

## FCC Test Report

### (PART 27)

**Report No.:** RFBFKV-WTW-P21060810-2

**FCC ID:** L6A1TF100-2

**Test Model:** ITF100-2, ITF100-3 (Refer to item 3.1 for more details)

**Received Date:** Jul. 10, 2021

**Test Date:** Sep. 30, 2021 ~ Oct. 06, 2021

**Issued Date:** Oct. 27, 2021

**Applicant:** BlackBerry Limited

**Address:** 2200 University Avenue East, Waterloo, Ontario, Canada N2K 0A7

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

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**Test Location:** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

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



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## 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.....                                 | 7         |
| 2.2 Test Site and Instruments .....                              | 8         |
| <b>3 General Information .....</b>                               | <b>10</b> |
| 3.1 General Description of EUT .....                             | 10        |
| 3.2 Configuration of System under Test.....                      | 12        |
| 3.2.1 Description of Support Units .....                         | 12        |
| 3.3 Test Mode Applicability and Tested Channel Detail .....      | 12        |
| 3.4 EUT Operating Conditions .....                               | 16        |
| 3.5 General Description of Applied Standards and references..... | 16        |
| <b>4 Test Types and Results .....</b>                            | <b>17</b> |
| 4.1 Output Power Measurement.....                                | 17        |
| 4.1.1 Limits of Output Power Measurement .....                   | 17        |
| 4.1.2 Test Procedures.....                                       | 17        |
| 4.1.3 Test Setup.....                                            | 18        |
| 4.1.4 Test Results .....                                         | 19        |
| 4.2 Modulation Characteristics Measurement .....                 | 29        |
| 4.2.1 Limits of Modulation Characteristics .....                 | 29        |
| 4.2.2 Test Setup.....                                            | 29        |
| 4.2.3 Test Procedure .....                                       | 29        |
| 4.2.4 Test Results .....                                         | 30        |
| 4.3 Frequency Stability Measurement .....                        | 31        |
| 4.3.1 Limits of Frequency Stability Measurement .....            | 31        |
| 4.3.2 Test Procedure .....                                       | 31        |
| 4.3.3 Test Setup.....                                            | 31        |
| 4.3.4 Test Results .....                                         | 32        |
| 4.4 Occupied Bandwidth Measurement.....                          | 42        |
| 4.4.1 Limits of Occupied Bandwidth Measurement .....             | 42        |
| 4.4.2 Test Procedure .....                                       | 42        |
| 4.4.3 Test Setup.....                                            | 42        |
| 4.4.4 Test Result .....                                          | 43        |
| 4.5 Band Edge Measurement .....                                  | 48        |
| 4.5.1 Limits of Band Edge Measurement .....                      | 48        |
| 4.5.2 Test Setup.....                                            | 48        |
| 4.5.3 Test Procedures.....                                       | 48        |
| 4.5.4 Test Results .....                                         | 49        |
| 4.6 Peak to Average Ratio .....                                  | 59        |
| 4.6.1 Limits of Peak to Average Ratio Measurement .....          | 59        |
| 4.6.2 Test Setup.....                                            | 59        |
| 4.6.3 Test Procedures.....                                       | 59        |
| 4.6.4 Test Results .....                                         | 60        |
| 4.7 Conducted Spurious Emissions .....                           | 65        |
| 4.7.1 Limits of Conducted Spurious Emissions Measurement .....   | 65        |
| 4.7.2 Test Setup.....                                            | 65        |
| 4.7.3 Test Procedure .....                                       | 65        |
| 4.7.4 Test Results .....                                         | 66        |
| 4.8 Radiated Emission Measurement.....                           | 76        |
| 4.8.1 Limits of Radiated Emission Measurement .....              | 76        |
| 4.8.2 Test Procedure .....                                       | 76        |
| 4.8.3 Deviation from Test Standard .....                         | 76        |
| 4.8.4 Test Setup.....                                            | 77        |

|                                                                 |           |
|-----------------------------------------------------------------|-----------|
| 4.8.5 Test Results .....                                        | 78        |
| <b>5 Pictures of Test Arrangements.....</b>                     | <b>98</b> |
| <b>Appendix – Information of the Testing Laboratories .....</b> | <b>99</b> |

### Release Control Record

| Issue No.              | Description      | Date Issued   |
|------------------------|------------------|---------------|
| RFBFKV-WTW-P21060810-2 | Original Release | Oct. 27, 2021 |

## 1 Certificate of Conformity

**Product:** Radar H2

**Brand:** BlackBerry

**Test Model:** ITF100-2, ITF100-3 (Refer to item 3.1 for more details)

**Sample Status:** Identical Prototype

**Applicant:** BlackBerry Limited

**Test Date:** Sep. 30, 2021 ~ Oct. 06, 2021

**Standards:** FCC Part 27, Subpart C, H, L

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 :** Lena Wang, **Date:** Oct. 27, 2021  
Lena Wang / Specialist

**Approved by :** Dylan Chiou, **Date:** Oct. 27, 2021  
Dylan Chiou / Senior Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 27 & Part 2 (LTE 4) |                                         |        |                                                                                       |
|------------------------------------------------|-----------------------------------------|--------|---------------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                               | Result | Remarks                                                                               |
| 2.1046<br>27.50(d)                             | Equivalent Isotropically radiated power | Pass   | Meet the requirement of limit.                                                        |
| 2.1047                                         | Modulation characteristics              | Pass   | Meet the requirement.                                                                 |
| 2.1055<br>27.54                                | Frequency Stability                     | Pass   | Meet the requirement of limit.                                                        |
| 2.1049                                         | Emission Bandwidth                      | Pass   | Meet the requirement of limit.                                                        |
| 2.1051<br>27.53(h)                             | Out of Band Emission Measurements       | Pass   | Meet the requirement of limit.                                                        |
| 27.50(d)(5)                                    | Peak To Average Ratio                   | Pass   | Meet the requirement of limit.                                                        |
| 2.1051<br>27.53(h)                             | Conducted Spurious Emissions            | Pass   | Meet the requirement of limit.                                                        |
| 2.1053<br>27.53(h)                             | Radiated Spurious Emissions             | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -37.12 dB at 3421.40 MHz. |

| Applied Standard: FCC Part 27 & Part 2 (LTE 12) |                                   |        |                                                                                       |
|-------------------------------------------------|-----------------------------------|--------|---------------------------------------------------------------------------------------|
| FCC Clause                                      | Test Item                         | Result | Remarks                                                                               |
| 2.1046<br>27.50(c)                              | Equivalent radiated power         | Pass   | Meet the requirement of limit.                                                        |
| 2.1047                                          | Modulation characteristics        | Pass   | Meet the requirement.                                                                 |
| 2.1055<br>27.54                                 | Frequency Stability               | Pass   | Meet the requirement of limit.                                                        |
| 2.1049                                          | Emission Bandwidth                | Pass   | Meet the requirement of limit.                                                        |
| 2.1051<br>27.53(g)                              | Out of Band Emission Measurements | Pass   | Meet the requirement of limit.                                                        |
| --                                              | Peak To Average Ratio             | Pass   | Meet the requirement of limit.                                                        |
| 2.1051<br>27.53(g)                              | Conducted Spurious Emissions      | Pass   | Meet the requirement of limit.                                                        |
| 2.1053<br>27.53(g)                              | Radiated Spurious Emissions       | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -36.06 dB at 1422.00 MHz. |

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<br>(k=2) ( $\pm$ ) |
|--------------------------------|--------------------|-----------------------------------------|
| Radiated Emissions up to 1 GHz | 9 kHz ~ 30 MHz     | 3.04 dB                                 |
|                                | 30 MHz ~ 200 MHz   | 2.93 dB                                 |
|                                | 200 MHz ~ 1000 MHz | 2.95 dB                                 |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz     | 2.26 dB                                 |
|                                | 18 GHz ~ 40 GHz    | 1.94 dB                                 |

## 2.2 Test Site and Instruments

| Description & Manufacturer                             | Model No.                              | Serial No.                      | Date of Calibration | Due Date of Calibration |
|--------------------------------------------------------|----------------------------------------|---------------------------------|---------------------|-------------------------|
| Test Receiver<br>KEYSIGHT                              | N9038A                                 | MY55420137                      | Apr. 09, 2021       | Apr. 08, 2022           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ                   | FSP40                                  | 100039                          | Jun. 10, 2021       | Jun. 09, 2022           |
| BILOG Antenna<br>SCHWARZBECK                           | VULB9168                               | 9168-160                        | Nov. 06, 2020       | Nov. 05, 2021           |
| BILOG Antenna<br>SCHWARZBECK                           | VULB9168                               | 9168-472                        | Nov. 06, 2020       | Nov. 05, 2021           |
| HORN Antenna<br>SCHWARZBECK                            | BBHA 9120 D                            | 9120D-1169                      | Nov. 22, 2020       | Nov. 21, 2021           |
| HORN Antenna<br>SCHWARZBECK                            | BBHA 9170                              | BBHA9170241                     | Nov. 22, 2020       | Nov. 21, 2021           |
| Preamplifier<br>Agilent<br>(Below 1GHz)                | 8447D                                  | 2944A10638                      | Jun. 05, 2021       | Jun. 04, 2022           |
| Preamplifier<br>Agilent<br>(Above 1GHz)                | 8449B                                  | 3008A02367                      | Feb. 17, 2021       | Feb. 16, 2022           |
| RF signal cable<br>HUBER+SUHNER&EMCI                   | SUCOFLEX 104 &<br>EMC104-SM-<br>SM8000 | CABLE-CH9-02<br>(248780+171006) | Jan. 16, 2021       | Jan. 15, 2022           |
| RF signal cable<br>HUBER+SUHNER                        | SUCOFLEX 104                           | CABLE-CH9-<br>(250795/4)        | Jan. 16, 2021       | Jan. 15, 2022           |
| RF signal cable<br>Woken                               | 8D-FB                                  | Cable-CH9-01                    | Jun. 05, 2021       | Jun. 04, 2022           |
| Software<br>BV ADT                                     | ADT_Radiated_<br>V7.6.15.9.5           | 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                      |
| Standard Temperature<br>And Humidity Chamber<br>TERCHY | MHU-225AU                              | 920842                          | Jun. 15, 2021       | Jun. 14, 2022           |
| JFW 20dB attenuation                                   | 50HF-020-SMA                           | NA                              | NA                  | NA                      |
| True RMS Clamp Meter<br>Fluke                          | 325                                    | 31130711WS                      | Jun. 02, 2021       | Jun. 01, 2022           |
| Radio Communication<br>Analyzer<br>Anritsu             | MT8820C                                | 6201300640                      | Aug. 26, 2021       | Aug. 25, 2022           |
| Radio Communication<br>Analyzer<br>Anritsu             | MT8821C                                | 6201462755                      | Feb. 07, 2021       | Feb. 06, 2022           |
| Radio Communication<br>Tester<br>ROHDE & SCHWARZ       | CMU200                                 | 101095                          | Nov. 18, 2020       | Nov. 17, 2021           |
| DC power supply<br>Keysight                            | U8002A                                 | MY56330015                      | NA                  | NA                      |

Note: 1. The calibration interval of the above test instruments is 12 / 24months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

### 3 General Information

#### 3.1 General Description of EUT

|                            |                                          |                          |                          |
|----------------------------|------------------------------------------|--------------------------|--------------------------|
| <b>Product</b>             | Radar H2                                 |                          |                          |
| <b>Brand</b>               | BlackBerry                               |                          |                          |
| <b>Test Model</b>          | ITF100-2, ITF100-3                       |                          |                          |
| <b>Model Difference</b>    | Refer to Note as below                   |                          |                          |
| <b>Status of EUT</b>       | Identical Prototype                      |                          |                          |
| <b>Power Supply Rating</b> | 7.2 Vdc (battery)                        |                          |                          |
| <b>Modulation Type</b>     | LTE                                      | QPSK, 16QAM              |                          |
| <b>Frequency Range</b>     | LTE Band 4 (Channel Bandwidth: 1.4 MHz)  | 1710.7 ~ 1754.3 MHz      |                          |
|                            | LTE Band 4 (Channel Bandwidth: 3 MHz)    | 1711.5 ~ 1753.5 MHz      |                          |
|                            | LTE Band 4 (Channel Bandwidth: 5 MHz)    | 1712.5 ~ 1752.5 MHz      |                          |
|                            | LTE Band 4 (Channel Bandwidth: 10 MHz)   | 1715.0 ~ 1750.0 MHz      |                          |
|                            | LTE Band 4 (Channel Bandwidth: 15 MHz)   | 1717.5 ~ 1747.5 MHz      |                          |
|                            | LTE Band 4 (Channel Bandwidth: 20 MHz)   | 1720.0 ~ 1745.0 MHz      |                          |
|                            | LTE Band 12 (Channel Bandwidth: 1.4 MHz) | 699.7 ~ 715.3 MHz        |                          |
|                            | LTE Band 12 (Channel Bandwidth: 3 MHz)   | 700.5 ~ 714.5 MHz        |                          |
|                            | LTE Band 12 (Channel Bandwidth: 5 MHz)   | 701.5 ~ 713.5 MHz        |                          |
|                            | LTE Band 12 (Channel Bandwidth: 10 MHz)  | 704.0 ~ 711.0 MHz        |                          |
| <b>Emission Designator</b> | LTE Band 4 (Channel Bandwidth: 1.4 MHz)  | 1M09D7W                  |                          |
|                            | LTE Band 4 (Channel Bandwidth: 3 MHz)    | 2M70G7D                  |                          |
|                            | LTE Band 4 (Channel Bandwidth: 5 MHz)    | 4M49D7W                  |                          |
|                            | LTE Band 4 (Channel Bandwidth: 10 MHz)   | 8M97D7W                  |                          |
|                            | LTE Band 4 (Channel Bandwidth: 15 MHz)   | 13M5G7D                  |                          |
|                            | LTE Band 4 (Channel Bandwidth: 20 MHz)   | 18M0D7W                  |                          |
|                            | LTE Band 12 (Channel Bandwidth: 1.4 MHz) | 1M09D7W                  |                          |
|                            | LTE Band 12 (Channel Bandwidth: 3 MHz)   | 2M70G7D                  |                          |
|                            | LTE Band 12 (Channel Bandwidth: 5 MHz)   | 4M49D7W                  |                          |
|                            | LTE Band 12 (Channel Bandwidth: 10 MHz)  | 8M99D7W                  |                          |
| <b>Max. ERP Power</b>      |                                          | QPSK                     | 16QAM                    |
|                            | LTE Band 12 (Channel Bandwidth: 1.4 MHz) | 52.723 mW<br>(17.22dBm)  | 41.687 mW<br>(16.20dBm)  |
|                            | LTE Band 12 (Channel Bandwidth: 3 MHz)   | 52.240 mW<br>(17.18dBm)  | 41.210 mW<br>(16.15dBm)  |
|                            | LTE Band 12 (Channel Bandwidth: 5 MHz)   | 51.050 mW<br>(17.08dBm)  | 40.832 mW<br>(16.11dBm)  |
|                            | LTE Band 12 (Channel Bandwidth: 10 MHz)  | 51.168 mW<br>(17.09dBm)  | 41.020 mW<br>(16.13dBm)  |
|                            |                                          |                          |                          |
| <b>Max. EIRP Power</b>     | LTE Band 4 (Channel Bandwidth: 1.4 MHz)  | 250.035 mW<br>(23.98dBm) | 200.909 mW<br>(23.03dBm) |
|                            | LTE Band 4 (Channel Bandwidth: 3 MHz)    | 258.821 mW<br>(24.13dBm) | 203.704 mW<br>(23.09dBm) |
|                            | LTE Band 4 (Channel Bandwidth: 5 MHz)    | 263.633 mW<br>(24.21dBm) | 206.538 mW<br>(23.15dBm) |
|                            | LTE Band 4 (Channel Bandwidth: 10 MHz)   | 261.818 mW<br>(24.18dBm) | 209.411 mW<br>(23.21dBm) |
|                            | LTE Band 4 (Channel Bandwidth: 15 MHz)   | 256.448 mW               | 208.449 mW               |

|                            |                                        |                          |                          |
|----------------------------|----------------------------------------|--------------------------|--------------------------|
|                            |                                        | (24.09dBm)               | (23.19dBm)               |
|                            | LTE Band 4 (Channel Bandwidth: 20 MHz) | 260.615 mW<br>(24.16dBm) | 200.909 mW<br>(23.03dBm) |
| <b>Antenna Type</b>        | Refer to Note as below                 |                          |                          |
| <b>Antenna Gain</b>        | Refer to Note as below                 |                          |                          |
| <b>Accessory Device</b>    | Refer to Note as below                 |                          |                          |
| <b>Data Cable Supplied</b> | N/A                                    |                          |                          |

Note:

1. All models are listed as below.

| Mode | Brand      | Supplier Code | Model    | Difference                              |
|------|------------|---------------|----------|-----------------------------------------|
| A    | BlackBerry | B13           | ITF100-3 | with battery model 63320-001 /7.2V,38Ah |
| B    |            | B12           | ITF100-2 | with battery model 63318-001 /7.2V,19Ah |

2. The EUT contains following accessory devices.

| Product   | Brand      | Model         | Description   | Remark         |
|-----------|------------|---------------|---------------|----------------|
| Battery 1 | BlackBerry | BAT-63320-001 | 7.2 Vdc, 38 A | (for ITF100-3) |
| Battery 2 | BlackBerry | BAT-63318-001 | 7.2 Vdc, 19 A | (for ITF100-2) |

\*The both difference are only in battery, therefore ITF100-2 only verifies the Radiated Spurious Emissions below 1GHz

3. The antenna information is listed as below.

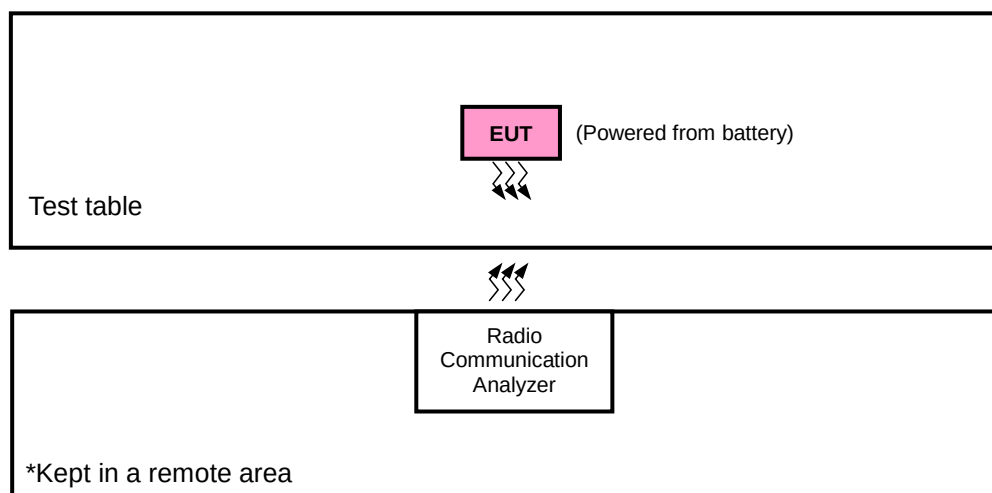
| Antenna Type | Monopole with gnd resonator |       |
|--------------|-----------------------------|-------|
| Band         | LTE                         |       |
|              | 4                           | 12    |
| Gain (dBi)   | 2.54                        | -3.32 |

4. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

## 3.2 Configuration of System under Test

### <Radiated Emission Test> & <E.R.P. / E.I.R.P. Test>



#### 3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

## 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 as the table below. Following channel(s) was (were) selected for the final test as listed below:

For Mode A

| Band        | Radiated Emission |
|-------------|-------------------|
| LTE Band 4  | Y-plane           |
| LTE Band 12 | Y-plane           |

For Mode B

| Band        | Radiated Emission |
|-------------|-------------------|
| LTE Band 4  | X-plane           |
| LTE Band 12 | X-plane           |

## LTE Band 4

| EUT Configure Mode | Test Item                  | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode                 |
|--------------------|----------------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| A                  | EIRP                       | 19957 to 20393    | 19957, 20175, 20393 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 19965 to 20385    | 19965, 20175, 20385 | 3 MHz             | QPSK, 16QAM | 1 RB / 7 RB Offset   |
|                    |                            | 19975 to 20375    | 19975, 20175, 20375 | 5 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 20000 to 20350    | 20000, 20175, 20350 | 10 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 20025 to 20325    | 20025, 20175, 20325 | 15 MHz            | QPSK, 16QAM | 1 RB / 74 RB Offset  |
|                    |                            | 20050 to 20300    | 20050, 20175, 20300 | 20 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
| A                  | Modulation Characteristics | 20050 to 20300    | 20175               | 20 MHz            | QPSK, 16QAM | 100 RB / 0 RB Offset |
| A                  | Frequency Stability        | 19957 to 20393    | 19957, 20393        | 1.4 MHz           | QPSK        | 6 RB / 0 RB Offset   |
|                    |                            | 19965 to 20385    | 19965, 20385        | 3 MHz             | QPSK        | 15 RB / 0 RB Offset  |
|                    |                            | 19975 to 20375    | 19975, 20375        | 5 MHz             | QPSK        | 25 RB / 0 RB Offset  |
|                    |                            | 20000 to 20350    | 20000, 20350        | 10 MHz            | QPSK        | 50 RB / 0 RB Offset  |
|                    |                            | 20025 to 20325    | 20025, 20325        | 15 MHz            | QPSK        | 75 RB / 0 RB Offset  |
|                    |                            | 20050 to 20300    | 20050, 20300        | 20 MHz            | QPSK        | 100 RB / 0 RB Offset |
| A                  | Occupied Bandwidth         | 19957 to 20393    | 19957, 20175, 20393 | 1.4 MHz           | QPSK, 16QAM | 6 RB / 0 RB Offset   |
|                    |                            | 19965 to 20385    | 19965, 20175, 20385 | 3 MHz             | QPSK, 16QAM | 15 RB / 0 RB Offset  |
|                    |                            | 19975 to 20375    | 19975, 20175, 20375 | 5 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                            | 20000 to 20350    | 20000, 20175, 20350 | 10 MHz            | QPSK, 16QAM | 50 RB / 0 RB Offset  |
|                    |                            | 20025 to 20325    | 20025, 20175, 20325 | 15 MHz            | QPSK, 16QAM | 75 RB / 0 RB Offset  |
|                    |                            | 20050 to 20300    | 20050, 20175, 20300 | 20 MHz            | QPSK, 16QAM | 100 RB / 0 RB Offset |
| A                  | Peak to Average Ratio      | 19957 to 20393    | 19957, 20175, 20393 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 19965 to 20385    | 19965, 20175, 20385 | 3 MHz             | QPSK, 16QAM | 1 RB / 7 RB Offset   |
|                    |                            | 19975 to 20375    | 19975, 20175, 20375 | 5 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 20000 to 20350    | 20000, 20175, 20350 | 10 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 20025 to 20325    | 20025, 20175, 20325 | 15 MHz            | QPSK, 16QAM | 1 RB / 74 RB Offset  |
|                    |                            | 20050 to 20300    | 20050, 20175, 20300 | 20 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |

| EUT Configure Mode | Test Item         | Available Channel | Tested Channel      | Channel Bandwidth | Modulation | Mode                |
|--------------------|-------------------|-------------------|---------------------|-------------------|------------|---------------------|
| A                  | Band Edge         | 19957 to 20393    | 19957               | 1.4 MHz           | QPSK       | 1 RB / 0 RB Offset  |
|                    |                   |                   | 20393               | 1.4 MHz           | QPSK       | 6 RB / 0 RB Offset  |
|                    |                   | 19965 to 20385    | 19965               | 3 MHz             | QPSK       | 1 RB / 5 RB Offset  |
|                    |                   |                   | 20385               | 3 MHz             | QPSK       | 6 RB / 0 RB Offset  |
|                    |                   | 19975 to 20375    | 19975               | 5 MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                    |                   |                   | 20375               | 5 MHz             | QPSK       | 15 RB / 0 RB Offset |
|                    |                   | 20000 to 20350    | 20000               | 10 MHz            | QPSK       | 1 RB / 14 RB Offset |
|                    |                   |                   | 20350               | 10 MHz            | QPSK       | 15 RB / 0 RB Offset |
|                    |                   | 20025 to 20325    | 20025               | 15 MHz            | QPSK       | 1 RB / 0 RB Offset  |
|                    |                   |                   | 20325               | 15 MHz            | QPSK       | 25 RB / 0 RB Offset |
|                    |                   | 20050 to 20300    | 20050               | 20 MHz            | QPSK       | 1 RB / 24 RB Offset |
|                    |                   |                   | 20300               | 20 MHz            | QPSK       | 25 RB / 0 RB Offset |
|                    |                   | 19957 to 20393    | 19957, 20175, 20393 | 1.4 MHz           | QPSK       | 1 RB / 0 RB Offset  |
|                    |                   |                   | 19965, 20175, 20385 | 3 MHz             | QPSK       | 1 RB / 49 RB Offset |
|                    |                   | 19965 to 20385    | 19965, 20175, 20385 | 3 MHz             | QPSK       | 50 RB / 0 RB Offset |
|                    |                   |                   | 19975, 20175, 20375 | 5 MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                    |                   | 20000 to 20350    | 20000, 20175, 20350 | 10 MHz            | QPSK       | 1 RB / 7 RB Offset  |
|                    |                   |                   | 20025, 20175, 20325 | 15 MHz            | QPSK       | 1 RB / 0 RB Offset  |
|                    |                   | 20050 to 20300    | 20050, 20175, 20300 | 20 MHz            | QPSK       | 1 RB / 74 RB Offset |
|                    |                   |                   | 20025, 20175, 20325 | 15 MHz            | QPSK       | 75 RB / 0 RB Offset |
| A, B               | Radiated Emission | 19957 to 20393    | 19957, 20175, 20393 | 1.4 MHz           | QPSK       | 1 RB / 0 RB Offset  |
|                    |                   | 19975 to 20375    | 19975, 20175, 20375 | 5 MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                    |                   | 20050 to 20300    | 20050, 20175, 20300 | 20 MHz            | QPSK       | 1 RB / 0 RB Offset  |

**Note:**

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1 and 3GPP 38.521-1 Section 6.5.3.1.4.1, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For Mode B only radiated emissions below 1 GHz test had been performed and presented in this report.

## LTE Band 12

| EUT Configure Mode | Test Item                  | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode                 |
|--------------------|----------------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| A                  | ERP                        | 23017 to 23173    | 23017, 23095, 23173 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 23025 to 23165    | 23025, 23095, 23165 | 3 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 23035 to 23155    | 23035, 23095, 23155 | 5 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 23060 to 23130    | 23060, 23095, 23130 | 10 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
| A                  | Modulation Characteristics | 23060 to 23130    | 23095               | 10 MHz            | QPSK, 16QAM | 100 RB / 0 RB Offset |
| A                  | Frequency Stability        | 23017 to 23173    | 23017, 23173        | 1.4 MHz           | QPSK        | 6 RB / 0 RB Offset   |
|                    |                            | 23025 to 23165    | 23025, 23165        | 3 MHz             | QPSK        | 15 RB / 0 RB Offset  |
|                    |                            | 23035 to 23155    | 23035, 23155        | 5 MHz             | QPSK        | 25 RB / 0 RB Offset  |
|                    |                            | 23060 to 23130    | 23060, 23130        | 10 MHz            | QPSK        | 50 RB / 0 RB Offset  |
| A                  | Occupied Bandwidth         | 23017 to 23173    | 23017, 23095, 23173 | 1.4 MHz           | QPSK, 16QAM | 6 RB / 0 RB Offset   |
|                    |                            | 23025 to 23165    | 23025, 23095, 23165 | 3 MHz             | QPSK, 16QAM | 15 RB / 0 RB Offset  |
|                    |                            | 23035 to 23155    | 23035, 23095, 23155 | 5 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                            | 23060 to 23130    | 23060, 23095, 23130 | 10 MHz            | QPSK, 16QAM | 50 RB / 0 RB Offset  |
| A                  | Peak to Average Ratio      | 23017 to 23173    | 23017, 23095, 23173 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 23025 to 23165    | 23025, 23095, 23165 | 3 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 23035 to 23155    | 23035, 23095, 23155 | 5 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 23060 to 23130    | 23060, 23095, 23130 | 10 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
| A                  | Band Edge                  | 23017 to 23173    | 23017               | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset   |
|                    |                            |                   | 23173               | 1.4 MHz           | QPSK        | 6 RB / 0 RB Offset   |
|                    |                            | 23025 to 23165    | 23025               | 3 MHz             | QPSK        | 1 RB / 5 RB Offset   |
|                    |                            |                   | 23165               | 3 MHz             | QPSK        | 6 RB / 0 RB Offset   |
|                    |                            | 23035 to 23155    | 23035               | 5 MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                            |                   | 23155               | 5 MHz             | QPSK        | 15 RB / 0 RB Offset  |
|                    |                            | 23060 to 23130    | 23060               | 10 MHz            | QPSK        | 1 RB / 14 RB Offset  |
|                    |                            |                   | 23130               | 10 MHz            | QPSK        | 15 RB / 0 RB Offset  |
|                    |                            | 23017 to 23173    | 23017, 23095, 23173 | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset   |
|                    |                            |                   | 23025, 23095, 23165 | 3 MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                            | 23035 to 23155    | 23035, 23095, 23155 | 5 MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                            | 23060 to 23130    | 23060, 23095, 23130 | 10 MHz            | QPSK        | 1 RB / 0 RB Offset   |
| A, B               | Radiated Emission          | 23017 to 23173    | 23017, 23095, 23173 | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset   |
|                    |                            | 23035 to 23155    | 23035, 23095, 23155 | 5 MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                            | 23060 to 23130    | 23060, 23095, 23130 | 10 MHz            | QPSK        | 1 RB / 0 RB Offset   |

### Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1 and 3GPP 38.521-1 Section 6.5.3.1.4.1, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For Mode B only radiated emissions below 1 GHz test had been performed and presented in this report.

