HCT CO.,LTD

HCT CO., LTD.

Product Compliance Division

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CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:

Juni Korea Co., Ltd.

Address:

E-603 Bundang Techno-park 151 Yatap-Dong,
Bundang-Gu, Seongnam-Si, Gyeonggi-Do, 463-760
South Korea

Date of Issue:
March 16, 2011

Location:

HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea(Lab)

Test Report No.: HCTR1102FR02-2

HCT FRN: 0005866421

FCC ID	**: YULJFW600**
APPLICANT	**: Juni Korea Co.,Ltd.**

Model(s):	JFW-600
EUT Type:	WiMAX Femto
Tx Frequency:	2 508.5 MHz ~ 2 684 MHz
Rx Frequency:	2 508.5 MHz ~ 2 684 MHz
Max. Conducted Power:	PATH1: 0.161 W (22.08 dBm) (64QAM) PATH2: 0.163 W (22.13 dBm) (16QAM) Combine : 0.325 W (25.20 dBm) (64QAM)
Emission Designator(s):	9M11G7D(QPSK), 9M12W7D(16QAM/64QAM)
FCC Classification:	Licensed Non-Broadcast Transmitter (TNB)
FCC Rule Part(s):	§27, §2

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Jae Chul Shin

Report prepared by
: Jae Chul Shin
Test engineer of RF Team

Chang Seok Choi

Approved by
: Chang Seok Choi
Manager of RF Team

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1102FR02	February 11, 2011	First Approval Report
HCTR1102FR02-1	February 17, 2011	Change the Emission Designator. (9M58W7D -> 9M12W7D) Change section 7.2 Occupied Bandwidth data on page 18 section (9.5830 -> 9.0583)
HCTR1102FR02-1	March 16, 2011	Change the Applicant Address
	March 28, 2011	Change the LIST OF TEST EQUIPMENT

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	Juni Korea Co.,Ltd.
Address:	E-603 Bundang Techno-Park 151 Yatap-Dong, Bundang-Gu, Seongnam-Si,Gyeonggi-Do, 467-760, South Korea
FCC ID:	YULJFW600
Application Type:	Certification
FCC Classification:	Licensed Non-Broadcast Transmitter (TNB)
FCC Rule Part(s):	§27, §2
EUT Type:	WiMAX Femto
Model(s):	JFW-600
Tx Frequency:	2 508.5 MHz ~ 2 684 MHz
Rx Frequency:	2 508.5 MHz ~ 2 684 MHz
Max. Conducted Power:	PATH1: 64QAM - 0.161 W (22.08 dBm) PATH2: 16QAM - 0.163 W (22.13 dBm) Combine : 64QAM - 0.325 W (25.20 dBm)
Emission Designator(s):	9M11G7D(QPSK), 9M12W7D(16QAM/64QAM)
Date(s) of Tests:	January 20, 2011 ~ February 9, 2011

2. INTRODUCTION

2.1. EUT DESCRIPTION

The Juni WiMAX Enterprise FemtoMax, JFW-600 is an integrated WiMAX backhauled WiMAX FemtoMax, Wi-Fi access point (802.11 b/g/n), and Ethernet router.

As JFW-600 can provide mobile WiMAX access and WiFi access, ideal applications for this product are hotspot applications such as coffee shops and hotels, enterprise internet access and indoor coverage, and campus coverage solutions.

With MIMO technology and an open R6 Profile Interface, the JFW-600 allows easy installation and operation providing upto 25dBm of output power (22dBm x 2 MIMO).

This User Manual outlines the specifications and the operation for the Juni JFW-600 WiMAX Enterprise FemtoMax™, hereon referred to as JFW-600.

The JFW-600 has been designed to operate in the Mobile WiMAX network using TDD (Time Division Duplexing) technology.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri , Majang-Myeon, Icheon-si, 467-811, KOREA.

The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated June 10, 2009 (Registration Number: 90661)

3. DESCRIPTION OF TESTS

3.1 EQUIVALENT ISOTROPIC RADIATED POWER

3.1.1 APPLICABLE STANDARD

According to FCC §2.1046 & 27.5(h)

1) Main, booster and base stations. (i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

3.1.2 TEST PROCEDURE

Radiated emission measurements were performed at an SAC(Semi-Anechoic Chamber)

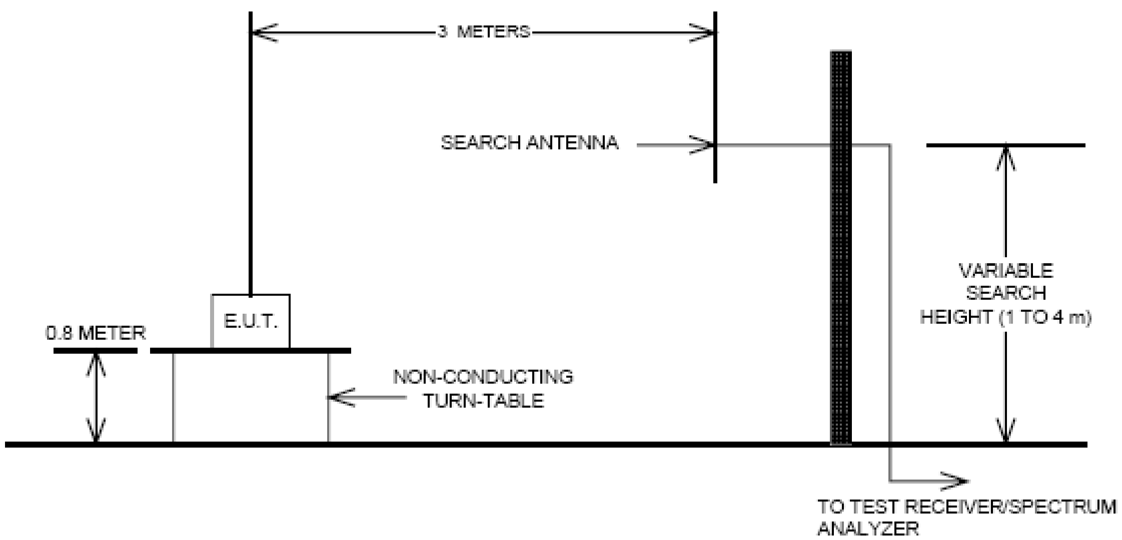
The equipment under test is placed on a non-conductive Styrofoam resin table 3-meters from the receive antenna. A Styrofoam turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

3.1.3 ENVIRONMENTAL CONDITIONS

Temperature:	25 °C
Relative Humidity:	66 %

3.1.4 TEST Set-up



3.2 CONDUCTED OUTPUT POWER

3.2.1 TEST PROCEDURE

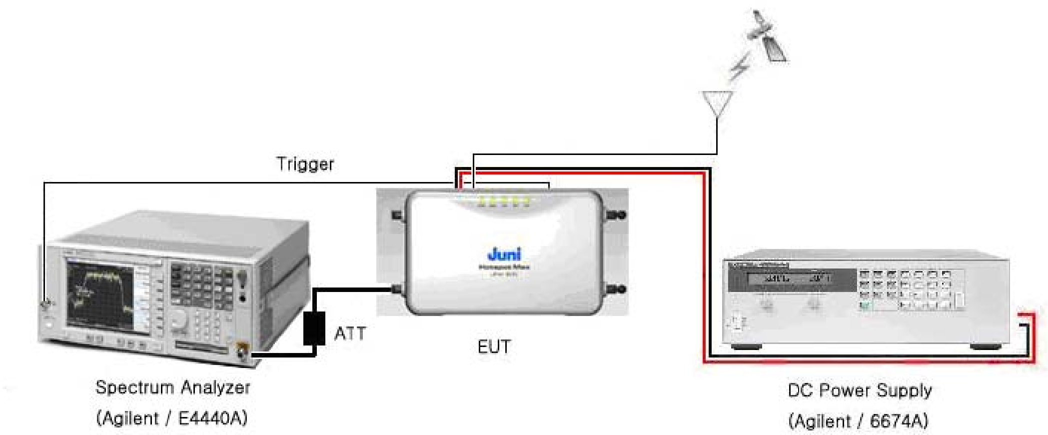
According to FCC §2.1046 (c), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

1) The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2) The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The lost of the cables the test system is calibrated to correct the reading.
3) The spectrum analyzer was set to RMS Detector function and Average mode.
4) The resolution bandwidth of the spectrum analyzer was comparable to the emission bandwidth.

3.2.2 ENVIRONMENTAL CONDITIONS

Temperature:	27 °C
Relative Humidity:	67 %

3.2.3 TEST SET-UP



3.3 OCCUPIED BANDWIDTH

3.3.1 APPLICABLE STANDARD

Requirements: CFR 47, Section 27.53(m)(6) Measurement procedure.

Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

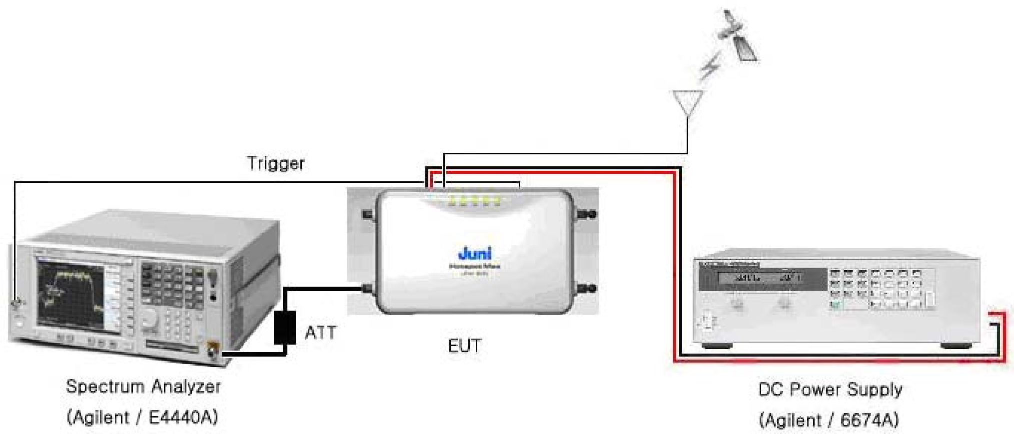
3.3.2 TEST PROCEDURE

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

3.3.3 ENVIRONMENTAL CONDITIONS

Temperature:	25 °C
Relative Humidity:	59 %

3.3.4 TEST SET-UP



3.4 BAND EDGES

3.4.1 APPLICABLE STANDARD

According to §27.53(m), 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 + 10 log (p) dB.

3.4.2 TEST PROCEDURE

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.

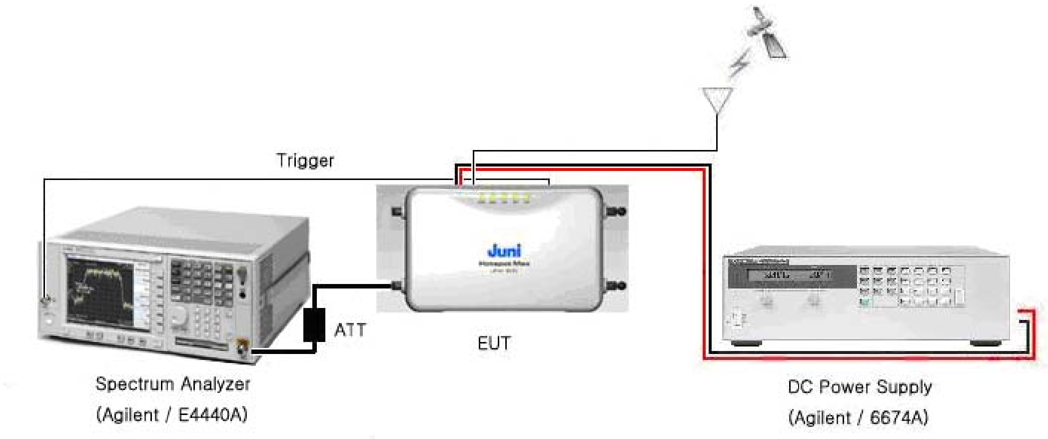
The EUT provides the MIMO function which is able to transmit on the same channel with same data simultaneously therefore a combiner is used to sum the individual transmitter output power.

The test data is shown as a combined output in the report.

3.4.3 ENVIRONMENTAL CONDITIONS

Temperature:	25 °C
Relative Humidity:	56 %

3.4.4 TEST SET-UP



3.5 SPURIOUS AD HARNONIC EMISSIONS AT ANTENNA TERMINAL.

3.5.1 APPLICABLE STANDARD

CFR 47§2.1051, §27.53

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in §2.1051

3.5.2 TEST PROCEDURE

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

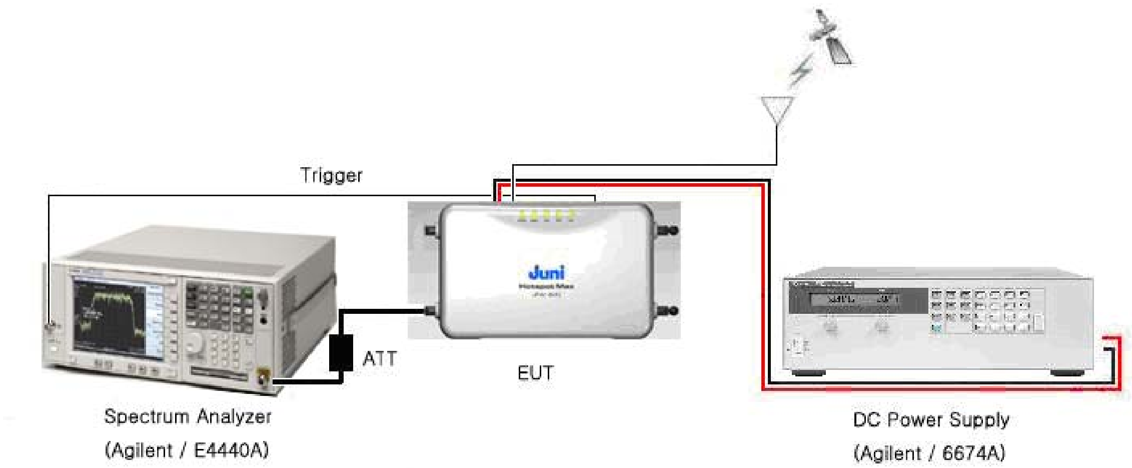
The EUT provides the MIMO function which is able to transmit on the same channel with same data simultaneously therefore a combiner is used to sum the individual transmitter output power.

The test data is shown as a combined output in the report.

3.5.3 ENVIRONMENTAL CONDITIONS

Temperature:	25 °C
Relative Humidity:	66 %

3.5.4 TEST SET-UP



3.6 RADIATED SPURIOUS AND HARMONIC EMISSIONS

3.6.1 APPLICABLE STANDARD

Requirements: CFR 47, §2.1053 (a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

3.6.2 TEST PROCEDURE

Radiated emission measurements were performed at an Semi-Anechoic Site.

The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 3600 and the receiving antenna scanned from 1-4m in order to capture the maximum emission.

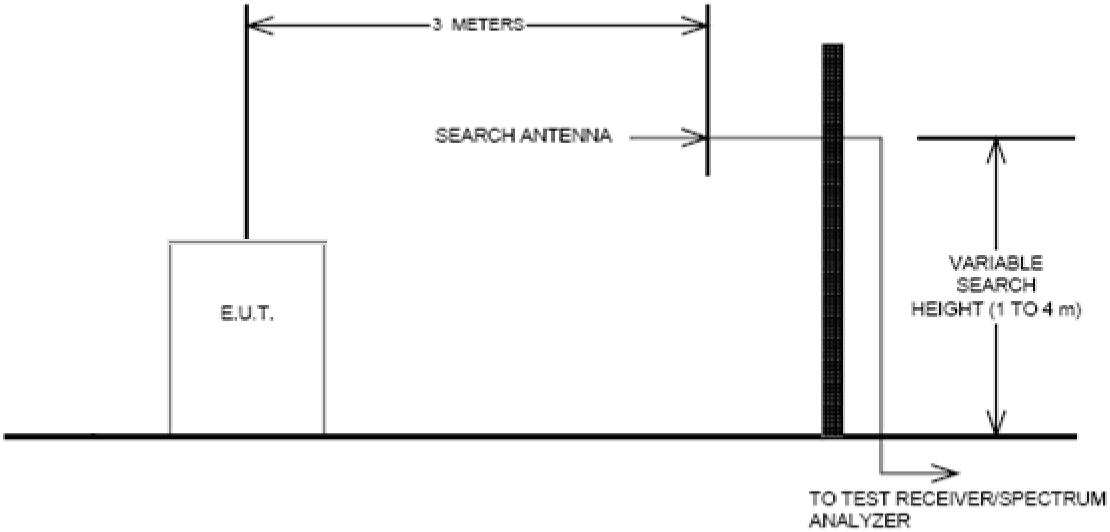
A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated.

The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10th or 40GHz, whichever was the lesser, were investigated.

3.6.3 ENVIRONMENTAL CONDITIONS

Temperature:	26 °C
Relative Humidity:	60 %

3.6.4 TEST SET-UP



The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section § 2.948. The SAC(Semi-Anechoic Chamber) meets requirements in ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotatable Styrofoam platform mounted at three from the antenna mast.

1) The unit mounted on a Styrofoam turntable 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
2) During the emission test, the turntable is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
4) The spectrum shall be scanned up to the 10^{th} harmonic of the fundamental frequency.

3.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

3.7.1 APPLICABLE STANDARD

Requirements: FCC § 2.1055 (a), Part27.54 following: The frequency stability shall be sufficient to ensure that the fundamental emissions stay

3.7.2 TEST PROCEDURE

Frequency Stability over Temperature variation:

The equipment under test was connected to an external AC-DC power supply and the RF output was connected to a Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 30 minutes, the frequency output was recorded from the VSA8960 S/W via MXA Signal Analyzer.

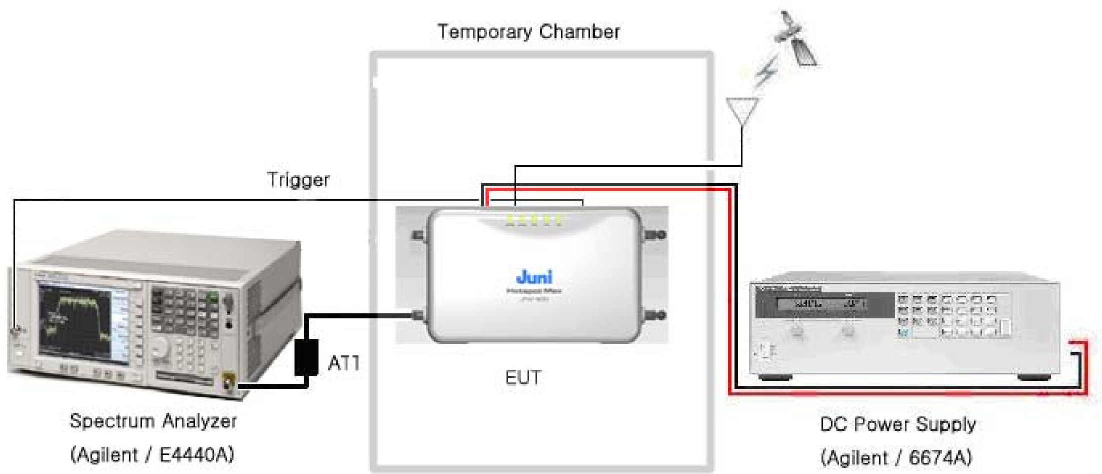
Frequency stability over Voltage variation:

An external variable AC-DC power supply Source. The voltage was set to 85% and 115% of the nominal value. The output frequency was recorded for each voltage.

3.7.3 ENVIRONMENTAL CONDITIONS

Temperature:	24 ° C
Relative Humidity:	58 %

3.7.4 TEST SET-UP



4. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	07/15/2012	9160-3150
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	Annual	09/29/2011	10094
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	09/23/2011	296
Korea Engineering	KR-1005L / Chamber	Annual	12/28/2011	KRAB07063-2CH
Rohde & Schwarz	FSP30 / Spectrum Analyzer	Annual	03/23/2012	839117/011
Agilent	E4440A / Spectrum Analyzer	Annual	06/09/2011	US45303008
Agilent	N9020A / MXA Signal Analyzer	Annual	03/03/2012	US46220219
Agilent	E4416A /Power Meter	Annual	01/04/2012	GB41291412
Agilent	E9327A /POWER SENSOR	Annual	07/23/2011	MY4442009
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	06/25/2011	1
Hewlett Packard	11636B/Power Divider	Annual	12/29/2011	11377
Hewlett Packard	11667B / Power Spliter	Annual	11/08/2011	10126
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	01/04/2012	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	12/01/2011	010002156287001199
EMCO	6502.LOOP ANTENNA	Biennial	01/13/2012	9009-2536

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049, 27.53(m)	Occupied Bandwidth	N/A	CONDUCTED	PASS
2.1051, 27.53(m)	Band Edge	< 43 + 10log10 (P[Watts])		PASS
2.1046	Conducted Output Power	N/A		PASS
2.1051, 27.53(m)	Spurious Emissions at Antenna Terminals	< 43 + 10log10 (P[Watts])		
2.1055, 27.54	Frequency stability	Fundamental emissions must stay within the allotted band		PASS
27.50(h)(2)	Equivalent Isotropic Radiated Power	< 33 dBW +10log(X/Y) max. EIRP	RADIATED	PASS
2.1053, 27.53(m)	Spurious Radiated Emissions.	< 43 + 10log10 (P[Watts]) for all out-of-band emissions		PASS

6. SAMPLE CALCULATION

A. EIRP Sample Calculation

Mode	Freq.	Measured	Substitude	Ant. Gain	C.L	Pol.	EIRP	
	Freq.(MHz)	Level(dBm)	LEVEL(dBm)				W	dBm
WiMAX	2596.00	-5.16	28.12	10.44	2.34	H	4.19	36.22

EIRP = SubstitudeLEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
6) The signal generator output level with Ant. Gain and cable loss are the rating of effective Isotropic radiated power (EIRP).

B. Emission Designator
Wimax Emission Designator

QPSK Modulation

Emission Designator = 9M11G7D

Wimax BW = 9.11 MHz (Measured at the 99% power bandwidth)

G= Phase Modulation

7 = Quantized/Digital Info

D= Amplitude/Angle Modulated

16QAM / 64QAM Modulation

Emission Designator = 9M12W7D

Wimax BW = 9.12 MHz (Measured at the 99% power bandwidth)

W= Combination (Audio/Data)

7 = Quantized/Digital Info

D= Amplitude/Angle Modulated

7. TEST DATA

7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.

7.1.1. Test Data at Output Port 0 (PATH 1)

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
QPSK	Low	2508.5	21.96	0.1572
	Middle	2596.0	21.68	0.1473
	High	2684.0	21.96	0.1572
16QAM	Low	2508.5	22.03	0.1595
	Middle	2596.0	21.97	0.1575
	High	2684.0	21.62	0.1452
64QAM	Low	2508.5	21.95	0.1565
	Middle	2596.0	21.77	0.1503
	High	2684.0	22.08	0.1615

7.1.2. Test Data at Output Port 1 (PATH 2)

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
QPSK	Low	2508.5	21.99	0.1582
	Middle	2596.0	21.87	0.1537
	High	2684.0	21.75	0.1495
16QAM	Low	2508.5	22.13	0.1633
	Middle	2596.0	22.13	0.1632
	High	2684.0	21.74	0.1491
64QAM	Low	2508.5	21.89	0.1546
	Middle	2596.0	21.81	0.1518
	High	2684.0	21.74	0.1491

7.1.3. Combined Test Data at Output Port

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
QPSK	Low	2508.5	25.03	0.3184
	Middle	2596.0	24.90	0.3093
	High	2684.0	25.05	0.3200
16QAM	Low	2508.5	24.80	0.3023
	Middle	2596.0	24.97	0.3137
	High	2684.0	24.94	0.3118
64QAM	Low	2508.5	24.96	0.3133
	Middle	2596.0	25.13	0.3258
	High	2684.0	25.20	0.3311

- Plots of the EUT's Conducted Output Power are shown Page 31 ~ 44.

7.2 OCCUPIED BANDWIDTH

7.2.1. Test Data at Output Port 0 (PATH 1)

Modulation	Channel	Frequency	Measured Bandwidth	
			99 %	26 dB
QPSK	Low	2508.5	9.0958	9.507
	Middle	2596.0	9.0684	9.519
	High	2684.0	9.0529	9.505
16QAM	Low	2508.5	9.0399	9.520
	Middle	2596.0	9.0583	9.511
	High	2684.0	9.0922	9.515
64QAM	Low	2508.5	9.0855	9.516
	Middle	2596.0	9.0932	9.513
	High	2684.0	9.1010	9.516

7.2.2. Test Data at Output Port 1 (PATH 2)

Modulation	Channel	Frequency	Measured Bandwidth	
			99 %	26 dB
QPSK	Low	2508.5	9.0643	9.509
	Middle	2596.0	9.0618	9.513
	High	2684.0	9.0971	9.515
16QAM	Low	2508.5	9.0777	9.513
	Middle	2596.0	9.0923	9.517
	High	2684.0	9.0482	9.524
64QAM	Low	2508.5	9.0657	9.507
	Middle	2596.0	9.0657	9.515
	High	2684.0	9.0755	9.507

7.2.3. Combined Test Data at Output Port

Modulation	Channel	Frequency	Measured Bandwidth	
			99 %	26 dB
QPSK	Low	2508.5	9.0064	9.412
	Middle	2596.0	9.1137	9.431
	High	2684.0	8.9498	9.419
16QAM	Low	2508.5	8.4799	9.206
	Middle	2596.0	9.0361	9.422
	High	2684.0	8.9516	9.410
64QAM	Low	2508.5	9.1291	9.444
	Middle	2596.0	8.9881	9.415
	High	2684.0	9.0120	9.420

- Plots of the EUT's Occupied Bandwidth are shown Page 45 ~ 58.

7.3 SPURIOUS EMISSION AT ATENNA TERMINAL

- Plots of the EUT's Conducted Spurious Emissions are shown Page 68 ~ 94.

7.4 BAND EDGES

7.4.1. Test data at Output 0 (PATH 1)

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2508.5	-41.68	-13.0
	High	2684.0	-22.58	
16QAM	Low	2508.5	-40.58	
	High	2684.0	-23.68	
64QAM	Low	2508.5	-41.38	
	High	2684.0	-24.00	

7.4.2. Test data at Output 1 (PATH 2)

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2508.5	-38.82	-13.0
	High	2684.0	-23.71	
16QAM	Low	2508.5	-38.14	
	High	2684.0	-25.43	
64QAM	Low	2508.5	-38.32	
	High	2684.0	-27.33	

7.4.3. Combined Test data at Output

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2508.5	-38.13	-13.0
	High	2684.0	-19.49	
16QAM	Low	2508.5	-38.22	
	High	2684.0	-17.44	
64QAM	Low	2508.5	-38.99	
	High	2684.0	-20.04	

- Plots of the EUT's Band Edge are shown Page 59 ~ 67.

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7.5 EQUIVALENT ISOTROPIC RADIATED POWER

(Combined Output)

- ▣ OPERATING FREQUENCY: 2508.5 MHz
- ▣ CHANNEL: LBS
- ▣ MODULATION SIGNAL: WIMAX
- ▣ BANDWIDTH: 10 MHz
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: 33 dBW + 10log(X/Y) dBW = 36.69 dBW = 66.69 dBm
  (X: 10MHz, Y: 5.5 MHz)

Ch./ Freq.		Measured Level(dBm)	Substitude LEVEL (dBm)	Ant. Gain (dBi)	C.L	ANT Pol.	EUT ANT Pol	EIRP	
Modulation	Freq.(MHz)							W	dBm
QPSK	2508.5	-6.34	26.69	10.29	2.33	V	V	2.92	34.65
16QAM	2508.5	-6.34	26.69			V	V	2.92	34.65
64QAM	2508.5	-6.34	26.69			V	H	2.92	34.65

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method

according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a non-conductive Styrofoam resin table table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A peak detector is used, with RBW = VBW = 10MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

The worst case of the EUT is in X plane in 10 MHz BW mode. Also worst case of detecting Antenna is in vertical polarization.

- ▣ OPERATING FREQUENCY: 2596.0 MHz
- ▣ CHANNEL: MBS
- ▣ MODULATION SIGNAL: WIMAX
- ▣ BANDWIDTH: 10 MHz
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: 33 dBW + 10log(X/Y) dBW = 35.21 dBW = 65.21 dBm
  (X: 10MHz, Y: 6 MHz)

Ch./ Freq.		Measured	Substitude	Ant. Gain (dBi)	C.L	ANT Pol.	EUT ANT Pol	EIRP	
Modulation	Freq.(MHz)	Level(dBm)	LEVEL (dBm)					W	dBm
QPSK	2596.0	-5.16	28.12	10.44	2.34	V	V	4.19	36.22
16QAM	2596.0	-5.62	27.66			V	V	3.77	35.76
64QAM	2596.0	-5.16	28.12			V	V	4.19	36.22

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a non-conductive Styrofoam resin table table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A peak detector is used, with RBW = VBW = 10MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

The worst case of the EUT is in X plane in 10 MHz BW mode. Also worst case of detecting Antenna is in vertical polarization.

▣ OPERATING FREQUENCY: 2684.0 MHz

▣ CHANNEL: UBS

▣ MODULATION SIGNAL: WIMAX

▣ BANDWIDTH: 10 MHz

▣ DISTANCE: 3 meters

▣ LIMIT: 33 dBW + 10log(X/Y) dBW = 36.69 dBW = 66.69 dBm

(X: 10MHz, Y: 5.5 MHz)

Ch./ Freq.		Measured Level(dBm)	Substitude LEVEL (dBm)	Ant. Gain (dBi)	C.L	ANT Pol.	EUT ANT Pol	EIRP	
Modulation	Freq.(MHz)							W	dBm
QPSK	2684.0	-8.09	25.71	10.59	2.52	V	V	2.39	33.78
16QAM	2684.0	-7.69	26.11			V	V	2.62	34.18
64QAM	2684.0	-7.30	26.50			V	V	2.86	34.57

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method

according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a non-conductive Styrofoam resin table table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A peak detector is used, with RBW = VBW = 10MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

The worst case of the EUT is in X plane in 10 MHz BW mode. Also worst case of detecting Antenna is in vertical polarization.

7.6 RADIATED SPURIOUS EMISSIONS

7.6.1 Field Strength of SPURIOUS Radiation (QPSK)

▣ MEASURED OUTPUT POWER:	36.22 dBm = 4.18 W
▣ MODULATION SIGNAL:	WIMAX
▣ MODULATION:	QPSK
▣ BANDWIDTH:	10 MHz
▣ DISTANCE:	3 meters
▣ LIMIT: - (43 + 10 log_{10} (W)) =	-49.21 dBc

Operating Freq. (MHz)	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Ant Pol.	EIRP (dBm)	dBc
2508.5	5,017.0	-45.35	12.41	−47.01	3.60	V	−38.20	−74.42
	7,525.5	-46.50	11.33	−39.00	3.88	H	−31.55	−67.77
	10,034.0	-	11.38	−	4.25	−	−	−
2596.0	5,192.0	-44.44	12.51	−45.81	3.39	H	−36.69	−72.91
	7,788.0	-45.42	11.26	−38.31	3.72	V	−30.77	−66.99
	10,384.0	-51.50	11.19	−39.34	4.40	−	−32.55	−68.77
2684.0	5,368.0	-39.50	12.62	−42.16	3.41	H	−32.95	−69.17
	8,052.0	-35.36	11.21	−25.75	4.07	V	−18.61	−54.83
	10,736.0	-46.47	11.06	−33.58	4.80	−	−27.32	−63.54

NOTES: 1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.

3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

4. Measured output power 36.22 dBm is the max EIRP in 2596.0 MHz 64QAM case.

5. The EUT provides the MIMO function which is able to transmit on the same channel with same data simultaneously therefore a combiner is used to sum the individual transmitter output power.

The test data is shown as a combined output in the report.

7.6.2 Field Strength of SPURIOUS Radiation (16QAM)

- ▣ MEASURED OUTPUT POWER: 36.22 dBm = 4.18 W
- ▣ MODULATION SIGNAL: WIMAX
- ▣ MODULATION: 16QAM
- ▣ BANDWIDTH: 10 MHz
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: - (43 + 10 $\log_{10}$ (W)) = -49.21 dBc

Operating Freq. (MHz)	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Ant Pol.	EIRP (dBm)	dBc
2508.5	5,017.0	−43.57	12.41	−45.23	3.60	V	−36.42	−72.64
	7,525.5	−46.81	11.33	−39.31	3.88	H	−31.86	−68.08
	10,034.0	−52.91	11.38	−41.69	4.25	−	−34.56	−70.78
2596.0	5,192.0	−42.69	12.51	−44.06	3.39	H	−34.94	−71.16
	7,788.0	−43.33	11.26	−36.22	3.72	V	−28.68	−64.90
	10,384.0	−50.89	11.19	−38.73	4.40	−	−31.94	−68.16
2684.0	5,368.0	−38.29	12.62	−40.95	3.41	H	−31.74	−67.96
	8,052.0	−35.56	11.21	−25.95	4.07	V	−18.81	−55.03
	10,736.0	−48.78	11.06	−35.89	4.80	−	−29.63	−65.85

NOTES:

1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.
3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. Measured output power 36.22 dBm is the max EIRP in 2596.0 MHz 64QAM case.
5. The EUT provides the MIMO function which is able to transmit on the same channel with same data simultaneously therefore a combiner is used to sum the individual transmitter output power.

The test data is shown as a combined output in the report.

7.6.3 Field Strength of SPURIOUS Radiation (64QAM)

- ▣ MEASURED OUTPUT POWER: 36.22 dBm = 4.18 W
- ▣ MODULATION SIGNAL: WIMAX
- ▣ MODULATION: 64QAM
- ▣ BANDWIDTH: 10 MHz
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: - (43 + 10 $\log_{10}$ (W)) = -49.21 dBc

Operating Freq. (MHz)	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Ant Pol.	EIRP (dBm)	dBc
2508.5	5,017.0	-43.68	12.41	-45.34	3.60	V	-36.53	-72.75
	7,525.5	-47.72	11.33	-40.22	3.88	H	-32.77	-68.99
	10,034.0	-53.23	11.38	-42.01	4.25	-	-34.88	-71.10
2596.0	5,192.0	-45.10	12.51	-46.47	3.39	H	-37.35	-73.57
	7,788.0	-44.03	11.26	-36.92	3.72	V	-29.38	-65.60
	10,384.0	-49.82	11.19	-37.66	4.40	-	-30.87	-67.09
2684.0	5,368.0	-40.41	12.62	-43.07	3.41	H	-33.86	-70.08
	8,052.0	-35.44	11.21	-25.83	4.07	V	-18.69	-54.91
	10,736.0	-48.85	11.06	-35.96	4.80	-	-29.70	-65.92

NOTES: 1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5^{th} Harmonic for all channel.

3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

4. Measured output power 36.22 dBm is the max EIRP in 2596.0 MHz 64QAM case.

5. The EUT provides the MIMO function which is able to transmit on the same channel with same data simultaneously therefore a combiner is used to sum the individual transmitter output power.

The test data is shown as a combined output in the report.

7.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.7.1 FREQUENCY STABILITY

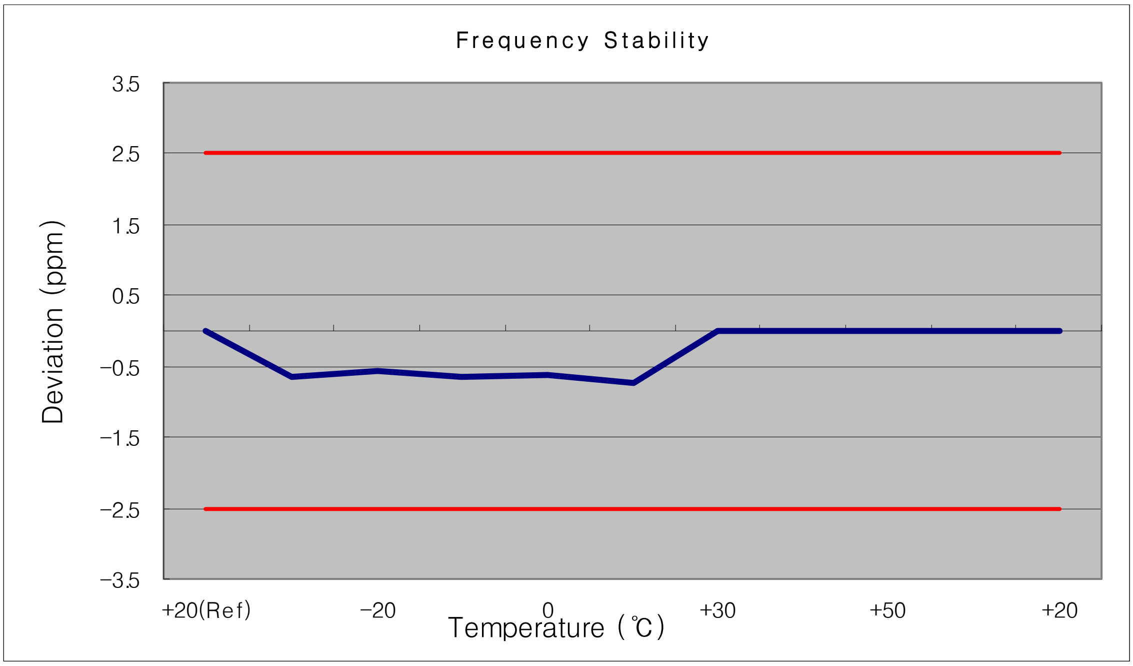
OPERATING FREQUENCY: 2596,000,000 Hz

MODULATION TYPE: QPSK

REFERENCE VOLTAGE: 48 VDC

DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	48.0	+20(Ref)	2596 000 000	0	0.000 000	0.000
100%		−30	2592 998 300	−1700	−0.000 065	−0.655
100%		−20	2592 998 500	−1500	−0.000 058	−0.578
100%		−10	2592 998 300	−1700	−0.000 065	−0.655
100%		0	2592 998 400	−1600	−0.000 062	−0.616
100%		+10	2592 998 100	−1900	−0.000 073	−0.732
100%		+30	2592 999 990	−9.6	0.000 000	−0.004
100%		+40	2593 000 005	4.7	0.000 000	0.002
100%		+50	2593 000 008	7.6	0.000 000	0.003
115%	55.2	+20	2593 000 007	7.3	0.000 000	0.003
Batt. Endpoint	40.8	+20	2593 000 002	1.7	0.000 000	0.001



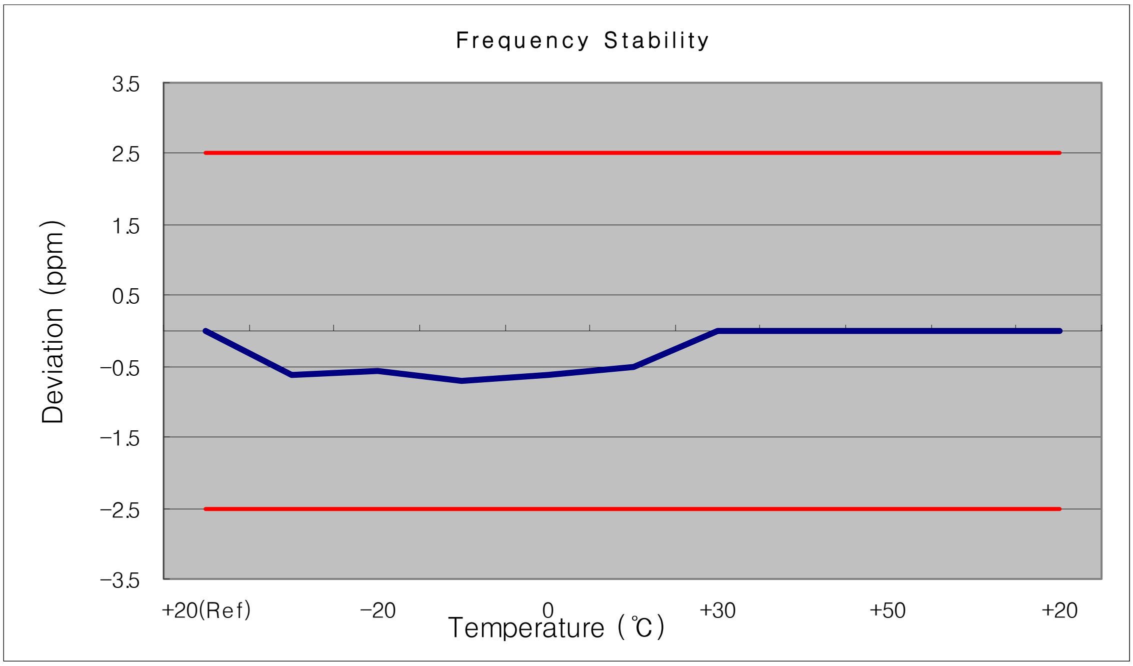
OPERATING FREQUENCY: 2596,000,000 Hz

MODULATION TYPE: 16QAM

REFERENCE VOLTAGE: 48 VDC

DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	48.0	+20(Ref)	2595 999 998	0	0.000 000	0.000
100%		−30	2592 998 400	−1600	−0.000 062	−0.616
100%		−20	2592 998 500	−1500	−0.000 058	−0.578
100%		−10	2592 998 200	−1800	−0.000 069	−0.693
100%		0	2592 998 400	−1600	−0.000 062	−0.616
100%		+10	2592 998 700	−1300	−0.000 050	−0.501
100%		+30	2592 999 994	−6.2	0.000 000	−0.002
100%		+40	2592 999 987	−13	−0.000 001	−0.005
100%		+50	2592 999 989	−11	0.000 000	−0.004
115%	55.2	+20	2592 999 991	−8.9	0.000 000	−0.003
Batt. Endpoint	40.8	+20	2592 999 997	−2.7	0.000 000	−0.001



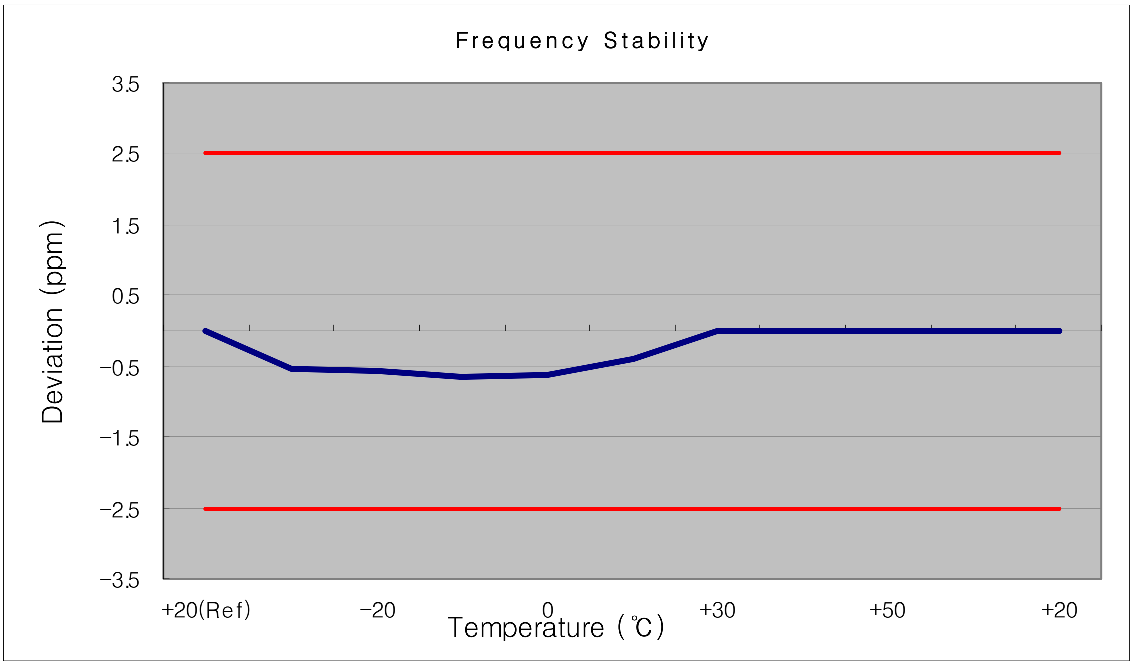
OPERATING FREQUENCY: 2596,000,000 Hz

MODULATION TYPE: 64QAM

REFERENCE VOLTAGE: 48 VDC

DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	48.0	+20(Ref)	2596 000 000	0	0.000 000	0.000
100%		−30	2592 998 600	−1400	−0.000 054	−0.539
100%		−20	2592 998 500	−1500	−0.000 058	−0.578
100%		−10	2592 998 300	−1700	−0.000 065	−0.655
100%		0	2592 998 400	−1600	−0.000 062	−0.616
100%		+10	2592 999 000	−1000	−0.000 039	−0.385
100%		+30	2593 000 011	11	0.000 000	0.004
100%		+40	2593 000 007	7.4	0.000 000	0.003
100%		+50	2593 000 002	2.3	0.000 000	0.001
115%	55.2	+20	2593 000 015	15.1	0.000 001	0.006
Batt. Endpoint	40.8	+20	2593 000 006	6.2	0.000 000	0.002

