7. BAND EDGES

7.1. Applicable Standard

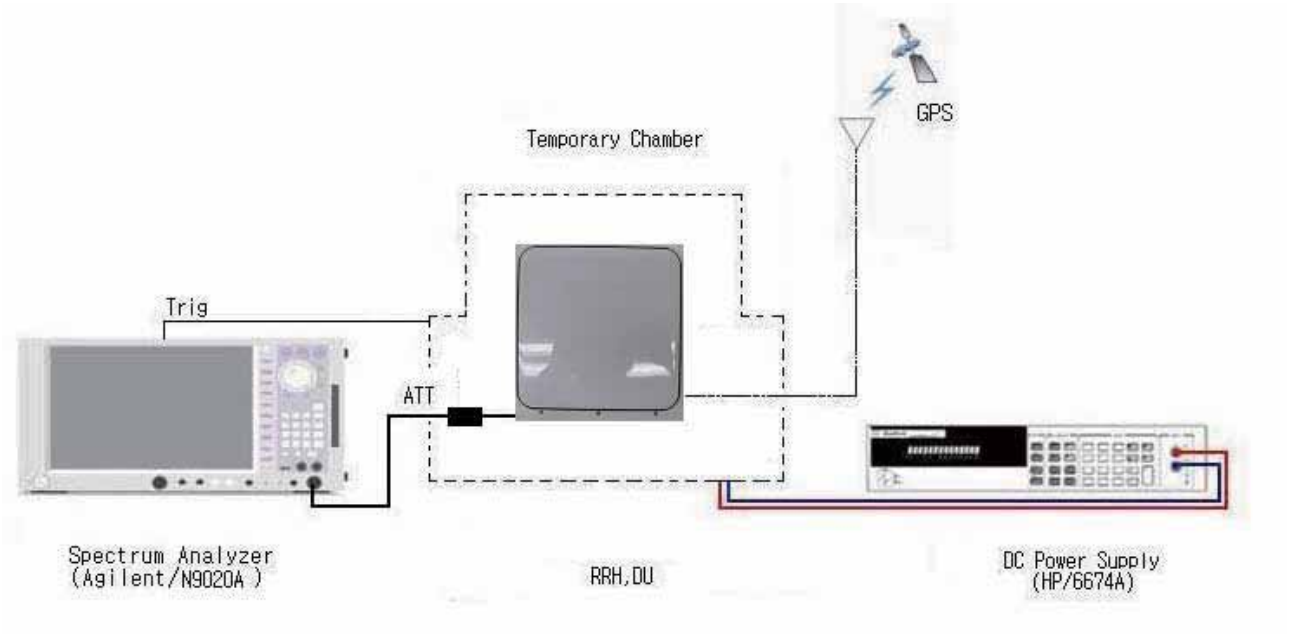
According to §27.53(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (p) by a factor of at least 43 + 10 log (p) dB.

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	67-30-33 / Attenuator	BU5347	01/06/2011
WEINSCHEL	67-30-33 / Attenuator	BR0530	01/14/2011
Agilent	N9020A / MXA Signal Analyzer	US46220219	03/03/2011

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	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2508.5	-40.059	-13.0
	High	2683.5	-38.164	
16QAM	Low	2508.5	-42.966	
	High	2683.5	-41.624	
64QAM	Low	2508.5	-34.243	
	High	2683.5	-34.518	

7.4.2. Test data at Output 1

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2508.5	-22.926	-13.0
	High	2683.5	-31.869	
16QAM	Low	2508.5	-28.766	
	High	2683.5	-24.999	
64QAM	Low	2508.5	-31.084	
	High	2683.5	-35.391	

7.4.3. Test data at Output 2

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2508.5	-34.788	-13.0
	High	2683.5	-33.000	
16QAM	Low	2508.5	-28.183	
	High	2683.5	-21.735	
64QAM	Low	2508.5	-24.708	
	High	2683.5	-33.665	

7.4.4. Test data at Output 3

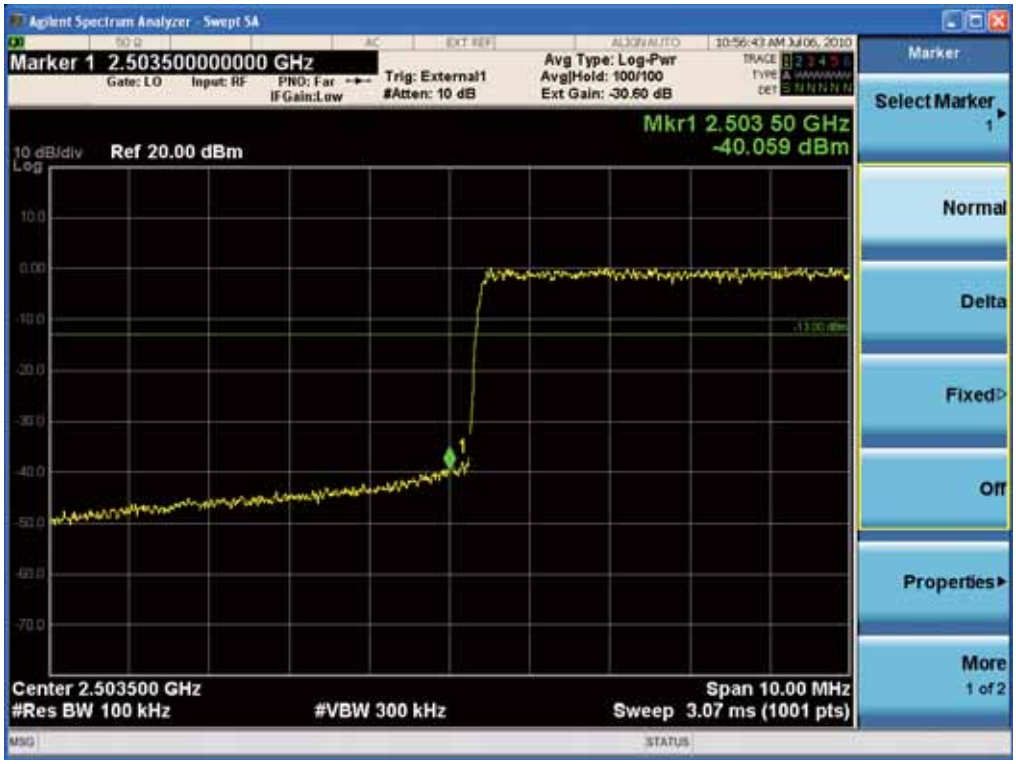
Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2508.5	-28.185	-13.0
	High	2683.5	-25.824	
16QAM	Low	2508.5	-34.229	
	High	2683.5	-20.486	
64QAM	Low	2508.5	-38.860	
	High	2683.5	-32.909	

7.4.5. Combined Test data at Output

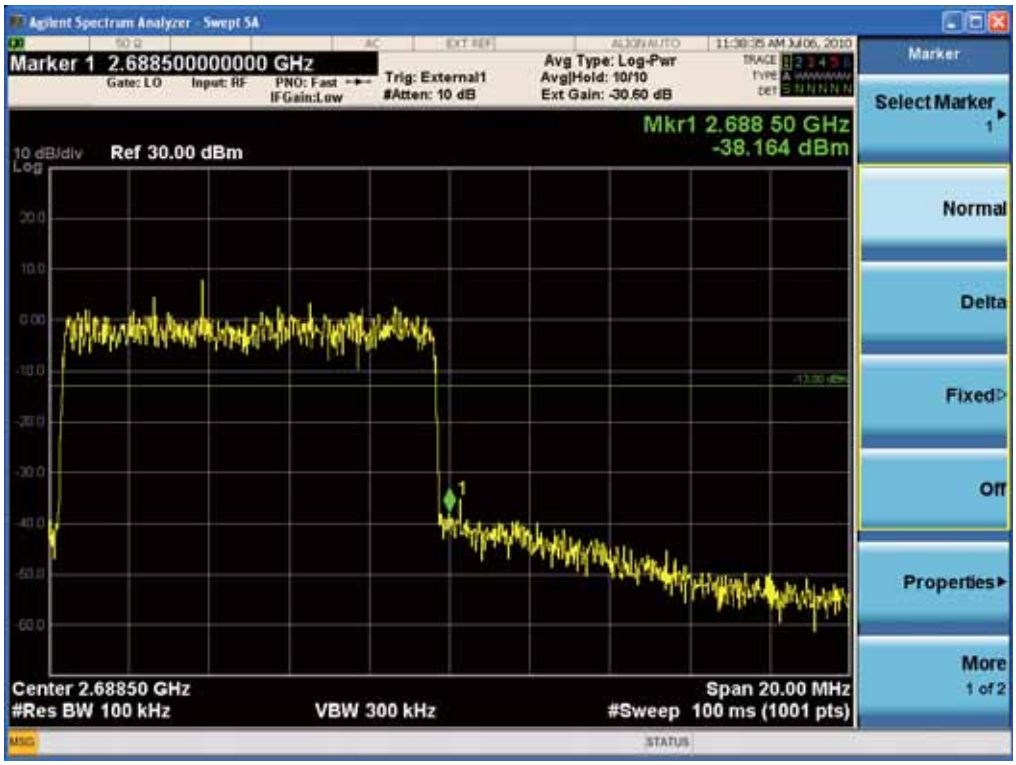
Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2508.5	-25.444	-13.0
	High	2683.5	-22.732	
16QAM	Low	2508.5	-23.602	
	High	2683.5	-26.099	
64QAM	Low	2508.5	-20.192	
	High	2683.5	-23.897	

7.4.6. Plot Data at Output 0

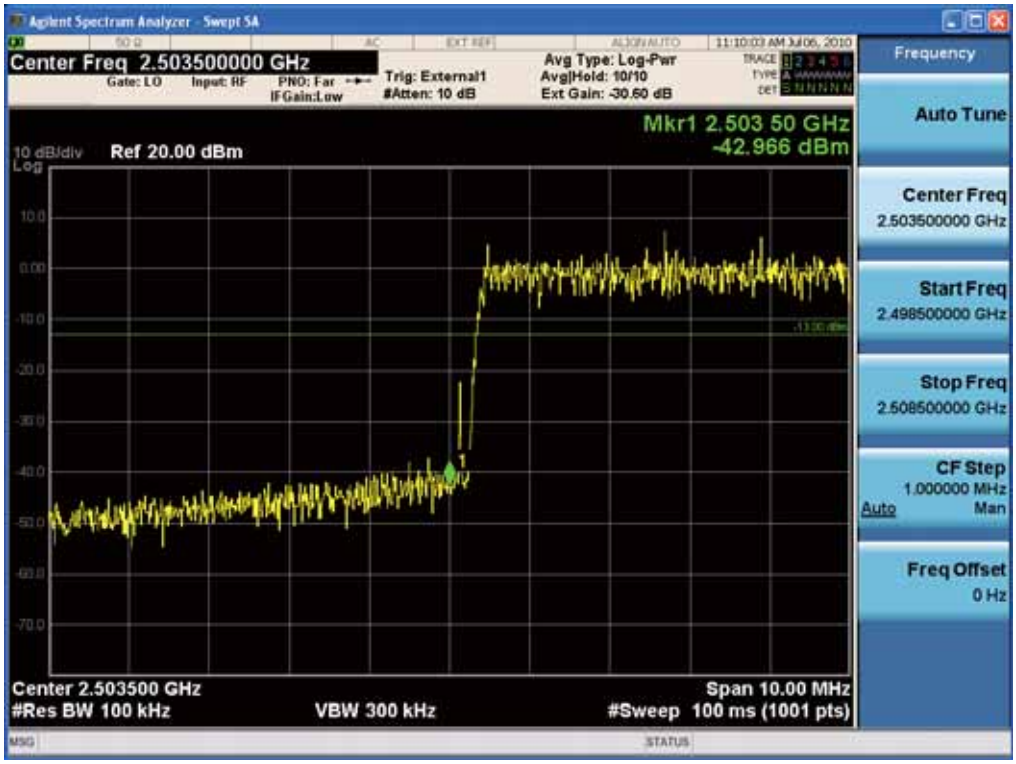
(QPSK Low Channel)



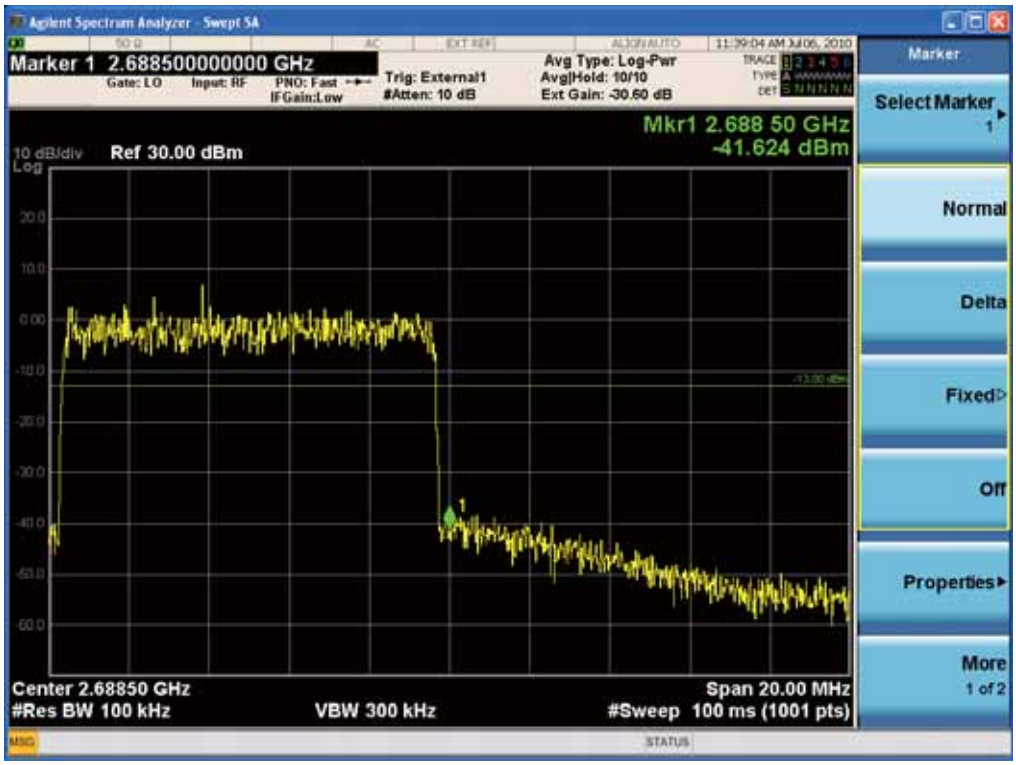
(QPSK High Channel)



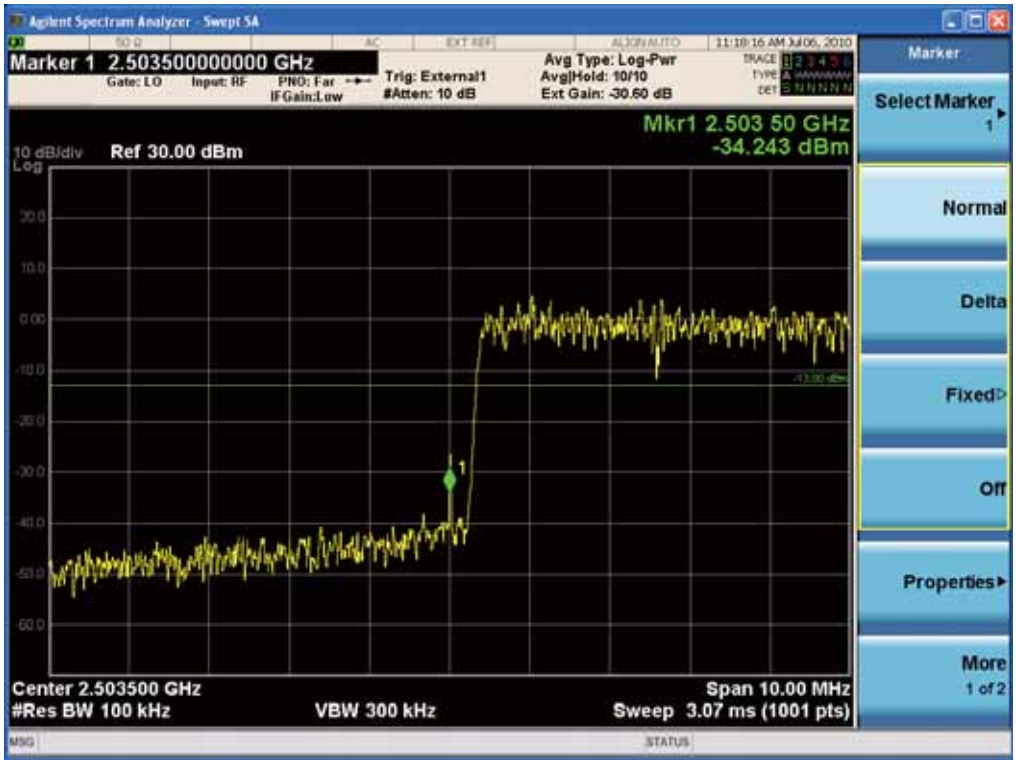
(16QAM Low Channel)



(16QAM High Channel)



(64QAM Low Channel)

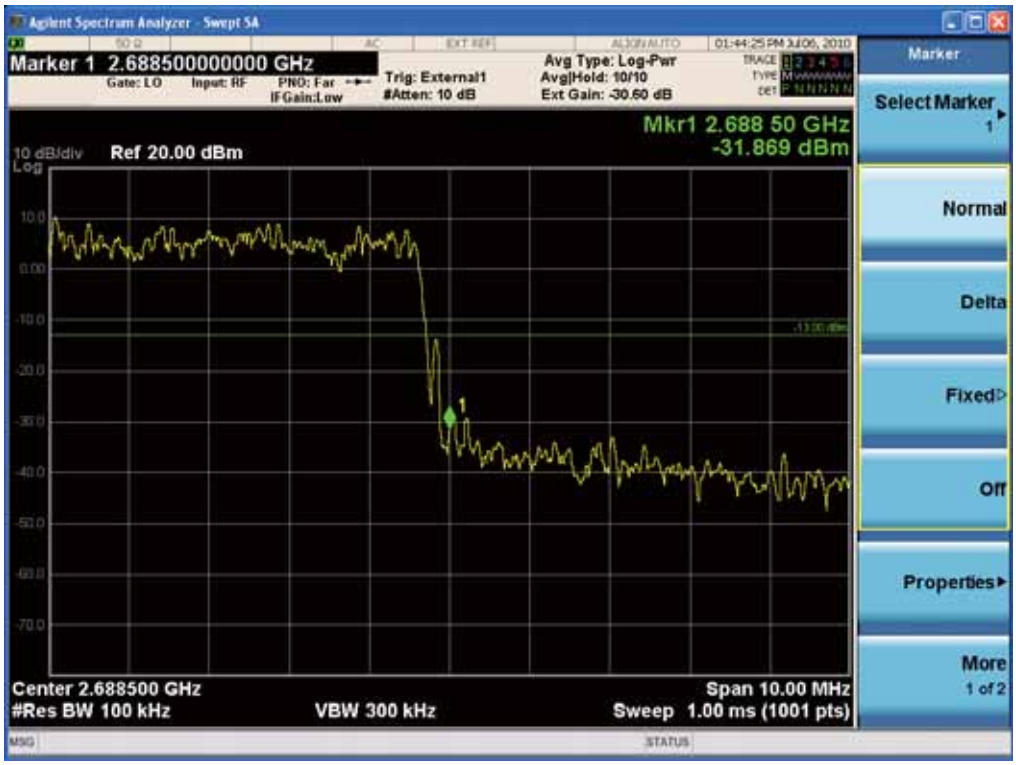


(64QAM High Channel)

