HCT CO., LTD.

PRODUCT COMPLIANCE DIVISION
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CERTIFICATE OF COMPLIANCE

FCC PART 27 Certification

Applicant Name:

SeAH Networks Co., Ltd.
9F, IT Venture Tower East Wing 78 Karak-Dong,
Songpa-Gu, Seoul, Korea(138-950)

Date of Issue: January 6, 2010
Test Site/Location:
HCT, San 136-1 Ami-ri, Bubal-eup, Icheon-si,
Kyungki-do, Korea
Test Report No.: HCTR1001FR03

FCC ID	:	**XQERAS1041**
APPLICANT	:	**SeAH Networks Co., Ltd.**

EUT Type	:	Mobile WiMAX Radio Access System
Manufacturer	:	SeAH Networks Co., Ltd.
Model name	:	RAS1041
Frequency of Operation	:	2496 MHz ~ 2690 MHz
FCC Rule Part(s)	:	FCC Part 27m.
Test Procedure(s)	:	ANSI/TIA-603-C-2004
Application Type	:	Original Equipment
Data of issue	:	January 6, 2010

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of FCC Part 27 of the FCC Rules under normal use and maintenance.

Chang Seok Choi

Report prepared by
: Chang Seok Choi
Test engineer of RF Team

Approved by
: Sang Jun Lee
Manager of RF Team

C O N T E N T S

1. GENERAL INFORMATION

1.1. CLIENT INFORMATION

Company	**SeAH Networks Co., Ltd.**
Contact Point	**9F, IT Venture Tower East Wing 78 Karak-Dong, Songpa-Gu, Seoul, Korea(138-950)**
Contact person	**Name: Kyung Soo Lee** **Phone #: +82-2-2142-0881** **Fax #: +82-2-2142-0808**

1.2. PRODUCT INFORMATION

EUT TYPE	Mobile WiMAX Radio Access System
EMISSION DESIGNATOR	9M14G7D (QPSK), 9M14W7D(16QAM/64QAM)
OPERATING FREQUENCY	2496MHz ~ 2690MHz
TX OUTPUT POWER	200 mW/Branch
CHANNEL BANDWIDTH	10 MHz
MODULATION TYPE	OFDMA (QPSK, 16QAM, 64QAM)
MAX CAPACITY	1 FA/Omni
SYSTEM INPUT VOLTAGE	DC 12 V

1.3. OPERATING DESCRIPTION OF EUT

RAS1041 system is the system base station of Mobile WiMAX which supports Base band call processing, ACR interoperability and interface, RF signal processing over the air from the MS(Mobile Station) in a single unit.
RAS1041 is a base station that supports system profile mp05 (Formerly 3A:2.5GHz/10MHz) of WiMAX Forum.
RAS1041 is a single indoor type system that can load 1FA/Omni Mobile WiMAX Channel in a single building and process hardware such as Network Interface, Digital, and RF. RAS1041 is light and compact in size for simple installation within a building. Patch Antenna for MIMO Service is placed at the front cover of RAS1041 and RF emits 200mW + 200mW.
RAS1041 was designed not for units but for a single building and used dependable equipments to secure Mobile WiMAX service without any system replacement.
RAS1041 is designed to utilize 1FA/Omni Service to the fullest and provides easy indoortype network configuration, increased capacity and affordable price range to provide basic network synchronization function.

Supports IEEE 802.16e-2005 Cor2/D3 standard
Has NWG system profile C structure of WiMAX Forum and supports R6 standard interface including GRE as interface between ACR and RAS
Supports WiMAX PHY/MAC Wave 1 and MIMO (2Tx/2Rx) feature of Wave 2
Provides filtering function to eliminate noise and small Power Amplifier to emit (200m) Watt per channel
Has configuration structure to support maximum of 1FA/Omni

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2. TEST SUMMARY

2.1. STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance With

FCC Part 27

SECTION	TEST ITEMS	RESULTS
2.1046, 27.50(h)	Conducted Output Power	Compliant
2.1049, 27.53(m)	Occupied Bandwidth	Compliant
2.1051, 27.53(m)	Spurious Emissions at Antenna Terminals	Compliant
2.1051, 27.53(m)	Band edge	Compliant
2.1053, 27.53(m)	Spurious Radiated Emissions.	Compliant
2.1055(a)(1), 27.54	Frequency Stability over Temperature variation	Compliant
2.1055(d), 27.54	Frequency stability over Voltage variation	Compliant

2.2. MODE OF OPERATION DURING THE TEST

The EUT was operated in a manner representative of the typical usage of the equipment.
During all testing, system components were manipulated within the confines of typical usage to maximize each emission. All Modulation (QPSK, 16QAM, and 64QAM) modes and different data rates ware tested, and the worst data was recorded in this test report.
The device does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports for radiated spurious emission testing.

3. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature :	**+ 15 ℃ to + 35 ℃**
Relative humidity:	**30 % to 60 %**
Air pressure	**860 mbar to 1060 mbar**

4. TEST EQUIPMENT

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	296	09/23/2010
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	147	03/26/2010
Schwarzbeck	VULB 9160 / TRILOG Antenna	9160-3150	12/18/2010
Schwarzbeck	VULB 9160 / TRILOG Antenna	3125	05/06/2011
HD	MA240 / Antenna Position Tower	556	N/A
EMCO	1050 / Turn Table	114	N/A
HD GmbH	HD 100 / Controller	13	N/A
HD GmbH	KMS 560 / SlideBar	12	N/A
MITEQ	AMF-60-0010 1800-35-20P	1200937	05/20/2010
Schwarzbeck	BBHA9170 / SHF-EHF Horn Antenna	BBHA9170342	03/20/2011
R&S	ESI40 / EMI TEST Receiver	831564/003	10/30/2010
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	1	06/29/2010
Agilent	6674A / DC Power Supply	3501A00901	05/14/2010
Agilent	8498A / Attenuator	51161	04/14/2010
Agilent	8498A / Attenuator	51162	12/24/2009
WEINSCHEL	67-30-33 / Attenuator	BU5347	01/13/2010
WEINSCHEL	67-30-33 / Attenuator	BR0530	02/03/2010
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	02/06/2010
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	21207	01/13/2010
Agilent	N9020A / MXA Signal Analyzer	US46220219	02/19/2010

5. CONDUCTED OUTPUT POWER

5.1. 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.

5.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	6674A / DC Power Supply	3501A00901	05/14/2010
Agilent	8498A / Attenuator	51161	04/14/2010
Agilent	8498A / Attenuator	51162	12/24/2009
WEINSCHEL	67-30-33 / Attenuator	BU5347	01/13/2010
WEINSCHEL	67-30-33 / Attenuator	BR0530	02/03/2010
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	02/06/2010
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	21207	01/13/2010
Agilent	N9020A / MXA Signal Analyzer	US46220219	02/19/2010

5.3. Test Procedure

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

According to FCC §2.1046 (A), 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 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.
2) The spectrum analyzer was set to RMS Detector function and Maximum hold mode.
3) The resolution banswidth of the spectrum analyzer was comparable to the emission bandwidth.
4) PAR is measured by using CCDF function of Spectrum Analyzer. Info BW is equal to EUT's emission bandwidth.

5.3.1. Environmental Conditions:

Temperature:	22 °C
Relative Humidity:	37 %

5.4. Test Result

: PASS

5.4.1. Test Data at Output Port 0

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
QPSK	Low	2508.5	23.16	0.21
	Middle	2608.0	23.17	0.21
	High	2683.5	22.61	0.18
16QAM	Low	2508.5	22.91	0.20
	Middle	2608.0	22.37	0.17
	High	2683.5	21.80	0.15
64QAM	Low	2508.5	22.89	0.19
	Middle	2608.0	22.74	0.19
	High	2683.5	22.27	0.17

5.4.2. Test Data at Output Port 1

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
QPSK	Low	2508.5	22.96	0.20
	Middle	2608.0	23.02	0.20
	High	2683.5	23.09	0.20
16QAM	Low	2508.5	21.99	0.16
	Middle	2608.0	22.33	0.17
	High	2683.5	22.41	0.17
64QAM	Low	2508.5	22.70	0.19
	Middle	2608.0	23.02	0.20
	High	2683.5	22.84	0.19

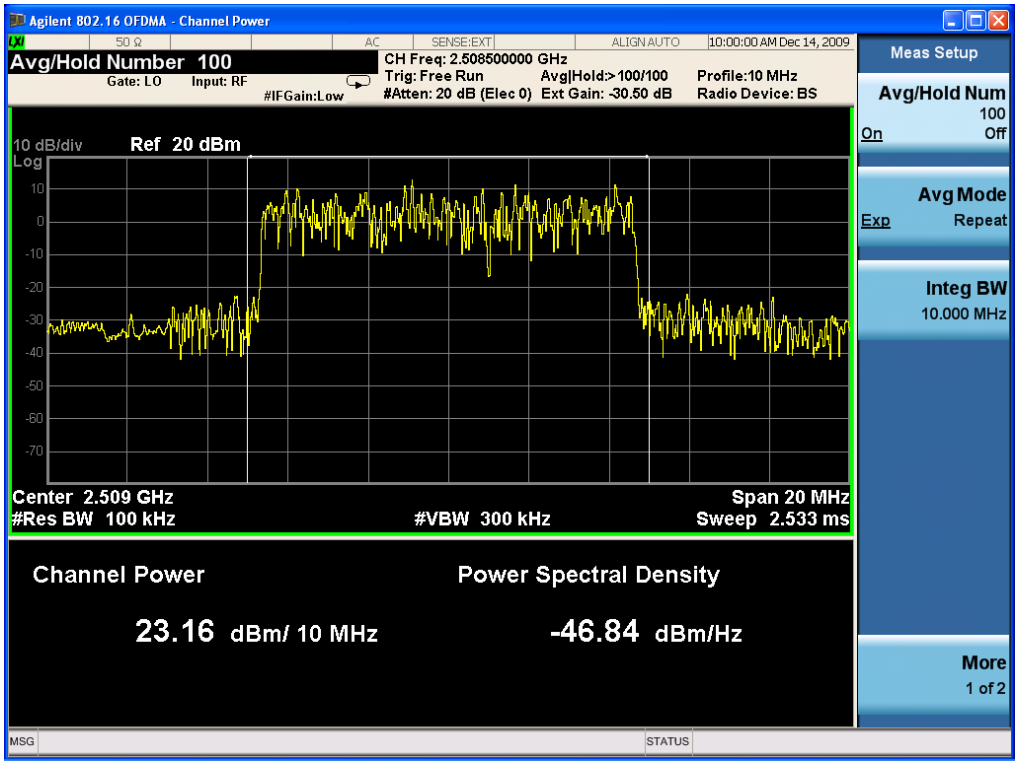
5.4.3. Combined Test Data at Output Port

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
QPSK	Low	2508.5	26.09	0.41
	Middle	2608.0	25.90	0.39
	High	2683.5	26.11	0.41
16QAM	Low	2508.5	25.39	0.35
	Middle	2608.0	25.44	0.35
	High	2683.5	25.33	0.34
64QAM	Low	2508.5	25.61	0.36
	Middle	2608.0	25.77	0.38
	High	2683.5	26.21	0.42

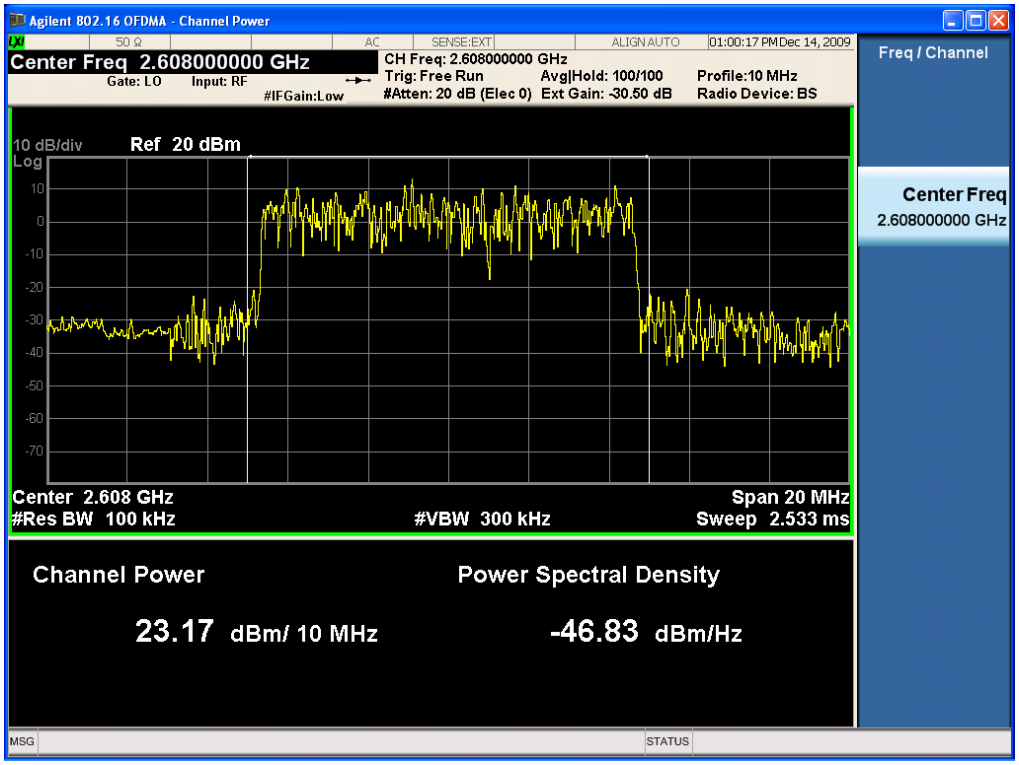
[Combine test diagram]

5.4.4. Plot Data for Output 0 (Conducted Output Power)

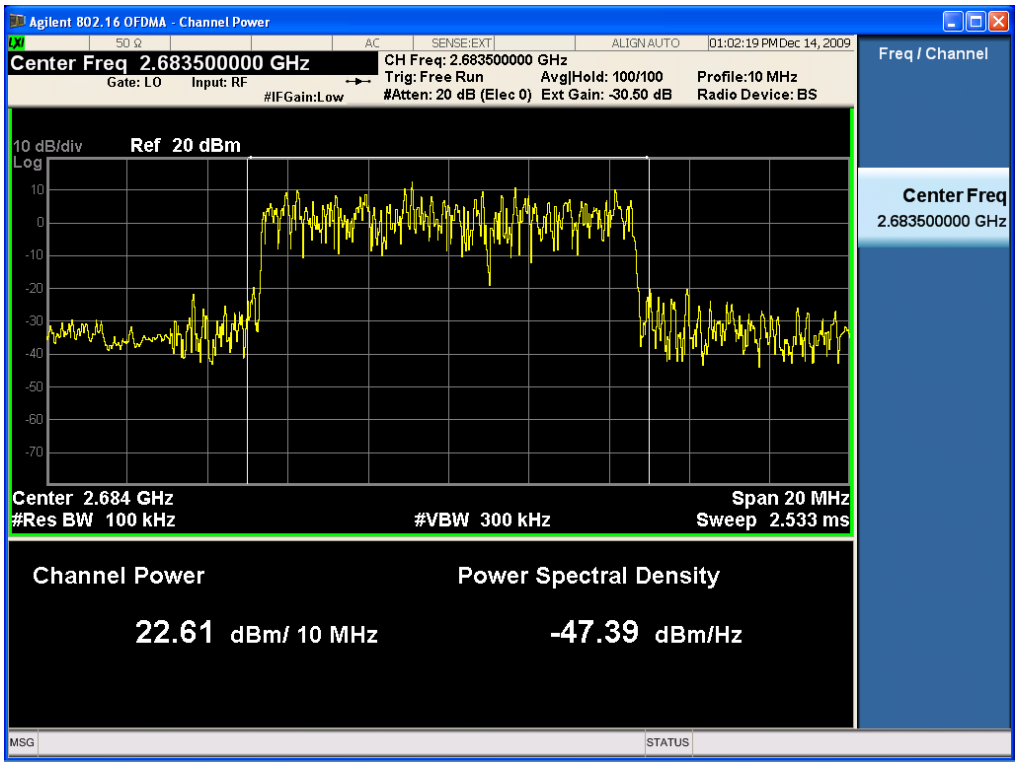
(QPSK Low Channel)



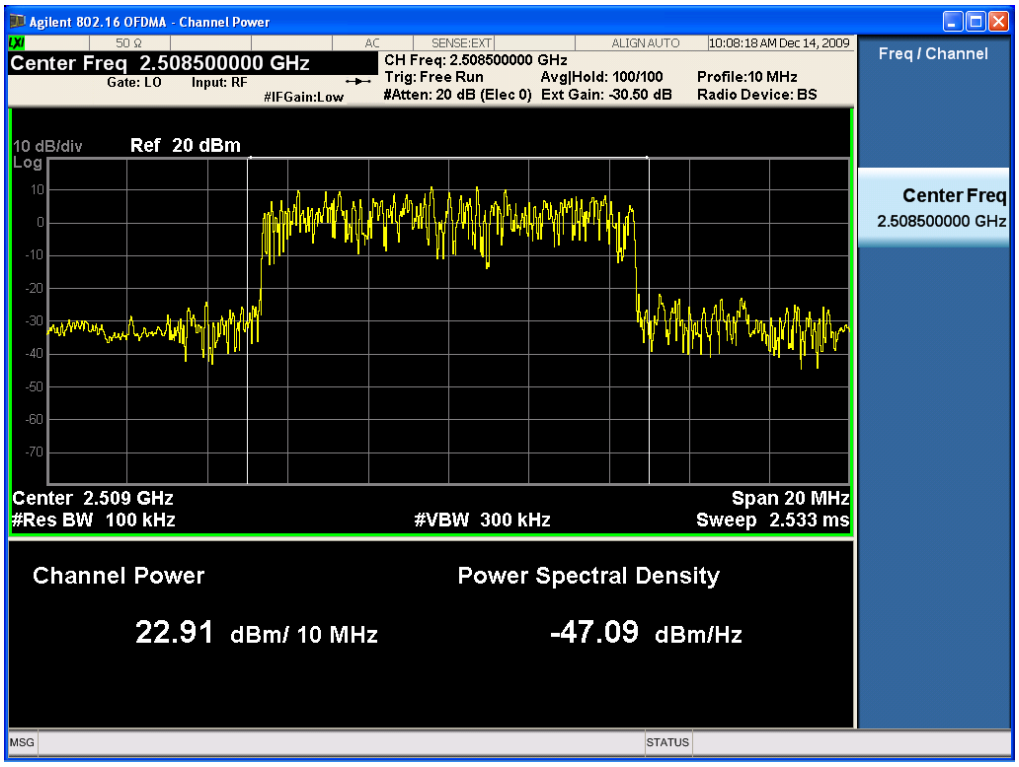
(QPSK Middle Channel)



