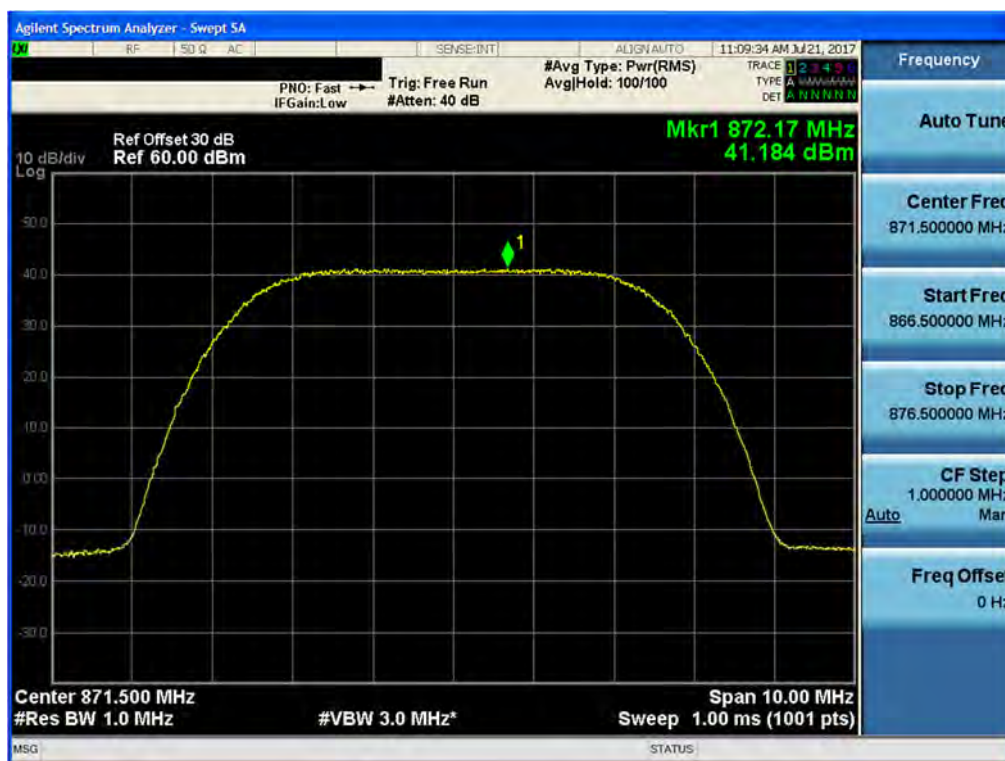


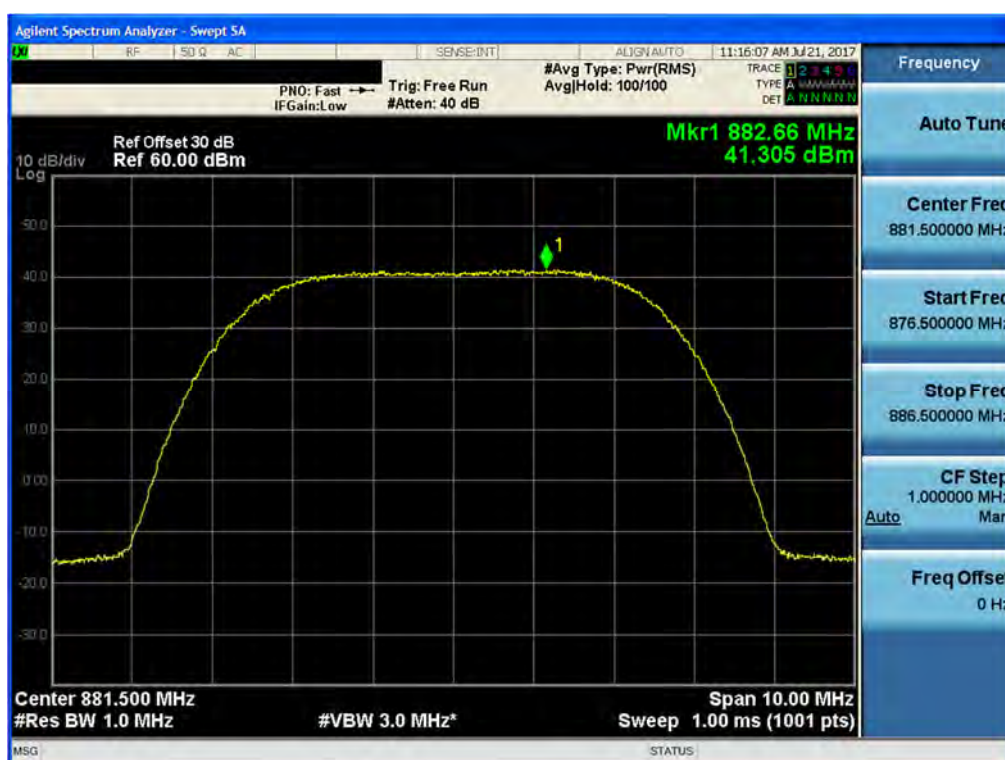
Plot Data for Output Port 3 (4 paths)

(16QAM Low Channel)



Plot Data for Output Port 4 (4 paths)

(QPSK Low Channel)



6. OCCUPIED BANDWIDTH

Test Requirements:

§ 2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, 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) Transmitters 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 the discretion of the user.

Test Procedures:

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.

Test Results:

LTE Band 13_1 Carrier

Test Data at Output Port 1 (2 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
751.00	8.977	8.966	8.989	8.982

Test Data at Output Port 2 (2 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
751.00	8.961	8.968	8.988	8.980

Test Data at Output Port 3 (4 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
751.00	8.974	8.963	8.993	8.975

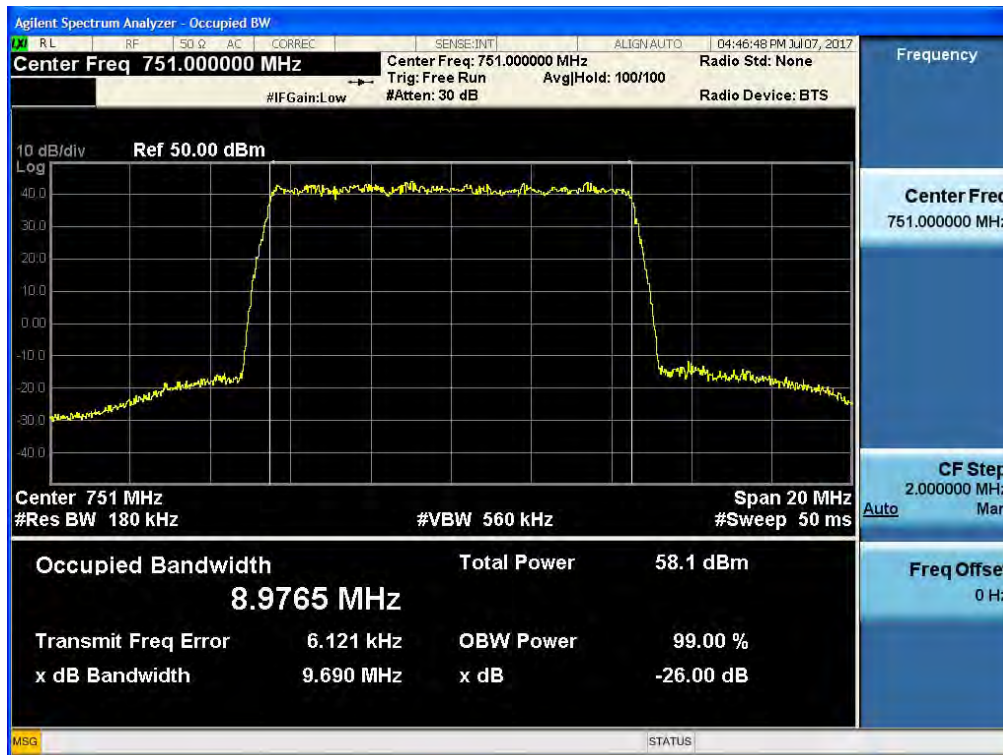
Test Data at Output Port 4 (4 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
751.00	8.967	8.976	8.992	8.981

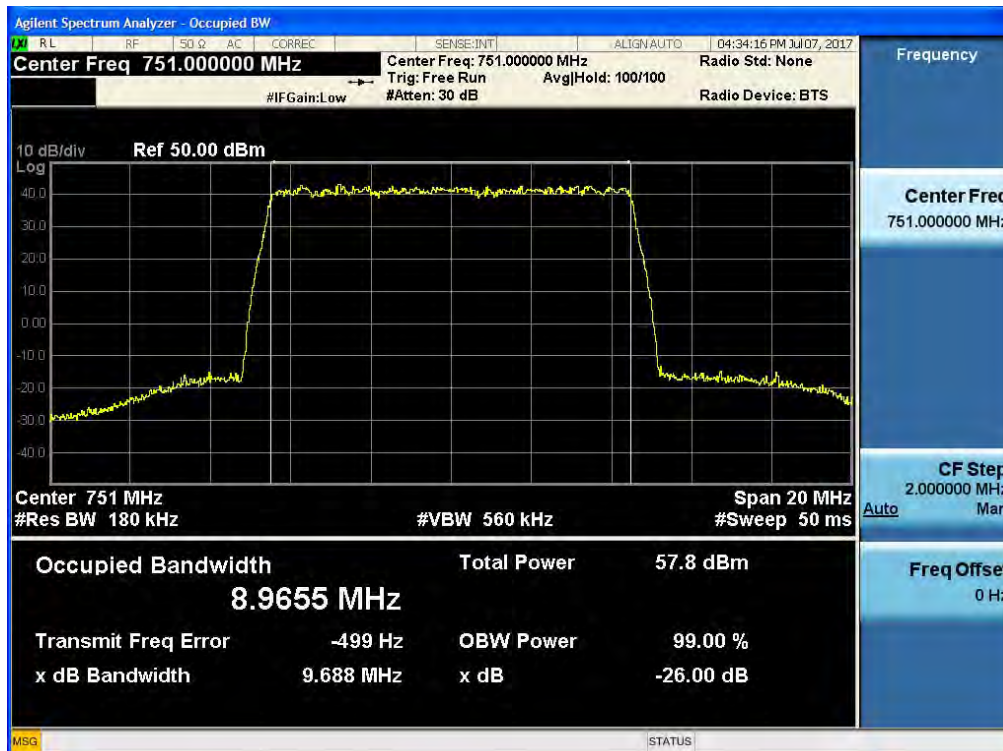
LTE Band 13_1 Carrier

Test Plot at Output Port 1 (2 paths)

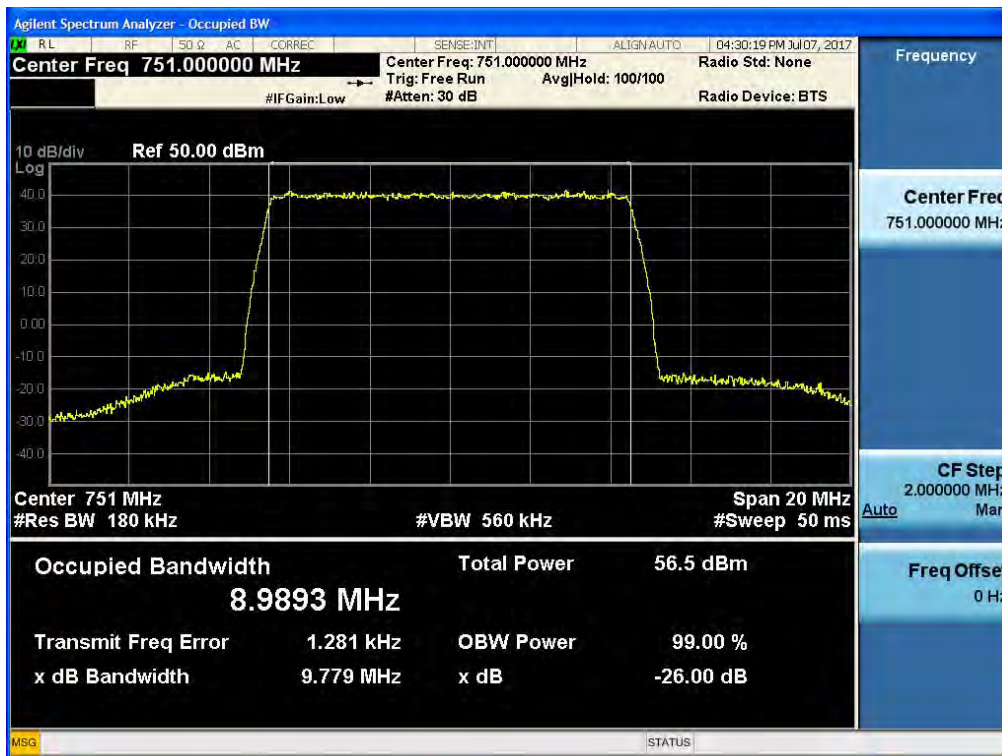
(QPSK)



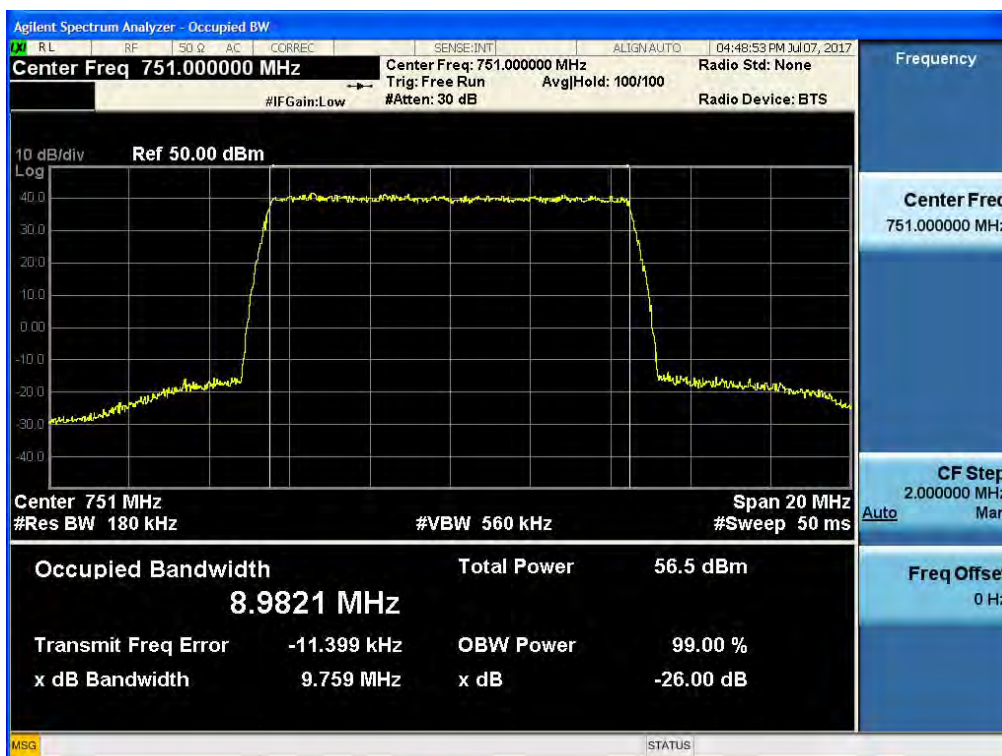
(16QAM)



(64QAM)

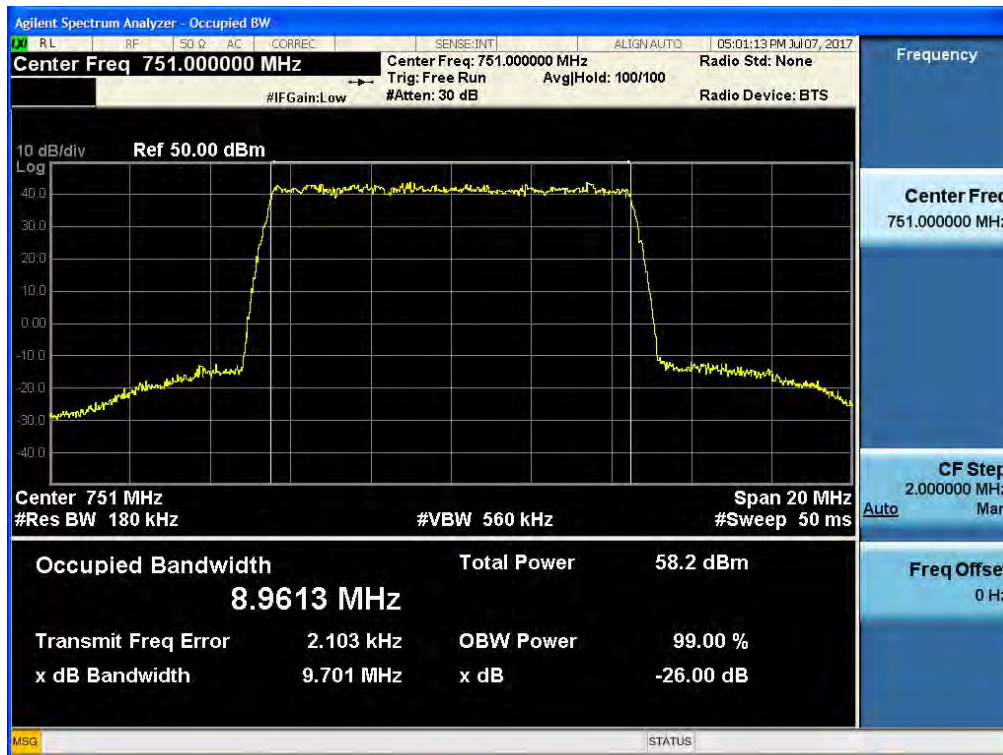


(256QAM)

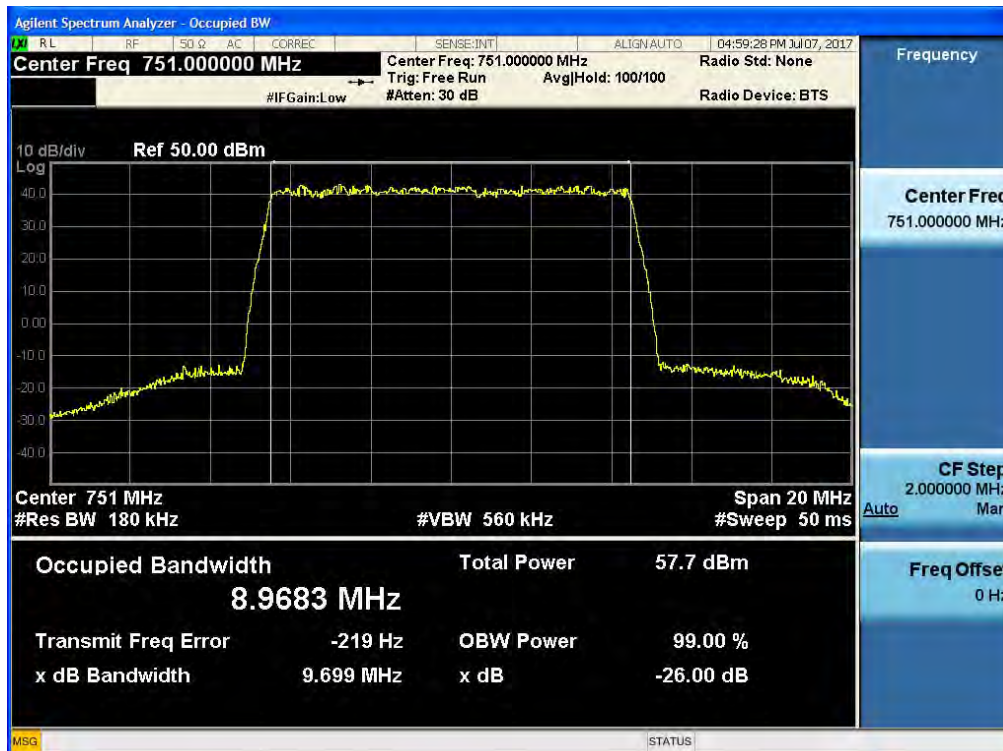


Test Plot at Output Port 2 (2 paths)

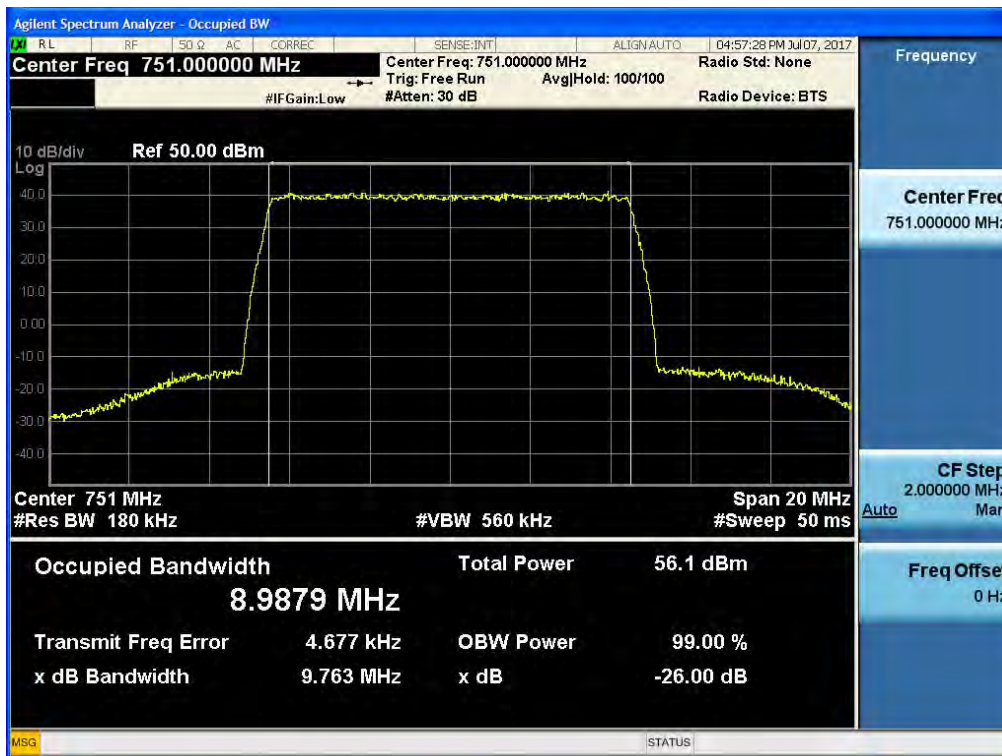
(QPSK)



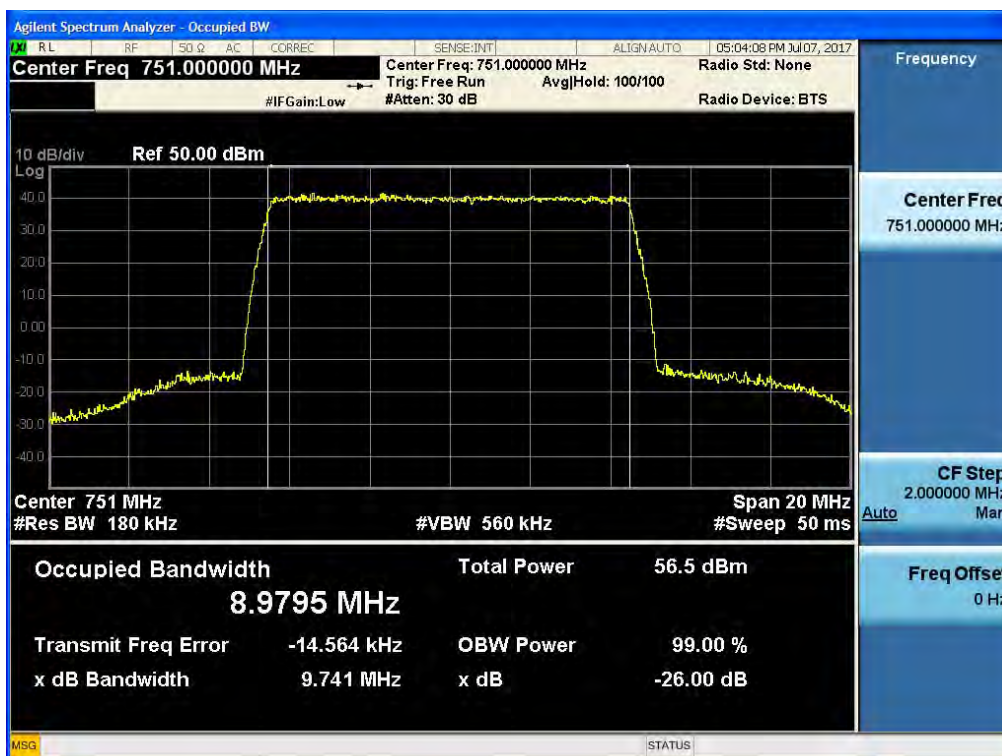
(16QAM)



(64QAM)

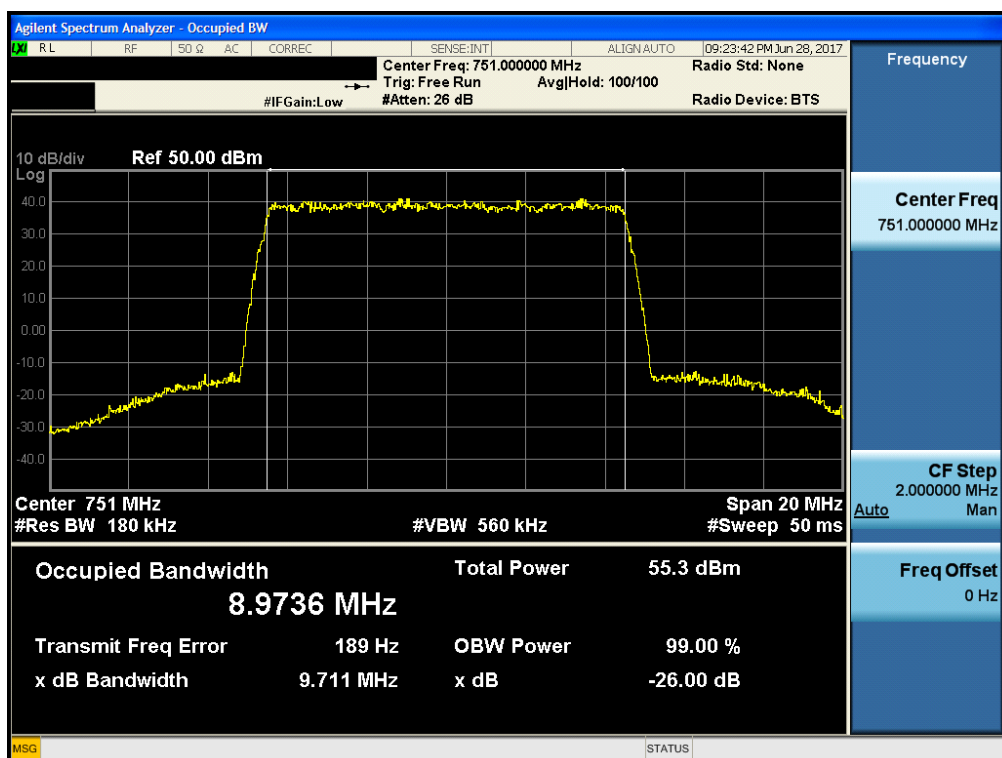


(256QAM)