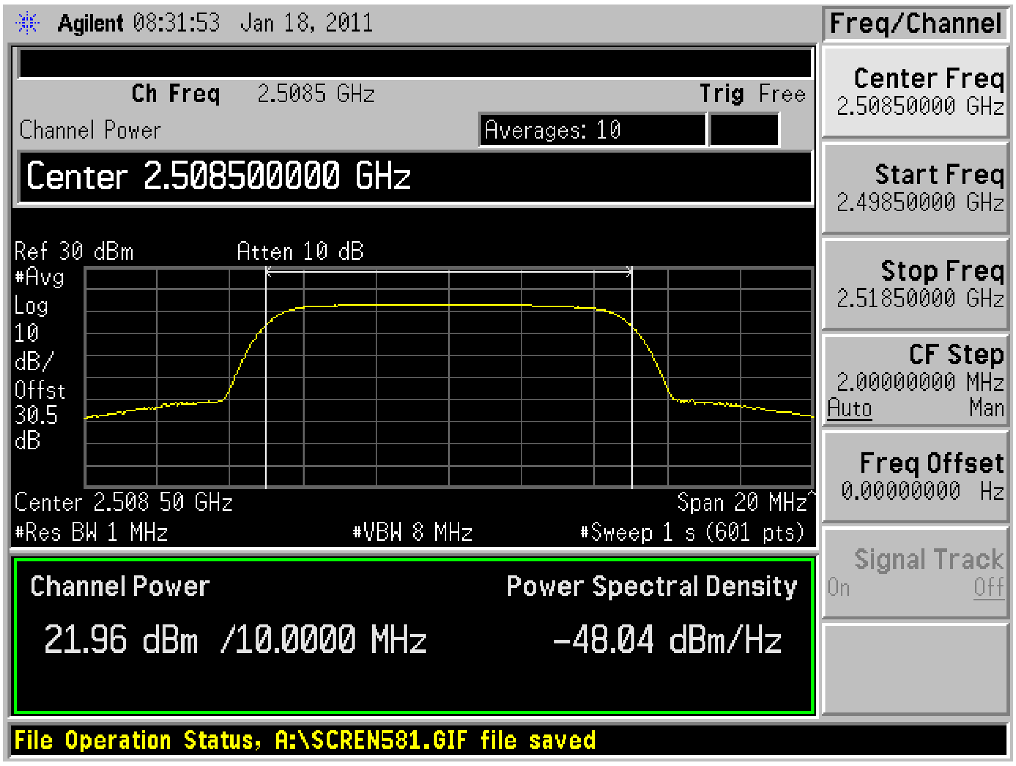


8. TEST PLOTS

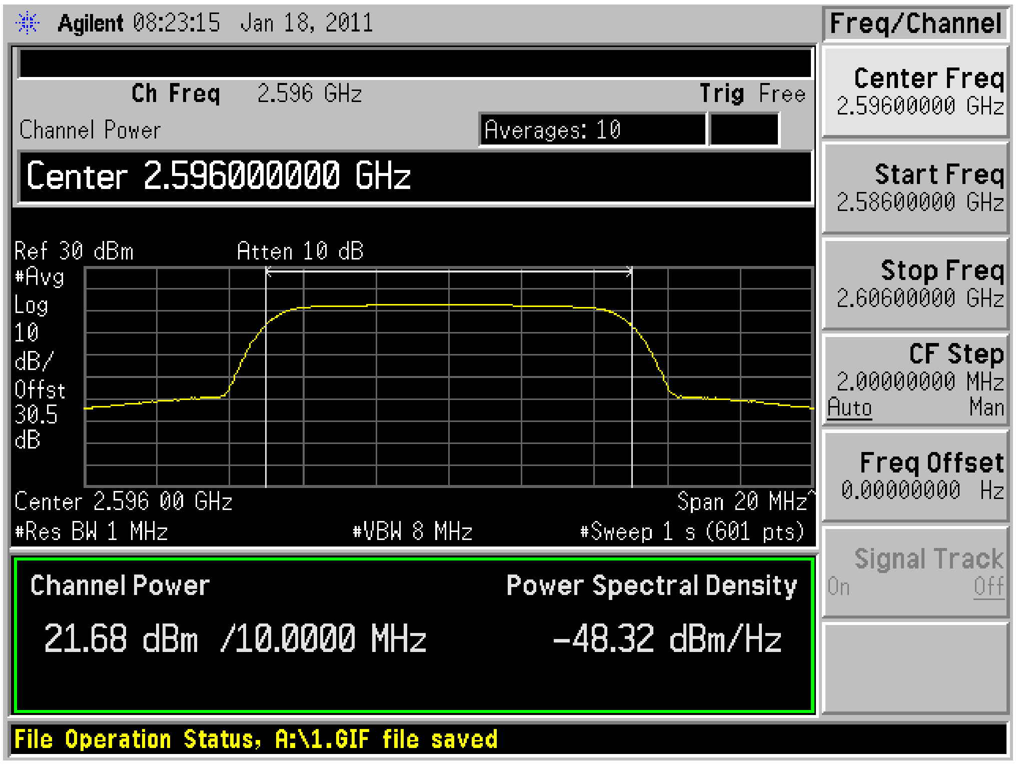
8.1. CONDUCTED OUTPUT POWER

8.1.1 Test Plot at Output Port 0

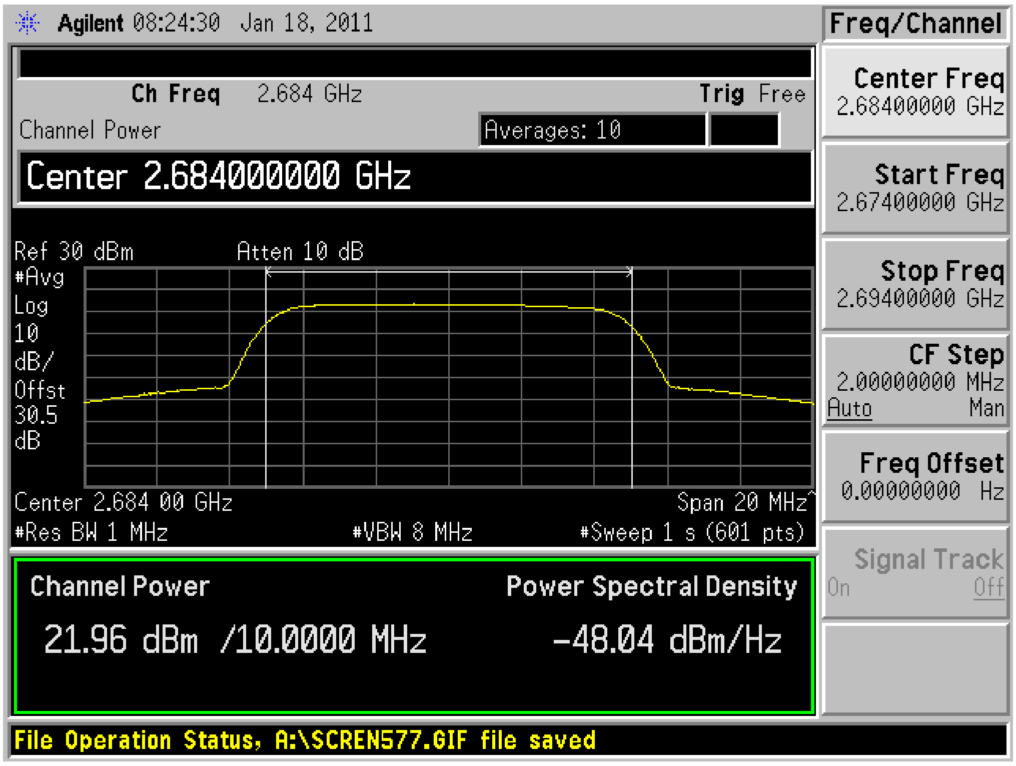
(QPSK Low Channel)



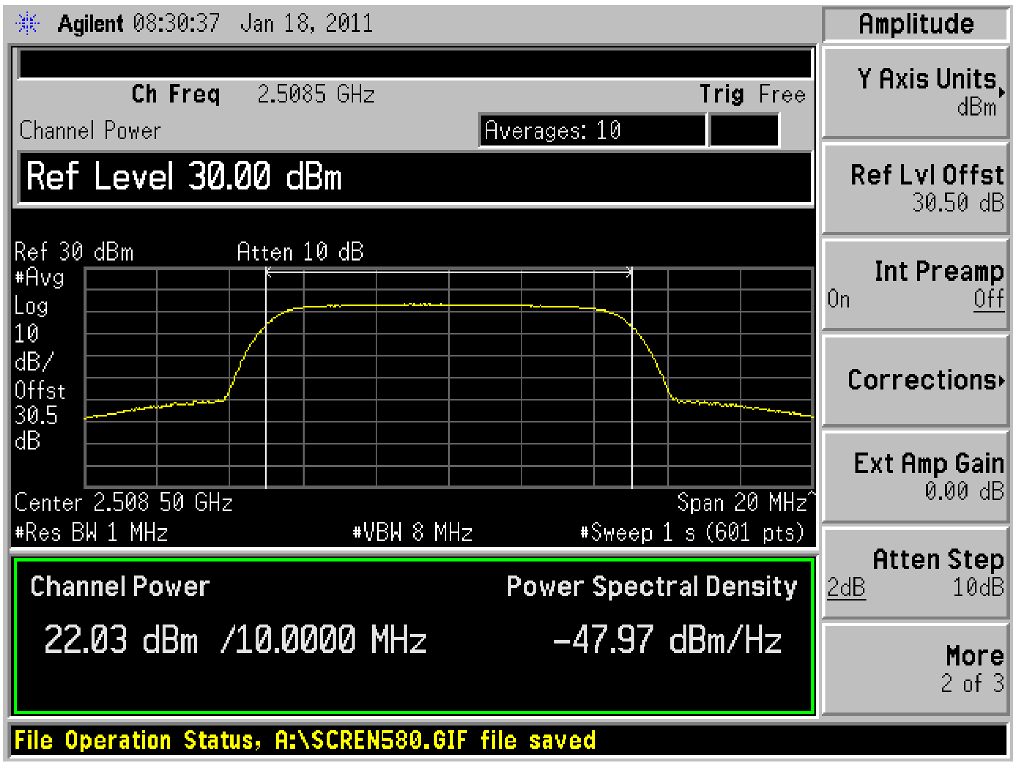
(QPSK Middle Channel)



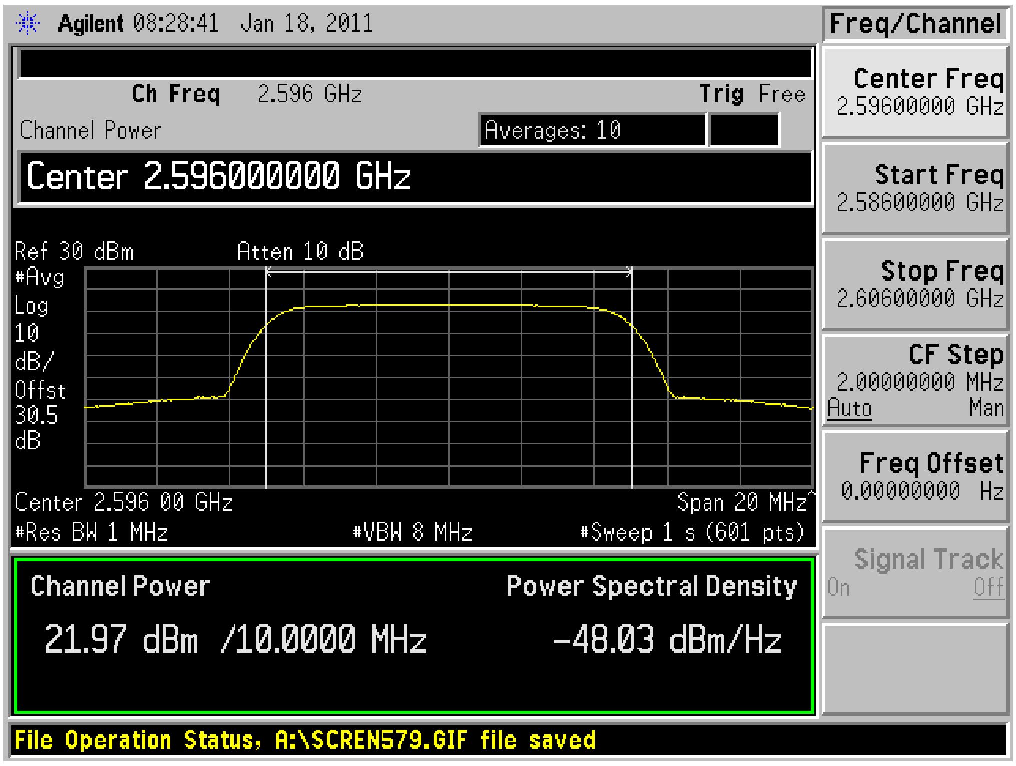
(QPSK High Channel)



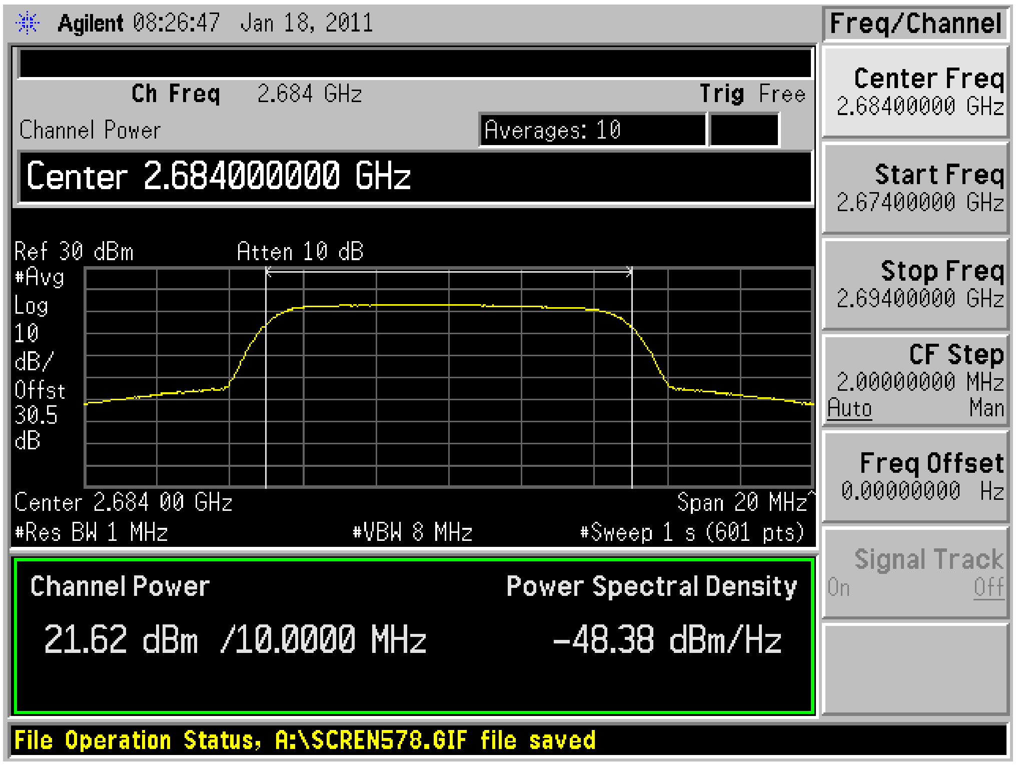
(16QAM Low Channel)



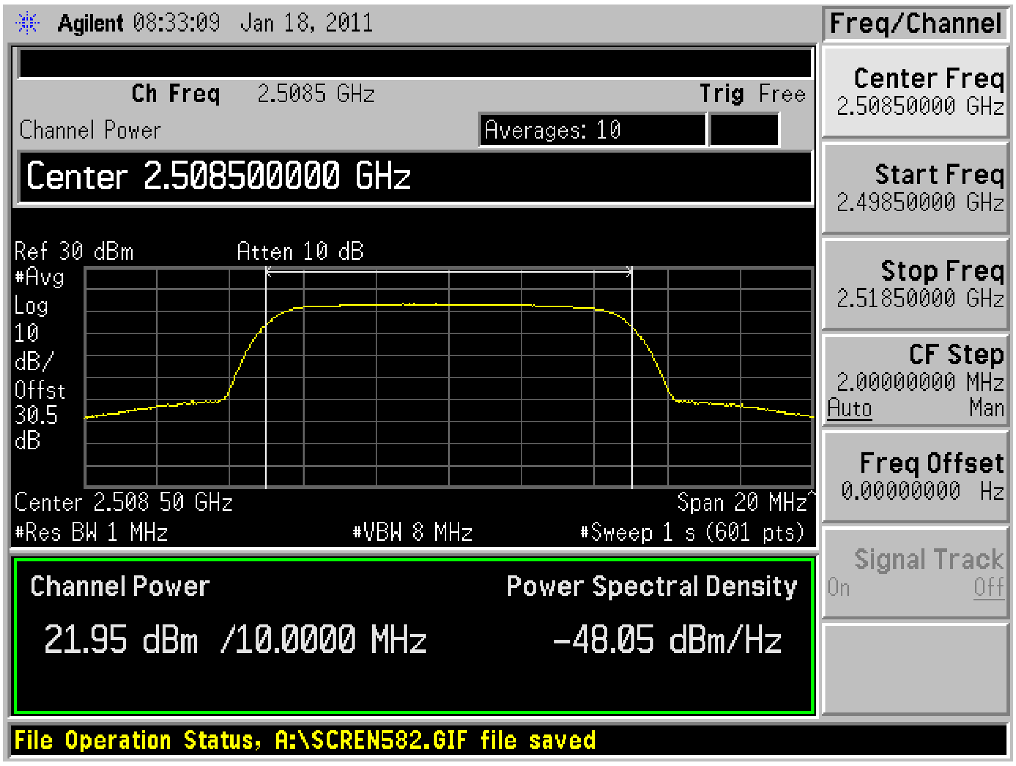
(16QAM Middle Channel)



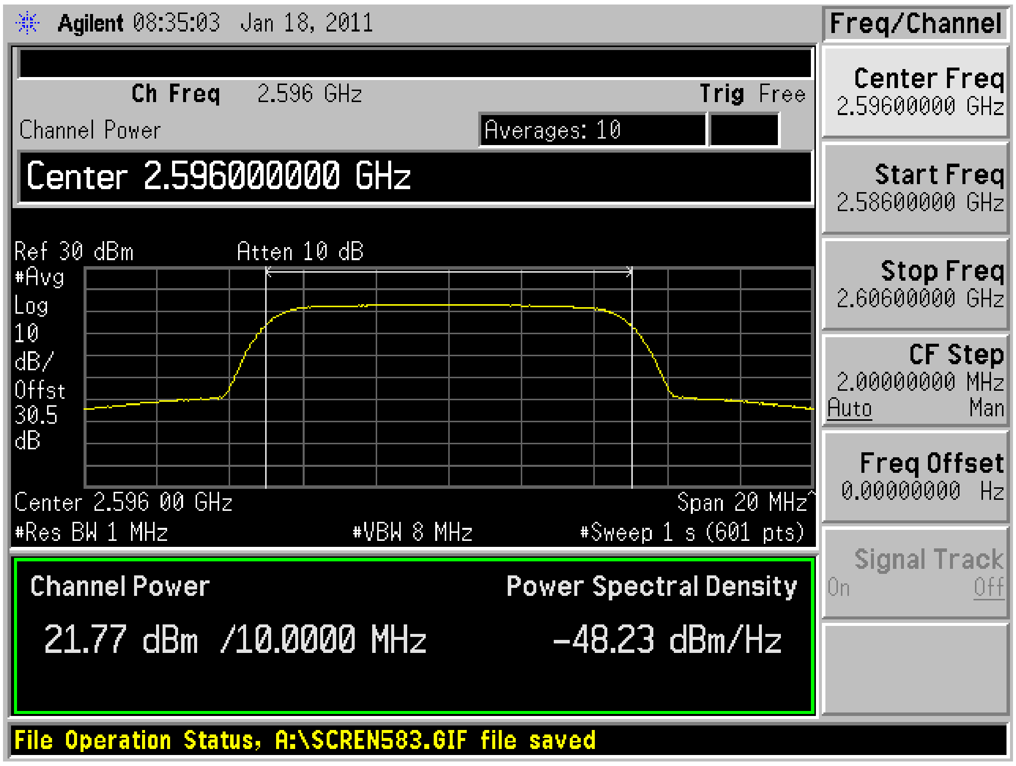
(16QAM High Channel)



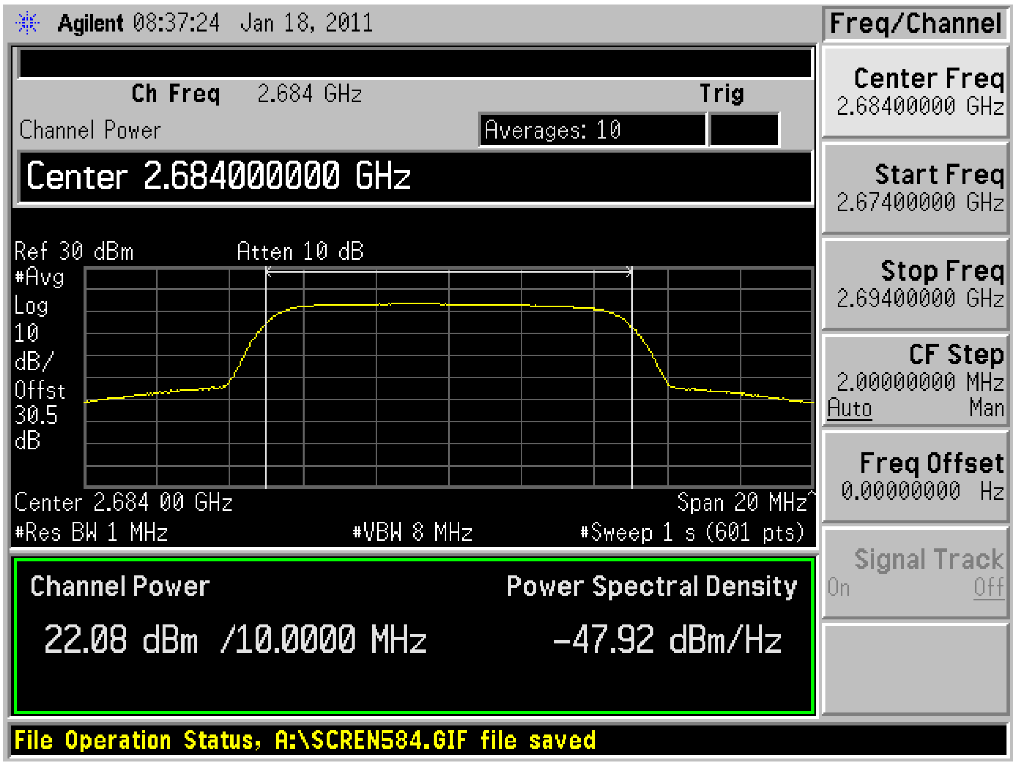
(64QAM Low Channel)



(64QAM Middle Channel)

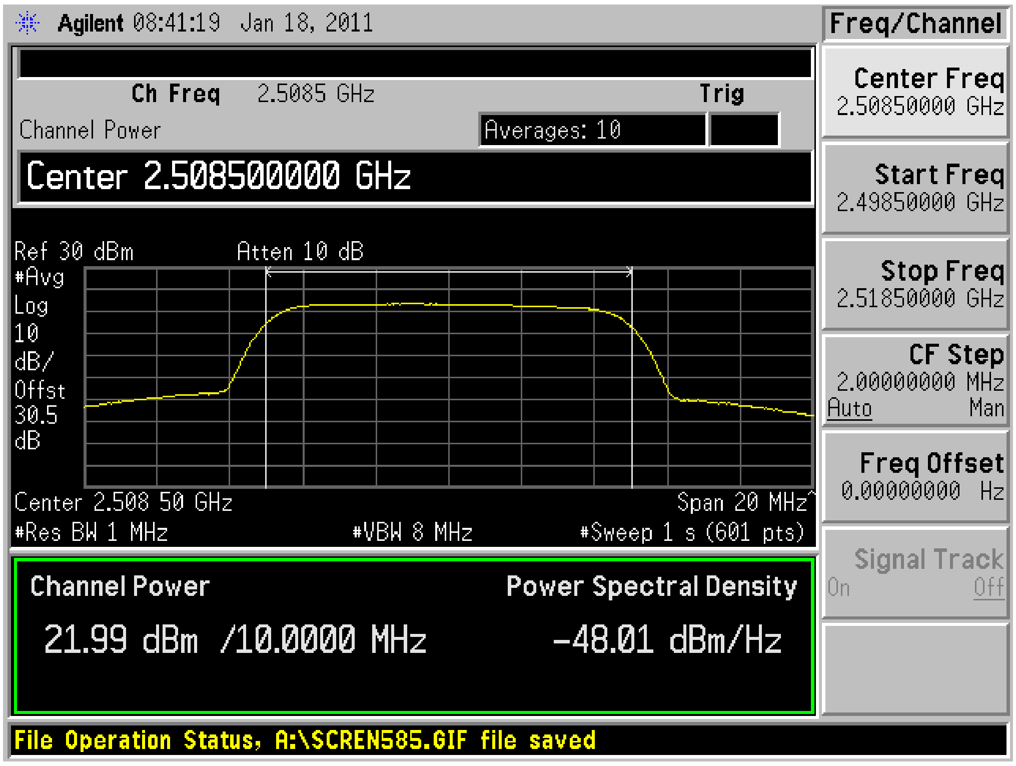


(64QAM High Channel)

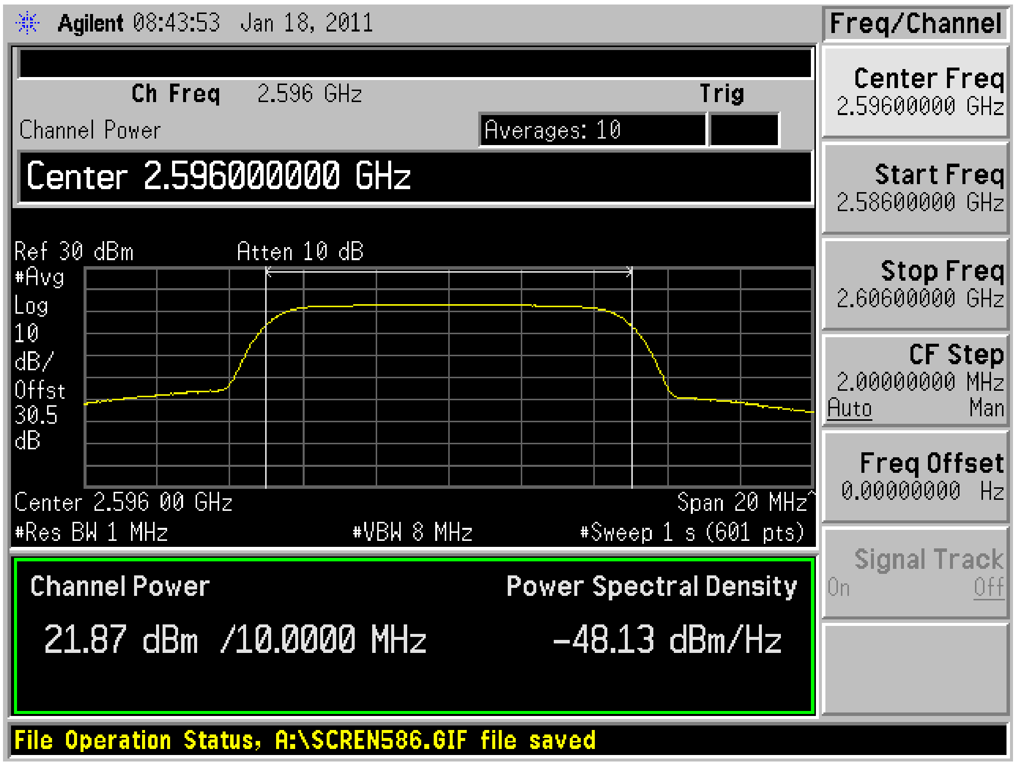


8.1.2. Plot Data for Output 1

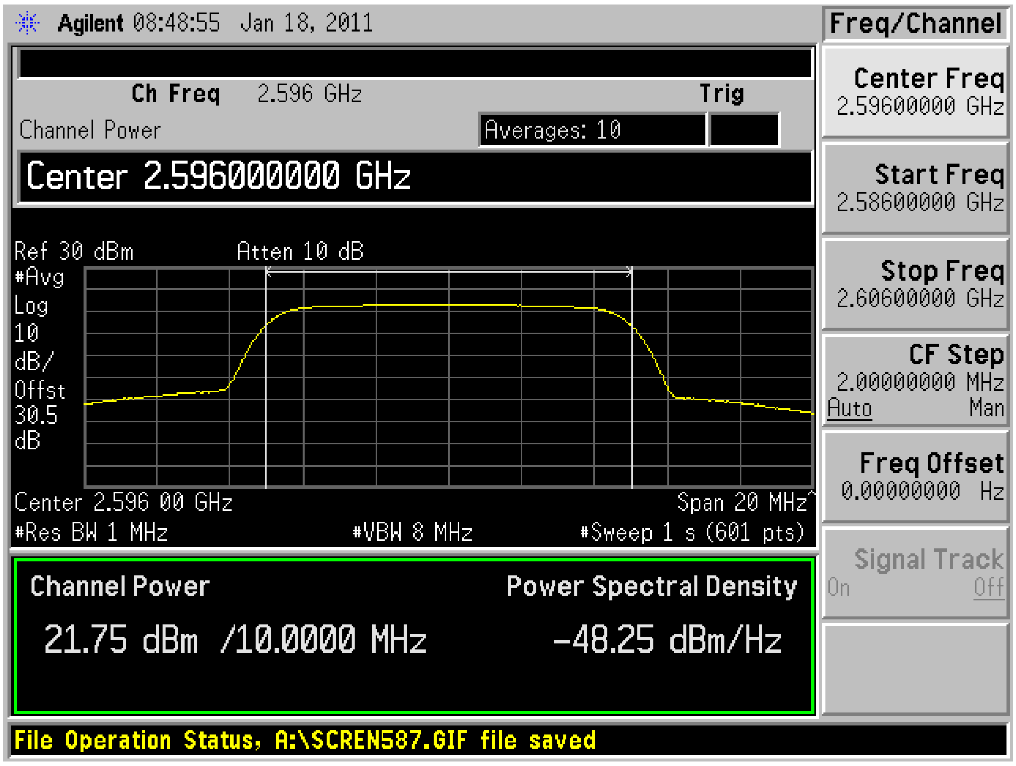
(QPSK Low Channel)



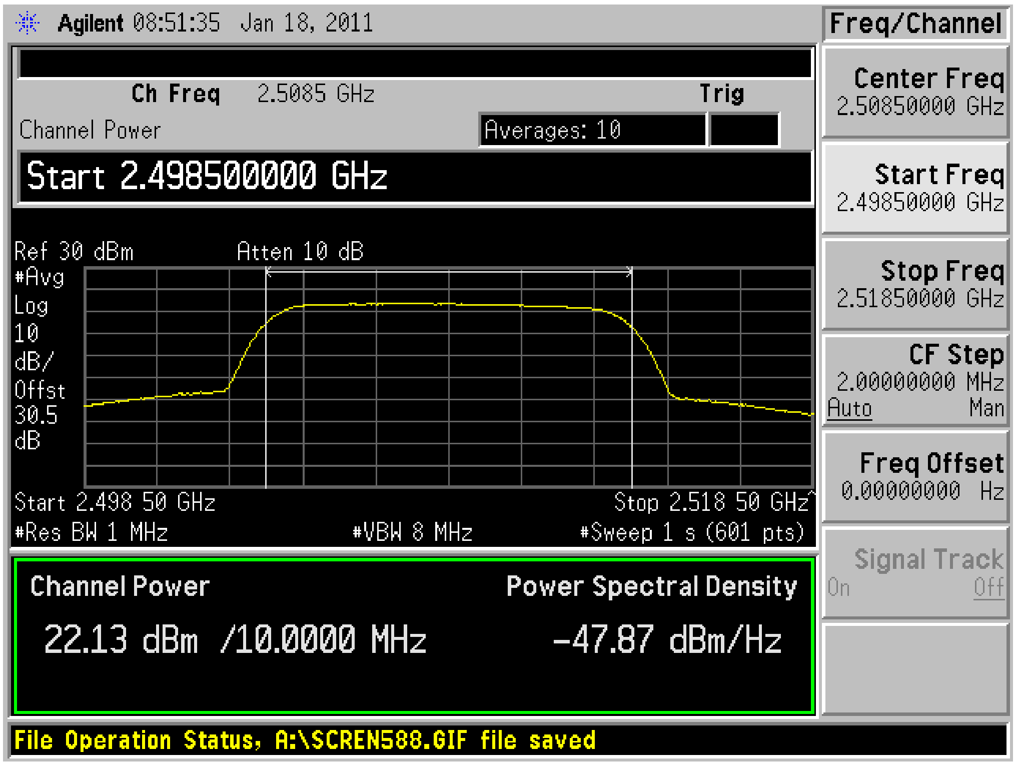
(QPSK Middle Channel)



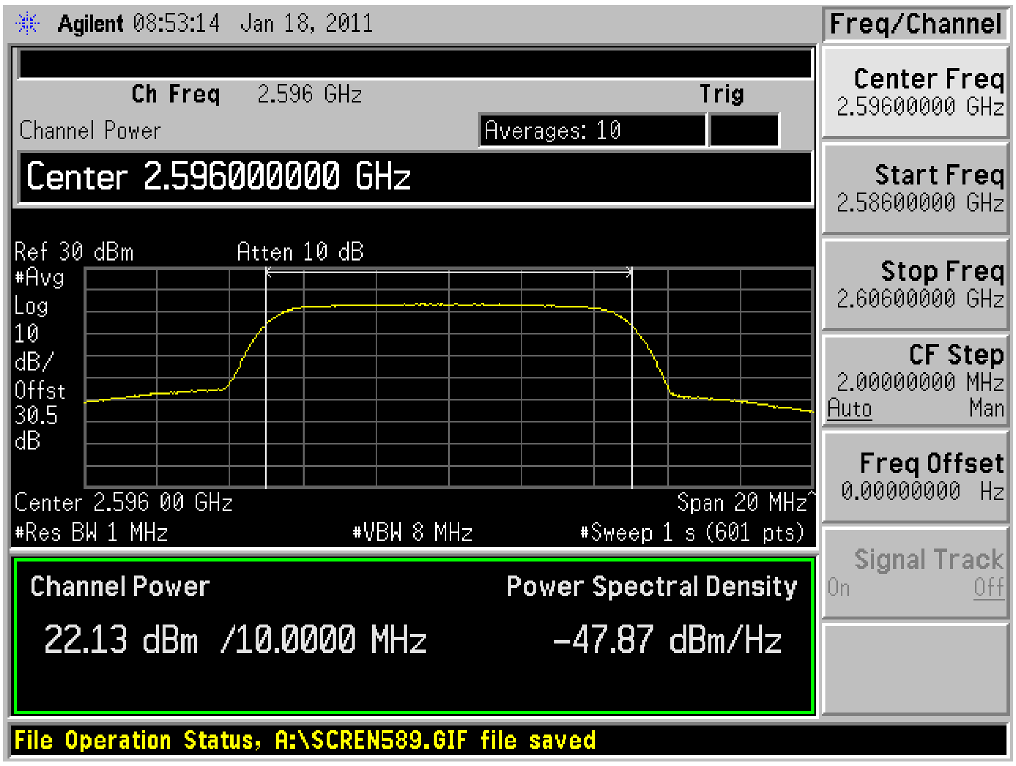
(QPSK High Channel)



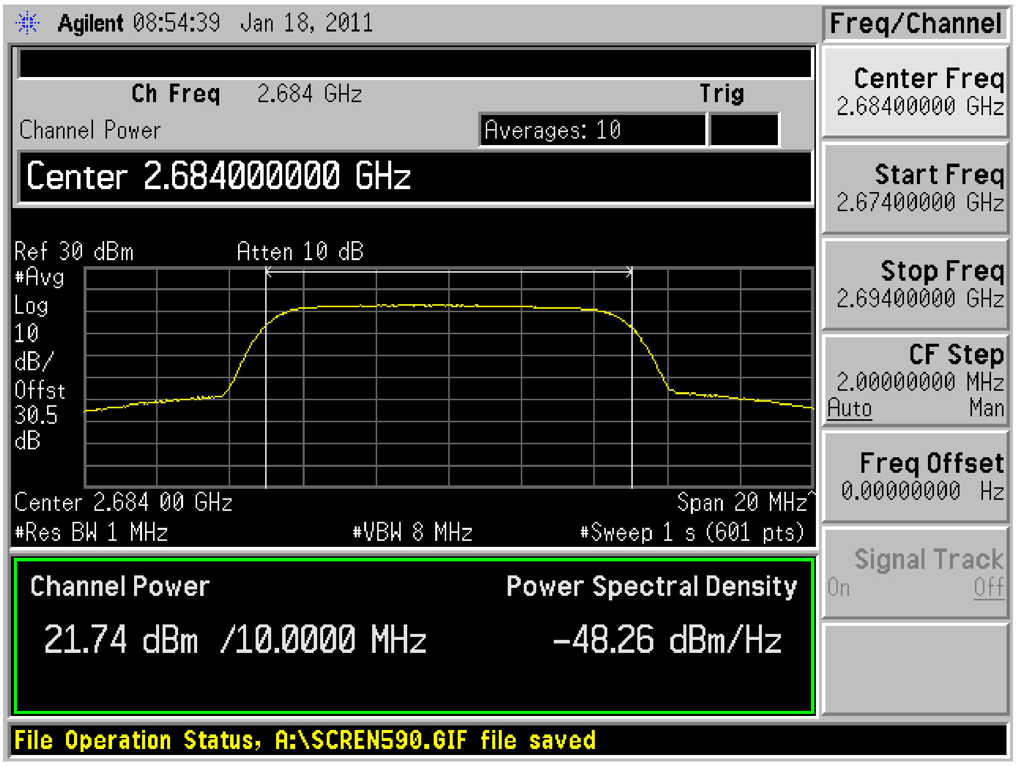
(16QAM Low Channel)



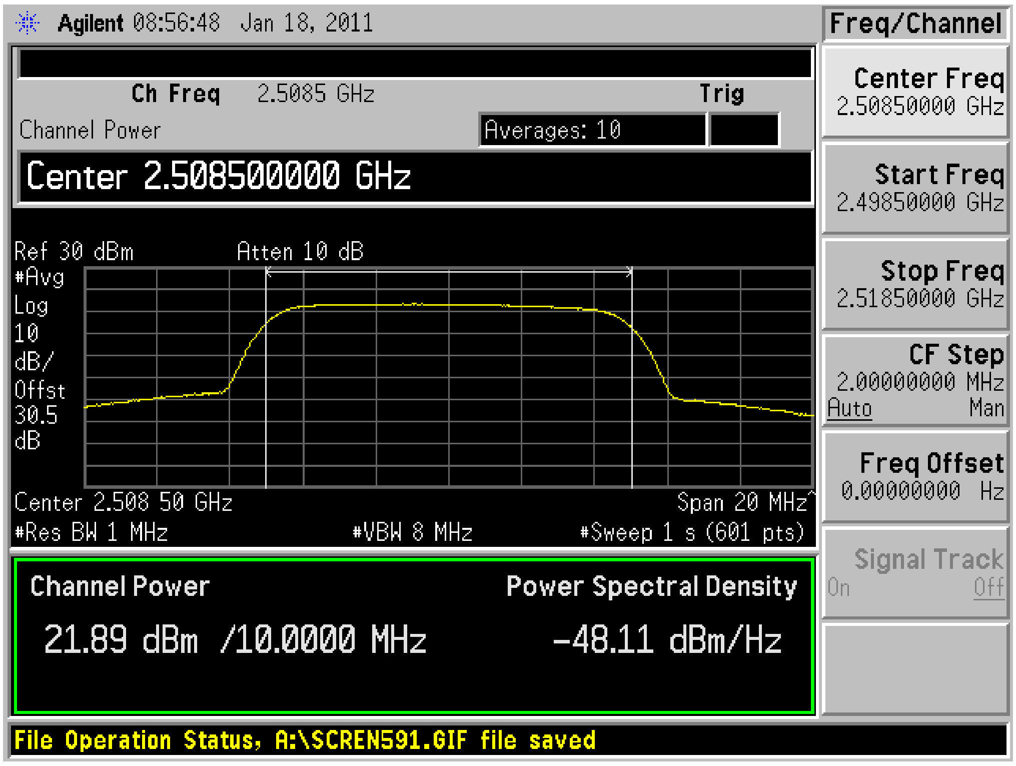
(16QAM Middle Channel)



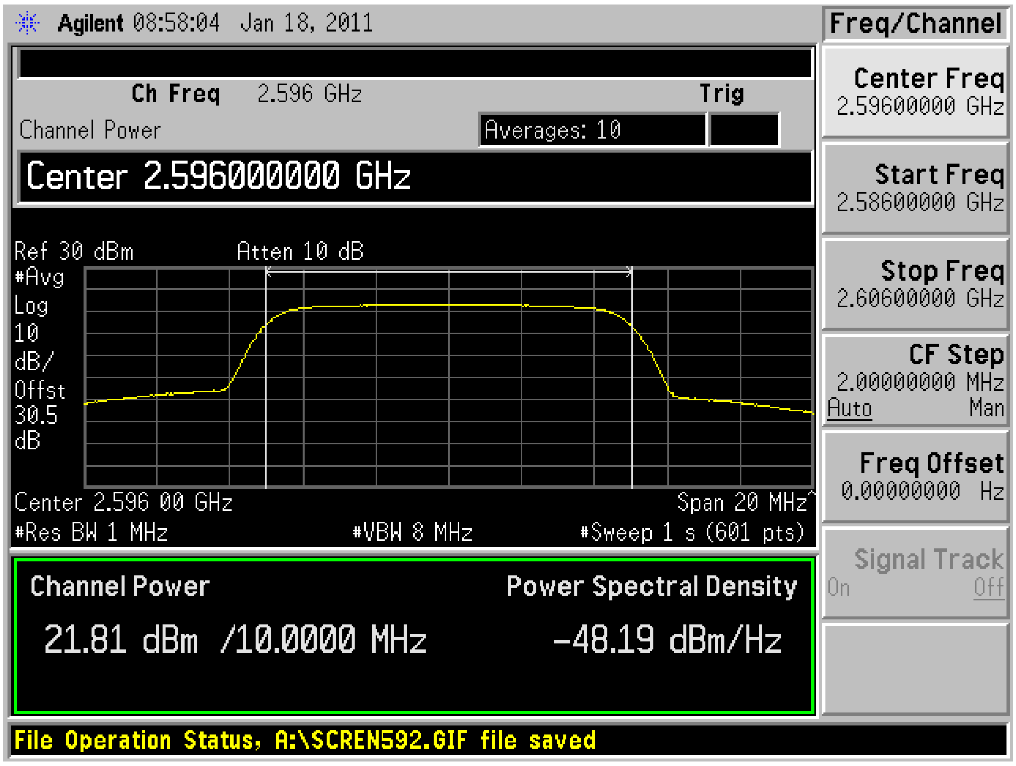
(16QAM High Channel)



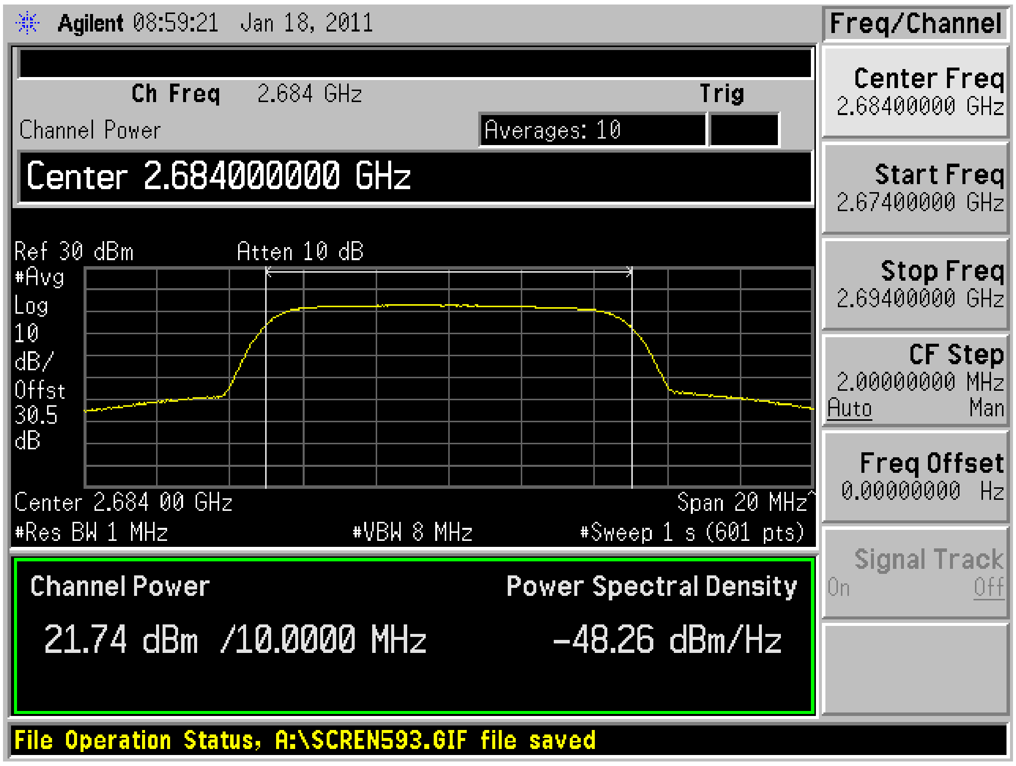
(64QAM Low Channel)



(64QAM Middle Channel)

