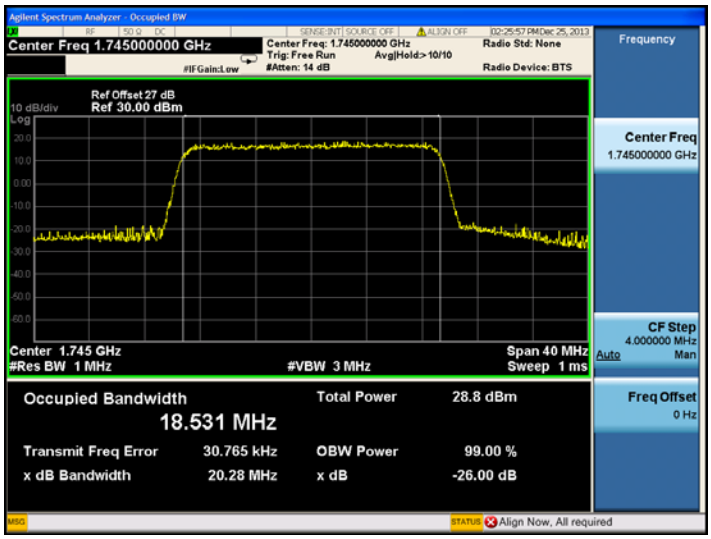
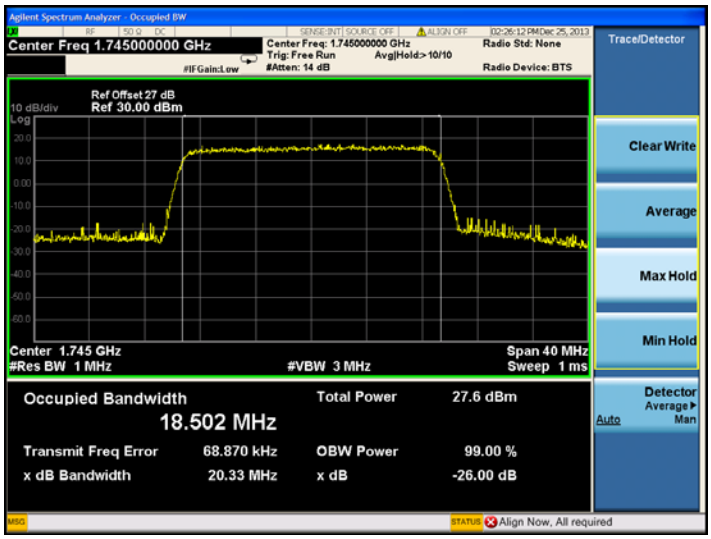
| Spectrum Plot of Worst Value | |
|---|---|
| 15MHz/QPSK | 15MHz/16QAM |
|  |  |
| **Spectrum Plot of Worst Value** | |
| **20MHz/QPSK** | **20MHz/16QAM** |
|  |  |

## 2.3 Frequency Stability

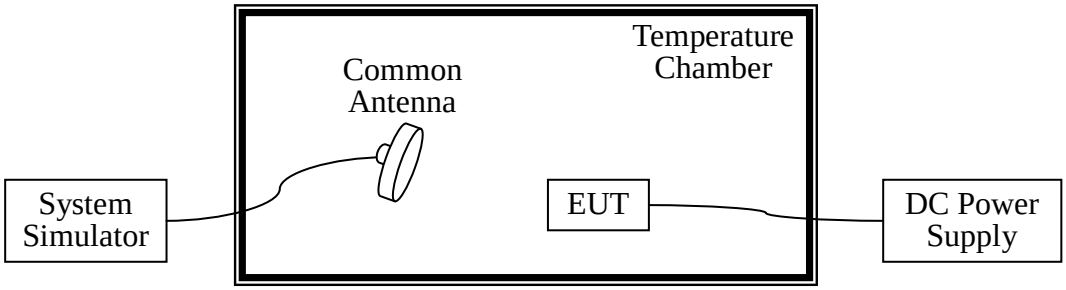
### 2.3.1 Requirement

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 | 1201.0002k50/124534/wk | 2013.05 | 2014.05 |
| DC Power Supply | Good Will | GPS-3030DD | EF920938 | 2013.05 | 2014.05 |
| Temperature Chamber | YinHe Experimental Equip. | HL4003T | (n.a.) | 2013.05 | 2014.05 |