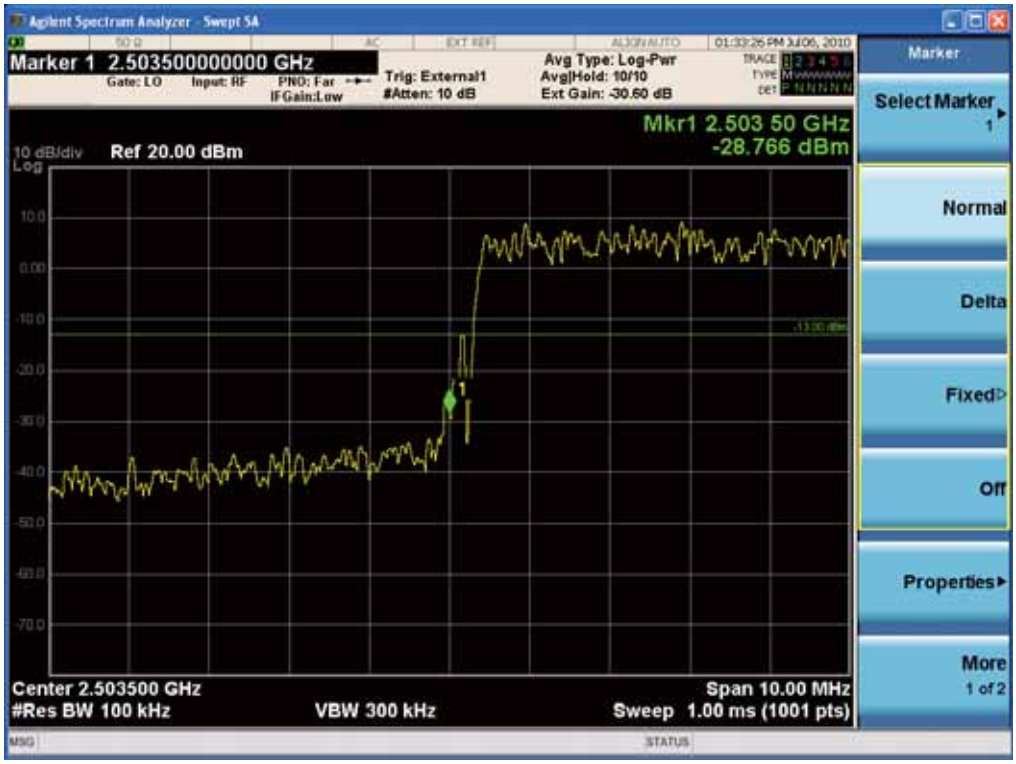
7.4.7. Plot Data at Output 1

(QPSK Low Channel)

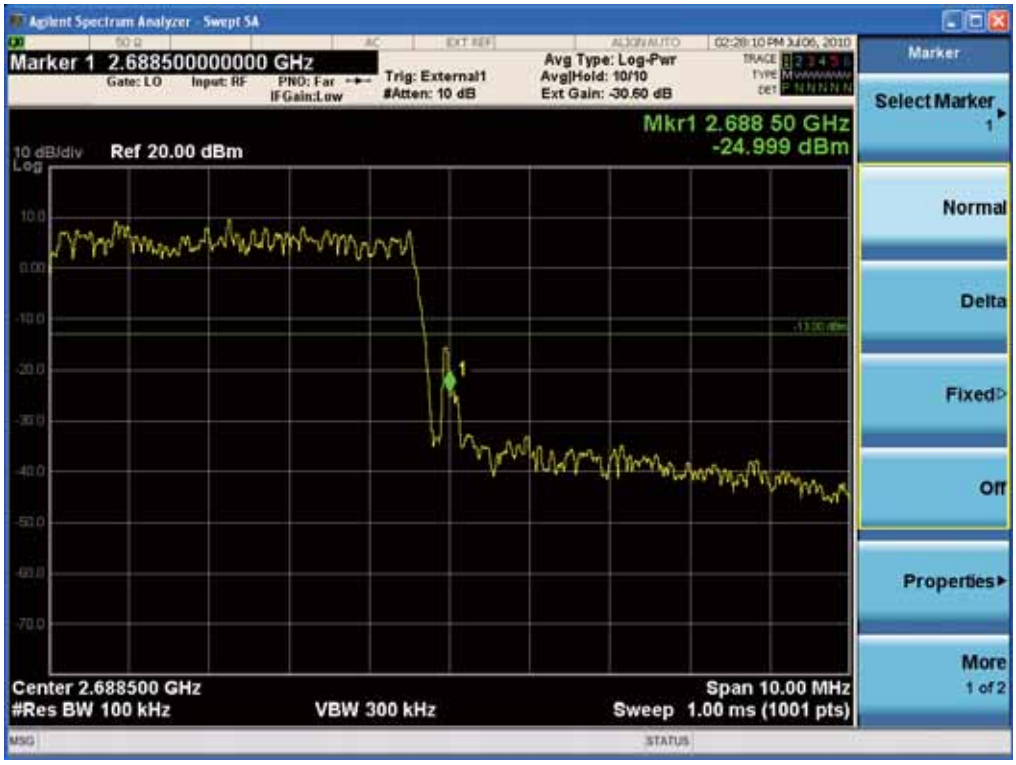
(QPSK High Channel)



(16QAM Low Channel)



(16QAM High Channel)

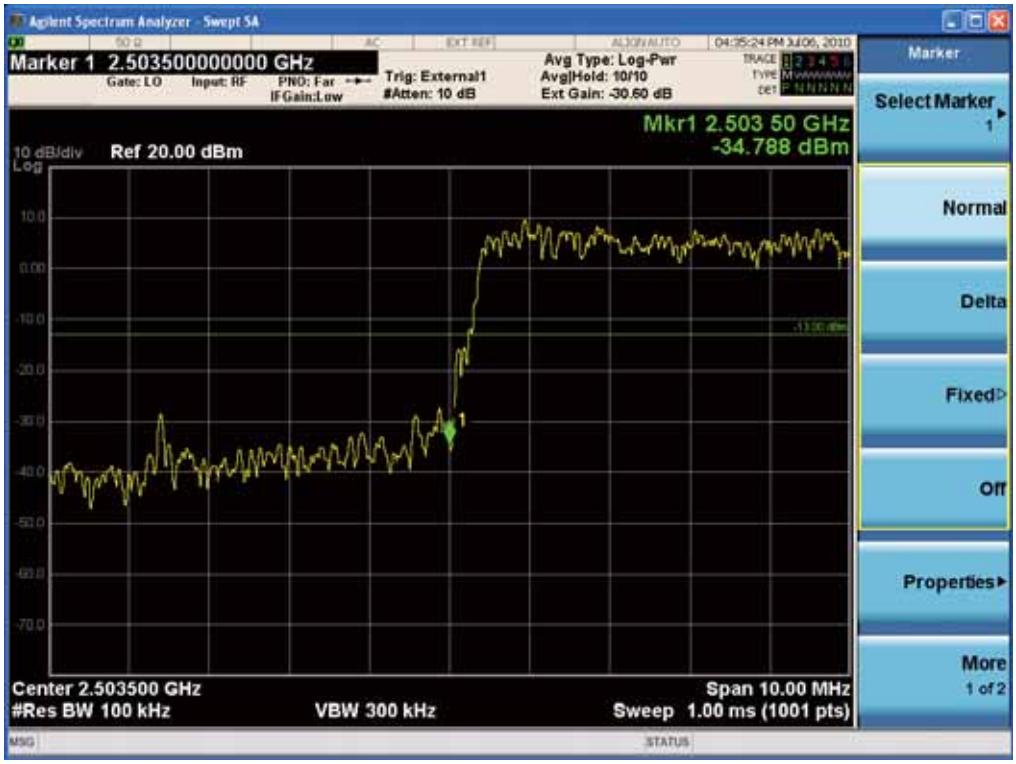


(64QAM Low Channel)

(64QAM High Channel)

7.4.8. Plot Data at Output 2

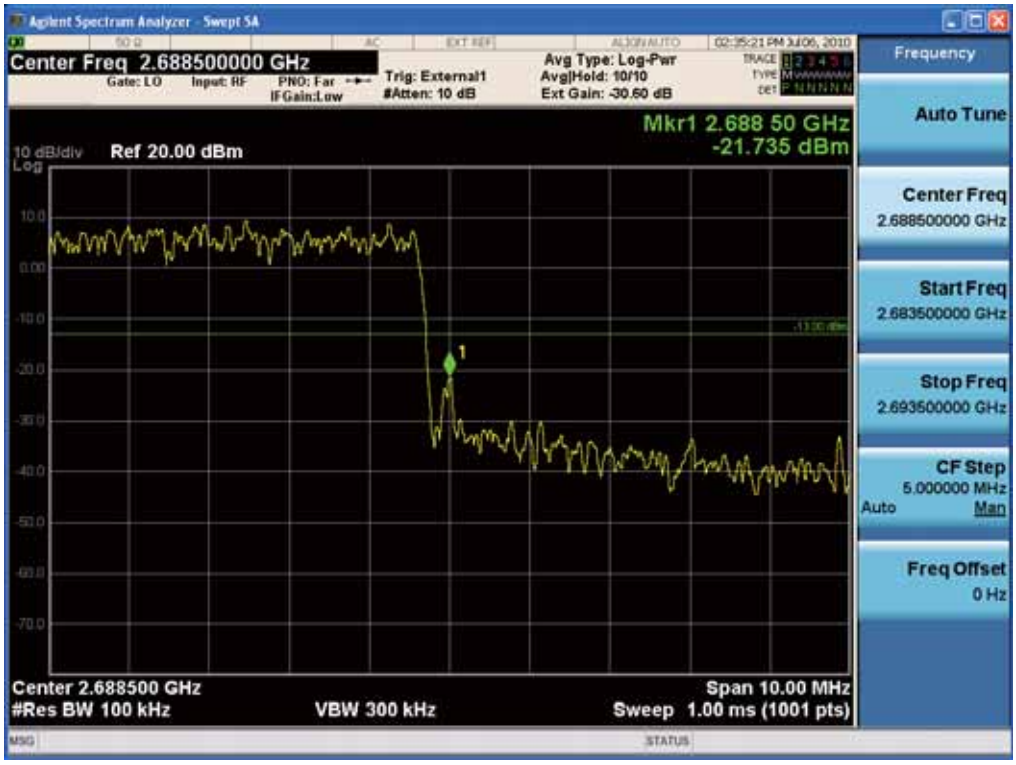
(QPSK Low Channel)



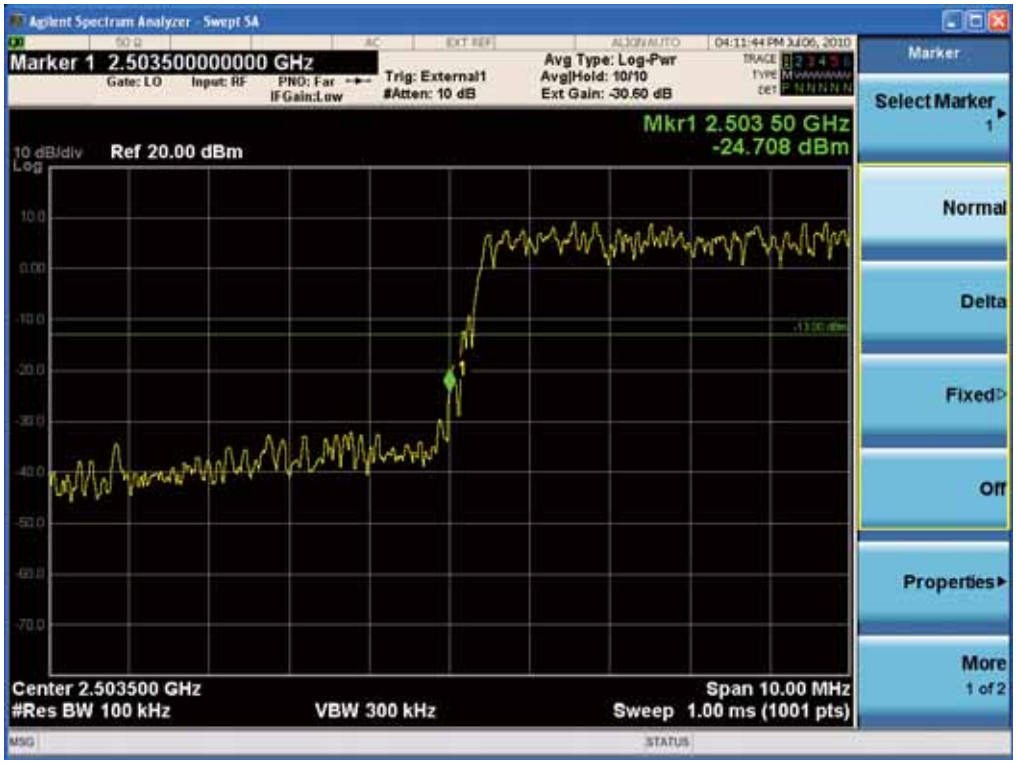
(QPSK High Channel)

(16QAM Low Channel)

(16QAM High Channel)



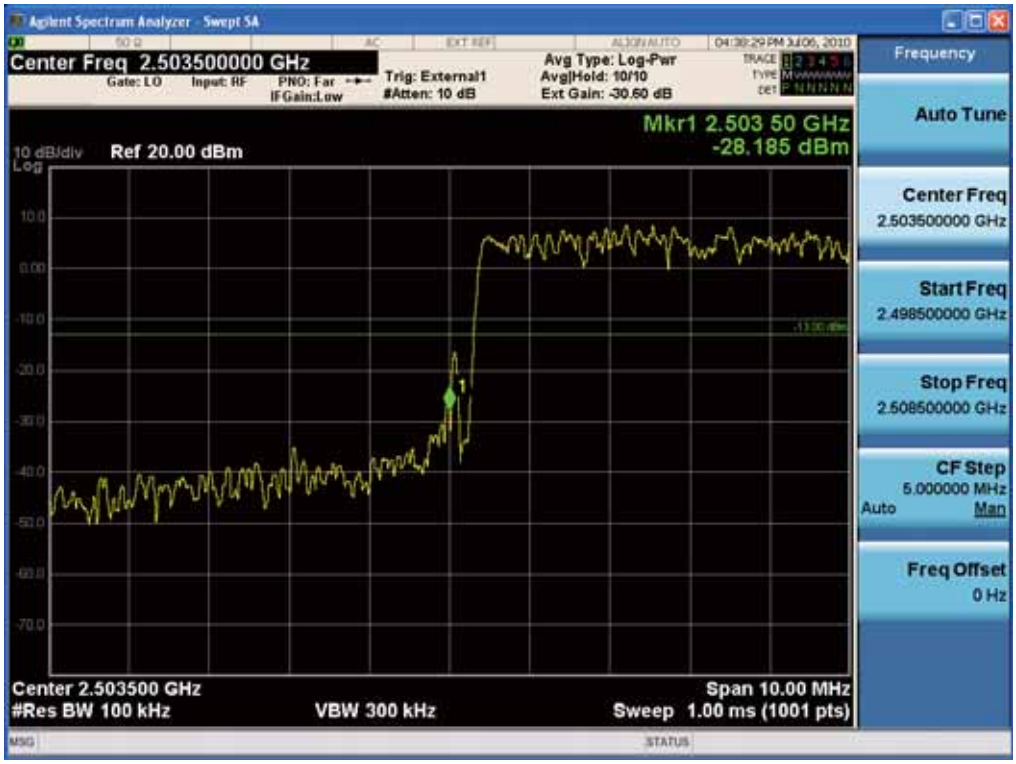
(64QAM Low Channel)



(64QAM High Channel)

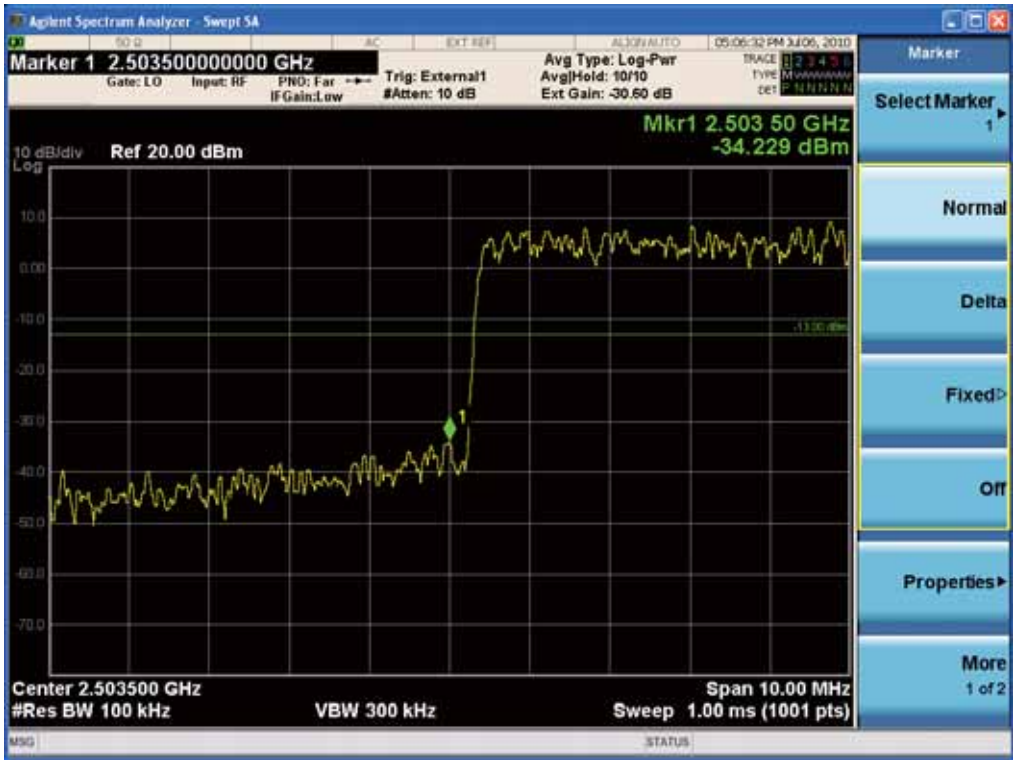
7.4.9. Plot Data at Output 3

(QPSK Low Channel)

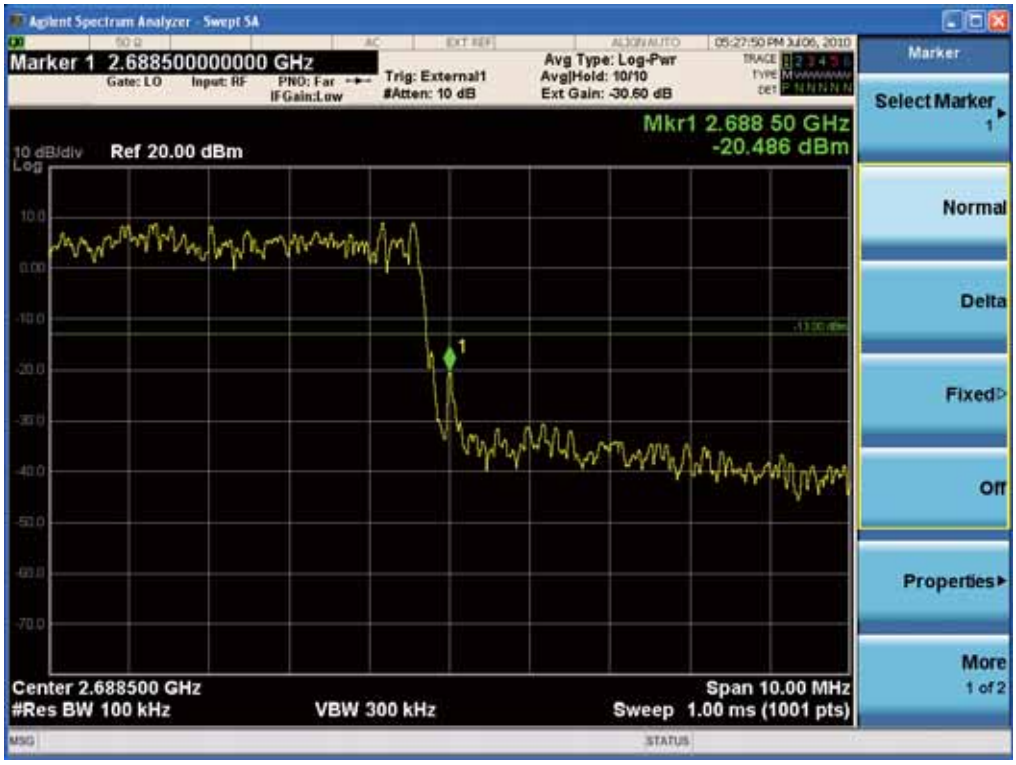


(QPSK High Channel)

