

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

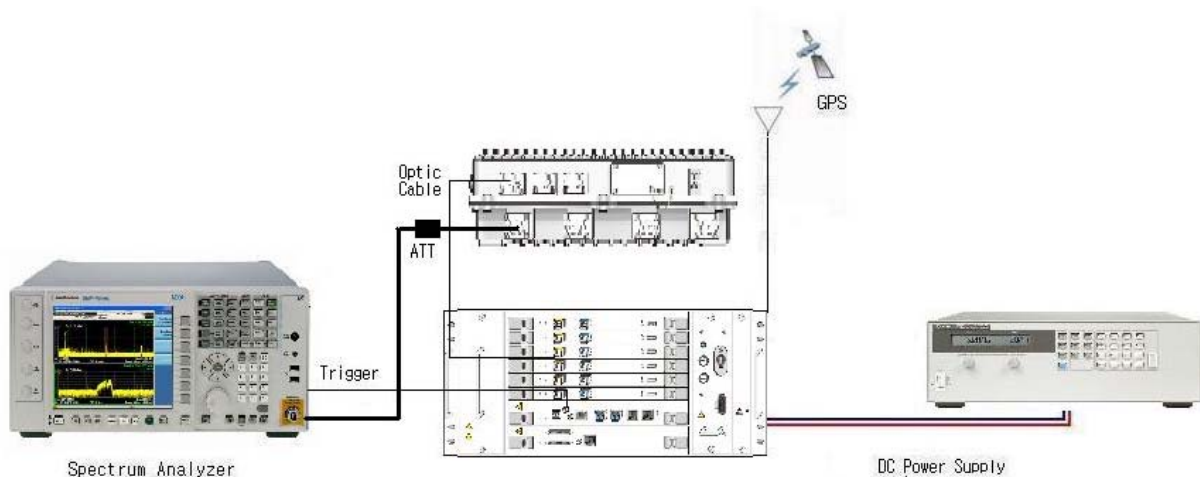
Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
WEINSCHEL	67-30-33 / Attenuator	BU5347	11/07/2012
WEINSCHEL	67-30-33 / Attenuator	BR0530	11/07/2012
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/07/2012
WEINSCHEL	AF9003-69-31 / Attenuator	5701	11/07/2012

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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

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6.4.1. Test Data at Output Port 0

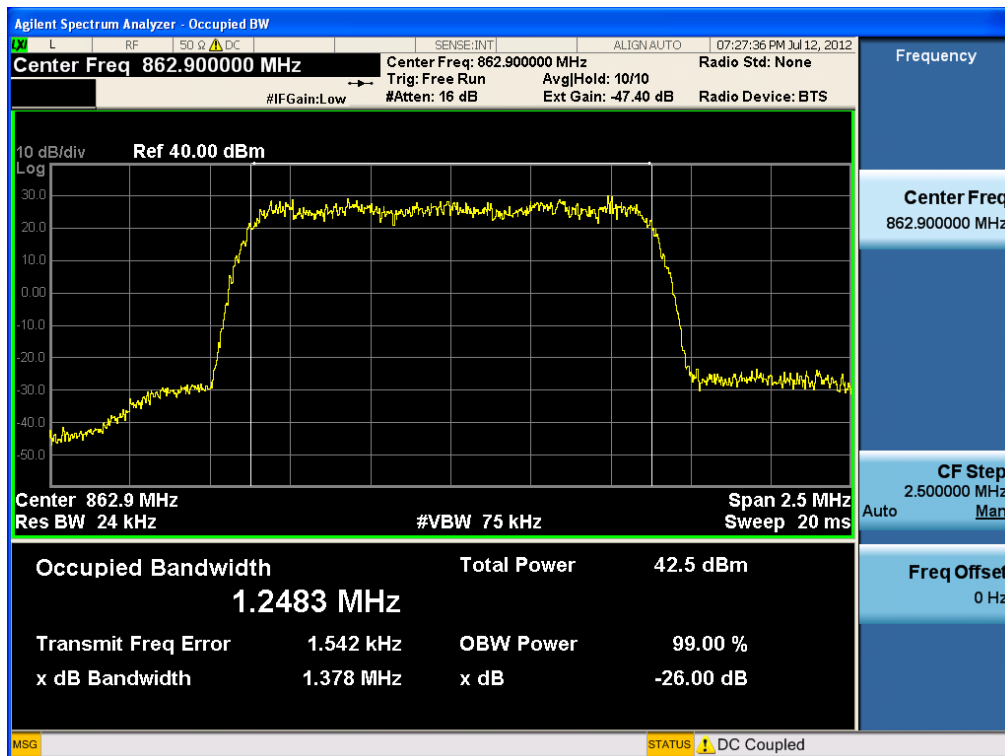
	Frequency (MHz)	Modulation	Bandwidth (MHz)	
			99 %	26 dB
CDMA	862.9	BPSK	1.2483	1.378
		QPSK	1.2451	1.366
		16QAM	1.2434	1.362
LTE	866.5	QPSK	4.4485	4.718
		16QAM	4.4694	4.754
		64QAM	4.4955	4.765
	865.5	QPSK	4.4976	4.823
		16QAM	4.4648	4.775
		64QAM	4.4966	4.795
	864.5	QPSK	4.4888	4.795
		16QAM	4.4764	4.754
		64QAM	4.4902	4.786

6.4.2. Test Data at Output Port 1

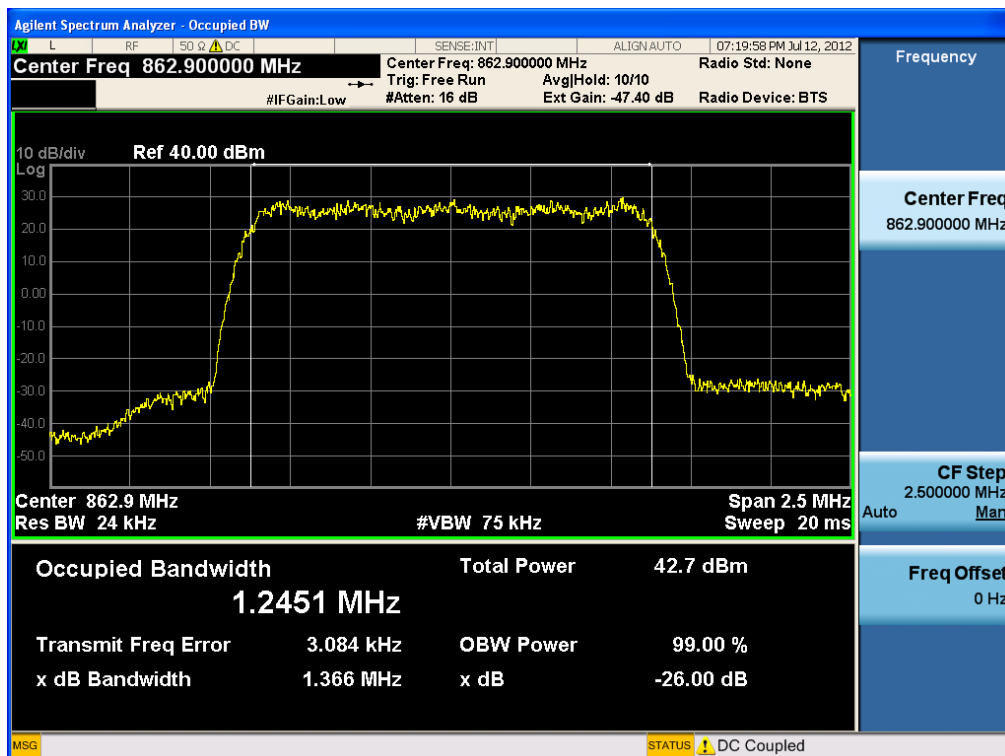
	Frequency (MHz)	Modulation	Bandwidth (MHz)	
			99 %	26 dB
CDMA	862.9	BPSK	1.2515	1.371
		QPSK	1.2464	1.372
		16QAM	1.2450	1.375
LTE	866.5	QPSK	4.4975	4.782
		16QAM	4.4794	4.760
		64QAM	4.4946	4.772
	865.5	QPSK	4.4963	4.742
		16QAM	4.4794	4.771
		64QAM	4.4975	4.787
	864.5	QPSK	4.4935	4.786
		16QAM	4.4664	4.749
		64QAM	4.5011	4.765

6.4.3. Plot Data for Output Port 0

(CDMA BPSK)

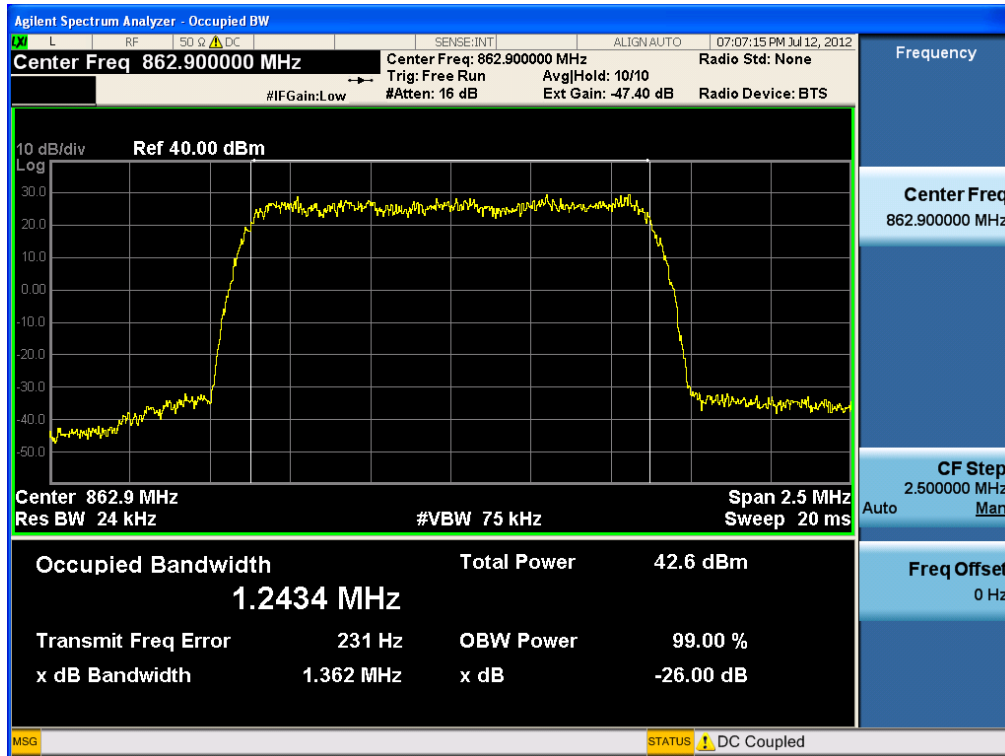


(CDMA QPSK)

