

## FCC Test Report (Part 22)

**Report No.:** RF190315C13

**FCC ID:** LHJ-BL28RW001

**Test Model:** BL28RW-001

**Received Date:** Mar. 15, 2019

**Test Date:** Mar. 29 ~ Apr. 08, 2019

**Issued Date:** Apr. 16, 2019

**Applicant:** Continental Automotive Systems

**Address:** 21440 West Lake Cook Road Deer Park, IL 60010 United States

**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 /** 788550 / TW0003

**Designation Number:**



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                             | 14        |
| 3.5 General Description of Applied Standards             | 14        |
| <b>4 Test Types and Results</b>                          | <b>15</b> |
| 4.1 Output Power Measurement                             | 15        |
| 4.1.1 Limits of Output Power Measurement                 | 15        |
| 4.1.2 Test Procedures                                    | 15        |
| 4.1.3 Test Setup                                         | 16        |
| 4.1.4 Test Results                                       | 17        |
| 4.2 Modulation Characteristics Measurement               | 36        |
| 4.2.1 Limits of Modulation Characteristics               | 36        |
| 4.2.2 Test Procedure                                     | 36        |
| 4.2.3 Test Setup                                         | 36        |
| 4.2.4 Test Results                                       | 37        |
| 4.3 Frequency Stability Measurement                      | 40        |
| 4.3.1 Limits of Frequency Stability Measurement          | 40        |
| 4.3.2 Test Procedure                                     | 40        |
| 4.3.3 Test Setup                                         | 40        |
| 4.3.4 Test Results                                       | 41        |
| 4.4 Occupied Bandwidth Measurement                       | 48        |
| 4.4.1 Test Procedure                                     | 48        |
| 4.4.2 Test Setup                                         | 48        |
| 4.4.3 Test Result                                        | 49        |
| 4.5 Band Edge Measurement                                | 57        |
| 4.5.1 Limits of Band Edge Measurement                    | 57        |
| 4.5.2 Test Setup                                         | 57        |
| 4.5.3 Test Procedures                                    | 57        |
| 4.5.4 Test Results                                       | 58        |
| 4.6 Peak to Average Ratio                                | 64        |
| 4.6.1 Limits of Peak to Average Ratio Measurement        | 64        |
| 4.6.2 Test Setup                                         | 64        |
| 4.6.3 Test Procedures                                    | 64        |
| 4.6.4 Test Results                                       | 65        |
| 4.7 Conducted Spurious Emissions                         | 69        |
| 4.7.1 Limits of Conducted Spurious Emissions Measurement | 69        |
| 4.7.2 Test Setup                                         | 69        |
| 4.7.3 Test Procedure                                     | 69        |
| 4.7.4 Test Results                                       | 70        |
| 4.8 Radiated Emission Measurement                        | 100       |
| 4.8.1 Limits of Radiated Emission Measurement            | 100       |
| 4.8.2 Test Procedure                                     | 100       |
| 4.8.3 Deviation from Test Standard                       | 100       |
| 4.8.4 Test Setup                                         | 101       |
| 4.8.5 Test Results                                       | 102       |

|          |                                                                 |            |
|----------|-----------------------------------------------------------------|------------|
| <b>5</b> | <b>Pictures of Test Arrangements.....</b>                       | <b>122</b> |
|          | <b>Appendix – Information on the Testing Laboratories .....</b> | <b>123</b> |

### Release Control Record

| Issue No.   | Description      | Date Issued   |
|-------------|------------------|---------------|
| RF190315C13 | Original release | Apr. 16, 2019 |

## 1 Certificate of Conformity

**Product:** BL28RW-001 Module

**Brand:** Continental

**Test Model:** BL28RW-001

**Sample Status:** Engineering sample

**Applicant:** Continental Automotive Systems

**Test Date:** Mar. 29 ~ Apr. 08, 2019

**Standards:** FCC Part 22, Subpart H

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:** Apr. 16, 2019  
Pettie Chen / Senior Specialist

**Approved by :** Bruce Chen , **Date:** Apr. 16, 2019  
Bruce Chen / Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 22 & Part 2 |                              |        |                                                                                  |
|----------------------------------------|------------------------------|--------|----------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                    | Result | Remarks                                                                          |
| 2.1046<br>22.913 (a)                   | Effective radiated power     | Pass   | Meet the requirement of limit.                                                   |
| 2.1047                                 | Modulation Characteristics   | Pass   | Meet the requirement                                                             |
| 22.913 (d)                             | Peak To Average Ratio        | Pass   | Meet the requirement of limit.                                                   |
| 2.1055<br>22.355                       | Frequency Stability          | Pass   | Meet the requirement of limit.                                                   |
| 2.1049                                 | Occupied Bandwidth           | Pass   | Meet the requirement of limit.                                                   |
| 22.917                                 | Band Edge Measurements       | Pass   | Meet the requirement of limit.                                                   |
| 2.1051<br>22.917                       | Conducted Spurious Emissions | Pass   | Meet the requirement of limit.                                                   |
| 2.1053<br>22.917                       | Radiated Spurious Emissions  | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -38.1dB at 65.89MHz. |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 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 | 9kHz ~ 30MHz     | 3.04 dB                              |
|                                | 30MHz ~ 200MHz   | 3.59 dB                              |
|                                | 200MHz ~ 1000MHz | 3.60 dB                              |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz     | 2.29 dB                              |
|                                | 18GHz ~ 40GHz    | 2.29 dB                              |

## 2.2 Test Site and Instruments

| Description & Manufacturer                       | Model No.                              | Serial No.                      | Cal. Date     | Cal. Due      |
|--------------------------------------------------|----------------------------------------|---------------------------------|---------------|---------------|
| Test Receiver<br>KEYSIGHT                        | N9038A                                 | MY55420137                      | Apr. 11, 2018 | Apr. 10, 2019 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ             | FSP40                                  | 100269                          | May 29, 2018  | May 28, 2019  |
| BILOG Antenna<br>SCHWARZBECK                     | VULB9168                               | 9168-160                        | Nov. 21, 2018 | Nov. 20, 2019 |
| HORN Antenna<br>SCHWARZBECK                      | BBHA 9120 D                            | 9120D-1169                      | Nov. 25, 2018 | Nov. 24, 2019 |
| HORN Antenna<br>SCHWARZBECK                      | BBHA 9170                              | BBHA9170241                     | Nov. 25, 2018 | Nov. 24, 2019 |
| Loop Antenna<br>TESEQ                            | HLA 6121                               | 45745                           | Jun. 14, 2018 | Jun. 13, 2019 |
| Preamplifier<br>Agilent<br>(Below 1GHz)          | 8447D                                  | 2944A10638                      | Aug. 08, 2018 | Aug. 07, 2019 |
| Preamplifier<br>Agilent<br>(Above 1GHz)          | 8449B                                  | 3008A02367                      | Feb. 19, 2019 | Feb. 18, 2020 |
| RF signal cable<br>HUBER+SUHNER&EMCI             | SUCOFLEX 104 &<br>EMC104-SM-SM80<br>00 | CABLE-CH9-02<br>(248780+171006) | Jan. 19, 2019 | Jan. 18, 2020 |
| RF signal cable<br>HUBER+SUHNER                  | SUCOFLEX 104                           | CABLE-CH9-(250795/4)            | Aug. 08, 2018 | Aug. 07, 2019 |
| RF signal cable<br>Woken                         | 8D-FB                                  | Cable-CH9-01                    | Jul. 31, 2018 | Jul. 30, 2019 |
| Software<br>BV ADT                               | ADT_Radiated_<br>V7.6.15.9.5           | NA                              | NA            | NA            |
| Antenna Tower<br>EMCO                            | 2070/2080                              | 512.835.4684                    | NA            | NA            |
| Turn Table<br>EMCO                               | 2087-2.03                              | NA                              | NA            | NA            |
| Antenna Tower & Turn<br>BV ADT                   | AT100                                  | AT93021705                      | NA            | NA            |
| Turn Table<br>BV ADT                             | TT100                                  | TT93021705                      | NA            | NA            |
| Turn Table Controller<br>BV ADT                  | SC100                                  | SC93021705                      | NA            | NA            |
| Boresight Antenna Fixture                        | FBA-01                                 | FBA-SIP01                       | NA            | NA            |
| Pre-amplifier (18GHz-40GHz)<br>EMC               | EMC184045B                             | 980175                          | Nov. 14, 2018 | Nov. 13, 2019 |
| WIT Standard Temperature<br>And Humidity Chamber | TH-4S-C                                | W981030                         | Jun. 04, 2018 | Jun. 03, 2019 |
| JFW 20dB attenuation                             | 50HF-020-SMA                           | NA                              | NA            | NA            |

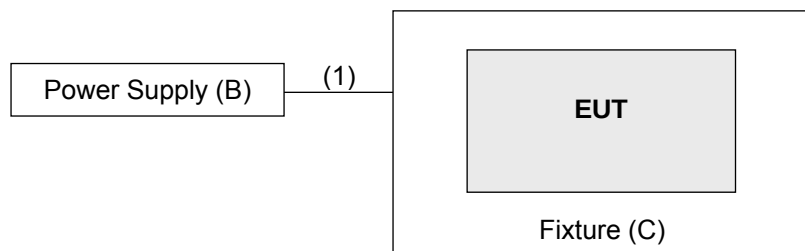
Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Chamber 9.  
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.  
4. The IC Site Registration No. is 7450F-9.

### 3 General Information

#### 3.1 General Description of EUT

|                     |                                                                                                             |                      |                     |                     |
|---------------------|-------------------------------------------------------------------------------------------------------------|----------------------|---------------------|---------------------|
| Product             | BL28RW-001 Module                                                                                           |                      |                     |                     |
| Brand               | Continental                                                                                                 |                      |                     |                     |
| Test Model          | BL28RW-001                                                                                                  |                      |                     |                     |
| Sample Status       | Engineering sample                                                                                          |                      |                     |                     |
| Power Supply Rating | 3.6 Vdc (Power supply)                                                                                      |                      |                     |                     |
| Modulation Type     | GSM, GPRS: GMSK<br>EDGE: 8PSK<br>WCDMA: BPSK, QPSK<br>HSDPA: BPSK<br>HSUPA: QPSK<br>LTE: QPSK, 16QAM, 64QAM |                      |                     |                     |
| Operating Frequency | GSM/GPRS/EDGE                                                                                               | 824.2~848.8MHz       |                     |                     |
|                     | WCDMA Band 5                                                                                                | 826.4~846.6MHz       |                     |                     |
|                     | LTE Band 5 (Channel Bandwidth 1.4MHz)                                                                       | 824.7~848.3MHz       |                     |                     |
|                     | LTE Band 5 (Channel Bandwidth 3MHz)                                                                         | 825.5~847.5MHz       |                     |                     |
|                     | LTE Band 5 (Channel Bandwidth 5MHz)                                                                         | 826.5~846.5MHz       |                     |                     |
|                     | LTE Band 5 (Channel Bandwidth 10MHz)                                                                        | 829.0~844.0MHz       |                     |                     |
| Max. ERP Power      | GSM                                                                                                         | 2041.738mW (33.1dBm) |                     |                     |
|                     | WCDMA Band 5                                                                                                | 398.107mW (26.0dBm)  |                     |                     |
|                     |                                                                                                             | QPSK                 | 16QAM               | 64QAM               |
|                     | LTE Band 5 (Channel Bandwidth 1.4MHz)                                                                       | 181.970mW (22.6dBm)  | 144.544mW (21.6dBm) | 128.825mW (21.1dBm) |
|                     | LTE Band 5 (Channel Bandwidth 3MHz)                                                                         | 194.984mW (22.9dBm)  | 154.881mW (21.9dBm) | 141.254mW (21.5dBm) |
|                     | LTE Band 5 (Channel Bandwidth 5MHz)                                                                         | 229.087mW (23.6dBm)  | 134.896mW (21.3dBm) | 123.027mW (20.9dBm) |
|                     | LTE Band 5 (Channel Bandwidth 10MHz)                                                                        | 194.984mW (22.9dBm)  | 131.826mW (21.2dBm) | 125.892mW (21.0dBm) |
|                     |                                                                                                             |                      |                     |                     |
| Emission Designator | GSM/GPRS                                                                                                    | 260KGXW              |                     |                     |
|                     | EDGE                                                                                                        | 250KG7W              |                     |                     |
|                     | WCDMA Band 5                                                                                                | 4M16F9W              |                     |                     |
|                     |                                                                                                             | QPSK                 | 16QAM               | 64QAM               |
|                     | LTE Band 5 (Channel Bandwidth 1.4MHz)                                                                       | 1M09G7D              | 1M09D7W             | 1M09D7W             |
|                     | LTE Band 5 (Channel Bandwidth 3MHz)                                                                         | 2M70G7D              | 2M70D7W             | 2M70D7W             |
|                     | LTE Band 5 (Channel Bandwidth 5MHz)                                                                         | 4M49G7D              | 4M49D7W             | 4M49D7W             |
|                     | LTE Band 5 (Channel Bandwidth 10MHz)                                                                        | 8M97G7D              | 8M97D7W             | 8M96D7W             |
| Antenna Type        | Dipole antenna with 2dBi gain                                                                               |                      |                     |                     |
| Antenna Connector   | SMA Male                                                                                                    |                      |                     |                     |
| Accessory Device    | NA                                                                                                          |                      |                     |                     |
| Cable Supplied      | NA                                                                                                          |                      |                     |                     |

### 3.2 Configuration of System under Test



Remote site



#### 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 Analyzer | Anritsu  | MT8860C   | 1702001    | NA     | -                        |
| B. | DC power supply              | Keysight | U8002A    | MY56330015 | NA     | -                        |
| C. | Fixture                      | NA       | NA        | NA         | NA     | Provided by manufacturer |

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. | Power cable  | 1    | 2          | 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 Z-plane. Following channel(s) was (were) selected for the final test as listed below.

#### GSM Mode

| EUT Configure Mode | Test Item                       | Available Channel | Tested Channel                                    | Mode            |
|--------------------|---------------------------------|-------------------|---------------------------------------------------|-----------------|
| -                  | ERP                             | 128 to 251        | 128(824.2MHz),<br>189(836.4MHz),<br>251(848.8MHz) | GSM             |
| -                  | Modulation Characteristics      | 128 to 251        | 128(824.2MHz)                                     | GSM, GPRS, EDGE |
| -                  | Frequency Stability             | 128 to 251        | 128(824.2MHz),<br>251(848.8MHz)                   | GSM, EDGE       |
| -                  | Occupied Bandwidth              | 128 to 251        | 128(824.2MHz),<br>189(836.4MHz),<br>251(848.8MHz) | GSM, GPRS, EDGE |
| -                  | Band Edge                       | 128 to 251        | 128(824.2MHz),<br>251(848.8MHz)                   | GSM, GPRS, EDGE |
| -                  | Peak To Average Ratio           | 128 to 251        | 128(824.2MHz),<br>189(836.4MHz),<br>251(848.8MHz) | GSM, GPRS, EDGE |
| -                  | Conducted Emission              | 128 to 251        | 128(824.2MHz),<br>189(836.4MHz),<br>251(848.8MHz) | GSM, GPRS, EDGE |
| -                  | Radiated Emission<br>Below 1GHz | 128 to 251        | 128(824.2MHz)                                     | GSM             |
| -                  | Radiated Emission<br>Above 1GHz | 128 to 251        | 128(824.2MHz),<br>189(836.4MHz),<br>251(848.8MHz) | GSM             |

Note: For radiated emission below 1GHz, low, mid and high channels were pre-tested E.R.P. in chamber. Low channel was found to be the worst case and therefore had been chosen for all final tests.

### WCDMA Band 5

| EUT Configure Mode | Test Item                       | Available Channel | Tested Channel                                          | Mode                |
|--------------------|---------------------------------|-------------------|---------------------------------------------------------|---------------------|
| -                  | ERP                             | 4132 to 4233      | 4132 (826.4MHz),<br>4182 (836.4MHz),<br>4233 (846.6MHz) | WCDMA               |
| -                  | Modulation Characteristics      | 4132 to 4233      | 4182 (836.4MHz)                                         | WCDMA, HSDPA, HSUPA |
| -                  | Frequency Stability             | 4132 to 4233      | 4132 (826.4MHz),<br>4233 (846.6MHz)                     | WCDMA               |
| -                  | Occupied Bandwidth              | 4132 to 4233      | 4132 (826.4MHz),<br>4182 (836.4MHz),<br>4233 (846.6MHz) | WCDMA, HSDPA, HSUPA |
| -                  | Band Edge                       | 4132 to 4233      | 4132 (826.4MHz),<br>4233 (846.6MHz)                     | WCDMA, HSDPA, HSUPA |
| -                  | Peak To Average Ratio           | 4132 to 4233      | 4132 (826.4MHz),<br>4182 (836.4MHz),<br>4233 (846.6MHz) | WCDMA, HSDPA, HSUPA |
| -                  | Conducted Emission              | 4132 to 4233      | 4132 (826.4MHz),<br>4182 (836.4MHz),<br>4233 (846.6MHz) | WCDMA, HSDPA, HSUPA |
| -                  | Radiated Emission<br>Below 1GHz | 4132 to 4233      | 4132 (826.4MHz)                                         | WCDMA               |
| -                  | Radiated Emission<br>Above 1GHz | 4132 to 4233      | 4132 (826.4MHz),<br>4182 (836.4MHz),<br>4233 (846.6MHz) | WCDMA               |

Note: For radiated emission below 1GHz, low, mid and high channels were pre-tested E.R.P. in chamber. Low channel was found to be the worst case and therefore had been chosen for all final tests.

# LTE Band 5

| EUT<br>Configure<br>Mode | Test item                     | Available channel | Tested channel                                          | Channel<br>Bandwidth | Modulation              | Mode                                                             |
|--------------------------|-------------------------------|-------------------|---------------------------------------------------------|----------------------|-------------------------|------------------------------------------------------------------|
| -                        | ERP                           | 20407 to 20643    | 20407(824.7MHz),<br>20525(836.5MHz),<br>20643(848.3MHz) | 1.4MHz               | QPSK / 16QAM /<br>64QAM | 1 RB / 0 RB Offset                                               |
|                          |                               | 20415 to 20635    | 20415(825.5MHz),<br>20525(836.5MHz),<br>20635(847.5MHz) | 3MHz                 | QPSK / 16QAM /<br>64QAM | 1 RB / 0 RB Offset                                               |
|                          |                               | 20425 to 20625    | 20425(826.5MHz),<br>20525(836.5MHz),<br>20625(846.5MHz) | 5MHz                 | QPSK / 16QAM /<br>64QAM | 1 RB / 0 RB Offset                                               |
|                          |                               | 20450 to 20600    | 20450(829.0MHz),<br>20525(836.5MHz),<br>20600(844.0MHz) | 10MHz                | QPSK / 16QAM /<br>64QAM | 1 RB / 0 RB Offset                                               |
| -                        | Modulation<br>characteristics | 20450 to 20600    | 20525(836.5MHz)                                         | 10MHz                | QPSK / 16QAM /<br>64QAM | 50 RB / 0 RB Offset                                              |
| -                        | Frequency Stability           | 20407 to 20643    | 20407(824.7MHz),<br>20643(848.3MHz)                     | 1.4MHz               | QPSK                    | 1 RB / 0 RB Offset                                               |
|                          |                               | 20415 to 20635    | 20415(825.5MHz),<br>20635(847.5MHz)                     | 3MHz                 | QPSK                    | 1 RB / 0 RB Offset                                               |
|                          |                               | 20425 to 20625    | 20425(826.5MHz),<br>20625(846.5MHz)                     | 5MHz                 | QPSK                    | 1 RB / 0 RB Offset                                               |
|                          |                               | 20450 to 20600    | 20450(829.0MHz),<br>20600(844.0MHz)                     | 10MHz                | QPSK                    | 1 RB / 0 RB Offset                                               |
| -                        | Occupied Bandwidth            | 20407 to 20643    | 20407(824.7MHz),<br>20525(836.5MHz),<br>20643(848.3MHz) | 1.4MHz               | QPSK / 16QAM /<br>64QAM | 6 RB / 0RB Offset                                                |
|                          |                               | 20415 to 20635    | 20415(825.5MHz),<br>20525(836.5MHz),<br>20635(847.5MHz) | 3MHz                 | QPSK / 16QAM /<br>64QAM | 15 RB / 0RB Offset                                               |
|                          |                               | 20425 to 20625    | 20425(826.5MHz),<br>20525(836.5MHz),<br>20625(846.5MHz) | 5MHz                 | QPSK / 16QAM /<br>64QAM | 25RB / 0RB Offset                                                |
|                          |                               | 20450 to 20600    | 20450(829.0MHz),<br>20525(836.5MHz),<br>20600(844.0MHz) | 10MHz                | QPSK / 16QAM /<br>64QAM | 50RB / 0RB Offset                                                |
| -                        | Band Edge                     | 20407 to 20643    | 20407(824.7MHz),<br>20643(848.3MHz)                     | 1.4MHz               | QPSK                    | 1 RB / 0 RB Offset<br>1 RB / 5 RB Offset<br>6 RB / 0 RB Offset   |
|                          |                               | 20415 to 20635    | 20415(825.5MHz),<br>20635(847.5MHz)                     | 3MHz                 | QPSK                    | 1 RB / 0 RB Offset<br>1 RB / 14 RB Offset<br>15 RB / 0 RB Offset |
|                          |                               | 20425 to 20625    | 20425(826.5MHz),<br>20625(846.5MHz)                     | 5MHz                 | QPSK                    | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset |
|                          |                               | 20450 to 20600    | 20450(829.0MHz),<br>20600(844.0MHz)                     | 10MHz                | QPSK                    | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset |

| EUT Configure Mode | Test item                    | Available channel | Tested channel                                          | Channel Bandwidth | Modulation           | Mode               |
|--------------------|------------------------------|-------------------|---------------------------------------------------------|-------------------|----------------------|--------------------|
| -                  | Peak to Average Ratio        | 20407 to 20643    | 20407(824.7MHz),<br>20525(836.5MHz),<br>20643(848.3MHz) | 1.4MHz            | QPSK / 16QAM / 64QAM | 1 RB / 0 RB Offset |
|                    |                              | 20415 to 20635    | 20415(825.5MHz),<br>20525(836.5MHz),<br>20635(847.5MHz) | 3MHz              | QPSK / 16QAM / 64QAM | 1 RB / 0 RB Offset |
|                    |                              | 20425 to 20625    | 20425(826.5MHz),<br>20525(836.5MHz),<br>20625(846.5MHz) | 5MHz              | QPSK / 16QAM / 64QAM | 1 RB / 0 RB Offset |
|                    |                              | 20450 to 20600    | 20450(829.0MHz),<br>20525(836.5MHz),<br>20600(844.0MHz) | 10MHz             | QPSK / 16QAM / 64QAM | 1 RB / 0 RB Offset |
| -                  | Conducted Emission           | 20407 to 20643    | 20407(824.7MHz),<br>20525(836.5MHz),<br>20643(848.3MHz) | 1.4MHz            | QPSK                 | 1 RB / 0 RB Offset |
|                    |                              | 20415 to 20635    | 20415(825.5MHz),<br>20525(836.5MHz),<br>20635(847.5MHz) | 3MHz              | QPSK                 | 1 RB / 0 RB Offset |
|                    |                              | 20425 to 20625    | 20425(826.5MHz),<br>20525(836.5MHz),<br>20625(846.5MHz) | 5MHz              | QPSK                 | 1 RB / 0 RB Offset |
|                    |                              | 20450 to 20600    | 20450(829.0MHz),<br>20525(836.5MHz),<br>20600(844.0MHz) | 10MHz             | QPSK                 | 1 RB / 0 RB Offset |
| -                  | Radiated Emission Below 1GHz | 20407 to 20643    | 20407(824.7MHz)                                         | 1.4MHz            | QPSK                 | 1 RB / 0 RB Offset |
|                    |                              | 20425 to 20625    | 20425(826.5MHz)                                         | 5MHz              | QPSK                 | 1 RB / 0 RB Offset |
|                    |                              | 20450 to 20600    | 20450(829.0MHz)                                         | 10MHz             | QPSK                 | 1 RB / 0 RB Offset |
| -                  | Radiated Emission Above 1GHz | 20407 to 20643    | 20407(824.7MHz),<br>20525(836.5MHz),<br>20643(848.3MHz) | 1.4MHz            | QPSK                 | 1 RB / 0 RB Offset |
|                    |                              | 20425 to 20625    | 20425(826.5MHz),<br>20525(836.5MHz),<br>20625(846.5MHz) | 5MHz              | QPSK                 | 1 RB / 0 RB Offset |
|                    |                              | 20450 to 20600    | 20450(829.0MHz),<br>20525(836.5MHz),<br>20600(844.0MHz) | 10MHz             | QPSK                 | 1 RB / 0 RB Offset |

**Note:**

1. For radiated emission below 1GHz, low, mid and high channels were pre-tested in chamber with 1.4MHz mode. Low channel was found to be the worst case and therefore had been chosen for all final tests.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The conducted output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

| Test Item                  | Environmental Conditions           | Input Power (system) | Tested By              |
|----------------------------|------------------------------------|----------------------|------------------------|
| ERP                        | 25deg. C, 70%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          | 25deg. C, 70%RH<br>22deg. C, 68%RH | 120Vac, 60Hz         | Noah Chang<br>Greg Lin |

### 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 22**

**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 7 watts e.r.p.

#### 4.1.2 Test Procedures

##### EIRP / ERP Measurement:

- All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, 5MHz for WCDMA mode, 10MHz for LTE mode.
- 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.
- 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
- $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15\text{dBi}$ .

Where:

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

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

$G_T$  : Gain of the transmitting antenna.

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

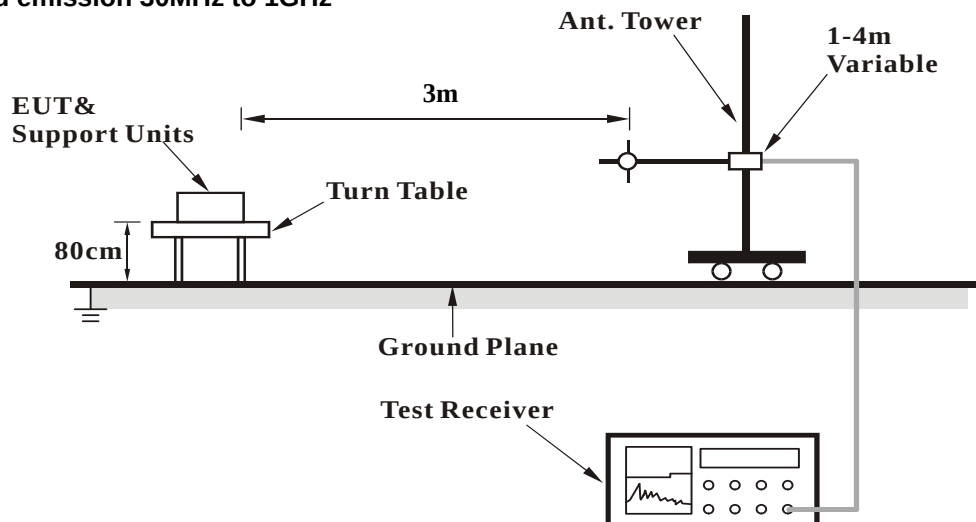
##### Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, WCDMA, 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.