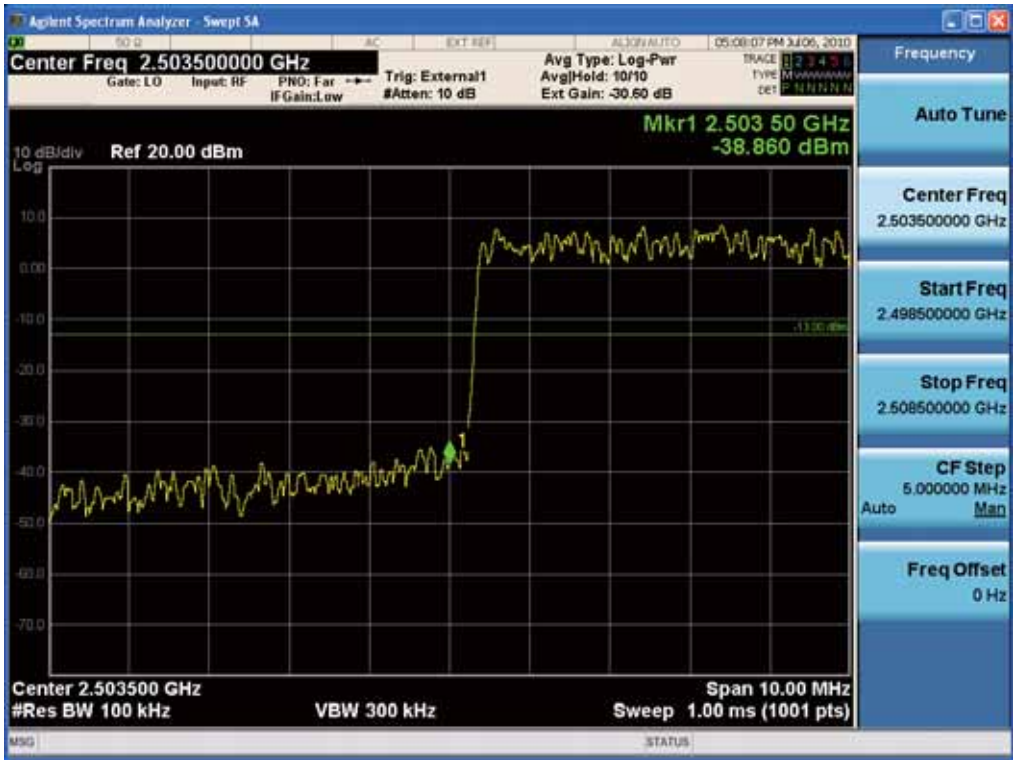
(16QAM Low Channel)



(16QAM High Channel)



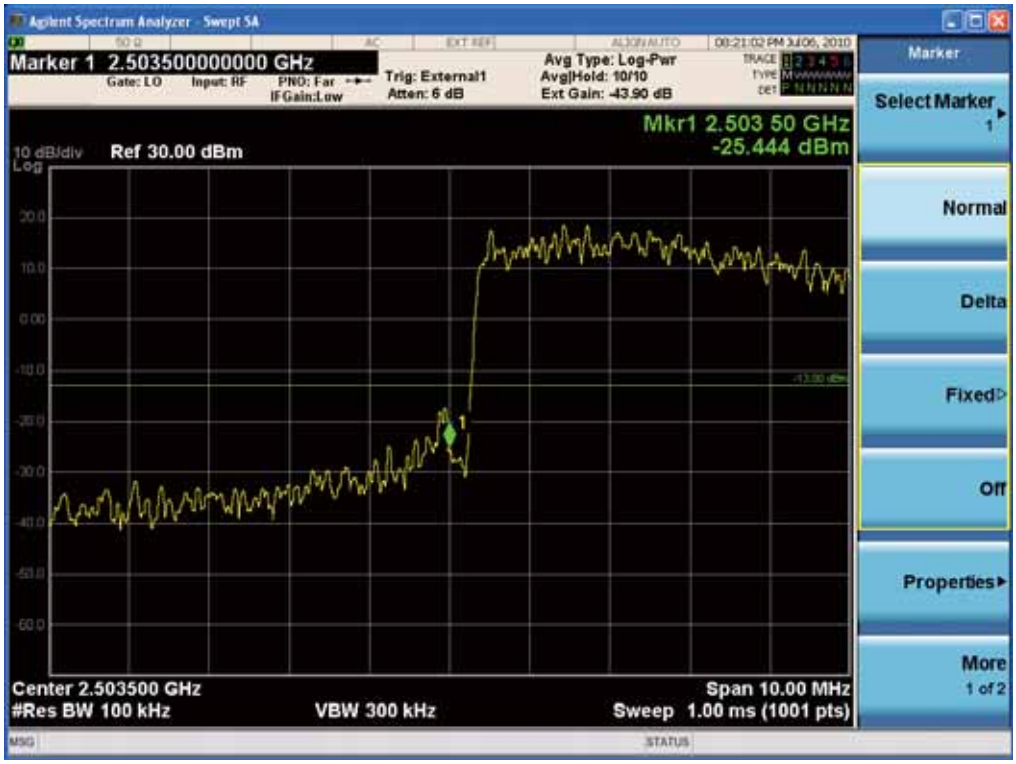
(64QAM Low Channel)



(64QAM High Channel)

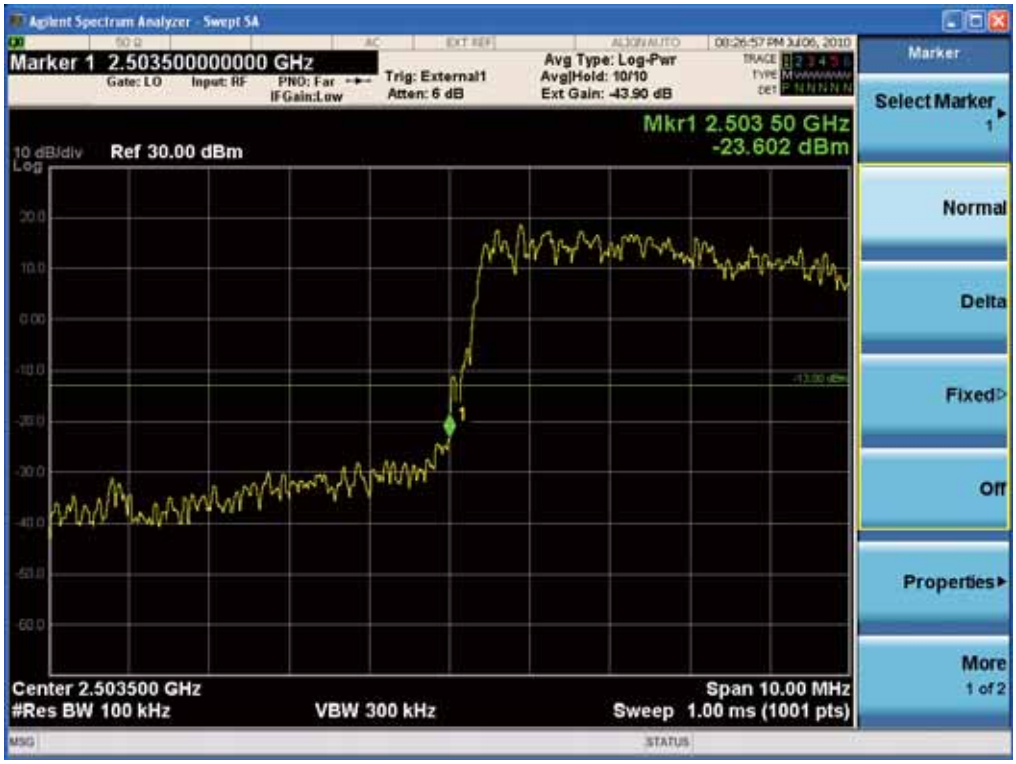
7.4.10. Combined Plot Data at Output

(QPSK Low Channel)



(QPSK High Channel)

(16QAM Low Channel)



(16QAM High Channel)

(64QAM Low Channel)

(64QAM High 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	67-30-33 / Attenuator	BU5347	01/06/2011
WEINSCHEL	67-30-33 / Attenuator	BR0530	01/14/2011
Agilent	N9020A / MXA Signal Analyzer	US46220219	03/03/2011

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:

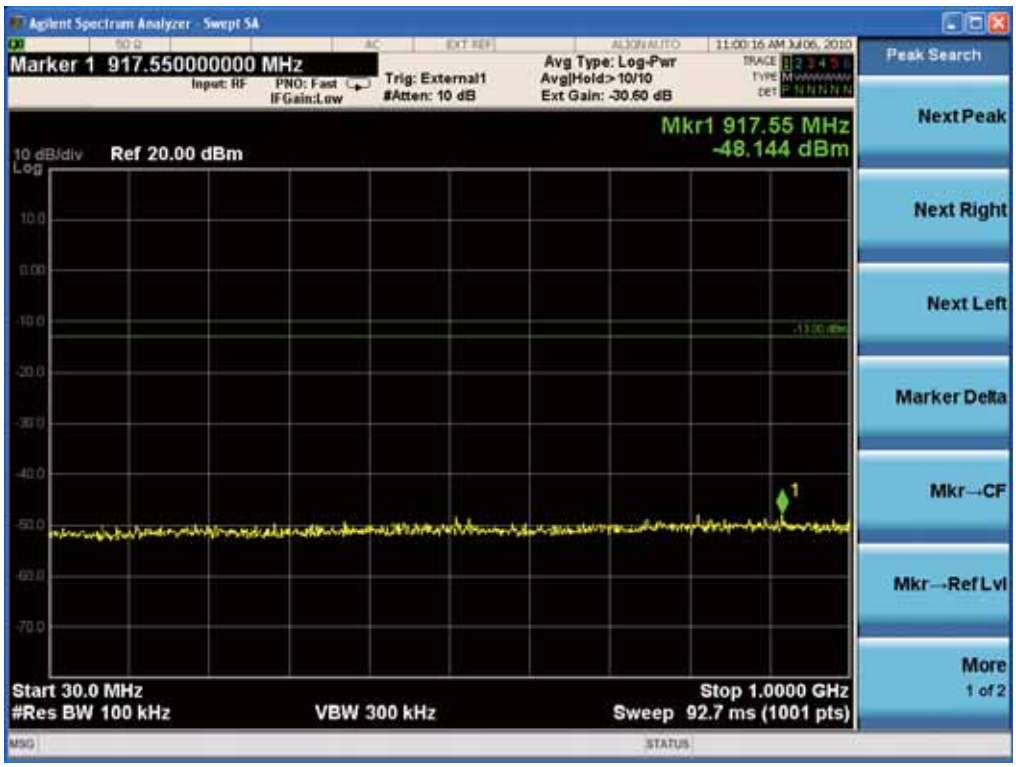
Temperature:	25 °C
Relative Humidity:	66 %

8.4. Test Result

: Pass

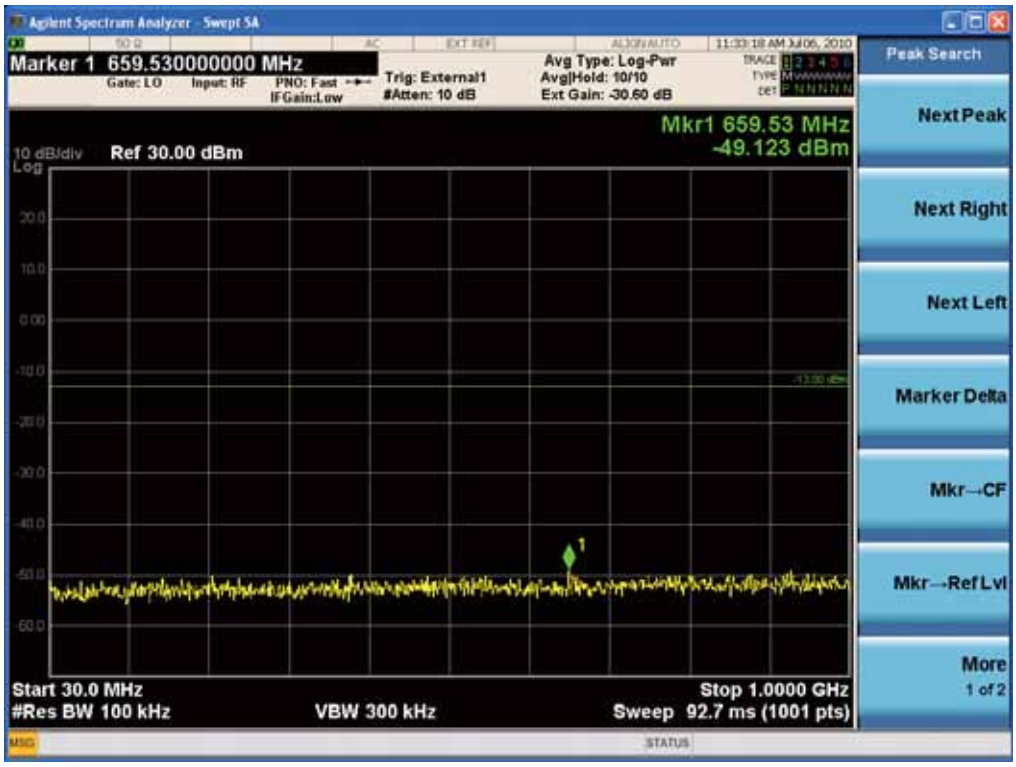
8.4.1. Plot Data at Output 0

(QPSK Low Channel)



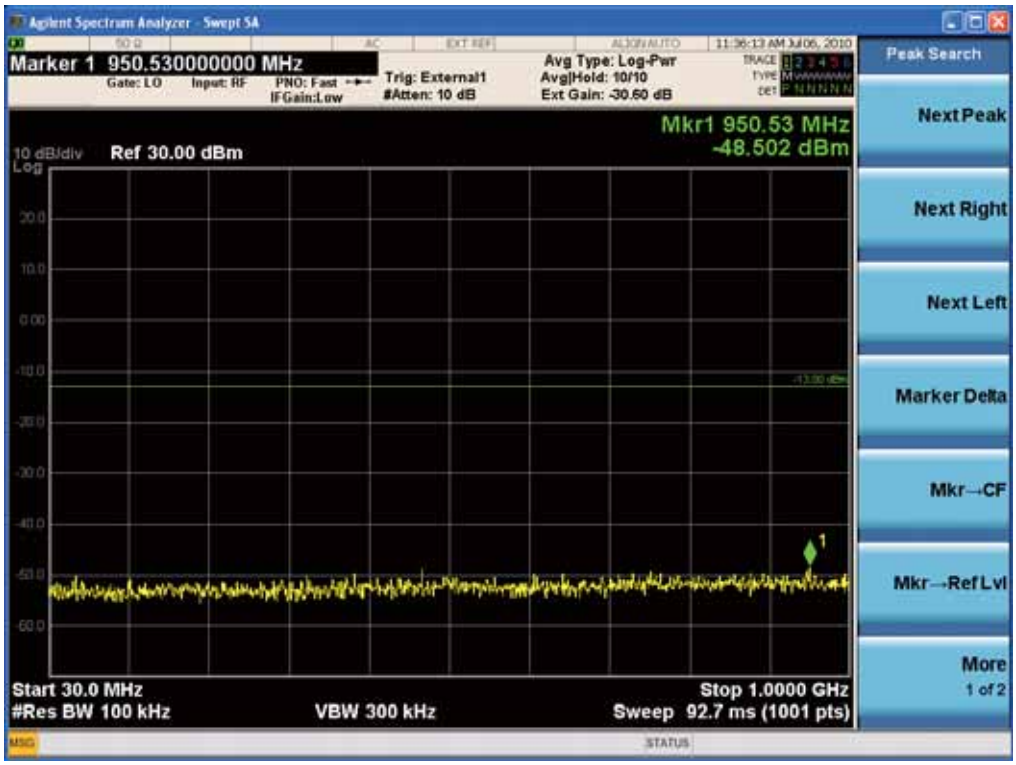
(30 MHz ~ 1 GHz)

(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)

(1 GHz ~ 26.5 GHz)

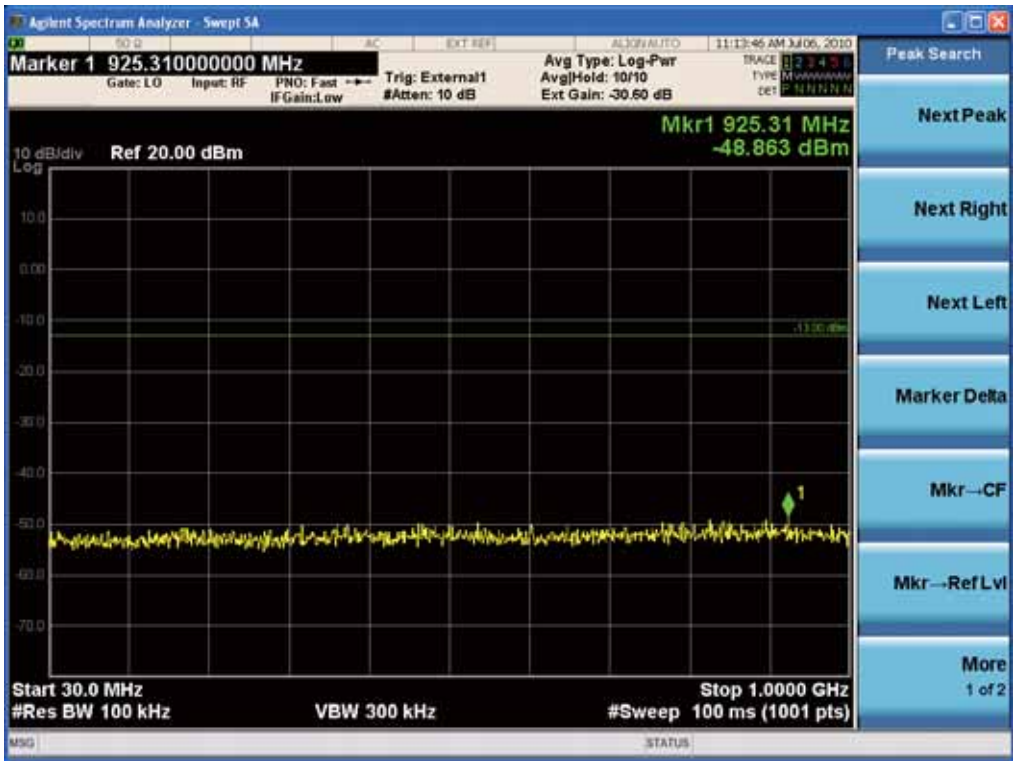
(QPSK Middle Channel)

(1 GHz ~ 26.5 GHz)

(QPSK High Channel)

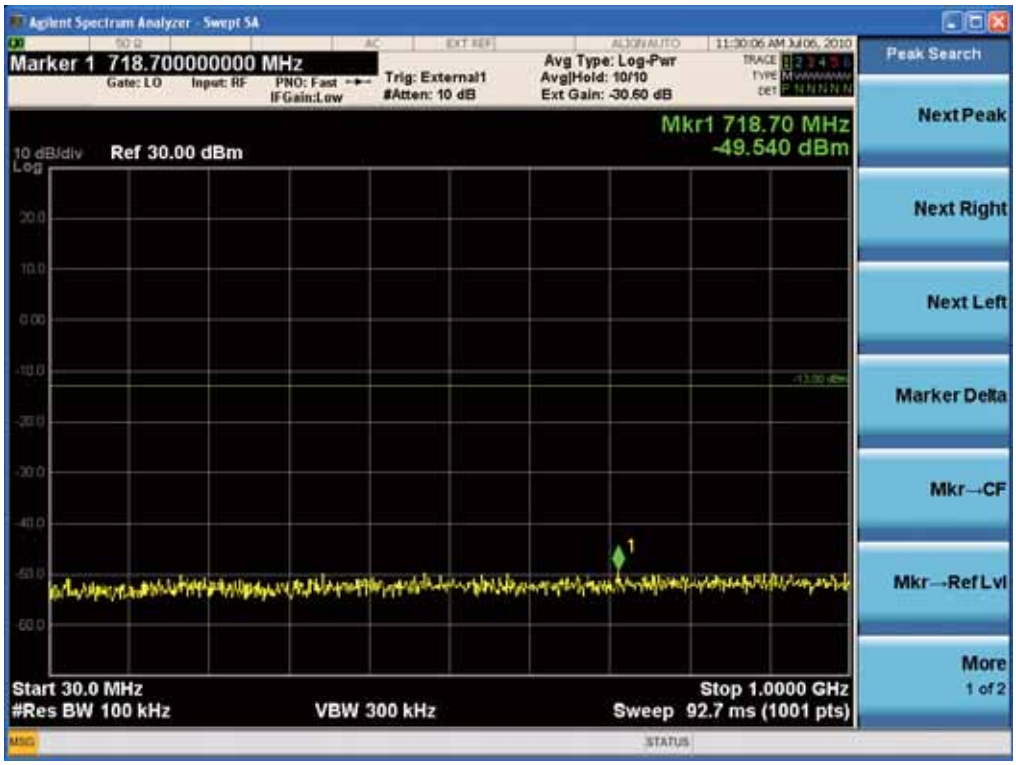
(1 GHz ~ 26.5 GHz)

(16QAM LOW Channel)