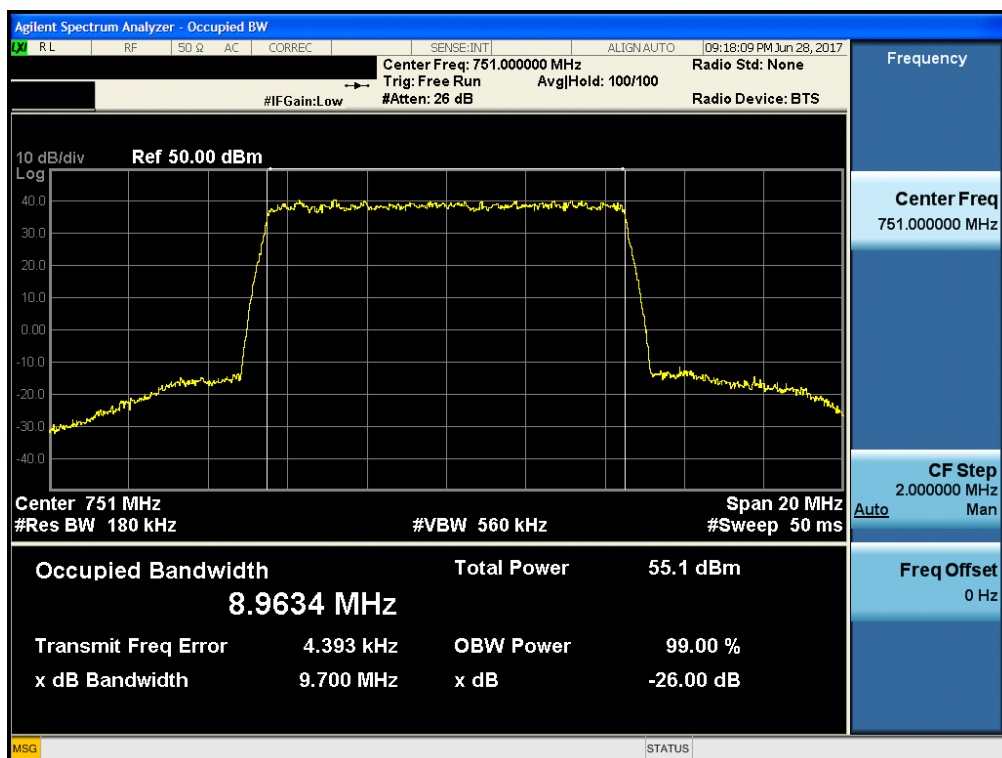


Test Plot at Output Port 3 (4 paths)

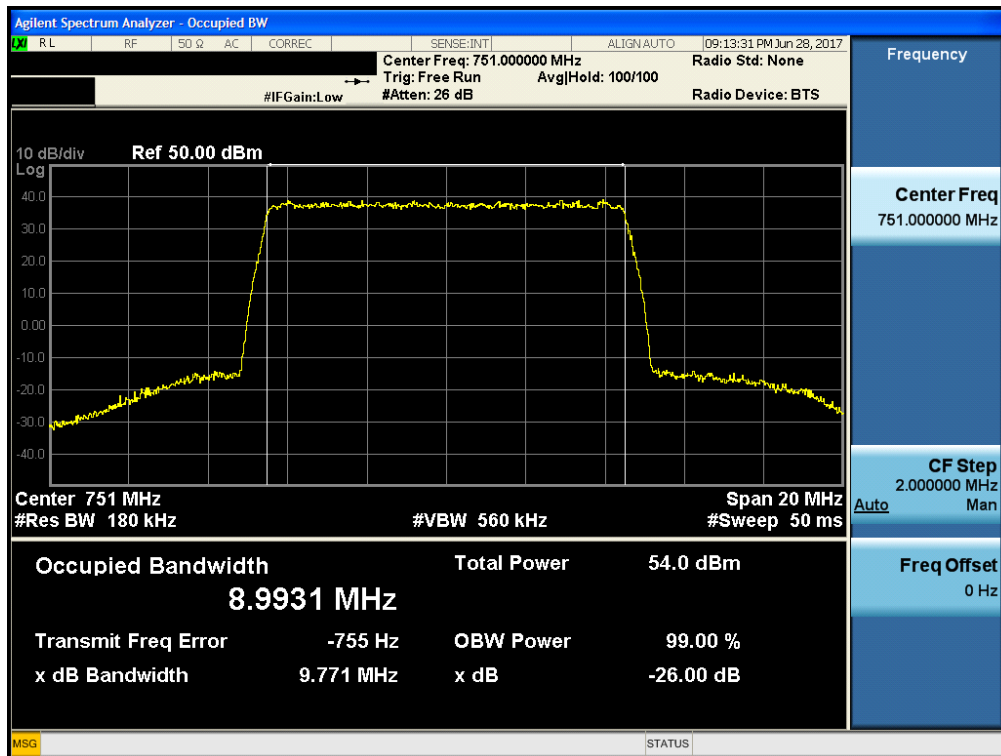
(QPSK)



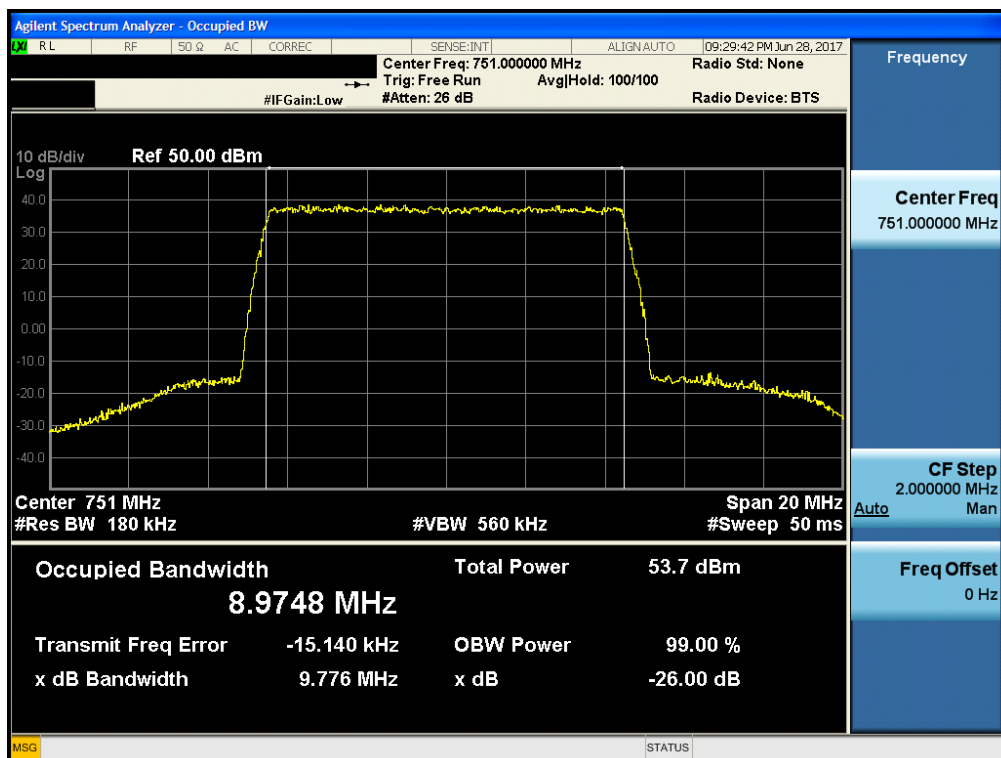
(16QAM)



(64QAM)

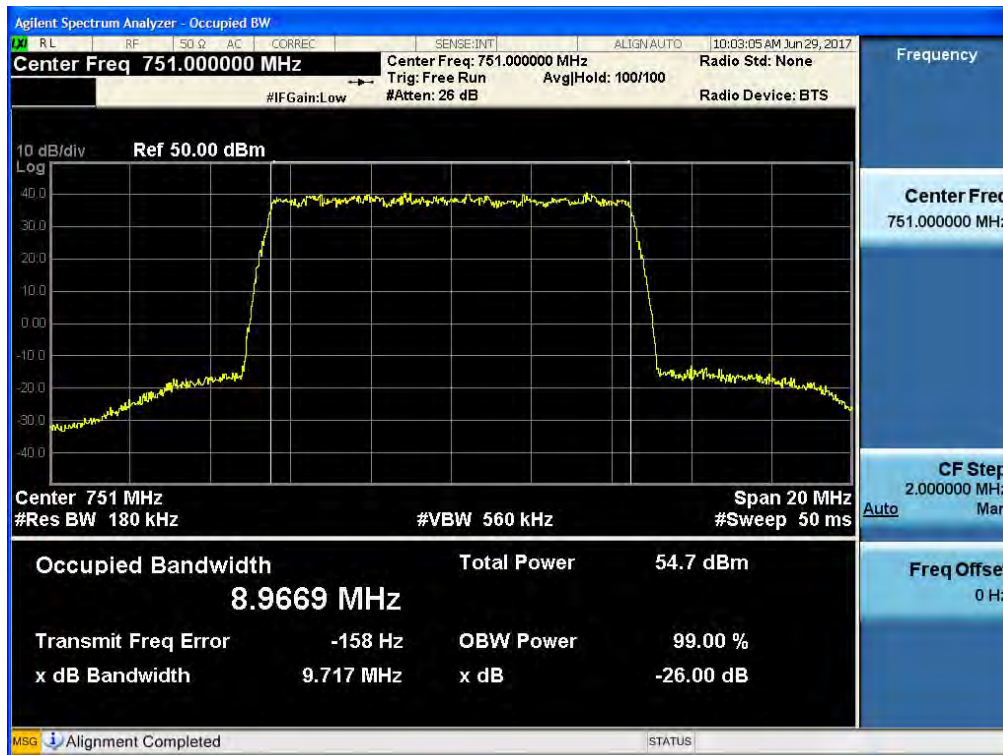


(256QAM)

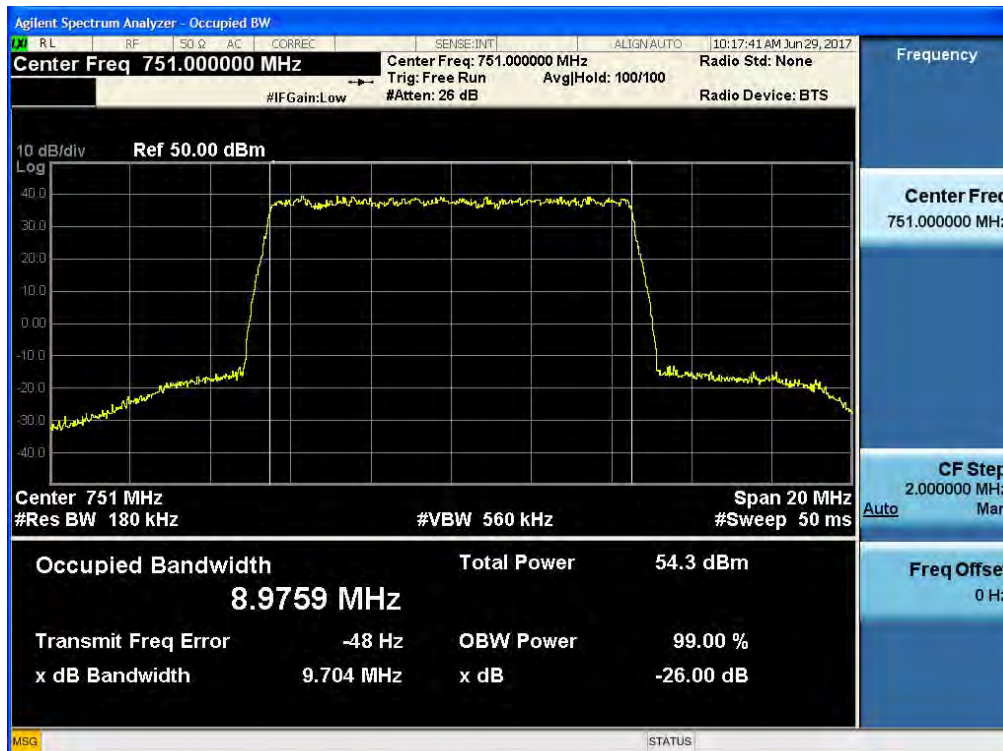


Test Plot at Output Port 4 (4 paths)

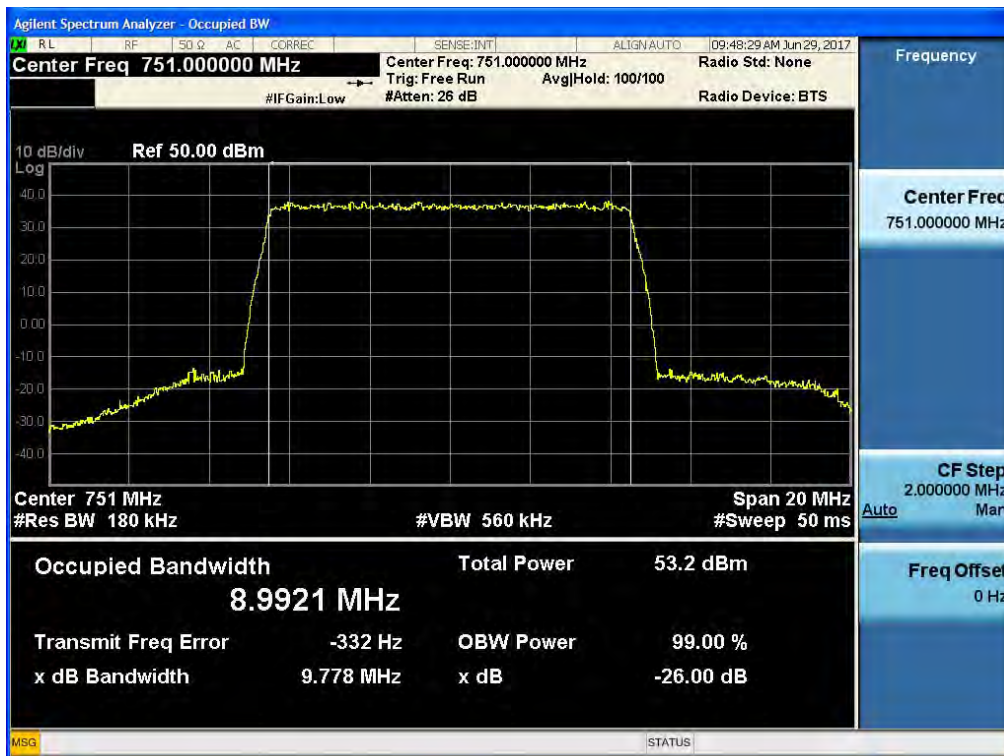
(QPSK)



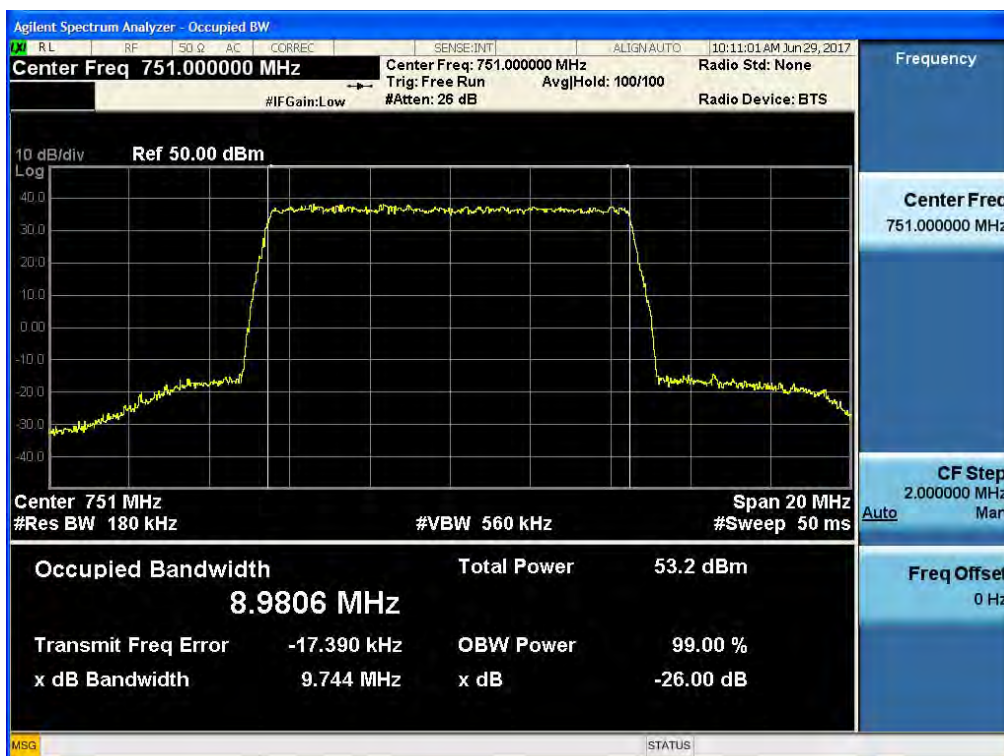
(16QAM)



(64QAM)



(256QAM)



LTE Band 5_1 Carrier (5 MHz)

Test Data at Output Port 1 (2 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
871.50	4.493	4.497	4.501	4.513
881.50	4.497	4.494	4.500	4.510
891.50	4.505	4.495	4.502	4.509

Test Data at Output Port 2 (2 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
871.50	4.498	4.492	4.507	4.513
881.50	4.505	4.492	4.503	4.504
891.50	4.503	4.494	4.505	4.513

Test Data at Output Port 3 (4 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
871.50	4.498	4.496	4.500	4.505
881.50	4.496	4.489	4.505	4.510
891.50	4.509	4.490	4.502	4.507

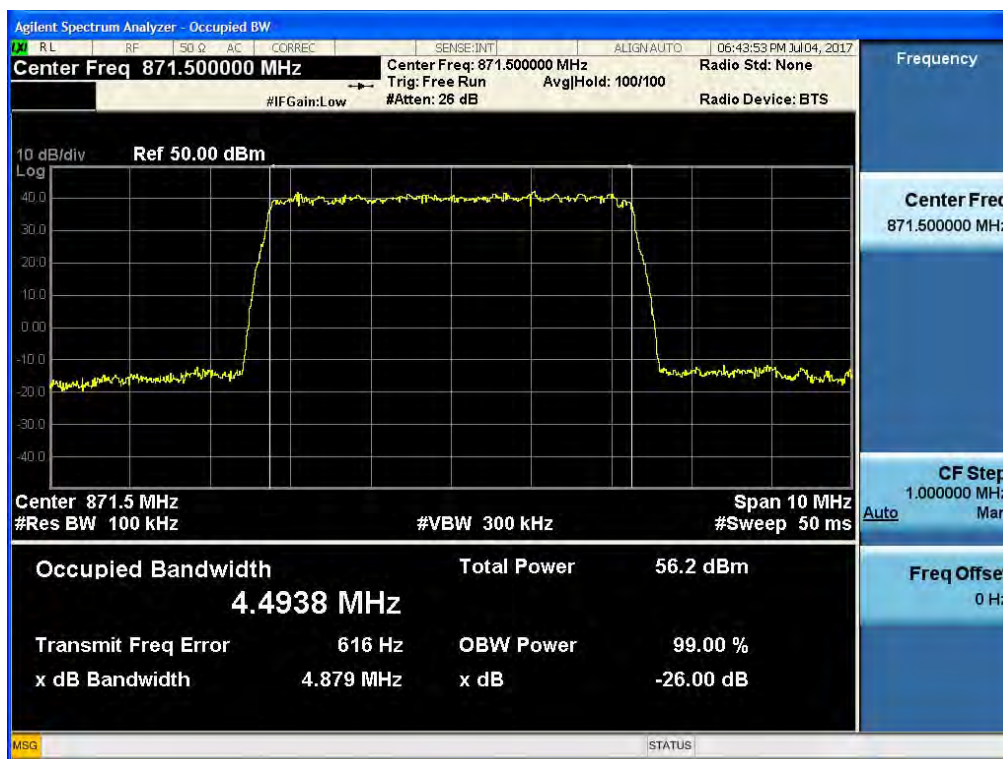
Test Data at Output Port 4 (4 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
871.50	4.496	4.494	4.502	4.508
881.50	4.500	4.496	4.500	4.510
891.50	4.501	4.498	4.501	4.508

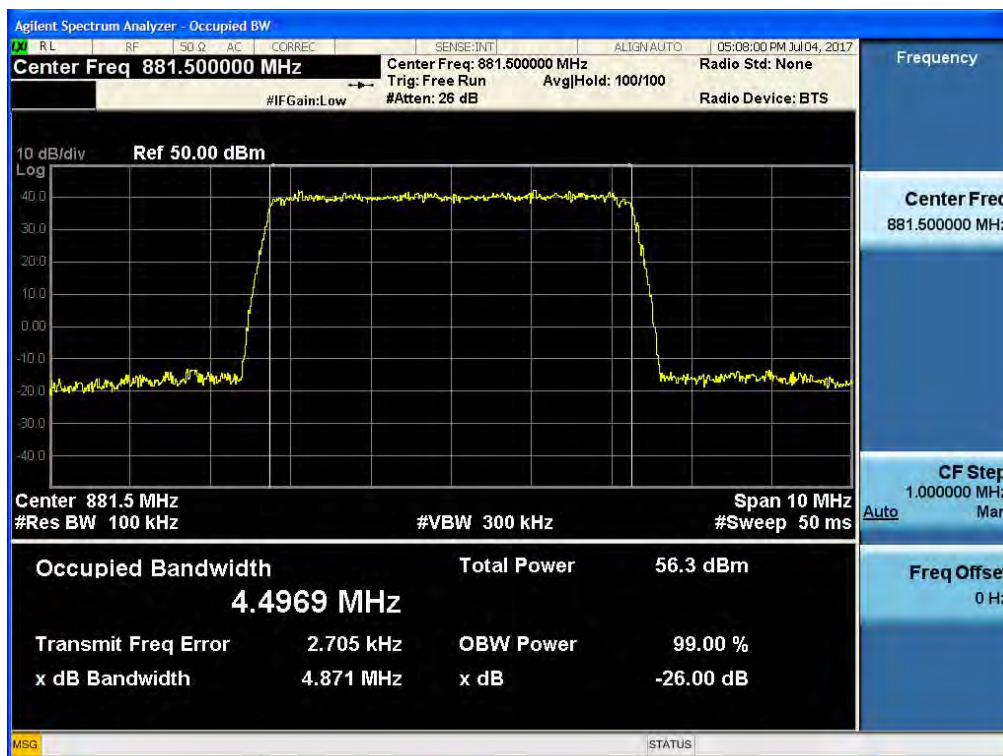
LTE Band 5_1 Carrier (5 MHz)

Test Plot at Output Port 1 (2 paths)

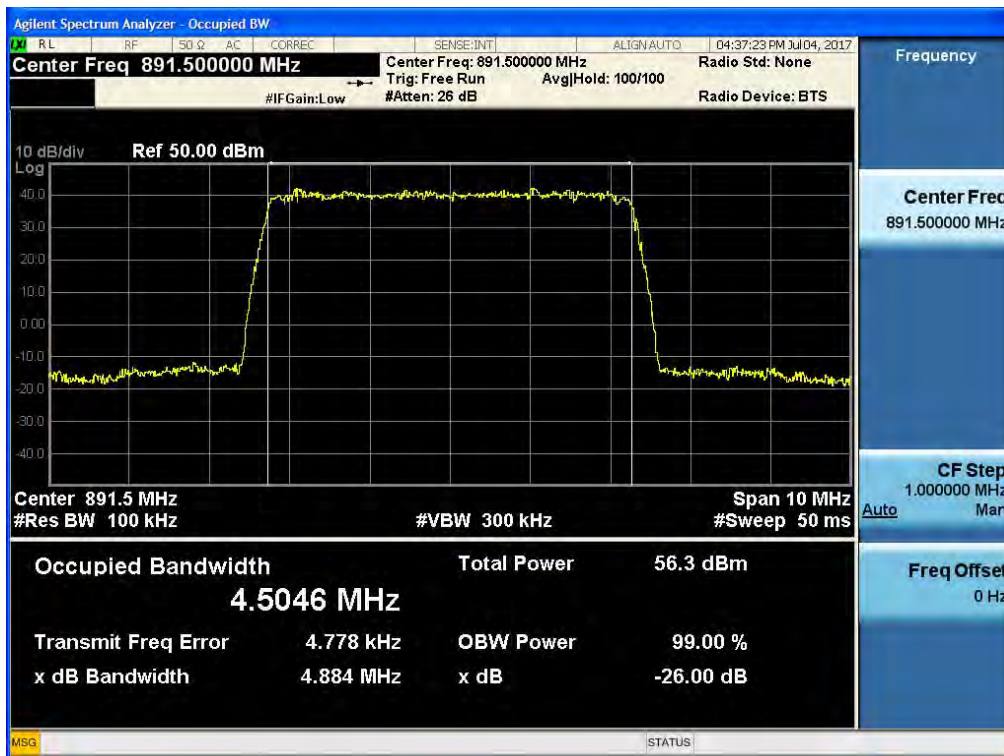
(QPSK Low Channel)



