HCT CO., LTD.

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CERTIFICATE OF COMPLIANCE

FCC PART 27 Certification

Applicant Name: JUNI Korea Co.Ltd. E-603 Bundang-gu, Seongnam-si, Gyeonggi-do, South Korea	**Date of Issue:** Nov 23, 2010 **Test Site/Location:** HCT, San 136-1 Ami-ri, Bubal-eup, Icheon-si, Kyungki-do, Korea **Test Report No.:** HCTR1011FR15-1

FCC ID	**:**	**YULJPW7320**
APPLICANT	**:**	**JUNI Korea Co.Ltd**

EUT Type	:	WiMAX PicoCell
Manufacturer	:	JUNI Korea Co.Ltd.
Model name	:	JPW-7320
Frequency of Operation	:	2 305 MHz ~ 2 320 MHz, 2 345 MHz ~ 2 360 MHz
FCC Rule Part(s)	:	FCC Part 27 Subpart (C).
Emission Designator	:	9M12G7D(QPSK), 9M13W7D(16QAM/64QAM)
Test Procedure(s)	:	ANSI/TIA-603C-C-2004
Application Type	:	Original Equipment
Data of issue	:	Nov 23, 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

CONTENTS

1. GENERAL INFORMATION

1.1. CLIENT INFORMATION

Company	**JUNI Korea Co.Ltd.**
Contact Point	**E-603 Bundang-gu, Seongnam-si, Gyeonggi-do, South Korea**
Contact person	**Name: Tyler Seo / Senior Research Engineer** **E-mail : tyler.seo@juniglobal.com** **Tel: +82-70-8611-5323** **Fax: +82-31-707-3463**

1.2. PRODUCT INFORMATION

EUT TYPE	WiMAX PicoCell
EMISSION DESIGNATOR	9M11G7D (QPSK), 9M12W7D (16QAM/64QAM)
OPERATING FREQUENCY	2 305 MHz ~ 2 320 MHz, 2 345 MHz ~ 2 360 MHz
TX OUTPUT POWER	32.2 dBm / Carrier / Path
CHANNEL BANDWIDTH	10 MHz
MODULATION TYPE	OFDMA(QPSK, 16QAM, 64QAM)
SYSTEM INPUT VOLTAGE	220 Vac

1.3. OPERATING DESCRIPTION OF EUT

The JPW 7320 provides an ideal cost effective alternative to macro deployments for coverage and capacity needs, suitable for vertical market business including Smart Grid network and services at railways, campuses, mines, oil drilling sites, bay area, and harbors. The very compact design and narrow form factor of the JPW 7320 enable it to be seamlessly attached to light poles as well as other similar structures. The unit can be used in conjunction with JS 100 Provisioning and JS 8 200 SON Servers. With MIMO technology and an open R6 Profile Interface, the JPW 7320 allows easy installation and operation providing less than 35dBm of output power (< 1.5W x 2 MIMO). The JPW 7320 also boasts extremely low power consumption allowing it to be implemented as a solar cell solution for those remote and hard to reach areas where self sufficient power is desired.

The JPW 7320 has been designed to operate in the Mobile WiMAX network using TDD (Time Division 5 Duplexing) technology. The basic configuration of the JPW 7320 connects to the Operator Core Network via the Internet RJ45 Ethernet cable interface to connect to local xDSL/cable ISP. The JPW 7320 site configuration includes a single dual-polarized antenna that transmits and receives signals to/from the Mobile Station. The Mobile Station may include handsets, mobile phones, wireless modems and other CPE (Customer Premises Equipement).

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(l)	Occupied Bandwidth	Compliant
2.1051, 27.53(l)	Spurious Emissions at Antenna Terminals	Compliant
2.1051, 27.53(l)	Band edge	Compliant
2.1053, 27.53(l)	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.
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	09/23/2011
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	147	04/13/2011
Schwarzbeck	VULB 9168 / TRILOG Antenna	9168-200	01/06/2011
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	AFS44-00102650-42-10P44-PS	1532439	04/05/2011
EMCO	6502/Loop Antenna	9009-2536	01/13/2012
R&S	ESI40 / EMI TEST Receiver	831564/003	10/30/2011
Wainwright Instrument	WHF6.0/26.5G-6SS / High Pass Filter	1	05/12/2011
Agilent	6674A / DC Power Supply	3501A00901	05/14/2011
Agilent	8498A / Attenuator	51161	01/06/2011
Agilent	8498A / Attenuator	51162	01/06/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	01/14/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	21207	01/06/2011
Agilent	N9020A / MXA Signal Analyzer	US46220219	03/03/2011
Agilent	11636B / Power Divider	11377	12/24/2010

5. CONDUCTED OUTPUT POWER

5.1. Applicable Standard

According to FCC §2.1046 & 27.50(a)

(1) *Base and fixed stations.* (i) For base and fixed stations transmitting in the 2305–2315 MHz band or the 2350–2360 MHz band:

(A) The average equivalent isotropically radiated power (EIRP) must not exceed 2,000 watts within any 5 megahertz of authorized bandwidth and must not exceed 400 watts within any 1 megahertz of authorized bandwidth.

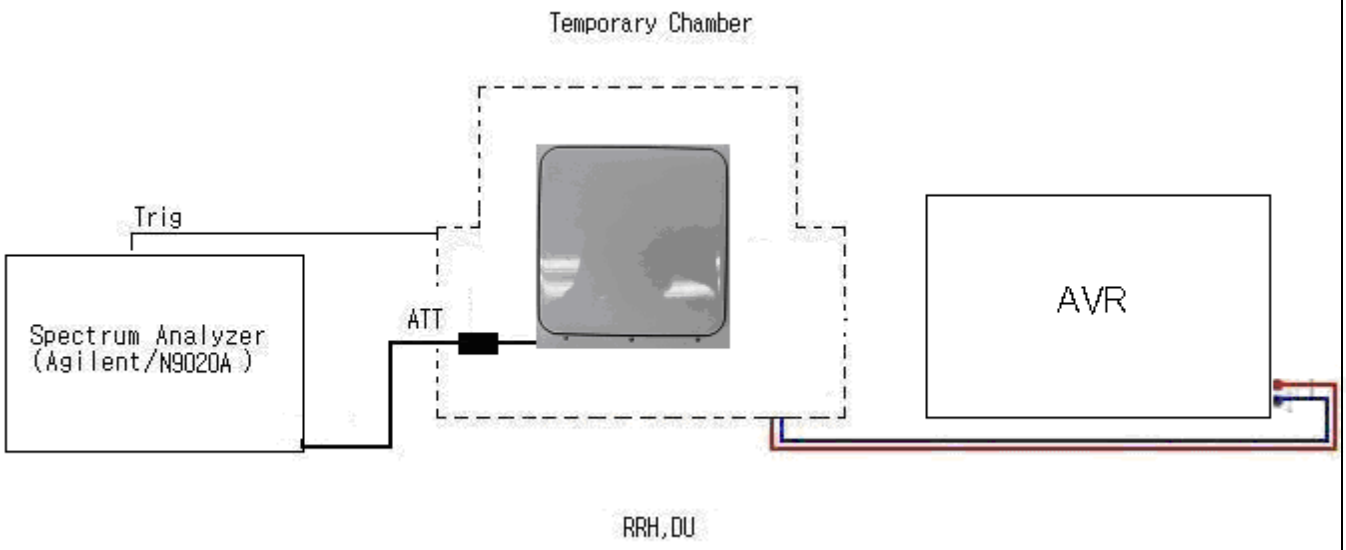
(ii) For base and fixed stations transmitting in the 2315–2320 MHz band or the 2345–2350 MHz band, the peak EIRP must not exceed 2,000 watts.

5.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	6674A / DC Power Supply	3501A00901	05/14/2011
Agilent	8498A / Attenuator	51161	01/06/2011
Agilent	8498A / Attenuator	51162	01/06/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	01/14/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	21207	01/06/2011
Agilent	N9020A / MXA Signal Analyzer	US46220219	03/03/2011
Agilent	11636B / Power Divider	11377	12/24/2010

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 (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 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 Average mode.
3) The resolution banswidth of the spectrum analyzer was comparable to the emission bandwidth.

5.3.1. Environmental Conditions:

Temperature:	27 °C
Relative Humidity:	67 %

5.4. Test Result

: PASS

5.4.1. Test Data at Output Port 0

Modulation	Frequency	Measured Output Power	
		dBm	W
QPSK	2312	31.79	1.5100
	2352	31.81	1.5171
16QAM	2312	31.57	1.4355
	2352	32.14	1.6368
64QAM	2312	31.65	1.4622
	2352	32.20	1.6596

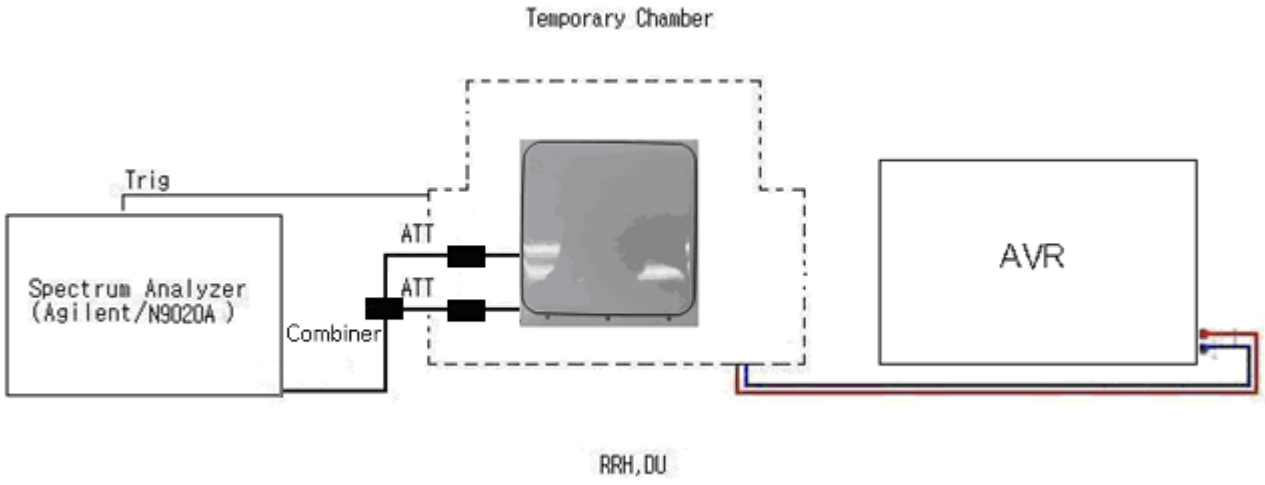
5.4.2. Test Data at Output Port 1

Modulation	Frequency	Measured Output Power	
		dBm	W
QPSK	2312	31.13	1.2972
	2352	31.21	1.3213
16QAM	2312	31.01	1.2618
	2352	31.29	1.3459
64QAM	2312	31.14	1.3002
	2352	31.54	1.4256

5.4.3. Combined Test Data at Output Port

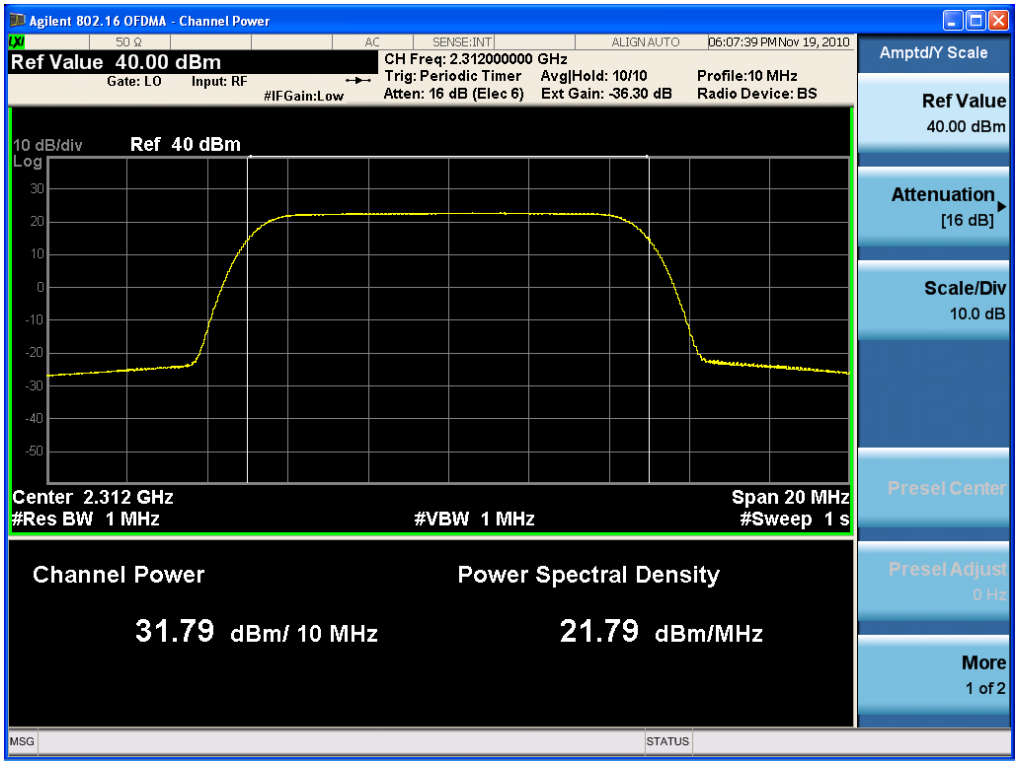
Modulation	Frequency	Measured Output Power	
		dBm	W
QPSK	2312	34.91	3.0974
	2352	34.26	2.6669
16QAM	2312	34.91	3.0974
	2352	34.28	2.6792
64QAM	2312	34.87	3.0690
	2352	34.18	2.6182

[Combine test diagram]



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

(QPSK Channel)



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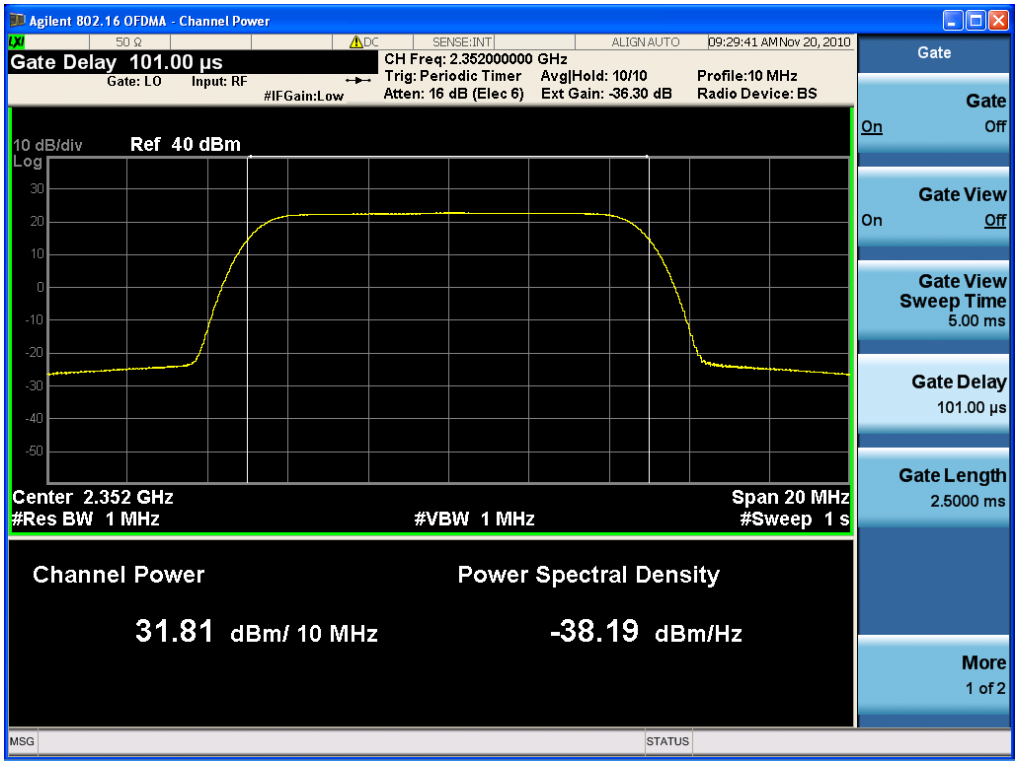
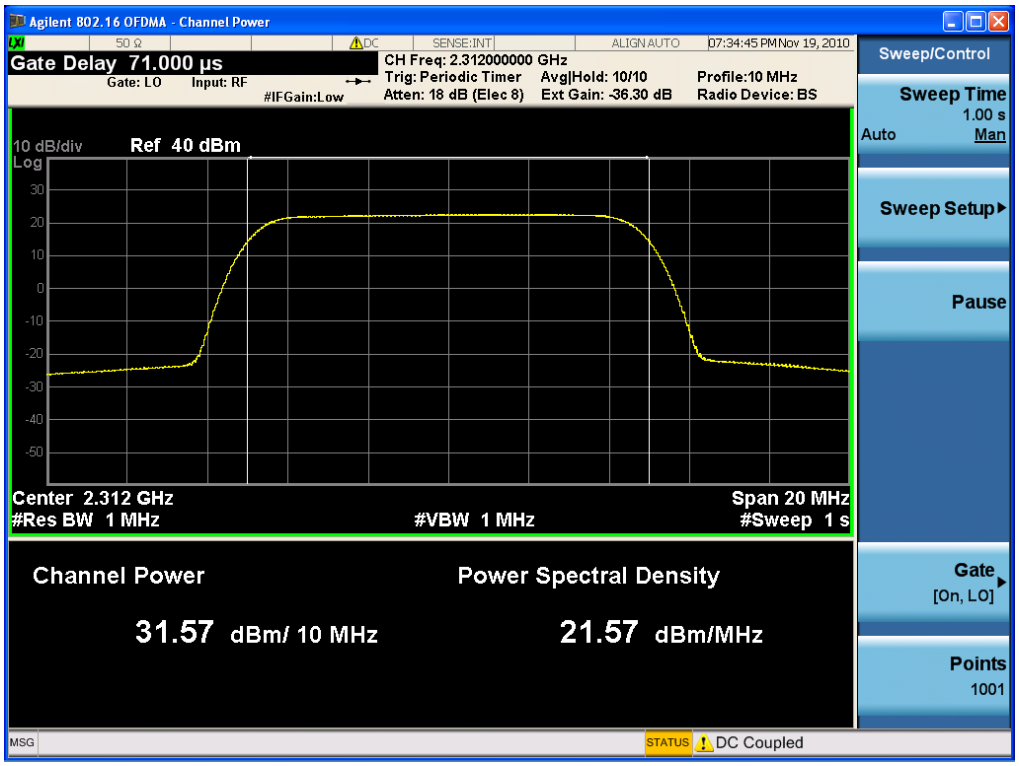


(16QAM Channel)



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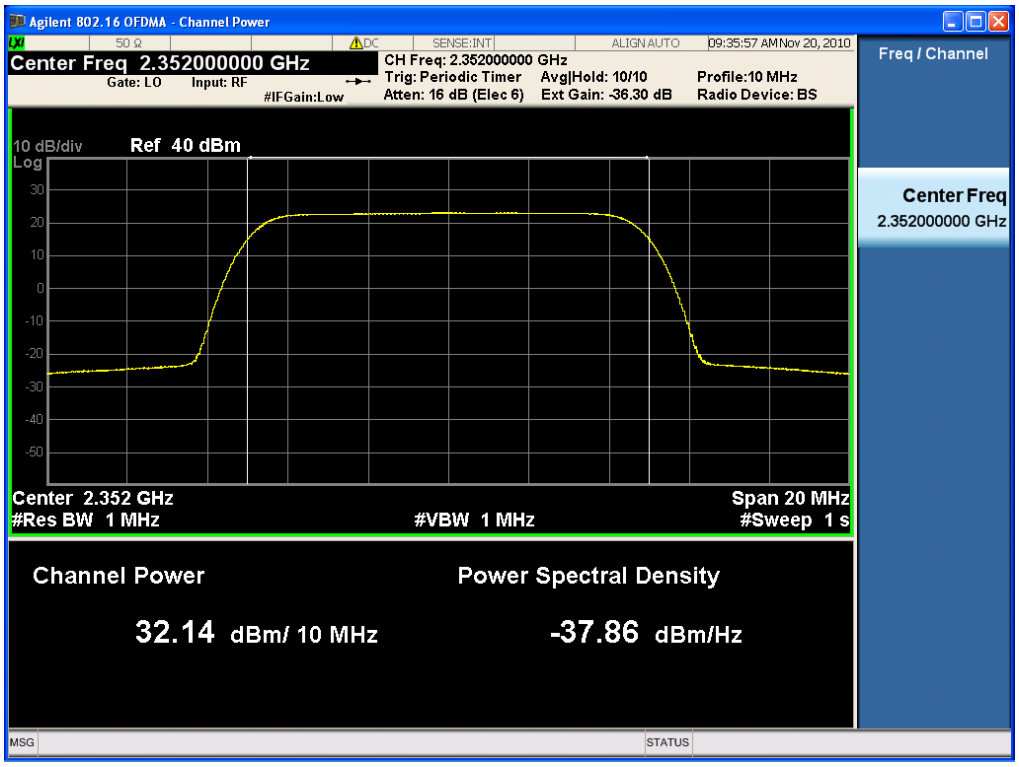

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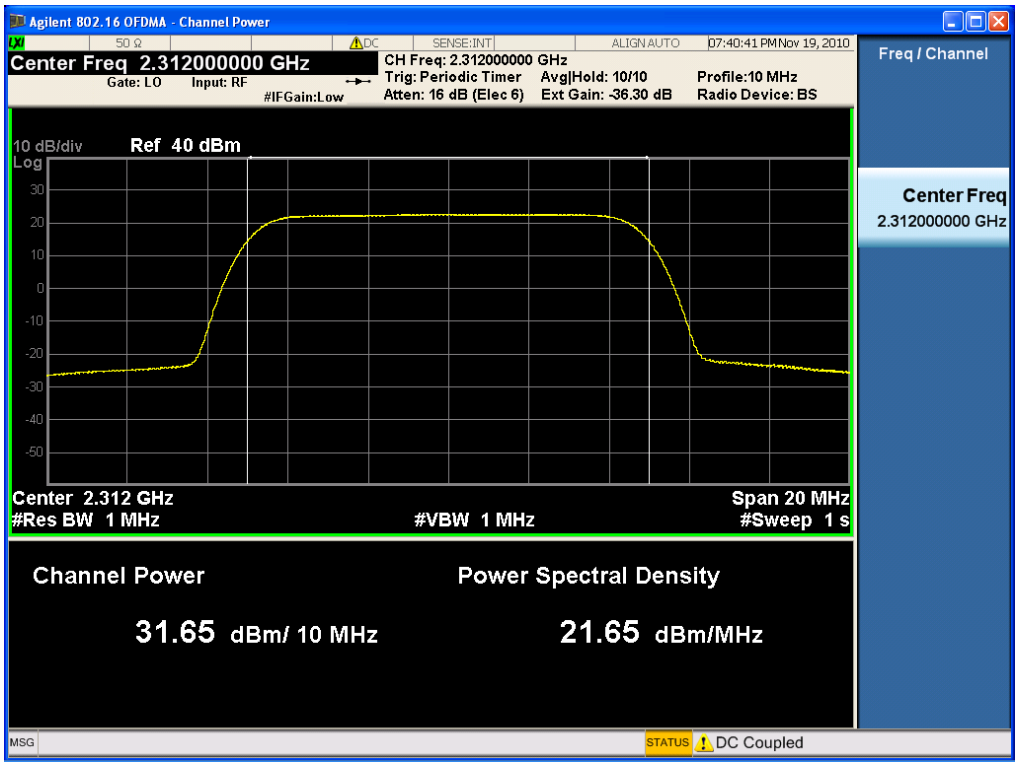

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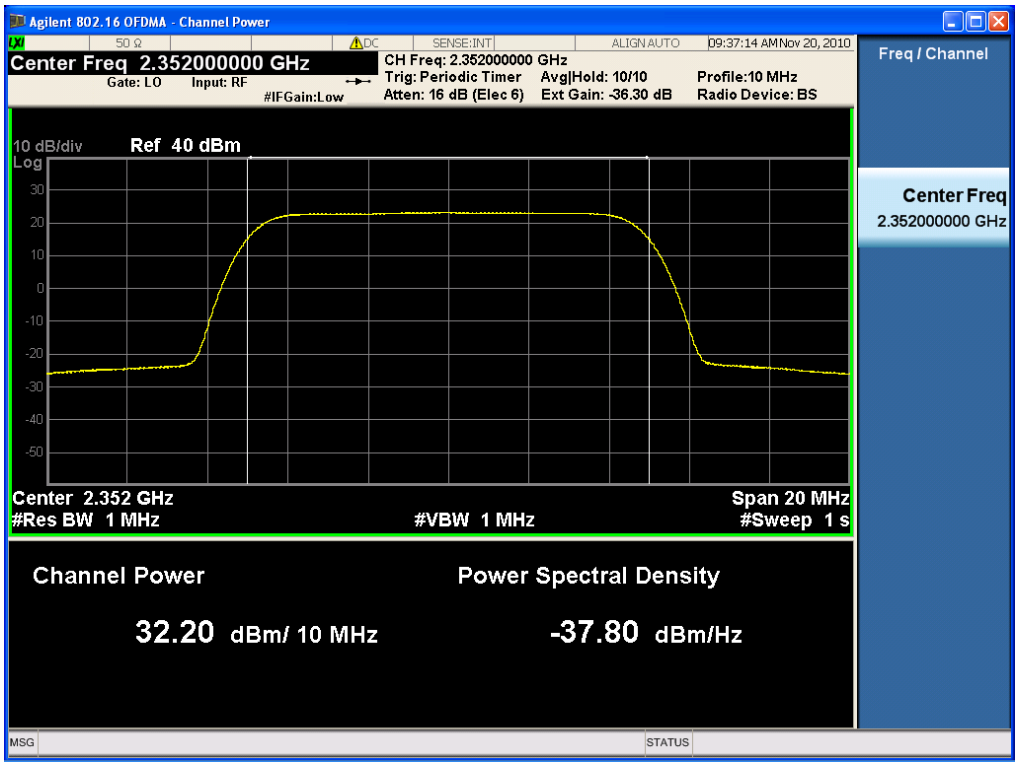
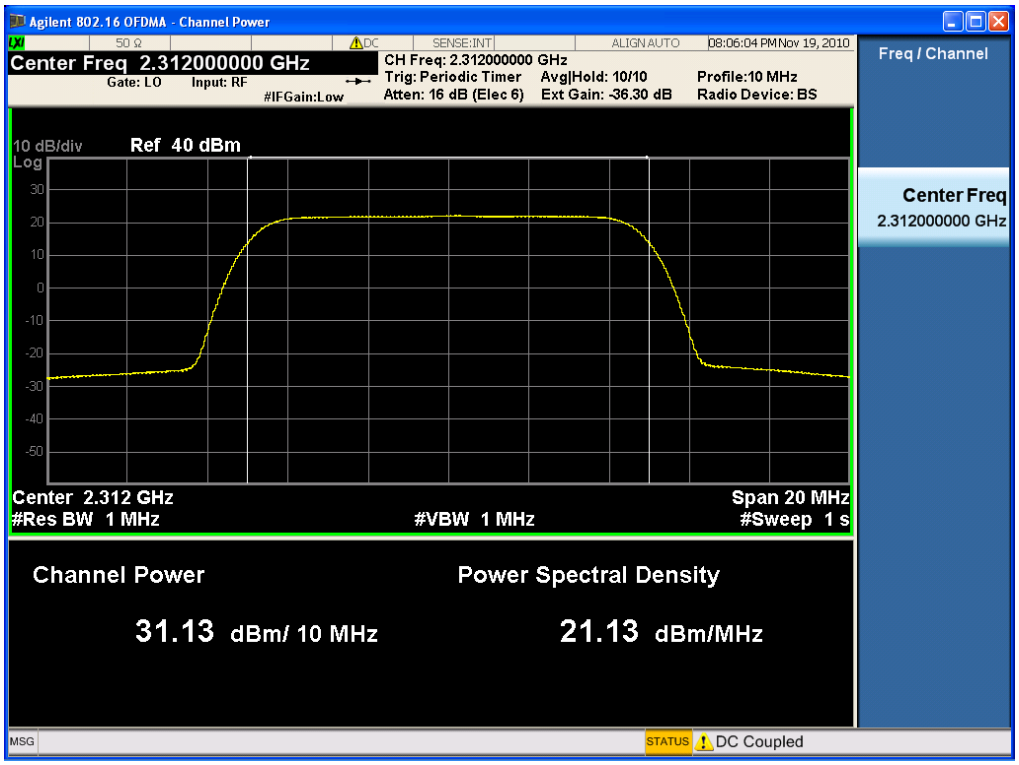
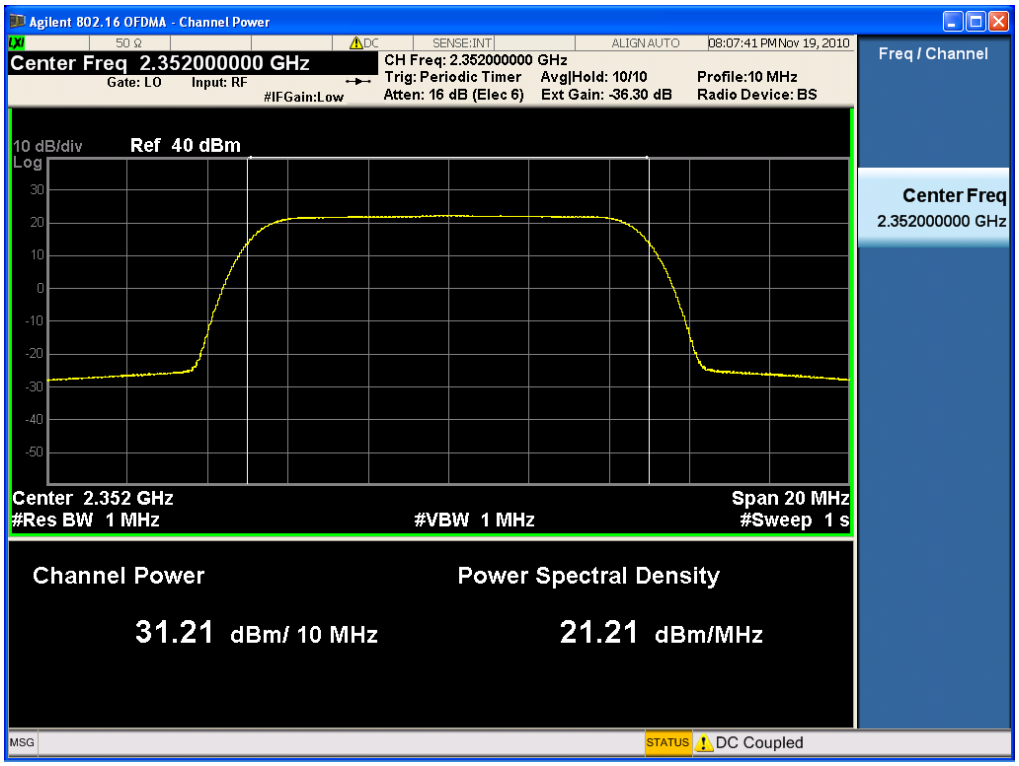