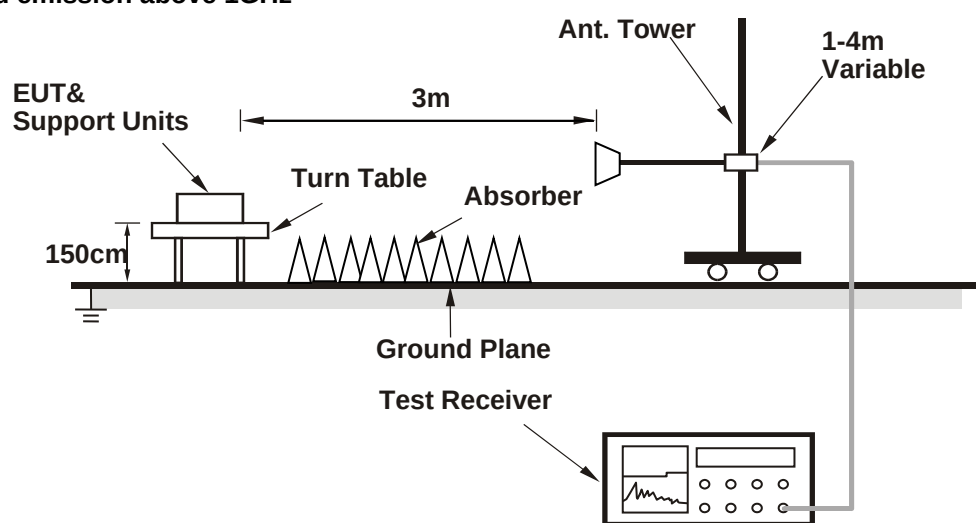
### 4.1.3 Test Setup

EIRP / ERP Measurement:

**For radiated emission 30MHz to 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                 | GSM850 |              |       |
|----------------------|--------|--------------|-------|
| Channel              | 128    | 189          | 251   |
| Frequency (MHz)      | 824.2  | 836.4        | 848.8 |
| GSM                  | 33.00  | <b>33.19</b> | 32.85 |
| GPRS 1Tx Slot        | 32.24  | 32.28        | 32.13 |
| GPRS 2Tx Slot        | 31.42  | 31.58        | 31.29 |
| GPRS 3Tx Slot        | 29.89  | 30.09        | 29.85 |
| GPRS 4Tx Slot        | 26.88  | 27.05        | 26.72 |
| DTM 9 (GPRS)         | 31.39  | 31.49        | 31.12 |
| DTM 11 (GPRS)        | 29.85  | 29.92        | 29.77 |
| EDGE 1Tx Slot (MCS9) | 26.91  | 27.10        | 26.78 |
| EDGE 2Tx Slot (MCS9) | 25.42  | 25.55        | 25.24 |
| EDGE 3Tx Slot (MCS9) | 23.88  | 24.09        | 23.64 |
| EDGE 4Tx Slot (MCS9) | 21.66  | 21.77        | 21.56 |
| DTM 9 (EDGE)         | 25.26  | 25.06        | 24.95 |
| DTM 11 (EDGE)        | 23.57  | 23.76        | 23.48 |

| Band            | WCDMA V      |       |       |
|-----------------|--------------|-------|-------|
| TX Channel      | 4132         | 4182  | 4233  |
| Rx Channel      | 4357         | 4407  | 4458  |
| Frequency (MHz) | 826.4        | 836.4 | 846.6 |
| RMC 12.2K       | <b>24.26</b> | 24.22 | 24.24 |
| HSDPA Subtest-1 | 23.40        | 23.33 | 23.35 |
| HSDPA Subtest-2 | 23.34        | 23.29 | 23.30 |
| HSDPA Subtest-3 | 22.89        | 22.84 | 22.85 |
| HSDPA Subtest-4 | 22.78        | 22.71 | 22.75 |
| HSUPA Subtest-1 | 23.38        | 23.31 | 23.29 |
| HSUPA Subtest-2 | 21.33        | 21.26 | 21.28 |
| HSUPA Subtest-3 | 22.29        | 22.18 | 22.23 |
| HSUPA Subtest-4 | 21.19        | 21.12 | 21.15 |
| HSUPA Subtest-5 | 23.11        | 23.04 | 23.08 |

| LTE Band 5 |           |                 |           |              |       |       |               |
|------------|-----------|-----------------|-----------|--------------|-------|-------|---------------|
| BW         | MCS Index | RB Size         | RB Offset | Low          | Mid   | High  | 3GPP MPR (dB) |
|            |           | Channel         |           | 20407        | 20525 | 20643 |               |
|            |           | Frequency (MHz) |           | 824.7        | 836.5 | 848.3 |               |
| 1.4M       | QPSK      | 1               | 0         | <b>24.33</b> | 24.10 | 24.19 | 0             |
|            |           | 1               | 2         | 24.31        | 24.11 | 24.20 | 0             |
|            |           | 1               | 5         | 24.28        | 24.12 | 24.22 | 0             |
|            |           | 3               | 0         | 24.11        | 24.05 | 24.08 | 0             |
|            |           | 3               | 1         | 24.16        | 24.06 | 24.06 | 0             |
|            |           | 3               | 3         | 24.13        | 24.03 | 24.08 | 0             |
|            |           | 6               | 0         | 24.00        | 23.97 | 24.01 | 1             |
|            | 16QAM     | 1               | 0         | 23.30        | 23.15 | 23.11 | 1             |
|            |           | 1               | 2         | 23.25        | 23.11 | 23.16 | 1             |
|            |           | 1               | 5         | 23.22        | 23.14 | 23.14 | 1             |
|            |           | 3               | 0         | 23.11        | 23.02 | 23.00 | 1             |
|            |           | 3               | 1         | 23.05        | 23.08 | 23.03 | 1             |
|            |           | 3               | 3         | 23.08        | 23.06 | 23.00 | 1             |
|            |           | 6               | 0         | 22.94        | 22.92 | 22.86 | 2             |
|            | 64QAM     | 1               | 0         | 23.15        | 23.11 | 23.12 | 1             |
|            |           | 1               | 2         | 23.11        | 23.05 | 23.11 | 1             |
|            |           | 1               | 5         | 23.14        | 23.03 | 23.06 | 1             |
|            |           | 3               | 0         | 23.02        | 23.03 | 23.02 | 1             |
|            |           | 3               | 1         | 23.03        | 23.02 | 22.96 | 1             |
|            |           | 3               | 3         | 23.06        | 22.99 | 23.02 | 1             |
|            |           | 6               | 0         | 22.95        | 22.91 | 22.88 | 2             |

| LTE Band 5 |           |                 |           |       |       |              |               |
|------------|-----------|-----------------|-----------|-------|-------|--------------|---------------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid   | High         | 3GPP MPR (dB) |
|            |           | Channel         |           | 20415 | 20525 | 20635        |               |
|            |           | Frequency (MHz) |           | 825.5 | 836.5 | 847.5        |               |
| 3M         | QPSK      | 1               | 0         | 24.35 | 24.41 | <b>24.49</b> | 0             |
|            |           | 1               | 7         | 24.33 | 24.33 | 24.44        | 0             |
|            |           | 1               | 14        | 24.29 | 24.36 | 24.43        | 0             |
|            |           | 8               | 0         | 24.18 | 24.25 | 24.30        | 1             |
|            |           | 8               | 3         | 24.16 | 24.20 | 24.33        | 1             |
|            |           | 8               | 7         | 24.15 | 24.22 | 24.28        | 1             |
|            |           | 15              | 0         | 24.07 | 24.12 | 24.18        | 1             |
|            | 16QAM     | 1               | 0         | 23.52 | 23.16 | 23.33        | 1             |
|            |           | 1               | 7         | 23.44 | 23.08 | 23.29        | 1             |
|            |           | 1               | 14        | 23.48 | 23.11 | 23.26        | 1             |
|            |           | 8               | 0         | 23.32 | 23.06 | 23.08        | 2             |
|            |           | 8               | 3         | 23.29 | 23.12 | 23.11        | 2             |
|            |           | 8               | 7         | 23.28 | 23.11 | 23.06        | 2             |
|            |           | 15              | 0         | 23.19 | 23.04 | 23.05        | 2             |
|            | 64QAM     | 1               | 0         | 23.39 | 23.11 | 23.26        | 1             |
|            |           | 1               | 7         | 23.33 | 23.00 | 23.18        | 1             |
|            |           | 1               | 14        | 23.28 | 23.06 | 23.15        | 1             |
|            |           | 8               | 0         | 23.12 | 23.01 | 23.05        | 2             |
|            |           | 8               | 3         | 23.06 | 23.02 | 23.08        | 2             |
|            |           | 8               | 7         | 23.09 | 23.02 | 23.06        | 2             |
|            |           | 15              | 0         | 22.97 | 22.84 | 22.87        | 2             |

| LTE Band 5 |           |                 |           |       |       |              |               |
|------------|-----------|-----------------|-----------|-------|-------|--------------|---------------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid   | High         | 3GPP MPR (dB) |
|            |           | Channel         |           | 20425 | 20525 | 20625        |               |
|            |           | Frequency (MHz) |           | 826.5 | 836.5 | 846.5        |               |
| 5M         | QPSK      | 1               | 0         | 24.05 | 24.26 | <b>24.43</b> | 0             |
|            |           | 1               | 12        | 24.01 | 24.22 | 24.40        | 0             |
|            |           | 1               | 24        | 24.01 | 24.21 | 24.38        | 0             |
|            |           | 12              | 0         | 23.88 | 24.02 | 24.22        | 1             |
|            |           | 12              | 6         | 23.84 | 24.05 | 24.15        | 1             |
|            |           | 12              | 13        | 23.85 | 24.08 | 24.11        | 1             |
|            |           | 25              | 0         | 23.66 | 23.88 | 23.99        | 1             |
|            | 16QAM     | 1               | 0         | 23.28 | 23.26 | 23.37        | 1             |
|            |           | 1               | 12        | 23.22 | 23.22 | 23.33        | 1             |
|            |           | 1               | 24        | 23.25 | 23.23 | 23.32        | 1             |
|            |           | 12              | 0         | 23.08 | 23.03 | 23.12        | 2             |
|            |           | 12              | 6         | 23.03 | 23.06 | 23.11        | 2             |
|            |           | 12              | 13        | 23.06 | 22.98 | 23.14        | 2             |
|            |           | 25              | 0         | 22.87 | 22.82 | 22.92        | 2             |
|            | 64QAM     | 1               | 0         | 23.16 | 23.21 | 23.25        | 1             |
|            |           | 1               | 12        | 23.11 | 23.15 | 23.18        | 1             |
|            |           | 1               | 24        | 23.12 | 23.19 | 23.11        | 1             |
|            |           | 12              | 0         | 22.96 | 22.99 | 23.01        | 2             |
|            |           | 12              | 6         | 22.95 | 22.96 | 23.03        | 2             |
|            |           | 12              | 13        | 22.92 | 23.02 | 23.04        | 2             |
|            |           | 25              | 0         | 22.76 | 22.78 | 22.85        | 2             |

| LTE Band 5 |           |                 |           |              |       |       |               |
|------------|-----------|-----------------|-----------|--------------|-------|-------|---------------|
| BW         | MCS Index | RB Size         | RB Offset | Low          | Mid   | High  | 3GPP MPR (dB) |
|            |           | Channel         |           | 20450        | 20525 | 20600 |               |
|            |           | Frequency (MHz) |           | 829          | 836.5 | 844   |               |
| 10M        | QPSK      | 1               | 0         | <b>24.41</b> | 24.28 | 24.39 | 0             |
|            |           | 1               | 24        | 24.38        | 24.22 | 24.33 | 0             |
|            |           | 1               | 49        | 24.32        | 24.21 | 24.28 | 0             |
|            |           | 25              | 0         | 24.21        | 24.11 | 24.13 | 1             |
|            |           | 25              | 12        | 24.15        | 24.19 | 24.16 | 1             |
|            |           | 25              | 25        | 24.15        | 24.11 | 24.08 | 1             |
|            |           | 50              | 0         | 24.03        | 23.99 | 23.95 | 1             |
|            | 16QAM     | 1               | 0         | 23.31        | 23.28 | 23.26 | 1             |
|            |           | 1               | 24        | 23.28        | 23.21 | 23.18 | 1             |
|            |           | 1               | 49        | 23.22        | 23.21 | 23.15 | 1             |
|            |           | 25              | 0         | 23.06        | 23.01 | 23.02 | 2             |
|            |           | 25              | 12        | 23.02        | 23.03 | 23.02 | 2             |
|            |           | 25              | 25        | 23.03        | 23.02 | 22.98 | 2             |
|            |           | 50              | 0         | 22.85        | 22.82 | 22.79 | 2             |
|            | 64QAM     | 1               | 0         | 23.18        | 23.11 | 23.12 | 1             |
|            |           | 1               | 24        | 23.11        | 23.02 | 23.06 | 1             |
|            |           | 1               | 49        | 23.16        | 23.05 | 23.08 | 1             |
|            |           | 25              | 0         | 22.87        | 22.82 | 22.84 | 2             |
|            |           | 25              | 12        | 22.86        | 22.79 | 22.80 | 2             |
|            |           | 25              | 25        | 22.86        | 22.77 | 22.77 | 2             |
|            |           | 50              | 0         | 22.61        | 22.58 | 22.55 | 2             |

# ERP Power

GSM Mode

|                                                     |             |                |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|----------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 128 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.20      | -2.2           | 25.4                  | 3.9                    | 29.3      | 38.5        | -9.2        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.20      | 0.9            | 29.2                  | 3.9                    | 33.1      | 38.5        | -5.4        |

|                                                     |             |                |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|----------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 189 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.40      | -2.1           | 25.3                  | 3.8                    | 29.1      | 38.5        | -9.4        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.40      | 0.9            | 29.0                  | 3.8                    | 32.8      | 38.5        | -5.7        |

|                                                     |             |                |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|----------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 251 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.80      | -2.0           | 25.7                  | 3.4                    | 29.1      | 38.5        | -9.4        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.80      | 1.3            | 29.4                  | 3.4                    | 32.8      | 38.5        | -5.7        |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

WCDMA Band 5

|                                                     |             |                 |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|-----------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 4132 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                 |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)   | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 826.40      | -9.3            | 18.3                  | 3.9                    | 22.2      | 38.5        | -16.3       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                 |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)   | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 826.40      | -6.2            | 22.1                  | 3.9                    | 26.0      | 38.5        | -12.5       |

|                                                     |             |                 |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|-----------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 4182 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                 |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)   | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.40      | -9.2            | 18.2                  | 3.8                    | 22.0      | 38.5        | -16.5       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                 |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)   | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.40      | -5.9            | 22.2                  | 3.8                    | 26.0      | 38.5        | -12.5       |

|                                                     |             |                 |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|-----------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 4233 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                 |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)   | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 846.60      | -8.8            | 18.8                  | 3.4                    | 22.2      | 38.5        | -16.3       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                 |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)   | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 846.60      | -5.7            | 22.5                  | 3.4                    | 25.9      | 38.5        | -12.6       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

# Modulation Type: QPSK

LTE Band 5, Channel Bandwidth: 1.4MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20407 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.70      | -10.7            | 16.9                  | 3.9                    | 20.8      | 38.5        | -17.7       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.70      | -9.6             | 18.7                  | 3.9                    | 22.6      | 38.5        | -15.9       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.4            | 17.1                  | 3.8                    | 20.9      | 38.5        | -17.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -9.5             | 18.6                  | 3.8                    | 22.4      | 38.5        | -16.1       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20643 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.30      | -10.6            | 17.1                  | 3.4                    | 20.5      | 38.5        | -18.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.30      | -9.2             | 18.9                  | 3.4                    | 22.3      | 38.5        | -16.2       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 3MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20415 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 825.50      | -10.2            | 17.4                  | 3.9                    | 21.3      | 38.5        | -17.2       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 825.50      | -9.4             | 19.0                  | 3.9                    | 22.9      | 38.5        | -15.6       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.4            | 17.1                  | 3.8                    | 20.9      | 38.5        | -17.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -9.5             | 18.6                  | 3.8                    | 22.4      | 38.5        | -16.1       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20635 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 847.50      | -9.9             | 17.7                  | 3.4                    | 21.1      | 38.5        | -17.4       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 847.50      | -9.3             | 18.9                  | 3.4                    | 22.3      | 38.5        | -16.2       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 5MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20425 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 826.50      | -9.9             | 17.7                  | 3.9                    | 21.6      | 38.5        | -16.9       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 826.50      | -8.6             | 19.7                  | 3.9                    | 23.6      | 38.5        | -14.9       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.4            | 17.1                  | 3.8                    | 20.9      | 38.5        | -17.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -9.2             | 18.8                  | 3.8                    | 22.6      | 38.5        | -15.9       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20625 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 846.50      | -10.4            | 17.2                  | 3.4                    | 20.6      | 38.5        | -17.9       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 846.50      | -9.4             | 18.8                  | 3.4                    | 22.2      | 38.5        | -16.3       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 10MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20450 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 829.00      | -10.2            | 17.5                  | 3.9                    | 21.4      | 38.5        | -17.1       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 829.00      | -9.5             | 18.7                  | 3.9                    | 22.6      | 38.5        | -15.9       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.4            | 17.1                  | 3.8                    | 20.9      | 38.5        | -17.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -9.4             | 18.7                  | 3.8                    | 22.5      | 38.5        | -16.0       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20600 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 844.00      | -10.4            | 17.2                  | 3.7                    | 20.9      | 38.5        | -17.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 844.00      | -9.2             | 19.2                  | 3.7                    | 22.9      | 38.5        | -15.6       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

# Modulation Type: 16QAM

LTE Band 5, Channel Bandwidth: 1.4MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20407 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.70      | -11.6            | 16.0                  | 3.9                    | 19.9      | 38.5        | -18.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.70      | -10.6            | 17.7                  | 3.9                    | 21.6      | 38.5        | -16.9       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -11.4            | 16.1                  | 3.8                    | 19.9      | 38.5        | -18.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.5            | 17.6                  | 3.8                    | 21.4      | 38.5        | -17.1       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20643 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.30      | -11.4            | 16.3                  | 3.4                    | 19.7      | 38.5        | -18.8       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.30      | -10.9            | 17.2                  | 3.4                    | 20.6      | 38.5        | -17.9       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 3MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20415 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 825.50      | -11.6            | 16.0                  | 3.9                    | 19.9      | 38.5        | -18.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 825.50      | -10.4            | 18.0                  | 3.9                    | 21.9      | 38.5        | -16.6       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -11.8            | 15.7                  | 3.8                    | 19.5      | 38.5        | -19.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.2            | 17.9                  | 3.8                    | 21.7      | 38.5        | -16.8       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20635 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 847.50      | -11.6            | 16.0                  | 3.4                    | 19.4      | 38.5        | -19.1       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 847.50      | -10.8            | 17.4                  | 3.4                    | 20.8      | 38.5        | -17.7       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 5MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20425 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 826.50      | -11.9            | 15.7                  | 3.9                    | 19.6      | 38.5        | -18.9       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 826.50      | -11.1            | 17.2                  | 3.9                    | 21.1      | 38.5        | -17.4       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -12.1            | 15.3                  | 3.8                    | 19.1      | 38.5        | -19.4       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -11.2            | 16.9                  | 3.8                    | 20.7      | 38.5        | -17.8       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20625 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 846.50      | -11.5            | 16.1                  | 3.4                    | 19.5      | 38.5        | -19.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 846.50      | -10.3            | 17.9                  | 3.4                    | 21.3      | 38.5        | -17.2       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 10MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20450 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 829.00      | -12.2            | 15.5                  | 3.9                    | 19.4      | 38.5        | -19.1       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 829.00      | -11.3            | 16.9                  | 3.9                    | 20.8      | 38.5        | -17.7       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -11.8            | 15.7                  | 3.8                    | 19.5      | 38.5        | -19.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.7            | 17.4                  | 3.8                    | 21.2      | 38.5        | -17.3       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20600 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 844.00      | -12.1            | 15.4                  | 3.7                    | 19.1      | 38.5        | -19.4       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 844.00      | -11.0            | 17.4                  | 3.7                    | 21.1      | 38.5        | -17.4       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

### Modulation Type: 64QAM

LTE Band 5, Channel Bandwidth: 1.4MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20407 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.70      | -12.0            | 15.6                  | 3.9                    | 19.5      | 38.5        | -19.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.70      | -11.1            | 17.2                  | 3.9                    | 21.1      | 38.5        | -17.4       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -11.6            | 15.8                  | 3.8                    | 19.6      | 38.5        | -18.9       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.9            | 17.2                  | 3.8                    | 21.0      | 38.5        | -17.5       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20643 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.30      | -11.9            | 15.8                  | 3.4                    | 19.2      | 38.5        | -19.3       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.30      | -11.2            | 16.9                  | 3.4                    | 20.3      | 38.5        | -18.2       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 3MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20415 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 825.50      | -12.1            | 15.5                  | 3.9                    | 19.4      | 38.5        | -19.1       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 825.50      | -10.8            | 17.6                  | 3.9                    | 21.5      | 38.5        | -17.0       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -12.1            | 15.3                  | 3.8                    | 19.1      | 38.5        | -19.4       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.5            | 17.6                  | 3.8                    | 21.4      | 38.5        | -17.1       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20635 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 847.50      | -11.8            | 15.8                  | 3.4                    | 19.2      | 38.5        | -19.3       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 847.50      | -11.2            | 17.0                  | 3.4                    | 20.4      | 38.5        | -18.1       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 5MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20425 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 826.50      | -12.4            | 15.2                  | 3.9                    | 19.1      | 38.5        | -19.4       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 826.50      | -11.4            | 16.9                  | 3.9                    | 20.8      | 38.5        | -17.7       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -12.4            | 15.0                  | 3.8                    | 18.8      | 38.5        | -19.7       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -11.5            | 16.6                  | 3.8                    | 20.4      | 38.5        | -18.1       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20625 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 846.50      | -11.8            | 15.8                  | 3.4                    | 19.2      | 38.5        | -19.3       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 846.50      | -10.7            | 17.5                  | 3.4                    | 20.9      | 38.5        | -17.6       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 5, Channel Bandwidth: 10MHz

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20450 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 829.00      | -12.6            | 15.1                  | 3.9                    | 19.0      | 38.5        | -19.5       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 829.00      | -11.8            | 16.5                  | 3.9                    | 20.4      | 38.5        | -18.1       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20525 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -12.2            | 15.2                  | 3.8                    | 19.0      | 38.5        | -19.5       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.50      | -10.9            | 17.2                  | 3.8                    | 21.0      | 38.5        | -17.5       |

|                                                     |             |                  |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Mode                                                |             | TX channel 20600 |                       |                        |           |             |             |
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 844.00      | -12.4            | 15.1                  | 3.7                    | 18.8      | 38.5        | -19.7       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 844.00      | -11.2            | 17.2                  | 3.7                    | 20.9      | 38.5        | -17.6       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

## 4.2 Modulation Characteristics Measurement

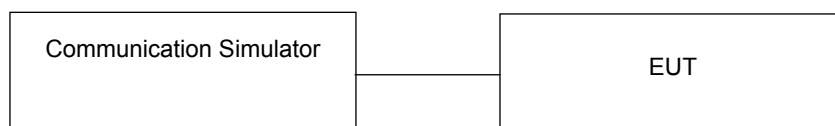
### 4.2.1 Limits of Modulation Characteristics

N/A

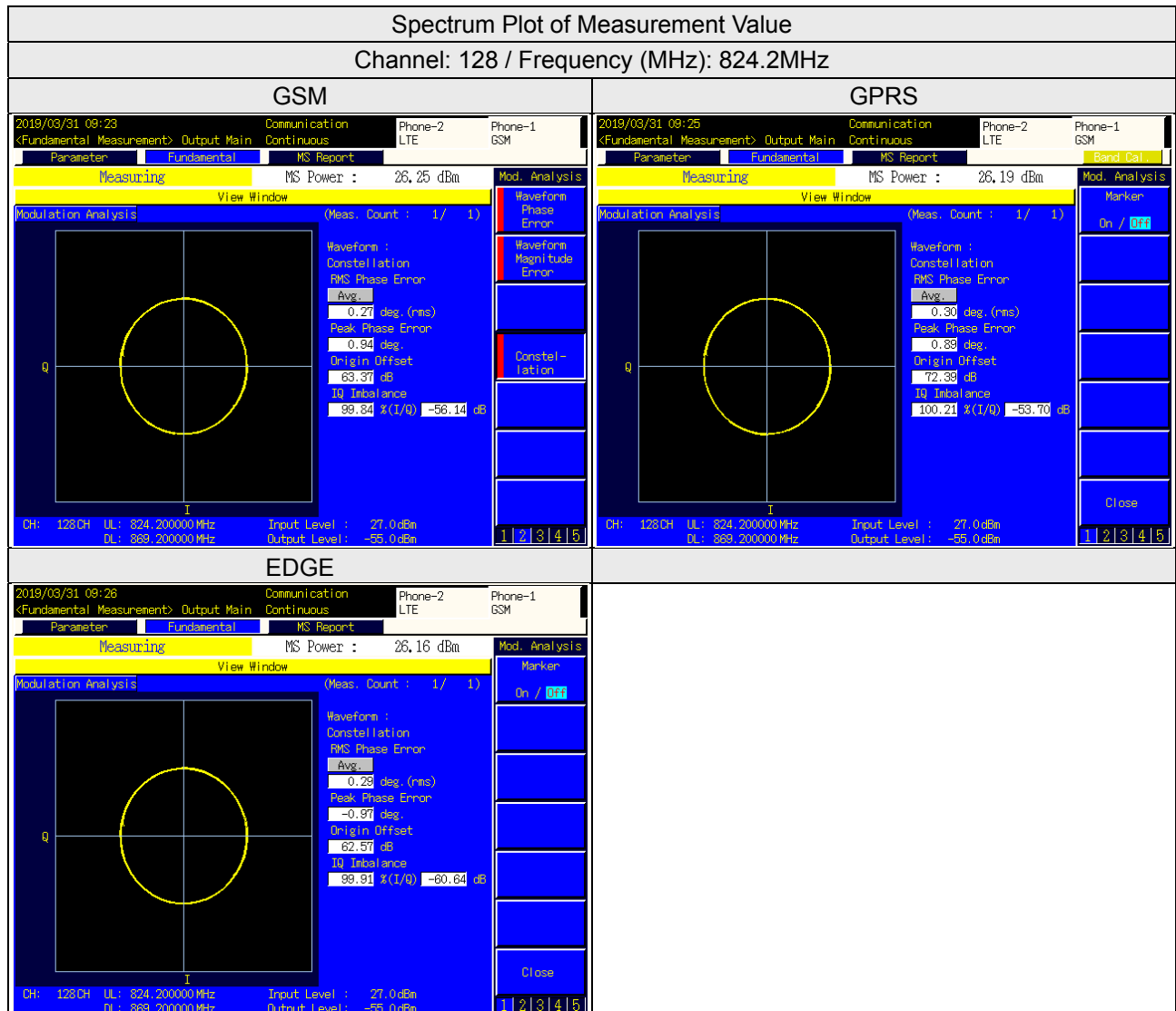
### 4.2.2 Test Procedure

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

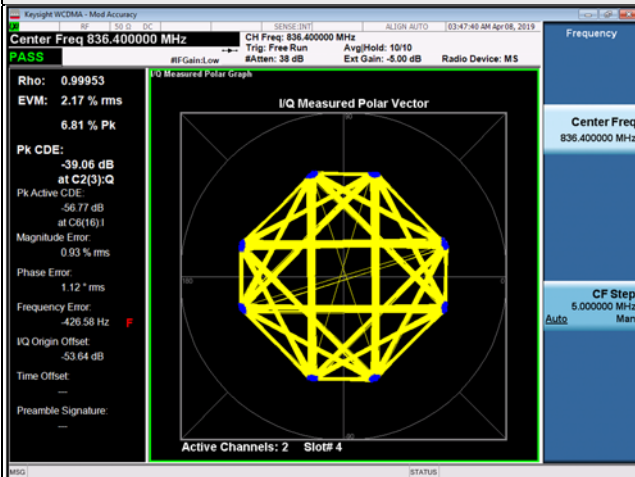


## WCDMA Band 5

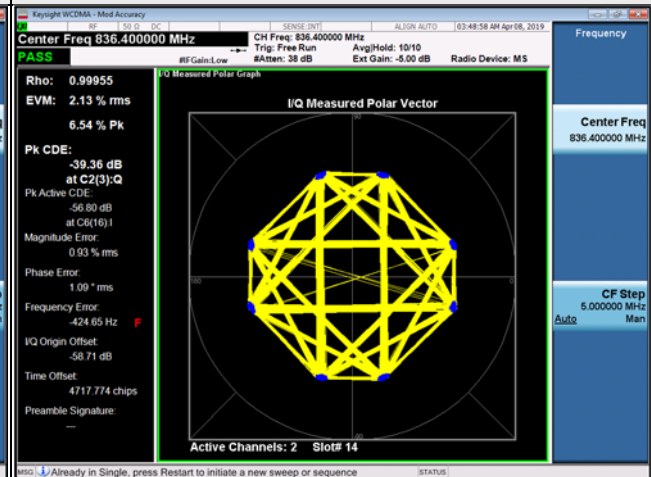
### Spectrum Plot of Measurement Value

Channel: 4182 / Frequency (MHz): 836.4MHz

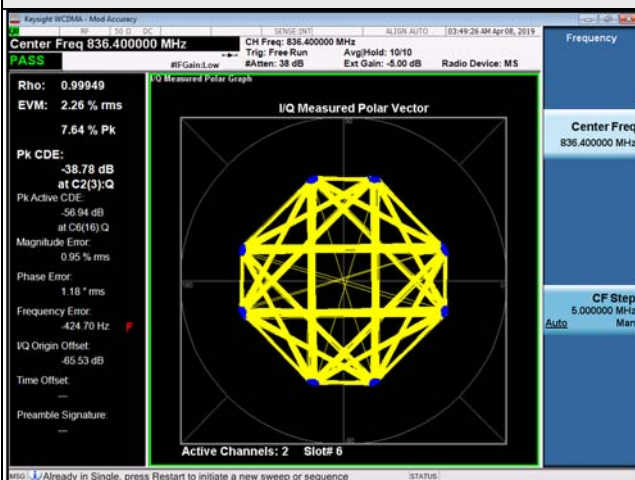
#### WCDMA



#### HSDPA



#### HSUPA

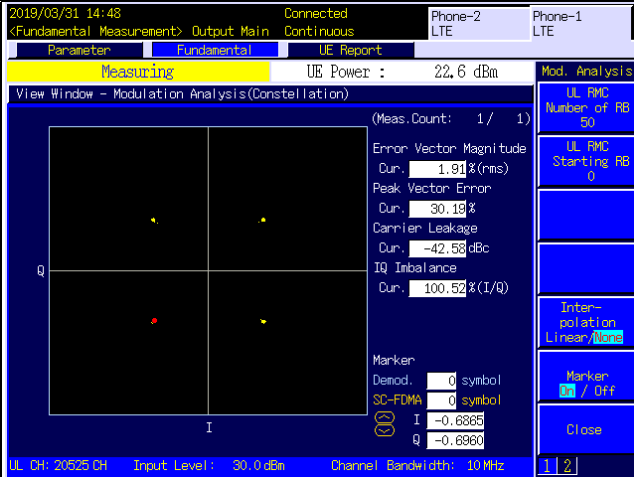


# LTE Band 5

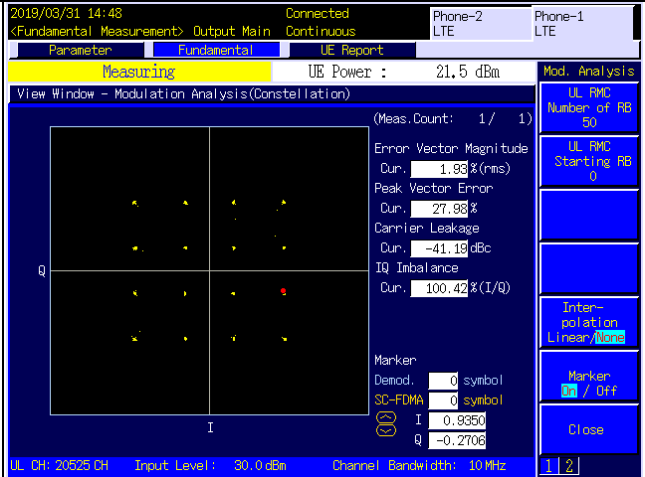
## Spectrum Plot of Measurement Value

Channel: 20525 / Frequency (MHz): 836.5MHz

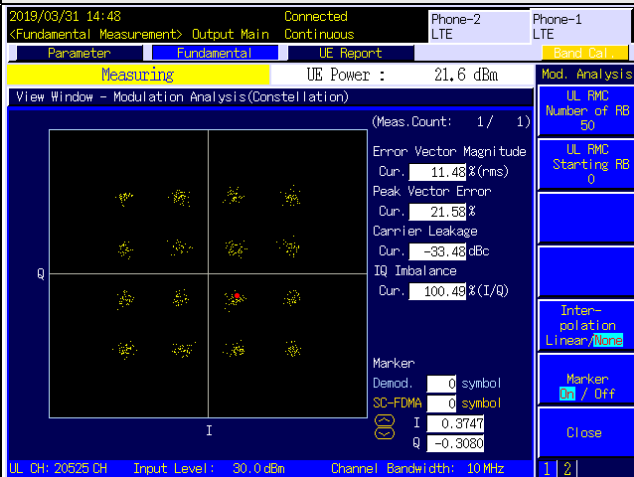
### QPSK



### 16QAM



### 64QAM



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

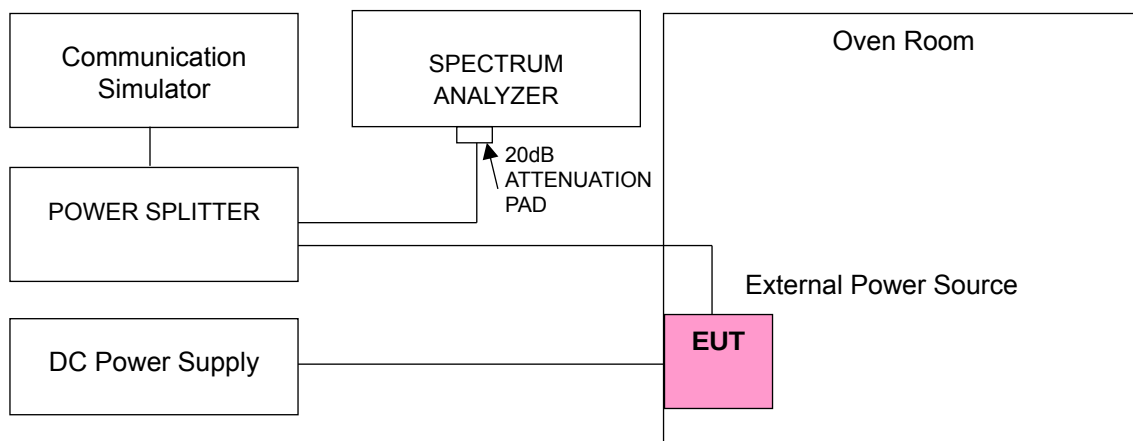
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

#### 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) | GSM 850         |                       |                 |                       |
|-----------------|-----------------|-----------------------|-----------------|-----------------------|
|                 | Low Channel     |                       | High Channel    |                       |
|                 | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 3.8             | 824.200002      | 0.002                 | 848.800002      | 0.003                 |
| 3.6             | 824.200001      | 0.002                 | 848.800004      | 0.004                 |
| 4.35            | 824.200003      | 0.004                 | 848.800002      | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.6Vdc to 4.35Vdc.

