

## FCC Test Report (Part 24)

**Report No.:** RF180504E08-1

**FCC ID:** NKR-IMG2

**Model:** IMG2

**Received Date:** May 16, 2018

**Test Date:** Aug. 05 ~ Aug. 06, 2018

**Issued Date:** Aug. 10, 2018

**Applicant:** Wistron NeWeb Corporation

**Address:** 20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

**FCC Registration / Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies

## Table of Contents

|                                                          |           |
|----------------------------------------------------------|-----------|
| <b>Release Control Record</b>                            | <b>4</b>  |
| <b>1 Certificate of Conformity</b>                       | <b>5</b>  |
| <b>2 Summary of Test Results</b>                         | <b>6</b>  |
| 2.1 Measurement Uncertainty                              | 6         |
| 2.2 Test Site and Instruments                            | 7         |
| <b>3 General Information</b>                             | <b>8</b>  |
| 3.1 General Description of EUT                           | 8         |
| 3.2 Configuration of System under Test                   | 9         |
| 3.2.1 Description of Support Units                       | 9         |
| 3.3 Test Mode Applicability and Tested Channel Detail    | 10        |
| 3.4 EUT Operating Conditions                             | 13        |
| 3.5 General Description of Applied Standards             | 13        |
| <b>4 Test Types and Results</b>                          | <b>14</b> |
| 4.1 Output Power Measurement                             | 14        |
| 4.1.1 Limits of Output Power Measurement                 | 14        |
| 4.1.2 Test Procedures                                    | 14        |
| 4.1.3 Test Setup                                         | 15        |
| 4.1.4 Test Results                                       | 16        |
| 4.2 Modulation Characteristics Measurement               | 22        |
| 4.2.1 Limits of Modulation Characteristics               | 22        |
| 4.2.2 Test Procedure                                     | 22        |
| 4.2.3 Test Setup                                         | 22        |
| 4.2.4 Test Results                                       | 23        |
| 4.3 Frequency Stability Measurement                      | 24        |
| 4.3.1 Limits of Frequency Stability Measurement          | 24        |
| 4.3.2 Test Procedure                                     | 24        |
| 4.3.3 Test Setup                                         | 24        |
| 4.3.4 Test Results                                       | 25        |
| 4.4 Occupied Bandwidth Measurement                       | 26        |
| 4.4.1 Test Procedure                                     | 26        |
| 4.4.2 Test Setup                                         | 26        |
| 4.4.3 Test Result                                        | 27        |
| 4.5 Band Edge Measurement                                | 31        |
| 4.5.1 Limits of Band Edge Measurement                    | 31        |
| 4.5.2 Test Setup                                         | 31        |
| 4.5.3 Test Procedures                                    | 31        |
| 4.5.4 Test Results                                       | 32        |
| 4.6 Peak to Average Ratio                                | 38        |
| 4.6.1 Limits of Peak to Average Ratio Measurement        | 38        |
| 4.6.2 Test Setup                                         | 38        |
| 4.6.3 Test Procedures                                    | 38        |
| 4.6.4 Test Results                                       | 39        |
| 4.7 Conducted Spurious Emissions                         | 42        |
| 4.7.1 Limits of Conducted Spurious Emissions Measurement | 42        |
| 4.7.2 Test Setup                                         | 42        |
| 4.7.3 Test Procedure                                     | 42        |
| 4.7.4 Test Results                                       | 43        |
| 4.8 Radiated Emission Measurement                        | 61        |
| 4.8.1 Limits of Radiated Emission Measurement            | 61        |
| 4.8.2 Test Procedure                                     | 61        |
| 4.8.3 Deviation from Test Standard                       | 61        |
| 4.8.4 Test Setup                                         | 62        |
| 4.8.5 Test Results                                       | 63        |

|          |                                                                 |            |
|----------|-----------------------------------------------------------------|------------|
| <b>5</b> | <b>Pictures of Test Arrangements.....</b>                       | <b>99</b>  |
|          | <b>Appendix – Information on the Testing Laboratories .....</b> | <b>100</b> |

### Release Control Record

| Issue No.     | Description      | Date Issued   |
|---------------|------------------|---------------|
| RF180504E08-1 | Original release | Aug. 10, 2018 |

## 1 Certificate of Conformity

**Product:** IMG2 LTE module

**Brand:** Wistron Neweb Corporation

**Model:** IMG2

**Sample Status:** Engineering sample

**Applicant:** Wistron NeWeb Corporation

**Test Date:** Aug. 05 ~ Aug. 06, 2018

**Standards:** FCC Part 24, Subpart E

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** Pettie Chen , **Date:** Aug. 10, 2018  
Pettie Chen / Senior Specialist

**Approved by :** Bruce Chen , **Date:** Aug. 10, 2018  
Bruce Chen / Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 24 & Part 2 |                              |        |                                                                                   |
|----------------------------------------|------------------------------|--------|-----------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                    | Result | Remarks                                                                           |
| 2.1046<br>24.232                       | Effective radiated power     | Pass   | Meet the requirement of limit.                                                    |
| 2.1046<br>24.232(d)                    | Peak To Average Ratio        | Pass   | Meet the requirement of limit.                                                    |
| 2.1047                                 | Modulation characteristics   | Pass   | Meet the requirement                                                              |
| 2.1055<br>24.235                       | Frequency Stability          | Pass   | Meet the requirement of limit.                                                    |
| 2.1049<br>24.238(b)                    | Occupied Bandwidth           | Pass   | Meet the requirement of limit.                                                    |
| 24.238(b)                              | Band Edge Measurements       | Pass   | Meet the requirement of limit.                                                    |
| 2.1051<br>24.238                       | Conducted Spurious Emissions | Pass   | Meet the requirement of limit.                                                    |
| 2.1053<br>24.238                       | Radiated Spurious Emissions  | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -30.54dB at 44.85MHz. |

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                    | Frequency       | Expanded Uncertainty (k=2) ( $\pm$ ) |
|--------------------------------|-----------------|--------------------------------------|
| Radiated Emissions up to 1 GHz | 30MHz ~ 200MHz  | 2.93 dB                              |
|                                | 200MHz ~1000MHz | 2.95 dB                              |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz    | 2.26 dB                              |
|                                | 18GHz ~ 40GHz   | 1.94 dB                              |

## 2.2 Test Site and Instruments

| Description & Manufacturer                     | Model No.                  | Serial No.                    | Cal. Date     | Cal. Due      |
|------------------------------------------------|----------------------------|-------------------------------|---------------|---------------|
| Test Receiver<br>Agilent                       | N9038A                     | MY51210203                    | Mar. 16, 2018 | Mar. 15, 2019 |
| Spectrum Analyzer<br>Agilent                   | N9010A                     | MY52220314                    | Nov. 24, 2017 | Nov. 23, 2018 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43                      | 101261                        | Jan. 11, 2018 | Jan. 10, 2019 |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9170                  | 148                           | Dec. 13, 2017 | Dec. 12, 2018 |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9120D                 | 9120D-969                     | Nov. 12, 2017 | Nov. 11, 2018 |
| Preamplifier<br>EMCI                           | EMC 012645                 | 980115                        | Oct. 20, 2017 | Oct. 19, 2018 |
| MXG Vector signal<br>generator<br>Agilent      | N5182B                     | MY53050430                    | Oct. 24, 2017 | Oct. 23, 2018 |
| BILOG Antenna<br>SCHWARZBECK                   | VULB9168                   | 9168-472                      | Dec. 06, 2017 | Dec. 05, 2018 |
| Radio Communication<br>Analyzer<br>Anritsu     | MT8820C                    | 6201300640                    | Aug. 16, 2017 | Aug. 15, 2019 |
| Preamplifier<br>EMCI                           | EMC 330H                   | 980112                        | Oct. 13, 2017 | Oct. 12, 2018 |
| Power Meter<br>Anritsu                         | ML2495A                    | 1012010                       | Aug. 15, 2017 | Aug. 14, 2018 |
| Power Sensor<br>Anritsu                        | MA2411B                    | 1315050                       | Aug. 15, 2017 | Aug. 14, 2018 |
| RF Coaxial Cable<br>HUBER+SUHNNER              | EMC104-SM-SM-8000<br>&3000 | 140811+170717                 | Oct. 20, 2017 | Oct. 19, 2018 |
| RF Coaxial Cable<br>HUBER+SUHNNER              | SUCOFLEX 104               | EMC104-SM-SM-1000(1<br>40807) | Oct. 20, 2017 | Oct. 19, 2018 |
| RF Coaxial Cable<br>Worken                     | 8D-FB                      | Cable-Ch10-01                 | Oct. 20, 2017 | Oct. 19, 2018 |
| Boresight Antenna Fixture                      | FBA-01                     | FBA-SIP01                     | NA            | NA            |
| Software<br>BV ADT                             | E3<br>6.120103             | NA                            | NA            | NA            |
| Antenna Tower<br>MF                            | MFA-440H                   | NA                            | NA            | NA            |
| Turn Table<br>MF                               | MFT-201SS                  | NA                            | NA            | NA            |
| Antenna Tower & Turn<br>Table Controller<br>MF | MF-7802                    | NA                            | NA            | NA            |

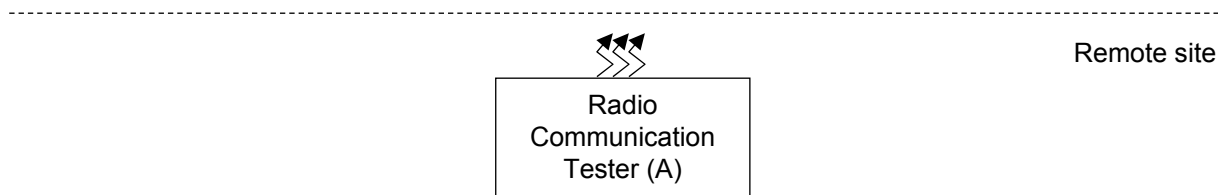
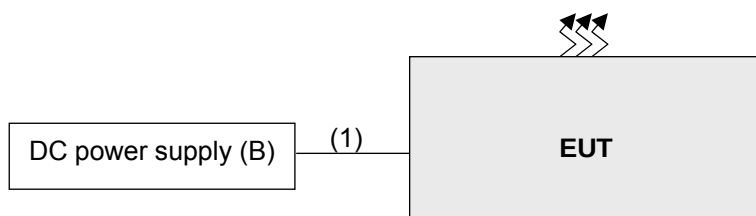
- Note: 1. The calibration interval of the above test instruments is 12/24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
4. The IC Site Registration No. is IC 7450F-10.

### 3 General Information

#### 3.1 General Description of EUT

|                     |                                       |                         |                        |
|---------------------|---------------------------------------|-------------------------|------------------------|
| Product             | IMG2 LTE module                       |                         |                        |
| Brand               | Wistron Neweb Corporation             |                         |                        |
| Model               | IMG2                                  |                         |                        |
| Sample Status       | Engineering sample                    |                         |                        |
| Power Supply Rating | 3.8Vdc (host)                         |                         |                        |
| Modulation Type     | LTE: QPSK, 16QAM                      |                         |                        |
| Operating Frequency | LTE Band 2 (Channel Bandwidth 1.4MHz) | 1850.7MHz ~ 1909.3MHz   |                        |
|                     | LTE Band 2 (Channel Bandwidth 3MHz)   | 1851.5MHz ~ 1908.5MHz   |                        |
|                     | LTE Band 2 (Channel Bandwidth 5MHz)   | 1852.5MHz ~ 1907.5MHz   |                        |
|                     | LTE Band 2 (Channel Bandwidth 10MHz)  | 1855.0MHz ~ 1905.0MHz   |                        |
|                     | LTE Band 2 (Channel Bandwidth 15MHz)  | 1857.5MHz ~ 1902.5MHz   |                        |
|                     | LTE Band 2 (Channel Bandwidth 20MHz)  | 1860.0MHz ~ 1900.0MHz   |                        |
| Max. EIRP Power     |                                       | QPSK                    | 16QAM                  |
|                     | LTE Band 2 (Channel Bandwidth 1.4MHz) | 206.54mW<br>(23.15dBm)  | 164.44mW<br>(22.16dBm) |
|                     | LTE Band 2 (Channel Bandwidth 3MHz)   | 217.27 mW<br>(23.37dBm) | 171.79mW<br>(22.35dBm) |
|                     | LTE Band 2 (Channel Bandwidth 5MHz)   | 232.27mW<br>(23.66dBm)  | 184.93mW<br>(22.67dBm) |
|                     | LTE Band 2 (Channel Bandwidth 10MHz)  | 244.34mW<br>(23.88dBm)  | 192.75mW<br>(22.85dBm) |
|                     | LTE Band 2 (Channel Bandwidth 15MHz)  | 256.45mW<br>(24.09dBm)  | 204.64mW<br>(23.11dBm) |
|                     | LTE Band 2 (Channel Bandwidth 20MHz)  | 270.40mW<br>(24.32dBm)  | 214.29mW<br>(23.31dBm) |
| Emission Designator |                                       | QPSK                    | 16QAM                  |
|                     | LTE Band 2 (Channel Bandwidth 1.4MHz) | 1M12G7D                 | 1M12W7D                |
|                     | LTE Band 2 (Channel Bandwidth 3MHz)   | 2M71G7D                 | 2M71W7D                |
|                     | LTE Band 2 (Channel Bandwidth 5MHz)   | 4M48G7D                 | 4M48W7D                |
|                     | LTE Band 2 (Channel Bandwidth 10MHz)  | 8M96G7D                 | 8M96W7D                |
|                     | LTE Band 2 (Channel Bandwidth 15MHz)  | 13M4G7D                 | 13M4W7D                |
|                     | LTE Band 2 (Channel Bandwidth 20MHz)  | 17M9G7D                 | 17M9W7D                |
| Antenna Type        | Dipole antenna with 1.56dBi gain      |                         |                        |
| Antenna Connector   | NA                                    |                         |                        |
| Accessory Device    | NA                                    |                         |                        |
| Data Cable Supplied | NA                                    |                         |                        |

### 3.2 Configuration of System under Test



#### 3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| ID | Product                    | Brand   | Model No. | Serial No. | FCC ID | Remarks |
|----|----------------------------|---------|-----------|------------|--------|---------|
| A. | Radio Communication Tester | Anritsu | MT8820C   | 6201300640 | NA     | -       |
| B. | DC power supply            | Topward | 3303D     | NA         | NA     | -       |

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|--------------|------|------------|--------------------|--------------|---------|
| 1. | DC cable     | 1    | 1.0        | N                  | 0            | -       |

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on X-plane. Following channel(s) was (were) selected for the final test as listed below:

#### LTE Band 2

| EUT Configure Mode | Test item                  | Available channel | Tested Channel                                                | Channel Bandwidth | Modulation   | Mode                 |
|--------------------|----------------------------|-------------------|---------------------------------------------------------------|-------------------|--------------|----------------------|
| -                  | EIRP                       | 18607 to 19193    | 18607(1850.70MHz),<br>18900(1880.00MHz),<br>19193(1909.30MHz) | 1.4MHz            | QPSK         | 1 RB / 5 RB Offset   |
|                    |                            | 18615 to 19185    | 18615(1851.50MHz),<br>18900(1880.00MHz),<br>19185(1908.50MHz) | 3MHz              | QPSK         | 1 RB / 14 RB Offset  |
|                    |                            | 18625 to 19175    | 18625(1852.50MHz),<br>18900(1880.00MHz),<br>19175(1907.50MHz) | 5MHz              | QPSK         | 1 RB / 24 RB Offset  |
|                    |                            | 18650 to 19150    | 18650(1855.00MHz),<br>18900(1880.00MHz),<br>19150(1905.00MHz) | 10MHz             | QPSK         | 1 RB / 49 RB Offset  |
|                    |                            | 18675 to 19125    | 18675(1857.50MHz),<br>18900(1880.00MHz),<br>19125(1902.50MHz) | 15MHz             | QPSK         | 1 RB / 74 RB Offset  |
|                    |                            | 18700 to 19100    | 18700(1860.00MHz),<br>18900(1880.00MHz),<br>19100(1900.00MHz) | 20MHz             | QPSK         | 1 RB / 99 RB Offset  |
| -                  | Modulation characteristics | 18700 to 19100    | 18900(1880.00MHz)                                             | 20MHz             | QPSK / 16QAM | 100 RB / 0 RB Offset |
| -                  | Frequency Stability        | 18607 to 19193    | 18900(1880.00MHz)                                             | 1.4MHz            | QPSK         | 1 RB / 5 RB Offset   |
| -                  | Occupied Bandwidth         | 18607 to 19193    | 18607(1850.70MHz),<br>18900(1880.00MHz),<br>19193(1909.30MHz) | 1.4MHz            | QPSK / 16QAM | 6 RB / 0 RB Offset   |
|                    |                            | 18615 to 19185    | 18615(1851.50MHz),<br>18900(1880.00MHz),<br>19185(1908.50MHz) | 3MHz              | QPSK / 16QAM | 15 RB / 0 RB Offset  |
|                    |                            | 18625 to 19175    | 18625(1852.50MHz),<br>18900(1880.00MHz),<br>19175(1907.50MHz) | 5MHz              | QPSK / 16QAM | 25 RB / 0 RB Offset  |
|                    |                            | 18650 to 19150    | 18650(1855.00MHz),<br>18900(1880.00MHz),<br>19150(1905.00MHz) | 10MHz             | QPSK / 16QAM | 50 RB / 0 RB Offset  |
|                    |                            | 18675 to 19125    | 18675(1857.50MHz),<br>18900(1880.00MHz),<br>19125(1902.50MHz) | 15MHz             | QPSK / 16QAM | 75 RB / 0 RB Offset  |
|                    |                            | 18700 to 19100    | 18700(1860.00MHz),<br>18900(1880.00MHz),<br>19100(1900.00MHz) | 20MHz             | QPSK / 16QAM | 100RB / 0 RB Offset  |

| EUT Configure Mode | Test item                    | Available channel | Tested Channel                                                | Channel Bandwidth | Modulation   | Mode                                                              |
|--------------------|------------------------------|-------------------|---------------------------------------------------------------|-------------------|--------------|-------------------------------------------------------------------|
| -                  | Band Edge                    | 18607 to 19193    | 18607(1850.70MHz),<br>19193(1909.30MHz)                       | 1.4MHz            | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 5 RB Offset<br>6 RB / 0 RB Offset    |
|                    |                              | 18615 to 19185    | 18615(1851.50MHz),<br>19185(1908.50MHz)                       | 3MHz              | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 14 RB Offset<br>15 RB / 0 RB Offset  |
|                    |                              | 18625 to 19175    | 18625(1852.50MHz),<br>19175(1907.50MHz)                       | 5MHz              | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset  |
|                    |                              | 18650 to 19150    | 18650(1855.00MHz),<br>19150(1905.00MHz)                       | 10MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                              | 18675 to 19125    | 18675(1857.50MHz),<br>19125(1902.50MHz)                       | 15MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 74 RB Offset<br>75 RB / 0 RB Offset  |
|                    |                              | 18700 to 19100    | 18700(1860.00MHz),<br>19100(1900.00MHz)                       | 20MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset<br>100 RB / 0 RB Offset |
| -                  | Peak to Average Ratio        | 18607 to 19193    | 18607(1850.70MHz),<br>18900(1880.00MHz),<br>19193(1909.30MHz) | 1.4MHz            | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                              | 18615 to 19185    | 18615(1851.50MHz),<br>18900(1880.00MHz),<br>19185(1908.50MHz) | 3MHz              | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                              | 18625 to 19175    | 18625(1852.50MHz),<br>18900(1880.00MHz),<br>19175(1907.50MHz) | 5MHz              | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                              | 18650 to 19150    | 18650(1855.00MHz),<br>18900(1880.00MHz),<br>19150(1905.00MHz) | 10MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                              | 18675 to 19125    | 18675(1857.50MHz),<br>18900(1880.00MHz),<br>19125(1902.50MHz) | 15MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                              | 18700 to 19100    | 18700(1860.00MHz),<br>18900(1880.00MHz),<br>19100(1900.00MHz) | 20MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
| -                  | Conducted Emission           | 18607 to 19193    | 18607(1850.70MHz),<br>18900(1880.00MHz),<br>19193(1909.30MHz) | 1.4MHz            | QPSK         | 1 RB / 0 RB Offset                                                |
|                    |                              | 18615 to 19185    | 18615(1851.50MHz),<br>18900(1880.00MHz),<br>19185(1908.50MHz) | 3MHz              | QPSK         | 1 RB / 0 RB Offset                                                |
|                    |                              | 18625 to 19175    | 18625(1852.50MHz),<br>18900(1880.00MHz),<br>19175(1907.50MHz) | 5MHz              | QPSK         | 1 RB / 0 RB Offset                                                |
|                    |                              | 18650 to 19150    | 18650(1855.00MHz),<br>18900(1880.00MHz),<br>19150(1905.00MHz) | 10MHz             | QPSK         | 1 RB / 0 RB Offset                                                |
|                    |                              | 18675 to 19125    | 18675(1857.50MHz),<br>18900(1880.00MHz),<br>19125(1902.50MHz) | 15MHz             | QPSK         | 1 RB / 0 RB Offset                                                |
|                    |                              | 18700 to 19100    | 18700(1860.00MHz),<br>18900(1880.00MHz),<br>19100(1900.00MHz) | 20MHz             | QPSK         | 1 RB / 0 RB Offset                                                |
| -                  | Radiated Emission Below 1GHz | 18700 to 19100    | 18900(1880.00MHz)                                             | 20MHz             | QPSK         | 1 RB / 99 RB Offset                                               |

| EUT Configure Mode | Test item                    | Available channel | Tested Channel                                                | Channel Bandwidth | Modulation | Mode                |
|--------------------|------------------------------|-------------------|---------------------------------------------------------------|-------------------|------------|---------------------|
| -                  | Radiated Emission Above 1GHz | 18607 to 19193    | 18607(1850.70MHz),<br>18900(1880.00MHz),<br>19193(1909.30MHz) | 1.4MHz            | QPSK       | 1 RB / 5 RB Offset  |
| -                  |                              | 18615 to 19185    | 18615(1851.50MHz),<br>18900(1880.00MHz),<br>19185(1908.50MHz) | 3MHz              | QPSK       | 1 RB / 14 RB Offset |
| -                  |                              | 18625 to 19175    | 18625(1852.50MHz),<br>18900(1880.00MHz),<br>19175(1907.50MHz) | 5MHz              | QPSK       | 1 RB / 24 RB Offset |
| -                  |                              | 18650 to 19150    | 18650(1855.00MHz),<br>18900(1880.00MHz),<br>19150(1905.00MHz) | 10MHz             | QPSK       | 1 RB / 49 RB Offset |
| -                  |                              | 18675 to 19125    | 18675(1857.50MHz),<br>18900(1880.00MHz),<br>19125(1902.50MHz) | 15MHz             | QPSK       | 1 RB / 74 RB Offset |
| -                  |                              | 18700 to 19100    | 18700(1860.00MHz),<br>18900(1880.00MHz),<br>19100(1900.00MHz) | 20MHz             | QPSK       | 1 RB / 99 RB Offset |

**Note:**

1. The conducted output power for QPSK, 16QAM, and measured value of QPSK is higher than 16QAM mode. Therefore, only occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM modes, the other test items were performed under QPSK mode only.

**Test Condition:**

| Test Item                  | Environmental Conditions | Input Power (System) | Tested By     |
|----------------------------|--------------------------|----------------------|---------------|
| EIRP                       | 22deg. C, 66%RH          | 120Vac, 60Hz         | Han Wu        |
| Modulation characteristics | 24deg. C, 64%RH          | 120Vac, 60Hz         | James Yang    |
| Frequency Stability        | 24deg. C, 64%RH          | 120Vac, 60Hz         | James Yang    |
| Occupied Bandwidth         | 24deg. C, 64%RH          | 120Vac, 60Hz         | James Yang    |
| Band Edge                  | 24deg. C, 64%RH          | 120Vac, 60Hz         | James Yang    |
| Peak To Average Ratio      | 24deg. C, 64%RH          | 120Vac, 60Hz         | James Yang    |
| Conducted Emission         | 24deg. C, 64%RH          | 120Vac, 60Hz         | James Yang    |
| Radiated Emission          | 22deg. C, 66%RH          | 120Vac, 60Hz         | Jisyoung Wang |

### **3.4 EUT Operating Conditions**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### **3.5 General Description of Applied Standards**

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 24**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

**ANSI/TIA/EIA-603-E 2016**

**ANSI 63.26-2015**

All test items have been performed and recorded as per the above standards.

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 2 watts e.i.r.p.

#### 4.1.2 Test Procedures

##### EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G
- d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dB.

Where:

$$\text{ERP/EIRP} = P_{\text{Meas}} + G_T - L_C$$

$P_{\text{Meas}}$  : Measure transmitter output power.

$G_T$  : Gain of the transmitting antenna.

$L_C$  : signal attenuation in the connecting cable between the transmitter and antenna.

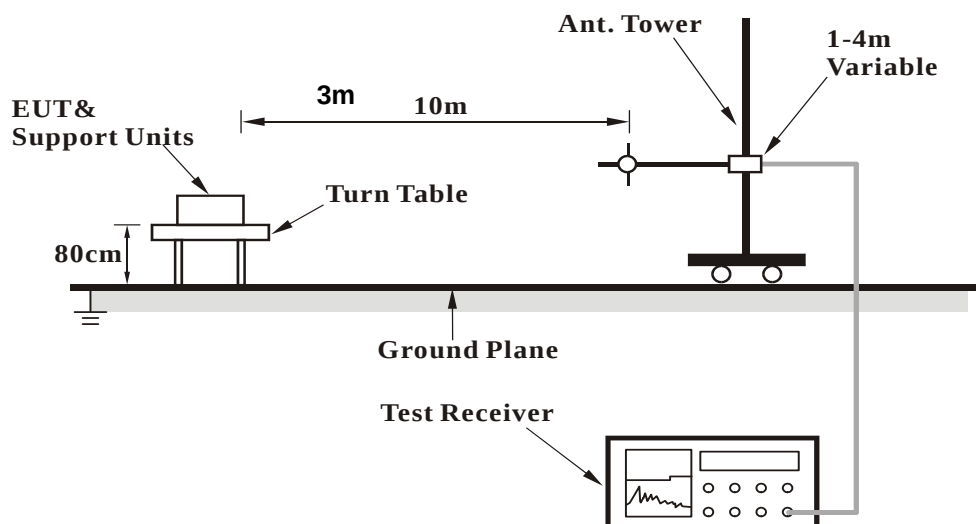
##### Conducted Power Measurement:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

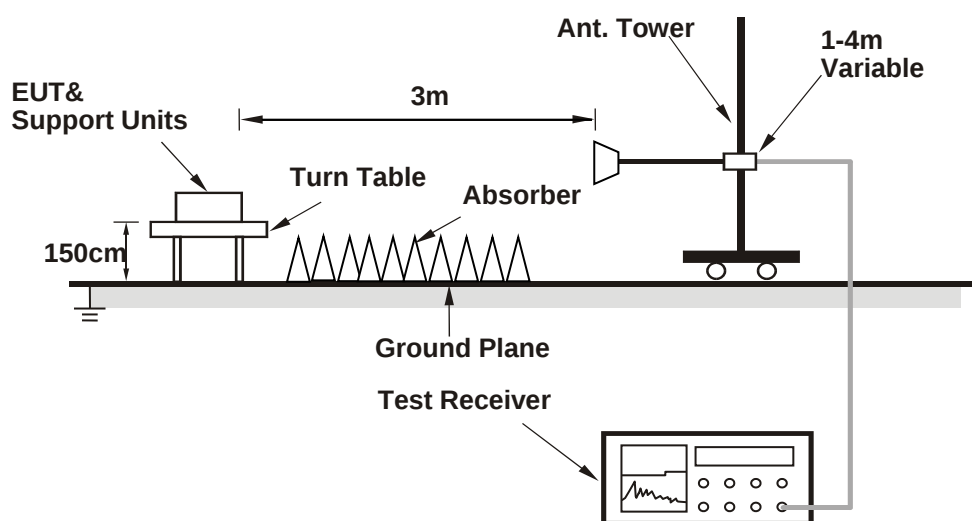
#### 4.1.3 Test Setup

EIRP / ERP Measurement:

**For Radiated Emission below or equal 1GHz**



**For Radiated Emission above 1GHz**



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Conducted Power Measurement:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.4 Test Results

