# FCC Test Report
## FCC Part 27

| | |
|---|---|
| **Report Reference No.....:** | HK2302270554-10E |
| **FCC ID.....:** | 2A2FCBT4101 |
| Compiled by ( position+printed name+signature)..: | File administrators Gary Qian |
| Supervised by ( position+printed name+signature)..: | Technique principal Eden Hu |
| Approved by ( position+printed name+signature)..: | Manager Jason Zhou |
| Date of issue.....: | Apr. 28, 2023 |
| **Testing Laboratory Name** .....: | **Shenzhen HUAK Testing Technology Co., Ltd.** |
| Address .....: | 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| **Applicant's name**.....: | **PowUnity GmbH** |
| Address .....: | Feldstrasse 9d Innsbruck, 6020 Austria |
| **Test specification** .....: | |
| Standard .....: | **FCC CFR Title 47 Part 2, Part 27** |
| TRF Originator.....: | Shenzhen HUAK Testing Technology Co., Ltd. |

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| | |
|---|---|
| **Test item description .....:** | GPS Tracker |
| Trade Mark .....: | BikeTrax |
| **Manufacturer**.....: | **PowUnity GmbH** |
| Model/Type reference.....: | BT41-01 |
| Series Models .....: | T4101-03-04 |
| Modulation Type .....: | QPSK, 16QAM |
| Rating .....: | DC 3.7V from battery |
| Hardware version .....: | V2.2 |
| Software version .....: | V2.2 |
| Result.....: | **PASS** |

# TEST REPORT

| Test Report No. : | HK2302270554-10E | Apr. 28, 2023<br>Date of issue |
|---|---|---|

| | | |
|---|---|---|
| Equipment under Test | : | GPS Tracker |
| Model /Type | : | BT41-01 |
| Series Models | : | T4101-03-04 |
| **Applicant** | : | **PowUnity GmbH** |
| Address | : | Feldstrasse 9d Innsbruck, 6020 Austria |
| **Manufacturer** | : | **PowUnity GmbH** |
| Address | : | Feldstrasse 9d Innsbruck, 6020 Austria |

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

The test report merely corresponds to the test sample.
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# ** Modified History **

| Revision | Description | Issued Data | Remark |
|---|---|---|---|
| Revision 1.0 | Initial Test Report Release | Apr. 28, 2023 | Jason Zhou |
| | | | |
| | | | |

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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 47 CFR FCC Part 15 Subpart B: - Unintentional Radiators.

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS.

KDB971168 D01: v02r02 MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS.

## 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 |

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## 1.3 Information of The Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：

A2LA Accreditation Code is 4781.01.
FCC Designation Number is CN1229.
Canada IC CAB identifier is CN0045.
CNAS Registration Number is L9589.

## 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 HUAK 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 Shenzhen HUAK Testing Technology Co., Ltd.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.

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# 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 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. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst resulton this report.
2. Test method and refer to 3GPP TS136521.

## 2.3 Test Frequency List

| TX Channel Bandwidth | Frequency (MHz) | channel |
|---|---|---|
| 1.4 MHz | 1710.7 | 131979 |
| | 1745 | 132322 |
| | 1779.3 | 132665 |
| 3 MHz | 1711.5 | 131987 |
| | 1745 | 132322 |
| | 1778.5 | 132657 |
| 5 MHz | 1712.5 | 131997 |
| | 1745 | 132322 |
| | 1777.5 | 132647 |
| 10 MHz | 1715.0 | 132022 |
| | 1745 | 132322 |
| | 1775.0 | 132622 |
| 15 MHz | 1717.5 | 132047 |
| | 1745 | 132322 |
| | 1772.5 | 132597 |
| 20 MHz | 1720.0 | 132072 |
| | 1745 | 132322 |
| | 1770.0 | 132572 |

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## 2.4 Equipments Used during the Test

| Test Equipment | Manufacturer | Model No. | Serial No. | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| LISN | ENV216 | R&S | HKE-059 | 2023/02/17 | 2024/02/16 |
| LISN | R&S | ENV216 | HKE-002 | 2023/02/17 | 2024/02/16 |
| Broadband antenna | Schwarzbeck | VULB 9163 | HKE-012 | 2023/02/17 | 2024/02/16 |
| Receiver | R&S | ESR-7 | HKE-010 | 2023/02/17 | 2024/02/16 |
| Spectrum analyzer | Agilent | N9020A | HKE-048 | 2023/02/17 | 2024/02/16 |
| RF automatic control unit | Tonscend | JS0806-2 | HKE-060 | 2023/02/17 | 2024/02/16 |
| Horn antenna | Schwarzbeck | 9120D | HKE-013 | 2023/02/17 | 2024/02/16 |
| Loop antenna | Schwarzbeck | FMZB 1519 B | HKE-014 | 2023/02/17 | 2024/02/16 |
| Preamplifier | EMCI | EMC051845SE | HKE-015 | 2023/02/17 | 2024/02/16 |
| Preamplifier | Agilent | 83051A | HKE-016 | 2023/02/17 | 2024/02/16 |
| Temperature and humidity meter | Boyang | HTC-1 | HKE-075 | 2023/02/17 | 2024/02/16 |
| High pass filter unit | Tonscend | JS0806-F | HKE-055 | 2023/02/17 | 2024/02/16 |
| RF cable | Times | 1-40G | HKE-034 | 2023/02/17 | 2024/02/16 |
| Power meter | Agilent | E4419B | HKE-085 | 2023/02/17 | 2024/02/16 |
| Power Sensor | Agilent | E9300A | HKE-086 | 2023/02/17 | 2024/02/16 |
| Wireless Communication Test Set | R&S | CMW500 | HKE-026 | 2023/02/17 | 2024/02/16 |
| Wireless Communication Test Set | R&S | CMU200 | HKE-029 | 2023/02/17 | 2024/02/16 |
| High gain antenna | Schwarzbeck | LB-180400KF | HKE-054 | 2023/02/17 | 2024/02/16 |
| Horn antenna | Schwarzbeck | 9120D | HKE-135 | 2023/02/17 | 2024/02/16 |
| High gain antenna | Schwarzbeck | LB-180400KF | HKE-128 | 2023/02/17 | 2024/02/16 |
| Broadband antenna | Schwarzbeck | VULB 9163 | HKE-087 | 2023/02/17 | 2024/02/16 |
| Signal generator | Agilent | E4433B | HKE-120 | 2023/02/17 | 2024/02/16 |
| Signal generator | Agilent | E4421B | HKE-121 | 2023/02/17 | 2024/02/16 |

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

This submittal(s) (test report) is intended for FCC ID: 2A2FCBT4101 filing to comply with of the FCC Part 27 Rules.

## 2.6 Modifications

No modifications were implemented to meet testing criteria.

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# 3 Test Conditions and Results

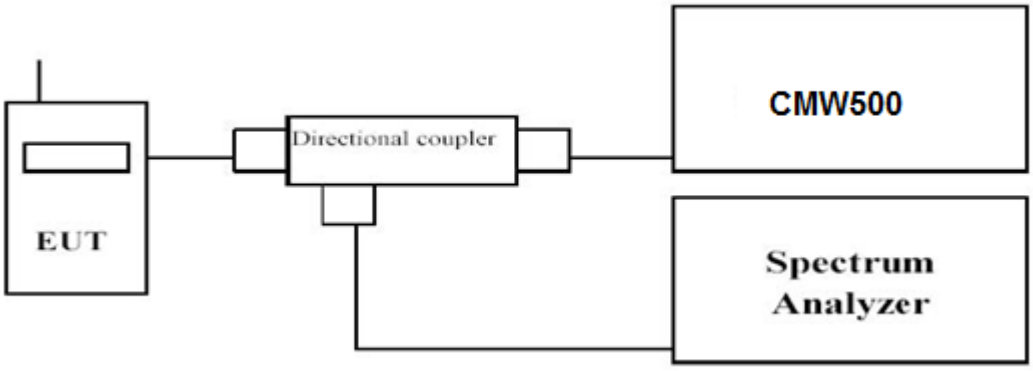
## 3.1 Output Power

**LIMIT**

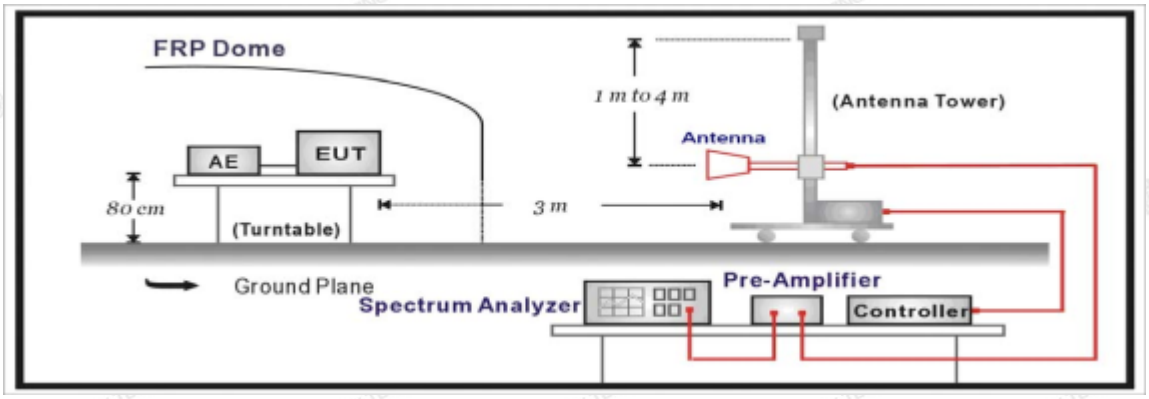
According to §27.50 (d) (4): Fixed, mobile, and portable (hand- held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

**TEST CONFIGURATION**

Conducted Power Measurement




Radiated Power Measurement:




**TEST PROCEDURE**

The EUT was setup according to EIA/TIA 603D.

**Conducted Power Measurement:**

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

**Radiated Power Measurement:**

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

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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:**

| *LTE FDD Band 66* | | | | |
|---|---|---|---|---|
| TX Channel Bandwidth | Frequency (MHz) | RB Size/Offset | Average Power [dBm] | |
| | | | QPSK | 16QAM |
| 1.4 MHz | 1710.7 | 1 RB low | 22.29 | 21.09 |
| | | 1 RB high | 22.10 | 20.94 |
| | | 50% RB mid | 20.76 | 19.73 |
| | | 100% RB | 21.98 | 20.77 |
| | 1745 | 1 RB low | 20.96 | 20.72 |
| | | 1 RB high | 19.37 | 19.35 |
| | | 50% RB mid | 19.25 | 19.31 |
| | | 100% RB | 20.43 | 19.26 |
| | 1779.3 | 1 RB low | 21.98 | 17.86 |
| | | 1 RB high | 20.34 | 17.63 |
| | | 50% RB mid | 20.91 | 19.20 |
| | | 100% RB | 20.54 | 17.11 |
| 3 MHz | 1711.5 | 1 RB low | 22.12 | 20.94 |
| | | 1 RB high | 21.98 | 20.84 |
| | | 50% RB mid | 21.65 | 19.53 |
| | | 100% RB | 20.58 | 20.12 |
| | 1745 | 1 RB low | 21.60 | 19.68 |
| | | 1 RB high | 21.90 | 18.98 |
| | | 50% RB mid | 20.28 | 19.21 |
| | | 100% RB | 20.84 | 18.99 |
| | 1778.5 | 1 RB low | 19.70 | 17.55 |
| | | 1 RB high | 18.46 | 18.78 |
| | | 50% RB mid | 19.15 | 17.76 |
| | | 100% RB | 19.94 | 17.22 |
| 5 MHz | 1712.5 | 1 RB low | 22.38 | 22.50 |
| | | 1 RB high | 21.82 | 22.20 |
| | | 50% RB mid | 21.41 | 20.49 |
| | | 100% RB | 20.78 | 21.56 |