##### Frequency Error vs. Temperature

| Temp. (°C) | GSM 850         |                       |                 |                       |
|------------|-----------------|-----------------------|-----------------|-----------------------|
|            | Low Channel     |                       | High Channel    |                       |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30        | 824.200000      | 0.000                 | 848.800003      | 0.003                 |
| -20        | 824.200000      | 0.000                 | 848.800002      | 0.002                 |
| -10        | 824.200001      | 0.001                 | 848.800002      | 0.002                 |
| 0          | 824.200004      | 0.004                 | 848.800004      | 0.005                 |
| 10         | 824.200002      | 0.002                 | 848.800003      | 0.003                 |
| 20         | 824.199999      | -0.001                | 848.799999      | -0.001                |
| 30         | 824.199998      | -0.003                | 848.799996      | -0.005                |
| 40         | 824.199998      | -0.002                | 848.799998      | -0.002                |
| 50         | 824.199997      | -0.003                | 848.799998      | -0.002                |
| 60         | 824.200000      | 0.000                 | 848.799997      | -0.003                |

### Frequency Error vs. Voltage

| Voltage (Volts) | EDGE 850        |                       |                 |                       |
|-----------------|-----------------|-----------------------|-----------------|-----------------------|
|                 | Low Channel     |                       | High Channel    |                       |
|                 | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 3.8             | 824.200002      | 0.003                 | 848.800003      | 0.004                 |
| 3.6             | 824.200002      | 0.002                 | 848.800003      | 0.004                 |
| 4.35            | 824.200003      | 0.003                 | 848.800003      | 0.004                 |

Note: The applicant defined the normal working voltage is from 3.6Vdc to 4.35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | EDGE 850        |                       |                 |                       |
|------------|-----------------|-----------------------|-----------------|-----------------------|
|            | Low Channel     |                       | High Channel    |                       |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30        | 824.200000      | 0.000                 | 848.800002      | 0.002                 |
| -20        | 824.200000      | 0.000                 | 848.800001      | 0.002                 |
| -10        | 824.200001      | 0.001                 | 848.800004      | 0.004                 |
| 0          | 824.200001      | 0.002                 | 848.800001      | 0.002                 |
| 10         | 824.200001      | 0.002                 | 848.800002      | 0.002                 |
| 20         | 824.199997      | -0.004                | 848.799997      | -0.004                |
| 30         | 824.199996      | -0.005                | 848.799998      | -0.002                |
| 40         | 824.199999      | -0.002                | 848.799999      | -0.002                |
| 50         | 824.199999      | -0.002                | 848.799997      | -0.003                |
| 60         | 824.200000      | 0.000                 | 848.799997      | -0.003                |

### Frequency Error vs. Voltage

| Voltage (Volts) | WCDMA Band 5    |                       |                 |                       |
|-----------------|-----------------|-----------------------|-----------------|-----------------------|
|                 | Low Channel     |                       | High Channel    |                       |
|                 | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 3.8             | 826.400002      | 0.002                 | 846.600002      | 0.002                 |
| 3.6             | 826.400003      | 0.003                 | 846.600003      | 0.003                 |
| 4.35            | 826.400002      | 0.003                 | 846.600001      | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.6Vdc to 4.35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | WCDMA Band 5    |                       |                 |                       |
|------------|-----------------|-----------------------|-----------------|-----------------------|
|            | Low Channel     |                       | High Channel    |                       |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30        | 826.400000      | 0.000                 | 846.600003      | 0.004                 |
| -20        | 826.400000      | 0.000                 | 846.600001      | 0.001                 |
| -10        | 826.400001      | 0.002                 | 846.600002      | 0.002                 |
| 0          | 826.400002      | 0.002                 | 846.600003      | 0.003                 |
| 10         | 826.400001      | 0.002                 | 846.600004      | 0.005                 |
| 20         | 826.399997      | -0.004                | 846.599997      | -0.004                |
| 30         | 826.399998      | -0.002                | 846.599998      | -0.003                |
| 40         | 826.399998      | -0.002                | 846.599997      | -0.003                |
| 50         | 826.399998      | -0.002                | 846.599997      | -0.003                |
| 60         | 826.400000      | 0.000                 | 846.599996      | -0.004                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 5                 |                       |                 |                       |
|--------------------|----------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|                    | Low Channel                |                       | High Channel    |                       |
|                    | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 3.8                | 824.700003                 | 0.003                 | 848.300001      | 0.001                 |
| 3.6                | 824.700004                 | 0.005                 | 848.300002      | 0.002                 |
| 4.35               | 824.700002                 | 0.002                 | 848.300002      | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.6Vdc to 4.35Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 5                 |                       |                 |                       |
|------------|----------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|            | Low Channel                |                       | High Channel    |                       |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30        | 824.700000                 | 0.000                 | 848.300002      | 0.002                 |
| -20        | 824.700000                 | 0.000                 | 848.300003      | 0.003                 |
| -10        | 824.700002                 | 0.002                 | 848.300001      | 0.001                 |
| 0          | 824.700002                 | 0.003                 | 848.300004      | 0.005                 |
| 10         | 824.700004                 | 0.004                 | 848.300002      | 0.002                 |
| 20         | 824.699997                 | -0.004                | 848.299997      | -0.003                |
| 30         | 824.699998                 | -0.003                | 848.299998      | -0.002                |
| 40         | 824.699998                 | -0.003                | 848.299997      | -0.003                |
| 50         | 824.699997                 | -0.003                | 848.299999      | -0.002                |
| 60         | 824.700000                 | 0.000                 | 848.299997      | -0.003                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 5               |                       |                 |                       |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |
|                    | Low Channel              |                       | High Channel    |                       |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 3.8                | 825.500003               | 0.004                 | 847.500002      | 0.002                 |
| 3.6                | 825.500004               | 0.004                 | 847.500003      | 0.004                 |
| 4.35               | 825.500004               | 0.005                 | 847.500002      | 0.003                 |

Note: The applicant defined the normal working voltage is from 3.6Vdc to 4.35Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 5               |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30        | 825.500000               | 0.000                 | 847.500003      | 0.003                 |
| -20        | 825.500000               | 0.000                 | 847.500001      | 0.001                 |
| -10        | 825.500003               | 0.004                 | 847.500001      | 0.002                 |
| 0          | 825.500004               | 0.005                 | 847.500003      | 0.003                 |
| 10         | 825.500003               | 0.003                 | 847.500004      | 0.004                 |
| 20         | 825.499998               | -0.003                | 847.499997      | -0.004                |
| 30         | 825.499998               | -0.003                | 847.499996      | -0.005                |
| 40         | 825.499999               | -0.002                | 847.499998      | -0.003                |
| 50         | 825.499997               | -0.004                | 847.499998      | -0.002                |
| 60         | 825.500000               | 0.000                 | 847.499997      | -0.004                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 5               |                       |                 |                       |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |
|                    | Low Channel              |                       | High Channel    |                       |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 3.8                | 826.500003               | 0.003                 | 846.500002      | 0.002                 |
| 3.6                | 826.500003               | 0.003                 | 846.500001      | 0.002                 |
| 4.35               | 826.500001               | 0.001                 | 846.500002      | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.6Vdc to 4.35Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 5               |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30        | 826.500000               | 0.000                 | 846.500003      | 0.003                 |
| -20        | 826.500000               | 0.000                 | 846.500002      | 0.002                 |
| -10        | 826.500001               | 0.001                 | 846.500002      | 0.002                 |
| 0          | 826.500002               | 0.003                 | 846.500003      | 0.004                 |
| 10         | 826.500003               | 0.003                 | 846.500002      | 0.002                 |
| 20         | 826.499997               | -0.004                | 846.499998      | -0.003                |
| 30         | 826.499997               | -0.004                | 846.499998      | -0.002                |
| 40         | 826.499996               | -0.005                | 846.499998      | -0.003                |
| 50         | 826.499998               | -0.002                | 846.499998      | -0.002                |
| 60         | 826.500000               | 0.000                 | 846.499997      | -0.004                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 5                |                       |                 |                       |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 10 MHz |                       |                 |                       |
|                    | Low Channel               |                       | High Channel    |                       |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 3.8                | 829.000001                | 0.001                 | 844.000003      | 0.003                 |
| 3.6                | 829.000002                | 0.003                 | 844.000003      | 0.004                 |
| 4.35               | 829.000002                | 0.002                 | 844.000002      | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.6Vdc to 4.35Vdc.

#### Frequency Error vs. Temperature

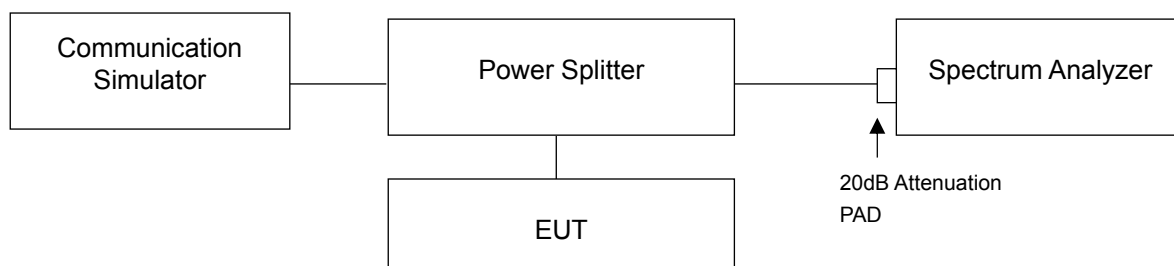
| Temp. (°C) | LTE Band 5                |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30        | 829.000000                | 0.000                 | 844.000002      | 0.002                 |
| -20        | 829.000000                | 0.000                 | 844.000004      | 0.005                 |
| -10        | 829.000002                | 0.002                 | 844.000003      | 0.003                 |
| 0          | 829.000001                | 0.002                 | 844.000002      | 0.002                 |
| 10         | 829.000004                | 0.005                 | 844.000002      | 0.002                 |
| 20         | 828.999997                | -0.004                | 843.999997      | -0.004                |
| 30         | 828.999996                | -0.005                | 843.999998      | -0.002                |
| 40         | 828.999997                | -0.004                | 843.999999      | -0.001                |
| 50         | 828.999997                | -0.004                | 843.999999      | -0.001                |
| 60         | 829.000000                | 0.000                 | 843.999997      | -0.004                |

## 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



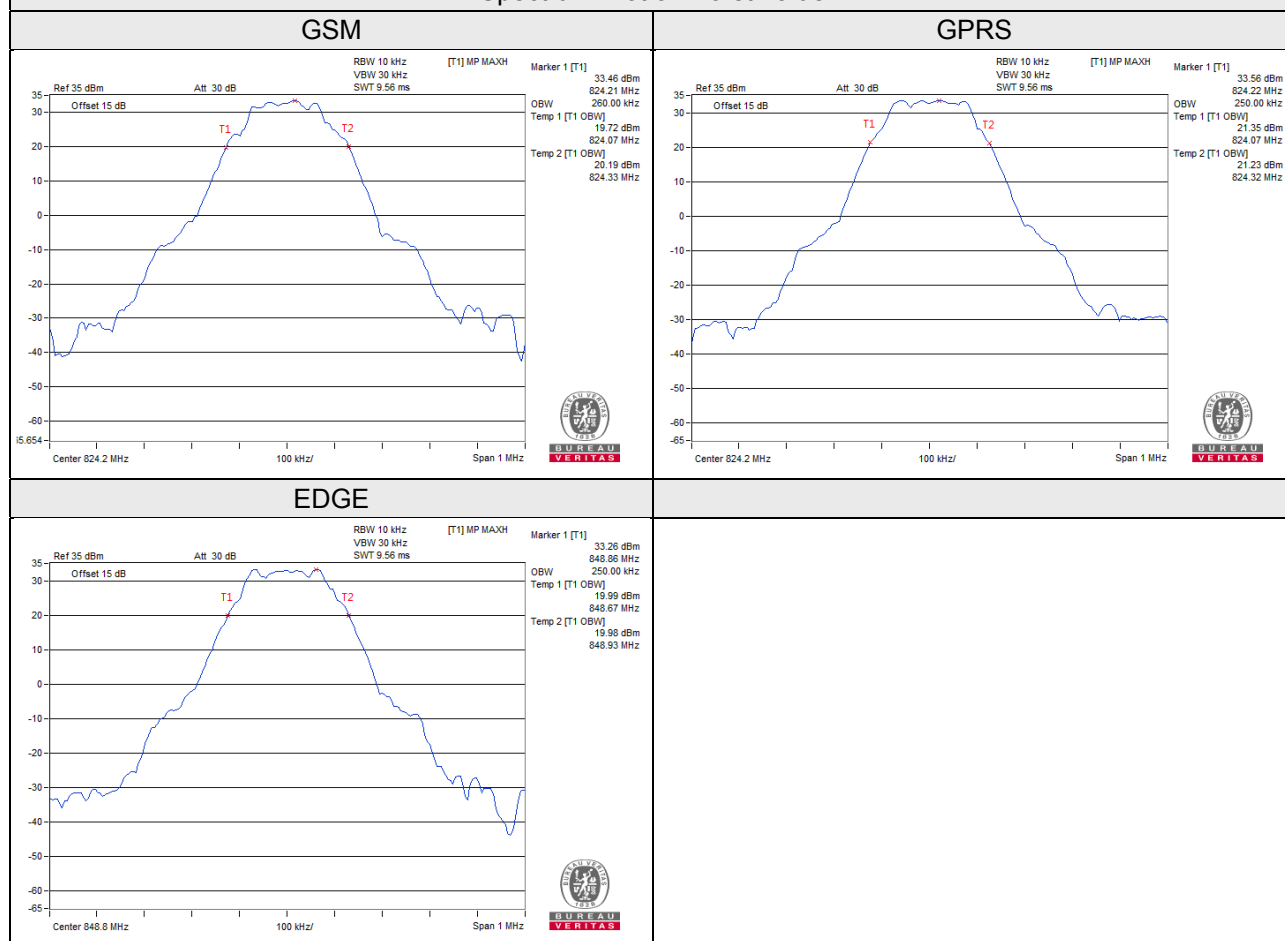
#### 4.4.3 Test Result

##### Occupied Bandwidth

##### GSM

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) |        |        |
|---------|-----------------|------------------------------|--------|--------|
|         |                 | GSM                          | GPRS   | EDGE   |
| 128     | 824.2           | 260.00                       | 250.00 | 250.00 |
| 189     | 836.4           | 250.00                       | 250.00 | 250.00 |
| 251     | 848.8           | 260.00                       | 250.00 | 250.00 |

#### Spectrum Plot of Worst Value

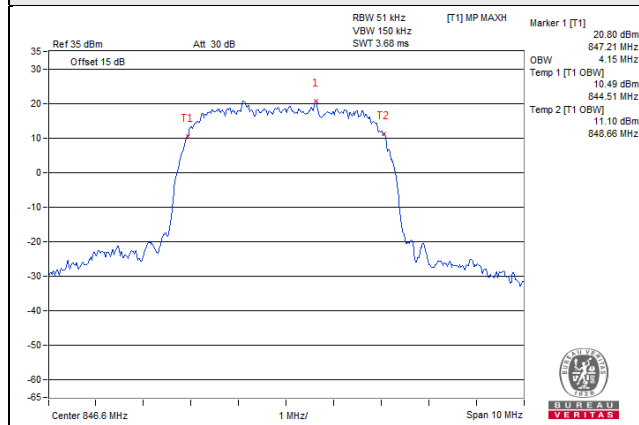


# WCDMA Band 5

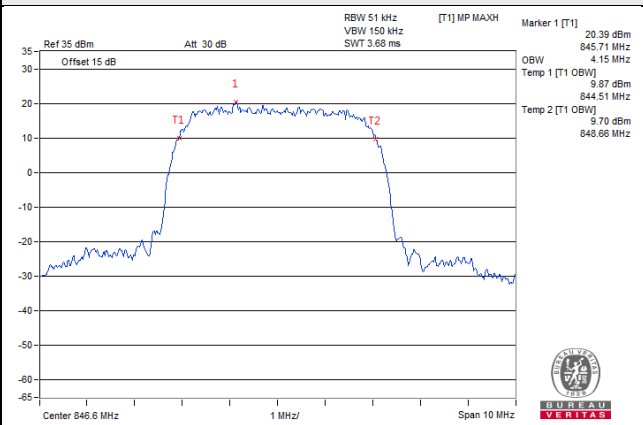
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |       |
|---------|-----------------|------------------------------|-------|-------|
|         |                 | WCDMA                        | HSDPA | HSUPA |
| 4132    | 826.4           | 4.13                         | 4.13  | 4.13  |
| 4182    | 836.4           | 4.15                         | 4.15  | 4.16  |
| 4233    | 846.6           | 4.15                         | 4.15  | 4.13  |

## Spectrum Plot of Worst Value

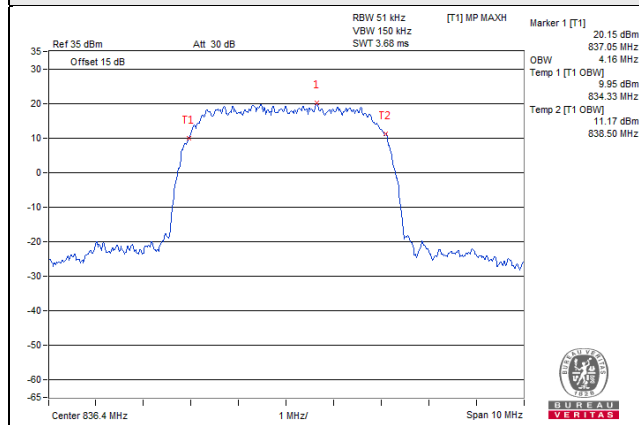
### WCDMA



### HSDPA



### HSUPA

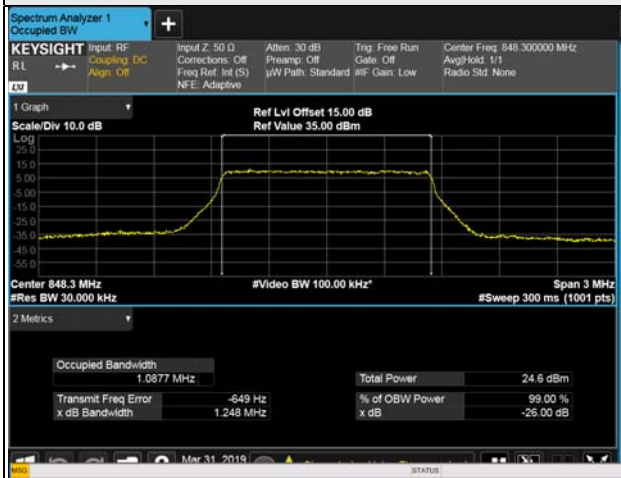


# LTE Band 5

| LTE Band 5, Channel Bandwidth 1.4MHz |                 |                              |       |       |
|--------------------------------------|-----------------|------------------------------|-------|-------|
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |       |
|                                      |                 | QPSK                         | 16QAM | 64QAM |
| 20407                                | 824.7           | 1.09                         | 1.09  | 1.09  |
| 20525                                | 836.5           | 1.09                         | 1.09  | 1.09  |
| 20643                                | 848.3           | 1.09                         | 1.09  | 1.09  |
| LTE Band 5, Channel Bandwidth 3MHz   |                 |                              |       |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |       |
|                                      |                 | QPSK                         | 16QAM | 64QAM |
| 20415                                | 825.5           | 2.70                         | 2.69  | 2.70  |
| 20525                                | 836.5           | 2.70                         | 2.70  | 2.70  |
| 20635                                | 847.5           | 2.70                         | 2.70  | 2.70  |
| LTE Band 5, Channel Bandwidth 5MHz   |                 |                              |       |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |       |
|                                      |                 | QPSK                         | 16QAM | 64QAM |
| 20425                                | 826.5           | 4.48                         | 4.49  | 4.48  |
| 20525                                | 836.5           | 4.49                         | 4.49  | 4.49  |
| 20625                                | 846.5           | 4.49                         | 4.49  | 4.49  |
| LTE Band 5, Channel Bandwidth 10MHz  |                 |                              |       |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |       |
|                                      |                 | QPSK                         | 16QAM | 64QAM |
| 20450                                | 829.0           | 8.93                         | 8.93  | 8.93  |
| 20525                                | 836.5           | 8.97                         | 8.97  | 8.96  |
| 20600                                | 844.0           | 8.93                         | 8.93  | 8.92  |

## Spectrum Plot of Worst Value

1.4MHz / 64QAM



3MHz / QPSK



5MHz / 16QAM



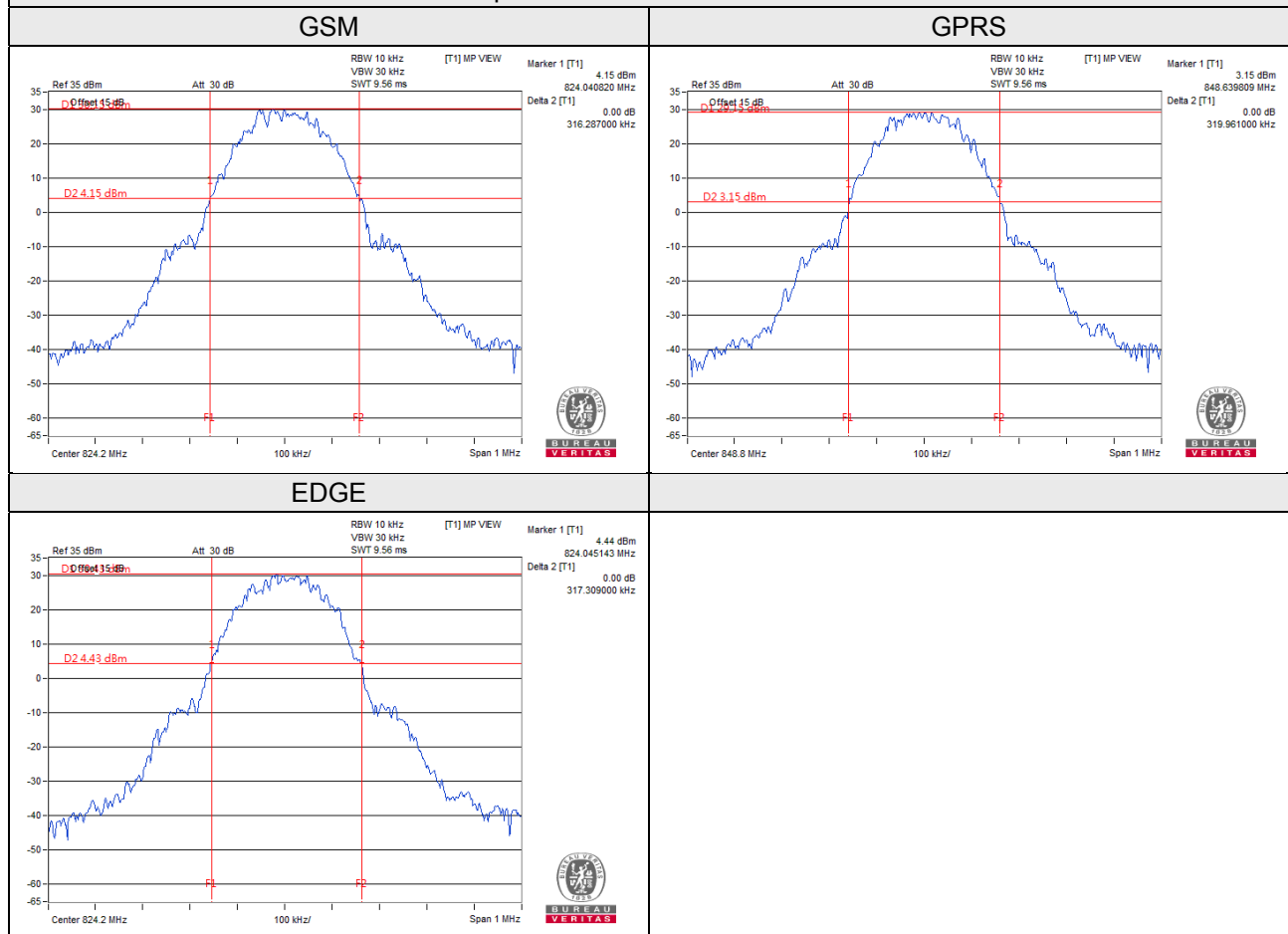
10MHz / 16QAM



## 26dB Bandwidth GSM

| Channel | Frequency (MHz) | 26dB Bandwidth (kHz) |         |        |
|---------|-----------------|----------------------|---------|--------|
|         |                 | GSM                  | GPRS    | EDGE   |
| 128     | 824.2           | 316.28               | 313.423 | 317.30 |
| 189     | 836.4           | 304.75               | 314.175 | 314.04 |
| 251     | 848.8           | 314.79               | 319.961 | 310.98 |

### Spectrum Plot of Worst Value

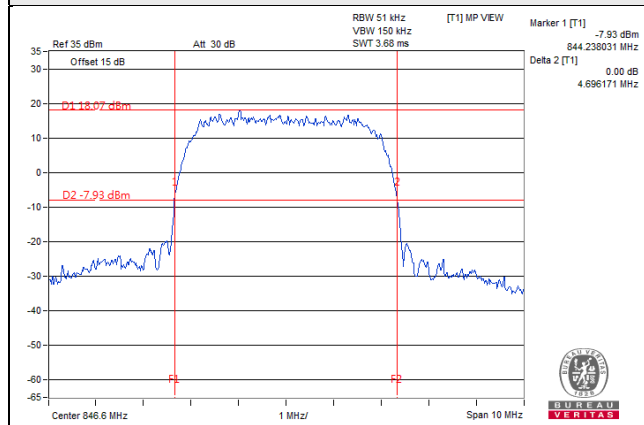


# WCDMA Band 5

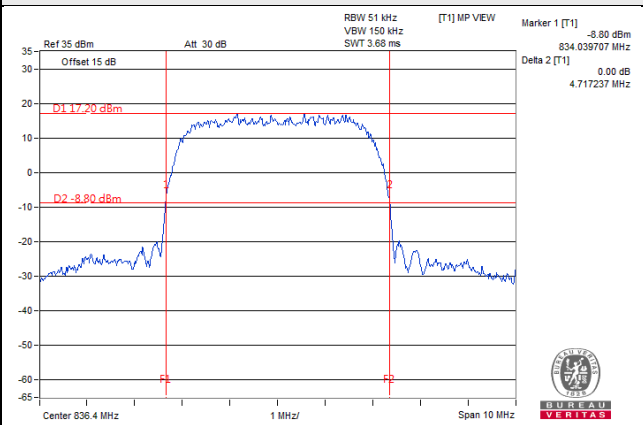
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) |       |       |
|---------|-----------------|----------------------|-------|-------|
|         |                 | WCDMA                | HSDPA | HSUPA |
| 4132    | 826.4           | 4.68                 | 4.70  | 4.68  |
| 4182    | 836.4           | 4.66                 | 4.71  | 4.70  |
| 4233    | 846.6           | 4.69                 | 4.69  | 4.68  |

## Spectrum Plot of Worst Value

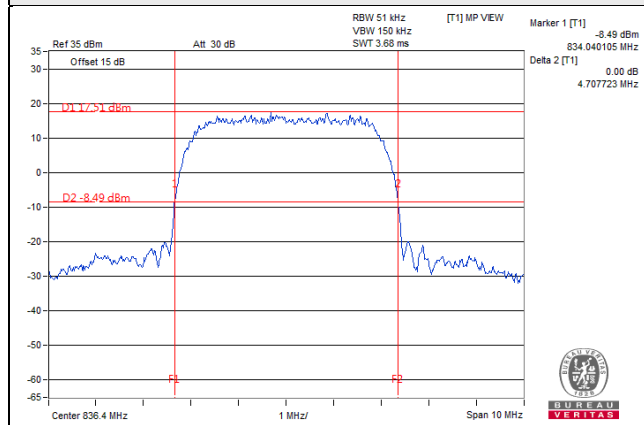
### WCDMA



### HSDPA



### HSUPA



# LTE Band 5

| LTE Band 5, Channel Bandwidth 1.4MHz |                 |                      |       |       |
|--------------------------------------|-----------------|----------------------|-------|-------|
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |       |
|                                      |                 | QPSK                 | 16QAM | 64QAM |
| 20407                                | 824.7           | 1.24                 | 1.25  | 1.25  |
| 20525                                | 836.5           | 1.24                 | 1.25  | 1.26  |
| 20643                                | 848.3           | 1.24                 | 1.24  | 1.25  |
| LTE Band 5, Channel Bandwidth 3MHz   |                 |                      |       |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |       |
|                                      |                 | QPSK                 | 16QAM | 64QAM |
| 20415                                | 825.5           | 2.91                 | 2.92  | 2.92  |
| 20525                                | 836.5           | 2.92                 | 2.93  | 2.92  |
| 20635                                | 847.5           | 2.91                 | 2.92  | 2.90  |
| LTE Band 5, Channel Bandwidth 5MHz   |                 |                      |       |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |       |
|                                      |                 | QPSK                 | 16QAM | 64QAM |
| 20425                                | 826.5           | 4.81                 | 4.79  | 4.80  |
| 20525                                | 836.5           | 4.81                 | 4.81  | 4.82  |
| 20625                                | 846.5           | 4.81                 | 4.82  | 4.81  |
| LTE Band 5, Channel Bandwidth 10MHz  |                 |                      |       |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |       |
|                                      |                 | QPSK                 | 16QAM | 64QAM |
| 20450                                | 829.0           | 9.48                 | 9.49  | 9.50  |
| 20525                                | 836.5           | 9.53                 | 9.53  | 9.53  |
| 20600                                | 844.0           | 9.49                 | 9.50  | 9.49  |

## Spectrum Plot of Worst Value

1.4MHz / 64QAM



3MHz / 16QAM



5MHz / 64QAM



10MHz / 64QAM

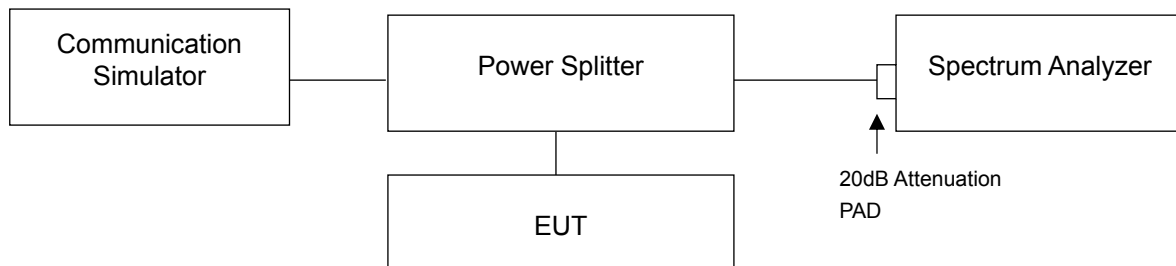


## 4.5 Band Edge Measurement

### 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

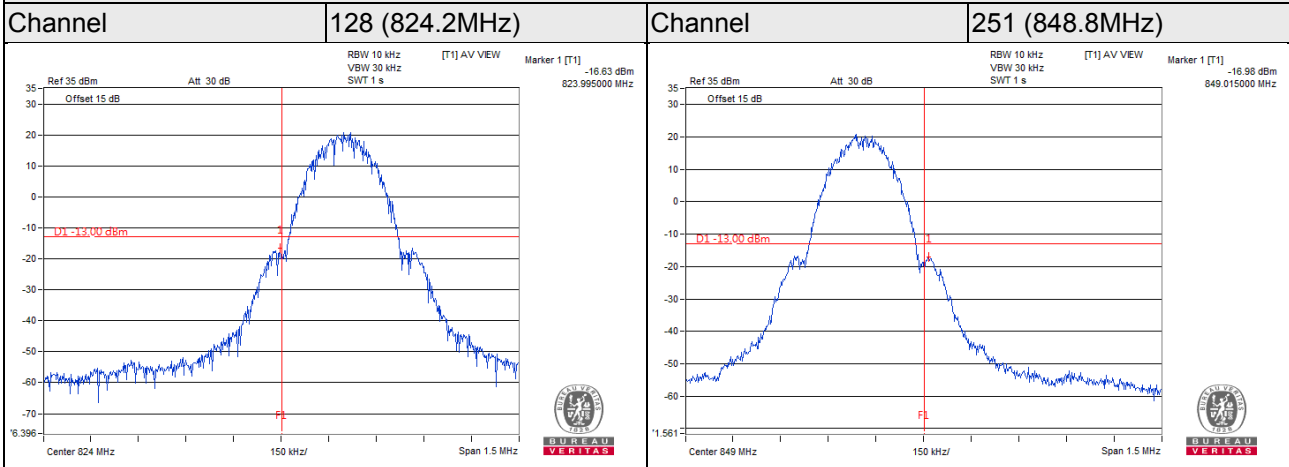


### 4.5.3 Test Procedures

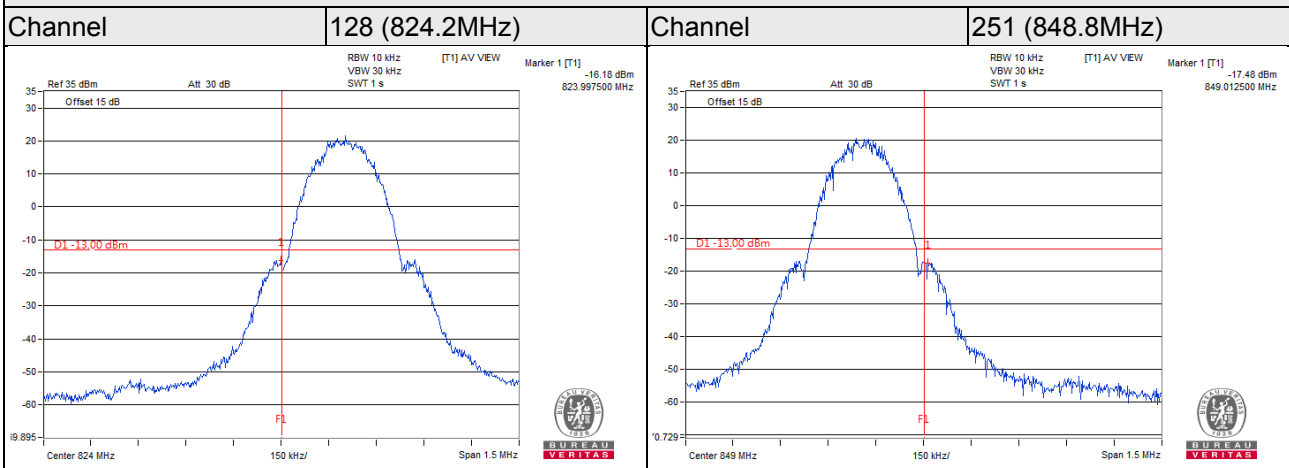
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 10kHz and VB of the spectrum is 30kHz (GSM / GPRS / EDGE).
- The center frequency of spectrum is the band edge frequency and span is 10MHz. RB of the spectrum is 51kHz and VB of the spectrum is 150kHz (WCDMA / HSDPA / HSUPA).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. 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 1MHz. 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 1MHz. RB of the spectrum is 62kHz and VB of the spectrum is 200kHz (LTE Channel Bandwidth 5MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. 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 150kHz and VB of the spectrum is 470kHz (LTE Channel Bandwidth 15MHz).
- Record the max trace plot into the test report.