5.4.5. Plot Data for Output 1 (Conducted Output Power)

(QPSK Channel)



(QPSK Channel)



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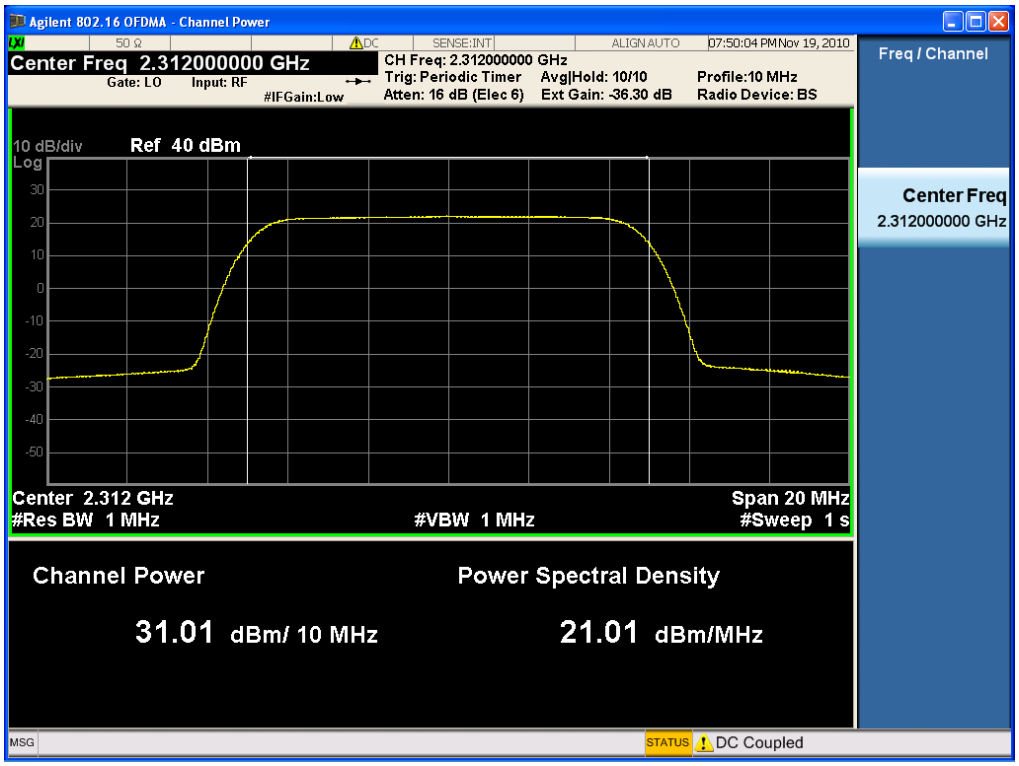

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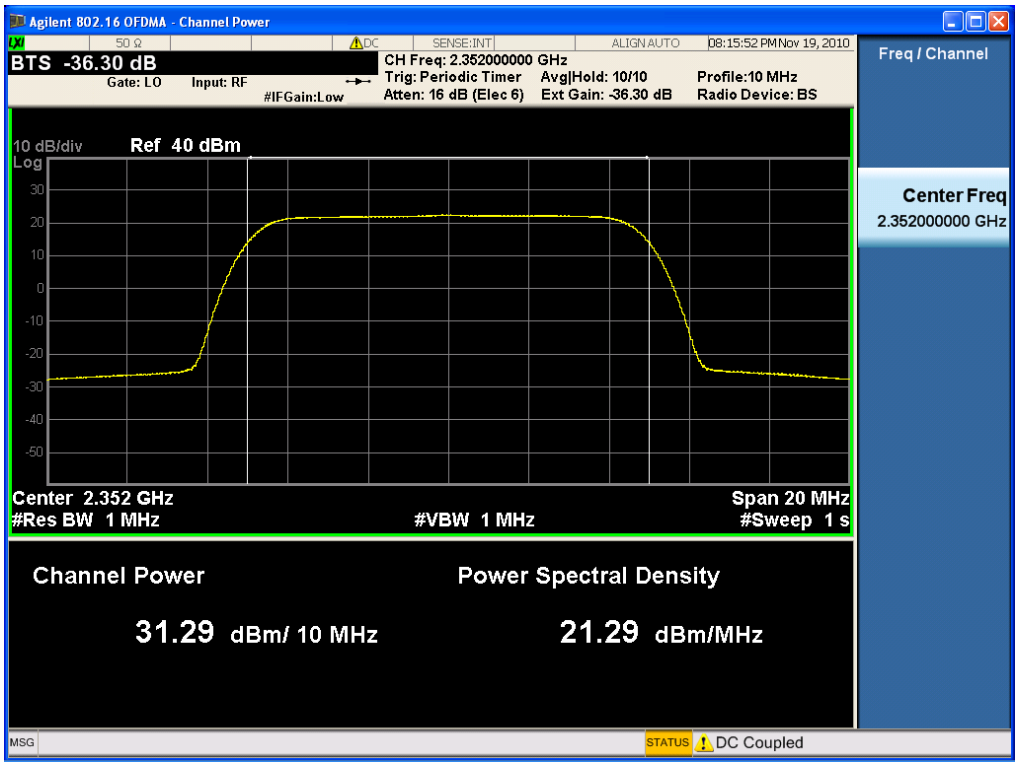

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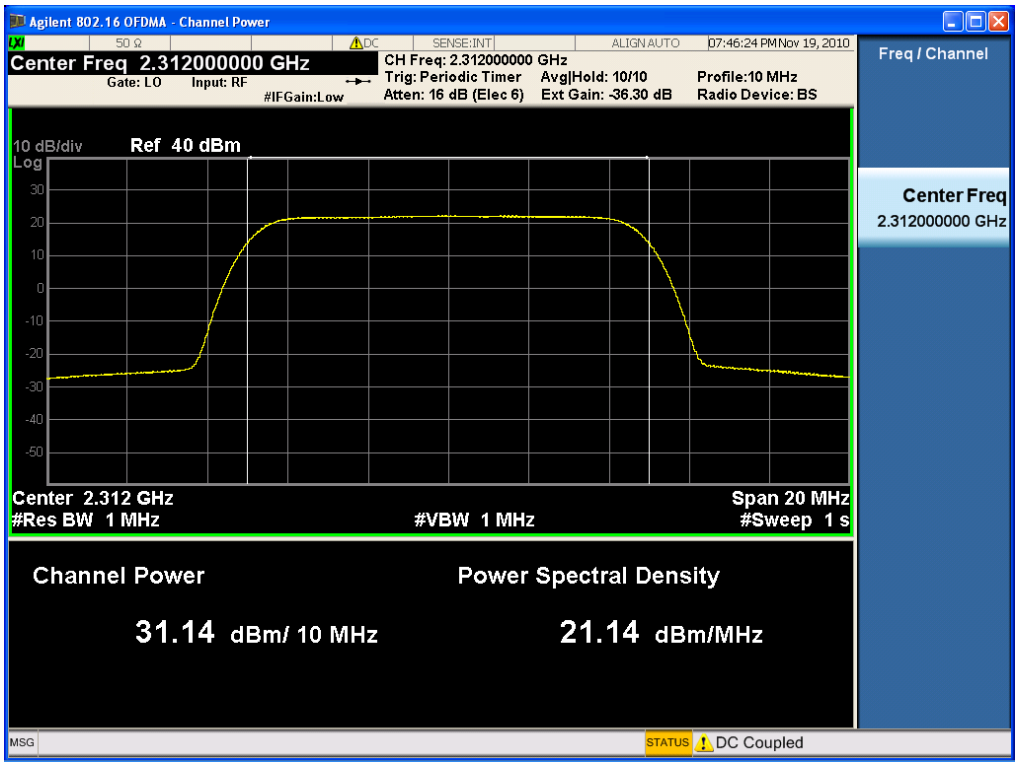

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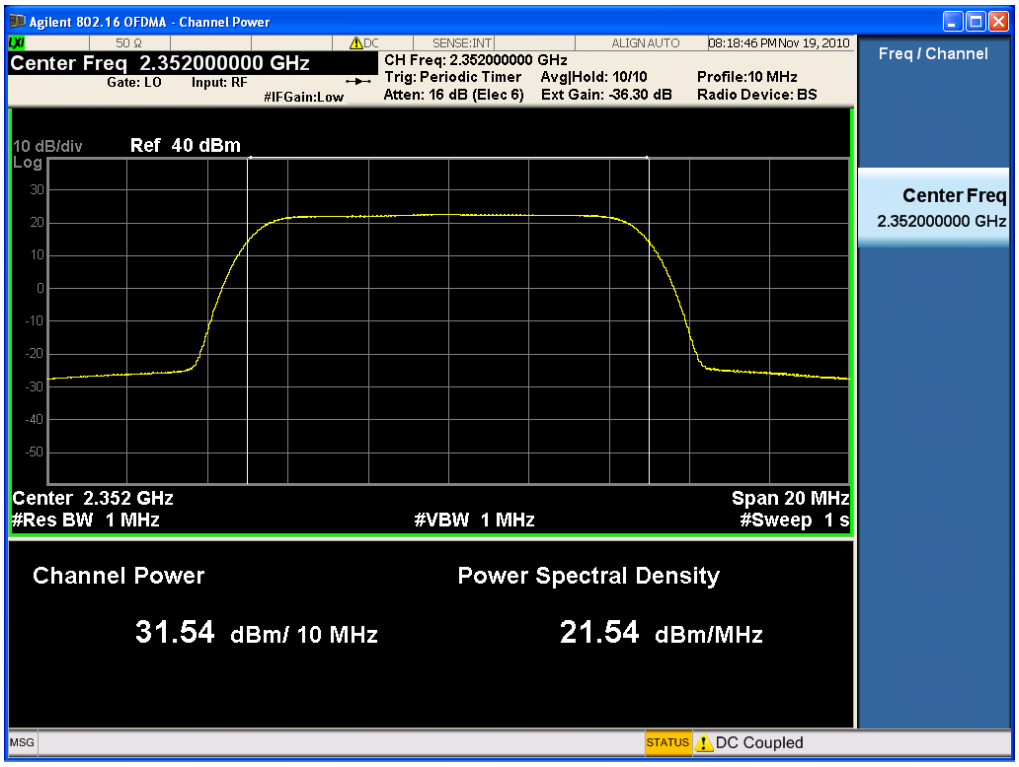
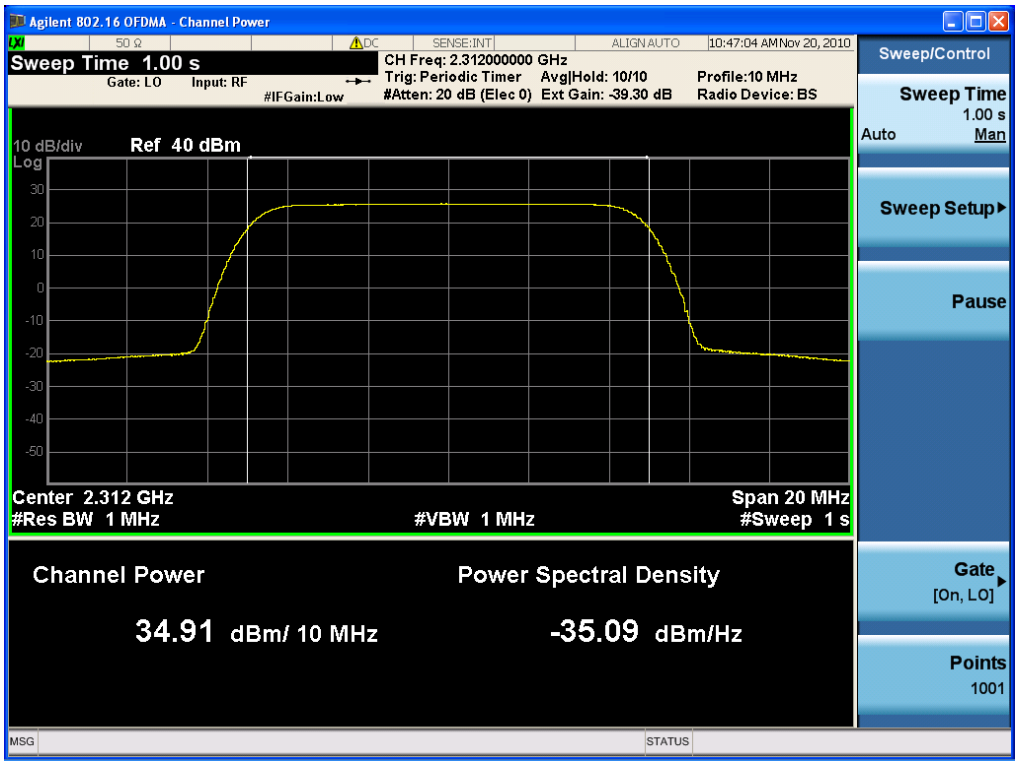
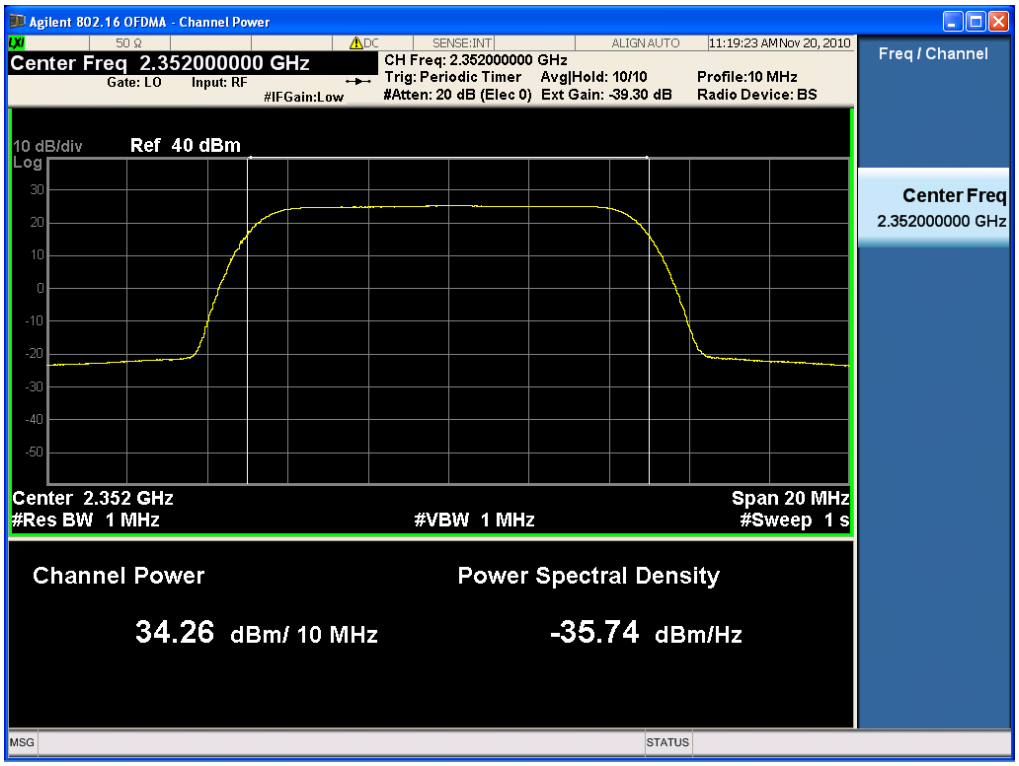


5.4.6. Combined Plot Data for Output (Conducted Output Power)

(QPSK Channel)



(QPSK Channel)



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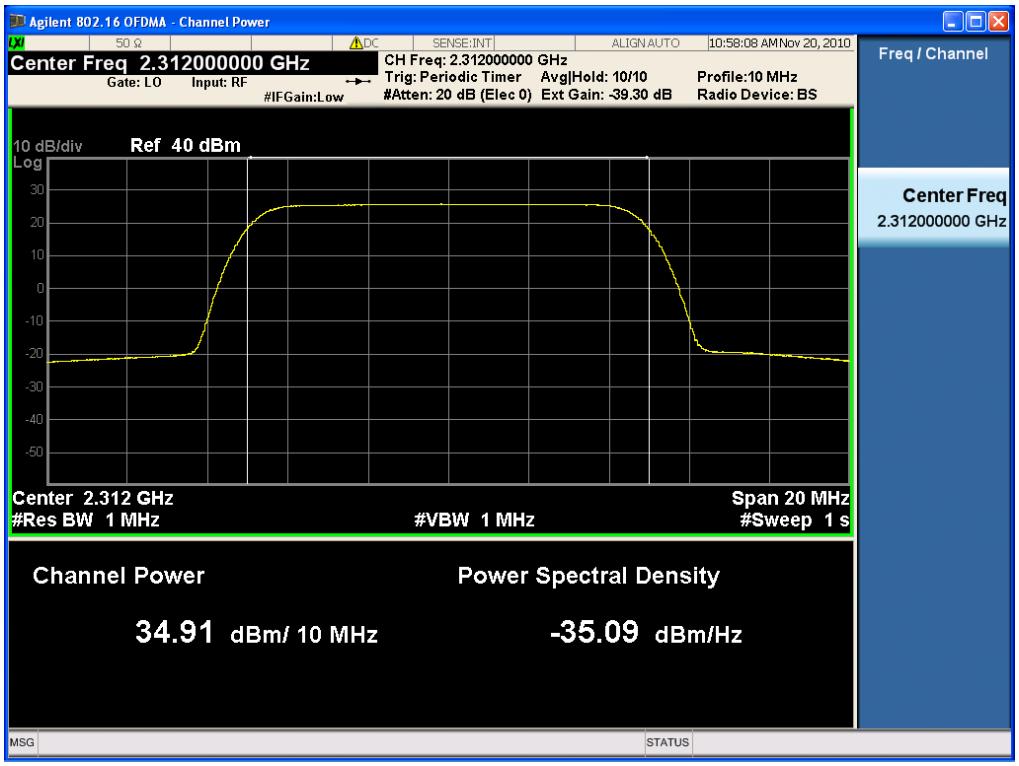

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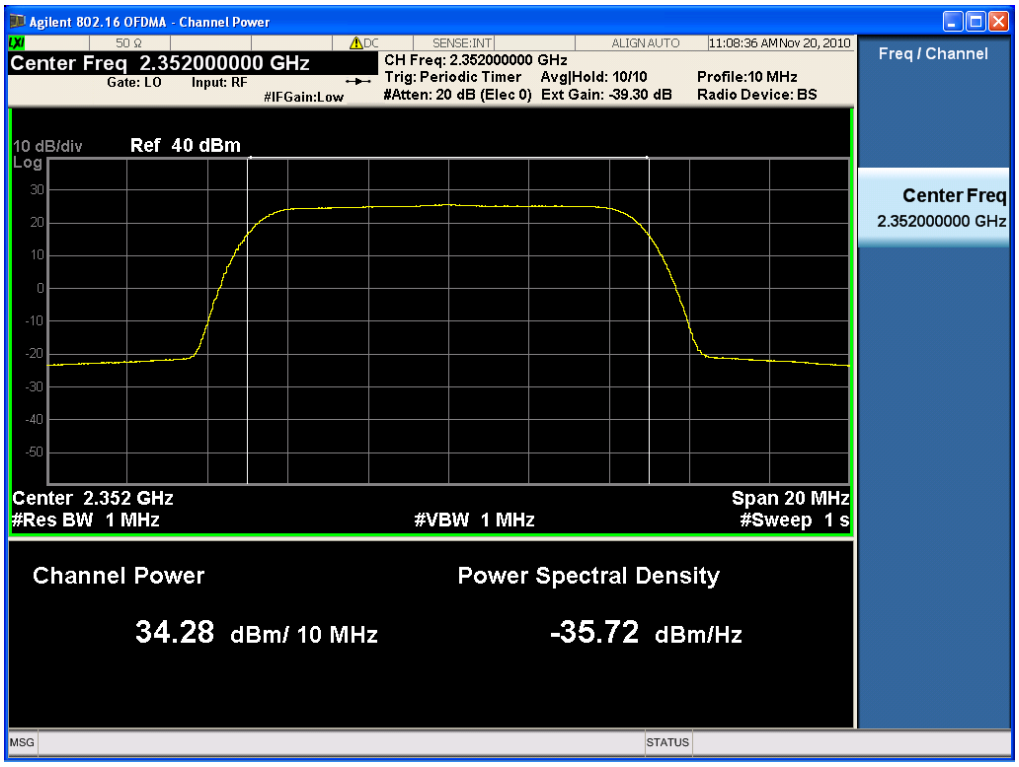

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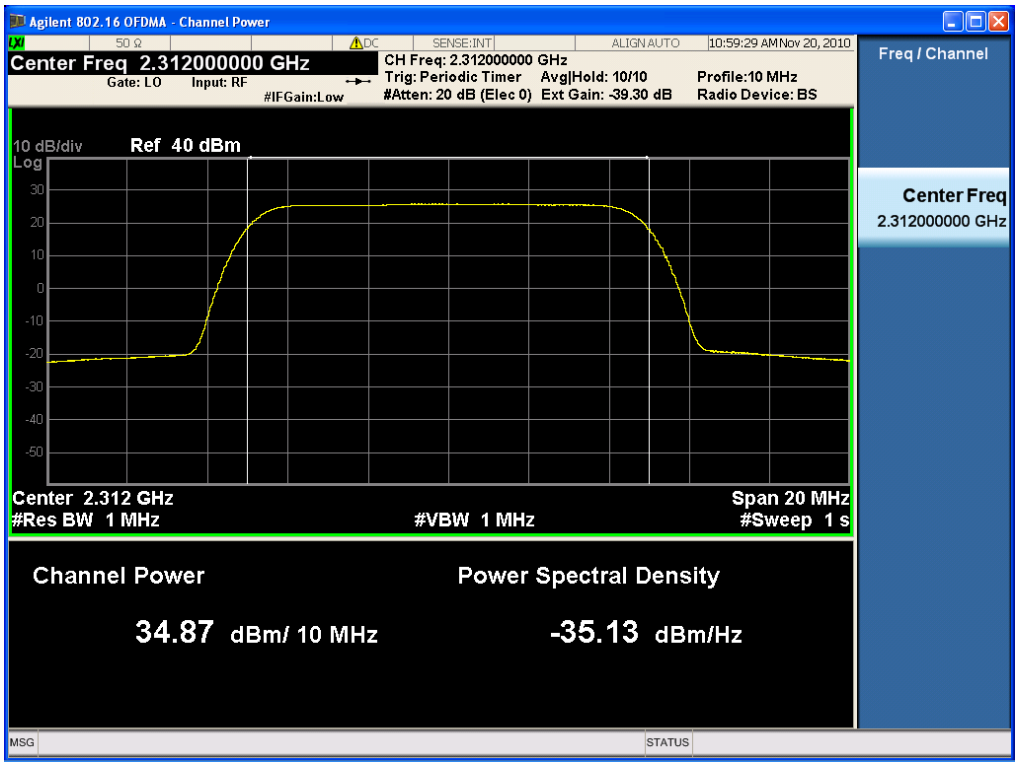
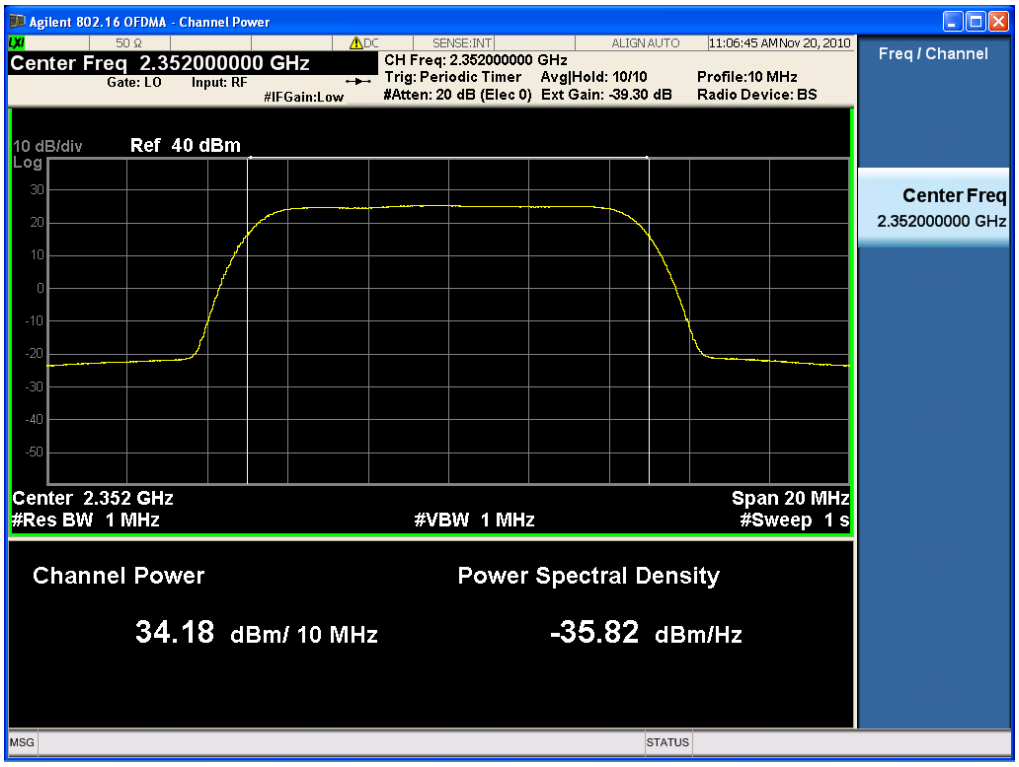