Conducted Output Power (dBm)

| Band / BW | RB Size | RB Offset | QPSK       |          |            | 16QAM      |          |            |
|-----------|---------|-----------|------------|----------|------------|------------|----------|------------|
|           |         |           | Low CH     | Mid CH   | High CH    | Low CH     | Mid CH   | High CH    |
|           |         |           | 18607      | 18900    | 19193      | 18607      | 18900    | 19193      |
|           |         |           | 1850.7 MHz | 1880 MHz | 1909.3 MHz | 1850.7 MHz | 1880 MHz | 1909.3 MHz |
| 2 / 1.4M  | 1       | 0         | 22.72      | 23.23    | 23.18      | 21.86      | 22.46    | 22.41      |
|           | 1       | 2         | 22.68      | 23.18    | 23.06      | 21.82      | 22.41    | 22.36      |
|           | 1       | 5         | 22.67      | 23.15    | 23.09      | 21.89      | 22.38    | 22.18      |
|           | 3       | 0         | 22.81      | 23.20    | 23.12      | 21.73      | 22.36    | 22.26      |
|           | 3       | 1         | 22.79      | 23.16    | 22.98      | 21.65      | 22.32    | 22.20      |
|           | 3       | 3         | 22.62      | 22.95    | 22.76      | 21.62      | 22.38    | 22.19      |
|           | 6       | 0         | 22.35      | 22.74    | 22.59      | 21.34      | 22.16    | 22.08      |

| Band / BW | RB Size | RB Offset | QPSK       |          |            | 16QAM      |          |            |
|-----------|---------|-----------|------------|----------|------------|------------|----------|------------|
|           |         |           | Low CH     | Mid CH   | High CH    | Low CH     | Mid CH   | High CH    |
|           |         |           | 18615      | 18900    | 19185      | 18615      | 18900    | 19185      |
|           |         |           | 1851.5 MHz | 1880 MHz | 1908.5 MHz | 1851.5 MHz | 1880 MHz | 1908.5 MHz |
| 2 / 3M    | 1       | 0         | 23.06      | 23.54    | 23.25      | 22.18      | 22.35    | 22.26      |
|           | 1       | 7         | 23.16      | 23.45    | 23.25      | 22.06      | 22.31    | 22.10      |
|           | 1       | 14        | 23.12      | 23.42    | 23.36      | 22.01      | 22.28    | 22.14      |
|           | 8       | 0         | 22.96      | 23.05    | 22.96      | 22.26      | 22.26    | 22.18      |
|           | 8       | 3         | 22.89      | 22.96    | 22.86      | 22.05      | 22.21    | 22.09      |
|           | 8       | 7         | 22.81      | 22.92    | 22.91      | 22.11      | 22.25    | 22.13      |
|           | 15      | 0         | 22.76      | 23.02    | 23.01      | 21.68      | 22.18    | 22.08      |

| Band / BW | RB Size | RB Offset | QPSK       |          |            | 16QAM      |          |            |
|-----------|---------|-----------|------------|----------|------------|------------|----------|------------|
|           |         |           | Low CH     | Mid CH   | High CH    | Low CH     | Mid CH   | High CH    |
|           |         |           | 18625      | 18900    | 19175      | 18625      | 18900    | 19175      |
|           |         |           | 1852.5 MHz | 1880 MHz | 1907.5 MHz | 1852.5 MHz | 1880 MHz | 1907.5 MHz |
| 2 / 5M    | 1       | 0         | 23.18      | 23.58    | 23.12      | 22.26      | 22.78    | 22.61      |
|           | 1       | 12        | 23.15      | 23.54    | 23.26      | 22.24      | 22.70    | 22.63      |
|           | 1       | 24        | 23.18      | 23.54    | 23.18      | 22.19      | 22.72    | 22.60      |
|           | 12      | 0         | 22.96      | 23.24    | 23.15      | 22.06      | 22.34    | 22.29      |
|           | 12      | 6         | 23.00      | 23.15    | 23.09      | 22.11      | 22.16    | 22.18      |
|           | 12      | 13        | 22.94      | 23.16    | 22.98      | 22.10      | 22.25    | 22.21      |
|           | 25      | 0         | 22.76      | 22.82    | 22.71      | 21.84      | 22.09    | 22.02      |

| Band / BW | RB Size | RB Offset | QPSK        |             |             | 16QAM       |             |             |
|-----------|---------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|
|           |         |           | Low CH      | Mid CH      | High CH     | Low CH      | Mid CH      | High CH     |
|           |         |           | 18650       | 18900       | 19150       | 18650       | 18900       | 19150       |
|           |         |           | 1855<br>MHz | 1880<br>MHz | 1905<br>MHz | 1855<br>MHz | 1880<br>MHz | 1905<br>MHz |
| 2 / 10M   | 1       | 0         | 23.65       | 23.82       | 23.79       | 22.68       | 22.91       | 22.90       |
|           | 1       | 24        | 23.50       | 23.81       | 23.57       | 22.57       | 22.87       | 22.84       |
|           | 1       | 49        | 23.46       | 23.83       | 23.62       | 22.59       | 22.81       | 22.76       |
|           | 25      | 0         | 22.39       | 22.70       | 22.49       | 22.08       | 22.18       | 22.09       |
|           | 25      | 12        | 22.41       | 22.62       | 22.60       | 21.96       | 22.26       | 22.23       |
|           | 25      | 25        | 22.68       | 22.63       | 22.62       | 21.99       | 22.19       | 22.11       |
|           | 50      | 0         | 22.69       | 22.82       | 22.73       | 21.37       | 21.65       | 21.47       |

| Band / BW | RB Size | RB Offset | QPSK          |             |               | 16QAM         |             |               |
|-----------|---------|-----------|---------------|-------------|---------------|---------------|-------------|---------------|
|           |         |           | Low CH        | Mid CH      | High CH       | Low CH        | Mid CH      | High CH       |
|           |         |           | 18675         | 18900       | 19125         | 18675         | 18900       | 19125         |
|           |         |           | 1857.5<br>MHz | 1880<br>MHz | 1902.5<br>MHz | 1857.5<br>MHz | 1880<br>MHz | 1902.5<br>MHz |
| 2 / 15M   | 1       | 0         | 24.10         | 24.32       | 24.18         | 22.96         | 23.18       | 22.94         |
|           | 1       | 37        | 24.02         | 24.30       | 24.06         | 22.91         | 23.15       | 22.86         |
|           | 1       | 74        | 24.11         | 24.29       | 24.09         | 22.87         | 23.16       | 22.73         |
|           | 36      | 0         | 23.76         | 23.90       | 23.28         | 22.54         | 22.78       | 22.62         |
|           | 36      | 19        | 23.62         | 23.78       | 23.75         | 22.54         | 22.71       | 22.61         |
|           | 36      | 39        | 23.68         | 23.84       | 23.69         | 22.58         | 22.72       | 22.63         |
|           | 75      | 0         | 23.01         | 23.19       | 22.97         | 22.11         | 22.38       | 22.24         |

| Band / BW | RB Size | RB Offset | QPSK        |             |             | 16QAM       |             |             |
|-----------|---------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|
|           |         |           | Low CH      | Mid CH      | High CH     | Low CH      | Mid CH      | High CH     |
|           |         |           | 18700       | 18900       | 19100       | 18700       | 18900       | 19100       |
|           |         |           | 1860<br>MHz | 1880<br>MHz | 1900<br>MHz | 1860<br>MHz | 1880<br>MHz | 1900<br>MHz |
| 2 / 20M   | 1       | 0         | 23.98       | 24.22       | 24.06       | 22.86       | 23.18       | 23.01       |
|           | 1       | 50        | 24.01       | 24.15       | 23.99       | 22.97       | 23.06       | 22.96       |
|           | 1       | 99        | 23.92       | 24.18       | 24.01       | 22.92       | 23.02       | 22.98       |
|           | 50      | 0         | 22.96       | 23.06       | 22.92       | 22.76       | 22.98       | 22.81       |
|           | 50      | 25        | 22.87       | 23.01       | 22.94       | 22.78       | 22.96       | 22.73       |
|           | 50      | 50        | 22.87       | 23.06       | 22.87       | 22.74       | 22.89       | 22.79       |
|           | 100     | 0         | 22.76       | 23.12       | 22.82       | 21.86       | 22.12       | 21.96       |

EIRP Power (dBm)

| LTE Band 5                       |         |                 |               |                        |           |          |                    |
|----------------------------------|---------|-----------------|---------------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4MHz / QPSK |         |                 |               |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18607   | 1850.7          | -13.42        | 36.57                  | 23.15     | 206.54   | H                  |
|                                  | 18900   | 1880.0          | -14.20        | 37.22                  | 23.02     | 200.45   |                    |
|                                  | 19193   | 1909.3          | -14.30        | 37.18                  | 22.88     | 194.09   |                    |
|                                  | 18607   | 1850.7          | -19.87        | 37.65                  | 17.78     | 59.98    | V                  |
|                                  | 18900   | 1880.0          | -20.09        | 37.58                  | 17.49     | 56.10    |                    |
|                                  | 19193   | 1909.3          | -20.13        | 37.48                  | 17.35     | 54.33    |                    |
| Channel Bandwidth: 3MHz / QPSK   |         |                 |               |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18615   | 1851.5          | -13.20        | 36.57                  | 23.37     | 217.27   | H                  |
|                                  | 18900   | 1880.0          | -13.98        | 37.22                  | 23.24     | 210.86   |                    |
|                                  | 19185   | 1908.5          | -14.08        | 37.18                  | 23.10     | 204.17   |                    |
|                                  | 18615   | 1851.5          | -19.65        | 37.65                  | 18.00     | 63.10    | V                  |
|                                  | 18900   | 1880.0          | -19.87        | 37.58                  | 17.71     | 59.02    |                    |
|                                  | 19185   | 1908.5          | -19.91        | 37.48                  | 17.57     | 57.15    |                    |
| Channel Bandwidth: 5MHz / QPSK   |         |                 |               |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18625   | 1852.5          | -12.91        | 36.57                  | 23.66     | 232.27   | H                  |
|                                  | 18900   | 1880.0          | -13.69        | 37.22                  | 23.53     | 225.42   |                    |
|                                  | 19175   | 1907.5          | -13.79        | 37.18                  | 23.39     | 218.27   |                    |
|                                  | 18625   | 1852.5          | -19.36        | 37.65                  | 18.29     | 67.45    | V                  |
|                                  | 18900   | 1880.0          | -19.58        | 37.58                  | 18.00     | 63.10    |                    |
|                                  | 19175   | 1907.5          | -19.62        | 37.48                  | 17.86     | 61.09    |                    |
| Channel Bandwidth: 10MHz / QPSK  |         |                 |               |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18650   | 1855.0          | -12.69        | 36.57                  | 23.88     | 244.34   | H                  |
|                                  | 18900   | 1880.0          | -13.47        | 37.22                  | 23.75     | 237.14   |                    |
|                                  | 19150   | 1905.0          | -13.57        | 37.18                  | 23.61     | 229.61   |                    |
|                                  | 18650   | 1855.0          | -19.14        | 37.65                  | 18.51     | 70.96    | V                  |
|                                  | 18900   | 1880.0          | -19.36        | 37.58                  | 18.22     | 66.37    |                    |
|                                  | 19150   | 1905.0          | -19.40        | 37.48                  | 18.08     | 64.27    |                    |
| Channel Bandwidth: 15MHz / QPSK  |         |                 |               |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18675   | 1857.5          | -12.48        | 36.57                  | 24.09     | 256.45   | H                  |
|                                  | 18900   | 1880.0          | -13.26        | 37.22                  | 23.96     | 248.89   |                    |
|                                  | 19125   | 1902.5          | -13.36        | 37.18                  | 23.82     | 240.99   |                    |
|                                  | 18675   | 1857.5          | -18.93        | 37.65                  | 18.72     | 74.47    | V                  |
|                                  | 18900   | 1880.0          | -19.15        | 37.58                  | 18.43     | 69.66    |                    |
|                                  | 19125   | 1902.5          | -19.19        | 37.48                  | 18.29     | 67.45    |                    |

| Channel Bandwidth: 20MHz / QPSK |         |                 |               |                        |           |          |                    |
|---------------------------------|---------|-----------------|---------------|------------------------|-----------|----------|--------------------|
| Plane                           | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                               | 18700   | 1860.0          | -12.25        | 36.57                  | 24.32     | 270.40   | H                  |
|                                 | 18900   | 1880.0          | -13.03        | 37.22                  | 24.19     | 262.42   |                    |
|                                 | 19100   | 1900.0          | -13.13        | 37.18                  | 24.05     | 254.10   |                    |
|                                 | 18700   | 1860.0          | -18.70        | 37.65                  | 18.95     | 78.52    | V                  |
|                                 | 18900   | 1880.0          | -18.92        | 37.58                  | 18.66     | 73.45    |                    |
|                                 | 19100   | 1900.0          | -18.96        | 37.48                  | 18.52     | 71.12    |                    |

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

| LTE Band 5                        |         |                 |               |                        |           |          |                    |
|-----------------------------------|---------|-----------------|---------------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4MHz / 16QAM |         |                 |               |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                 | 18607   | 1850.7          | -14.41        | 36.57                  | 22.16     | 164.44   | H                  |
|                                   | 18900   | 1880.0          | -15.19        | 37.22                  | 22.03     | 159.59   |                    |
|                                   | 19193   | 1909.3          | -15.29        | 37.18                  | 21.89     | 154.53   |                    |
|                                   | 18607   | 1850.7          | -20.86        | 37.65                  | 16.79     | 47.75    | V                  |
|                                   | 18900   | 1880.0          | -21.08        | 37.58                  | 16.50     | 44.67    |                    |
|                                   | 19193   | 1909.3          | -21.12        | 37.48                  | 16.36     | 43.25    |                    |
| Channel Bandwidth: 3MHz / 16QAM   |         |                 |               |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                 | 18615   | 1851.5          | -14.22        | 36.57                  | 22.35     | 171.79   | H                  |
|                                   | 18900   | 1880.0          | -15.00        | 37.22                  | 22.22     | 166.72   |                    |
|                                   | 19185   | 1908.5          | -15.10        | 37.18                  | 22.08     | 161.44   |                    |
|                                   | 18615   | 1851.5          | -20.67        | 37.65                  | 16.98     | 49.89    | V                  |
|                                   | 18900   | 1880.0          | -20.89        | 37.58                  | 16.69     | 46.67    |                    |
|                                   | 19185   | 1908.5          | -20.93        | 37.48                  | 16.55     | 45.19    |                    |
| Channel Bandwidth: 5MHz / 16QAM   |         |                 |               |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                 | 18625   | 1852.5          | -13.90        | 36.57                  | 22.67     | 184.93   | H                  |
|                                   | 18900   | 1880.0          | -14.68        | 37.22                  | 22.54     | 179.47   |                    |
|                                   | 19175   | 1907.5          | -14.78        | 37.18                  | 22.40     | 173.78   |                    |
|                                   | 18625   | 1852.5          | -20.35        | 37.65                  | 17.30     | 53.70    | V                  |
|                                   | 18900   | 1880.0          | -20.57        | 37.58                  | 17.01     | 50.23    |                    |
|                                   | 19175   | 1907.5          | -20.61        | 37.48                  | 16.87     | 48.64    |                    |
| Channel Bandwidth: 10MHz / 16QAM  |         |                 |               |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                 | 18650   | 1855.0          | -13.72        | 36.57                  | 22.85     | 192.75   | H                  |
|                                   | 18900   | 1880.0          | -14.50        | 37.22                  | 22.72     | 187.07   |                    |
|                                   | 19150   | 1905.0          | -14.60        | 37.18                  | 22.58     | 181.13   |                    |
|                                   | 18650   | 1855.0          | -20.17        | 37.65                  | 17.48     | 55.98    | V                  |
|                                   | 18900   | 1880.0          | -20.39        | 37.58                  | 17.19     | 52.36    |                    |
|                                   | 19150   | 1905.0          | -20.43        | 37.48                  | 17.05     | 50.70    |                    |
| Channel Bandwidth: 15MHz / 16QAM  |         |                 |               |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                 | 18675   | 1857.5          | -13.46        | 36.57                  | 23.11     | 204.64   | H                  |
|                                   | 18900   | 1880.0          | -14.24        | 37.22                  | 22.98     | 198.61   |                    |
|                                   | 19125   | 1902.5          | -14.34        | 37.18                  | 22.84     | 192.31   |                    |
|                                   | 18675   | 1857.5          | -19.91        | 37.65                  | 17.74     | 59.43    | V                  |
|                                   | 18900   | 1880.0          | -20.13        | 37.58                  | 17.45     | 55.59    |                    |
|                                   | 19125   | 1902.5          | -20.17        | 37.48                  | 17.31     | 53.83    |                    |

| Channel Bandwidth: 20MHz / 16QAM |         |                 |               |                        |           |          |                    |
|----------------------------------|---------|-----------------|---------------|------------------------|-----------|----------|--------------------|
| Plane                            | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18700   | 1860.0          | -13.26        | 36.57                  | 23.31     | 214.29   | H                  |
|                                  | 18900   | 1880.0          | -14.04        | 37.22                  | 23.18     | 207.97   |                    |
|                                  | 19100   | 1900.0          | -14.14        | 37.18                  | 23.04     | 201.37   |                    |
|                                  | 18700   | 1860.0          | -19.71        | 37.65                  | 17.94     | 62.23    | V                  |
|                                  | 18900   | 1880.0          | -19.93        | 37.58                  | 17.65     | 58.21    |                    |
|                                  | 19100   | 1900.0          | -19.97        | 37.48                  | 17.51     | 56.36    |                    |

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

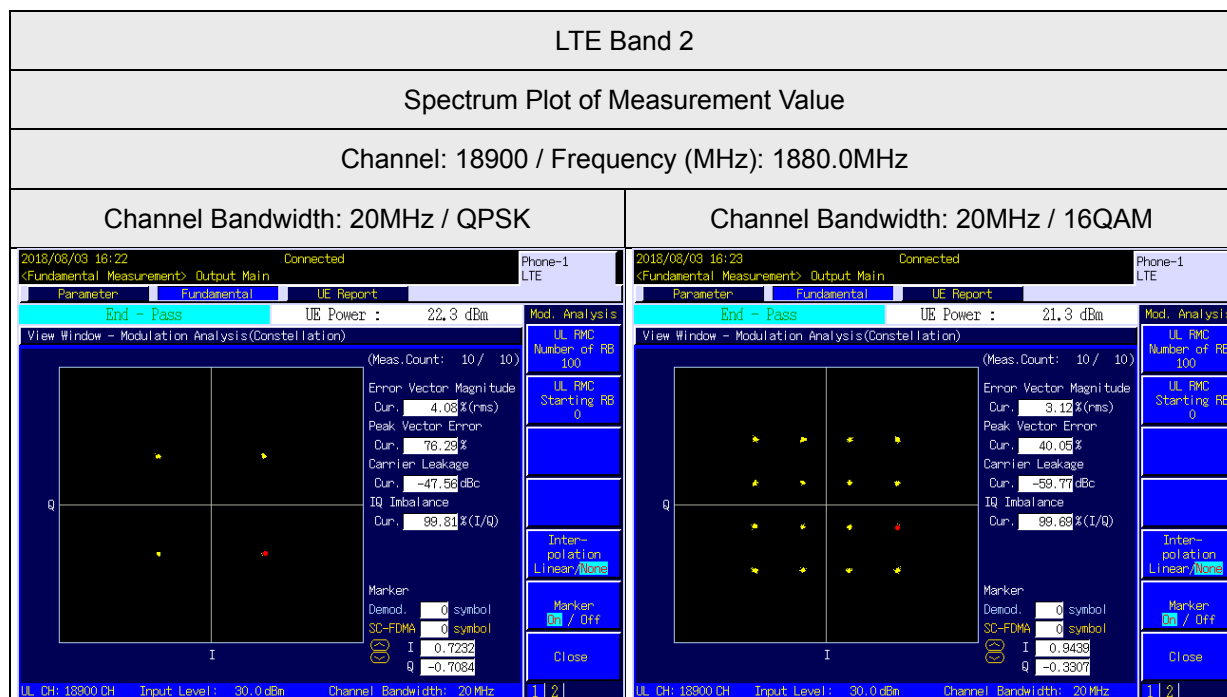
### 4.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

### 4.2.3 Test Setup



#### 4.2.4 Test Results



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

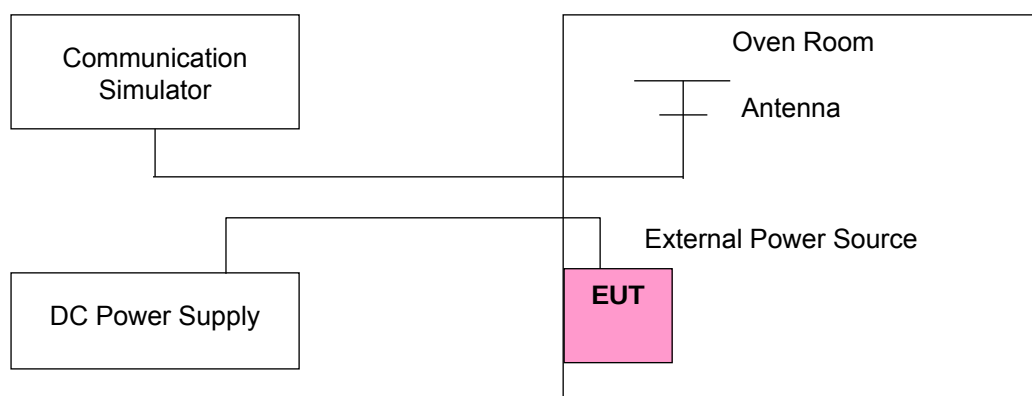
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

#### 4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

#### 4.3.3 Test Setup



#### 4.3.4 Test Results

##### Frequency Error vs. Voltage

| Voltage (Volts) | Frequency Error (ppm) | Limit (ppm) |
|-----------------|-----------------------|-------------|
|                 | LTE Band 2            |             |
| 4.4             | 0.07054               | 2.5         |
| 3.8             | 0.05371               | 2.5         |
| 3.2             | 0.06045               | 2.5         |

Note: The applicant defined the normal working voltage is from 3.2Vdc to 4.4Vdc.

##### Frequency Error vs. Temperature.

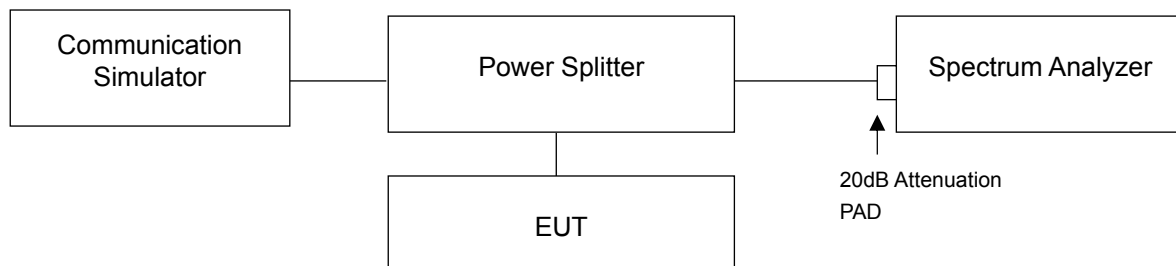
| Temp. (°C) | Frequency Error (ppm) | Limit (ppm) |
|------------|-----------------------|-------------|
|            | LTE Band 2            |             |
| 50         | 0.00279               | 2.5         |
| 40         | 0.05425               | 2.5         |
| 30         | 0.06097               | 2.5         |
| 20         | 0.05371               | 2.5         |
| 10         | 0.07009               | 2.5         |
| 0          | 0.04435               | 2.5         |
| -10        | 0.03556               | 2.5         |
| -20        | 0.09543               | 2.5         |
| -30        | 0.02570               | 2.5         |

#### 4.4 Occupied Bandwidth Measurement

##### 4.4.1 Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

##### 4.4.2 Test Setup



#### 4.4.3 Test Result

##### Occupied Bandwidth

| LTE Band 2, Channel Bandwidth 1.4MHz |                 |                              |       |
|--------------------------------------|-----------------|------------------------------|-------|
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 18607                                | 1850.7          | 1.12                         | 1.12  |
| 18900                                | 1880.0          | 1.12                         | 1.12  |
| 19193                                | 1909.3          | 1.12                         | 1.12  |

| LTE Band 2, Channel Bandwidth 3MHz |                 |                              |       |
|------------------------------------|-----------------|------------------------------|-------|
| Channel                            | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                    |                 | QPSK                         | 16QAM |
| 18615                              | 1851.5          | 2.70                         | 2.71  |
| 18900                              | 1880.0          | 2.70                         | 2.70  |
| 19185                              | 1908.5          | 2.71                         | 2.70  |

| LTE Band 2, Channel Bandwidth 5MHz |                 |                              |       |
|------------------------------------|-----------------|------------------------------|-------|
| Channel                            | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                    |                 | QPSK                         | 16QAM |
| 18625                              | 1852.5          | 4.46                         | 4.48  |
| 18900                              | 1880.0          | 4.48                         | 4.48  |
| 19175                              | 1907.5          | 4.48                         | 4.48  |

| LTE Band 2, Channel Bandwidth 10MHz |                 |                              |       |
|-------------------------------------|-----------------|------------------------------|-------|
| Channel                             | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                     |                 | QPSK                         | 16QAM |
| 18650                               | 1855.0          | 8.93                         | 8.93  |
| 18900                               | 1880.0          | 8.96                         | 8.96  |
| 19150                               | 1905.0          | 8.96                         | 8.93  |

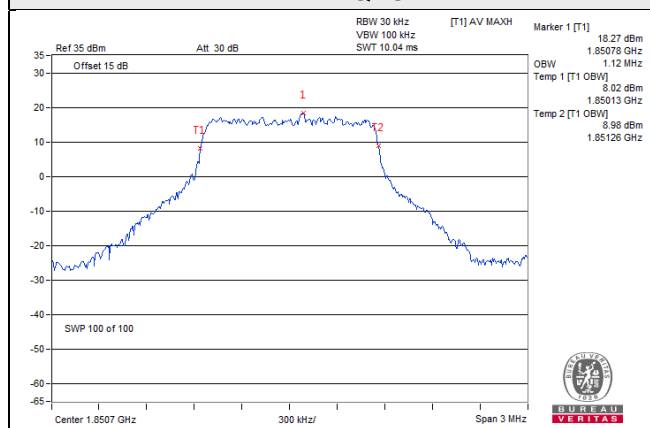
| LTE Band 2, Channel Bandwidth 15MHz |                 |                              |       |
|-------------------------------------|-----------------|------------------------------|-------|
| Channel                             | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                     |                 | QPSK                         | 16QAM |
| 18675                               | 1857.5          | 13.43                        | 13.40 |
| 18900                               | 1880.0          | 13.40                        | 13.40 |
| 19125                               | 1902.5          | 13.33                        | 13.30 |

### LTE Band 2, Channel Bandwidth 20MHz

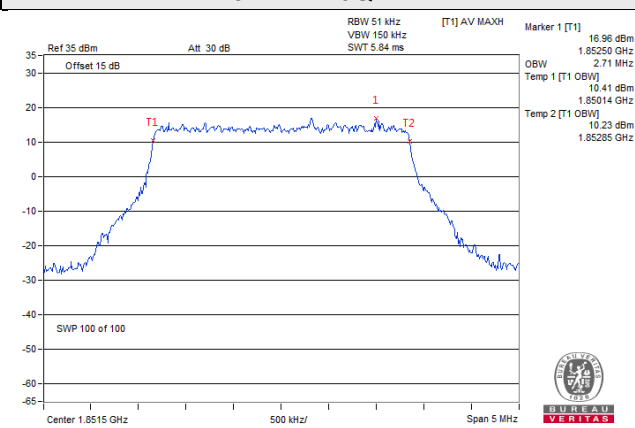
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|---------|-----------------|------------------------------|-------|
|         |                 | QPSK                         | 16QAM |
| 18700   | 1860.0          | 17.93                        | 17.93 |
| 18900   | 1880.0          | 17.93                        | 17.93 |
| 19100   | 1900.0          | 17.80                        | 17.80 |