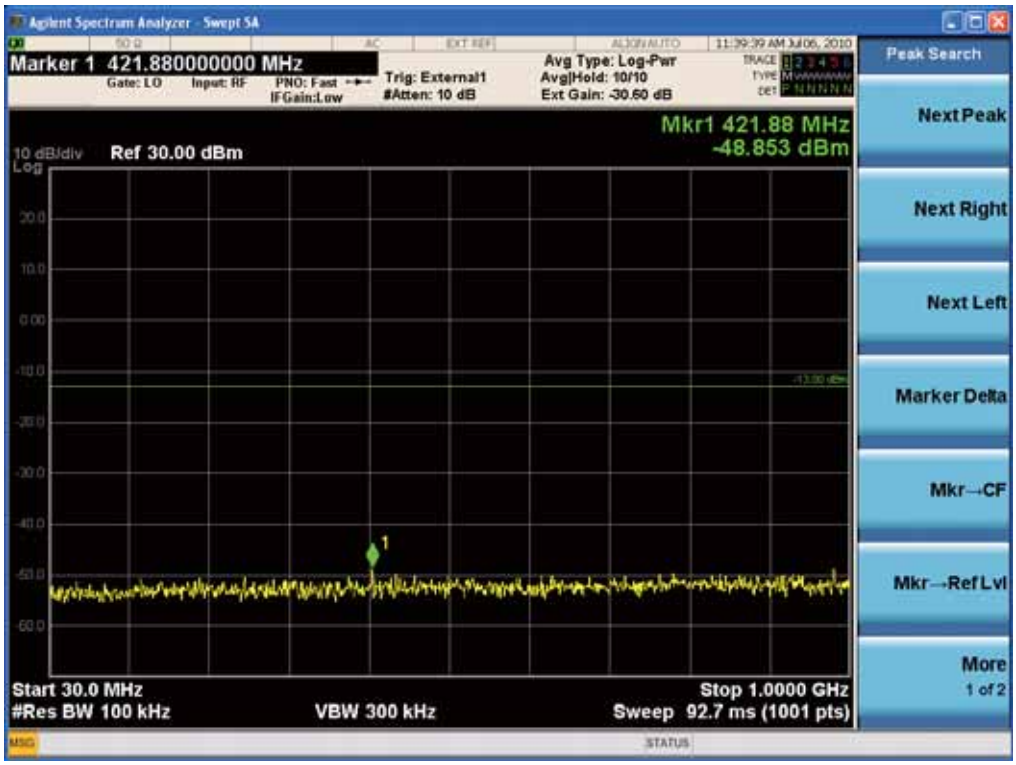
(30 MHz ~ 1 GHz)

(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

(16QAM LOW Channel)

(1 GHz ~ 26.5 GHz)

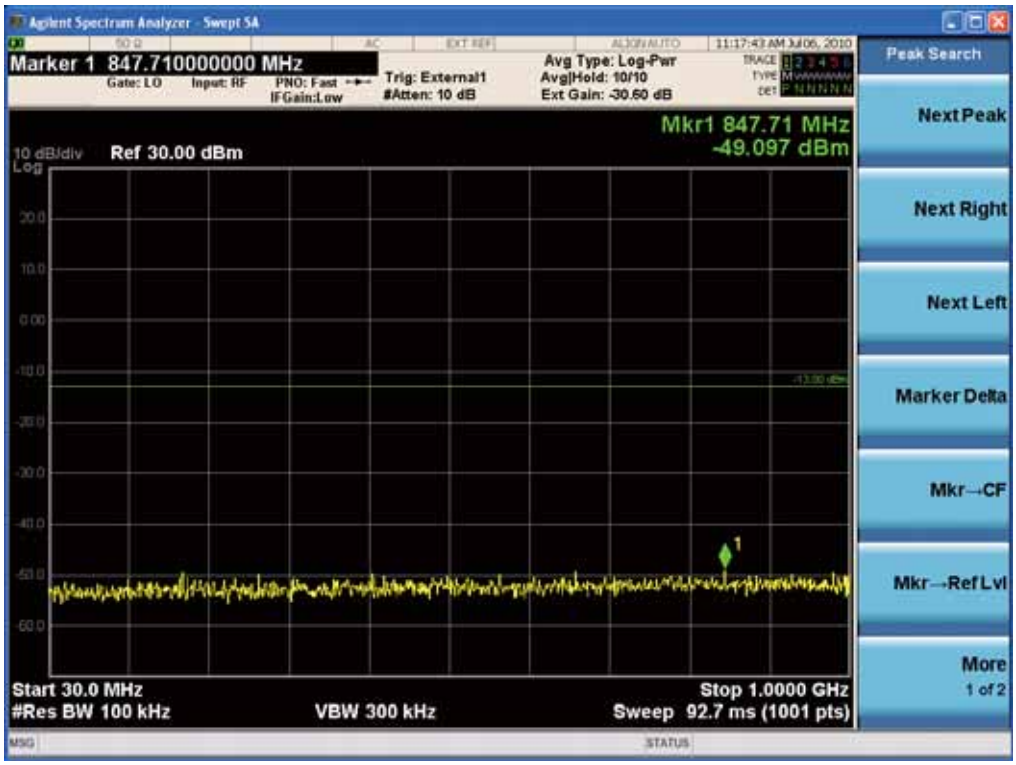
(16QAM Middle Channel)

(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

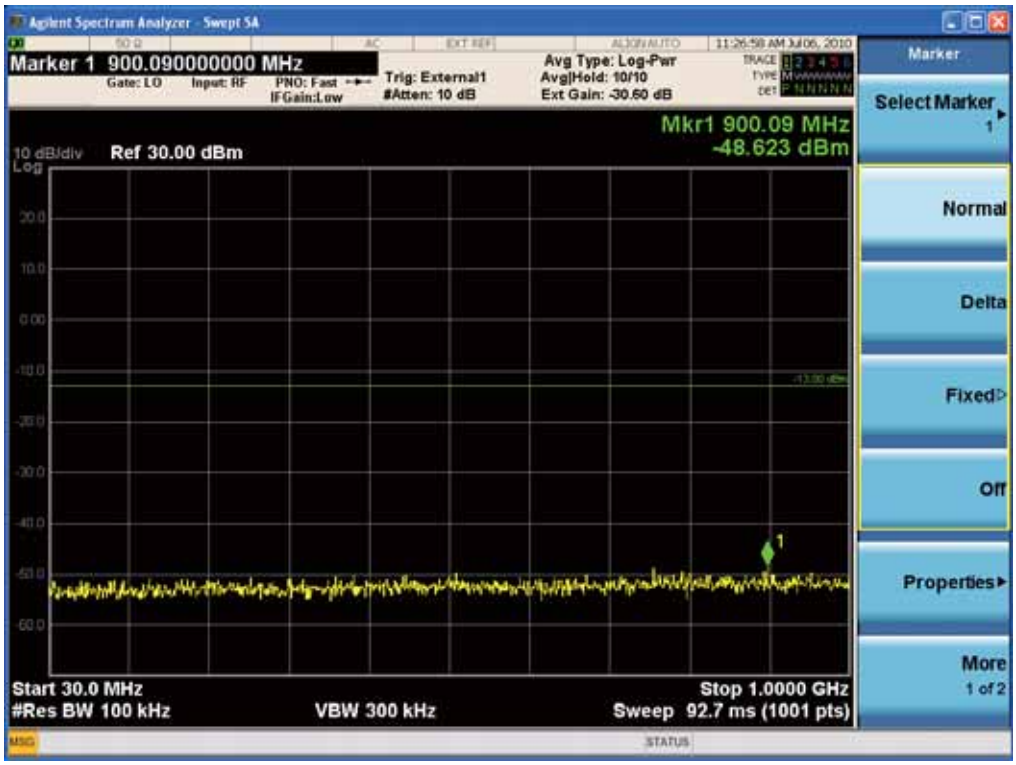
(1 GHz ~ 26.5 GHz)

(64QAM Low Channel)



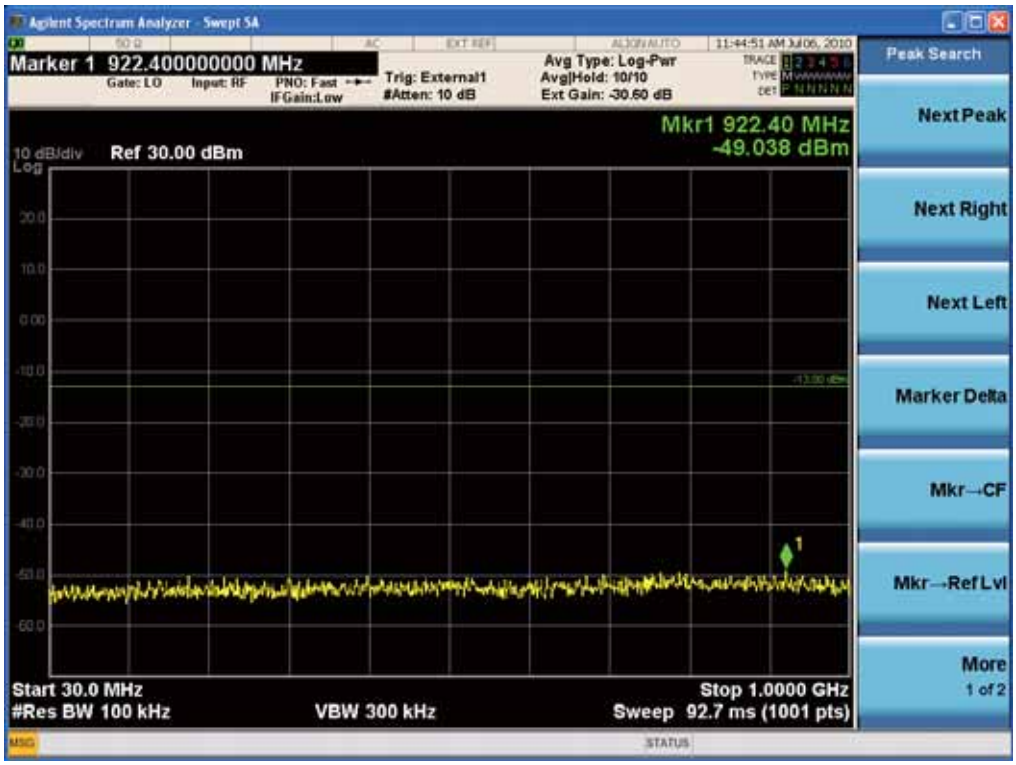
(30 MHz ~ 1 GHz)

(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)

(1 GHz ~ 26.5 GHz)

(64QAM Middle Channel)

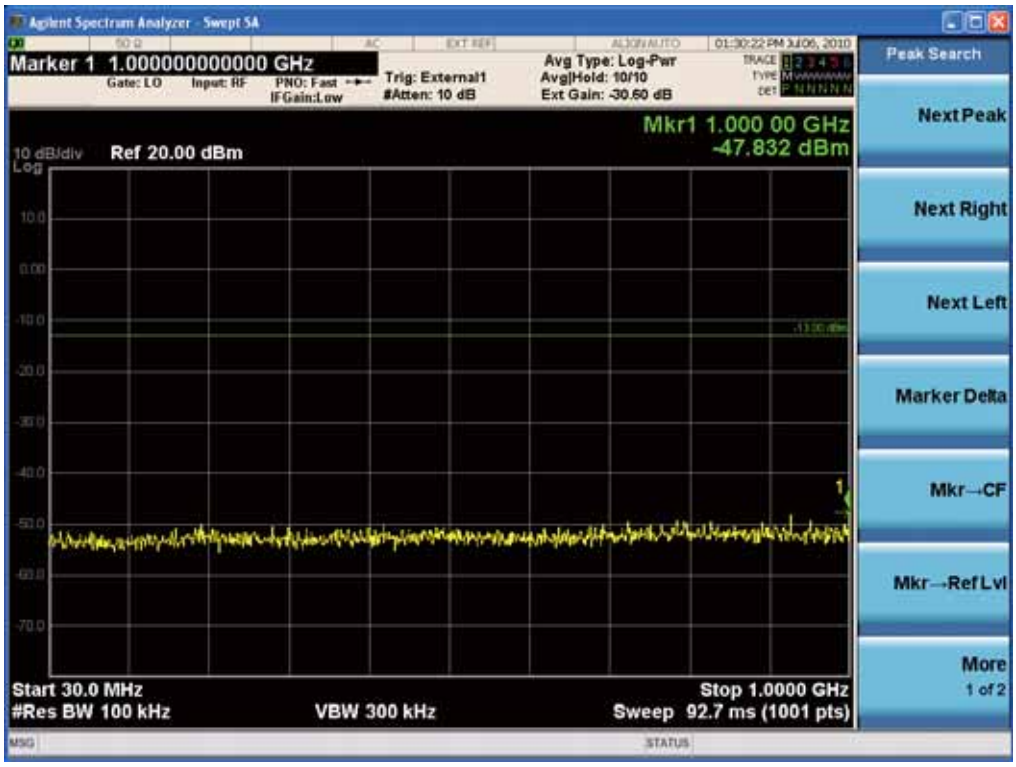
(1 GHz ~ 26.5 GHz)

(64QAM High Channel)

(1 GHz ~ 26.5 GHz)

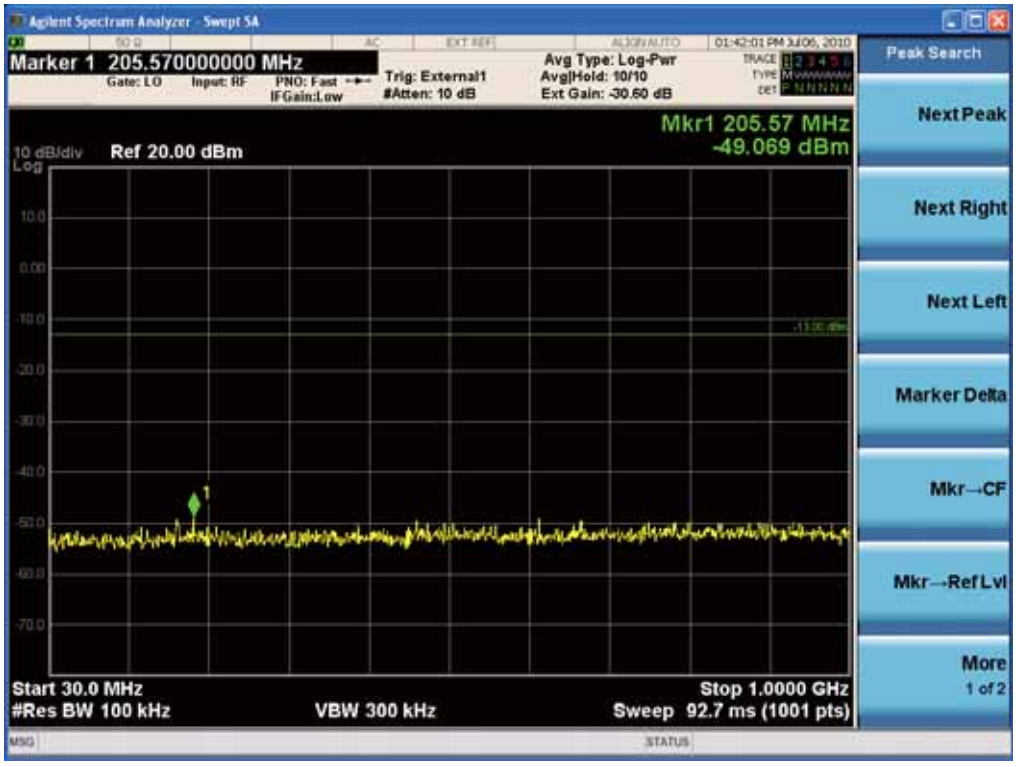
8.4.2. Plot Data at Output 1

(QPSK Low Channel)



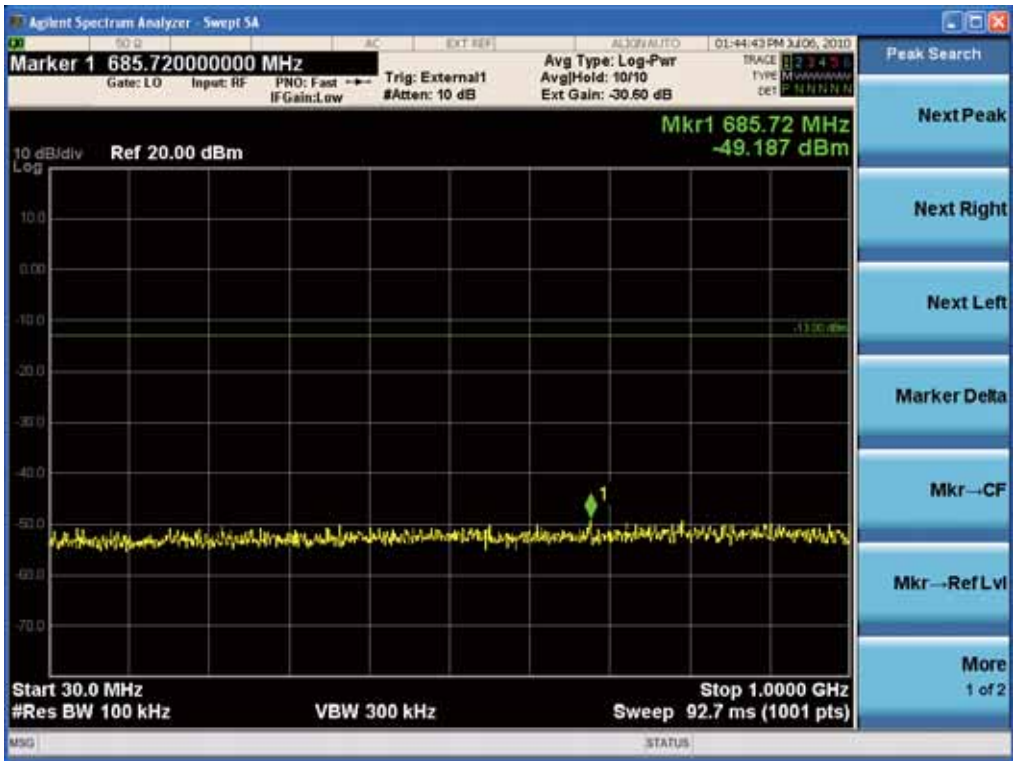
(30 MHz ~ 1 GHz)

(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)

(1 GHz ~ 26.5 GHz)

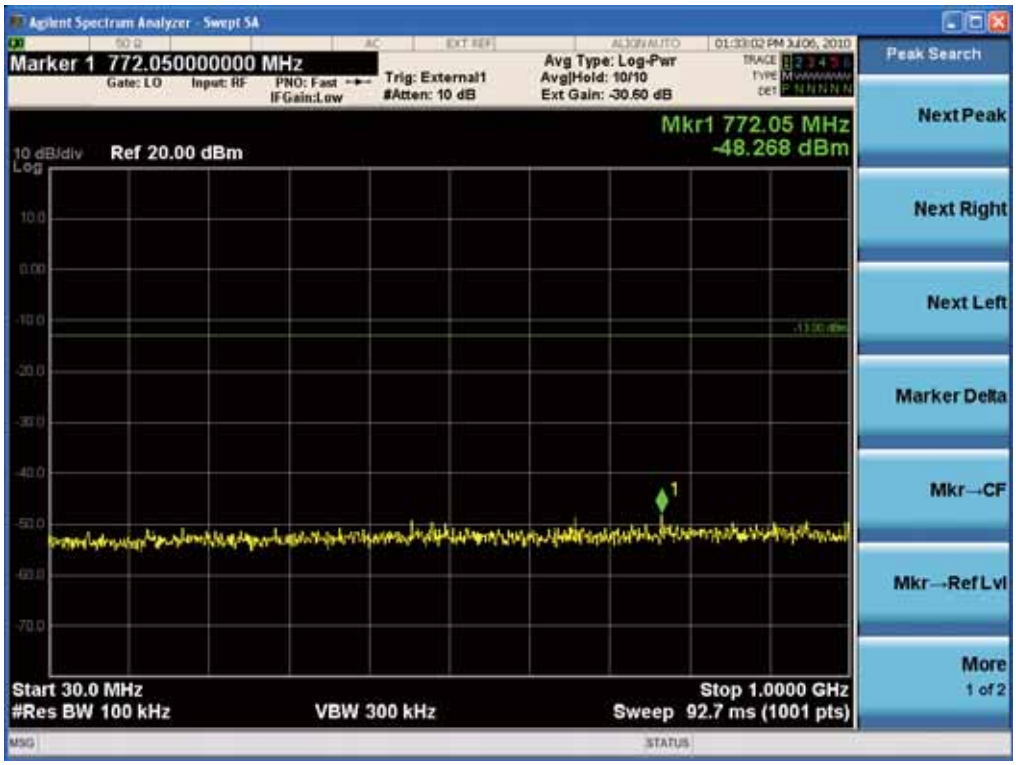
(QPSK Middle Channel)

(1 GHz ~ 26.5 GHz)

(QPSK High Channel)