### 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 17 – QPSK - Channel 23790 – Frequency 710MHz – RB 25/0<br>Limit: 710MHz*2.5ppm=1775Hz | | | | |
|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Result** |
| 100 | 3.8 | -30 | 5.31 | PASS |
| 100 | | -20 | -5.74 | |
| 100 | | -10 | -5.78 | |
| 100 | | 0 | -4.68 | |
| 100 | | +10 | -4.41 | |
| 100 | | +20 | 5.55 | |
| 100 | | +30 | -5.41 | |
| 100 | | +40 | 4.60 | |
| 100 | | +50 | -6.18 | |
| 115 | 4.35 | +20 | -6.47 | |
| 85 | 3.6 | +20 | -5.59 | |

| LTE Band 4 – QPSK - Channel 20175 – Frequency 1732.5MHz – RB 6/0<br>Limit: 1732.5MHz*2.5ppm=4331.25Hz | | | | |
|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Result** |
| 100 | 3.8 | -30 | 12.56 | PASS |
| 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 | 11.12 | |
| 85 | 3.6 | +20 | 12.52 | |

## 2.4 Peak to Average Radio

### 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.

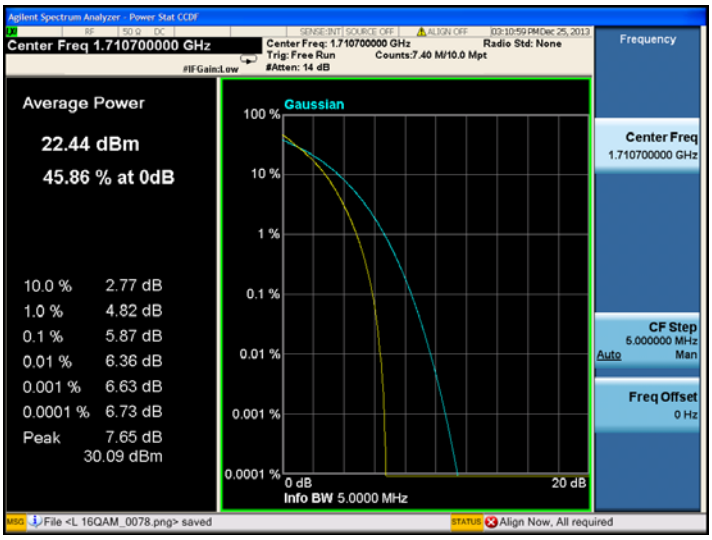
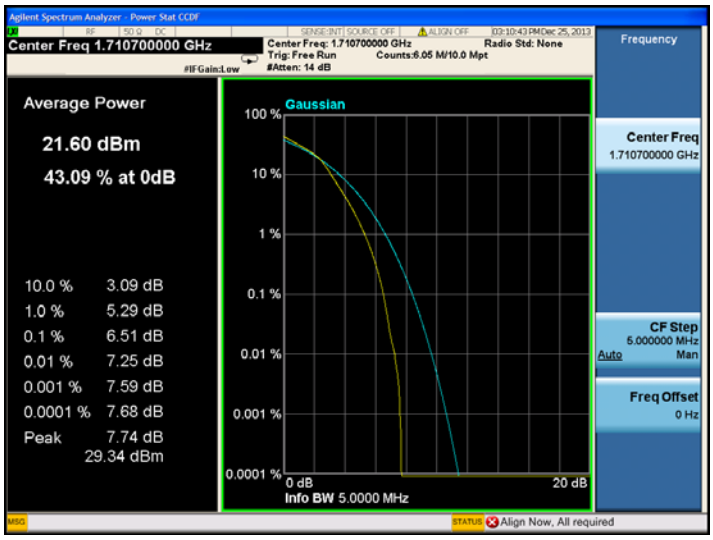
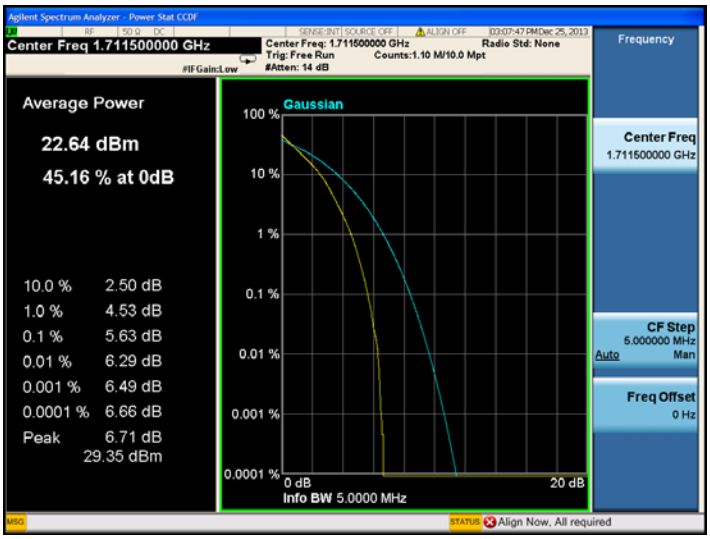
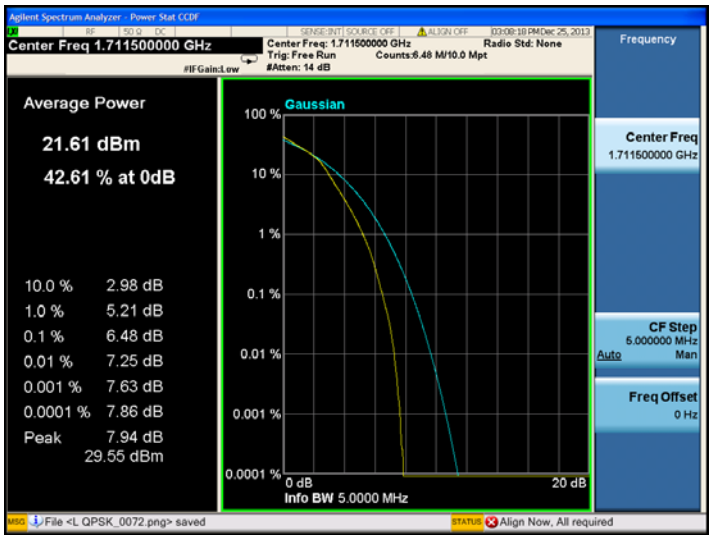
### 2.4.3 Test Result

