# LTE RADIO TEST REPORT

Report No: STS1512070F05

Issued for

UNNECTO HOLDING LIMITED

13/F HARBOUR COMMERCIAL BUILDING
122-124 CONNAUGHT ROAD CENTRAL SHEUNG WAN HK

| | |
|---|---|
| Product Name: | 4G MOBILE PHONE |
| Brand Name: | unnecto ™ |
| Model No.: | U5051 |
| Series Model: | N/A |
| **FCC ID:** | 2ADR3U5051 |
| **Test Standard:** | FCC Part 24E<br>FCC Part 27L/M |



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# TEST RESULT CERTIFICATION

**Applicant's name**..... UNNECTO HOLDING LIMITED

Address..... 13/F HARBOUR COMMERCIAL BUILDING
122-124 CONNAUGHT ROAD CENTRAL SHEUNG WAN HK

**Manufacture's Name**..... Shenzhen Uni-one Electronic Co.,Ltd

Address..... 5/F,Bldg A2,Kexing Science Park,Keyuan Rd.,Hi-Tech Park
Shenzhen,P.R.China

Product name..... 4G MOBILE PHONE

Band name ..... unnecto ™

Model and/or type reference. U5051

**Standards**..... FCC Part 24E. FCC Part 27L/M

Test procedure..... ANSI / TIA / EIA-603-C-2009

This device described above has been tested by STS and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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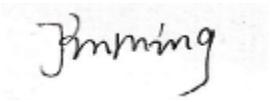
**Date of Test**.....

Date of performance of tests..... 15 Dec. 2015 ~22 Dec. 2015

Date of Issue..... 23 Dec. 2015

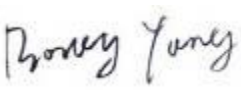
Test Result ..... **Pass**

Testing Engineer **:** 

(Jin Ming)

Technical Manager **:** 

(Tony Liu)

Authorized Signatory **:** 

(Bovey Yang)

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## Revision History

| Rev. | Issue Date | Report NO. | Effect Page | Contents |
|---|---|---|---|---|
| 00 | 23 Dec. 2015 | STS1512070F05 | ALL | Initial Issue |
| | | | | |

# 1. SUMMARY OF TEST RESULTS

## 1.1 TEST RESULTS DESCRIPTION AND LABORATORY INFORMATION

| Setion | FCC Rule | Description | Limit | Result |
|---|---|---|---|---|
| | §2.1046 | Conducted Output Power | Reporting Only | PASS |
| | §24.232(d) | Peak-to-Average Ratio | <13 dB | PASS |
| | §2.1049<br>§24.238(b)<br>§27.53(h)(3)<br>§27.53(m)(6) | Occupied Bandwidth | Reporting Only | PASS |
| | §2.1051<br>§24.238(a)<br>§27.53(g)<br>§27.53(h) | Conducted Band Edge Measurement<br>(Band 2 ) (Band 4) (Band 12) (Band 17) | <43+10log10(P[Watts]) | PASS |
| | §27.53(m)(4/6) | (Band 7) | <43+10log10(P[Watts]) | PASS |
| | §2.1051<br>§24.238(a)<br>§27.53(g)<br>§27.53(h) | Conducted Spurious Emission<br>(Band 2 ) (Band 4) (Band 12) (Band 17) | <43+10log10(P[Watts]) | PASS |
| | §27.53(m)(4/6) | Conducted Spurious Emission<br>(Band 7) | < 55+10log10(P[Watts]) | PASS |
| | §2.1055<br>§24.235<br>§27.54 | Frequency Stability<br>Temperature & Voltage | < 2.5 ppm for Part 22<br>Within Authorized Band | PASS |

| | | | | |
|---|---|---|---|---|
| | §22.913(a)(2 | Effective Radiated Power (Band 5) | ERP < 7 Watt | |
| | §27.50(c)(10) §27.50(b)(10) | Effective Radiated Power (Band 17) (Band 12) | ERP < 3 Watt | PASS |
| | §24.232(c) | Equivalent Isotropic Radiated Power (Band 2) | EIRP < 2Watt | PASS |
| | §27.50(d)(4) | Equivalent Isotropic Radiated Power (Band 4) | EIRP < 1Watt | PASS |
| | §2.1051 §22.917(a) §24.238(a) §27.53(g) | Radiated Spurious Emission (Band 2 ) (Band 4) (Band 12) (Band 17) | < 43+10log10(P[Watts]) | PASS |
| | §27.53(m)(4)(6) | Radiated Spurious Emission (Band 7) | < 55+10log10(P[Watts]) | PASS |

1.1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.
Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,
Fuyong Street, Bao'an District, Shenzhen, Guangdong,China
CNAS Registration No.: L7649;
FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

| No. | Item | Uncertainty |
|---|---|---|
| 1 | Conducted Emission (9KHz-150KHz) | ±2.88dB |
| 2 | Conducted Emission (150KHz-30MHz) | ±2.67dB |
| 3 | RF power,conducted | ±0.70dB |
| 4 | Spurious emissions,conducted | ±1.19dB |
| 5 | All emissions,radiated(<1G) 30MHz-200MHz | ±2.83dB |
| 6 | All emissions,radiated(<1G) 200MHz-1000MHz | ±2.94dB |
| 7 | All emissions,radiated(>1G) | ±3.03dB |
| 8 | Temperature | ±0.5°C |
| 9 | Humidity | ±2% |

# 2. GENERAL INFORMATION

## 2.1 TECHNICAL SPECIFICATIONS AND REGULATIONS

### 2.1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

| | |
|---|---|
| Product Designation: | 4G MOBILE PHONE |
| Hardware version: | V1.0 |
| Software version: | UNI-ONE_L551_1527_V01_T09_0807（USA）.zip |
| FCC ID: | 2ADR3U5051 |
| Frequency Bands: | U.S. Bands:<br>☒LTE FDD Band 2 ☒LTE FDD Band 4<br>☐LTE FDD Band 5 ☐LTE FDD Band 7<br>☒LTE FDD Band 12 ☐LTE FDD Band 13<br>☒LTE FDD Band 17 |
| SIM CARD | SIM 1 and SIM 2 is a chipset unit and tested as single chipset,SIM 1 is used to tested |
| Antenna: | PIFA Antenna |
| Antenna gain: | LTE Band 12 :-1.5 dBi<br>LTE Band 17 :-1.4dBi<br>LTE Band 4 :-1.1 dBi<br>LTE Band 2 :-0.9 dBi |
| Power Supply: | DC 3.8V by battery or DC 5.0V supplied by adapter |
| Battery parameter: | Capacitance: 2300mA, Rated Voltage: 3.8V |
| Adapter Input: | AC100-240V, 50-60Hz, 180mA |
| Adapter Output: | DC 5.0V, 1000mA |

2.1.2 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

| Product Specification Subjective To This Standard | |
|---|---|
| **Tx Frequency** | LTE Band 2:1850.7~1909.3MHz<br>LTE Band 4:1710.7~1754.3MHz<br>LTE Band 12 : 699 MHz ~ 716 MHz<br>LTE Band 17:706.5~713.5MHz |
| **Rx Frequency** | LTE Band 2:1930.7~1989.3MHz<br>LTE Band 4:2110.7~2154.3MHz<br>LTE Band 12 : 729 MHz ~ 746 MHz<br>LTE Band 17:736.5~743.5MHz |
| **Bandwidth** | LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz<br>LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz<br>LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz<br>LTE Band 17 : 5MHz / 10MHz |
| **Maximum Output Power Limit** | LTE Band 2 : 21.60 dBm<br>LTE Band 4 : 22.74 dBm<br>LTE Band 12 : 22.96 dBm<br>LTE Band 17 : 22.71 dBm |
| **Type of Modulation** | QPSK / 16QAM |

2.1.3 EMISSION DESIGNATOR

| LTE Band 2 BW(MHz) | Emission Designator (99%OBW)QPSK | Emission Designator (99%OBW)16QAM |
|---|---|---|
| 1.4 | 1M10G7D | 1M11W7D |
| 3 | 2M69G7D | 2M68W7D |
| 5 | 4M52G7D | 5M31W7D |
| 10 | 8M95G7D | 8M96W7D |
| 15 | 13M53G7D | 13M52W7D |
| 20 | 17M95G7D | 17M95W7D |

| LTE Band 4 BW(MHz) | Emission Designator (99%OBW)QPSK | Emission Designator (99%OBW)16QAM |
|---|---|---|
| 1.4 | 1M10G7D | 1M10W7D |
| 3 | 2M69G7D | 2M68W7D |
| 5 | 4M52G7D | 4M53W7D |
| 10 | 8M95G7D | 8M94W7D |
| 15 | 13M52G7D | 13M53W7D |
| 20 | 17M97G7D | 17M97W7D |

| LTE Band 12 BW(MHz) | Emission Designator (99%OBW)QPSK | Emission Designator (99%OBW)16QAM |
|---|---|---|
| 1.4 | 1M11G7D | 1M11W7D |
| 3 | 2M69G7D | 2M69W7D |
| 5 | 4M54G7D | 4M54W7D |
| 10 | 8M97G7D | 8M98W7D |

| LTE Band 17 BW(MHz) | Emission Designator (99%OBW)QPSK | Emission Designator (99%OBW)16QAM |
|---|---|---|
| 5 | 4M54G7D | 4M53W7D |
| 10 | 8M95G7D | 8M94W7D |

2.1.4 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D02 Power Meas. License Digital Systems v02r02 with maximum output power.Radiated measurements are performed by rotating the EUT in three different orthogonal test planes tofind the maximum emission.

Remark:

1. The mark “v “ means that this configuration is chosen for testing
2. The mark “-“ means that this bandwidth is not supported.
3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated

| ITEMS | Band | Bandwidth (MHz) | | | | | | Modulation | | RB # | | | Test Channel | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.4 | 3 | 5 | 10 | 15 | 20 | QPSK | 16QAM | 1 | Half | Full | L | M | H |
| Max. Output Power | 2 | v | v | v | v | v | v | v | v | v | v | v | v | v | v |
| | 4 | v | v | v | v | v | v | v | v | v | v | v | v | v | v |
| | 12 | v | v | v | v | - | - | v | v | v | v | v | v | v | v |
| | 17 | - | - | v | v | - | - | v | v | v | v | v | v | v | v |
| Peak&Avera Ratio | 2 | | | | | | v | v | v | v | | v | v | v | v |
| | 4 | | | | | | v | v | v | v | | v | v | v | v |
| | 12 | | | | v | - | - | v | v | v | | v | v | v | v |
| | 17 | - | - | | v | - | - | v | v | v | | v | v | v | v |
| 26dB&99% Bandwidth | 2 | v | v | v | v | v | v | v | v | | | v | v | v | v |
| | 4 | v | v | v | v | v | v | v | v | | | v | v | v | v |
| | 12 | v | v | v | v | - | - | v | v | | | v | v | v | v |
| | 17 | - | - | v | v | - | - | v | v | | | v | v | v | v |
| Conducted Band Edge | 2 | v | v | v | v | v | v | v | v | v | | v | v | v | v |
| | 4 | v | v | v | v | v | v | v | v | v | | v | v | v | v |
| | 12 | v | v | v | v | - | - | v | v | v | | v | v | v | v |
| | 17 | - | - | v | v | - | - | v | v | v | | v | v | v | v |

| ITEMS | Band | Bandwidth (MHz) | | | | | | Modulation | | RB # | | | Test Channel | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.4 | 3 | 5 | 10 | 15 | 20 | QPSK | 16QAM | 1 | Half | Full | L | M | H |
| Conducted Spurious Emission | 2 | v | v | v | v | v | v | v | v | v | | | v | v | v |
| | 4 | v | v | v | v | v | v | v | v | v | | | v | v | v |
| | 12 | v | v | v | v | - | - | v | v | v | | | v | v | v |
| | 17 | - | - | v | v | - | - | v | v | v | | | v | v | v |
| Frequency Stability | 2 | | | | v | | | v | | | | v | | v | |
| | 4 | | | | v | | | v | | | | v | | v | |
| | 12 | | | | v | - | - | v | | | | v | | v | |
| | 17 | - | - | | v | - | - | v | | | | v | | v | |
| E.R.P.& E.I.R.P. | 2 | v | v | v | v | v | v | v | v | v | | | v | v | v |
| | 4 | v | v | v | v | v | v | v | v | v | | | v | v | v |
| | 12 | v | v | v | v | - | - | v | v | v | | | v | v | v |
| | 17 | - | - | v | v | - | - | v | v | v | | | v | v | v |
| Radiated Spurious Emission | 2 | v | v | v | v | v | v | v | | v | | | v | v | v |
| | 4 | v | v | v | v | v | v | v | | v | | | v | v | v |
| | 12 | v | v | v | v | - | - | v | | v | | | v | v | v |
| | 17 | - | - | v | v | - | - | v | | v | | | v | v | v |

2.1.5 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for filing to comply with the fcc part 24E&27.

2.1.6 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with eut intended for fcc grant together.

2.1.7 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.1.8 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.1.9 CONFIGURATION OF EUT SYSTEM

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

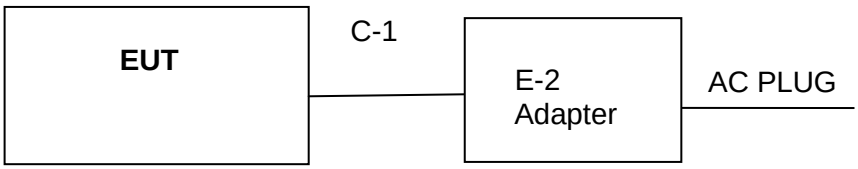



Table 2-1 Equipment Used in EUT System

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|---|---|---|---|---|---|
| E-1 | 4G MOBILE PHONE | unnecto ™ | U5051 | N/A | EUT |
| E-2 | Adapter | unnecto ™ | CU-5051 | N/A | EUT |
| | | | | | |
| | | | | | |

| Item | Shielded Type | Ferrite Core | Length | Note |
|---|---|---|---|---|
| C-1 | USB Cable | NO | 99cm | N/A |
| | | | | |
| | | | | |

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

(3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

(4) PC is the FCC DOC is approved.

2.1.10 MEASUREMENT INSTRUMENTS

The radiated emission testing was performed according to the procedures of ansi ANSI / TIA / EIA-603-C-2004 and fcc cfr 47 rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last Calibration | Calibrated Until |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4407B | MY50140340 | 2015.10.25 | 2016.10.24 |
| Test Receiver | R&S | ESCI | 101427 | 2015.10.25 | 2016.10.24 |
| Communication Tester | Agilent | 8960 | MY48360751 | 2015.11.20 | 2016.11.19 |
| Communication Tester | R&S | CMU200 | 112012 | 2015.10.25 | 2016.10.24 |
| Test Receiver | R&S | ESCI | 102086 | 2015.10.25 | 2016.10.24 |
| Bilog Antenna (measurement) | TESEQ | CBL6111D (30MHz-1GHz) | 34678 | 2015.11.25 | 2016.11.24 |
| Horn Antenna (measurement) | Schwarzbeck | BBHA 9120D(1201) (1GHz-18GHz) | 9120D-1343 | 2015.03.06 | 2016.03.05 |
| STS-E048 | MXA SIGNAL Analyzer | Agilent | N9020A | 2015.10.25 | 2016.10.24 |
| Logarithm -Antenna(substituted) | Schwarzbeck | VUSLP 9111 (200MHz-4GHz) | 9111-512 | 2015.09.03 | 2016.09.02 |
| Horn-Antenna(substituted) | Schwarzbeck | BBHA9120D (1GHz-18GHz) | D:266 | 2015.03.06 | 2016.03.05 |

2. 1.11 MEASUREMENT RESULTS EXPLANATION EXAMPLE

For all conducted test items:
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factorbetween EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
*Offset = RF Cable Loss + Attenuator Factor.*

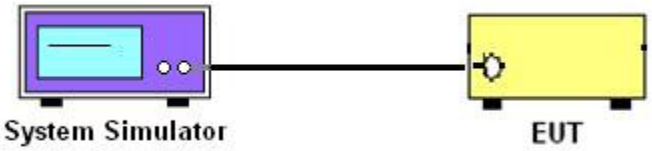
# 3. CONDUCTED OUTPUT POWER

## 3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

### 3.1.1 MEASUREMENT METHOD

A System Simulator Was Used To Establish Communication With The EUT. Its Parameters Were Set To Force The EUT Transmitting At Maximum Output Power. The Measured Power In The Radio Frequency On The Transmitter Output Terminals Shall Be Reported.
configuration follows KDB 971168 D01.