(64QAM Channel)



6. OCCUPIED BANDWIDTH

6.1. Applicable Standard

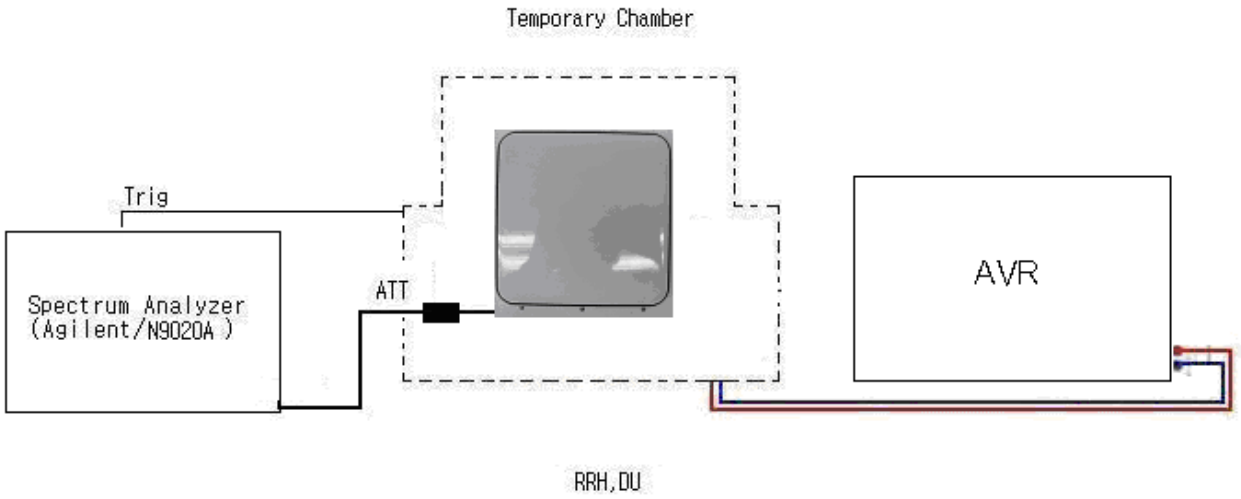
Requirements: CFR 47, Section 27.53(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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	05/14/2011
Agilent	8498A / Attenuator	51161	01/06/2011
Agilent	8498A / Attenuator	51162	01/06/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	01/14/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	21207	01/06/2011
Agilent	N9020A / MXA Signal Analyzer	US46220219	03/03/2011
Agilent	11636B / Power Divider	11377	12/24/2010

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:	59 %

6.4. Test Result

: PASS

6.4.1. Test Data at Output Port 0

Modulation	Frequency	Measured Bandwidth	
		99 %	26 dB
QPSK	2312	9.1115	9.578
	2352	9.1124	9.536
16QAM	2312	9.1166	9.587
	2352	9.1175	9.608
64QAM	2312	9.1158	9.604
	2352	9.1169	9.602

6.4.2. Test Data at Output Port 1

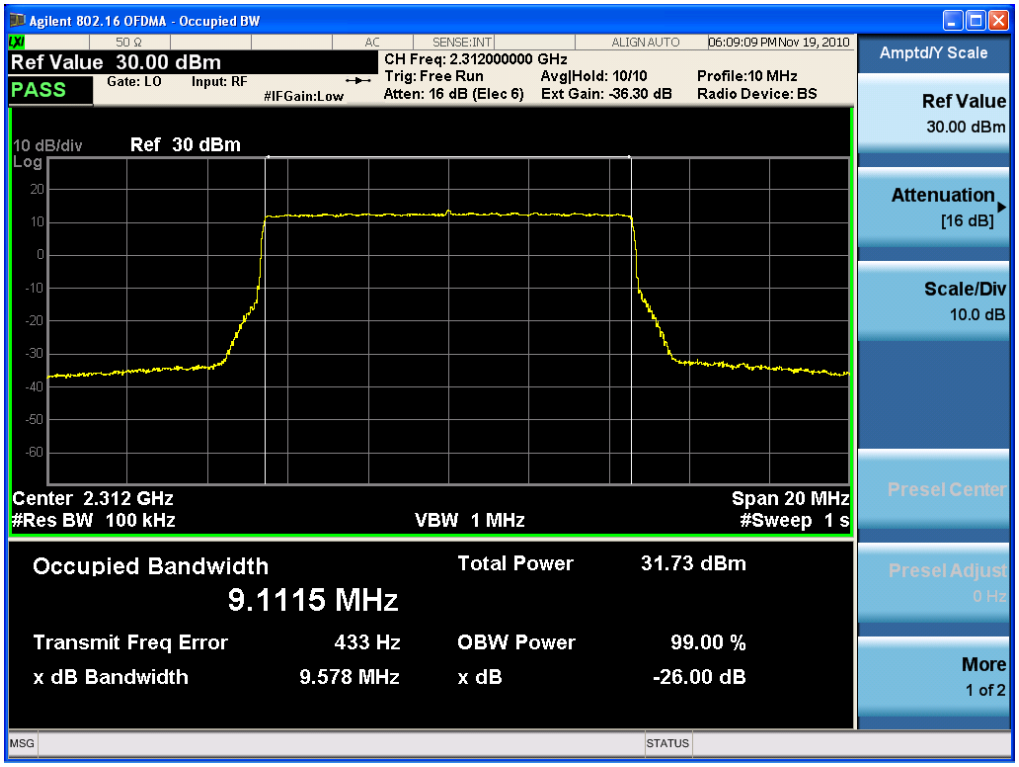
Modulation	Frequency	Measured Bandwidth	
		99 %	26 dB
QPSK	2312	9.1113	9.517
	2352	9.1073	9.498
16QAM	2312	9.1155	9.500
	2352	9.1124	9.490
64QAM	2312	9.1118	9.511
	2352	9.1084	9.496

6.4.3. Combined Test Data at Output Port

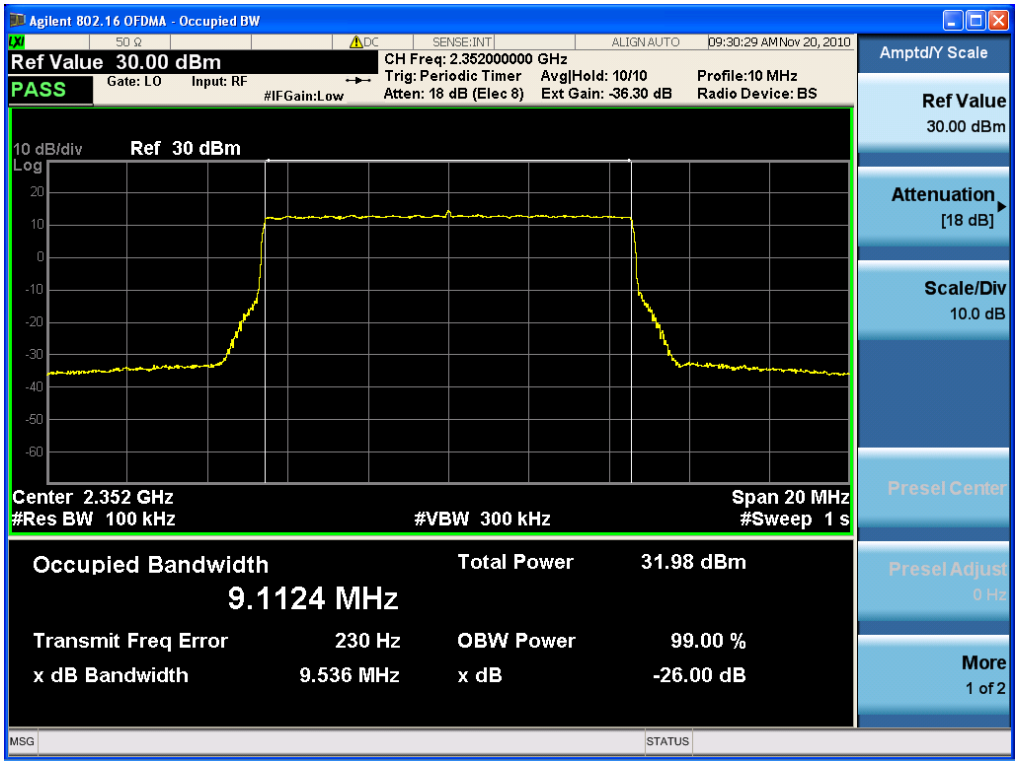
Modulation	Frequency	Measured Bandwidth	
		99 %	26 dB
QPSK	2312	9.0888	9.454
	2352	9.1152	9.442
16QAM	2312	9.1047	9.440
	2352	9.1286	9.438
64QAM	2312	9.0996	9.470
	2345	9.1186	9.440

6.4.4. Test Plot at Output Port 0

(QPSK Channel)



(QPSK Channel)



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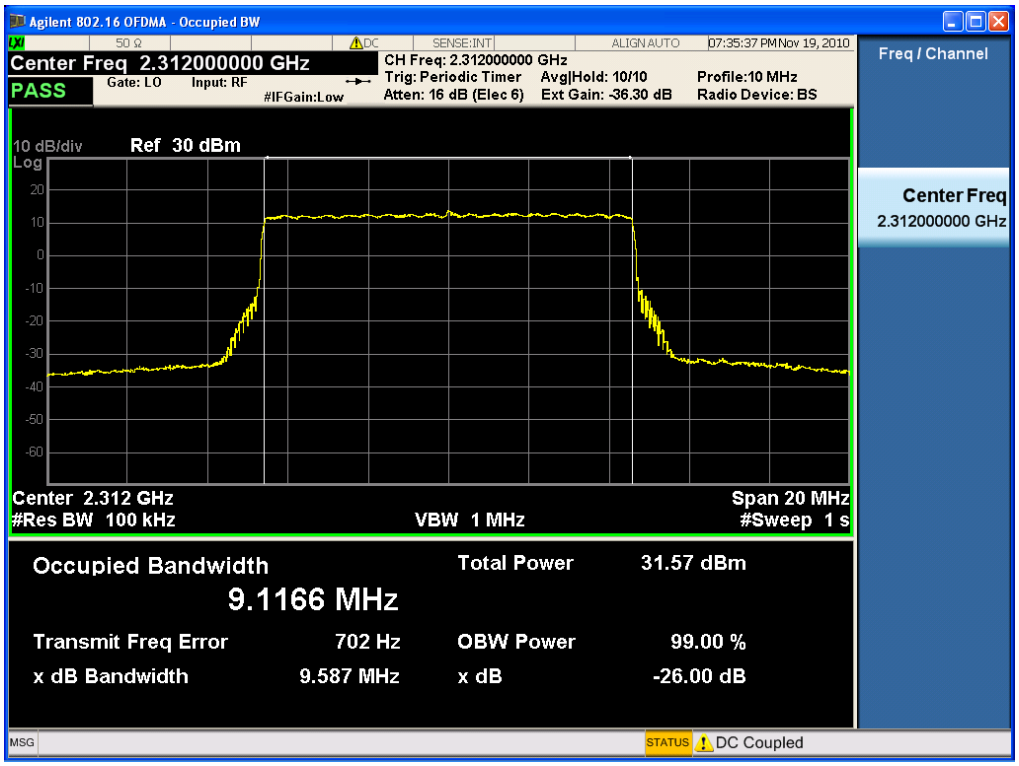

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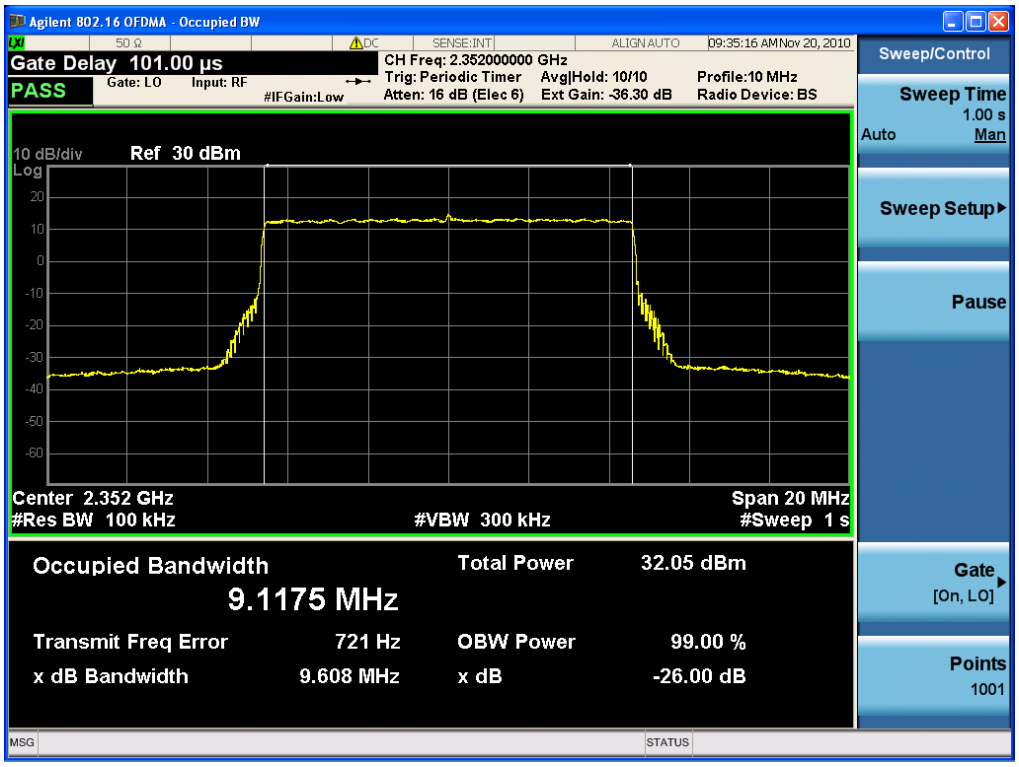

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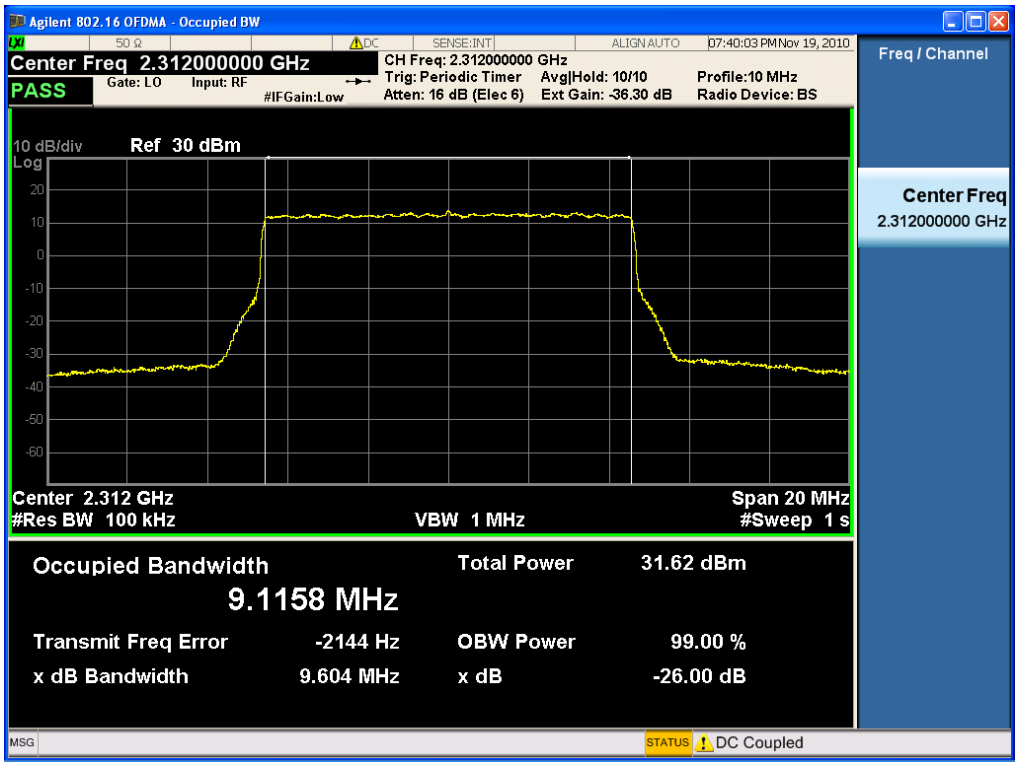

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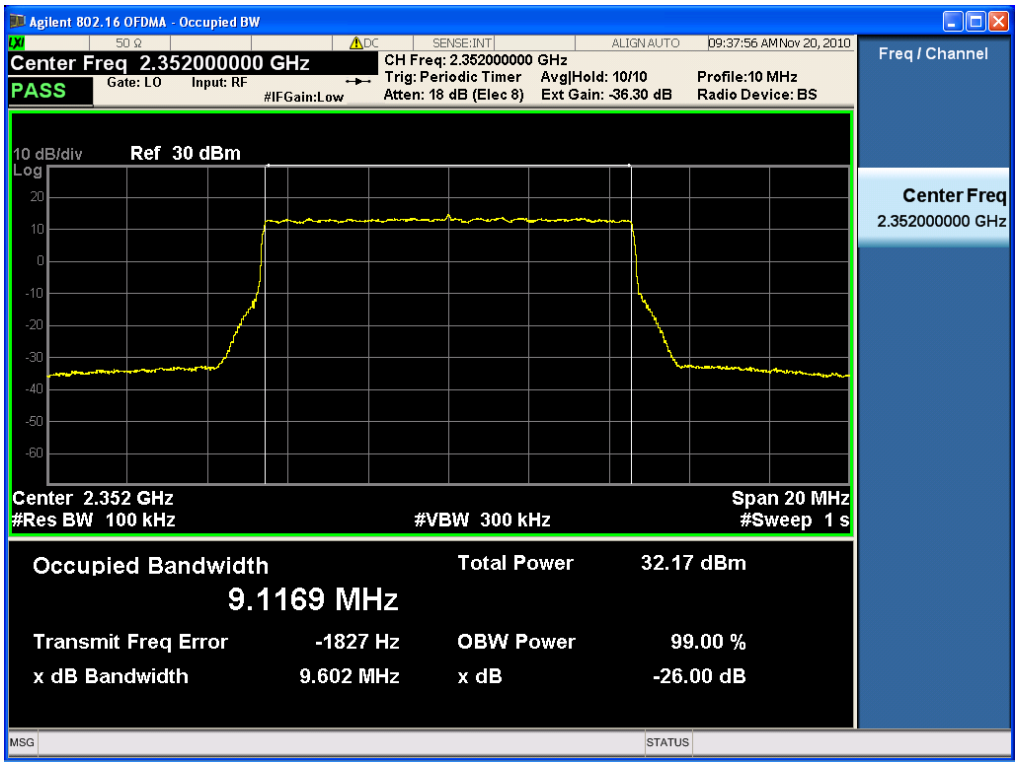
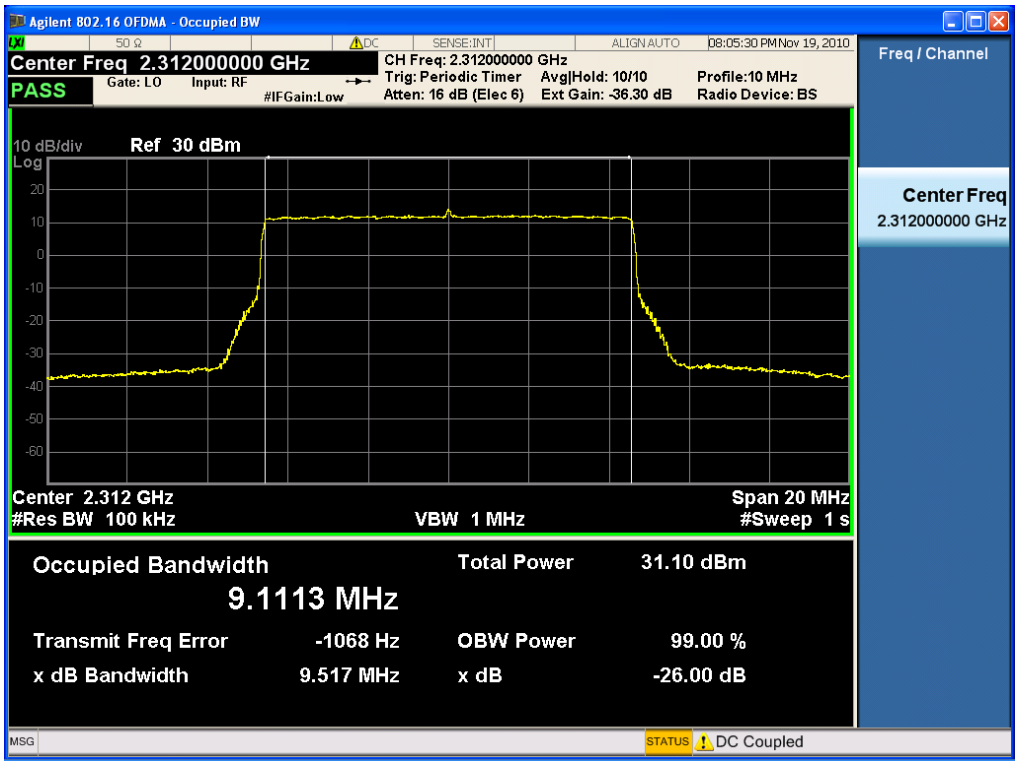


6.4.5. Test Plot at Output Port 1

(QPSK Channel)



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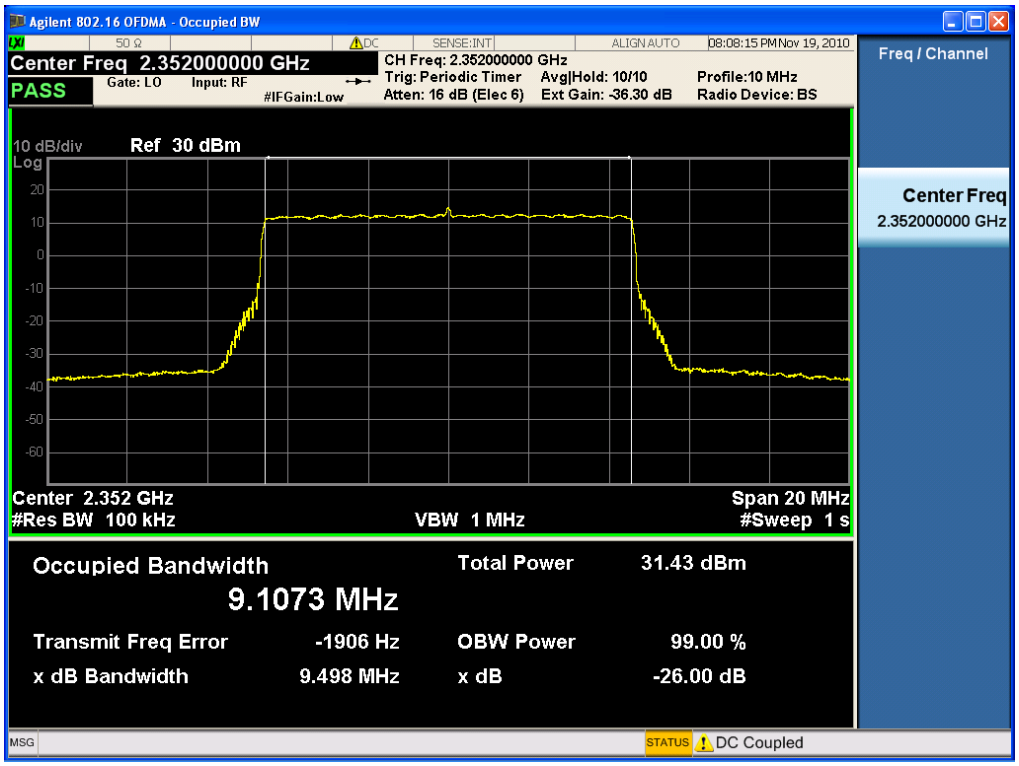
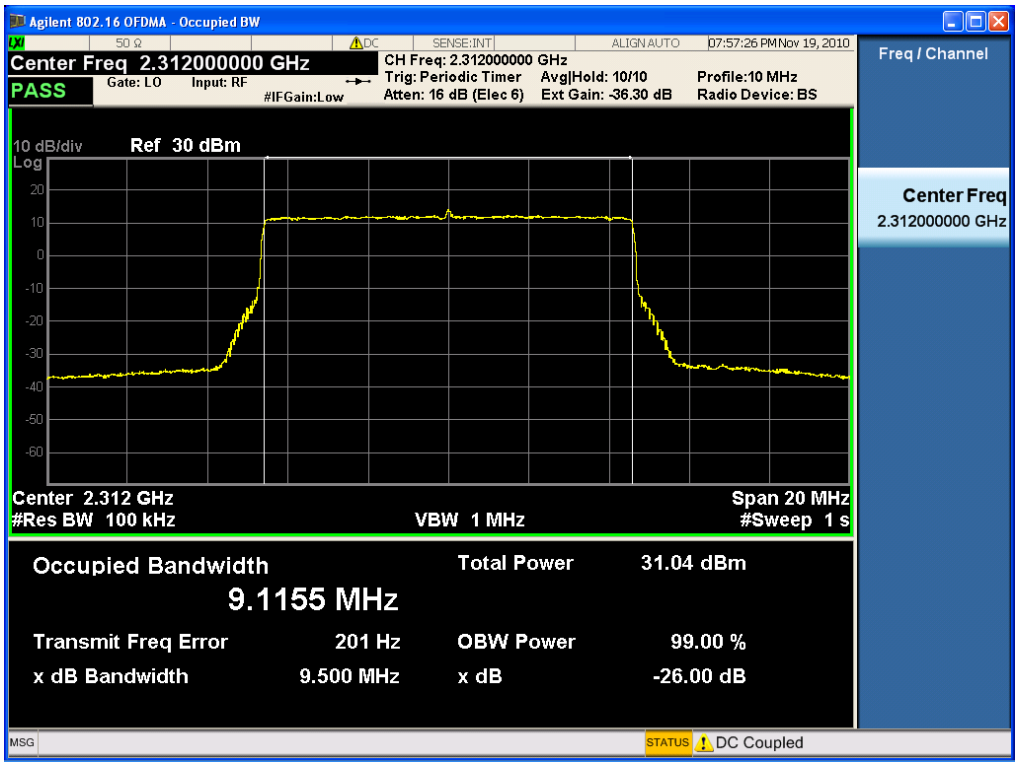
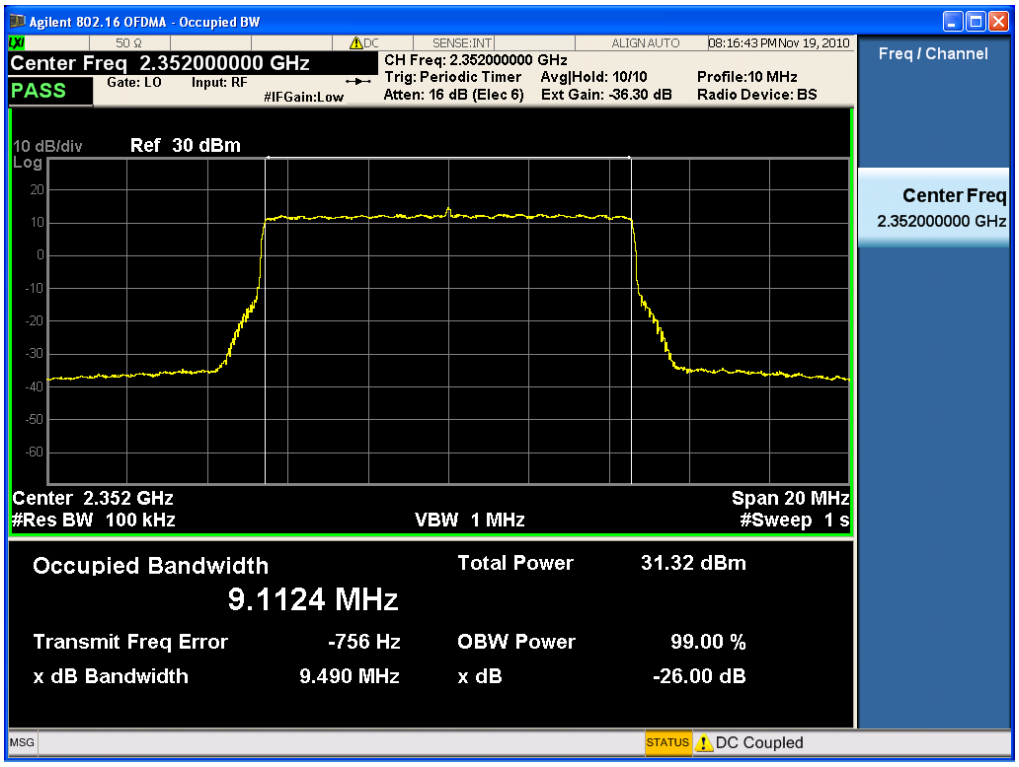