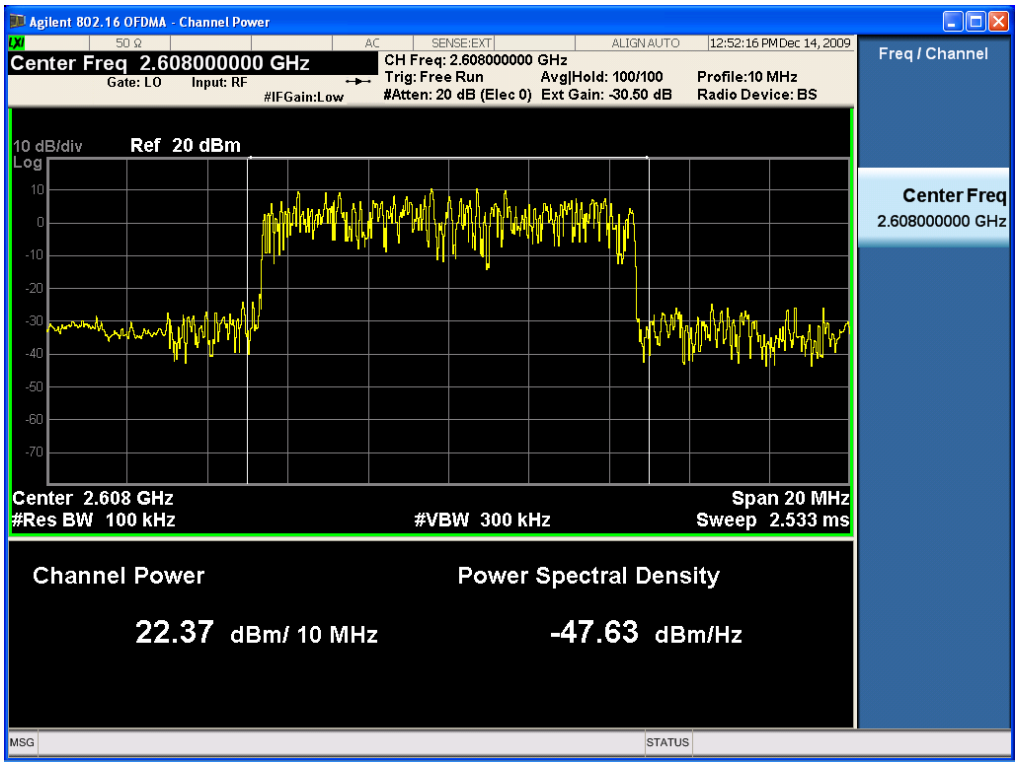
(QPSK High Channel)



(16QAM Low Channel)



(16QAM Middle Channel)



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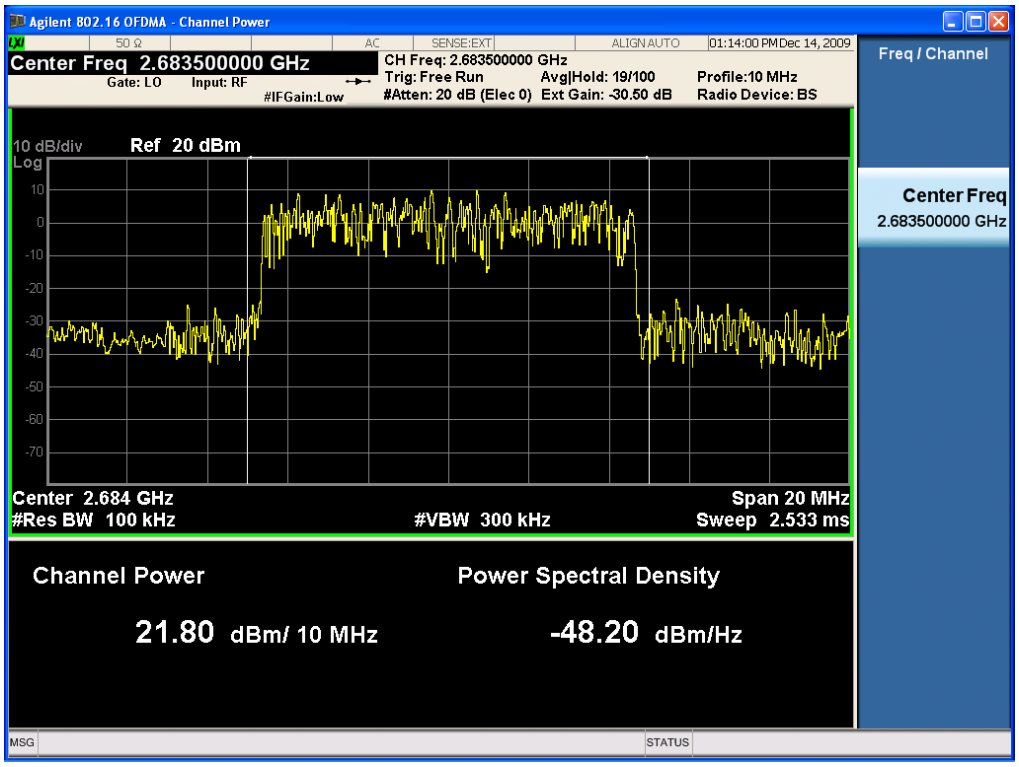

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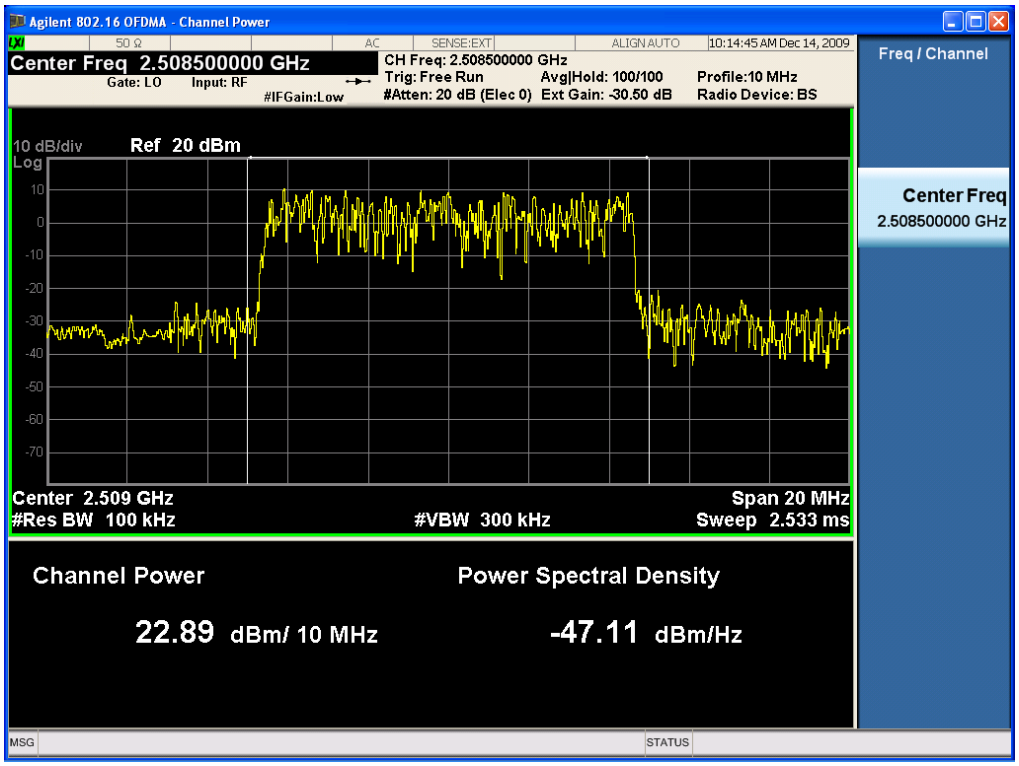

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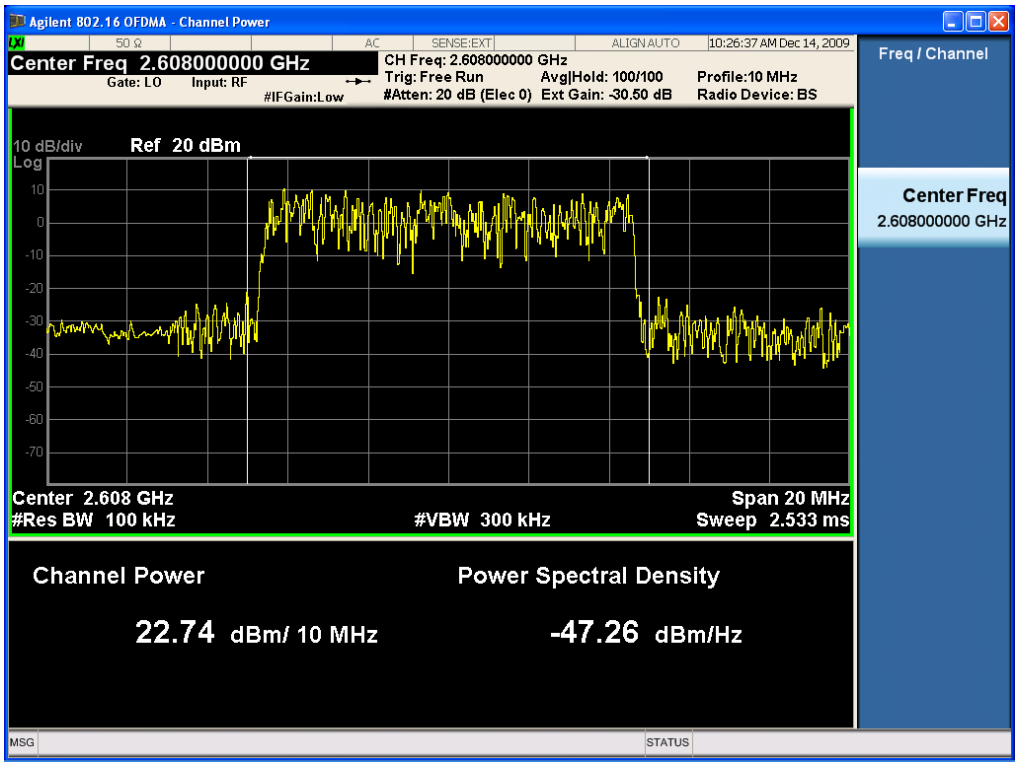
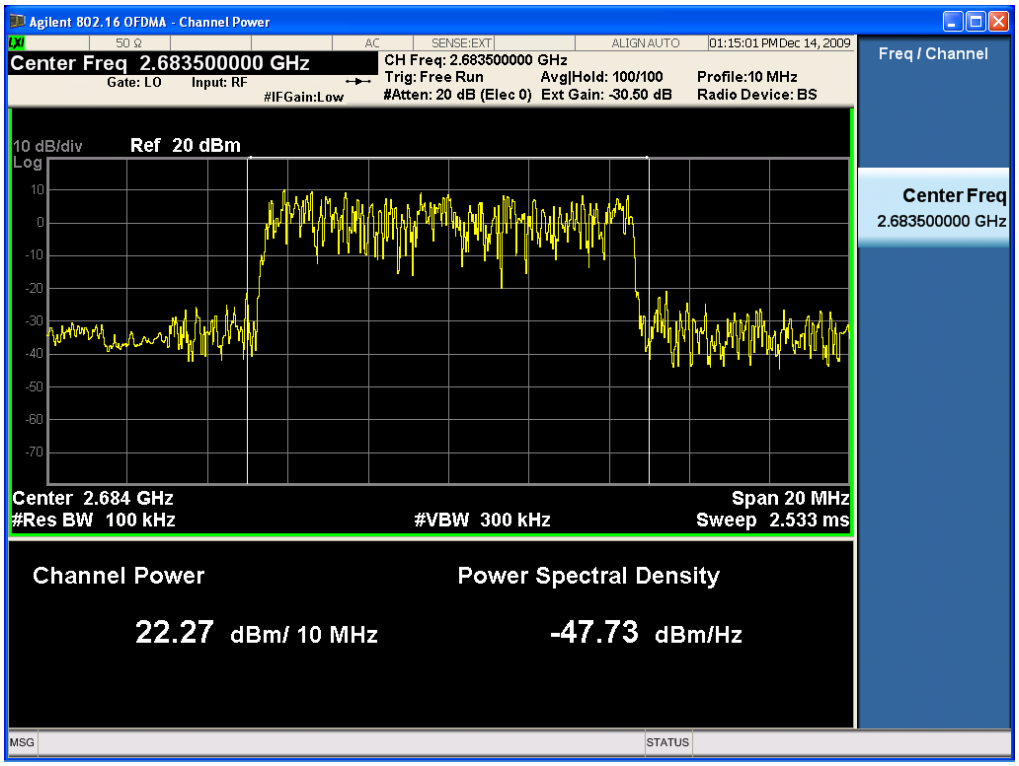
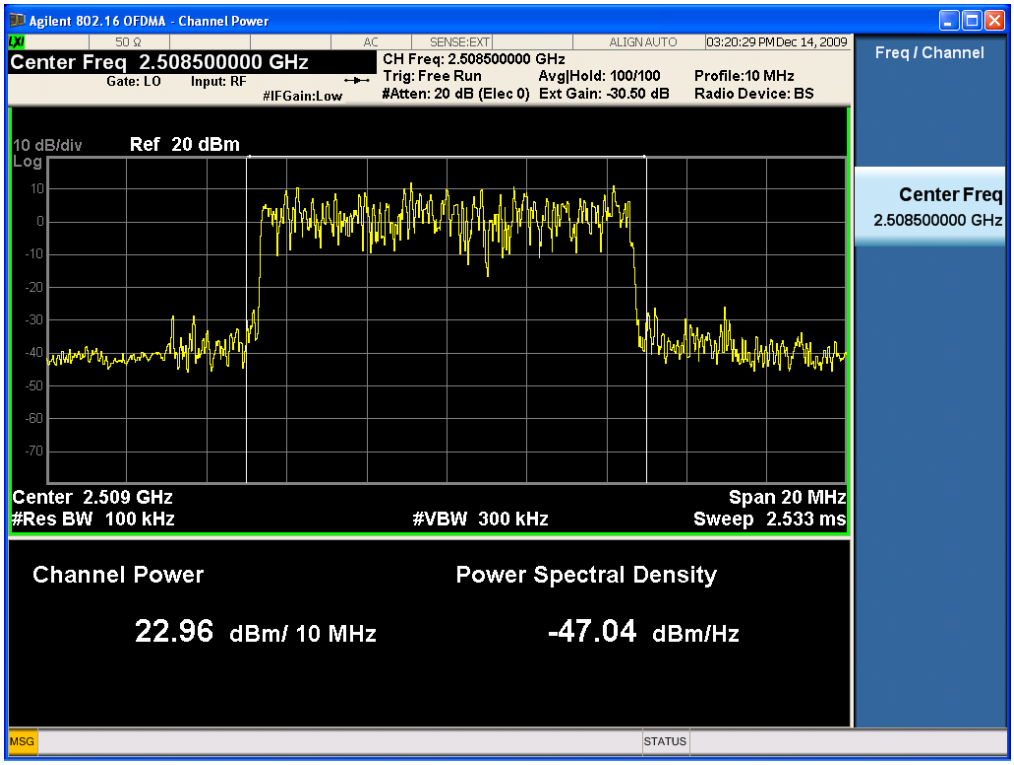


(64QAM High Channel)