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| | | | | |
|---|---|---|---|---|
| | 1745 | 1 RB low | 21.31 | 21.61 |
| | | 1 RB high | 20.79 | 19.79 |
| | | 50% RB mid | 20.04 | 20.68 |
| | | 100% RB | 20.42 | 20.69 |
| | 1777.5 | 1 RB low | 20.98 | 18.77 |
| | | 1 RB high | 19.06 | 18.26 |
| | | 50% RB mid | 20.23 | 19.34 |
| | | 100% RB | 19.69 | 17.82 |
| 10 MHz | 1715.0 | 1 RB low | 22.40 | 22.59 |
| | | 1 RB high | 21.80 | 22.15 |
| | | 50% RB mid | 22.28 | 20.34 |
| | | 100% RB | 21.22 | 21.82 |
| | 1745 | 1 RB low | 20.94 | 21.08 |
| | | 1 RB high | 19.40 | 19.40 |
| | | 50% RB mid | 20.18 | 20.79 |
| | | 100% RB | 20.25 | 20.73 |
| | 1775.0 | 1 RB low | 19.95 | 18.85 |
| | | 1 RB high | 20.47 | 19.00 |
| | | 50% RB mid | 20.86 | 17.26 |
| | | 100% RB | 19.27 | 18.95 |
| 15 MHz | 1717.5 | 1 RB low | 21.88 | 22.74 |
| | | 1 RB high | 21.63 | 21.96 |
| | | 50% RB mid | 20.87 | 21.49 |
| | | 100% RB | 21.10 | 21.71 |
| | 1745 | 1 RB low | 20.96 | 21.26 |
| | | 1 RB high | 20.77 | 20.85 |
| | | 50% RB mid | 20.43 | 21.03 |
| | | 100% RB | 20.46 | 21.07 |
| | 1772.5 | 1 RB low | 20.46 | 20.45 |
| | | 1 RB high | 20.77 | 19.20 |
| | | 50% RB mid | 20.43 | 19.47 |
| | | 100% RB | 19.08 | 18.83 |
| 20 MHz | 1720.0 | 1 RB low | 21.67 | 21.90 |
| | | 1 RB high | 21.69 | 21.85 |
| | | 50% RB mid | 20.74 | 21.46 |
| | | 100% RB | 21.09 | 21.74 |
| | 1745 | 1 RB low | 21.03 | 21.63 |
| | | 1 RB high | 20.74 | 20.83 |
| | | 50% RB mid | 20.48 | 21.05 |
| | | 100% RB | 20.77 | 21.13 |
| | 1770.0 | 1 RB low | 20.42 | 20.42 |
| | | 1 RB high | 21.49 | 20.46 |
| | | 50% RB mid | 21.56 | 19.75 |
| | | 100% RB | 20.42 | 19.84 |

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**Radiated Measurement:**

*Remark:*

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 66; recorded worst case for each Channel Bandwidth of LTE FDD Band 66.*
2. *EIRP=$P_{Mea}$(dBm)-$P_{cl}$(dB)+$P_{Ag}$(dB)+$G_a$(dBi)*

*LTE FDD Band 66_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 | -16.51 | 3.06 | 9.68 | 34.80 | 24.91 | 30.00 | 5.09 | V |
| 1745 | -16.8 | 3.17 | 9.68 | 34.80 | 24.51 | 30.00 | 5.49 | V |
| 1779.3 | -17.8 | 3.22 | 9.75 | 34.80 | 23.53 | 30.00 | 6.47 | V |
| 1710.7 | -16.86 | 3.06 | 9.68 | 34.80 | 24.56 | 30.00 | 5.44 | H |
| 1745 | -17.28 | 3.17 | 9.68 | 34.80 | 24.03 | 30.00 | 5.97 | H |
| 1779.3 | -17.49 | 3.22 | 9.75 | 34.80 | 23.84 | 30.00 | 6.16 | H |

*LTE FDD Band 66_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 | -16.82 | 3.06 | 9.68 | 34.80 | 24.60 | 30.00 | 5.40 | V |
| 1745 | -17.49 | 3.17 | 9.68 | 34.80 | 23.82 | 30.00 | 6.18 | V |
| 1778.5 | -16.55 | 3.22 | 9.75 | 34.80 | 24.78 | 30.00 | 5.22 | V |
| 1711.5 | -15.42 | 3.06 | 9.68 | 34.80 | 26.00 | 30.00 | 4.00 | H |
| 1745 | -16.63 | 3.17 | 9.68 | 34.80 | 24.68 | 30.00 | 5.32 | H |
| 1778.5 | -17.03 | 3.22 | 9.75 | 34.80 | 24.30 | 30.00 | 5.70 | H |

*LTE FDD Band 66_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 | -18.41 | 3.06 | 9.68 | 34.80 | 23.01 | 30.00 | 6.99 | V |
| 1745 | -16.78 | 3.17 | 9.68 | 34.80 | 24.53 | 30.00 | 5.47 | V |
| 1777.5 | -16.65 | 3.22 | 9.75 | 34.80 | 24.68 | 30.00 | 5.32 | V |
| 1712.5 | -17.61 | 3.06 | 9.68 | 34.80 | 23.81 | 30.00 | 6.19 | H |
| 1745 | -17.12 | 3.17 | 9.68 | 34.80 | 24.19 | 30.00 | 5.81 | H |
| 1777.5 | -18.28 | 3.22 | 9.75 | 34.80 | 23.05 | 30.00 | 6.95 | H |

*LTE FDD Band 66_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 | -16.84 | 3.06 | 9.68 | 34.80 | 24.58 | 30.00 | 5.42 | V |
| 1745 | -14.98 | 3.17 | 9.68 | 34.80 | 26.33 | 30.00 | 3.67 | V |
| 1775.0 | -17.54 | 3.22 | 9.75 | 34.80 | 23.79 | 30.00 | 6.21 | V |
| 1715.0 | -17.55 | 3.06 | 9.68 | 34.80 | 23.87 | 30.00 | 6.13 | H |
| 1745 | -16.8 | 3.17 | 9.68 | 34.80 | 24.51 | 30.00 | 5.49 | H |
| 1775.0 | -17.76 | 3.22 | 9.75 | 34.80 | 23.57 | 30.00 | 6.43 | H |

*LTE FDD Band 66_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 | -17.13 | 3.06 | 9.68 | 34.80 | 24.29 | 30.00 | 5.71 | V |
| 1745 | -16.77 | 3.17 | 9.68 | 34.80 | 24.54 | 30.00 | 5.46 | V |
| 1772.5 | -16.57 | 3.22 | 9.75 | 34.80 | 24.76 | 30.00 | 5.24 | V |
| 1717.5 | -17.9 | 3.06 | 9.68 | 34.80 | 23.52 | 30.00 | 6.48 | H |
| 1745 | -16.88 | 3.17 | 9.68 | 34.80 | 24.43 | 30.00 | 5.57 | H |
| 1772.5 | -18.03 | 3.22 | 9.75 | 34.80 | 23.30 | 30.00 | 6.70 | H |

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*LTE FDD Band 66_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 | -16.75 | 3.06 | 9.68 | 34.80 | 24.67 | 30.00 | 5.33 | V |
| 1745 | -17.66 | 3.17 | 9.68 | 34.80 | 23.65 | 30.00 | 6.35 | V |
| 1770.0 | -16.83 | 3.22 | 9.75 | 34.80 | 24.50 | 30.00 | 5.50 | V |
| 1720.0 | -18.93 | 3.06 | 9.68 | 34.80 | 22.49 | 30.00 | 7.51 | H |
| 1745 | -17.28 | 3.17 | 9.68 | 34.80 | 24.03 | 30.00 | 5.97 | H |
| 1770.0 | -18.12 | 3.22 | 9.75 | 34.80 | 23.21 | 30.00 | 6.79 | H |

*LTE FDD Band 66_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 | -17.04 | 3.06 | 9.68 | 34.80 | 24.38 | 30.00 | 5.62 | V |
| 1745 | -16.69 | 3.17 | 9.68 | 34.80 | 24.62 | 30.00 | 5.38 | V |
| 1779.3 | -18.32 | 3.22 | 9.75 | 34.80 | 23.01 | 30.00 | 6.99 | V |
| 1710.7 | -16.14 | 3.06 | 9.68 | 34.80 | 25.28 | 30.00 | 4.72 | H |
| 1745 | -18.62 | 3.17 | 9.68 | 34.80 | 22.69 | 30.00 | 7.31 | H |
| 1779.3 | -17.65 | 3.22 | 9.75 | 34.80 | 23.68 | 30.00 | 6.32 | H |

*LTE FDD Band 66_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 | -17.49 | 3.06 | 9.68 | 34.80 | 23.93 | 30.00 | 6.07 | V |
| 1745 | -16.09 | 3.17 | 9.68 | 34.80 | 25.22 | 30.00 | 4.78 | V |
| 1778.5 | -17.53 | 3.22 | 9.75 | 34.80 | 23.80 | 30.00 | 6.20 | V |
| 1711.5 | -17.87 | 3.06 | 9.68 | 34.80 | 23.55 | 30.00 | 6.45 | H |
| 1745 | -16.32 | 3.17 | 9.68 | 34.80 | 24.99 | 30.00 | 5.01 | H |
| 1778.5 | -17.65 | 3.22 | 9.75 | 34.80 | 23.68 | 30.00 | 6.32 | H |

*LTE FDD Band 66_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 | -16.33 | 3.06 | 9.68 | 34.80 | 25.09 | 30.00 | 4.91 | V |
| 1745 | -16.73 | 3.17 | 9.68 | 34.80 | 24.58 | 30.00 | 5.42 | V |
| 1777.5 | -18.66 | 3.22 | 9.75 | 34.80 | 22.67 | 30.00 | 7.33 | V |
| 1712.5 | -17.03 | 3.06 | 9.68 | 34.80 | 24.39 | 30.00 | 5.61 | H |
| 1745 | -15.56 | 3.17 | 9.68 | 34.80 | 25.75 | 30.00 | 4.25 | H |
| 1777.5 | -16.68 | 3.22 | 9.75 | 34.80 | 24.65 | 30.00 | 5.35 | H |

*LTE FDD Band 66_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 | -16.65 | 3.06 | 9.68 | 34.80 | 24.77 | 30.00 | 5.23 | V |
| 1745 | -17.01 | 3.17 | 9.68 | 34.80 | 24.30 | 30.00 | 5.70 | V |
| 1775.0 | -16.89 | 3.22 | 9.75 | 34.80 | 24.44 | 30.00 | 5.56 | V |
| 1715.0 | -15.77 | 3.06 | 9.68 | 34.80 | 25.65 | 30.00 | 4.35 | H |
| 1745 | -17.48 | 3.17 | 9.68 | 34.80 | 23.83 | 30.00 | 6.17 | H |
| 1775.0 | -18.94 | 3.22 | 9.75 | 34.80 | 22.39 | 30.00 | 7.61 | H |

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*LTE FDD Band 66_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 | -17.69 | 3.06 | 9.68 | 34.80 | 23.73 | 30.00 | 6.27 | V |
| 1745 | -15.83 | 3.17 | 9.68 | 34.80 | 25.48 | 30.00 | 4.52 | V |
| 1772.5 | -16.22 | 3.22 | 9.75 | 34.80 | 25.11 | 30.00 | 4.89 | V |
| 1717.5 | -17.4 | 3.06 | 9.68 | 34.80 | 24.02 | 30.00 | 5.98 | H |
| 1745 | -16.16 | 3.17 | 9.68 | 34.80 | 25.15 | 30.00 | 4.85 | H |
| 1772.5 | -18.05 | 3.22 | 9.75 | 34.80 | 23.28 | 30.00 | 6.72 | H |

*LTE FDD Band 66_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 | -17.35 | 3.06 | 9.68 | 34.80 | 24.07 | 30.00 | 5.93 | V |
| 1745 | -16.72 | 3.17 | 9.68 | 34.80 | 24.59 | 30.00 | 5.41 | V |
| 1770.0 | -18.26 | 3.22 | 9.75 | 34.80 | 23.07 | 30.00 | 6.93 | V |
| 1720.0 | -18.03 | 3.06 | 9.68 | 34.80 | 23.39 | 30.00 | 6.61 | H |
| 1745 | -17.35 | 3.17 | 9.68 | 34.80 | 23.96 | 30.00 | 6.04 | H |
| 1770.0 | -18.61 | 3.22 | 9.75 | 34.80 | 22.72 | 30.00 | 7.28 | H |