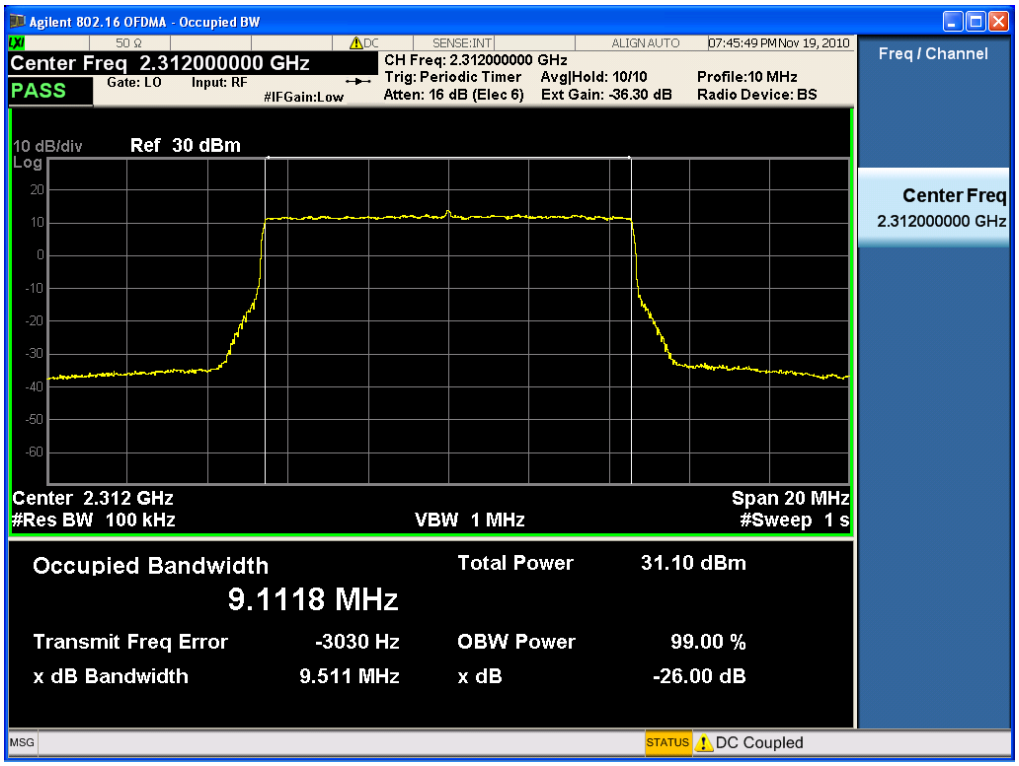
(16QAM Channel)



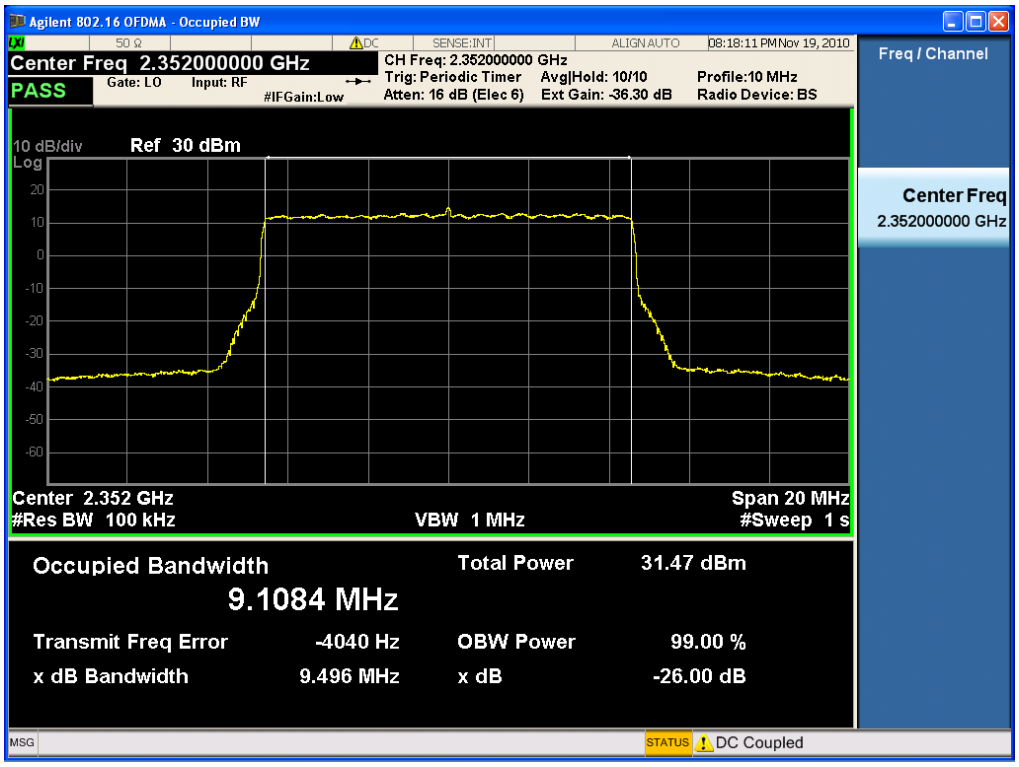
(16QAM Channel)



(64QAM Channel)

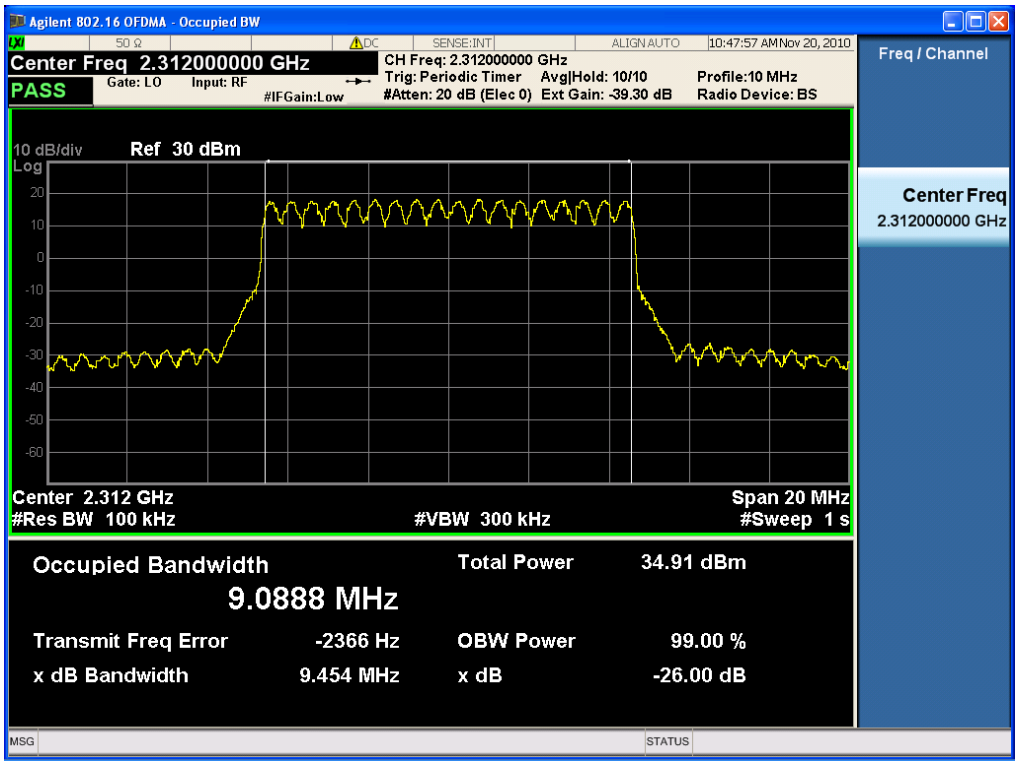


(64QAM Channel)

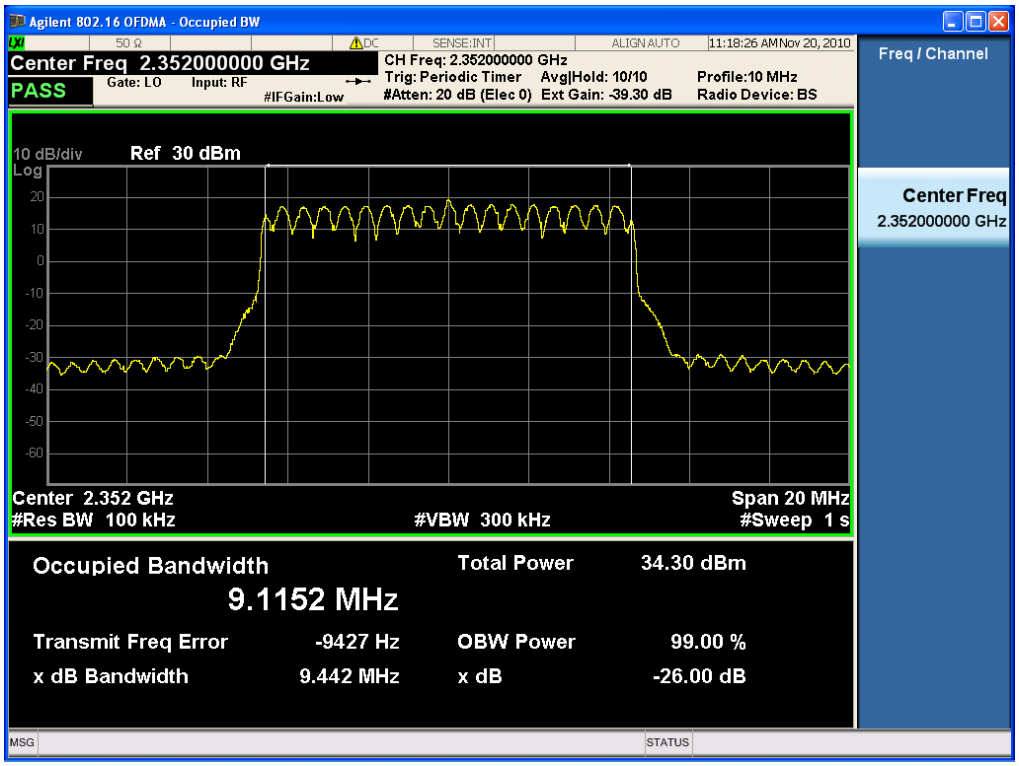


6.4.6. Combined Test Plot at Output Port

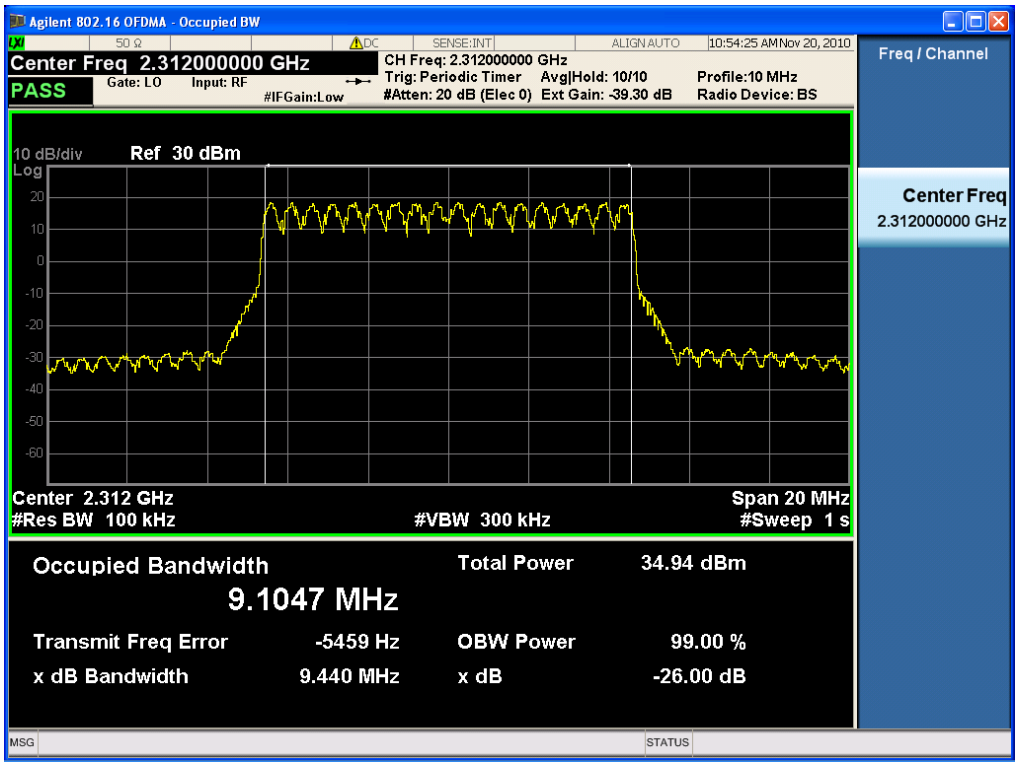
(QPSK Channel)



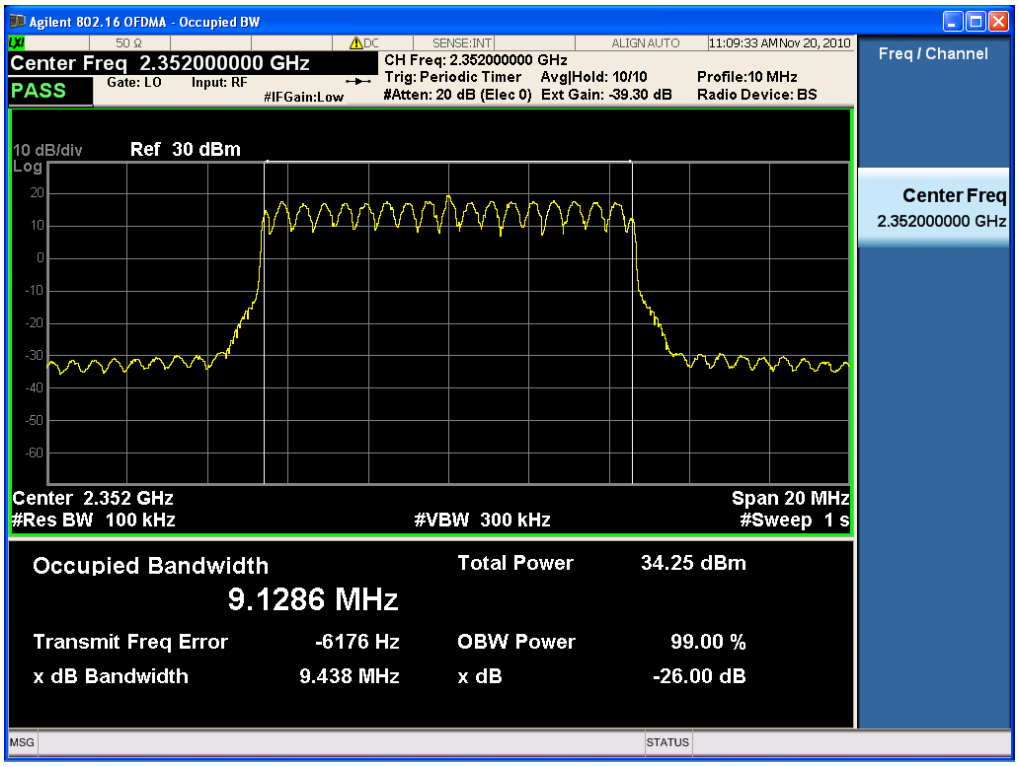
(QPSK Channel)



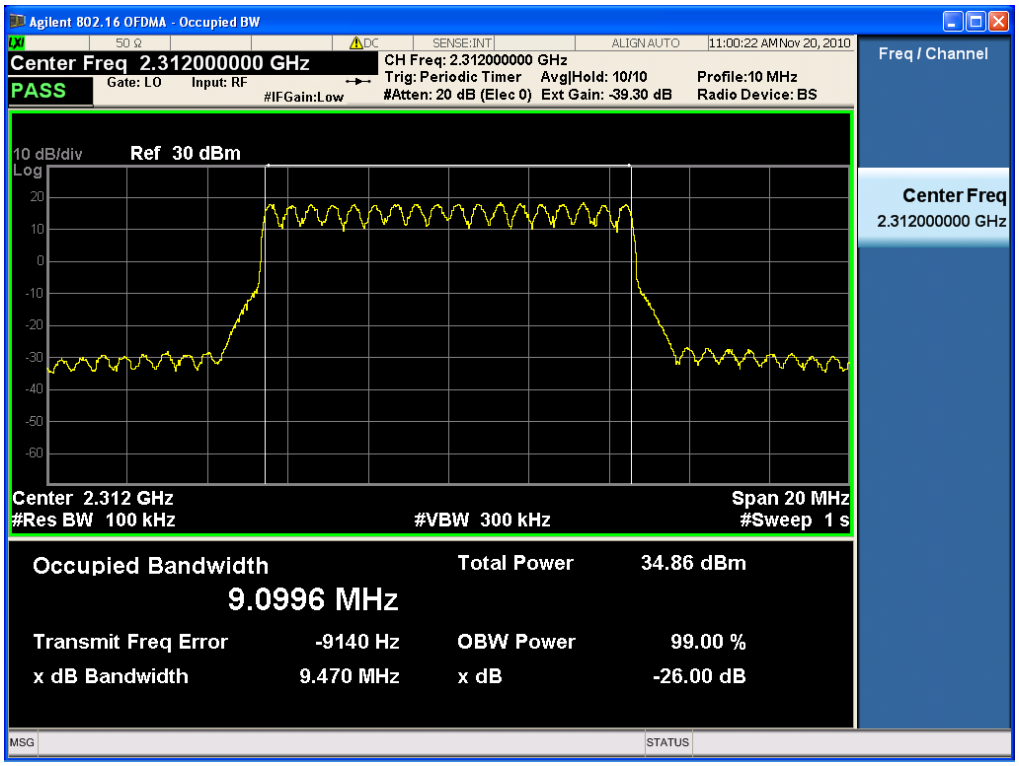
(16QAM Channel)



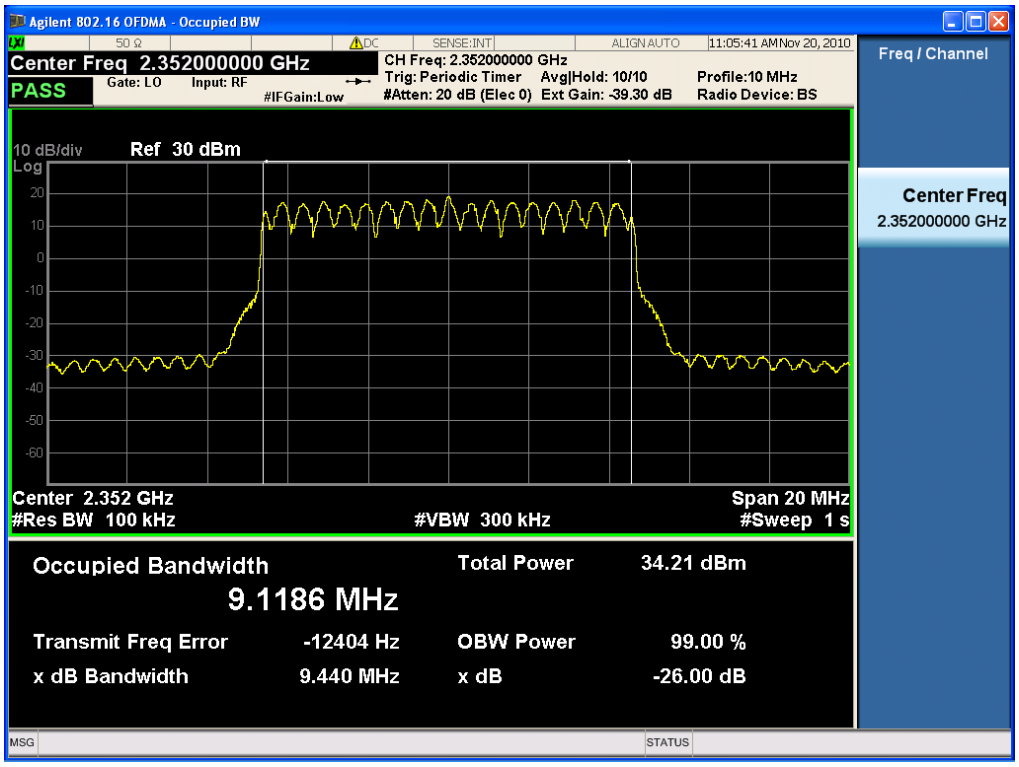
(16QAM Channel)



(64QAM Channel)



(64QAM Channel)



7. BAND EDGES

7.1. Applicable Standard

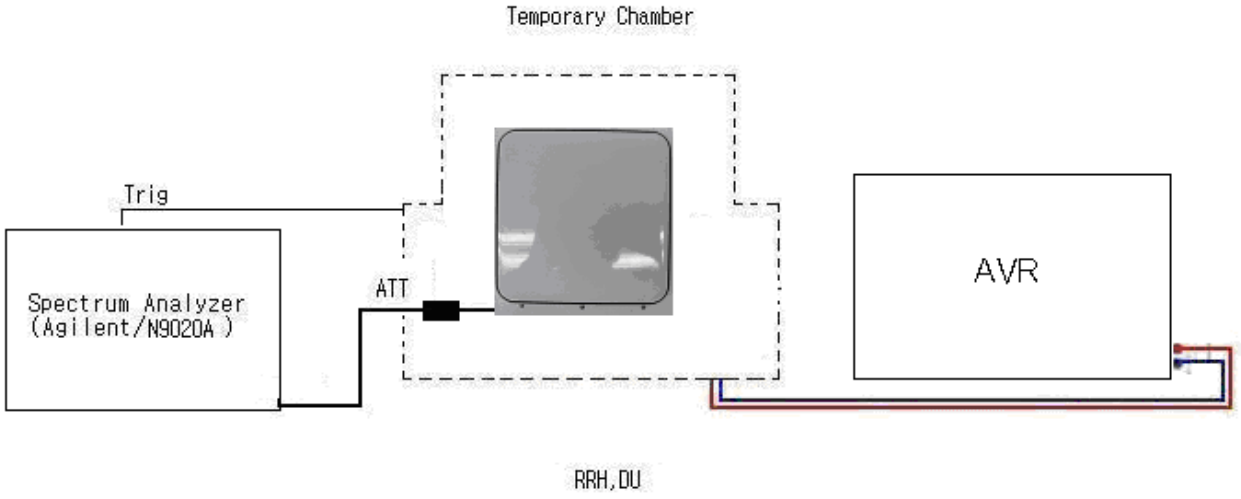
According to §27.53(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (p) by a factor of at least 43 + 10 log (p) dB.

7.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	6674A / DC Power Supply	3501A00901	05/14/2011
Agilent	8498A / Attenuator	51161	01/06/2011
Agilent	8498A / Attenuator	51162	01/06/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	01/14/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	21207	01/06/2011
Agilent	N9020A / MXA Signal Analyzer	US46220219	03/03/2011
Agilent	11636B / Power Divider	11377	12/24/2010

7.3. 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.

7.3.1. Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %

7.4. Test Result

: PASS

7.4.1. Test data at Output 0

Modulation	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	2312	-35.618	-13.0
	2352	-22.158	
16QAM	2312	-34.200	
	2352	-29.458	
64QAM	2312	-34.629	
	2352	-29.482	

7.4.2. Test data at Output 1

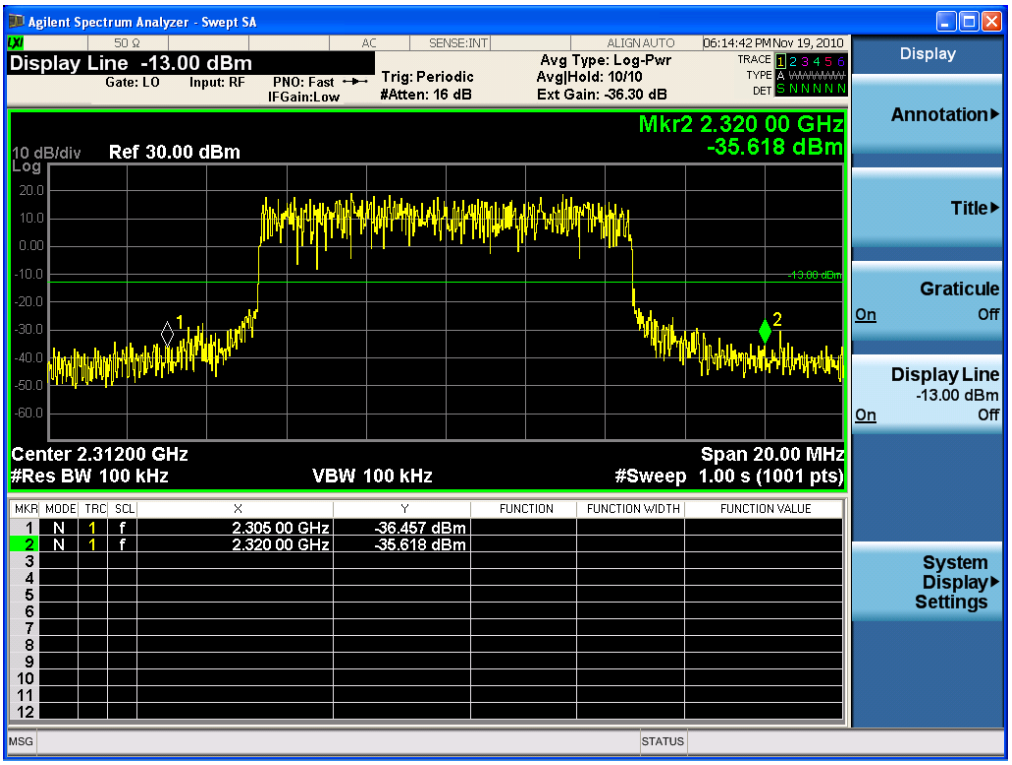
Modulation	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	2312	-24.212	-13.0
	2352	-27.343	
16QAM	2312	-24.094	
	2352	-24.842	
64QAM	2312	-24.940	
	2352	-23.962	