### 3.1.2 TEST SETUP




### 3.1.3 TEST PROCEDURES

1. The Transmitter Output Port Was Connected To The System Simulator.

2. Set EUT at maximum power through the system simulator.

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Measure and record the power level from the system simulator.

3.1.4 TEST RESULTS

**LTE BAND 2**

| LTE Band 2 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 1.4 | 1 | 0 | QPSK | 21.20 | 21.09 | 21.50 |
| 1.4 | 1 | 2 | | 21.16 | 21.07 | 21.49 |
| 1.4 | 1 | 5 | | 21.19 | 21.11 | 21.55 |
| 1.4 | 3 | 0 | | 21.32 | 21.30 | 21.58 |
| 1.4 | 3 | 1 | | 21.26 | 21.35 | 21.60 |
| 1.4 | 3 | 2 | | 21.23 | 21.26 | 21.54 |
| 1.4 | 6 | 0 | | 20.17 | 20.05 | 20.40 |
| 1.4 | 1 | 0 | 16-QAM | 20.34 | 20.18 | 20.49 |
| 1.4 | 1 | 2 | | 20.29 | 20.16 | 20.47 |
| 1.4 | 1 | 5 | | 20.31 | 20.21 | 20.54 |
| 1.4 | 3 | 0 | | 20.38 | 20.24 | 20.56 |
| 1.4 | 3 | 1 | | 20.36 | 20.21 | 20.54 |
| 1.4 | 3 | 2 | | 20.39 | 20.25 | 20.63 |
| 1.4 | 6 | 0 | | 19.23 | 19.19 | 19.39 |
| 3 | 1 | 0 | QPSK | 21.23 | 21.04 | 21.47 |
| 3 | 1 | 7 | | 21.17 | 21.12 | 21.48 |
| 3 | 1 | 14 | | 21.24 | 21.08 | 21.52 |
| 3 | 8 | 0 | | 20.42 | 20.21 | 20.54 |
| 3 | 8 | 4 | | 20.48 | 20.36 | 20.58 |
| 3 | 8 | 7 | | 20.31 | 20.21 | 20.56 |
| 3 | 15 | 0 | | 20.28 | 20.19 | 20.51 |
| 3 | 1 | 0 | 16-QAM | 20.84 | 20.69 | 20.93 |
| 3 | 1 | 7 | | 20.88 | 20.73 | 20.97 |
| 3 | 1 | 14 | | 20.87 | 20.70 | 21.04 |
| 3 | 8 | 0 | | 20.78 | 20.69 | 21.05 |
| 3 | 8 | 4 | | 20.99 | 20.87 | 21.14 |
| 3 | 8 | 7 | | 20.93 | 20.87 | 21.18 |
| 3 | 15 | 0 | | 19.52 | 19.38 | 19.87 |

**LTE BAND 2**

| LTE Band 2 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 5 | 1 | 0 | QPSK | 21.24 | 21.12 | 21.46 |
| 5 | 1 | 12 | | 21.28 | 21.16 | 21.51 |
| 5 | 1 | 24 | | 21.26 | 21.14 | 21.47 |
| 5 | 12 | 0 | | 20.37 | 20.26 | 20.51 |
| 5 | 12 | 6 | | 20.54 | 20.35 | 20.62 |
| 5 | 12 | 11 | | 20.39 | 20.27 | 20.54 |
| 5 | 25 | 0 | | 20.24 | 20.19 | 20.38 |
| 5 | 1 | 0 | 16-QAM | 20.33 | 20.21 | 20.55 |
| 5 | 1 | 12 | | 20.37 | 20.25 | 20.58 |
| 5 | 1 | 24 | | 20.32 | 20.23 | 20.57 |
| 5 | 12 | 0 | | 20.48 | 20.36 | 20.64 |
| 5 | 12 | 6 | | 20.51 | 20.42 | 20.69 |
| 5 | 12 | 11 | | 20.48 | 20.44 | 20.70 |
| 5 | 25 | 0 | | 19.63 | 19.54 | 19.84 |
| 10 | 1 | 0 | QPSK | 21.24 | 21.11 | 21.44 |
| 10 | 1 | 24 | | 21.23 | 21.12 | 21.45 |
| 10 | 1 | 49 | | 21.28 | 21.17 | 21.48 |
| 10 | 25 | 0 | | 20.35 | 20.21 | 20.52 |
| 10 | 25 | 12 | | 20.42 | 20.36 | 20.68 |
| 10 | 25 | 24 | | 20.33 | 20.26 | 20.56 |
| 10 | 50 | 0 | | 20.31 | 20.28 | 20.55 |
| 10 | 1 | 0 | 16-QAM | 20.67 | 20.53 | 21.02 |
| 10 | 1 | 24 | | 20.78 | 20.74 | 21.04 |
| 10 | 1 | 49 | | 20.94 | 20.82 | 20.96 |
| 10 | 25 | 0 | | 20.81 | 20.63 | 21.14 |
| 10 | 25 | 12 | | 20.81 | 20.86 | 21.15 |
| 10 | 25 | 24 | | 21.05 | 20.96 | 21.08 |
| 10 | 50 | 0 | | 19.53 | 19.41 | 19.66 |

**LTE BAND 2**

| LTE Band 2 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 15 | 1 | 0 | QPSK | 21.28 | 21.16 | 21.47 |
| 15 | 1 | 37 | | 21.31 | 21.17 | 21.45 |
| 15 | 1 | 74 | | 21.44 | 21.26 | 21.53 |
| 15 | 36 | 0 | | 20.31 | 20.19 | 20.54 |
| 15 | 36 | 18 | | 20.42 | 20.32 | 20.65 |
| 15 | 36 | 39 | | 20.35 | 20.24 | 20.58 |
| 15 | 75 | 0 | | 20.32 | 20.23 | 20.59 |
| 15 | 1 | 0 | 16-QAM | 20.84 | 20.72 | 21.02 |
| 15 | 1 | 38 | | 20.91 | 20.78 | 20.94 |
| 15 | 1 | 75 | | 20.93 | 20.84 | 21.05 |
| 15 | 36 | 0 | | 21.01 | 20.92 | 21.09 |
| 15 | 36 | 18 | | 21.01 | 20.85 | 21.10 |
| 15 | 36 | 39 | | 21.07 | 20.93 | 21.18 |
| 15 | 75 | 0 | | 19.38 | 19.27 | 19.69 |
| 20 | 1 | 0 | QPSK | 21.28 | 21.23 | 21.44 |
| 20 | 1 | 49 | | 21.30 | 21.21 | 21.46 |
| 20 | 1 | 99 | | 21.42 | 21.35 | 21.52 |
| 20 | 50 | 0 | | 20.47 | 20.36 | 20.61 |
| 20 | 50 | 24 | | 20.52 | 20.48 | 20.71 |
| 20 | 50 | 49 | | 20.45 | 20.34 | 20.66 |
| 20 | 100 | 0 | | 20.44 | 20.30 | 20.67 |
| 20 | 1 | 0 | 16-QAM | 20.58 | 20.50 | 20.77 |
| 20 | 1 | 49 | | 20.61 | 20.53 | 20.74 |
| 20 | 1 | 99 | | 20.74 | 20.66 | 20.79 |
| 20 | 50 | 0 | | 20.69 | 20.68 | 20.89 |
| 20 | 50 | 24 | | 20.75 | 20.69 | 20.86 |
| 20 | 50 | 49 | | 20.86 | 20.81 | 20.92 |
| 20 | 100 | 0 | | 19.52 | 19.39 | 19.62 |

**LTE BAND 4**

| LTE Band 4 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 1.4 | 1 | 0 | QPSK | 22.61 | 22.49 | 22.49 |
| 1.4 | 1 | 2 | | 22.67 | 22.56 | 22.56 |
| 1.4 | 1 | 5 | | 22.61 | 22.52 | 22.45 |
| 1.4 | 3 | 0 | | 22.58 | 22.55 | 22.46 |
| 1.4 | 3 | 1 | | 22.69 | 22.68 | 22.58 |
| 1.4 | 3 | 3 | | 22.57 | 22.52 | 22.45 |
| 1.4 | 6 | 0 | | 21.62 | 21.53 | 21.42 |
| 1.4 | 1 | 0 | 16-QAM | 21.65 | 21.45 | 21.42 |
| 1.4 | 1 | 2 | | 21.72 | 21.49 | 21.48 |
| 1.4 | 1 | 5 | | 21.65 | 21.48 | 21.40 |
| 1.4 | 3 | 0 | | 21.75 | 21.69 | 21.58 |
| 1.4 | 3 | 1 | | 21.86 | 21.59 | 21.69 |
| 1.4 | 3 | 3 | | 21.79 | 21.65 | 21.57 |
| 1.4 | 6 | 0 | | 20.60 | 20.51 | 20.31 |
| 3 | 1 | 0 | QPSK | 22.58 | 22.47 | 22.41 |
| 3 | 1 | 7 | | 22.63 | 22.53 | 22.46 |
| 3 | 1 | 14 | | 22.61 | 22.48 | 22.38 |
| 3 | 8 | 0 | | 21.59 | 21.54 | 21.46 |
| 3 | 8 | 4 | | 21.75 | 21.73 | 21.68 |
| 3 | 8 | 8 | | 21.61 | 21.52 | 21.47 |
| 3 | 15 | 0 | | 21.61 | 21.50 | 21.45 |
| 3 | 1 | 0 | 16-QAM | 21.92 | 21.91 | 21.82 |
| 3 | 1 | 7 | | 21.95 | 21.95 | 21.85 |
| 3 | 1 | 14 | | 21.90 | 21.89 | 21.78 |
| 3 | 8 | 0 | | 22.14 | 22.10 | 21.96 |
| 3 | 8 | 4 | | 22.15 | 22.16 | 21.99 |
| 3 | 8 | 7 | | 22.10 | 22.04 | 21.89 |
| 3 | 15 | 0 | | 20.62 | 21.50 | 20.50 |

**LTE BAND 4**

| LTE Band 4 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 5 | 1 | 0 | QPSK | 22.67 | 22.58 | 22.64 |
| 5 | 1 | 12 | | 22.70 | 22.62 | 22.61 |
| 5 | 1 | 24 | | 22.74 | 22.61 | 22.59 |
| 5 | 12 | 0 | | 21.64 | 21.58 | 22.53 |
| 5 | 12 | 6 | | 21.75 | 21.68 | 22.63 |
| 5 | 12 | 11 | | 21.65 | 21.60 | 21.48 |
| 5 | 25 | 0 | | 21.59 | 21.54 | 21.46 |
| 5 | 1 | 0 | 16-QAM | 21.56 | 21.64 | 21.77 |
| 5 | 1 | 12 | | 21.59 | 21.70 | 21.73 |
| 5 | 1 | 24 | | 21.61 | 21.68 | 21.71 |
| 5 | 12 | 0 | | 21.65 | 21.71 | 21.92 |
| 5 | 12 | 6 | | 21.75 | 21.86 | 21.88 |
| 5 | 12 | 11 | | 21.75 | 21.86 | 21.90 |
| 5 | 25 | 0 | | 20.64 | 20.51 | 20.41 |
| 10 | 1 | 0 | QPSK | 22.62 | 22.52 | 22.69 |
| 10 | 1 | 24 | | 22.62 | 22.62 | 22.60 |
| 10 | 1 | 49 | | 22.45 | 22.57 | 22.55 |
| 10 | 25 | 0 | | 21.60 | 21.52 | 21.58 |
| 10 | 25 | 12 | | 21.74 | 21.69 | 21.70 |
| 10 | 25 | 24 | | 21.59 | 21.55 | 21.56 |
| 10 | 50 | 0 | | 21.60 | 21.56 | 21.55 |
| 10 | 1 | 0 | 16-QAM | 21.68 | 21.98 | 21.57 |
| 10 | 1 | 12 | | 21.74 | 22.03 | 21.30 |
| 10 | 1 | 24 | | 21.69 | 21.97 | 21.51 |
| 10 | 25 | 0 | | 21.81 | 22.15 | 21.75 |
| 10 | 25 | 12 | | 21.92 | 22.15 | 21.80 |
| 10 | 25 | 24 | | 21.77 | 22.14 | 21.69 |
| 10 | 50 | 0 | | 20.58 | 20.58 | 20.57 |

**LTE BAND 4**

| LTE Band 4 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 15 | 1 | 0 | QPSK | 22.64 | 22.57 | 22.61 |
| 15 | 1 | 37 | | 22.54 | 22.66 | 22.59 |
| 15 | 1 | 75 | | 22.58 | 22.65 | 22.22 |
| 15 | 36 | 0 | | 21.74 | 21.63 | 21.64 |
| 15 | 36 | 18 | | 21.93 | 21.78 | 21.80 |
| 15 | 36 | 37 | | 21.70 | 21.64 | 21.60 |
| 15 | 75 | 0 | | 21.70 | 21.63 | 21.61 |
| 15 | 1 | 0 | 16-QAM | 21.97 | 21.82 | 21.65 |
| 15 | 1 | 37 | | 22.02 | 21.89 | 21.65 |
| 15 | 1 | 74 | | 22.00 | 21.86 | 21.55 |
| 15 | 36 | 0 | | 22.10 | 22.02 | 21.90 |
| 15 | 36 | 18 | | 22.15 | 22.07 | 21.82 |
| 15 | 36 | 36 | | 22.08 | 22.00 | 21.74 |
| 15 | 75 | 0 | | 20.65 | 20.63 | 20.59 |
| 20 | 1 | 0 | QPSK | 22.66 | 22.62 | 22.64 |
| 20 | 1 | 50 | | 22.68 | 22.66 | 22.71 |
| 20 | 1 | 99 | | 22.59 | 22.66 | 22.68 |
| 20 | 50 | 0 | | 21.73 | 21.56 | 21.69 |
| 20 | 50 | 24 | | 21.95 | 21.71 | 21.80 |
| 20 | 50 | 49 | | 21.75 | 21.60 | 21.74 |
| 20 | 100 | 0 | | 21.73 | 21.55 | 21.66 |
| 20 | 1 | 0 | 16-QAM | 21.94 | 21.83 | 21.71 |
| 20 | 1 | 49 | | 21.96 | 21.85 | 21.76 |
| 20 | 1 | 99 | | 22.01 | 21.86 | 21.64 |
| 20 | 50 | 0 | | 22.04 | 21.93 | 21.85 |
| 20 | 50 | 24 | | 22.16 | 22.01 | 21.89 |
| 20 | 50 | 49 | | 22.17 | 22.02 | 21.93 |
| 20 | 100 | 0 | | 20.68 | 20.58 | 20.61 |

