HCT CO., LTD.

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CERTIFICATE OF COMPLIANCE

FCC PART 24 Certification

Applicant Name:

SAMSUNG Electronics Co., Ltd.
416, Maetan-3dong, Yeongtong-gu, Suwon-si,
Gyeonggi-do, Korea

Date of Issue: August 17, 2011
Test Site/Location:
HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon,
Icheon-si, Kyunggi-Do, Korea
Test Report No.: HCTR1108FR15

FCC ID	:	**A3LSMM-2LD0581902**
APPLICANT	:	**SAMSUNG Electronics Co., Ltd.**

EUT Type	: Remote Radio Head
Manufacturer	: SAMSUNG Electronics Co., Ltd
Model name	: SMM-2LD0581900
Frequency of Operation	: 1 930 MHz ~ 1 995 MHz
TX Output Power	: 160W
FCC Rule Part(s)	: FCC Part 24 Subpart E
Emission Designator	: 1M40G7D(BPSK/QPSK), 1M39W7D(16QAM), 2M64G7D(BPSK/QPSK), 2M64W7D(16QAM),
Test Procedure(s)	: ANSI/TIA-603C-2004
Application Type	: Original Equipment
Data of issue	: August 17, 2011

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 24 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

Revision

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1108FR15	August 17, 2011	First Approval Report

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1. GENERAL INFORMATION

1.1. CLIENT INFORMATION

Company	**Samsung Electronics Co., Ltd.**
Contact Point	**416, Maetan-3dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea**
Contact person	**Name: JUNG-HO BAE / Senior Research Engineer** **E-mail :** banco@samsung.com **Tel: +82-31-279-3544** **Fax: +82-31-279-7576**

1.2. PRODUCT INFORMATION

EUT TYPE	Remote Radio Head
EMISSION DESIGNATOR	1M40G7D (BPSK, QPSK), 1M39W7D(16QAM)
OPERATING FREQUENCY	1 930 MHz ~ 1 995 MHz
TX OUTPUT POWER	160W
CHANNEL BANDWIDTH	1.25 MHz
MODULATION TYPE	BPSK, QPSK, 16QAM
MAXIMUM NUMBER OF CARRIERS/SECTORS	8Carrier 3Sector(2Br) or 6Carrier 3Sector(4Br) or mix
SYSTEM INPUT VOLTAGE	DC - 48 V

1.3. INTRODUCTION OF EUT

"Smart MBS System" is multi-mode base station that will satisfy such needs of mobile telecommunication market by integrating Voice(1X), Data(EVDO), LTE(4G) into a single base station equipment.
Smart MBS System mounts common DU(Digital Unit) Platform, and RRH (per each frequency bandwidth) that operator can decide to configure it with either single or multiple mobile technology. Smart MBS System provides CDMA(w/ FDD), LTE(w/FDD), and TD-LTE(w/TDD).

Smart MBS System supports the following telecommunication technologies.

- CDMA2000 1X/1X Advanced
  Having CDMA2000 1X as a reference, integrate the system (w/ EVRC-B, RLIC, QOF, New RC algorithm) and the terminal(w/ (e)QLIC, MRD, New RC algorithm) to support 1X Advanced. As a result, voice capacity enhancement will be provided.

- CDMA2000 1xEV-DO Rev.A/Rev.B
  Smart MBS supports CDMA2000 1xEV-DO Rev.A/Rev.B service and data service of CDMA network.

- LTE (Long Term Evolution)
  Samsung LTE System is a wireless network system that supports 3GPP LTE(Long Term Evolution)(a.k.a. LTE). It improves the existing 3GPP mobile telecommunication system(low data throughput, but high in cost) to a next generation wireless network system which provides a high speed data service with minimal cost. Samsung LTE System supports "Downlink OFDMA"(Orthogonal Frequency Division Multiple Access) with either FDD(Frequency Division Duplex) or TDD(Time Division Duplex), "Uplink SC(Single Carrier) FDMA", and "Scalable Bandwidth(for various spectrum allocation)" to provide high speed data service. Also, high-end hardware is implemented to improve system performance and capacity that various high speed data feature/service can be provided.

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 24 Subpart E

SECTION	TEST ITEMS	RESULTS
2.1046, 24.232	Conducted Output Power	Compliant
2.1049	Occupied Bandwidth	Compliant
2.1051, 2.1057, 24.238	Spurious Emissions at Antenna Terminals	Compliant
2.1055, 24.235	Frequency Stability over Temperature variation	Compliant
2.1055, 24.235	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 (BPSK, QPSK, and 16QAM) modes were tested.
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	04/13/2012
Schwarzbeck	VULB 9168 / TRILOG Antenna	9168-200	02/19/2013
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-6D-001180-35-20P/AMP	990893	05/02/2012
EMCO	6502/Loop Antenna	9009-2536	01/13/2012
Agilent	N9020A /Signal Analyzer	MY51110020	04/16/2012
Agilent	6674A / DC Power Supply	3501A00901	05/02/2012
WEINSCHEL	67-30-33 / Attenuator	BU5347	12/29/2011
WEINSCHEL	67-30-33 / Attenuator	BR0530	12/29/2011
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/12/2011
WEINSCHEL	AF9003-69-31 / Attenuator	639	11/12/2011

5. CONDUCTED OUTPUT POWER

5.1. Applicable Standard

According to FCC §2.1046 & 24.232

(2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.

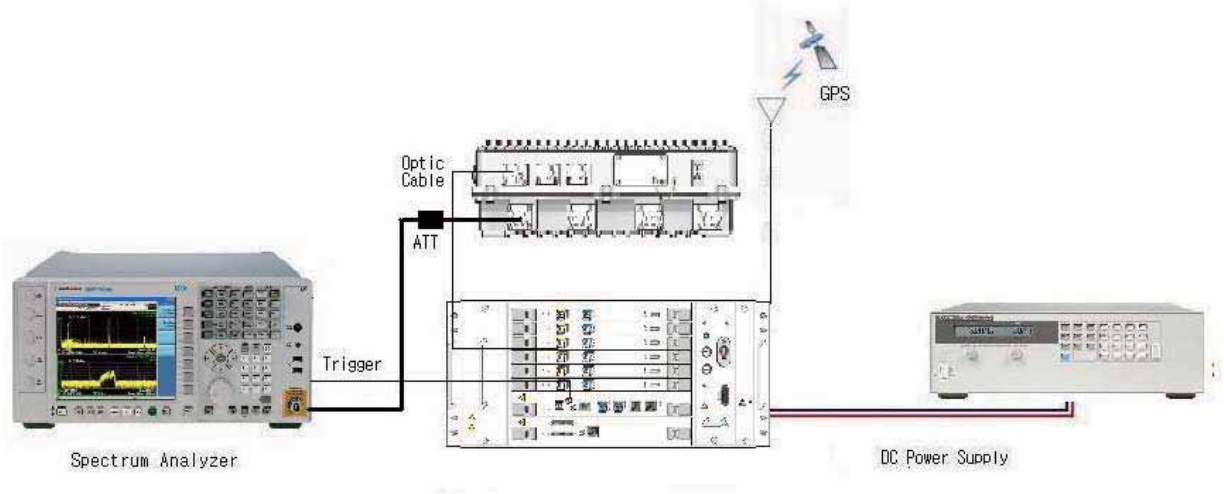
5.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	MY51110020	04/16/2012
WEINSCHEL	67-30-33 / Attenuator	BU5347	12/29/2011
WEINSCHEL	67-30-33 / Attenuator	BR0530	12/29/2011
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/12/2011
WEINSCHEL	AF9003-69-31 / Attenuator	639	11/12/2011
Agilent	6674A / DC Power Supply	3501A00901	05/02/2012

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 Average mode.
3) The resolution banswidth of the spectrum analyzer was comparable to the emission bandwidth.
4) The conducted emission level is meaured at each antenna port and then summed mathmatically to determine the total emission level from the device.
   (160 W = 4 x 40 W / Port)



5.4. Test Result

: PASS (Power boost mode was tested on.)

[1 Tx Mode – 1 Carrier / 1 Port]

5.4.1. Test Data at Output Port 0

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
BPSK	Low	1931.25	43.01	19.9986
	Middle	1962.50	43.13	20.5589
	High	1993.75	43.03	20.0909
QPSK	Low	1931.25	43.28	21.2814
	Middle	1962.50	42.96	19.7697
	High	1993.75	43.28	21.2814
16QAM	Low	1931.25	43.12	20.5116
	Middle	1962.50	43.07	20.2768
	High	1993.75	43.19	20.8449

5.4.2. Test Data at Output Port 1

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
BPSK	Low	1931.25	43.19	20.8449
	Middle	1962.50	42.95	19.7242
	High	1993.75	42.81	19.0985
QPSK	Low	1931.25	43.16	20.7014
	Middle	1962.50	42.94	19.6789
	High	1993.75	42.70	18.6209
16QAM	Low	1931.25	43.62	23.0144
	Middle	1962.50	43.33	21.5278
	High	1993.75	43.29	21.3305

5.4.3. Test Data at Output Port 2

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
BPSK	Low	1931.25	42.75	18.8365
	Middle	1962.50	43.12	20.5116
	High	1993.75	43.11	20.4645
QPSK	Low	1931.25	43.10	20.4174
	Middle	1962.50	43.08	20.3236
	High	1993.75	43.17	20.7491
16QAM	Low	1931.25	43.23	21.0378
	Middle	1962.50	43.21	20.9411
	High	1993.75	43.20	20.8930

5.4.4. Test Data at Output Port 3

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
BPSK	Low	1931.25	43.01	19.9986
	Middle	1962.50	43.07	20.2768
	High	1993.75	43.27	21.2325
QPSK	Low	1931.25	43.01	19.9986
	Middle	1962.50	43.08	20.3236
	High	1993.75	43.04	20.1372
16QAM	Low	1931.25	43.10	20.4174
	Middle	1962.50	43.09	20.3704
	High	1993.75	43.26	21.1836

[1 Tx Mode – 2 Carriers / 1 Port]

5.4.5. Test Data at Output Port 0

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
BPSK	Low	1931.875	45.69	37.0681
	Middle	1961.875	45.58	36.1409
	High	1993.125	45.59	36.2243
QPSK	Low	1931.875	45.80	38.0189
	Middle	1961.875	45.56	35.9749
	High	1993.125	45.90	38.9045
16QAM	Low	1931.875	45.73	37.4111
	Middle	1961.875	45.57	36.0579
	High	1993.125	45.91	38.9942

5.4.6. Test Data at Output Port 1

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
BPSK	Low	1931.875	45.98	39.6278
	Middle	1961.875	45.72	37.3250
	High	1993.125	45.72	37.3250
QPSK	Low	1931.875	46.14	41.1150
	Middle	1961.875	45.62	36.4754
	High	1993.125	45.90	38.9045
16QAM	Low	1931.875	46.02	39.9945
	Middle	1961.875	45.72	37.3250
	High	1993.125	45.77	37.7572

5.4.7. Test Data at Output Port 2

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
BPSK	Low	1931.875	45.69	37.0681
	Middle	1961.875	45.66	36.8129
	High	1993.125	45.87	38.6367
QPSK	Low	1931.875	45.66	36.8129
	Middle	1961.875	45.73	37.4111
	High	1993.125	45.92	39.0841
16QAM	Low	1931.875	45.76	37.6704
	Middle	1961.875	45.73	37.4111
	High	1993.125	45.96	39.4457

5.4.8. Test Data at Output Port 3

Modulation	Channel	Frequency	Measured Output Power	
			dBm	W
BPSK	Low	1931.875	45.57	36.0579
	Middle	1961.875	45.91	38.9942
	High	1993.125	46.04	40.1791
QPSK	Low	1931.875	45.79	37.9315
	Middle	1961.875	45.79	37.9315
	High	1993.125	45.96	39.4457
16QAM	Low	1931.875	45.86	38.5478
	Middle	1961.875	45.75	37.5837
	High	1993.125	45.93	39.1742

5.4.9. Measure and sum data

Modulation	Channel	Frequency	Measured Output Power
BPSK	Low	1931.25	76.6959
	Middle	1962.50	73.4659
	High	1993.75	73.5493
QPSK	Low	1931.25	79.1339
	Middle	1962.50	72.4503
	High	1993.75	77.809
16QAM	Low	1931.25	77.4056
	Middle	1962.50	73.3829
	High	1993.75	76.7514

(2 Ports)

Modulation	Channel	Frequency	Measured Output Power
BPSK	Low	1931.25	113.7640
	Middle	1962.50	110.2788
	High	1993.75	112.1860
QPSK	Low	1931.25	115.9468
	Middle	1962.50	109.8614
	High	1993.75	116.8931
16QAM	Low	1931.25	115.0760
	Middle	1962.50	110.7940
	High	1993.75	116.1971

(3 Ports)

Modulation	Channel	Frequency	Measured Output Power
BPSK	Low	1931.25	149.8219
	Middle	1962.50	149.2730
	High	1993.75	152.3651
QPSK	Low	1931.25	153.8783
	Middle	1962.50	147.7929
	High	1993.75	156.3388
16QAM	Low	1931.25	153.6238
	Middle	1962.50	148.3777
	High	1993.75	155.3713

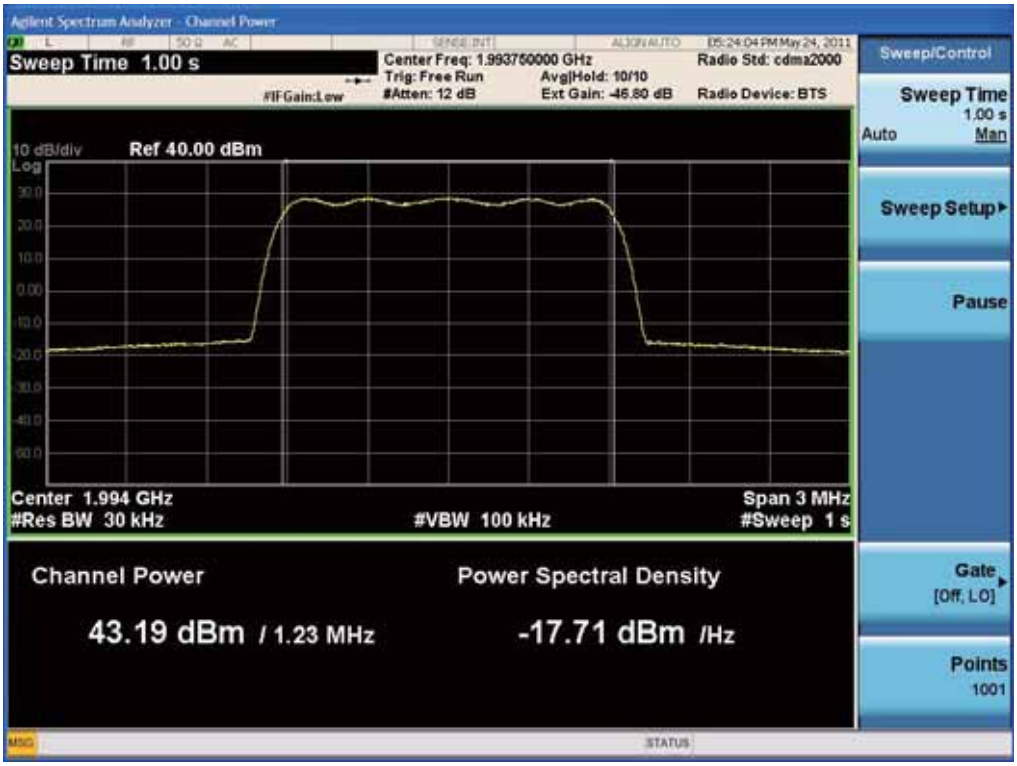
(4 Ports)

5.5.1. Plot Data for 1 Tx mode – 1 Carrier , Output Port 0

(16QAM Low Channel)

(16QAM Middle Channel)

(16QAM High Channel)

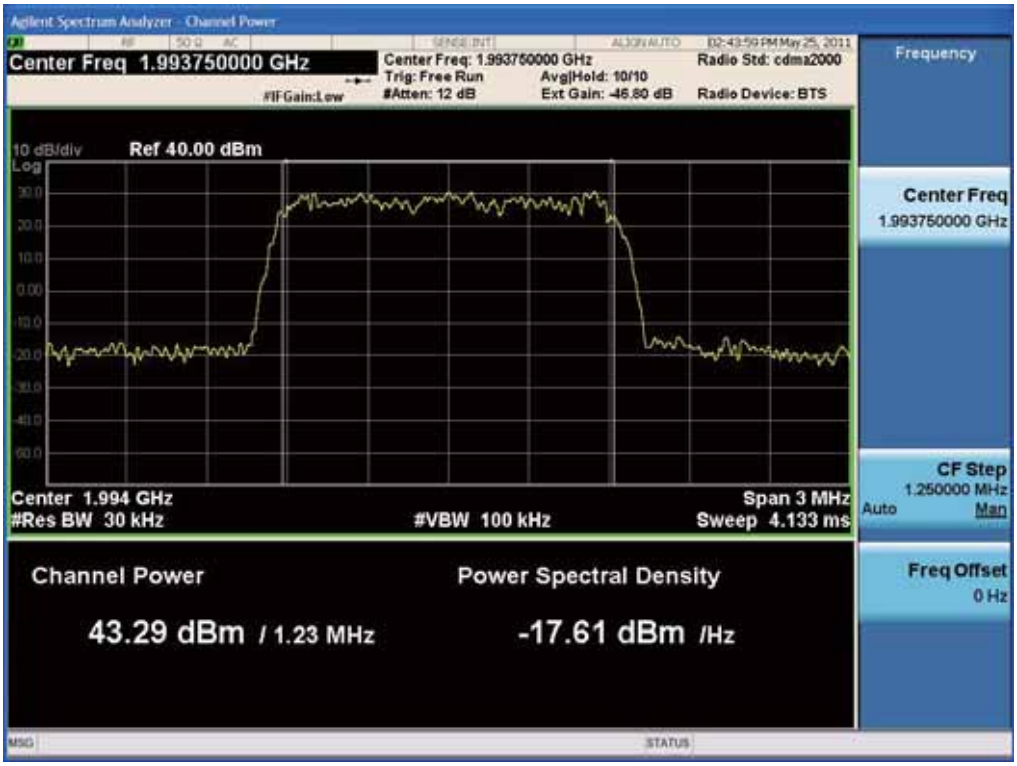


5.5.2. Plot Data for 1 Tx mode – 1 Carrier , Output Port 1

(16QAM Low Channel)

(16QAM Middle Channel)

(16QAM High Channel)



5.5.3. Plot Data for 1 Tx mode – 1 Carrier , Output Port 2

(16QAM Low Channel)

(16QAM Middle Channel)

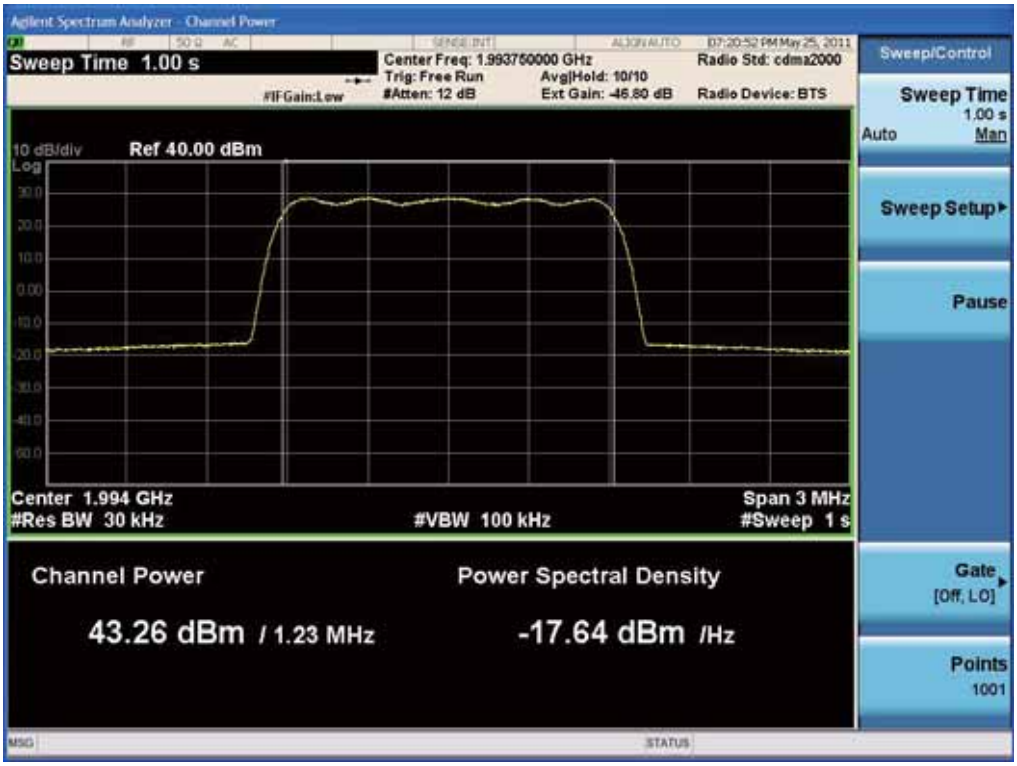
(16QAM High Channel)

5.5.4. Plot Data for 1 Tx mode – 1 Carrier , Output Port 3

(16QAM Low Channel)

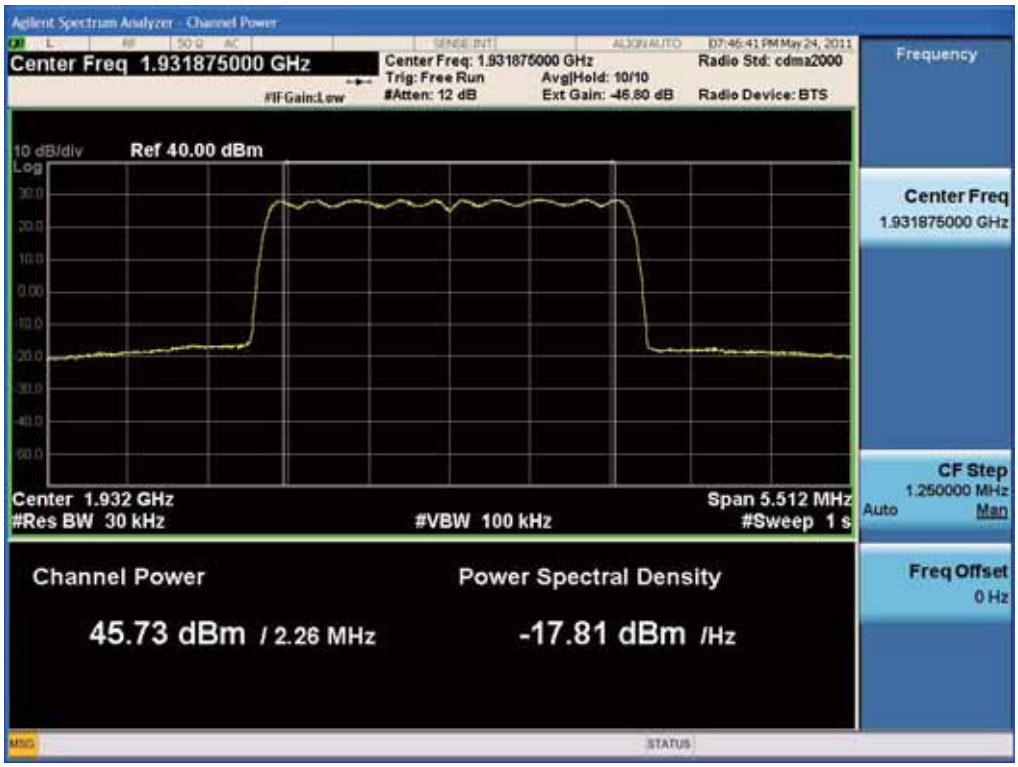
(16QAM Middle Channel)

(16QAM High Channel)

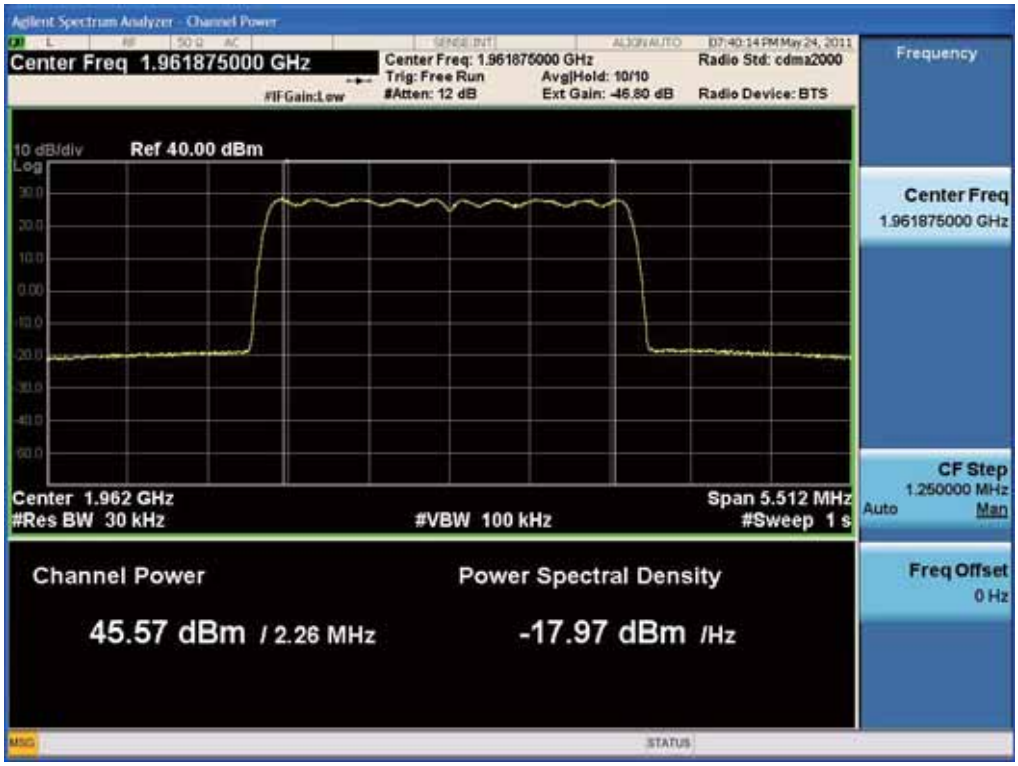


5.5.5. Plot Data for 1 Tx mode – 2 Carriers, Output Port 0

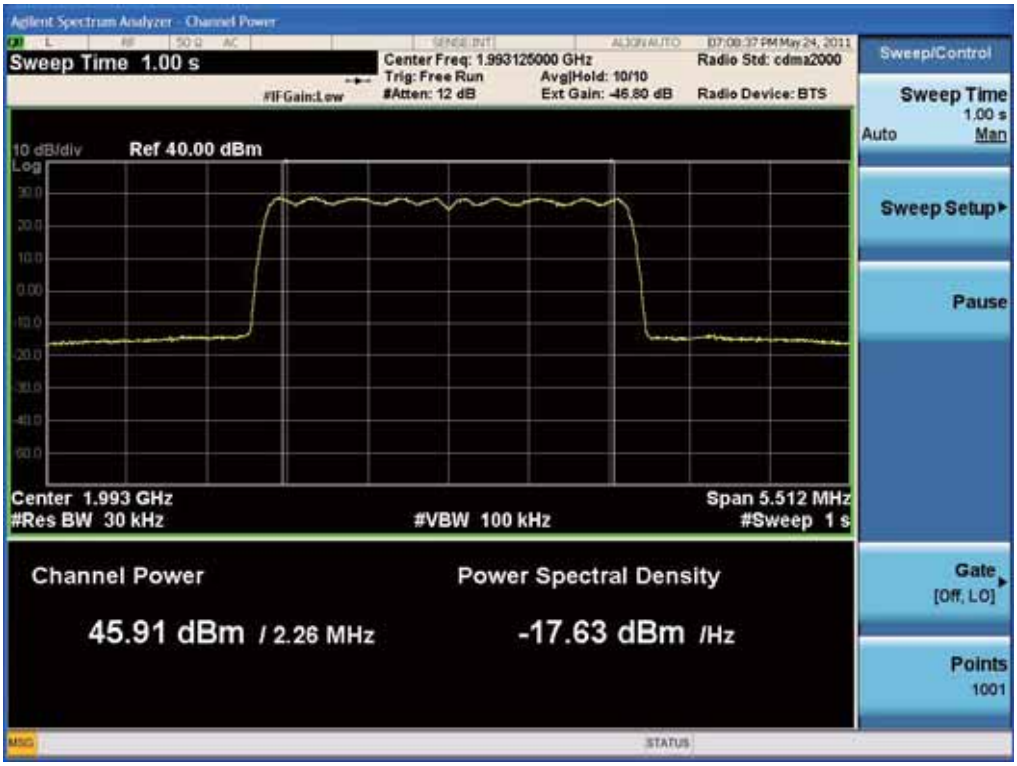
(16QAM Low Channel)