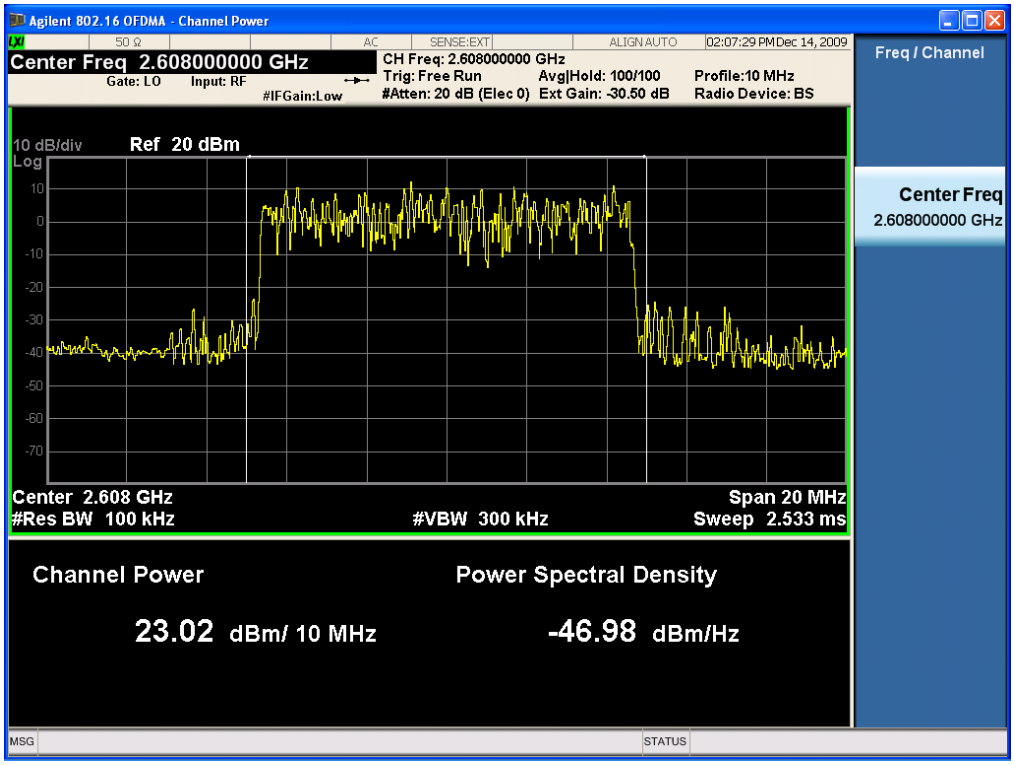


5.4.5. Plot Data for Output 1 (Conducted Output Power)

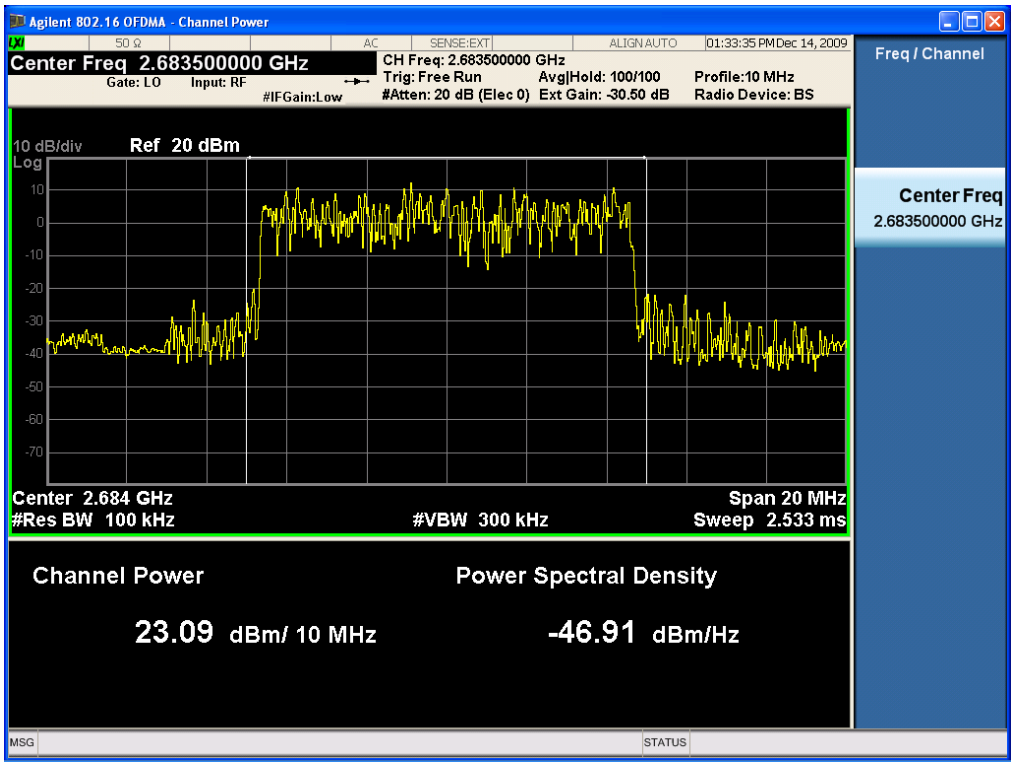
(QPSK Low Channel)



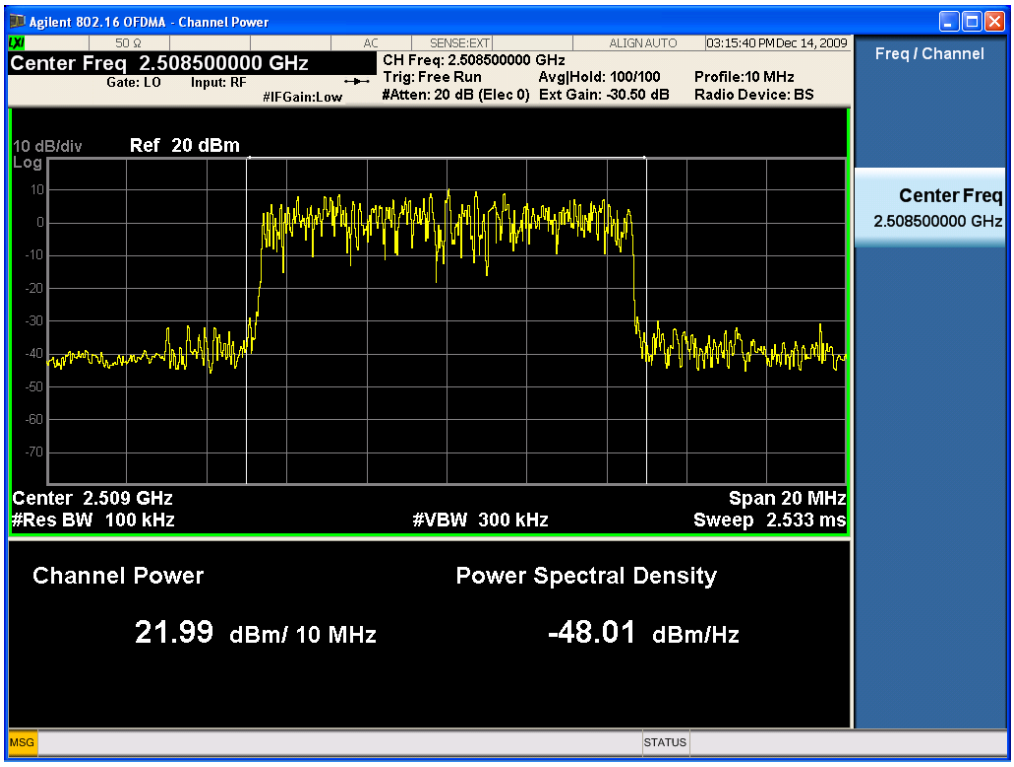
(QPSK Middle Channel)



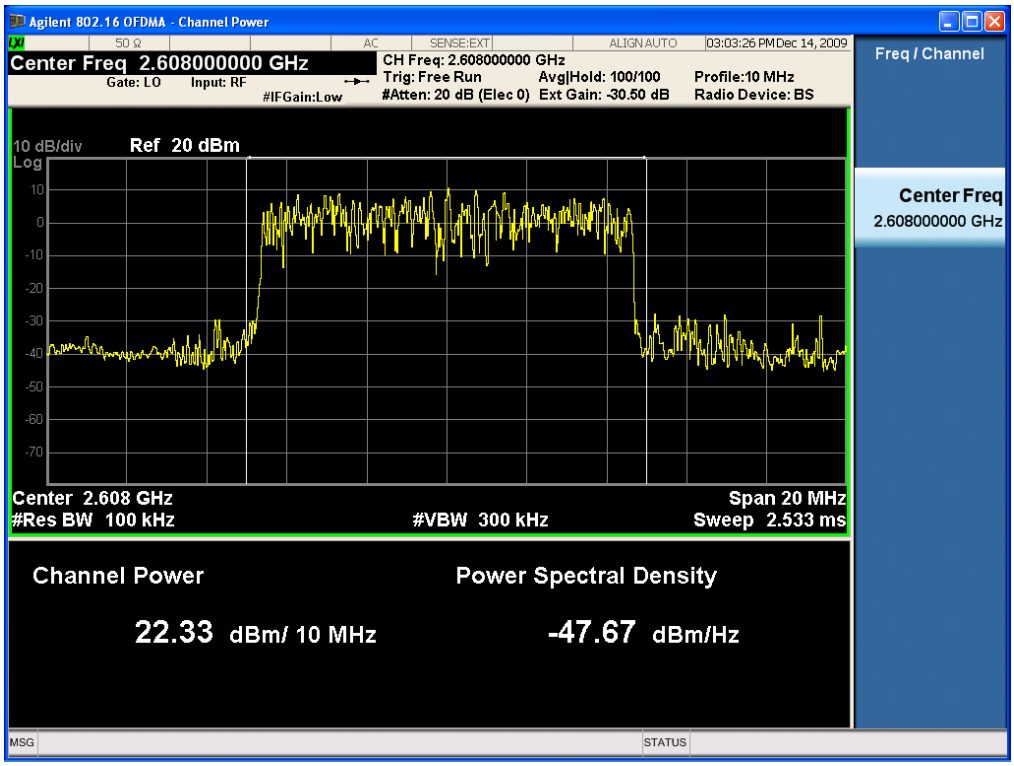
(QPSK High Channel)



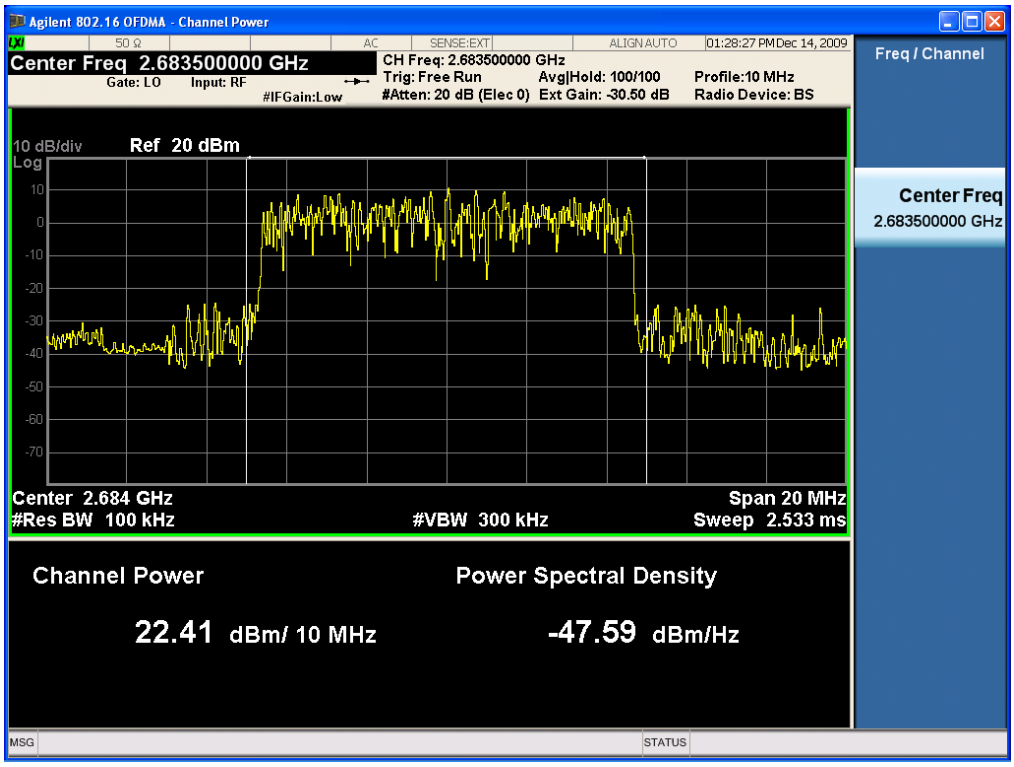
(16QAM Low Channel)



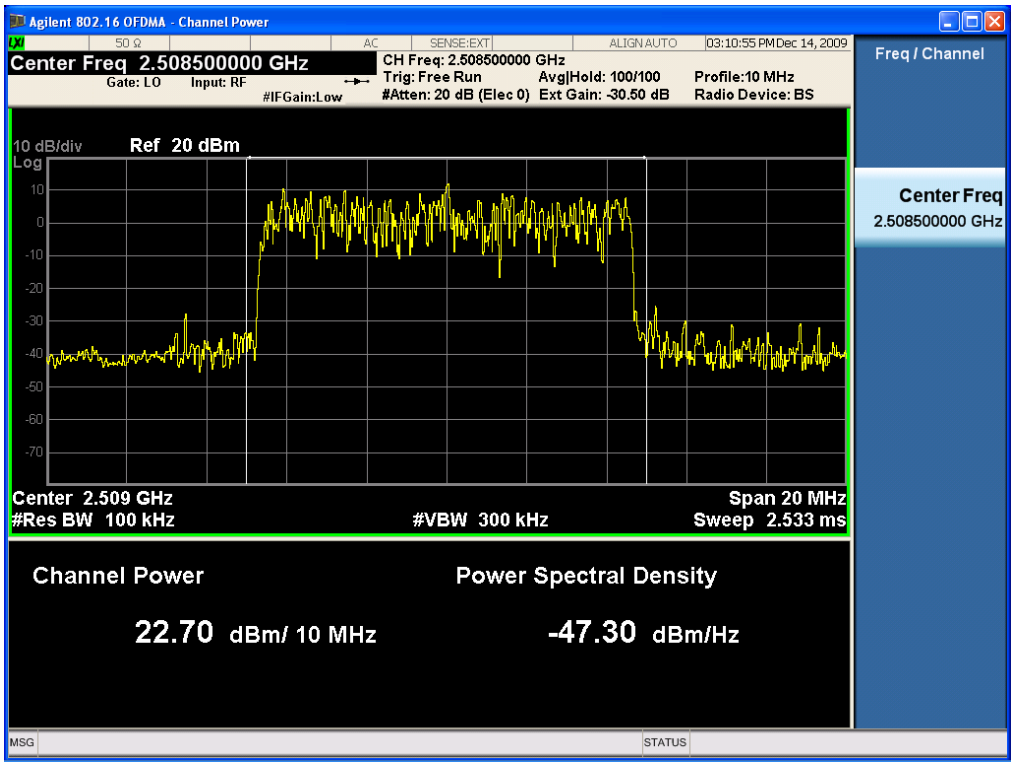
(16QAM Middle Channel)



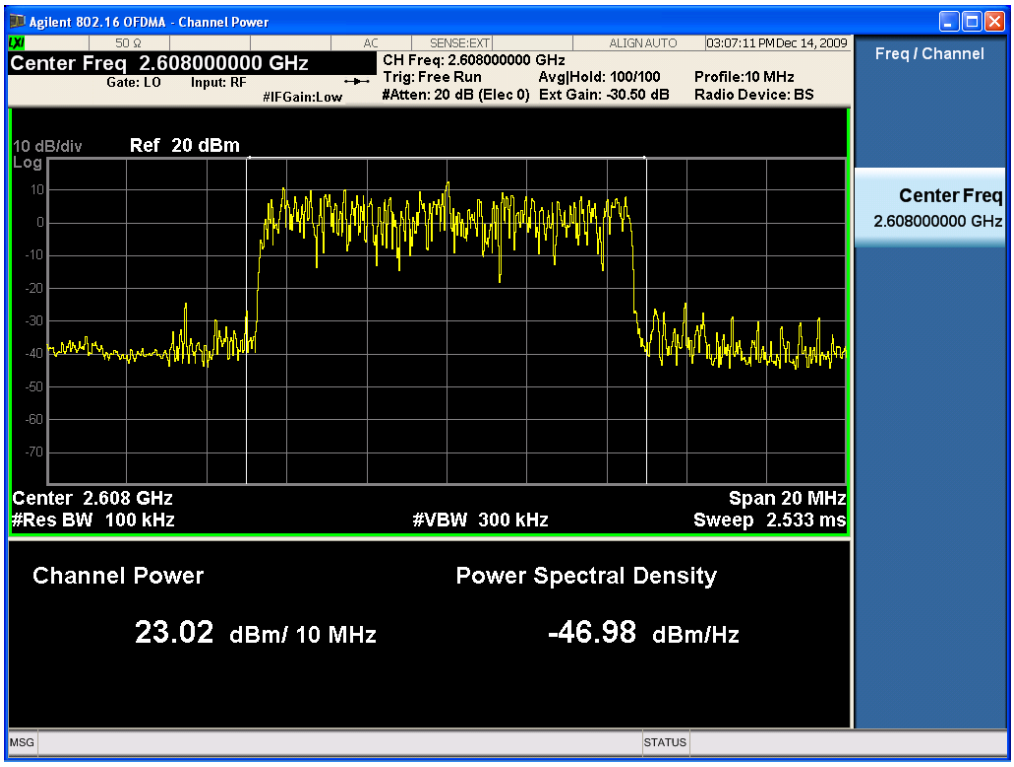
(16QAM High Channel)



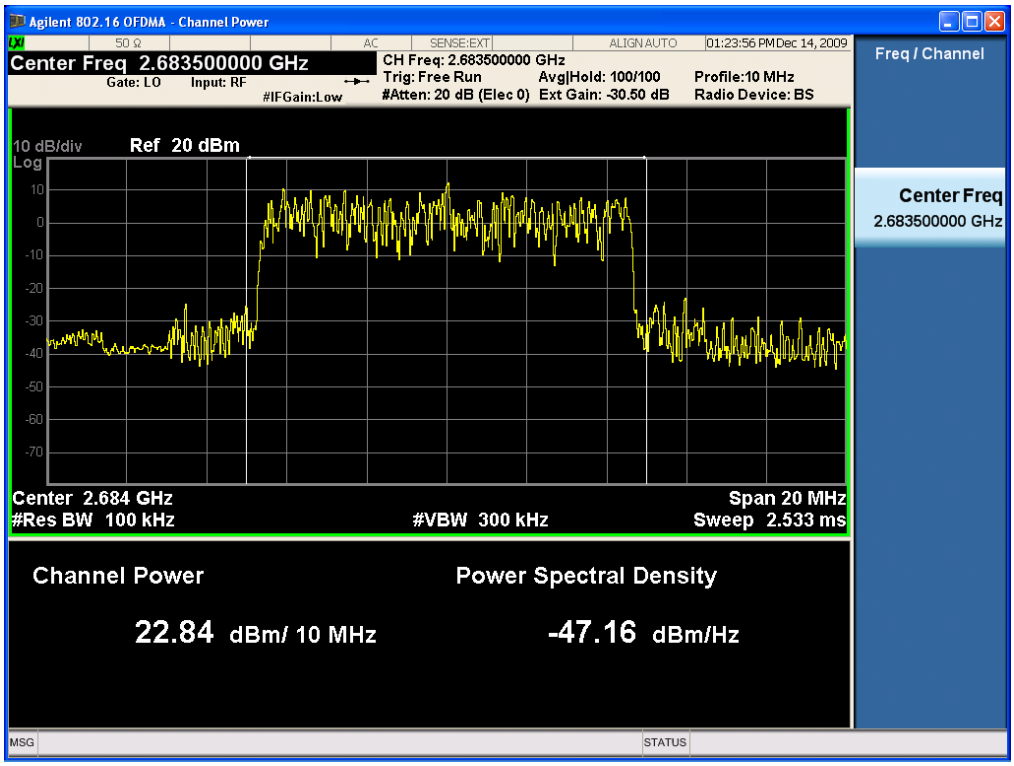
(64QAM Low Channel)