7.4.3. Combined Test data at Output

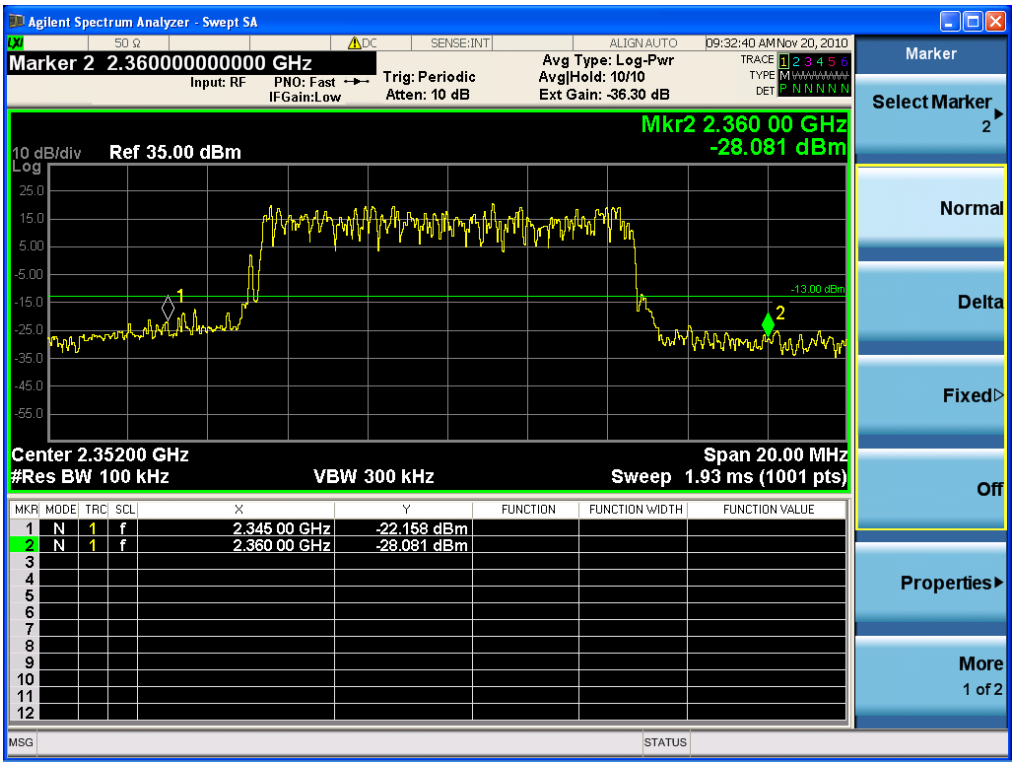
Modulation	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	2312	-25.839	-13.0
	2352	-30.598	
16QAM	2312	-22.367	
	2352	-33.473	
64QAM	2312	-27.690	
	2352	-26.595	

7.4.4. Plot Data at Output 0

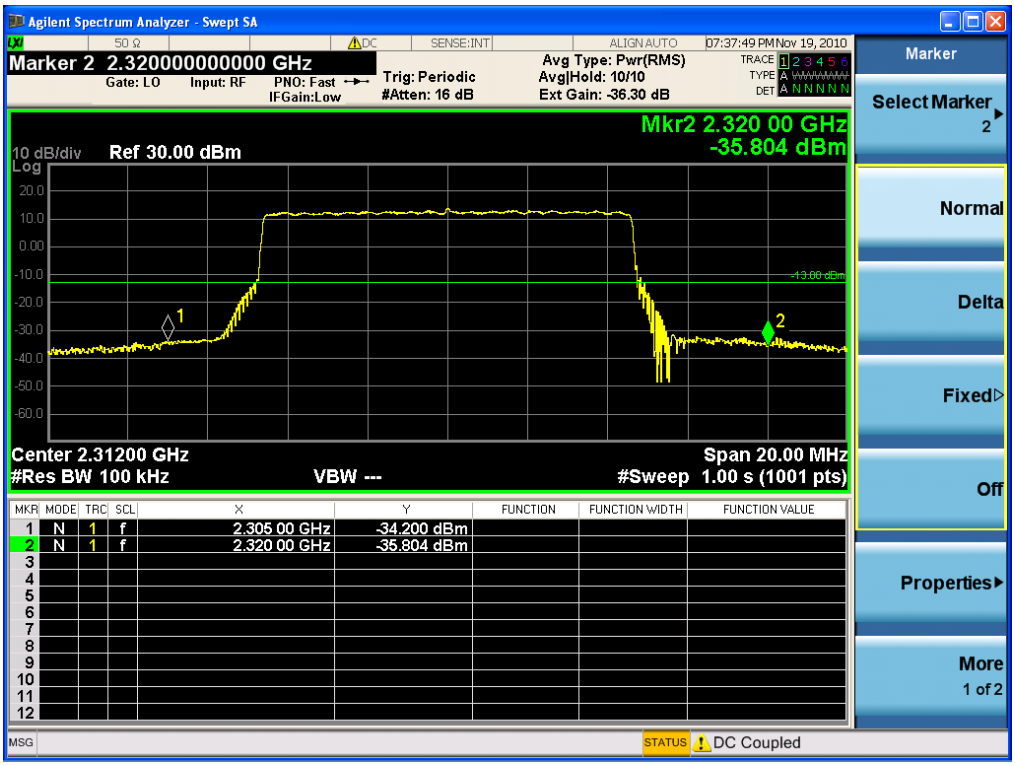
(QPSK Channel)



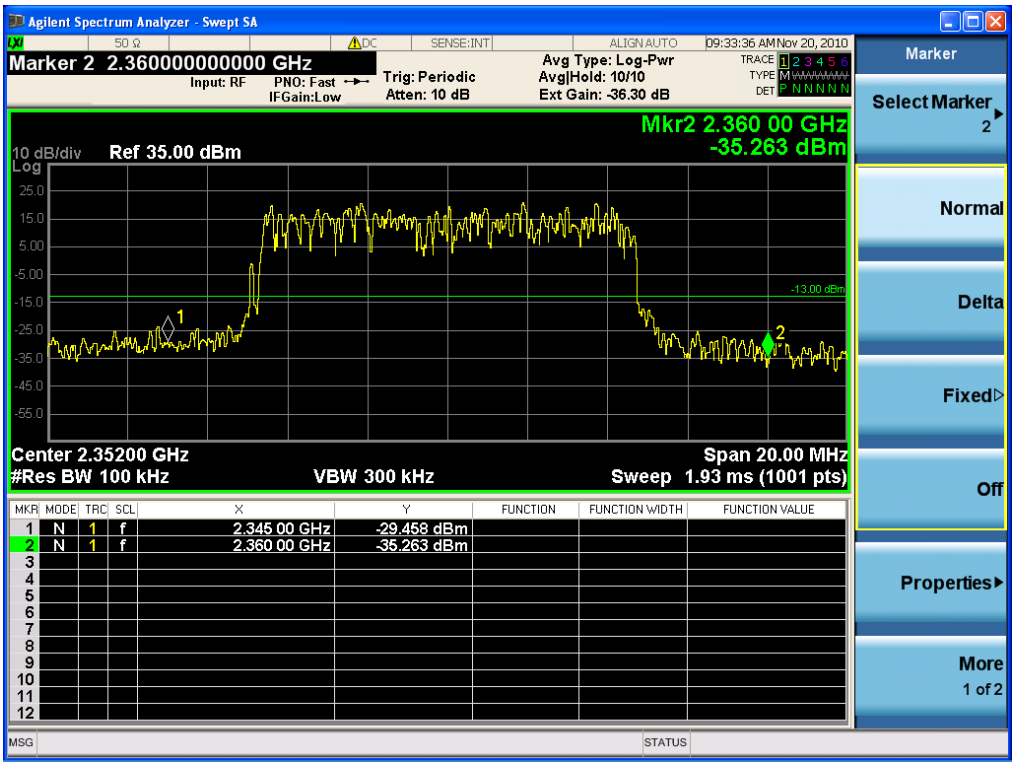
(QPSK Channel)



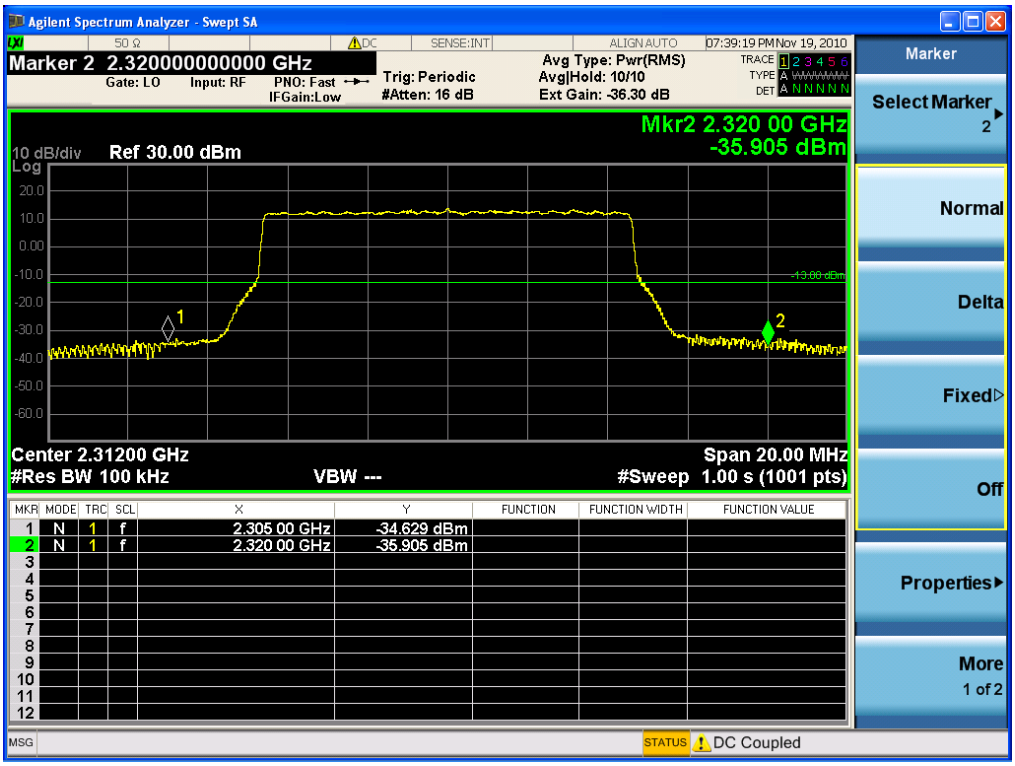
(16QAM Channel)



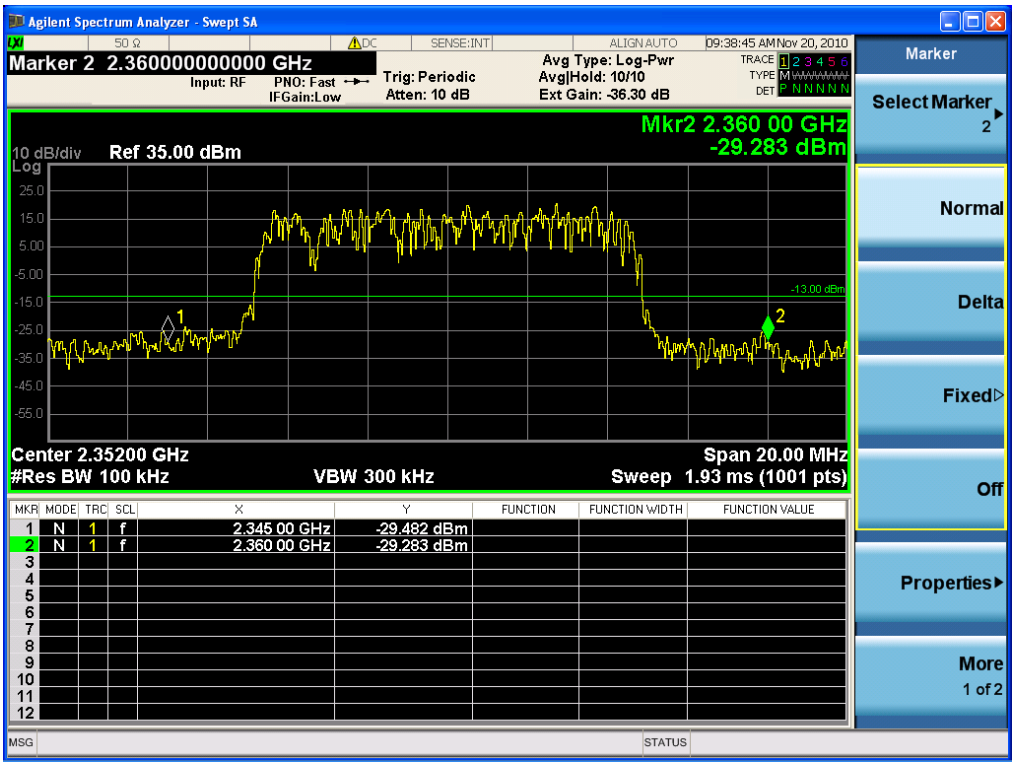
(16QAM Channel)



(64QAM Channel)

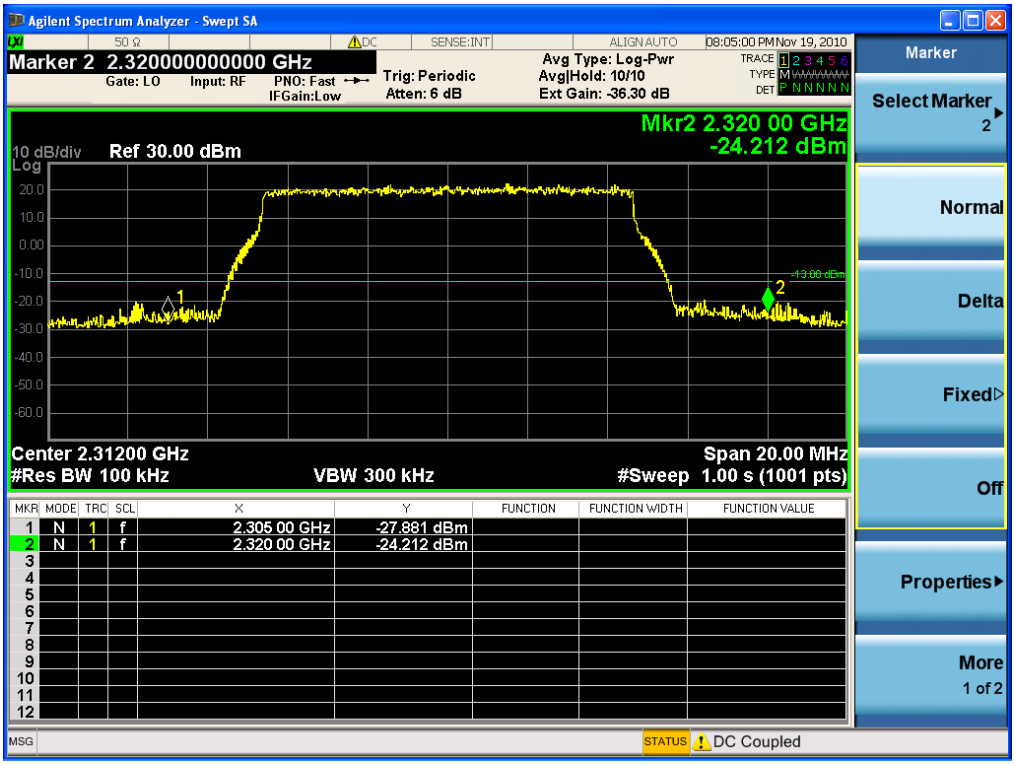


(64QAM Channel)

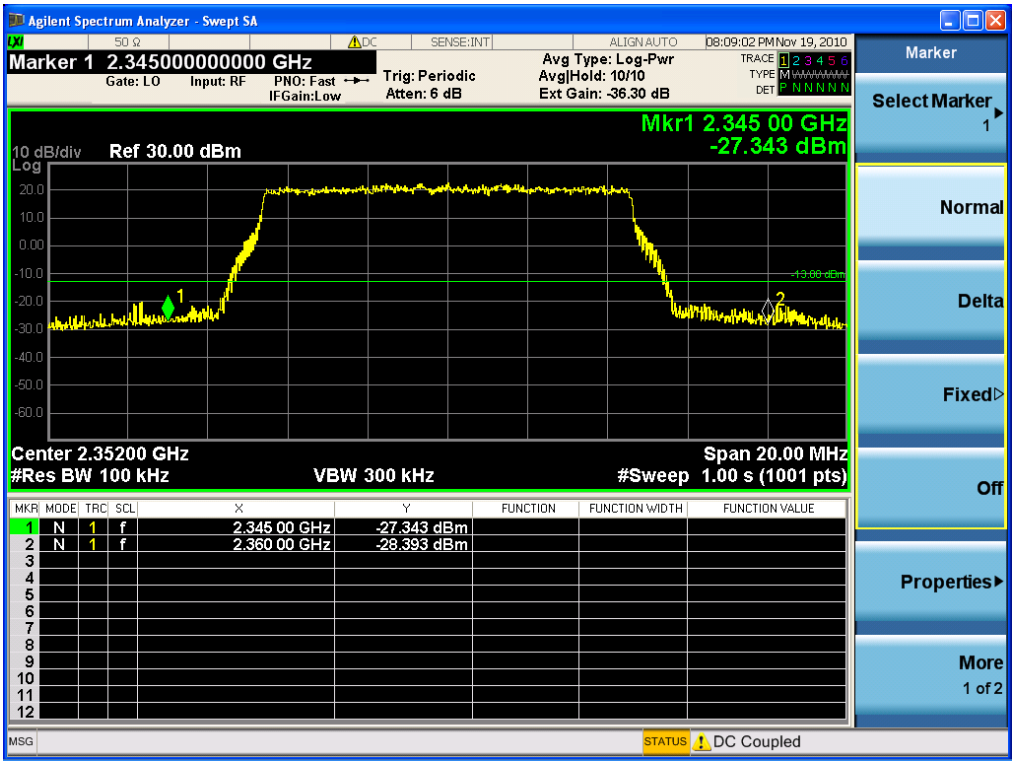


7.4.5. Plot Data at Output 1

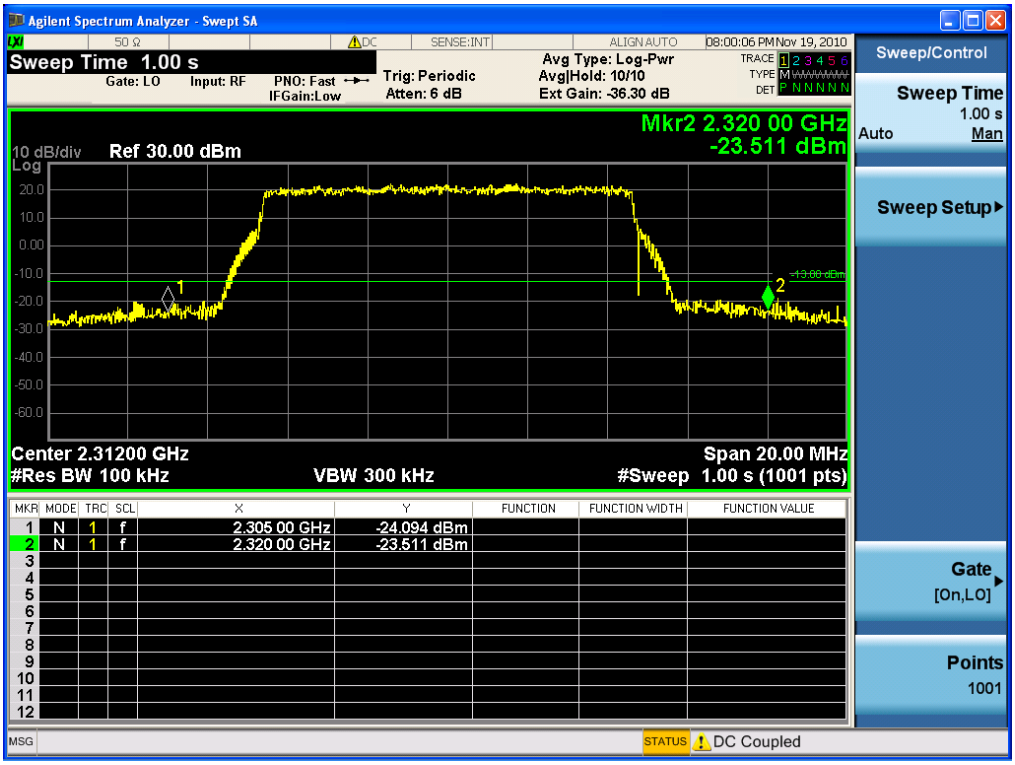
(QPSK Channel)



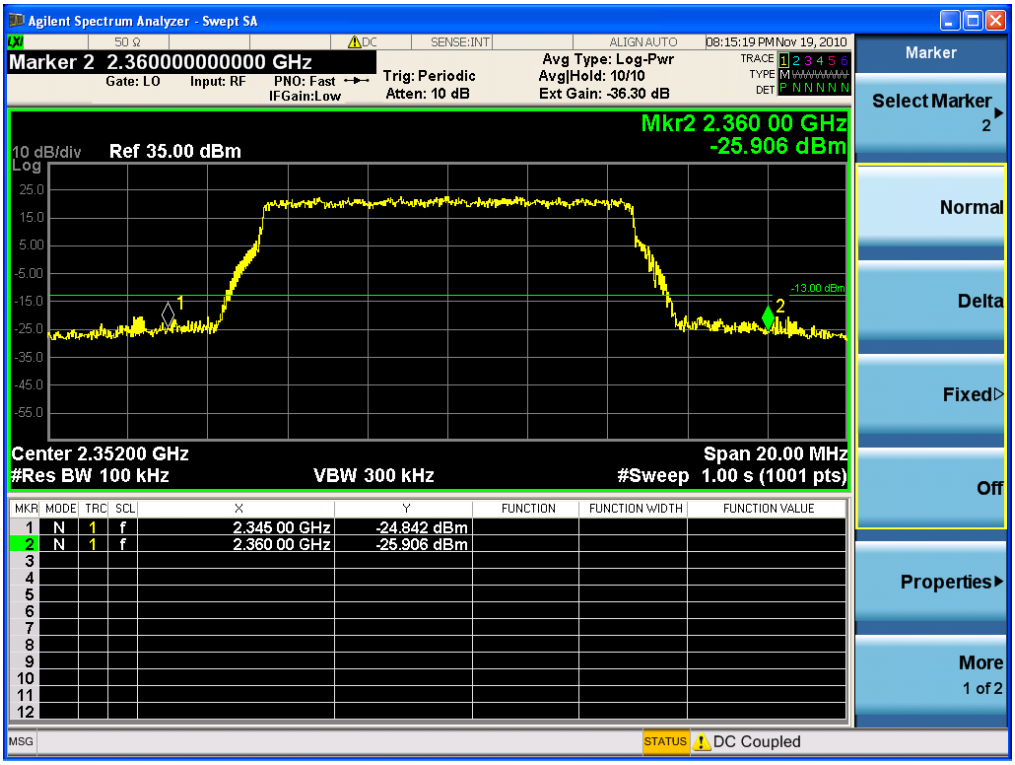
(QPSK Channel)



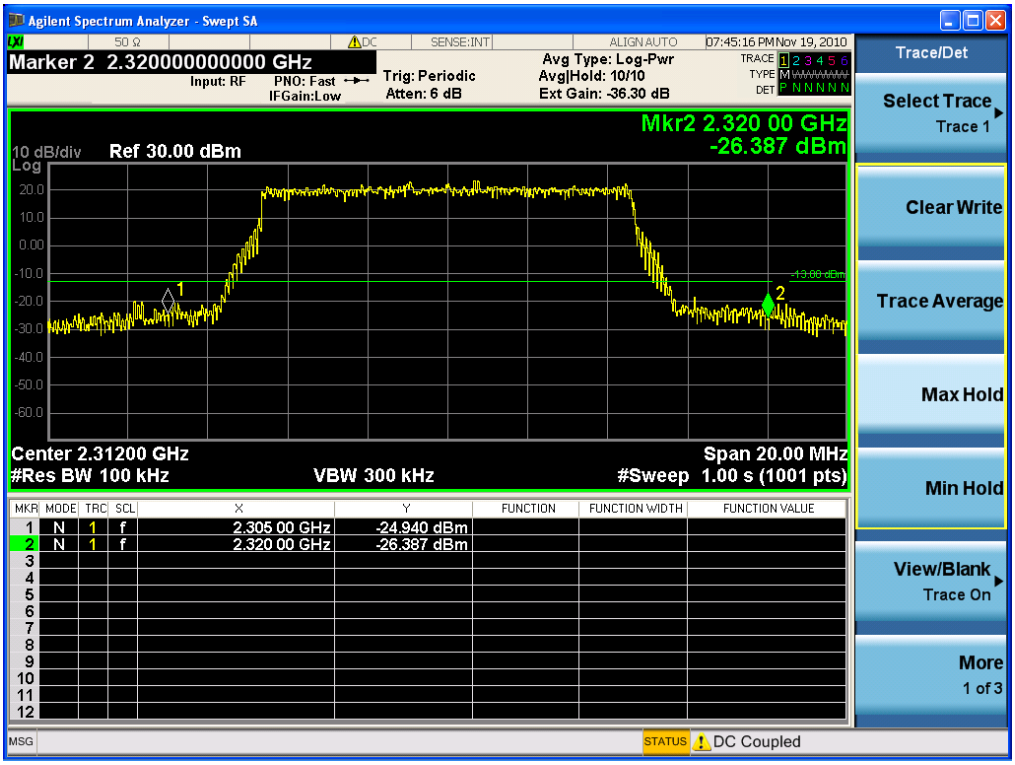
(16QAM Channel)



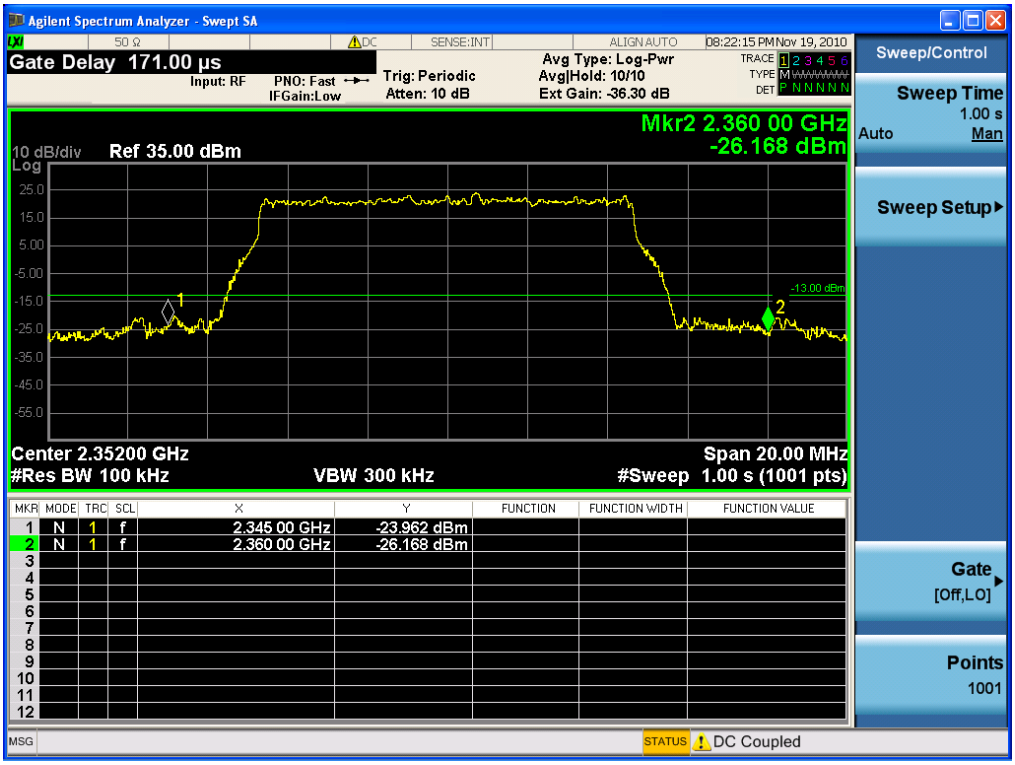
(16QAM Channel)



(64QAM Channel)

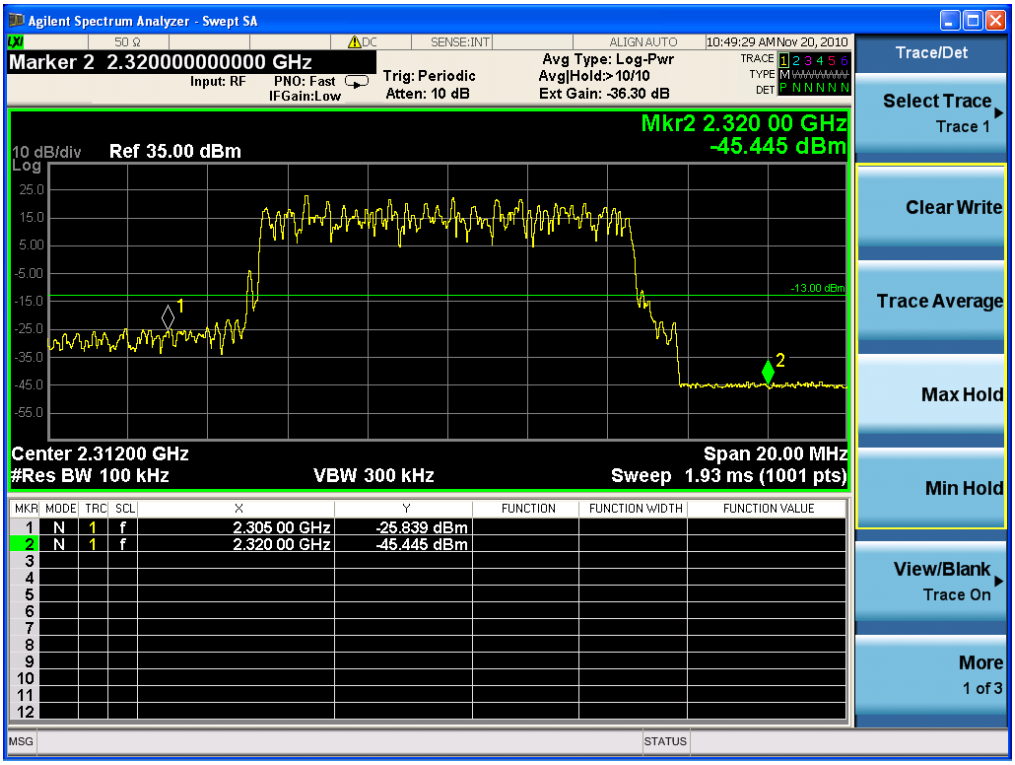


(64QAM Channel)