## 4.5.4 Test Results

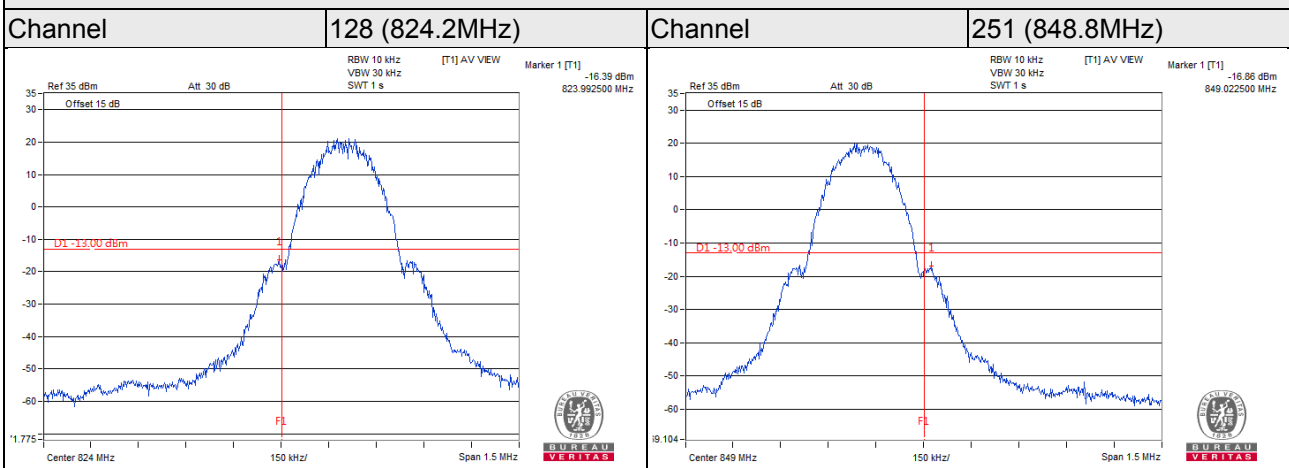
### GSM



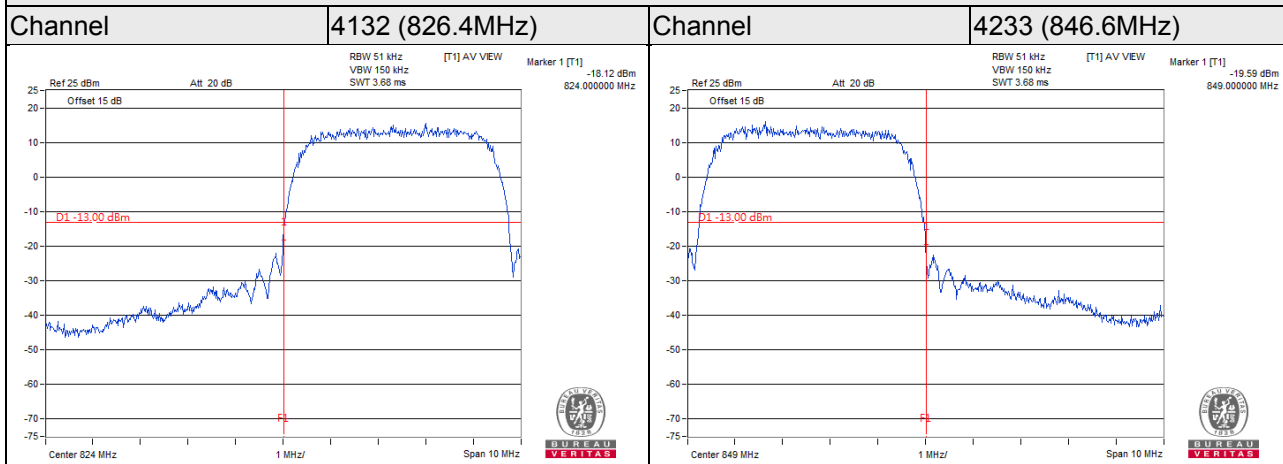
### GPRS



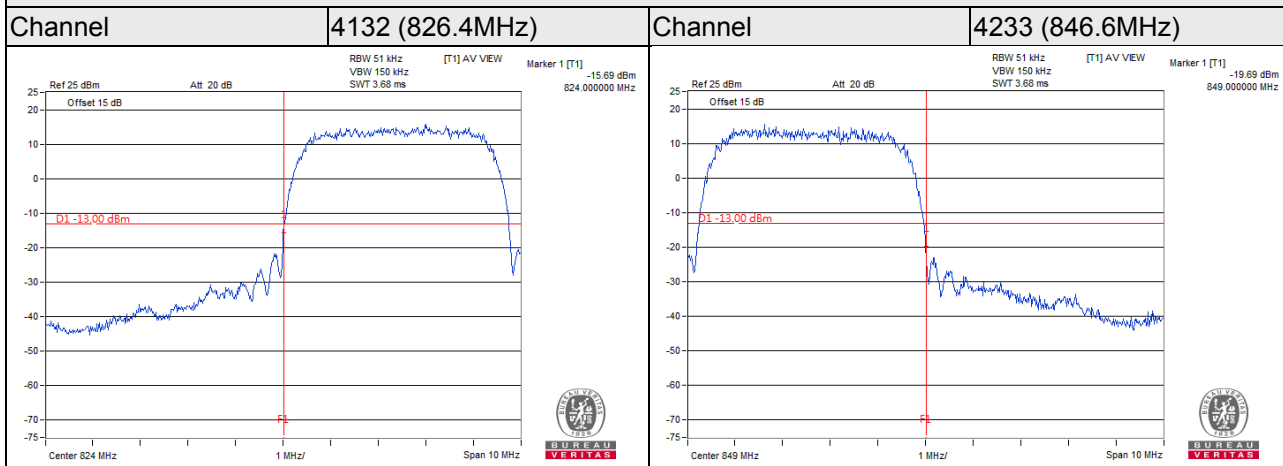
### EDGE



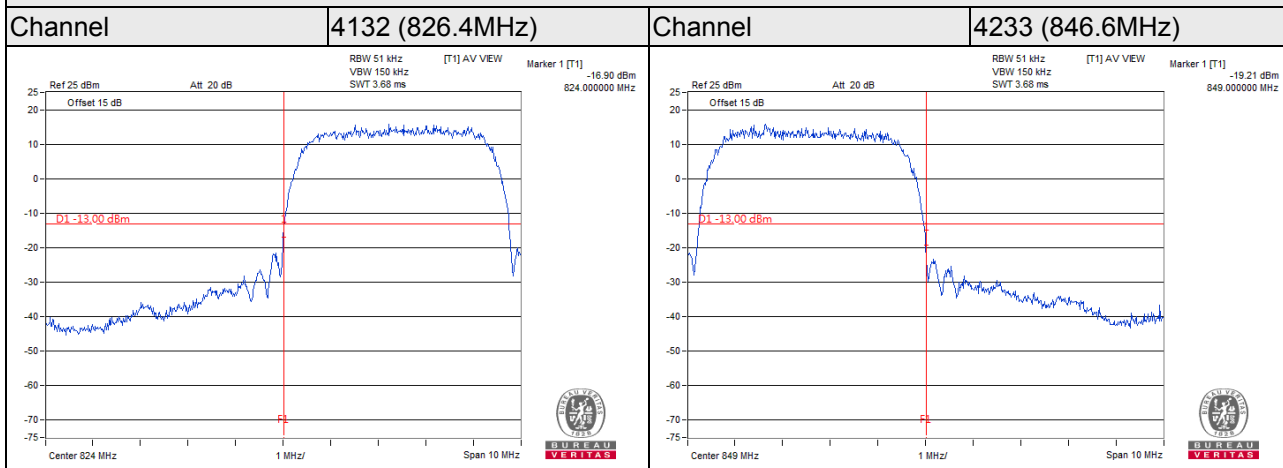
## WCDMA



## HSDPA



## HSUPA



# LTE Band 5, Channel Bandwidth 1.4MHz

Channel 20407  
(824.7MHz)

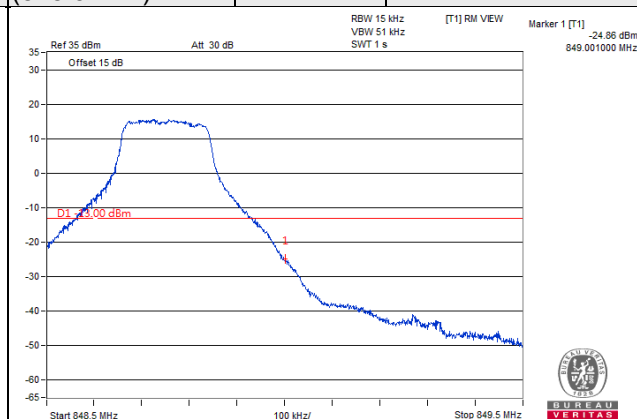
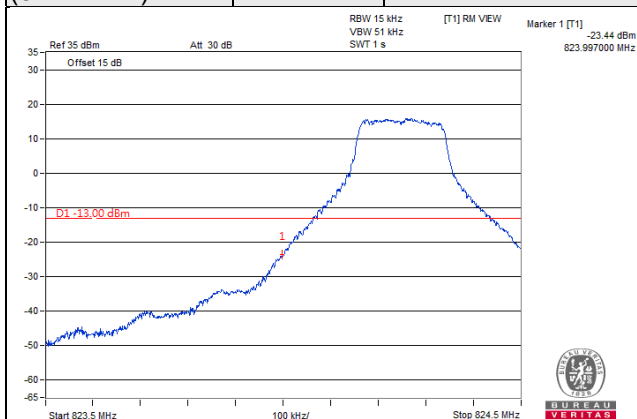
QPSK

1 RB / 0 RB Offset

Channel 20643  
(848.3MHz)

QPSK

1 RB / 5 RB Offset



Channel 20407  
(824.7MHz)

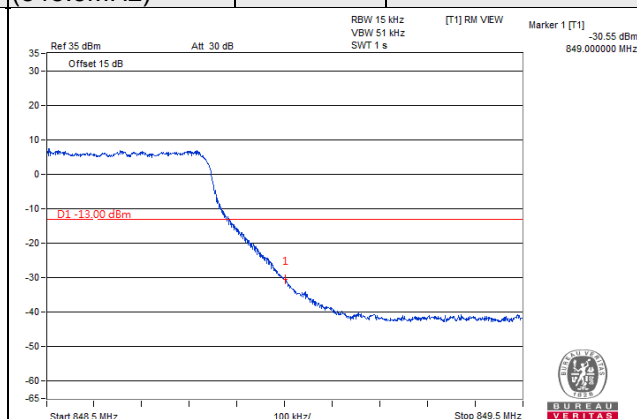
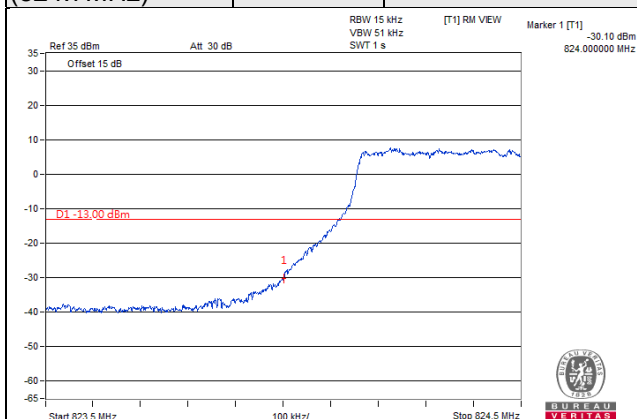
QPSK

6 RB / 0 RB Offset

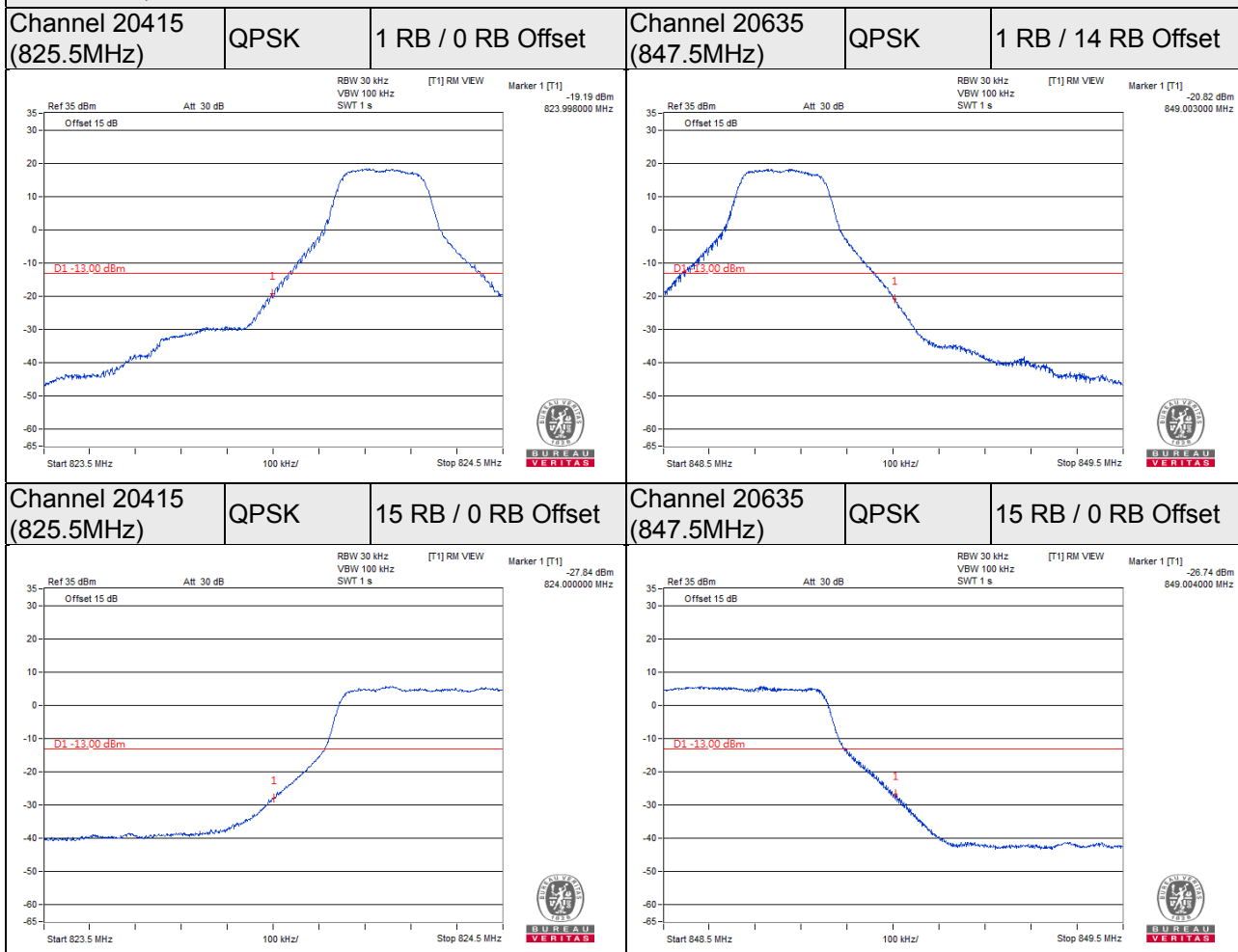
Channel 20643  
(848.3MHz)

QPSK

6 RB / 0 RB Offset



# LTE Band 5, Channel Bandwidth 3MHz



# LTE Band 5, Channel Bandwidth 5MHz

Channel 20425  
(826.5MHz)

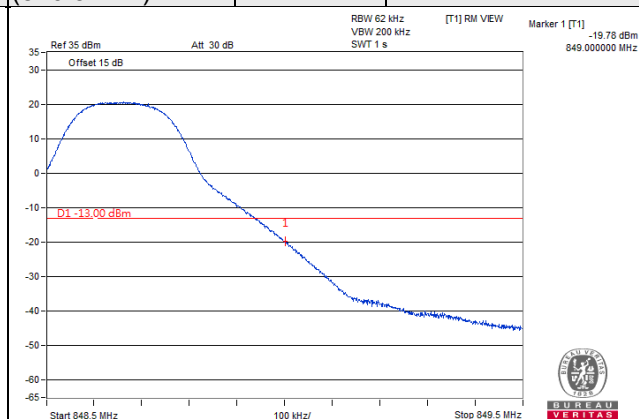
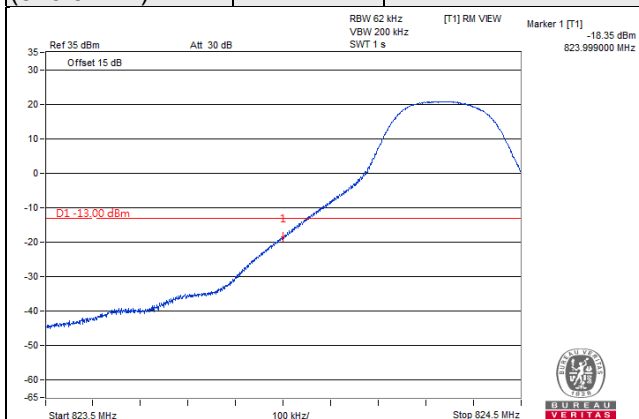
QPSK

1 RB / 0 RB Offset

Channel 20625  
(846.5MHz)

QPSK

1 RB / 24 RB Offset



Channel 20425  
(826.5MHz)

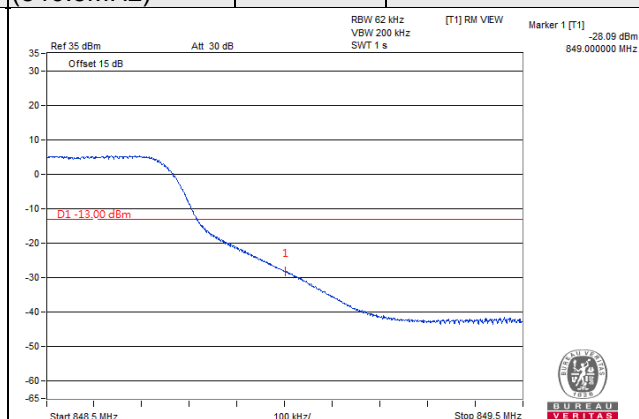
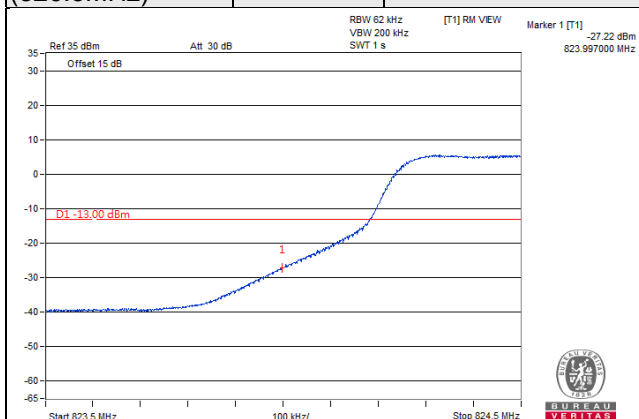
QPSK

25 RB / 0 RB Offset

Channel 20625  
(846.5MHz)

QPSK

25 RB / 0 RB Offset



# LTE Band 5, Channel Bandwidth 10MHz

Channel 20450  
(829.0MHz)

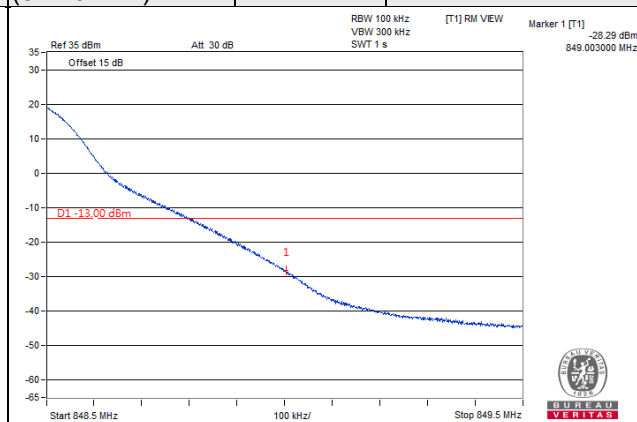
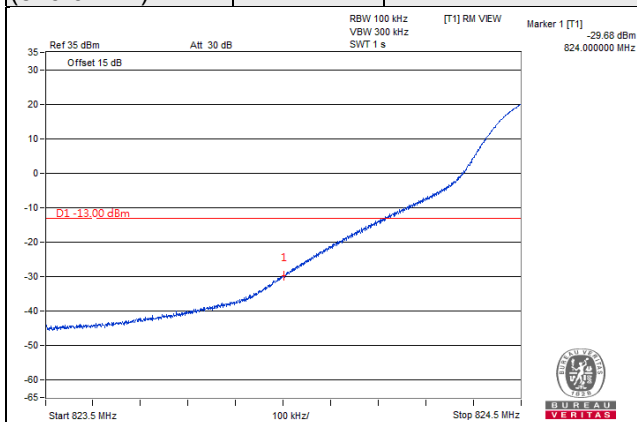
QPSK

1 RB / 0 RB Offset

Channel 20600  
(844.0MHz)

QPSK

1 RB / 49 RB Offset



Channel 20450  
(829.0MHz)

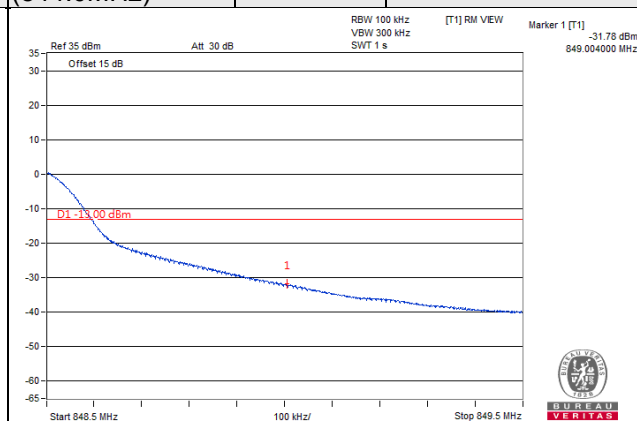
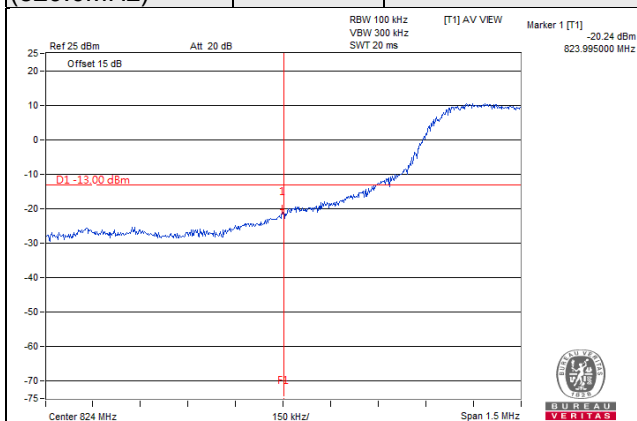
QPSK

50 RB / 0 RB Offset

Channel 20600  
(844.0MHz)

QPSK

50 RB / 0 RB Offset

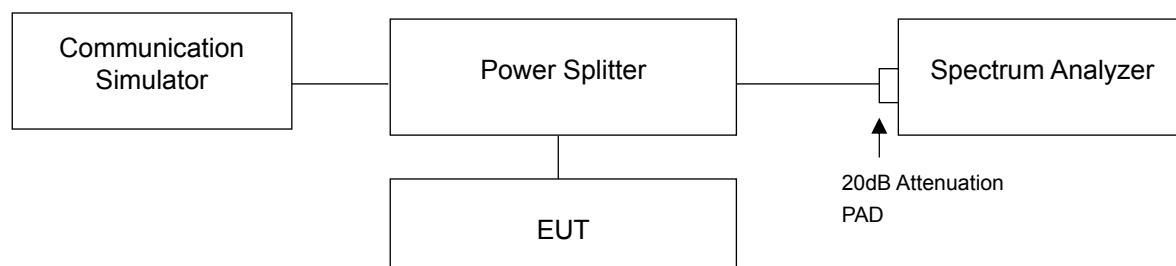


## 4.6 Peak to Average Ratio

### 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

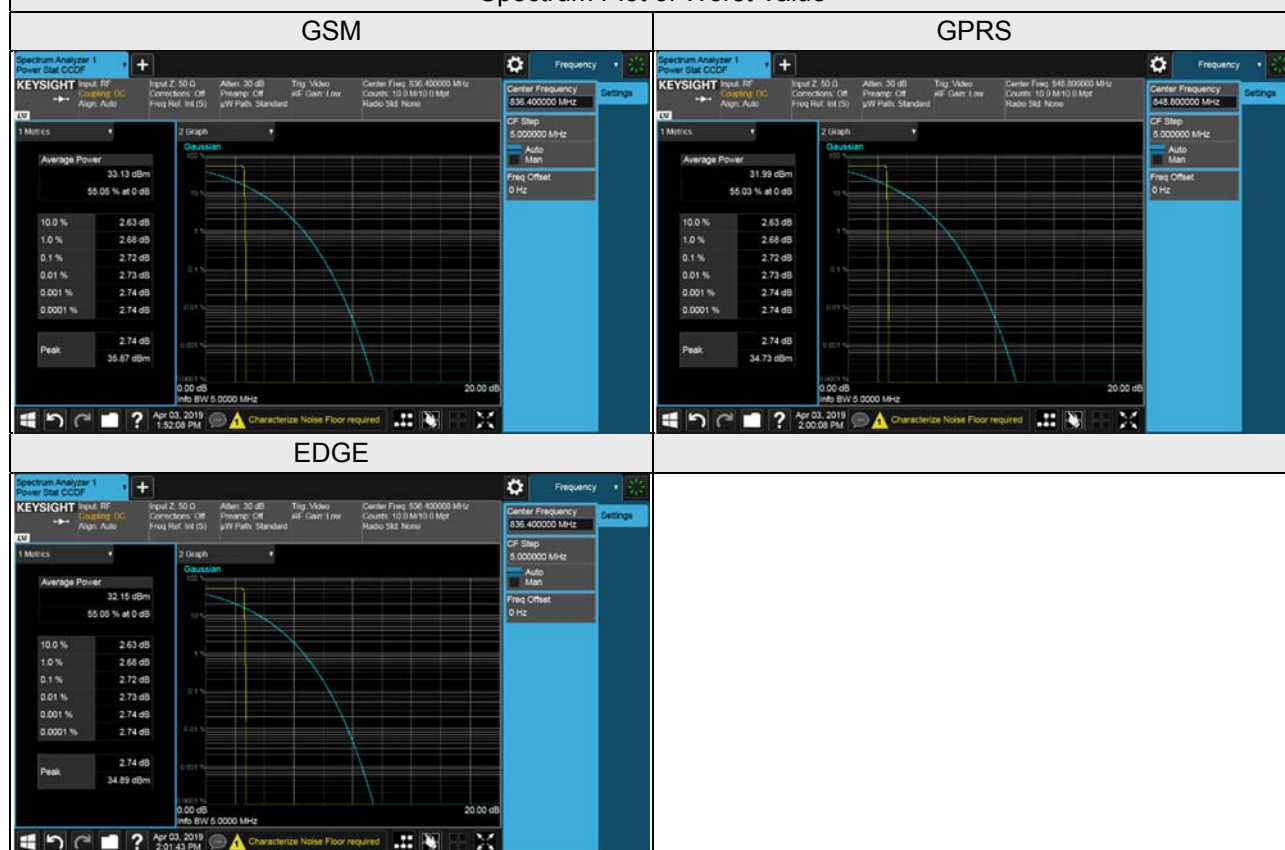
- Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

#### 4.6.4 Test Results

##### GSM

| Channel | Frequency (MHz) | Peak To Average Ratio (dB) |      |      |
|---------|-----------------|----------------------------|------|------|
|         |                 | GSM                        | GPRS | EDGE |
| 128     | 824.2           | 2.71                       | 2.71 | 2.71 |
| 189     | 836.4           | 2.72                       | 2.72 | 2.72 |
| 251     | 848.8           | 2.71                       | 2.72 | 2.71 |