#### **Test Condition:**

| Test Item                  | Environmental Conditions | Input Power | Tested By          |
|----------------------------|--------------------------|-------------|--------------------|
| ERP / EIRP                 | 25 deg. C, 65 % RH       | 7.2 Vdc     | Noah Chen          |
| Modulation Characteristics | 25 deg. C, 65 % RH       | 7.2 Vdc     | Noah Chen          |
| Frequency Stability        | 25 deg. C, 65 % RH       | 7.2 Vdc     | Noah Chen          |
| Occupied Bandwidth         | 25 deg. C, 65 % RH       | 7.2 Vdc     | Noah Chen          |
| Band Edge                  | 25 deg. C, 65 % RH       | 7.2 Vdc     | Noah Chen          |
| Peak to Average Ratio      | 25 deg. C, 65 % RH       | 7.2 Vdc     | Noah Chen          |
| Conducted Emission         | 25 deg. C, 65 % RH       | 7.2 Vdc     | Noah Chen          |
| Radiated Emission          | 25 deg. C, 65 % RH       | 7.2 Vdc     | Greg Lin, Rex Wang |

### **3.4 EUT Operating Conditions**

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

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

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

#### **Test Standard:**

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27**

**ANSI 63.26-2015**

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

#### **References Test Guidance:**

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

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

**Note:** All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

For LTE Band 4:

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

For LTE Band 12:

Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

#### 4.1.2 Test Procedures

##### 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.

##### Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$$\text{EIRP} = P_{\text{Meas}} + G_T$$

$$\text{ERP} = P_{\text{Meas}} + G_T - 2.15$$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively  
(expressed in the same units as  $P_{\text{Meas}}$ , e.g., dBm or dBW)

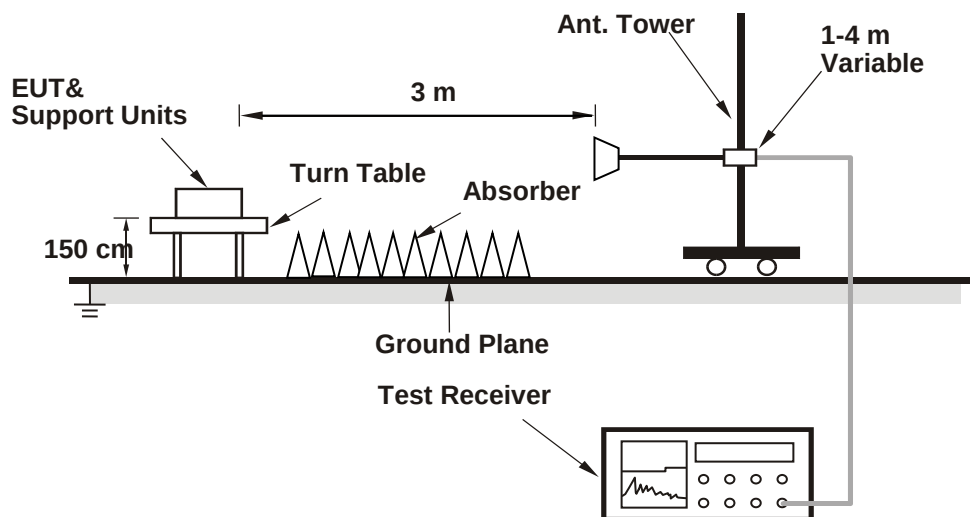
$P_{\text{Meas}}$  measured transmitter output power or PSD, in dBm or dBW

$G_T$  gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

#### 4.1.3 Test Setup

##### EIRP / ERP Measurement:

<Radiated Emission above 1 GHz>



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

##### Conducted Power Measurement:



#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 19957  | 20175  | 20393  |
|            |           | Frequency (MHz) |    | 1710.7 | 1732.5 | 1754.3 |
| 1.4M       | QPSK      | 1               | 0  | 21.40  | 21.33  | 21.40  |
|            |           | 1               | 2  | 21.42  | 21.25  | 21.39  |
|            |           | 1               | 5  | 21.38  | 21.44  | 21.42  |
|            |           | 3               | 0  | 20.38  | 20.32  | 20.55  |
|            |           | 3               | 1  | 20.49  | 20.35  | 20.45  |
|            |           | 3               | 3  | 20.63  | 20.28  | 20.55  |
|            |           | 6               | 0  | 20.41  | 20.46  | 20.37  |
|            | 16QAM     | 1               | 0  | 20.47  | 20.34  | 20.49  |
|            |           | 1               | 2  | 20.26  | 20.29  | 20.37  |
|            |           | 1               | 5  | 20.34  | 20.36  | 20.35  |
|            |           | 3               | 0  | 19.49  | 19.32  | 19.58  |
|            |           | 3               | 1  | 19.35  | 19.35  | 19.37  |
|            |           | 3               | 3  | 19.56  | 19.32  | 19.42  |
|            |           | 6               | 0  | 19.50  | 19.54  | 19.47  |
| BW         | MCS Index | Channel         |    | 19965  | 20175  | 20385  |
|            |           | Frequency (MHz) |    | 1711.5 | 1732.5 | 1753.5 |
| 3M         | QPSK      | 1               | 0  | 21.42  | 21.59  | 21.43  |
|            |           | 1               | 7  | 21.33  | 21.38  | 21.40  |
|            |           | 1               | 14 | 21.47  | 21.45  | 21.28  |
|            |           | 8               | 0  | 20.30  | 20.28  | 20.56  |
|            |           | 8               | 3  | 20.60  | 20.36  | 20.62  |
|            |           | 8               | 7  | 20.41  | 20.46  | 20.31  |
|            |           | 15              | 0  | 20.41  | 20.41  | 20.52  |
|            | 16QAM     | 1               | 0  | 20.38  | 20.47  | 20.35  |
|            |           | 1               | 7  | 20.23  | 20.41  | 20.55  |
|            |           | 1               | 14 | 20.47  | 20.52  | 20.29  |
|            |           | 8               | 0  | 19.38  | 19.37  | 19.67  |
|            |           | 8               | 3  | 19.54  | 19.36  | 19.56  |
|            |           | 8               | 7  | 19.36  | 19.45  | 19.34  |
|            |           | 15              | 0  | 19.27  | 19.25  | 19.50  |

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 19975  | 20175  | 20375  |
|            |           | Frequency (MHz) |    | 1712.5 | 1732.5 | 1752.5 |
| 5M         | QPSK      | 1               | 0  | 21.67  | 21.54  | 21.33  |
|            |           | 1               | 12 | 21.48  | 21.58  | 21.54  |
|            |           | 1               | 24 | 21.23  | 21.51  | 21.34  |
|            |           | 12              | 0  | 20.46  | 20.37  | 20.42  |
|            |           | 12              | 6  | 20.36  | 20.36  | 20.38  |
|            |           | 12              | 13 | 20.51  | 20.38  | 20.36  |
|            |           | 25              | 0  | 20.54  | 20.26  | 20.48  |
|            | 16QAM     | 1               | 0  | 20.61  | 20.47  | 20.30  |
|            |           | 1               | 12 | 20.51  | 20.59  | 20.53  |
|            |           | 1               | 24 | 20.38  | 20.34  | 20.40  |
|            |           | 12              | 0  | 19.63  | 19.34  | 19.40  |
|            |           | 12              | 6  | 19.40  | 19.47  | 19.42  |
|            |           | 12              | 13 | 19.45  | 19.34  | 19.39  |
|            |           | 25              | 0  | 19.42  | 19.28  | 19.55  |
| BW         | MCS Index | Channel         |    | 20000  | 20175  | 20350  |
|            |           | Frequency (MHz) |    | 1715   | 1732.5 | 1750   |
| 10M        | QPSK      | 1               | 0  | 21.56  | 21.57  | 21.50  |
|            |           | 1               | 24 | 21.46  | 21.56  | 21.64  |
|            |           | 1               | 49 | 21.53  | 21.48  | 21.40  |
|            |           | 25              | 0  | 20.55  | 20.45  | 20.29  |
|            |           | 25              | 12 | 20.43  | 20.62  | 20.45  |
|            |           | 25              | 25 | 20.38  | 20.59  | 20.41  |
|            |           | 50              | 0  | 20.34  | 20.46  | 20.48  |
|            | 16QAM     | 1               | 0  | 20.60  | 20.67  | 20.38  |
|            |           | 1               | 24 | 20.46  | 20.60  | 20.46  |
|            |           | 1               | 49 | 20.60  | 20.42  | 20.47  |
|            |           | 25              | 0  | 19.47  | 19.42  | 19.40  |
|            |           | 25              | 12 | 19.52  | 19.63  | 19.41  |
|            |           | 25              | 25 | 19.27  | 19.51  | 19.41  |
|            |           | 50              | 0  | 19.43  | 19.47  | 19.68  |

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 20025  | 20175  | 20325  |
|            |           | Frequency (MHz) |    | 1717.5 | 1732.5 | 1747.5 |
| 15M        | QPSK      | 1               | 0  | 21.28  | 21.32  | 21.34  |
|            |           | 1               | 37 | 21.51  | 21.22  | 21.50  |
|            |           | 1               | 74 | 21.55  | 21.42  | 21.47  |
|            |           | 36              | 0  | 20.45  | 20.36  | 20.53  |
|            |           | 36              | 19 | 20.51  | 20.34  | 20.41  |
|            |           | 36              | 39 | 20.41  | 20.40  | 20.49  |
|            |           | 75              | 0  | 20.35  | 20.48  | 20.57  |
|            | 16QAM     | 1               | 0  | 20.31  | 20.35  | 20.31  |
|            |           | 1               | 37 | 20.43  | 20.34  | 20.65  |
|            |           | 1               | 74 | 20.49  | 20.37  | 20.46  |
|            |           | 36              | 0  | 19.59  | 19.45  | 19.37  |
|            |           | 36              | 19 | 19.53  | 19.35  | 19.45  |
|            |           | 36              | 39 | 19.40  | 19.26  | 19.45  |
|            |           | 75              | 0  | 19.35  | 19.42  | 19.48  |
| BW         | MCS Index | Channel         |    | 20050  | 20175  | 20300  |
|            |           | Frequency (MHz) |    | 1720   | 1732.5 | 1745   |
| 20M        | QPSK      | 1               | 0  | 21.47  | 21.54  | 21.62  |
|            |           | 1               | 50 | 21.49  | 21.43  | 21.31  |
|            |           | 1               | 99 | 21.37  | 21.29  | 21.47  |
|            |           | 50              | 0  | 20.60  | 20.39  | 20.52  |
|            |           | 50              | 25 | 20.34  | 20.42  | 20.34  |
|            |           | 50              | 50 | 20.45  | 20.33  | 20.42  |
|            |           | 100             | 0  | 20.38  | 20.27  | 20.24  |
|            | 16QAM     | 1               | 0  | 20.37  | 20.40  | 20.48  |
|            |           | 1               | 50 | 20.48  | 20.42  | 20.38  |
|            |           | 1               | 99 | 20.45  | 20.32  | 20.49  |
|            |           | 50              | 0  | 19.56  | 19.38  | 19.62  |
|            |           | 50              | 25 | 19.45  | 19.31  | 19.27  |
|            |           | 50              | 50 | 19.38  | 19.30  | 19.53  |
|            |           | 100             | 0  | 19.39  | 19.39  | 19.39  |

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23017 | 23095 | 23173 |
|             |           | Frequency (MHz) |    | 699.7 | 707.5 | 715.3 |
| 1.4M        | QPSK      | 1               | 0  | 22.69 | 22.47 | 22.50 |
|             |           | 1               | 2  | 22.51 | 22.28 | 22.49 |
|             |           | 1               | 5  | 22.30 | 22.60 | 22.39 |
|             |           | 3               | 0  | 21.61 | 21.45 | 21.53 |
|             |           | 3               | 1  | 21.50 | 21.30 | 21.38 |
|             |           | 3               | 3  | 21.32 | 21.54 | 21.52 |
|             |           | 6               | 0  | 21.36 | 21.48 | 21.55 |
|             | 16QAM     | 1               | 0  | 21.62 | 21.29 | 21.62 |
|             |           | 1               | 2  | 21.56 | 21.37 | 21.46 |
|             |           | 1               | 5  | 21.47 | 21.67 | 21.30 |
|             |           | 3               | 0  | 20.54 | 20.35 | 20.48 |
|             |           | 3               | 1  | 20.48 | 20.34 | 20.41 |
|             |           | 3               | 3  | 20.39 | 20.56 | 20.44 |
|             |           | 6               | 0  | 20.45 | 20.58 | 20.52 |
| BW          | MCS Index | Channel         |    | 23025 | 23095 | 23165 |
|             |           | Frequency (MHz) |    | 700.5 | 707.5 | 714.5 |
| 3M          | QPSK      | 1               | 0  | 22.37 | 22.58 | 22.64 |
|             |           | 1               | 7  | 22.37 | 22.56 | 22.61 |
|             |           | 1               | 14 | 22.38 | 22.42 | 22.65 |
|             |           | 8               | 0  | 21.64 | 21.41 | 21.46 |
|             |           | 8               | 3  | 21.47 | 21.42 | 21.40 |
|             |           | 8               | 7  | 21.36 | 21.41 | 21.26 |
|             |           | 15              | 0  | 21.43 | 21.55 | 21.58 |
|             | 16QAM     | 1               | 0  | 21.32 | 21.56 | 21.60 |
|             |           | 1               | 7  | 21.49 | 21.60 | 21.62 |
|             |           | 1               | 14 | 21.38 | 21.36 | 21.60 |
|             |           | 8               | 0  | 20.65 | 20.53 | 20.42 |
|             |           | 8               | 3  | 20.39 | 20.23 | 20.29 |
|             |           | 8               | 7  | 20.53 | 20.51 | 20.28 |
|             |           | 15              | 0  | 20.52 | 20.64 | 20.56 |

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23035 | 23095 | 23155 |
|             |           | Frequency (MHz) |    | 701.5 | 707.5 | 713.5 |
| 5M          | QPSK      | 1               | 0  | 22.55 | 22.33 | 22.37 |
|             |           | 1               | 12 | 22.48 | 22.49 | 22.26 |
|             |           | 1               | 24 | 22.38 | 22.29 | 22.38 |
|             |           | 12              | 0  | 21.44 | 21.61 | 21.48 |
|             |           | 12              | 6  | 21.42 | 21.39 | 21.22 |
|             |           | 12              | 13 | 21.43 | 21.64 | 21.44 |
|             |           | 25              | 0  | 21.41 | 21.35 | 21.59 |
|             | 16QAM     | 1               | 0  | 21.48 | 21.33 | 21.42 |
|             |           | 1               | 12 | 21.36 | 21.58 | 21.41 |
|             |           | 1               | 24 | 21.38 | 21.46 | 21.40 |
|             |           | 12              | 0  | 20.40 | 20.57 | 20.41 |
|             |           | 12              | 6  | 20.50 | 20.43 | 20.40 |
|             |           | 12              | 13 | 20.56 | 20.50 | 20.40 |
|             |           | 25              | 0  | 20.38 | 20.40 | 20.51 |
| BW          | MCS Index | Channel         |    | 23060 | 23095 | 23130 |
|             |           | Frequency (MHz) |    | 704   | 707.5 | 711   |
| 10M         | QPSK      | 1               | 0  | 22.56 | 22.54 | 22.53 |
|             |           | 1               | 24 | 22.28 | 22.49 | 22.42 |
|             |           | 1               | 49 | 22.46 | 22.46 | 22.38 |
|             |           | 25              | 0  | 21.35 | 21.41 | 21.51 |
|             |           | 25              | 12 | 21.45 | 21.29 | 21.56 |
|             |           | 25              | 25 | 21.41 | 21.39 | 21.46 |
|             |           | 50              | 0  | 21.44 | 21.48 | 21.49 |
|             | 16QAM     | 1               | 0  | 21.51 | 21.38 | 21.57 |
|             |           | 1               | 24 | 21.42 | 21.54 | 21.60 |
|             |           | 1               | 49 | 21.55 | 21.42 | 21.23 |
|             |           | 25              | 0  | 20.43 | 20.47 | 20.55 |
|             |           | 25              | 12 | 20.50 | 20.34 | 20.49 |
|             |           | 25              | 25 | 20.45 | 20.42 | 20.38 |
|             |           | 50              | 0  | 20.38 | 20.54 | 20.45 |

**EIRP Power(dBm)**

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 19957  | 20175  | 20393  |
|            |           | Frequency (MHz) |    | 1710.7 | 1732.5 | 1754.3 |
| 1.4M       | QPSK      | 1               | 0  | 23.94  | 23.87  | 23.94  |
|            |           | 1               | 2  | 23.96  | 23.79  | 23.93  |
|            |           | 1               | 5  | 23.92  | 23.98  | 23.96  |
|            |           | 3               | 0  | 22.92  | 22.86  | 23.09  |
|            |           | 3               | 1  | 23.03  | 22.89  | 22.99  |
|            |           | 3               | 3  | 23.17  | 22.82  | 23.09  |
|            |           | 6               | 0  | 22.95  | 23.00  | 22.91  |
|            | 16QAM     | 1               | 0  | 23.01  | 22.88  | 23.03  |
|            |           | 1               | 2  | 22.80  | 22.83  | 22.91  |
|            |           | 1               | 5  | 22.88  | 22.90  | 22.89  |
|            |           | 3               | 0  | 22.03  | 21.86  | 22.12  |
|            |           | 3               | 1  | 21.89  | 21.89  | 21.91  |
|            |           | 3               | 3  | 22.10  | 21.86  | 21.96  |
|            |           | 6               | 0  | 22.04  | 22.08  | 22.01  |
| BW         | MCS Index | Channel         |    | 19965  | 20175  | 20385  |
|            |           | Frequency (MHz) |    | 1711.5 | 1732.5 | 1753.5 |
| 3M         | QPSK      | 1               | 0  | 23.96  | 24.13  | 23.97  |
|            |           | 1               | 7  | 23.87  | 23.92  | 23.94  |
|            |           | 1               | 14 | 24.01  | 23.99  | 23.82  |
|            |           | 8               | 0  | 22.84  | 22.82  | 23.10  |
|            |           | 8               | 3  | 23.14  | 22.90  | 23.16  |
|            |           | 8               | 7  | 22.95  | 23.00  | 22.85  |
|            |           | 15              | 0  | 22.95  | 22.95  | 23.06  |
|            | 16QAM     | 1               | 0  | 22.92  | 23.01  | 22.89  |
|            |           | 1               | 7  | 22.77  | 22.95  | 23.09  |
|            |           | 1               | 14 | 23.01  | 23.06  | 22.83  |
|            |           | 8               | 0  | 21.92  | 21.91  | 22.21  |
|            |           | 8               | 3  | 22.08  | 21.90  | 22.10  |
|            |           | 8               | 7  | 21.90  | 21.99  | 21.88  |
|            |           | 15              | 0  | 21.81  | 21.79  | 22.04  |

\*EIRP = Conducted + antenna gain (2.54dBi)

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 19975  | 20175  | 20375  |
|            |           | Frequency (MHz) |    | 1712.5 | 1732.5 | 1752.5 |
| 5M         | QPSK      | 1               | 0  | 24.21  | 24.08  | 23.87  |
|            |           | 1               | 12 | 24.02  | 24.12  | 24.08  |
|            |           | 1               | 24 | 23.77  | 24.05  | 23.88  |
|            |           | 12              | 0  | 23.00  | 22.91  | 22.96  |
|            |           | 12              | 6  | 22.90  | 22.90  | 22.92  |
|            |           | 12              | 13 | 23.05  | 22.92  | 22.90  |
|            |           | 25              | 0  | 23.08  | 22.80  | 23.02  |
|            | 16QAM     | 1               | 0  | 23.15  | 23.01  | 22.84  |
|            |           | 1               | 12 | 23.05  | 23.13  | 23.07  |
|            |           | 1               | 24 | 22.92  | 22.88  | 22.94  |
|            |           | 12              | 0  | 22.17  | 21.88  | 21.94  |
|            |           | 12              | 6  | 21.94  | 22.01  | 21.96  |
|            |           | 12              | 13 | 21.99  | 21.88  | 21.93  |
|            |           | 25              | 0  | 21.96  | 21.82  | 22.09  |
| BW         | MCS Index | Channel         |    | 20000  | 20175  | 20350  |
|            |           | Frequency (MHz) |    | 1715   | 1732.5 | 1750   |
| 10M        | QPSK      | 1               | 0  | 24.10  | 24.11  | 24.04  |
|            |           | 1               | 24 | 24.00  | 24.10  | 24.18  |
|            |           | 1               | 49 | 24.07  | 24.02  | 23.94  |
|            |           | 25              | 0  | 23.09  | 22.99  | 22.83  |
|            |           | 25              | 12 | 22.97  | 23.16  | 22.99  |
|            |           | 25              | 25 | 22.92  | 23.13  | 22.95  |
|            |           | 50              | 0  | 22.88  | 23.00  | 23.02  |
|            | 16QAM     | 1               | 0  | 23.14  | 23.21  | 22.92  |
|            |           | 1               | 24 | 23.00  | 23.14  | 23.00  |
|            |           | 1               | 49 | 23.14  | 22.96  | 23.01  |
|            |           | 25              | 0  | 22.01  | 21.96  | 21.94  |
|            |           | 25              | 12 | 22.06  | 22.17  | 21.95  |
|            |           | 25              | 25 | 21.81  | 22.05  | 21.95  |
|            |           | 50              | 0  | 21.97  | 22.01  | 22.22  |

\*EIRP = Conducted + antenna gain (2.54dBi)

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 20025  | 20175  | 20325  |
|            |           | Frequency (MHz) |    | 1717.5 | 1732.5 | 1747.5 |
| 15M        | QPSK      | 1               | 0  | 23.82  | 23.86  | 23.88  |
|            |           | 1               | 37 | 24.05  | 23.76  | 24.04  |
|            |           | 1               | 74 | 24.09  | 23.96  | 24.01  |
|            |           | 36              | 0  | 22.99  | 22.90  | 23.07  |
|            |           | 36              | 19 | 23.05  | 22.88  | 22.95  |
|            |           | 36              | 39 | 22.95  | 22.94  | 23.03  |
|            |           | 75              | 0  | 22.89  | 23.02  | 23.11  |
|            | 16QAM     | 1               | 0  | 22.85  | 22.89  | 22.85  |
|            |           | 1               | 37 | 22.97  | 22.88  | 23.19  |
|            |           | 1               | 74 | 23.03  | 22.91  | 23.00  |
|            |           | 36              | 0  | 22.13  | 21.99  | 21.91  |
|            |           | 36              | 19 | 22.07  | 21.89  | 21.99  |
|            |           | 36              | 39 | 21.94  | 21.80  | 21.99  |
|            |           | 75              | 0  | 21.89  | 21.96  | 22.02  |
| BW         | MCS Index | Channel         |    | 20050  | 20175  | 20300  |
|            |           | Frequency (MHz) |    | 1720   | 1732.5 | 1745   |
| 20M        | QPSK      | 1               | 0  | 24.01  | 24.08  | 24.16  |
|            |           | 1               | 50 | 24.03  | 23.97  | 23.85  |
|            |           | 1               | 99 | 23.91  | 23.83  | 24.01  |
|            |           | 50              | 0  | 23.14  | 22.93  | 23.06  |
|            |           | 50              | 25 | 22.88  | 22.96  | 22.88  |
|            |           | 50              | 50 | 22.99  | 22.87  | 22.96  |
|            |           | 100             | 0  | 22.92  | 22.81  | 22.78  |
|            | 16QAM     | 1               | 0  | 22.91  | 22.94  | 23.02  |
|            |           | 1               | 50 | 23.02  | 22.96  | 22.92  |
|            |           | 1               | 99 | 22.99  | 22.86  | 23.03  |
|            |           | 50              | 0  | 22.10  | 21.92  | 22.16  |
|            |           | 50              | 25 | 21.99  | 21.85  | 21.81  |
|            |           | 50              | 50 | 21.92  | 21.84  | 22.07  |
|            |           | 100             | 0  | 21.93  | 21.93  | 21.93  |

\*EIRP = Conducted + antenna gain (2.54dBi)

# ERP Power (dBm)

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23017 | 23095 | 23173 |
|             |           | Frequency (MHz) |    | 699.7 | 707.5 | 715.3 |
| 1.4M        | QPSK      | 1               | 0  | 17.22 | 17.00 | 17.03 |
|             |           | 1               | 2  | 17.04 | 16.81 | 17.02 |
|             |           | 1               | 5  | 16.83 | 17.13 | 16.92 |
|             |           | 3               | 0  | 16.14 | 15.98 | 16.06 |
|             |           | 3               | 1  | 16.03 | 15.83 | 15.91 |
|             |           | 3               | 3  | 15.85 | 16.07 | 16.05 |
|             |           | 6               | 0  | 15.89 | 16.01 | 16.08 |
|             | 16QAM     | 1               | 0  | 16.15 | 15.82 | 16.15 |
|             |           | 1               | 2  | 16.09 | 15.90 | 15.99 |
|             |           | 1               | 5  | 16.00 | 16.20 | 15.83 |
|             |           | 3               | 0  | 15.07 | 14.88 | 15.01 |
|             |           | 3               | 1  | 15.01 | 14.87 | 14.94 |
|             |           | 3               | 3  | 14.92 | 15.09 | 14.97 |
|             |           | 6               | 0  | 14.98 | 15.11 | 15.05 |
| BW          | MCS Index | Channel         |    | 23025 | 23095 | 23165 |
|             |           | Frequency (MHz) |    | 700.5 | 707.5 | 714.5 |
| 3M          | QPSK      | 1               | 0  | 16.90 | 17.11 | 17.17 |
|             |           | 1               | 7  | 16.90 | 17.09 | 17.14 |
|             |           | 1               | 14 | 16.91 | 16.95 | 17.18 |
|             |           | 8               | 0  | 16.17 | 15.94 | 15.99 |
|             |           | 8               | 3  | 16.00 | 15.95 | 15.93 |
|             |           | 8               | 7  | 15.89 | 15.94 | 15.79 |
|             |           | 15              | 0  | 15.96 | 16.08 | 16.11 |
|             | 16QAM     | 1               | 0  | 15.85 | 16.09 | 16.13 |
|             |           | 1               | 7  | 16.02 | 16.13 | 16.15 |
|             |           | 1               | 14 | 15.91 | 15.89 | 16.13 |
|             |           | 8               | 0  | 15.18 | 15.06 | 14.95 |
|             |           | 8               | 3  | 14.92 | 14.76 | 14.82 |
|             |           | 8               | 7  | 15.06 | 15.04 | 14.81 |
|             |           | 15              | 0  | 15.05 | 15.17 | 15.09 |