### Spectrum Plot of Worst Value

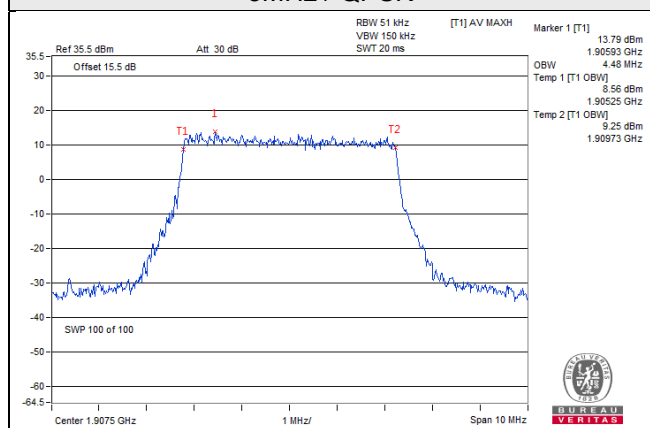
#### 1.4MHz / QPSK



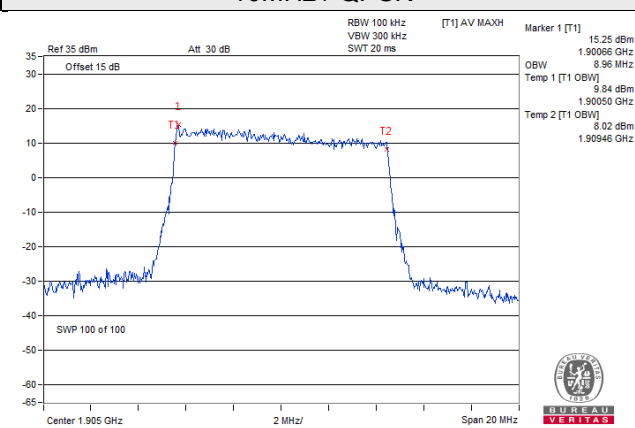
#### 3MHz / 16QAM



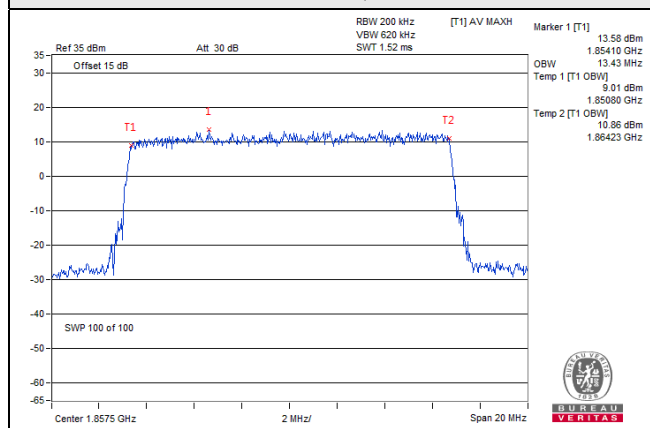
#### 5MHz / QPSK



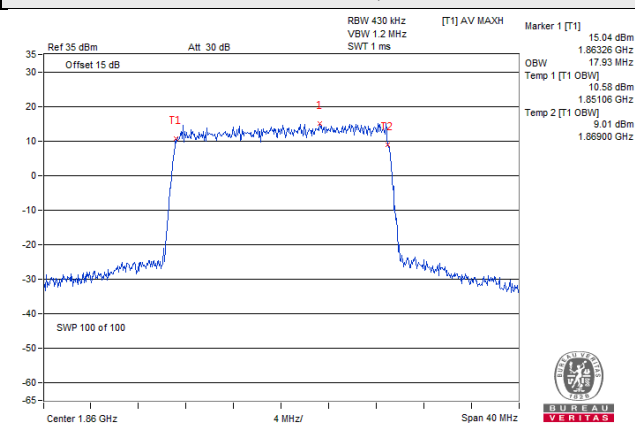
#### 10MHz / QPSK



#### 15MHz / QPSK



#### 20MHz / 16QAM



## 26dB Bandwidth

| LTE Band 2, Channel Bandwidth 1.4MHz |                 |                      |       |
|--------------------------------------|-----------------|----------------------|-------|
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 18607                                | 1850.7          | 1.646                | 1.621 |
| 18900                                | 1880.0          | 1.561                | 1.525 |
| 19193                                | 1909.3          | 1.652                | 1.632 |

| LTE Band 2, Channel Bandwidth 3MHz |                 |                      |       |
|------------------------------------|-----------------|----------------------|-------|
| Channel                            | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                    |                 | QPSK                 | 16QAM |
| 18615                              | 1851.5          | 3.376                | 3.336 |
| 18900                              | 1880.0          | 3.252                | 3.313 |
| 19185                              | 1908.5          | 3.299                | 3.318 |

| LTE Band 2, Channel Bandwidth 5MHz |                 |                      |       |
|------------------------------------|-----------------|----------------------|-------|
| Channel                            | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                    |                 | QPSK                 | 16QAM |
| 18625                              | 1852.5          | 5.121                | 5.105 |
| 18900                              | 1880.0          | 5.147                | 5.124 |
| 19175                              | 1907.5          | 5.178                | 5.093 |

| LTE Band 2, Channel Bandwidth 10MHz |                 |                      |       |
|-------------------------------------|-----------------|----------------------|-------|
| Channel                             | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                     |                 | QPSK                 | 16QAM |
| 18650                               | 1855.0          | 9.710                | 9.790 |
| 18900                               | 1880.0          | 9.713                | 9.774 |
| 19150                               | 1905.0          | 9.648                | 9.632 |

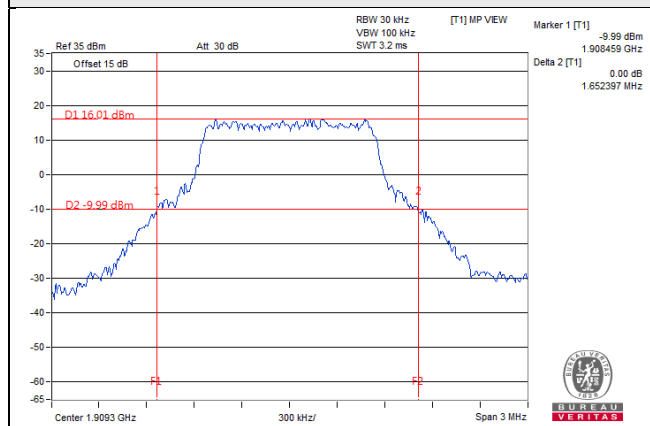
| LTE Band 2, Channel Bandwidth 15MHz |                 |                      |        |
|-------------------------------------|-----------------|----------------------|--------|
| Channel                             | Frequency (MHz) | 26dB Bandwidth (MHz) |        |
|                                     |                 | QPSK                 | 16QAM  |
| 18675                               | 1857.5          | 14.457               | 14.478 |
| 18900                               | 1880.0          | 14.450               | 14.425 |
| 19125                               | 1902.5          | 14.315               | 14.335 |

### LTE Band 2, Channel Bandwidth 20MHz

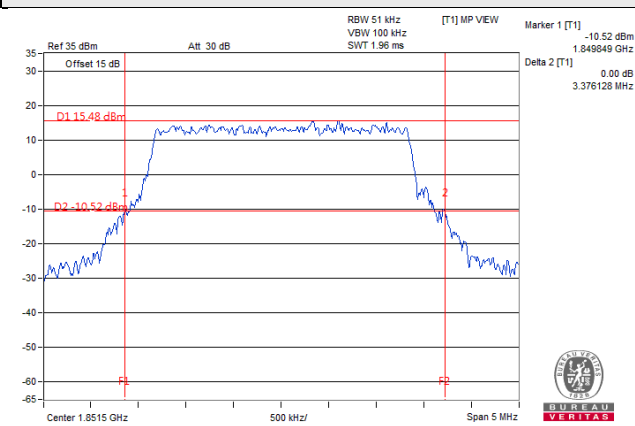
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) |        |
|---------|-----------------|----------------------|--------|
|         |                 | QPSK                 | 16QAM  |
| 18700   | 1860.0          | 19.300               | 19.409 |
| 18900   | 1880.0          | 19.293               | 19.405 |
| 19100   | 1900.0          | 19.165               | 19.226 |

### Spectrum Plot of Worst Value

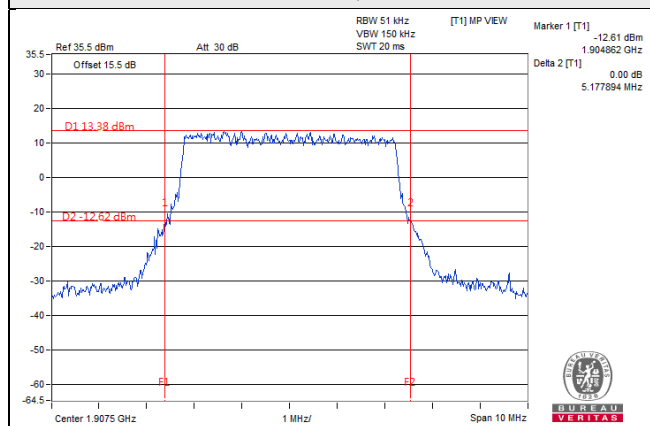
#### 1.4MHz / QPSK



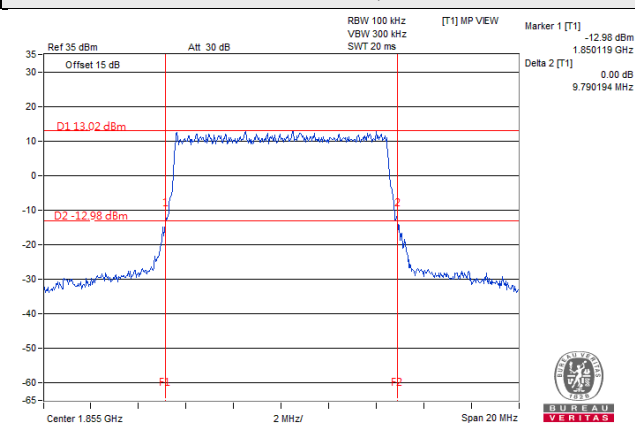
#### 3MHz / QPSK



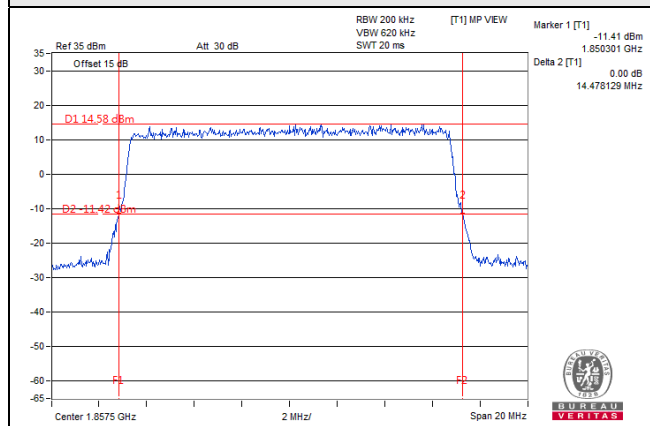
#### 5MHz / QPSK



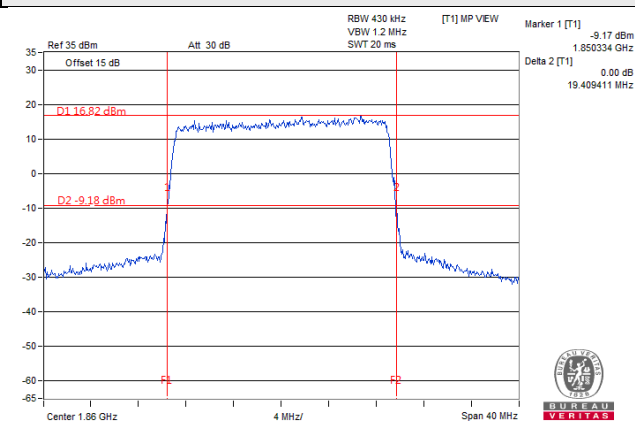
#### 10MHz / 16QAM



#### 15MHz / 16QAM



#### 20MHz / 16QAM

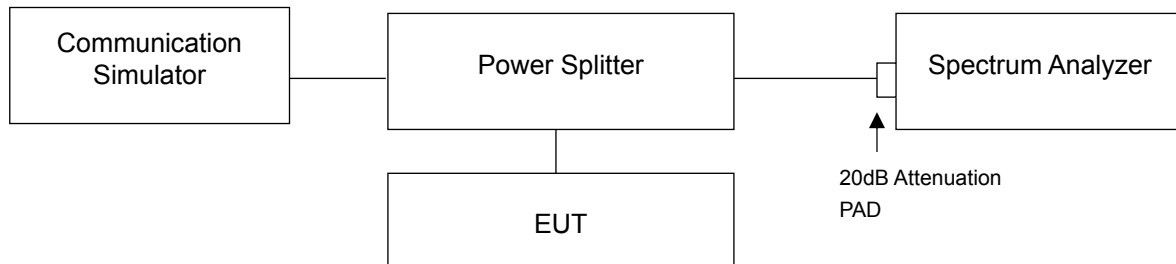


## 4.5 Band Edge Measurement

### 4.5.1 Limits of Band Edge Measurement

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

### 4.5.2 Test Setup



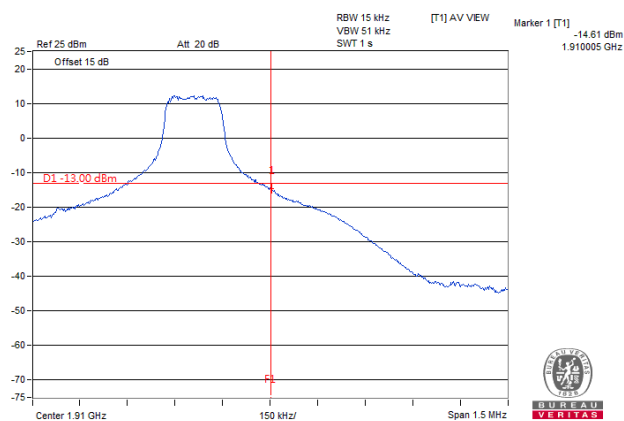
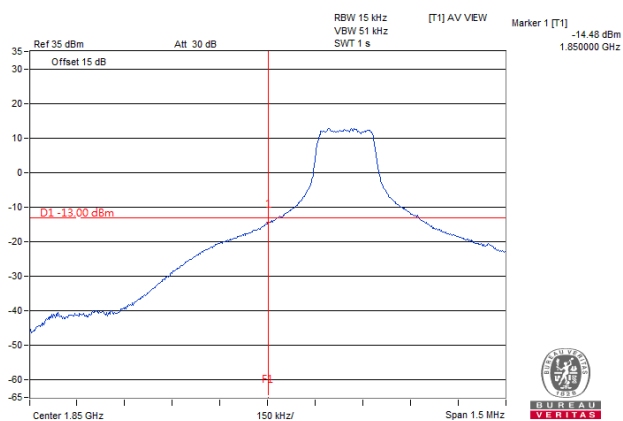
### 4.5.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 15kHz and VB of the spectrum is 51kHz (LTE Channel Bandwidth 1.4MHz).
- The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Channel Bandwidth 3MHz)
- The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 51kHz and VB of the spectrum is 150kHz (LTE Channel Bandwidth 5MHz).
- The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 200kHz and VB of the spectrum is 620kHz (LTE Channel Bandwidth 15MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 430kHz and VB of the spectrum is 1.2MHz (LTE Channel Bandwidth 20MHz).
- Record the max trace plot into the test report.

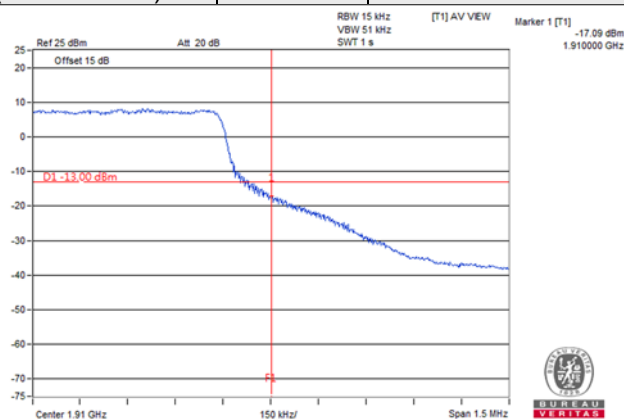
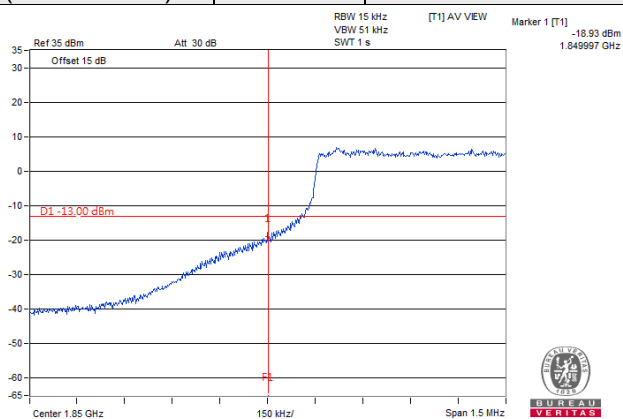
## 4.5.4 Test Results

### LTE Band 2, Channel Bandwidth 1.4MHz

| Channel 18607<br>(1850.70MHz) | QPSK | 1 RB / 0 RB Offset | Channel 19193<br>(1909.30MHz) | QPSK | 1 RB / 5 RB Offset |
|-------------------------------|------|--------------------|-------------------------------|------|--------------------|
|-------------------------------|------|--------------------|-------------------------------|------|--------------------|

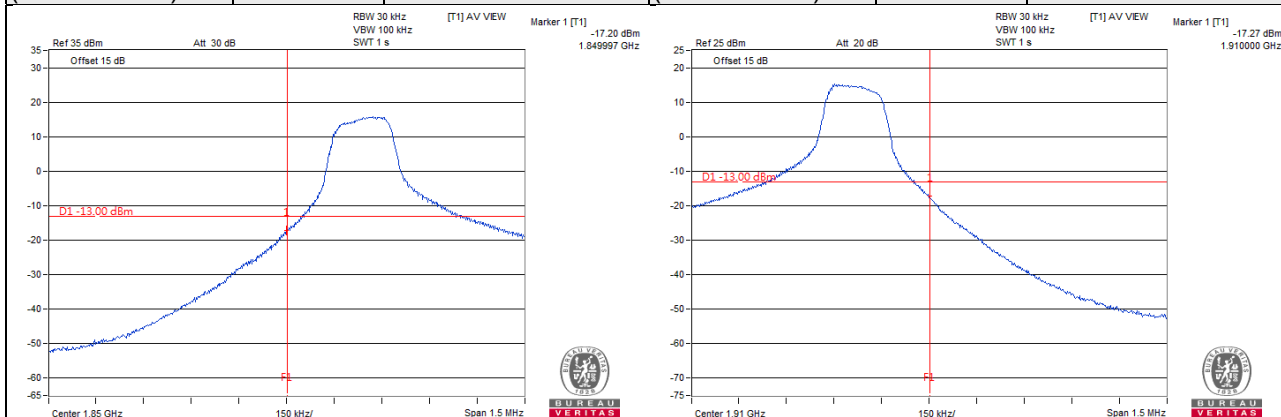


| Channel 18607<br>(1850.70MHz) | QPSK | 6 RB / 0 RB Offset | Channel 19193<br>(1909.30MHz) | QPSK | 6 RB / 0 RB Offset |
|-------------------------------|------|--------------------|-------------------------------|------|--------------------|
|-------------------------------|------|--------------------|-------------------------------|------|--------------------|

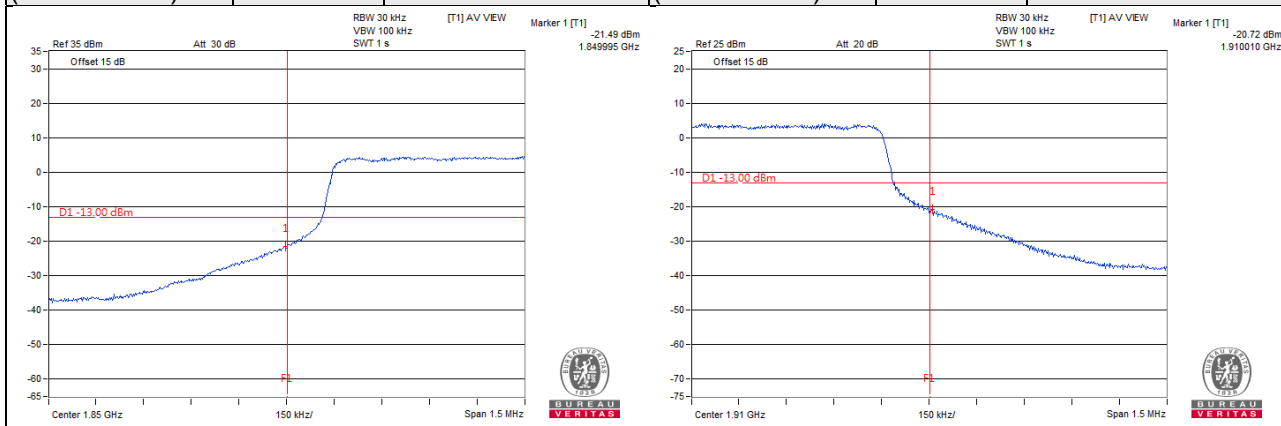


# LTE Band 2, Channel Bandwidth 3MHz

| Channel 18615<br>(1851.50MHz) | QPSK | 1 RB / 0 RB Offset | Channel 19185<br>(1908.50MHz) | QPSK | 1 RB / 14 RB Offset |
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|

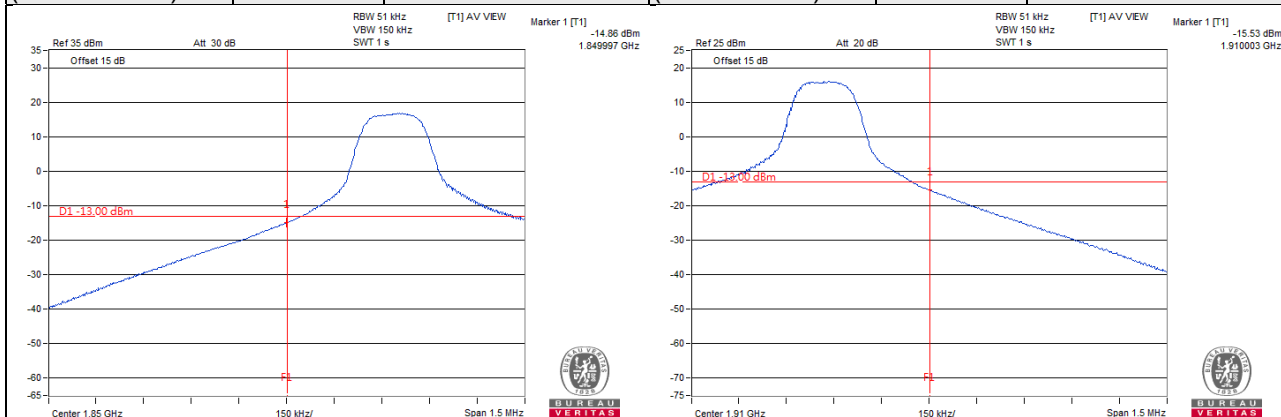


| Channel 18615<br>(1851.50MHz) | QPSK | 15 RB / 0 RB Offset | Channel 19185<br>(1908.50MHz) | QPSK | 15 RB / 0 RB Offset |
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|

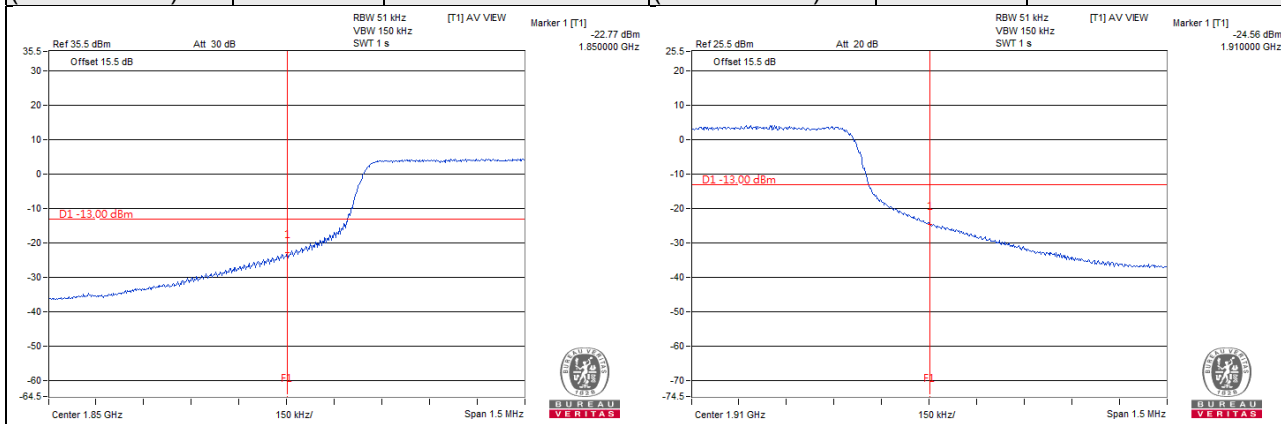


# LTE Band 2, Channel Bandwidth 5MHz

| Channel 18625<br>(1852.50MHz) | QPSK | 1 RB / 0 RB Offset | Channel 19175<br>(1907.50MHz) | QPSK | 1 RB / 24 RB Offset |
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|

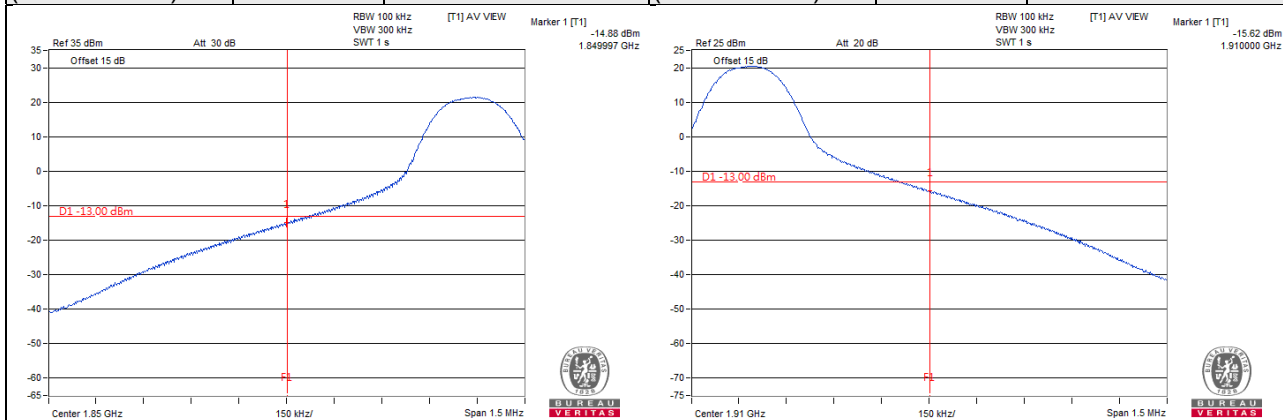


| Channel 18625<br>(1852.50MHz) | QPSK | 25 RB / 0 RB Offset | Channel 19175<br>(1907.50MHz) | QPSK | 25 RB / 0 RB Offset |
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|

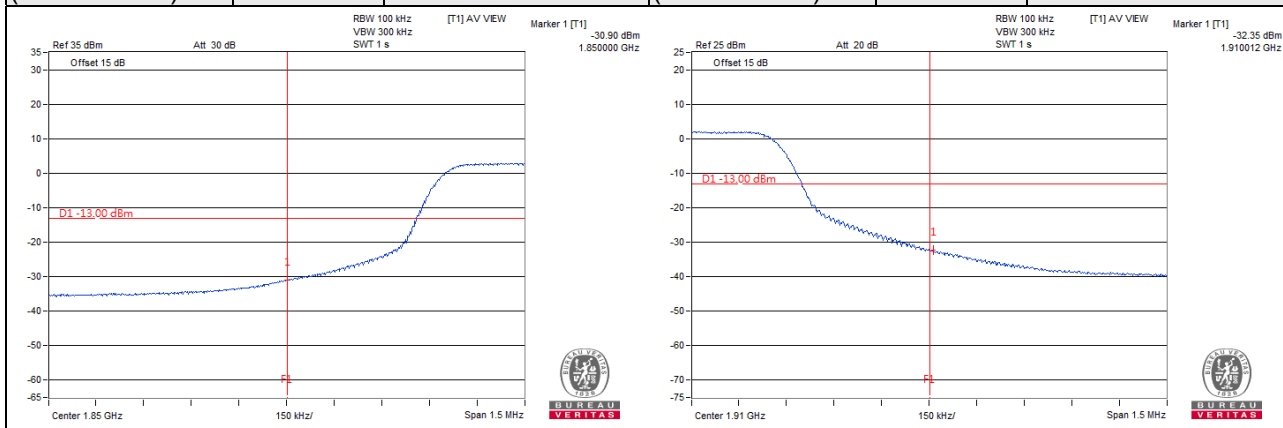


# LTE Band 2, Channel Bandwidth 10MHz

| Channel 18650<br>(1855.00MHz) | QPSK | 1 RB / 0 RB Offset | Channel 19150<br>(1905.00MHz) | QPSK | 1 RB / 49 RB Offset |
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|

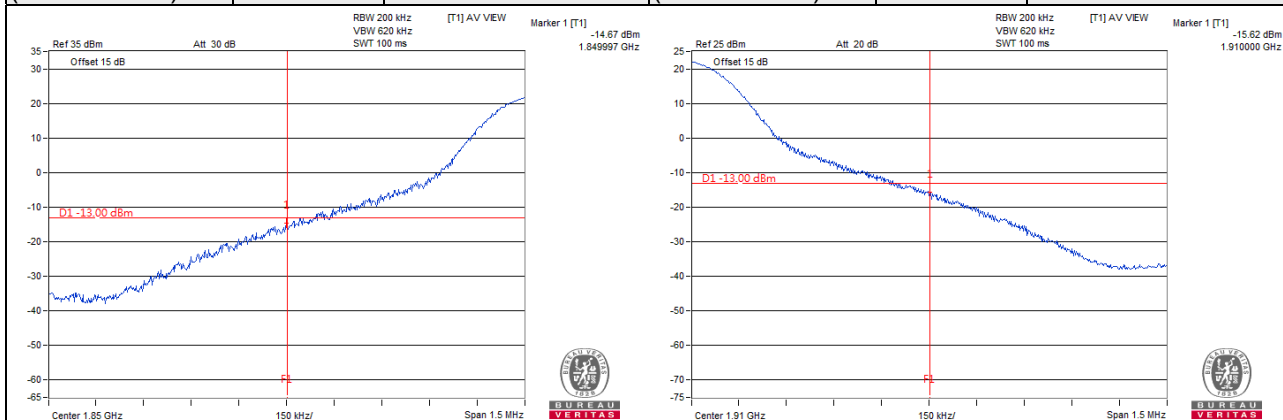


| Channel 18650<br>(1855.00MHz) | QPSK | 50 RB / 0 RB Offset | Channel 19150<br>(1905.00MHz) | QPSK | 50 RB / 0 RB Offset |
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|