(16QAM Middle Channel)

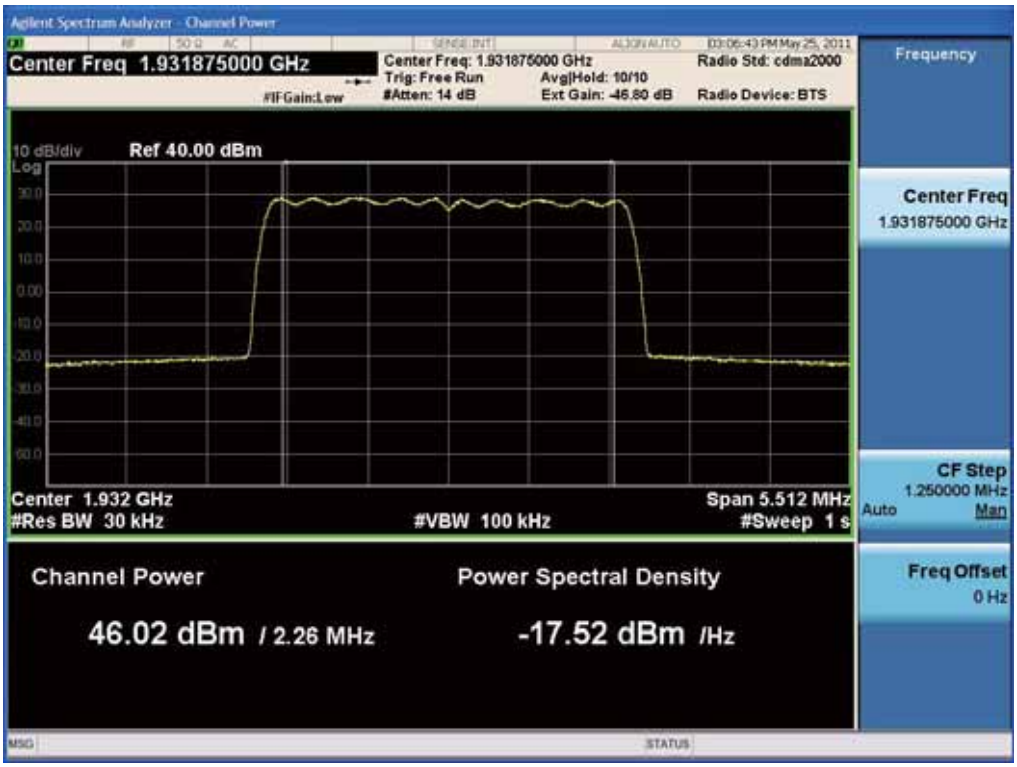


(16QAM High Channel)

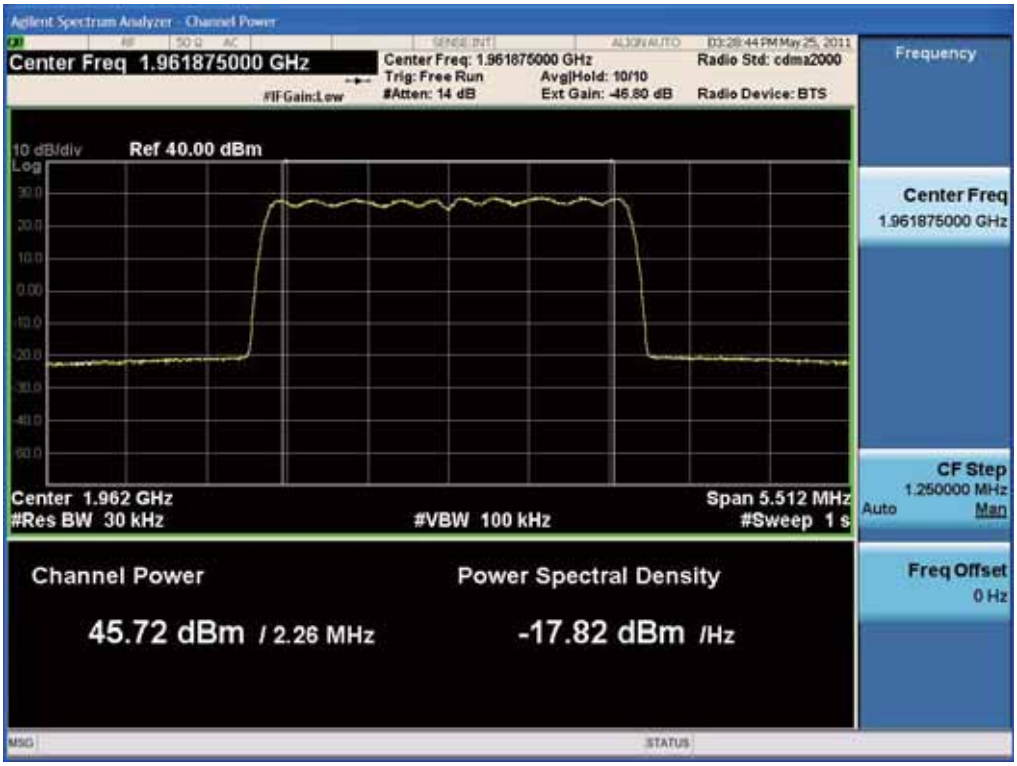


5.5.6. Plot Data for 1 Tx mode – 2 Carriers , Output Port 1

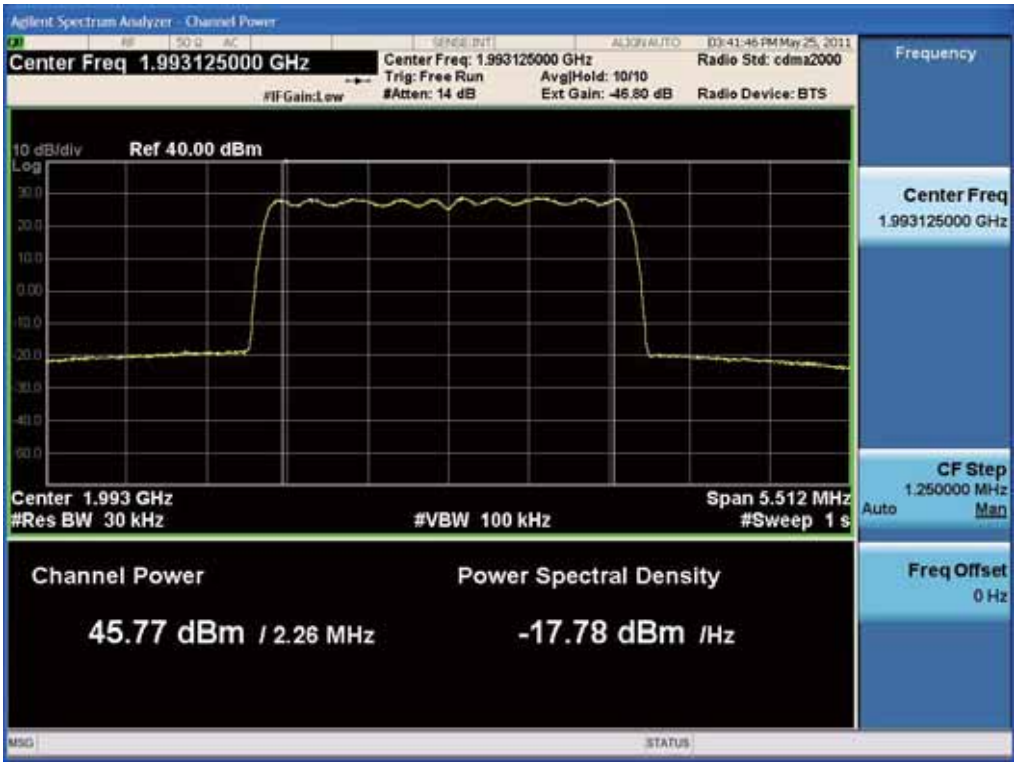
(16QAM Low Channel)



(16QAM Middle Channel)

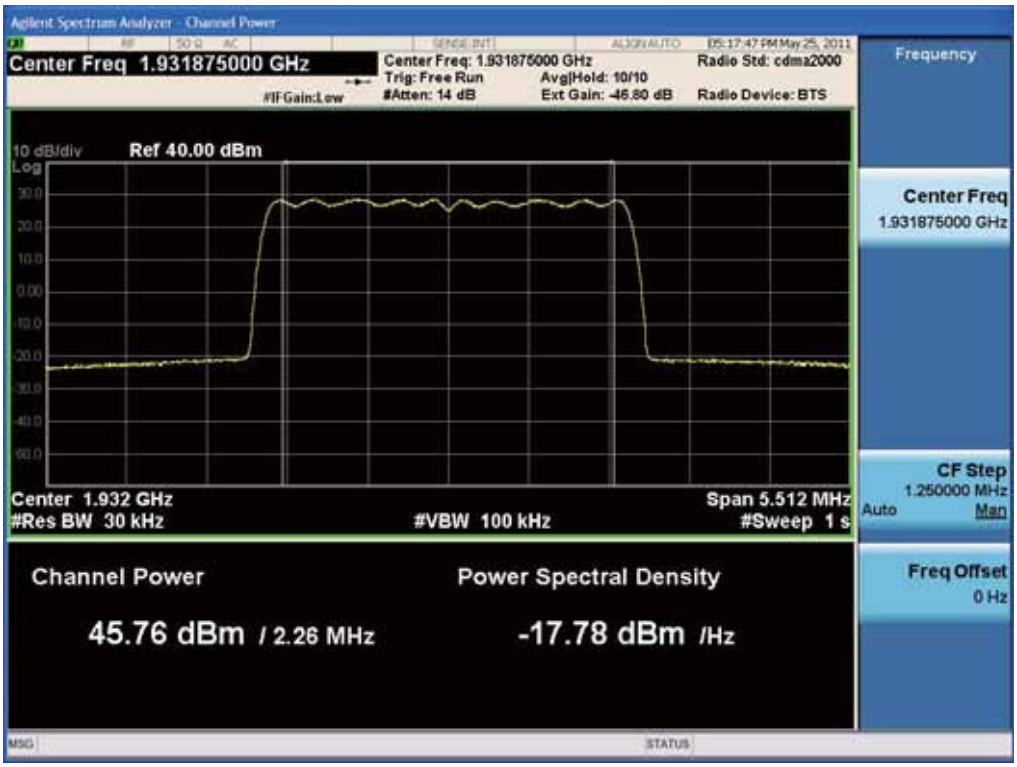


(16QAM High Channel)



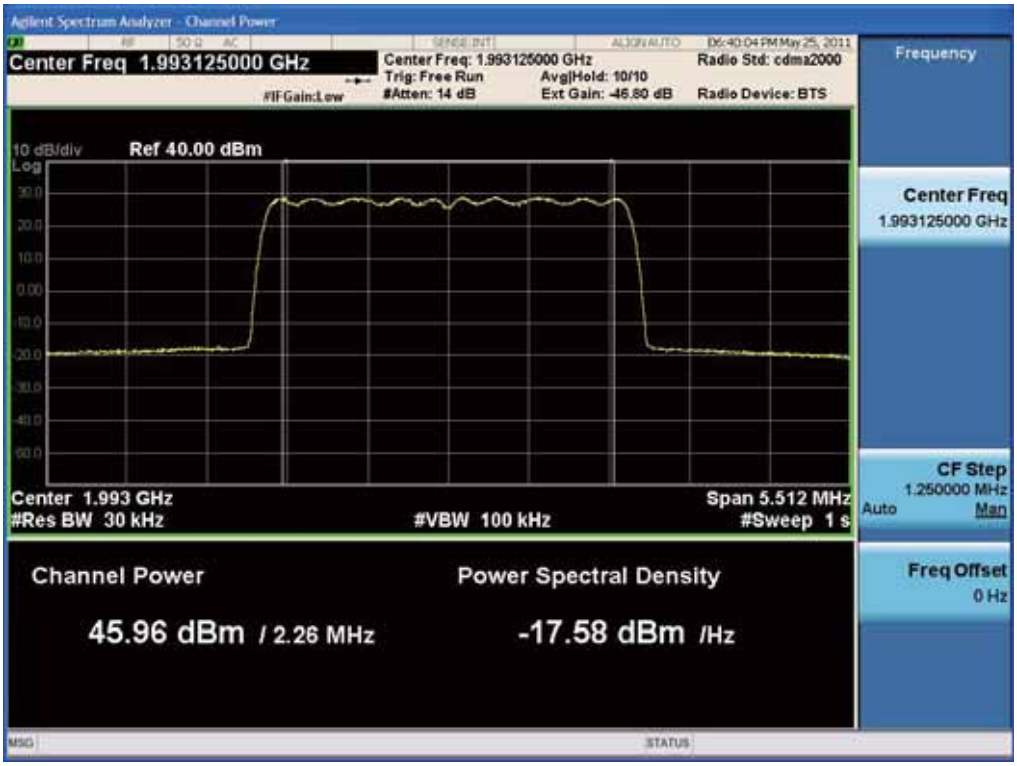
5.5.7. Plot Data for 1 Tx mode – 2 Carriers, Output Port 2

(16QAM Low Channel)



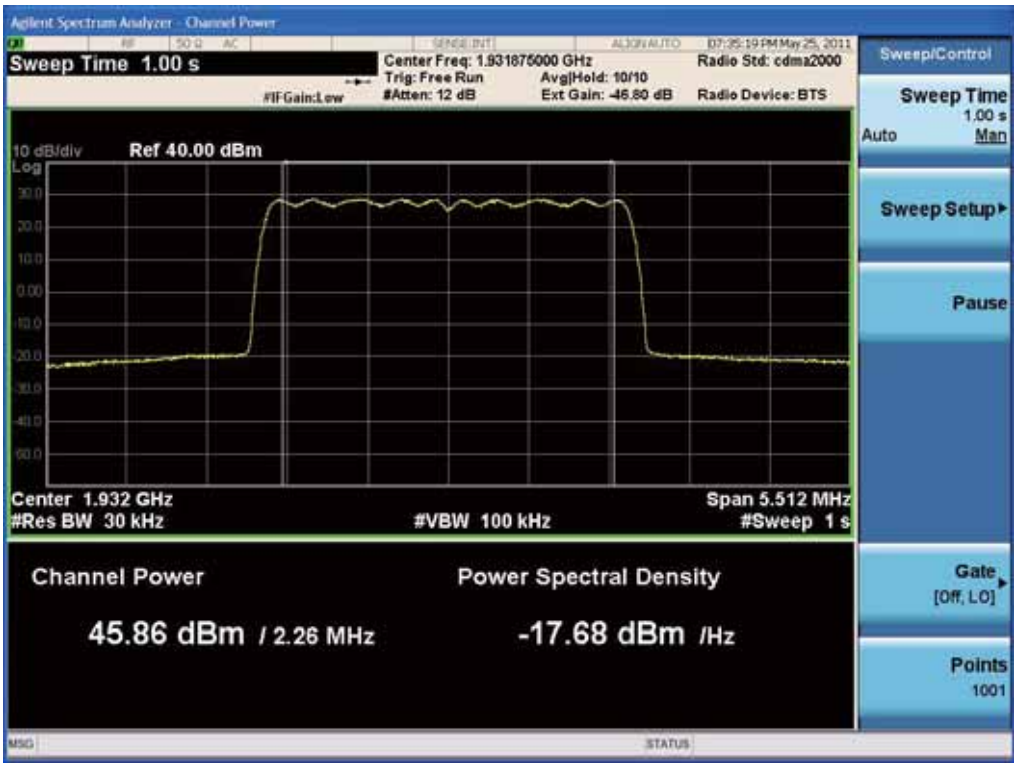
(16QAM Middle Channel)

(16QAM High Channel)

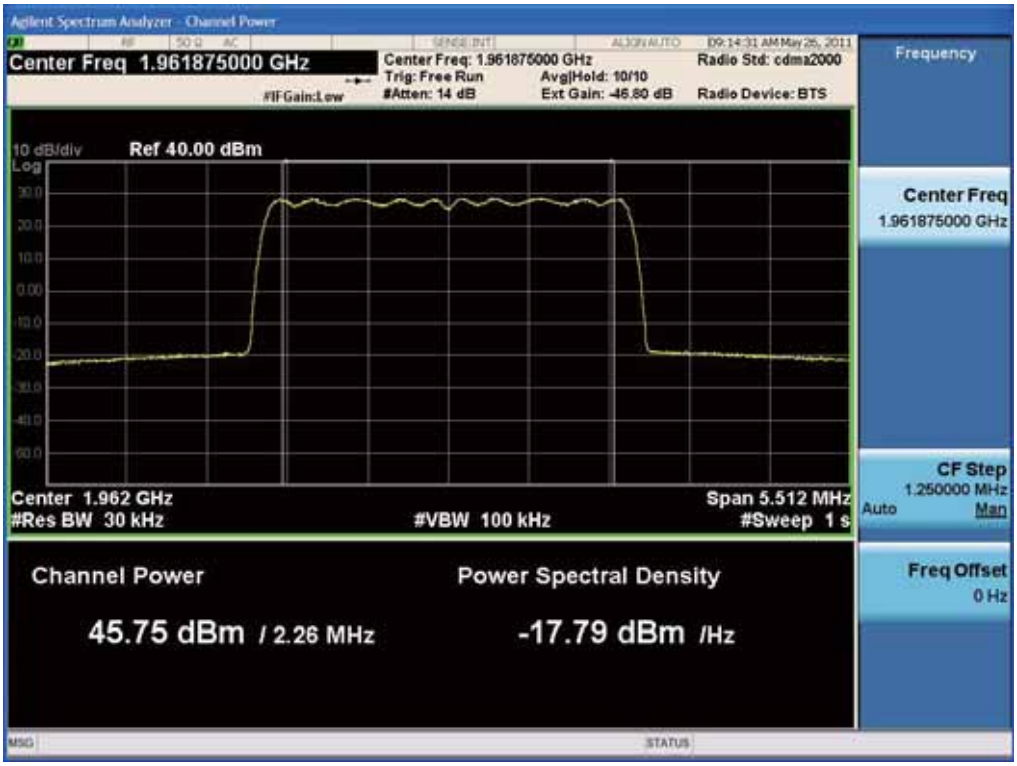


5.5.8. Plot Data for 1 Tx mode – 2 Carriers , Output Port 3

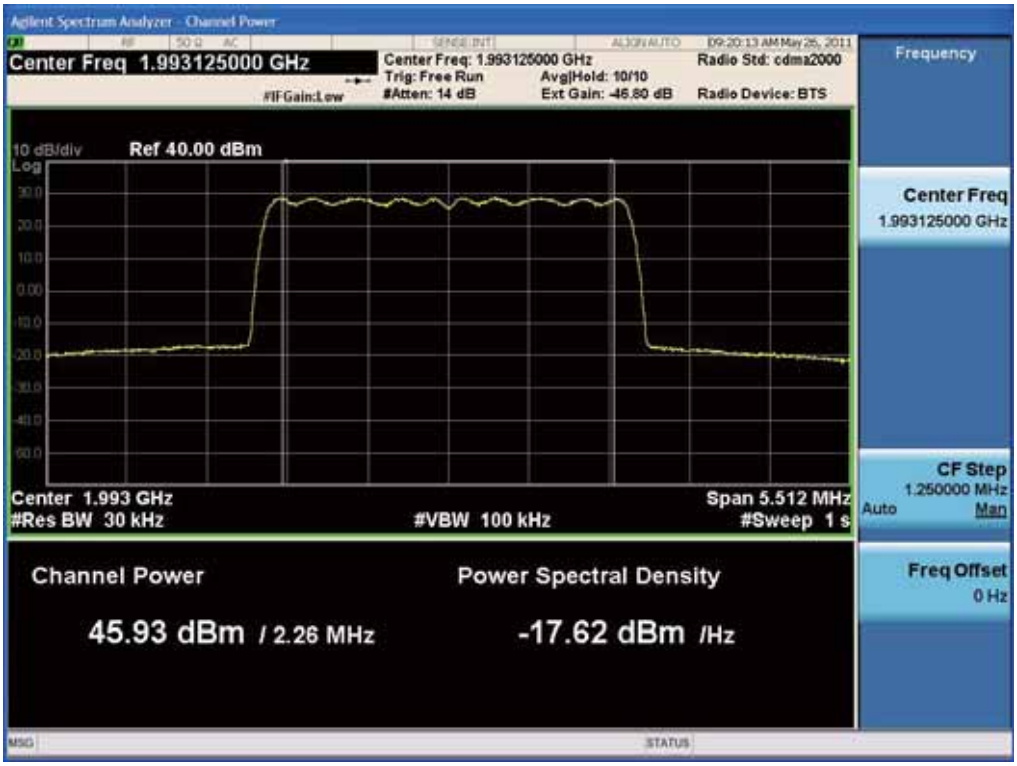
(16QAM Low Channel)



(16QAM Middle Channel)



(16QAM High Channel)



6. OCCUPIED BANDWIDTH

6.1. Applicable Standard

According to FCC §2.1049

The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0. 5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(g) Transmitter in which the modulating baseband comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer ’s maximum rated condition

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user

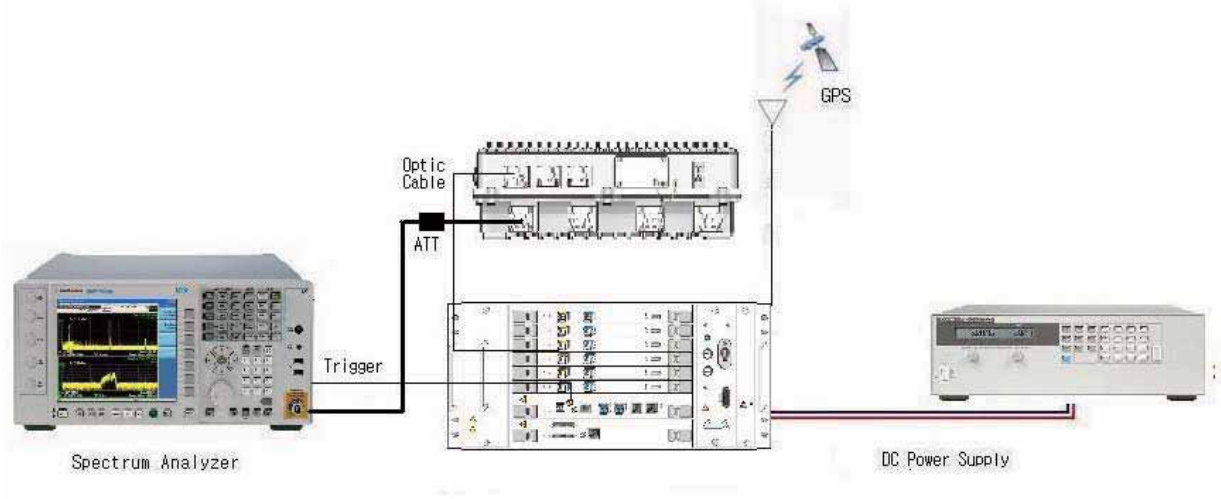
6.2.Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	MY51110020	04/16/2012
WEINSCHEL	67-30-33 / Attenuator	BU5347	12/29/2011
WEINSCHEL	67-30-33 / Attenuator	BR0530	12/29/2011
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/12/2011
WEINSCHEL	AF9003-69-31 / Attenuator	639	11/12/2011
Agilent	6674A / DC Power Supply	3501A00901	05/02/2012

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 analyzer 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 analyzer. It was set to measure the bandwidth where 99% of the signal power was contained. The analyzer automatically configures the measurement bandwidths to make an accurate measurement based on the channel bandwidth and channel spacing of the EUT.



6.4. Test Result

: PASS (Power boost mode was tested on.)