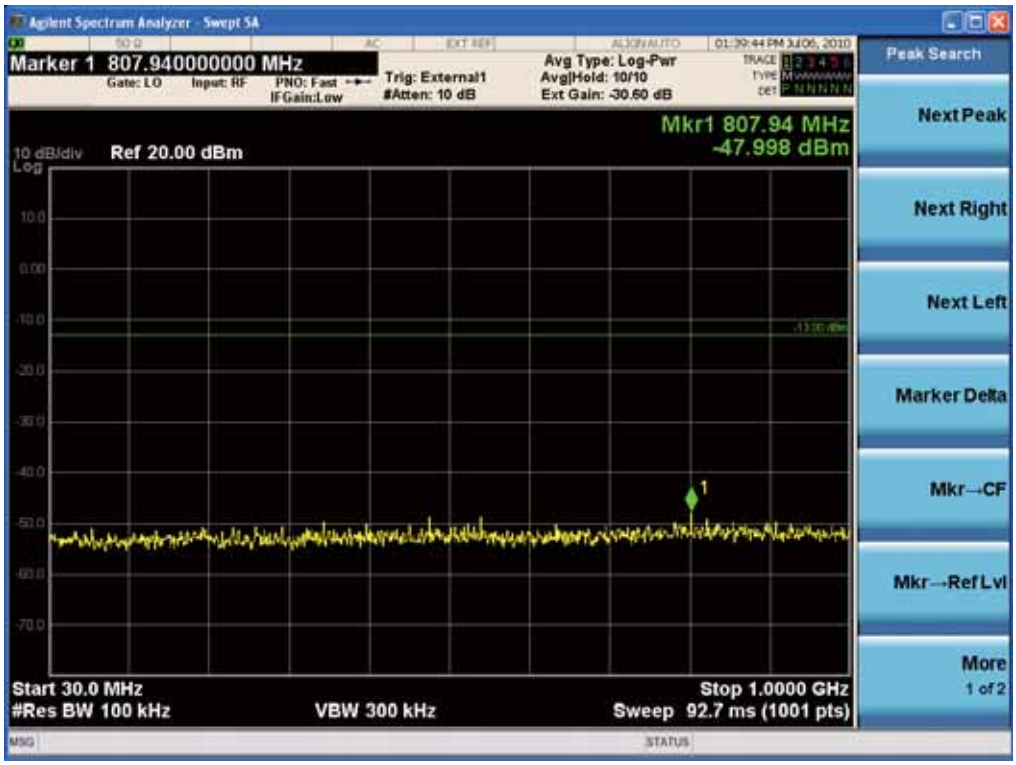
(1 GHz ~ 26.5 GHz)

(16QAM LOW Channel)



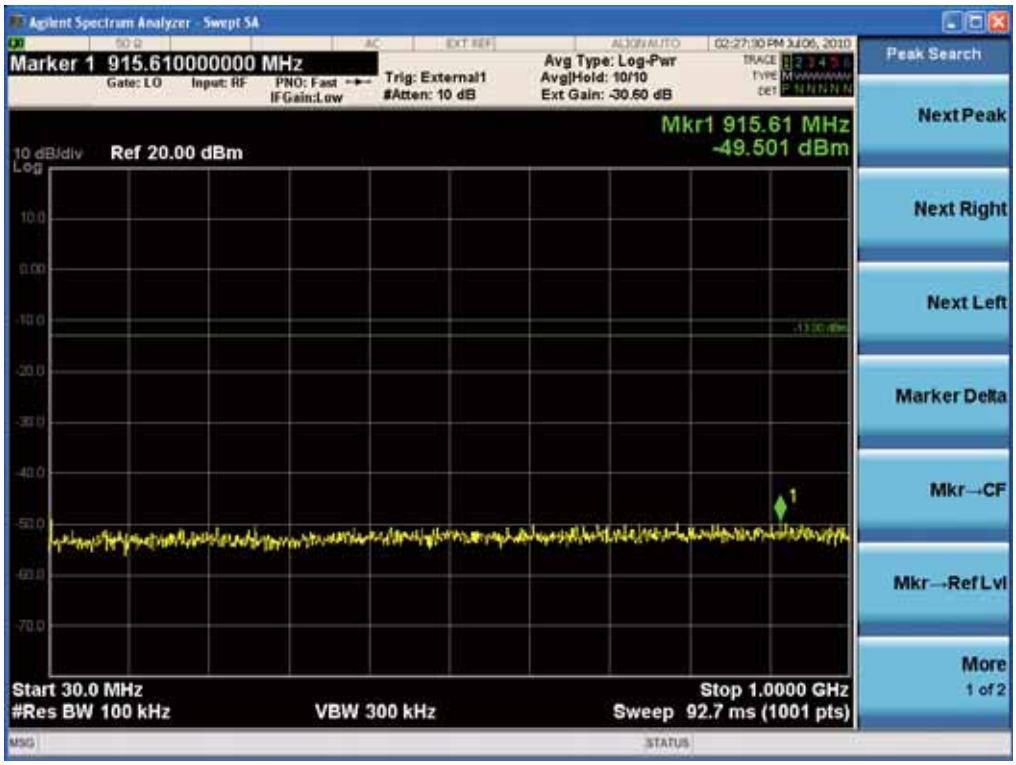
(30 MHz ~ 1 GHz)

(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

(16QAM LOW Channel)

(1 GHz ~ 26.5 GHz)

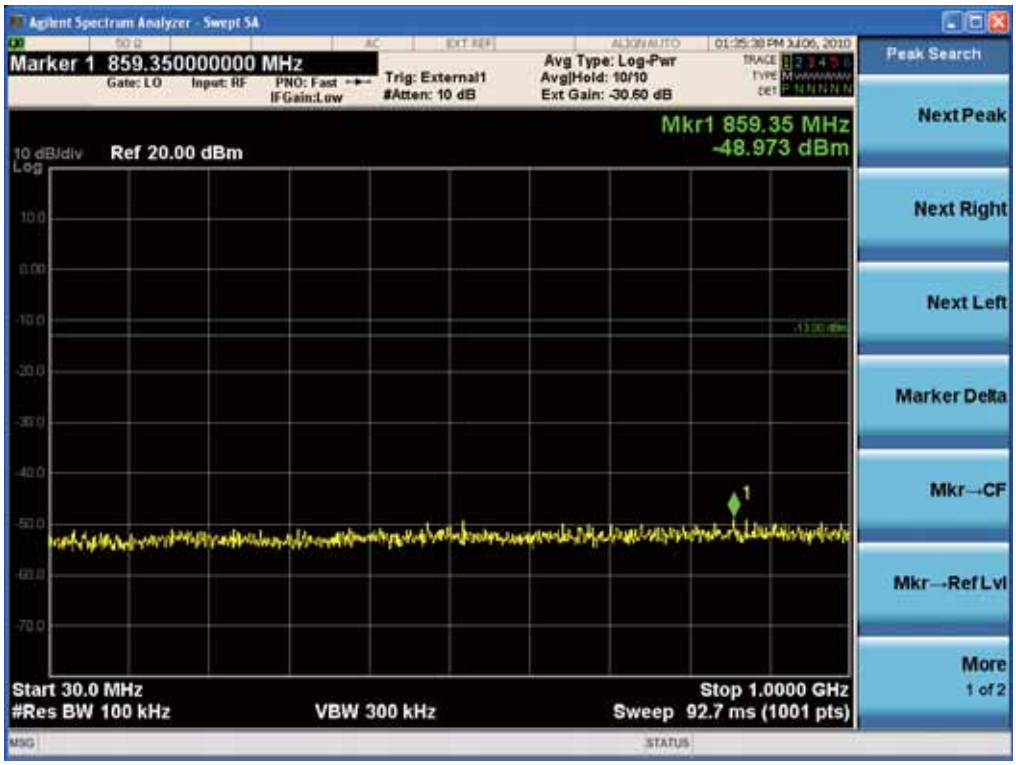
(16QAM Middle Channel)

(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

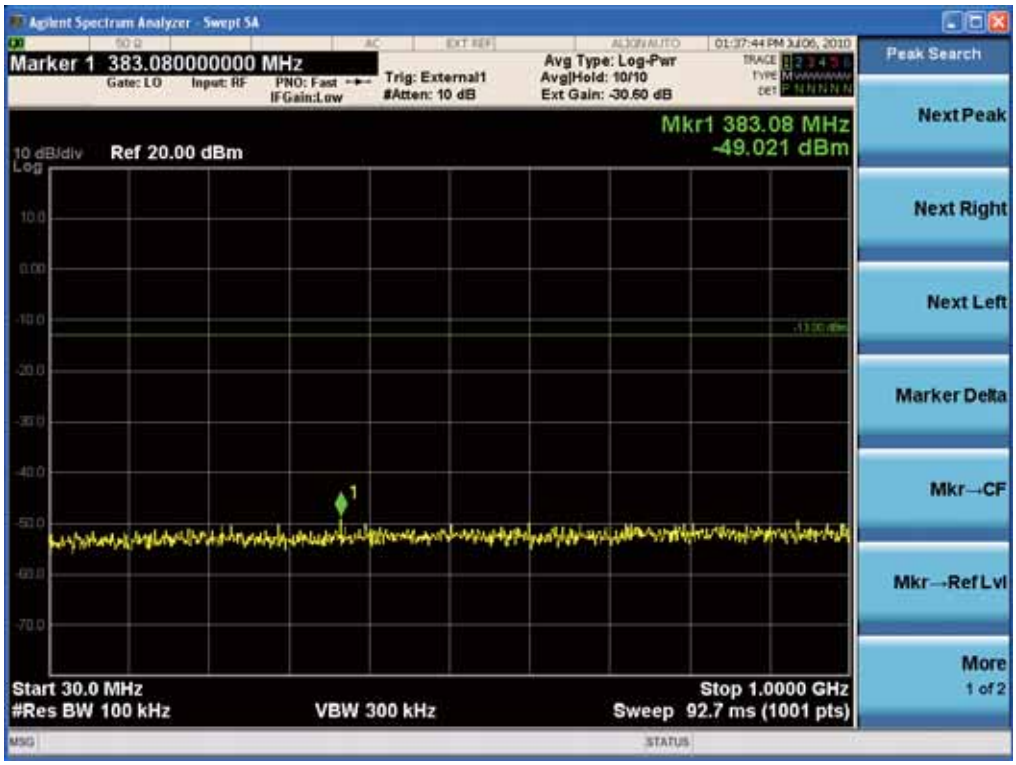
(1 GHz ~ 26.5 GHz)

(64QAM Low Channel)



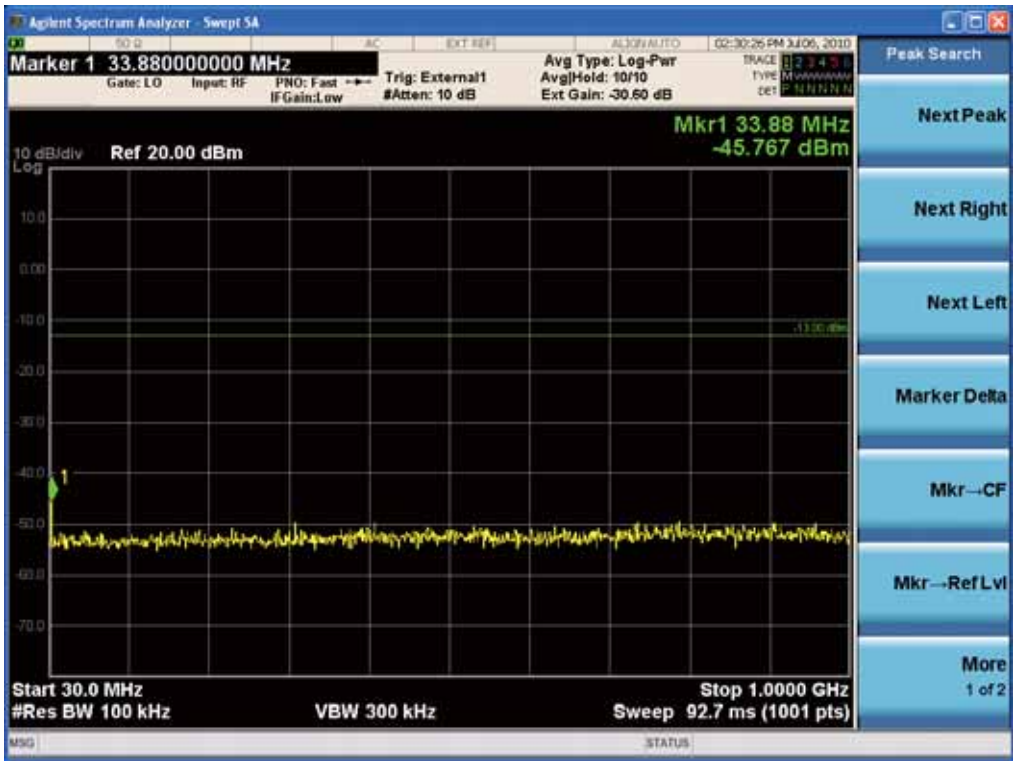
(30 MHz ~ 1 GHz)

(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)

(1 GHz ~ 26.5 GHz)

(64QAM Middle Channel)

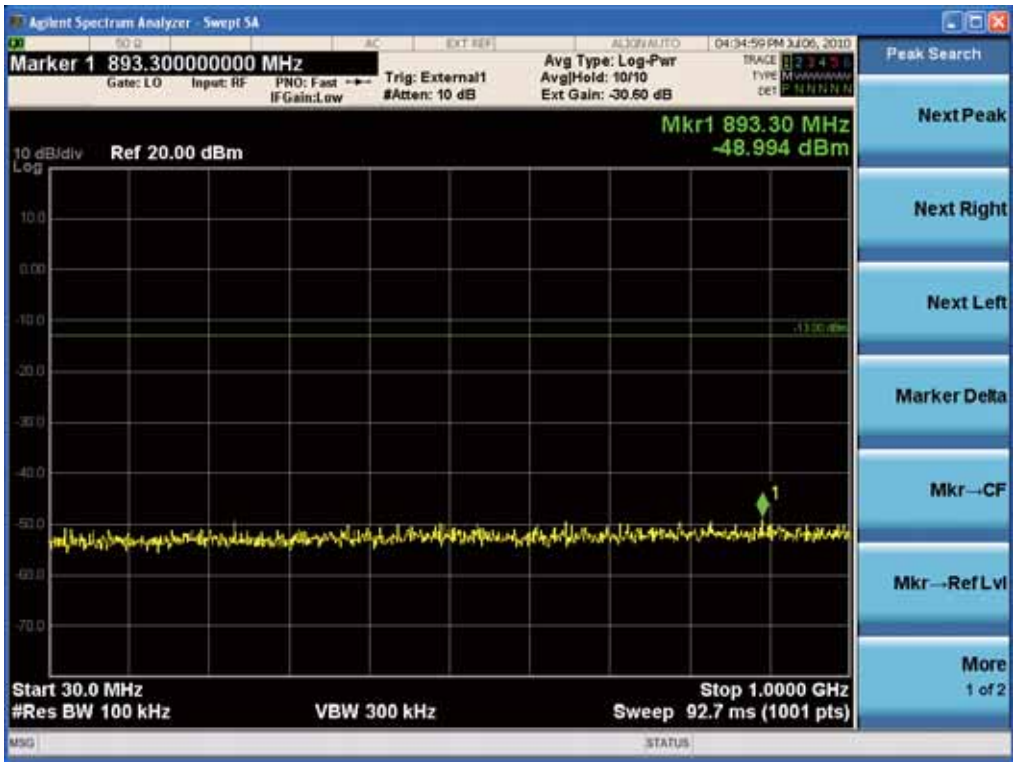
(1 GHz ~ 26.5 GHz)

(64QAM High Channel)

(1 GHz ~ 26.5 GHz)

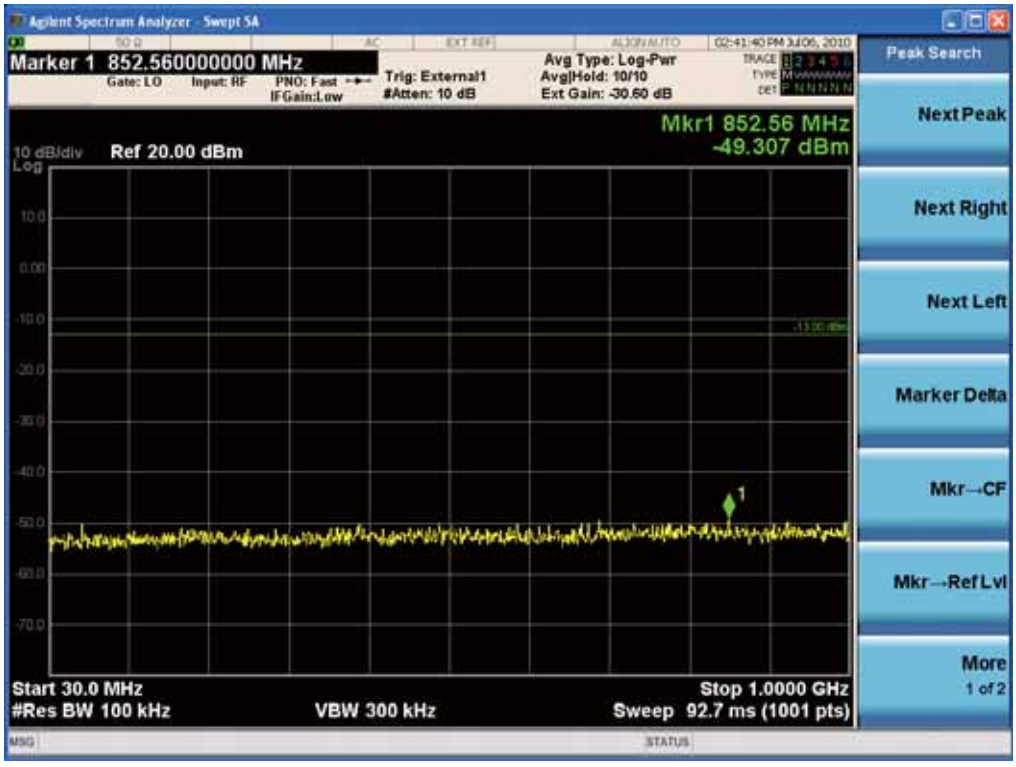
8.4.3. Plot Data at Output 2

(QPSK Low Channel)



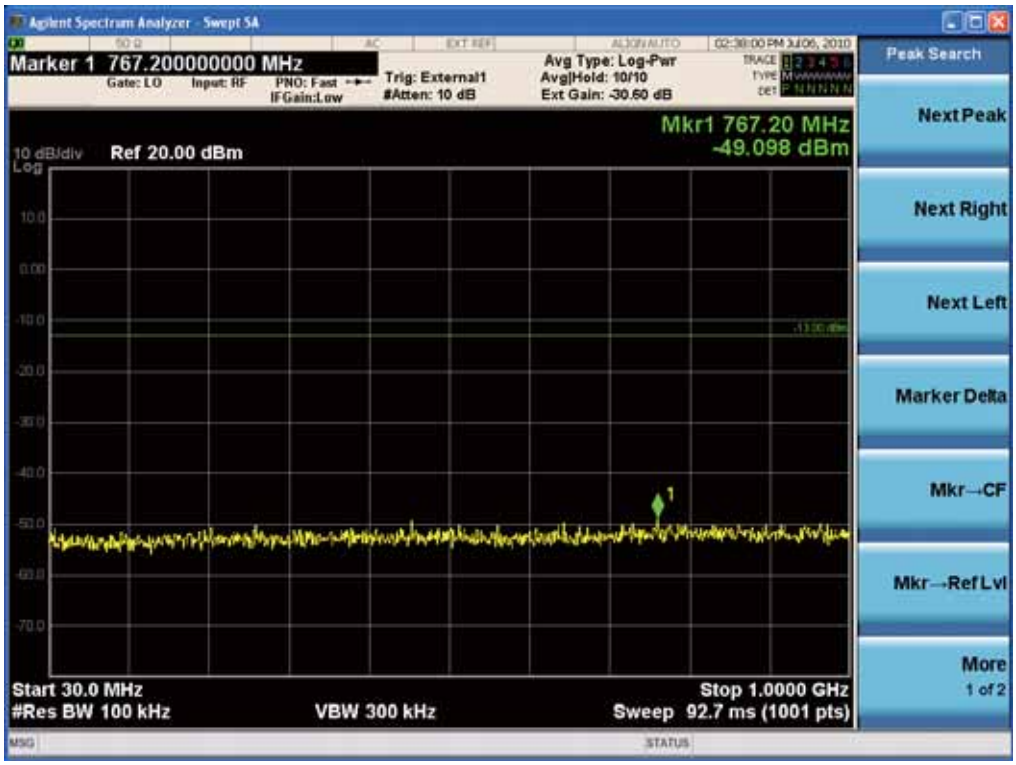
(30 MHz ~ 1 GHz)

(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)

(1 GHz ~ 26.5 GHz)

