



DATE: 08 October 2015

**I.T.L. (PRODUCT TESTING) LTD.
FCC Radio Test Report
for
Telrad Networks Ltd.**

Equipment under test:

**BreezeCompact 3000 Base Station
CMP3000-B41-2496-2690MHz**

Tested by:



M. Zohar

Approved by:



D. Shidlow

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This report relates only to items tested.



**Measurement/Technical Report for
Telrad Networks Ltd.
BreezeCompact 3000 Base Station**

CMP3000-B41-2496-2690MHz

FCC ID: ARA-COMPACT2X

This report concerns:

Original Grant:

Class II change: X

Class I change:

Equipment type:

Licensed Non-Broadcast Transmitter

Limits used:

47CFR Part 27

Measurement procedure used is ANSI C63.4-2009.

Substitution Method used as in ANSI/TIA-603-C: 2004

Application for Certification

prepared by:

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Applicant for this device:

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1. General Information

1.1 Administrative Information

Manufacturer:	Telrad Networks Ltd.
Manufacturer's Address:	1 Batsheva St. P.O.B. 6118 Lod 711600 Israel Tel: +972-73-246-7651 Fax: +972-73-246-7504
Manufacturer's Representative:	Klara Milman
Equipment Under Test (E.U.T):	BreezeCompact 3000 Base Station
Equipment Model No.:	CMP3000-B41-2496-2690MHz
Serial Number No.:	Not designated
Date of Receipt of E.U.T:	30.07.2015
Start of Test:	30.07.2015
End of Test:	30.07.2015
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St, Lod, Israel 7116002
Test Specifications:	FCC Part 27



1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation Number US1004.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-3006, R-2729, T-1877, G-245.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025A-1.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.



1.3 **Product Description**

Breeze Compact 2.5G Base station is a high capacity, IP services oriented Broadband Wireless Access system.

Breeze Compact 2.5G is digital modulated TDD system covering 2496 MHz up to 2690 range. The system contains an all outdoor base station unit.

The basic base station system configuration is contains power supply, MODEM and based on RF IC radio.

The following describes the transmit path and receive path of the Breeze Compact 2.5G.

Note: The ODU consists of four identical RF radio paths based on two identical RF IC chipsets, all paths terminated with antenna ports. Only two radio paths that based on one RF IC are described in the detailed block diagram.

The DC voltage applied to the final RF amplifying device is 28VDC.

Transmit mode:

The signal flow in transmit mode is as follows: The IQ signal passes from the Modem to radio part, and converted to required RF frequency by RF IC then the signal passes thru combo Balun+BPF, GVA-63+ and MGA635P8 amplifiers, amplified again by MGA-22033, then passes thru cable to high power card and amplified again by BLF6G27-10G and BLF7G27L-90P.

The amplified signal passes thru circulator and cavity filter (2496-2690MHz) directly to antenna port.

Receive mode:

The signal flow in the receive mode is as follows: The unit antenna receives the signal. The received signal passes thru cavity filter (2496-2690MHz), circulator and TX/RX switch. The LNA MGA635P8, combo Balun+BPF directly to the RF IC, converted to IQ signal and directed to the Modem.

1.4 **Test Methodology**

Radiated testing was performed according to the procedures in ANSI C63.4: 2009. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 **Test Facility**

Radiated emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation Number is US1004.

1.6 **Measurement Uncertainty**

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 4.96 dB



2. System Test Configuration

2.1 *Justification*

The EUT was originally authorized for FCC certification under FCC ID: ARA-COMPACT2X. The EUT operated in the frequency band of 2496-2690 MHz, with two bandwidths (5 and 10 MHz) at three representative channels: 2506 MHz, 2593 MHz and 2680 MHz.

The Class II Permissive Change to the original product is:

Adding the 20 MHz bandwidth by making software changes.

The base station transmitted continuously during testing while communicating with a subscriber unit for configuration purposes only.

2.2 *EUT Exercise Software*

Compact 2.x Software Release 5.1 software was used.

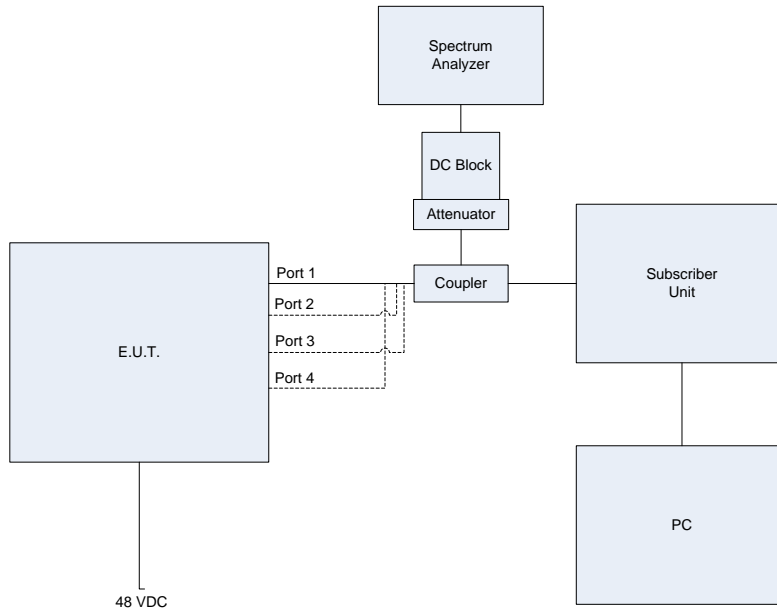
2.3 *Special Accessories*

No special accessories were needed in order to achieve compliance.

2.4 *Equipment Modifications*

No modifications were necessary in order to achieve compliance.

2.5 Configuration of Tested System



Note: Each antenna port was tested separately connected via the coupler to the subscriber unit and spectrum analyzer.

Figure 1. Conducted Emission From Antenna Ports Test Set-up

3. Test Set-up Photos



Figure 2. Conducted Emission From Antenna Port Tests



4. Maximum Peak Output Power 20 MHz Bandwidth

4.1 Test Specification

FCC Part 27, Sub-part C (27.50(h)(1))

4.2 Test Procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator, an appropriate coaxial cable, coupler, and DC block, including the duty cycle (see *Figure 40* to *Figure 41*), (total loss=-40.1 dB). The E.U.T. RF output was OFDMA modulated with QPSK, 16QAM and 64QAM, at 20 MHz BW.

Special attention was taken to prevent Spectrum Analyzer RF input overload.
Tested frequencies: 2506.0 MHz, 2593.0 MHz and 2680.0 MHz

According to 47 CFR Part 2 section § 2.1046 and Part 27 section § 27.50(h)(1), the maximum EIRP of a base station shall not exceed $33\text{dBW} + 10 \log (X/Y) \text{ dBW}$, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition.

As to the limit, the X is 20MHz and Y is 6 MHz for the EUT, so the limit is calculated to be $63 + 10 \log (20 \text{ MHz}/24 \text{ MHz}) = 62.2\text{dBm}$.

Antenna type: Manual tilt panel antenna (Gain: 18 dBi) with N type connector.



4.3 Test Results

Operation Frequency (MHz)	Modulation	Reading				4 Ports MIMO Calculated (dBm)	Specification (dBm)	Margin (dB)
		Port 1 (dBm)	Port 2 (dBm)	Port 3 (dBm)	Port 4 (dBm)			
2506.00	QPSK	38.9	38.9	39.1	39.1	45.0	62.2	-17.2
	16QAM	38.9	38.9	39.1	39.1	45.0	62.2	-17.2
	64QAM	38.6	38.8	39.0	39.2	44.9	62.2	-17.3
2593.00	QPSK	39.3	39.2	39.3	39.4	45.3	62.2	-16.9
	16QAM	39.4	39.2	39.6	39.5	45.5	62.2	-16.7
	64QAM	39.4	39.2	39.6	39.4	45.4	62.2	-16.8
2680.00	QPSK	38.9	38.5	39.0	38.9	44.9	62.2	-17.3
	16QAM	38.9	38.6	39.1	38.9	44.9	62.2	-17.3
	64QAM	38.7	38.5	39.2	38.9	44.9	62.2	-17.3

Figure 3. Maximum Peak Power Output 20 MHz Bandwidth Test Results

See additional information in *Figure 4 to Figure 39*.

