



**Shenzhen Global Test Service Co.,Ltd.**

No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China

# TEST REPORT

FCC Part 27

**Report Reference No.....:** GTS20190726008-1-3-4

**FCC ID.....:** S8U-IDD-213LA

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Date of issue.....: Aug.12, 2019

**Testing Laboratory Name .....** **Shenzhen Global Test Service Co.,Ltd.**

Address ..... No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China

**Applicant's name .....** **Sinocastel Co.,Ltd.**

Address ..... 5/F,5th Building,Software Park ,No. 2 Gaoxin C. 3rd RoadHi-Tech. Industrial Park,Shenzhen, China

**Test specification .....**

Standard ..... **FCC CFR Title 47 Part 2, Part 24E**  
**ANSI/TIA-603-E-2016**  
**KDB 971168 D01**

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**Test item description.....:** OBD Vehicle Tracking Device

Trade Mark ..... OBD-Smart

**Manufacturer.....:** **Sinocastel Co.,Ltd.**

Model/Type reference.....: IDD-213LA

Listed Models .....: IDD-213LA-L

Ratings .....: DC 9-36V

Modulation .....: QPSK

Hardware version .....: IDD-213L MAIN-V2.2

Software version .....: V1.0

Frequency.....: E-UTRA FDD Band II, IV, XII

Result.....: **PASS**

# TEST REPORT

|                   |                      |               |
|-------------------|----------------------|---------------|
| Test Report No. : | GTS20190726008-1-3-4 | Aug.12, 2019  |
|                   |                      | Date of issue |

Equipment under Test : OBD Vehicle Tracking Device

Model /Type : IDD-213LA

Listed Models : IDD-213LA-L

**Applicant** : **Sinocastel Co.,Ltd.**

Address : 5/F,5th Building,Software Park ,No. 2 Gaoxin C. 3rd  
RoadHi-Tech. Industrial Park,Shenzhen, China

**Manufacturer** : **Sinocastel Co.,Ltd.**

Address : 5/F,5th Building,Software Park ,No. 2 Gaoxin C. 3rd  
RoadHi-Tech. Industrial Park,Shenzhen, China

|                    |               |
|--------------------|---------------|
| <b>Test result</b> | <b>Pass *</b> |
|--------------------|---------------|

\* In the configuration tested, the EUT complied with the standards specified page 4.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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# 1 SUMMARY

## 1.1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[FCC Part 27](#): MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

[ANSI/TIA-603-E-2016](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[ANSI C63.26-2015](#): IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

[FCKDB971168D01](#) Power Meas License Digital Systems

## 1.2 Test Description

| Test Item                              | Section in CFR 47               | Result |
|----------------------------------------|---------------------------------|--------|
| RF Output Power                        | Part 2.1046<br>Part 27.50(d)(4) | Pass   |
| Peak-to-Average Ratio                  | Part 27.50(d)(4)                | Pass   |
| 99% & -26 dB Occupied Bandwidth        | Part 2.1049<br>Part 27.53(h)    | Pass   |
| Spurious Emissions at Antenna Terminal | Part 2.1051<br>Part 27.53(h)    | Pass   |
| Field Strength of Spurious Radiation   | Part 2.1053<br>Part 27.53(h)    | Pass   |
| Out of band emission, Band Edge        | Part 2.1051<br>Part 27.53(h)    | Pass   |
| Frequency stability                    | Part 2.1055<br>Part 27.54       | Pass   |

### 1.3 Address of the test laboratory

#### Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

### 1.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### FCC-Registration No.: 165725

Shenzhen Global Test Service Co.,Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

#### A2LA-Lab Cert. No.: 4758.01

Shenzhen Global Test Service Co.,Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2024.

### 1.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Global Test Service Co.,Ltd. is reported:

| Test                                | Range      | Measurement Uncertainty | Notes |
|-------------------------------------|------------|-------------------------|-------|
| Radiated Emission                   | 30~1000MHz | 4.10 dB                 | (1)   |
| Radiated Emission                   | 1~18GHz    | 4.32 dB                 | (1)   |
| Radiated Emission                   | 18-40GHz   | 5.54 dB                 | (1)   |
| Conducted Disturbance               | 0.15~30MHz | 3.12 dB                 | (1)   |
| Conducted Power                     | 9KHz~18GHz | 0.61 dB                 | (1)   |
| Spurious RF Conducted Emission      | 9KHz~40GHz | 1.22 dB                 | (1)   |
| Band Edge Compliance of RF Emission | 9KHz~40GHz | 1.22 dB                 | (1)   |
| Occupied Bandwidth                  | 9KHz~40GHz | -                       | (1)   |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## **2 GENERAL INFORMATION**

### **2.1 Environmental conditions**

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

|                     |         |
|---------------------|---------|
| Normal Temperature: | 25°C    |
| Relative Humidity:  | 55 %    |
| Air Pressure:       | 101 kPa |

### **2.2 General Description of EUT**

|                       |                             |
|-----------------------|-----------------------------|
| Product Name:         | OBD Vehicle Tracking Device |
| Model/Type reference: | IDD-213LA                   |
| Power supply:         | DC 12.0V from battery       |
| <b>LTE</b>            |                             |
| Operation Band:       | FDD-LTE: Band 2/4/12        |
| Modulation Type:      | QPSK, 16QAM                 |
| Release Version:      | Release 9                   |
| Category:             | Cat 4                       |
| Antenna Type:         | FPC antenna                 |

Note: For more details, refer to the user's manual of the EUT.

### **2.3 Description of Test Modes and Test Frequency**

The EUT has been tested under typical operating condition. The CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

## 2.4 Equipments Used during the Test

| Test Equipment             | Manufacturer   | Model No.             | Serial No.   | Calibration Date | Calibration Due Date |
|----------------------------|----------------|-----------------------|--------------|------------------|----------------------|
| LISN                       | R&S            | ENV216                | 3560.6550.08 | 2018/09/20       | 2019/09/19           |
| LISN                       | R&S            | ESH2-Z5               | 893606/008   | 2018/09/20       | 2019/09/19           |
| Bilog Antenna              | Schwarzbeck    | VULB9163              | 976          | 2018/09/20       | 2019/09/19           |
| Bilog Antenna              | Schwarzbeck    | VULB9163              | 979          | 2018/09/20       | 2019/09/19           |
| EMI Test Receiver          | R&S            | ESCI7                 | 101102       | 2018/09/20       | 2019/09/19           |
| Spectrum Analyzer          | Agilent        | N9020A                | MY48010425   | 2018/09/20       | 2019/09/19           |
| Spectrum Analyzer          | R&S            | FSP40                 | 100019       | 2018/06/05       | 2019/06/04           |
| Controller                 | EM Electronics | Controller EM 1000    | N/A          | N/A              | N/A                  |
| Horn Antenna               | Schwarzbeck    | BBHA 9120D            | 01622        | 2018/09/20       | 2019/09/19           |
| Horn Antenna               | Schwarzbeck    | BBHA 9120D            | 01652        | 2018/09/20       | 2019/09/19           |
| Active Loop Antenna        | SCHWARZBECK    | FMZB1519              | 1519-037     | 2018/09/20       | 2019/09/19           |
| Broadband Horn Antenna     | SCHWARZBECK    | BBHA 9170             | 971          | 2018/09/20       | 2019/09/19           |
| Amplifier                  | Schwarzbeck    | BBV 9743              | #202         | 2018/09/20       | 2019/09/19           |
| Amplifier                  | EMCI           | EMC051845B            | 980355       | 2018/09/20       | 2019/09/19           |
| Temperature/Humidity Meter | Gangxing       | CTH-608               | 02           | 2018/09/20       | 2019/09/19           |
| High-Pass Filter           | K&L            | 9SH10-2700/X12750-O/O | KL142031     | 2018/09/20       | 2019/09/19           |
| High-Pass Filter           | K&L            | 41H10-1375/U12750-O/O | KL142032     | 2018/09/20       | 2019/09/19           |
| RF Cable(below 1GHz)       | HUBER+SUHNER   | RG214                 | RE01         | 2018/09/20       | 2019/09/19           |
| RF Cable(above 1GHz)       | HUBER+SUHNER   | RG214                 | RE02         | 2018/09/20       | 2019/09/19           |
| Data acquisition card      | Agilent        | U2531A                | TW53323507   | 2018/09/20       | 2019/09/19           |
| Power Sensor               | Agilent        | U2021XA               | MY5365004    | 2018/09/20       | 2019/09/19           |
| EMI Test Software          | R&S            | ES-K1                 | V1.7.1       | 2018/09/20       | 2019/09/19           |
| EMI Test Software          | JS Tonscend    | JS32-RE               | 2.0.1.5      | 2018/09/20       | 2019/09/19           |
| EMI Test Software          | Audix          | E3                    | 2..1.1       | 2018/09/20       | 2019/09/19           |

## 2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: S8U-IDD-213LA filing to comply with of the FCC Part 27 Rules.

## 2.6 Modifications

No modifications were implemented to meet testing criteria.

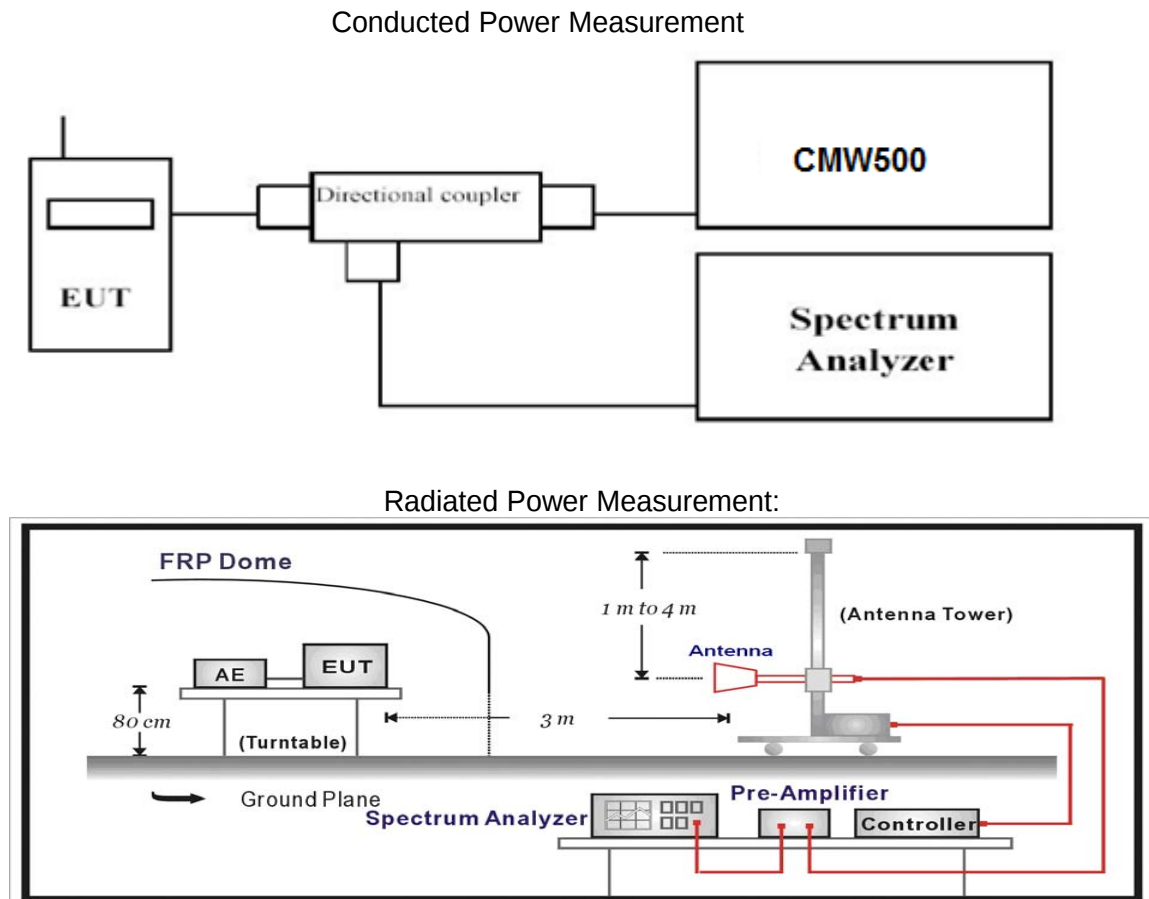
### 3 TEST CONDITIONS AND RESULTS

#### 3.1 Output Power

##### LIMIT

According to §27.50 (d) (4): Fixed, mobile, and portable (hand- held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

##### TEST CONFIGURATION



##### TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

##### **Conducted Power Measurement:**

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Coupler.
- EUT Communicate with CMW500 then selects a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

##### **Radiated Power Measurement:**

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- The output of the test antenna shall be connected to the measuring receiver.
- The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h) The maximum signal level detected by the measuring receiver shall be noted.
- i) The transmitter shall be replaced by a substitution antenna.
- j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k) The substitution antenna shall be connected to a calibrated signal generator.
- l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q) Test site anechoic chamber refer to ANSI C63.4.

