

## FCC Test Report

### (PART 90S)

**Report No.:** RF201118C03-10

**FCC ID:** B32V2104G

**Test Model:** V210 4G

**Received Date:** Nov. 18, 2020

**Test Date:** Dec. 09, 2020 ~ Jan. 05, 2021

**Issued Date:** Jan. 11, 2021

**Applicant:** Verifone, Inc.

**Address:** 1400 West Stanford Ranch Road Suite 200 Rocklin CA 95765 USA

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

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

**Test Location (1):** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**Test Location (2):** B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan

**FCC Registration /**  
**Designation Number:** 427177 / TW0011



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

## Table of Contents

|                                                                  |           |
|------------------------------------------------------------------|-----------|
| <b>Release Control Record .....</b>                              | <b>3</b>  |
| <b>1 Certificate of Conformity .....</b>                         | <b>4</b>  |
| <b>2 Summary of Test Results.....</b>                            | <b>5</b>  |
| 2.1 Measurement Uncertainty.....                                 | 5         |
| 2.2 Test Site and Instruments .....                              | 6         |
| <b>3 General Information .....</b>                               | <b>7</b>  |
| 3.1 General Description of EUT .....                             | 7         |
| 3.2 Configuration of System under Test.....                      | 8         |
| 3.2.1 Description of Support Units.....                          | 8         |
| 3.3 Test Mode Applicability and Tested Channel Detail .....      | 9         |
| 3.4 General Description of Applied Standards and references..... | 10        |
| <b>4 Test Types and Results .....</b>                            | <b>11</b> |
| 4.1 Output Power Measurement.....                                | 11        |
| 4.1.1 Limits of Output Power Measurement .....                   | 11        |
| 4.1.2 Test Procedures.....                                       | 11        |
| 4.1.3 Test Setup.....                                            | 12        |
| 4.1.4 Test Results .....                                         | 13        |
| 4.2 Modulation Characteristics Measurement .....                 | 16        |
| 4.2.1 Limits of Modulation Characteristics .....                 | 16        |
| 4.2.2 Test Setup.....                                            | 16        |
| 4.2.3 Test Procedure .....                                       | 16        |
| 4.2.4 Test Results .....                                         | 17        |
| 4.3 Frequency Stability Measurement .....                        | 18        |
| 4.3.1 Limits of Frequency Stability Measurement .....            | 18        |
| 4.3.2 Test Procedure .....                                       | 18        |
| 4.3.3 Test Setup.....                                            | 18        |
| 4.3.4 Test Results .....                                         | 19        |
| 4.4 Occupied Bandwidth Measurement.....                          | 23        |
| 4.4.1 Limits of Occupied Bandwidth Measurement .....             | 23        |
| 4.4.2 Test Procedure .....                                       | 23        |
| 4.4.3 Test Setup.....                                            | 23        |
| 4.4.4 Test Results .....                                         | 24        |
| 4.5 Emission Mask Measurement.....                               | 26        |
| 4.5.1 Limits of Emission Mask Measurement.....                   | 26        |
| 4.5.2 Test Setup.....                                            | 26        |
| 4.5.3 Test Procedures.....                                       | 26        |
| 4.5.4 Test Results .....                                         | 27        |
| 4.6 Conducted Spurious Emissions.....                            | 35        |
| 4.6.1 Limits of Conducted Spurious Emissions Measurement.....    | 35        |
| 4.6.2 Test Setup.....                                            | 35        |
| 4.6.3 Test Procedure .....                                       | 35        |
| 4.6.4 Test Results .....                                         | 36        |
| 4.7 Radiated Emission Measurement.....                           | 40        |
| 4.7.1 Limits of Radiated Emission Measurement .....              | 40        |
| 4.7.2 Test Procedure .....                                       | 40        |
| 4.7.3 Deviation from Test Standard .....                         | 40        |
| 4.7.4 Test Setup.....                                            | 41        |
| 4.7.5 Test Results .....                                         | 42        |
| <b>5 Pictures of Test Arrangements.....</b>                      | <b>56</b> |
| <b>Appendix – Information of the Testing Laboratories .....</b>  | <b>57</b> |

### Release Control Record

| Issue No.      | Description      | Date Issued   |
|----------------|------------------|---------------|
| RF201118C03-10 | Original Release | Jan. 11, 2021 |

## 1 Certificate of Conformity

**Product:** Point of Sale Terminal

**Brand:** Verifone

**Test Model:** V210 4G

**Sample Status:** Identical Prototype

**Applicant:** Verifone, Inc.

**Test Date:** Dec. 09, 2020 ~ Jan. 05, 2021

**Standards:** FCC Part 90, Subpart I, S  
FCC Part 2

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 :** Gina Liu, **Date:** Jan. 11, 2021  
Gina Liu / Specialist

**Approved by :** Dylan Chiou, **Date:** Jan. 11, 2021  
Dylan Chiou / Senior Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 90 & Part 2 (LTE 26) |                              |        |                                                                                       |
|-------------------------------------------------|------------------------------|--------|---------------------------------------------------------------------------------------|
| FCC Clause                                      | Test Item                    | Result | Remarks                                                                               |
| 2.1046<br>90.635 (b)                            | Effective Radiated Power     | Pass   | Meet the requirement of limit.                                                        |
| 2.1047                                          | Modulation Characteristics   | Pass   | Meet the requirement.                                                                 |
| 2.1055<br>90.213                                | Frequency Stability          | Pass   | Meet the requirement of limit.                                                        |
| 2.1049<br>90.209                                | Occupied Bandwidth           | Pass   | Meet the requirement of limit.                                                        |
| 90.691                                          | Emission Masks               | Pass   | Meet the requirement of limit.                                                        |
| 2.1051<br>90.691                                | Conducted Spurious Emissions | Pass   | Meet the requirement of limit.                                                        |
| 2.1053<br>90.691                                | Radiated Spurious Emissions  | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -32.00 dB at 1638.00 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 (k=2) (±) |
|--------------------------------|--------------------|--------------------------------|
| Radiated Emissions up to 1 GHz | 9 kHz ~ 30 MHz     | 3.0400 dB                      |
|                                | 30 MHz ~ 200 MHz   | 2.0153 dB                      |
|                                | 200 MHz ~ 1000 MHz | 2.0224 dB                      |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz     | 1.0121 dB                      |
|                                | 18 GHz ~ 40 GHz    | 1.1508 dB                      |