JUDGEMENT: Passed by 16.7 dB

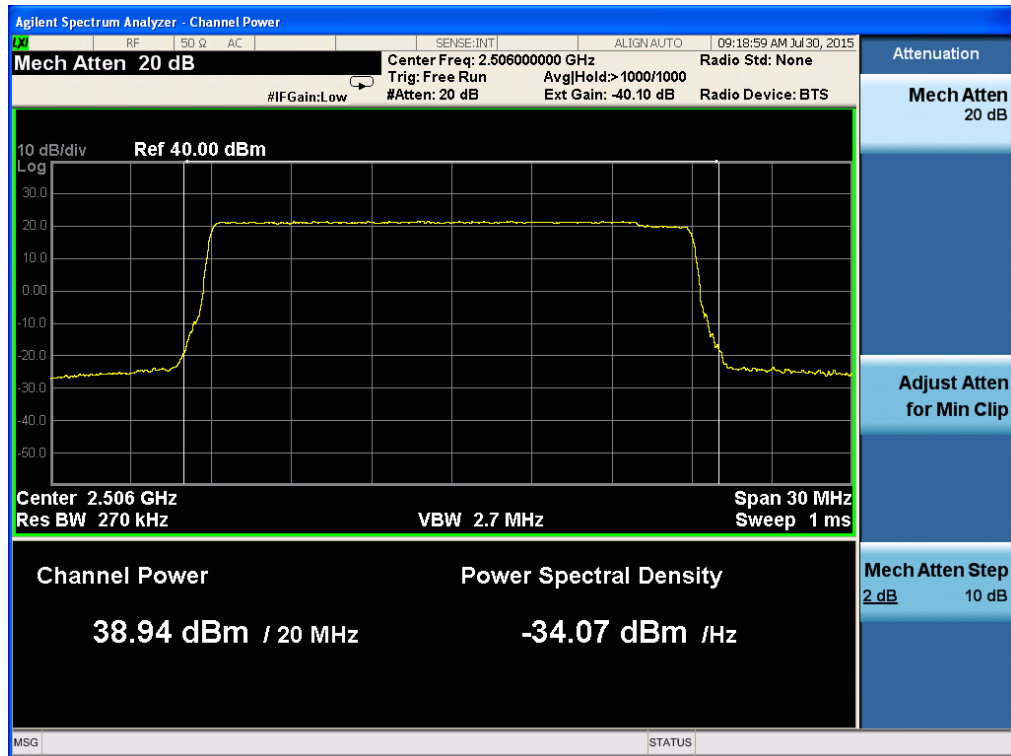


Figure 4. — 2506.0 MHz QPSK Port 1

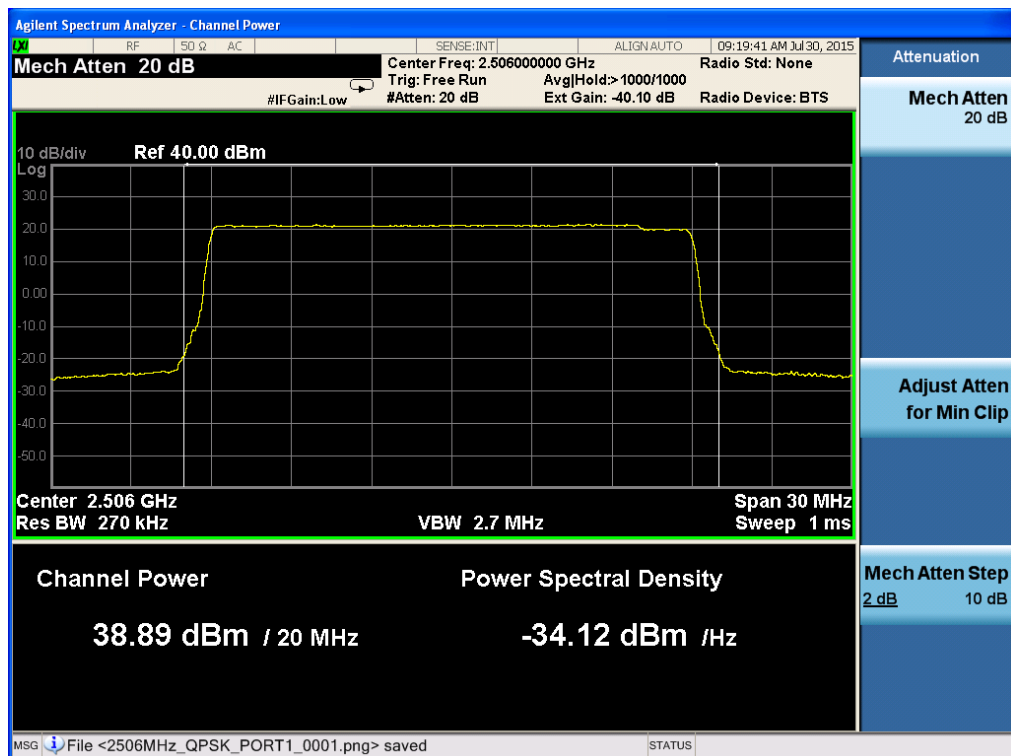


Figure 5. — 2506.0 MHz QPSK Port 2

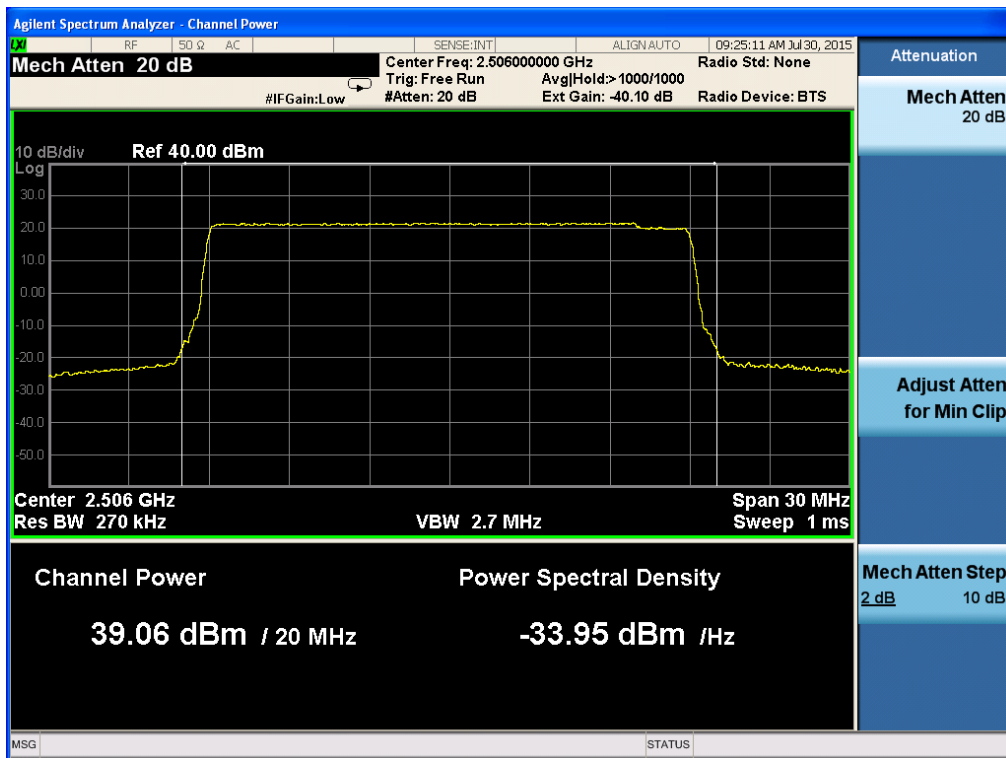


Figure 6. — 2506.0 MHz QPSK Port 3

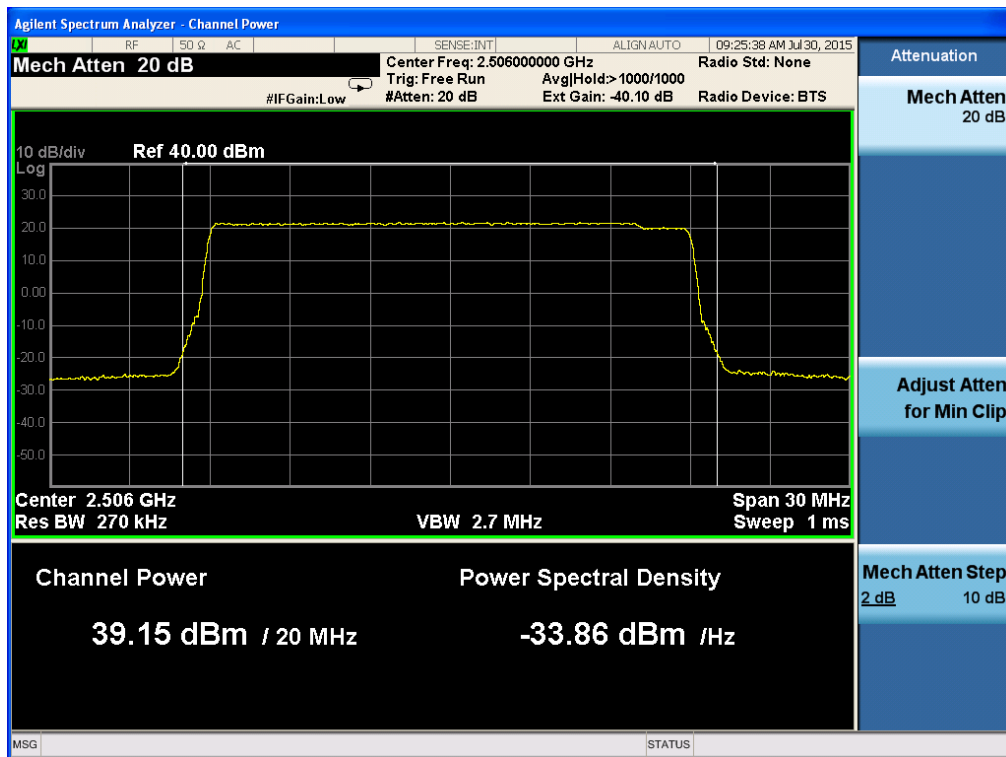


Figure 7. — 2506.0 MHz QPSK Port 4

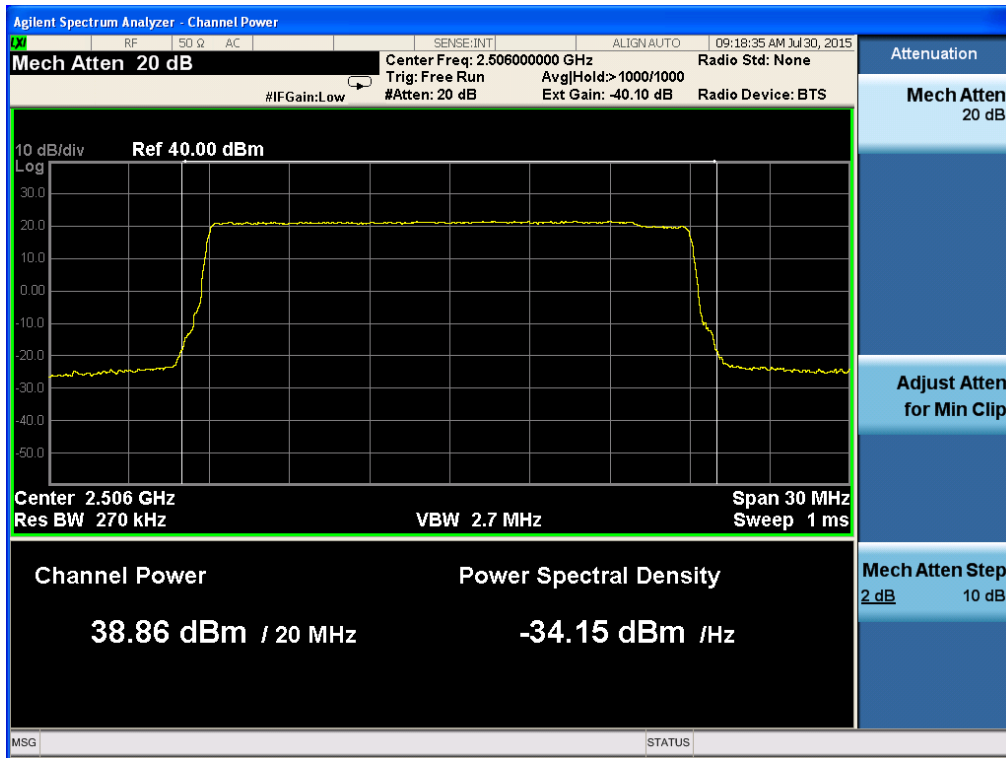


Figure 8. — 2506.0 MHz 16QAM Port 1

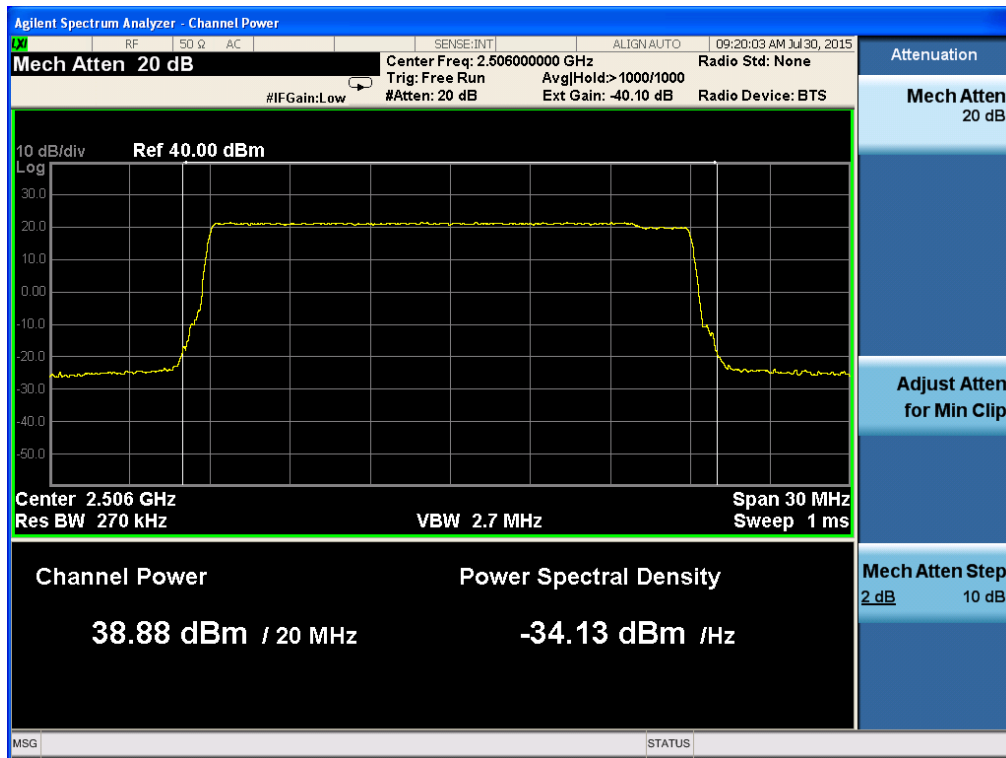


Figure 9. — 2506.0 MHz 16QAM Port 2

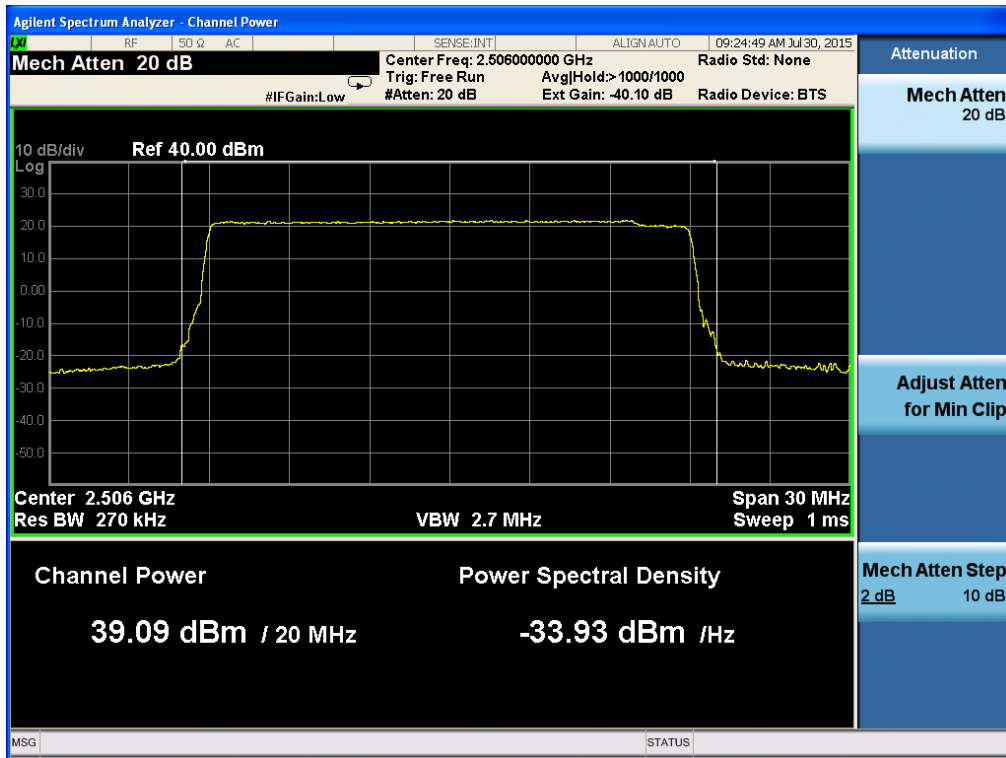


Figure 10. — 2506.0 MHz 16QAM Port 3

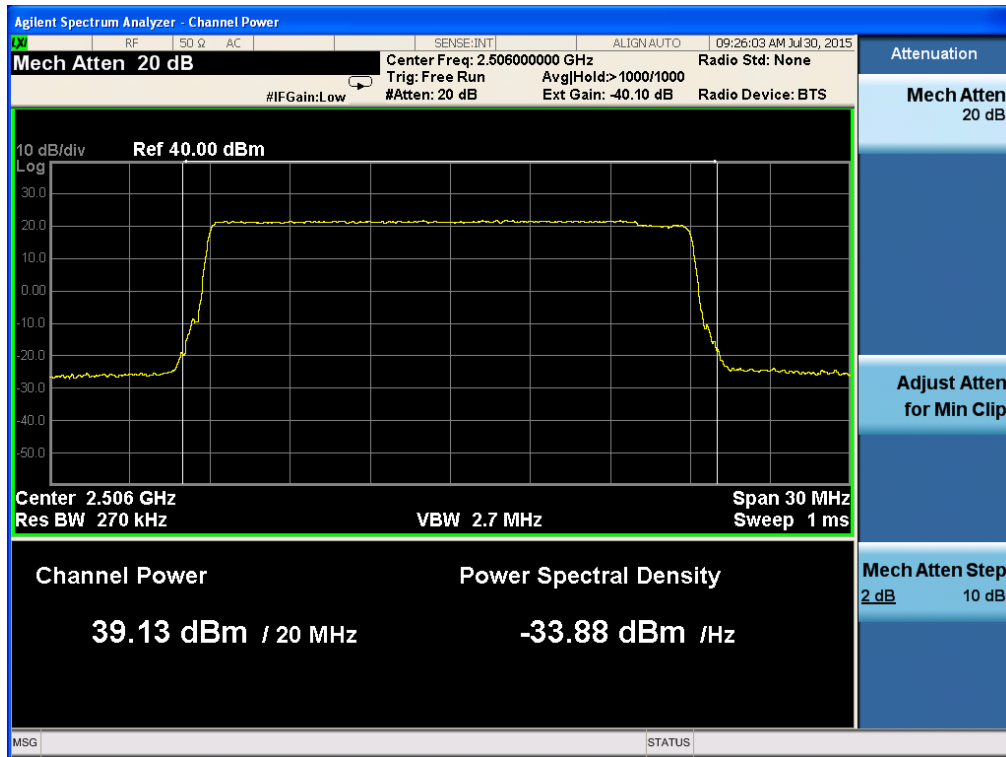


Figure 11. — 2506.0 MHz 16QAM Port 4

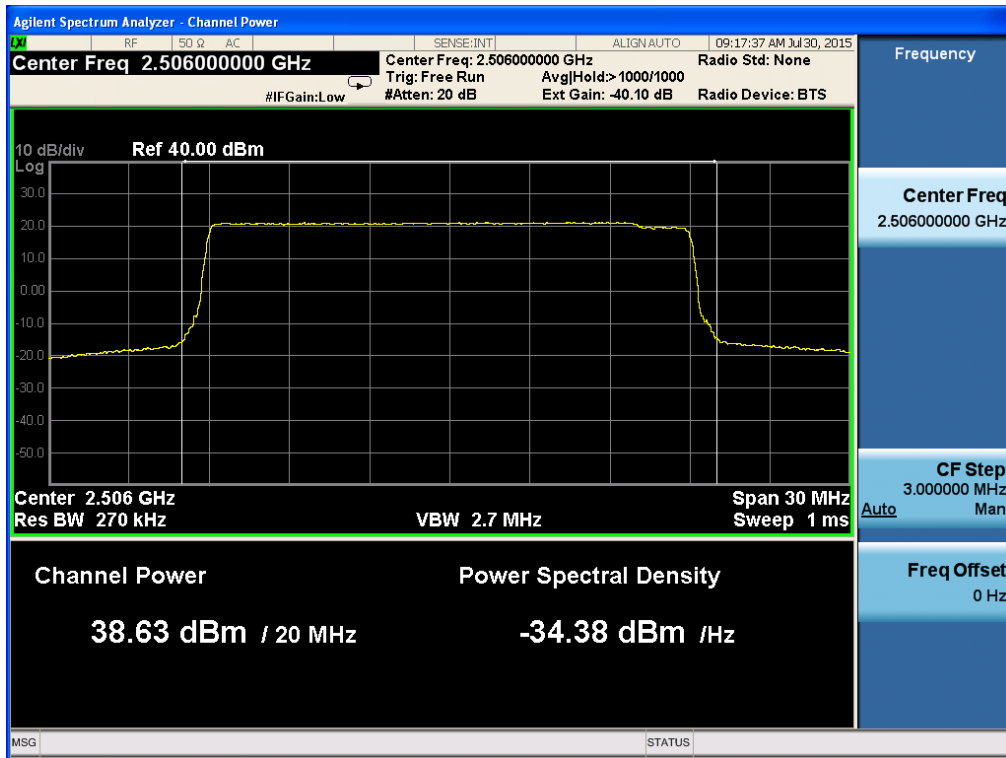


Figure 12. — 2506.0 MHz 64QAM Port 1

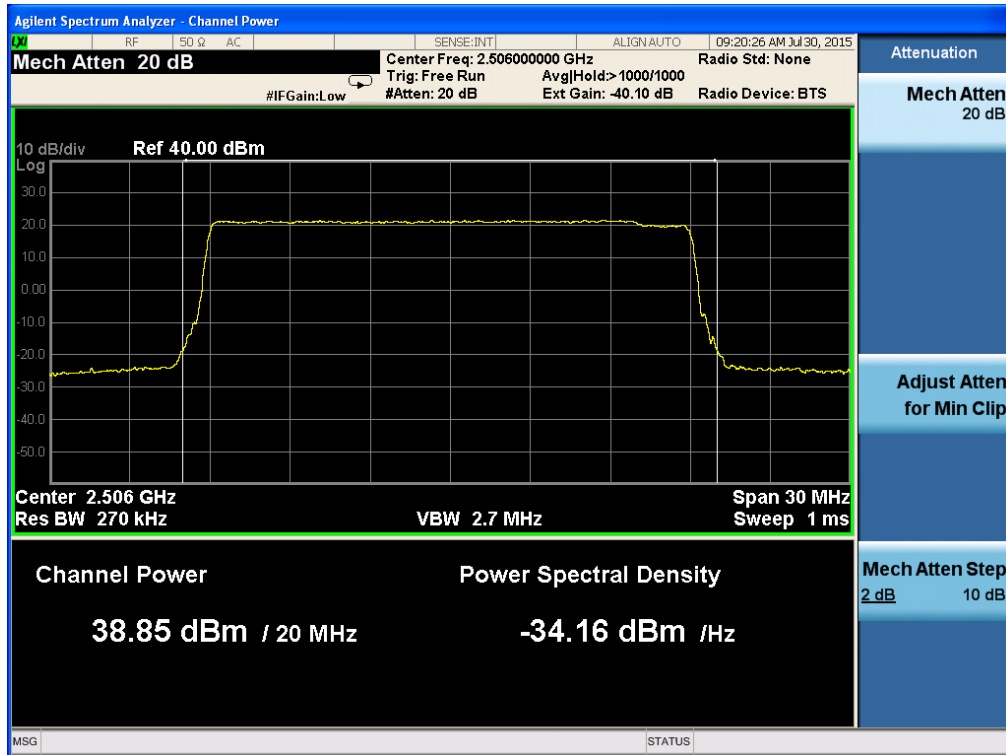


Figure 13. — 2506.0 MHz 64QAM Port 2

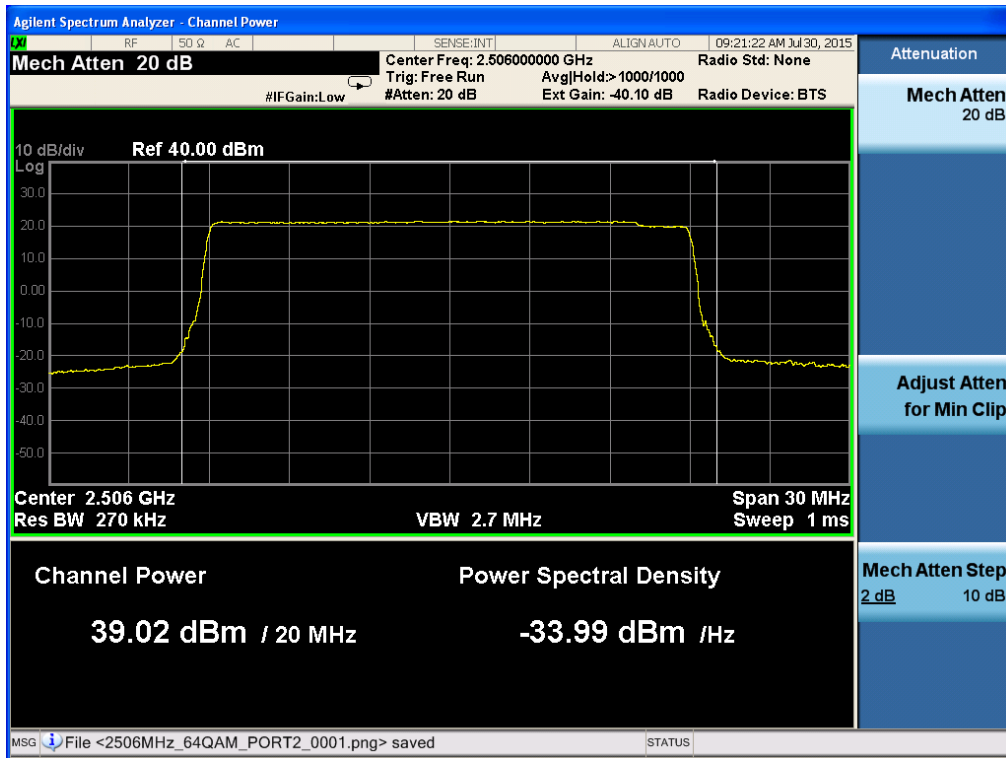


Figure 14. — 2506.0 MHz 64QAM Port 3

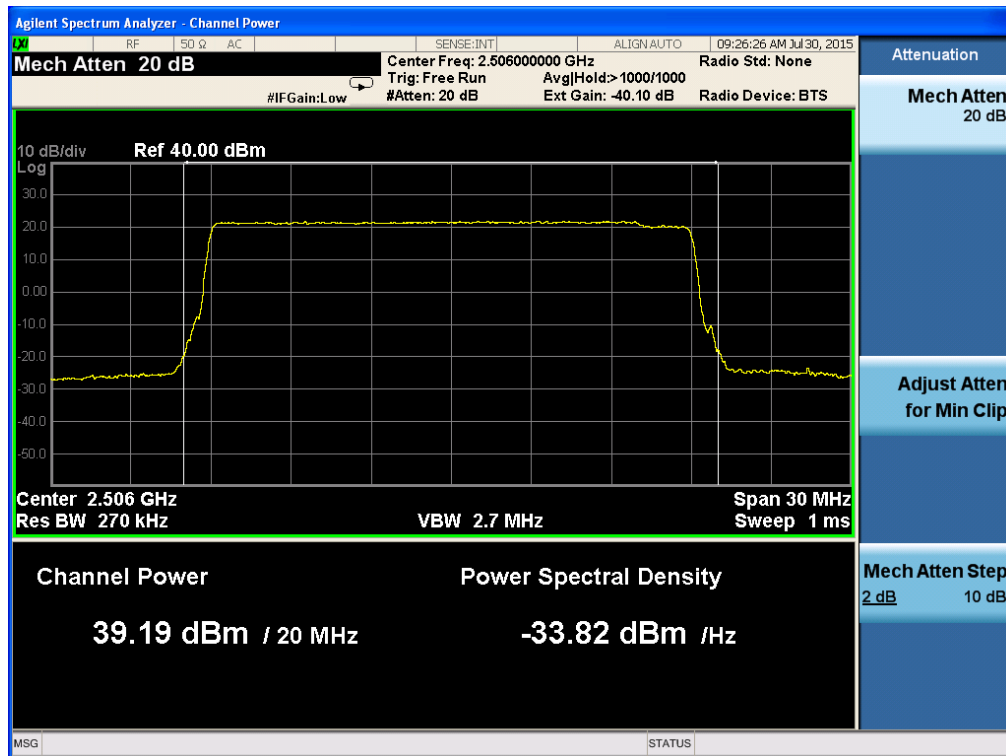


Figure 15. — 2506.0 MHz 64QAM Port 4

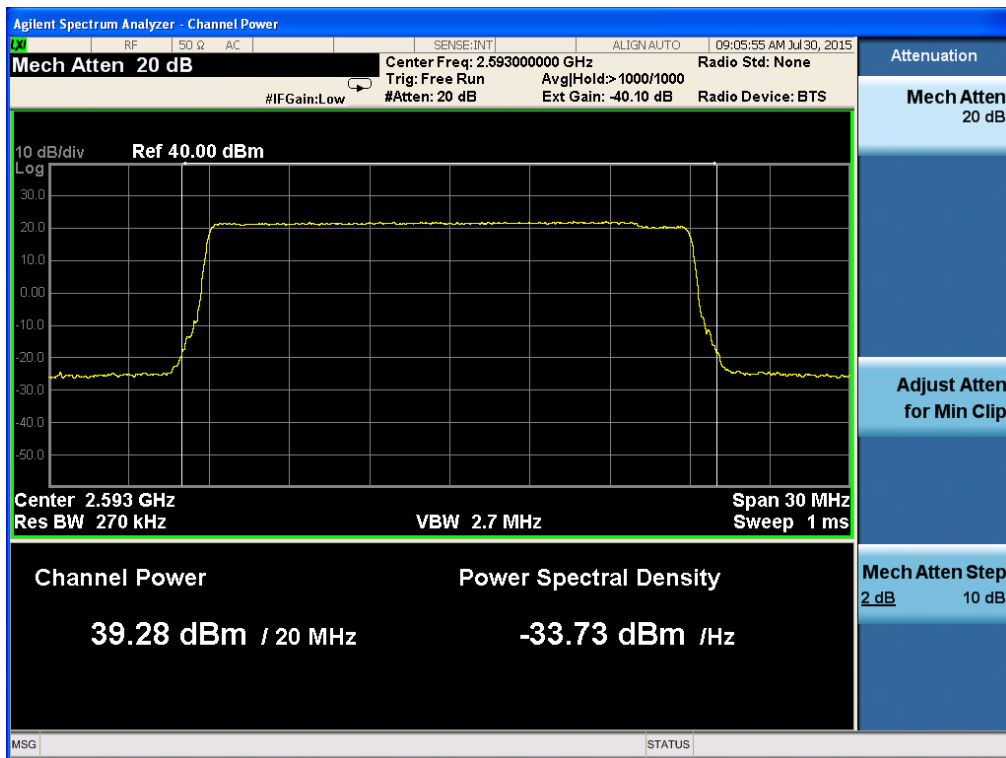


Figure 16. — 2593.0 MHz QPSK Port 1

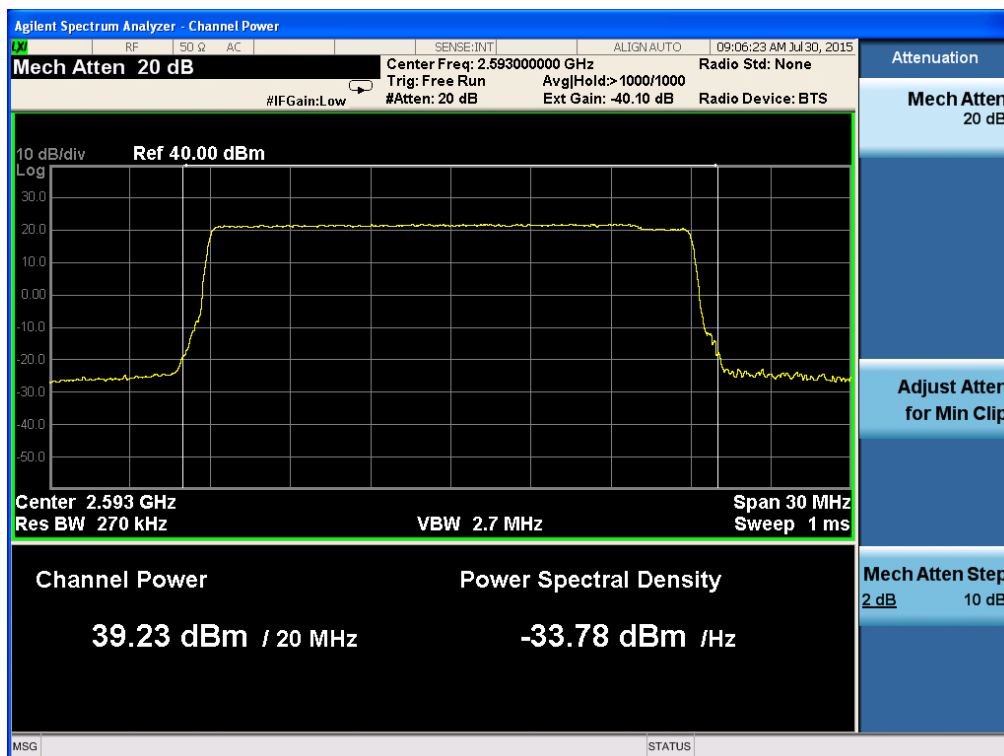


Figure 17. — 2593.0 MHz QPSK Port 2

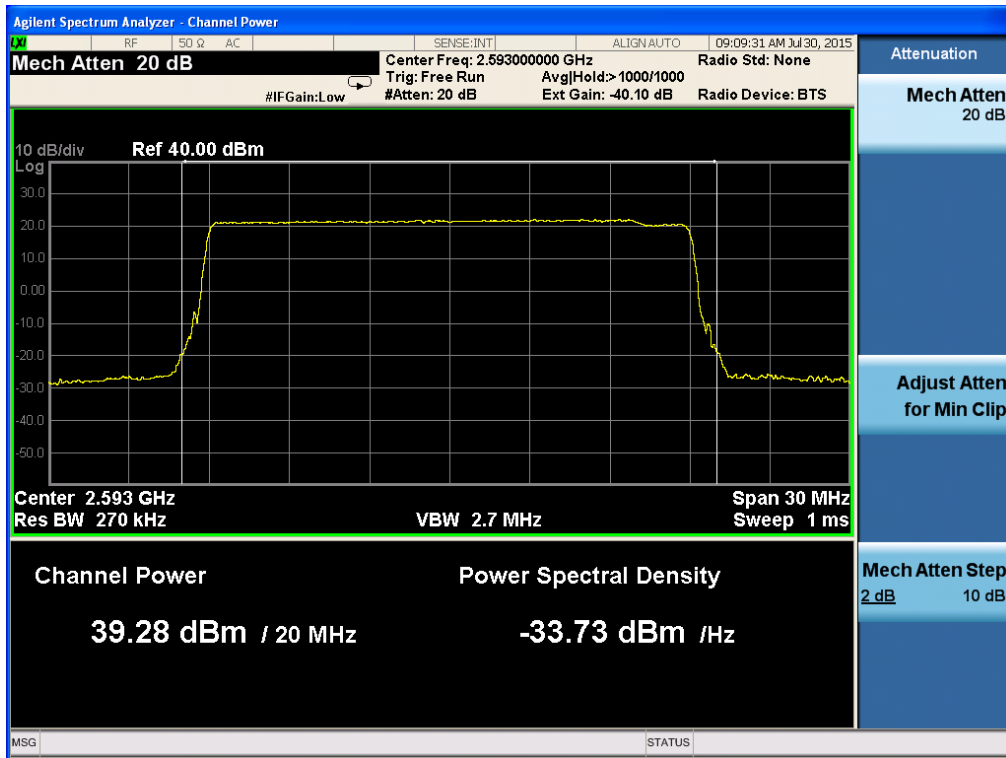


Figure 18. — 2593.0 MHz QPSK Port 3

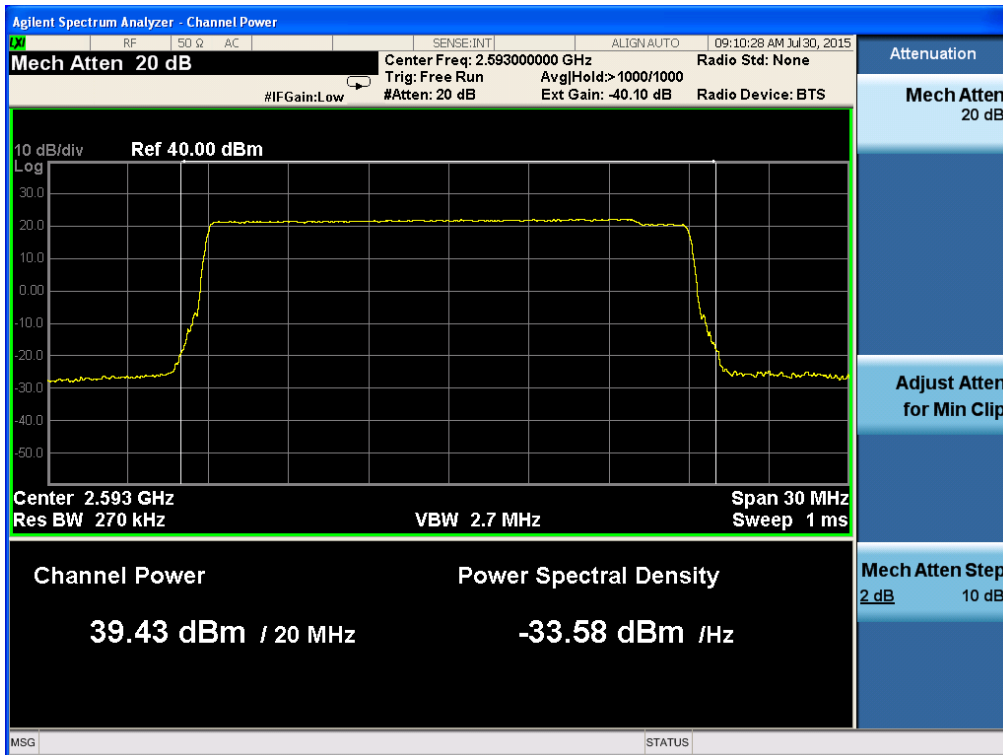


Figure 19. — 2593.0 MHz QPSK Port 4

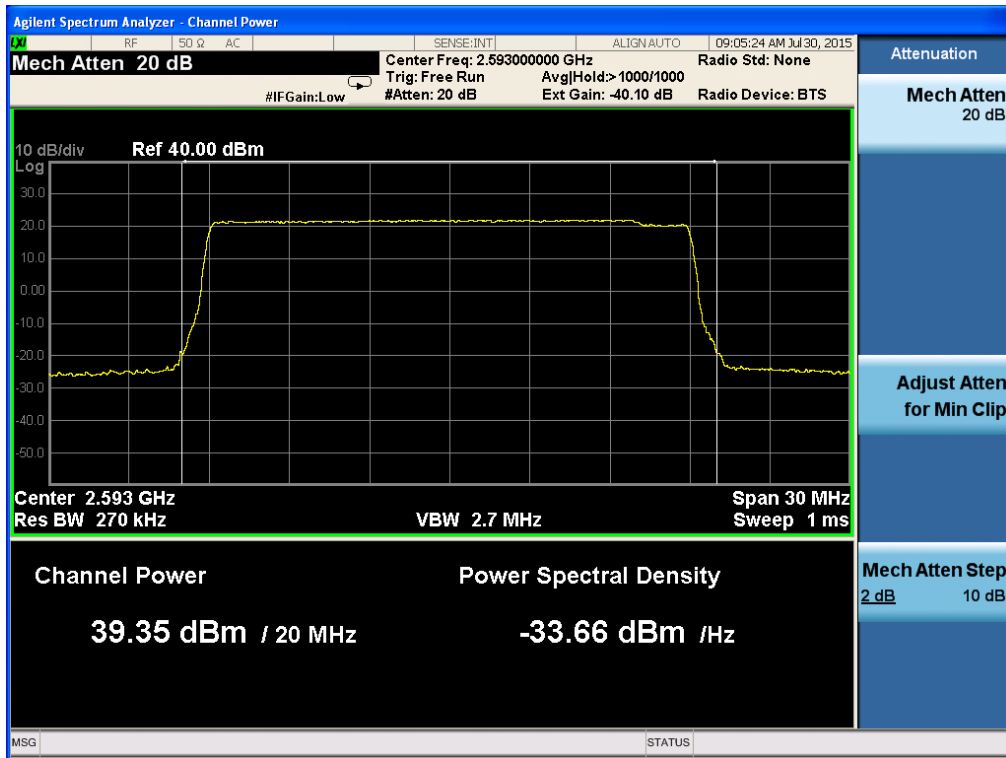


Figure 20. — 2593.0 MHz 16QAM Port 1

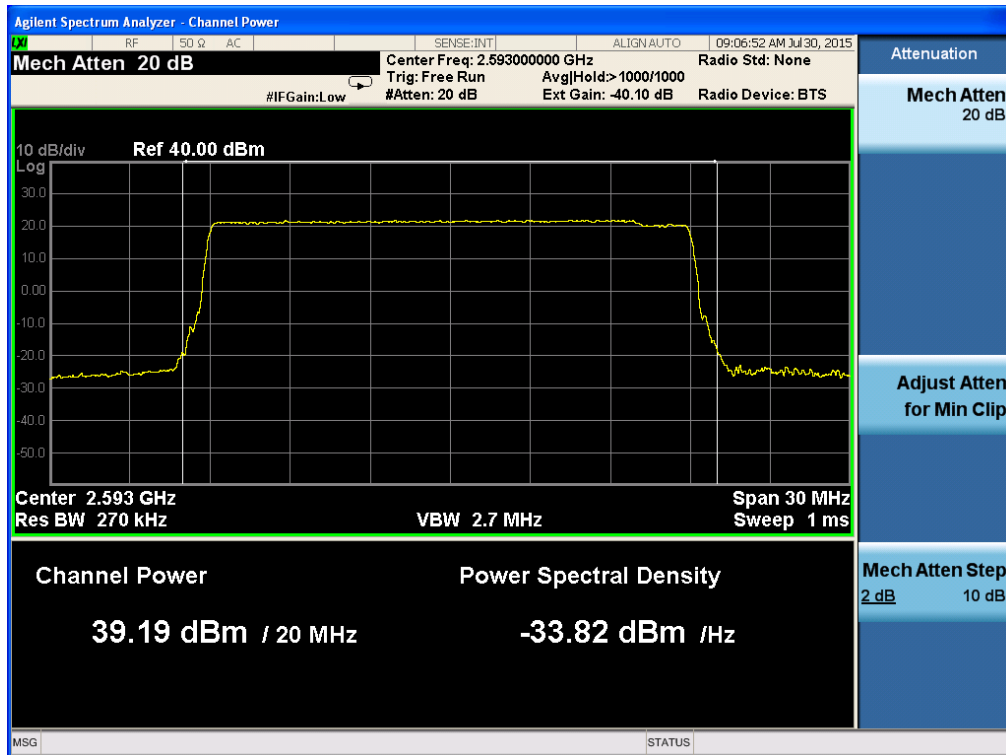


Figure 21. — 2593.0 MHz 16QAM Port 2

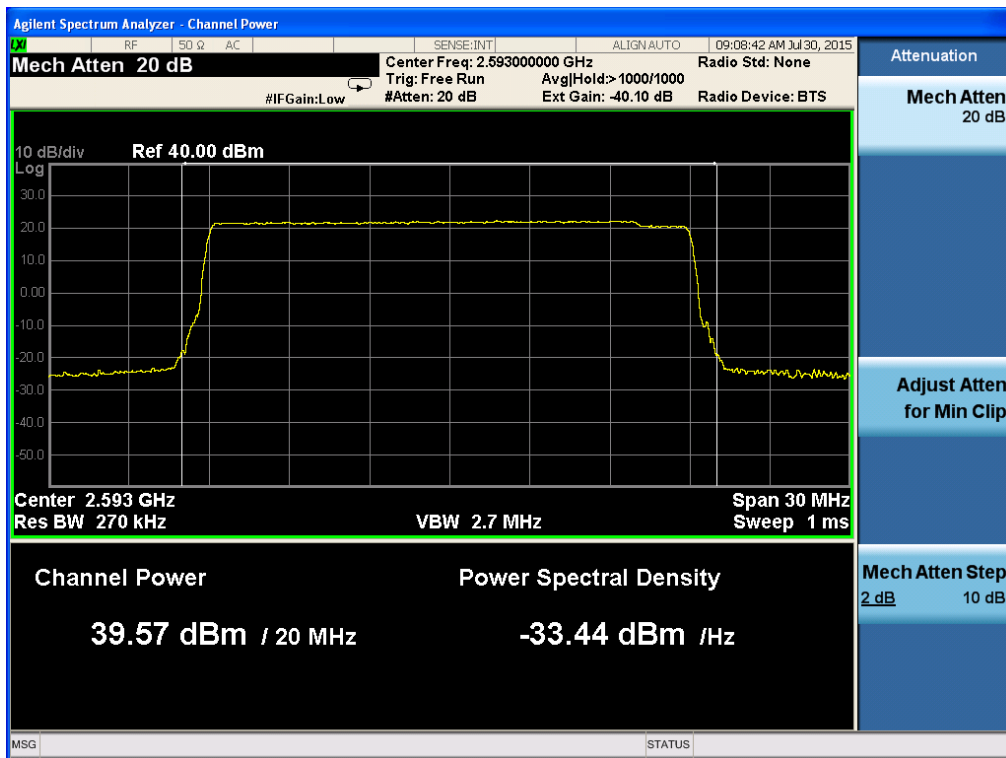


Figure 22. — 2593.0 MHz 16QAM Port 3

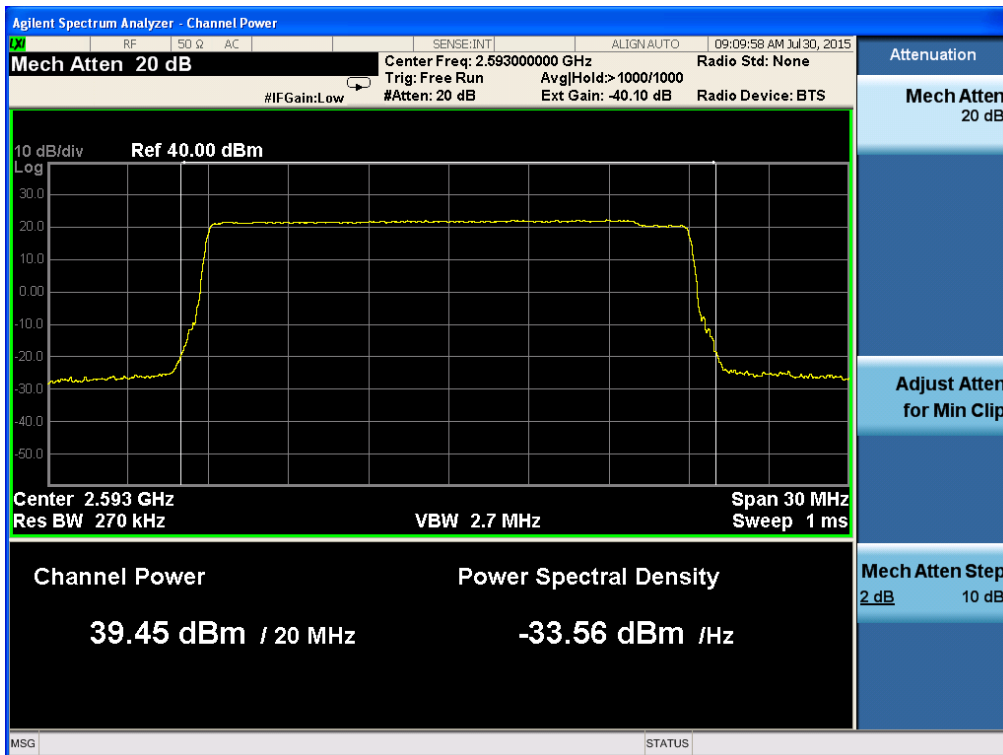


Figure 23. — 2593.0 MHz 16QAM Port 4

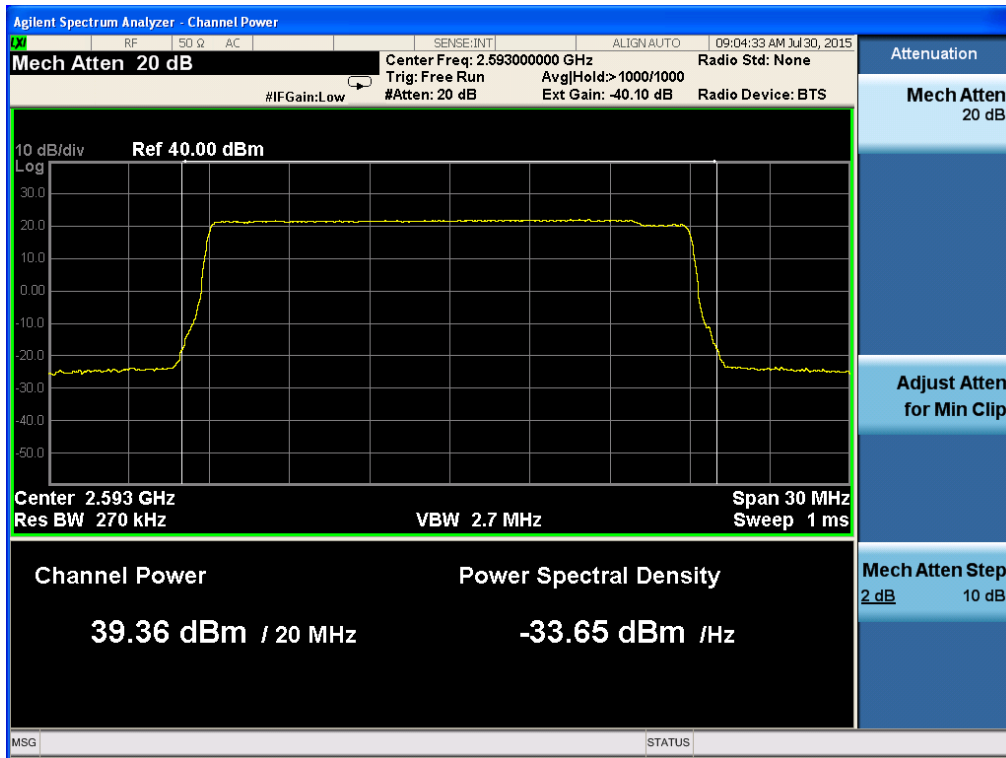


Figure 24. — 2593.0 MHz 64QAM Port 1

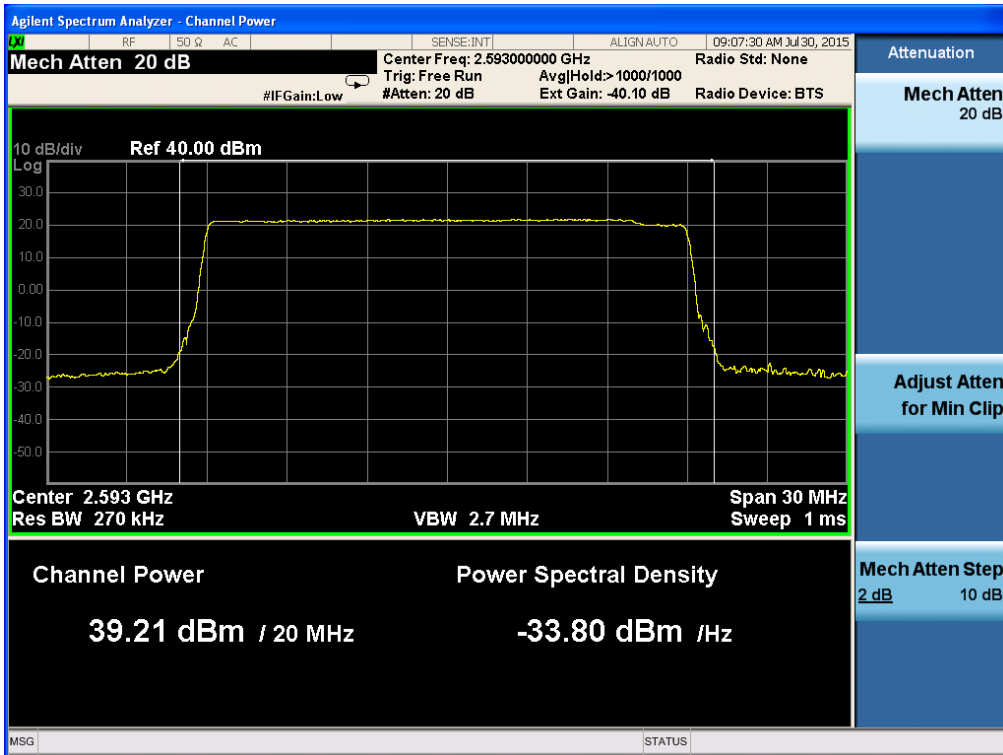


Figure 25. — 2593.0 MHz 64QAM Port 2

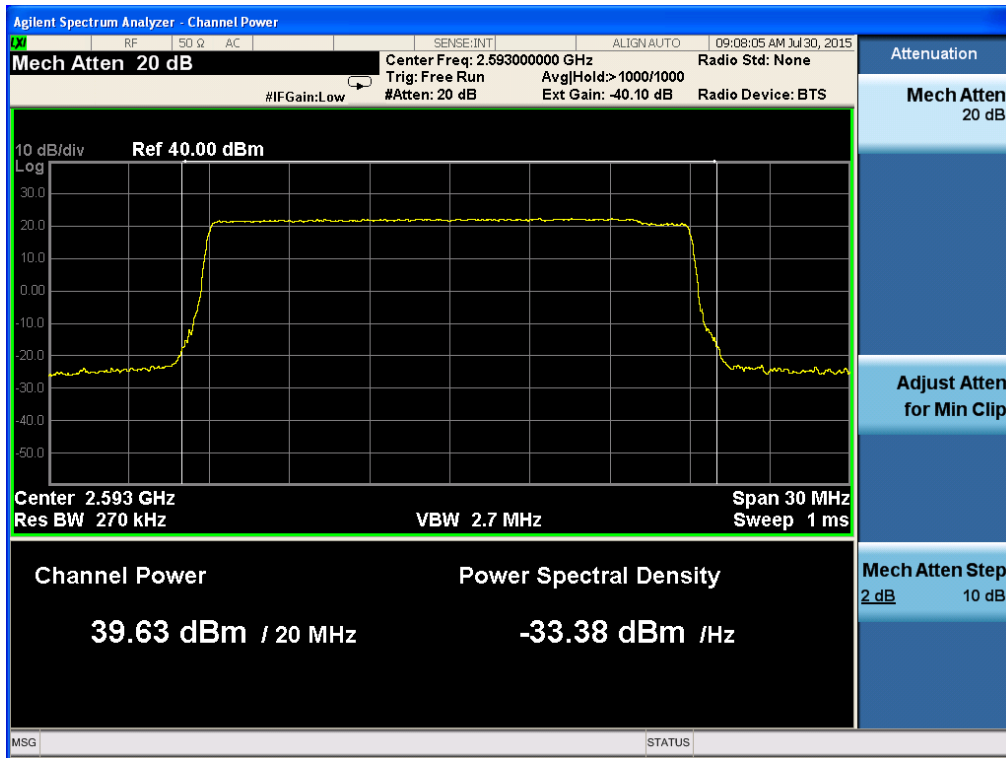


Figure 26. — 2593.0 MHz 64QAM Port 3

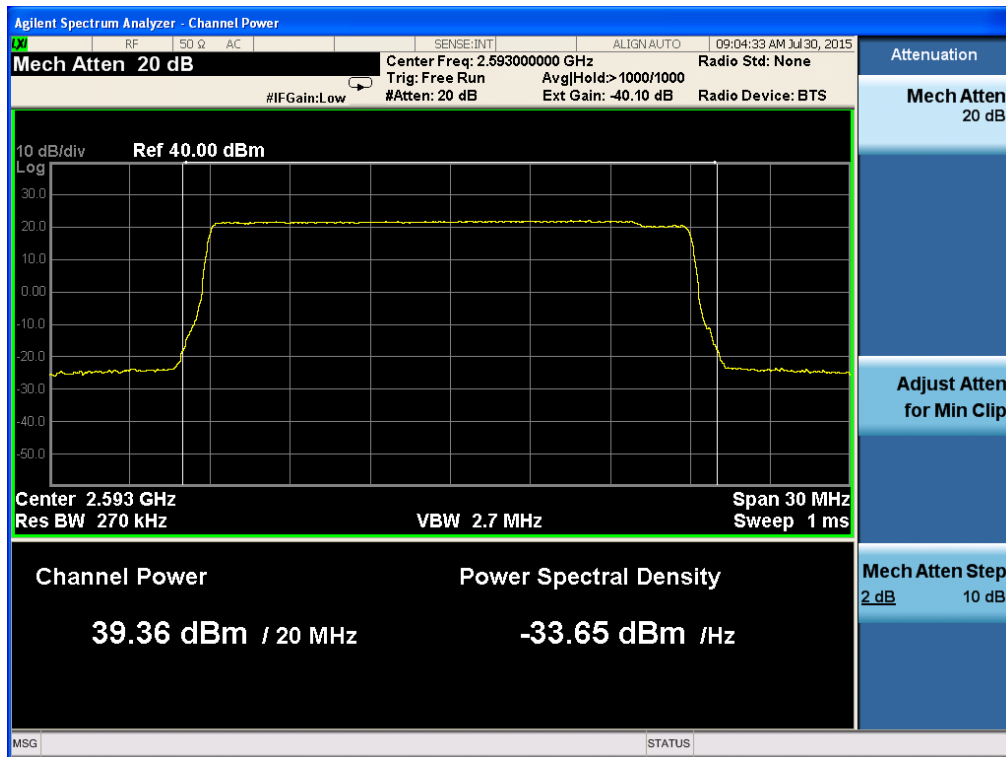


Figure 27. — 2593.0 MHz 64QAM Port 4

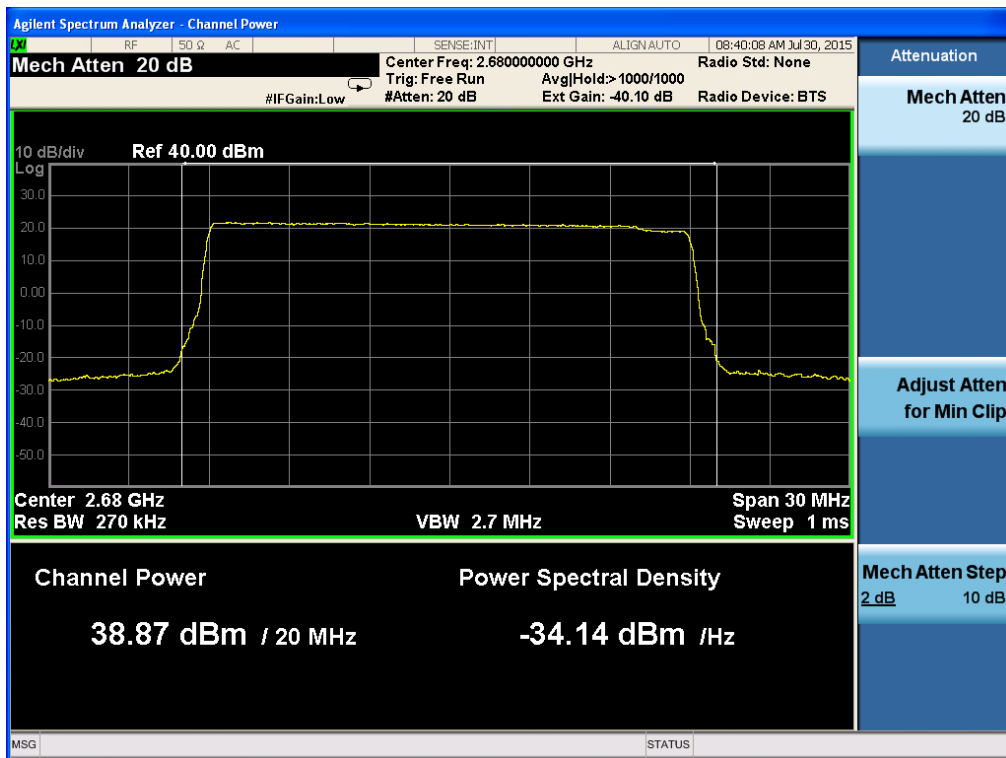