(64QAM Middle Channel)

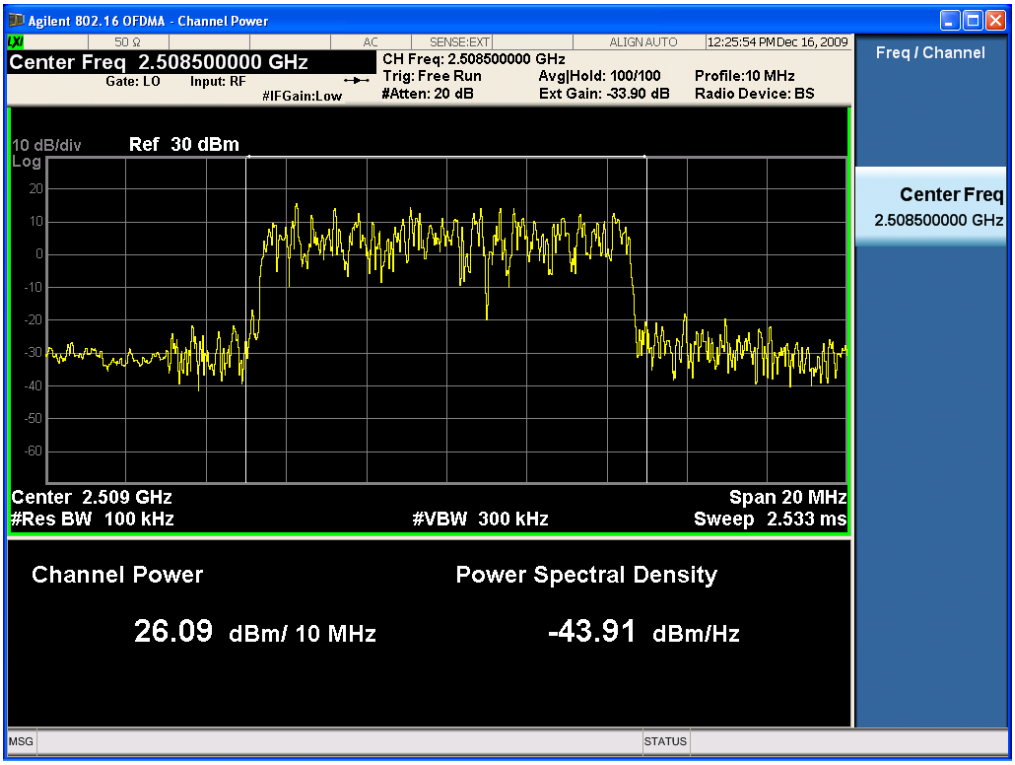


(64QAM High Channel)

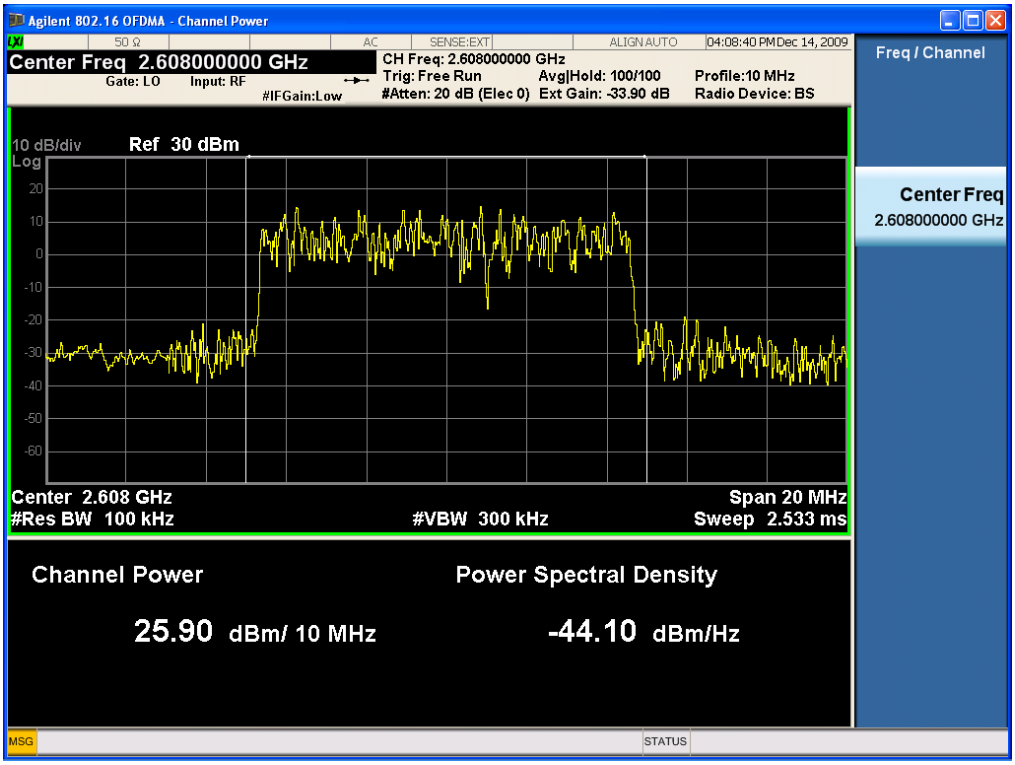


5.4.6. Combined Plot Data for output(Conducted Output Power)

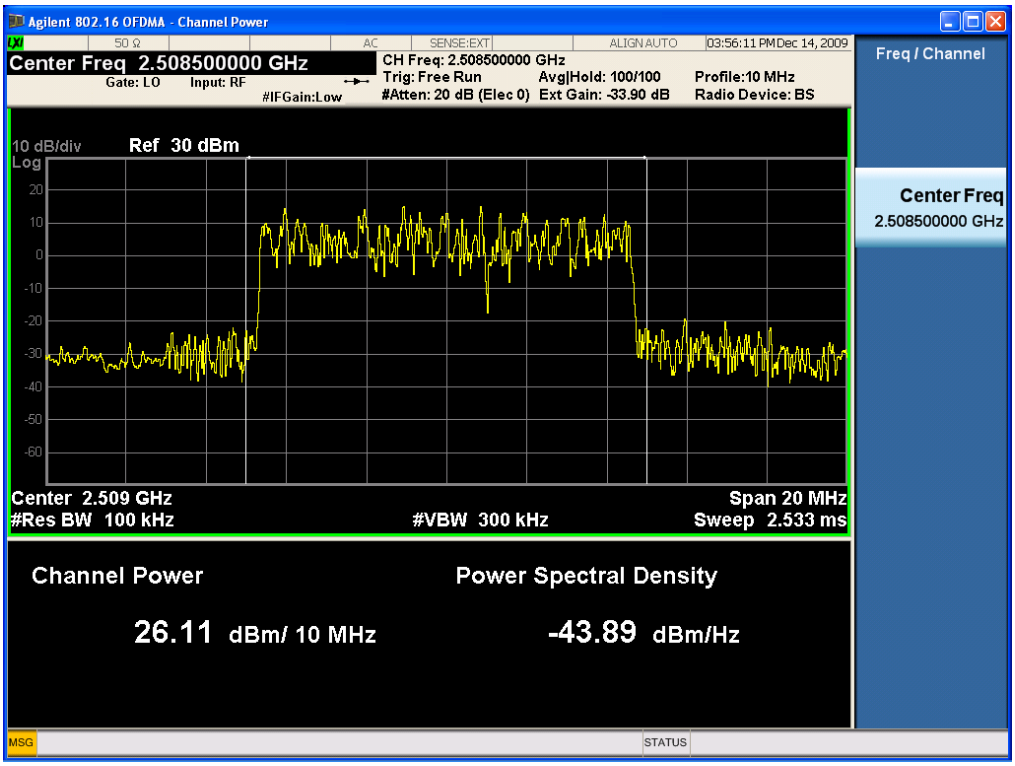
(QPSK Low Channel)



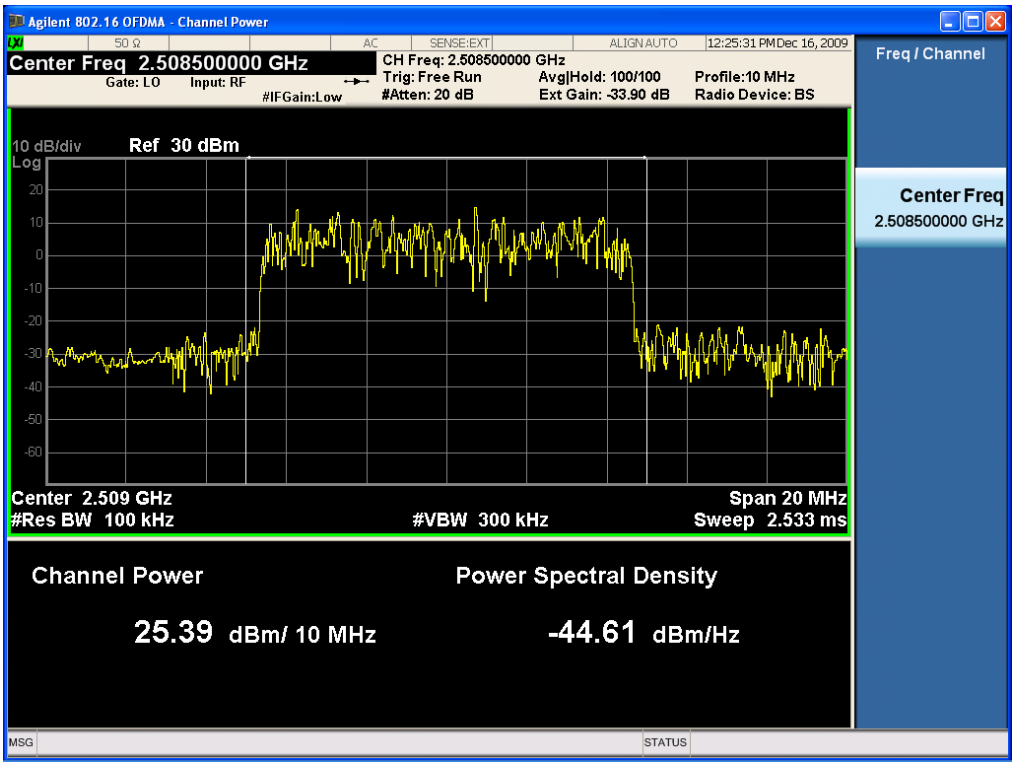
(QPSK Middle Channel)



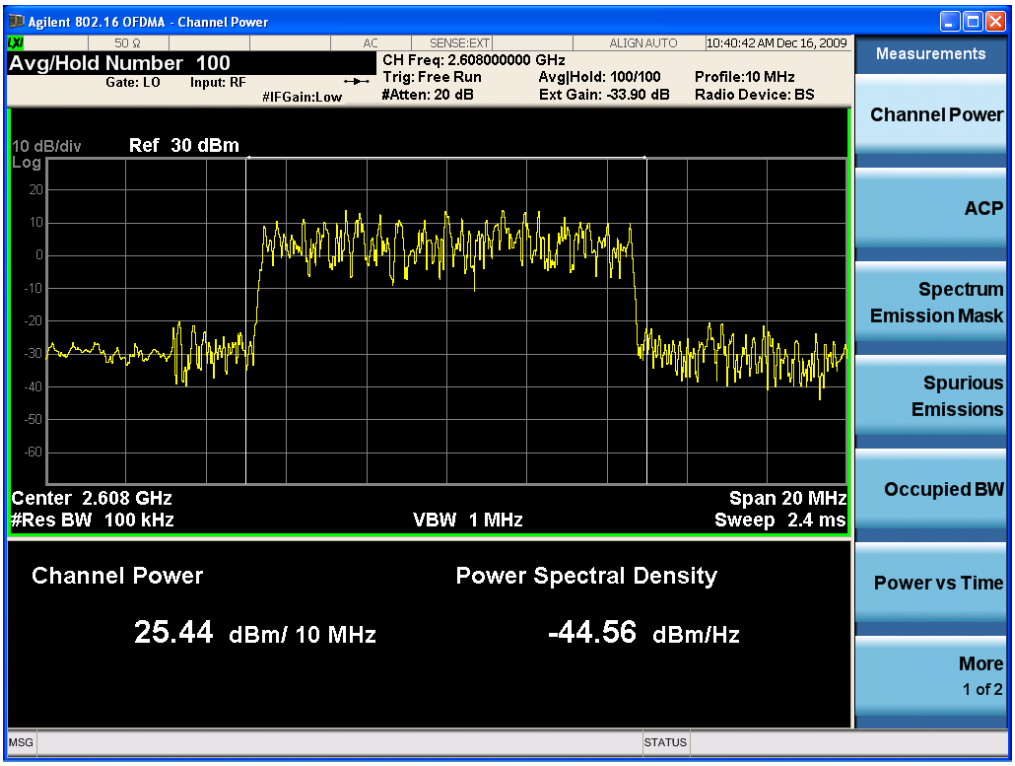
(QPSK High Channel)



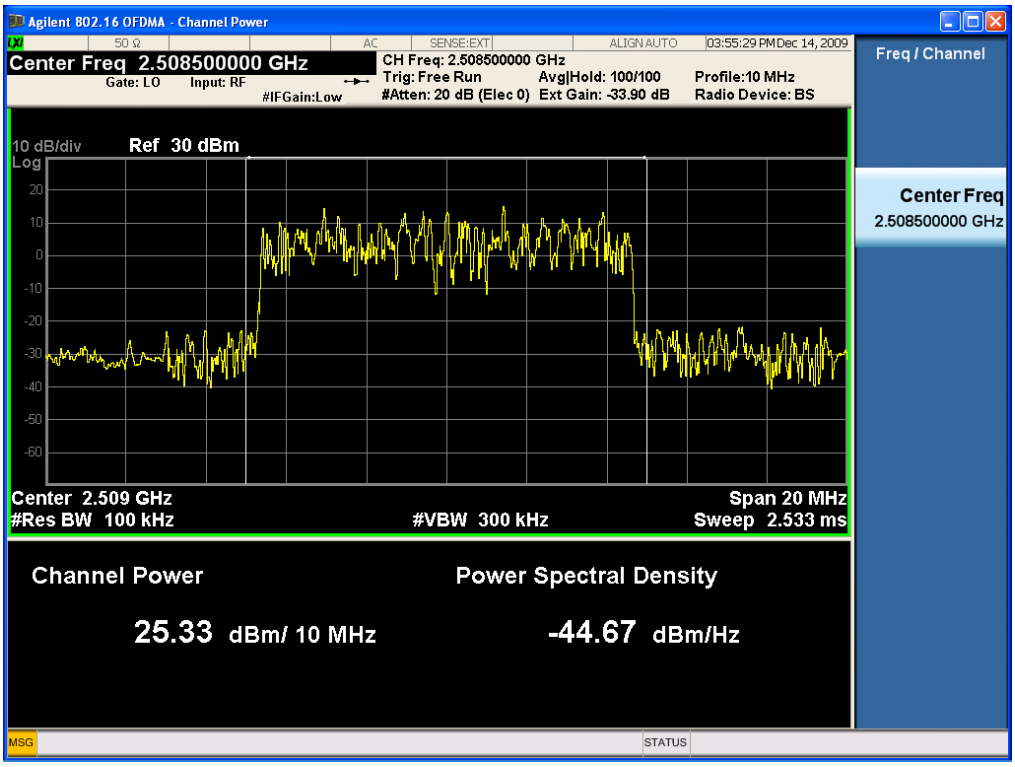
(16QAM Low Channel)



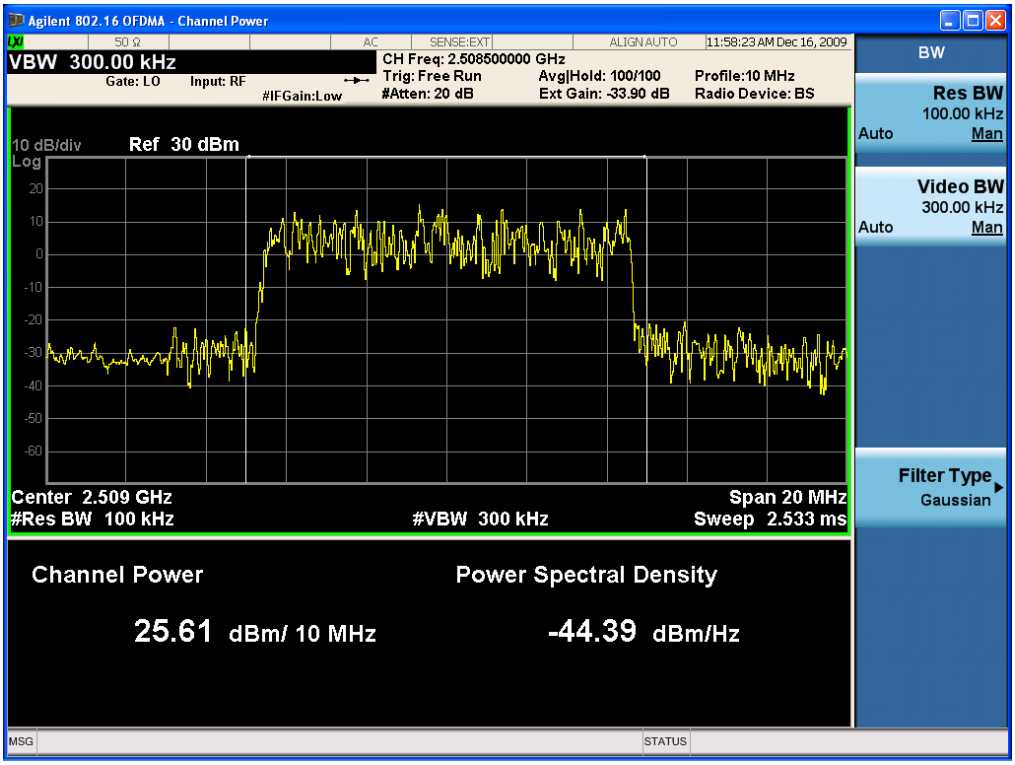
(16QAM Middle Channel)