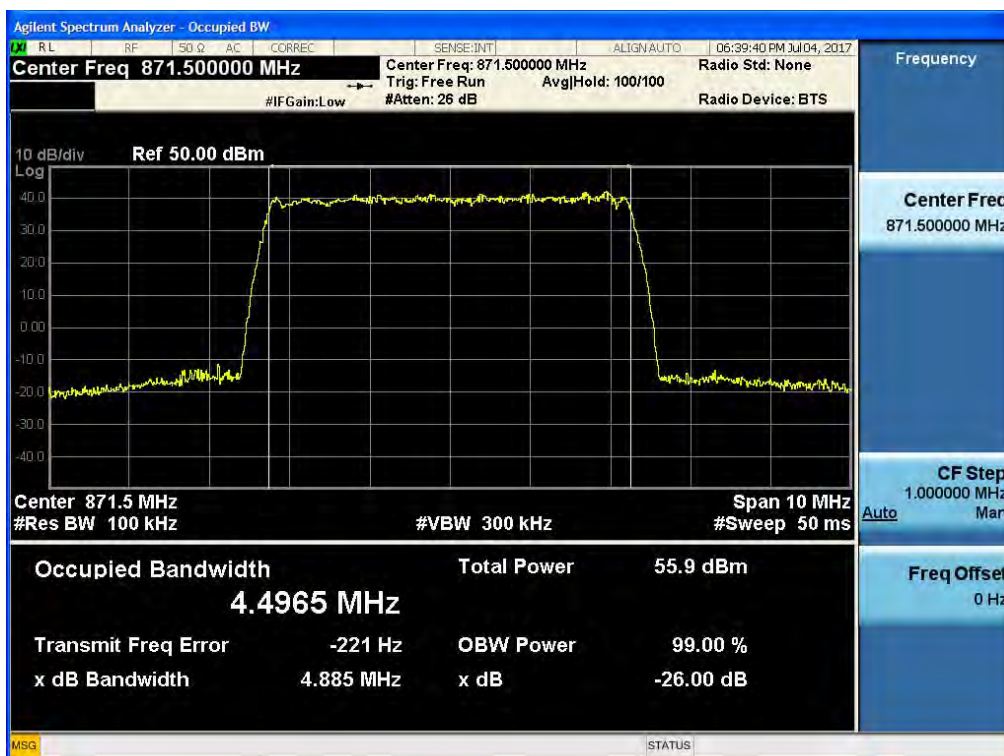
(QPSK Middle Channel)



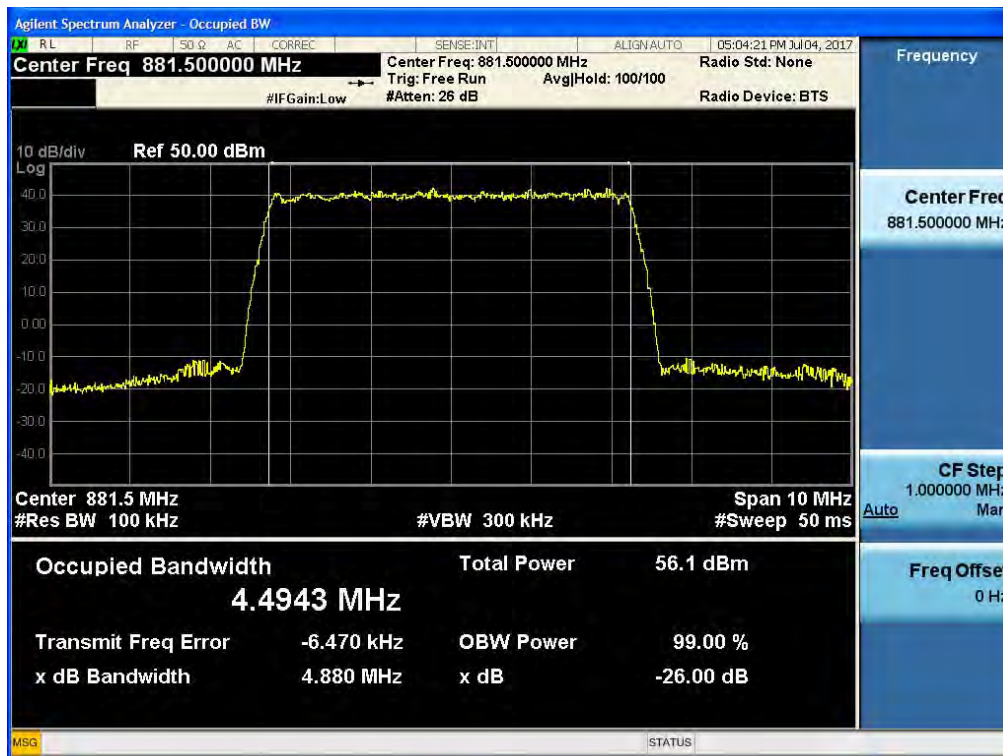
(QPSK High Channel)



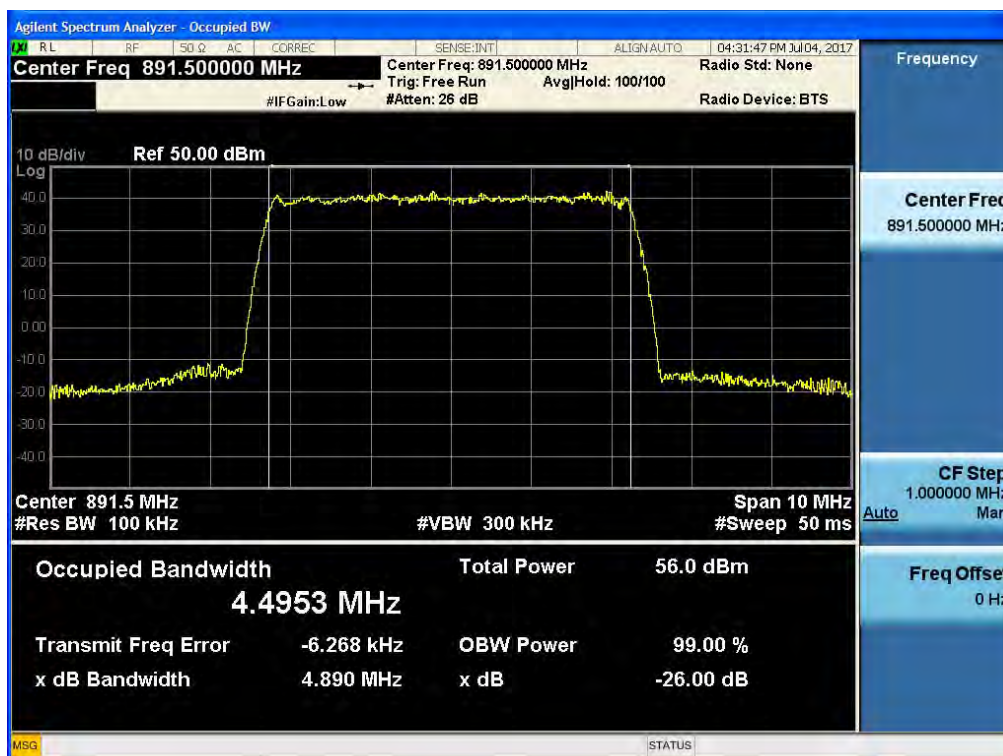
(16QAM Low Channel)



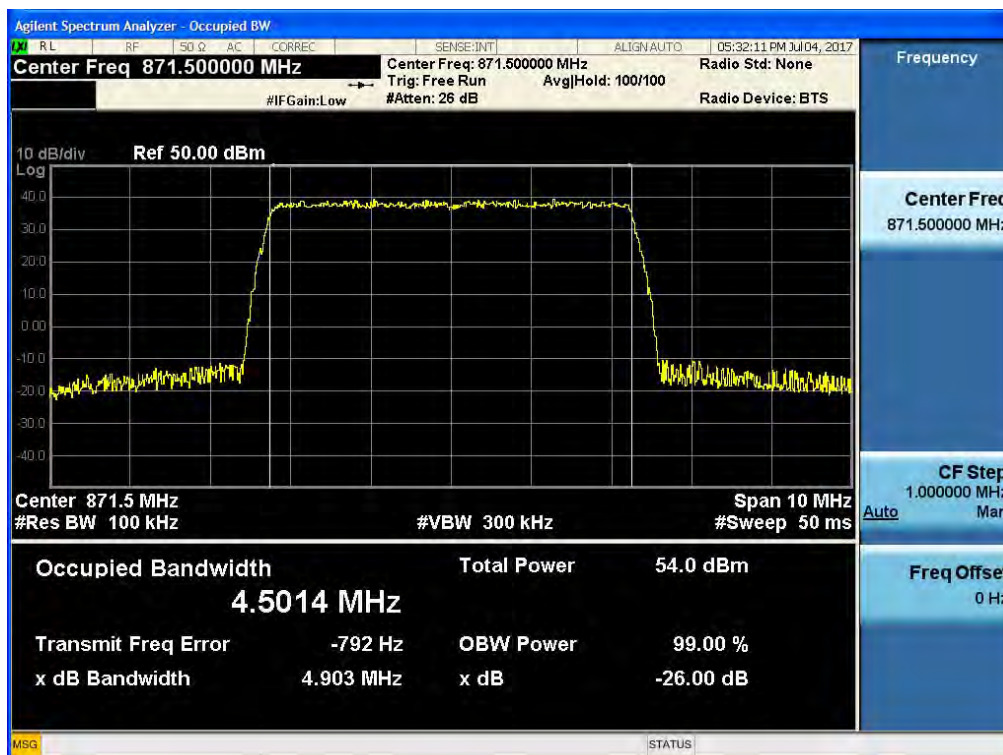
(16QAM Middle Channel)



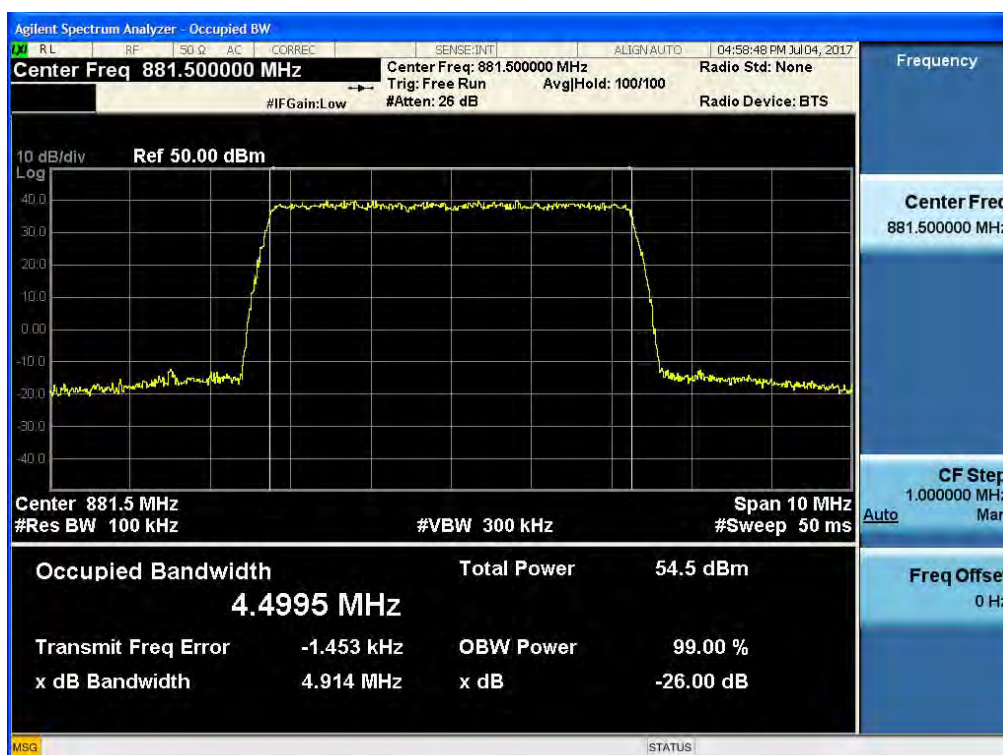
(16QAM High Channel)



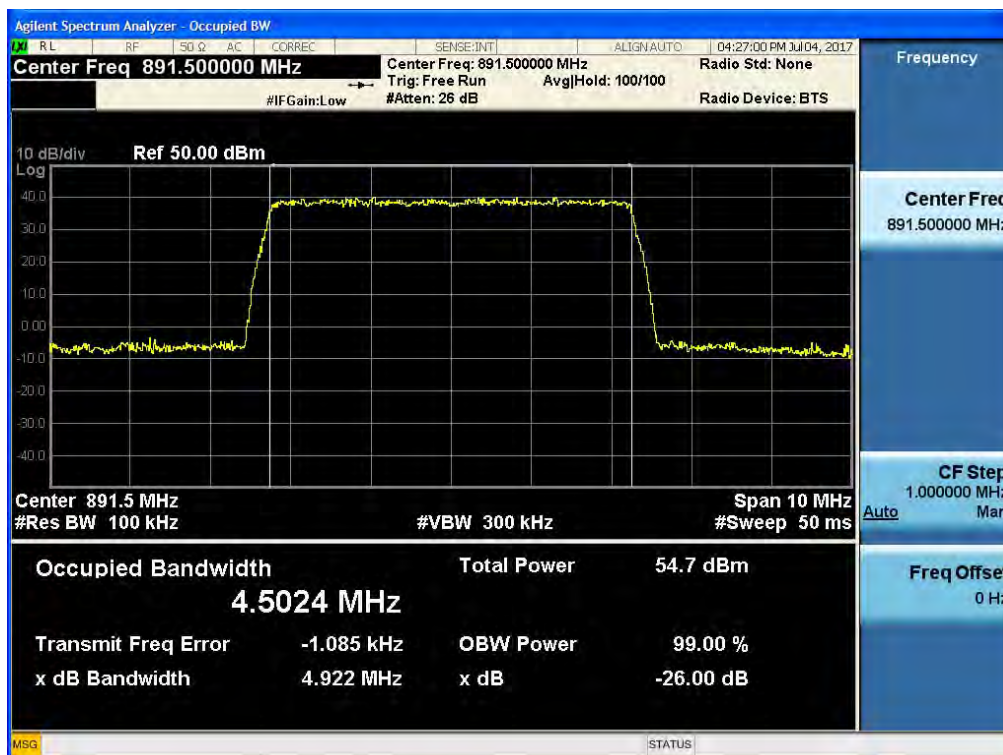
(64QAM Low Channel)



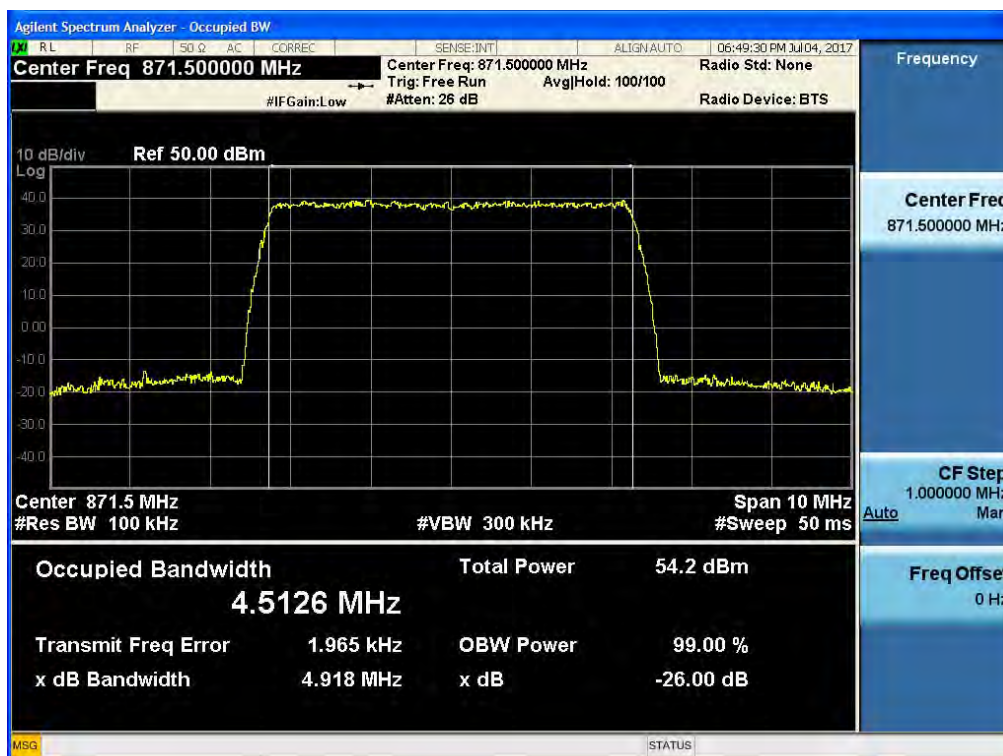
(64QAM Middle Channel)



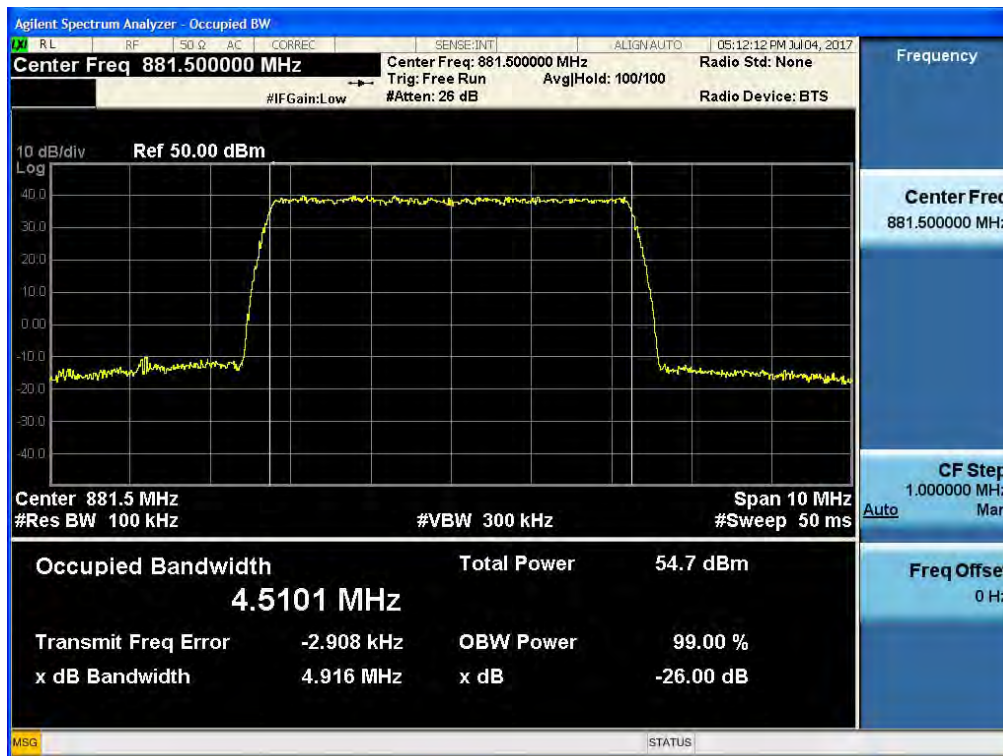
(64QAM High Channel)



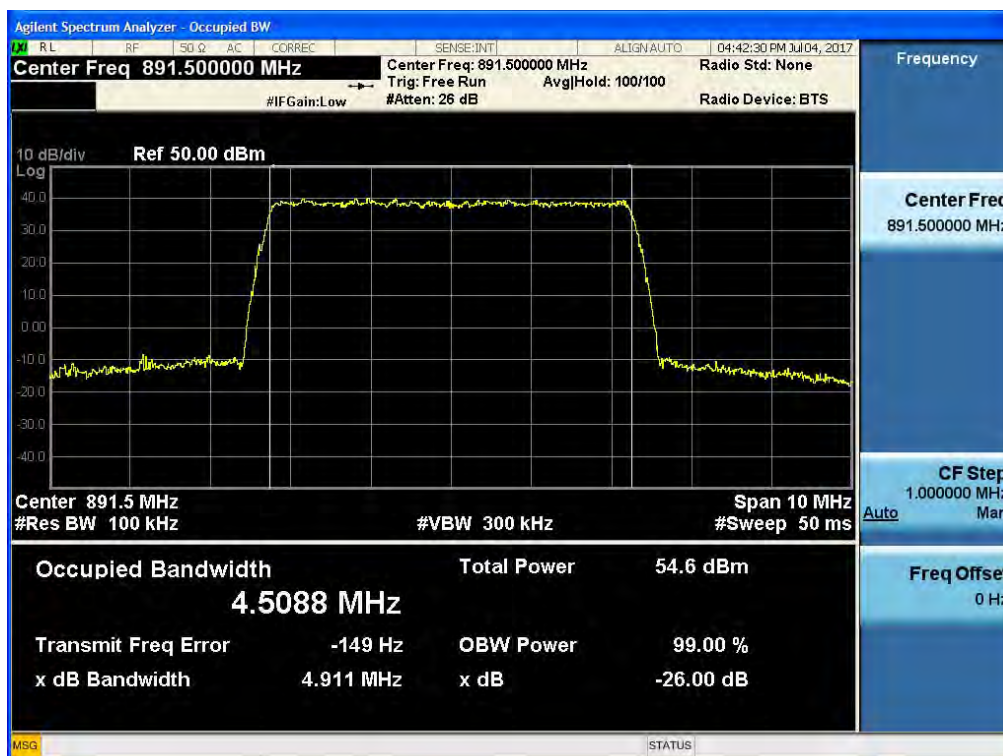
(256QAM Low Channel)



(256QAM Middle Channel)

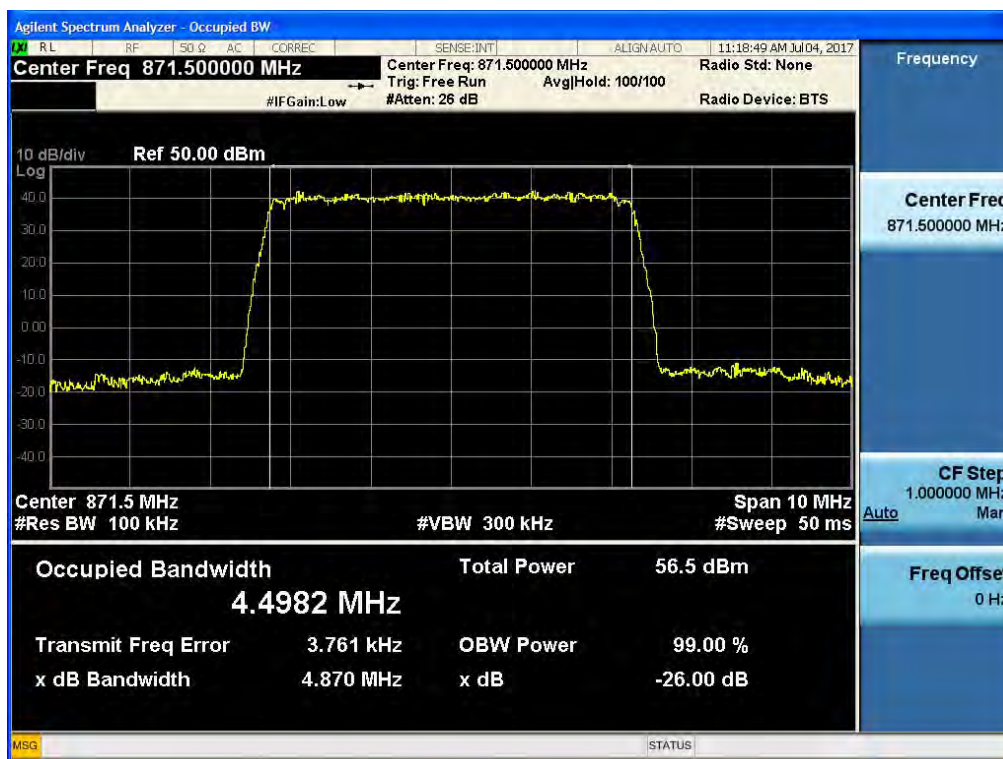


(256QAM High Channel)

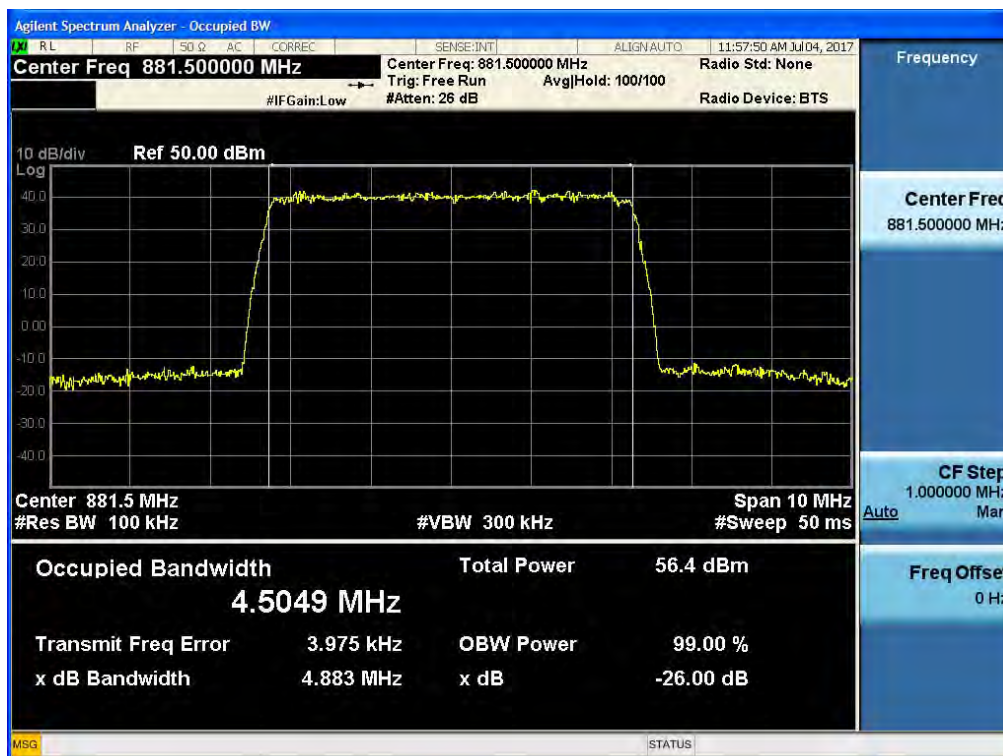


Test Plot at Output Port 2 (2 paths)