**TEST RESULTS****Conducted Measurement:**

| <i>LTE FDD Band 4</i> |                 |                |                     |       |
|-----------------------|-----------------|----------------|---------------------|-------|
| TX Channel Bandwidth  | Frequency (MHz) | RB Size/Offset | Average Power [dBm] |       |
|                       |                 |                | QPSK                | 16QAM |
| 1.4 MHz               | 1710.7          | 1 RB low       | 22.14               | 21.37 |
|                       |                 | 1 RB high      | 22.76               | 22.23 |
|                       |                 | 50% RB mid     | 21.93               | 21.33 |
|                       |                 | 100% RB        | 22.22               | 21.69 |
|                       | 1732.5          | 1 RB low       | 23.04               | 22.67 |
|                       |                 | 1 RB high      | 22.94               | 22.18 |
|                       |                 | 50% RB mid     | 21.86               | 21.43 |
|                       |                 | 100% RB        | 22.50               | 21.85 |
|                       | 1754.3          | 1 RB low       | 23.12               | 22.76 |
|                       |                 | 1 RB high      | 21.72               | 21.24 |
|                       |                 | 50% RB mid     | 23.23               | 22.41 |
|                       |                 | 100% RB        | 22.70               | 22.10 |
| 3 MHz                 | 1711.5          | 1 RB low       | 22.41               | 21.67 |
|                       |                 | 1 RB high      | 23.08               | 22.59 |
|                       |                 | 50% RB mid     | 23.48               | 23.12 |
|                       |                 | 100% RB        | 22.06               | 21.31 |
|                       | 1732.5          | 1 RB low       | 22.19               | 21.36 |
|                       |                 | 1 RB high      | 21.55               | 20.91 |
|                       |                 | 50% RB mid     | 22.09               | 21.40 |
|                       |                 | 100% RB        | 21.59               | 21.05 |
|                       | 1753.5          | 1 RB low       | 22.33               | 21.54 |
|                       |                 | 1 RB high      | 22.44               | 21.84 |
|                       |                 | 50% RB mid     | 22.06               | 21.44 |
|                       |                 | 100% RB        | 21.56               | 21.04 |
| 5 MHz                 | 1712.5          | 1 RB low       | 22.79               | 22.14 |
|                       |                 | 1 RB high      | 22.85               | 22.47 |
|                       |                 | 50% RB mid     | 21.88               | 21.42 |
|                       |                 | 100% RB        | 23.21               | 22.40 |
|                       | 1732.5          | 1 RB low       | 22.73               | 22.34 |
|                       |                 | 1 RB high      | 23.30               | 22.85 |
|                       |                 | 50% RB mid     | 21.65               | 21.20 |
|                       |                 | 100% RB        | 23.04               | 22.28 |
|                       | 1752.5          | 1 RB low       | 23.28               | 22.64 |
|                       |                 | 1 RB high      | 23.02               | 22.64 |
|                       |                 | 50% RB mid     | 22.36               | 21.83 |
|                       |                 | 100% RB        | 23.43               | 22.73 |
| 10 MHz                | 1715.0          | 1 RB low       | 23.46               | 22.72 |
|                       |                 | 1 RB high      | 22.96               | 22.45 |
|                       |                 | 50% RB mid     | 22.66               | 22.11 |
|                       |                 | 100% RB        | 23.07               | 22.37 |
|                       | 1732.5          | 1 RB low       | 21.98               | 21.47 |
|                       |                 | 1 RB high      | 21.56               | 20.88 |
|                       |                 | 50% RB mid     | 22.10               | 21.55 |
|                       |                 | 100% RB        | 23.20               | 22.75 |
|                       | 1750.0          | 1 RB low       | 23.06               | 22.58 |
|                       |                 | 1 RB high      | 23.14               | 22.44 |
|                       |                 | 50% RB mid     | 21.82               | 20.97 |
|                       |                 | 100% RB        | 23.41               | 22.66 |
| 15 MHz                | 1717.5          | 1 RB low       | 22.72               | 22.17 |
|                       |                 | 1 RB high      | 22.85               | 22.33 |
|                       |                 | 50% RB mid     | 22.72               | 22.00 |

|        |        |            |       |       |
|--------|--------|------------|-------|-------|
|        | 1732.5 | 100% RB    | 21.59 | 20.85 |
|        |        | 1 RB low   | 23.06 | 22.35 |
|        |        | 1 RB high  | 22.64 | 22.21 |
|        |        | 50% RB mid | 23.18 | 22.67 |
|        | 1747.5 | 100% RB    | 23.24 | 22.45 |
|        |        | 1 RB low   | 23.07 | 22.32 |
|        |        | 1 RB high  | 23.45 | 22.81 |
|        |        | 50% RB mid | 22.60 | 21.79 |
| 20 MHz | 1720.0 | 100% RB    | 23.09 | 22.32 |
|        |        | 1 RB low   | 22.57 | 21.98 |
|        |        | 1 RB high  | 22.76 | 22.33 |
|        |        | 50% RB mid | 21.76 | 21.00 |
|        | 1732.5 | 100% RB    | 23.30 | 22.59 |
|        |        | 1 RB low   | 23.10 | 22.63 |
|        |        | 1 RB high  | 21.66 | 21.31 |
|        |        | 50% RB mid | 22.51 | 21.66 |
|        | 1745.0 | 100% RB    | 22.38 | 21.99 |
|        |        | 1 RB low   | 22.46 | 21.99 |
|        |        | 1 RB high  | 22.31 | 21.91 |
|        |        | 50% RB mid | 23.42 | 22.60 |
|        |        | 100% RB    | 23.49 | 22.98 |

**Radiated Measurement:**

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.
2.  $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + P_{Ag}(dB) + G_a(dBi)$

*LTE FDD Band 4\_Channel Bandwidth 1.4MHz\_QPSK*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1710.7          | -19.52                 | 2.75                 | 8.98                            | 35.70                | 22.41      | 30.00       | 7.59        | V            |
| 1732.5          | -19.39                 | 2.81                 | 9.15                            | 35.70                | 22.65      | 30.00       | 7.35        | V            |
| 1754.3          | -20.35                 | 2.85                 | 9.47                            | 35.70                | 21.97      | 30.00       | 8.03        | V            |

*LTE FDD Band 4\_Channel Bandwidth 3MHz\_QPSK*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1711.5          | -20.39                 | 2.75                 | 8.98                            | 35.70                | 21.54      | 30.00       | 8.46        | V            |
| 1732.5          | -19.39                 | 2.81                 | 9.15                            | 35.70                | 22.65      | 30.00       | 7.35        | V            |
| 1753.5          | -20.90                 | 2.85                 | 9.47                            | 35.70                | 21.42      | 30.00       | 8.58        | V            |

*LTE FDD Band 4\_Channel Bandwidth 5MHz\_QPSK*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1712.5          | -19.88                 | 2.75                 | 8.98                            | 35.70                | 22.05      | 30.00       | 7.95        | V            |
| 1732.5          | -19.68                 | 2.81                 | 9.15                            | 35.70                | 22.36      | 30.00       | 7.64        | V            |
| 1752.5          | -20.54                 | 2.85                 | 9.47                            | 35.70                | 21.78      | 30.00       | 8.22        | V            |

*LTE FDD Band 4\_Channel Bandwidth 10MHz\_QPSK*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1715.0          | -19.52                 | 2.75                 | 8.98                            | 35.70                | 22.41      | 30.00       | 7.59        | V            |
| 1732.5          | -19.35                 | 2.81                 | 9.15                            | 35.70                | 22.69      | 30.00       | 7.31        | V            |
| 1750.0          | -20.45                 | 2.85                 | 9.47                            | 35.70                | 21.87      | 30.00       | 8.13        | V            |

*LTE FDD Band 4\_Channel Bandwidth 15MHz\_QPSK*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1717.5          | -20.38                 | 2.75                 | 8.98                            | 35.70                | 21.55      | 30.00       | 8.45        | V            |
| 1732.5          | -19.98                 | 2.81                 | 9.15                            | 35.70                | 22.06      | 30.00       | 7.94        | V            |
| 1747.5          | -20.45                 | 2.85                 | 9.47                            | 35.70                | 21.87      | 30.00       | 8.13        | V            |

*LTE FDD Band 4\_Channel Bandwidth 20MHz\_QPSK*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1720.0          | -19.52                 | 2.75                 | 8.98                            | 35.70                | 22.41      | 30.00       | 7.59        | V            |
| 1732.5          | -19.48                 | 2.81                 | 9.15                            | 35.70                | 22.56      | 30.00       | 7.44        | V            |
| 1745.0          | -19.87                 | 2.85                 | 9.47                            | 35.70                | 22.45      | 30.00       | 7.55        | V            |

*LTE FDD Band 4\_Channel Bandwidth 1.4MHz\_16QAM*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1710.7          | -20.35                 | 2.75                 | 8.98                            | 35.70                | 21.58      | 30.00       | 8.42        | V            |
| 1732.5          | -20.81                 | 2.81                 | 9.15                            | 35.70                | 21.23      | 30.00       | 8.77        | V            |
| 1754.3          | -21.99                 | 2.85                 | 9.47                            | 35.70                | 20.33      | 30.00       | 9.67        | V            |

*LTE FDD Band 4\_Channel Bandwidth 3MHz\_16QAM*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1711.5          | -21.69                 | 2.75                 | 8.98                            | 35.70                | 20.24      | 30.00       | 9.76        | V            |
| 1732.5          | -20.68                 | 2.81                 | 9.15                            | 35.70                | 21.36      | 30.00       | 8.64        | V            |
| 1753.5          | -20.87                 | 2.85                 | 9.47                            | 35.70                | 21.45      | 30.00       | 8.55        | V            |

*LTE FDD Band 4\_Channel Bandwidth 5MHz\_16QAM*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1712.5          | -20.41                 | 2.75                 | 8.98                            | 35.70                | 21.52      | 30.00       | 8.48        | V            |
| 1732.5          | -21.27                 | 2.81                 | 9.15                            | 35.70                | 20.77      | 30.00       | 9.23        | V            |
| 1752.5          | -20.74                 | 2.85                 | 9.47                            | 35.70                | 21.58      | 30.00       | 8.42        | V            |

*LTE FDD Band 4\_Channel Bandwidth 10MHz\_16QAM*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1715.0          | -21.27                 | 2.75                 | 8.98                            | 35.70                | 20.66      | 30.00       | 9.34        | V            |
| 1732.5          | -20.72                 | 2.81                 | 9.15                            | 35.70                | 21.32      | 30.00       | 8.68        | V            |
| 1750.0          | -20.90                 | 2.85                 | 9.47                            | 35.70                | 21.42      | 30.00       | 8.58        | V            |

*LTE FDD Band 4\_Channel Bandwidth 15MHz\_16QAM*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1717.5          | -20.45                 | 2.75                 | 8.98                            | 35.70                | 21.48      | 30.00       | 8.52        | V            |
| 1732.5          | -19.99                 | 2.81                 | 9.15                            | 35.70                | 22.05      | 30.00       | 7.95        | V            |
| 1747.5          | -20.69                 | 2.85                 | 9.47                            | 35.70                | 21.63      | 30.00       | 8.37        | V            |

*LTE FDD Band 4\_Channel Bandwidth 20MHz\_16QAM*

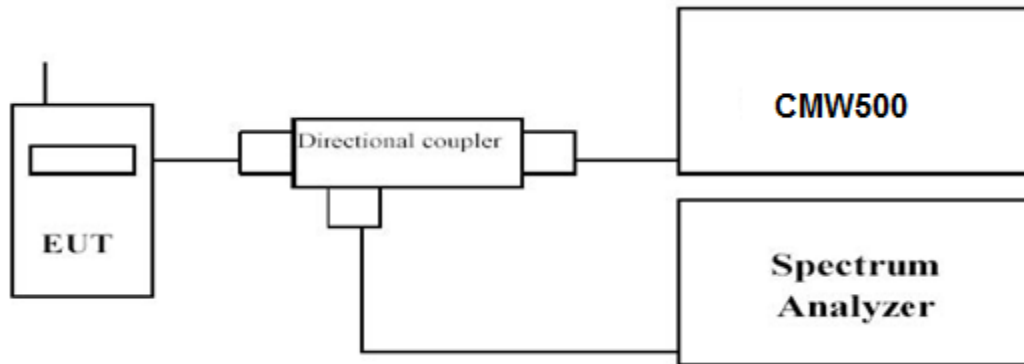
| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1720.0          | -19.52                 | 2.75                 | 8.98                            | 35.70                | 22.41      | 30.00       | 7.59        | V            |
| 1732.5          | -19.68                 | 2.81                 | 9.15                            | 35.70                | 22.36      | 30.00       | 7.64        | V            |
| 1745.0          | -20.74                 | 2.85                 | 9.47                            | 35.70                | 21.58      | 30.00       | 8.42        | V            |

### 3.2 Peak-to-Average Ratio (PAR)

#### LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as follows:
  - 1). for continuous transmissions, set to 1 ms,
  - 2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
5. Record the maximum PAPR level associated with a probability of 0.1%.

**TEST RESULTS**

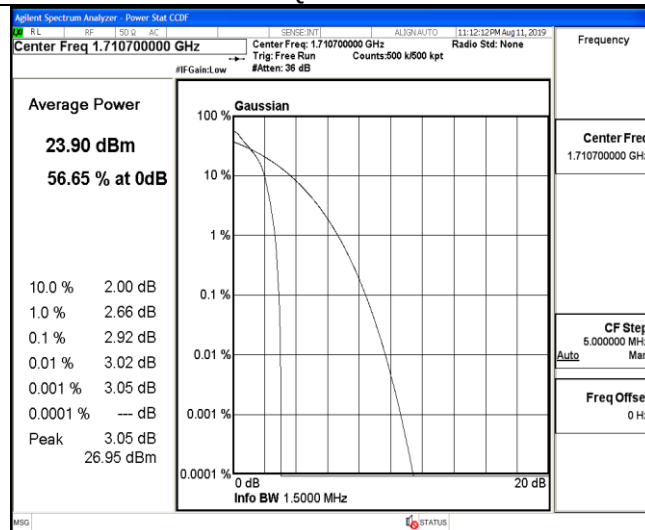
Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.

