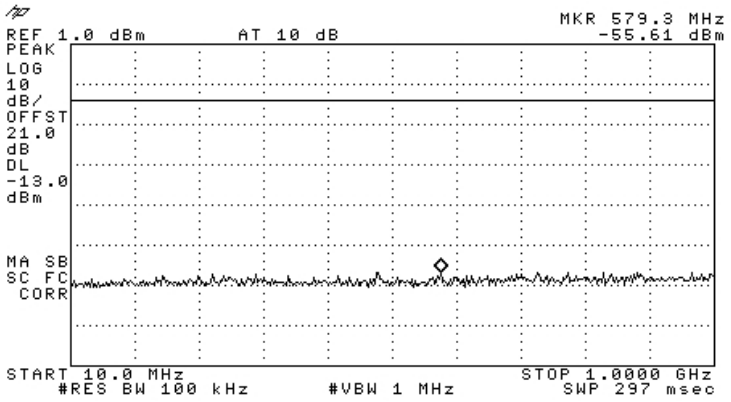


Figure 229.— 3670.00 MHz 64QAM

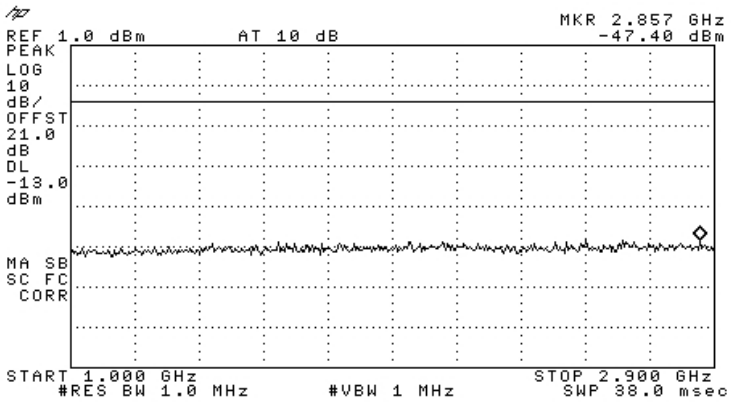


Figure 230.— 3670.00 MHz 64QAM

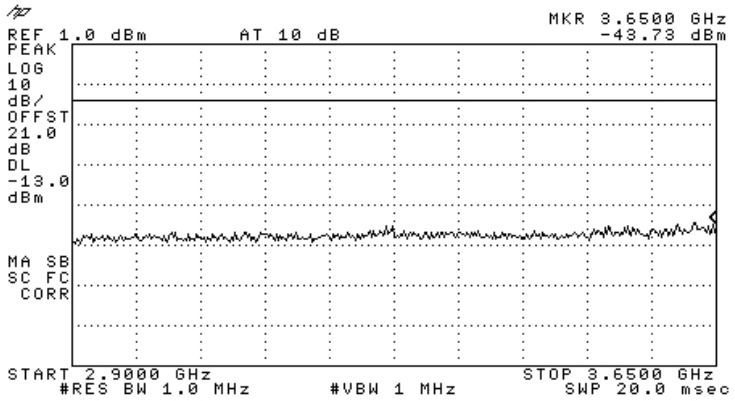


Figure 231.— 3670.00 MHz 64QAM

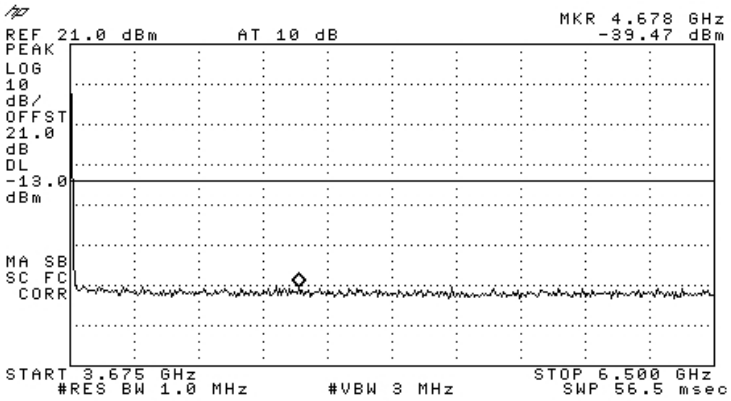


Figure 232.— 3670.00 MHz 64QAM

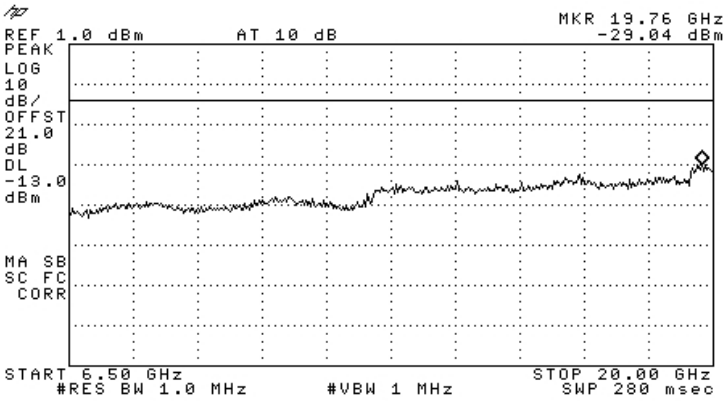


Figure 233.— 3670.00 MHz 64QAM

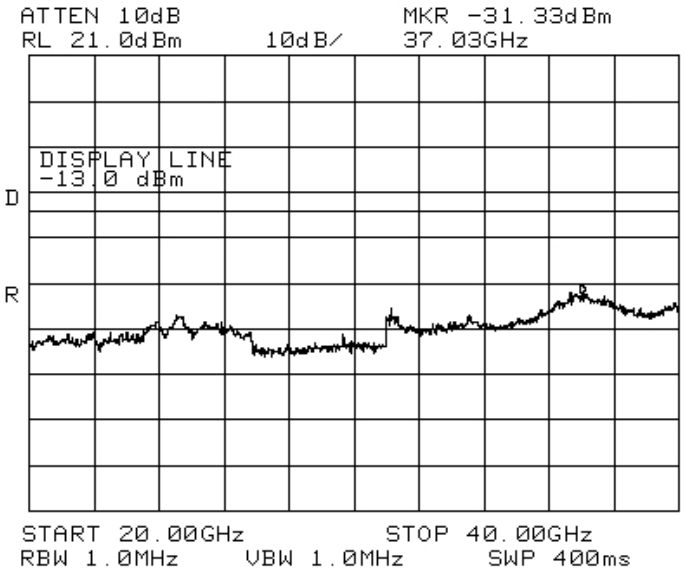


Figure 234.— 3670.00 MHz 64QAM

11.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Serial Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90 Section 90.1323

Operation Frequency (MHz)		Reading (dBm)	Specification (dBm)	Margin (dB)
3655.00	QPSK	-29.0	-13.0	-16.0
	16QAM	-28.5	-13.0	-15.5
	64QAM	-28.7	-13.0	-15.7
3665.00	QPSK	-27.7	-13.0	-14.7
	16QAM	-22.0	-13.0	-9.0
	64QAM	-21.6	-13.0	-8.6
3670.00	QPSK	-29.2	-13.0	-16.2
	16QAM	-28.4	-13.0	-15.4
	64QAM	-29.0	-13.0	-16.0