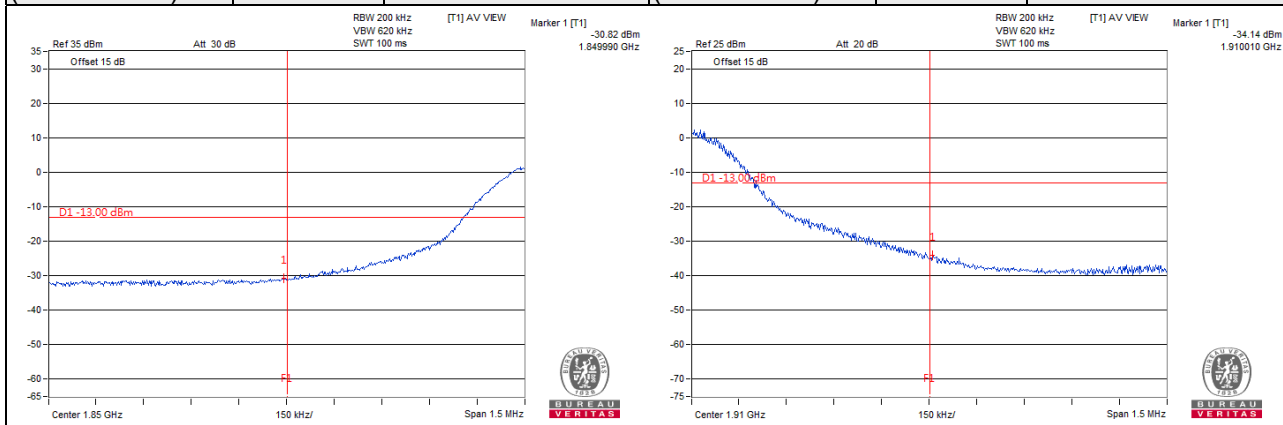


# LTE Band 2, Channel Bandwidth 15MHz

| Channel 18675<br>(1857.50MHz) | QPSK | 1 RB / 0 RB Offset | Channel 19125<br>(1902.50MHz) | QPSK | 1 RB / 74 RB Offset |
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|

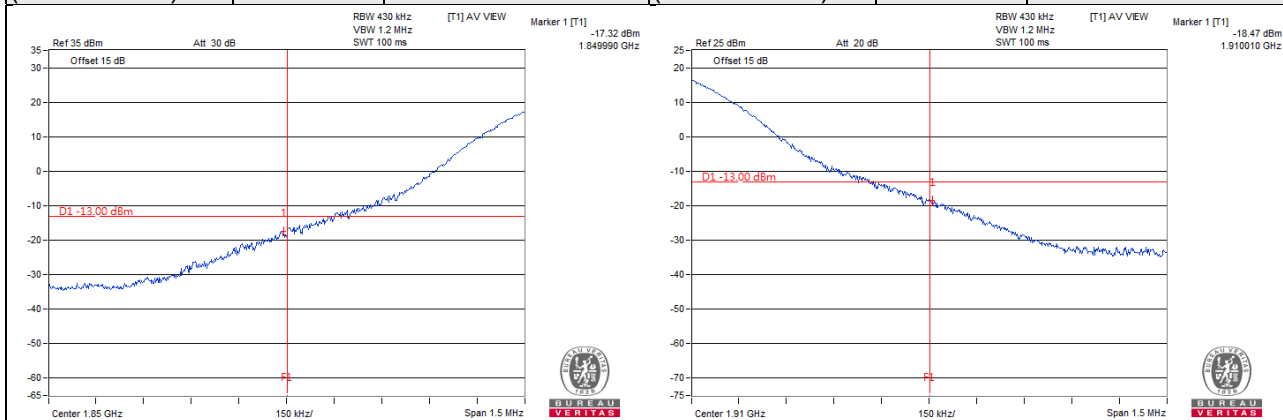


| Channel 18675<br>(1857.50MHz) | QPSK | 75 RB / 0 RB Offset | Channel 19125<br>(1902.50MHz) | QPSK | 75 RB / 0 RB Offset |
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|

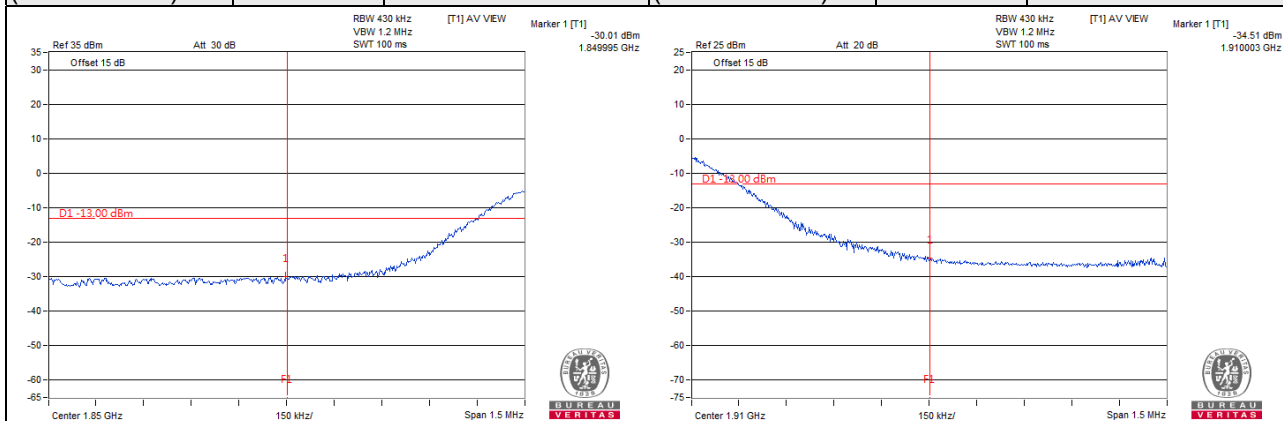


# LTE Band 2, Channel Bandwidth 20MHz

| Channel 18700<br>(1860.00MHz) | QPSK | 1 RB / 0 RB Offset | Channel 19100<br>(1900.00 MHz) | QPSK | 1 RB / 99 RB Offset |
|-------------------------------|------|--------------------|--------------------------------|------|---------------------|
|-------------------------------|------|--------------------|--------------------------------|------|---------------------|



| Channel 18700<br>(1860.00MHz) | QPSK | 100 RB / 0 RB Offset | Channel 19100<br>(1900.00 MHz) | QPSK | 100 RB / 0 RB Offset |
|-------------------------------|------|----------------------|--------------------------------|------|----------------------|
|-------------------------------|------|----------------------|--------------------------------|------|----------------------|

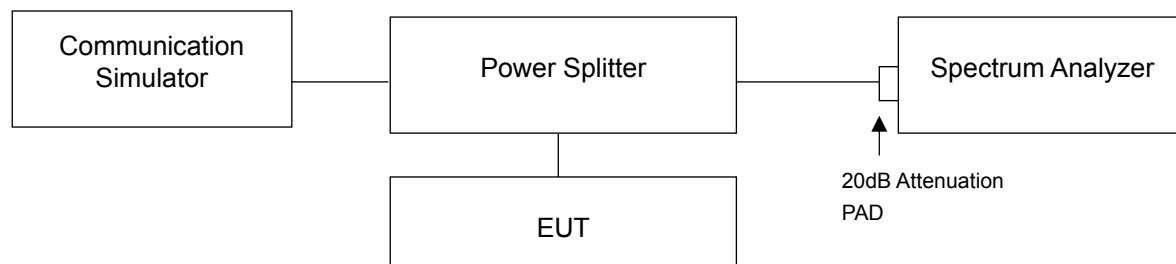


## 4.6 Peak to Average Ratio

### 4.6.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

### 4.6.2 Test Setup



### 4.6.3 Test Procedures

- Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

#### 4.6.4 Test Results

| LTE Band 2, Channel Bandwidth 1.4MHz |                 |                            |       |
|--------------------------------------|-----------------|----------------------------|-------|
| Channel                              | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                                      |                 | QPSK                       | 16QAM |
| 18607                                | 1850.7          | 4.97                       | 5.01  |
| 18900                                | 1880.0          | 5.03                       | 5.03  |
| 19193                                | 1909.3          | 4.59                       | 4.59  |

| LTE Band 2, Channel Bandwidth 3MHz |                 |                            |       |
|------------------------------------|-----------------|----------------------------|-------|
| Channel                            | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                                    |                 | QPSK                       | 16QAM |
| 18615                              | 1851.5          | 5.16                       | 5.11  |
| 18900                              | 1880.0          | 5.11                       | 5.09  |
| 19185                              | 1908.5          | 4.88                       | 4.78  |

| LTE Band 2, Channel Bandwidth 5MHz |                 |                            |       |
|------------------------------------|-----------------|----------------------------|-------|
| Channel                            | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                                    |                 | QPSK                       | 16QAM |
| 18625                              | 1852.5          | 5.11                       | 5.11  |
| 18900                              | 1880.0          | 5.07                       | 5.07  |
| 19175                              | 1907.5          | 4.85                       | 4.86  |

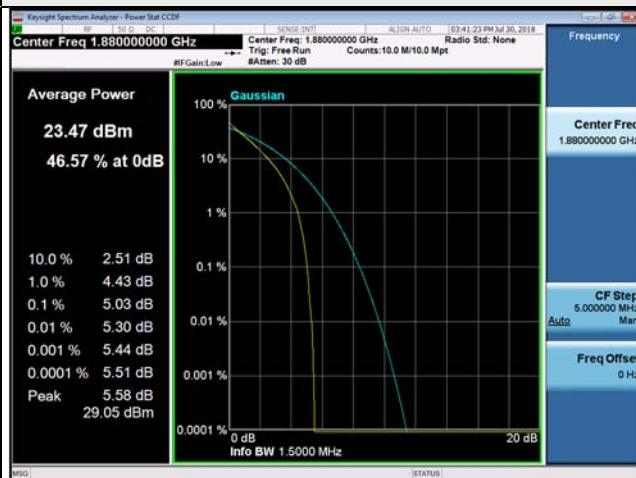
| LTE Band 2, Channel Bandwidth 10MHz |                 |                            |       |
|-------------------------------------|-----------------|----------------------------|-------|
| Channel                             | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                                     |                 | QPSK                       | 16QAM |
| 18650                               | 1855.0          | 4.92                       | 4.92  |
| 18900                               | 1880.0          | 4.80                       | 4.82  |
| 19150                               | 1905.0          | 4.63                       | 4.63  |

| LTE Band 2, Channel Bandwidth 15MHz |                 |                            |       |
|-------------------------------------|-----------------|----------------------------|-------|
| Channel                             | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                                     |                 | QPSK                       | 16QAM |
| 18675                               | 1857.5          | 5.05                       | 5.01  |
| 18900                               | 1880.0          | 5.02                       | 5.03  |
| 19125                               | 1902.5          | 4.98                       | 4.95  |

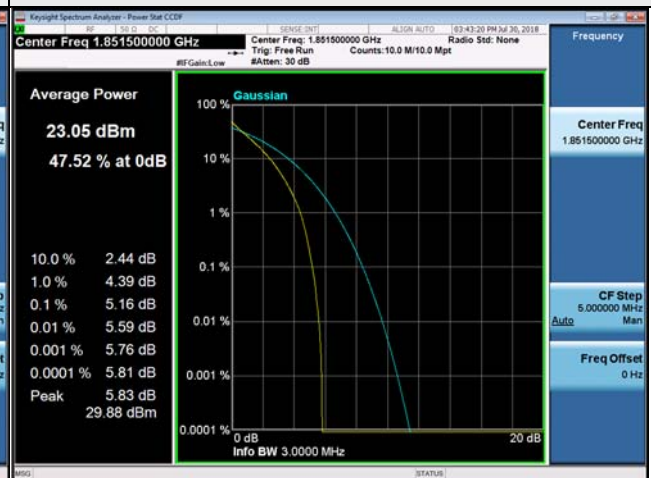
| LTE Band 2, Channel Bandwidth 20MHz |                 |                            |       |
|-------------------------------------|-----------------|----------------------------|-------|
| Channel                             | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                                     |                 | QPSK                       | 16QAM |
| 18700                               | 1860.0          | 4.88                       | 4.89  |
| 18900                               | 1880.0          | 4.94                       | 4.94  |
| 19100                               | 1900.0          | 4.92                       | 4.90  |

## Spectrum Plot Of Worst Value

### 1.4MHz / 16QAM



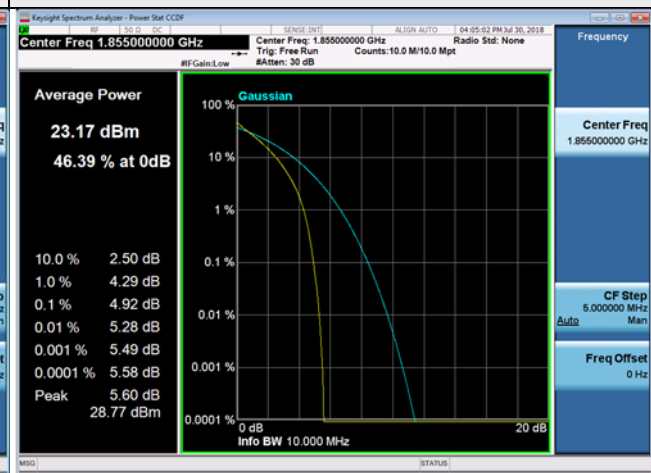
### 3MHz / QPSK



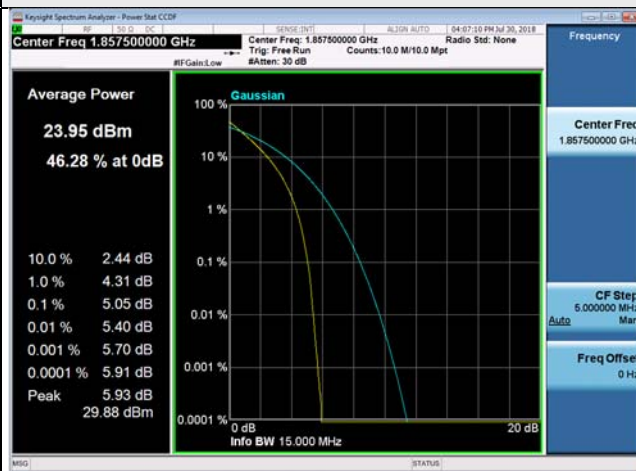
### 5MHz / 16QAM



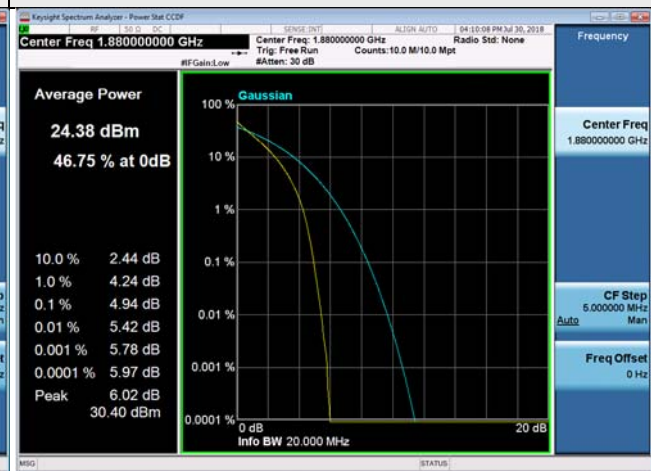
### 10MHz / 16QAM



### 15MHz / QPSK



### 20MHz / QPSK

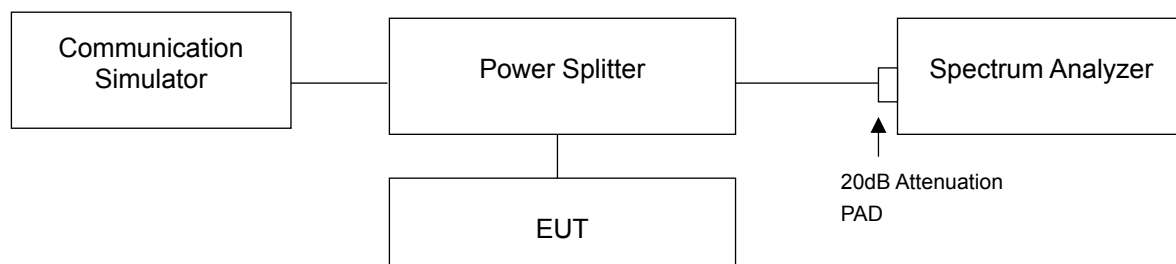


## 4.7 Conducted Spurious Emissions

### 4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to  $-13\text{dBm}$ .

### 4.7.2 Test Setup



### 4.7.3 Test Procedure

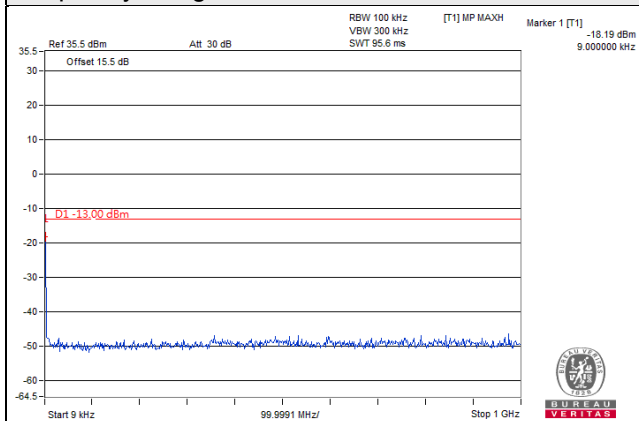
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 1GHz. 20dB attenuation pad is connected with spectrum. RBW=100kHz and VBW=300kHz is used for conducted emission measurement.
- Measuring frequency range is from 1GHz to 26.5GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

## 4.7.4 Test Results

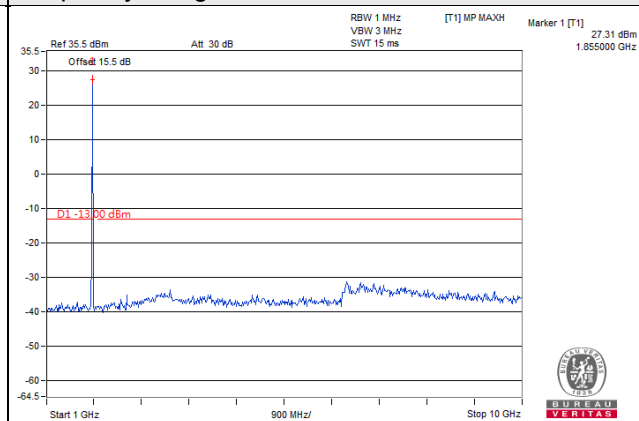
LTE Band 2, Channel Bandwidth 1.4MHz

Channel 18607 (1850.70MHz)

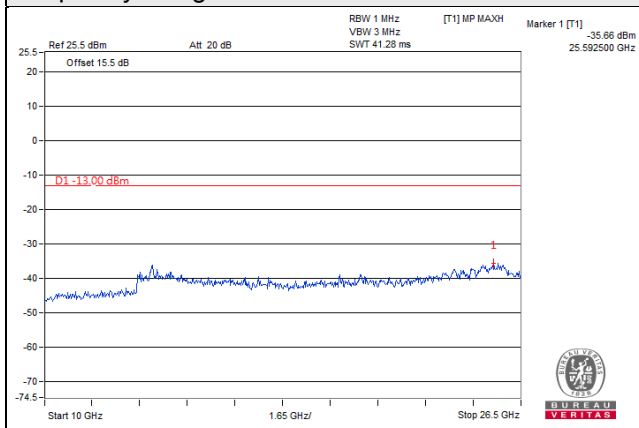
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



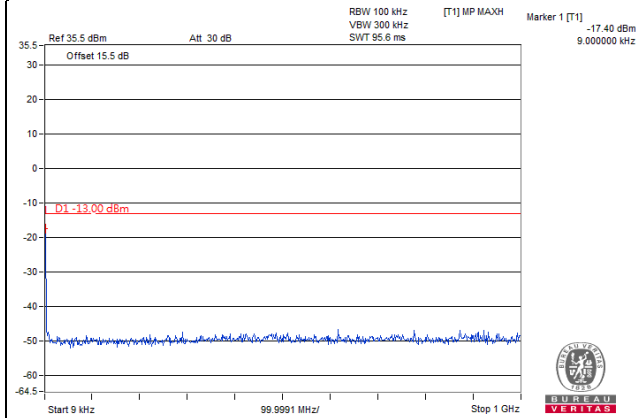
Frequency Range : 10GHz~26.5GHz



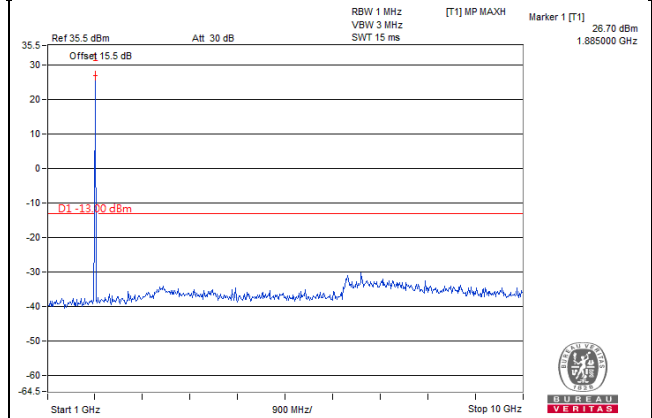
# LTE Band 2, Channel Bandwidth 1.4MHz

Channel 18900 (1880.00MHz)

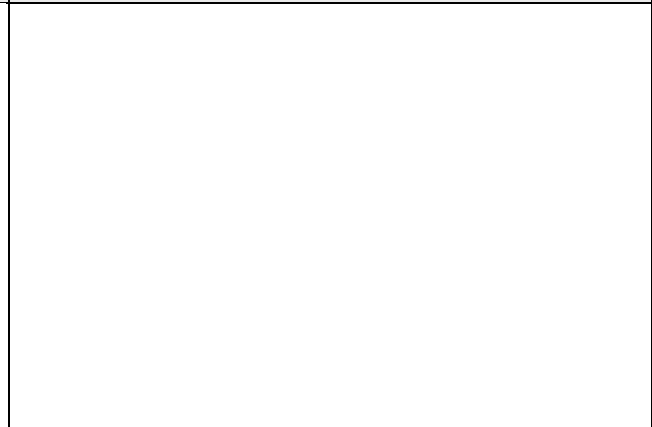
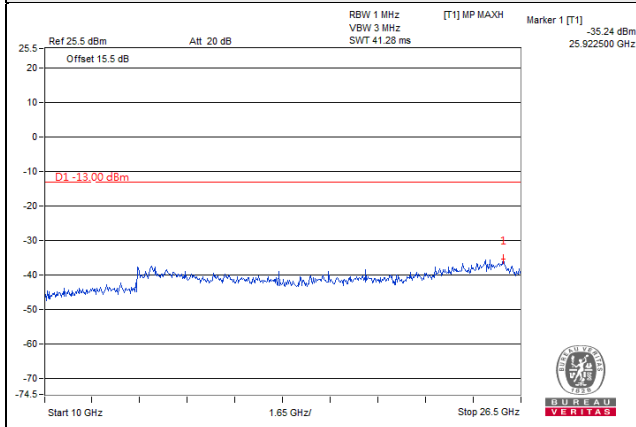
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



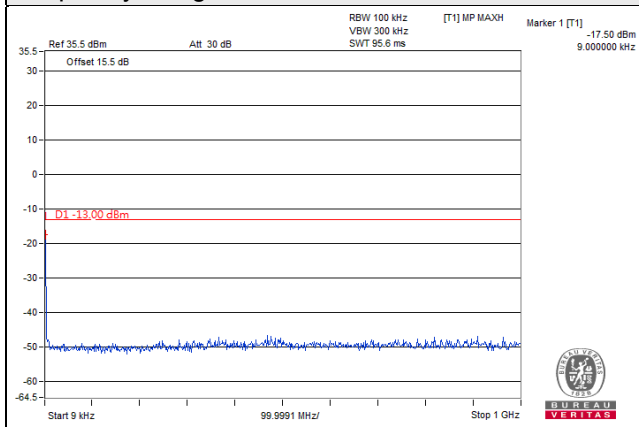
Frequency Range : 10GHz~26.5GHz



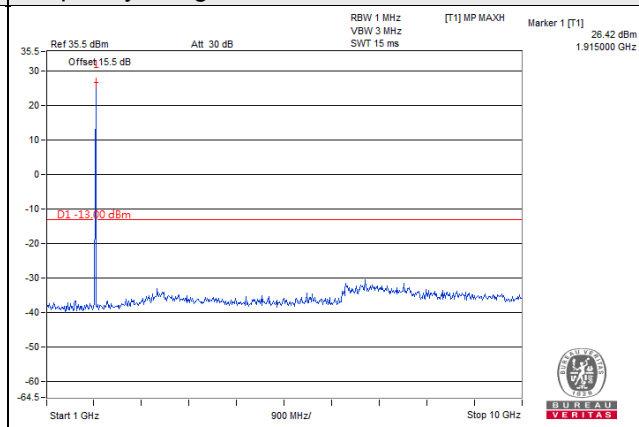
# LTE Band 2, Channel Bandwidth 1.4MHz

Channel 19193 (1909.30MHz)

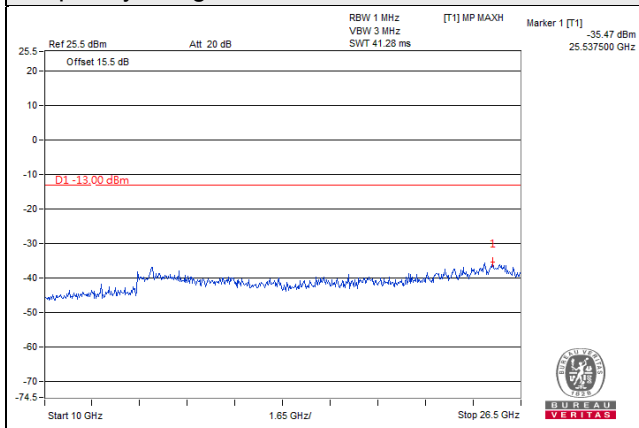
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



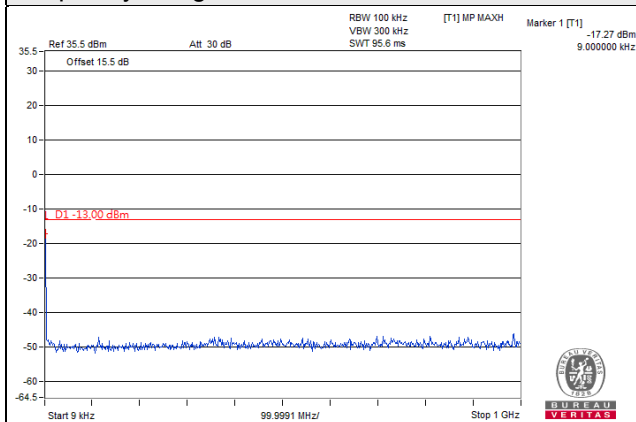
Frequency Range : 10GHz~26.5GHz



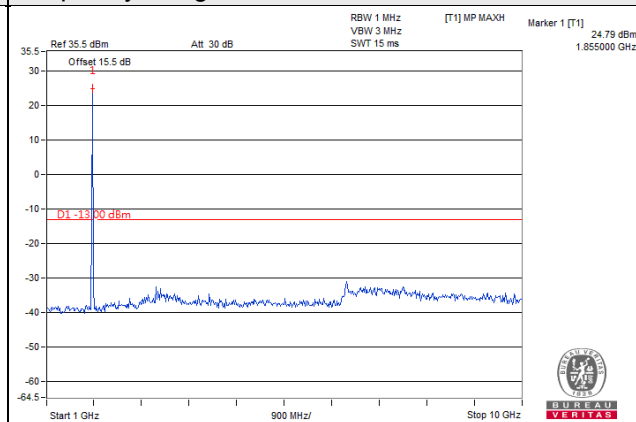
# LTE Band 2, Channel Bandwidth 3MHz

Channel 18615 (1851.50MHz)

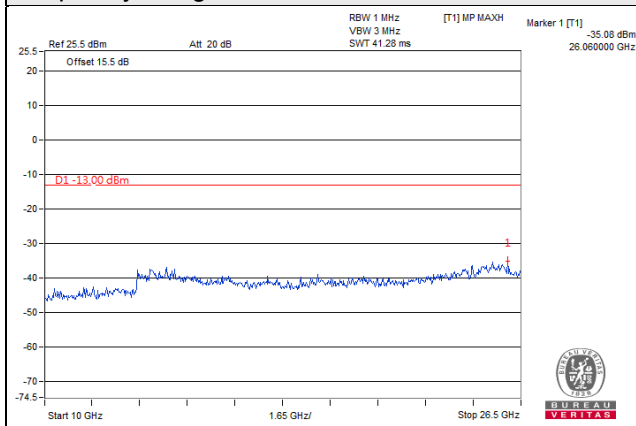
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



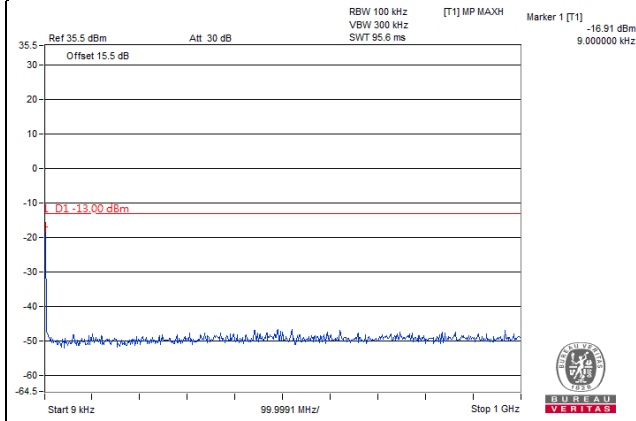
Frequency Range : 10GHz~26.5GHz



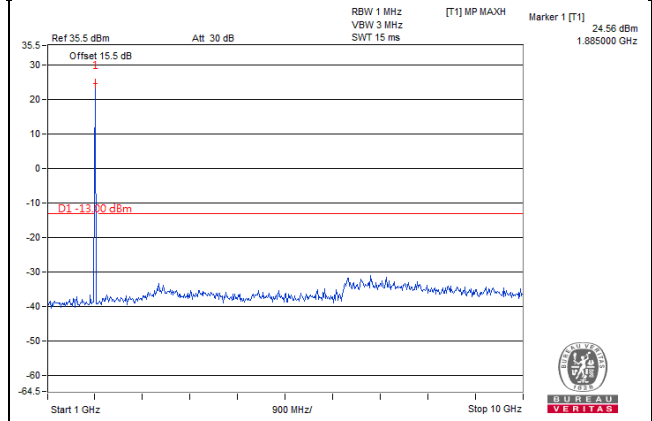
# LTE Band 2, Channel Bandwidth 3MHz

Channel 18900 (1880.00MHz)