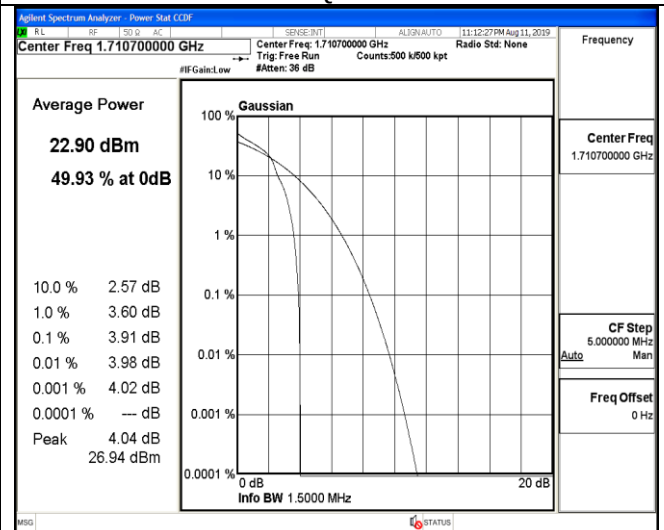
| LTE FDD Band 4       |                 |                |           |       |
|----------------------|-----------------|----------------|-----------|-------|
| TX Channel Bandwidth | Frequency (MHz) | RB Size/Offset | PAPR (dB) |       |
|                      |                 |                | QPSK      | 16QAM |
| 1.4 MHz              | 1710.7          | 1RB#0          | 2.92      | 3.91  |
|                      | 1732.5          |                | 3.43      | 4.42  |
|                      | 1754.3          |                | 3.19      | 4.15  |
| 3 MHz                | 1711.5          | 1RB#0          | 2.77      | 3.61  |
|                      | 1732.5          |                | 3.54      | 4.42  |
|                      | 1753.5          |                | 3.11      | 4.06  |
| 5 MHz                | 1712.5          | 1RB#0          | 2.84      | 3.77  |
|                      | 1732.5          |                | 3.48      | 4.34  |
|                      | 1752.5          |                | 3.18      | 3.94  |
| 10 MHz               | 1715.0          | 1RB#0          | 2.92      | 3.85  |
|                      | 1732.5          |                | 3.53      | 4.47  |
|                      | 1750.0          |                | 3.09      | 4.05  |
| 15 MHz               | 1717.5          | 1RB#0          | 3.10      | 3.98  |
|                      | 1732.5          |                | 3.47      | 3.39  |
|                      | 1747.5          |                | 3.28      | 4.11  |
| 20 MHz               | 1720.0          | 1RB#0          | 3.16      | 3.89  |
|                      | 1732.5          |                | 3.45      | 4.31  |
|                      | 1745.0          |                | 3.23      | 4.00  |

## LTE FDD Band 4-1.4MHz Channel Bandwidth PAPR

## QPSK



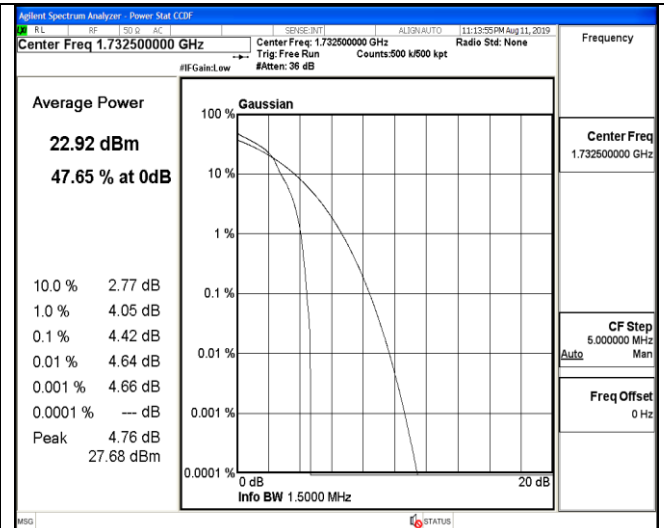
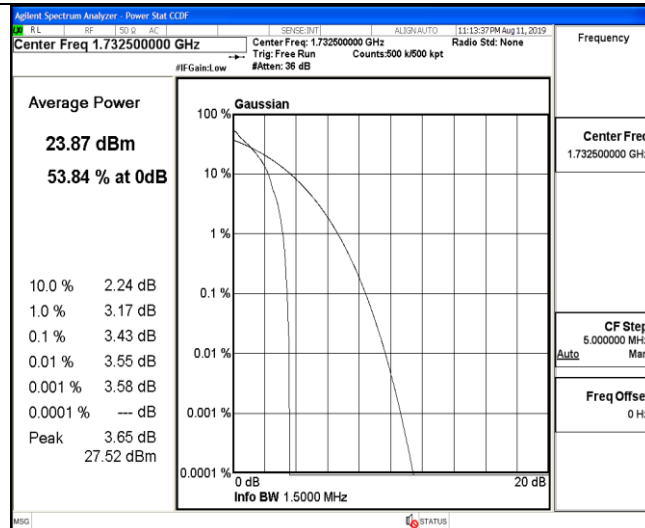
## 16QAM



## 1RB#0

## 1RB#0

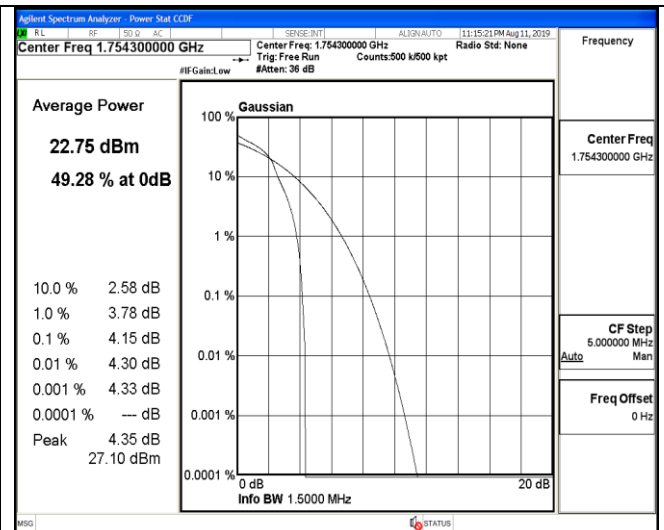
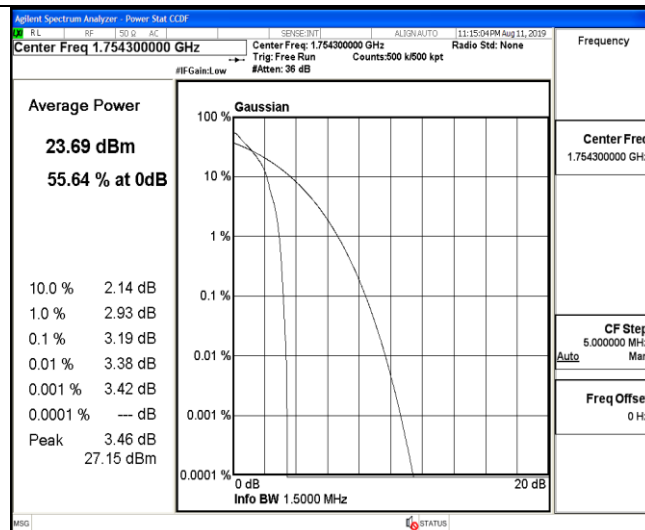
## Low Channel



## 1RB#0

## 1RB#0

## Middle Channel



## 1RB#0

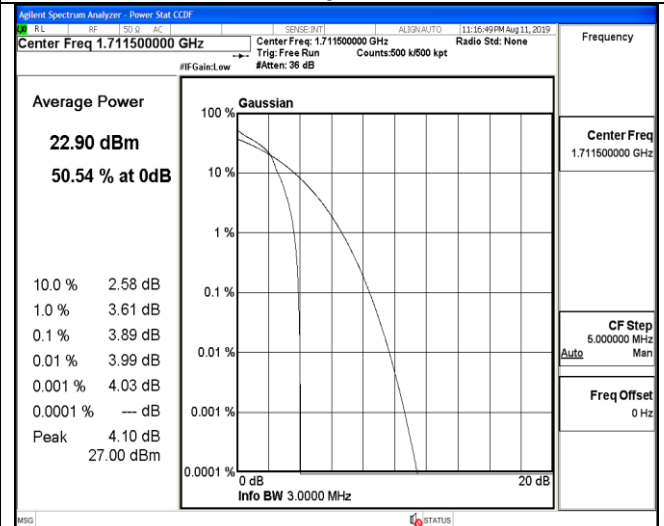
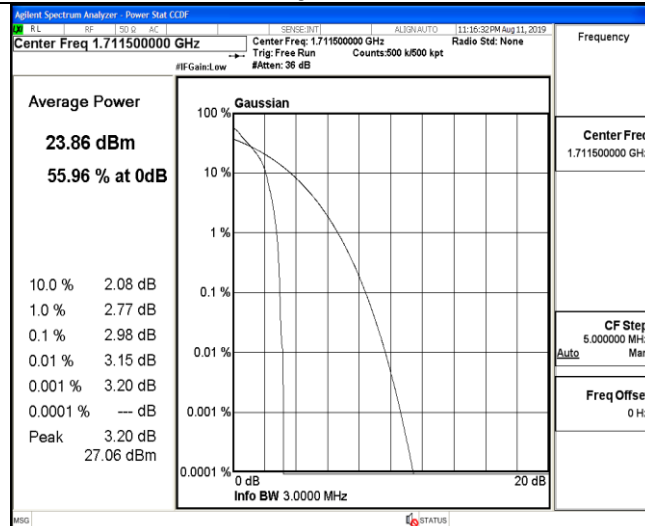
## 1RB#0

## High Channel

## LTE FDD Band 4-3MHz Channel Bandwidth PAPR

QPSK

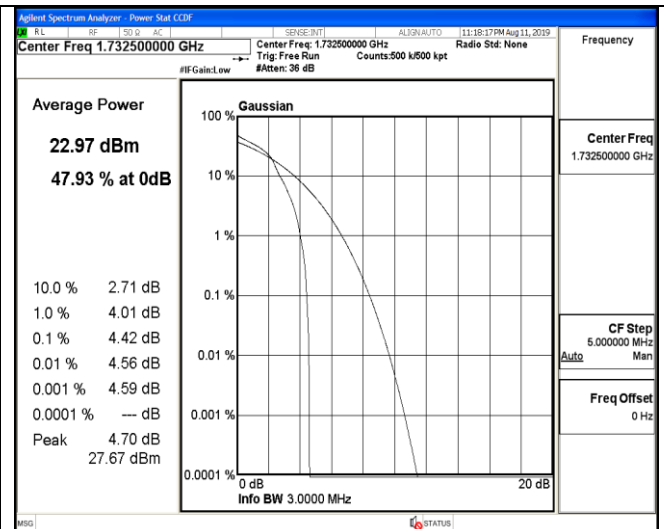
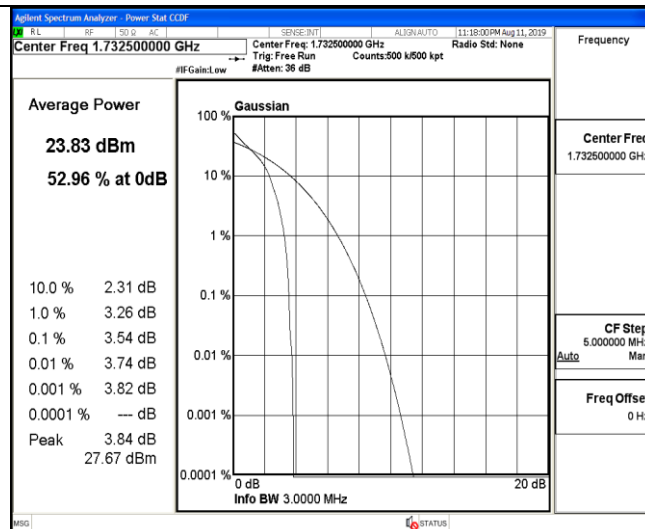
16QAM



1RB#0

1RB#0

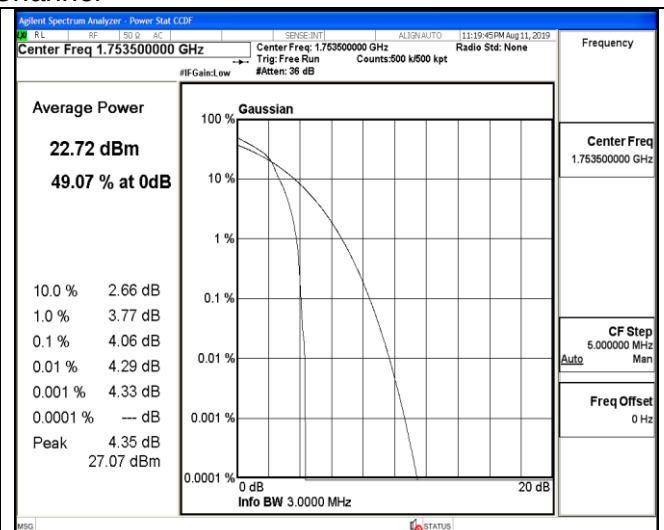
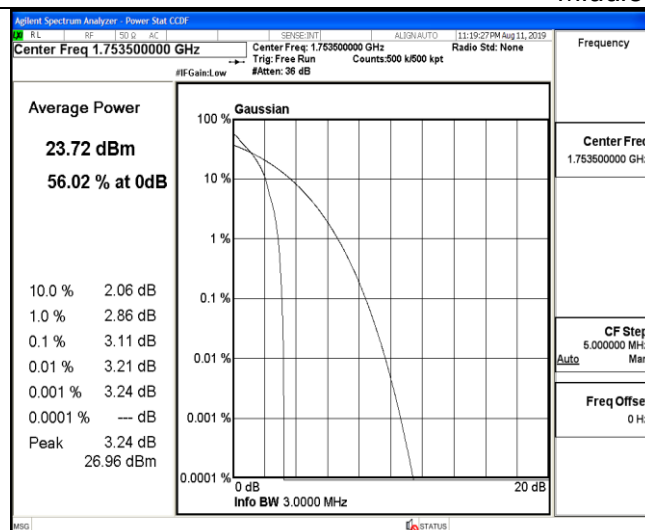
## Low Channel