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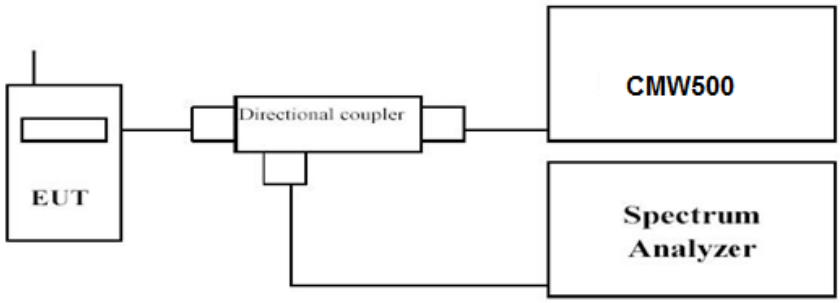
## 3.2 Peak-to-Average Ratio (PAR)

**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 ≥ 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 66; recorded worst case for each Channel Bandwidth of LTE FDD Band 66.*

| *LTE FDD Band 66* | | | | |
|---|---|---|---|---|
| TX Channel Bandwidth | Frequency (MHz) | RB Size/Offset | PAPR (dB) | |
| | | | QPSK | 16QAM |
| 1.4 MHz | 1710.7 | *1RB#0* | 8.47 | 9.64 |
| | 1745 | | 7.89 | 10.44 |
| | 1779.3 | | 8.50 | 8.98 |
| 3 MHz | 1711.5 | *1RB#0* | 10.12 | 10.58 |
| | 1745 | | 9.16 | 10.60 |
| | 1778.5 | | 10.11 | 11.20 |
| 5 MHz | 1712.5 | *1RB#0* | 8.45 | 8.45 |
| | 1745 | | 8.41 | 8.47 |
| | 1777.5 | | 8.47 | 8.47 |
| 10 MHz | 1715.0 | *1RB#0* | 9.05 | 8.96 |
| | 1745 | | 10.27 | 8.78 |
| | 1775.0 | | 9.31 | 9.61 |
| 15 MHz | 1717.5 | *1RB#0* | 8.18 | 7.57 |
| | 1745 | | 10.29 | 8.28 |
| | 1772.5 | | 9.34 | 9.97 |
| 20 MHz | 1720.0 | *1RB#0* | 8.45 | 8.50 |
| | 1745 | | 8.51 | 8.52 |
| | 1770.0 | | 10.01 | 10.62 |

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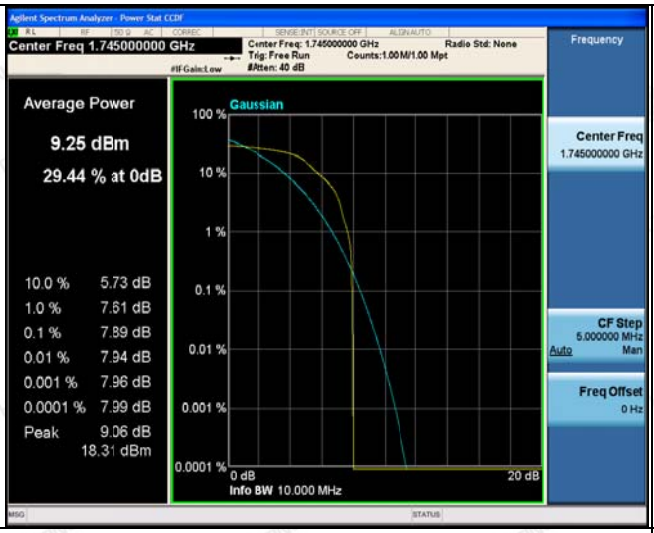
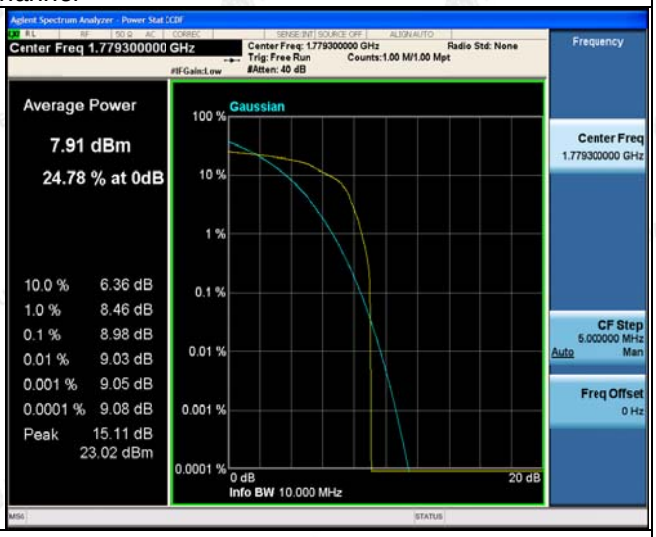
| LTE FDD Band 66-1.4MHz Channel Bandwidth PAPR | |
|---|---|
| QPSK | 16QAM |
| | |
| 1RB#0 | 1RB#0 |
| Low Channel | |
|  | |
| 1RB#0 | 1RB#0 |
| Middle Channel | |
| |  |
| 1RB#0 | 1RB#0 |
| High Channel | |

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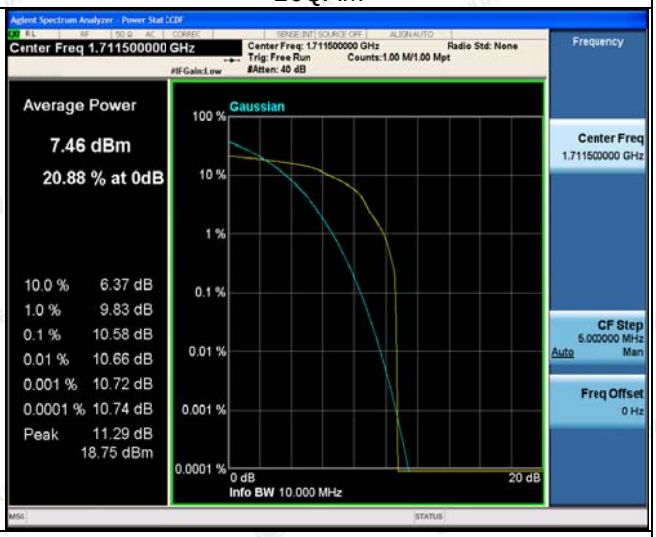
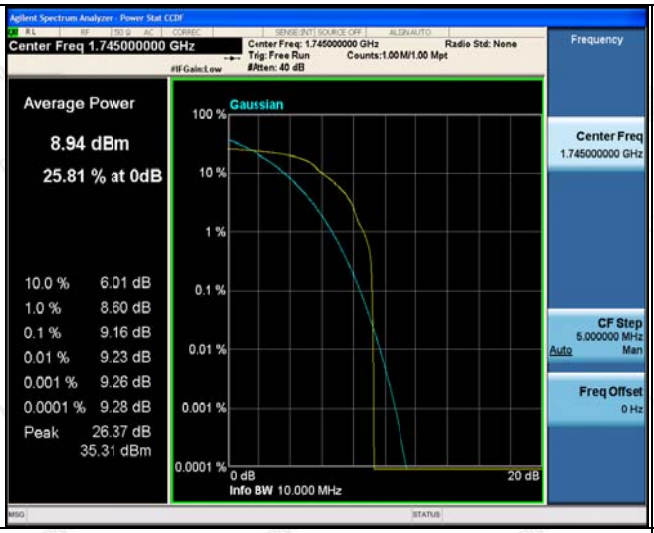
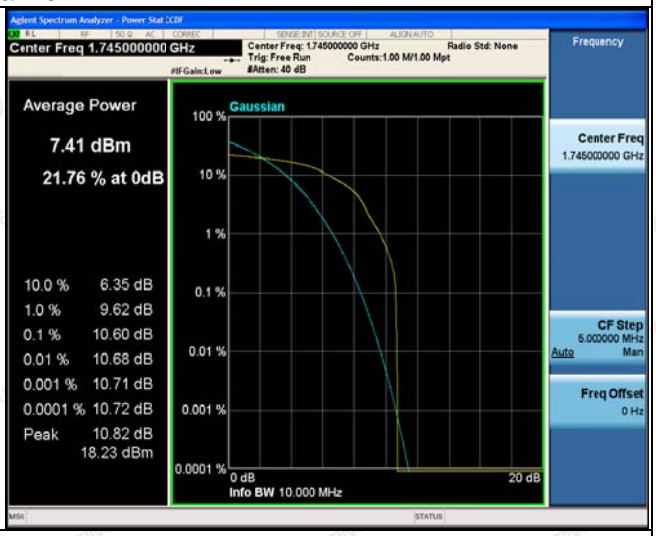
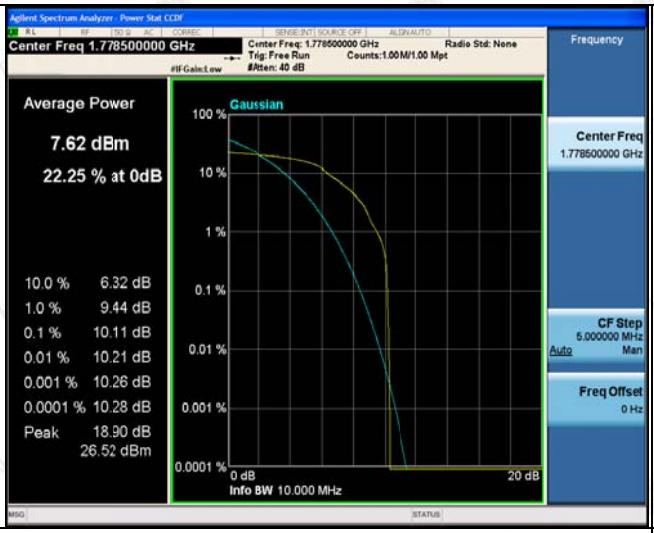
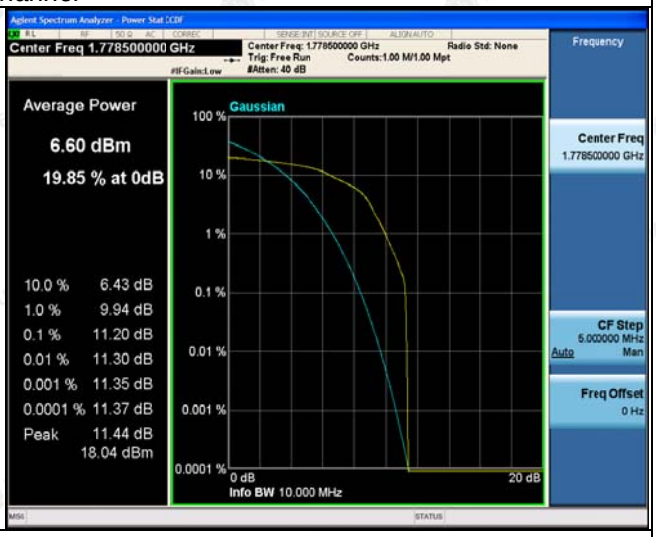
| LTE FDD Band 66-3MHz Channel Bandwidth PAPR | |
|---|---|
| QPSK | 16QAM |
| |  |
| 1RB#0 | 1RB#0 |
| Low Channel | |
|  |  |
| 1RB#0 | 1RB#0 |
| Middle Channel | |
|  |  |
| 1RB#0 | 1RB#0 |
| High Channel | |