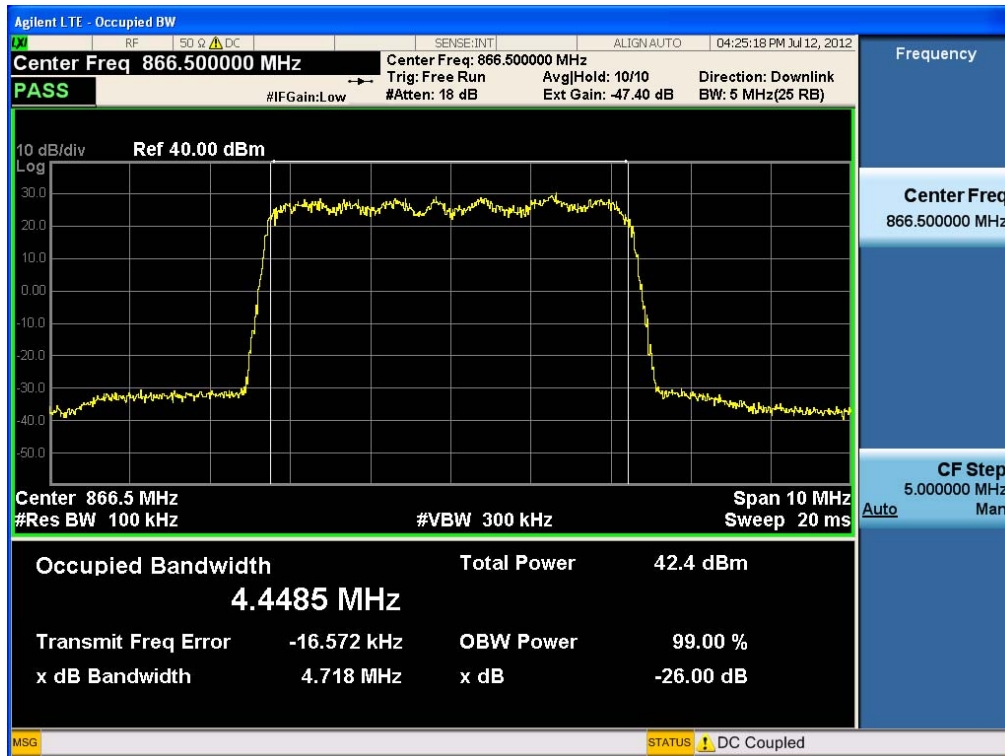


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(CDMA 16QAM)

