DATE: 31 December 2009

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

FCC Radio Test Report

for

Runcom Technologies Ltd.

Equipment under test:

WiMAX Base Station

Outdoor Pico Base Station 2.5 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 2.5 GHz

FCC ID: XYMPICO251WDC

This report concerns:	Original Grant: X Class II change: Class I change:
Equipment type:	Licensed Non-Broadcast Transmitter
Limits used: 47CFR Part 27	

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")

Ronen Greenberg
Runcom Technologies Ltd.
11 Moshe Levi St.
Rishon Le Zion 75658
Israel
Tel: +972-3-952-8440
Fax: +972-3-952-8805
e-mail: roneng@runcom.co.il

TABLE OF CONTENTS

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 2.5 GHz
Part Number No.:	PICO-O-2.5-C-1W-DC
Date of Receipt of E.U.T:	29.09.09
Start of Test:	29.09.09
End of Test:	15.11.09
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 27

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

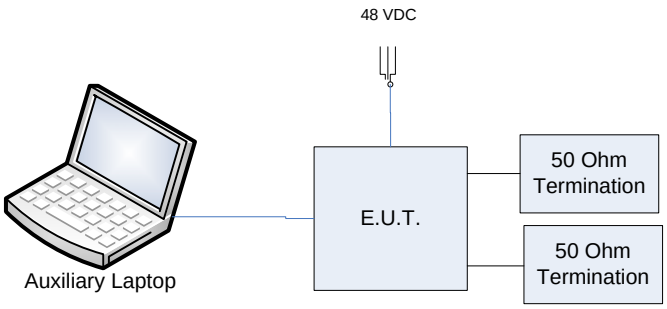


Figure 1. Conducted Emission From DC Lines and Radiated Emission Test Set-up

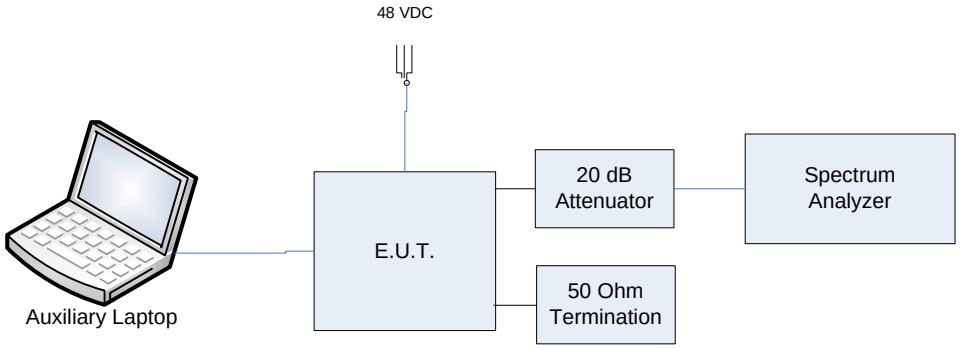


Figure 2. Conducted Emission From Antenna Ports Test Set-up

3. Test Set-up Photos

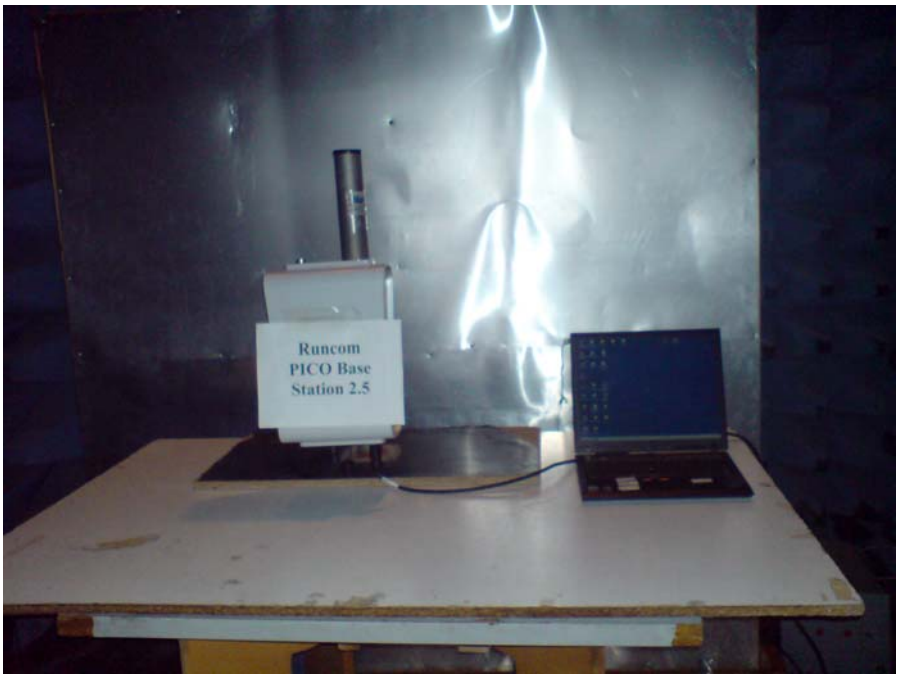


Figure 3. Conducted Emission From DC Lines Test

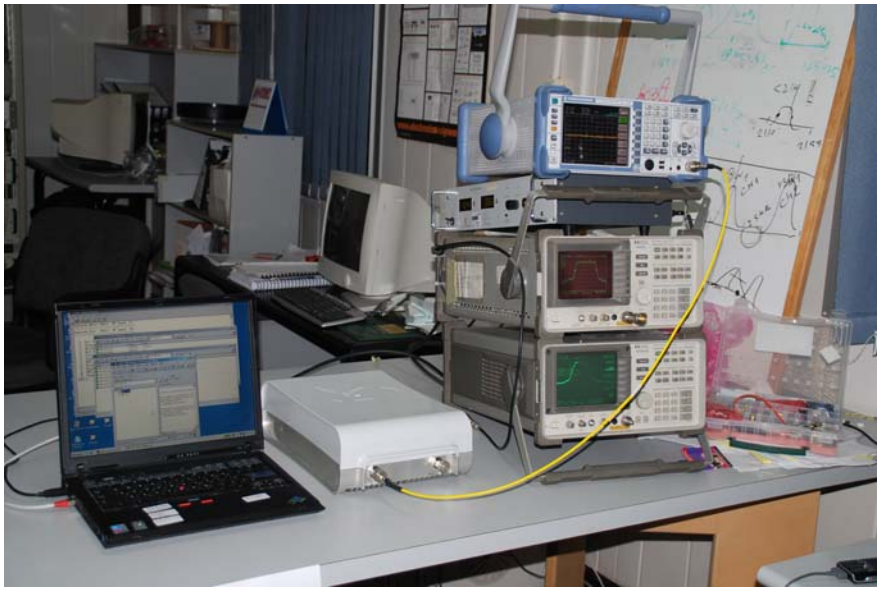


Figure 4. Conducted Emission From Antenna Port Tests

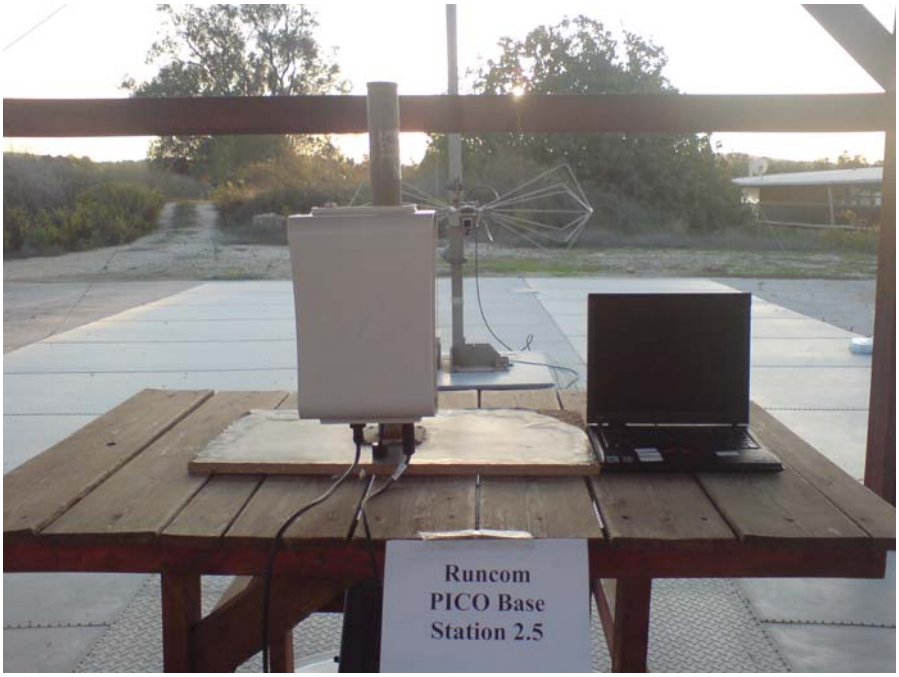


Figure 5. Radiated Emission Test

4. Conducted Emission Data

4.1 Test Specification

F.C.C., Part 15, Subpart C

4.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 3.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall.

The E.U.T was powered from 48 VDC via a 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, and using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

4.3 Measured Data

JUDGEMENT: Passed by 11.6 dB

The margin between the emission levels and the specification limit is, in the worst case, 11.6 dB for the 48 VDC + line at 0.26 MHz and 12.4 dB at 0.26 MHz for the 48 VDC - line.

The EUT met the F.C.C. Part 15, Subpart C specification requirements.

The details of the highest emissions are given in *Figure 6* to *Figure 9*.

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

Typed/Printed Name: A. Sharabi

Conducted Emission

E.U.T Description	WiMAX Base Station
Type	Outdoor Pico Base Station 2.5 GHz
Part Number:	PICO-O-2.5-C-1W-DC

Specification:	F.C.C., Part 15, Subpart C
Lead:	48 VDC +
Detectors:	Peak, Quasi-peak, Average

Signal Number	Frequency (MHz)	Peak (dBuV)	QP (dBuV)	QP Delta L 1 (dB)	Avg (dBuV)	Av Delta L 2 (dB)	Corr (dB)
1	0.201288	34.6	33.4	-30.2	32.8	-20.9	0.0
2	0.256252	43.1	42.0	-19.6	40.0	-11.6	0.0
3	0.471646	16.2	0.0	-56.5	-3.1	-49.6	0.0
4	1.708931	23.7	22.7	-33.3	21.8	-24.2	0.0
5	11.768020	29.0	27.5	-32.5	26.0	-24.0	0.0
6	20.484390	42.4	39.0	-21.0	14.0	-36.0	0.0

Figure 6. Detectors: Peak, Quasi-peak, AVERAGE .

Note: QP Delta/Av Delta refer to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	WiMAX Base Station
Type	Outdoor Pico Base Station 2.5 GHz
Part Number:	PICO-O-2.5-C-1W-DC

Specification:	F.C.C., Part 15, Subpart C
Lead:	48 VDC +
Detectors:	Peak, Quasi-peak, Average

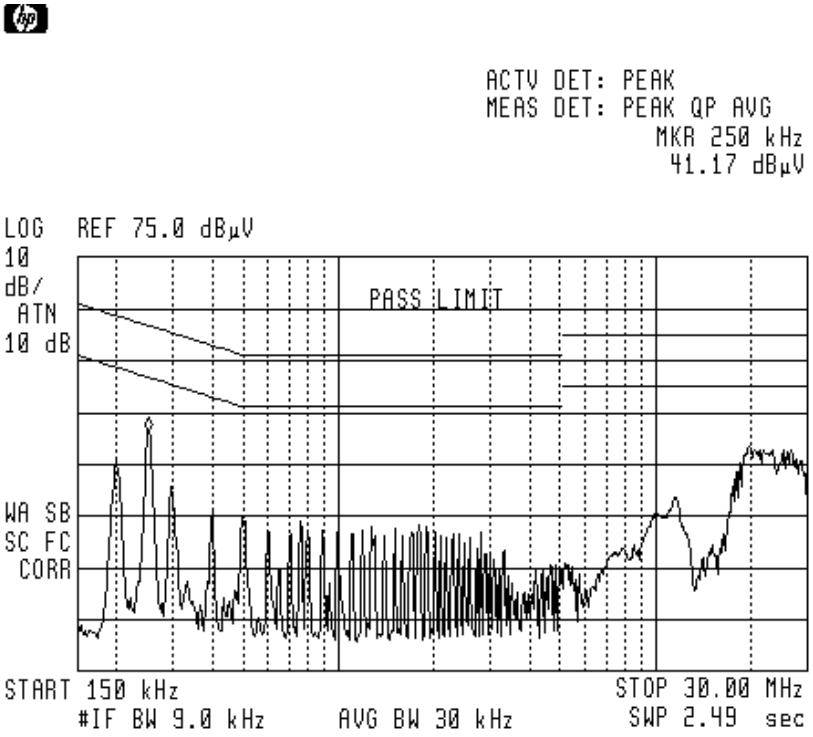


Figure 7. Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description	WiMAX Base Station
Type	Outdoor Pico Base Station 2.5 GHz
Part Number:	PICO-O-2.5-C-1W-DC

Specification:	F.C.C., Part 15, Subpart C
Lead:	48 VDC -
Detectors:	Peak, Quasi-peak, Average

Signal Number	Frequency (MHz)	Peak (dBuV)	QP (dBuV)	QP Delta L 1 (dB)	Avg (dBuV)	Av Delta L 2 (dB)	Corr (dB)
1	0.256292	42.6	41.5	-20.0	39.2	-12.4	0.0
2	0.767909	23.7	23.0	-33.0	21.9	-24.1	0.0
3	1.278945	22.4	21.0	-35.0	19.8	-26.2	0.0
4	11.678016	30.5	29.4	-30.6	27.9	-22.1	0.0
5	19.968807	33.7	30.3	-29.7	5.0	-45.0	0.0
6	26.840723	33.1	31.5	-28.5	24.0	-26.0	0.0

Figure 8. Detectors: Peak, Quasi-peak, AVERAGE

Note: QP Delta/Av Delta refer to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	WiMAX Base Station
Type	Outdoor Pico Base Station 2.5 GHz
Part Number:	PICO-O-2.5-C-1W-DC

Specification:	F.C.C., Part 15, Subpart C
Lead:	48 VDC -
Detectors:	Peak, Quasi-peak, Average

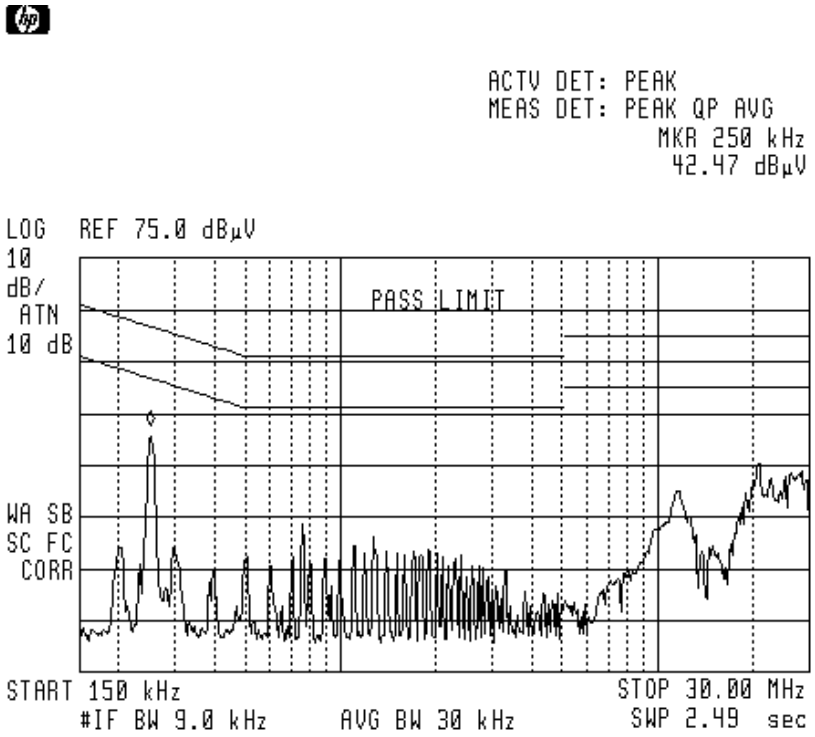


Figure 9 Conducted Emission: NEUTRAL
Detectors: Peak, Quasi-peak, Average

4.4 Test Instrumentation Used, Conducted Measurement

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
LISN	Fischer	FCC-LISN-2A	127	March 3, 2009	1 Year
LISN	Fischer	FCC-LISN-2A	128	March 3, 2009	1 Year
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1Year
RF Filter Section	HP	85420E	3705A00248	November 10, 2009	1Year
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

5. Maximum Peak Output Power 5 MHz Bandwidth

5.1 Test Specification

FCC Part 27, Sub-part C (27.50(h)(2))

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 5 MHz BW.

Special attention was taken to prevent Spectrum Analyzer RF input overload. Tested frequencies: 2498.5MHz, 2596.0MHz and 2687.5MHz

According to 47 CFR Part 2 section § 2.1046 and Part 27 section § 27.50(h)(1), the maximum EIRP of a base station shall not exceed 33 + 10 log (X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition.

As to the limit, the X is 10 MHz and Y is 6 MHz for the EUT, so the limit is calculated to be 33 + 10 log (5 MHz/6 MHz) = 62.2 dBm.

ANTENNA TYPE Dipole antenna with N type connector

(Antenna Gain : 15 dBi)

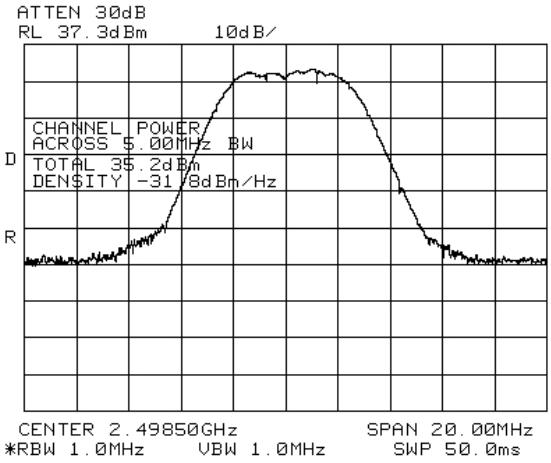


Figure 10.— 2498.50 MHz QPSK

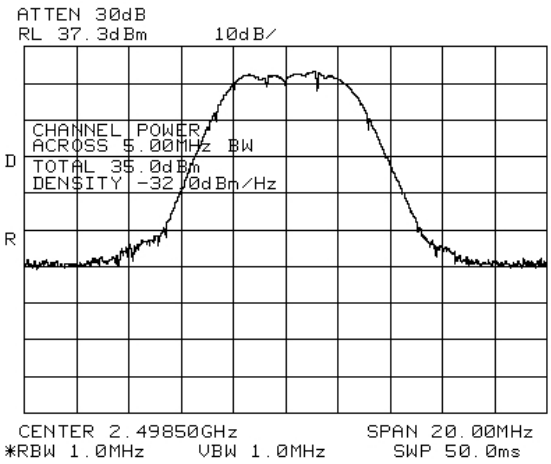


Figure 11.— 2498.50 MHz 16QAM

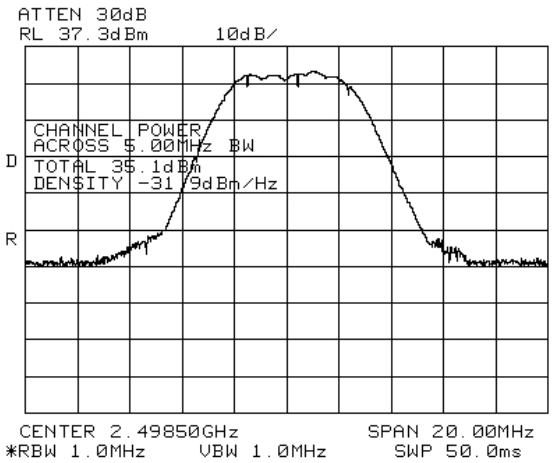


Figure 12.— 2498.50 MHz 64QAM

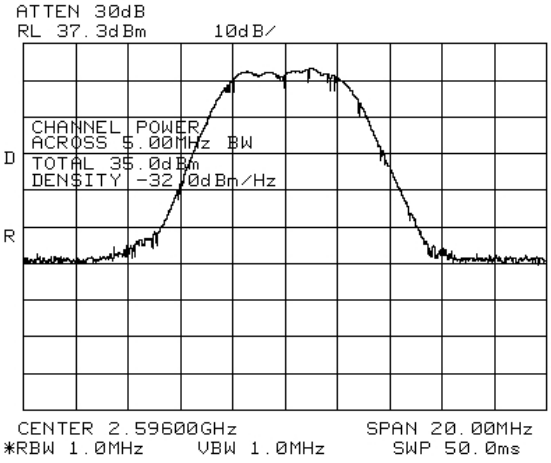


Figure 13.— 2596.00 MHz QPSK

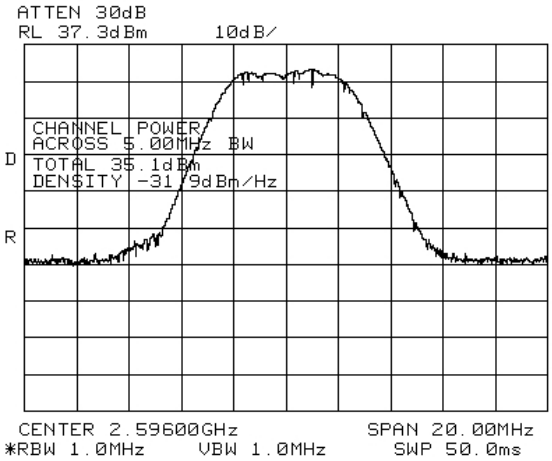


Figure 14.— 2596.00 MHz 16QAM

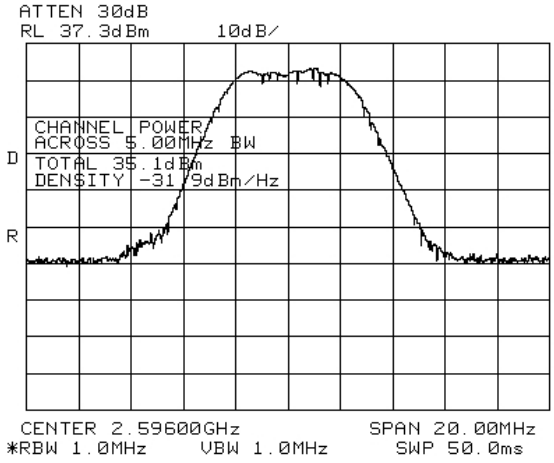


Figure 15.— 2596.00 MHz 64QAM

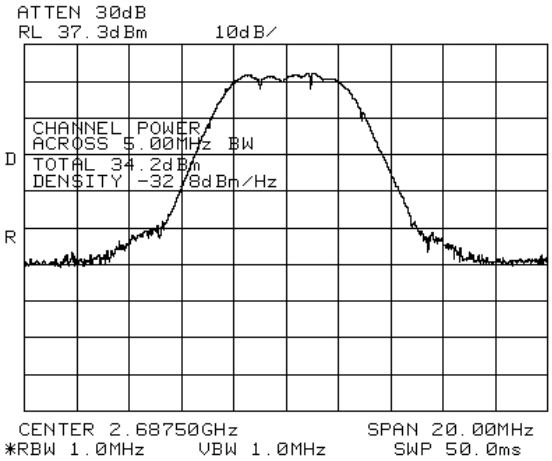


Figure 16.— 2687.50 MHz QPSK

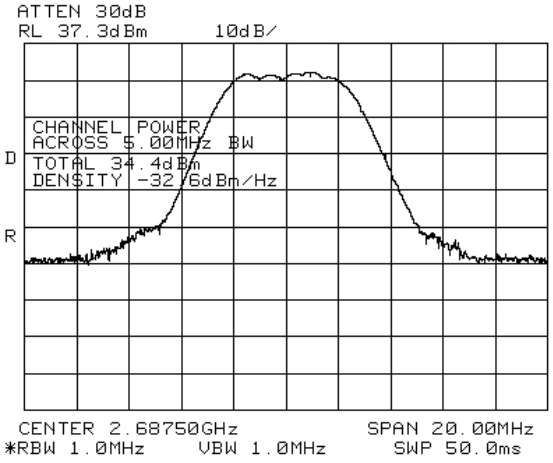


Figure 17.— 2687.50 MHz 16QAM

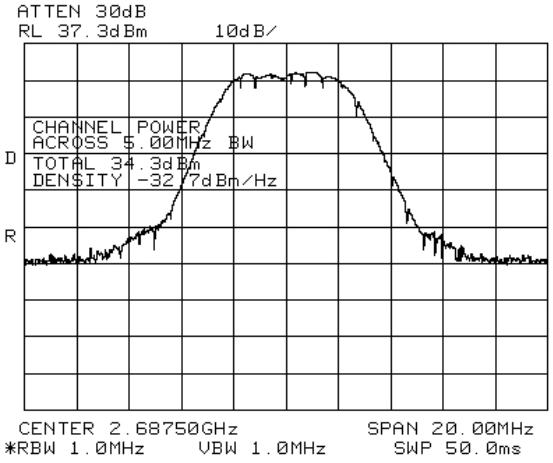


Figure 18.— 2687.50 MHz 64QAM

5.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 27, Sub-part C, Section 27.50 (h) (2)

Operation Frequency (MHz)	Modulation	Reading (dBm)	Antenna Gain (dBi)	Maximum Peak Output Power (dBm)	Specification* (dBm)	Margin (dB)
2498.50	QPSK	35.2	15	50.2	62.2	-12.0
	16QAM	35.0	15	50.0	62.2	-12.2
	64QAM	35.1	15	50.1	62.2	-12.1
2596.00	QPSK	35.0	15	50.0	62.2	-12.2
	16QAM	35.1	15	50.1	62.2	-12.1
	64QAM	35.1	15	50.1	62.2	-12.1
2685.00	QPSK	34.2	15	49.2	62.2	-13.0
	16QAM	34.4	15	49.4	62.2	-12.8
	64QAM	34.3	15	49.3	62.2	-12.9

* Limit = 33 + 10 log (5/6) dBm

Figure 19 Maximum Peak Power Output

JUDGEMENT: Passed by 12.0 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 04.01.10
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 20 Test Equipment Used

6. Maximum Peak Output Power 10 MHz Bandwidth

6.1 Test Specification

FCC Part 27, Sub-part C (27.50(h)(2))

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 10MHz BW.

Special attention was taken to prevent Spectrum Analyzer RF input overload. Tested frequencies: 2501.0MHz, 2596.0MHz and 2685.0MHz

According to 47 CFR Part 2 section § 2.1046 and Part 27 section § 27.50(h)(1), the maximum EIRP of a base station shall not exceed 33 + 10 log (X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition.

As to the limit, the X is 10 MHz and Y is 6 MHz for the EUT, so the limit is calculated to be 33 + 10 log (10 MHz/6 MHz) = 65.2 dBm.

ANTENNA TYPE Dipole antenna with N type connector
(Antenna Gain : 15 dBi)

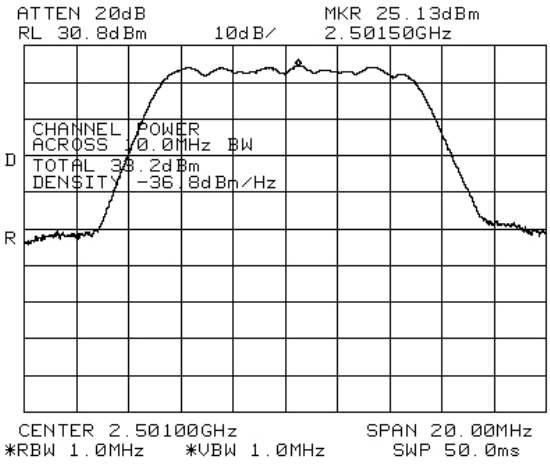


Figure 21.— 2501.00 MHz QPSK

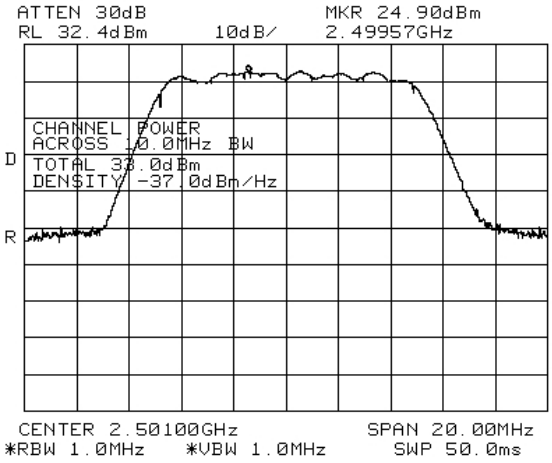


Figure 22.— 2501.00 MHz 16QAM

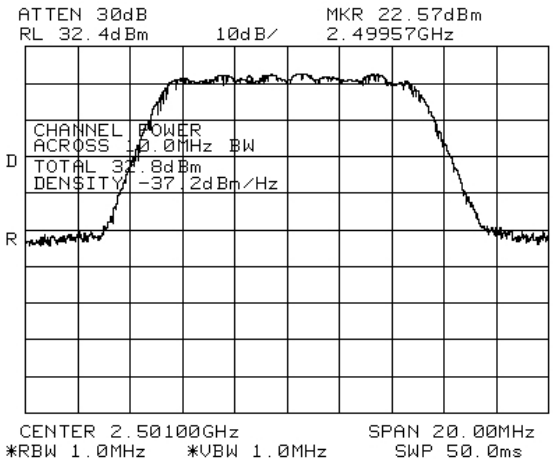


Figure 23.— 2501.00 MHz 64QAM

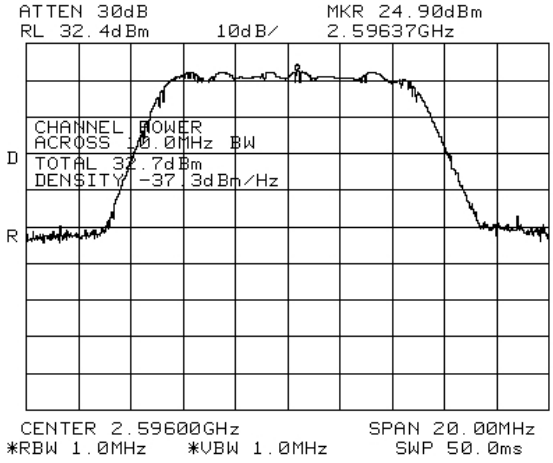


Figure 24.— 2596.00 MHz QPSK

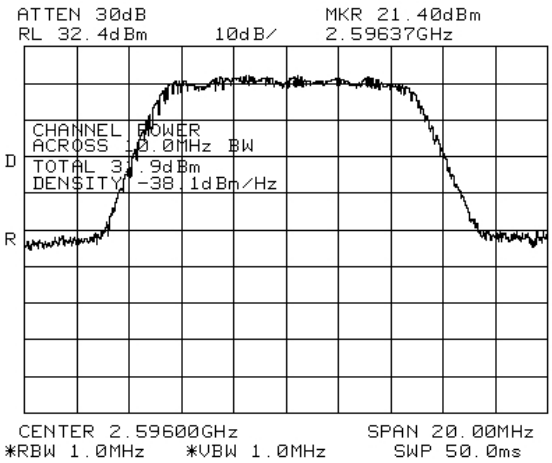


Figure 25.— 2596.00 MHz 16QAM

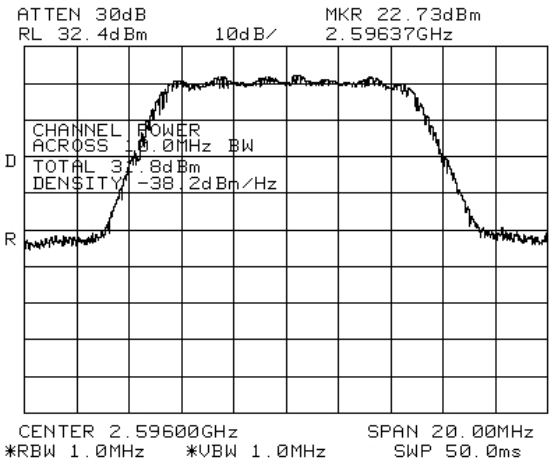


Figure 26.— 2596.00 MHz 64QAM

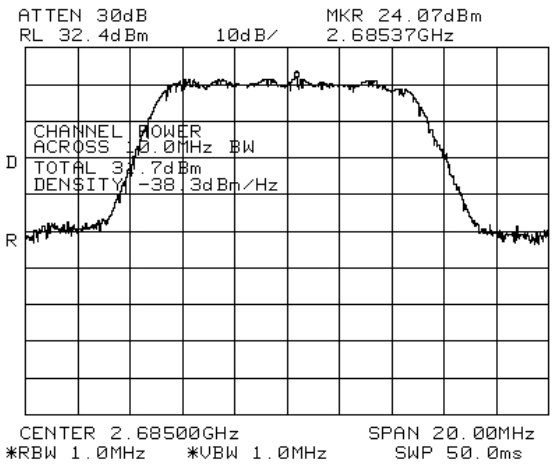


Figure 27.— 2685.00 MHz QPSK

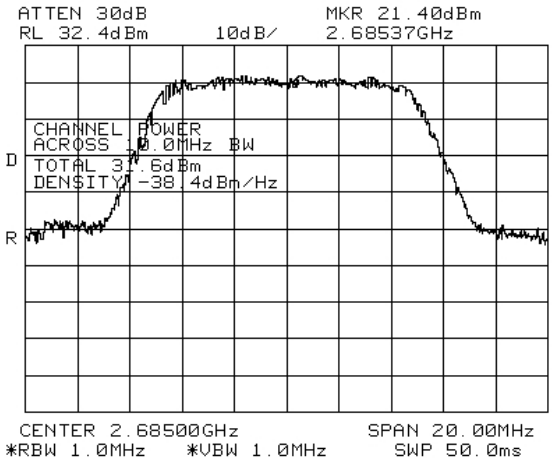


Figure 28.— 2685.00 MHz 16QAM

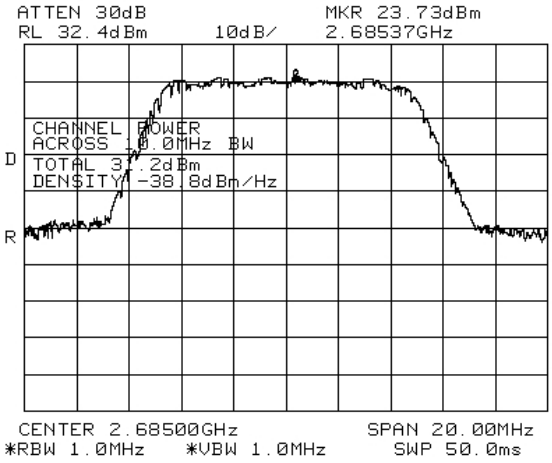


Figure 29.— 2685.00 MHz 64QAM

6.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 27, Sub-part C, Section 27.50 (h) (2)

Operation Frequency (MHz)	Modulation	Reading (dBm)	Antenna Gain	Maximum Peak Power Output	Specification* (dBm)	Margin (dB)
2501.00	QPSK	33.2	15	48.2	65.2	-17.0
	16QAM	33.0	15	48.0	65.2	-17.2
	64QAM	32.8	15	47.8	65.2	-17.4
2596.00	QPSK	32.7	15	47.7	65.2	-17.5
	16QAM	31.9	15	46.9	65.2	-18.3
	64QAM	31.8	15	46.8	65.2	-18.4
2685.00	QPSK	31.7	15	46.7	65.2	-18.5
	16QAM	31.6	15	46.6	65.2	-18.6
	64QAM	31.2	15	46.2	65.2	-19.0

* Limit = 63 + 10log(10/6) dBm

Figure 30 Maximum Peak Power Output

JUDGEMENT: Passed by 17.0 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

Typed/Printed Name: A. Sharabi

6.4 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 31 Test Equipment Used

7. Spectral Power Density 5 MHz Bandwidth

7.1 Test Specification

FCC Part 27, Sub-part C (27.50(h)(4))

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 5 MHz BW. Power spectral density was measured over 100 kHz RBW.