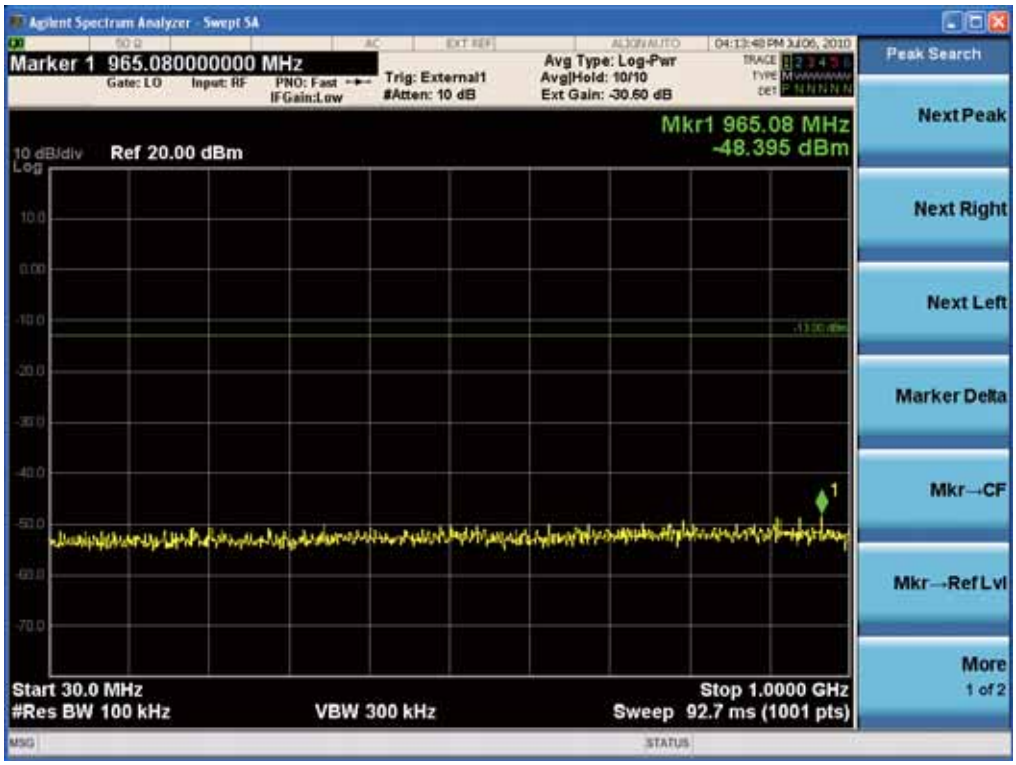
(QPSK Middle Channel)

(1 GHz ~ 26.5 GHz)

(QPSK High Channel)

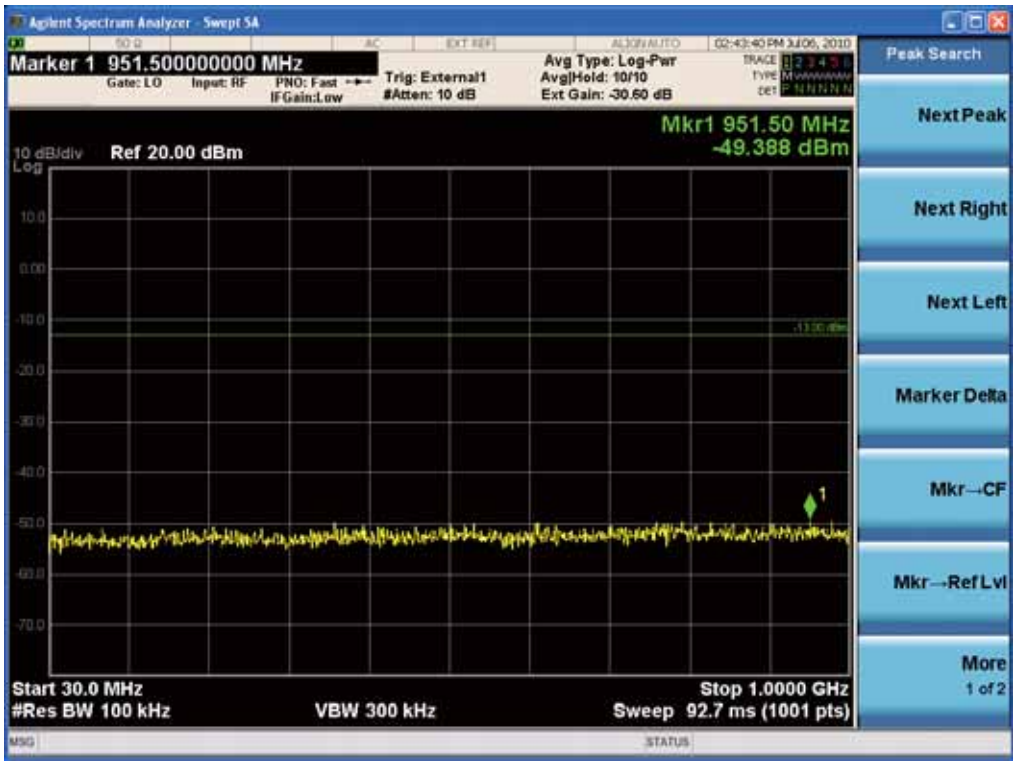
(1 GHz ~ 26.5 GHz)

(16QAM LOW Channel)



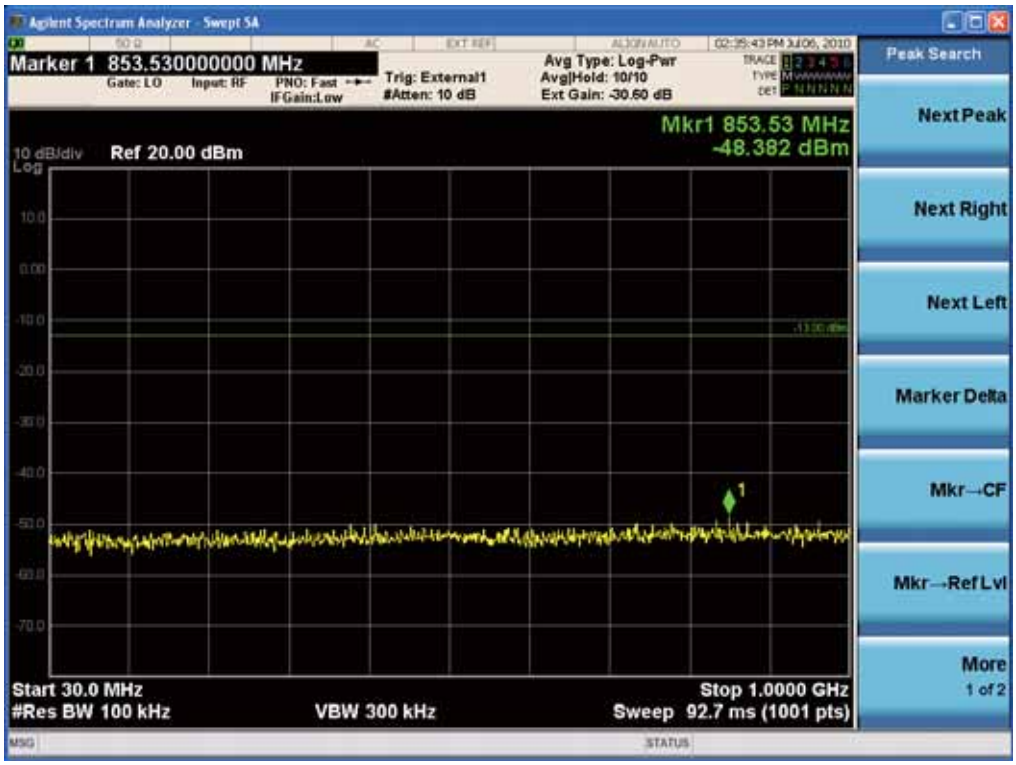
(30 MHz ~ 1 GHz)

(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

(16QAM LOW Channel)

(1 GHz ~ 26.5 GHz)

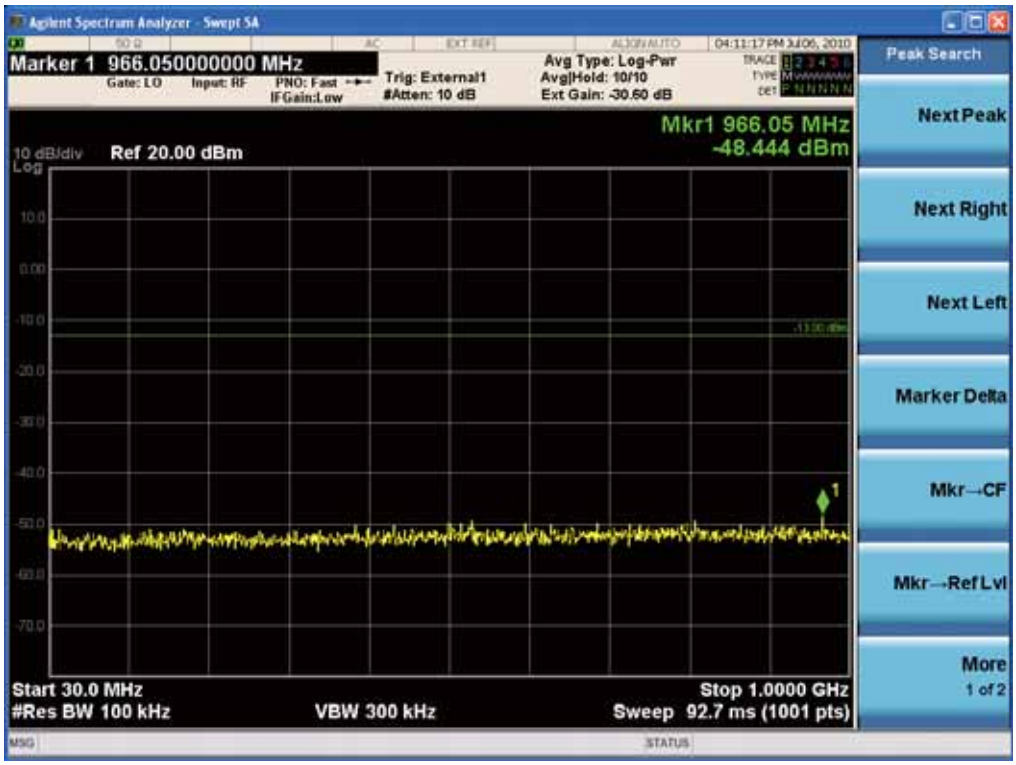
(16QAM Middle Channel)

(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

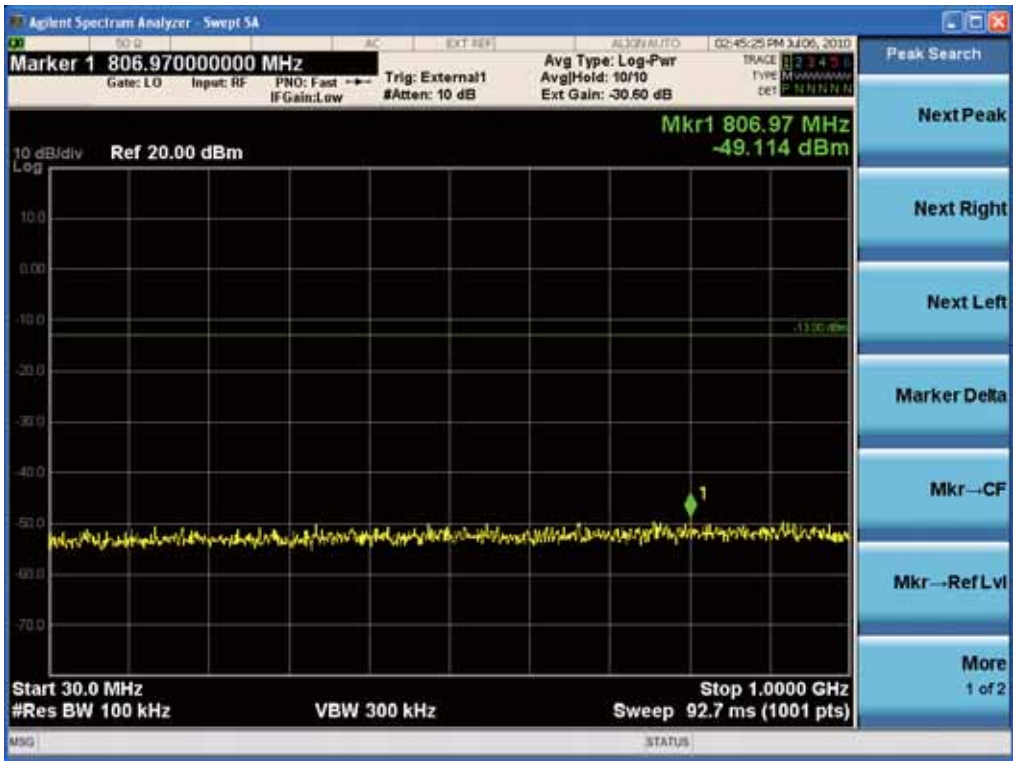
(1 GHz ~ 26.5 GHz)

(64QAM Low Channel)



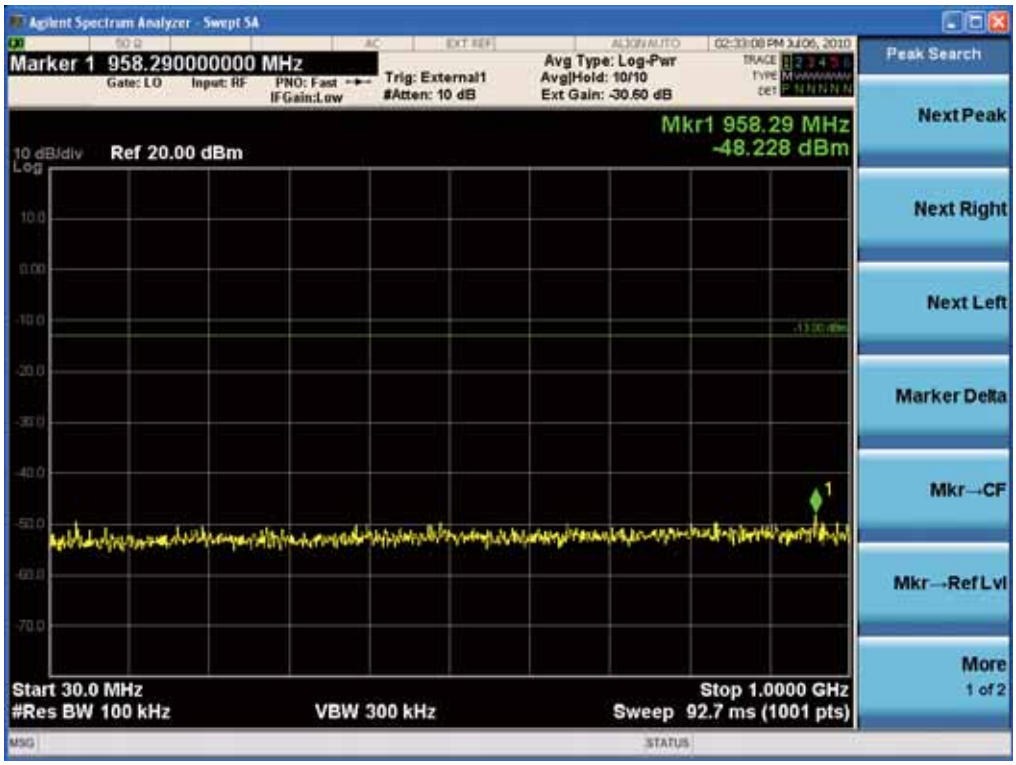
(30 MHz ~ 1 GHz)

(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)

(1 GHz ~ 26.5 GHz)

(64QAM Middle Channel)

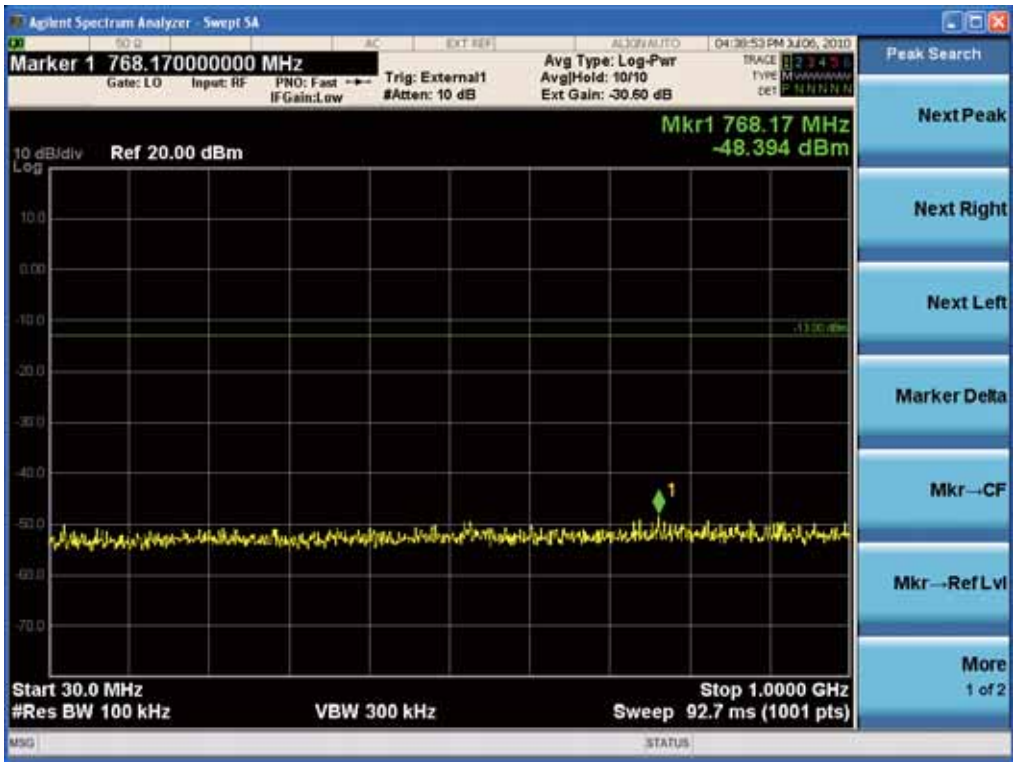
(1 GHz ~ 26.5 GHz)

(64QAM High Channel)

(1 GHz ~ 26.5 GHz)

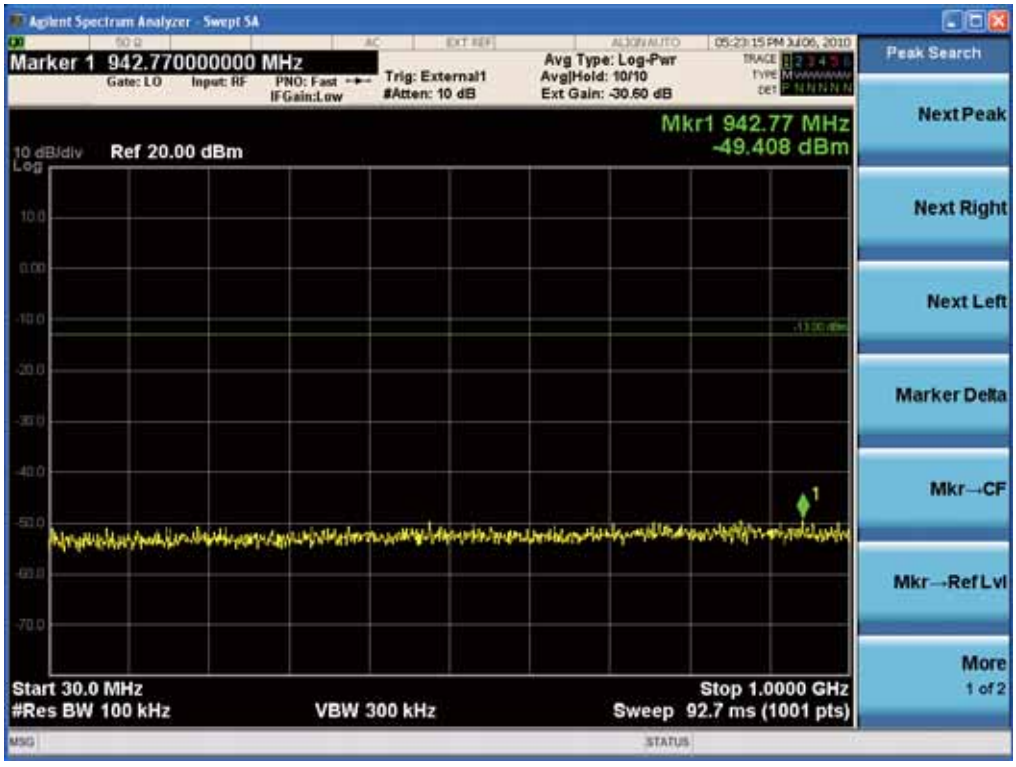
8.4.4. Plot Data at Output 3

(QPSK Low Channel)



