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TEST REPORT

FCC Part 27

Report Reference No.: **CTL151214663-WF-02**

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Tracy Qi

Product Name: 4G LTE Router

Model/Type reference: TN500

List Model(s): /

Brand Name: PCD

FCC ID: 2AGP4-PCDTN500

Applicant's name: **Quality One Wireless, LLC**

Address of applicant: 1500 Tradeport Drive, Suite A, Orlando, FL. 32824, USA

Test Firm: **Shenzhen CTL Testing Technology Co., Ltd.**

Address of Test Firm: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

Test specification.....:

FCC CFR Title 47 Part 2, Part 27

Standard.....: **EIA/TIA 603-D: 2010**

KDB 971168 D01

TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF: Dated 2011-01

Date of Receipt: Dec. 24, 2015

Date of Test Date: Dec. 24, 2015–Jan. 05, 2016

Data of Issue: Jan. 06, 2016

Result: Positive

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TEST REPORT

| | | |
|--------------------------|---------------------------|---------------|
| Test Report No. : | CTL151214663-WF-02 | Jan. 06, 2016 |
| | | Date of issue |

Equipment under Test : 4G LTE Router

Model /Type : TN500

Listed Models : /

Applicant : **Quality One Wireless, LLC**

Address : 1500 Tradeport Drive, Suite A, Orlando, FL. 32824, USA

Manufacturer : **Asiatelco Technologies Co.**

Address : #289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China

| | |
|--------------------|---------------|
| Test result | Pass * |
|--------------------|---------------|

* In the configuration tested, the EUT complied with the standards specified page 5.

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.

**** Modified History ****

| Revisions | Description | Issued Data | Report No. | Remark |
|-------------|-----------------------------|-------------|--------------------|----------|
| Version 1.0 | Initial Test Report Release | 2016-01-06 | CTL151214663-WF-02 | Tracy Qi |
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1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:

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

[TIA/EIA 603 D June 2010](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

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

[KDB971168 D01: v02r02](#) MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

[ANSI C63.4:2014](#): Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

1.2 Test Description

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

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology 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. Registration 970318, December 19, 2013.

1.4 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 CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology 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 CTL laboratory is reported:

| Test | Range | Measurement Uncertainty | Notes |
|-----------------------|------------|-------------------------|-------|
| Radiated Emission | 30~1000MHz | 4.10dB | (1) |
| Radiated Emission | Above 1GHz | 4.32dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 3.20dB | (1) |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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: | 4G LTE Router |
| Model/Type reference: | TN500 |
| Power supply: | DC 3.7V from battery or DC 12V from adapter |
| Serial number: | Prototype |
| Adapter information: | Model:ASSA1A-120100 Input: 100-240V, 50/60Hz 0.45A Output:12V ---1.0A |
| WIFI | |
| Supported type: | 802.11b/802.11g/802.11n(H20)/802.11n(H40) |
| Modulation: | 802.11b: DSSS 802.11g/802.11n(H20)/802.11n(H40): OFDM |
| Operation frequency: | 802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11n(H40): 2422MHz~2452MHz |
| Channel number: | 802.11b/802.11g/802.11n(H20): 11 802.11n(H40): 7 |
| Channel separation: | 5MHz |
| Antenna type: | PCB Antenna : 2*TX 2*RX |
| Antenna gain: | 2.0dBi |
| LTE | |
| Operation Band: | FDD-LTE: Band 4 |
| Modulation Type: | QPSK, 16QAM |
| Release Version: | Release 9 |
| Category: | Cat 3 |
| Antenna Type: | External Omni-antenna: 1*TX 2*RX |
| Antenna gain: | 2.0dBi |

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

2.3 Description of Test Modes

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.

Note:

1. All tests performed with alternate AC power supply and DC power supply , recorded the worst case at AC mode except frequency stability test.
2. Test method and refer to 3GPP TS136521.

2.4 Equipments Used during the Test

| Test Equipment | Manufacturer | Model No. | Serial No. | Calibration Date | Calibration Due Date |
|-------------------------------------|----------------------|-----------------------|------------|------------------|----------------------|
| Bilog Antenna | Sunol Sciences Corp. | JB1 | A061713 | 2015/06/02 | 2016/06/01 |
| Bilog Antenna | Sunol Sciences Corp. | JB1 | A061714 | 2015/06/02 | 2016/06/01 |
| EMI Test Receiver | R&S | ESCI | 103710 | 2015/06/02 | 2016/06/01 |
| Spectrum Analyzer | Agilent | E4407B | MY41440676 | 2015/05/21 | 2016/05/20 |
| Spectrum Analyzer | Agilent | N9020 | US46220290 | 2015/11/11 | 2016/11/10 |
| Controller | EM Electronics | Controller EM 1000 | N/A | 2015/05/21 | 2016/05/20 |
| Horn Antenna | Sunol Sciences Corp. | DRH-118 | A062013 | 2015/05/19 | 2016/05/18 |
| Horn Antenna | Sunol Sciences Corp. | DRH-118 | A062014 | 2015/05/19 | 2016/05/18 |
| Active Loop Antenna | SCHWARZBEC K | FMZB1519 | 1519-037 | 2015/05/19 | 2016/05/18 |
| Amplifier | Agilent | 8349B | 3008A02306 | 2015/05/19 | 2016/05/18 |
| Amplifier | Agilent | 8447D | 2944A10176 | 2015/05/19 | 2016/05/18 |
| Temperature/Humidity Meter | Gangxing | CTH-608 | 02 | 2015/05/20 | 2016/05/19 |
| Radio Communication Tester | R&S | CMU200 | 115419 | 2015/05/22 | 2016/05/21 |
| Wideband Radio Communication Tester | R&S | CMW500 | 101814 | 2014/11/23 | 2015/11/22 |
| High-Pass Filter | K&L | 9SH10-2700/X12750-O/O | N/A | 2015/05/20 | 2016/05/19 |
| High-Pass Filter | K&L | 41H10-1375/U12750-O/O | N/A | 2015/05/20 | 2016/05/19 |
| Climate Chamber | ESPEC | EL-10KA | A20120523 | 2015/05/20 | 2016/05/19 |
| SIGNAL GENERATOR | Agilent | E4421B | US40051744 | 2015/05/20 | 2016/05/19 |
| Directional Coupler | Agilent | 87300B | 3116A03638 | 2015/05/20 | 2016/05/19 |
| Coaxial Cables | HUBER+SUHNER | SUCOFLEX 104PEA-10M | 10m | 2015/06/02 | 2016/06/01 |
| Coaxial Cables | HUBER+SUHNER | SUCOFLEX 104PEA-3M | 3m | 2015/06/02 | 2016/06/01 |
| Coaxial Cables | HUBER+SUHNER | SUCOFLEX 104PEA-3M | 3m | 2015/06/02 | 2016/06/01 |
| RF Cable | Megalon | RF-A303 | N/A | 2015/06/02 | 2016/06/01 |

2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID:2AGP4-PCDTN500 filing comply with of the FCC Part 27 Rules.

2.6 Modifications

No modifications were implemented to meet testing criteria.

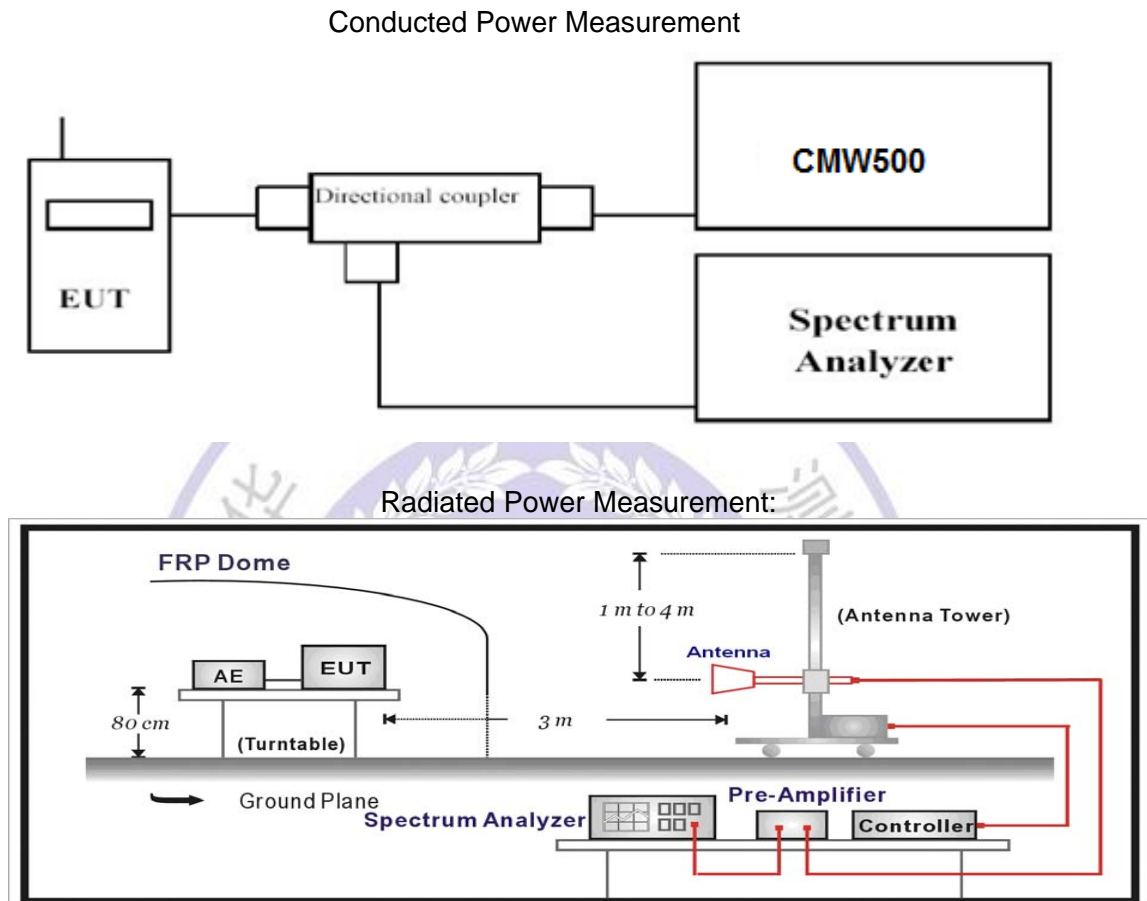
3 TEST CONDITIONS AND RESULTS

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 select 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: 2014.

TEST RESULTS

Conducted Measurement:

| LTE FDD Band 4 | | | | |
|----------------------|----------------|-----------------|---------------------|-------|
| TX Channel Bandwidth | RB Size/Offset | Frequency (MHz) | Average Power [dBm] | |
| | | | QPSK | 16QAM |
| 1.4 MHz | 1 RB low | 1710.7 | 23.58 | 22.76 |
| | | 1732.5 | 23.71 | 23.09 |
| | | 1754.3 | 23.59 | 23.23 |
| | 1 RB high | 1710.7 | 23.57 | 22.78 |
| | | 1732.5 | 23.81 | 23.06 |
| | | 1754.3 | 23.53 | 23.18 |
| | 50% RB mid | 1710.7 | 23.68 | 22.67 |
| | | 1732.5 | 23.75 | 22.90 |
| | | 1754.3 | 24.02 | 22.91 |
| | 100% RB | 1710.7 | 22.51 | 21.56 |
| | | 1732.5 | 22.92 | 21.98 |
| | | 1754.3 | 22.81 | 21.69 |
| 3 MHz | 1 RB low | 1711.5 | 23.51 | 22.98 |
| | | 1732.5 | 23.75 | 23.17 |
| | | 1753.5 | 23.66 | 23.38 |
| | 1 RB high | 1711.5 | 23.58 | 22.79 |
| | | 1732.5 | 23.88 | 23.34 |
| | | 1753.5 | 23.62 | 23.44 |
| | 50% RB mid | 1711.5 | 22.73 | 21.79 |
| | | 1732.5 | 22.84 | 22.01 |
| | | 1753.5 | 23.62 | 21.74 |
| | 100% RB | 1711.5 | 22.67 | 21.71 |
| | | 1732.5 | 22.88 | 21.96 |
| | | 1753.5 | 23.18 | 21.97 |
| 5 MHz | 1 RB low | 1712.5 | 23.64 | 23.42 |
| | | 1732.5 | 23.81 | 23.22 |
| | | 1752.5 | 23.88 | 23.24 |
| | 1 RB high | 1712.5 | 23.51 | 23.49 |
| | | 1732.5 | 24.04 | 23.27 |
| | | 1752.5 | 23.82 | 23.40 |

| | | | | |
|--------|------------|--------|-------|-------|
| | 50% RB mid | 1712.5 | 22.85 | 21.82 |
| | | 1732.5 | 22.90 | 22.08 |
| | | 1752.5 | 23.11 | 22.08 |
| | 100% RB | 1712.5 | 22.77 | 21.76 |
| | | 1732.5 | 22.86 | 21.99 |
| | | 1752.5 | 23.07 | 21.81 |
| 10 MHz | 1 RB low | 1715.0 | 23.89 | 23.29 |
| | | 1732.5 | 23.81 | 23.17 |
| | | 1750.0 | 23.79 | 23.11 |
| | 1 RB high | 1715.0 | 23.72 | 23.09 |
| | | 1732.5 | 23.96 | 23.46 |
| | | 1750.0 | 23.63 | 23.13 |
| | 50% RB mid | 1715.0 | 22.86 | 21.70 |
| | | 1732.5 | 23.02 | 22.06 |
| | | 1750.0 | 23.04 | 21.89 |
| | 100% RB | 1715.0 | 22.89 | 21.84 |
| | | 1732.5 | 22.73 | 21.82 |
| | | 1750.0 | 22.99 | 21.83 |
| 15 MHz | 1 RB low | 1717.5 | 23.88 | 23.11 |
| | | 1732.5 | 23.75 | 23.17 |
| | | 1747.5 | 23.97 | 23.42 |
| | 1 RB high | 1717.5 | 23.55 | 23.08 |
| | | 1732.5 | 23.89 | 23.32 |
| | | 1747.5 | 23.91 | 23.33 |
| | 50% RB mid | 1717.5 | 22.75 | 21.90 |
| | | 1732.5 | 23.09 | 22.15 |
| | | 1747.5 | 23.25 | 21.89 |
| | 100% RB | 1717.5 | 22.96 | 22.02 |
| | | 1732.5 | 22.85 | 21.97 |
| | | 1747.5 | 23.14 | 22.07 |
| 20 MHz | 1 RB low | 1720.0 | 24.13 | 23.16 |
| | | 1732.5 | 23.89 | 23.13 |
| | | 1745.0 | 24.12 | 23.33 |
| | 1 RB high | 1720.0 | 23.97 | 23.21 |
| | | 1732.5 | 24.34 | 23.45 |
| | | 1745.0 | 24.01 | 23.32 |
| | 50% RB mid | 1720.0 | 22.85 | 21.87 |
| | | 1732.5 | 23.18 | 22.13 |
| | | 1745.0 | 23.23 | 21.87 |
| | 100% RB | 1720.0 | 22.74 | 21.77 |
| | | 1732.5 | 22.81 | 21.82 |
| | | 1745.0 | 23.13 | 21.95 |