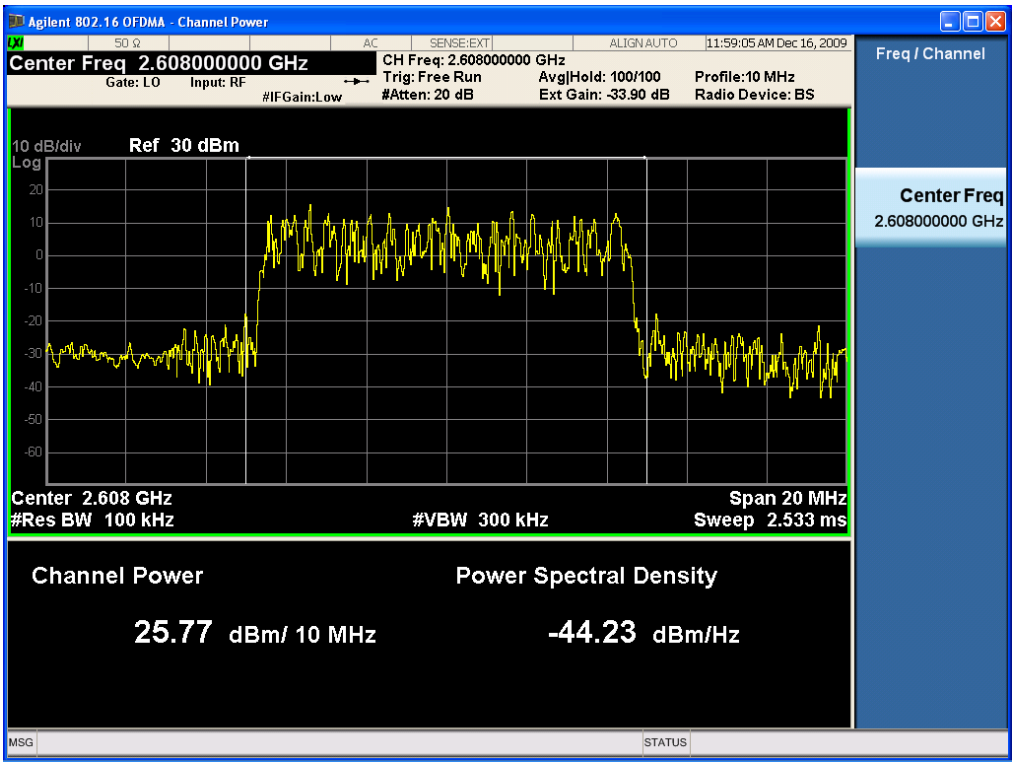
(16QAM High Channel)



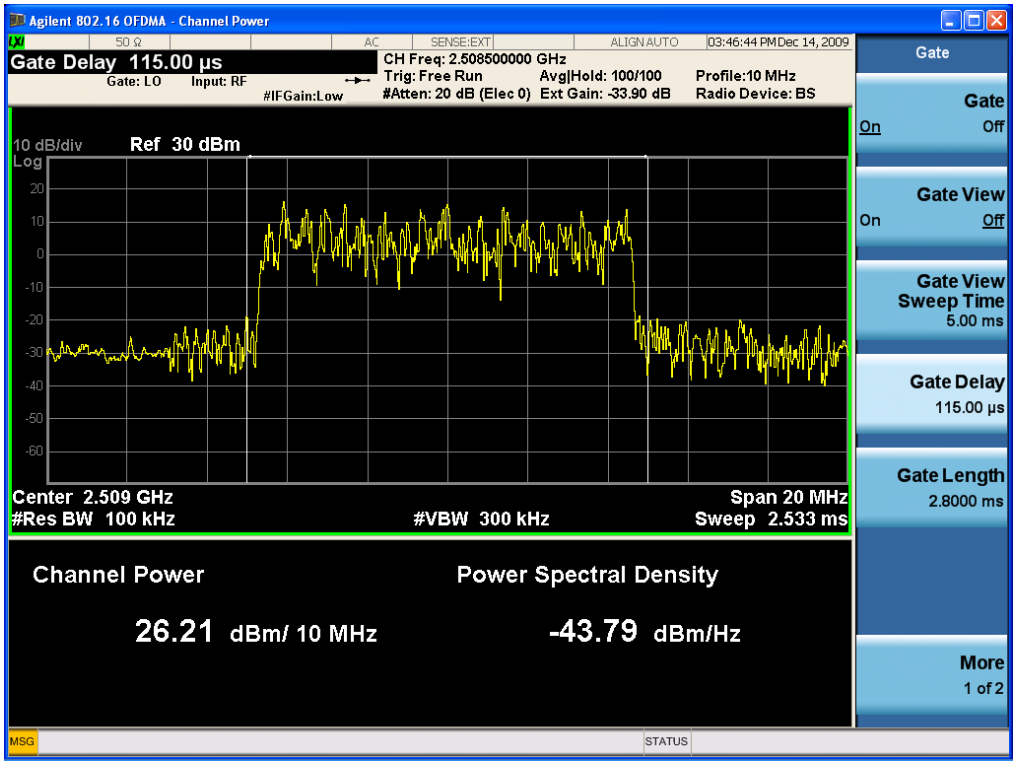
(64QAM Low Channel)



(64QAM Middle Channel)



(64QAM High Channel)



6. OCCUPIED BANDWIDTH

6.1. 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.

6.2.Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	6674A / DC Power Supply	3501A00901	05/14/2010
Agilent	8498A / Attenuator	51161	04/14/2010
Agilent	8498A / Attenuator	51162	12/24/2009
WEINSCHEL	67-30-33 / Attenuator	BU5347	01/13/2010
WEINSCHEL	67-30-33 / Attenuator	BR0530	02/03/2010
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	02/06/2010
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	21207	01/13/2010
Agilent	N9020A / MXA Signal Analyzer	US46220219	02/19/2010

6.3. Test Procedure

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

The EUT was connected to a spectrum analyser enabled with an occupied bandwidth function via its antenna port. Measurements were performed to determine the occupied bandwidth in accordance with FCC Part 2.1049. The occupied bandwidth was measured from the fundamental emission at the bottom, middle and top channels. The occupied bandwidth was measured using the built in occupied bandwidth function of the spectrum analyser. It was set to measure the bandwidth where 99% of the signal power was contained. The analyser automatically configures the measurement bandwidths to make an accurate measurement based on the channel bandwidth and channel spacing of the EUT.

6.3.1. Environmental Conditions:

Temperature:	25 ℃
Relative Humidity:	39 %

6.4. Test Result

: PASS

6.4.1. Test Data at Output Port 0

Modulation	Channel	Frequency	Measured Bandwidth	
			99 %	26 dB
QPSK	Low	2508.5	9.14	9.376
	Middle	2608.0	9.14	9.371
	High	2683.5	9.14	9.370
16QAM	Low	2508.5	9.13	9.318
	Middle	2608.0	9.13	9.322
	High	2683.5	9.14	9.322
64QAM	Low	2508.5	9.02	9.356
	Middle	2608.0	9.01	9.360
	High	2683.5	9.02	9.355

6.4.2. Test Data at Output Port 1

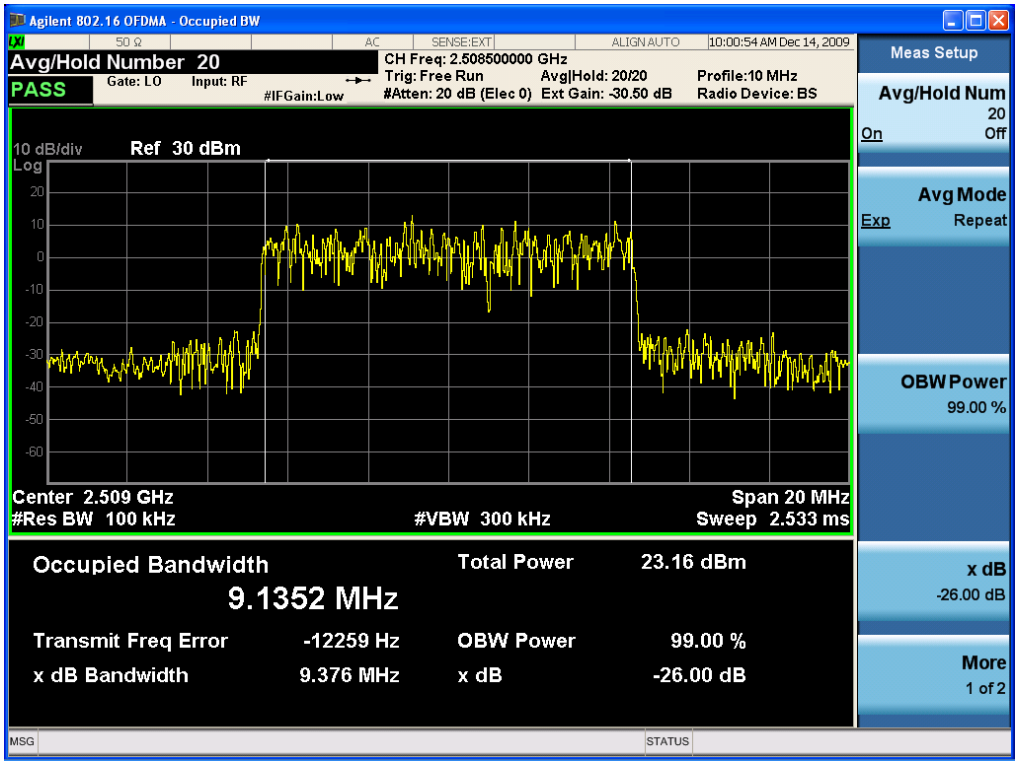
Modulation	Channel	Frequency	Measured Bandwidth	
			99 %	26 dB
QPSK	Low	2508.5	9.14	9.374
	Middle	2608.0	9.14	9.373
	High	2683.5	9.14	9.372
16QAM	Low	2508.5	9.14	9.317
	Middle	2608.0	9.14	9.318
	High	2683.5	9.14	9.318
64QAM	Low	2508.5	9.00	9.352
	Middle	2608.0	9.00	9.355
	High	2683.5	9.01	9.355

6.4.3. Combined Test Data at Output Port

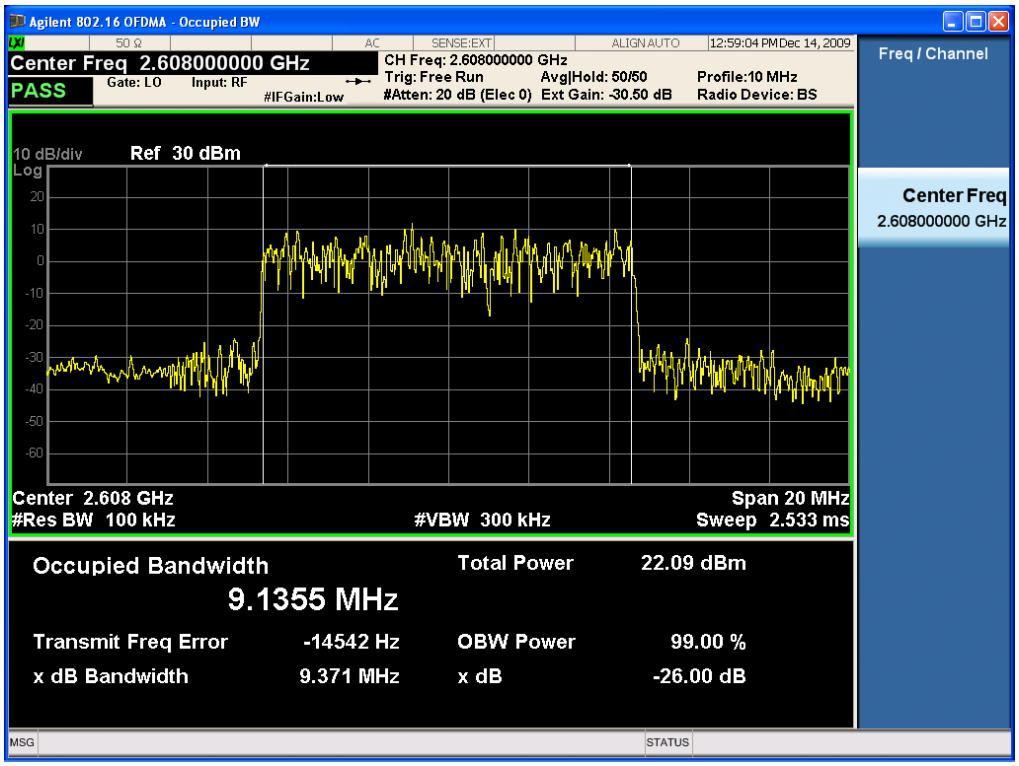
Modulation	Channel	Frequency	Measured Bandwidth	
			99 %	26 dB
QPSK	Low	2508.5	9.00	9.310
	Middle	2608.0	9.07	9.353
	High	2683.5	9.16	9.358
16QAM	Low	2508.5	8.91	9.287
	Middle	2608.0	9.10	9.312
	High	2683.5	9.12	9.304
64QAM	Low	2508.5	8.93	9.297
	Middle	2608.0	9.03	9.359
	High	2683.5	9.04	9.348

6.4.4. Plot Data for Output 0

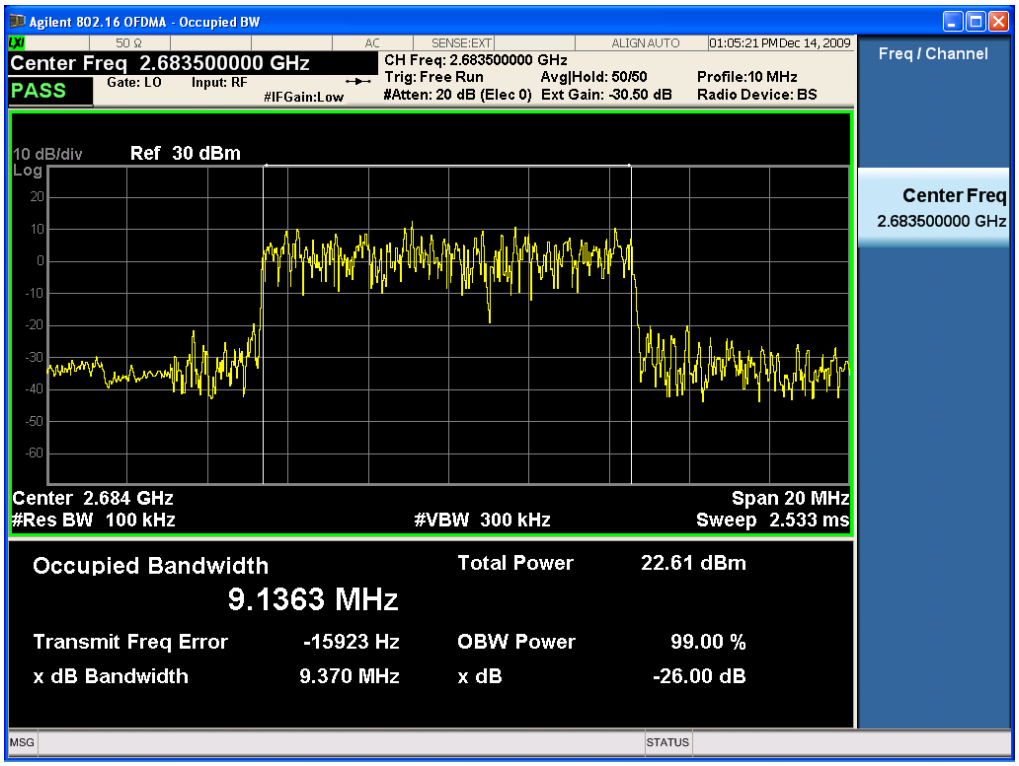
(QPSK Low Channel)



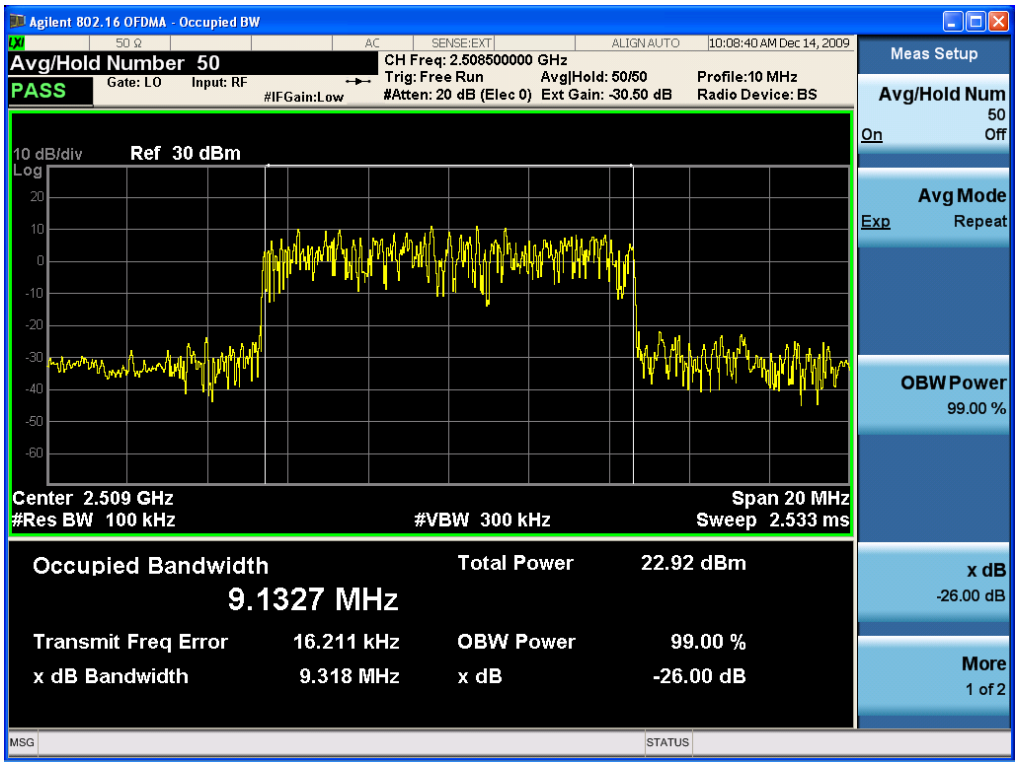
(QPSK Middle Channel)