[1 Tx Mode – 1 Carrier / 1 Port]

6.4.1. Test Data at Output Port 0

Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
BPSK	Low	1931.25	1.387
	Middle	1962.50	1.401
	High	1993.75	1.388
QPSK	Low	1931.25	1.389
	Middle	1962.5	1.392
	High	1993.75	1.388
16QAM	Low	1931.25	1.389
	Middle	1962.5	1.388
	High	1993.75	1.389

6.4.2. Test Data at Output Port 1

Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
BPSK	Low	1931.25	1.397
	Middle	1962.5	1.388
	High	1993.75	1.388
QPSK	Low	1931.25	1.389
	Middle	1962.5	1.387
	High	1993.75	1.388
16QAM	Low	1931.25	1.388
	Middle	1962.5	1.389
	High	1993.75	1.387

6.4.3. Test Data at Output Port 2

Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
BPSK	Low	1931.25	1.391
	Middle	1962.5	1.387
	High	1993.75	1.388
QPSK	Low	1931.25	1.389
	Middle	1962.5	1.387
	High	1993.75	1.387
16QAM	Low	1931.25	1.389
	Middle	1962.5	1.390
	High	1993.75	1.389

6.4.4. Test Data at Output Port 3

Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
BPSK	Low	1931.25	1.388
	Middle	1962.5	1.387
	High	1993.75	1.389
QPSK	Low	1931.25	1.389
	Middle	1962.5	1.389
	High	1993.75	1.388
16QAM	Low	1931.25	1.390
	Middle	1962.5	1.390
	High	1993.75	1.388

[1 Tx Mode – 2 Carriers / 1 Port]

6.4.5. Test Data at Output Port 0

Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
BPSK	Low	1931.875	2.640
	Middle	1961.875	2.638
	High	1993.125	2.639
QPSK	Low	1931.875	2.640
	Middle	1961.875	2.638
	High	1993.125	2.639
16QAM	Low	1931.875	2.639
	Middle	1961.875	2.639
	High	1993.125	2.638

6.4.6. Test Data at Output Port 1

Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
BPSK	Low	1931.875	2.638
	Middle	1961.875	2.639
	High	1993.125	2.638
QPSK	Low	1931.875	2.637
	Middle	1961.875	2.638
	High	1993.125	2.638
16QAM	Low	1931.875	2.638
	Middle	1961.875	2.638
	High	1993.125	2.638

6.4.7. Test Data at Output Port 2

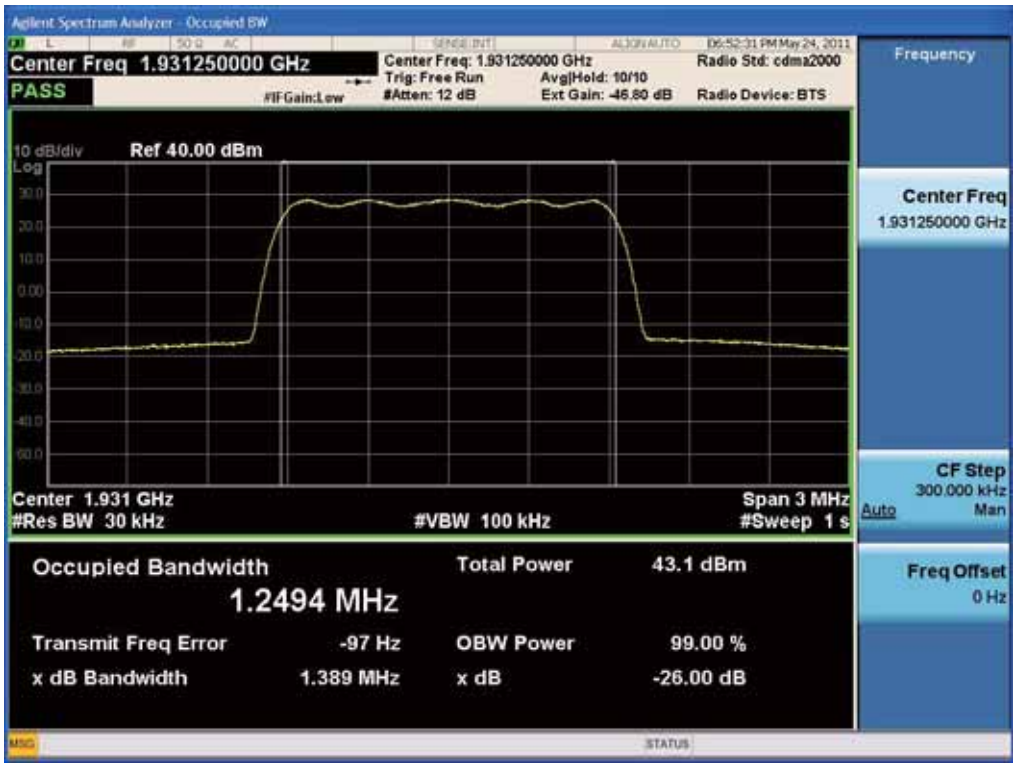
Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
BPSK	Low	1931.875	2.639
	Middle	1961.875	2.639
	High	1993.125	2.639
QPSK	Low	1931.875	2.639
	Middle	1961.875	2.638
	High	1993.125	2.638
16QAM	Low	1931.875	2.639
	Middle	1961.875	2.640
	High	1993.125	2.637

6.4.8. Test Data at Output Port 3

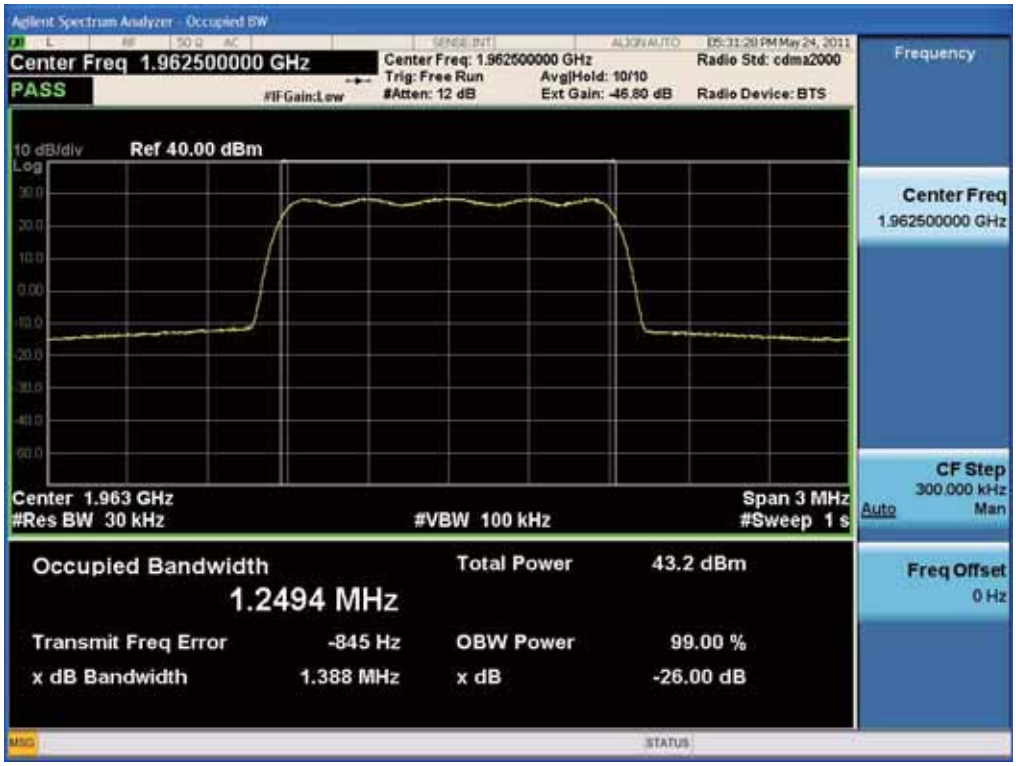
Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
BPSK	Low	1931.875	2.639
	Middle	1961.875	2.639
	High	1993.125	2.637
QPSK	Low	1931.875	2.639
	Middle	1961.875	2.639
	High	1993.125	2.639
16QAM	Low	1931.875	2.638
	Middle	1961.875	2.638
	High	1993.125	2.638

6.5.1. Plot Data for 1 Tx mode – 1 Carrier , Output Port 0

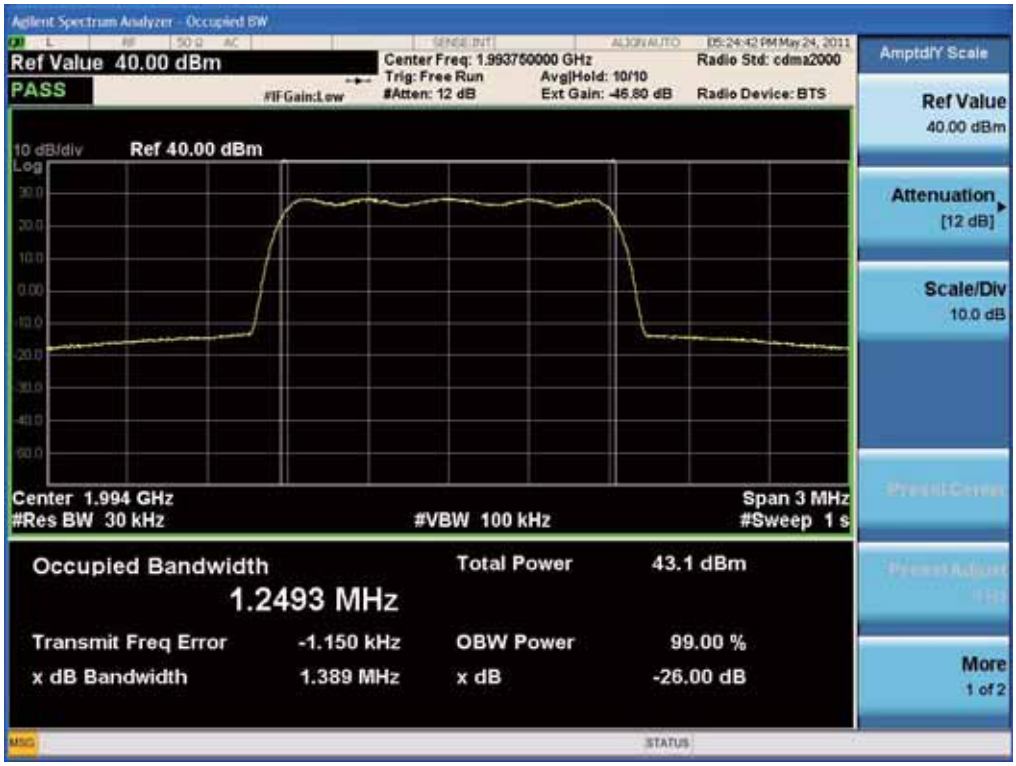
(16QAM Low Channel)



(16QAM Middle Channel)

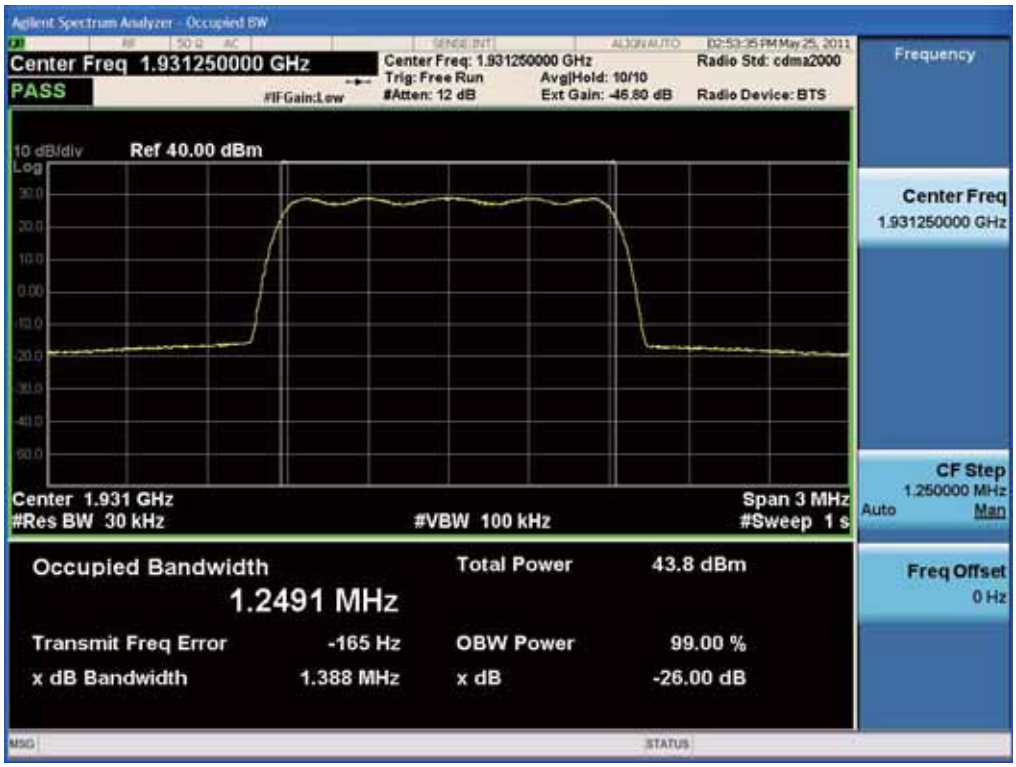


(16QAM High Channel)

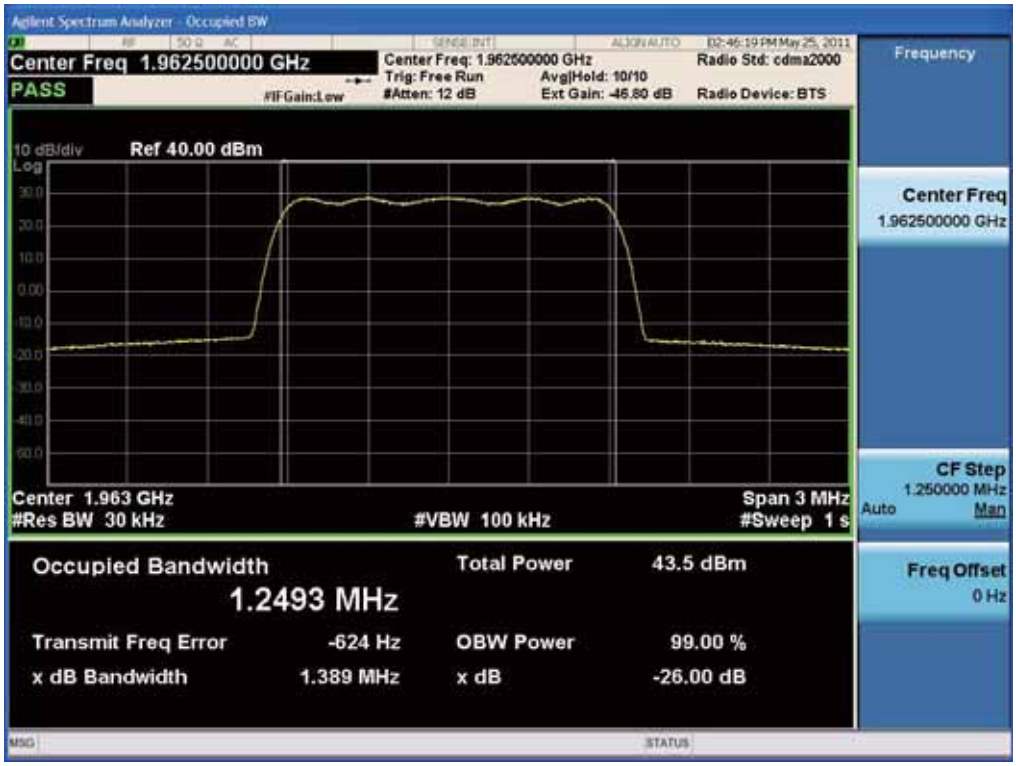


6.5.2. Plot Data for 1 Tx mode – 1 Carrier , Output Port 1

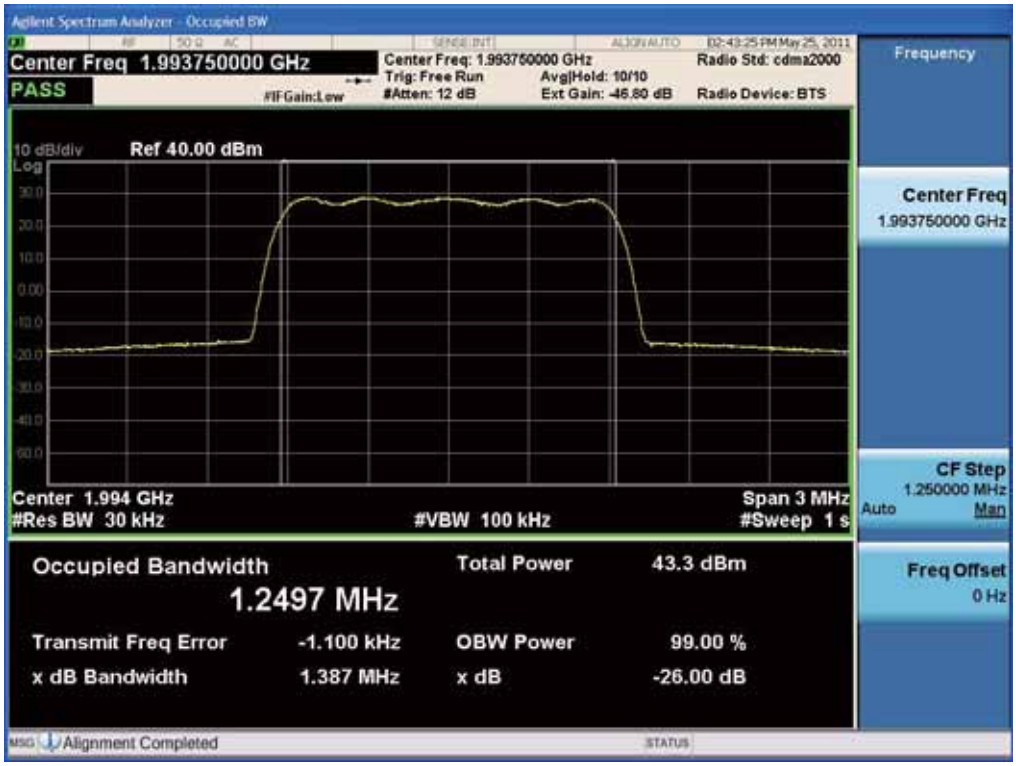
(16QAM Low Channel)



(16QAM Middle Channel)

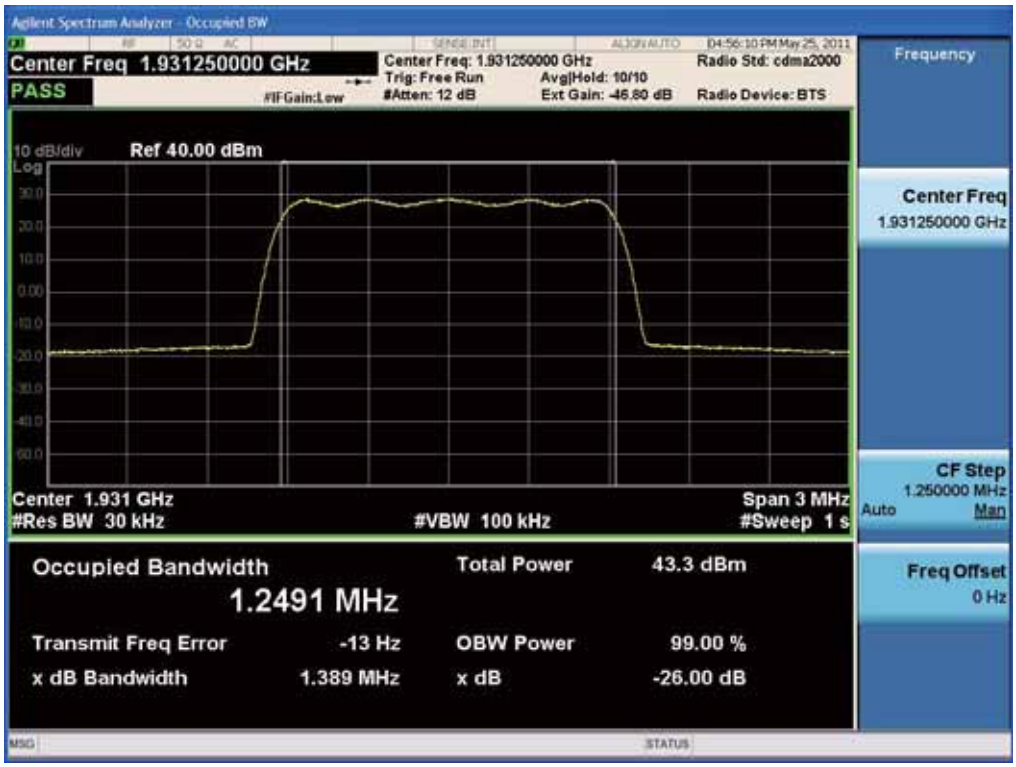


(16QAM High Channel)

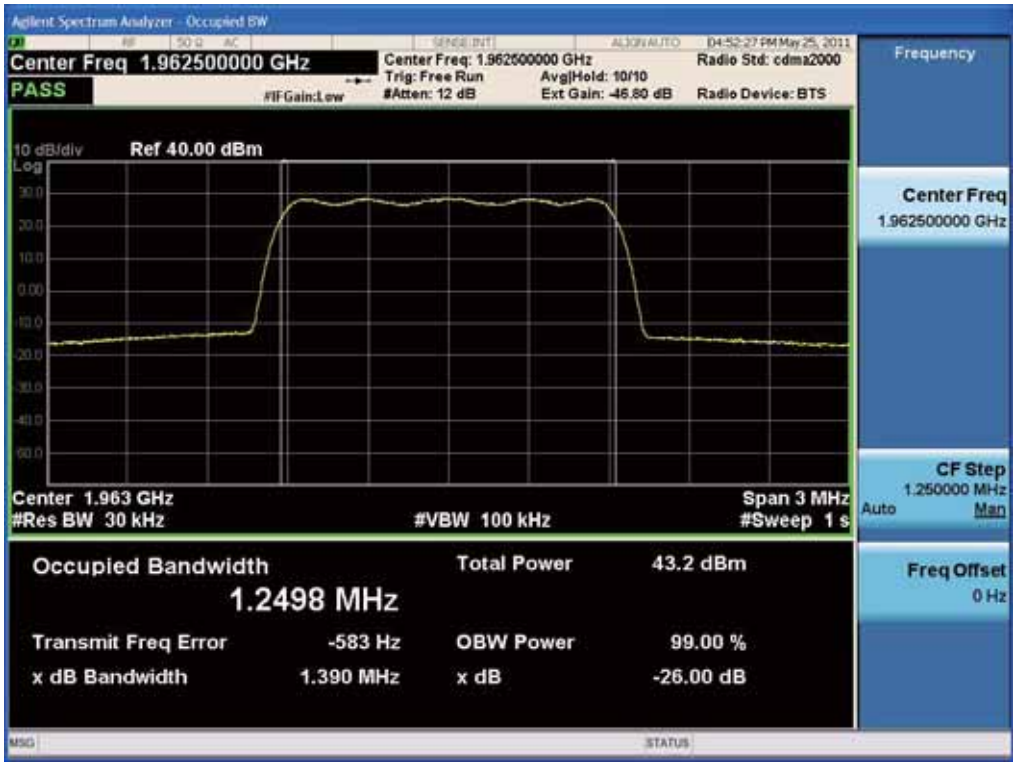


6.5.3. Plot Data for 1 Tx mode – 1 Carrier , Output Port 2

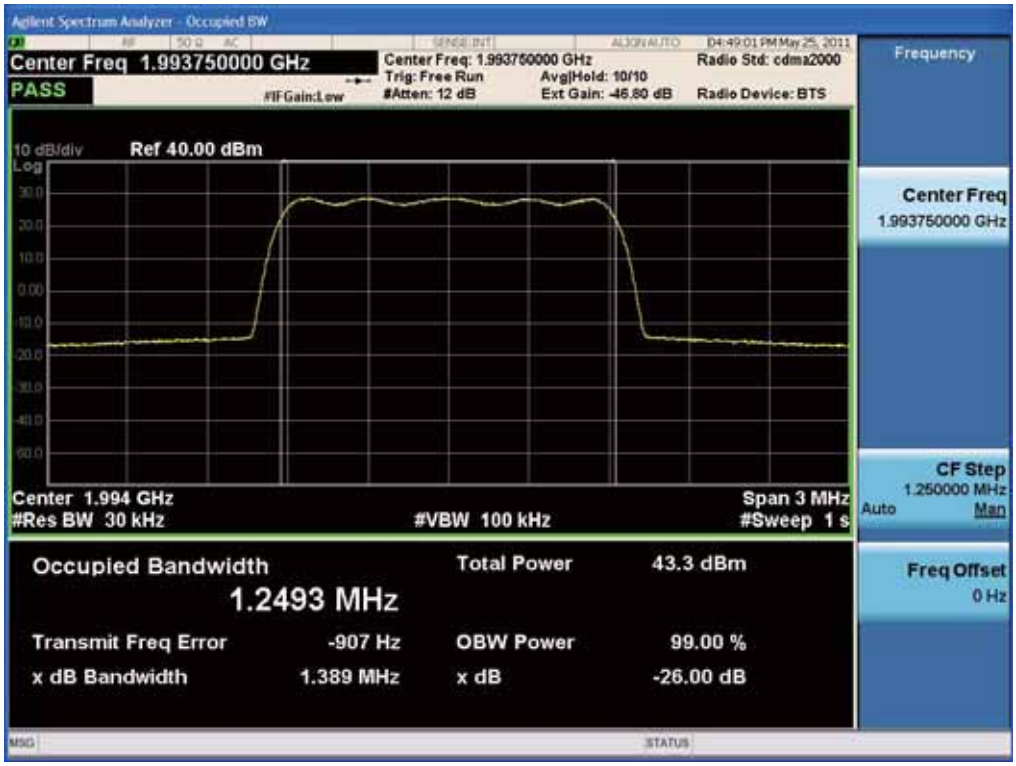
(16QAM Low Channel)



(16QAM Middle Channel)

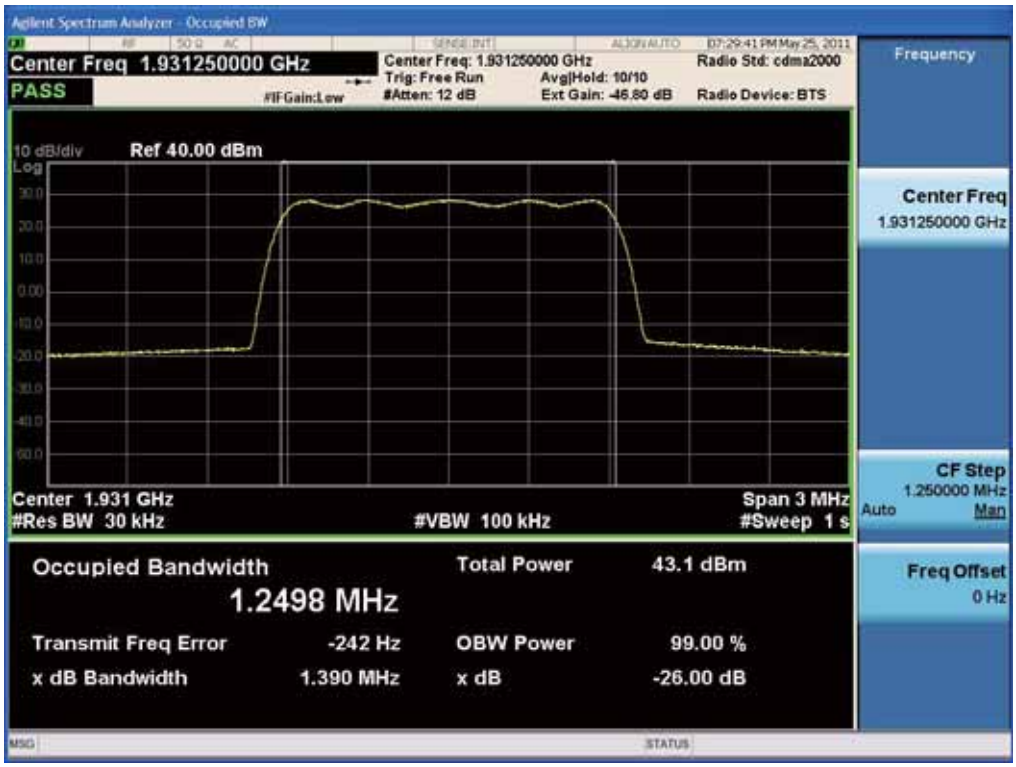


(16QAM High Channel)