Figure 28. — 2680.0 MHz QPSK Port 1

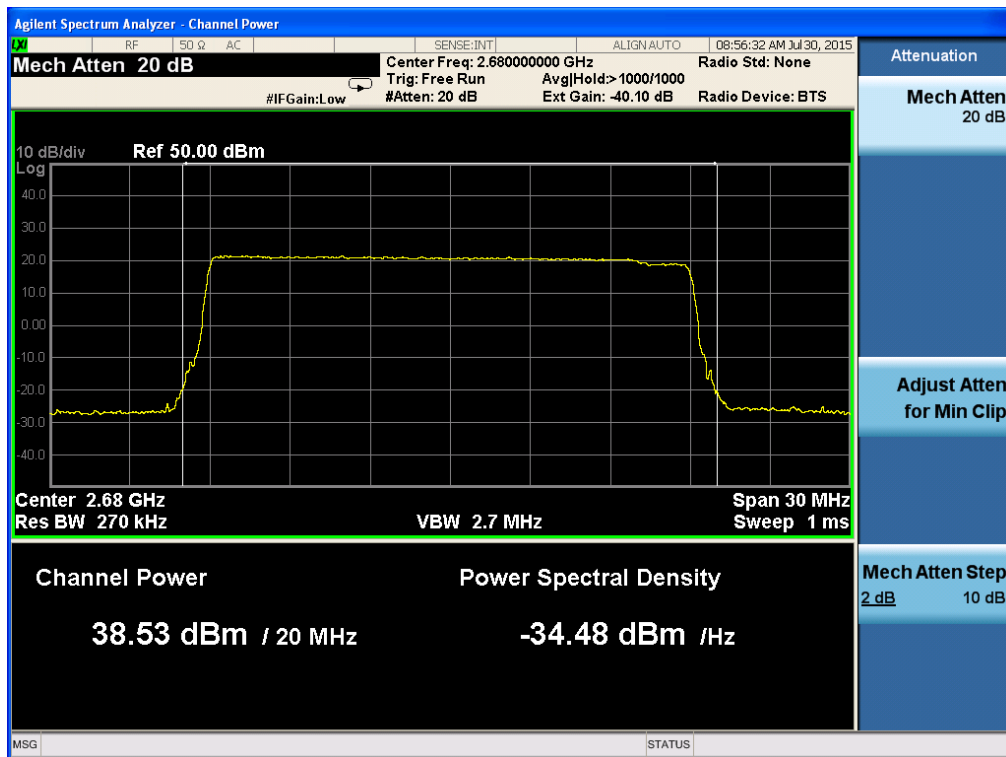


Figure 29. — 2680.0 MHz QPSK Port 2

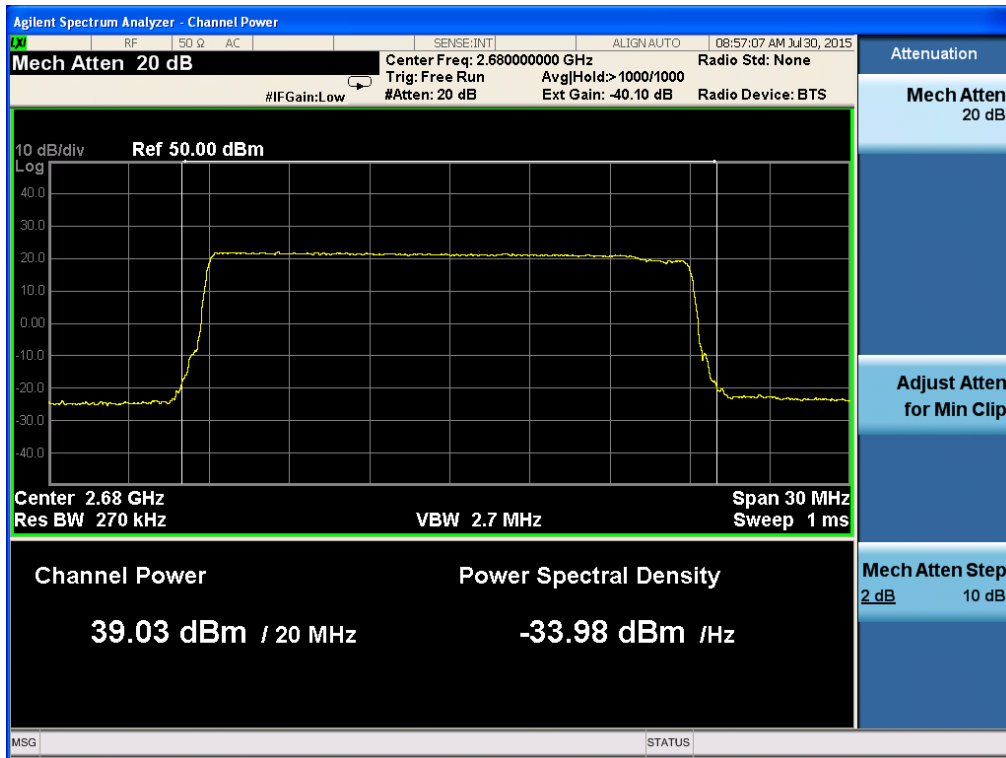


Figure 30. — 2680.0 MHz QPSK Port 3

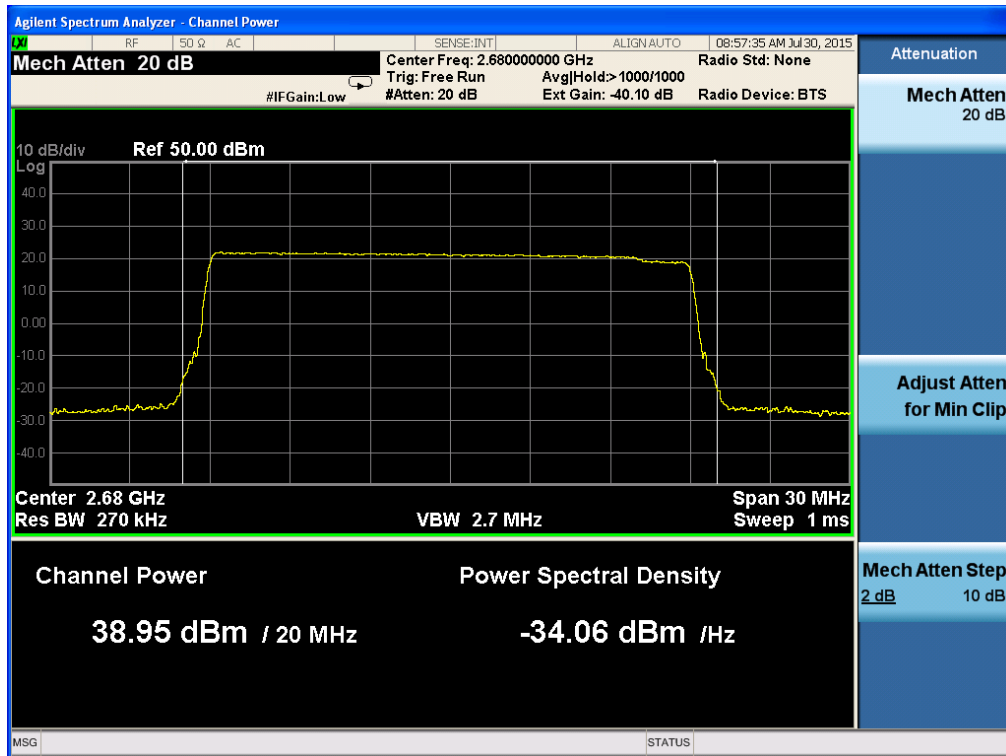


Figure 31. — 2680.0 MHz QPSK Port 4

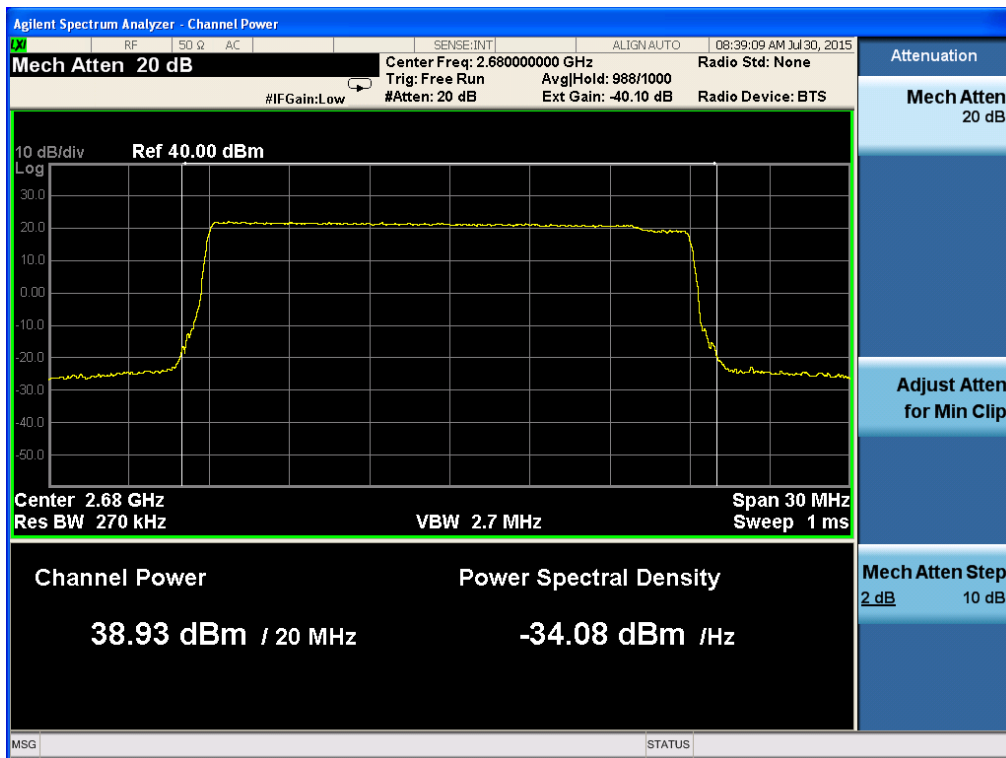


Figure 32. — 2680.0 MHz 16QAM Port 1

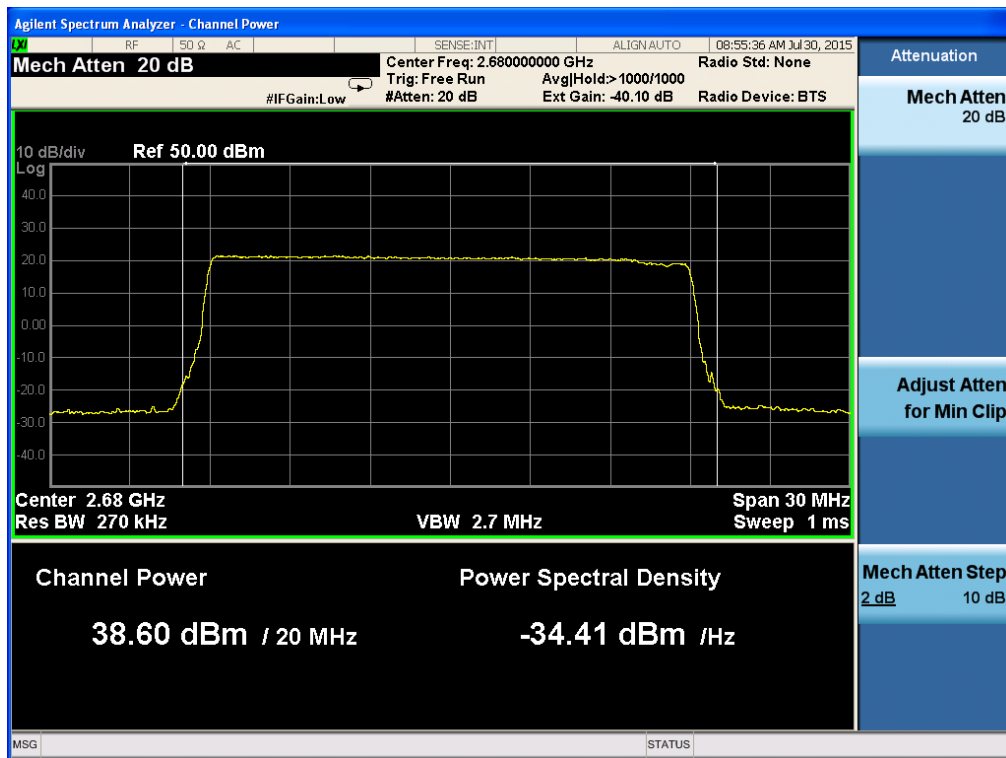


Figure 33. — 2680.0 MHz 16QAM Port 2

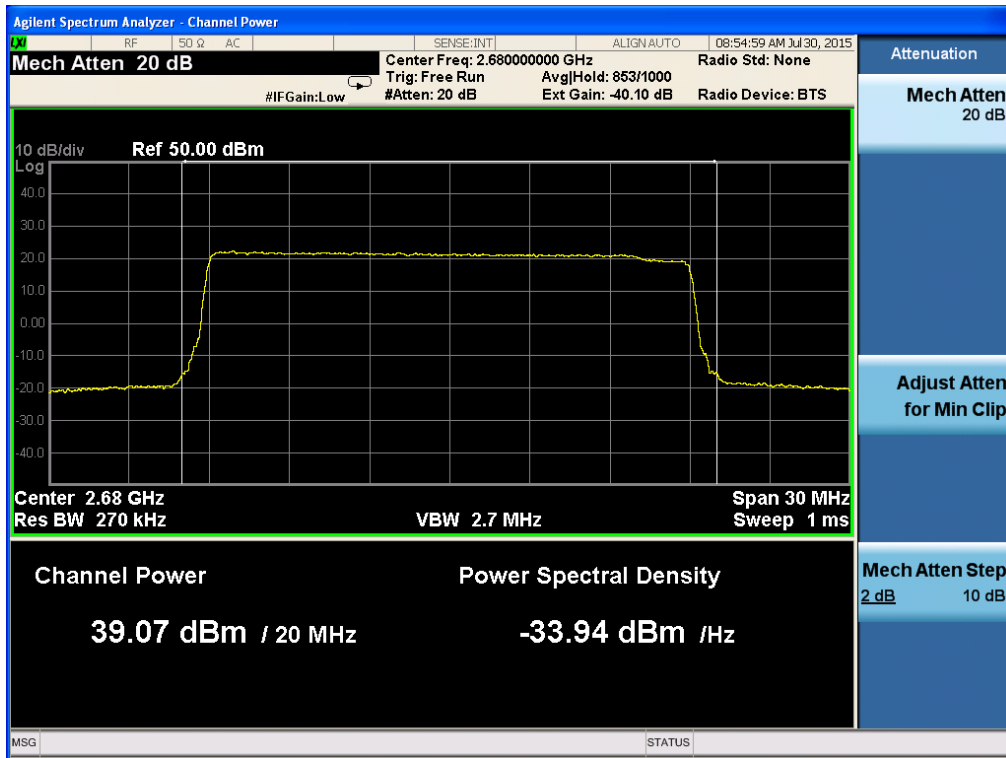


Figure 34. — 2680.0 MHz 16QAM Port 3

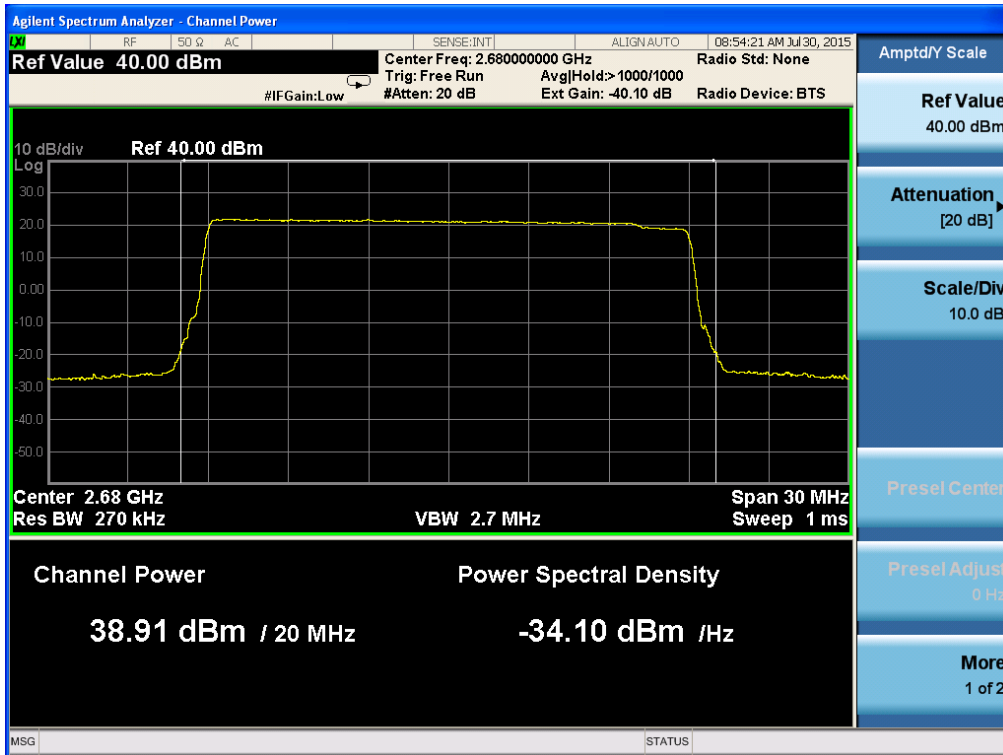


Figure 35. — 2680.0 MHz 16QAM Port 4

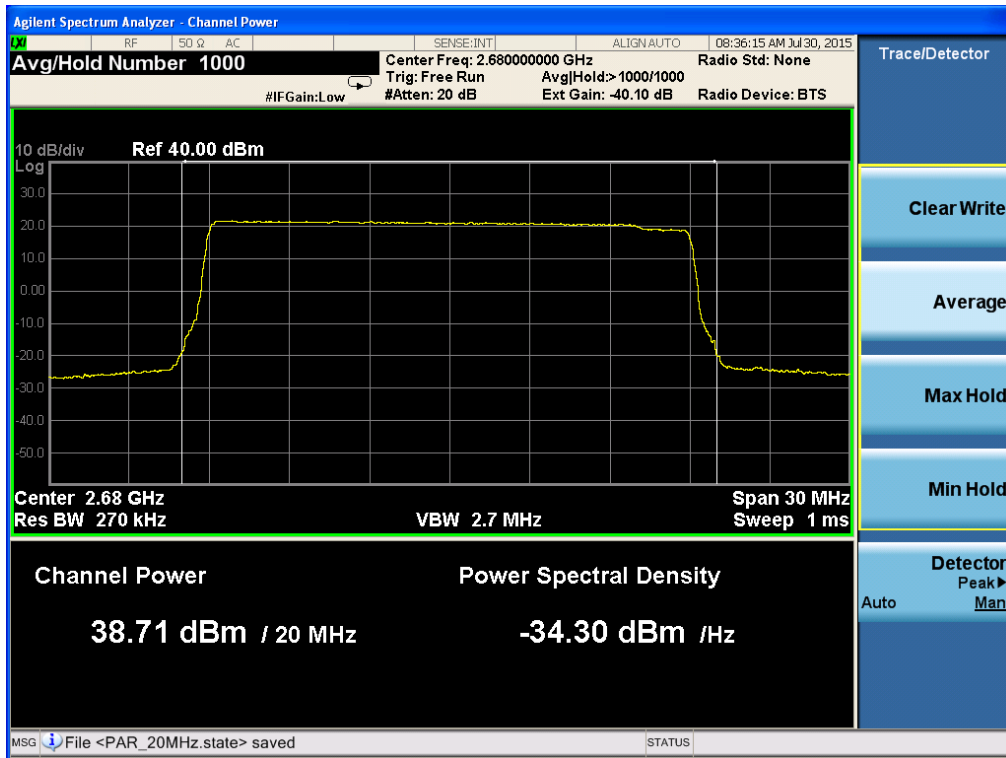


Figure 36. — 2680.0 MHz 64QAM Port 1

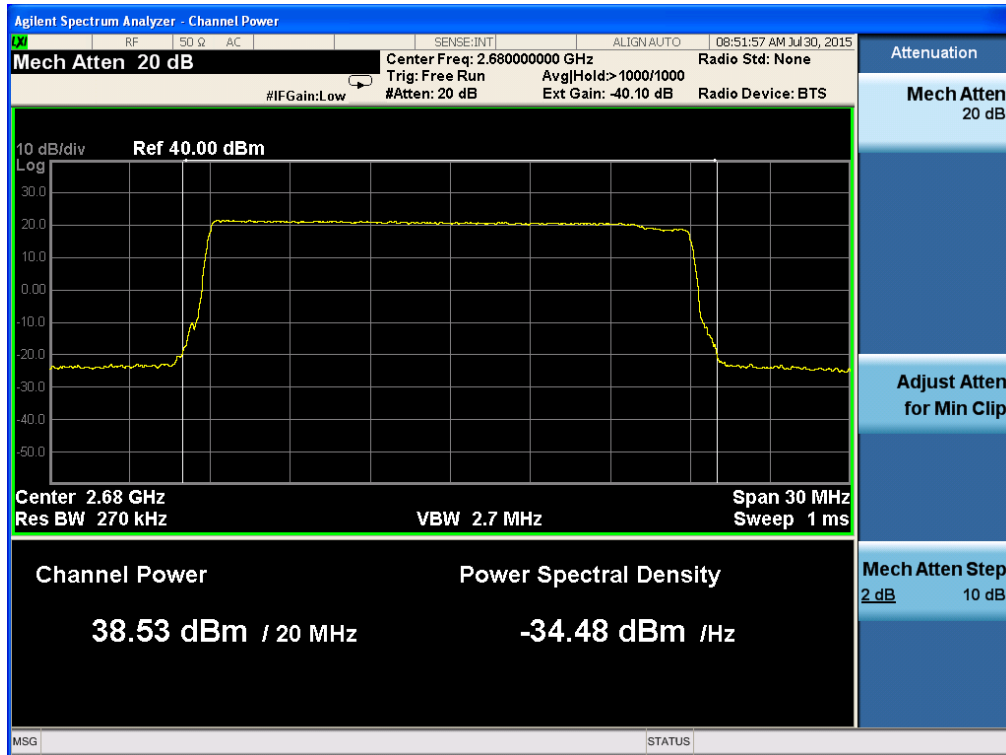


Figure 37. — 2680.0 MHz 64QAM Port 2

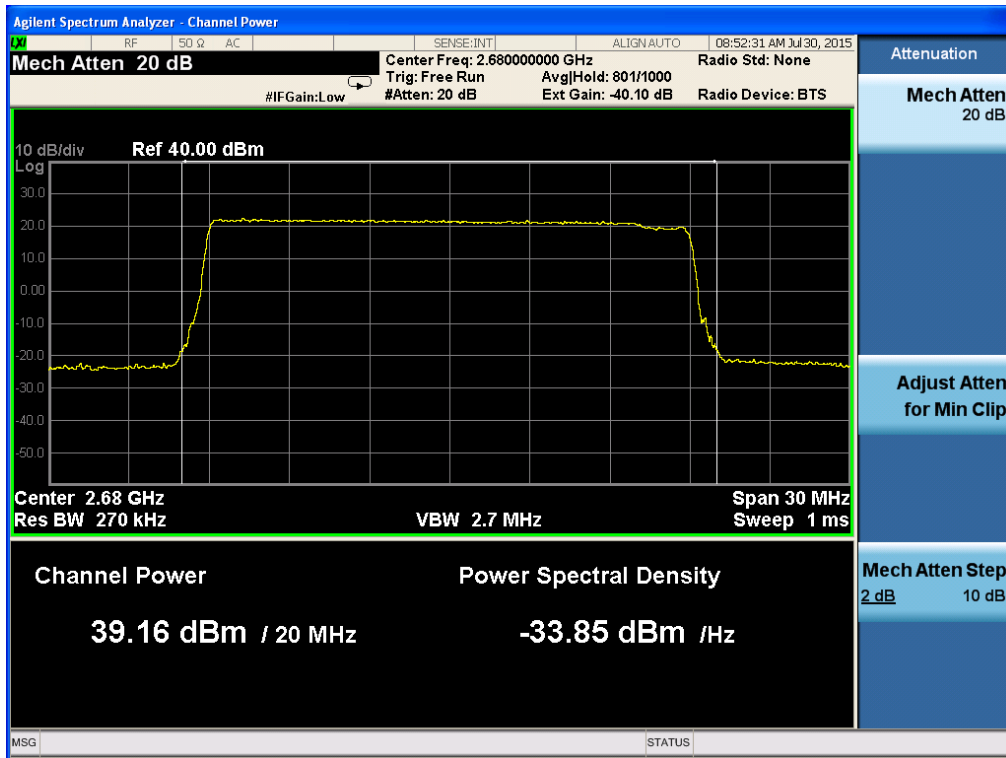


Figure 38. — 2680.0 MHz 64QAM Port 3

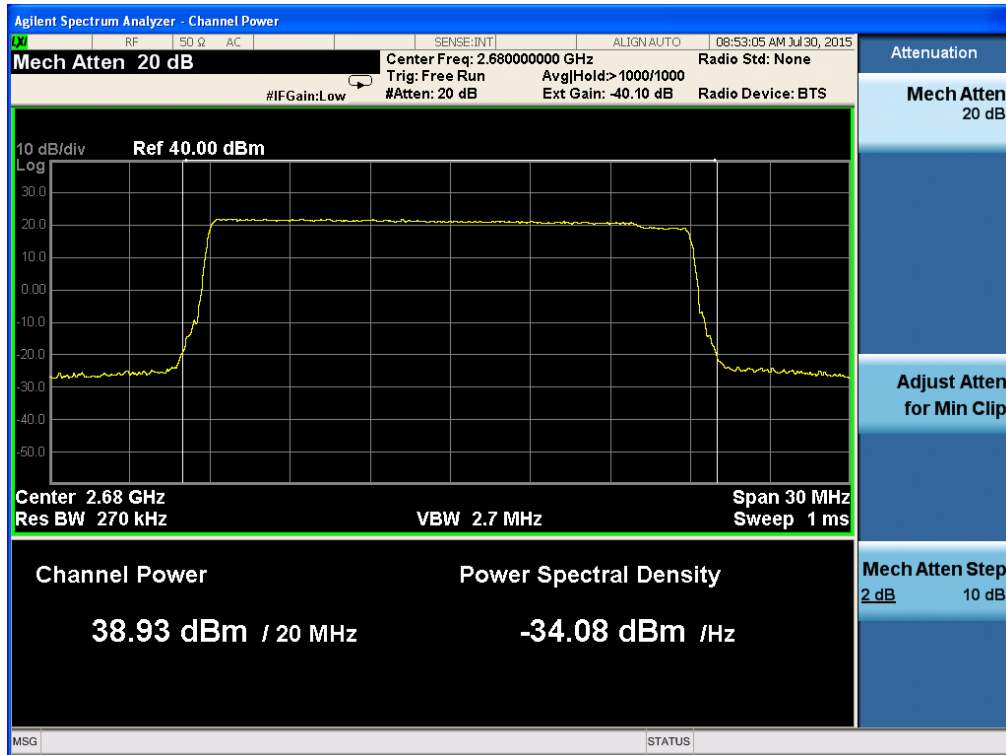


Figure 39. — 2680.0 MHz 64QAM Port 4

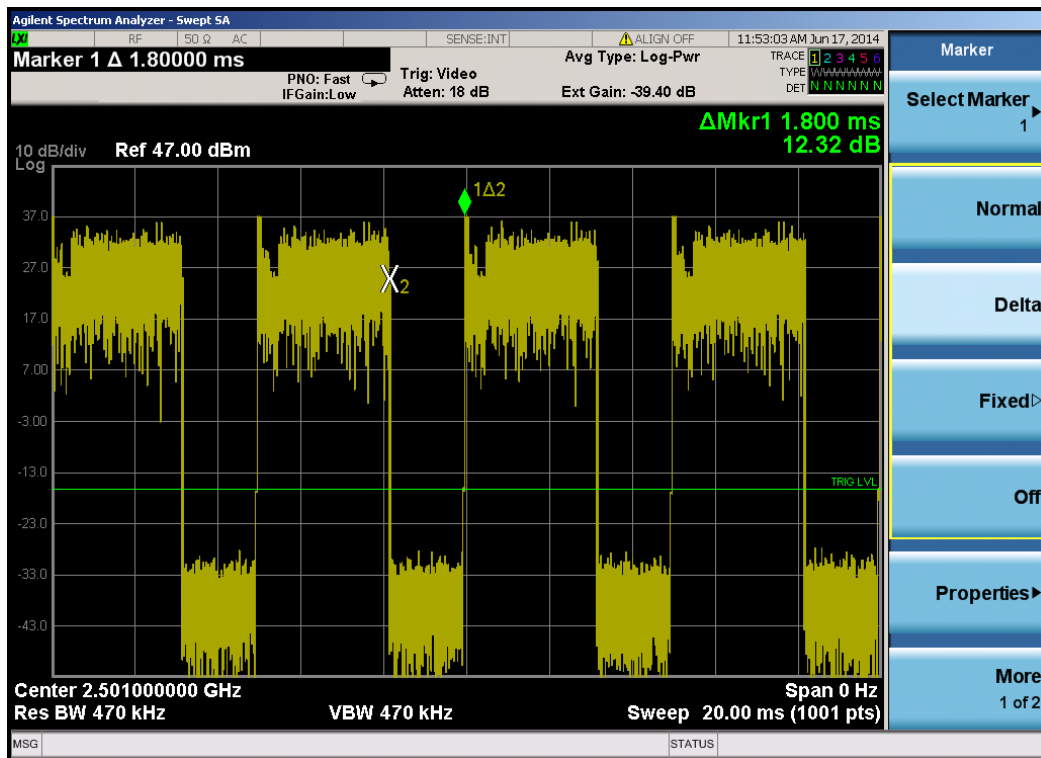


Figure 40 Duty Cycle E.U.T. Off

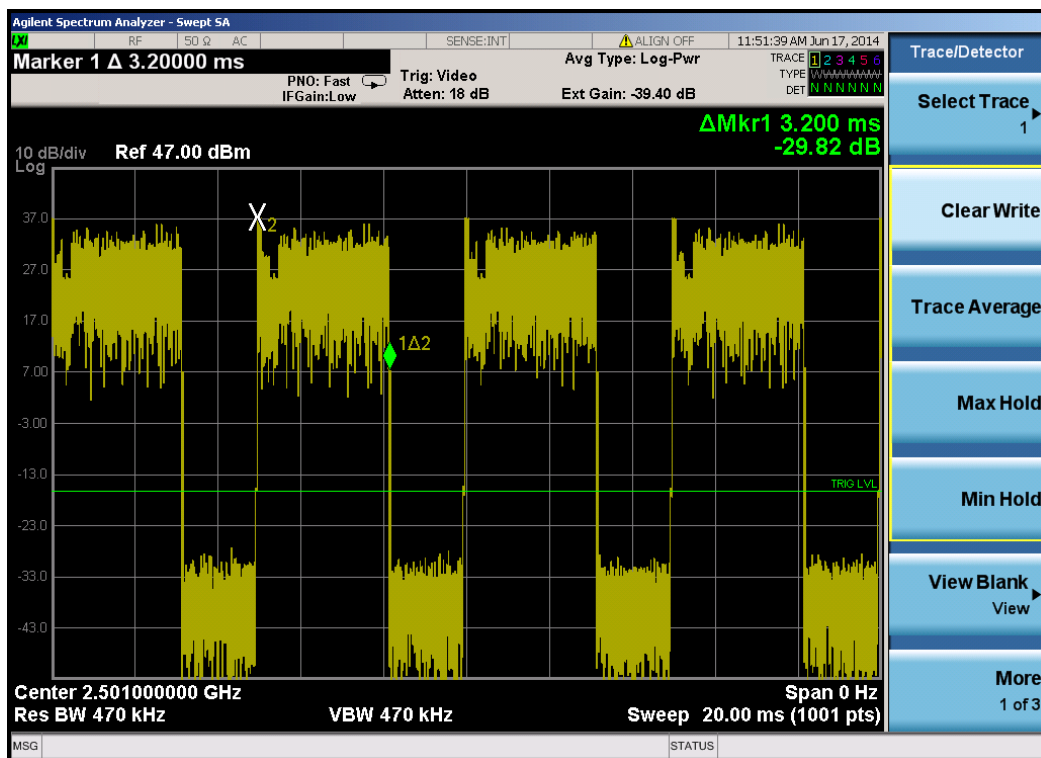


Figure 41 Duty Cycle E.U.T. On



4.4 Test Equipment Used; Maximum Peak Output Power 20MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
MXA Signal Analyzer	Agilent	N9020A	MY46471581	February 12 2015	2 years
DC Block	JFW	50DB-007	1-23	N/A	N/A
Coupler	Pulsar	CS06-B57-436/9	-	N/A	N/A
Attenuator	Weinschel	24-20-34	BZ144	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0855	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A

Figure 42 Test Equipment Used Maximum Peak Output Power 20 MHz Bandwidth

5. Power Spectral Density 20 MHz Bandwidth

5.1 Test Specification

FCC Part 27, Sub-part C (27.50(h)(4))

5.2 Test Procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator, an appropriate coaxial cable, coupler, and DC block, including the duty cycle (see *Figure 40* to *Figure 41*), (total loss=-40.1 dB). The E.U.T. RF output was OFDMA modulated with QPSK, 16QAM and 64QAM, at 20MHz BW. Power spectral density was measured over 200 kHz RBW.