Special attention was taken to prevent Spectrum Analyzer RF input overload. Tested frequencies: 2498.5MHz, 2596.0MHz and 2687.5MHz

ANTENNA TYPE Dipole antenna with N type connector

(Antenna Gain : 15 dBi)

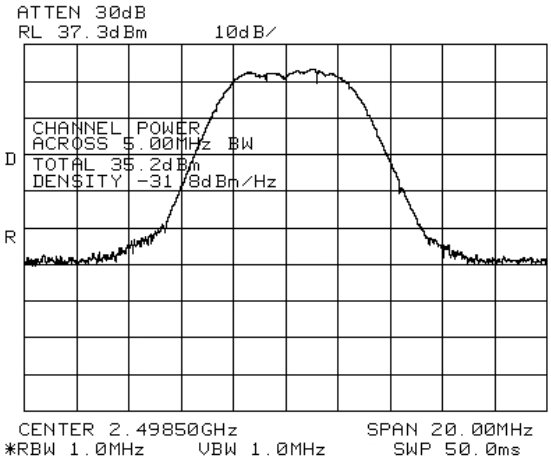


Figure 32.— 2498.50 MHz QPSK

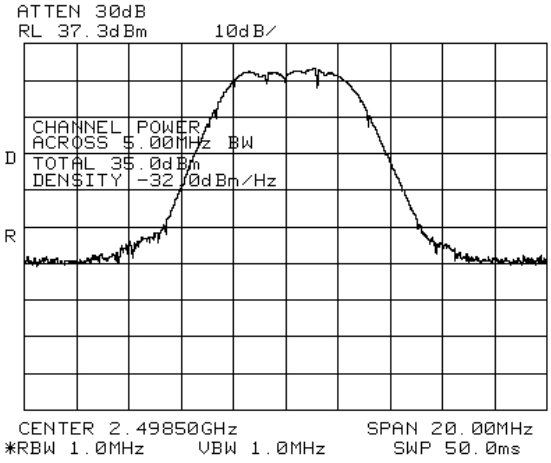


Figure 33.— 2498.50 MHz 16QAM

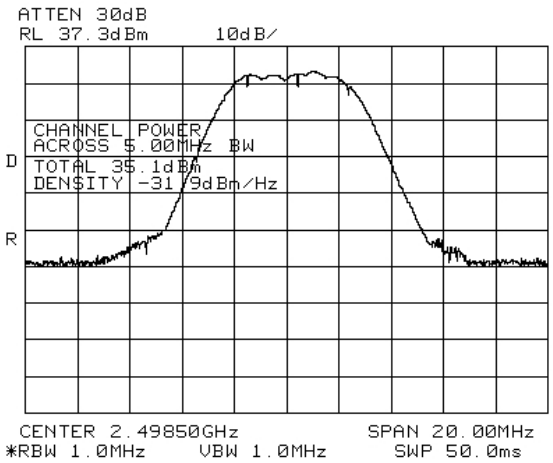


Figure 34.— 2498.50 MHz 64QAM

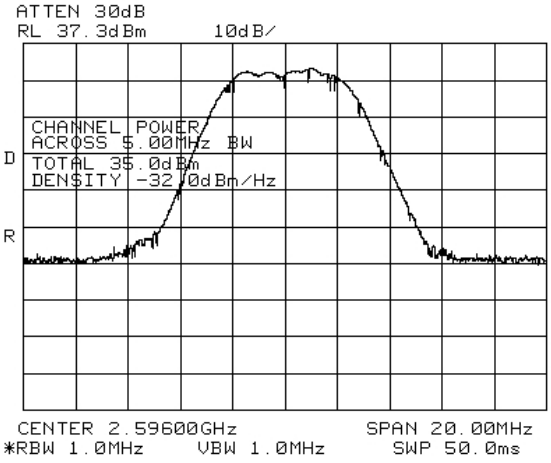


Figure 35.— 2596.00 MHz QPSK

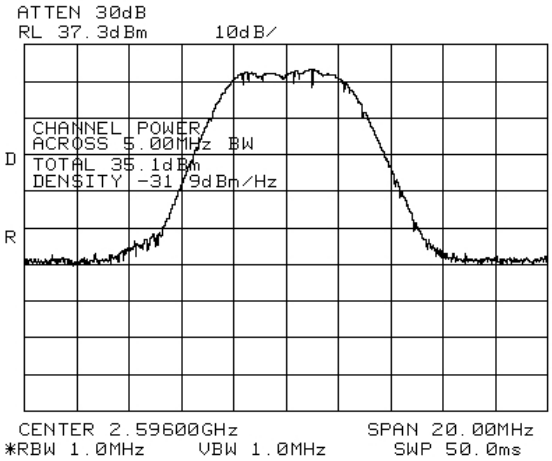


Figure 36.— 2596.00 MHz 16QAM

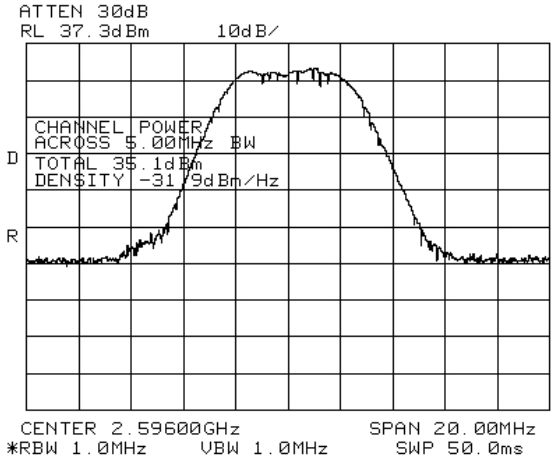


Figure 37.— 2596.00 MHz 64QAM

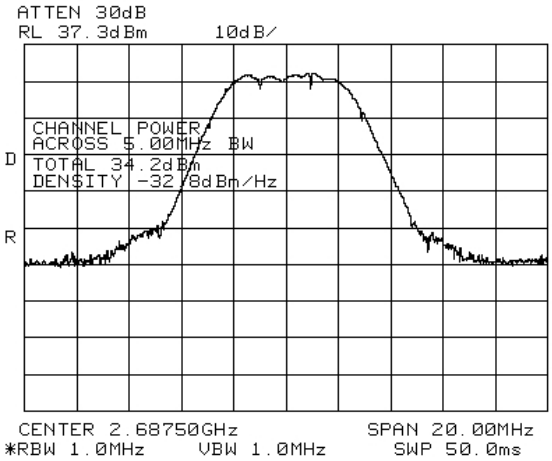


Figure 38.— 2687.50 MHz QPSK

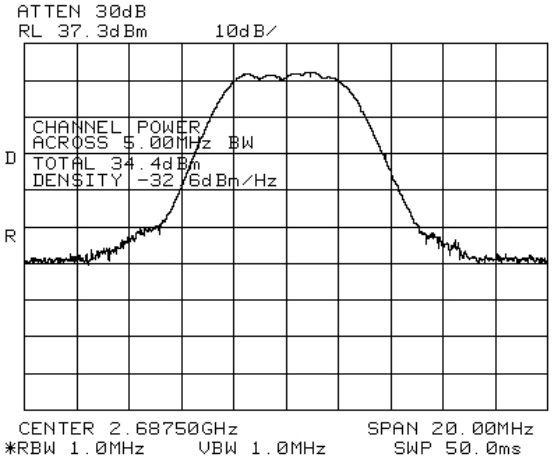


Figure 39.— 2687.50 MHz 16QAM

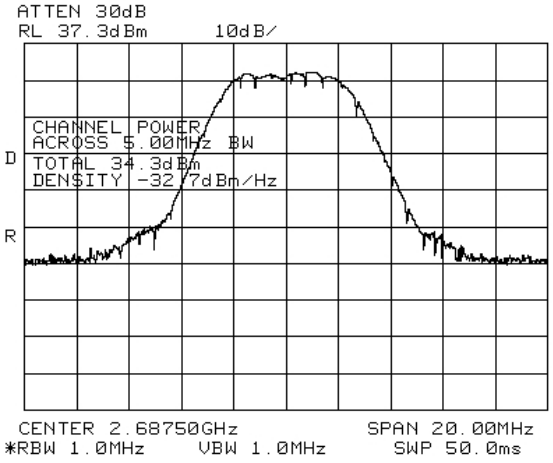


Figure 40.— 2687.50 MHz 64QAM

7.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 27, Sub-part C, Section 27.50 (h) (4)

Operation Frequency (MHz)	Modulation	Reading* (dBm)	Antenna Gain (dBi)	Spectral Power Density (dBm)	Specification (dBm)	Margin (dB)
2498.50	QPSK	18.2	15	33.2	47.4	-14.2
	16QAM	18.0	15	33.0	47.4	-14.4
	64QAM	18.1	15	33.1	47.4	-14.3
2596.00	QPSK	18.0	15	33.0	47.4	-14.4
	16QAM	18.1	15	33.1	47.4	-14.3
	64QAM	18.1	15	33.1	47.4	-14.3
2685.00	QPSK	17.2	15	32.2	47.4	-15.2
	16QAM	17.4	15	32.4	47.4	-15.0
	64QAM	17.3	15	32.3	47.4	-15.1

*- Spectral power density, dBm/100kHz = Spectrum analyzer reading, dBm/Hz + 50 dB

Figure 41 Spectral Power Density

JUDGEMENT: Passed by 14.2 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 04.01.10
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 42 Test Equipment Used

8. Spectral Power Density 10 MHz Bandwidth

8.1 Test Specification

FCC Part 27, Sub-part C (27.50(h)(4))

8.2 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. Power spectral density was measured over 100 kHz RBW.

Special attention was taken to prevent Spectrum Analyzer RF input overload. Tested frequencies: 2501.0MHz, 2596.0MHz and 2685.0MHz

ANTENNA TYPE Dipole antenna with N type connector
(Antenna Gain : 15 dBi)

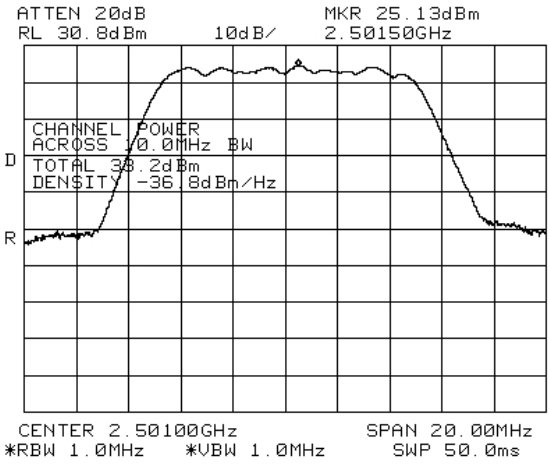


Figure 43.— 2501.00 MHz QPSK

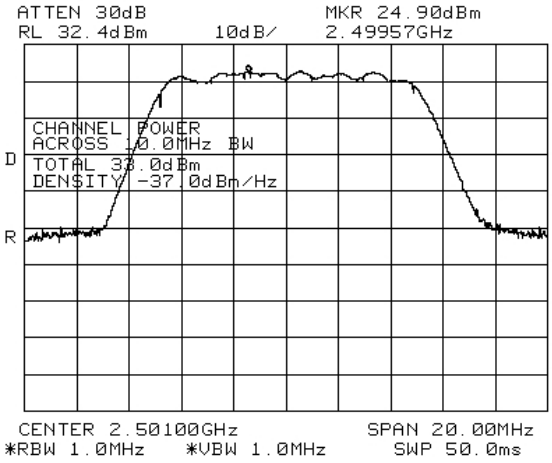


Figure 44.— 2501.00 MHz 16QAM

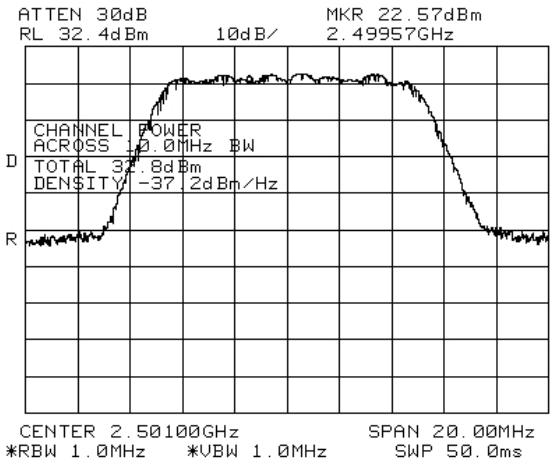


Figure 45.— 2501.00 MHz 64QAM

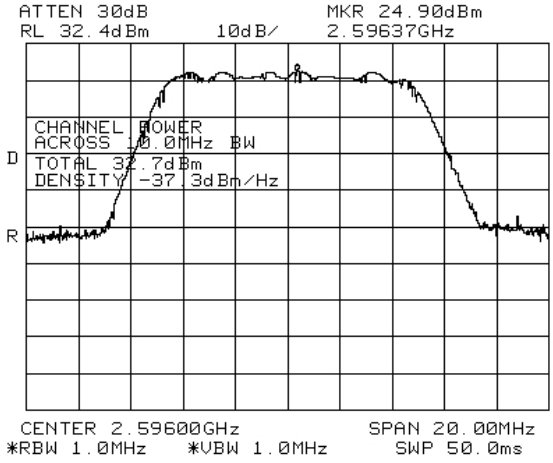


Figure 46.— 2596.00 MHz QPSK

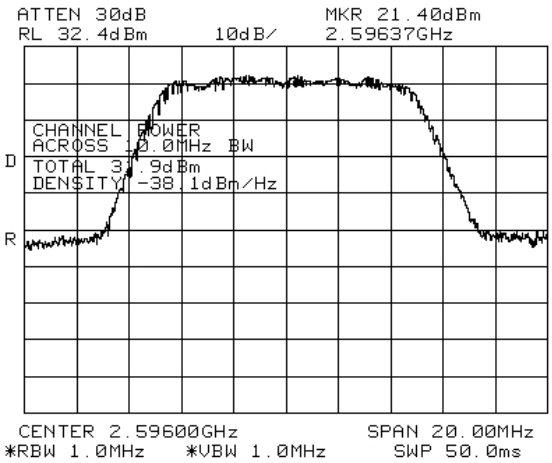


Figure 47.— 2596.00 MHz 16QAM

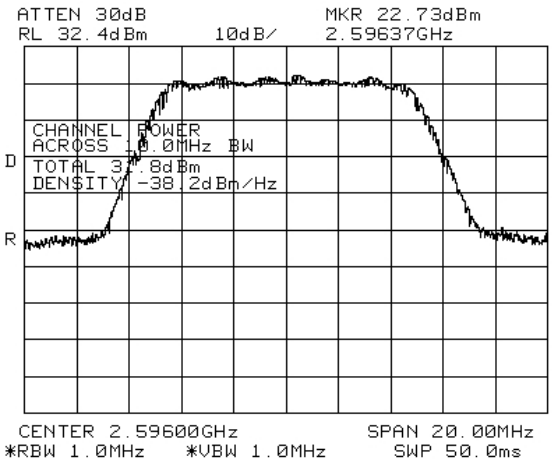


Figure 48.— 2596.00 MHz 64QAM

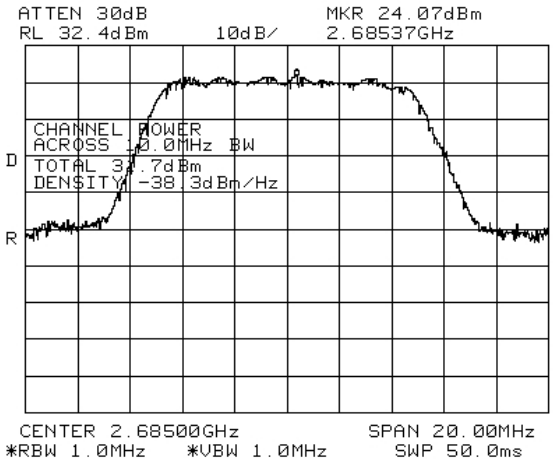


Figure 49.— 2685.00 MHz QPSK

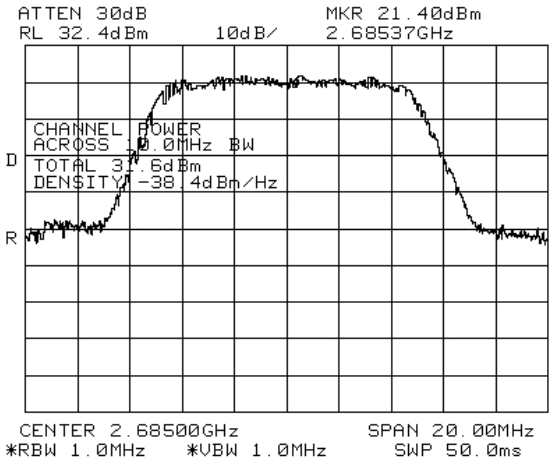


Figure 50.— 2685.00 MHz 16QAM

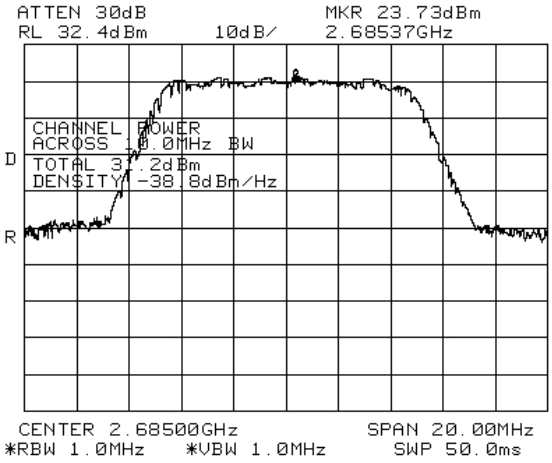


Figure 51.— 2685.00 MHz 64QAM

8.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 27, Sub-part C, Section 27.50 (h) (4)

Operation Frequency (MHz)	Modulation	Reading* (dBm)	Antenna Gain	Spectral Power Densityt	Specification (dBm)	Margin (dB)
2501.00	QPSK	13.2	15	28.2	47.4	-19.2
	16QAM	13.0	15	28.0	47.4	-19.4
	64QAM	12.8	15	27.8	47.4	-19.6
2596.00	QPSK	12.7	15	27.7	47.4	-19.7
	16QAM	11.9	15	26.9	47.4	-20.5
	64QAM	11.8	15	26.8	47.4	-20.6
2685.00	QPSK	11.7	15	26.7	47.4	-20.7
	16QAM	11.6	15	26.6	47.4	-20.8
	64QAM	11.2	15	26.2	47.4	-21.2

*- Spectral power density, dBm/100kHz = Spectrum analyzer reading, dBm/Hz + 50 dB

Figure 52 Spectral Power Density

JUDGEMENT: Passed by 19.2 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 04.01.10
Typed/Printed Name: A. Sharabi

8.4 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 53 Test Equipment Used

9. Occupied Bandwidth 5 MHz Bandwidth

9.1 Test Specification

FCC Part 2, Section 1049

9.2 Test Procedure

The E.U.T. was set to the applicable test frequency with OFDMA modulations and 5 MHZ bandwidth in the 2498.5-2687.5MHz
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, that is the frequency bandwidth such that, below its lower and above its upper frequency limit, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.
Occupied bandwidth measured was repeated in the input terminal of the E.U.T.

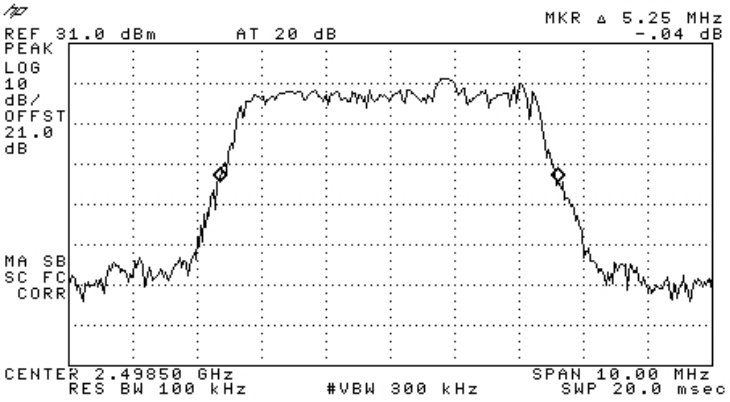


Figure 54.— 2498.50 MHz QPSK

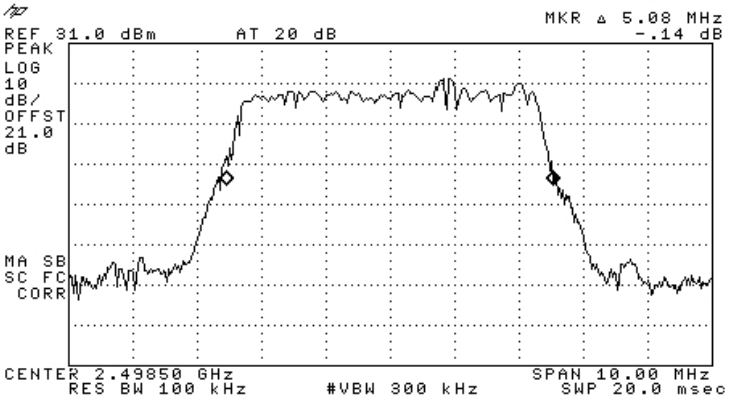


Figure 55.— 2498.50 MHz 16QAM

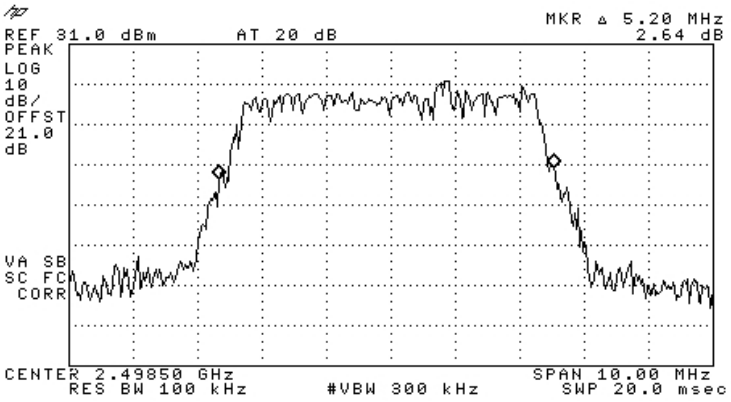


Figure 56.— 2498.50 MHz 64 QAM

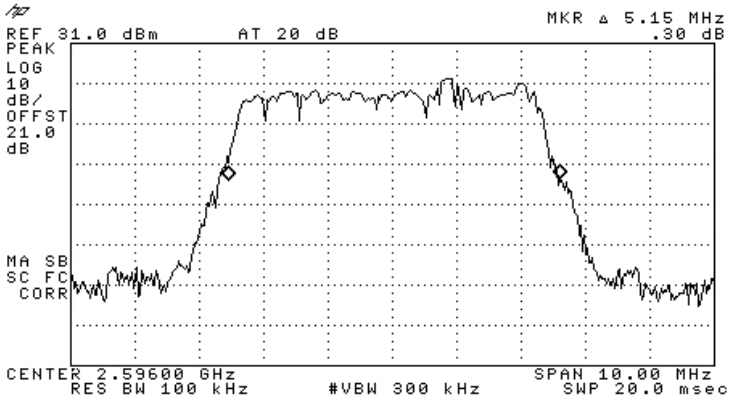


Figure 57.— 2596.00 MHz QPSK

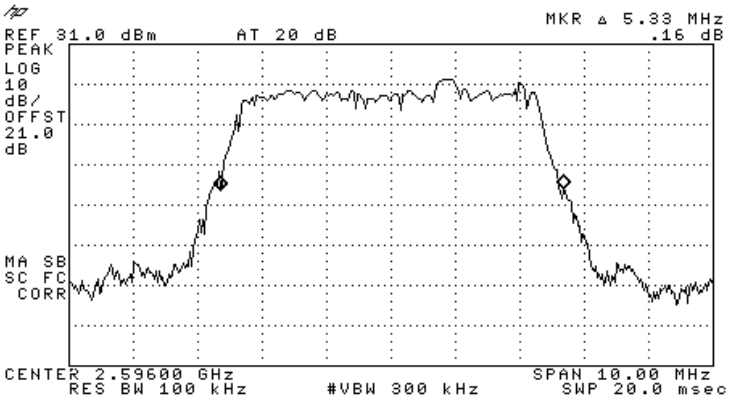


Figure 58.— 2596.00 MHz 16QAM

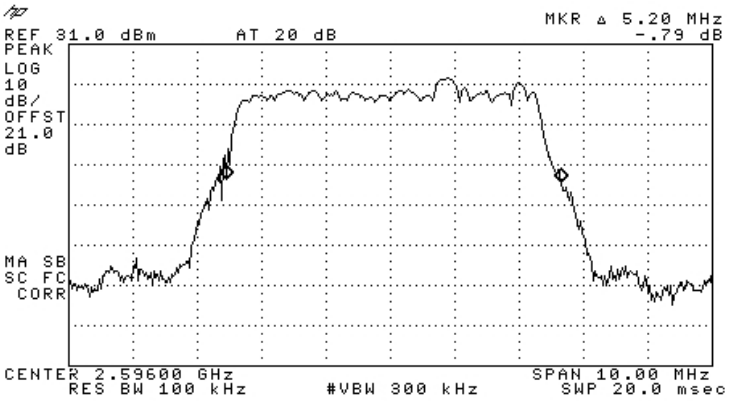


Figure 59.— 2596.00 MHz 64 QAM

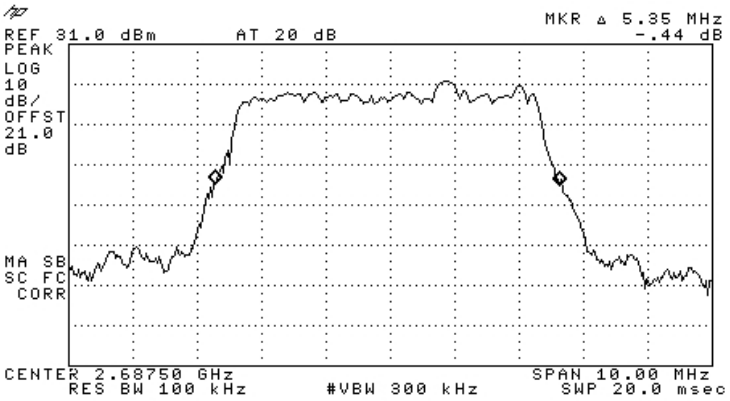


Figure 60.— 2687.50 MHz QPSK

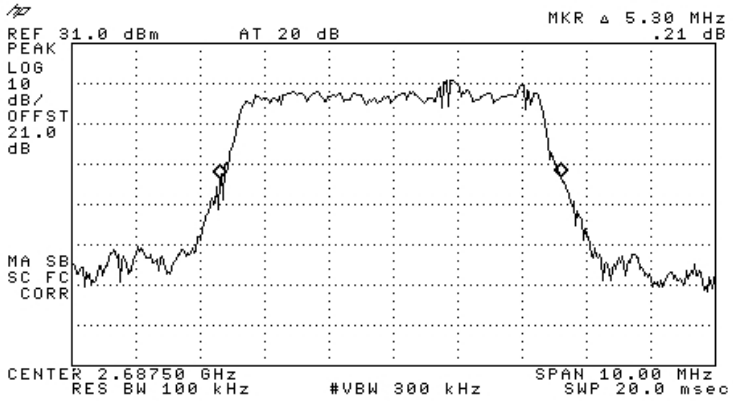


Figure 61.— 2687.50 MHz 16 QAM

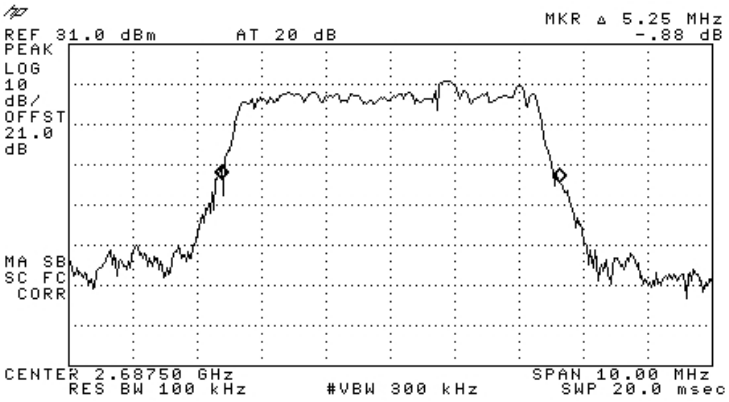


Figure 62.— 2687.50 MHz 64 QAM

9.3 Results Table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 2, Section 1049

Operating Frequency (MHz)	Modulation	Reading (26dBc) (MHz)
2498.50	QPSK	5.25
	16QAM	5.08
	64QAM	5.20
2596.00	QPSK	5.15
	16QAM	5.33
	64QAM	5.20
2687.50	QPSK	5.35
	16QAM	5.30
	64QAM	5.25

Figure 63 Occupied Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

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 64 Test Equipment Used

10. Occupied Bandwidth 10 MHz Bandwidth

10.1 Test Specification

FCC Part 2, Section 1049

10.2 Test Procedure

The E.U.T. was set to the applicable test frequency with OFDMA modulations and 10MHZ bandwidth in the 2501.0-2685.0MHz
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, that is the frequency bandwidth such that, below its lower and above its upper frequency limit, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.
Occupied bandwidth measured was repeated in the input terminal of the E.U.T.

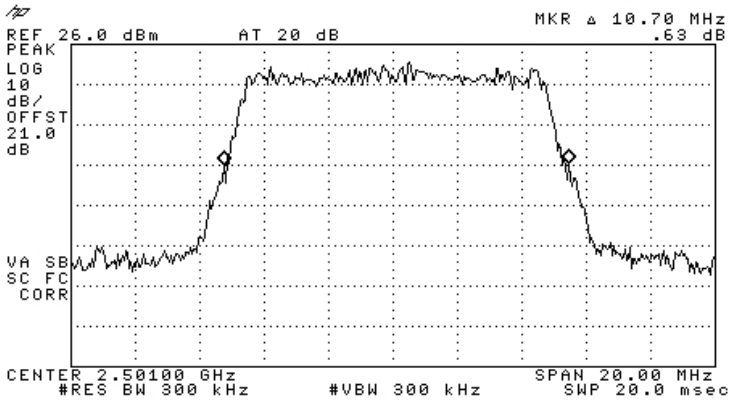


Figure 65.— 2501.00 MHz QPSK

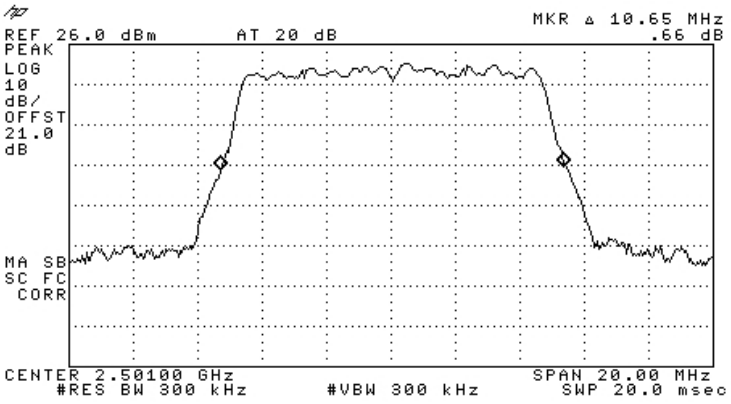


Figure 66.— 2501.00 MHz 16QAM

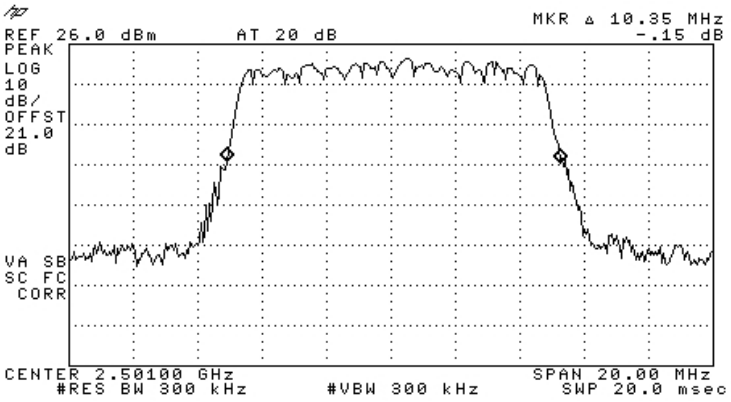


Figure 67.— 2501.00 MHz 64 QAM

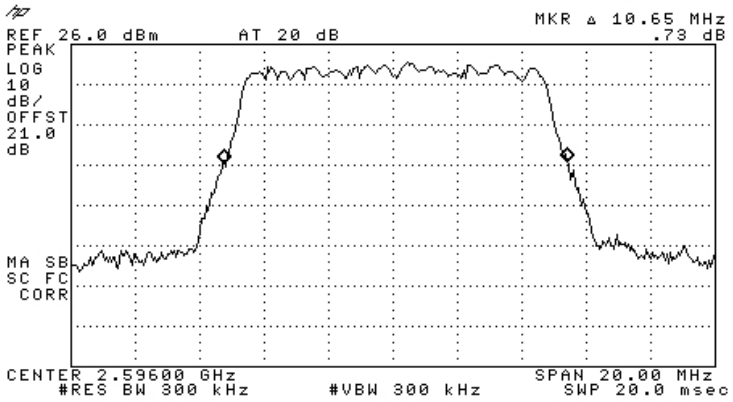


Figure 68.— 2596.00 MHz QPSK

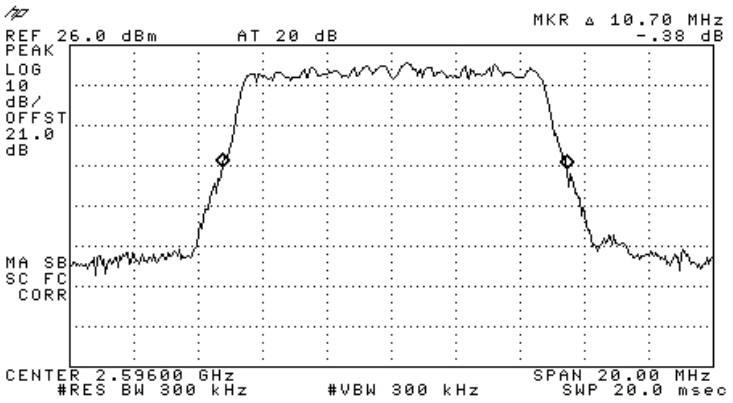


Figure 69.— 2596.00 MHz 16QAM

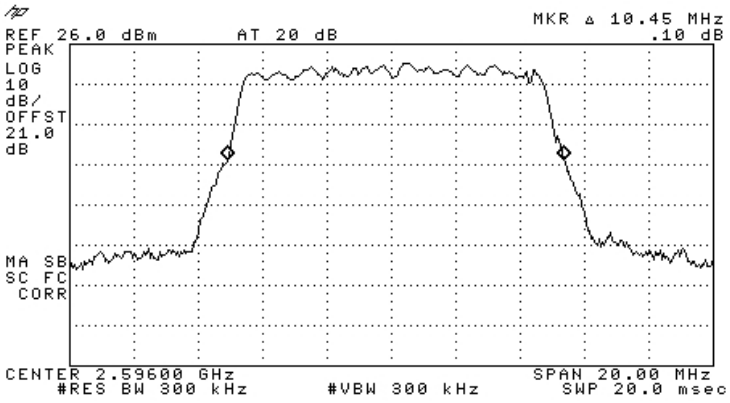


Figure 70.— 2596.00 MHz 64 QAM

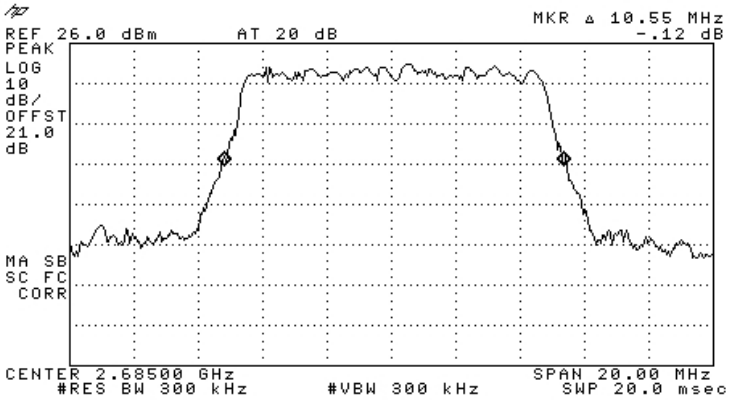


Figure 71.— 2685.00 MHz QPSK

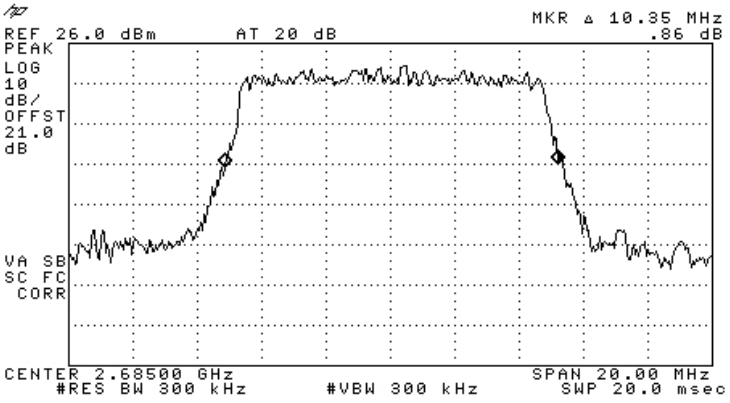


Figure 72.— 2685.00 MHz 16 QAM

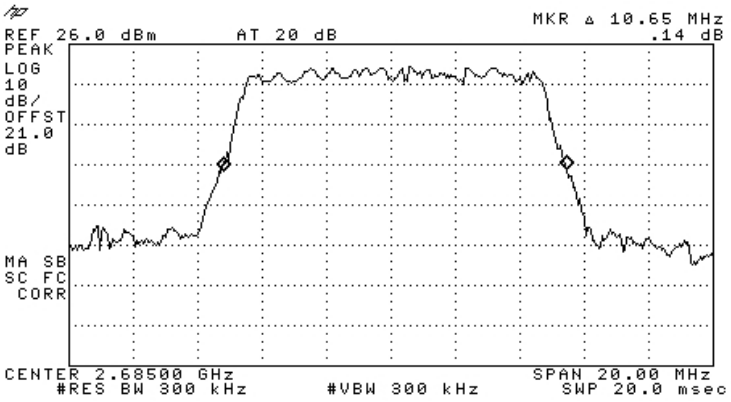


Figure 73.— 2685.00 MHz 64 QAM

10.3 Results Table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 2, Section 1049

Operating Frequency (MHz)	Modulation	Reading (26dBc) (MHz)
2501.00	QPSK	10.70
	16QAM	10.65
	64QAM	10.35
2696.00	QPSK	10.65
	16QAM	10.70
	64QAM	10.45
2685.00	QPSK	10.55
	16QAM	10.35
	64QAM	10.65

Figure 74 Occupied Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

Typed/Printed Name: A. Sharabi

10.4 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 75 Test Equipment Used

11. Conducted Spurious Emissions 5 MHz Bandwidth

11.1 Test Specification

FCC Part 27, Sub-part C, Section 27.53 (m)

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).