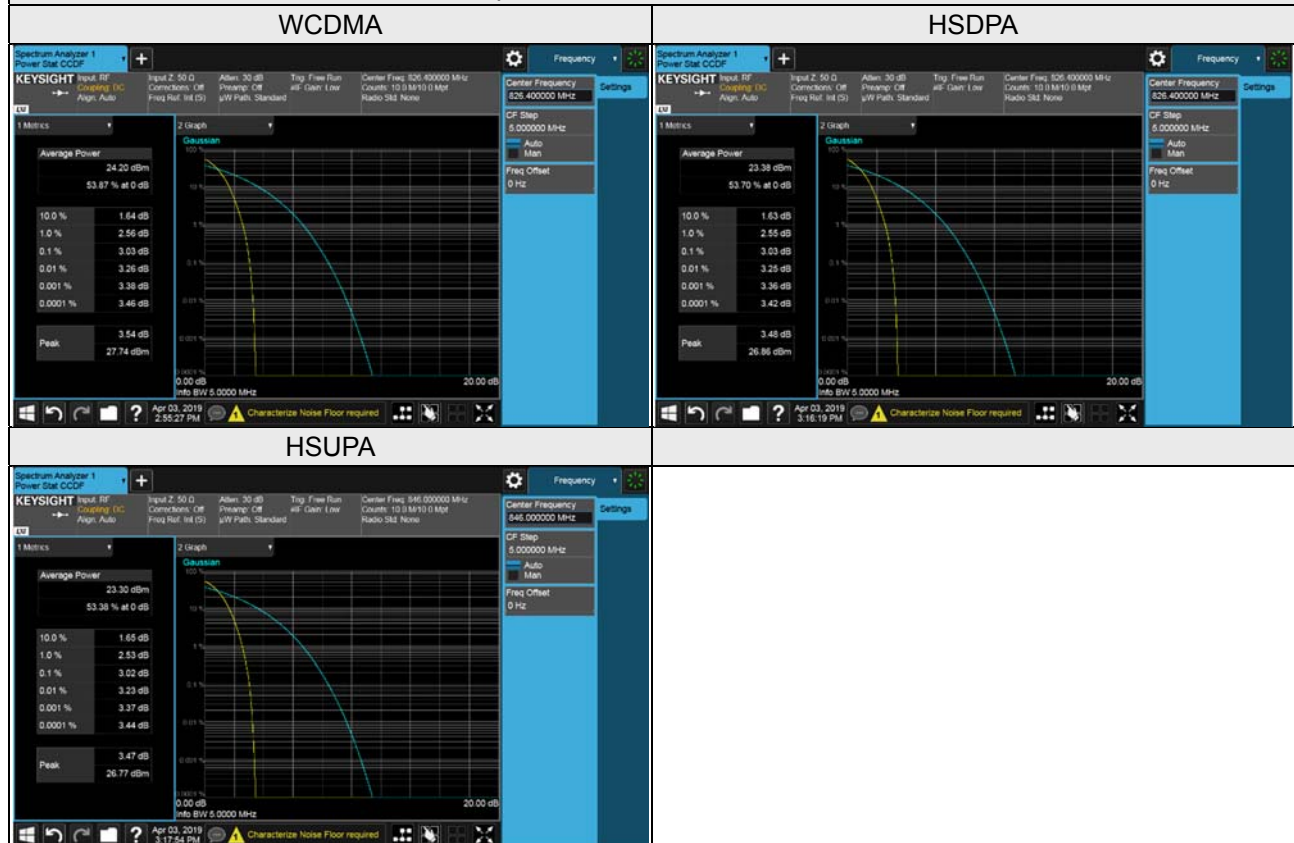
##### Spectrum Plot of Worst Value



# WCDMA Band 5

| Channel | Frequency (MHz) | Peak To Average Ratio (dB) |       |       |
|---------|-----------------|----------------------------|-------|-------|
|         |                 | WCDMA                      | HSDPA | HSUPA |
| 4132    | 826.4           | 3.03                       | 3.03  | 3.02  |
| 4182    | 836.4           | 2.94                       | 2.95  | 2.95  |
| 4233    | 846.6           | 3.01                       | 3.02  | 3.02  |

## Spectrum Plot of Worst Value



# LTE Band 5

| LTE Band 5, Channel Bandwidth 1.4MHz |                 |                            |       |       |
|--------------------------------------|-----------------|----------------------------|-------|-------|
| Channel                              | Frequency (MHz) | Peak To Average Ratio (dB) |       |       |
|                                      |                 | QPSK                       | 16QAM | 64QAM |
| 20407                                | 824.7           | 4.52                       | 5.33  | 5.42  |
| 20525                                | 836.5           | 4.52                       | 5.34  | 5.39  |
| 20643                                | 848.3           | 4.50                       | 5.46  | 5.38  |
| LTE Band 5, Channel Bandwidth 3MHz   |                 |                            |       |       |
| Channel                              | Frequency (MHz) | Peak To Average Ratio (dB) |       |       |
|                                      |                 | QPSK                       | 16QAM | 64QAM |
| 20415                                | 825.5           | 4.54                       | 5.32  | 5.44  |
| 20525                                | 836.5           | 4.54                       | 5.38  | 5.47  |
| 20635                                | 847.5           | 4.49                       | 5.36  | 5.52  |
| LTE Band 5, Channel Bandwidth 5MHz   |                 |                            |       |       |
| Channel                              | Frequency (MHz) | Peak To Average Ratio (dB) |       |       |
|                                      |                 | QPSK                       | 16QAM | 64QAM |
| 20425                                | 826.5           | 4.51                       | 5.30  | 5.40  |
| 20525                                | 836.5           | 4.48                       | 5.30  | 5.43  |
| 20625                                | 846.5           | 4.44                       | 5.32  | 5.39  |
| LTE Band 5, Channel Bandwidth 10MHz  |                 |                            |       |       |
| Channel                              | Frequency (MHz) | Peak To Average Ratio (dB) |       |       |
|                                      |                 | QPSK                       | 16QAM | 64QAM |
| 20450                                | 829.0           | 4.48                       | 5.27  | 5.43  |
| 20525                                | 836.5           | 4.53                       | 5.26  | 5.54  |
| 20600                                | 844.0           | 4.48                       | 5.35  | 5.41  |

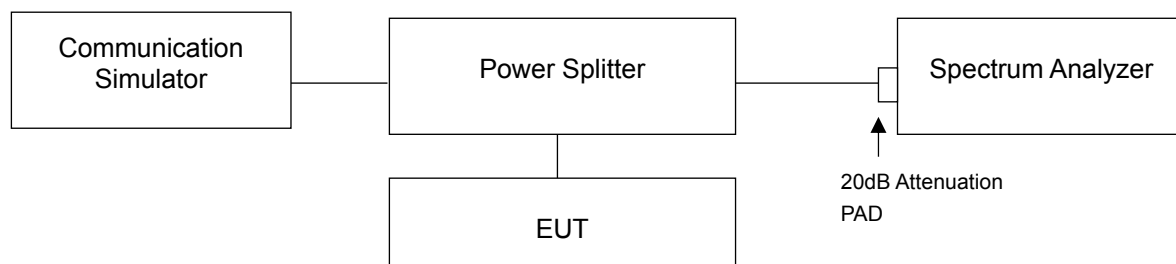


## 4.7 Conducted Spurious Emissions

### 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

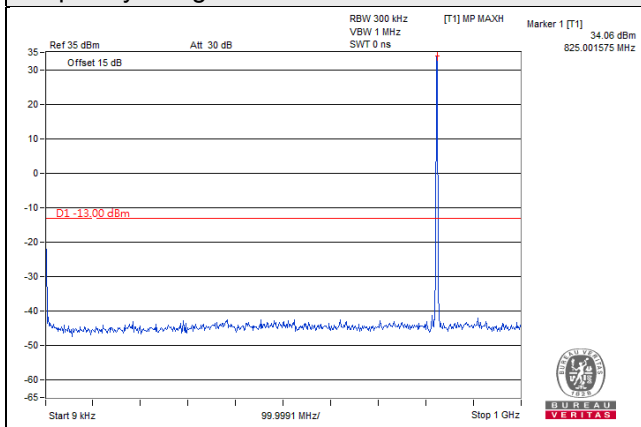
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 1GHz. 20dB attenuation pad is connected with spectrum. RBW=300kHz and VBW=1MHz is used for conducted emission measurement.
- Measuring frequency range is from 1GHz to 26.5GHz or 27GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

## 4.7.4 Test Results

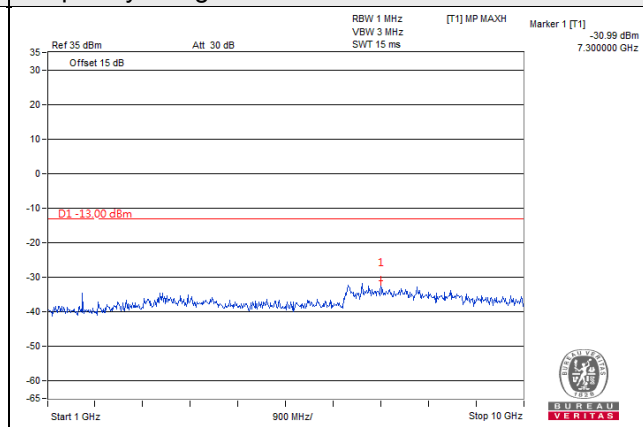
GSM

Channel 128 (824.2MHz)

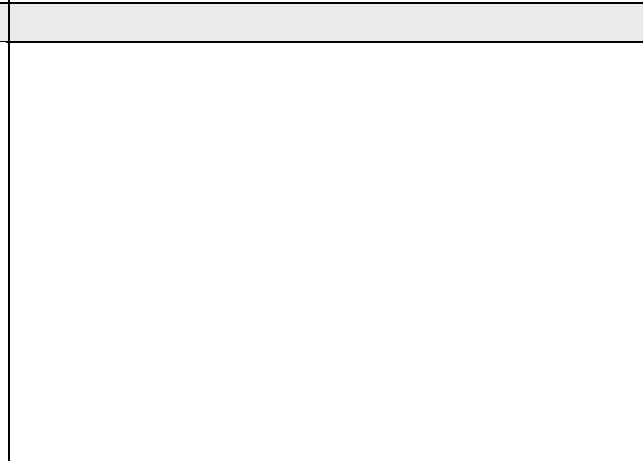
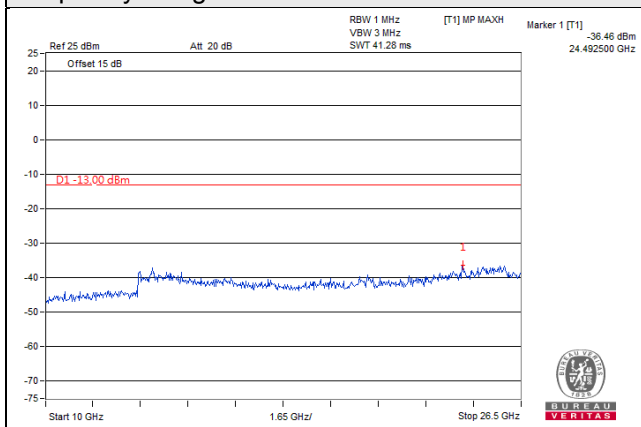
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



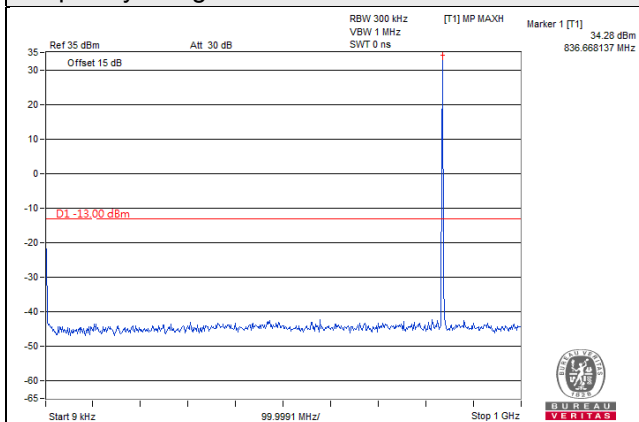
Frequency Range : 10GHz~26.5GHz



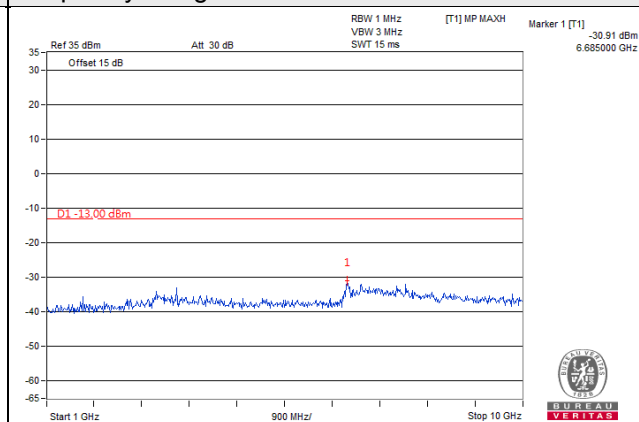
\*The 9kHz signal over the limit is from Spectrum.

# Channel 189 (836.4MHz)

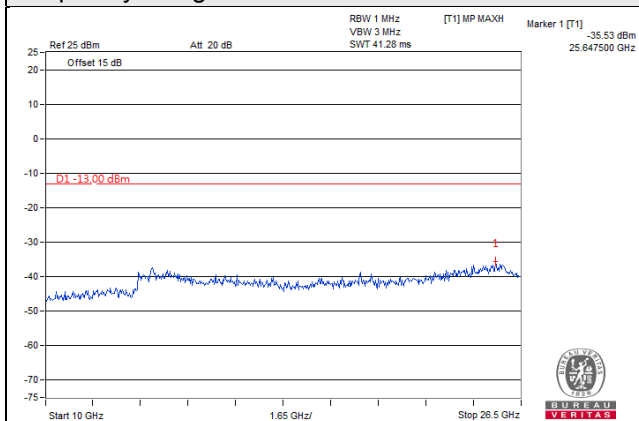
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



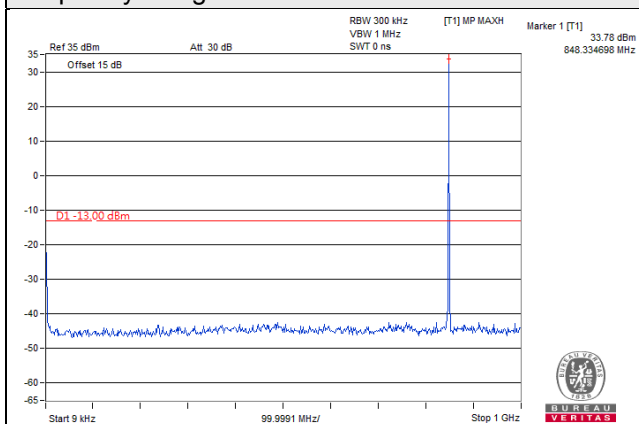
Frequency Range : 10GHz~26.5GHz



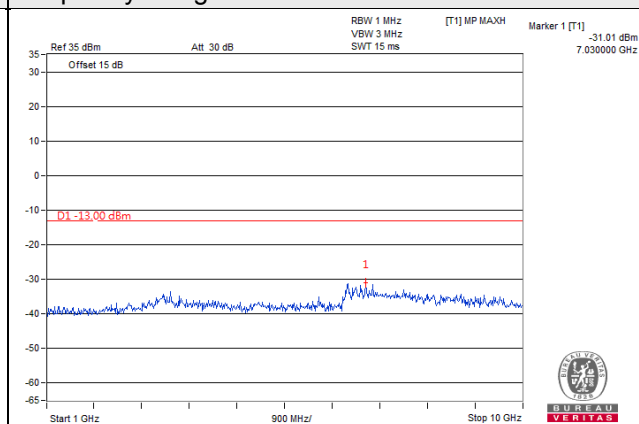
\*The 9kHz signal over the limit is from Spectrum.

# Channel 251 (848.8MHz)

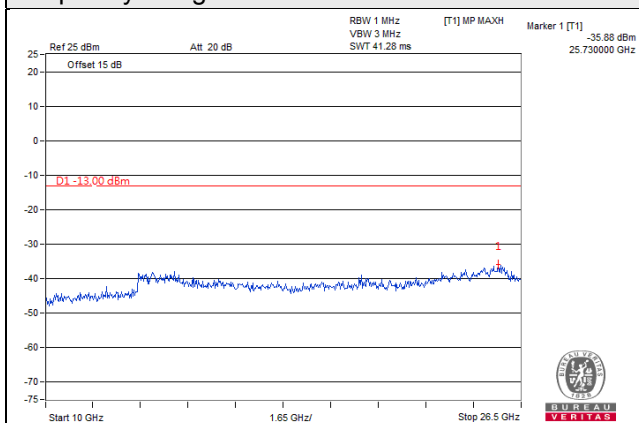
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~26.5GHz

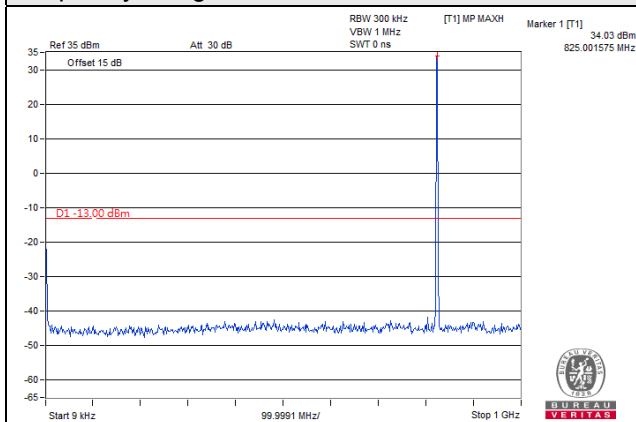


\*The 9kHz signal over the limit is from Spectrum.

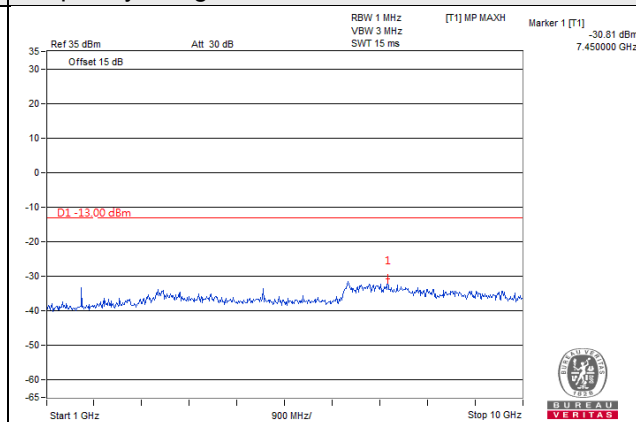
# GPRS

Channel 128 (824.2MHz)

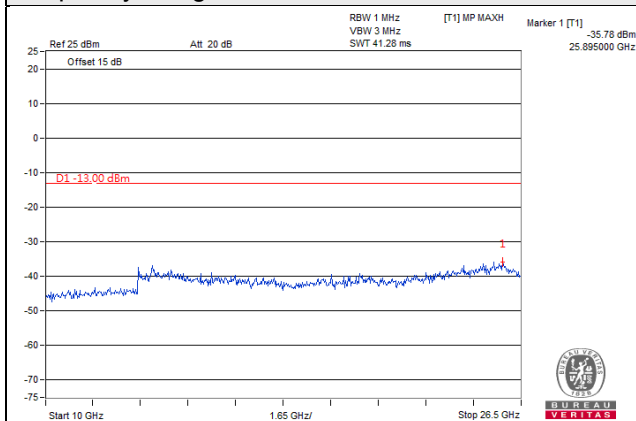
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



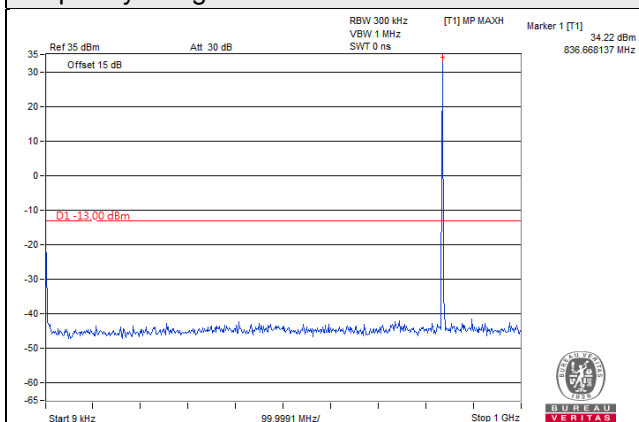
Frequency Range : 10GHz~26.5GHz



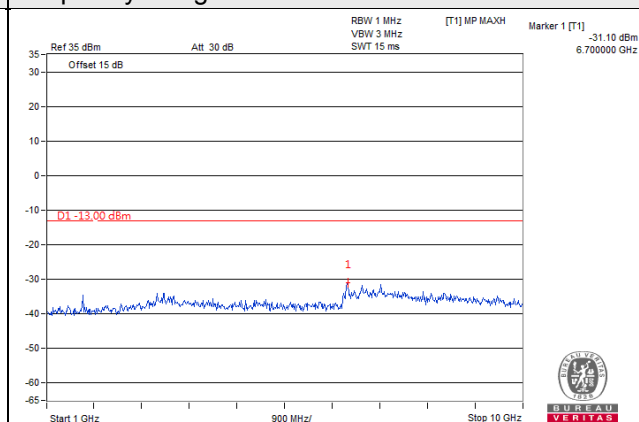
\*The 9kHz signal over the limit is from Spectrum.

# Channel 189 (836.4MHz)

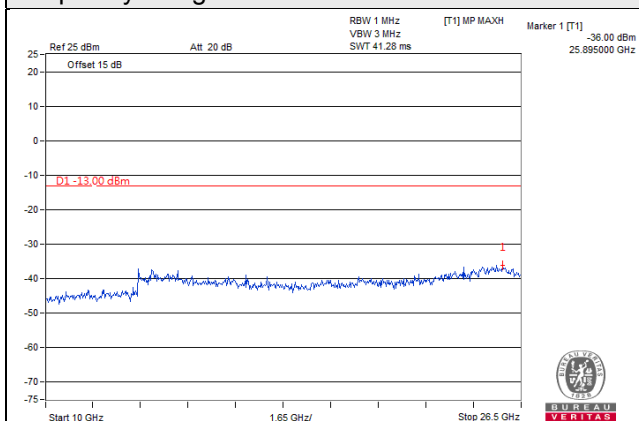
## Frequency Range : 9kHz~1GHz



## Frequency Range : 1GHz~10GHz



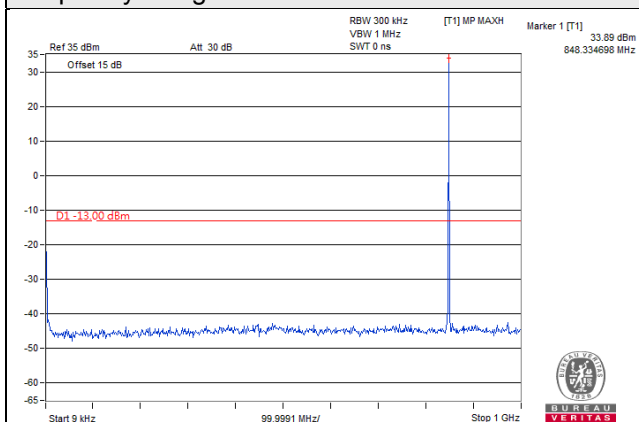
## Frequency Range : 10GHz~26.5GHz



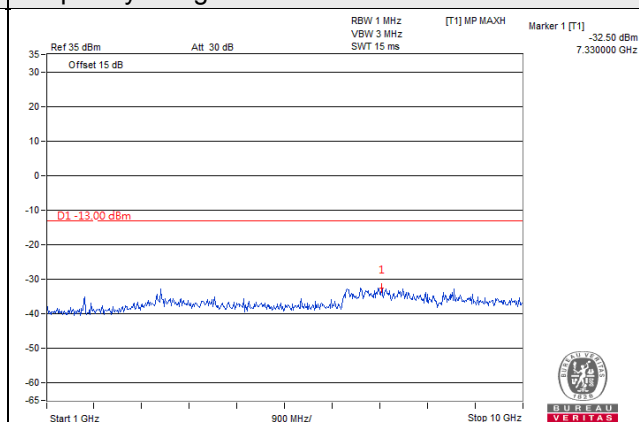
\*The 9kHz signal over the limit is from Spectrum.

# Channel 251 (848.8MHz)

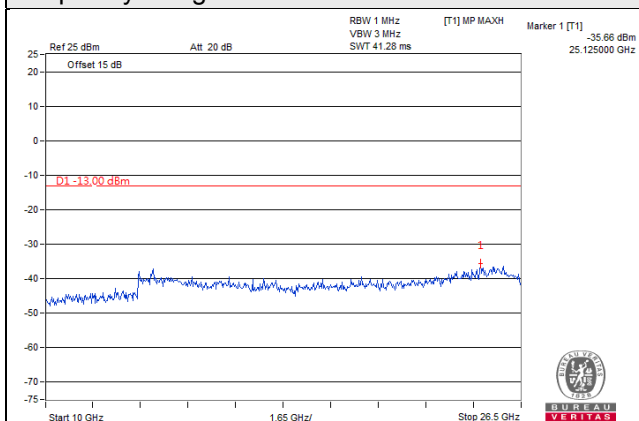
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~26.5GHz

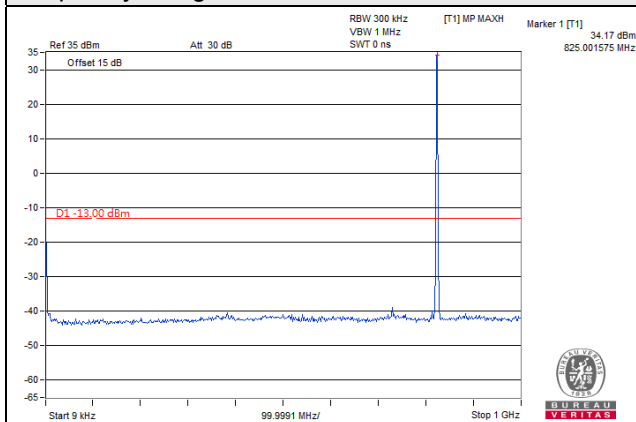


\*The 9kHz signal over the limit is from Spectrum.

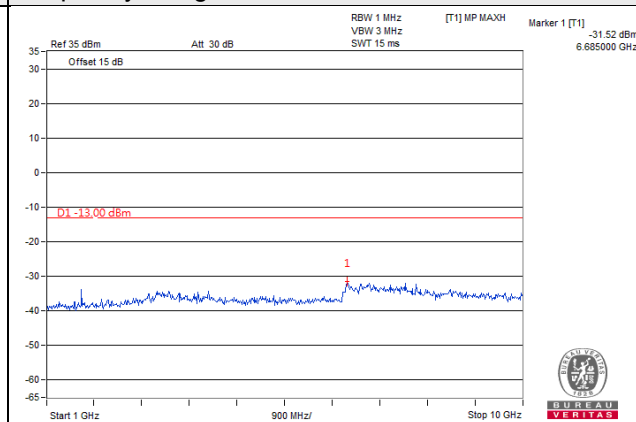
# EDGE

Channel 128 (824.2MHz)

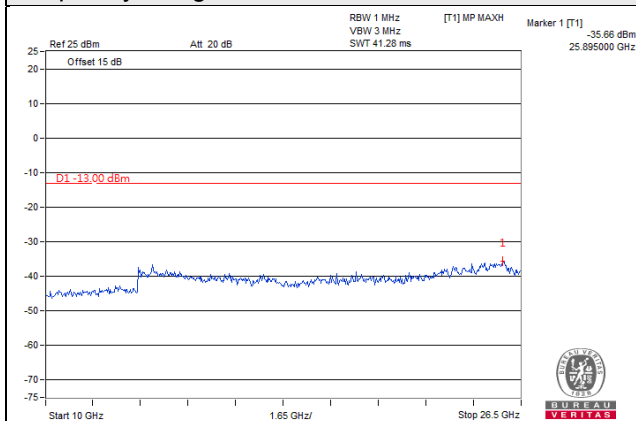
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



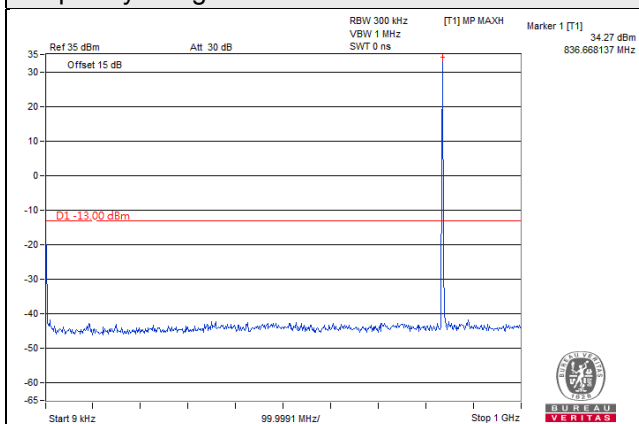
Frequency Range : 10GHz~26.5GHz



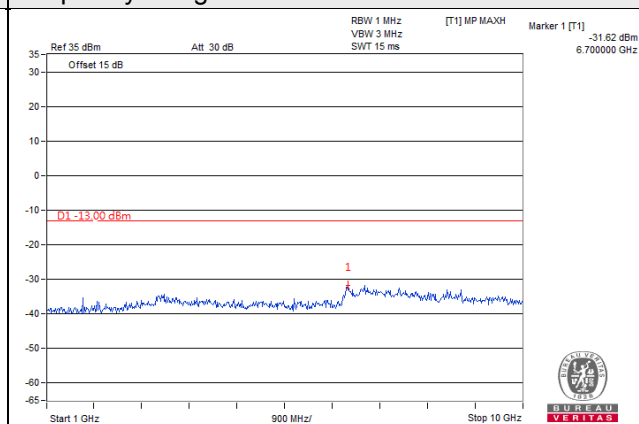
\*The 9kHz signal over the limit is from Spectrum.

# Channel 189 (836.4MHz)

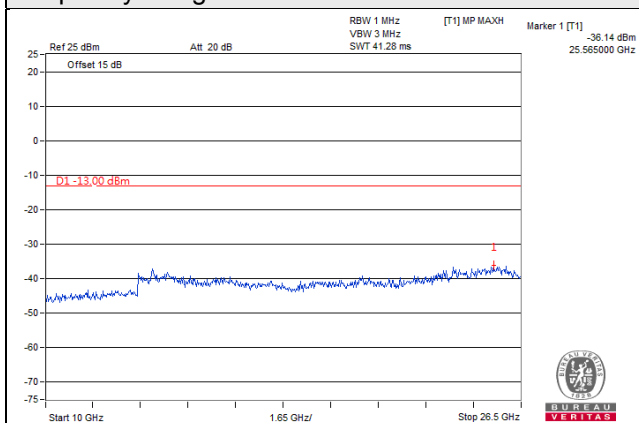
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



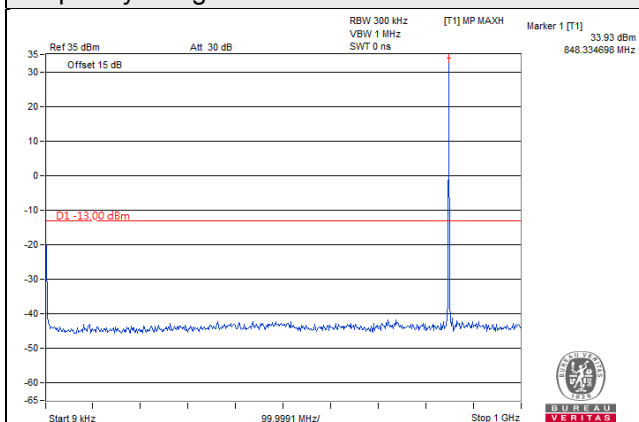
Frequency Range : 10GHz~26.5GHz



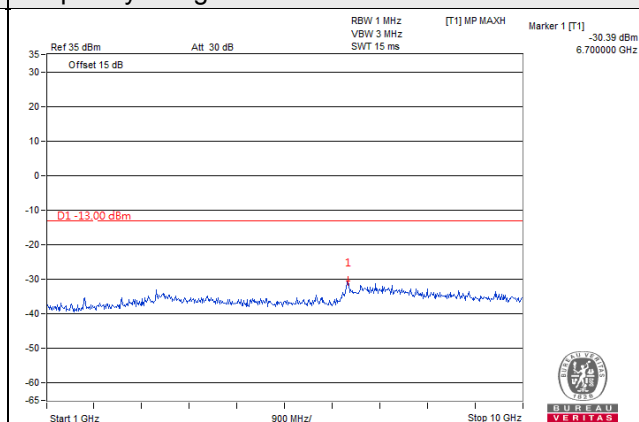
\*The 9kHz signal over the limit is from Spectrum.