Radiated Measurement:

Remark:

1. We were tested all RB and RB offset Configuration according to 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4, the worst case for each Channel Bandwidth of LTE FDD Band 4 were reported.
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 _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1710.7 | -18.87 | 3.06 | 9.68 | 34.80 | 22.55 | 30.00 | 7.45 | V |
| 1732.5 | -18.57 | 3.17 | 9.68 | 34.80 | 22.74 | 30.00 | 7.26 | V |
| 1754.3 | -18.09 | 3.22 | 9.75 | 34.80 | 23.24 | 30.00 | 6.76 | V |

LTE FDD Band 4_Channel Bandwidth 3MHz_QPSK

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1711.5 | -18.87 | 3.06 | 9.68 | 34.80 | 22.55 | 30.00 | 7.45 | V |
| 1732.5 | -17.90 | 3.17 | 9.68 | 34.80 | 23.41 | 30.00 | 6.59 | V |
| 1753.5 | -17.49 | 3.22 | 9.75 | 34.80 | 23.84 | 30.00 | 6.16 | V |

LTE FDD Band 4_Channel Bandwidth 5MHz_QPSK

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1712.5 | -18.17 | 3.06 | 9.68 | 34.80 | 23.25 | 30.00 | 6.75 | V |
| 1732.5 | -18.44 | 3.17 | 9.68 | 34.80 | 22.87 | 30.00 | 7.13 | V |
| 1752.5 | -17.79 | 3.22 | 9.75 | 34.80 | 23.54 | 30.00 | 6.46 | V |

LTE FDD Band 4_Channel Bandwidth 10MHz_QPSK

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1715.0 | -18.88 | 3.06 | 9.68 | 34.80 | 22.54 | 30.00 | 7.46 | V |
| 1732.5 | -18.19 | 3.17 | 9.68 | 34.80 | 23.12 | 30.00 | 6.88 | V |
| 1750.0 | -17.32 | 3.22 | 9.75 | 34.80 | 24.01 | 30.00 | 5.99 | V |

LTE FDD Band 4_Channel Bandwidth 15MHz_QPSK

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1717.5 | -19.27 | 3.06 | 9.68 | 34.80 | 22.15 | 30.00 | 7.85 | V |
| 1732.5 | -17.46 | 3.17 | 9.68 | 34.80 | 23.85 | 30.00 | 6.15 | V |
| 1747.5 | -18.81 | 3.22 | 9.75 | 34.80 | 22.52 | 30.00 | 7.48 | V |

LTE FDD Band 4_Channel Bandwidth 20MHz_QPSK

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1720.0 | -18.31 | 3.06 | 9.68 | 34.80 | 23.11 | 30.00 | 6.89 | V |
| 1732.5 | -18.33 | 3.17 | 9.68 | 34.80 | 22.98 | 30.00 | 7.02 | V |
| 1745.0 | -17.92 | 3.22 | 9.75 | 34.80 | 23.41 | 30.00 | 6.59 | V |

LTE FDD Band 4_Channel Bandwidth 1.4MHz_16QAM

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1710.7 | -19.55 | 3.06 | 9.68 | 34.80 | 21.87 | 30.00 | 8.13 | V |
| 1732.5 | -18.09 | 3.17 | 9.68 | 34.80 | 23.22 | 30.00 | 6.78 | V |
| 1754.3 | -18.08 | 3.22 | 9.75 | 34.80 | 23.25 | 30.00 | 6.75 | V |

LTE FDD Band 4_Channel Bandwidth 3MHz_16QAM

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1711.5 | -19.20 | 3.06 | 9.68 | 34.80 | 22.22 | 30.00 | 7.78 | V |
| 1732.5 | -18.57 | 3.17 | 9.68 | 34.80 | 22.74 | 30.00 | 7.26 | V |
| 1753.5 | -18.68 | 3.22 | 9.75 | 34.80 | 22.65 | 30.00 | 7.35 | V |

LTE FDD Band 4_Channel Bandwidth 5MHz_16QAM

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1712.5 | -18.74 | 3.06 | 9.68 | 34.80 | 22.68 | 30.00 | 7.32 | V |
| 1732.5 | -17.90 | 3.17 | 9.68 | 34.80 | 23.41 | 30.00 | 6.59 | V |
| 1752.5 | -17.67 | 3.22 | 9.75 | 34.80 | 23.66 | 30.00 | 6.34 | V |

LTE FDD Band 4_Channel Bandwidth 10MHz_16QAM

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1715.0 | -18.57 | 3.06 | 9.68 | 34.80 | 22.85 | 30.00 | 7.15 | V |
| 1732.5 | -17.84 | 3.17 | 9.68 | 34.80 | 23.47 | 30.00 | 6.53 | V |
| 1750.0 | -16.97 | 3.22 | 9.75 | 34.80 | 24.36 | 30.00 | 5.64 | V |

LTE FDD Band 4_Channel Bandwidth 15MHz_16QAM

| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1717.5 | -17.90 | 3.06 | 9.68 | 34.80 | 23.52 | 30.00 | 6.48 | V |
| 1732.5 | -18.05 | 3.17 | 9.68 | 34.80 | 23.26 | 30.00 | 6.74 | V |
| 1747.5 | -16.92 | 3.22 | 9.75 | 34.80 | 24.41 | 30.00 | 5.59 | V |

LTE FDD Band 4_Channel Bandwidth 20MHz_16QAM

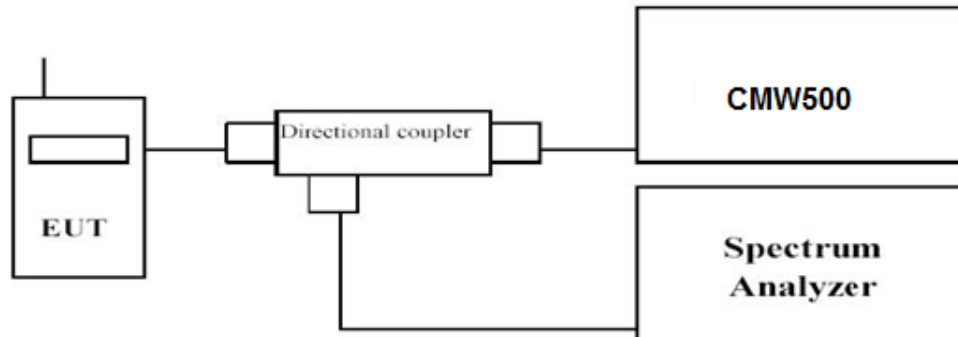
| Frequency (MHz) | P _{Mea} (dBm) | P _{cl} (dB) | G _a Antenna Gain(dB) | P _{Ag} (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 1720.0 | -19.01 | 3.06 | 9.68 | 34.80 | 22.41 | 30.00 | 7.59 | V |
| 1732.5 | -17.46 | 3.17 | 9.68 | 34.80 | 23.85 | 30.00 | 6.15 | V |
| 1745.0 | -16.77 | 3.22 | 9.75 | 34.80 | 24.56 | 30.00 | 5.44 | V |

3.3 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

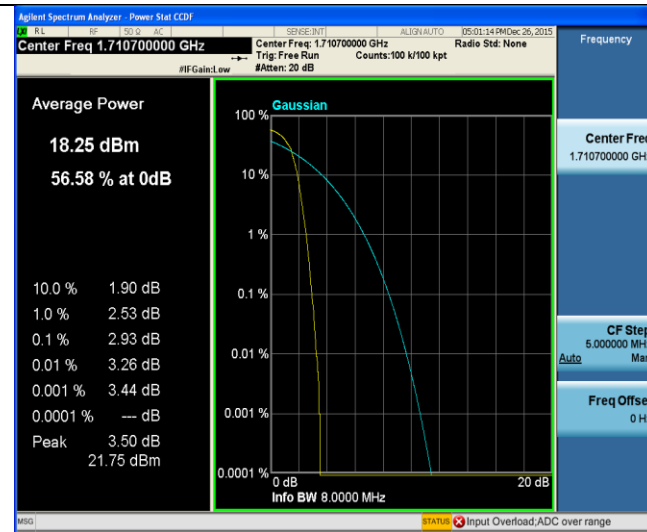
Remark:

1. We were tested all RB and RB offset Configuration according to 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4, the worst case for each Channel Bandwidth of LTE FDD Band 4 were reported.

| LTE FDD Band 4 | | | | |
|----------------------|-----------------|----------------|-----------|-------|
| TX Channel Bandwidth | Frequency (MHz) | RB Size/Offset | PAPR (dB) | |
| | | | QPSK | 16QAM |
| 1.4 MHz | 1710.7 | 100% RB/#0 | 2.92 | 3.74 |
| | 1732.5 | | 3.90 | 4.93 |
| | 1754.3 | | 3.14 | 4.13 |
| 3 MHz | 1711.5 | 100% RB/#0 | 4.31 | 5.34 |
| | 1732.5 | | 3.52 | 4.26 |
| | 1753.5 | | 3.33 | 4.06 |
| 5 MHz | 1712.5 | 100% RB/#0 | 2.42 | 2.70 |
| | 1732.5 | | 2.32 | 2.07 |
| | 1752.5 | | 2.49 | 3.06 |
| 10 MHz | 1715.0 | 100% RB/#0 | 4.10 | 5.17 |
| | 1732.5 | | 1.88 | 2.94 |
| | 1750.0 | | 3.46 | 4.40 |
| 15 MHz | 1717.5 | 100% RB/#0 | 3.74 | 4.77 |
| | 1732.5 | | 2.80 | 3.92 |
| | 1747.5 | | 3.49 | 4.40 |
| 20 MHz | 1720.0 | 100% RB/#0 | 3.39 | 4.53 |
| | 1732.5 | | 2.38 | 3.50 |
| | 1745.0 | | 3.71 | 4.53 |

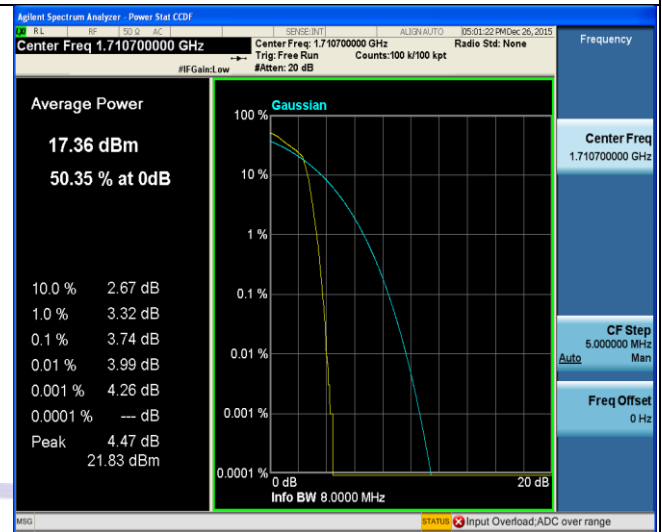
LTE FDD Band 4-1.4MHz Channel Bandwidth PAPR