## 2.2 Test Site and Instruments

| Description & Manufacturer                     | Model No.        | Serial No.                                                    | Date of Calibration | Due Date of Calibration |
|------------------------------------------------|------------------|---------------------------------------------------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent Technologies          | N9038A           | MY52260177                                                    | Aug. 24, 2020       | Aug. 23, 2021           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43            | 101261                                                        | Apr. 16, 2020       | Apr. 15, 2021           |
| Loop Antenna TESEQ                             | HLA 6121         | 45745                                                         | Jul. 06, 2020       | Jul. 05, 2021           |
| HORN Antenna<br>ETS-Lindgren                   | 3117             | 00143293                                                      | Nov. 22, 2020       | Nov. 21, 2021           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168        | 9168-631                                                      | Nov. 22, 2020       | Nov. 21, 2021           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168        | 9168-616                                                      | Nov. 09, 2020       | Nov. 08, 2021           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9170        | 9170-480                                                      | Nov. 22, 2020       | Nov. 21, 2021           |
| Fixed Attenuator<br>Mini-Circuits              | MDCS18N-10       | MDCS18N-10-01                                                 | Apr. 14, 2020       | Apr. 13, 2021           |
| MXG Vector signal generator<br>Agilent         | N5182B           | MY53050430                                                    | Nov. 25, 2020       | Nov. 24, 2021           |
| Preamplifier<br>Agilent                        | 310N             | 187226                                                        | Jun. 17, 2020       | Jun. 16, 2021           |
| Preamplifier<br>Agilent                        | 83017A           | MY39501357                                                    | Jun. 17, 2020       | Jun. 16, 2021           |
| Preamplifier<br>EMCI                           | EMC 184045       | 980116                                                        | Oct. 07, 2020       | Oct. 06, 2021           |
| RF signal cable<br>ETS-LINDGREN                | 5D-FB            | Cable-CH1-01(RFC-SM<br>S-100-SMS-120+RFC-<br>SMS-100-SMS-400) | Jun. 17, 2020       | Jun. 16, 2021           |
| RF signal cable<br>ETS-LINDGREN                | 8D-FB            | Cable-CH1-02(RFC-SM<br>S-100-SMS-24)                          | Jun. 17, 2020       | Jun. 17, 2021           |
| Boresight Antenna Fixture                      | FBA-01           | FBA-SIP01                                                     | NA                  | NA                      |
| Software<br>BV ADT                             | E3<br>8.130425b  | NA                                                            | NA                  | NA                      |
| Antenna Tower<br>MF                            | NA               | NA                                                            | NA                  | NA                      |
| Turn Table<br>MF                               | NA               | NA                                                            | NA                  | NA                      |
| Antenna Tower & Turn Table<br>Controller<br>MF | MF-7802          | NA                                                            | NA                  | NA                      |
| Radio Communication<br>Analyzer<br>Anritsu     | MT8821C          | 6201462755                                                    | Feb. 13, 2020       | Feb. 12, 2021           |
| Radio Communication<br>Analyzer<br>Anritsu     | MT8820C          | 6201300640                                                    | Aug. 19, 2019       | Aug. 18, 2021           |
| Temperature & Humidity<br>Chamber              | GTH-120-40-CP-AR | MAA1306-019                                                   | Sep. 09, 2020       | Sep. 08, 2021           |
| DC Power Supply<br>Topward                     | 33010D           | 807748                                                        | NA                  | NA                      |

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

2. The test was performed in HsinTien Chamber 1.

### 3 General Information

#### 3.1 General Description of EUT

|                            |                                          |                   |
|----------------------------|------------------------------------------|-------------------|
| <b>Product</b>             | Point of Sale Terminal                   |                   |
| <b>Brand</b>               | Verifone                                 |                   |
| <b>Test Model</b>          | V210 4G                                  |                   |
| <b>Status of EUT</b>       | Identical Prototype                      |                   |
| <b>Power Supply Rating</b> | 5.0 Vdc (adapter)<br>3.7 Vdc (battery)   |                   |
| <b>Modulation Type</b>     | LTE                                      | QPSK, 16QAM       |
| <b>Frequency Range</b>     | LTE Band 26 (Channel Bandwidth: 1.4 MHz) | 814.7 ~ 823.3 MHz |
|                            | LTE Band 26 (Channel Bandwidth: 3 MHz)   | 815.5 ~ 822.5 MHz |
|                            | LTE Band 26 (Channel Bandwidth: 5 MHz)   | 816.5 ~ 821.5 MHz |
|                            | LTE Band 26 (Channel Bandwidth: 10 MHz)  | 819 MHz           |
| <b>Emission Designator</b> | LTE Band 26 (Channel Bandwidth: 1.4 MHz) | 1M09G7D           |
|                            | LTE Band 26 (Channel Bandwidth: 3 MHz)   | 2M70G7D           |
|                            | LTE Band 26 (Channel Bandwidth: 5 MHz)   | 4M49G7D           |
|                            | LTE Band 26 (Channel Bandwidth: 10 MHz)  | 8M96G7D           |
| <b>Max. ERP Power</b>      | LTE Band 26 (Channel Bandwidth: 1.4 MHz) | 204.55 mW         |
|                            | LTE Band 26 (Channel Bandwidth: 3 MHz)   | 206.44 mW         |
|                            | LTE Band 26 (Channel Bandwidth: 5 MHz)   | 208.83 mW         |
|                            | LTE Band 26 (Channel Bandwidth: 10 MHz)  | 206.54 mW         |
| <b>Antenna Type</b>        | Refer to Note as below                   |                   |
| <b>Accessory Device</b>    | Refer to Note as below                   |                   |
| <b>Data Cable Supplied</b> | Refer to Note as below                   |                   |