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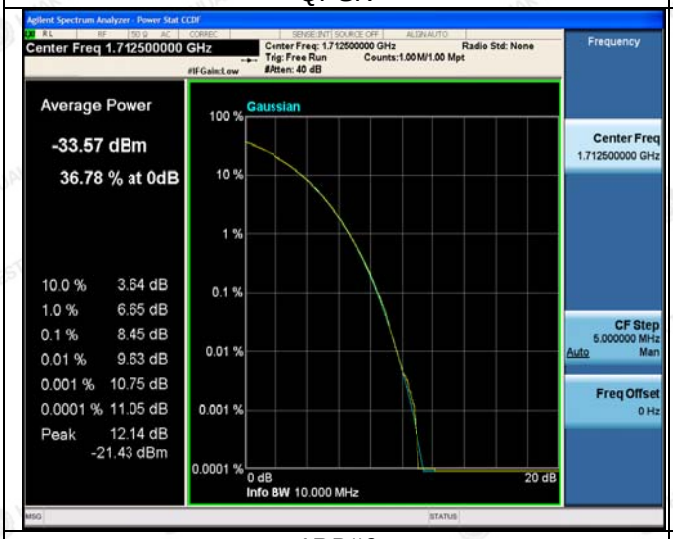
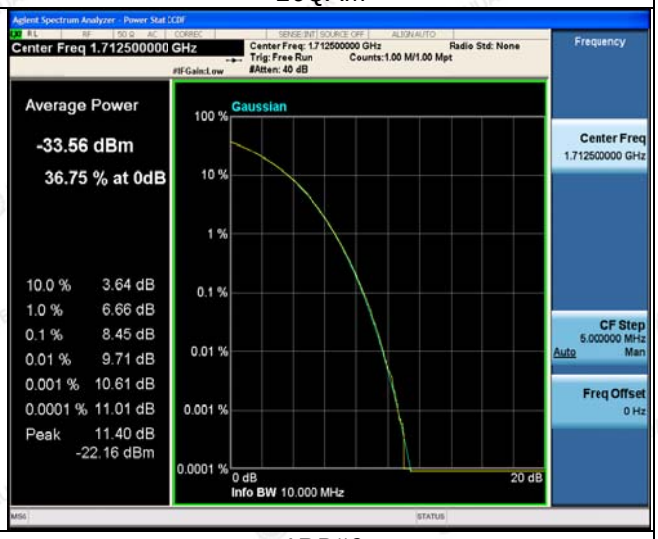
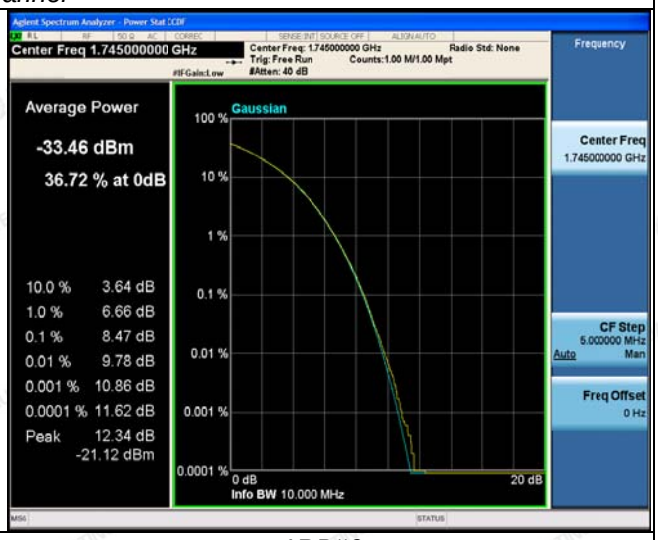
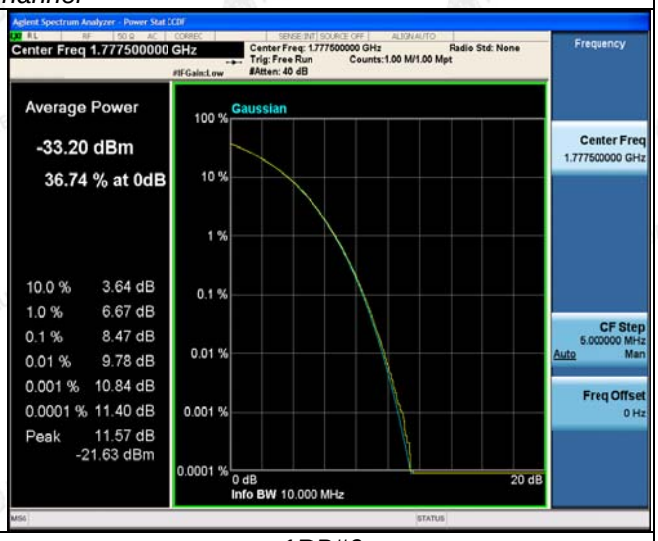
| LTE FDD Band 66-5MHz Channel Bandwidth PAPR | |
|---|---|
| QPSK | 16QAM |
|  |  |
| 1RB#0 | 1RB#0 |
| Low Channel | |
| |  |
| 1RB#0 | 1RB#0 |
| Middle Channel | |
| |  |
| 1RB#0 | 1RB#0 |
| High Channel | |

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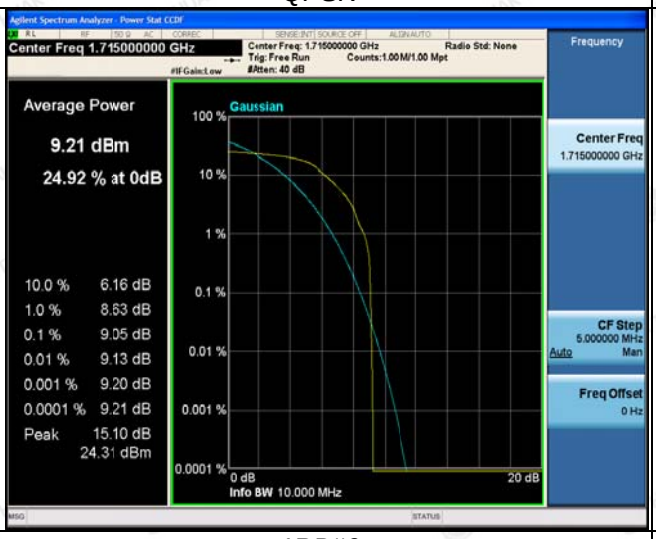
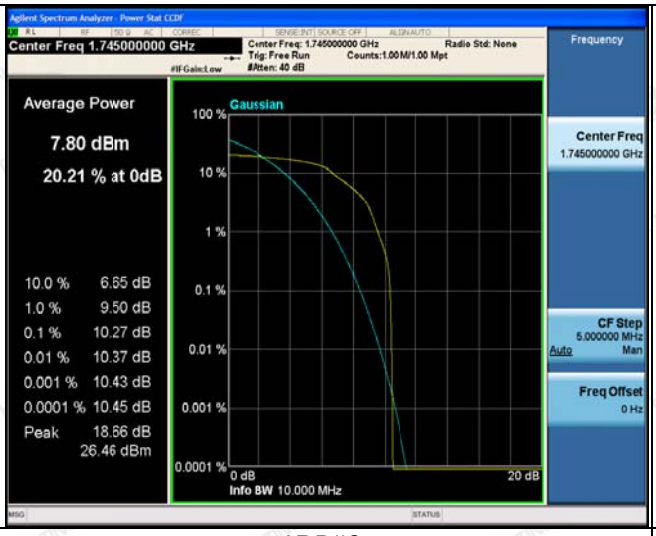
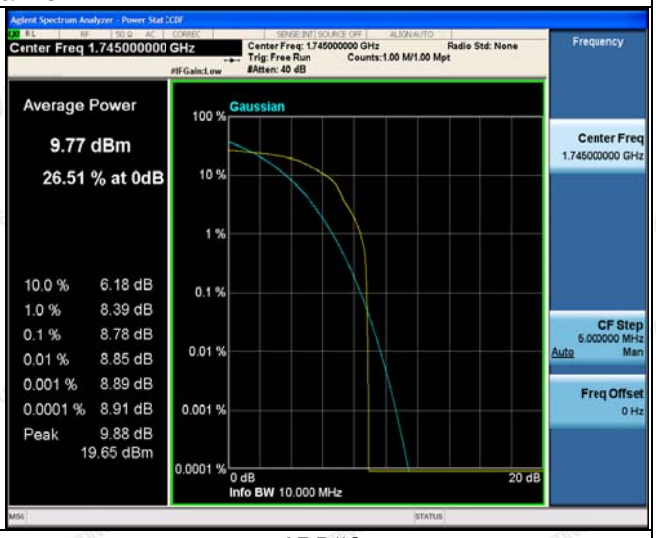
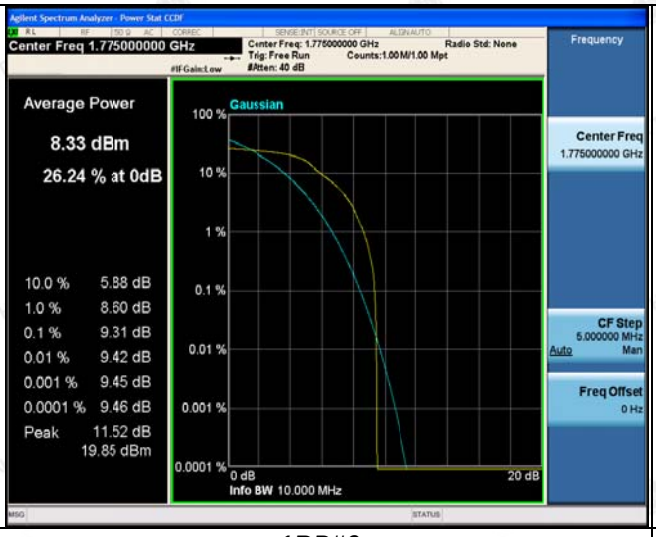
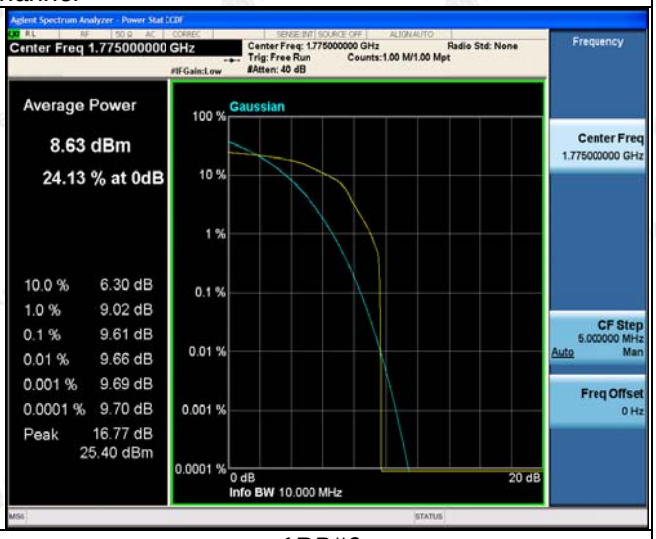
| LTE FDD Band 66-10MHz Channel Bandwidth PAPR | |
|---|---|
| QPSK | 16QAM |
|  | |
| 1RB#0 | 1RB#0 |
| Low Channel | |
|  |  |
| 1RB#0 | 1RB#0 |
| Middle Channel | |
|  |  |
| 1RB#0 | 1RB#0 |
| High Channel | |

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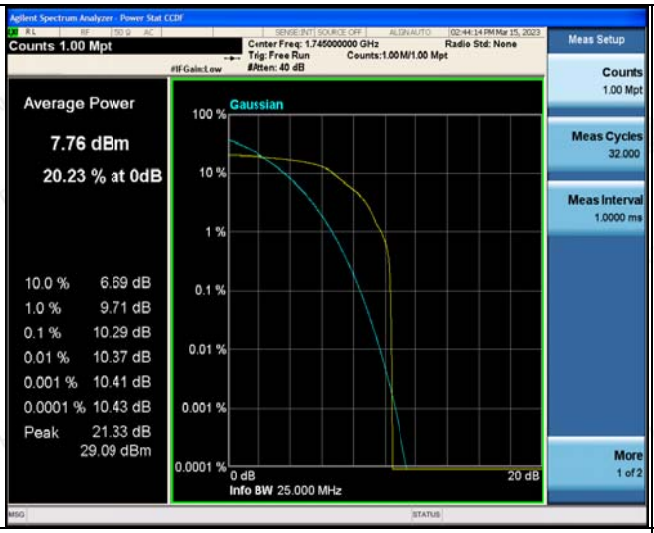
*LTE FDD Band 66-15MHz Channel Bandwidth PAPR*

| *QPSK* | *16QAM* |
|---|---|
| | |
| *1RB#0* | *1RB#0* |





*Low Channel*

| | |
|---|---|
|  | |
| *1RB#0* | *1RB#0* |





*Middle Channel*

| | |
|---|---|
| | |
| *1RB#0* | *1RB#0* |





*High Channel*

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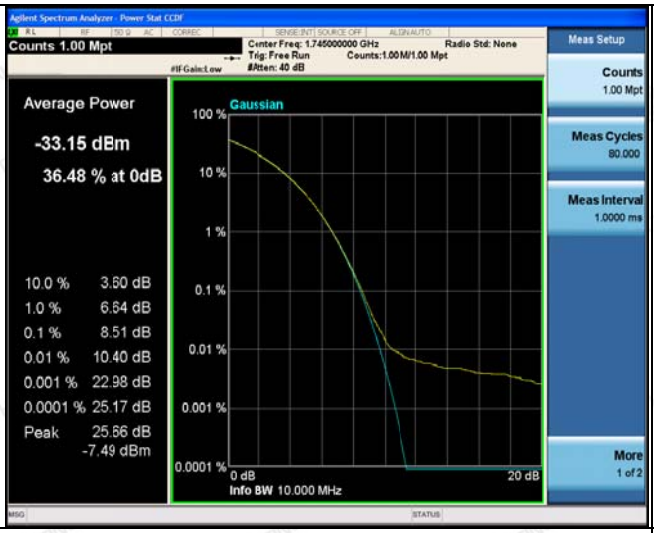
| LTE FDD Band 66-20MHz Channel Bandwidth PAPR | |
|---|---|
| QPSK | 16QAM |
| | |
| 1RB#0 | 1RB#0 |
| Low Channel | |
|  | |
| 1RB#0 | 1RB#0 |
| Middle Channel | |
| | |
| 1RB#0 | 1RB#0 |
| High Channel | |