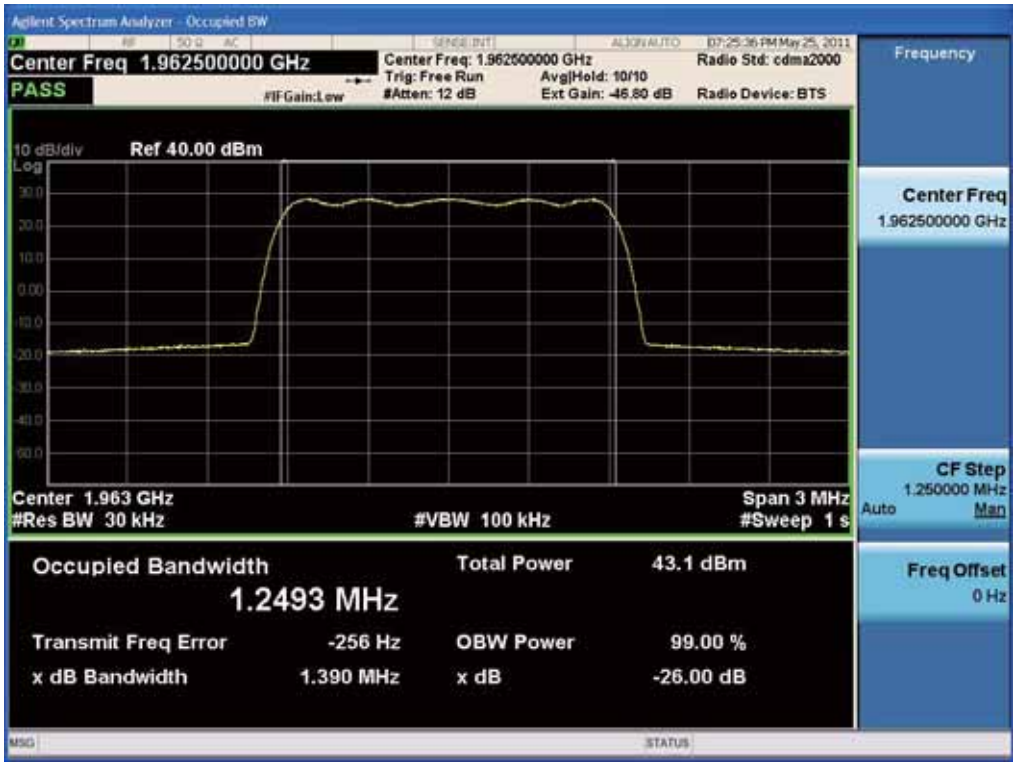


6.5.4. Plot Data for 1 Tx mode – 1 Carrier , Output Port 3

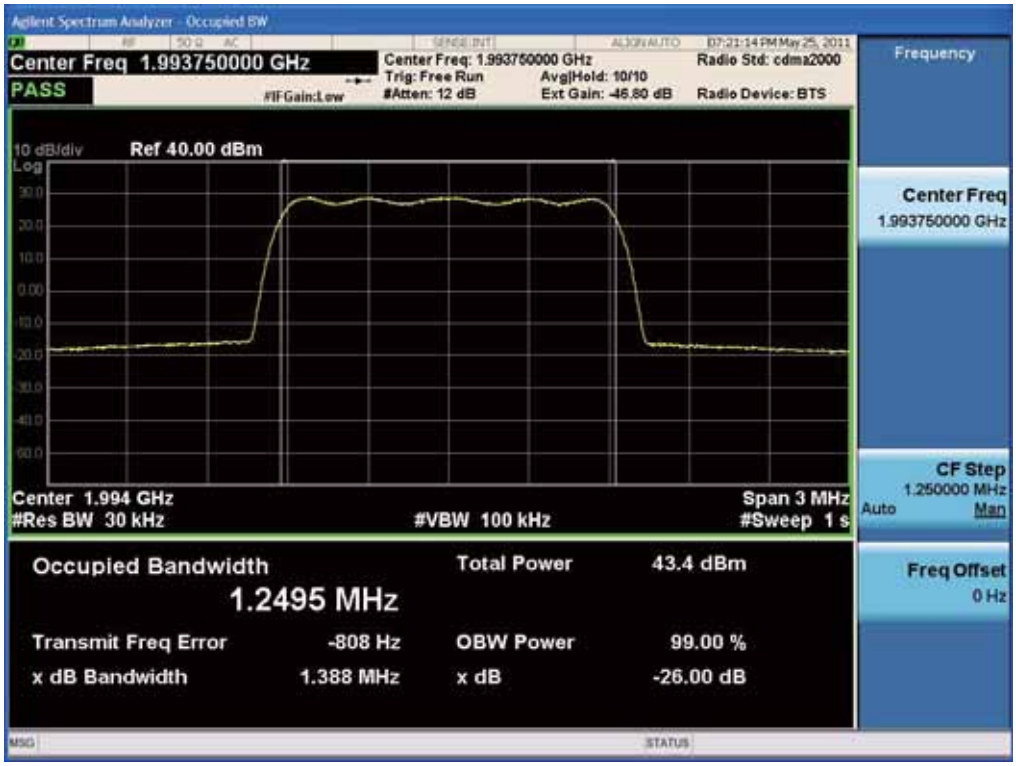
(16QAM Low Channel)



(16QAM Middle Channel)

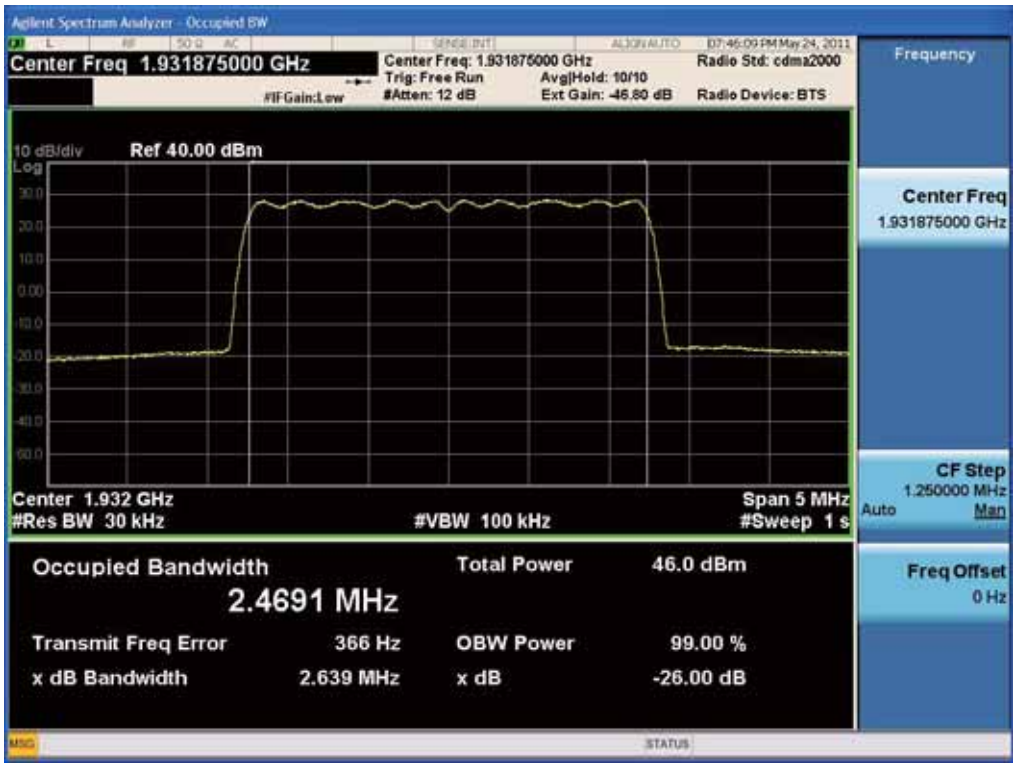


(16QAM High Channel)

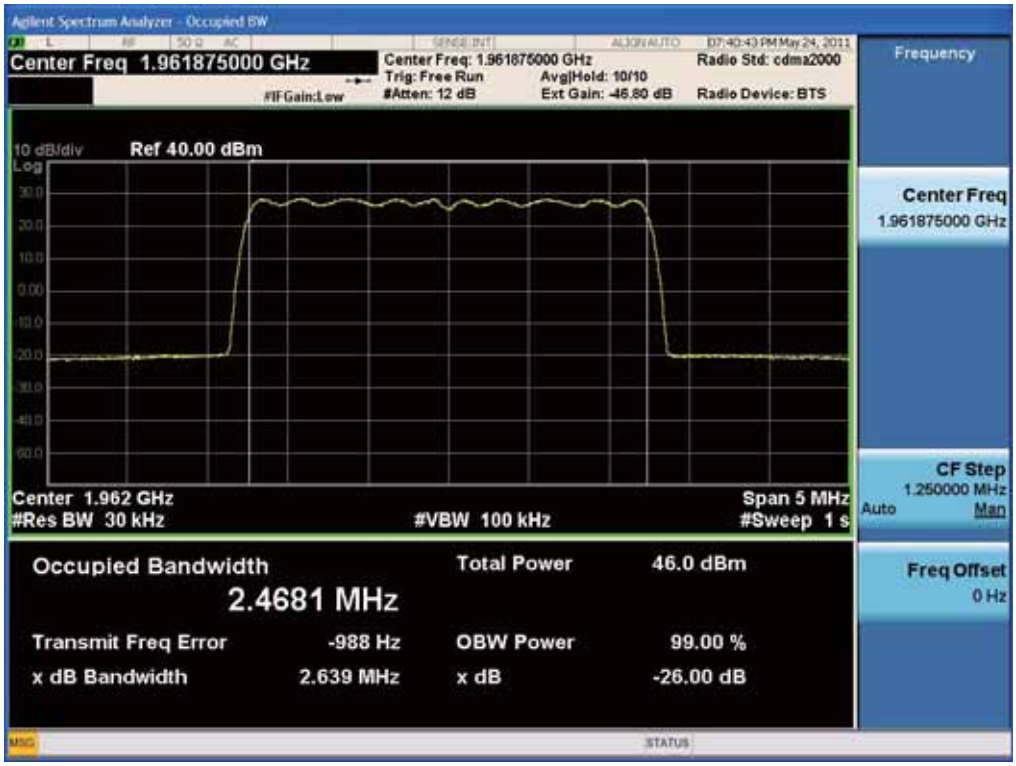


6.5.5. Plot Data for 1 Tx mode – 2 Carriers, Output Port 0

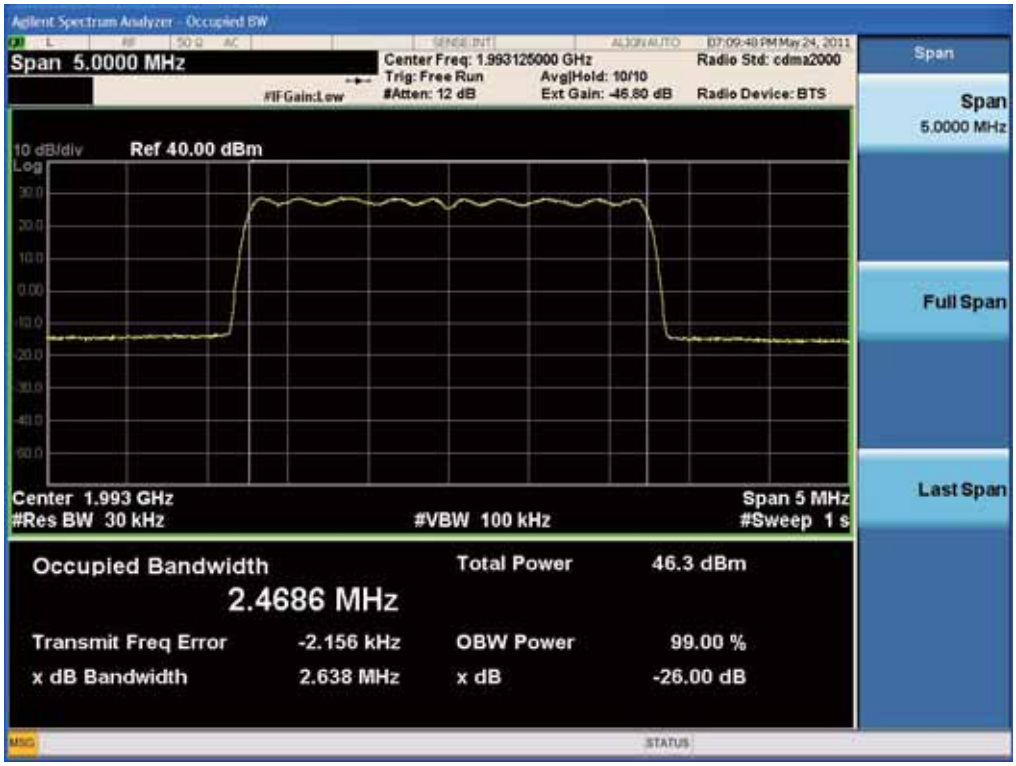
(16QAM Low Channel)



(16QAM Middle Channel)

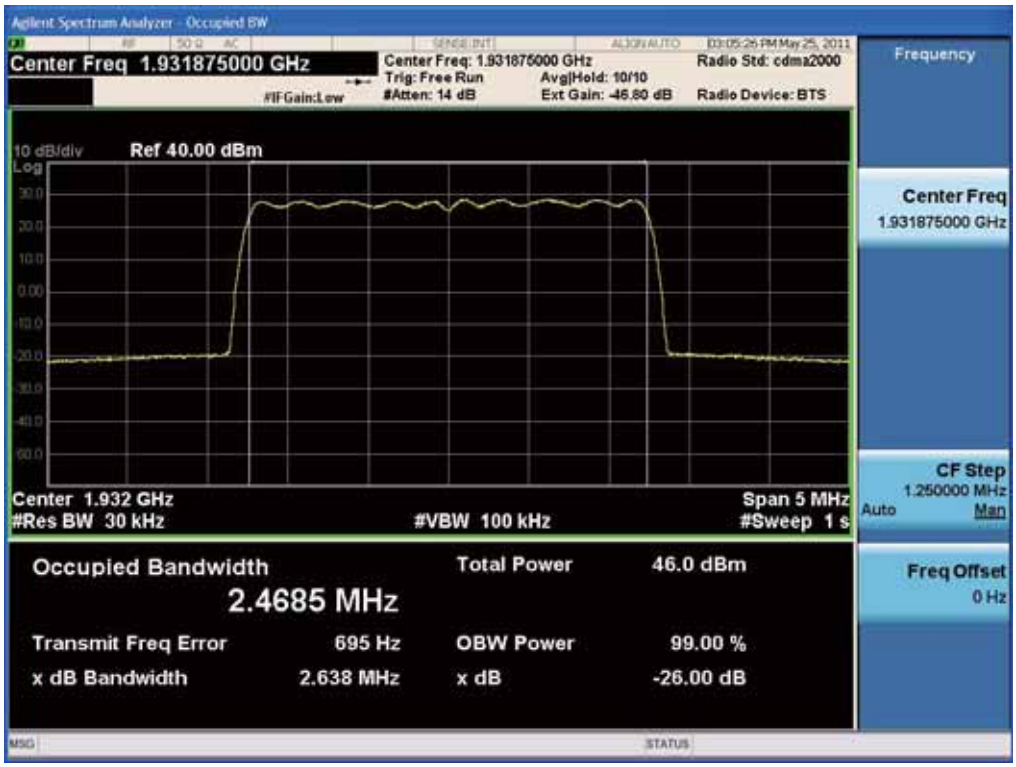


(16QAM High Channel)

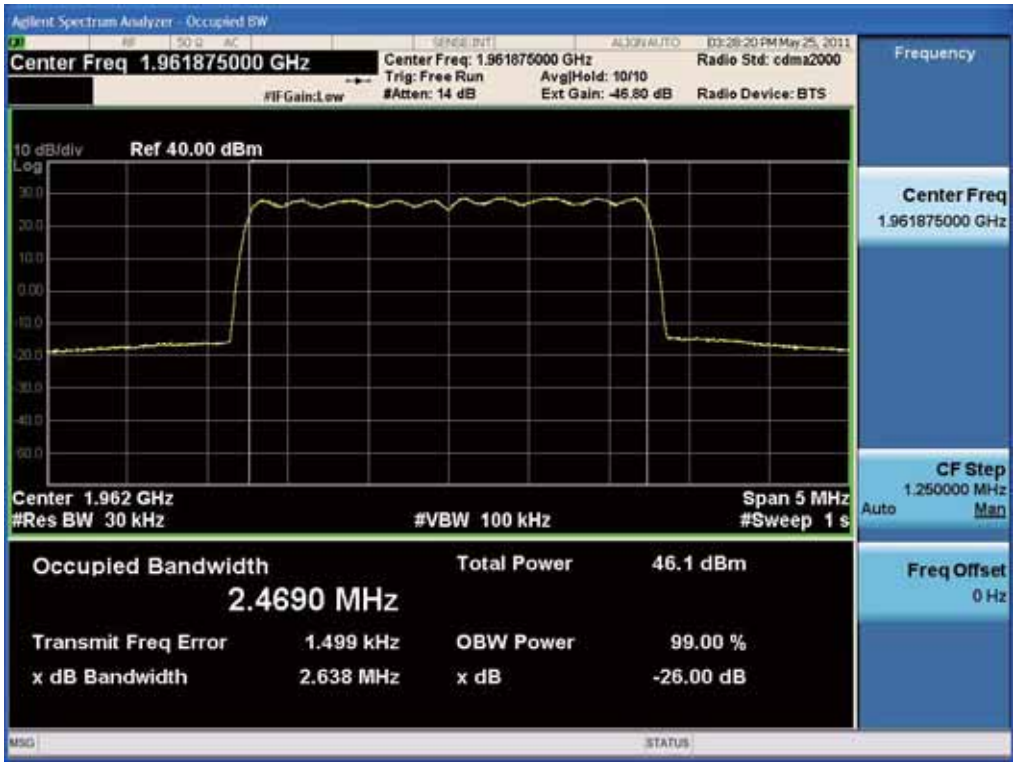


6.5.6. Plot Data for 1 Tx mode – 2 Carriers , Output Port 1

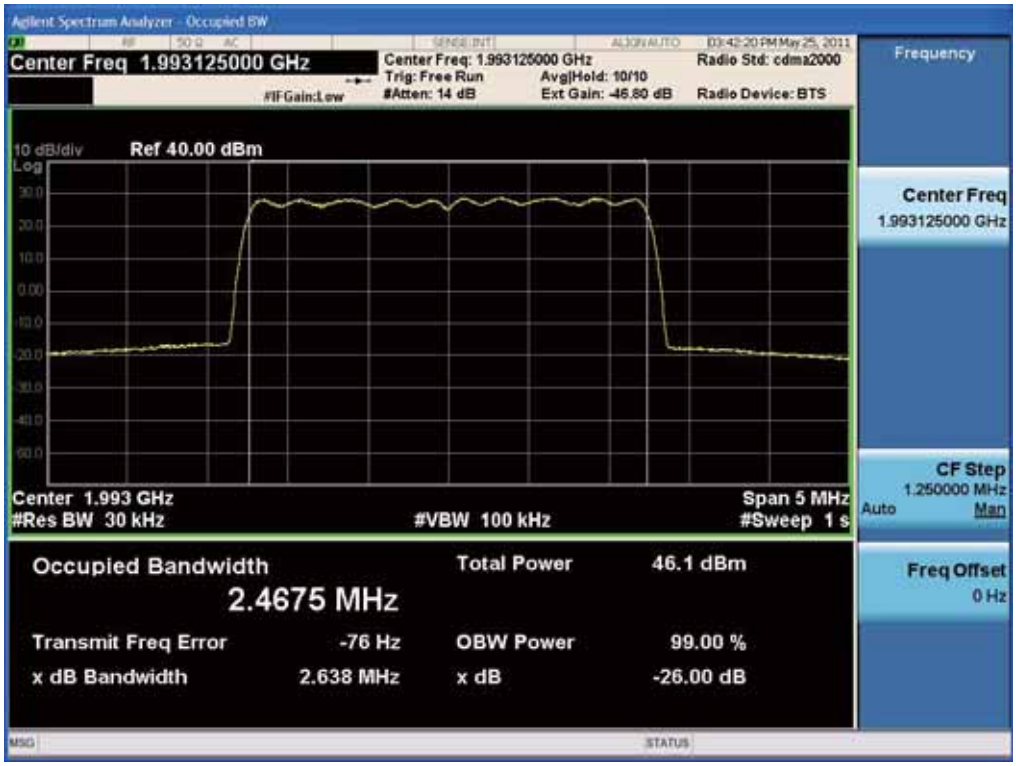
(16QAM Low Channel)



(16QAM Middle Channel)

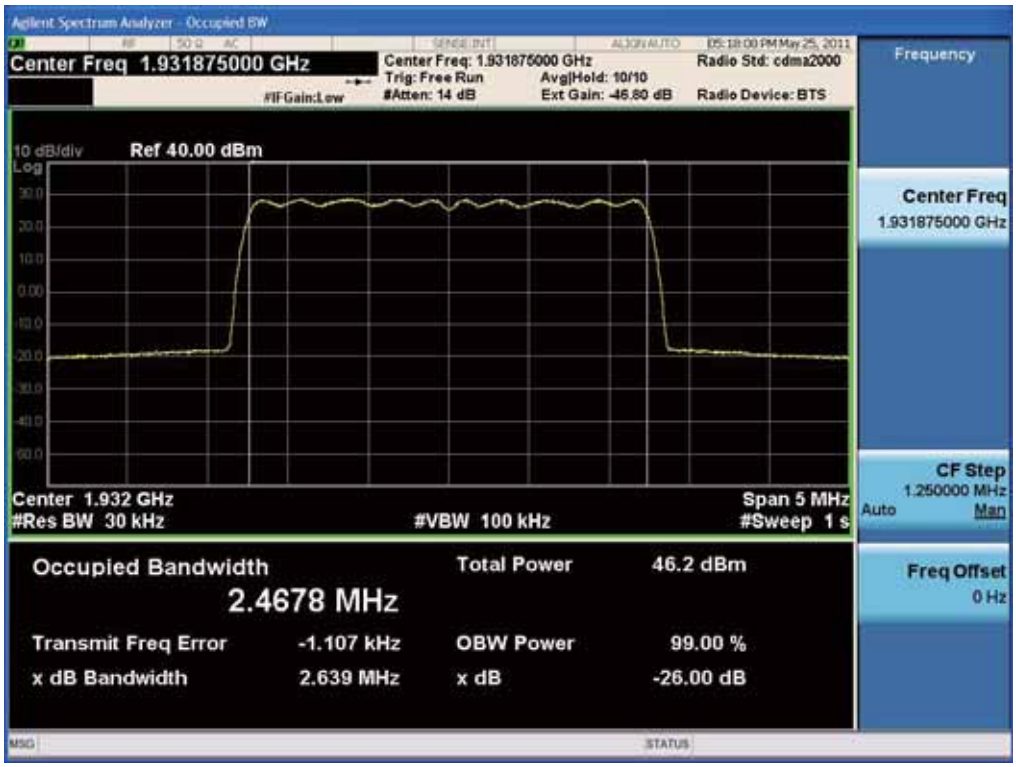


(16QAM High Channel)

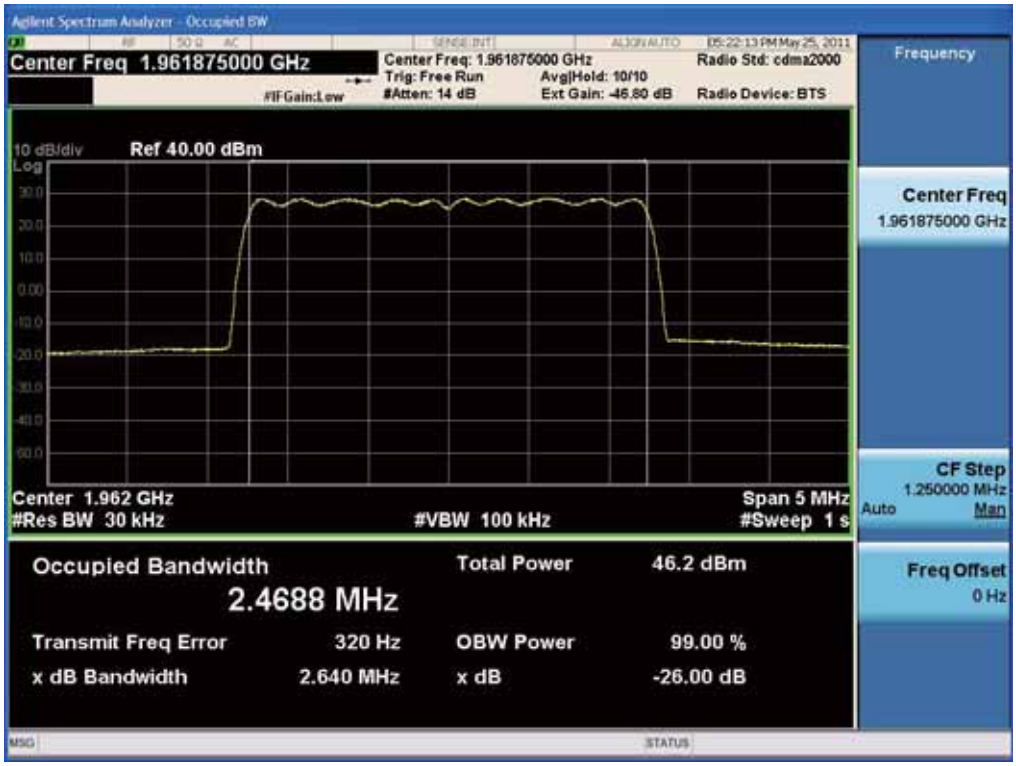


6.5.7. Plot Data for 1 Tx mode – 2 Carriers , Output Port 2

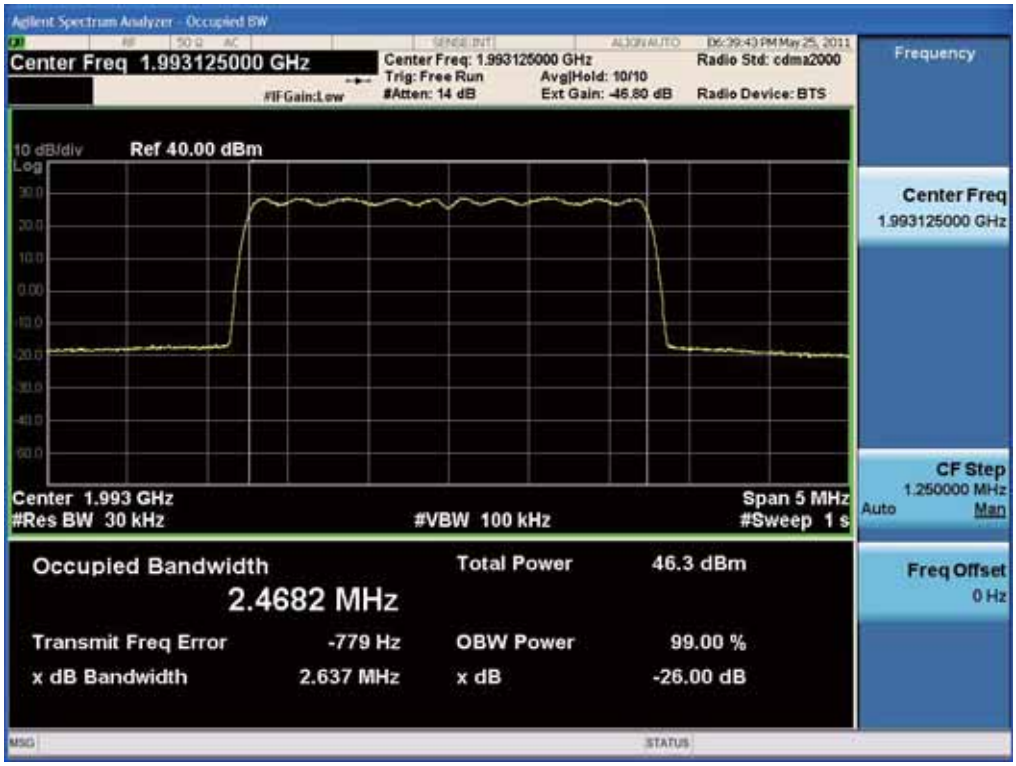
(16QAM Low Channel)