Note:

- The EUT contains following accessory devices.

| Product              | Brand    | Model      | Description                                            |
|----------------------|----------|------------|--------------------------------------------------------|
| Adapter<br>(EU Type) | Verifone | AM11E-050A | I/P: 100-240 Vac, 50-60 Hz, 0.5 A<br>O/P: 5 Vdc, 2.2 A |
| Adapter<br>(US Type) | Verifone | AM11A-050A | I/P: 100-240 Vac, 50-60 Hz, 0.5 A<br>O/P: 5 Vdc, 2.2 A |
| Battery              | Verifone | BPK183-001 | 3.7 Vdc, 3100 mAh (11.47 Wh)                           |

\*Adapter of US Type was chosen for final test.

- The antenna information is listed as below.

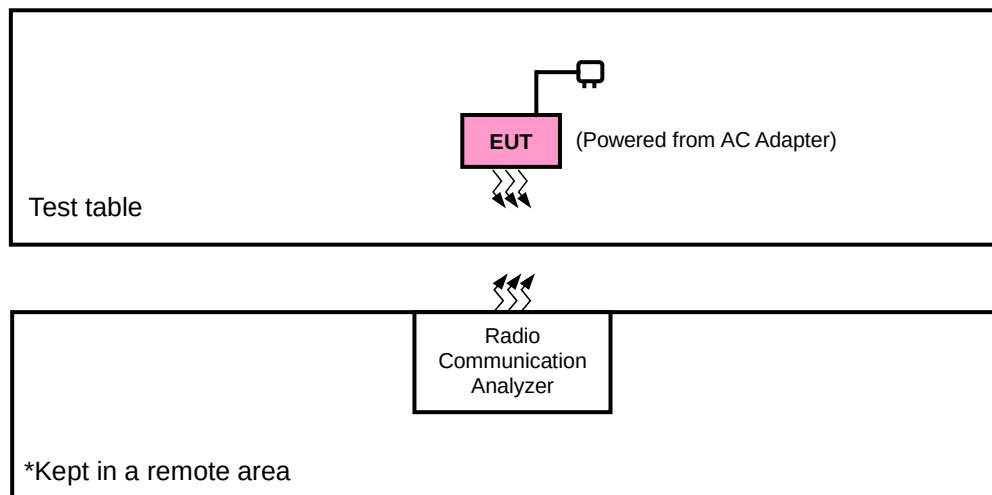
| Ant. Type | Ant. | Antenna Peak Gain (dBi) |                                |                                     |       |        |        |        |        |        |
|-----------|------|-------------------------|--------------------------------|-------------------------------------|-------|--------|--------|--------|--------|--------|
|           |      | WCDMA 4 /<br>LTE 4      | GSM850 /<br>WCDMA 5 /<br>LTE 5 | GSM1900 /<br>WCDMA 2 /<br>LTE 2, 25 | LTE 7 | LTE 12 | LTE 13 | LTE 26 | LTE 38 | LTE 41 |
| Dipole    | 1    | 3.2                     | 0                              | 3.6                                 | 2.0   | -0.5   | 0.3    | 0      | 2.3    | 3.1    |
|           | 2    | 2.2                     | 1.9                            | 3.8                                 | 2.2   | -4.5   | -0.6   | 1.8    | 2.8    | 3.9    |

\* The Max antenna gain was chosen for final test.

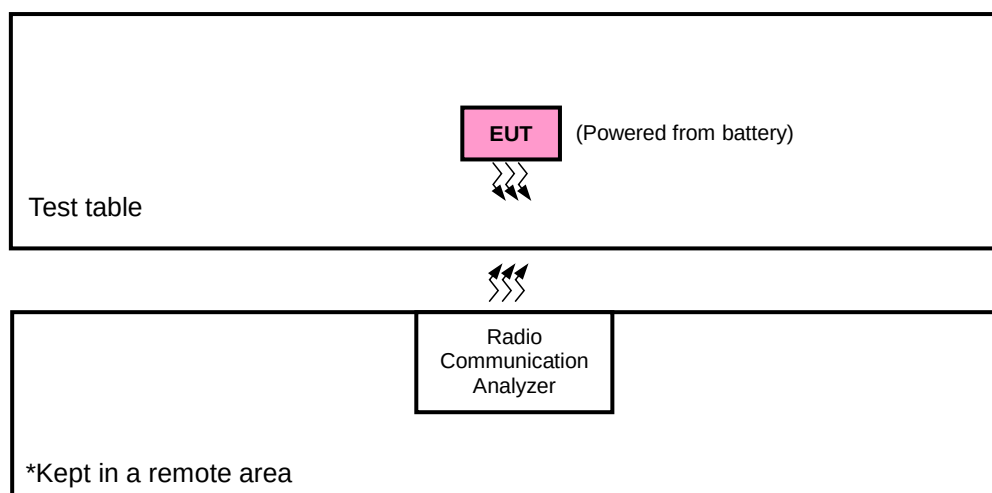
- The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
- The above EUT information is declared by manufacturer and for more detailed features description,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