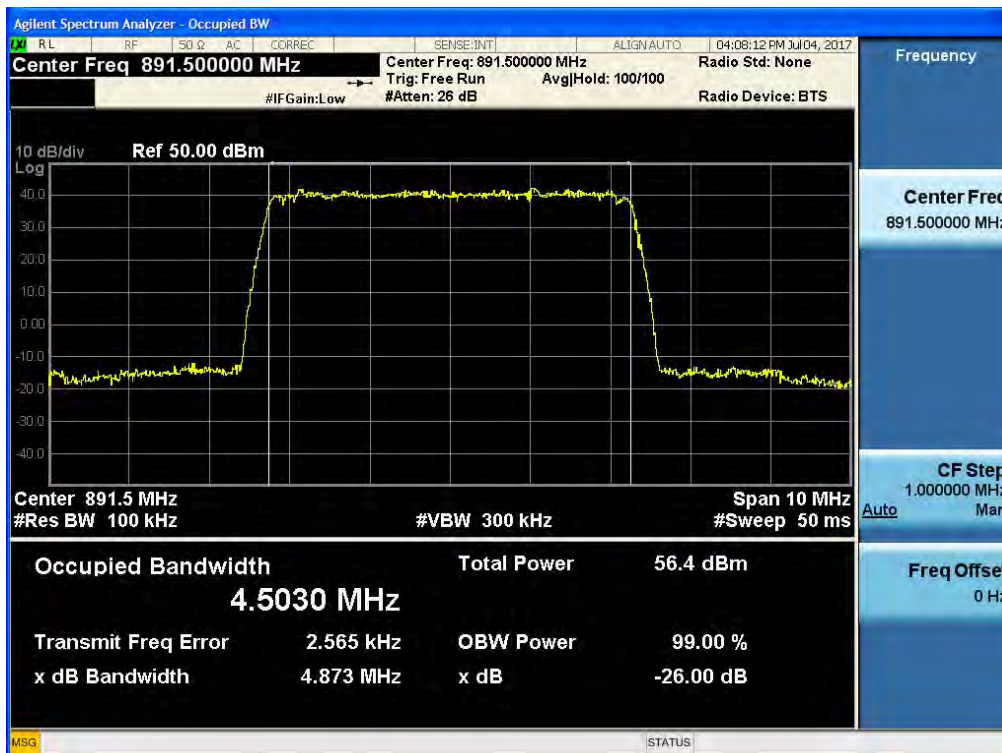
(QPSK Low Channel)



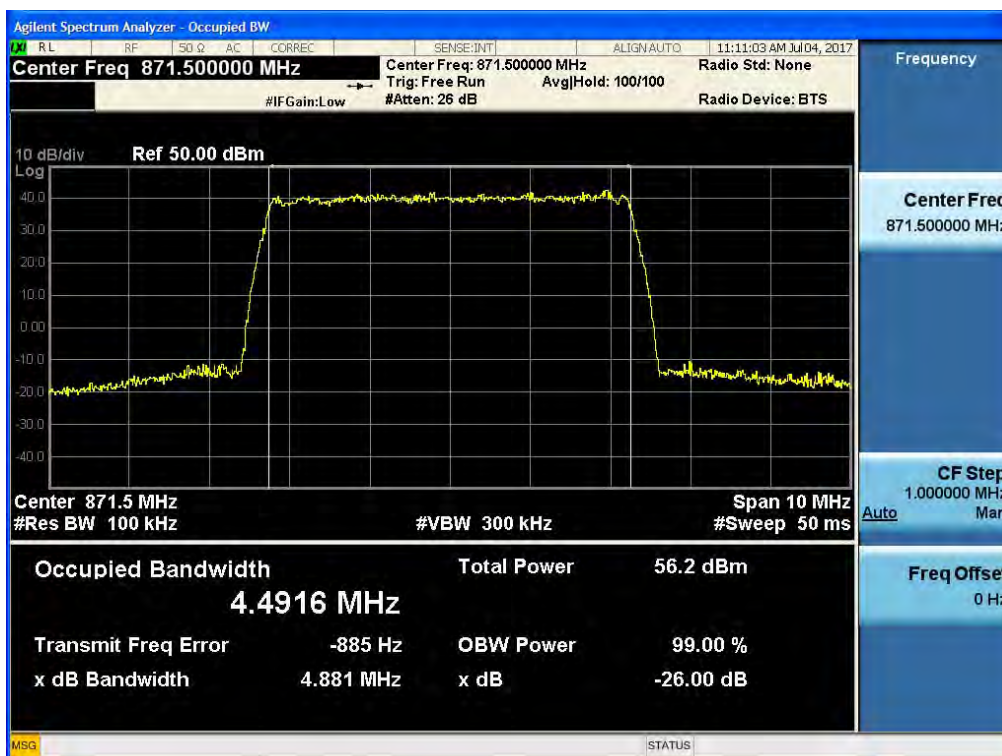
(QPSK Middle Channel)



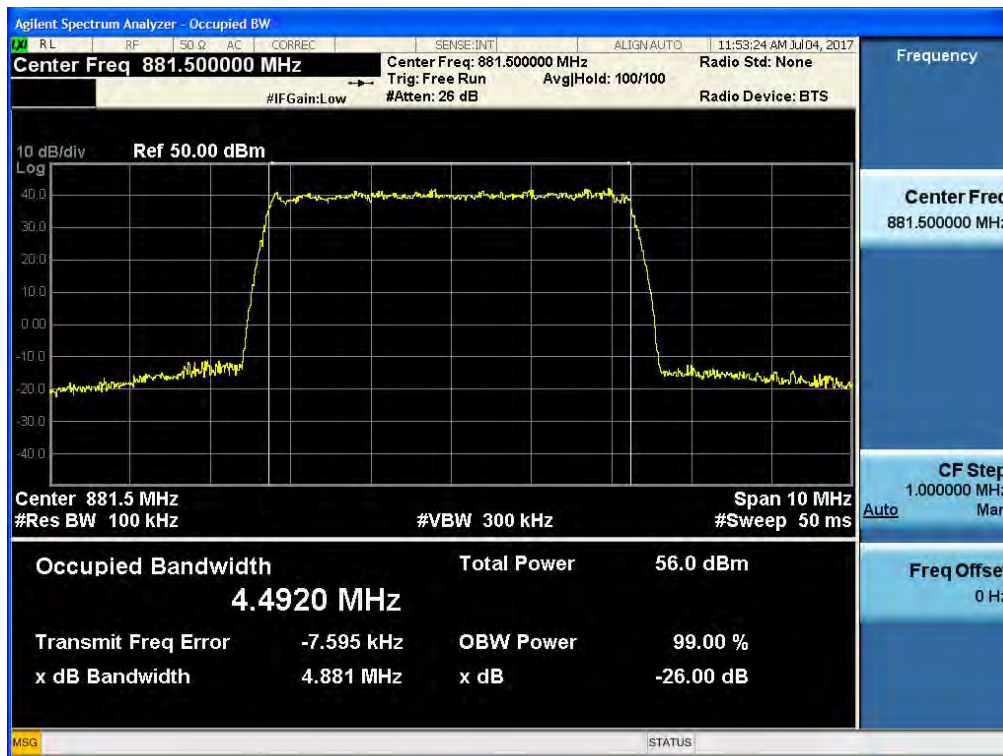
(QPSK High Channel)



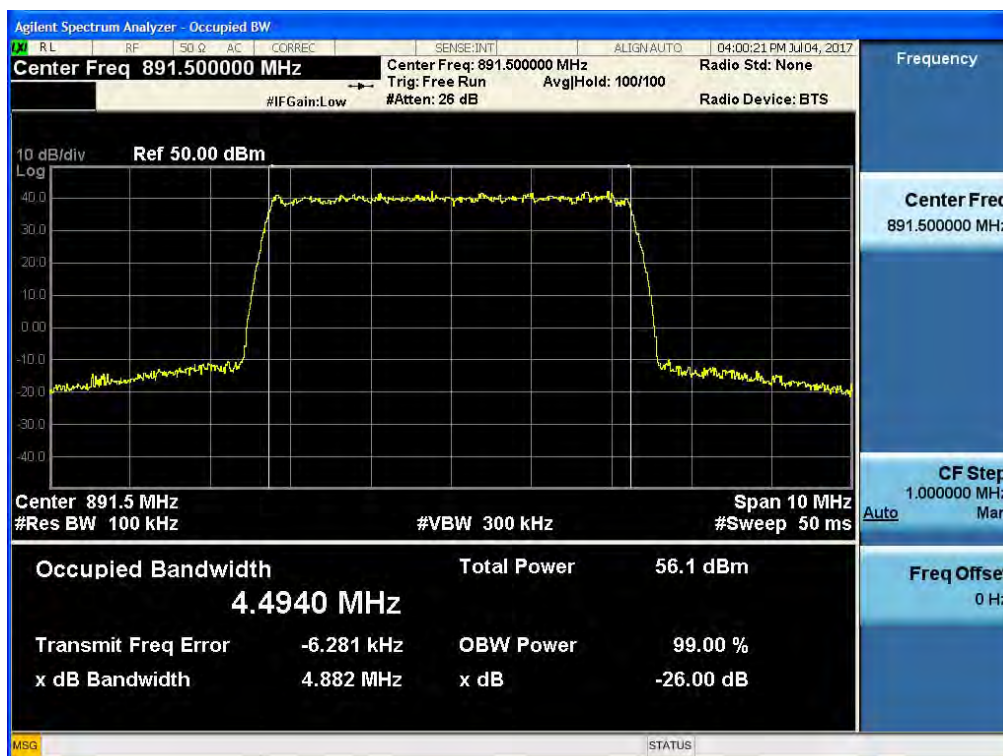
(16QAM Low Channel)



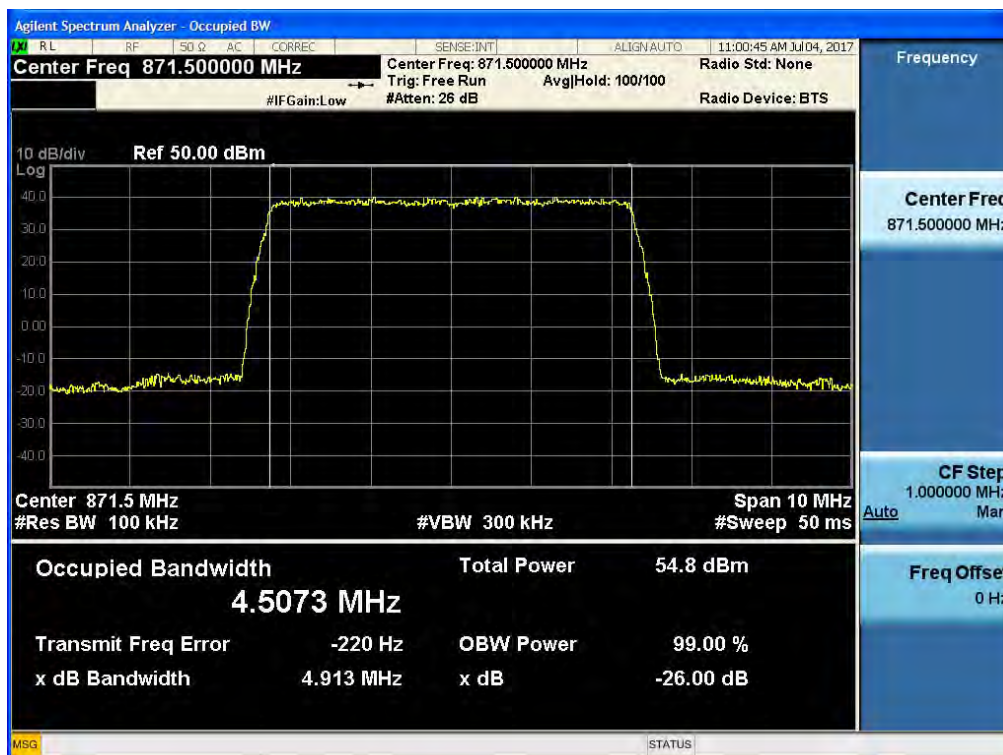
(16QAM Middle Channel)



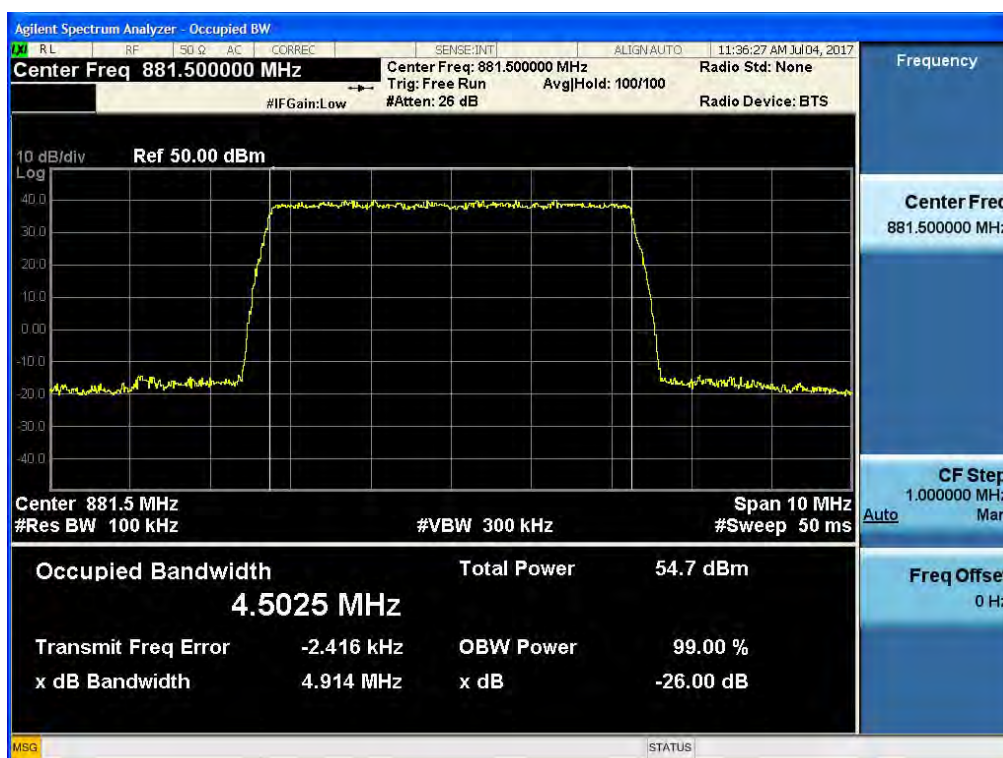
(16QAM High Channel)



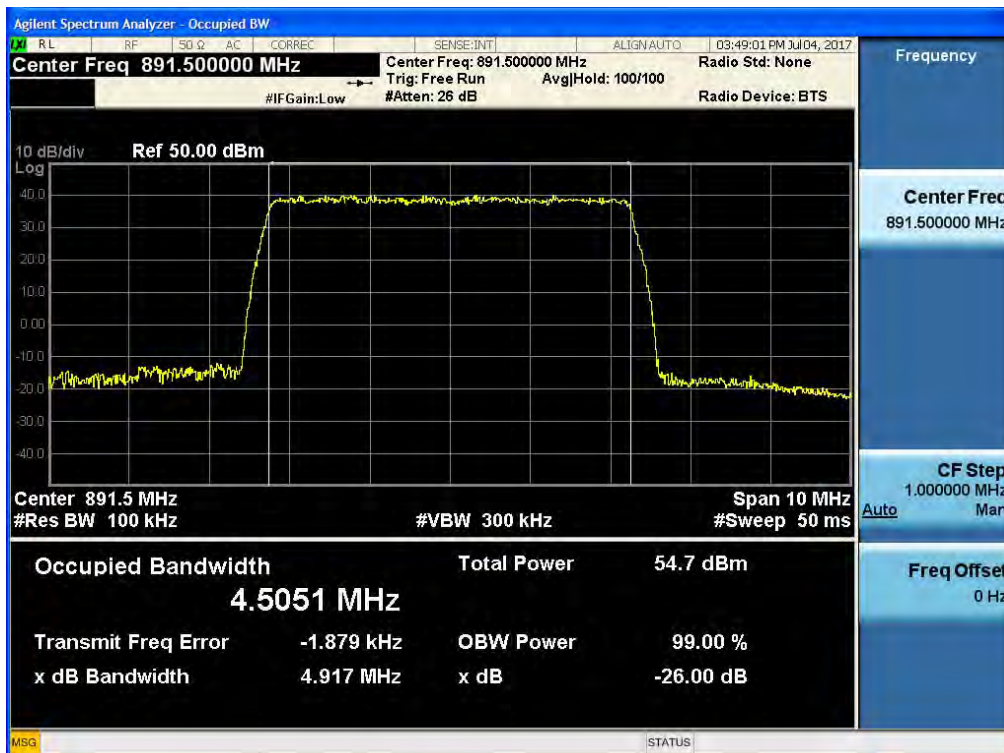
(64QAM Low Channel)



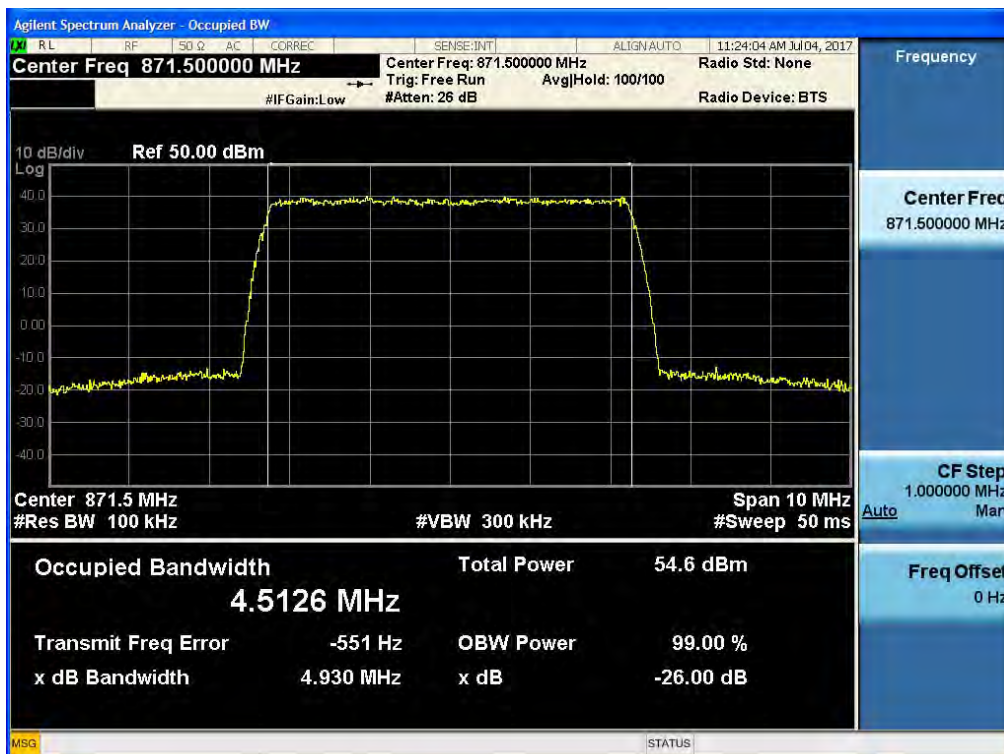
(64QAM Middle Channel)



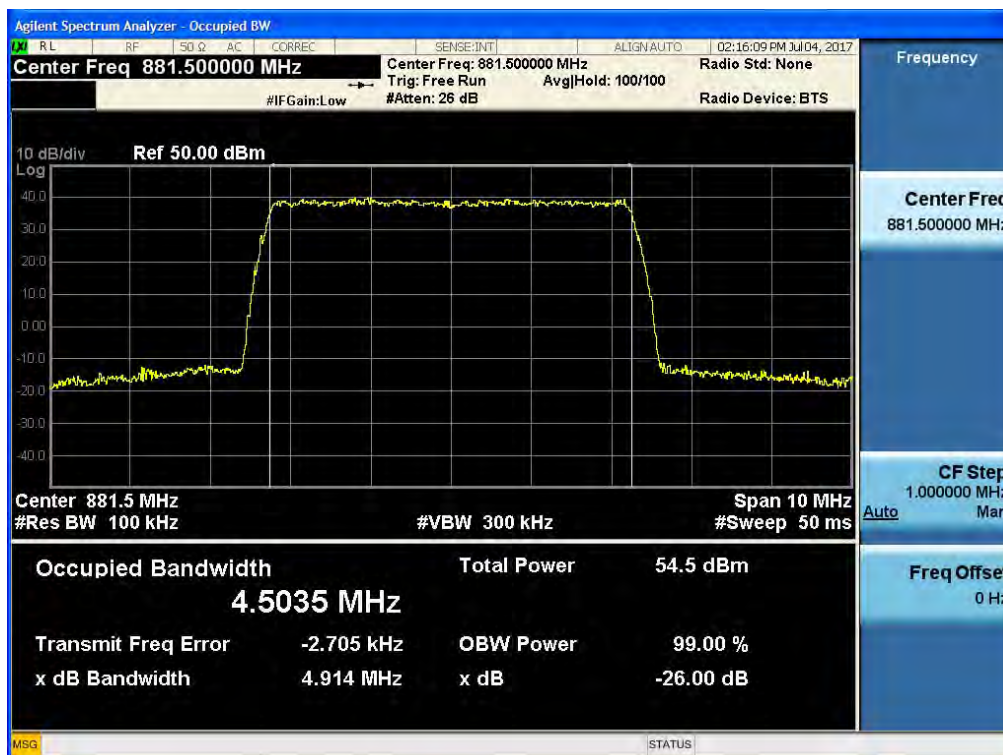
(64QAM High Channel)



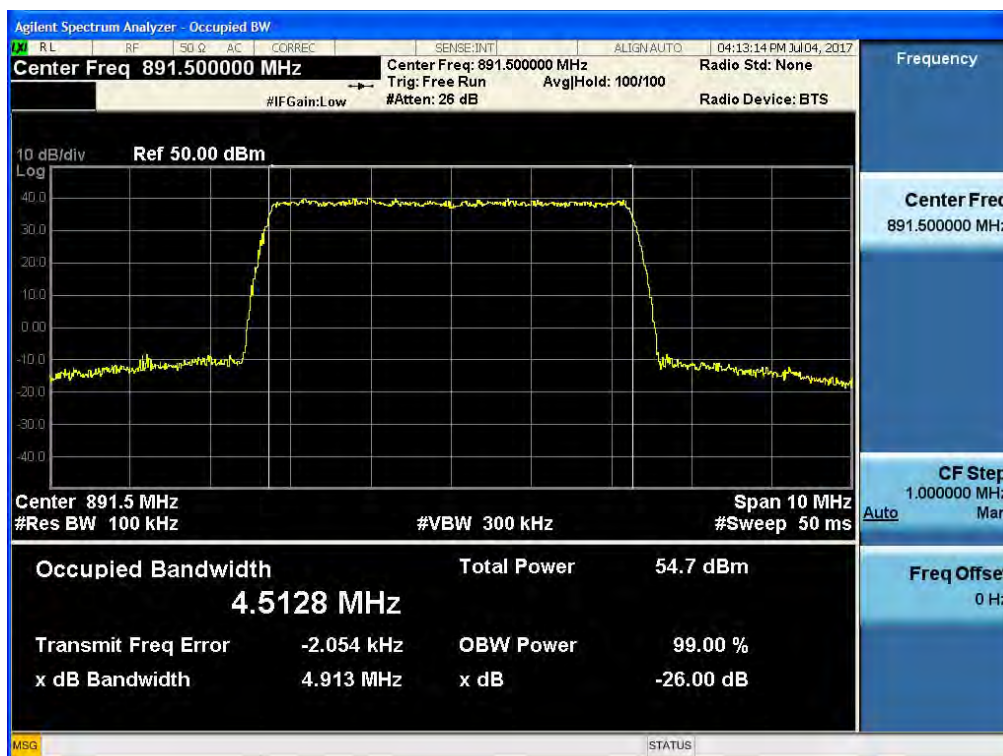
(256QAM Low Channel)



(256QAM Middle Channel)

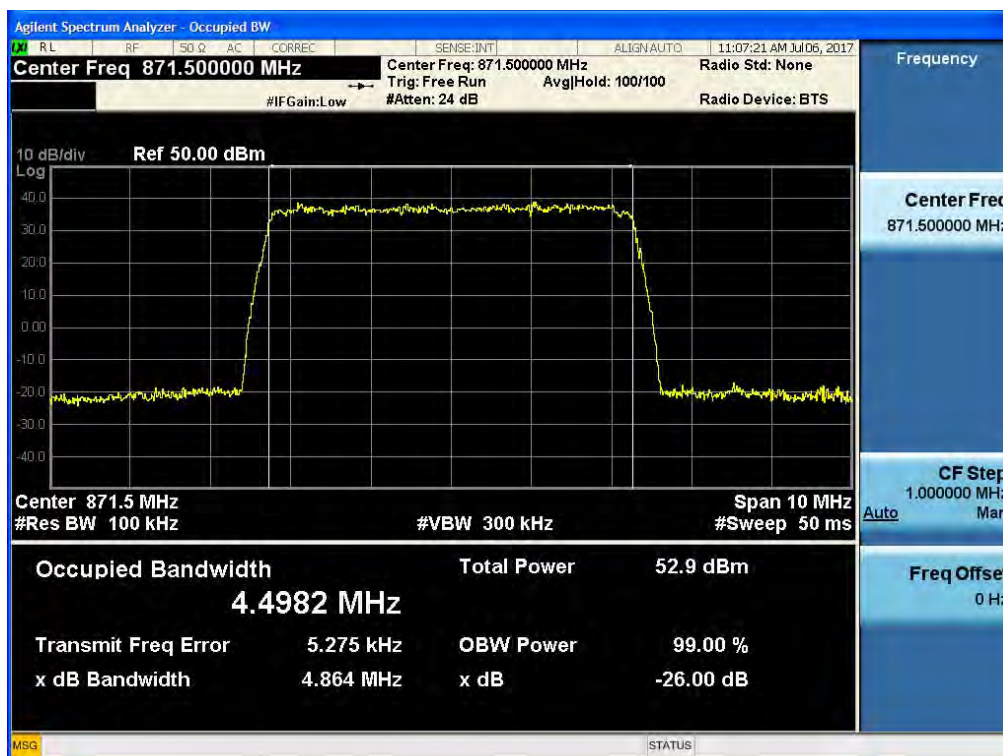


(256QAM High Channel)