Special attention was taken to prevent Spectrum Analyzer RF input overload.
Tested frequencies: 2506.00 MHz, 2593.00 MHz and 2680.00 MHz

Antenna type: Manual tilt panel antenna (Gain: 18 dBi) with N type connector.

5.3 Test Results

Operation Frequency (MHz)	Modulation	Reading* (dBm)	Antenna Gain (dBi)	Spectral Power Density (dBm)	Specification (dBm)	Margin (dB)
2506.0	QPSK	15.1	18.0	33.1	45.2	-12.1
	16QAM	15.9	18.0	33.9	45.2	-11.3
	64QAM	15.6	18.0	33.6	45.2	-11.6
2593.0	QPSK	16.3	18.0	34.3	45.2	-10.9
	16QAM	16.3	18.0	34.3	45.2	-10.9
	64QAM	16.3	18.0	34.3	45.2	-10.9
2680.0	QPSK	15.8	18.0	33.8	45.2	-11.4
	16QAM	15.9	18.0	33.9	45.2	-11.3
	64QAM	15.7	18.0	33.7	45.2	-11.5

*- Spectral power density, dBm/100kHz = Spectrum analyzer reading, dBm/Hz + 50 dB
See additional information in *Figure 47* to *Figure 82*.

Figure 43 Spectral Power Density 20 MHz Bandwidth Test Results Port 1



Operation Frequency (MHz)	Modulation	Reading* (dBm)	Antenna Gain (dBi)	Spectral Power Density (dBm)	Specification (dBm)	Margin (dB)
2506.00	QPSK	15.9	18.0	33.9	45.2	-11.3
	16QAM	15.9	18.0	33.9	45.2	-11.3
	64QAM	15.8	18.0	33.8	45.2	-11.4
2593.00	QPSK	16.2	18.0	34.2	45.2	-11.0
	16QAM	16.2	18.0	34.2	45.2	-11.0
	64QAM	16.2	18.0	34.2	45.2	-11.0
2680.00	QPSK	15.5	18.0	33.5	45.2	-11.7
	16QAM	15.6	18.0	33.6	45.2	-11.6
	64QAM	15.5	18.0	33.5	45.2	-11.7

*- Spectral power density, dBm/100kHz = Spectrum analyzer reading, dBm/Hz + 50 dB
See additional information in *Figure 47* to *Figure 82*.

Figure 44 Spectral Power Density 20 MHz Bandwidth Test Results Port 2

Operation Frequency (MHz)	Modulation	Reading* (dBm)	Antenna Gain (dBi)	Spectral Power Density (dBm)	Specification (dBm)	Margin (dB)
2506.00	QPSK	16.1	18.0	34.1	45.2	-11.1
	16QAM	16.1	18.0	34.1	45.2	-11.1
	64QAM	16.0	18.0	34.0	45.2	-11.2
2593.00	QPSK	16.6	18.0	34.6	45.2	-10.6
	16QAM	16.6	18.0	34.6	45.2	-10.6
	64QAM	16.4	18.0	34.4	45.2	-10.8
2680.00	QPSK	16.0	18.0	34.0	45.2	-11.2
	16QAM	16.1	18.0	34.1	45.2	-11.1
	64QAM	16.2	18.0	34.2	45.2	-11.0

*- Spectral power density, dBm/100kHz = Spectrum analyzer reading, dBm/Hz + 50 dB
See additional information in *Figure 47* to *Figure 82*.

Figure 45 Spectral Power Density 20 MHz Bandwidth Test Results Port 3



Operation Frequency (MHz)	Modulation	Reading* (dBm)	Antenna Gain (dBi)	Spectral Power Density (dBm)	Specification (dBm)	Margin (dB)
2506.00	QPSK	16.1	18.0	34.1	45.2	-11.1
	16QAM	16.1	18.0	34.1	45.2	-11.1
	64QAM	16.2	18.0	34.2	45.2	-11.0
2593.00	QPSK	16.3	18.0	34.3	45.2	-10.9
	16QAM	16.4	18.0	34.4	45.2	-10.8
	64QAM	16.4	18.0	34.4	45.2	-10.8
2680.00	QPSK	15.9	18.0	33.9	45.2	-11.3
	16QAM	15.9	18.0	33.9	45.2	-11.3
	64QAM	15.9	18.0	33.9	45.2	-11.3

*- Spectral power density, dBm/100kHz = Spectrum analyzer reading, dBm/Hz + 50 dB
See additional information in *Figure 47* to *Figure 82*.

