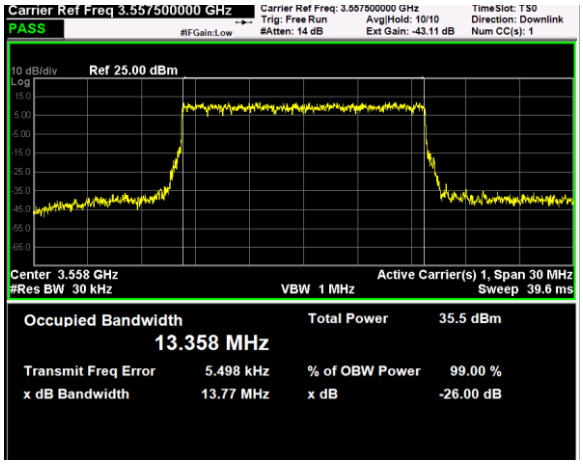
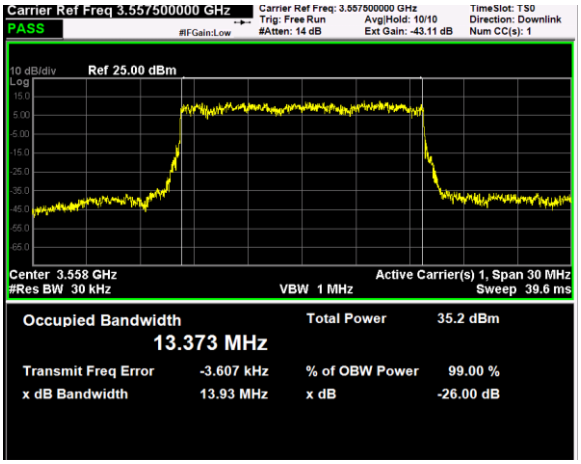
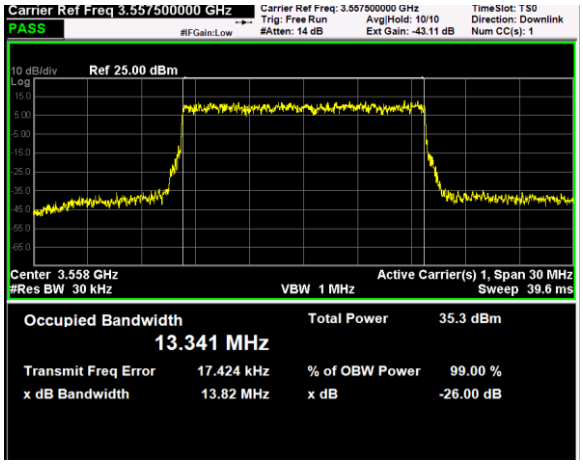