Figure 235 Spurious Emissions at Antenna Terminals Results

JUDGEMENT: Passed by 8.6 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 10.05.10

Typed/Printed Name: A. Sharabi

11.4 Test Equipment Used.

Spurious Emissions at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Spectrum Analyzer	HP	8546E	3442A00275	December 15, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1675	October 19, 2009	1 year

Figure 236 Test Equipment Used

12. Band Edge Spectrum
5 MHz Bandwidth

12.1 Test Specification

FCC Part 90, Subpart Z, Section 90.1323

12.2 Test procedure

Enclosed are spectrum analyzer plots for the lowest operation frequency and the highest operation frequency in which the E.U.T. is planned to be used.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + log (P) dB, yielding –13dBm.
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (21.0 dB).
The spectrum analyzer was set to 100kHz R.B.W (1% from 5MHz)

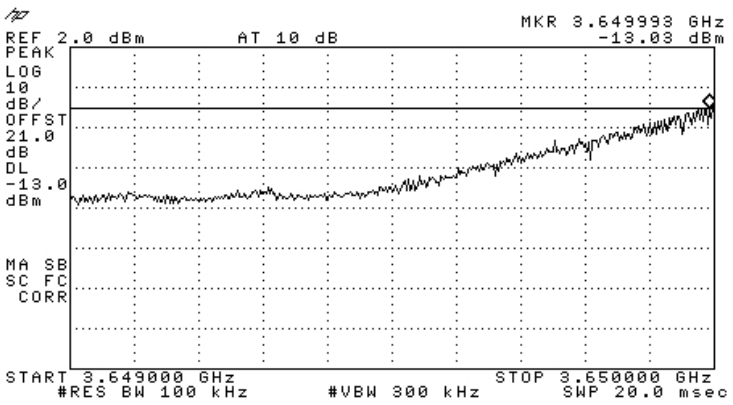


Figure 237.— 3652.50 MHz QPSK

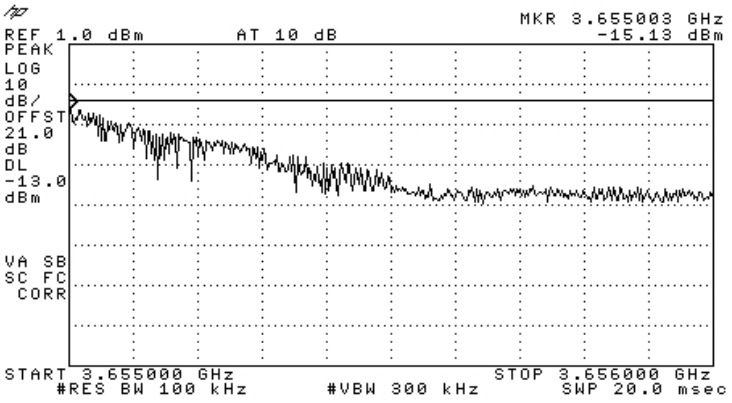


Figure 238.— 3652.50 MHz QPSK

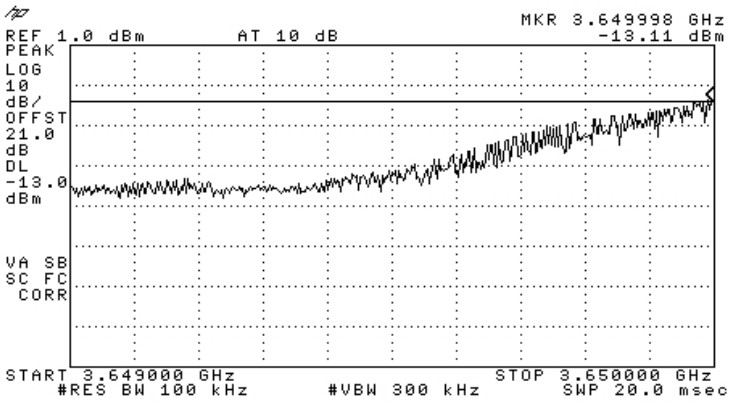


Figure 239.— 3652.50 16QAM

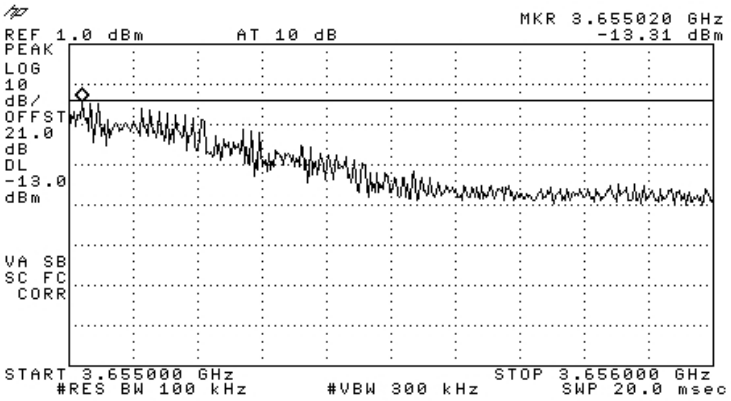


Figure 240.— 3652.50 MHz 16QAM