### 3.2 Configuration of System under Test

#### <Radiated Emission Test>



#### <E.R.P. 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:

| Band        | ERP     | Radiated Emission |
|-------------|---------|-------------------|
| LTE Band 26 | Y-plane | Y-axis            |

#### LTE Band 26

| EUT Configure Mode | Test Item                  | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode                                                             |
|--------------------|----------------------------|-------------------|---------------------|-------------------|-------------|------------------------------------------------------------------|
| -                  | ERP                        | 26697 to 26783    | 26697, 26740, 26783 | 1.4 MHz           | QPSK, 16QAM | 3 RB / 0 RB Offset                                               |
|                    |                            | 26705 to 26775    | 26705, 26740, 26775 | 3 MHz             | QPSK, 16QAM | 1 RB / 7 RB Offset                                               |
|                    |                            | 26715 to 26765    | 26715, 26740, 26765 | 5 MHz             | QPSK, 16QAM | 1 RB / 12 RB Offset                                              |
|                    |                            | 26740             | 26740               | 10 MHz            | QPSK, 16QAM | 1 RB / 49 RB Offset                                              |
| -                  | Modulation Characteristics | 26740             | 26740               | 10 MHz            | QPSK        | 50 RB / 0 RB Offset                                              |
|                    |                            | 26715 to 26765    |                     | 5 MHz             | 16QAM       | 25 RB / 0 RB Offset                                              |
| -                  | Frequency Stability        | 26697 to 26783    | 26697, 26783        | 1.4 MHz           | QPSK        | 6 RB / 0 RB Offset                                               |
|                    |                            | 26705 to 26775    | 26705, 26775        | 3 MHz             | QPSK        | 15 RB / 0 RB Offset                                              |
|                    |                            | 26715 to 26765    | 26715, 26765        | 5 MHz             | QPSK        | 25 RB / 0 RB Offset                                              |
|                    |                            | 26740             | 26740               | 10 MHz            | QPSK        | 50 RB / 0 RB Offset                                              |
| -                  | Occupied Bandwidth         | 26697 to 26783    | 26697, 26740, 26783 | 1.4 MHz           | QPSK, 16QAM | 6 RB / 0 RB Offset                                               |
|                    |                            | 26705 to 26775    | 26705, 26740, 26775 | 3 MHz             | QPSK, 16QAM | 15 RB / 0 RB Offset                                              |
|                    |                            | 26715 to 26765    | 26715, 26740, 26765 | 5 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset                                              |
|                    |                            | 26740             | 26740               | 10 MHz            | QPSK, 16QAM | 50 RB / 0 RB Offset                                              |
| -                  | Emission Mask              | 26697 to 26783    | 26697, 26740, 26783 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset<br>1 RB / 5 RB Offset<br>6 RB / 0 RB Offset   |
|                    |                            | 26705 to 26775    | 26705, 26740, 26775 | 3 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset<br>1 RB / 14 RB Offset<br>15 RB / 0 RB Offset |
|                    |                            | 26715 to 26765    | 26715, 26740, 26765 | 5 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset |
|                    |                            | 26740             | 26740               | 10 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset |
| -                  | Conducted Emission         | 26697 to 26783    | 26697, 26740, 26783 | 1.4 MHz           | QPSK        | 3 RB / 0 RB Offset                                               |
|                    |                            | 26705 to 26775    | 26705, 26740, 26775 | 3 MHz             | QPSK        | 1 RB / 7 RB Offset                                               |
|                    |                            | 26715 to 26765    | 26715, 26740, 26765 | 5 MHz             | QPSK        | 1 RB / 12 RB Offset                                              |
|                    |                            | 26740             | 26740               | 10 MHz            | QPSK        | 1 RB / 49 RB Offset                                              |
| -                  | Radiated Emission          | 26697 to 26783    | 26697, 26740, 26783 | 1.4 MHz           | QPSK        | 3 RB / 1 RB Offset                                               |
|                    |                            | 26715 to 26765    | 26715, 26740, 26765 | 5 MHz             | QPSK        | 1 RB / 12 RB Offset                                              |
|                    |                            | 26740             | 26740               | 10 MHz            | QPSK        | 1 RB / 49 RB Offset                                              |

#### Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only ERP, modulation characteristics, occupied bandwidth and Emission Mask items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel for final testing

**Test Condition:**

| Test Item             | Environmental Conditions | Input Power    | Tested By |
|-----------------------|--------------------------|----------------|-----------|
| ERP                   | 25 deg. C, 65 % RH       | 3.7 Vdc        | Karl Lee  |
| Frequency Stability   | 25 deg. C, 65 % RH       | 3.7 Vdc        | Gavin Wu  |
| Occupied Bandwidth    | 25 deg. C, 65 % RH       | 3.7 Vdc        | Gavin Wu  |
| Peak to Average Ratio | 25 deg. C, 65 % RH       | 3.7 Vdc        | Gavin Wu  |
| Emission Mask         | 25 deg. C, 65 % RH       | 3.7 Vdc        | Gavin Wu  |
| Band Edge             | 25 deg. C, 65 % RH       | 3.7 Vdc        | Gavin Wu  |
| Conducted Emission    | 25 deg. C, 65 % RH       | 3.7 Vdc        | Gavin Wu  |
| Radiated Emission     | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Karl Lee  |

### 3.4 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 90**

**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**

**KDB 971168 D02 Misc Rev Approv License Devices v02r01**

**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

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw) ERP.