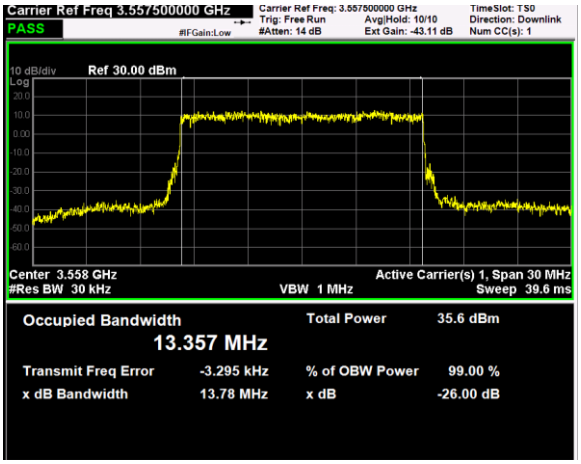

Channel: BOTTOM, Modulation: QPSK, BW=15MHz



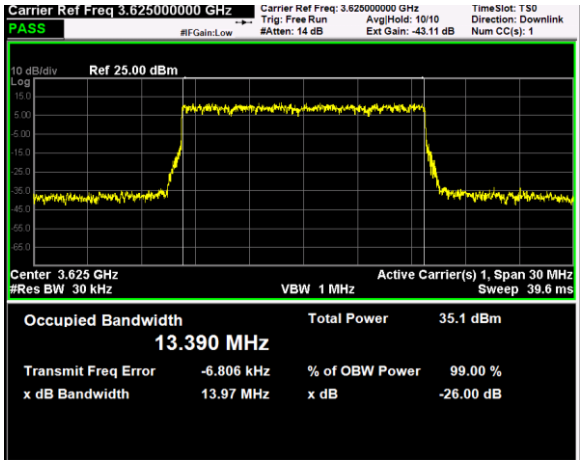

Channel: BOTTOM, Modulation: 16QAM, BW=15MHz



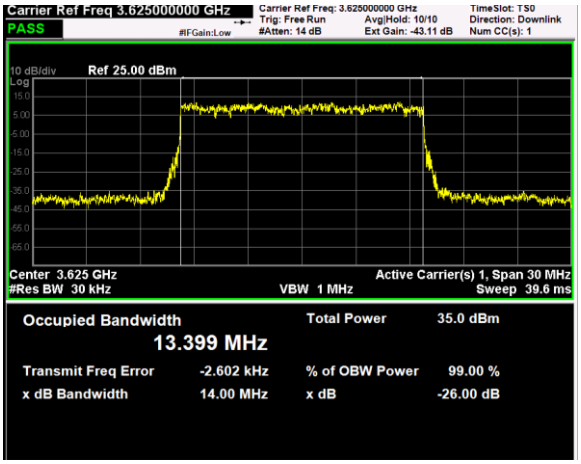

Channel: BOTTOM, Modulation: 64QAM, BW=15MHz



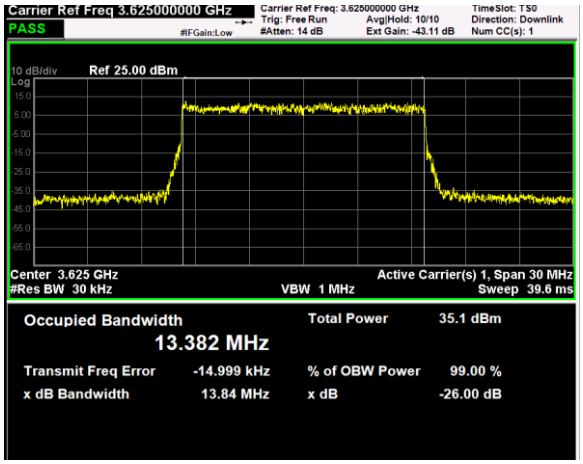

Channel: BOTTOM, Modulation: 256QAM, BW=15MHz



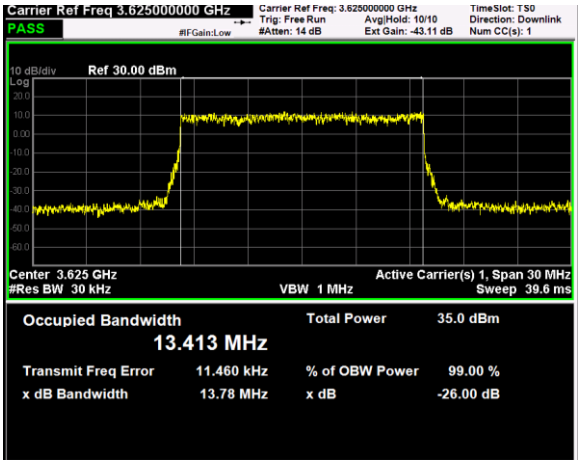

Channel: MIDDLE, Modulation: QPSK, BW=15MHz



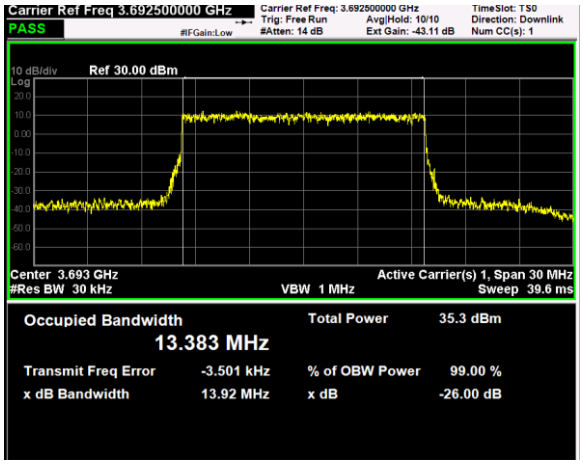

Channel: MIDDLE, Modulation: 16QAM, BW=15MHz



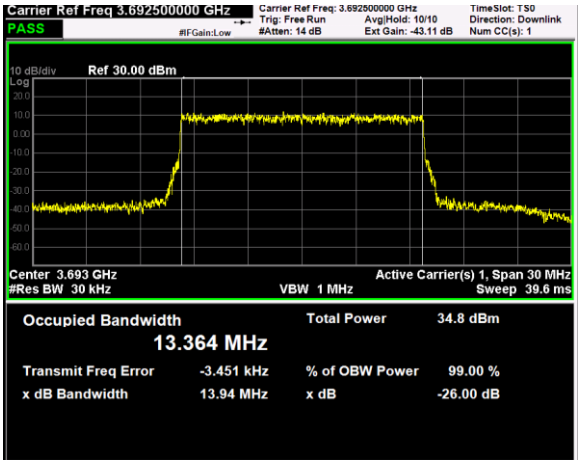

Channel: MIDDLE, Modulation: 64QAM, BW=15MHz



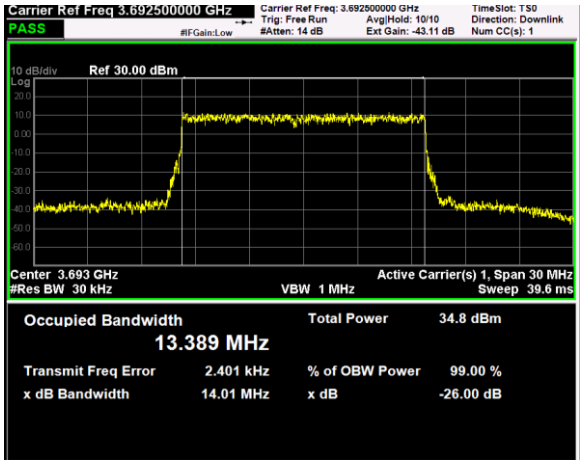

Channel: MIDDLE, Modulation: 256QAM, BW=15MHz



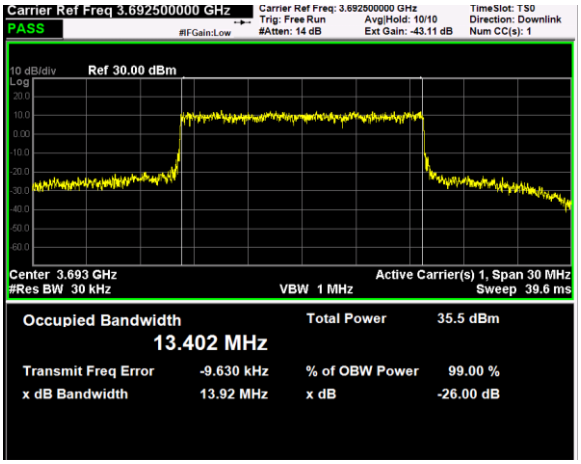

Channel: TOP, Modulation: QPSK, BW=15MHz



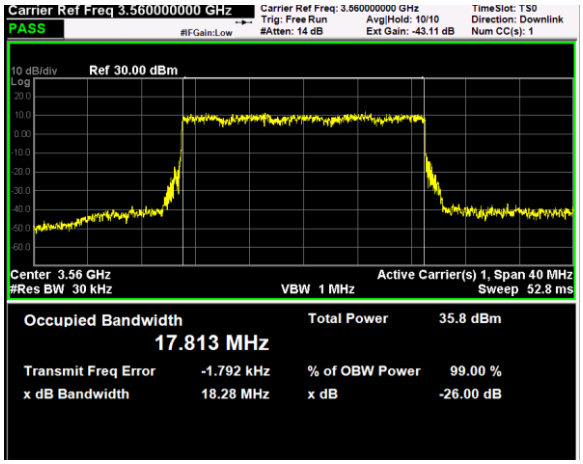

Channel: TOP, Modulation: 16QAM, BW=15MHz



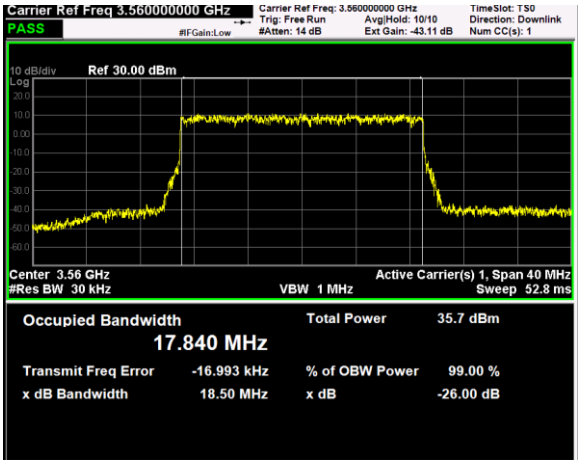

Channel: TOP, Modulation: 64QAM, BW=15MHz



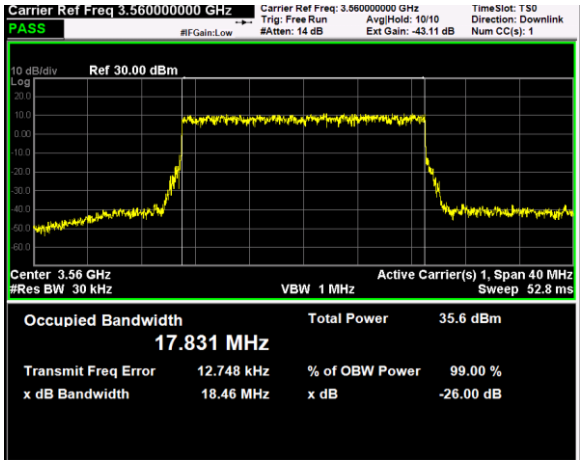

Channel: TOP, Modulation: 256QAM, BW=15MHz



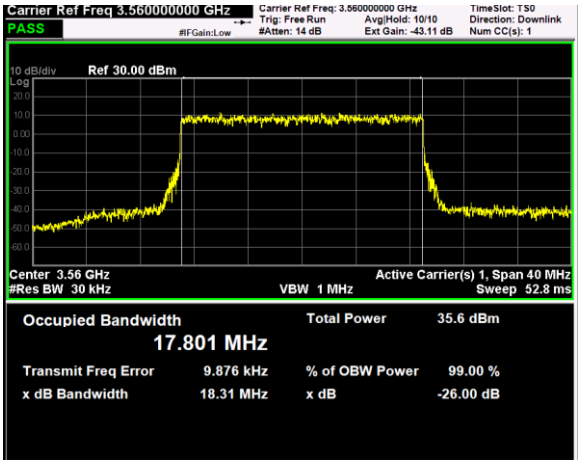

Channel: BOTTOM, Modulation: QPSK, BW=20MHz



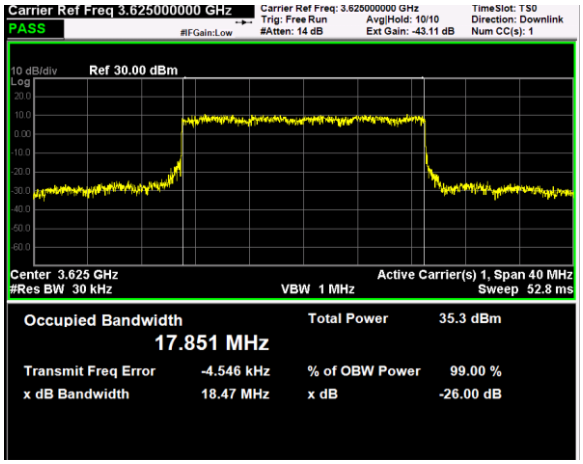

Channel: BOTTOM, Modulation: 16QAM, BW=20MHz



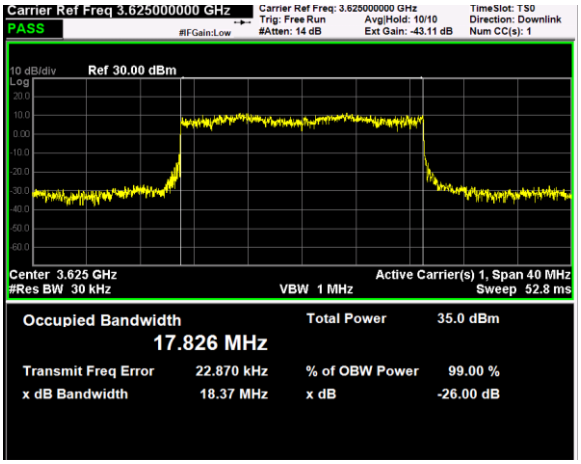

Channel: BOTTOM, Modulation: 64QAM, BW=20MHz



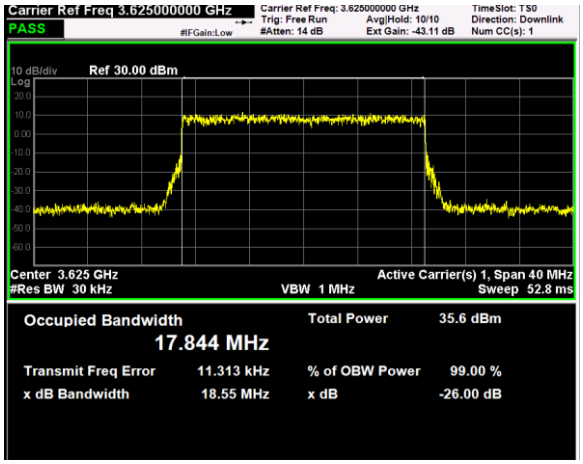

Channel: BOTTOM, Modulation: 256QAM, BW=20MHz



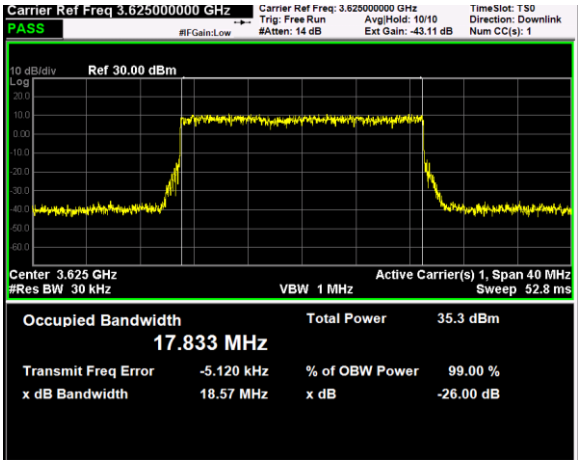

Channel: MIDDLE, Modulation: QPSK, BW=20MHz



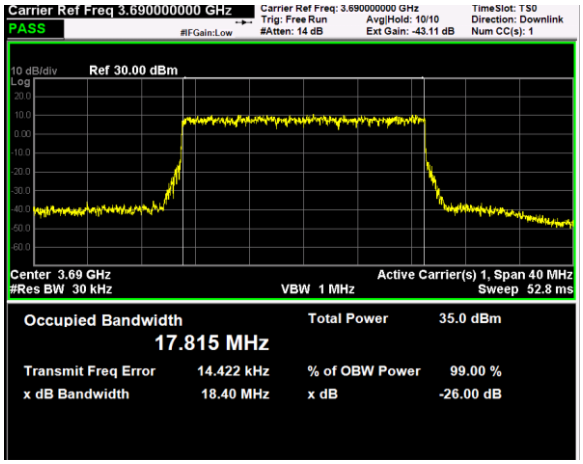

Channel: MIDDLE, Modulation: 16QAM, BW=20MHz



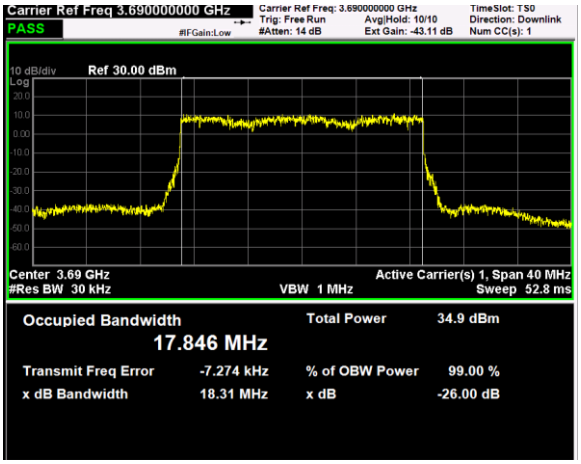

Channel: MIDDLE, Modulation: 64QAM, BW=20MHz



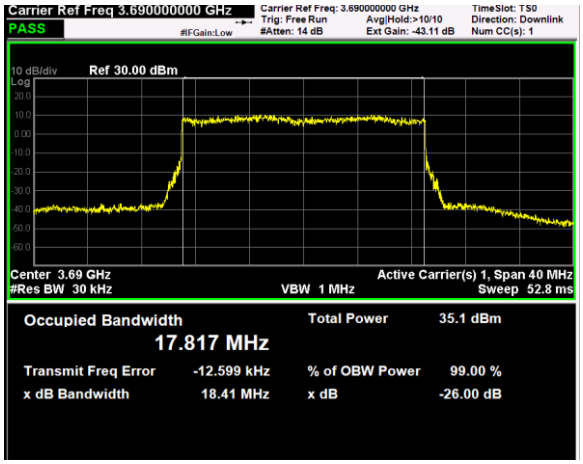

Channel: MIDDLE, Modulation: 256QAM, BW=20MHz



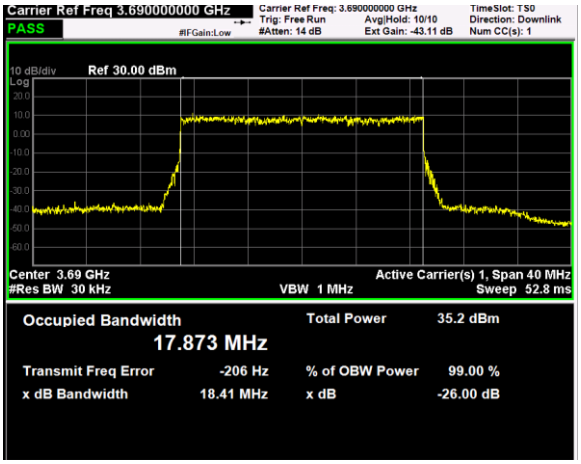

Channel: TOP, Modulation: QPSK, BW=20MHz




Channel: TOP, Modulation: 16QAM, BW=20MHz




Channel: TOP, Modulation: 64QAM, BW=20MHz




Channel: TOP, Modulation: 256QAM, BW=20MHz

## Clause 96.41(b)(g) Peak output power at RF antenna connector

(b) *Power limits.* Unless otherwise specified in this section, the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the table in this paragraph (b):

| Device | Maximum EIRP (dBm/10 megahertz) | Maximum PSD (dBm/MHz) |
|---|---|---|
| End User Device | 23 | n/a |
| Category A CBSD | 30 | 20 |
| Category B CBSD[1] | 47 | 37 |