\*ERP = Conducted + antenna gain (-3.32dBi)-2.15

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23035 | 23095 | 23155 |
|             |           | Frequency (MHz) |    | 701.5 | 707.5 | 713.5 |
| 5M          | QPSK      | 1               | 0  | 17.08 | 16.86 | 16.90 |
|             |           | 1               | 12 | 17.01 | 17.02 | 16.79 |
|             |           | 1               | 24 | 16.91 | 16.82 | 16.91 |
|             |           | 12              | 0  | 15.97 | 16.14 | 16.01 |
|             |           | 12              | 6  | 15.95 | 15.92 | 15.75 |
|             |           | 12              | 13 | 15.96 | 16.17 | 15.97 |
|             |           | 25              | 0  | 15.94 | 15.88 | 16.12 |
|             | 16QAM     | 1               | 0  | 16.01 | 15.86 | 15.95 |
|             |           | 1               | 12 | 15.89 | 16.11 | 15.94 |
|             |           | 1               | 24 | 15.91 | 15.99 | 15.93 |
|             |           | 12              | 0  | 14.93 | 15.10 | 14.94 |
|             |           | 12              | 6  | 15.03 | 14.96 | 14.93 |
|             |           | 12              | 13 | 15.09 | 15.03 | 14.93 |
|             |           | 25              | 0  | 14.91 | 14.93 | 15.04 |
| BW          | MCS Index | Channel         |    | 23060 | 23095 | 23130 |
|             |           | Frequency (MHz) |    | 704   | 707.5 | 711   |
| 10M         | QPSK      | 1               | 0  | 17.09 | 17.07 | 17.06 |
|             |           | 1               | 24 | 16.81 | 17.02 | 16.95 |
|             |           | 1               | 49 | 16.99 | 16.99 | 16.91 |
|             |           | 25              | 0  | 15.88 | 15.94 | 16.04 |
|             |           | 25              | 12 | 15.98 | 15.82 | 16.09 |
|             |           | 25              | 25 | 15.94 | 15.92 | 15.99 |
|             |           | 50              | 0  | 15.97 | 16.01 | 16.02 |
|             | 16QAM     | 1               | 0  | 16.04 | 15.91 | 16.10 |
|             |           | 1               | 24 | 15.95 | 16.07 | 16.13 |
|             |           | 1               | 49 | 16.08 | 15.95 | 15.76 |
|             |           | 25              | 0  | 14.96 | 15.00 | 15.08 |
|             |           | 25              | 12 | 15.03 | 14.87 | 15.02 |
|             |           | 25              | 25 | 14.98 | 14.95 | 14.91 |
|             |           | 50              | 0  | 14.91 | 15.07 | 14.98 |

\*ERP = Conducted + antenna gain (-3.32dBi)-2.15

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

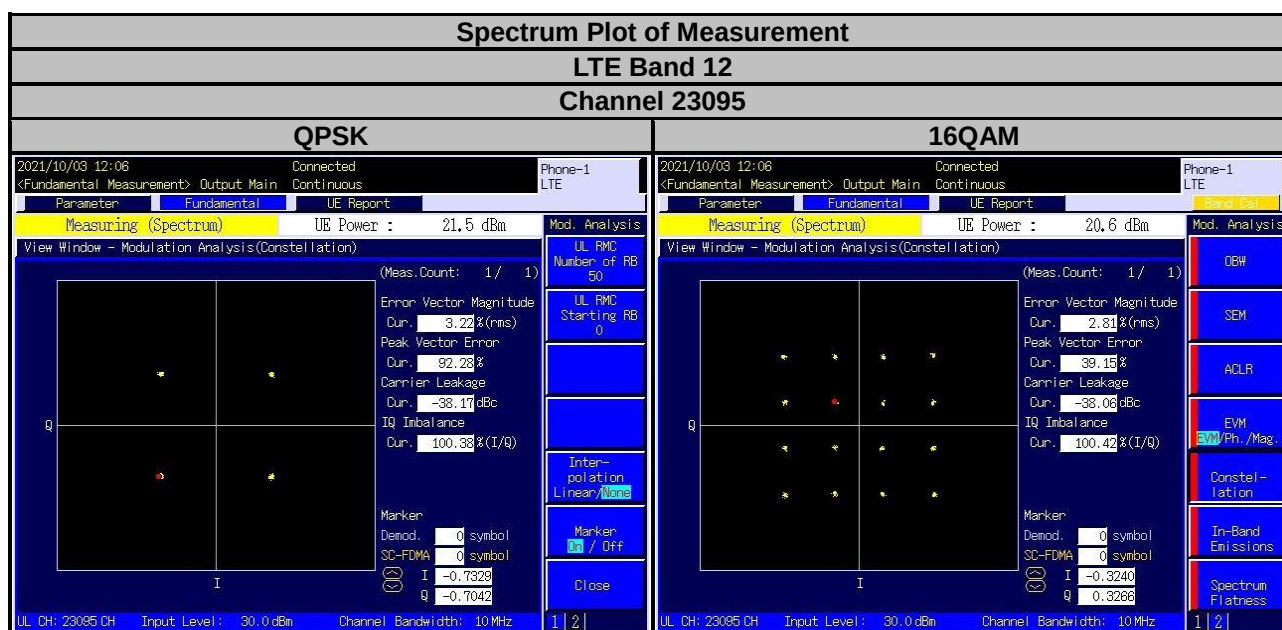
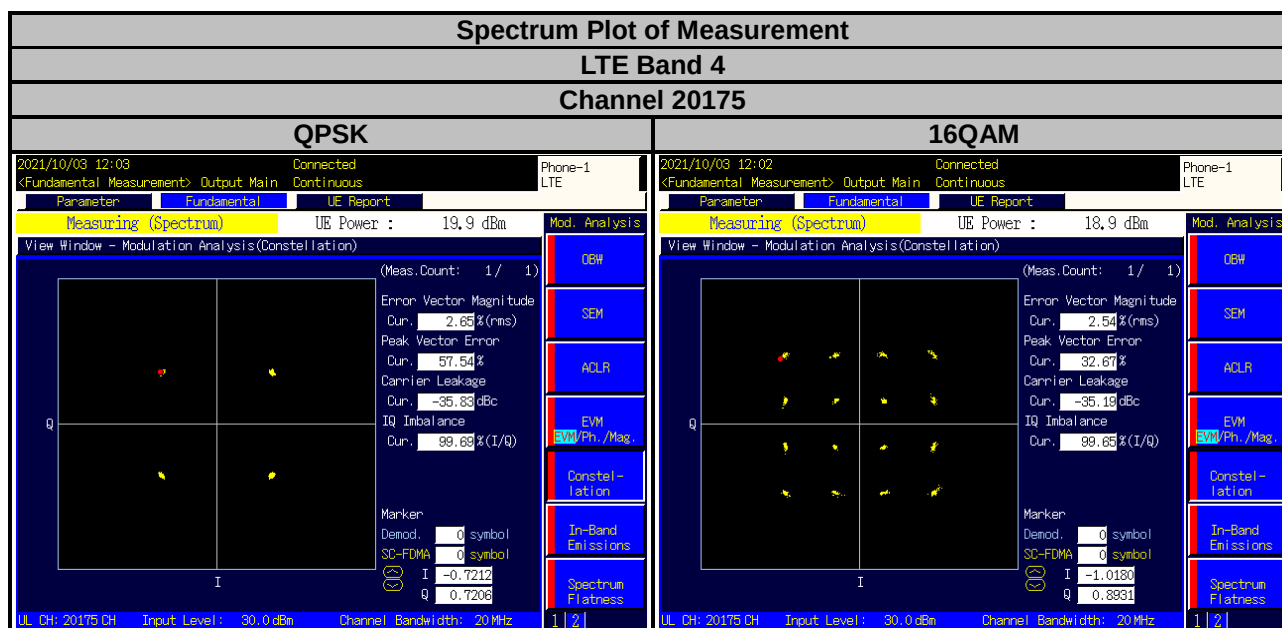
### 4.2.2 Test Setup



### 4.2.3 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.

## 4.2.4 Test Results



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

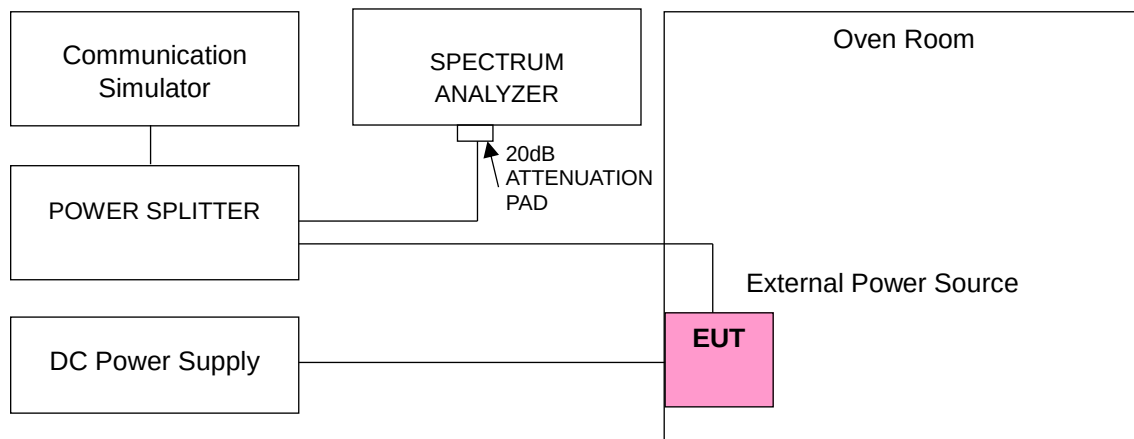
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT  $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .

#### 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<br>(Volts) | LTE Band 4                 |                       |                 |                       |
|--------------------|----------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|                    | Low Channel                |                       | High Channel    |                       |
|                    | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 1710.700004                | 0.002                 | 1754.300002     | 0.001                 |
| 6.12               | 1710.700003                | 0.002                 | 1754.300004     | 0.002                 |
| 8.28               | 1710.700004                | 0.002                 | 1754.300002     | 0.001                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

##### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4                 |                       |                 |                       |
|------------|----------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|            | Low Channel                |                       | High Channel    |                       |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1710.700002                | 0.001                 | 1754.300004     | 0.002                 |
| -30        | 1710.700002                | 0.001                 | 1754.300004     | 0.002                 |
| -20        | 1710.700004                | 0.002                 | 1754.300002     | 0.001                 |
| -10        | 1710.700004                | 0.002                 | 1754.300001     | 0.001                 |
| 0          | 1710.700002                | 0.001                 | 1754.300001     | 0.001                 |
| 10         | 1710.700003                | 0.002                 | 1754.300004     | 0.002                 |
| 20         | 1710.699996                | -0.002                | 1754.299998     | -0.001                |
| 30         | 1710.699998                | -0.001                | 1754.299998     | -0.001                |
| 40         | 1710.699996                | -0.002                | 1754.299998     | -0.001                |
| 50         | 1710.699996                | -0.002                | 1754.299997     | -0.002                |
| 60         | 1710.700003                | 0.002                 | 1754.299998     | -0.001                |
| 70         | 1710.700002                | 0.001                 | 1754.299997     | -0.002                |
| 85         | 1710.700003                | 0.002                 | 1754.299997     | -0.001                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 4               |                       |                 |                       |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |
|                    | Low Channel              |                       | High Channel    |                       |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 1711.500003              | 0.001                 | 1753.500002     | 0.001                 |
| 6.12               | 1711.500003              | 0.002                 | 1753.500003     | 0.002                 |
| 8.28               | 1711.500002              | 0.001                 | 1753.500001     | 0.001                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4               |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1711.500003              | 0.002                 | 1753.500002     | 0.001                 |
| -30        | 1711.500004              | 0.002                 | 1753.500002     | 0.001                 |
| -20        | 1711.500002              | 0.001                 | 1753.500001     | 0.001                 |
| -10        | 1711.500004              | 0.002                 | 1753.500002     | 0.001                 |
| 0          | 1711.500001              | 0.001                 | 1753.500003     | 0.001                 |
| 10         | 1711.500002              | 0.001                 | 1753.500003     | 0.002                 |
| 20         | 1711.499997              | -0.002                | 1753.499997     | -0.002                |
| 30         | 1711.499999              | -0.001                | 1753.499998     | -0.001                |
| 40         | 1711.499996              | -0.002                | 1753.499996     | -0.002                |
| 50         | 1711.499996              | -0.002                | 1753.499998     | -0.001                |
| 60         | 1711.499999              | -0.001                | 1753.499997     | -0.002                |
| 70         | 1711.499998              | -0.001                | 1753.499999     | -0.001                |
| 85         | 1711.499998              | -0.001                | 1753.499998     | -0.001                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 4               |                       |                 |                       |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |
|                    | Low Channel              |                       | High Channel    |                       |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 1712.500001              | 0.001                 | 1752.500003     | 0.001                 |
| 6.12               | 1712.500002              | 0.001                 | 1752.500003     | 0.002                 |
| 8.28               | 1712.500002              | 0.001                 | 1752.500002     | 0.001                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4               |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1712.500002              | 0.001                 | 1752.500003     | 0.002                 |
| -30        | 1712.500002              | 0.001                 | 1752.500004     | 0.002                 |
| -20        | 1712.500003              | 0.002                 | 1752.500002     | 0.001                 |
| -10        | 1712.500002              | 0.001                 | 1752.500004     | 0.002                 |
| 0          | 1712.500003              | 0.002                 | 1752.500003     | 0.002                 |
| 10         | 1712.500003              | 0.002                 | 1752.500001     | 0.001                 |
| 20         | 1712.499996              | -0.002                | 1752.499997     | -0.002                |
| 30         | 1712.499997              | -0.002                | 1752.499998     | -0.001                |
| 40         | 1712.499997              | -0.002                | 1752.499997     | -0.002                |
| 50         | 1712.499999              | -0.001                | 1752.499997     | -0.002                |
| 60         | 1712.500002              | 0.001                 | 1752.499998     | -0.001                |
| 70         | 1712.500004              | 0.002                 | 1752.499997     | -0.002                |
| 85         | 1712.500002              | 0.001                 | 1752.499997     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 4                |                       |                 |                       |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 10 MHz |                       |                 |                       |
|                    | Low Channel               |                       | High Channel    |                       |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 1715.000004               | 0.002                 | 1750.000004     | 0.002                 |
| 6.12               | 1715.000004               | 0.002                 | 1750.000002     | 0.001                 |
| 8.28               | 1715.000002               | 0.001                 | 1750.000004     | 0.002                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4                |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1715.000004               | 0.002                 | 1750.000002     | 0.001                 |
| -30        | 1715.000004               | 0.002                 | 1750.000002     | 0.001                 |
| -20        | 1715.000004               | 0.002                 | 1750.000003     | 0.002                 |
| -10        | 1715.000001               | 0.001                 | 1750.000003     | 0.002                 |
| 0          | 1715.000002               | 0.001                 | 1750.000002     | 0.001                 |
| 10         | 1715.000003               | 0.002                 | 1750.000003     | 0.002                 |
| 20         | 1714.999997               | -0.002                | 1749.999998     | -0.001                |
| 30         | 1714.999996               | -0.002                | 1749.999998     | -0.001                |
| 40         | 1714.999996               | -0.002                | 1749.999997     | -0.001                |
| 50         | 1714.999997               | -0.002                | 1749.999997     | -0.002                |
| 60         | 1715.000002               | 0.001                 | 1750.000002     | 0.001                 |
| 70         | 1715.000003               | 0.001                 | 1749.999997     | -0.002                |
| 85         | 1715.000002               | 0.001                 | 1749.999997     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 4                |                       |                 |                       |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 15 MHz |                       |                 |                       |
|                    | Low Channel               |                       | High Channel    |                       |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 1717.500003               | 0.002                 | 1747.500004     | 0.002                 |
| 6.12               | 1717.500004               | 0.002                 | 1747.500003     | 0.002                 |
| 8.28               | 1717.500003               | 0.002                 | 1747.500003     | 0.002                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4                |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 15 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1717.500003               | 0.002                 | 1747.500004     | 0.002                 |
| -30        | 1717.500002               | 0.001                 | 1747.500004     | 0.002                 |
| -20        | 1717.500002               | 0.001                 | 1747.500004     | 0.002                 |
| -10        | 1717.500004               | 0.002                 | 1747.500001     | 0.001                 |
| 0          | 1717.500001               | 0.001                 | 1747.500003     | 0.002                 |
| 10         | 1717.500003               | 0.001                 | 1747.500003     | 0.002                 |
| 20         | 1717.499998               | -0.001                | 1747.499997     | -0.002                |
| 30         | 1717.499998               | -0.001                | 1747.499998     | -0.001                |
| 40         | 1717.499997               | -0.002                | 1747.499998     | -0.001                |
| 50         | 1717.499998               | -0.001                | 1747.499997     | -0.002                |
| 60         | 1717.500002               | 0.001                 | 1747.500004     | 0.002                 |
| 70         | 1717.500004               | 0.002                 | 1747.500004     | 0.002                 |
| 85         | 1717.500001               | 0.001                 | 1747.499997     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 4                |                       |                 |                       |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 20 MHz |                       |                 |                       |
|                    | Low Channel               |                       | High Channel    |                       |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 1720.000001               | 0.001                 | 1745.000004     | 0.002                 |
| 6.12               | 1720.000003               | 0.002                 | 1745.000003     | 0.002                 |
| 8.28               | 1720.000002               | 0.001                 | 1745.000003     | 0.002                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4                |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 20 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1720.000002               | 0.001                 | 1745.000002     | 0.001                 |
| -30        | 1720.000002               | 0.001                 | 1745.000002     | 0.001                 |
| -20        | 1720.000001               | 0.001                 | 1745.000002     | 0.001                 |
| -10        | 1720.000004               | 0.002                 | 1745.000003     | 0.002                 |
| 0          | 1720.000002               | 0.001                 | 1745.000003     | 0.002                 |
| 10         | 1720.000002               | 0.001                 | 1745.000003     | 0.002                 |
| 20         | 1719.999997               | -0.002                | 1744.999997     | -0.002                |
| 30         | 1719.999996               | -0.002                | 1744.999998     | -0.001                |
| 40         | 1719.999997               | -0.002                | 1744.999998     | -0.001                |
| 50         | 1719.999996               | -0.002                | 1744.999998     | -0.001                |
| 60         | 1719.999997               | -0.002                | 1745.000003     | 0.002                 |
| 70         | 1719.999996               | -0.003                | 1745.000002     | 0.001                 |
| 85         | 1719.999999               | -0.001                | 1744.999997     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 12                |                       |                 |                       |
|--------------------|----------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|                    | Low Channel                |                       | High Channel    |                       |
|                    | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 699.700002                 | 0.003                 | 715.300003      | 0.004                 |
| 6.12               | 699.700002                 | 0.003                 | 715.300004      | 0.005                 |
| 8.28               | 699.700003                 | 0.004                 | 715.300001      | 0.001                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12                |                       |                 |                       |
|------------|----------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|            | Low Channel                |                       | High Channel    |                       |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 699.699999                 | -0.002                | 715.299997      | -0.004                |
| -30        | 699.700001                 | 0.002                 | 715.300003      | 0.005                 |
| -20        | 699.700003                 | 0.004                 | 715.300003      | 0.005                 |
| -10        | 699.700002                 | 0.003                 | 715.300004      | 0.005                 |
| 0          | 699.700003                 | 0.004                 | 715.300004      | 0.005                 |
| 10         | 699.700004                 | 0.006                 | 715.300004      | 0.005                 |
| 20         | 699.699997                 | -0.005                | 715.299998      | -0.003                |
| 30         | 699.699998                 | -0.003                | 715.299999      | -0.002                |
| 40         | 699.699998                 | -0.003                | 715.299996      | -0.005                |
| 50         | 699.699999                 | -0.002                | 715.299996      | -0.005                |
| 60         | 699.699998                 | -0.003                | 715.300002      | 0.003                 |
| 70         | 699.699999                 | -0.002                | 715.300003      | 0.004                 |
| 85         | 699.699997                 | -0.004                | 715.300003      | 0.003                 |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 12              |                       |                 |                       |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |
|                    | Low Channel              |                       | High Channel    |                       |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 700.500003               | 0.004                 | 714.500004      | 0.005                 |
| 6.12               | 700.500002               | 0.003                 | 714.500001      | 0.002                 |
| 8.28               | 700.500004               | 0.005                 | 714.500004      | 0.005                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12              |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 700.500002               | 0.002                 | 714.500003      | 0.005                 |
| -30        | 700.500001               | 0.001                 | 714.500004      | 0.006                 |
| -20        | 700.500004               | 0.005                 | 714.500001      | 0.002                 |
| -10        | 700.500004               | 0.005                 | 714.500003      | 0.004                 |
| 0          | 700.500003               | 0.004                 | 714.500003      | 0.004                 |
| 10         | 700.500002               | 0.003                 | 714.500003      | 0.004                 |
| 20         | 700.499996               | -0.005                | 714.499998      | -0.003                |
| 30         | 700.499996               | -0.005                | 714.499999      | -0.001                |
| 40         | 700.499998               | -0.002                | 714.499997      | -0.004                |
| 50         | 700.499997               | -0.004                | 714.499997      | -0.004                |
| 60         | 700.499997               | -0.004                | 714.499997      | -0.004                |
| 70         | 700.499997               | -0.004                | 714.499999      | -0.002                |
| 85         | 700.499996               | -0.005                | 714.499999      | -0.002                |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 12              |                       |                 |                       |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |
|                    | Low Channel              |                       | High Channel    |                       |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 701.500002               | 0.003                 | 713.500004      | 0.005                 |
| 6.12               | 701.500001               | 0.001                 | 713.500002      | 0.003                 |
| 8.28               | 701.500002               | 0.003                 | 713.500001      | 0.002                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12              |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 701.500003               | 0.004                 | 713.500003      | 0.004                 |
| -30        | 701.500002               | 0.003                 | 713.500003      | 0.005                 |
| -20        | 701.500003               | 0.004                 | 713.500001      | 0.002                 |
| -10        | 701.500002               | 0.003                 | 713.500003      | 0.004                 |
| 0          | 701.500004               | 0.005                 | 713.500002      | 0.002                 |
| 10         | 701.500003               | 0.004                 | 713.500003      | 0.004                 |
| 20         | 701.499996               | -0.005                | 713.499996      | -0.005                |
| 30         | 701.499997               | -0.004                | 713.499997      | -0.005                |
| 40         | 701.499998               | -0.003                | 713.499996      | -0.005                |
| 50         | 701.499999               | -0.002                | 713.499996      | -0.006                |
| 60         | 701.500002               | 0.003                 | 713.500001      | 0.002                 |
| 70         | 701.499997               | -0.004                | 713.500004      | 0.005                 |
| 85         | 701.499997               | -0.004                | 713.500002      | 0.003                 |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 12               |                       |                 |                       |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 10 MHz |                       |                 |                       |
|                    | Low Channel               |                       | High Channel    |                       |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 7.2                | 704.000002                | 0.003                 | 711.000003      | 0.004                 |
| 6.12               | 704.000003                | 0.004                 | 711.000003      | 0.004                 |
| 8.28               | 704.000003                | 0.004                 | 711.000003      | 0.005                 |

**Note:** The applicant defined the normal working voltage of the battery is from 6.12 Vdc to 8.28 Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12               |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 704.000002                | 0.003                 | 711.000003      | 0.004                 |
| -30        | 704.000002                | 0.003                 | 711.000003      | 0.004                 |
| -20        | 704.000001                | 0.002                 | 711.000003      | 0.004                 |
| -10        | 704.000002                | 0.003                 | 711.000001      | 0.002                 |
| 0          | 704.000002                | 0.003                 | 711.000002      | 0.003                 |
| 10         | 704.000003                | 0.004                 | 711.000002      | 0.003                 |
| 20         | 703.999997                | -0.004                | 710.999999      | -0.002                |
| 30         | 703.999999                | -0.002                | 710.999997      | -0.004                |
| 40         | 703.999998                | -0.003                | 710.999998      | -0.003                |
| 50         | 703.999997                | -0.005                | 710.999997      | -0.004                |
| 60         | 703.999998                | -0.003                | 710.999998      | -0.003                |
| 70         | 703.999998                | -0.003                | 710.999999      | -0.002                |
| 85         | 703.999998                | -0.003                | 710.999999      | -0.002                |

#### 4.4 Occupied Bandwidth Measurement

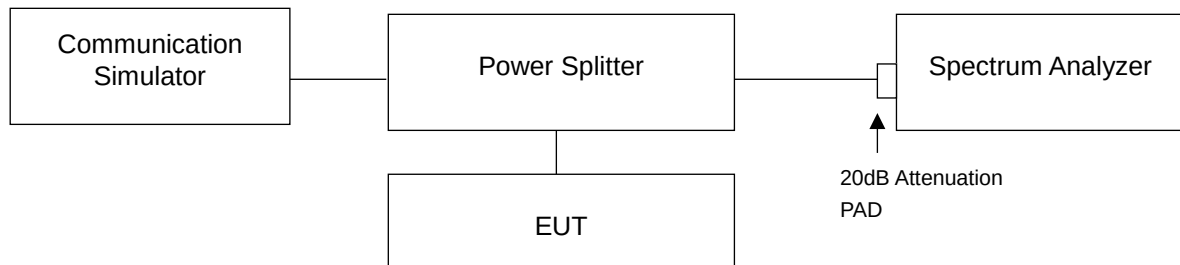
##### 4.4.1 Limits of Occupied Bandwidth Measurement

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

##### 4.4.2 Test Procedure

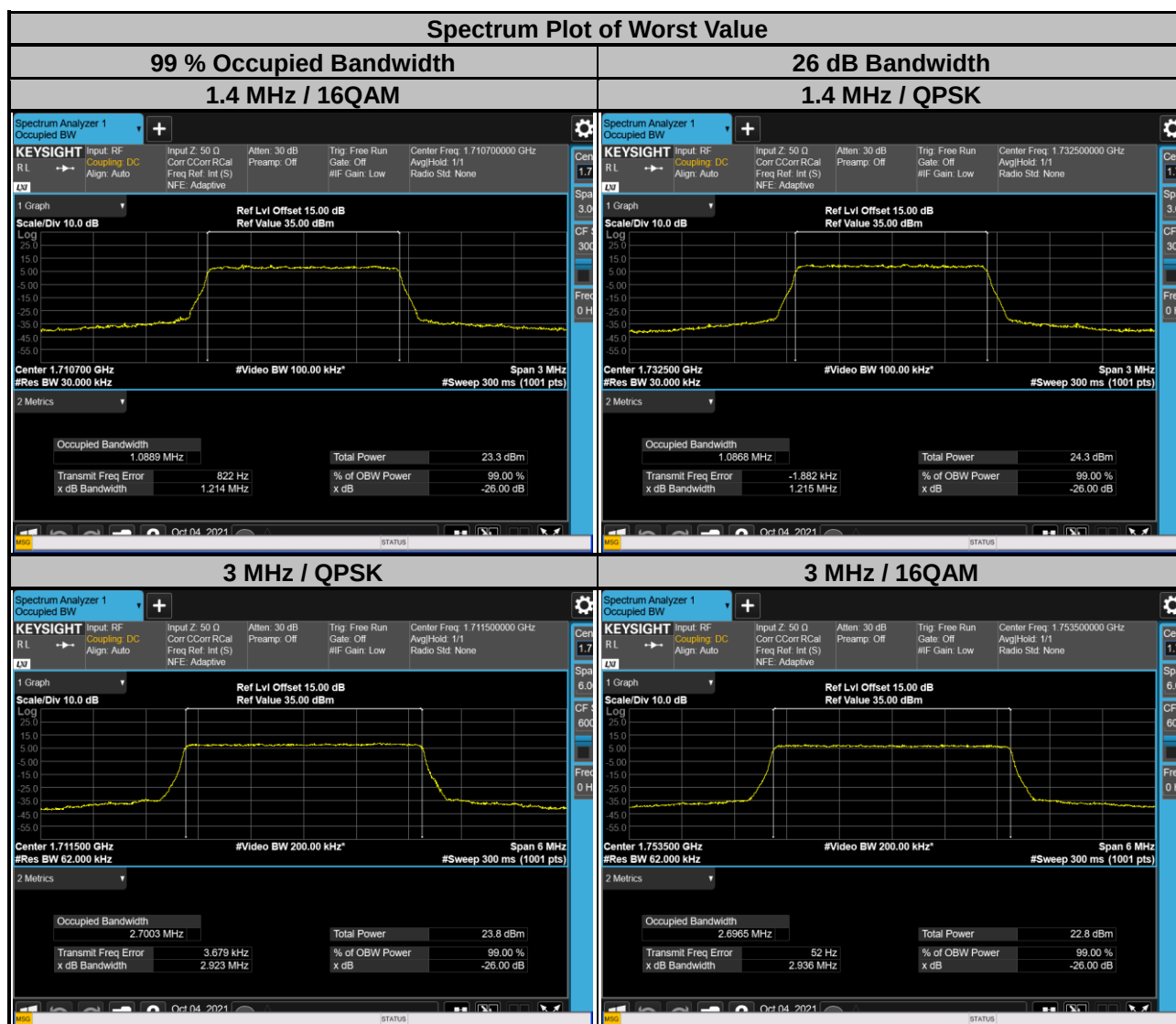
- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Refer to ANSI C63.26 section 5.4.4. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth. For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