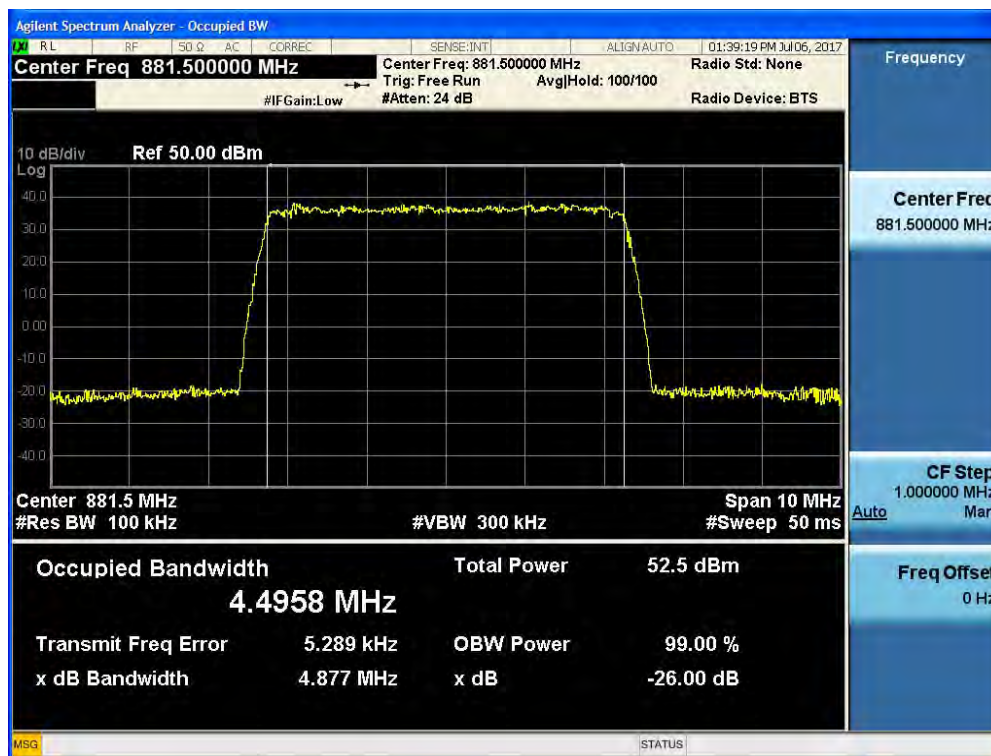


Test Plot at Output Port 3 (4 paths)

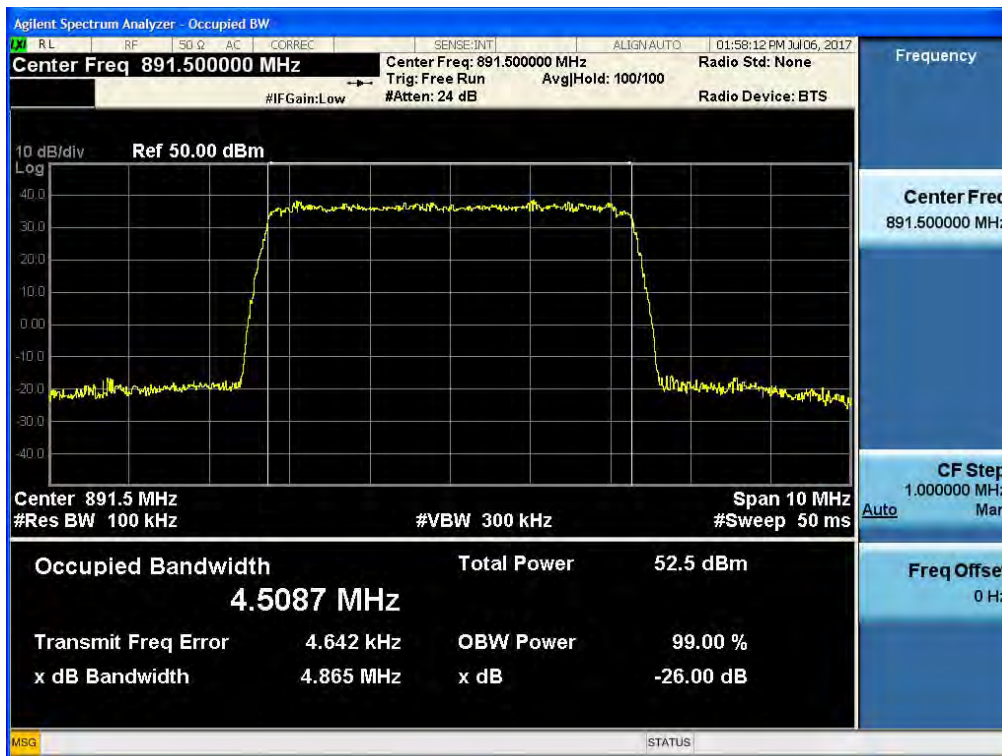
(QPSK Low Channel)



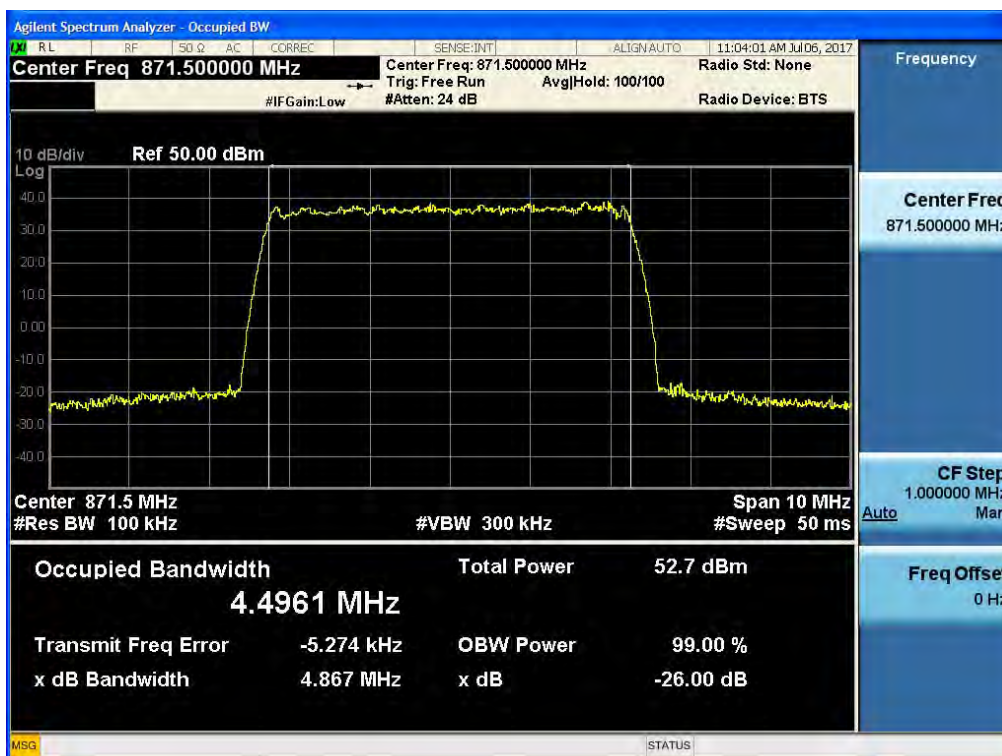
(QPSK Middle Channel)



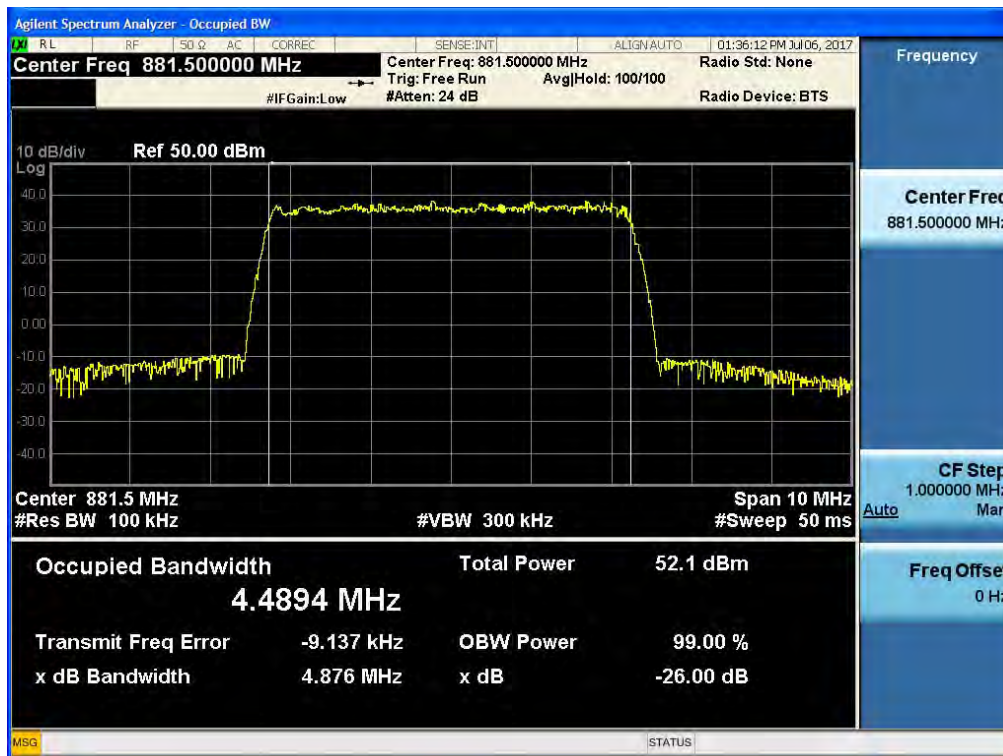
(QPSK High Channel)



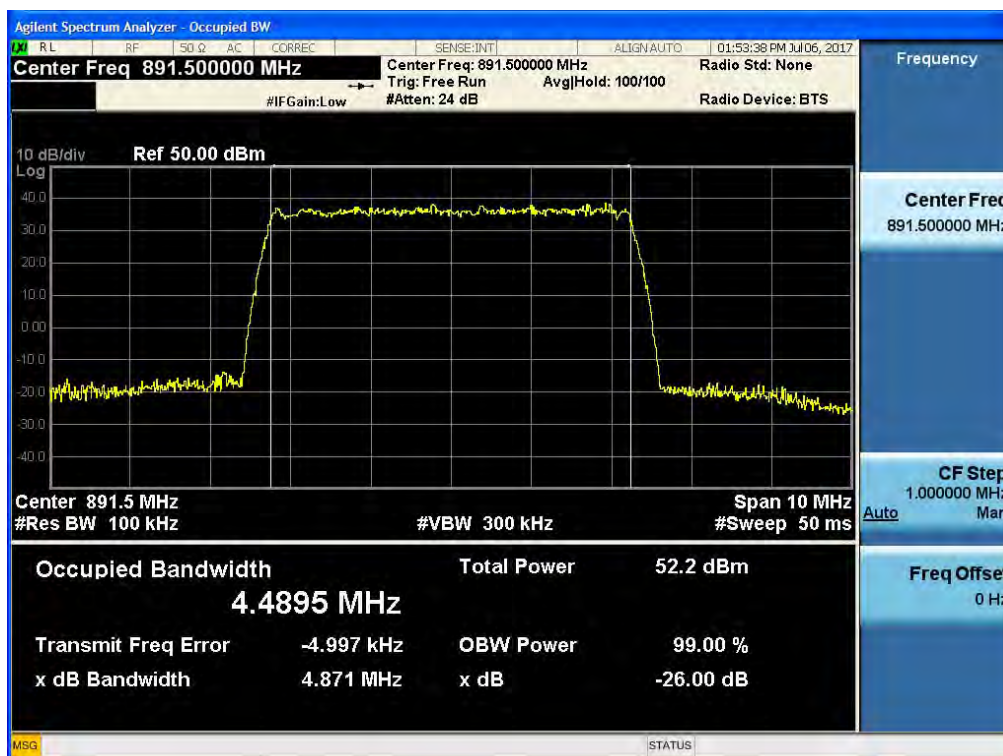
(16QAM Low Channel)



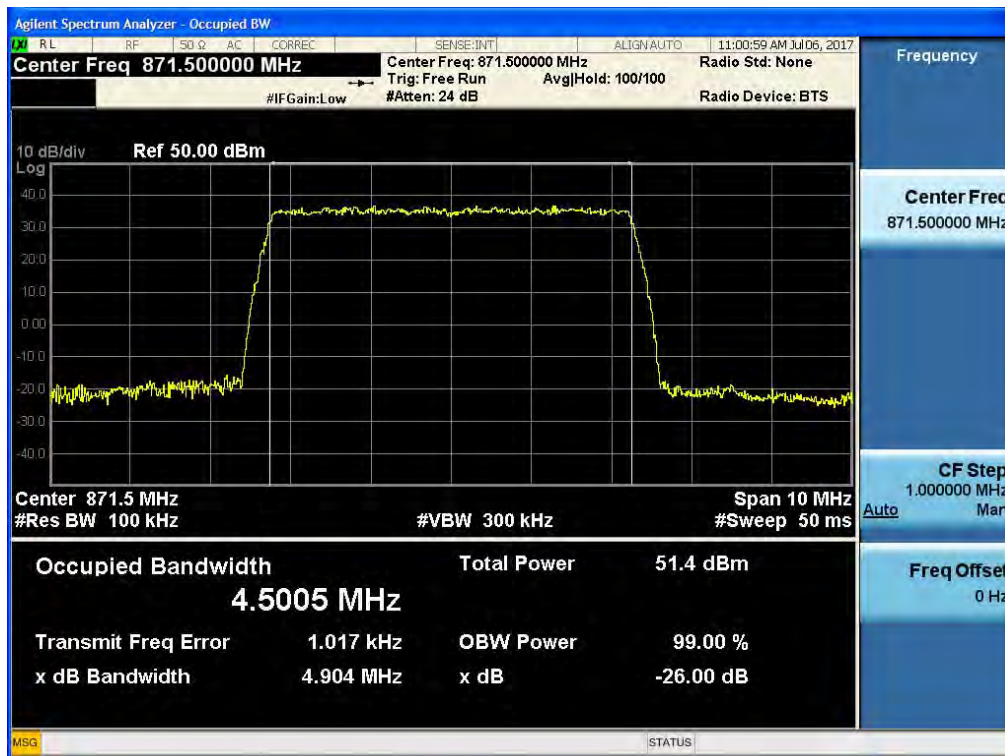
(16QAM Middle Channel)



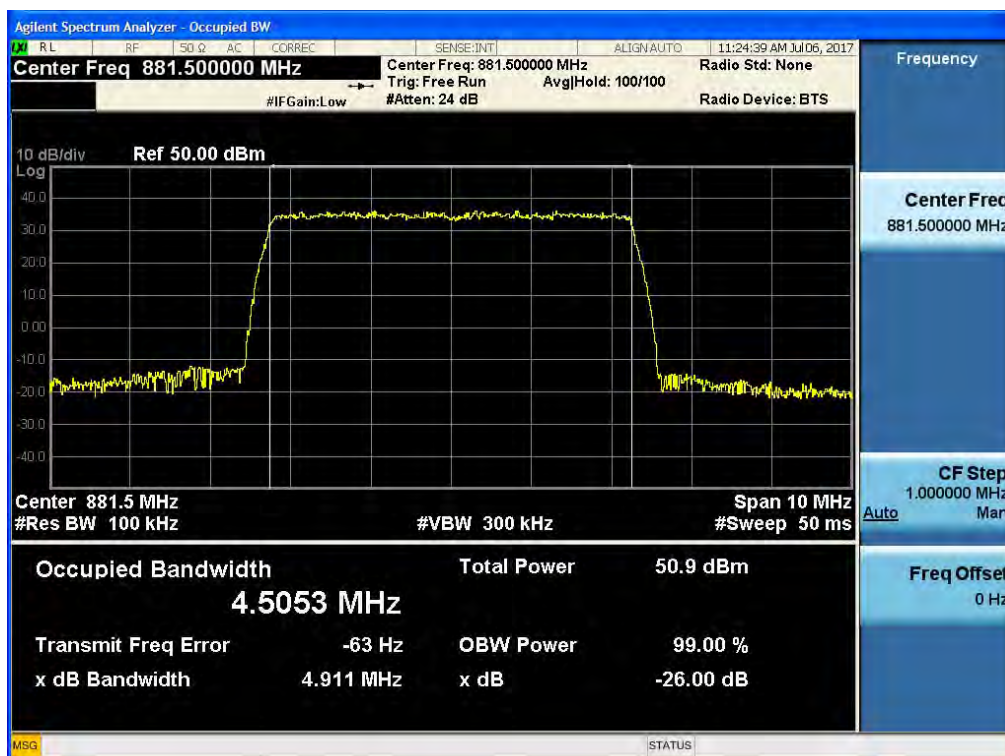
(16QAM High Channel)



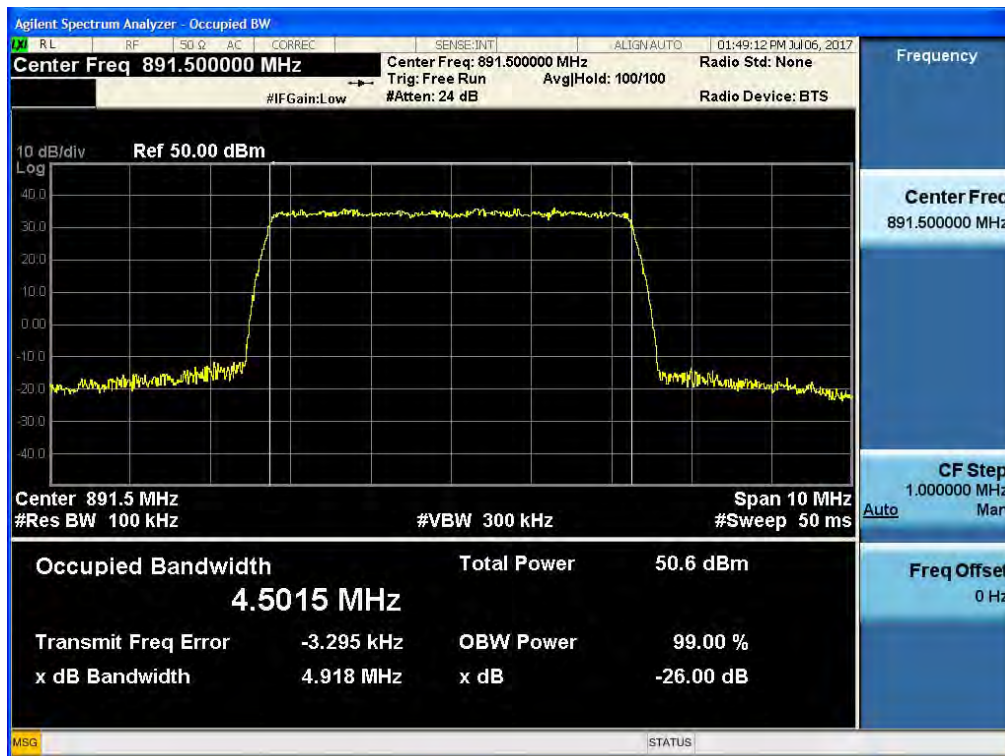
(64QAM Low Channel)



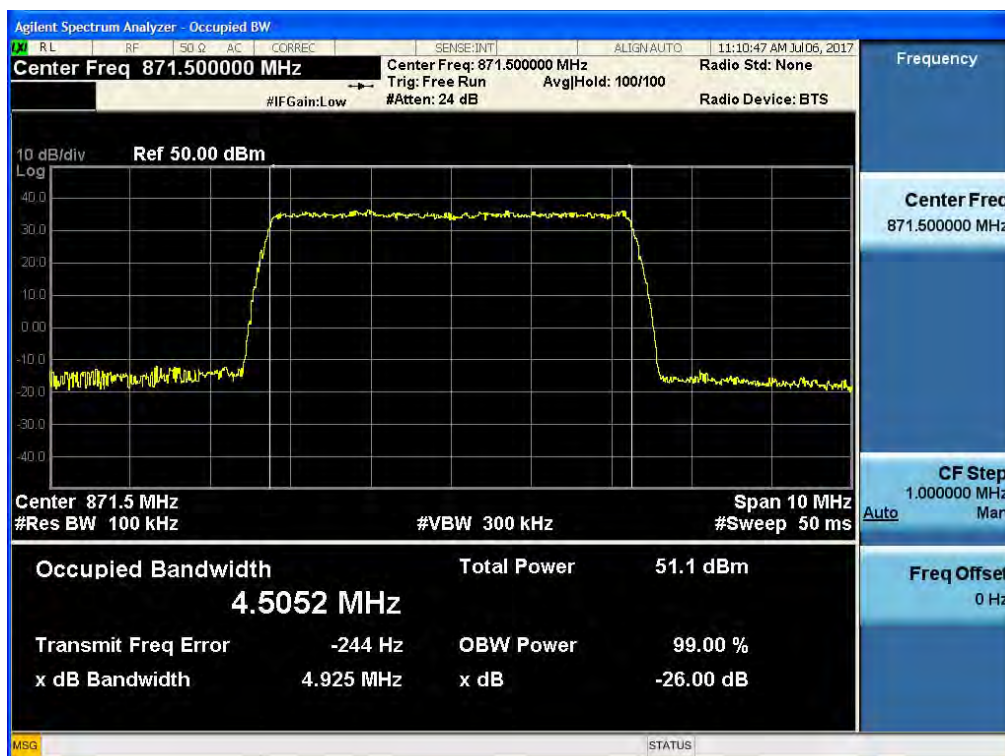
(64QAM Middle Channel)



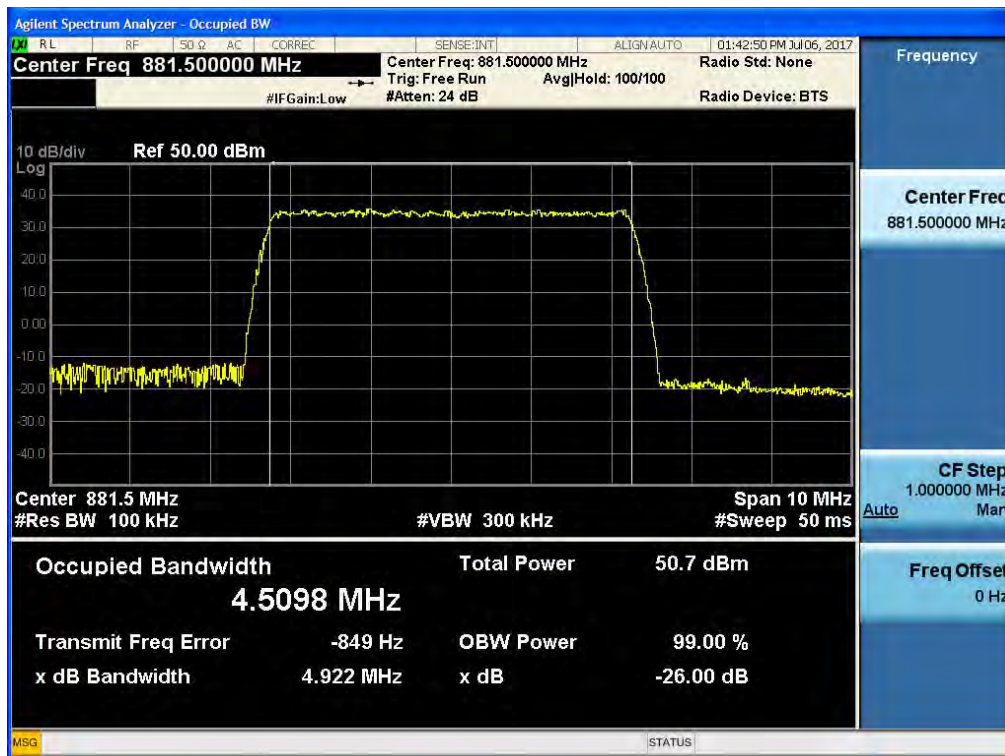
(64QAM High Channel)



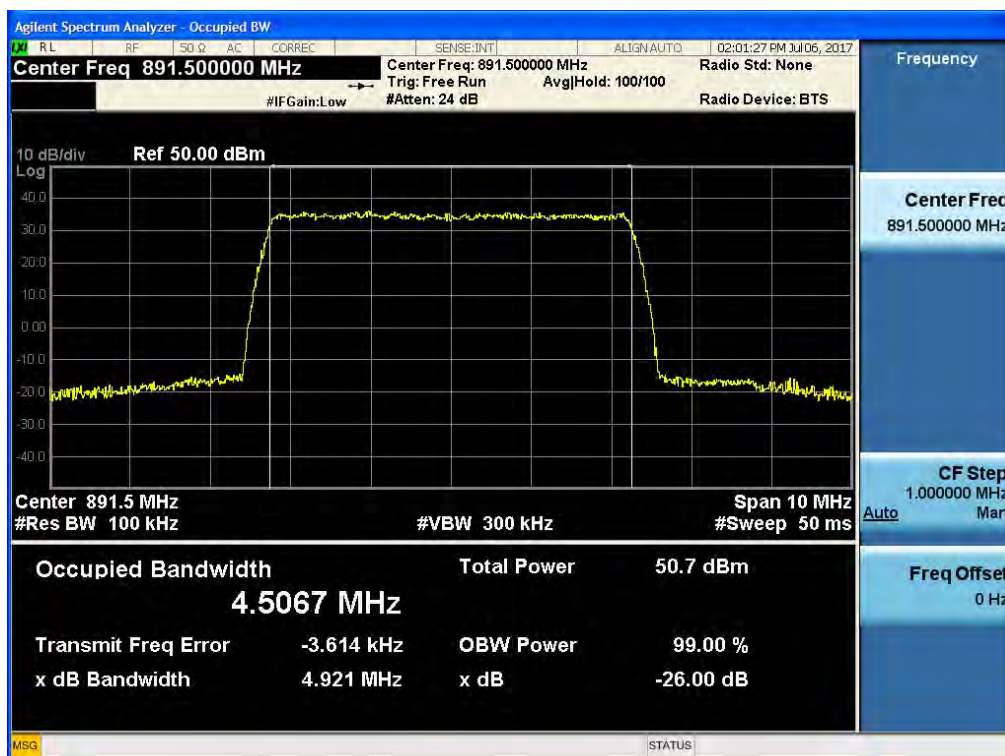
(256QAM Low Channel)



(256QAM Middle Channel)