#### 4.1.2 Test Procedures

##### **EIRP / ERP Measurement:**

- a. All measurements were done at low, middle and high operational frequency range. RBW is 1.4 MHz 、 3 MHz 、 5 MHz 、 10 MHz for LTE mode, and VBW  $\geq 3 \times$  RBW.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c.  $EIRP = \text{Output power level} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dB}$ . Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. – Tx cable loss.
- d. Measurement method refers to ANSI C63.26 section 5.2.7 & 5.2.4.

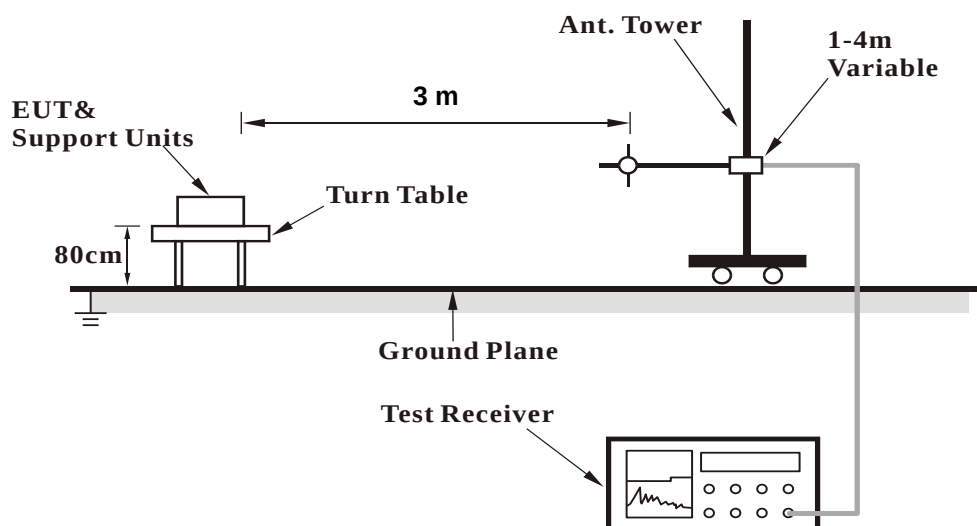
##### **Conducted Power Measurement:**

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

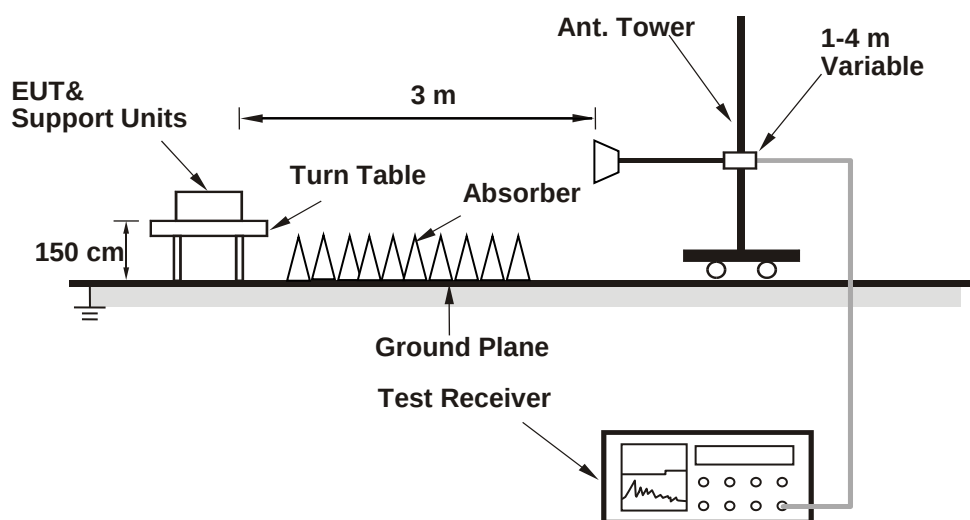
#### 4.1.3 Test Setup

##### EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

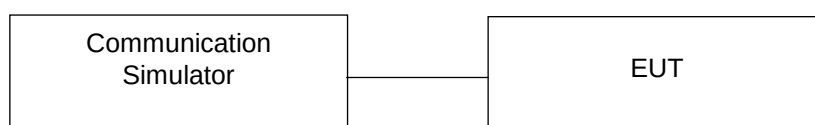


<Radiated Emission above 1 GHz>



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

##### Conducted Power Measurement:



#### 4.1.4 Test Results

\* For 16QAM modulated conducted output power and ERP/ EIRP power with bandwidth higher than 10MHz for reference.