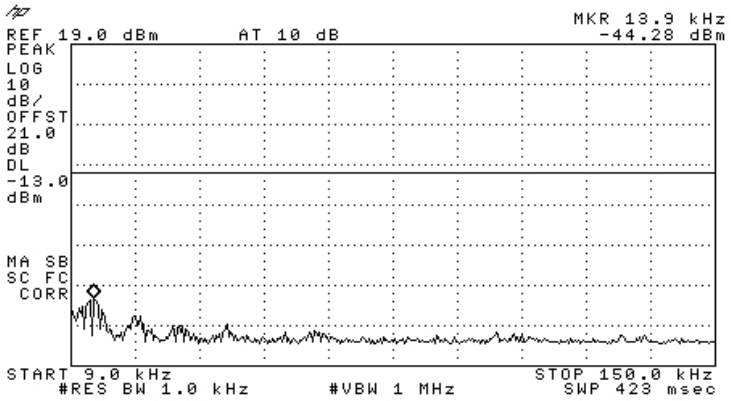


Figure 76.— 2498.50 MHz QPSK

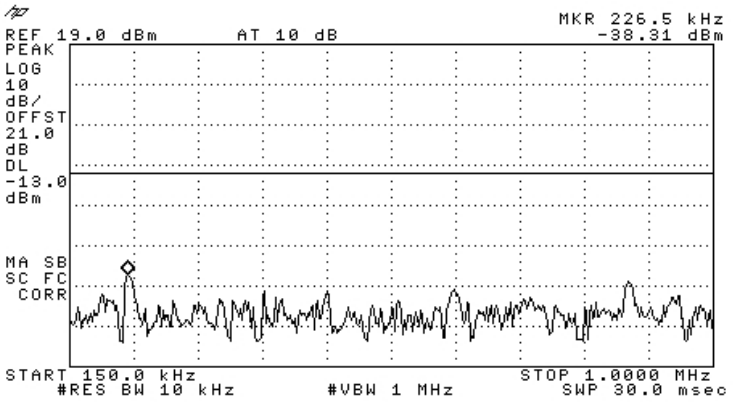


Figure 77.— 2498.50 MHz QPSK

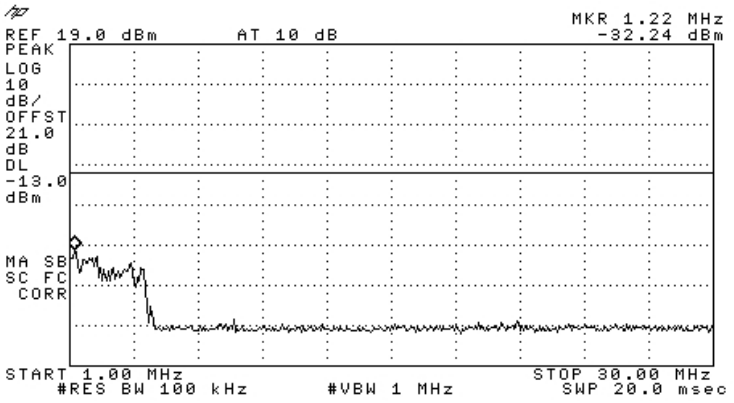


Figure 78.— 2498.50 MHz QPSK

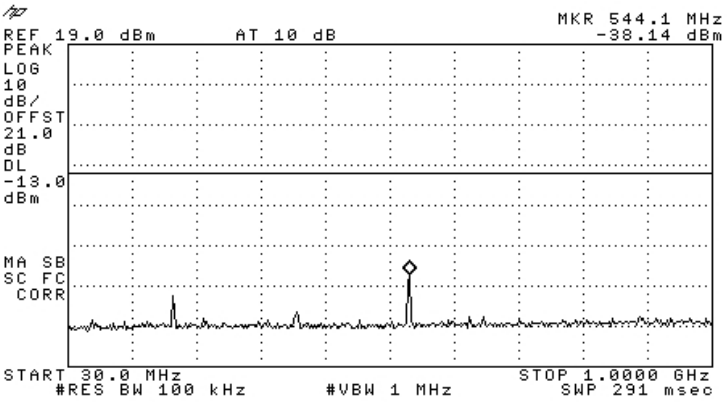


Figure 79.— 2498.50 MHz QPSK

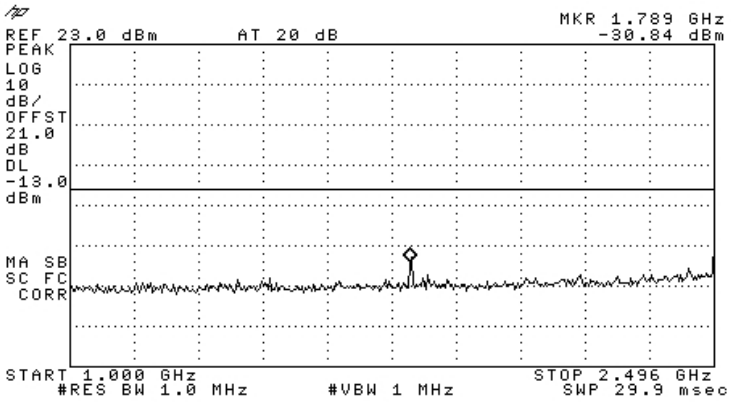


Figure 80.— 2498.50 MHz QPSK

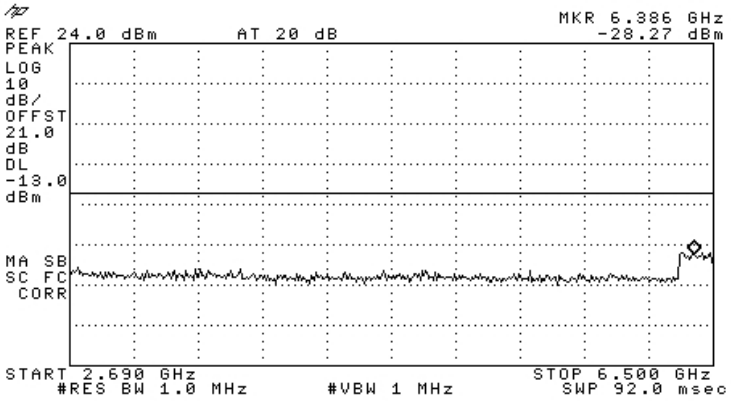


Figure 81.— 2498.50 MHz QPSK

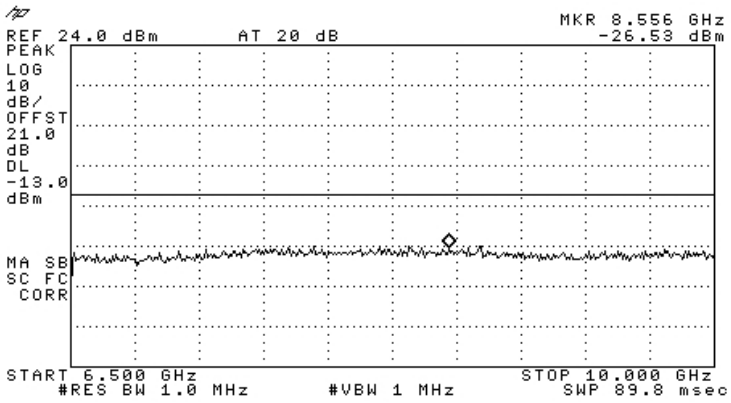


Figure 82.— 2498.50 MHz QPSK

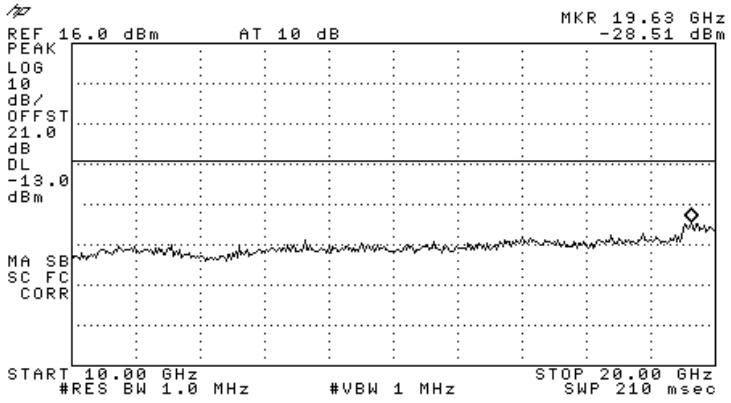


Figure 83.— 2498.50 MHz QPSK

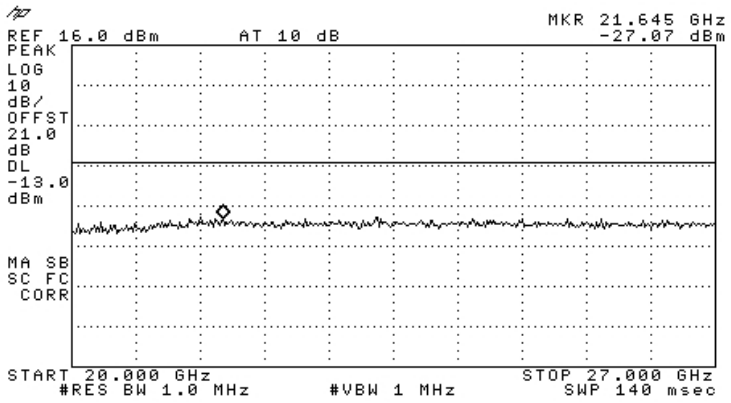


Figure 84.— 2498.50 MHz QPSK

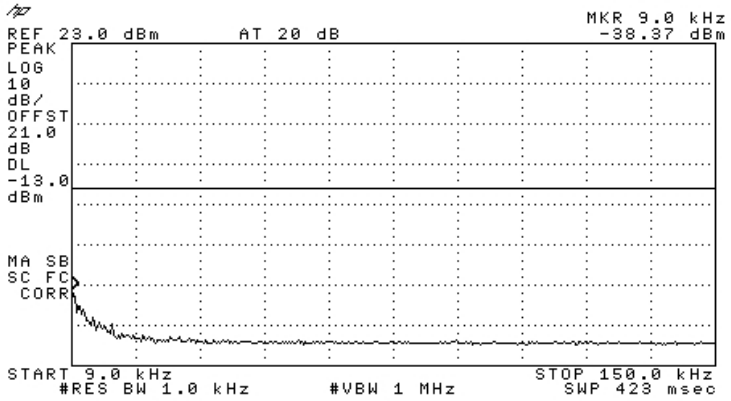


Figure 85.— 2498.50 MHz 16QAM

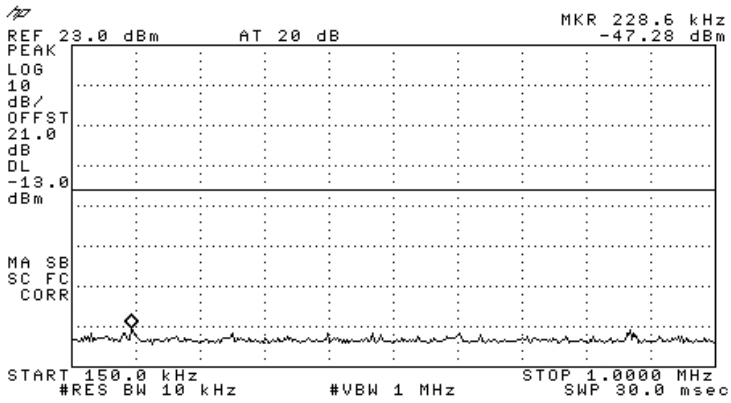


Figure 86.— 2498.50 MHz 16QAM

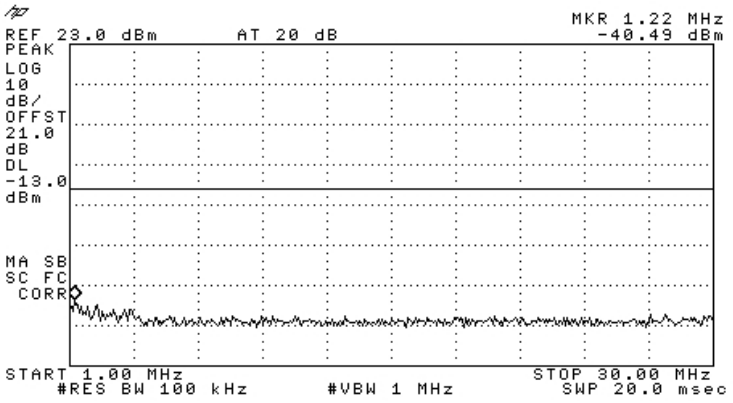


Figure 87.— 2498.50 MHz 16QAM

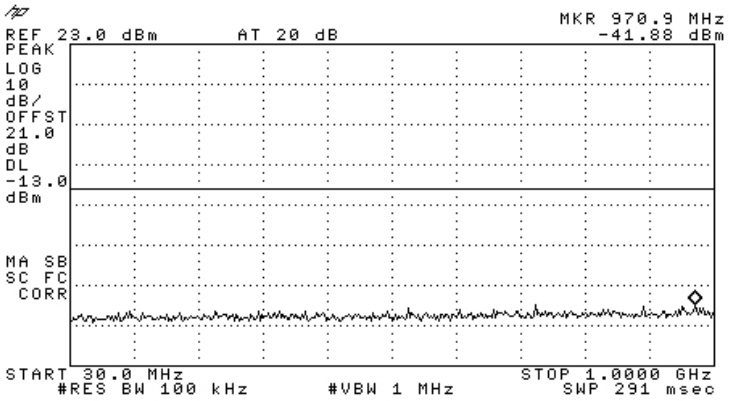


Figure 88.— 2498.50 MHz 16QAM

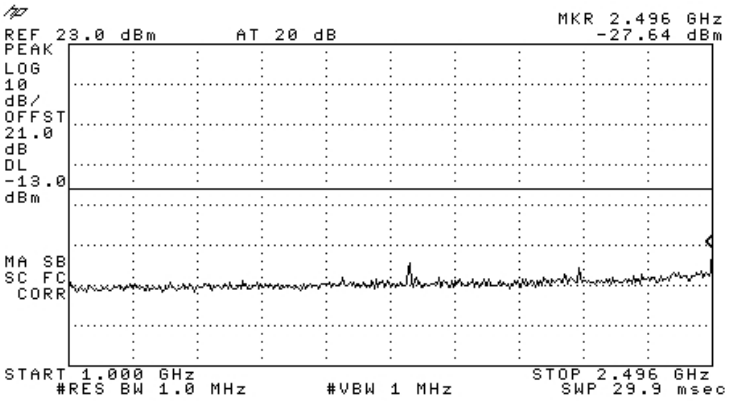


Figure 89.— 2498.50 MHz 16QAM

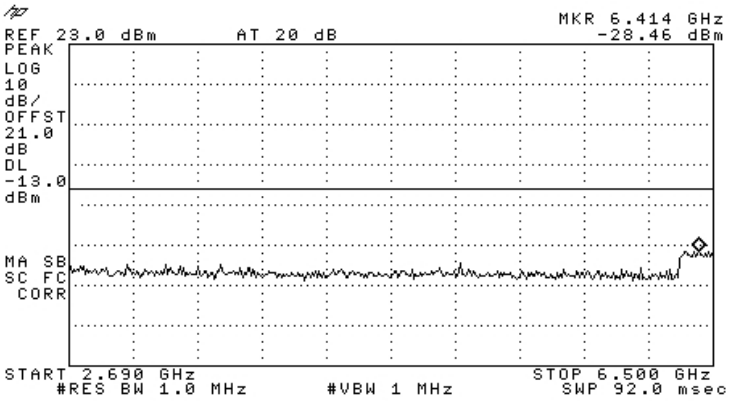


Figure 90.— 2498.50 MHz 16QAM

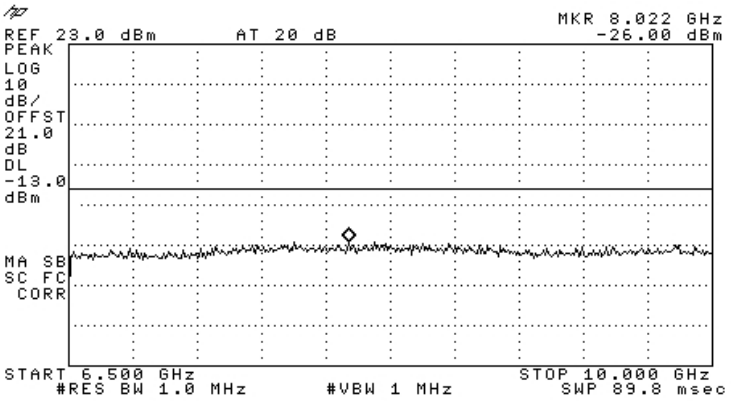


Figure 91.— 2498.50 MHz 16QAM

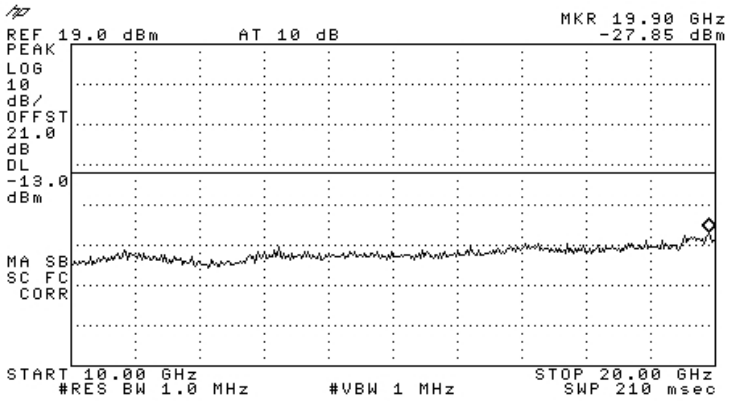


Figure 92.— 2498.50 MHz 16QAM

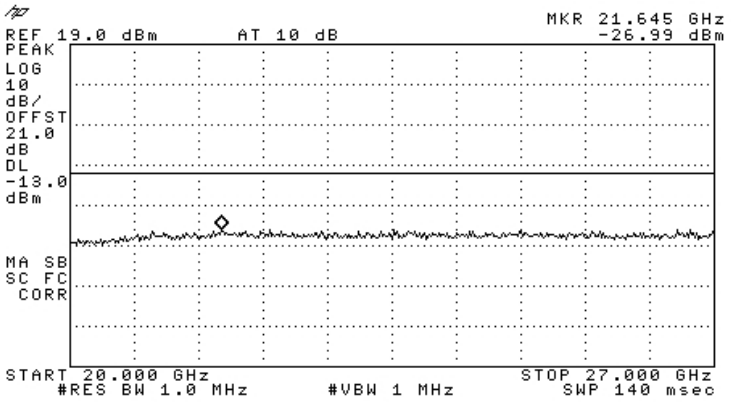


Figure 93.— 2498.50 MHz 16QAM

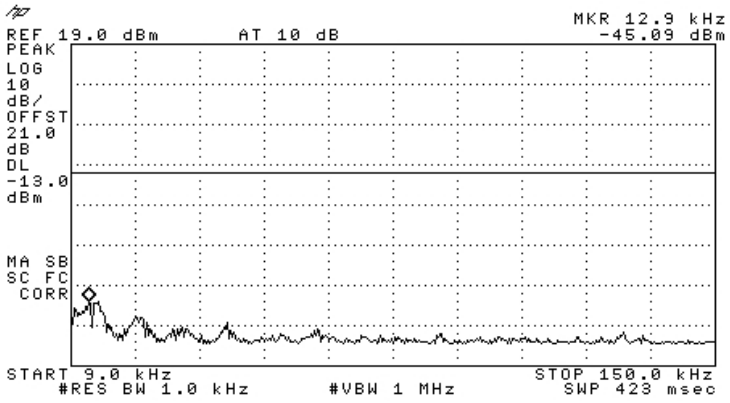


Figure 94.— 2498.50 MHz 64QAM

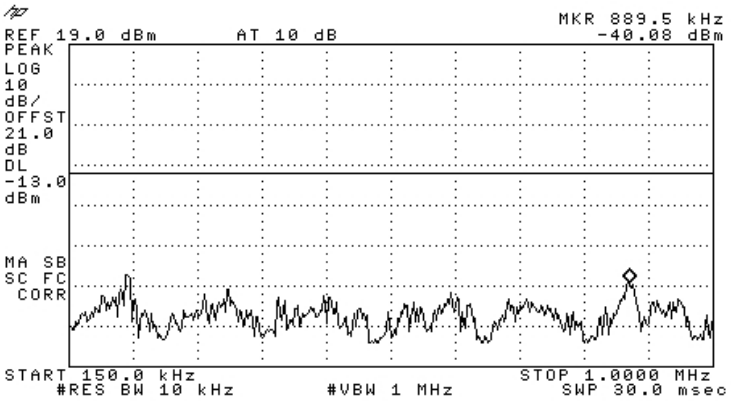


Figure 95.— 2498.50 MHz 64QAM

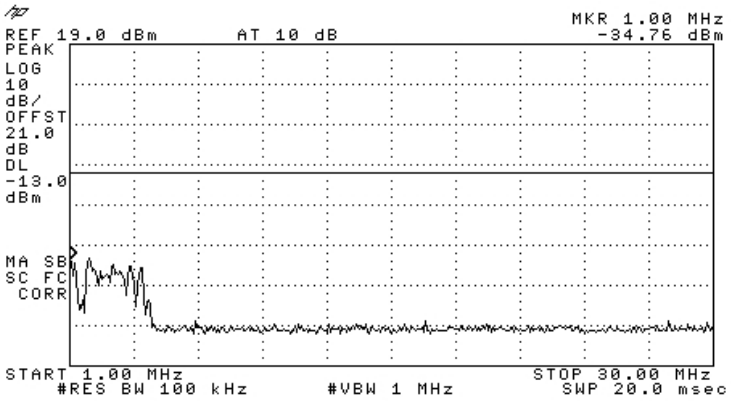


Figure 96.— 2498.50 MHz 64QAM

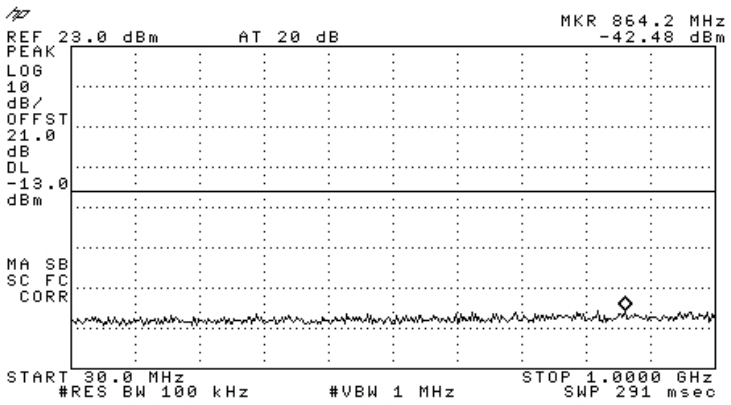


Figure 97.— 2498.50 MHz 64QAM

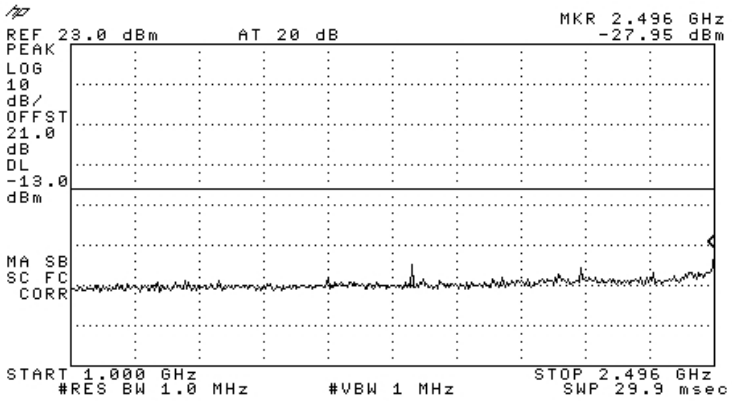


Figure 98.— 2498.50 MHz 64QAM

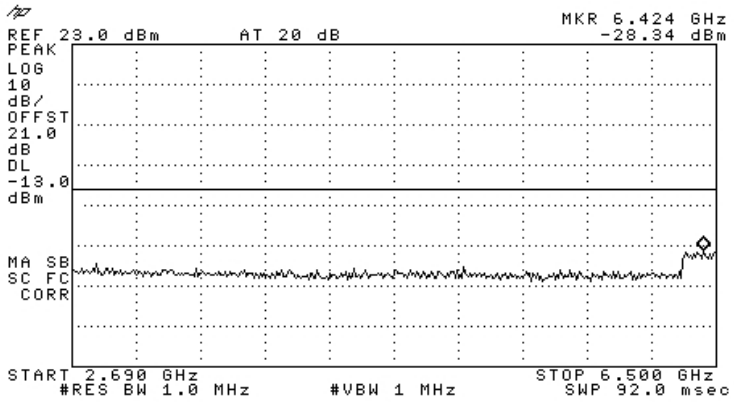


Figure 99.— 2498.50 MHz 64QAM

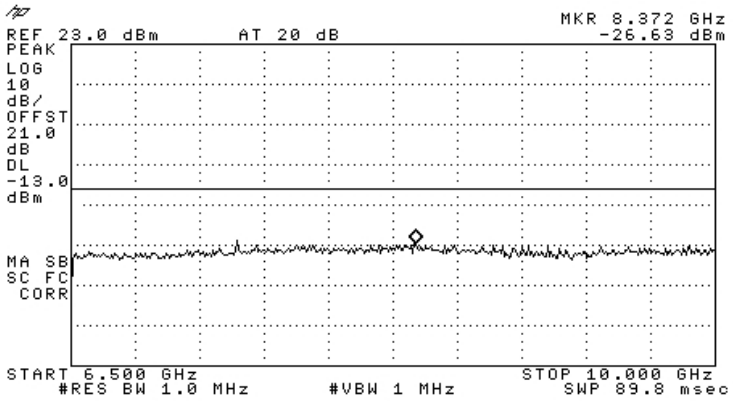


Figure 100.— 2498.50 MHz 64QAM

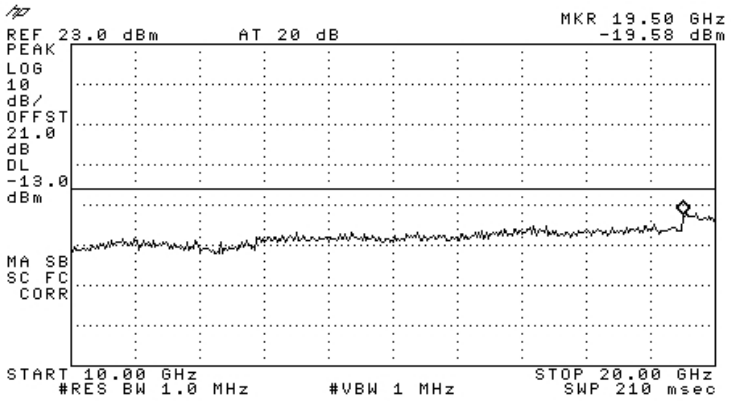


Figure 101.— 2498.50 MHz 64QAM

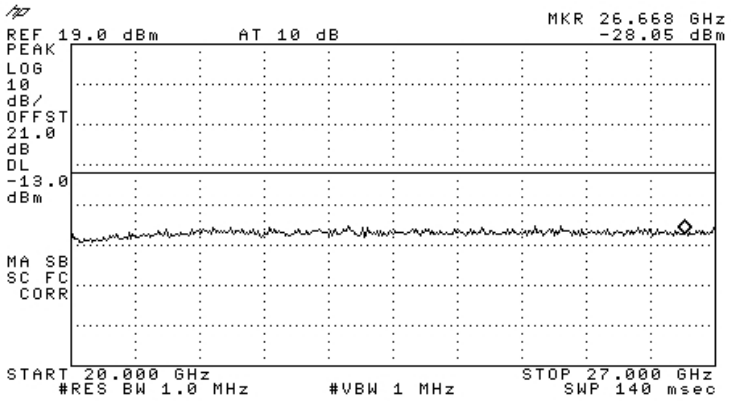


Figure 102.— 2498.50 MHz 64QAM

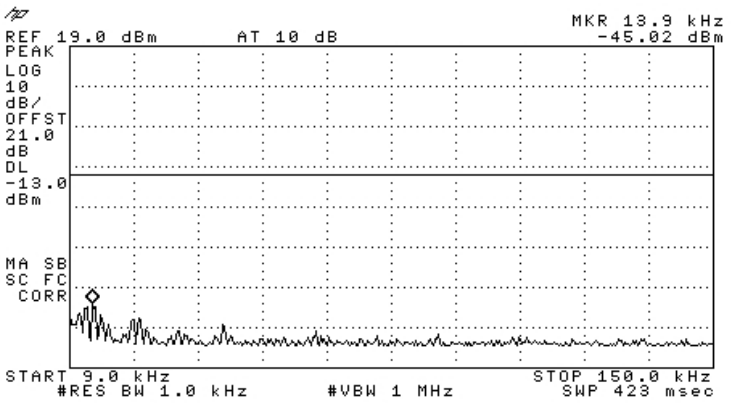


Figure 103.— 2596.00 MHz QPSK

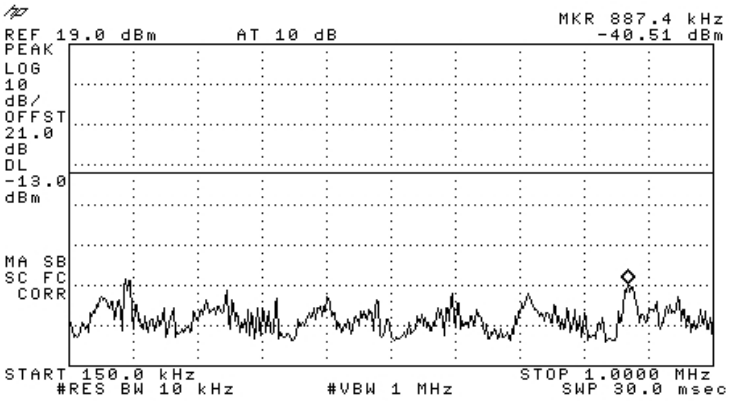


Figure 104.— 2596.00 MHz QPSK

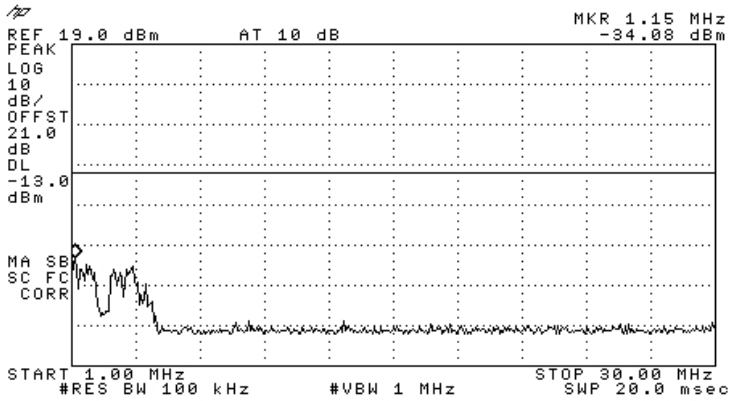


Figure 105.— 2596.00 MHz QPSK

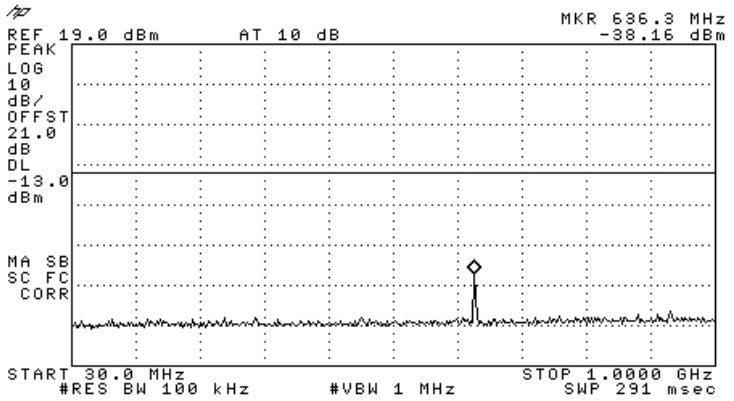


Figure 106.— 2596.00 MHz QPSK

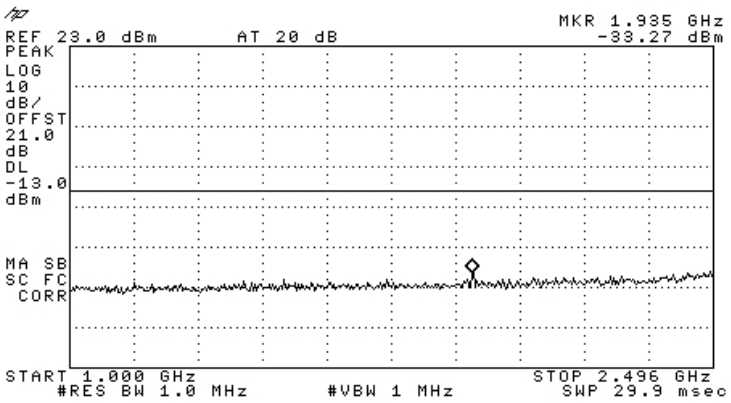


Figure 107.— 2596.00 MHz QPSK

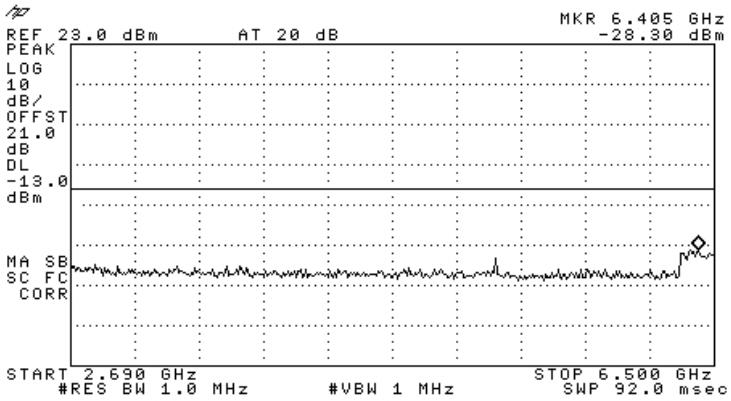


Figure 108.— 2596.00 MHz QPSK

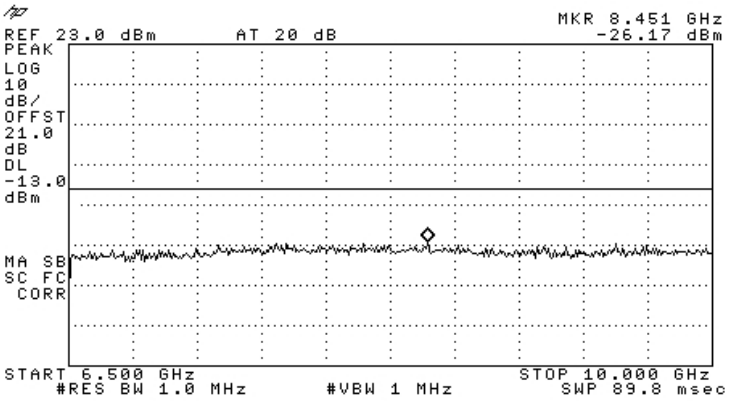


Figure 109.— 2596.00 MHz QPSK

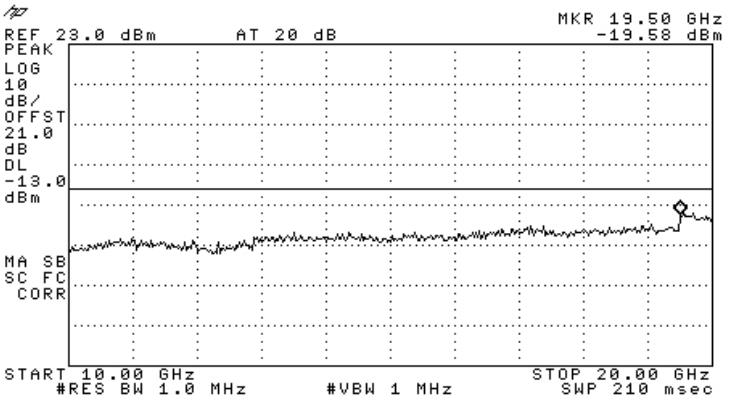


Figure 110.— 2596.00 MHz QPSK

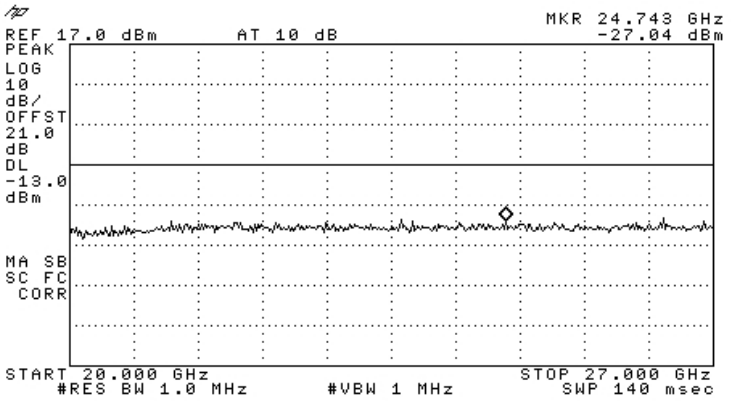


Figure 111.— 2596.00 MHz QPSK

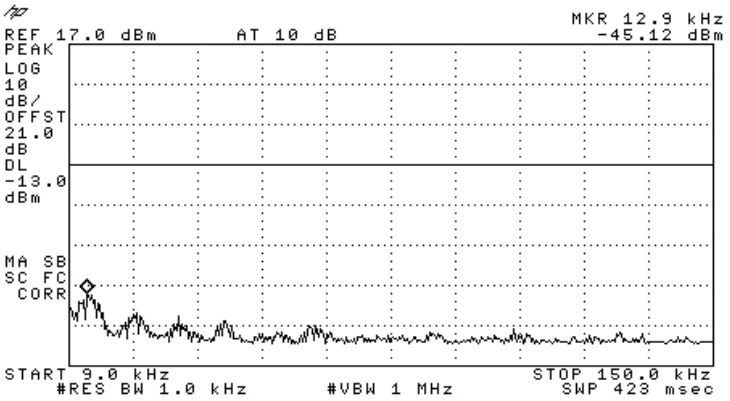


Figure 112.— 2596.00 MHz 16QAM

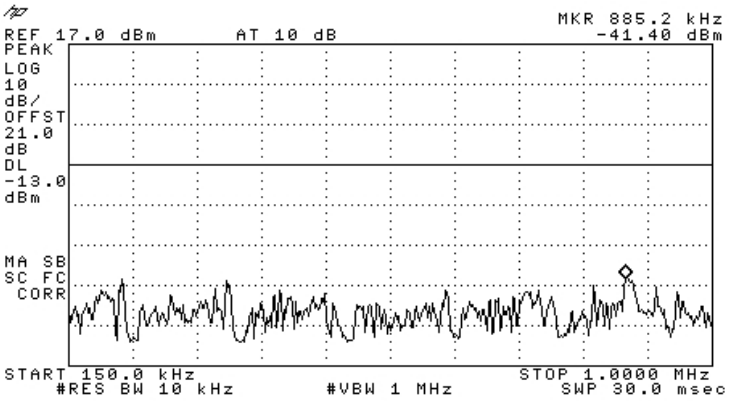


Figure 113.— 2596.00 MHz 16QAM

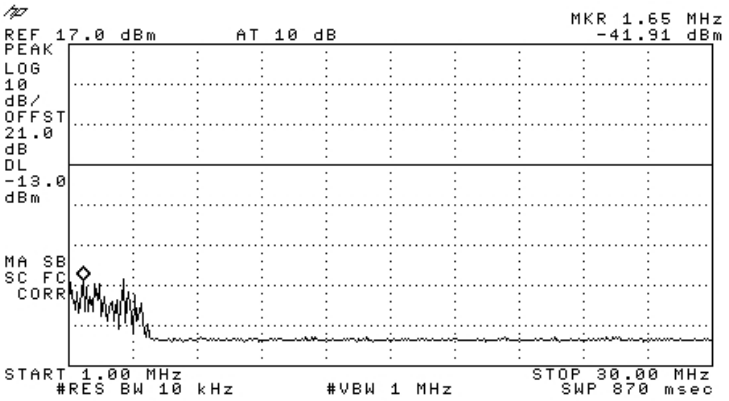


Figure 114.— 2596.00 MHz 16QAM

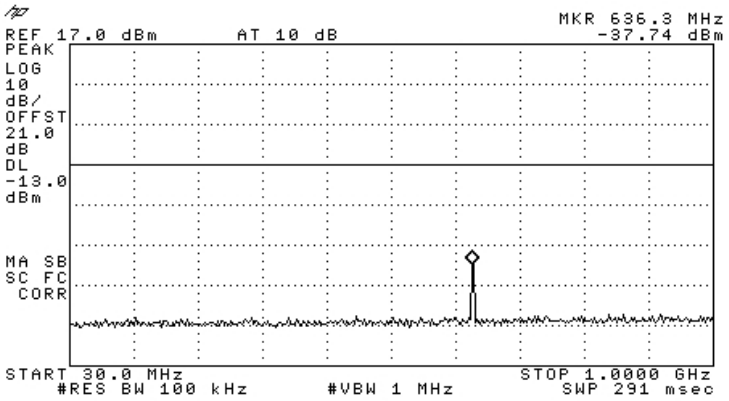


Figure 115.— 2596.00 MHz 16QAM

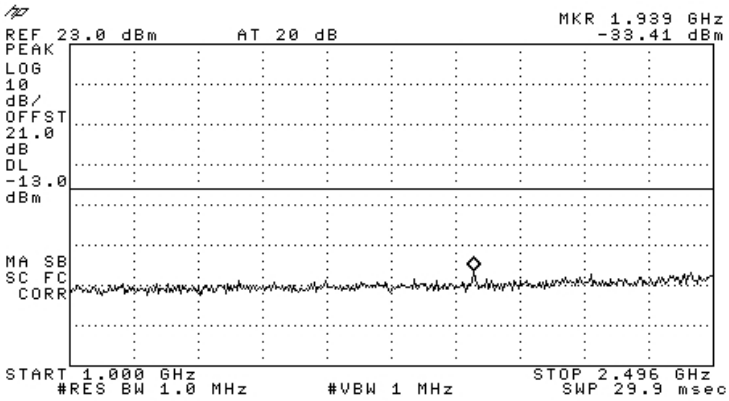


Figure 116.— 2596.00 MHz 16QAM

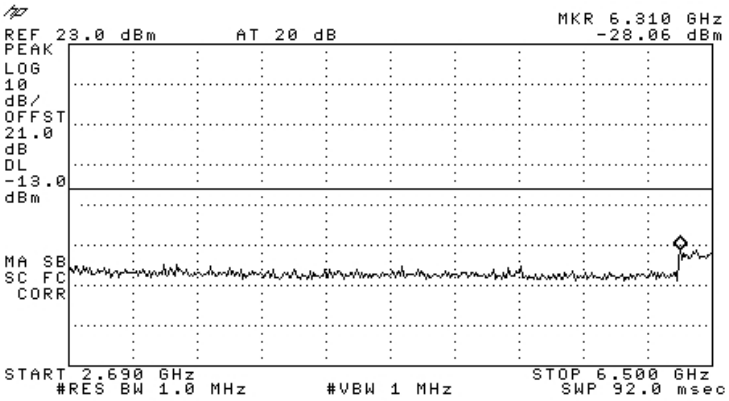


Figure 117.— 2596.00 MHz 16QAM

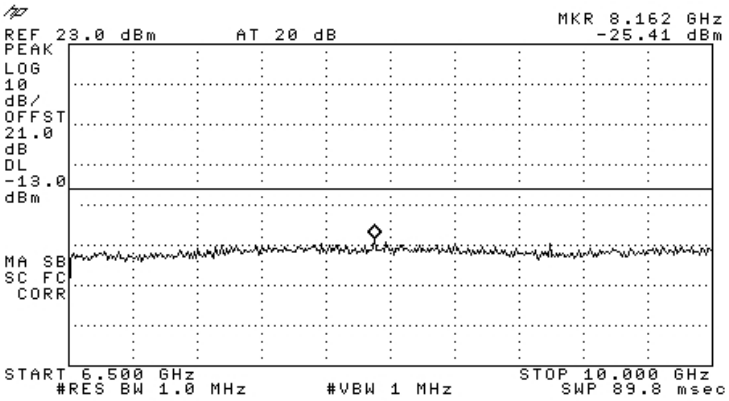


Figure 118.— 2596.00 MHz 16QAM

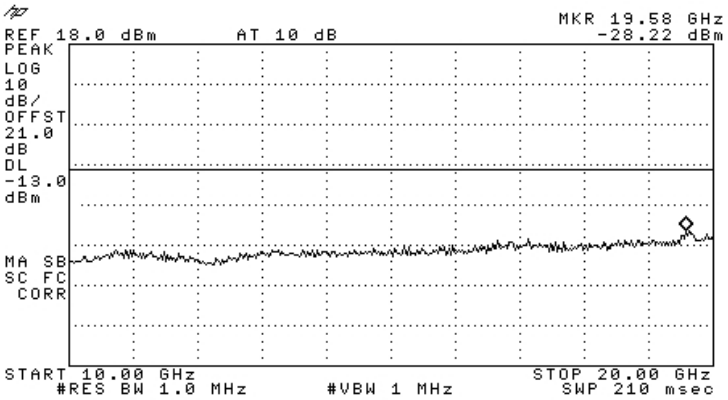


Figure 119.— 2596.00 MHz 16QAM

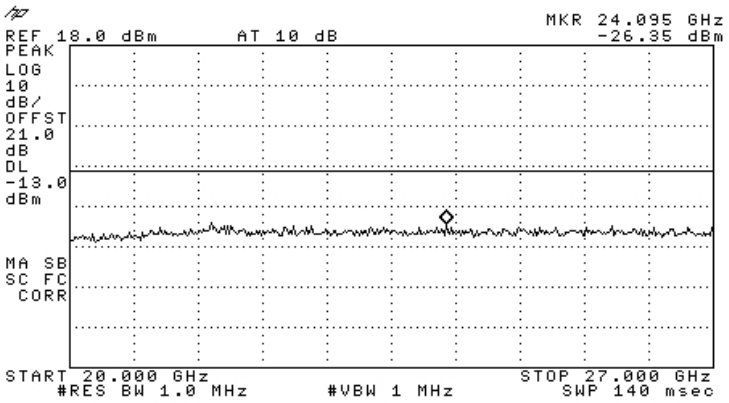


Figure 120.— 2596.00 MHz 16QAM

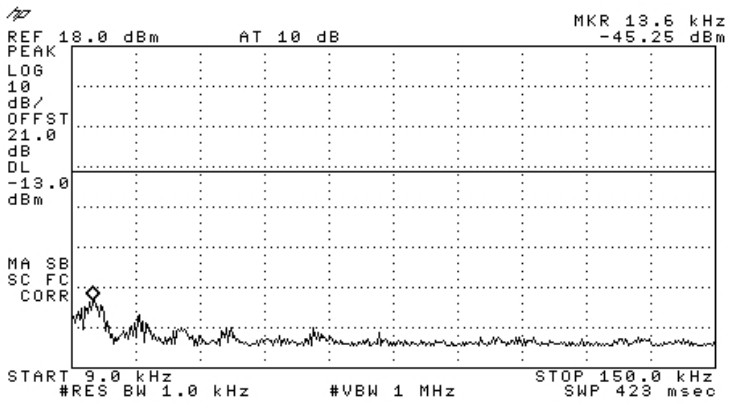


Figure 121.— 2596.00 MHz 64QAM

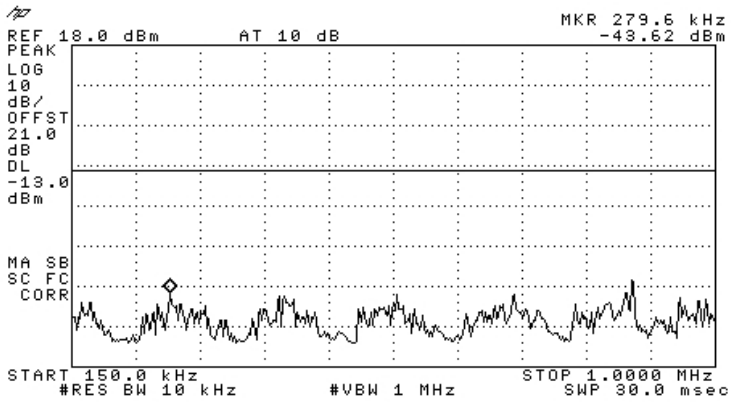


Figure 122.— 2596.00 MHz 64QAM

