

FCC TEST REPORT



Issued to

GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP.,LTD

For

Mobile Phone

Model Name: OPPO R831L
Trade Name: OPPO
Brand Name: OPPO
FCC ID : R9C-R831L
Standard: 47 CFR Part 27, Subpart L
Test date: 2014-5-14 to 2014-6-4
Issue date: 2014-6-9

By

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Date 2014.6.9

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Date 2014.6.9



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Date 2014.6.9

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| Change History | | |
|----------------|-------------|-------------------|
| Issue | Date | Reason for change |
| 1.0 | Jun 9, 2014 | First edition |
| | | |



1. GENERAL INFORMATION

1.1 EUT Description

EUT Type..... : Mobile Phone
Serial No..... : (n.a, marked #1 by test site)
Hardware Version..... : 214081
Software Version : R831L_1X_XXXXXX
Applicant..... : GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP.,LTD
NO.18 HAIBIN ROAD, WUSHA, CHANG'AN, DONGGUAN,
GUANGDONG,CHINA
Manufacturer : GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP.,LTD
NO.18 HAIBIN ROAD, WUSHA, CHANG'AN, DONGGUAN,
GUANGDONG,CHINA
Modulation Type : LTE Band 4: QPSK, 16QAM
Emission Designator 1M11G7D (LTE Band 4, QPSK, BW 1.4MHz)
1M20W7D (LTE Band 4, 16QAM, BW 1.4MHz)
2M72G7D (LTE Band 4, QPSK, BW 3MHz)
2M71 W7D (LTE Band 4, 16QAM, BW 3MHz)
4M52G7D (LTE Band 4, QPSK, BW 5MHz)
4M52 W7D (LTE Band 4, 16QAM, BW 5MHz)
9M00G7D (LTE Band 4, QPSK, BW 10MHz)
8M99 W7D (LTE Band 4, 16QAM, BW 10MHz)
13M46G7D (LTE Band 4, QPSK, BW 15MHz)
13M47 W7D (LTE Band 4, 16QAM, BW 15MHz)
17M92G7D (LTE Band 4, QPSK, BW 20MHz)
17M92W7D (LTE Band 4, 16QAM, BW 20MHz)
Antenna Type : PIFA Antenna
Power Supply 3.8V DC Power

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2 and Part 27 for the EUT FCC ID Certification:

| No. | Identity | Document Title |
|-----|----------------|---|
| 1 | 47 CFR Part 2 | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| 2 | 47 CFR Part 27 | Miscellaneous Wireless Communications Services |

Test detailed items/section required by FCC rules and results are as below:

| No. | Section | Description | Result |
|-----|------------------------------|-------------------------------------|-------------|
| 1 | 2.1046 | Transmitter Conducted Output Power | <u>PASS</u> |
| 2 | 27.50(d)(5) | Occupied Bandwidth | <u>PASS</u> |
| 3 | 2.1049,27.53(g) | Frequency Stability | <u>PASS</u> |
| 4 | 2.1055, 27.54 | Peak to Average Ratio | <u>PASS</u> |
| 5 | 2.1051,2.1057,27.53(g) | Conducted Spurious Emissions | <u>PASS</u> |
| 6 | 2.1051,2.1057 27.53(g)(h) | Band Edge | <u>PASS</u> |
| 7 | 27.50(d)(4) | Equivalent Isotropic Radiated Power | <u>PASS</u> |
| 8 | 2.1053,2.1057 27.53(g) | Radiated Spurious Emissions | <u>PASS</u> |

1.3 Facilities and Accreditations

1.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. China. The test site is constructed in conformance with the requirements of TIA/EIA 603.D: 2010, ANSI C63.4: 2009 and CISPR Publication 22: 2010. The FCC registration number is 695796.

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

| | |
|-----------------------------|----------|
| Temperature (°C): | 15 - 35 |
| Relative Humidity (%): | 30 - 60 |
| Atmospheric Pressure (kPa): | 86 - 106 |

2. 47 CFR PART 2, PART 27L REQUIREMENTS

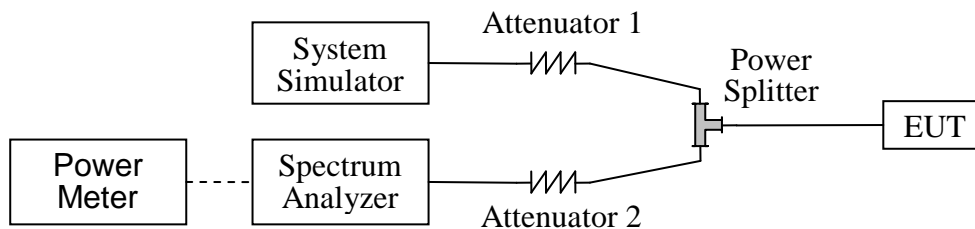
2.1 Transmitter Conducted Output Power

2.1.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

2.1.2 Test Description

1. Test Setup:



The EUT, which is powered 5V DC power (USB port), is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2. Equipments List:

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due |
|-------------------|----------------|--------|----------------------------|------------|------------|
| System Simulator | Rohde& Schwarz | CMW500 | 1201.0002k50 /124534/wk | 2014.02.26 | 2015.02.25 |
| Spectrum Analyzer | Rohde& Schwarz | FSL | 10246 | 2014.02.26 | 2015.02.25 |
| Spectrum Analyzer | Agilent | E4445A | MY44200685 | 2014.02.26 | 2015.02.25 |
| Power Meter | Agilent | E4418B | GB43318055 | 2014.02.26 | 2015.02.25 |
| Power Meter | Agilent | E4418B | GB43318055 | 2014.02.26 | 2015.02.25 |
| Power Sensor | Agilent | 8482A | MY41091706 | 2014.02.26 | 2015.02.25 |
| Power Splitter | Weinschel | 1506A | NW521 | 2014.02.26 | 2015.02.25 |
| Attenuator 1 | Resnet | 20dB | (n.a.) | 2014.02.26 | 2015.02.25 |



| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due |
|--------------|--------------|-------|------------|------------|------------|
| Attenuator 2 | Resnet | 3dB | (n.a.) | 2014.02.26 | 2015.02.25 |

2.1.3 Test Results

LTE BAND 4

| Band Width | Channel | Freq.(MHZ) | Modulation | RB Configuration | | Average Power (dBm) |
|------------|------------|------------|------------|------------------|-----------|---------------------|
| | | | | RB Size | RB Offset | |
| 20MHz | L 20050 | 1720.0 | QPSK | 1 | 0 | 23.17 |
| | | | | 1 | 49 | 23.08 |
| | | | | 1 | 99 | 23.07 |
| | | | | 50 | 0 | 23.08 |
| | | | | 50 | 25 | 22.97 |
| | | | | 50 | 49 | 22.97 |
| | | | | 100 | 0 | 22.88 |
| | | | 16-QAM | 1 | 0 | 23.10 |
| | | | | 1 | 49 | 23.18 |
| | | | | 1 | 99 | 23.15 |
| | | | | 50 | 0 | 23.04 |
| | | | | 50 | 25 | 23.04 |
| | | | | 50 | 49 | 23.03 |
| | | | | 100 | 0 | 22.89 |
| | M 20175 | 1732.5 | QPSK | 1 | 0 | 23.26 |
| | | | | 1 | 49 | 23.16 |
| | | | | 1 | 99 | 23.18 |
| | | | | 50 | 0 | 23.12 |
| | | | | 50 | 25 | 23.10 |
| | | | | 50 | 49 | 23.09 |
| | | | | 100 | 0 | 22.98 |
| | | | 16-QAM | 1 | 0 | 23.15 |
| | | | | 1 | 49 | 23.14 |
| | | | | 1 | 99 | 23.18 |
| | | | | 50 | 0 | 23.11 |
| | | | | 50 | 25 | 23.17 |
| | | | | 50 | 49 | 23.14 |
| | | | | 100 | 0 | 22.97 |
| | H 20300 | 1745.0 | QPSK | 1 | 0 | 23.18 |
| | | | | 1 | 49 | 23.08 |
| 1 | | | | 99 | 23.07 | |
| 50 | | | | 0 | 23.15 | |
| 50 | | | | 25 | 23.10 | |
| 50 | | | | 49 | 23.08 | |
| 100 | | | | 0 | 22.94 | |
| 16-QAM | | | 1 | 0 | 23.18 | |



| | | | | | | |
|--|--|--|--|-----|----|-------|
| | | | | 1 | 49 | 23.15 |
| | | | | 1 | 99 | 23.16 |
| | | | | 50 | 0 | 23.10 |
| | | | | 50 | 25 | 23.04 |
| | | | | 50 | 49 | 23.05 |
| | | | | 100 | 0 | 22.96 |

LTE BAND 4 (Continue)

| Band Width | Channel | Freq.(MHZ) | Modulation | RB Configuration | | Average Power (dBm) |
|------------|------------|------------|------------|------------------|-----------|---------------------|
| | | | | RB Size | RB Offset | |
| 15MHz | L 20025 | 1717.5 | QPSK | 1 | 0 | 23.11 |
| | | | | 1 | 37 | 23.08 |
| | | | | 1 | 74 | 23.10 |
| | | | | 36 | 0 | 23.08 |
| | | | | 36 | 18 | 23.07 |
| | | | | 36 | 35 | 23.07 |
| | | | | 75 | 0 | 22.95 |
| | | | 16-QAM | 1 | 0 | 23.10 |
| | | | | 1 | 37 | 23.08 |
| | | | | 1 | 74 | 23.05 |
| | | | | 36 | 0 | 23.04 |
| | | | | 36 | 18 | 23.04 |
| | | | | 36 | 35 | 23.03 |
| | | | | 75 | 0 | 22.88 |
| | M 20175 | 1732.5 | QPSK | 1 | 0 | 23.12 |
| | | | | 1 | 37 | 23.11 |
| | | | | 1 | 74 | 23.18 |
| | | | | 36 | 0 | 23.06 |
| | | | | 36 | 18 | 23.01 |
| | | | | 36 | 35 | 23.09 |
| | | | | 75 | 0 | 23.02 |
| | | | 16-QAM | 1 | 0 | 23.14 |
| | | | | 1 | 37 | 23.15 |
| | | | | 1 | 74 | 23.19 |
| | | | | 36 | 0 | 23.12 |
| | | | | 36 | 18 | 23.17 |
| | | | | 36 | 35 | 23.14 |
| | | | | 75 | 0 | 22.95 |
| | H 20325 | 1747.5 | QPSK | 1 | 0 | 23.11 |
| | | | | 1 | 37 | 23.08 |
| 1 | | | | 74 | 23.05 | |
| 36 | | | | 0 | 23.04 | |
| 36 | | | | 18 | 23.00 | |



| | | | | | | |
|--|--|--|--------|----|----|-------|
| | | | | 36 | 35 | 23.08 |
| | | | | 75 | 0 | 23.01 |
| | | | | 1 | 0 | 23.10 |
| | | | 16-QAM | 1 | 37 | 23.15 |
| | | | | 1 | 74 | 23.16 |
| | | | | 36 | 0 | 23.05 |
| | | | | 36 | 18 | 23.04 |
| | | | | 36 | 35 | 23.05 |
| | | | | 75 | 0 | 22.91 |

LTE BAND 4 (Continue)

| Band Width | Channel | Freq.(MHZ) | Modulation | RB Configuration | | Average Power (dBm) |
|-------------|------------|------------|------------|------------------|-----------|---------------------|
| | | | | RB Size | RB Offset | |
| 10MHz | L 20000 | 1715.0 | QPSK | 1 | 0 | 23.12 |
| | | | | 1 | 24 | 23.18 |
| | | | | 1 | 49 | 23.10 |
| | | | | 25 | 0 | 22.88 |
| | | | | 25 | 12 | 22.87 |
| | | | | 25 | 24 | 22.87 |
| | | | 16-QAM | 50 | 0 | 22.75 |
| | | | | 1 | 0 | 23.51 |
| | | | | 1 | 24 | 23.48 |
| | | | | 1 | 49 | 23.45 |
| | | | | 25 | 0 | 23.05 |
| | | | | 25 | 12 | 23.06 |
| | M 20175 | 1732.5 | QPSK | 25 | 24 | 23.03 |
| | | | | 50 | 0 | 22.81 |
| | | | | 1 | 0 | 23.16 |
| | | | | 1 | 24 | 23.10 |
| | | | | 1 | 49 | 23.18 |
| | | | | 25 | 0 | 23.15 |
| | | | 16-QAM | 25 | 12 | 23.11 |
| | | | | 25 | 24 | 23.09 |
| | | | | 50 | 0 | 22.65 |
| | | | | 1 | 0 | 23.04 |
| | | | | 1 | 24 | 23.04 |
| | | | | 1 | 49 | 23.06 |
| H 1750.0 | 1750.0 | QPSK | 25 | 0 | 23.00 | |
| | | | 25 | 12 | 23.05 | |
| | | | 25 | 24 | 23.04 | |
| | | | 50 | 0 | 23.15 | |
| | | | 1 | 0 | 23.16 | |
| | | | 1 | 24 | 23.18 | |



| | | | | | | |
|--|-------|--|--------|----|----|-------|
| | 20350 | | | 1 | 49 | 23.02 |
| | | | | 25 | 0 | 23.08 |
| | | | | 25 | 12 | 23.10 |
| | | | | 25 | 24 | 23.09 |
| | | | | 50 | 0 | 23.01 |
| | | | 16-QAM | 1 | 0 | 23.08 |
| | | | | 1 | 24 | 23.05 |
| | | | | 1 | 49 | 23.06 |
| | | | | 25 | 0 | 22.96 |
| | | | | 25 | 12 | 22.94 |
| | | | | 25 | 24 | 22.93 |
| | | | | 50 | 0 | 22.90 |

LTE BAND 4 (Continue)

| Band Width | Channel | Freq.(MHZ) | Modulation | RB Configuration | | Average Power (dBm) |
|-------------|------------|------------|------------|------------------|-----------|---------------------|
| | | | | RB Size | RB Offset | |
| 05MHz | L 19975 | 1712.5 | QPSK | 1 | 0 | 22.92 |
| | | | | 1 | 12 | 22.98 |
| | | | | 1 | 24 | 22.90 |
| | | | | 12 | 0 | 22.88 |
| | | | | 12 | 6 | 22.87 |
| | | | | 12 | 11 | 22.87 |
| | | | 16-QAM | 25 | 0 | 22.75 |
| | | | | 1 | 0 | 22.51 |
| | | | | 1 | 12 | 22.48 |
| | | | | 1 | 24 | 22.45 |
| | | | | 12 | 0 | 22.05 |
| | | | | 12 | 6 | 22.06 |
| | M 20175 | 1732.5 | QPSK | 12 | 11 | 22.03 |
| | | | | 25 | 0 | 21.80 |
| | | | | 1 | 0 | 22.45 |
| | | | | 1 | 12 | 22.41 |
| | | | | 1 | 24 | 22.47 |
| | | | | 12 | 0 | 22.15 |
| | | 16-QAM | 12 | 6 | 22.16 | |
| | | | 12 | 11 | 22.09 | |
| | | | 25 | 0 | 21.98 | |
| | | | 1 | 0 | 22.41 | |
| | | | 1 | 12 | 22.54 | |
| | | | 1 | 24 | 22.46 | |
| H 1752.5 | 1732.5 | QPSK | 12 | 0 | 22.30 | |
| | | | 12 | 6 | 22.25 | |
| | | | 12 | 11 | 22.24 | |
| | | | 25 | 0 | 21.15 | |
| | | | 1 | 0 | 22.61 | |



| | | | | | | | |
|--|--------|--|--|----|----|-------|-------|
| | 20375 | | | 1 | 12 | 22.58 | |
| | | | | 1 | 24 | 22.53 | |
| | | | | 12 | 0 | 22.28 | |
| | | | | 12 | 6 | 22.21 | |
| | | | | 12 | 11 | 22.19 | |
| | | | | 25 | 0 | 22.05 | |
| | | | | 25 | 0 | 21.90 | |
| | 16-QAM | | | | 1 | 0 | 22.68 |
| | | | | | 1 | 12 | 22.65 |
| | | | | | 1 | 24 | 22.56 |
| | | | | | 12 | 0 | 22.16 |
| | | | | | 12 | 6 | 22.24 |
| | | | | | 12 | 11 | 22.15 |
| | | | | | 25 | 0 | 21.90 |