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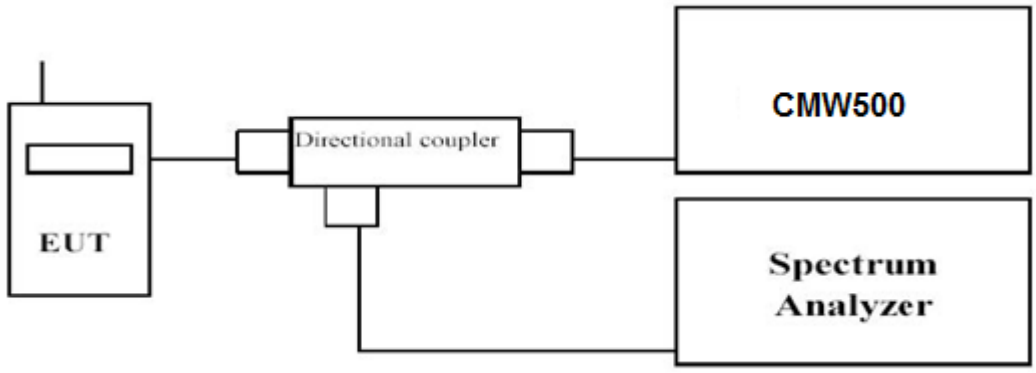
## 3.3 Occupied Bandwidth and Emission Bandwidth

**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≥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 66; recorded worst case for each Channel Bandwidth of LTE FDD Band 66.*

| *LTE FDD Band 66* | | | | | | |
|---|---|---|---|---|---|---|
| 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 | 1.270 | 1.242 | 1.0913 | 1.0897 |
| | | 1745 | 1.245 | 1.254 | 1.0921 | 1.0918 |
| | | 1779.3 | 1.253 | 1.251 | 1.0892 | 1.0894 |
| 3 MHz | *6RB#0* | 1711.5 | 1.258 | 1.247 | 1.0890 | 1.0890 |
| | | 1745 | 1.241 | 1.259 | 1.0863 | 1.0884 |
| | | 1778.5 | 1.251 | 1.246 | 1.0914 | 1.0899 |
| 5 MHz | *6RB#0* | 1712.5 | 1.282 | 1.273 | 1.0918 | 1.0967 |
| | | 1745 | 1.268 | 1.280 | 1.0965 | 1.0972 |
| | | 1777.5 | 1.242 | 1.252 | 1.0858 | 1.0846 |
| 10 MHz | *6RB#0* | 1715.0 | 1.259 | 1.265 | 1.0915 | 1.0902 |
| | | 1745 | 1.266 | 1.258 | 1.0972 | 1.0938 |
| | | 1775.0 | 1.259 | 1.238 | 1.0955 | 1.0838 |
| 15 MHz | *6RB#0* | 1717.5 | 1.280 | 1.300 | 1.1072 | 1.1079 |
| | | 1745 | 1.295 | 1.279 | 1.1037 | 1.1039 |
| | | 1772.5 | 1.273 | 1.283 | 1.1000 | 1.0987 |
| 20 MHz | *6RB#0* | 1720.0 | 1.314 | 1.318 | 1.1067 | 1.1111 |
| | | 1745 | 1.287 | 1.280 | 1.1107 | 1.1123 |
| | | 1770.0 | 1.273 | 1.279 | 1.1055 | 1.1097 |

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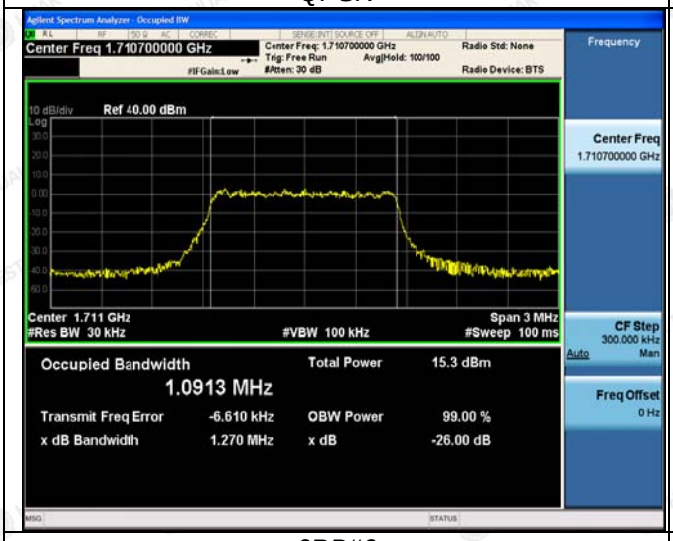
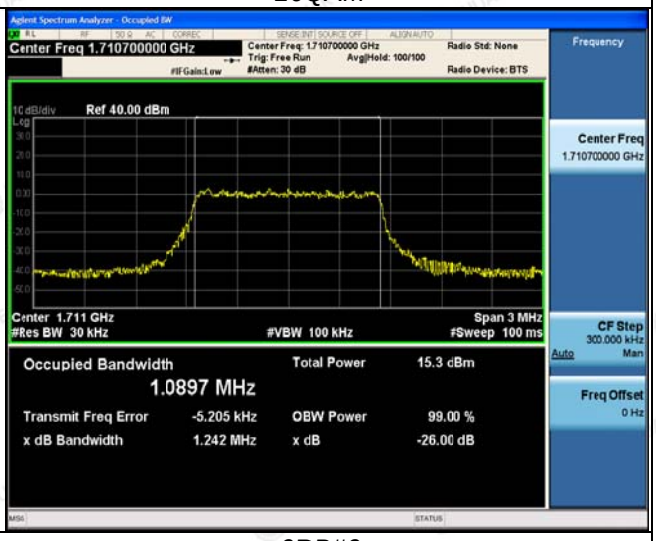
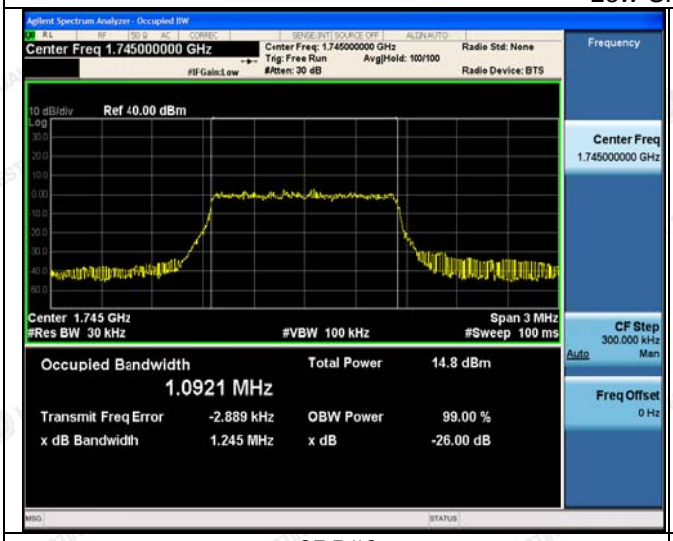
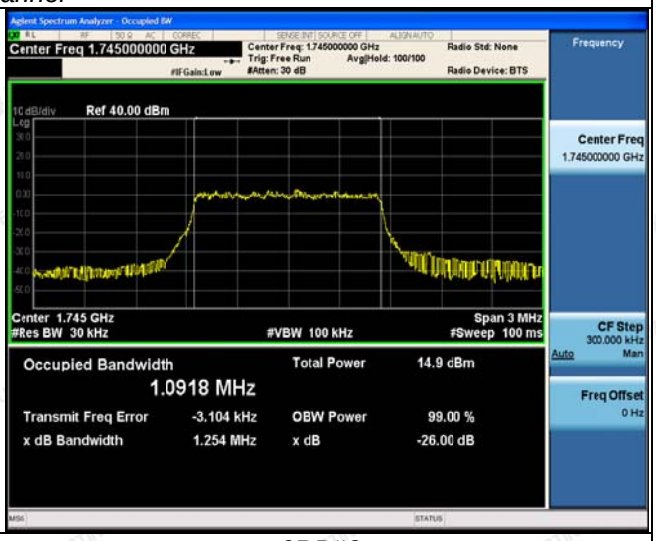
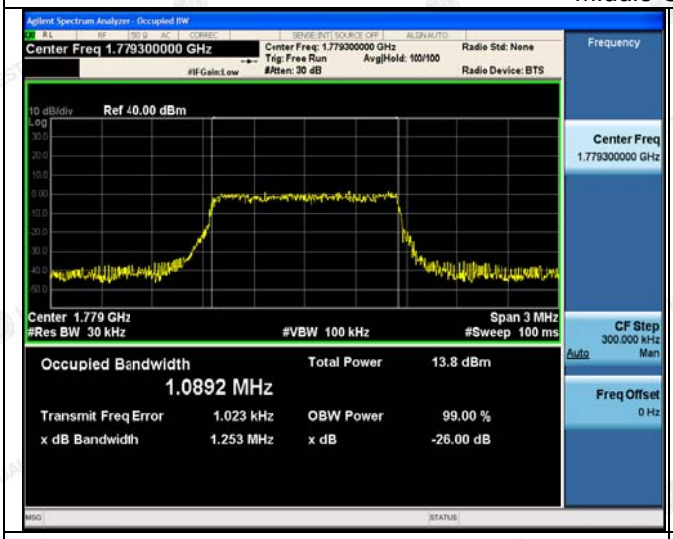
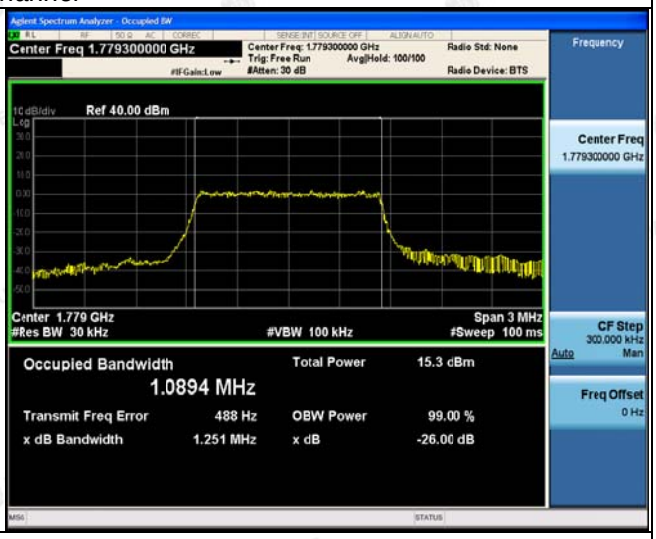
| LTE FDD Band 66-1.4MHz Channel Bandwidth | |
|---|---|
| QPSK | 16QAM |
|  |  |
| 6RB#0 | 6RB#0 |
| Low Channel | |
|  |  |
| 6RB#0 | 6RB#0 |
| Middle Channel | |
|  |  |
| 6RB#0 | 6RB#0 |
| High Channel | |