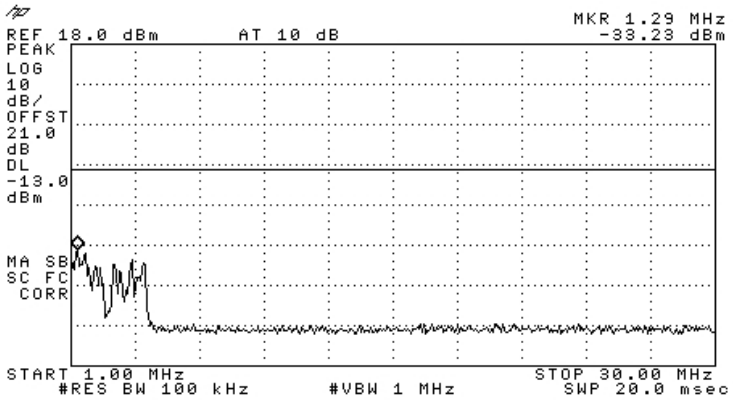


Figure 123.— 2596.00 MHz 64QAM

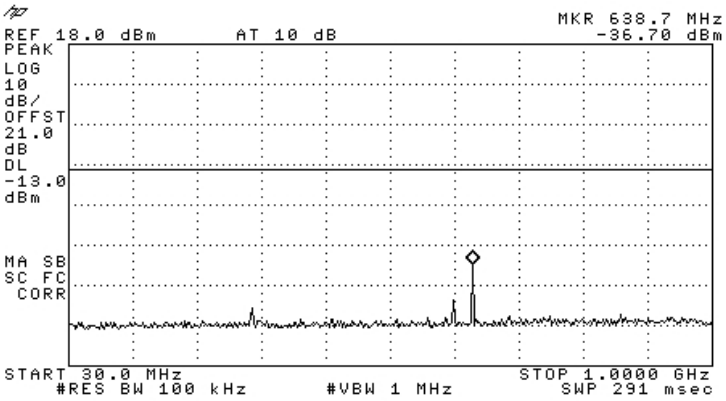


Figure 124.— 2596.00 MHz 64QAM

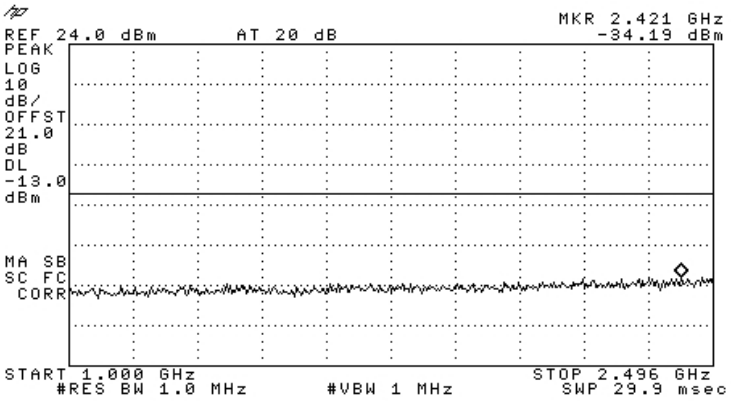


Figure 125.— 2596.00 MHz 64QAM

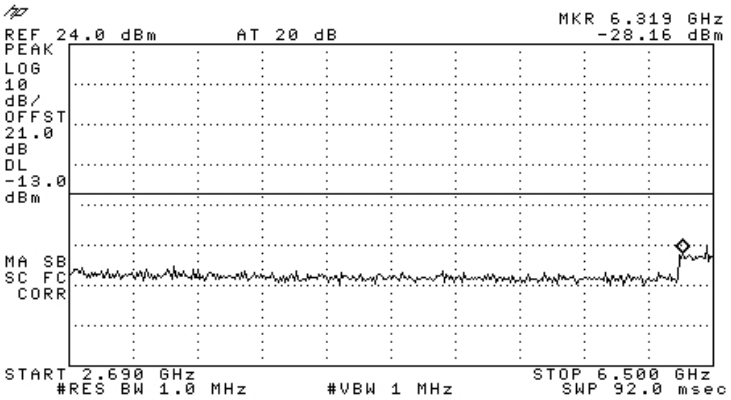


Figure 126.— 2596.00 MHz 64QAM

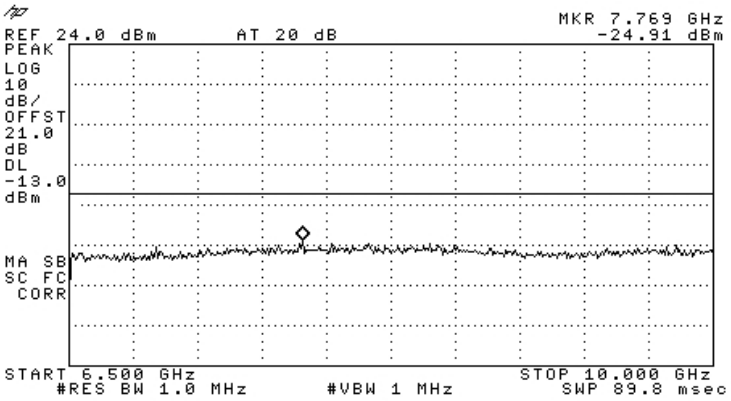


Figure 127.— 2596.00 MHz 64QAM

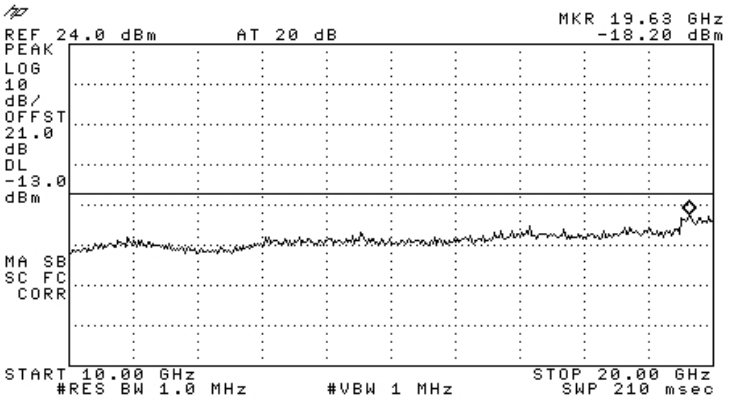


Figure 128.— 2596.00 MHz 64QAM

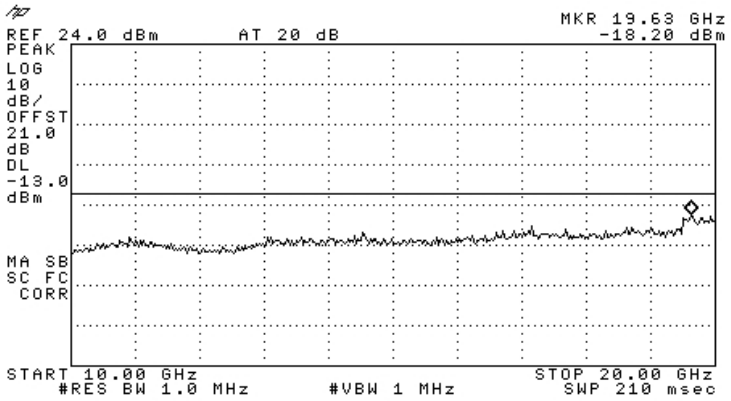


Figure 129.— 2596.00 MHz 64QAM

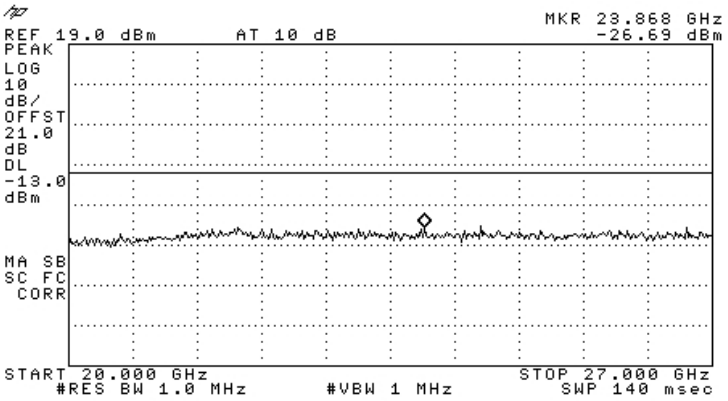


Figure 130.— 2596.00 MHz 64QAM

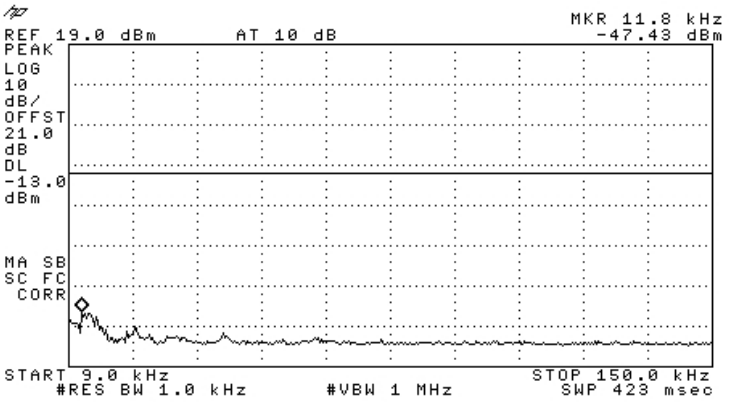


Figure 131.— 2687.50 MHz QPSK

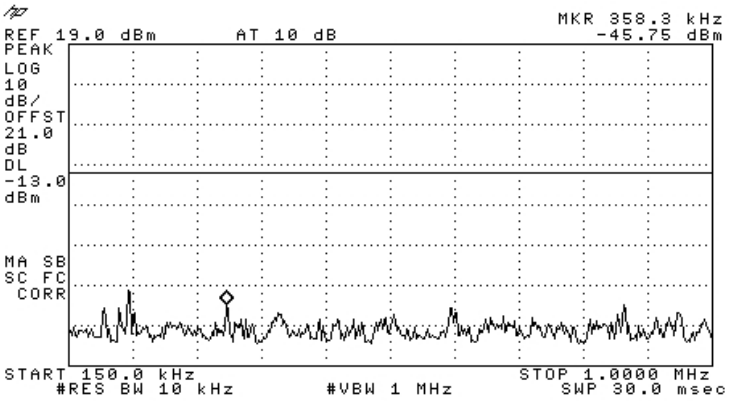


Figure 132.— 2687.50 MHz QPSK

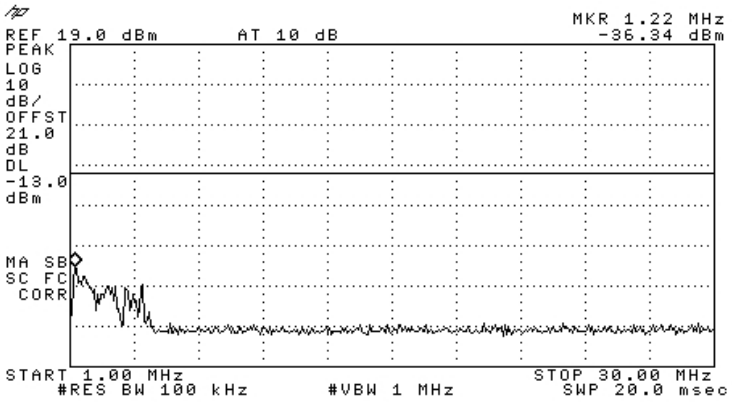


Figure 133.— 2687.50 MHz QPSK

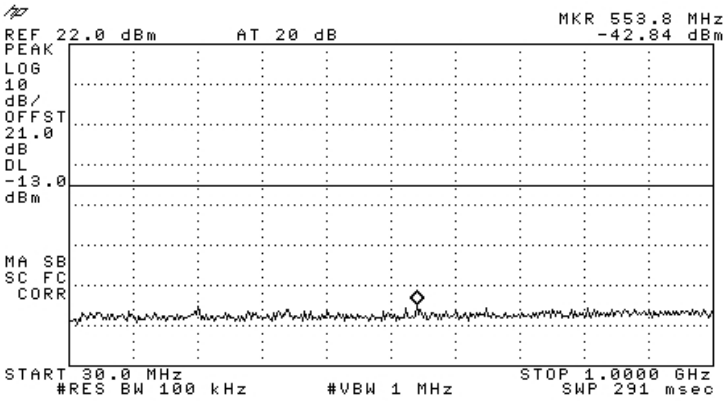


Figure 134.— 2687.50 MHz QPSK

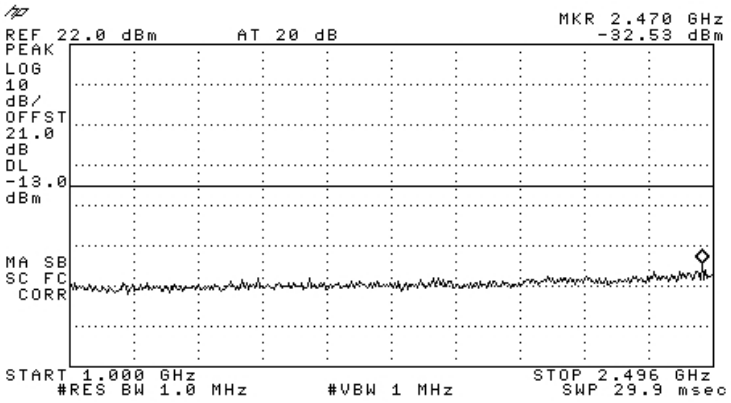


Figure 135.— 2687.50 MHz QPSK

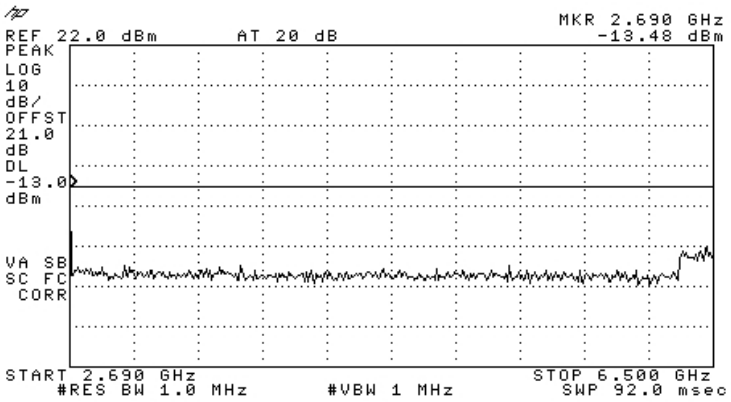


Figure 136.— 2687.50 MHz QPSK

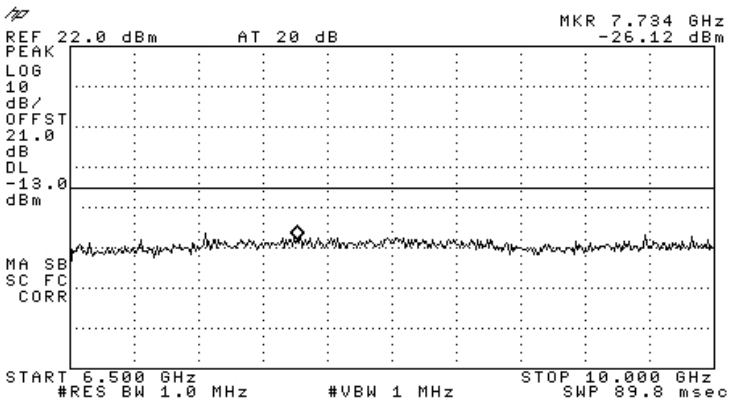


Figure 137.— 2687.50 MHz QPSK

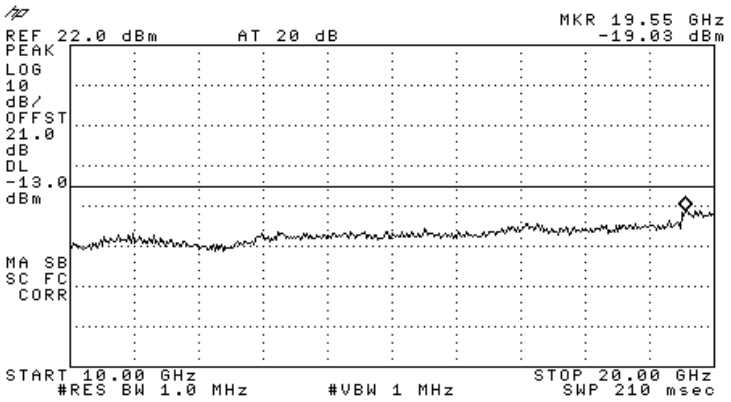


Figure 138.— 2687.50 MHz QPSK

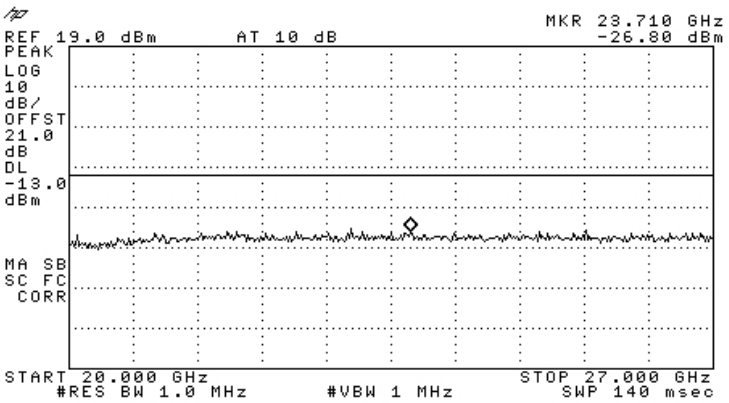


Figure 139.— 2687.50 MHz QPSK

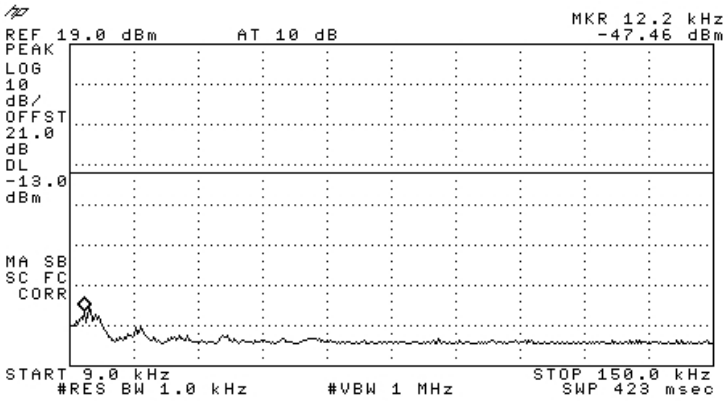


Figure 140.— 2687.50 MHz 16QAM

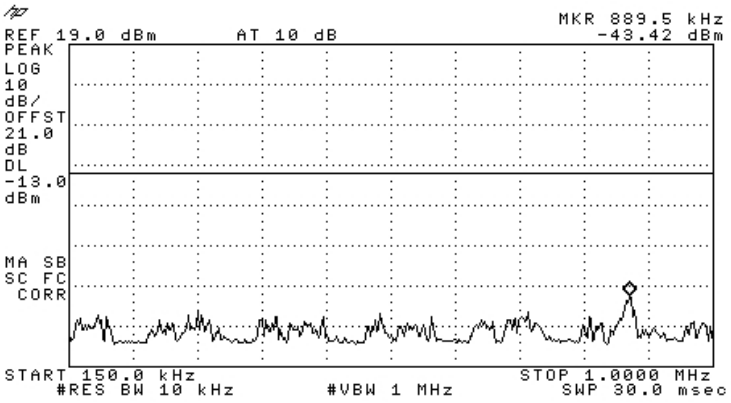


Figure 141.— 2687.50 MHz 16QAM

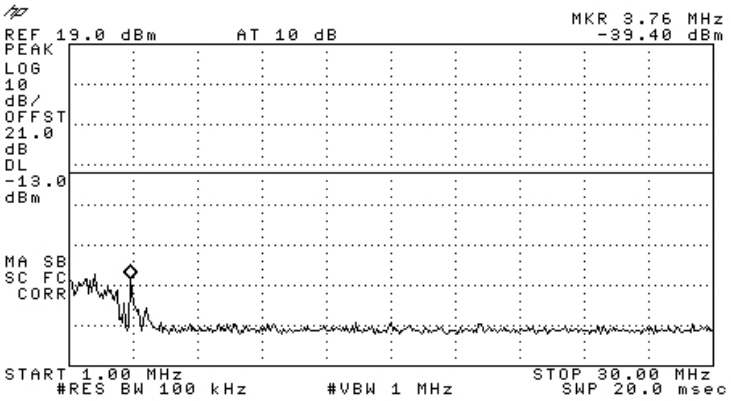


Figure 142.— 2687.50 MHz 16QAM

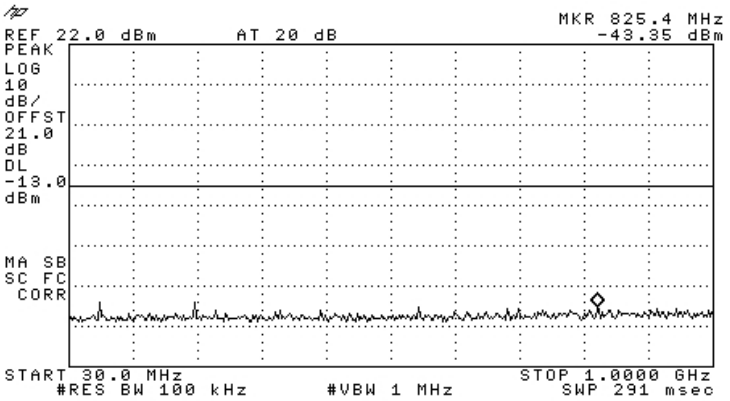


Figure 143.— 2687.50 MHz 16QAM

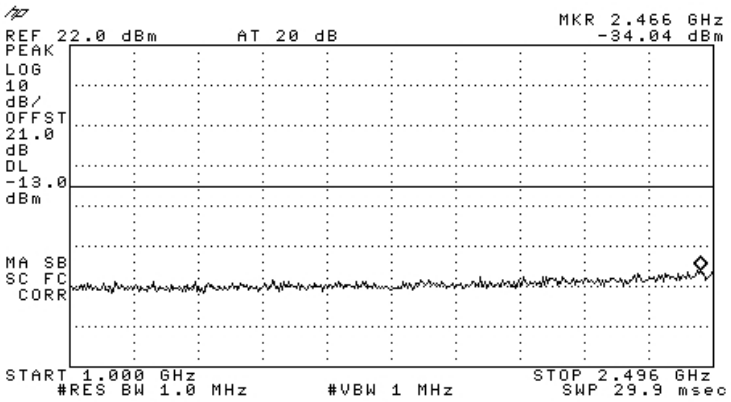


Figure 144.— 2687.50 MHz 16QAM

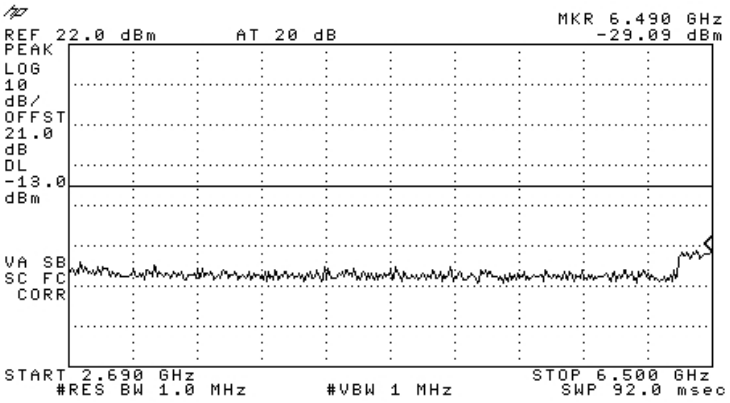


Figure 145.— 2687.50 MHz 16QAM

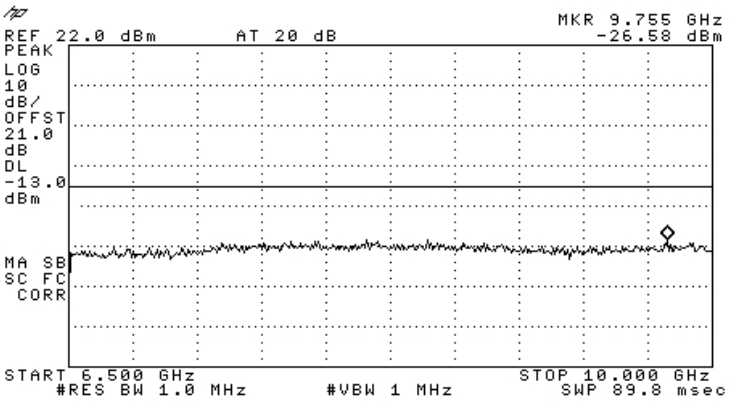


Figure 146.— 2687.50 MHz 16QAM

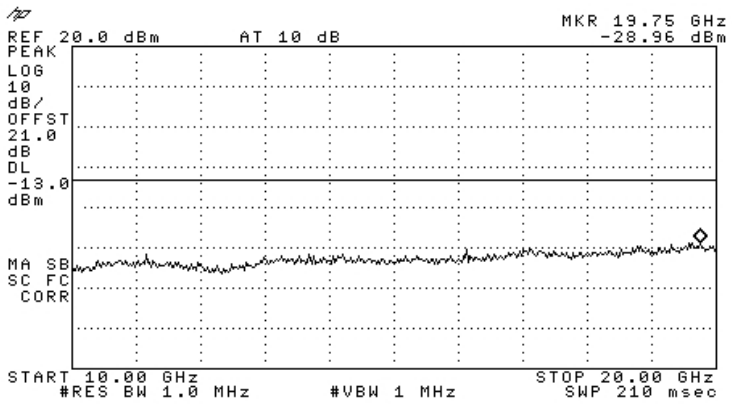


Figure 147.— 2687.50 MHz 16QAM

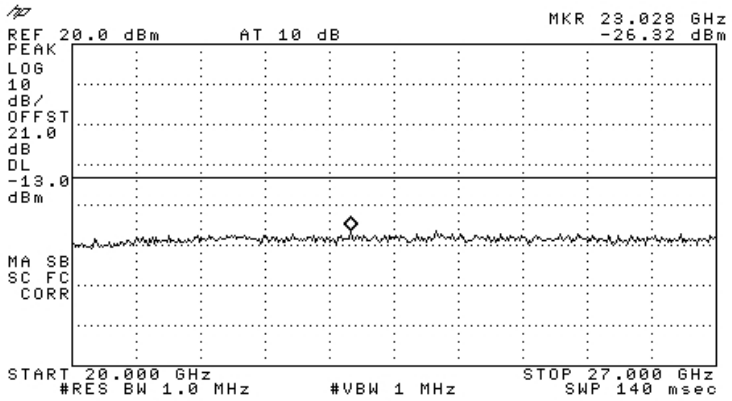


Figure 148.— 2687.50 MHz 16QAM

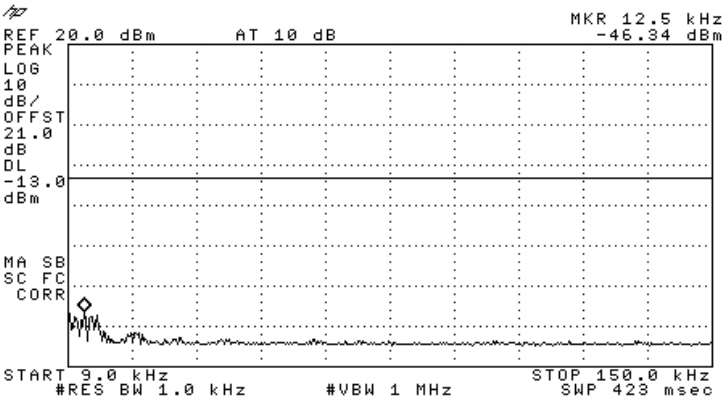


Figure 149.— 2687.50 MHz 64QAM

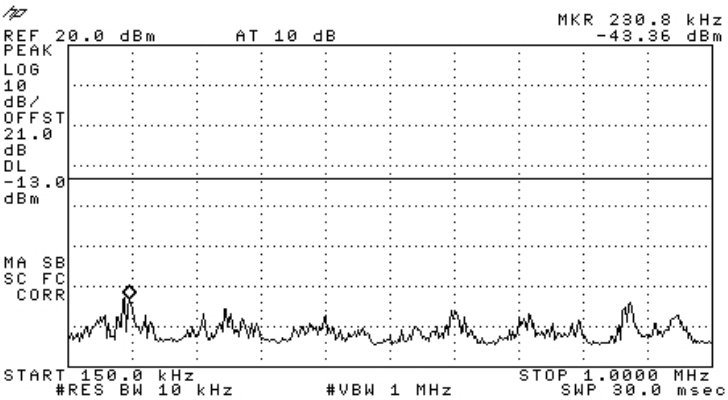


Figure 150.— 2687.50 MHz 64QAM

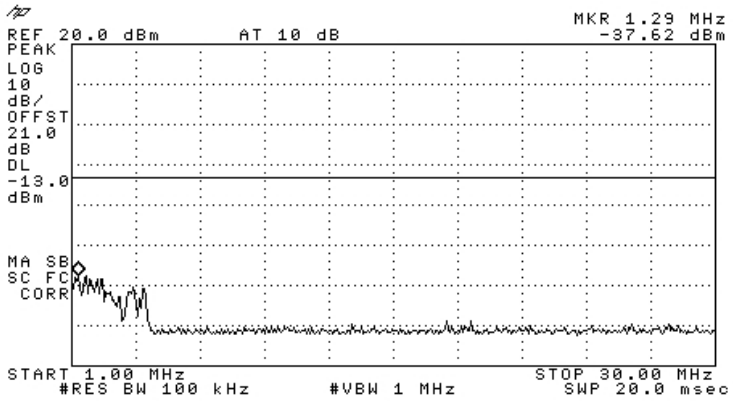


Figure 151.— 2687.50 MHz 64QAM

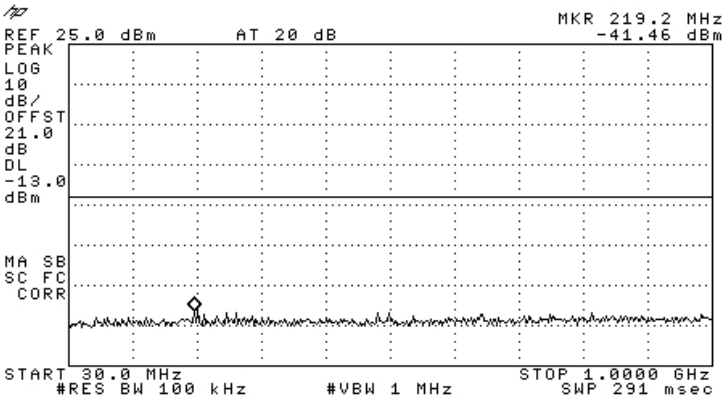


Figure 152.— 2687.50 MHz 64QAM

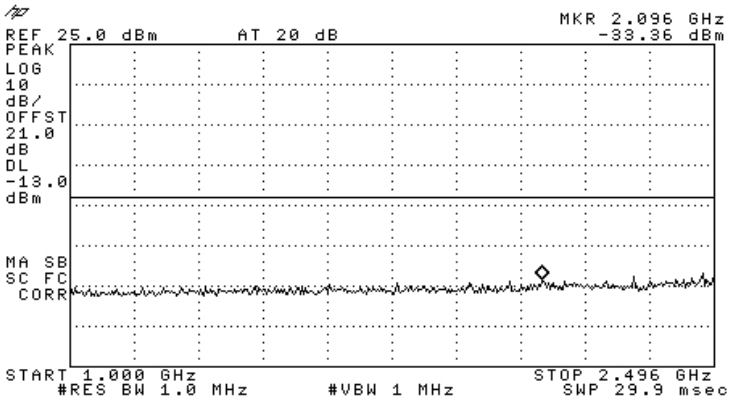


Figure 153.— 2687.50 MHz 64QAM

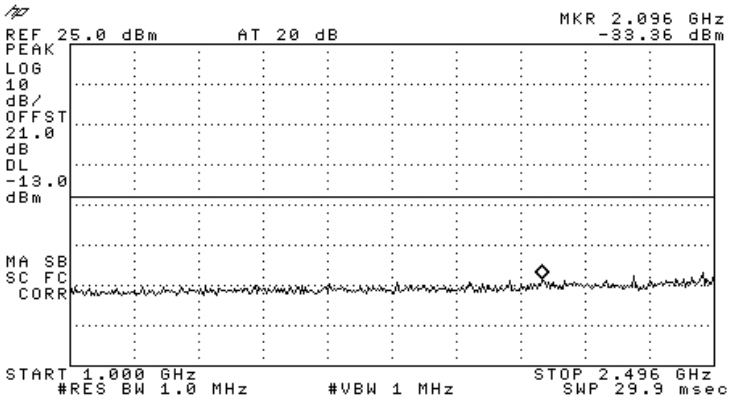


Figure 154.— 2687.50 MHz 64QAM

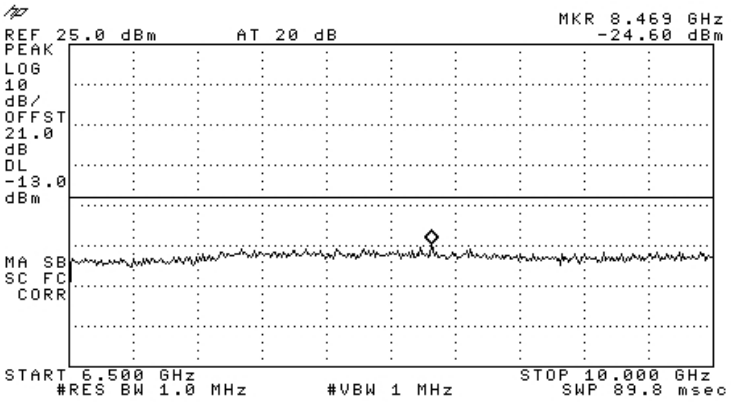


Figure 155.— 2687.50 MHz 64QAM

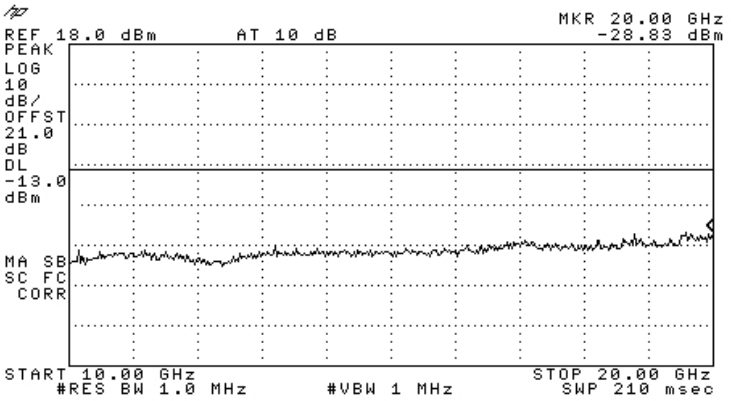


Figure 156.— 2687.50 MHz 64QAM

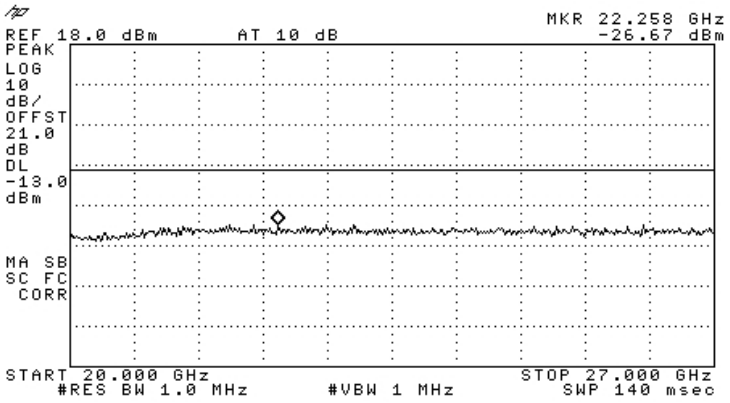


Figure 157.— 2687.50 MHz 64QAM

11.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 27, Sub-part C, Section 27.53 (g)

Operation Frequency (MHz)		Reading (dBm)	Specification (dBm)	Margin (dB)
2498.50	QPSK	-26.53	-13.0	-13.53
	16QAM	-26.00	-13.0	-13.00
	64QAM	-19.51	-13.0	-6.51
2596.00	QPSK	-19.58	-13.0	-6.58
	16QAM	-25.41	-13.0	-12.41
	64QAM	-18.20	-13.0	-5.20
2687.50	QPSK	-19.03	-13.0	-6.03
	16QAM	-26.32	-13.0	-13.32
	64QAM	-24.60	-13.0	-11.60

Figure 158 Spurious Emissions at Antenna Terminals Results

JUDGEMENT: Passed by 5.2 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

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
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 2009	1 year

Figure 159 Test Equipment Used

12. Conducted Spurious Emissions 10 MHz Bandwidth

12.1 Test Specification

FCC Part 27, Sub-part C, Section 27.53 (m)

12.2 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).