Figure 46 Spectral Power Density 20 MHz Bandwidth Test Results Port 4

JUDGEMENT: Passed by 10.6 dB

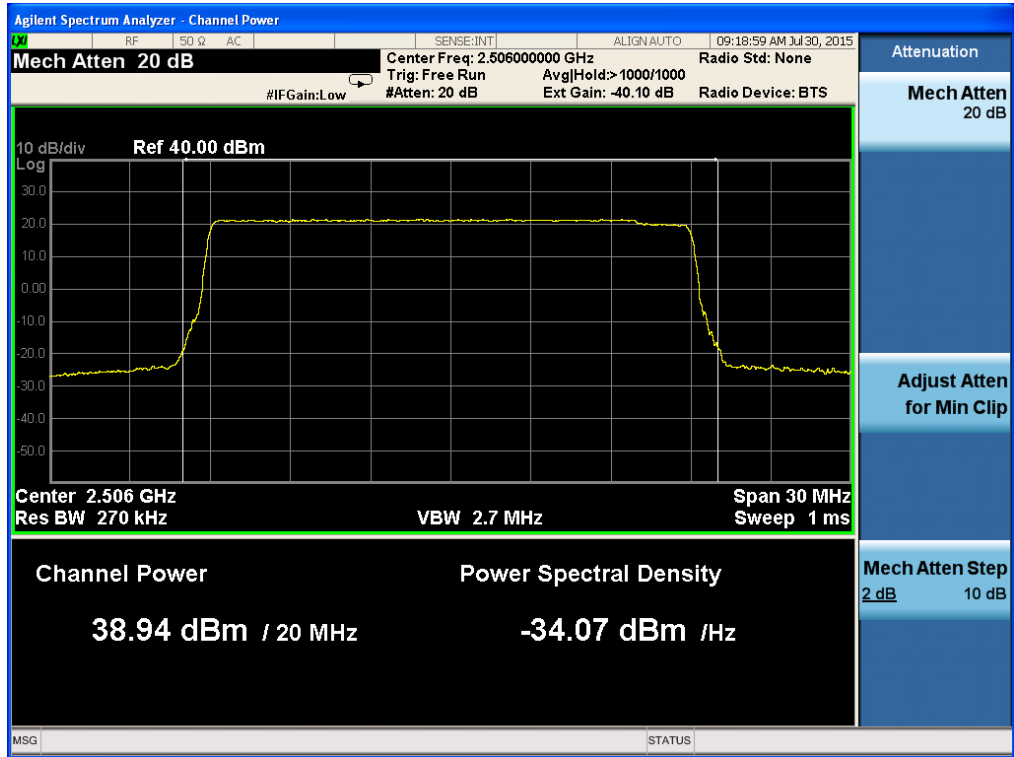


Figure 47. — 2506.0 MHz QPSK Port 1

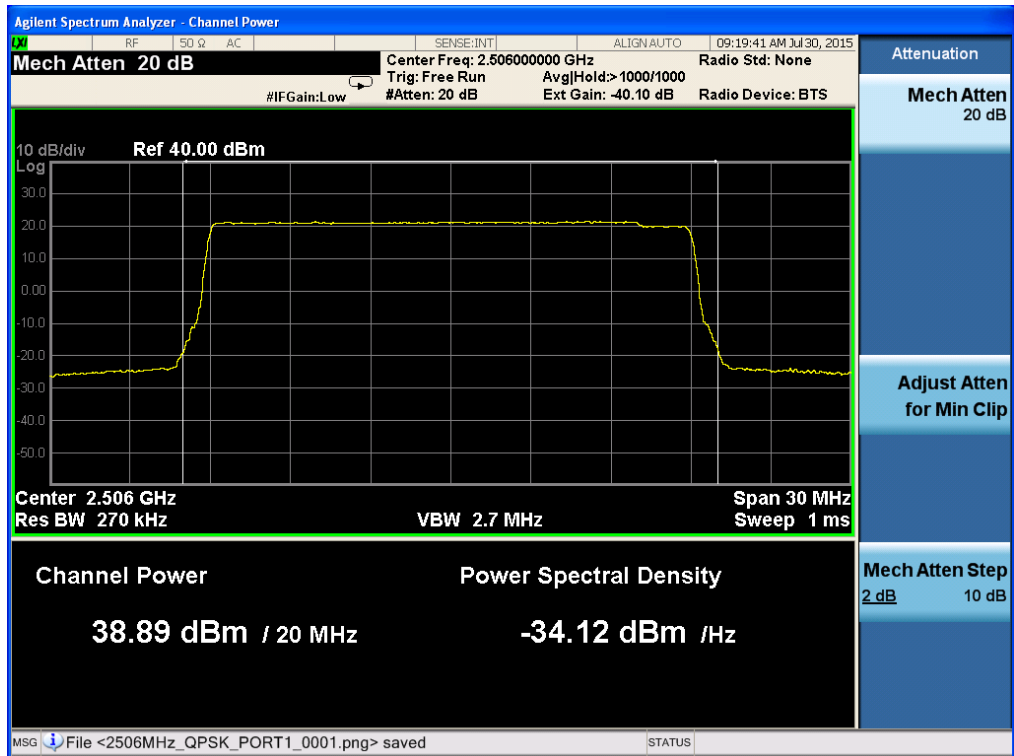


Figure 48. — 2506.0 MHz QPSK Port 2

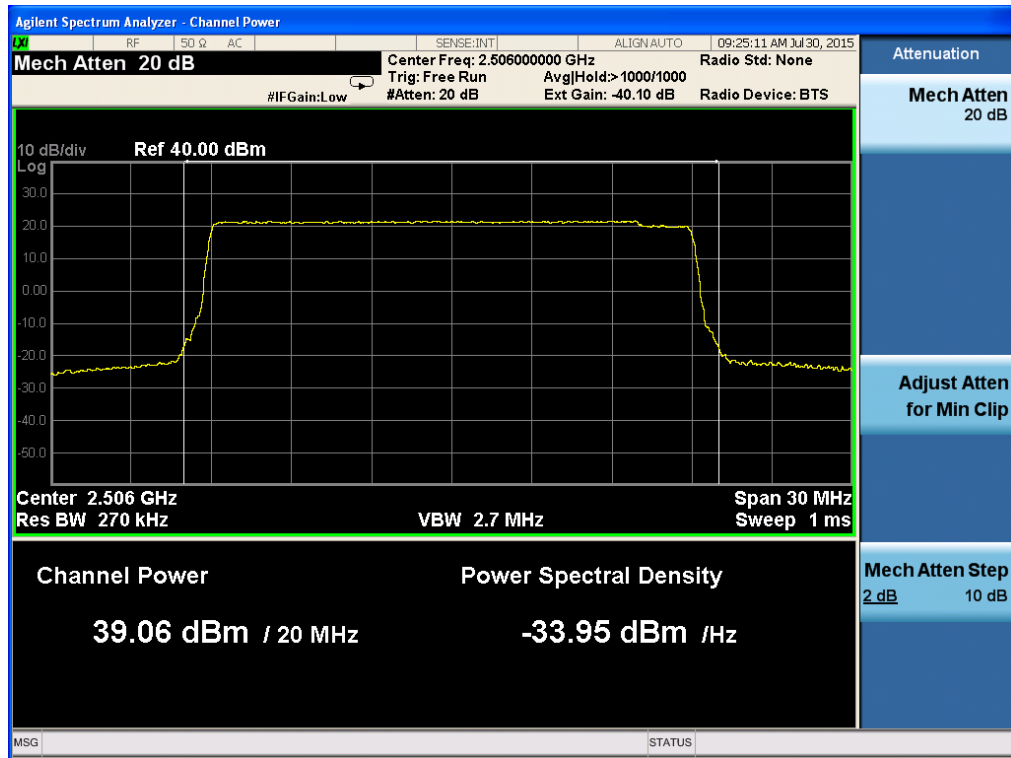


Figure 49. — 2506.0 MHz QPSK Port 3

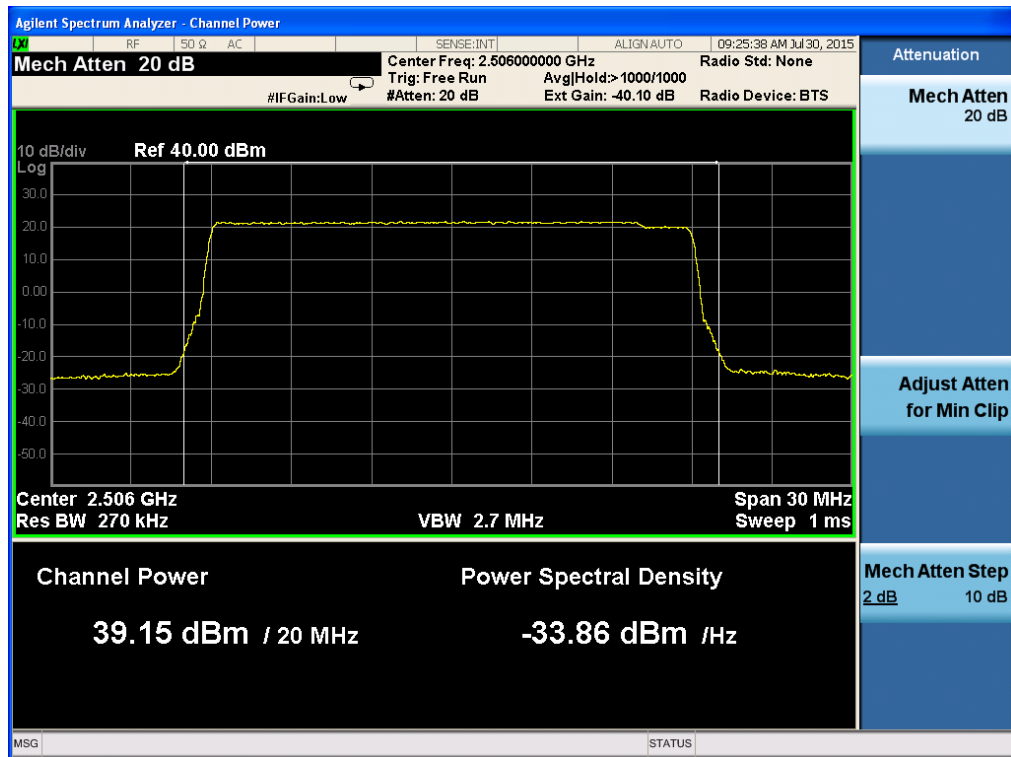


Figure 50. — 2506.0 MHz QPSK Port 4

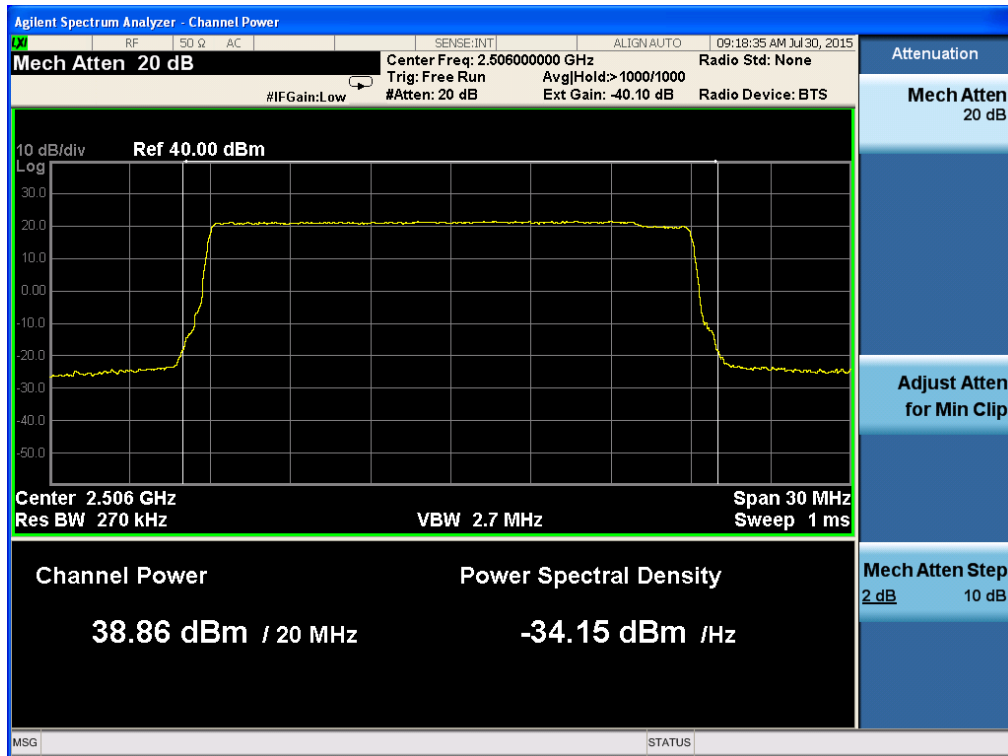


Figure 51. — 2506.0 MHz 16QAM Port 1

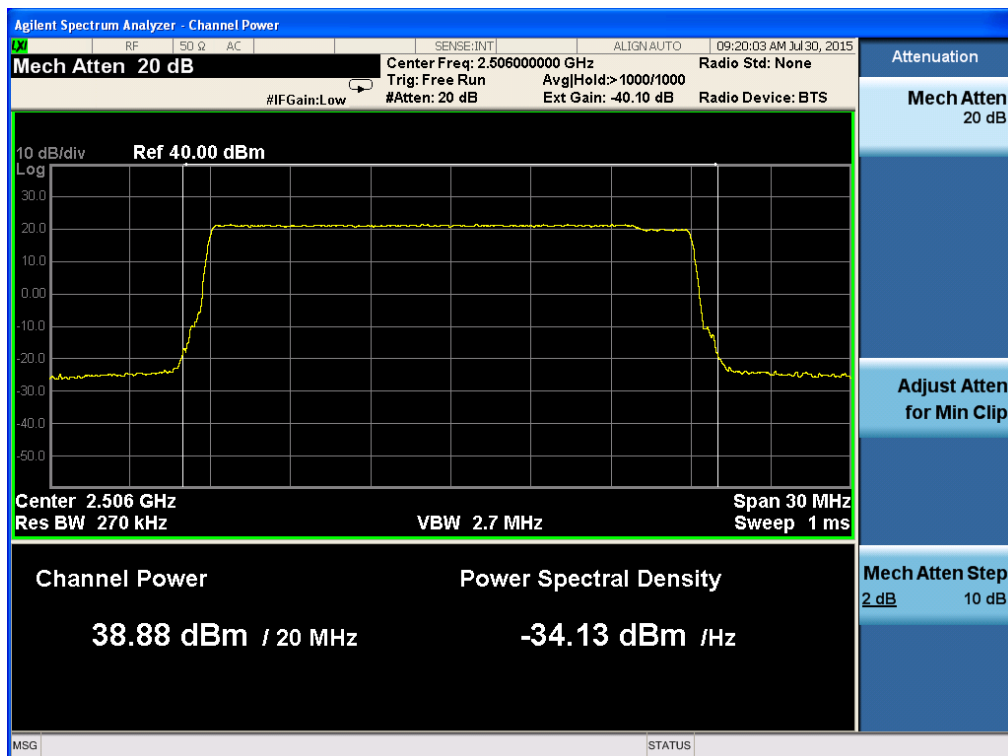


Figure 52. — 2506.0 MHz 16QAM Port 2

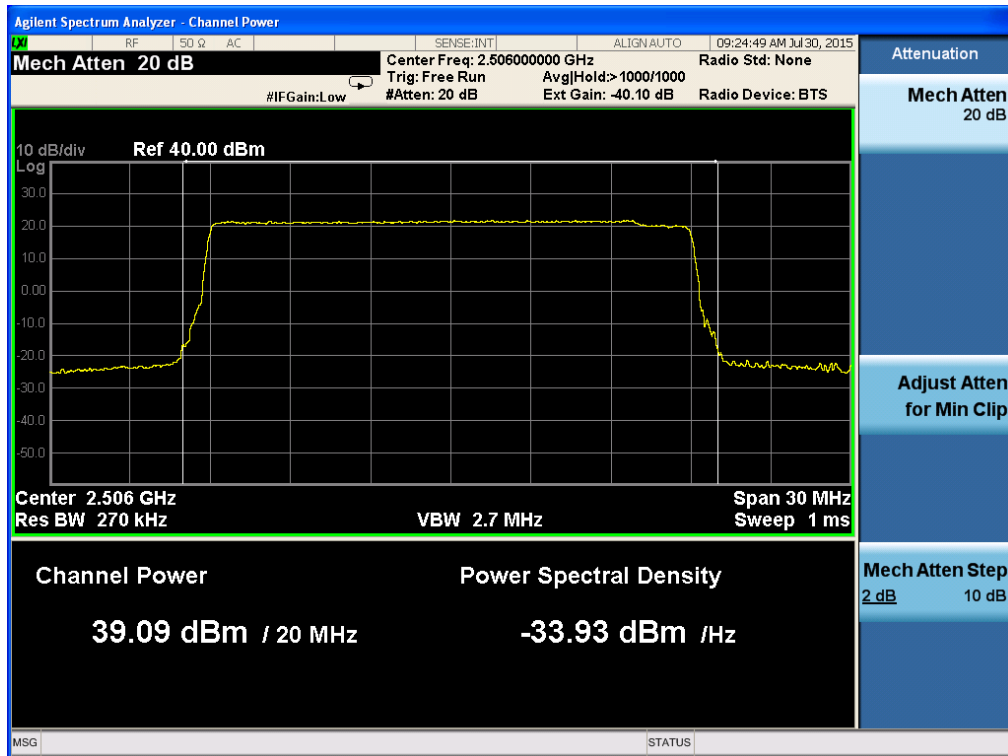


Figure 53. — 2506.0 MHz 16QAM Port 3

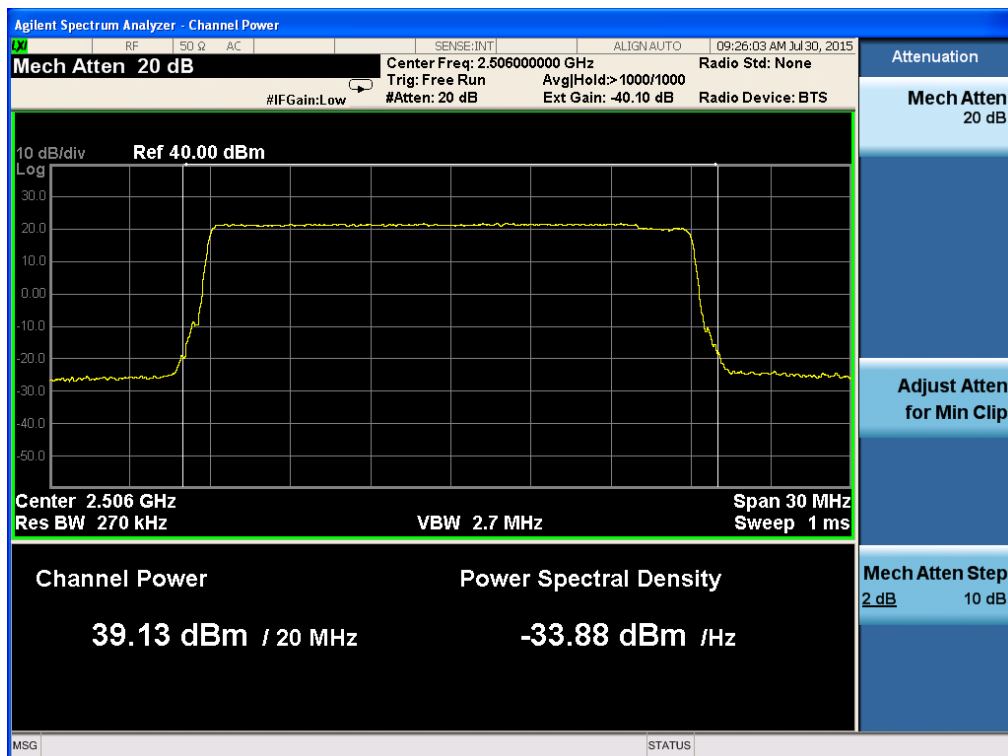


Figure 54. — 2506.0 MHz 16QAM Port 4

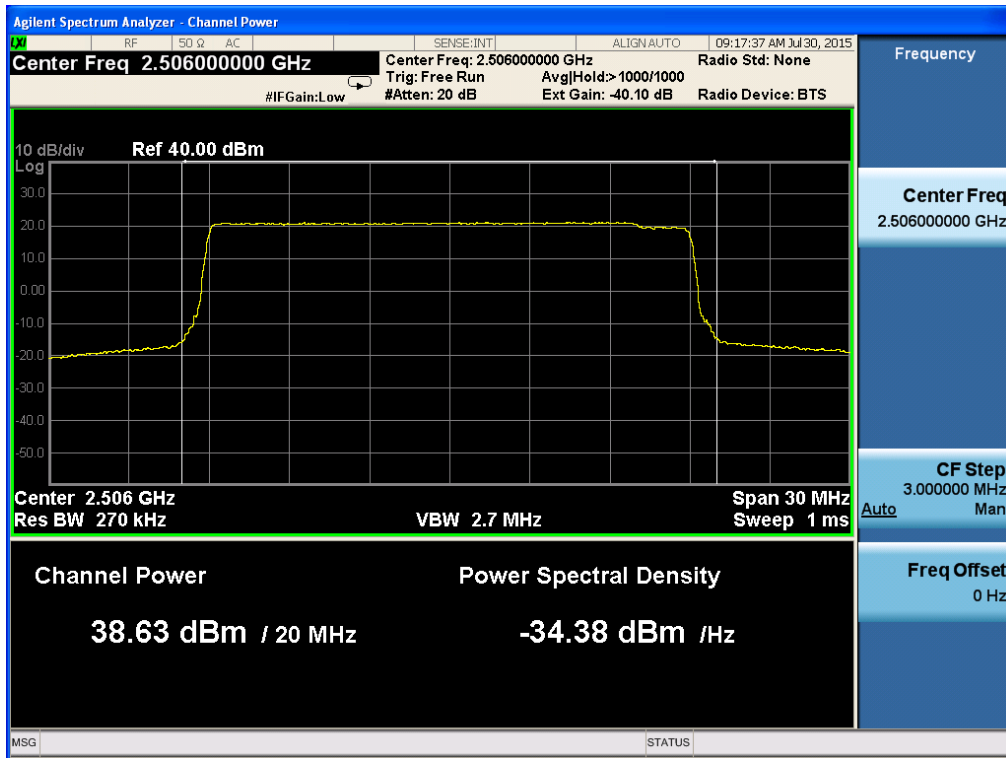


Figure 55. — 2506.0 MHz 64QAM Port 1

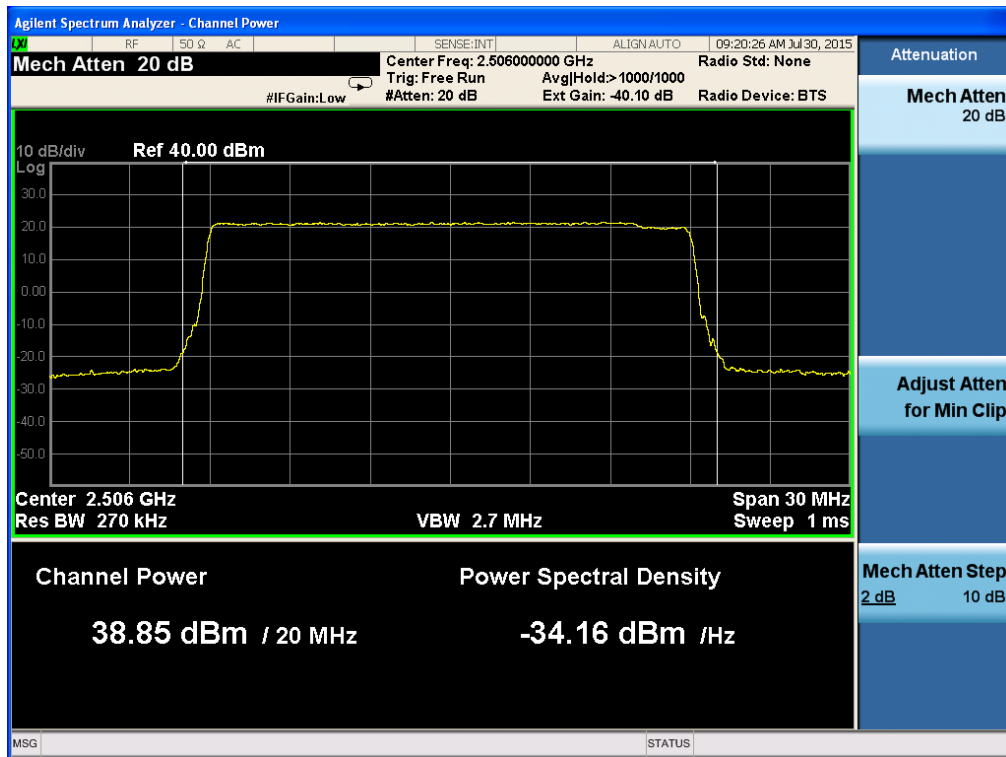


Figure 56. — 2506.0 MHz 64QAM Port 2

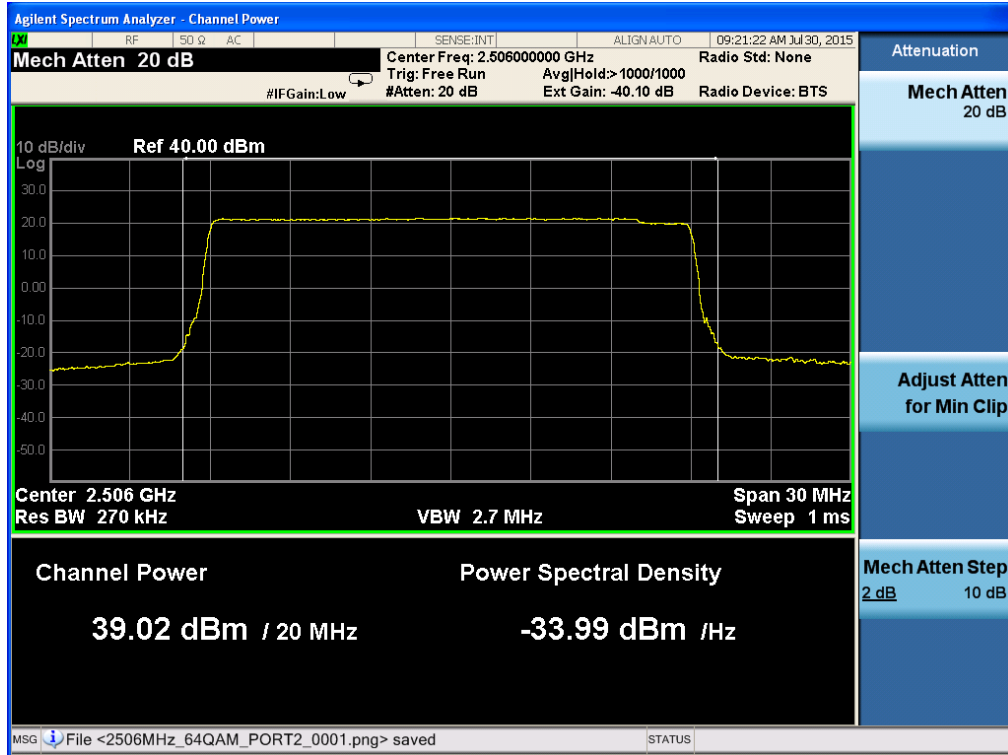


Figure 57. — 2506.0 MHz 64QAM Port 3

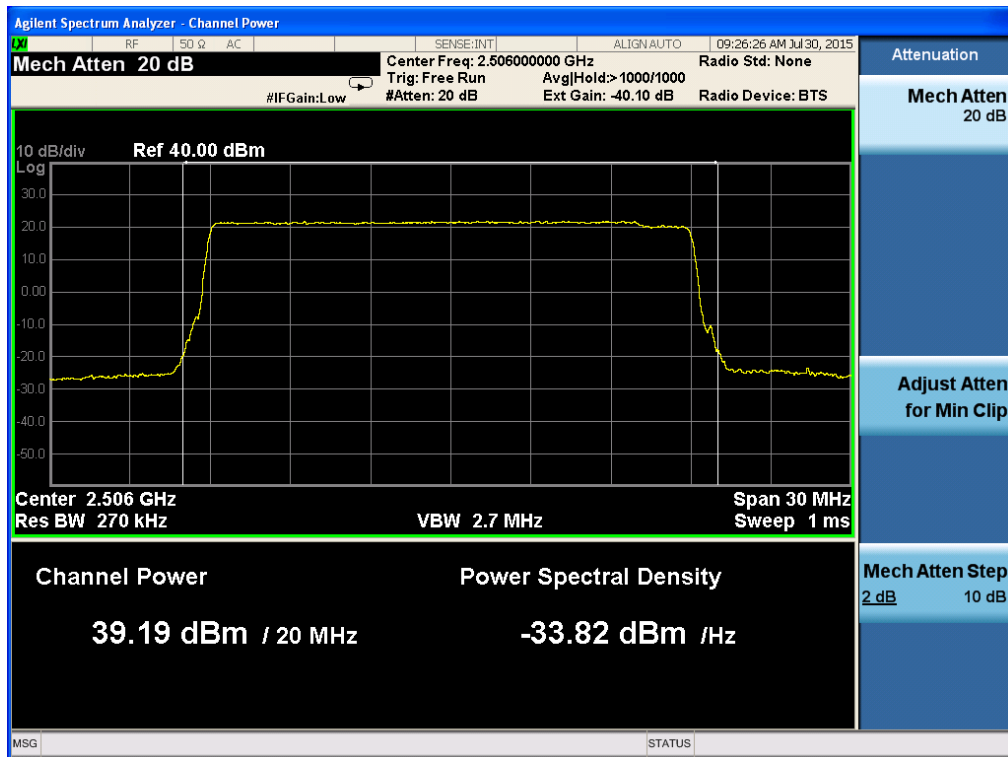


Figure 58. — 2506.0 MHz 64QAM Port 4

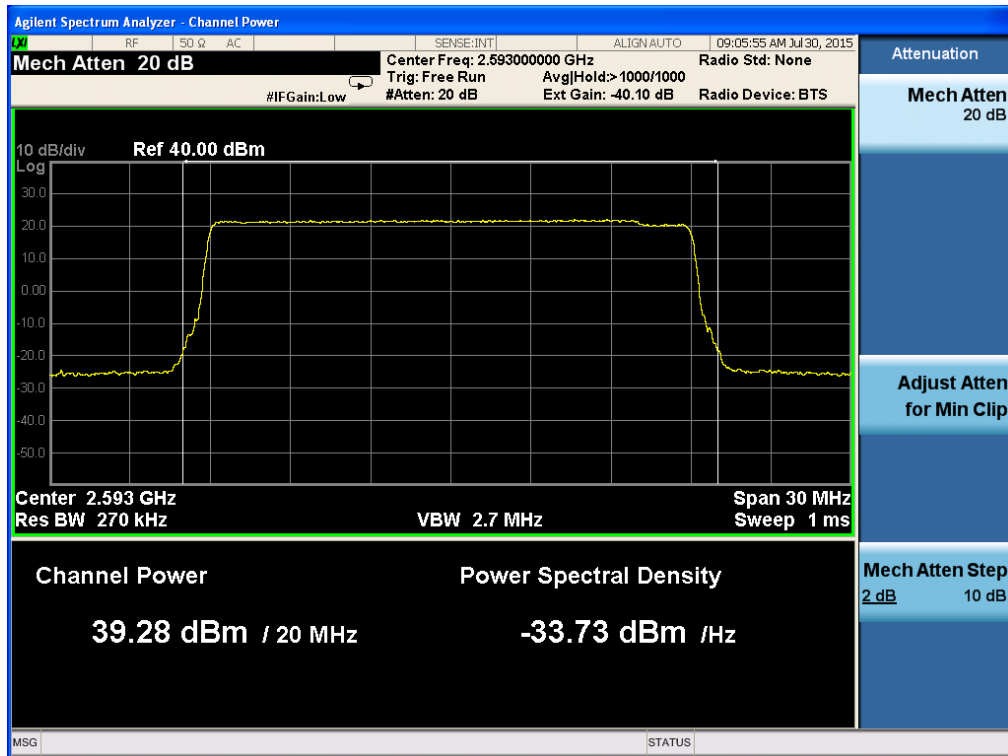


Figure 59. — 2593.0 MHz QPSK Port 1

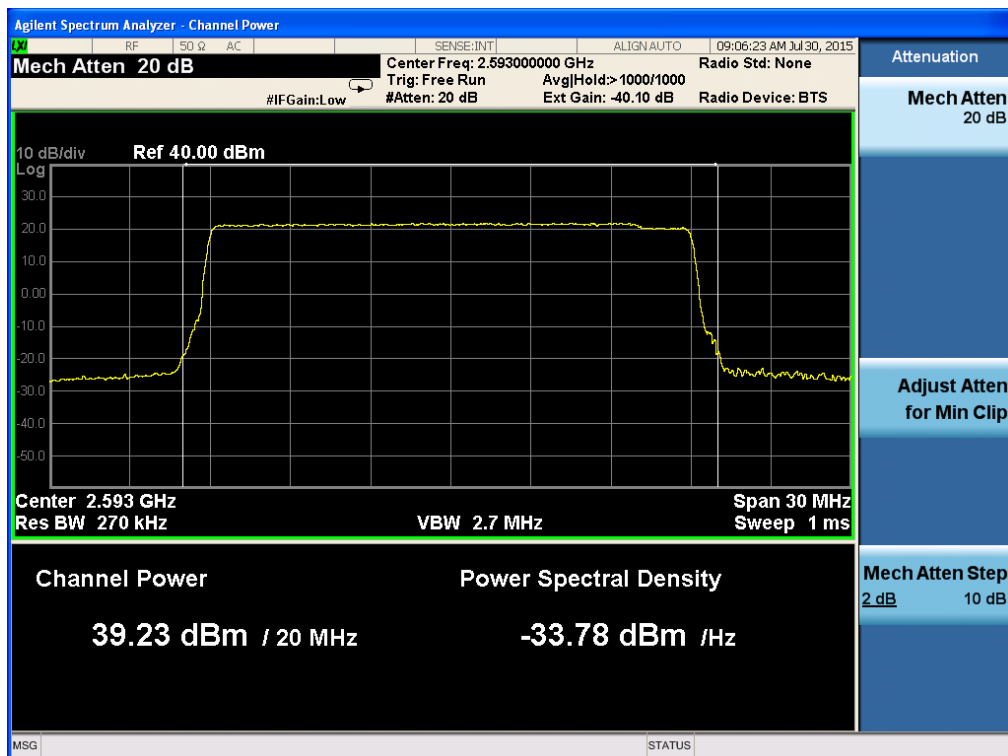


Figure 60. — 2593.0 MHz QPSK Port 2

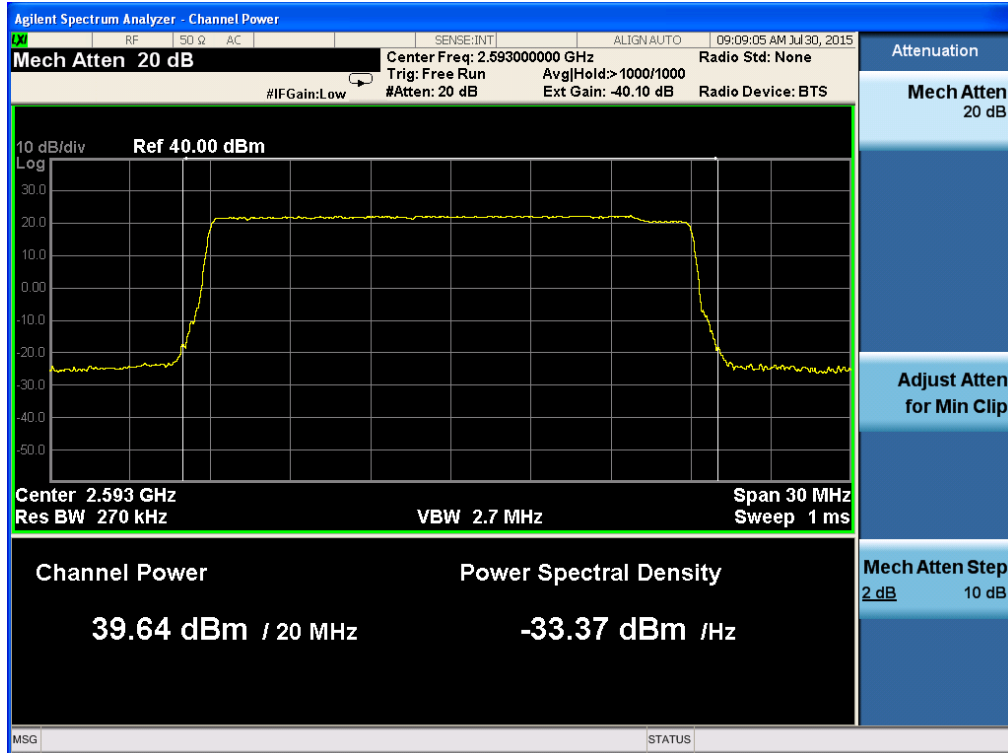


Figure 61. — 2593.0 MHz QPSK Port 3

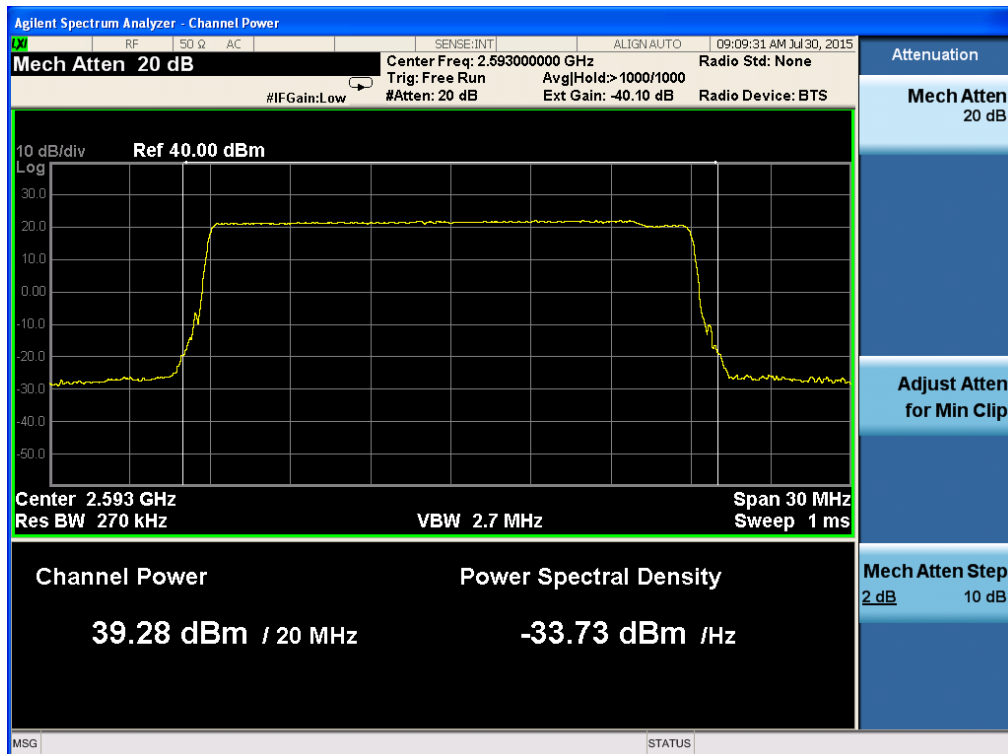


Figure 62. — 2593.0 MHz QPSK Port 4

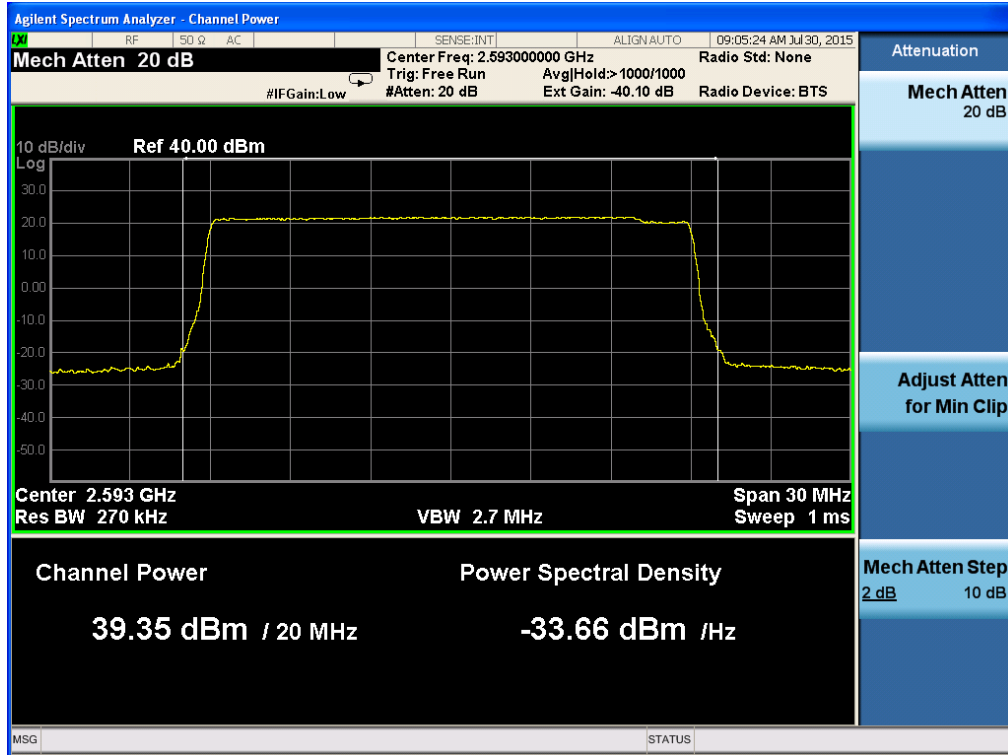


Figure 63. — 2593.0 MHz 16QAM Port 1

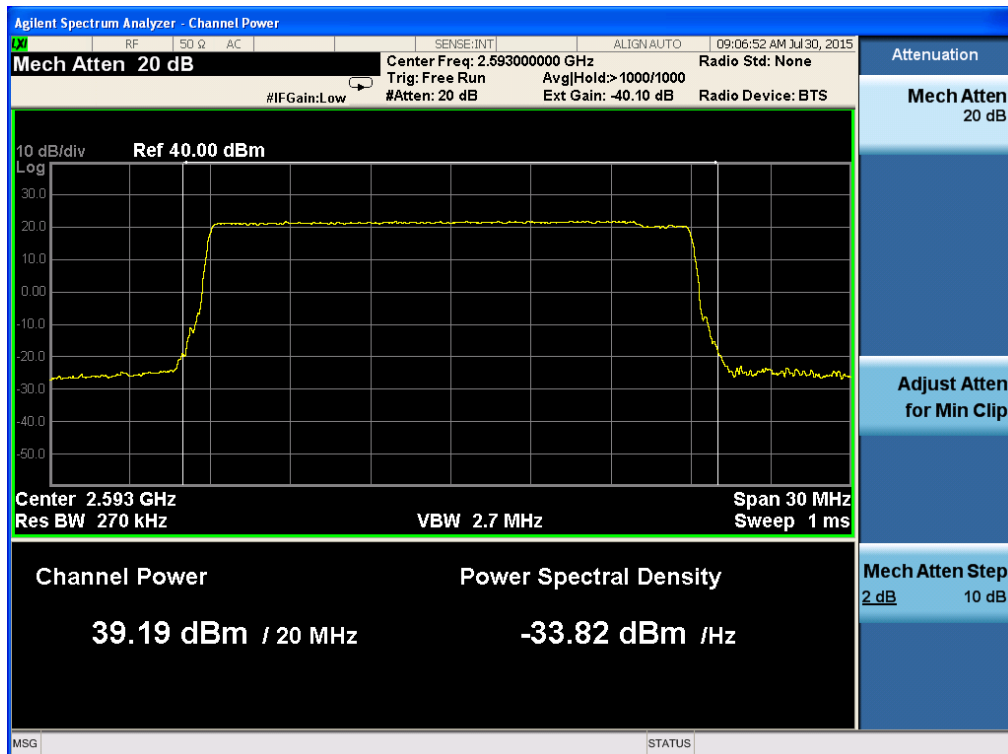


Figure 64. — 2593.0 MHz 16QAM Port 2

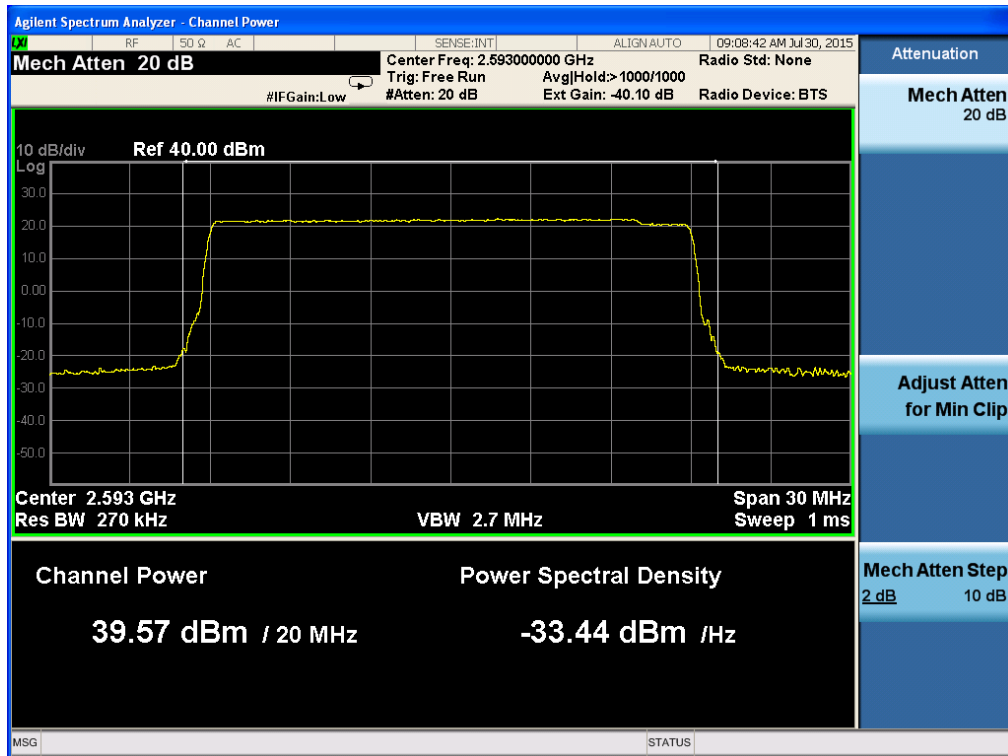


Figure 65. — 2593.0 MHz 16QAM Port 3

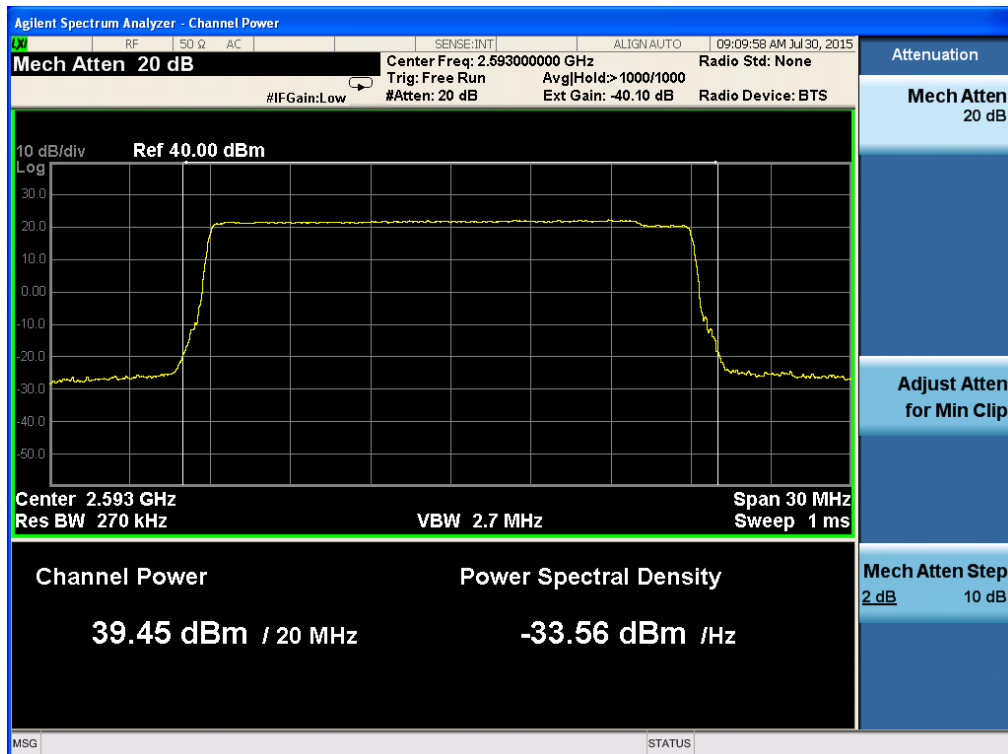


Figure 66. — 2593.0 MHz 16QAM Port 4

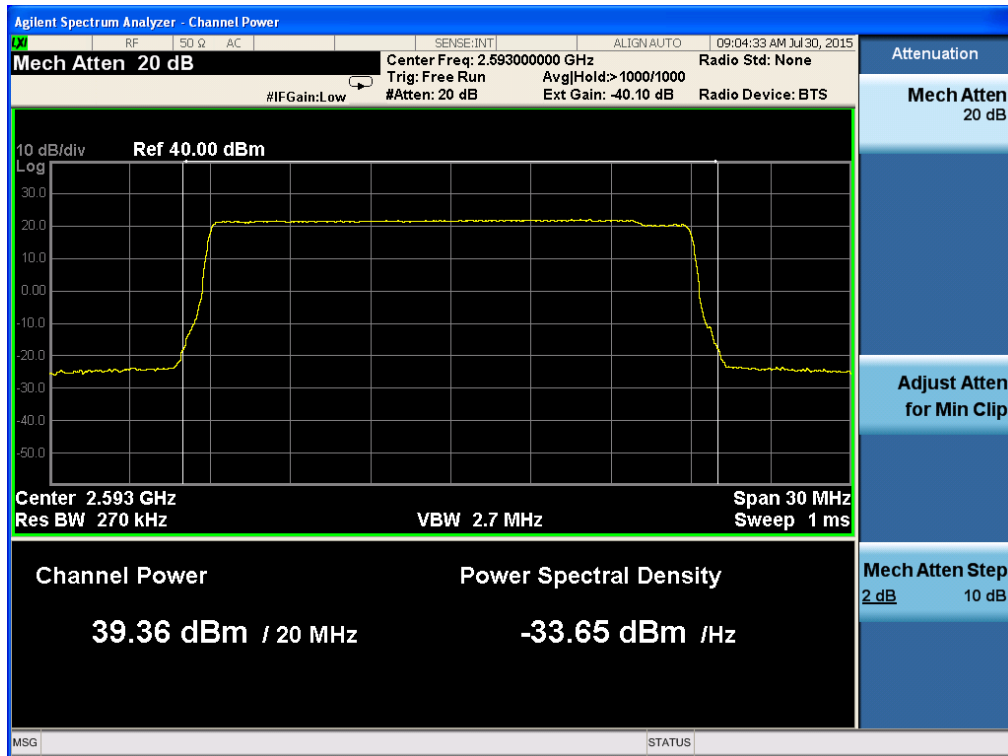


Figure 67. — 2593.0 MHz 64QAM Port 1

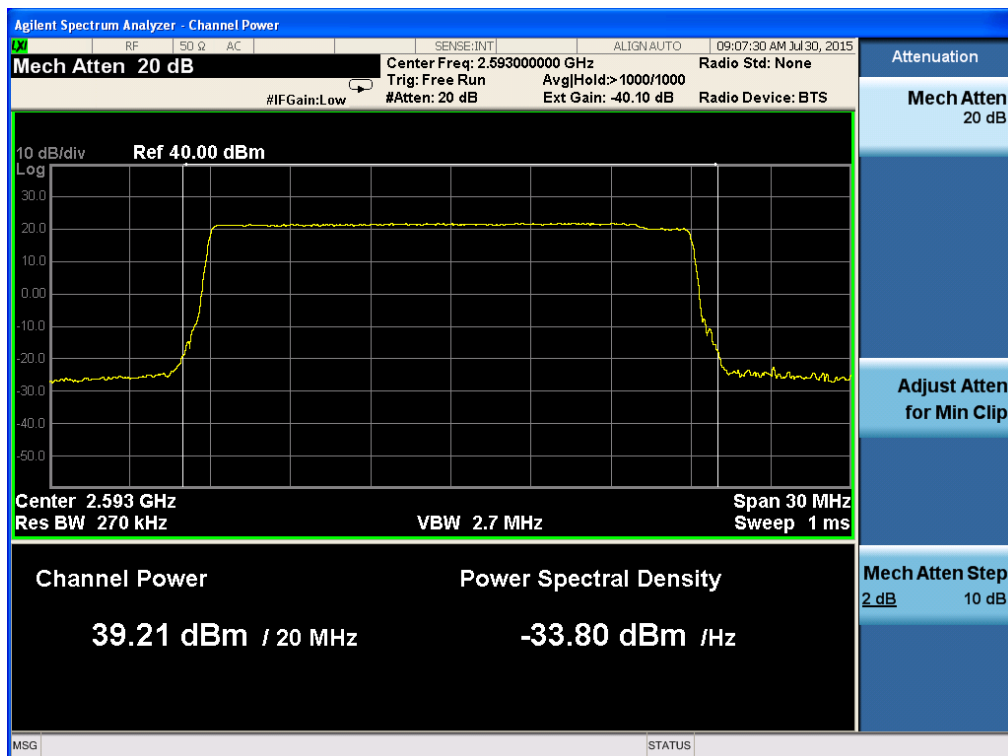


Figure 68. — 2593.0 MHz 64QAM Port 2

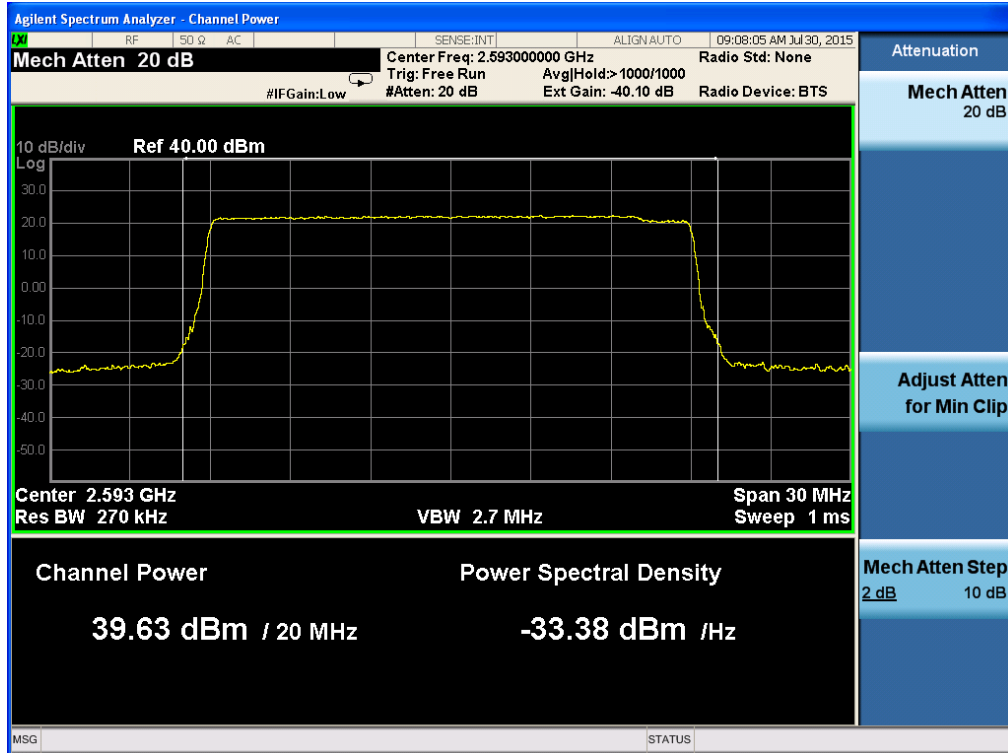


Figure 69. — 2593.0 MHz 64QAM Port 3

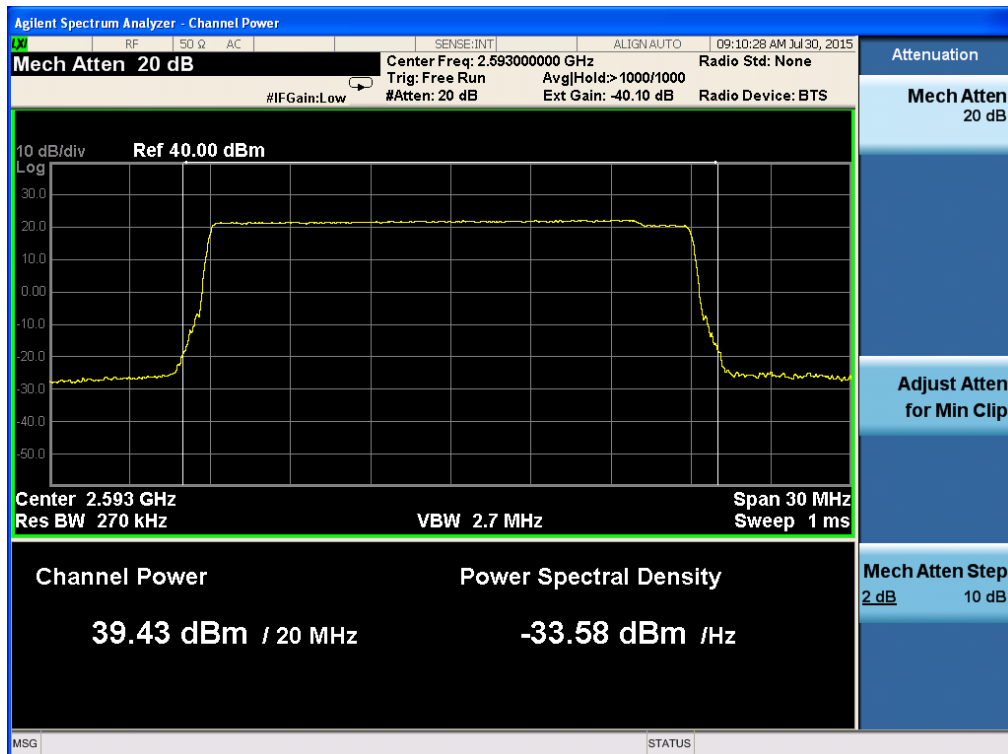


Figure 70. — 2593.0 MHz 64QAM Port 4

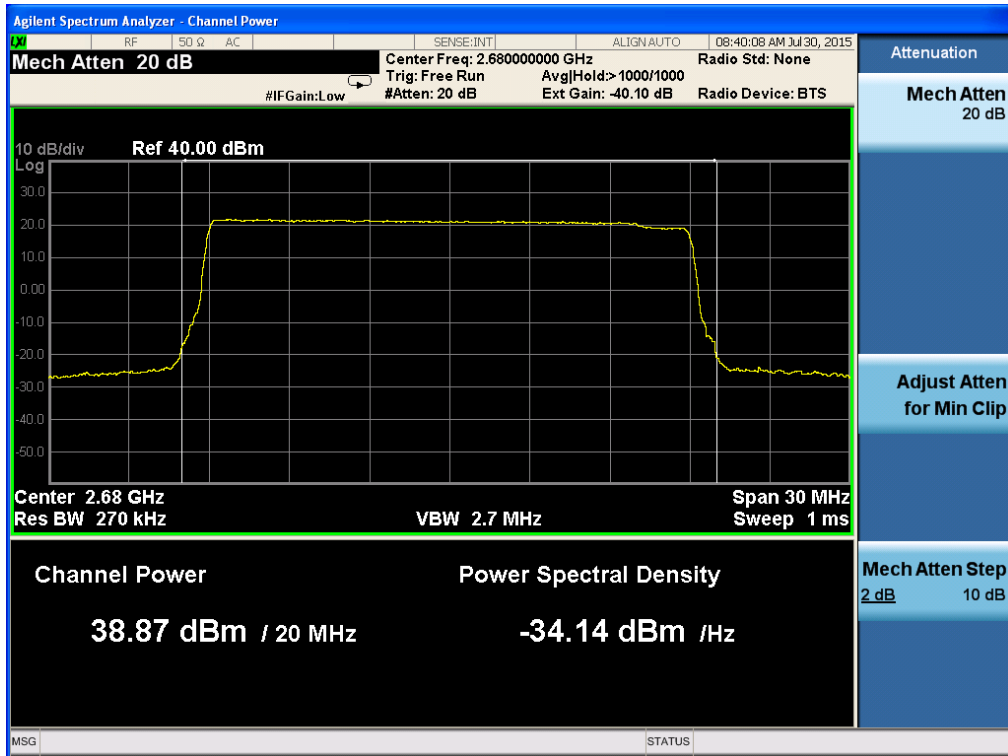


Figure 71. — 2680.0 MHz QPSK Port 1

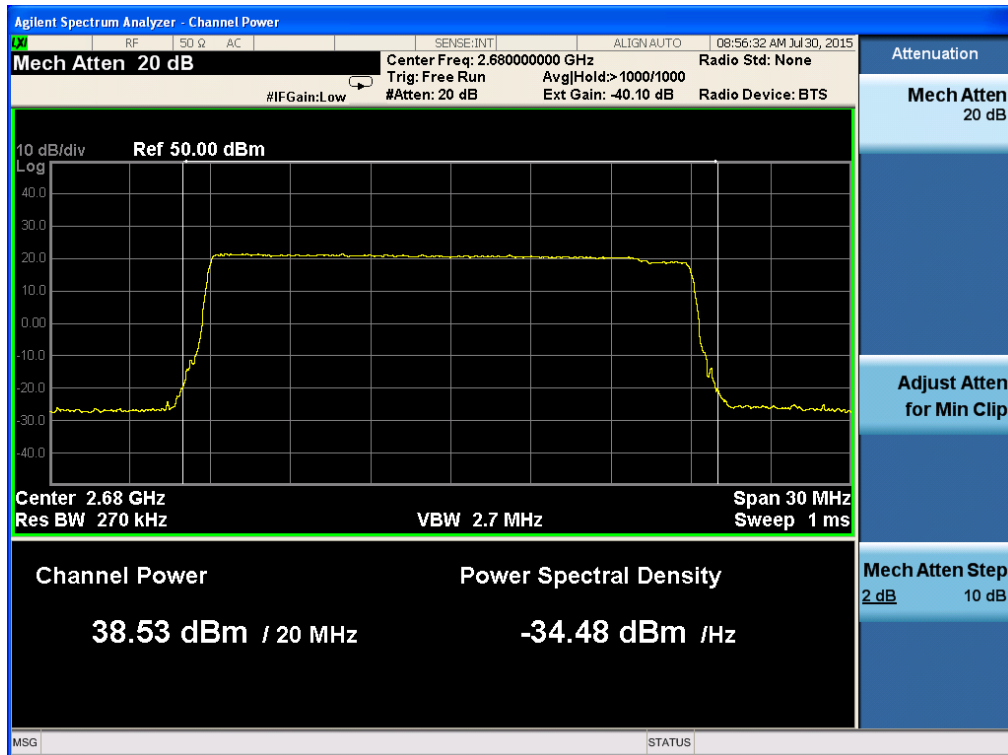


Figure 72. — 2680.0 MHz QPSK Port 2

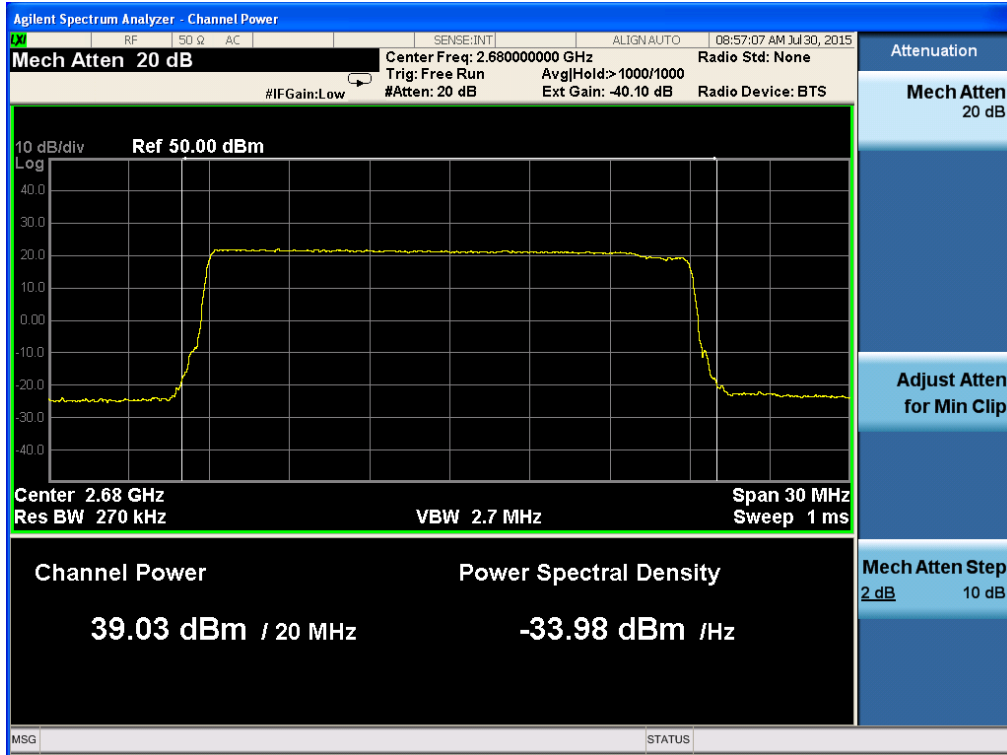