QPSK



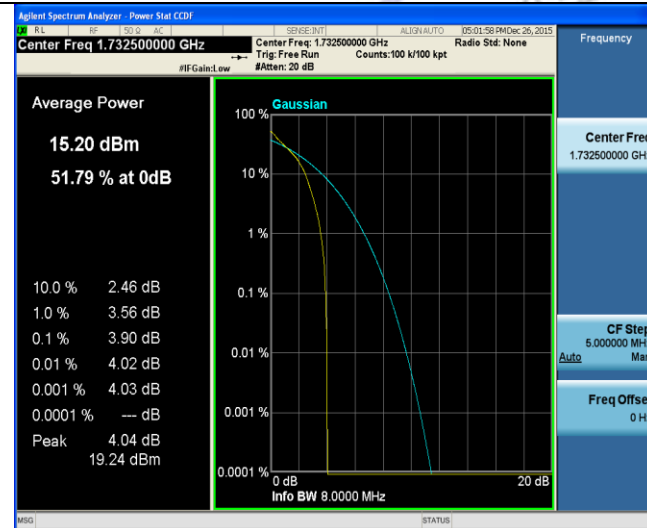
100% RB/#0

16QAM



100% RB/#0

Low Channel

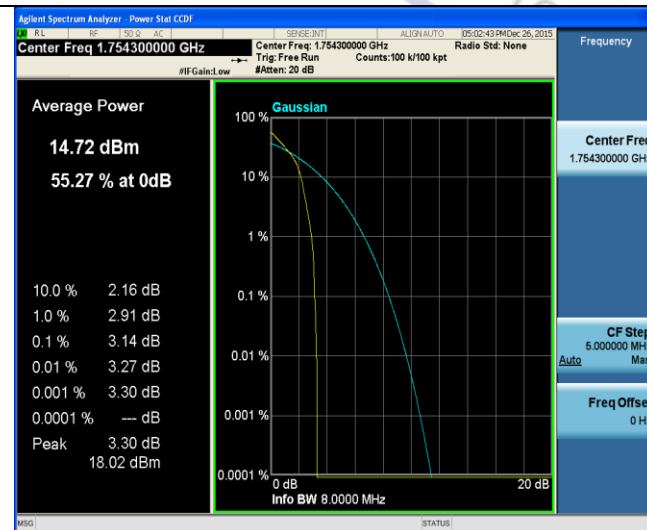


100% RB/#0

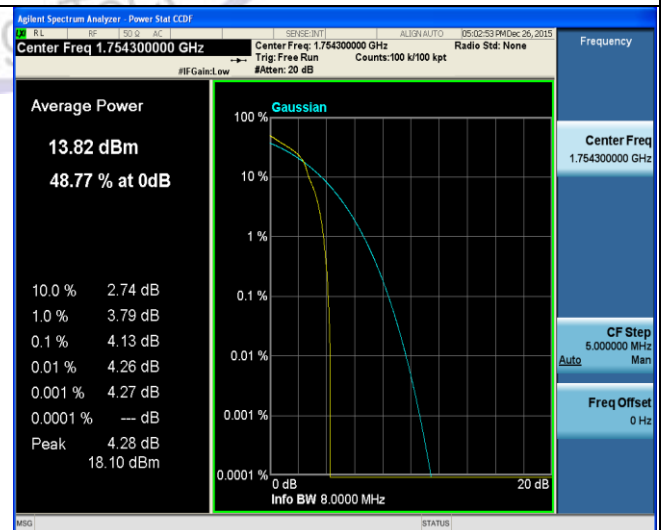


100% RB/#0

Middle Channel



100% RB/#0

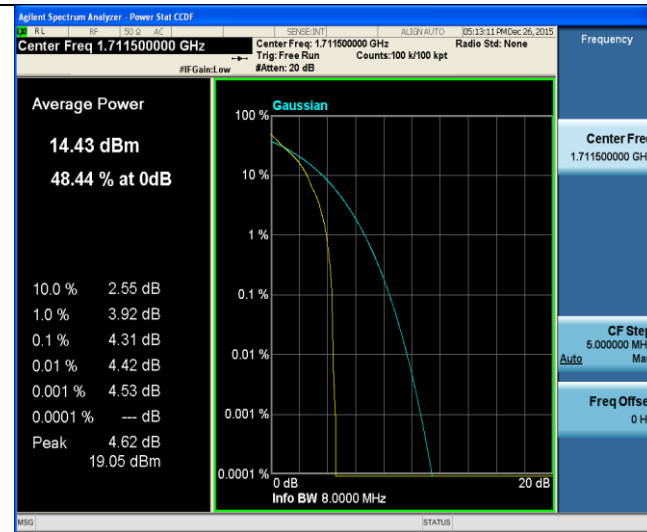


100% RB/#0

High Channel

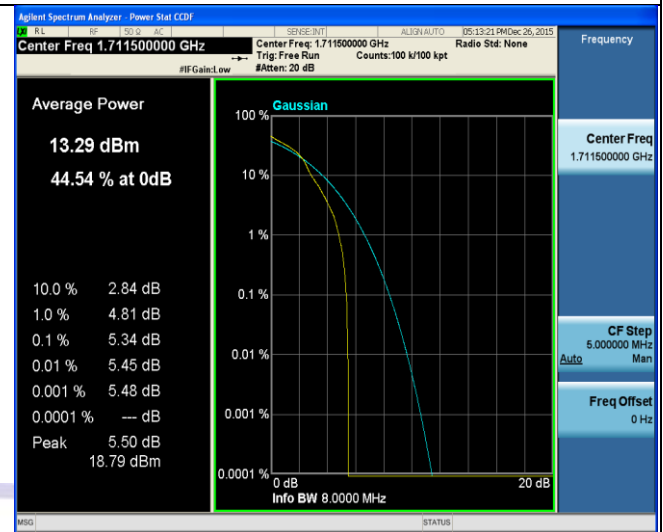
LTE FDD Band 4-3MHz Channel Bandwidth PAPR

QPSK



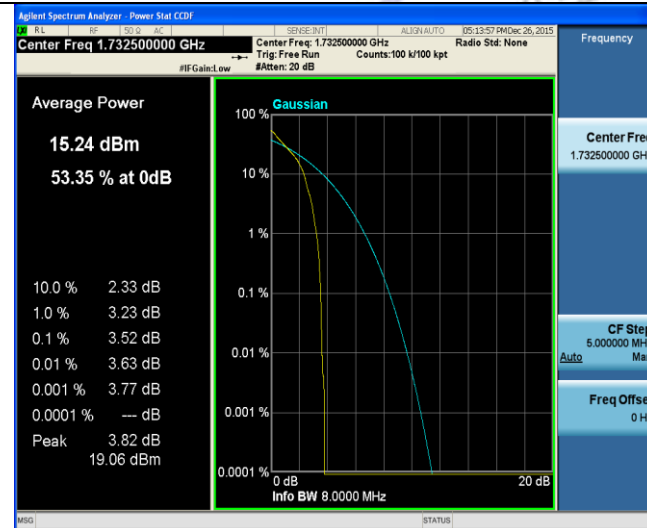
100% RB/#0

16QAM

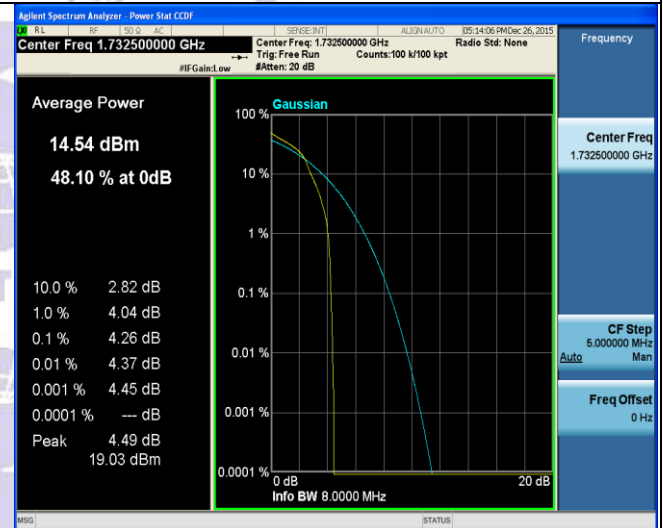


100% RB/#0

Low Channel

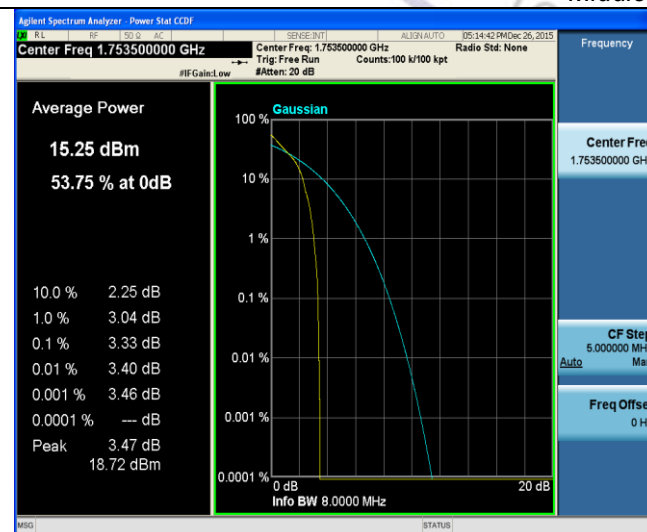


100% RB/#0

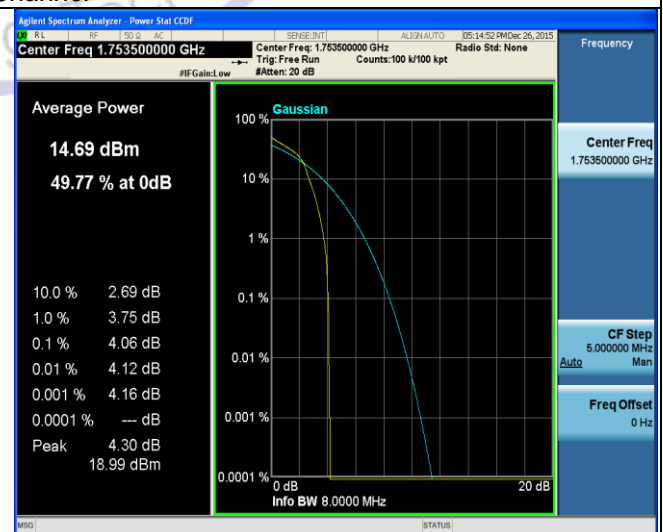


100% RB/#0

Middle Channel



100% RB/#0

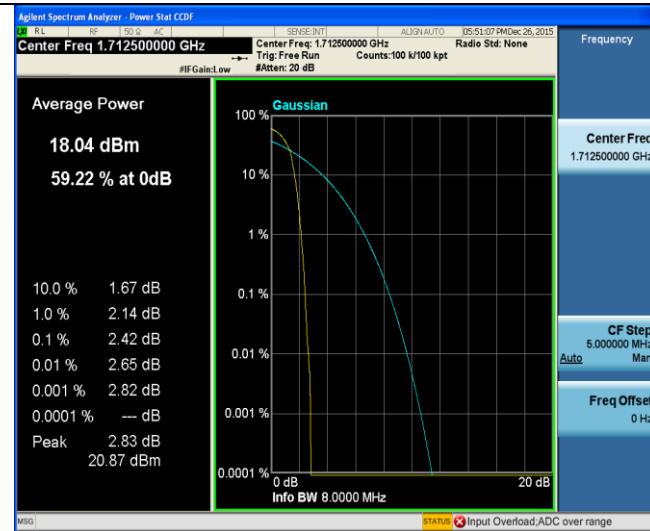


100% RB/#0

High Channel

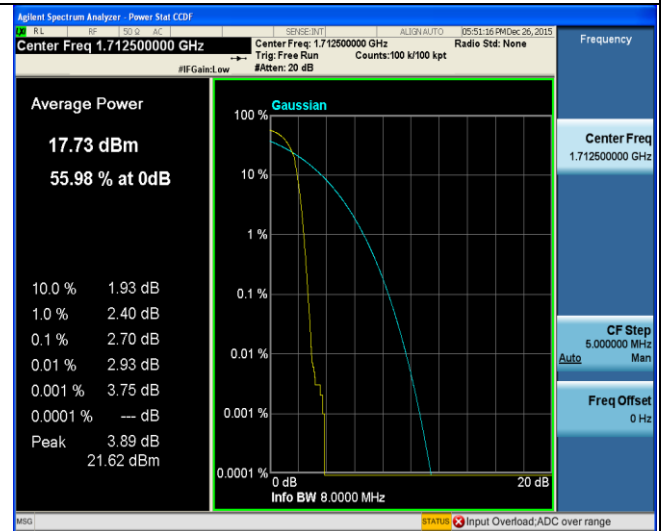
LTE FDD Band 4-5MHz Channel Bandwidth PAPR