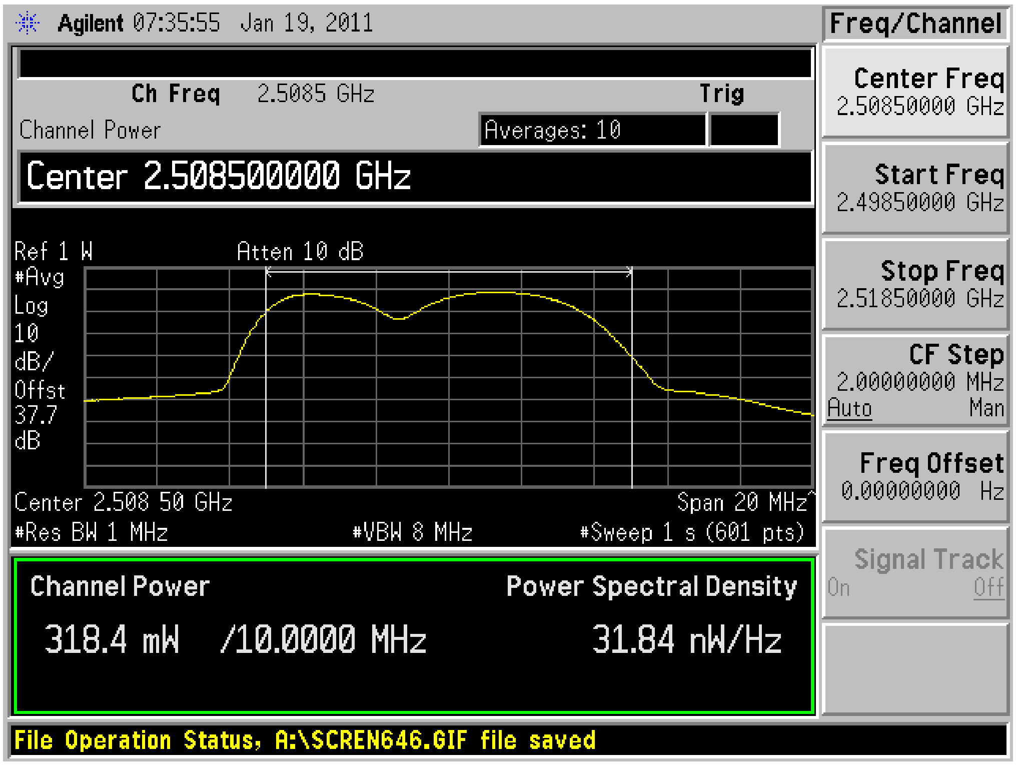


(64QAM High Channel)

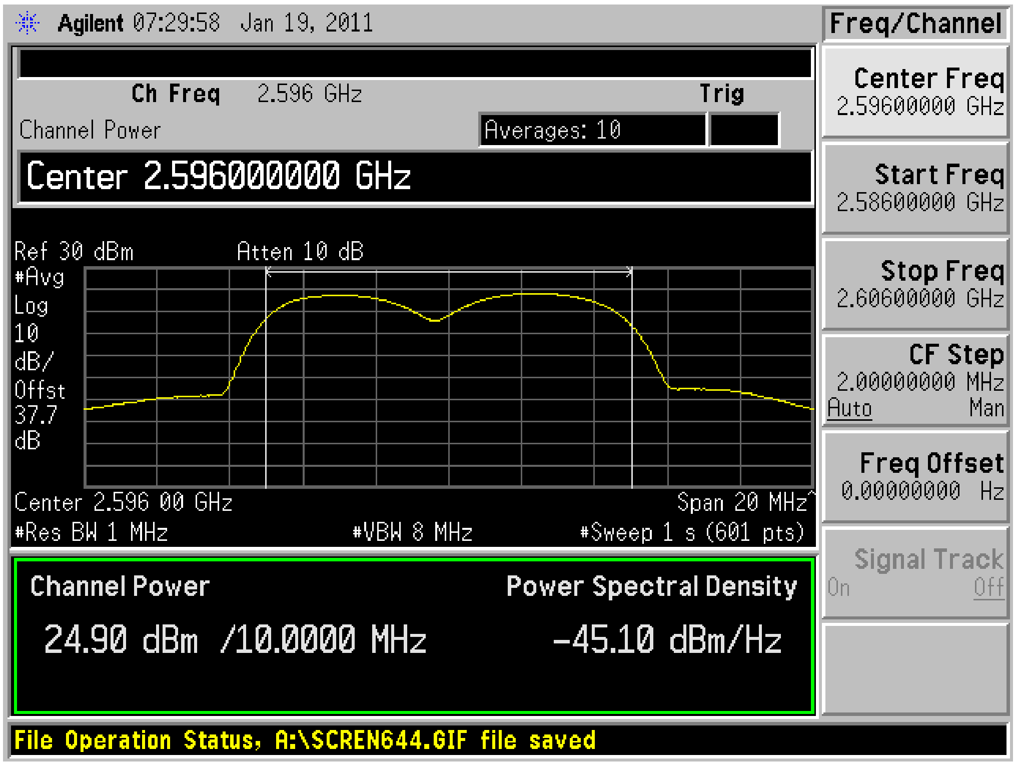


8.1.3. Combined Plot Data for Output

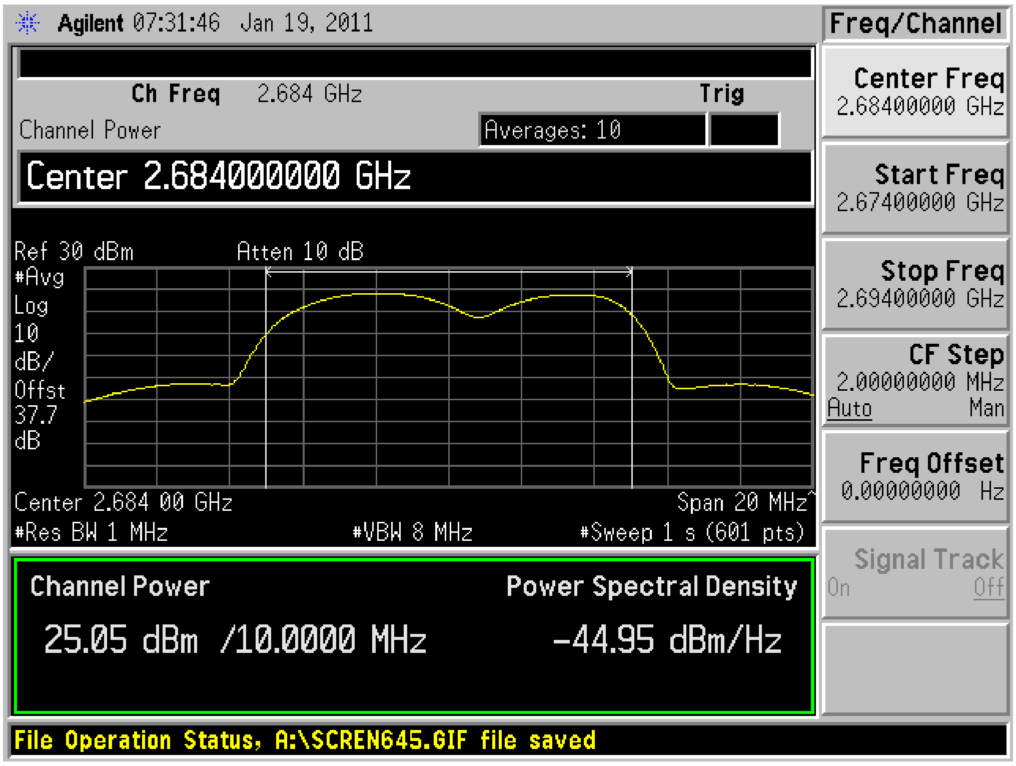
(QPSK Low Channel)



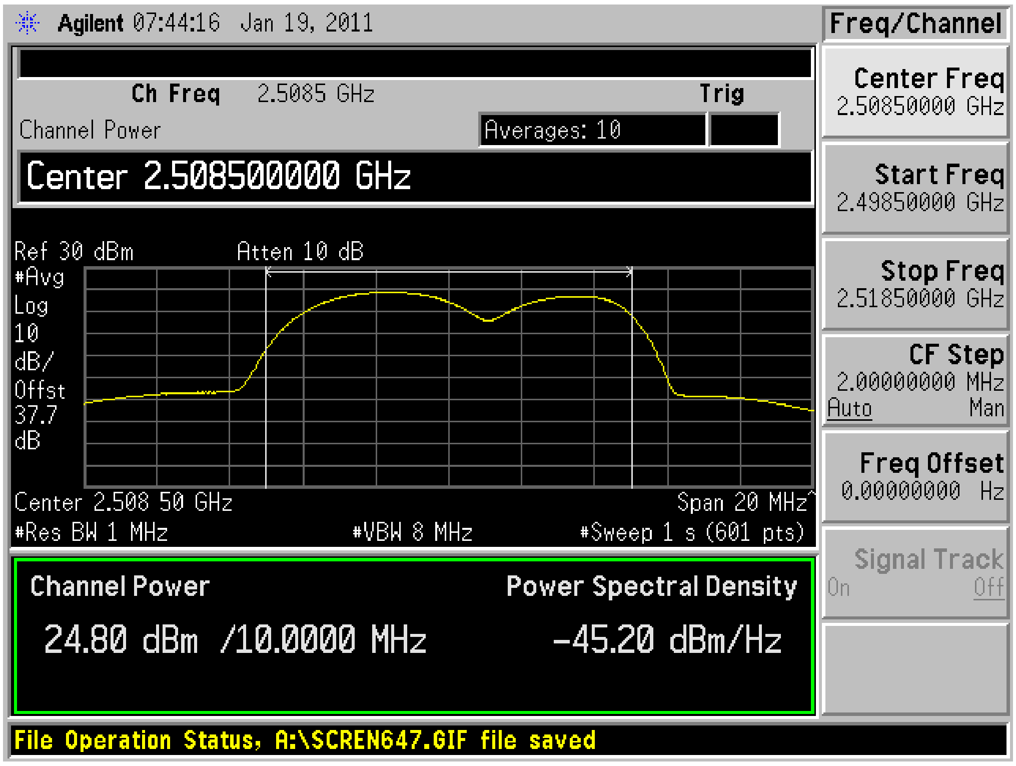
(QPSK Middle Channel)



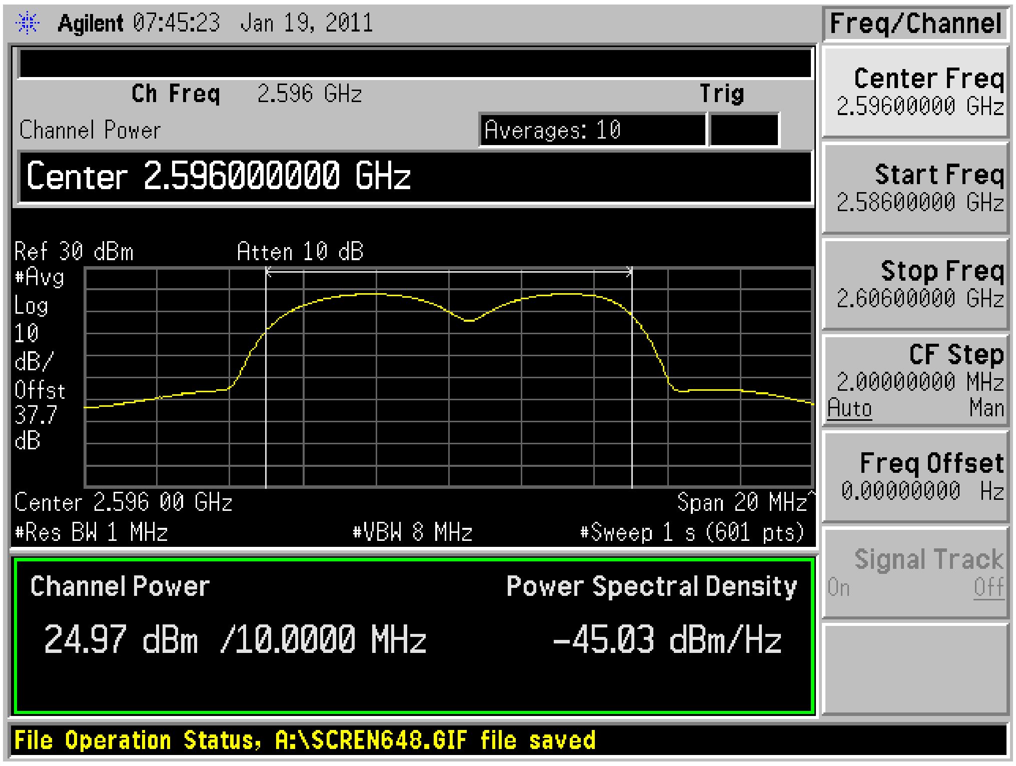
(QPSK High Channel)



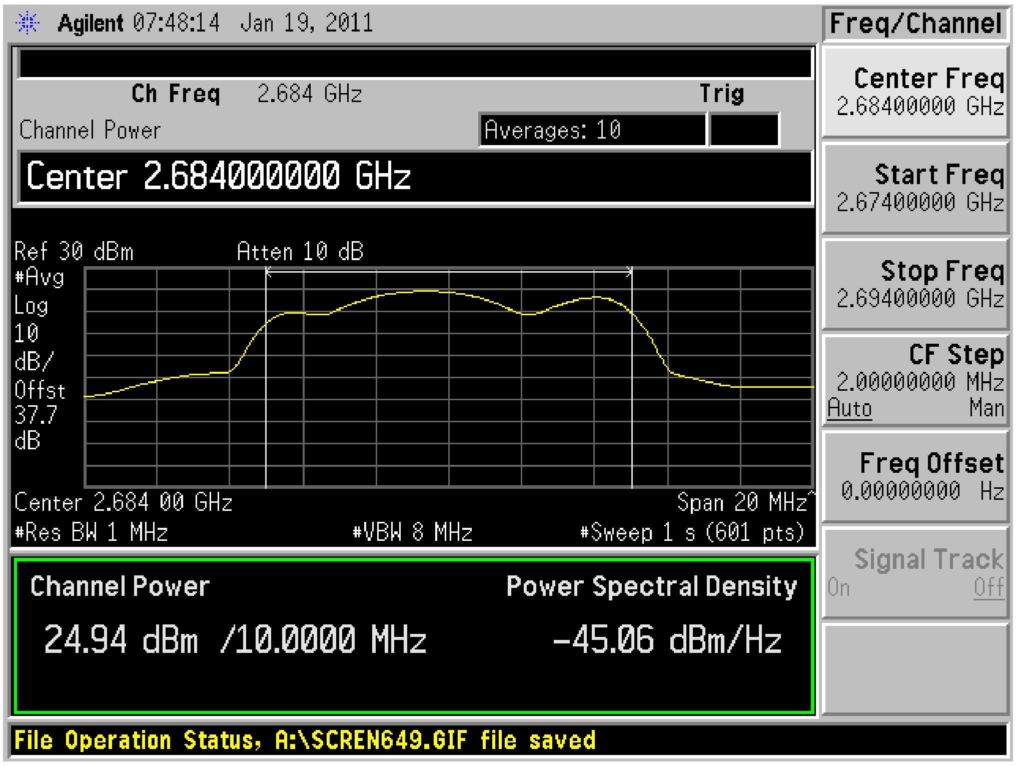
(16QAM Low Channel)



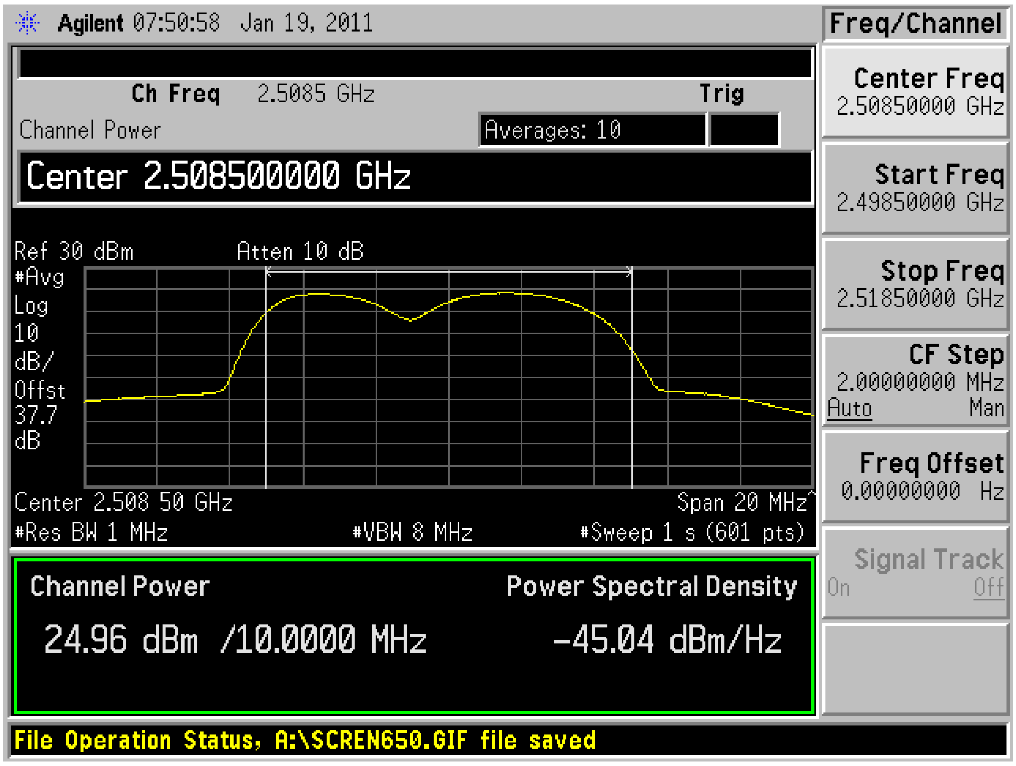
(16QAM Middle Channel)



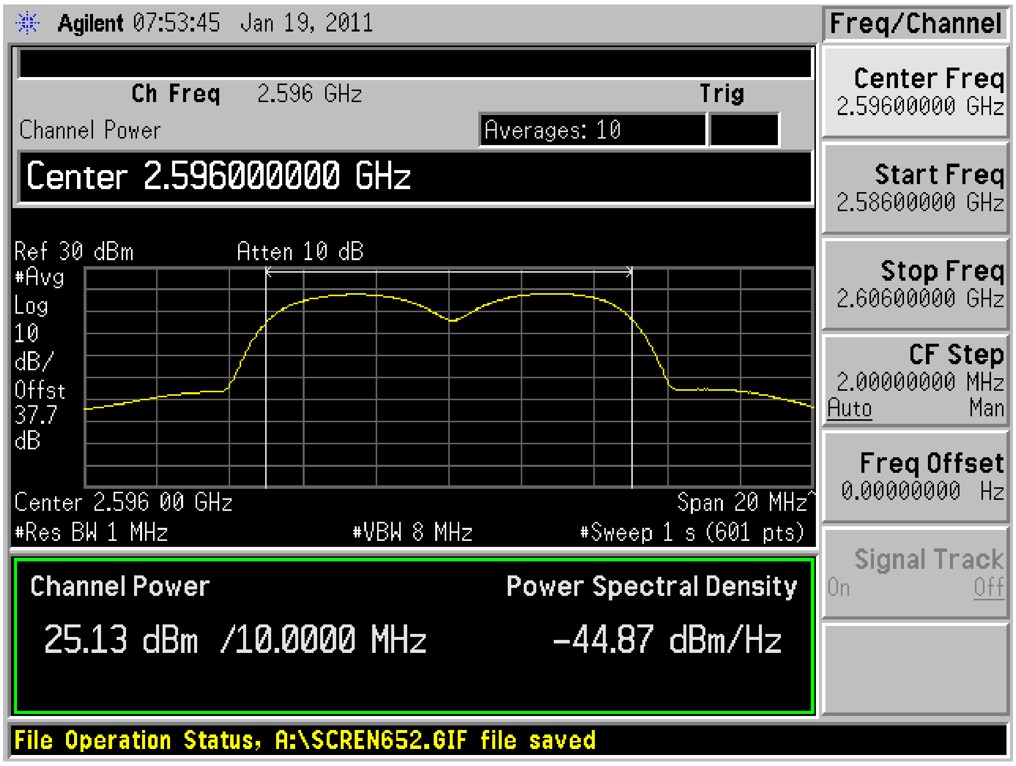
(16QAM High Channel)



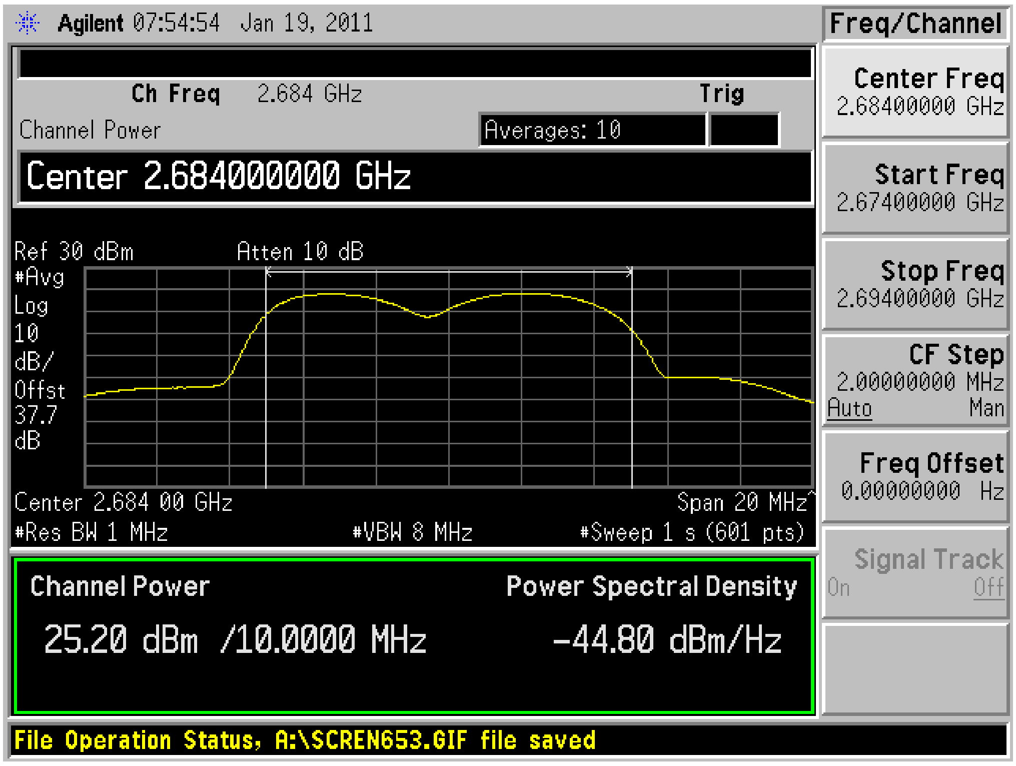
(64QAM Low Channel)



(64QAM Middle Channel)



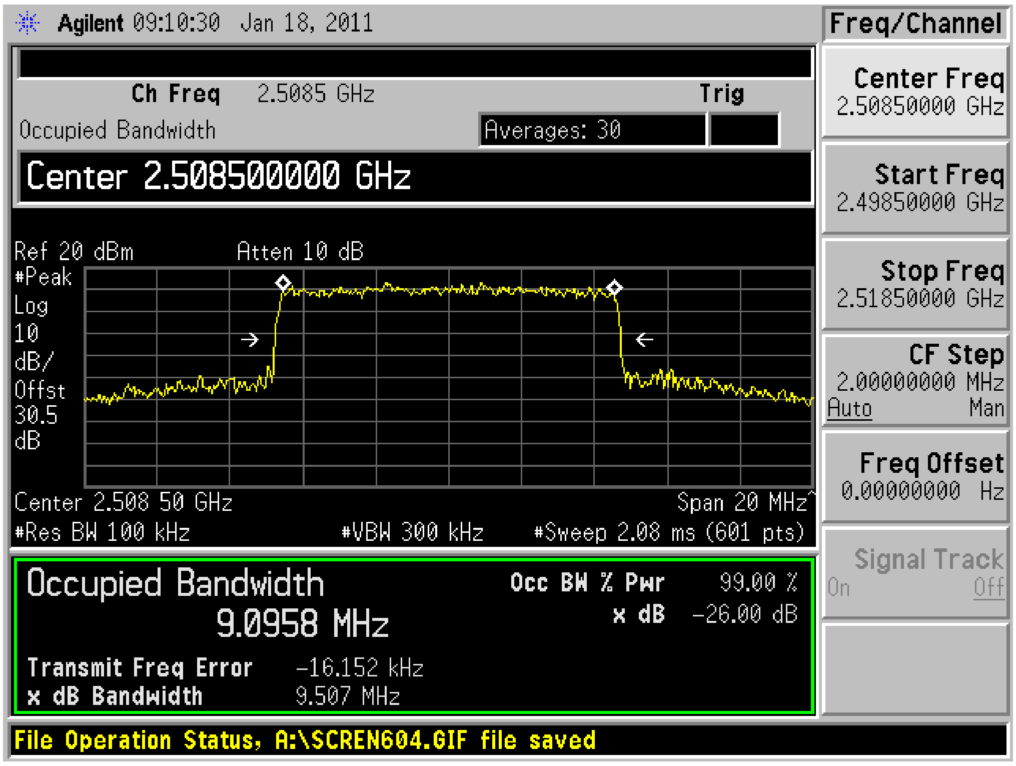
(64QAM High Channel)



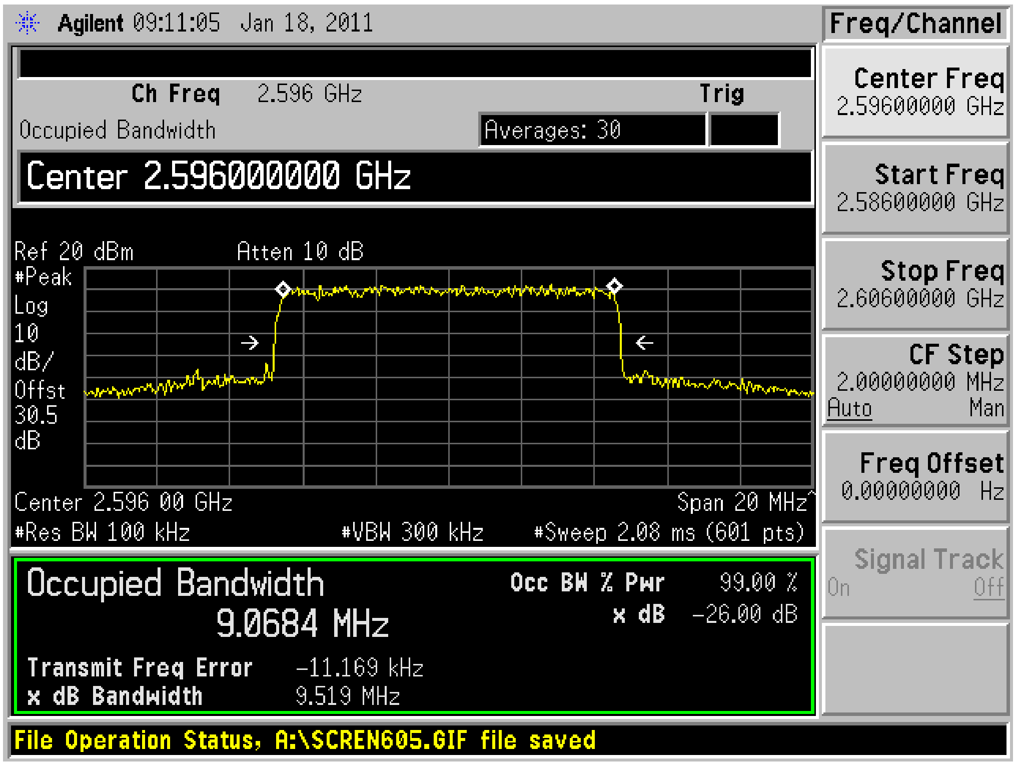
8.2. OCCUPIED BANDWIDTH

8.2.1 Test Plot at Output Port 0

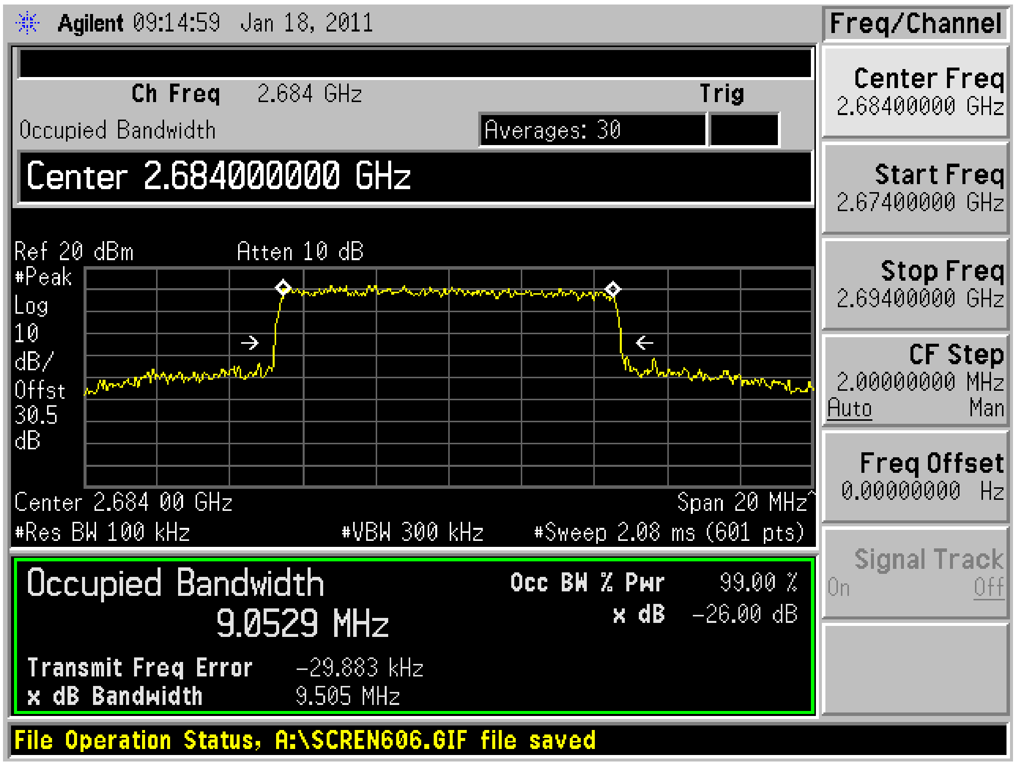
(QPSK Low Channel)



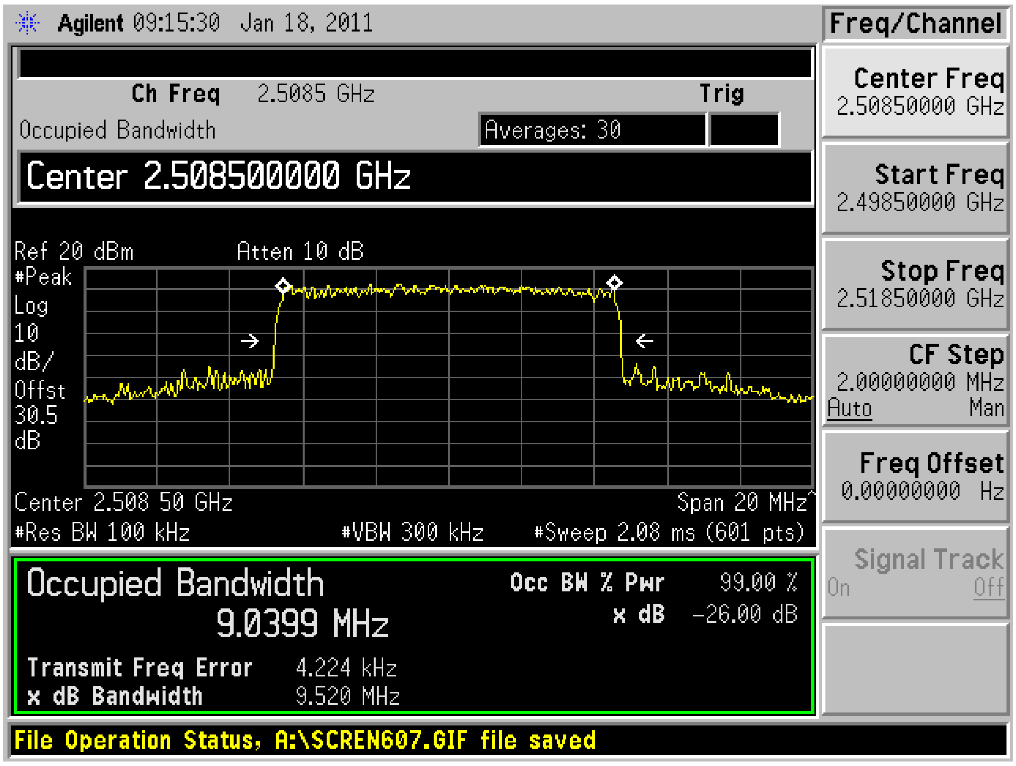
(QPSK Middle Channel)



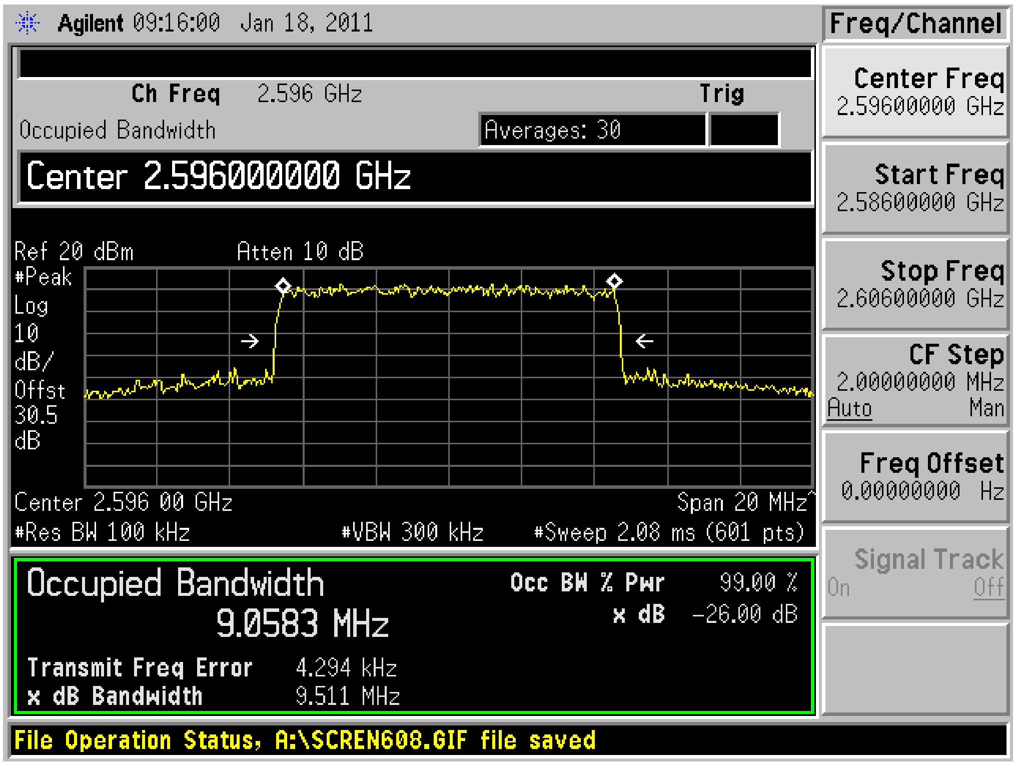
(QPSK High Channel)



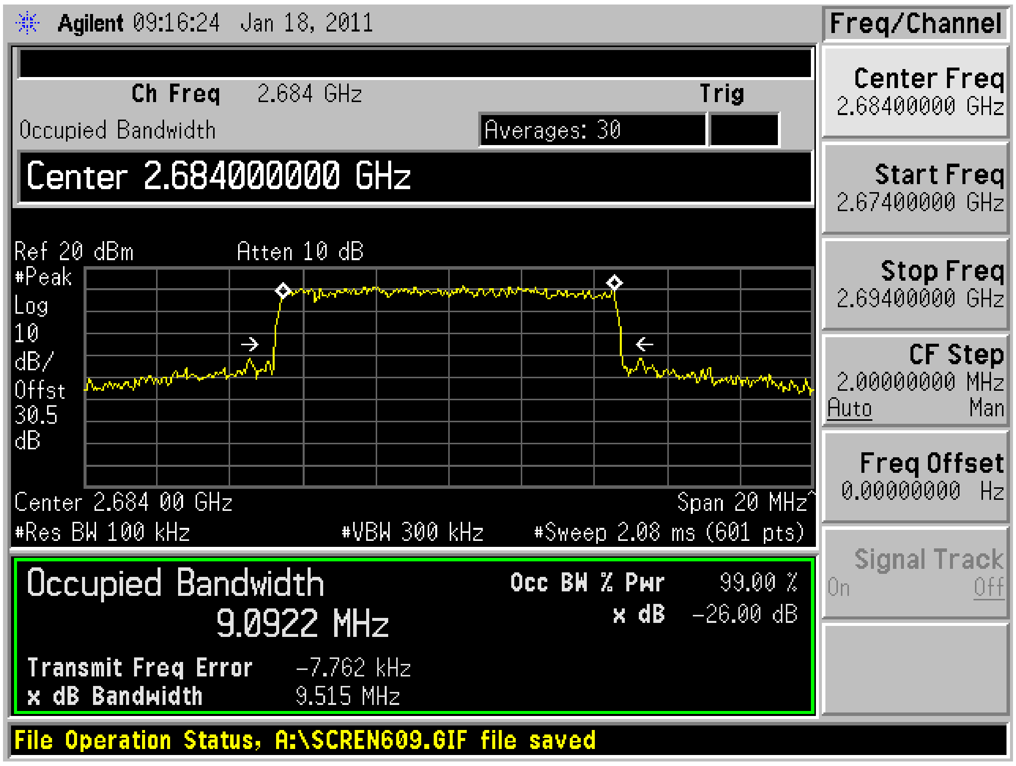
(16QAM Low Channel)



(16QAM Middle Channel)

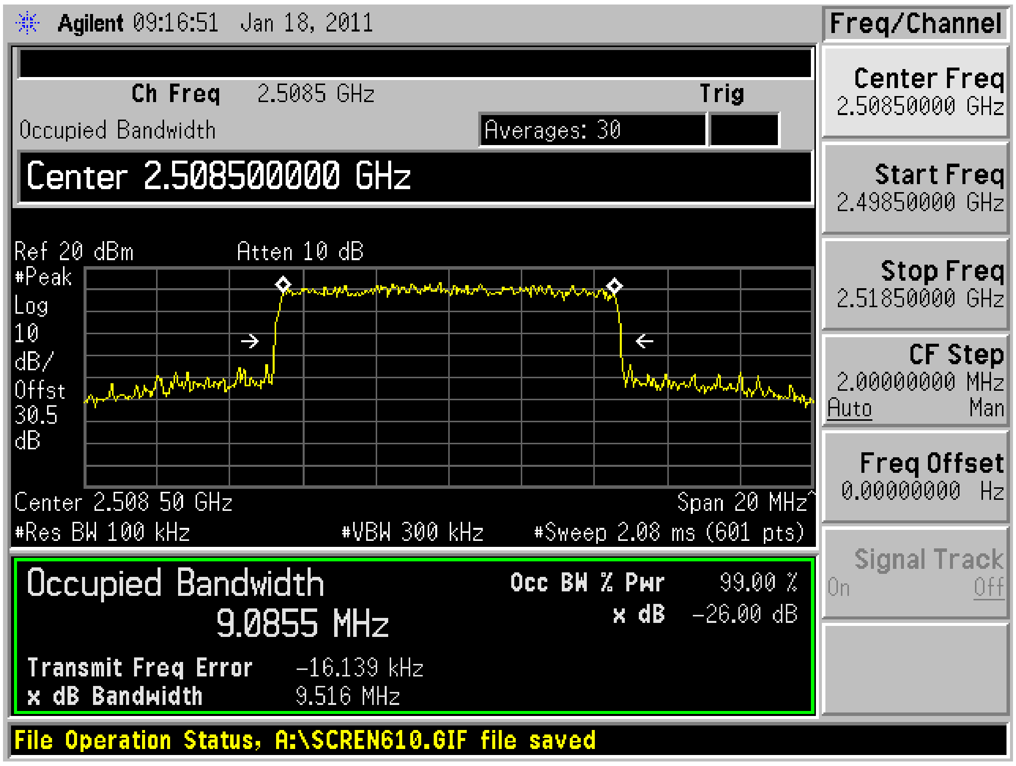


(16QAM High Channel)

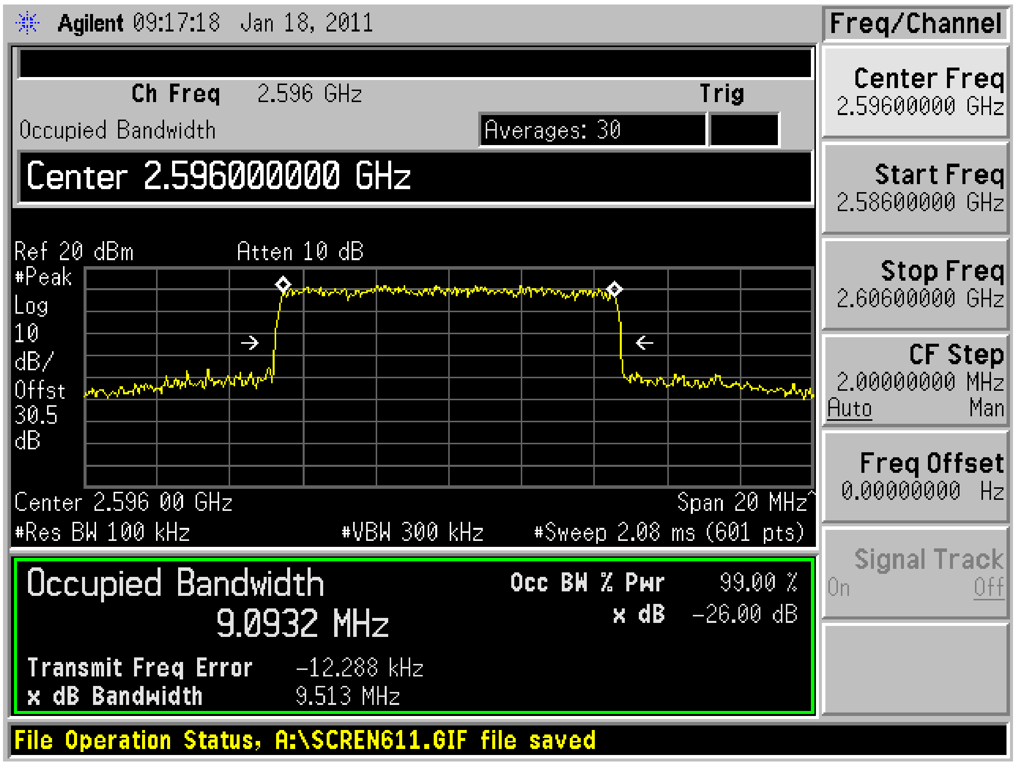


HCT CO.,LTD

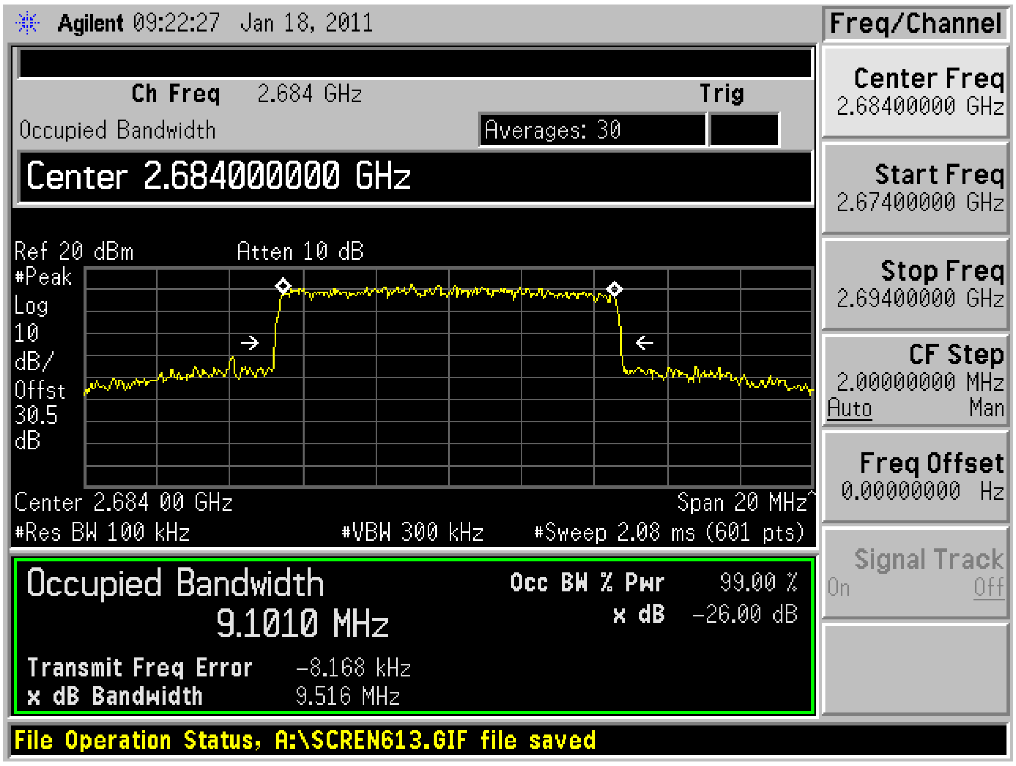
(64QAM Low Channel)



(64QAM Middle Channel)