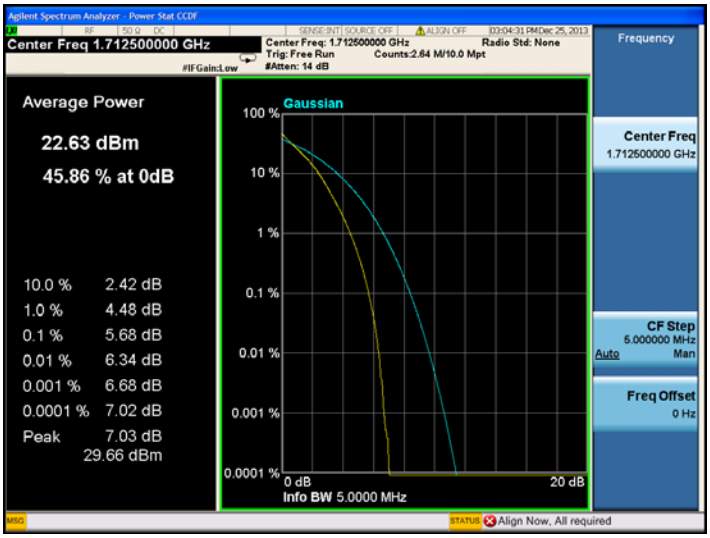
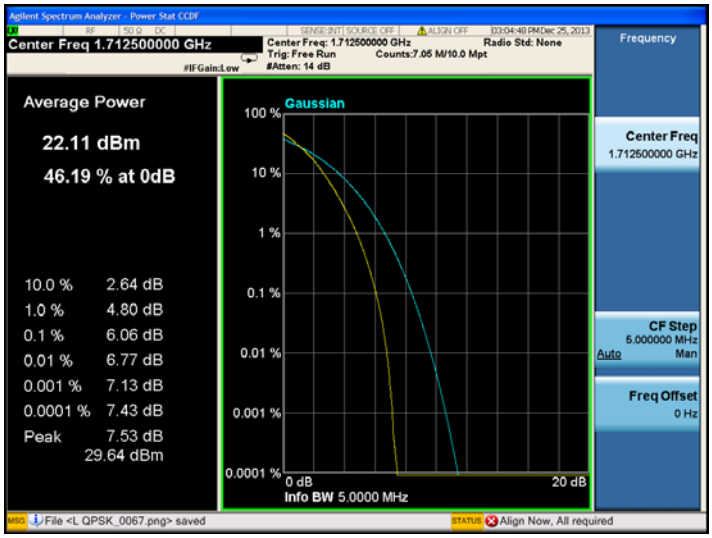
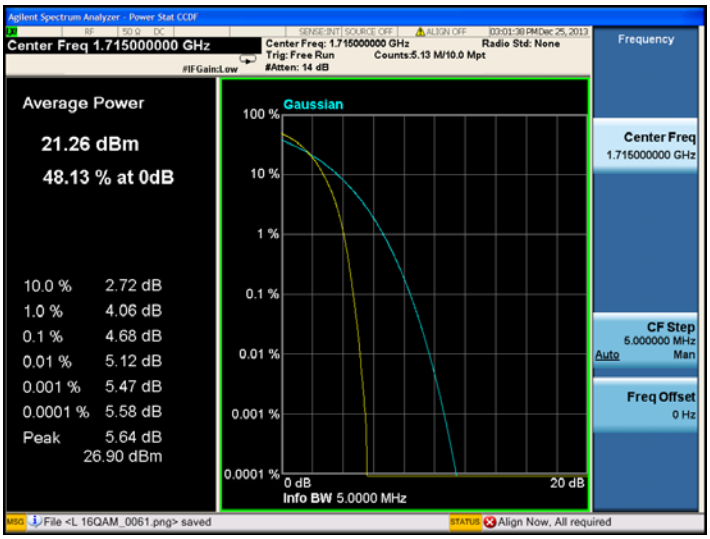
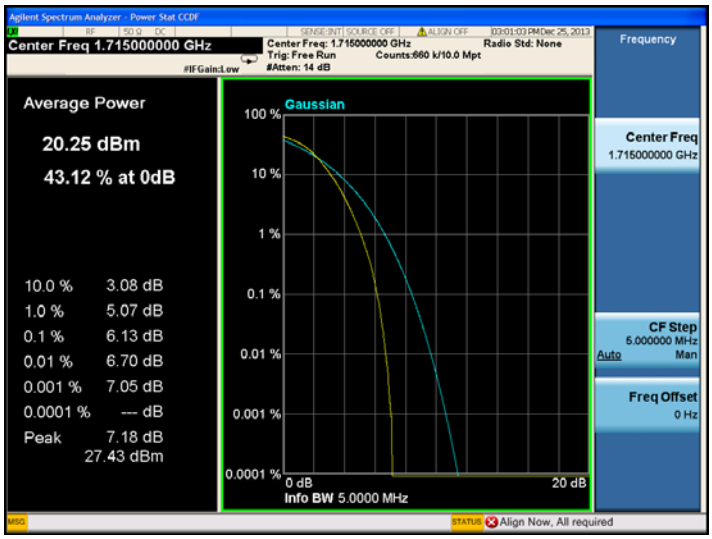
Record the maximum PAPR level associated with a probability of 0.1%.