QPSK



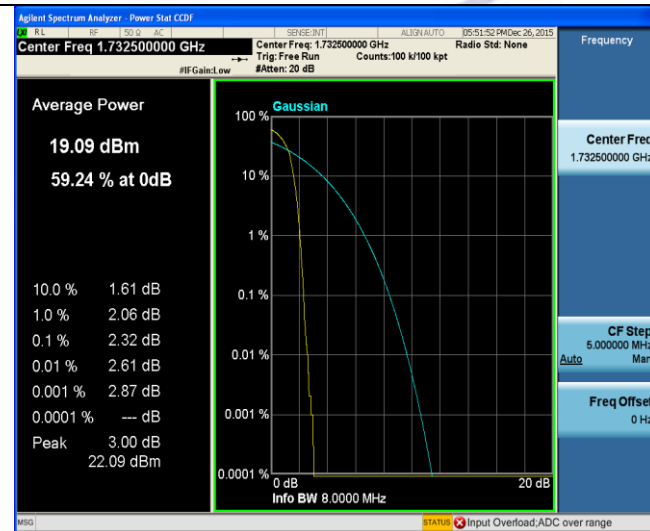
100% RB/#0

16QAM

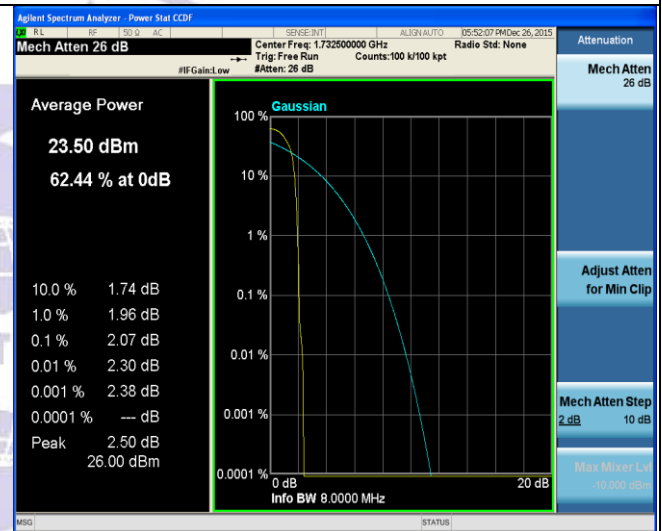


100% RB/#0

Low Channel

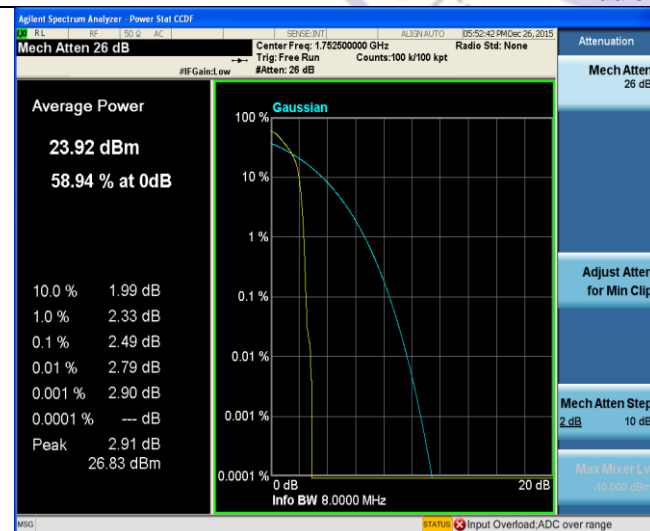


100% RB/#0

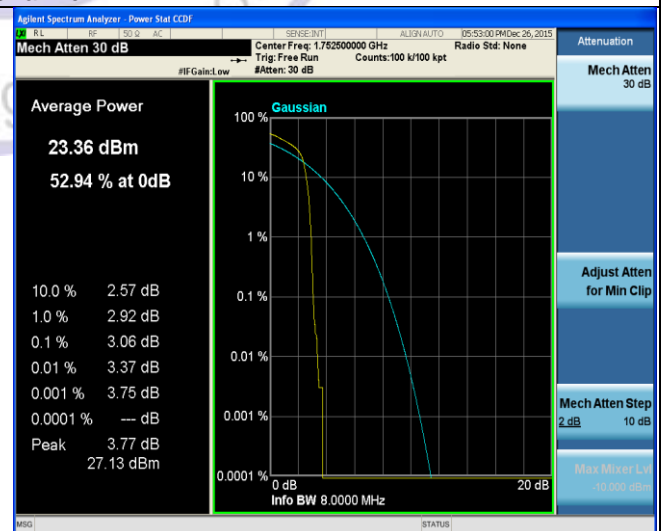


100% RB/#0

Middle Channel



100% RB/#0

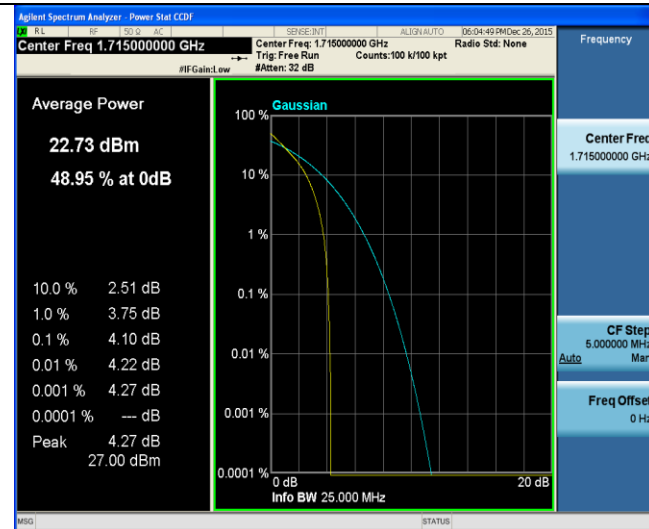


100% RB/#0

High Channel

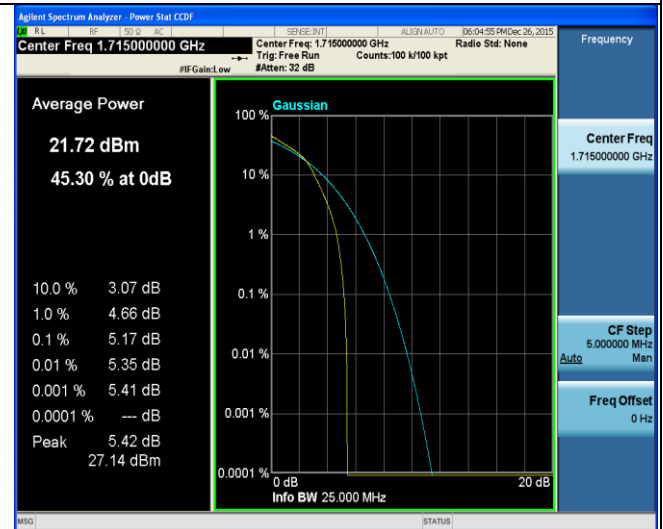
LTE FDD Band 4-10MHz Channel Bandwidth PAPR