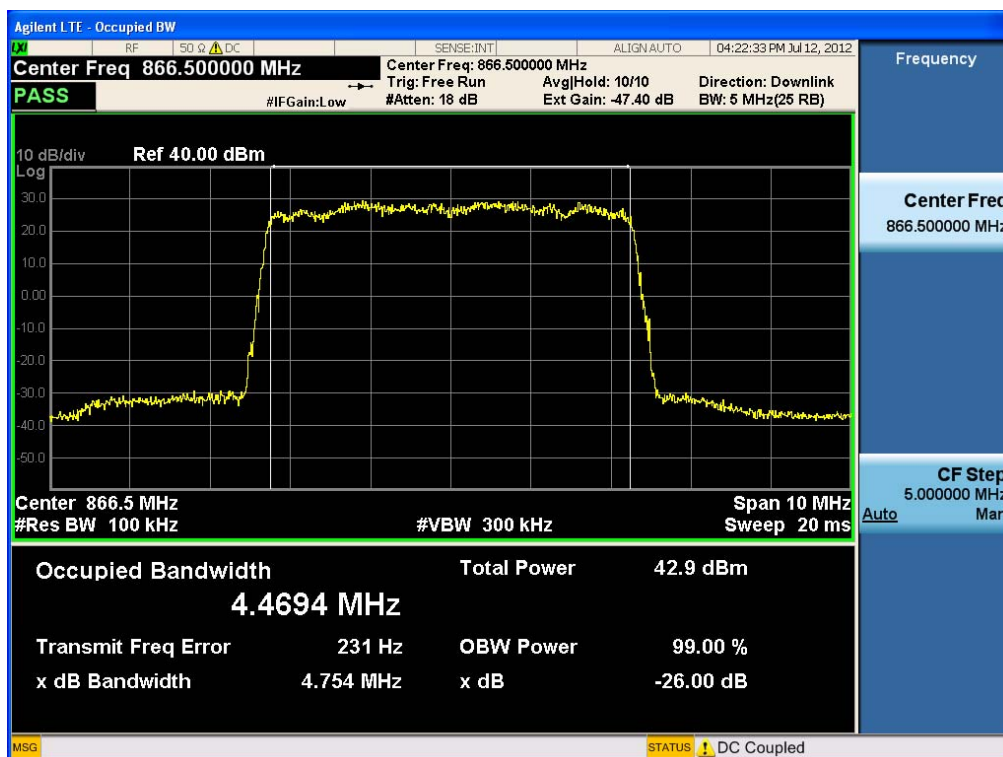


(LTE QPSK) High

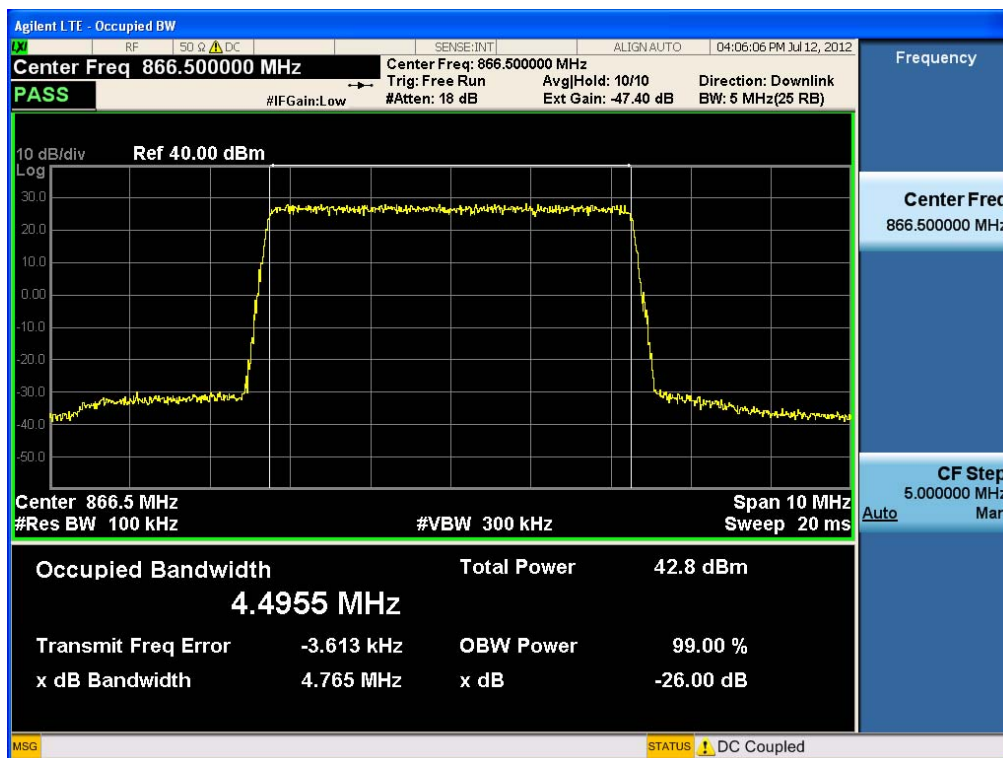


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(LTE 16QAM) High

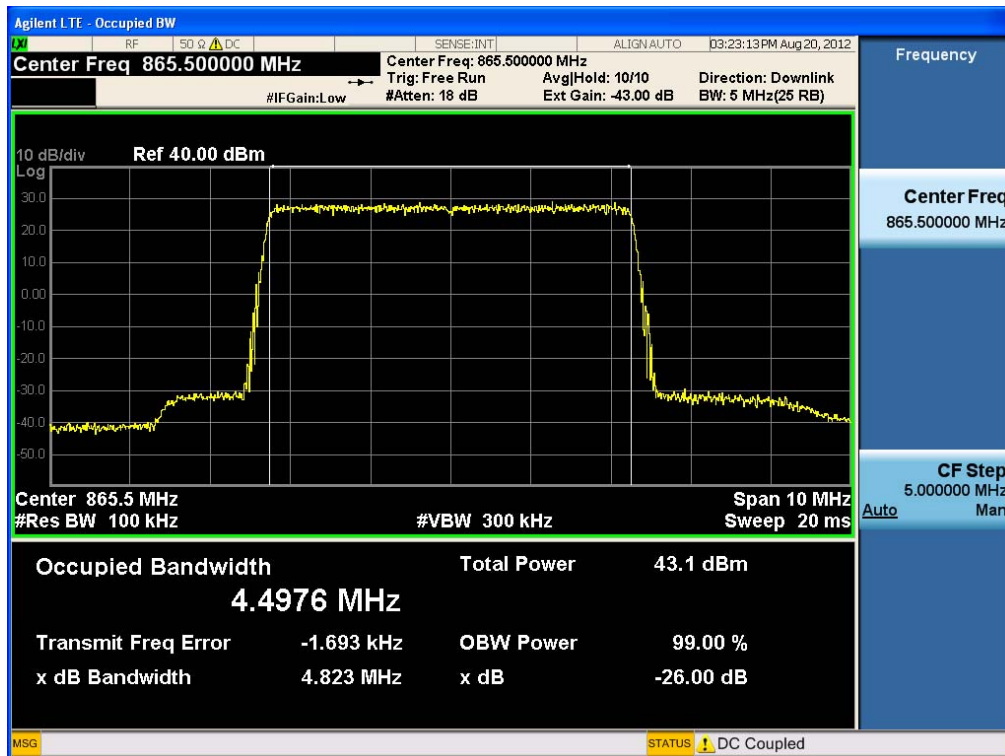


(LTE 64QAM) High

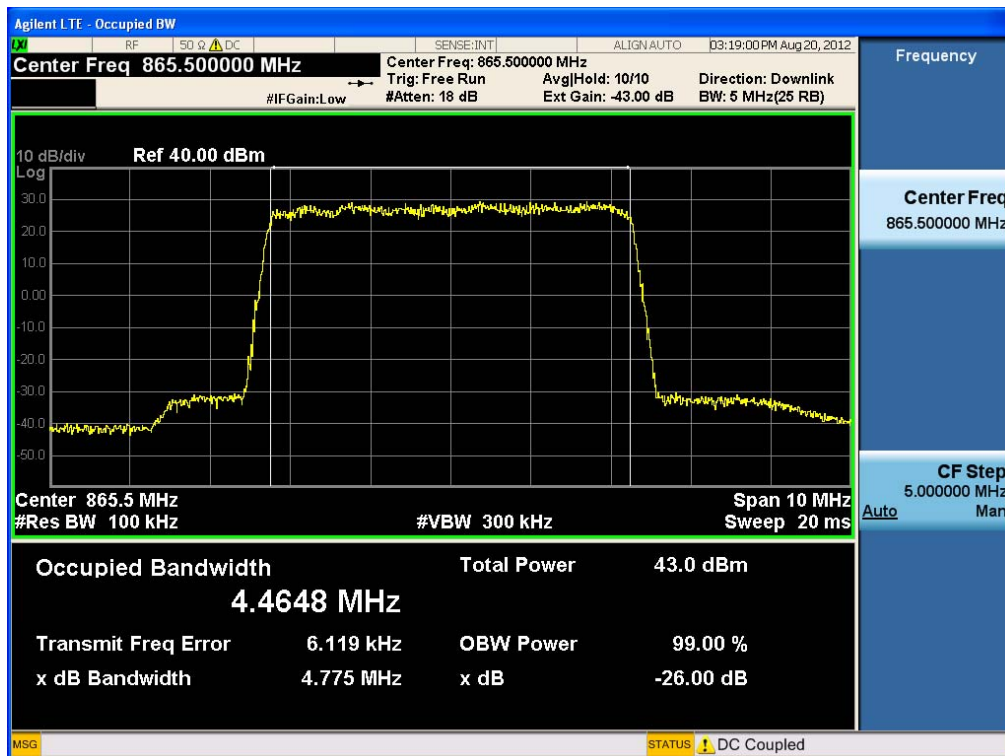


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(LTE QPSK) Middle

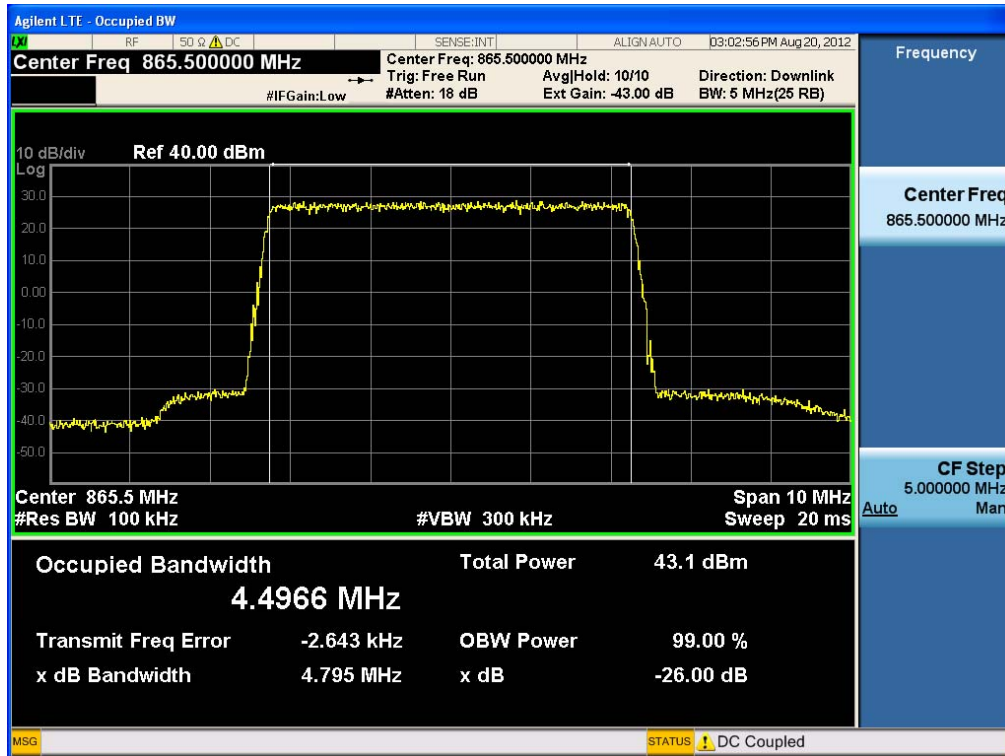


(LTE 16QAM) Middle

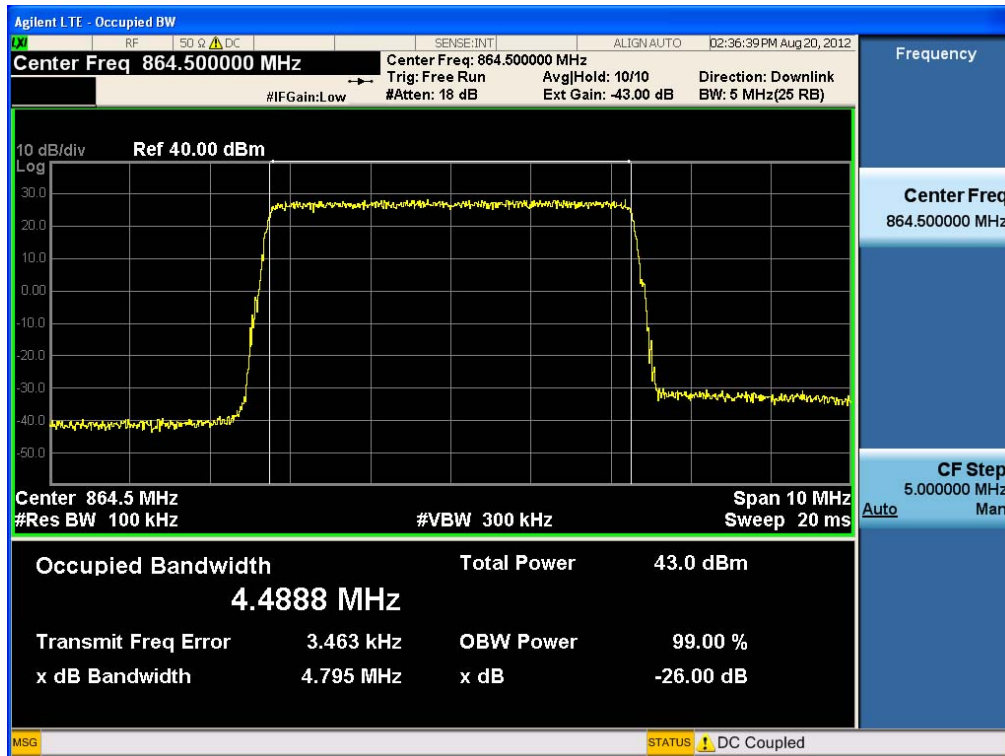


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(LTE 64QAM) Middle