(g) *Power measurement.* The peak-to-average power ratio (PAPR) of any CBSD transmitter output power must not exceed 13 dB. PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities or another Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

Test date: 09/28/2020 to 10/09/2020

Test results: Pass

### Special notes

-

## Clause 96.41(b)(d) Peak output power at RF antenna connector

### Test data

### RF PORT 1 (BW = 5 MHz)

| Test data | | | | | | | |
|---|---|---|---|---|---|---|---|
| Direction | Modulation | Frequency (MHz) | RF output Power (dBm) | RF output channel Power (W) | PSD (dBm/Hz) | PSD (dBm/MHz) | PAR (dB) |
| Down-link | LTE 5MHz (QPSK) | 3552.5 | 37.0 | 5.000 | -30.0 | 30.0 | 10.1 |
| Down-link | LTE 5MHz (QPSK) | 3625.0 | 37.0 | 4.966 | -30.0 | 30.0 | 10.7 |
| Down-link | LTE 5MHz (QPSK) | 3697.5 | 37.8 | 4.753 | -30.2 | 29.8 | 9.5 |
| Down-link | LTE 5MHz (16QAM) | 3552.5 | 37.0 | 4.966 | -30.0 | 30.0 | 10.0 |
| Down-link | LTE 5MHz (16QAM) | 3625.0 | 36.8 | 4.742 | -30.2 | 29.8 | 10.7 |
| Down-link | LTE 5MHz (16QAM) | 3697.5 | 36.8 | 4.808 | -30.2 | 29.8 | 10.0 |
| Down-link | LTE 5MHz (64QAM) | 3552.5 | 37.1 | 5.117 | -29.9 | 30.1 | 10.0 |
| Down-link | LTE 5MHz (64QAM) | 3625.0 | 36.7 | 4.677 | -30.3 | 29.7 | 10.2 |
| Down-link | LTE 5MHz (64QAM) | 3697.5 | 37.0 | 4.955 | -30.0 | 30.0 | 9.9 |
| Down-link | LTE 5MHz (256QAM) | 3552.5 | 36.9 | 4.898 | -30.1 | 29.9 | 10.1 |
| Down-link | LTE 5MHz (256QAM) | 3625.0 | 37.0 | 5.012 | -30.0 | 30.0 | 11.2 |
| Down-link | LTE 5MHz (256QAM) | 3697.5 | 37.0 | 4.955 | -30.0 | 30.0 | 10.3 |

## RF PORT 2 (BW = 5 MHz)

| Test data | | | | | | | |
|---|---|---|---|---|---|---|---|
| Direction | Modulation | Frequency (MHz) | RF output Power (dBm) | RF output channel Power (W) | PSD (dBm/Hz) | PSD (dBm/MHz) | PAR (dB) |
| Down-link | LTE 5MHz (QPSK) | 3552.5 | 36.7 | 4.688 | -30.3 | 29.7 | 10.4 |
| Down-link | LTE 5MHz (QPSK) | 3625.0 | 36.8 | 4.797 | -30.2 | 29.8 | 9.9 |
| Down-link | LTE 5MHz (QPSK) | 3697.5 | 36.7 | 4.667 | -30.3 | 29.7 | 10.0 |
| Down-link | LTE 5MHz (16QAM) | 3552.5 | 36.7 | 4.688 | -30.3 | 29.7 | 10.1 |
| Down-link | LTE 5MHz (16QAM) | 3625.0 | 36.8 | 4.819 | -30.2 | 29.8 | 9.8 |
| Down-link | LTE 5MHz (16QAM) | 3697.5 | 36.7 | 4.634 | -30.3 | 29.7 | 10.0 |
| Down-link | LTE 5MHz (64QAM) | 3552.5 | 36.7 | 4.699 | -30.3 | 29.7 | 9.7 |
| Down-link | LTE 5MHz (64QAM) | 3625.0 | 36.8 | 4.775 | -30.2 | 29.8 | 10.0 |
| Down-link | LTE 5MHz (64QAM) | 3697.5 | 36.8 | 4.786 | -30.2 | 29.8 | 9.8 |
| Down-link | LTE 5MHz (256QAM) | 3552.5 | 36.7 | 4.721 | -30.3 | 29.8 | 10.6 |
| Down-link | LTE 5MHz (256QAM) | 3625.0 | 36.7 | 4.710 | -30.3 | 29.7 | 10.1 |
| Down-link | LTE 5MHz (256QAM) | 3697.5 | 36.8 | 4.764 | -30.2 | 29.8 | 10.5 |

### Special notes

Remark: MIMO application where only cross-polarized antennas are allowed (KDB “662911 D01 Multiple Transmitter Output v02r01”, chapter F, paragraph 2), letter c), item (i) ).

Please note that the case with cross-polarized antennas (the only allowed, as stated in the User Manual), with a pair of antennas ($N_{ANT}$ = 2) and two outputs ports driving the antennas, has been considered as worst case; therefore the directional gain is the gain of an individual antenna.

**Compliance to Category A limits (BW = 5 MHz):**

Maximum EIRP ≤ 30 dBm/10MHz
Maximum PSD eirp ≤ 20 dBm/1MHz

PSD eirp (in 1 MHz) = $PSD_{max}$ – N + $G_{max}$ = 30* – N + $G_{max}$ ≤ 20

The allowed max antenna gain is calculated as: $G_{max}$ ≤ (20-30+N) = N -10 dBi

**Compliance to Category B limits (BW = 5 MHz):**

Maximum EIRP ≤ 47 dBm/10MHz
Maximum PSD eirp ≤ 37 dBm/1MHz

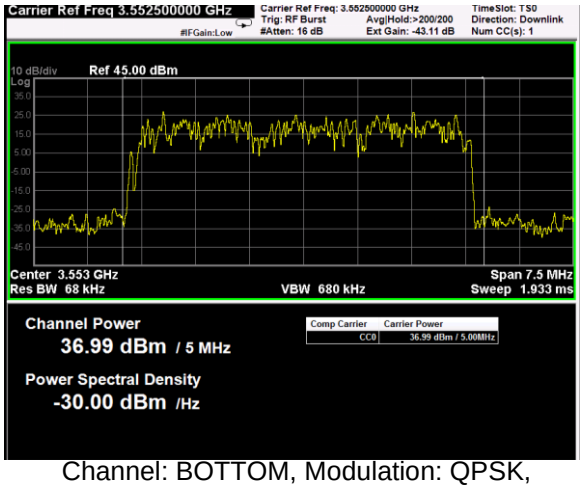
PSD eirp (in 1 MHz) = $PSD_{max}$ – N + $G_{max}$ = 30* – N + $G_{max}$ ≤ 37

The allowed max antenna gain is calculated as: $G_{max}$ ≤ (37-30+N) = N + 7 dBi

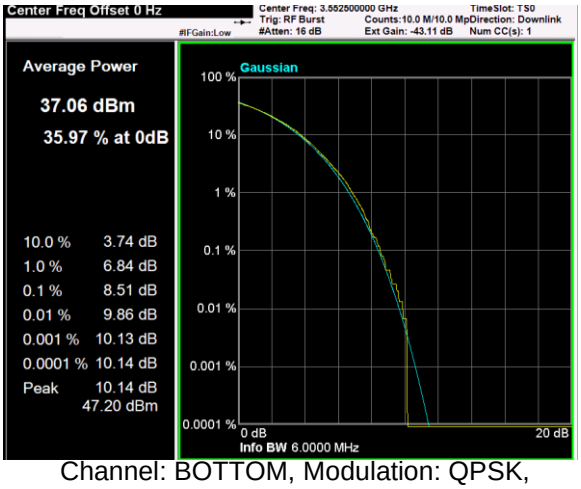
Where:

- $PSD_{max}$ is the maximum PSD value measured on the antenna connector of the equipment and it depends on the LTE bandwidth signal (∗: 37 dBm, that is the measured value at antenna port, with a 5 MHz band matches up 37+10∗Log(1/5) = 30 dBm/1MHz)
- N is system path loss (in dB) due to cable insertion, splitter, etc….
- $G_{max}$ is the maximum antenna gain allowed (in dBi)