#### Conducted Output Power (dBm)

| LTE Band 26 |           |                 |           |       |       |       |                 |               |           |                 |           |           |       |       |               |               |
|-------------|-----------|-----------------|-----------|-------|-------|-------|-----------------|---------------|-----------|-----------------|-----------|-----------|-------|-------|---------------|---------------|
| BW          | MCS Index | RB Size         | RB Offset |       |       | Mid   |                 | 3GPP MPR (dB) | BW        | MCS Index       | RB Size   | RB Offset | Low   | Mid   | High          | 3GPP MPR (dB) |
|             |           | Channel         |           |       | 26740 |       | Channel         |               |           |                 | 26715     | 26740     | 26765 |       |               |               |
|             |           | Frequency (MHz) |           |       | 819.0 |       | Frequency (MHz) |               |           |                 | 816.5     | 819.0     | 821.5 |       |               |               |
| 10M         | QPSK      | 1               | 0         |       | 22.34 |       | 0               | 5M            | QPSK      | 1               | 0         | 22.87     | 22.34 | 22.97 | 0             |               |
|             |           | 1               | 24        |       | 23.03 |       | 0               |               |           | 1               | 12        | 22.52     | 23.03 | 23.35 | 0             |               |
|             |           | 1               | 49        |       | 23.11 |       | 0               |               |           | 1               | 24        | 22.67     | 23.11 | 23.15 | 0             |               |
|             |           | 25              | 0         |       | 22.48 |       | 1               |               |           | 12              | 0         | 22.21     | 22.48 | 22.37 | 1             |               |
|             |           | 25              | 12        |       | 22.46 |       | 1               |               |           | 12              | 6         | 22.32     | 22.46 | 22.45 | 1             |               |
|             |           | 25              | 25        |       | 22.41 |       | 1               |               |           | 12              | 13        | 22.36     | 22.41 | 22.41 | 1             |               |
|             |           | 50              | 0         |       | 22.21 |       | 1               |               |           | 25              | 0         | 22.31     | 22.21 | 22.34 | 1             |               |
|             | 16QAM     | 1               | 0         |       | 22.17 |       | 1               |               | 16QAM     | 1               | 0         | 22.12     | 22.17 | 22.32 | 1             |               |
|             |           | 1               | 24        |       | 22.13 |       | 1               |               |           | 1               | 12        | 22.08     | 22.13 | 22.26 | 1             |               |
|             |           | 1               | 49        |       | 22.52 |       | 1               |               |           | 1               | 24        | 22.47     | 22.52 | 22.23 | 1             |               |
|             |           | 25              | 0         |       | 21.24 |       | 2               |               |           | 12              | 0         | 21.19     | 21.24 | 21.17 | 2             |               |
|             |           | 25              | 12        |       | 21.21 |       | 2               |               |           | 12              | 6         | 21.16     | 21.21 | 21.18 | 2             |               |
|             |           | 25              | 25        |       | 21.15 |       | 2               |               |           | 12              | 13        | 21.10     | 21.15 | 21.16 | 2             |               |
|             |           | 50              | 0         |       |       |       |                 |               |           | 25              | 0         | 21.06     | 21.11 | 21.09 | 2             |               |
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  | 3GPP MPR (dB)   | BW            | MCS Index | RB Size         | RB Offset | Low       | Mid   | High  | 3GPP MPR (dB) |               |
|             |           | Channel         |           | 26705 | 26740 | 26775 |                 |               |           | Channel         |           | 26697     | 26740 | 26783 |               |               |
|             |           | Frequency (MHz) |           | 815.5 | 819.0 | 822.5 |                 |               |           | Frequency (MHz) |           | 814.7     | 819.0 | 823.3 |               |               |
| 3M          | QPSK      | 1               | 0         | 23.01 | 22.33 | 22.85 | 0               | 1.4M          | QPSK      | 1               | 0         | 22.95     | 22.24 | 22.86 | 0             |               |
|             |           | 1               | 7         | 22.91 | 23.02 | 23.21 | 0               |               |           | 1               | 2         | 23.11     | 22.99 | 23.28 | 0             |               |
|             |           | 1               | 14        | 22.68 | 23.01 | 23.04 | 0               |               |           | 1               | 5         | 22.78     | 22.97 | 23.04 | 0             |               |
|             |           | 8               | 0         | 22.36 | 22.46 | 22.34 | 1               |               |           | 3               | 0         | 22.75     | 23.34 | 23.35 | 0             |               |
|             |           | 8               | 3         | 22.32 | 22.36 | 22.40 | 1               |               |           | 3               | 1         | 22.98     | 23.38 | 23.42 | 0             |               |
|             |           | 8               | 7         | 22.27 | 22.39 | 22.26 | 1               |               |           | 3               | 3         | 22.79     | 23.29 | 23.40 | 0             |               |
|             |           | 15              | 0         | 22.32 | 22.09 | 22.31 | 1               |               |           | 6               | 0         | 22.57     | 22.21 | 22.31 | 1             |               |
|             | 16QAM     | 1               | 0         | 22.09 | 22.06 | 22.24 | 1               |               | 16QAM     | 1               | 0         | 22.06     | 22.15 | 22.20 | 1             |               |
|             |           | 1               | 7         | 22.05 | 22.02 | 22.12 | 1               |               |           | 1               | 2         | 22.02     | 22.07 | 22.18 | 1             |               |
|             |           | 1               | 14        | 22.44 | 22.49 | 22.19 | 1               |               |           | 1               | 5         | 22.41     | 22.52 | 22.13 | 1             |               |
|             |           | 8               | 0         | 21.16 | 21.10 | 21.06 | 2               |               |           | 3               | 0         | 21.93     | 22.17 | 22.10 | 1             |               |
|             |           | 8               | 3         | 21.13 | 21.18 | 21.13 | 2               |               |           | 3               | 1         | 21.91     | 22.16 | 22.15 | 1             |               |
|             |           | 8               | 7         | 21.07 | 21.06 | 21.11 | 2               |               |           | 3               | 3         | 21.94     | 22.13 | 22.16 | 1             |               |
|             |           | 15              | 0         | 21.03 | 21.09 | 20.99 | 2               |               |           | 6               | 0         | 21.00     | 21.06 | 20.95 | 2             |               |