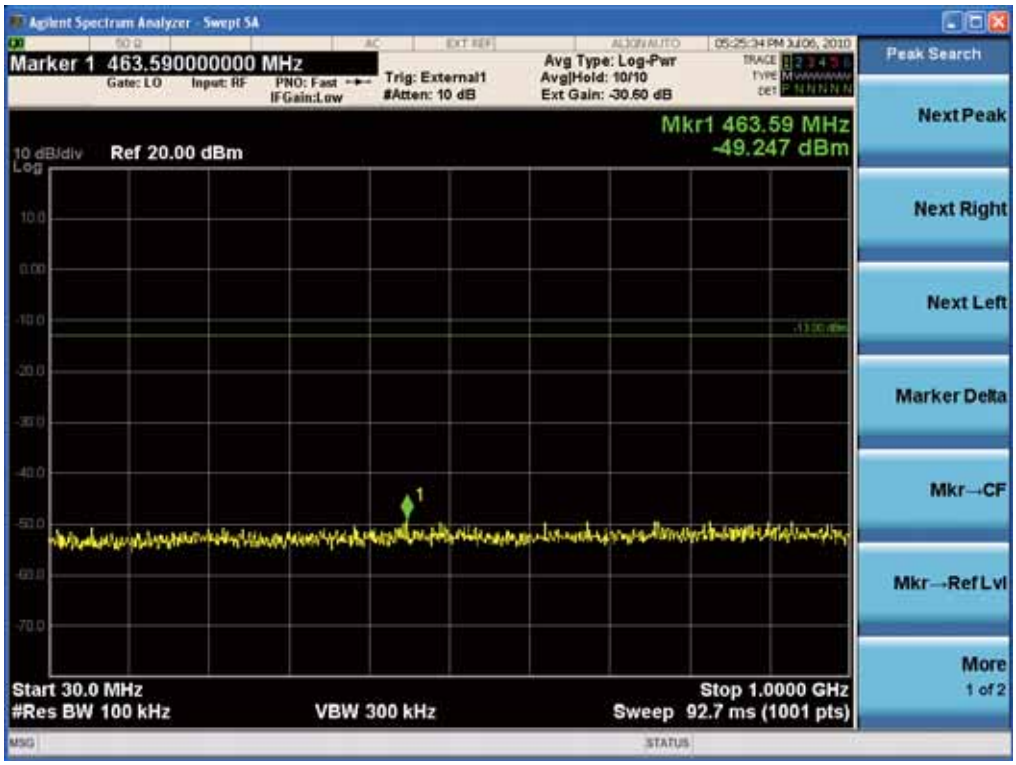
(30 MHz ~ 1 GHz)

(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)

(1 GHz ~ 26.5 GHz)

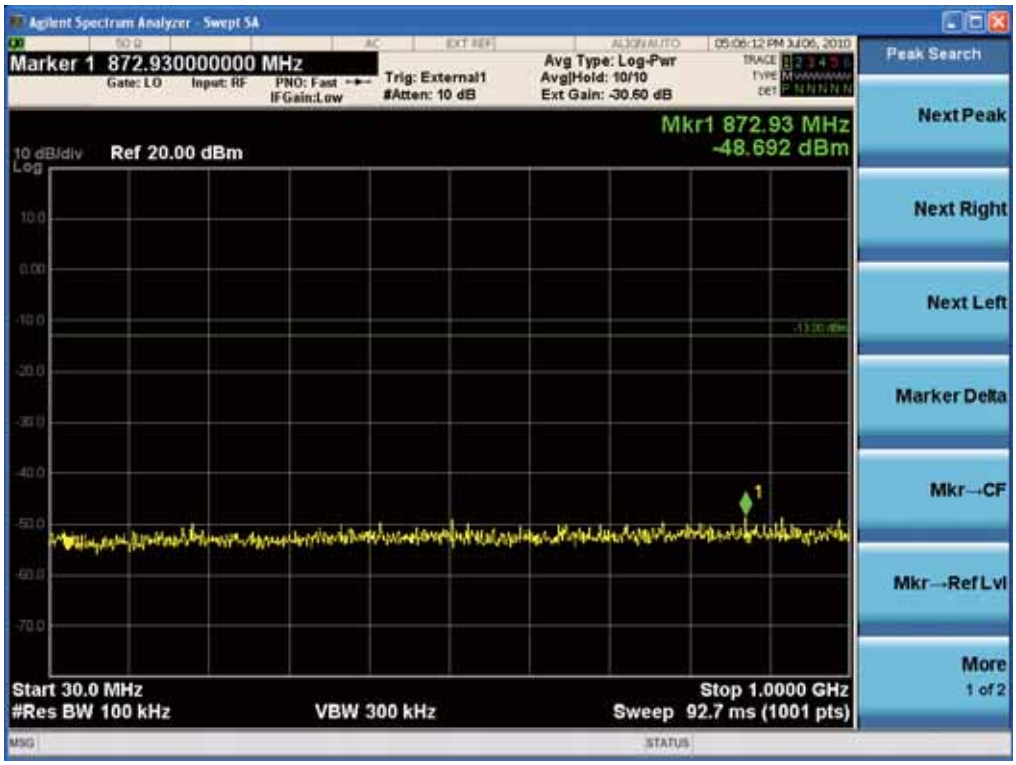
(QPSK Middle Channel)

(1 GHz ~ 26.5 GHz)

(QPSK High Channel)

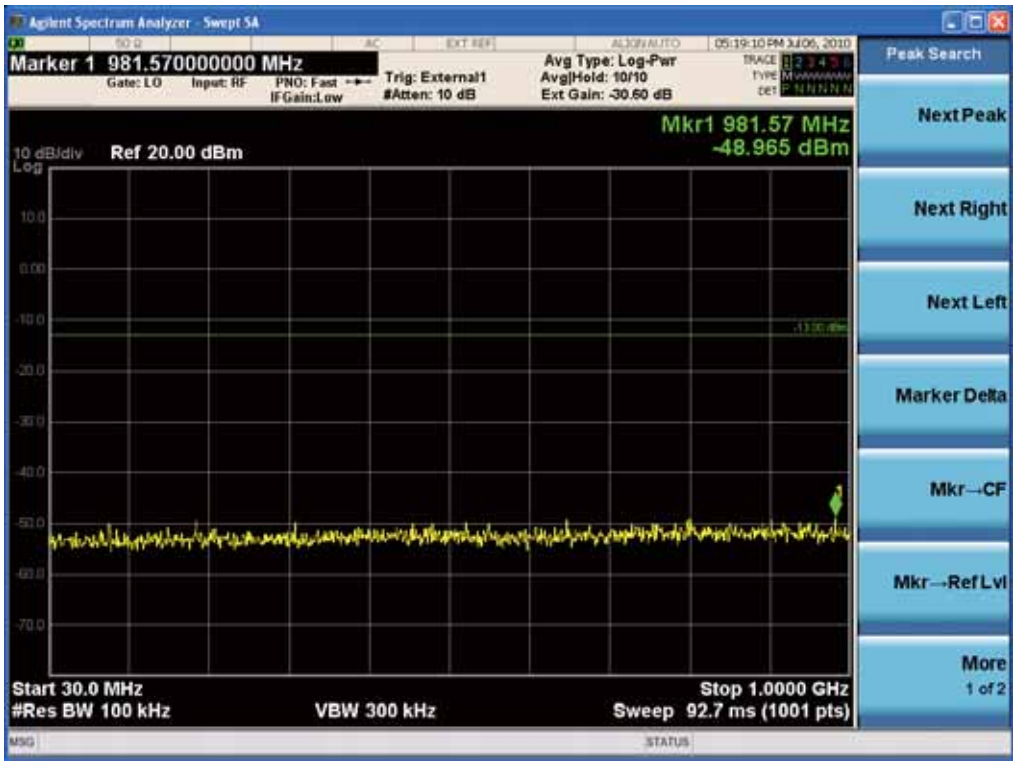
(1 GHz ~ 26.5 GHz)

(16QAM LOW Channel)



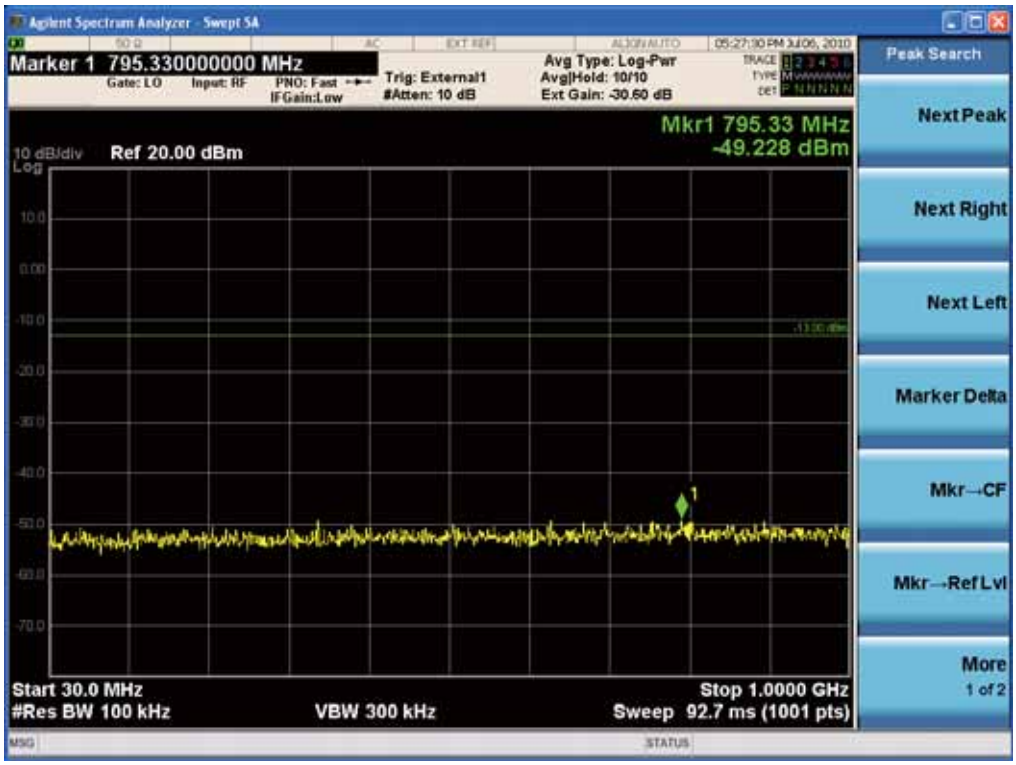
(30 MHz ~ 1 GHz)

(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

(16QAM LOW Channel)

(1 GHz ~ 26.5 GHz)

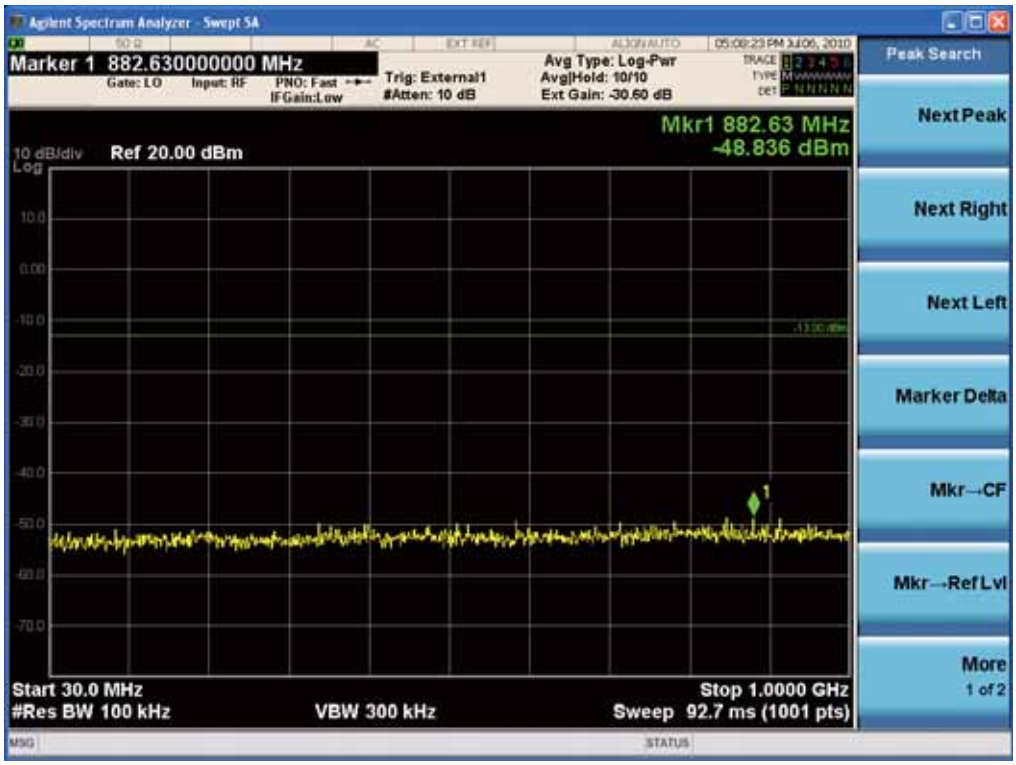
(16QAM Middle Channel)

(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

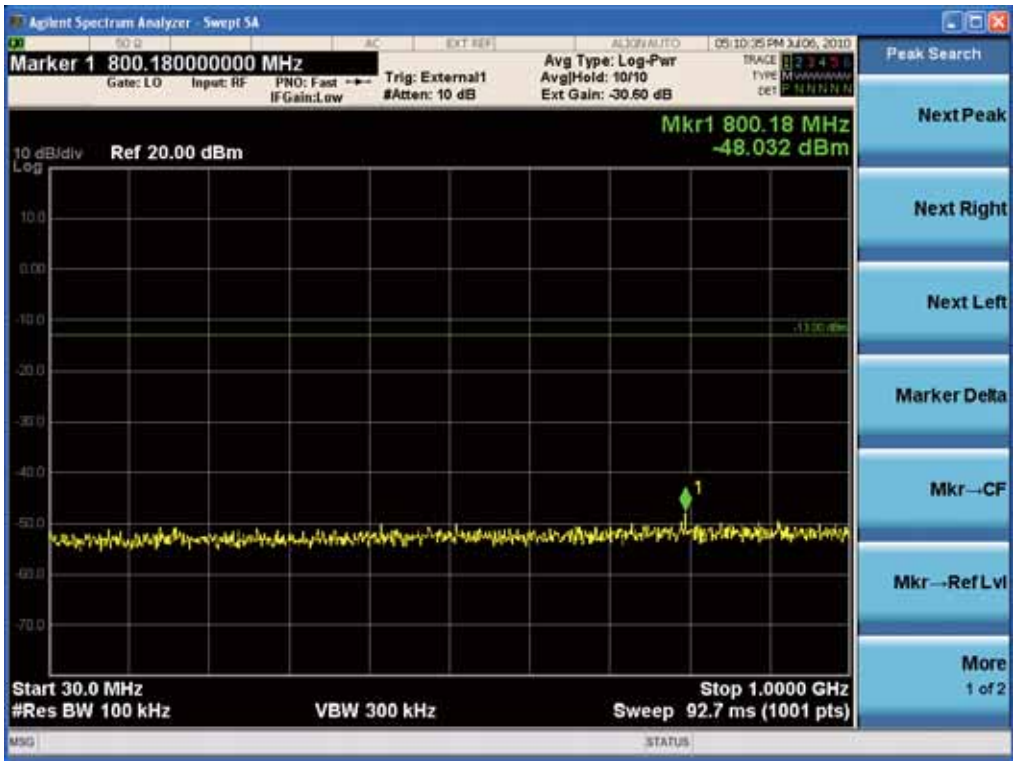
(1 GHz ~ 26.5 GHz)

(64QAM Low Channel)



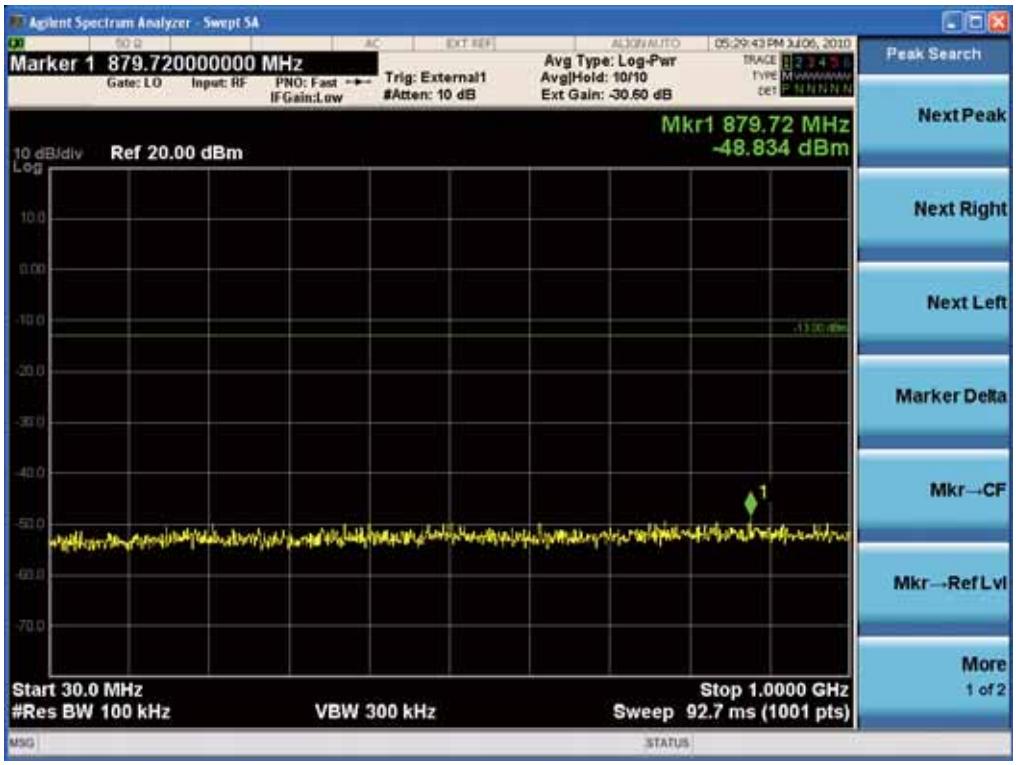
(30 MHz ~ 1 GHz)

(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)

(1 GHz ~ 26.5 GHz)

(64QAM Middle Channel)

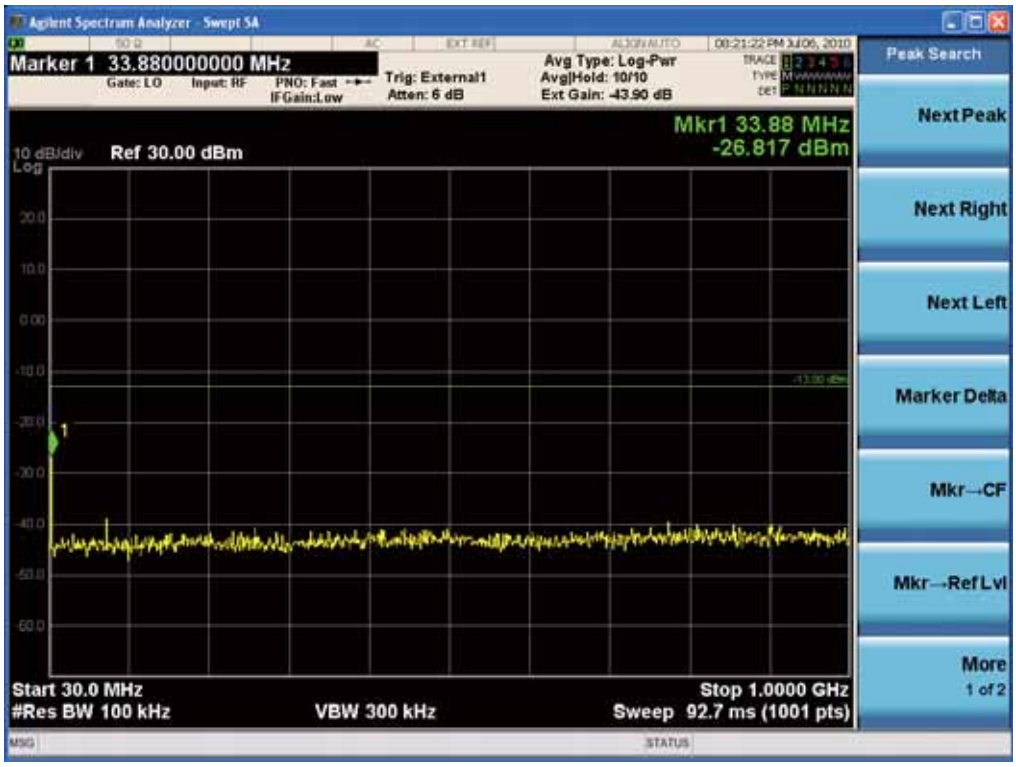
(1 GHz ~ 26.5 GHz)

(64QAM High Channel)

(1 GHz ~ 26.5 GHz)