1RB#0

1RB#0

## Middle Channel



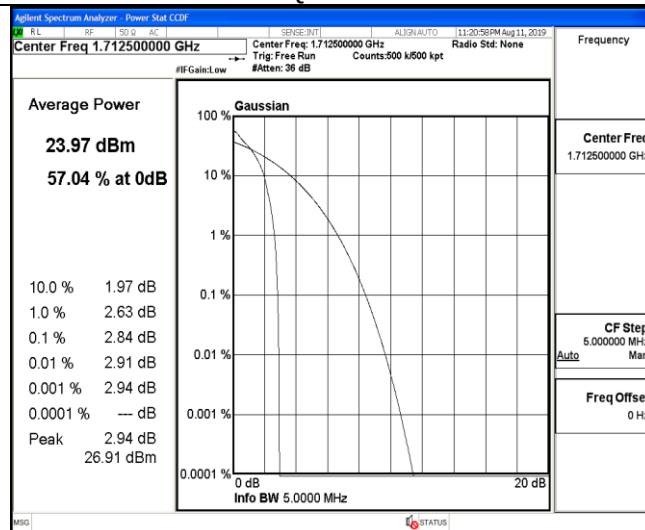
1RB#0

1RB#0

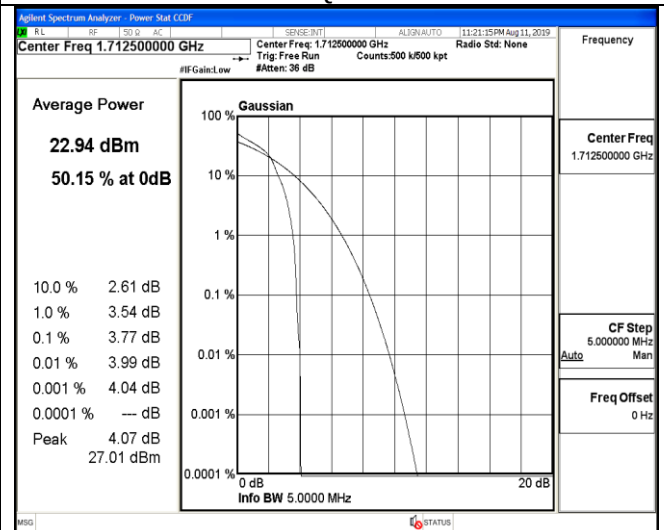
## High Channel

## LTE FDD Band 4-5MHz Channel Bandwidth PAPR

## QPSK



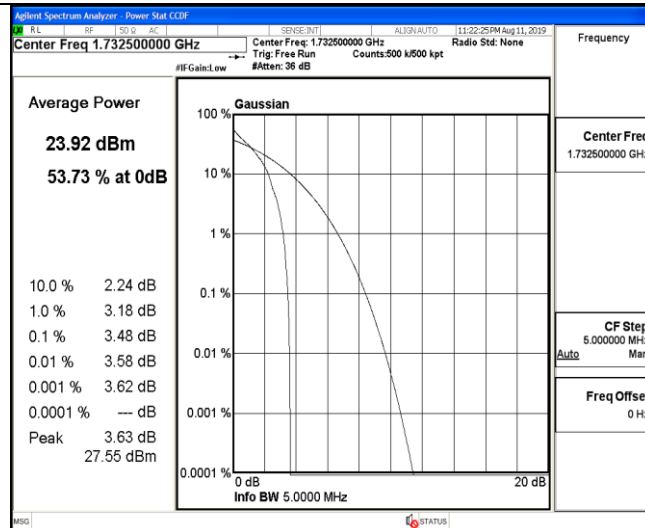
## 16QAM



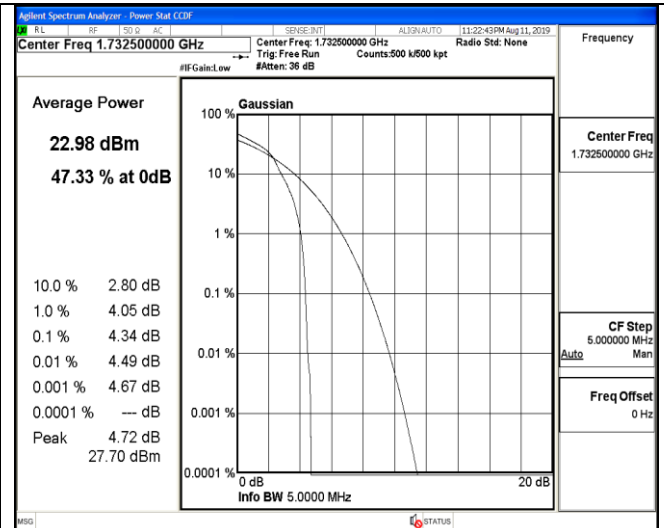
## 1RB#0

## 1RB#0

## Low Channel

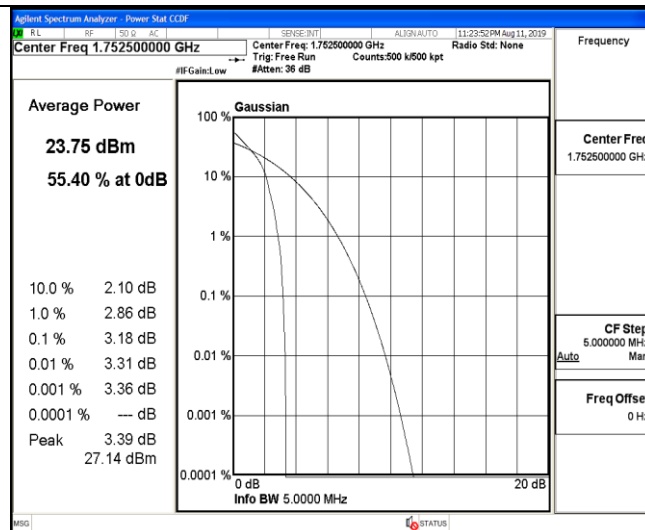


## 1RB#0

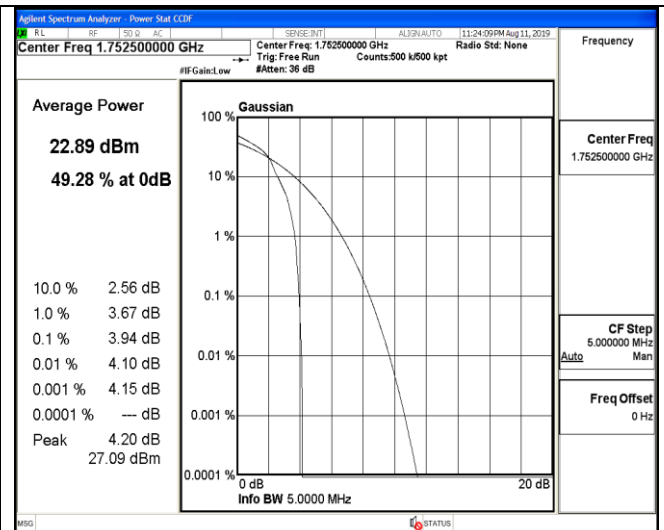


## 1RB#0

## Middle Channel



## 1RB#0



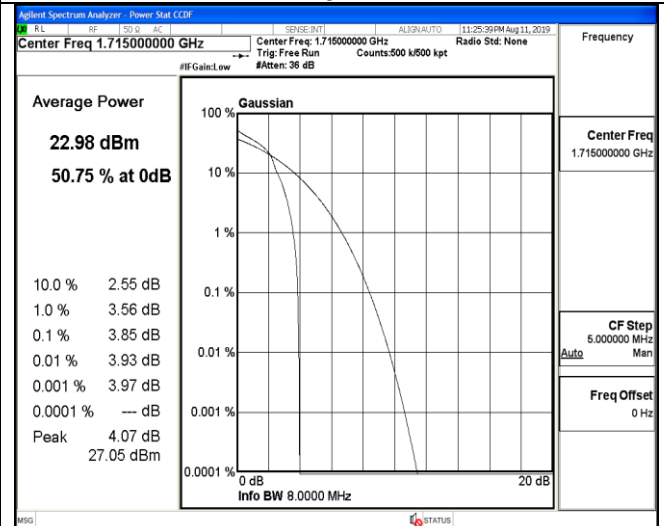
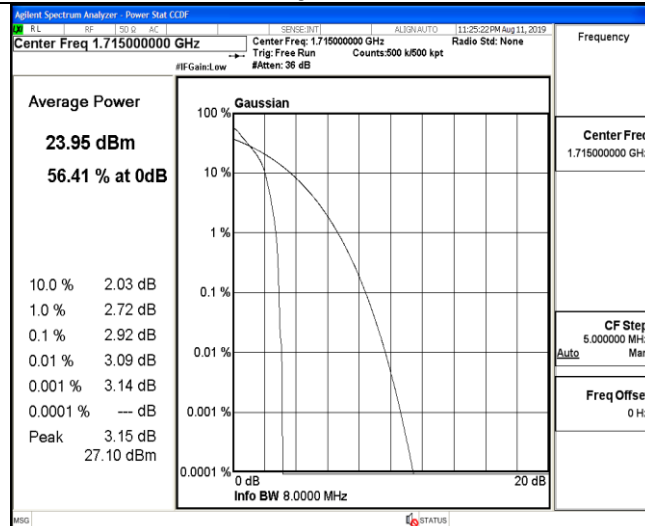
## 1RB#0

## High Channel

## LTE FDD Band 4-10MHz Channel Bandwidth PAPR

QPSK

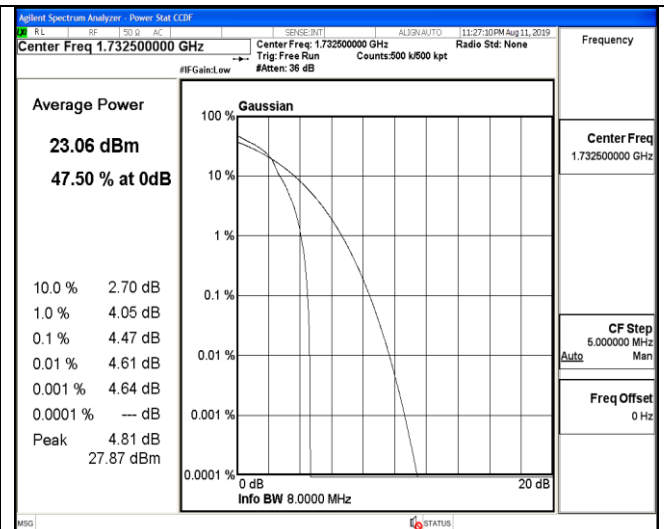
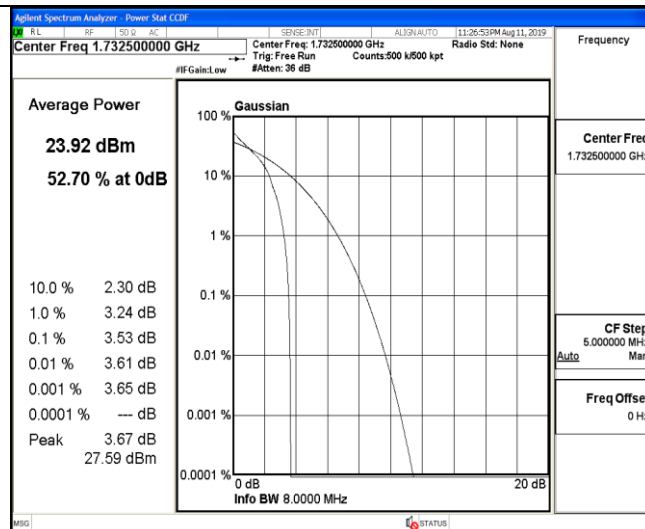
16QAM



1RB#0

1RB#0

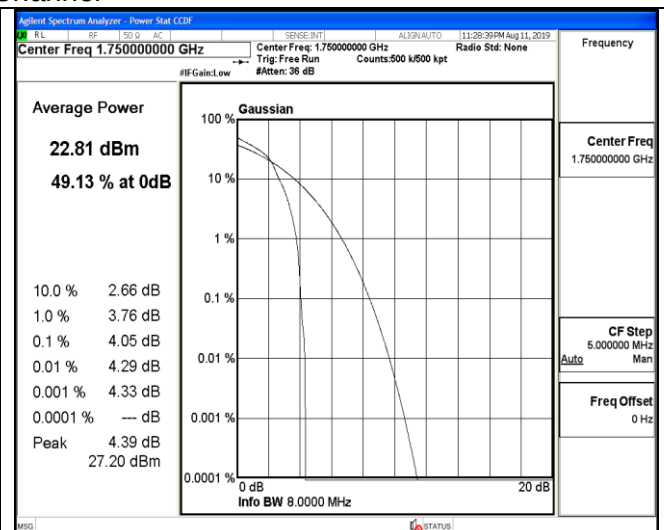
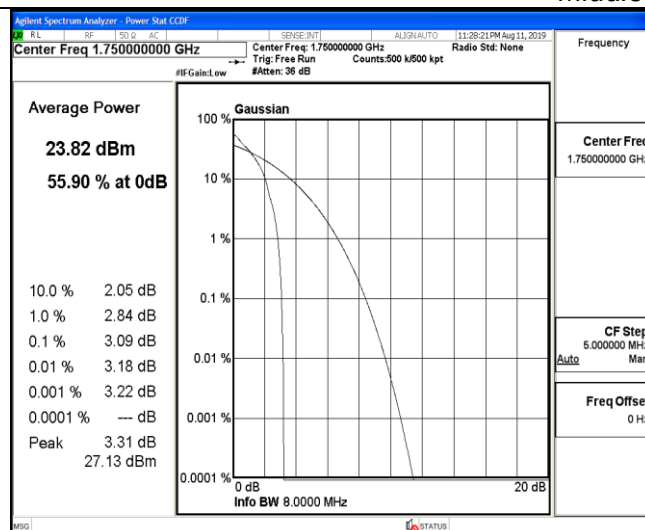
## Low Channel