**LTE BAND 12**

| LTE Band 12 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 1.4 | 1 | 0 | QPSK | 22.66 | 22.62 | 22.67 |
| 1.4 | 1 | 2 | | 22.68 | 22.71 | 22.64 |
| 1.4 | 1 | 5 | | 22.68 | 22.60 | 22.50 |
| 1.4 | 3 | 0 | | 22.82 | 22.73 | 22.67 |
| 1.4 | 3 | 1 | | 22.96 | 22.85 | 55.81 |
| 1.4 | 3 | 2 | | 22.81 | 22.72 | 22.58 |
| 1.4 | 6 | 0 | | 21.67 | 21.54 | 21.51 |
| 1.4 | 1 | 0 | 16-QAM | 21.70 | 21.64 | 21.73 |
| 1.4 | 1 | 2 | | 21.74 | 21.74 | 21.70 |
| 1.4 | 1 | 5 | | 21.73 | 21.66 | 21.60 |
| 1.4 | 3 | 0 | | 21.90 | 21.79 | 21.85 |
| 1.4 | 3 | 1 | | 21.89 | 21.88 | 21.84 |
| 1.4 | 3 | 2 | | 21.87 | 21.79 | 21.80 |
| 1.4 | 6 | 0 | | 20.73 | 20.54 | 20.54 |
| 3 | 1 | 0 | QPSK | 22.58 | 22.54 | 22.59 |
| 3 | 1 | 7 | | 22.64 | 22.59 | 22.66 |
| 3 | 1 | 14 | | 22.53 | 22.51 | 22.54 |
| 3 | 8 | 0 | | 21.71 | 21.66 | 21.73 |
| 3 | 8 | 4 | | 21.82 | 21.71 | 21.86 |
| 3 | 8 | 7 | | 21.69 | 21.64 | 21.68 |
| 3 | 15 | 0 | | 21.67 | 21.63 | 21.68 |
| 3 | 1 | 0 | 16-QAM | 22.04 | 22.01 | 21.96 |
| 3 | 1 | 7 | | 22.11 | 22.08 | 21.97 |
| 3 | 1 | 14 | | 22.10 | 22.04 | 22.01 |
| 3 | 8 | 0 | | 22.14 | 22.18 | 22.13 |
| 3 | 8 | 4 | | 22.21 | 22.19 | 22.12 |
| 3 | 8 | 7 | | 22.21 | 22.15 | 22.19 |
| 3 | 15 | 0 | | 20.81 | 20.73 | 21.75 |

**LTE BAND 12**

| LTE Band 12 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 5 | 1 | 0 | QPSK | 22.73 | 22.65 | 22.53 |
| 5 | 1 | 12 | | 22.71 | 22.67 | 22.71 |
| 5 | 1 | 24 | | 22.69 | 22.56 | 22.68 |
| 5 | 12 | 0 | | 21.74 | 21.67 | 21.69 |
| 5 | 12 | 6 | | 21.82 | 21.82 | 21.84 |
| 5 | 12 | 11 | | 21.76 | 21.66 | 21.72 |
| 5 | 25 | 0 | | 21.76 | 21.64 | 21.71 |
| 5 | 1 | 0 | 16-QAM | 21.77 | 21.64 | 21.79 |
| 5 | 1 | 12 | | 21.76 | 21.66 | 21.83 |
| 5 | 1 | 24 | | 21.74 | 21.62 | 21.74 |
| 5 | 12 | 0 | | 21.88 | 21.74 | 21.89 |
| 5 | 12 | 6 | | 21.85 | 21.84 | 21.92 |
| 5 | 12 | 11 | | 21.81 | 21.77 | 21.86 |
| 5 | 25 | 0 | | 20.83 | 20.79 | 21.85 |
| 10 | 1 | 0 | QPSK | 22.64 | 22.56 | 22.65 |
| 10 | 1 | 24 | | 22.71 | 22.64 | 22.68 |
| 10 | 1 | 49 | | 22.68 | 22.54 | 22.59 |
| 10 | 25 | 0 | | 21.72 | 21.62 | 21.74 |
| 10 | 25 | 12 | | 21.89 | 21.75 | 21.89 |
| 10 | 25 | 24 | | 21.73 | 21.65 | 21.77 |
| 10 | 50 | 0 | | 21.71 | 21.66 | 21.75 |
| 10 | 1 | 0 | 16-QAM | 22.08 | 22.03 | 22.11 |
| 10 | 1 | 24 | | 22.14 | 22.15 | 22.16 |
| 10 | 1 | 49 | | 22.13 | 22.09 | 22.09 |
| 10 | 25 | 0 | | 22.17 | 22.15 | 22.12 |
| 10 | 25 | 12 | | 22.20 | 22.18 | 22.10 |
| 10 | 25 | 24 | | 22.14 | 22.19 | 22.17 |
| 10 | 50 | 0 | | 20.82 | 20.71 | 22.83 |

**LTE BAND 17**

| LTE Band 17 Maximum Average Power [dBm] | | | | | | |
|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 5 | 1 | 0 | QPSK | 22.59 | 22.66 | 22.64 |
| 5 | 1 | 12 | | 22.59 | 22.63 | 22.71 |
| 5 | 1 | 24 | | 22.62 | 22.53 | 22.68 |
| 5 | 12 | 0 | | 21.75 | 21.71 | 21.66 |
| 5 | 12 | 6 | | 21.85 | 21.84 | 21.76 |
| 5 | 12 | 11 | | 21.77 | 21.67 | 21.59 |
| 5 | 25 | 0 | | 21.70 | 21.65 | 21.58 |
| 5 | 1 | 0 | 16-QAM | 21.72 | 21.98 | 22.04 |
| 5 | 1 | 12 | | 21.75 | 21.94 | 21.94 |
| 5 | 1 | 24 | | 21.75 | 21.86 | 21.85 |
| 5 | 12 | 0 | | 21.82 | 22.04 | 22.10 |
| 5 | 12 | 6 | | 21.95 | 22.04 | 22.05 |
| 5 | 12 | 11 | | 21.92 | 21.93 | 21.88 |
| 5 | 25 | 0 | | 20.87 | 20.66 | 20.55 |
| 10 | 1 | 0 | QPSK | 22.58 | 22.51 | 22.60 |
| 10 | 1 | 24 | | 22.63 | 22.55 | 22.60 |
| 10 | 1 | 49 | | 22.58 | 22.49 | 22.48 |
| 10 | 25 | 0 | | 21.71 | 21.68 | 21.67 |
| 10 | 25 | 12 | | 20.74 | 20.72 | 20.77 |
| 10 | 25 | 24 | | 21.64 | 21.60 | 21.59 |
| 10 | 50 | 0 | | 21.69 | 21.64 | 21.65 |
| 10 | 1 | 0 | 16-QAM | 21.85 | 22.23 | 21.76 |
| 10 | 1 | 24 | | 21.84 | 22.24 | 21.67 |
| 10 | 1 | 49 | | 21.74 | 22.07 | 21.54 |
| 10 | 25 | 0 | | 22.96 | 22.31 | 21.84 |
| 10 | 25 | 12 | | 21.93 | 22.31 | 21.85 |
| 10 | 25 | 24 | | 21.88 | 22.14 | 21.65 |
| 10 | 50 | 0 | | 20.76 | 20.71 | 20.72 |

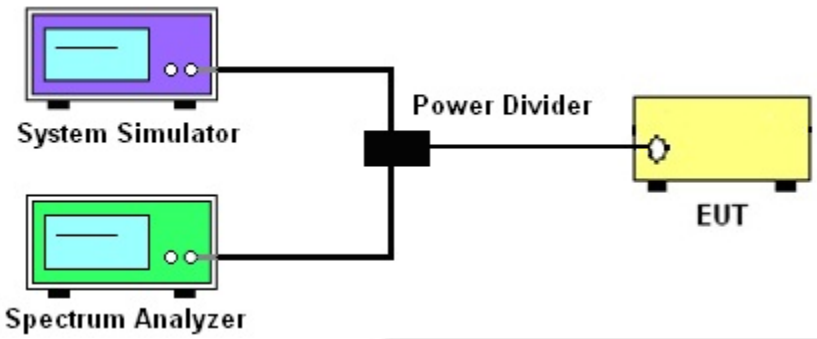
# 4. PEAK-TO-AVERAGE RATIO

## 4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

### 4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:
PAPR (dB) = PPk (dBm) - PAvg (dBm).

### 4.1.2 TEST SETUP




### 4.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.2..

2. The EUT was connected to spectrum and system simulator via a power divider

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Set the test probe and measure the peak and average power of the spectrum analyzer

5. Record the deviation as Peak to Average Ratio.

| | LTE | | | | | |
|---|---|---|---|---|---|---|
| LTE BW | 1.4M | 3M | 5M | 10M | 15M | 20M |
| Span | 3MHz | 6MHz | 10MHz | 20MHz | 30MHz | 40MHz |
| RBW | 30kHz | 100kHz | 100kHz | 300kHz | 300kHz | 300kHz |
| VBW | 100kHz | 300kHz | 300kHz | 1000kHz | 1000kHz | 1000kHz |
| Detector | PK/RMS | PK/RMS | PK/RMS | PK/RMS | PK/RMS | PK/RMS |
| Peak Trace | Max | Max | Max | Max | Max | Max |
| AVG Trace | Trace average at least 100 traces in power averaging (i.e., RMS) mode. | | | | | |
| Sweep Count | Auto | Auto | Auto | Auto | Auto | Auto |

4.1.4 TEST RESULTS

**LTE BAND 2**

| LTE Band 2 PAR [dBm] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | Mod | Lowest | | | Middle | | | Highest | | |
| | | | PEAK | AVG | P-A | PEAK | AVG | P-A | PEAK | AVG | P-A |
| 20 | 1 | QPSK | 24.39 | 21.42 | 2.97 | 24.31 | 21.35 | 2.96 | 24.22 | 21.52 | 2.70 |
| 20 | 100 | | 23.35 | 20.44 | 2.91 | 22.91 | 20.30 | 2.61 | 23.67 | 20.67 | 3.00 |
| 20 | 1 | 16-QAM | 23.30 | 20.74 | 2.56 | 23.37 | 20.66 | 2.71 | 23.64 | 20.79 | 2.85 |
| 20 | 100 | | 22.26 | 19.52 | 2.74 | 22.34 | 19.39 | 2.95 | 22.53 | 19.62 | 2.91 |
| Limit | | | ≤13dBm | | | | | | | | |

**LTE BAND 4**

| LTE Band 4 PAR [dBm] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | Mod | Lowest | | | Middle | | | Highest | | |
| | | | PEAK | AVG | P-A | PEAK | AVG | P-A | PEAK | AVG | P-A |
| 20 | 1 | QPSK | 25.43 | 22.68 | 2.75 | 25.44 | 22.66 | 2.78 | 25.68 | 22.71 | 2.97 |
| 20 | 100 | | 24.54 | 21.73 | 2.81 | 24.06 | 21.55 | 2.51 | 24.49 | 21.66 | 2.83 |
| 20 | 1 | 16-QAM | 24.63 | 22.01 | 2.62 | 24.44 | 21.86 | 2.58 | 24.68 | 21.76 | 2.92 |
| 20 | 100 | | 23.47 | 20.68 | 2.79 | 23.56 | 20.58 | 2.98 | 23.31 | 20.61 | 2.70 |
| Limit | | | ≤13dBm | | | | | | | | |

**LTE BAND 12**

| LTE Band 12 PAR [dBm] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | Mod | Lowest | | | Middle | | | Highest | | |
| | | | PEAK | AVG | P-A | PEAK | AVG | P-A | PEAK | AVG | P-A |
| 20 | 1 | QPSK | 25.33 | 22.71 | 2.62 | 23.55 | 20.82 | 2.73 | 25.22 | 22.68 | 2.54 |
| 20 | 100 | | 24.24 | 21.71 | 2.53 | 22.66 | 19.68 | 2.98 | 24.34 | 21.75 | 2.59 |
| 20 | 1 | 16-QAM | 24.88 | 22.14 | 2.74 | 22.71 | 20.07 | 2.64 | 25.07 | 22.16 | 2.91 |
| 20 | 100 | | 23.81 | 20.82 | 2.99 | 23.23 | 20.71 | 2.52 | 25.78 | 22.83 | 2.95 |
| Limit | | | ≤13dBm | | | | | | | | |

**LTE BAND 17**

| LTE Band 17 PAR [dBm] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BW [MHz] | RB Size | Mod | Lowest | | | Middle | | | Highest | | |
| | | | PEAK | AVG | P-A | PEAK | AVG | P-A | PEAK | AVG | P-A |
| 10 | 1 | QPSK | 25.43 | 22.63 | 2.80 | 25.06 | 22.55 | 2.51 | 25.45 | 22.60 | 2.85 |
| 10 | 75 | | 24.52 | 21.69 | 2.83 | 24.57 | 21.64 | 2.93 | 24.65 | 21.65 | 3.00 |
| 10 | 1 | 16-QAM | 24.55 | 21.85 | 2.70 | 24.93 | 22.24 | 2.69 | 24.55 | 21.76 | 2.79 |
| 10 | 75 | | 23.64 | 20.76 | 2.88 | 23.35 | 20.71 | 2.64 | 23.48 | 20.72 | 2.76 |
| Limit | | | ≤13dBm | | | | | | | | |

# 5. RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

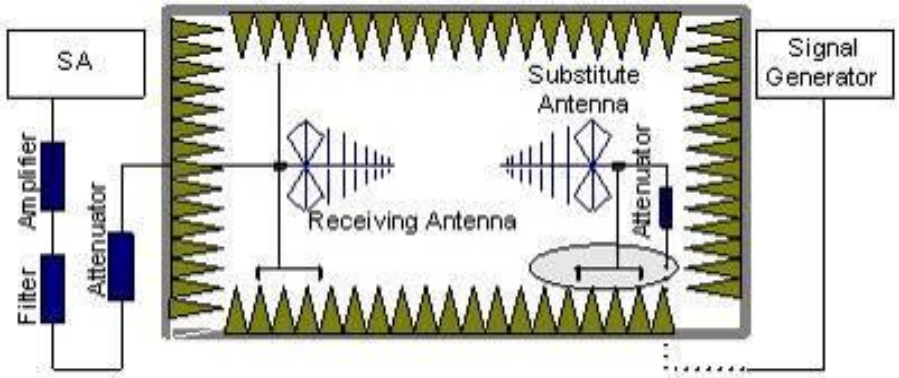
## 5.1 DESCRIPTION OF THE ERP/EIRP MEASUREMENT

### 5.1.1 MEASUREMENT METHOD

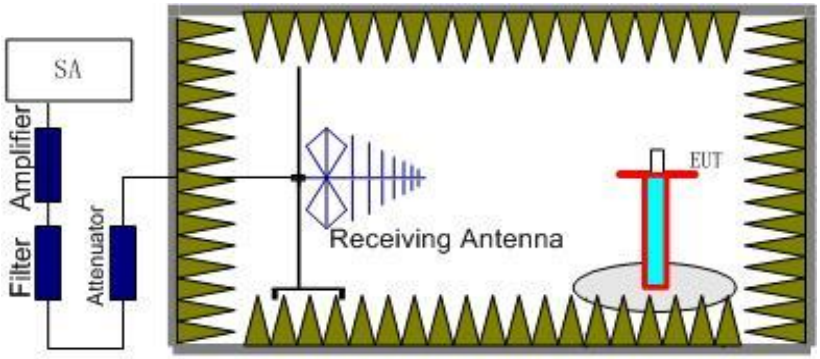
Effective radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average ERP of 3 watts with LTE band17 . average ERP of 7 watts with LTE band 5.
Equivalent isotropic radiated power output measurements by substitution method according to ANSI /TIA / EIA-603-C, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 2 / 7 and 1 watt with LTE band 4.