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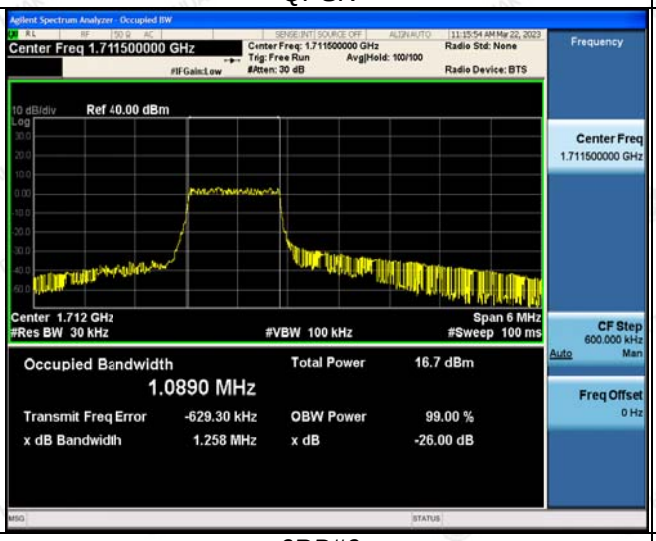
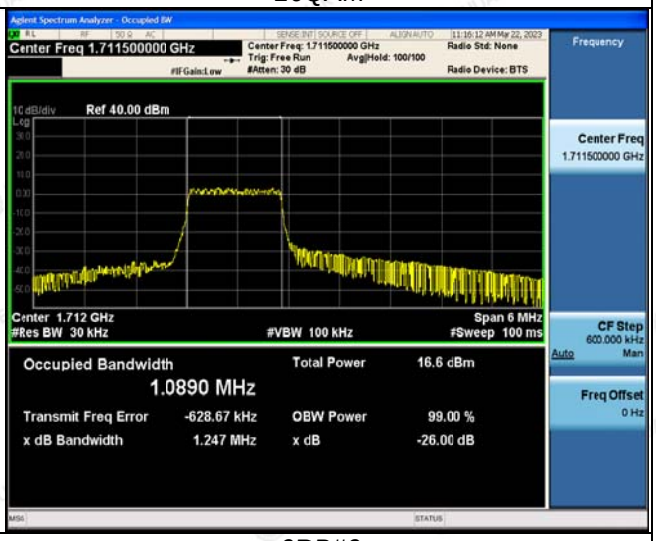
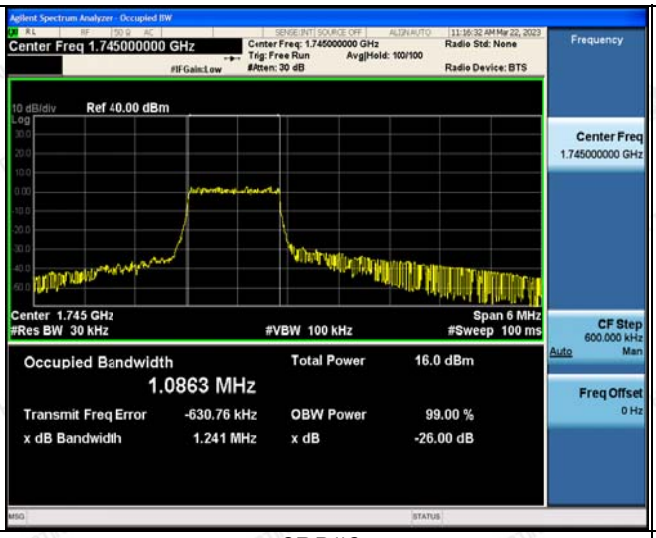
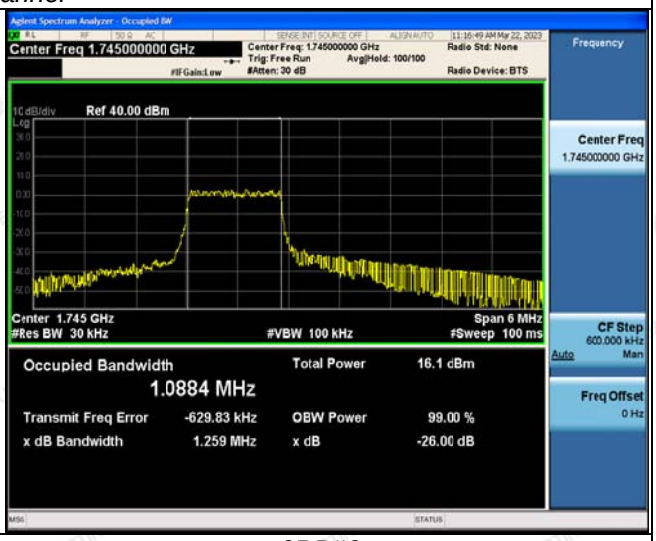
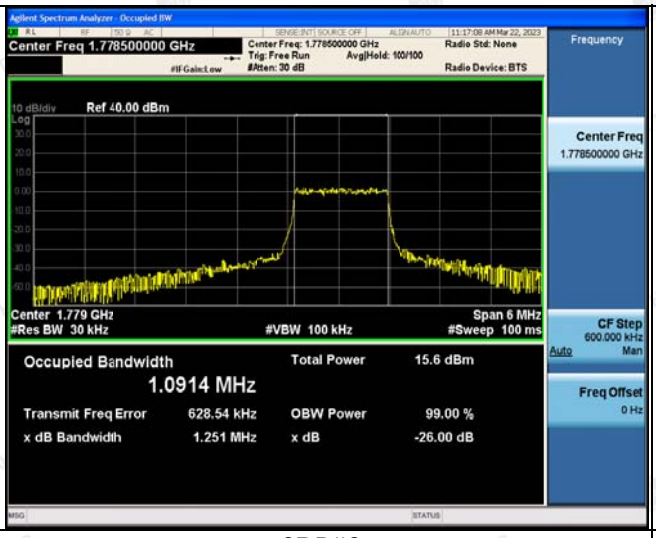
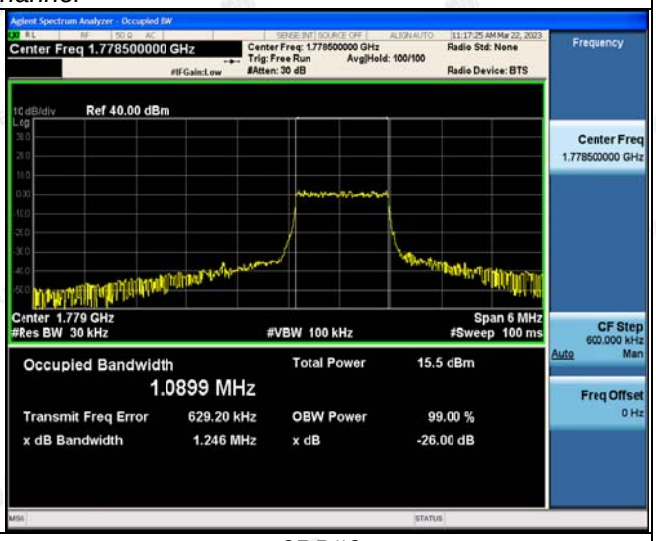
| LTE FDD Band 66-3MHz Channel Bandwidth | |
|---|---|
| QPSK | 16QAM |
|  |  |
| 6RB#0 | 6RB#0 |
| Low Channel | |
|  |  |
| 6RB#0 | 6RB#0 |
| Middle Channel | |
|  |  |
| 6RB#0 | 6RB#0 |
| High Channel | |

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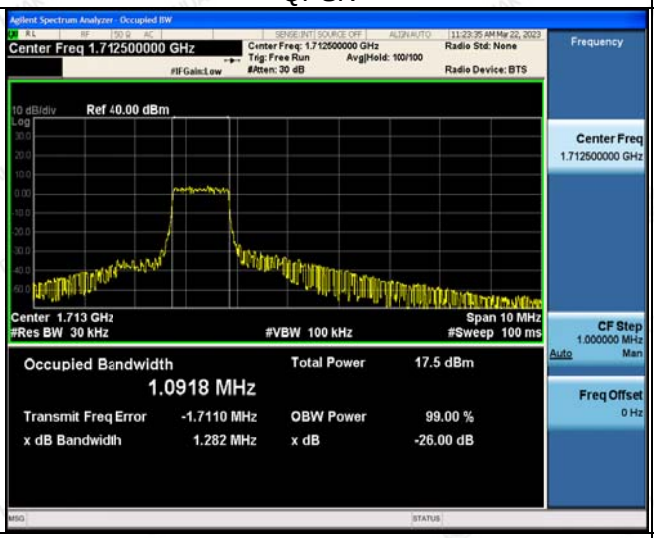
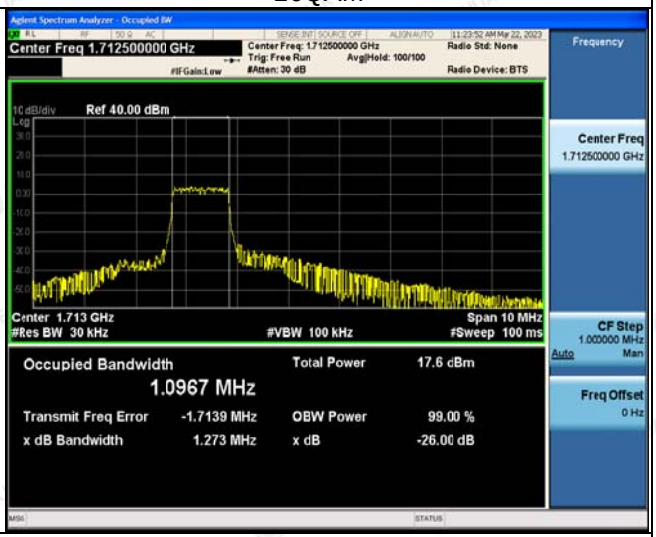
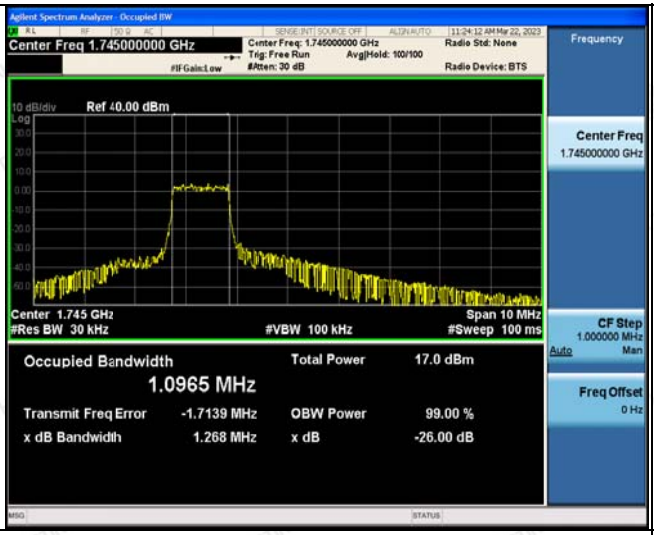
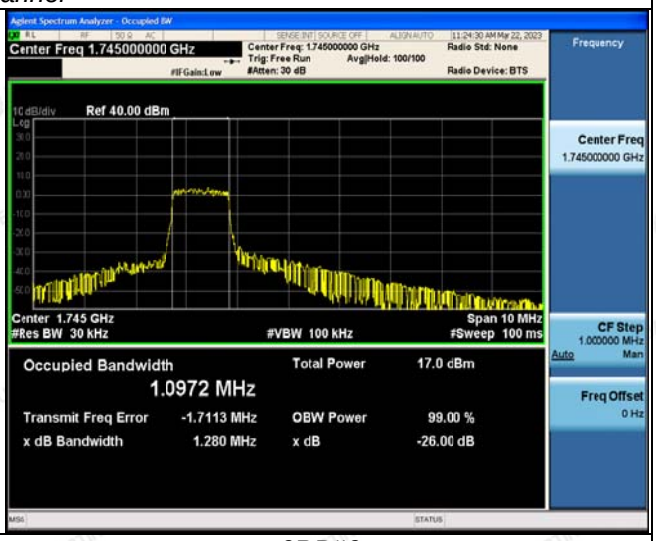
*LTE FDD Band 66-5MHz Channel Bandwidth*