1RB#0

1RB#0

## Middle Channel



1RB#0

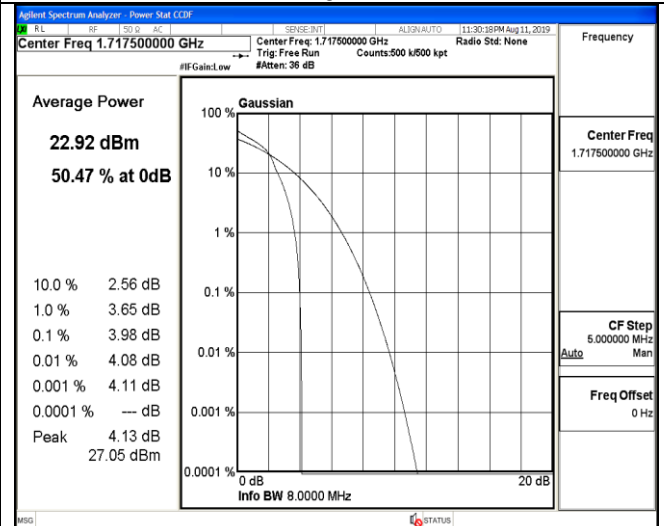
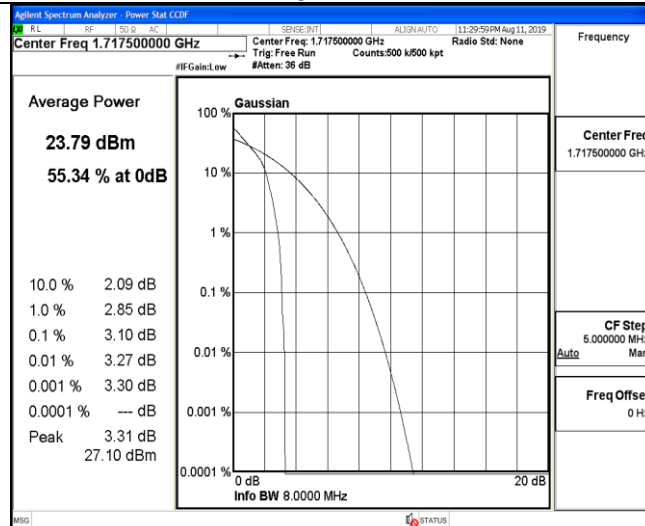
1RB#0

## High Channel

## LTE FDD Band 4-15MHz Channel Bandwidth PAPR

QPSK

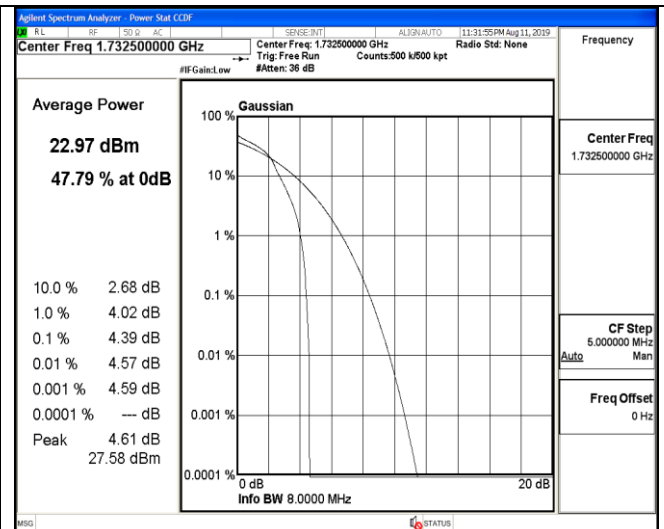
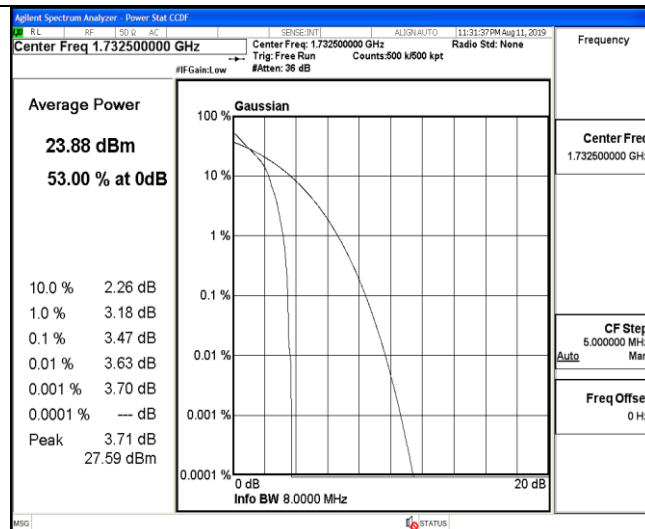
16QAM



1RB#0

1RB#0

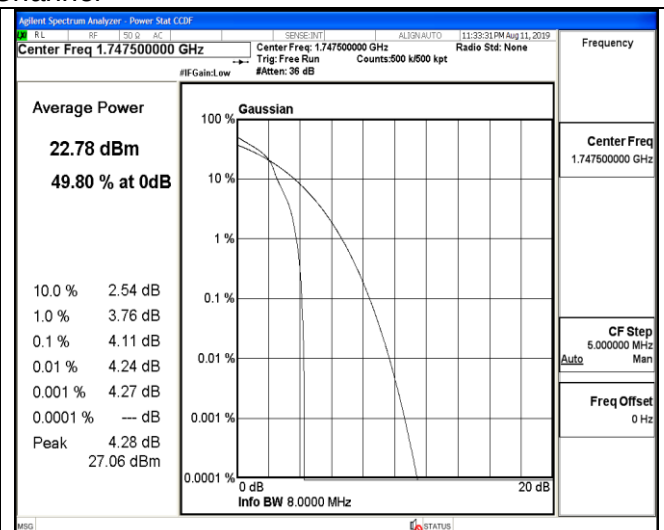
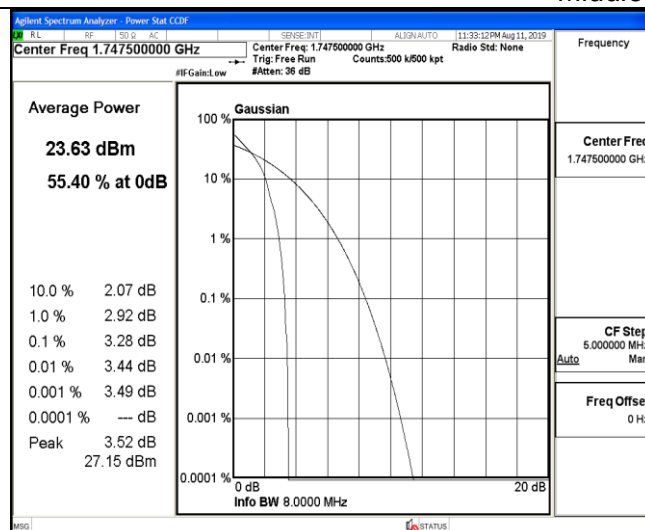
## Low Channel



1RB#0

1RB#0

## Middle Channel



1RB#0

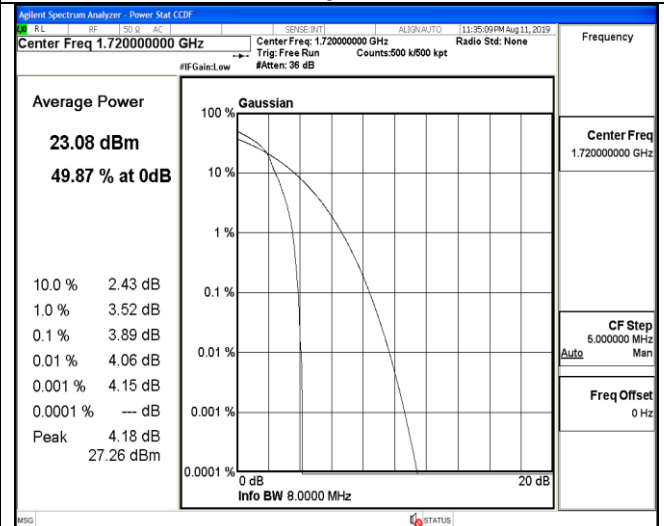
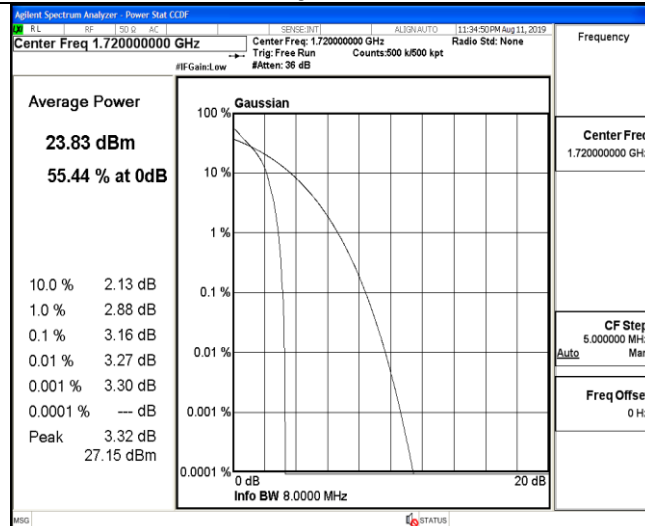
1RB#0

## High Channel

## LTE FDD Band 4-20MHz Channel Bandwidth PAPR

QPSK

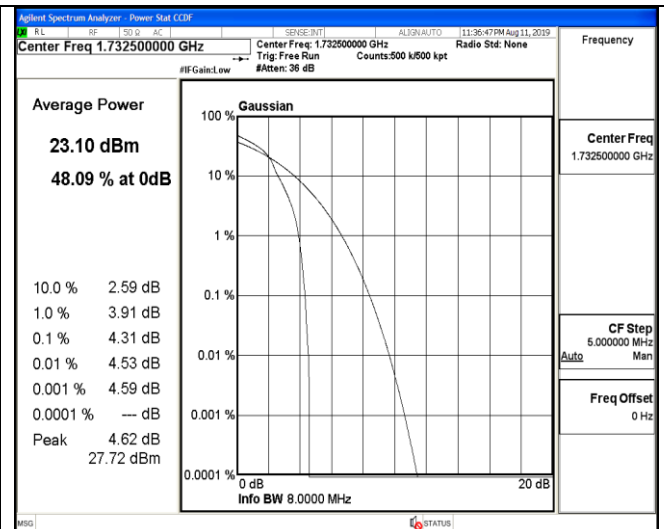
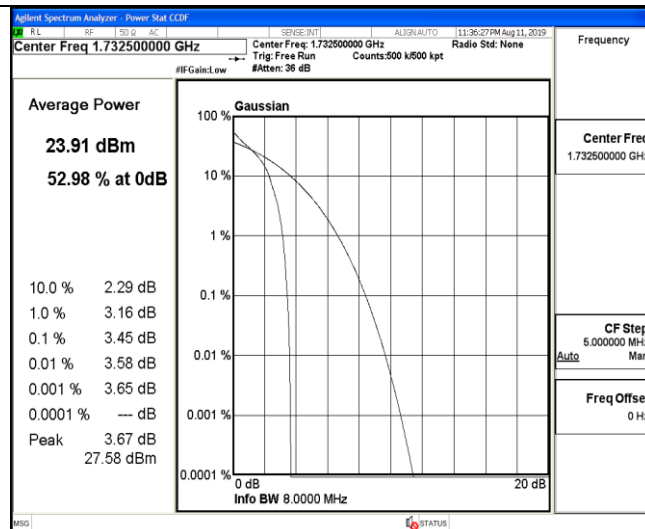
16QAM



1RB#0

1RB#0

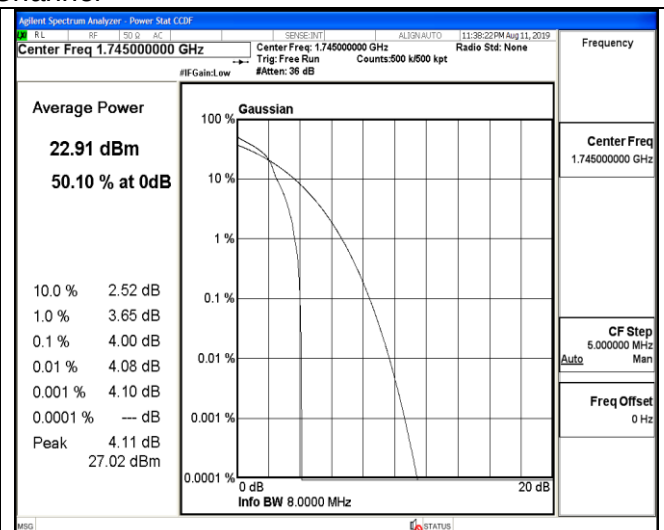
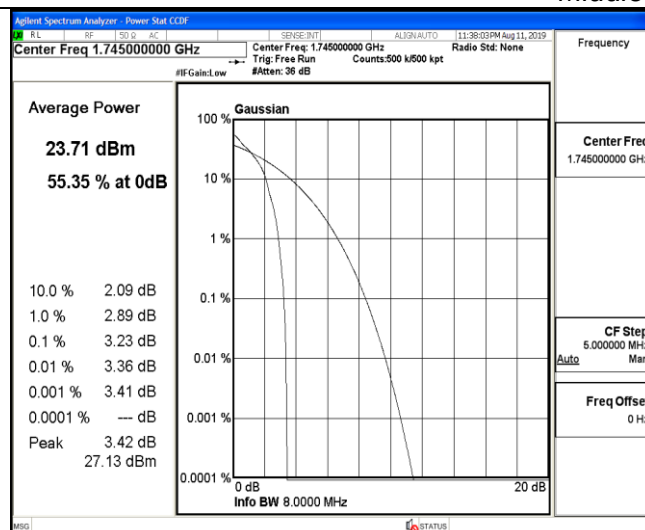
## Low Channel



1RB#0

1RB#0

## Middle Channel



1RB#0

1RB#0

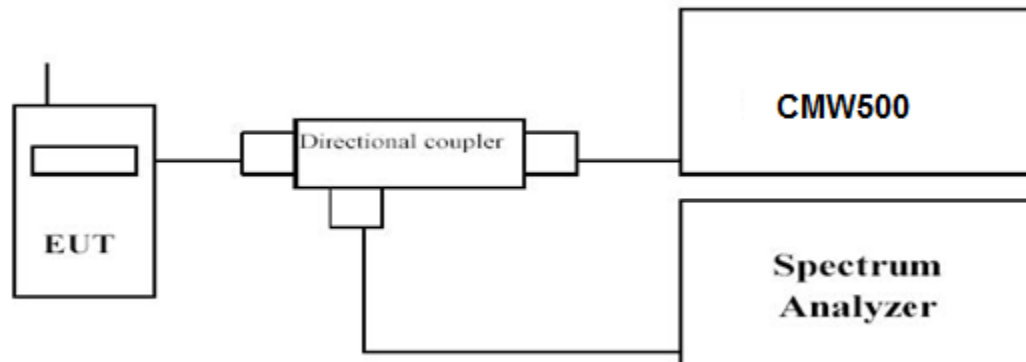
## High Channel

### 3.3 Occupied Bandwidth and Emission Bandwidth

#### LIMIT

N/A

#### TEST CONFIGURATION



#### TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded.

Set RBW was set to about 1% of emission BW, VBW $\geq$ 3 times RBW.