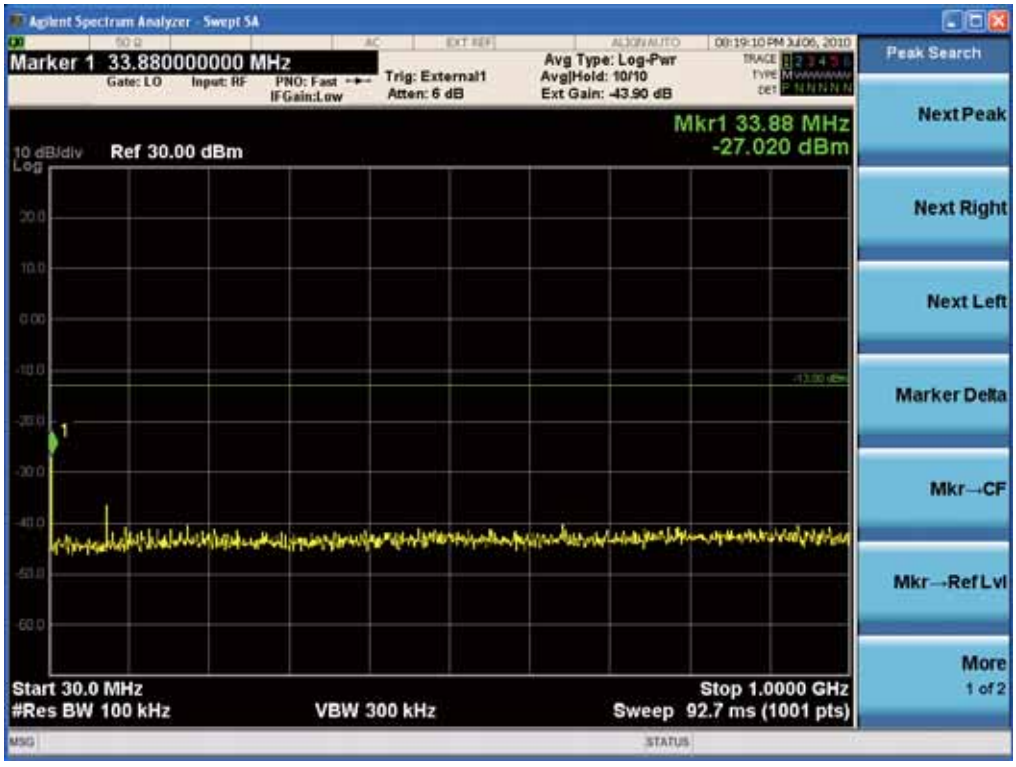
8.4.5. Combined Plot Data at Output

(QPSK Low Channel)



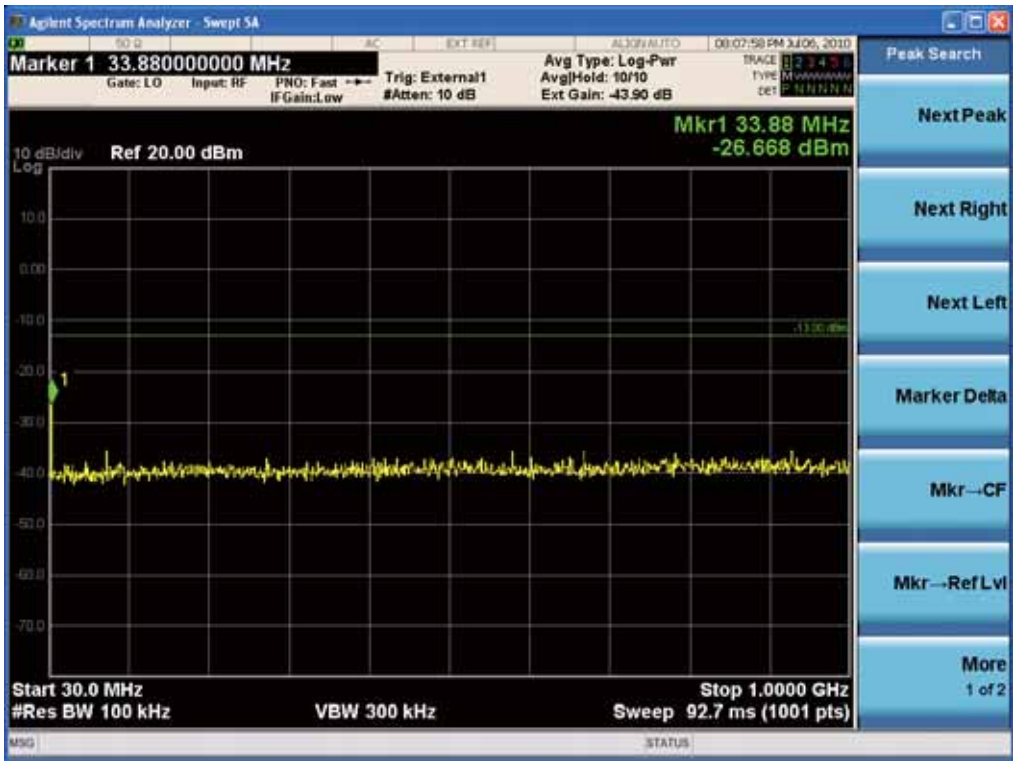
(30 MHz ~ 1 GHz)

(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)

(1 GHz ~ 26.5 GHz)

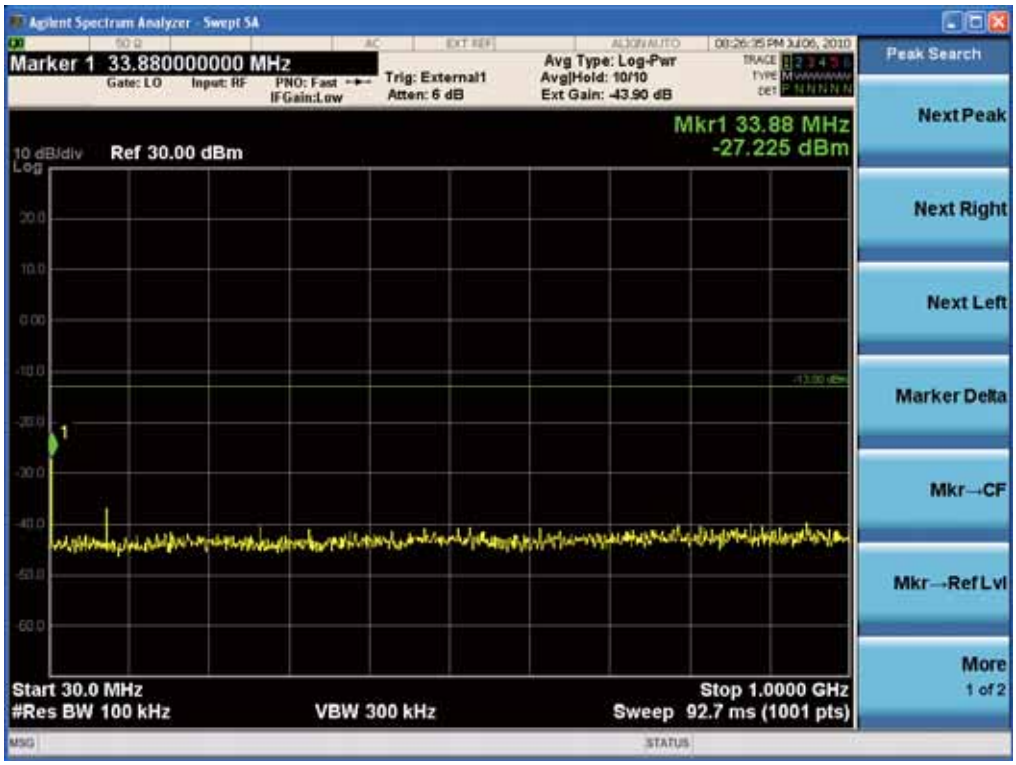
(QPSK Middle Channel)

(1 GHz ~ 26.5 GHz)

(QPSK High Channel)

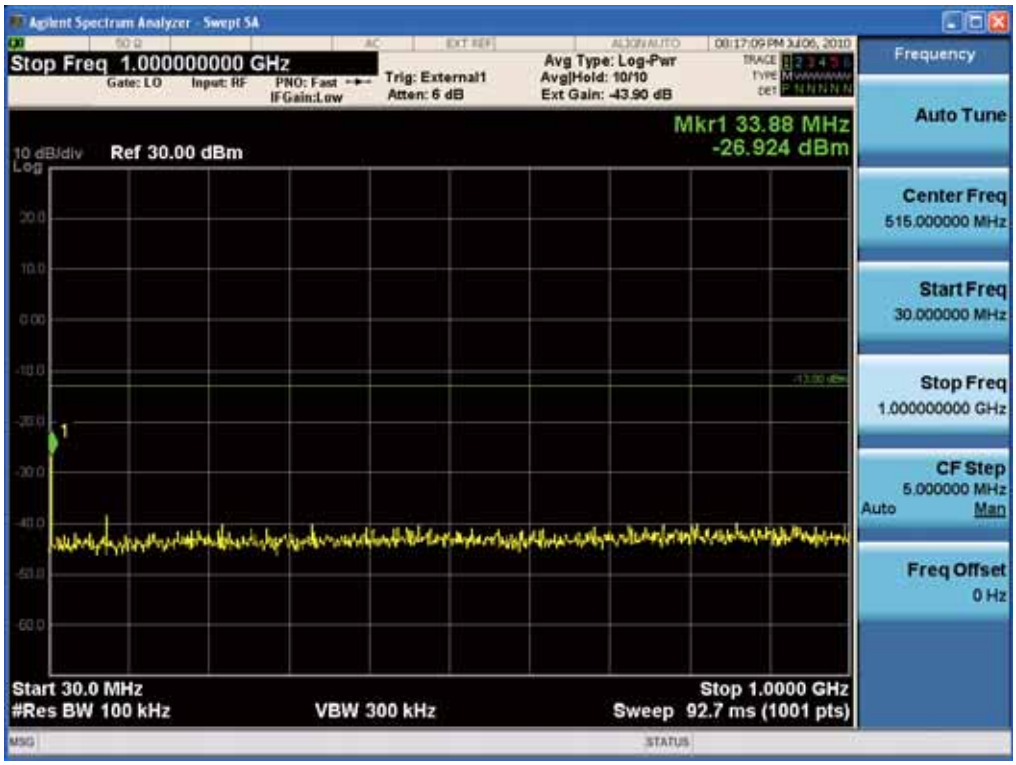
(1 GHz ~ 26.5 GHz)

(16QAM LOW Channel)



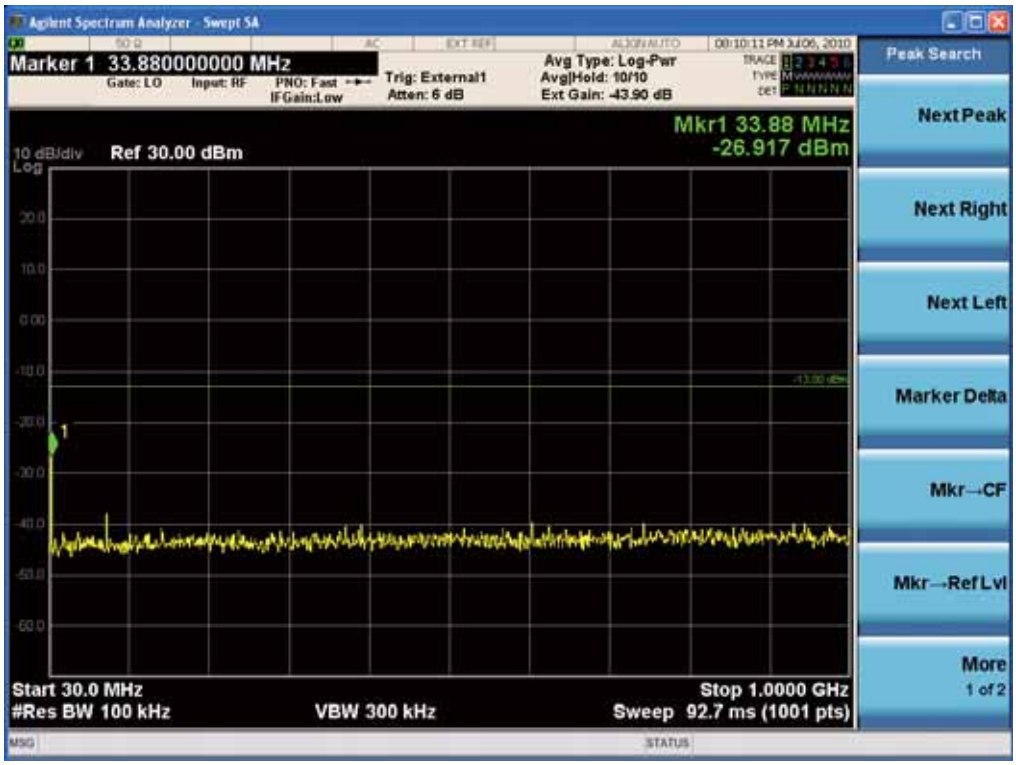
(30 MHz ~ 1 GHz)

(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

(16QAM LOW Channel)

(1 GHz ~ 26.5 GHz)

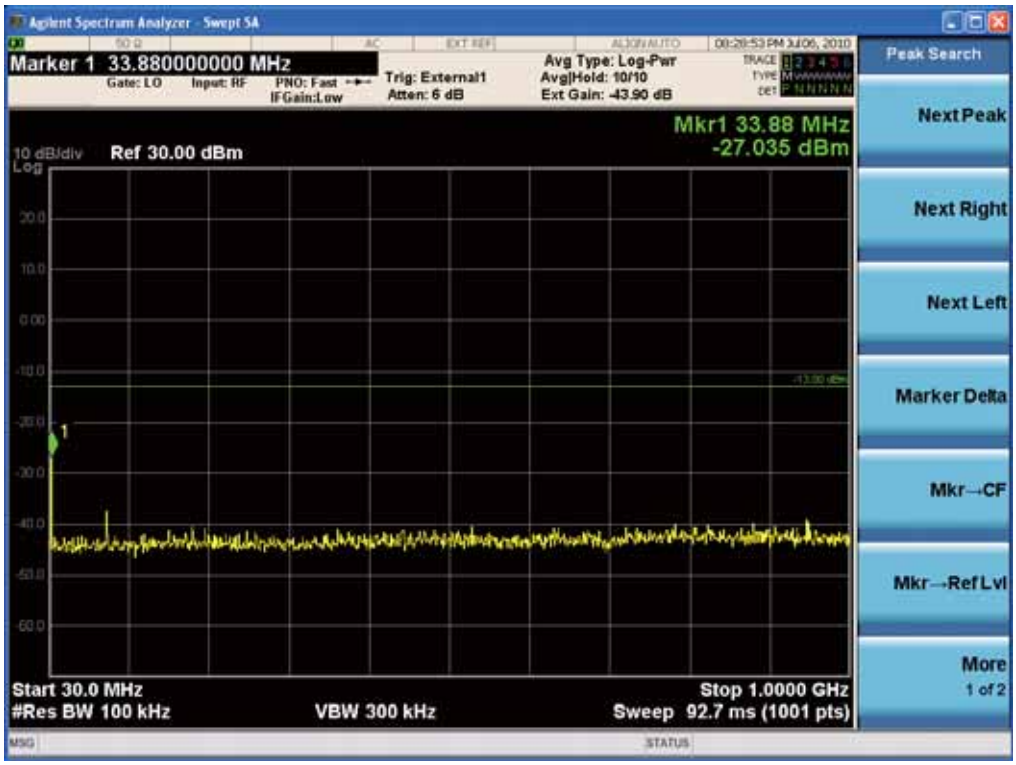
(16QAM Middle Channel)

(1 GHz ~ 26.5 GHz)

(16QAM High Channel)

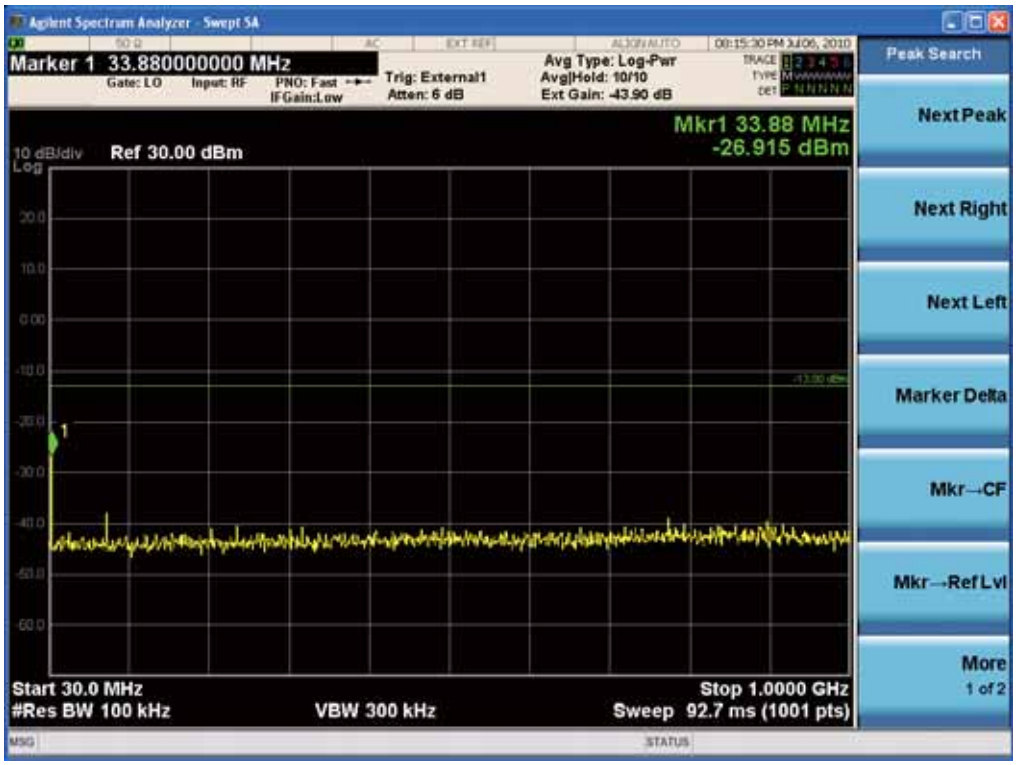
(1 GHz ~ 26.5 GHz)

(64QAM Low Channel)



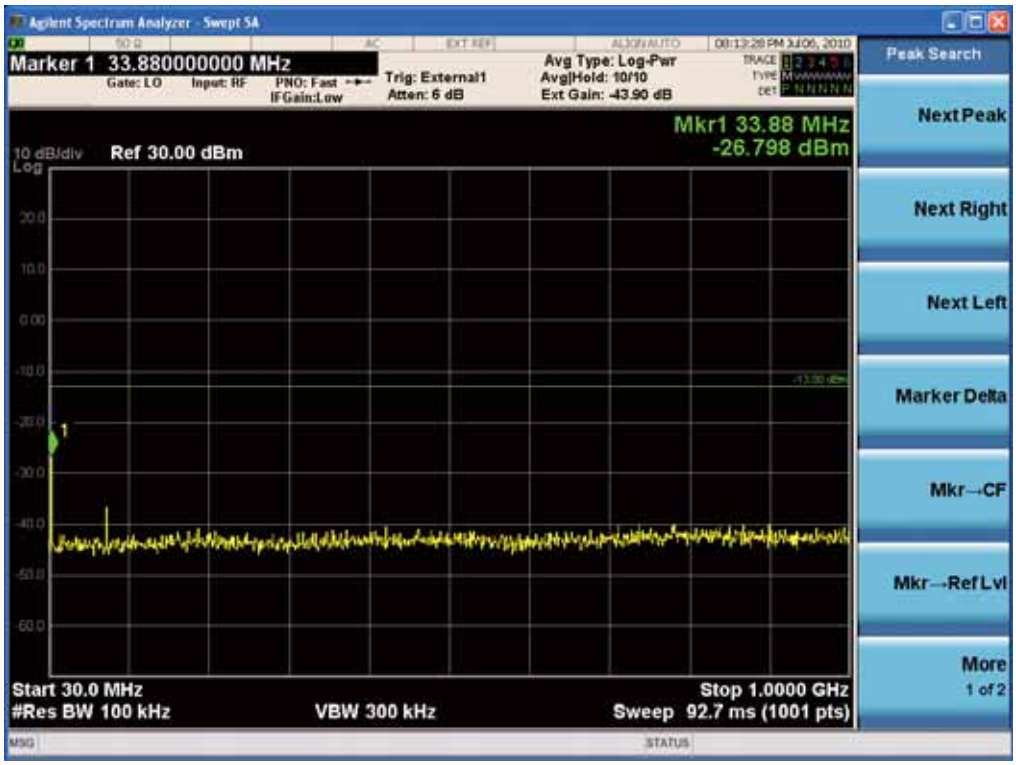
(30 MHz ~ 1 GHz)

(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)

(1 GHz ~ 26.5 GHz)

(64QAM Middle Channel)

(1 GHz ~ 26.5 GHz)

(64QAM High Channel)

(1 GHz ~ 26.5 GHz)