Figure 73. — 2680.0 MHz QPSK Port 3

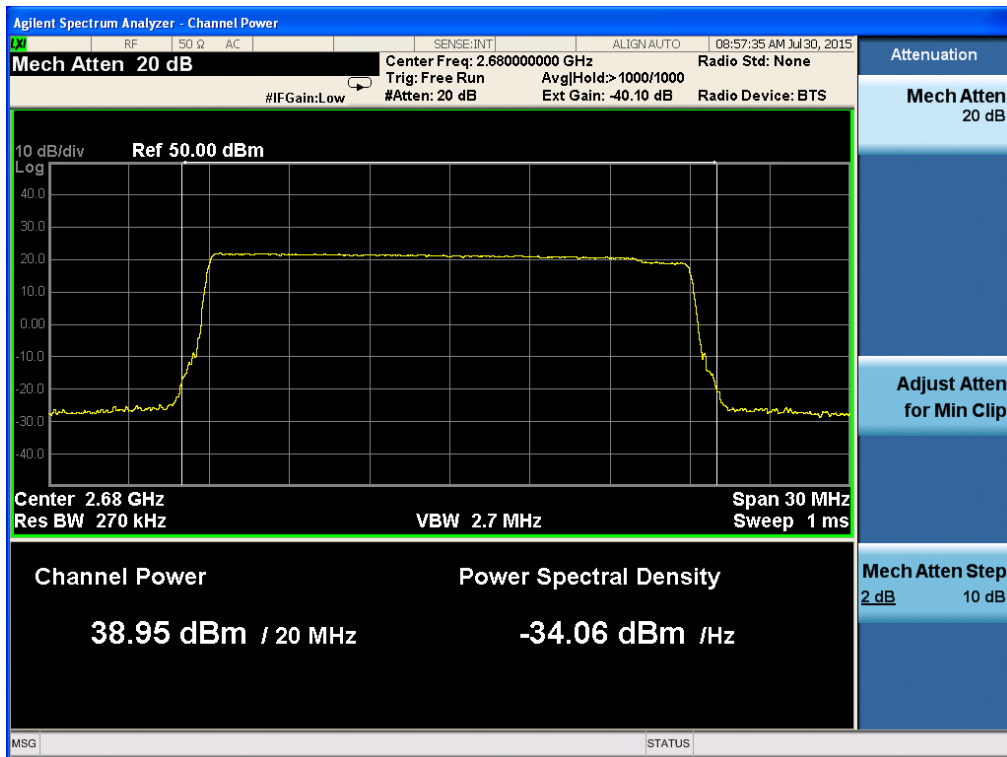


Figure 74. — 2680.0 MHz QPSK Port 4

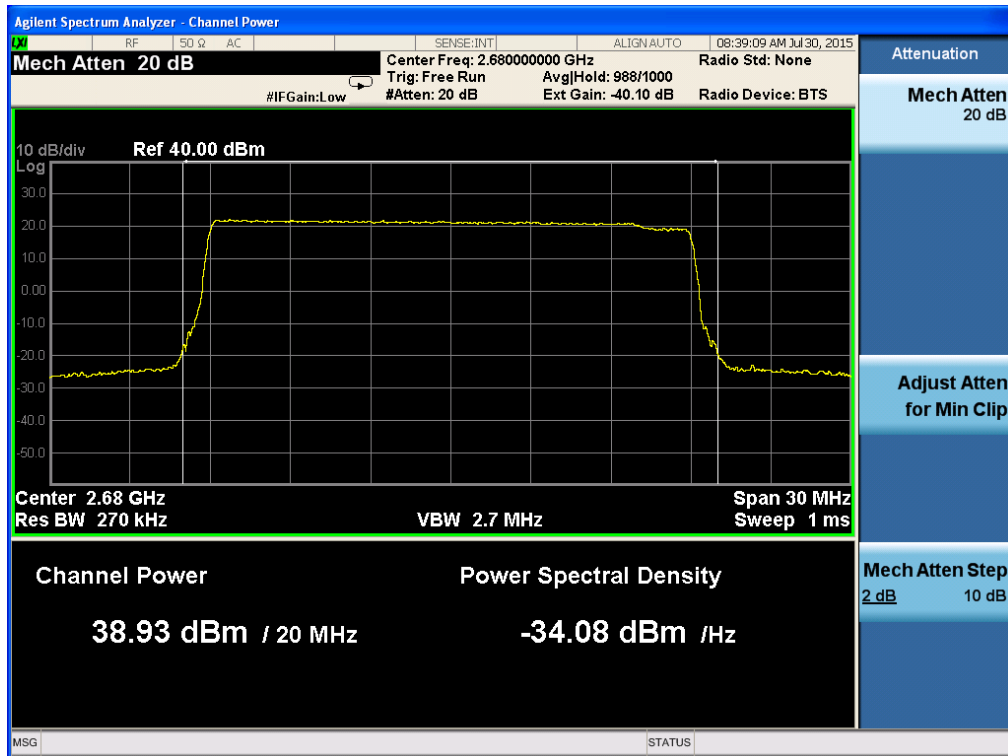


Figure 75. — 2680.0 MHz 16QAM Port 1

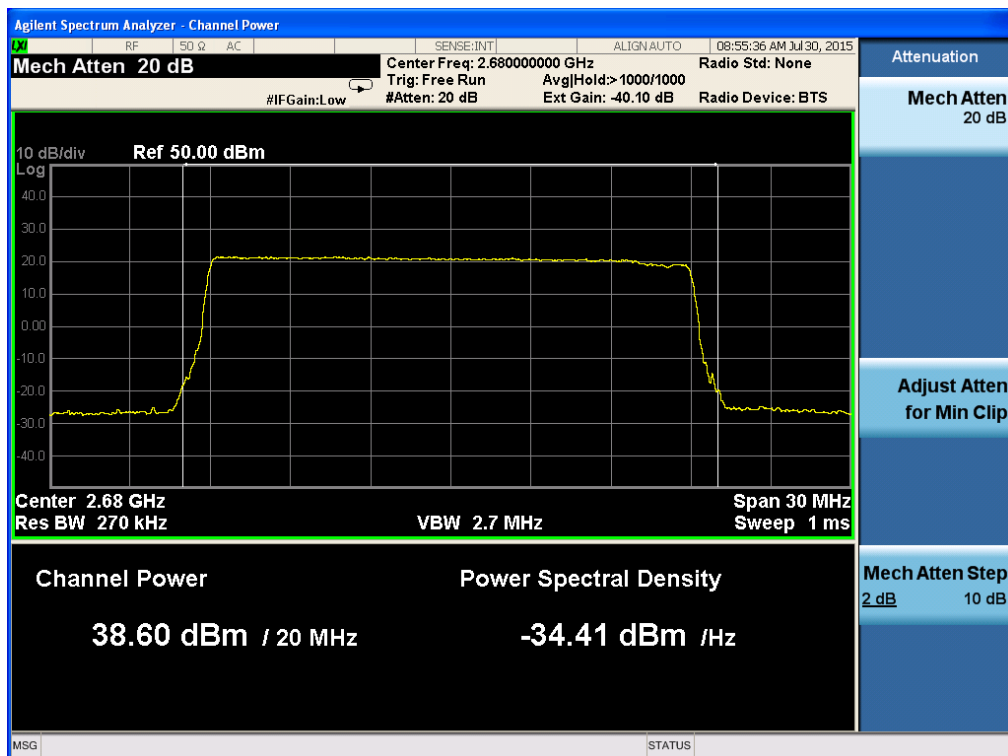


Figure 76. — 2680.0 MHz 16QAM Port 2

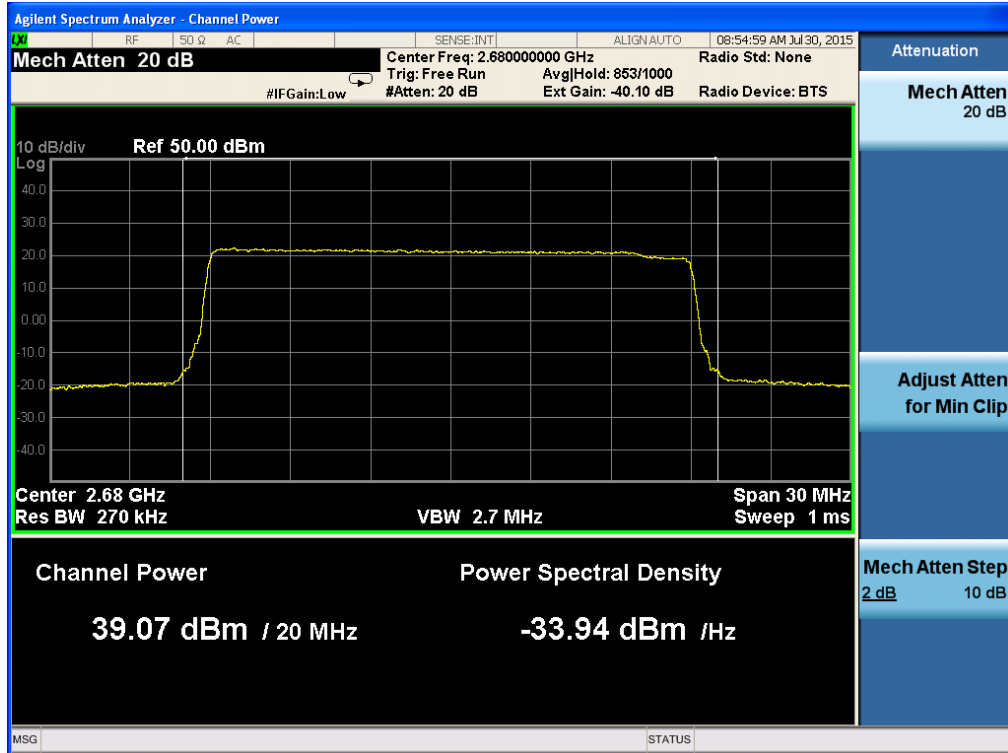


Figure 77. — 2680.0 MHz 16QAM Port 3

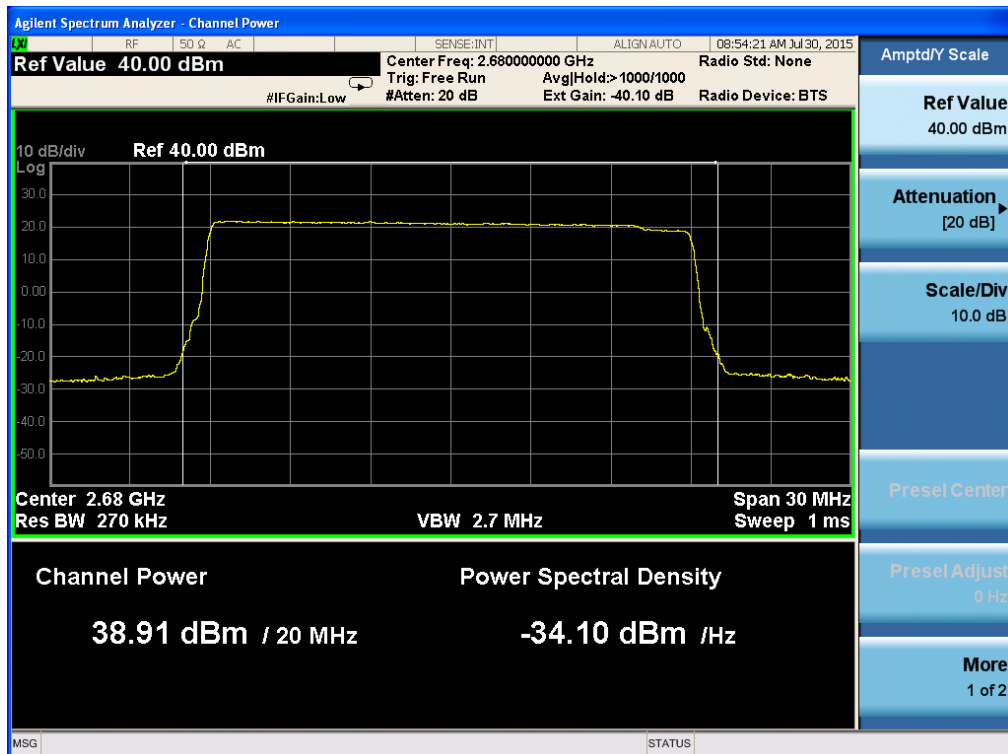


Figure 78. — 2680.0 MHz 16QAM Port 4

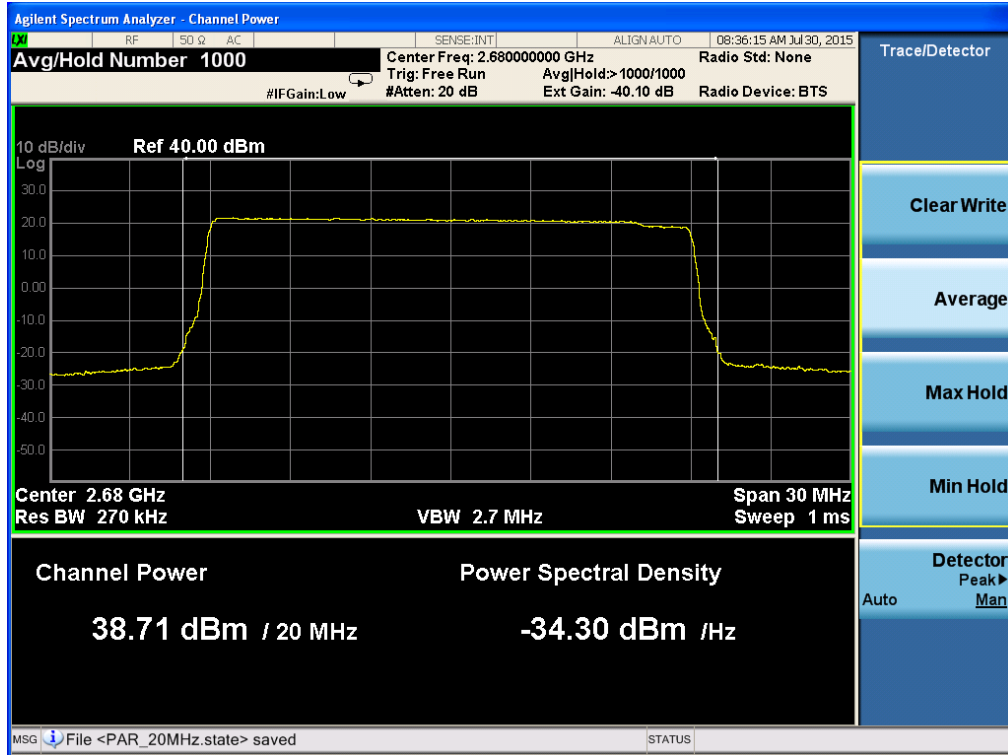


Figure 79. — 2680.0 MHz 64QAM Port 1

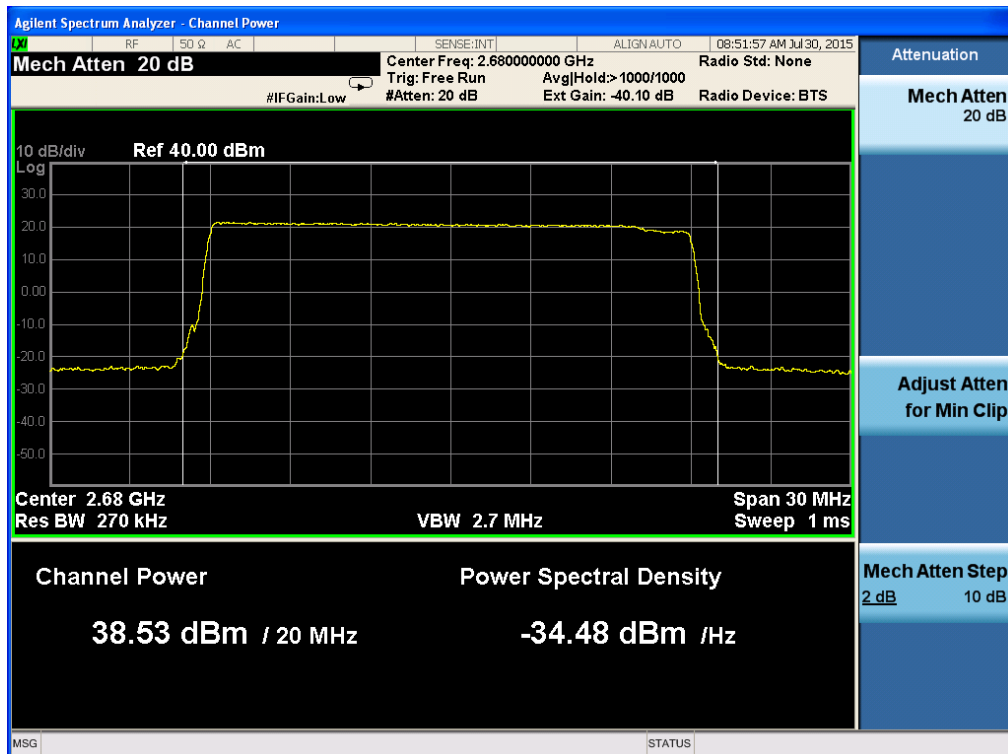


Figure 80. — 2680.0 MHz 64QAM Port 2

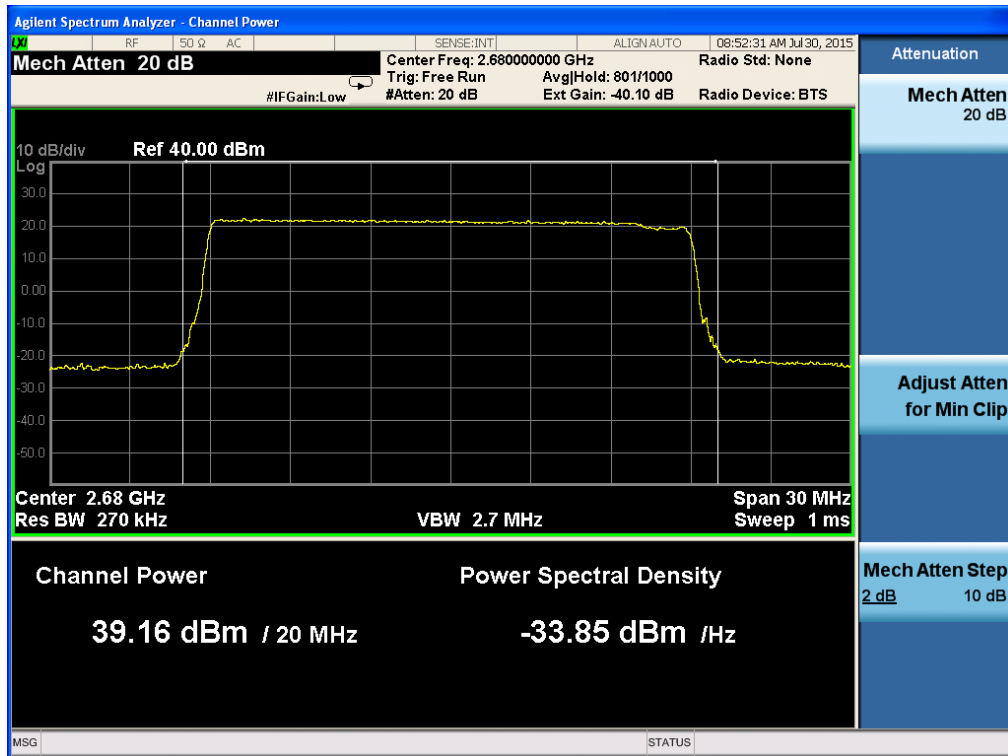


Figure 81. — 2680.0 MHz 64QAM Port 3

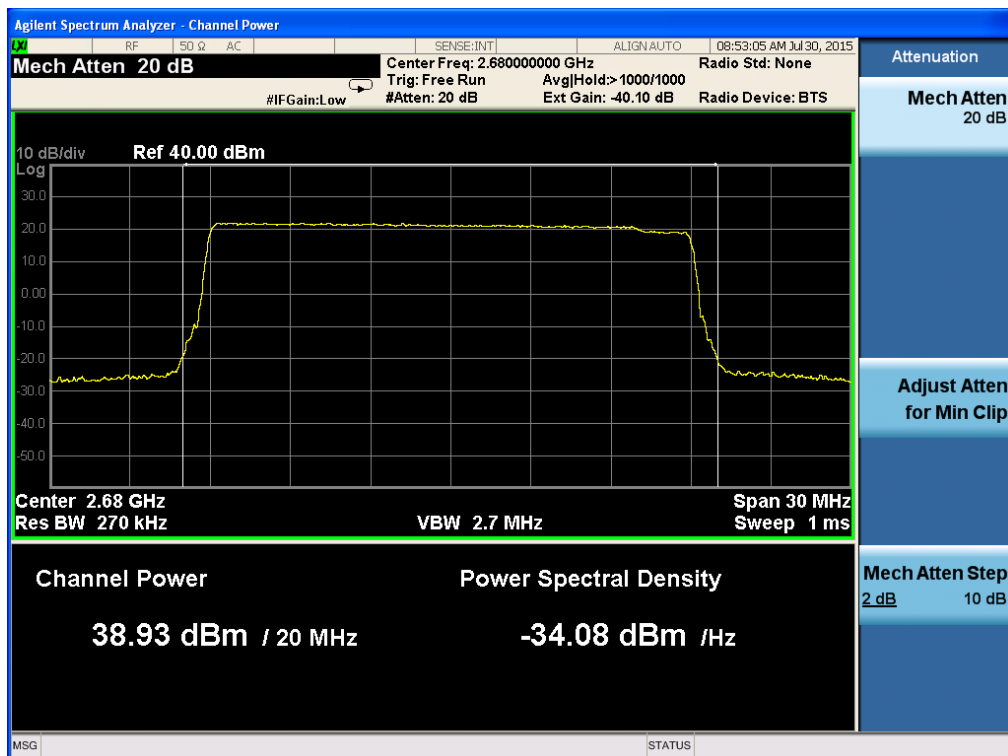


Figure 82. — 2680.0 MHz 64QAM Port 4



5.4 Test Equipment Used; Maximum Spectral Density 20 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
MXA Signal Analyzer	Agilent	N9020A	MY46471581	February 12 2015	2 years
DC Block	JFW	50DB-007	1-23	N/A	N/A
Coupler	Pulsar	CS06-B57-436/9	-	N/A	N/A
Attenuator	Weinschel	24-20-34	BZ144	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0855	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A

Figure 83 Test Equipment Used Maximum Spectral Density 20 MHz Bandwidth

6. Occupied Bandwidth 20 MHz Bandwidth

6.1 Test Specification

FCC Part 2, Section 1049

6.2 Test Procedure

The E.U.T. was set to the applicable test frequency with OFDMA modulations and 20MHz bandwidth in the 2506.0-2680.0MHz

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator, an appropriate coaxial cable, coupler, and DC block.

Including the duty cycle (see *Figure 40* to *Figure 41*), (total loss= -40.1 dB).

The spectrum analyzer was set to proper resolution B.W.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limit, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.

Occupied bandwidth measured was repeated in the input terminal of the E.U.T.

6.3 Test Results

Operating Frequency (MHz)	Modulation	Reading (MHz)
2506.00	QPSK	17.8
	16QAM	17.8
	64QAM	17.8
2593.00	QPSK	17.8
	16QAM	17.8
	64QAM	17.8
2680.00	QPSK	17.8
	16QAM	17.8
	64QAM	17.8

Figure 84 Occupied Bandwidth Test Results 20 MHz Bandwidth

See additional information in *Figure 85* to *Figure 93*.