### 5.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:
a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx( dBuV )+CL( dB )+SA( dB )+Gain( dBi )-107( dBuV to dBm )The SA is calibrated using following setup.




b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl

5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v02r02 Section 5.6. and ANSI / TIA-603-C-2009 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with Peak detector.
3. During the measurement, the system simulator parameters were set to force the EUTtransmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to-TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location,and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain -Analyzer reading. Then the EUT’s EIRP was calculated with the correction factor, EIRP= LVL +Correction factor and ERP = EIRP – 2.15.

5.RB Set greater than bandwidth,Vb Set spectrum analyzer Maximum support.

5.1.4 TEST RESULTS

**LTE Band 2**

| LTE Band 2 / 1.4MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 20.99 | 20.96 |
| Middle | | 1 | 0 | 20.97 | 21.06 |
| Highest | | 1 | 0 | 21.03 | 21.03 |
| Lowest | 16QAM | 1 | 0 | 20.21 | 20.22 |
| Middle | | 1 | 0 | 20.19 | 20.11 |
| Highest | | 1 | 0 | 20.13 | 20.15 |
| Limit | EIRP<2W=33dBm | | | Result | PASS |

| LTE Band 2 / 3MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 20.96 | 20.97 |
| Middle | | 1 | 0 | 21.01 | 21.01 |
| Highest | | 1 | 0 | 20.98 | 20.99 |
| Lowest | 16QAM | 1 | 0 | 20.52 | 20.51 |
| Middle | | 1 | 0 | 20.54 | 20.53 |
| Highest | | 1 | 0 | 20.46 | 20.47 |
| Limit | EIRP<2W=33dBm | | | Result | PASS |

| LTE Band 2 / 5MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 21.01 | 21.11 |
| Middle | | 1 | 0 | 21.05 | 21.03 |
| Highest | | 1 | 0 | 21.10 | 21.07 |
| Lowest | 16QAM | 1 | 0 | 20.22 | 20.19 |
| Middle | | 1 | 0 | 20.21 | 20.17 |
| Highest | | 1 | 0 | 20.18 | 20.21 |
| Limit | EIRP<2W=33dBm | | | Result | PASS |

| LTE Band 2 / 10MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 21.07 | 21.05 |
| Middle | | 1 | 0 | 21.06 | 21.10 |
| Highest | | 1 | 0 | 21.12 | 21.13 |
| Lowest | 16QAM | 1 | 0 | 20.55 | 20.61 |
| Middle | | 1 | 0 | 20.57 | 20.53 |
| Highest | | 1 | 0 | 20.52 | 20.56 |
| Limit | EIRP<2W=33dBm | | | Result | PASS |

| LTE Band 2 / 15MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 21.09 | 21.15 |
| Middle | | 1 | 0 | 21.11 | 21.13 |
| Highest | | 1 | 0 | 21.08 | 21.07 |
| Lowest | 16QAM | 1 | 0 | 20.73 | 20.79 |
| Middle | | 1 | 0 | 20.71 | 20.75 |
| Highest | | 1 | 0 | 20.68 | 20.69 |
| Limit | EIRP<2W=33dBm | | | Result | PASS |

| LTE Band 2 / 20MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 21.22 | 21.20 |
| Middle | | 1 | 0 | 21.13 | 21.15 |
| Highest | | 1 | 0 | 21.16 | 21.11 |
| Lowest | 16QAM | 1 | 0 | 20.47 | 20.50 |
| Middle | | 1 | 0 | 20.51 | 20.46 |
| Highest | | 1 | 0 | 20.52 | 20.47 |
| Limit | EIRP<2W=33dBm | | | Result | PASS |

**LTE Band 4**

| LTE Band 4 / 1.4MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 21.37 | 21.26 |
| Middle | | 1 | 0 | 21.32 | 21.31 |
| Highest | | 1 | 0 | 21.29 | 21.31 |
| Lowest | 16QAM | 1 | 0 | 21.40 | 21.37 |
| Middle | | 1 | 0 | 21.39 | 21.35 |
| Highest | | 1 | 0 | 21.31 | 21.40 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

| LTE Band 4 / 3MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.27 | 22.30 |
| Middle | | 1 | 0 | 22.26 | 22.25 |
| Highest | | 1 | 0 | 22.31 | 22.27 |
| Lowest | 16QAM | 1 | 0 | 21.80 | 21.79 |
| Middle | | 1 | 0 | 21.76 | 21.75 |
| Highest | | 1 | 0 | 21.74 | 21.73 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

| LTE Band 4 / 5MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.56 | 22.54 |
| Middle | | 1 | 0 | 22.47 | 22.46 |
| Highest | | 1 | 0 | 22.36 | 22.37 |
| Lowest | 16QAM | 1 | 0 | 21.43 | 21.40 |
| Middle | | 1 | 0 | 21.35 | 21.36 |
| Highest | | 1 | 0 | 21.23 | 21.22 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

| LTE Band 4 / 10MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.41 | 22.45 |
| Middle | | 1 | 0 | 22.36 | 22.47 |
| Highest | | 1 | 0 | 22.37 | 22.46 |
| Lowest | 16QAM | 1 | 0 | 21.60 | 21.60 |
| Middle | | 1 | 0 | 21.46 | 21.43 |
| Highest | | 1 | 0 | 21.55 | 21.57 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

| LTE Band 4 / 15MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.51 | 22.53 |
| Middle | | 1 | 0 | 22.43 | 22.46 |
| Highest | | 1 | 0 | 22.47 | 22.50 |
| Lowest | 16QAM | 1 | 0 | 21.40 | 21.42 |
| Middle | | 1 | 0 | 21.43 | 21.47 |
| Highest | | 1 | 0 | 21.45 | 21.40 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

| LTE Band 4 / 20MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.57 | 22.60 |
| Middle | | 1 | 0 | 22.59 | 22.63 |
| Highest | | 1 | 0 | 22.60 | 22.57 |
| Lowest | 16QAM | 1 | 0 | 21.73 | 21.70 |
| Middle | | 1 | 0 | 21.64 | 21.69 |
| Highest | | 1 | 0 | 21.56 | 21.58 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

**LTE Band 12**

| LTE Band 12 / 1.4MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.62 | 22.42 |
| Middle | | 1 | 0 | 22.31 | 21.46 |
| Highest | | 1 | 0 | 22.55 | 22.37 |
| Lowest | 16QAM | 1 | 0 | 21.60 | 21.59 |
| Middle | | 1 | 0 | 21.56 | 21.47 |
| Highest | | 1 | 0 | 21.43 | 21.56 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

| LTE Band 12 / 3MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.02 | 21.40 |
| Middle | | 1 | 0 | 22.34 | 21.32 |
| Highest | | 1 | 0 | 22.28 | 21.31 |
| Lowest | 16QAM | 1 | 0 | 22.00 | 21.99 |
| Middle | | 1 | 0 | 21.87 | 21.86 |
| Highest | | 1 | 0 | 21.83 | 21.79 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

| LTE Band 12 / 5MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.23 | 22.12 |
| Middle | | 1 | 0 | 22.18 | 22.17 |
| Highest | | 1 | 0 | 22.22 | 22.10 |
| Lowest | 16QAM | 1 | 0 | 21.23 | 21.22 |
| Middle | | 1 | 0 | 21.18 | 21.17 |
| Highest | | 1 | 0 | 21.22 | 21.10 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

| LTE Band 12 / 10MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 21.78 | 21.76 |
| Middle | | 1 | 0 | 21.65 | 21.57 |
| Highest | | 1 | 0 | 21.87 | 21.85 |
| Lowest | 16QAM | 1 | 0 | 21.78 | 21.76 |
| Middle | | 1 | 0 | 21.65 | 21.57 |
| Highest | | 1 | 0 | 21.87 | 21.85 |
| Limit | EIRP<1W=30dBm | | | Result | PASS |

**LTE Band 17**

| LTE Band 17 / 5MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 21.96 | 22.15 |
| Middle | | 1 | 0 | 22.09 | 22.10 |
| Highest | | 1 | 0 | 22.16 | 22.17 |
| Lowest | 16QAM | 1 | 0 | 21.86 | 21.81 |
| Middle | | 1 | 0 | 21.69 | 21.76 |
| Highest | | 1 | 0 | 21.56 | 21.43 |
| Limit | ERP<2W=34.77dBm | | | Result | PASS |

| LTE Band 17 / 10MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Modulation | RB | | Horizontal | Vertical |
| | | Size | Offset | EIRP(dBm) | EIRP(dBm) |
| Lowest | QPSK | 1 | 0 | 22.06 | 22.19 |
| Middle | | 1 | 0 | 22.15 | 22.11 |
| Highest | | 1 | 0 | 22.20 | 22.17 |
| Lowest | 16QAM | 1 | 0 | 21.56 | 21.67 |
| Middle | | 1 | 0 | 21.83 | 21.78 |
| Highest | | 1 | 0 | 21.16 | 21.36 |
| Limit | ERP<3W=34.77dBm | | | Result | PASS |

# 6. OCCUPIED BANDWIDTH

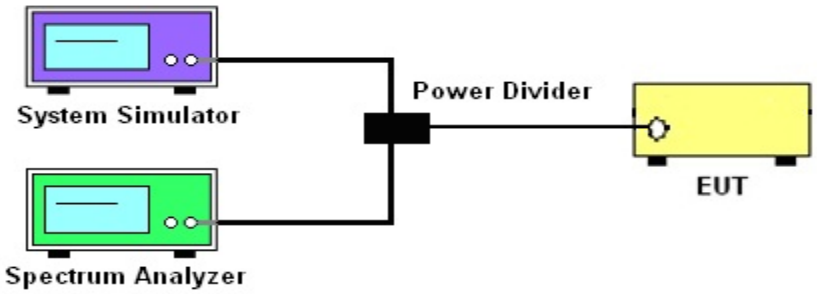
## 6.1 DESCRIPTION OF OCCUPIED BANDWIDTH MEASUREMENT

### 6.1.1 MEASUREMENT METHOD

1.The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

2.The 26 db emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 db below the maximum in-band spectral density of the modulated signal. spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

### 6.1.2 TEST SETUP




### 6.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v02r02 Section 4.1.and 4.2

2. The EUT was connected to spectrum and system simulator via a power divider

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Set the test probe and measure the Occupied Bandwidth of the spectrum analyzer

5. Measure and record the Occupied Bandwidth from the Spectrum Analyzer.

| | LTE | | | | | |
|---|---|---|---|---|---|---|
| LTE BW | 1.4M | 3M | 5M | 10M | 15M | 20M |
| Span | 3MHz | 6MHz | 10MHz | 20MHz | 30MHz | 40MHz |
| RBW | 30kHz | 100kHz | 100kHz | 300kHz | 300kHz | 300kHz |
| VBW | 100kHz | 300kHz | 300kHz | 1000kHz | 1000kHz | 1000kHz |
| Detector | PK | PK | PK | PK | PK | PK |
| Trace | Max | Max | Max | Max | Max | Max |
| Sweep Count | Auto | Auto | Auto | Auto | Auto | Auto |

6.1.4 MEASUREMENT RESULT

**LTE BAND 2**

| LTE Band 2 Bandwidth [MHz] | | | | | | | |
|---|---|---|---|---|---|---|---|
| BW [MHz] | Mod | Lowest | | Middle | | Highest | |
| | | 26dB BW | 99% BW | 26dB BW | 99% BW | 26dB BW | 99% BW |
| 1.4 | QPSK | 1.266 | 1.104 | 1.282 | 1.095 | 1.610 | 1.106 |
| 1.4 | 16-QAM | 1.267 | 1.096 | 1.257 | 1.094 | 1.302 | 1.106 |
| 3 | QPSK | 2.900 | 2.682 | 2.687 | 2.681 | 2.930 | 2.685 |
| 3 | 16-QAM | 2.920 | 2.680 | 2.913 | 2.682 | 2.911 | 2.680 |
| 5 | QPSK | 5.052 | 4.516 | 5.104 | 4.517 | 5.027 | 4.521 |
| 5 | 16-QAM | 5.084 | 4.520 | 5.025 | 4.527 | 5.082 | 5.312 |
| 10 | QPSK | 9.777 | 8.948 | 9.637 | 8.935 | 9.727 | 8.949 |
| 10 | 16-QAM | 9.720 | 8.941 | 9.675 | 8.951 | 9.742 | 8.956 |
| 15 | QPSK | 14.860 | 13.505 | 14.840 | 13.481 | 15.050 | 13.527 |
| 15 | 16-QAM | 14.780 | 13.504 | 14.830 | 13.509 | 14.840 | 13.517 |
| 20 | QPSK | 19.360 | 17.948 | 19.240 | 17.934 | 19.560 | 17.951 |
| 20 | 16-QAM | 19.460 | 17.951 | 19.480 | 17.932 | 19.440 | 17.951 |

**LTE BAND 4**

| LTE Band 4 Bandwidth [MHz] | | | | | | | |
|---|---|---|---|---|---|---|---|
| BW [MHz] | Mod | Lowest | | Middle | | Highest | |
| | | 26dB BW | 99% BW | 26dB BW | 99% BW | 26dB BW | 99% BW |
| 1.4 | QPSK | 1.268 | 1.094 | 1.303 | 1.101 | 1.273 | 1.104 |
| 1.4 | 16-QAM | 1.283 | 1.097 | 1.275 | 1.097 | 1.273 | 1.098 |
| 3 | QPSK | 2.910 | 2.682 | 2.913 | 2.692 | 2.912 | 2.684 |
| 3 | 16-QAM | 2.885 | 2.677 | 2.899 | 2.683 | 2.917 | 2.681 |
| 5 | QPSK | 5.044 | 4.523 | 5.082 | 4.524 | 5.041 | 4.522 |
| 5 | 16-QAM | 5.034 | 4.520 | 5.047 | 4.523 | 5.084 | 4.529 |
| 10 | QPSK | 9.783 | 8.950 | 9.765 | 8.943 | 9.780 | 8.953 |
| 10 | 16-QAM | 9.619 | 8.943 | 9.699 | 8.942 | 9.683 | 8.938 |
| 15 | QPSK | 14.950 | 13.521 | 14.900 | 13.497 | 14.950 | 13.501 |
| 15 | 16-QAM | 14.900 | 13.502 | 14.830 | 13.528 | 14.770 | 13.515 |
| 20 | QPSK | 19.310 | 17.934 | 19.310 | 17.929 | 19.540 | 17.966 |
| 20 | 16-QAM | 19.630 | 17.957 | 19.480 | 17.962 | 19.410 | 17.957 |

**LTE BAND 12**

| LTE Band 12 Bandwidth [MHz] | | | | | | | |
|---|---|---|---|---|---|---|---|
| BW [MHz] | Mod | Lowest | | Middle | | Highest | |
| | | 26dB BW | 99% BW | 26dB BW | 99% BW | 26dB BW | 99% BW |
| 1.4 | QPSK | 1.276 | 1.103 | 1.267 | 1.108 | 1.272 | 1.098 |
| 1.4 | 16-QAM | 1.288 | 1.103 | 1.267 | 1.108 | 1.275 | 1.098 |
| 3 | QPSK | 2.907 | 2.683 | 2.915 | 2.692 | 2.912 | 2.684 |
| 3 | 16-QAM | 2.907 | 2.680 | 2.917 | 2.693 | 2.923 | 2.686 |
| 5 | QPSK | 5.051 | 4.527 | 5.120 | 4.541 | 5.043 | 4.535 |
| 5 | 16-QAM | 5.056 | 4.529 | 5.122 | 4.532 | 5.022 | 4.535 |
| 10 | QPSK | 9.755 | 8.973 | 9.744 | 8.964 | 9.787 | 8.953 |
| 10 | 16-QAM | 9.745 | 8.975 | 9.781 | 8.968 | 9.703 | 8.943 |