QPSK



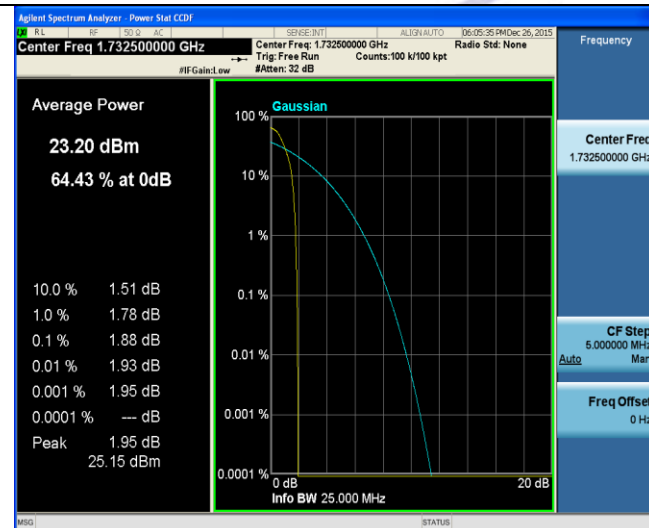
100% RB/#0

16QAM

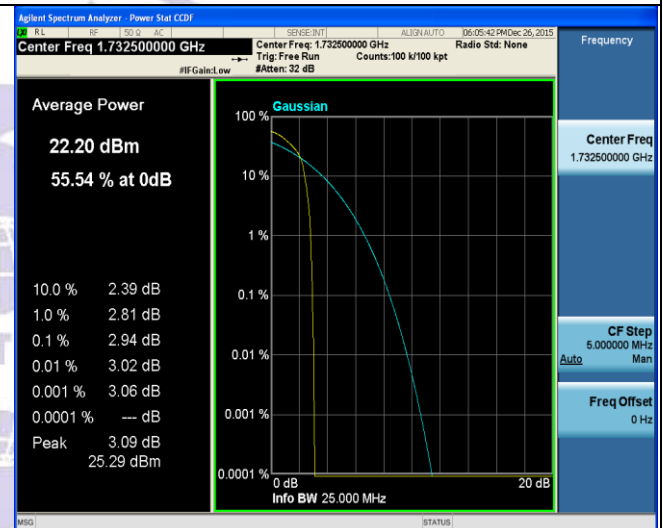


100% RB/#0

Low Channel

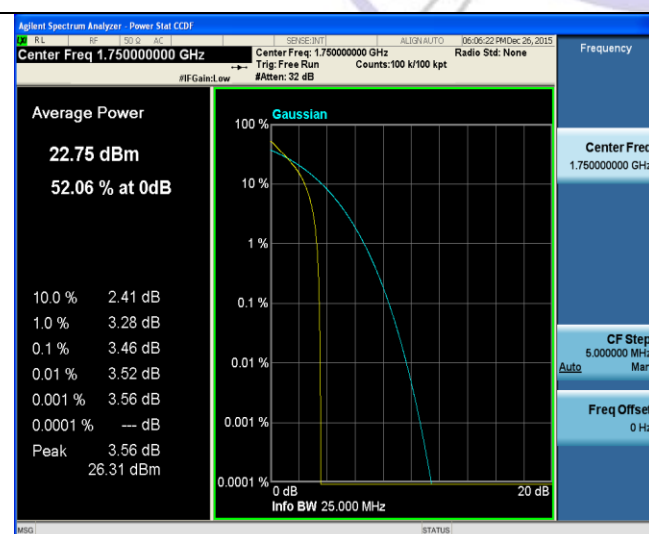


100% RB/#0

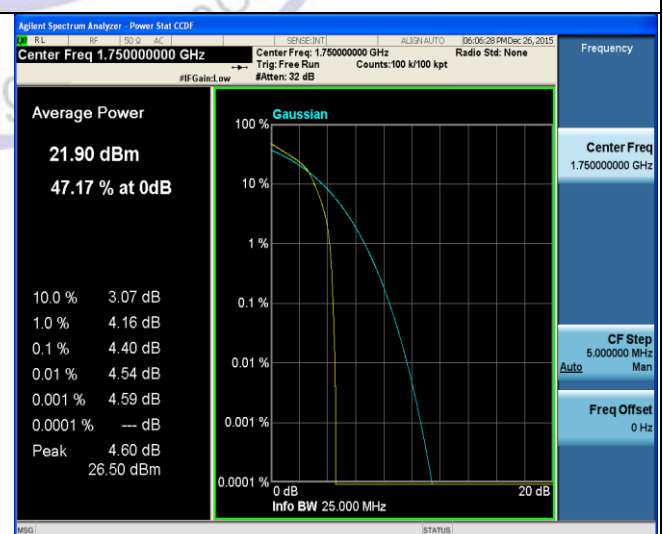


100% RB/#0

Middle Channel



100% RB/#0

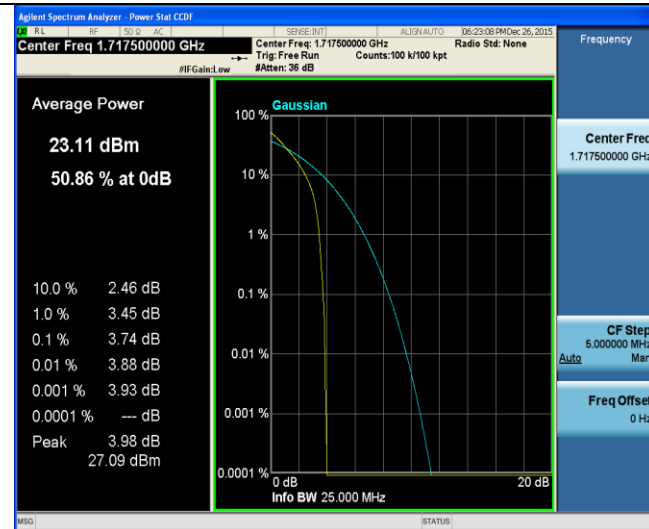


100% RB/#0

High Channel

LTE FDD Band 4-15MHz Channel Bandwidth PAPR

QPSK



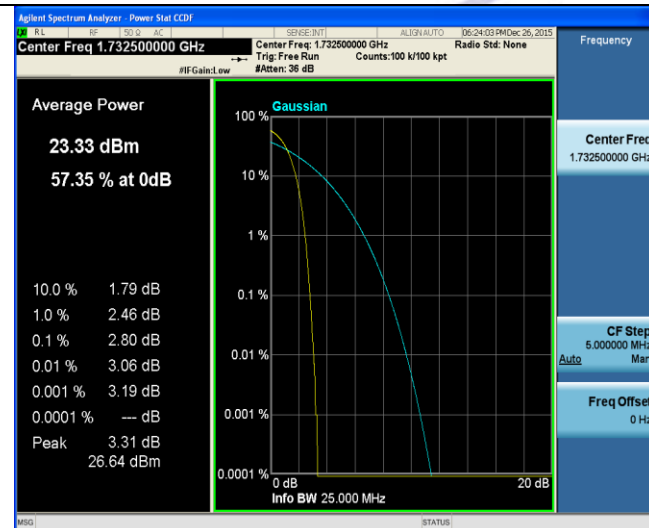
100% RB/#0

16QAM

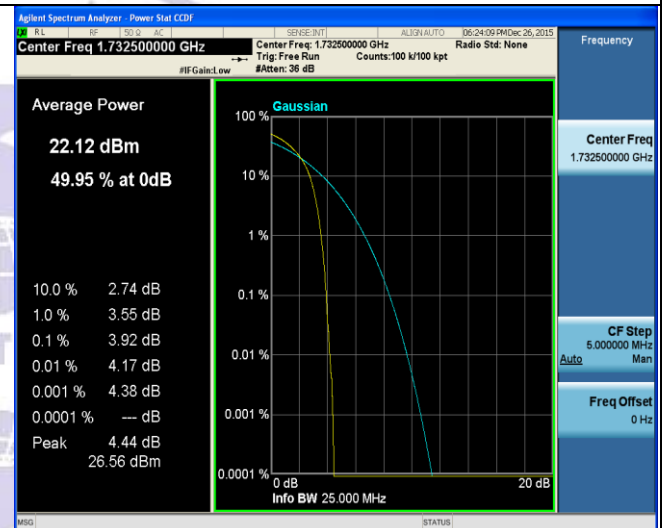


100% RB/#0

Low Channel

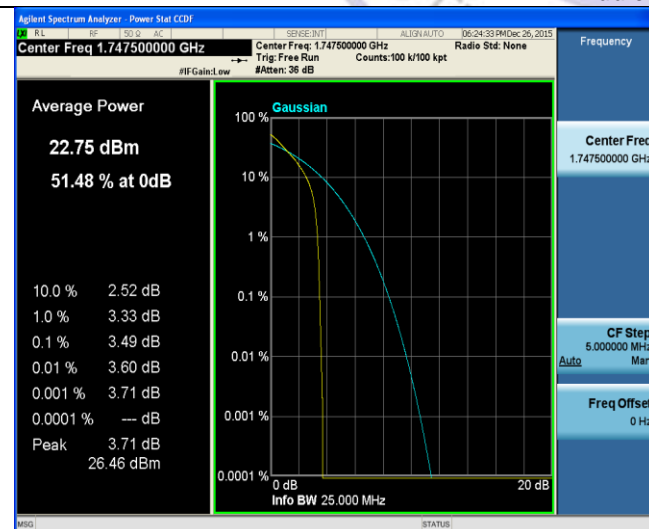


100% RB/#0

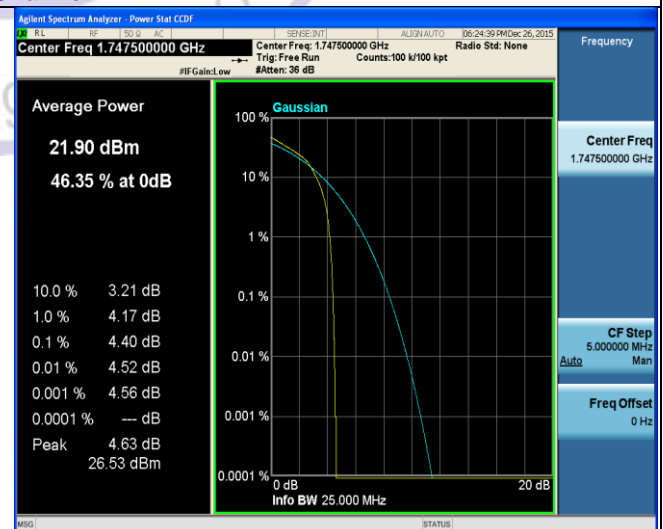


100% RB/#0

Middle Channel



100% RB/#0

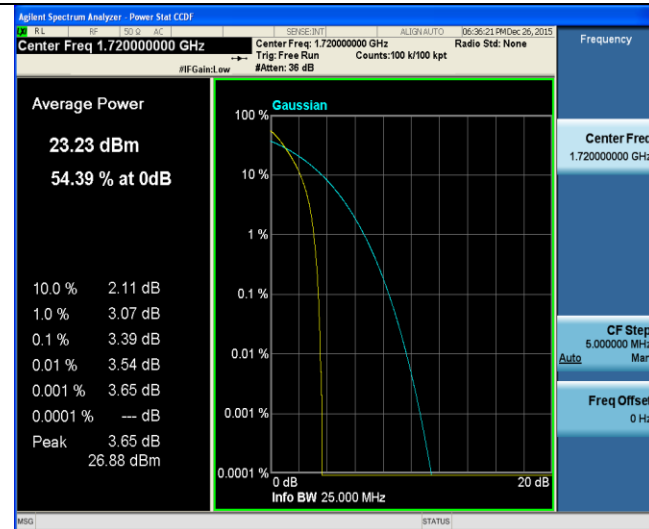


100% RB/#0

High Channel

LTE FDD Band 4-20MHz Channel Bandwidth PAPR

QPSK



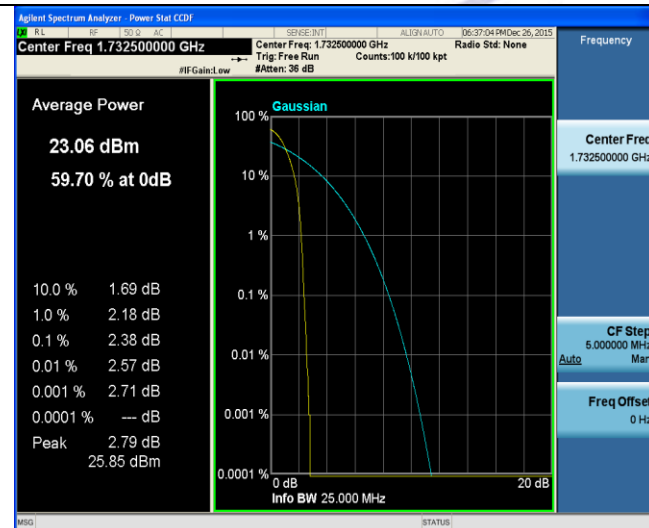
100% RB/#0

16QAM

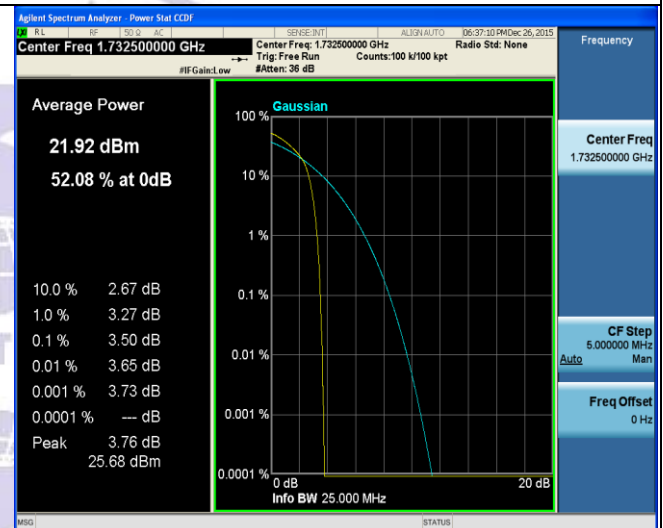


100% RB/#0

Low Channel

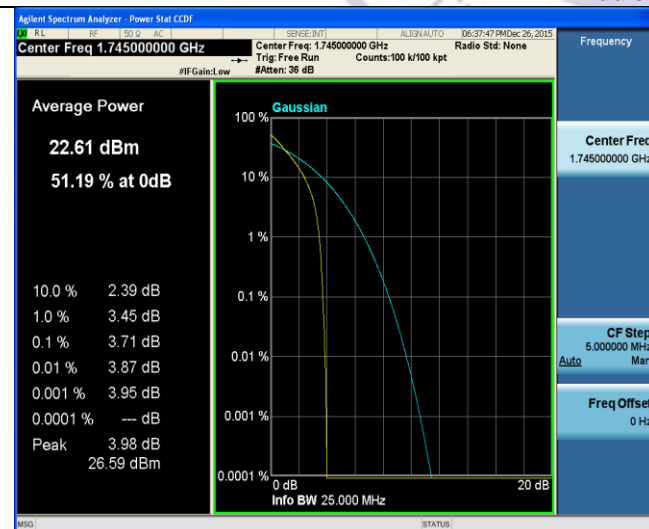


100% RB/#0

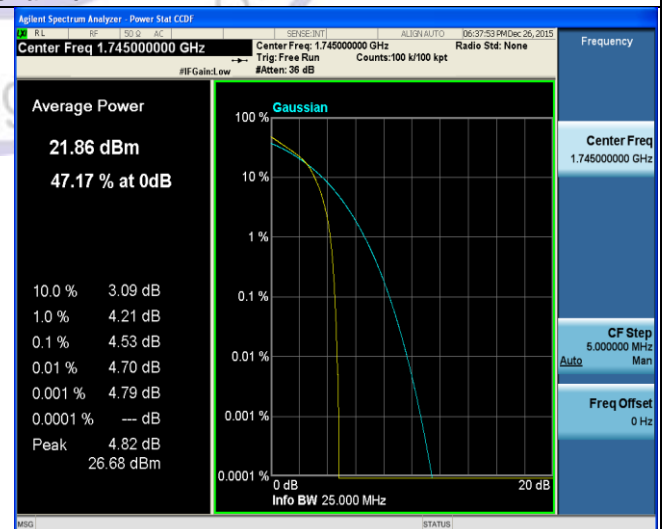


100% RB/#0

Middle Channel



100% RB/#0



100% RB/#0

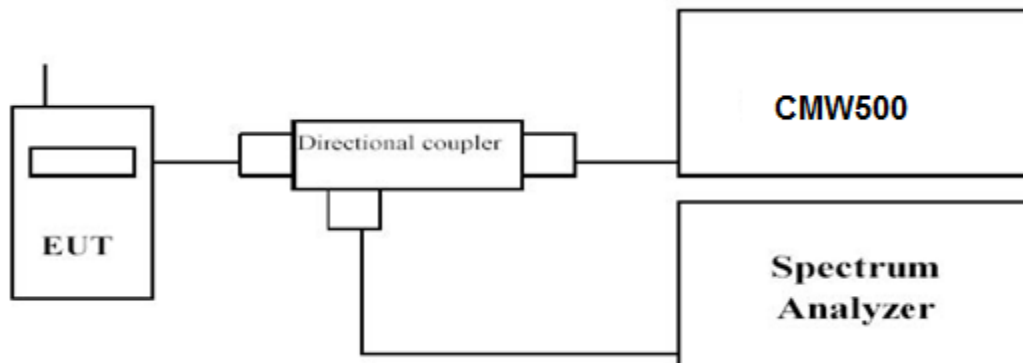
High Channel

3.4 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

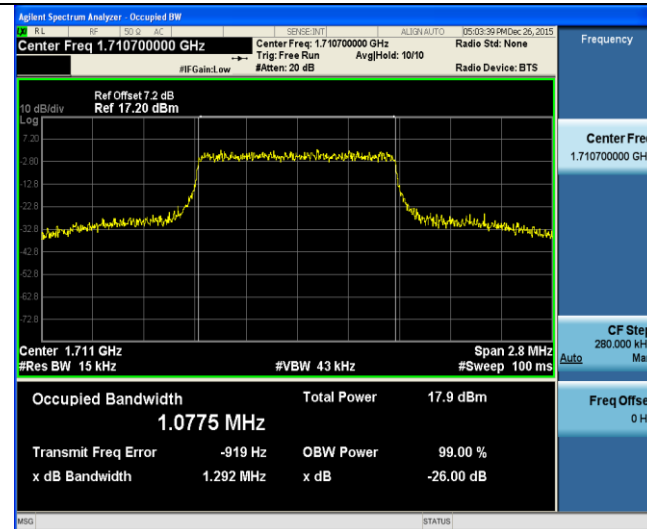
Remark:

1. We were tested all RB and RB offset Configuration according to 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4, the worst case for each Channel Bandwidth of LTE FDD Band 4 were reported.