(16QAM Middle Channel)

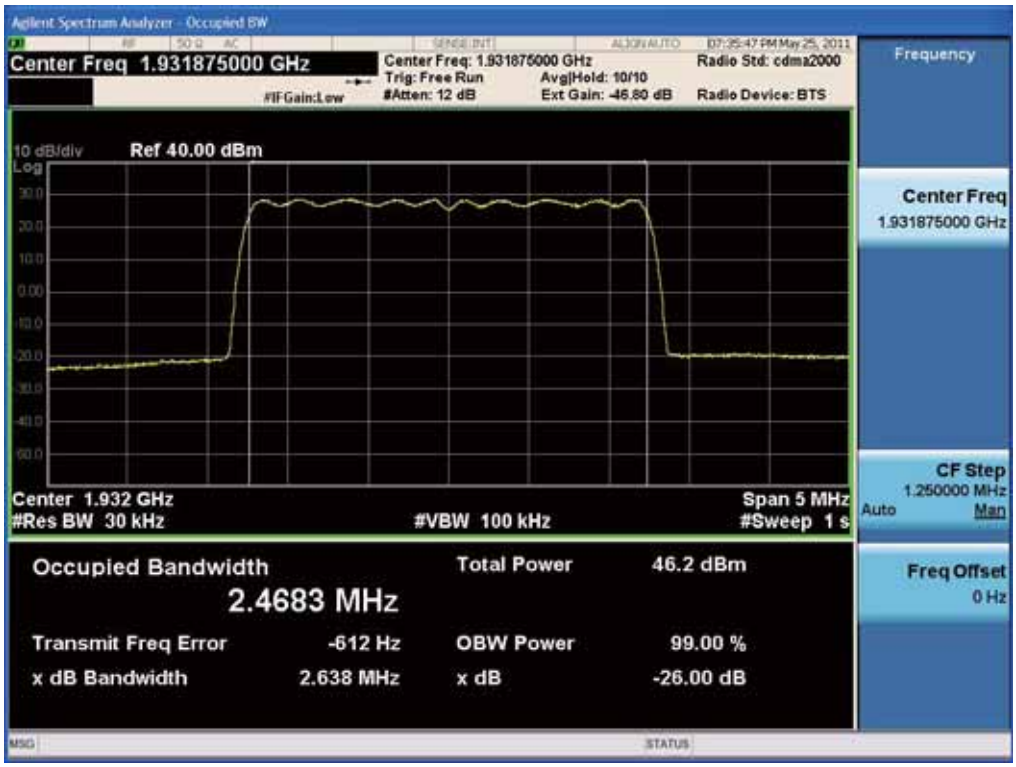


(16QAM High Channel)

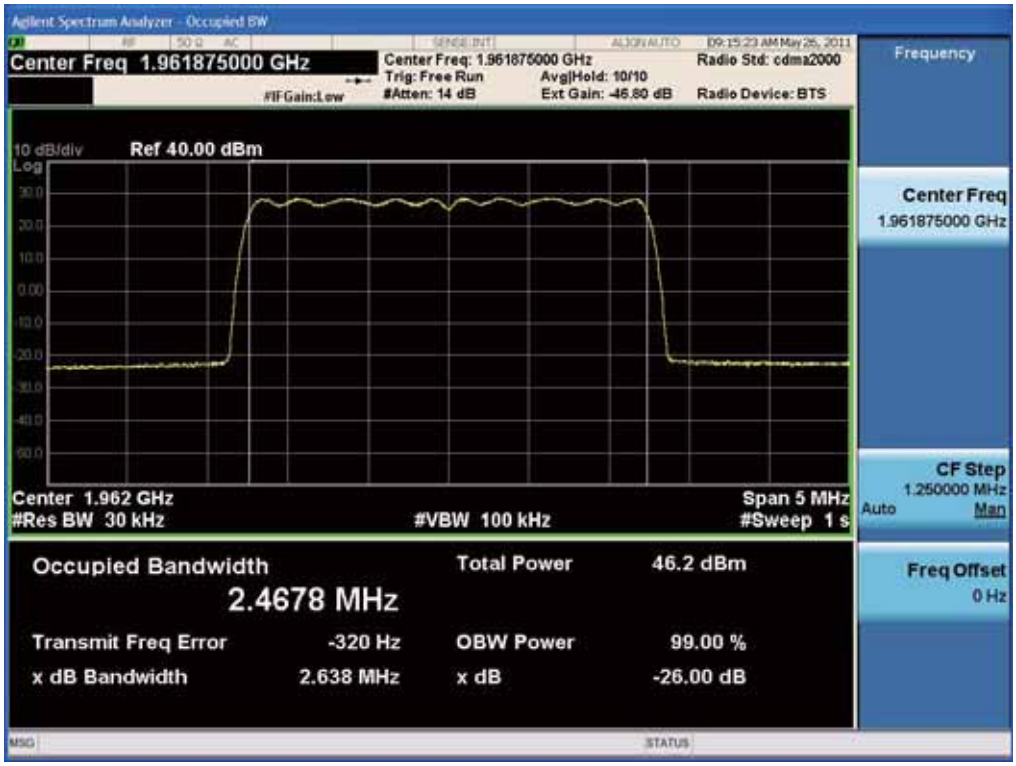


6.5.8. Plot Data for 1 Tx mode – 2 Carrier , Output Port 3

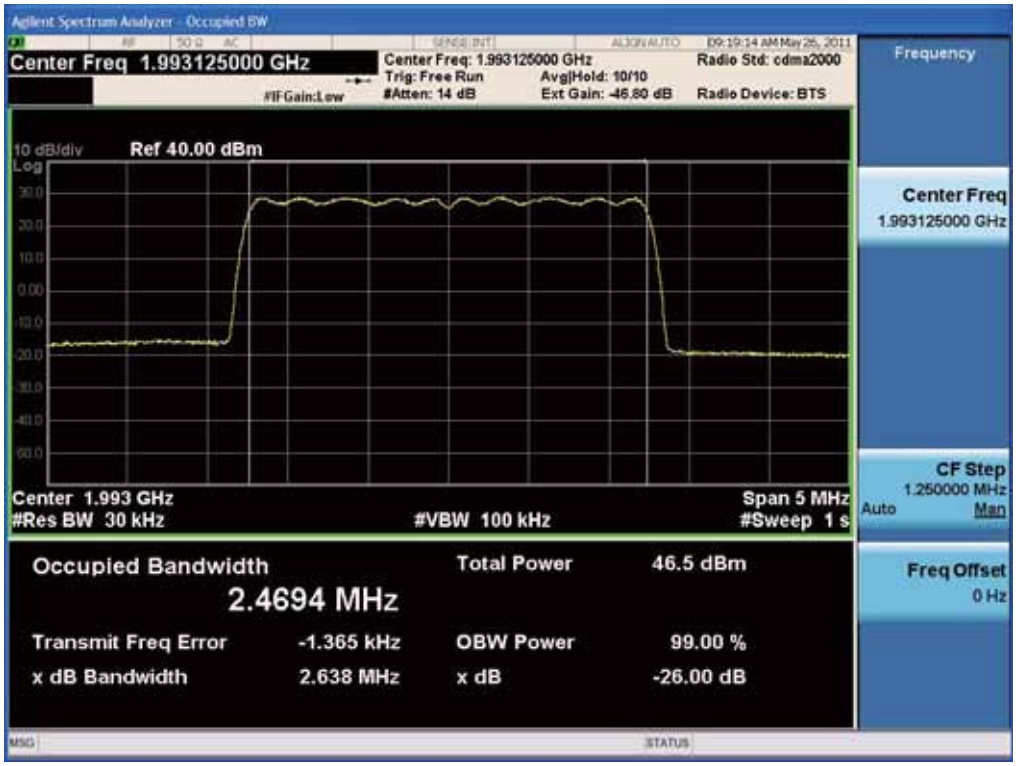
(16QAM Low Channel)



(16QAM Middle Channel)



(16QAM High Channel)



7. SPURIOUS EMISSION AT ANTENNA TERMINAL

7.1. Applicable Standard

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

According to FCC § 24.238, (a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmit power (P) by a factor of at least 43+10* logP dB.

7.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	MY51110020	04/16/2012
WEINSCHEL	67-30-33 / Attenuator	BU5347	12/29/2011
WEINSCHEL	67-30-33 / Attenuator	BR0530	12/29/2011
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/12/2011
WEINSCHEL	AF9003-69-31 / Attenuator	639	11/12/2011
Agilent	6674A / DC Power Supply	3501A00901	05/02/2012

7.3. 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 conducted emission level is meaured at each antenna port and then summed mathmatically to determine the total emission level from the device.

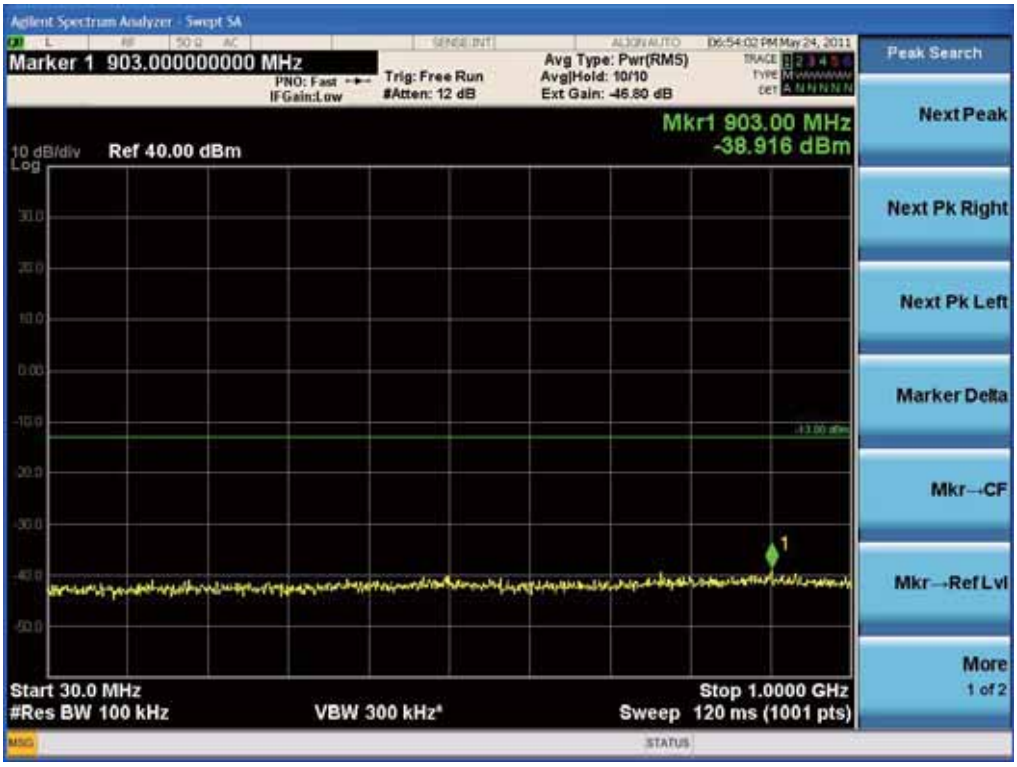
7.4. Test Result

: Pass (Power boost mode was tested on.)

7.4.1. Plot Data for 1 Tx mode – 1 Carrier , Output Port 0

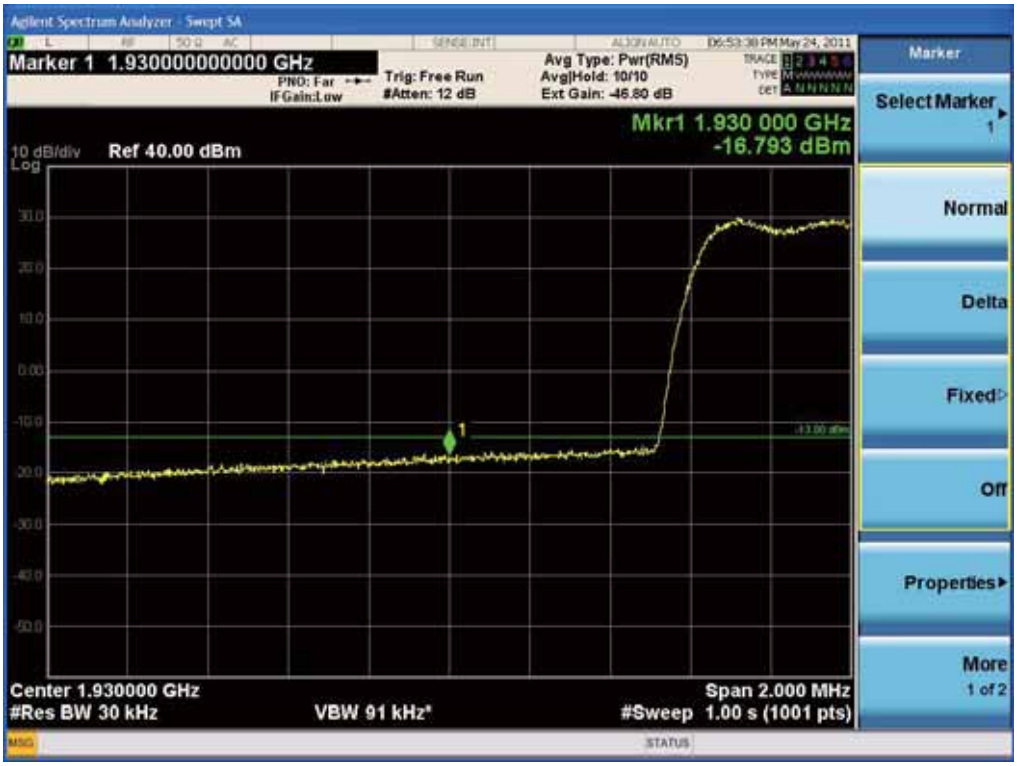
(16QAM Low Channel)

(30 MHz ~ 1 GHz)



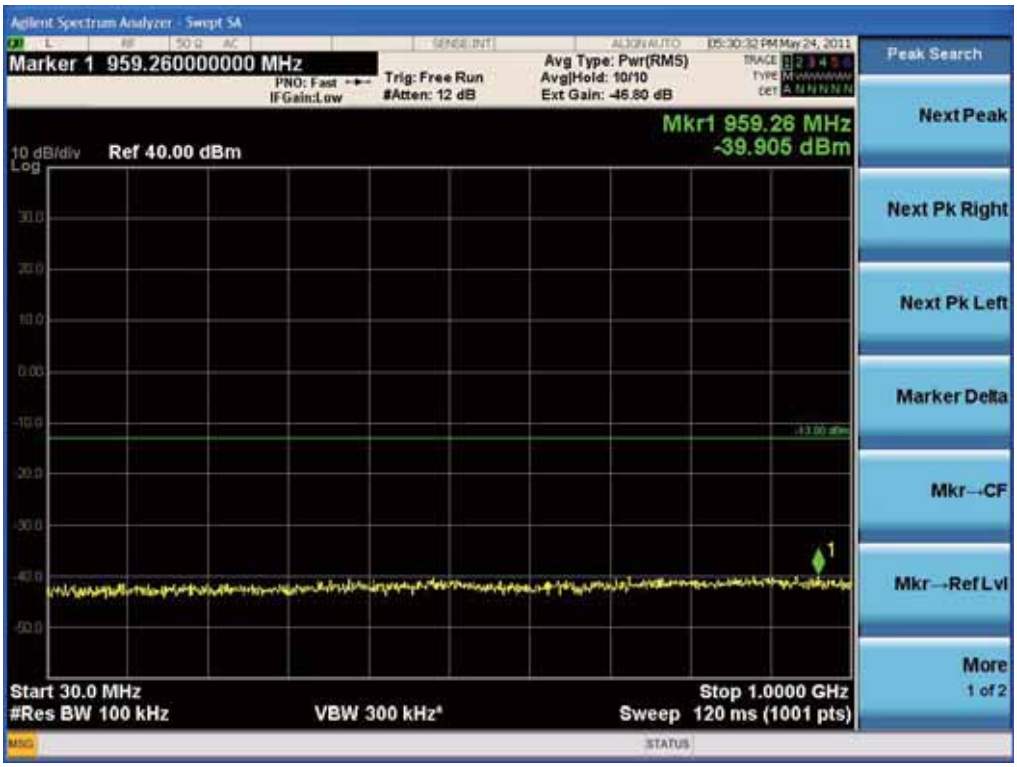
(1 GHz ~ 26.5 GHz)

(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Marker 1 1.930000000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
06:53:38 PM May 24, 2011
Mkr1 1.930 000 GHz
-16.793 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.930000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

(16QAM Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

(30 MHz ~ 1 GHz)

(1 GHz ~ 26.5 GHz)

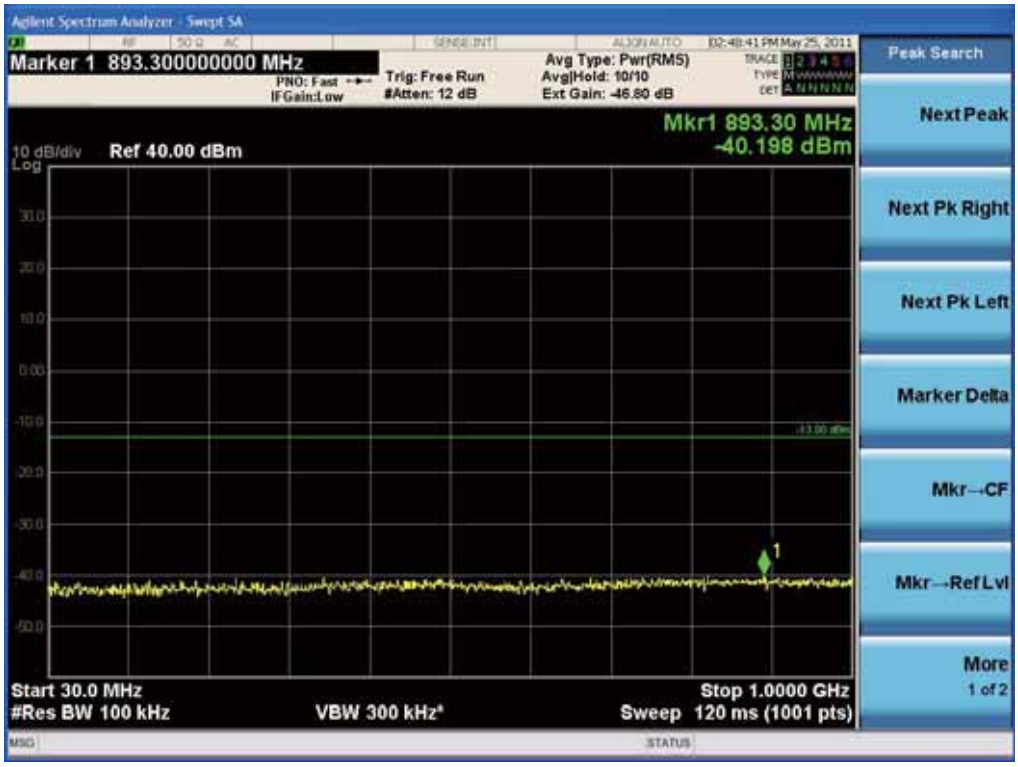
(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Sweep Time 1.00 s
PRO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
05:26:00 PM May 24, 2011
Mkr1 1.995 000 GHz
-17.739 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.995000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Sweep/Control
Sweep Time
1.00 s
Auto
Man
Sweep Setup
Gate
[Off,LO]
Points
1001
MSG
STATUS

7.4.2. Plot Data for 1 Tx mode – 1 Carrier , Output Port 1

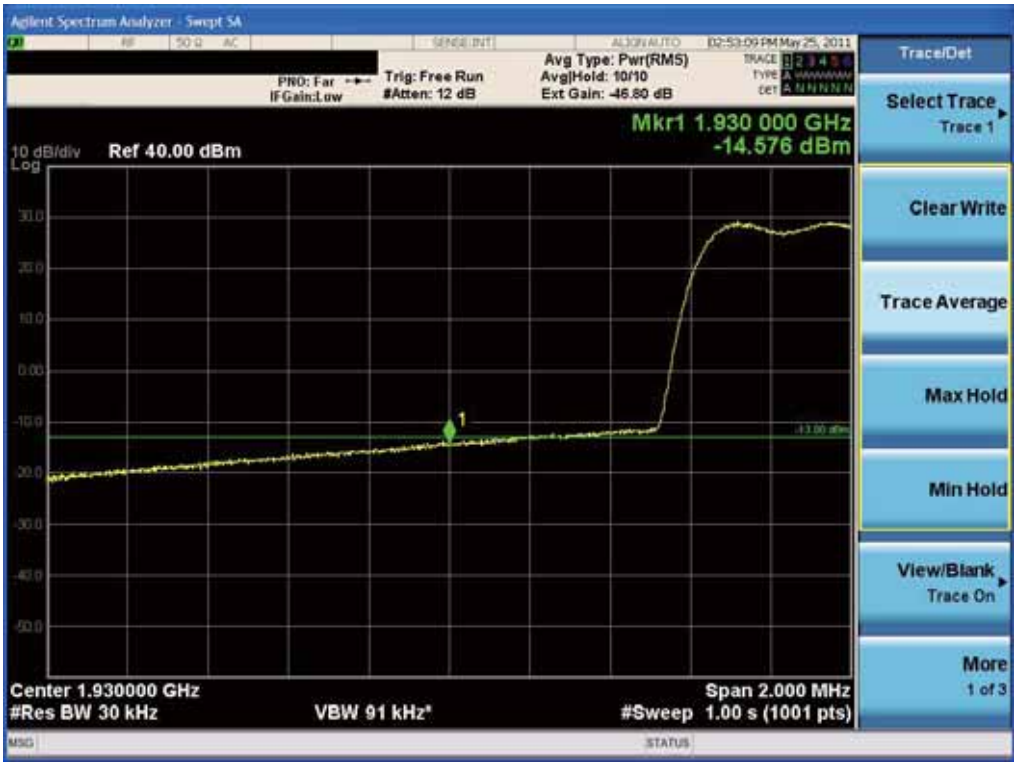
(16QAM Low Channel)

(30 MHz ~ 1 GHz)



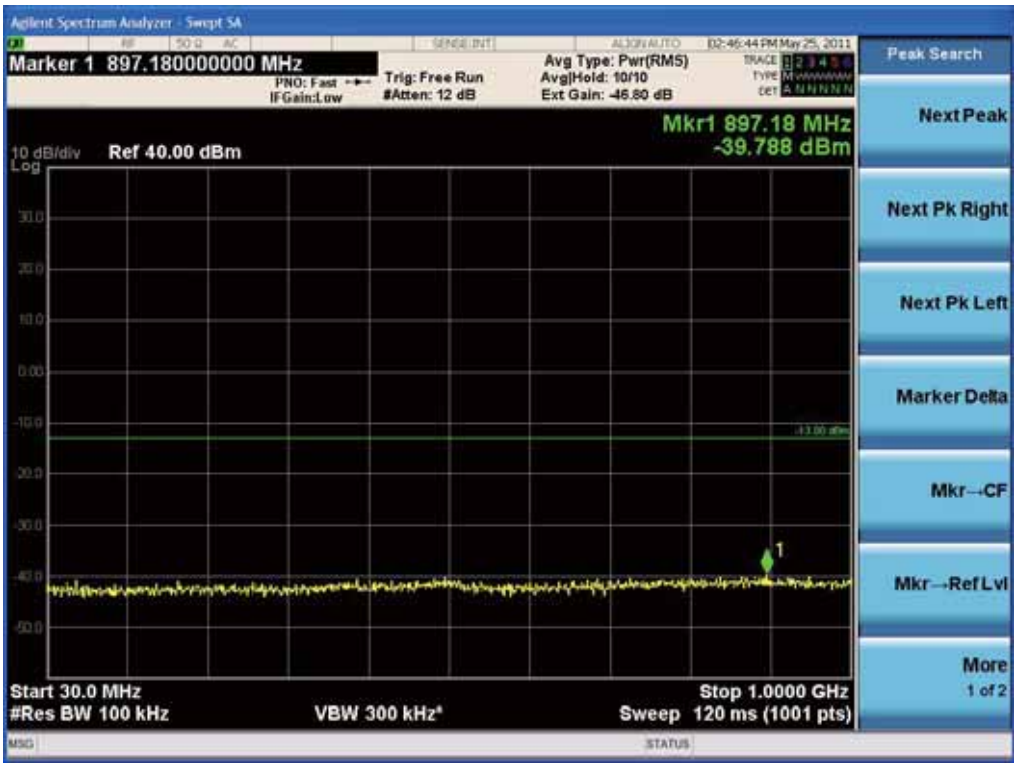
(1 GHz ~ 26.5 GHz)

(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Trace/Det
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
PRO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Mkr1 1.930 000 GHz
-14.576 dBm
10 dB/div
Log
Ref 40.00 dBm
Select Trace
Trace 1
Clear Write
Trace Average
Max Hold
Min Hold
View/Blank
Trace On
More
1 of 3
Center 1.930000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
MSG
STATUS

(16QAM Middle Channel)