LTE BAND 4 (Continue)

| Band Width | Channel | Freq.(MHZ) | Modulation | RB Configuration | | Average Power (dBm) |
|------------|------------|------------|------------|------------------|-----------|---------------------|
| | | | | RB Size | RB Offset | |
| 3MHz | L 19965 | 1711.5 | QPSK | 1 | 0 | 22.92 |
| | | | | 1 | 7 | 22.84 |
| | | | | 1 | 14 | 22.91 |
| | | | | 8 | 0 | 22.88 |
| | | | | 8 | 4 | 22.85 |
| | | | | 8 | 7 | 22.87 |
| | | | 16-QAM | 15 | 0 | 22.76 |
| | | | | 1 | 0 | 22.51 |
| | | | | 1 | 7 | 22.49 |
| | | | | 1 | 14 | 22.45 |
| | | | | 8 | 0 | 22.15 |
| | | | | 8 | 4 | 22.16 |
| | M 20175 | 1732.5 | QPSK | 8 | 7 | 22.13 |
| | | | | 15 | 0 | 21.88 |
| | | | | 1 | 0 | 22.44 |
| | | | | 1 | 7 | 22.41 |
| | | | | 1 | 14 | 22.46 |
| | | | | 8 | 0 | 22.15 |
| | | | 16-QAM | 8 | 4 | 22.10 |
| | | | | 8 | 7 | 22.08 |
| | | | | 15 | 0 | 21.98 |
| | | | | 1 | 0 | 22.41 |
| | | | | 1 | 7 | 22.54 |
| | | | | 1 | 14 | 22.46 |
| 8 | 0 | 22.31 | | | | |
| 8 | 4 | 22.26 | | | | |
| 8 | 7 | 22.23 | | | | |



| | | | | | | |
|--|-------|--------|--------|----|-------|-------|
| | H | 1753.5 | QPSK | 15 | 0 | 21.15 |
| | | | | 1 | 0 | 22.61 |
| | | | | 1 | 7 | 22.58 |
| | | | | 1 | 14 | 22.53 |
| | | | | 8 | 0 | 22.28 |
| | | | | 8 | 4 | 22.21 |
| | | | | 8 | 7 | 22.19 |
| | 20385 | 1753.5 | 16-QAM | 15 | 0 | 22.05 |
| | | | | 1 | 0 | 22.69 |
| | | | | 1 | 7 | 22.64 |
| | | | | 1 | 14 | 22.58 |
| | | | | 8 | 0 | 22.16 |
| | | | | 8 | 4 | 22.19 |
| | | | | 8 | 7 | 22.16 |
| | | | 15 | 0 | 21.94 | |

LTE BAND 4 (Continue)

| Band Width | Channel | Freq.(MHZ) | Modulation | RB Configuration | | Average Power (dBm) |
|------------|---------|------------|------------|------------------|-----------|---------------------|
| | | | | RB Size | RB Offset | |
| 1.4MHz | L | 1710.7 | QPSK | 1 | 0 | 22.90 |
| | | | | 1 | 2 | 22.81 |
| | | | | 1 | 5 | 22.84 |
| | | | | 3 | 0 | 22.84 |
| | | | | 3 | 1 | 22.86 |
| | | | | 3 | 2 | 22.80 |
| | | | 16-QAM | 6 | 0 | 22.75 |
| | | | | 1 | 0 | 22.50 |
| | | | | 1 | 2 | 22.49 |
| | | | | 1 | 5 | 22.44 |
| | M | 1732.5 | QPSK | 3 | 0 | 22.07 |
| | | | | 3 | 1 | 22.06 |
| | | | | 3 | 2 | 22.03 |
| | | | | 6 | 0 | 21.85 |
| | | | | 1 | 0 | 22.48 |
| | | | | 1 | 2 | 22.47 |
| | | | 16-QAM | 1 | 5 | 22.41 |
| | | | | 3 | 0 | 22.19 |
| | | | | 3 | 1 | 22.16 |
| | | | | 3 | 2 | 22.09 |
| | | | 6 | 0 | 21.94 | |
| | | | 1 | 0 | 22.46 | |
| | | | 1 | 2 | 22.54 | |
| | | | 1 | 5 | 22.48 | |
| | | | 3 | 0 | 22.30 | |



| | | | | | | |
|--|------------|--------|--------|---|---|-------|
| | | | | 3 | 2 | 22.27 |
| | | | | 3 | 5 | 22.29 |
| | | | | 6 | 0 | 21.15 |
| | H 20393 | 1754.3 | QPSK | 1 | 0 | 22.61 |
| | | | | 1 | 2 | 22.58 |
| | | | | 1 | 5 | 22.53 |
| | | | | 3 | 0 | 22.28 |
| | | | | 3 | 1 | 22.18 |
| | | | | 3 | 2 | 22.24 |
| | | | | 6 | 0 | 22.05 |
| | | | | 1 | 0 | 22.71 |
| | | | | 1 | 2 | 22.65 |
| | | | 16-QAM | 1 | 5 | 22.60 |
| | | | | 3 | 0 | 22.19 |
| | | | | 3 | 1 | 22.25 |
| | | | | 3 | 2 | 22.17 |
| | | | | 6 | 0 | 21.84 |

2.2 Occupied Bandwidth

2.2.1 Definition

According to FCC section 2.1049 and 27.53(g), the occupied bandwidth 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.

Occupied bandwidth is also known as the 99% emission bandwidth.

2.2.2 Test Description

See section 2.1.2 of this report.

2.2.3 Test Results

LTE Band 4

Low channel:

| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
|---------------------------|-----------------|----------------------|--------|-------------------------|-----------------|---------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19957 | 1710.7 | 1.0959 | 1.0957 | 19965 | 1711.5 | 2.7052 | 2.6962 |
| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19957 | 1710.7 | 1.281 | 1.282 | 19965 | 1711.5 | 2.973 | 2.980 |

| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
|-------------------------|-----------------|----------------------|--------|--------------------------|-----------------|---------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19975 | 1712.5 | 4.5050 | 4.5040 | 20000 | 1715.0 | 8.9978 | 8.9818 |
| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19975 | 1712.5 | 4.960 | 4.942 | 20000 | 1715.0 | 9.826 | 9.867 |



| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
|--------------------------|-----------------|----------------------|--------|--------------------------|-----------------|---------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20025 | 1717.5 | 13.474 | 13.481 | 20050 | 1720.0 | 17.963 | 17.939 |
| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20025 | 1717.5 | 14.52 | 14.53 | 20050 | 1720.0 | 19.27 | 19.16 |



Middle channel:

| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
|---------------------------|-----------------|---------------------|--------|-------------------------|-----------------|--------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 1.0992 | 1.0904 | 20175 | 1732.5 | 2.7045 | 2.6990 |

| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
|---------------------------|-----------------|----------------------|-------|-------------------------|-----------------|---------------------|-------|
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 1.309 | 1.280 | 20175 | 1732.5 | 2.987 | 2.968 |

| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
|-------------------------|-----------------|---------------------|--------|--------------------------|-----------------|--------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 4.5018 | 4.4988 | 20175 | 1732.5 | 8.9628 | 8.9603 |

| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
|-------------------------|-----------------|----------------------|-------|--------------------------|-----------------|---------------------|-------|
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 4.947 | 4.968 | 20175 | 1732.5 | 9.921 | 9.799 |

| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
|--------------------------|-----------------|---------------------|--------|--------------------------|-----------------|--------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 13.429 | 13.402 | 20175 | 1732.5 | 17.913 | 17.892 |

| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
|--------------------------|-----------------|----------------------|-------|--------------------------|-----------------|---------------------|-------|
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 14.42 | 14.37 | 20175 | 1732.5 | 19.34 | 19.07 |



High channel:

| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
|---------------------------|-----------------|---------------------|--------|-------------------------|-----------------|--------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20392 | 1754.2 | 1.1018 | 1.0914 | 20384 | 1753.4 | 2.7028 | 2.7009 |

| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
|---------------------------|-----------------|----------------------|-------|-------------------------|-----------------|---------------------|-------|
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20392 | 1754.2 | 1.278 | 1.275 | 20384 | 1753.4 | 2.966 | 2.987 |

| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
|-------------------------|-----------------|---------------------|--------|--------------------------|-----------------|--------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20375 | 1752.5 | 4.5110 | 4.5221 | 20350 | 1750.0 | 8.9965 | 8.9888 |

| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
|-------------------------|-----------------|----------------------|-------|--------------------------|-----------------|---------------------|-------|
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20375 | 1752.5 | 4.986 | 4.981 | 20350 | 1750.0 | 9.909 | 9.703 |

| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
|--------------------------|-----------------|---------------------|--------|--------------------------|-----------------|--------------------|--------|
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20325 | 1747.5 | 13.499 | 13.430 | 20300 | 1745.0 | 17.954 | 17.925 |

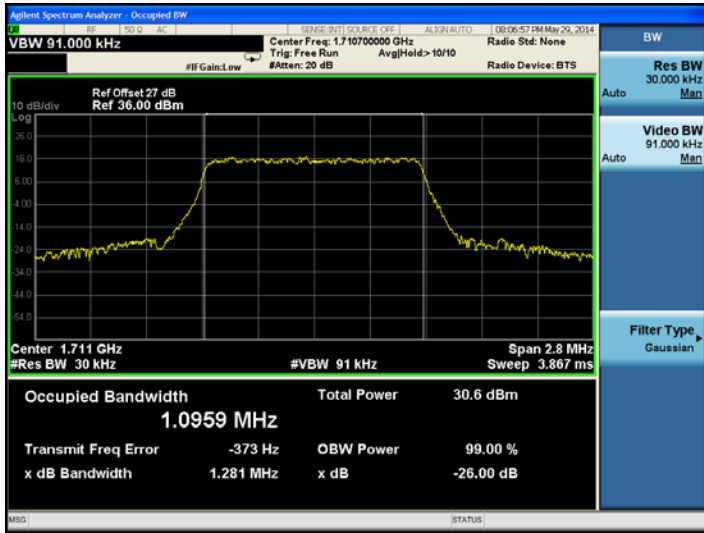
| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
|--------------------------|-----------------|----------------------|-------|--------------------------|-----------------|---------------------|-------|
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | Channel | Frequency (MHz) | 26dB Bandwidth(MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20325 | 1747.5 | 14.57 | 14.43 | 20300 | 1745.0 | 19.07 | 19.16 |



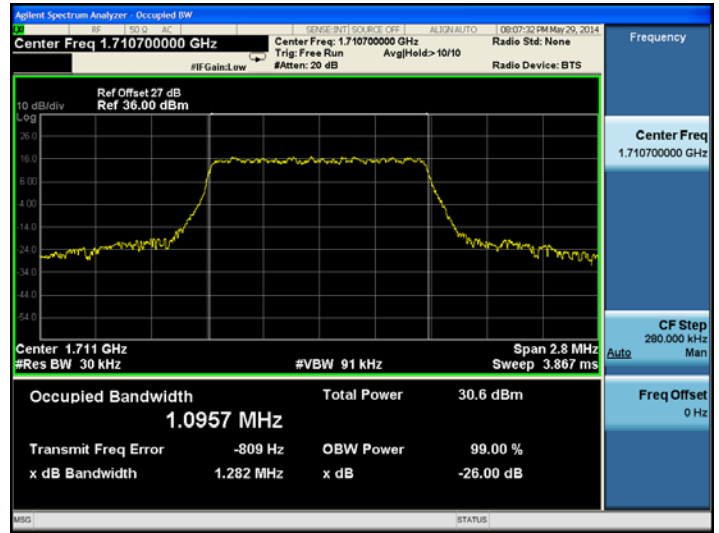
Low channel:

Spectrum Plot of Worst Value

1.4MHz/QPSK

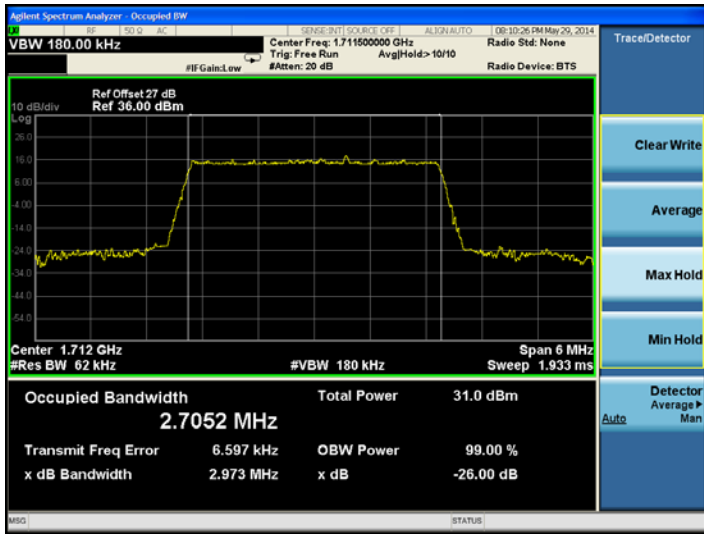


1.4MHz/16QAM

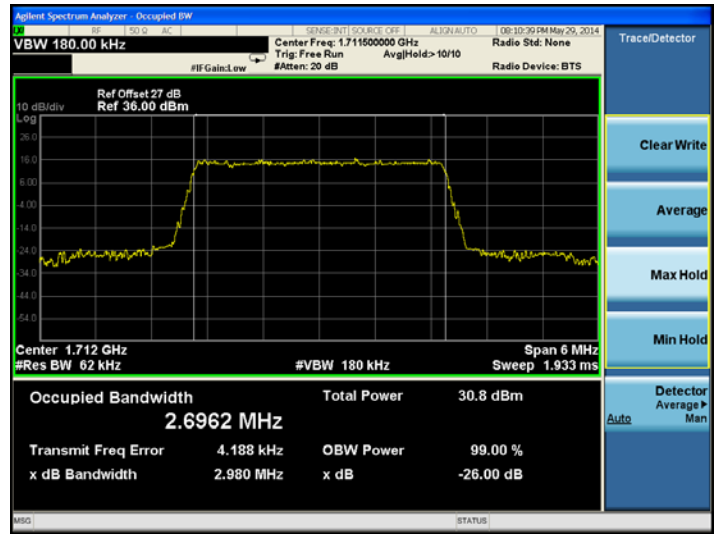


Spectrum Plot of Worst Value

3MHz/QPSK



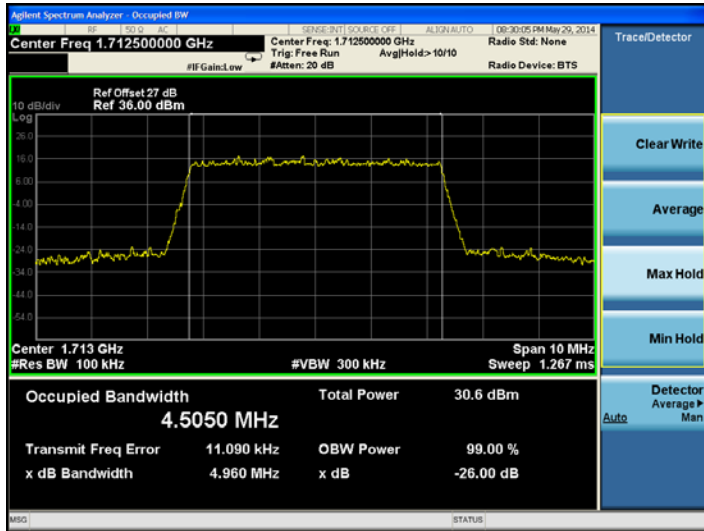
3MHz/16QAM



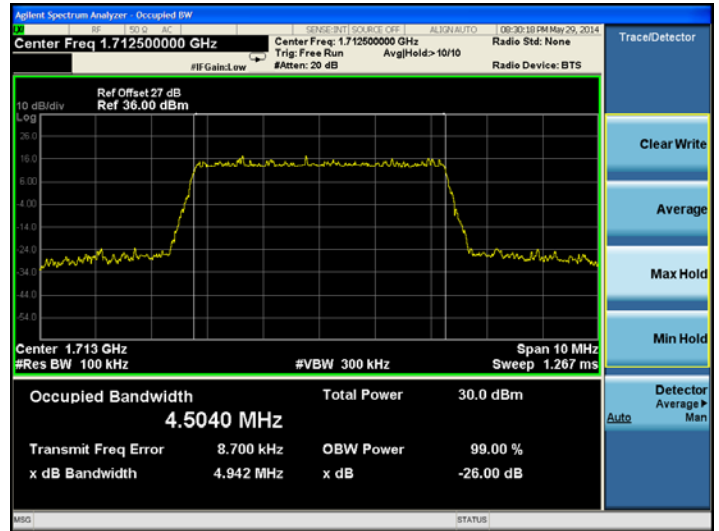


Spectrum Plot of Worst Value

5MHz/QPSK

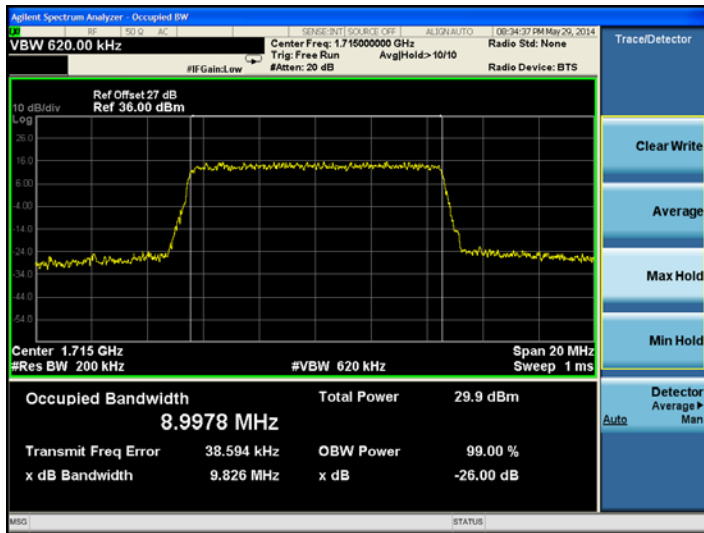


5MHz/16QAM

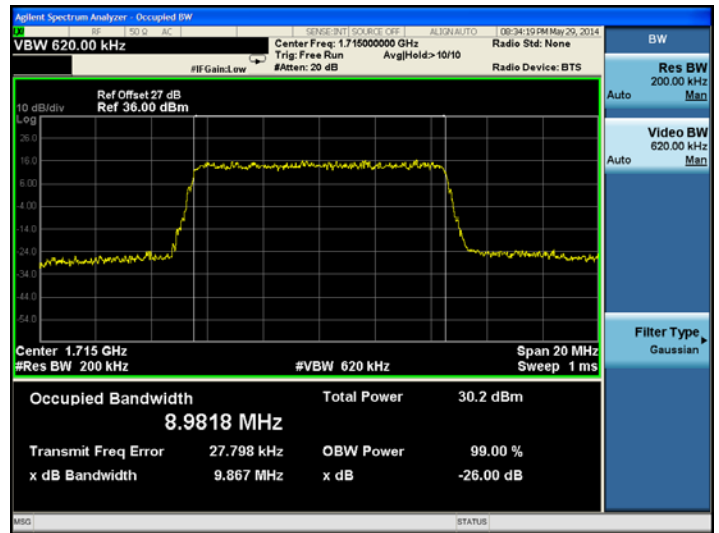


Spectrum Plot of Worst Value

10MHz/QPSK



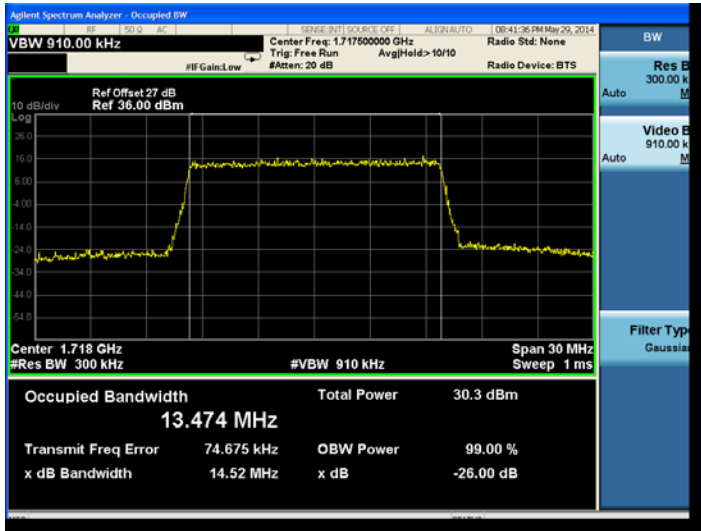
10MHz/16QAM



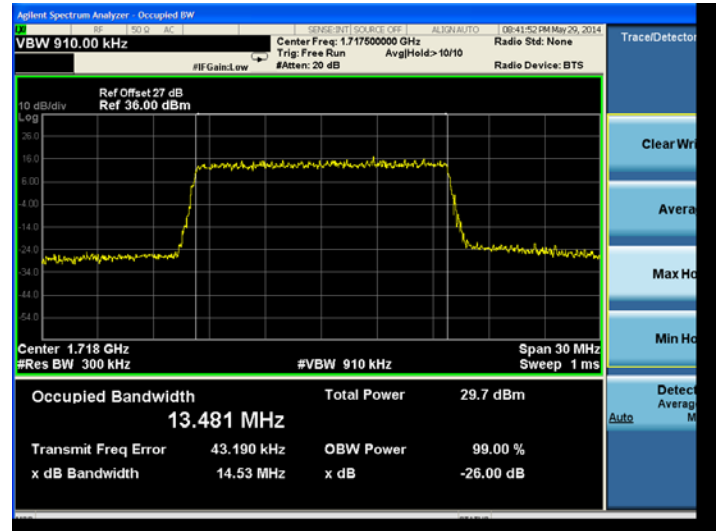


Spectrum Plot of Worst Value

15MHz/QPSK

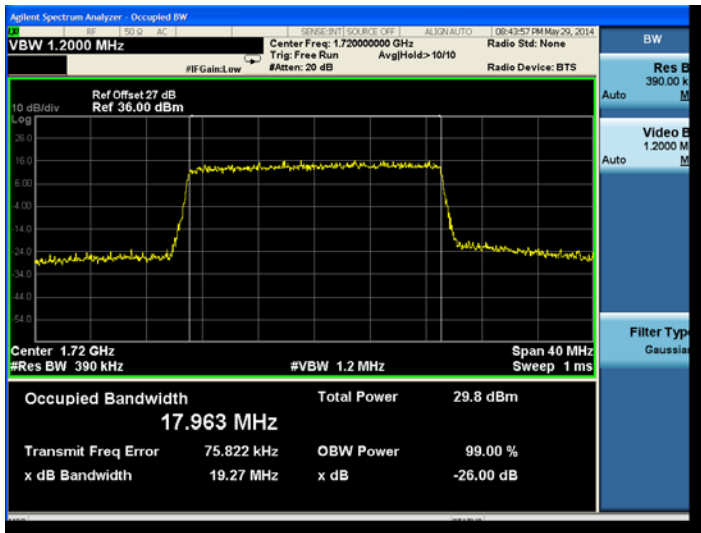


15MHz/16QAM

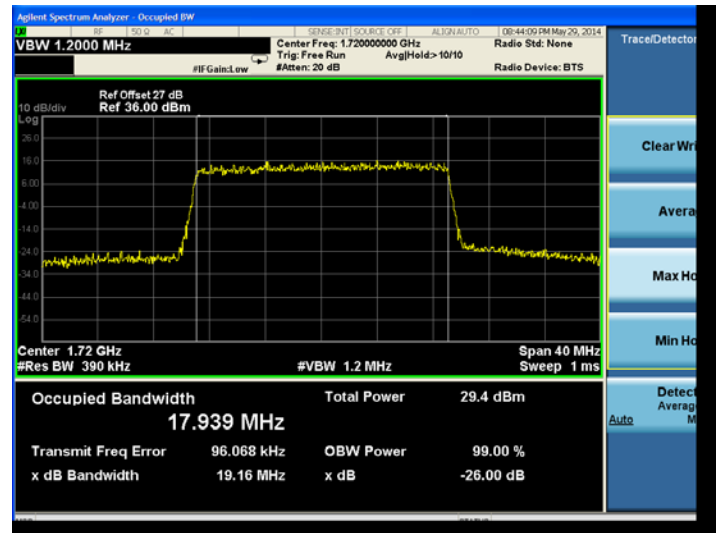


Spectrum Plot of Worst Value

20MHz/QPSK



20MHz/16QAM

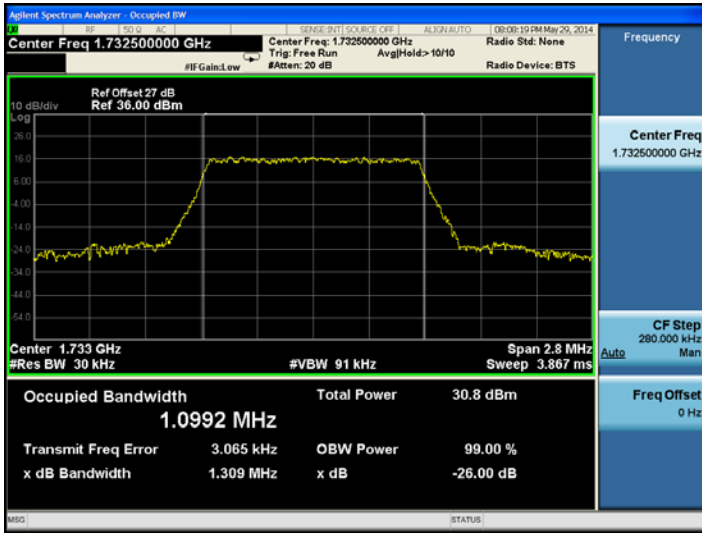




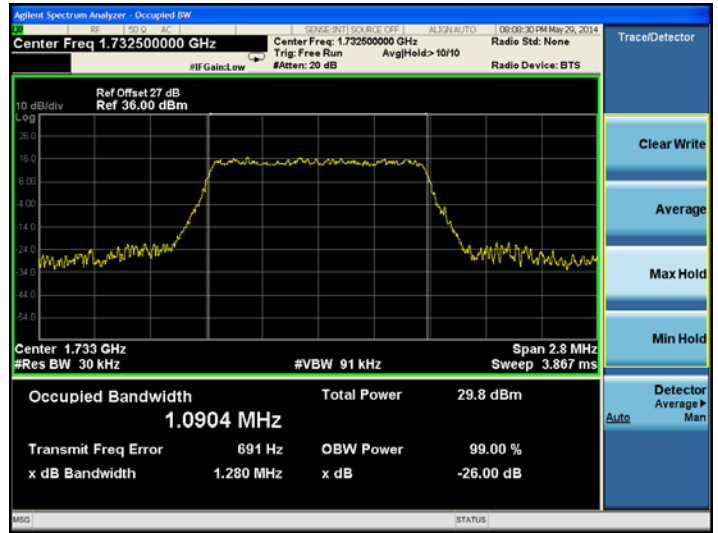
Middle channel:

Spectrum Plot of Worst Value

1.4MHz/QPSK

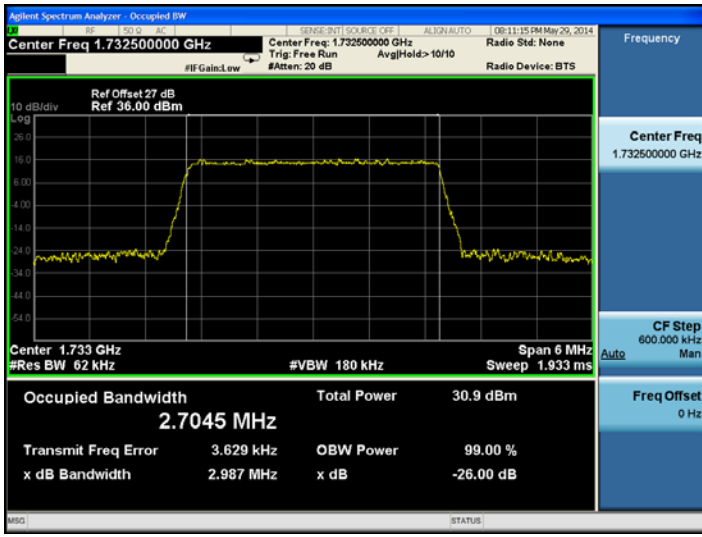


1.4MHz/16QAM

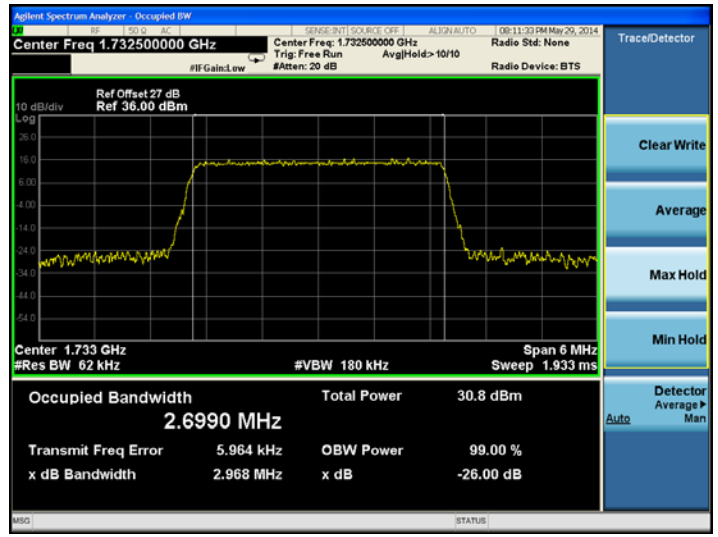


Spectrum Plot of Worst Value

3MHz/QPSK



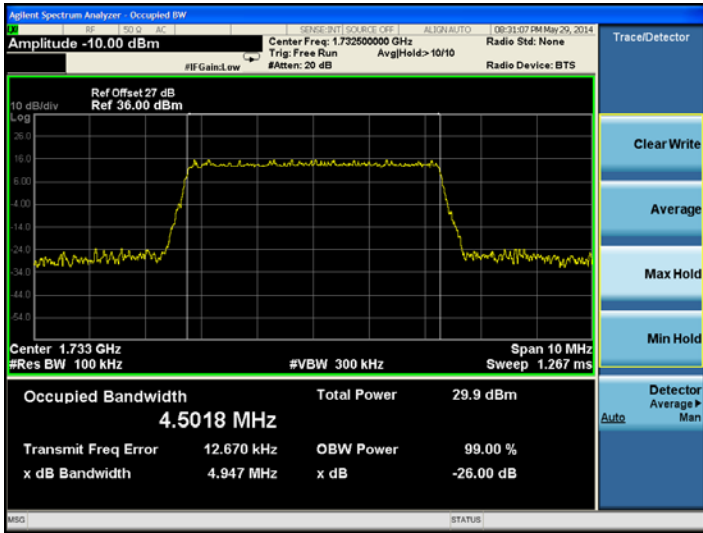
3MHz/16QAM



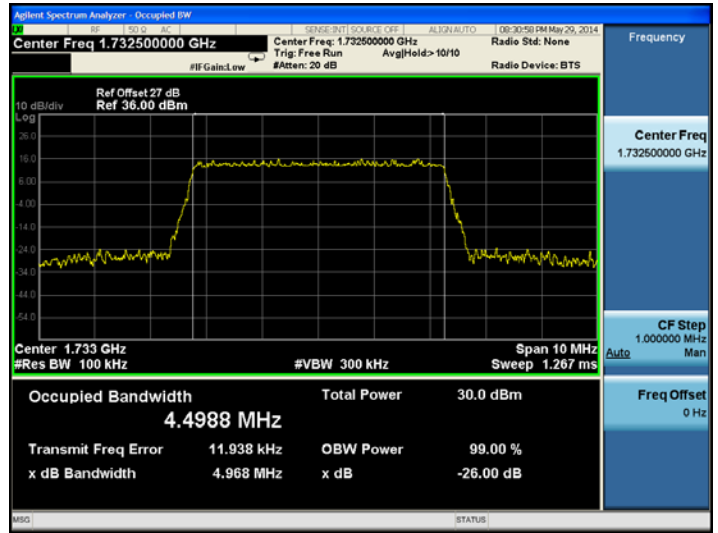


Spectrum Plot of Worst Value

5MHz/QPSK

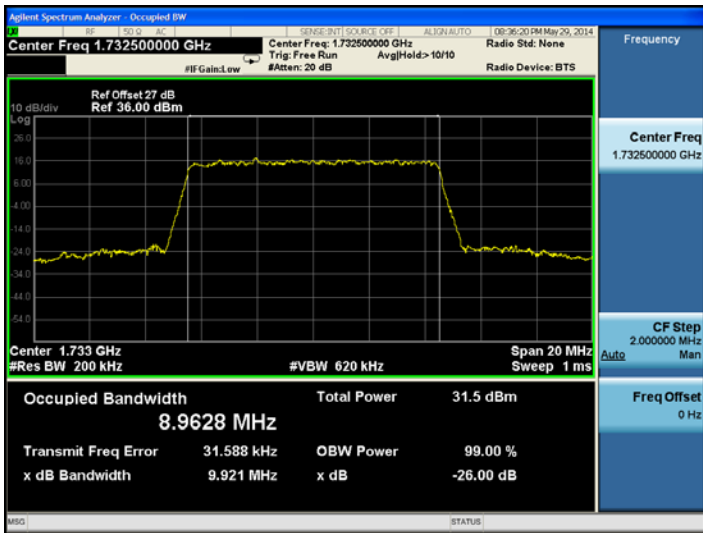


5MHz/16QAM

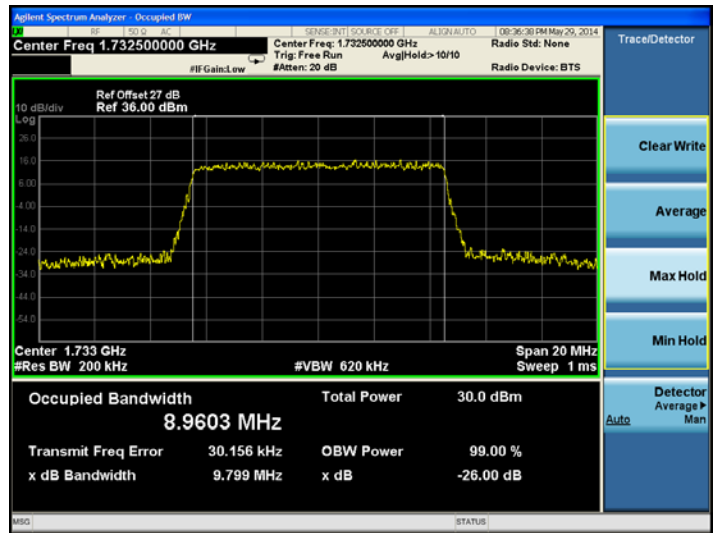


Spectrum Plot of Worst Value

10MHz/QPSK



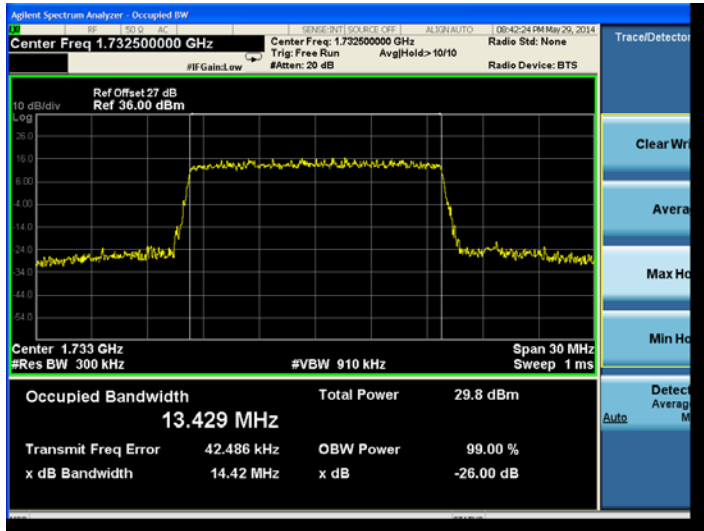
10MHz/16QAM



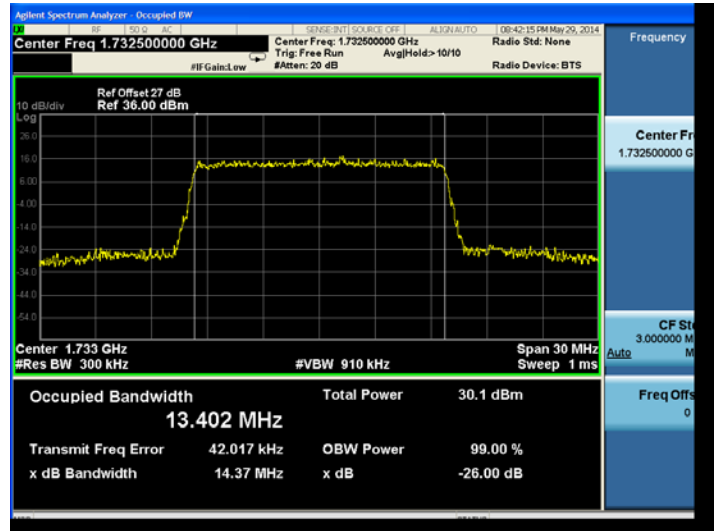


Spectrum Plot of Worst Value

15MHz/QPSK

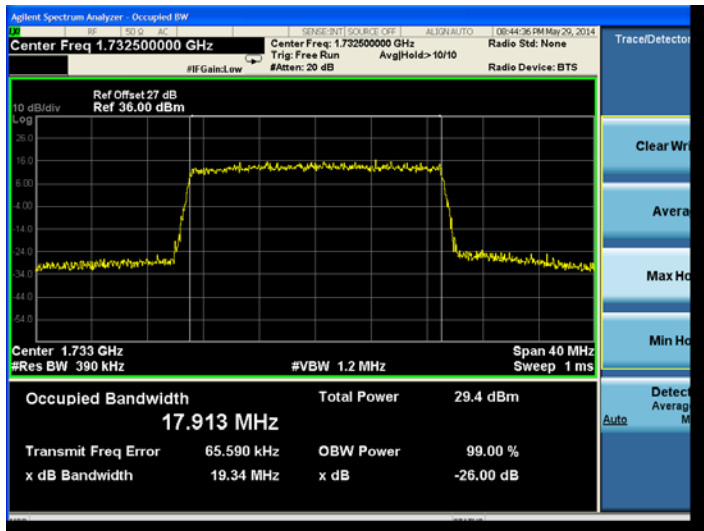


15MHz/16QAM

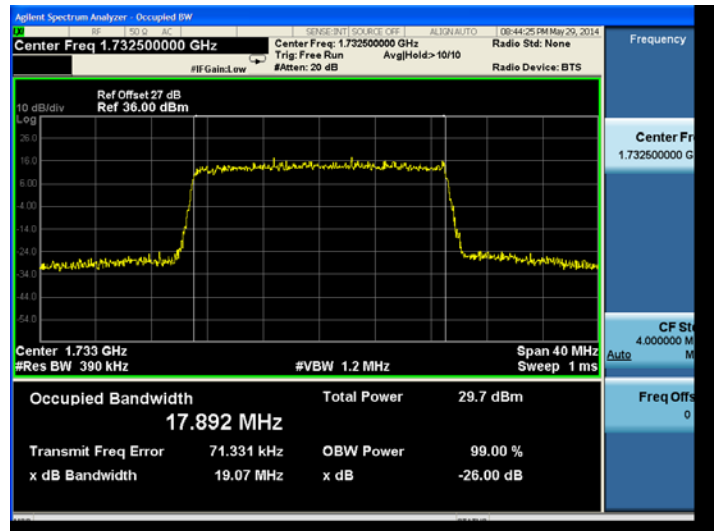


Spectrum Plot of Worst Value

20MHz/QPSK



20MHz/16QAM

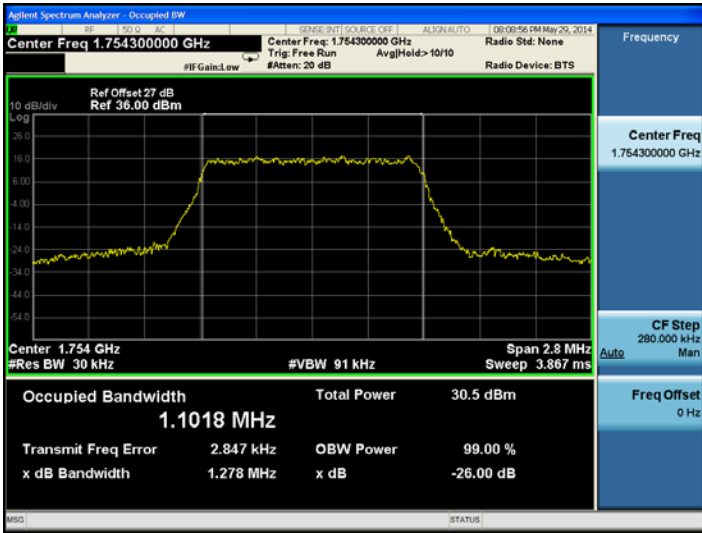




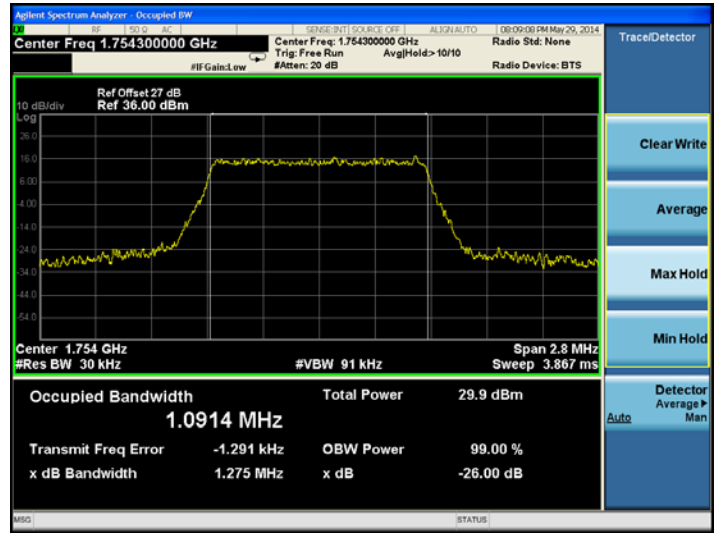
High channel:

Spectrum Plot of Worst Value

1.4MHz/QPSK

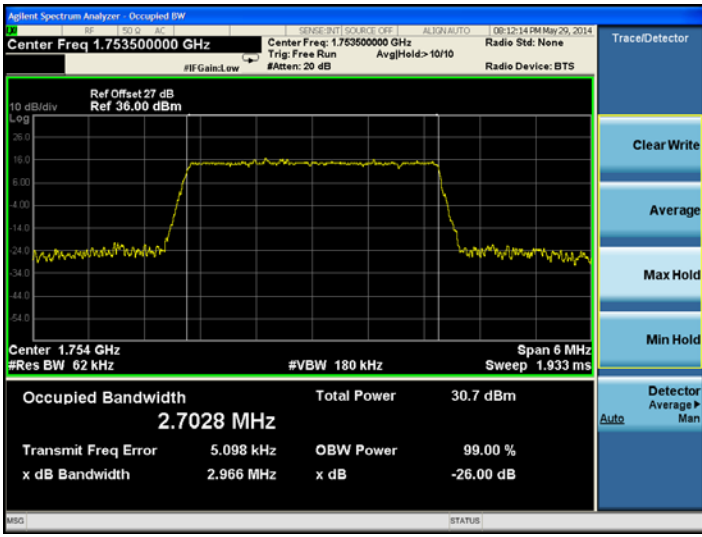


1.4MHz/16QAM

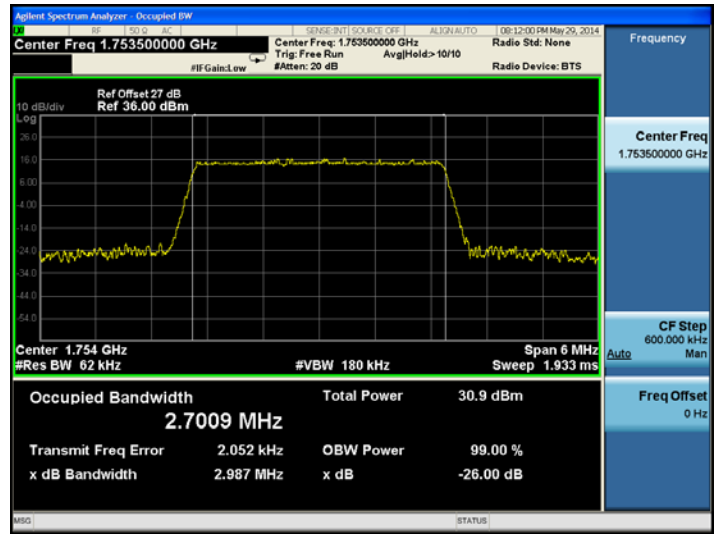


Spectrum Plot of Worst Value

3MHz/QPSK



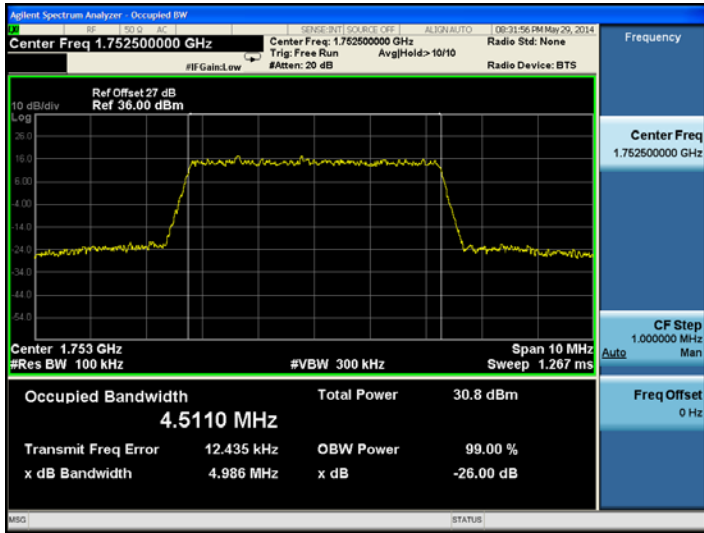
3MHz/16QAM



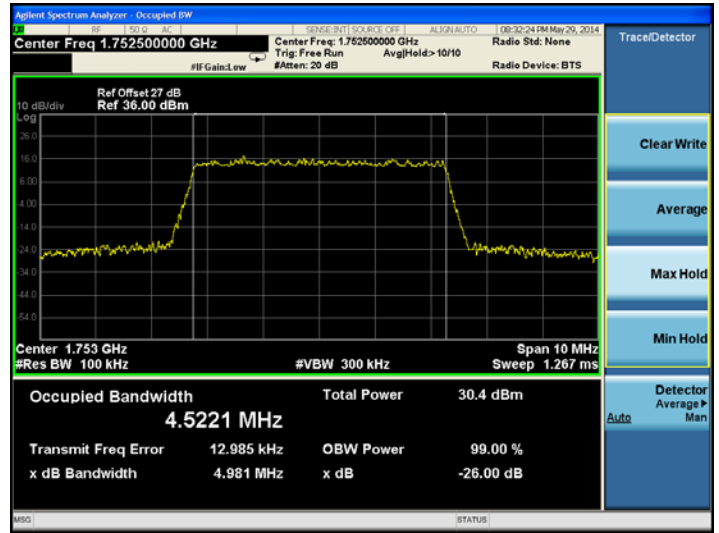


Spectrum Plot of Worst Value

5MHz/QPSK

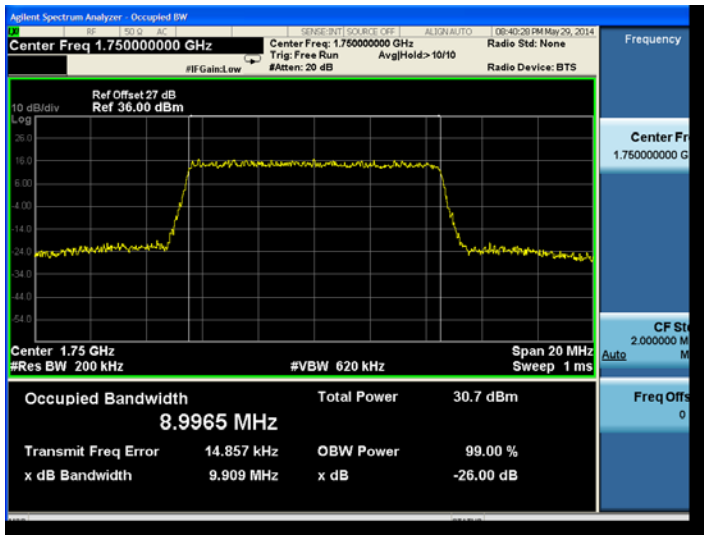


5MHz/16QAM

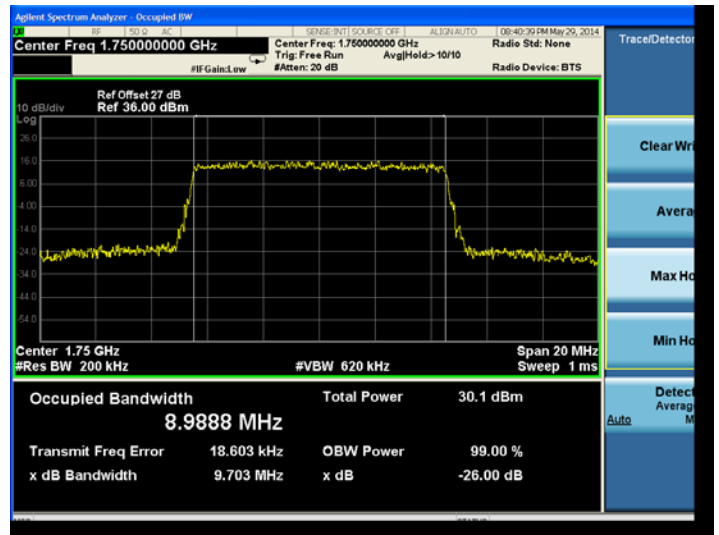


Spectrum Plot of Worst Value

10MHz/QPSK



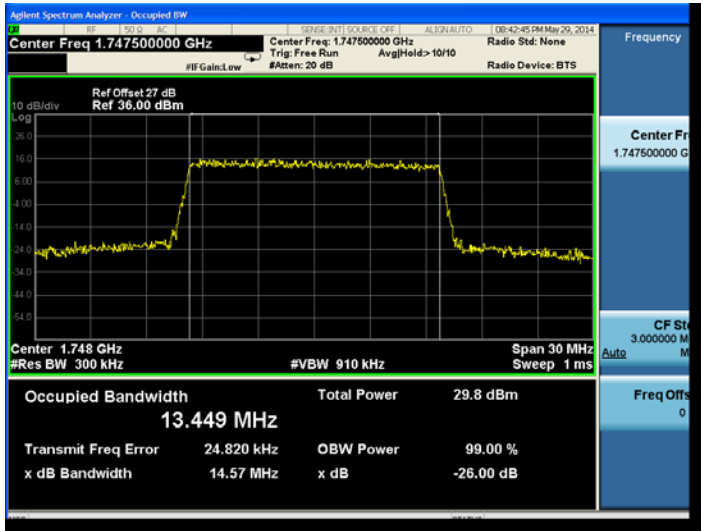
10MHz/16QAM



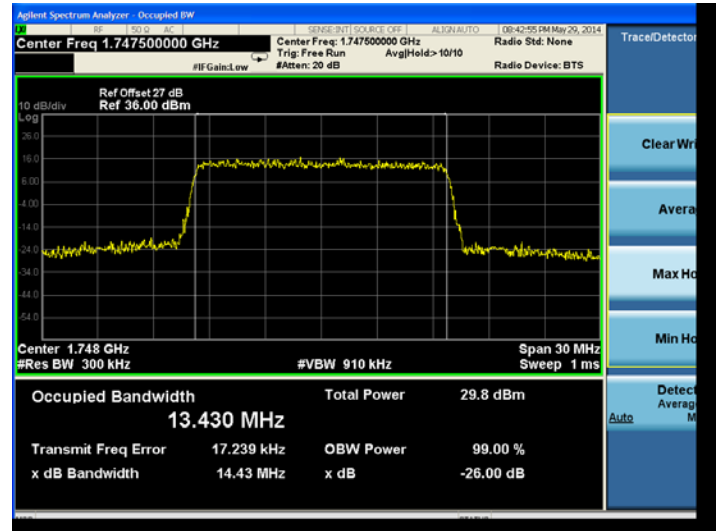


Spectrum Plot of Worst Value

15MHz/QPSK

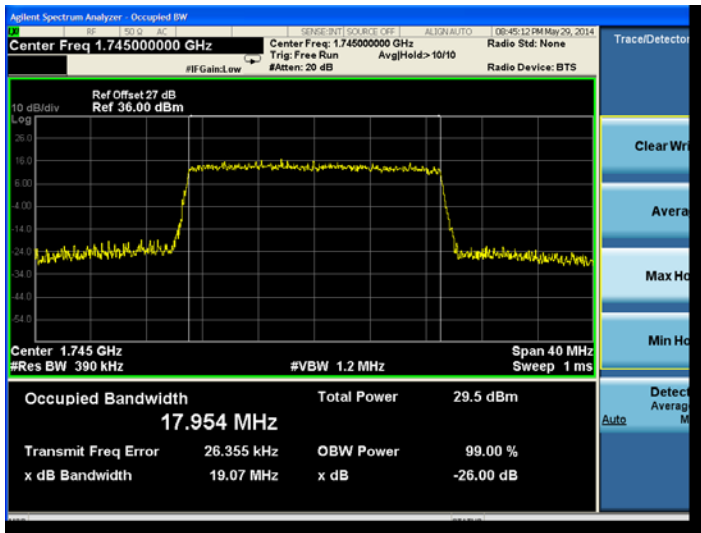


15MHz/16QAM

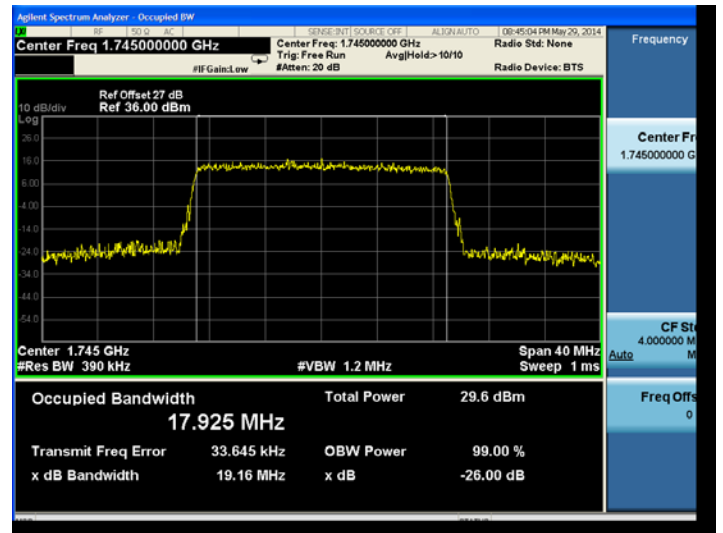


Spectrum Plot of Worst Value

20MHz/QPSK



20MHz/16QAM



2.3 Frequency Stability

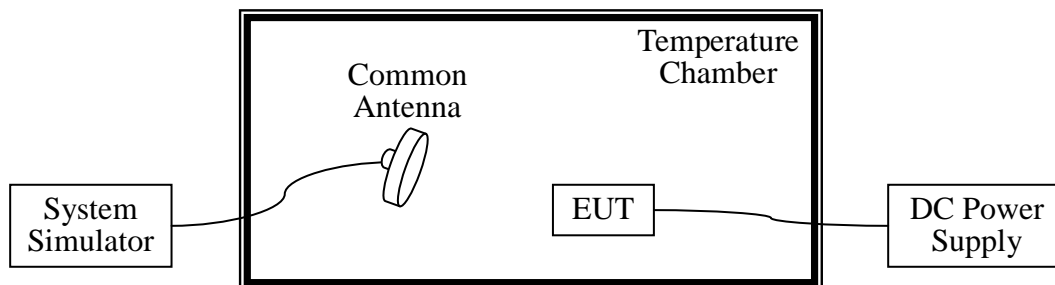
2.3.1 Requirement

According to FCC section 2.1055 and FCC section 27.54, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.3.2 Test Description

1. Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power. A call is established between the EUT and the SS via a Common Antenna.

2. Equipments List:

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due |
|---------------------|---------------------------|------------|----------------------------|------------|------------|
| System Simulator | Rohde& Schwarz | CMW500 | 1201.0002k5 0/124534/wk | 2014.02.26 | 2015.02.25 |
| DC Power Supply | Good Will | GPS-3030DD | EF920938 | 2014.02.26 | 2015.02.25 |
| Temperature Chamber | YinHe Experimental Equip. | HL4003T | (n.a.) | 2014.02.26 | 2015.02.25 |

2.3.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.35VDC and 3.6VDC, which are specified by the applicant; the normal temperature here used is 20°C. The frequency deviation limit is



±2.5ppm.

The testing was performed using one RB and Bandwidth setting for each band.

| LTE Band 4 – QPSK - Channel 20175 – Frequency 1732.5MHz – RB 6/0 | | | | |
|--|-------------|-----------|----------------|-------------|
| Limit: 1732.5MHz*2.5ppm=4331.25Hz | | | | |
| Voltage (%) | Power (VDC) | Temp (°C) | Fre. Dev. (Hz) | Result |
| 100 | 3.8 | -30 | 12.56 | <u>PASS</u> |
| 100 | | -20 | 11.66 | |
| 100 | | -10 | 10.50 | |
| 100 | | 0 | 11.74 | |
| 100 | | +10 | 11.56 | |
| 100 | | +20 | 9.48 | |
| 100 | | +30 | -10.89 | |
| 100 | | +40 | 10.83 | |
| 100 | | +50 | 12.62 | |
| 115 | | 4.35 | +20 | |
| 85 | 3.6 | +20 | 12.52 | |

2.4 Peak to Average Ratio

2.4.1 Requirement

According to FCC section 27.50(d) (5), the peak to average ratio (PAR) of the transmission may not exceed 13dB.

2.4.2 Test Description

See section 2.1.2 of this report.

2.4.3 Test Result

Record the maximum PAPR level associated with a probability of 0.1%.