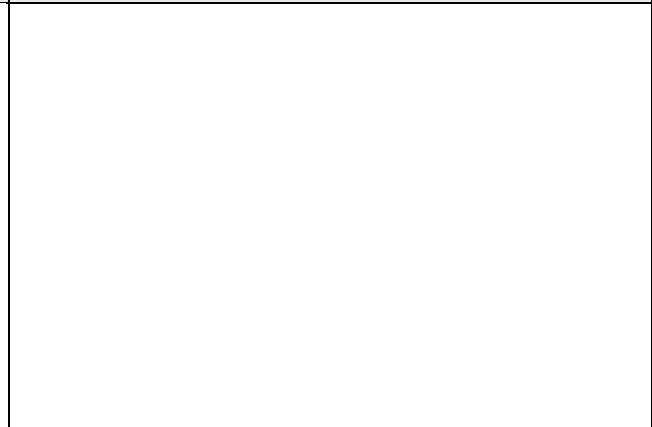
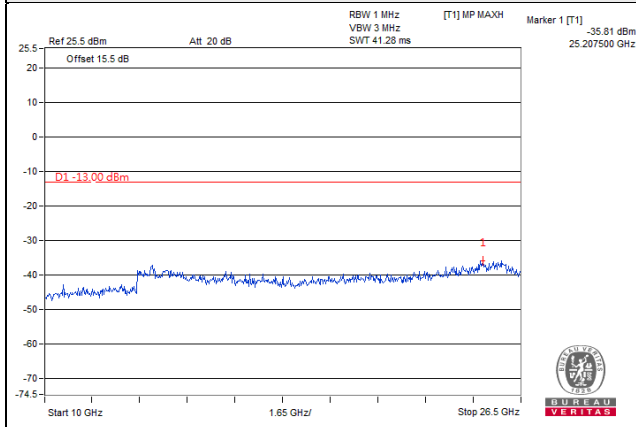
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



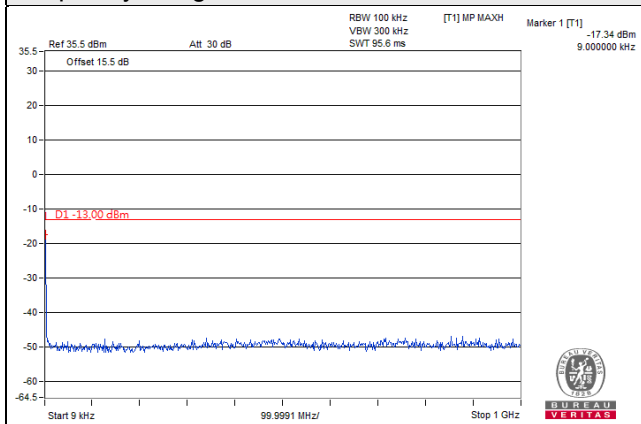
Frequency Range : 10GHz~26.5GHz



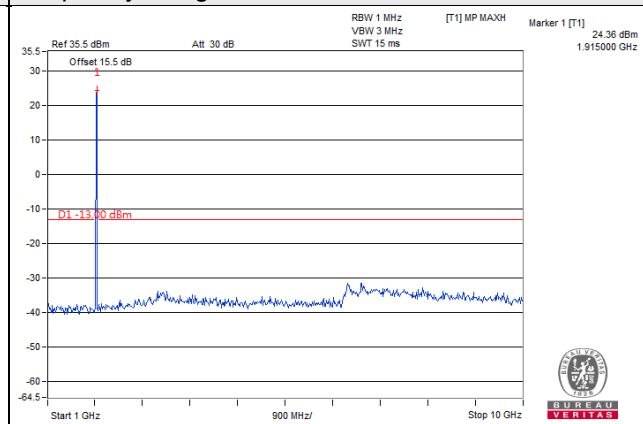
# LTE Band 2, Channel Bandwidth 3MHz

Channel 19185 (1908.50MHz)

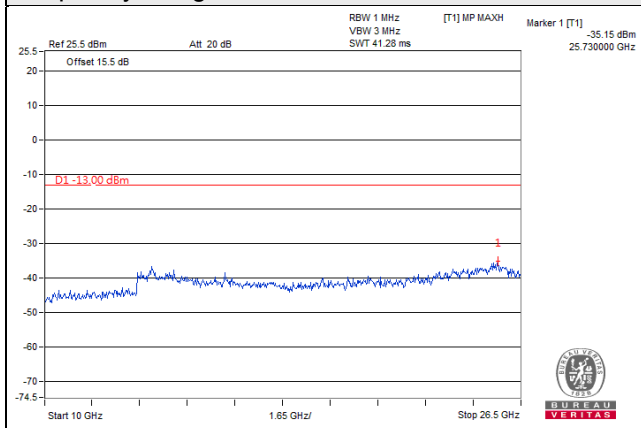
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



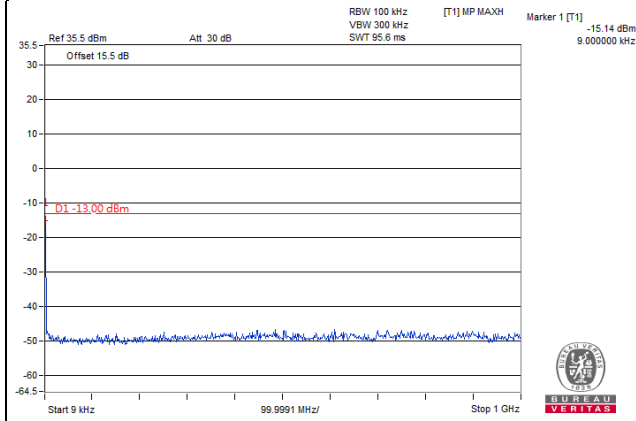
Frequency Range : 10GHz~26.5GHz



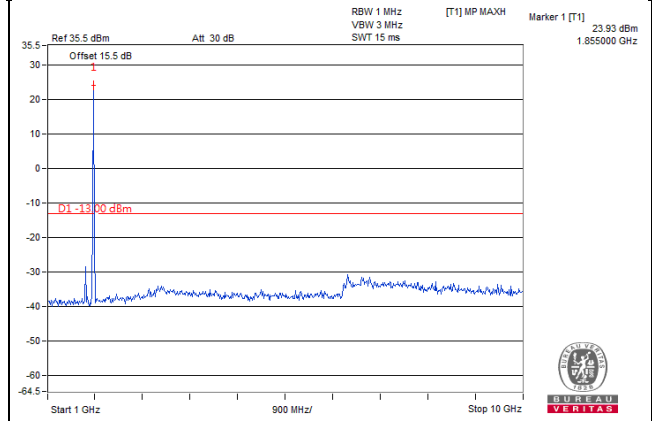
# LTE Band 2, Channel Bandwidth 5MHz

## Channel 18625 (1852.50MHz)

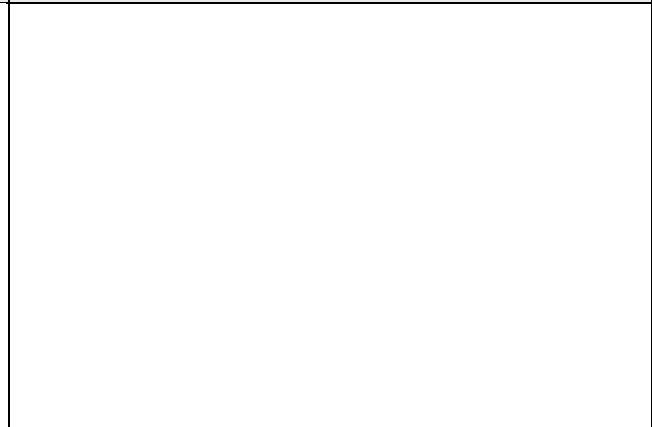
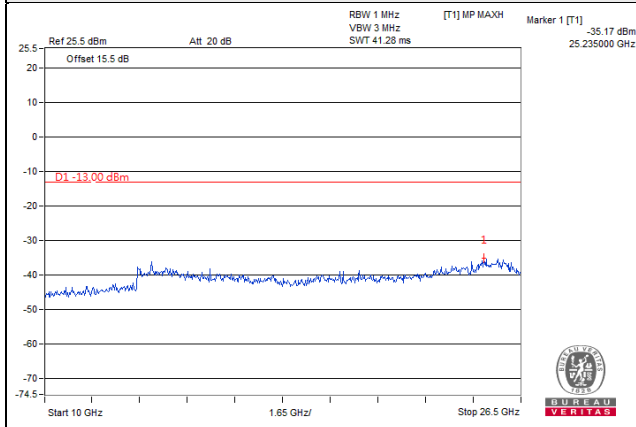
### Frequency Range : 9kHz~1GHz



### Frequency Range : 1GHz~10GHz



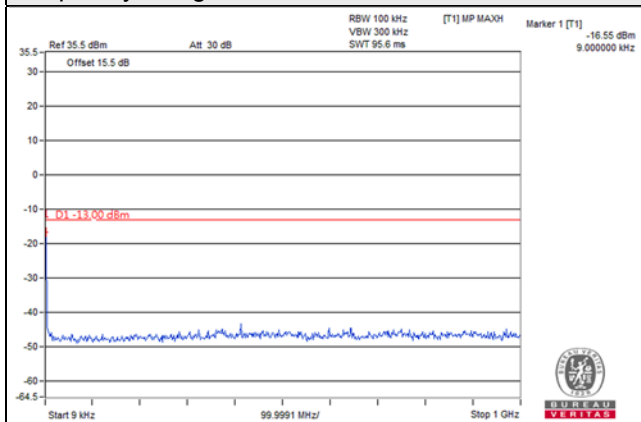
### Frequency Range : 10GHz~26.5GHz



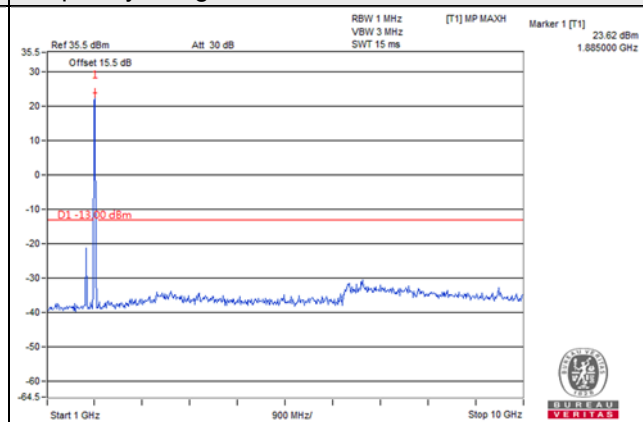
# LTE Band 2, Channel Bandwidth 5MHz

Channel 18900 (1880.00MHz)

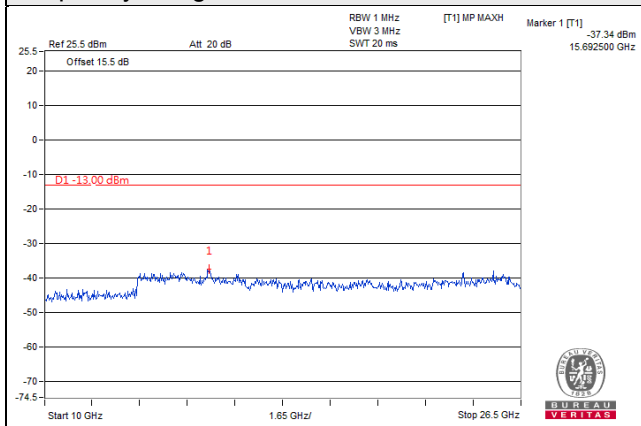
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



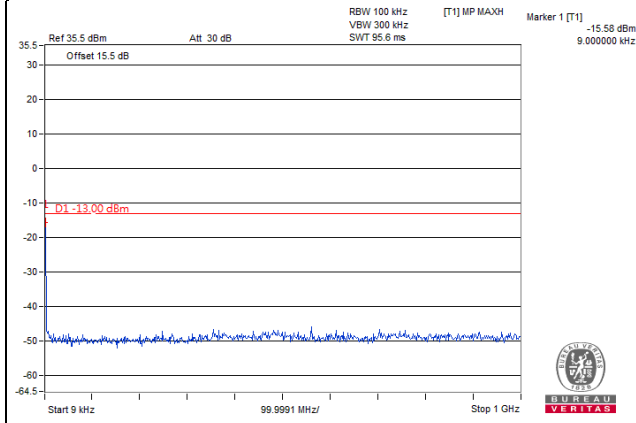
Frequency Range : 10GHz~26.5GHz



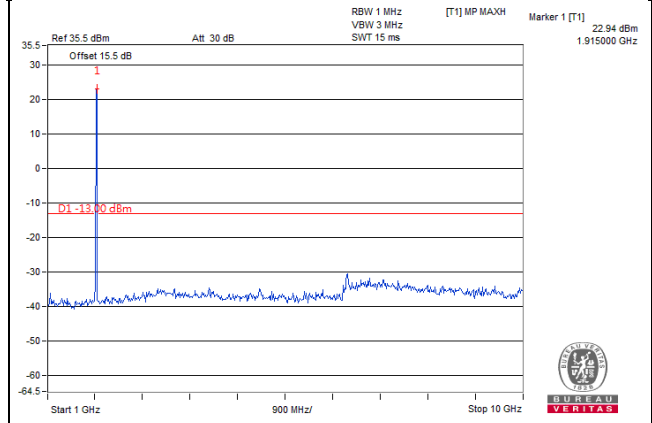
# LTE Band 2, Channel Bandwidth 5MHz

Channel 19175 (1907.50MHz)

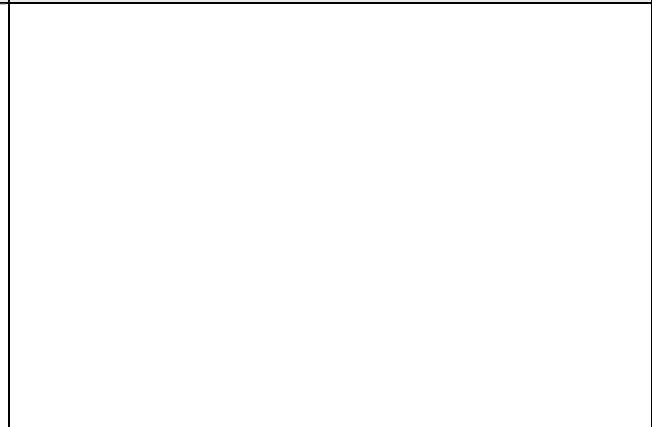
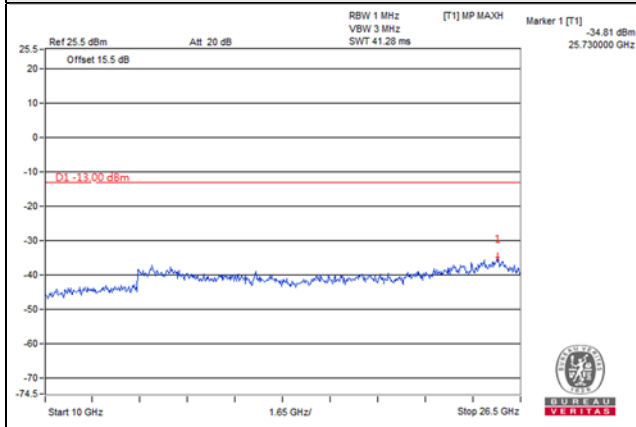
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



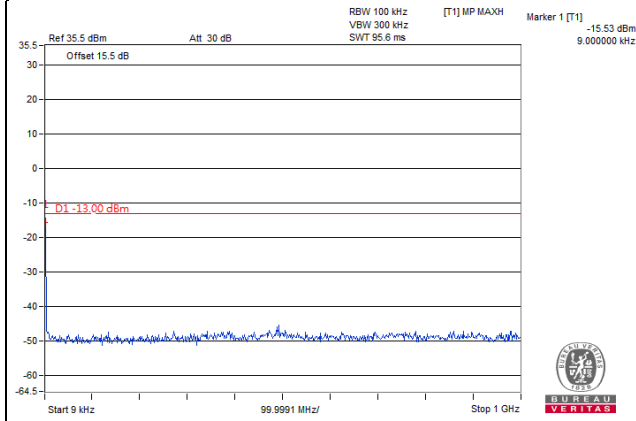
Frequency Range : 10GHz~26.5GHz



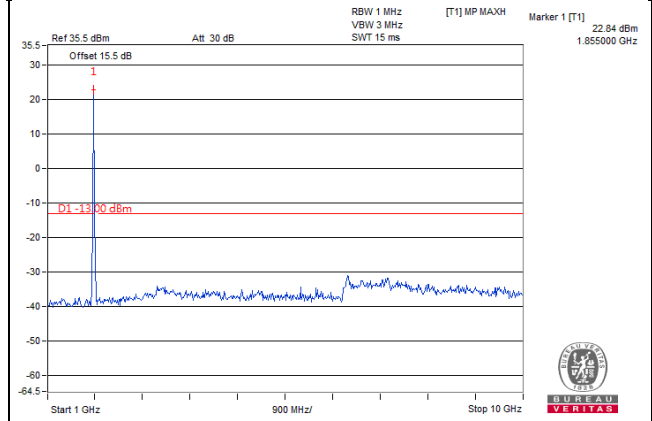
# LTE Band 2, Channel Bandwidth 10MHz

Channel 18650 (1855.00MHz)

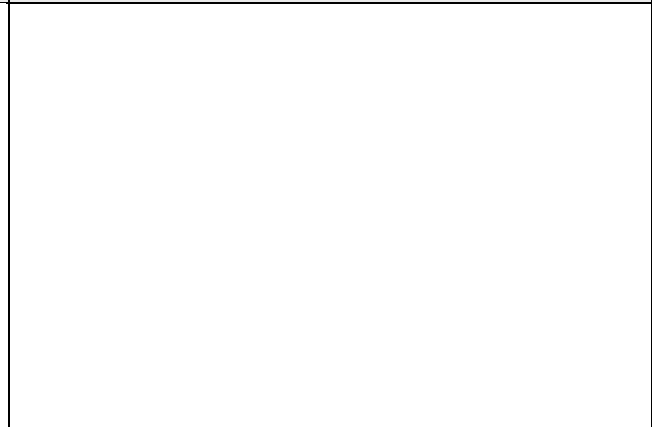
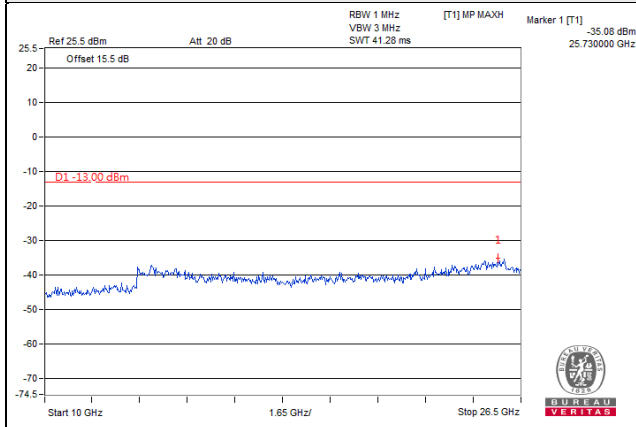
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



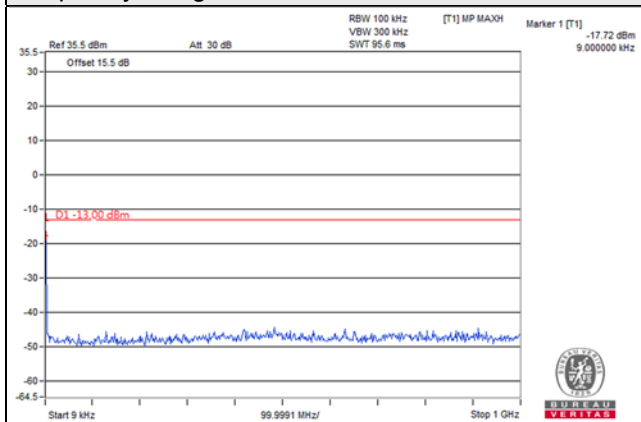
Frequency Range : 10GHz~26.5GHz



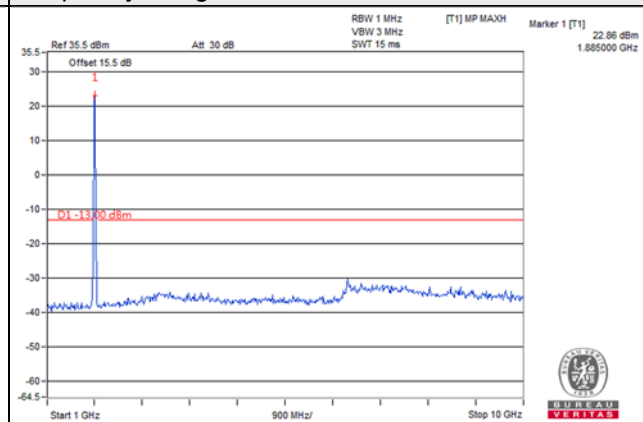
LTE Band 2, Channel Bandwidth 10MHz

Channel 18900 (1880.00MHz)

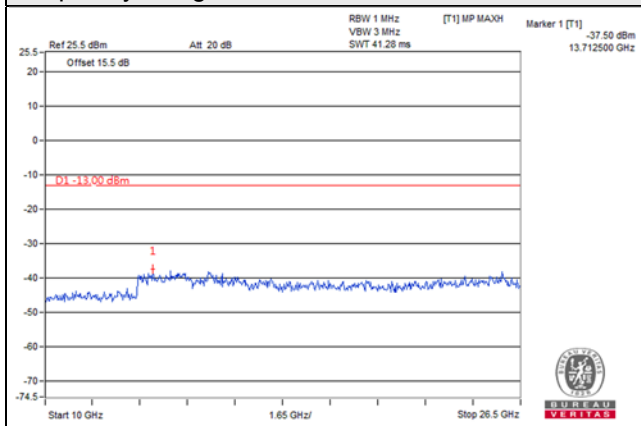
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



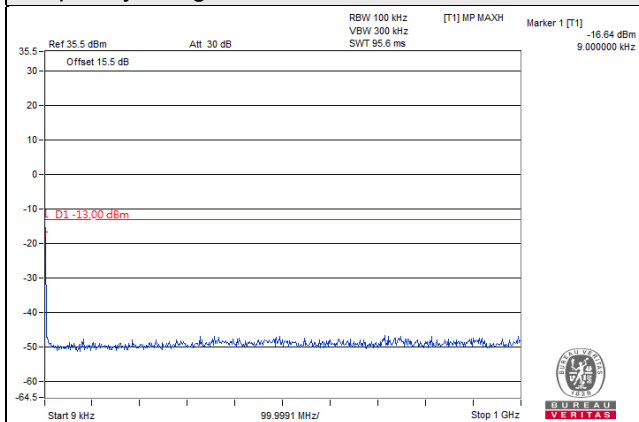
Frequency Range : 10GHz~26.5GHz



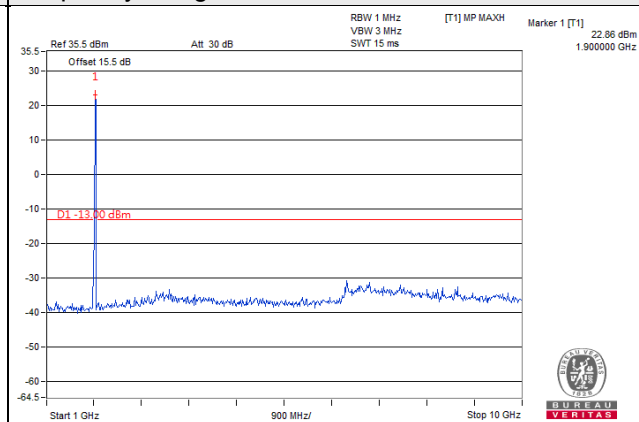
# LTE Band 2, Channel Bandwidth 10MHz

Channel 19150 (1905.00MHz)

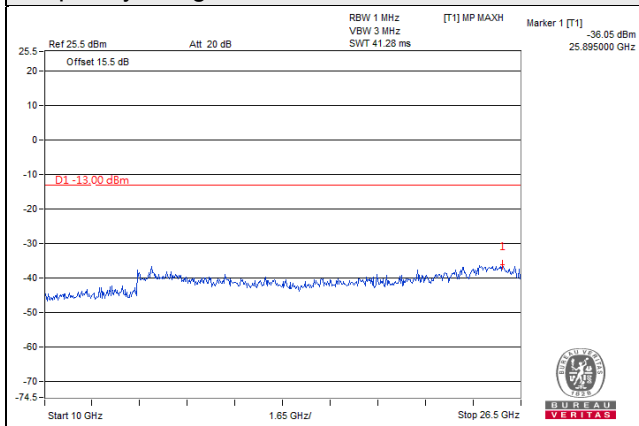
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



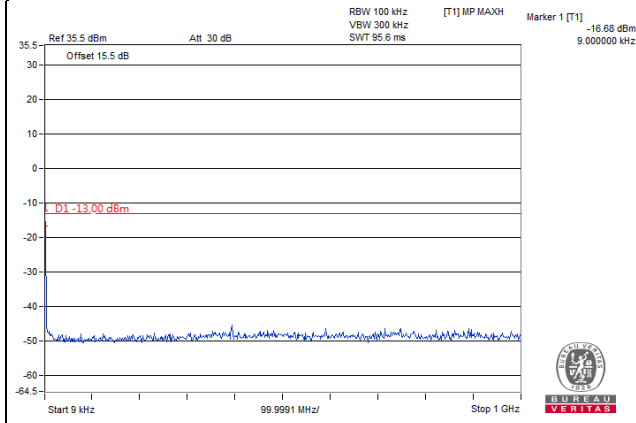
Frequency Range : 10GHz~26.5GHz



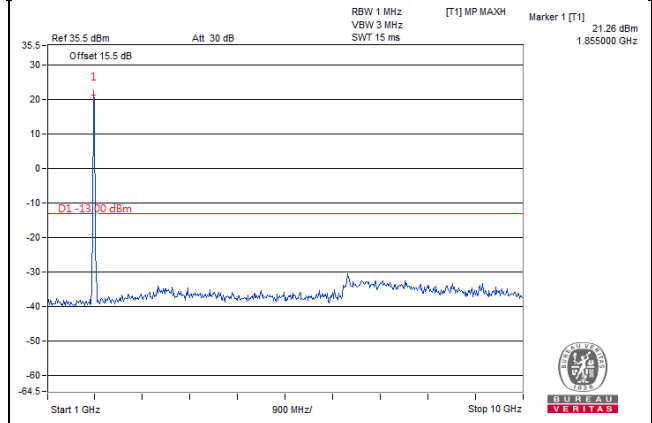
# LTE Band 2, Channel Bandwidth 15MHz

Channel 18675 (1857.50MHz)

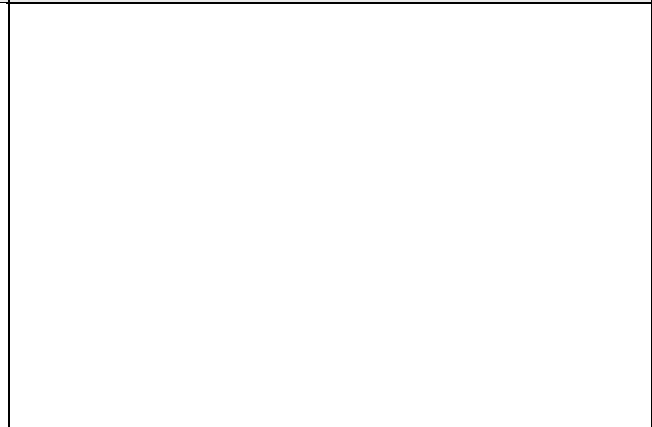
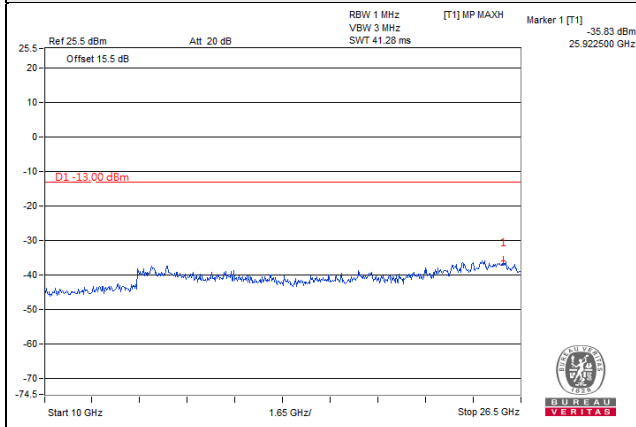
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