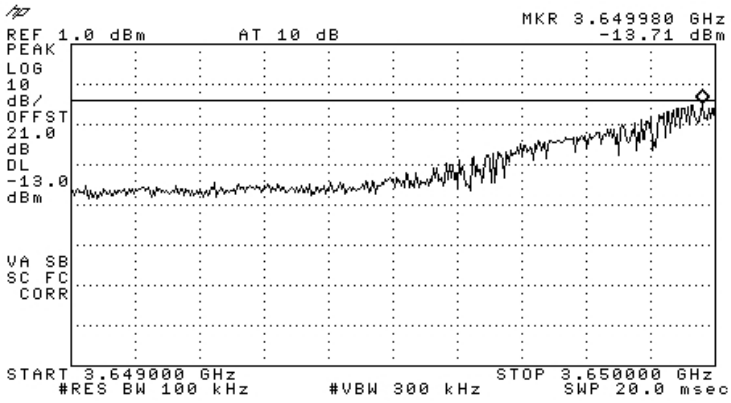


Figure 241.— 3652.50 MHz 64QAM

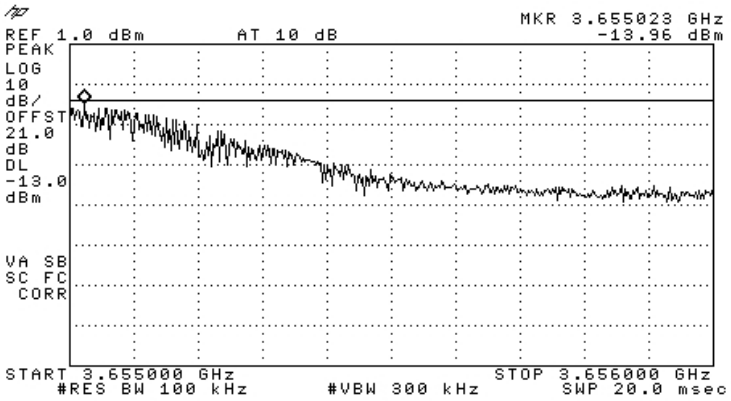


Figure 242.— 3652.50 MHz 64QAM

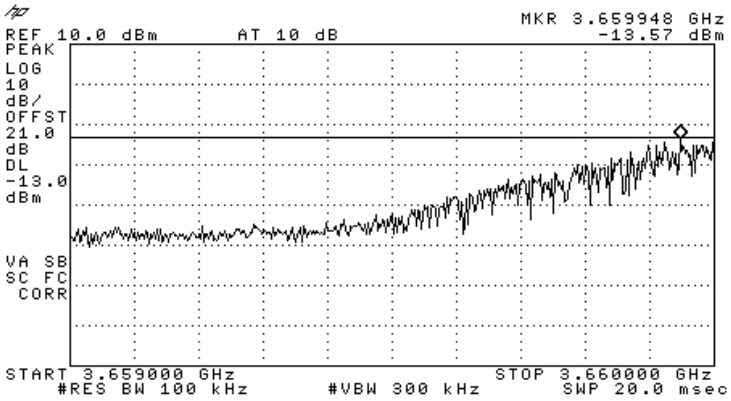


Figure 243.— 3662.50 MHz QPSK

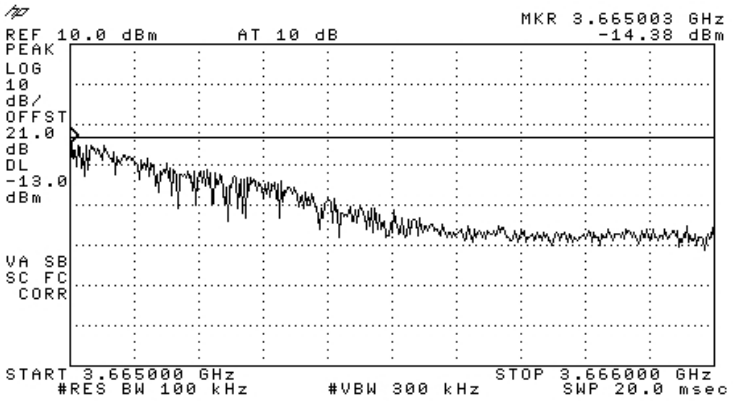


Figure 244.— 3662.50 MHz QPSK

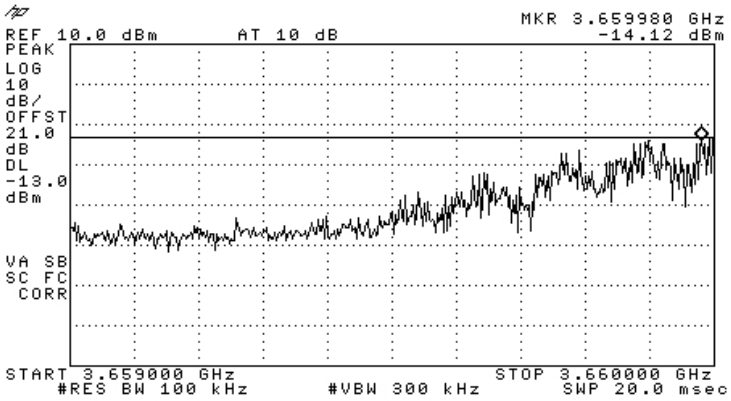


Figure 245.— 3662.50 MHz 16QAM

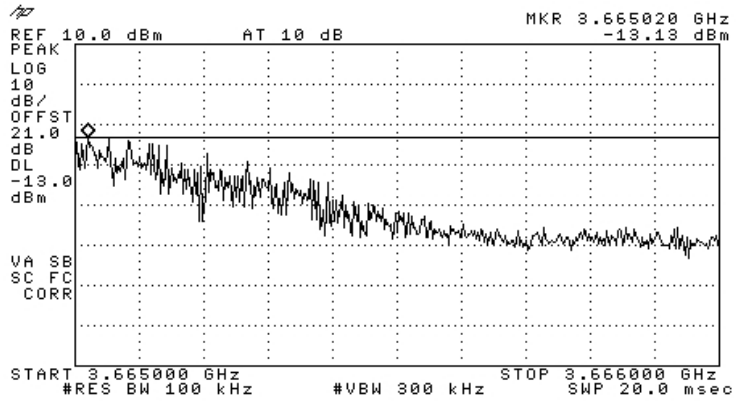


Figure 246.— 3662.50 MHz 16QAM

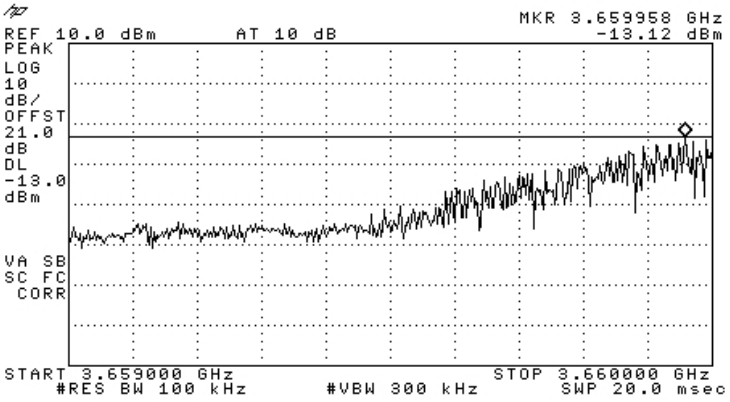


Figure 247.— 3662.50 MHz 64QAM

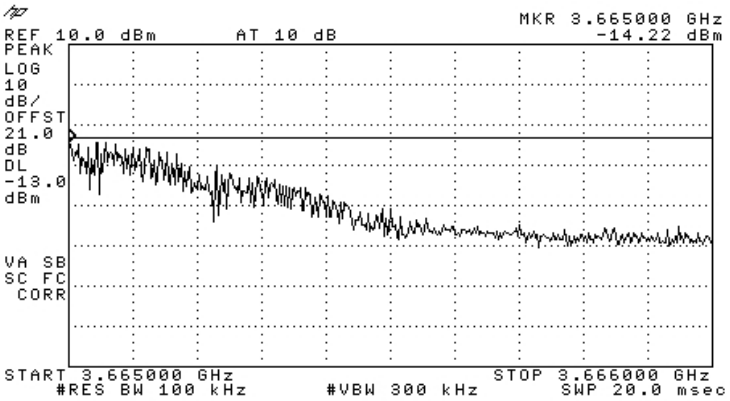


Figure 248.— 3662.50 MHz 64QAM

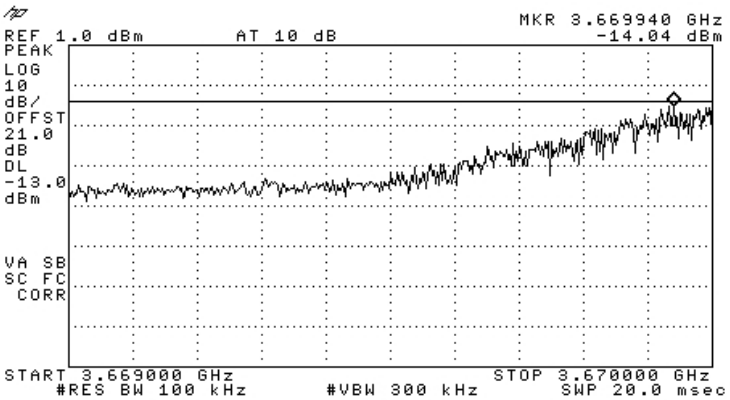


Figure 249.— 3672.50 MHz QPSK

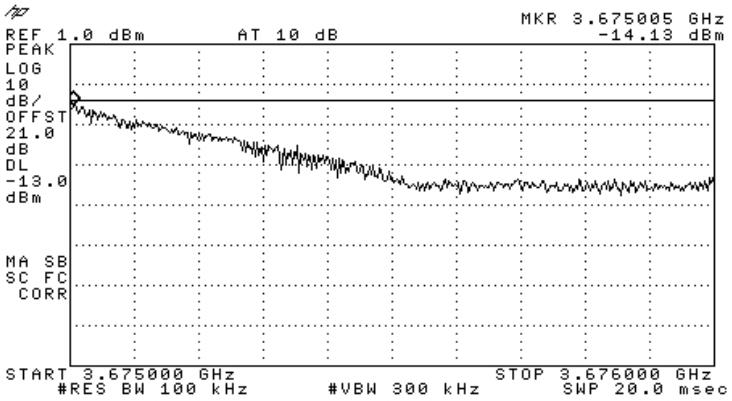


Figure 250.— 3672.50 MHz QPSK

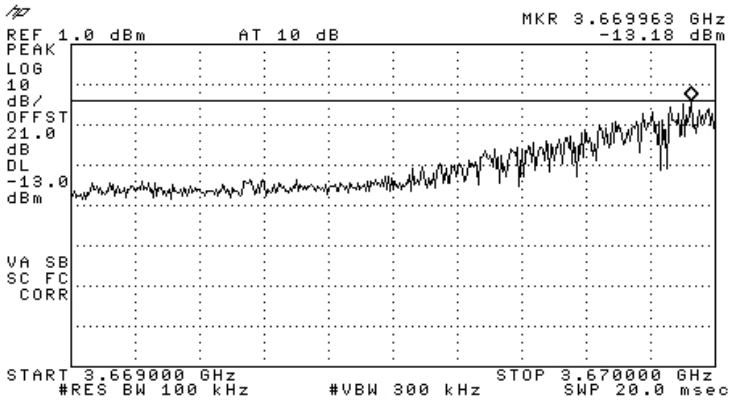


Figure 251.— 3672.50 MHz 16QAM

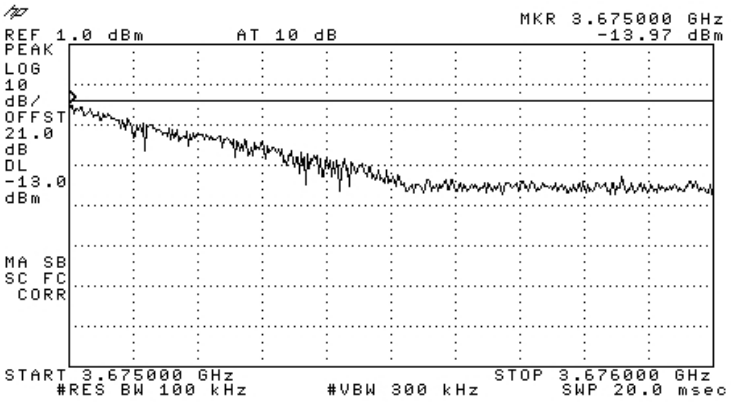


Figure 252.— 3672.50 MHz 16QAM

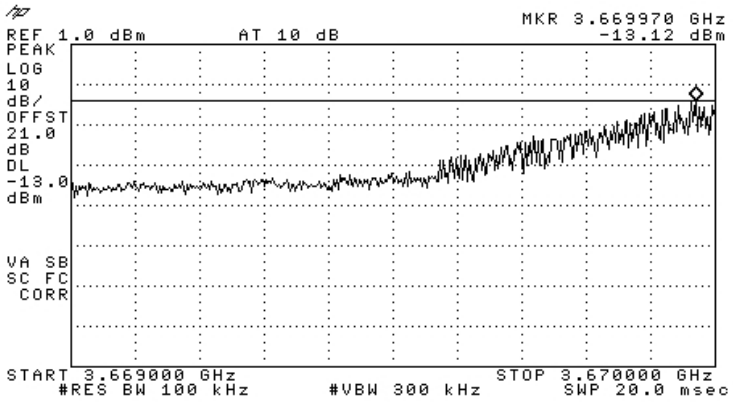


Figure 253.— 3672.50 MHz 64QAM

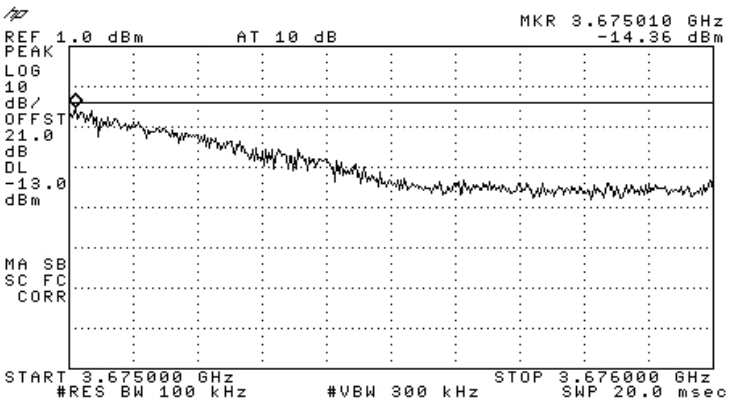


Figure 254.— 3672.50 MHz 64QAM

12.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90, Subpart Z, Section 90.1323

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Reading (dBm)	Specification (dBm)
3652.50	QPSK	3649.993	-13.03	-13.0