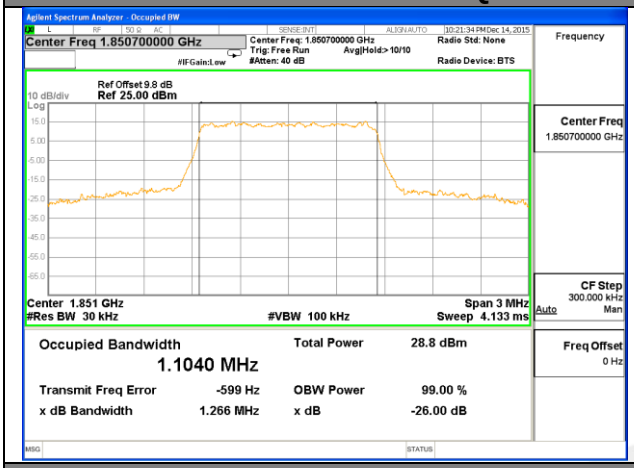
**LTE BAND 17**

| LTE Band XVII Bandwidth [MHz] | | | | | | | |
|---|---|---|---|---|---|---|---|
| BW [MHz] | Mod | Lowest | | Middle | | Highest | |
| | | 26dB BW | 99% BW | 26dB BW | 99% BW | 26dB BW | 99% BW |
| 5 | QPSK | 5.090 | 4.534 | 5.003 | 4.520 | 5.026 | 4.535 |
| 5 | 16-QAM | 5.030 | 4.526 | 5.056 | 4.526 | 5.051 | 4.523 |
| 10 | QPSK | 9.729 | 8.949 | 9.703 | 8.924 | 9.746 | 8.942 |
| 10 | 16-QAM | 9.609 | 8.937 | 9.696 | 8.936 | 9.673 | 8.944 |