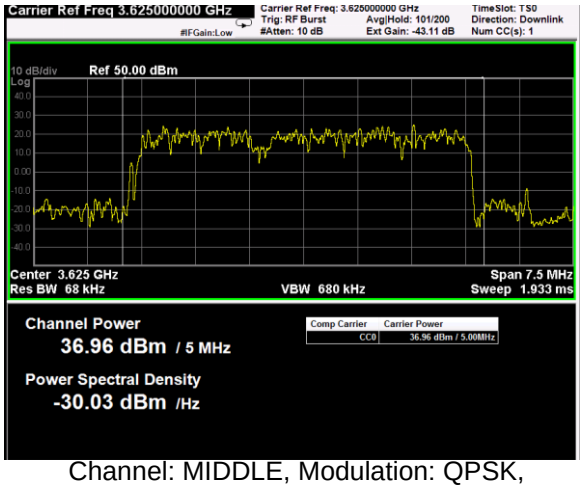
## RF PORT 1 PLOT



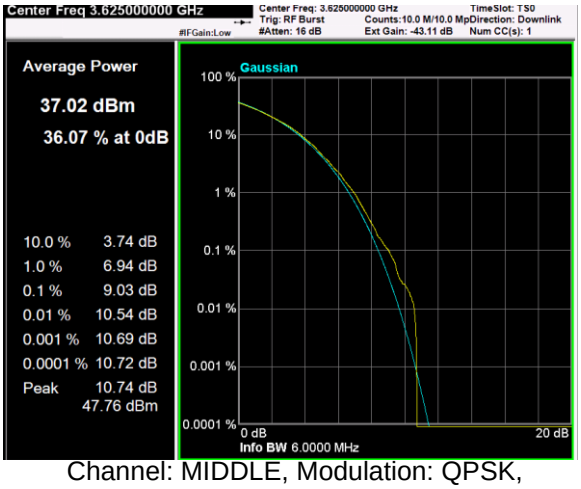

Channel: BOTTOM, Modulation: QPSK, BW=5MHz, Channel Power



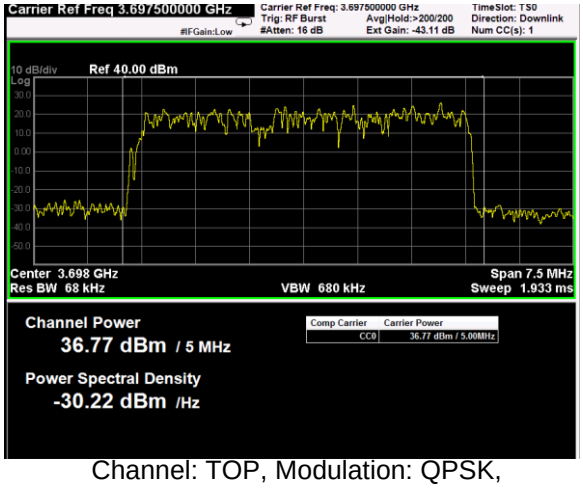

Channel: BOTTOM, Modulation: QPSK, BW=5MHz, CCDF



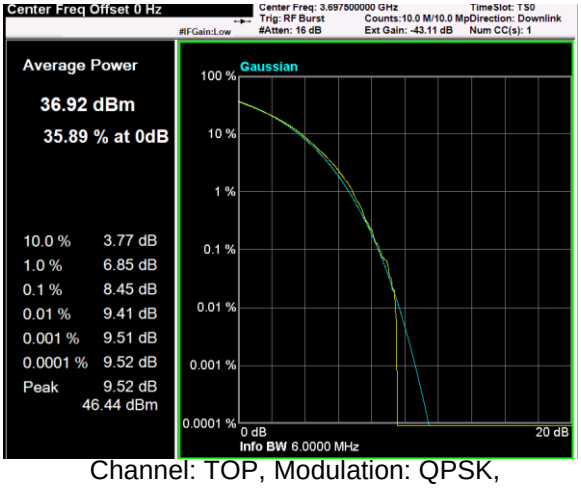

Channel: MIDDLE, Modulation: QPSK, BW=5MHz, Channel Power



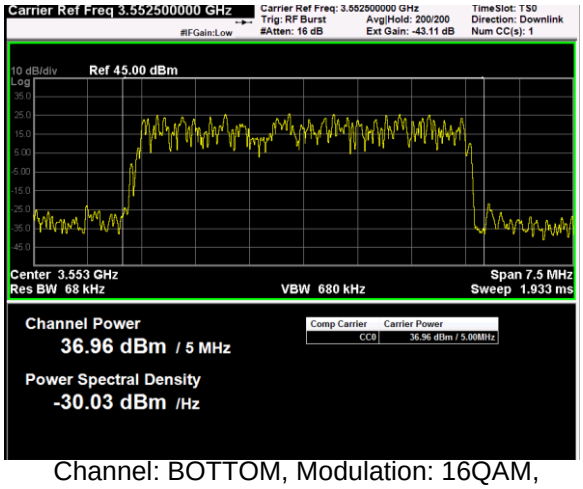

Channel: MIDDLE, Modulation: QPSK, BW=5MHz, CCDF



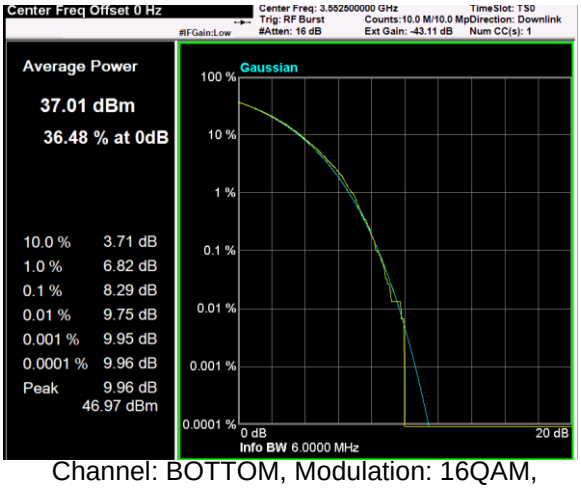

Channel: TOP, Modulation: QPSK, BW=5MHz, Channel Power



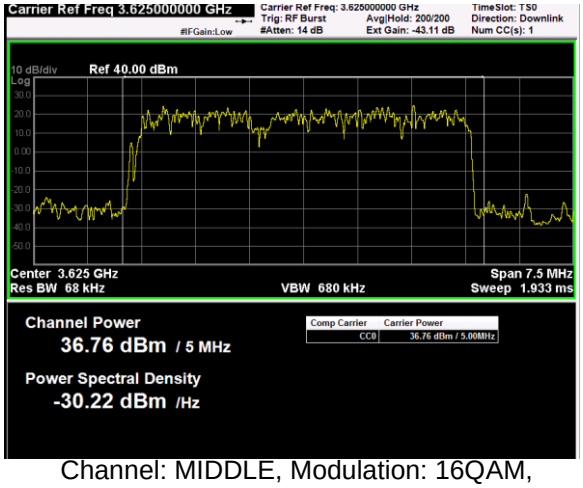

Channel: TOP, Modulation: QPSK, BW=5MHz, CCDF



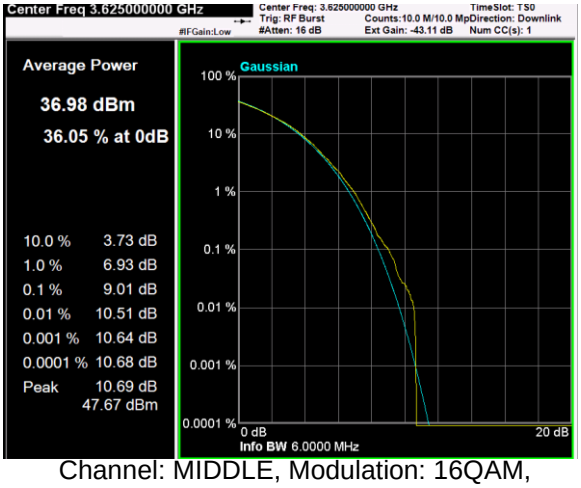

Channel: BOTTOM, Modulation: 16QAM, BW=5MHz, Channel Power



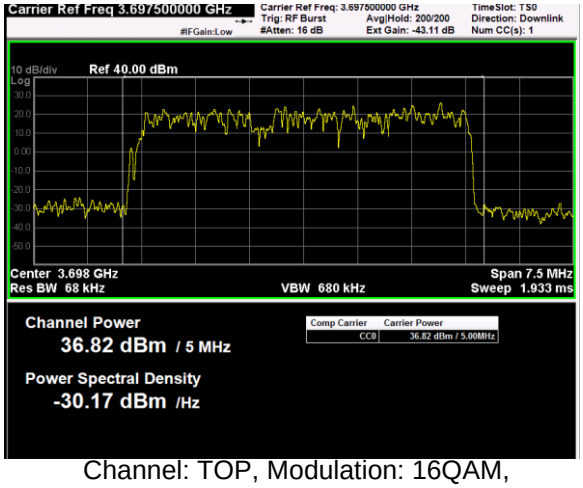

Channel: BOTTOM, Modulation: 16QAM, BW=5MHz, CCDF



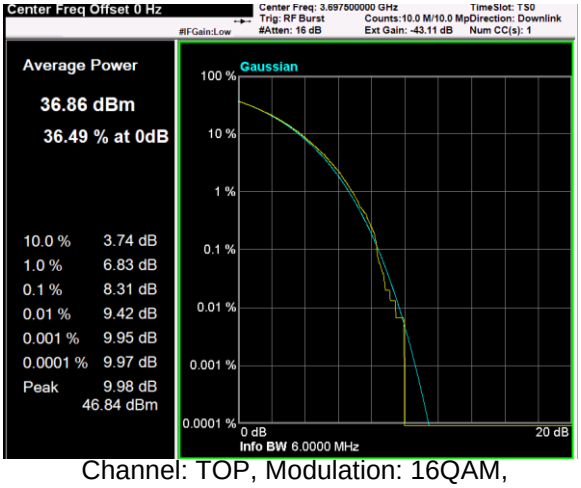

Channel: MIDDLE, Modulation: 16QAM, BW=5MHz, Channel Power



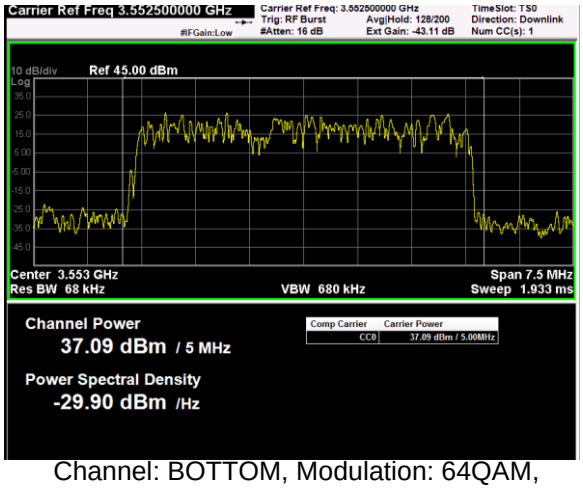

Channel: MIDDLE, Modulation: 16QAM, BW=5MHz, CCDF



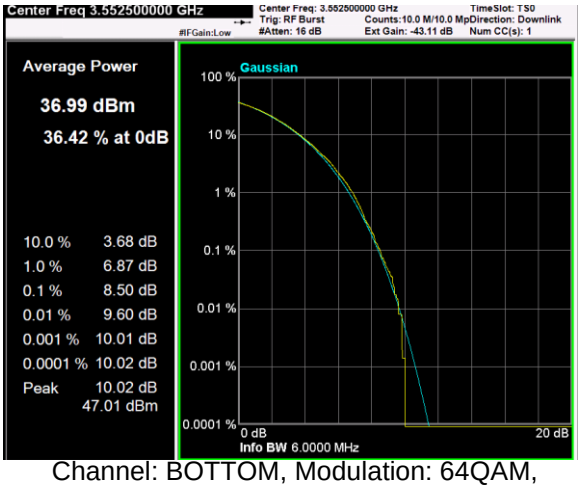

Channel: TOP, Modulation: 16QAM, BW=5MHz, Channel Power



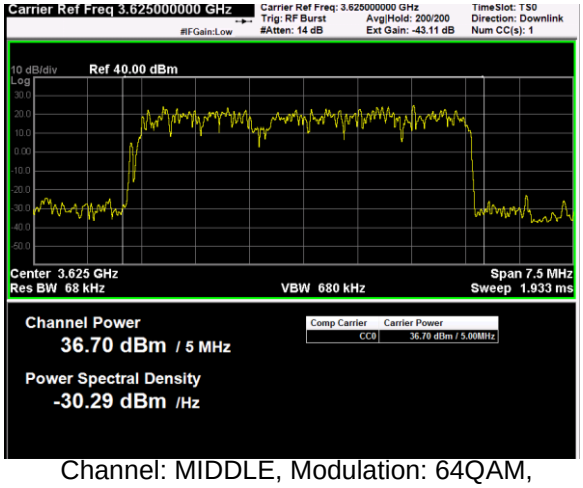

Channel: TOP, Modulation: 16QAM, BW=5MHz, CCDF



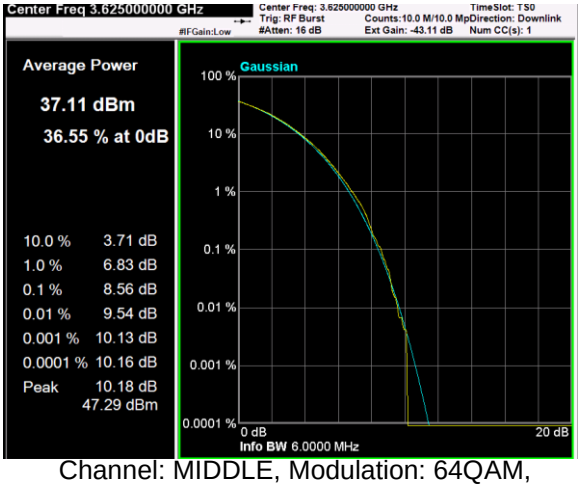

Channel: BOTTOM, Modulation: 64QAM, BW=5MHz, Channel Power



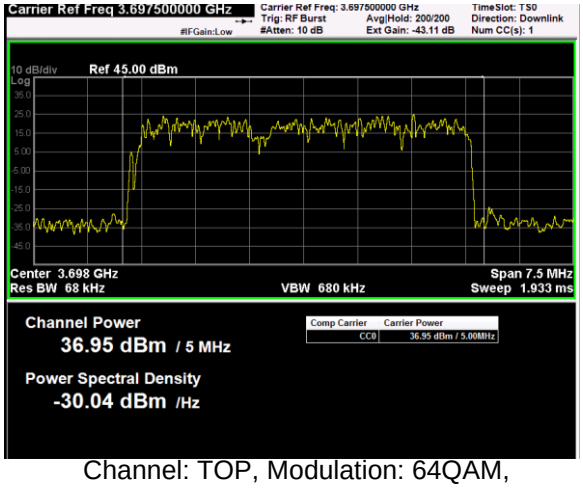

Channel: BOTTOM, Modulation: 64QAM, BW=5MHz, CCDF



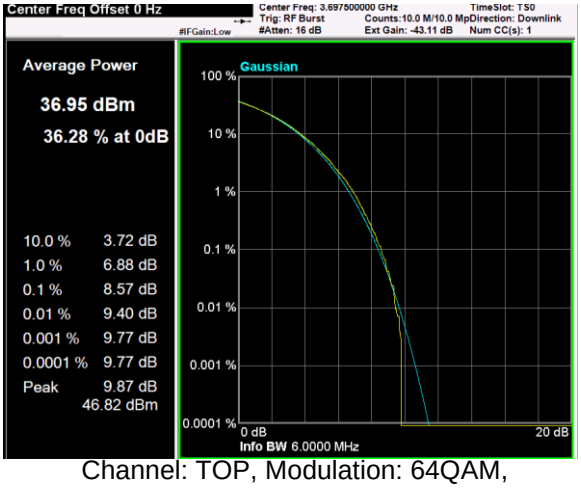