JUDGEMENT: Passed

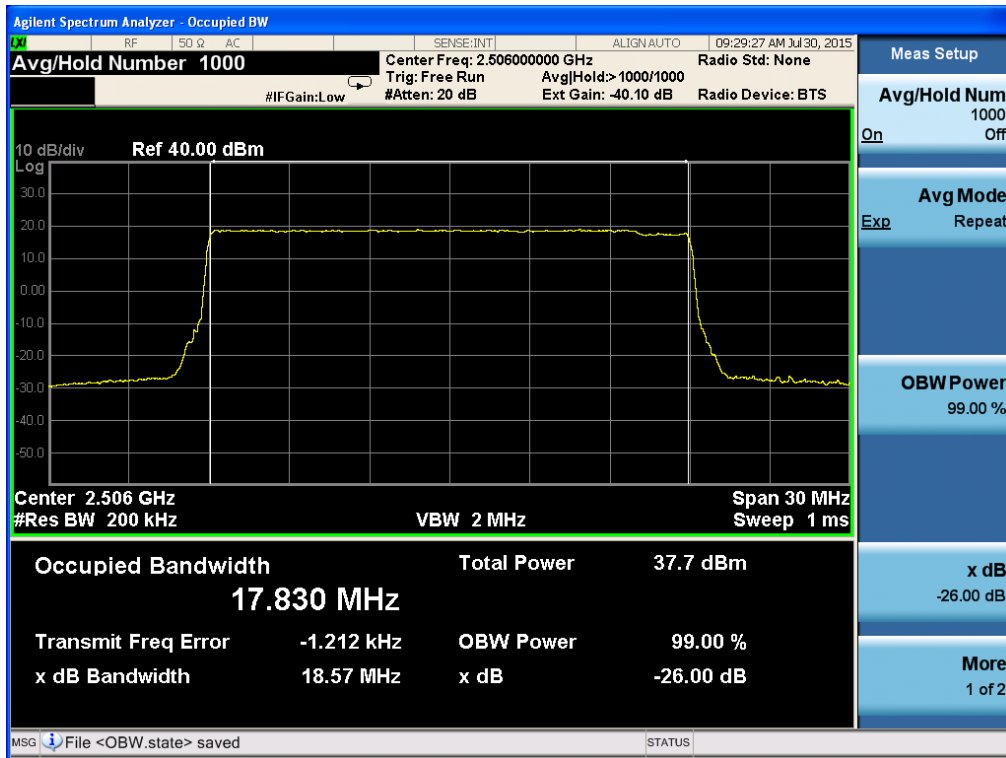


Figure 85. — 2506.0 MHz QPSK

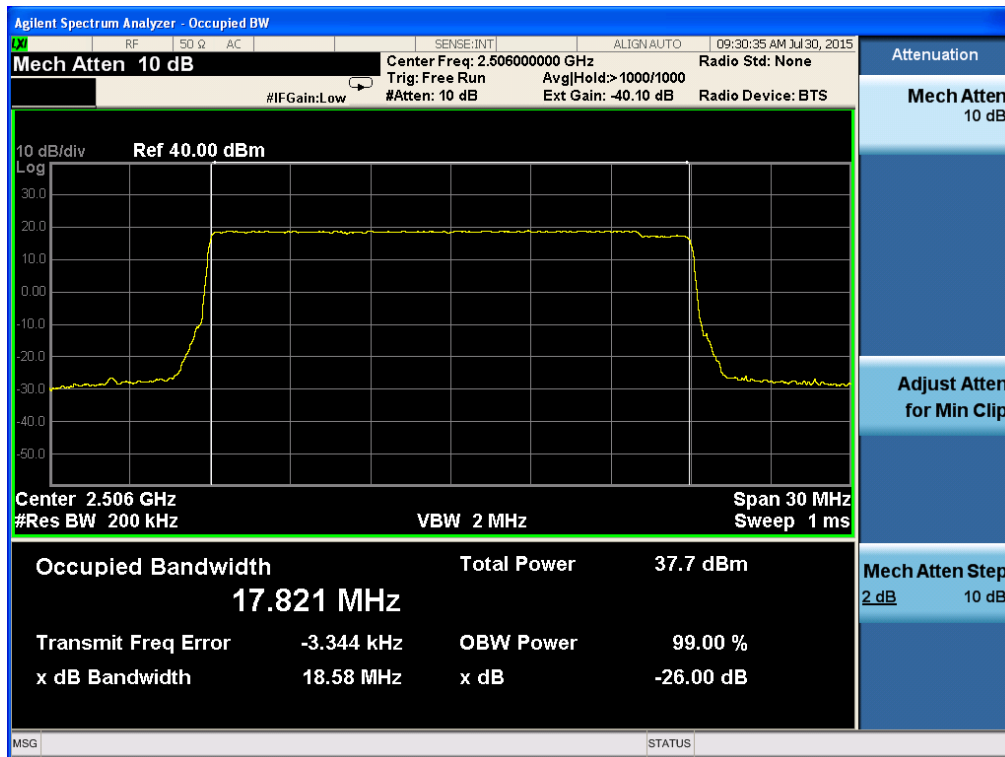


Figure 86. — 2506.0 MHz 16QAM

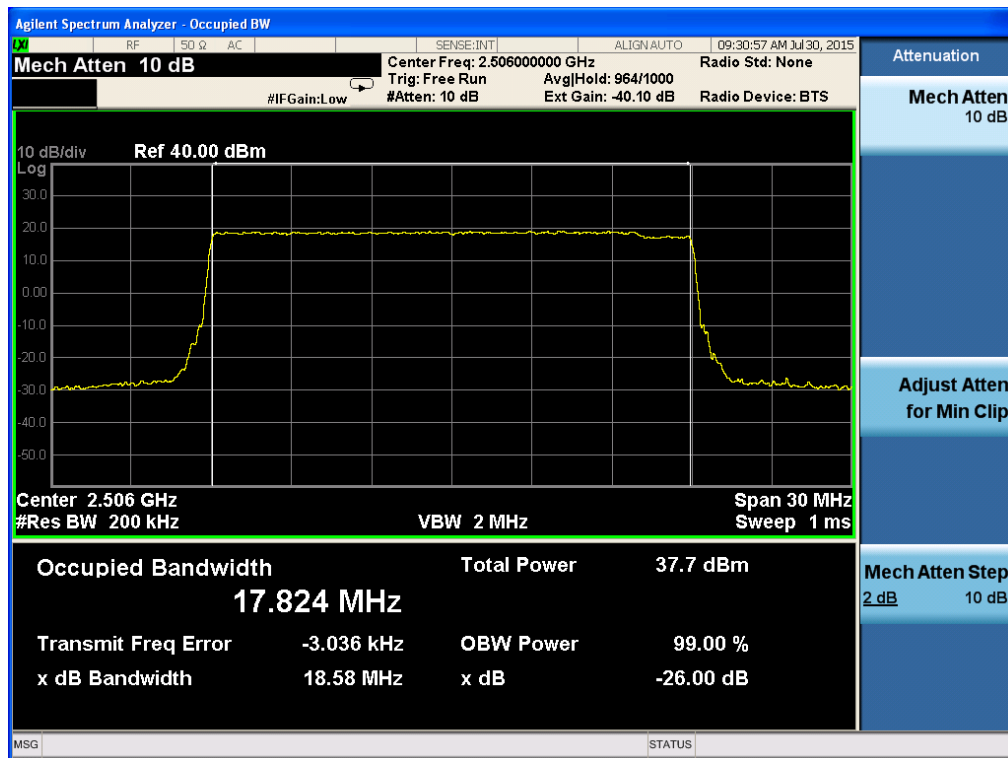


Figure 87. — 2506.0 MHz 64QAM

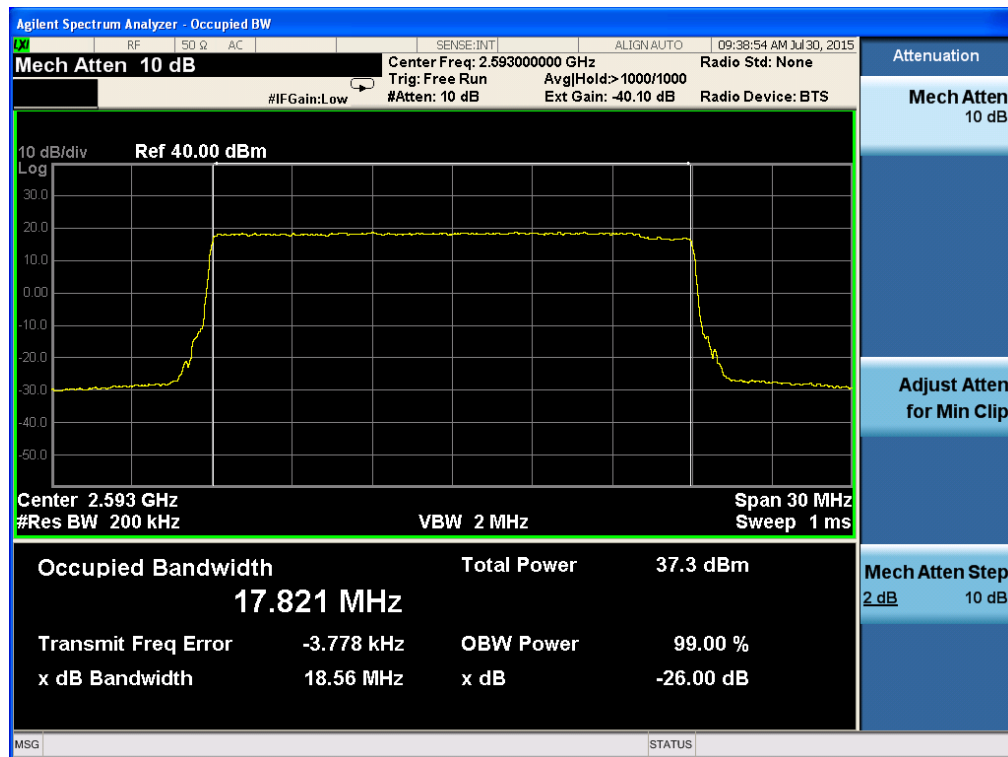


Figure 88. — 2593.0 MHz QPSK

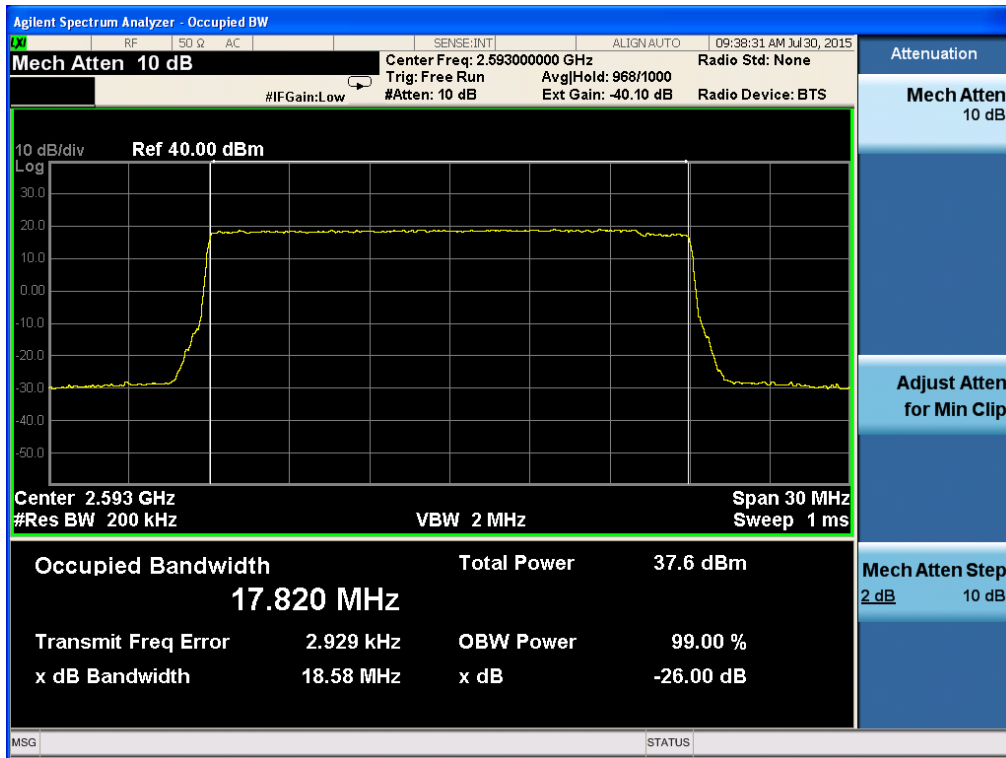


Figure 89. — 2593.0 MHz 16QAM

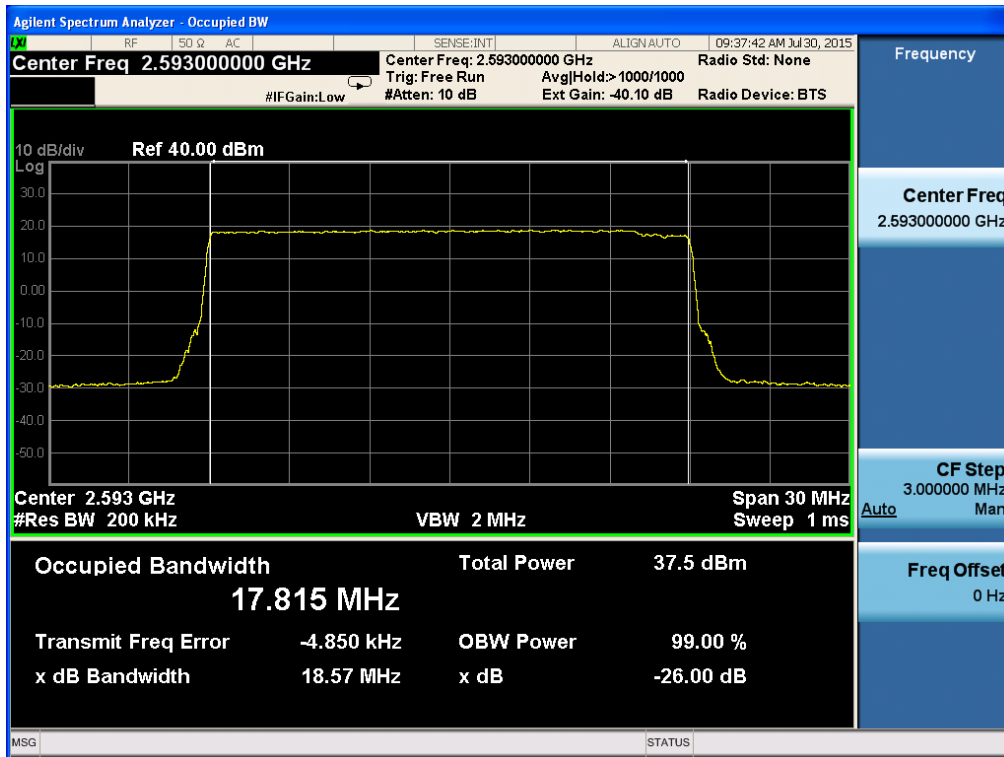


Figure 90. — 2593.0 MHz 64 QAM

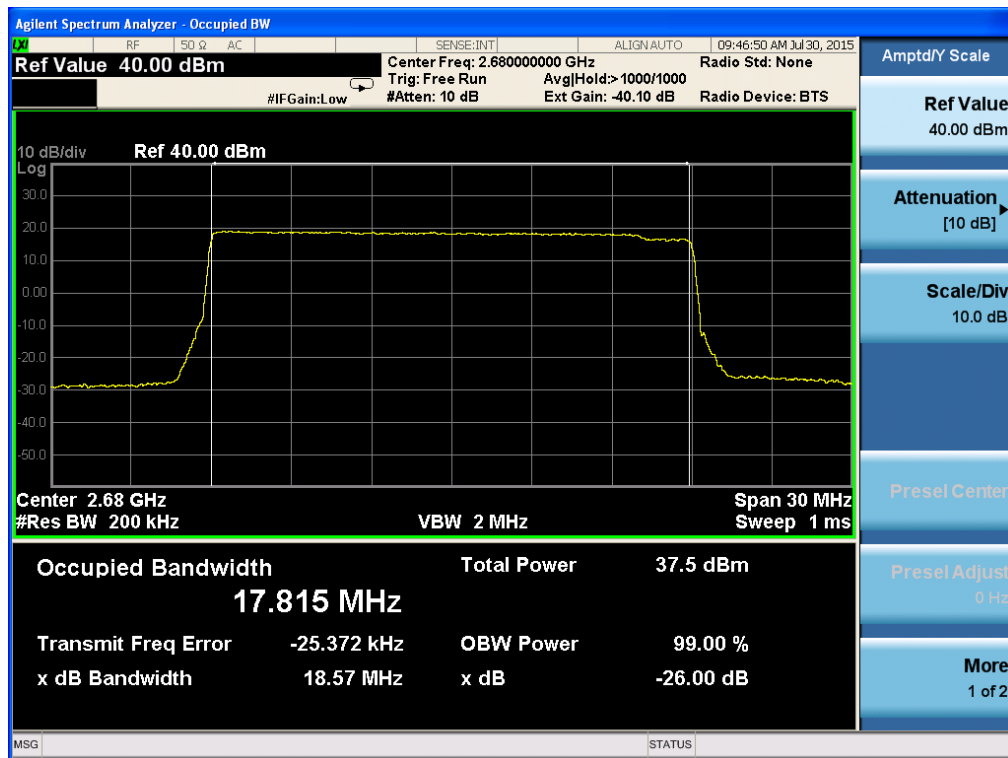


Figure 91. — 2680.0 MHz QPSK

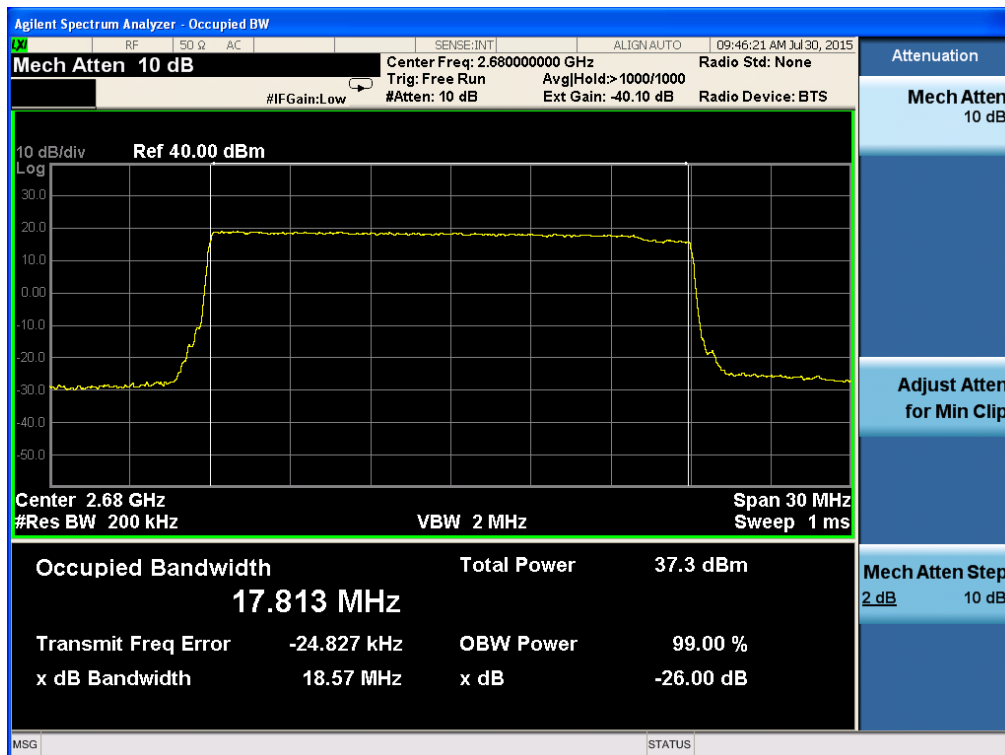


Figure 92. — 2680.0 MHz 16 QAM

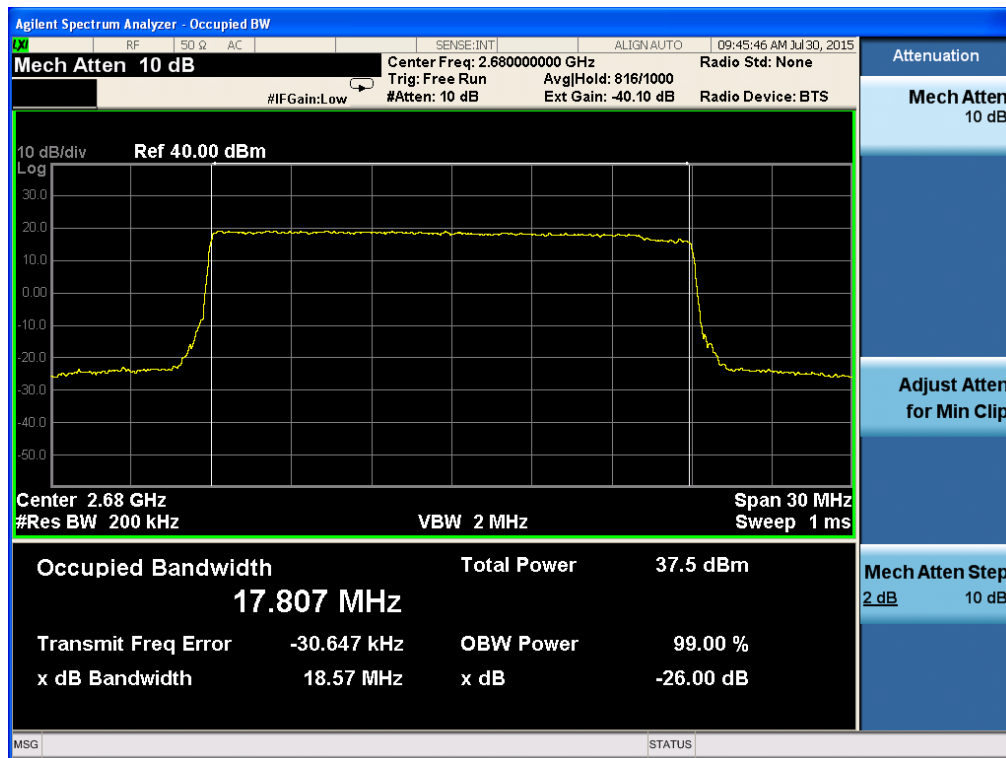


Figure 93. — 2680.0 MHz 64 QAM

6.4 Test Equipment Used; Occupied Bandwidth 20 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
MXA Signal Analyzer	Agilent	N9020A	MY46471581	February 12 2015	2 years
DC Block	JFW	50DB-007	1-23	N/A	N/A
Coupler	Pulsar	CS06-B57-436/9	-	N/A	N/A
Attenuator	Weinschel	24-20-34	BZ144	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0855	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A

Figure 94. Test Equipment Used Occupied Bandwidth 20 MHz Bandwidth



7. Band Edge Spectrum 20 MHz Bandwidth

7.1 Test Specification

FCC Part 27, Sub-part C, Section 27.53 (m 4-6)

7.2 Test Procedure

Enclosed are spectrum analyzer plots for the lowest operation frequency and the highest operation frequency in which the E.U.T. is planned to be used.

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, yielding -13dBm .

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator, an appropriate coaxial cable, coupler, and DC block, including the duty cycle (total loss= -40.1 dB).

The spectrum analyzer was set to 200 kHz R.B.W (1% from 20MHz).

7.3 Test Results

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Reading (dBm)	Specification (dBm)
2506.00	QPSK	2495.9	-22.6	-13.0
	QPSK	2516.1	-23.1	-13.0
	16QAM	2495.9	-22.8	-13.0
	16QAM	2516.1	-22.7	-13.0
	64QAM	2495.9	-22.5	-13.0
	64QAM	2516.1	-22.1	-13.0
2593.00	QPSK	2582.9	-25.5	-13.0
	QPSK	2603.9	-25.2	-13.0
	16QAM	2582.9	-23.9	-13.0
	16QAM	2603.9	-26.0	-13.0
	64QAM	2582.9	-24.0	-13.0
	64QAM	2603.9	-24.4	-13.0
2680.00	QPSK	2669.9	-23.5	-13.0
	QPSK	2690.0	-22.1	-13.0
	16QAM	2669.9	-22.7	-13.0
	16QAM	2690.0	-23.9	-13.0
	64QAM	2669.9	-24.9	-13.0
	64QAM	2690.0	-23.6	-13.0

Figure 95. Band Edge Spectrum Test Results

See additional information in *Figure 96 to Figure 113*.