-26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

#### TEST RESULTS

*Remark:*

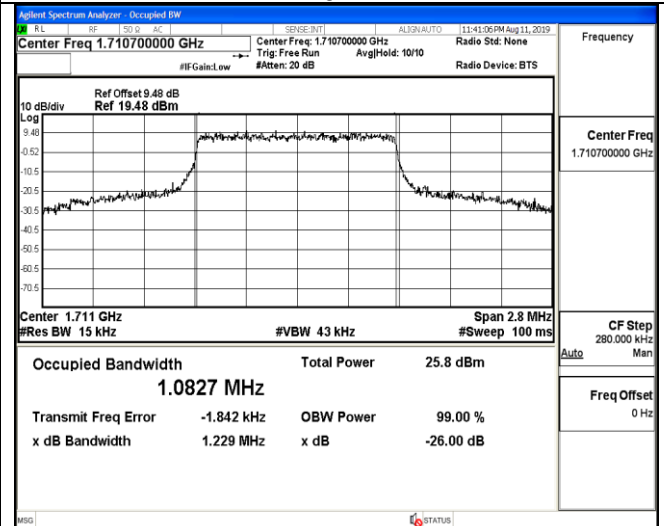
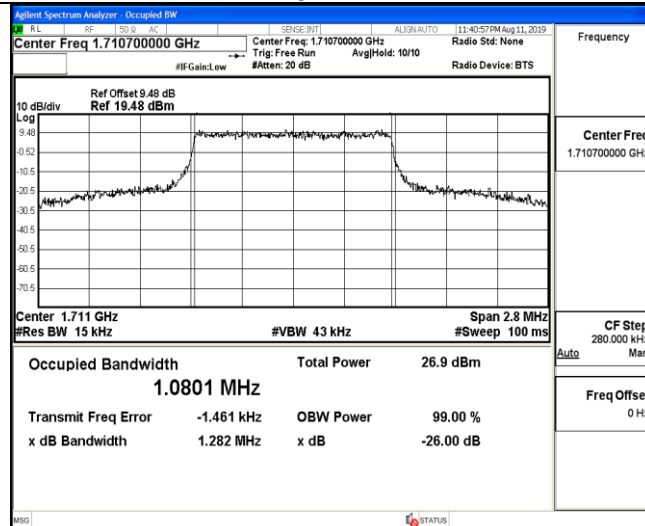
1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.

| LTE FDD Band 4       |                |                 |                                 |       |                              |        |
|----------------------|----------------|-----------------|---------------------------------|-------|------------------------------|--------|
| TX Channel Bandwidth | RB Size/Offset | Frequency (MHz) | -26dBc Emission bandwidth (MHz) |       | 99% Occupied bandwidth (MHz) |        |
|                      |                |                 | QPSK                            | 16QAM | QPSK                         | 16QAM  |
| 1.4 MHz              | 6RB#0          | 1710.7          | 1.282                           | 1.229 | 1.0801                       | 1.0827 |
|                      |                | 1732.5          | 1.208                           | 1.218 | 1.0761                       | 1.0790 |
|                      |                | 1754.3          | 1.224                           | 1.217 | 1.0795                       | 10.775 |
| 3 MHz                | 15RB#0         | 1711.5          | 2.884                           | 2.877 | 2.6853                       | 2.6861 |
|                      |                | 1732.5          | 2.872                           | 2.872 | 2.6828                       | 2.6816 |
|                      |                | 1753.5          | 2.883                           | 2.892 | 2.6846                       | 2.6887 |
| 5 MHz                | 25RB#0         | 1712.5          | 4.862                           | 4.886 | 4.4847                       | 4.4772 |
|                      |                | 1732.5          | 4.843                           | 4.813 | 4.4901                       | 4.4810 |
|                      |                | 1752.5          | 4.820                           | 4.856 | 4.4771                       | 4.4855 |
| 10 MHz               | 50RB#0         | 1715.0          | 9.542                           | 9.483 | 8.9455                       | 8.9423 |
|                      |                | 1732.5          | 9.523                           | 7.472 | 8.9483                       | 8.9391 |
|                      |                | 1750.0          | 9.566                           | 9.444 | 8.9390                       | 8.9415 |
| 15 MHz               | 75RB#0         | 1717.5          | 14.35                           | 14.11 | 13.424                       | 13.415 |
|                      |                | 1732.5          | 14.10                           | 14.14 | 13.413                       | 13.406 |
|                      |                | 1747.5          | 14.32                           | 14.13 | 13.420                       | 13.417 |
| 20 MHz               | 100RB#0        | 1720.0          | 18.73                           | 18.67 | 17.888                       | 17.878 |
|                      |                | 1732.5          | 18.72                           | 18.60 | 17.873                       | 17.877 |
|                      |                | 1745.0          | 18.80                           | 18.64 | 17.881                       | 17.849 |

## LTE FDD Band 4-1.4MHz Channel Bandwidth

QPSK

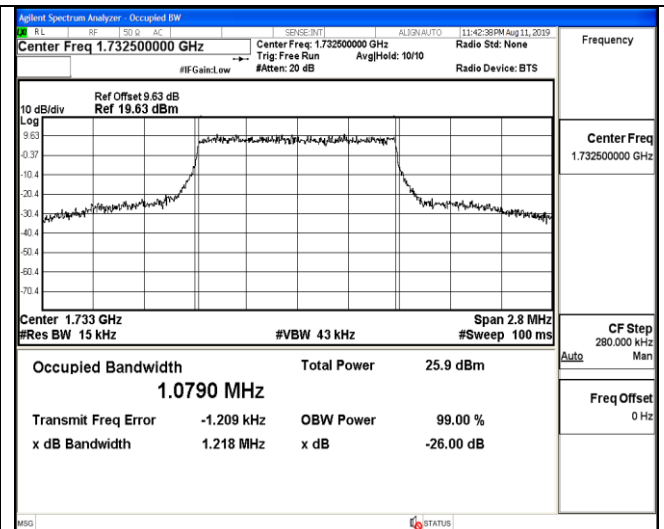
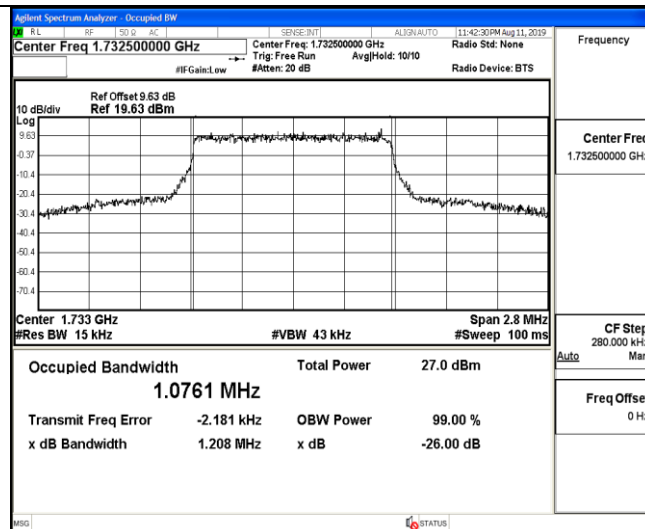
16QAM



6RB#0

6RB#0

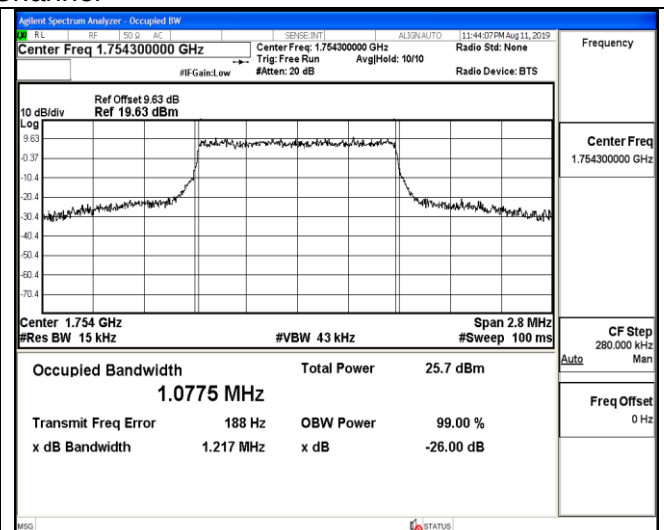
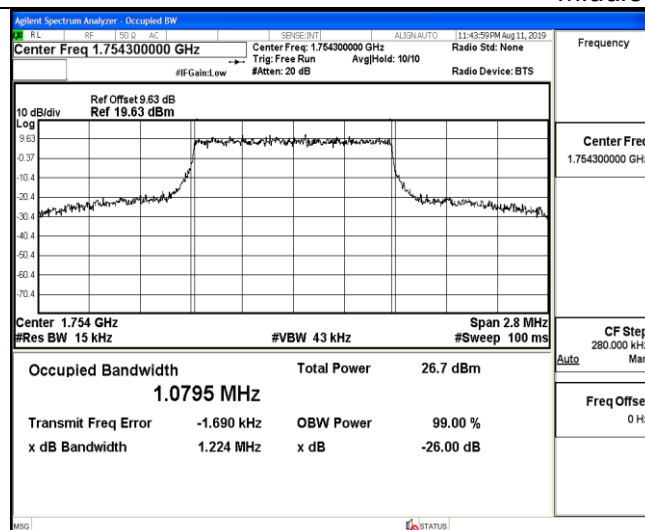
## Low Channel



6RB#0

6RB#0

## Middle Channel



6RB#0

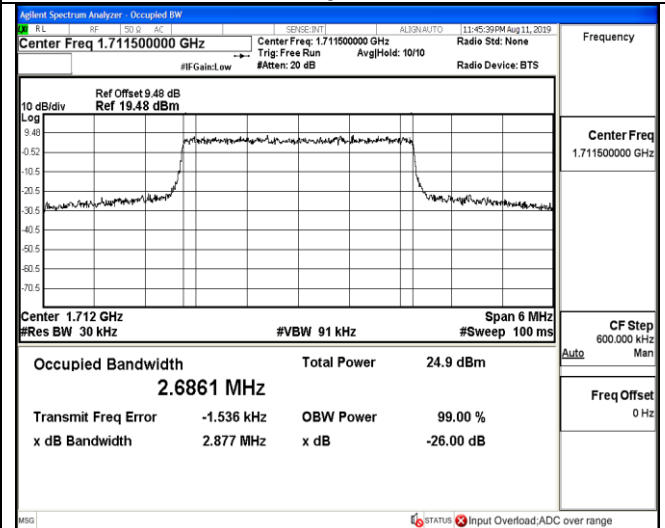
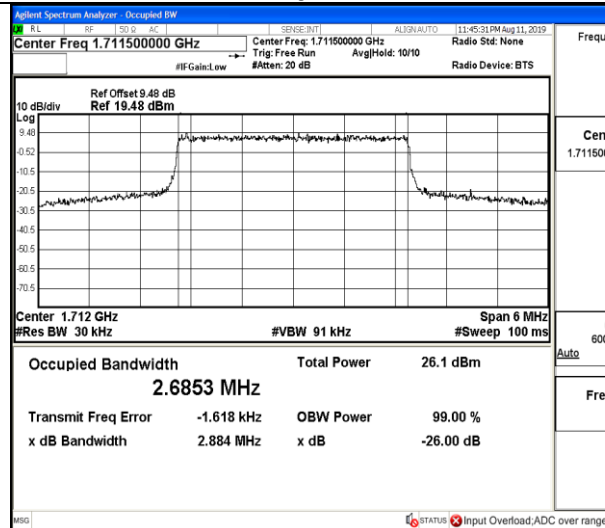
6RB#0

## High Channel

## LTE FDD Band 4-3MHz Channel Bandwidth

QPSK

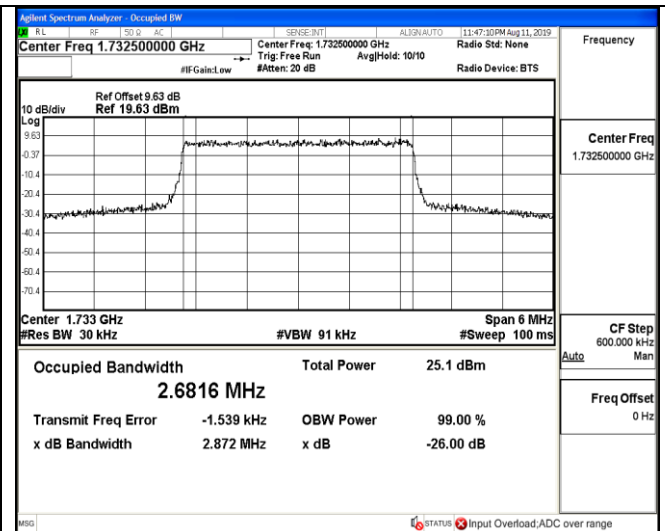
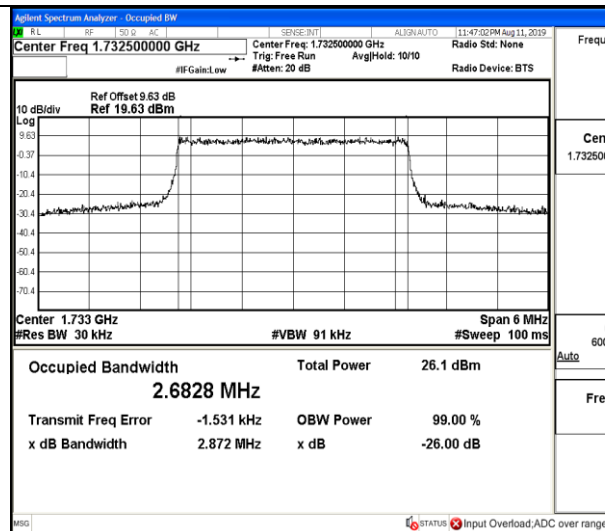
16QAM