	QPSK	3655.003	-15.13	-13.0
	16QAM	3649.998	-13.11	-13.0
	16QAM	3655.020	-13.31	-13.0
	64QAM	3649.980	-13.71	-13.0
	64QAM	3655.023	-13.96	-13.0
3662.50	QPSK	3659.948	-13.57	-13.0
	QPSK	3665.003	-14.38	-13.0
	16QAM	3659.980	-14.12	-13.0
	16QAM	3665.020	-13.13	-13.0
	64QAM	3659.958	-13.12	-13.0
	64QAM	3665.000	-14.22	-13.0
3672.50	QPSK	3669.940	-14.04	-13.0
	QPSK	3675.005	-14.13	-13.0
	16QAM	3669.963	-13.18	-13.0
	16QAM	3675.000	-13.97	-13.0
	64QAM	3669.970	-13.12	-13.0
	64QAM	3675.010	-14.36	-13.0

Figure 255 Band Edge Spectrum Results

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 10.05.10

Typed/Printed Name: A. Sharabi

12.4 Test Equipment Used.

Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 256 Test Equipment Used

13. Band Edge Spectrum
10 MHz Bandwidth

13.1 Test Specification

FCC Part 90, Subpart Z, Section 90.1323

13.2 Test procedure

Enclosed are spectrum analyzer plots for the lowest operation frequency and the highest operation frequency in which the E.U.T. is planned to be used.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + log (P) dB, yielding –13dBm.
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (21.0 dB).
The spectrum analyzer was set to 100kHz R.B.W (1% from 10MHz).