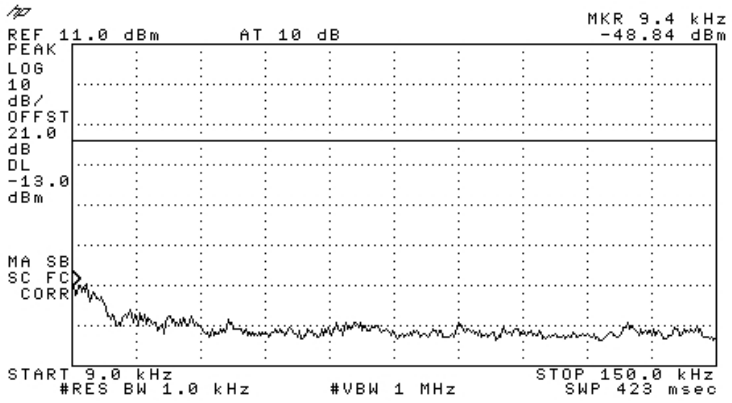


Figure 160.— 2501.00 MHz QPSK

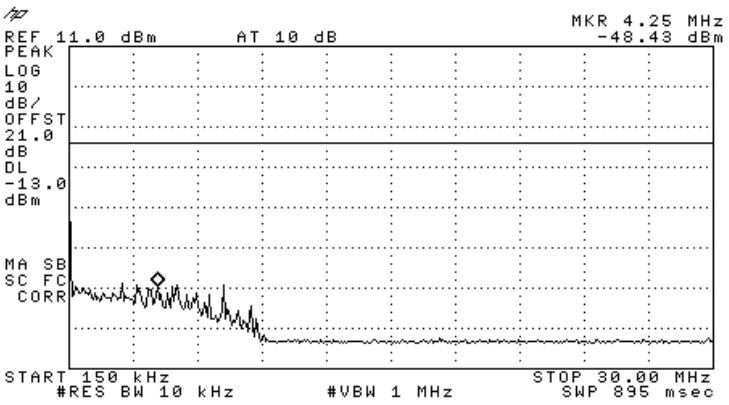


Figure 161.— 2501.00 MHz QPSK

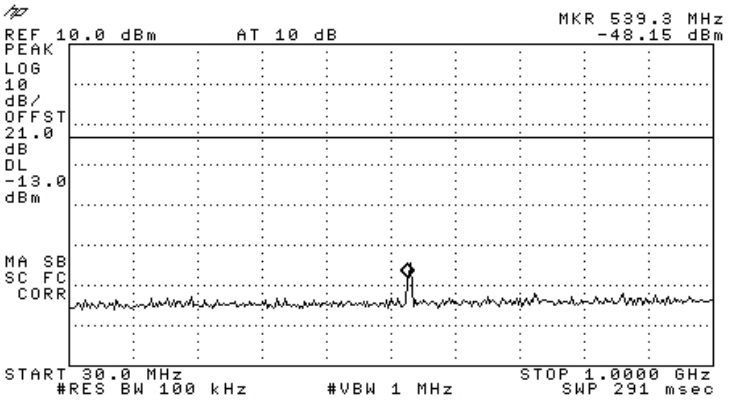


Figure 162.— 2501.00 MHz QPSK

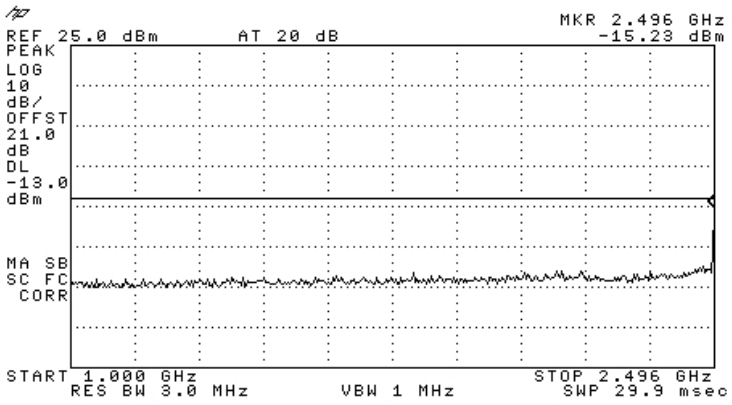


Figure 163.— 2501.00 MHz QPSK

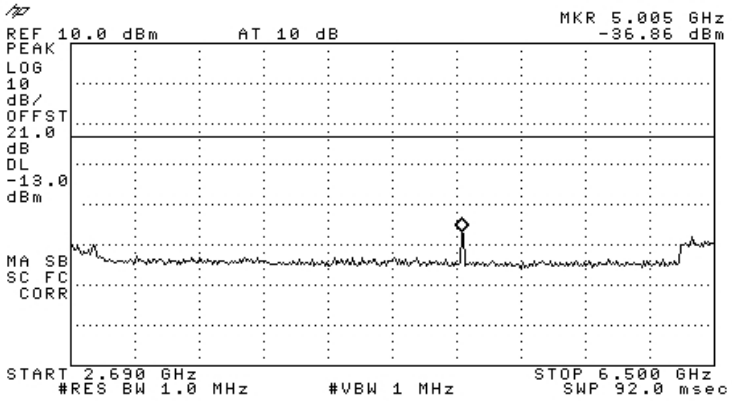


Figure 164.— 2501.00 MHz QPSK

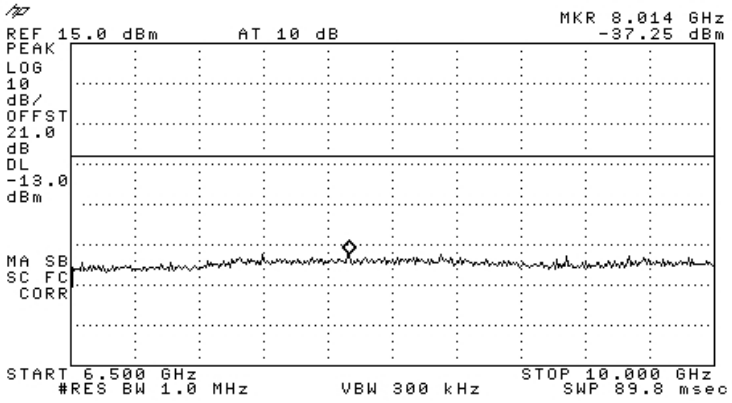


Figure 165.— 2501.00 MHz QPSK

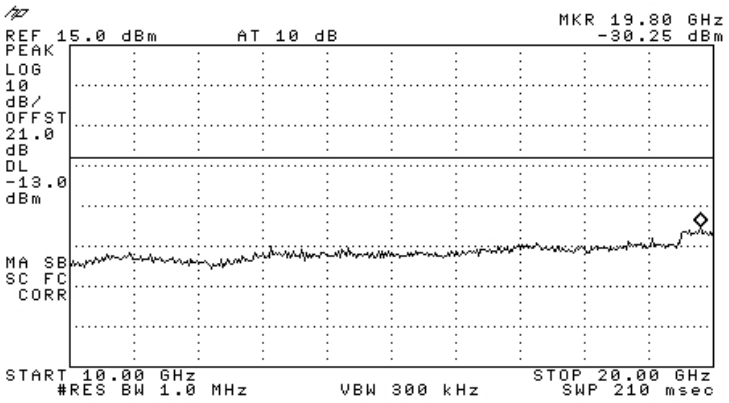


Figure 166.— 2501.00 MHz QPSK

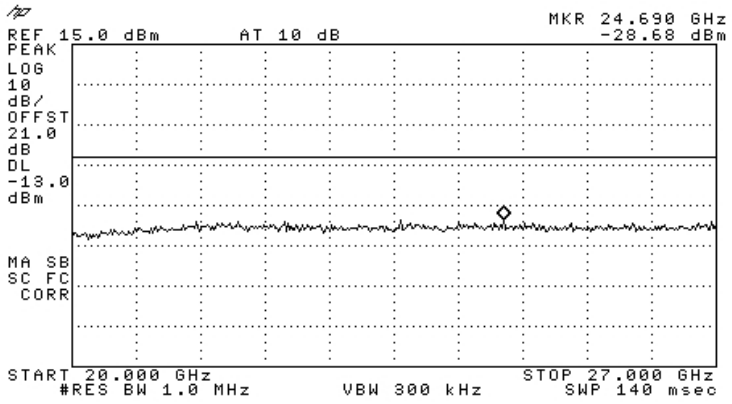


Figure 167.— 2501.00 MHz QPSK

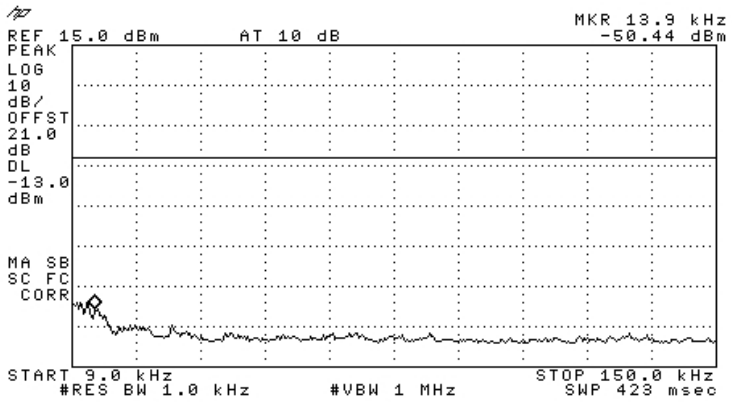


Figure 168.— 2501.00 MHz 16QAM

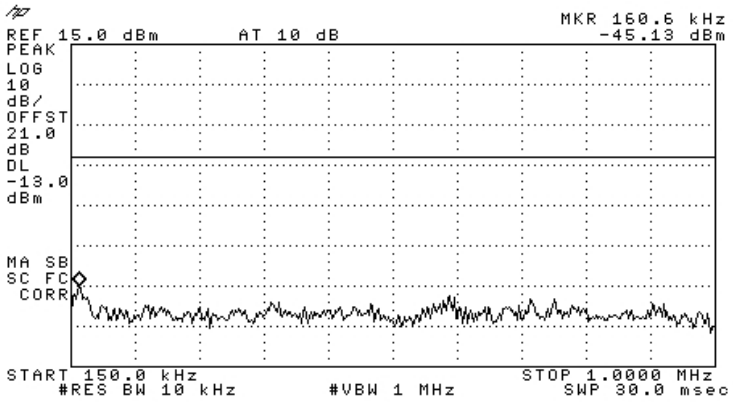


Figure 169.— 2501.00 MHz 16QAM

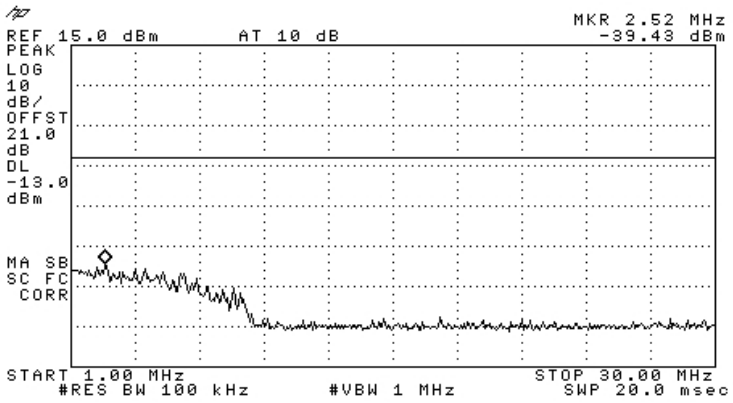


Figure 170.— 2501.00 MHz 16QAM

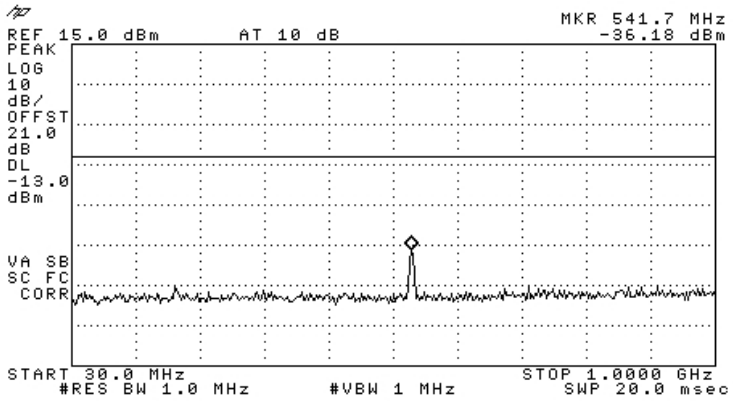


Figure 171.— 2501.00 MHz 16QAM

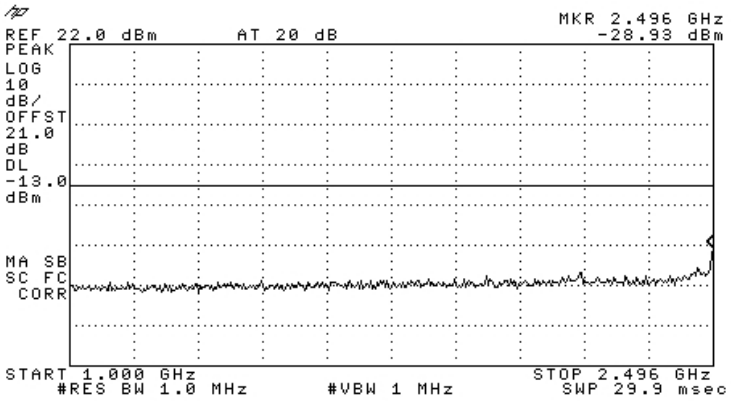


Figure 172.— 2501.00 MHz 16QAM

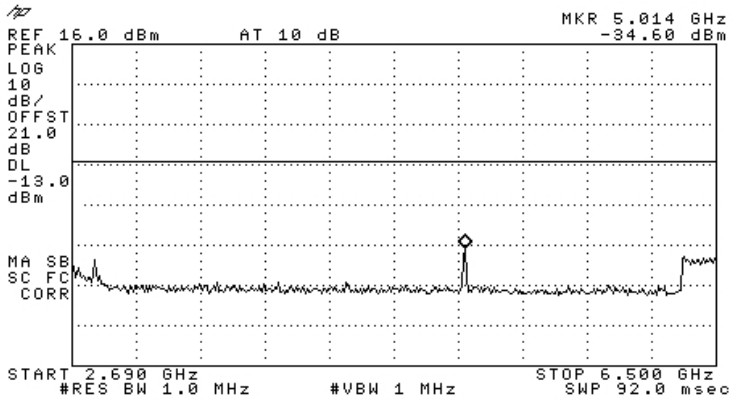


Figure 173.— 2501.00 MHz 16QAM

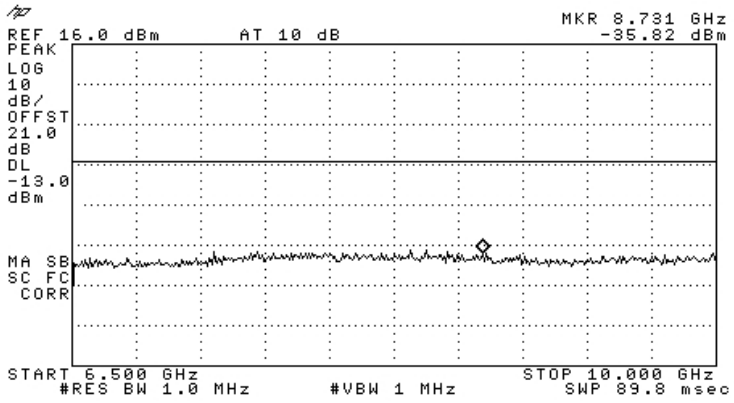


Figure 174.— 2501.00 MHz 16QAM

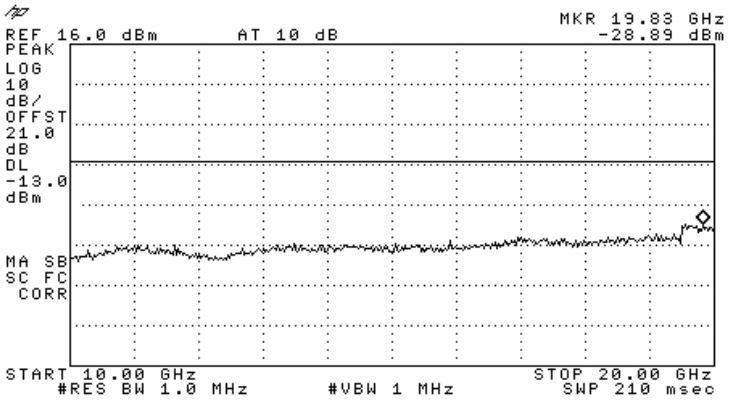


Figure 175.— 2501.00 MHz 16QAM

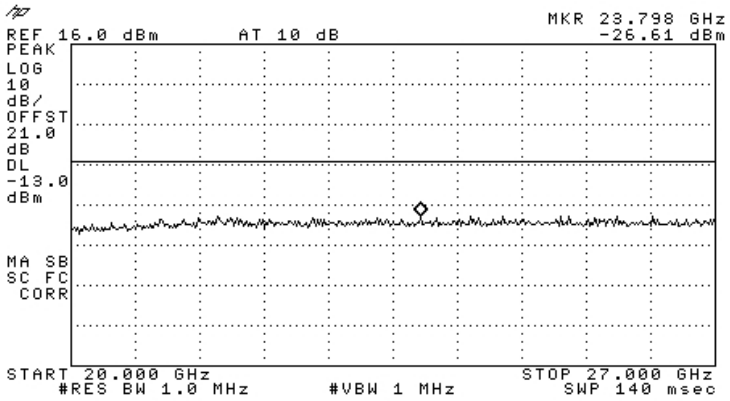


Figure 176.— 2501.00 MHz 16QAM

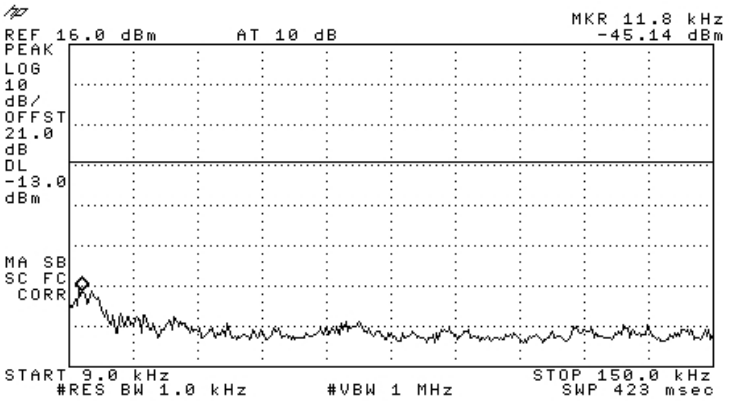


Figure 177.— 2501.00 MHz 64QAM

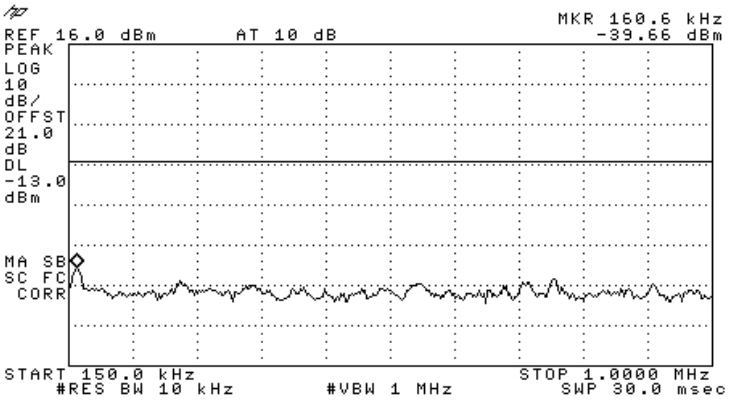


Figure 178.— 2501.00 MHz 64QAM

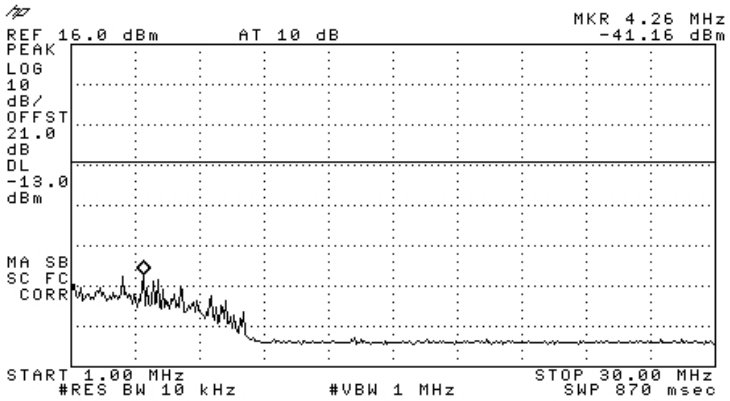


Figure 179.— 2501.00 MHz 64QAM

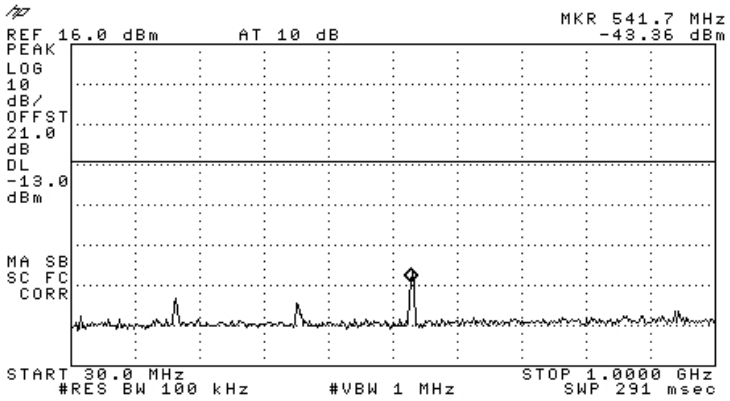


Figure 180.— 2501.00 MHz 64QAM

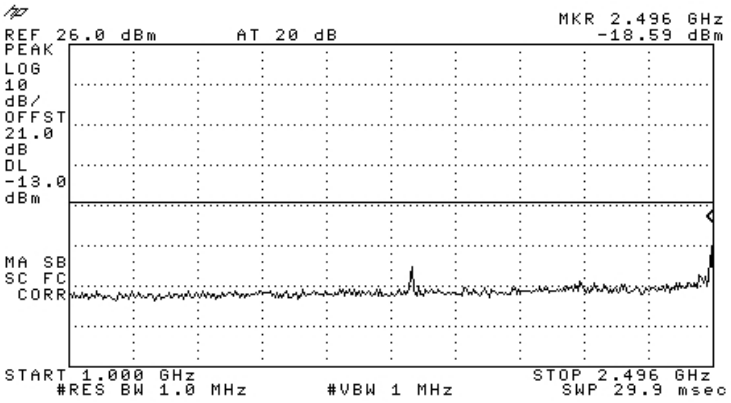


Figure 181.— 2501.00 MHz 64QAM

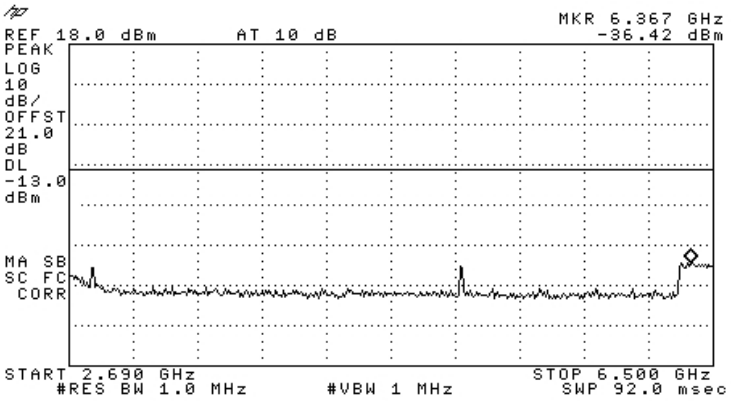


Figure 182.— 2501.00 MHz 64QAM

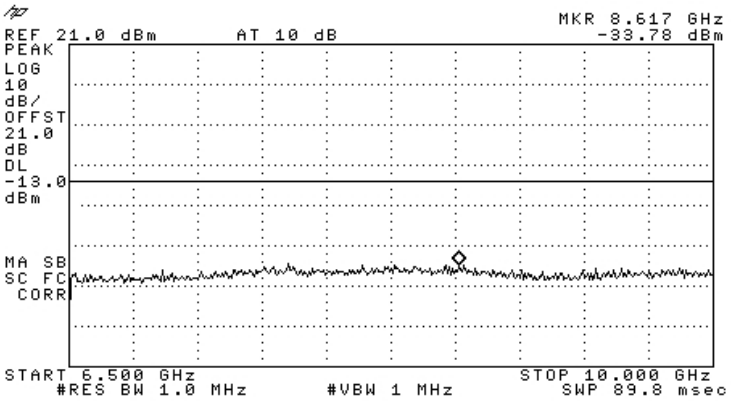


Figure 183.— 2501.00 MHz 64QAM

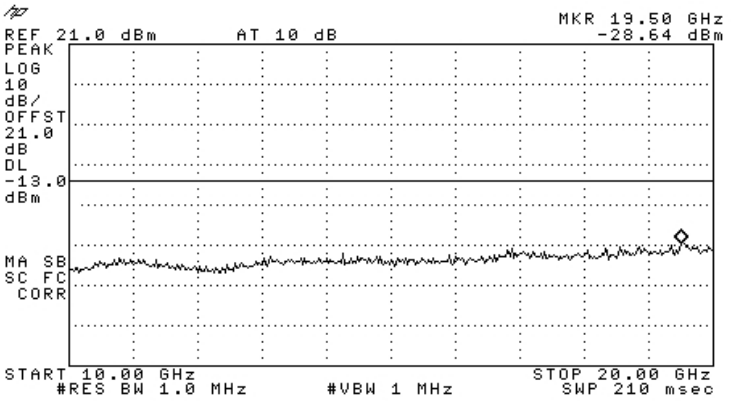


Figure 184.— 2501.00 MHz 64QAM

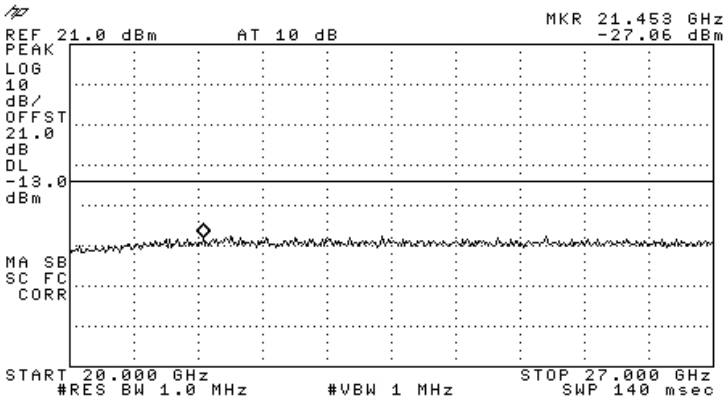


Figure 185.— 2501.00 MHz 64QAM

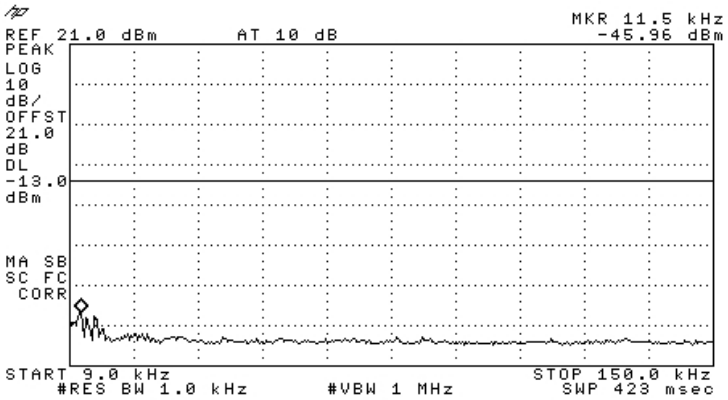


Figure 186.— 2596.00 MHz QPSK

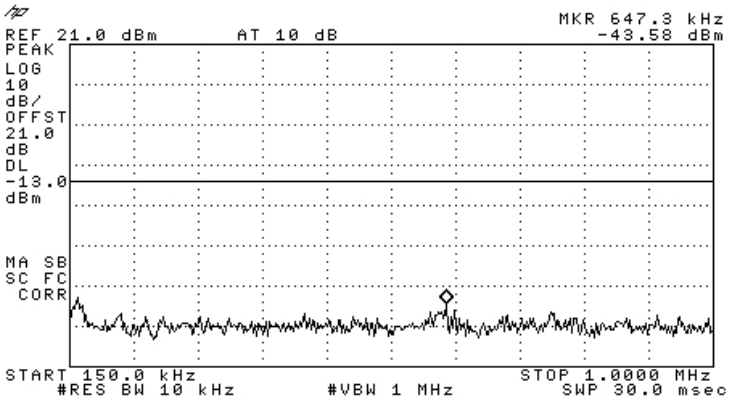


Figure 187.— 2596.00 MHz QPSK

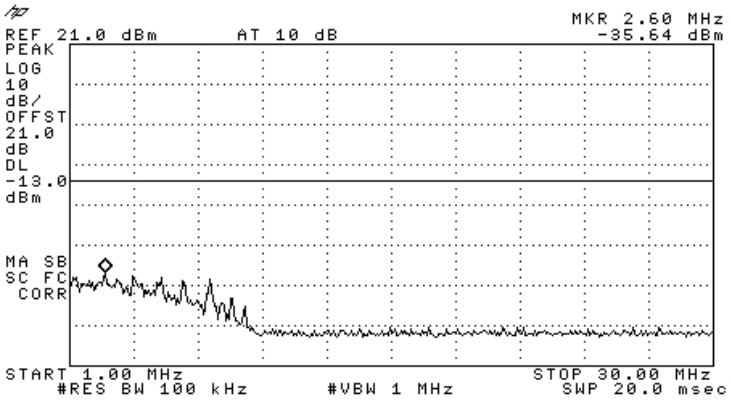


Figure 188.— 2596.00 MHz QPSK

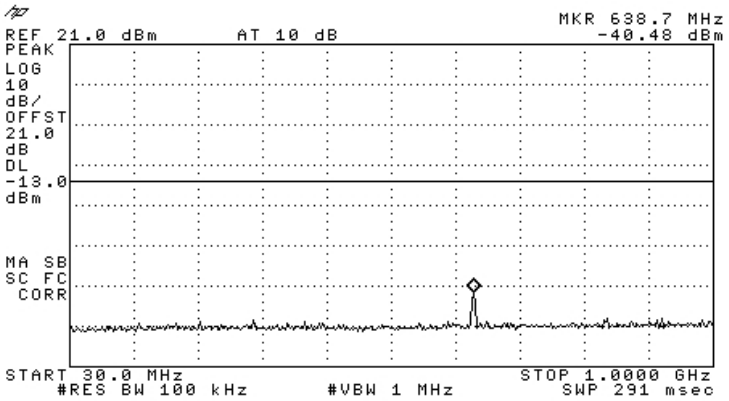


Figure 189.— 2596.00 MHz QPSK

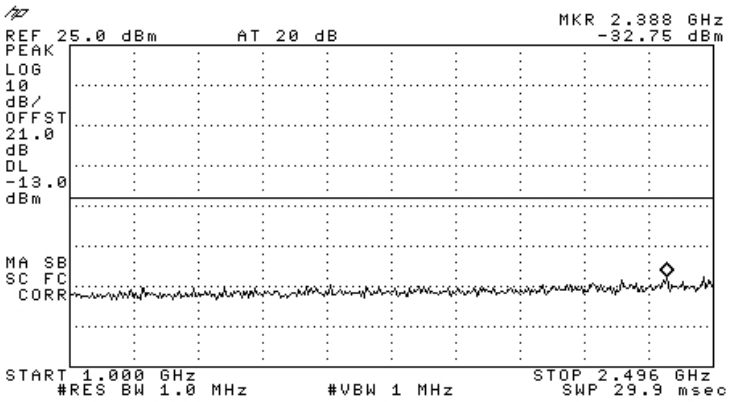


Figure 190.— 2596.00 MHz QPSK

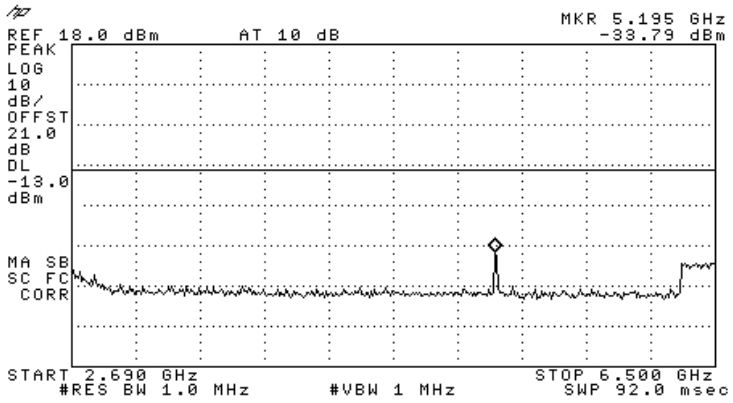


Figure 191.— 2596.00 MHz QPSK

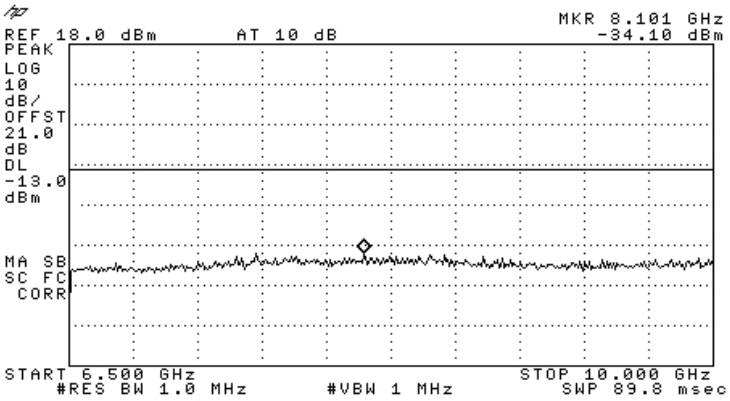


Figure 192.— 2596.00 MHz QPSK

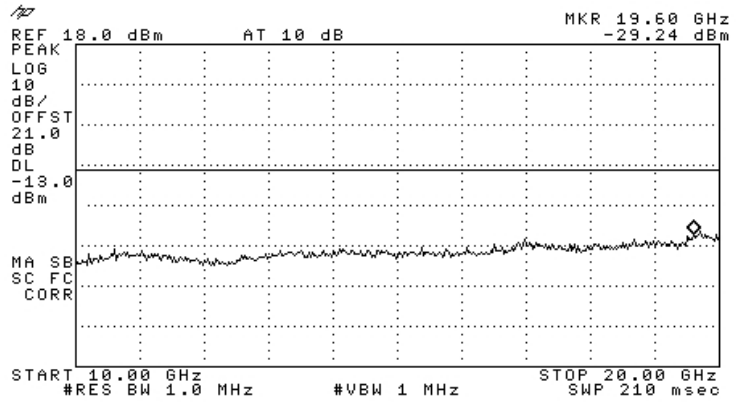


Figure 193.— 2596.00 MHz QPSK

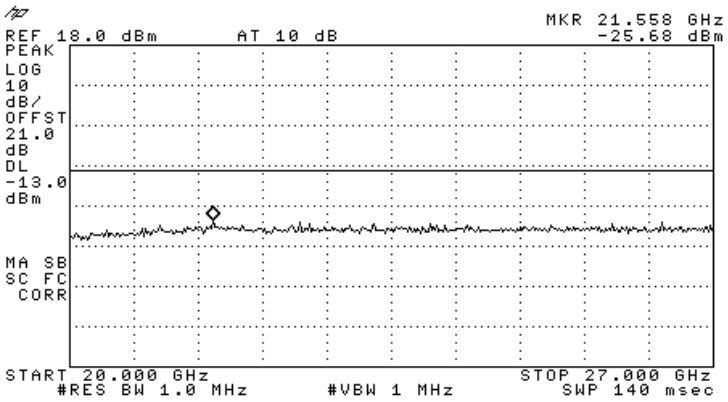


Figure 194.— 2596.00 MHz QPSK

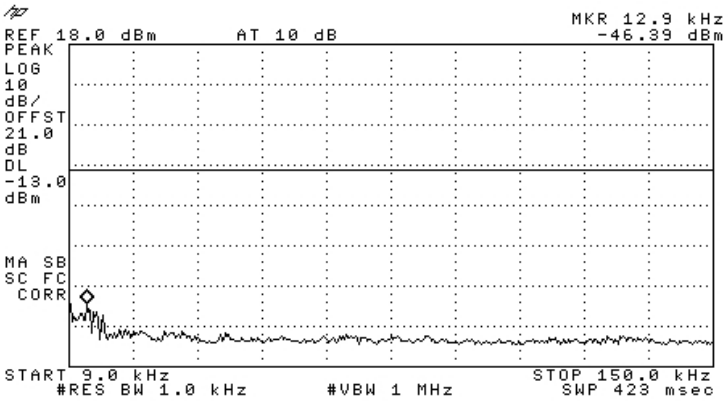


Figure 195.— 2596.00 MHz 16QAM

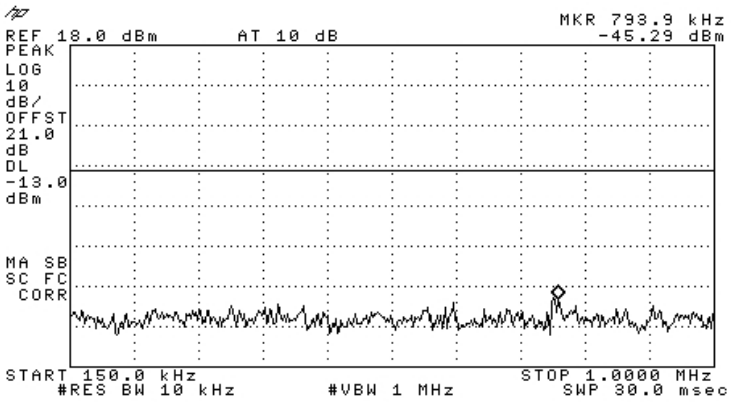


Figure 196.— 2596.00 MHz 16QAM

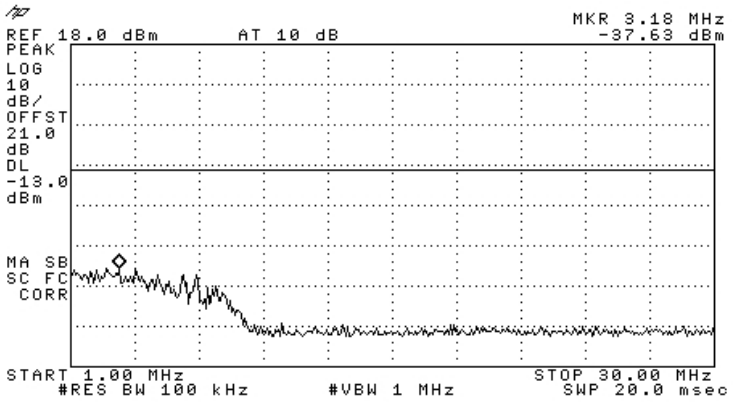


Figure 197.— 2596.00 MHz 16QAM

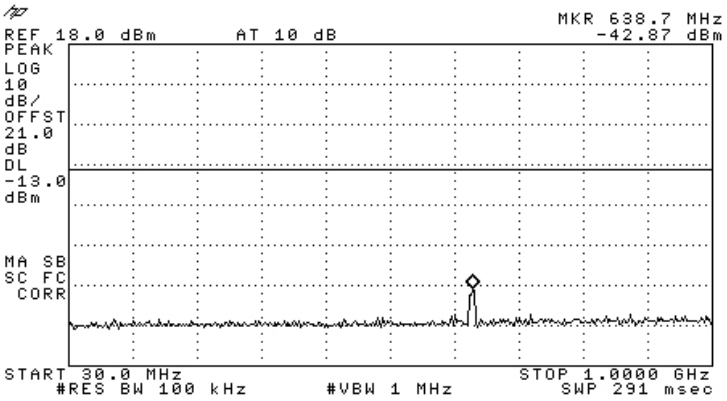


Figure 198.— 2596.00 MHz 16QAM

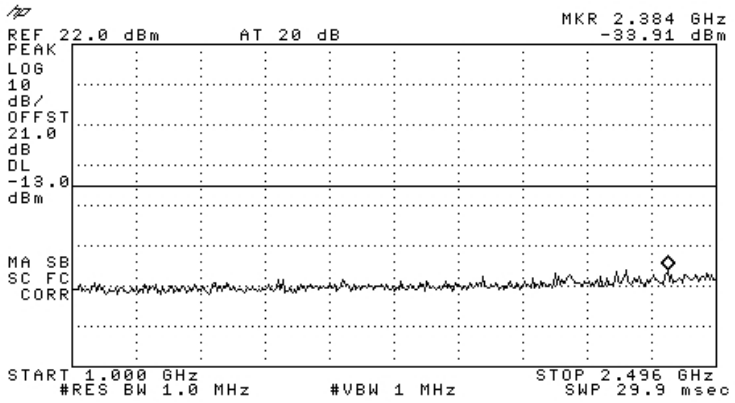


Figure 199.— 2596.00 MHz 16QAM

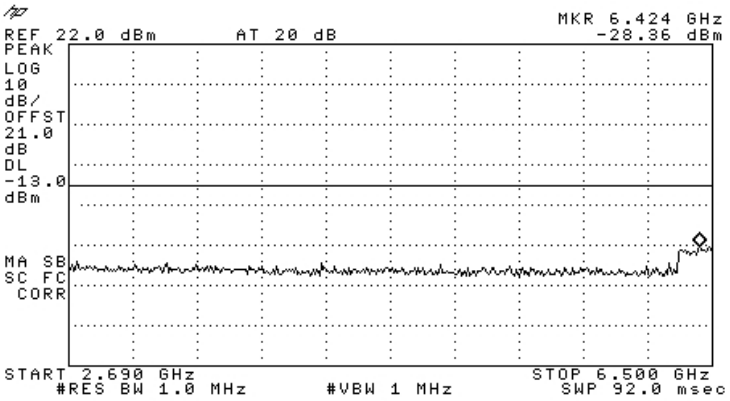


Figure 200.— 2596.00 MHz 16QAM

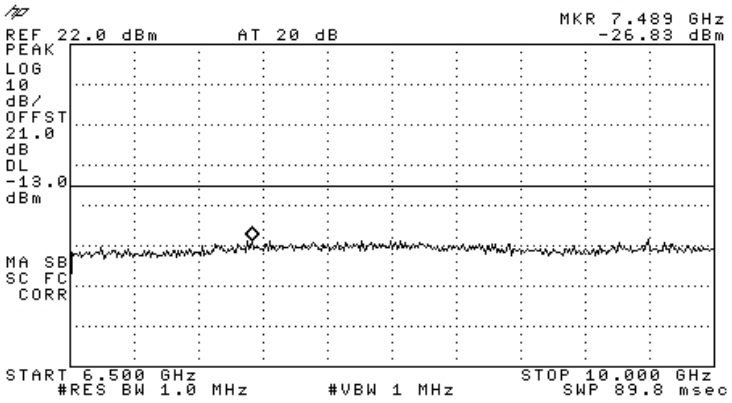


Figure 201.— 2596.00 MHz 16QAM

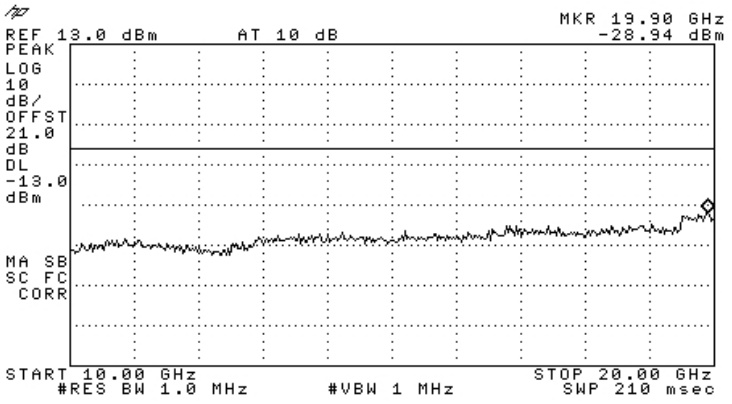


Figure 202.— 2596.00 MHz 16QAM

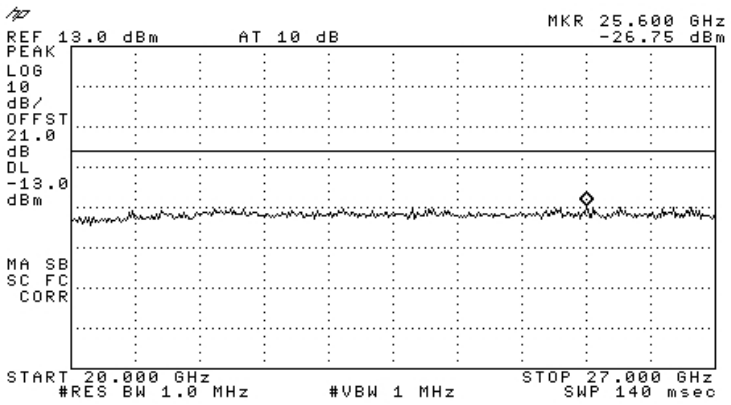


Figure 203.— 2596.00 MHz 16QAM

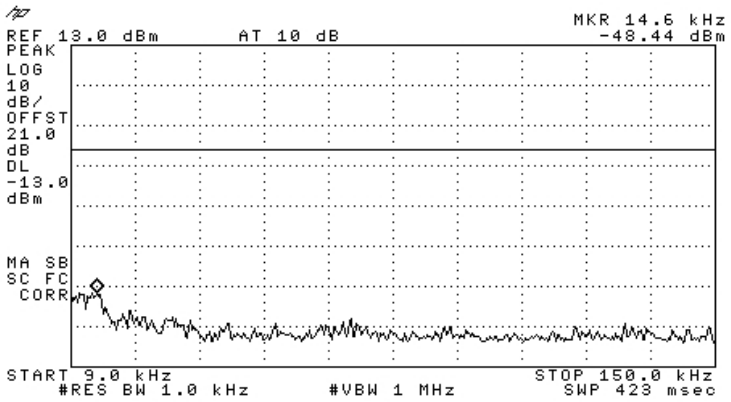


Figure 204.— 2596.00 MHz 64QAM

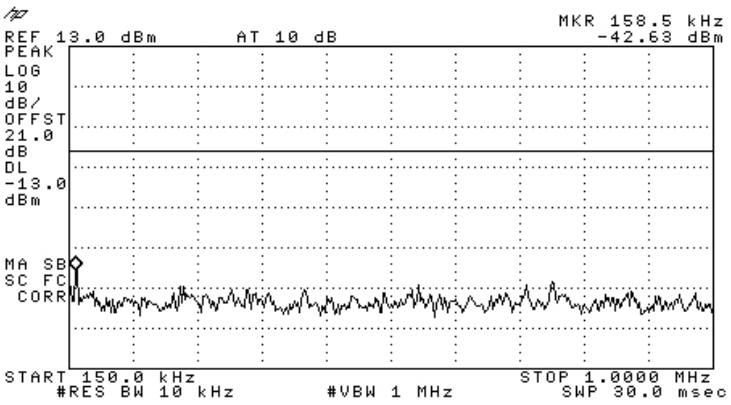


Figure 205.— 2596.00 MHz 64QAM

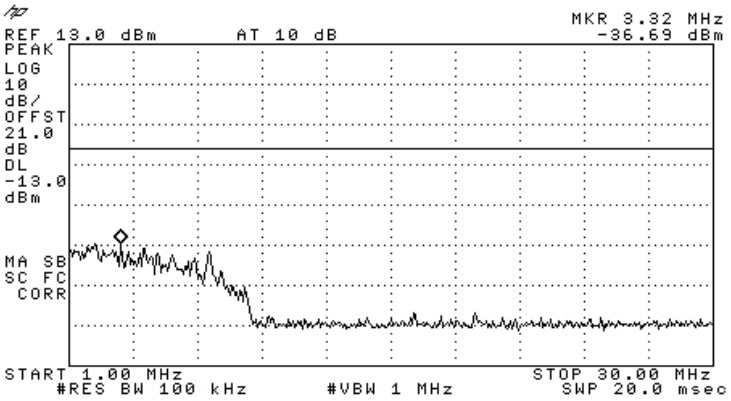