15RB#0

15RB#0

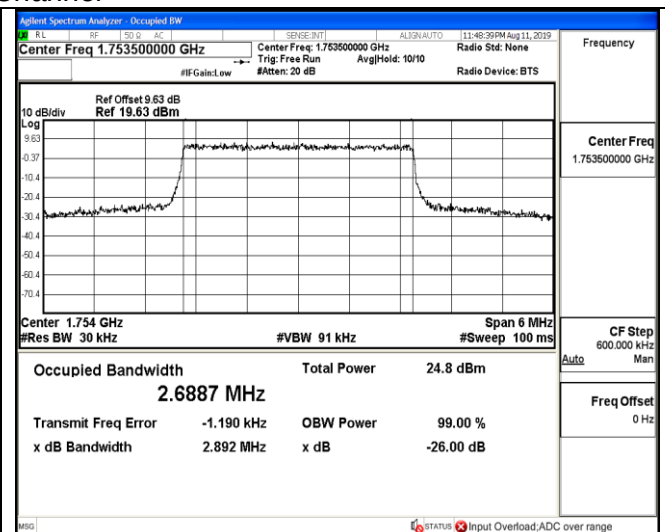
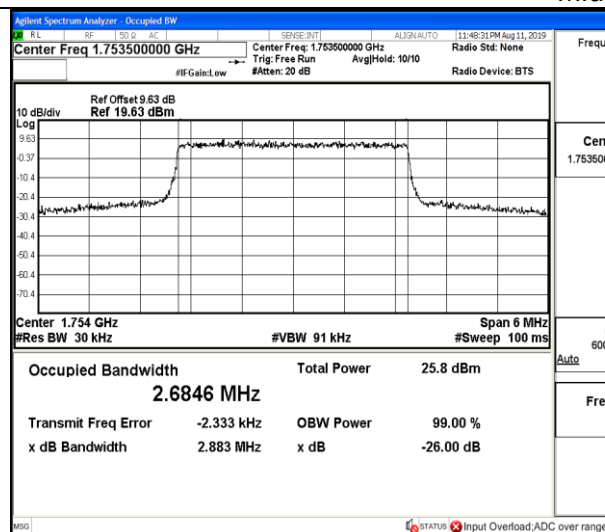
## Low Channel



15RB#0

15RB#0

## Middle Channel



15RB#0

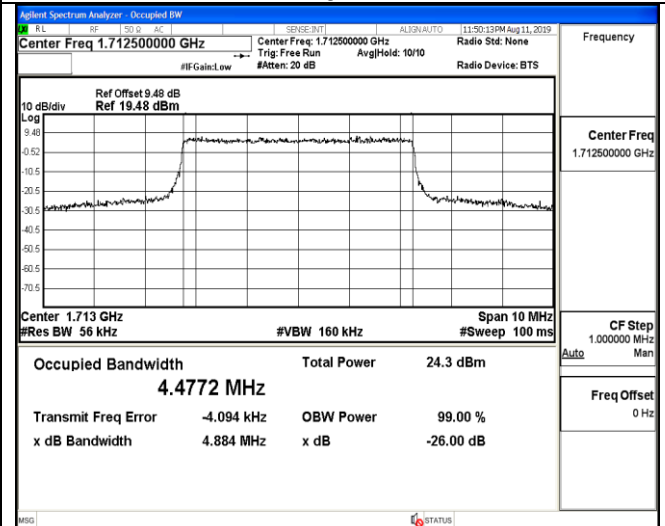
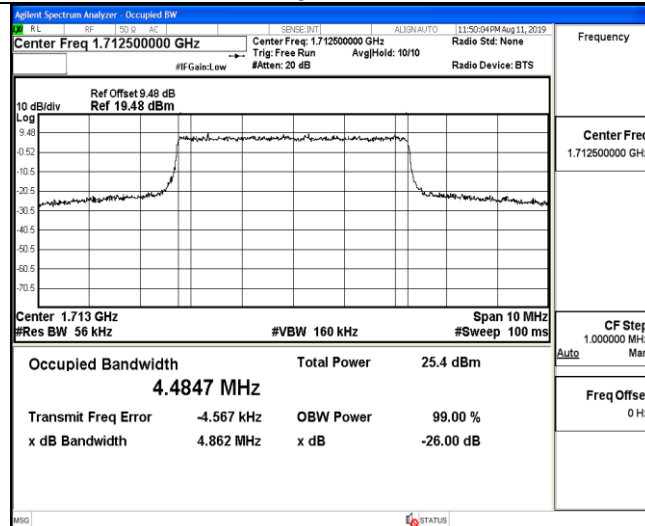
15RB#0

## High Channel

## LTE FDD Band 4-5MHz Channel Bandwidth

QPSK

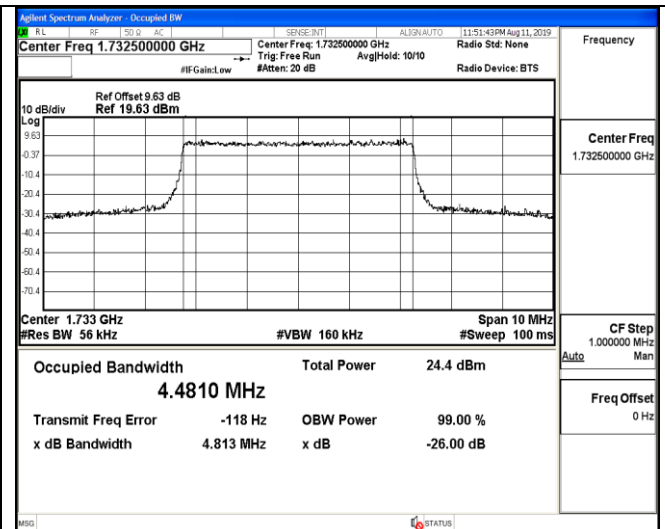
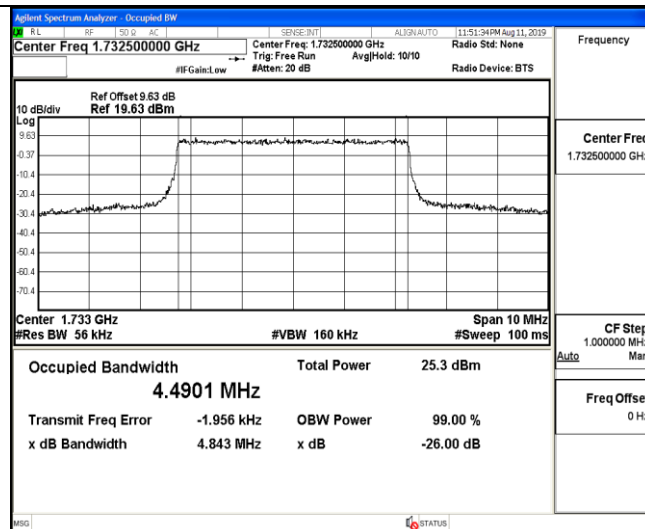
16QAM



25RB#0

25RB#0

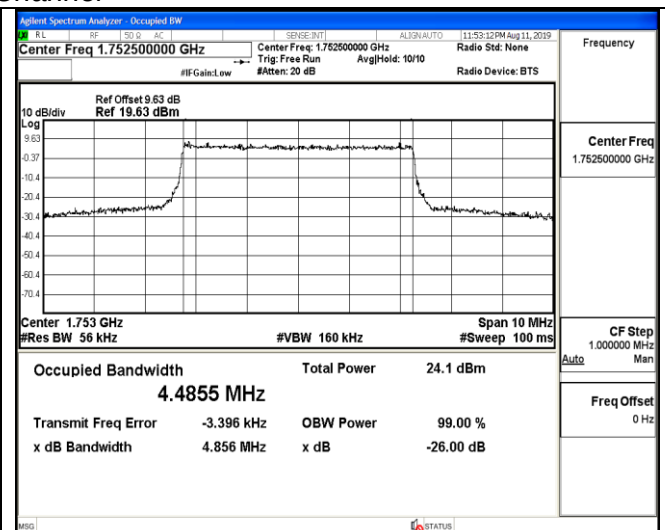
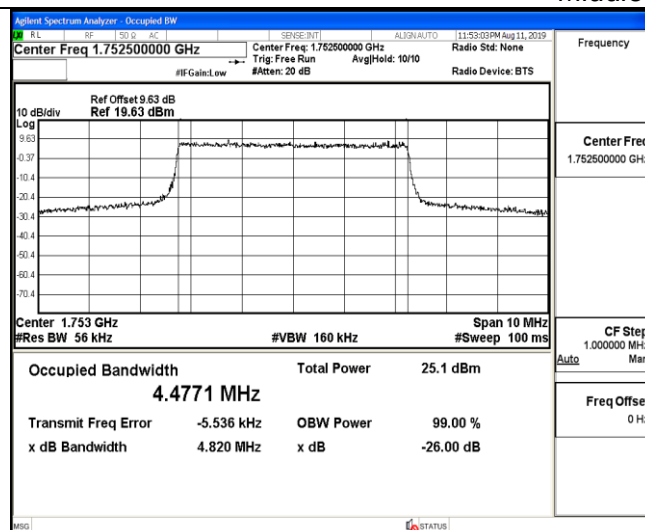
## Low Channel