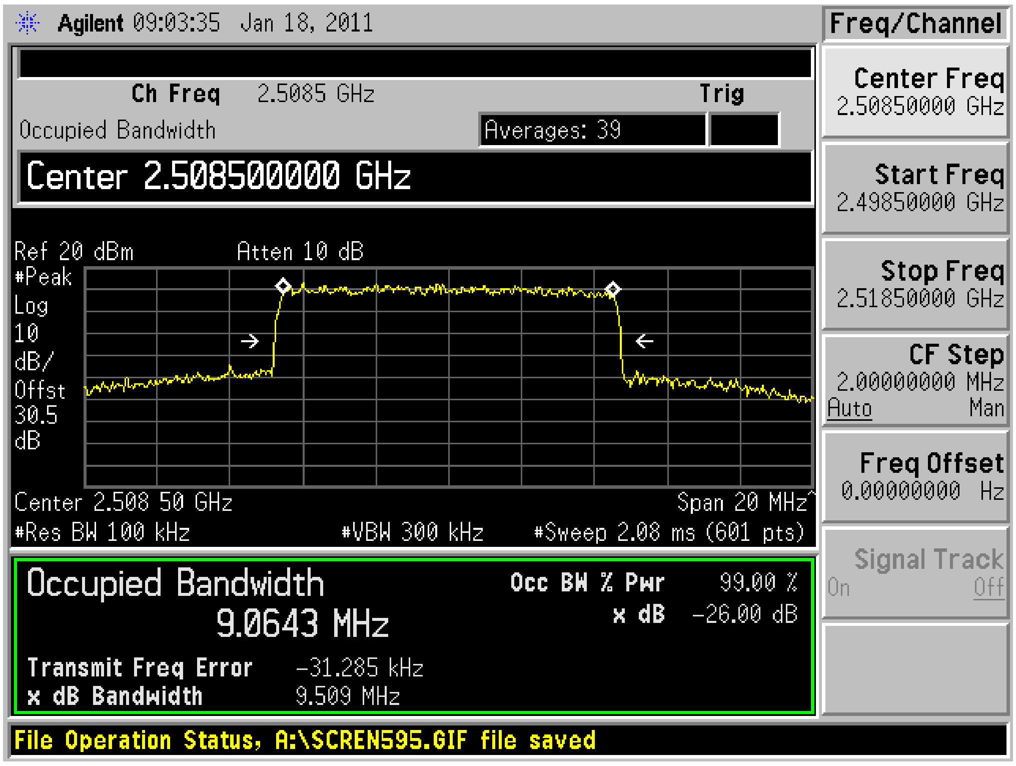


(64QAM High Channel)

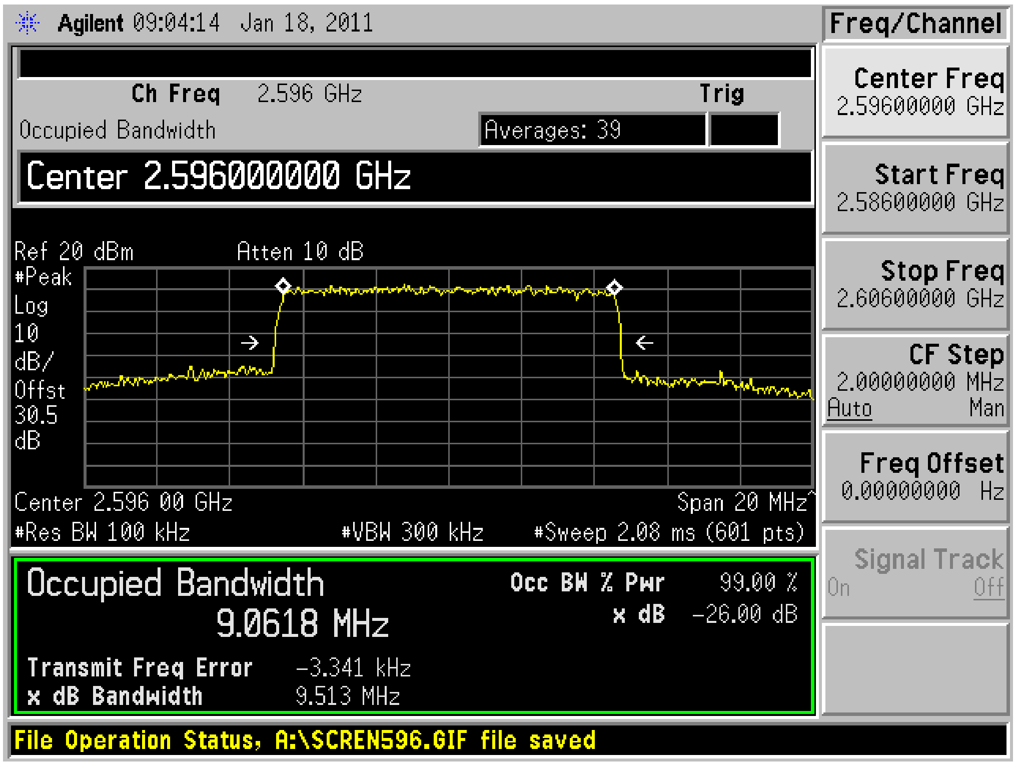


8.2.2. Test Plot at Output Port 1

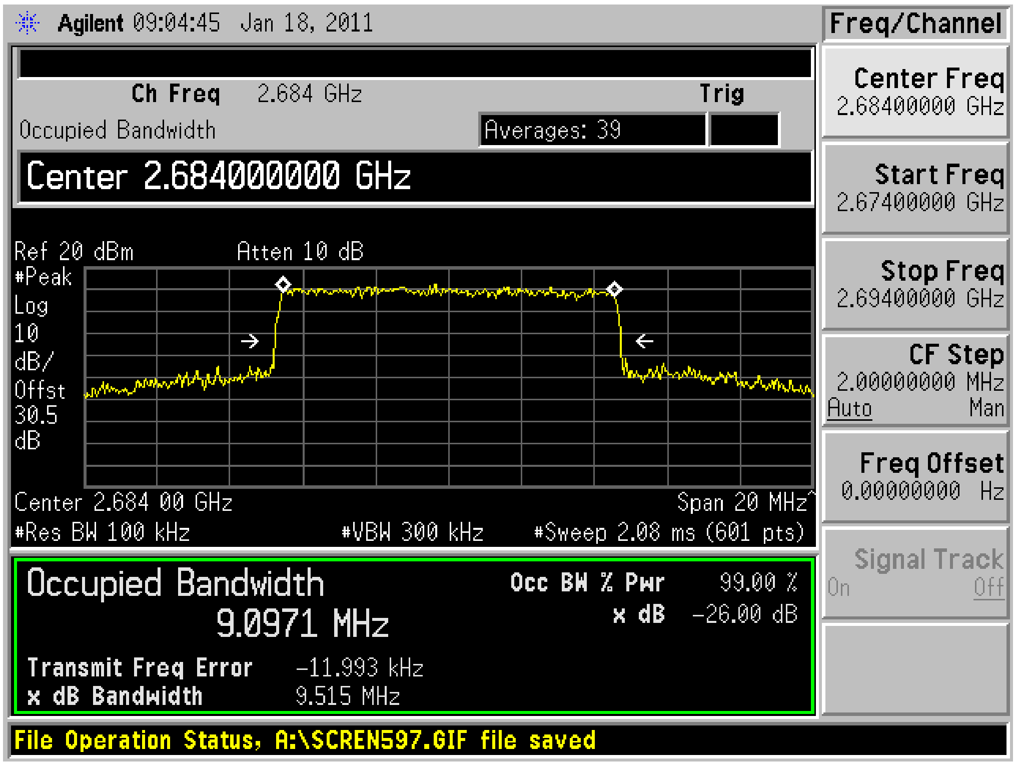
(QPSK Low Channel)



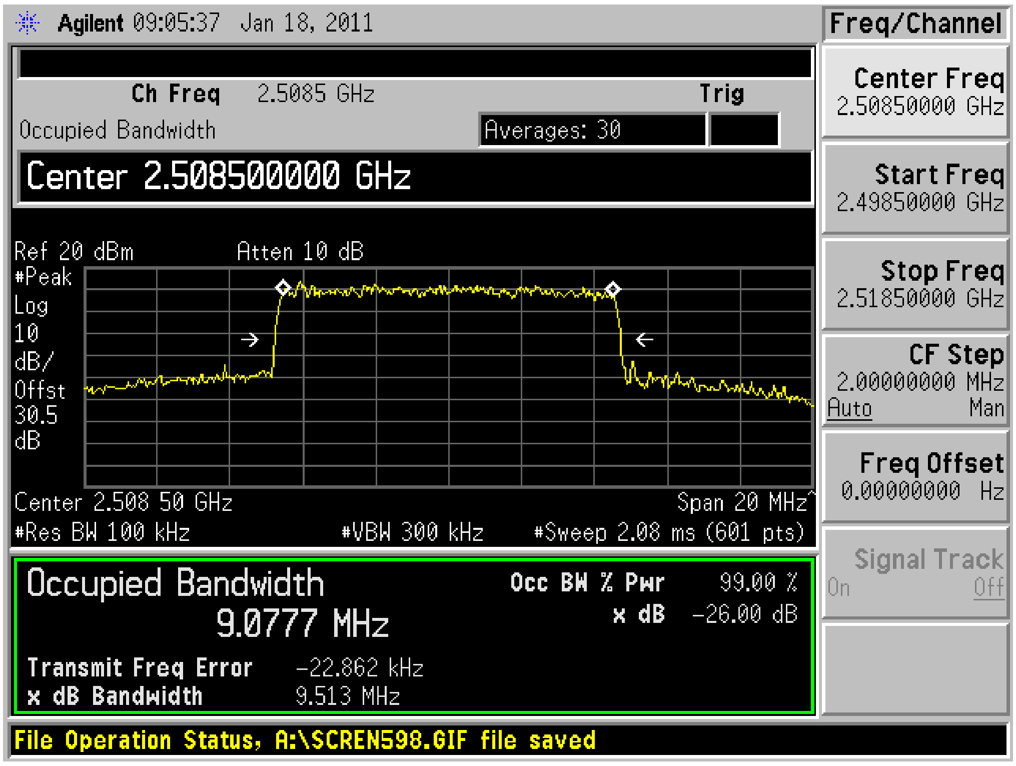
(QPSK Middle Channel)



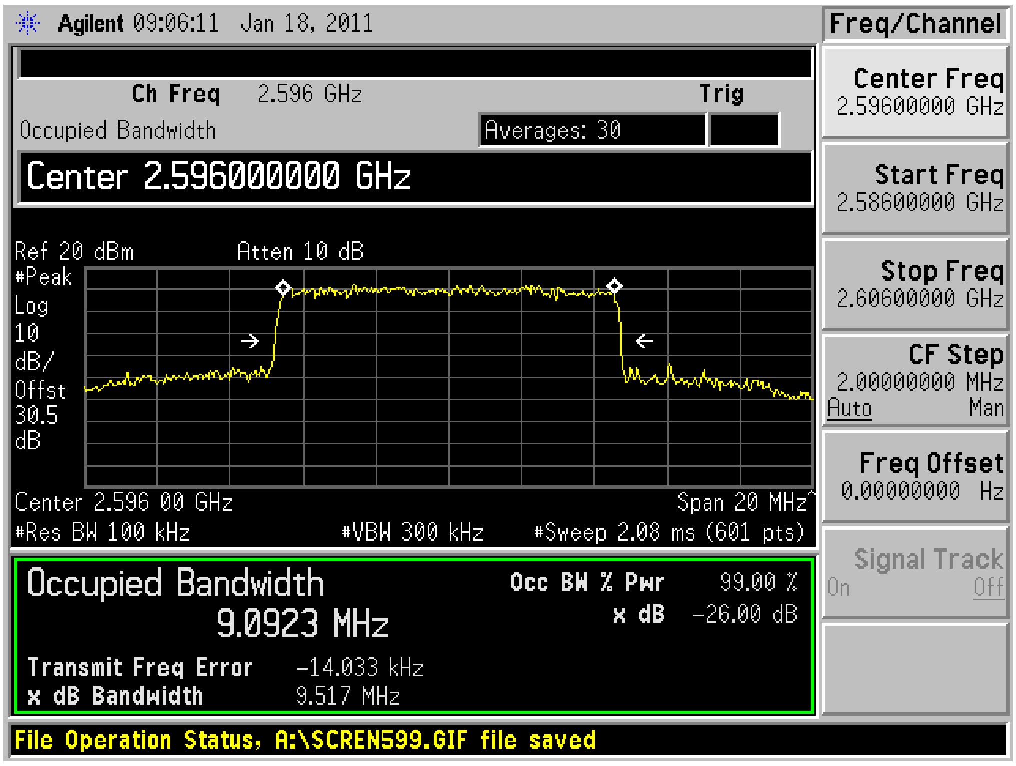
(QPSK High Channel)



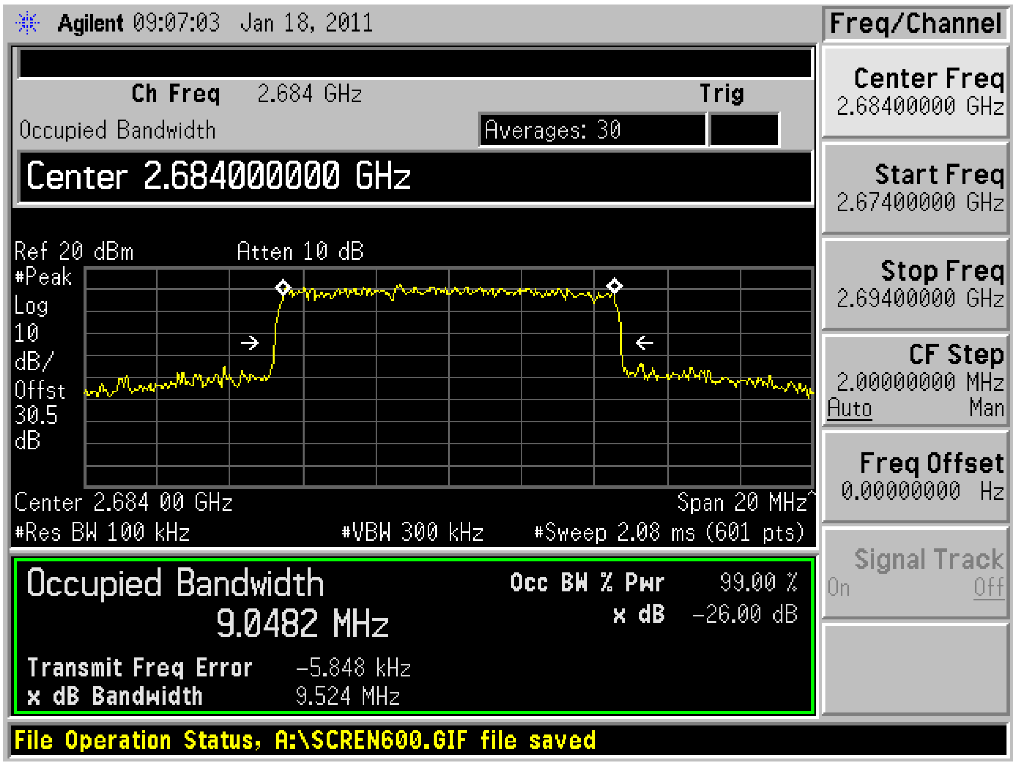
(16QAM Low Channel)



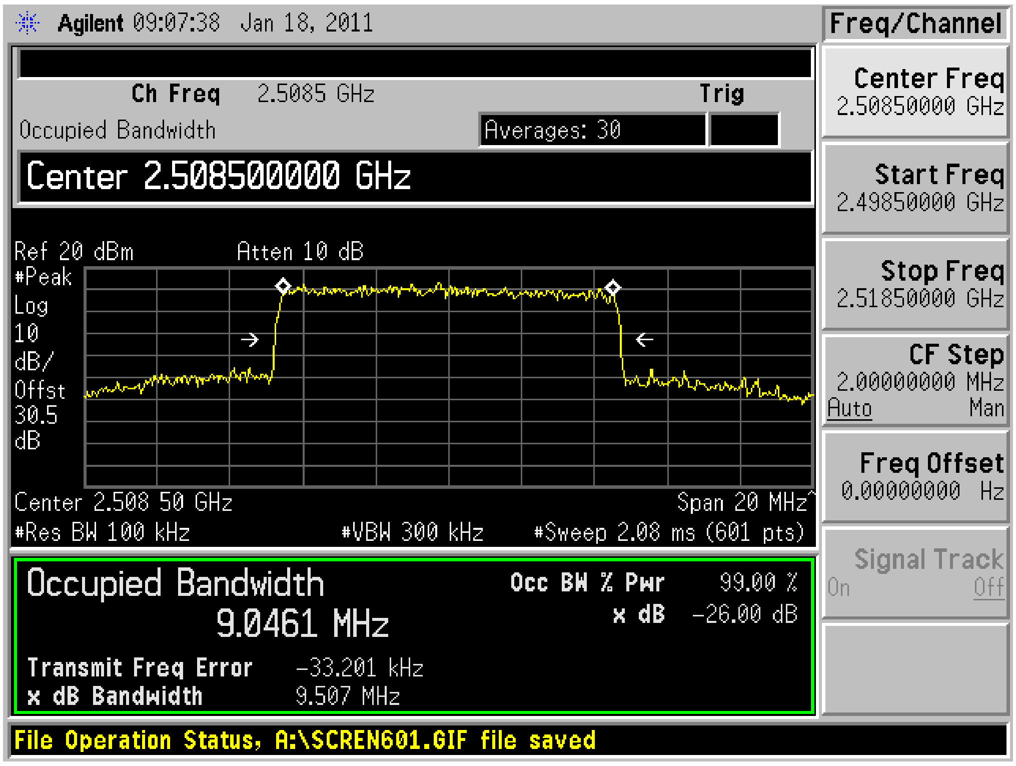
(16QAM Middle Channel)



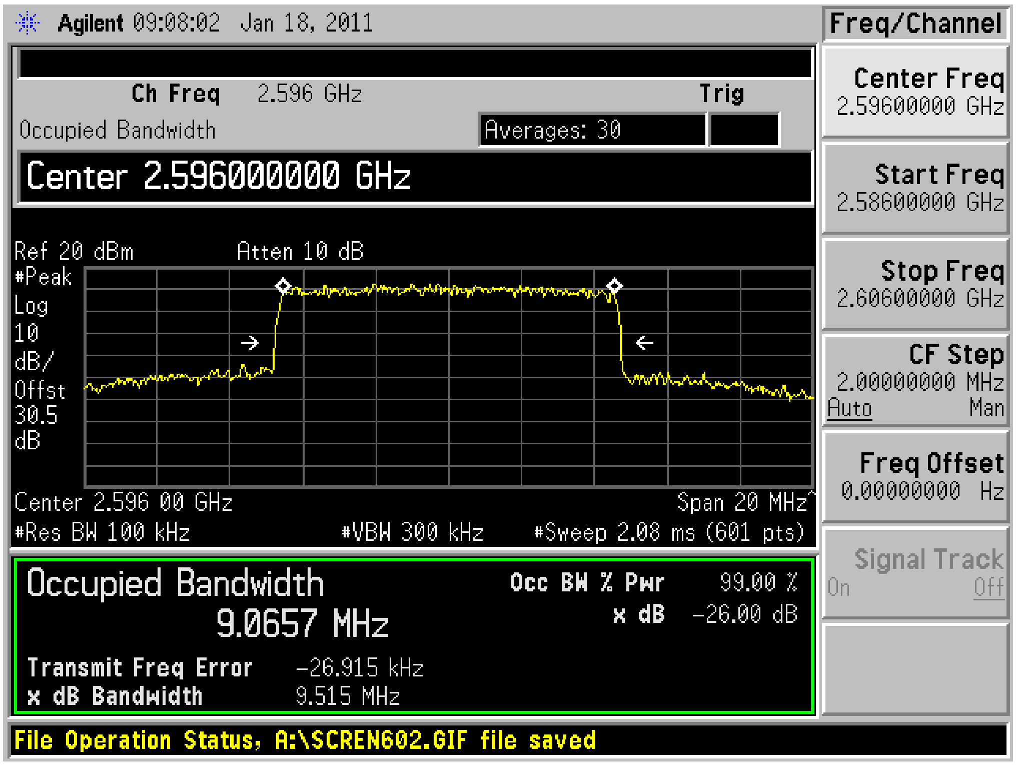
(16QAM High Channel)



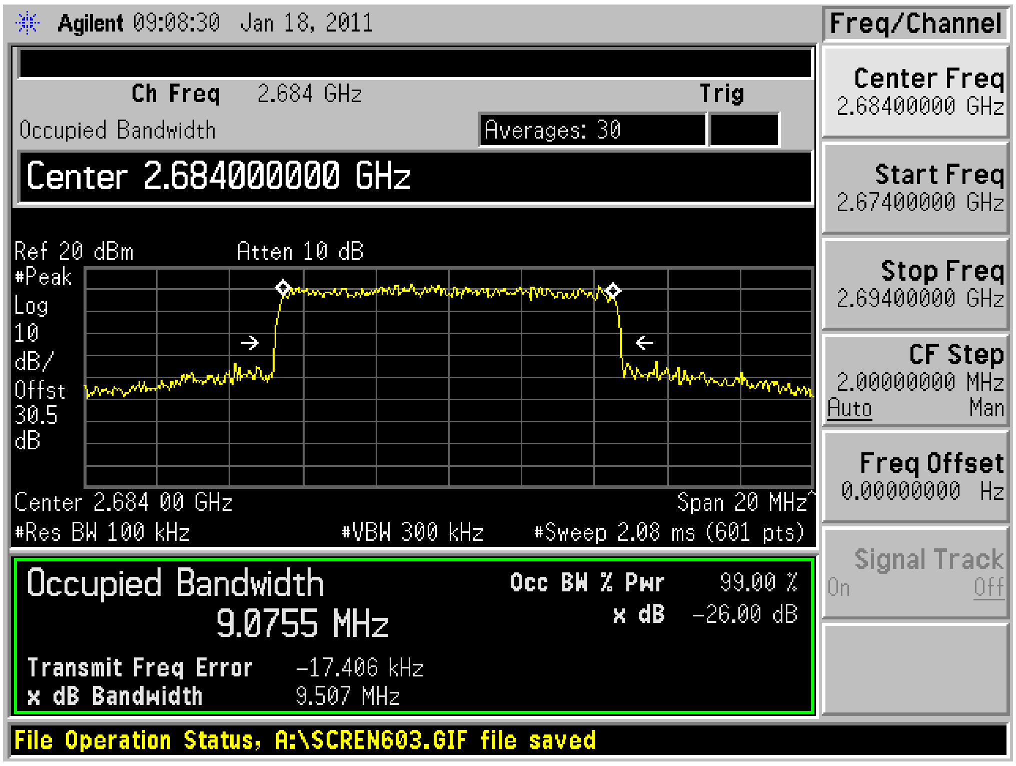
(64QAM Low Channel)



(64QAM Middle Channel)

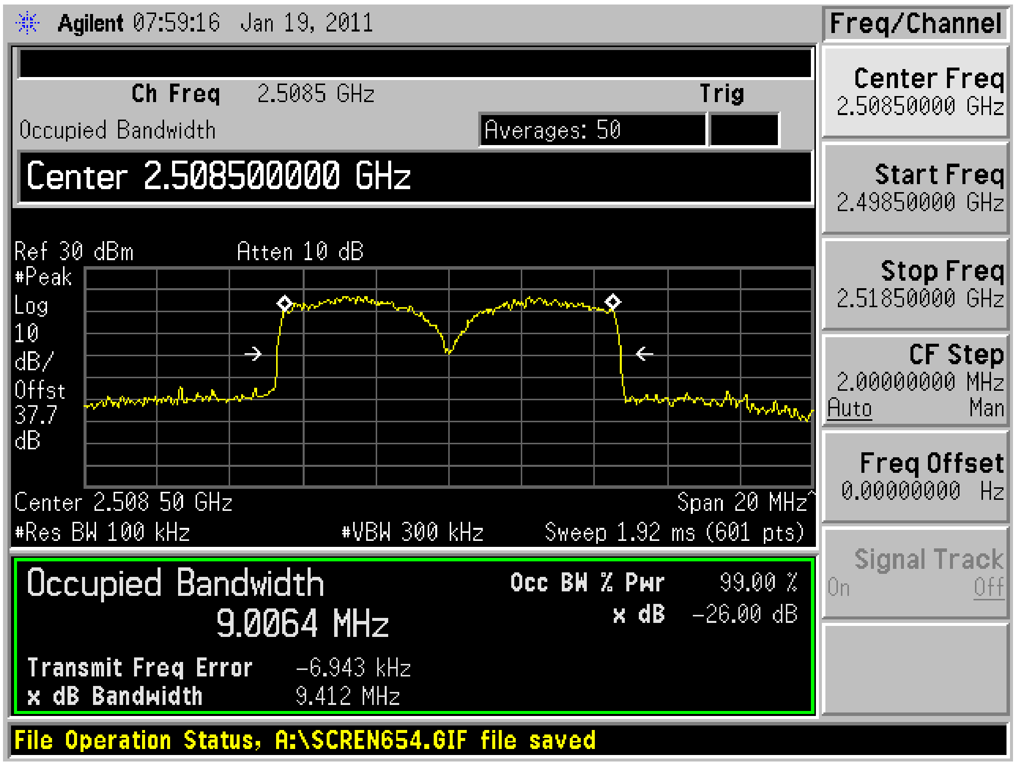


(64QAM High Channel)

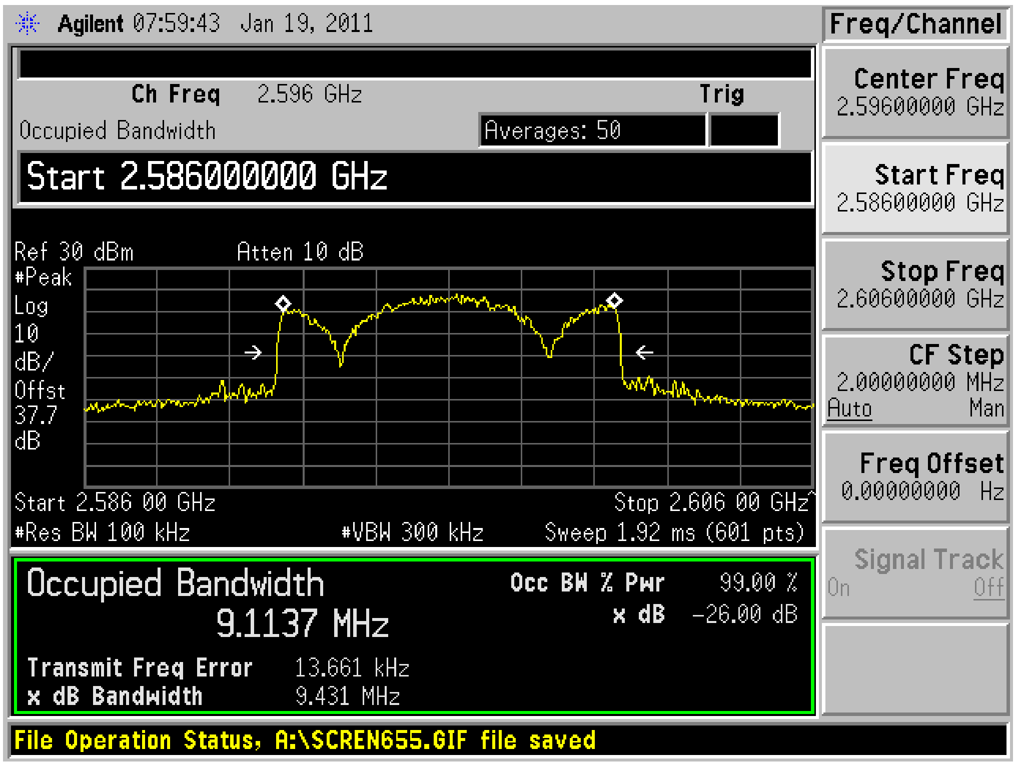


8.2.3. Combined Test Plot at Output Port

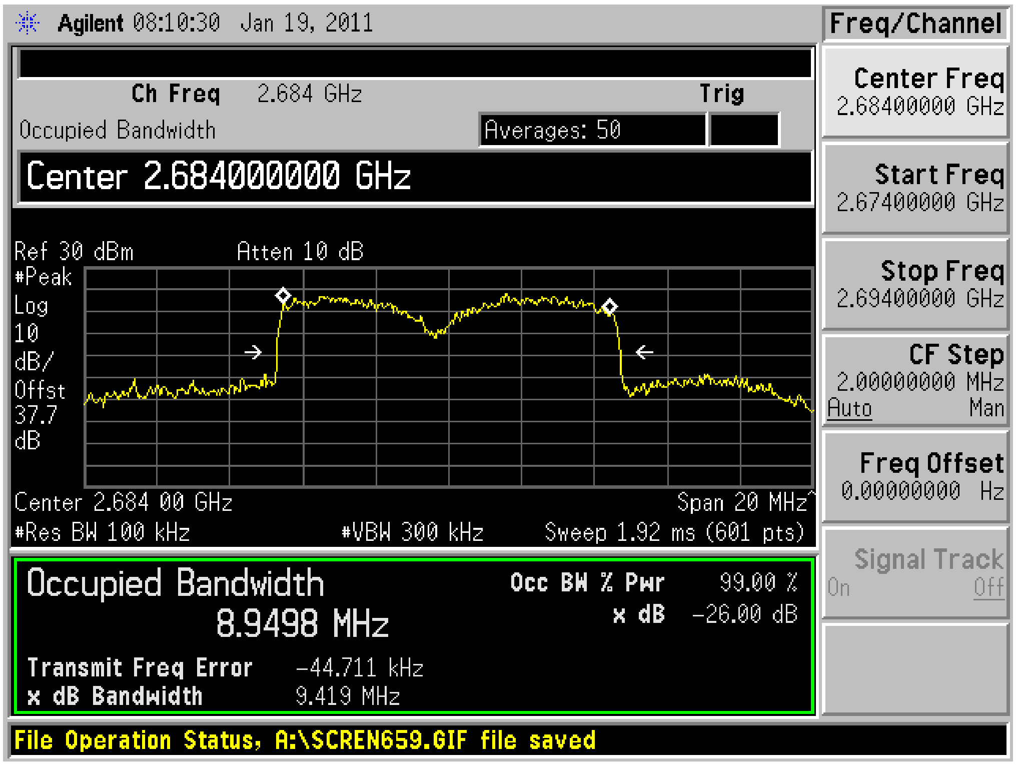
(QPSK Low Channel)



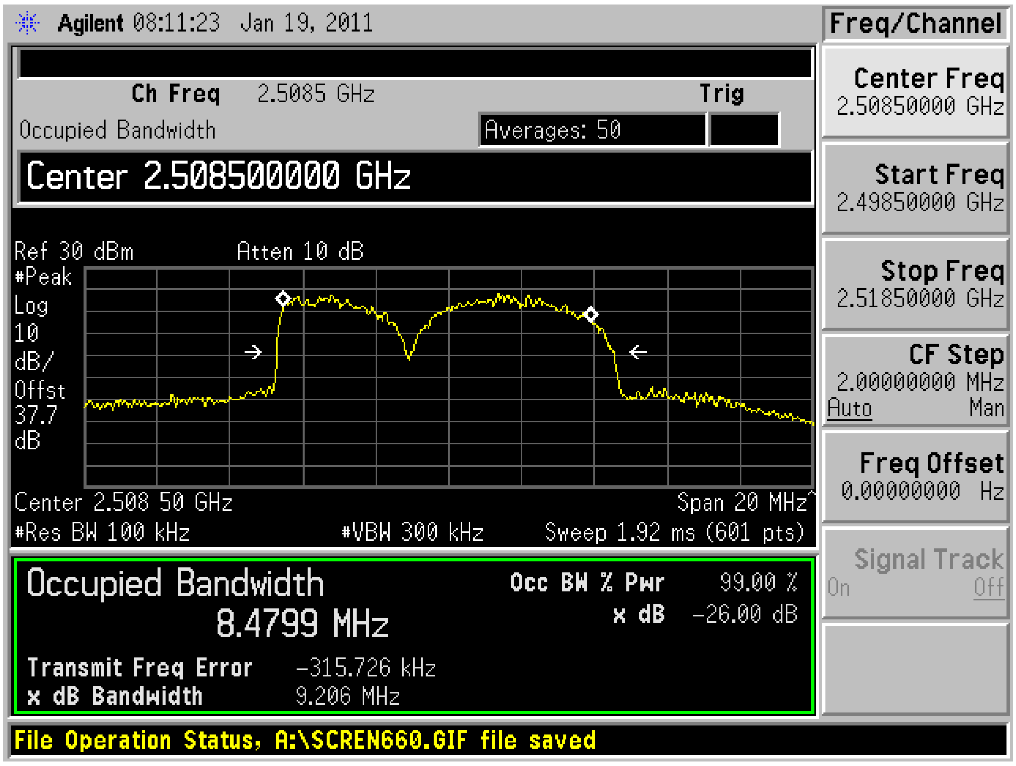
(QPSK Middle Channel)



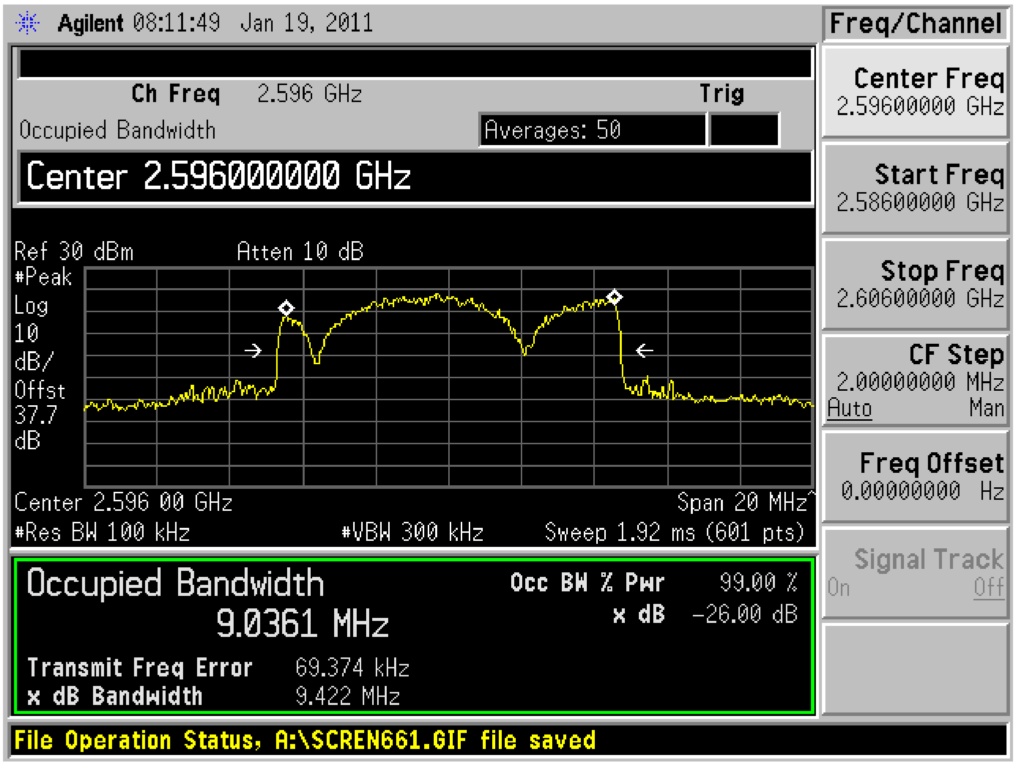
(QPSK High Channel)



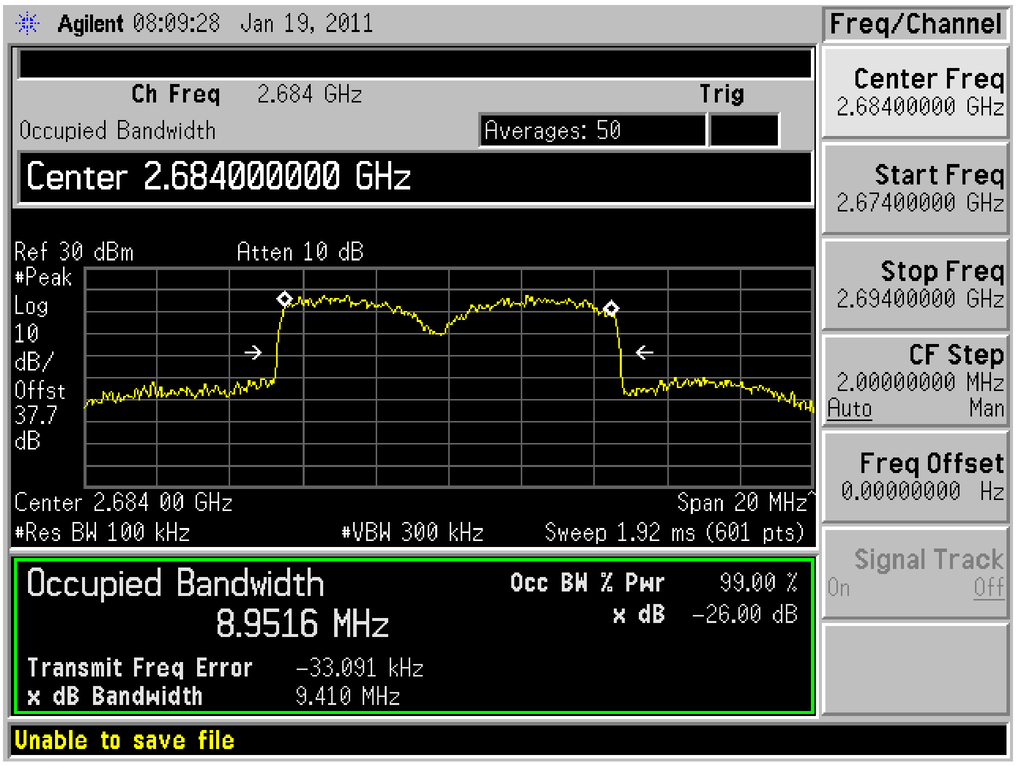
(16QAM Low Channel)



(16QAM Middle Channel)

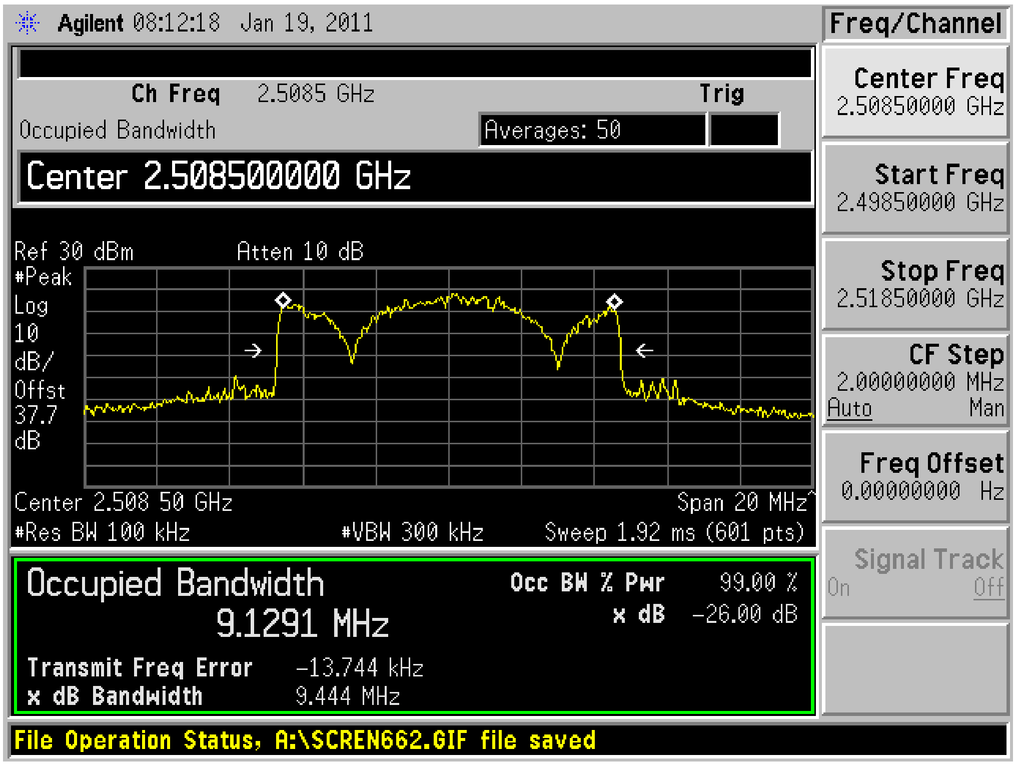


(16QAM High Channel)

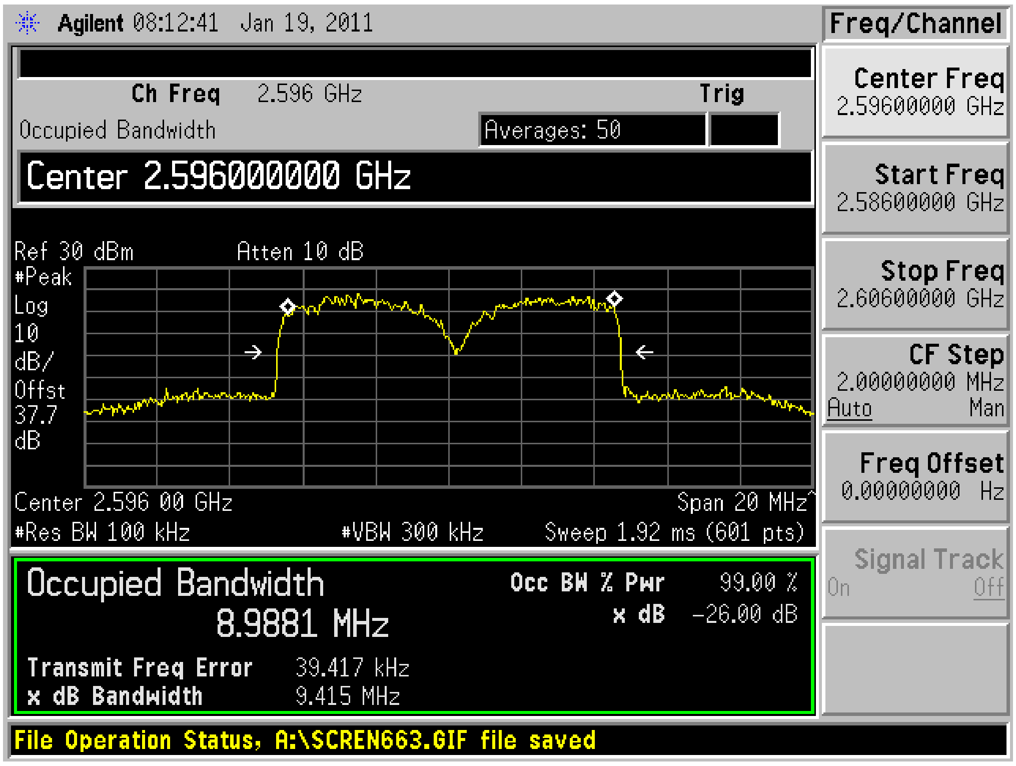


HCT
HCT CO.,LTD

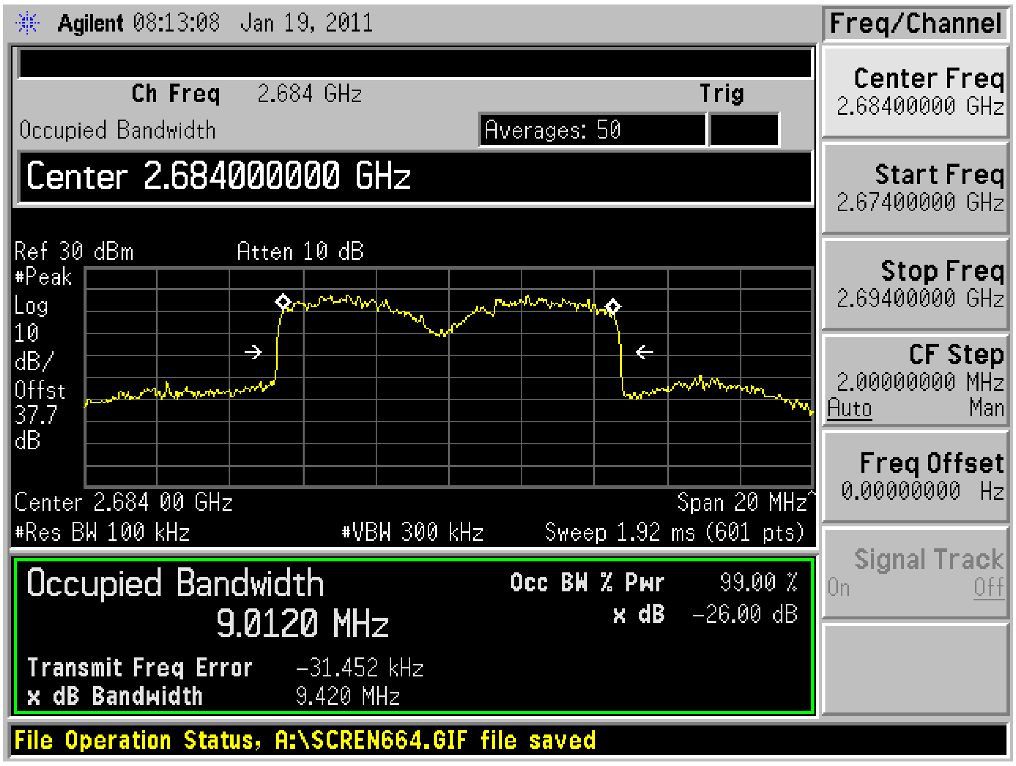
(64QAM Low Channel)



(64QAM Middle Channel)



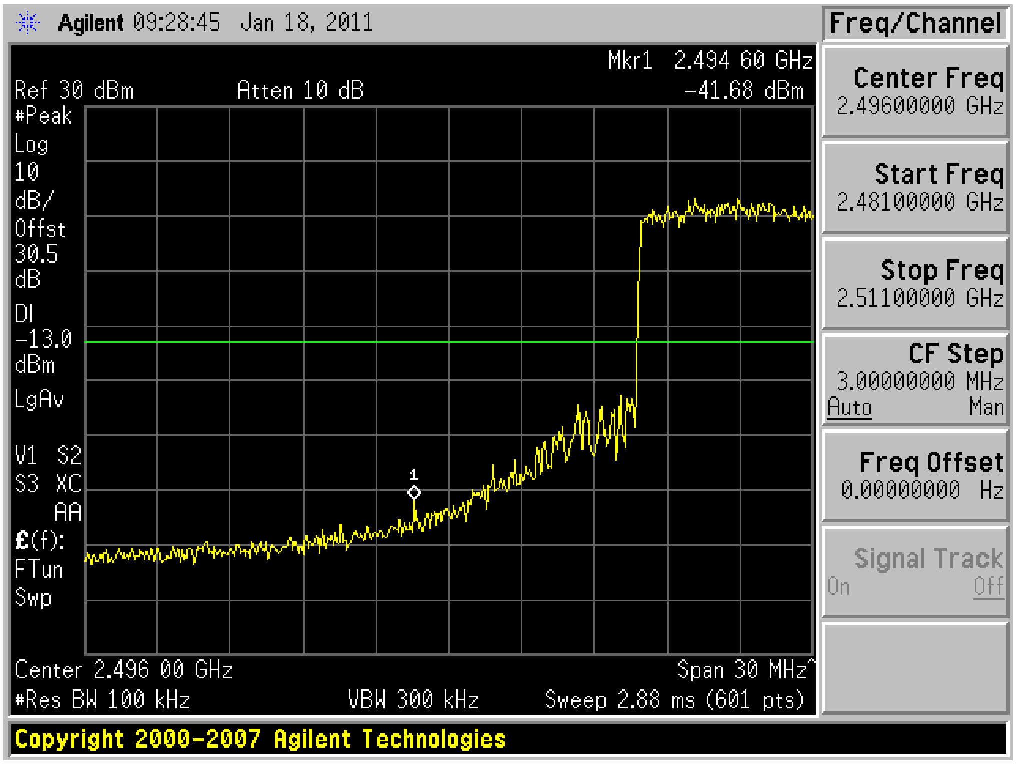
(64QAM High Channel)