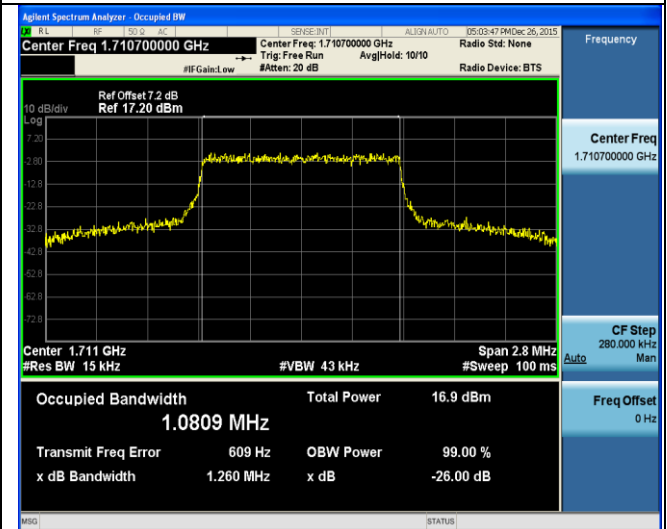
| LTE FDD Band 4 | | | | | | |
|----------------------|----------------|-----------------|---------------------------------|-------|------------------------------|--------|
| TX Channel Bandwidth | RB Size/Offset | Frequency (MHz) | -26dBc Emission bandwidth (MHz) | | 99% Occupied bandwidth (MHz) | |
| | | | QPSK | 16QAM | QPSK | 16QAM |
| 1.4 MHz | 6RB#0 | 1710.7 | 1.292 | 1.260 | 1.0775 | 1.0809 |
| | | 1732.5 | 2.062 | 1.718 | 1.0918 | 1.0899 |
| | | 1754.3 | 1.224 | 1.241 | 1.0790 | 1.0813 |
| 3 MHz | 15RB#0 | 1711.5 | 2.997 | 3.624 | 2.6883 | 2.6914 |
| | | 1732.5 | 3.674 | 3.244 | 2.6942 | 2.6867 |
| | | 1753.5 | 4.425 | 4.173 | 2.6941 | 2.6994 |
| 5 MHz | 25RB#0 | 1712.5 | 4.786 | 4.785 | 4.4773 | 4.4847 |
| | | 1732.5 | 7.489 | 5.931 | 4.5078 | 4.4873 |
| | | 1752.5 | 5.636 | 6.030 | 4.4899 | 4.4920 |
| 10 MHz | 50RB#0 | 1715.0 | 9.421 | 9.596 | 8.9437 | 8.9558 |
| | | 1732.5 | 15.54 | 13.13 | 9.0087 | 8.9646 |
| | | 1750.0 | 10.02 | 11.05 | 8.9512 | 8.9587 |
| 15 MHz | 75RB#0 | 1717.5 | 14.02 | 14.01 | 13.417 | 13.443 |
| | | 1732.5 | 24.41 | 17.69 | 13.513 | 13.464 |
| | | 1747.5 | 19.55 | 17.49 | 13.472 | 13.466 |
| 20 MHz | 100RB#0 | 1720.0 | 18.66 | 18.60 | 17.832 | 17.872 |
| | | 1732.5 | 23.34 | 20.11 | 17.866 | 17.851 |
| | | 1745.0 | 20.25 | 20.06 | 17.915 | 17.927 |

LTE FDD Band 4-1.4MHz Channel Bandwidth

QPSK



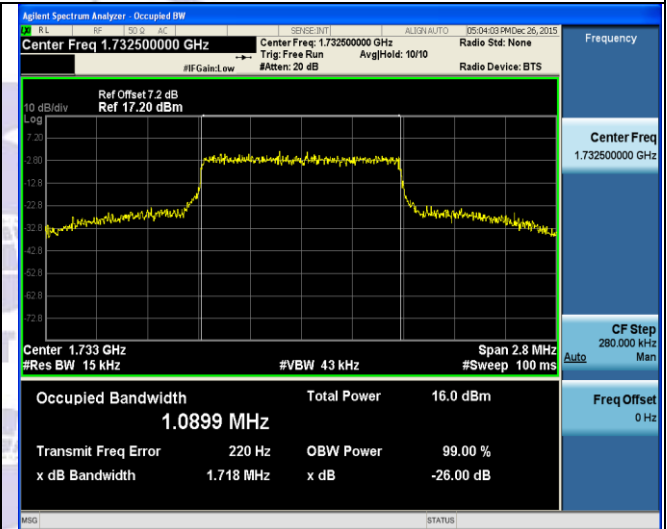
16QAM



6RB#0

6RB#0

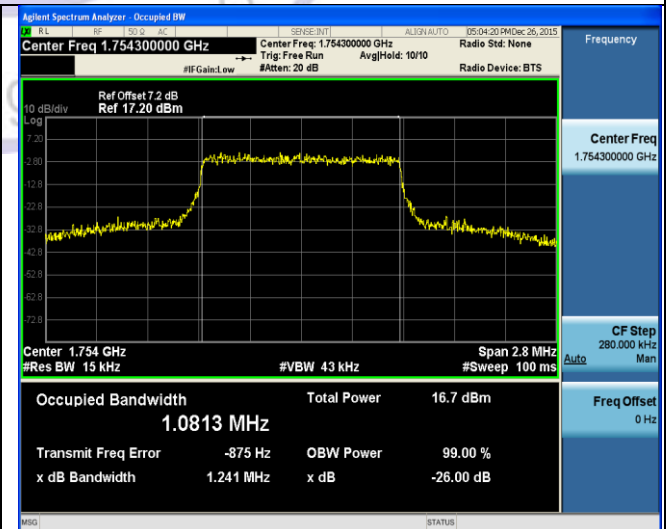
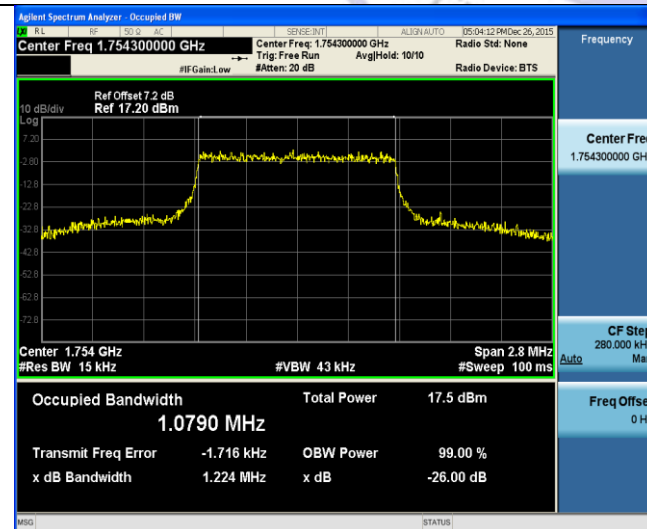
Low Channel



6RB#0

6RB#0

Middle Channel



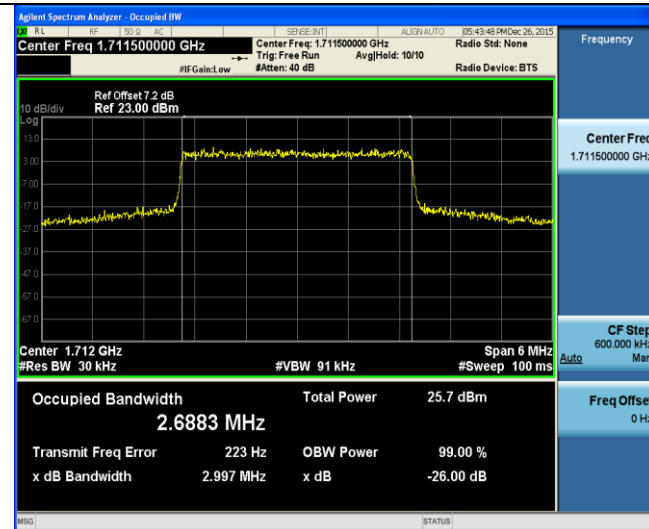
6RB#0

6RB#0

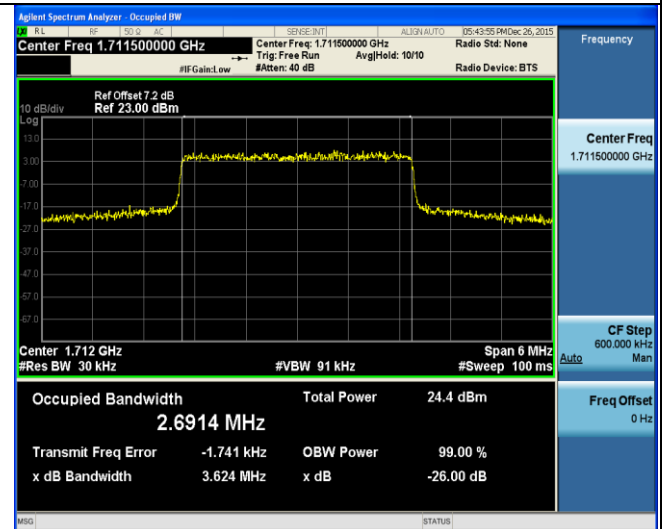
High Channel

LTE FDD Band 4-3MHz Channel Bandwidth

QPSK



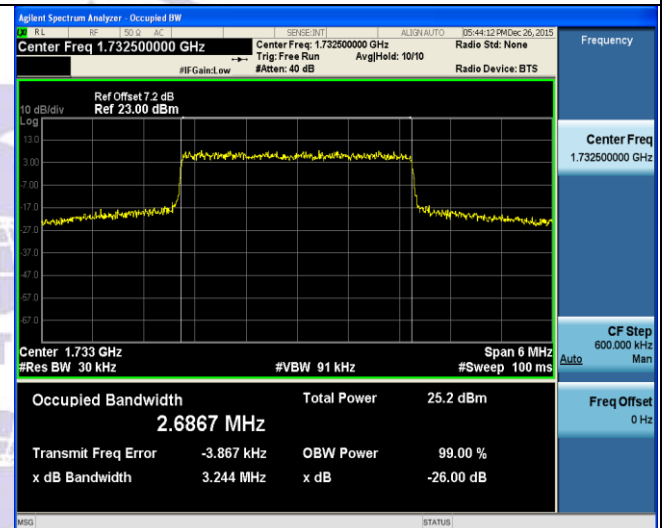
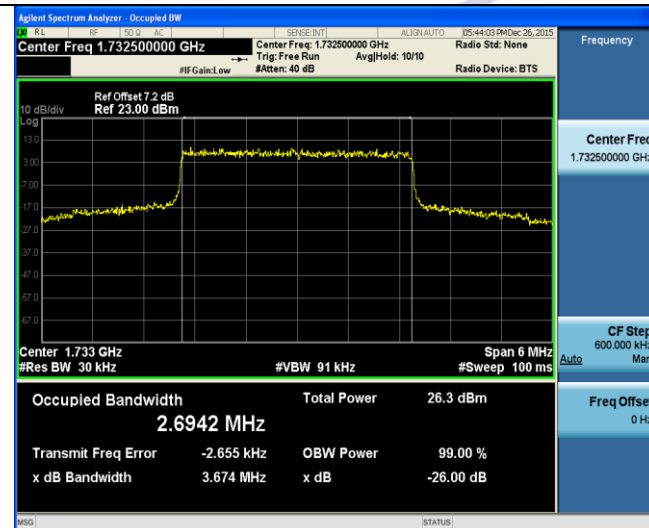
16QAM



15RB#0

15RB#0

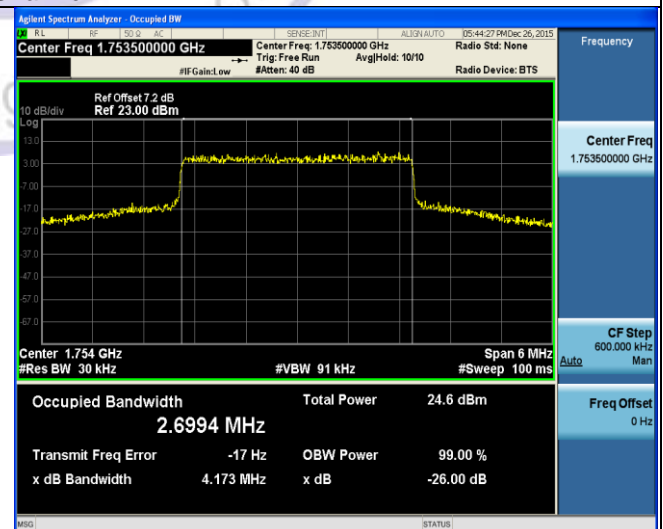
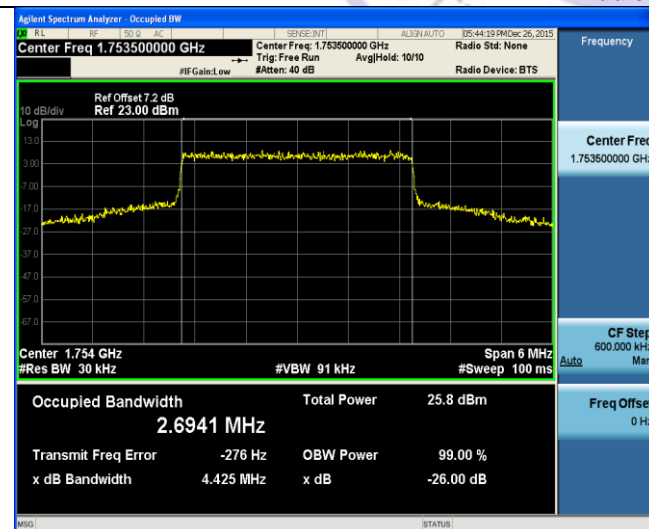
Low Channel