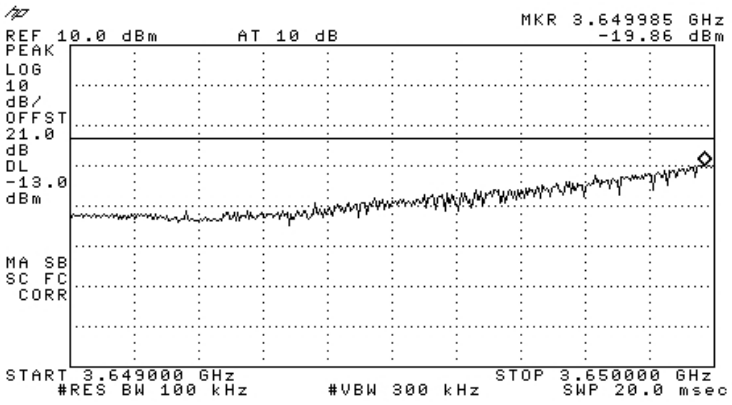


Figure 257.— 3655.00 MHz QPSK

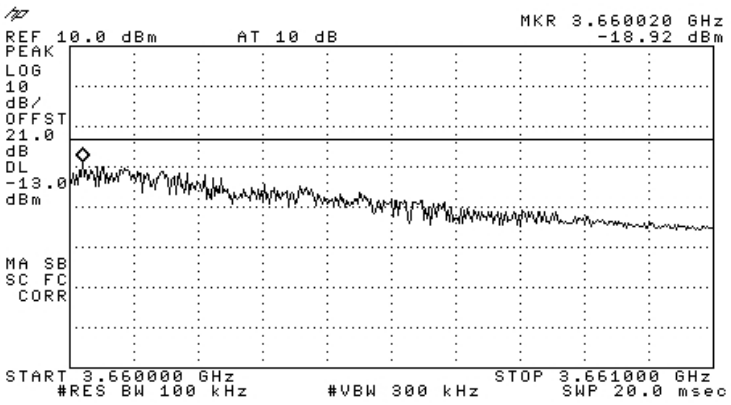


Figure 258.— 3655.00 MHz QPSK

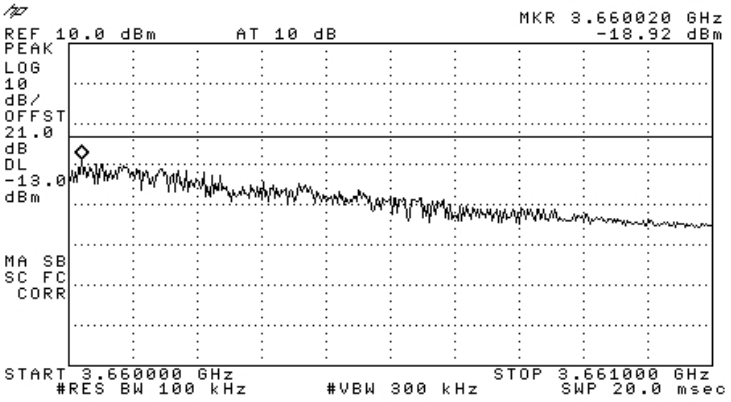


Figure 259.— 3655.00 16QAM

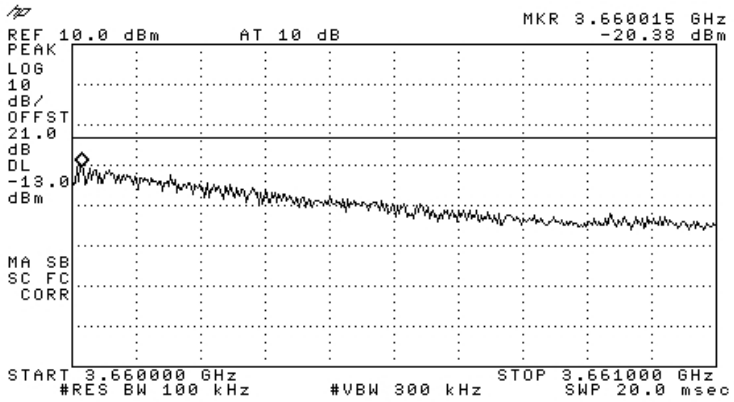


Figure 260.— 3655.00 MHz 16QAm

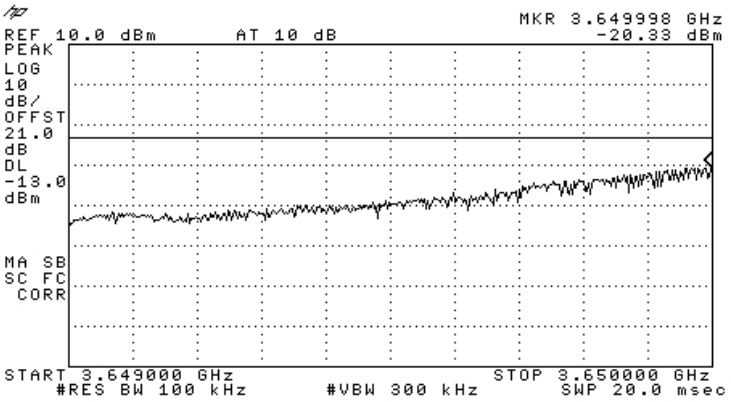


Figure 261.— 3655.00 MHz 64QAm

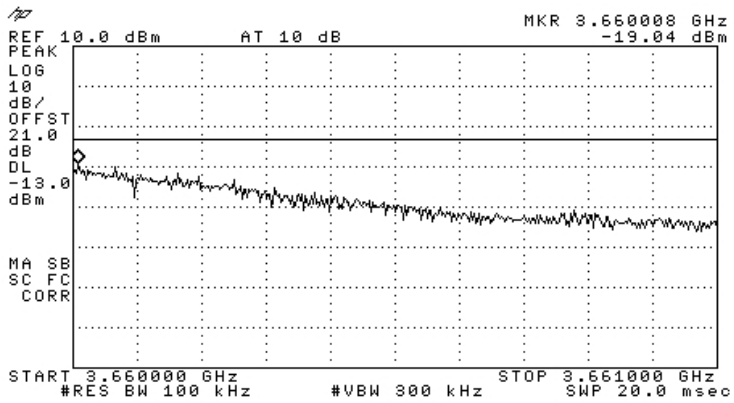


Figure 262.— 3655.00 MHz 64QAM

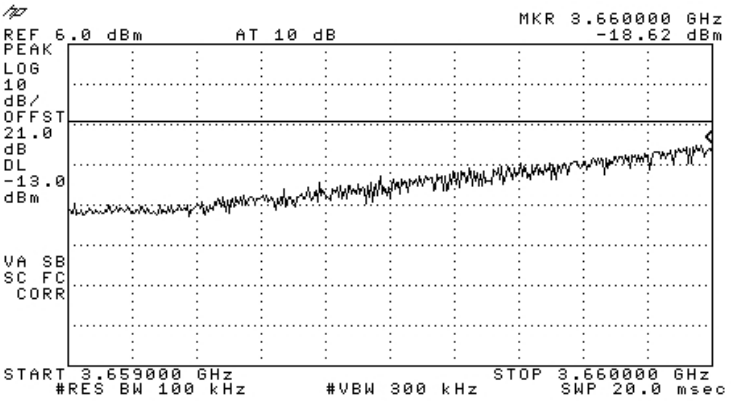


Figure 263.— 3665.00 MHz QPSK

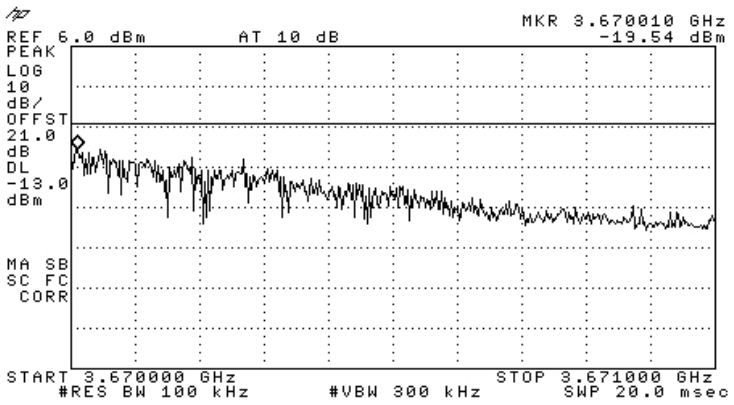


Figure 264.— 3665.00 MHz QPSK

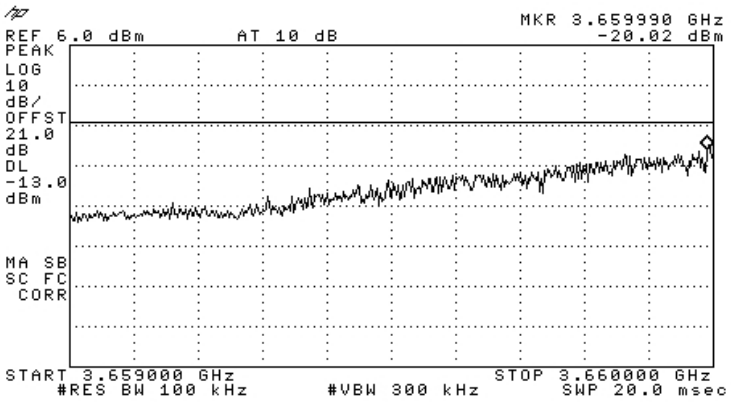


Figure 265.— 3665.00 MHz 16QAM

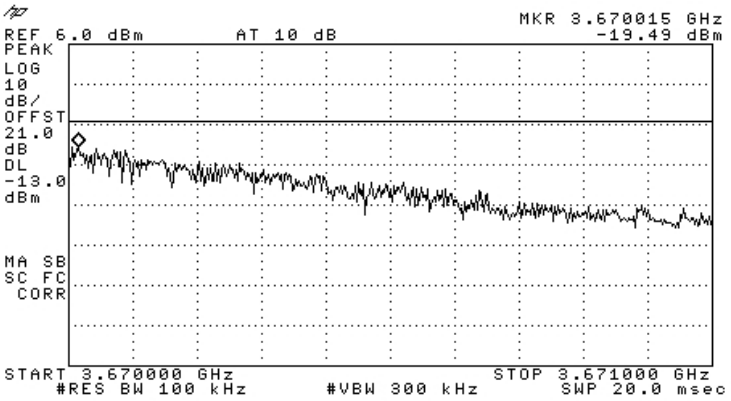


Figure 266.— 3665.00 MHz 16QAM

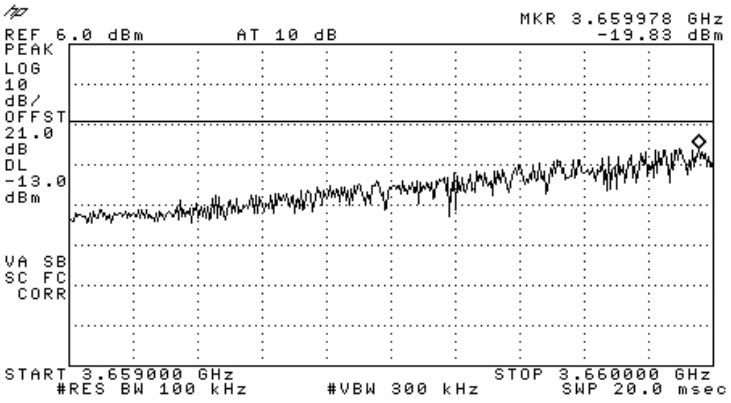


Figure 267.— 3665.00 MHz 64QAM

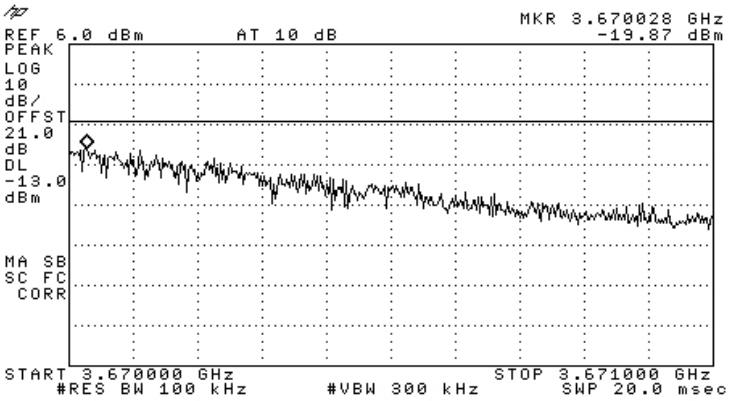


Figure 268.— 3665.00 MHz 64QAM

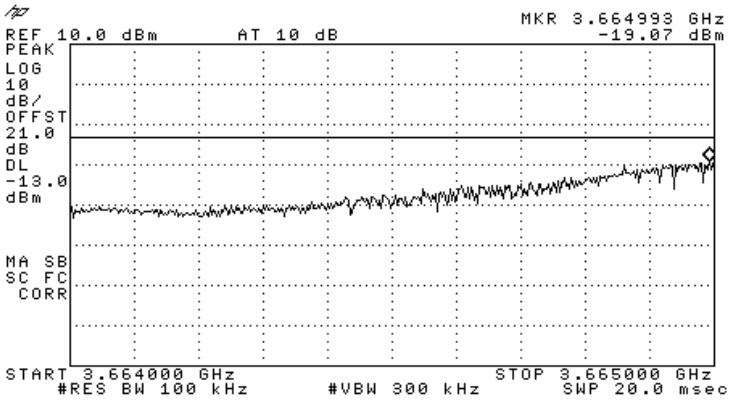


Figure 269.— 3670.00 MHz QPSK

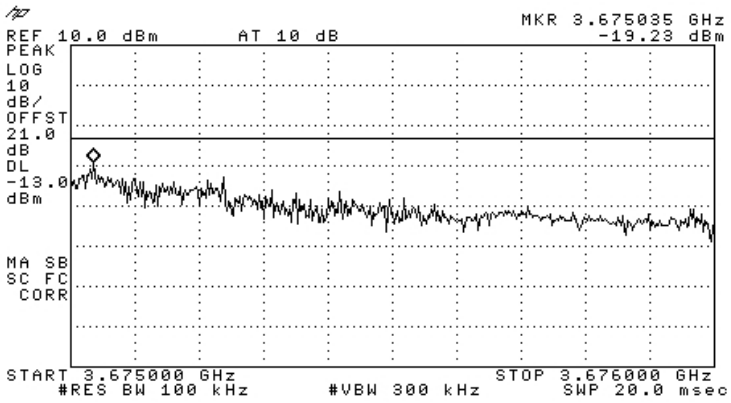