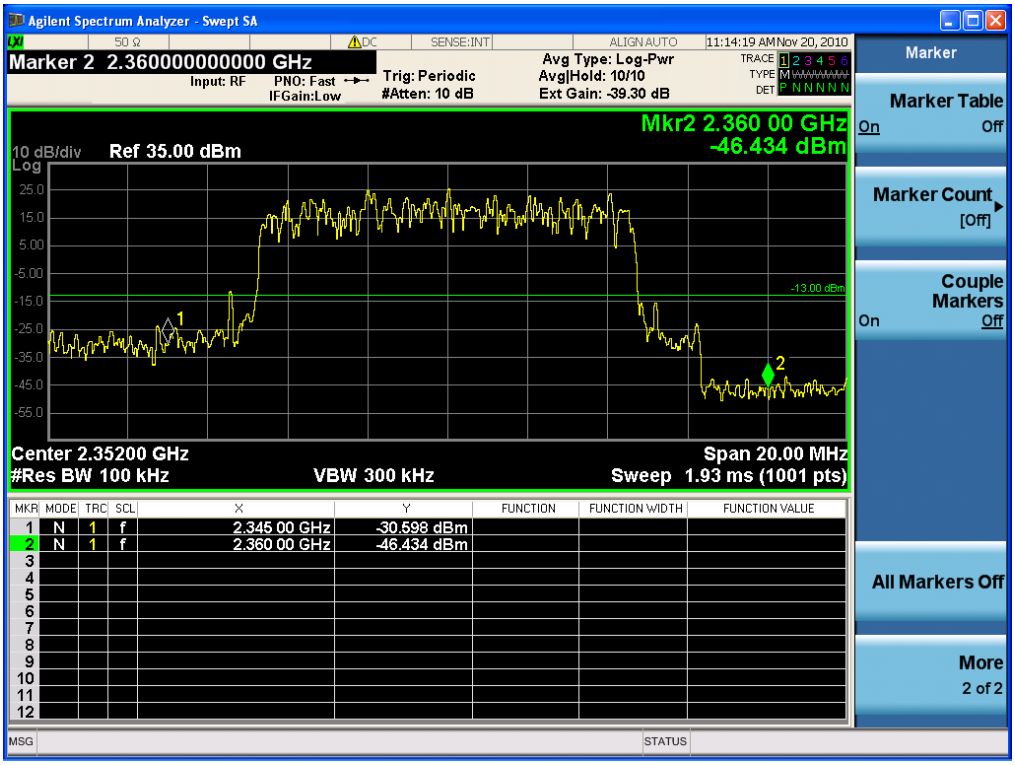


7.4.6. Combined Plot Data at Output

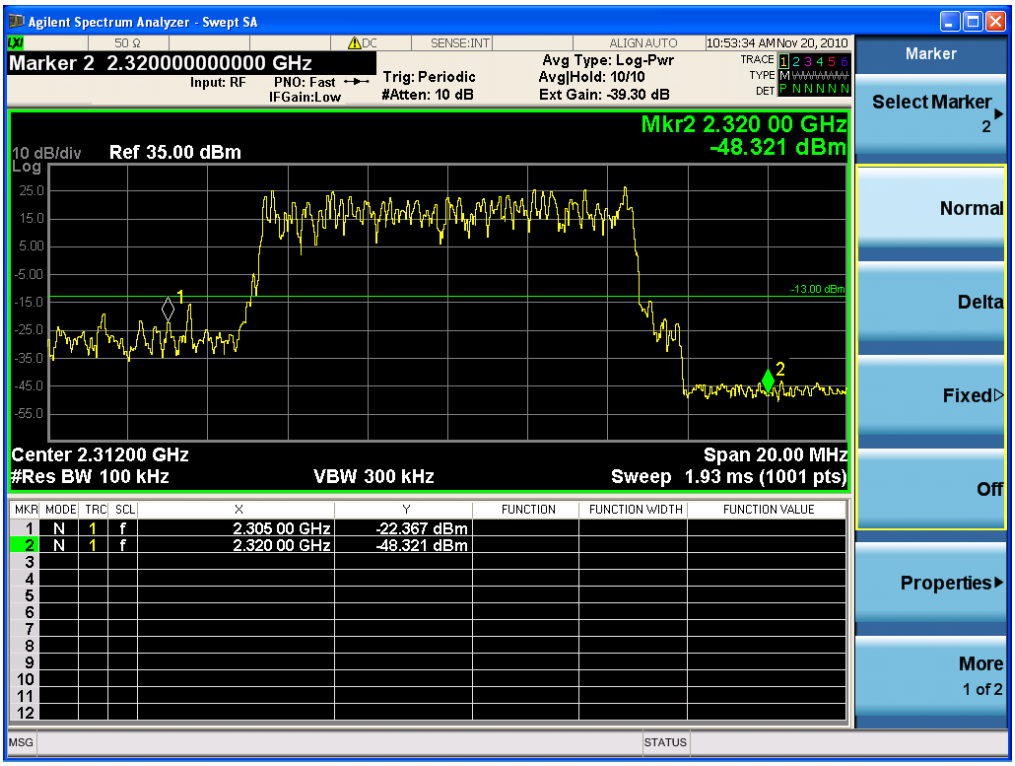
(QPSK Channel)



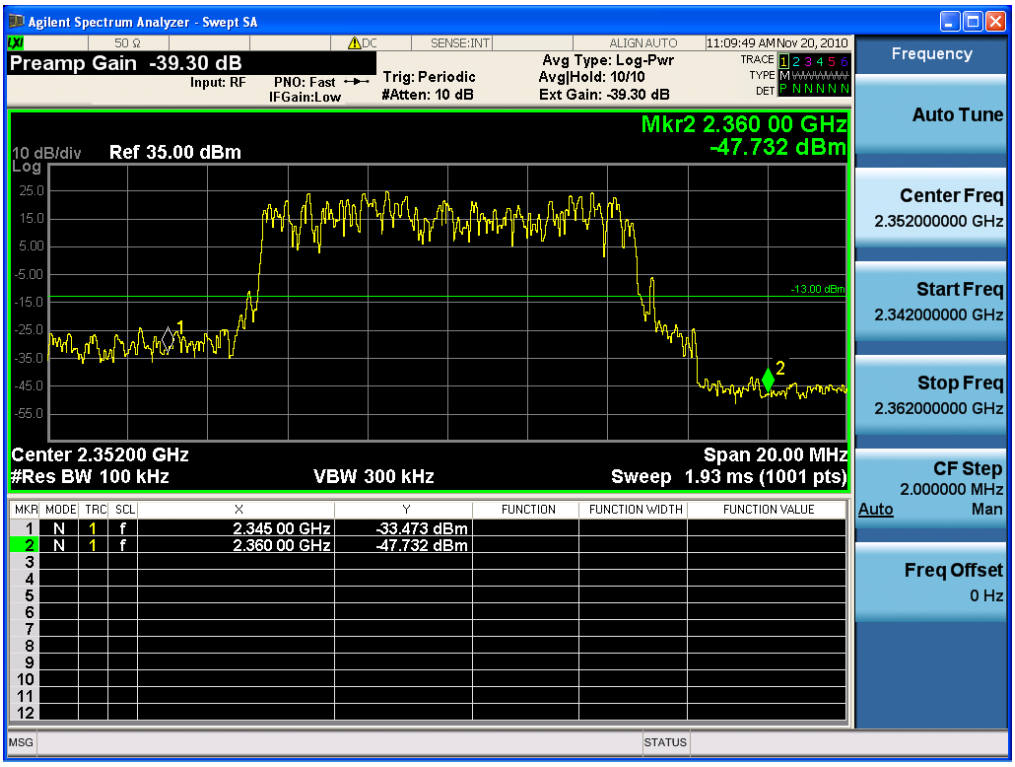
(QPSK Channel)



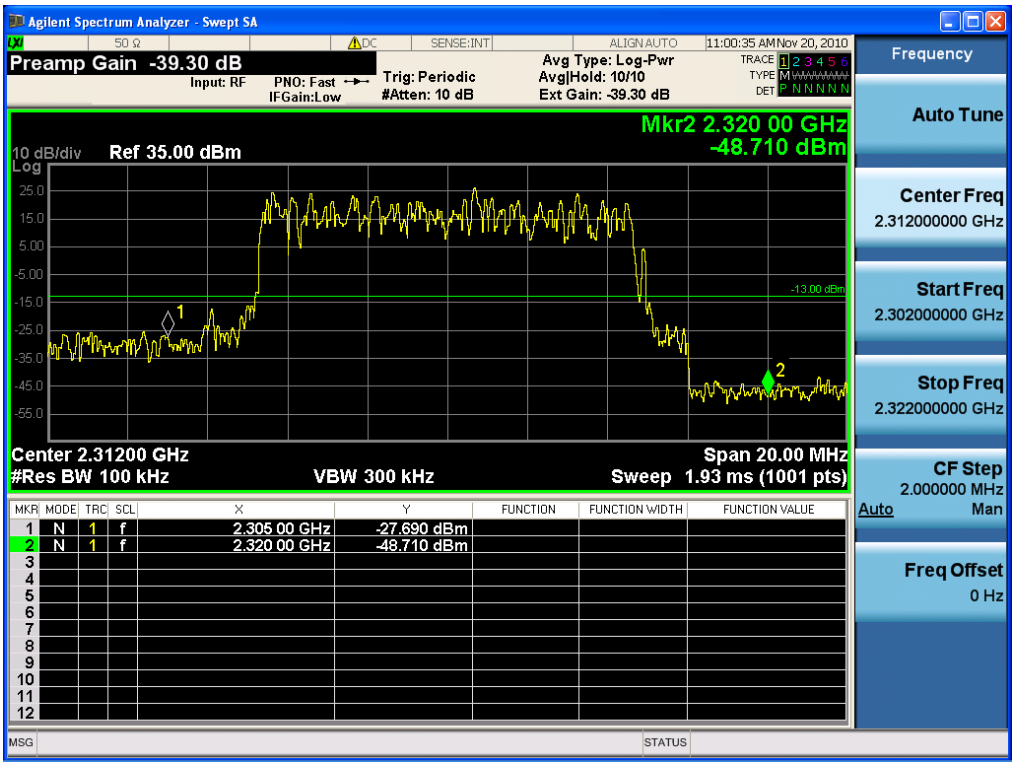
(16QAM Channel)



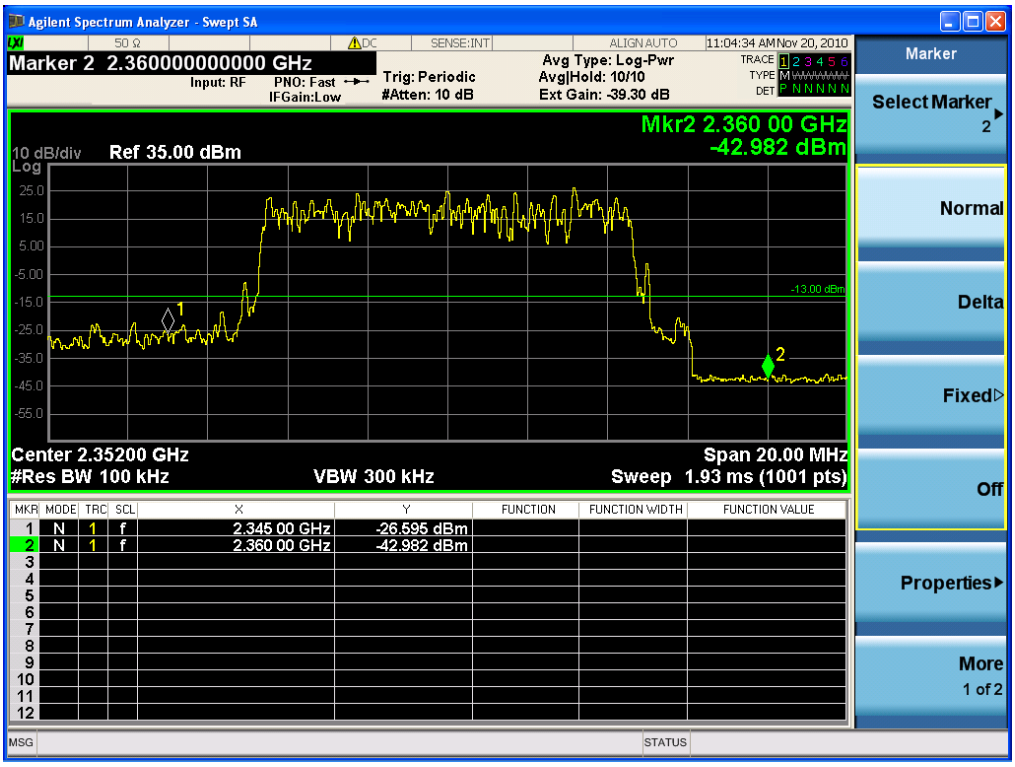
(16QAM Channel)



(64QAM Channel)



(64QAM Channel)



8. SPURIOUS EMISSION AT ANTENNA TERMINAL

8.1. 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

8.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	6674A / DC Power Supply	3501A00901	05/14/2011
Agilent	8498A / Attenuator	51161	01/06/2011
Agilent	8498A / Attenuator	51162	01/06/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	01/14/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	21207	01/06/2011
Agilent	N9020A / MXA Signal Analyzer	US46220219	03/03/2011
Agilent	11636B / Power Divider	11377	12/24/2010

8.3. 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.

8.3.1 Environmental Conditions:

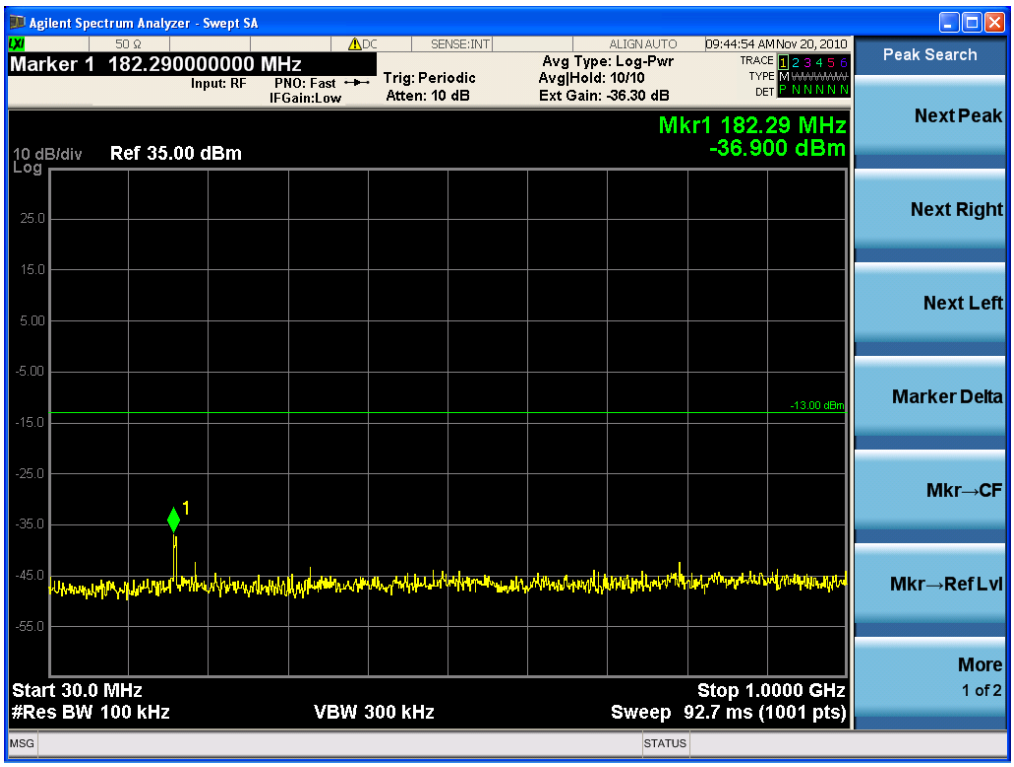
Temperature:	25 °C
Relative Humidity:	66 %

8.4. Test Result

: Pass

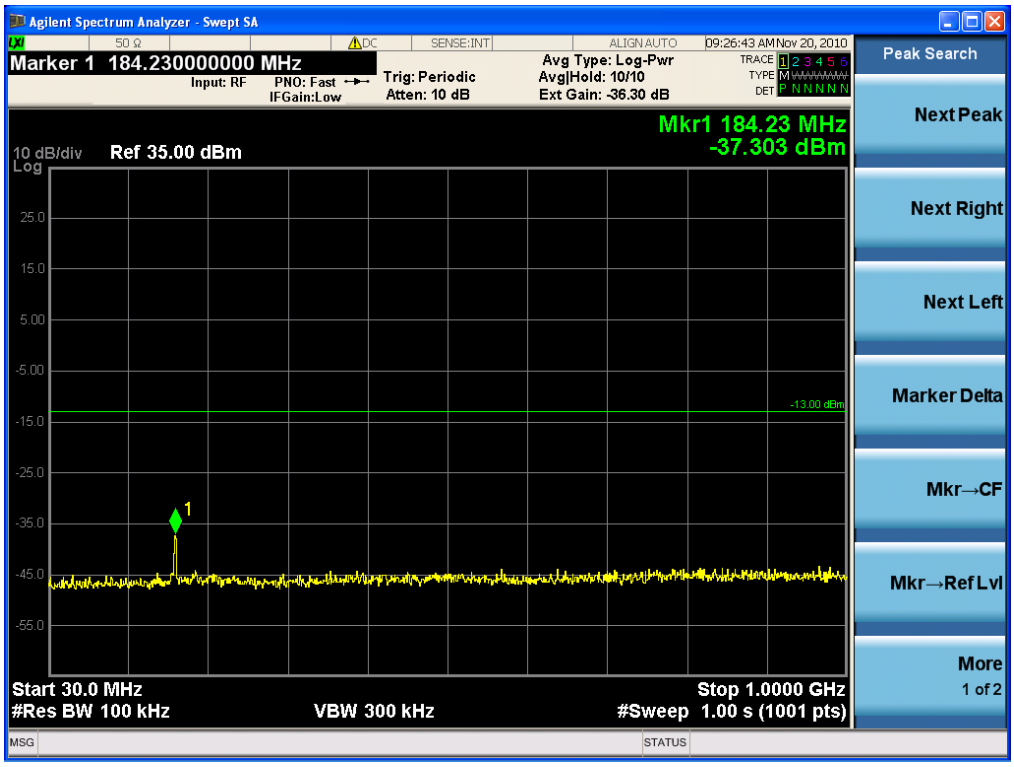
8.4.1. Plot Data at Output 0

(QPSK Channel)



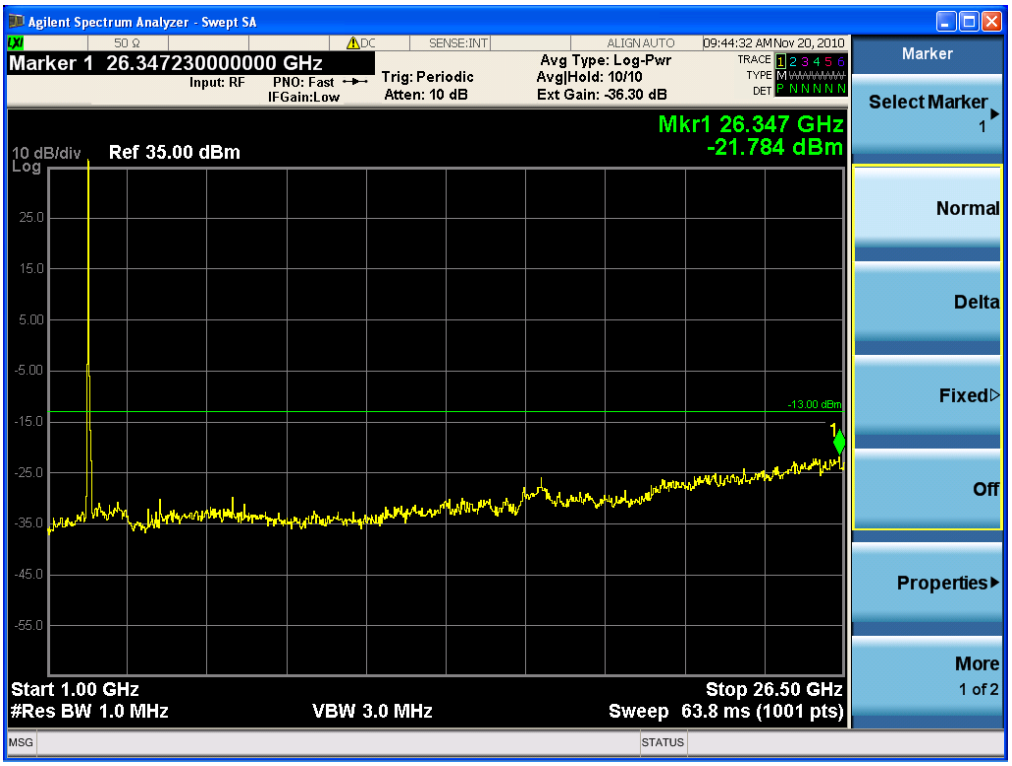
(30 MHz ~ 1 GHz)

(QPSK Channel)



(30 MHz ~ 1 GHz)

(QPSK Channel)

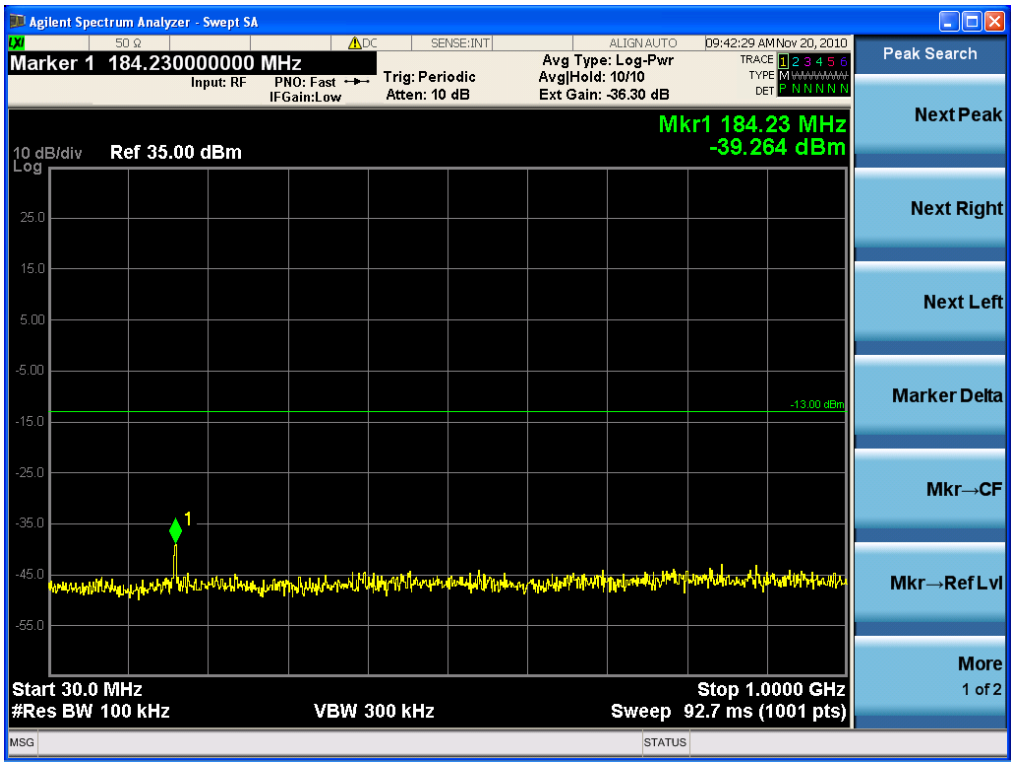


(1 GHz ~ 26.5 GHz)

(QPSK Channel)

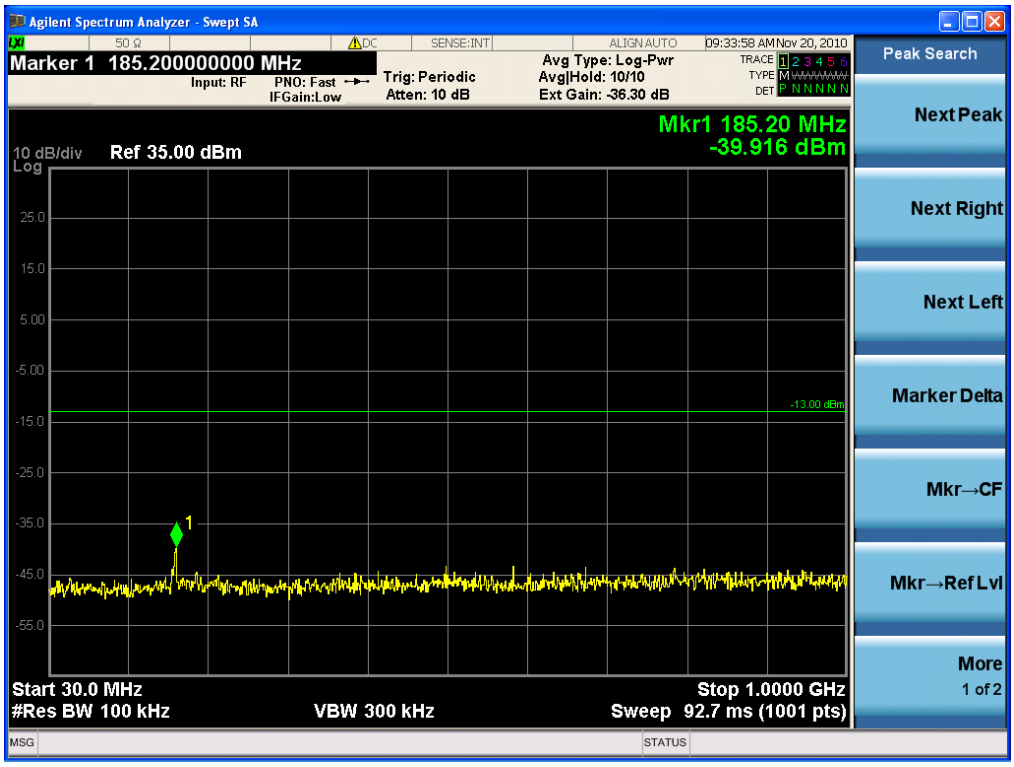
(1 GHz ~ 26.5 GHz)

(16QAM Channel)



(30 MHz ~ 1 GHz)

(16QAM Channel)



(30 MHz ~ 1 GHz)