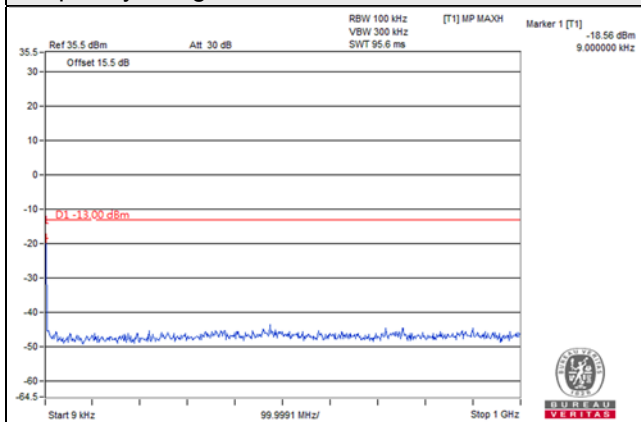
Frequency Range : 10GHz~26.5GHz



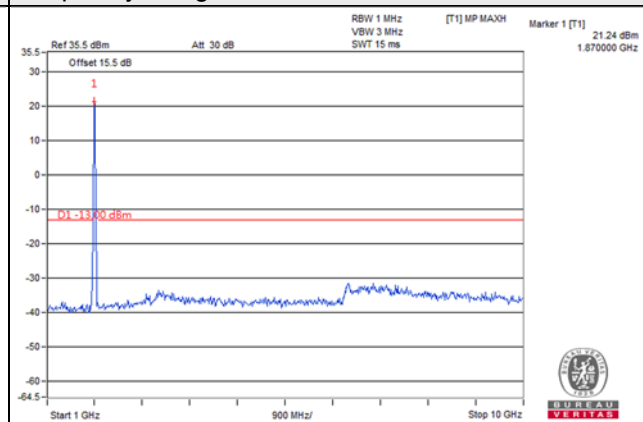
LTE Band 2, Channel Bandwidth 15MHz

Channel 18900 (1880.00MHz)

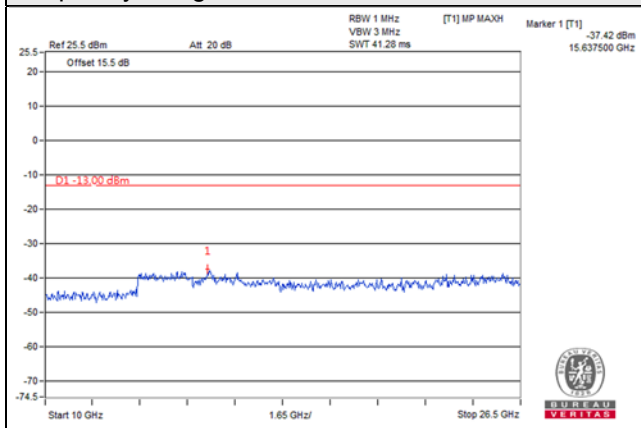
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



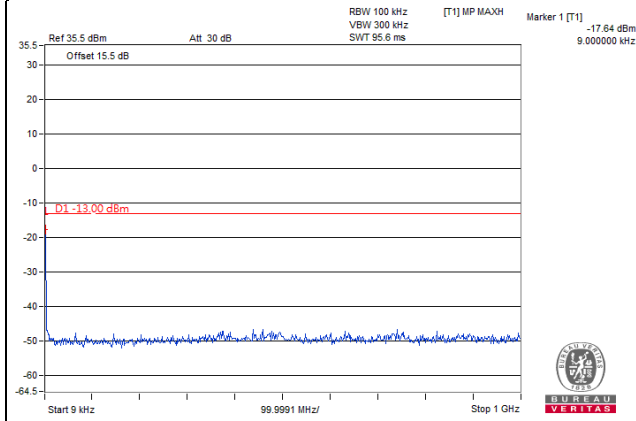
Frequency Range : 10GHz~26.5GHz



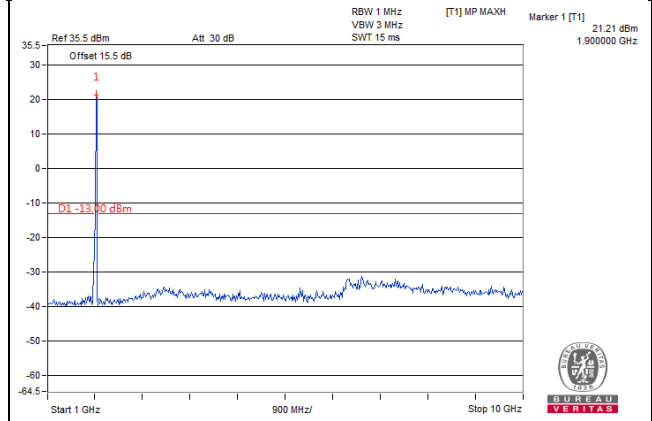
# LTE Band 2, Channel Bandwidth 15MHz

Channel 19125 (1902.50MHz)

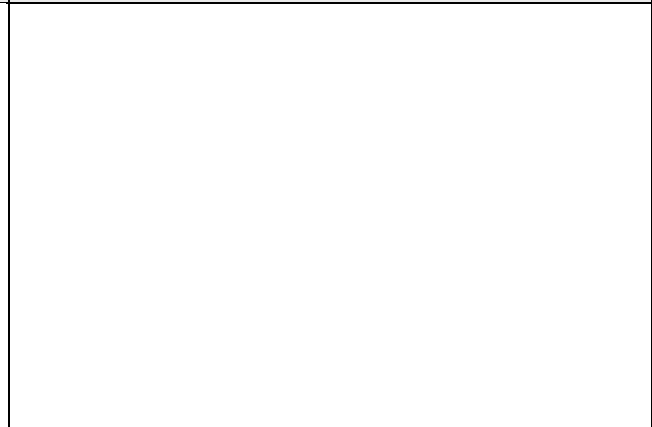
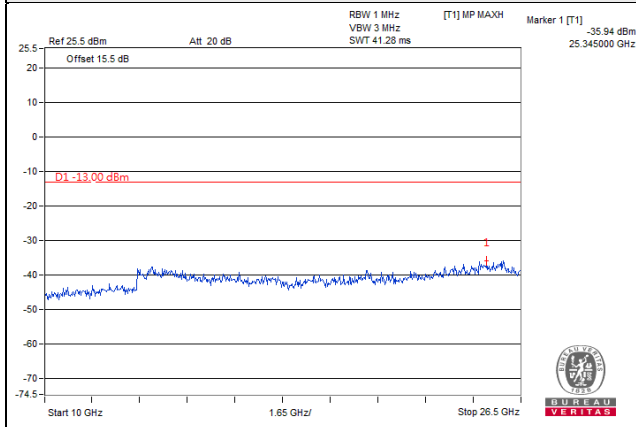
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



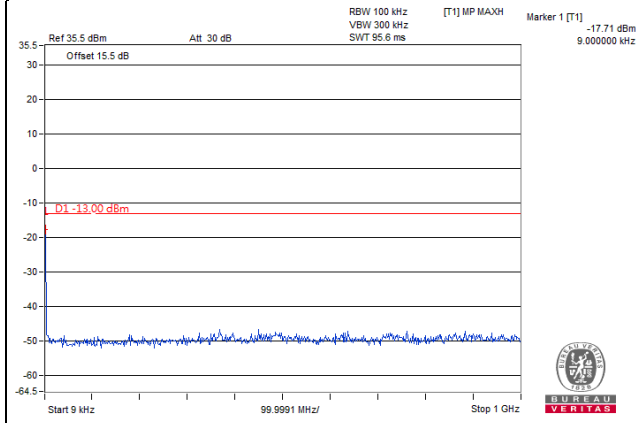
Frequency Range : 10GHz~26.5GHz



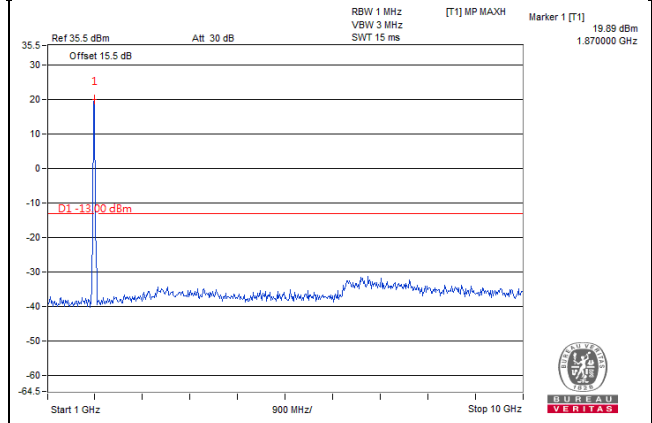
# LTE Band 2, Channel Bandwidth 20MHz

Channel 18700 (1860.00MHz)

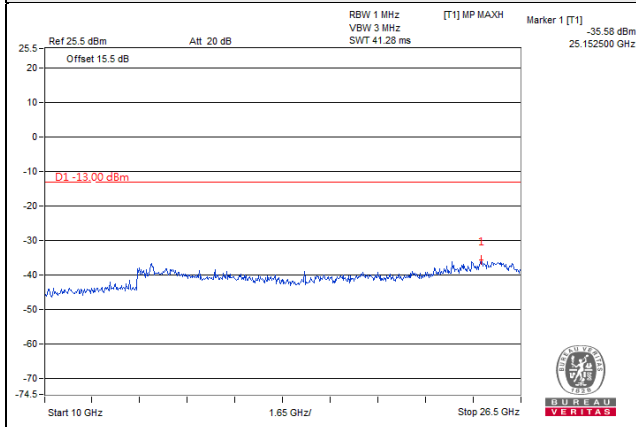
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



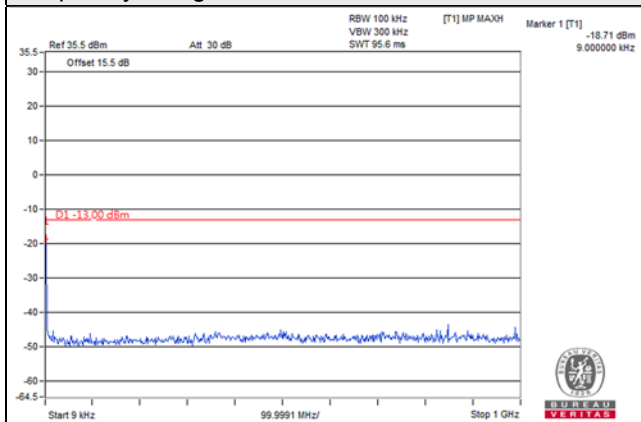
Frequency Range : 10GHz~26.5GHz



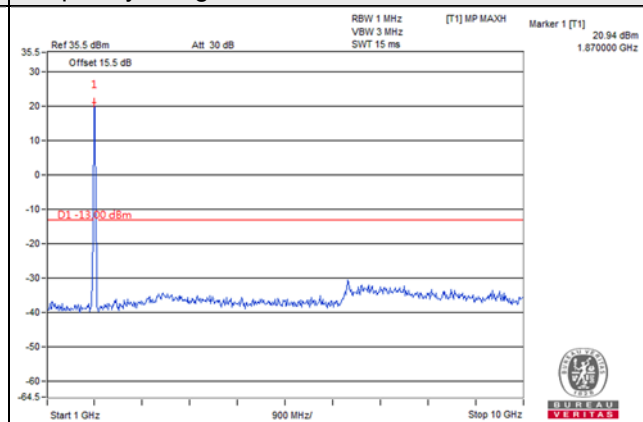
LTE Band 2, Channel Bandwidth 20MHz

Channel 18900 (1880.00MHz)

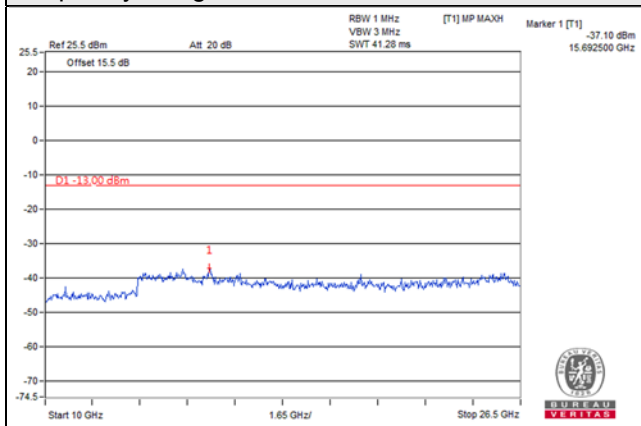
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



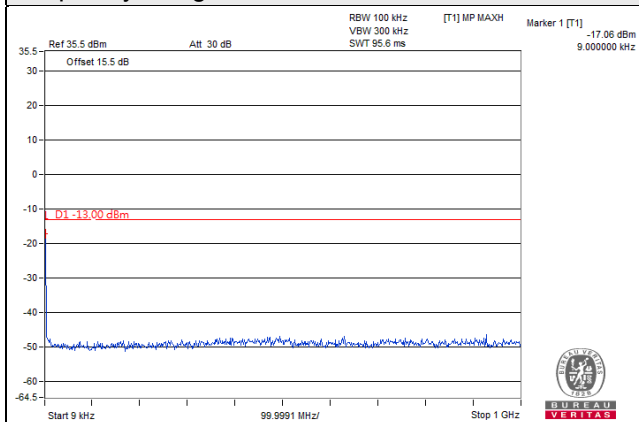
Frequency Range : 10GHz~26.5GHz



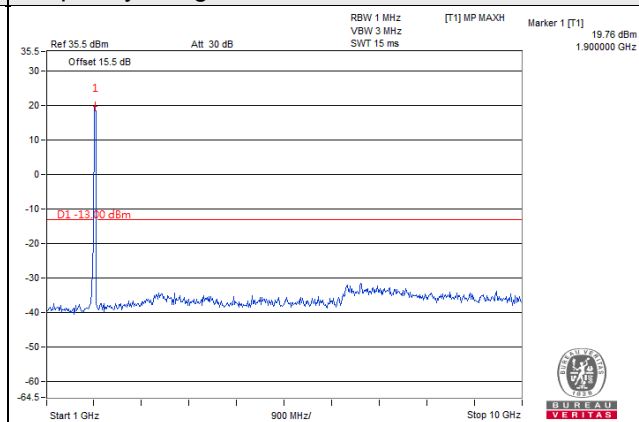
# LTE Band 2, Channel Bandwidth 20MHz

Channel 19100 (1900.00MHz)

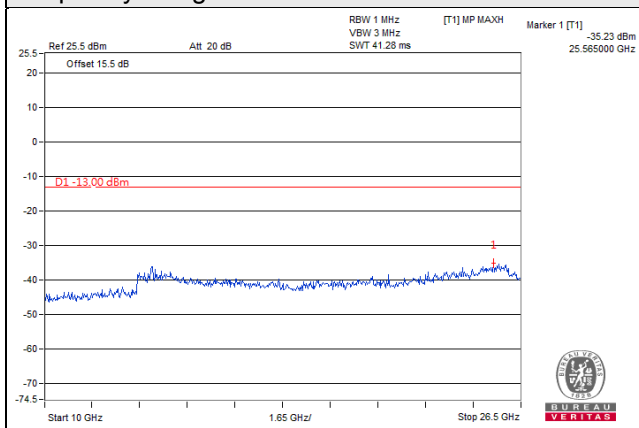
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~26.5GHz



## **4.8 Radiated Emission Measurement**

### **4.8.1 Limits of Radiated Emission Measurement**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to  $-13\text{dBm}$ .

### **4.8.2 Test Procedure**

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ .
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $\text{E.R.P power} = \text{E.I.R.P power} - 2.15\text{dBi}$ .

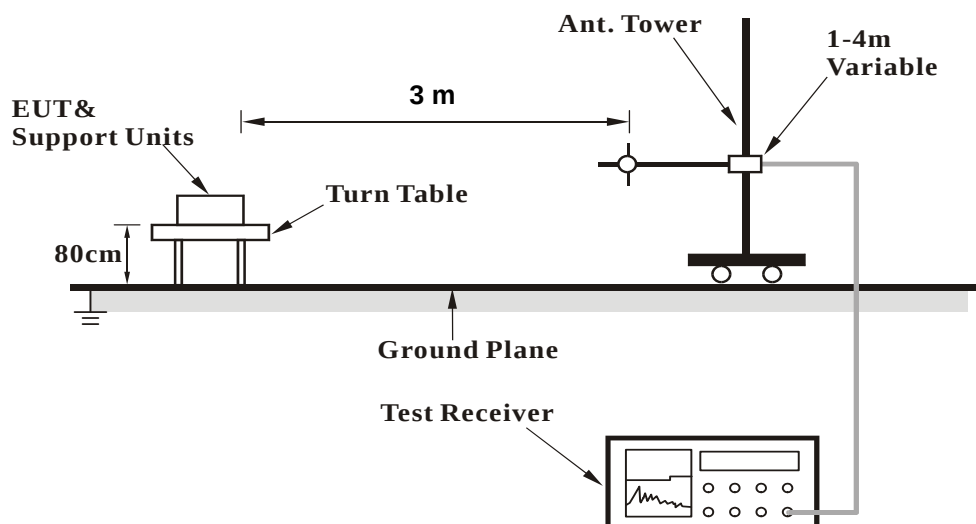
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### **4.8.3 Deviation from Test Standard**

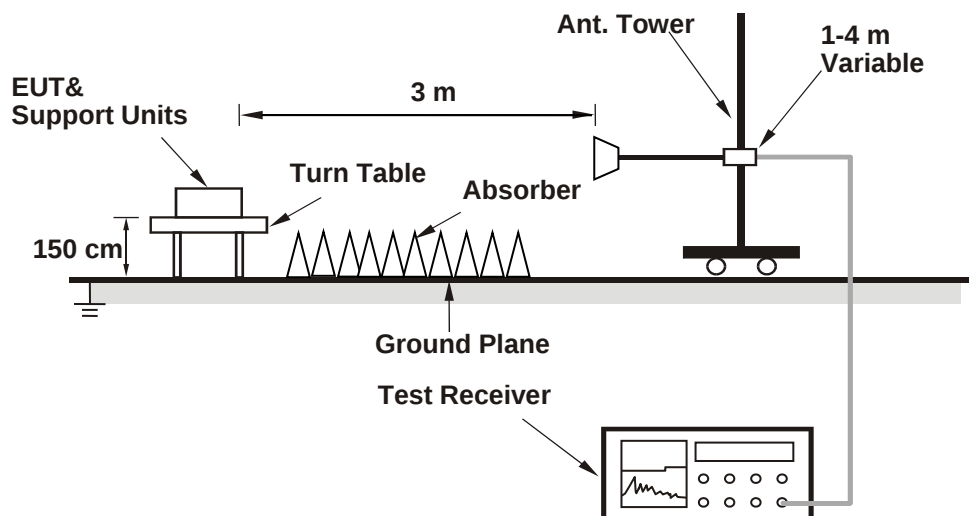
No deviation.

#### 4.8.4 Test Setup

##### <Radiated Emission below or equal 1 GHz>



##### <Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.8.5 Test Results

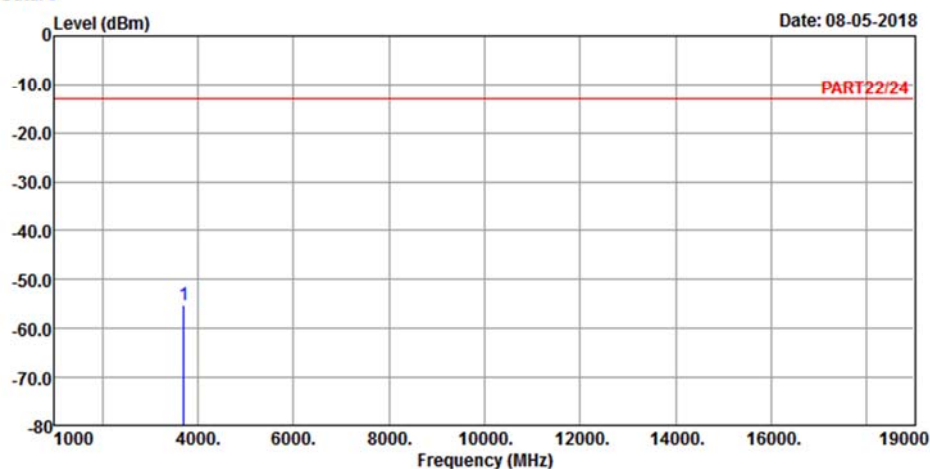
|      |                                            |         |                                  |
|------|--------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>1.4MHz | Channel | TX channel 18607<br>(1850.70MHz) |
|------|--------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_1.4M Link\_L-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3701.40 | -55.20 | -48.27 | -13.00 | -42.20 | -6.93  | Peak   |

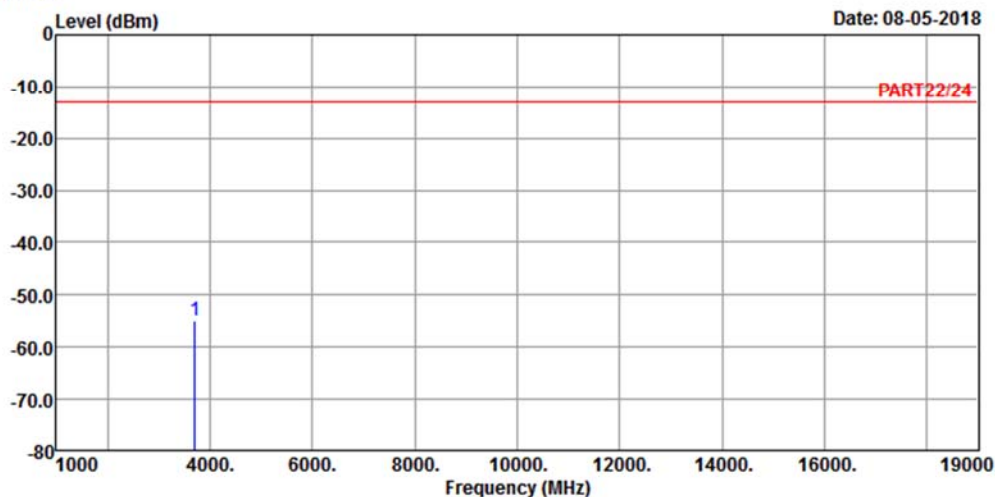
|      |                                            |         |                                  |
|------|--------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>1.4MHz | Channel | TX channel 18607<br>(1850.70MHz) |
|------|--------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_1.4M Link\_L-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3701.40 | -54.81 | -47.88 | -13.00 | -41.81 | -6.93  | Peak   |

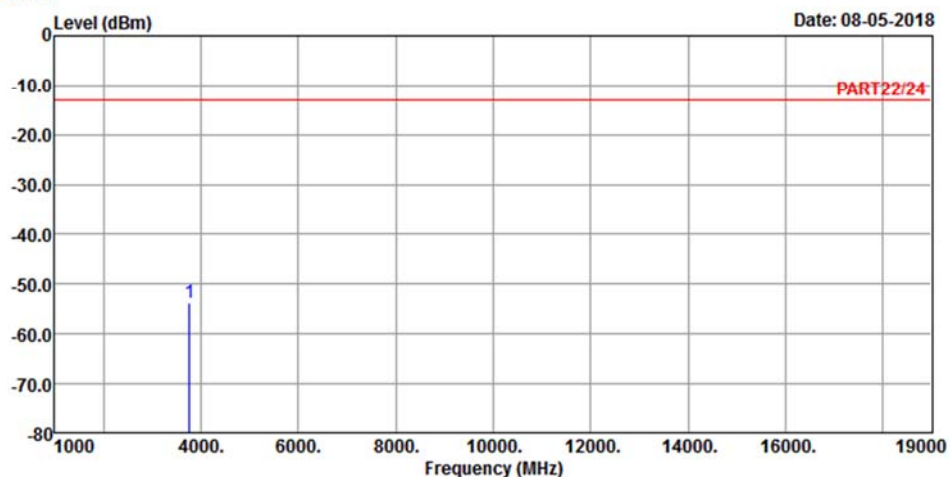
|      |                                            |         |                                  |
|------|--------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>1.4MHz | Channel | TX channel 18900<br>(1880.00MHz) |
|------|--------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_1.4M Link\_M-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3760.00 -53.76 -47.11 -13.00 -40.76 -6.65 Peak

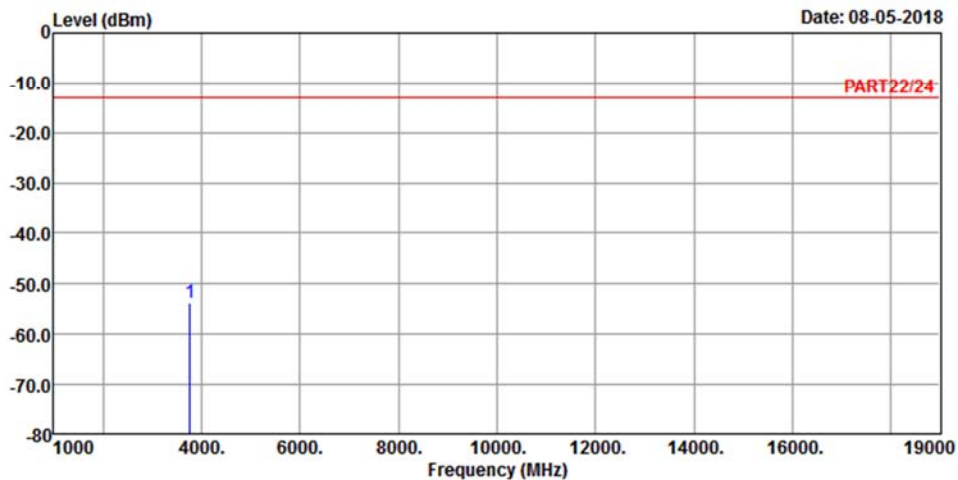
|      |                                            |         |                                  |
|------|--------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>1.4MHz | Channel | TX channel 18900<br>(1880.00MHz) |
|------|--------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_1.4M Link\_M-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3760.00 | -53.81 | -47.16 | -13.00 | -40.81 | -6.65  | Peak   |

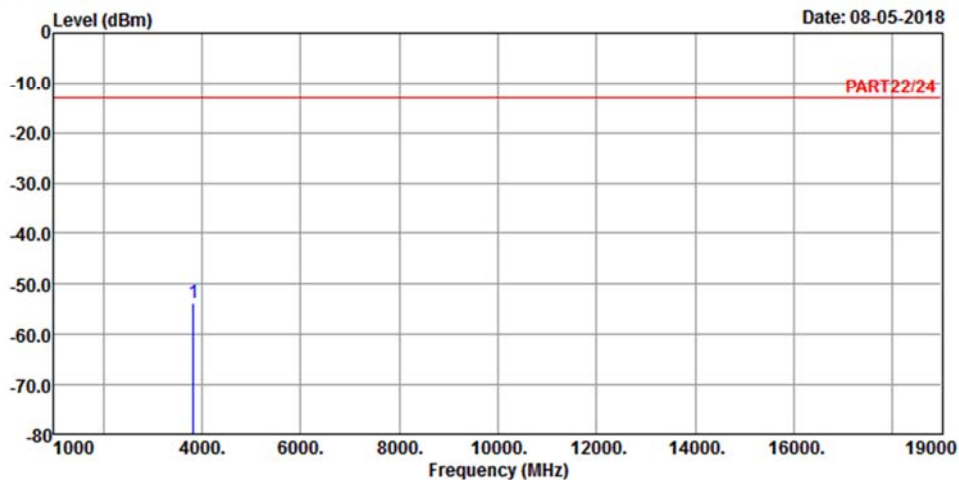
|      |                                            |         |                                  |
|------|--------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>1.4MHz | Channel | TX channel 19193<br>(1909.30MHz) |
|------|--------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_1.4M Link\_H-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3818.60 | -53.62 | -47.22 | -13.00 | -40.62 | -6.40  | Peak   |

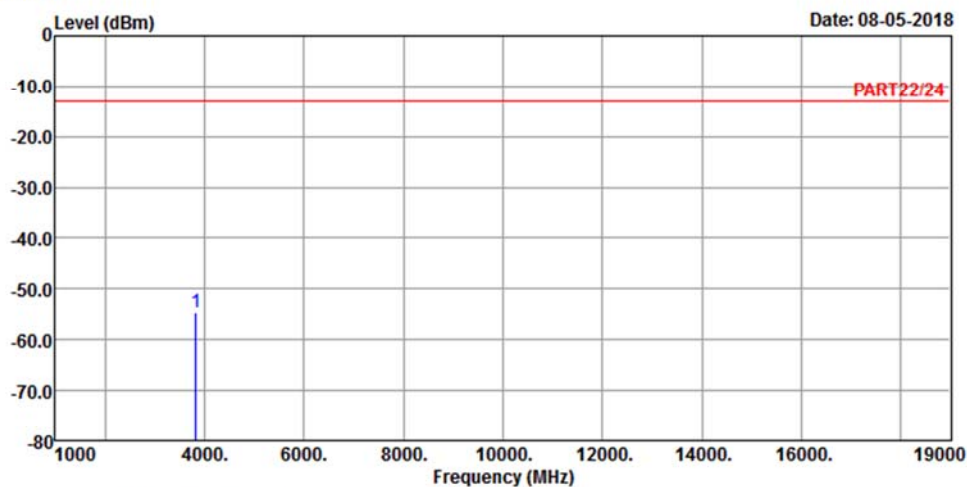
|      |                                            |         |                                  |
|------|--------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>1.4MHz | Channel | TX channel 19193<br>(1909.30MHz) |
|------|--------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_1.4M Link\_H-CH  
Tested by: Jisyoung Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3818.60 | -54.50 | -48.10 | -13.00 | -41.50 | -6.40  | Peak   |