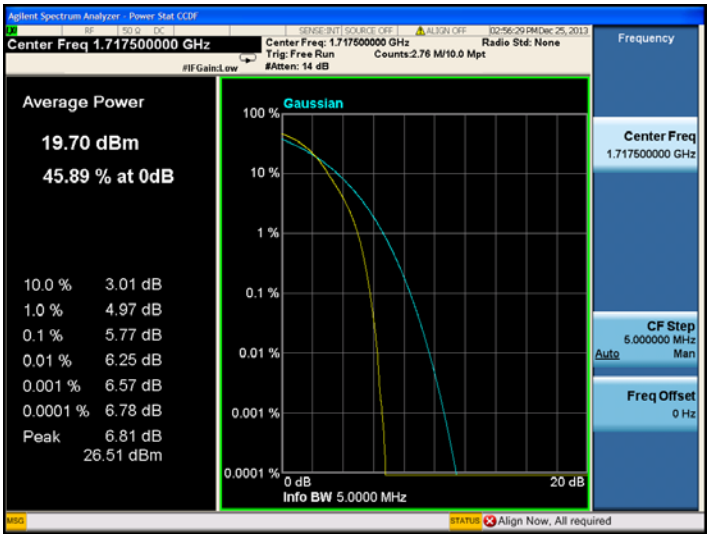
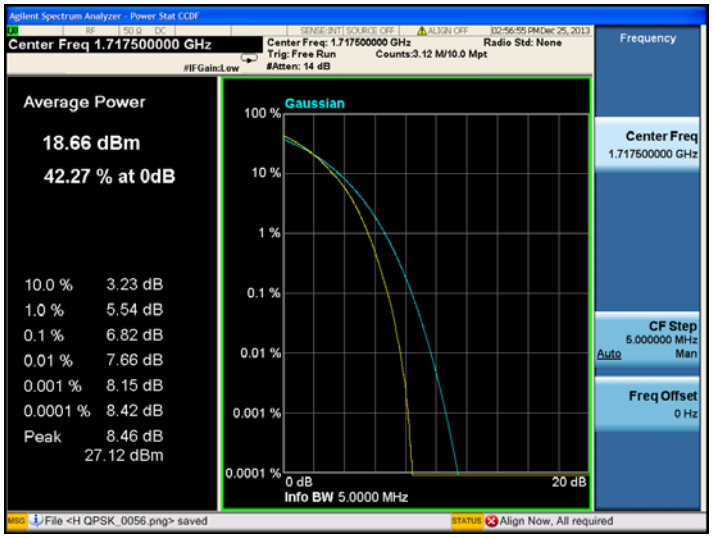
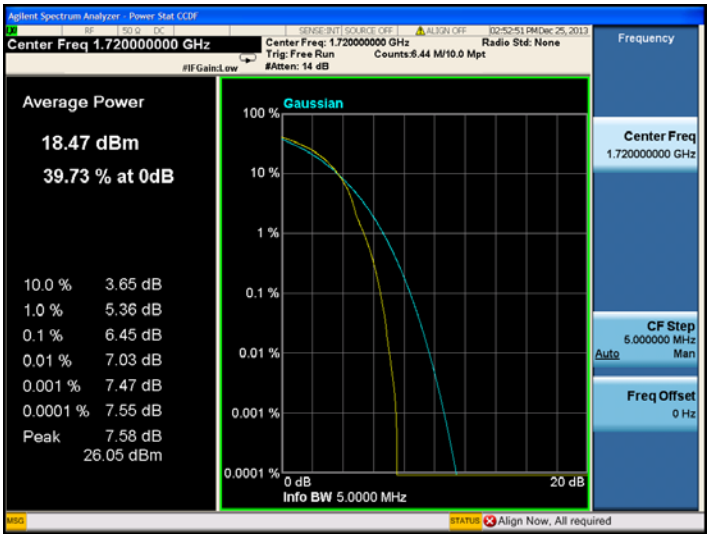
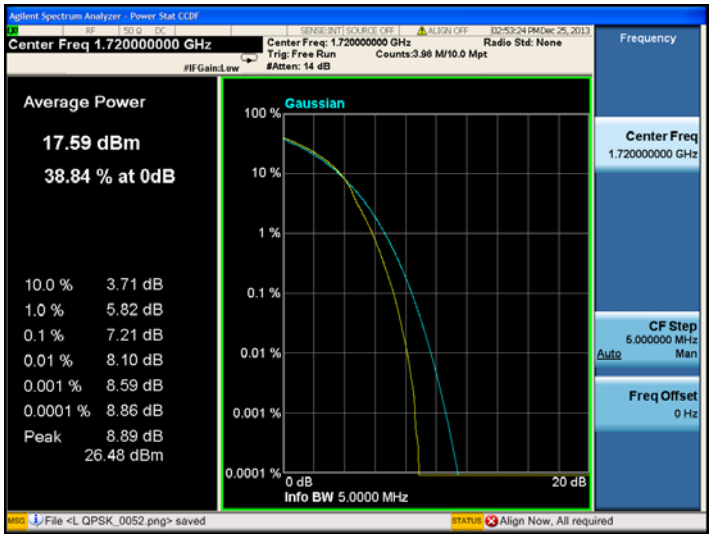
**LTE Band 4:**