Figure 270.— 3670.00 MHz QPSK

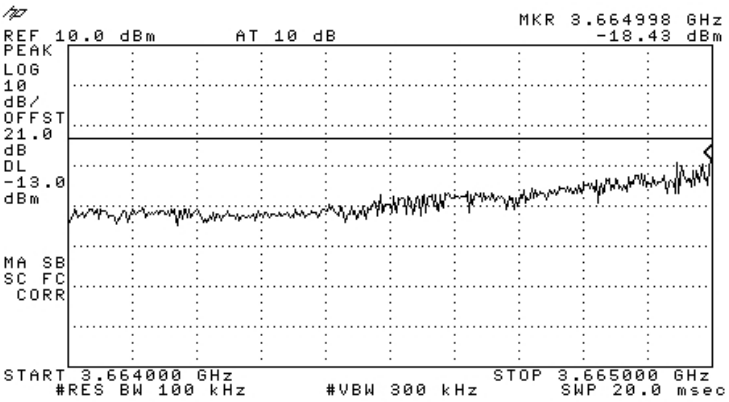


Figure 271.— 3670.00 MHz 16QAM

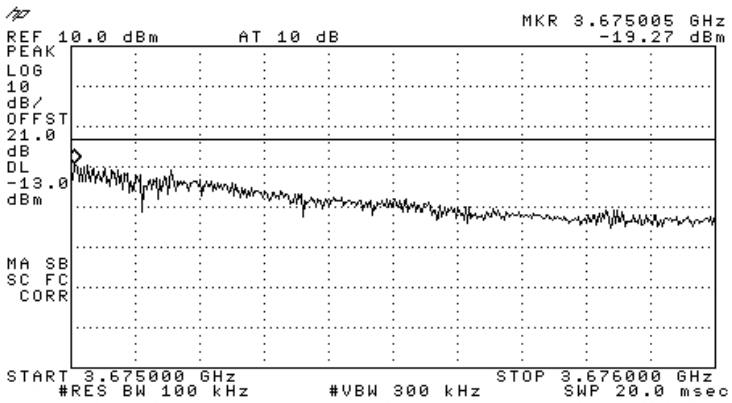


Figure 272.— 3670.00 MHz 16QAM

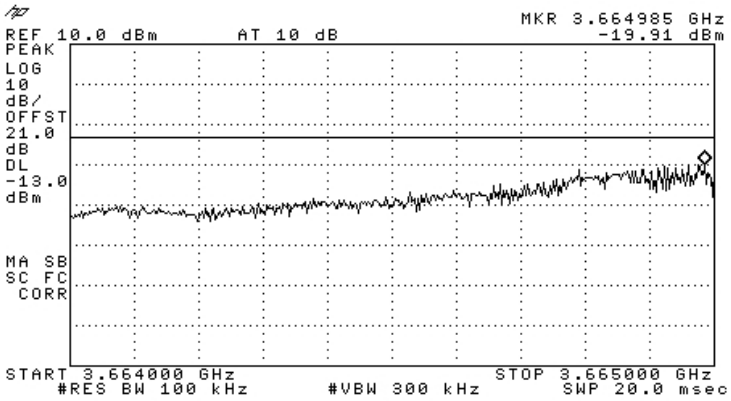


Figure 273.— 3670.00 MHz 64QAM

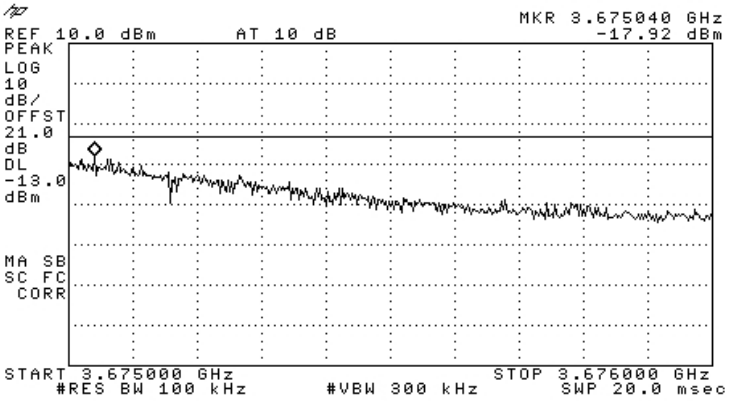


Figure 274.— 3670.00 MHz 64QAM

13.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC
Specification: FCC Part 90, Subpart Z, Section 90.1323

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Reading (dBm)	Specification (dBm)
3655.0	QPSK	3649.985	-19.86	-13.0
	QPSK	3660.020	-18.92	-13.0
	16QAM	3649.998	-20.45	-13.0
	16QAM	3660.0.15	-20.38	-13.0
	64QAM	3649.998	-20.33	-13.0
	64QAM	3660.008	-19.04	-13.0
3665.00	QPSK	3660.000	-18.62	-13.0
	QPSK	3670.010	-19.54	-13.0
	16QAM	3659.990	-20.02	-13.0
	16QAM	3670.015	-19.49	-13.0
	64QAM	3659.978	-19.83	-13.0
	64QAM	3670.028	-19.87	-13.0
3670.00	QPSK	3664.993	-19.07	-13.0
	QPSK	3675.035	-19.23	-13.0
	16QAM	3664.998	-18.43	-13.0
	16QAM	3675.005	-19.27	-13.0
	64QAM	3664.985	-19.91	-13.0
	64QAM	3675.040	-17.92	-13.0

Figure 275 Band Edge Spectrum Results

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 10.05.10

Typed/Printed Name: A. Sharabi

13.4 Test Equipment Used.

Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 209	1 year

Figure 276 Test Equipment Used

14. Spurious Radiated Emission 5 and 10 MHz Bandwidth

14.1 Test Specification

FCC, Part 90, Subpart Z, Section 90.1323

14.2 Test Procedure

The test method was based on ANSI/TIA-603-B: 2002, Section 2.2.12 Unwanted Emissions: Radiated Spurious.
The power of any emission outside of the authorized operating frequency ranges (3650 - 3670 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB, yielding –13dBm.

(a) The E.U.T. operation mode and test set-up are as described in Section 3. 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 configuration tested is shown in Figure 1.
The frequency range 9 kHz-27 GHz 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.