##### 4.4.3 Test Setup

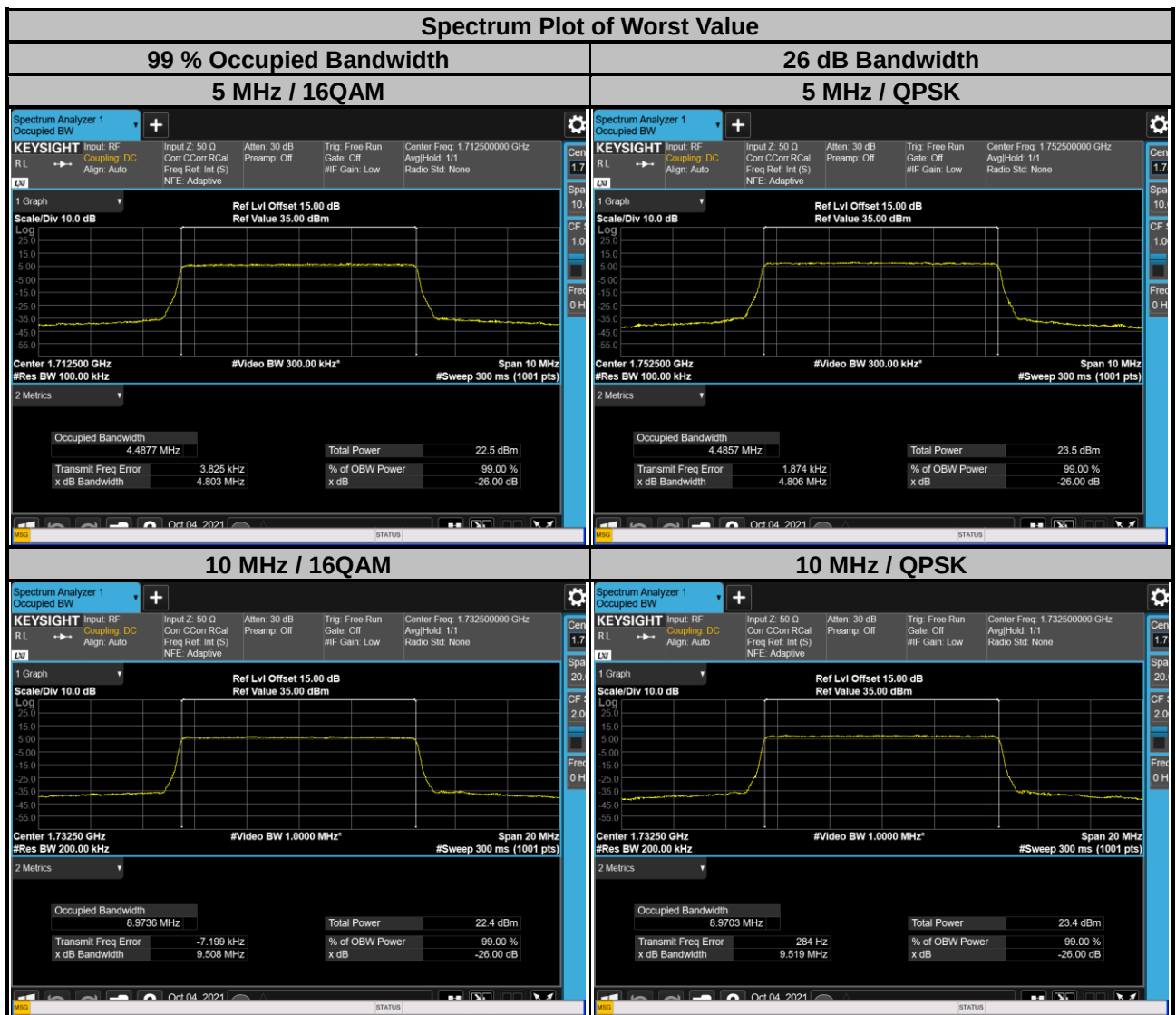


#### 4.4.4 Test Result

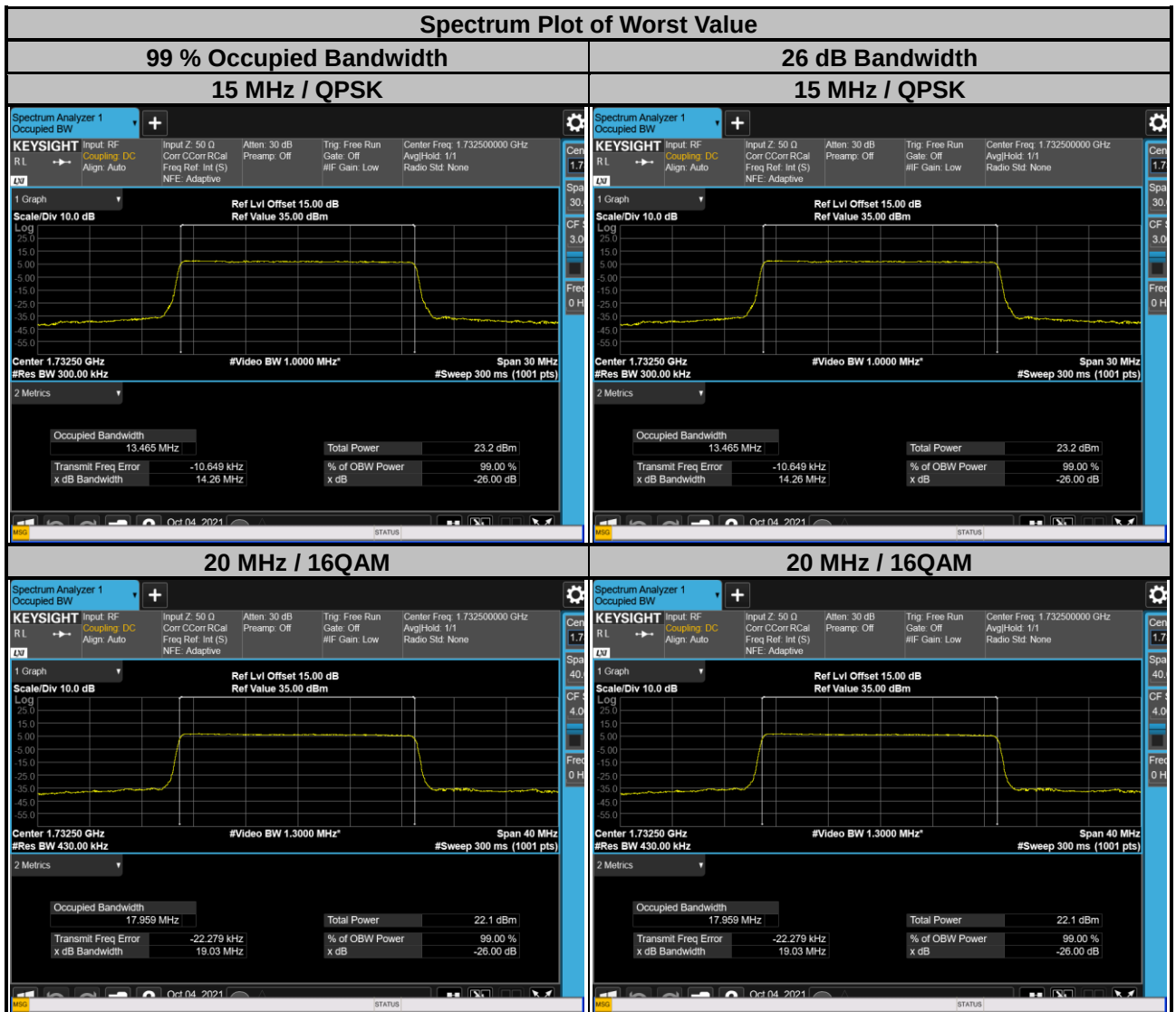
| LTE Band 4                 |                 |                               |       |                       |       |
|----------------------------|-----------------|-------------------------------|-------|-----------------------|-------|
| Channel Bandwidth: 1.4 MHz |                 |                               |       |                       |       |
| Channel                    | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                            |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 19957                      | 1710.7          | 1.09                          | 1.09  | 1.21                  | 1.21  |
| 20175                      | 1732.5          | 1.09                          | 1.09  | 1.22                  | 1.21  |
| 20393                      | 1754.3          | 1.09                          | 1.09  | 1.21                  | 1.21  |
| Channel Bandwidth: 3 MHz   |                 |                               |       |                       |       |
| Channel                    | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                            |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 19965                      | 1711.5          | 2.70                          | 2.70  | 2.92                  | 2.93  |
| 20175                      | 1732.5          | 2.70                          | 2.69  | 2.92                  | 2.93  |
| 20385                      | 1753.5          | 2.70                          | 2.70  | 2.93                  | 2.94  |



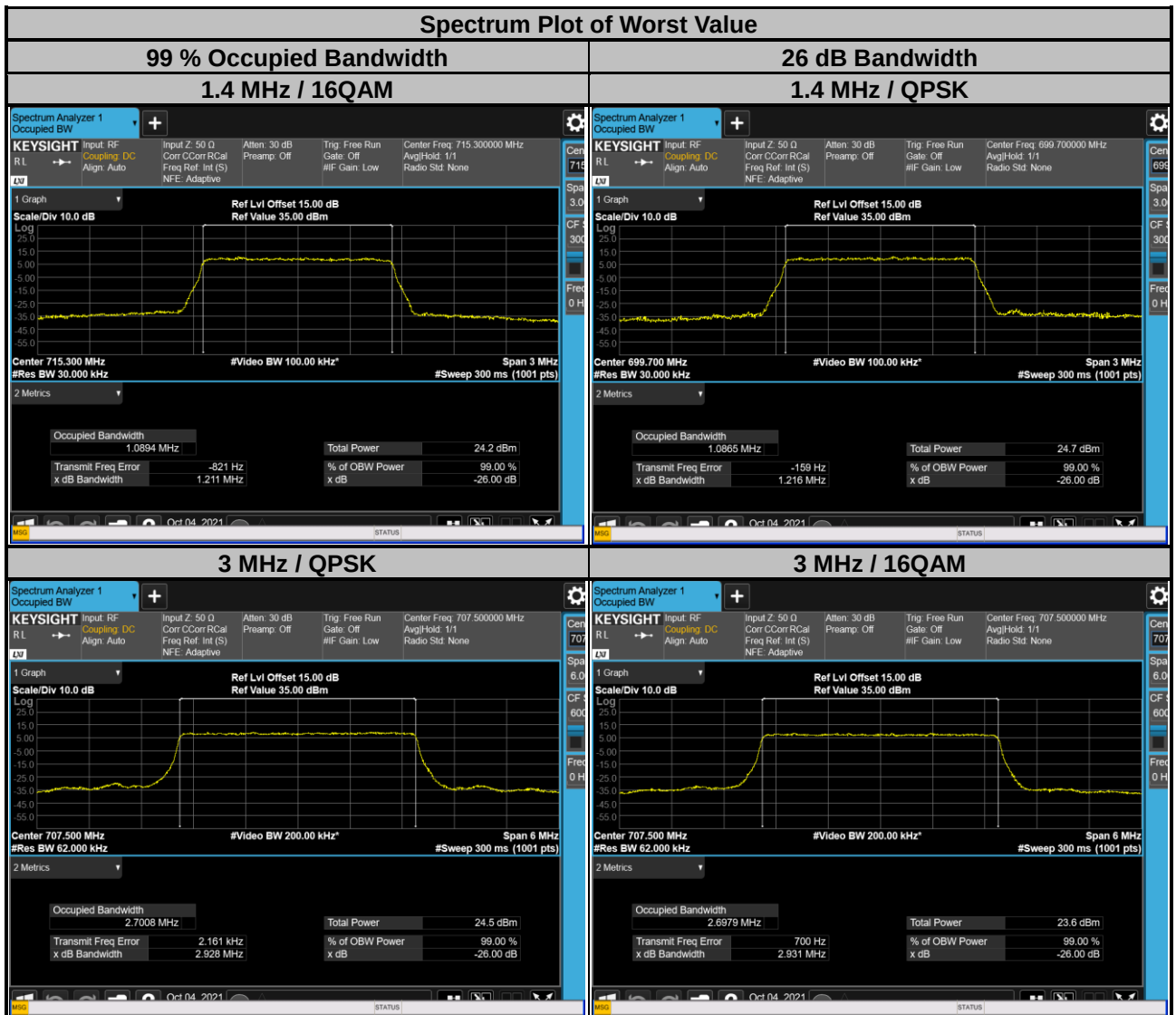
| LTE Band 4                |                 |                               |       |                       |       |
|---------------------------|-----------------|-------------------------------|-------|-----------------------|-------|
| Channel Bandwidth: 5 MHz  |                 |                               |       |                       |       |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                           |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 19975                     | 1712.5          | 4.49                          | 4.49  | 4.80                  | 4.80  |
| 20175                     | 1732.5          | 4.49                          | 4.49  | 4.79                  | 4.80  |
| 20375                     | 1752.5          | 4.49                          | 4.49  | 4.81                  | 4.80  |
| Channel Bandwidth: 10 MHz |                 |                               |       |                       |       |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                           |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 20000                     | 1715.0          | 8.96                          | 8.96  | 9.49                  | 9.51  |
| 20175                     | 1732.5          | 8.97                          | 8.97  | 9.52                  | 9.51  |
| 20350                     | 1750.0          | 8.96                          | 8.96  | 9.50                  | 9.52  |



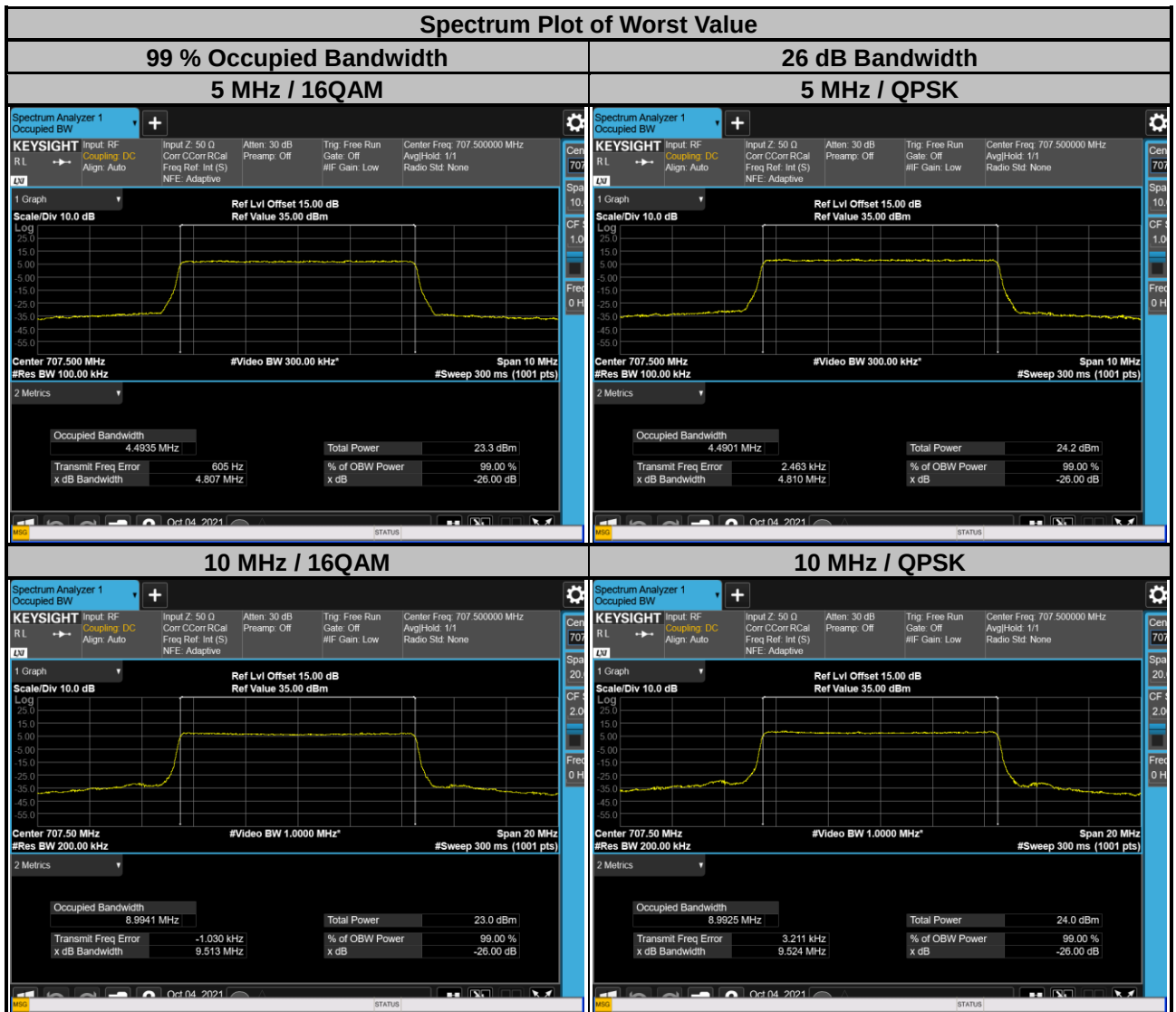
| LTE Band 4                |                 |                               |       |                       |       |
|---------------------------|-----------------|-------------------------------|-------|-----------------------|-------|
| Channel Bandwidth: 15 MHz |                 |                               |       |                       |       |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                           |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 20025                     | 1717.5          | 13.43                         | 13.42 | 14.24                 | 14.23 |
| 20175                     | 1732.5          | 13.47                         | 13.46 | 14.26                 | 14.25 |
| 20325                     | 1747.5          | 13.45                         | 13.43 | 14.24                 | 14.24 |
| Channel Bandwidth: 20 MHz |                 |                               |       |                       |       |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                           |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 20050                     | 1720.0          | 17.85                         | 17.87 | 18.98                 | 18.98 |
| 20175                     | 1732.5          | 17.94                         | 17.96 | 19.03                 | 19.03 |
| 20300                     | 1745.0          | 17.92                         | 17.94 | 19.02                 | 19.02 |



| LTE Band 12                |                 |                               |       |                       |       |
|----------------------------|-----------------|-------------------------------|-------|-----------------------|-------|
| Channel Bandwidth: 1.4 MHz |                 |                               |       |                       |       |
| Channel                    | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                            |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 23017                      | 699.7           | 1.09                          | 1.09  | 1.22                  | 1.21  |
| 23095                      | 707.5           | 1.09                          | 1.09  | 1.21                  | 1.21  |
| 23173                      | 715.3           | 1.09                          | 1.09  | 1.21                  | 1.21  |
| Channel Bandwidth: 3 MHz   |                 |                               |       |                       |       |
| Channel                    | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                            |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 23025                      | 700.5           | 2.70                          | 2.69  | 2.91                  | 2.92  |
| 23095                      | 707.5           | 2.70                          | 2.70  | 2.93                  | 2.93  |
| 23165                      | 714.5           | 2.70                          | 2.69  | 2.92                  | 2.91  |



| LTE Band 12               |                 |                               |       |                       |       |
|---------------------------|-----------------|-------------------------------|-------|-----------------------|-------|
| Channel Bandwidth: 5 MHz  |                 |                               |       |                       |       |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                           |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 23035                     | 701.5           | 4.48                          | 4.48  | 4.77                  | 4.78  |
| 23095                     | 707.5           | 4.49                          | 4.49  | 4.81                  | 4.81  |
| 23155                     | 713.5           | 4.47                          | 4.48  | 4.78                  | 4.77  |
| Channel Bandwidth: 10 MHz |                 |                               |       |                       |       |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                           |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 23060                     | 704.0           | 8.94                          | 8.94  | 9.48                  | 9.48  |
| 23095                     | 707.5           | 8.99                          | 8.99  | 9.52                  | 9.51  |
| 23130                     | 711.0           | 8.94                          | 8.95  | 9.48                  | 9.49  |



## 4.5 Band Edge Measurement

### 4.5.1 Limits of Band Edge Measurement

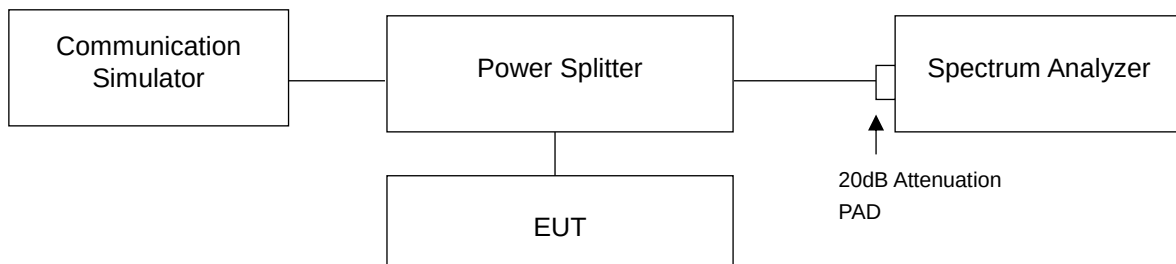
For LTE Band 12:

According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

For LTE Band 4:

According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz, 1915-1920MHz, 1995-2000 MHz, 2000-2020MHz, 2110-2155MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log (P)$  dB. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