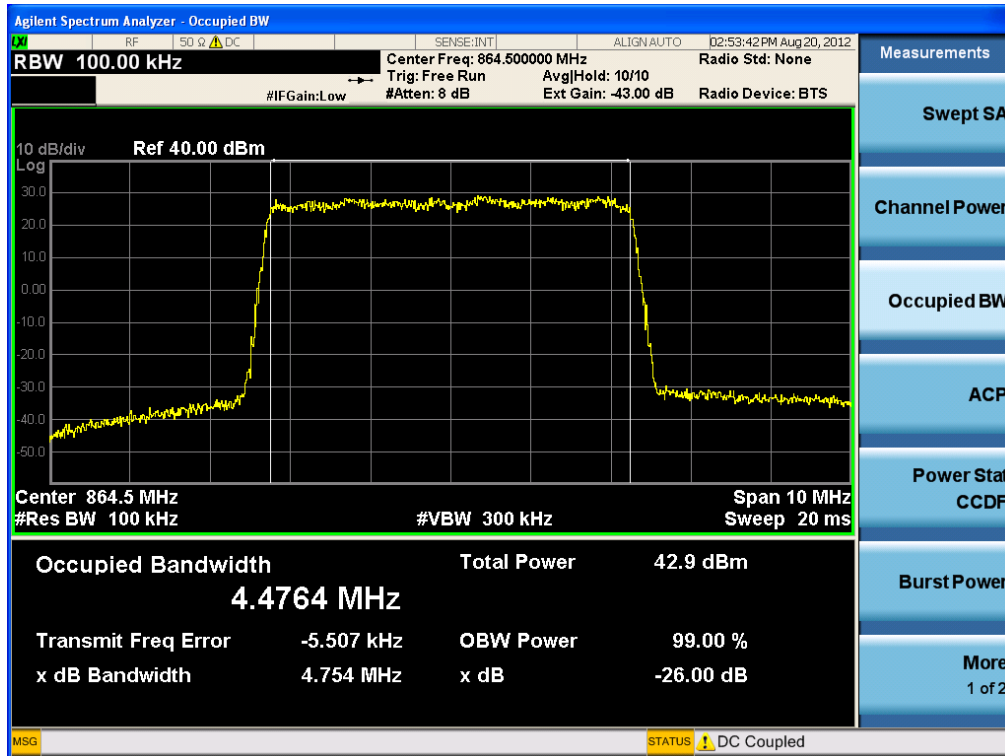


(LTE QPSK) Low

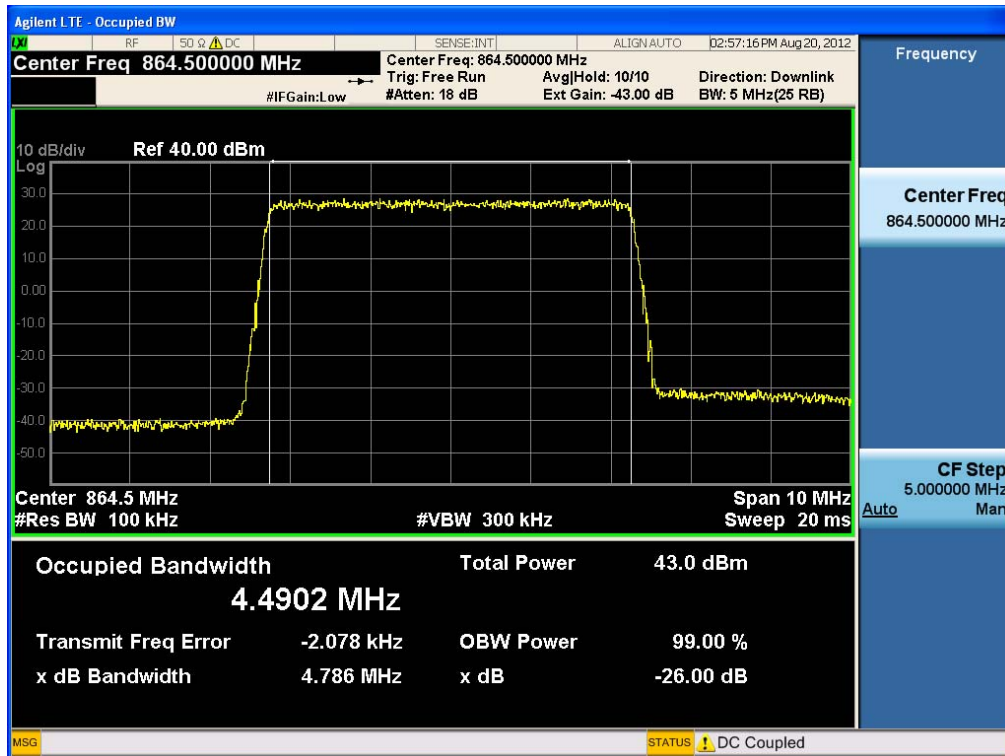


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(LTE 16QAM) Low



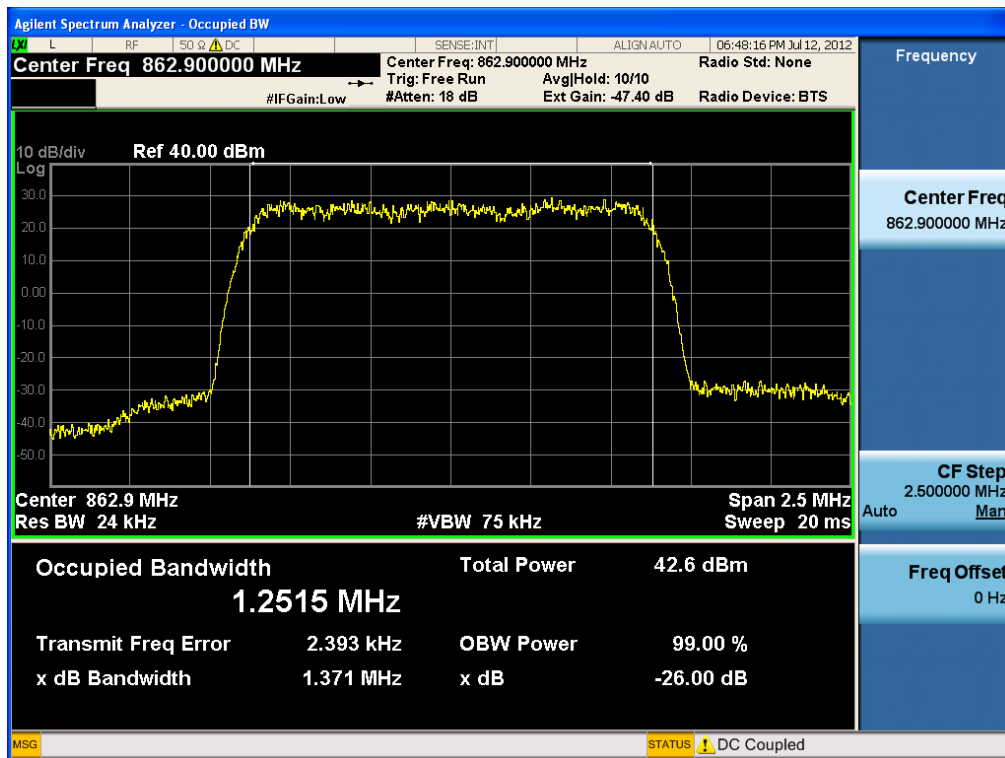
(LTE 64QAM) Low



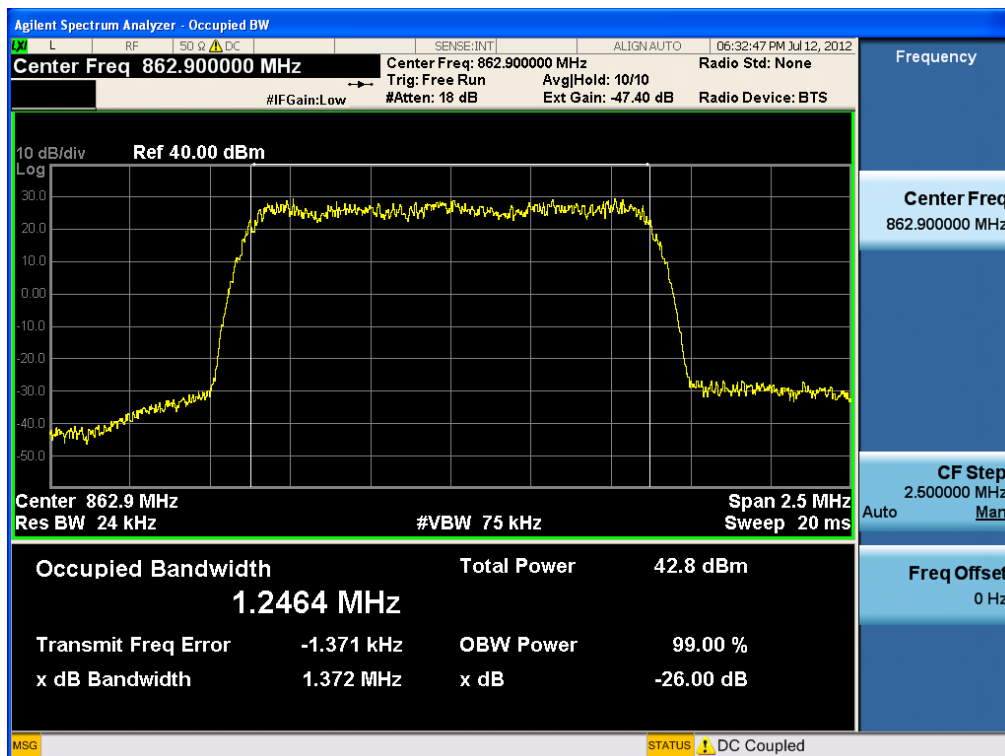
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6.4.4. Plot Data for Output Port 1

(CDMA BPSK)

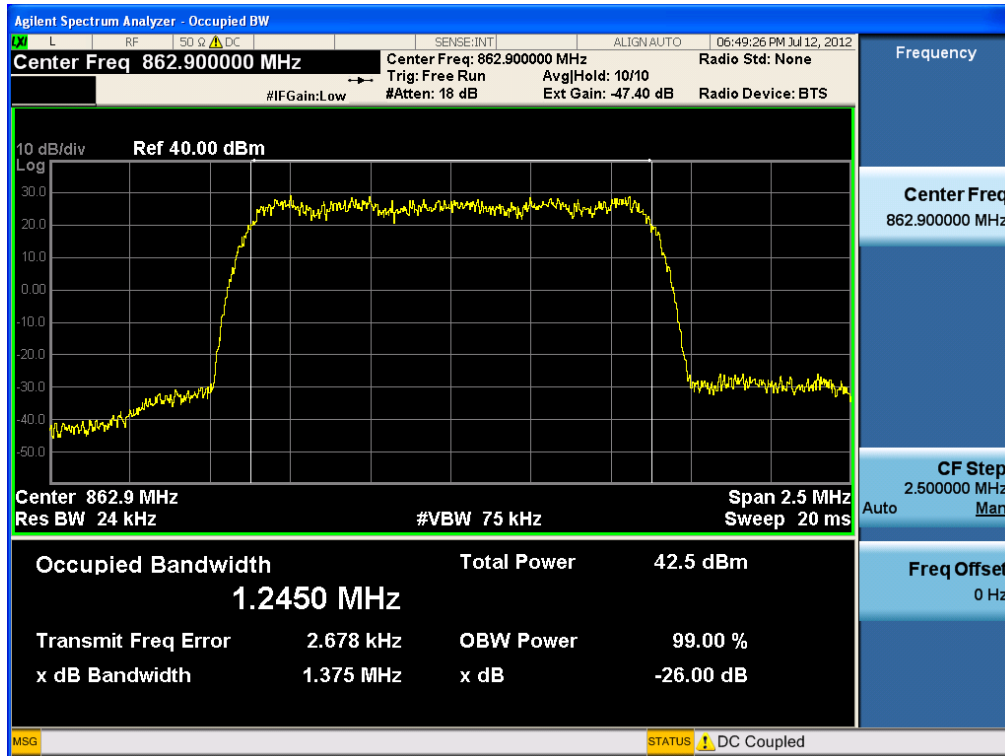


(CDMA QPSK)

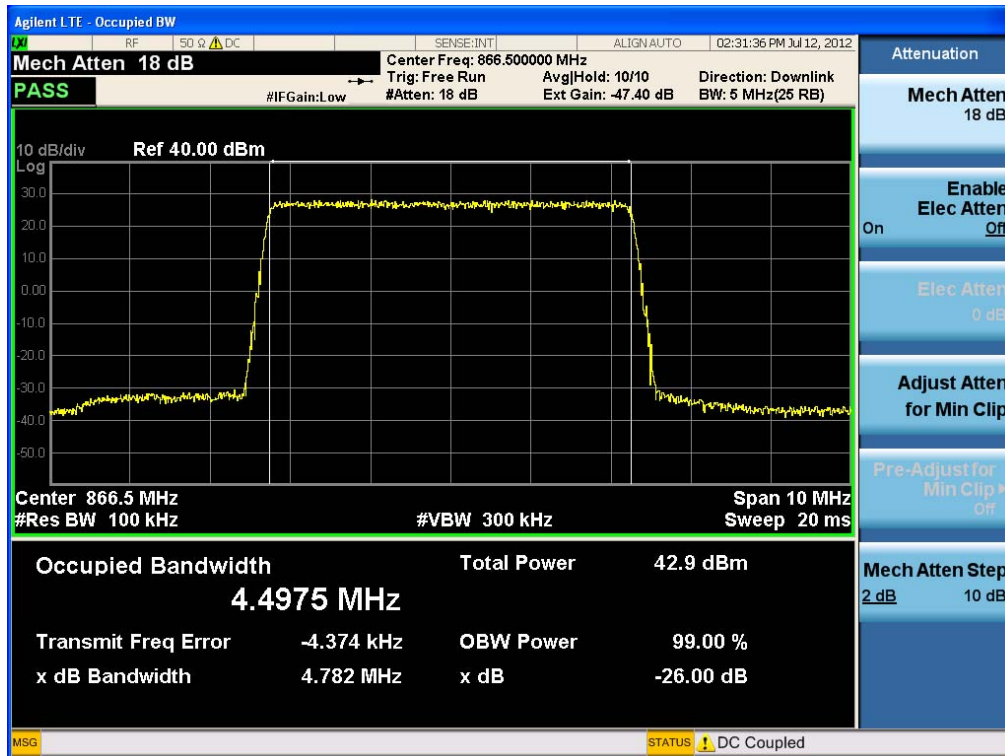


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(CDMA 16QAM)