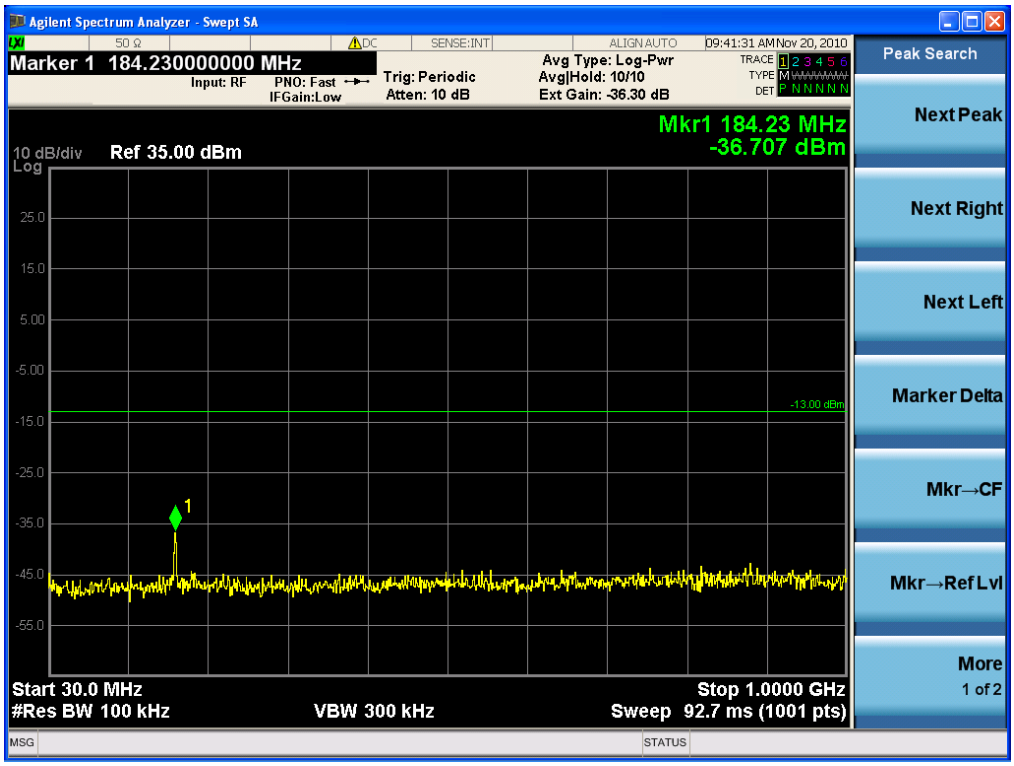
(16QAM Channel)

(1 GHz ~ 26.5 GHz)

(16QAM Channel)

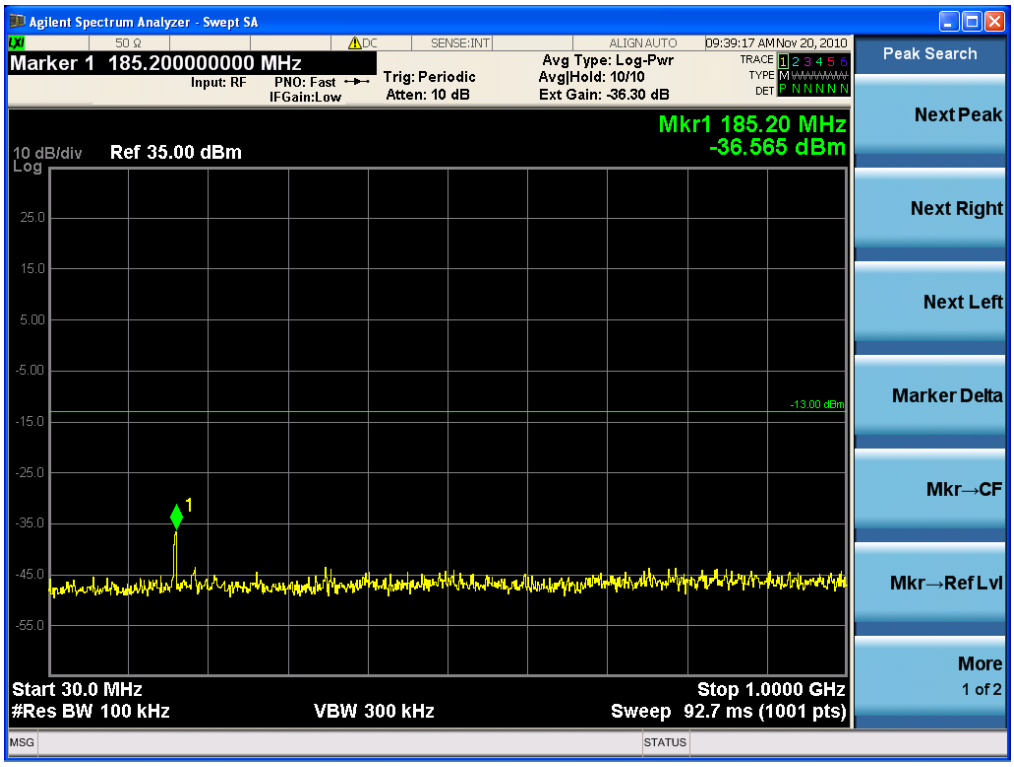
(1 GHz ~ 26.5 GHz)

(64QAM Channel)



(30 MHz ~ 1 GHz)

(64QAM Channel)

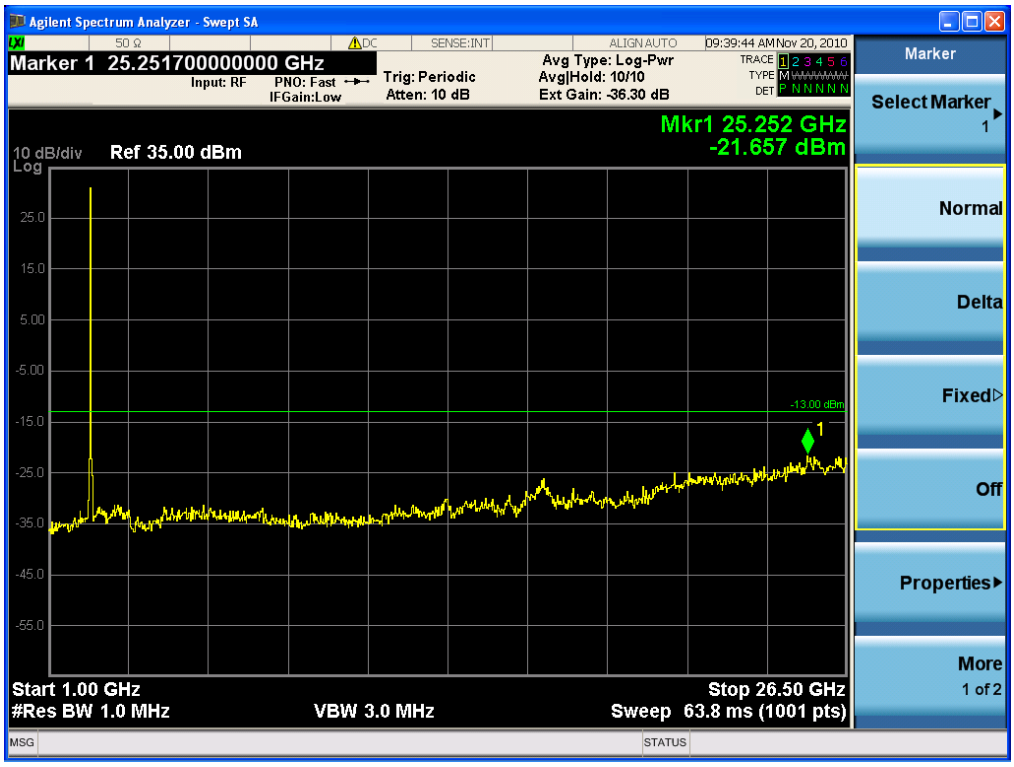


(30 MHz ~ 1 GHz)

(64QAM Channel)

(1 GHz ~ 26.5 GHz)

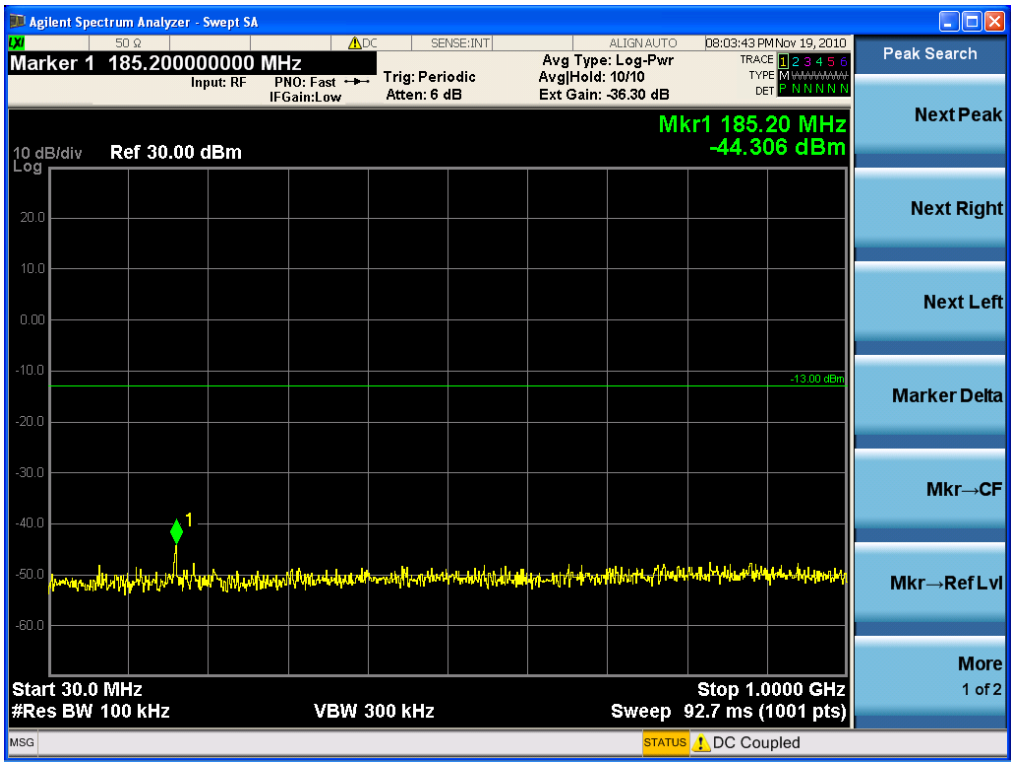
(64QAM Channel)



(1 GHz ~ 26.5 GHz)

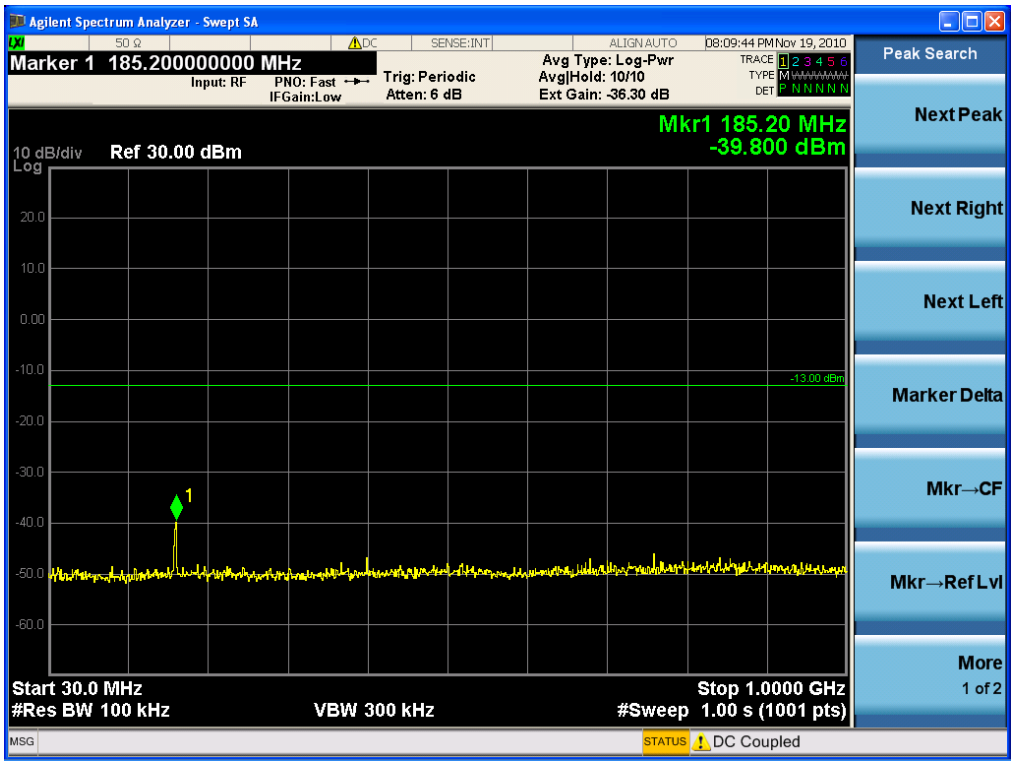
8.4.2. Plot Data at Output 1

(QPSK Channel)



(30 MHz ~ 1 GHz)

(QPSK Channel)



(30 MHz ~ 1 GHz)

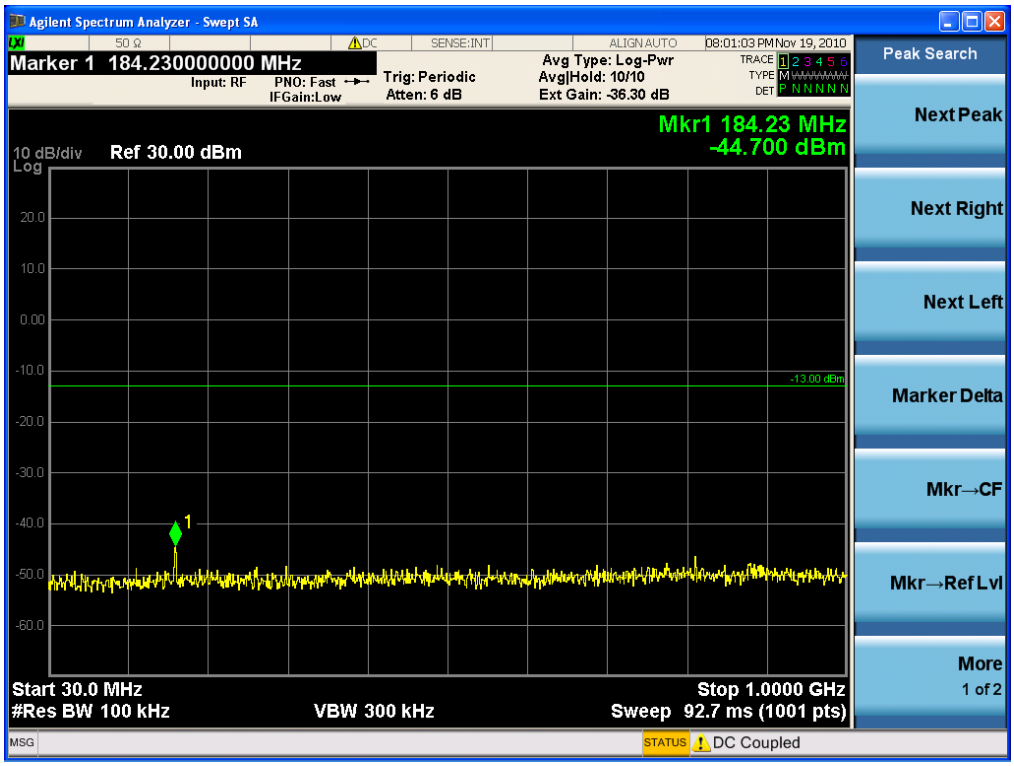
(QPSK Channel)

(1 GHz ~ 26.5 GHz)

(QPSK Channel)

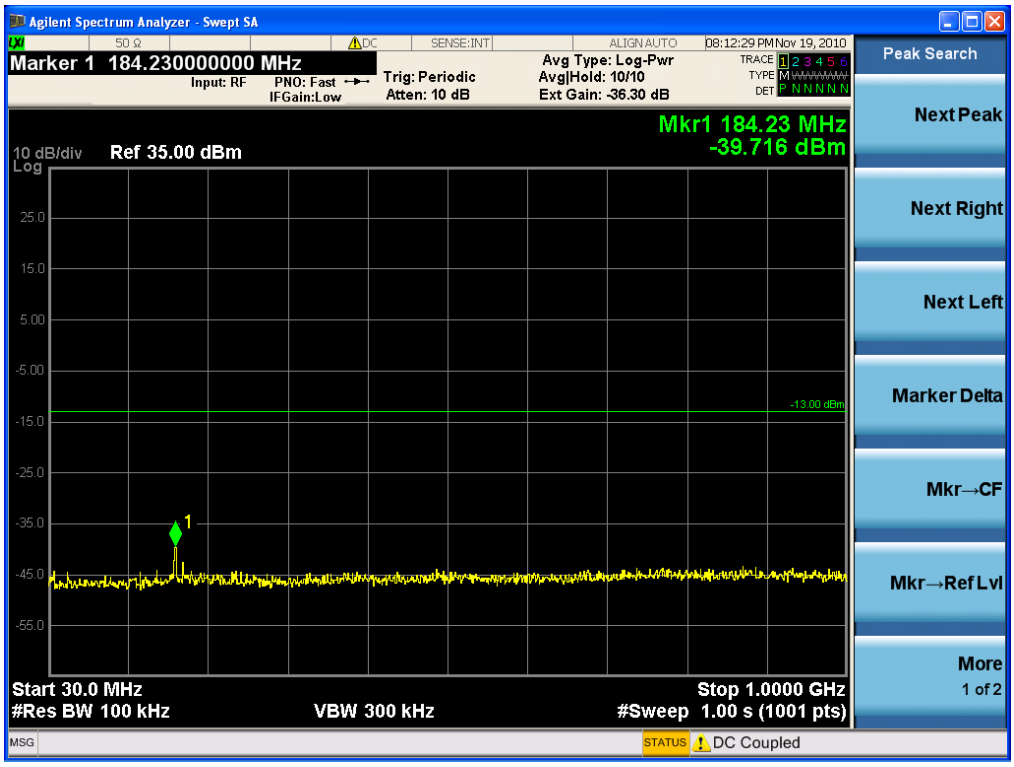
(1 GHz ~ 26.5 GHz)

(16QAM Channel)



(30 MHz ~ 1 GHz)

(16QAM Channel)



(30 MHz ~ 1 GHz)

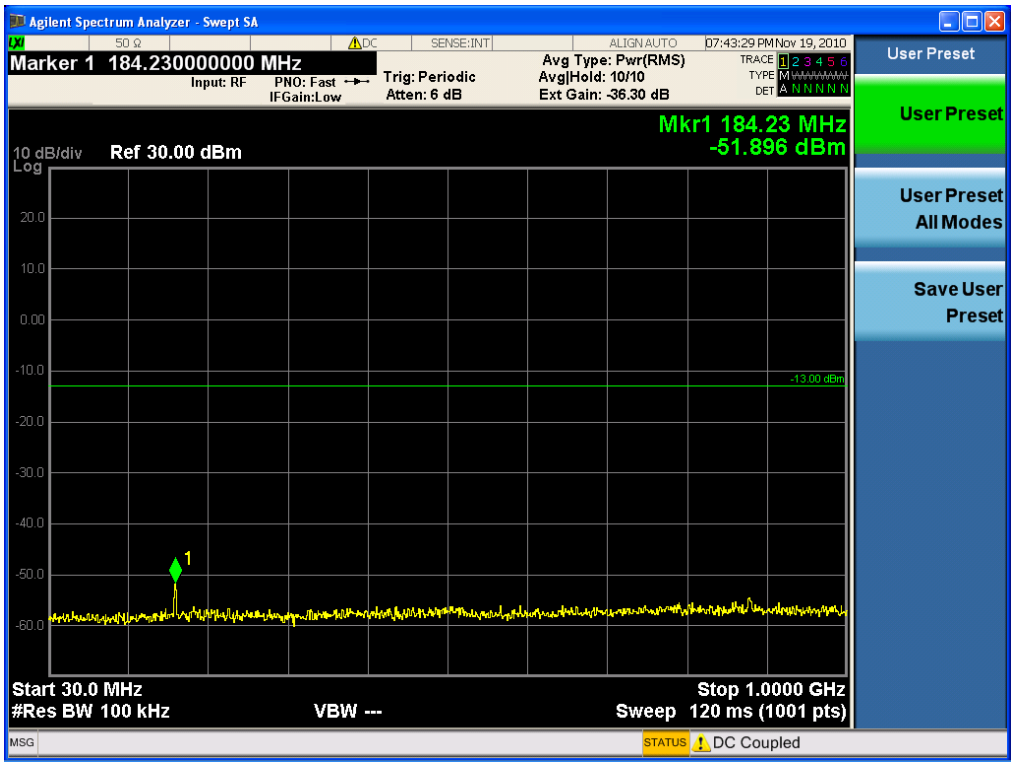
(16QAM Channel)

(1 GHz ~ 26.5 GHz)

(16QAM Channel)

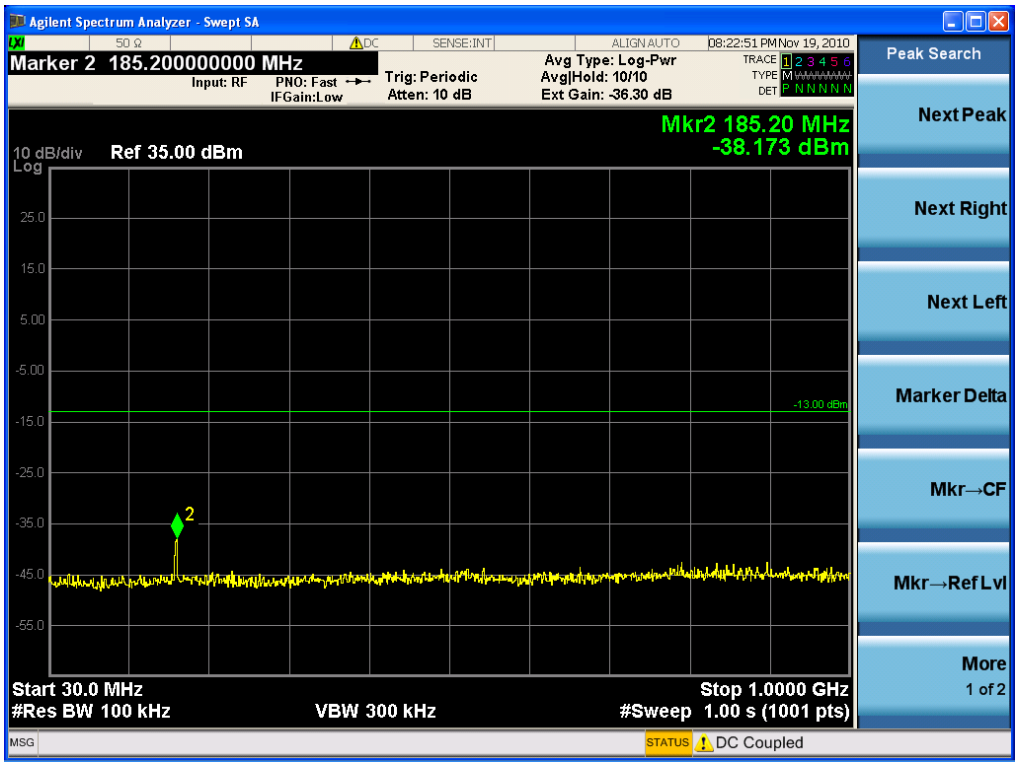
(1 GHz ~ 26.5 GHz)

(64QAM Channel)



(30 MHz ~ 1 GHz)

(64QAM Channel)



(30 MHz ~ 1 GHz)

(64QAM Channel)

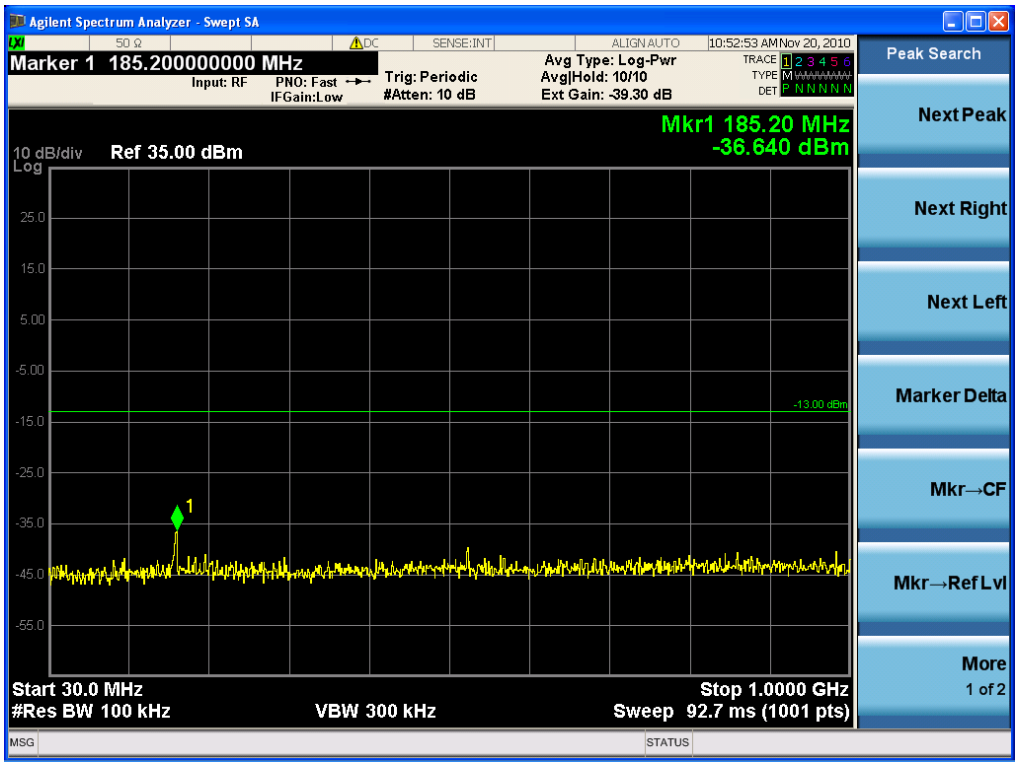
(1 GHz ~ 26.5 GHz)

(64QAM Channel)

(1 GHz ~ 26.5 GHz)

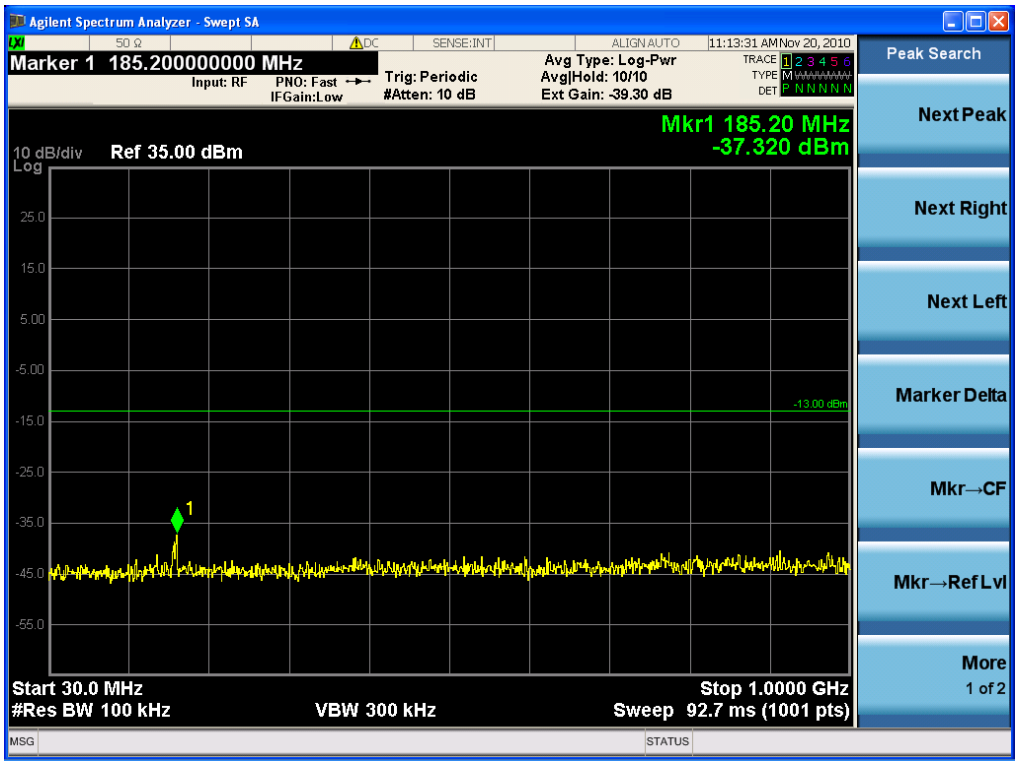
8.4.3. Combined Plot Data at Output

(QPSK Channel)