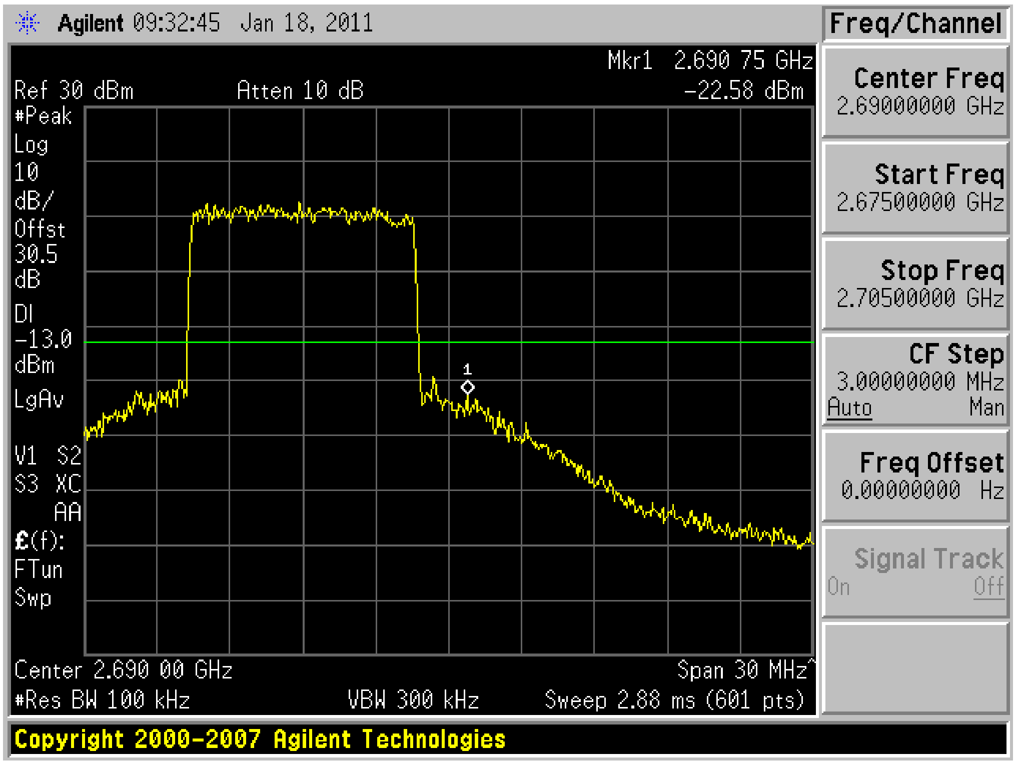
8.3. BAND EDGES

8.3.1 Test Plot at Output Port 0

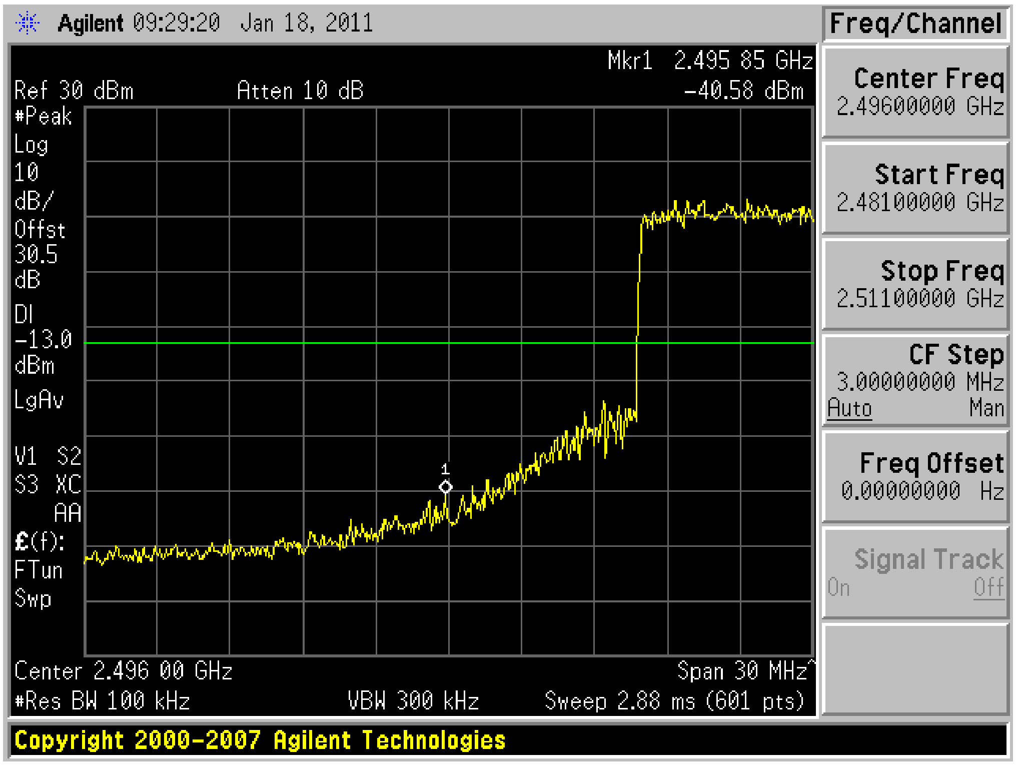
(QPSK Low Channel)



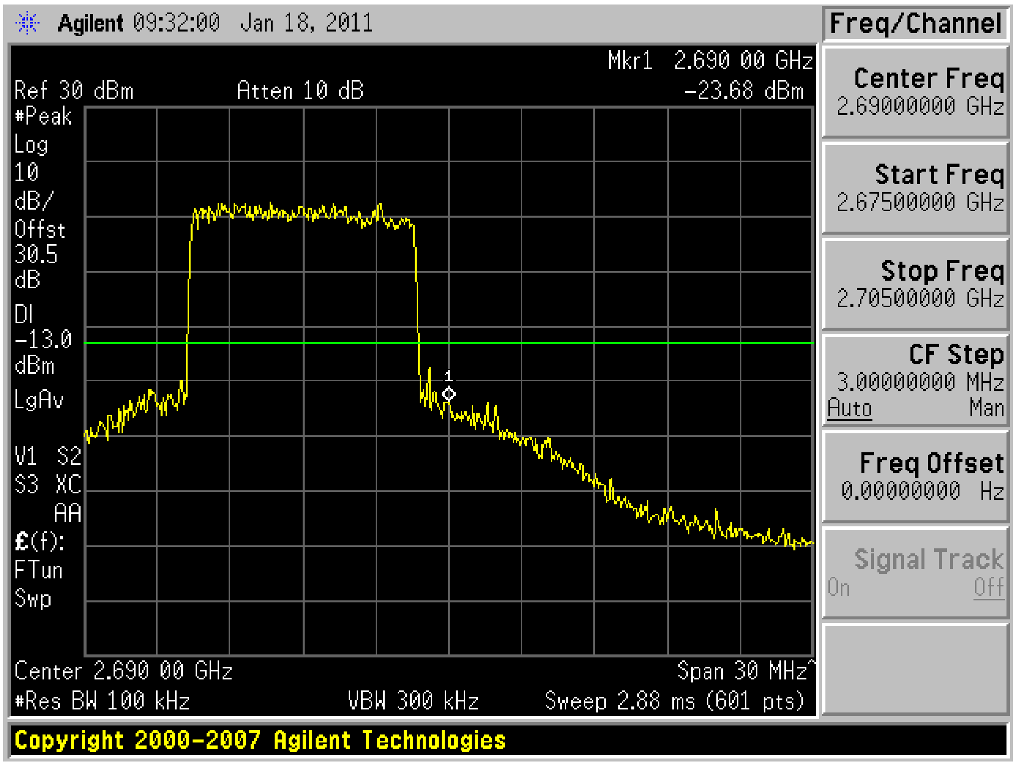
(QPSK High Channel)



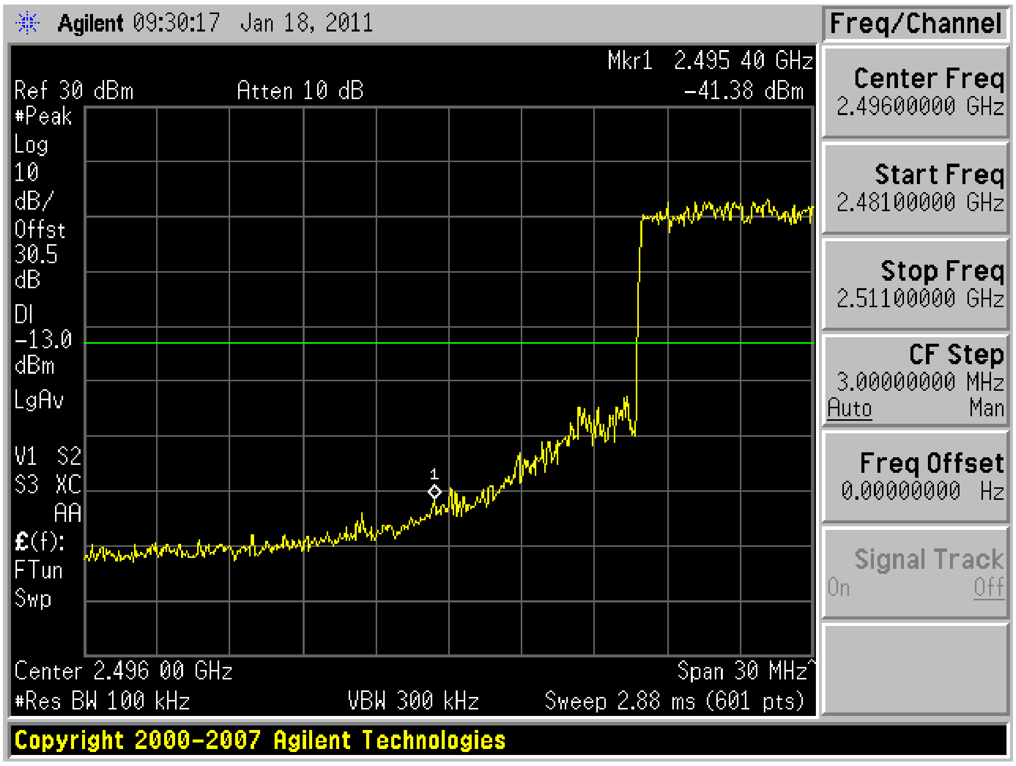
(16QAM Low Channel)



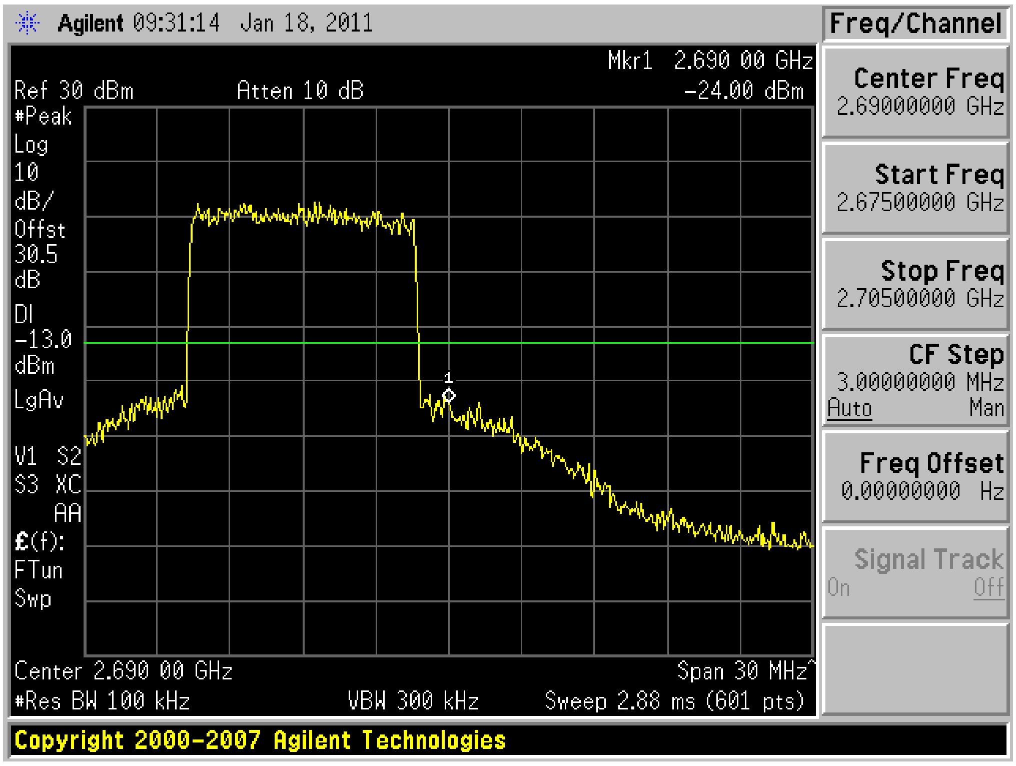
(16QAM High Channel)



(64QAM Low Channel)

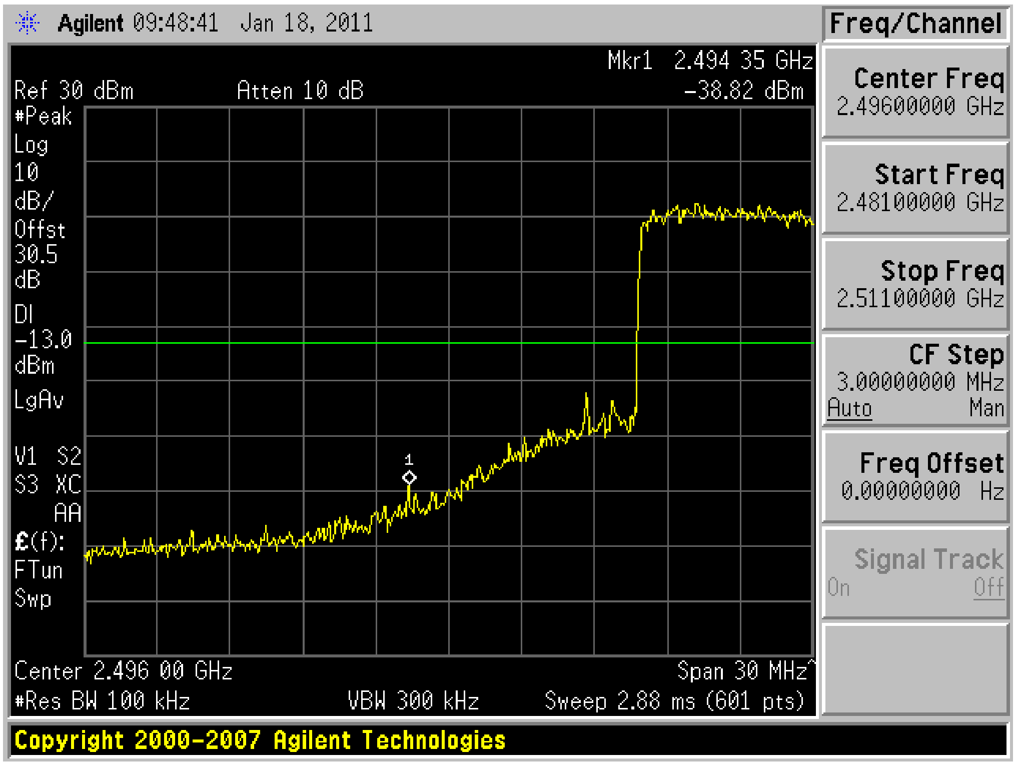


(64QAM High Channel)

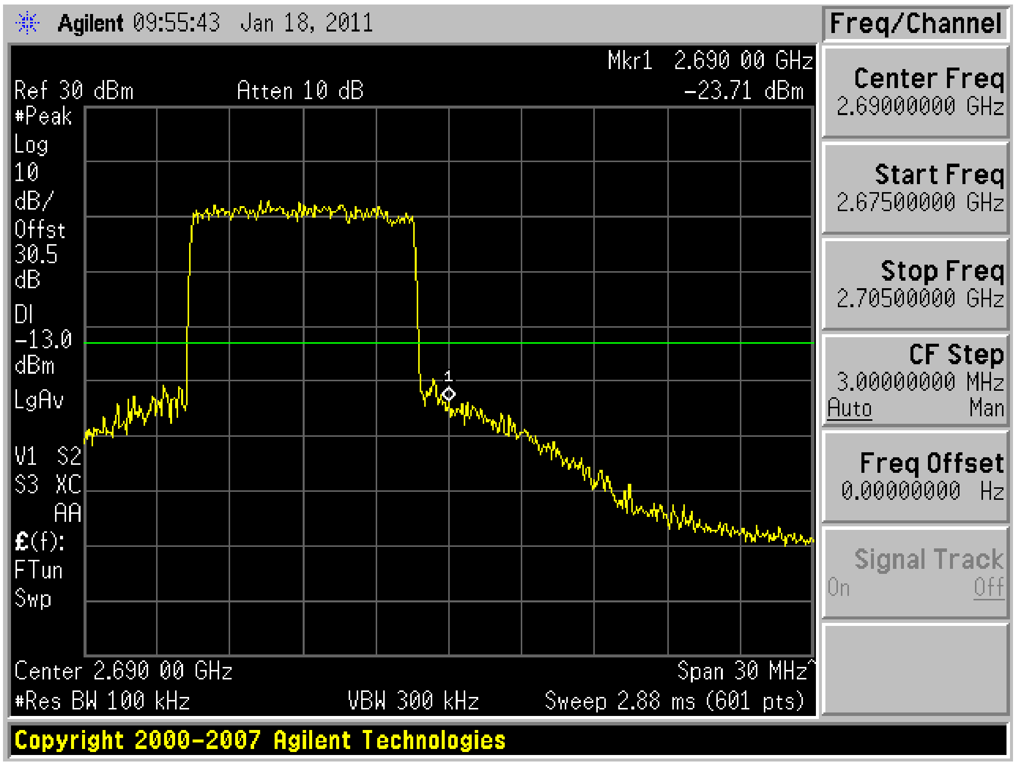


8.3.2. Plot Data at Output 1

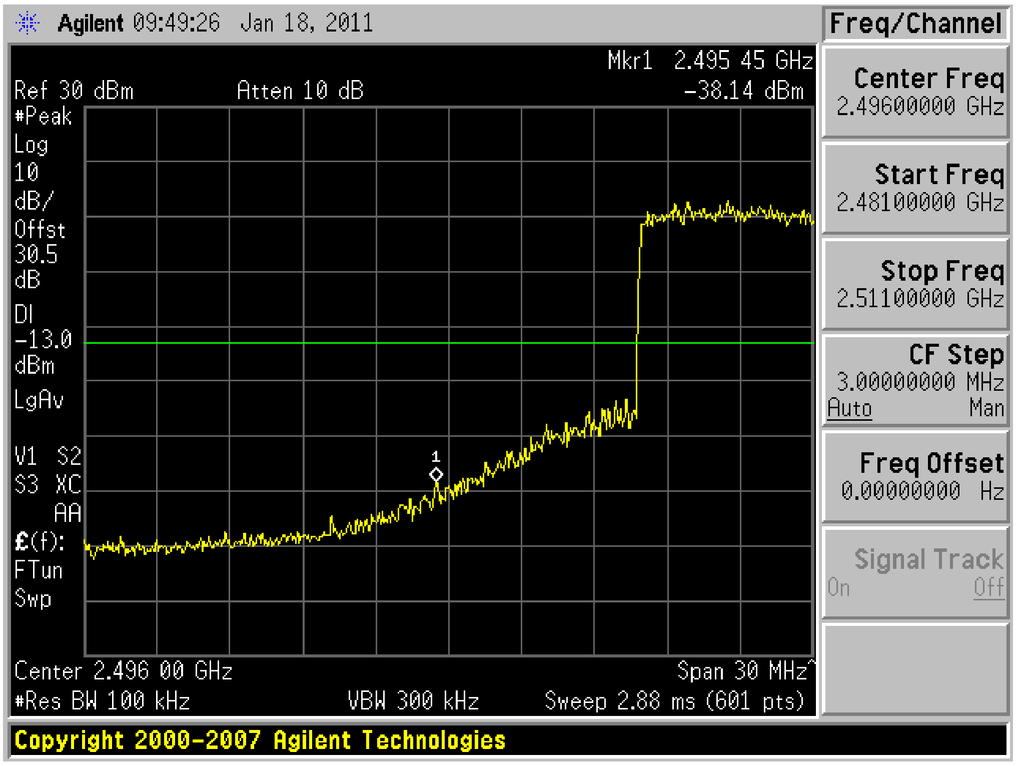
(QPSK Low Channel)



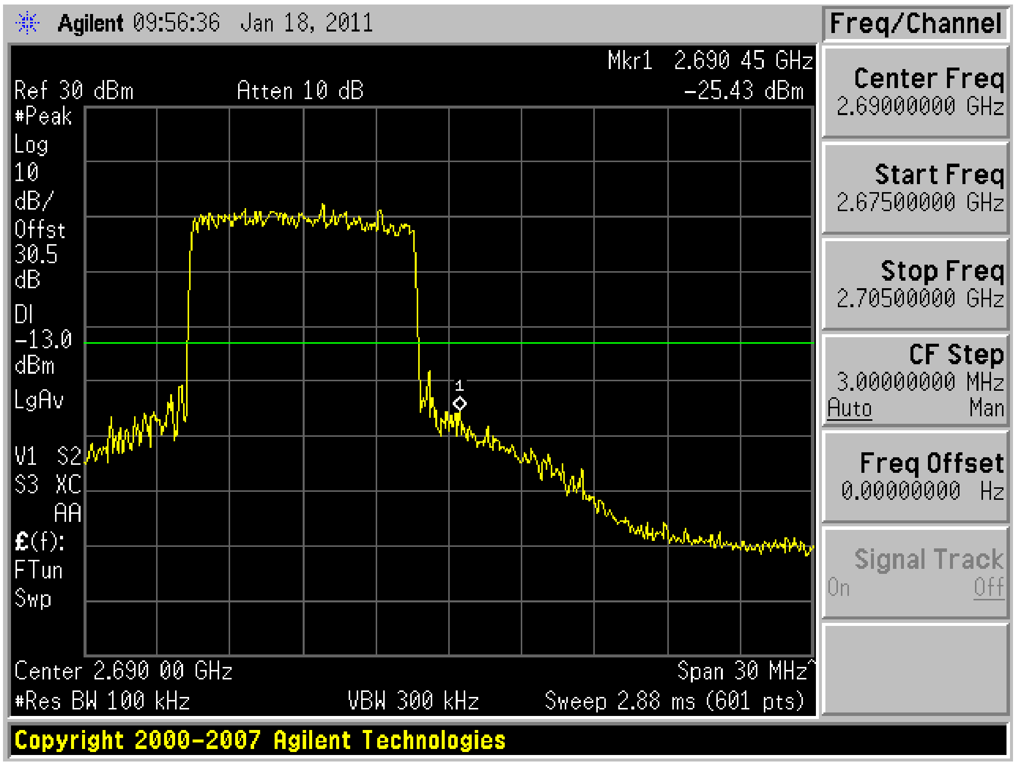
(QPSK High Channel)



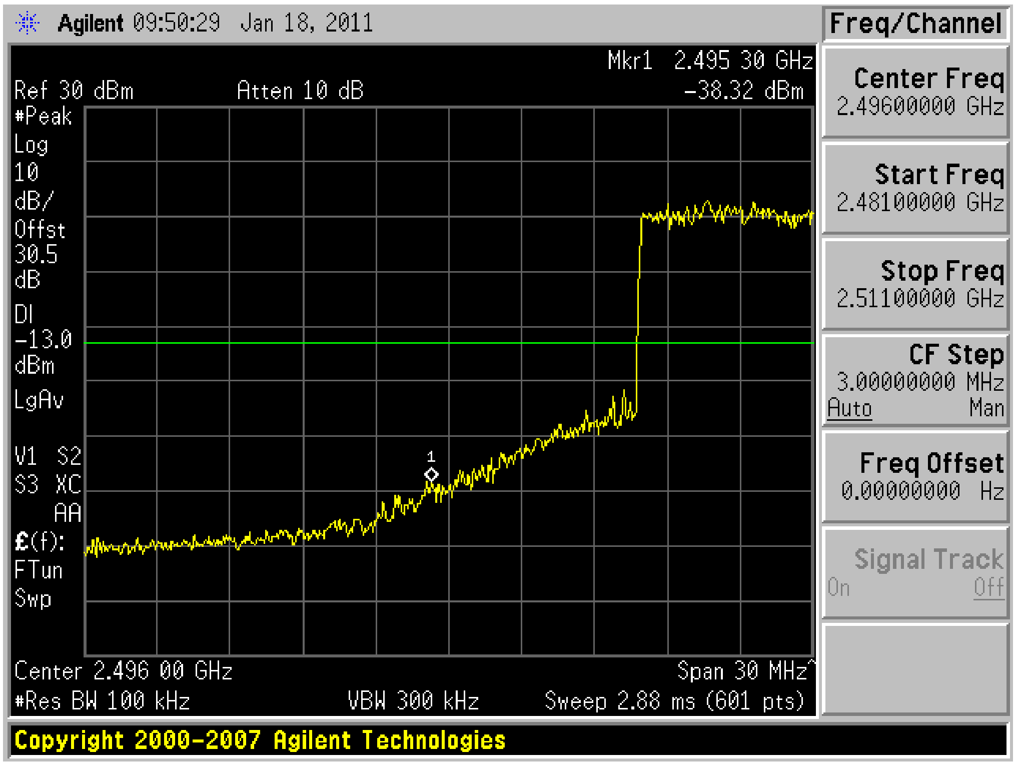
(16QAM Low Channel)



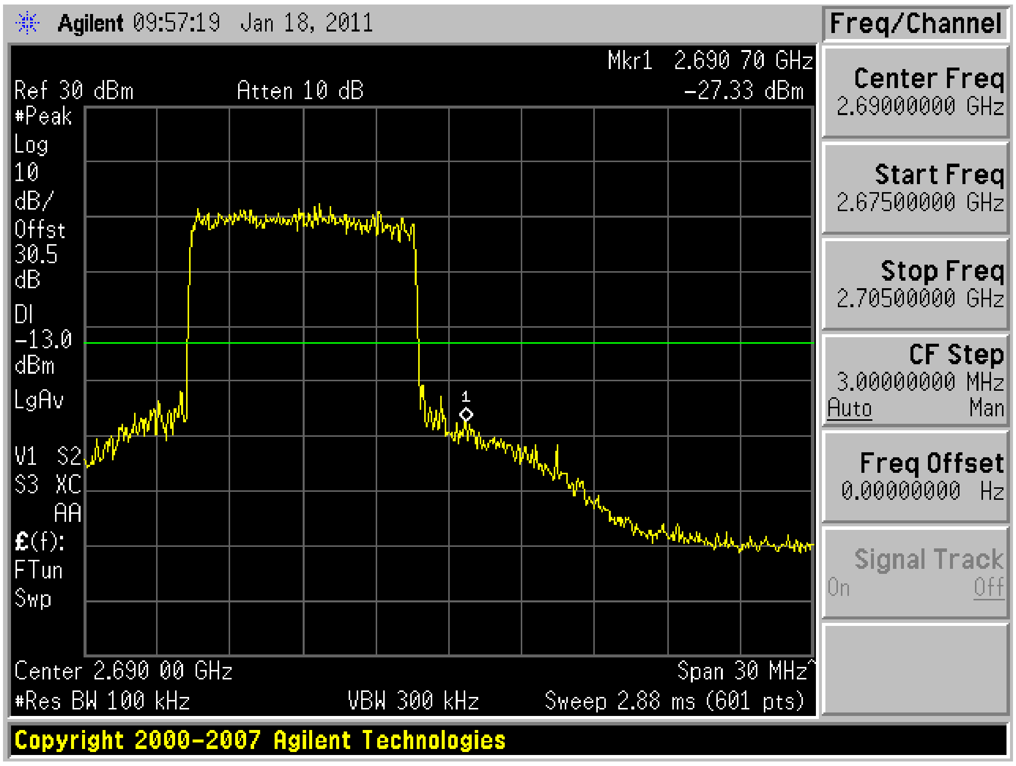
(16QAM High Channel)



(64QAM Low Channel)

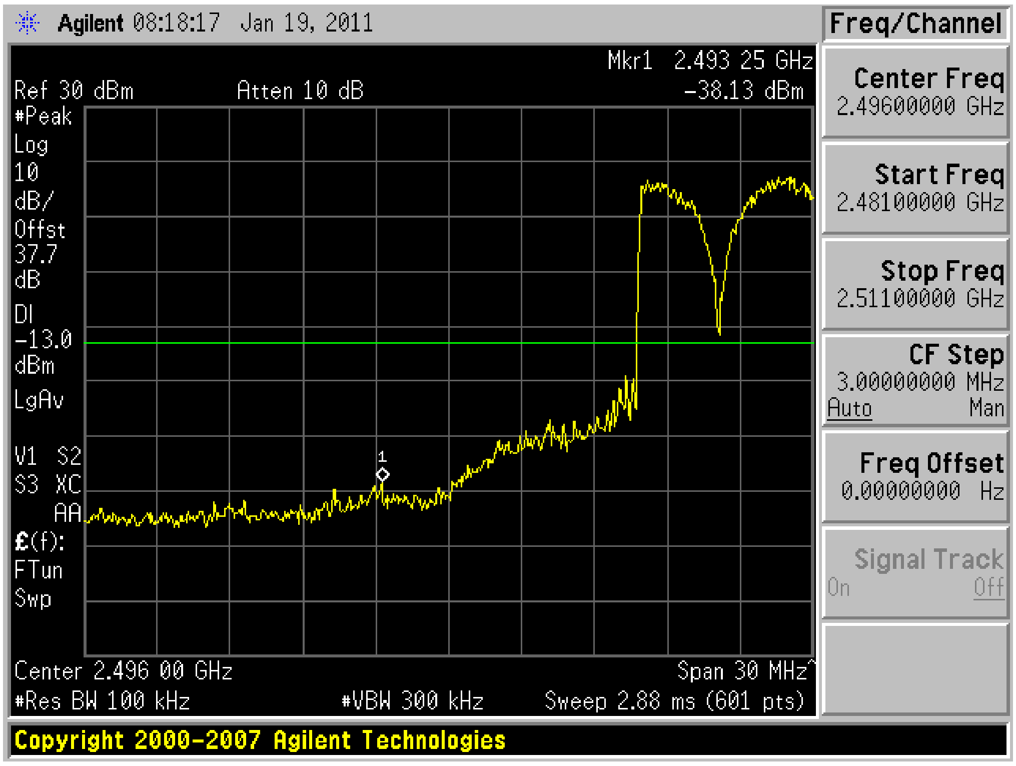


(64QAM High Channel)

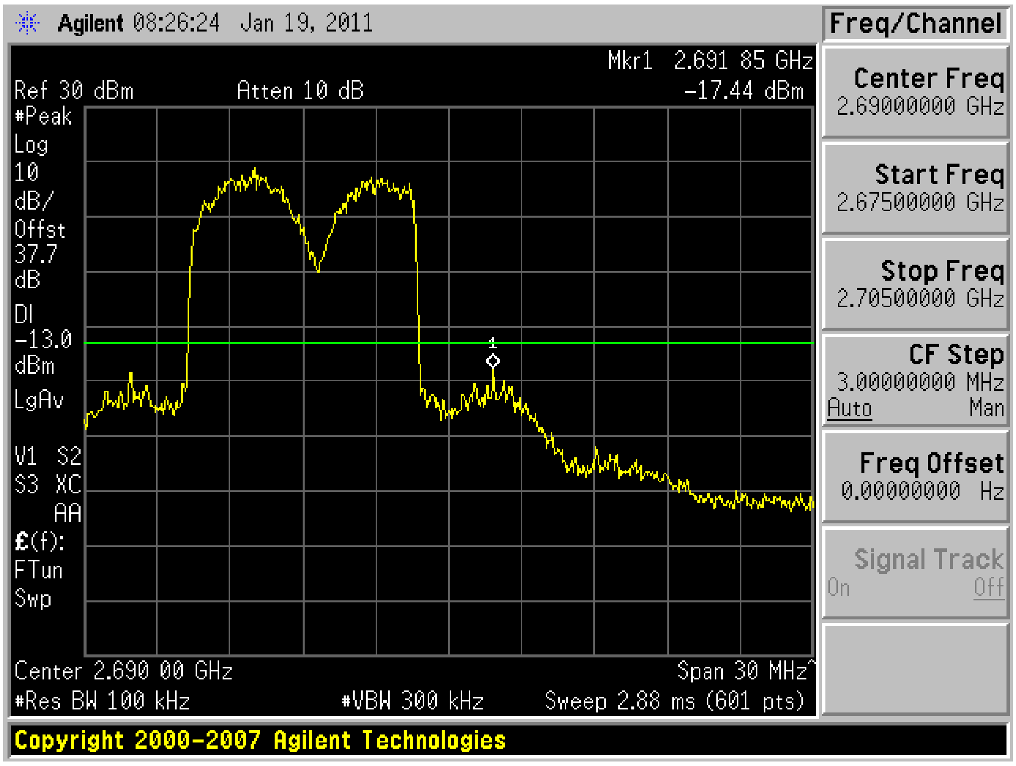


8.3.3. Combined Plot Data at Output

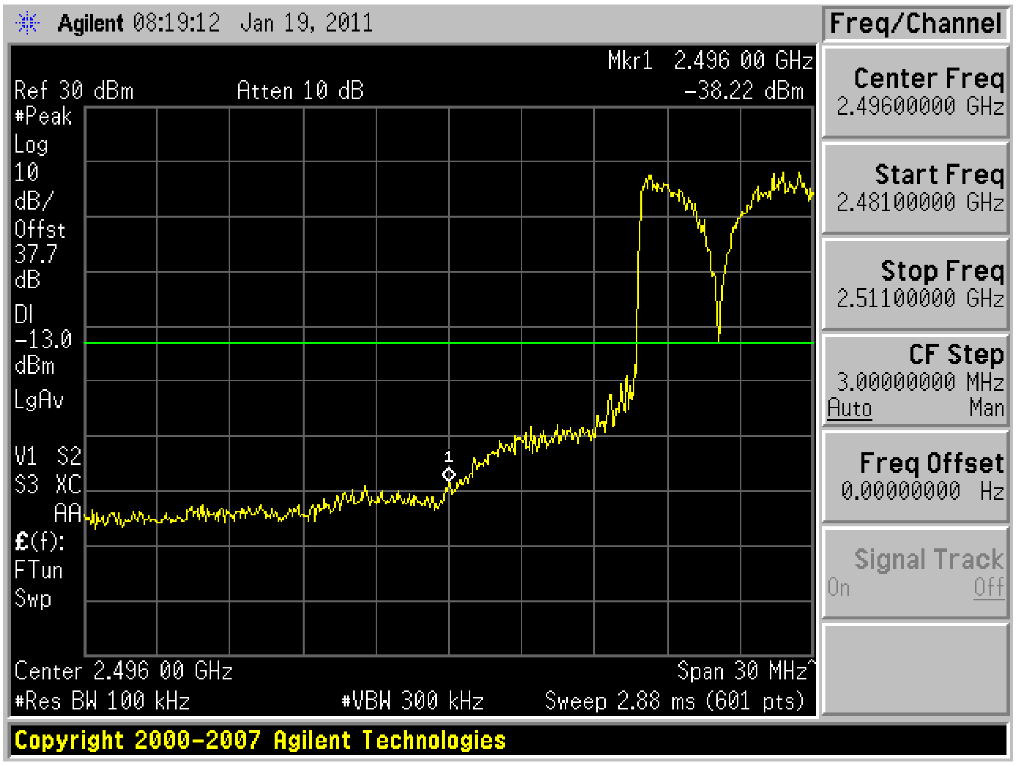
(QPSK Low Channel)



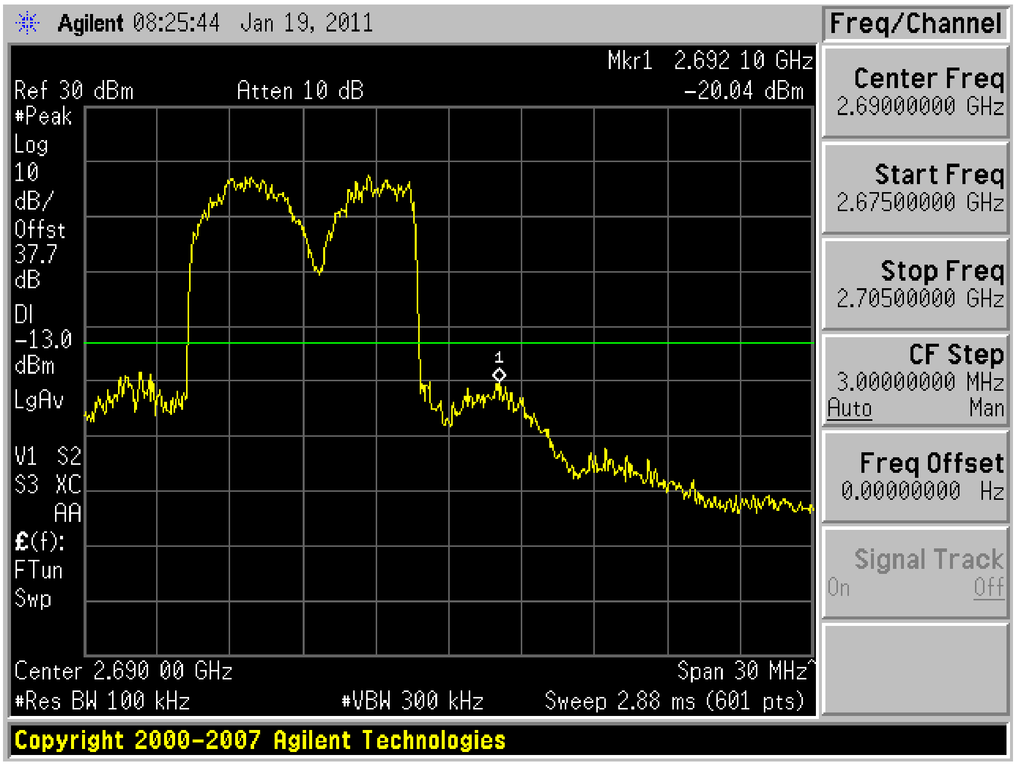
(QPSK High Channel)



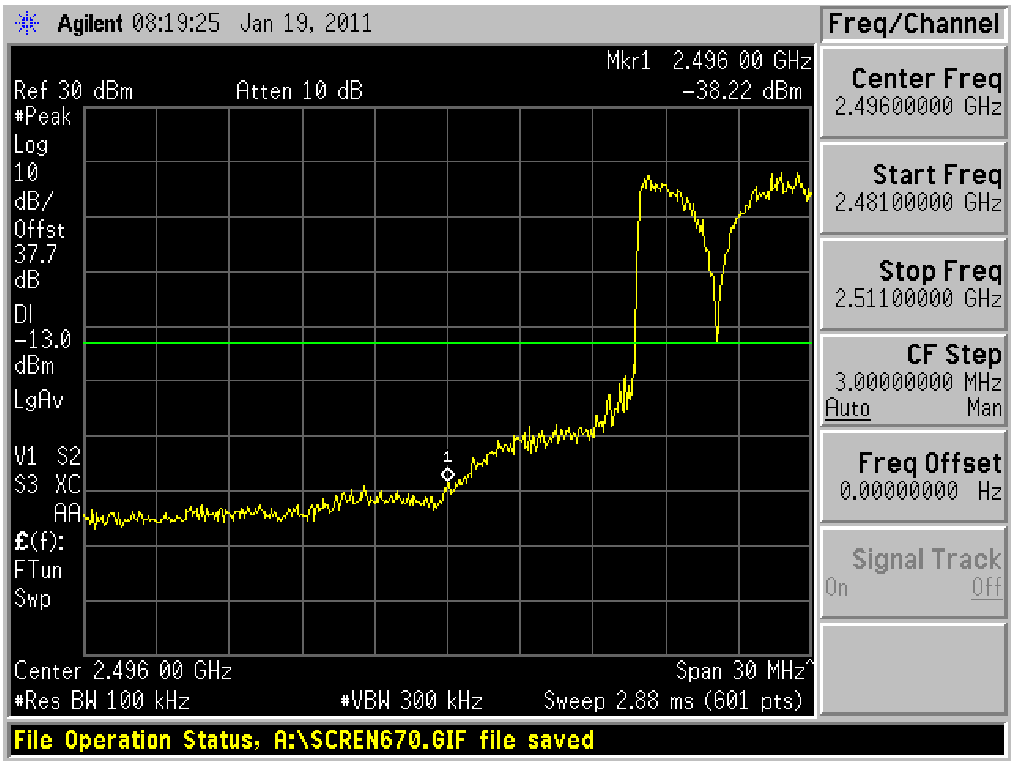
(16QAM Low Channel)



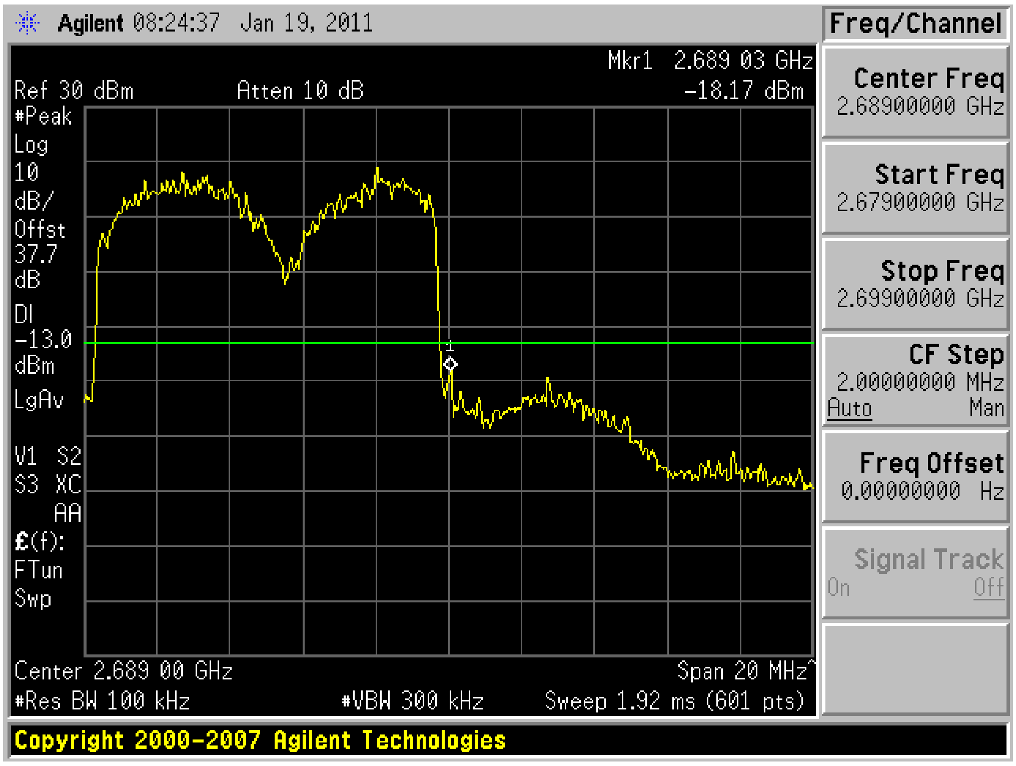
(16QAM High Channel)



(64QAM Low Channel)



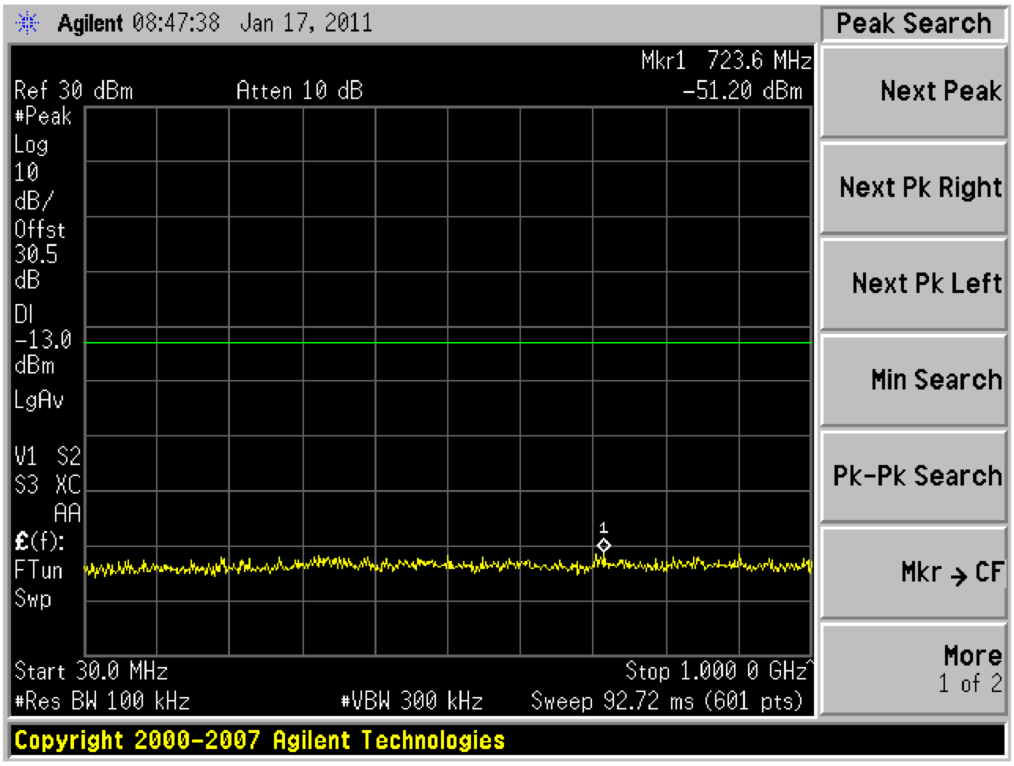
(64QAM High Channel)