| *QPSK* | *16QAM* |
|---|---|
|  |  |
| *6RB#0* | *6RB#0* |





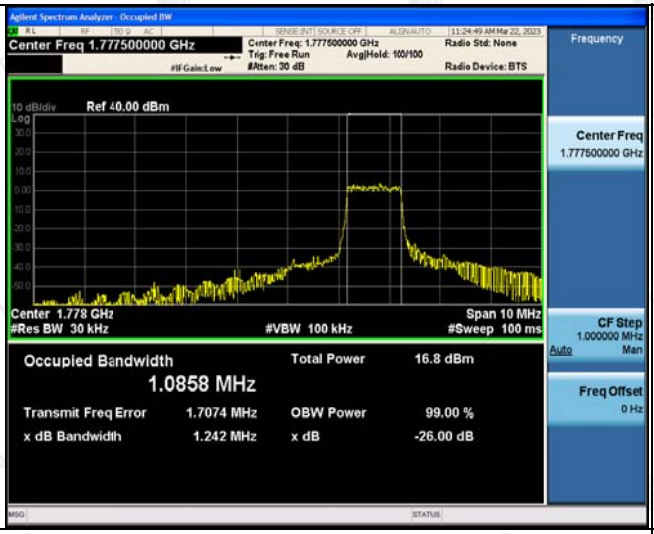
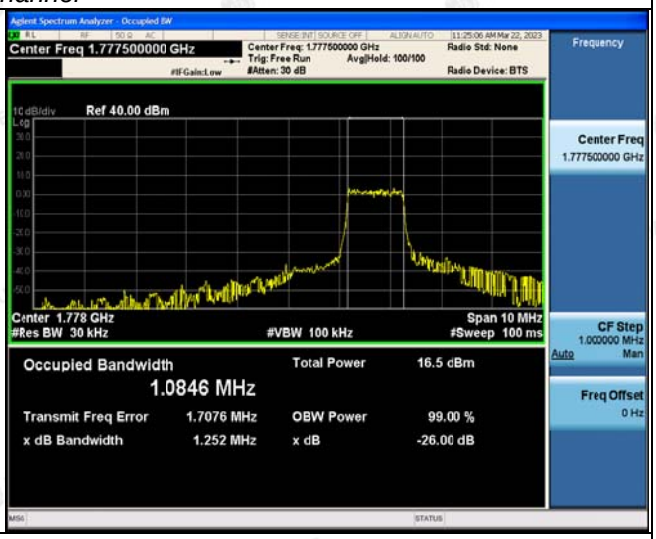
*Low Channel*

| | |
|---|---|
|  |  |
| *6RB#0* | *6RB#0* |





*Middle Channel*

| | |
|---|---|
|  |  |
| *6RB#0* | *6RB#0* |





*High Channel*

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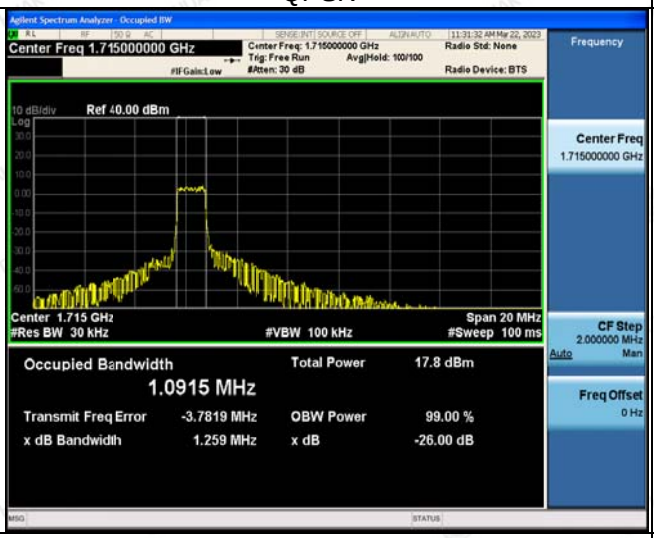
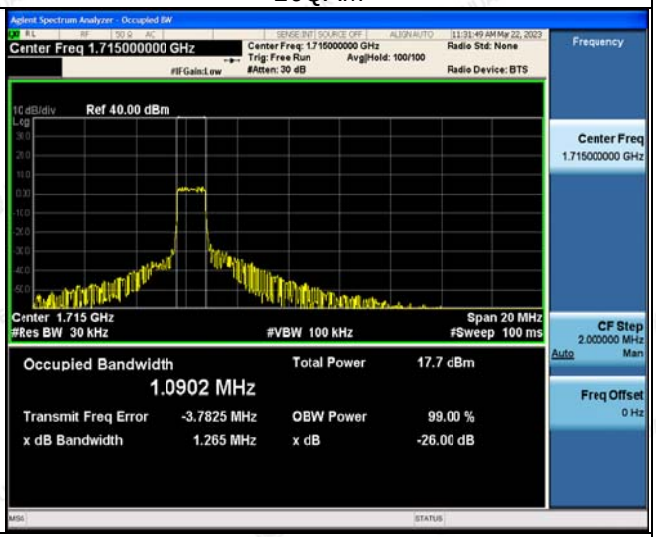
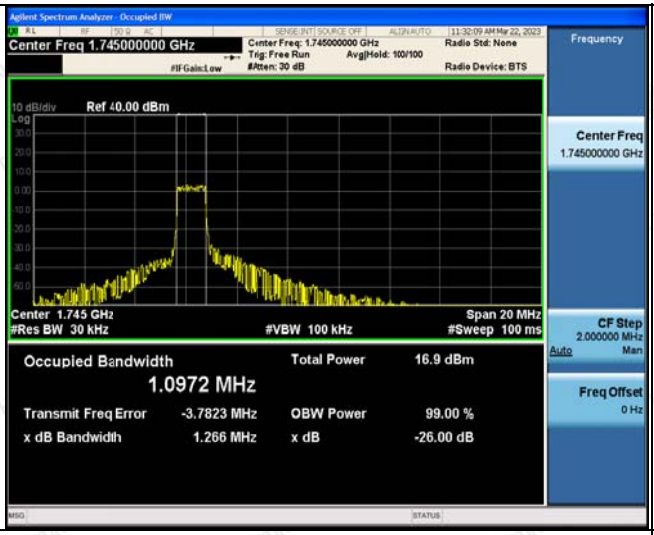
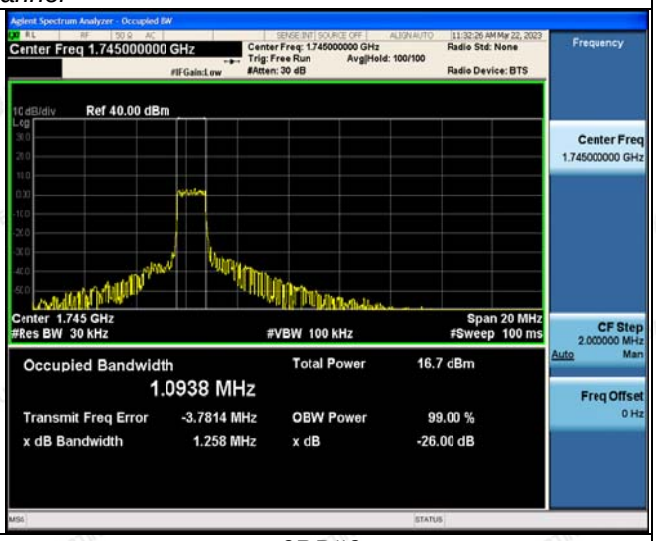
*LTE FDD Band 66-10MHz Channel Bandwidth*

| *QPSK* | *16QAM* |
|---|---|
|  |  |
| *6RB#0* | *6RB#0* |





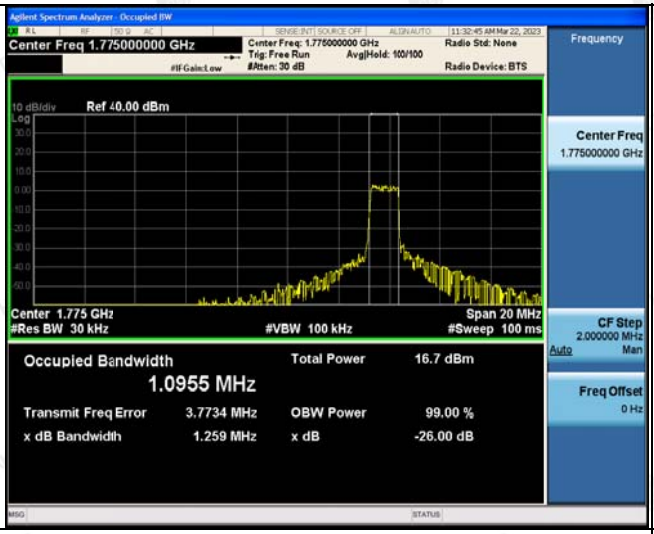
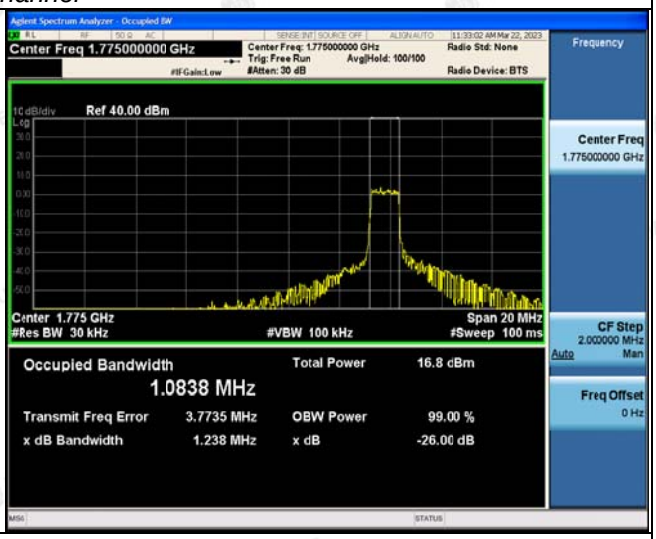
*Low Channel*