**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 | 5.87 | 6.51 | 19965 | 1771.5 | 5.63 | 6.48 |
| **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 | QPSK | 16QAM |
| 19975 | 1712.5 | 5.68 | 6.06 | 20000 | 1715.0 | 4.68 | 6.13 |
| **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 | QPSK | 16QAM |
| 20025 | 1717.5 | 5.77 | 6.82 | 20050 | 1720.0 | 6.45 | 7.21 |

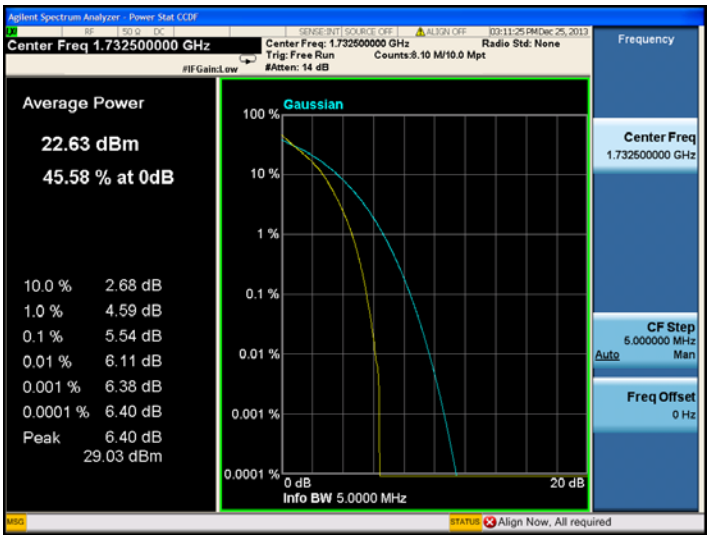
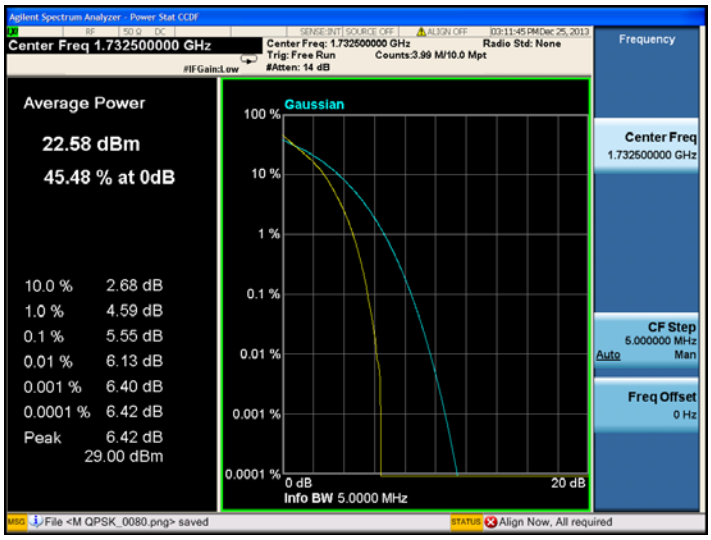
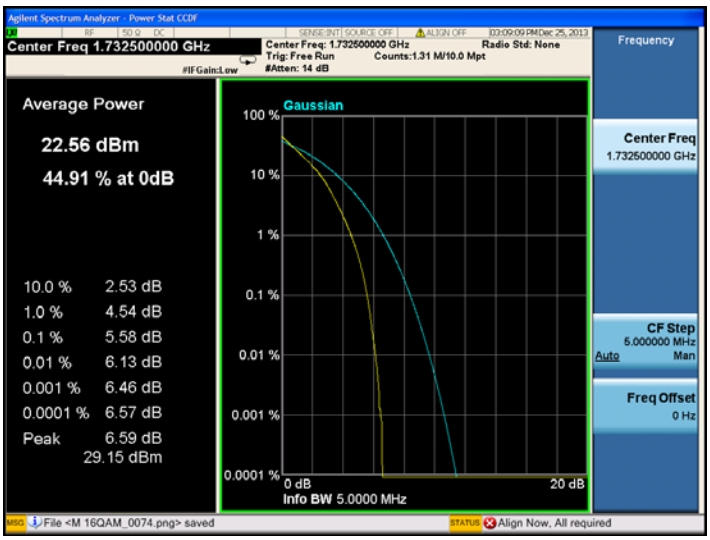
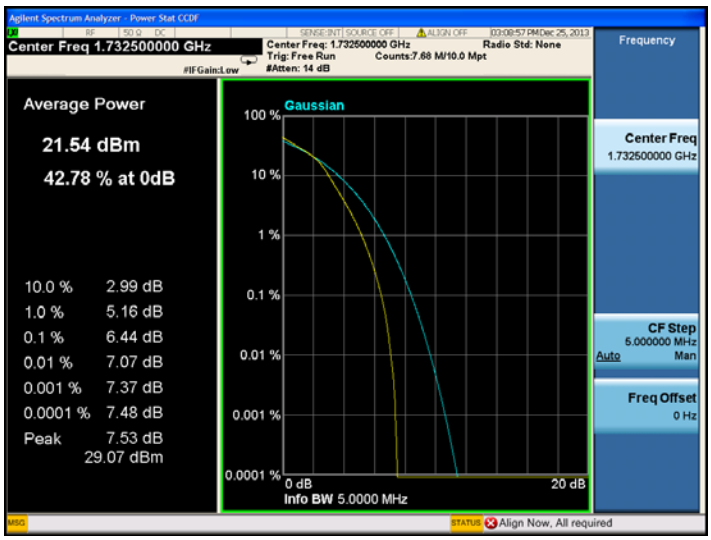
| Spectrum Plot of Worst Value (Low channel) | |
|---|---|
| 1.4MHz/QPSK | 1.4MHz/16QAM |
|  |  |
| **Spectrum Plot of Worst Value** | |
| 3MHz/QPSK | 3MHz/16QAM |
|  |  |