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

The E.U.T. was operated at the frequencies of 3652.50, 3662.50, and 3672.50 MHz with QPSK, 16QAM, and 64QAM modulations with 5 MHz bandwidth and at the frequencies of 3655.00, 3665.00, and 3670.00 MHz with QPSK, 16QAM, and 64QAM modulations with 10 MHz bandwidth.
The worst case results using 64QAM modulation and both 5 and 10 MHz bandwidth were recorded.

5 MHz Bandwidth

Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dBµV/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
3652.50	7307.00	V	63.9	-31.5	17.2	10.7	-38.0	-13.0	-25.0
3652.50	7307.00	H	63.1	-31.3	17.2	10.7	-37.8	-13.0	-24.8
3662.50	7325.00	V	54.1	-39.1	17.2	10.7	-45.6	-13.0	-32.6
3662.50	7325.00	H	53.9	-41.2	17.2	10.7	-47.7	-13.0	-34.7
3672.50	7346.00	V	54.0	-39.2	17.2	10.7	-45.7	-13.0	-32.7
3672.50	7346.00	H	54.5	-39.1	17.2	10.7	-45.6	-13.0	-32.6

10 MHz Bandwidth

Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dBµV/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
3655.00	7310.00	V	58.9	-36.3	17.2	10.7	-42.8	-13.0	-29.8
3655.00	7310.00	H	60.6	-34.5	17.2	10.7	-41.0	-13.0	-28.0
3665.00	7330.00	V	54.3	-39.0	17.2	10.7	-45.5	-13.0	-32.5
3665.00	7330.00	H	54.8	-38.8	17.2	10.7	-45.3	-13.0	-32.3
3670.00	7340.00	V	53.8	-39.3	17.2	10.7	-45.8	-13.0	-32.8
3670.00	7340.00	H	53.8	-39.3	17.2	10.7	-45.8	-13.0	-32.8

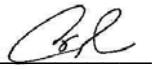
14.3 Test Results

JUDGEMENT: Passed by 24.8 dB (5 MHz Bandwidth)

JUDGEMENT: Passed by 28.0 dB (10 MHz Bandwidth)

The E.U.T met the requirements of the FCC, Part 90, Subpart Z, Section 90.1323 specifications.

TEST PERSONNEL:

Tester Signature:  Date: 10.05.10

Typed/Printed Name: A. Sharabi

14.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 17, 2008	1 year
RF Section	HP	85420E	3427A00103	November 16, 2008	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 29, 2009	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 3, 2008	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 8, 2009	1 year
Signal Generator	HP	8648C	3623A04126	January 11, 2008	2 years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 16, 2008	2 years
Horn Antenna	ARA	SWH-28	1008	December 23, 2008	2 years
Horn Antenna	Narda	V637	0410	December 23, 2008	2 years

15. Frequency Stability 5 and 10 MHz Bandwidth

15.1 Test Specification

Part 90 Subpart Z Section 90.

15.2 Test Procedure

The E.U.T operation mode and test setup are as described in Section 2. The E.U.T. was operated with a CW signal in the downlink path.

The E.U.T. was placed inside a temperature chamber. The E.U.T. was operated from 36 VDC at normal temperature and the chamber temperature was set to +30°C.

The spectrum analyzer was set to 10.0 kHz span and 1.0 kHz RBW, and 1.0 kHz VBW.

The carrier frequency was measured and recorded (reference frequency reading).

The carrier frequency measurement was repeated for:

(a). +30°C and 48 VDC

(b). +30°C and 70 VDC

(c). -30°C and 48 VDC

(d). -20°C and 48 VDC

(e). -10°C and 48 VDC

(f). 0°C and 48 VDC

(g). +10°C and 48 VDC

(h). +20°C and 48 VDC

(i). +40°C and 48 VDC

(j). +50°C and 48 VDC

The carrier frequency was measured and recorded after at least 20 minutes of exposing the E.U.T. to the temperature.

The E.U.T. was operated at 3652.50 and 3672.50 MHz for 5 MHz bandwidth, and 3655.00 and 3670.00 MHz for 10 MHz bandwidth.

15.3 Test Results

The E.U.T met the requirements of Part 90 Subpart Z, Section 90. specification.

The details of the results are given in *Figure 277*.

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 10.05.10

Typed/Printed Name: A. Sharabi

Frequency Stability

E.U.T Description WiMAX Base Station
Type Outdoor Pico Base Station 3.5 GHz
Part Number: PICO-O-3.5-C-1W-DC

Specification: FCC Part 90 Subpart Z Section 90.

		5 MHz Bandwidth		10 MHz Bandwidth	
Temperature (°C)	**Voltage** (VDC)	**Frequency** (MHz)	**Frequency** (MHz)	**Frequency** (MHz)	**Frequency** (MHz)
30	36	3652.50298	3672.49628	3655.00305	3669.99630
	48	3652.50308	3672.49620	3655.00310	3669.99625
	70	3652.50315	3672.49618	3655.00308	3669.99620
-30	48	3652.50397	3672.49449	3655.00480	3669.99590
-20	48	3652.50258	3672.49590	3655.00250	3669.99595
-10	48	3652.50475	6672.49585	3655.00478	3669.99563
0	48	3652.50413	3672.49503	3655.00443	3669.99545
+10	48	3652.50355	3672.49543	3655.00340	3669.99535
+20	48	3652.50283	3672.49628	3655.00290	3669.99530
+40	48	3652.50300	3672.49588	3655.00298	3669.99518
+50	48	3652.50270	3672.49588	3655.00268	3669.99523

Figure 277. Frequency Stability

15.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Environmental Chamber	THERMOTRON CORP	SM 32C Mini Max	25-1030	March 04, 2009	1 Year
Digital Voltage Meter	Escort	EDM1111A	10313121	November 3, 2008	2 Years
Variable Voltage Transformer	Variac Voltage Co.	-	-	N/A	N/A
Spectrum Analyzer	HP	8594E	3809U03785	February 26, 2009	1 Year

16. APPENDIX A - CORRECTION FACTORS

16.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.2
70.0	1.3
80.0	1.4
90.0	1.6
100.0	1.7
150.0	2.0
200.0	2.3
250.0	2.7
300.0	3.1
350.0	3.4
400.0	3.7
450.0	4.0
500.0	4.3
600.0	4.7
700.0	5.3
800.0	5.9
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0	9.1
2000.0	9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 27 meters.

3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

16.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

16.3 Correction factors for CABLE

from spectrum analyzer to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.

2. The cable is used for measurements above 2.9 GHz.

3. The overall length of the cable is 10 meters.

16.4 Correction factors for LOG PERIODIC ANTENNA

Type SAS-200/511
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. Antenna serial number is 253.

2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.

3. The files mentioned above are located on the disk marked "Antenna Factors".

16.5 Correction factors forDouble-Ridged Waveguide Horn

Model: 3115, S/N 29845
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			

16.6 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

16.7 Correction factors for Horn Antenna

Model: V637

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
26.0	43.6	14.9
27.0	43.7	15.1
28.0	43.8	15.3
29.0	43.9	15.5
30.0	43.9	15.8
31.0	44.0	16.0
32.0	44.1	16.2
33.0	44.1	16.4
34.0	44.1	16.7
35.0	44.2	16.9
36.0	44.2	17.1
37.0	44.2	17.4
38.0	44.2	17.6
39.0	44.2	17.8
40.0	44.2	18.0