15RB#0

15RB#0

Middle Channel



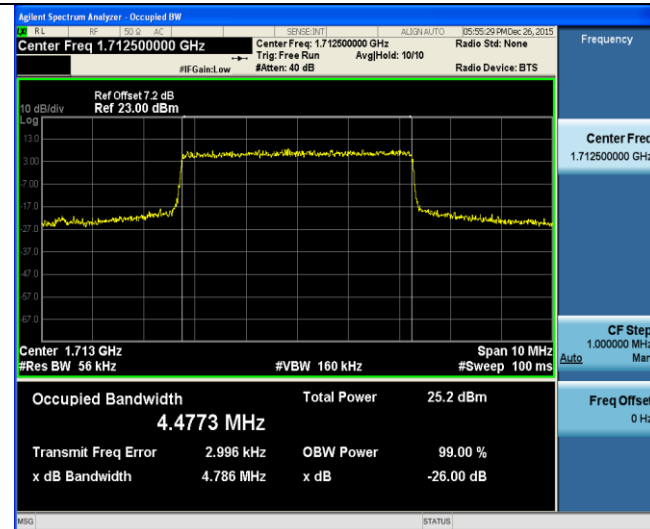
15RB#0

15RB#0

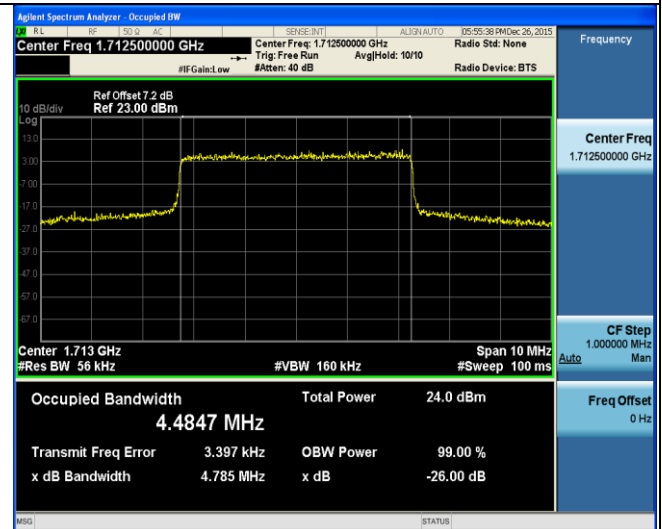
High Channel

LTE FDD Band 4-5MHz Channel Bandwidth

QPSK



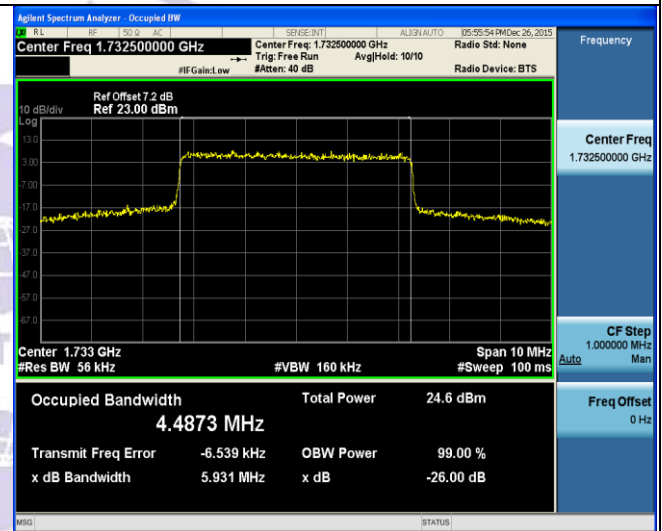
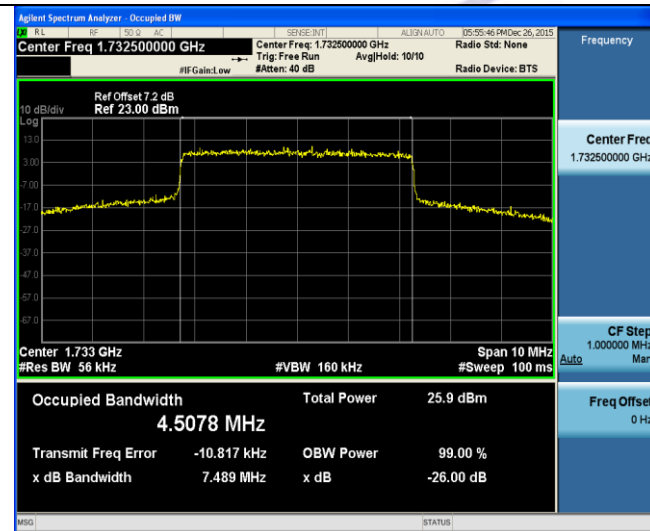
16QAM



25RB#0

25RB#0

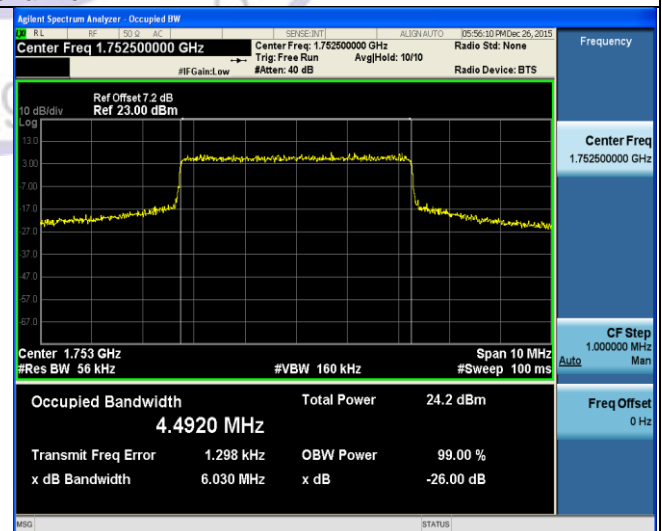
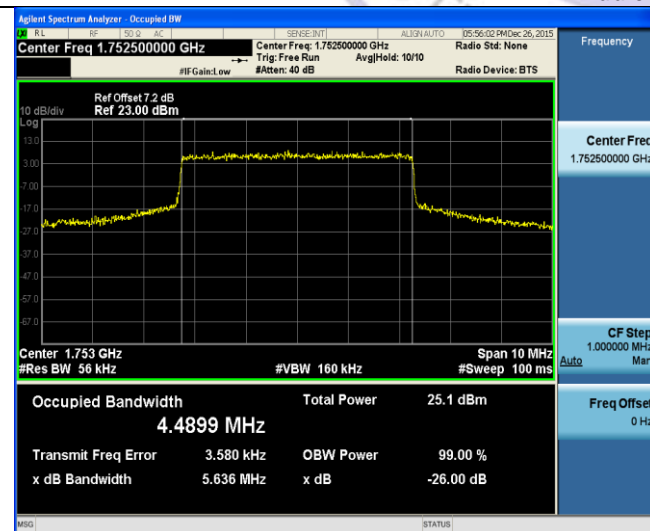
Low Channel



25RB#0

25RB#0

Middle Channel



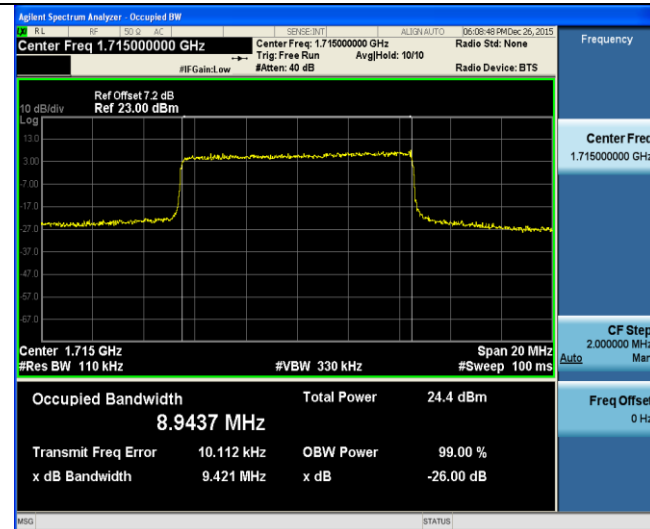
25RB#0

25RB#0

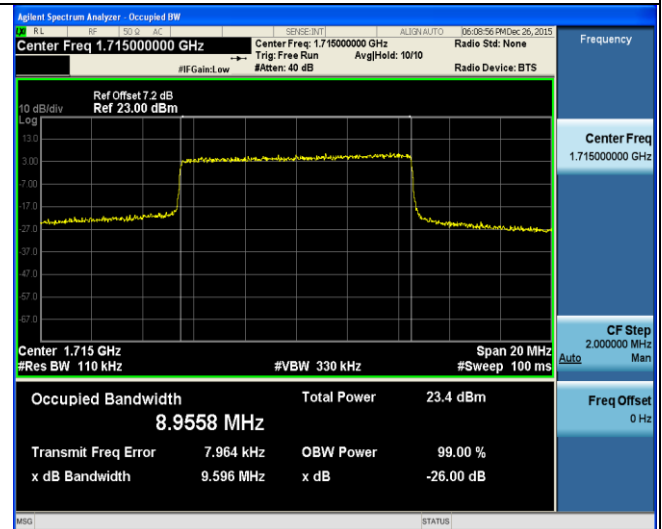
High Channel

LTE FDD Band 4-10MHz Channel Bandwidth

QPSK



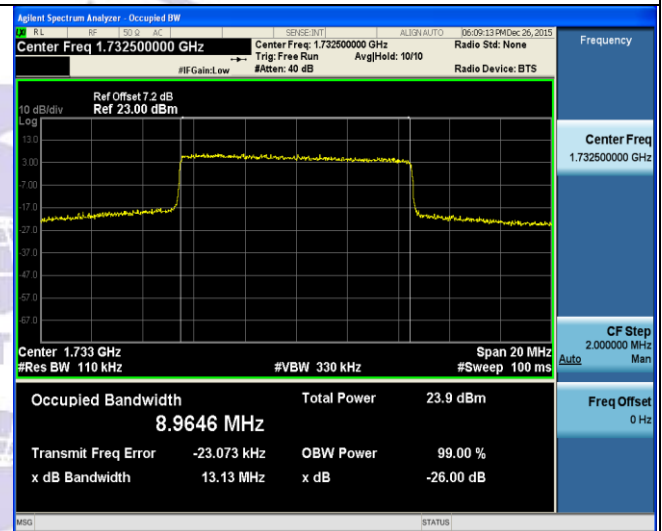
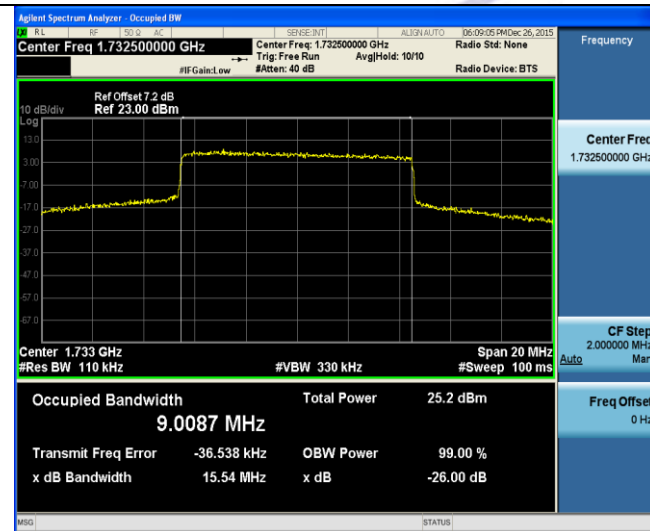
16QAM



50RB#0

50RB#0

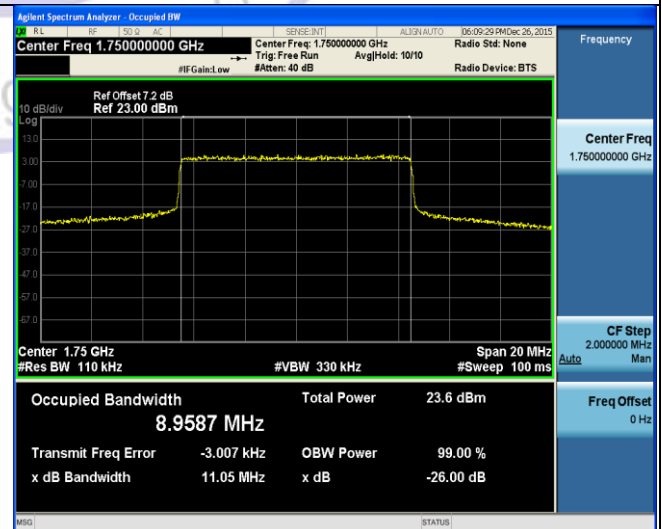
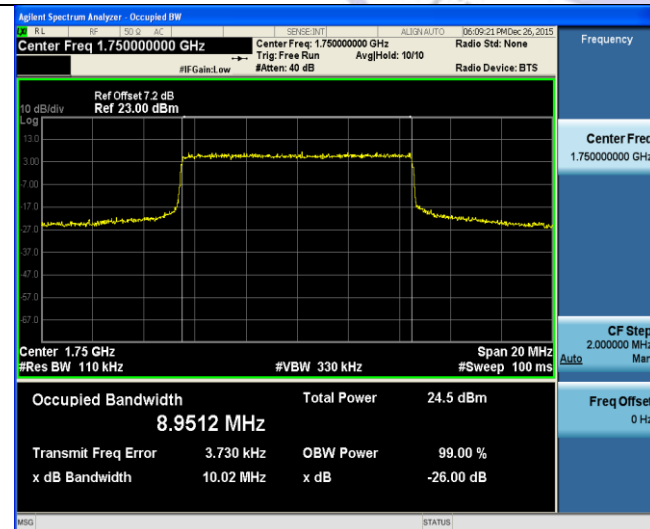
Low Channel