Channel: MIDDLE, Modulation: 64QAM, BW=5MHz, Channel Power



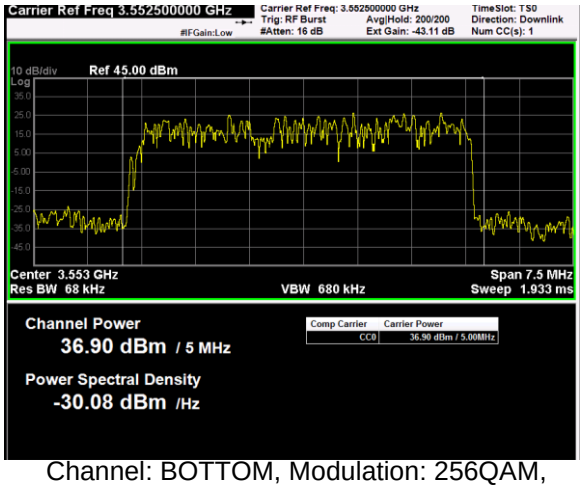

Channel: MIDDLE, Modulation: 64QAM, BW=5MHz, CCDF



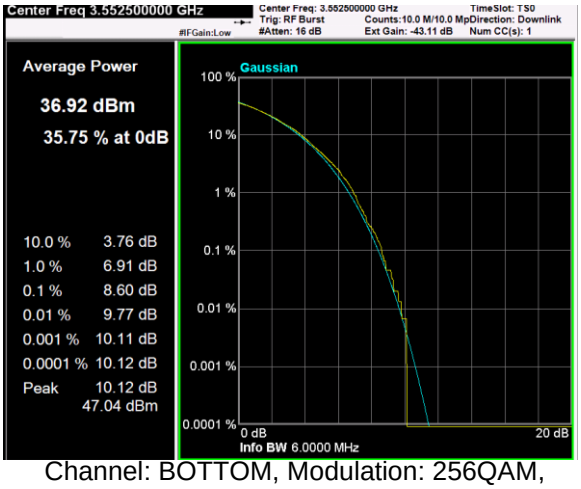

Channel: TOP, Modulation: 64QAM, BW=5MHz, Channel Power



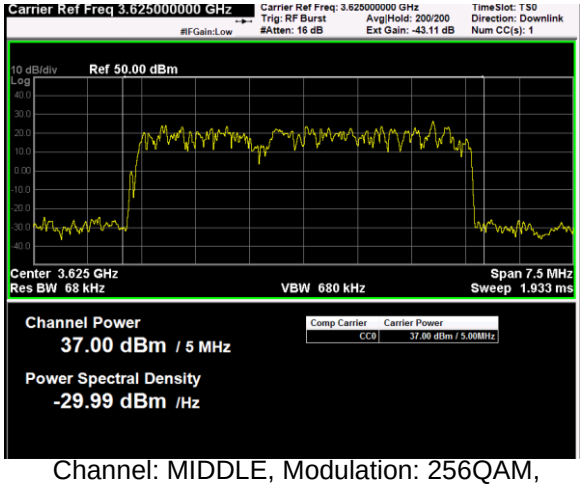

Channel: TOP, Modulation: 64QAM, BW=5MHz, CCDF



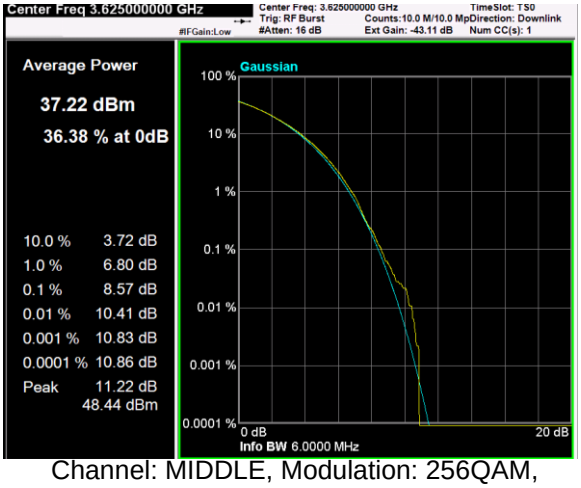

Channel: BOTTOM, Modulation: 256QAM, BW=5MHz, Channel Power



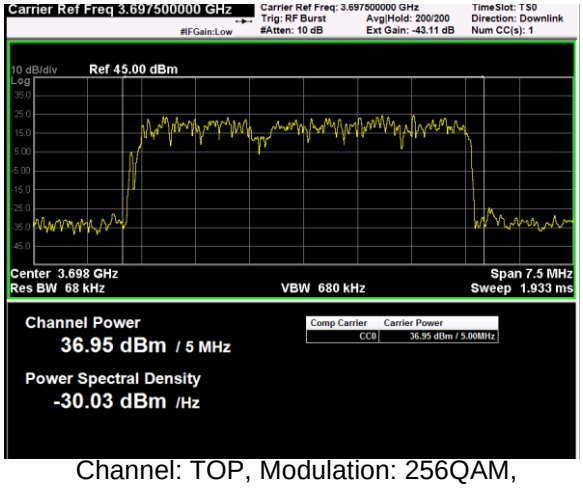

Channel: BOTTOM, Modulation: 256QAM, BW=5MHz, CCDF



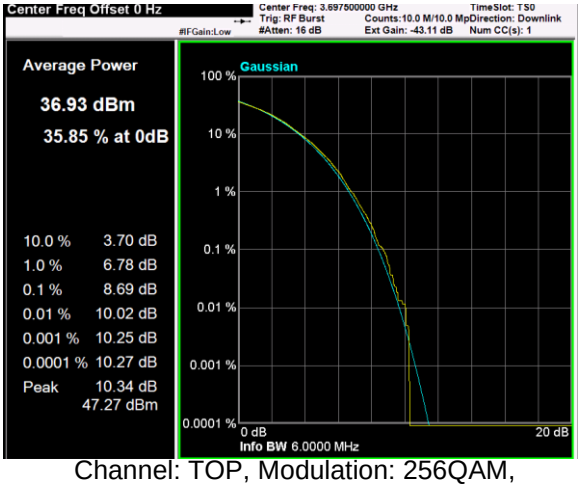

Channel: MIDDLE, Modulation: 256QAM, BW=5MHz, Channel Power




Channel: MIDDLE, Modulation: 256QAM, BW=5MHz, CCDF

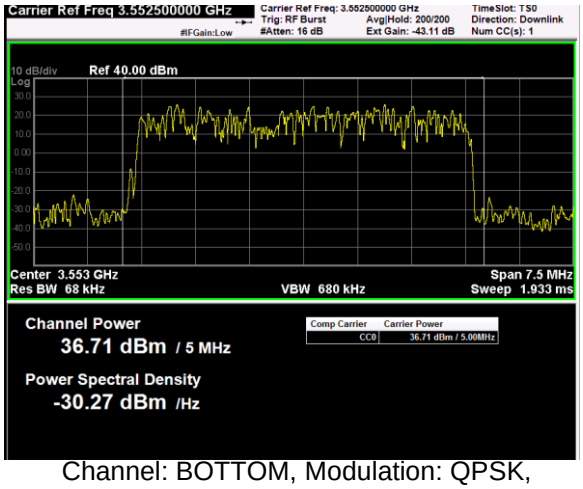



Channel: TOP, Modulation: 256QAM, BW=5MHz, Channel Power

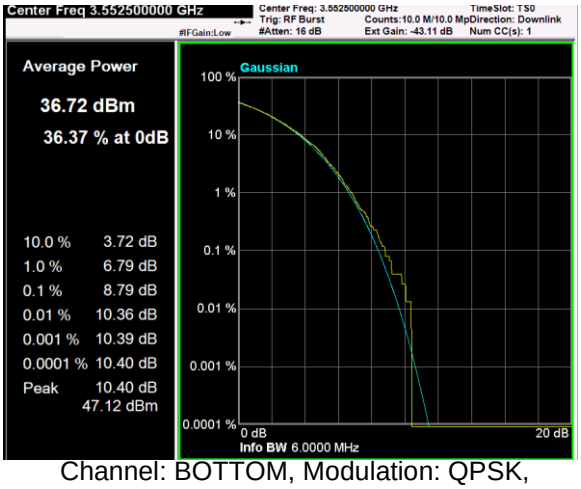



Channel: TOP, Modulation: 256QAM, BW=5MHz, CCDF

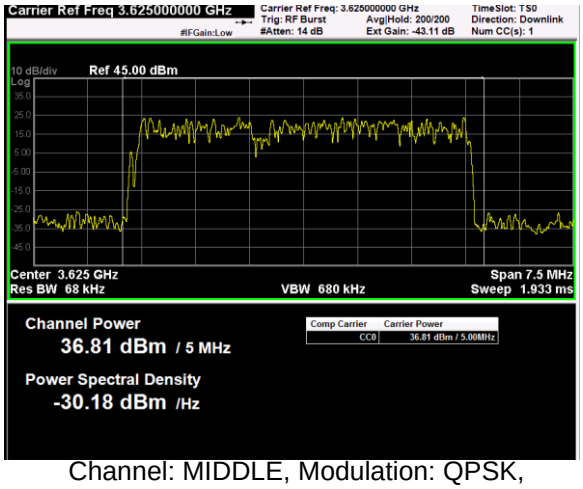
## RF PORT 2 PLOT



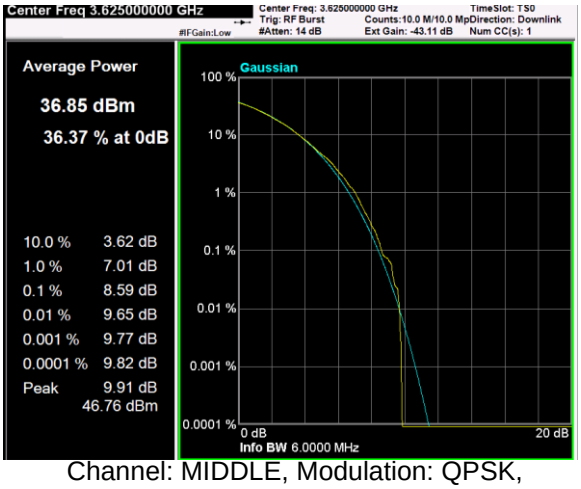

Channel: BOTTOM, Modulation: QPSK, BW=5MHz, Channel Power



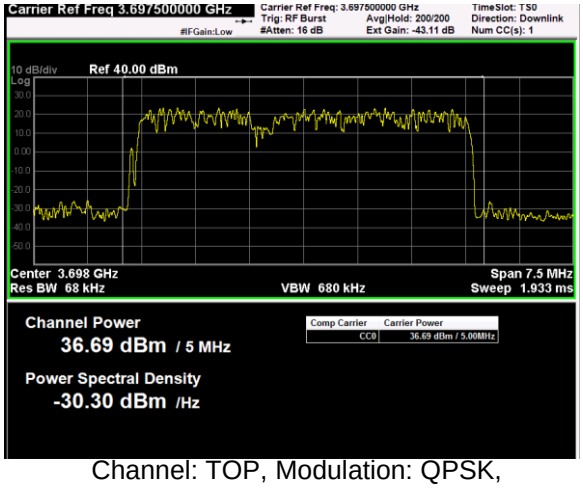

Channel: BOTTOM, Modulation: QPSK, BW=5MHz, CCDF



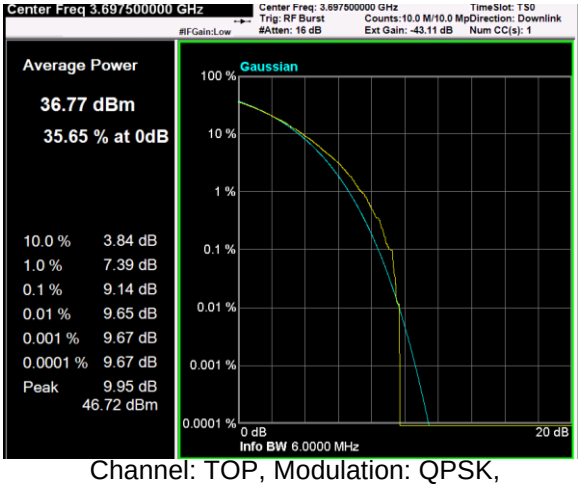

Channel: MIDDLE, Modulation: QPSK, BW=5MHz, Channel Power



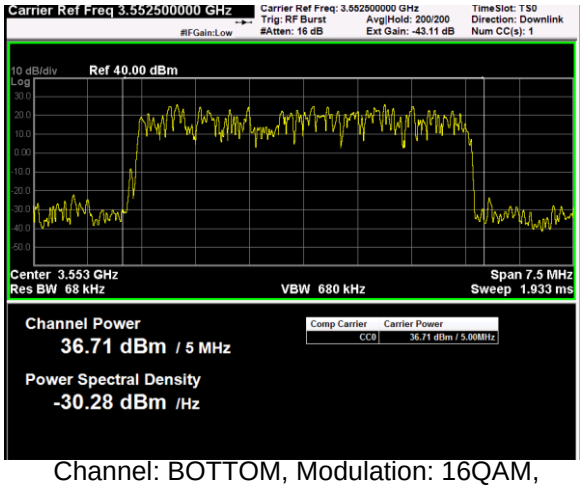

Channel: MIDDLE, Modulation: QPSK, BW=5MHz, CCDF



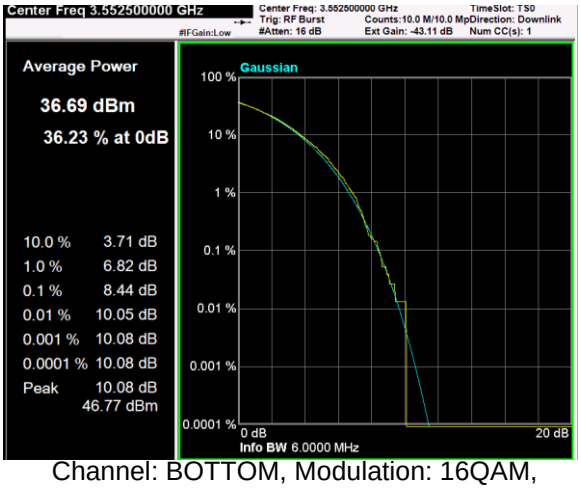

Channel: TOP, Modulation: QPSK, BW=5MHz, Channel Power