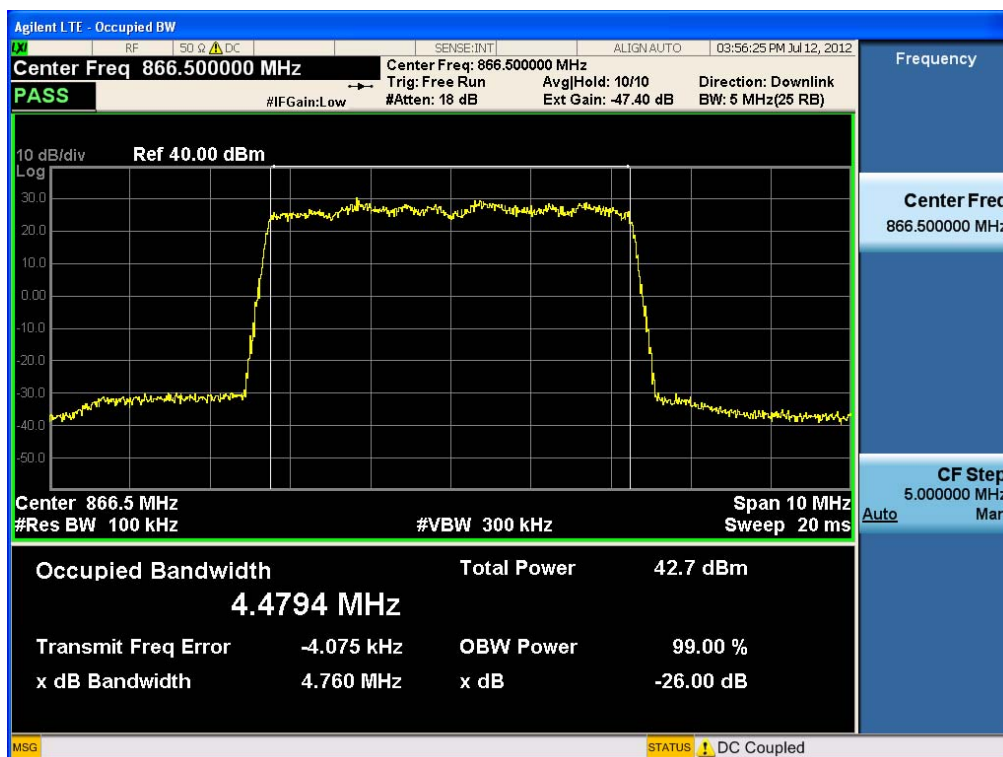


(LTE QPSK) High

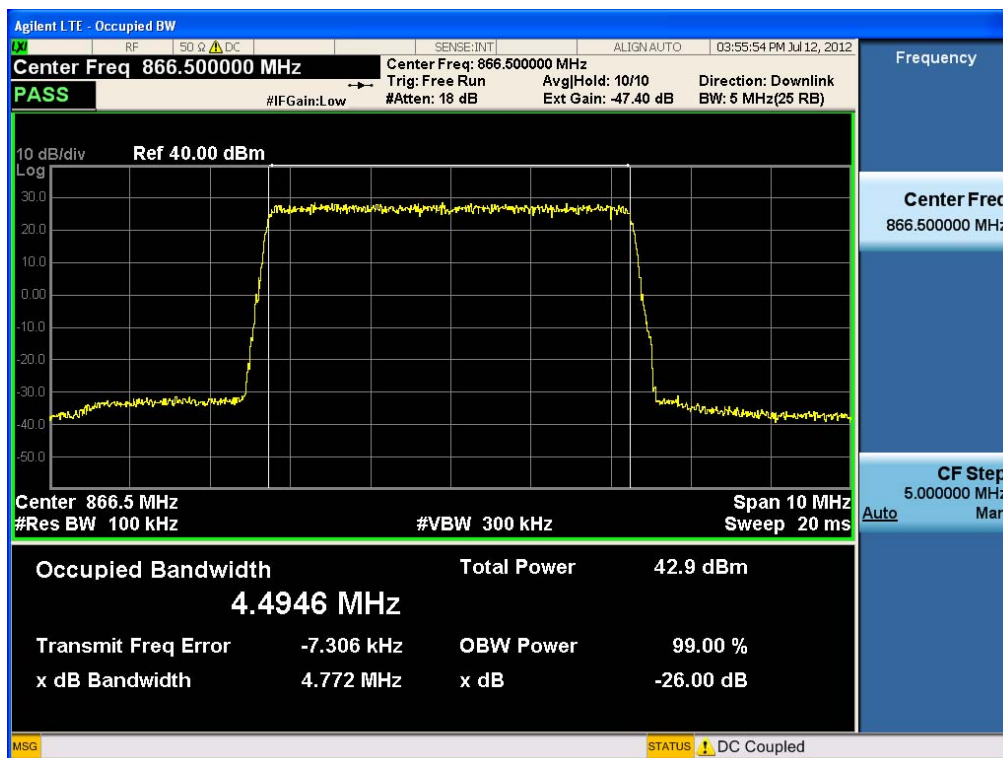


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(LTE 16QAM) High

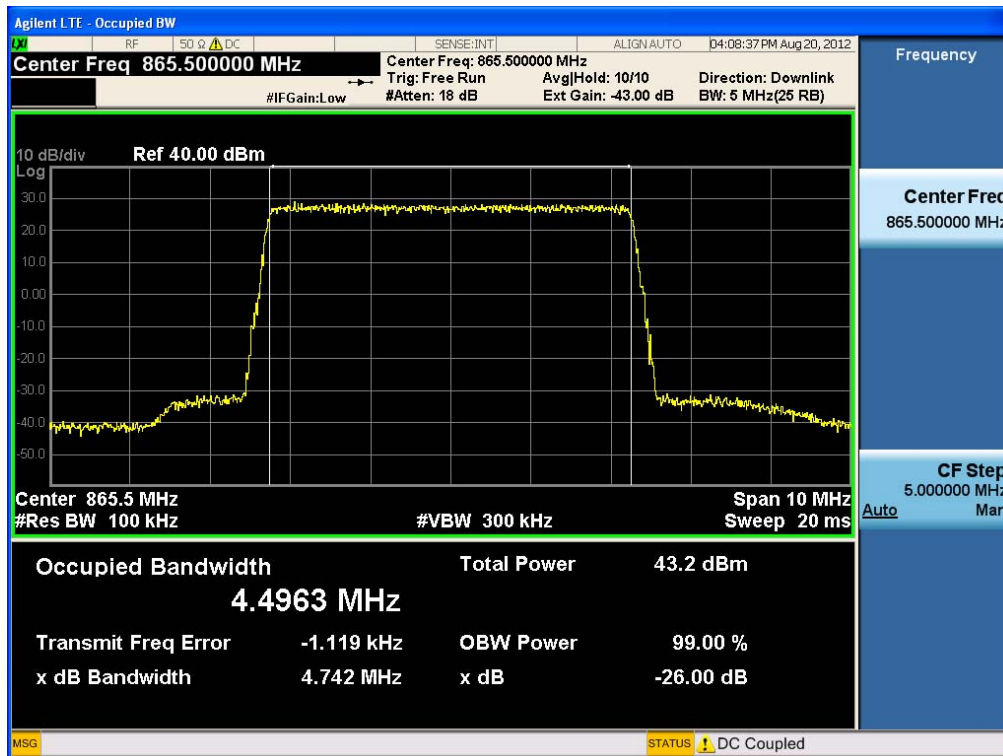


(LTE 64QAM) High

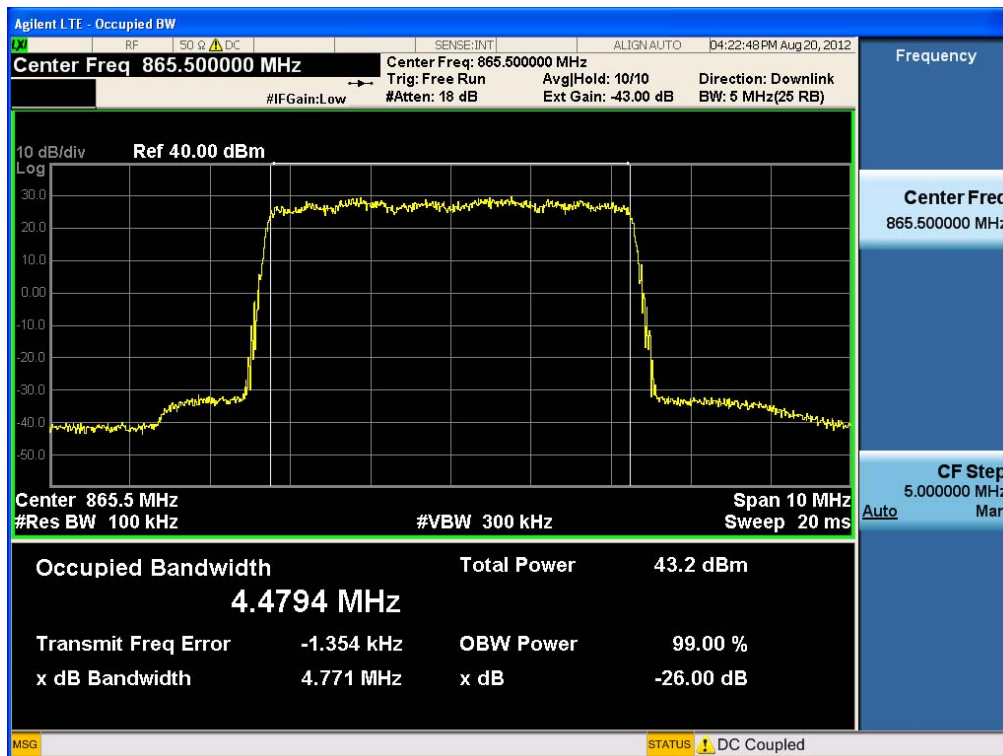


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(LTE QPSK) Middle

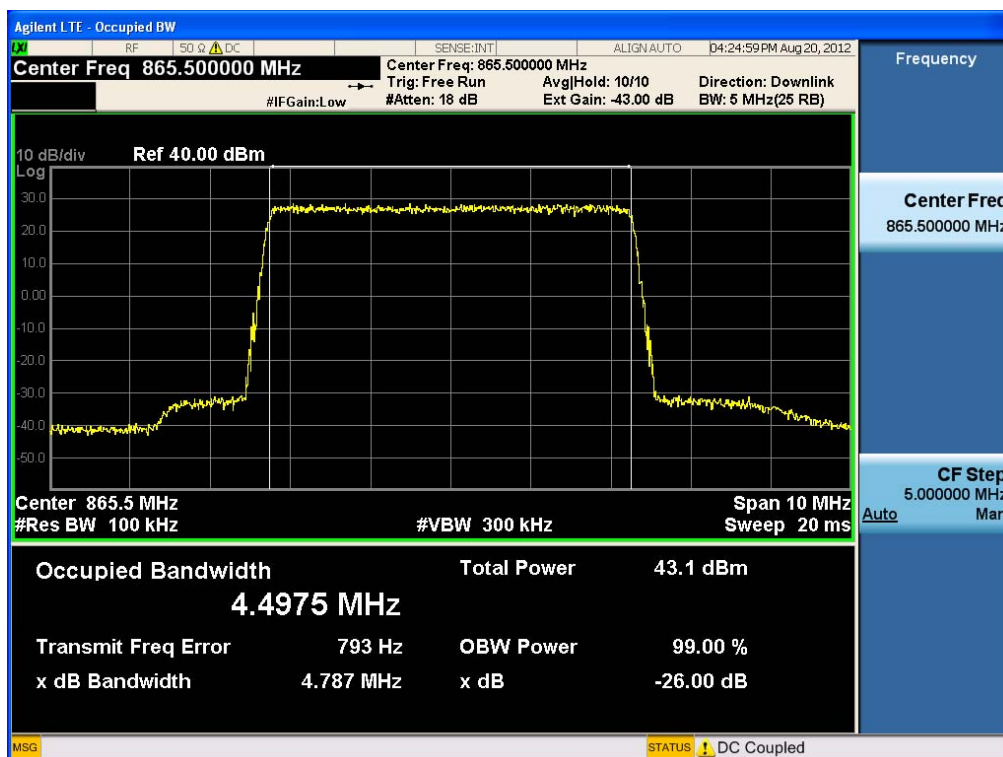


(LTE 16QAM) Middle

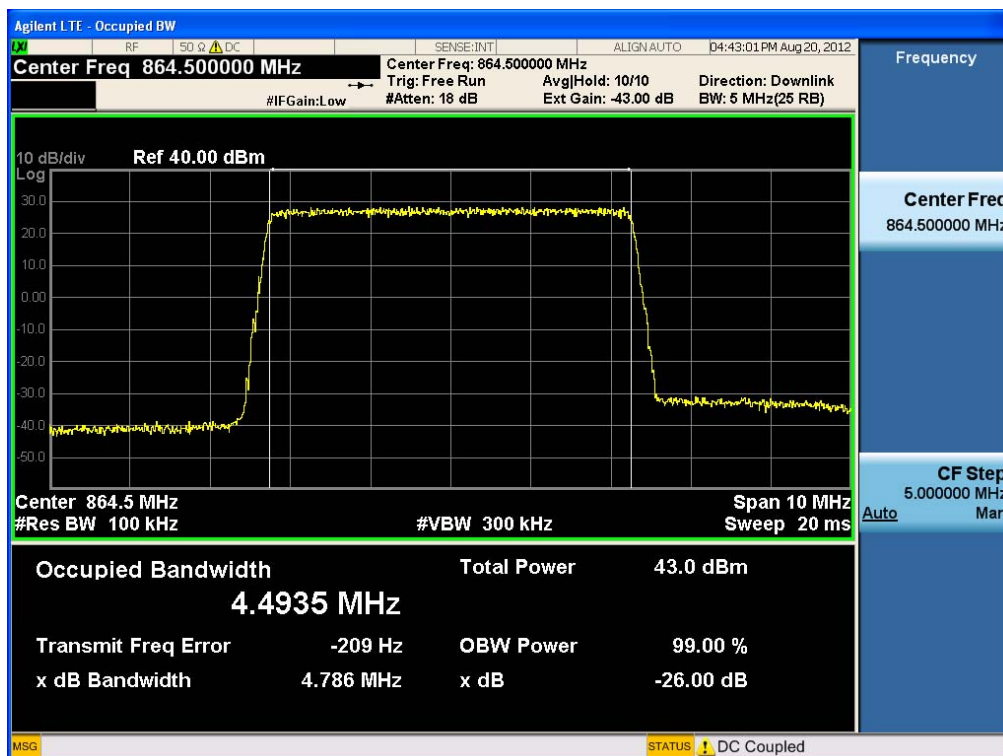


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(LTE 64QAM) Middle

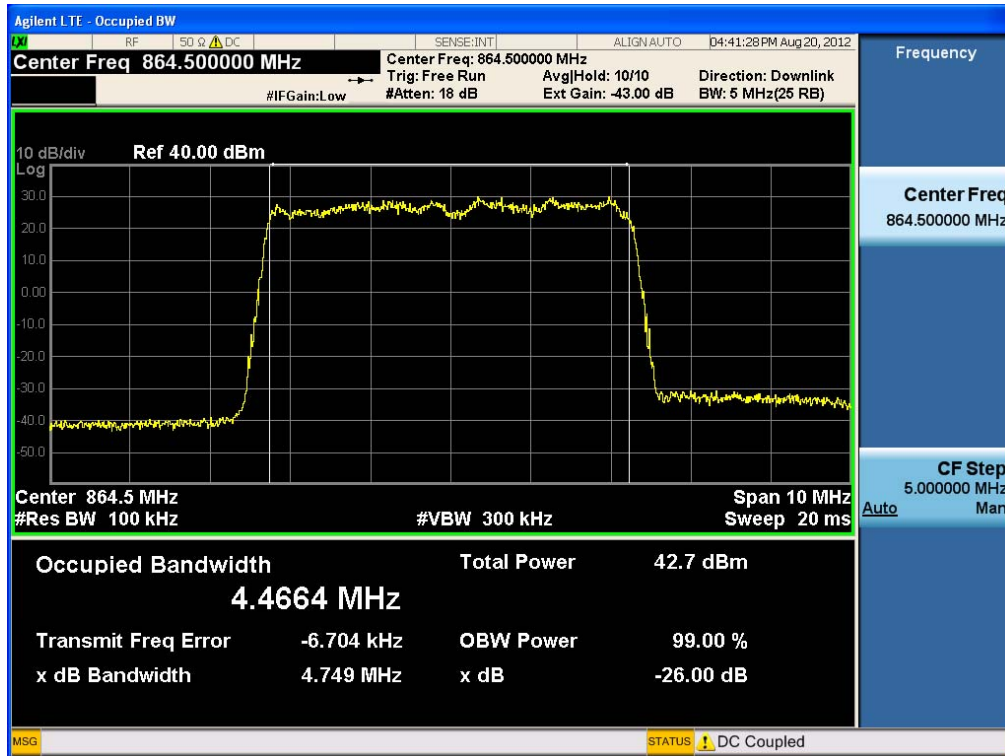


(LTE QPSK) Low

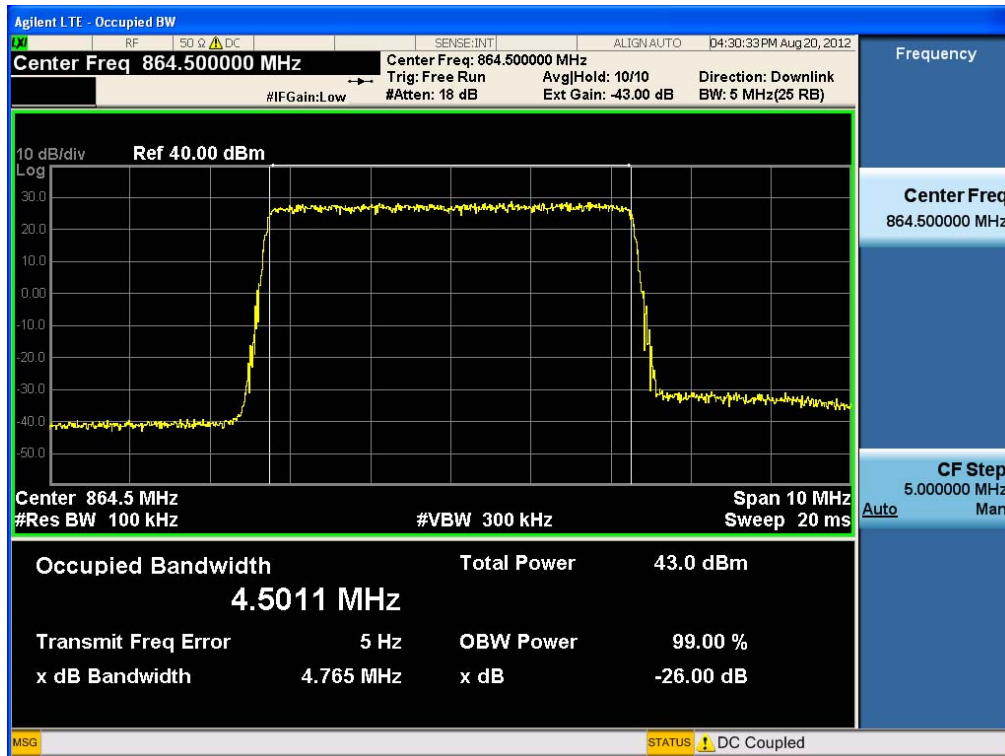


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(LTE 16QAM) Low



(LTE 64QAM) Low



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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 § 90.691, (a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows: (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz. (2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

7.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
WEINSCHEL	67-30-33 / Attenuator	BU5347	11/07/2012
WEINSCHEL	67-30-33 / Attenuator	BR0530	11/07/2012
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/07/2012
WEINSCHEL	AF9003-69-31 / Attenuator	5701	11/07/2012
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013

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.