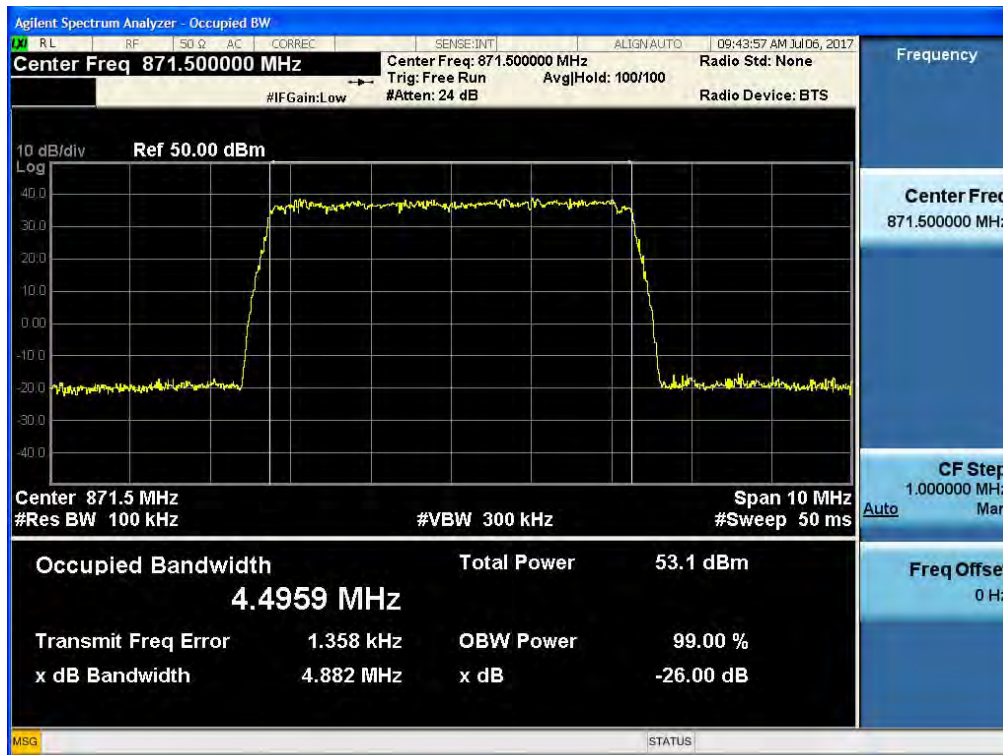


(256QAM High Channel)

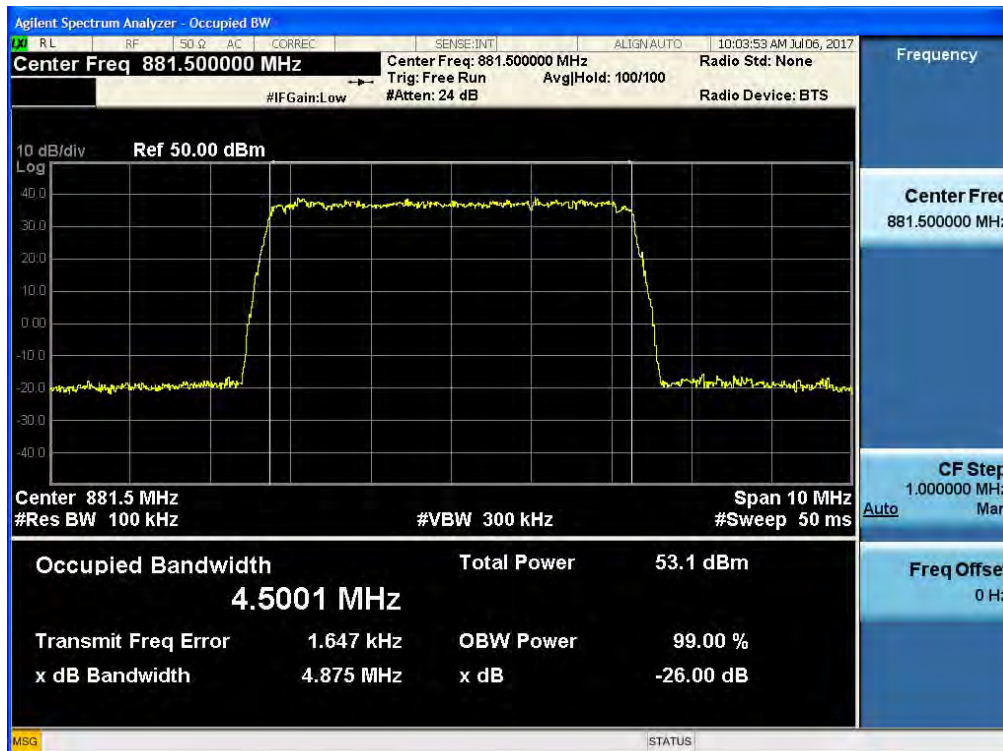


Test Plot at Output Port 4 (4 paths)

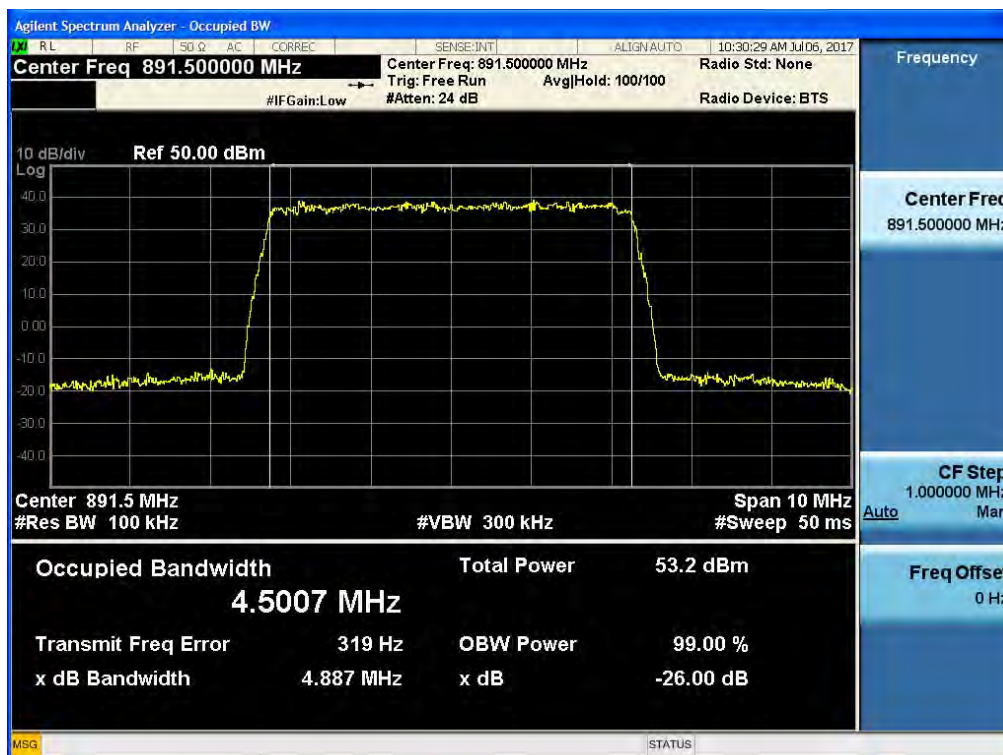
(QPSK Low Channel)



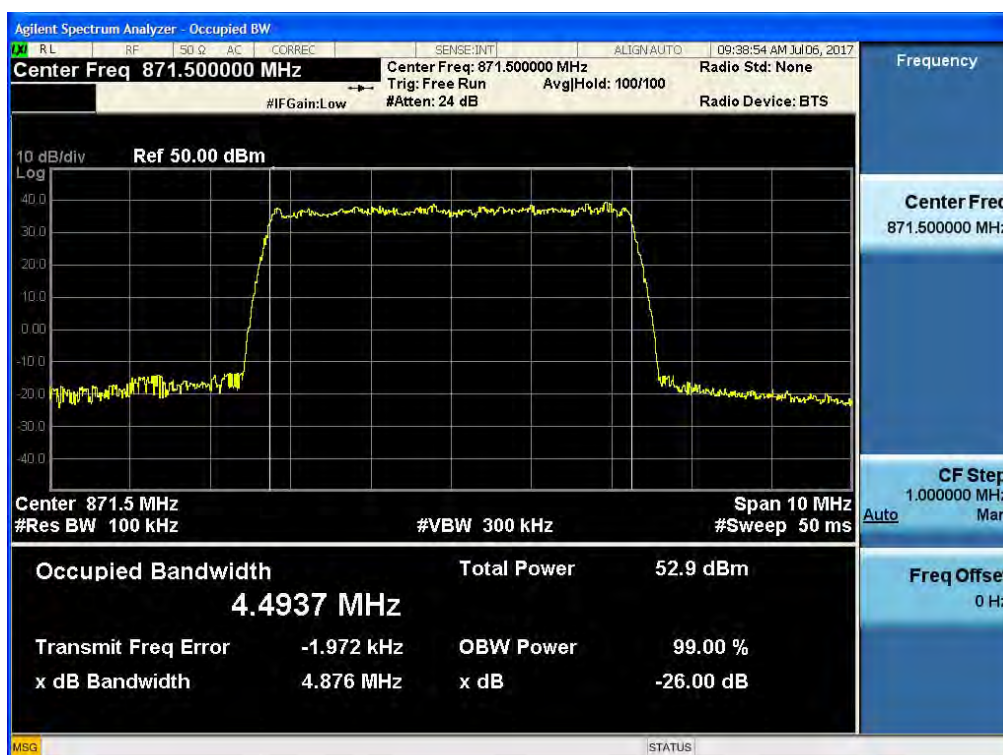
(QPSK Middle Channel)



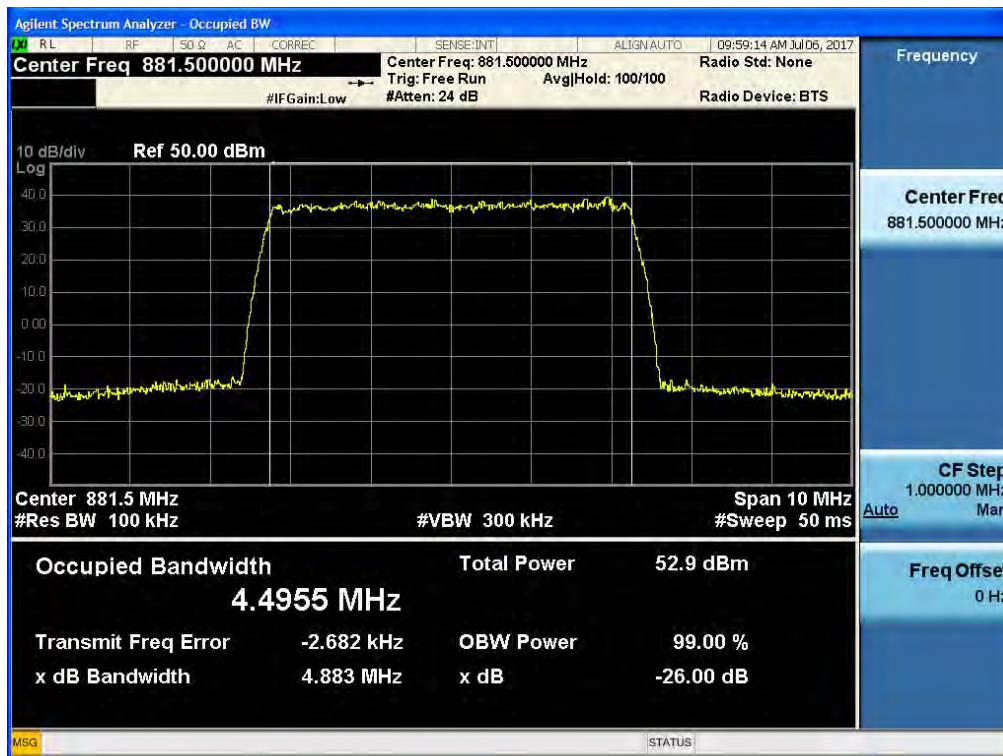
(QPSK High Channel)



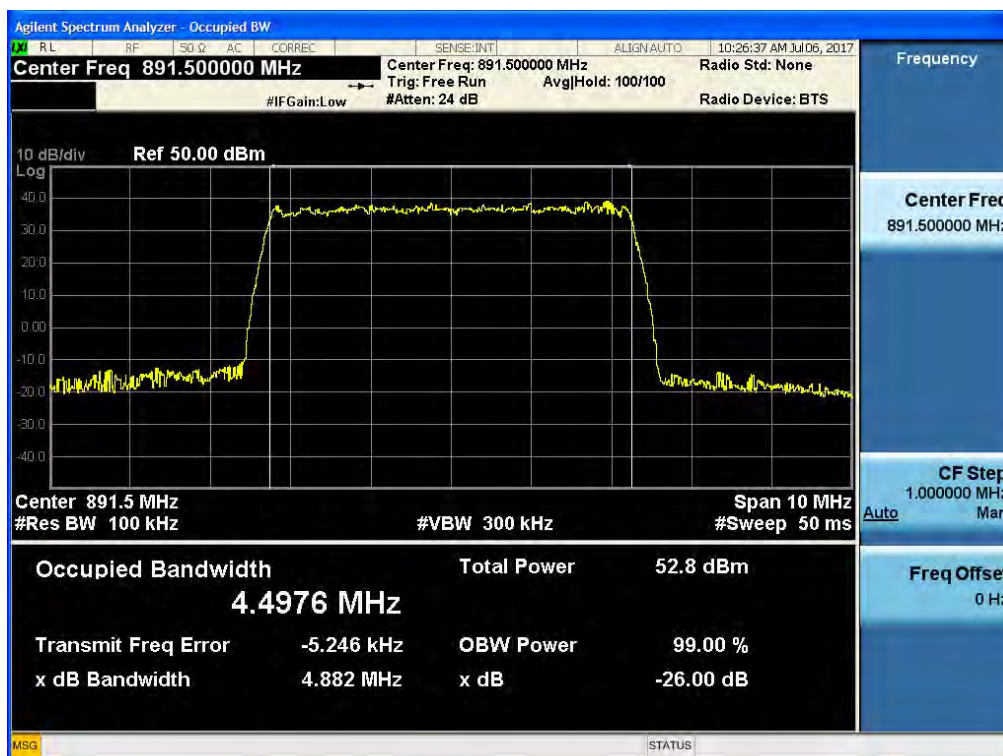
(16QAM Low Channel)



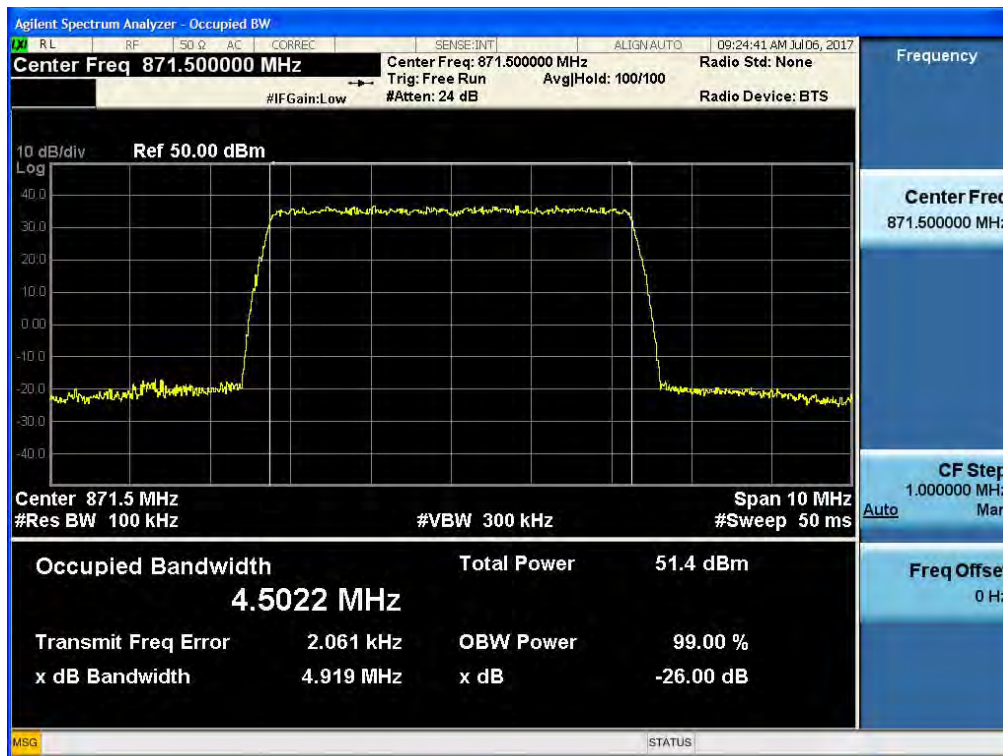
(16QAM Middle Channel)



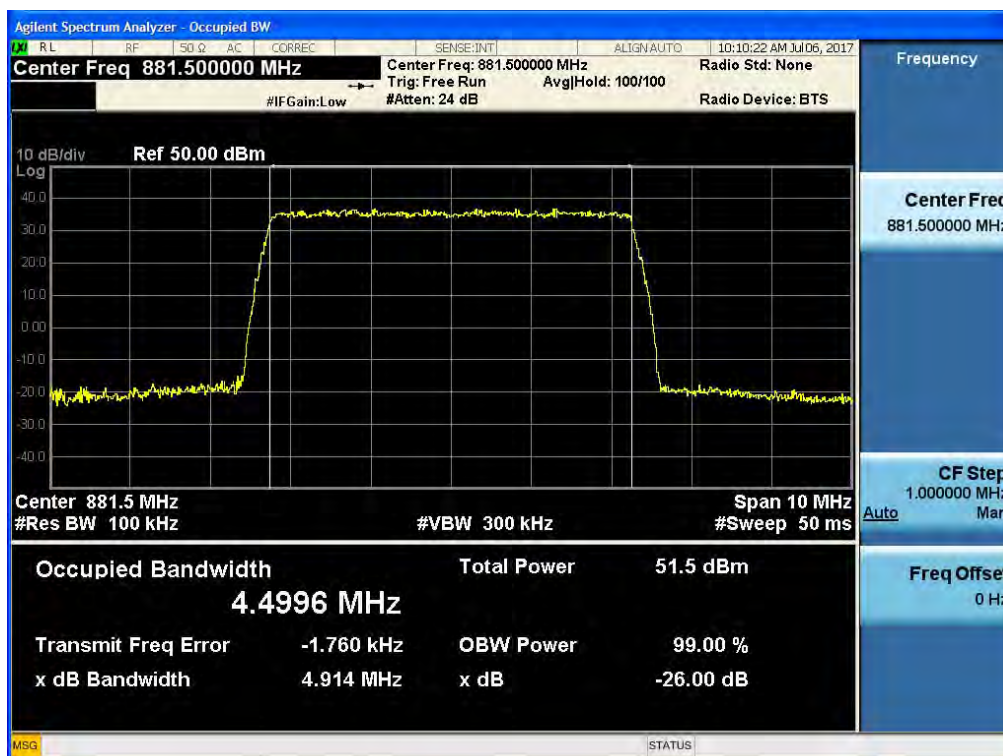
(16QAM High Channel)



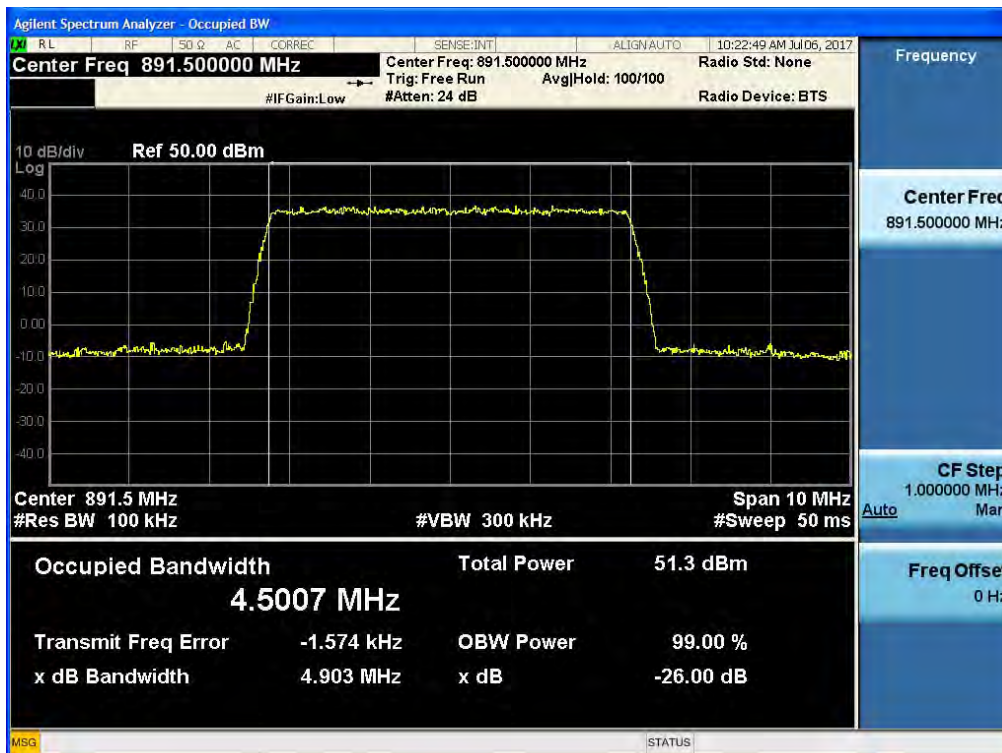
(64QAM Low Channel)



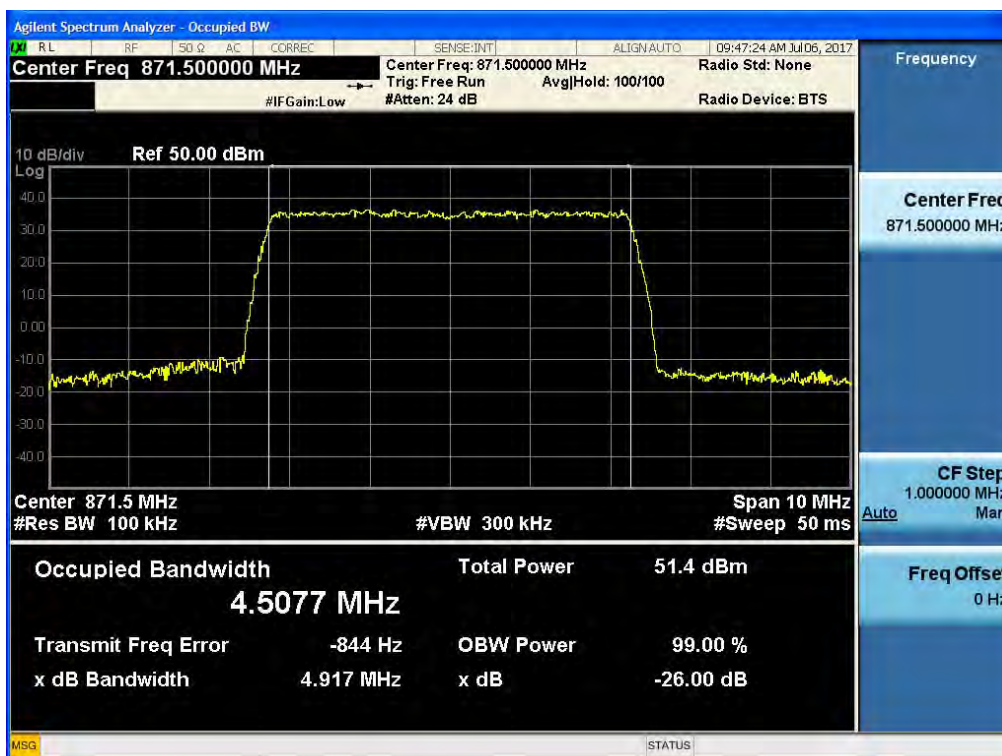
(64QAM Middle Channel)



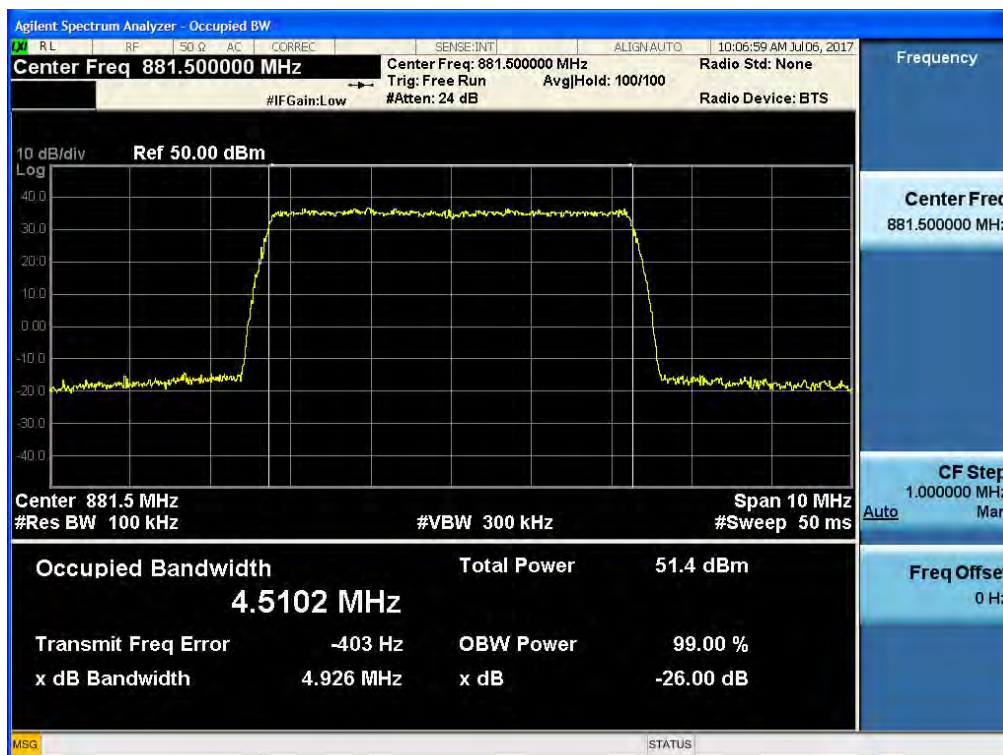
(64QAM High Channel)