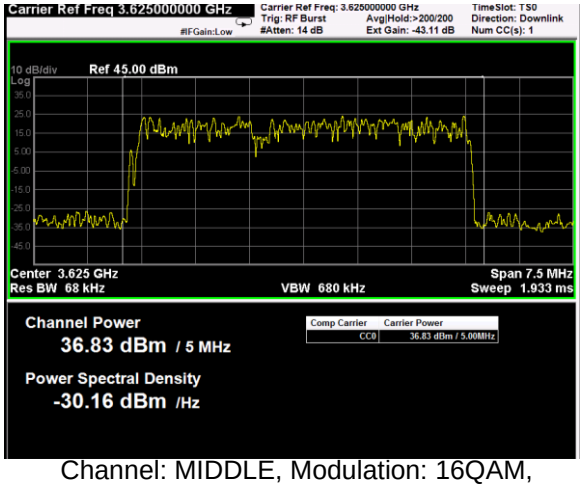

Channel: TOP, Modulation: QPSK, BW=5MHz, CCDF



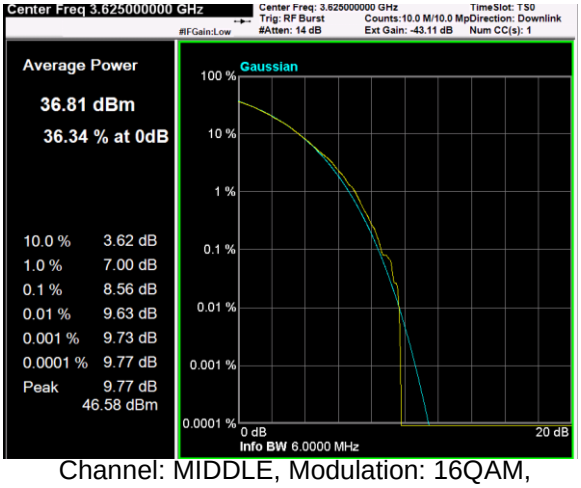

Channel: BOTTOM, Modulation: 16QAM, BW=5MHz, Channel Power



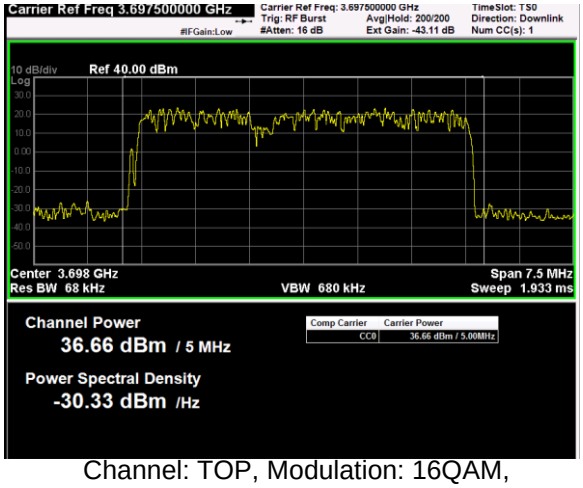

Channel: BOTTOM, Modulation: 16QAM, BW=5MHz, CCDF



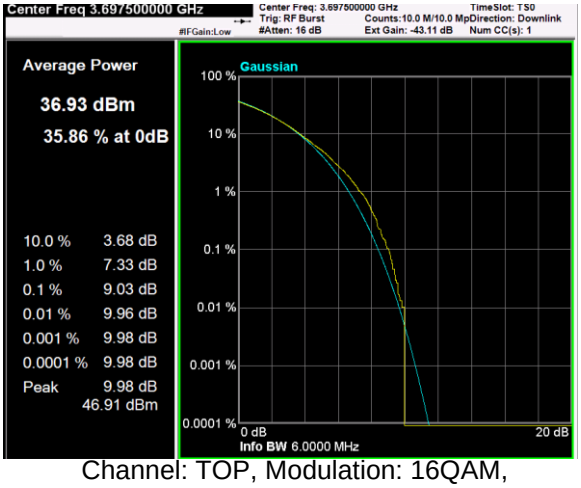

Channel: MIDDLE, Modulation: 16QAM, BW=5MHz, Channel Power



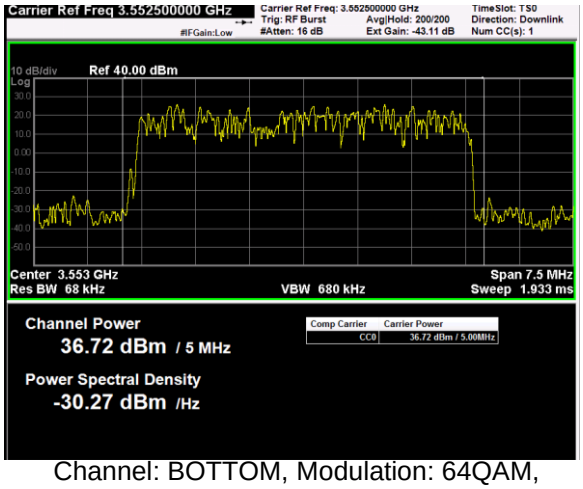

Channel: MIDDLE, Modulation: 16QAM, BW=5MHz, CCDF



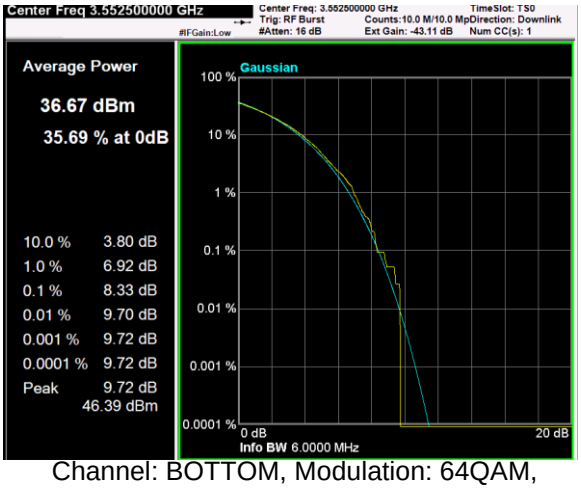

Channel: TOP, Modulation: 16QAM, BW=5MHz, Channel Power



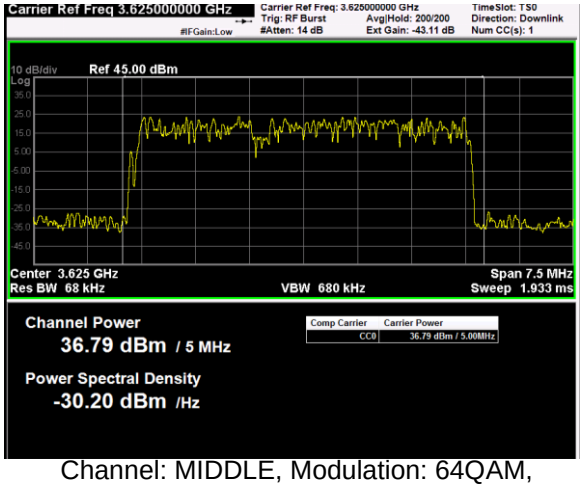

Channel: TOP, Modulation: 16QAM, BW=5MHz, CCDF



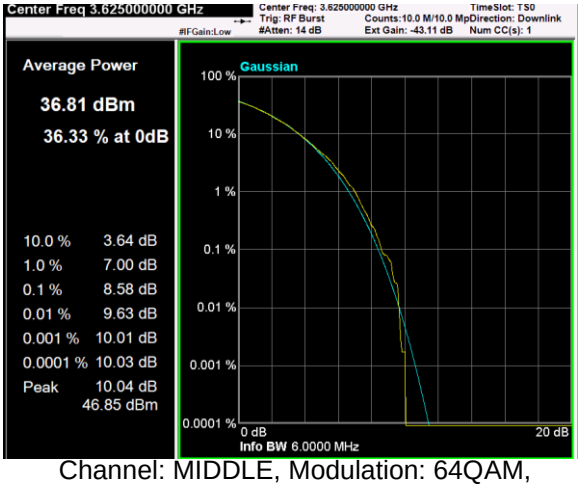

Channel: BOTTOM, Modulation: 64QAM, BW=5MHz, Channel Power



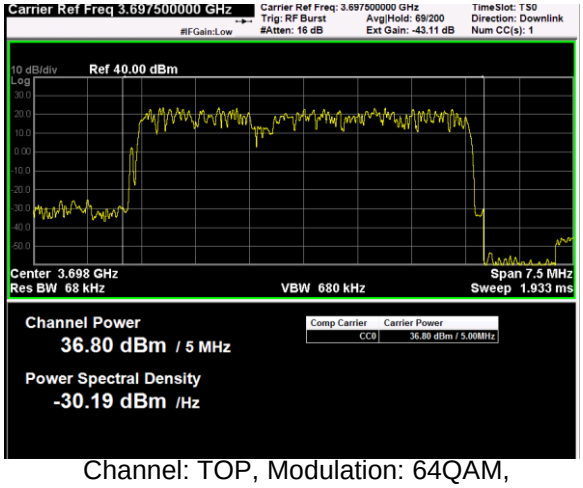

Channel: BOTTOM, Modulation: 64QAM, BW=5MHz, CCDF



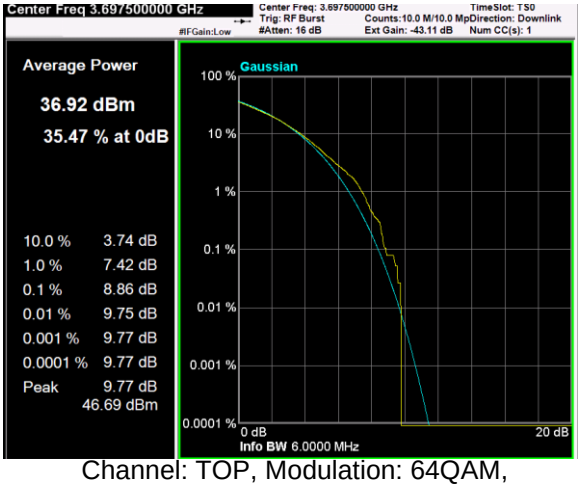

Channel: MIDDLE, Modulation: 64QAM, BW=5MHz, Channel Power



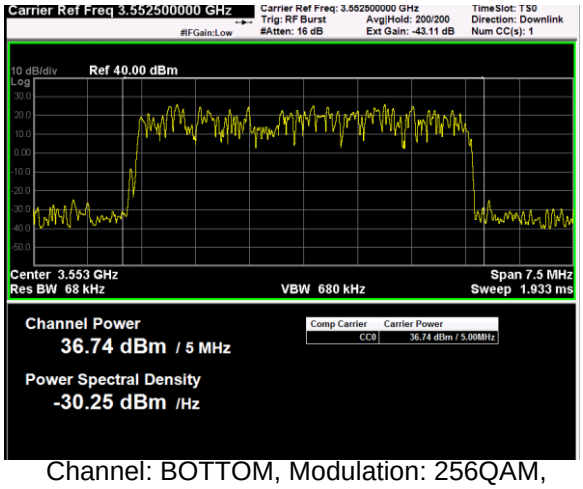

Channel: MIDDLE, Modulation: 64QAM, BW=5MHz, CCDF



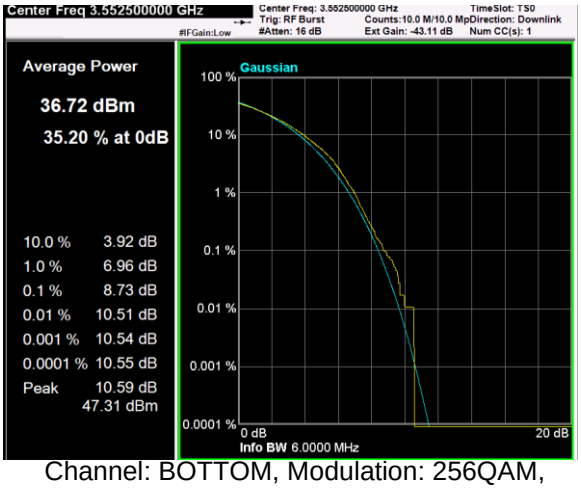

Channel: TOP, Modulation: 64QAM, BW=5MHz, Channel Power



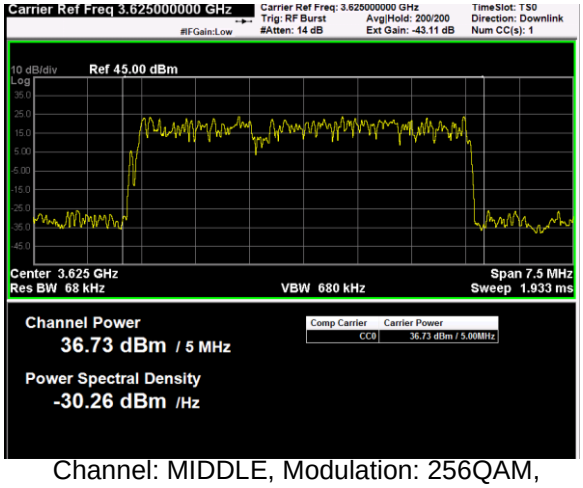

Channel: TOP, Modulation: 64QAM, BW=5MHz, CCDF



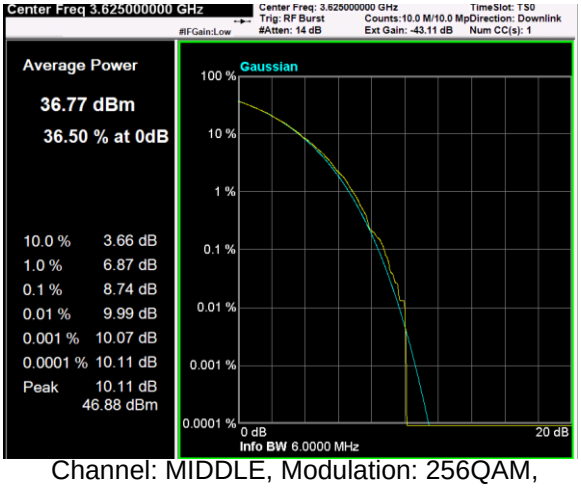

Channel: BOTTOM, Modulation: 256QAM, BW=5MHz, Channel Power



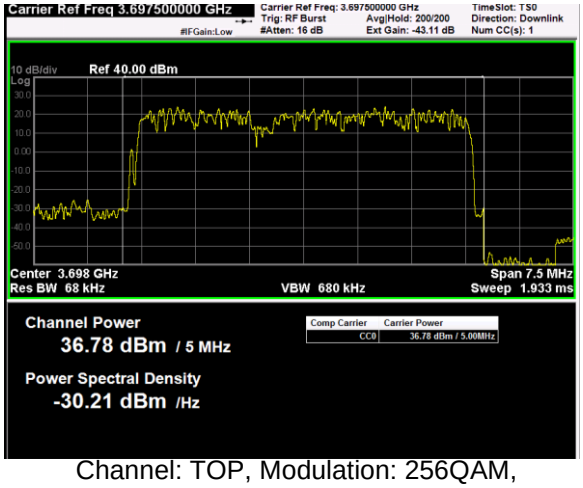