# Channel 251 (848.8MHz)

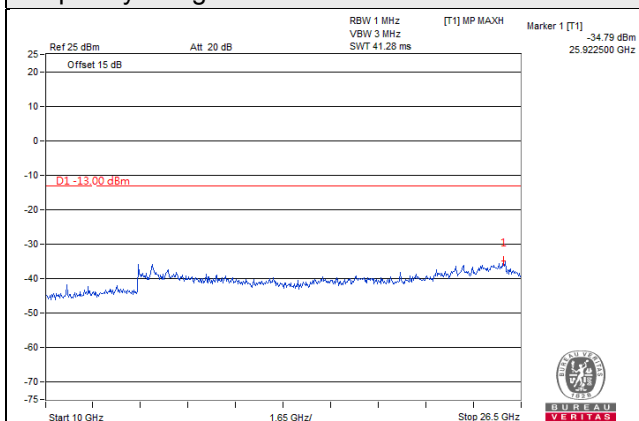
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~26.5GHz

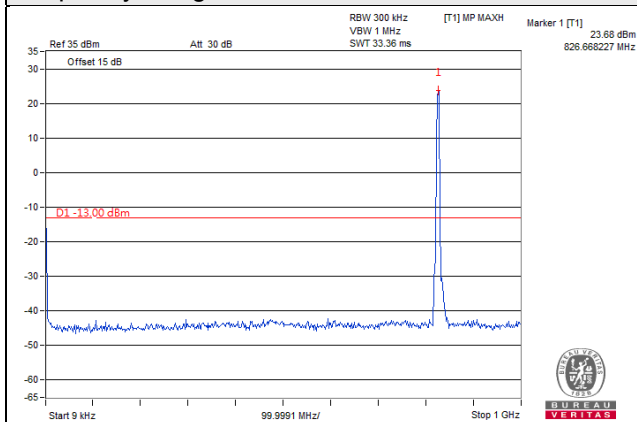


\*The 9kHz signal over the limit is from Spectrum.

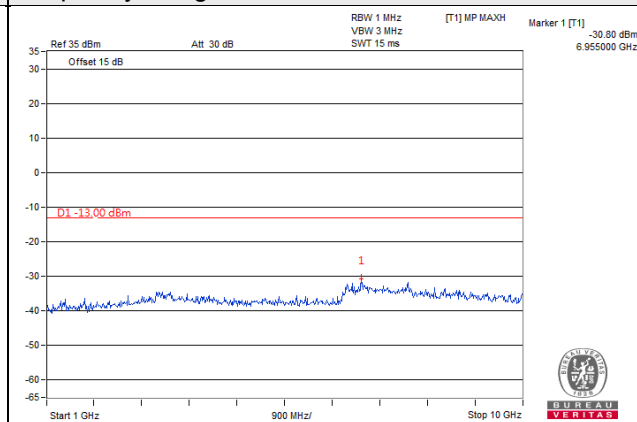
# WCDMA

Channel 4132 (826.4MHz)

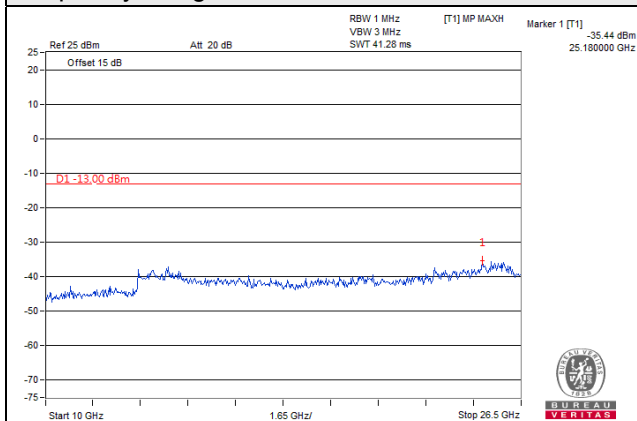
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



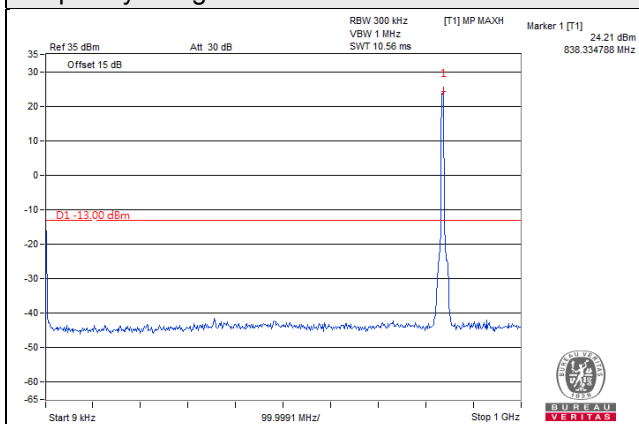
Frequency Range : 10GHz~26.5GHz



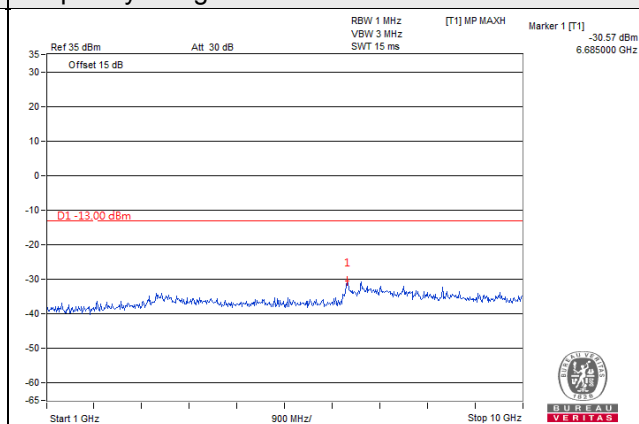
\*The 9kHz signal over the limit is from Spectrum.

# Channel 4182 (836.4MHz)

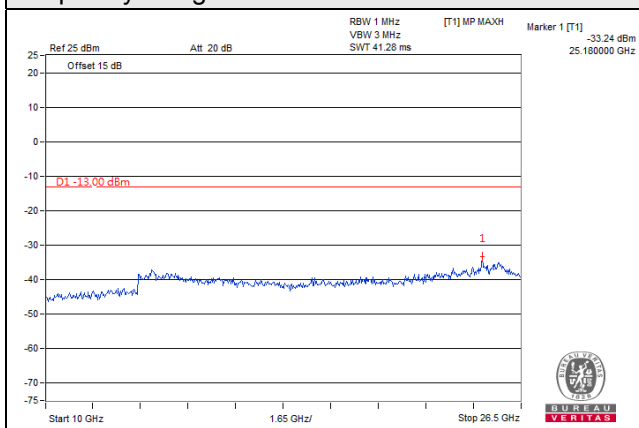
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



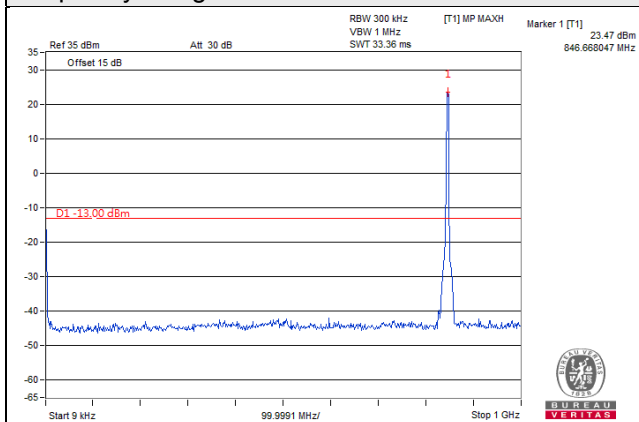
Frequency Range : 10GHz~26.5GHz



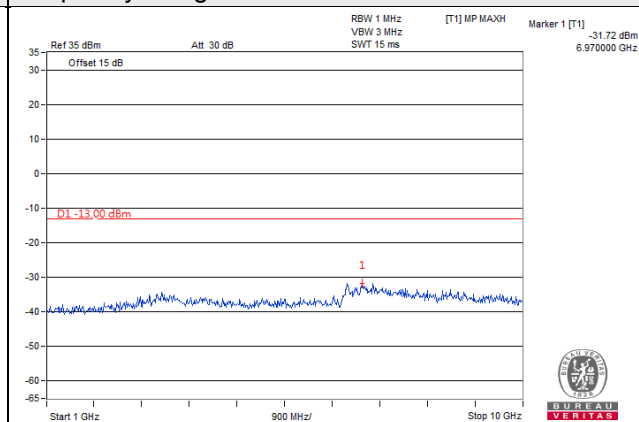
\*The 9kHz signal over the limit is from Spectrum.

# Channel 4233 (846.6MHz)

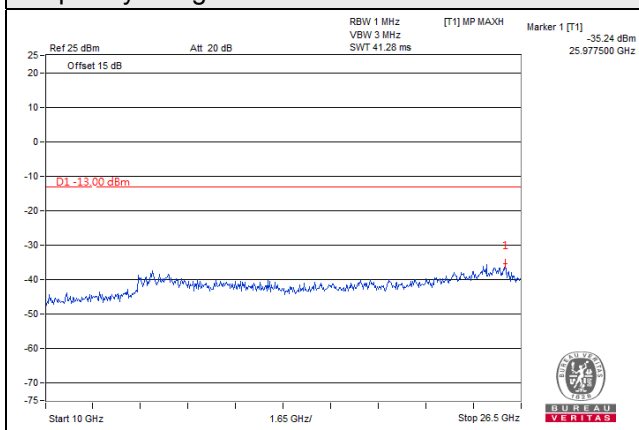
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~26.5GHz

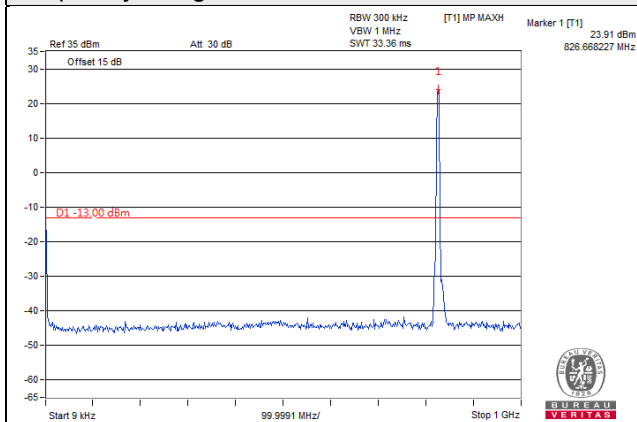


\*The 9kHz signal over the limit is from Spectrum.

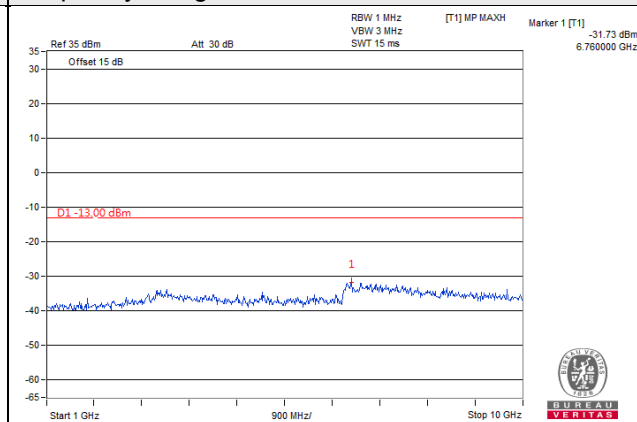
# HSDPA

Channel 4132 (826.4MHz)

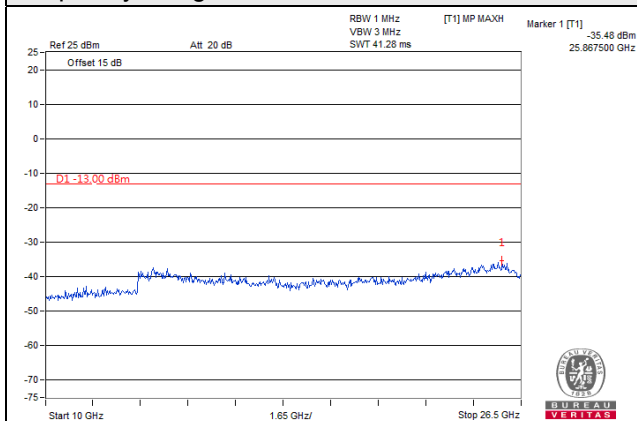
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



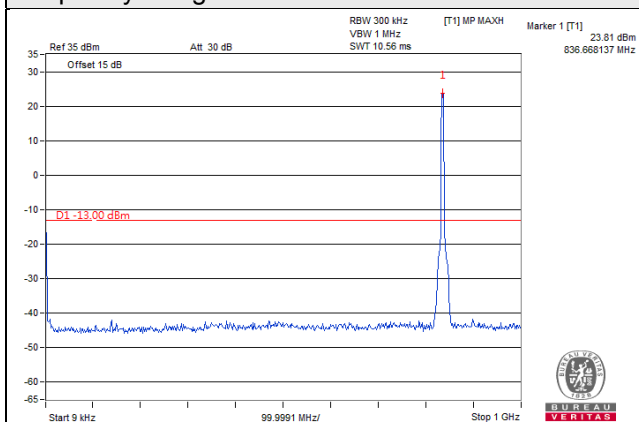
Frequency Range : 10GHz~26.5GHz



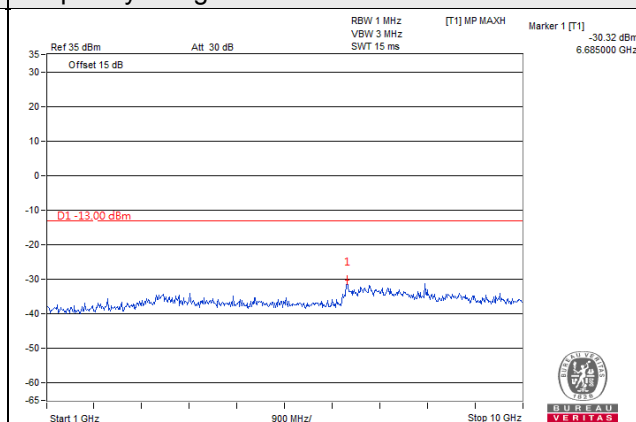
\*The 9kHz signal over the limit is from Spectrum.

# Channel 4182 (836.4MHz)

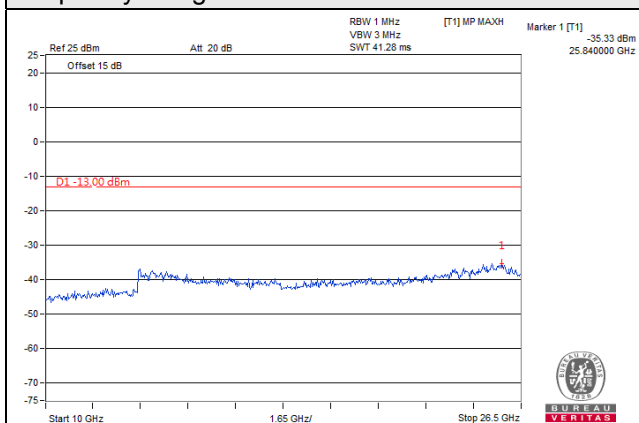
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



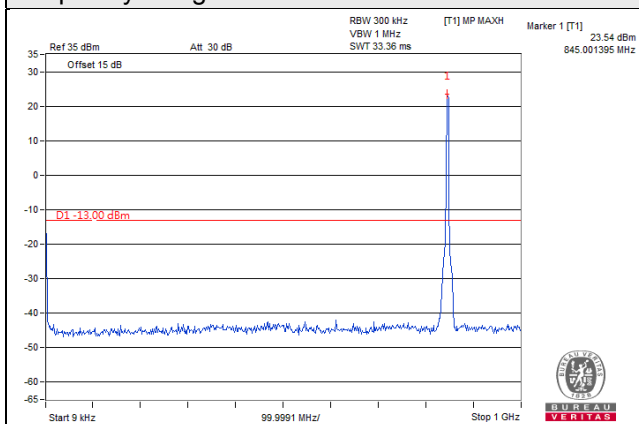
Frequency Range : 10GHz~26.5GHz



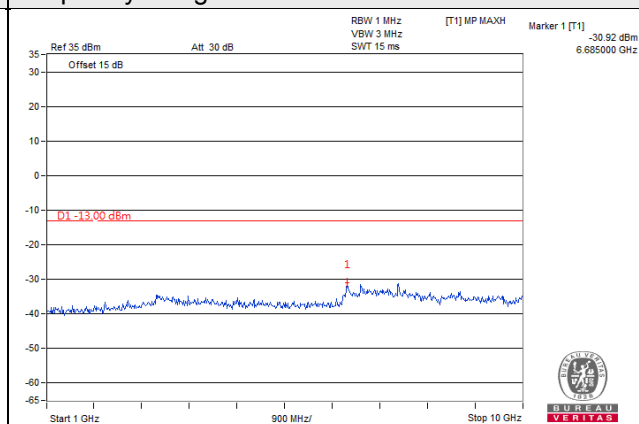
\*The 9kHz signal over the limit is from Spectrum.

# Channel 4233 (846.6MHz)

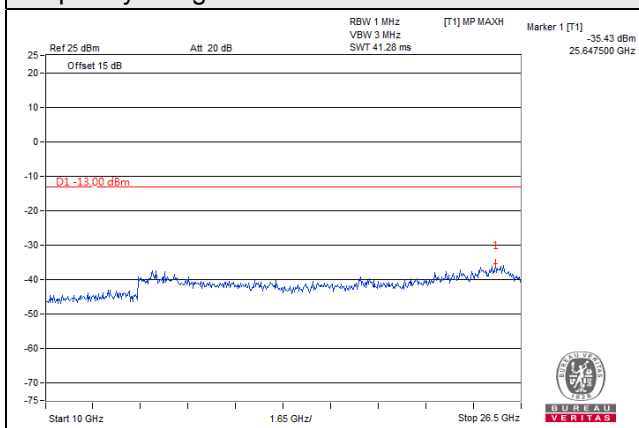
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~26.5GHz

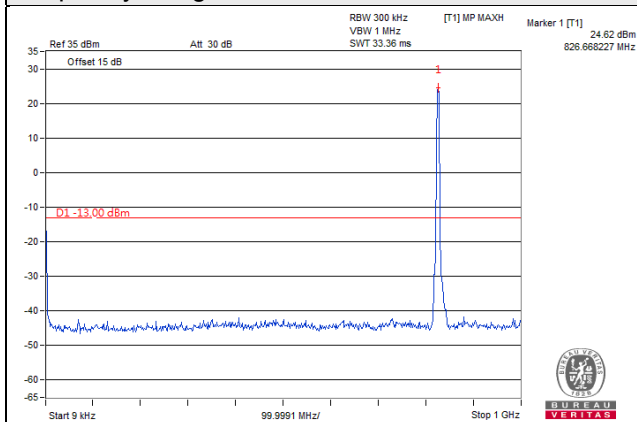


\*The 9kHz signal over the limit is from Spectrum.

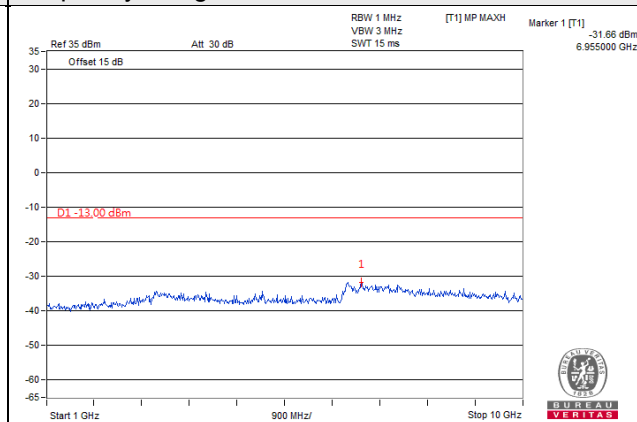
# HSUPA

Channel 4132 (826.4MHz)

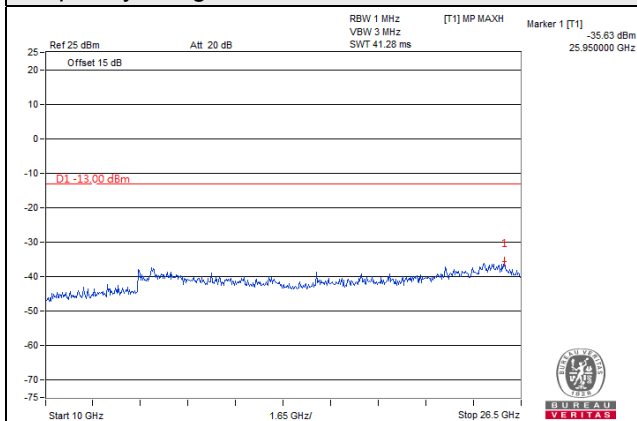
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



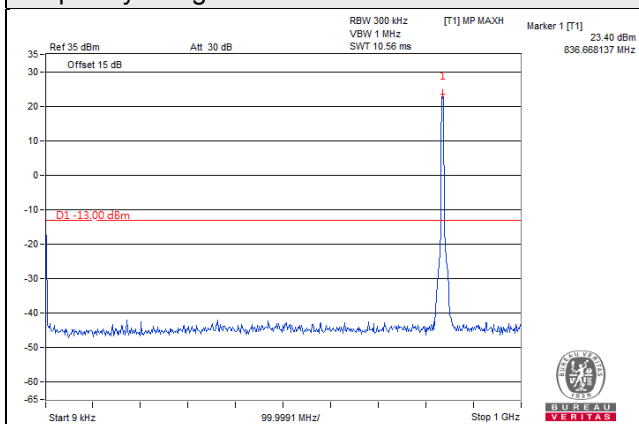
Frequency Range : 10GHz~26.5GHz



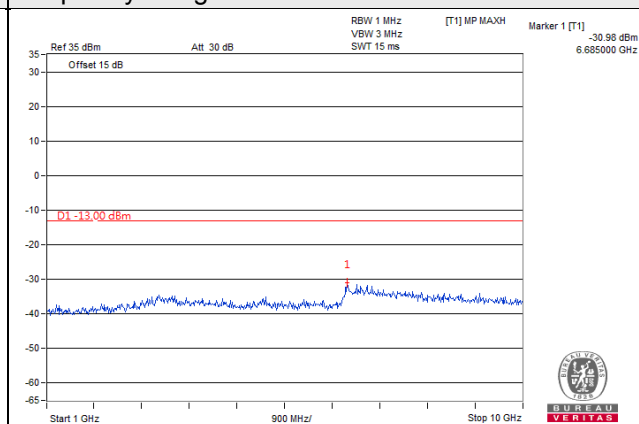
\*The 9kHz signal over the limit is from Spectrum.

# Channel 4182 (836.4MHz)

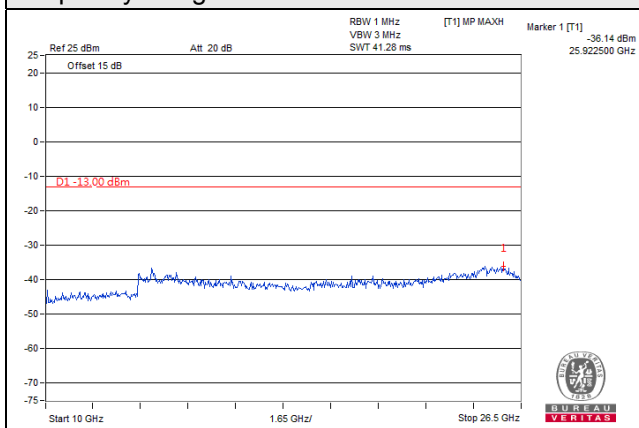
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



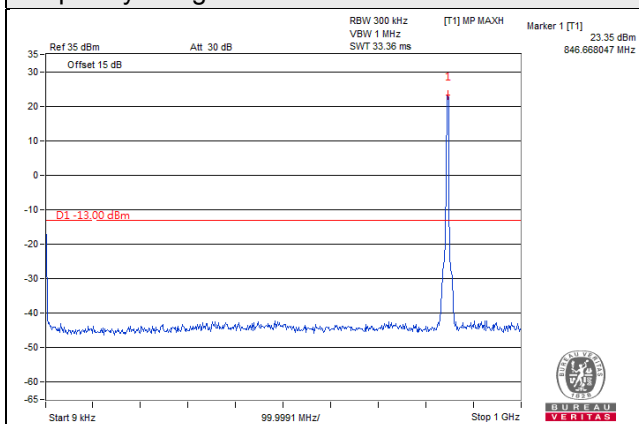
Frequency Range : 10GHz~26.5GHz



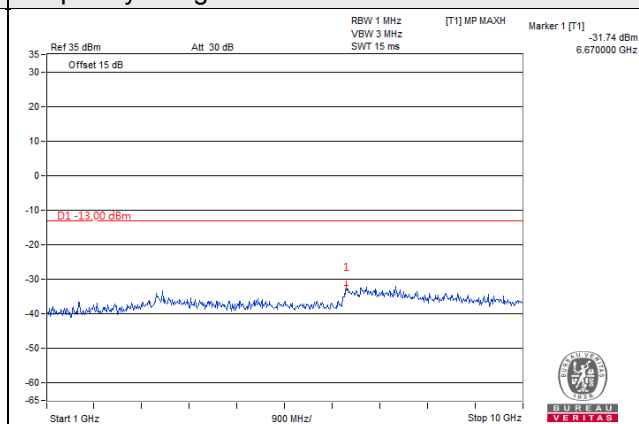
\*The 9kHz signal over the limit is from Spectrum.

# Channel 4233 (846.6MHz)

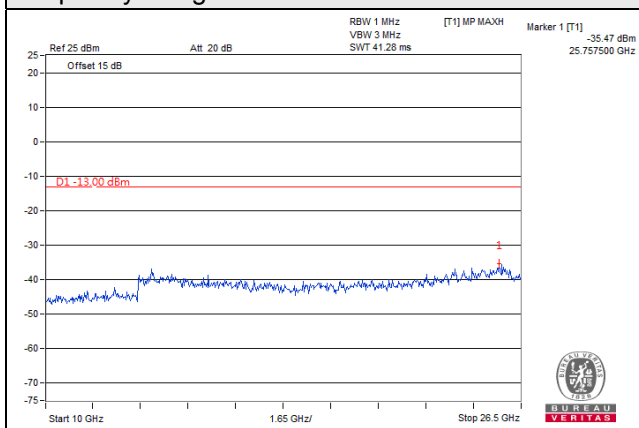
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~26.5GHz

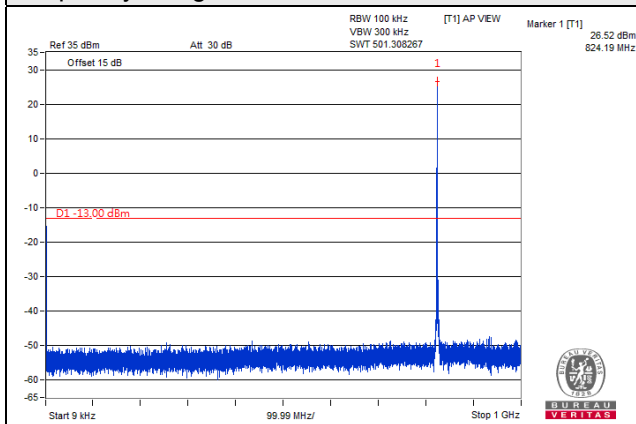


\*The 9kHz signal over the limit is from Spectrum.

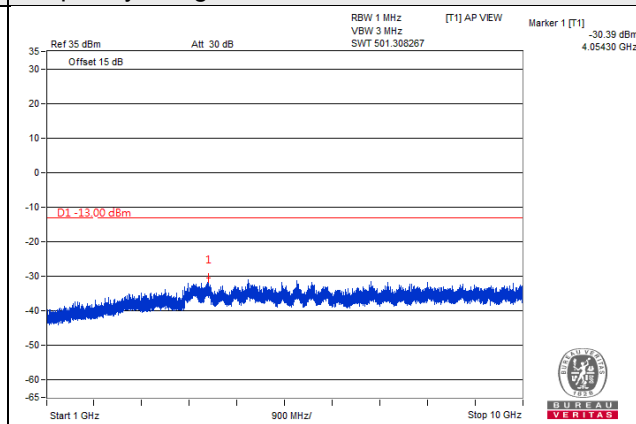
LTE Band 5, Channel Bandwidth 1.4MHz

Channel 20407 (824.7MHz)

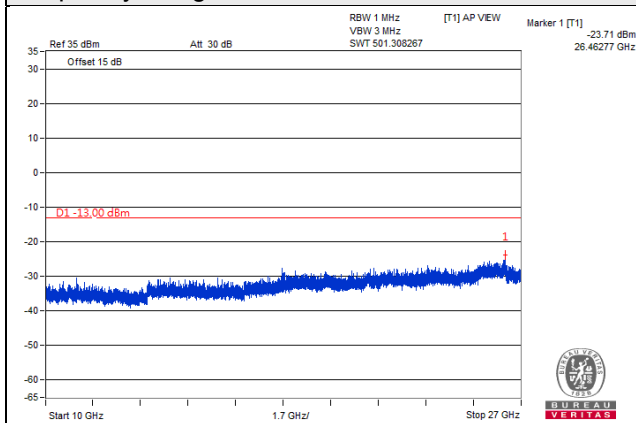
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



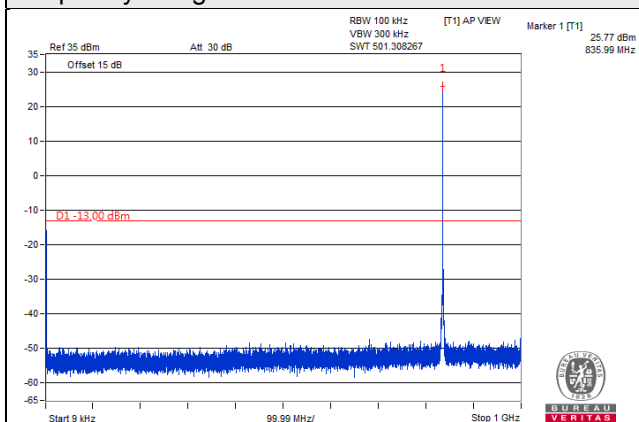
Frequency Range : 10GHz~27GHz



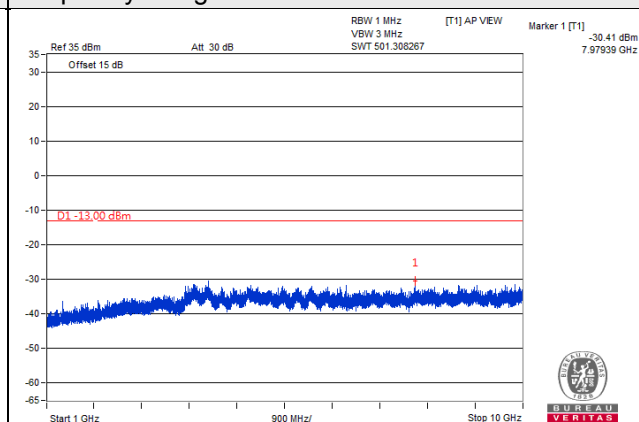
\*The 9kHz signal over the limit is from Spectrum.