| | |
|---|---|
|  |  |
| *6RB#0* | *6RB#0* |





*Middle Channel*

| | |
|---|---|
|  |  |
| *6RB#0* | *6RB#0* |





*High Channel*

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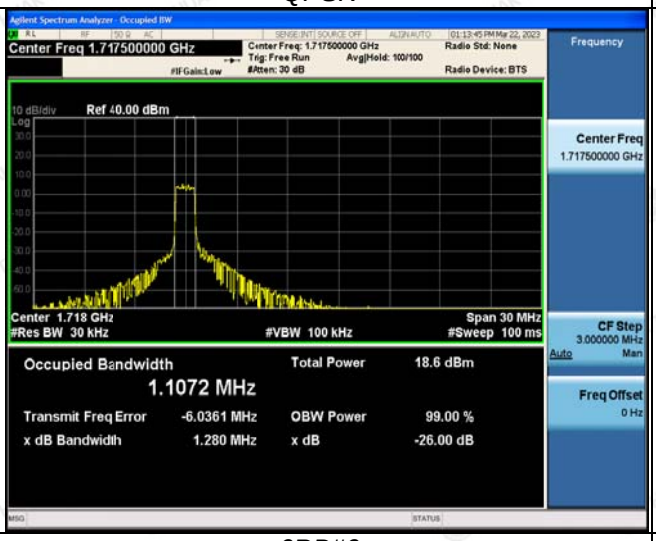
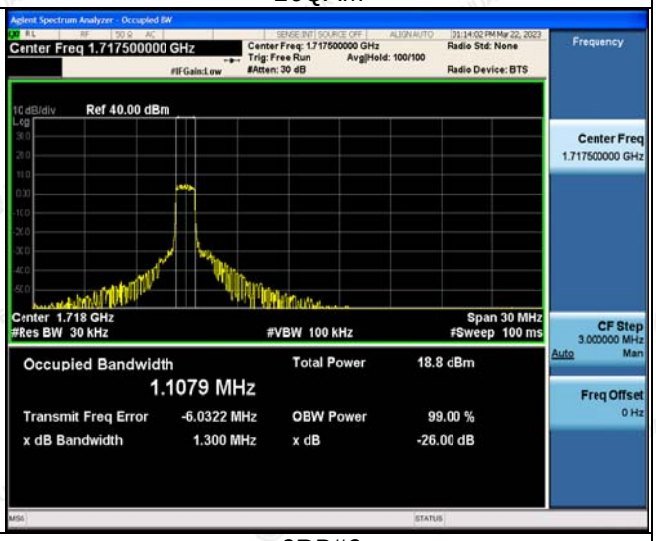
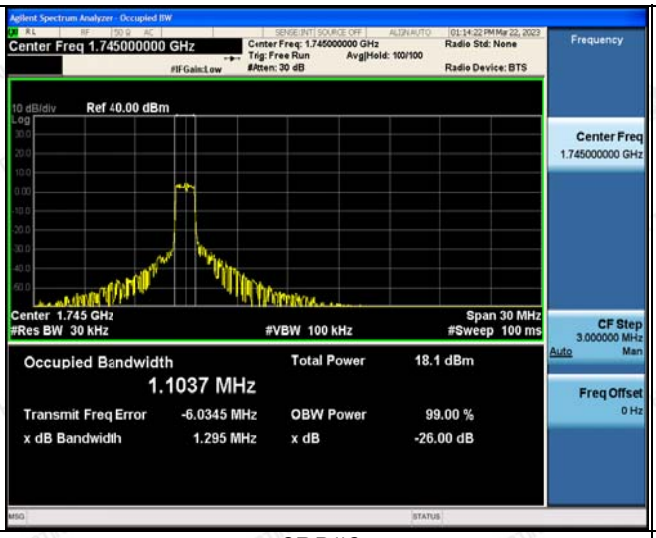
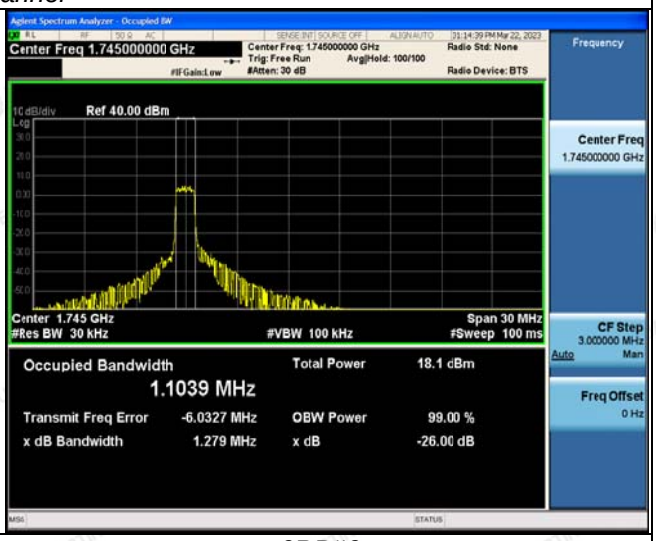
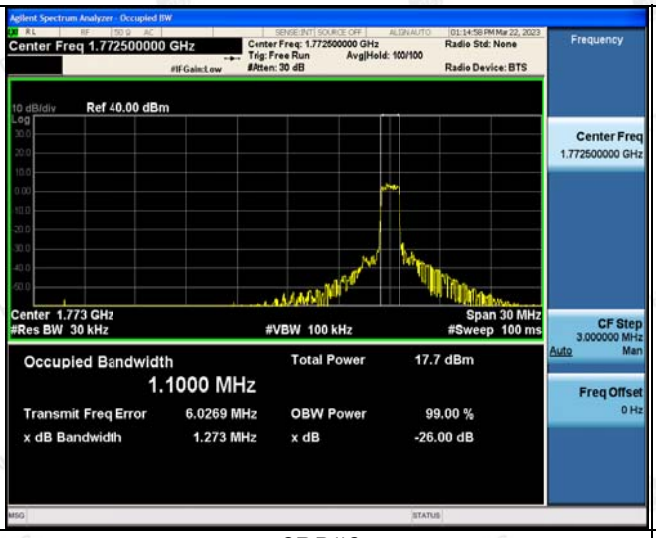
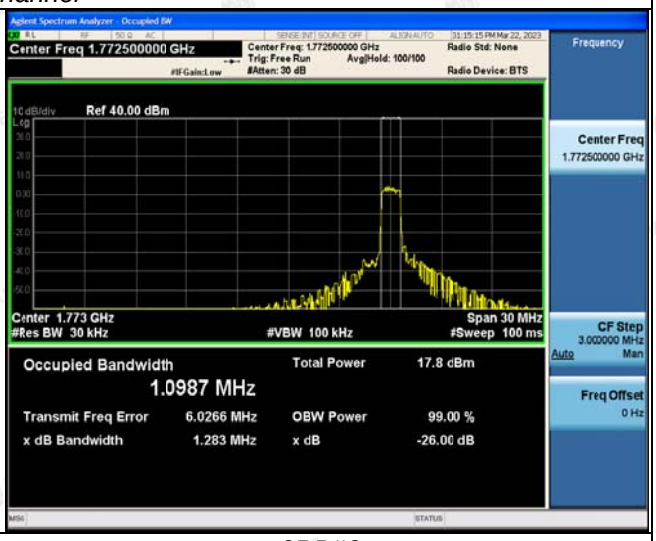
| LTE FDD Band 66-15MHz Channel Bandwidth | |
|---|---|
| QPSK | 16QAM |
|  |  |
| 6RB#0 | 6RB#0 |
| Low Channel | |
|  |  |
| 6RB#0 | 6RB#0 |
| Middle Channel | |
|  |  |
| 6RB#0 | 6RB#0 |
| High Channel | |

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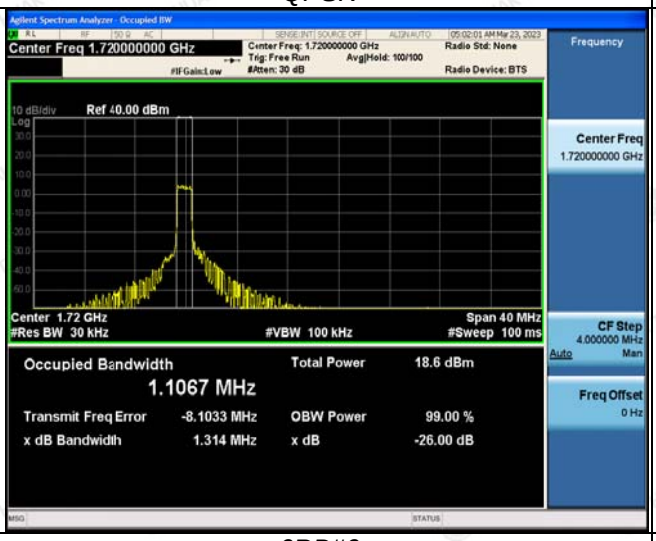
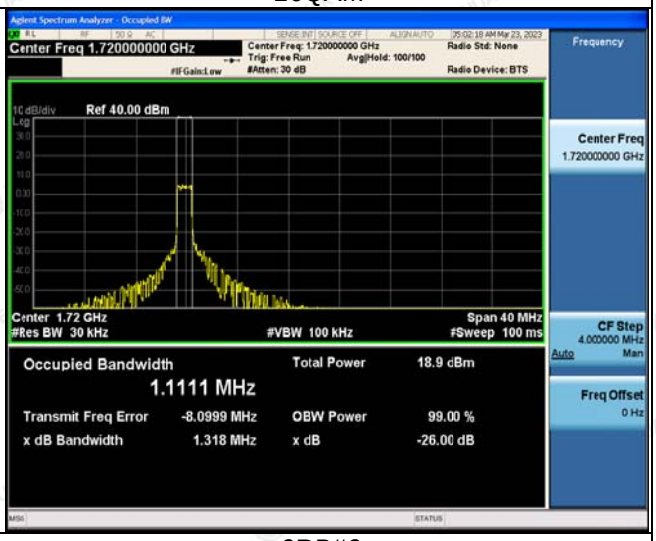
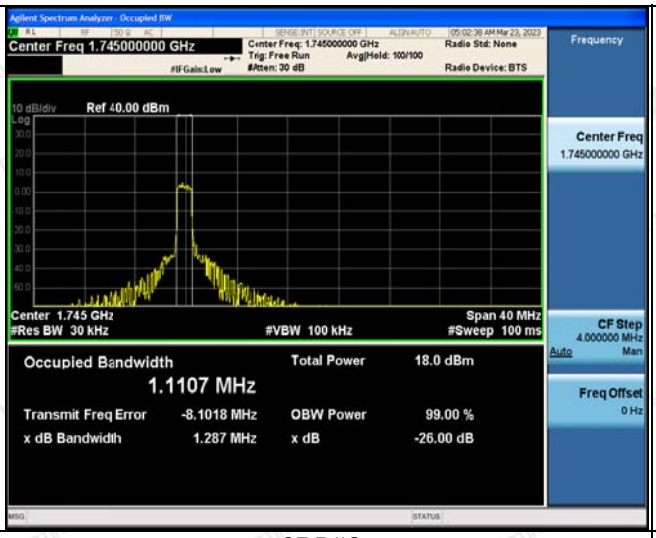
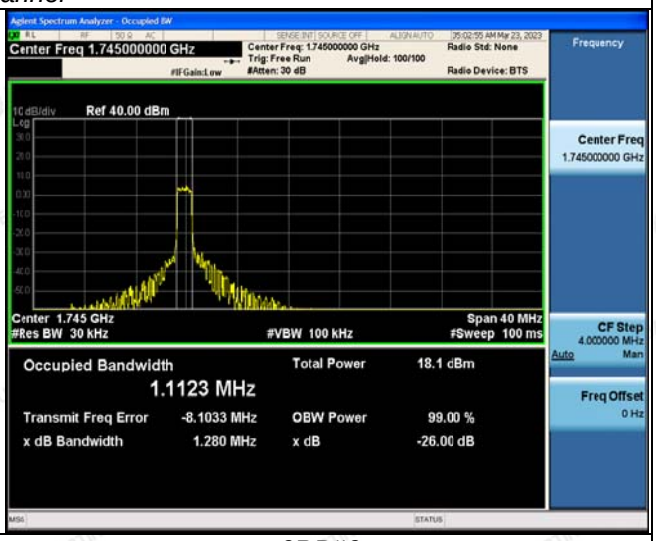
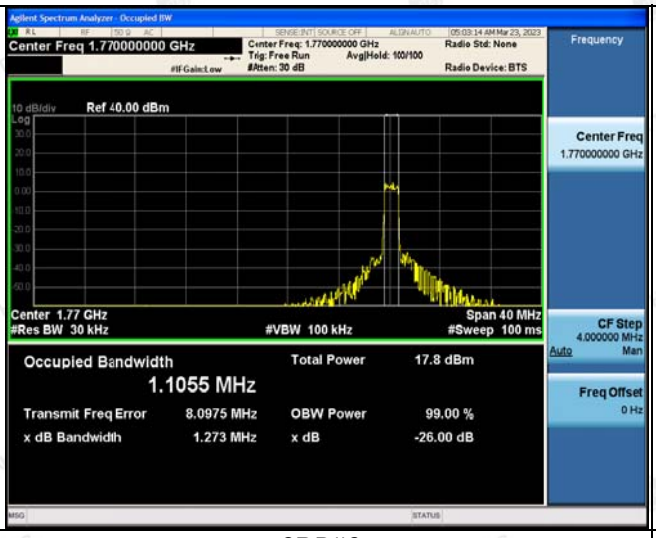
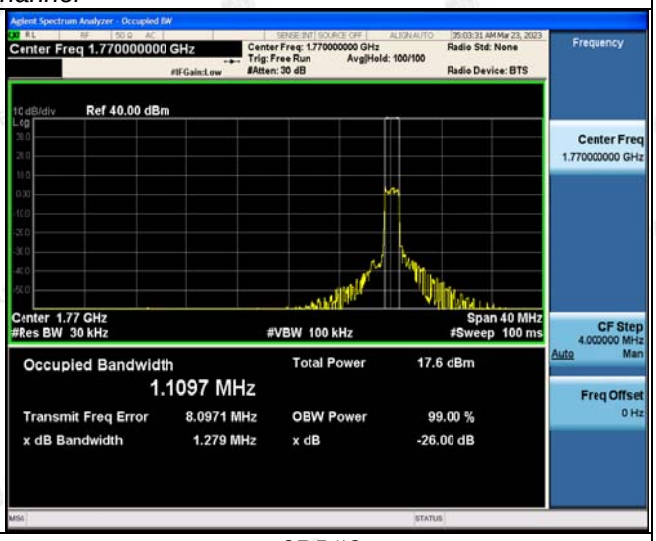
| LTE FDD Band 66-20MHz Channel Bandwidth | |
|---|---|
| QPSK | 16QAM |
|  |  |
| 6RB#0 | 6RB#0 |
| Low Channel | |
|  |  |
| 6RB#0 | 6RB#0 |
| Middle Channel | |
|  |  |
| 6RB#0 | 6RB#0 |
| High Channel | |

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