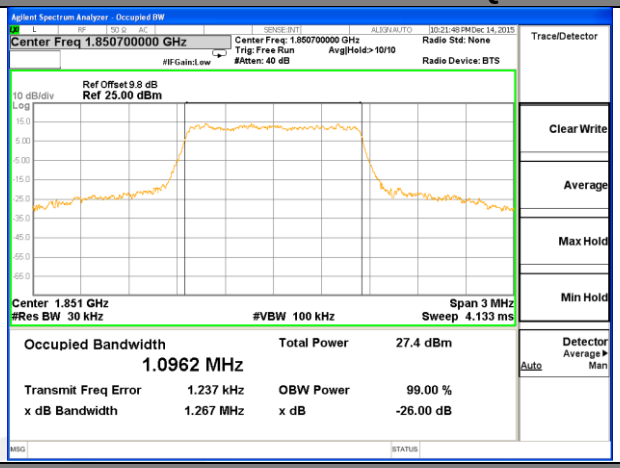
## LTE band 2

### LTE band 2 (99% and -26 Bandwidth)

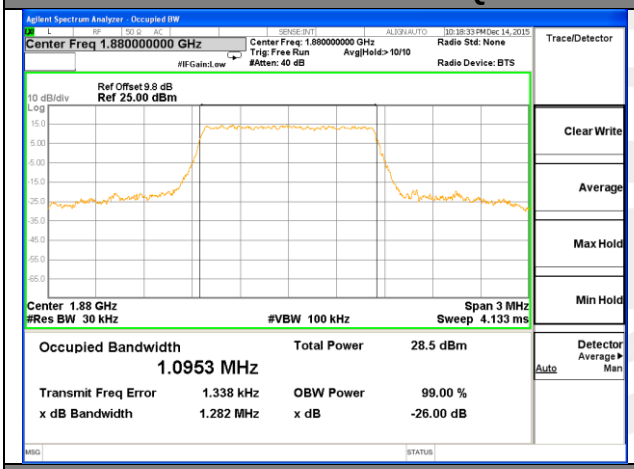
#### Lowest Channel / 1.4MHz / QPSK



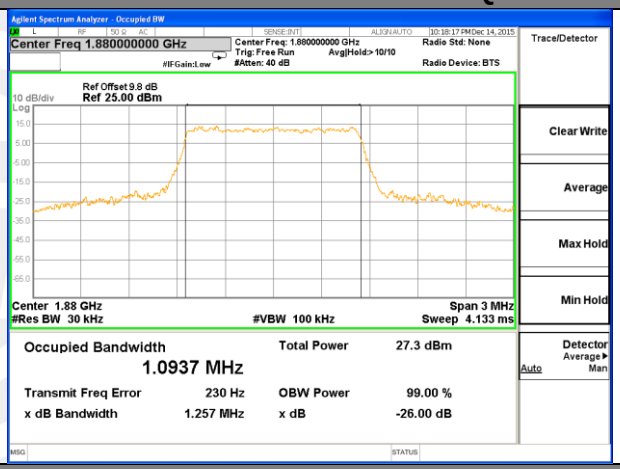

#### Lowest Channel / 1.4MHz / 16QAM



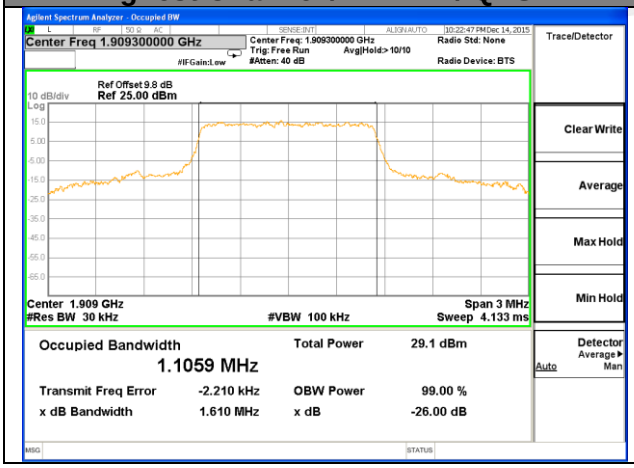

#### Middle Channel / 1.4MHz / QPSK



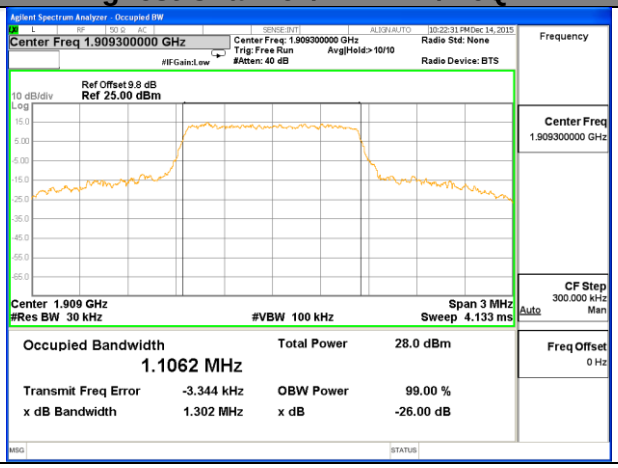

#### Middle Channel / 1.4MHz / 16QAM




#### Highest Channel / 1.4MHz / QPSK



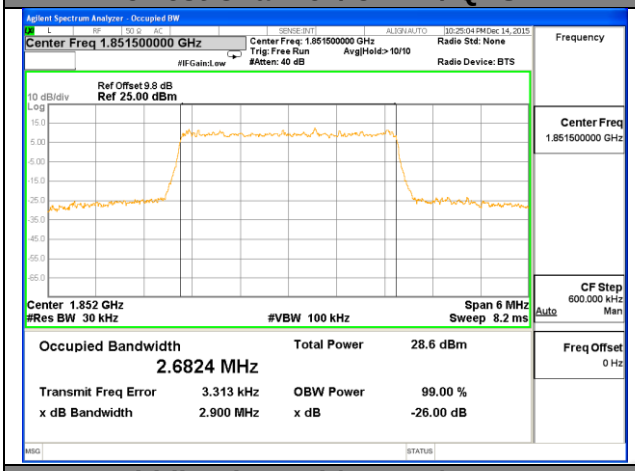

#### Highest Channel / 1.4MHz / 16QAM



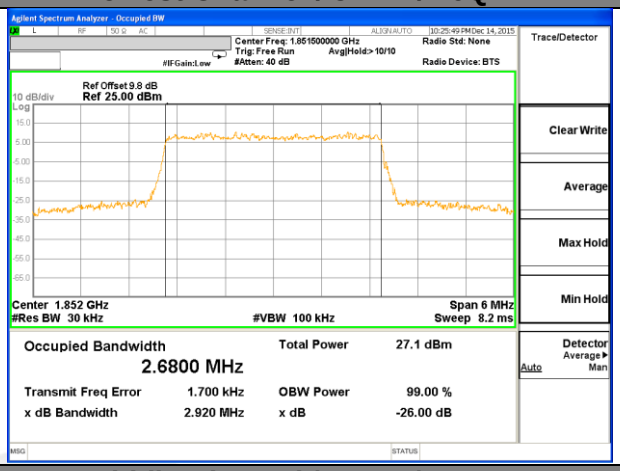
## LTE band 2

### LTE band 2 (99% and -26 Bandwidth)

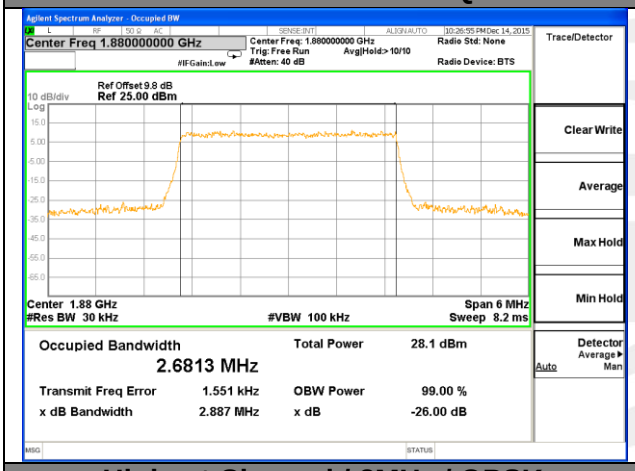
#### Lowest Channel / 3MHz / QPSK



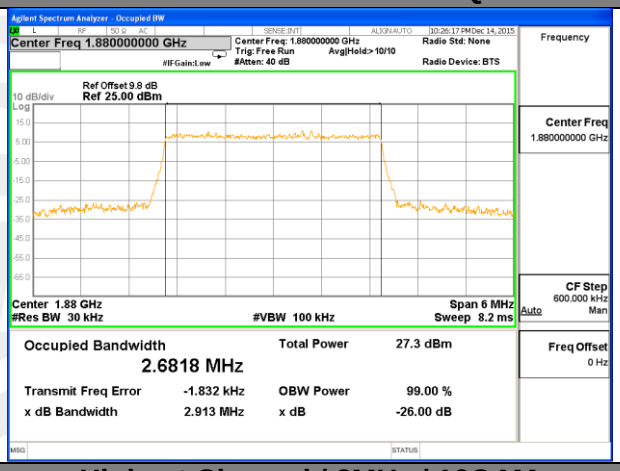

#### Lowest Channel / 3MHz / 16QAM



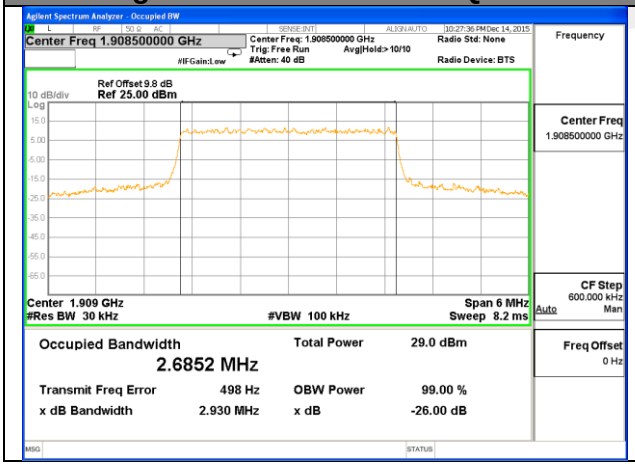

#### Middle Channel / 3MHz / QPSK



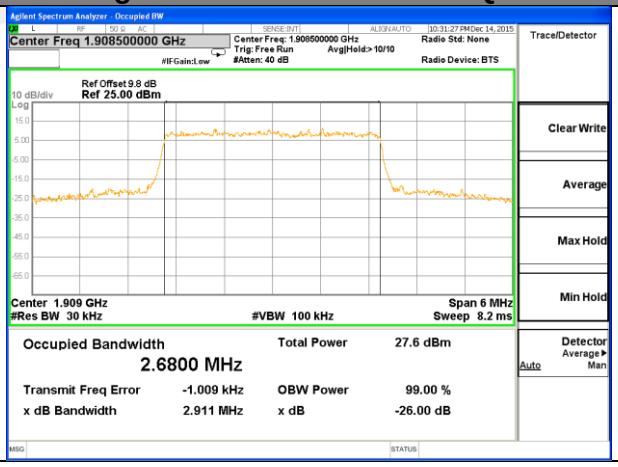

#### Middle Channel / 3MHz / 16QAM




#### Highest Channel / 3MHz / QPSK



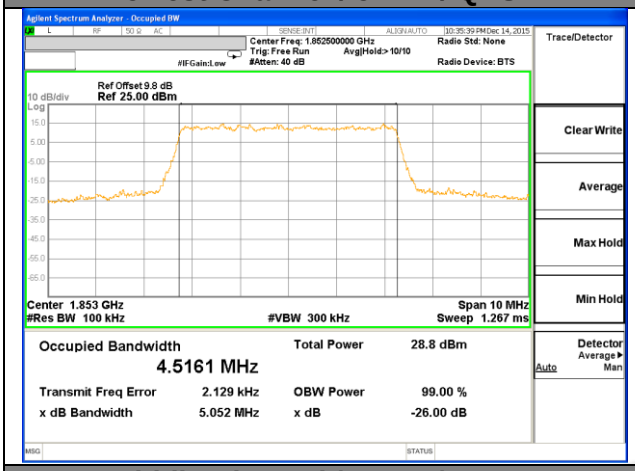

#### Highest Channel / 3MHz / 16QAM



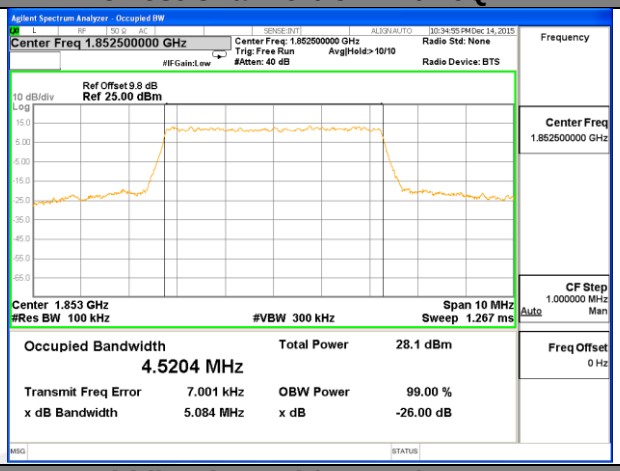
## LTE band 2

### LTE band 2 (99% and -26 Bandwidth)

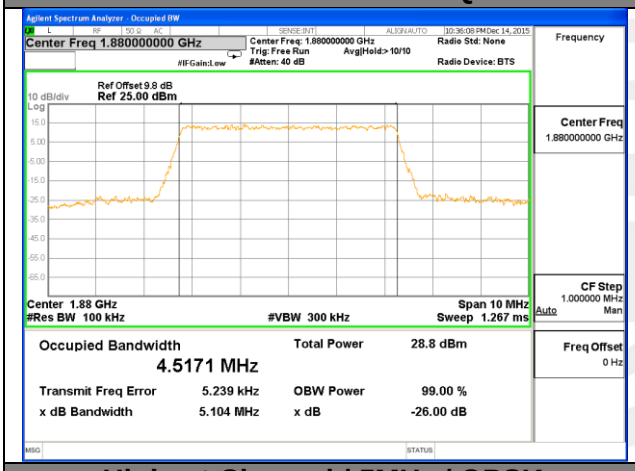
#### Lowest Channel / 5MHz / QPSK



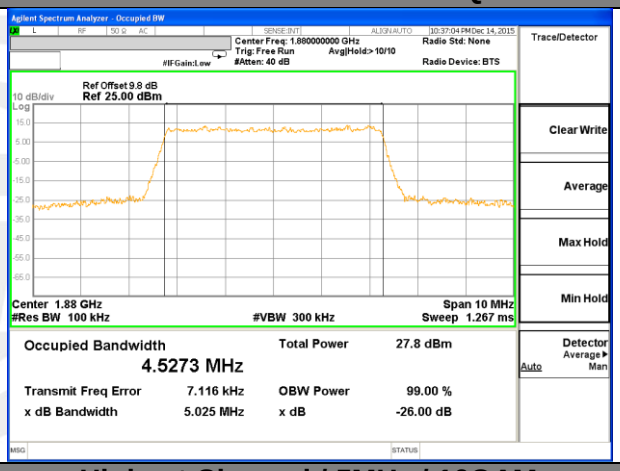

#### Lowest Channel / 5MHz / 16QAM



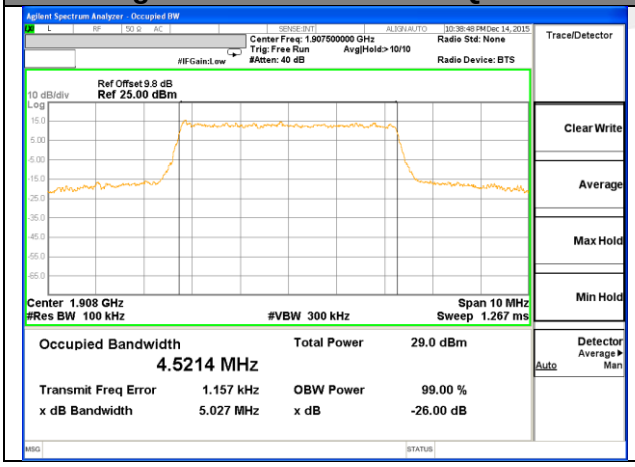

#### Middle Channel / 5MHz / QPSK



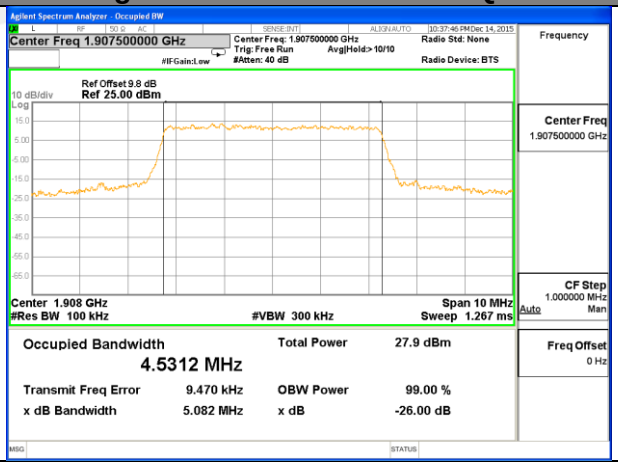

#### Middle Channel / 5MHz / 16QAM




#### Highest Channel / 5MHz / QPSK



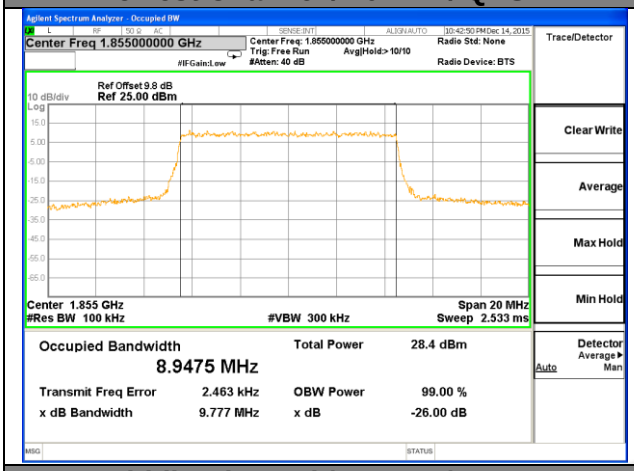

#### Highest Channel / 5MHz / 16QAM



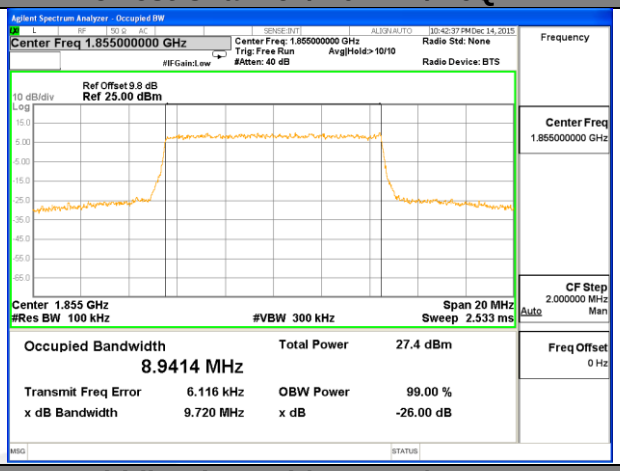
## LTE band 2

### LTE band 2 (99% and -26 Bandwidth)

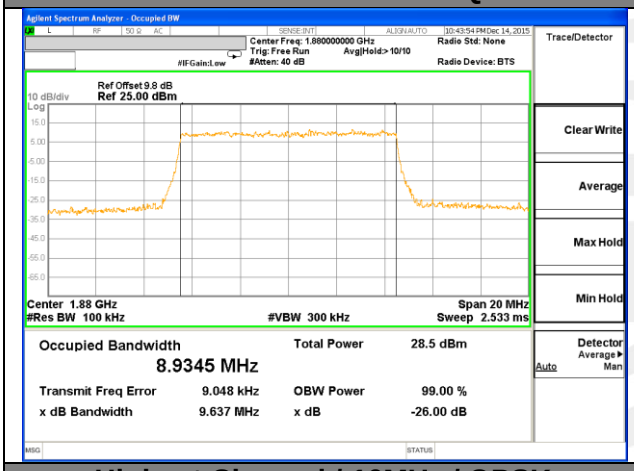