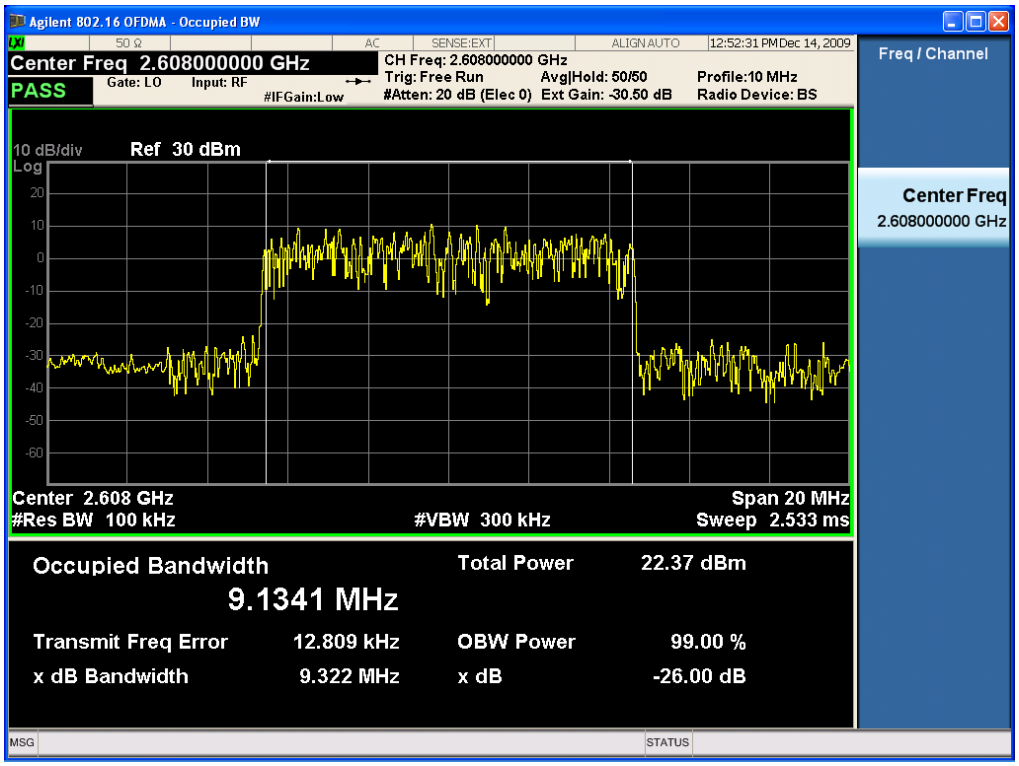
(QPSK High Channel)



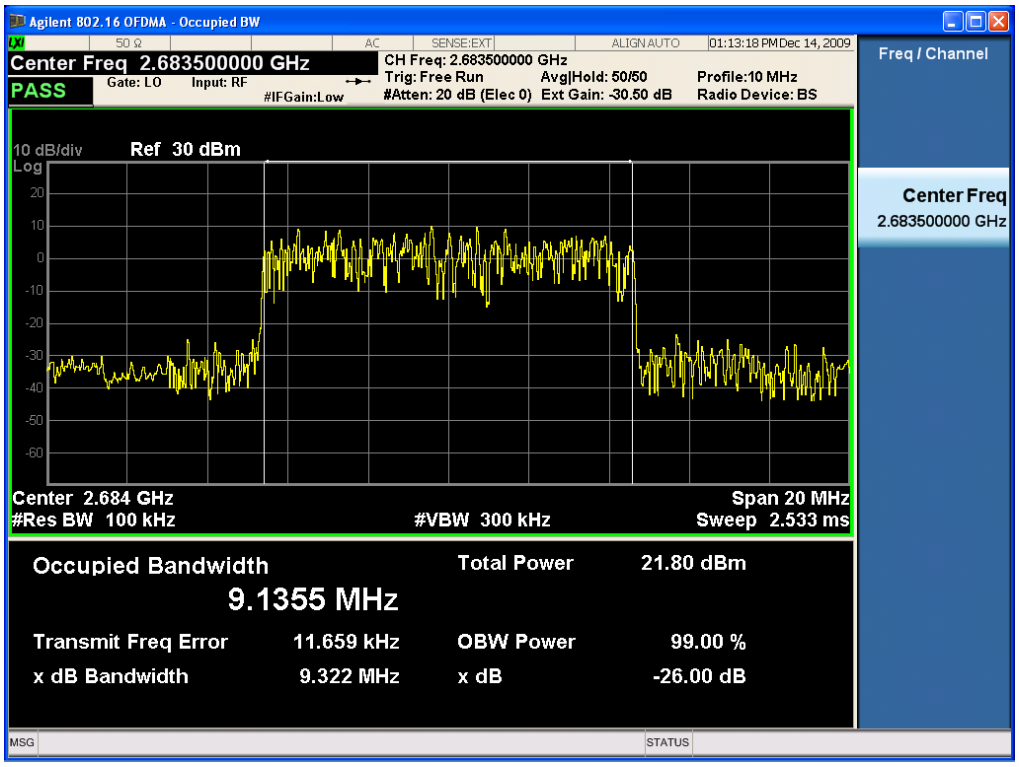
(16QAM Low Channel)



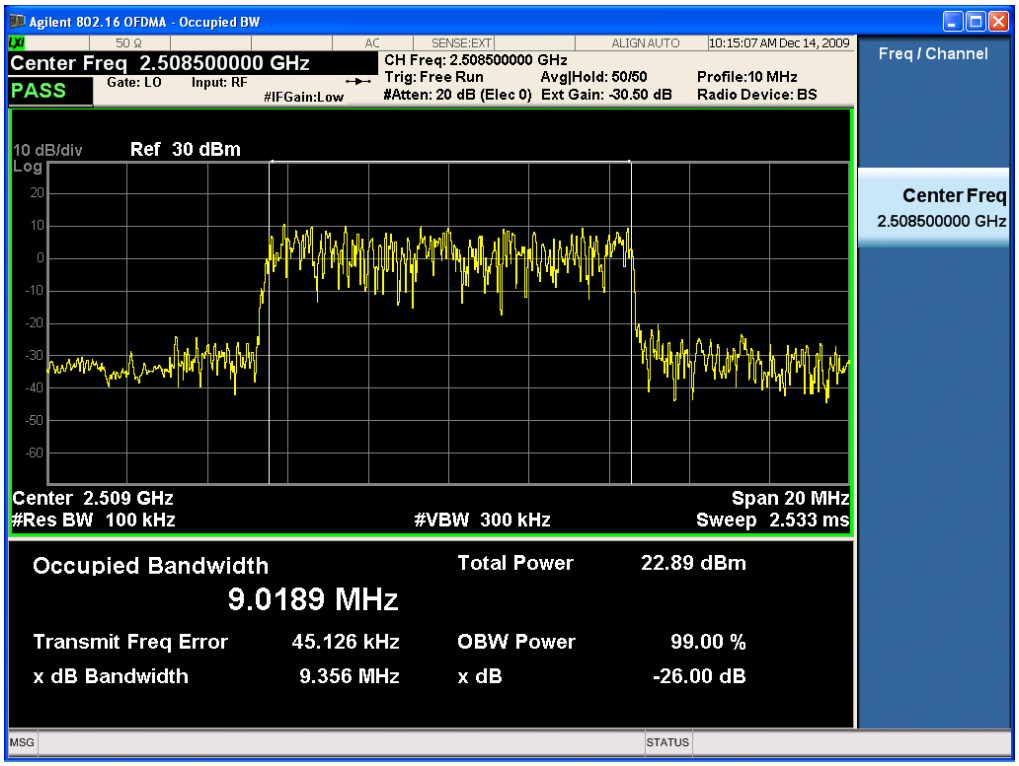
(16QAM Middle Channel)



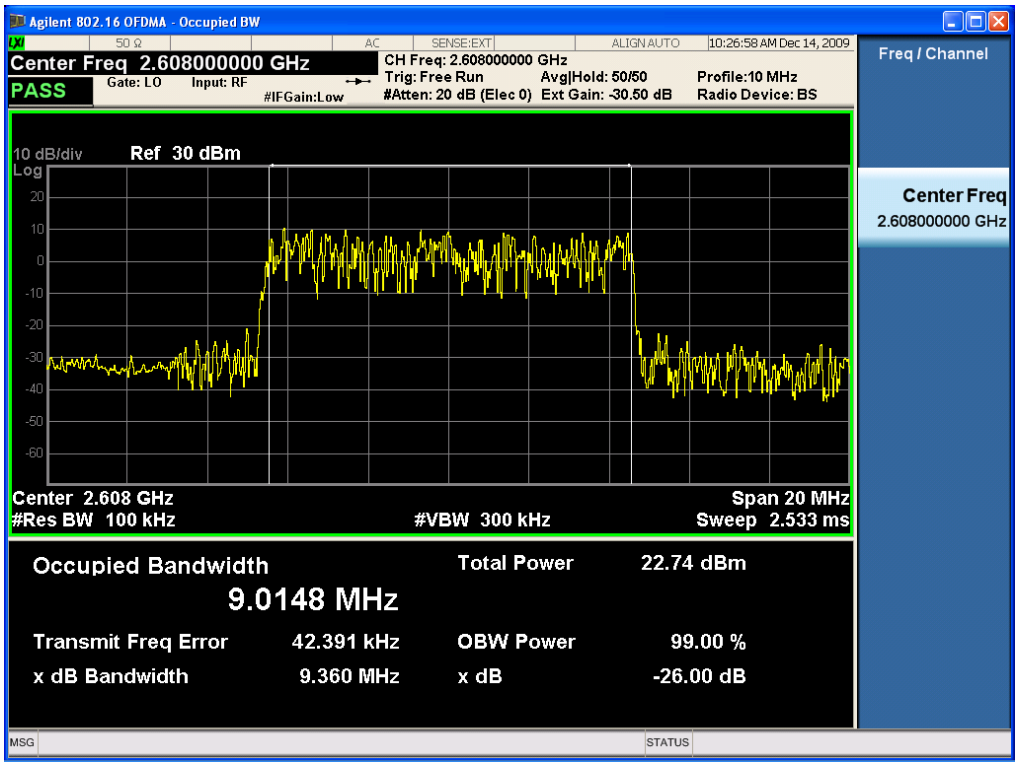
(16QAM High Channel)



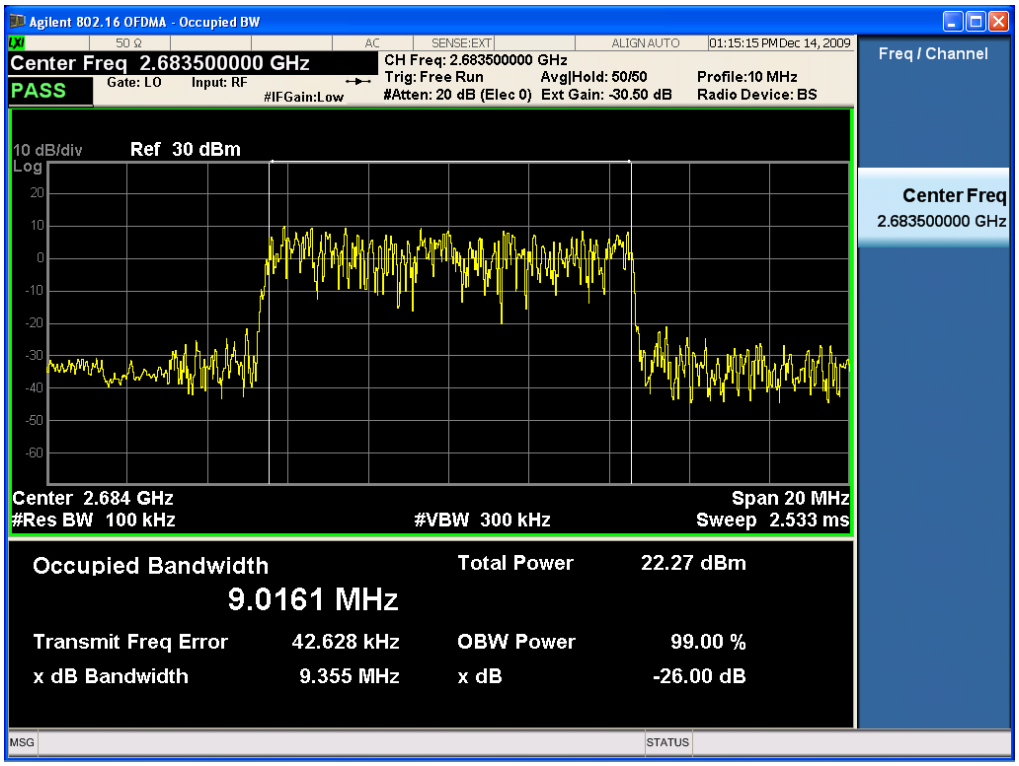
(64QAM Low Channel)



(64QAM Middle Channel)

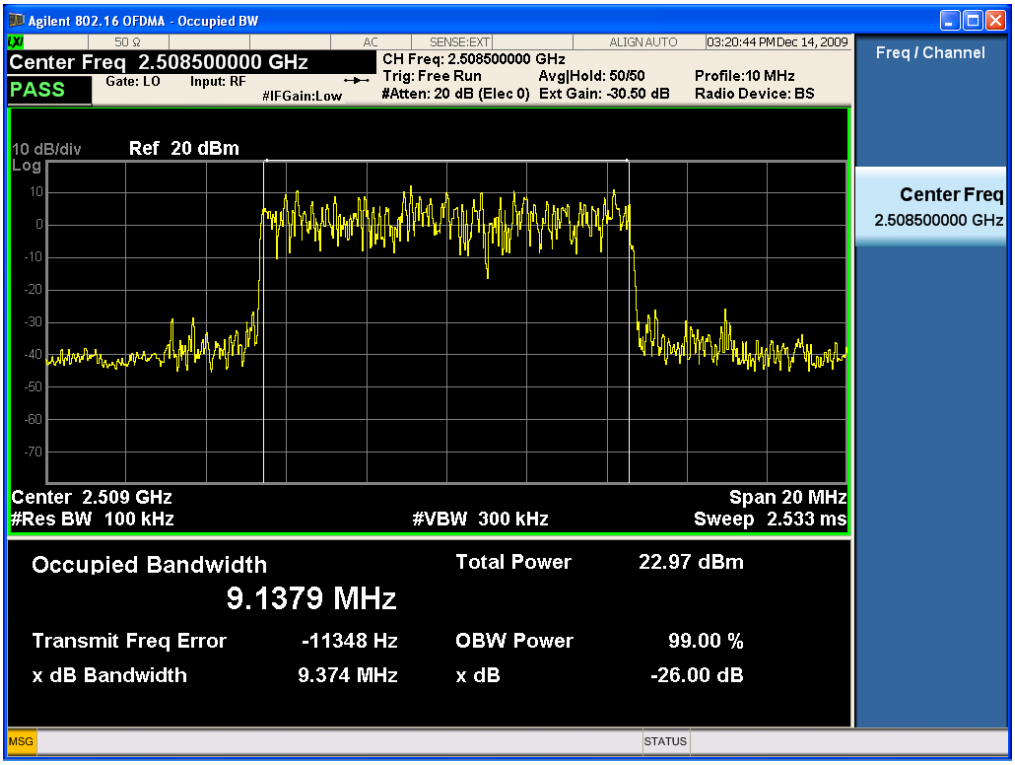


(64QAM High Channel)