8.4. SPURIOUS EMISSION AT ANTENNA TERMINAL

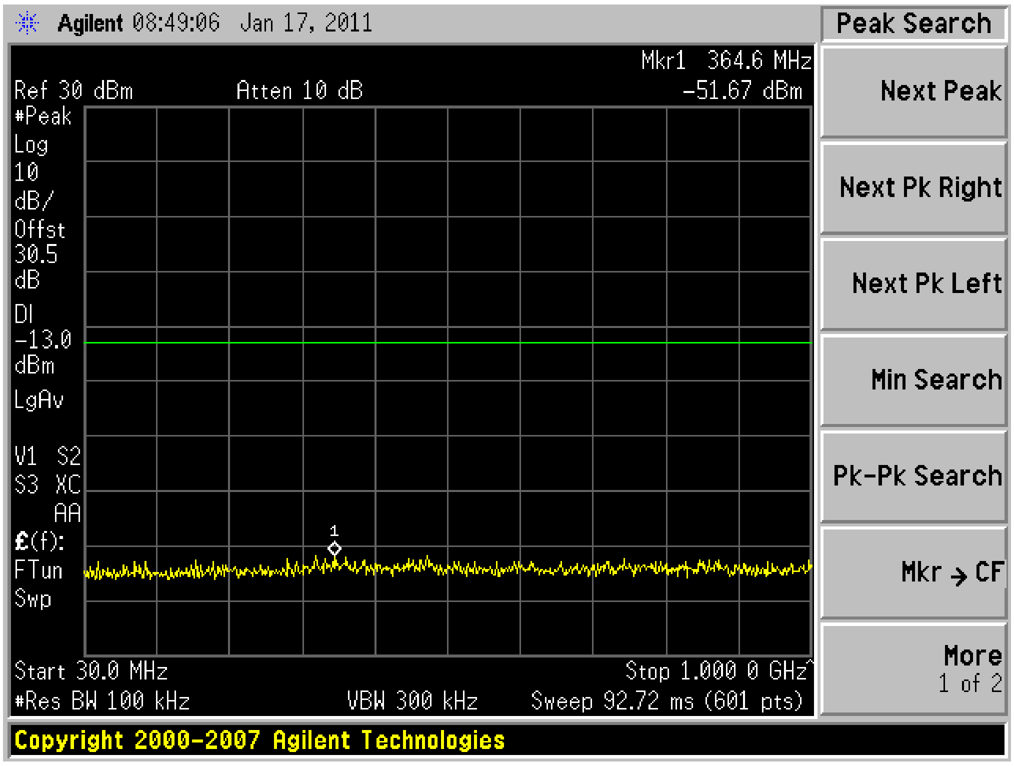
8.4.1 Test Plot at Output Port 0

(QPSK Low Channel)



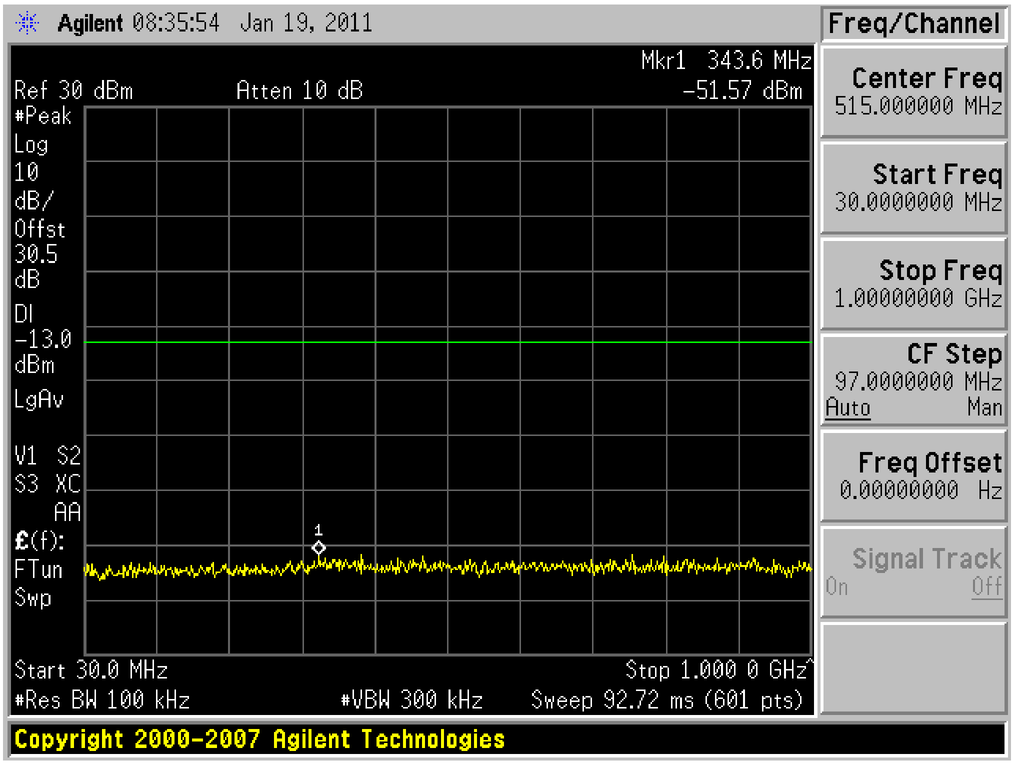
(30 MHz ~ 1 GHz)

(QPSK Middle Channel)



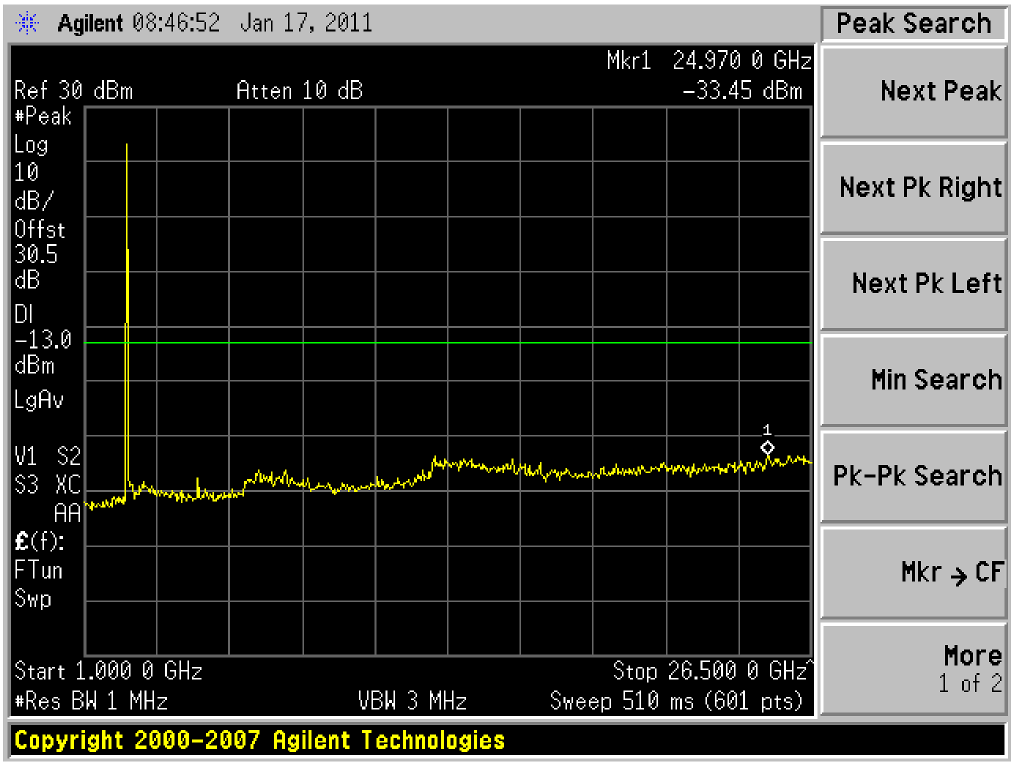
(30 MHz ~ 1 GHz)

(QPSK High Channel)



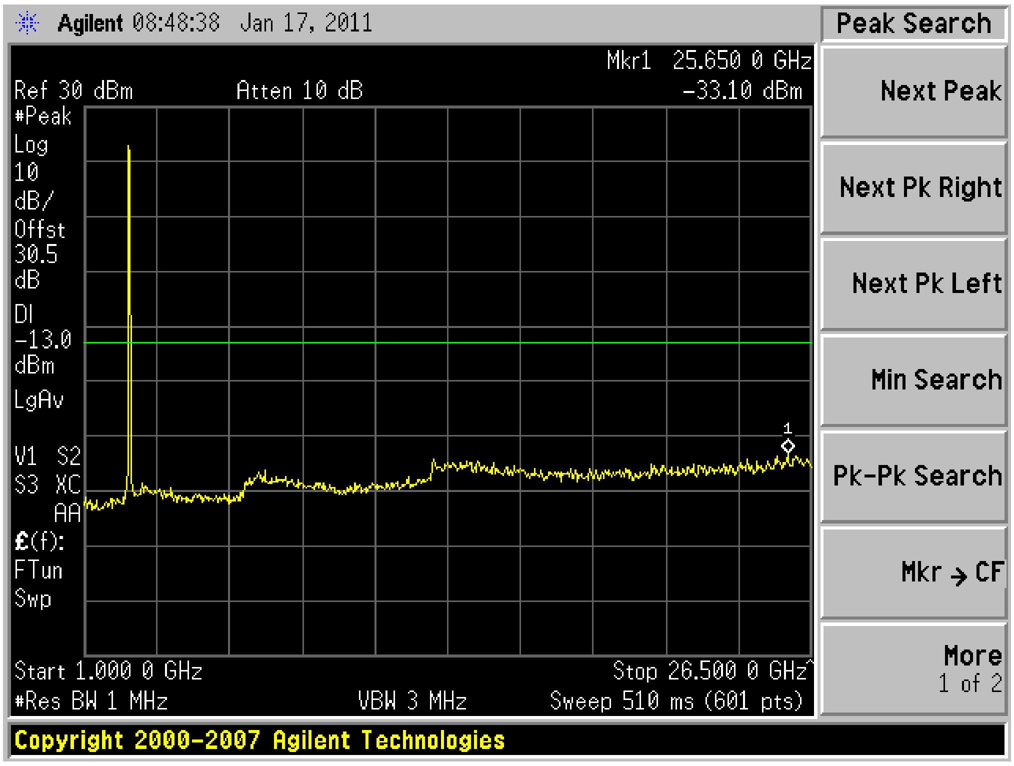
(30 MHz ~ 1 GHz)

(QPSK Low Channel)



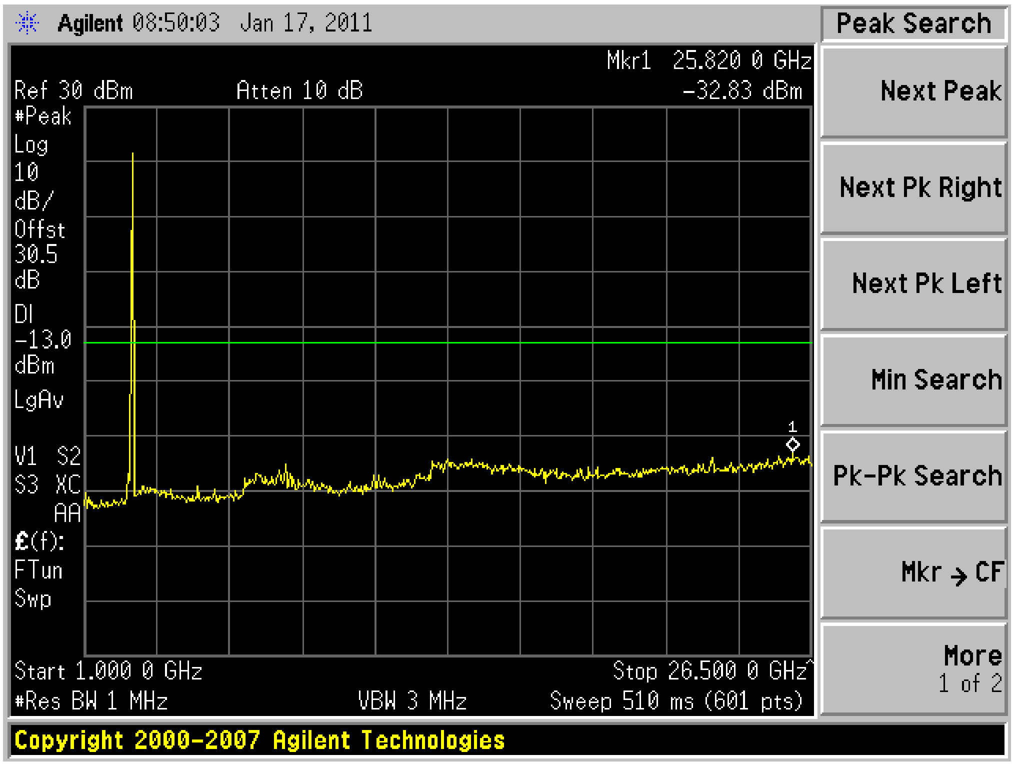
(1 GHz ~ 26.5 GHz)

(QPSK Middle Channel)



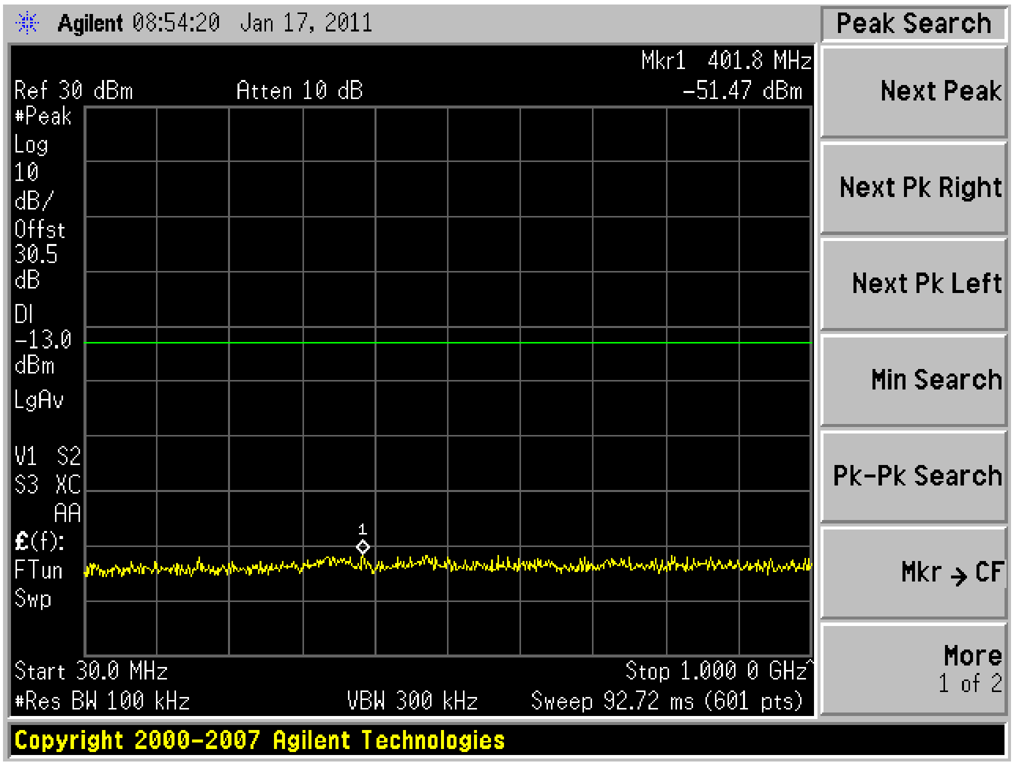
(1 GHz ~ 26.5 GHz)

(QPSK High Channel)



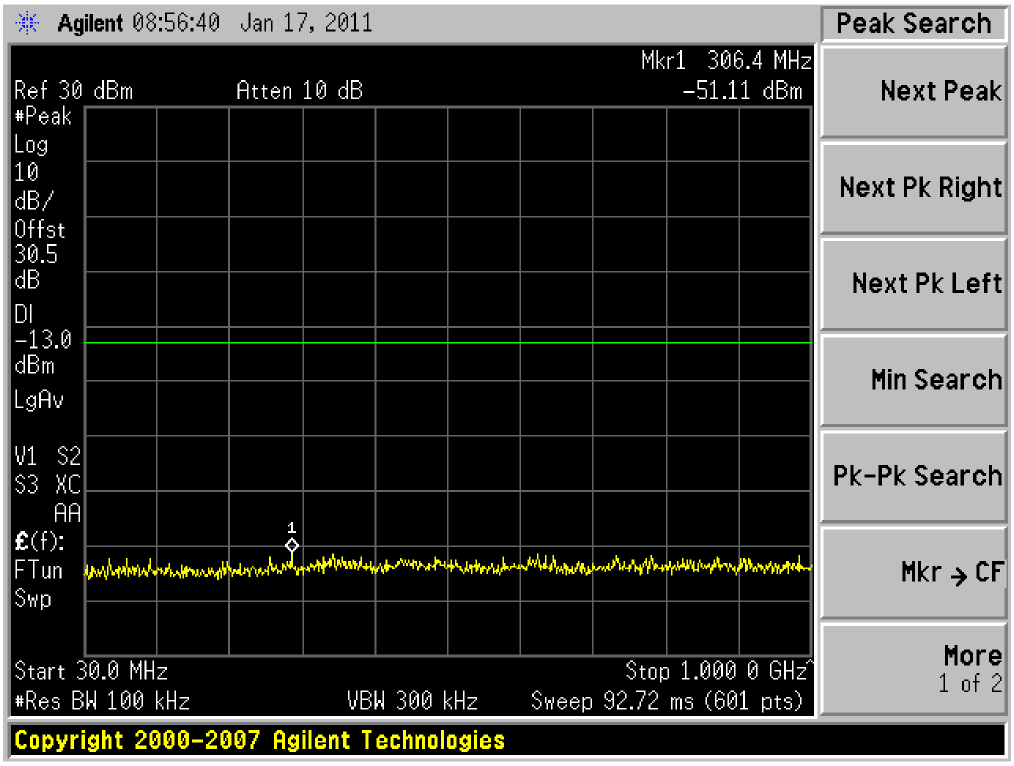
(1 GHz ~ 26.5 GHz)

(16QAM LOW Channel)



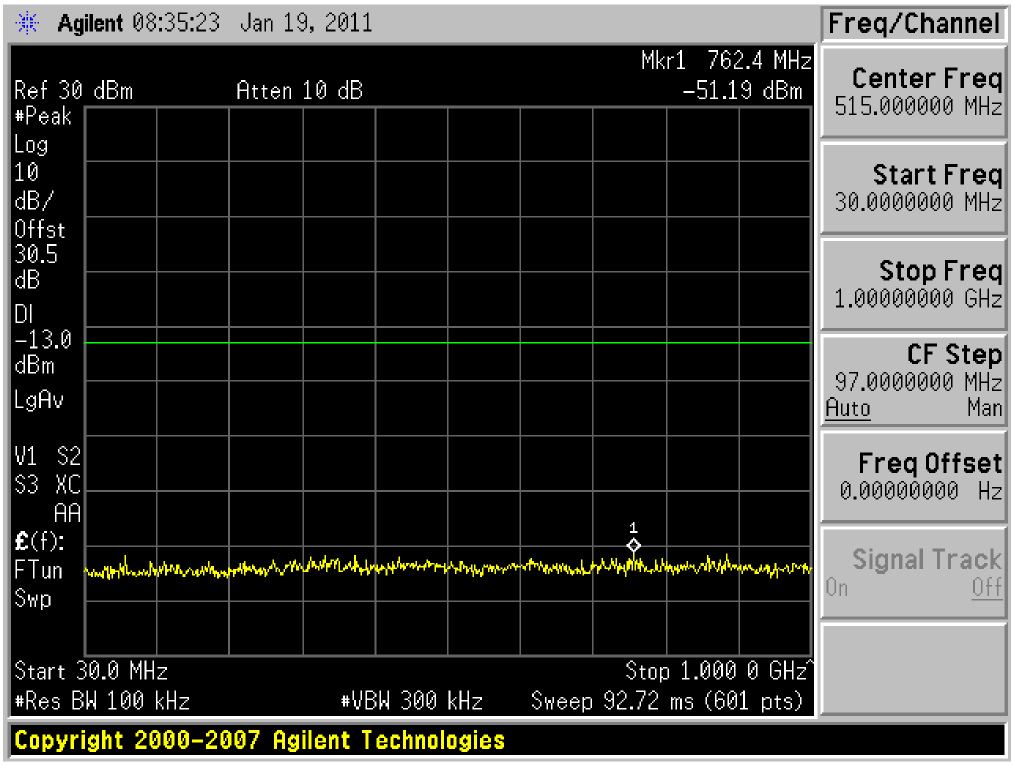
(30 MHz ~ 1 GHz)

(16QAM Middle Channel)



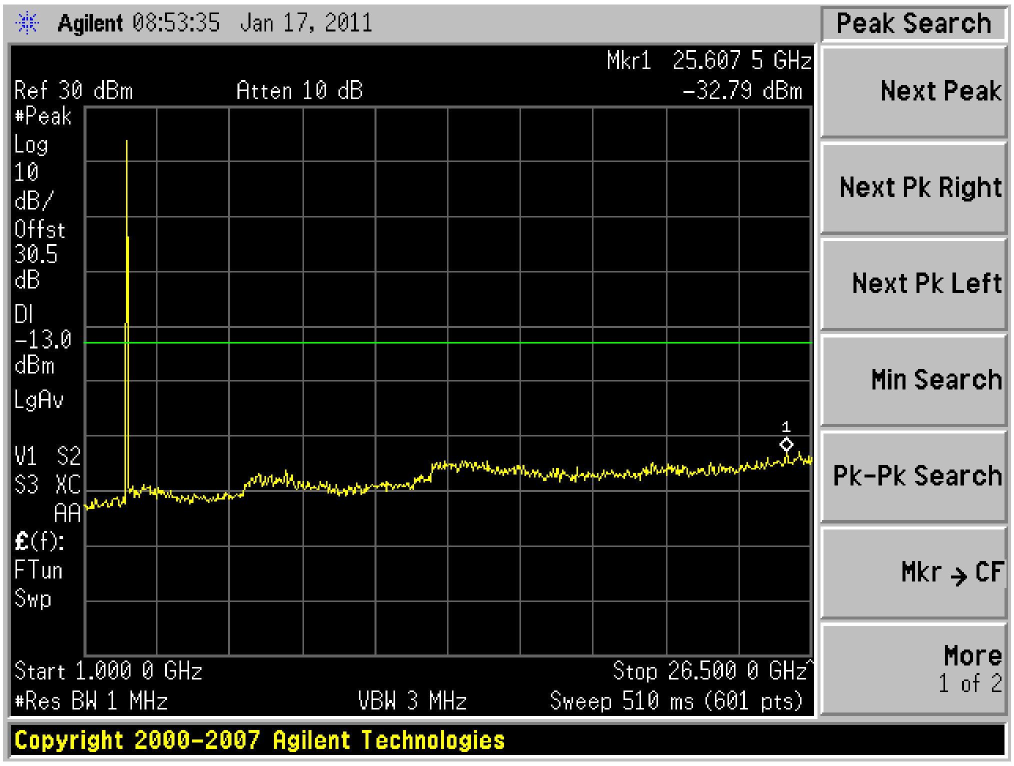
(30 MHz ~ 1 GHz)

(16QAM High Channel)



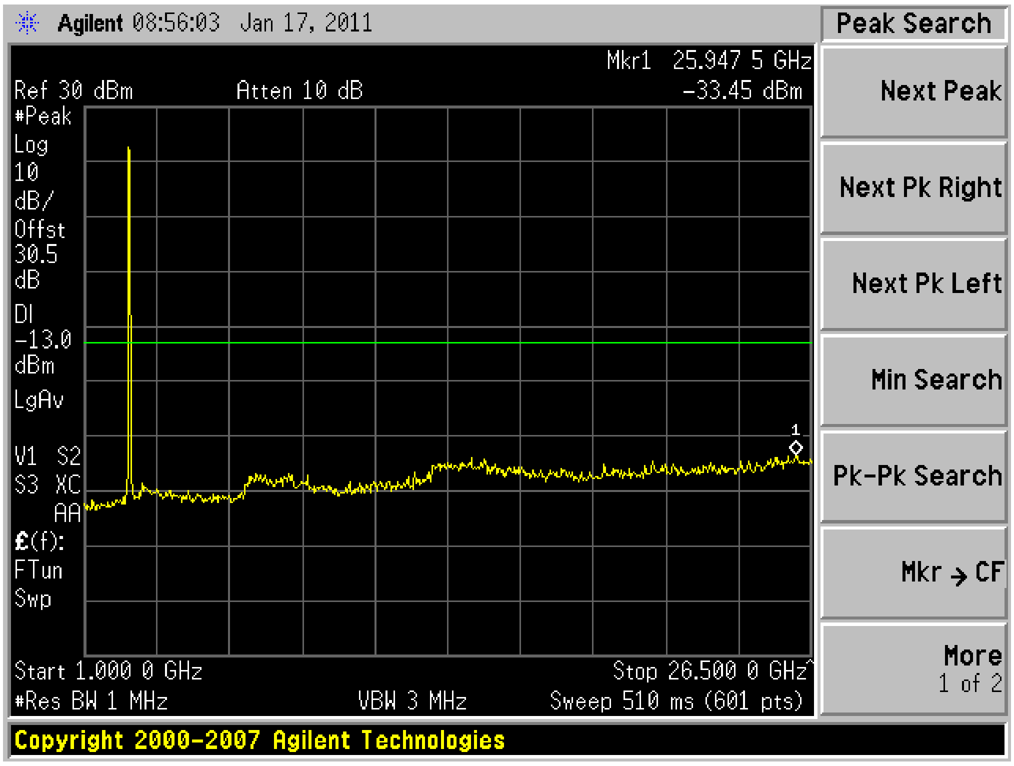
(30 MHz ~ 1 GHz)

(16QAM LOW Channel)



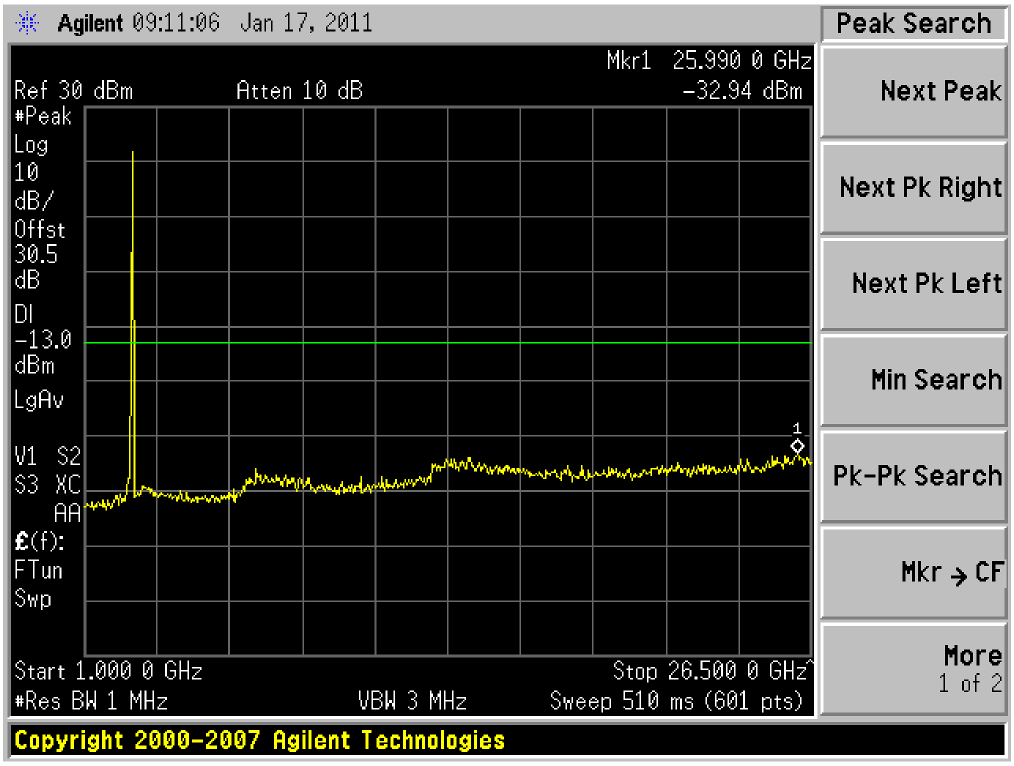
(1 GHz ~ 26.5 GHz)

(16QAM Middle Channel)



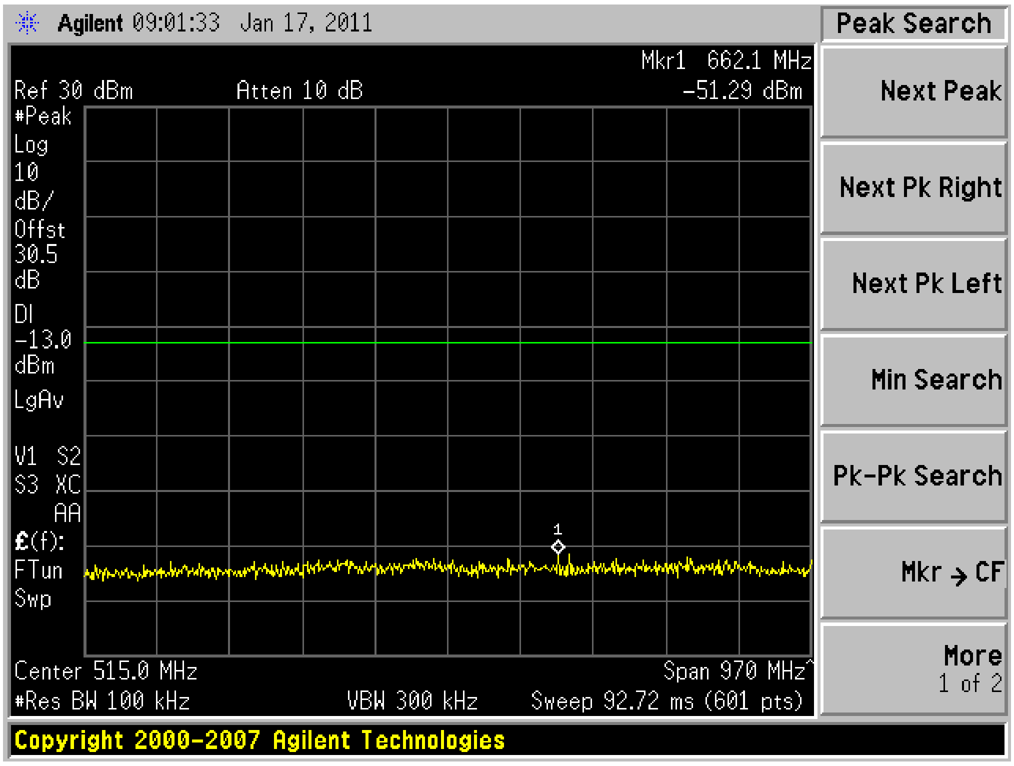
(1 GHz ~ 26.5 GHz)

(16QAM High Channel)



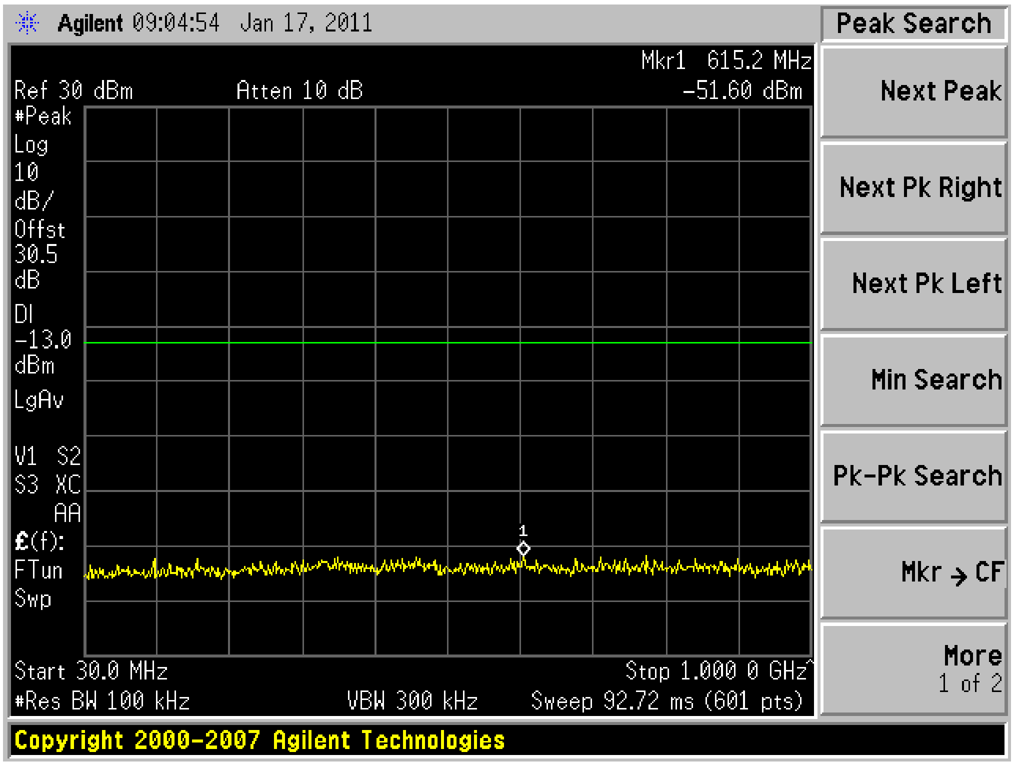
(1 GHz ~ 26.5 GHz)

(64QAM Low Channel)



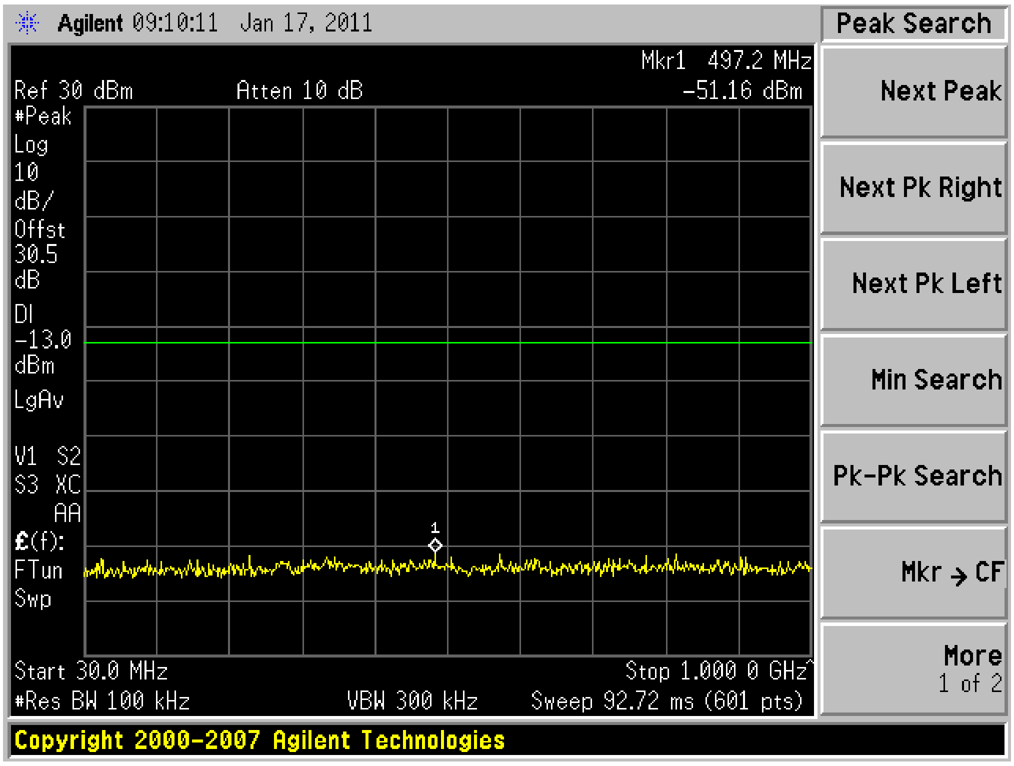
(30 MHz ~ 1 GHz)

(64QAM Middle Channel)



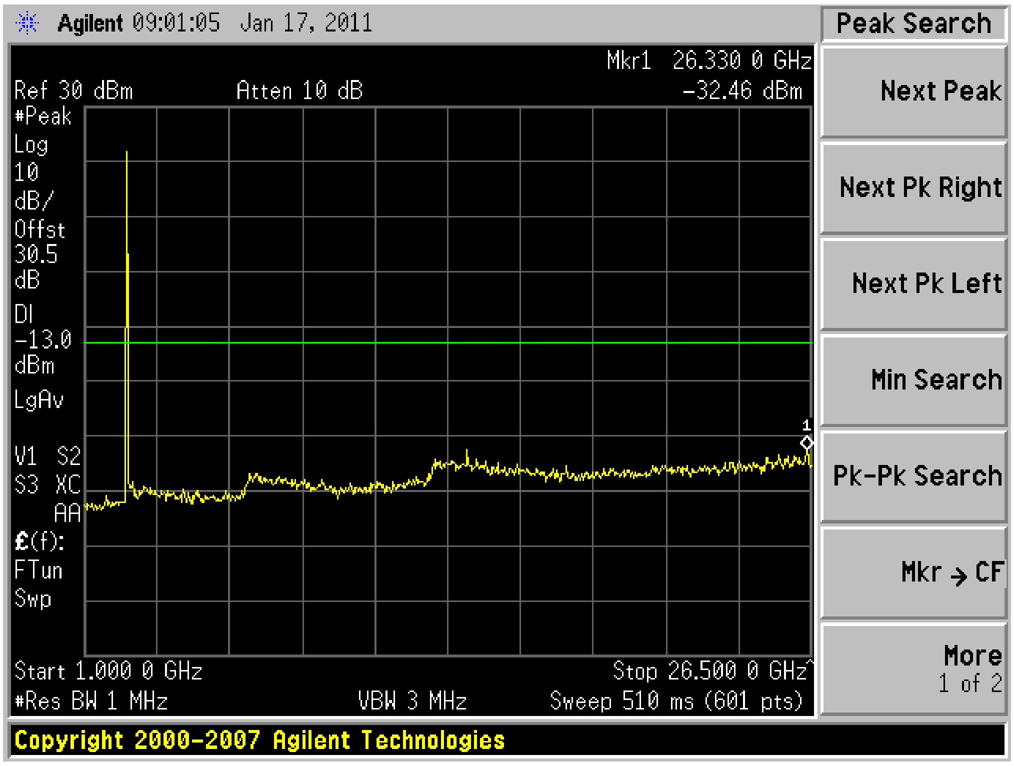
(30 MHz ~ 1 GHz)

(64QAM High Channel)



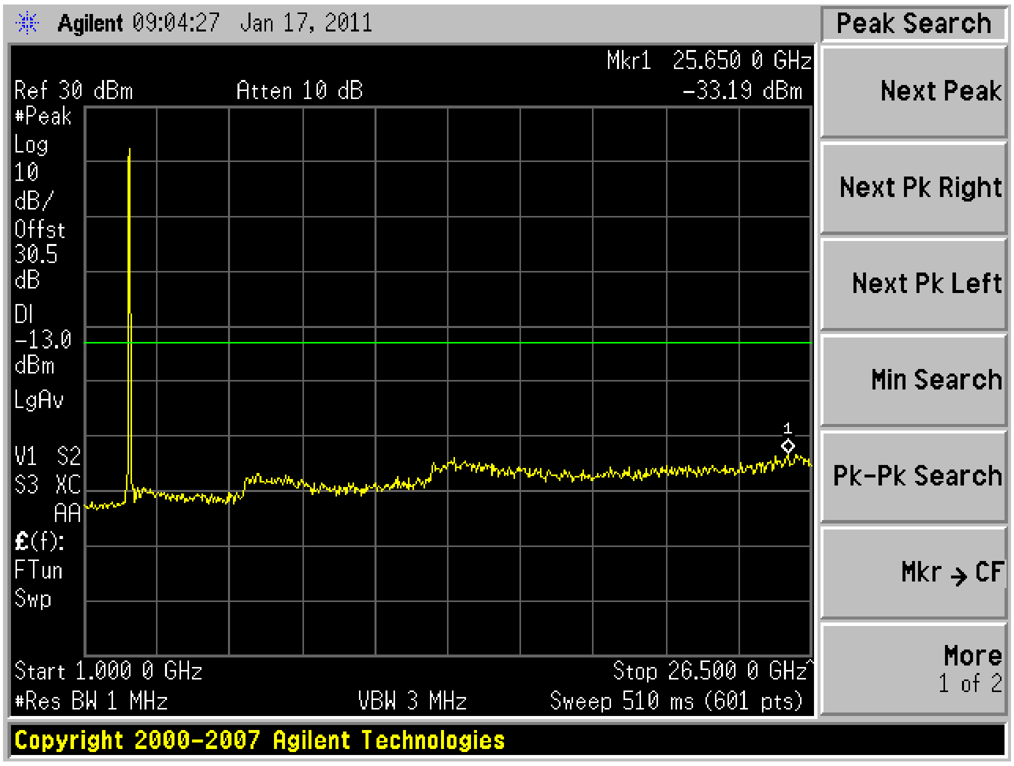
(30 MHz ~ 1 GHz)

(64QAM Low Channel)



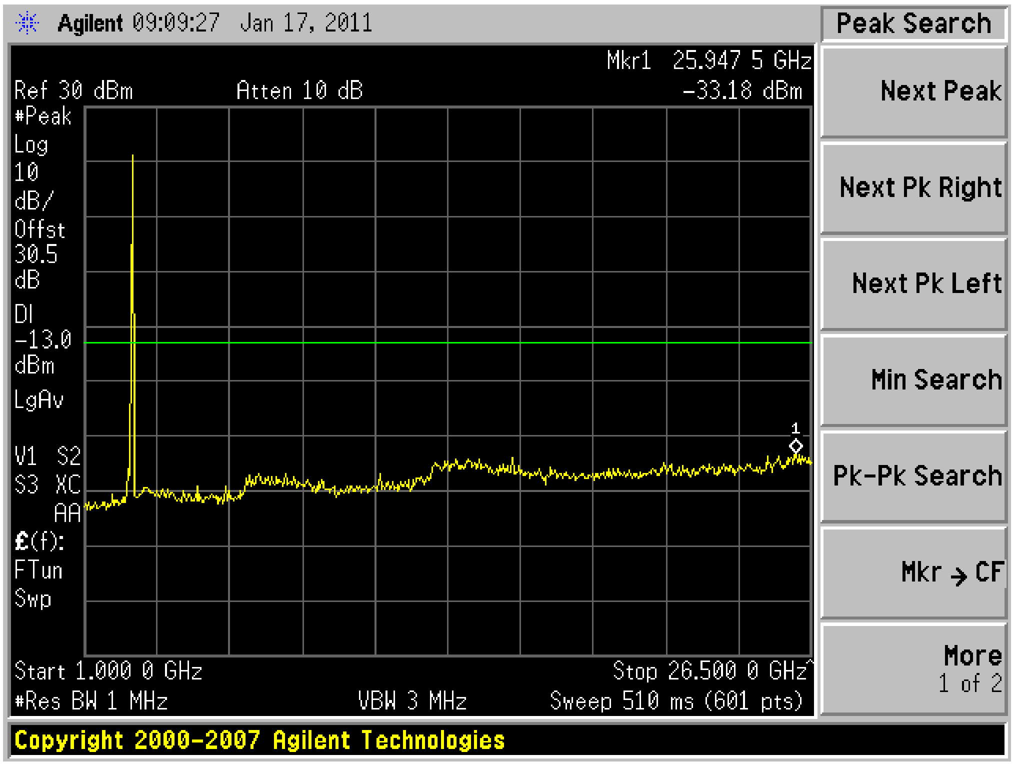
(1 GHz ~ 26.5 GHz)