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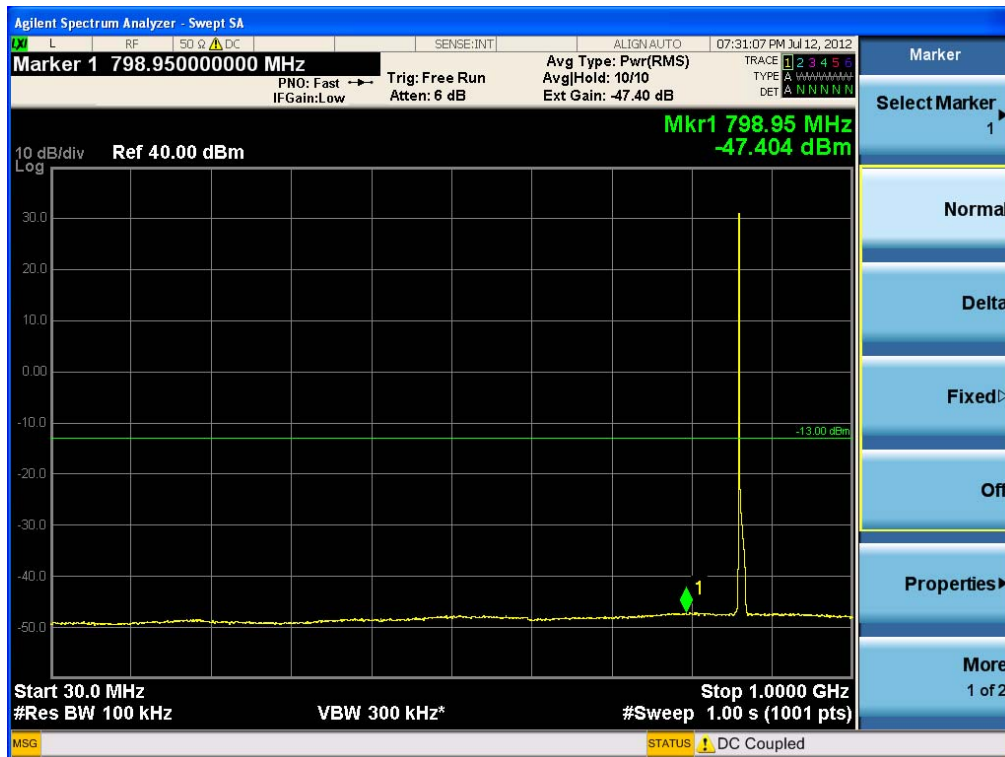
7.4. Test Result

: Pass

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7.4.1. Plot Data for Output Port 0
(CDMA_BPSK)

(30 MHz ~ 1 GHz)

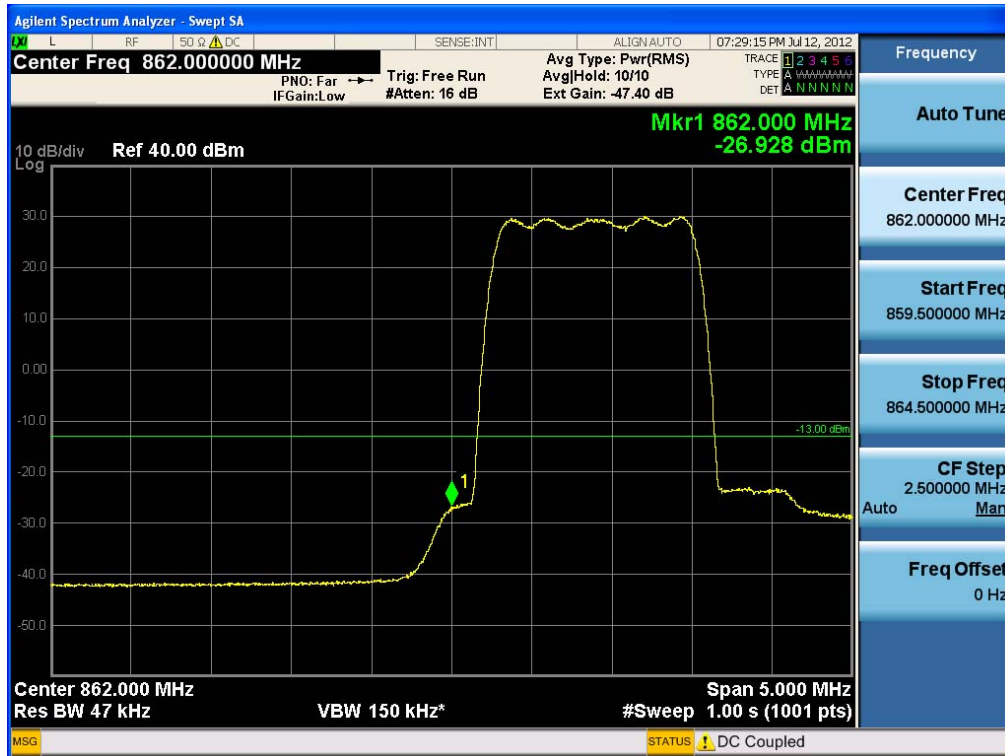


(1 GHz ~ 26.5 GHz)



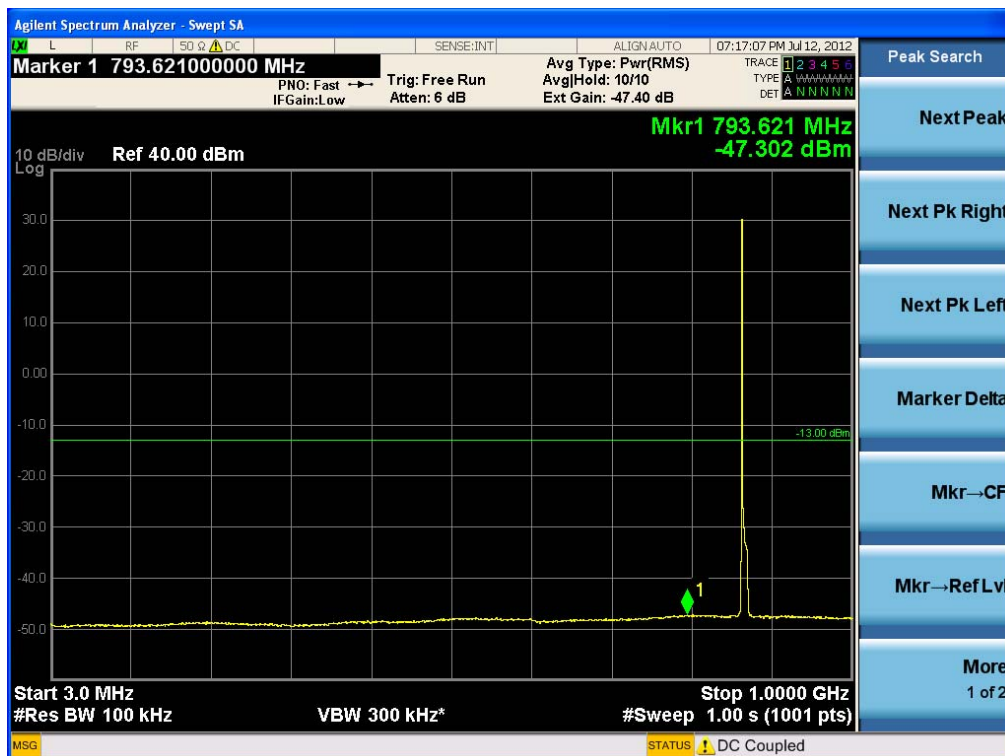
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(Band Edge)



(CDMA_QPSK)

(30 MHz ~ 1 GHz)

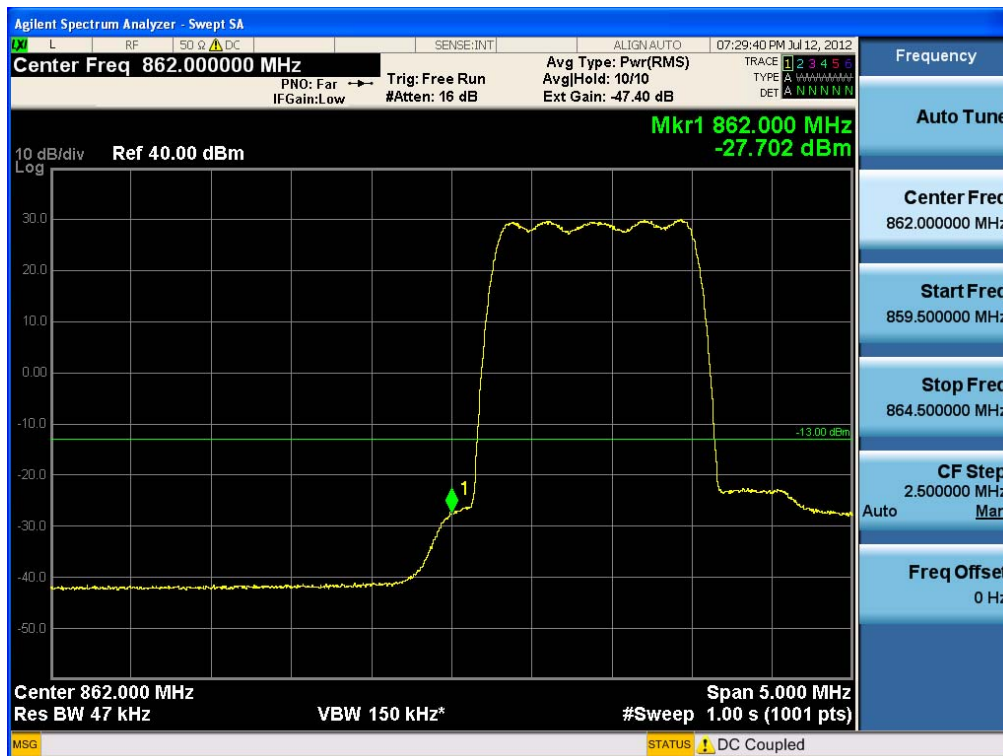


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(1 GHz ~ 26.5 GHz)