Channel: BOTTOM, Modulation: 256QAM, BW=5MHz, CCDF



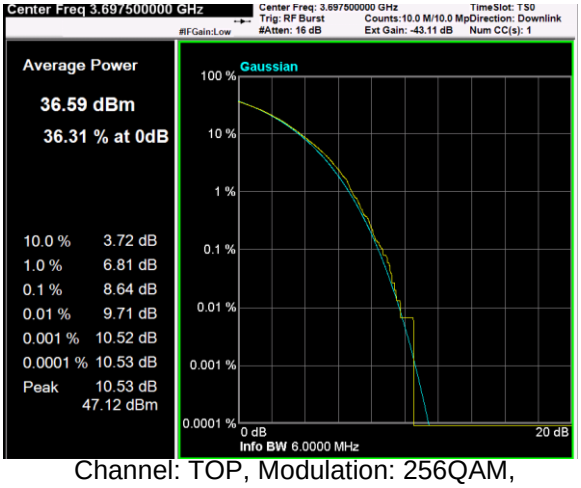

Channel: MIDDLE, Modulation: 256QAM, BW=5MHz, Channel Power




Channel: MIDDLE, Modulation: 256QAM, BW=5MHz, CCDF




Channel: TOP, Modulation: 256QAM, BW=5MHz, Channel Power




Channel: TOP, Modulation: 256QAM, BW=5MHz, CCDF

## RF PORT 1 (BW = 10 MHz)

| Test data | | | | | | | |
|---|---|---|---|---|---|---|---|
| Direction | Modulation | Frequency (MHz) | RF output Power (dBm) | RF output channel Power (W) | PSD (dBm/Hz) | PSD (dBm/MHz) | PAR (dB) |
| Down-link | LTE 10MHz (QPSK) | 3555 | 36.9 | 4.887 | -33.1 | 26.9 | 9.4 |
| Down-link | LTE 10MHz (QPSK) | 3625 | 36.9 | 4.920 | -33.1 | 26.9 | 9.4 |
| Down-link | LTE 10MHz (QPSK) | 3695 | 36.8 | 4.819 | -33.2 | 26.8 | 9.4 |
| Down-link | LTE 10MHz (16QAM) | 3555 | 36.9 | 4.864 | -33.1 | 26.9 | 9.4 |
| Down-link | LTE 10MHz (16QAM) | 3625 | 37.2 | 5.260 | -32.8 | 27.2 | 9.4 |
| Down-link | LTE 10MHz (16QAM) | 3695 | 36.9 | 4.864 | -33.1 | 26.9 | 9.4 |
| Down-link | LTE 10MHz (64QAM) | 3555 | 36.9 | 4.887 | -33.1 | 26.9 | 9.4 |
| Down-link | LTE 10MHz (64QAM) | 3625 | 37.1 | 5.070 | -33.0 | 27.1 | 9.4 |
| Down-link | LTE 10MHz (64QAM) | 3695 | 36.8 | 4.732 | -33.3 | 26.8 | 9.4 |
| Down-link | LTE 10MHz (256QAM) | 3555 | 36.8 | 4.732 | -33.3 | 26.8 | 9.4 |
| Down-link | LTE 10MHz (256QAM) | 3625 | 37.1 | 5.117 | -32.9 | 27.1 | 9.4 |
| Down-link | LTE 10MHz (256QAM) | 3695 | 36.7 | 4.721 | -33.3 | 26.7 | 9.4 |