(64QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

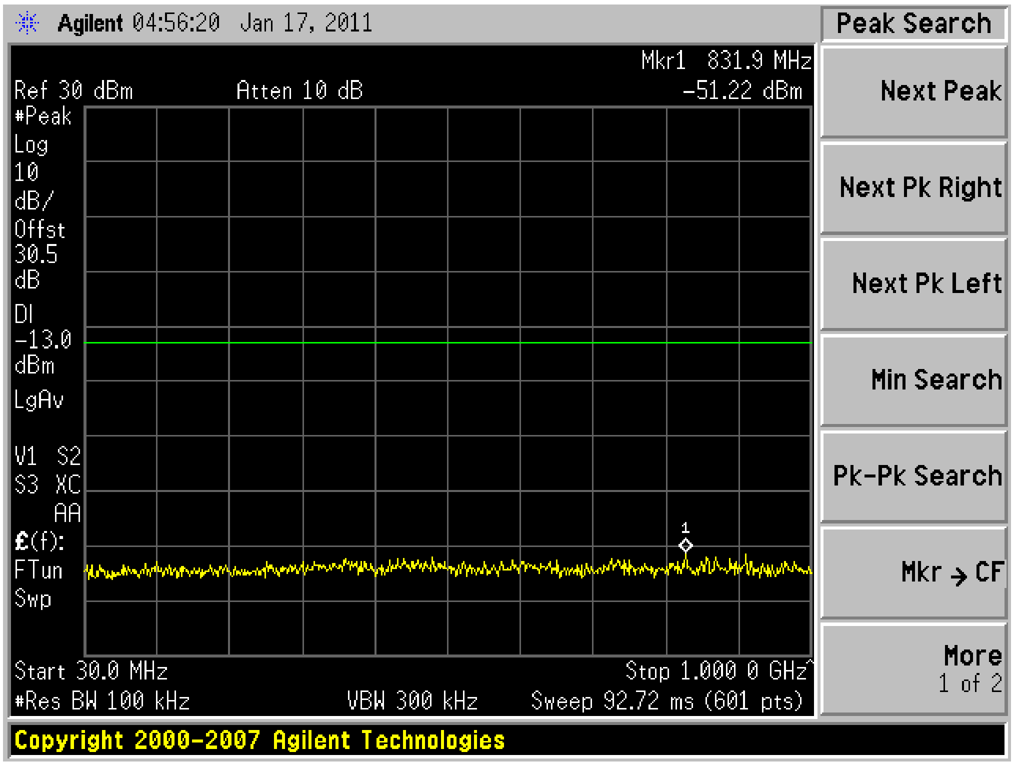
(64QAM High Channel)



(1 GHz ~ 26.5 GHz)

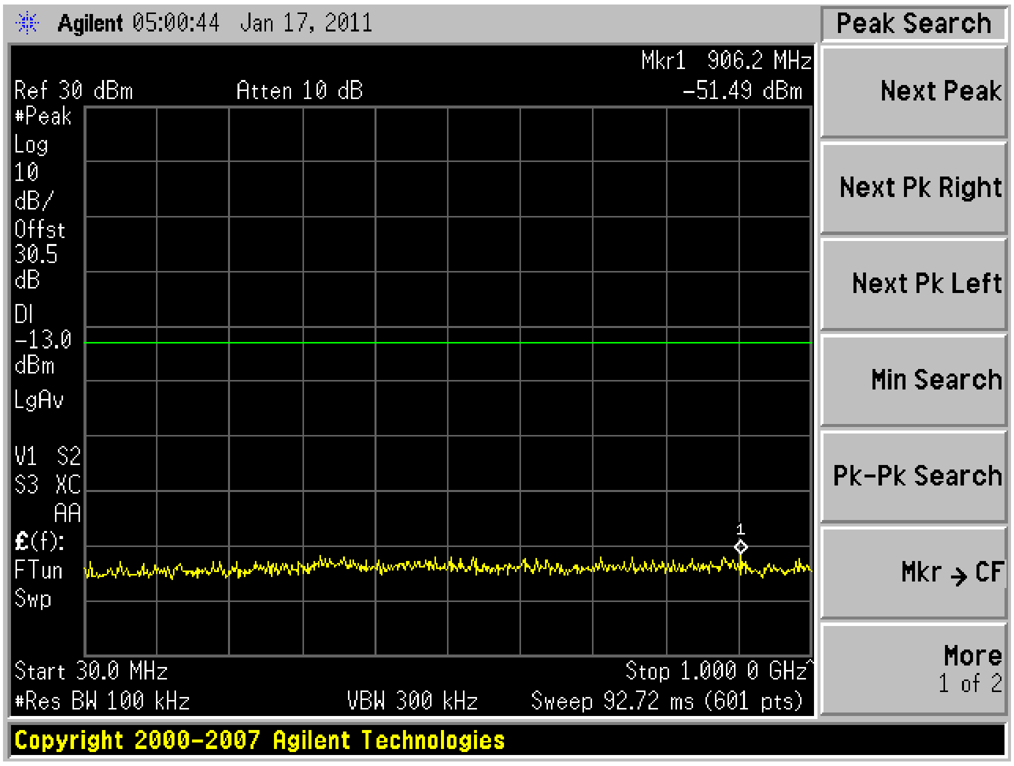
8.4.2. Plot Data at Output 1

(QPSK Low Channel)



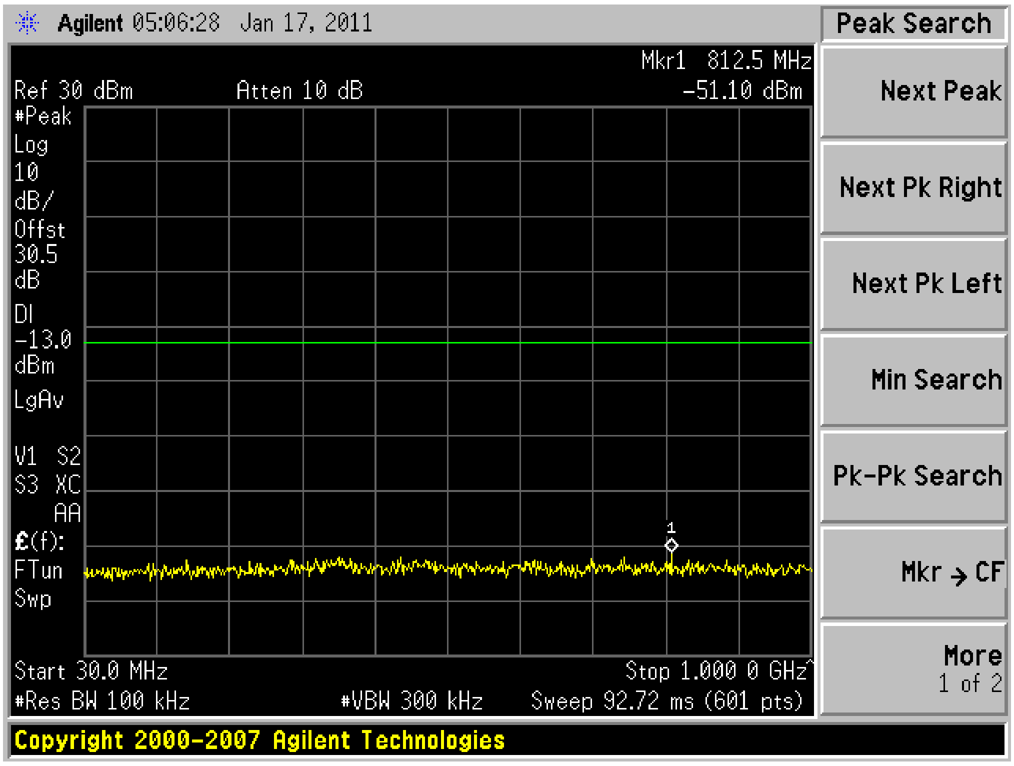
(30 MHz ~ 1 GHz)

(QPSK Middle Channel)



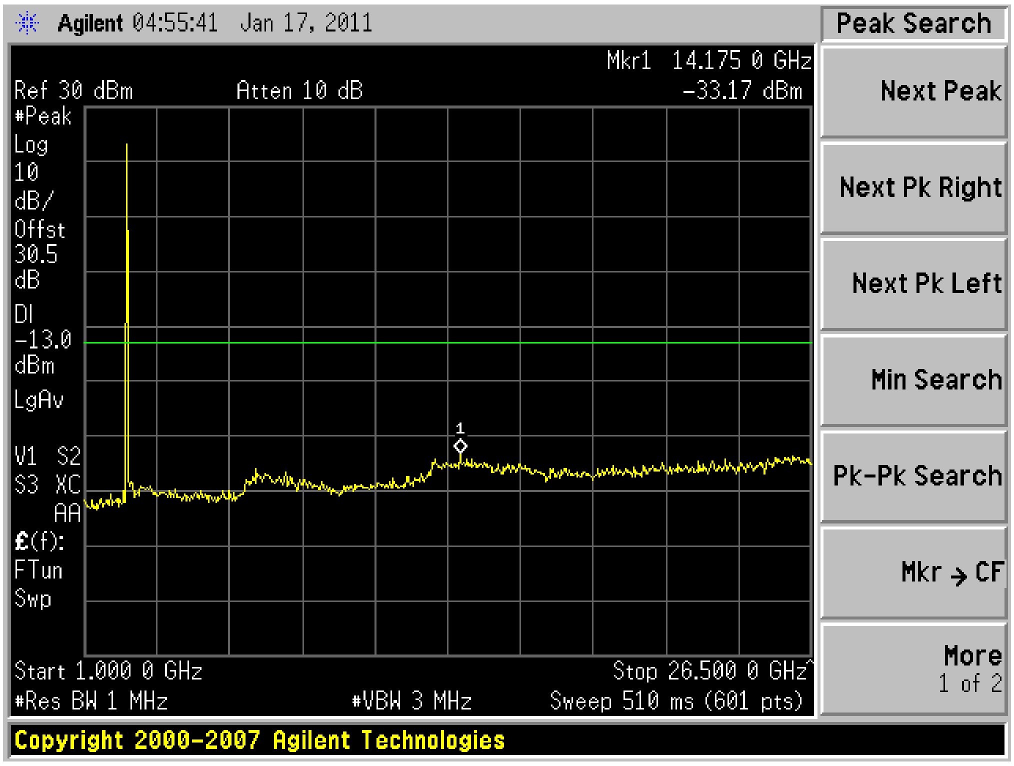
(30 MHz ~ 1 GHz)

(QPSK High Channel)



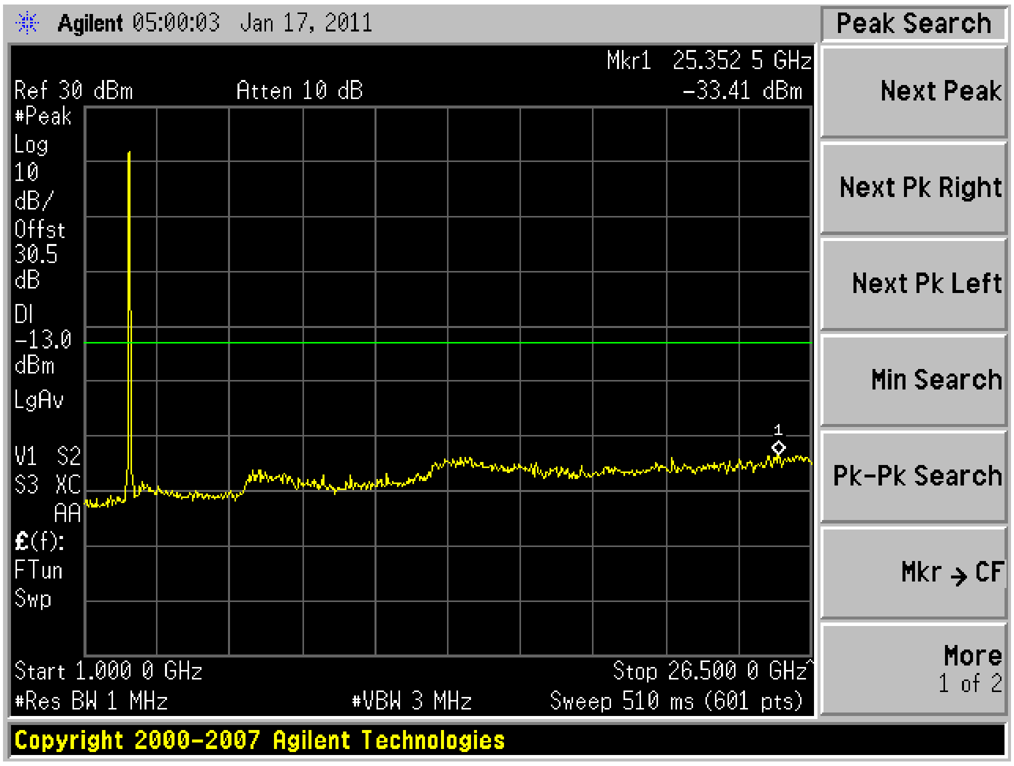
(30 MHz ~ 1 GHz)

(QPSK Low Channel)



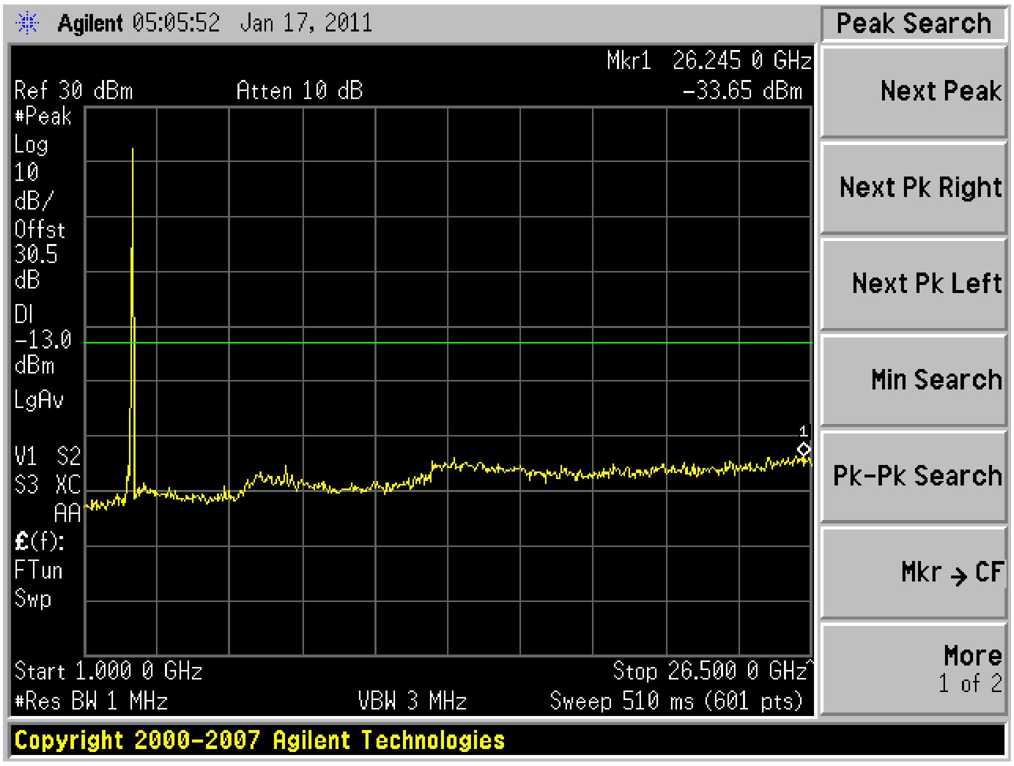
(1 GHz ~ 26.5 GHz)

(QPSK Middle Channel)



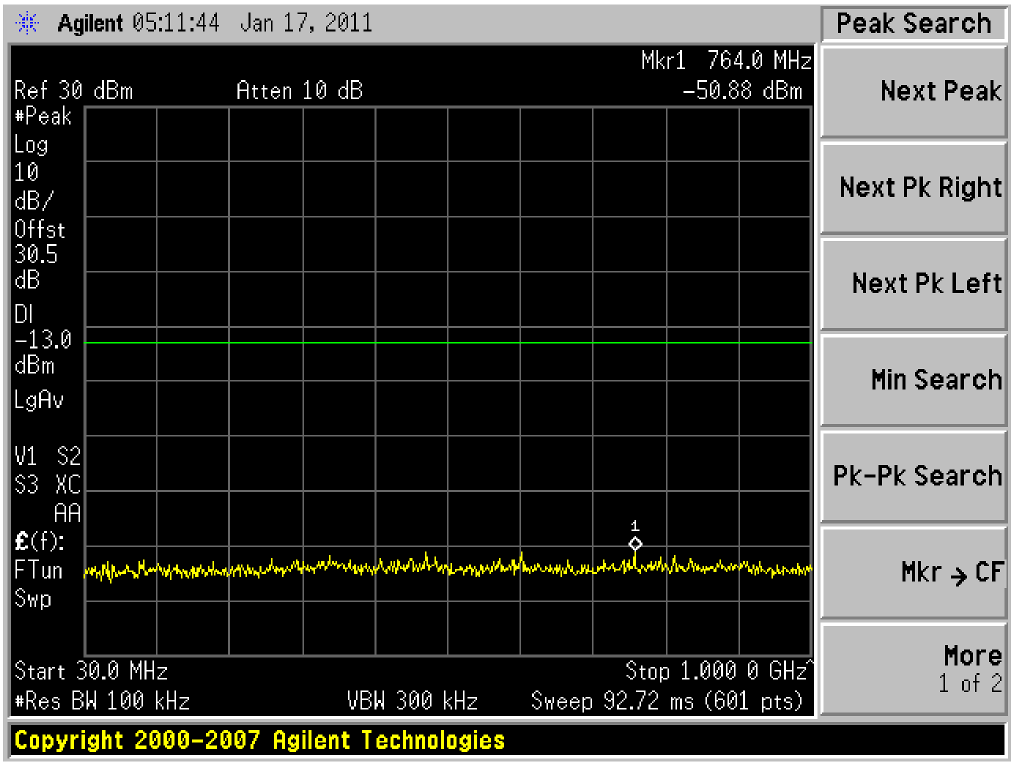
(1 GHz ~ 26.5 GHz)

(QPSK High Channel)



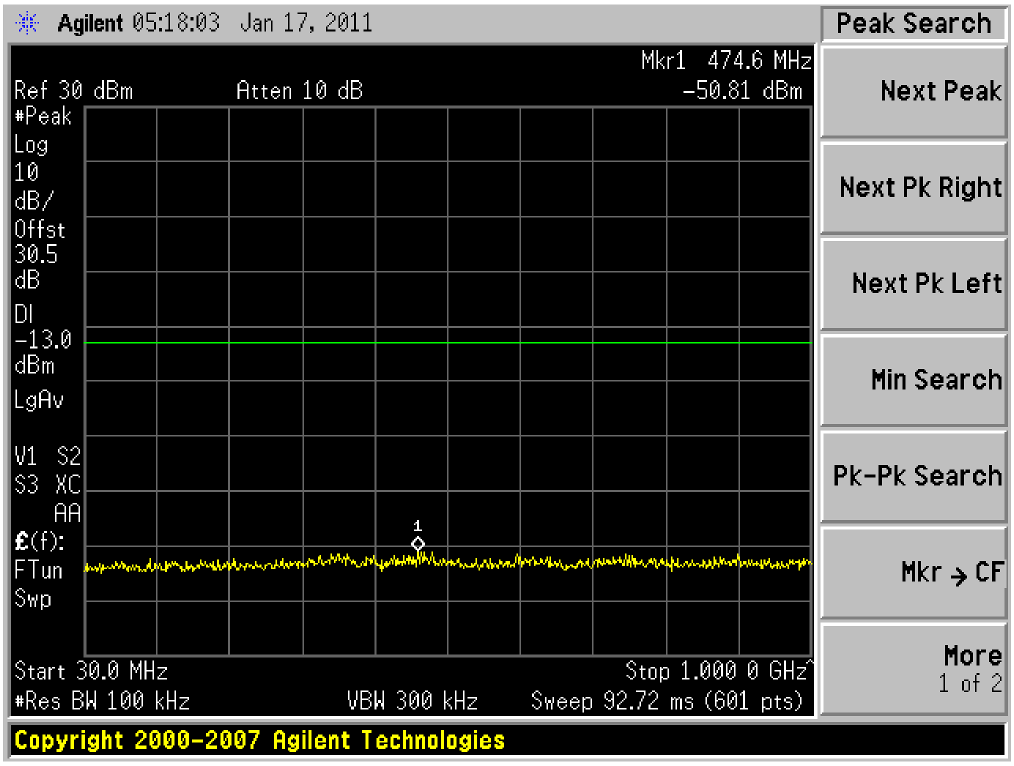
(1 GHz ~ 26.5 GHz)

(16QAM LOW Channel)



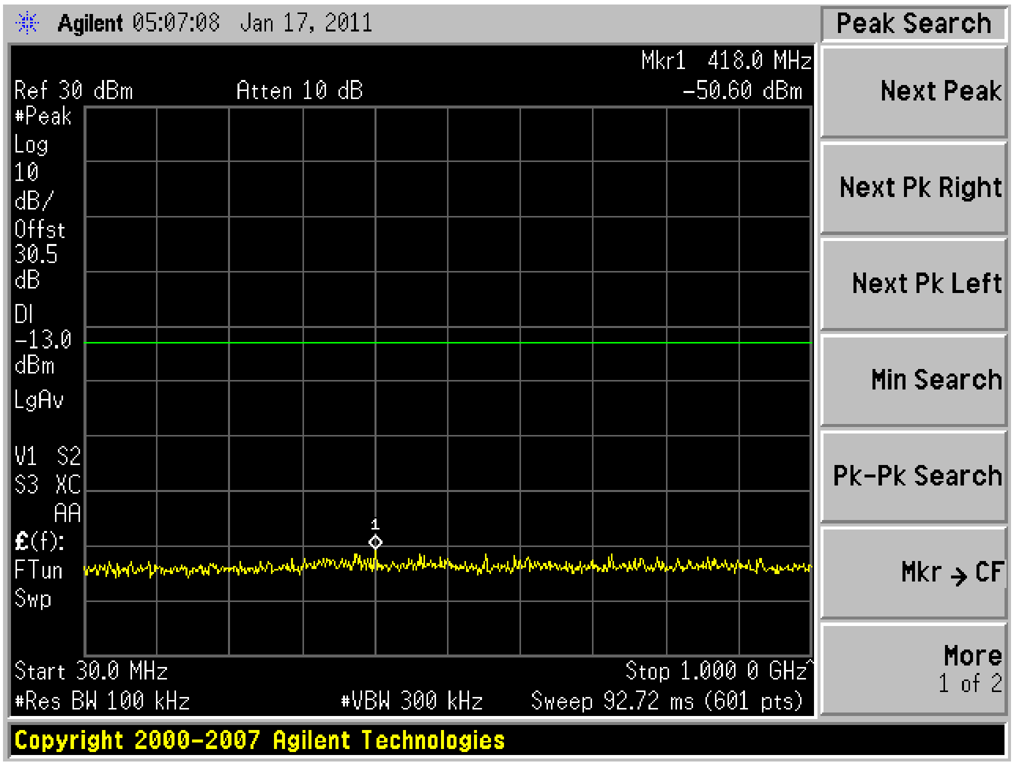
(30 MHz ~ 1 GHz)

(16QAM Middle Channel)



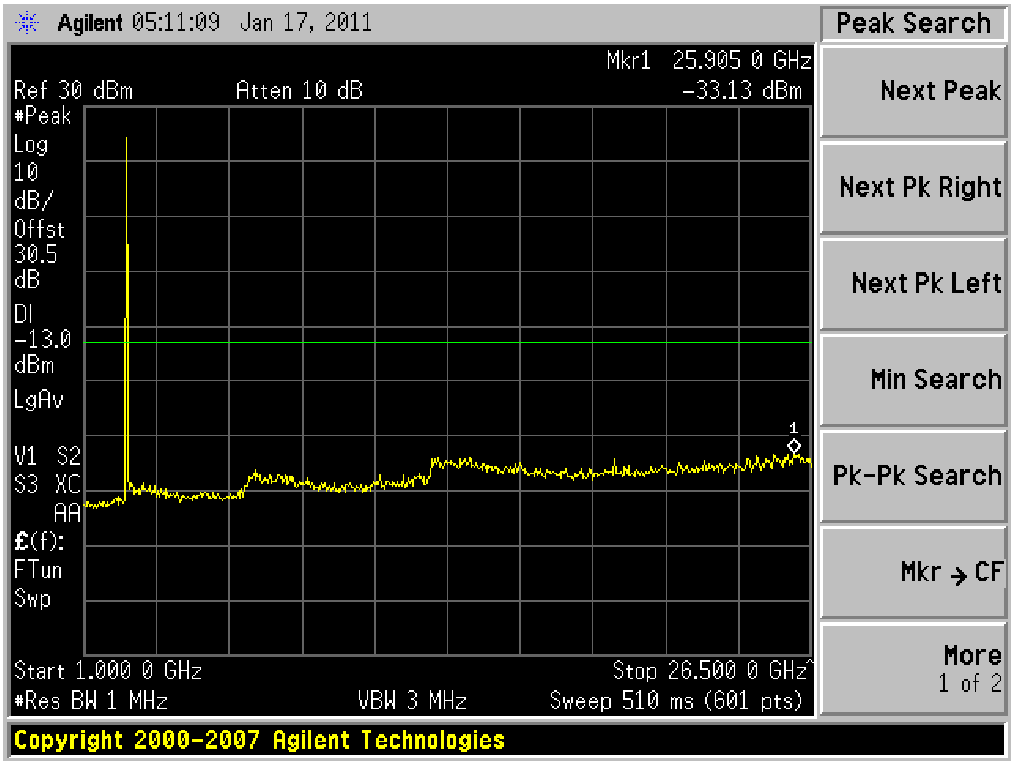
(30 MHz ~ 1 GHz)

(16QAM High Channel)



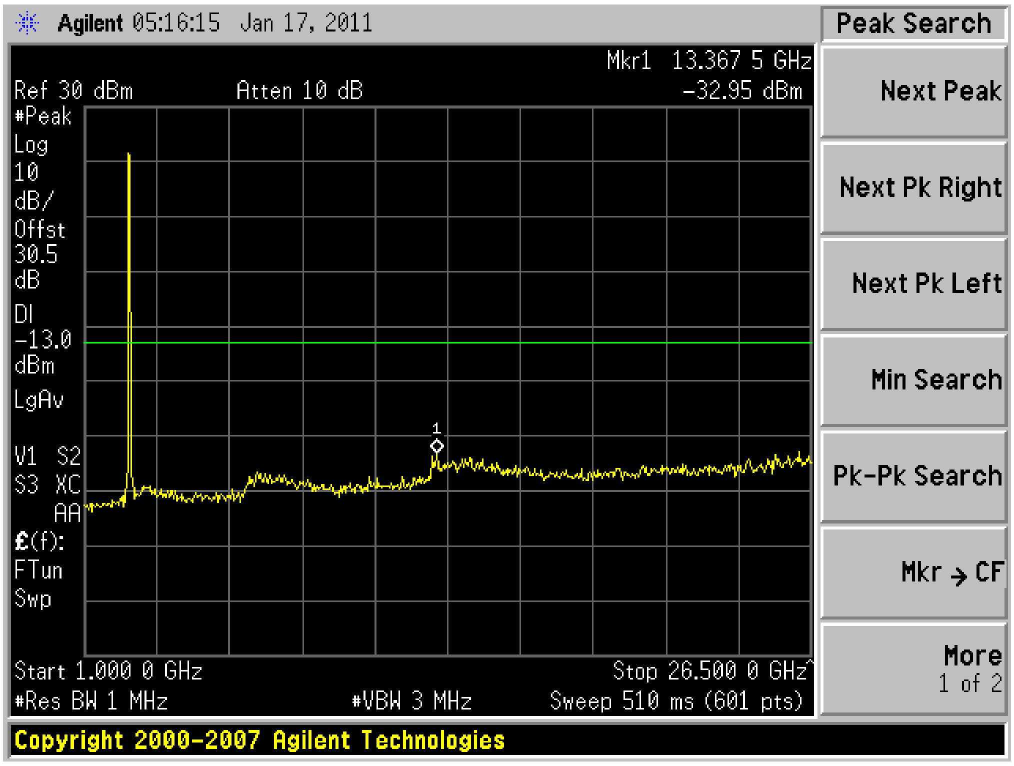
(30 MHz ~ 1 GHz)

(16QAM LOW Channel)



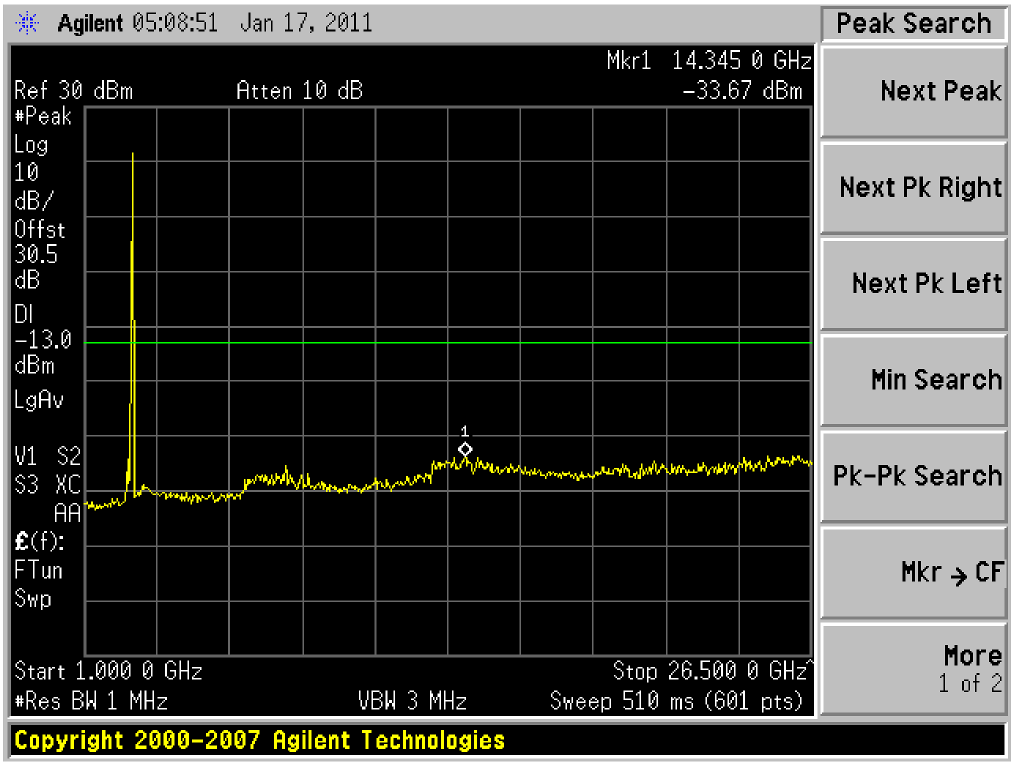
(1 GHz ~ 26.5 GHz)

(16QAM Middle Channel)



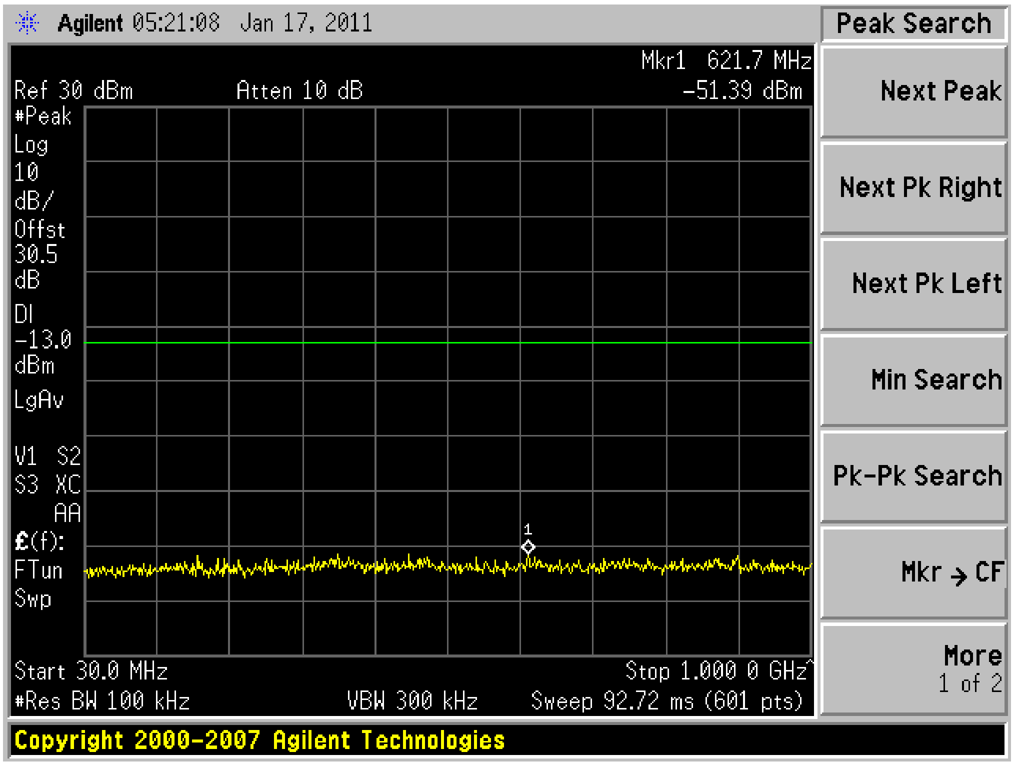
(1 GHz ~ 26.5 GHz)

(16QAM High Channel)



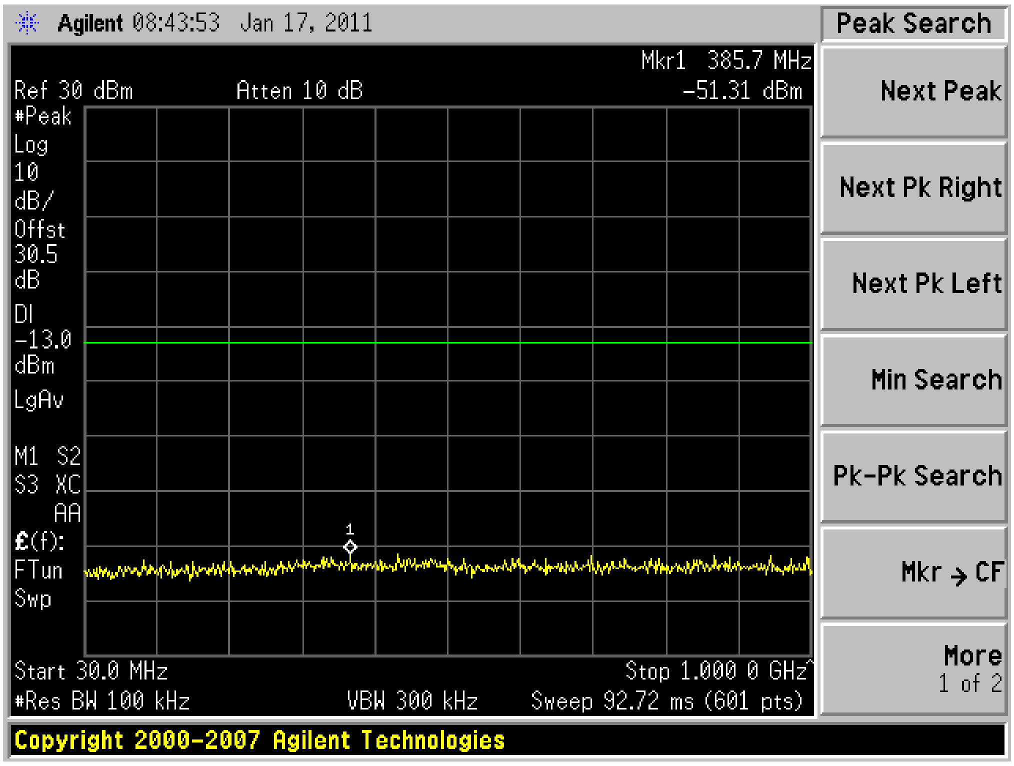
(1 GHz ~ 26.5 GHz)

(64QAM Low Channel)



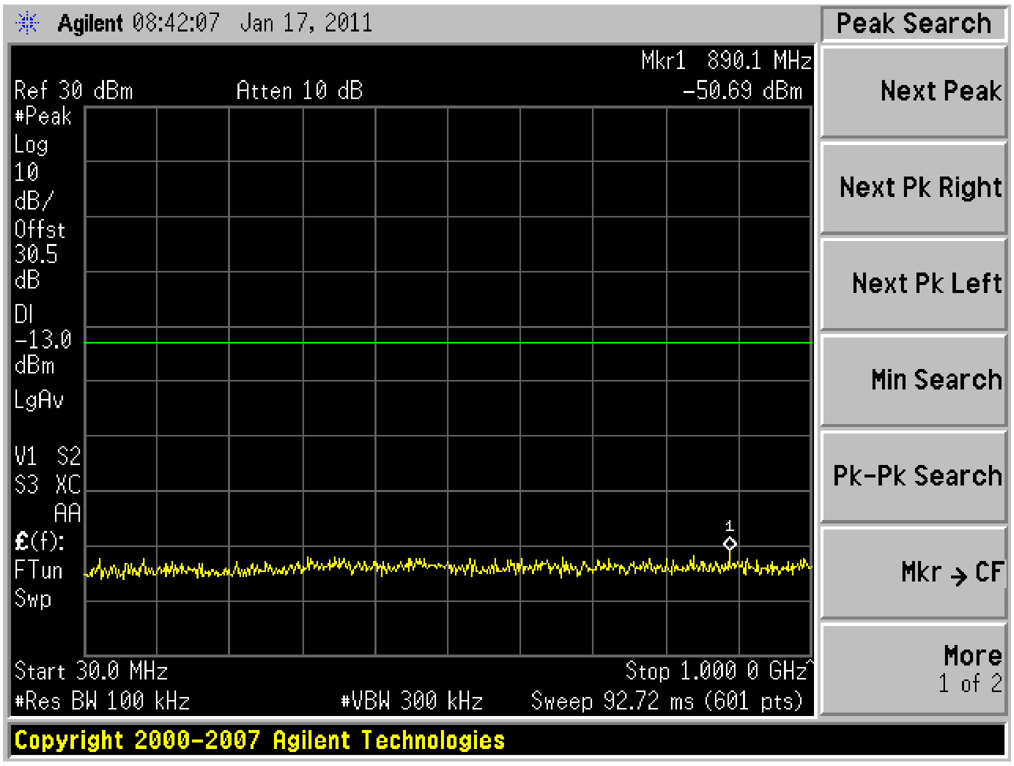
(30 MHz ~ 1 GHz)

(64QAM Middle Channel)



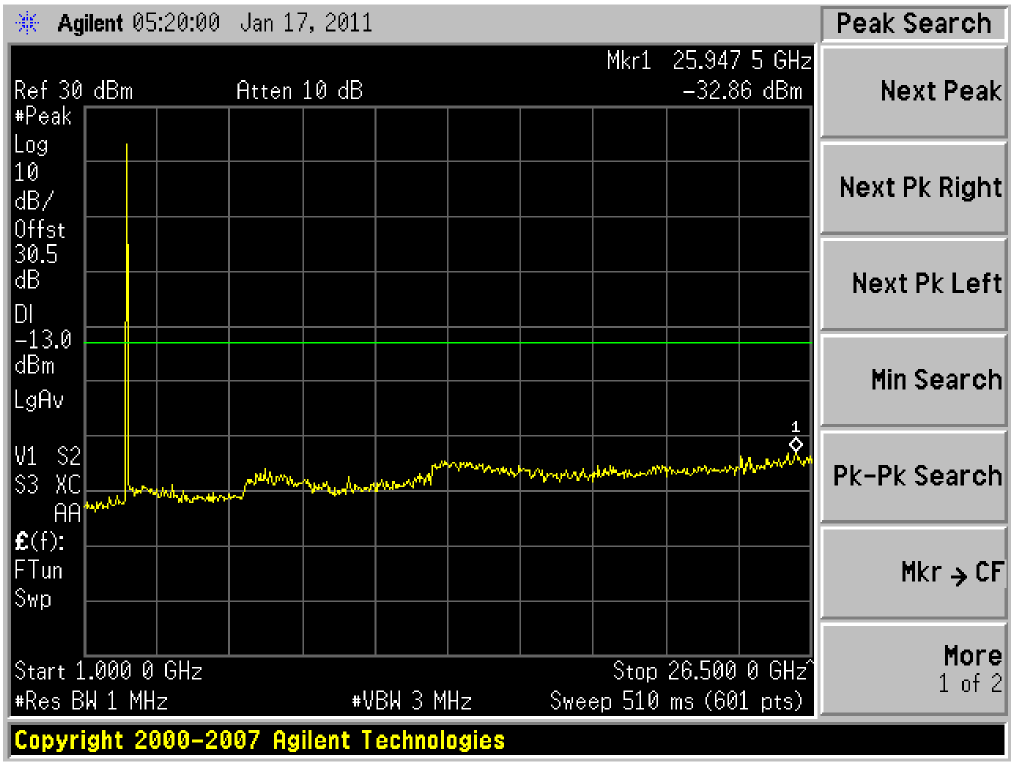
(30 MHz ~ 1 GHz)

(64QAM High Channel)



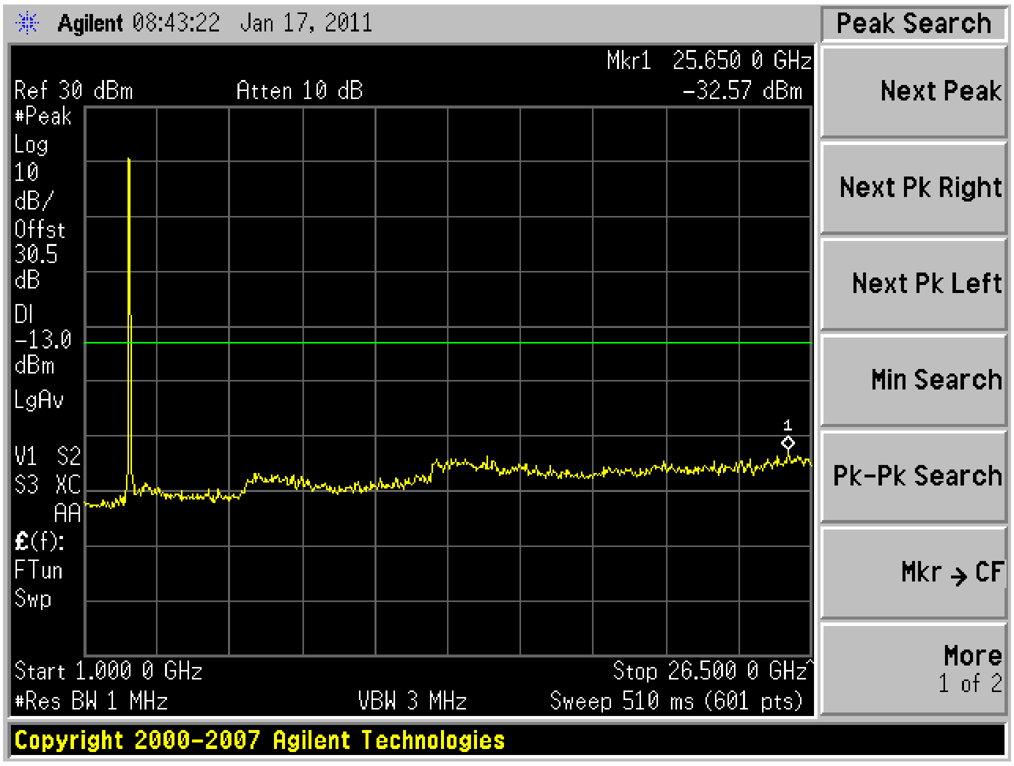
(30 MHz ~ 1 GHz)

(64QAM Low Channel)



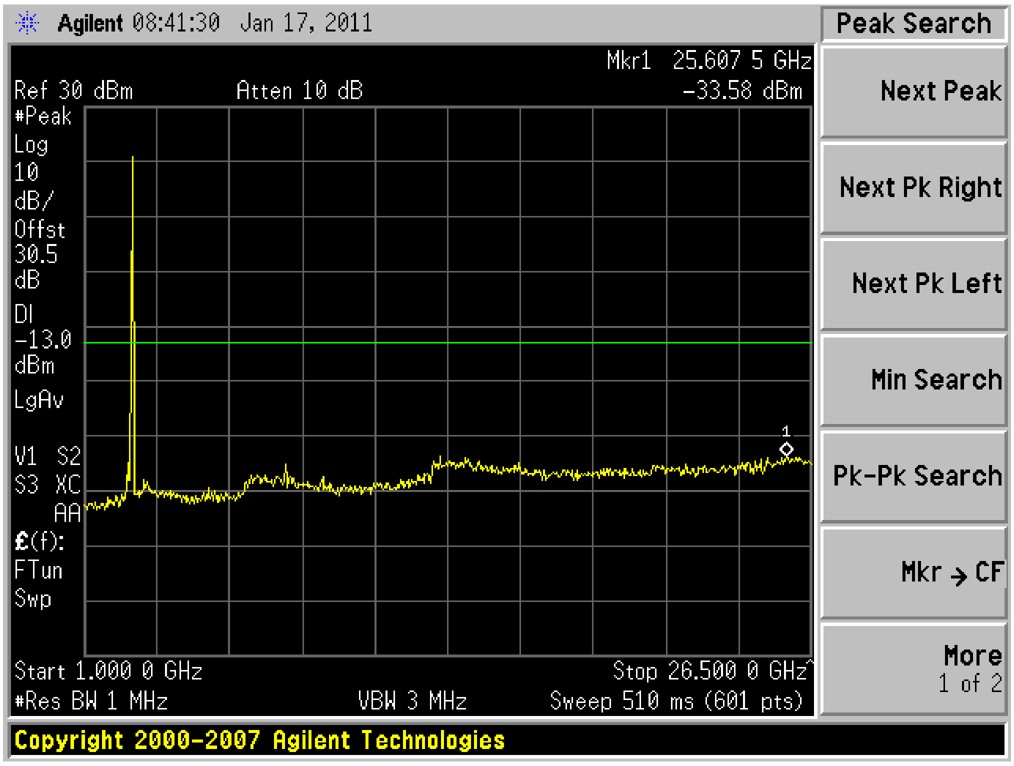
(1 GHz ~ 26.5 GHz)