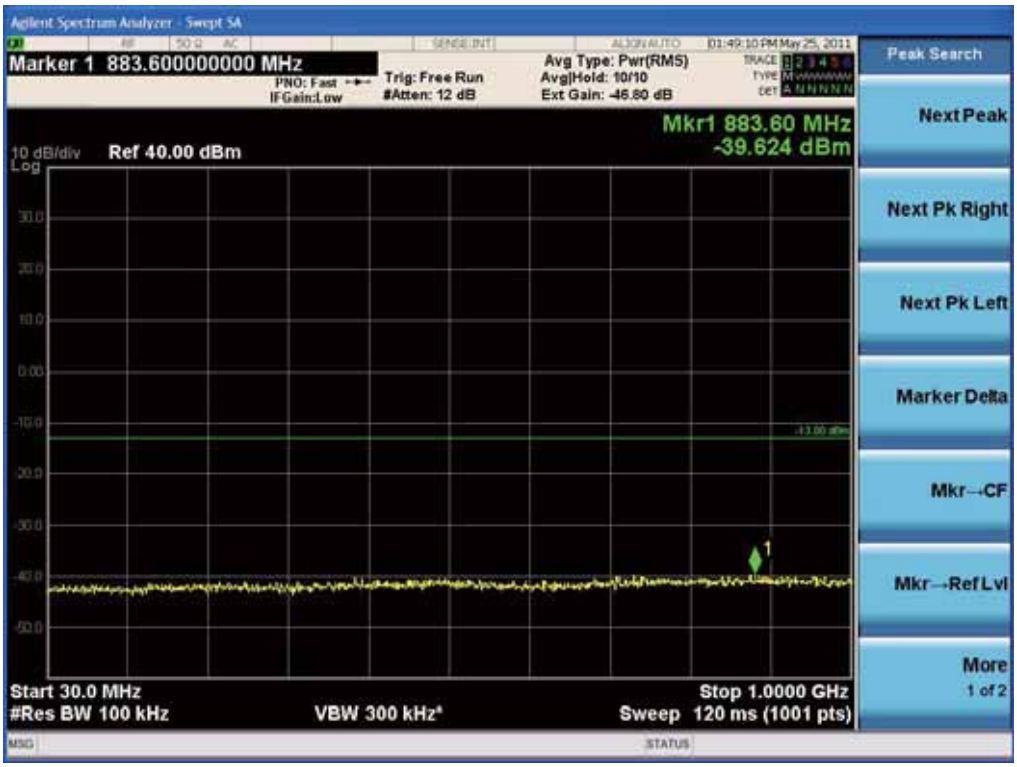
(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

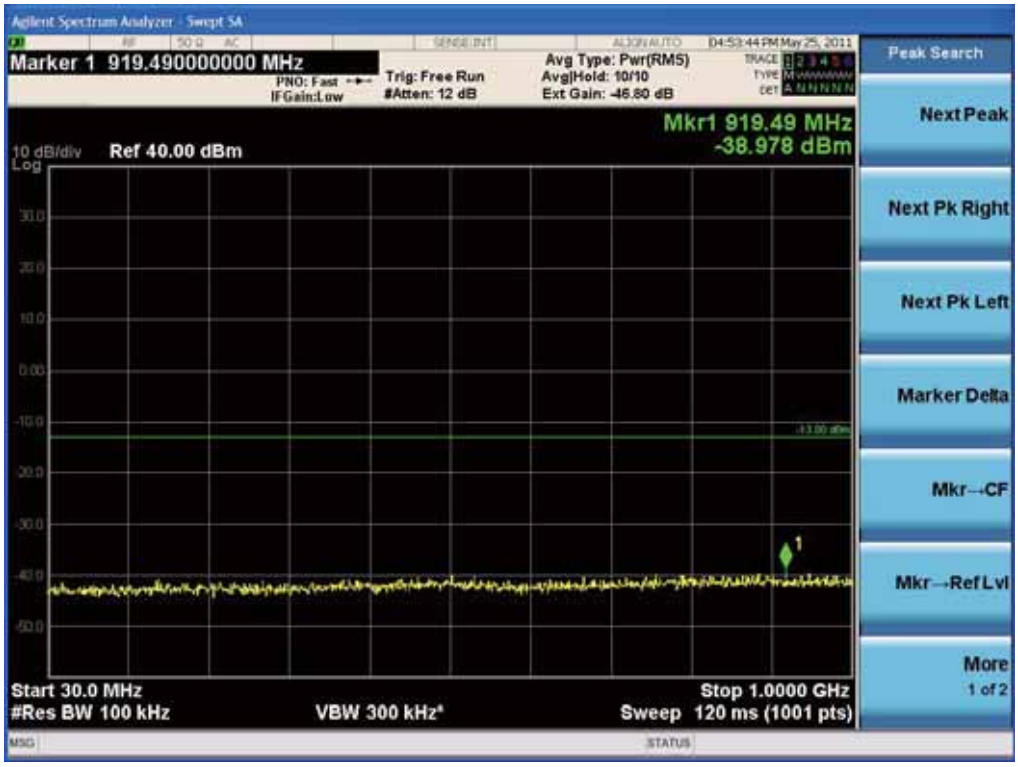
(Band Edge)


Agilent Spectrum Analyzer - Swept SA
01:49:54 PM May 25, 2011
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
PRO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Mkr1 1.995 000 GHz
-16.649 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.995000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Trace/Det
Select Trace
Trace 1
Clear Write
Trace Average
Max Hold
Min Hold
View/Blank
Trace On
More
1 of 3

7.4.3. Plot Data for 1 Tx mode – 1 Carrier , Output Port 2

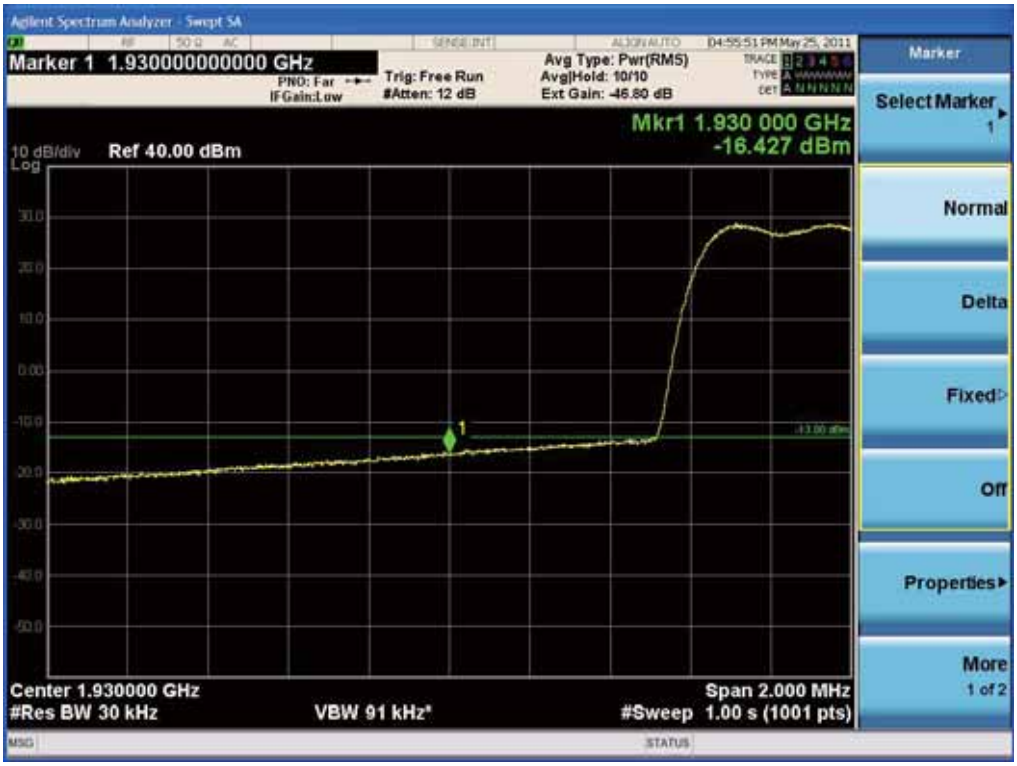
(16QAM Low Channel)

(30 MHz ~ 1 GHz)



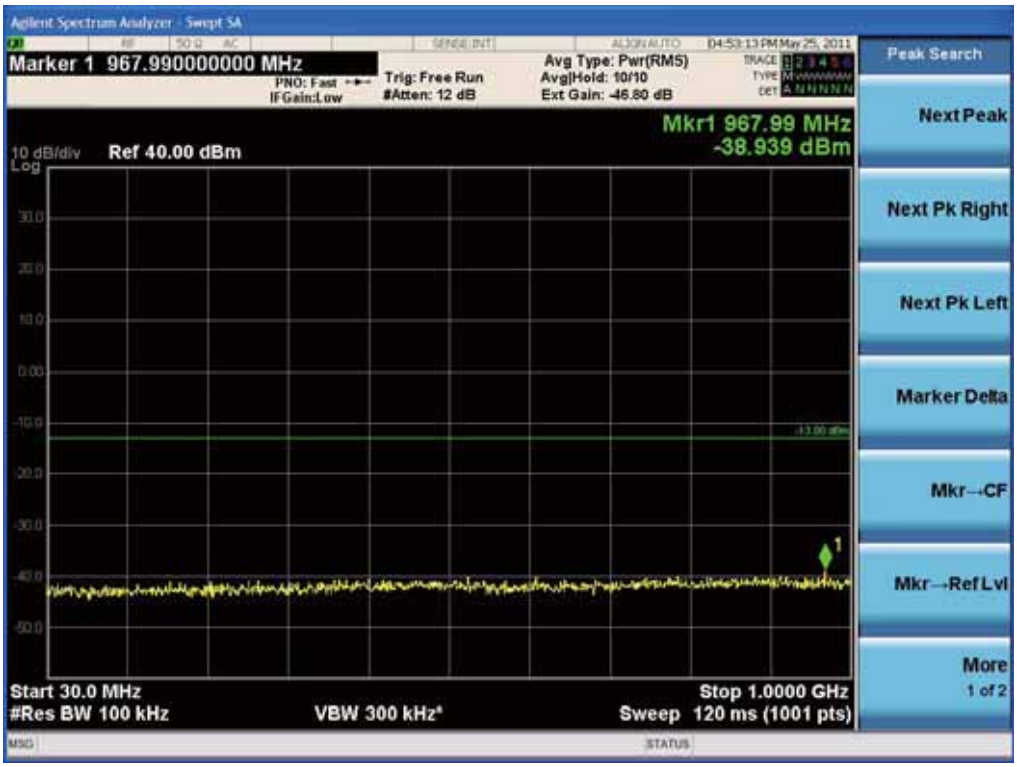
(1 GHz ~ 26.5 GHz)

(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Marker 1 1.930000000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
04:55:51 PM May 25, 2011
Mkr1 1.930 000 GHz
-16.427 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.930000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

(16QAM Middle Channel)

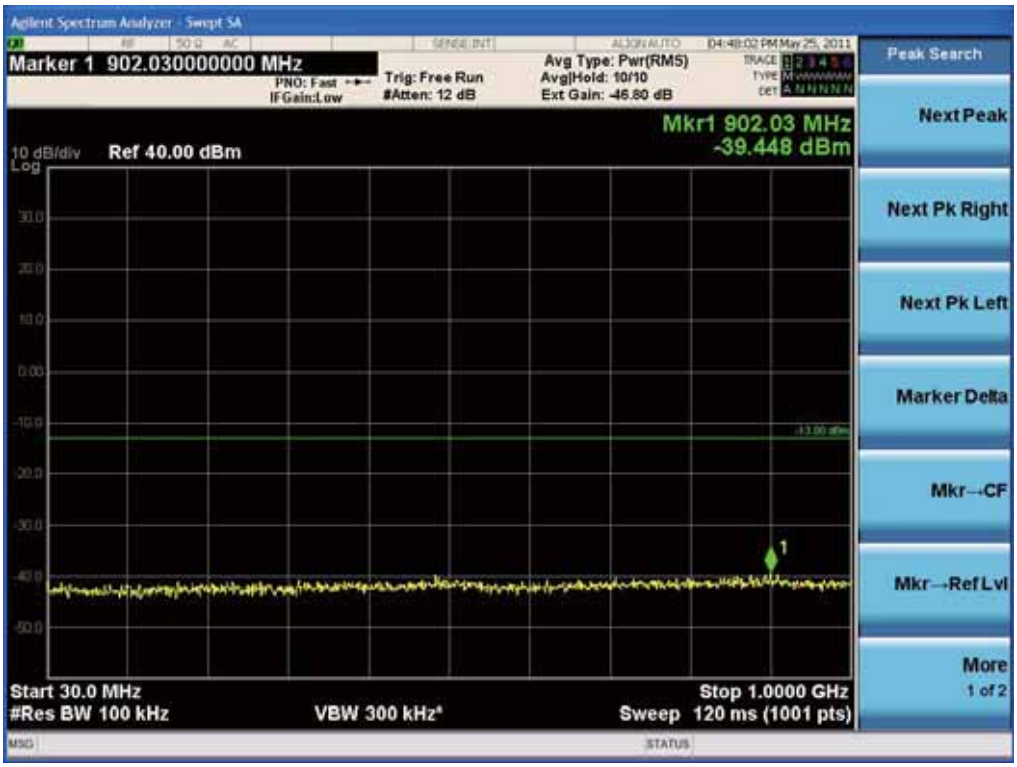
(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

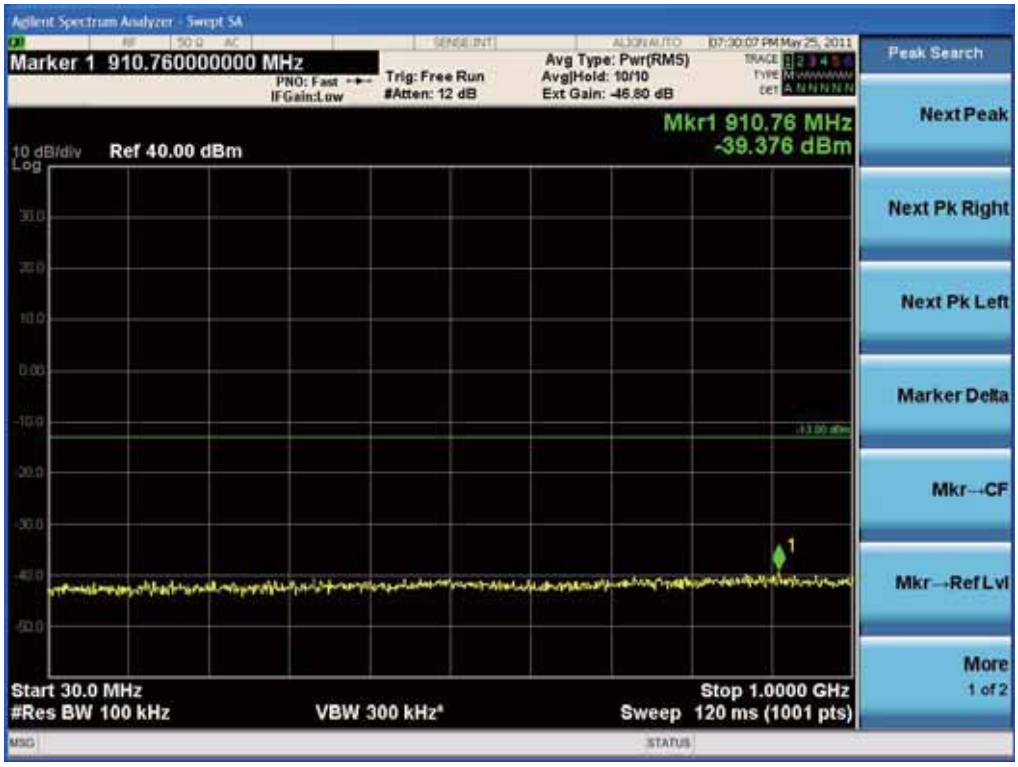
(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Marker 1 1.995000000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
04:47:43 PM May 25, 2011
Mkr1 1.995 000 GHz
-16.817 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.995000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

7.4.4. Plot Data for 1 Tx mode – 1 Carrier , Output Port 3

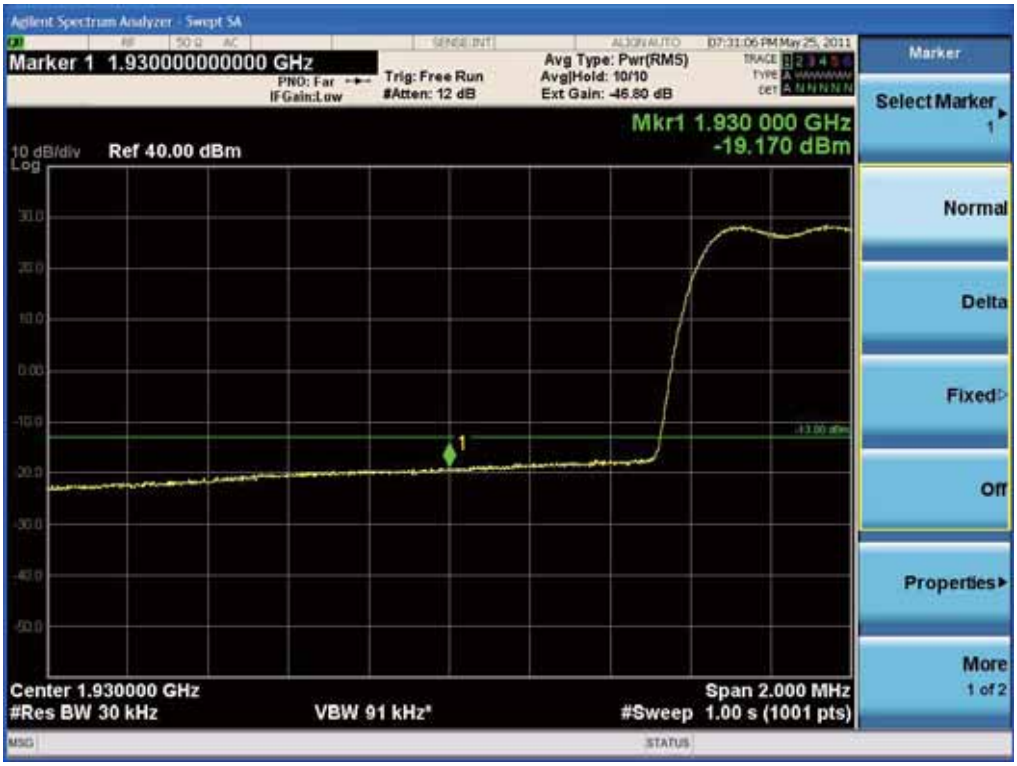
(16QAM Low Channel)

(30 MHz ~ 1 GHz)



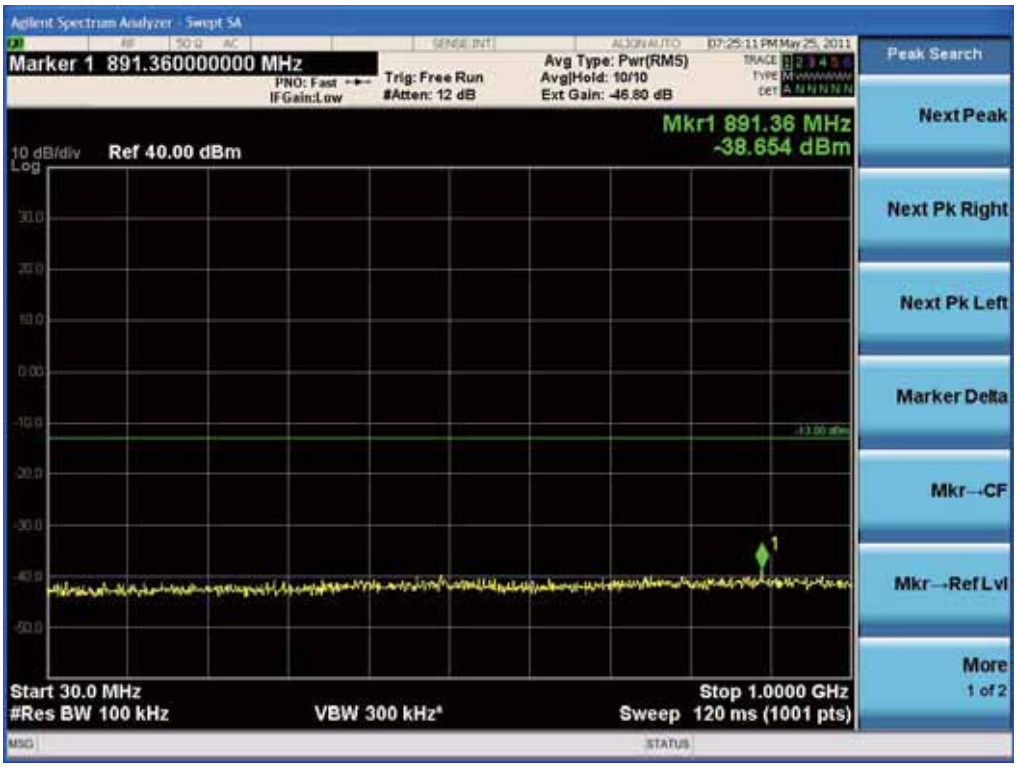
(1 GHz ~ 26.5 GHz)

(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Marker 1 1.930000000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
07:31:06 PM May 25, 2011
Mkr1 1.930 000 GHz
-19.170 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.930000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

(16QAM Middle Channel)

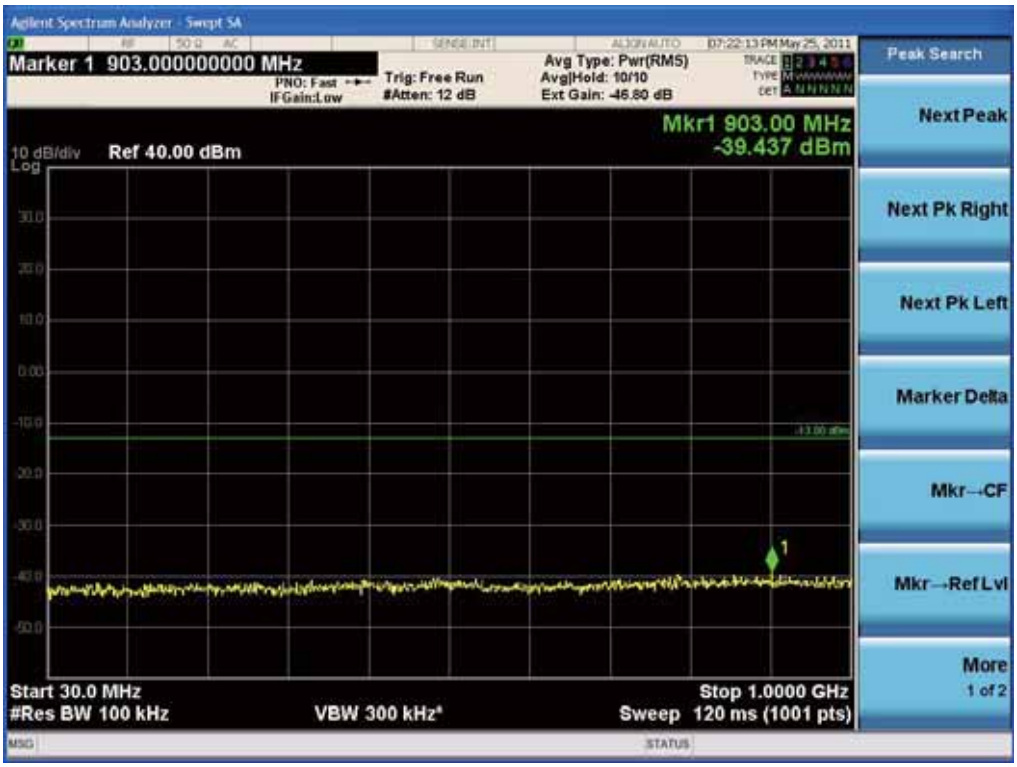
(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

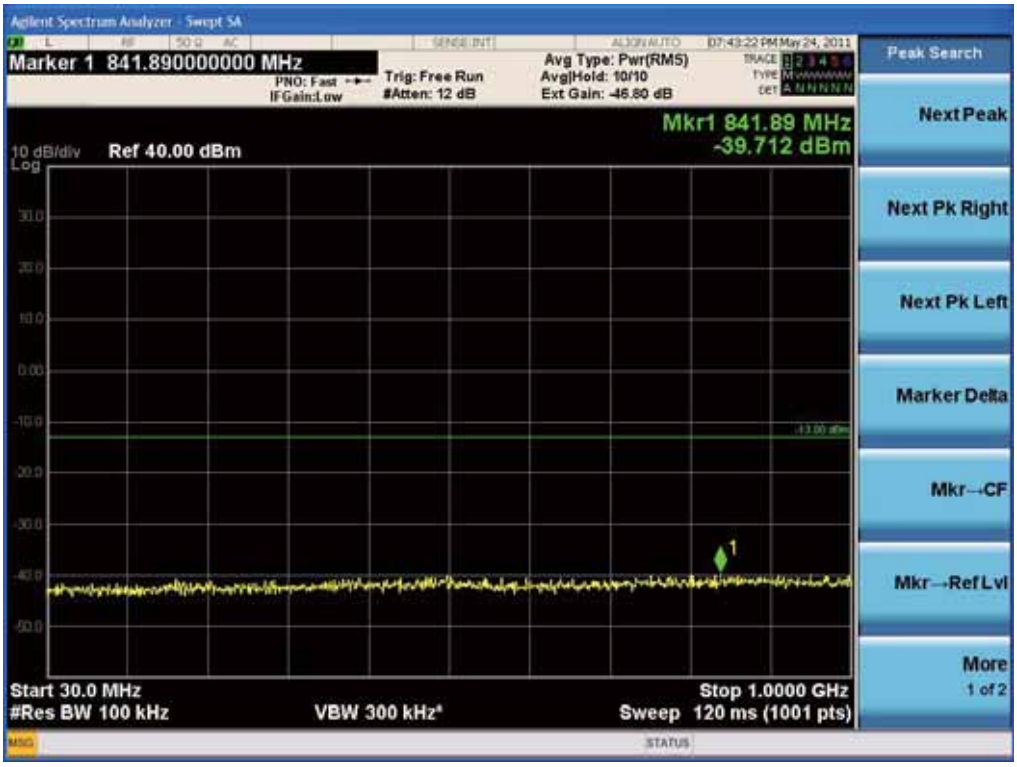
(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Sweep Time 1.00 s
PRO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
07:21:48 PM May 25, 2011
Mkr1 1.995 000 GHz
-18.693 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.995000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Sweep/Control
Sweep Time
1.00 s
Auto
Man
Sweep Setup
Gate
[Off,LO]
Points
1001
MSG
STATUS