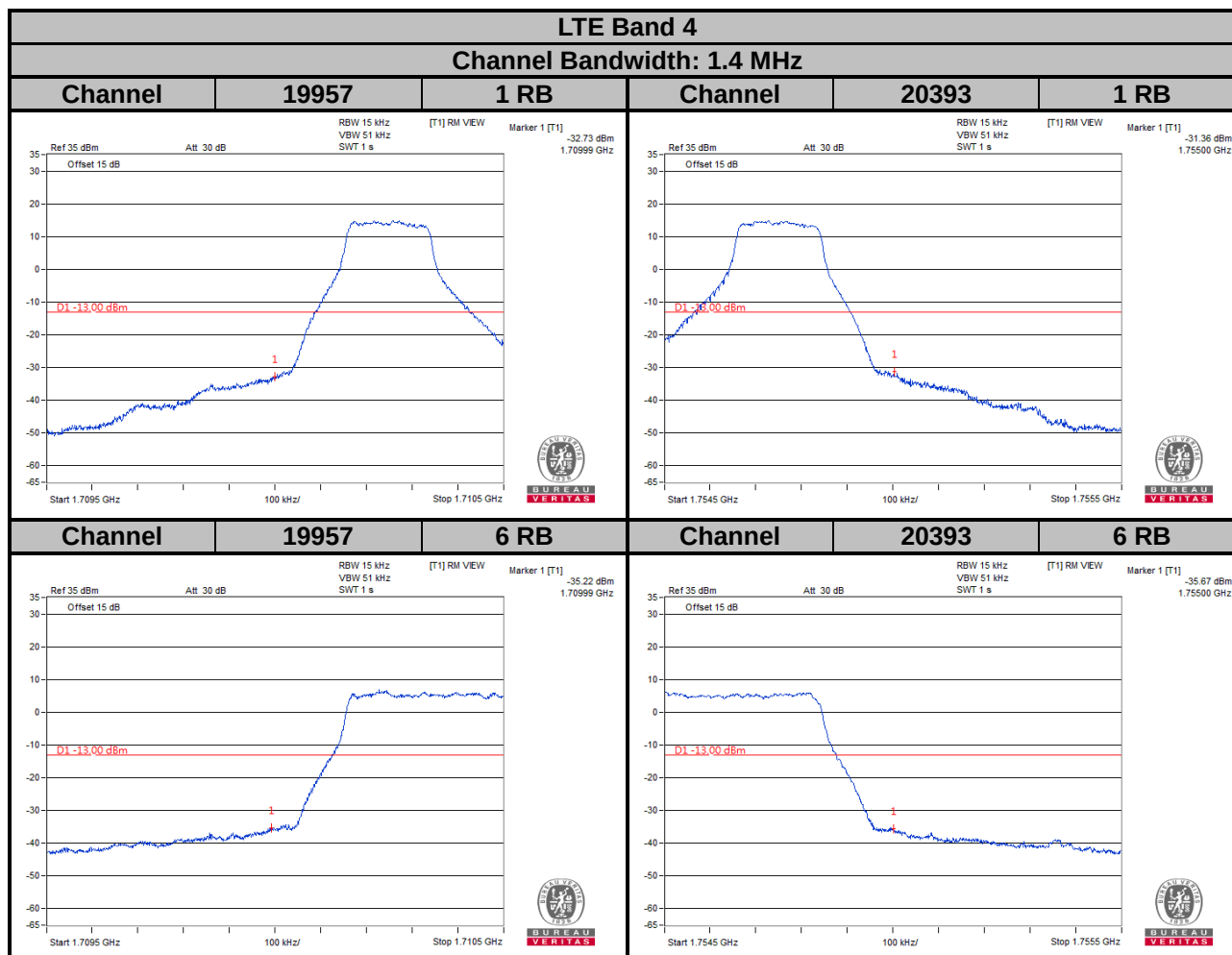
### 4.5.2 Test Setup

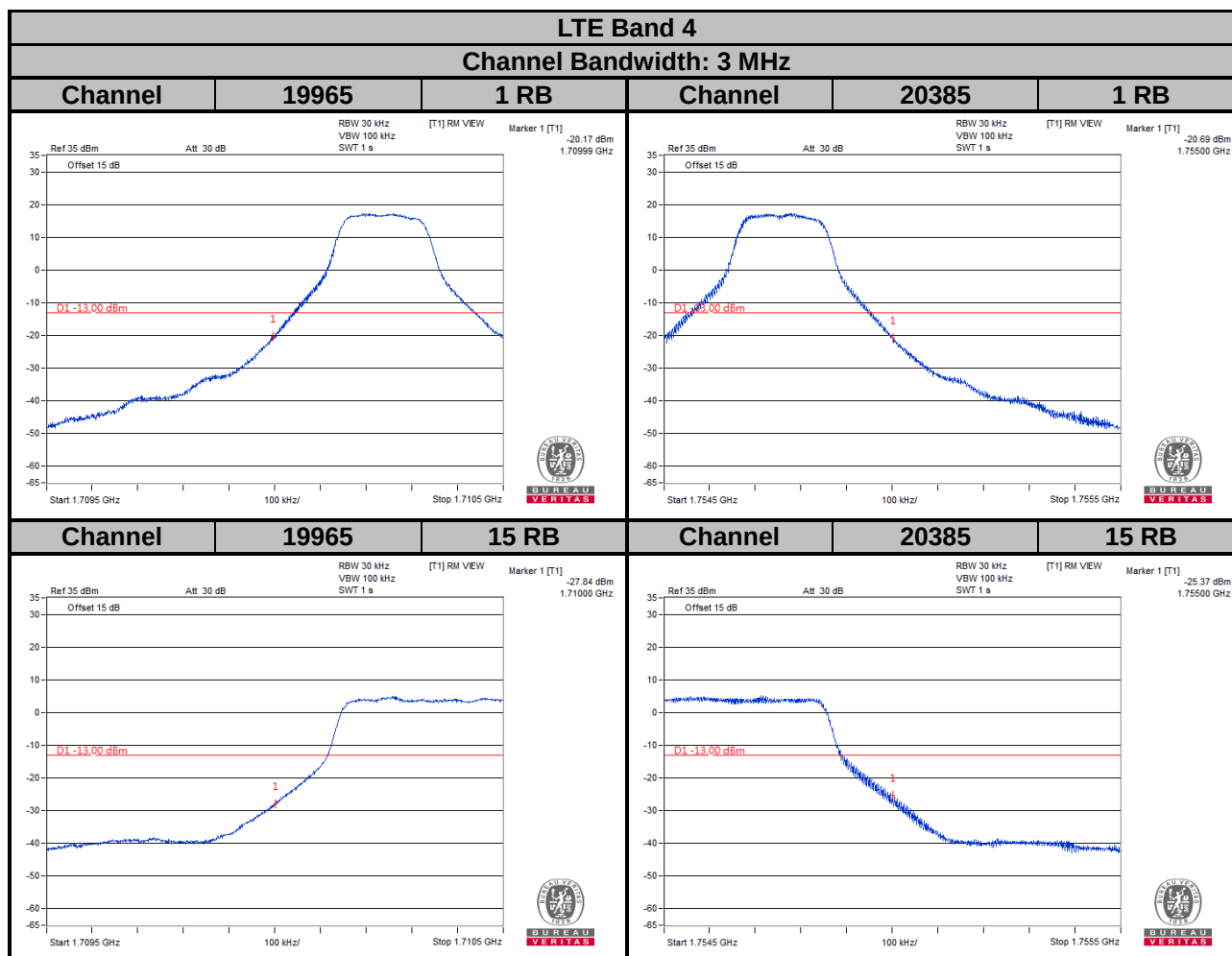


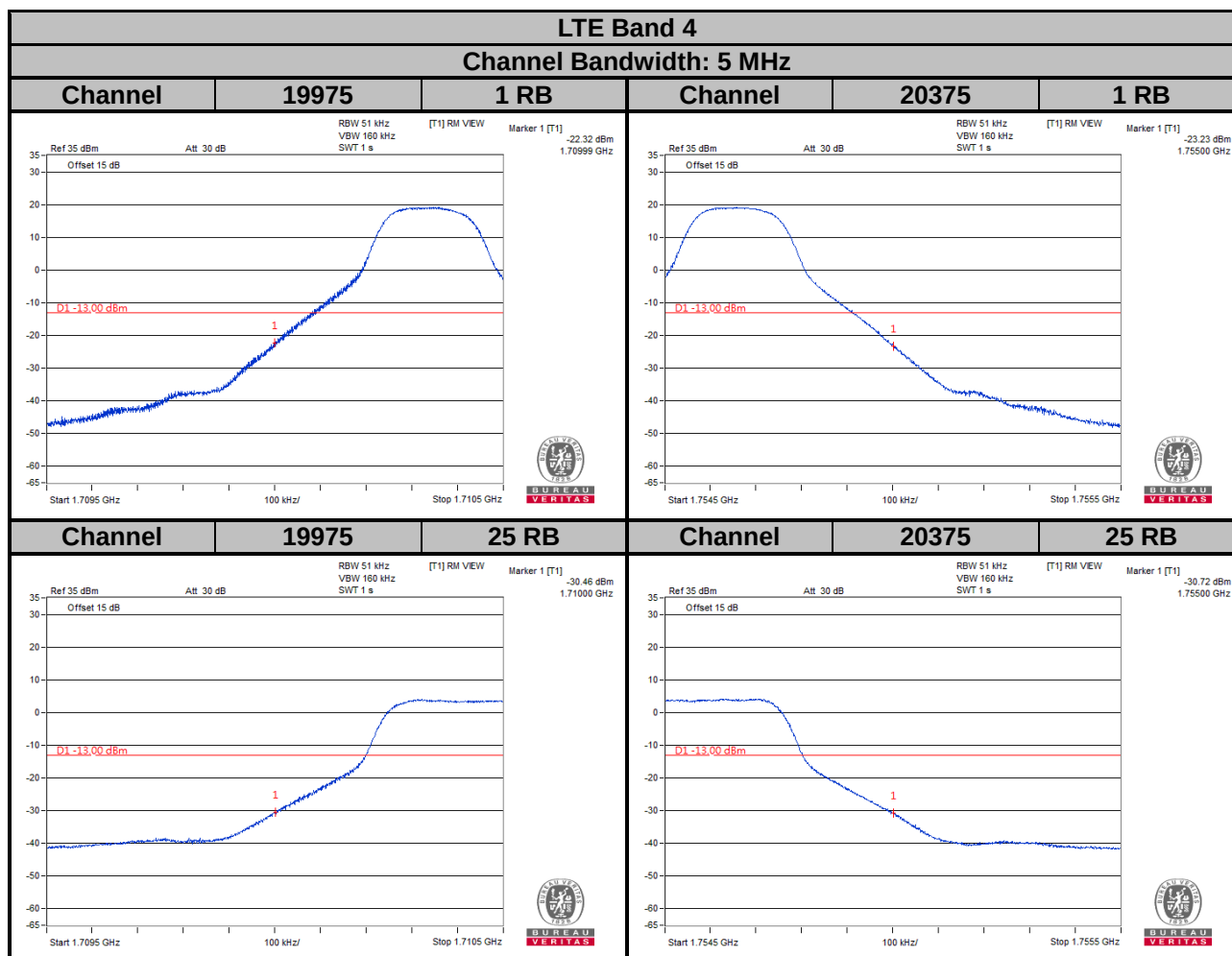
### 4.5.3 Test Procedures

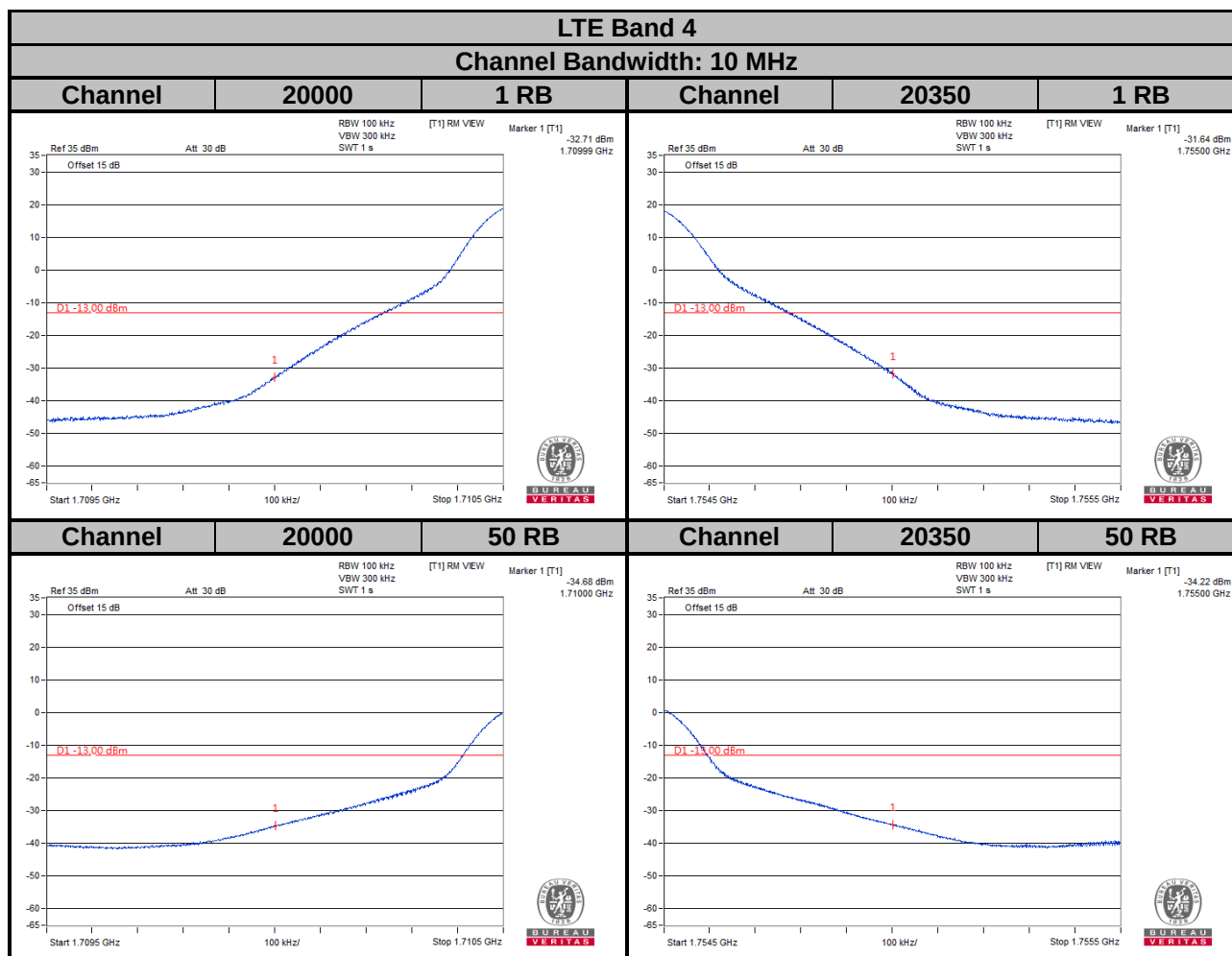
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 kHz or 30 kHz and VB of the spectrum is 51 kHz or 100 kHz (LTE Bandwidth 1.4 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 51 kHz and VB of the spectrum is 160 kHz (LTE Bandwidth 5 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 200 kHz and VB of the spectrum is 1 MHz (LTE Bandwidth 20 MHz).
- Record the max. trace plot into the test report.