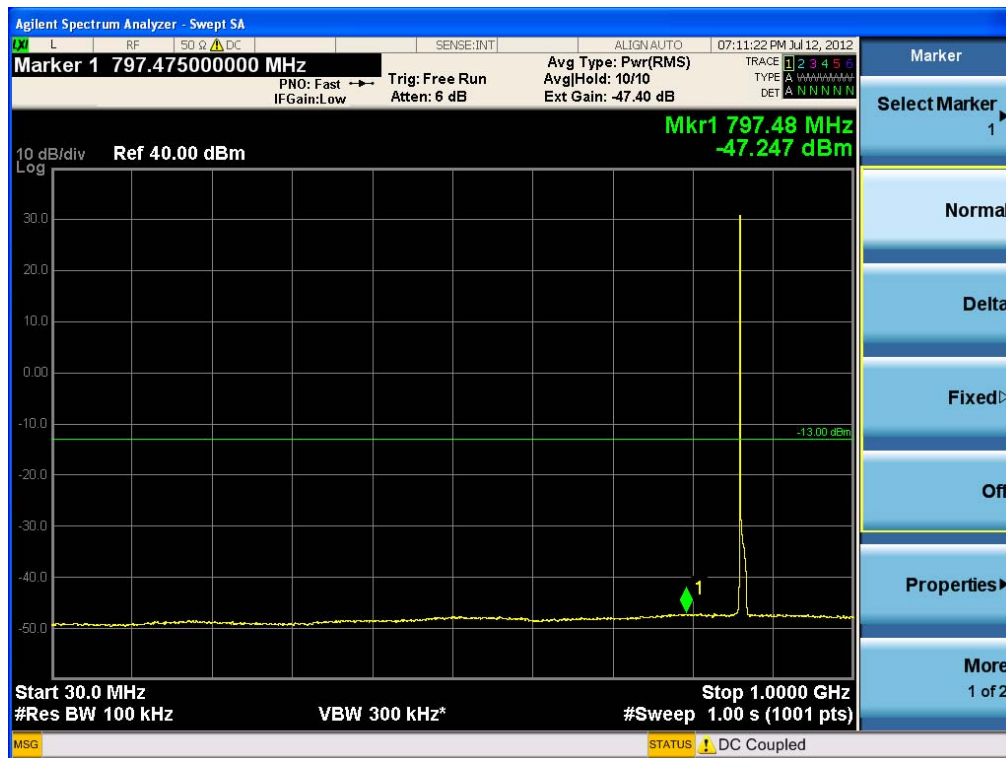
(Band Edge)



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(CDMA_16QAM)

(30 MHz ~ 1 GHz)

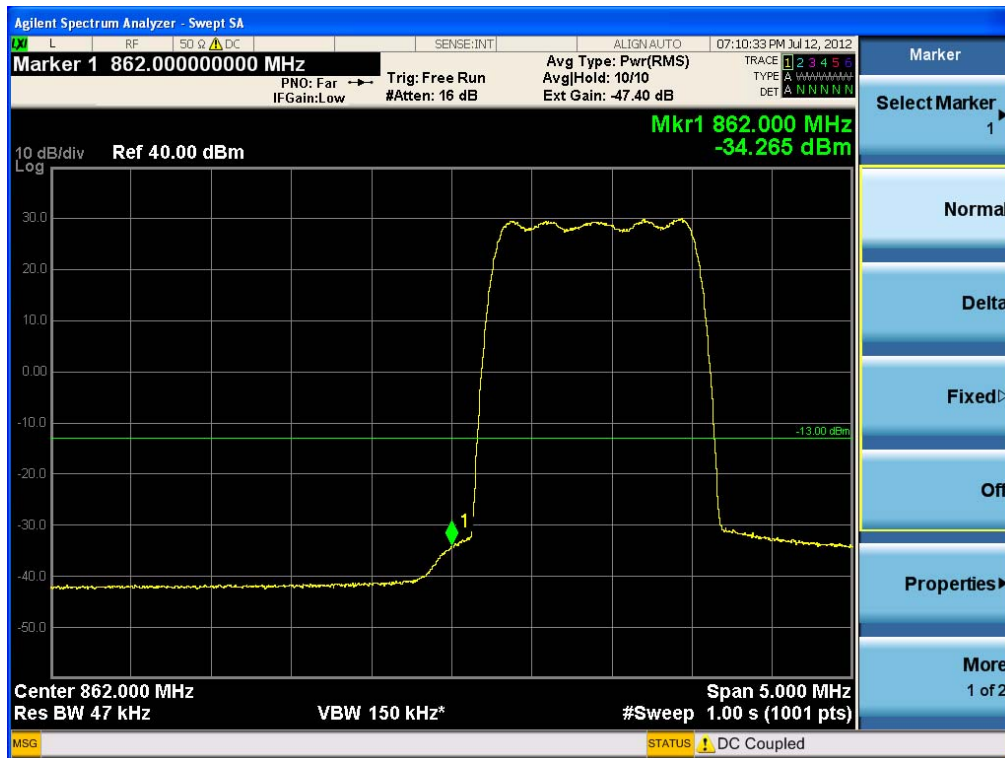


(1 GHz ~ 26.5 GHz)



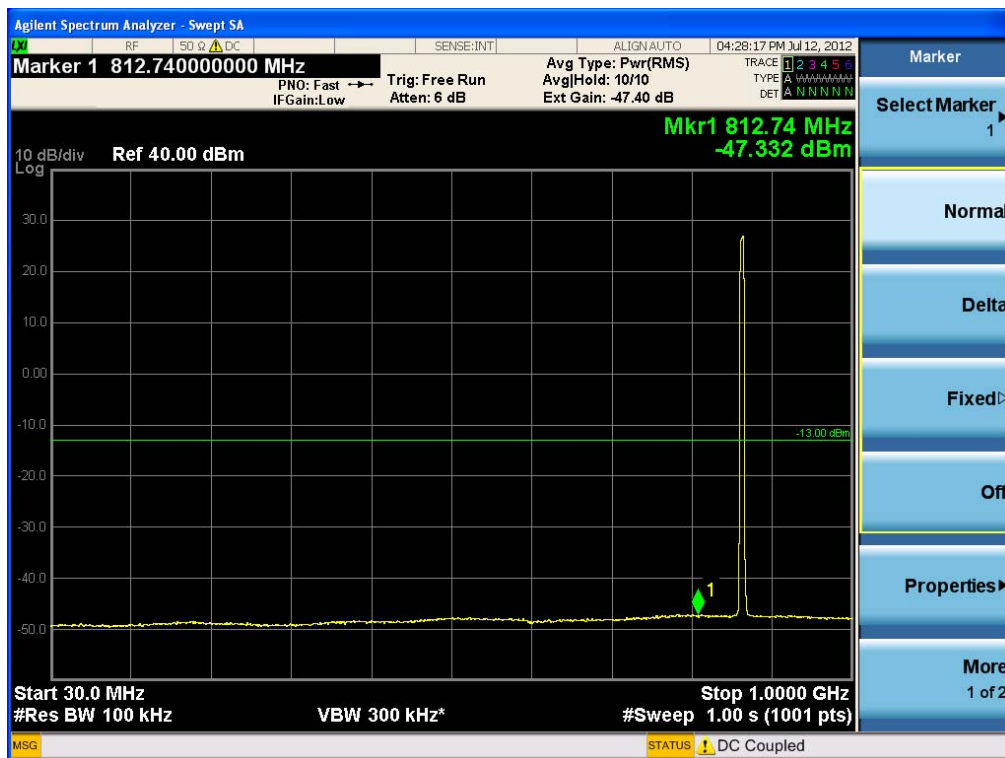
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(Band Edge)



(LTE_QPSK) High

(30 MHz ~ 1 GHz)



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(1 GHz ~ 26.5 GHz)



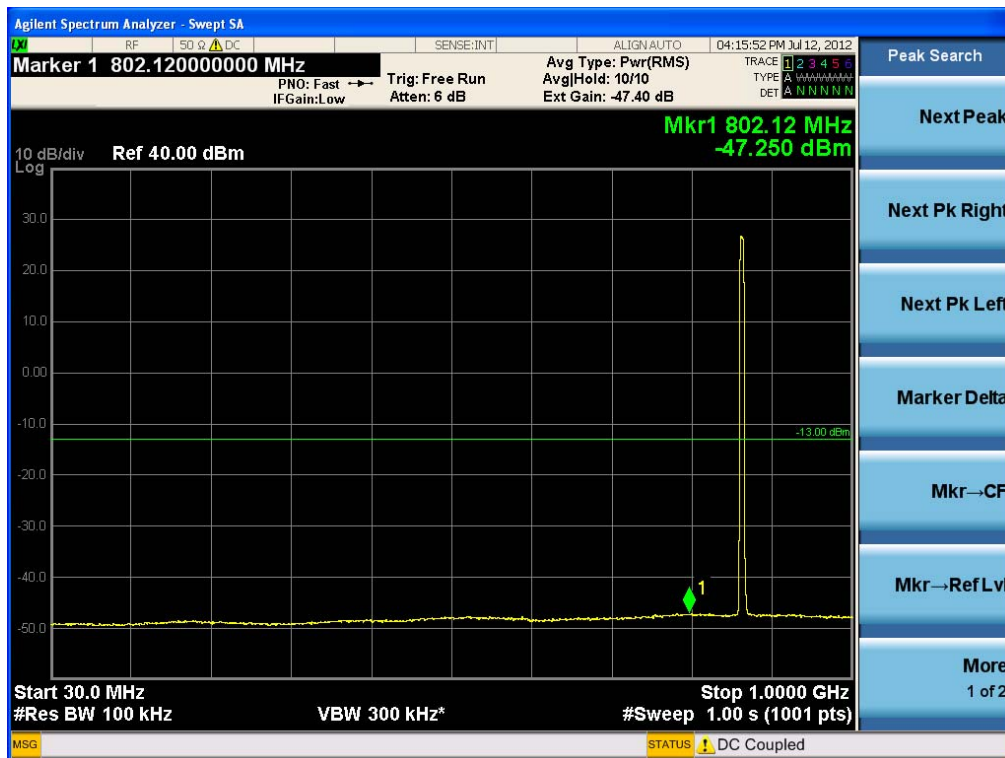
(Band Edge)



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(LTE_16QAM) High

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



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(Band Edge)



(LTE_64QAM) High

(30 MHz ~ 1 GHz)



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(1 GHz ~ 26.5 GHz)



(Band Edge)



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