#### Lowest Channel / 10MHz / QPSK



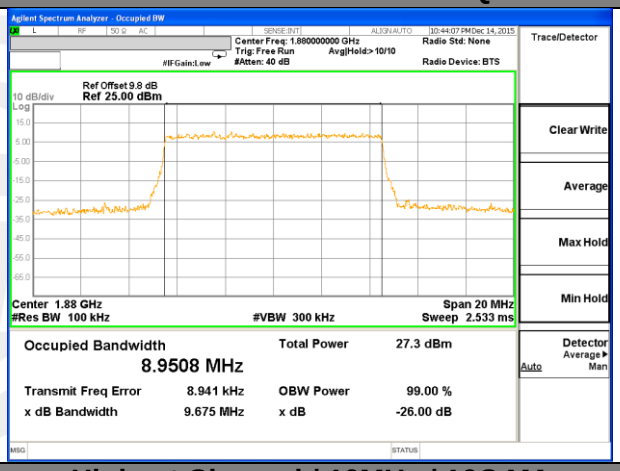

#### Lowest Channel / 10MHz / 16QAM



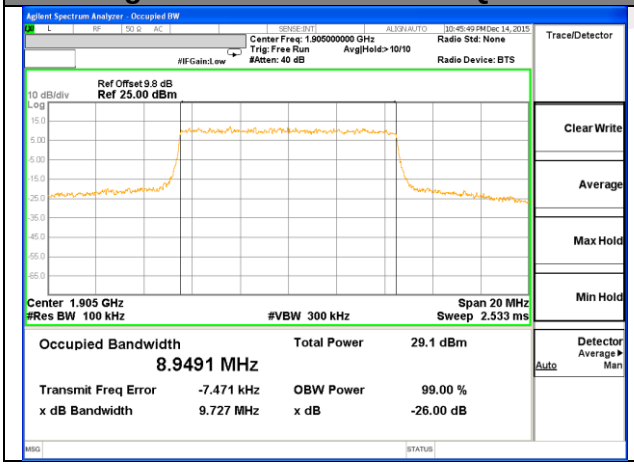

#### Middle Channel / 10MHz / QPSK



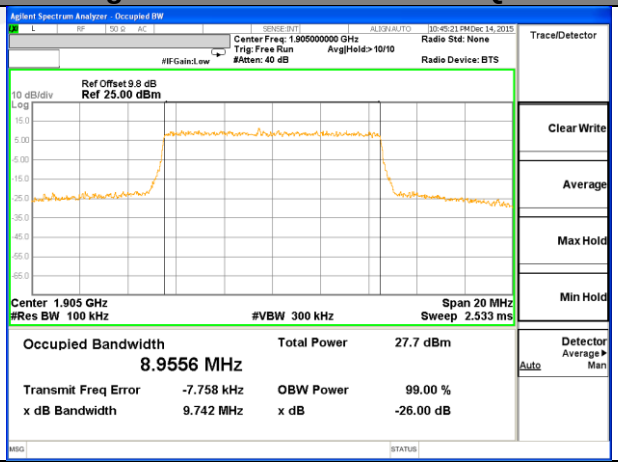

#### Middle Channel / 10MHz / 16QAM




#### Highest Channel / 10MHz / QPSK



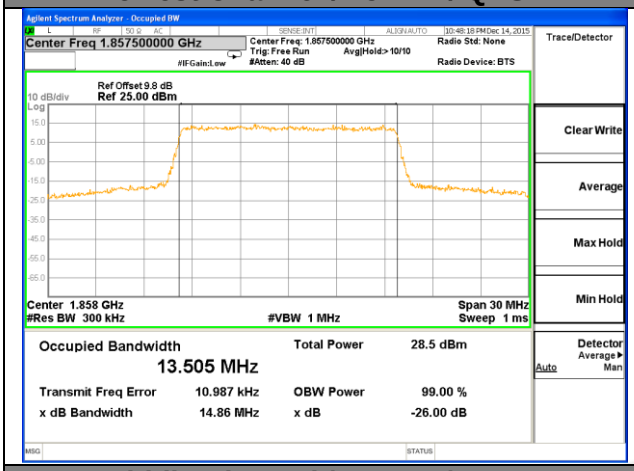

#### Highest Channel / 10MHz / 16QAM



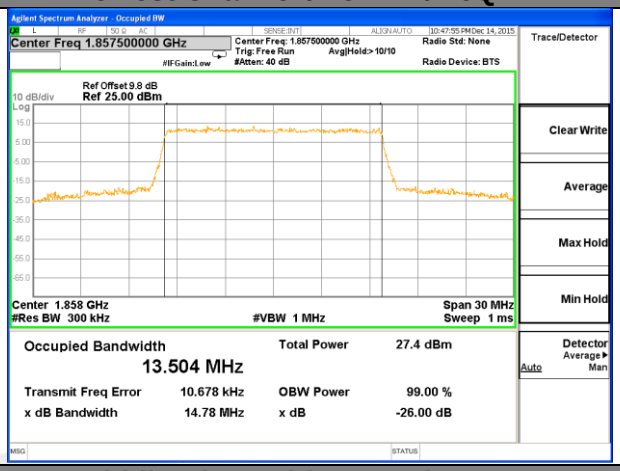
## LTE band 2

### LTE band 2 (99% and -26 Bandwidth)

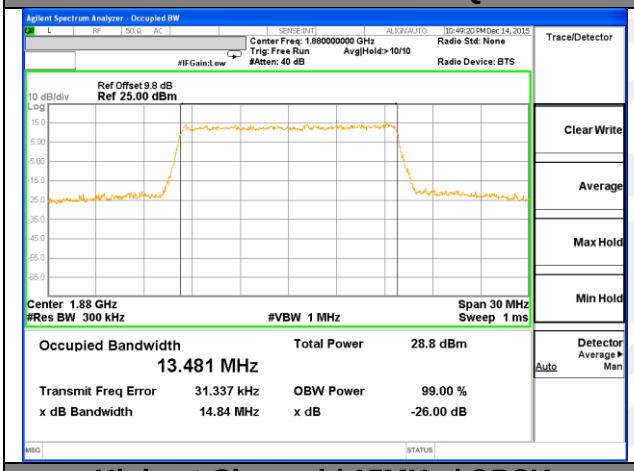
#### Lowest Channel / 15MHz / QPSK



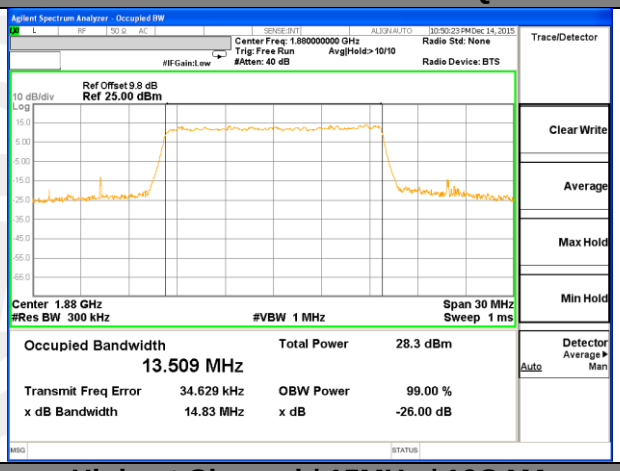

#### Lowest Channel / 15MHz / 16QAM



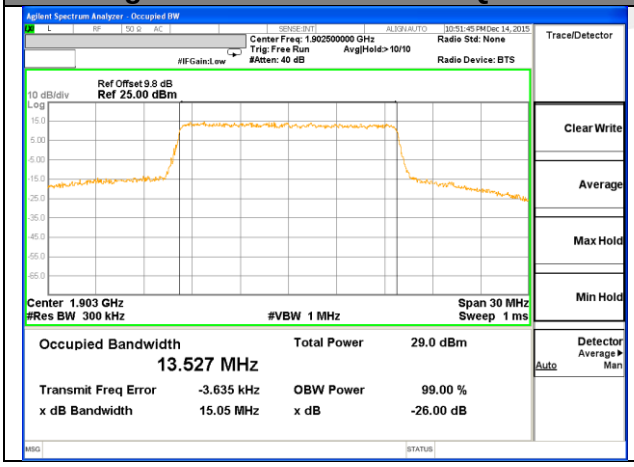

#### Middle Channel / 15MHz / QPSK



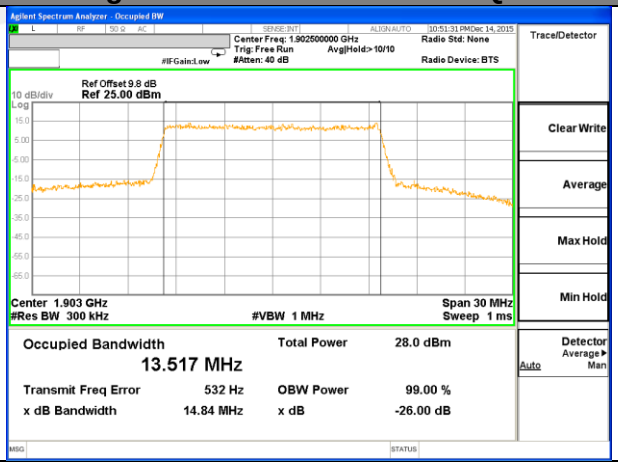

#### Middle Channel / 15MHz / 16QAM




#### Highest Channel / 15MHz / QPSK



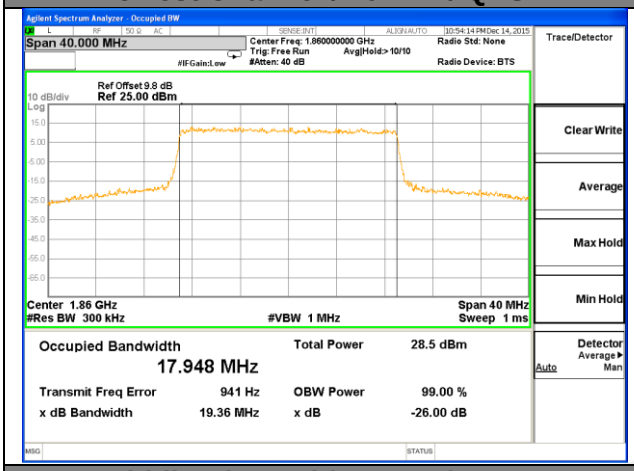

#### Highest Channel / 15MHz / 16QAM



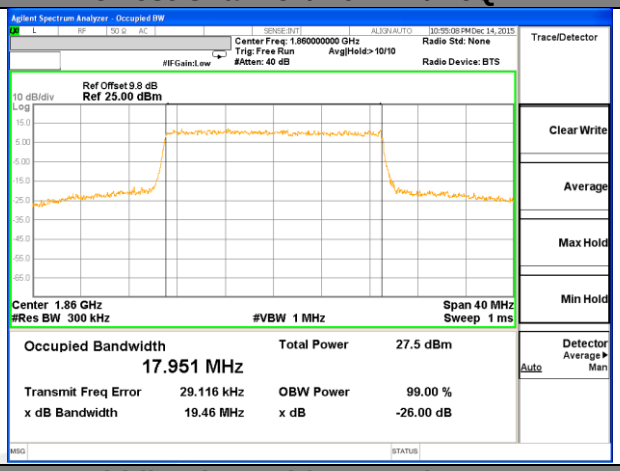
## LTE band 2

### LTE band 2 (99% and -26 Bandwidth)

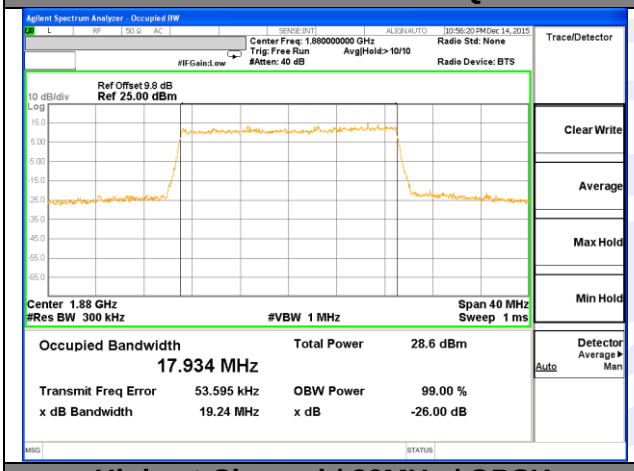
#### Lowest Channel / 20MHz / QPSK



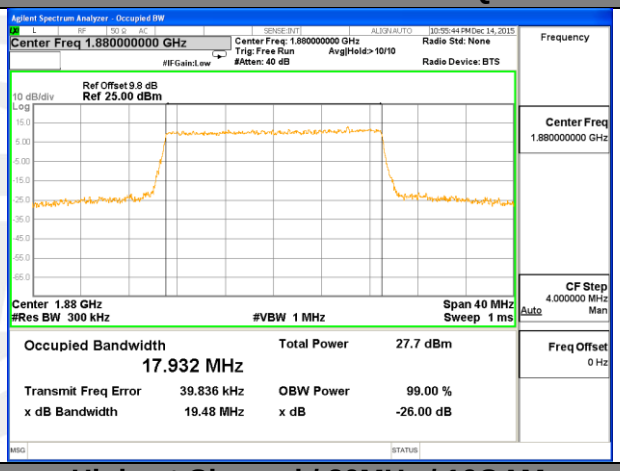

#### Lowest Channel / 20MHz / 16QAM



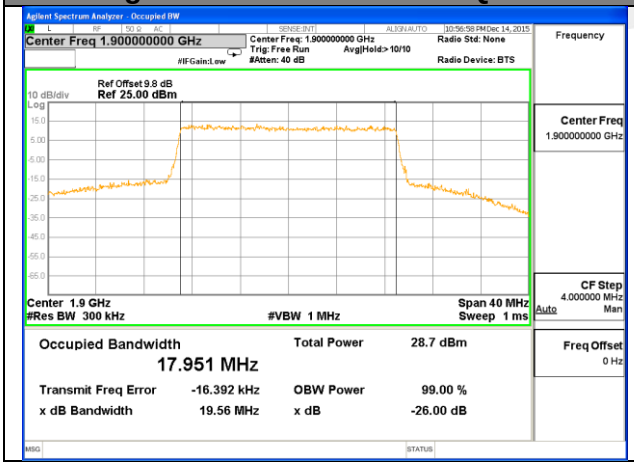

#### Middle Channel / 20MHz / QPSK



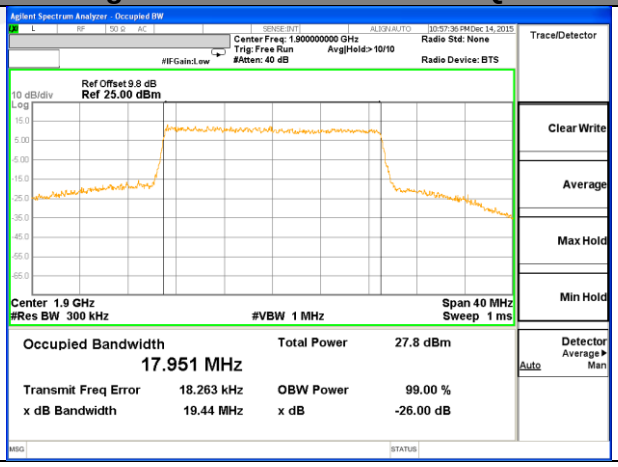

#### Middle Channel / 20MHz / 16QAM




#### Highest Channel / 20MHz / QPSK



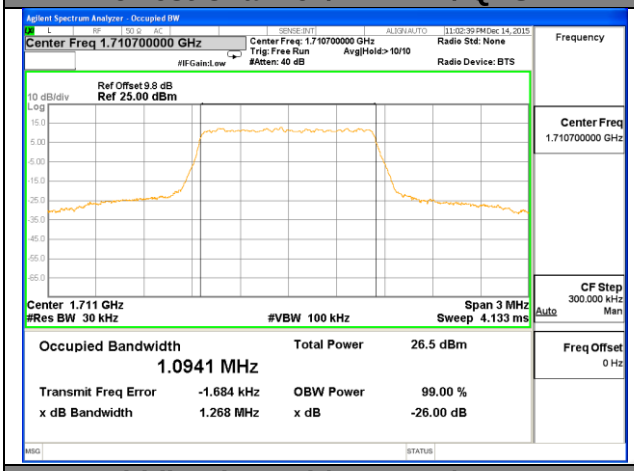

#### Highest Channel / 20MHz / 16QAM



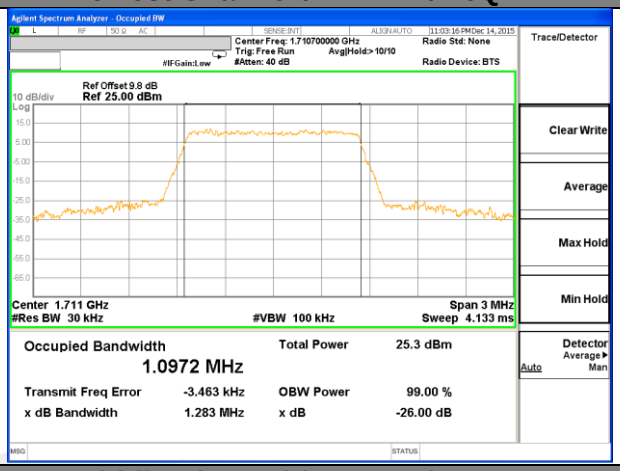
## LTE band 4

### LTE band 4 (99% and -26 Bandwidth)

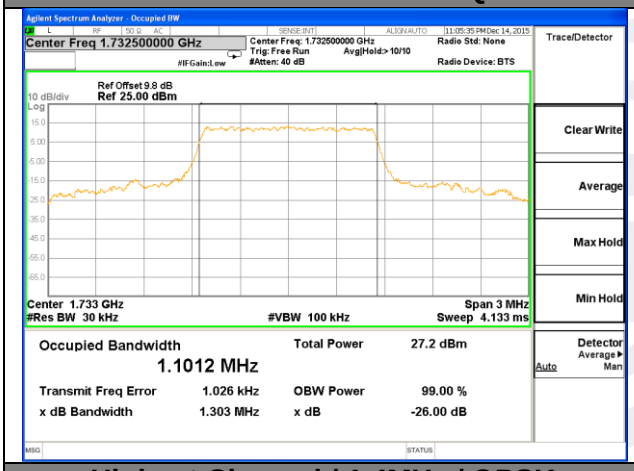
#### Lowest Channel / 1.4MHz / QPSK



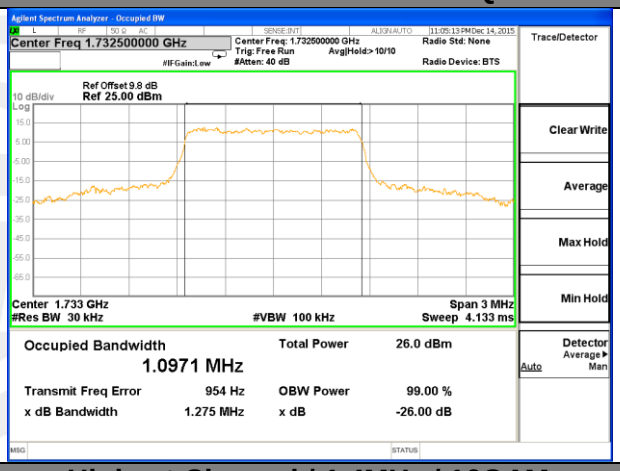

#### Lowest Channel / 1.4MHz / 16QAM



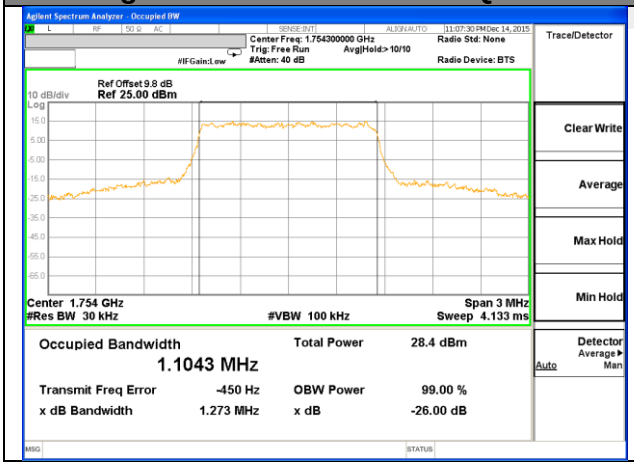