25RB#0

25RB#0

## Middle Channel



25RB#0

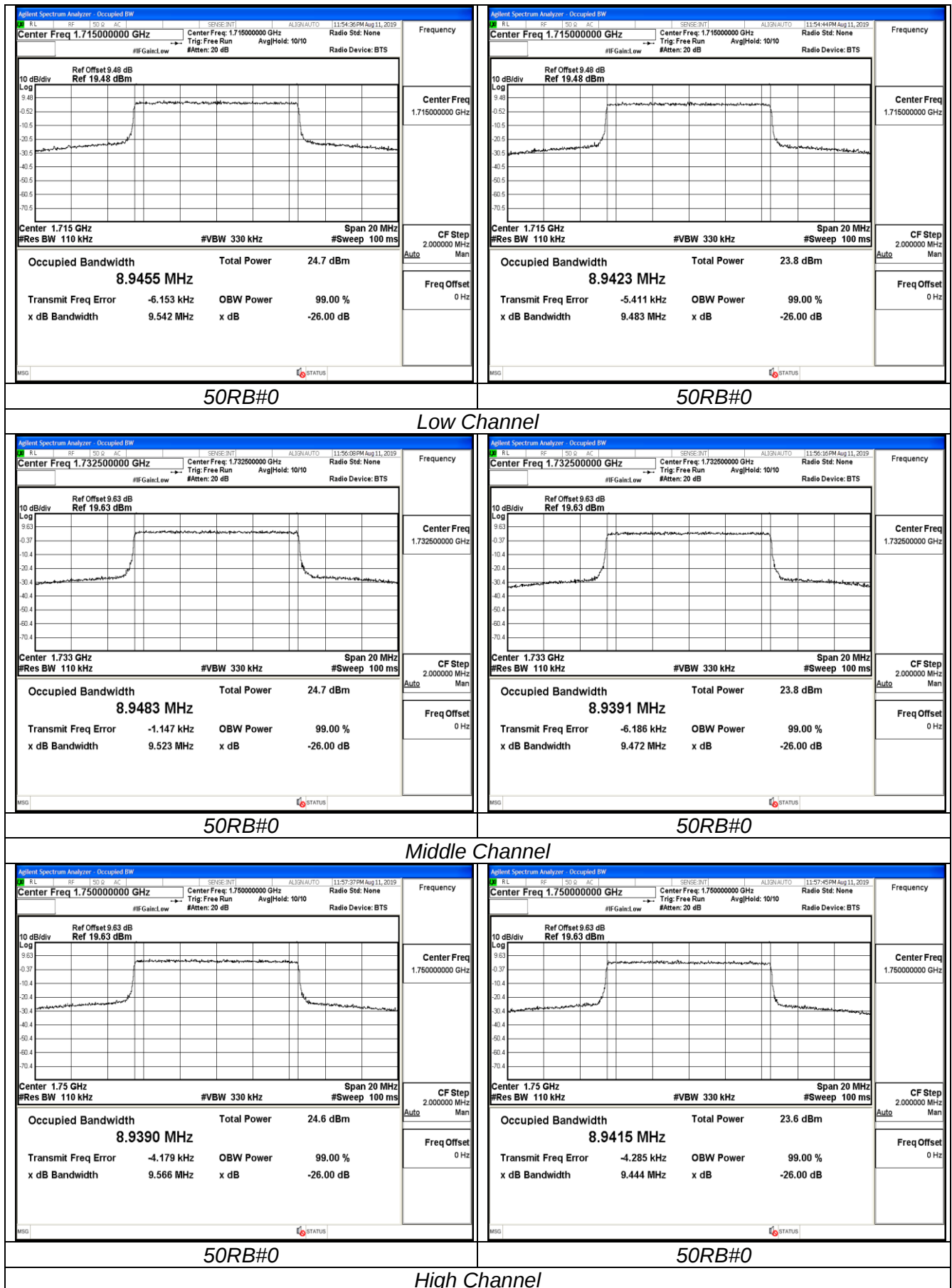
25RB#0

## High Channel

## LTE FDD Band 4-10MHz Channel Bandwidth

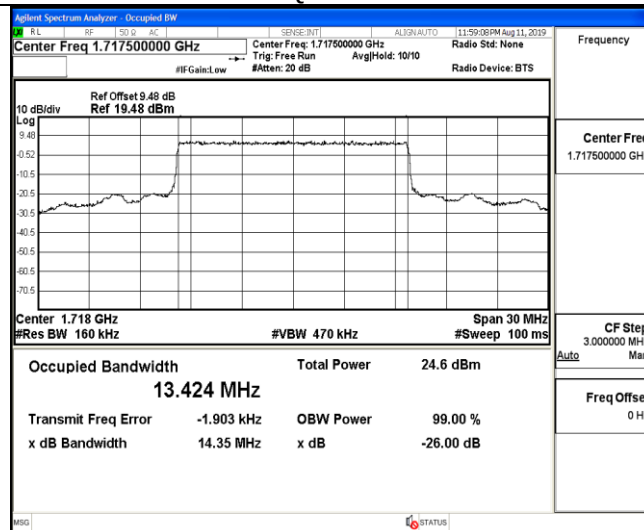
QPSK

16QAM

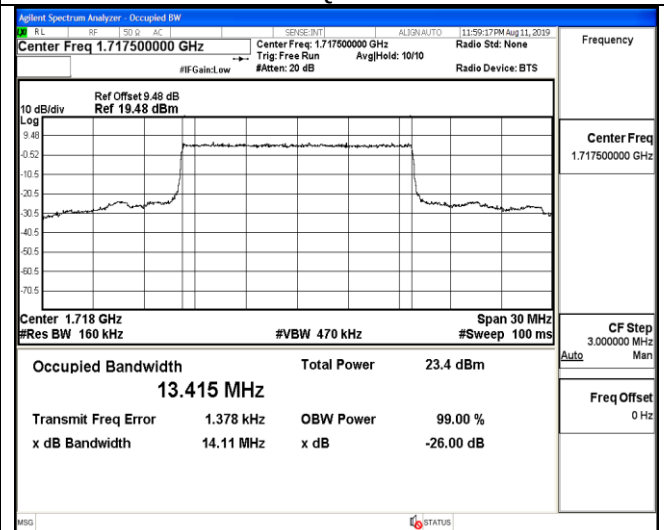


## LTE FDD Band 4-15MHz Channel Bandwidth

## QPSK



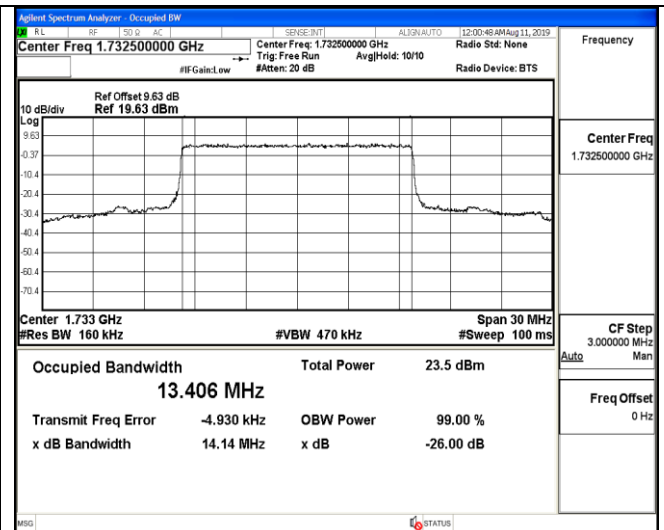
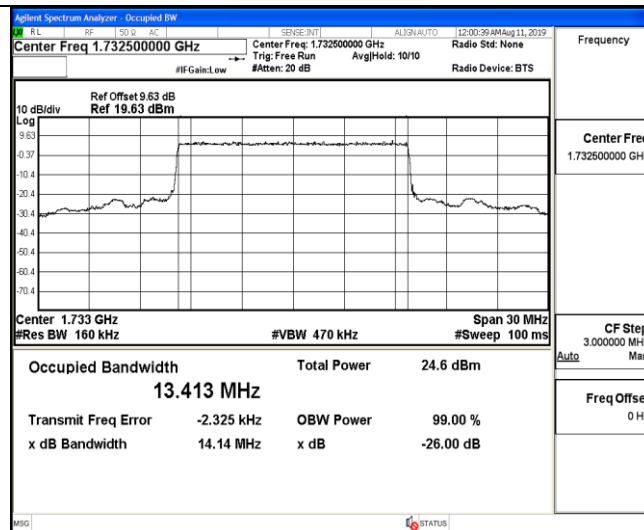
## 16QAM



## 75RB#0

## 75RB#0

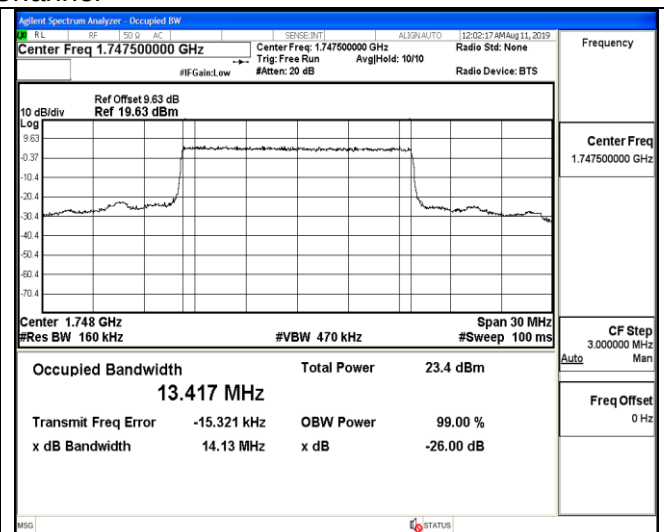
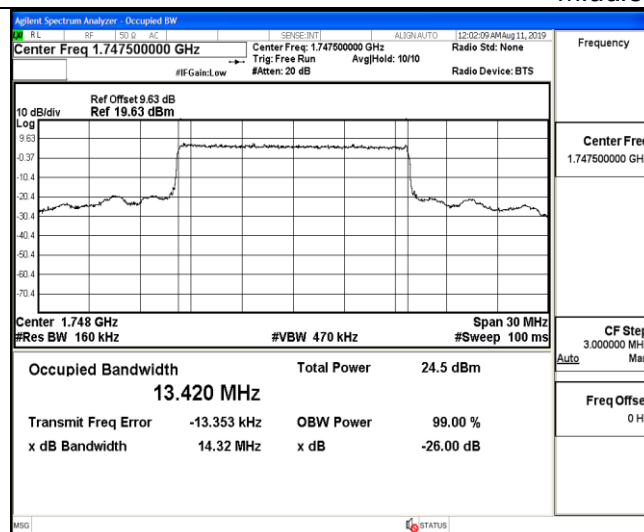
## Low Channel



## 75RB#0

## 75RB#0

## Middle Channel



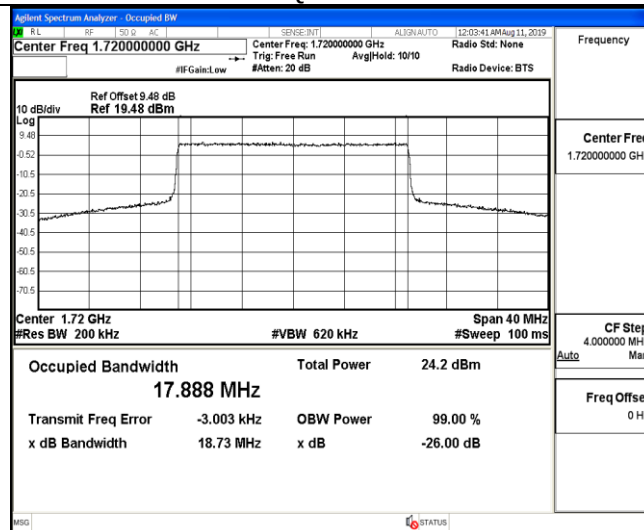
## 75RB#0

## 75RB#0

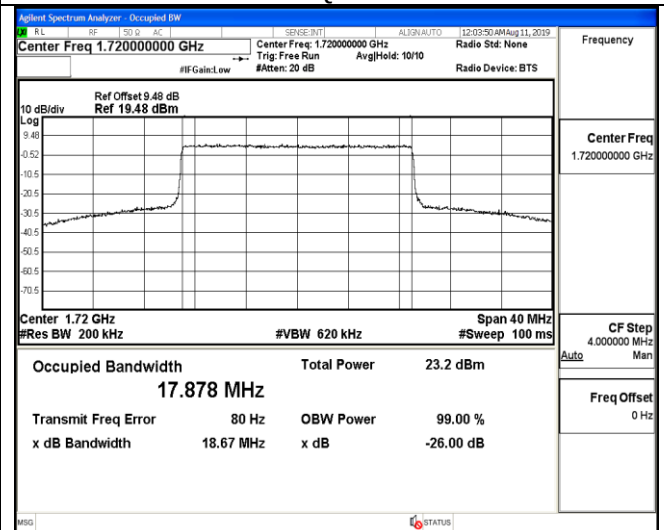
## High Channel

## LTE FDD Band 4-20MHz Channel Bandwidth

## QPSK



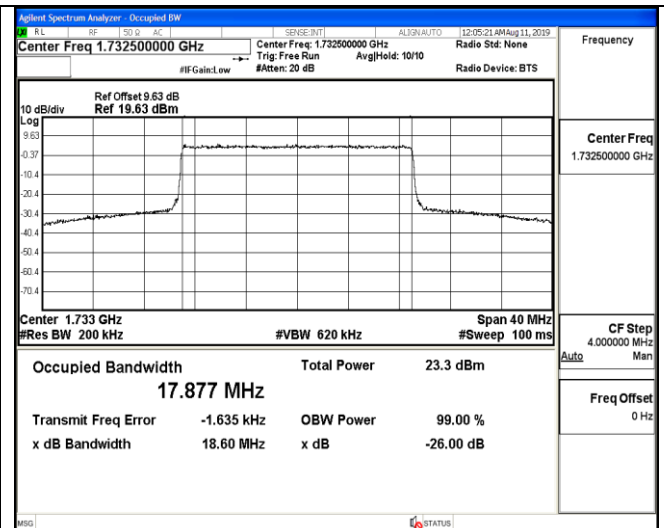
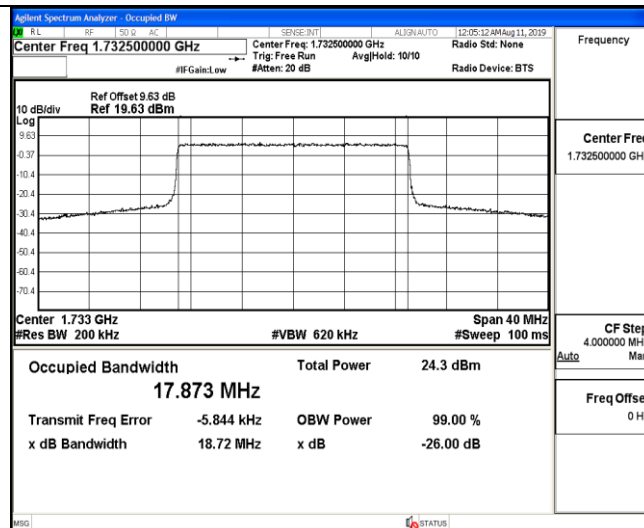
## 16QAM



## 100RB#0

## 100RB#0

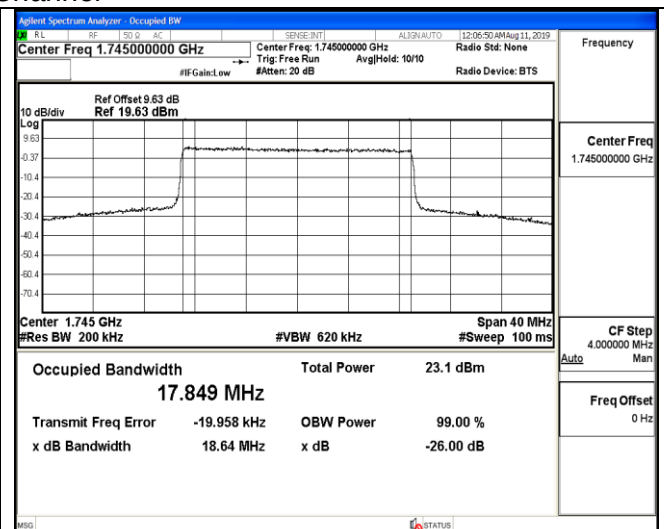
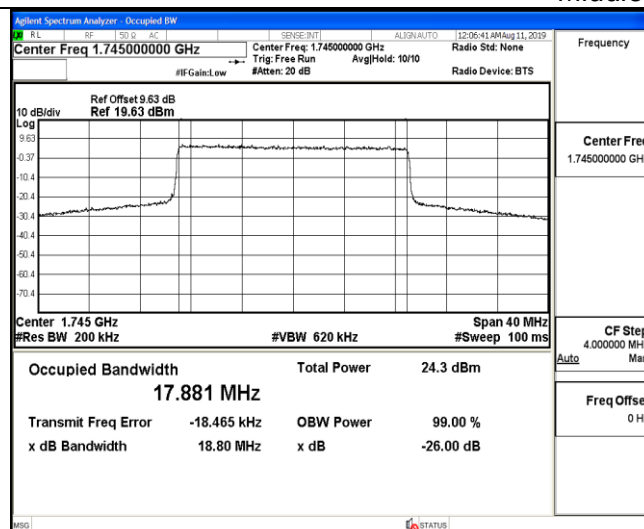
## Low Channel



## 100RB#0

## 100RB#0

## Middle Channel



## 100RB#0

## 100RB#0

## High Channel