Figure 206.— 2596.00 MHz 64QAM

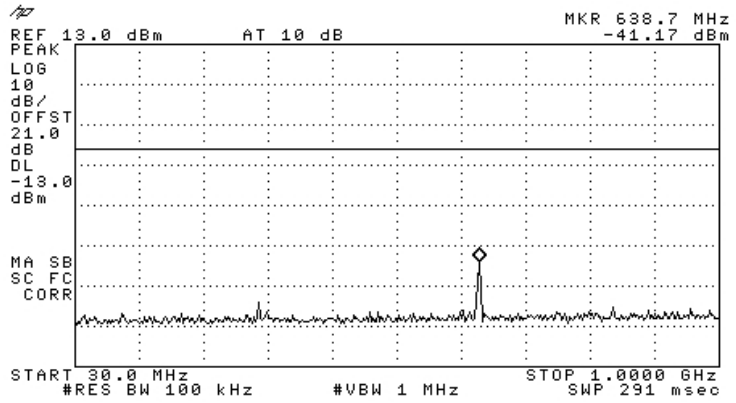


Figure 207.— 2596.00 MHz 64QAM

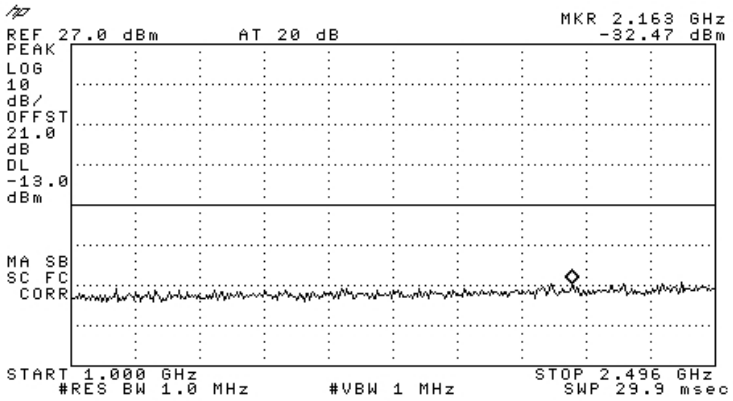


Figure 208.— 2596.00 MHz 64QAM

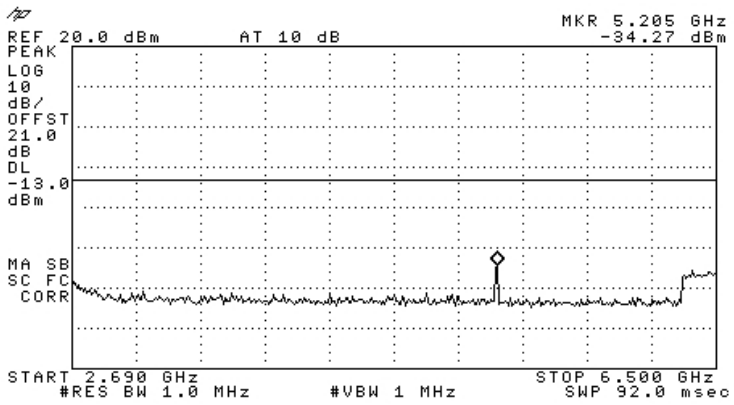


Figure 209.— 2596.00 MHz 64QAM

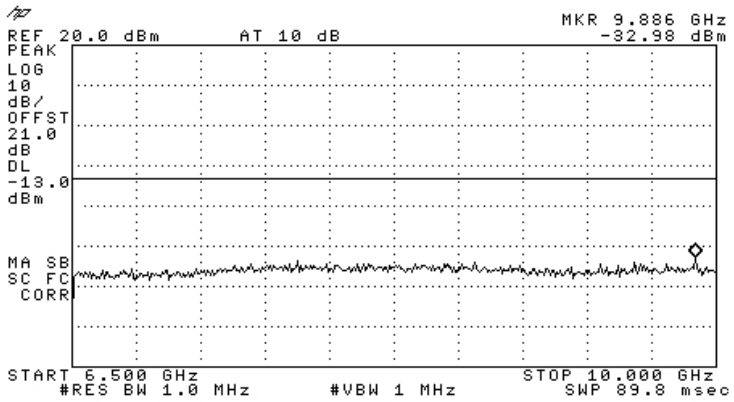


Figure 210.— 2596.00 MHz 64QAM

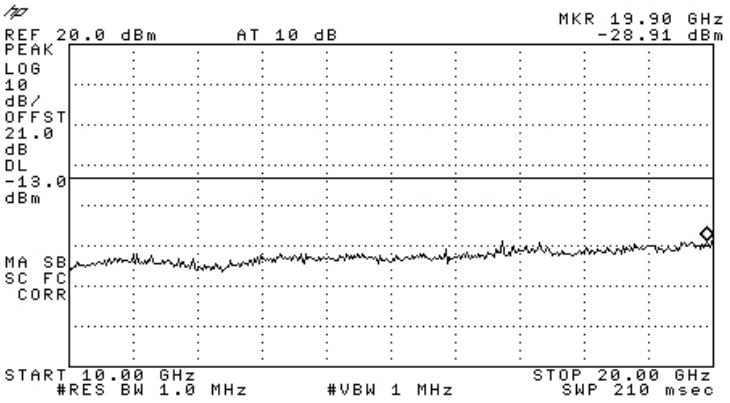


Figure 211.— 2596.00 MHz 64QAM

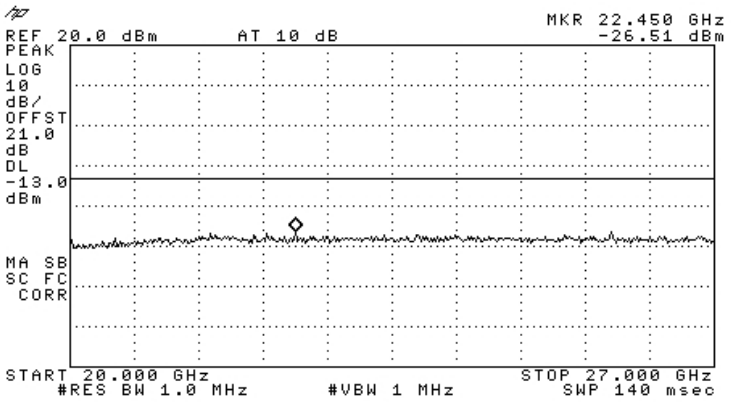


Figure 212.— 2596.00 MHz 64QAM

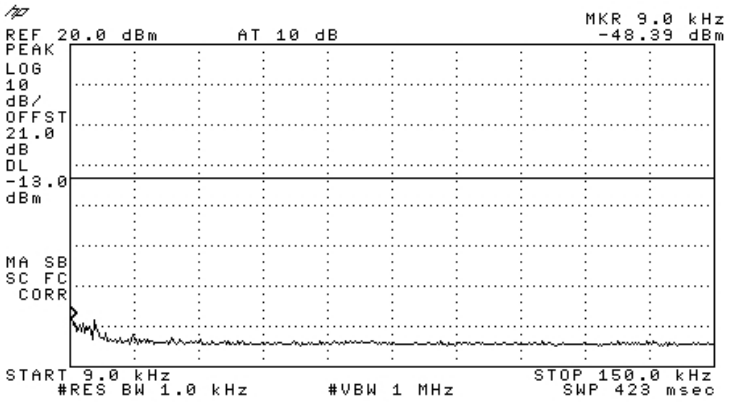


Figure 213.— 2685.00 MHz QPSK

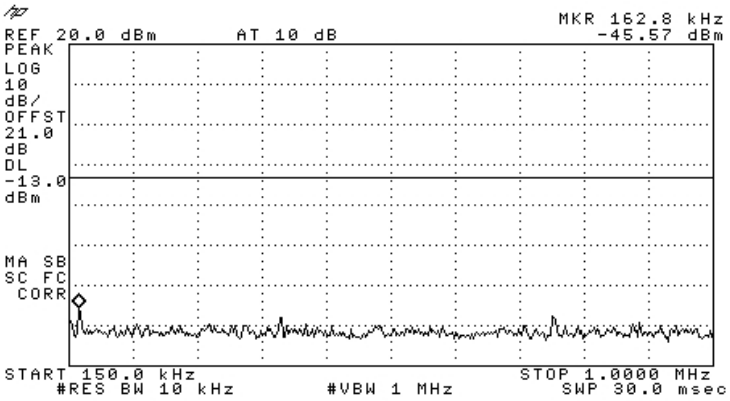


Figure 214.— 2685.00 MHz QPSK

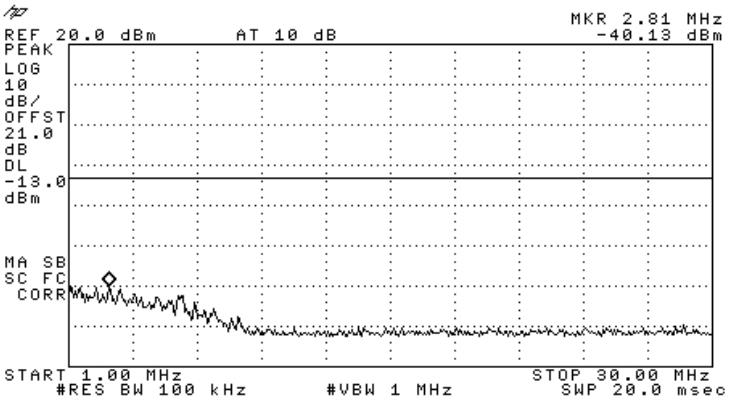


Figure 215.— 2685.00 MHz QPSK

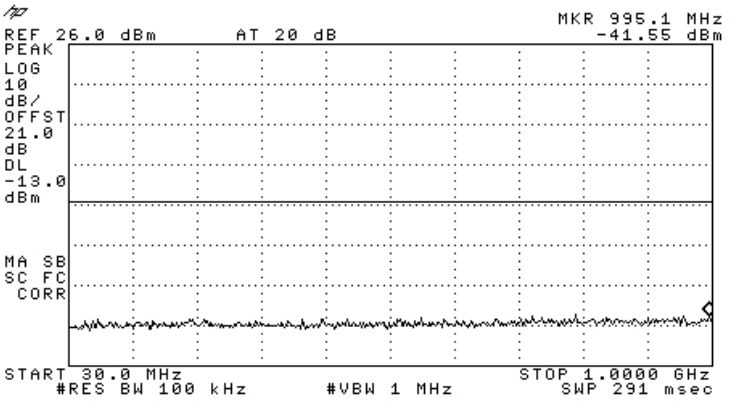


Figure 216.— 2685.00 MHz QPSK

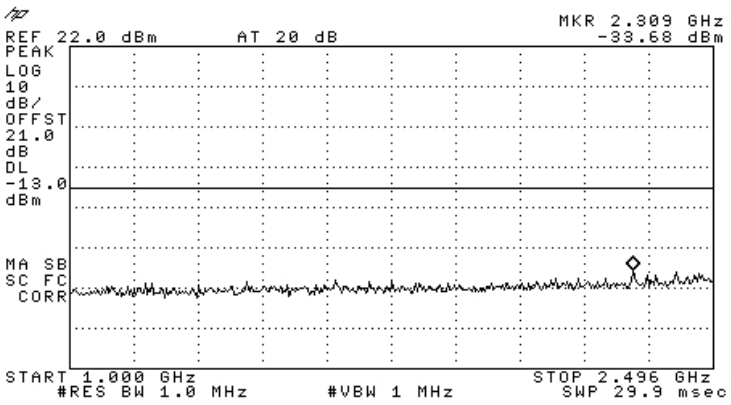


Figure 217.— 2685.00 MHz QPSK

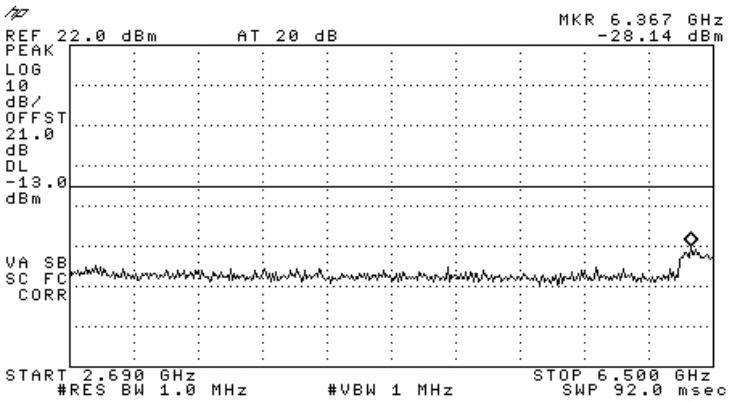


Figure 218.— 2685.00 MHz QPSK

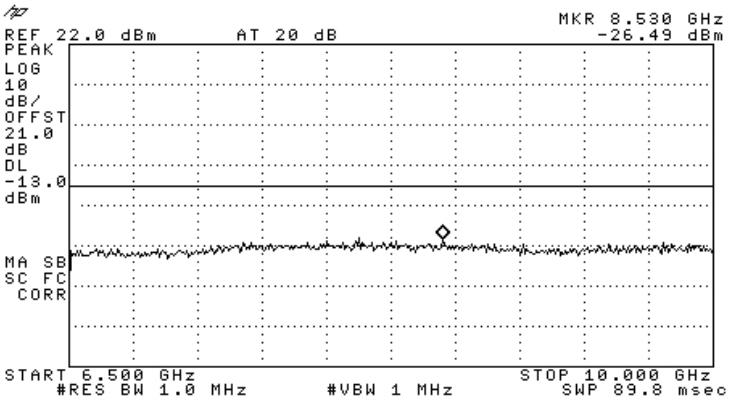


Figure 219.— 2685.00 MHz QPSK

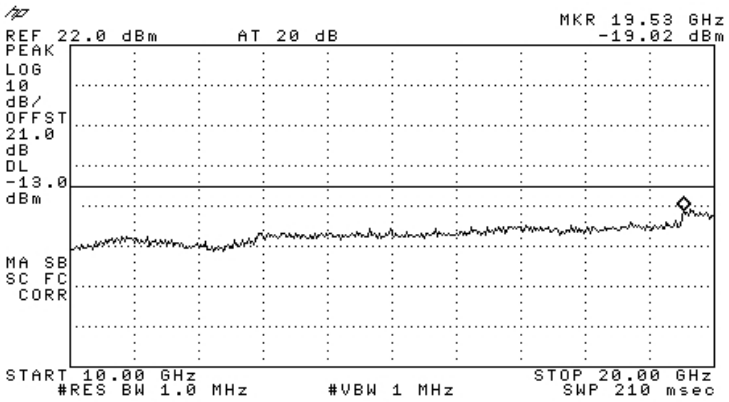


Figure 220.— 2685.00 MHz QPSK

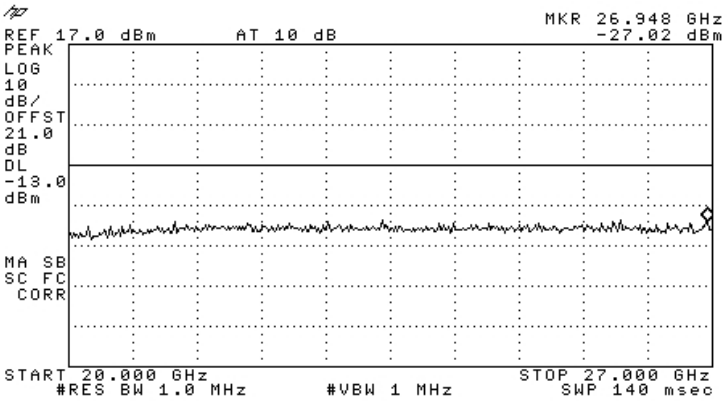


Figure 221.— 2685.00 MHz QPSK

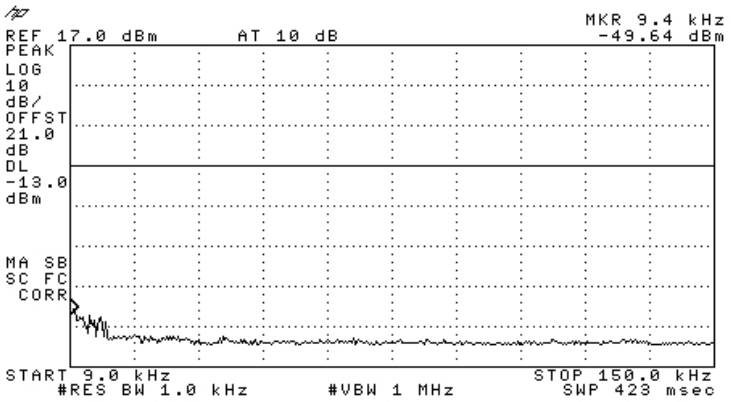


Figure 222.— 2685.00 MHz 16QAM

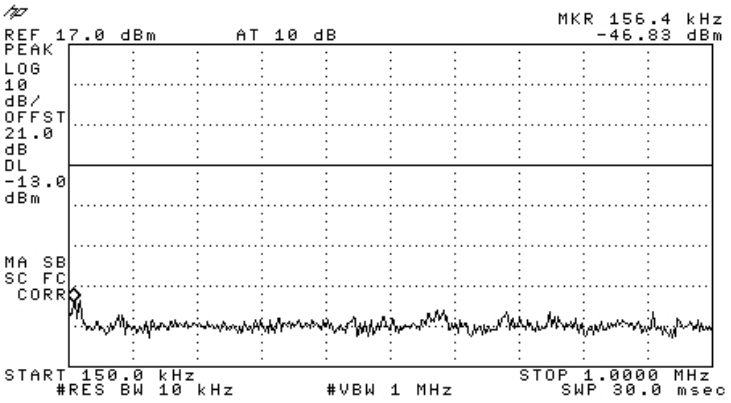


Figure 223.— 2685.00 MHz 16QAM

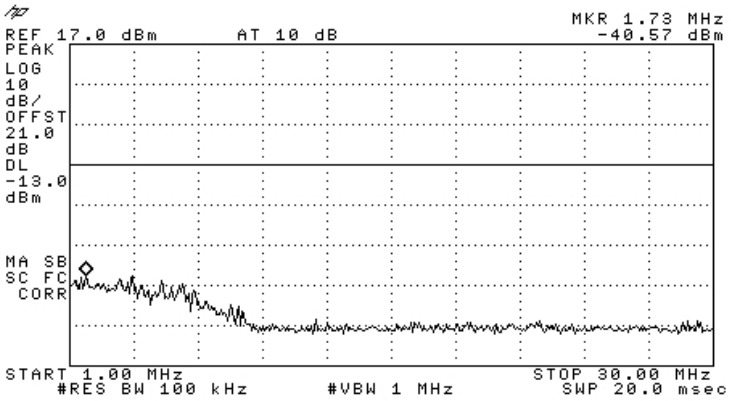


Figure 224.— 2685.00 MHz 16QAM

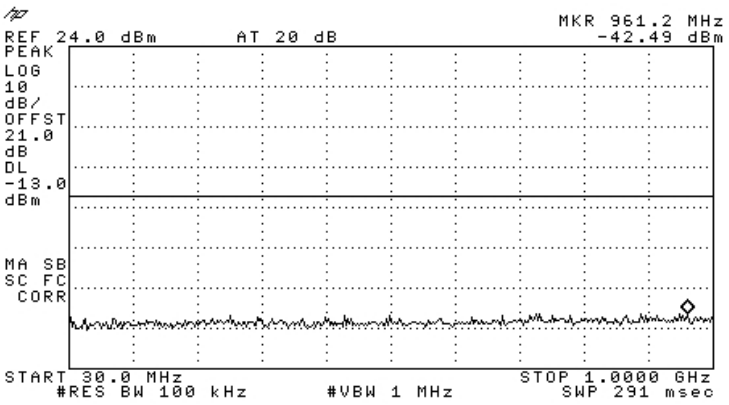


Figure 225.— 2685.00 MHz 16QAM

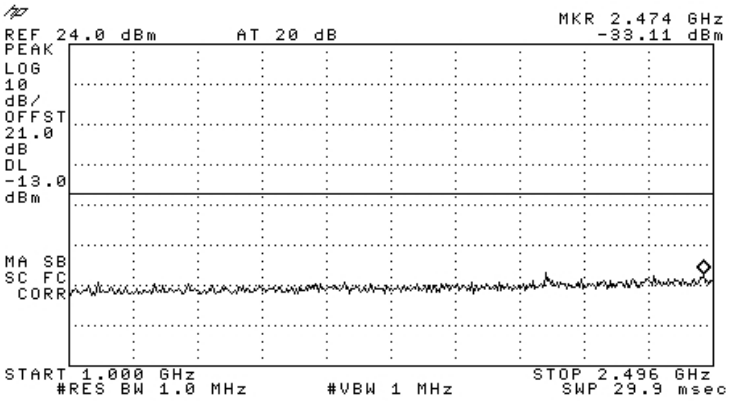


Figure 226.— 2685.00 MHz 16QAM

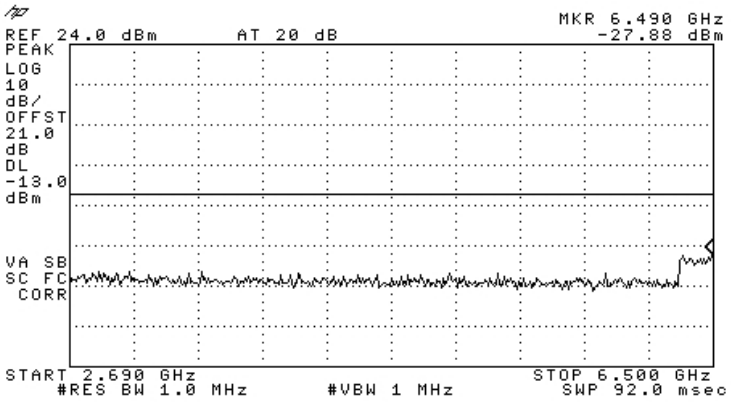


Figure 227.— 2685.00 MHz 16QAM

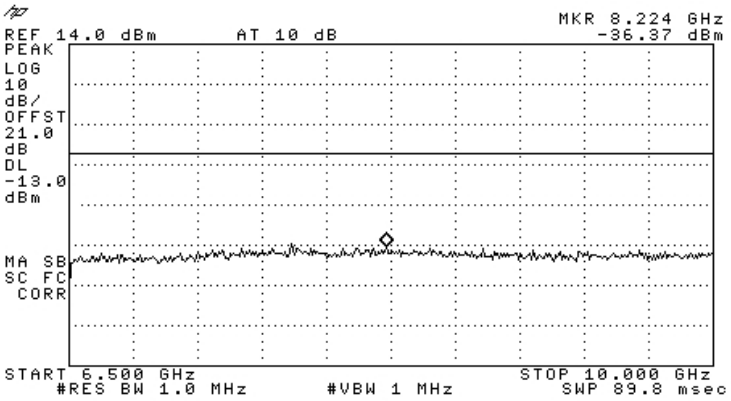


Figure 228.— 2685.00 MHz 16QAM

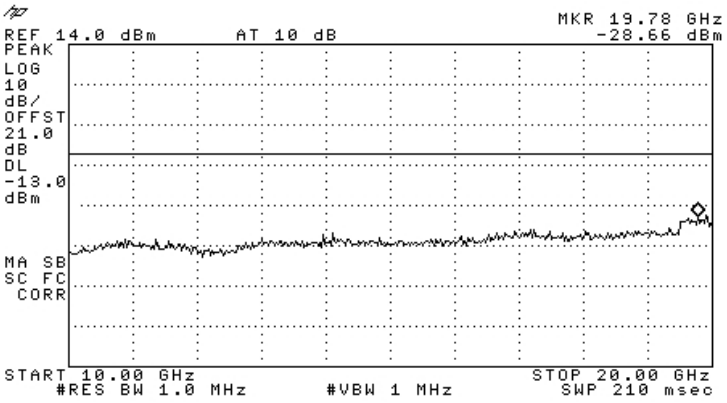


Figure 229.— 2685.00 MHz 16QAM

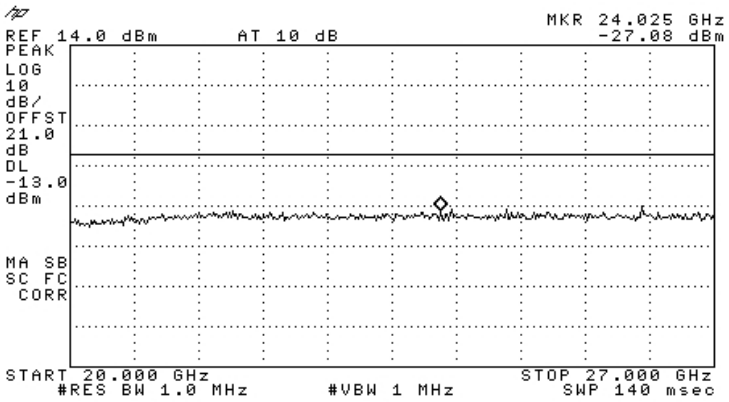


Figure 230.— 2685.00 MHz 16QAM

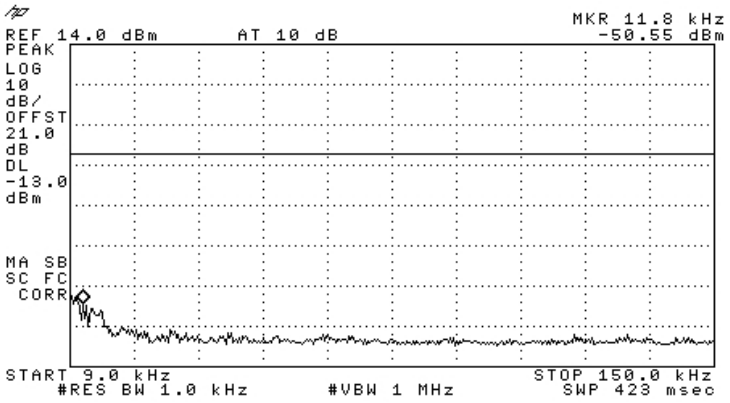


Figure 231.— 2685.00 MHz 64QAM

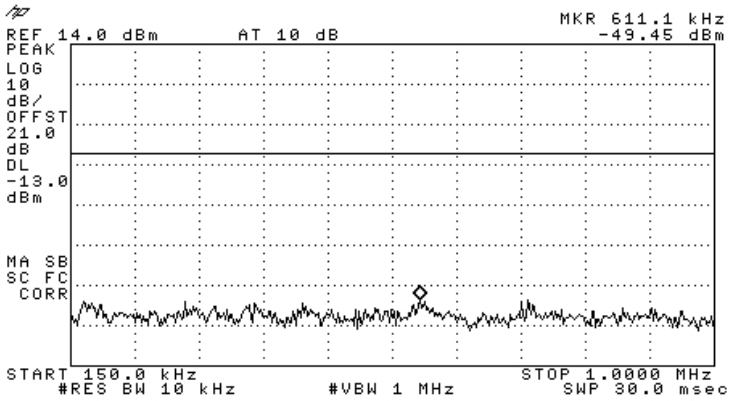


Figure 232.— 2685.00 MHz 64QAM

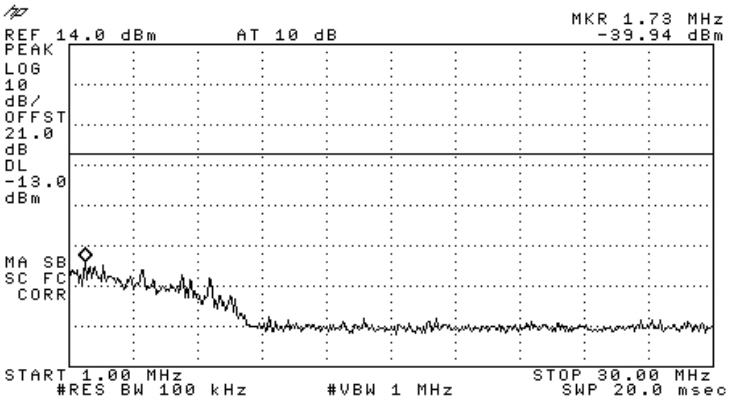


Figure 233.— 2685.00 MHz 64QAM

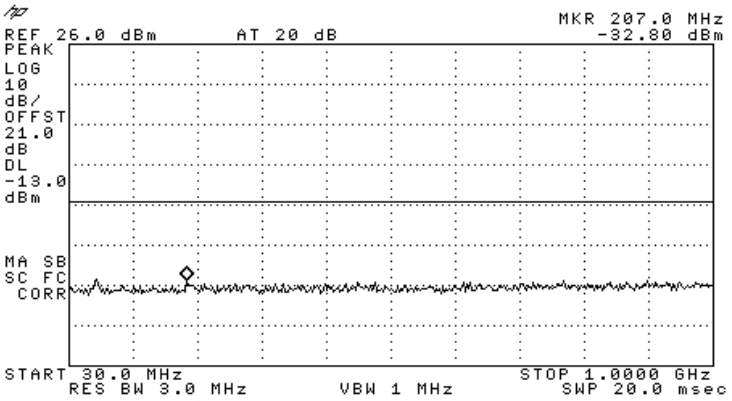


Figure 234.— 2685.00 MHz 64QAM

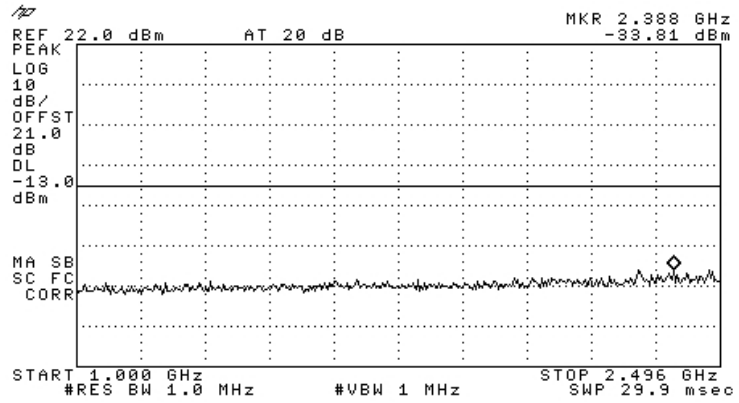


Figure 235.— 2685.00 MHz 64QAM

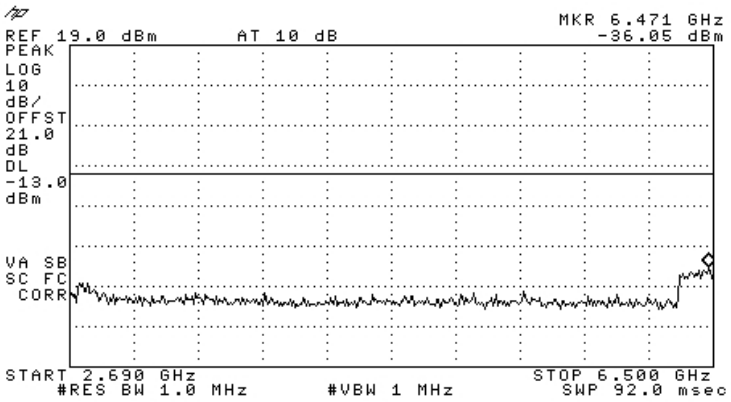


Figure 236.— 2685.00 MHz 64QAM

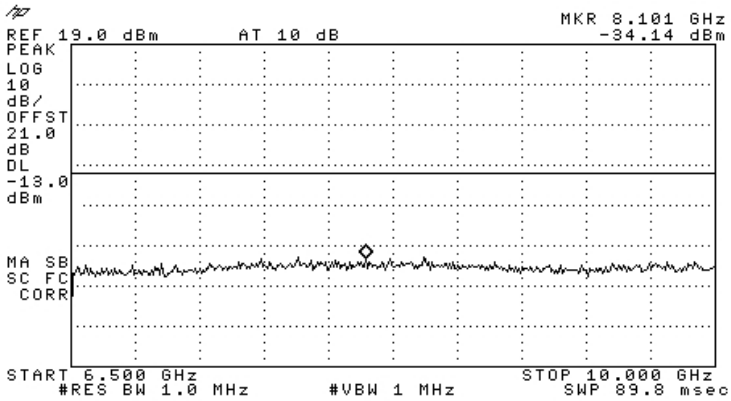


Figure 237.— 2685.00 MHz 64QAM

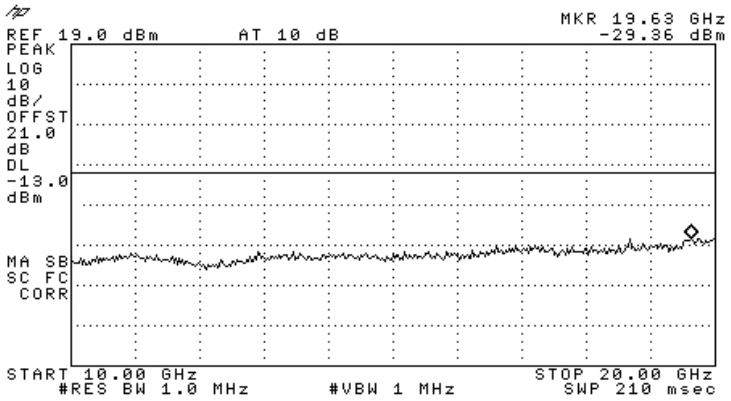


Figure 238.— 2685.00 MHz 64QAM

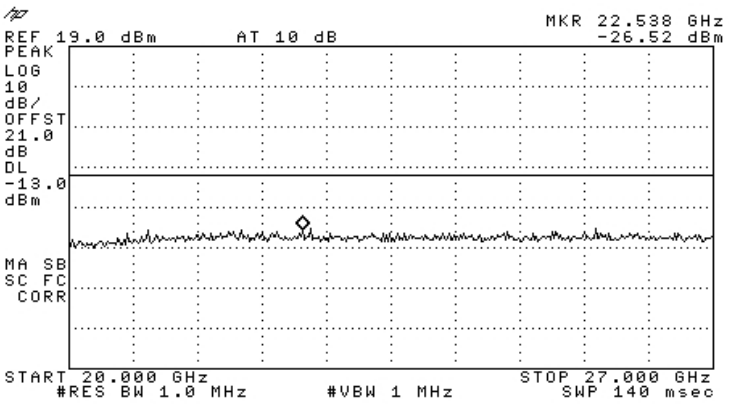


Figure 239.— 2685.00 MHz 64QAM

12.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Serial Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 27, Sub-part C, Section 27.53 (g)

Operation Frequency (MHz)		Reading (dBm)	Specification (dBm)	Margin (dB)
2501.00	QPSK	-15.23	-13.0	-2.23
	16QAM	-26.61	-13.0	-13.61
	64QAM	-18.59	-13.0	-5.59
2596.00	QPSK	-25.68	-13.0	-12.68
	16QAM	-26.75	-13.0	-13.75
	64QAM	-26.51	-13.0	-13.51
2687.50	QPSK	-19.02	-13.0	-6.02
	16QAM	-27.08	-13.0	-14.08
	64QAM	-26.52	-13.0	-13.52

Figure 240 Spurious Emissions at Antenna Terminals Results

JUDGEMENT: Passed by 2.2 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

Typed/Printed Name: A. Sharabi

12.4 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
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1675	October 19, 2009	1 year

Figure 241 Test Equipment Used

13. Band Edge Spectrum
5 MHz Bandwidth

13.1 Test Specification

FCC Part 27, Sub-part C, Section 27.53 (m 4-6)

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 5MHz).