# Channel 20525 (836.5MHz)

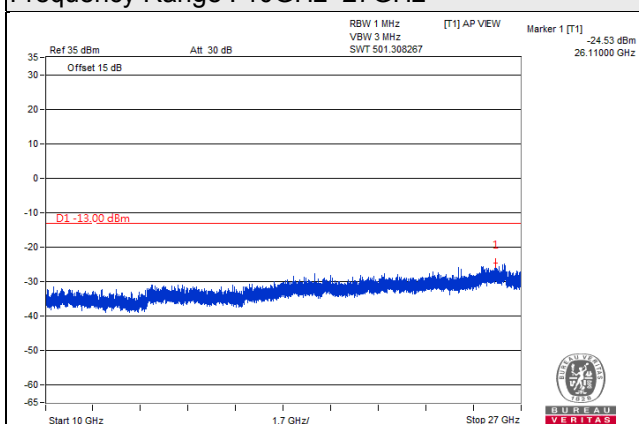
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



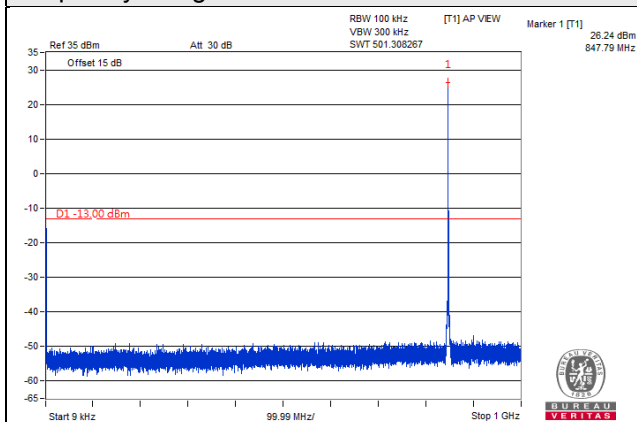
Frequency Range : 10GHz~27GHz



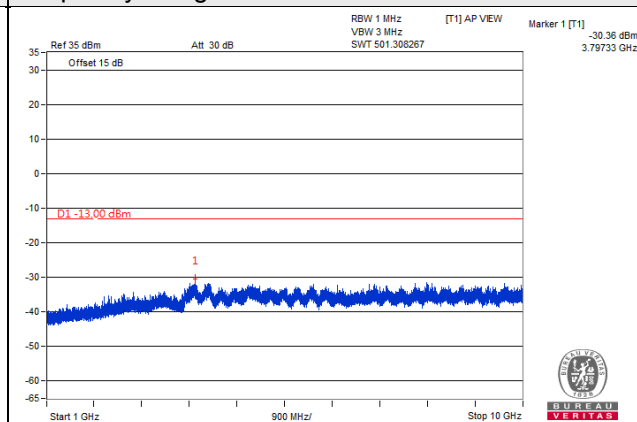
\*The 9kHz signal over the limit is from Spectrum.

# Channel 20643 (848.3MHz)

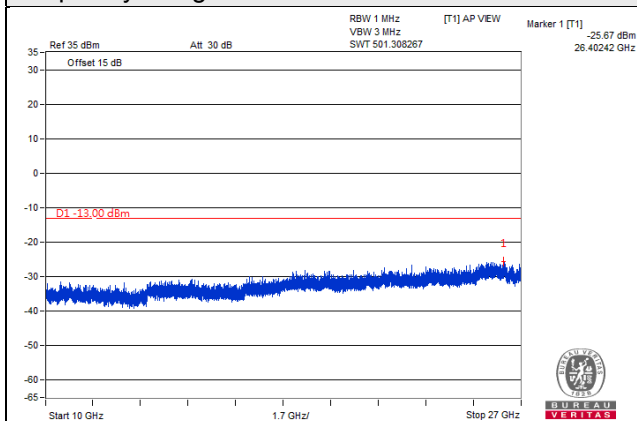
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

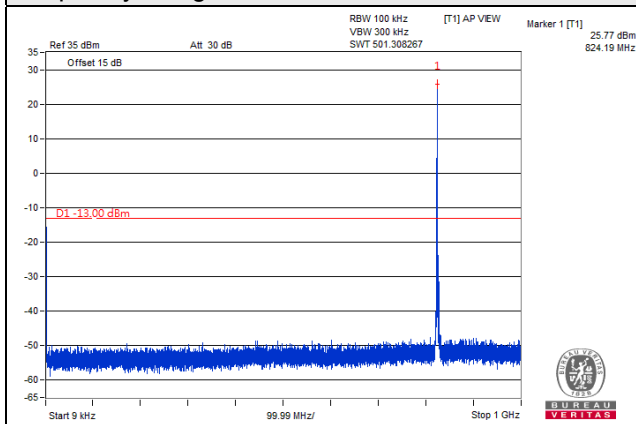


\*The 9kHz signal over the limit is from Spectrum.

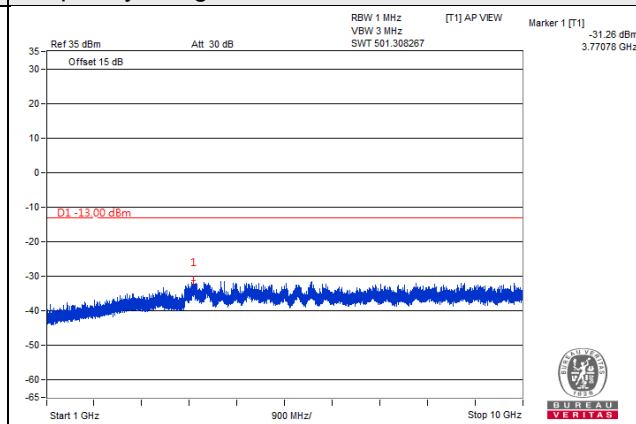
# LTE Band 5, Channel Bandwidth 3MHz

Channel 20415 (825.5MHz)

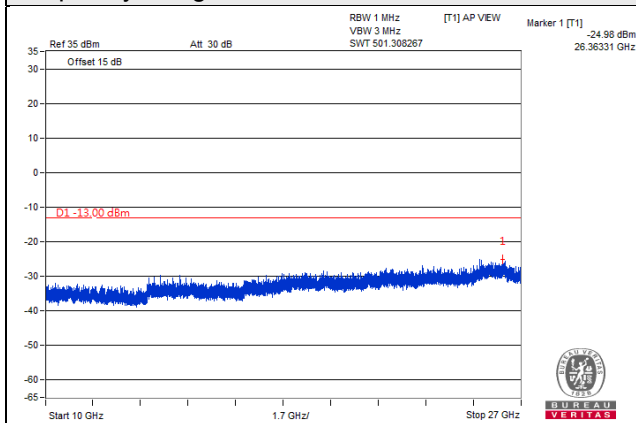
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



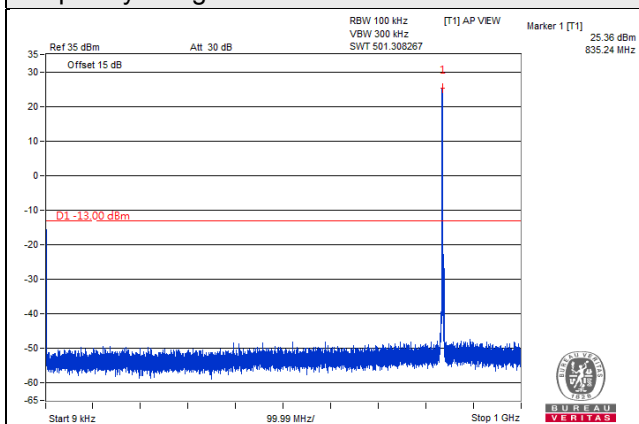
Frequency Range : 10GHz~27GHz



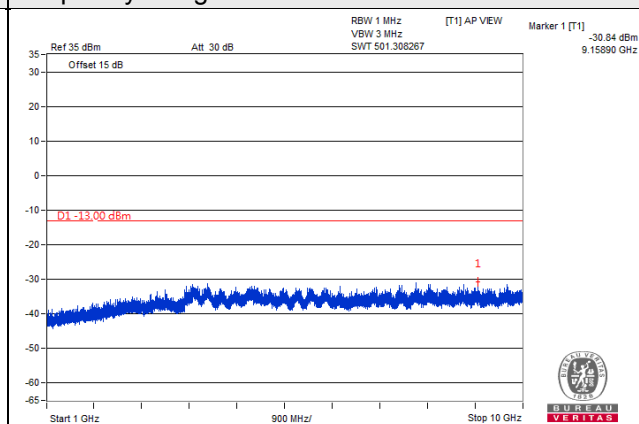
\*The 9kHz signal over the limit is from Spectrum.

# Channel 20525 (836.5MHz)

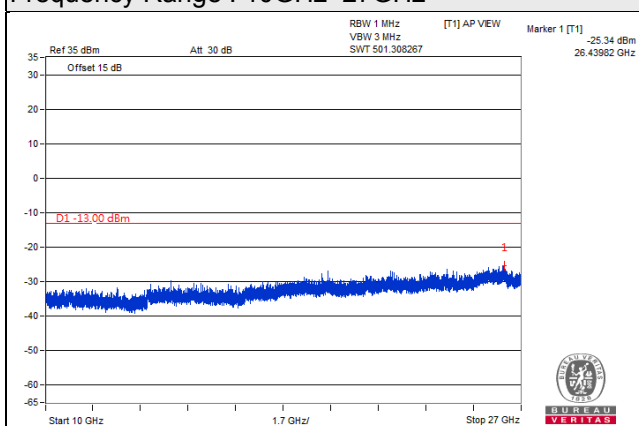
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



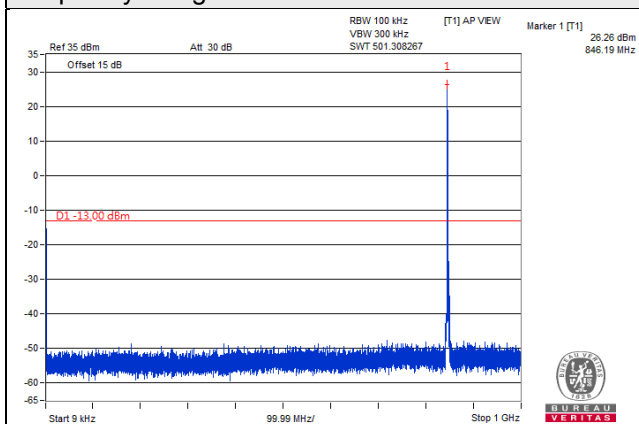
Frequency Range : 10GHz~27GHz



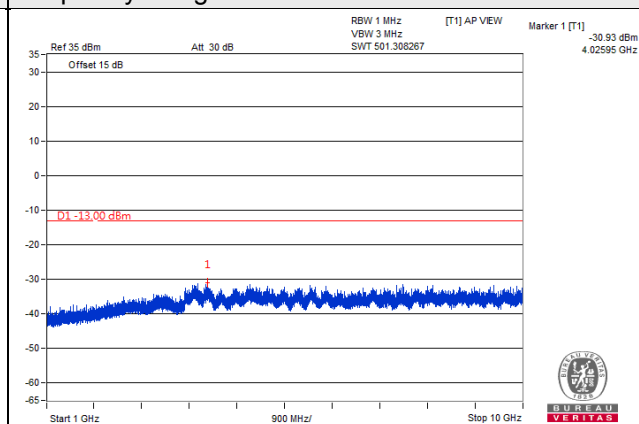
\*The 9kHz signal over the limit is from Spectrum.

# Channel 20635 (847.5MHz)

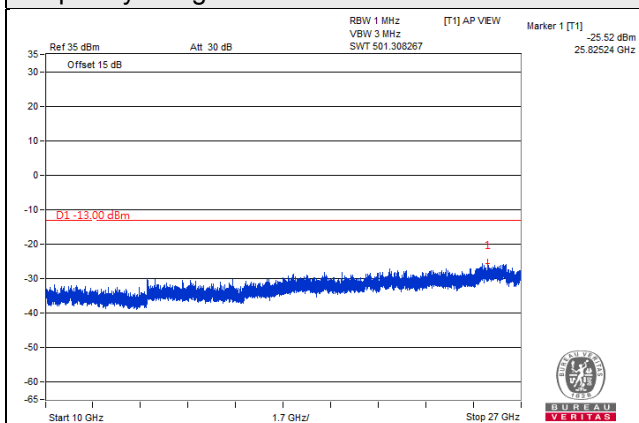
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

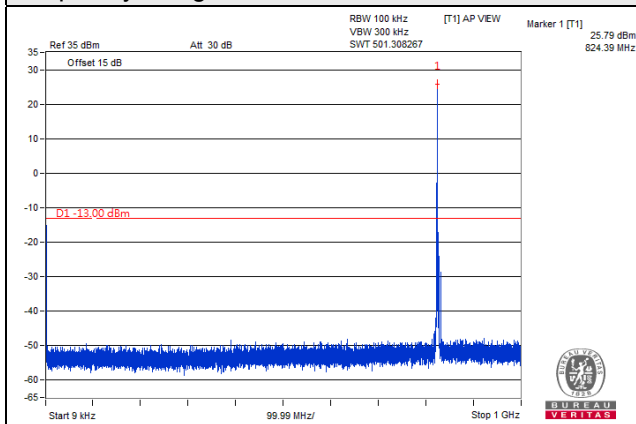


\*The 9kHz signal over the limit is from Spectrum.

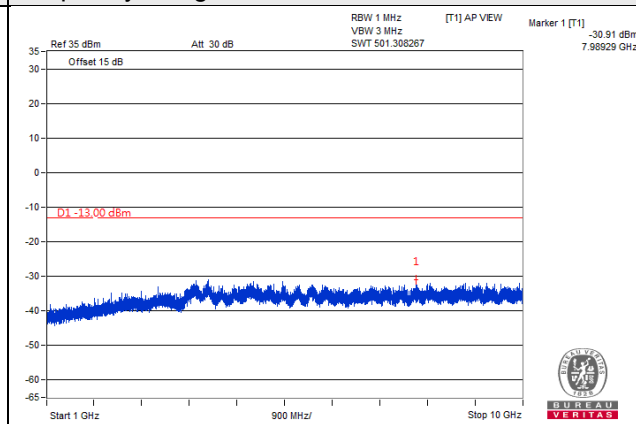
# LTE Band 5, Channel Bandwidth 5MHz

Channel 20425 (826.5MHz)

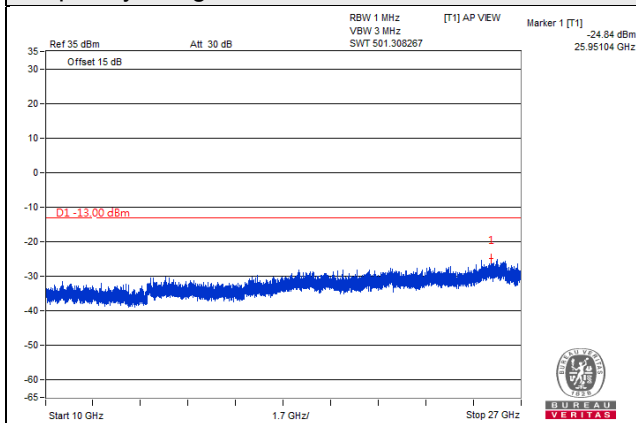
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



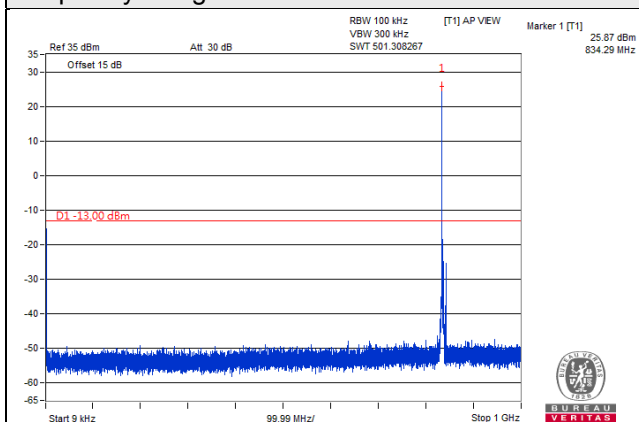
Frequency Range : 10GHz~27GHz



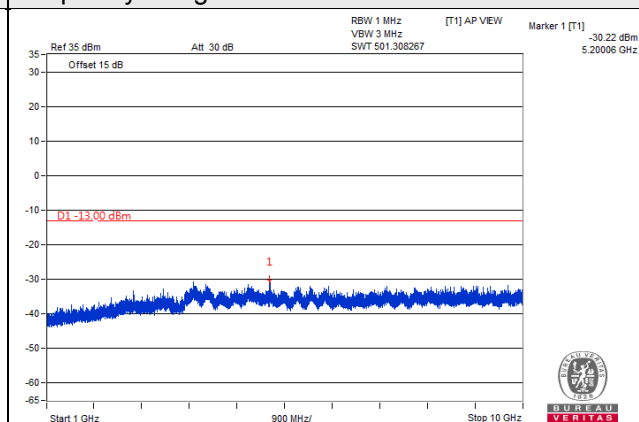
\*The 9kHz signal over the limit is from Spectrum.

# Channel 20525 (836.5MHz)

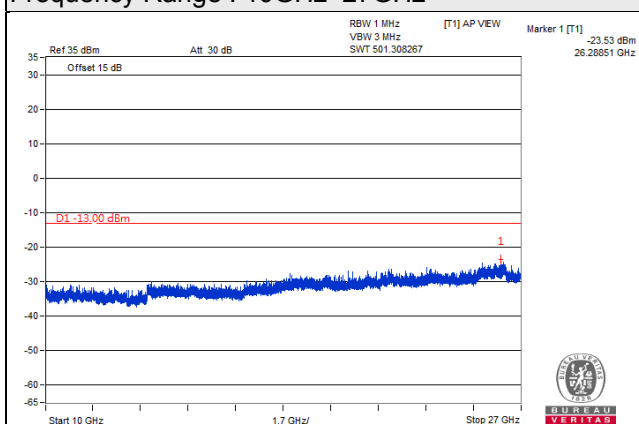
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



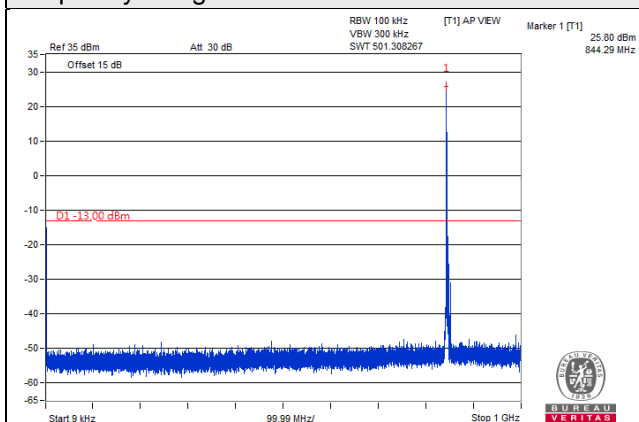
Frequency Range : 10GHz~27GHz



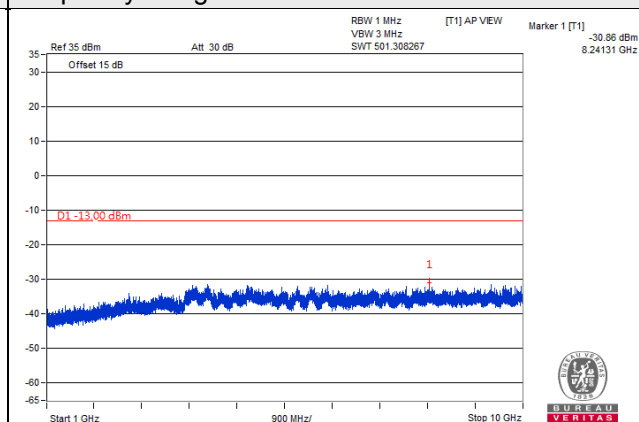
\*The 9kHz signal over the limit is from Spectrum.

# Channel 20625 (846.5MHz)

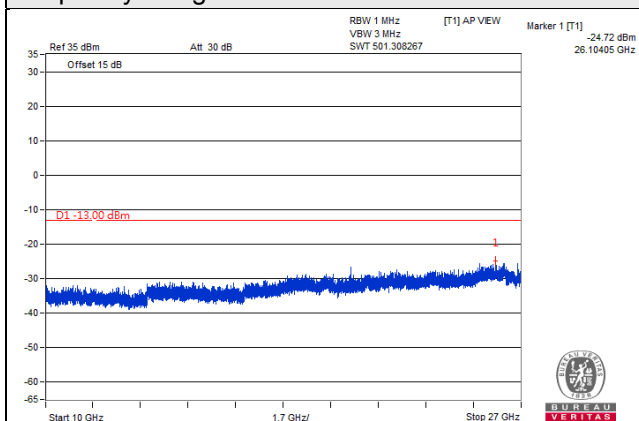
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

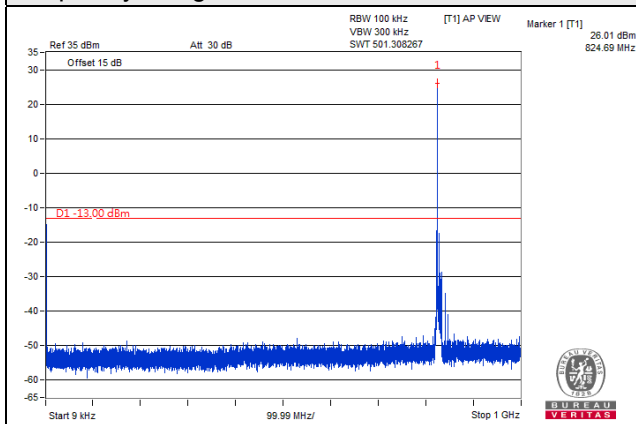


\*The 9kHz signal over the limit is from Spectrum.

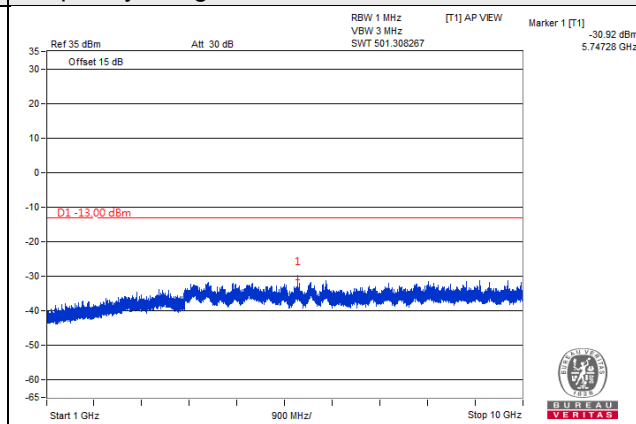
# LTE Band 5, Channel Bandwidth 10MHz

Channel 20450 (829.0MHz)

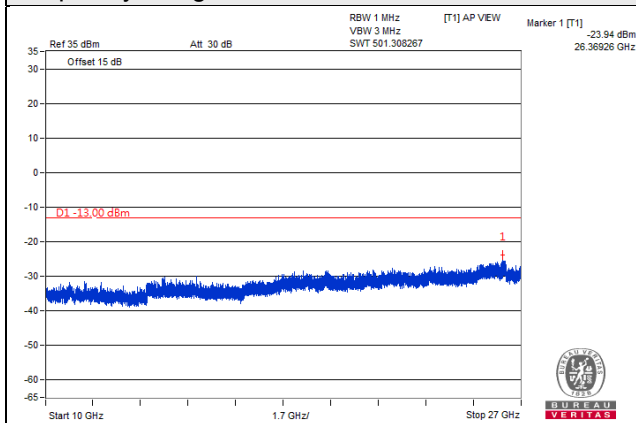
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



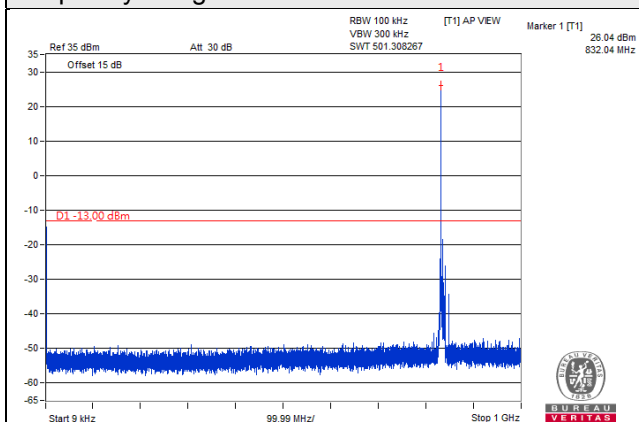
Frequency Range : 10GHz~27GHz



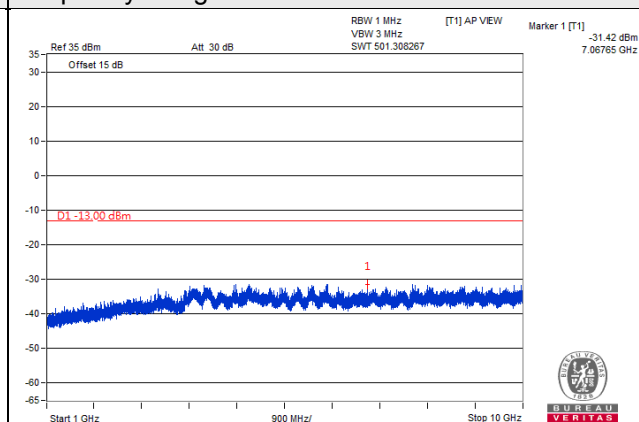
\*The 9kHz signal over the limit is from Spectrum.

# Channel 20525 (836.5MHz)

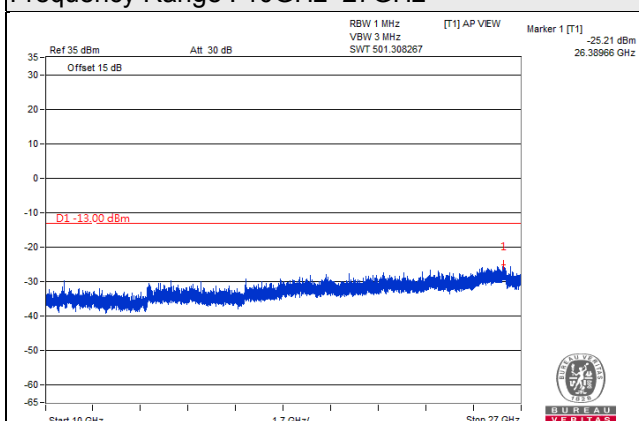
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



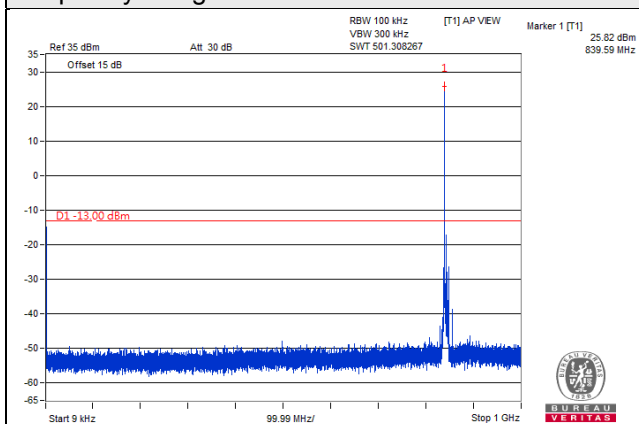
Frequency Range : 10GHz~27GHz



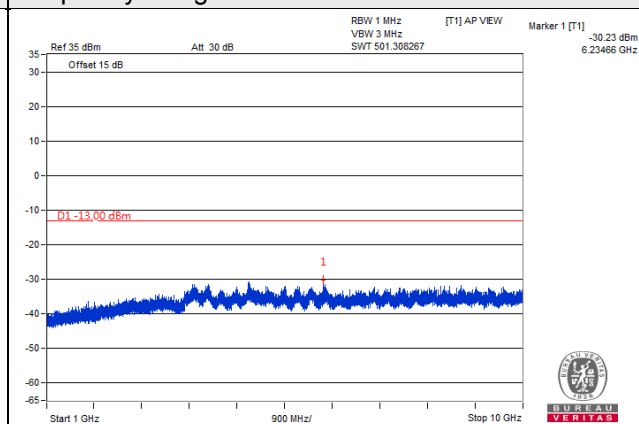
\*The 9kHz signal over the limit is from Spectrum.

# Channel 20600 (844.0MHz)

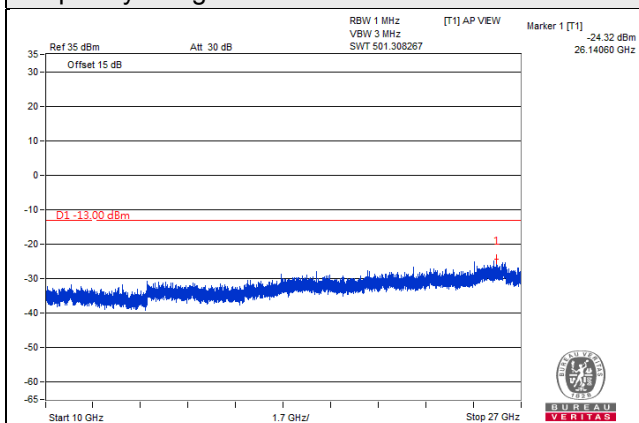
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz



\*The 9kHz signal over the limit is from Spectrum.

## **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 0.8m 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.
- 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,  $\text{E.R.P power} = \text{E.I.R.P power} - 2.15\text{dBi}$ .