7.4.5. Plot Data for 1 Tx mode – 2 Carriers, Output Port 0

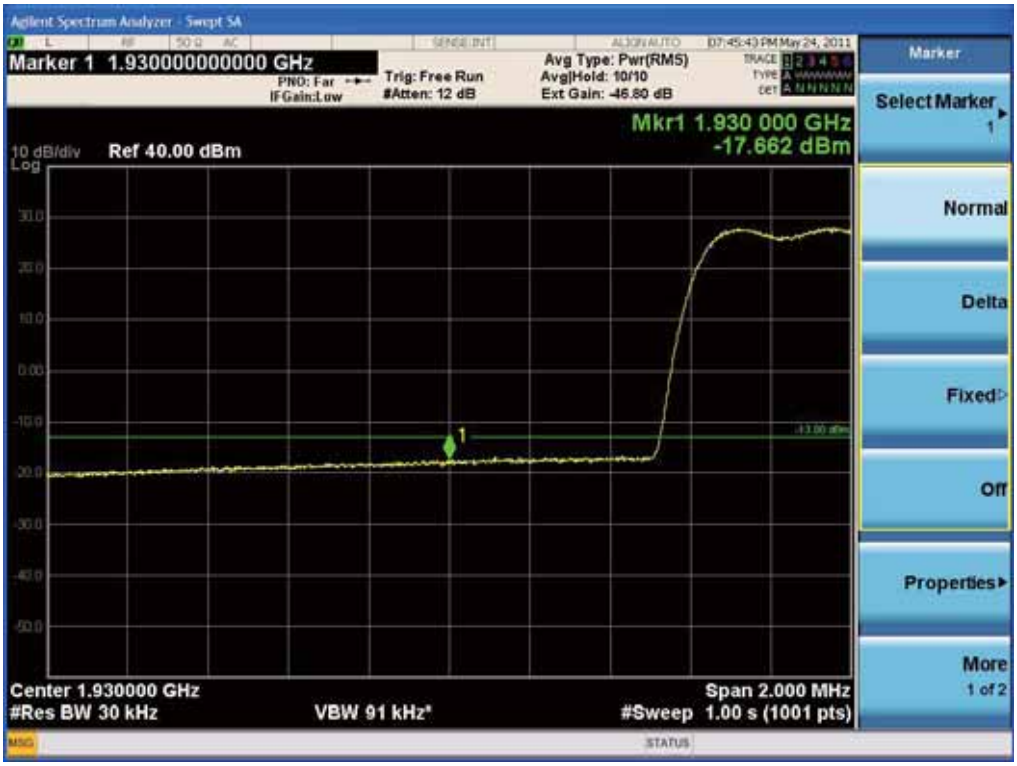
(16QAM Low Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Marker 1 1.930000000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
07:45:43 PM May 24, 2011
Mkr1 1.930 000 GHz
-17.662 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.930000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

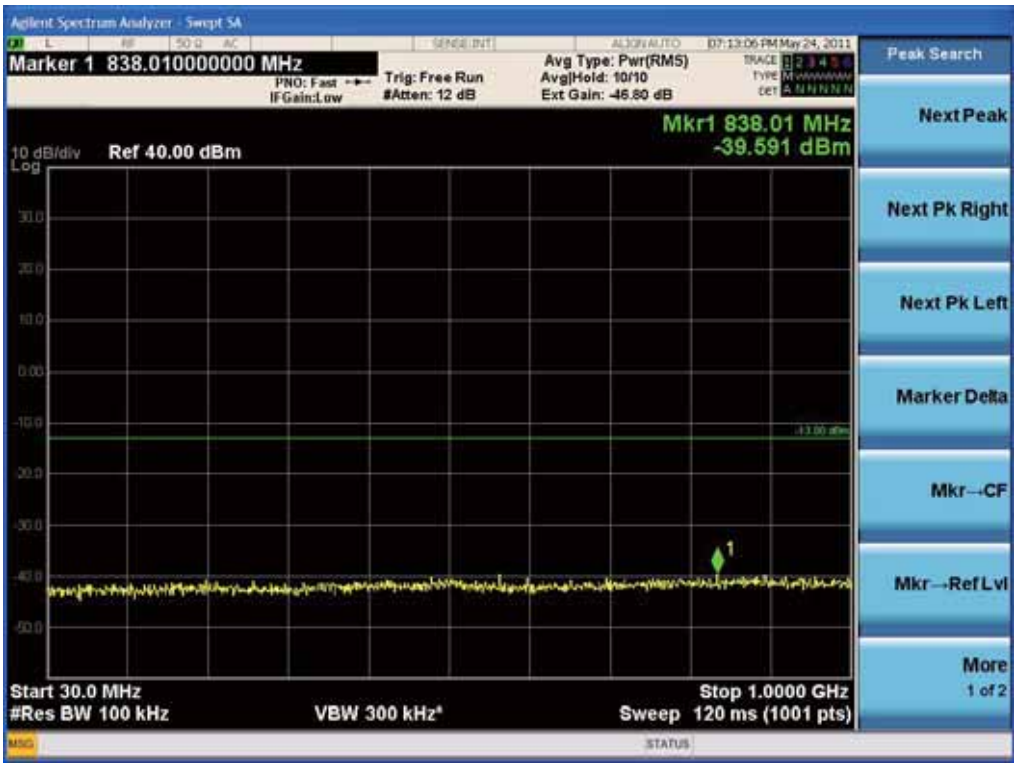
(16QAM Middle Channel)

(30 MHz ~ 1 GHz)

(1 GHz ~ 26.5 GHz)

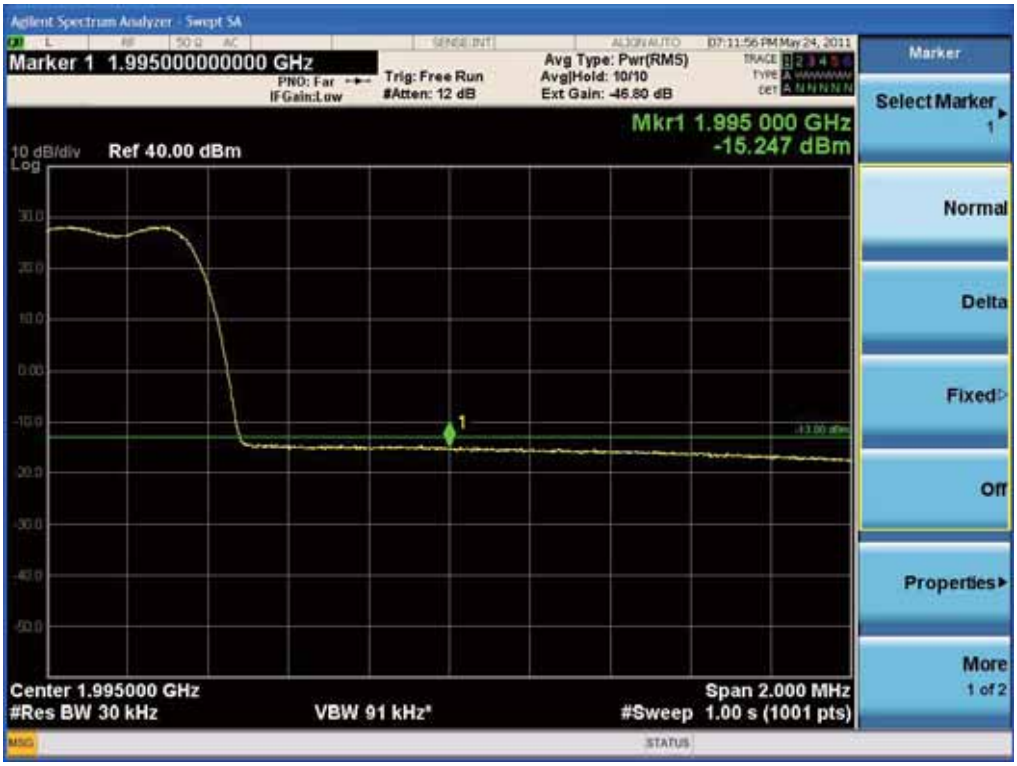
(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

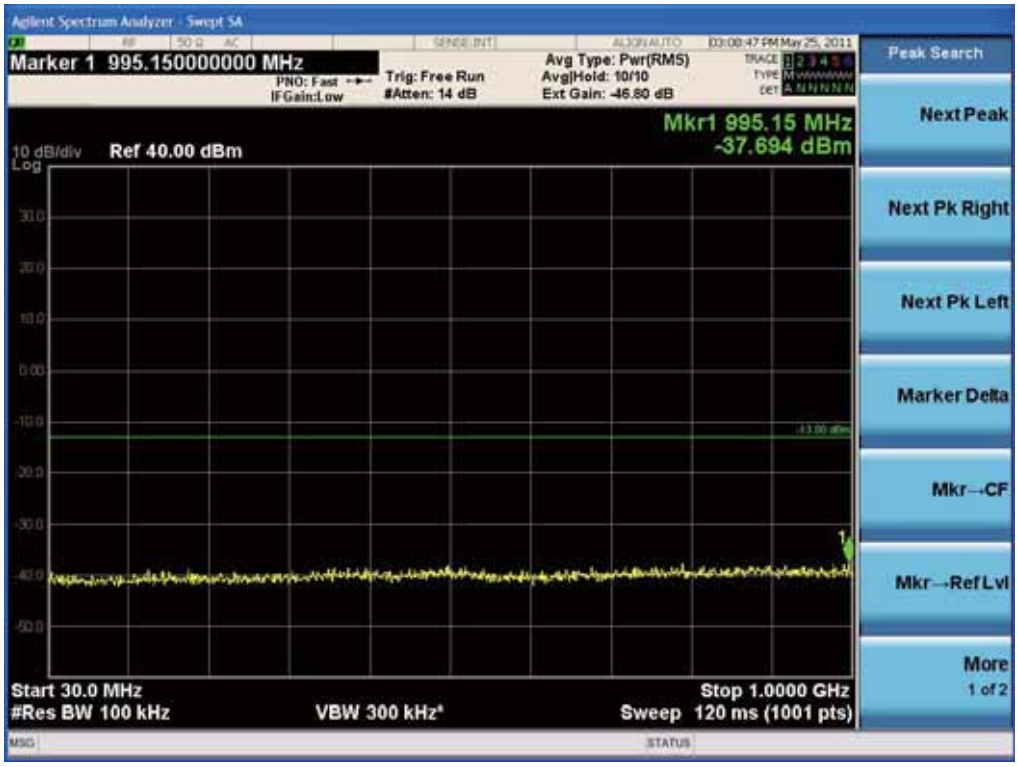
(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Marker 1 1.995000000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
07:11:56 PM May 24, 2011
Mkr1 1.995 000 GHz
-15.247 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.995000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

7.4.6. Plot Data for 1 Tx mode – 2 Carriers , Output Port 1

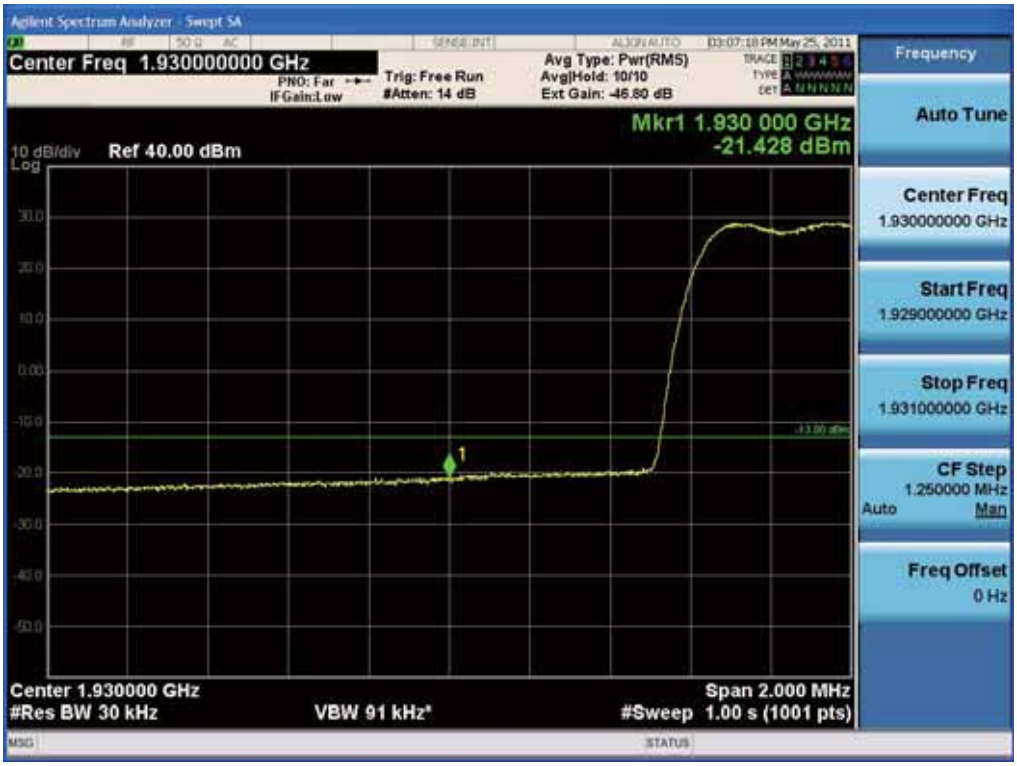
(16QAM Low Channel)

(30 MHz ~ 1 GHz)



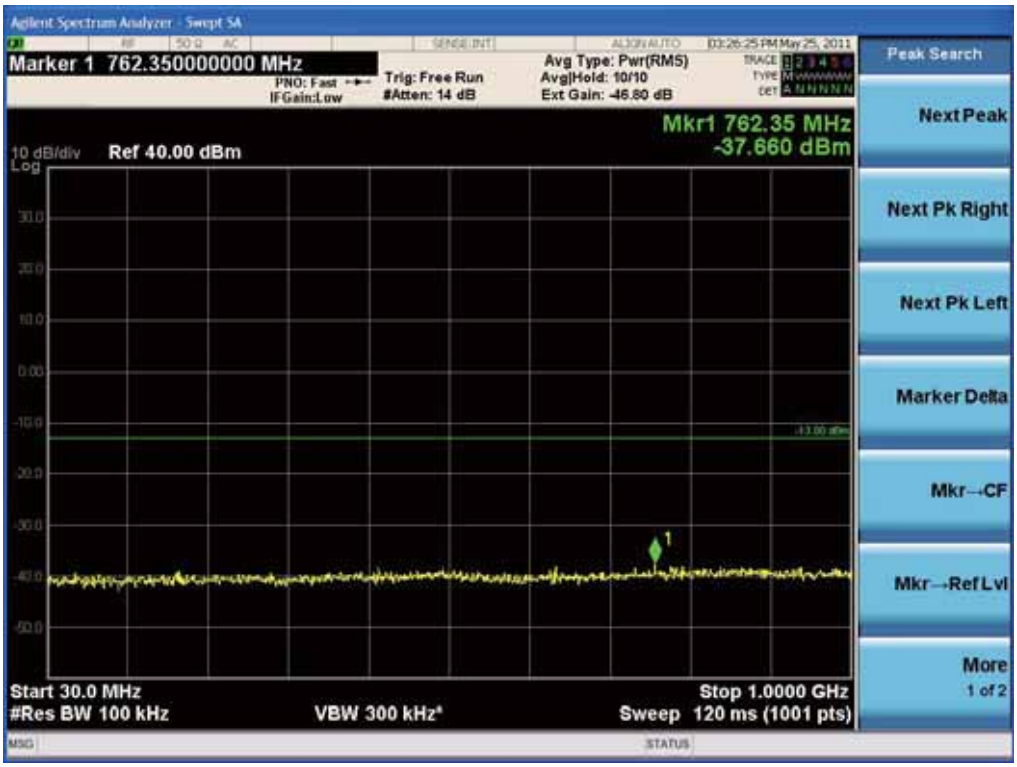
(1 GHz ~ 26.5 GHz)

(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Center Freq 1.930000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 14 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
03:07:18 PM May 25, 2011
Mkr1 1.930 000 GHz
-21.428 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.930000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Frequency
Auto Tune
Center Freq
1.930000000 GHz
Start Freq
1.929000000 GHz
Stop Freq
1.931000000 GHz
CF Step
1.250000 MHz
Auto
Man
Freq Offset
0 Hz

(16QAM Middle Channel)

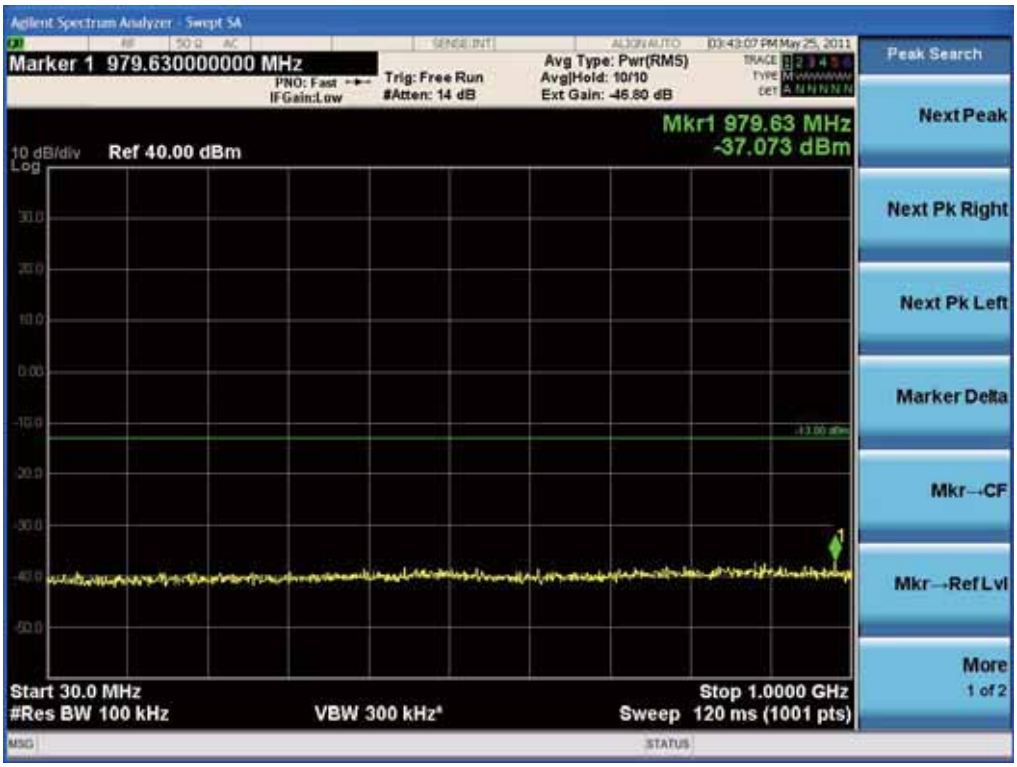
(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

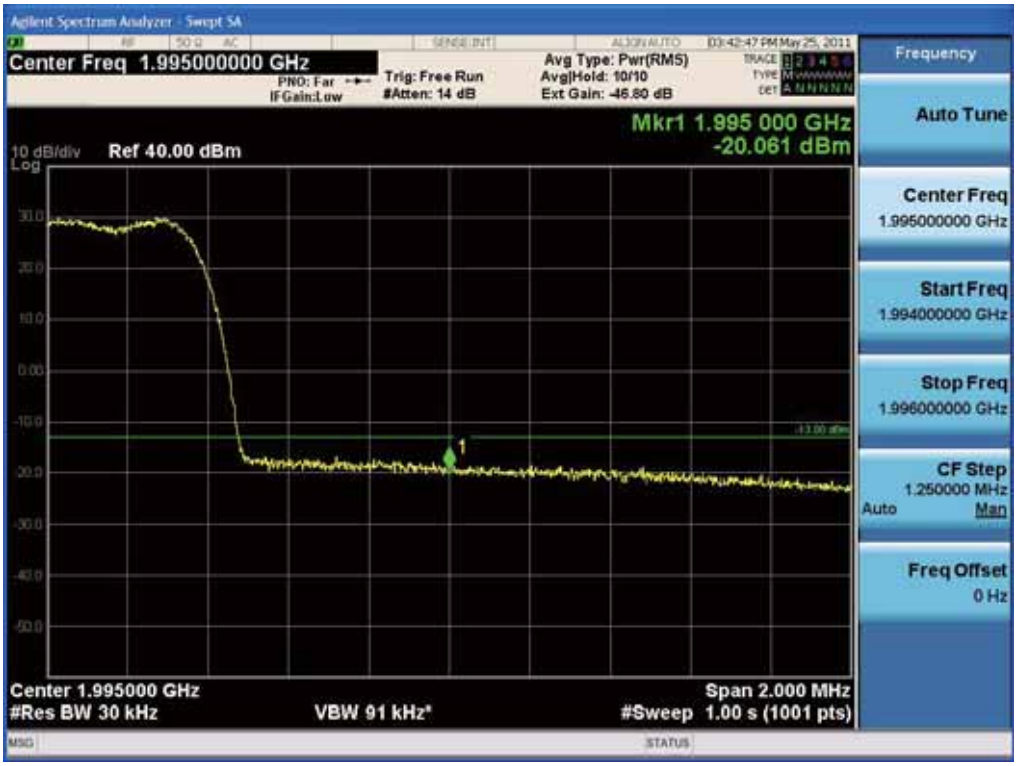
(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

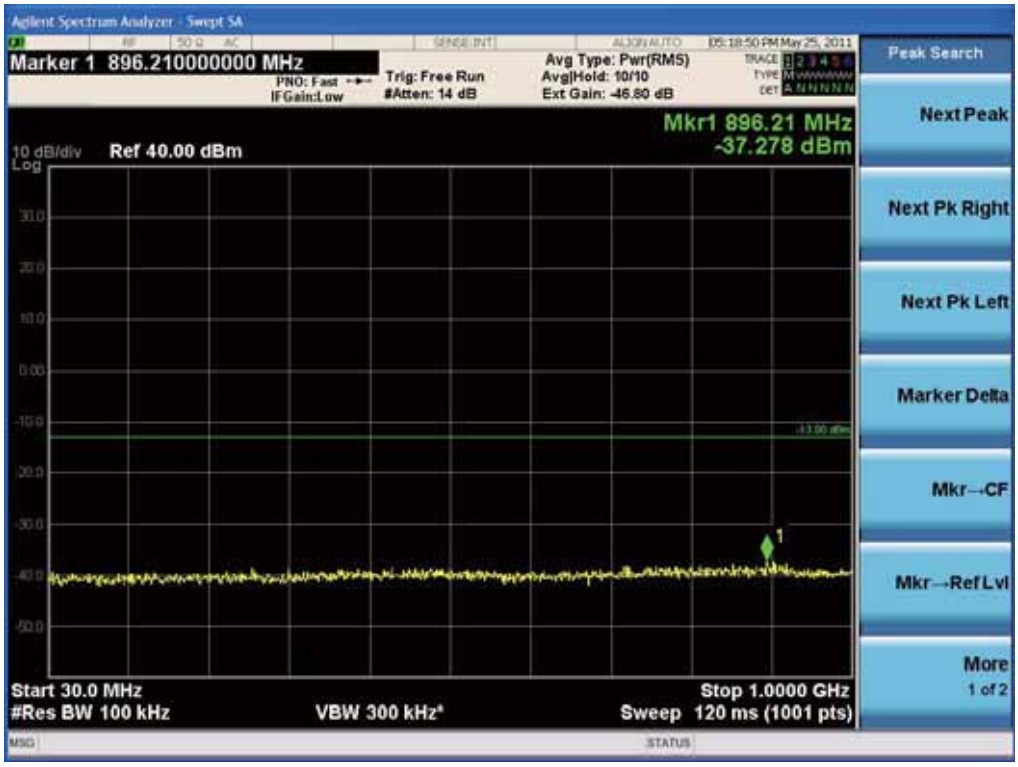
(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Center Freq 1.995000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 14 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
03:42:47 PM May 25, 2011
Mkr1 1.995 000 GHz
-20.061 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.995000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Frequency
Auto Tune
Center Freq
1.995000000 GHz
Start Freq
1.994000000 GHz
Stop Freq
1.996000000 GHz
CF Step
1.250000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

7.4.7. Plot Data for 1 Tx mode – 2 Carriers, Output Port 2

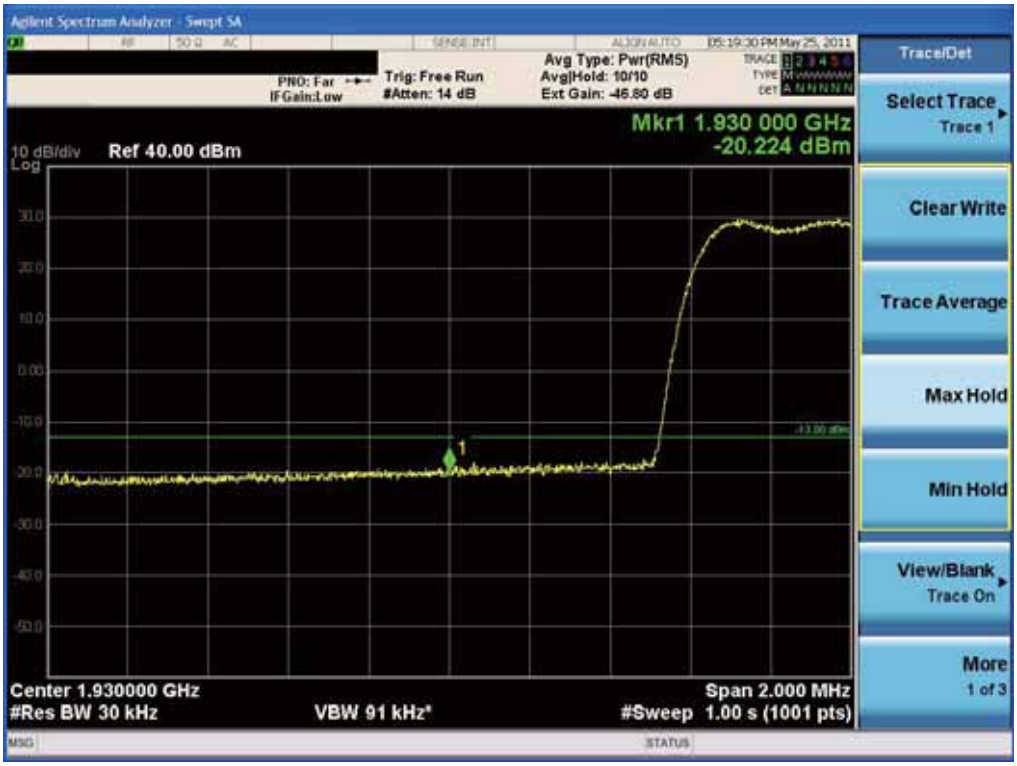
(16QAM Low Channel)

(30 MHz ~ 1 GHz)