## RF PORT 2 (BW = 10 MHz)

| Test data | | | | | | | |
|---|---|---|---|---|---|---|---|
| Direction | Modulation | Frequency (MHz) | RF output Power (dBm) | RF output channel Power (W) | PSD (dBm/Hz) | PSD (dBm/MHz) | PAR (dB) |
| Down-link | LTE 10MHz (QPSK) | 3555 | 36.9 | 4.887 | -33.1 | 26.9 | 9.4 |
| Down-link | LTE 10MHz (QPSK) | 3625 | 37.0 | 4.955 | -33.1 | 27.0 | 9.3 |
| Down-link | LTE 10MHz (QPSK) | 3695 | 37.1 | 5.176 | -32.9 | 27.1 | 9.4 |
| Down-link | LTE 10MHz (16QAM) | 3555 | 36.9 | 4.909 | -33.1 | 26.9 | 9.3 |
| Down-link | LTE 10MHz (16QAM) | 3625 | 36.7 | 4.721 | -33.3 | 26.7 | 9.4 |
| Down-link | LTE 10MHz (16QAM) | 3695 | 36.9 | 4.943 | -33.1 | 26.9 | 9.5 |
| Down-link | LTE 10MHz (64QAM) | 3555 | 36.9 | 4.875 | -33.1 | 26.9 | 9.4 |
| Down-link | LTE 10MHz (64QAM) | 3625 | 37.1 | 5.164 | -32.9 | 27.1 | 9.4 |
| Down-link | LTE 10MHz (64QAM) | 3695 | 37.0 | 4.966 | -33.0 | 27.0 | 9.4 |
| Down-link | LTE 10MHz (256QAM) | 3555 | 37.1 | 5.105 | -32.9 | 27.1 | 9.3 |
| Down-link | LTE 10MHz (256QAM) | 3625 | 37.1 | 5.105 | -32.9 | 27.1 | 9.3 |
| Down-link | LTE 10MHz (256QAM) | 3695 | 37.0 | 4.989 | -33.0 | 27.0 | 9.4 |

### Special notes

Remark: MIMO application where only cross-polarized antennas are allowed (KDB “662911 D01 Multiple Transmitter Output v02r01”, chapter F, paragraph 2), letter c), item (i) ).

Please note that the case with cross-polarized antennas (the only allowed, as stated in the User Manual), with a pair of antennas ($N_{ANT}$ = 2) and two outputs ports driving the antennas, has been considered as worst case; therefore the directional gain is the gain of an individual antenna.

**Compliance to Category A limits (BW = 10 MHz):**

Maximum EIRP ≤ 30 dBm/10MHz

Maximum PSD eirp ≤ 20 dBm/1MHz

PSD eirp (in 1 MHz) = $PSD_{max}$ – N + $G_{max}$ = 27* – N + $G_{max}$ ≤ 20

The allowed max antenna gain is calculated as: $G_{max}$ ≤ (20-27+N) = N - 7 dBi

**Compliance to Category B limits (BW = 10 MHz):**

Maximum EIRP ≤ 47 dBm/10MHz

Maximum PSD eirp ≤ 37 dBm/1MHz

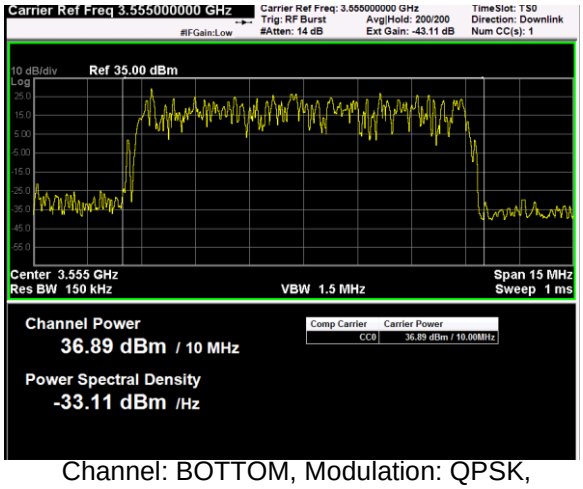
PSD eirp (in 1 MHz) = $PSD_{max}$ – N + $G_{max}$ = 27* – N + $G_{max}$ ≤ 37

The allowed max antenna gain is calculated as: $G_{max}$ ≤ (37-27+N) = N + 10 dBi

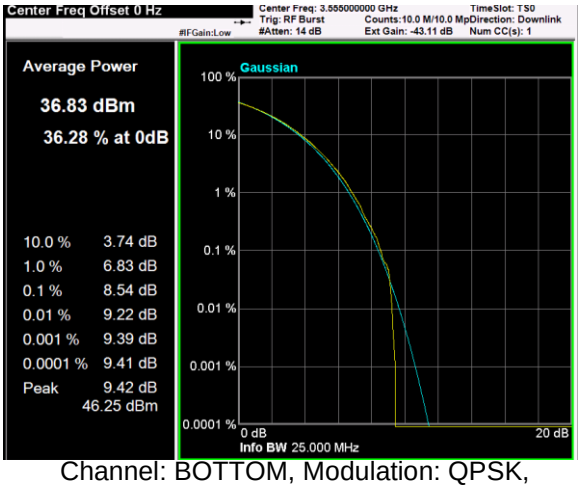
Where:

- $PSD_{max}$ is the maximum PSD value measured on the antenna connector of the equipment and it depends on the LTE bandwidth signal (∗: 37 dBm, that is the measured value at antenna port, with a 10 MHz band matches up 37+10∗Log(1/10) = 27 dBm/1MHz)
- N is system path loss (in dB) due to cable insertion, splitter, etc….
- $G_{max}$ is the maximum antenna gain allowed (in dBi)

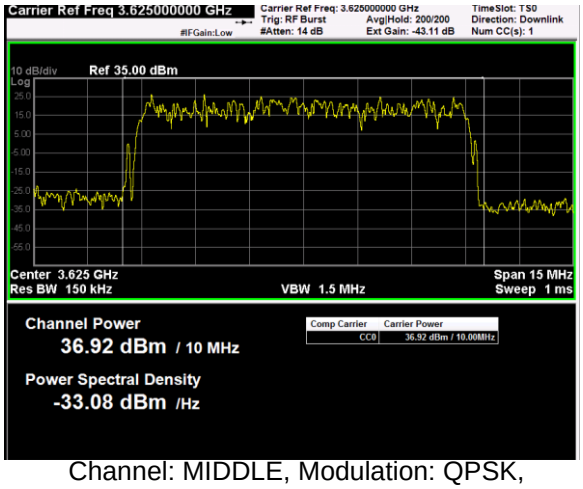
## RF PORT 1 PLOT



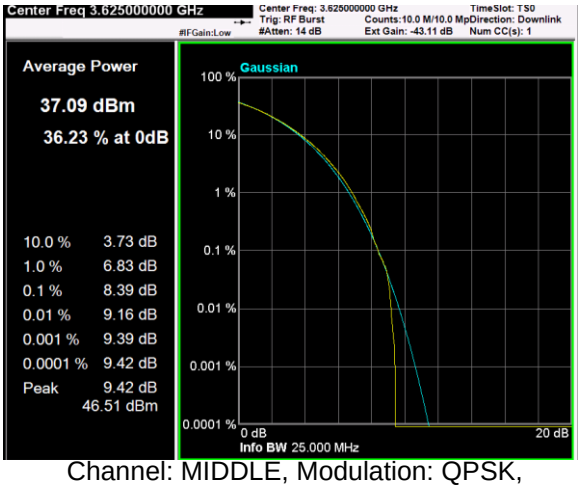

Channel: BOTTOM, Modulation: QPSK, BW=10MHz, Channel Power



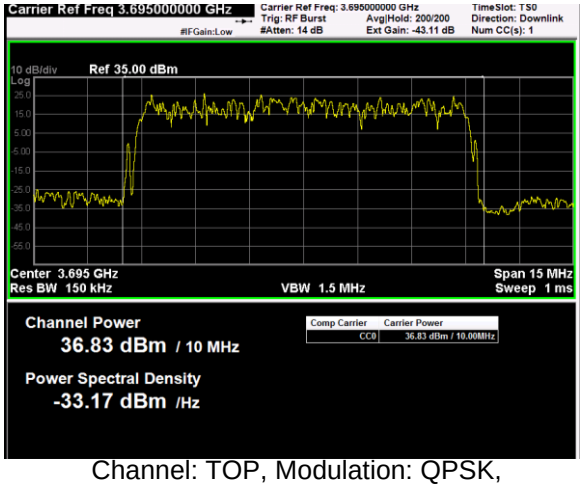

Channel: BOTTOM, Modulation: QPSK, BW=10MHz, CCDF



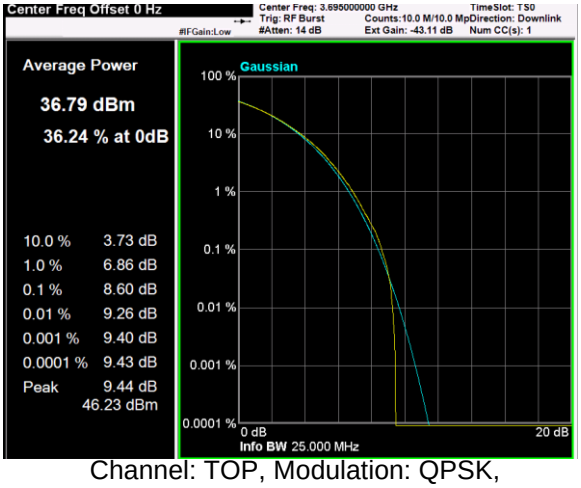

Channel: MIDDLE, Modulation: QPSK, BW=10MHz, Channel Power




Channel: MIDDLE, Modulation: QPSK, BW=10MHz, CCDF




Channel: TOP, Modulation: QPSK, BW=10MHz, Channel Power




Channel: TOP, Modulation: QPSK, BW=10MHz, CCDF