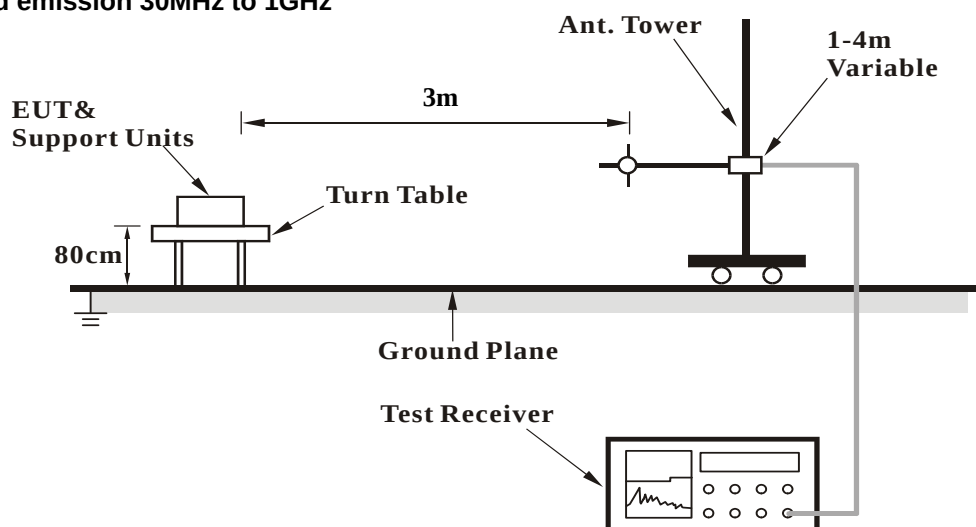
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

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

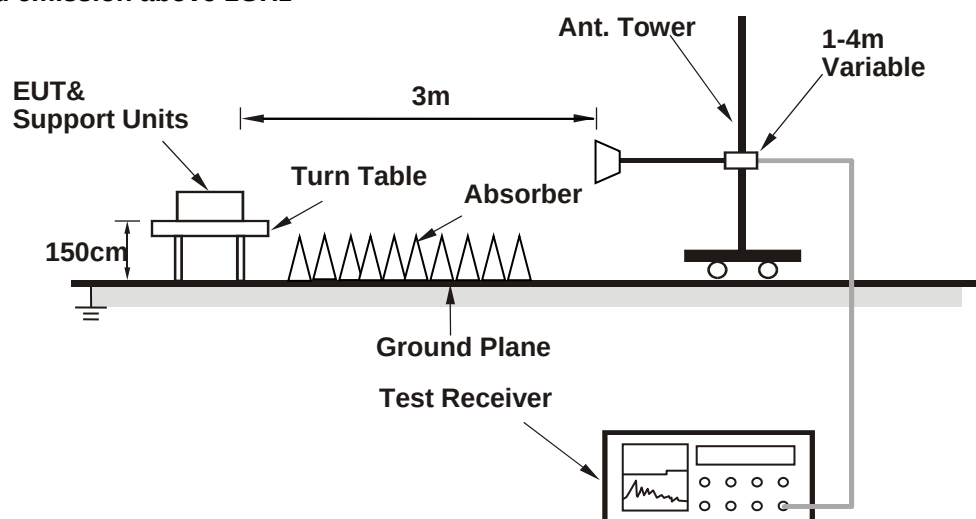
No deviation.

#### 4.8.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



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

#### 4.8.5 Test Results

Below 1GHz

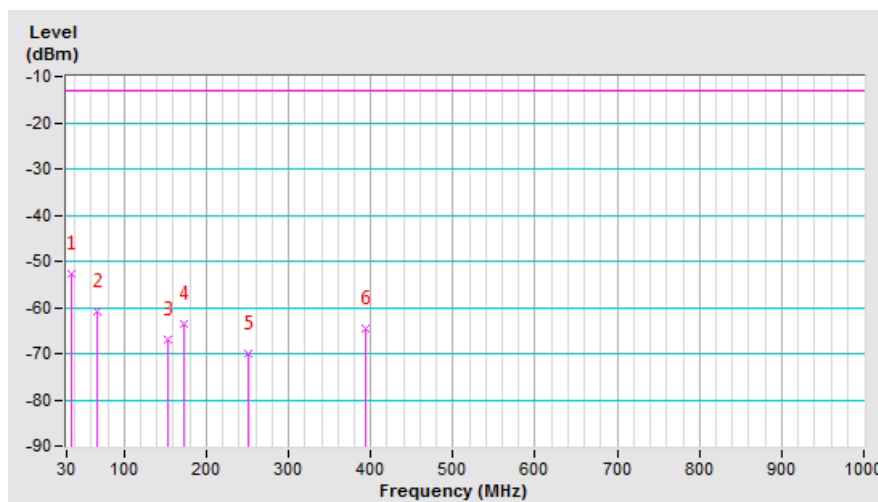
GSM Mode

|                          |                              |                 |                |
|--------------------------|------------------------------|-----------------|----------------|
| Mode                     | TX channel 128<br>(824.2MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH              | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                       |                 |                |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 35.82       | -54.1         | -36.8                 | -15.9                  | -52.7     | -13.0       | -39.7       |
| 2                                                   | 66.86       | -52.0         | -59.5                 | -1.5                   | -61.0     | -13.0       | -48.0       |
| 3                                                   | 153.19      | -60.6         | -64.1                 | -2.9                   | -67.0     | -13.0       | -54.0       |
| 4                                                   | 172.59      | -54.2         | -60.7                 | -2.9                   | -63.6     | -13.0       | -50.6       |
| 5                                                   | 251.16      | -61.6         | -68.5                 | -1.4                   | -69.9     | -13.0       | -56.9       |
| 6                                                   | 393.75      | -61.8         | -67.9                 | 3.3                    | -64.6     | -13.0       | -51.6       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

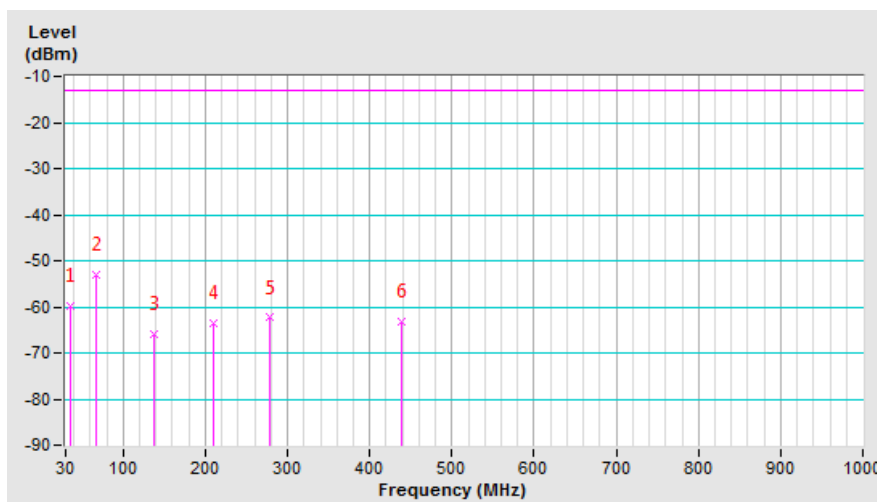


|                          |                              |                 |                |
|--------------------------|------------------------------|-----------------|----------------|
| Mode                     | TX channel 128<br>(824.2MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH              | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                       |                 |                |

| Antenna Polarity & Test Distance: Vertical at 3 M |             |               |                       |                        |           |             |             |
|---------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                               | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                 | 35.82       | -48.0         | -44.0                 | -15.9                  | -59.9     | -13.0       | -46.9       |
| 2                                                 | 66.86       | -43.5         | -51.4                 | -1.5                   | -52.9     | -13.0       | -39.9       |
| 3                                                 | 136.70      | -60.6         | -62.8                 | -3.2                   | -66.0     | -13.0       | -53.0       |
| 4                                                 | 209.45      | -58.5         | -61.7                 | -2.0                   | -63.7     | -13.0       | -50.7       |
| 5                                                 | 278.32      | -63.5         | -60.8                 | -1.6                   | -62.4     | -13.0       | -49.4       |
| 6                                                 | 439.34      | -61.1         | -66.7                 | 3.5                    | -63.2     | -13.0       | -50.2       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



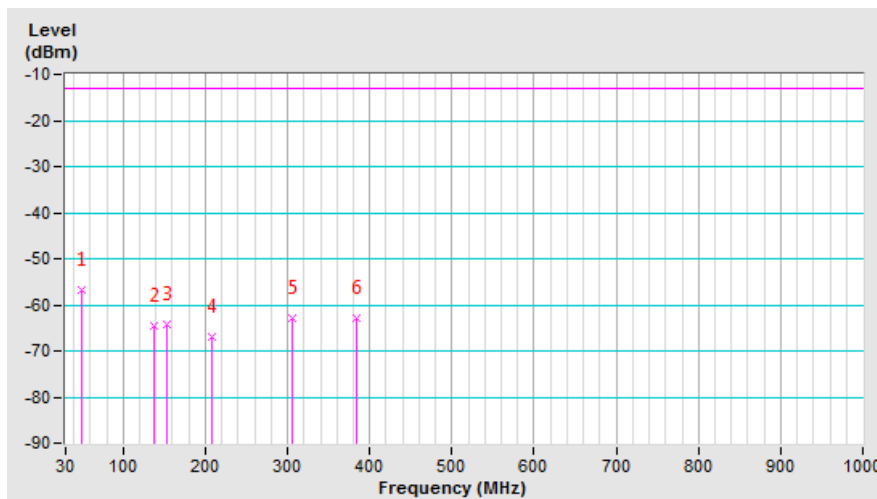
# WCDMA Band 5

|                          |                            |                 |                |
|--------------------------|----------------------------|-----------------|----------------|
| Mode                     | TX channel 4132 (826.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH            | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                     |                 |                |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 49.40       | -54.4         | -48.6                 | -8.3                   | -56.9     | -13.0       | -43.9       |
| 2                                                   | 137.67      | -56.3         | -61.4                 | -3.2                   | -64.6     | -13.0       | -51.6       |
| 3                                                   | 154.16      | -57.8         | -61.3                 | -2.9                   | -64.2     | -13.0       | -51.2       |
| 4                                                   | 208.48      | -56.5         | -65.0                 | -2.0                   | -67.0     | -13.0       | -54.0       |
| 5                                                   | 306.45      | -56.5         | -66.8                 | 3.9                    | -62.9     | -13.0       | -49.9       |
| 6                                                   | 383.08      | -59.6         | -66.4                 | 3.5                    | -62.9     | -13.0       | -49.9       |

## Remarks:

- ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
- Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

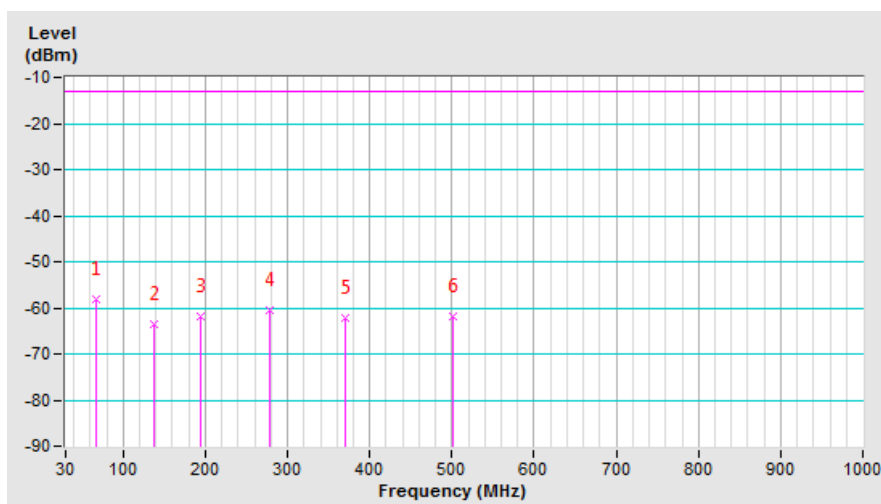


|                          |                               |                 |                |
|--------------------------|-------------------------------|-----------------|----------------|
| Mode                     | TX channel 4132<br>(826.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH               | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                        |                 |                |

| Antenna Polarity & Test Distance: Vertical at 3 M |             |               |                       |                        |           |             |             |
|---------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                               | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                 | 66.86       | -48.9         | -56.7                 | -1.5                   | -58.2     | -13.0       | -45.2       |
| 2                                                 | 137.67      | -58.4         | -60.5                 | -3.2                   | -63.7     | -13.0       | -50.7       |
| 3                                                 | 194.90      | -58.5         | -59.1                 | -2.6                   | -61.7     | -13.0       | -48.7       |
| 4                                                 | 279.29      | -61.6         | -58.9                 | -1.6                   | -60.5     | -13.0       | -47.5       |
| 5                                                 | 370.47      | -59.6         | -66.0                 | 3.9                    | -62.1     | -13.0       | -49.1       |
| 6                                                 | 501.42      | -59.6         | -65.7                 | 3.8                    | -61.9     | -13.0       | -48.9       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



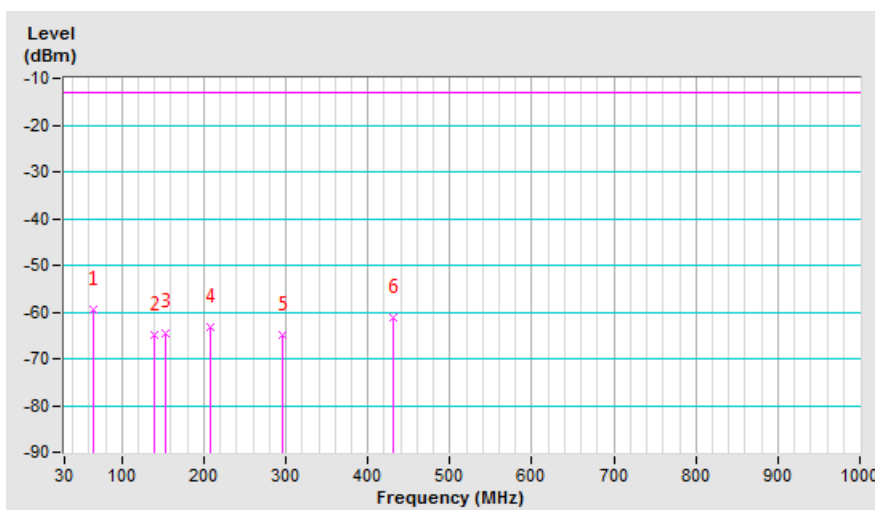
LTE Band 5, Channel Bandwidth: 1.4MHz

|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20407<br>(824.7MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                         |                 |                |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 65.89       | -50.4         | -57.7                 | -1.9                   | -59.6     | -13.0       | -46.6       |
| 2                                                   | 138.64      | -56.6         | -61.6                 | -3.2                   | -64.8     | -13.0       | -51.8       |
| 3                                                   | 153.19      | -58.1         | -61.5                 | -2.9                   | -64.4     | -13.0       | -51.4       |
| 4                                                   | 207.51      | -52.8         | -61.2                 | -2.0                   | -63.2     | -13.0       | -50.2       |
| 5                                                   | 296.75      | -60.0         | -63.1                 | -1.8                   | -64.9     | -13.0       | -51.9       |
| 6                                                   | 431.58      | -58.8         | -64.8                 | 3.5                    | -61.3     | -13.0       | -48.3       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

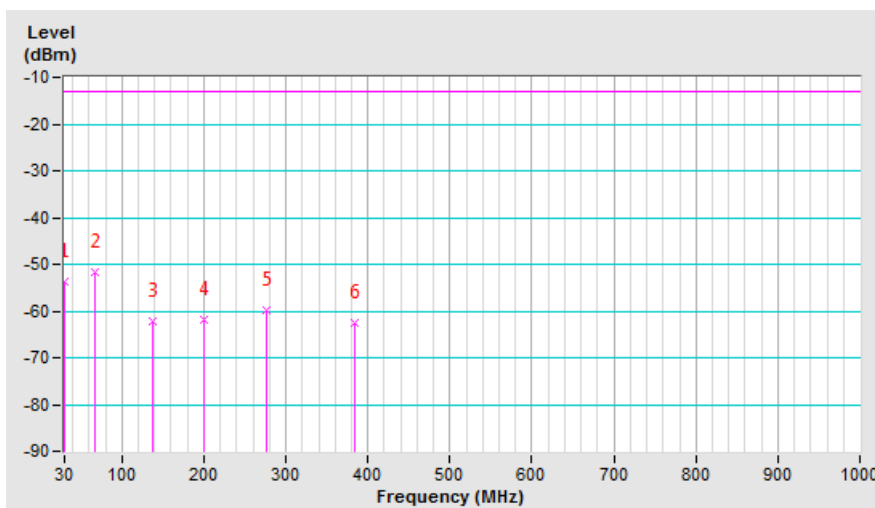


|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20407<br>(824.7MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                         |                 |                |

| Antenna Polarity & Test Distance: Vertical at 3 M |             |               |                       |                        |           |             |             |
|---------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                               | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                 | 30.00       | -41.5         | -34.2                 | -19.4                  | -53.6     | -13.0       | -40.6       |
| 2                                                 | 66.86       | -42.4         | -50.3                 | -1.5                   | -51.8     | -13.0       | -38.8       |
| 3                                                 | 136.70      | -56.9         | -59.0                 | -3.2                   | -62.2     | -13.0       | -49.2       |
| 4                                                 | 199.75      | -58.6         | -59.5                 | -2.4                   | -61.9     | -13.0       | -48.9       |
| 5                                                 | 277.35      | -61.0         | -58.3                 | -1.6                   | -59.9     | -13.0       | -46.9       |
| 6                                                 | 384.05      | -60.1         | -66.1                 | 3.5                    | -62.6     | -13.0       | -49.6       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



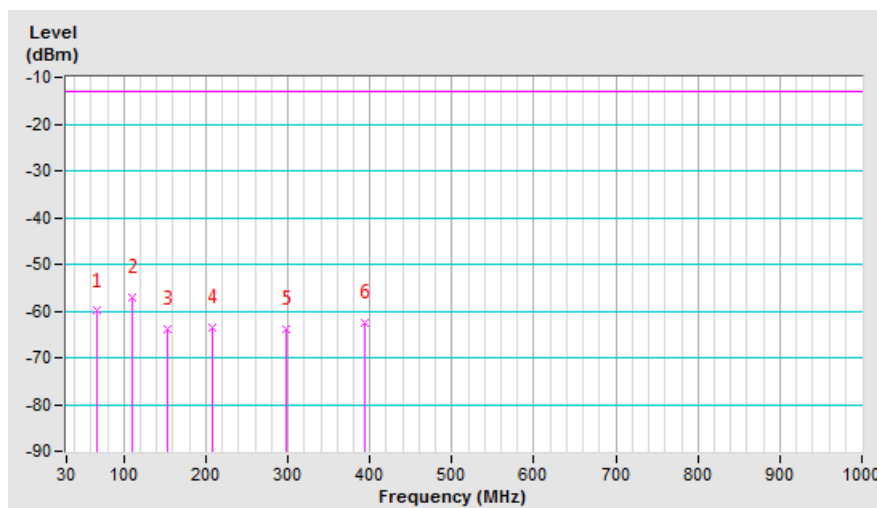
LTE Band 5, Channel Bandwidth: 5MHz

|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20425<br>(826.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                         |                 |                |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 66.86       | -51.0         | -58.5                 | -1.5                   | -60.0     | -13.0       | -47.0       |
| 2                                                   | 109.54      | -47.0         | -54.6                 | -2.5                   | -57.1     | -13.0       | -44.1       |
| 3                                                   | 153.19      | -57.6         | -61.1                 | -2.9                   | -64.0     | -13.0       | -51.0       |
| 4                                                   | 208.48      | -53.0         | -61.5                 | -2.0                   | -63.5     | -13.0       | -50.5       |
| 5                                                   | 297.72      | -59.1         | -62.3                 | -1.7                   | -64.0     | -13.0       | -51.0       |
| 6                                                   | 392.78      | -59.9         | -65.8                 | 3.3                    | -62.5     | -13.0       | -49.5       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

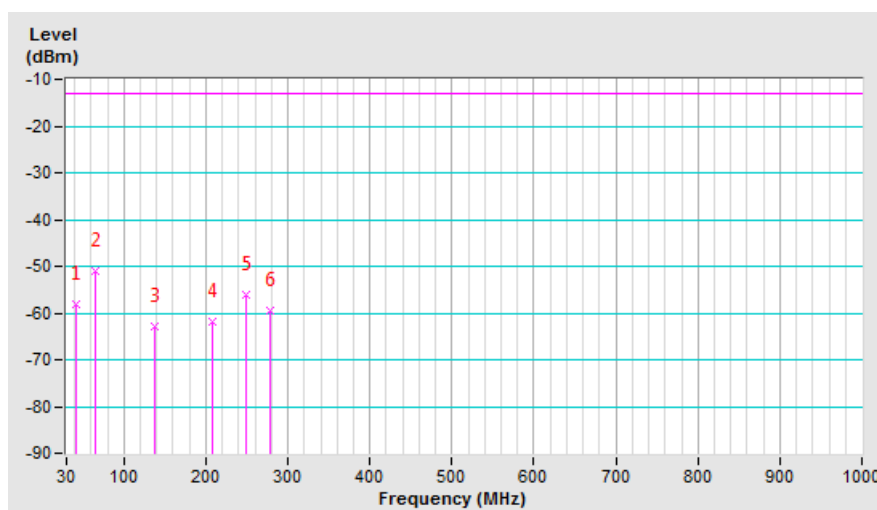


|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20425<br>(826.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                         |                 |                |

| Antenna Polarity & Test Distance: Vertical at 3 M |              |               |                       |                        |              |              |              |
|---------------------------------------------------|--------------|---------------|-----------------------|------------------------|--------------|--------------|--------------|
| No.                                               | Freq. (MHz)  | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm)    | Limit (dBm)  | Margin (dB)  |
| 1                                                 | 41.64        | -49.1         | -45.8                 | -12.3                  | -58.1        | -13.0        | -45.1        |
| 2                                                 | <b>65.89</b> | <b>-43.7</b>  | <b>-49.2</b>          | <b>-1.9</b>            | <b>-51.1</b> | <b>-13.0</b> | <b>-38.1</b> |
| 3                                                 | 136.70       | -59.7         | -59.7                 | -3.2                   | -62.9        | -13.0        | -49.9        |
| 4                                                 | 207.51       | -59.1         | -59.9                 | -2.0                   | -61.9        | -13.0        | -48.9        |
| 5                                                 | 248.25       | -55.6         | -54.6                 | -1.5                   | -56.1        | -13.0        | -43.1        |
| 6                                                 | 279.29       | -62.9         | -58.0                 | -1.6                   | -59.6        | -13.0        | -46.6        |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



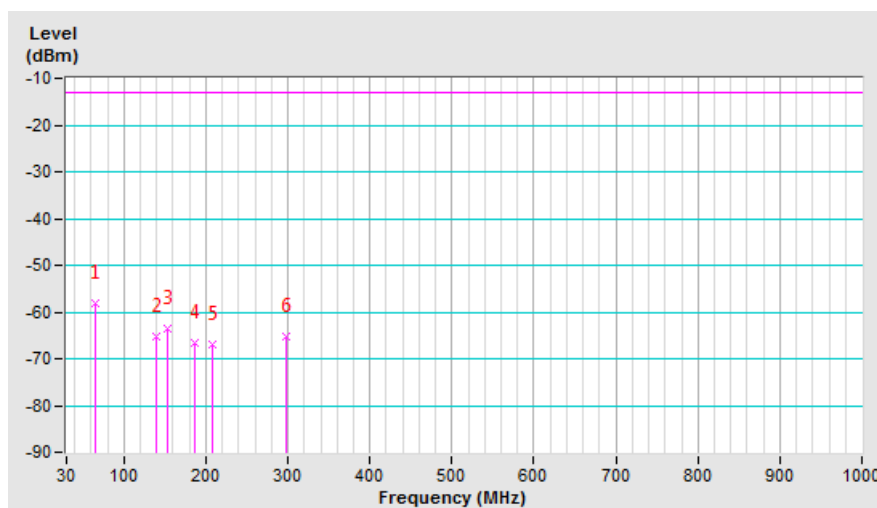
LTE Band 5, Channel Bandwidth: 10MHz

|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20450<br>(829.0MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                         |                 |                |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 65.89       | -49.0         | -56.3                 | -1.9                   | -58.2     | -13.0       | -45.2       |
| 2                                                   | 138.64      | -56.9         | -61.9                 | -3.2                   | -65.1     | -13.0       | -52.1       |
| 3                                                   | 153.19      | -57.1         | -60.6                 | -2.9                   | -63.5     | -13.0       | -50.5       |
| 4                                                   | 187.14      | -56.4         | -64.0                 | -2.7                   | -66.7     | -13.0       | -53.7       |
| 5                                                   | 208.48      | -56.4         | -64.9                 | -2.0                   | -66.9     | -13.0       | -53.9       |
| 6                                                   | 297.72      | -60.4         | -63.5                 | -1.7                   | -65.2     | -13.0       | -52.2       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

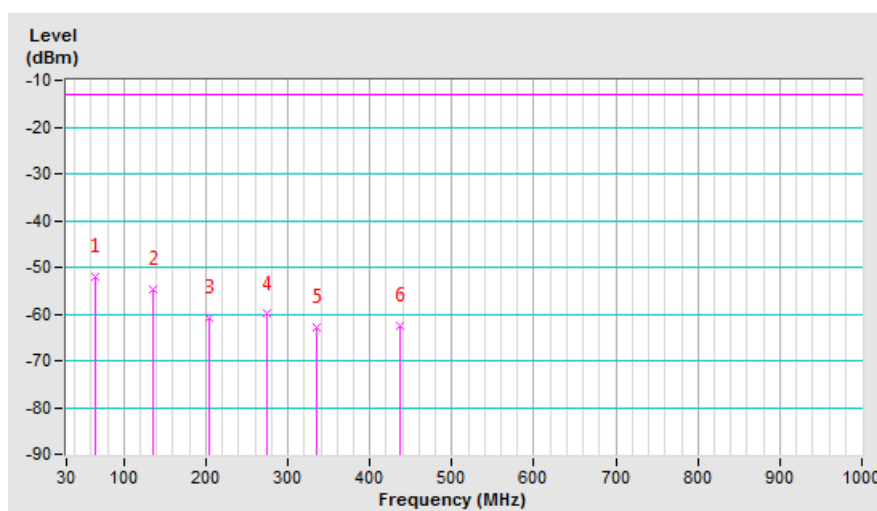


|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20450<br>(829.0MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                         |                 |                |

| Antenna Polarity & Test Distance: Vertical at 3 M |             |               |                       |                        |           |             |             |
|---------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                               | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                 | 65.89       | -42.7         | -50.3                 | -1.9                   | -52.2     | -13.0       | -39.2       |
| 2                                                 | 134.76      | -49.0         | -51.5                 | -3.2                   | -54.7     | -13.0       | -41.7       |
| 3                                                 | 204.60      | -57.0         | -59.0                 | -2.0                   | -61.0     | -13.0       | -48.0       |
| 4                                                 | 275.41      | -61.0         | -58.4                 | -1.6                   | -60.0     | -13.0       | -47.0       |
| 5                                                 | 334.58      | -60.1         | -66.9                 | 4.0                    | -62.9     | -13.0       | -49.9       |
| 6                                                 | 436.43      | -60.2         | -66.0                 | 3.6                    | -62.4     | -13.0       | -49.4       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Above 1GHz  
GSM Mode

|                          |                              |                 |              |
|--------------------------|------------------------------|-----------------|--------------|
| Mode                     | TX channel 128<br>(824.2MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH              | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                     |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1648.40     | -54.4         | -46.7                 | 0.9                    | -45.8     | -13.0       | -32.8       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1648.40     | -52.0         | -44.6                 | 0.9                    | -43.7     | -13.0       | -30.7       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                              |                 |              |
|--------------------------|------------------------------|-----------------|--------------|
| Mode                     | TX channel 189<br>(836.4MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH              | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                     |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1672.80     | -54.0         | -46.4                 | 0.8                    | -45.6     | -13.0       | -32.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1672.80     | -51.8         | -44.4                 | 0.8                    | -43.6     | -13.0       | -30.6       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                              |                 |              |
|--------------------------|------------------------------|-----------------|--------------|
| Mode                     | TX channel 251<br>(848.8MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH              | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                     |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1697.60     | -53.5         | -45.9                 | 0.7                    | -45.2     | -13.0       | -32.2       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1697.60     | -51.2         | -43.9                 | 0.7                    | -43.2     | -13.0       | -30.2       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

# WCDMA Band 5

|                          |                               |                 |              |
|--------------------------|-------------------------------|-----------------|--------------|
| Mode                     | TX channel 4132<br>(826.4MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH               | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                      |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1652.80     | -60.5         | -52.8                 | 0.9                    | -51.9     | -13.0       | -38.9       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1652.80     | -58.0         | -50.8                 | 0.9                    | -49.9     | -13.0       | -36.9       |

## Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                               |                 |              |
|--------------------------|-------------------------------|-----------------|--------------|
| Mode                     | TX channel 4182<br>(836.4MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH               | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                      |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1672.80     | -60.2         | -52.6                 | 0.8                    | -51.8     | -13.0       | -38.8       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1672.80     | -57.8         | -50.4                 | 0.8                    | -49.6     | -13.0       | -36.6       |

## Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                               |                 |              |
|--------------------------|-------------------------------|-----------------|--------------|
| Mode                     | TX channel 4233<br>(846.6MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH               | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                      |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1693.20     | -60.8         | -53.2                 | 0.7                    | -52.5     | -13.0       | -39.5       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1693.20     | -58.2         | -50.9                 | 0.7                    | -50.2     | -13.0       | -37.2       |

Remarks:

1.  $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$ .
2.  $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)}$ .

LTE Band 5, Channel Bandwidth: 1.4MHz

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20407<br>(824.7MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1649.40     | -58.6         | -50.9                 | 0.9                    | -50.0     | -13.0       | -37.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1649.40     | -56.2         | -49.0                 | 0.9                    | -48.1     | -13.0       | -35.1       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20525<br>(836.5MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1673.00     | -59.5         | -51.8                 | 0.8                    | -51.0     | -13.0       | -38.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1673.00     | -56.2         | -48.9                 | 0.8                    | -48.1     | -13.0       | -35.1       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20643<br>(848.3MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1696.60     | -59.2         | -53.3                 | -0.4                   | -53.7     | -13.0       | -40.7       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1696.60     | -56.5         | -52.1                 | -0.4                   | -52.5     | -13.0       | -39.5       |

Remarks:

1.  $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$ .
2.  $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)}$ .

LTE Band 5, Channel Bandwidth: 5MHz

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20425<br>(826.5MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1653.00     | -58.9         | -51.1                 | 0.9                    | -50.2     | -13.0       | -37.2       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1653.00     | -56.2         | -49.0                 | 0.9                    | -48.1     | -13.0       | -35.1       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20525<br>(836.5MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1673.00     | -59.3         | -51.7                 | 0.8                    | -50.9     | -13.0       | -37.9       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1673.00     | -56.2         | -48.9                 | 0.8                    | -48.1     | -13.0       | -35.1       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20625<br>(846.5MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1693.00     | -58.5         | -50.9                 | 0.7                    | -50.2     | -13.0       | -37.2       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1693.00     | -55.9         | -48.6                 | 0.7                    | -47.9     | -13.0       | -34.9       |

Remarks:

1.  $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$ .
2.  $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)}$ .

LTE Band 5, Channel Bandwidth: 10MHz

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20450<br>(829.0MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1658.00     | -59.0         | -51.4                 | 0.9                    | -50.5     | -13.0       | -37.5       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1658.00     | -56.9         | -49.7                 | 0.9                    | -48.8     | -13.0       | -35.8       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20525<br>(836.5MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1673.00     | -58.5         | -50.9                 | 0.8                    | -50.1     | -13.0       | -37.1       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1673.00     | -56.6         | -49.3                 | 0.8                    | -48.5     | -13.0       | -35.5       |

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                |                 |              |
|--------------------------|--------------------------------|-----------------|--------------|
| Mode                     | TX channel 20600<br>(844.0MHz) | Frequency Range | 1GHz ~ 10GHz |
| Environmental Conditions | 22deg. C, 68%RH                | Input Power     | 120Vac, 60Hz |
| Tested By                | Greg Lin                       |                 |              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1688.00     | -59.1         | -51.4                 | 0.7                    | -50.7     | -13.0       | -37.7       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1688.00     | -59.1         | -51.4                 | 0.7                    | -50.7     | -13.0       | -37.7       |

Remarks:

1.  $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$ .
2.  $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)}$ .

## 5 Pictures of Test Arrangements

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

## Appendix – Information of 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:

### Lin Kou 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 ---