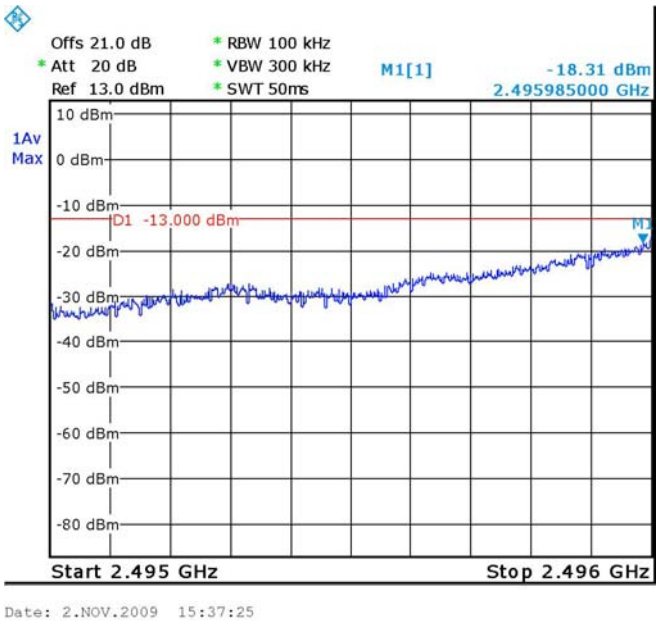


Figure 242.— 2498.5 MHz QPSK

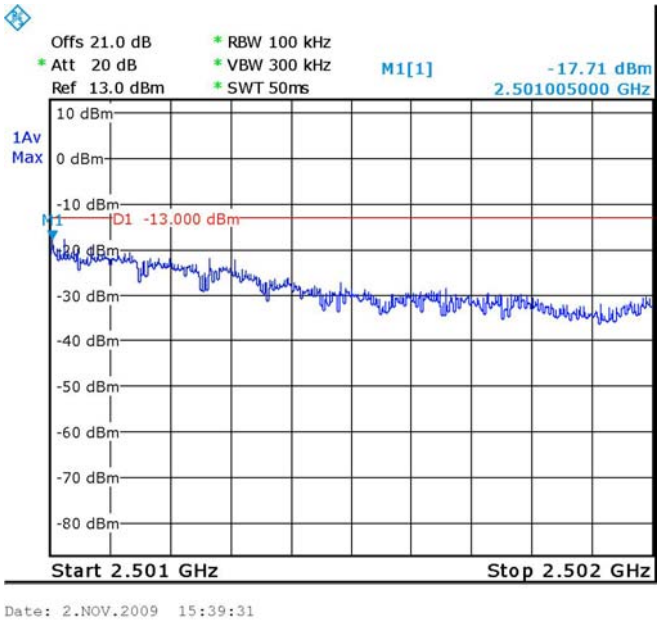


Figure 243.— 2498.50 MHz QPSK

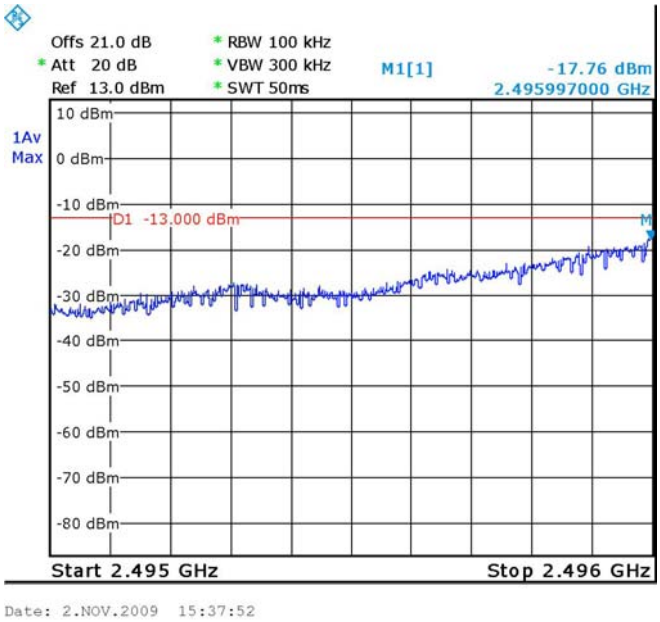


Figure 244.— 2498.50 16QAM

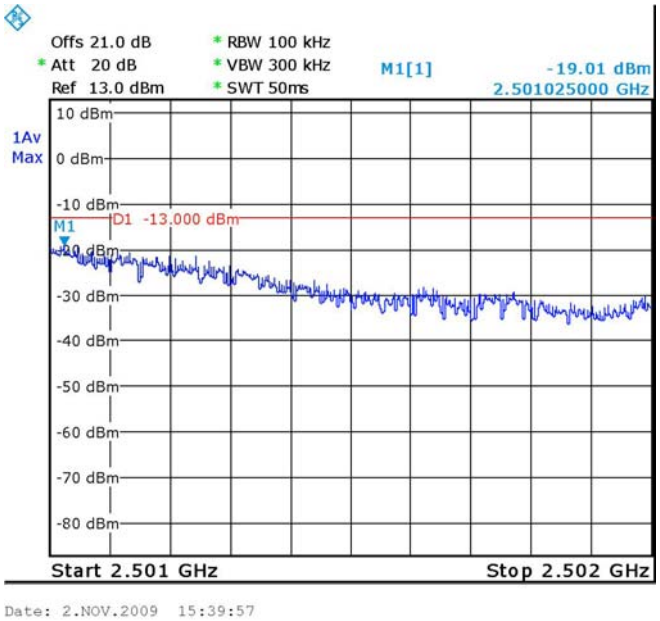


Figure 245.— 2498.50 MHz 16QAM

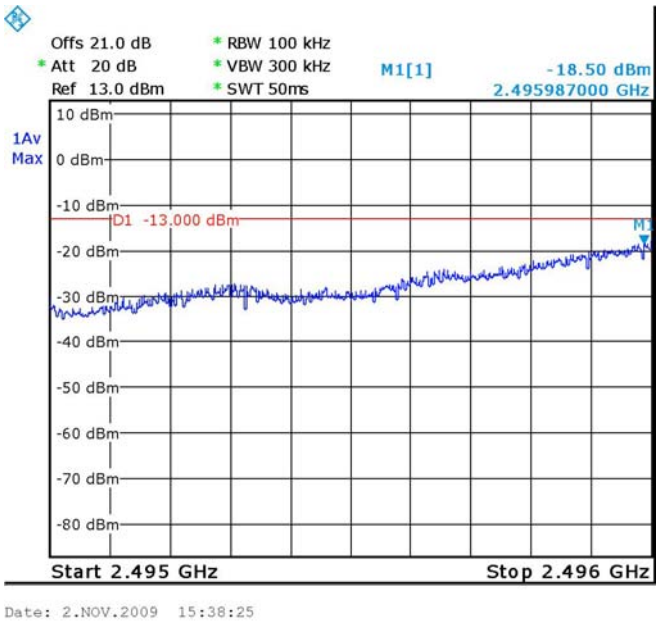


Figure 246.— 2498.50 MHz 64QAM

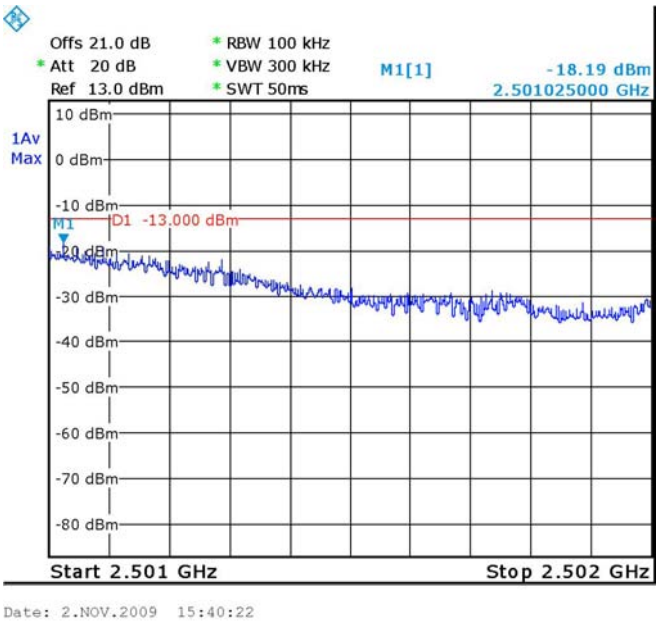


Figure 247.— 2498.50 MHz 64QAM

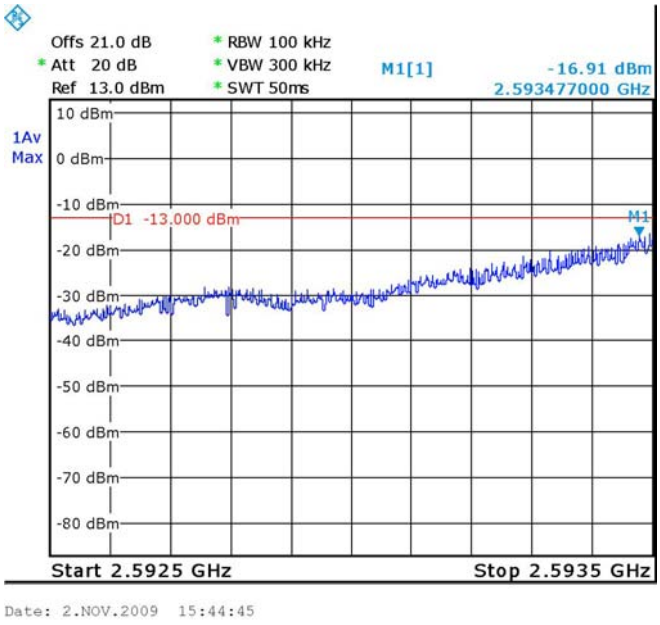


Figure 248.— 2596.00 MHz QPSK

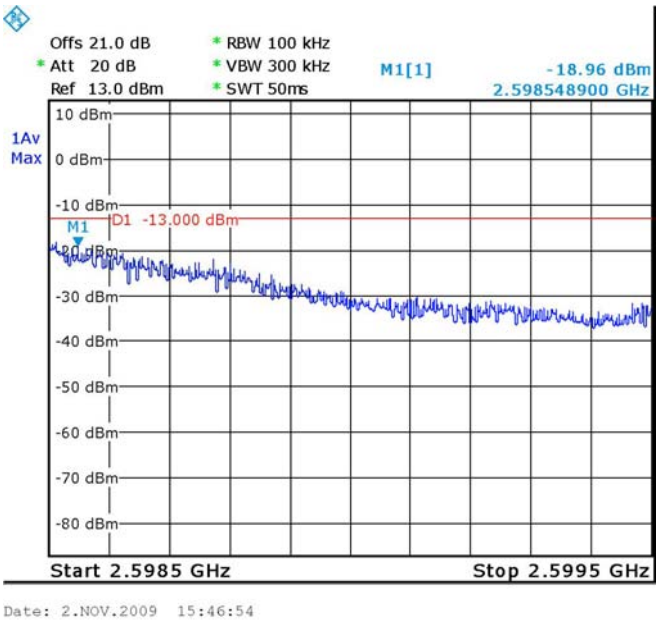


Figure 249.— 2596.00 MHz QPSK

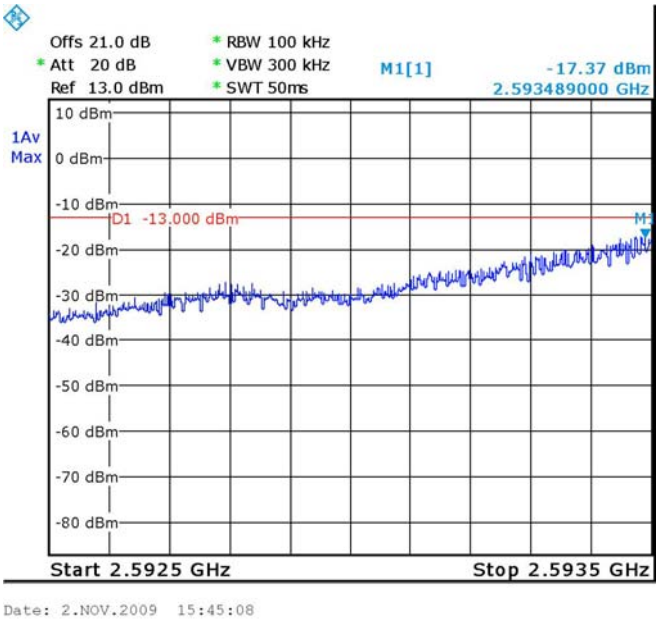


Figure 250.— 2596.00 MHz 16QAM

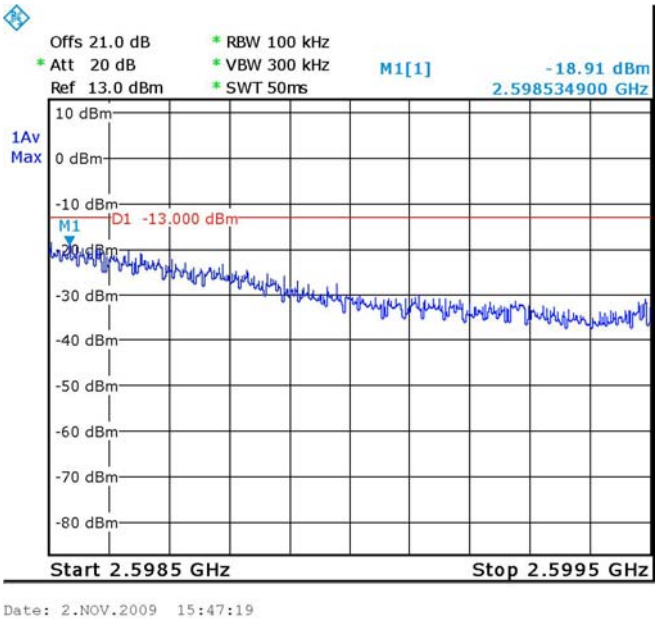


Figure 251.— 2596.00 MHz 16QAM

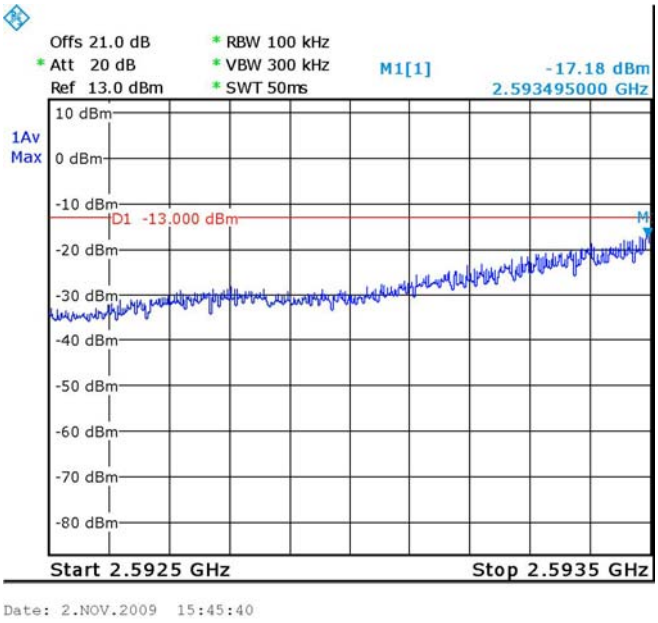


Figure 252.— 2596.00 MHz 64QAM

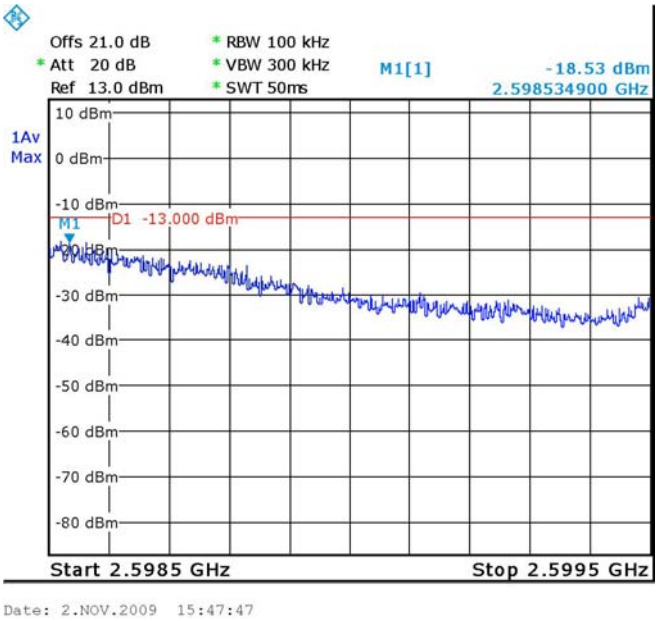


Figure 253.— 2596.00 MHz 64QAM

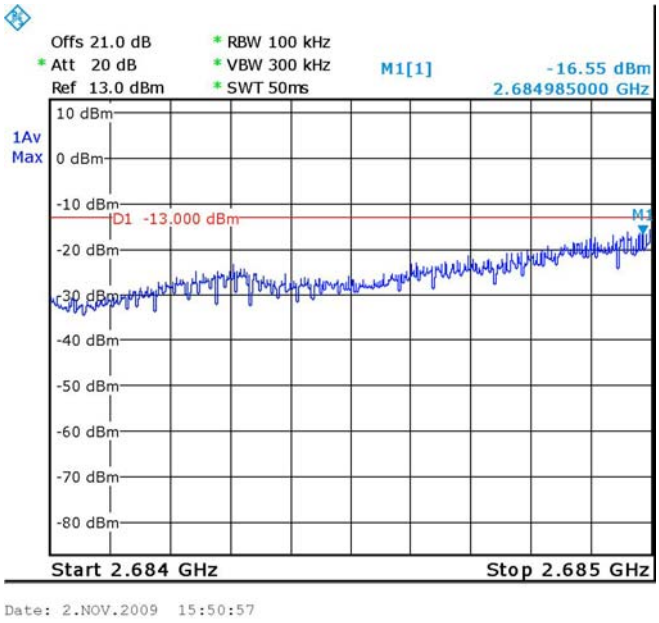


Figure 254.— 2687.50 MHz QPSK

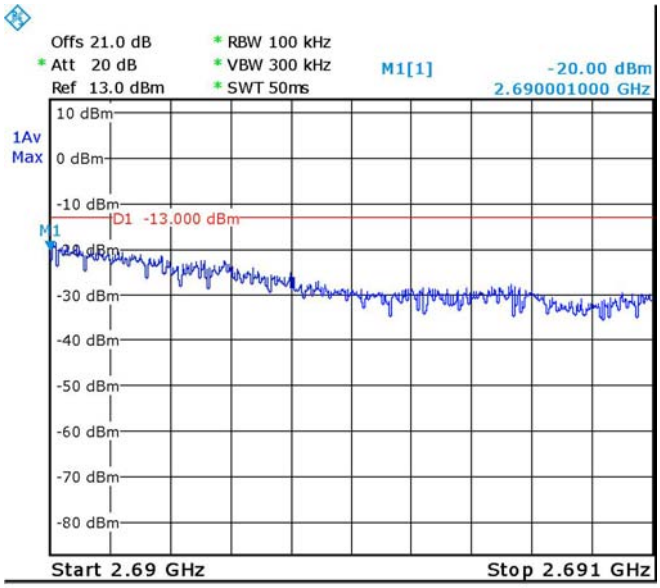


Figure 255.— 2687.50 MHz QPSK

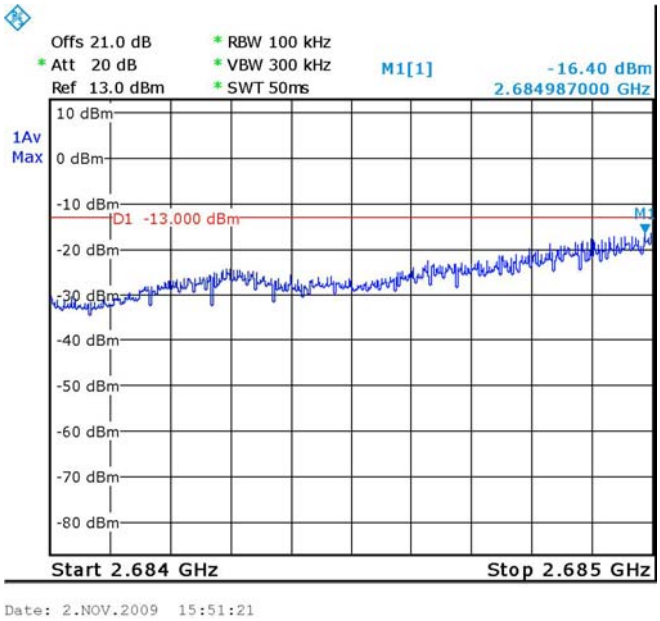


Figure 256.— 2687.50 MHz 16QAM

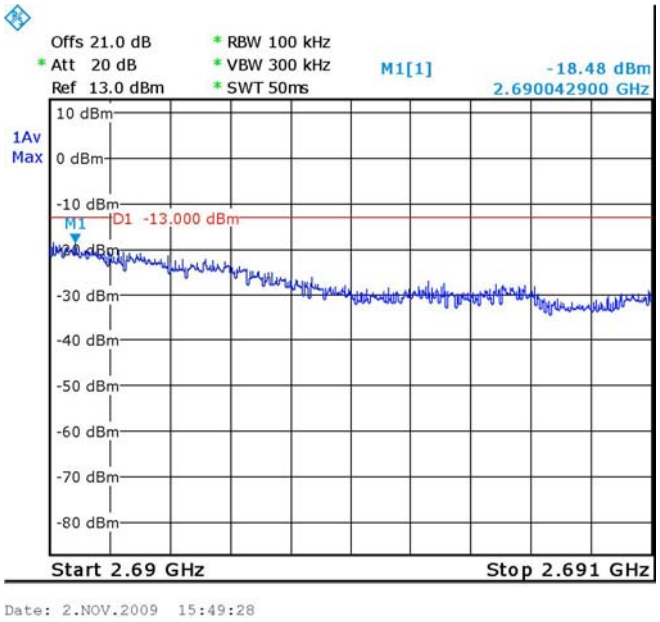


Figure 257.— 2687.50 MHz 16QAM

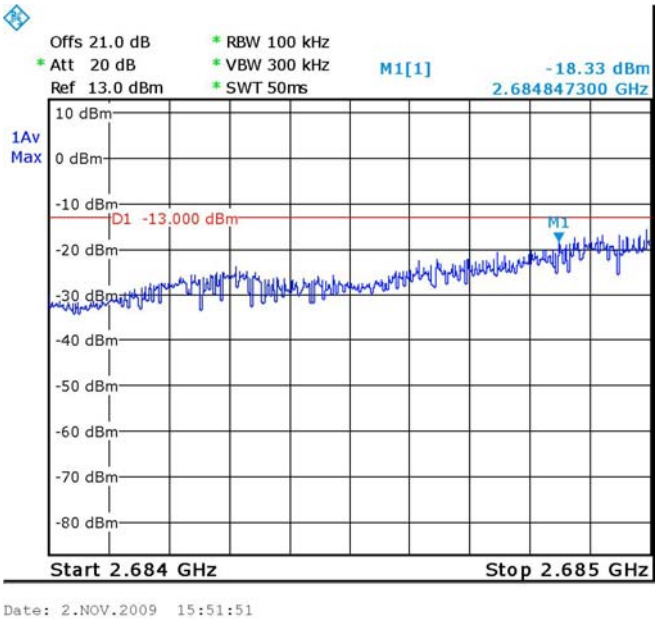


Figure 258.— 2687.50 MHz 64QAM

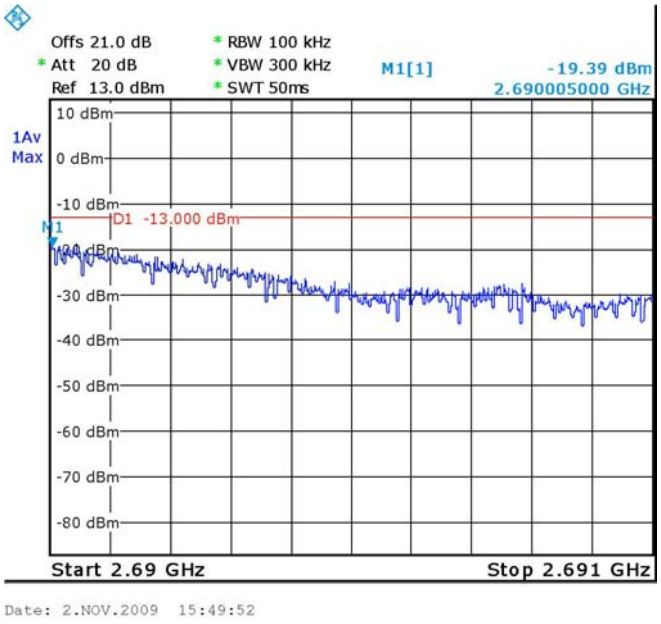


Figure 259.— 2687.50 MHz 64QAM

13.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 27, Sub-part C, Section 27.53 (m 4-6)

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Reading (dBm)	Specification (dBm)
2498.50	QPSK	2495.985	-18.31	-13.0
	QPSK	2501.005	-17.71	-13.0
	16QAM	2495.997	-17.76	-13.0
	16QAM	2501.025	-19.01	-13.0
	64QAM	2495.987	-18.50	-13.0
	64QAM	2501.025	-18.19	-13.0
2596.00	QPSK	2593.477	-16.91	-13.0
	QPSK	2598.548	-18.96	-13.0
	16QAM	2593.489	-17.37	-13.0
	16QAM	2598.534	-18.91	-13.0
	64QAM	2593.495	-17.18	-13.0
	64QAM	2598.534	-18.53	-13.0
2687.50	QPSK	2684.985	-16.55	-13.0
	QPSK	2690.001	-20.00	-13.0
	16QAM	2684.987	-16.40	-13.0
	16QAM	2690.042	-18.48	-13.0
	64QAM	2684.847	-18.33	-13.0
	64QAM	2690.005	-19.39	-13.0

Figure 260 Band Edge Spectrum Results

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

Typed/Printed Name: A. Sharabi

13.4 Test Equipment Used.

Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	RHODE&SCHWARTZ	FSL6	100234	December 01, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 209	1 year

Figure 261 Test Equipment Used

14. Band Edge Spectrum
10 MHz Bandwidth

14.1 Test Specification

FCC Part 27, Sub-part C, Section 27.53 (m 4-6)

14.2 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).

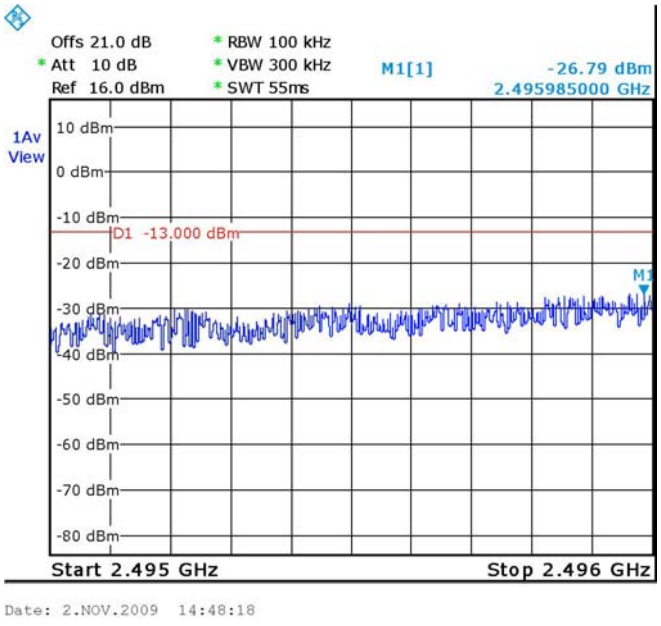


Figure 262.— 2501.00 MHz QPSK

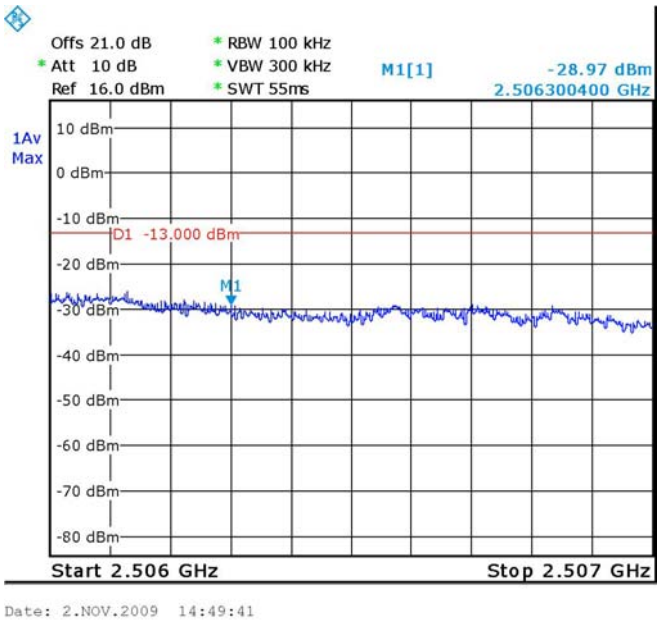


Figure 263.— 2501.00 MHz QPSK

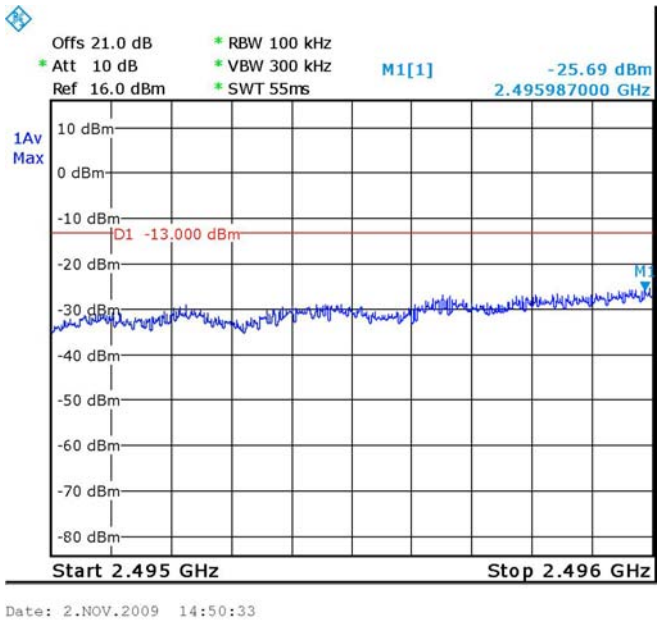


Figure 264.— 2501.00 16QAM

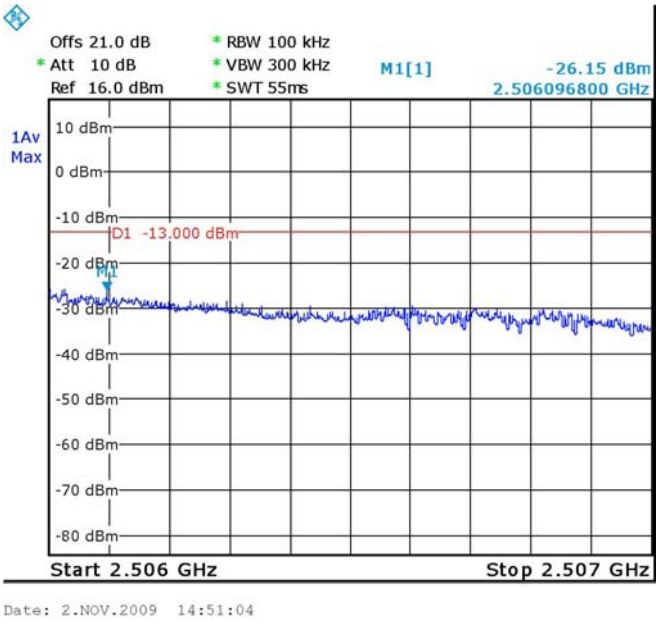


Figure 265.— 2501.00 MHz 16QAm

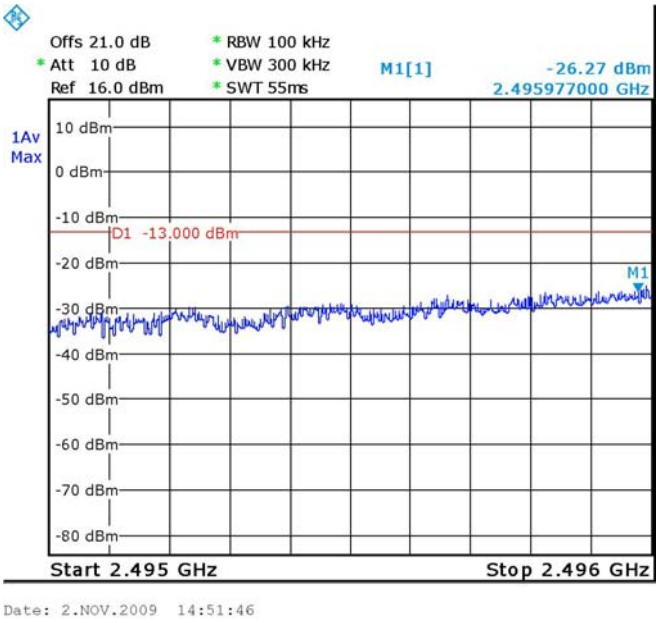


Figure 266.— 2501.00 MHz 64QAm

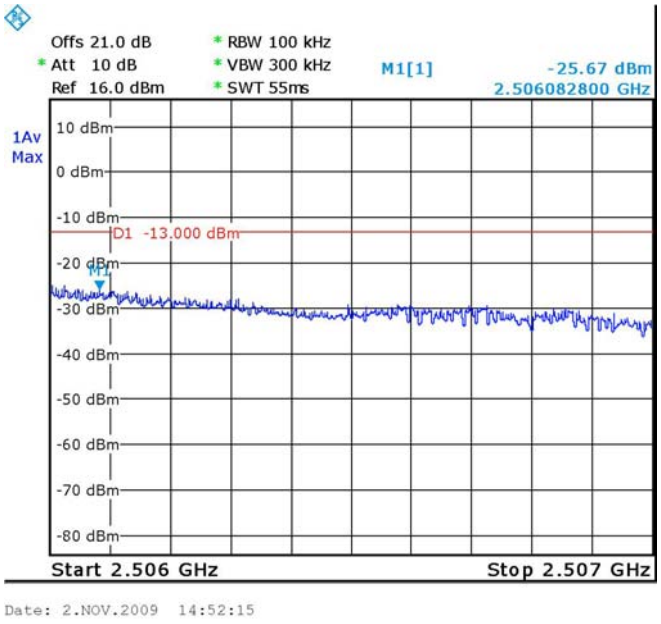


Figure 267.— 2501.00 MHz 64QAM

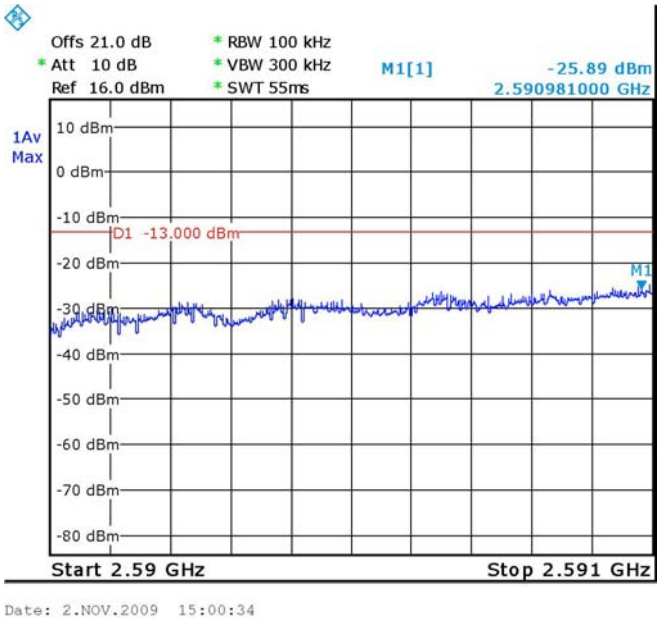


Figure 268.— 2596.00 MHz QPSK

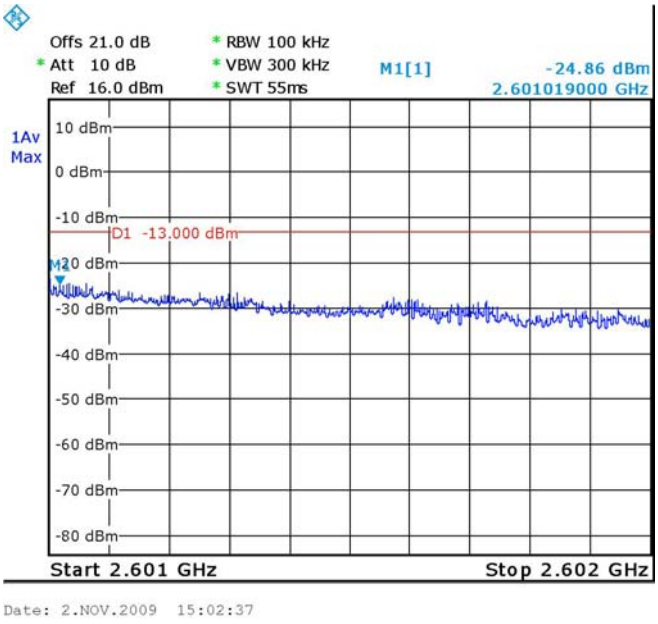


Figure 269.— 2596.00 MHz QPSK

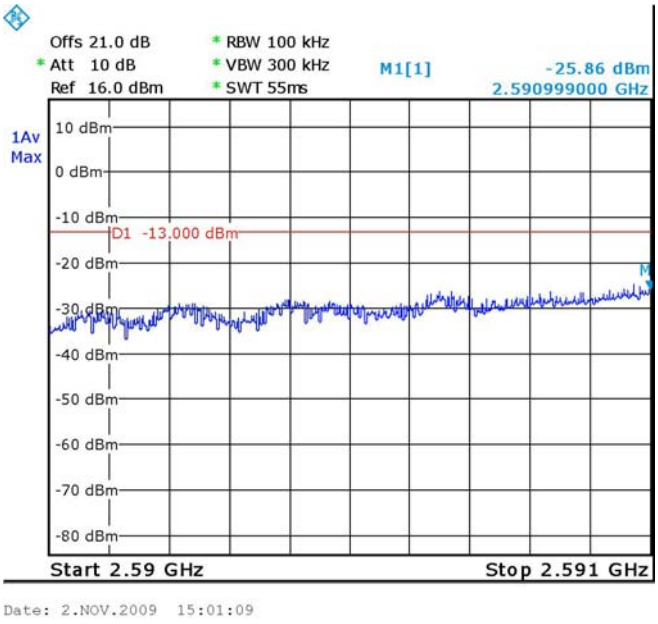


Figure 270.— 2596.00 MHz 16QAM

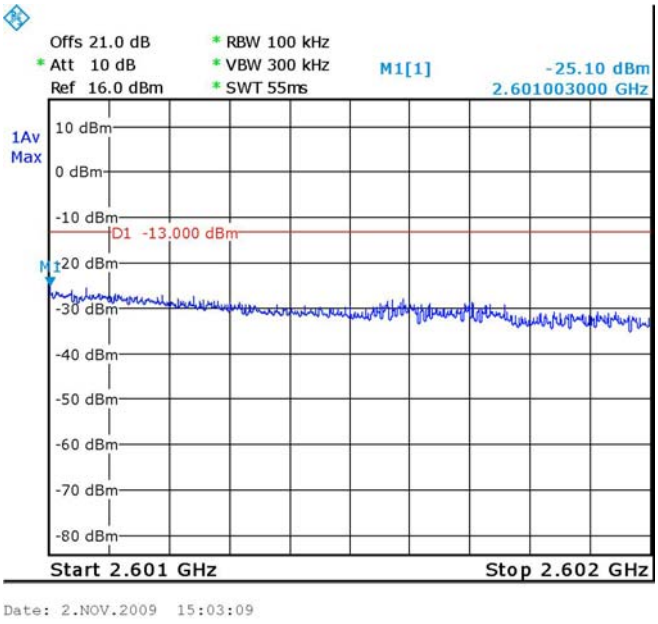


Figure 271.— 2596.00 MHz 16QAM

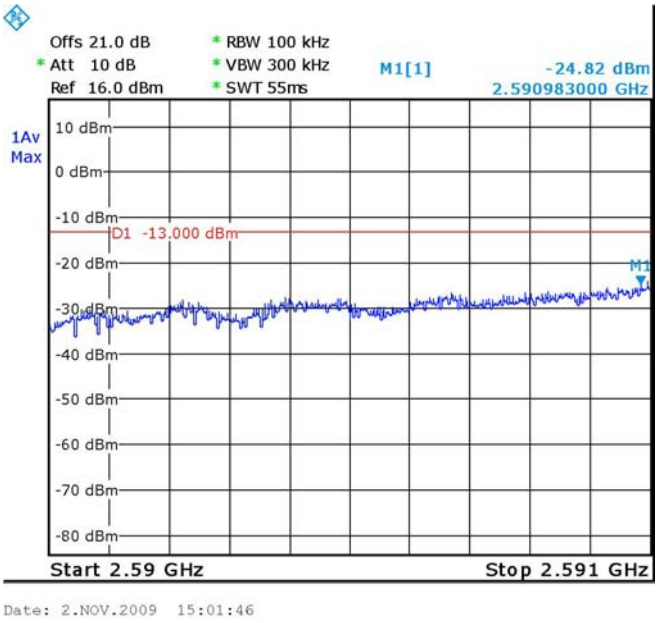


Figure 272.— 2596.00 MHz 64QAM

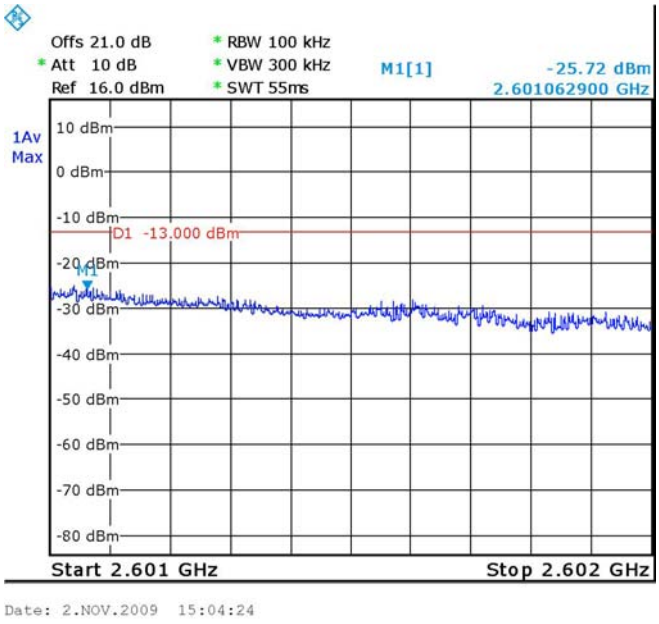


Figure 273.— 2596.00 MHz 64QAM

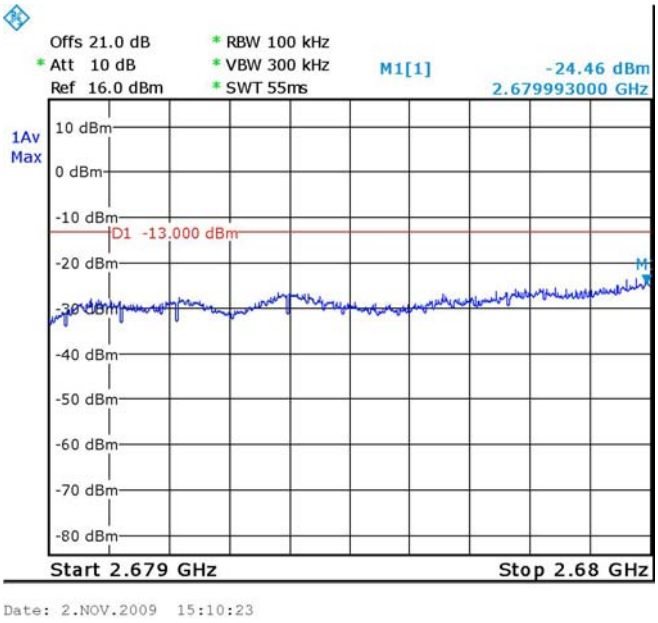


Figure 274.— 2685.00 MHz QPSK

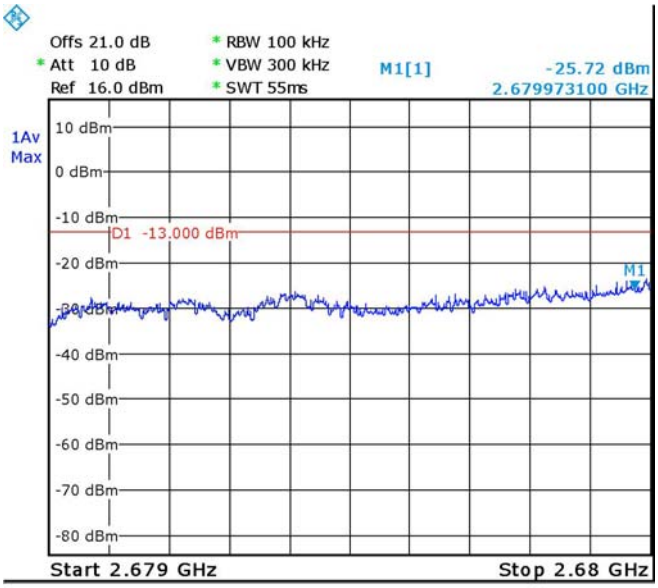


Figure 275.— 2685.00 MHz QPSK

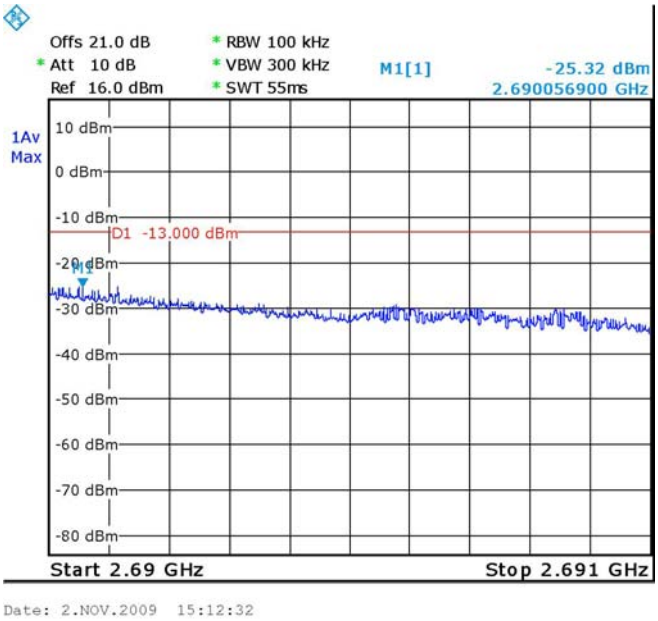


Figure 276.— 2685.00 MHz 16QAM

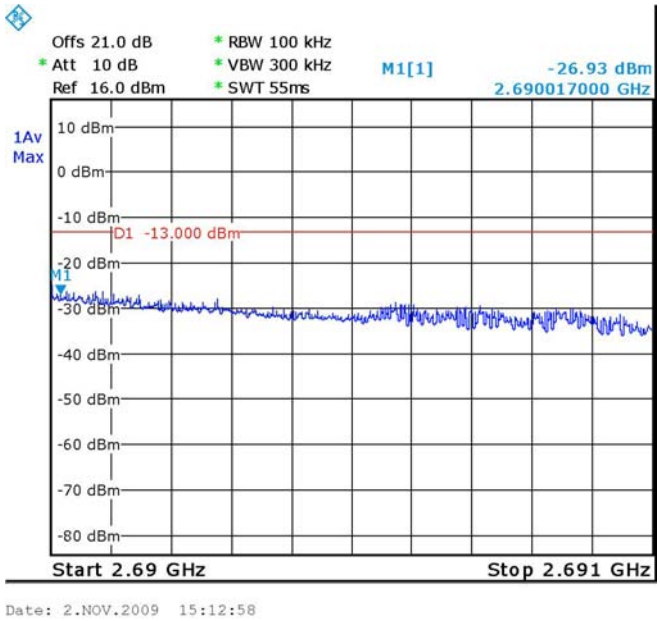


Figure 277.— 2685.00 MHz 16QAM

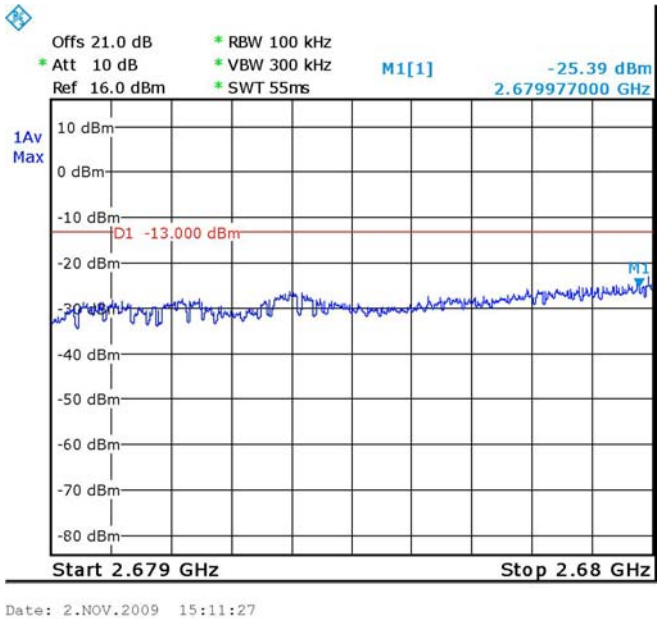


Figure 278.— 2685.00 MHz 64QAM

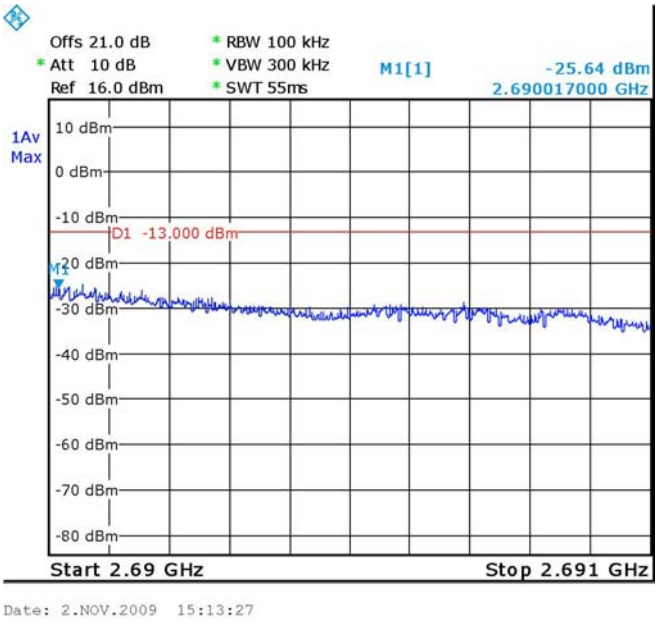


Figure 279.— 2685.00 MHz 64QAM

14.3 Results table

E.U.T. Description: WiMAX Base Station
Model No.: Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC
Specification: FCC Part 27, Sub-part C, Section 27.53 (m 4-6)

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Reading (dBm)	Specification (dBm)
2501.00	QPSK	2495.985	-26.79	-13.0
	QPSK	2506.300	-28.79	-13.0
	16QAM	2495.987	-25.69	-13.0
	16QAM	2506.096	-26.15	-13.0
	64QAM	2495.977	-26.27	-13.0
	64QAM	2506.082	-25.67	-13.0