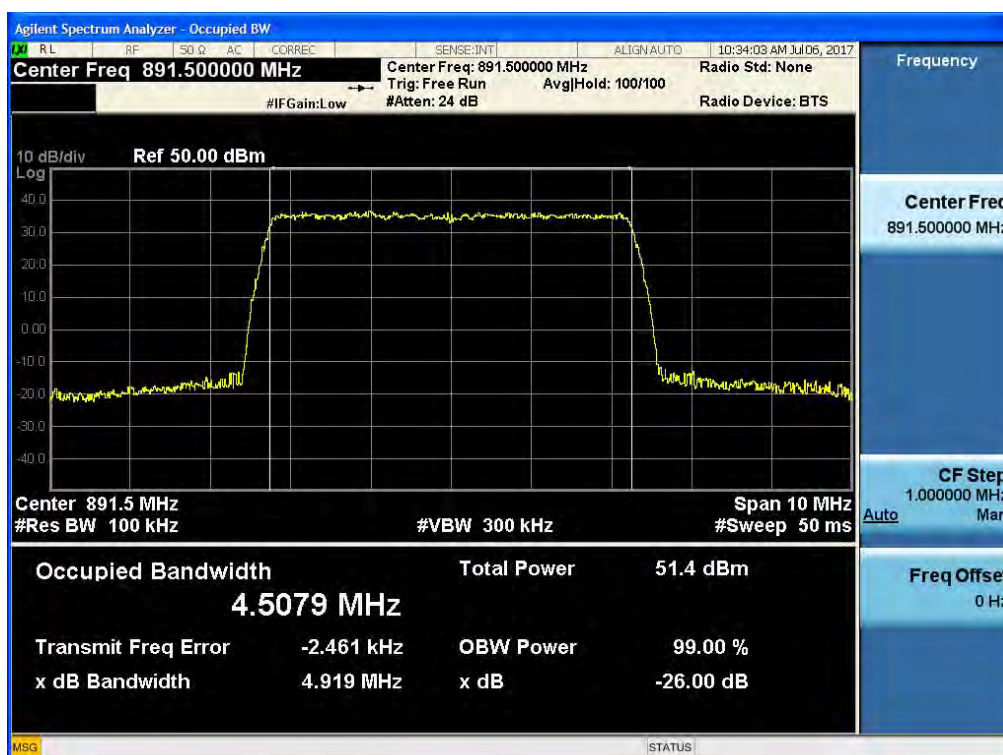
(256QAM Low Channel)



(256QAM Middle Channel)



(256QAM High Channel)



LTE Band 5_1 Carrier (10 MHz)

Test Data at Output Port 1 (2 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
874.00	8.994	8.990	8.982	9.003
881.50	9.000	8.995	8.991	9.002
889.00	8.999	8.996	8.988	9.001

Test Data at Output Port 2 (2 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
874.00	8.992	8.995	8.990	9.003
881.50	8.999	9.002	8.997	8.997
889.00	8.994	8.991	8.972	8.992

Test Data at Output Port 3 (4 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
874.00	8.996	9.000	8.988	8.985
881.50	8.998	9.000	8.979	9.007
889.00	8.994	8.988	8.983	8.993

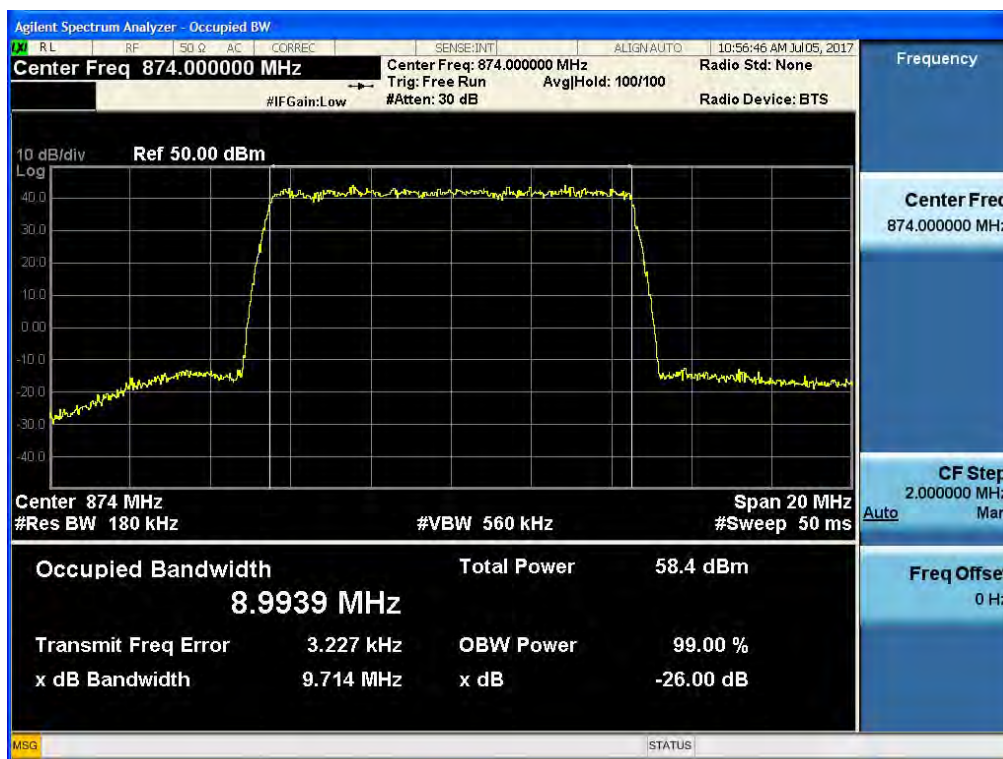
Test Data at Output Port 4 (4 paths)

Frequency (MHz)	Occupied Bandwidth (MHz)			
	QPSK	16QAM	64QAM	256QAM
874.00	8.995	8.995	8.982	9.006
881.50	8.991	8.993	8.990	8.998
889.00	8.990	8.995	8.982	8.991

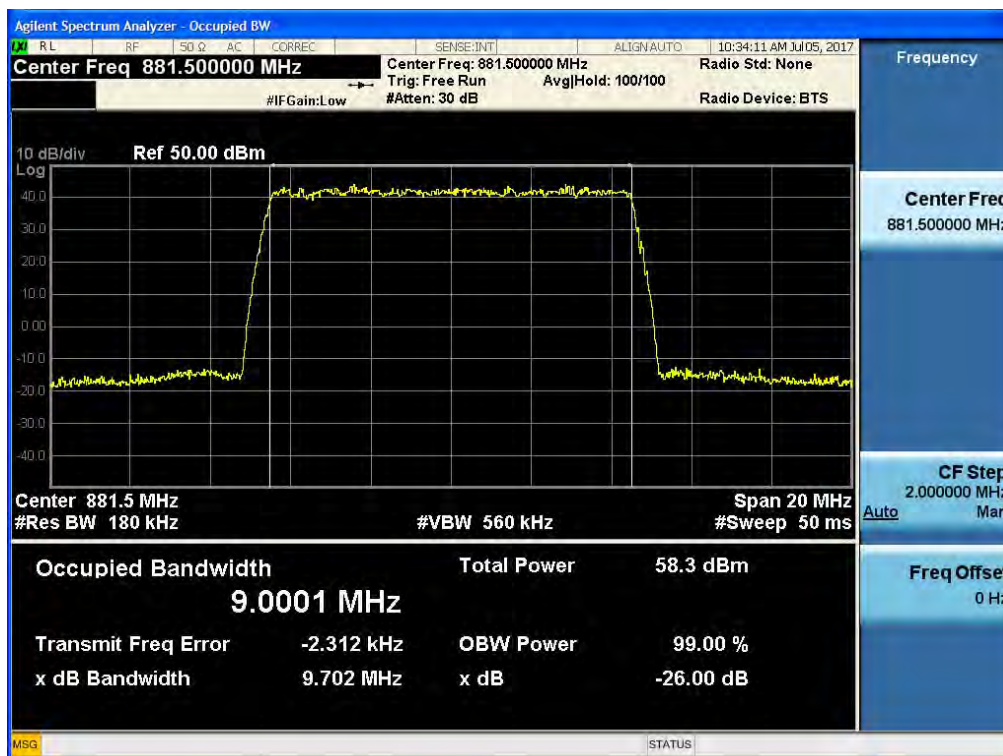
LTE Band 5_1 Carrier (10 MHz)

Test Plot at Output Port 1 (2 paths)

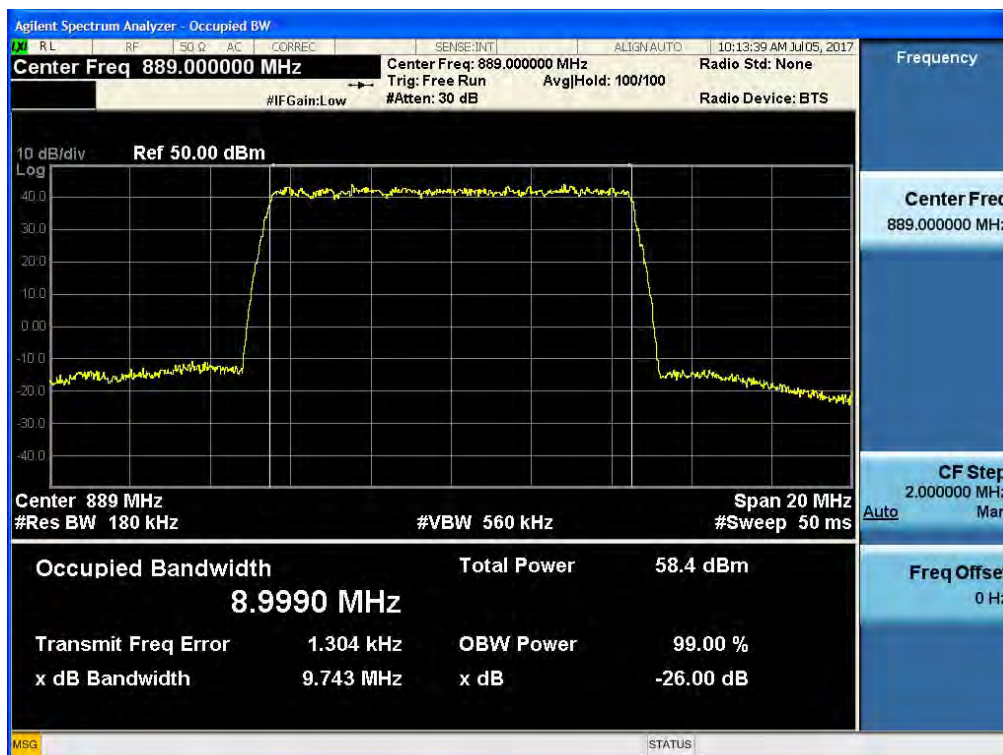
(QPSK Low Channel)



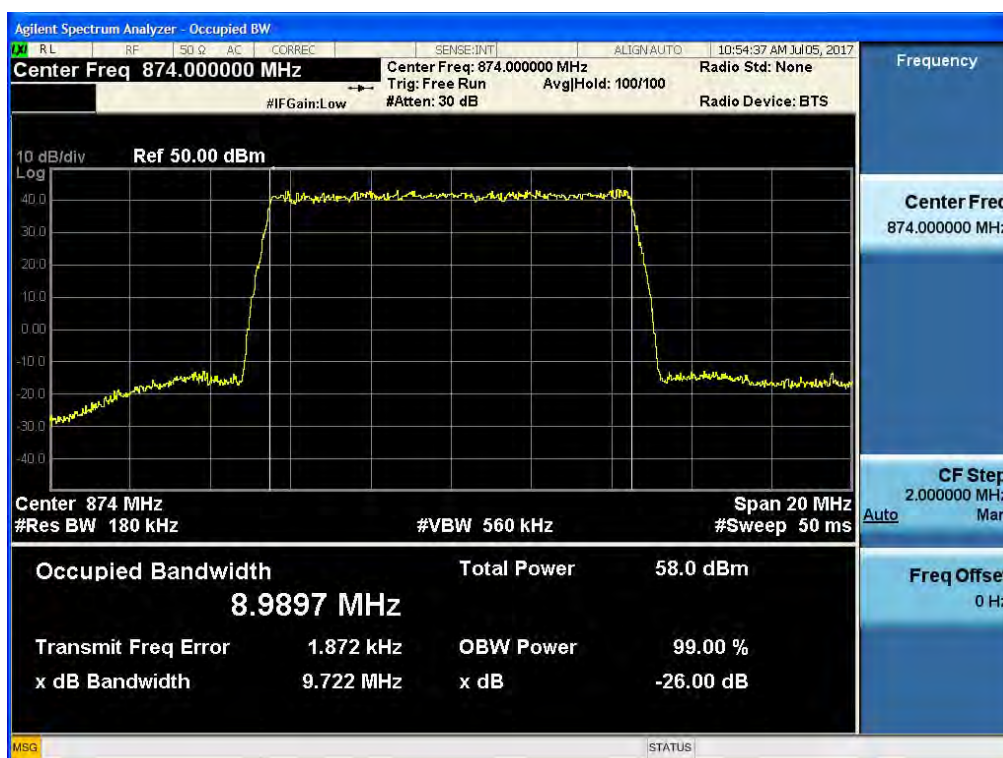
(QPSK Middle Channel)



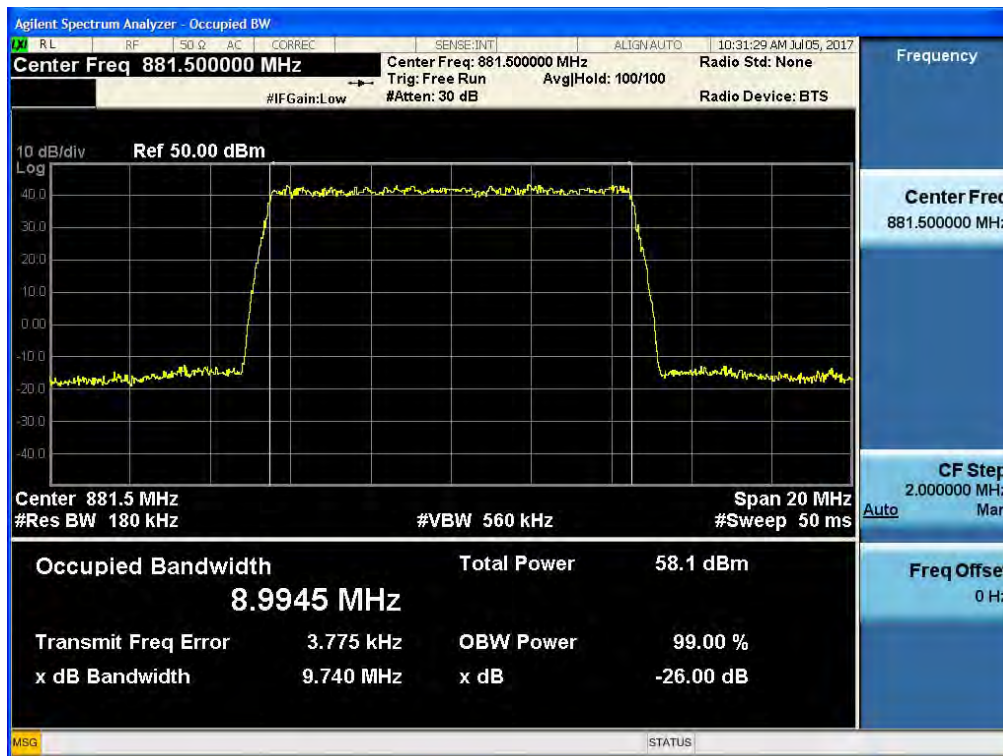
(QPSK High Channel)



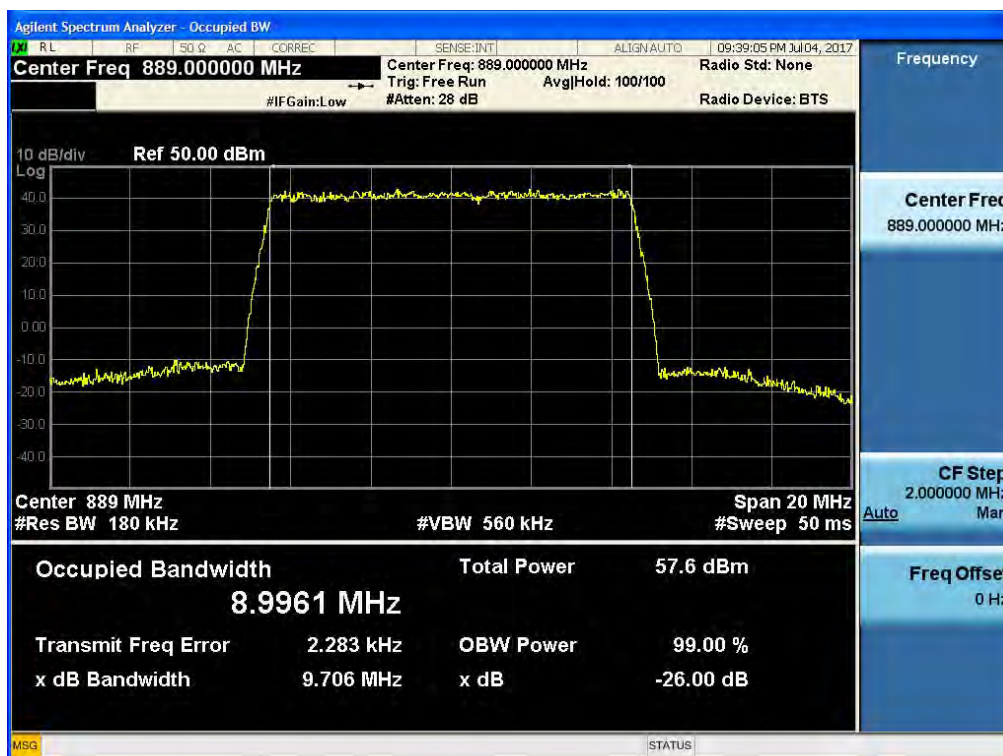
(16QAM Low Channel)



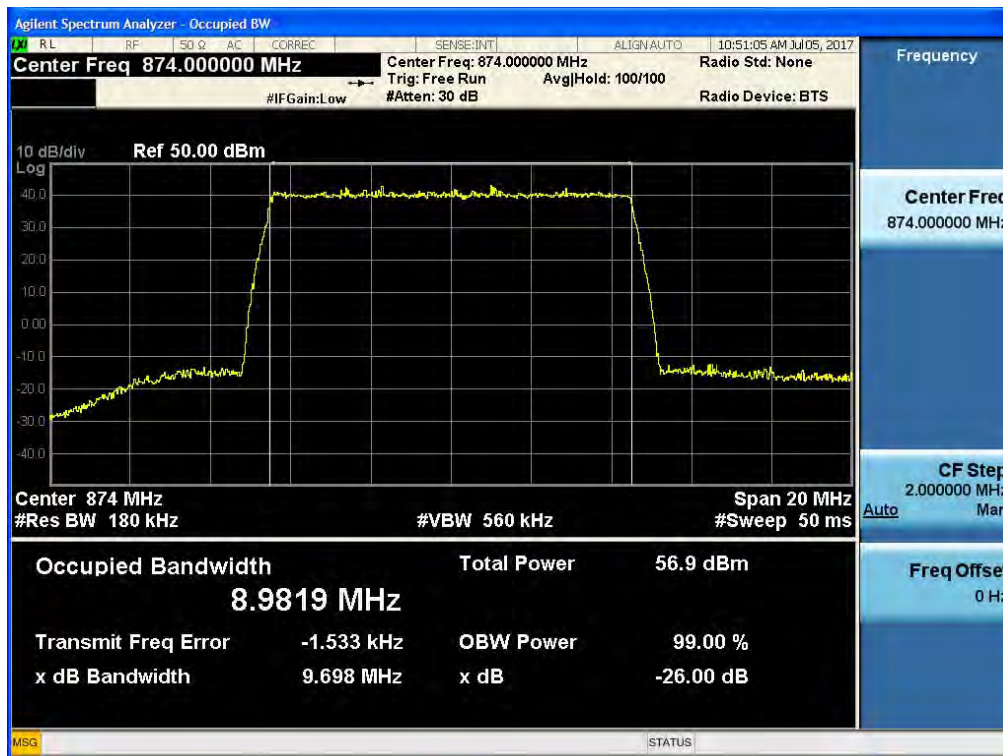
(16QAM Middle Channel)



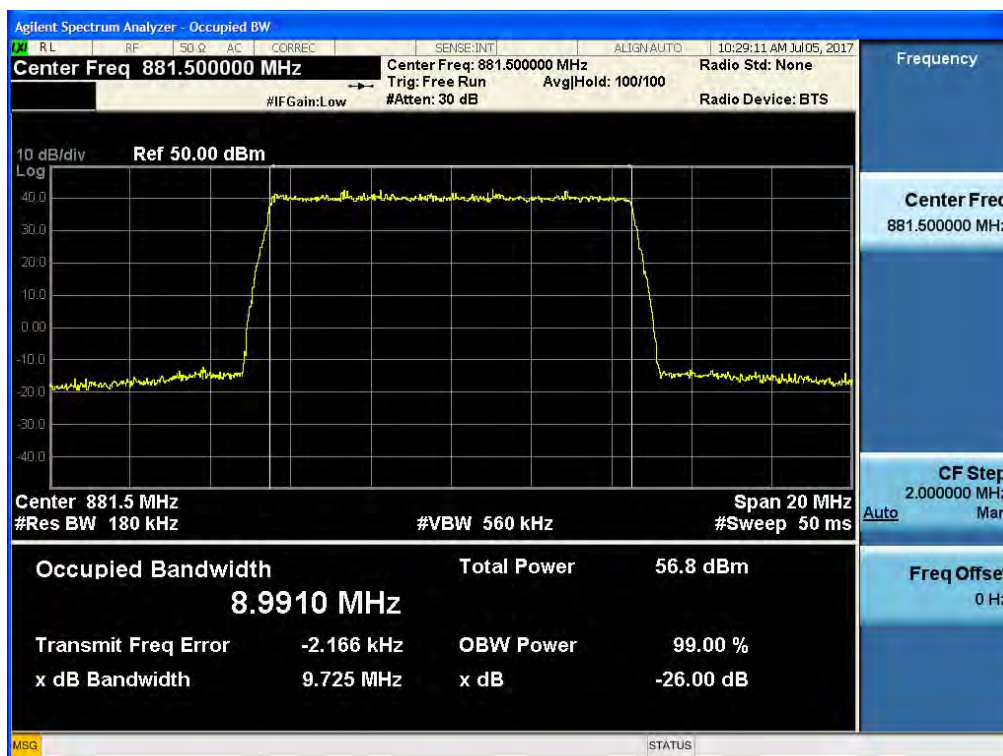
(16QAM High Channel)



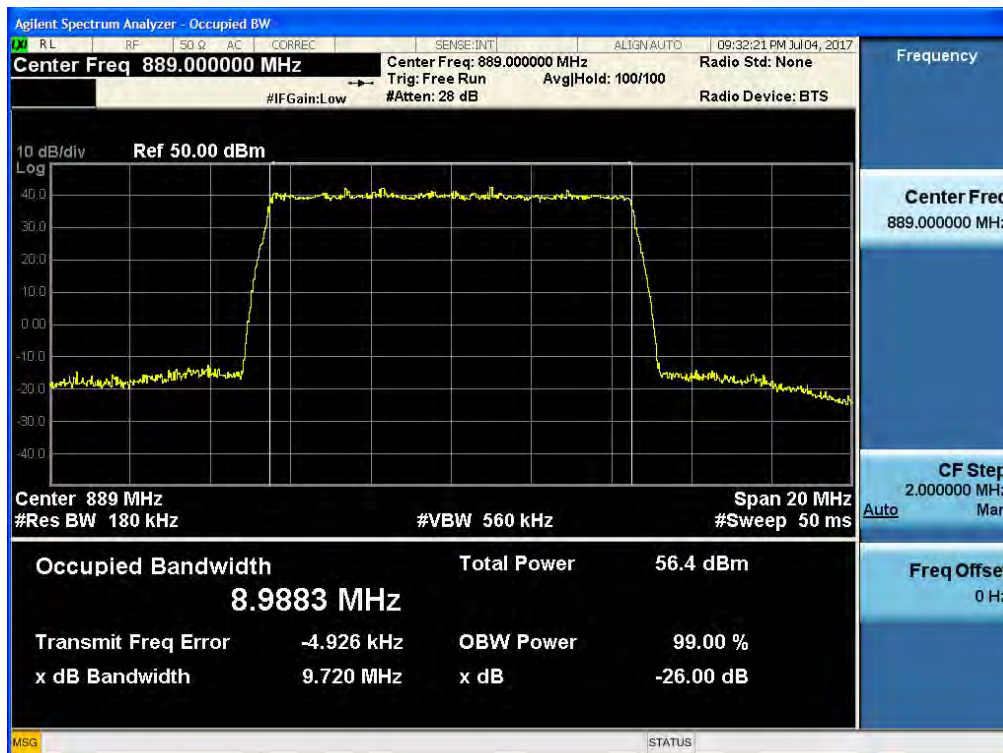
(64QAM Low Channel)



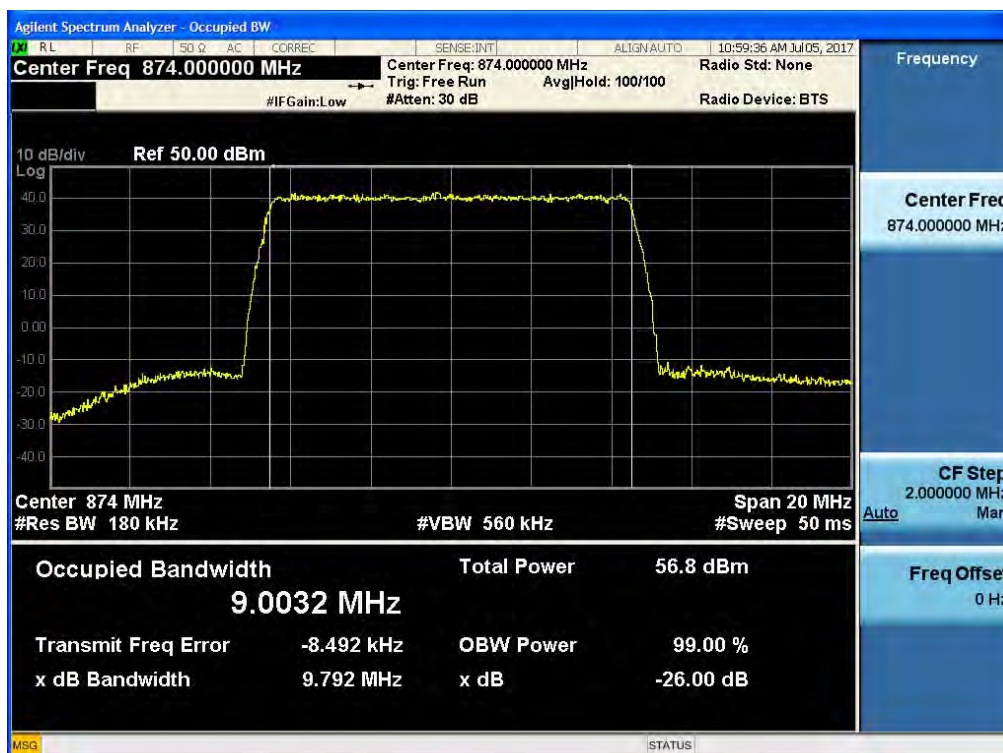
(64QAM Middle Channel)