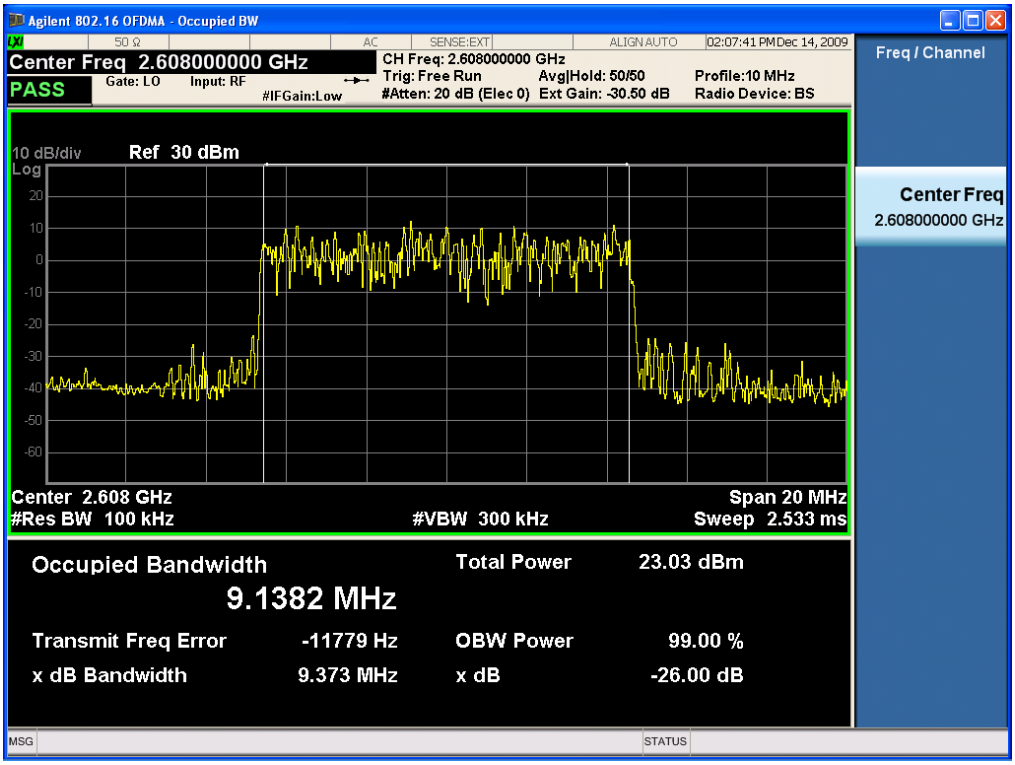


6.4.5. Plot Data for Output 1

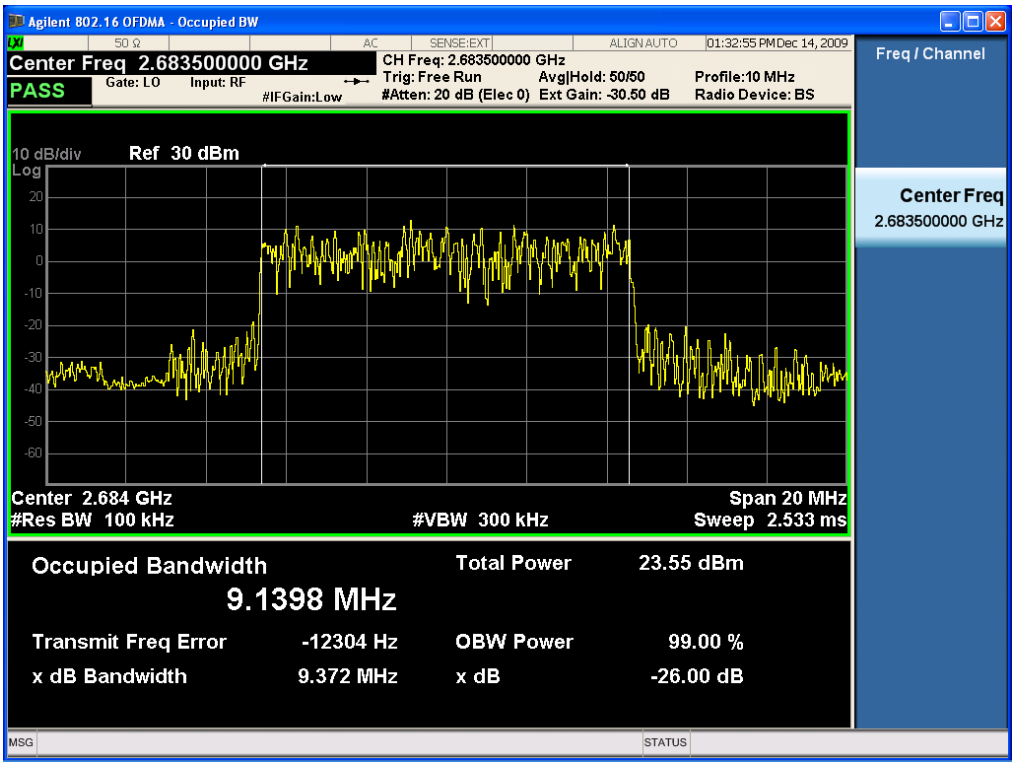
(QPSK Low Channel)



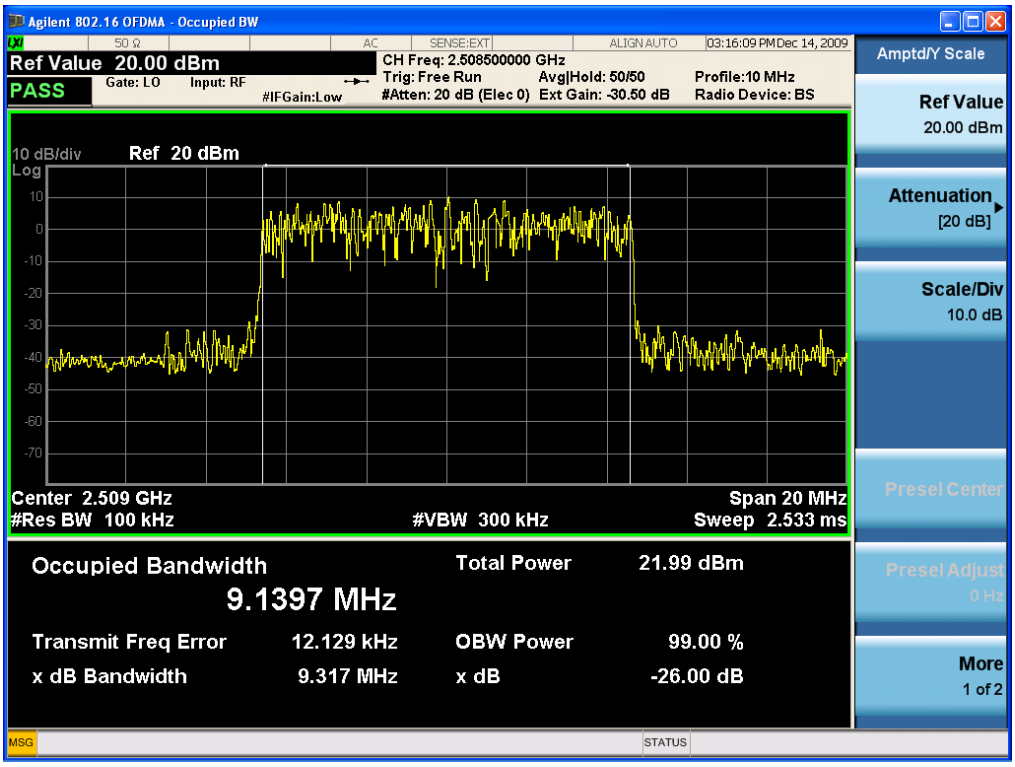
(QPSK Middle Channel)



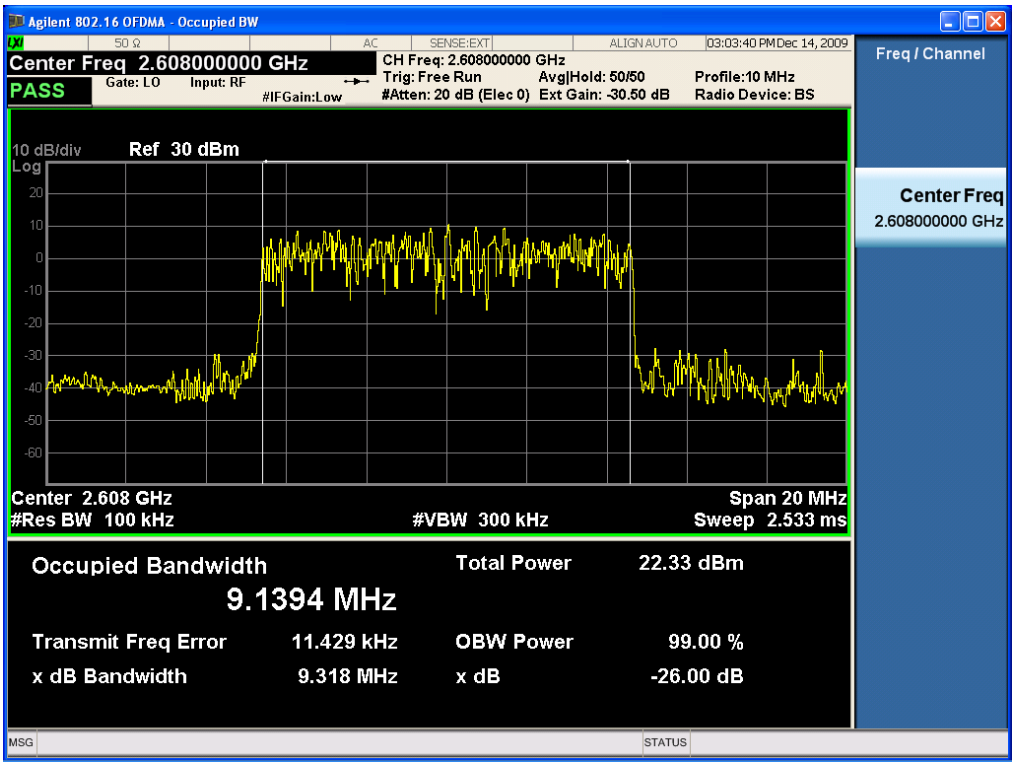
(QPSK High Channel)



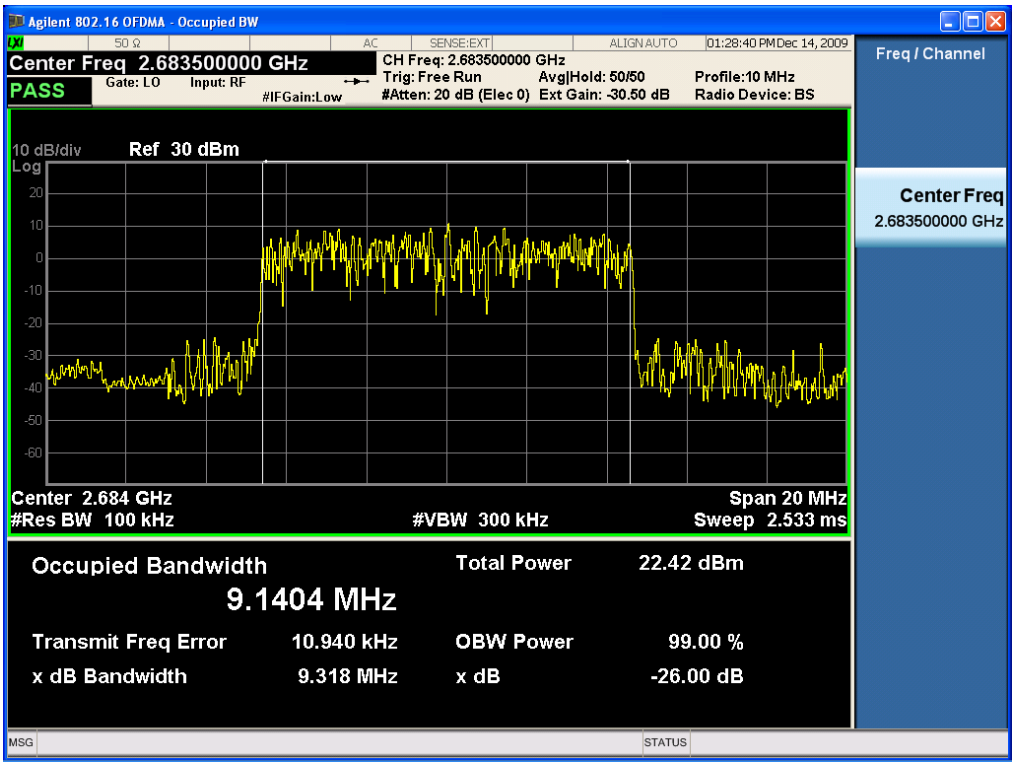
(16QAM Low Channel)



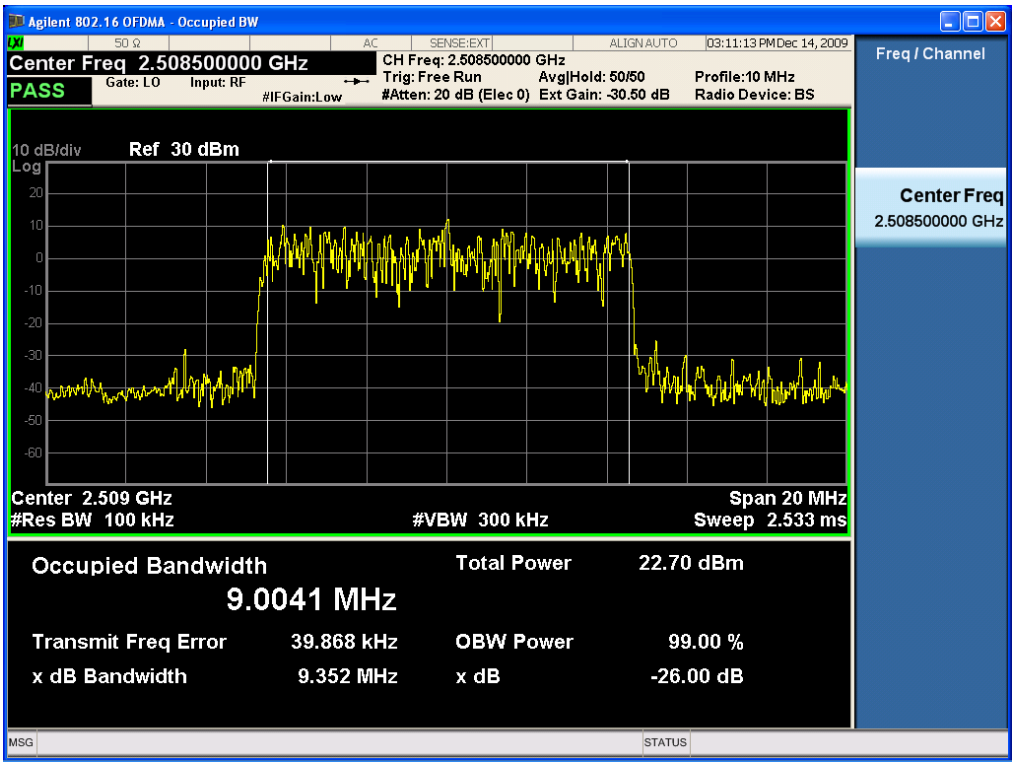
(16QAM Middle Channel)



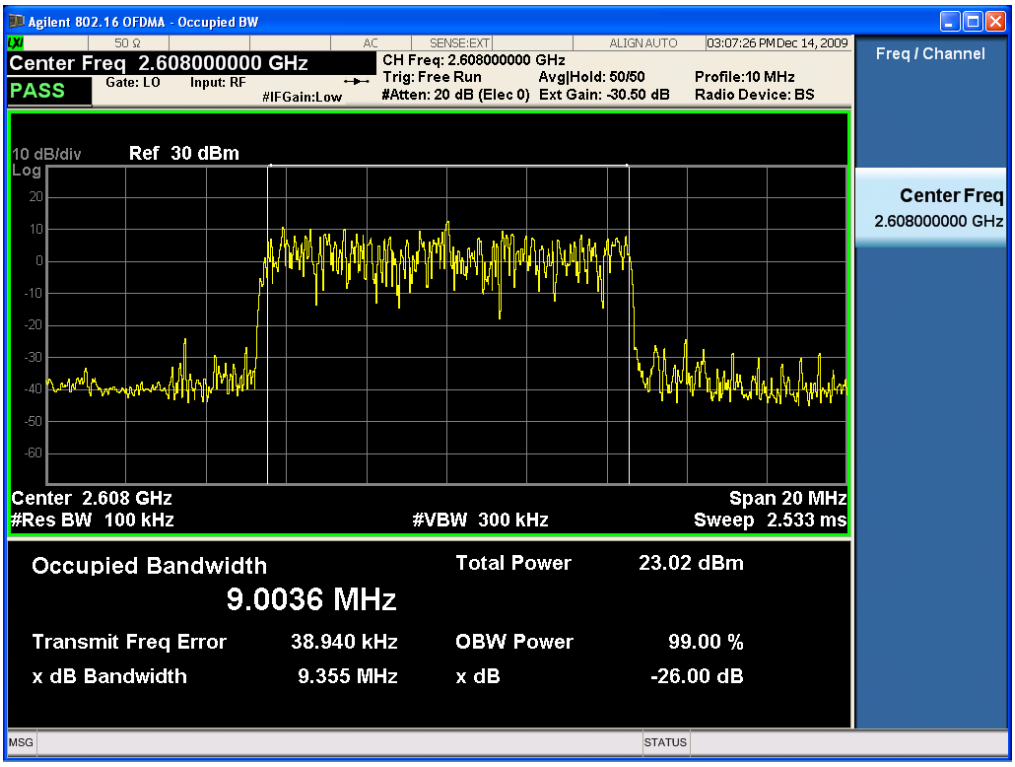
(16QAM High Channel)



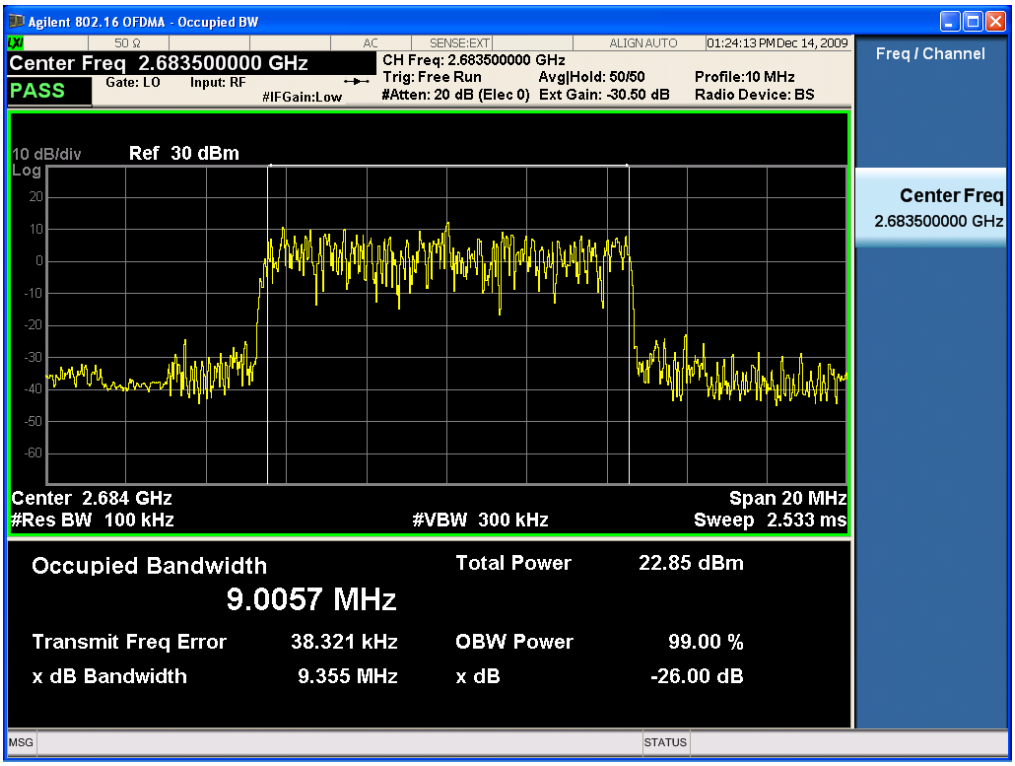
(64QAM Low Channel)