LTE Band 4:

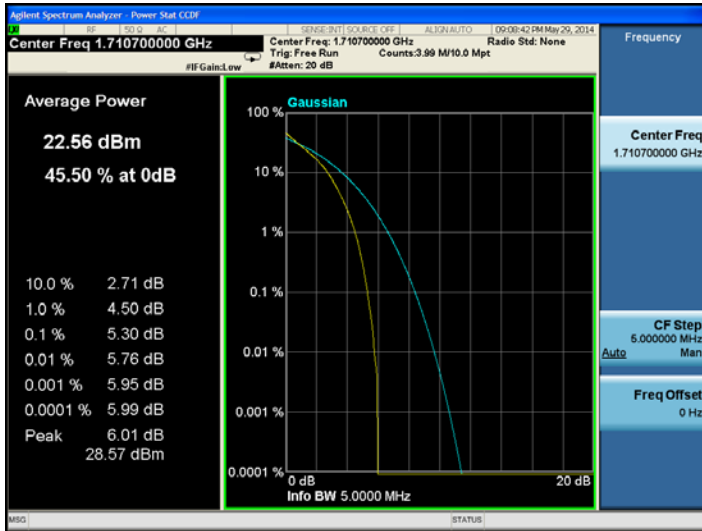
Low channel:

| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
|---------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19957 | 1710.7 | 5.30 | 6.15 | 19965 | 1771.5 | 5.57 | 6.40 |
| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19975 | 1712.5 | 5.66 | 6.51 | 20000 | 1715.0 | 6.13 | 6.90 |
| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20025 | 1717.5 | 6.75 | 7.33 | 20050 | 1720.0 | 7.15 | 7.58 |

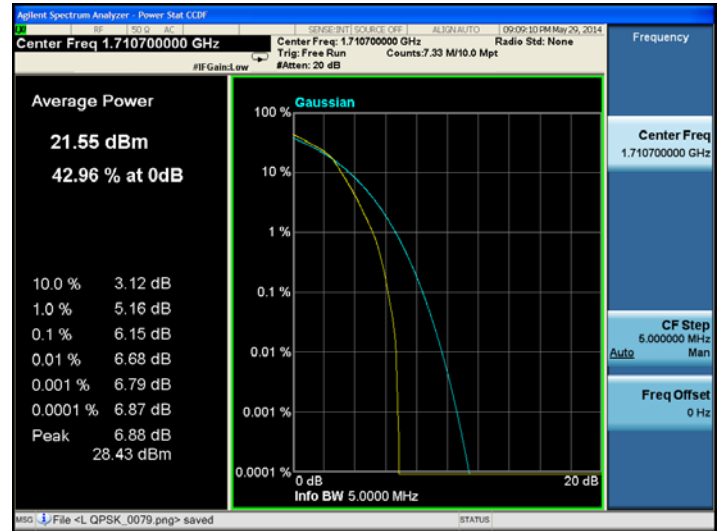


Spectrum Plot of Worst Value (Low channel)

1.4MHz/QPSK

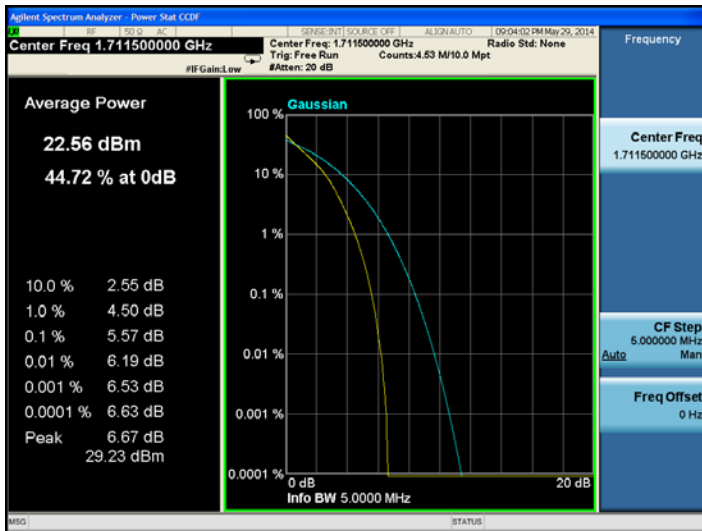


1.4MHz/16QAM

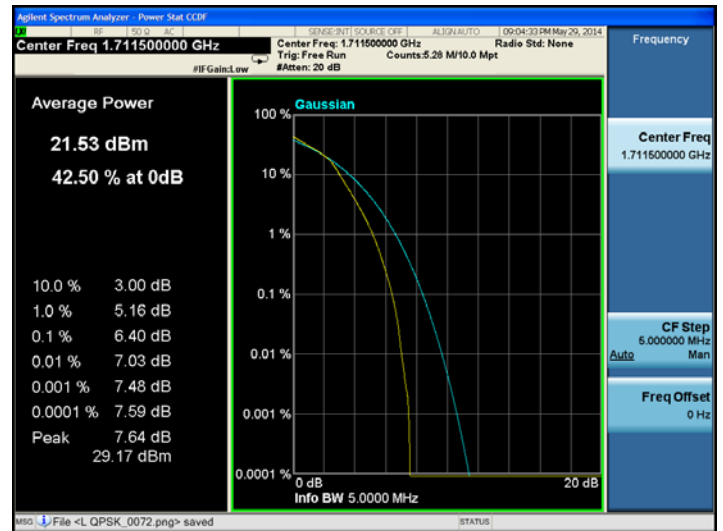


Spectrum Plot of Worst Value

3MHz/QPSK



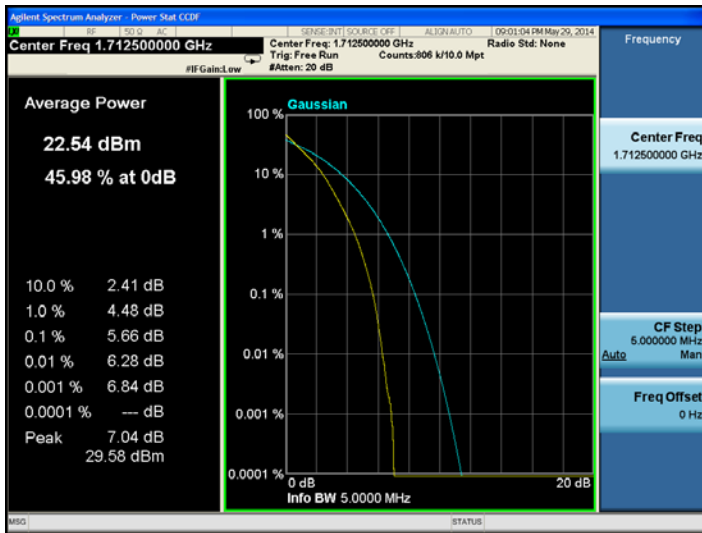
3MHz/16QAM



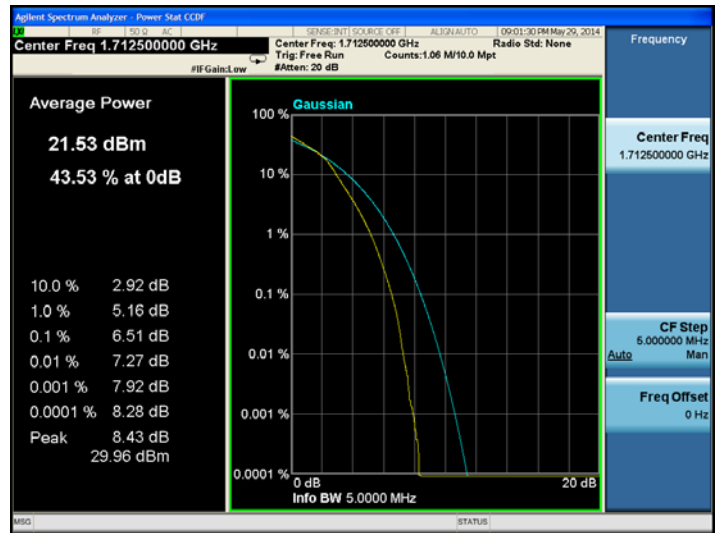


Spectrum Plot of Worst Value

5MHz/QPSK

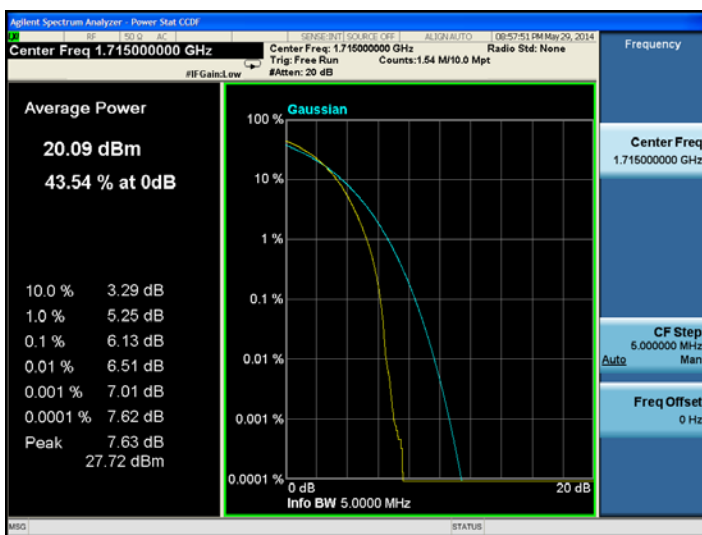


5MHz/16QAM

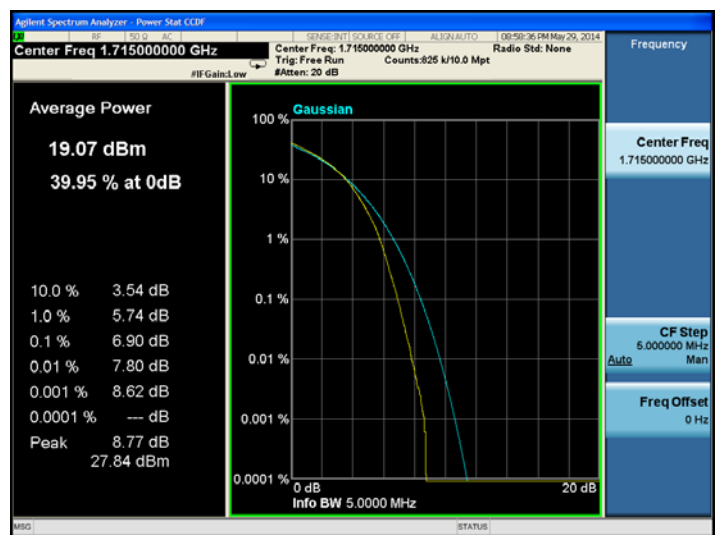


Spectrum Plot of Worst Value

10MHz/QPSK



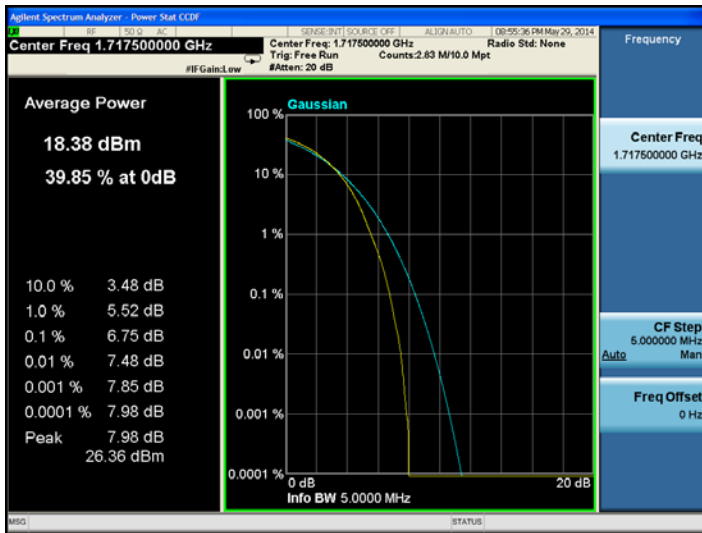
10MHz/16QAM



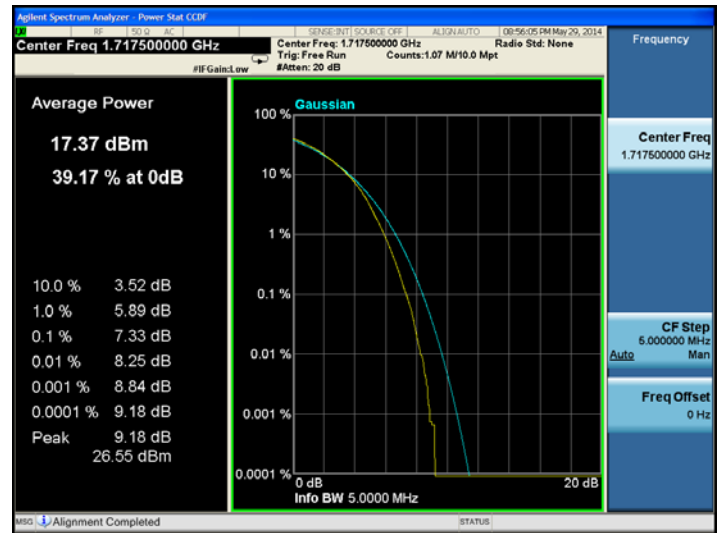


Spectrum Plot of Worst Value

15MHz/QPSK

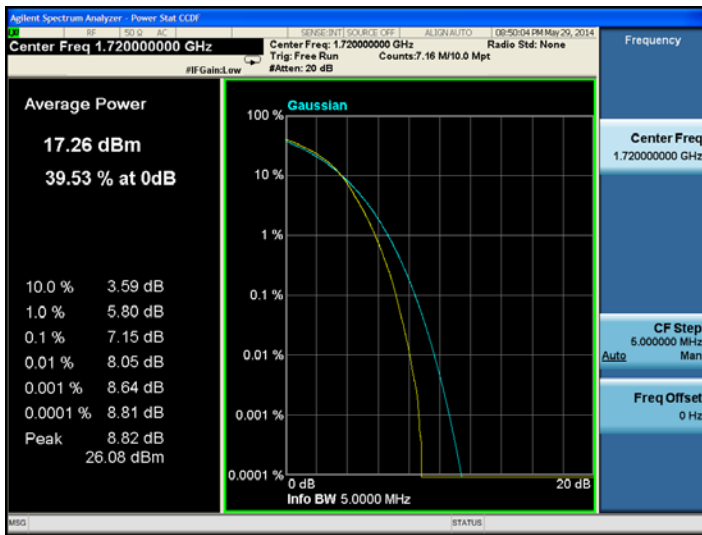


15MHz/16QAM

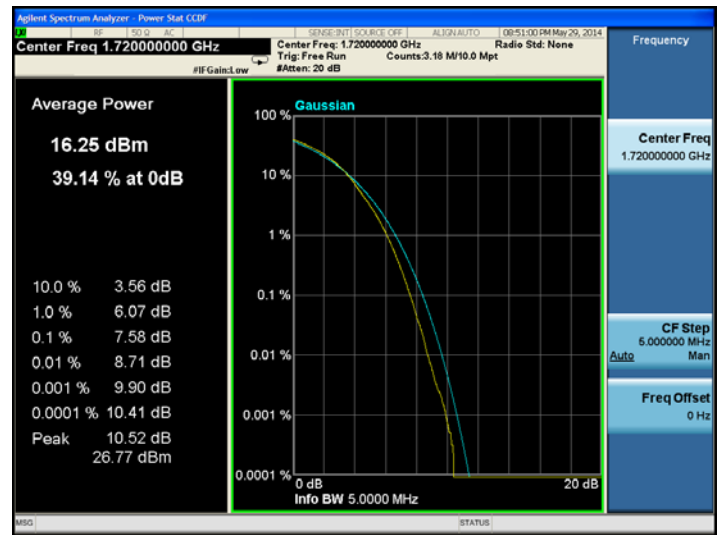


Spectrum Plot of Worst Value

20MHz/QPSK



20MHz/16QAM





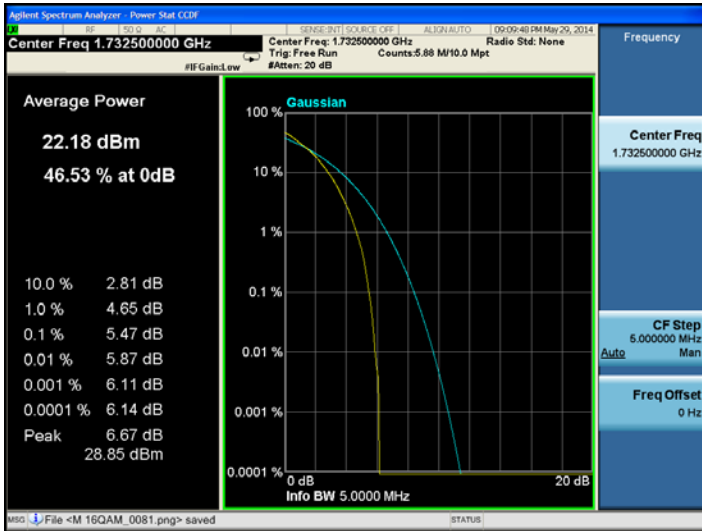
Middle channel:

| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
|---------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 5.47 | 5.98 | 20175 | 1732.5 | 5.31 | 6.16 |
| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 6.56 | 5.97 | 20175 | 1732.5 | 6.52 | 6.74 |
| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20175 | 1732.5 | 6.72 | 7.38 | 20175 | 1732.5 | 7.07 | 7.46 |

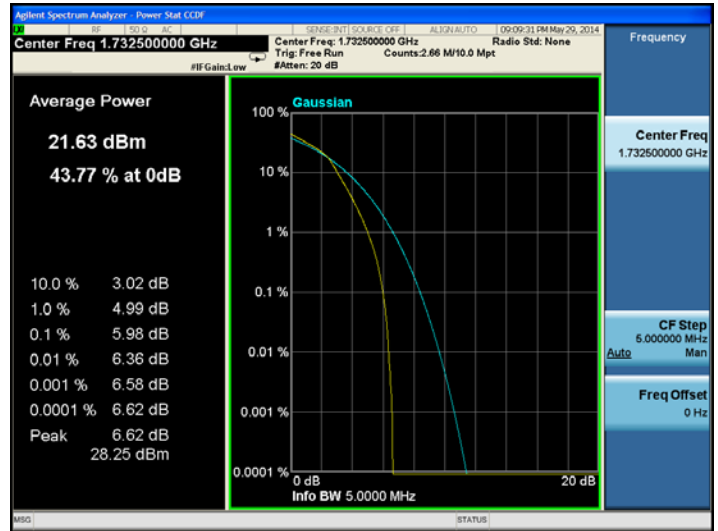


Spectrum Plot of Worst Value

1.4MHz/QPSK



1.4MHz/16QAM

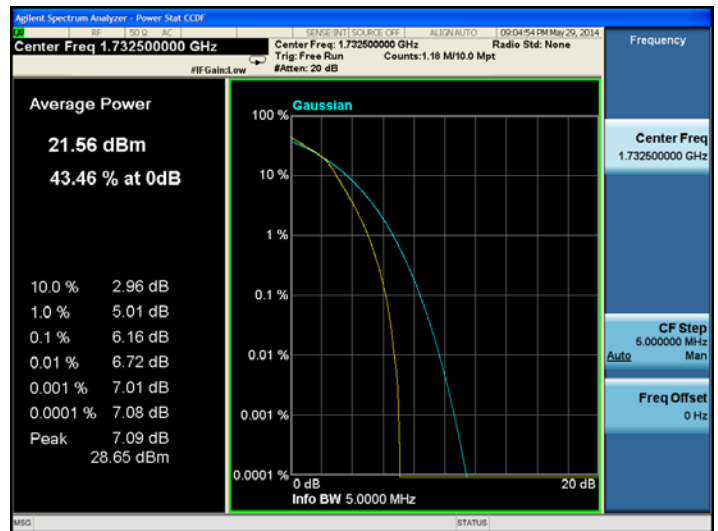


Spectrum Plot of Worst Value

3MHz/QPSK



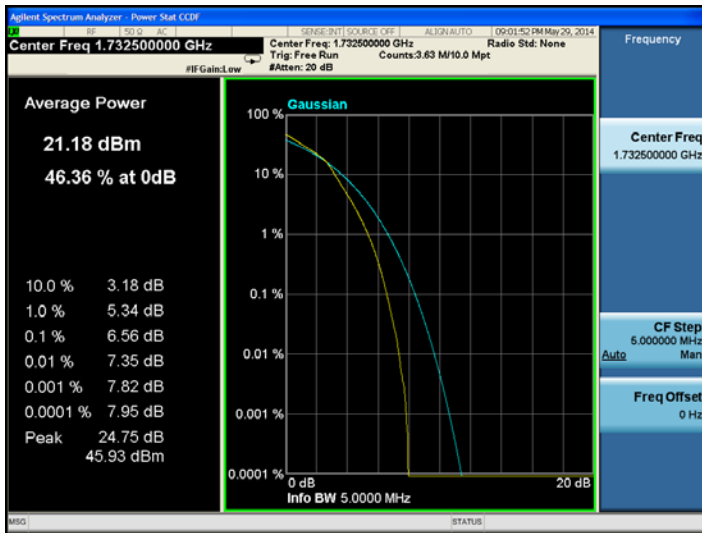
3MHz/16QAM



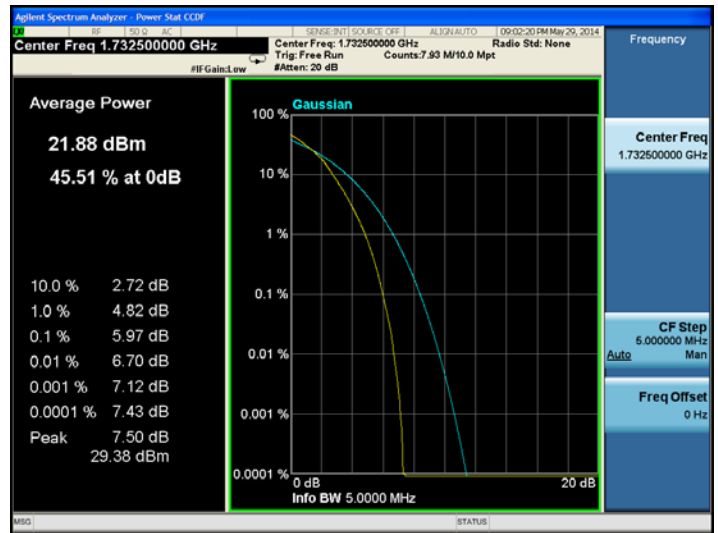


Spectrum Plot of Worst Value

5MHz/QPSK

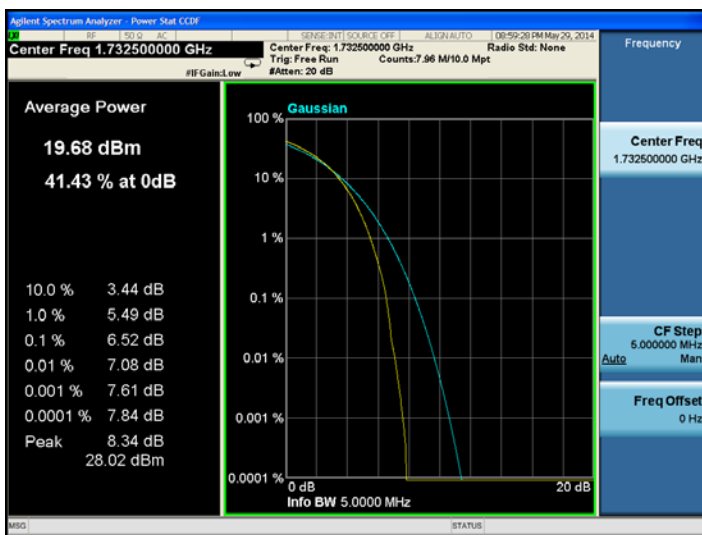


5MHz/16QAM

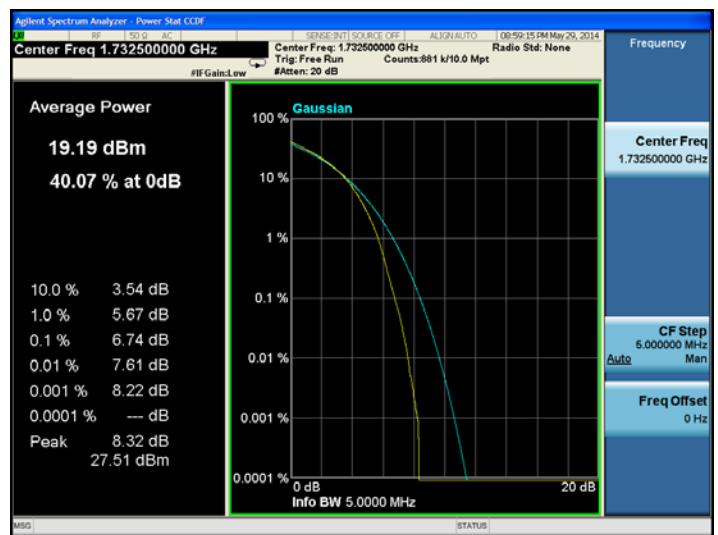


Spectrum Plot of Worst Value

10MHz/QPSK



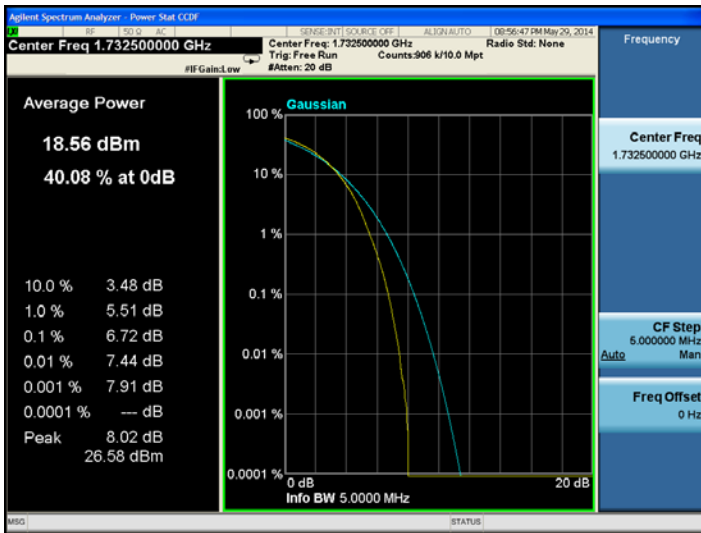
10MHz/16QAM



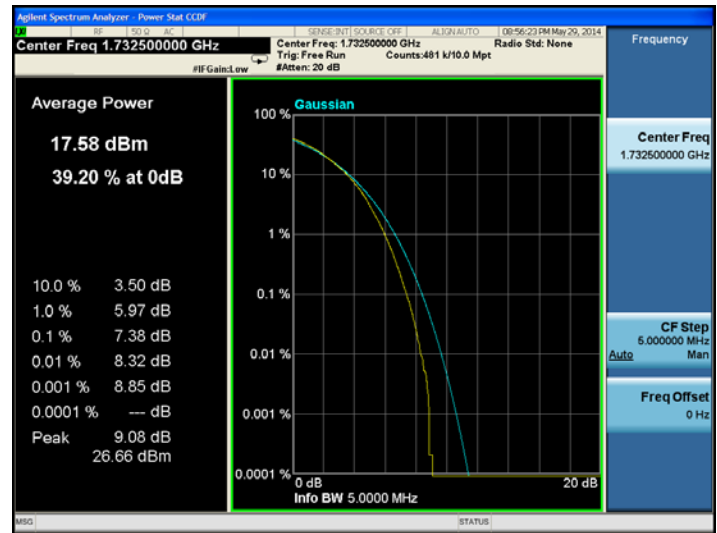


Spectrum Plot of Worst Value

15MHz/QPSK

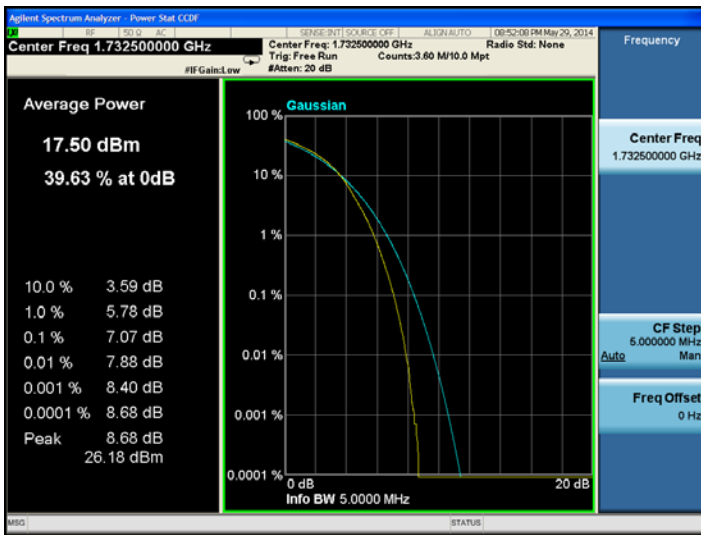


15MHz/16QAM

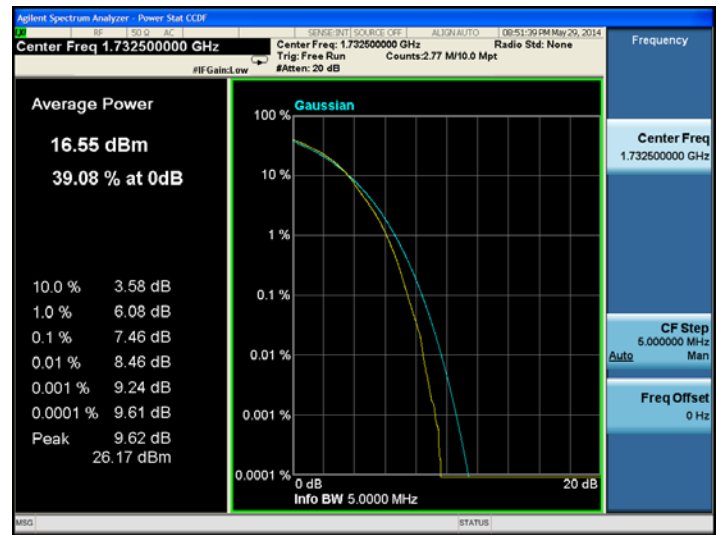


Spectrum Plot of Worst Value

20MHz/QPSK



20MHz/16QAM





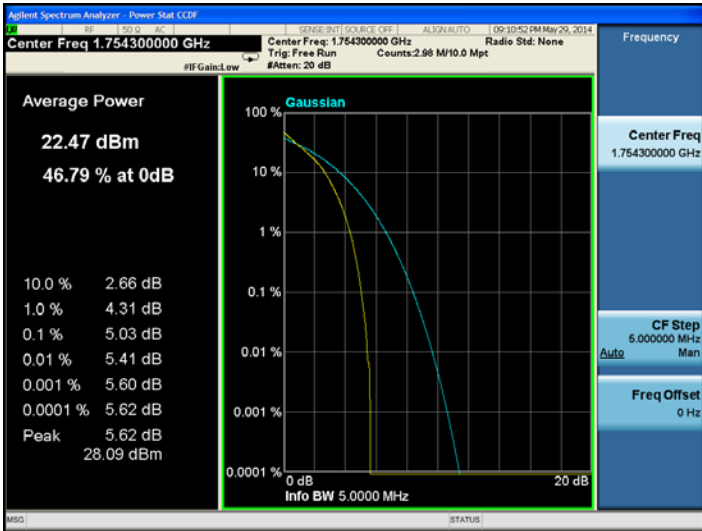
High channel:

| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
|---------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20392 | 1754.2 | 5.03 | 5.87 | 20384 | 1753.4 | 5.24 | 6.11 |
| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20375 | 1752.5 | 5.43 | 6.22 | 20350 | 1750.0 | 6.15 | 6.80 |
| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20325 | 1747.5 | 6.77 | 7.31 | 20300 | 1745.0 | 7.18 | 7.07 |