**ERP Power (dBm)**

| LTE Band 26                        |         |                 |               |                        |           |          |                    |
|------------------------------------|---------|-----------------|---------------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4 MHz / QPSK  |         |                 |               |                        |           |          |                    |
| Plane                              | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Y                                  | 26697   | 814.7           | -5.95         | 29.058                 | 23.11     | 204.55   | H                  |
|                                    | 26740   | 819.0           | -6.13         | 29.15                  | 23.02     | 200.45   |                    |
|                                    | 26783   | 823.3           | -6.12         | 29.072                 | 22.95     | 197.33   |                    |
|                                    | 26697   | 814.7           | -10.36        | 29.354                 | 18.99     | 79.32    | V                  |
|                                    | 26740   | 819.0           | -10.09        | 28.967                 | 18.88     | 77.21    |                    |
|                                    | 26783   | 823.3           | -11.00        | 29.772                 | 18.77     | 75.37    |                    |
| Channel Bandwidth: 1.4 MHz / 16QAM |         |                 |               |                        |           |          |                    |
| Y                                  | 26697   | 814.7           | -6.95         | 29.058                 | 22.11     | 162.48   | H                  |
|                                    | 26740   | 819.0           | -7.13         | 29.15                  | 22.02     | 159.22   |                    |
|                                    | 26783   | 823.3           | -7.12         | 29.072                 | 21.95     | 156.75   |                    |
|                                    | 26697   | 814.7           | -11.37        | 29.354                 | 17.98     | 62.86    | V                  |
|                                    | 26740   | 819.0           | -11.09        | 28.967                 | 17.88     | 61.33    |                    |
|                                    | 26783   | 823.3           | -12.00        | 29.772                 | 17.77     | 59.87    |                    |

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

| LTE Band 26                      |         |                 |               |                        |           |          |                    |
|----------------------------------|---------|-----------------|---------------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 3 MHz / QPSK  |         |                 |               |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Y                                | 26705   | 815.5           | -5.91         | 29.058                 | 23.15     | 206.44   | H                  |
|                                  | 26740   | 819.0           | -6.09         | 29.15                  | 23.06     | 202.30   |                    |
|                                  | 26775   | 822.5           | -6.08         | 29.072                 | 22.99     | 199.16   |                    |
|                                  | 26705   | 815.5           | -10.34        | 29.354                 | 19.01     | 79.69    | V                  |
|                                  | 26740   | 819.0           | -10.05        | 28.967                 | 18.92     | 77.93    |                    |
|                                  | 26775   | 822.5           | -10.95        | 29.772                 | 18.82     | 76.24    |                    |
| Channel Bandwidth: 3 MHz / 16QAM |         |                 |               |                        |           |          |                    |
| Y                                | 26705   | 815.5           | -6.91         | 29.058                 | 22.15     | 163.98   | H                  |
|                                  | 26740   | 819.0           | -7.09         | 29.15                  | 22.06     | 160.69   |                    |
|                                  | 26775   | 822.5           | -7.10         | 29.072                 | 21.97     | 157.47   |                    |
|                                  | 26705   | 815.5           | -11.35        | 29.354                 | 18.00     | 63.15    | V                  |
|                                  | 26740   | 819.0           | -11.05        | 28.967                 | 17.92     | 61.90    |                    |
|                                  | 26775   | 822.5           | -11.96        | 29.772                 | 17.81     | 60.42    |                    |

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

| LTE Band 26                      |         |                 |               |                        |           |          |                    |
|----------------------------------|---------|-----------------|---------------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5 MHz / QPSK  |         |                 |               |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Y                                | 26715   | 816.5           | -5.86         | 29.058                 | 23.198    | 208.83   | H                  |
|                                  | 26740   | 819.0           | -6.04         | 29.15                  | 23.11     | 204.64   |                    |
|                                  | 26765   | 821.5           | -6.05         | 29.072                 | 23.022    | 200.54   |                    |
|                                  | 26715   | 816.5           | -10.30        | 29.354                 | 19.054    | 80.43    | V                  |
|                                  | 26740   | 819.0           | -10.01        | 28.967                 | 18.957    | 78.65    |                    |
|                                  | 26765   | 821.5           | -10.90        | 29.772                 | 18.872    | 77.13    |                    |
| Channel Bandwidth: 5 MHz / 16QAM |         |                 |               |                        |           |          |                    |
| Y                                | 26715   | 816.5           | -6.87         | 29.058                 | 22.19     | 165.50   | H                  |
|                                  | 26740   | 819.0           | -7.04         | 29.15                  | 22.11     | 162.55   |                    |
|                                  | 26765   | 821.5           | -7.06         | 29.072                 | 22.01     | 158.93   |                    |
|                                  | 26715   | 816.5           | -11.31        | 29.354                 | 18.04     | 63.74    | V                  |
|                                  | 26740   | 819.0           | -11.02        | 28.967                 | 17.95     | 62.33    |                    |
|                                  | 26765   | 821.5           | -11.91        | 29.772                 | 17.86     | 61.12    |                    |

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

| LTE Band 26                       |         |                 |               |                        |           |          |                    |
|-----------------------------------|---------|-----------------|---------------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10 MHz / QPSK  |         |                 |               |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Y                                 | 26740   | 819.0           | -6.00         | 29.15                  | 23.15     | 206.54   | H                  |
|                                   | 26740   | 819.0           | -9.96         | 28.967                 | 19.01     | 79.56    | V                  |
| Channel Bandwidth: 10 MHz / 16QAM |         |                 |               |                        |           |          |                    |
| Y                                 | 26740   | 819.0           | -6.91         | 29.15                  | 22.24     | 167.49   | H                  |
|                                   | 26740   | 819.0           | -10.96        | 28.967                 | 18.01     | 63.20    | V                  |