JUDGEMENT: Passed

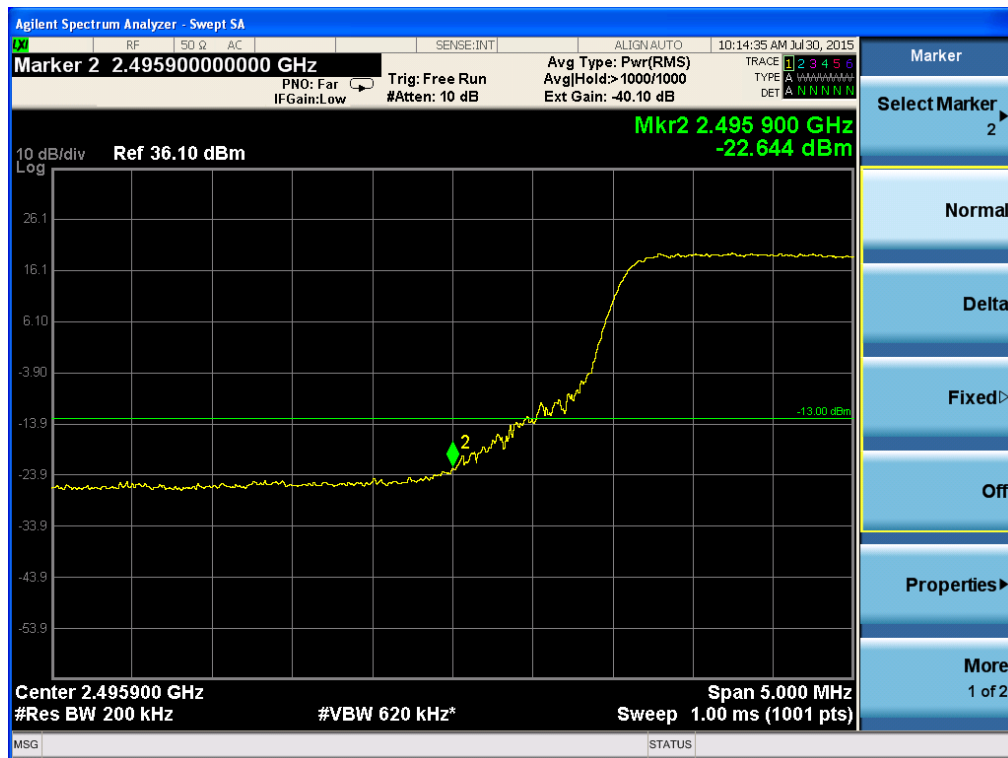


Figure 96. — 2506.0 MHz QPSK LOW

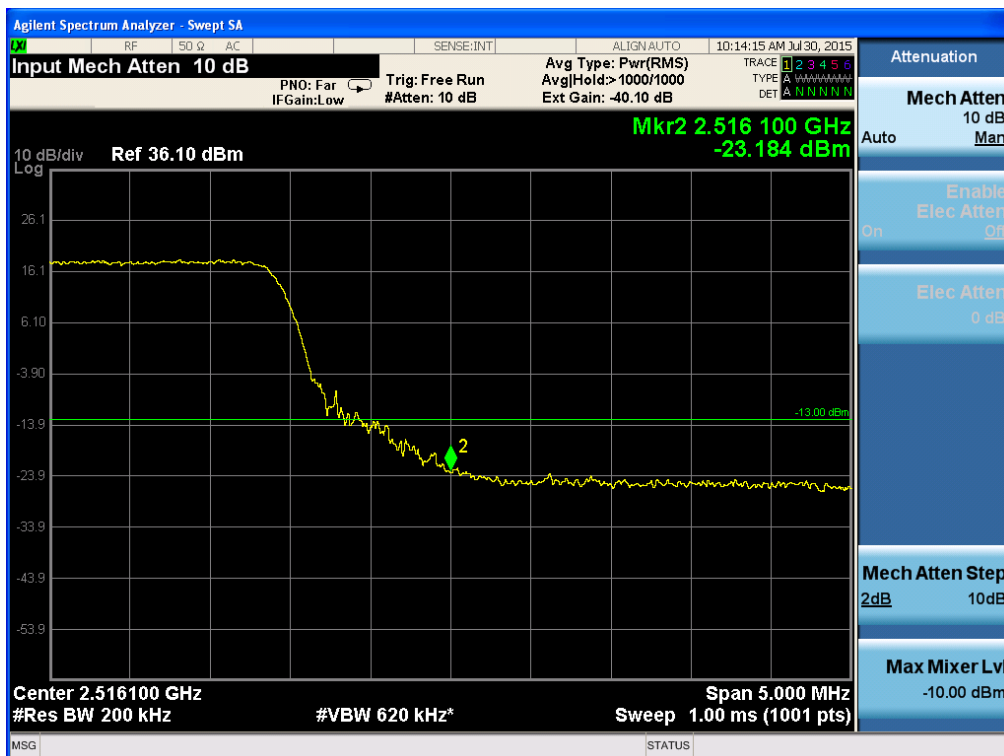


Figure 97. — 2506.0 MHz QPSK HIGH

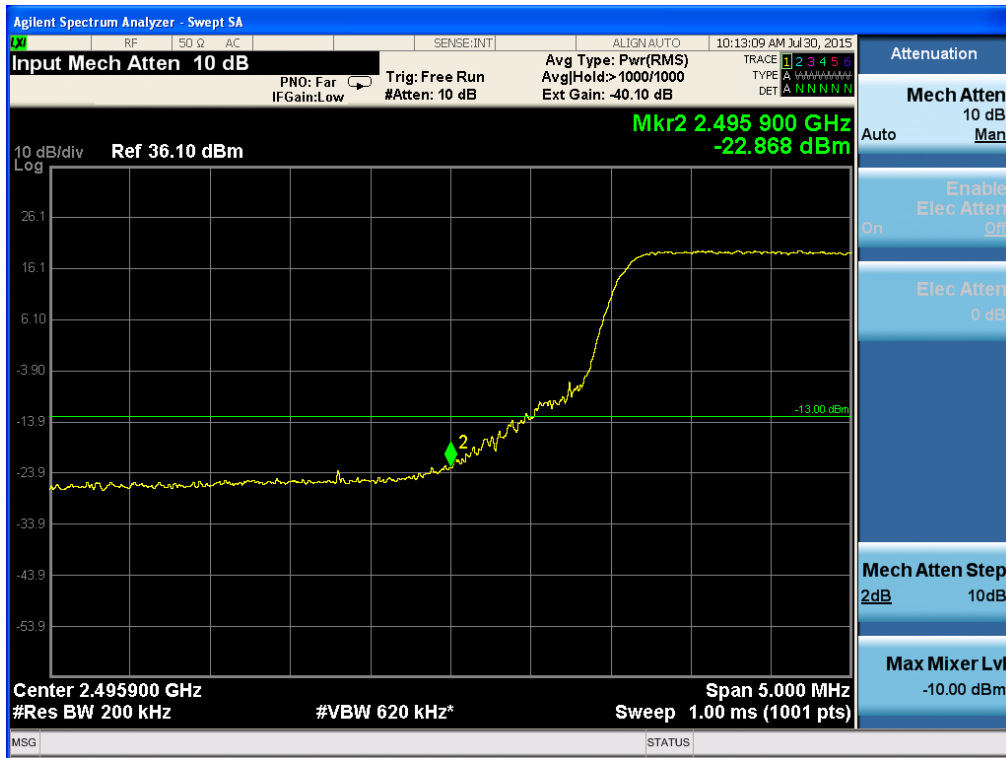


Figure 98. — 2506.0 MHz 16QAM LOW

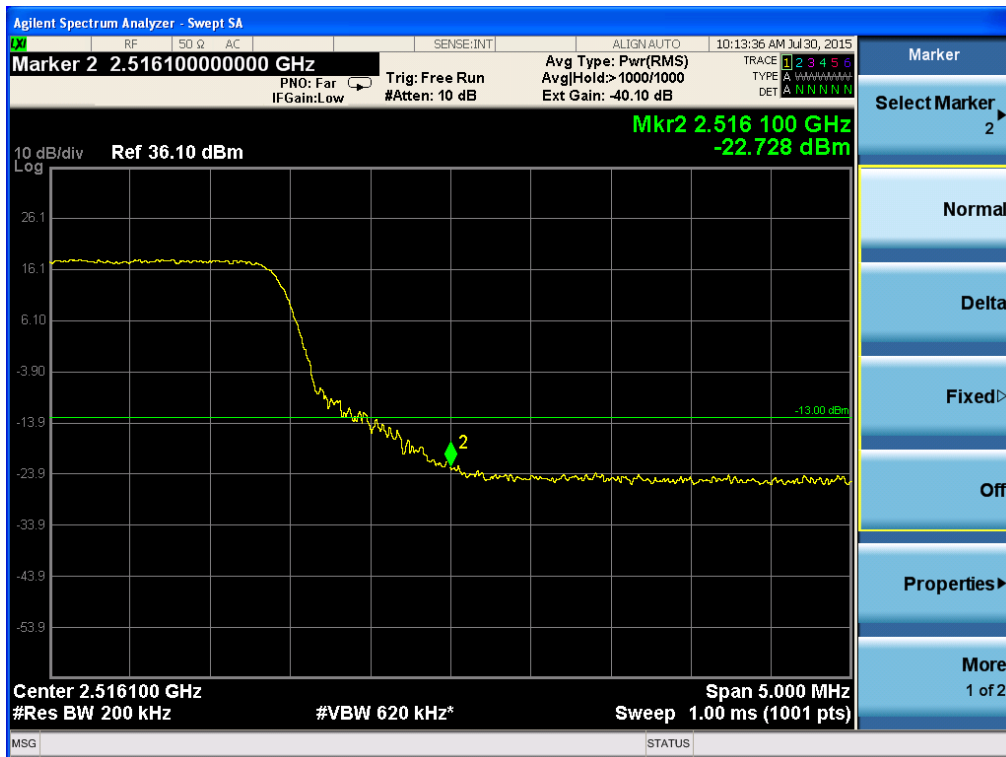


Figure 99. — 2506.0 MHz 16QAM HIGH

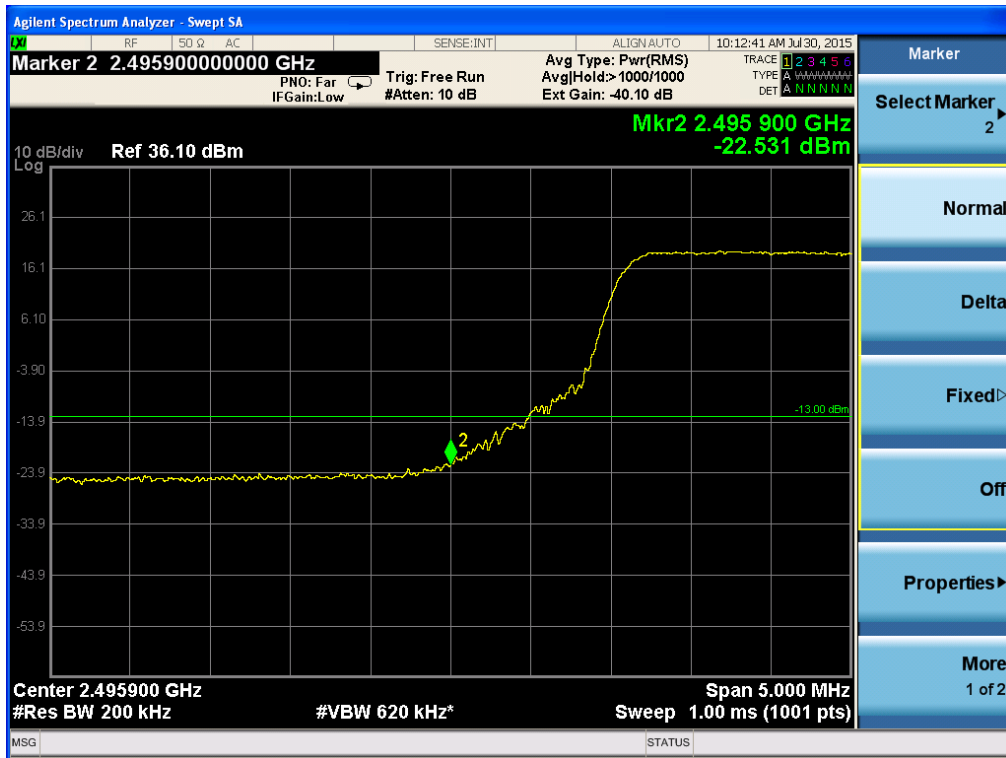


Figure 100. — 2506.0 MHz 64QAM LOW

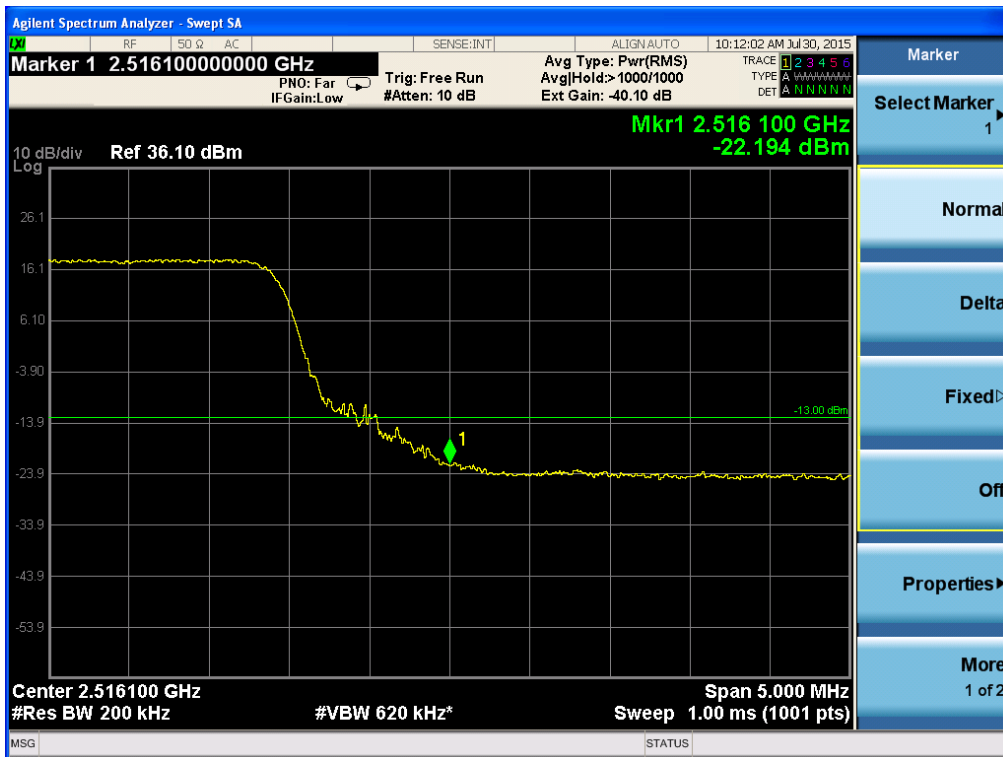


Figure 101. — 2506.0 MHz 64QAM HIGH

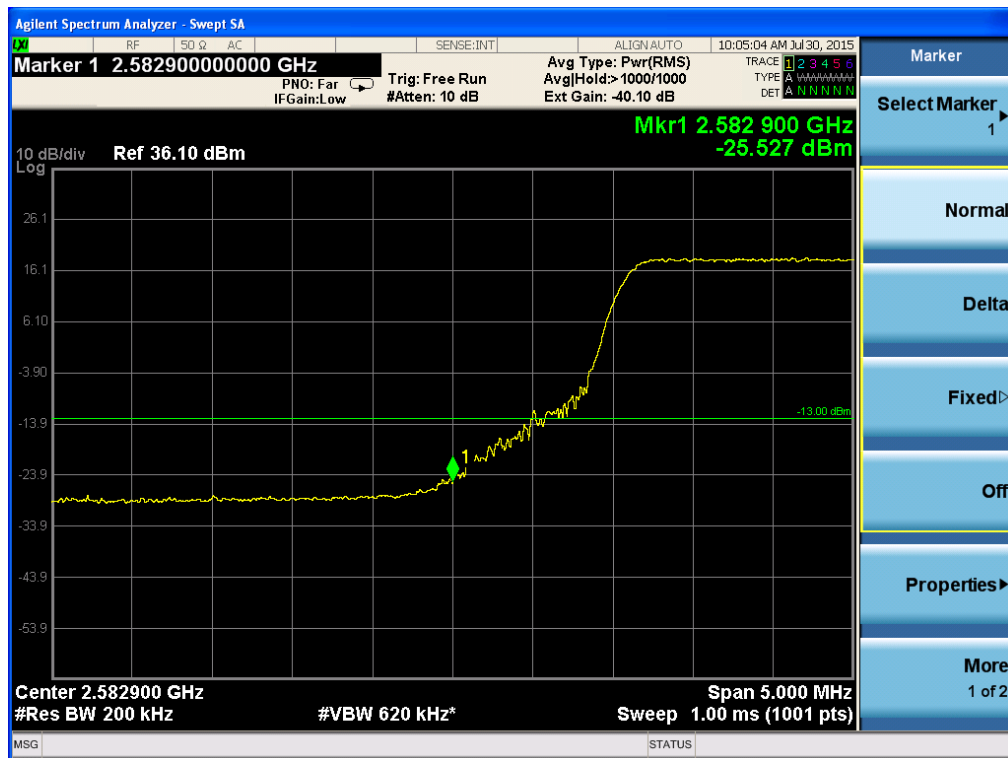


Figure 102. — 2593.0 MHz QPSK LOW

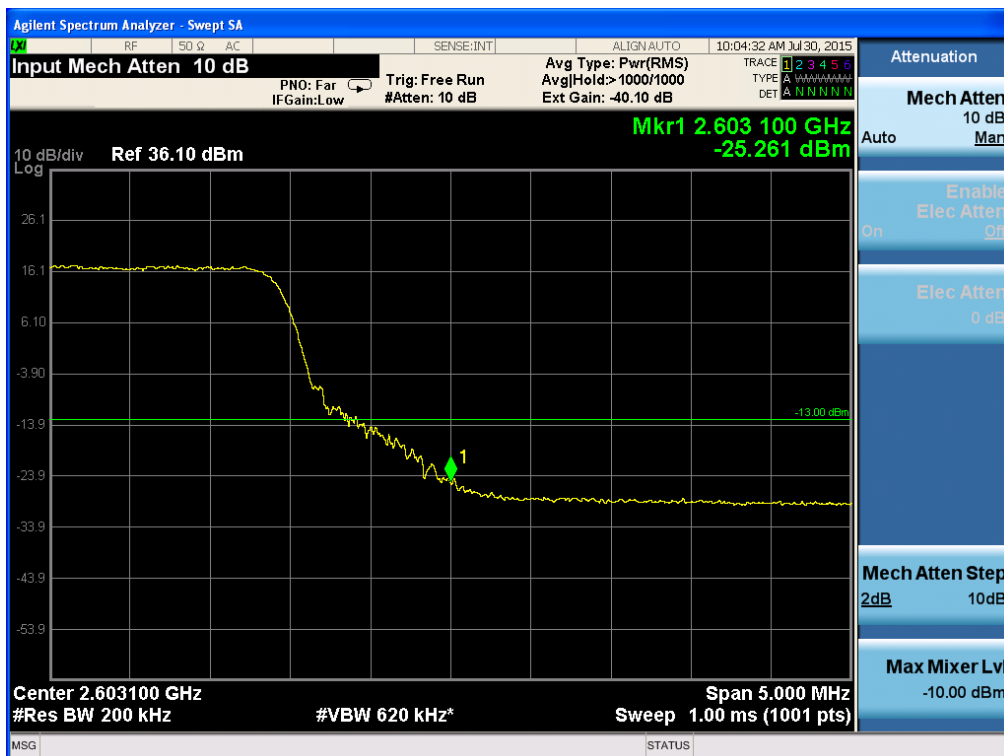


Figure 103. — 2593.0 MHz QPSK HIGH

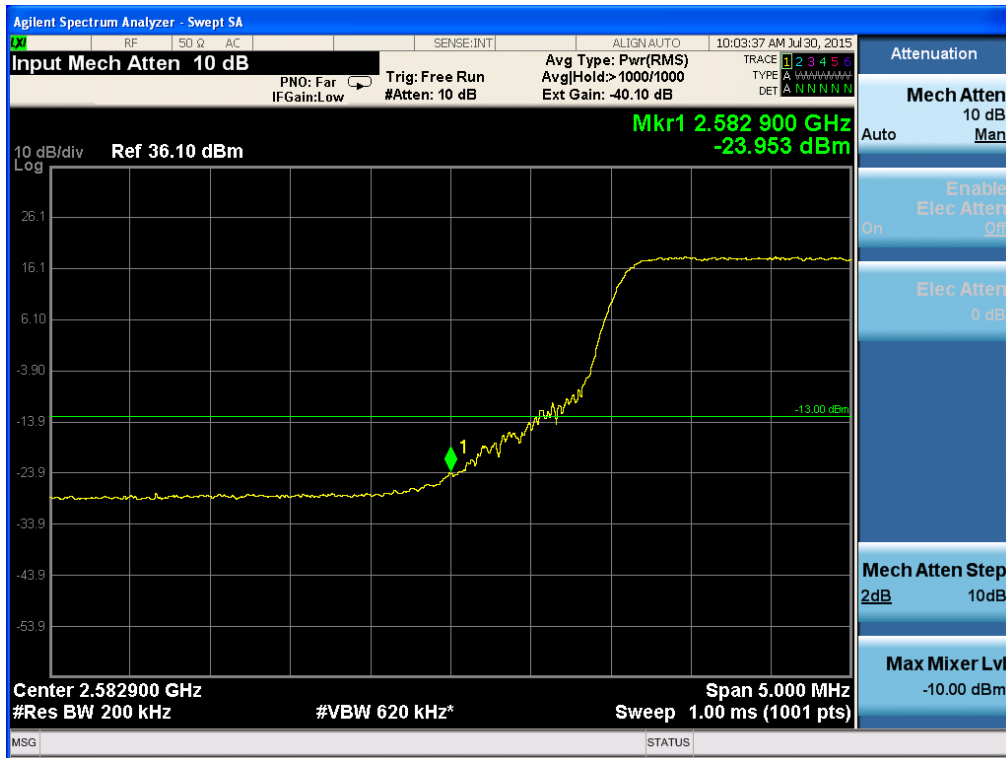


Figure 104. — 2593.0 MHz 16QAM LOW

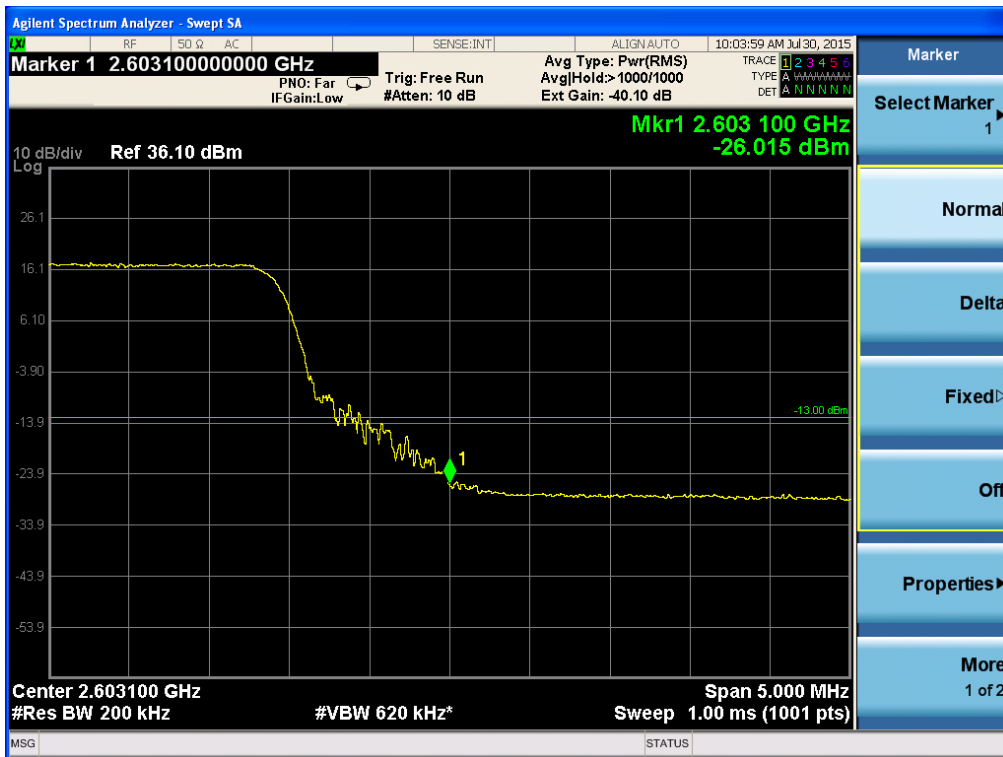


Figure 105. — 2593.0 MHz 16QAM HIGH

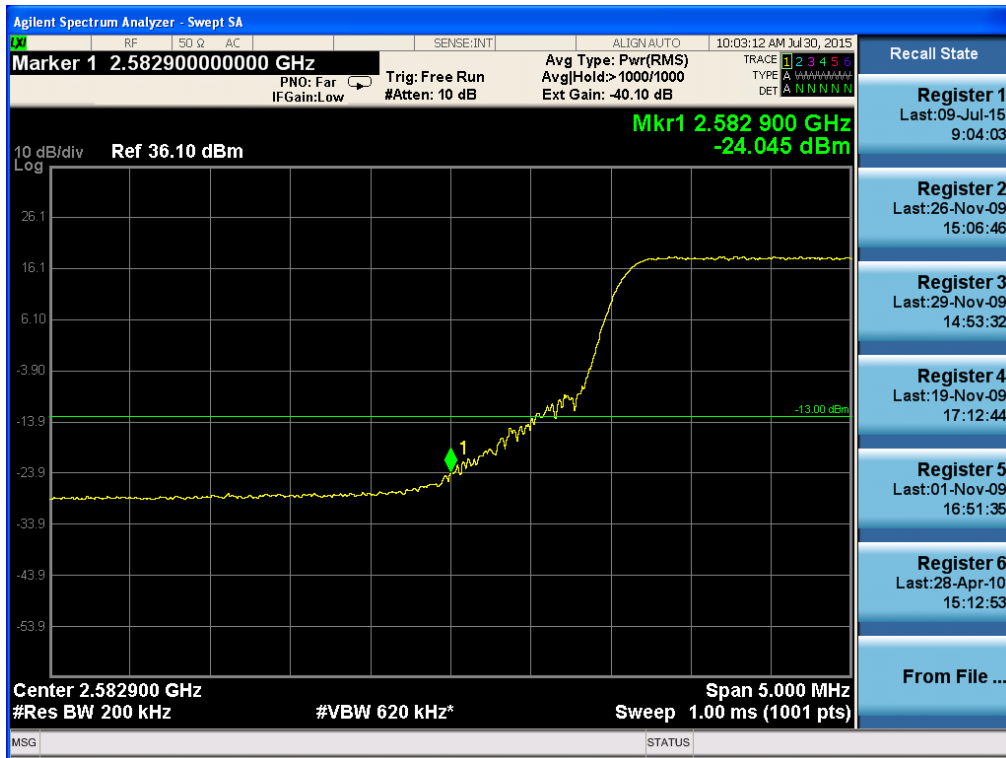


Figure 106. — 2593.0 MHz 64QAM LOW

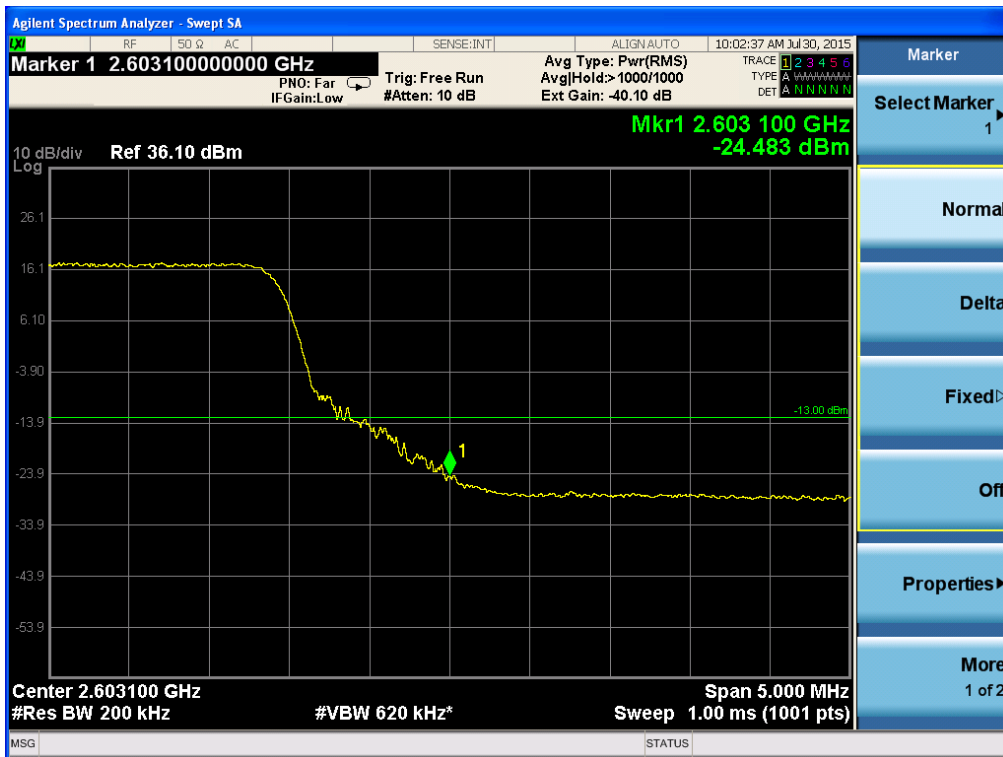


Figure 107. — 2593.0 MHz 64QAM HIGH

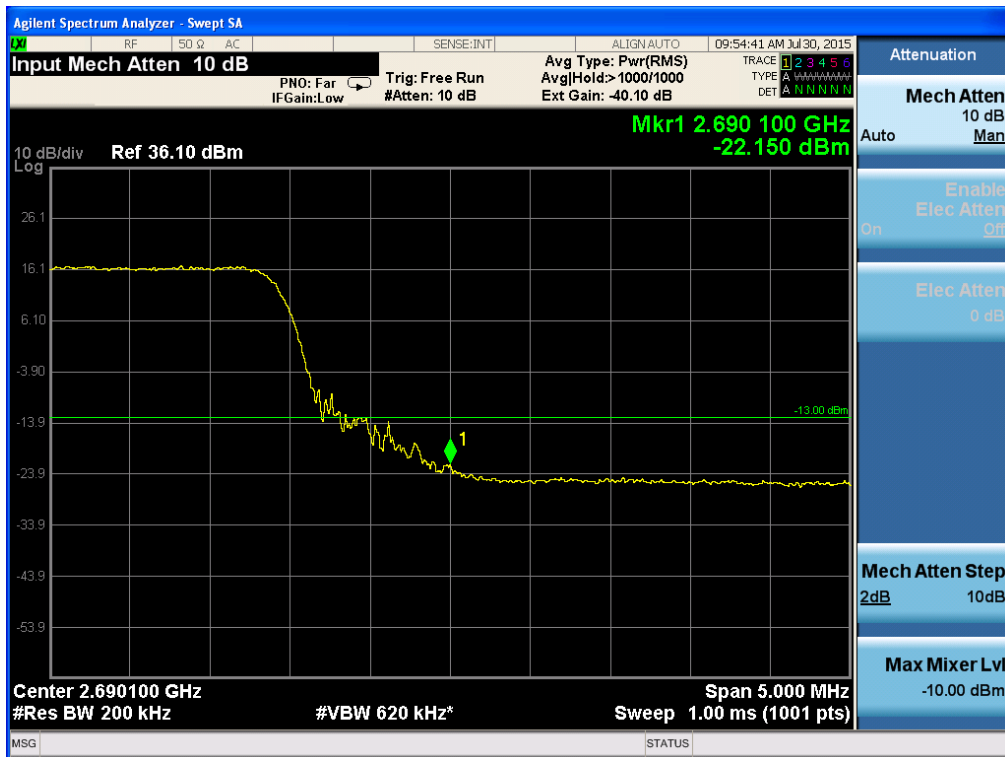
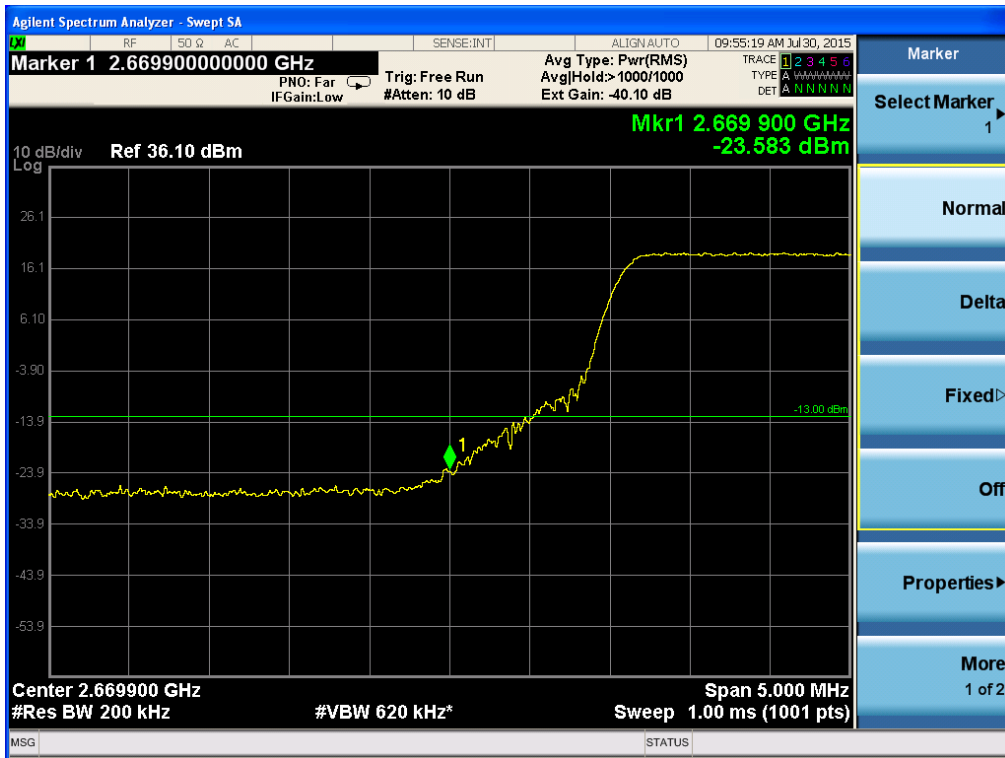


Figure 108. — 2680.0 MHz QPSK LOW

Figure 109. — 2680.0 MHz QPSK HIGH

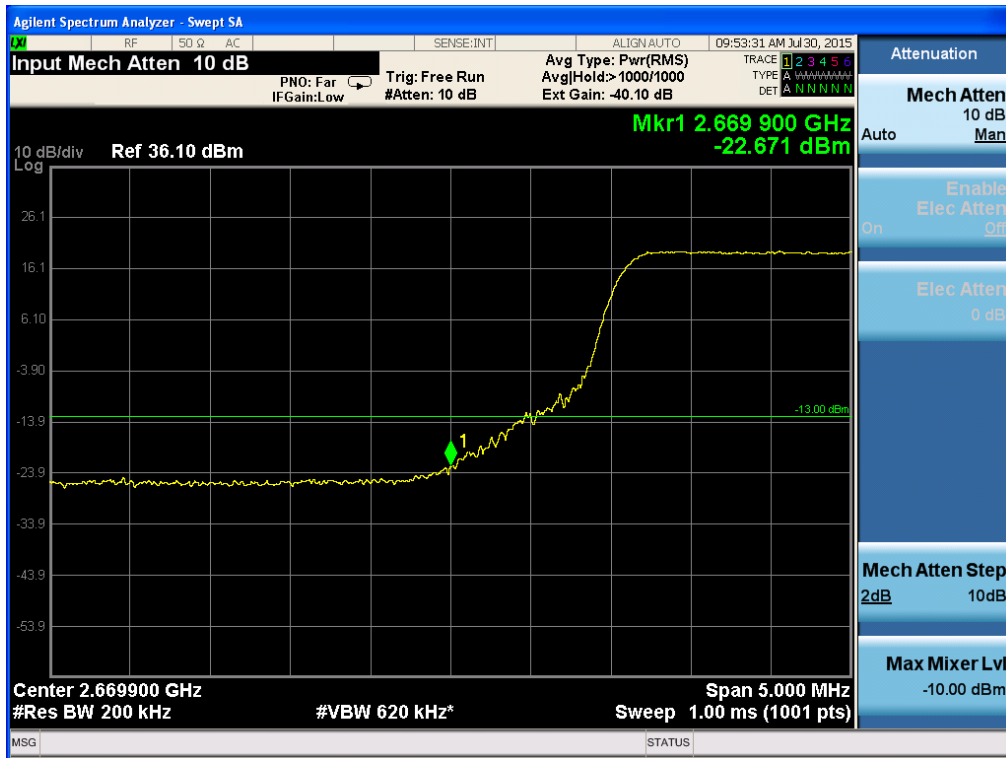


Figure 110. — 2680.0 MHz 16QAM LOW

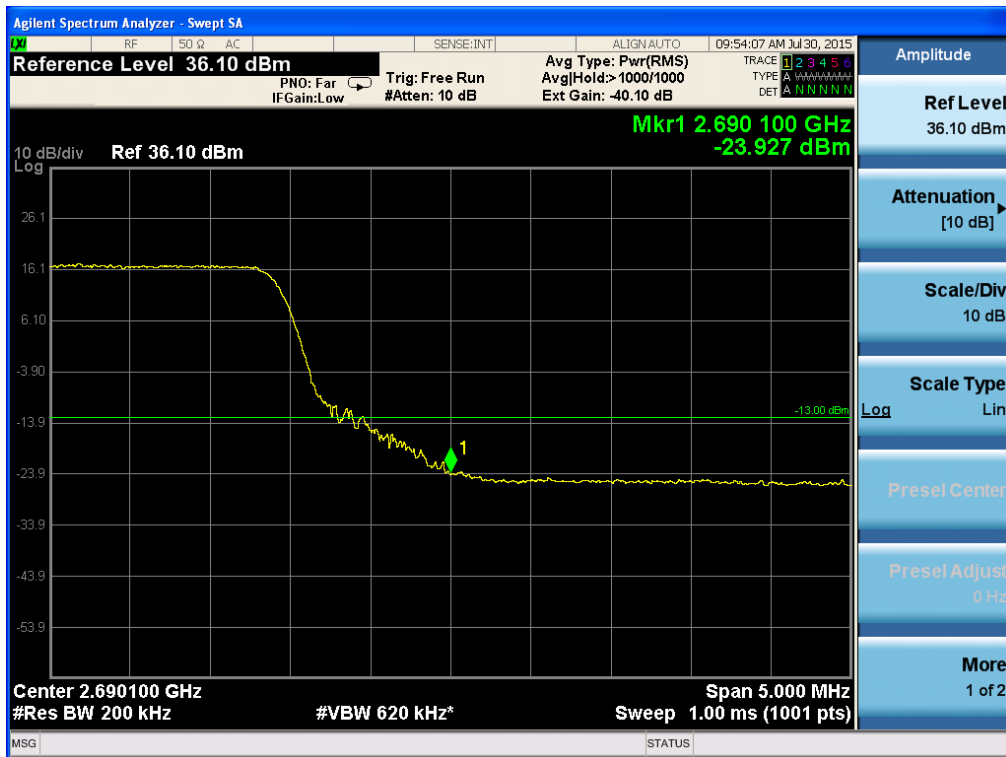


Figure 111. — 2680.0 MHz 16QAM HIGH

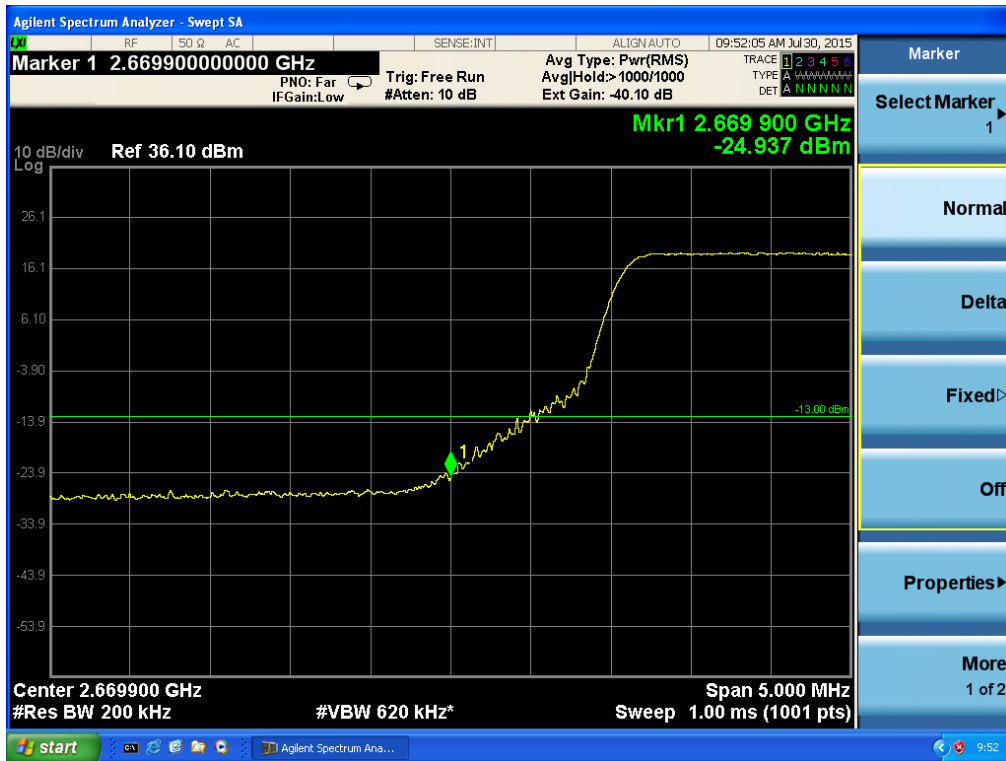


Figure 112. — 2680.0 MHz 64QAM LOW

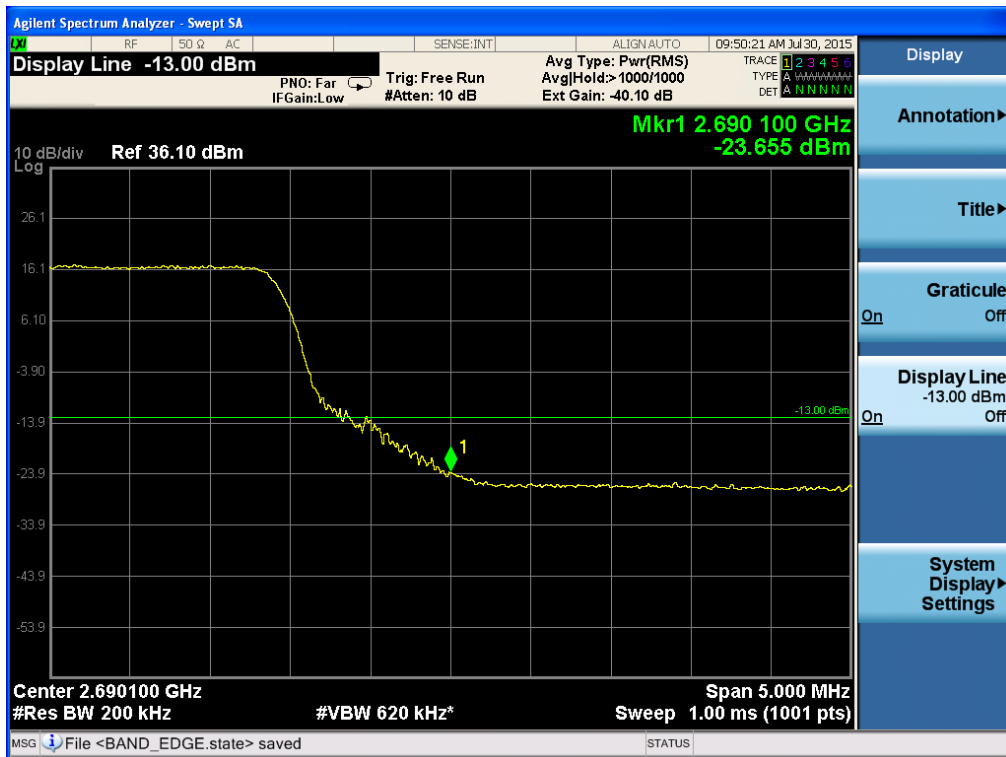


Figure 113. — 2680.0 MHz 64QAM HIGH



7.4 Test Equipment Used; Band Edge Spectrum 20 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
MXA Signal Analyzer	Agilent	N9020A	MY46471581	February 12 2015	2 years
DC Block	JFW	50DB-007	1-23	N/A	N/A
Coupler	Pulsar	CS06-B57-436/9	-	N/A	N/A
Attenuator	Weinschel	24-20-34	BZ144	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0855	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A

Figure 114. Test Equipment Used Band Edge spectrum 20 MHz Bandwidth