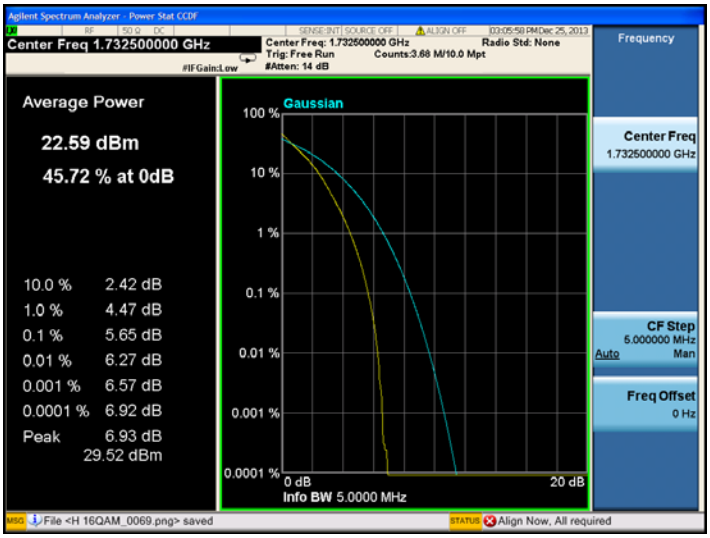
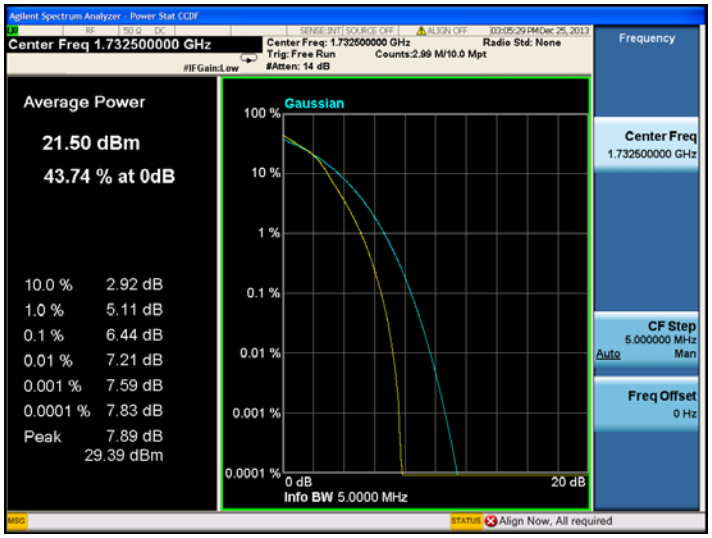
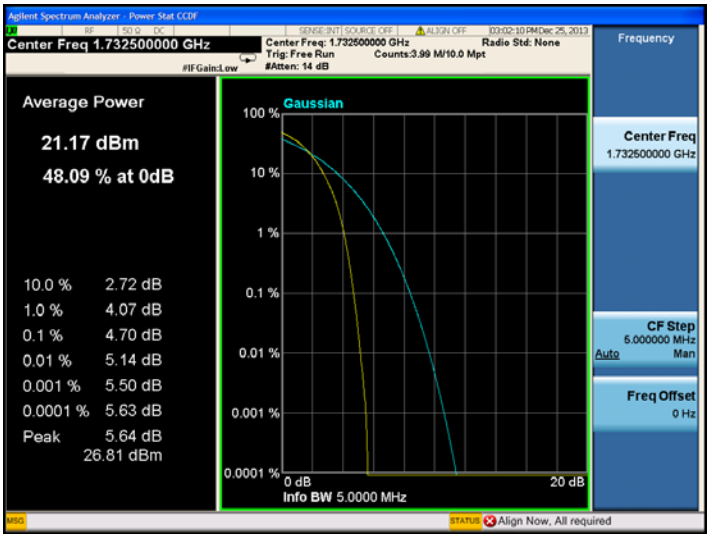
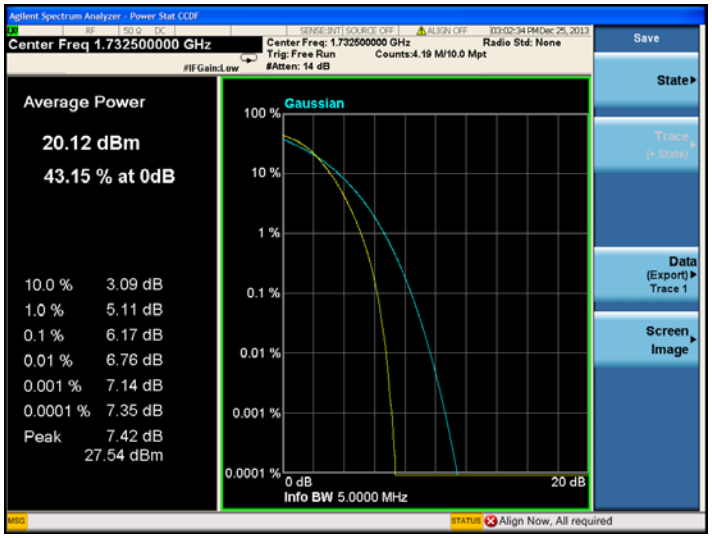
| Spectrum Plot of Worst Value | |
|---|---|
| **5MHz/QPSK** | **5MHz/16QAM** |
|  |  |
| **Spectrum Plot of Worst Value** | |
| **10MHz/QPSK** | **10MHz/16QAM** |
|  |  |