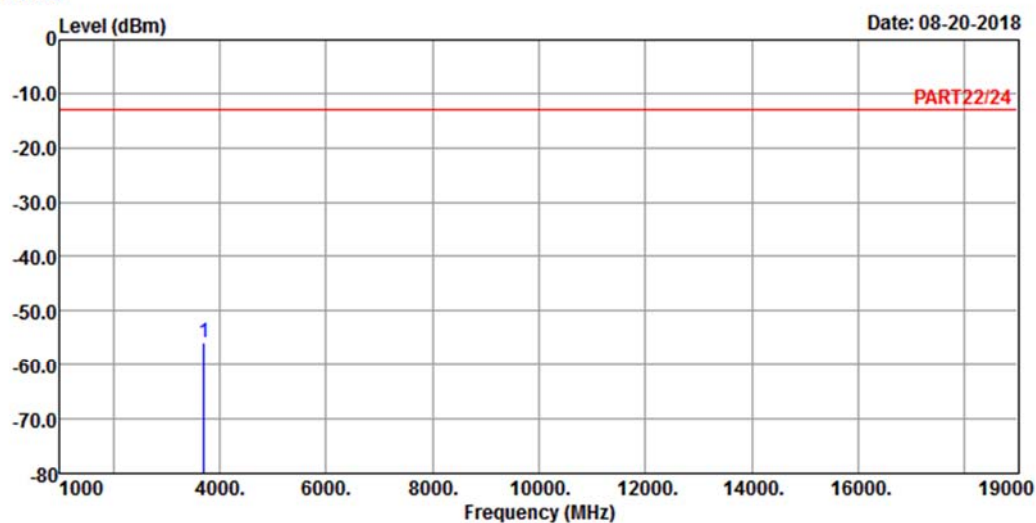
|      |                                          |         |                                 |
|------|------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>3MHz | Channel | TX channel<br>18615(1851.50MHz) |
|------|------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_3M Link\_L-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3703.00 | -55.85 | -48.92 | -13.00 | -42.85 | -6.93  | Peak   |

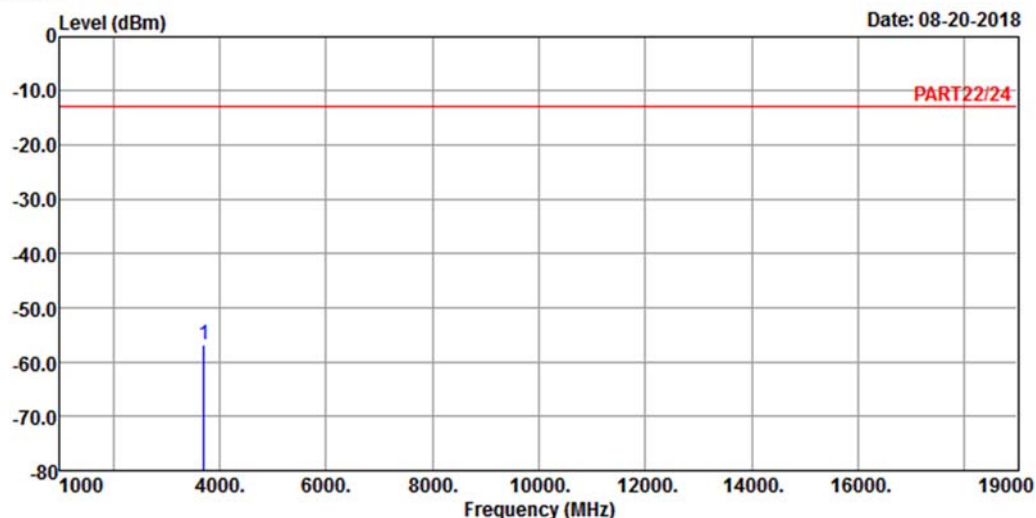
|      |                                          |         |                                 |
|------|------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>3MHz | Channel | TX channel<br>18615(1851.50MHz) |
|------|------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_3M Link\_L-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3703.00 -56.58 -49.65 -13.00 -43.58 -6.93 Peak

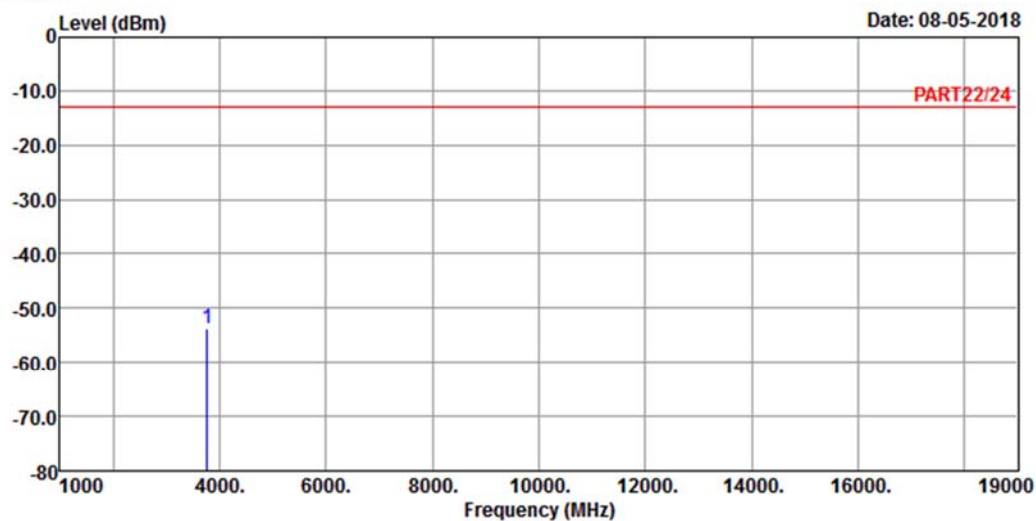
|      |                                          |         |                                 |
|------|------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>3MHz | Channel | TX channel<br>18900(1880.00MHz) |
|------|------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_3M Link\_M-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3760.00 -53.76 -47.11 -13.00 -40.76 -6.65 Peak

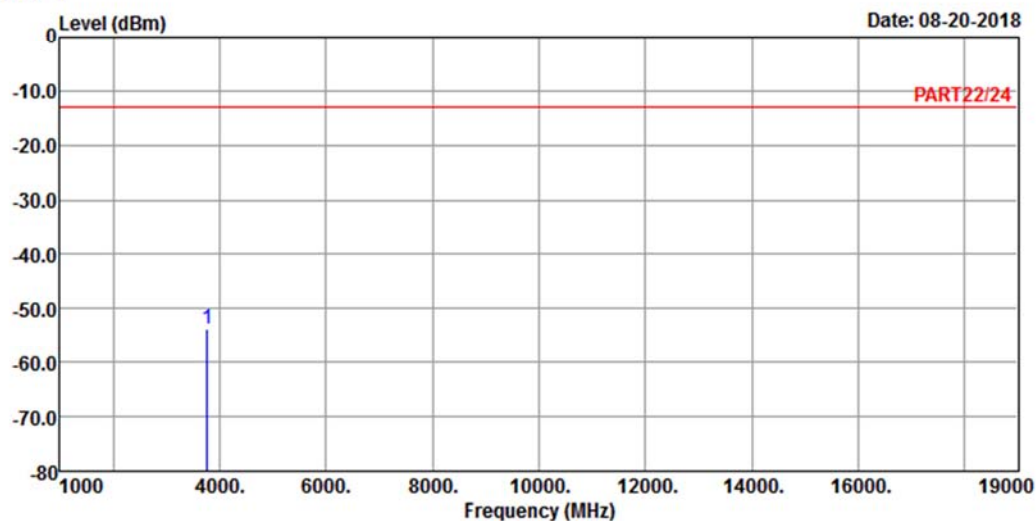
|      |                                          |         |                                 |
|------|------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>3MHz | Channel | TX channel<br>18900(1880.00MHz) |
|------|------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_3M Link\_M-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3760.00 -53.85 -47.20 -13.00 -40.85 -6.65 Peak

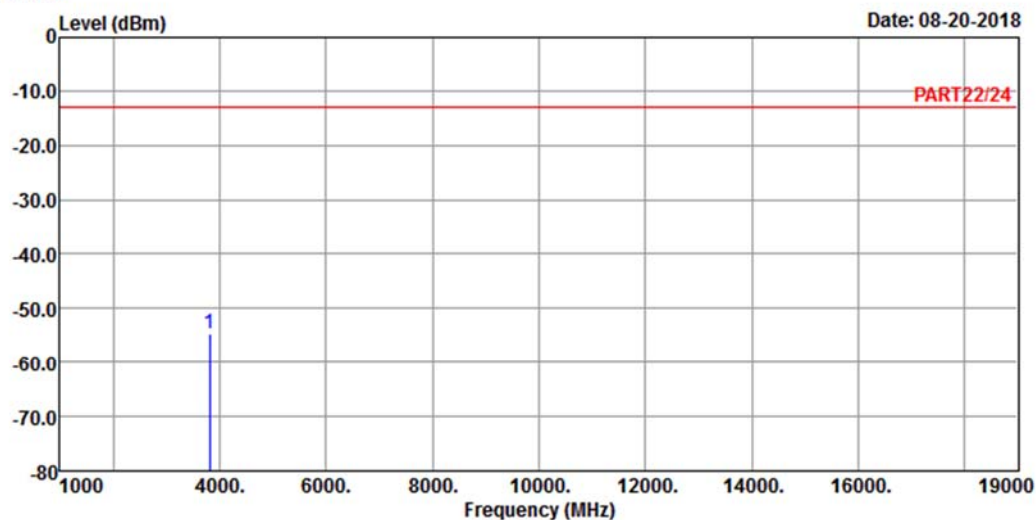
|      |                                          |         |                                 |
|------|------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>3MHz | Channel | TX channel<br>19185(1908.50MHz) |
|------|------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_3M Link\_H-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3817.00 -54.52 -48.12 -13.00 -41.52 -6.40 Peak

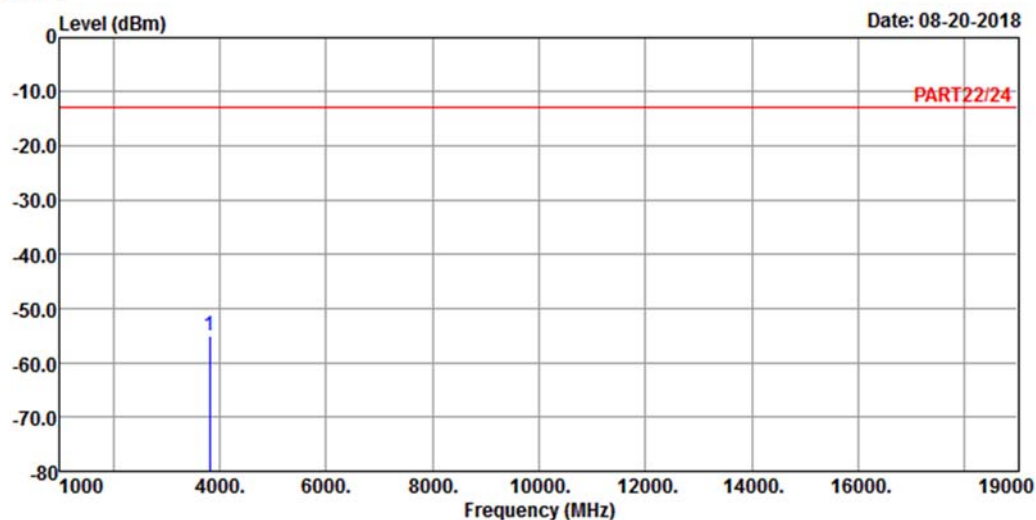
|      |                                          |         |                                 |
|------|------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>3MHz | Channel | TX channel<br>19185(1908.50MHz) |
|------|------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_3M Link\_H-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3817.00 -54.85 -48.45 -13.00 -41.85 -6.40 Peak

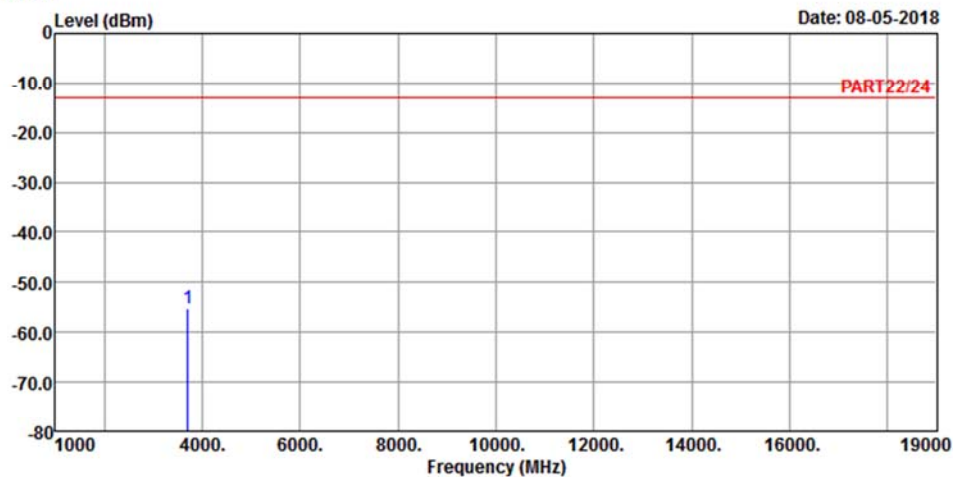
|      |                                          |         |                                  |
|------|------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>5MHz | Channel | TX channel 18625<br>(1852.50MHz) |
|------|------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_5M Link\_L-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3705.00 -55.20 -48.27 -13.00 -42.20 -6.93 Peak

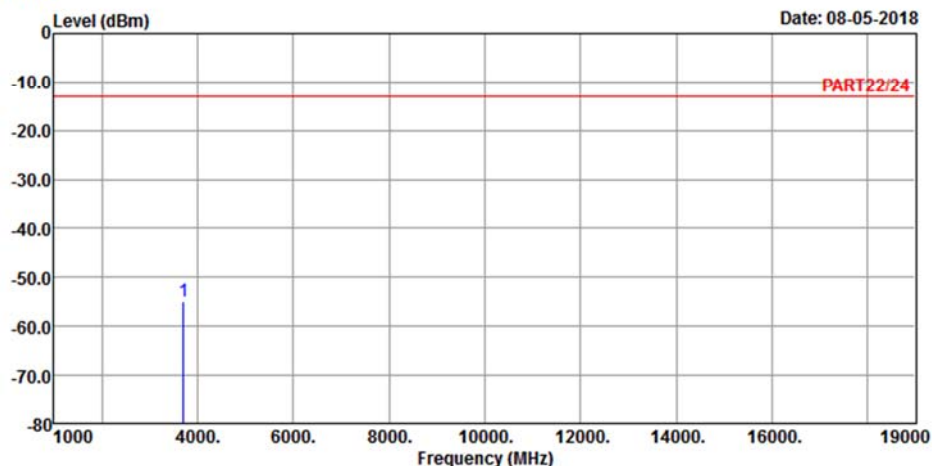
|      |                                          |         |                                  |
|------|------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>5MHz | Channel | TX channel 18625<br>(1852.50MHz) |
|------|------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_5M Link\_L-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3705.00 | -54.81 | -47.88 | -13.00 | -41.81 | -6.93  | Peak   |

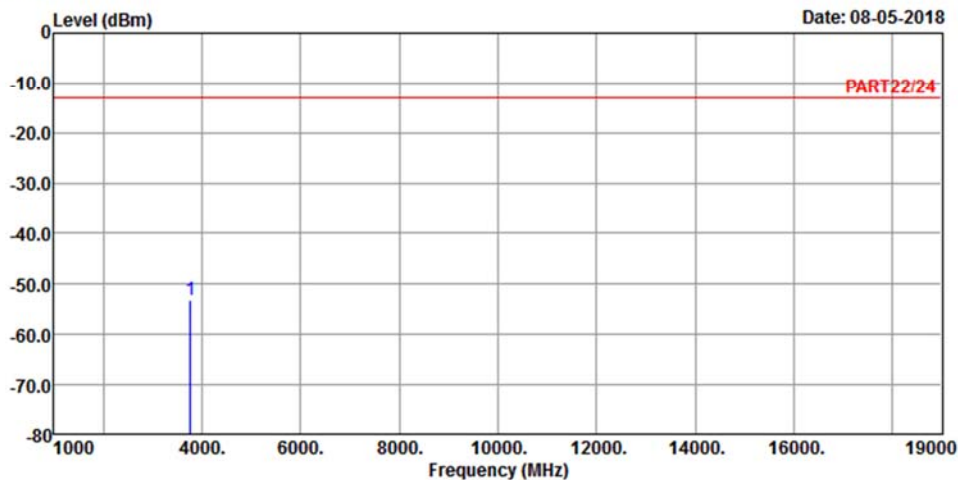
|      |                                          |         |                                  |
|------|------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>5MHz | Channel | TX channel 18900<br>(1880.00MHz) |
|------|------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_5M Link\_M-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3760.00 | -53.11 | -46.46 | -13.00 | -40.11 | -6.65  | Peak   |

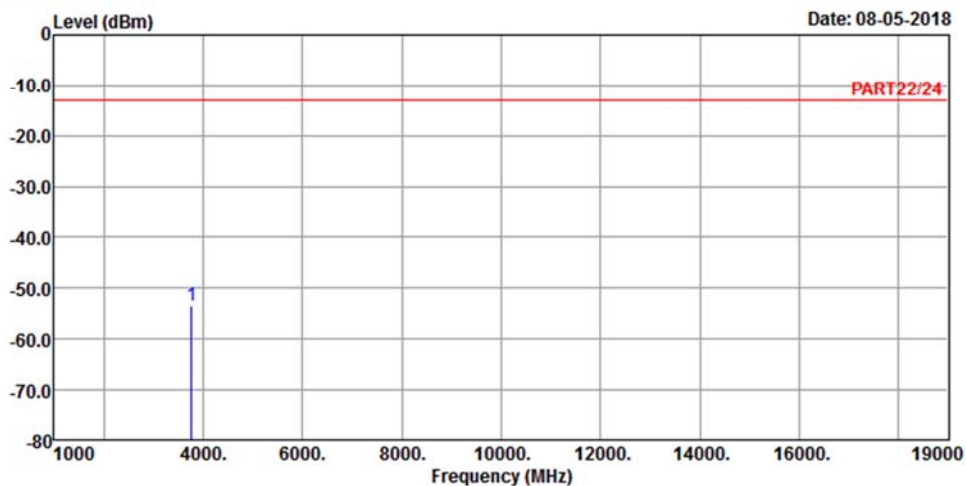
|      |                                          |         |                                  |
|------|------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>5MHz | Channel | TX channel 18900<br>(1880.00MHz) |
|------|------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : LTE Band 2 QPSK\_5M Link\_M-CH

Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3760.00 | -53.38 | -46.73 | -13.00 | -40.38 | -6.65  | Peak   |

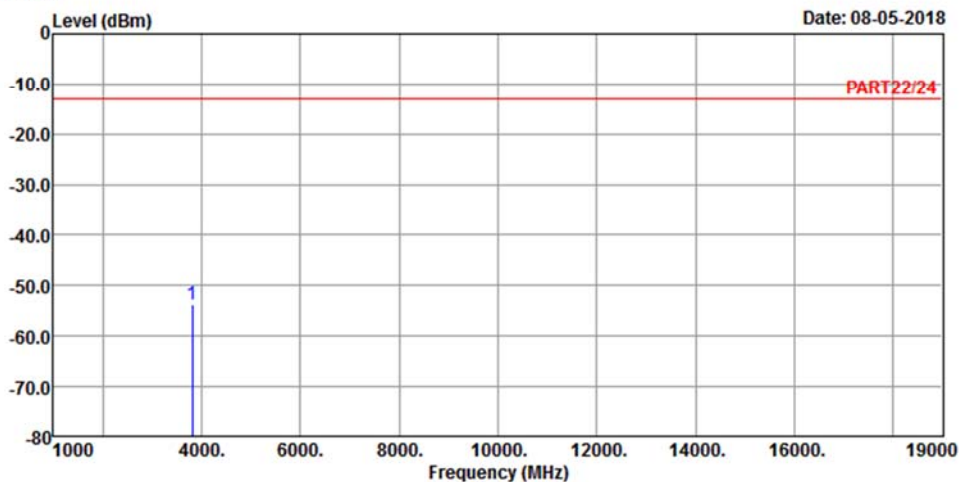
|      |                                          |         |                                  |
|------|------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>5MHz | Channel | TX channel 19175<br>(1907.50MHz) |
|------|------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_5M Link\_H-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3815.00 | -53.62 | -47.22 | -13.00 | -40.62 | -6.40  | Peak   |

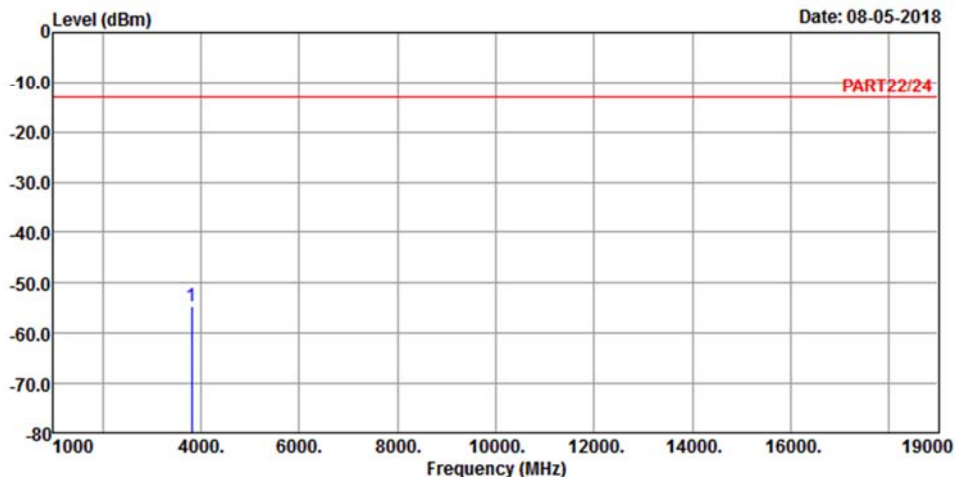
|      |                                          |         |                                  |
|------|------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>5MHz | Channel | TX channel 19175<br>(1907.50MHz) |
|------|------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_5M Link\_H-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3815.00 | -54.50 | -48.10 | -13.00 | -41.50 | -6.40  | Peak   |

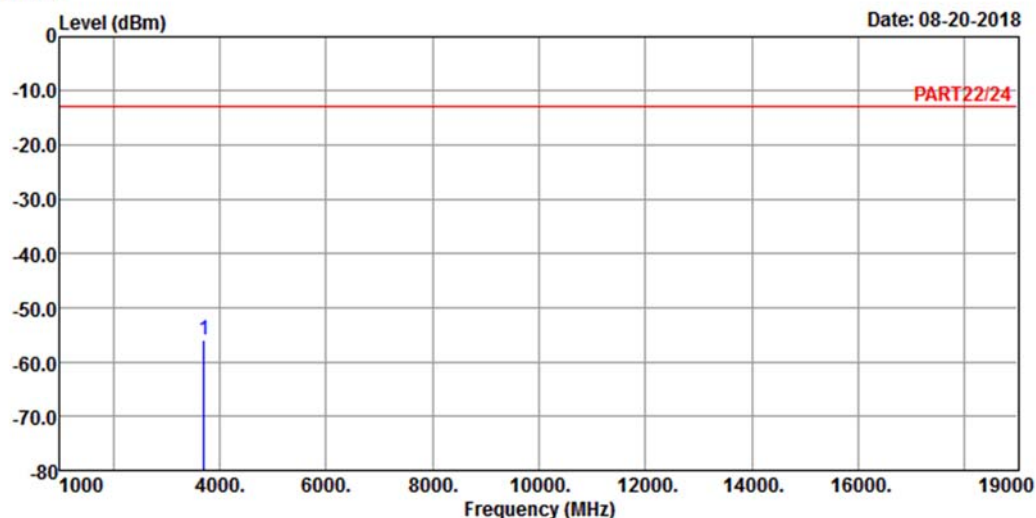
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>10MHz | Channel | TX channel<br>18650(1855.00MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_10M Link\_L-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3710.00 | -55.85 | -48.98 | -13.00 | -42.85 | -6.87  | Peak   |

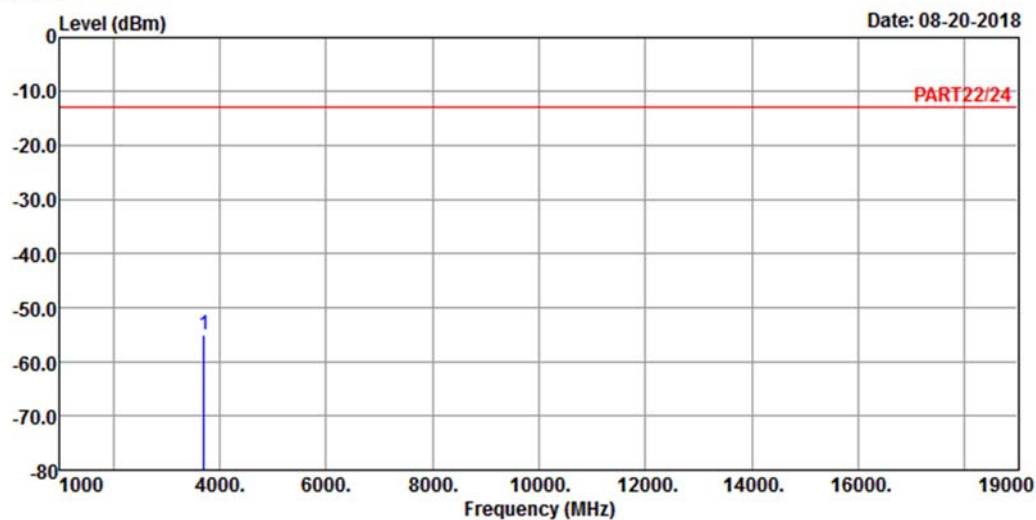
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>10MHz | Channel | TX channel<br>18650(1855.00MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_10M Link\_L-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3710.00 -54.96 -48.09 -13.00 -41.96 -6.87 Peak

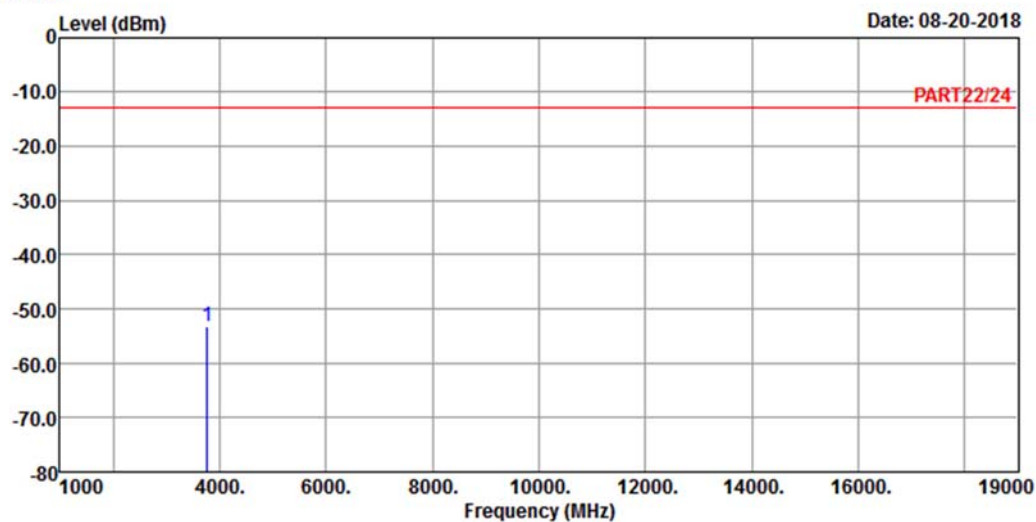
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>10MHz | Channel | TX channel<br>18900(1880.00MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_10M Link\_M-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3760.00 -53.01 -46.36 -13.00 -40.01 -6.65 Peak

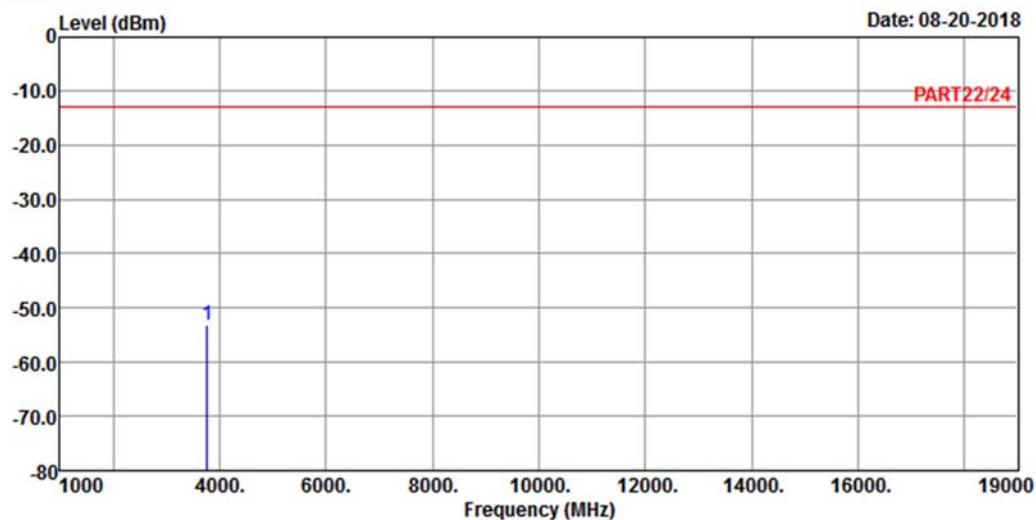
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>10MHz | Channel | TX channel<br>18900(1880.00MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
 Condition: PART22/24 VERTICAL  
 Remak : LTE Band 2 QPSK\_10M Link\_M-CH  
 Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3760.00 -53.15 -46.50 -13.00 -40.15 -6.65 Peak