2596.00	QPSK	2590.981	-25.89	-13.0
	QPSK	2601.019	-24.86	-13.0
	16QAM	2590.999	-25.86	-13.0
	16QAM	2601.003	-25.10	-13.0
	64QAM	2590.983	-24.82	-13.0
	64QAM	2601.062	-25.72	-13.0
	QPSK	2679.993	-24.46	-13.0
	QPSK	2679.973	-25.72	-13.0
	16QAM	2690.056	-25.32	-13.0
	16QAM	2690.017	-26.93	-13.0
	64QAM	2679.977	-25.39	-13.0
	64QAM	2690.017	-25.64	-13.0

Figure 280 Band Edge Spectrum Results

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

Typed/Printed Name: A. Sharabi

14.4 Test Equipment Used.

Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	RHODE&SCHWARTZ	FSL6	100234	December 01, 2008	1 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G2W20	October 19, 2009	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	October 19, 209	1 year

Figure 281 Test Equipment Used

15. Spurious Radiated Emission 5 and 10 MHz Bandwidth

15.1 Test Specification

FCC, Part 27, Sub-part C Section 27.53 (g)

15.2 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 (2489.50-2687.50 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 frequency of 2501.00, 2596.00, and 2685.00 MHz with QPSK, 16QAM, and 64QAM modulations with 5 and 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)
2498.50	4997.00	V	64.0	-33.2	10.0	10.0	-33.2	-13.0	-20.2
2498.50	4997.00	H	57.0	-39.0	10.0	10.0	-39.0	-13.0	-26.0
2596.00	5192.00	V	66.0	-30.3	11.0	10.1	-31.2	-13.0	-18.2
2596.00	5192.00	H	58.3	-36.0	11.0	10.1	-36.9	-13.0	-23.9
2687.5	5375.00	V	60.2	-32.5	12.0	10.2	-34.3	-13.0	-21.3
2687.50	5375.00	H	57.1	-35.4	12.0	10.2	-37.2	-13.0	-24.2

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)
2501.00	5002.00	V	63.0	-32.2	10.0	10.0	-32.2	-13.0	-19.2
2501.00	5002.00	H	56.0	-40.0	10.0	10.0	-40.0	-13.0	-27.0
2596.00	5192.00	V	58.0	-37.3	11.0	10.1	-38.2	-13.0	-25.2
2596.00	5192.00	H	56.3	-38.0	11.0	10.1	-38.9	-13.0	-25.9
2685.00	5370.00	V	59.0	-33.5	12.0	10.2	-35.3	-13.0	-22.3
2685.00	5370.00	H	57.2	-35.4	12.0	10.2	-37.2	-13.0	-24.2

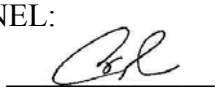
15.3 Test Results

JUDGEMENT: Passed by 18.2 dB (5 MHz Bandwidth)

JUDGEMENT: Passed by 19.2 dB (10 MHz Bandwidth)

The E.U.T met the requirements of the FCC, Part 27, Sub-part C, Section 27.53 (g) specifications.

TEST PERSONNEL:

Tester Signature:  Date: 04.01.10

Typed/Printed Name: A. Sharabi

15.4 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	E4432B ESG-D	GB38450502	August 8, 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

16. Frequency Stability 5 and 10 MHz Bandwidth

16.1 Test Specification

Part 27 Sub-part C Section 27.53

16.2 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 2498.50 and 2687.50 MHz for 5 MHz bandwidth, and 2501.00 and 2685.00 MHz for 10 MHz bandwidth.

16.3 Test Results

The E.U.T met the requirements of Part 27 Sub-part C, Section 27.54 specification.

The details of the results are given in *Figure 282*.

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 04.01.10

Typed/Printed Name: A. Sharabi

Frequency Stability

E.U.T Description WiMAX Base Station
Type Outdoor Pico Base Station 2.5 GHz
Part Number: PICO-O-2.5-C-1W-DC

Specification: FCC Part 27 Sub-part C Section 27.54

		5 MHz Bandwidth		10 MHz Bandwidth	
Temperature (°C)	**Voltage** (VDC)	**Frequency** (MHz)	**Frequency** (MHz)	**Frequency** (MHz)	**Frequency** (MHz)
30	36	2498.50260	2687.50270	2501.00256	2685.0273
	48	2498.50260	2687.50270	2501.00256	2685.0275
	70	2498.50260	2687.50270	2501.00260	2685.00275
-30	48	2498.50413	2687.50415	2501.00363	2685.0385
-20	48	2498.50230	2687.50245	2501.00249	2685.0268
-10	48	2498.50288	2687.50305	2501.00280	2685.00293
0	48	2498.50270	2687.50293	2501.00258	2685.00285
+10	48	2498.50270	2687.50293	2501.00255	2685.00280
+20	48	2498.50255	2687.50275	2501.00260	2685.0285
+40	48	2498.50203	2687.50203	2501.00198	2685.00213
+50	48	2498.50178	2687.50190	2501.00178	2685.00195

Figure 282. Frequency Stability

16.4 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

17. APPENDIX A - CORRECTION FACTORS

17.1 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".

17.2 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.

17.3 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.

17.4 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".

17.5 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			

17.6 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

17.7 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