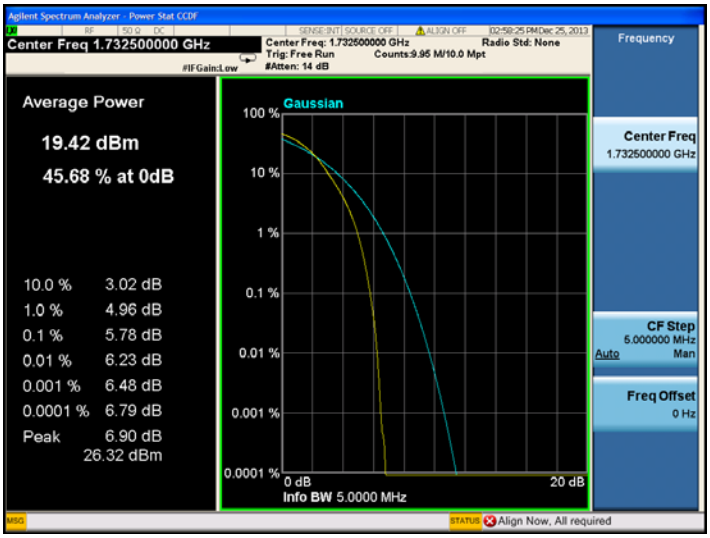
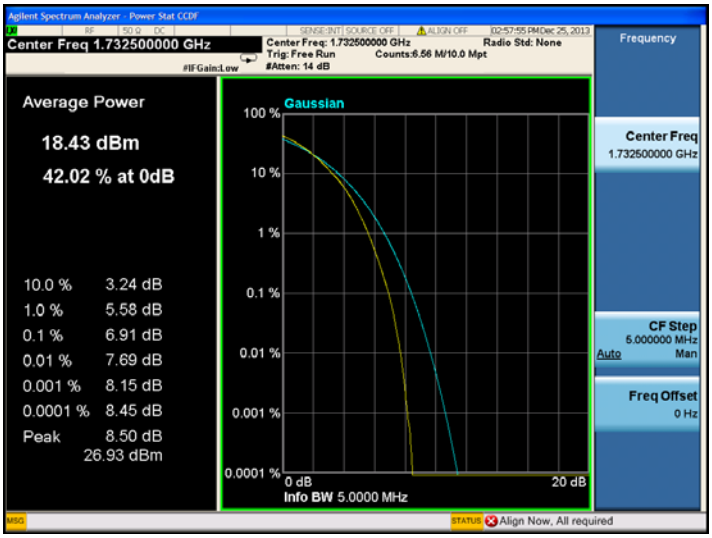
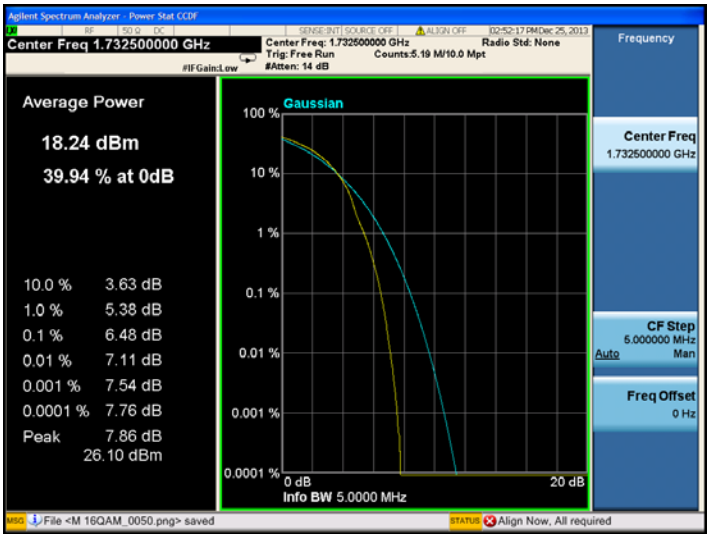
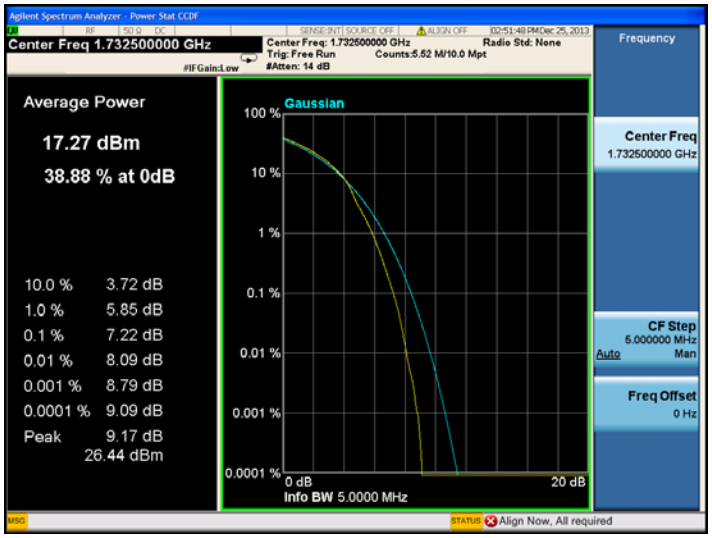
| Spectrum Plot of Worst Value | |
|---|---|
| 15MHz/QPSK | 15MHz/16QAM |
|  |  |
| Spectrum Plot of Worst Value | |
| 20MHz/QPSK | 20MHz/16QAM |
|  |  |

**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 | 5.54 | 5.55 | 20175 | 1732.5 | 5.58 | 6.44 |
| **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 | QPSK | 16QAM |
| 20175 | 1732.5 | 5.65 | 6.44 | 20175 | 1732.5 | 4.70 | 6.17 |
| **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 | QPSK | 16QAM |
| 20175 | 1732.5 | 5.78 | 6.91 | 20175 | 1732.5 | 6.48 | 7.22 |

| 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 |
|  |  |