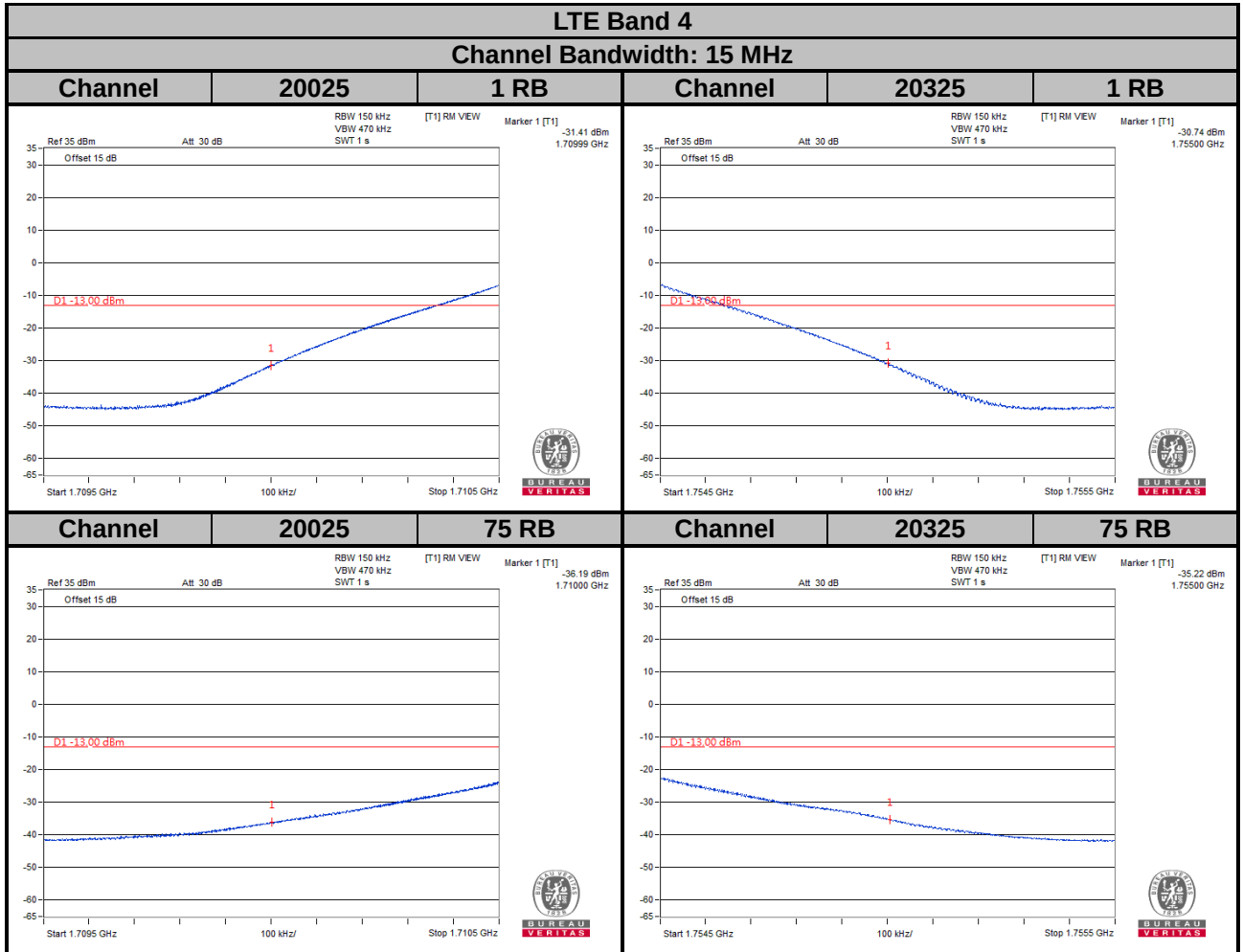
#### 4.5.4 Test Results

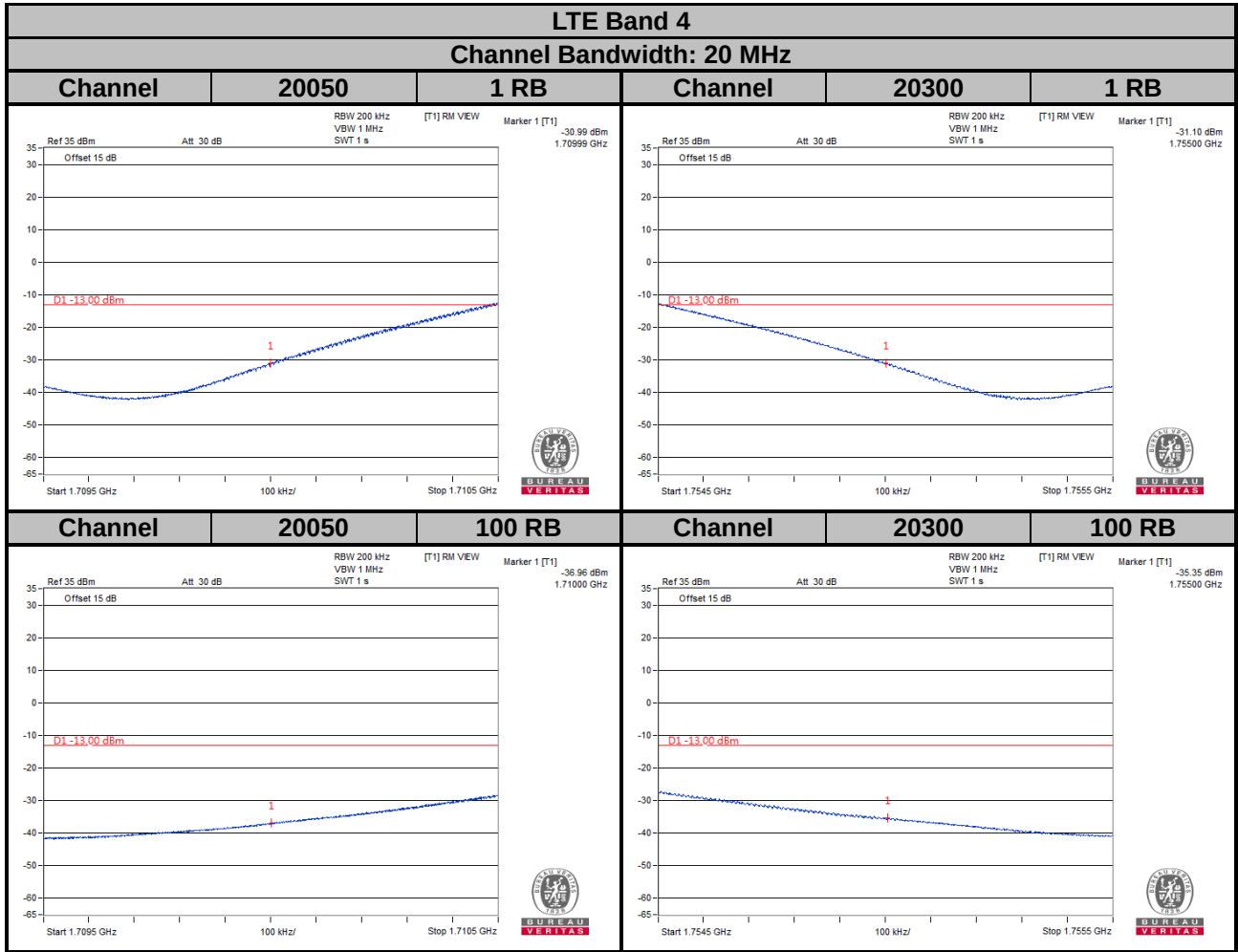


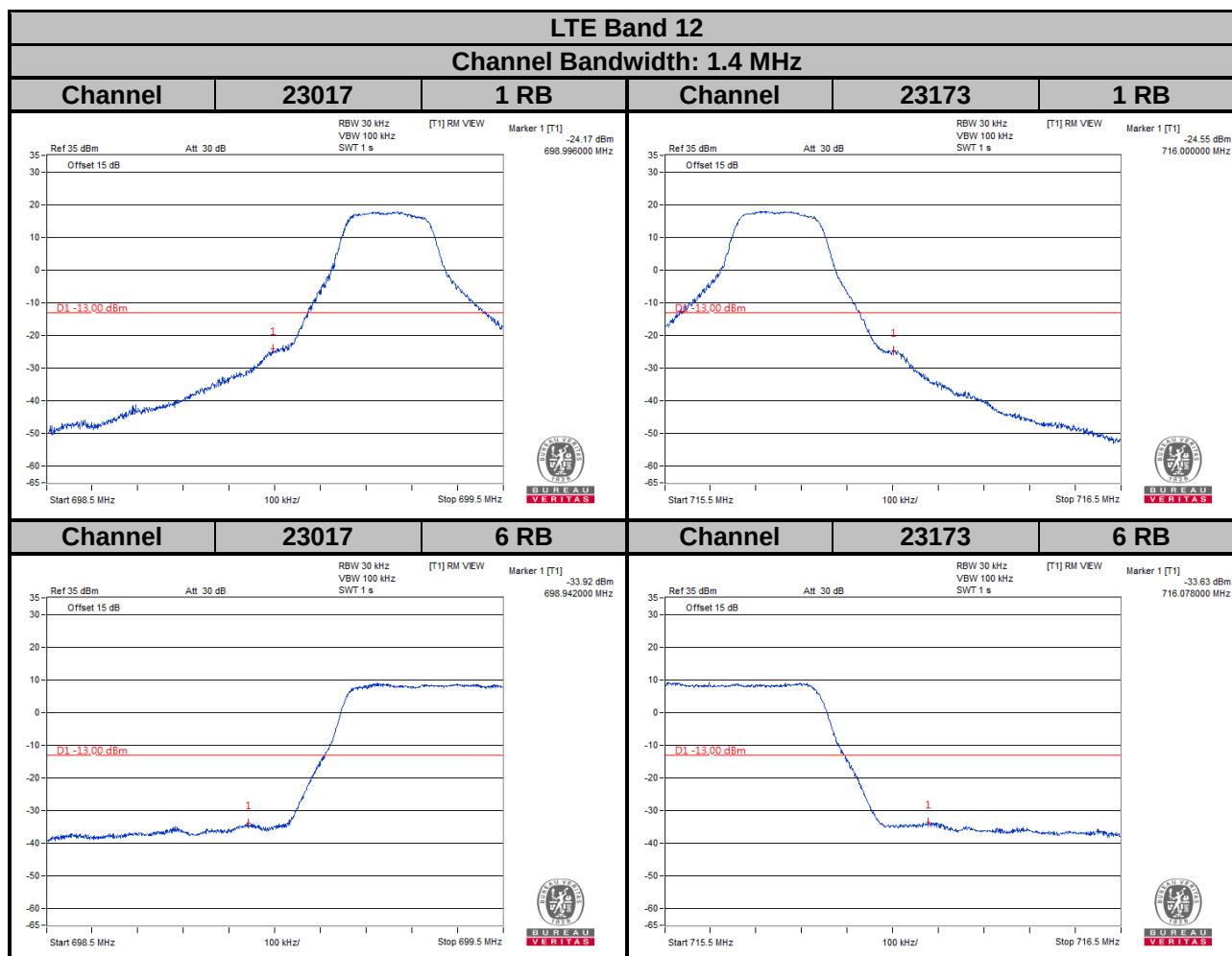


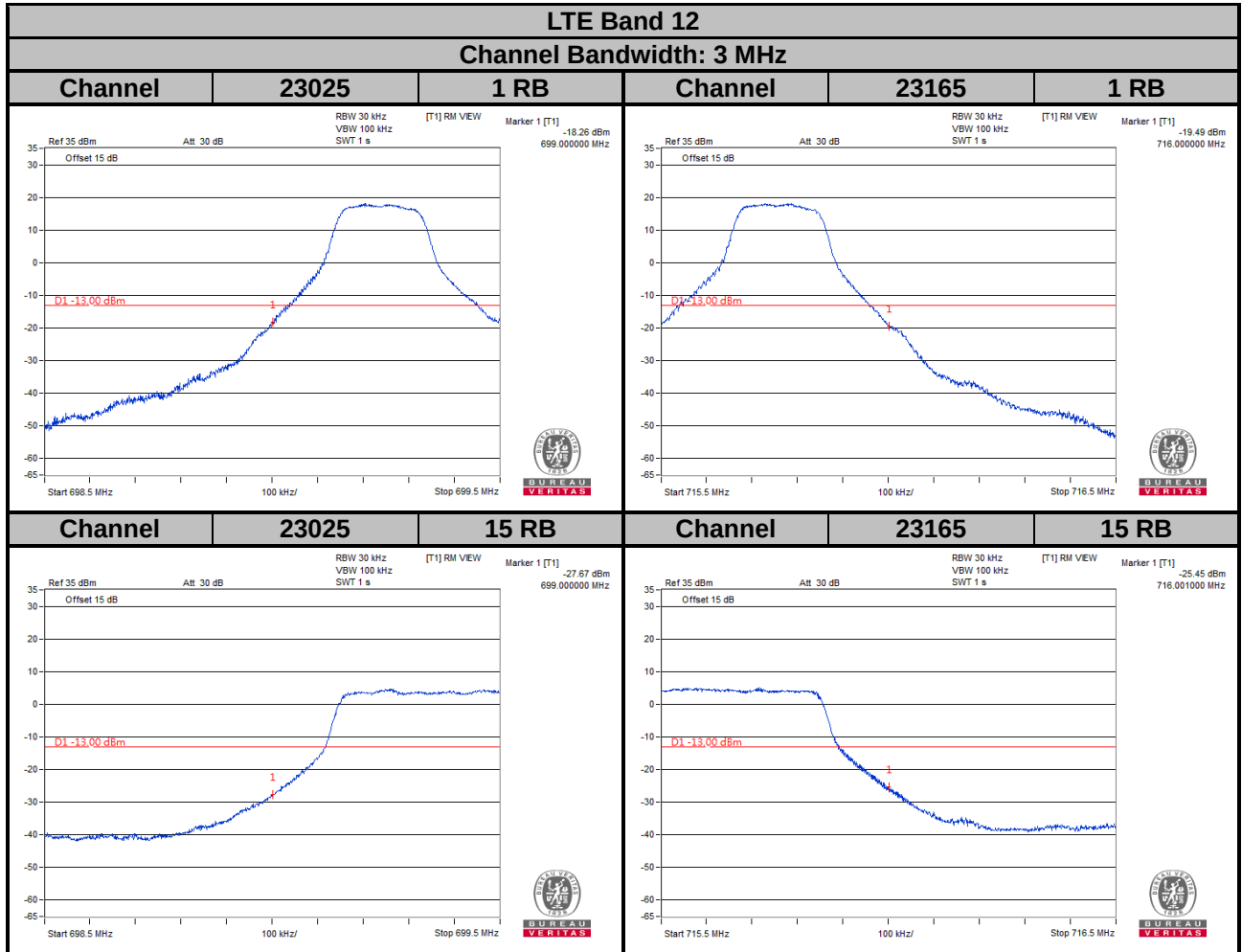


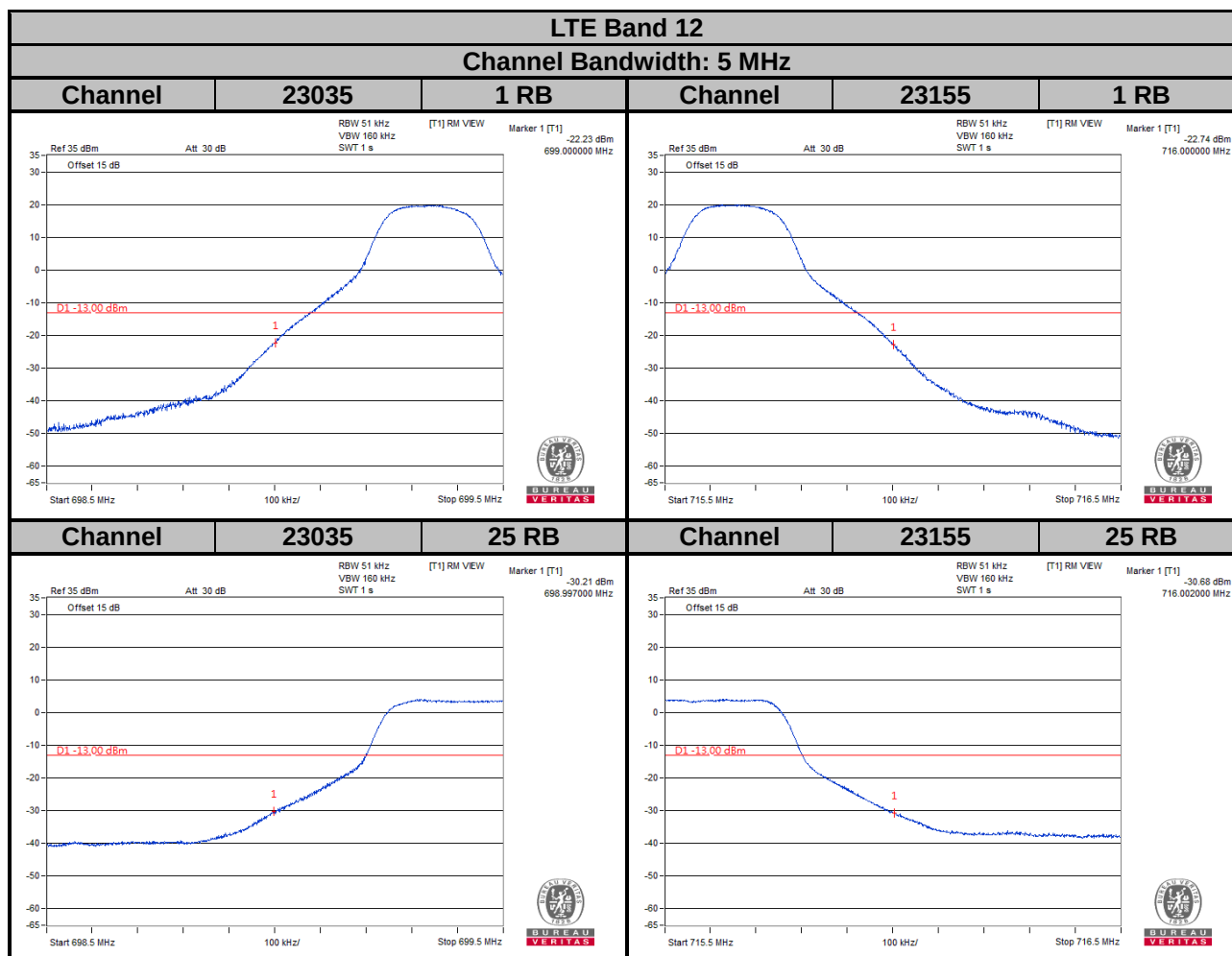


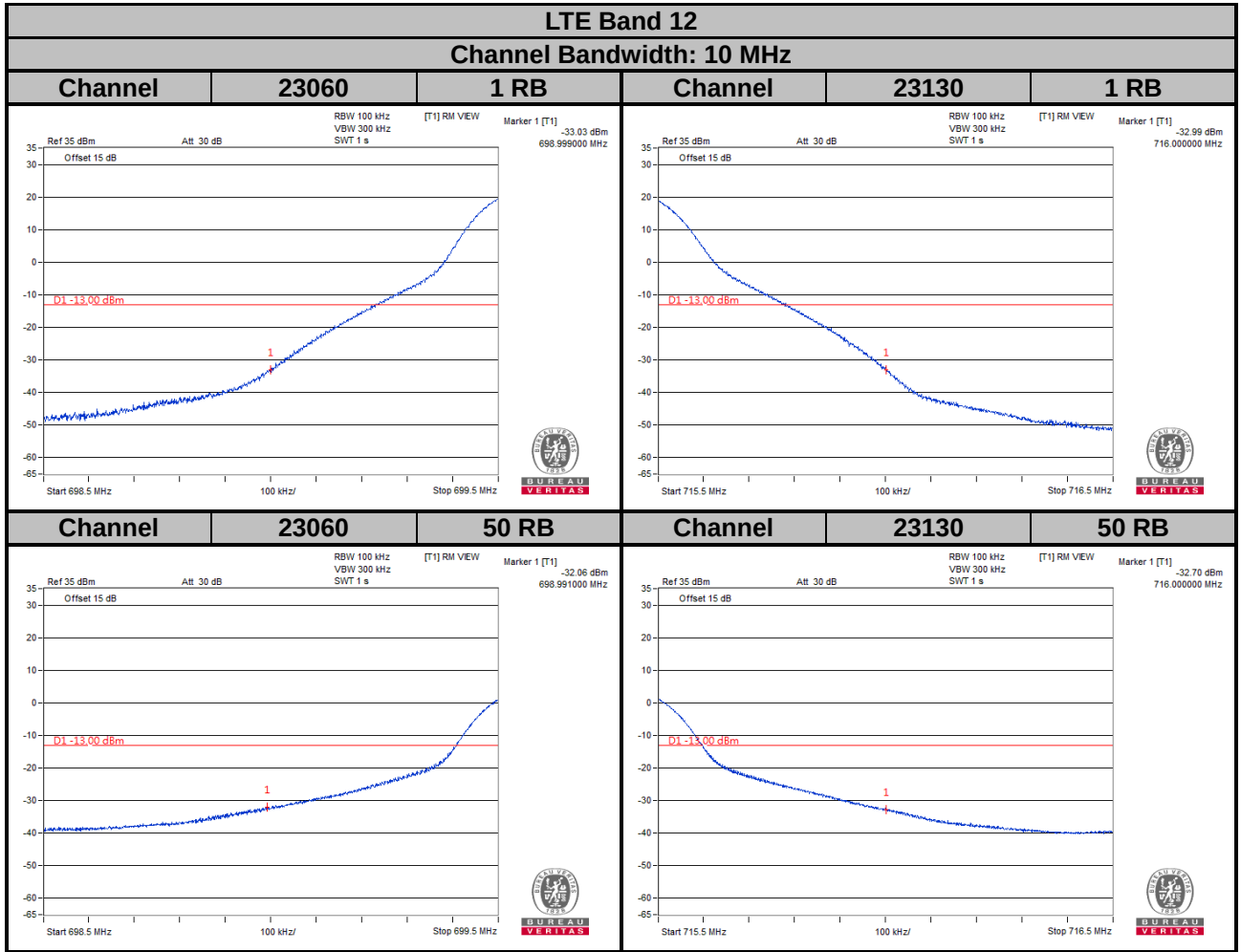










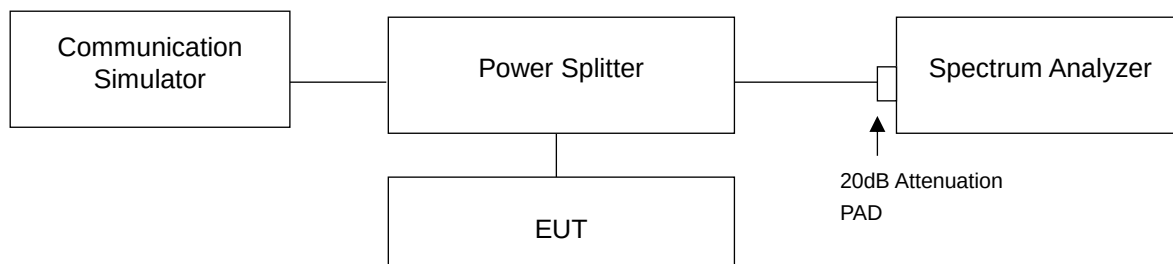


## 4.6 Peak to Average Ratio

### 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

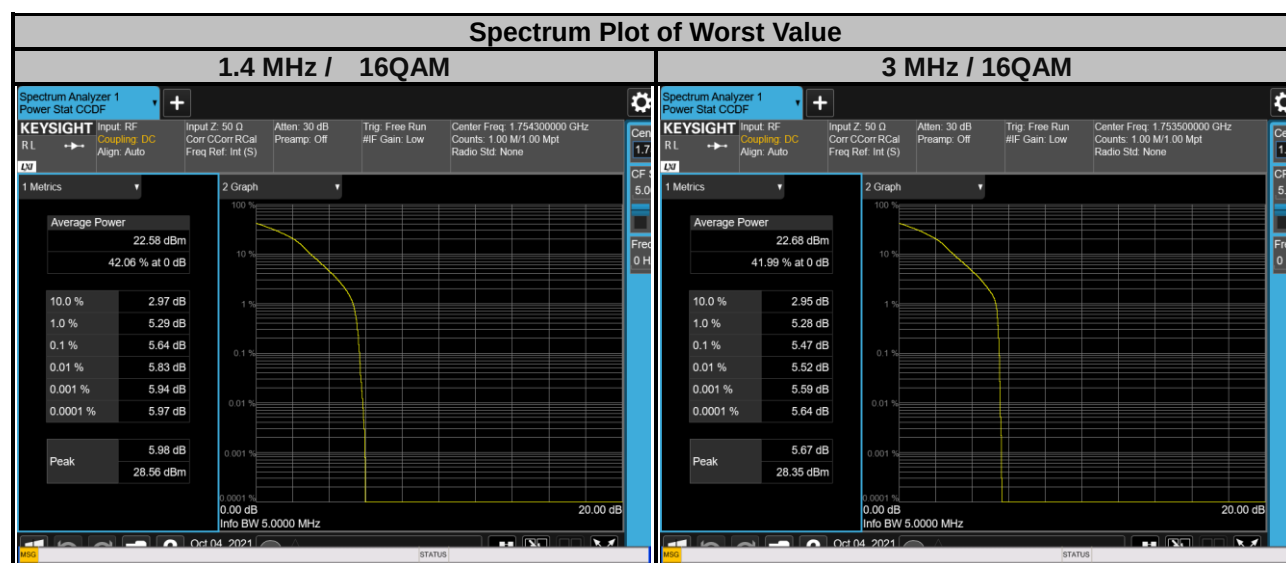


### 4.6.3 Test Procedures

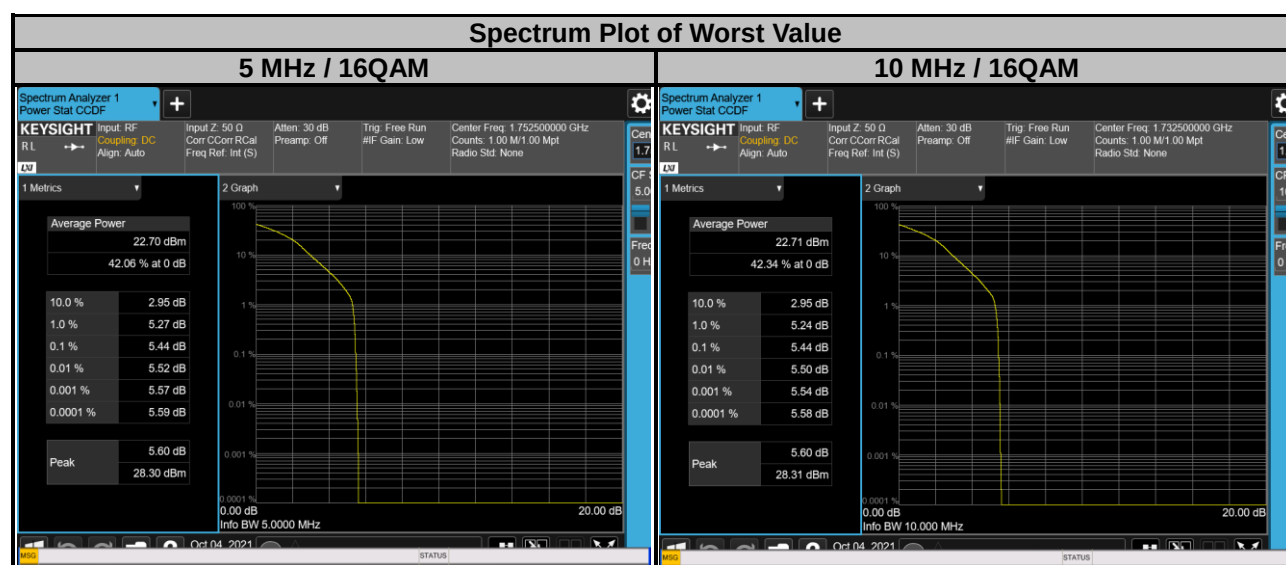
1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

#### 4.6.4 Test Results

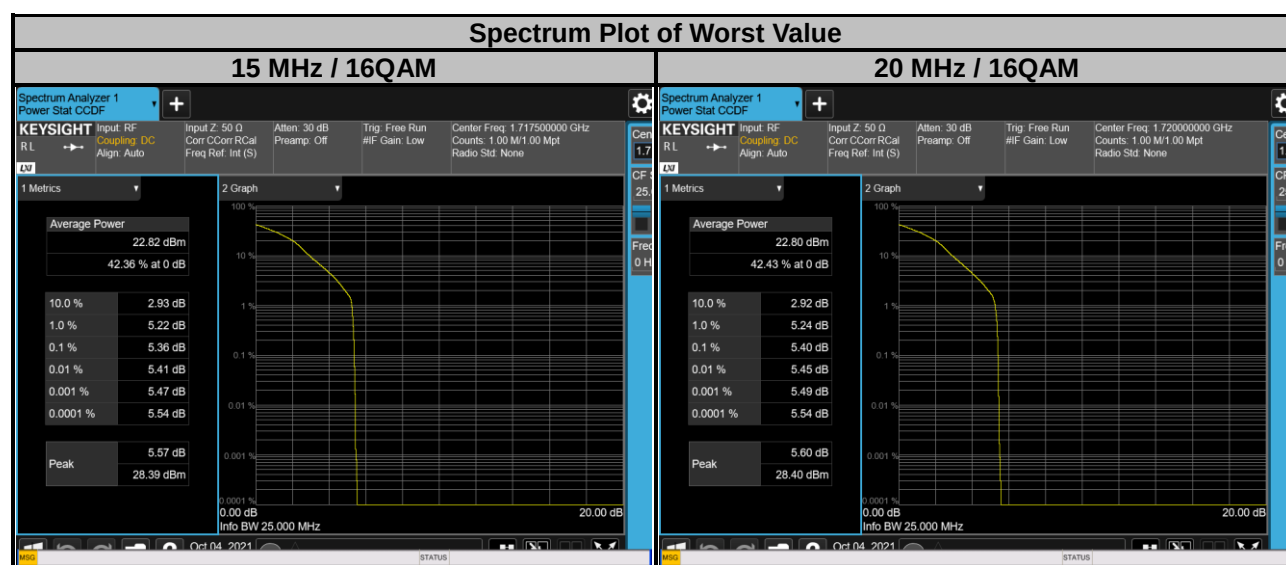
| LTE Band 4                 |                 |                            |       |                          |                 |                            |       |
|----------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 1.4 MHz |                 |                            |       | Channel Bandwidth: 3 MHz |                 |                            |       |
| Channel                    | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                            |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 19957                      | 1710.7          | 4.84                       | 5.63  | 19965                    | 1711.5          | 4.69                       | 5.44  |
| 20175                      | 1732.5          | 4.80                       | 5.57  | 20175                    | 1732.5          | 4.61                       | 5.40  |
| 20393                      | 1754.3          | 4.86                       | 5.64  | 20385                    | 1753.5          | 4.69                       | 5.47  |



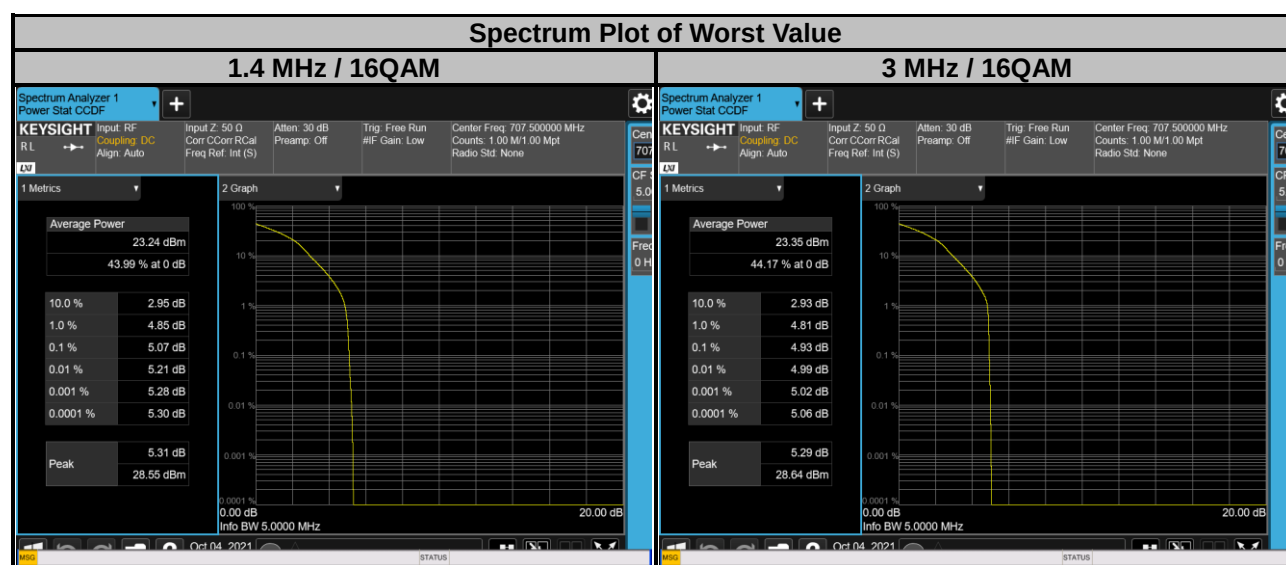
| LTE Band 4               |                 |                            |       |                           |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|---------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 5 MHz |                 |                            |       | Channel Bandwidth: 10 MHz |                 |                            |       |
| Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                   | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                          |                 | QPSK                       | 16QAM |                           |                 | QPSK                       | 16QAM |
| 19975                    | 1712.5          | 4.65                       | 5.41  | 20000                     | 1715.0          | 4.63                       | 5.32  |
| 20175                    | 1732.5          | 4.59                       | 5.38  | 20175                     | 1732.5          | 4.61                       | 5.44  |
| 20375                    | 1752.5          | 4.66                       | 5.44  | 20350                     | 1750.0          | 4.59                       | 5.35  |



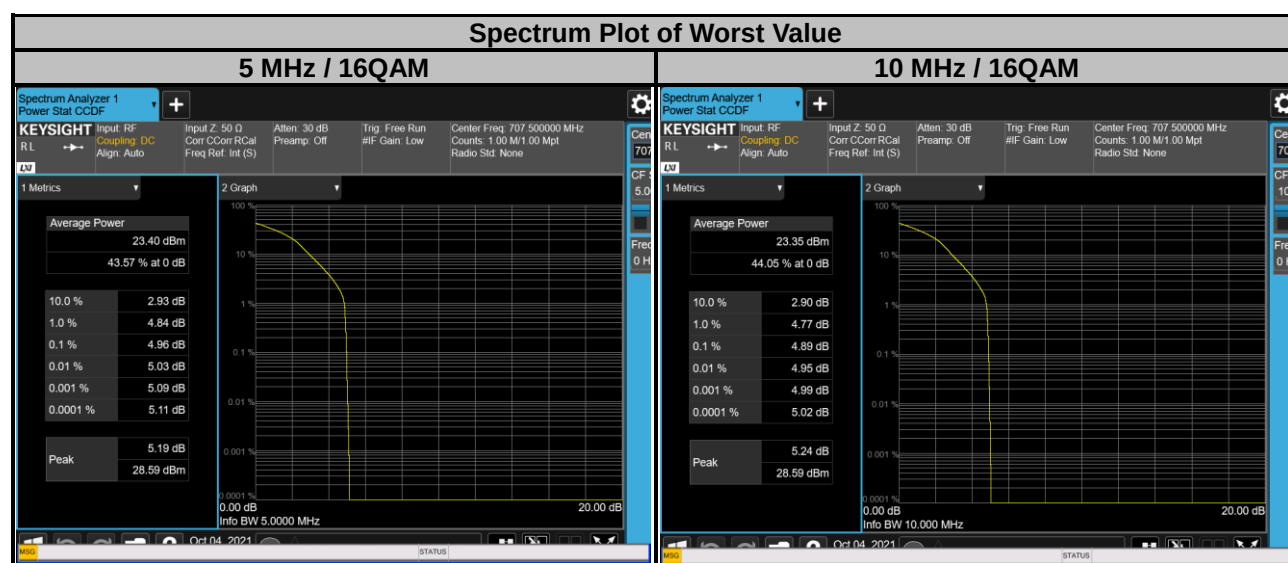
| LTE Band 4                |                 |                            |       |                           |                 |                            |       |
|---------------------------|-----------------|----------------------------|-------|---------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 15 MHz |                 |                            |       | Channel Bandwidth: 20 MHz |                 |                            |       |
| Channel                   | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                   | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                           |                 | QPSK                       | 16QAM |                           |                 | QPSK                       | 16QAM |
| 20025                     | 1717.5          | 4.58                       | 5.36  | 20050                     | 1720.0          | 4.58                       | 5.40  |
| 20175                     | 1732.5          | 4.59                       | 5.34  | 20175                     | 1732.5          | 4.59                       | 5.34  |
| 20325                     | 1747.5          | 4.52                       | 5.30  | 20300                     | 1745.0          | 4.51                       | 5.22  |



| LTE Band 12                |                 |                            |       |                          |                 |                            |       |
|----------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 1.4 MHz |                 |                            |       | Channel Bandwidth: 3 MHz |                 |                            |       |
| Channel                    | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                            |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 23017                      | 699.7           | 3.96                       | 4.78  | 23025                    | 700.5           | 3.89                       | 4.70  |
| 23095                      | 707.5           | 4.28                       | 5.07  | 23095                    | 707.5           | 4.13                       | 4.93  |
| 23173                      | 715.3           | 4.09                       | 4.88  | 23165                    | 714.5           | 3.87                       | 4.62  |



| LTE Band 12              |                 |                            |       |                           |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|---------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 5 MHz |                 |                            |       | Channel Bandwidth: 10 MHz |                 |                            |       |
| Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                   | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                          |                 | QPSK                       | 16QAM |                           |                 | QPSK                       | 16QAM |
| 23035                    | 701.5           | 3.89                       | 4.67  | 23060                     | 704.0           | 3.84                       | 4.62  |
| 23095                    | 707.5           | 4.18                       | 4.96  | 23095                     | 707.5           | 4.14                       | 4.89  |
| 23155                    | 713.5           | 3.87                       | 4.63  | 23130                     | 711.0           | 4.08                       | 4.83  |



## 4.7 Conducted Spurious Emissions

### 4.7.1 Limits of Conducted Spurious Emissions Measurement

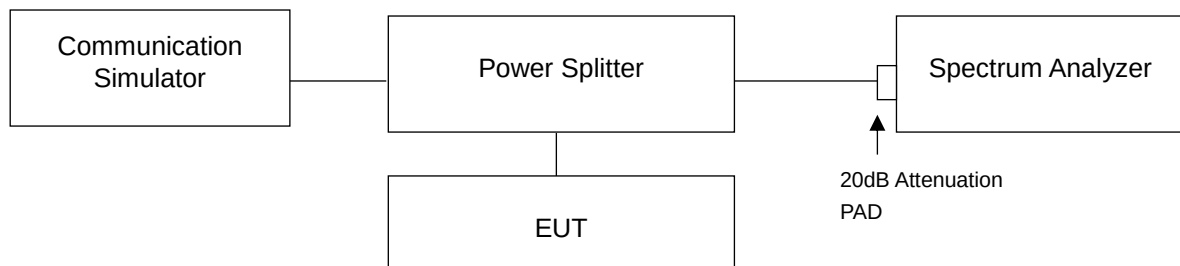
For LTE Band 12:

According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. The limit of emissions is equal to -13 dBm.

For LTE Band 4:

According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log (P)$  dB.

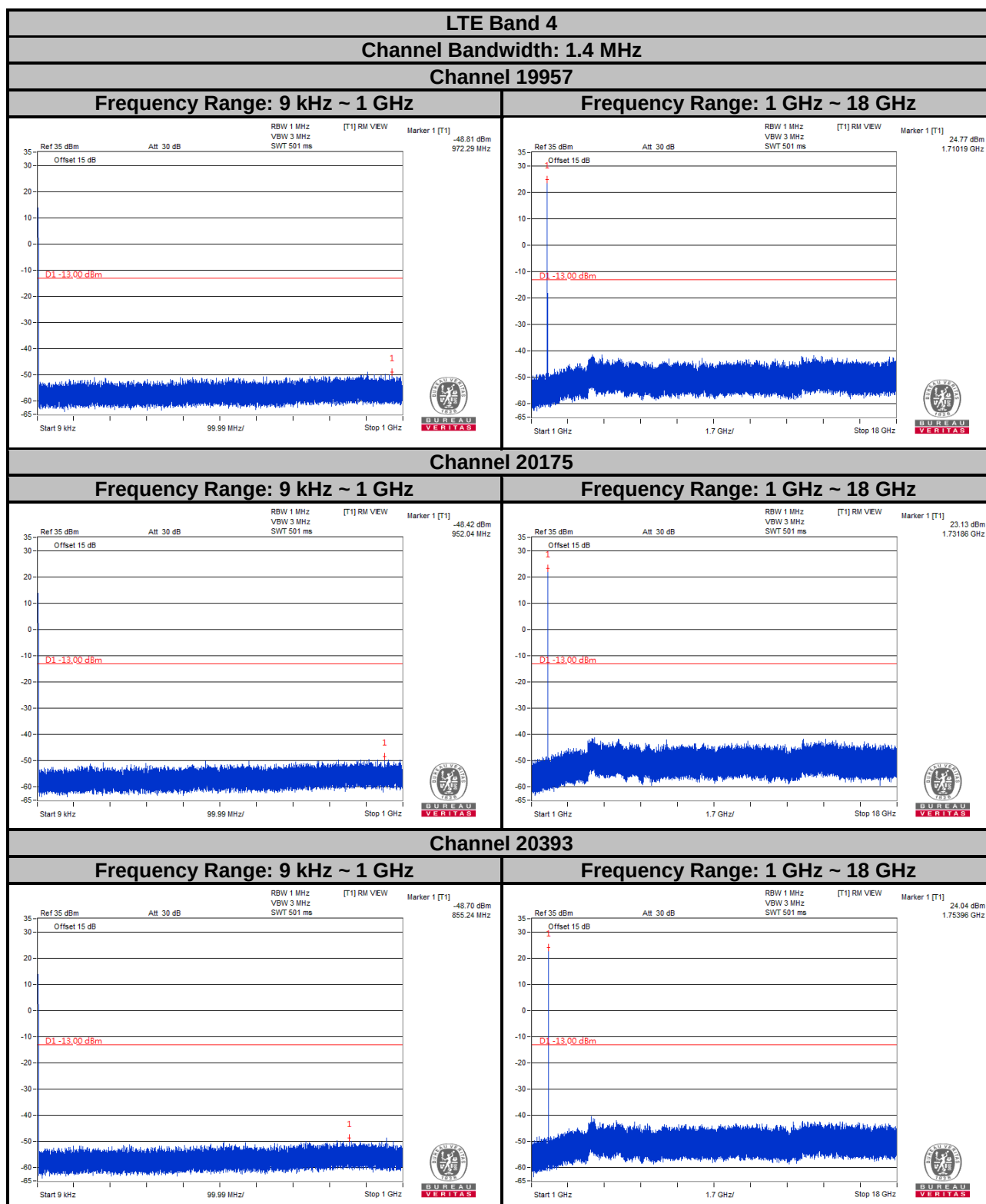
### 4.7.2 Test Setup



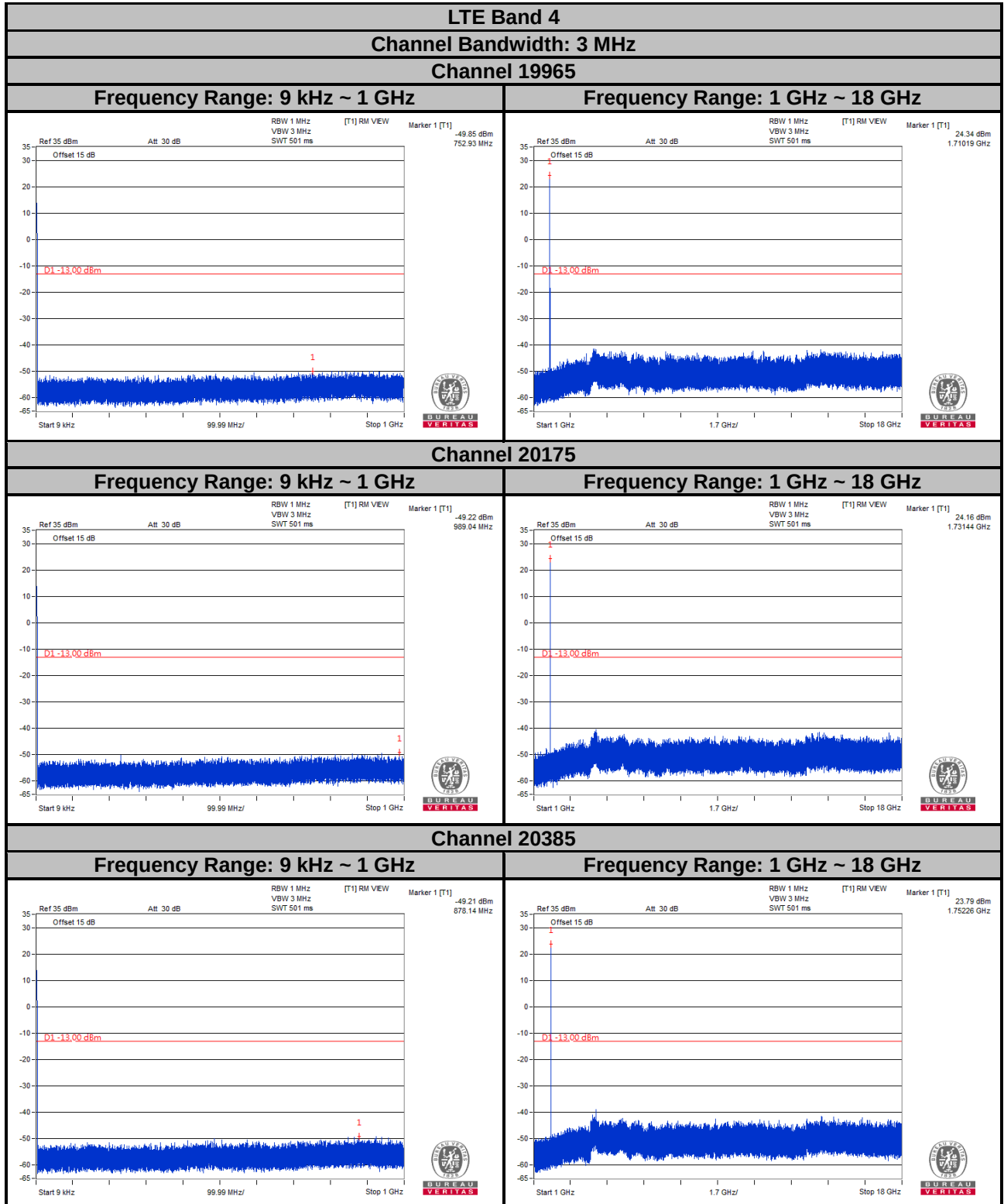
### 4.7.3 Test Procedure

- 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 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 100 kHz and VBW = 300 kHz is used for LTE band 12 conducted emission measurement.
- Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for LTE band 4 conducted emission measurement.
- Measuring frequency range is from 1 GHz to 8 GHz / 18 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.