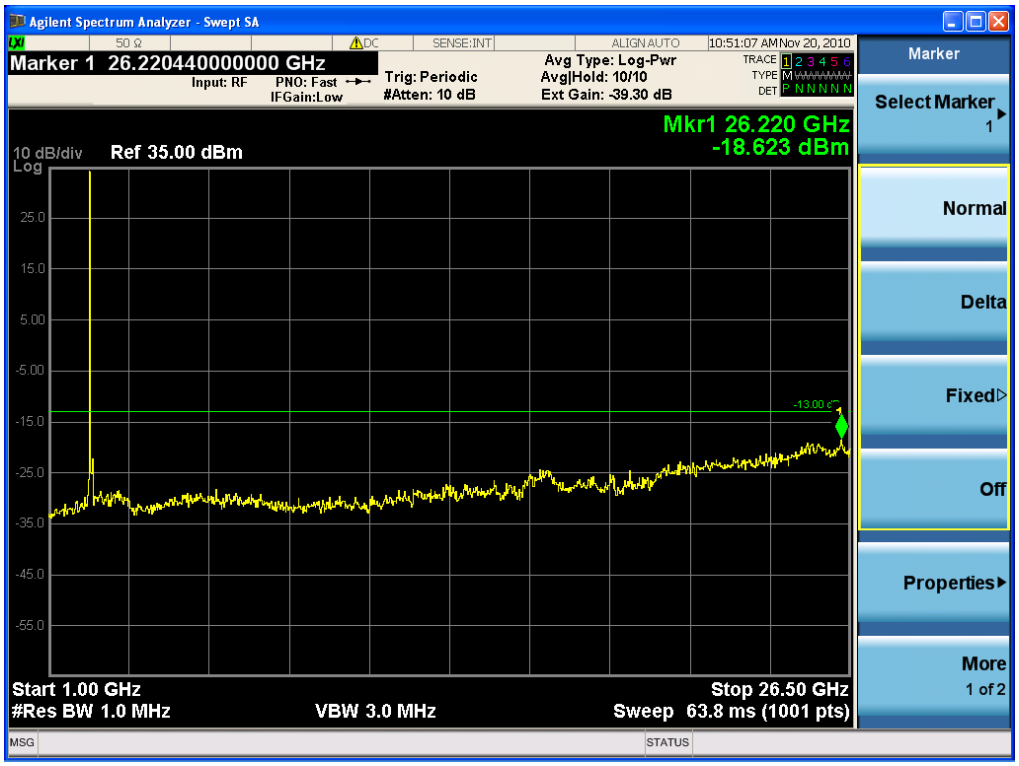
(30 MHz ~ 1 GHz)

(QPSK Channel)



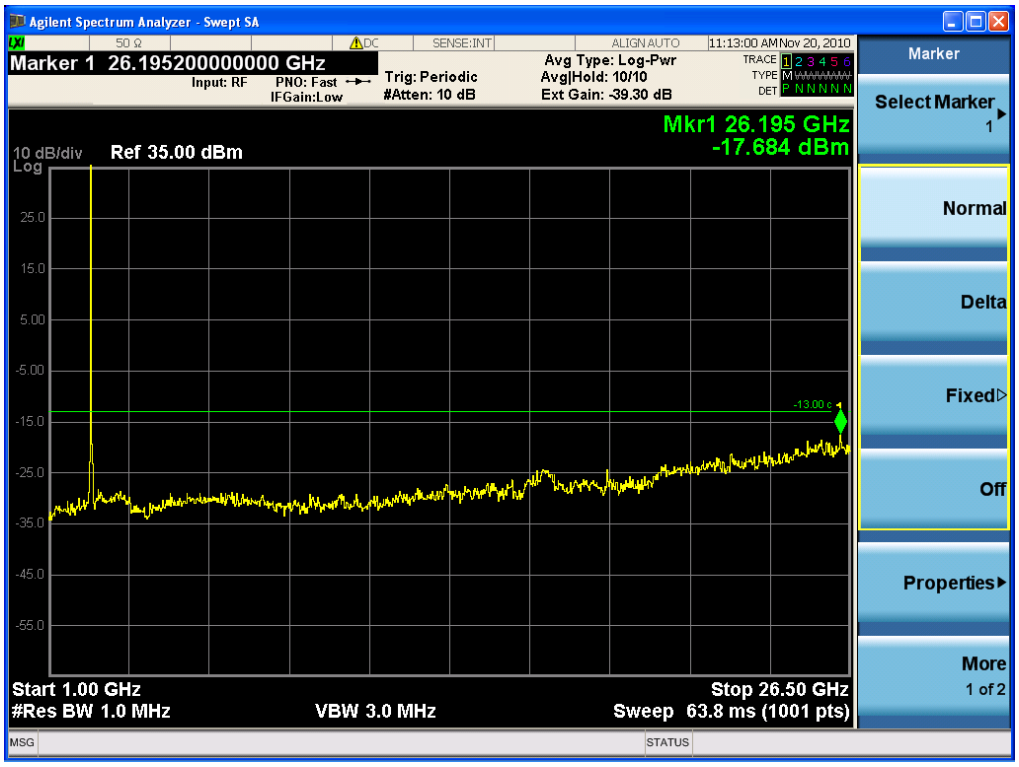
(30 MHz ~ 1 GHz)

(QPSK Channel)



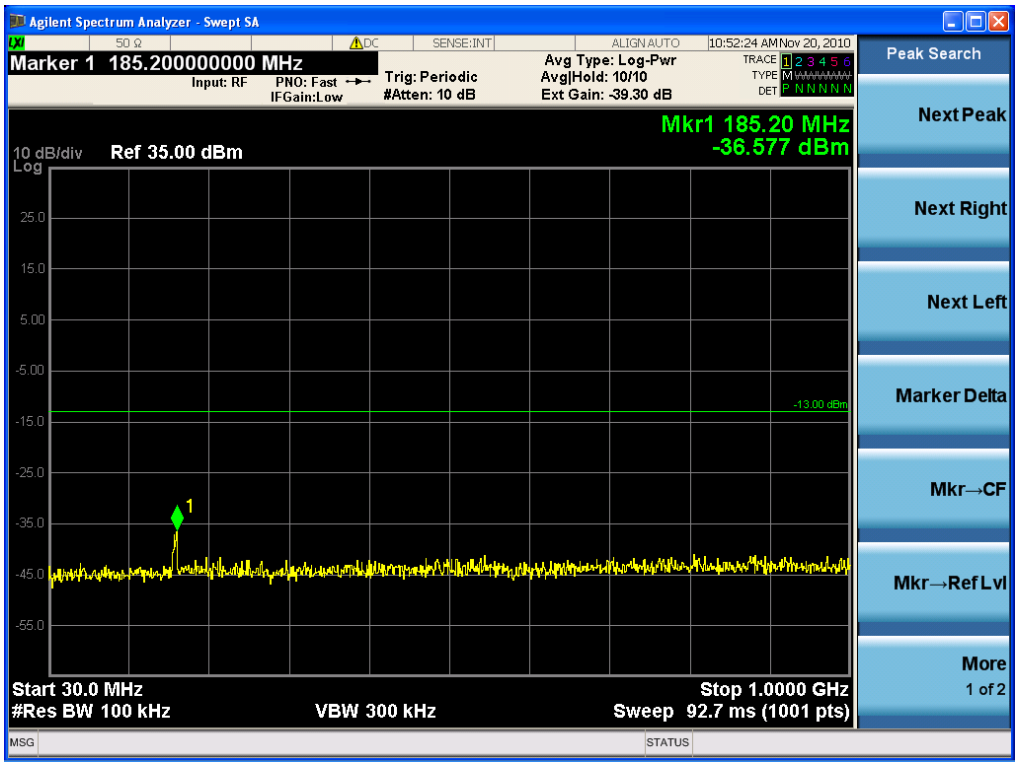
(1 GHz ~ 26.5 GHz)

(QPSK Channel)



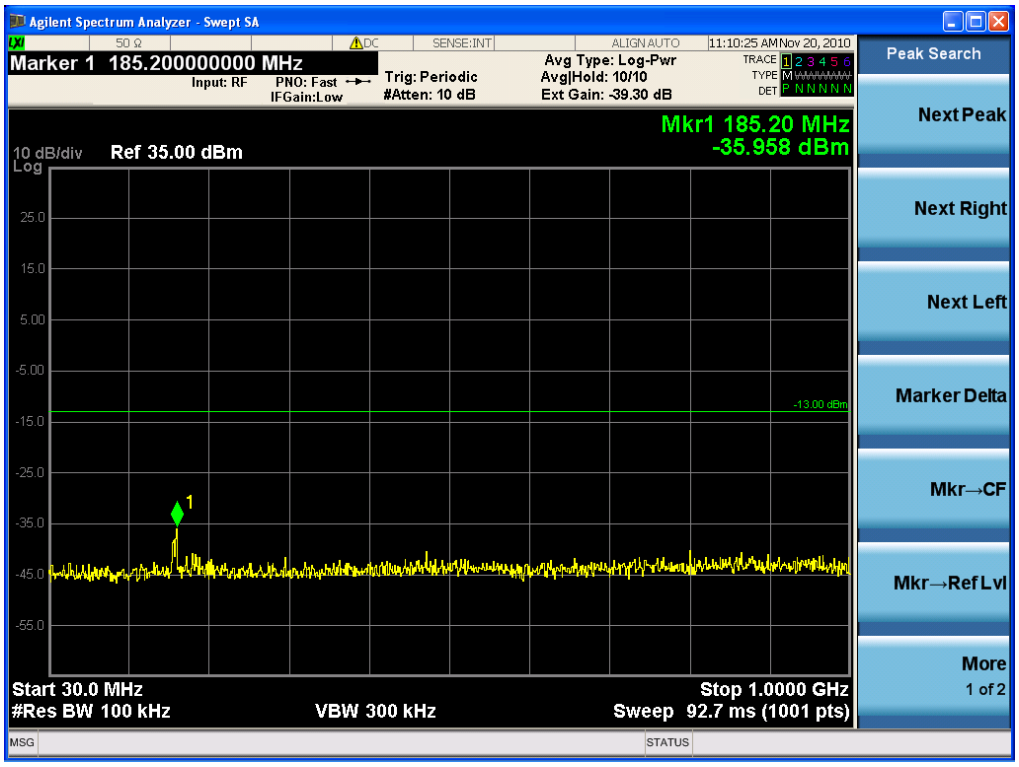
(1 GHz ~ 26.5 GHz)

(16QAM Channel)



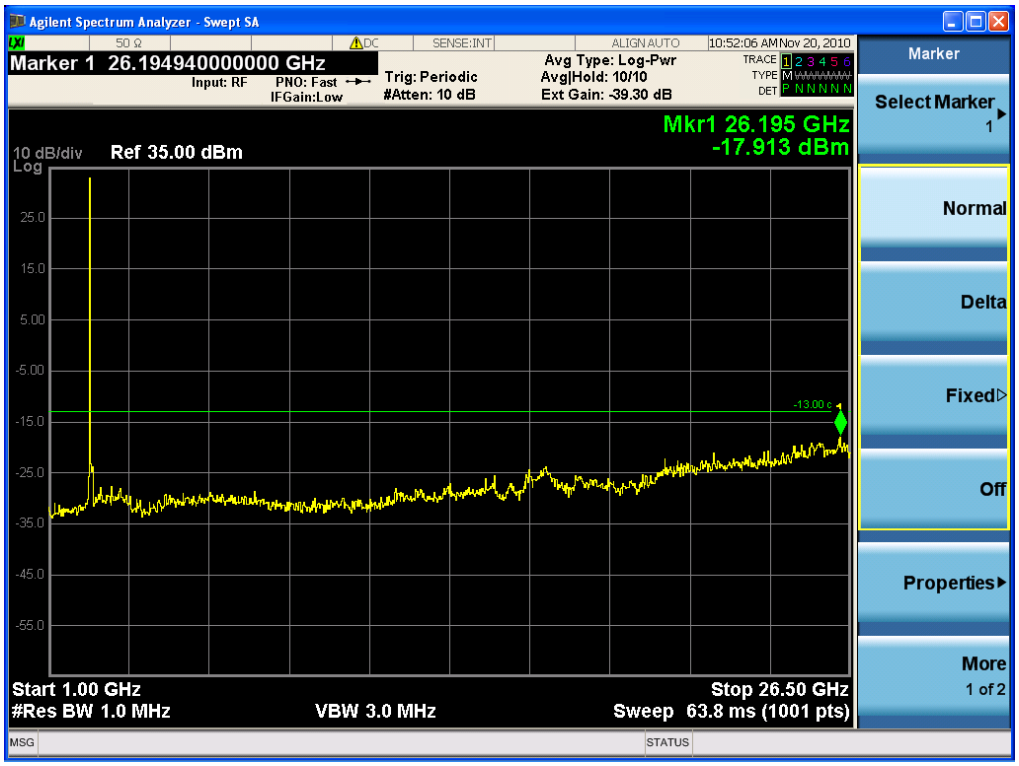
(30 MHz ~ 1 GHz)

(16QAM Channel)



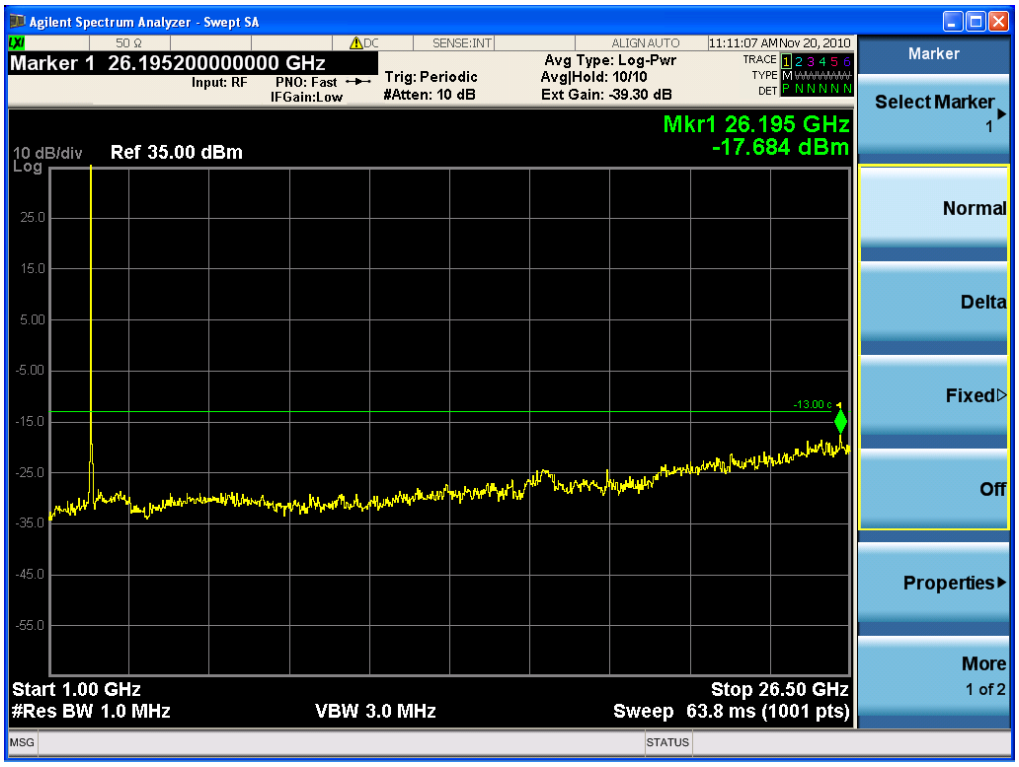
(30 MHz ~ 1 GHz)

(16QAM Channel)



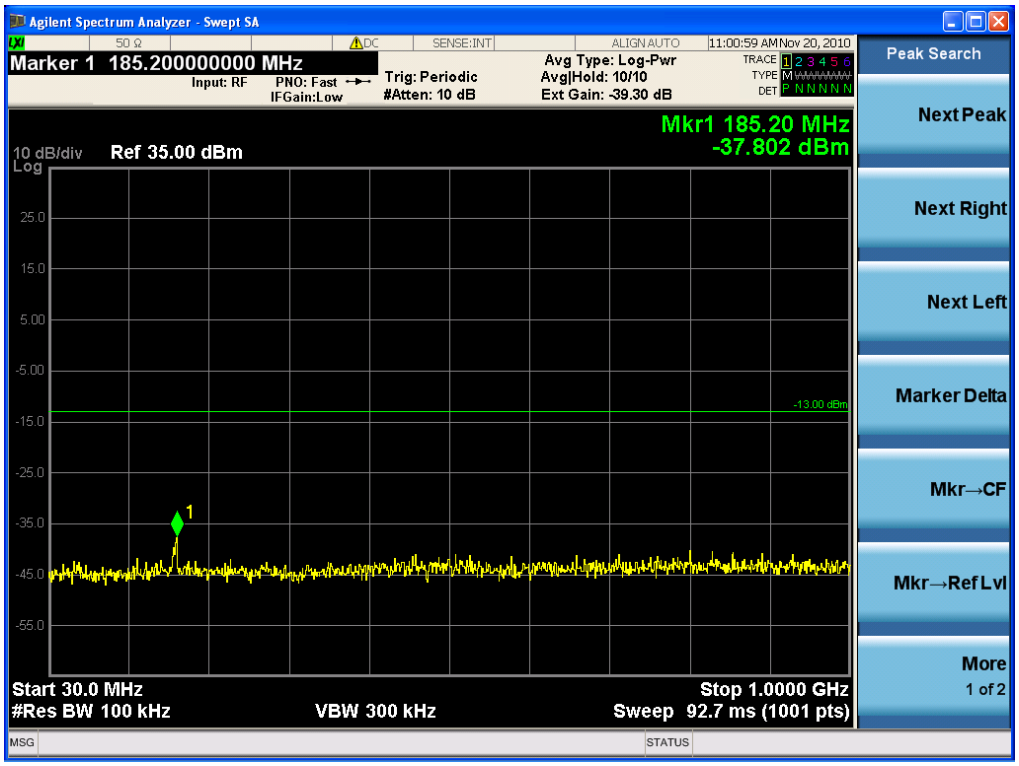
(1 GHz ~ 26.5 GHz)

(16QAM Channel)



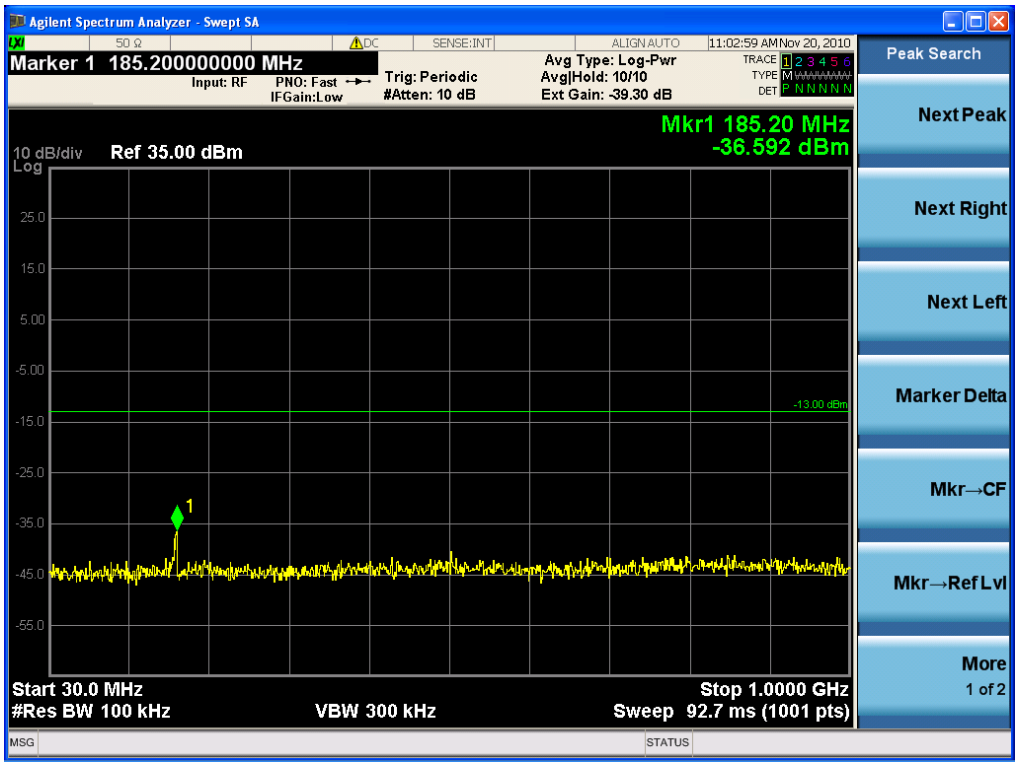
(1 GHz ~ 26.5 GHz)

(64QAM Channel)



(30 MHz ~ 1 GHz)

(64QAM Channel)



(30 MHz ~ 1 GHz)

(64QAM Channel)

(1 GHz ~ 26.5 GHz)

(64QAM Channel)

(1 GHz ~ 26.5 GHz)

9. RADIATED SPURIOUS EMISSION

9.1 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.

9.2 Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Schwarzbeck	BBHA 9120D /Double Ridged Horn Antenna	296	09/23/2011
Schwarzbeck	BBHA 9120D /Double Ridged Horn Antenna	147	04/13/2011
Schwarzbeck	VULB 9168/ TRILOG Antenna	9168-200	01/06/2011
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	AFS44-00102650-42-10P44-PS	1532439	04/05/2011
EMCO	6502/Loop Antenna	9009-2536	01/13/2012
R&S	ESI40 / EMI TEST Receiver	831564/003	10/30/2010
Agilent	11636B / Power Divider	11377	12/24/2010

9.3 Test Procedure

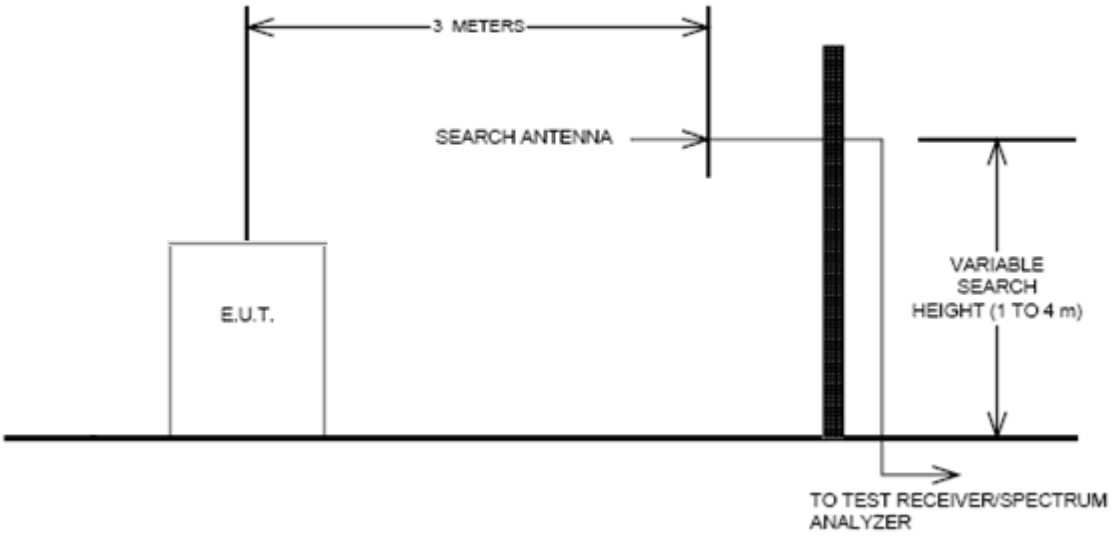
Radiated emission measurements were performed at an open Site.

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 360° 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.

9.3.1 Radiated Spurious Emissions Test Setup



9.3.2 Environmental Conditions:

Temperature:	26 °C
Relative Humidity:	60 %

9.4 Test Result

: PASS (There were no emissions detected above the noise floor which was at least 20 dB below the limit.)

9.4 Test Result

: PASS (There were no emissions detected above the noise floor which was at least 20 dB below the limit.)

Frequency	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBd)	C.L	Pol.	ERP (dBm)	Margin (dB)
2312.0	4624.0	-44.4	10.34	4.38	H	-38.44	-25.44
	6936.0	-43.8	10.69	5.04	H	-38.15	-25.15

10. FREQUECNY STABILITY

10.1 Applicable Standard

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

10.2 Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	8498A / Attenuator	51162	01/06/2011
WEINSCHEL	AF117A-69-43 / STEP ATTENUATOR	20623	01/14/2011
Agilent	N9020A / MXA Signal Analyzer	US46220219	03/03/2011

10.3 Test Procedure

Frequency Stability over Temperature variation:
The equipment under test was connected to an external AC 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 power supply Source. The voltage was set to 85% and 115% of the nominal value. The output frequency was recorded for each voltage.

10.3.1. Environmental conditions

Temperature:	24 ° C
Relative Humidity:	58 %

10.4. Test Result

: Pass

10.4.1. Frequency Stability over Temperature and Voltage variation

Modulation: QPSK

Reference: 220 Vac at 20°C **Freq.** = 2312,000,000 MHz

Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	2312 000 024	24	0	0.0000
	-30	2312 000 027	27	3	0.0013
	-20	2311 999 987	-13	-37	-0.0160
	-10	2312 000 022	22	-2	-0.0009
	0	2312 000 018	18	-6	-0.0026
	+10	2312 000 019	19	-5	-0.0022
	+30	2312 000 028	28	4	0.0017
	+40	2312 000 013	13	-11	-0.0048
	+50	2311 999 984	-16	-40	-0.0173
115%	+20	2311 999 981	-19	-43	-0.0186
85%	+20	2311 999 971	-29	-53	-0.0229

Modulation: 16QAM

Reference: 220 Vac at 20°C **Freq.** = 2312,000,000 MHz

Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	2312 000 016	16	0	0.0000
	-30	2312 000 022	22	6	0.0026
	-20	2312 000 018	18	2	0.0009
	-10	2312 000 019	19	3	0.0013
	0	2312 000 026	26	10	0.0043
	+10	2311 999 982	-18	-34	-0.0147
	+30	2311 999 978	-22	-38	-0.0164
	+40	2312 000 015	15	-1	-0.0004
	+50	2312 000 012	12	-4	-0.0017
115%	+20	2311 999 990	-10	-26	-0.0112
85%	+20	2312 000 029	29	13	0.0056

Modulation: 64QAM

Reference: 220 Vac at 20°c **Freq.** = 2312,000,000 MHz

Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	2312 000 028	28	0	0.0000
	-30	2312 000 017	17	-11	-0.0048
	-20	2312 000 022	22	-6	-0.0026
	-10	2312 000 034	34	6	0.0026
	0	2312 000 029	29	1	0.0004
	+10	2312 000 028	28	0	0.0000
	+30	2312 000 010	10	-18	-0.0078
	+40	2311 999 974	-26	-54	-0.0234
	+50	2312 000 018	18	-10	-0.0043
115%	+20	2312 000 024	24	-4	-0.0017
85%	+20	2312 000 022	22	-6	-0.0026

11. RF EXPOSURE STATEMENT

1. LIMITS

According to §1.1310 and §2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
0.3 - 1.34.....	614	1.63	*(100)	30
1.34 - 30.....	824/f	2.19/f	*(180/ f^2)	30
30 - 300.....	27.5	0.073	0.2	30
300 - 1500.....	.....	.....	f/1500	30
1500 - 100.000.....	.....	.....	1.0	30

F = frequency in MHz

* = Plane-wave equivalent power density

2. MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Max Peak output Power at antenna input terminal	34.91000	dBm
Max Peak output Power at antenna input terminal	3097.41930	mW
Prediction distance	50.00000	cm
Prediction frequency	2312.00000	MHz
Antenna Gain(typical)	8.00000	dBi
Antenna Gain(numeric)	6.30957	-
Power density at prediction frequency (S)	0.62209	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.00000	mW/cm^2

3. RESULTS

The power density level at 50 cm is 0.62209 mW/cm², which is below the uncontrolled exposure limit of 1.0 mW/cm² at 2312 MHz.