(64QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

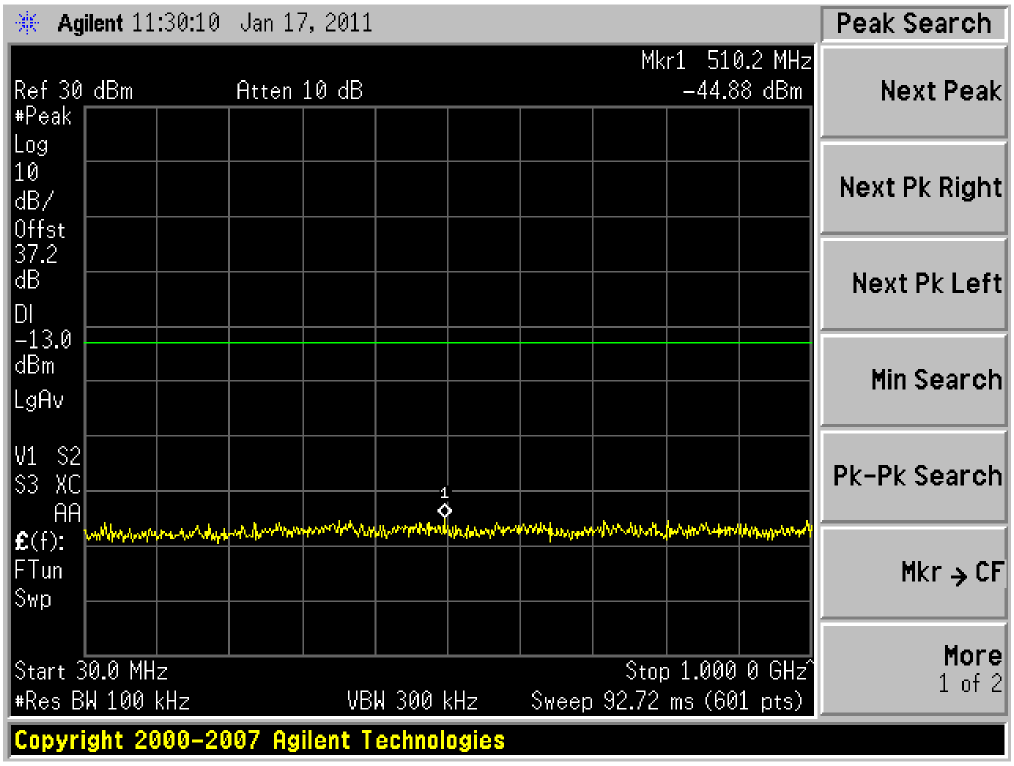
(64QAM High Channel)



(1 GHz ~ 26.5 GHz)

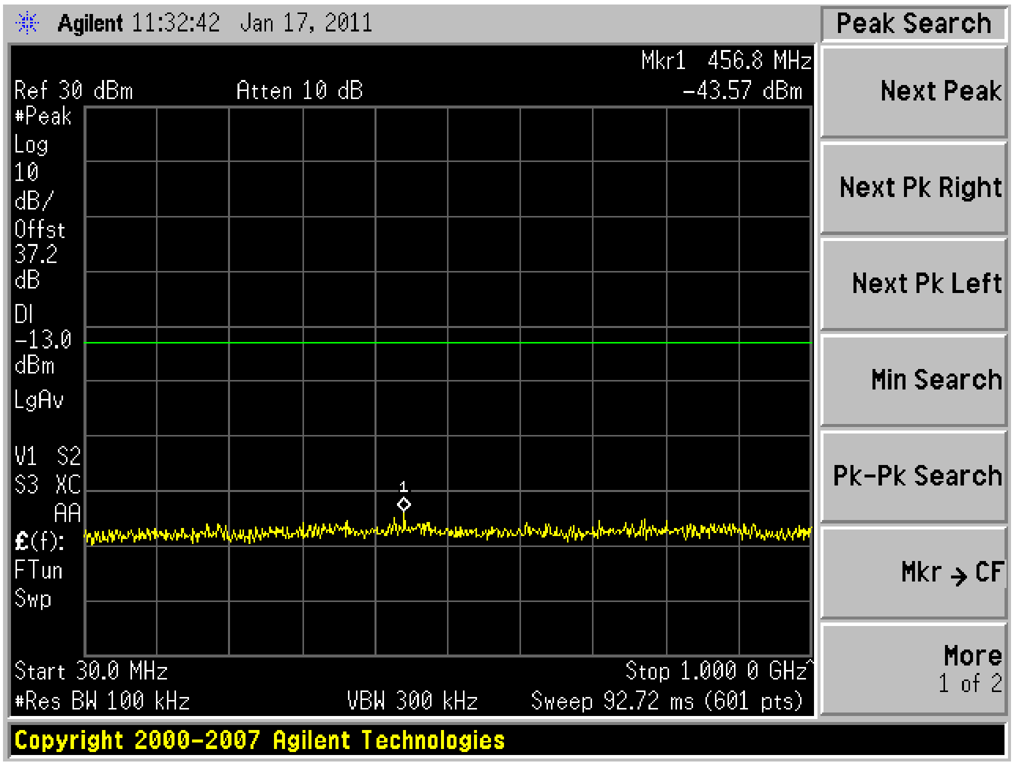
8.4.3. Combined Plot Data at Output

(QPSK Low Channel)



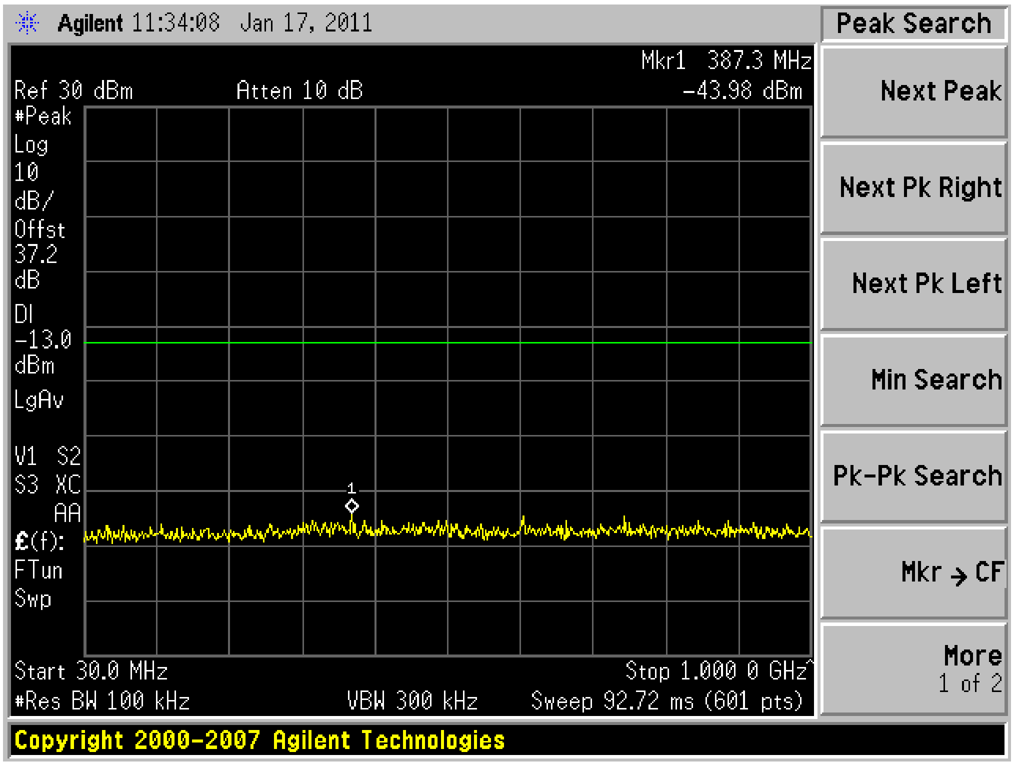
(30 MHz ~ 1 GHz)

(QPSK Middle Channel)



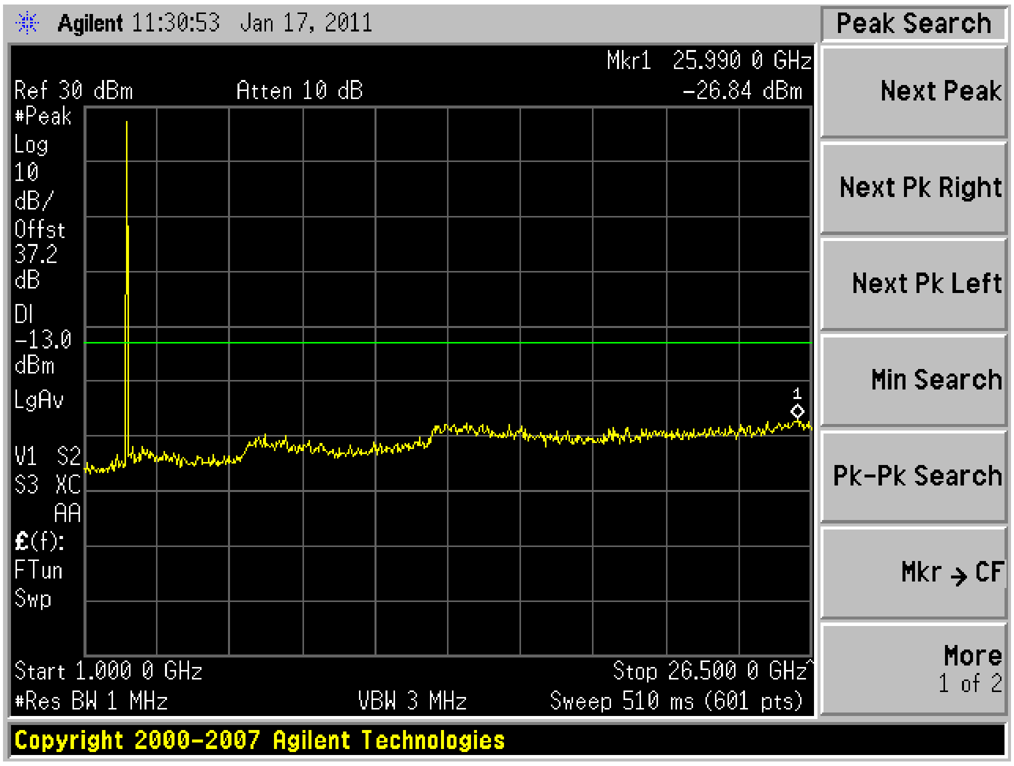
(30 MHz ~ 1 GHz)

(QPSK High Channel)



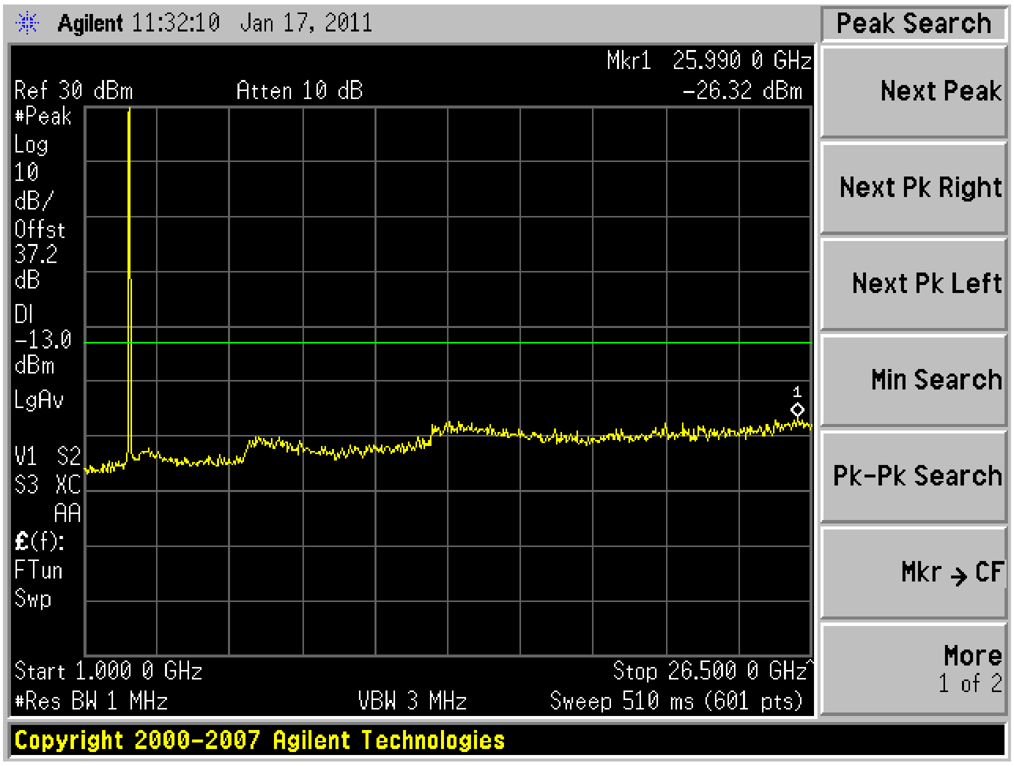
(30 MHz ~ 1 GHz)

(QPSK Low Channel)



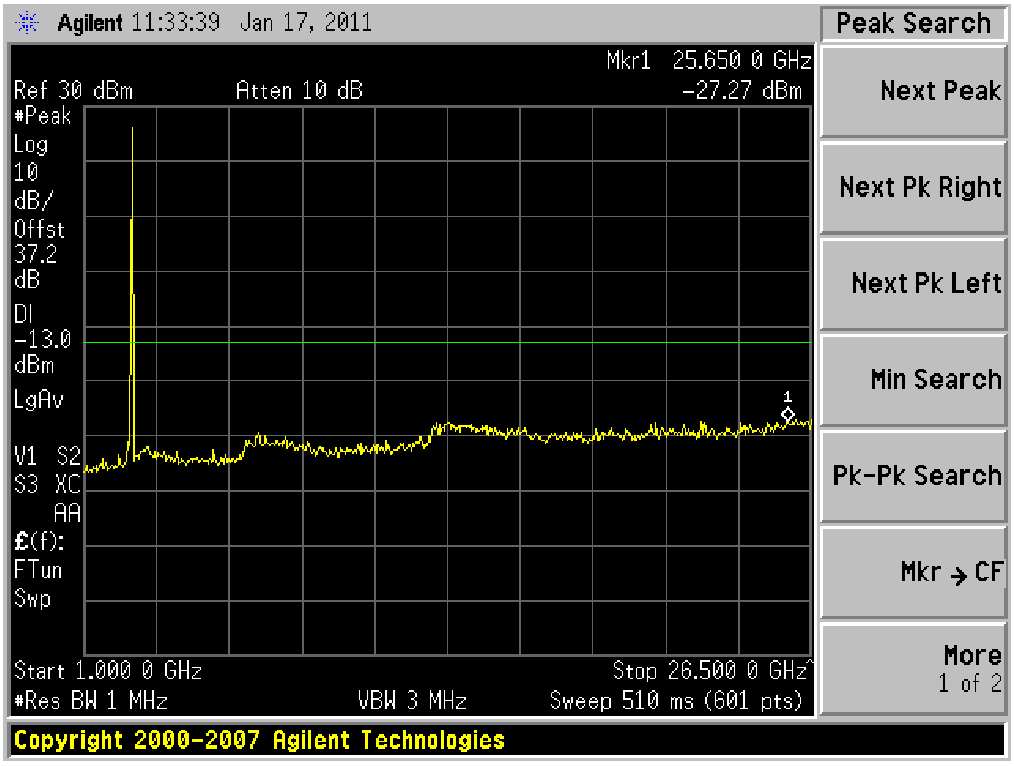
(1 GHz ~ 26.5 GHz)

(QPSK Middle Channel)



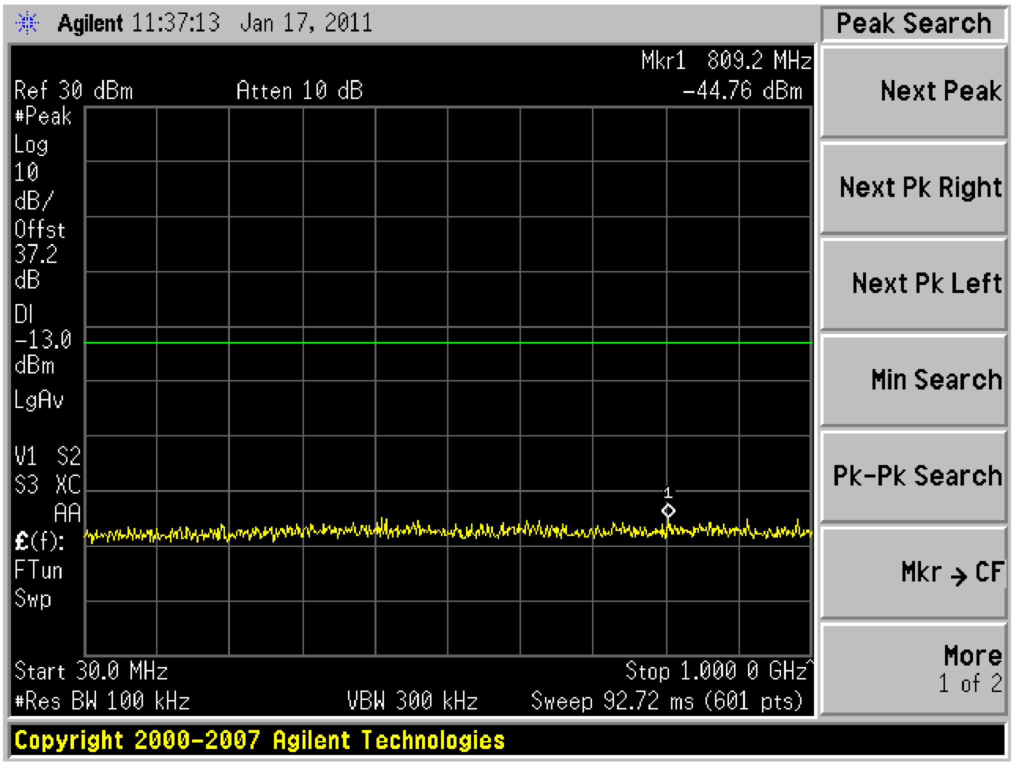
(1 GHz ~ 26.5 GHz)

(QPSK High Channel)



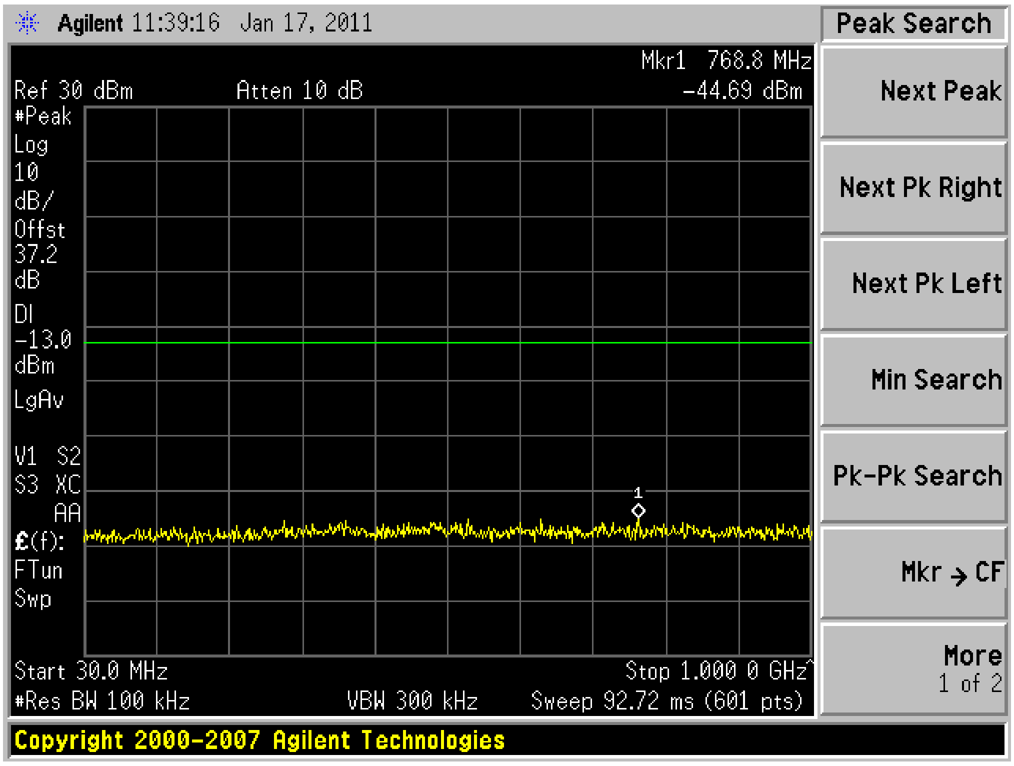
(1 GHz ~ 26.5 GHz)

(16QAM LOW Channel)



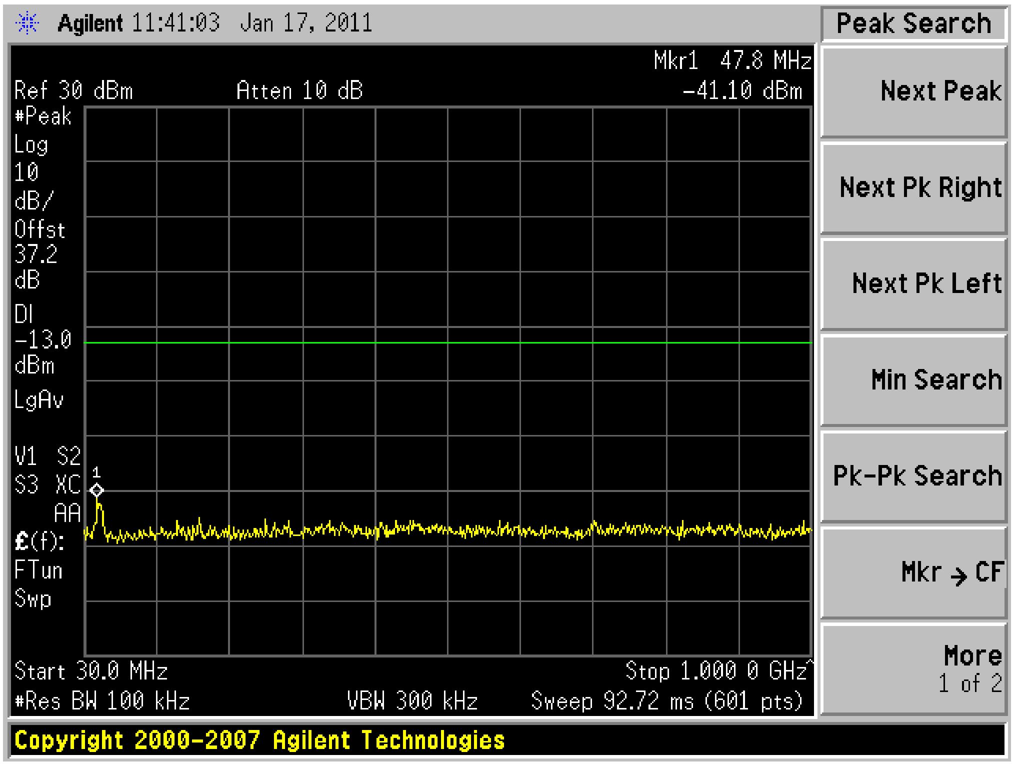
(30 MHz ~ 1 GHz)

(16QAM Middle Channel)



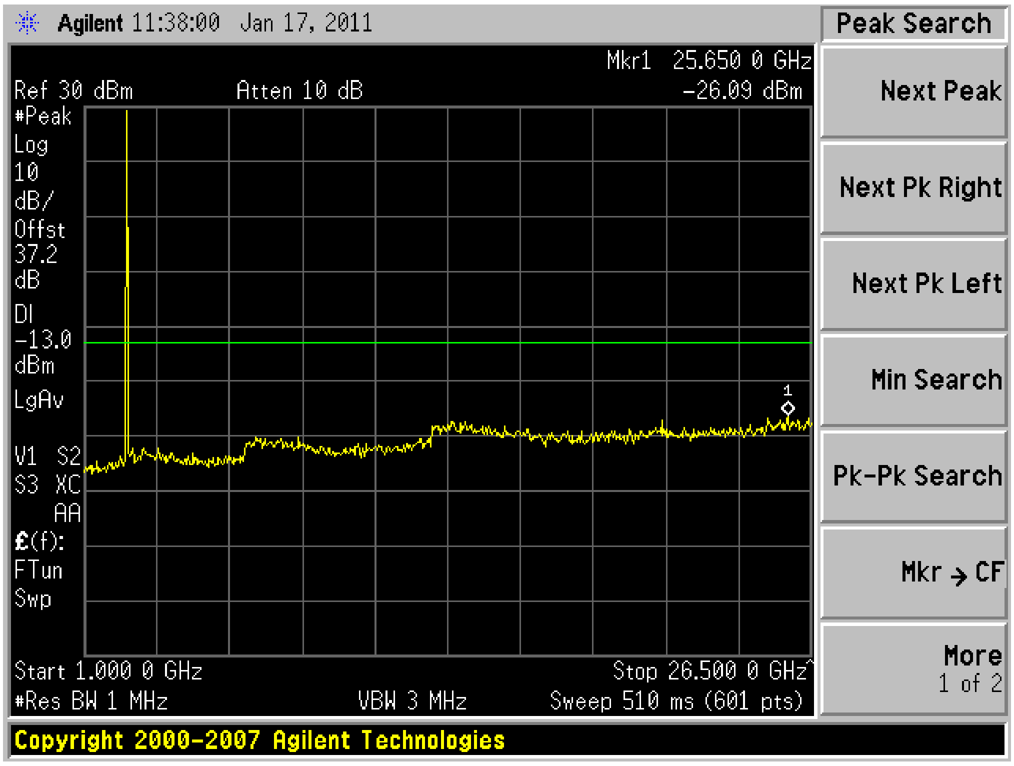
(30 MHz ~ 1 GHz)

(16QAM High Channel)



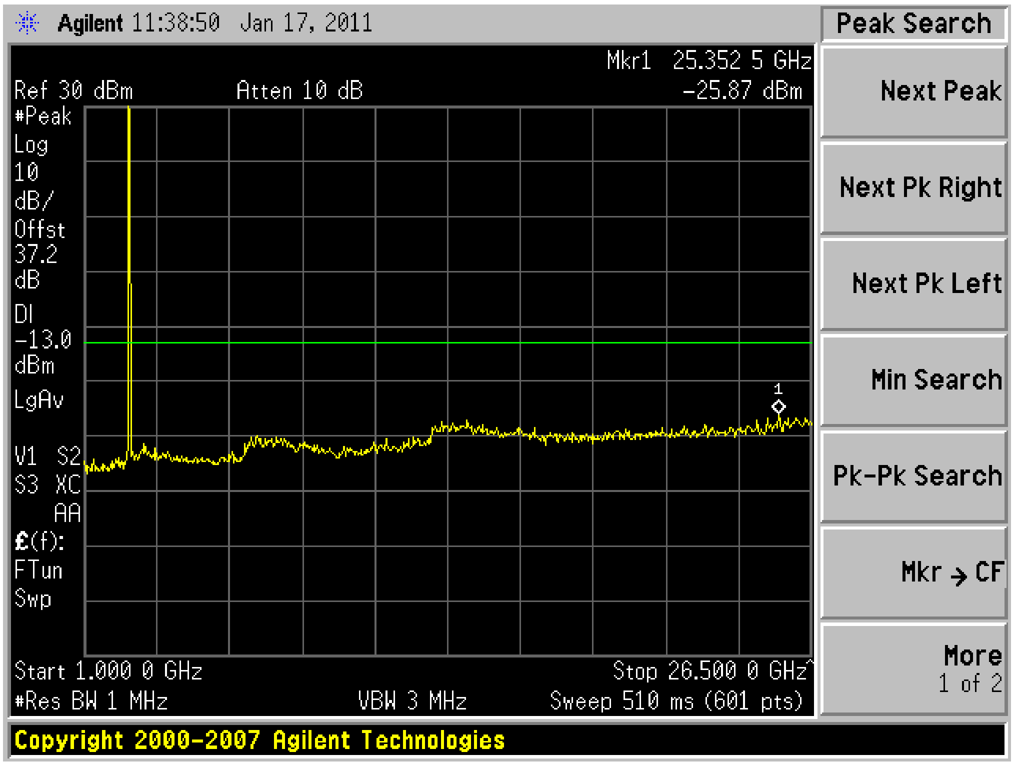
(30 MHz ~ 1 GHz)

(16QAM LOW Channel)



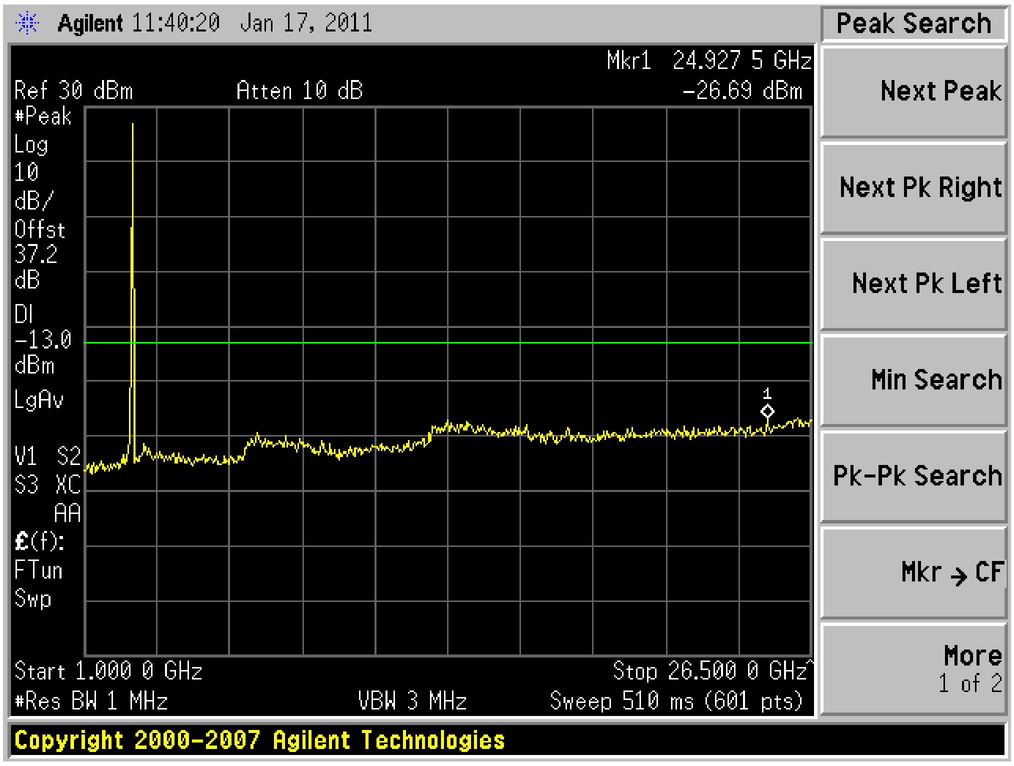
(1 GHz ~ 26.5 GHz)

(16QAM Middle Channel)



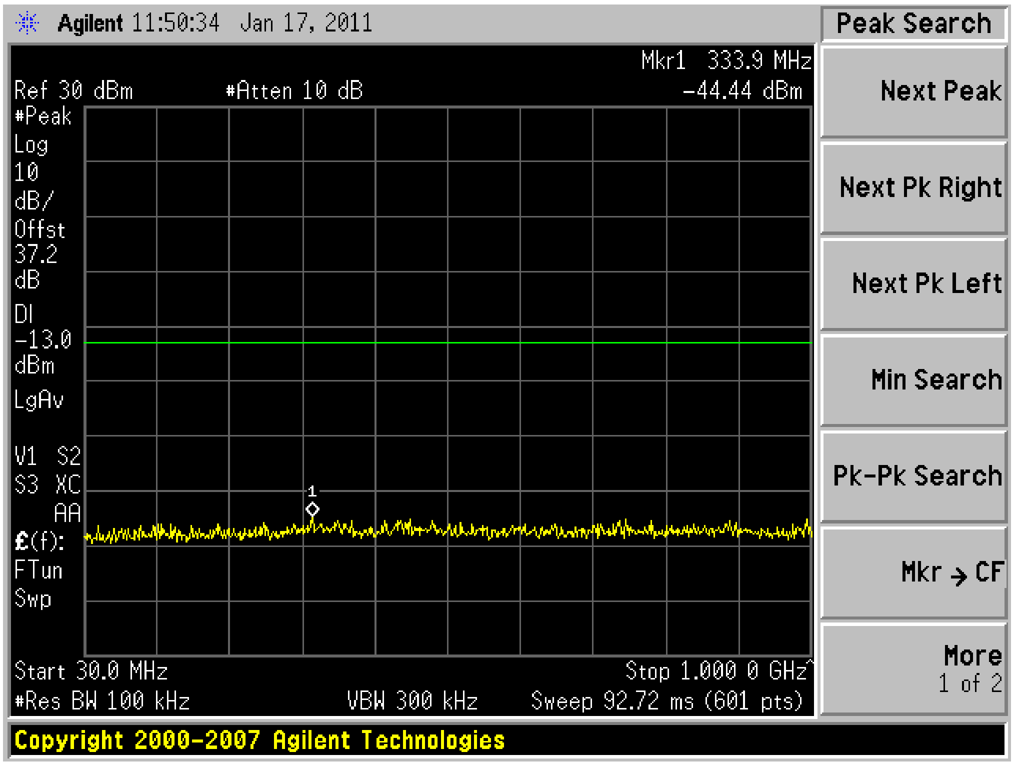
(1 GHz ~ 26.5 GHz)

(16QAM High Channel)



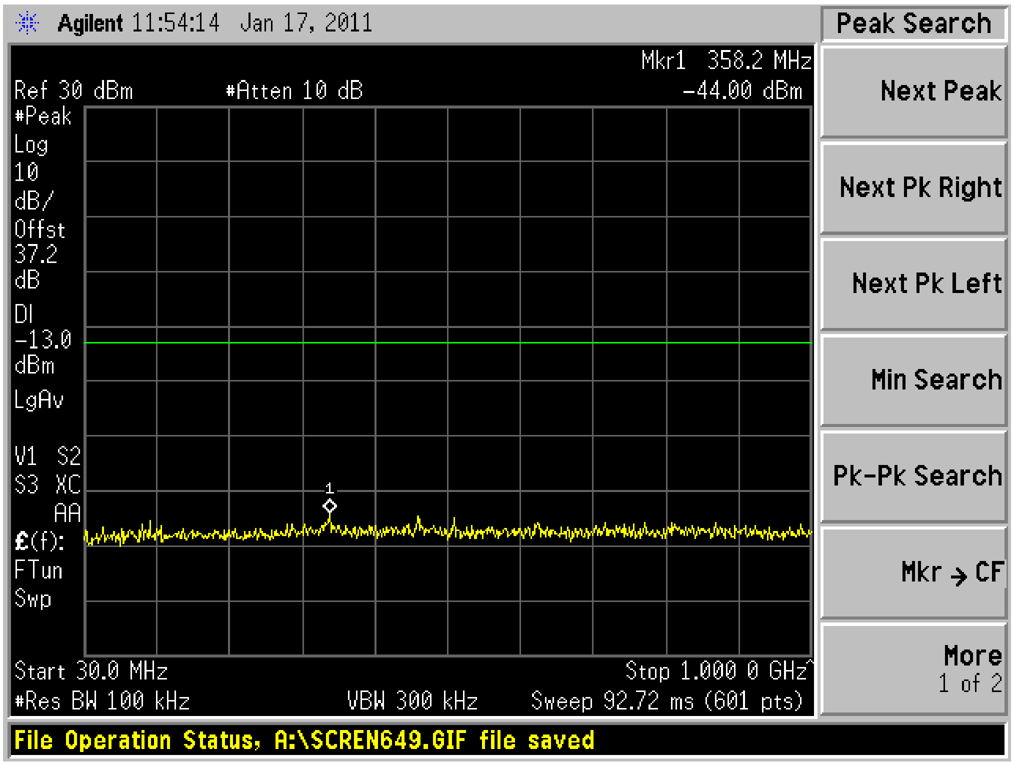
(1 GHz ~ 26.5 GHz)

(64QAM Low Channel)



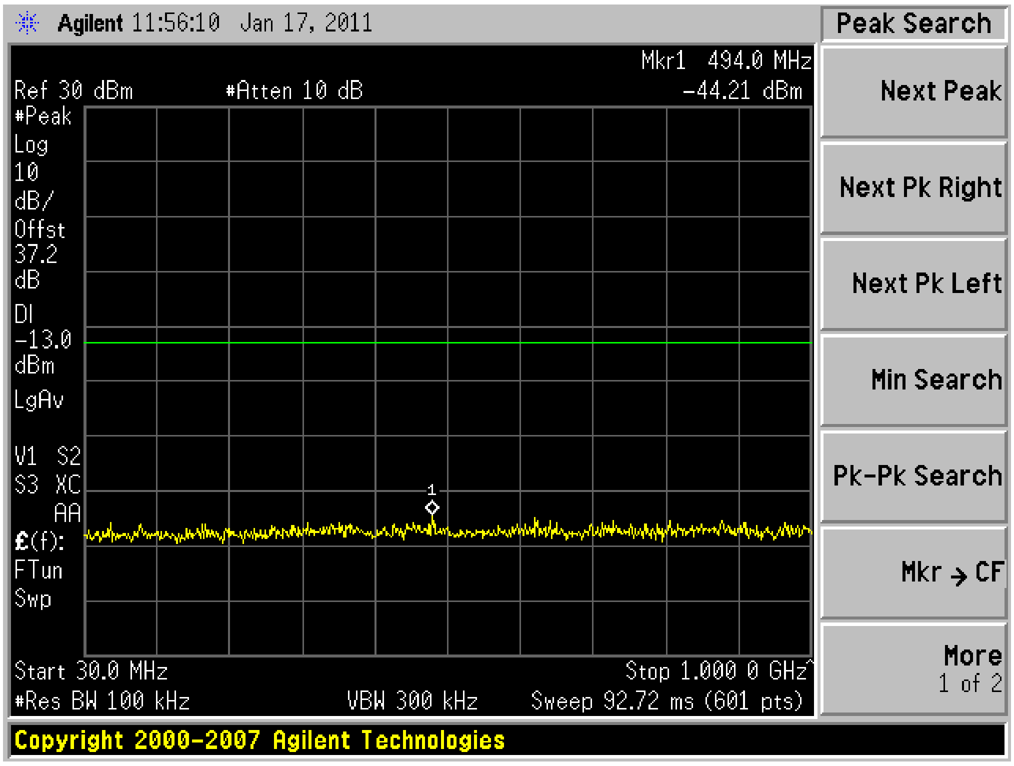
(30 MHz ~ 1 GHz)

(64QAM Middle Channel)



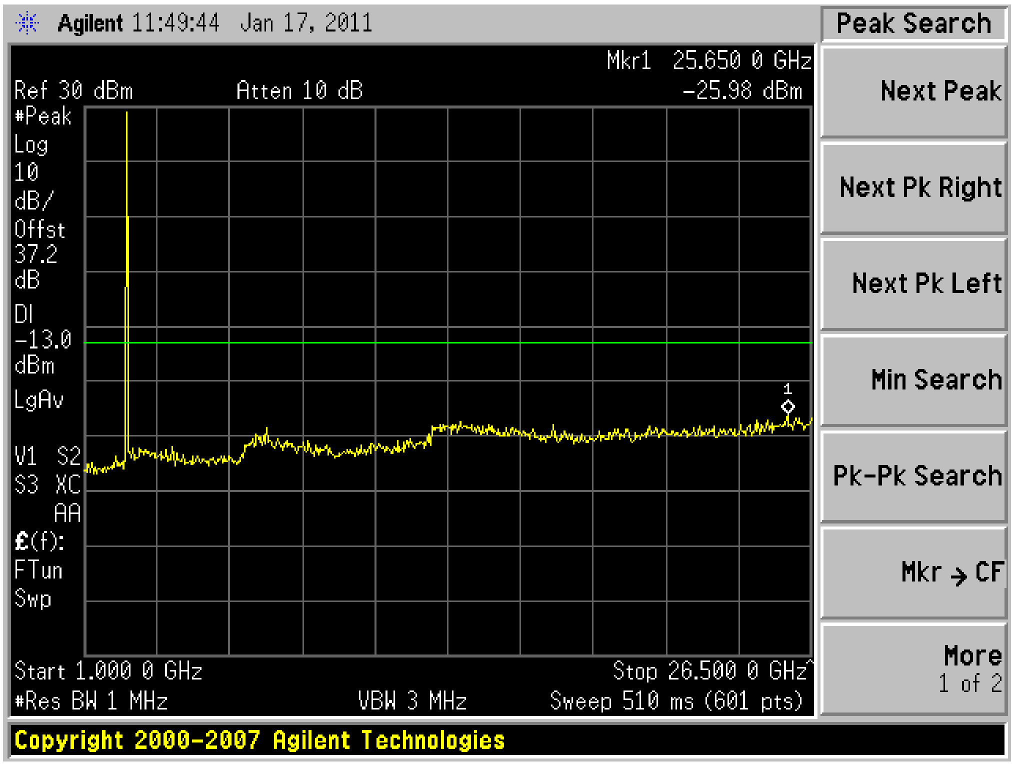
(30 MHz ~ 1 GHz)

(64QAM High Channel)



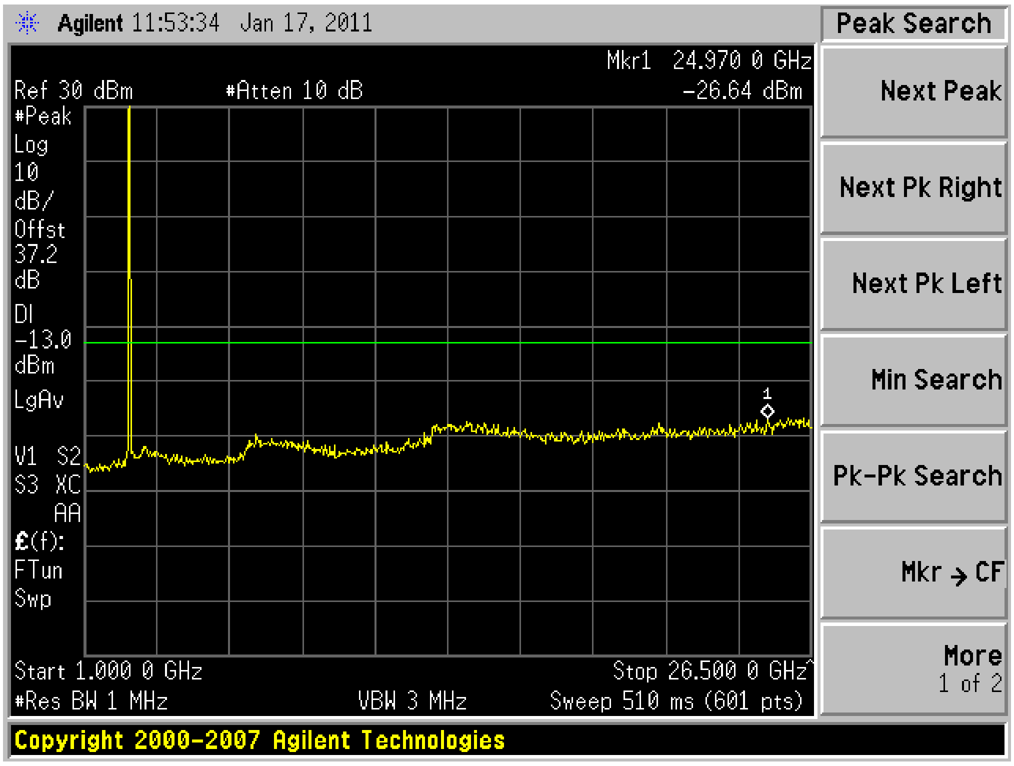
(30 MHz ~ 1 GHz)

(64QAM Low Channel)



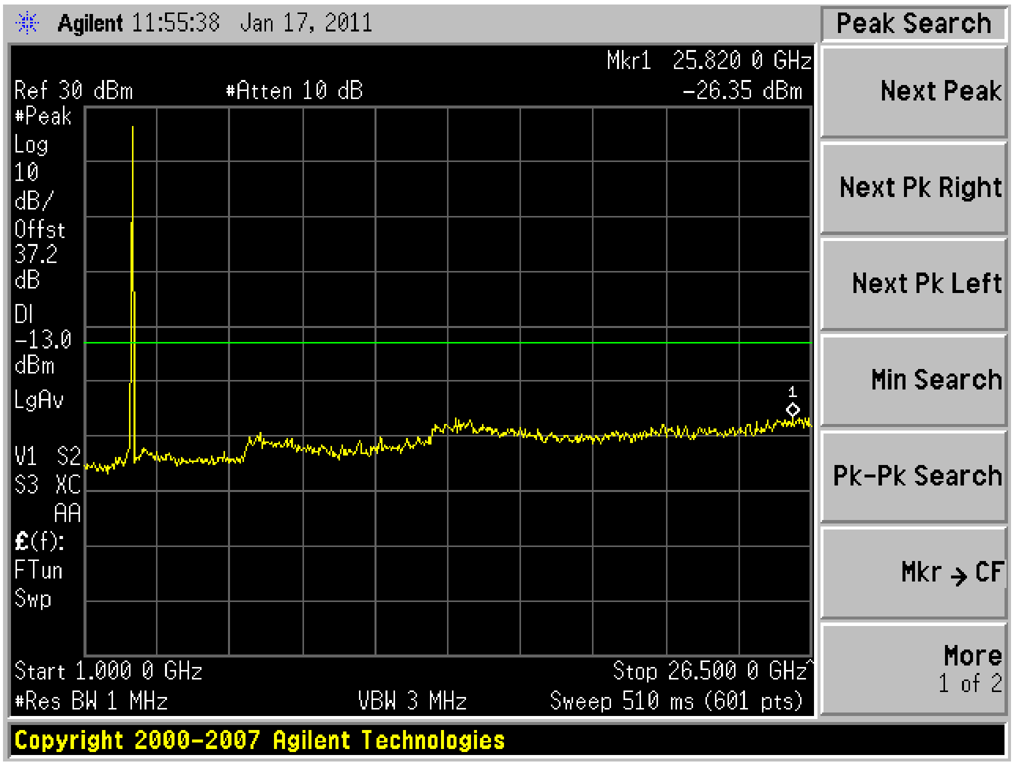
(1 GHz ~ 26.5 GHz)

(64QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(64QAM High Channel)



(1 GHz ~ 26.5 GHz)