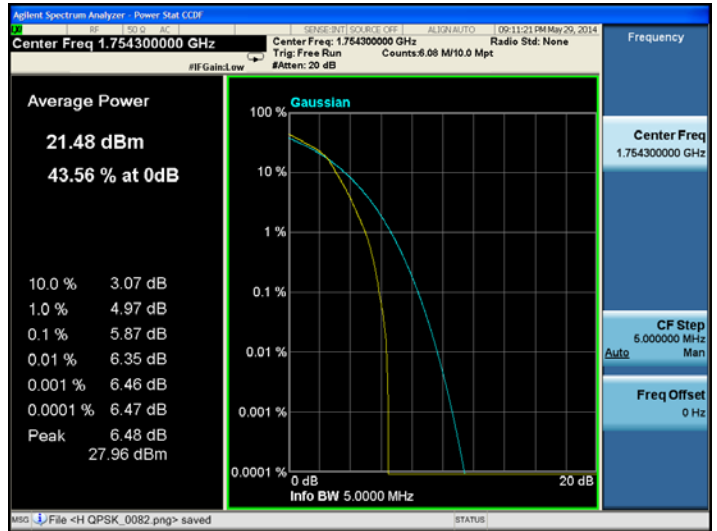


Spectrum Plot of Worst Value

1.4MHz/QPSK

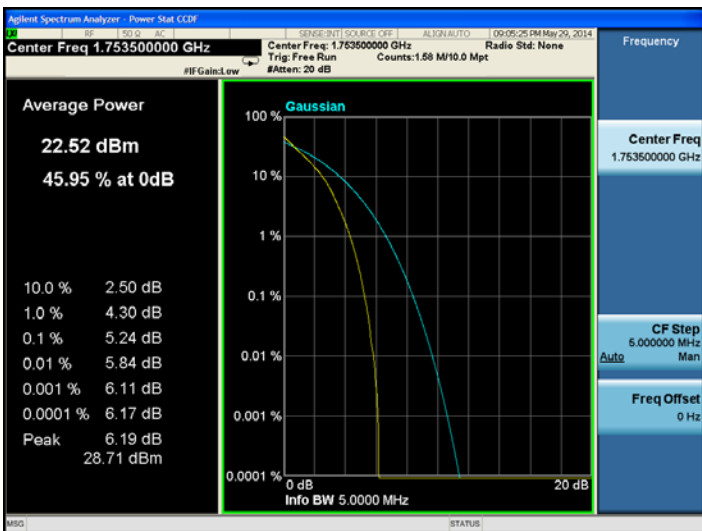


1.4MHz/16QAM

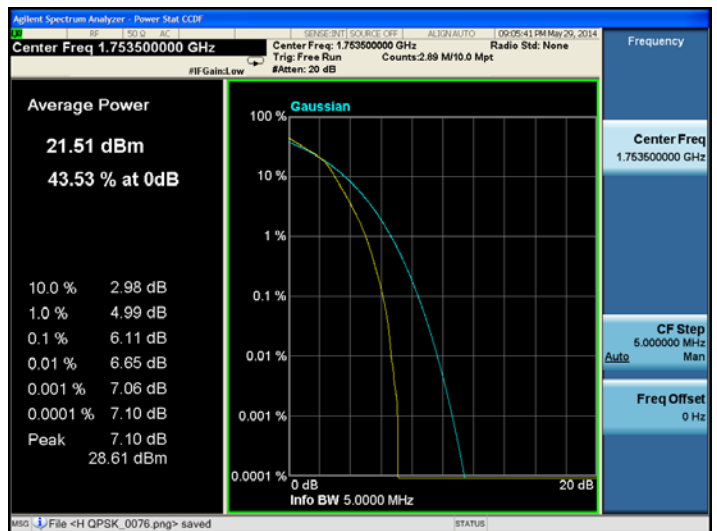


Spectrum Plot of Worst Value

3MHz/QPSK



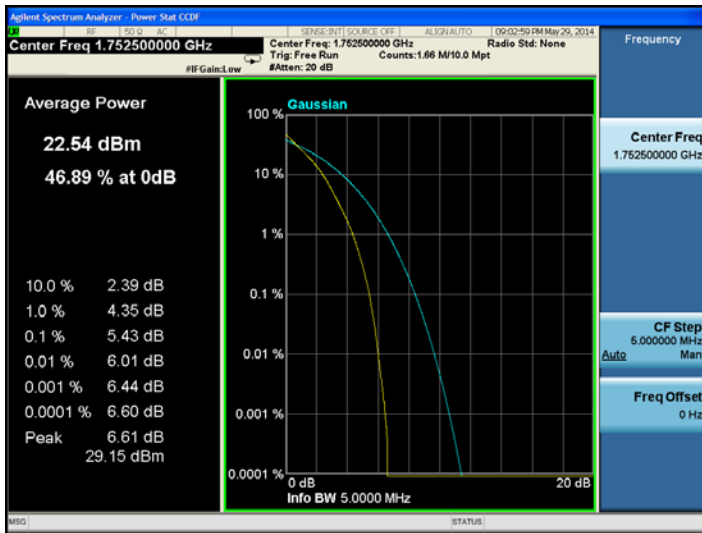
3MHz/16QAM



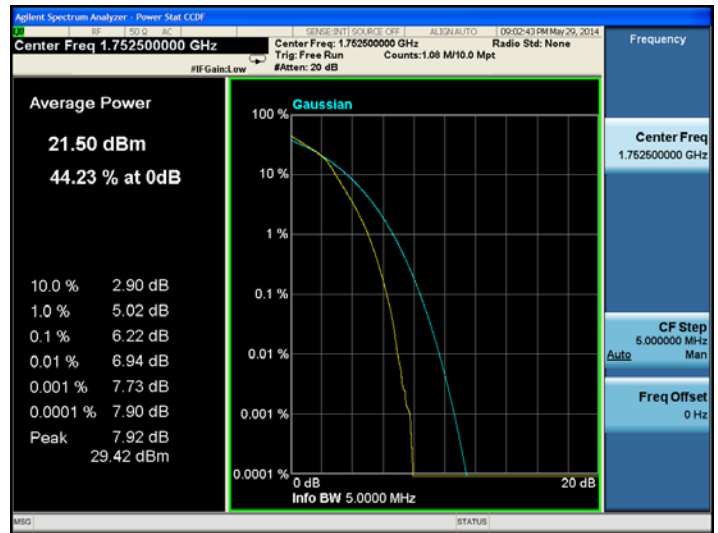


Spectrum Plot of Worst Value

5MHz/QPSK

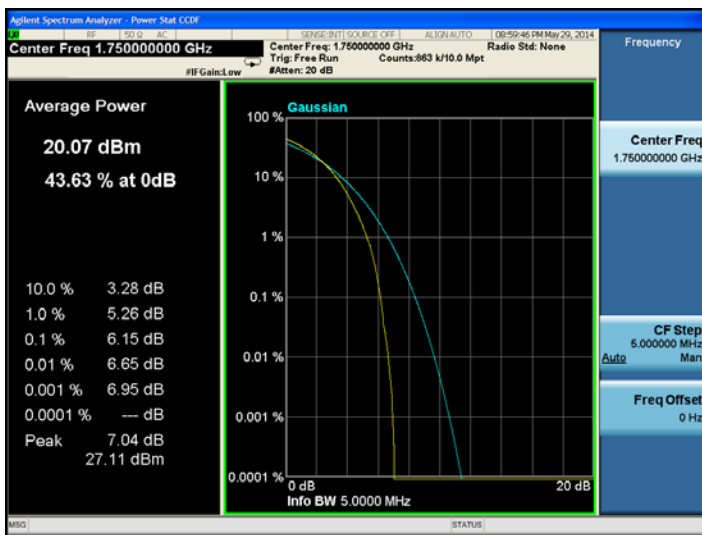


5MHz/16QAM

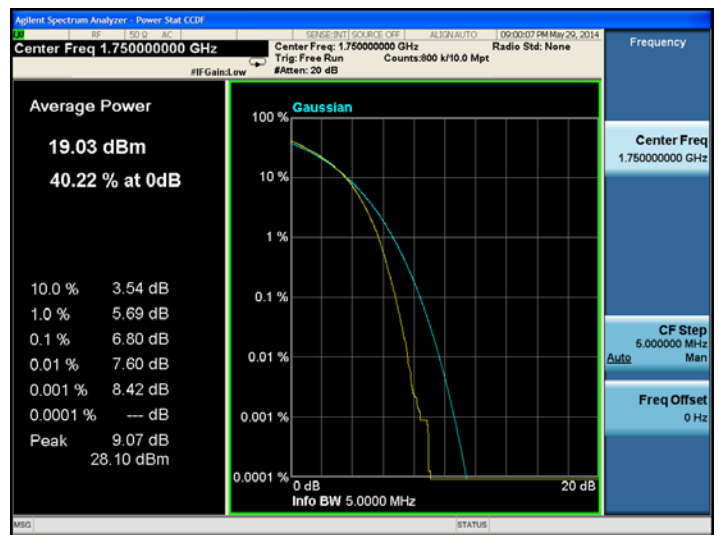


Spectrum Plot of Worst Value

10MHz/QPSK



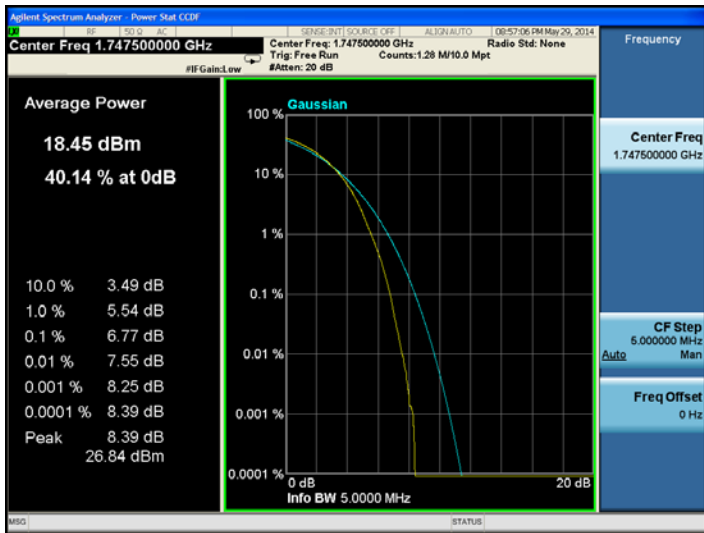
10MHz/16QAM



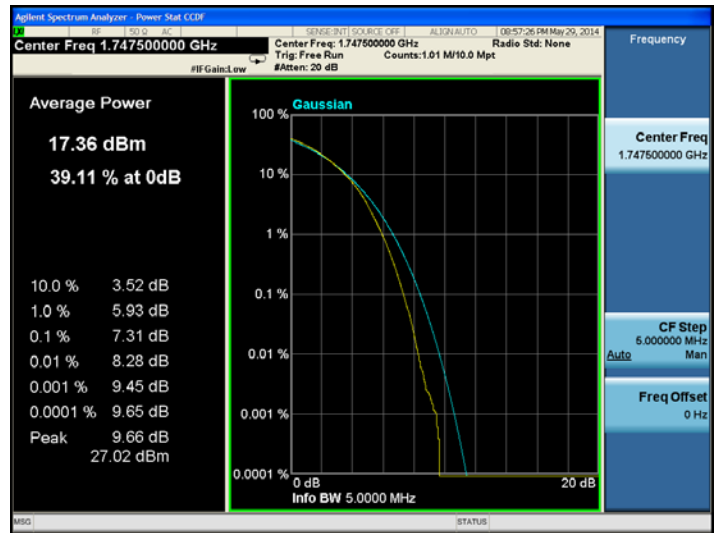


Spectrum Plot of Worst Value

15MHz/QPSK

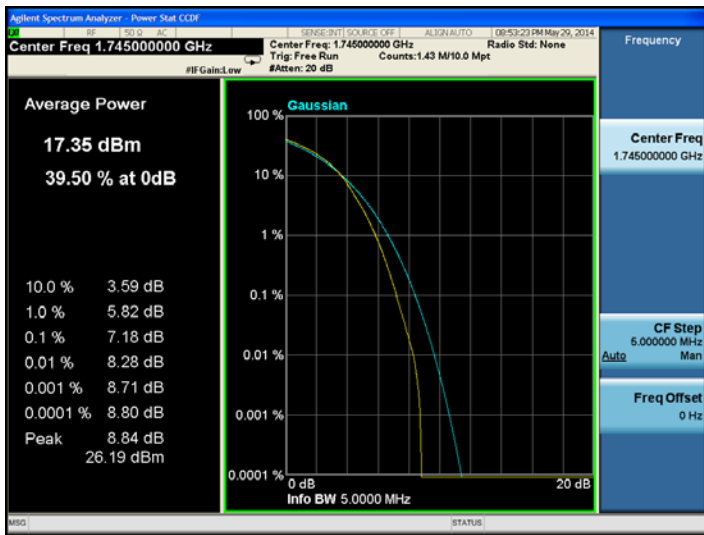


15MHz/16QAM



Spectrum Plot of Worst Value

20MHz/QPSK



20MHz/16QAM