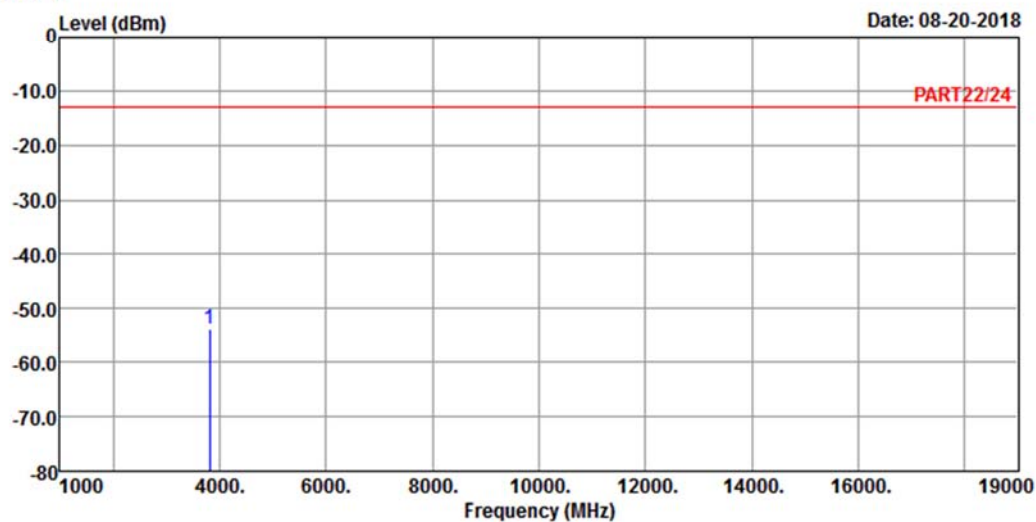
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>10MHz | Channel | TX channel<br>19150(1905.00MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_10M Link\_H-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3810.00 -53.85 -47.45 -13.00 -40.85 -6.40 Peak

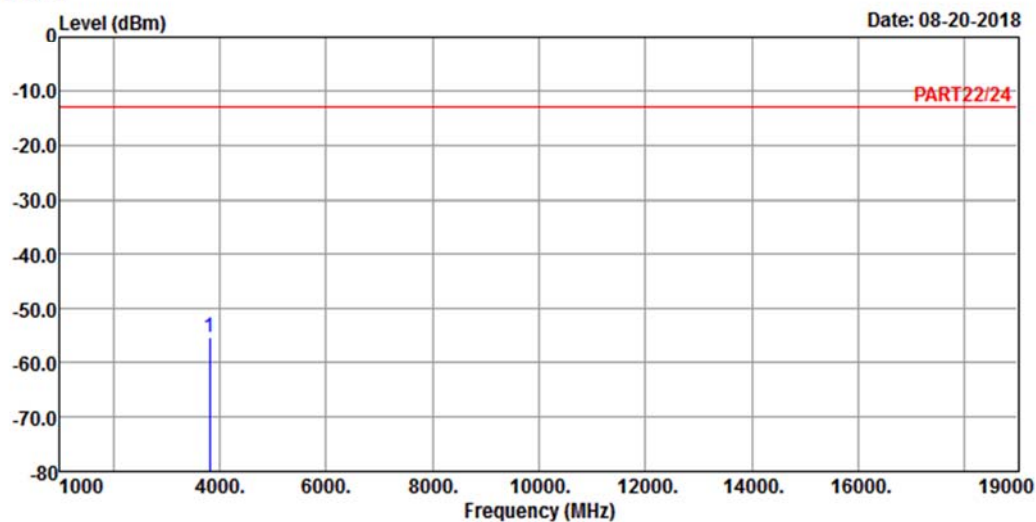
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>10MHz | Channel | TX channel<br>19150(1905.00MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_10M Link\_H-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3810.00 -55.14 -48.74 -13.00 -42.14 -6.40 Peak

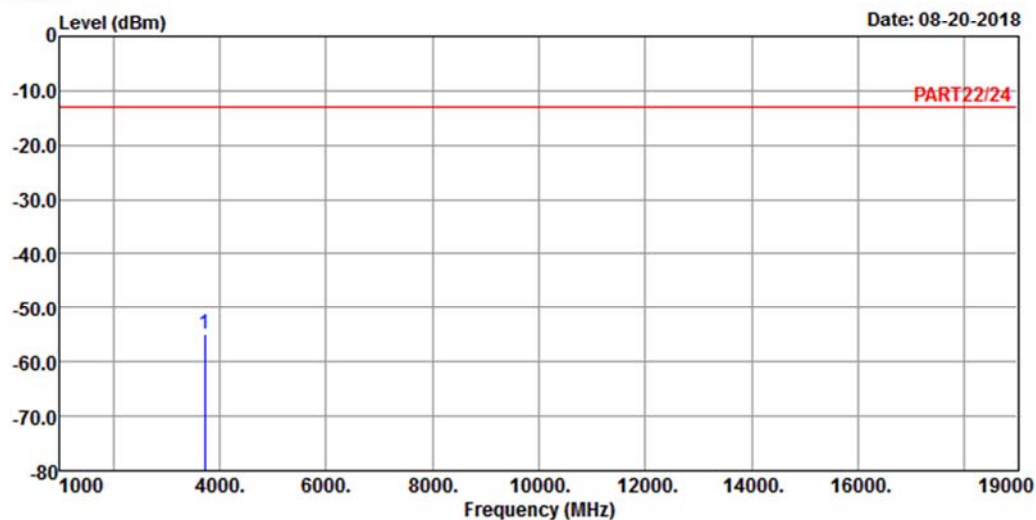
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>15MHz | Channel | TX channel<br>18675(1857.50MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_15M Link\_L-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3715.00 | -54.96 | -48.09 | -13.00 | -41.96 | -6.87  | Peak   |

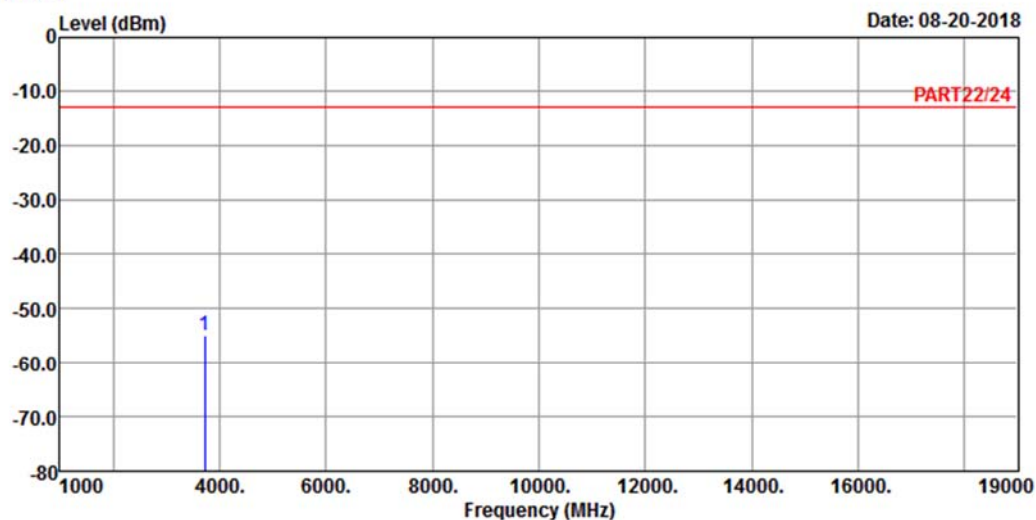
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>15MHz | Channel | TX channel<br>18675(1857.50MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_15M Link\_L-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3715.00 -54.78 -47.91 -13.00 -41.78 -6.87 Peak

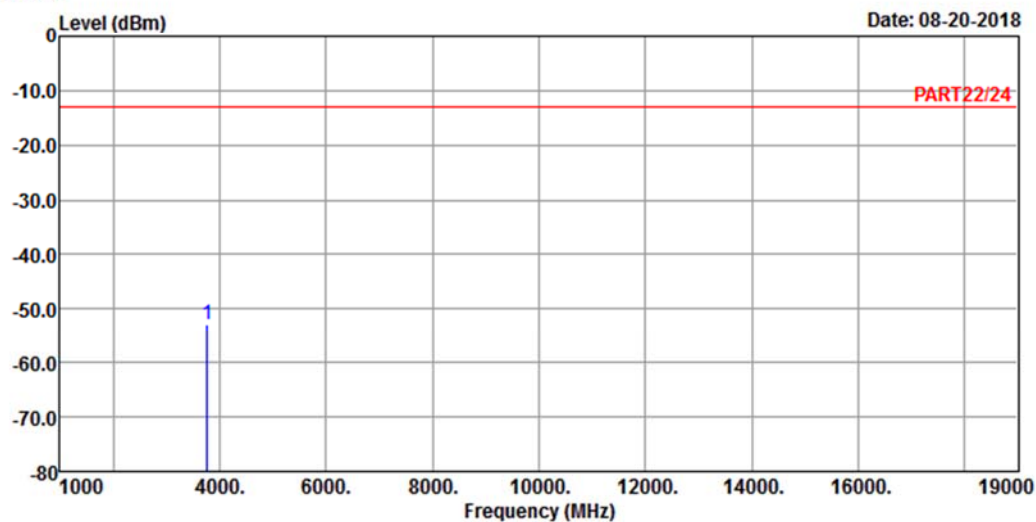
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>15MHz | Channel | TX channel<br>18900(1880.00MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_15M Link\_M-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3760.00 -52.75 -46.10 -13.00 -39.75 -6.65 Peak

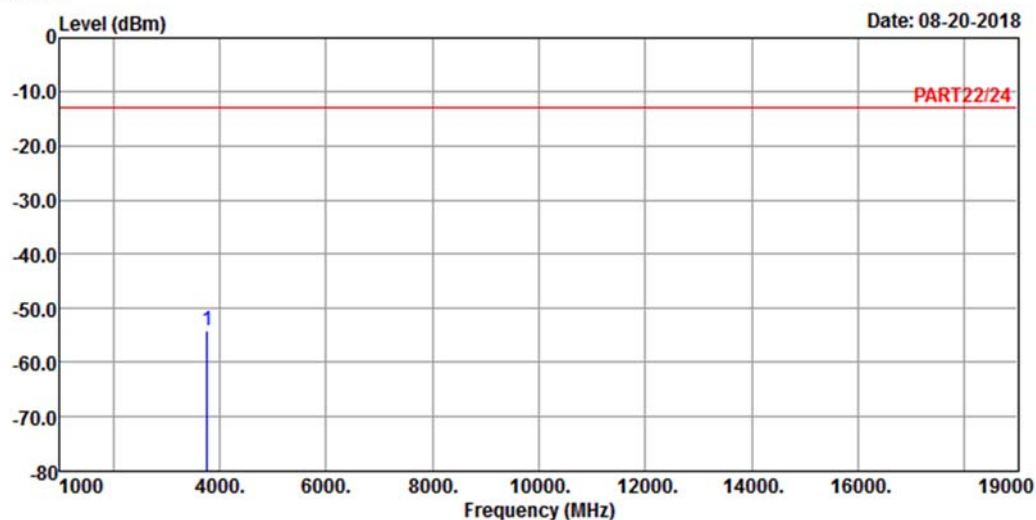
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>15MHz | Channel | TX channel<br>18900(1880.00MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_15M Link\_M-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3760.00 -53.99 -47.34 -13.00 -40.99 -6.65 Peak

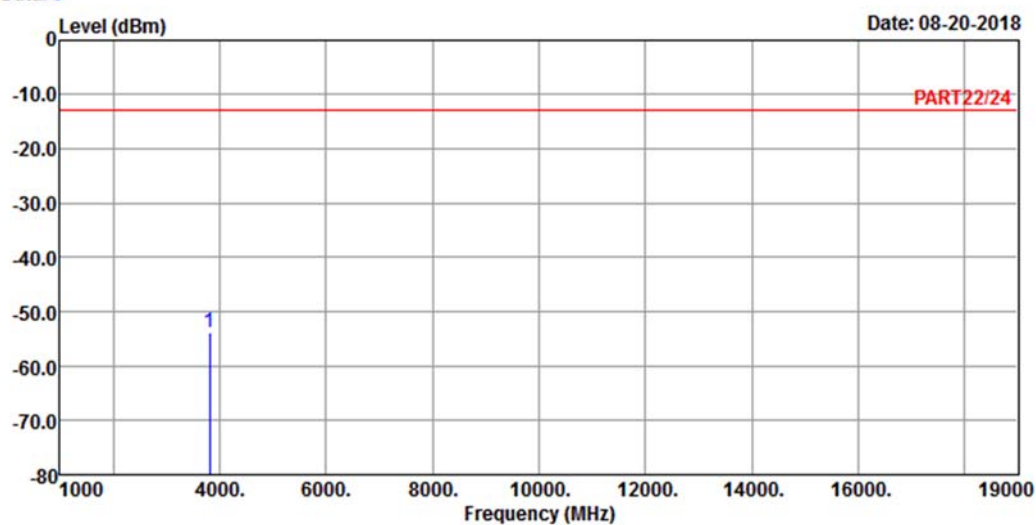
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>15MHz | Channel | TX channel<br>19125(1902.50MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_15M Link\_H-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3805.00 -53.85 -47.42 -13.00 -40.85 -6.43 Peak

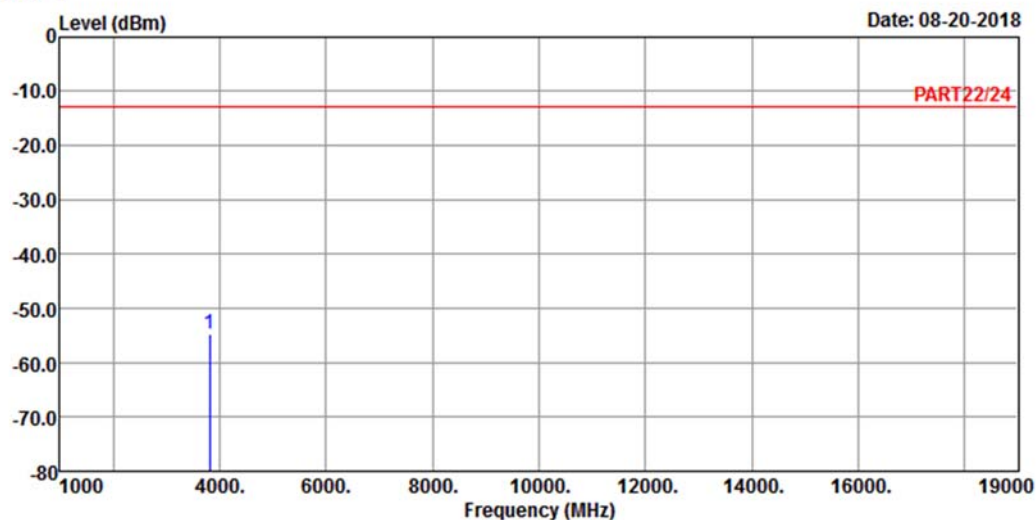
|      |                                           |         |                                 |
|------|-------------------------------------------|---------|---------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>15MHz | Channel | TX channel<br>19125(1902.50MHz) |
|------|-------------------------------------------|---------|---------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_15M Link\_H-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3805.00 -54.69 -48.26 -13.00 -41.69 -6.43 Peak

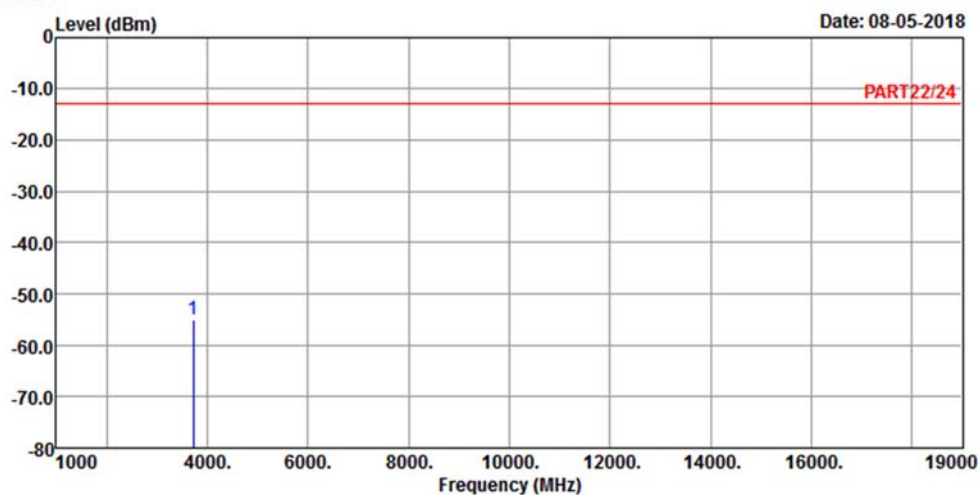
|      |                                           |         |                                  |
|------|-------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>20MHz | Channel | TX channel 18700<br>(1860.00MHz) |
|------|-------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_20M Link\_L-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3720.00 -54.76 -47.94 -13.00 -41.76 -6.82 Peak

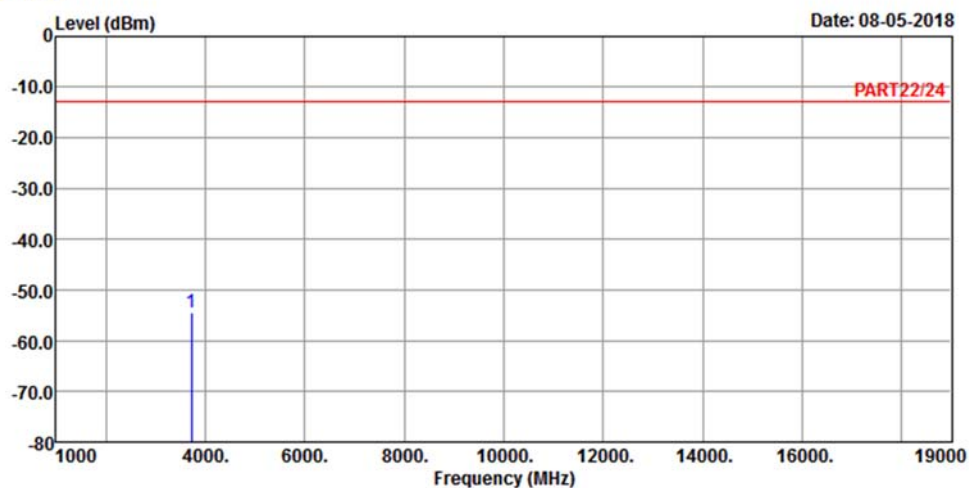
|      |                                           |         |                                  |
|------|-------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>20MHz | Channel | TX channel 18700<br>(1860.00MHz) |
|------|-------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_20M Link\_L-CH  
Tested by: Jisyong Wang

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 3720.00 | -54.46 | -47.64 | -13.00 | -41.46 | -6.82  | Peak   |

|      |                                           |         |                                  |
|------|-------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>20MHz | Channel | TX channel 18900<br>(1880.00MHz) |
|------|-------------------------------------------|---------|----------------------------------|

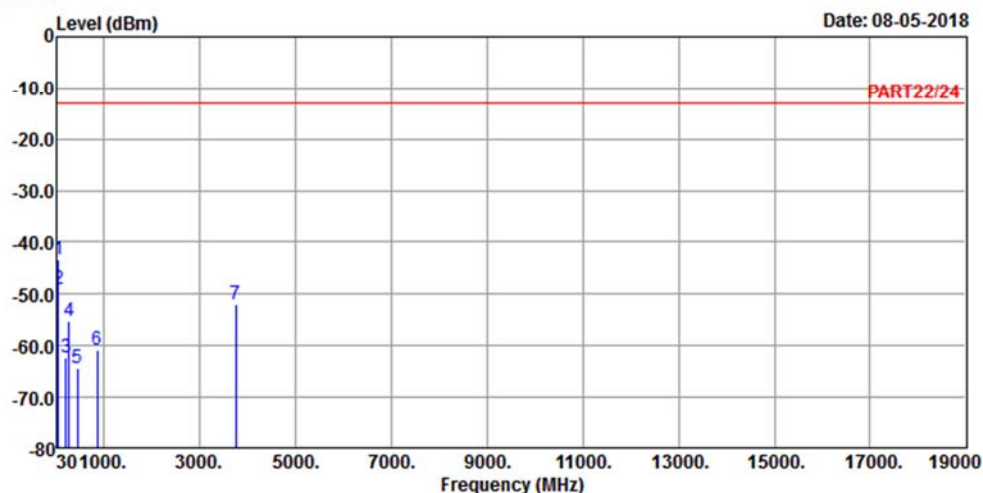


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 7

Date: 08-05-2018



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : LTE Band 2 QPSK\_20M Link\_M-CH

Tested by: Jisyong Wang

|      | Freq    | Level  | Read Level | Limit  | Over Limit | Factor | Remark |
|------|---------|--------|------------|--------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm    | dB         | dB     |        |
| 1 pp | 44.85   | -43.54 | -41.55     | -13.00 | -30.54     | -1.99  | Peak   |
| 2    | 52.95   | -48.92 | -43.11     | -13.00 | -35.92     | -5.81  | Peak   |
| 3    | 206.31  | -62.28 | -54.53     | -13.00 | -49.28     | -7.75  | Peak   |
| 4    | 268.95  | -55.07 | -48.70     | -13.00 | -42.07     | -6.37  | Peak   |
| 5    | 449.10  | -64.30 | -58.74     | -13.00 | -51.30     | -5.56  | Peak   |
| 6    | 861.40  | -60.91 | -61.27     | -13.00 | -47.91     | 0.36   | Peak   |
| 7    | 3760.00 | -52.01 | -45.36     | -13.00 | -39.01     | -6.65  | Peak   |

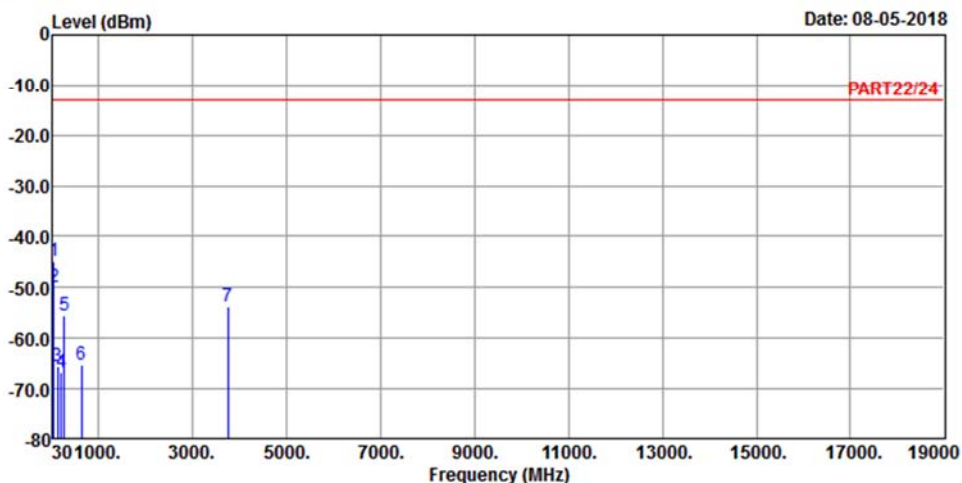
|      |                                           |         |                                  |
|------|-------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>20MHz | Channel | TX channel 18900<br>(1880.00MHz) |
|------|-------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 8



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_20M Link\_M-CH  
Tested by: Jisyong Wang

|      |         | Read   | Limit  | Over   |        |               |
|------|---------|--------|--------|--------|--------|---------------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor Remark |
|      | MHz     | dBm    | dBm    | dBm    | dB     | dB            |
| 1 pp | 44.04   | -44.73 | -43.26 | -13.00 | -31.73 | -1.47 Peak    |
| 2    | 52.95   | -49.77 | -43.96 | -13.00 | -36.77 | -5.81 Peak    |
| 3    | 133.14  | -65.54 | -56.86 | -13.00 | -52.54 | -8.68 Peak    |
| 4    | 205.23  | -66.85 | -59.06 | -13.00 | -53.85 | -7.79 Peak    |
| 5    | 271.92  | -55.64 | -49.21 | -13.00 | -42.64 | -6.43 Peak    |
| 6    | 644.40  | -65.25 | -64.38 | -13.00 | -52.25 | -0.87 Peak    |
| 7    | 3760.00 | -53.86 | -47.21 | -13.00 | -40.86 | -6.65 Peak    |

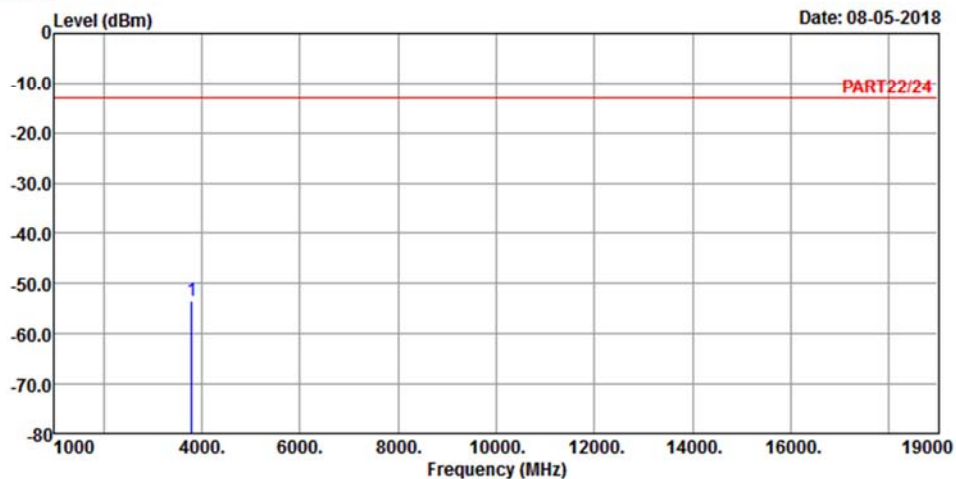
|      |                                           |         |                                  |
|------|-------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>20MHz | Channel | TX channel 19100<br>(1900.00MHz) |
|------|-------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5  
Condition: PART22/24 HORIZONTAL  
Remak : LTE Band 2 QPSK\_20M Link\_H-CH  
Tested by: Jisyong Wang

|      |       | Read  | Limit | Over  |        |        |
|------|-------|-------|-------|-------|--------|--------|
| Freq | Level | Level | Line  | Limit | Factor | Remark |
| MHz  | dBm   | dBm   | dBm   | dB    | dB     |        |

1 pp 3800.00 -53.53 -47.10 -13.00 -40.53 -6.43 Peak

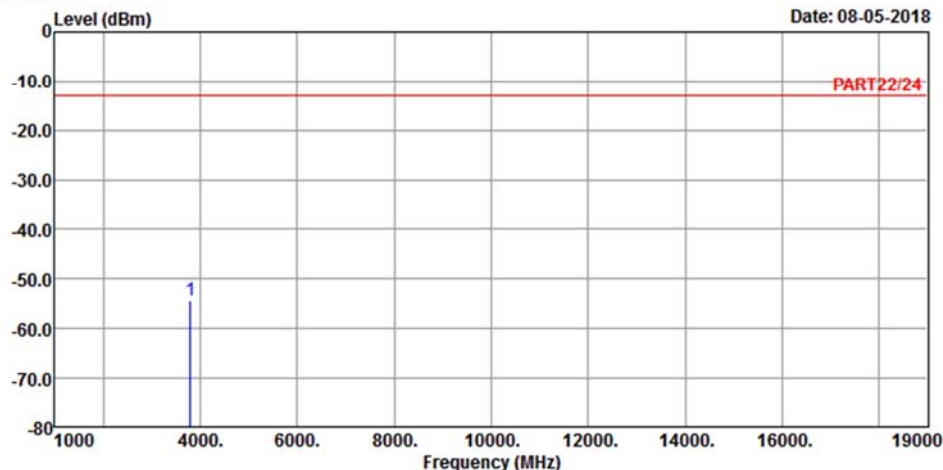
|      |                                           |         |                                  |
|------|-------------------------------------------|---------|----------------------------------|
| Mode | LTE Band 2<br>Channel Bandwidth:<br>20MHz | Channel | TX channel 19100<br>(1900.00MHz) |
|------|-------------------------------------------|---------|----------------------------------|



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5  
Condition: PART22/24 VERTICAL  
Remak : LTE Band 2 QPSK\_20M Link\_H-CH  
Tested by: Jisyong Wang

| Freq         | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|--------------|--------|------------|------------|------------|--------|--------|
| MHz          | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1 pp 3800.00 | -54.28 | -47.85     | -13.00     | -41.28     | -6.43  | Peak   |

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety Lab**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

--- END ---