(64QAM Middle Channel)

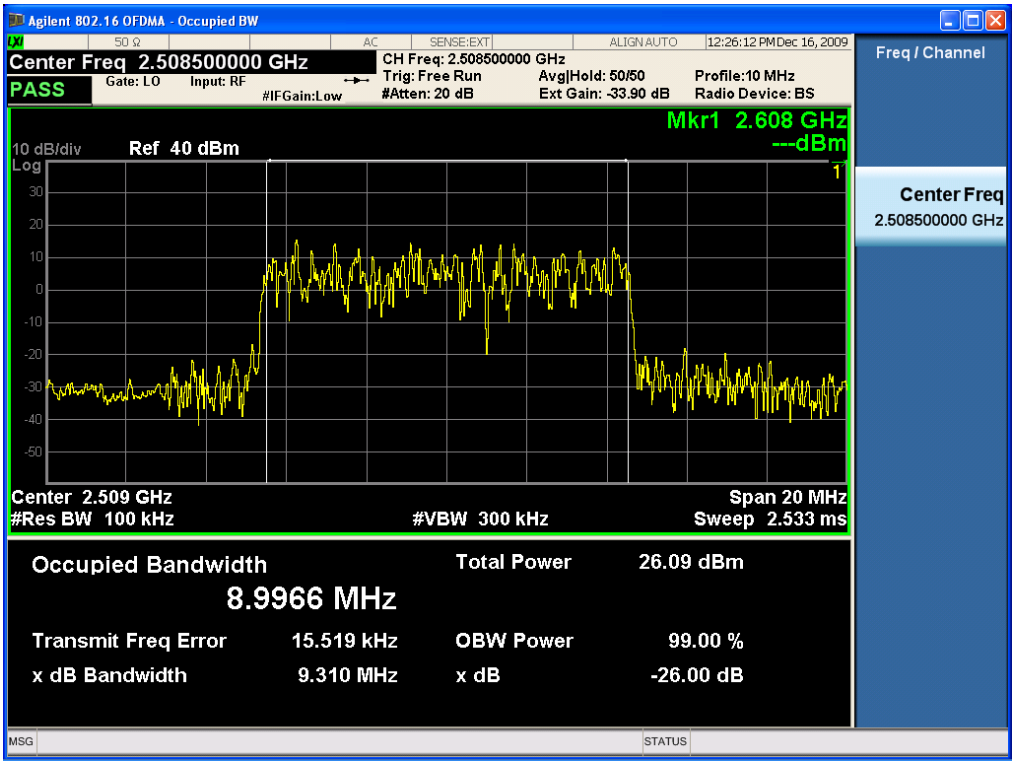


(64QAM High Channel)

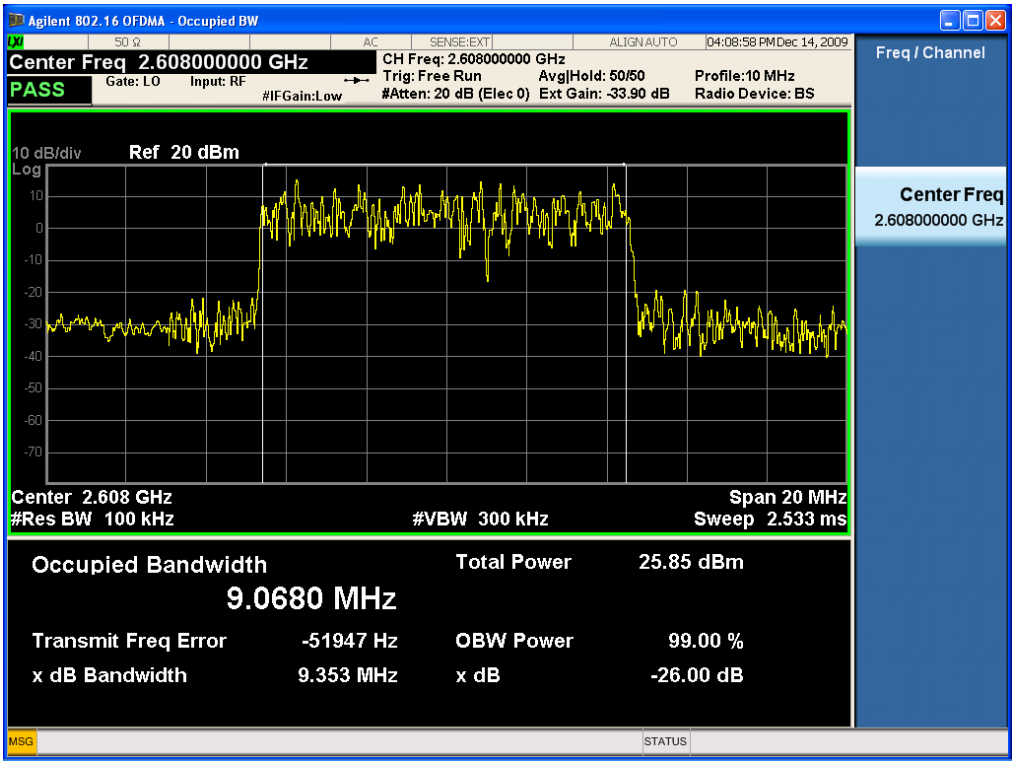


6.4.6. Combined Test Plot at Output Port

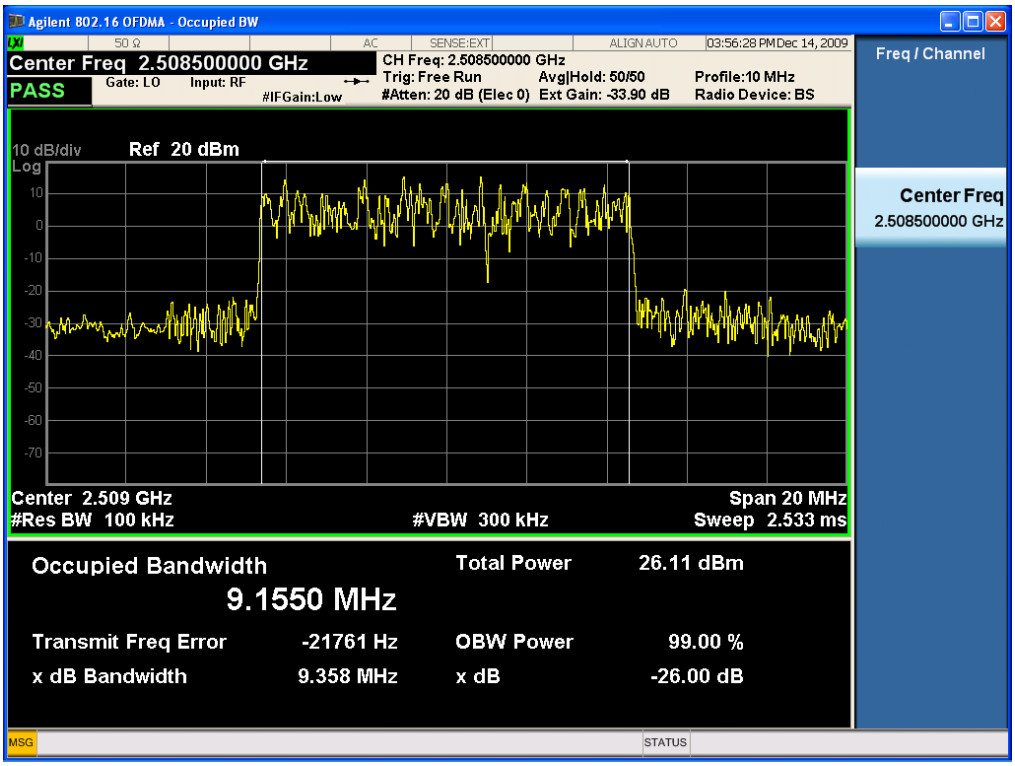
(QPSK Low Channel)



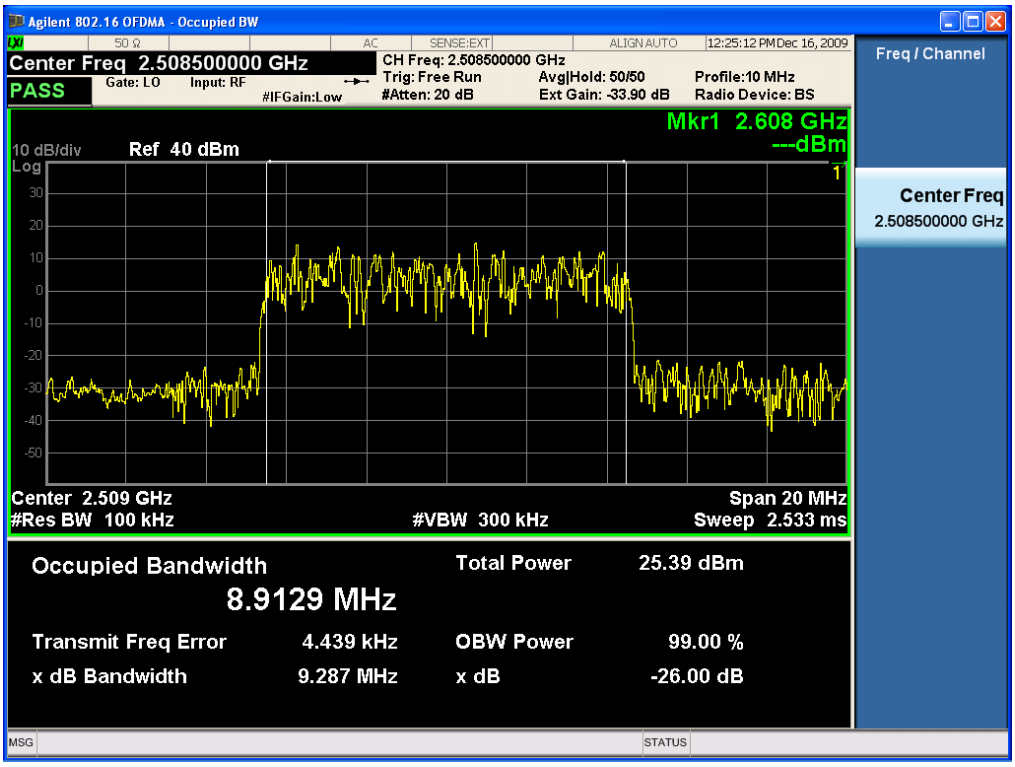
(QPSK Middle Channel)



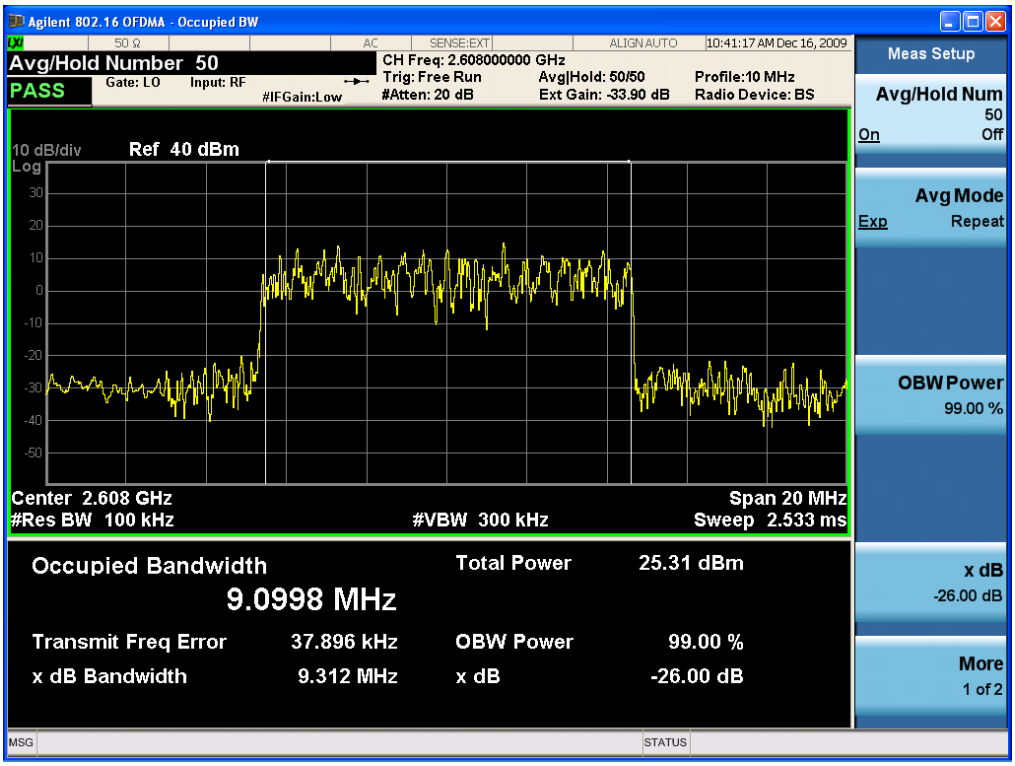
(QPSK High Channel)



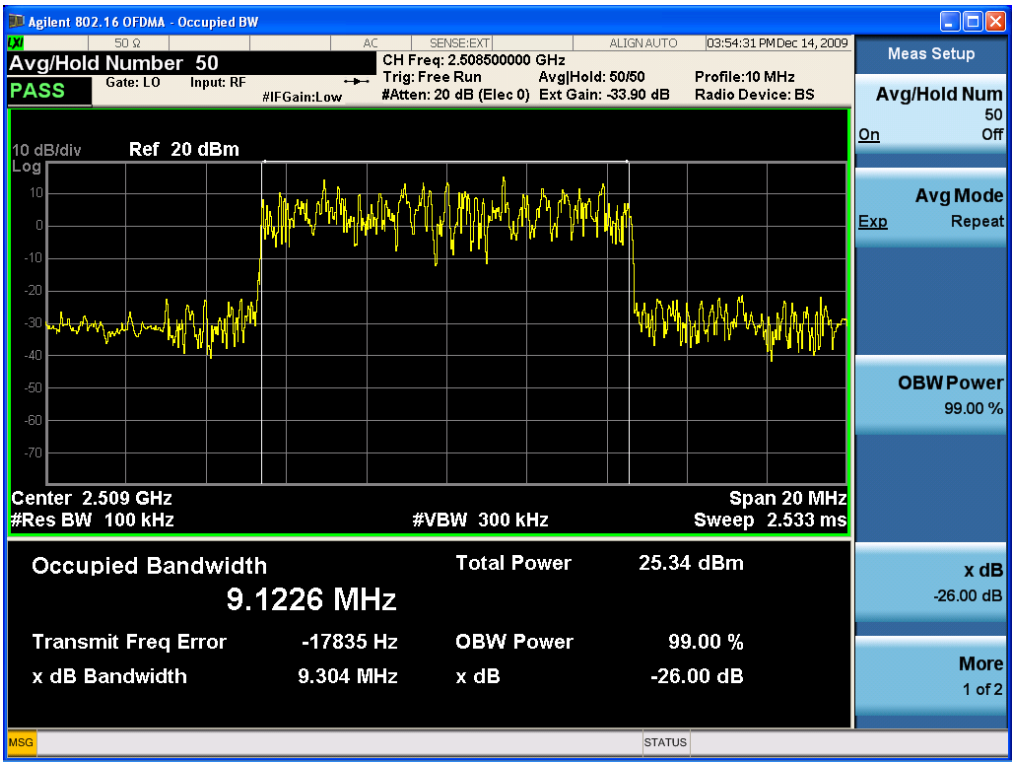
(16QAM Low Channel)



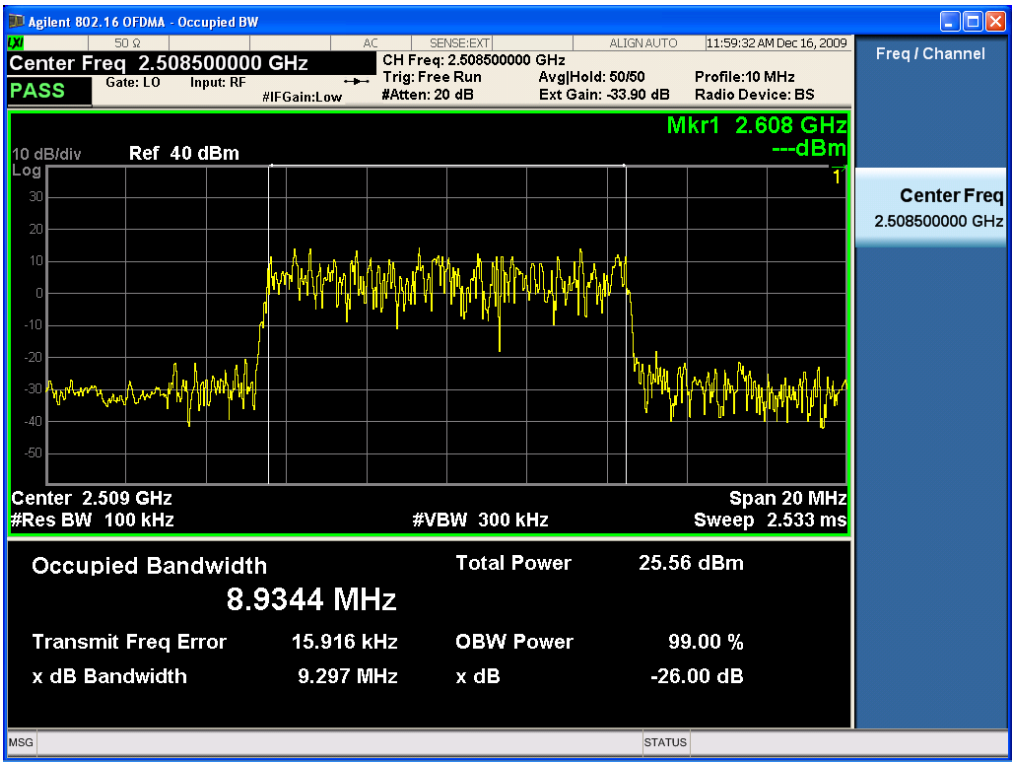
(16QAM Middle Channel)



(16QAM High Channel)



(64QAM Low Channel)



(64QAM Middle Channel)