#### Middle Channel / 1.4MHz / QPSK



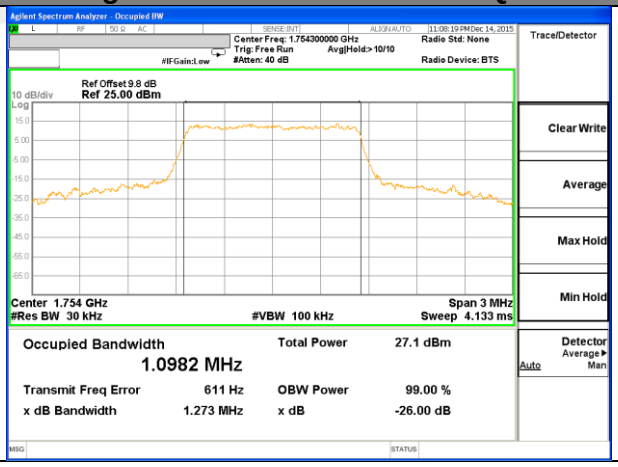

#### Middle Channel / 1.4MHz / 16QAM




#### Highest Channel / 1.4MHz / QPSK



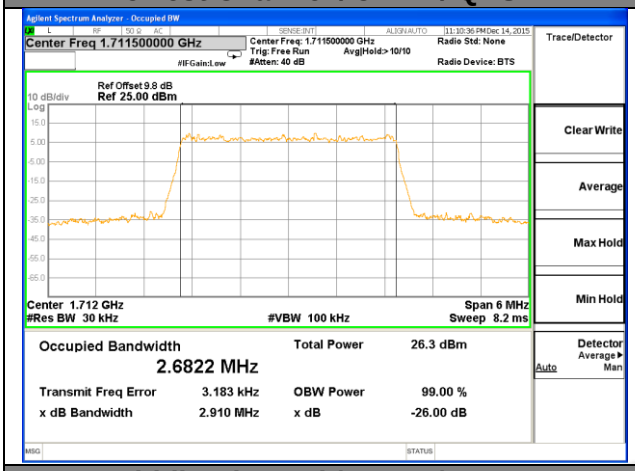

#### Highest Channel / 1.4MHz / 16QAM



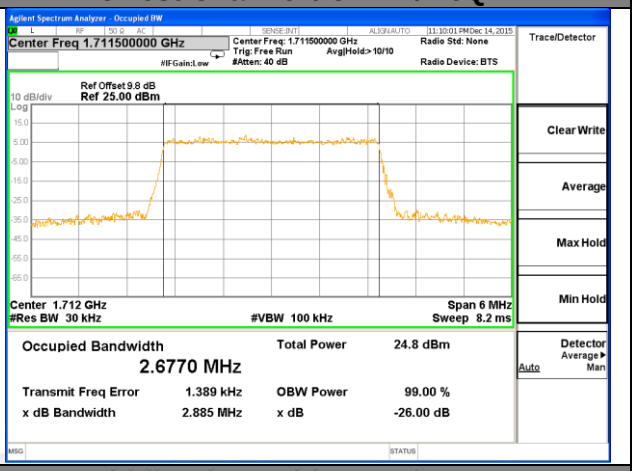
## LTE band 4

### LTE band 4 (99% and -26 Bandwidth)

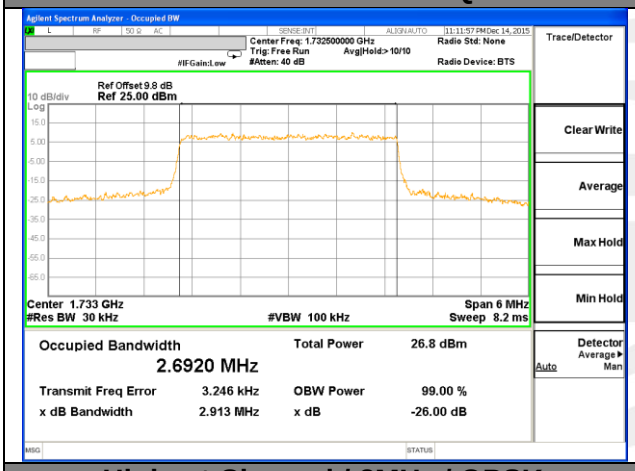
#### Lowest Channel / 3MHz / QPSK



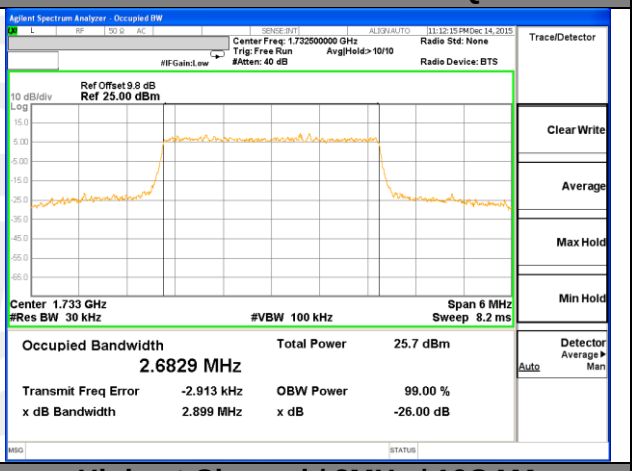

#### Lowest Channel / 3MHz / 16QAM



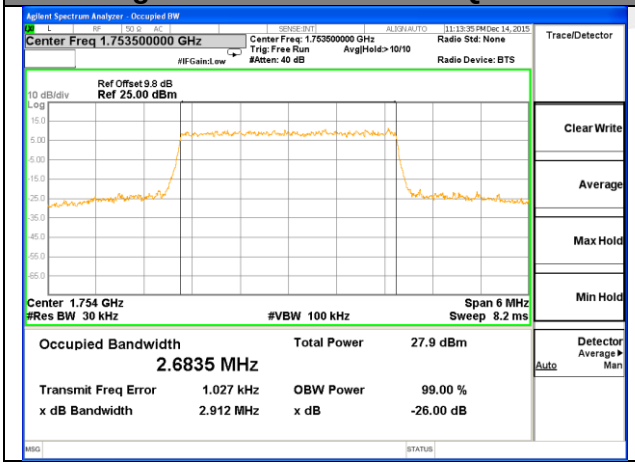

#### Middle Channel / 3MHz / QPSK



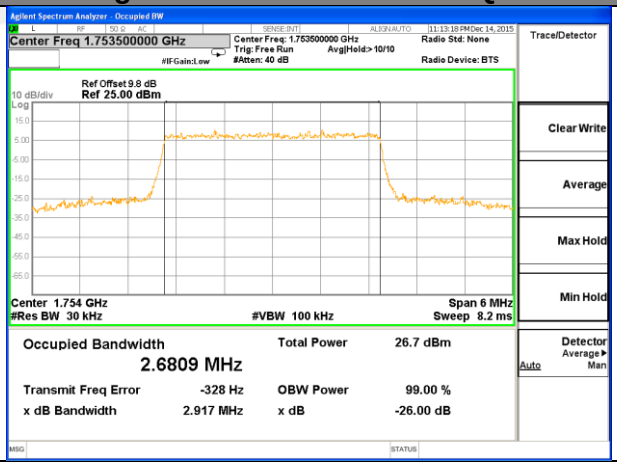

#### Middle Channel / 3MHz / 16QAM




#### Highest Channel / 3MHz / QPSK



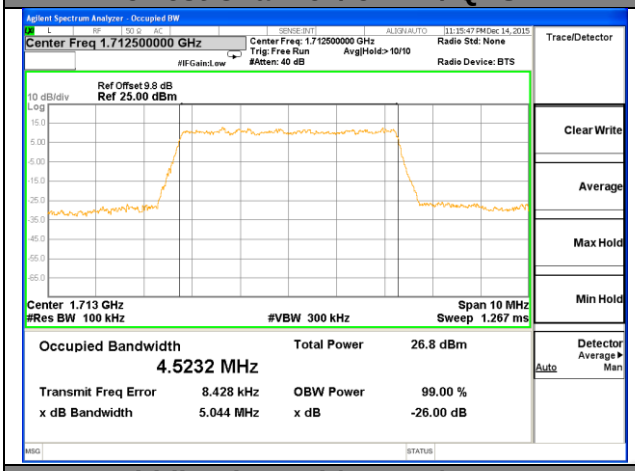

#### Highest Channel / 3MHz / 16QAM



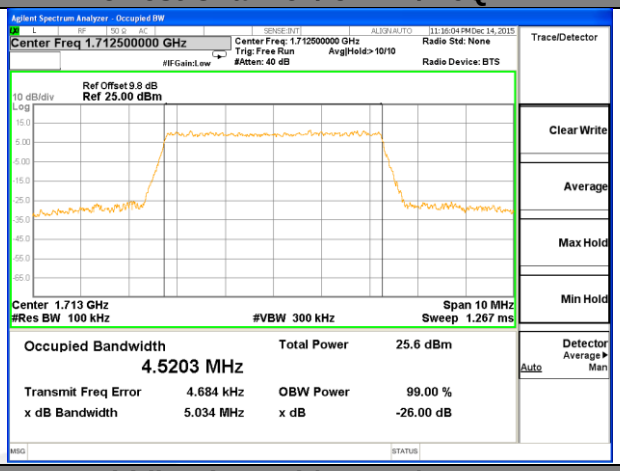
## LTE band 4

### LTE band 4 (99% and -26 Bandwidth)

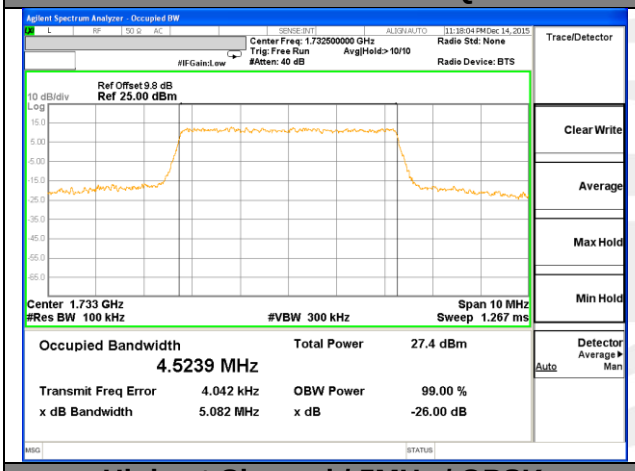
#### Lowest Channel / 5MHz / QPSK



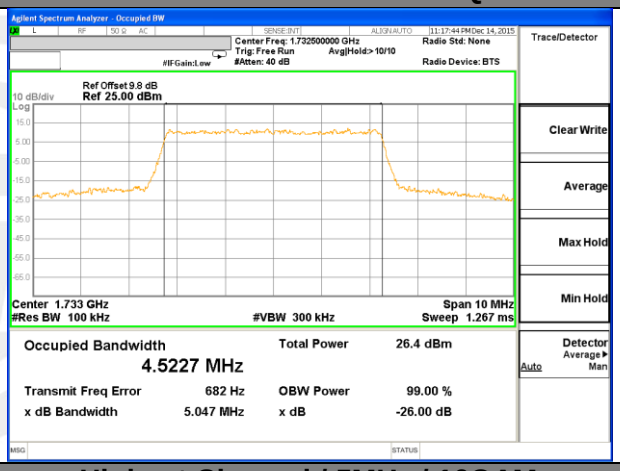

#### Lowest Channel / 5MHz / 16QAM



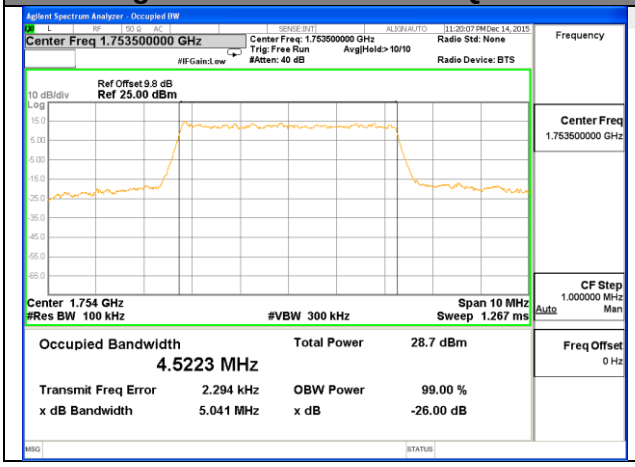

#### Middle Channel / 5MHz / QPSK



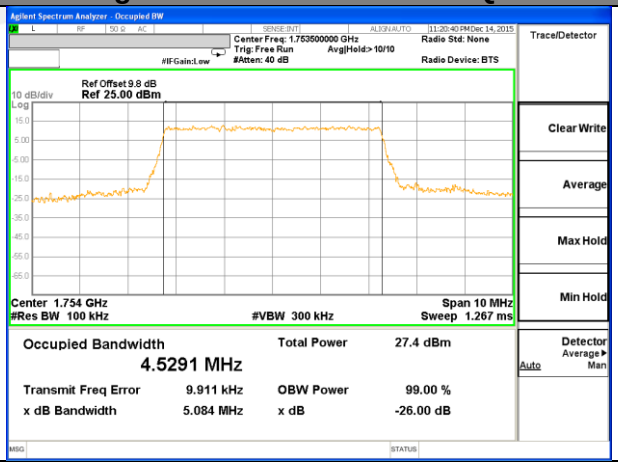

#### Middle Channel / 5MHz / 16QAM




#### Highest Channel / 5MHz / QPSK



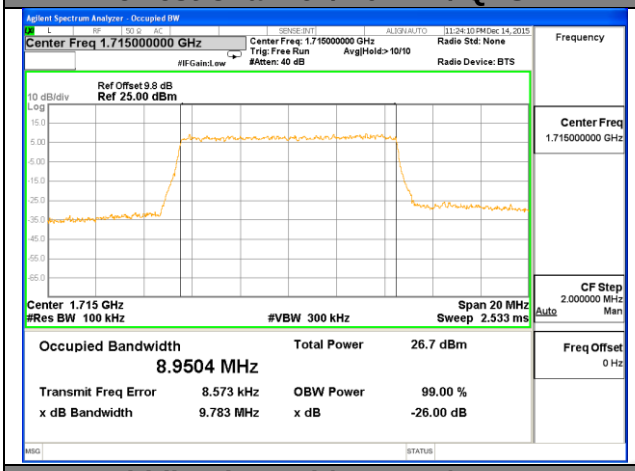

#### Highest Channel / 5MHz / 16QAM



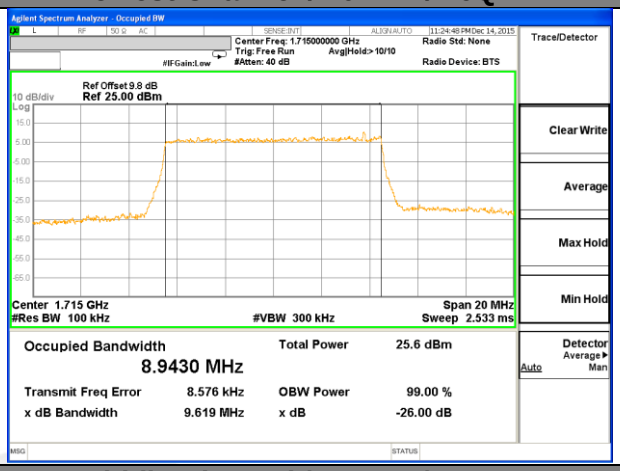
## LTE band 4

### LTE band 4 (99% and -26 Bandwidth)

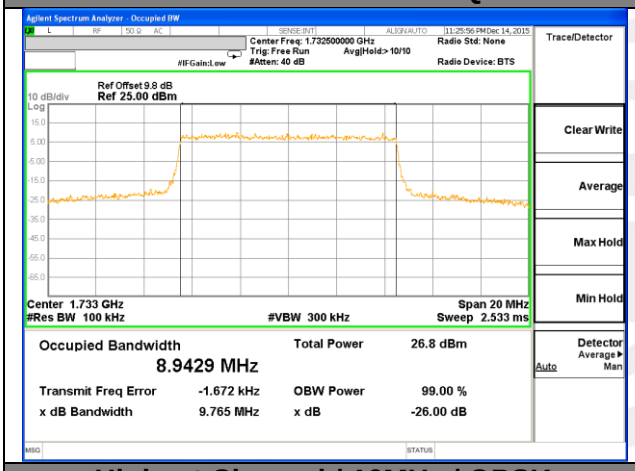
#### Lowest Channel / 10MHz / QPSK



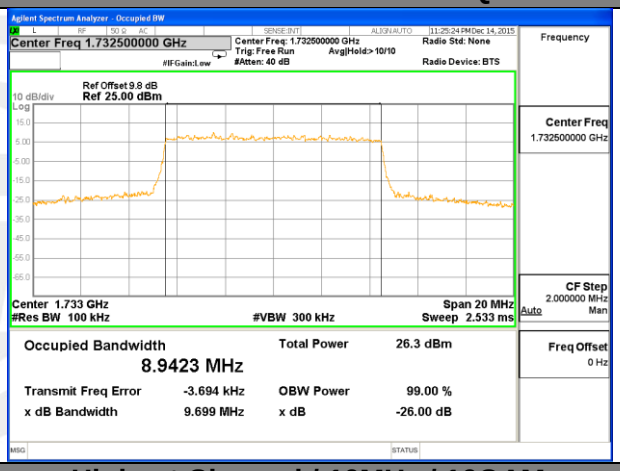

#### Lowest Channel / 10MHz / 16QAM



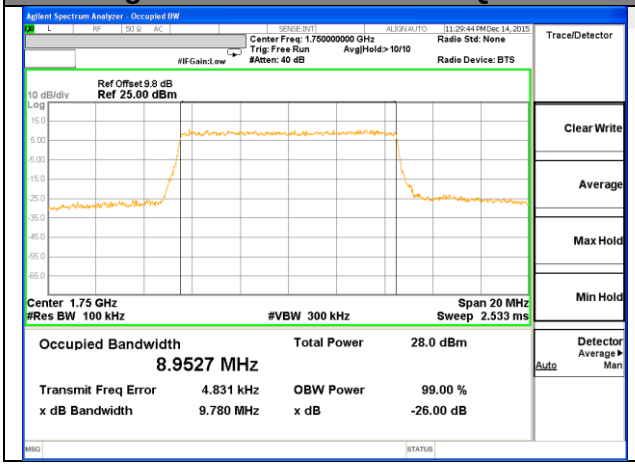

#### Middle Channel / 10MHz / QPSK




#### Middle Channel / 10MHz / 16QAM




#### Highest Channel / 10MHz / QPSK




#### Highest Channel / 10MHz / 16QAM