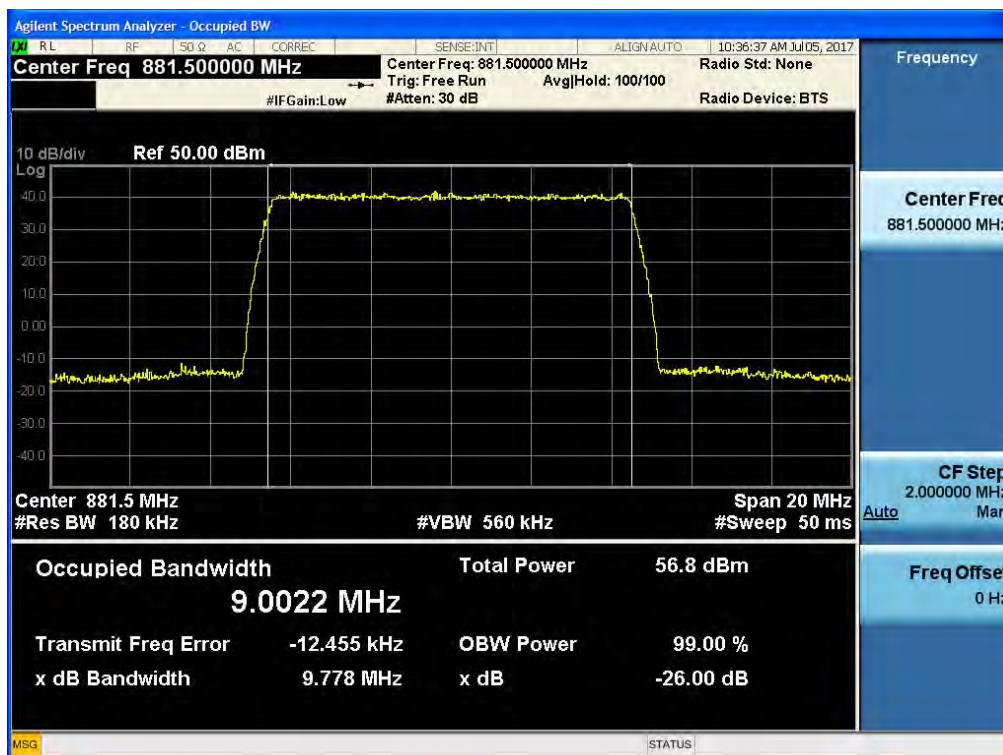
(64QAM High Channel)



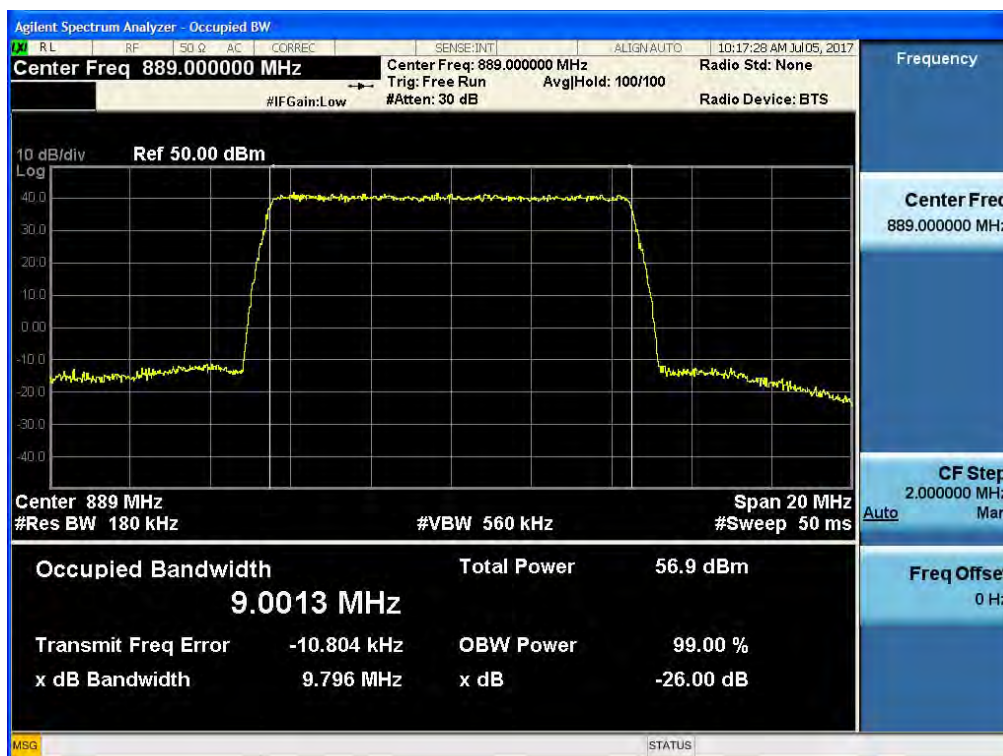
(256QAM Low Channel)



(256QAM Middle Channel)

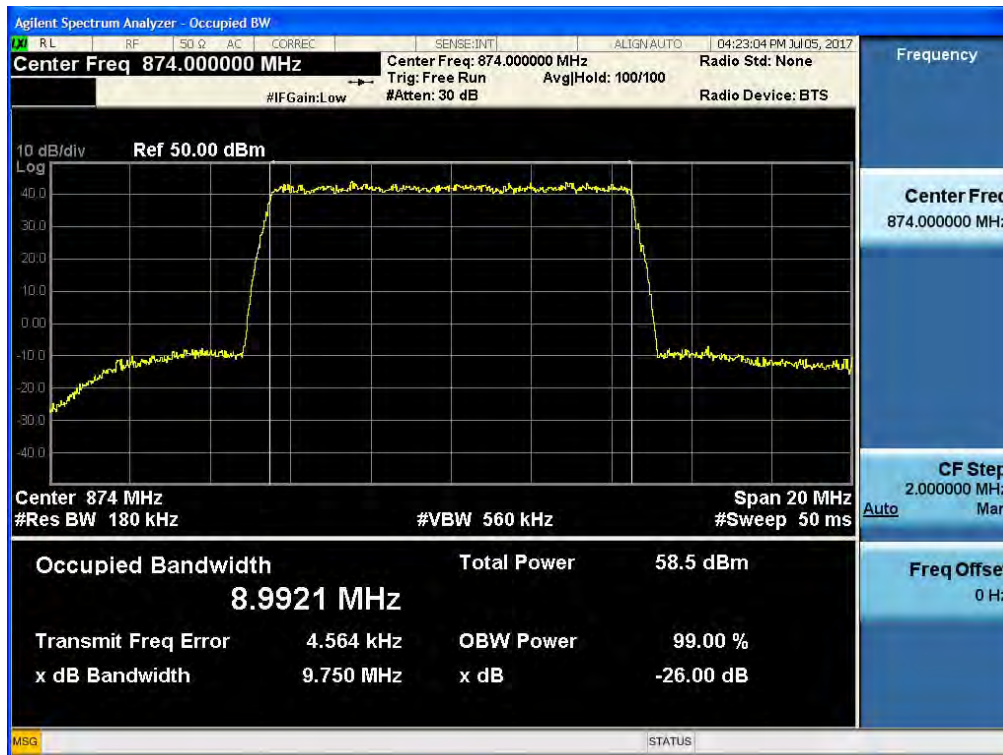


(256QAM High Channel)

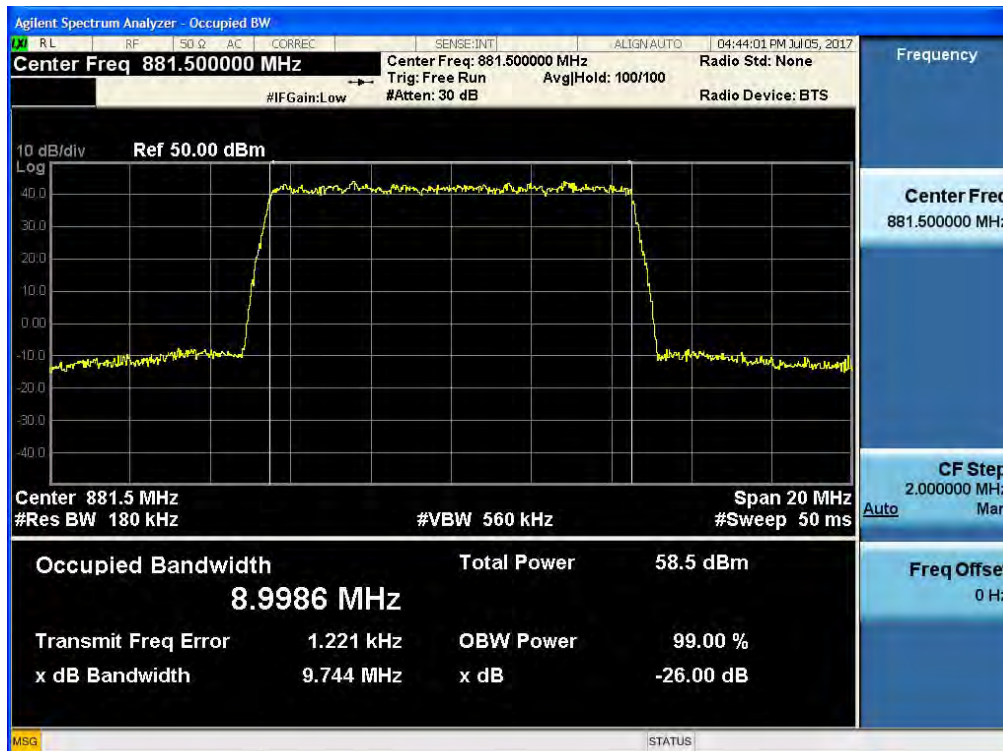


Test Plot at Output Port 2 (2 paths)

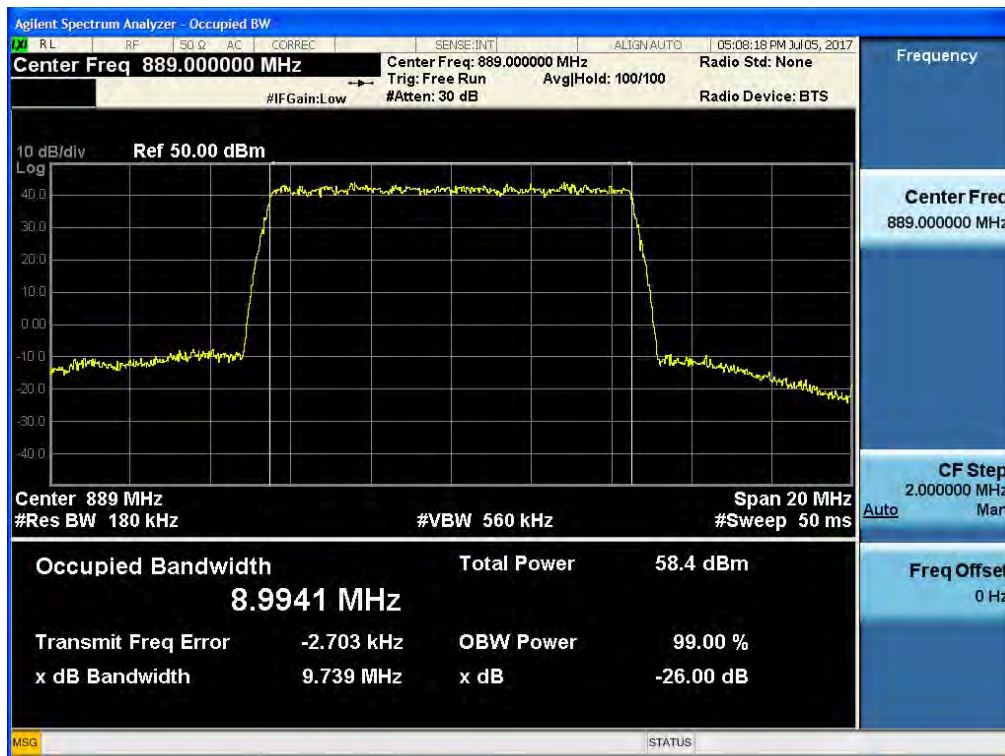
(QPSK Low Channel)



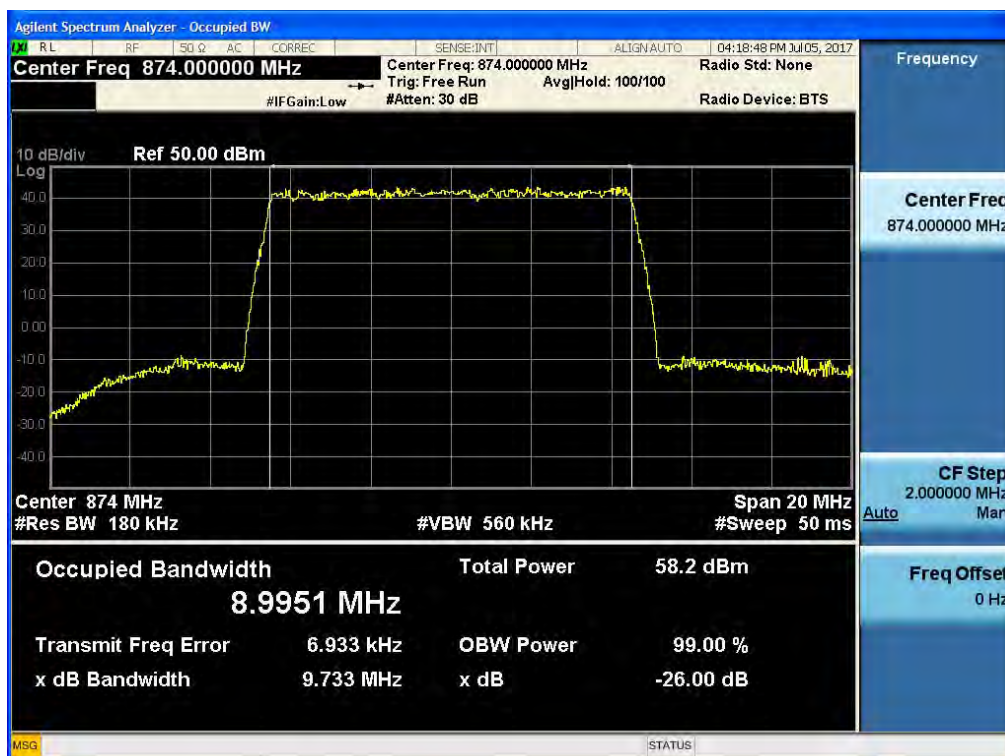
(QPSK Middle Channel)



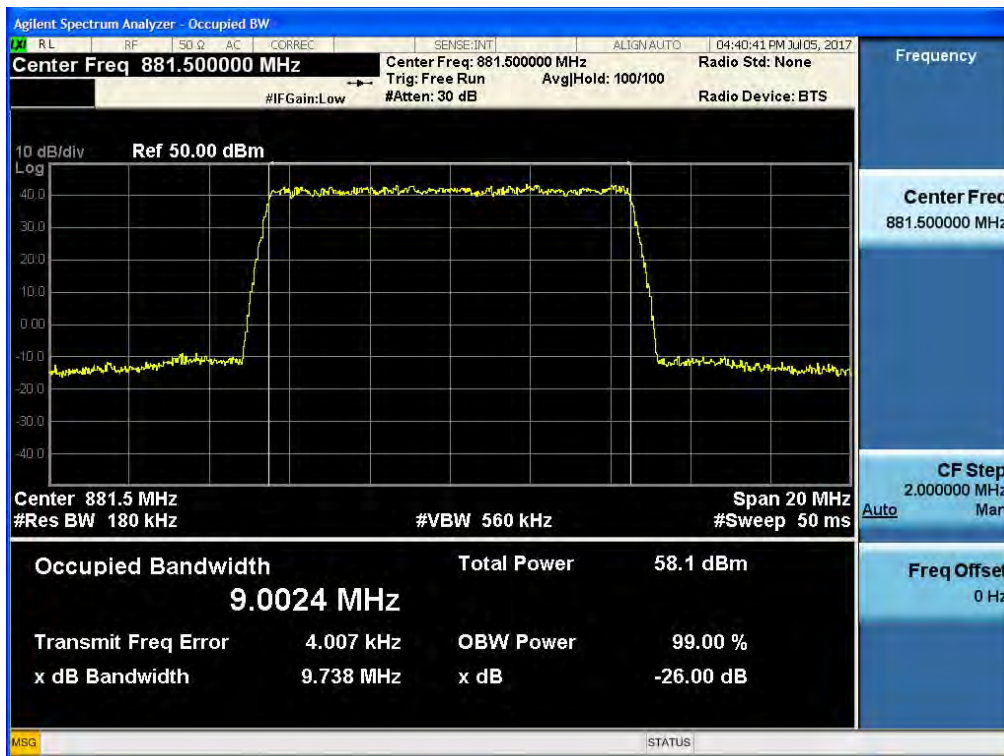
(QPSK High Channel)



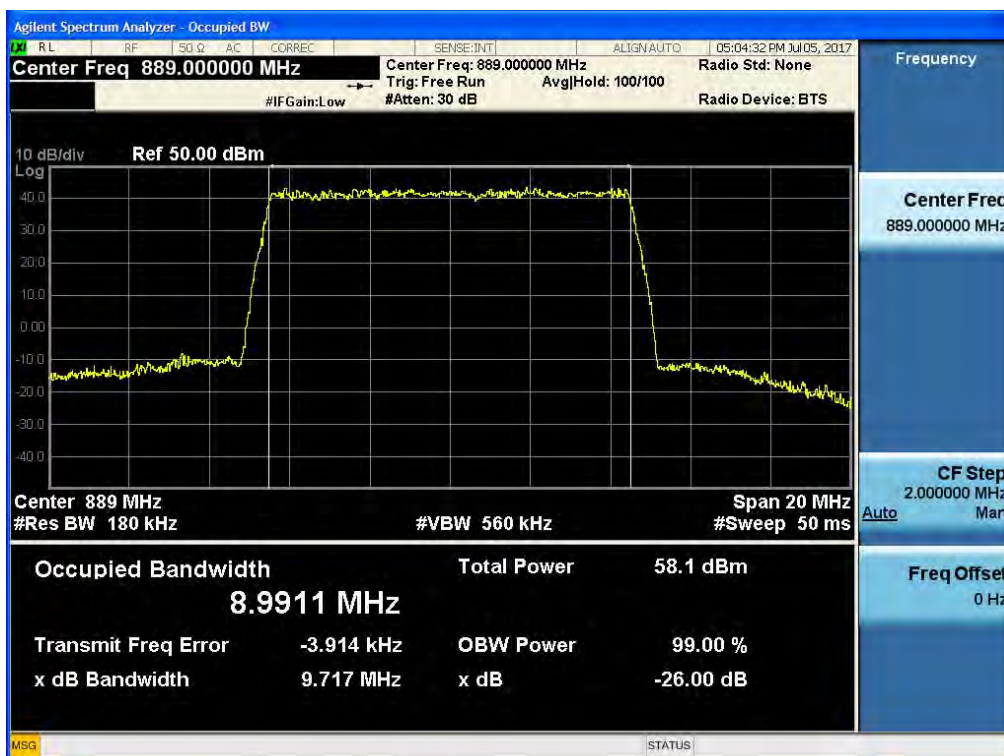
(16QAM Low Channel)



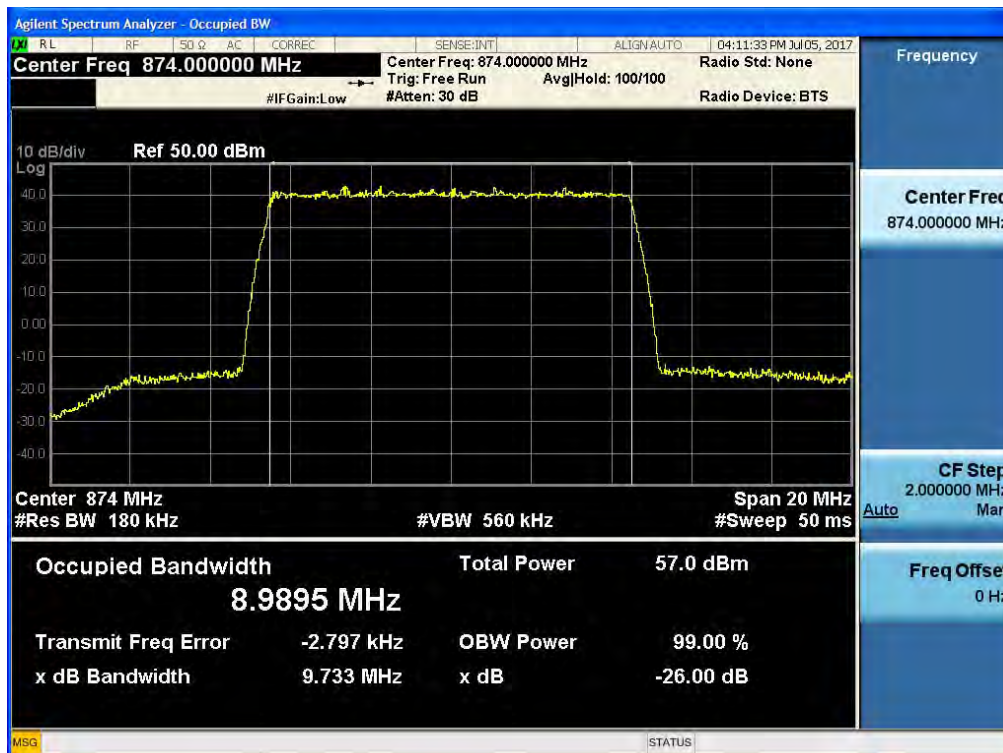
(16QAM Middle Channel)



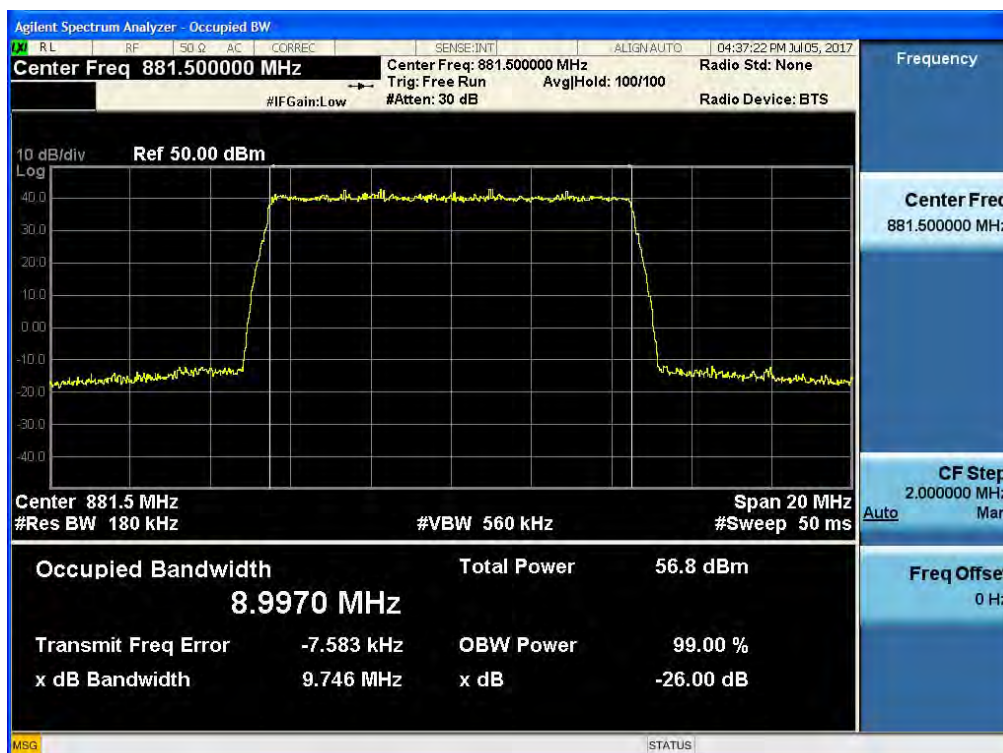
(16QAM High Channel)



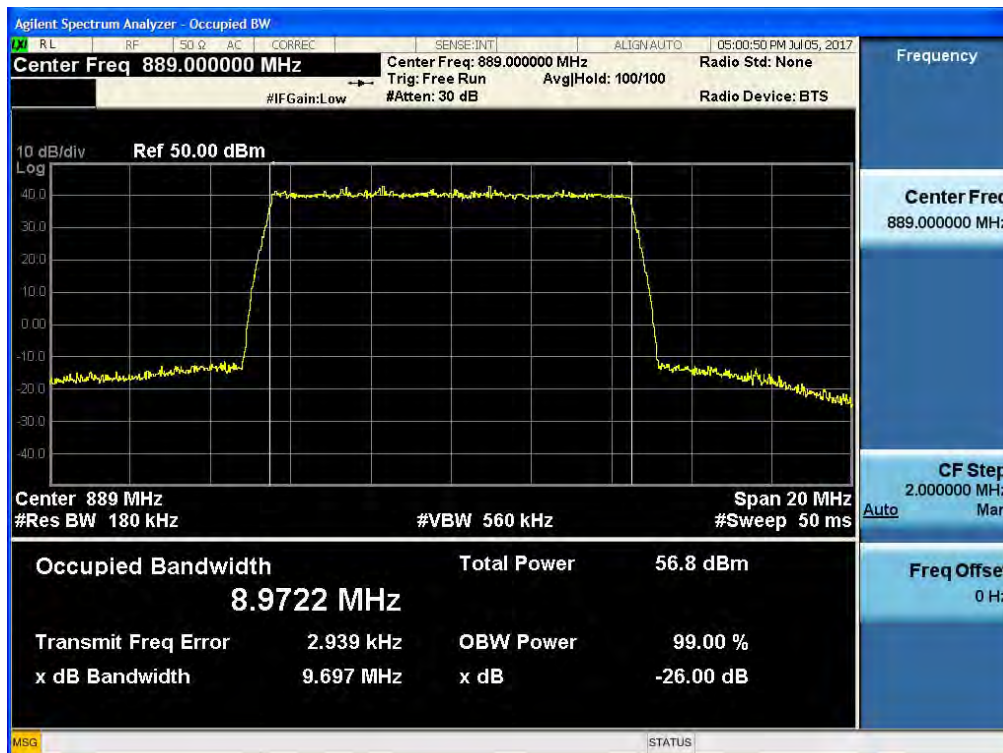
(64QAM Low Channel)



(64QAM Middle Channel)



(64QAM High Channel)



(256QAM Low Channel)