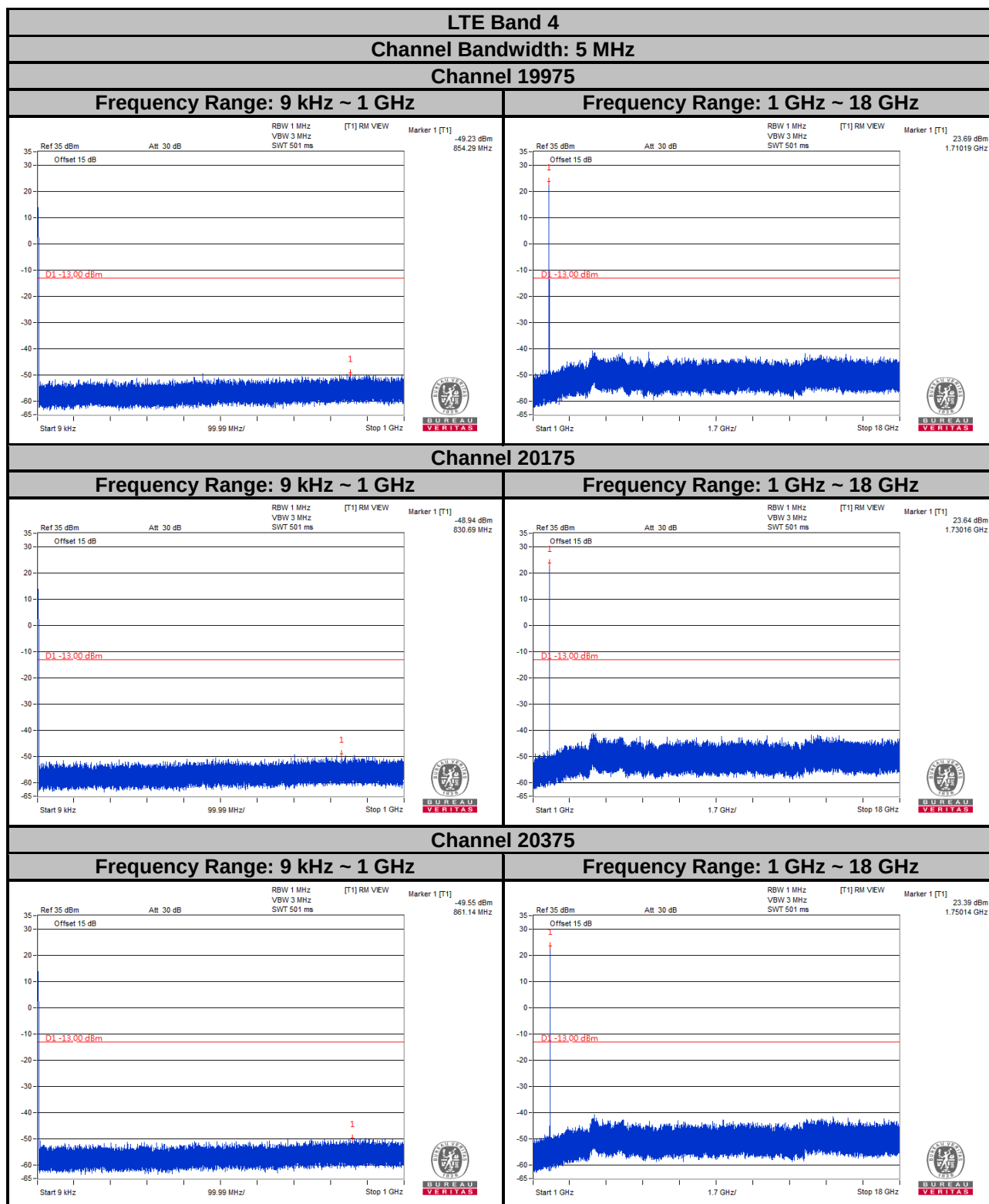
#### 4.7.4 Test Results



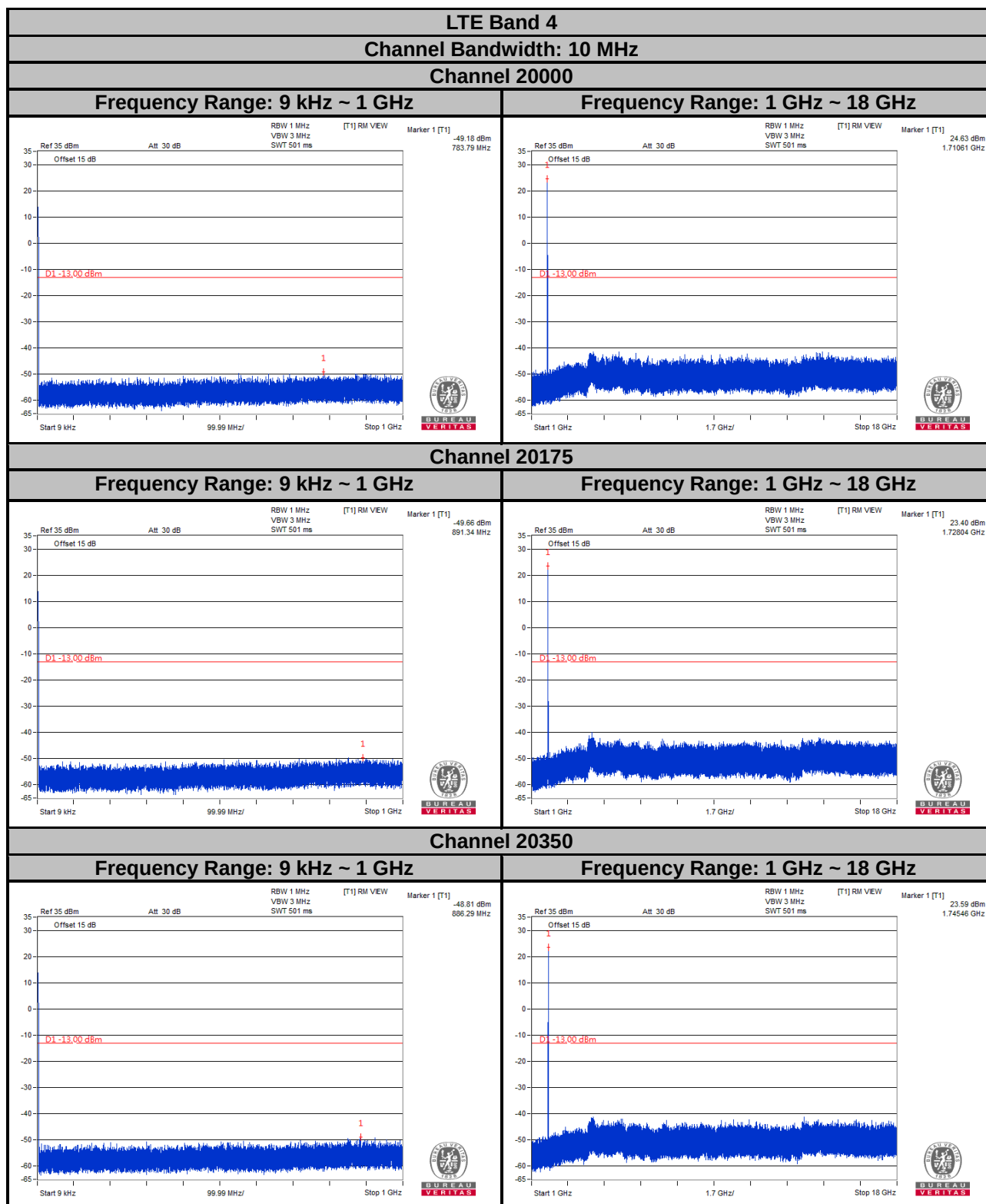
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



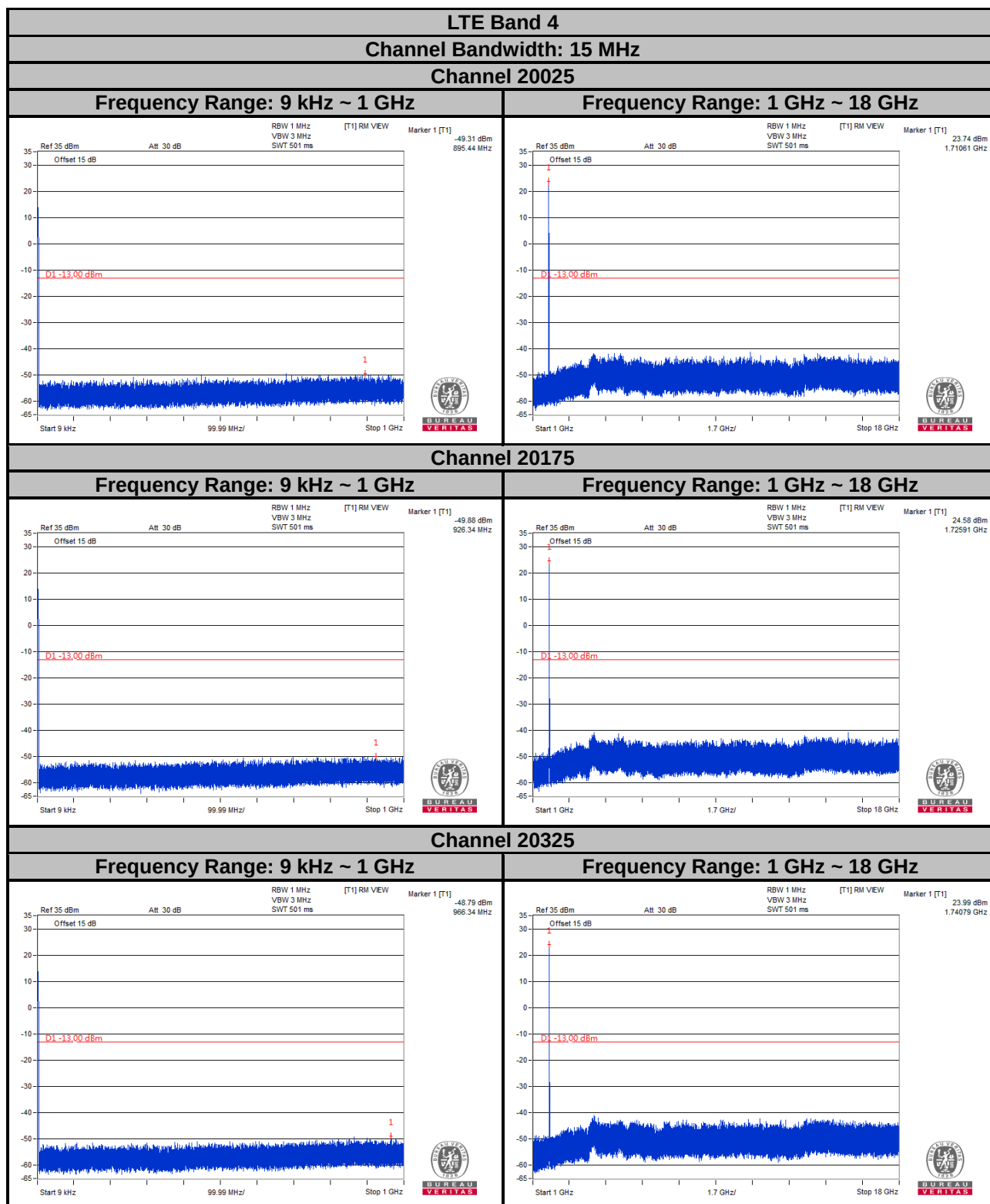
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



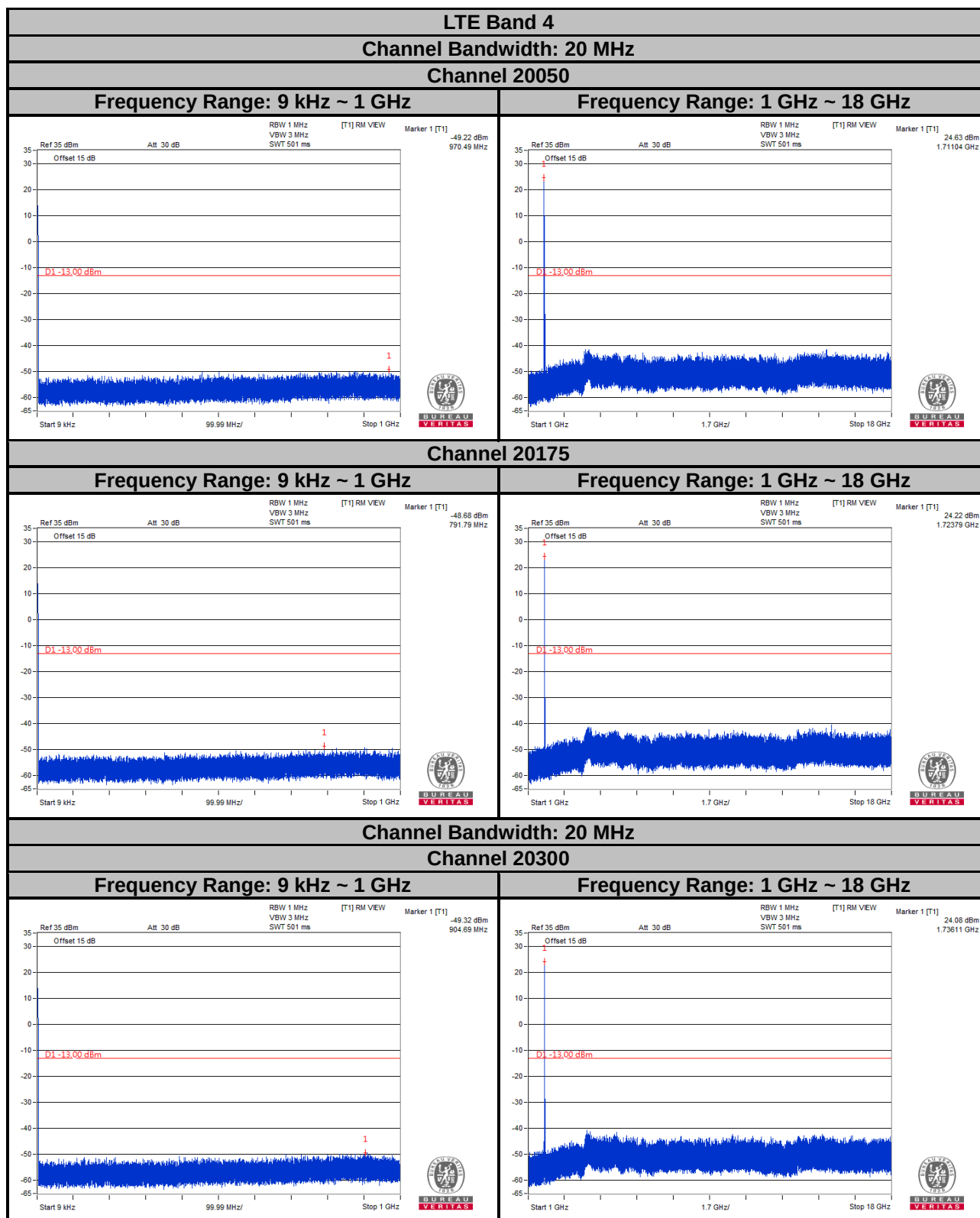
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



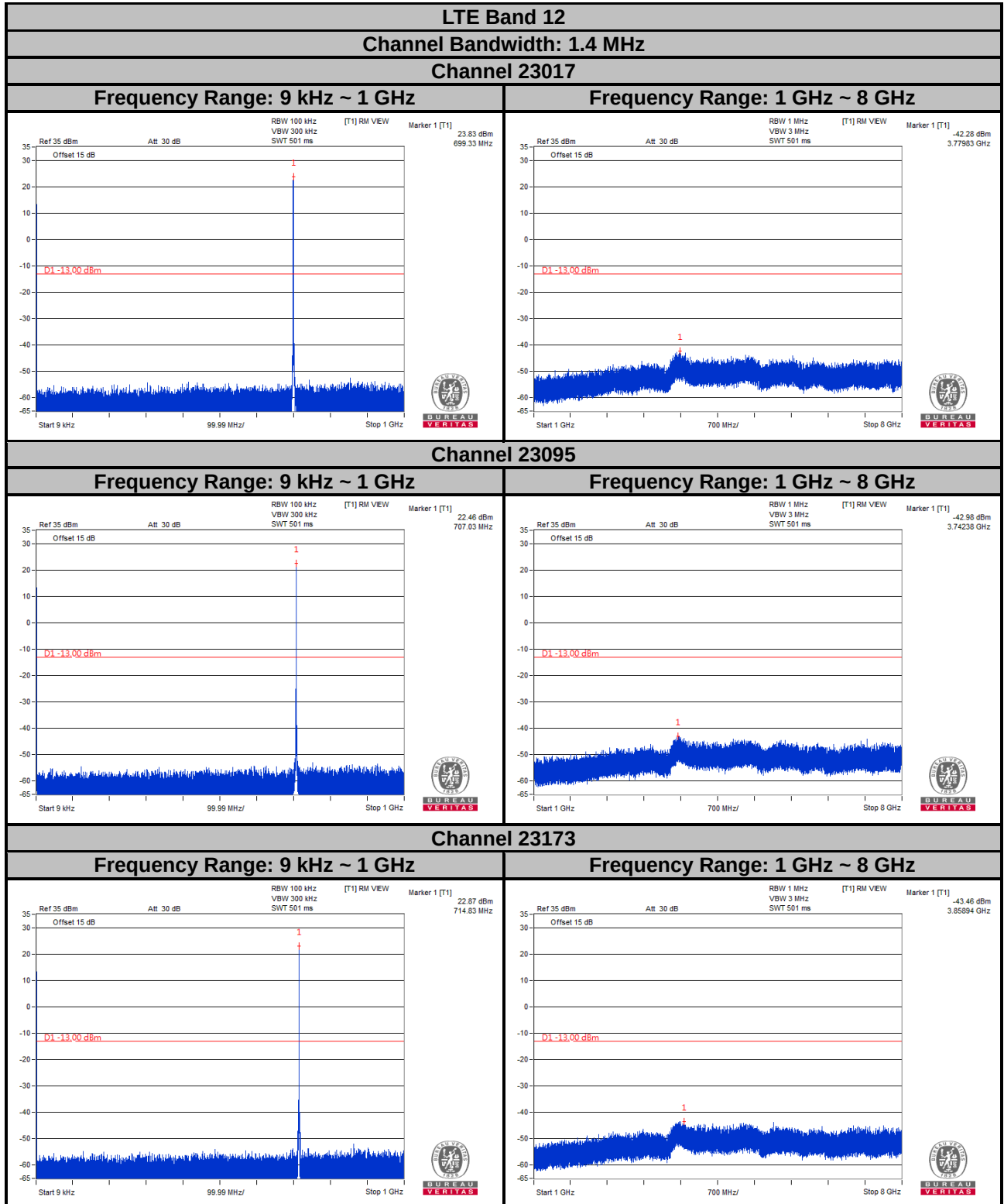
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



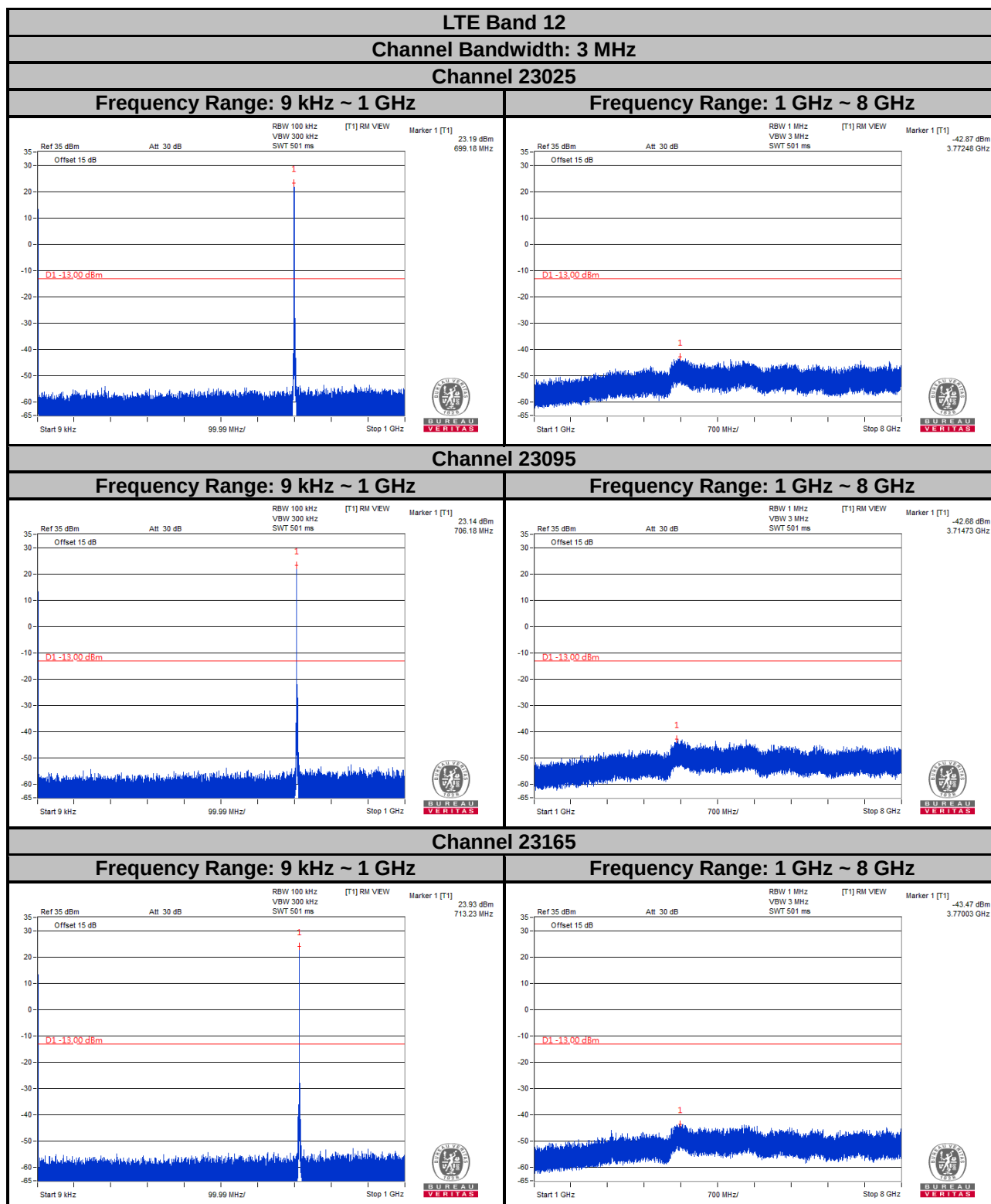
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



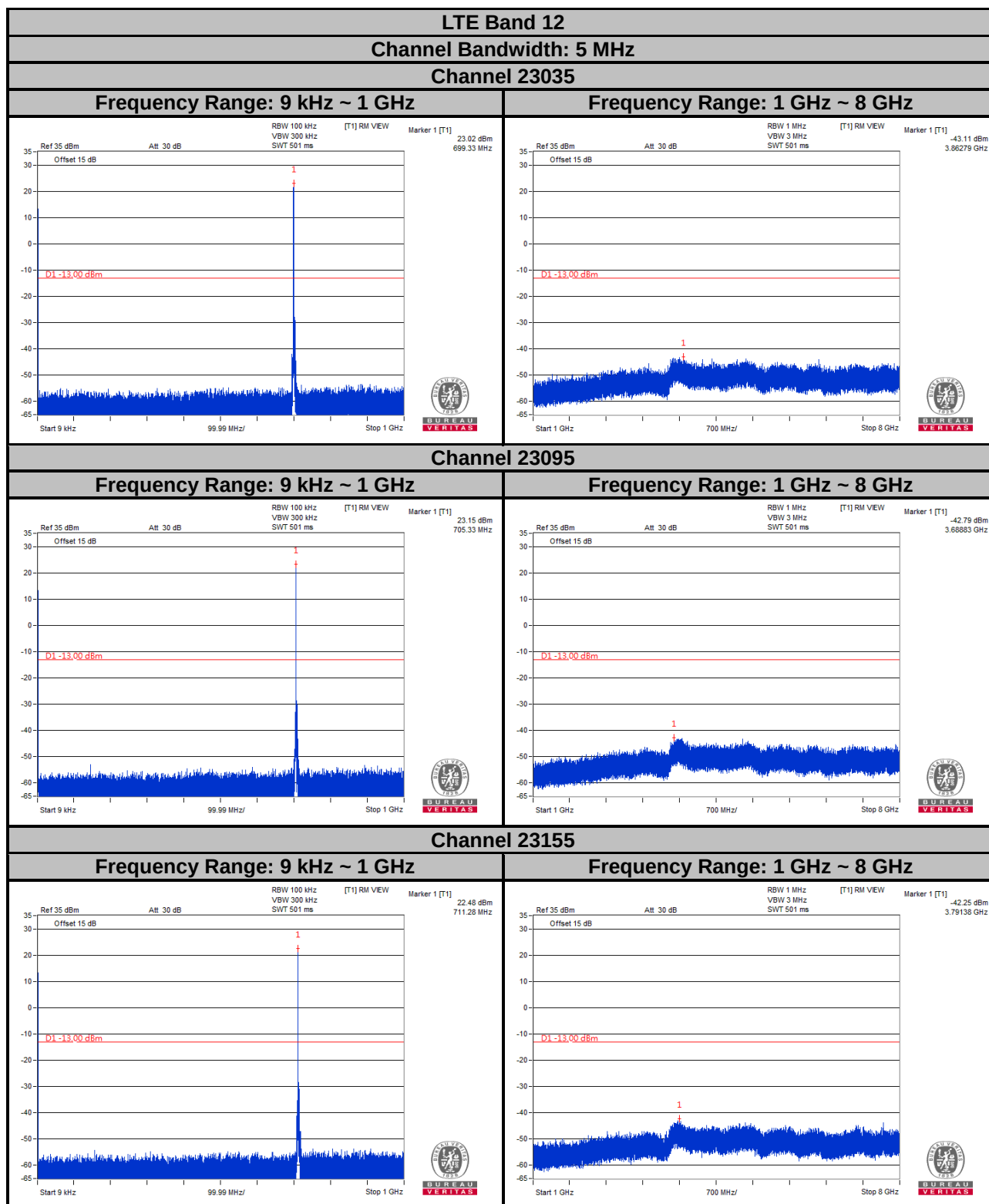
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



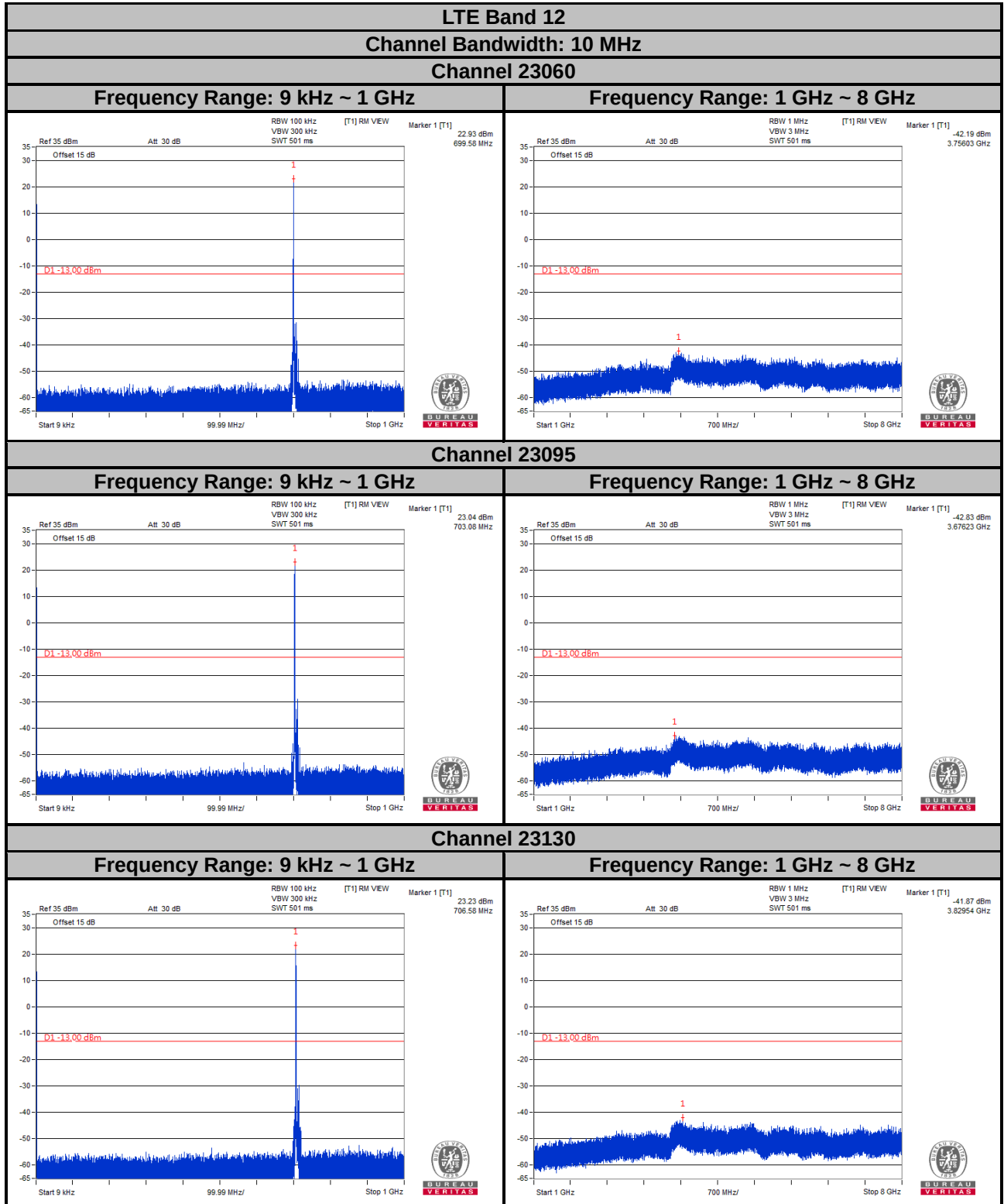
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

## 4.8 Radiated Emission Measurement

### 4.8.1 Limits of Radiated Emission Measurement

For LTE Band 12:

According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. The limit of emissions is equal to -13 dBm.

For LTE Band 4:

According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log (P)$  dB.

### 4.8.2 Test Procedure

- a. 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.
- b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- d. Following C63.26 section 5.5 and 5.2.7  
$$\text{EIRP (dBm)} = E (\text{dB}\mu\text{V/m}) + 20\log(D) - 104.8;$$
 where D is the measurement distance (in the far field region) in m.  
$$\text{ERP (dBm)} = E (\text{dB}\mu\text{V/m}) + 20\log(D) - 104.8 - 2.15;$$
 where D is the measurement distance (in the far field region) in m.

#### Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:

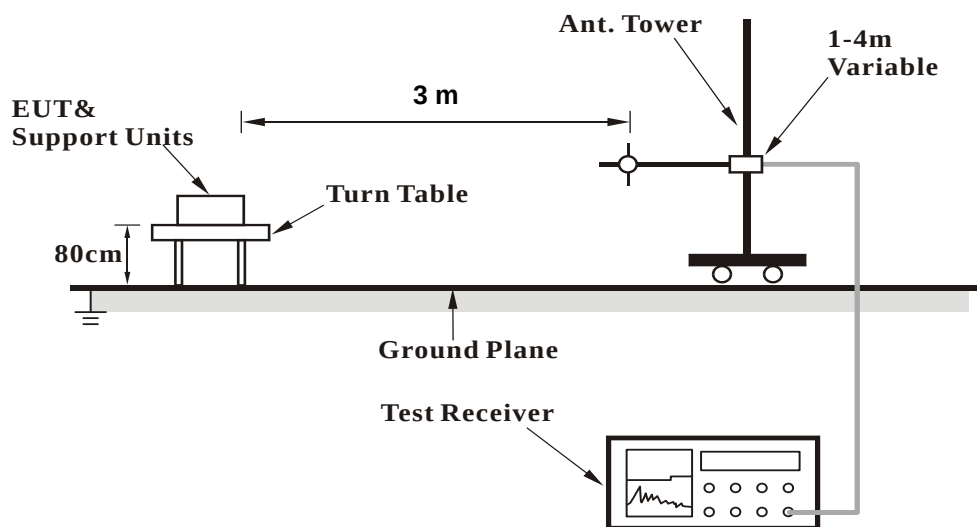
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 4.8.3 Deviation from Test Standard

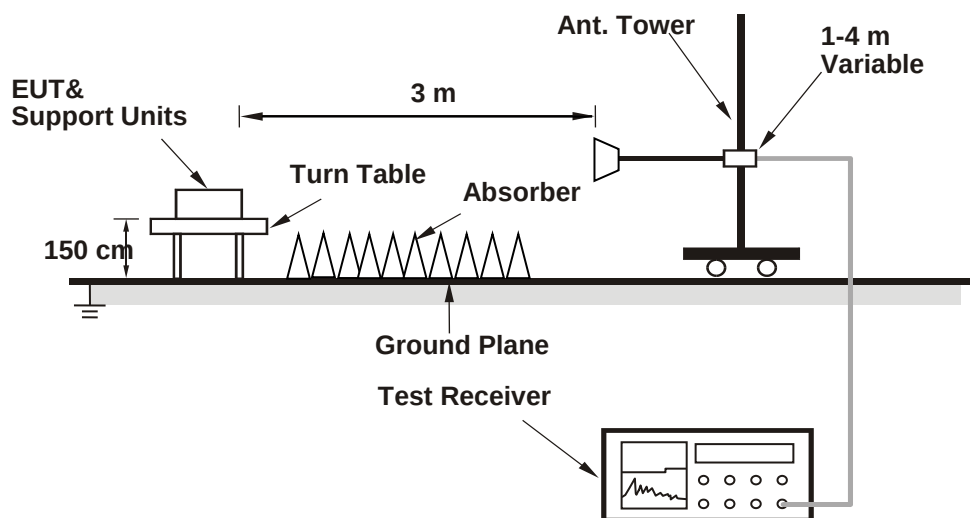
No deviation.

#### 4.8.4 Test Setup

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



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



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

#### 4.8.5 Test Results

Below 1GHz

##### Mode A

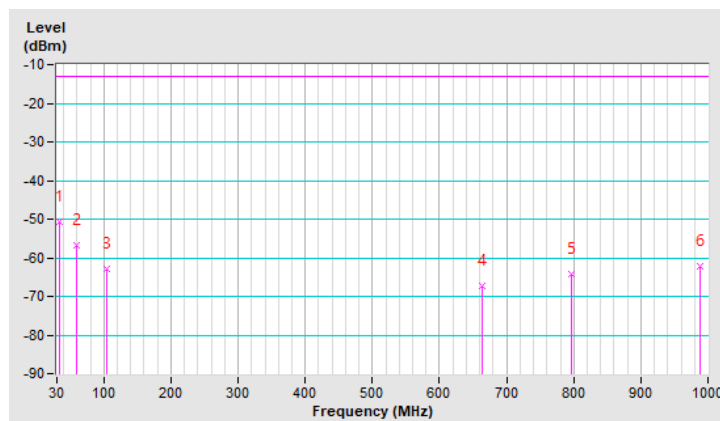
LTE Band 4, Channel Bandwidth: 1.4MHz

|                        |                       |                |                       |
|------------------------|-----------------------|----------------|-----------------------|
| <b>RF Mode</b>         | TX LTE Band IV-1.4MHz | <b>Channel</b> | CH 19957 : 1710.7 MHz |
| <b>Frequency Range</b> | 30MHz ~ 1GHz          |                |                       |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 33.88           | -50.79     | -13.00      | -37.79      | 1.25 H             | 91                   | 54.51            | -105.30                  |
| 2                                                    | 60.07           | -56.77     | -13.00      | -43.77      | 1.00 H             | 34                   | 47.92            | -104.69                  |
| 3                                                    | 104.69          | -63.02     | -13.00      | -50.02      | 1.25 H             | 320                  | 44.83            | -107.85                  |
| 4                                                    | 664.38          | -67.45     | -13.00      | -54.45      | 1.50 H             | 327                  | 27.11            | -94.56                   |
| 5                                                    | 797.27          | -64.38     | -13.00      | -51.38      | 1.00 H             | 6                    | 27.39            | -91.77                   |
| 6                                                    | 988.36          | -62.07     | -13.00      | -49.07      | 1.25 H             | 223                  | 26.66            | -88.73                   |

##### Remarks:

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

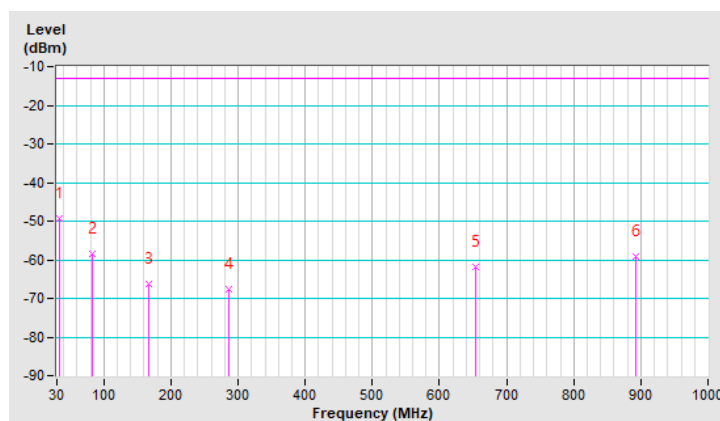


|                        |                           |                |                          |
|------------------------|---------------------------|----------------|--------------------------|
| <b>RF Mode</b>         | TX LTE Band IV-<br>1.4MHz | <b>Channel</b> | CH 19957 : 1710.7<br>MHz |
| <b>Frequency Range</b> | 30MHz ~ 1GHz              |                |                          |

| Antenna Polarity & Test Distance : Vertical at 3 m |                    |               |                |                |                          |                            |                        |                                |
|----------------------------------------------------|--------------------|---------------|----------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No                                                 | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                  | 33.88              | -49.22        | -13.00         | -36.22         | 1.00 V                   | 247                        | 56.08                  | -105.30                        |
| 2                                                  | 83.35              | -58.32        | -13.00         | -45.32         | 1.00 V                   | 300                        | 51.03                  | -109.35                        |
| 3                                                  | 166.77             | -66.37        | -13.00         | -53.37         | 1.50 V                   | 70                         | 37.58                  | -103.95                        |
| 4                                                  | 286.08             | -67.60        | -13.00         | -54.60         | 1.00 V                   | 18                         | 34.76                  | -102.36                        |
| 5                                                  | 653.71             | -62.03        | -13.00         | -49.03         | 1.25 V                   | 39                         | 32.64                  | -94.67                         |
| 6                                                  | 893.30             | -59.27        | -13.00         | -46.27         | 1.25 V                   | 323                        | 30.72                  | -89.99                         |

**Remarks:**

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.



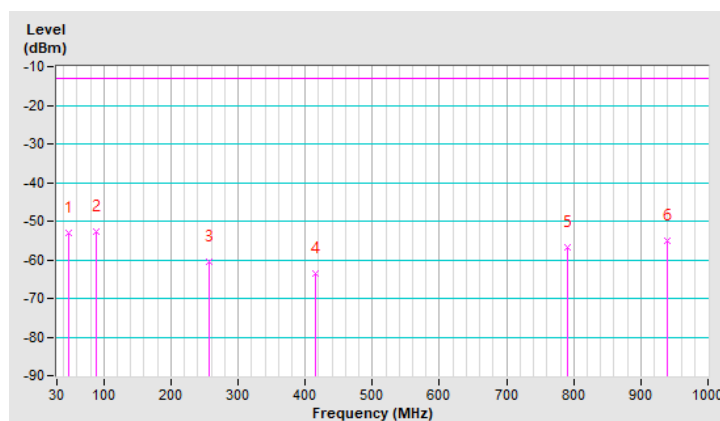
LTE Band 12, Channel Bandwidth: 10MHz

|                        |                       |                |                    |
|------------------------|-----------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XII-10MHz | <b>Channel</b> | CH 23130 : 711 MHz |
| <b>Frequency Range</b> | 30MHz ~ 1GHz          |                |                    |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 48.43           | -52.96    | -13.00      | -39.96      | 1.25 H             | 231                  | 53.33            | -106.29                  |
| 2                                                    | 89.17           | -52.81    | -13.00      | -39.81      | 1.00 H             | 56                   | 59.15            | -111.96                  |
| 3                                                    | 256.01          | -60.51    | -13.00      | -47.51      | 1.00 H             | 112                  | 45.47            | -105.98                  |
| 4                                                    | 416.06          | -63.72    | -13.00      | -50.72      | 1.50 H             | 316                  | 38.00            | -101.72                  |
| 5                                                    | 790.48          | -56.94    | -13.00      | -43.94      | 1.00 H             | 15                   | 37.05            | -93.99                   |
| 6                                                    | 939.86          | -55.12    | -13.00      | -42.12      | 1.25 H             | 128                  | 36.01            | -91.13                   |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3.  $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.

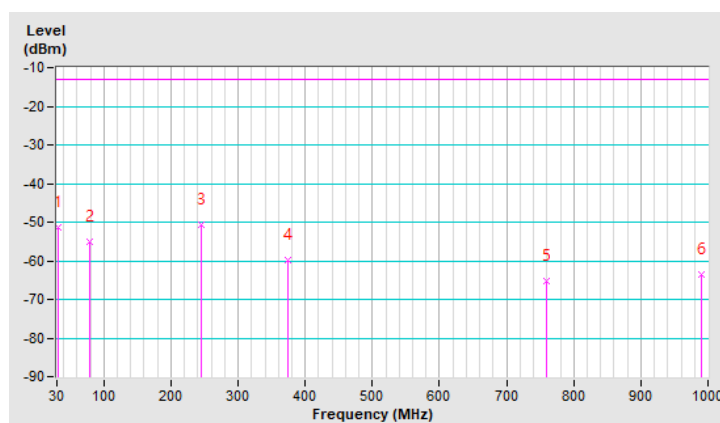


|                 |                       |         |                    |
|-----------------|-----------------------|---------|--------------------|
| RF Mode         | TX LTE Band XII-10MHz | Channel | CH 23130 : 711 MHz |
| Frequency Range | 30MHz ~ 1GHz          |         |                    |

| Antenna Polarity & Test Distance : Vertical at 3 m |                 |           |             |             |                    |                      |                  |                          |
|----------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                 | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                  | 32.91           | -51.43    | -13.00      | -38.43      | 1.25 V             | 10                   | 56.35            | -107.78                  |
| 2                                                  | 79.47           | -55.00    | -13.00      | -42.00      | 1.00 V             | 108                  | 55.67            | -110.67                  |
| 3                                                  | 245.34          | -50.68    | -13.00      | -37.68      | 1.00 V             | 108                  | 55.67            | -106.35                  |
| 4                                                  | 373.38          | -59.71    | -13.00      | -46.71      | 1.50 V             | 108                  | 42.89            | -102.60                  |
| 5                                                  | 760.41          | -65.13    | -13.00      | -52.13      | 1.00 V             | 17                   | 29.55            | -94.68                   |
| 6                                                  | 990.30          | -63.41    | -13.00      | -50.41      | 1.25 V             | 10                   | 27.51            | -90.92                   |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3.  $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.



## Mode B

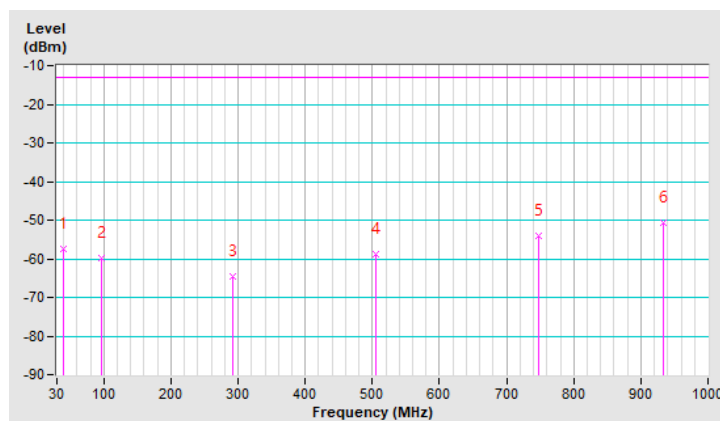
LTE Band 4, Channel Bandwidth: 1.4MHz

|                        |                           |                |                          |
|------------------------|---------------------------|----------------|--------------------------|
| <b>RF Mode</b>         | TX LTE Band IV-<br>1.4MHz | <b>Channel</b> | CH 19957 : 1710.7<br>MHz |
| <b>Frequency Range</b> | 30MHz ~ 1GHz              |                |                          |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 40.67           | -57.42     | -13.00      | -44.42      | 1.00 H             | 18                   | 47.31            | -104.73                  |
| 2                                                    | 95.96           | -59.84     | -13.00      | -46.84      | 1.50 H             | 135                  | 49.54            | -109.38                  |
| 3                                                    | 291.90          | -64.43     | -13.00      | -51.43      | 1.00 H             | 187                  | 37.78            | -102.21                  |
| 4                                                    | 505.30          | -58.77     | -13.00      | -45.77      | 1.25 H             | 256                  | 38.64            | -97.41                   |
| 5                                                    | 746.83          | -53.91     | -13.00      | -40.91      | 1.00 H             | 5                    | 39.10            | -93.01                   |
| 6                                                    | 933.07          | -50.61     | -13.00      | -37.61      | 1.00 H             | 84                   | 38.30            | -88.91                   |

### Remarks:

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

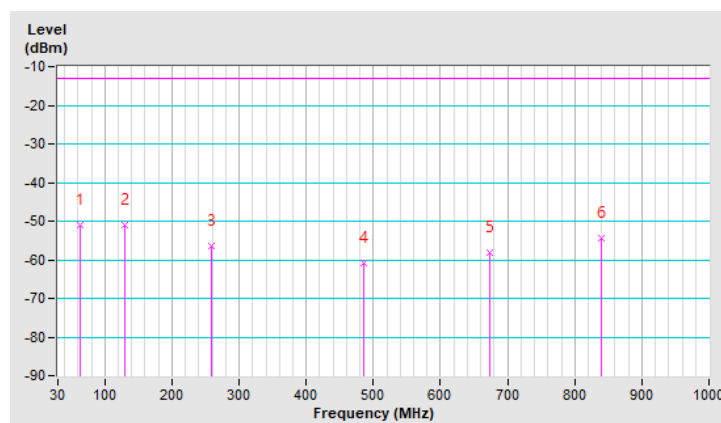


|                        |                           |                |                          |
|------------------------|---------------------------|----------------|--------------------------|
| <b>RF Mode</b>         | TX LTE Band IV-<br>1.4MHz | <b>Channel</b> | CH 19957 : 1710.7<br>MHz |
| <b>Frequency Range</b> | 30MHz ~ 1GHz              |                |                          |

| Antenna Polarity & Test Distance : Vertical at 3 m |                    |               |                |                |                          |                            |                        |                                |
|----------------------------------------------------|--------------------|---------------|----------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No                                                 | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                  | 63.95              | -51.04        | -13.00         | -38.04         | 1.50 V                   | 156                        | 54.27                  | -105.31                        |
| 2                                                  | 129.91             | -51.10        | -13.00         | -38.10         | 1.00 V                   | 149                        | 54.14                  | -105.24                        |
| 3                                                  | 258.92             | -56.56        | -13.00         | -43.56         | 1.25 V                   | 167                        | 47.16                  | -103.72                        |
| 4                                                  | 484.93             | -60.96        | -13.00         | -47.96         | 1.00 V                   | 4                          | 36.93                  | -97.89                         |
| 5                                                  | 674.08             | -58.18        | -13.00         | -45.18         | 1.00 V                   | 157                        | 36.23                  | -94.41                         |
| 6                                                  | 838.98             | -54.39        | -13.00         | -41.39         | 1.25 V                   | 291                        | 36.73                  | -91.12                         |

**Remarks:**

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.



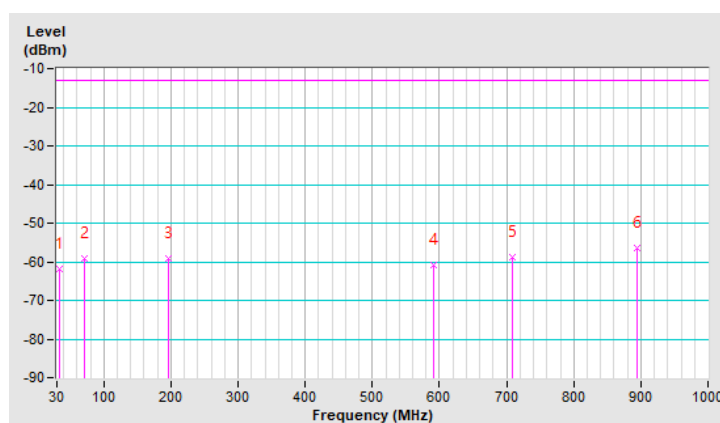
LTE Band 12, Channel Bandwidth: 10MHz

|                        |                       |                |                    |
|------------------------|-----------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XII-10MHz | <b>Channel</b> | CH 23130 : 711 MHz |
| <b>Frequency Range</b> | 30MHz ~ 1GHz          |                |                    |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 33.88           | -61.73    | -13.00      | -48.73      | 1.25 H             | 5                    | 45.72            | -107.45                  |
| 2                                                    | 71.71           | -59.32    | -13.00      | -46.32      | 1.00 H             | 258                  | 49.43            | -108.75                  |
| 3                                                    | 195.87          | -59.14    | -13.00      | -46.14      | 1.00 H             | 250                  | 49.70            | -108.84                  |
| 4                                                    | 590.66          | -60.68    | -13.00      | -47.68      | 1.25 H             | 162                  | 37.15            | -97.83                   |
| 5                                                    | 708.03          | -58.66    | -13.00      | -45.66      | 1.50 H             | 18                   | 37.42            | -96.08                   |
| 6                                                    | 894.27          | -56.36    | -13.00      | -43.36      | 1.00 H             | 18                   | 35.75            | -92.11                   |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3.  $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.

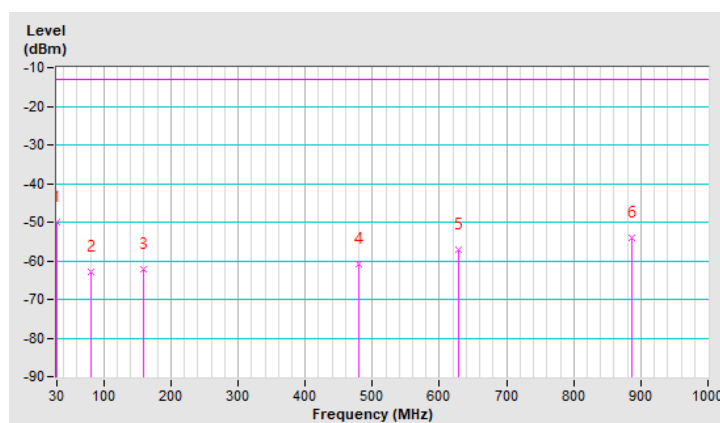


|                 |                       |         |                    |
|-----------------|-----------------------|---------|--------------------|
| RF Mode         | TX LTE Band XII-10MHz | Channel | CH 23130 : 711 MHz |
| Frequency Range | 30MHz ~ 1GHz          |         |                    |

| Antenna Polarity & Test Distance : Vertical at 3 m |                 |           |             |             |                    |                      |                  |                          |
|----------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                 | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                  | 30.00           | -49.95    | -13.00      | -36.95      | 1.50 V             | 173                  | 57.68            | -107.63                  |
| 2                                                  | 81.41           | -62.80    | -13.00      | -49.80      | 1.00 V             | 331                  | 48.40            | -111.20                  |
| 3                                                  | 159.98          | -62.19    | -13.00      | -49.19      | 1.25 V             | 156                  | 43.75            | -105.94                  |
| 4                                                  | 480.08          | -60.88    | -13.00      | -47.88      | 1.00 V             | 254                  | 39.23            | -100.11                  |
| 5                                                  | 627.52          | -57.14    | -13.00      | -44.14      | 1.50 V             | 181                  | 39.95            | -97.09                   |
| 6                                                  | 887.48          | -54.18    | -13.00      | -41.18      | 1.50 V             | 14                   | 38.14            | -92.32                   |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3.  $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.



Above 1GHz

LTE Band 4, Channel Bandwidth: 1.4MHz

|                        |                       |                |                       |
|------------------------|-----------------------|----------------|-----------------------|
| <b>RF Mode</b>         | TX LTE Band IV-1.4MHz | <b>Channel</b> | CH 19957 : 1710.7 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz         |                |                       |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3421.40         | -51.54     | -13.00      | -38.54      | 3.39 H             | 214                  | 41.66            | -93.20                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3421.40         | -50.12     | -13.00      | -37.12      | 1.39 V             | 82                   | 43.08            | -93.20                   |

**Remarks:**

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

|                        |                       |                |                       |
|------------------------|-----------------------|----------------|-----------------------|
| <b>RF Mode</b>         | TX LTE Band IV-1.4MHz | <b>Channel</b> | CH 20175 : 1732.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz         |                |                       |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3465.00         | -51.34     | -13.00      | -38.34      | 3.23 H             | 201                  | 41.53            | -92.87                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3465.00         | -51.76     | -13.00      | -38.76      | 1.19 V             | 73                   | 41.11            | -92.87                   |

**Remarks:**

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

|                        |                       |                |                       |
|------------------------|-----------------------|----------------|-----------------------|
| <b>RF Mode</b>         | TX LTE Band IV-1.4MHz | <b>Channel</b> | CH 20393 : 1754.3 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz         |                |                       |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3508.60         | -50.72     | -13.00      | -37.72      | 3.34 H             | 218                  | 41.79            | -92.51                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3508.60         | -50.83     | -13.00      | -37.83      | 1.31 V             | 80                   | 41.68            | -92.51                   |

**Remarks:**

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

LTE Band 4, Channel Bandwidth: 5MHz

|                        |                     |                |                       |
|------------------------|---------------------|----------------|-----------------------|
| <b>RF Mode</b>         | TX LTE Band IV-5MHz | <b>Channel</b> | CH 19975 : 1712.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz       |                |                       |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3425.00         | -51.84     | -13.00      | -38.84      | 3.36 H             | 214                  | 41.33            | -93.17                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3425.00         | -50.92     | -13.00      | -37.92      | 1.37 V             | 68                   | 42.25            | -93.17                   |

**Remarks:**

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

|                        |                     |                |                       |
|------------------------|---------------------|----------------|-----------------------|
| <b>RF Mode</b>         | TX LTE Band IV-5MHz | <b>Channel</b> | CH 20175 : 1732.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz       |                |                       |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3465.00         | -51.63     | -13.00      | -38.63      | 3.38 H             | 196                  | 41.24            | -92.87                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3465.00         | -52.23     | -13.00      | -39.23      | 1.28 V             | 90                   | 40.64            | -92.87                   |

**Remarks:**

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

|                        |                     |                |                       |
|------------------------|---------------------|----------------|-----------------------|
| <b>RF Mode</b>         | TX LTE Band IV-5MHz | <b>Channel</b> | CH 20375 : 1752.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz       |                |                       |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3505.00         | -52.08     | -13.00      | -39.08      | 3.35 H             | 219                  | 40.46            | -92.54                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3505.00         | -50.69     | -13.00      | -37.69      | 1.35 V             | 73                   | 41.85            | -92.54                   |

**Remarks:**

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

LTE Band 4, Channel Bandwidth: 20MHz

|                        |                      |                |                     |
|------------------------|----------------------|----------------|---------------------|
| <b>RF Mode</b>         | TX LTE Band IV-20MHz | <b>Channel</b> | CH 20050 : 1720 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz        |                |                     |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3440.00         | -51.54     | -13.00      | -38.54      | 3.28 H             | 194                  | 41.54            | -93.08                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3440.00         | -50.62     | -13.00      | -37.62      | 1.17 V             | 103                  | 42.46            | -93.08                   |

**Remarks:**

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

|                        |                      |                |                       |
|------------------------|----------------------|----------------|-----------------------|
| <b>RF Mode</b>         | TX LTE Band IV-20MHz | <b>Channel</b> | CH 20175 : 1732.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz        |                |                       |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3465.00         | -52.17     | -13.00      | -39.17      | 3.36 H             | 198                  | 40.70            | -92.87                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3465.00         | -50.82     | -13.00      | -37.82      | 1.15 V             | 81                   | 42.05            | -92.87                   |

**Remarks:**

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

|                        |                      |                |                     |
|------------------------|----------------------|----------------|---------------------|
| <b>RF Mode</b>         | TX LTE Band IV-20MHz | <b>Channel</b> | CH 20300 : 1745 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz        |                |                     |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |            |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3490.00         | -52.24     | -13.00      | -39.24      | 3.31 H             | 199                  | 40.42            | -92.66                   |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |            |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 3490.00         | -50.82     | -13.00      | -37.82      | 1.24 V             | 75                   | 41.84            | -92.66                   |

**Remarks:**

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

LTE Band 12, Channel Bandwidth: 1.4MHz

|                        |                        |                |                      |
|------------------------|------------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XII-1.4MHz | <b>Channel</b> | CH 23017 : 699.7 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz          |                |                      |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1399.40         | -52.45    | -13.00      | -39.45      | 3.33 H             | 197                  | 49.15            | -101.60                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1399.40         | -49.89    | -13.00      | -36.89      | 1.21 V             | 82                   | 51.71            | -101.60                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

|                        |                        |                |                      |
|------------------------|------------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XII-1.4MHz | <b>Channel</b> | CH 23095 : 707.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz          |                |                      |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1415.00         | -52.24    | -13.00      | -39.24      | 3.34 H             | 195                  | 49.39            | -101.63                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1415.00         | -49.13    | -13.00      | -36.13      | 1.23 V             | 87                   | 52.50            | -101.63                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

|                        |                        |                |                      |
|------------------------|------------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XII-1.4MHz | <b>Channel</b> | CH 23173 : 715.3 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz          |                |                      |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1430.60         | -51.69    | -13.00      | -38.69      | 3.26 H             | 197                  | 49.98            | -101.67                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1430.60         | -49.87    | -13.00      | -36.87      | 1.15 V             | 84                   | 51.80            | -101.67                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3.  $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.

LTE Band 12, Channel Bandwidth: 5MHz

|                        |                      |                |                      |
|------------------------|----------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XII-5MHz | <b>Channel</b> | CH 23035 : 701.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz        |                |                      |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1403.00         | -52.72    | -13.00      | -39.72      | 3.15 H             | 208                  | 48.89            | -101.61                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1403.00         | -49.92    | -13.00      | -36.92      | 1.17 V             | 89                   | 51.69            | -101.61                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

|                        |                      |                |                      |
|------------------------|----------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XII-5MHz | <b>Channel</b> | CH 23095 : 707.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz        |                |                      |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1415.00         | -52.48    | -13.00      | -39.48      | 3.26 H             | 214                  | 49.15            | -101.63                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1415.00         | -49.34    | -13.00      | -36.34      | 1.19 V             | 94                   | 52.29            | -101.63                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

|                        |                      |                |                      |
|------------------------|----------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XII-5MHz | <b>Channel</b> | CH 23155 : 713.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz        |                |                      |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1427.00         | -51.96    | -13.00      | -38.96      | 3.17 H             | 202                  | 49.69            | -101.65                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1427.00         | -49.72    | -13.00      | -36.72      | 1.17 V             | 76                   | 51.93            | -101.65                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3.  $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.

LTE Band 12, Channel Bandwidth: 10MHz

|                        |                       |                |                    |
|------------------------|-----------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XII-10MHz | <b>Channel</b> | CH 23060 : 704 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz         |                |                    |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1408.00         | -52.37    | -13.00      | -39.37      | 3.26 H             | 217                  | 49.24            | -101.61                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1408.00         | -49.37    | -13.00      | -36.37      | 1.63 V             | 87                   | 52.24            | -101.61                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

|                        |                       |                |                      |
|------------------------|-----------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XII-10MHz | <b>Channel</b> | CH 23095 : 707.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz         |                |                      |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1415.00         | -52.47    | -13.00      | -39.47      | 3.12 H             | 218                  | 49.16            | -101.63                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1415.00         | -49.53    | -13.00      | -36.53      | 1.47 V             | 93                   | 52.10            | -101.63                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

|                        |                       |                |                    |
|------------------------|-----------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XII-10MHz | <b>Channel</b> | CH 23130 : 711 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 18GHz         |                |                    |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                 |           |             |             |                    |                      |                  |                          |
|------------------------------------------------------|-----------------|-----------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1422.00         | -52.74    | -13.00      | -39.74      | 3.09 H             | 217                  | 48.90            | -101.64                  |
| Antenna Polarity & Test Distance : Vertical at 3 m   |                 |           |             |             |                    |                      |                  |                          |
| No                                                   | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                    | 1422.00         | -49.06    | -13.00      | -36.06      | 1.53 V             | 72                   | 52.58            | -101.64                  |

**Remarks:**

1.  $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3.  $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.

## 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 according to ISO/IEC 17025.

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

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