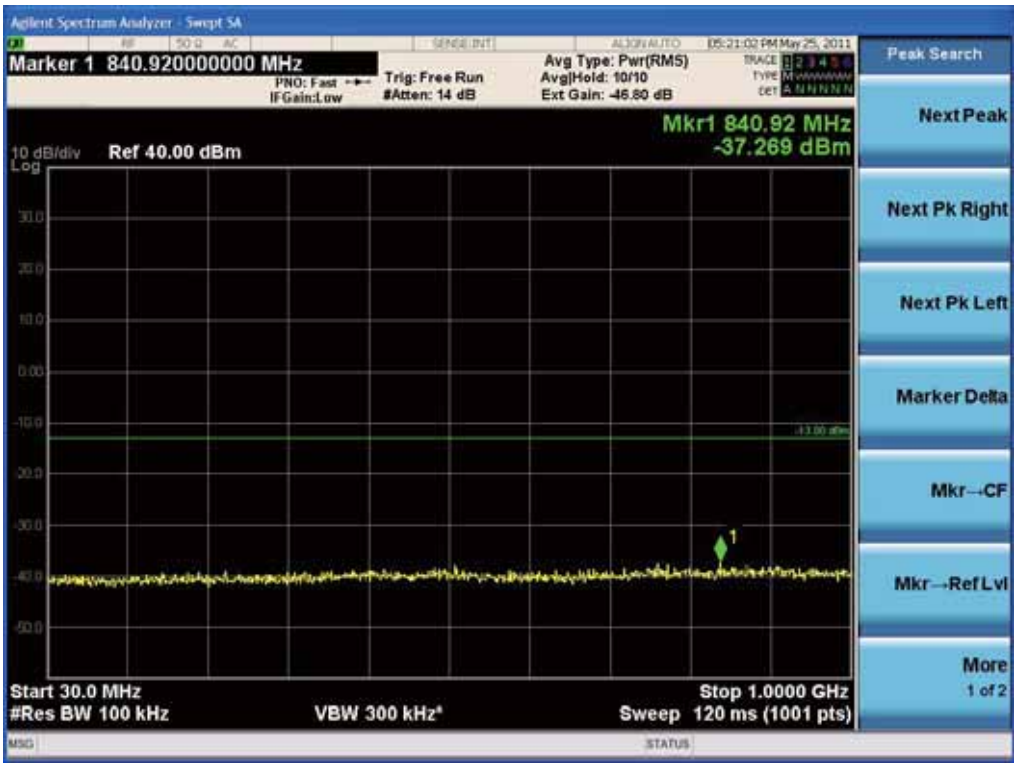
(1 GHz ~ 26.5 GHz)

(Band Edge)


Agilent Spectrum Analyzer - Swept SA
05:19:30 PM May 25, 2011
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
PRO: Far
IFGain:Low
Trig: Free Run
#Atten: 14 dB
Mkr1 1.930 000 GHz
-20.224 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.930000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Trace/Det
Select Trace
Trace 1
Clear Write
Trace Average
Max Hold
Min Hold
View/Blank
Trace On
More
1 of 3
MSG
STATUS

(16QAM Middle Channel)

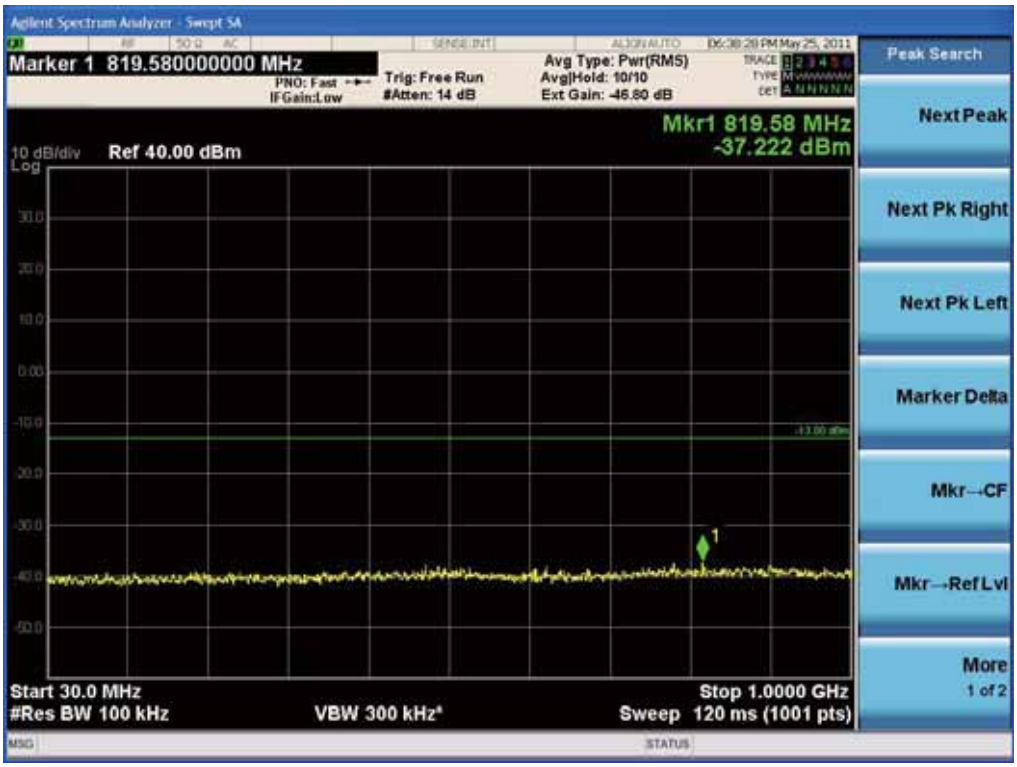
(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

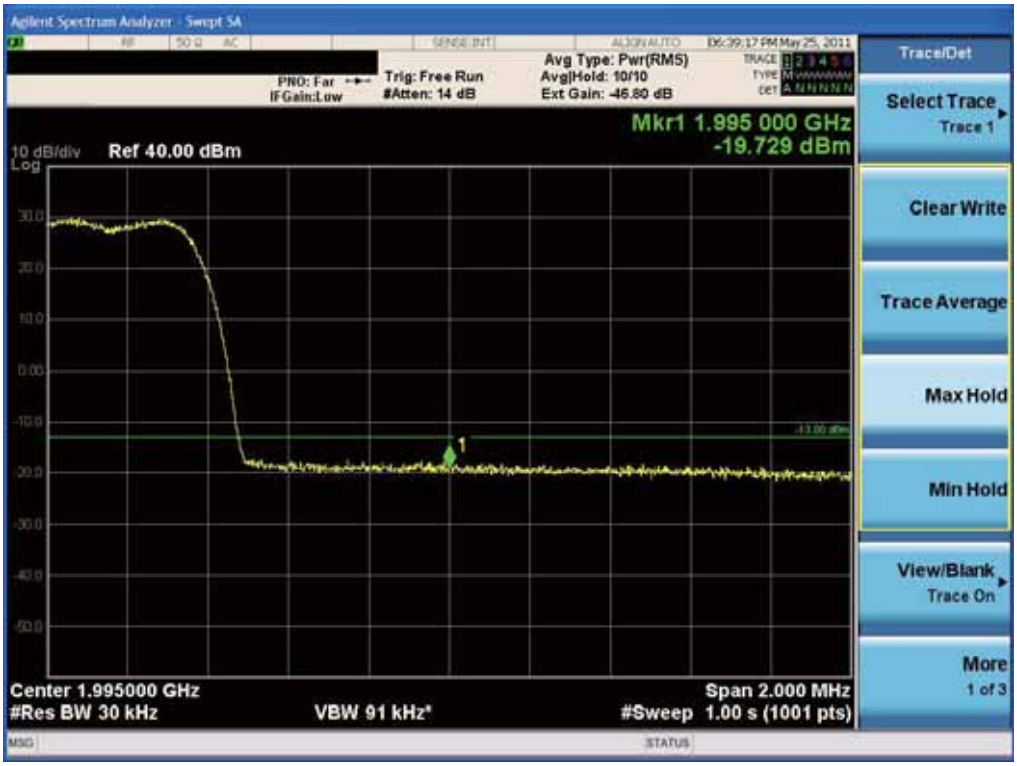
(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

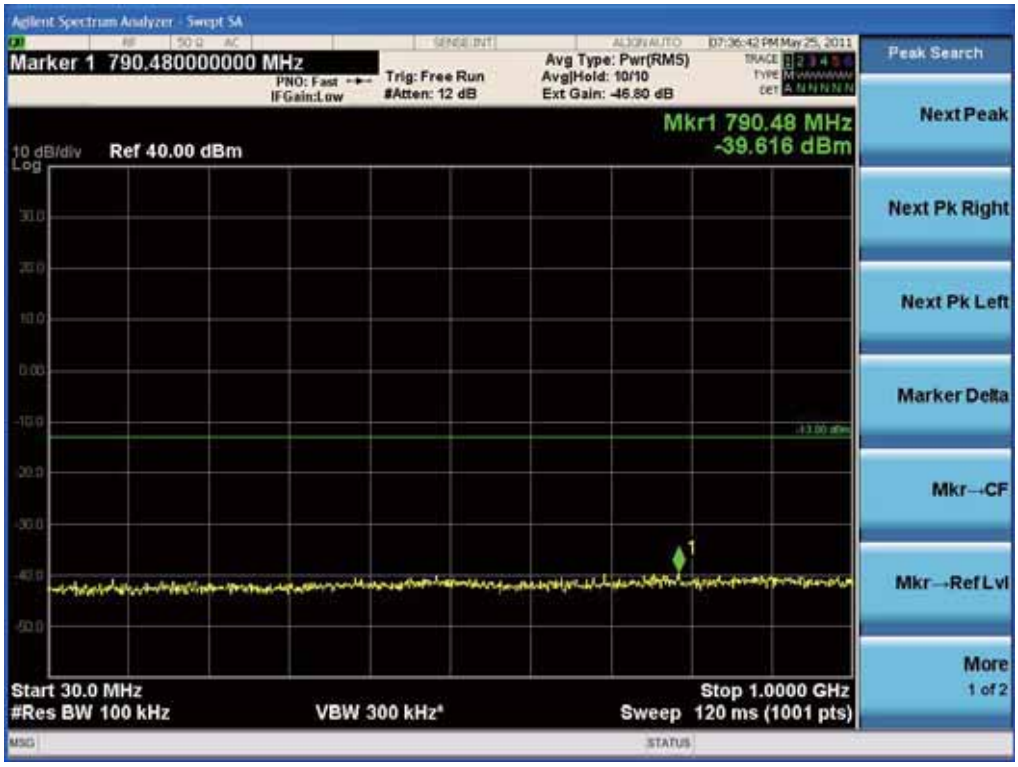
(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Trace/Det
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
PRO: Far
IFGain:Low
Trig: Free Run
#Atten: 14 dB
Mkr1 1.995 000 GHz
-19.729 dBm
10 dB/div
Log
Ref 40.00 dBm
Select Trace
Trace 1
Clear Write
Trace Average
Max Hold
Min Hold
View/Blank
Trace On
More
1 of 3
Center 1.995000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
MSG
STATUS

7.4.8. Plot Data for 1 Tx mode – 2 Carrier , Output Port 3

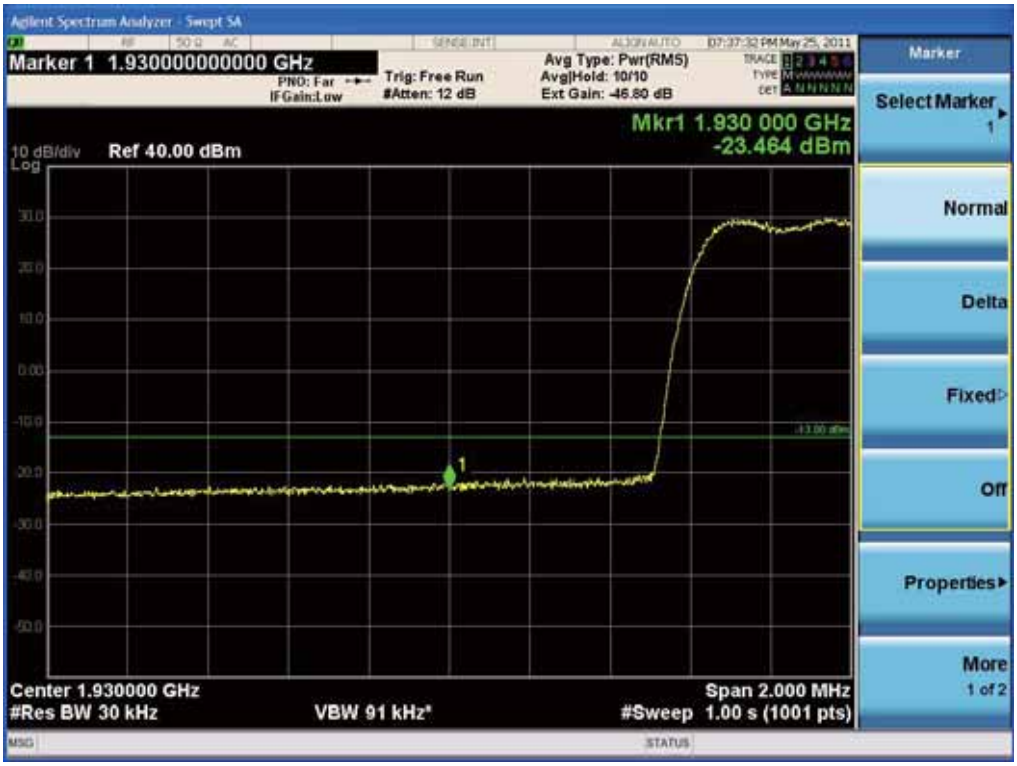
(16QAM Low Channel)

(30 MHz ~ 1 GHz)



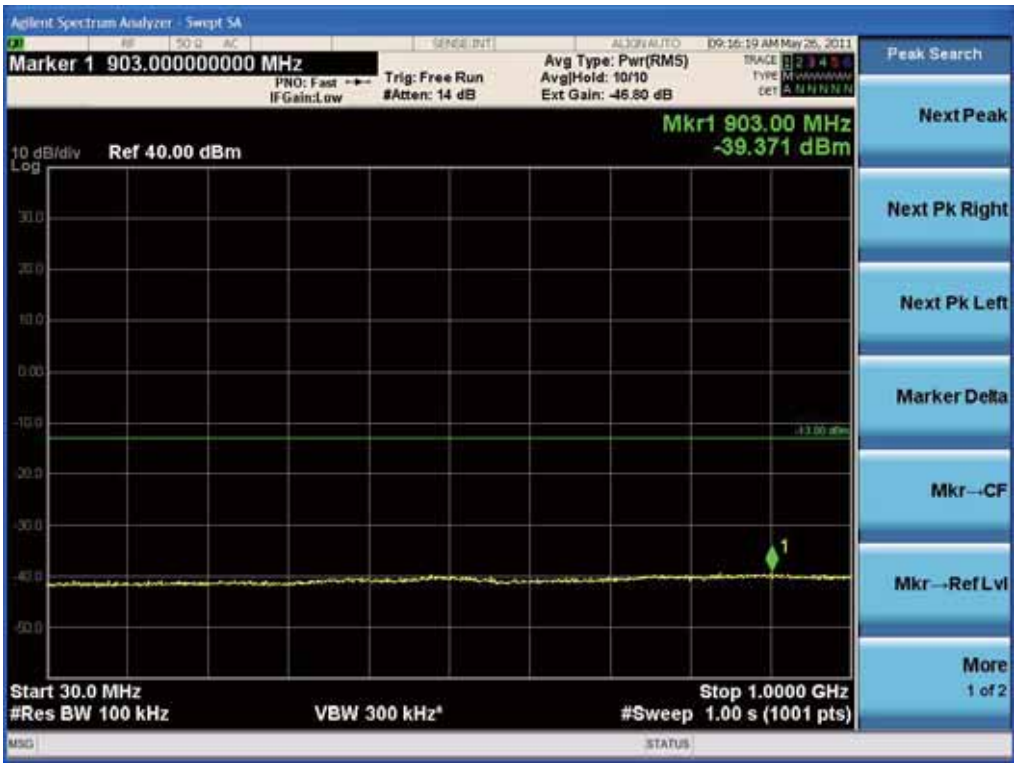
(1 GHz ~ 26.5 GHz)

(Band Edge)


Agilent Spectrum Analyzer - Swept SA
Marker 1 1.930000000000 GHz
PNO: Far
IFGain:Low
Trig: Free Run
#Atten: 12 dB
Avg Type: Pwr(RMS)
Avg|Hold: 10/10
Ext Gain: -46.80 dB
07:37:32 PM May 25, 2011
Mkr1 1.930 000 GHz
-23.464 dBm
10 dB/div
Log
Ref 40.00 dBm
Center 1.930000 GHz
#Res BW 30 kHz
VBW 91 kHz*
Span 2.000 MHz
#Sweep 1.00 s (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

(16QAM Middle Channel)

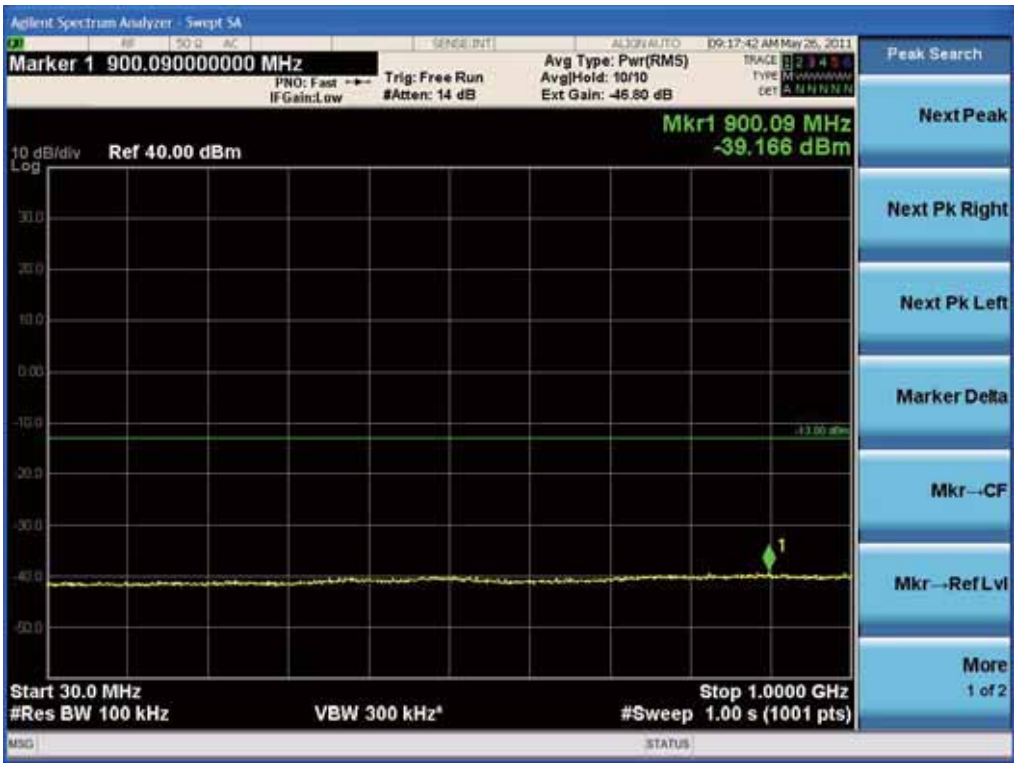
(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)

(Band Edge)

7.4.9. Measure and add 10log(N) data (N=4)

Modulation	Channel	Frequency	Measured data (dBm)		10*log(N)	Measure and sum (dBm)	
			30 MHz ~ 1 GHz	1 GHz ~ 26.5 GHz		30 MHz ~ 1 GHz	1 GHz ~ 26.5 GHz
BPSK	Low	1931.875	-39.075	-19.412	6.02	-33.055	-13.392
	Middle	1961.875	-39.396	-19.488		-33.376	-13.468
	High	1993.125	-39.791	-19.304		-33.771	-13.284
QPSK	Low	1931.875	-41.476	-20.146		-35.456	-14.126
	Middle	1961.875	-39.215	-19.378		-33.195	-13.358
	High	1993.125	-39.761	-19.329		-33.741	-13.309
16QAM	Low	1931.875	-39.712	-19.554		-33.692	-13.534
	Middle	1961.875	-39.828	-19.552		-33.808	-13.532
	High	1993.125	-39.591	-19.613		-33.571	-13.593

8. RADIATED SPURIOUS EMISSION

8.1 Applicable Standard

According to FCC § 24.238

(a) *Out of band emissions.* 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.

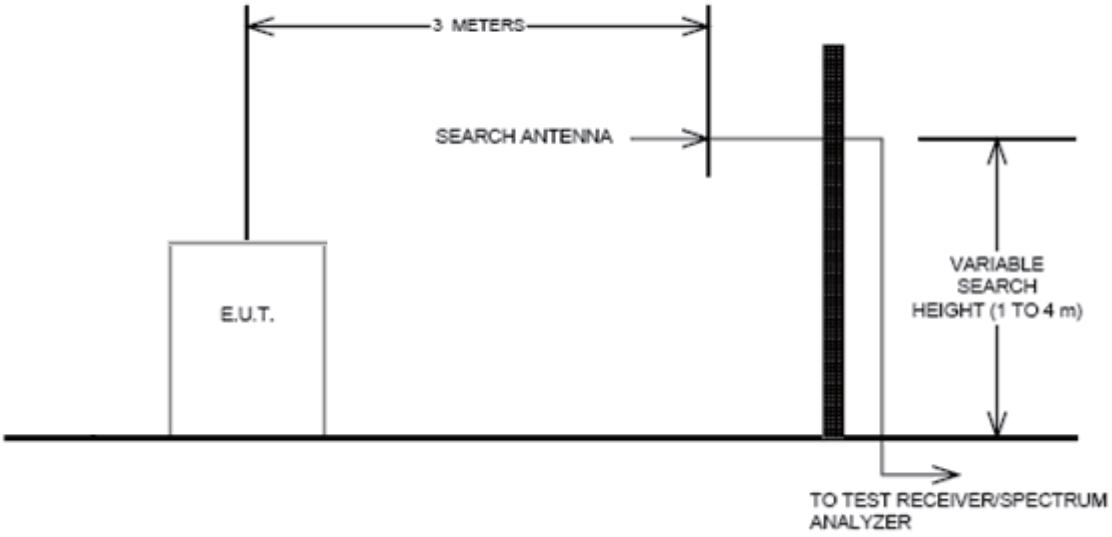
8.2 Txest Equipment List and Details

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	04/13/2012
Schwarzbeck	VULB 9168 / TRILOG Antenna	9168-200	02/19/2013
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-6D-001180-35-20P/AMP	990893	05/02/2012
EMCO	6502/Loop Antenna	9009-2536	01/13/2012
Agilent	N9020A /Signal Analyzer	MY51110020	04/16/2012
Agilent	6674A / DC Power Supply	3501A00901	05/02/2012
WEINSCHEL	67-30-33 / Attenuator	BU5347	12/29/2011
WEINSCHEL	67-30-33 / Attenuator	BR0530	12/29/2011
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/12/2011
WEINSCHEL	AF9003-69-31 / Attenuator	639	11/12/2011

8.3 Test Procedure

Radiated emission measurements were performed at an semi-anechoic chamber.
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 360^0 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.

8.3.1 Radiated Spurious Emissions Test Setup



8.4 Test Result

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

(Power boost mode was tested on.)

Mode	Frequency	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBd)	C.L	Pol.	ERP (dBm)	Margin (dB)
1 Carrier	1962.5	3925.00	−50.8	10.37	8.57	V	−49.00	−36.00
		5887.50	−50.1	10.74	10.41	V	−49.77	−36.77
2 Carriers	1961.875	3923.75	−50.4	10.37	8.56	V	−48.59	−35.59
		5885.63	−49.7	10.73	10.41	V	−49.38	−36.38
3 Carriers	1962.5	3925.00	−49.9	10.37	8.57	V	−48.10	−35.10
		5887.50	−50.1	10.74	10.41	V	−49.77	−36.77
4 Carriers	1963.125	3926.25	−48.3	10.37	8.57	V	−46.50	−33.50
		5889.38	−47.6	10.74	10.41	V	−47.27	−34.27

※ Tested at 2 Tx mode (Port 0 & 1)

9. FREQUECNY STABILITY

9.1 Applicable Standard

Requirements: FCC § 2.1055 (a), §24.235 following: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

9.2 Txest Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	MY51110020	04/16/2012
WEINSCHEL	67-30-33 / Attenuator	BU5347	12/29/2011
WEINSCHEL	67-30-33 / Attenuator	BR0530	12/29/2011
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/12/2011
WEINSCHEL	AF9003-69-31 / Attenuator	639	11/12/2011
Agilent	6674A / DC Power Supply	3501A00901	05/02/2012
Agilent	11636B / Power Divider	11377	12/29/2011

9.3 Test Procedure

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

9.4. Test Result

: Pass (Power boost mode was tested on.)

9.4.1. Frequency Stability over Temperature and Voltage variation

Modulation: BPSK

Reference: - 48 Vdc at 20°c **Freq.** = 1962,500,000 MHz

Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	1962 499 918	-82	0	0.0000
	-30	1962 499 960	-40	42	0.0214
	-20	1962 500 093	93	175	0.0892
	-10	1962 500 049	49	131	0.0668
	0	1962 499 972	-28	54	0.0275
	+10	1962 499 947	-53	29	0.0148
	+30	1962 500 038	38	120	0.0611
	+40	1962 500 036	36	118	0.0601
	+50	1962 500 011	11	93	0.0474
115%	+20	1962 499 936	-64	18	0.0092
85%	+20	1962 499 957	-43	39	0.0199

(Output Port 1)

Modulation: QPSK

Reference: - 48 Vdc at 20°c **Freq.** = 1962,500,000 MHz

Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	1962 499 945	-55	0	0.0000
	-30	1962 499 951	-49	6	0.0031
	-20	1962 499 953	-47	8	0.0041
	-10	1962 499 961	-39	16	0.0082
	0	1962 499 952	-48	7	0.0036
	+10	1962 500 032	32	87	0.0443
	+30	1962 500 038	38	93	0.0474
	+40	1962 499 935	-65	-10	-0.0051
	+50	1962 499 974	-26	29	0.0148
115%	+20	1962 499 981	-19	36	0.0183
85%	+20	1962 500 021	21	76	0.0387

(Output Port 2)

Modulation: 16QAM

Reference: - 48 Vdc at 20°c **Freq.** = 1962,500,000 MHz

Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	1962 500 018	18	0	0.0000
	-30	1962 500 027	27	9	0.0046
	-20	1962 499 937	-63	-81	-0.0413
	-10	1962 499 958	-42	-60	-0.0306
	0	1962 499 961	-39	-57	-0.0290
	+10	1962 499 960	-40	-58	-0.0296
	+30	1962 499 968	-32	-50	-0.0255
	+40	1962 499 981	-19	-37	-0.0189
	+50	1962 499 978	-22	-40	-0.0204
115%	+20	1962 499 969	-31	-49	-0.0250
85%	+20	1962 499 964	-36	-54	-0.0275

(Output Port 3)

10. 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

3. RESULTS

Max Peak output Power at antenna input terminal	49.39000	dBm
Max Peak output Power at antenna input terminal	86896.04293	mW
Prediction distance	900.00000	cm
Prediction frequency	1963.12500	MHz
Antenna Gain(typical)	20.00000	dBi
Antenna Gain(numeric)	100.00000	–
Power density at prediction frequency (S)	0.85370	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.00000	mW/cm^2

The power density level at 900 cm is 0.85370 mW/cm^2, which is below the uncontrolled exposure limit of 1.0 mW/cm^2 at 1963.125 MHz.