50RB#0

50RB#0

Middle Channel



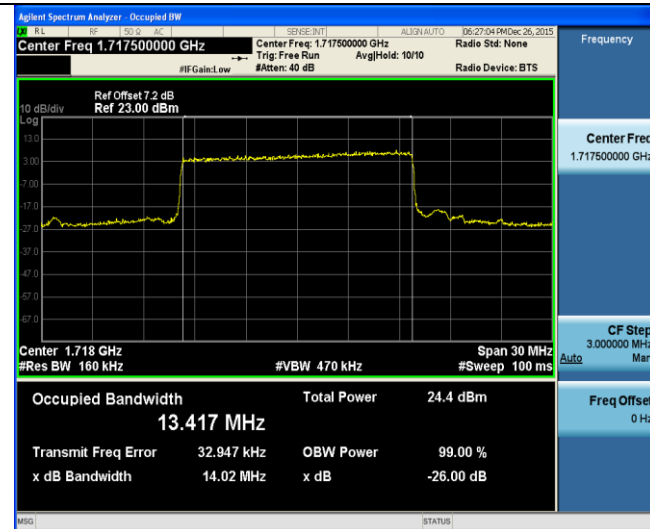
50RB#0

50RB#0

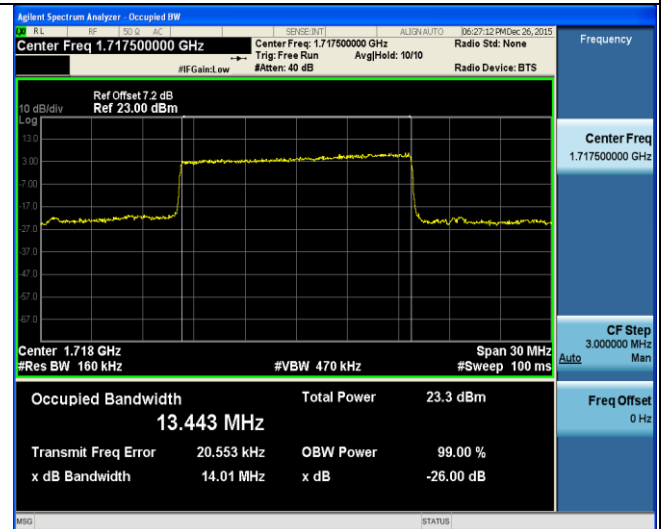
High Channel

LTE FDD Band 4-15MHz Channel Bandwidth

QPSK



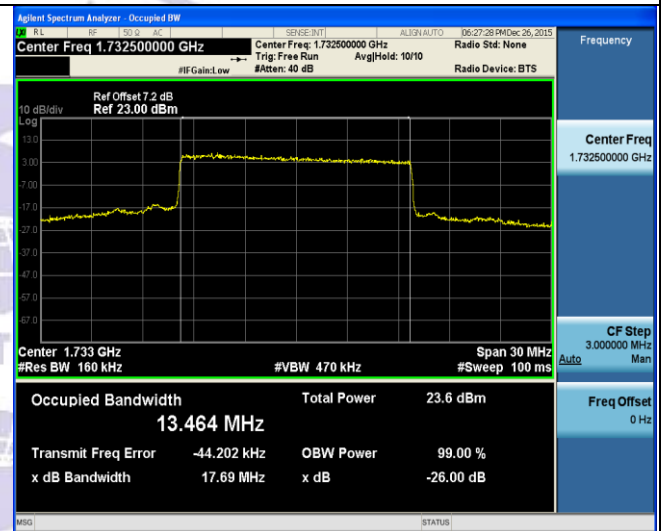
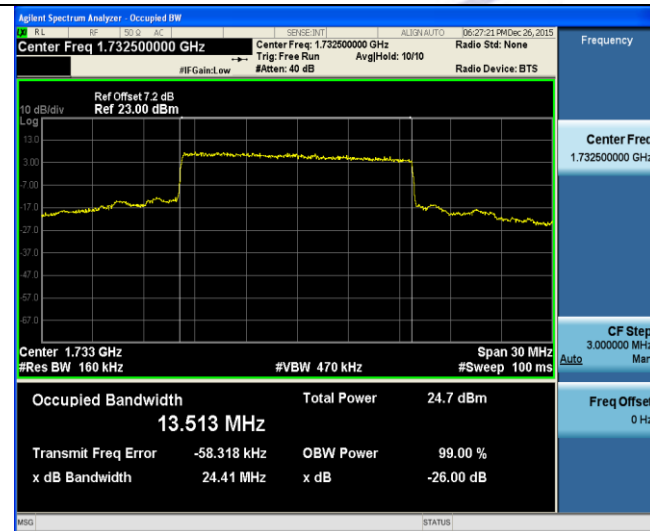
16QAM



75RB#0

75RB#0

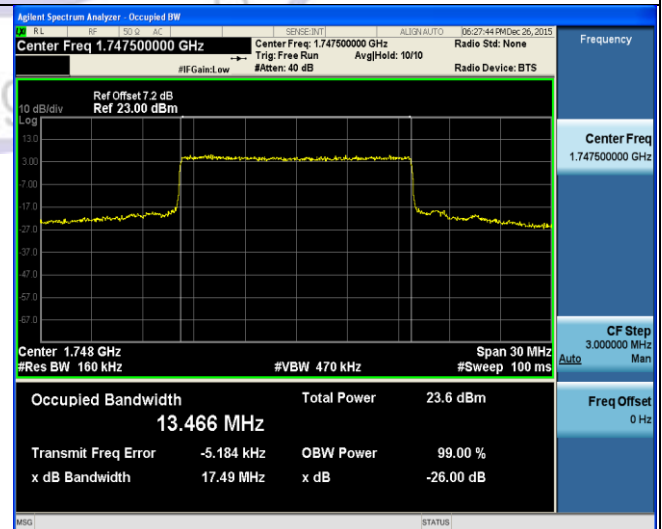
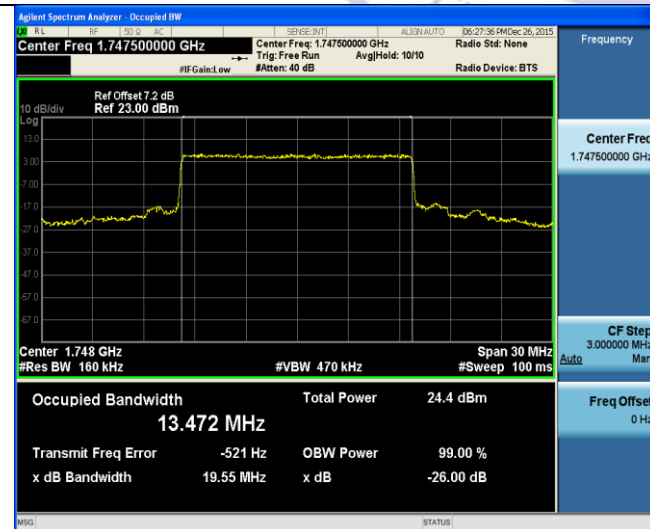
Low Channel



75RB#0

75RB#0

Middle Channel



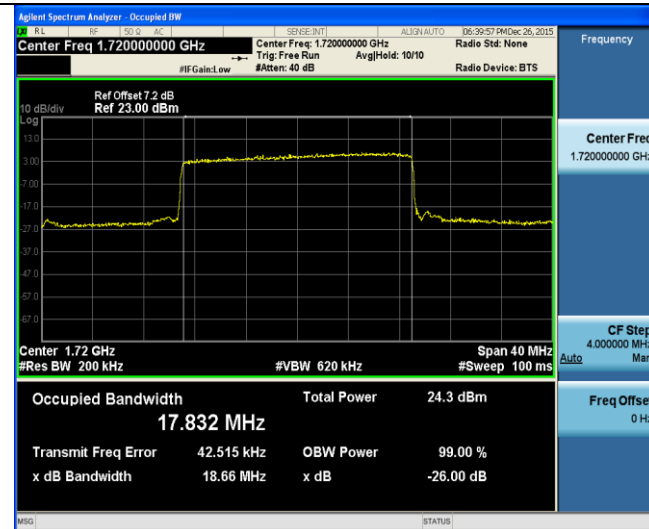
75RB#0

75RB#0

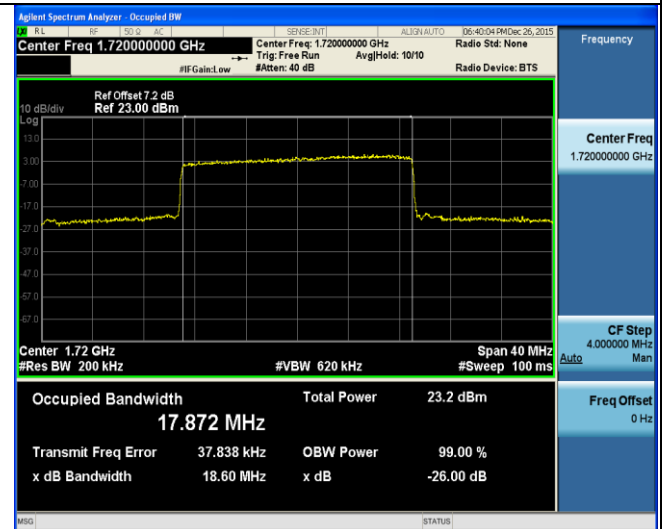
High Channel

LTE FDD Band 4-20MHz Channel Bandwidth

QPSK



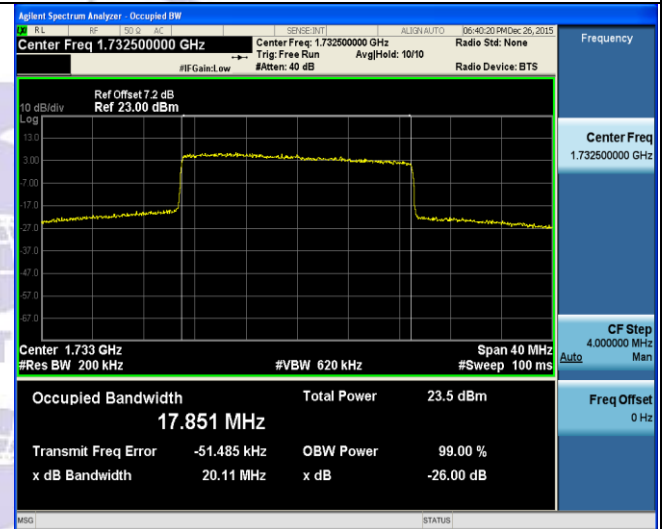
16QAM



100RB#0

100RB#0

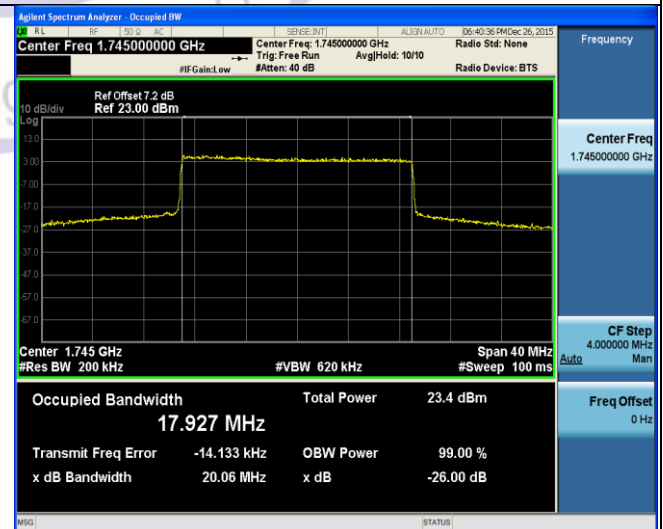
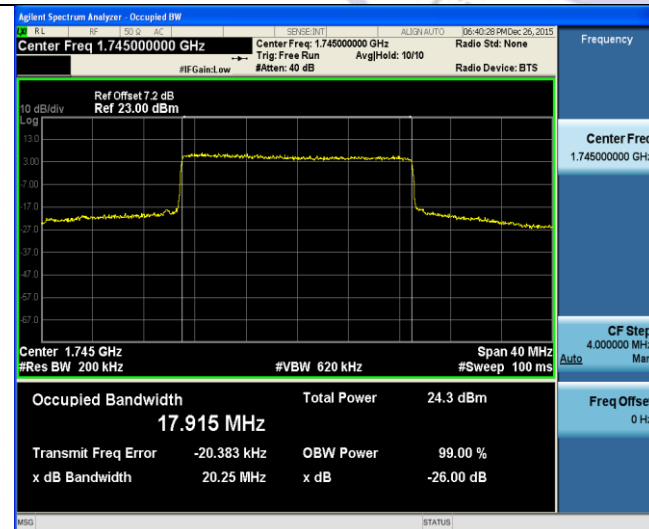
Low Channel



100RB#0

100RB#0

Middle Channel



100RB#0

100RB#0

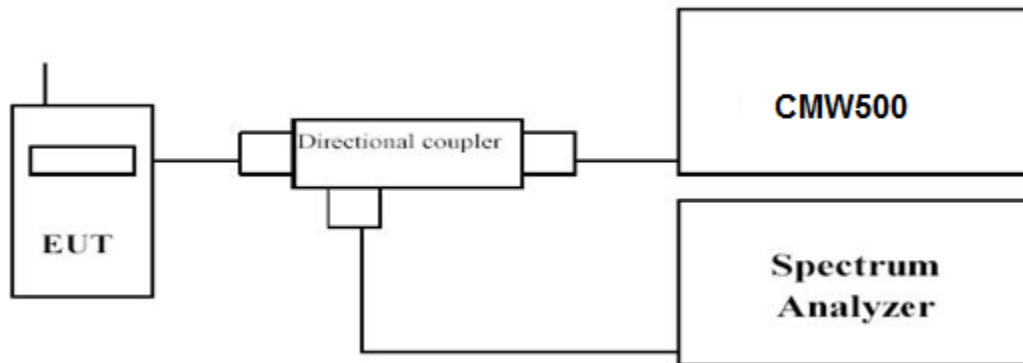
High Channel

3.5 Band Edge compliance

LIMIT

According to §27.53 (h): For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

TEST RESULTS

Remark:

1. We were tested all RB and RB offset Configuration according to 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4, the worst case for each Channel Bandwidth of LTE FDD Band 4 were reported.