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

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

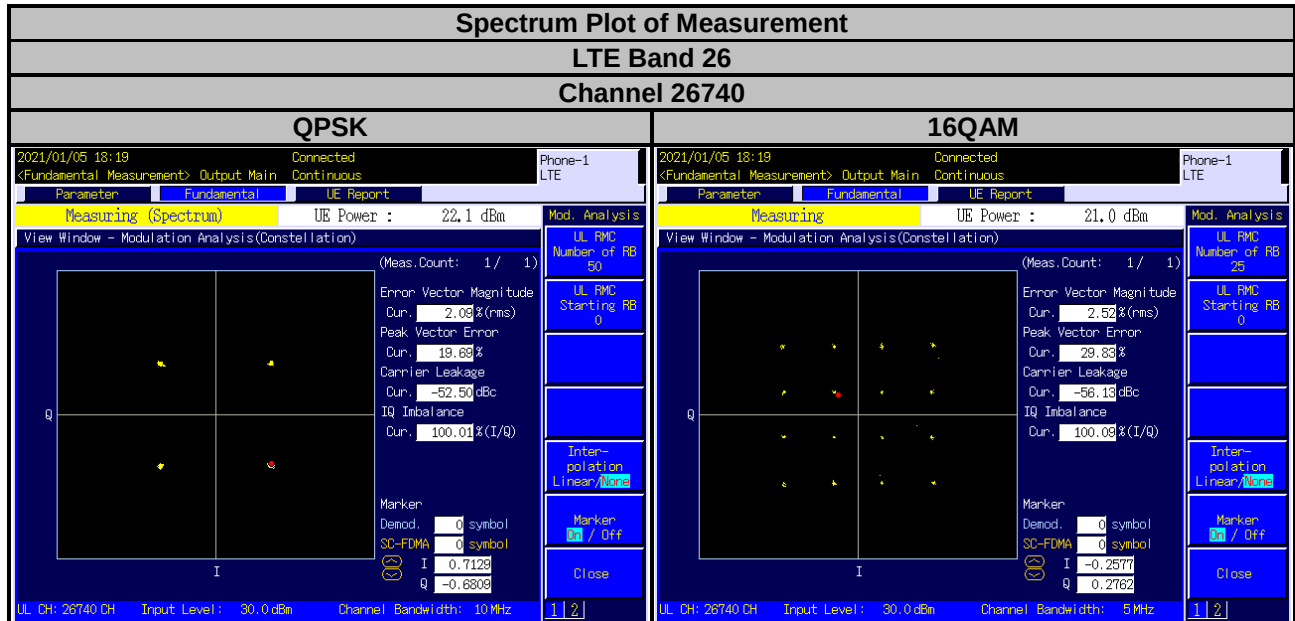
### 4.2.2 Test Setup



### 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

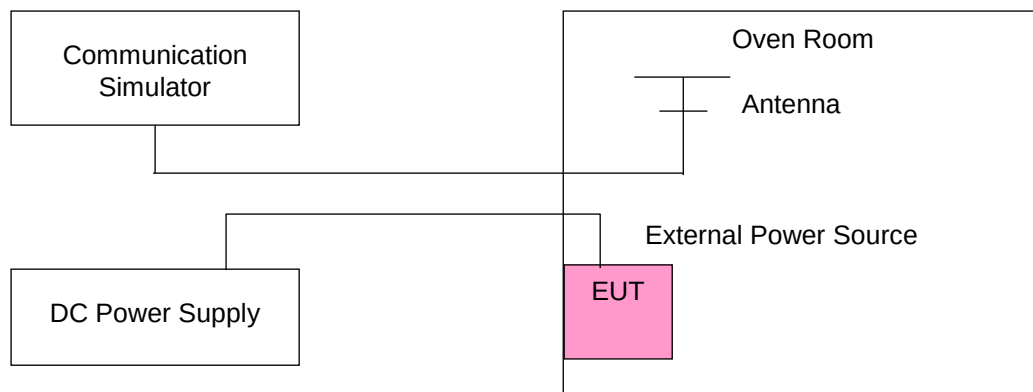
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

#### 4.3.2 Test Procedure

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

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

#### 4.3.3 Test Setup



#### 4.3.4 Test Results

##### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26                |                       |                 |                       | Limit (ppm) |
|--------------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|                    | Low Channel                |                       | High Channel    |                       |             |
|                    | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 3.7                | 814.700004                 | 0.005                 | 823.300003      | 0.004                 | 2.5         |
| 3.14               | 814.700001                 | 0.001                 | 823.300002      | 0.003                 | 2.5         |
| 4.25               | 814.700004                 | 0.005                 | 823.300004      | 0.004                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

##### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 26                |                       |                 |                       | Limit (ppm) |
|------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|            | Low Channel                |                       | High Channel    |                       |             |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -20        | 814.700003                 | 0.004                 | 823.300003      | 0.004                 | 2.5         |
| -10        | 814.700002                 | 0.002                 | 823.300004      | 0.004                 | 2.5         |
| 0          | 814.700003                 | 0.004                 | 823.300002      | 0.003                 | 2.5         |
| 10         | 814.700003                 | 0.003                 | 823.300002      | 0.002                 | 2.5         |
| 20         | 814.699996                 | -0.004                | 823.299999      | -0.001                | 2.5         |
| 30         | 814.699996                 | -0.004                | 823.299999      | -0.002                | 2.5         |
| 40         | 814.699998                 | -0.002                | 823.299998      | -0.002                | 2.5         |
| 50         | 814.699998                 | -0.002                | 823.299997      | -0.004                | 2.5         |

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26              |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 3.7                | 815.500003               | 0.004                 | 822.500002      | 0.003                 | 2.5         |
| 3.14               | 815.500004               | 0.004                 | 822.500002      | 0.002                 | 2.5         |
| 4.25               | 815.500004               | 0.005                 | 822.500003      | 0.004                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 26              |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -20        | 815.500004               | 0.005                 | 822.500001      | 0.001                 | 2.5         |
| -10        | 815.500003               | 0.004                 | 822.500001      | 0.002                 | 2.5         |
| 0          | 815.500002               | 0.002                 | 822.500002      | 0.003                 | 2.5         |
| 10         | 815.500003               | 0.004                 | 822.500002      | 0.003                 | 2.5         |
| 20         | 815.499997               | -0.003                | 822.499998      | -0.003                | 2.5         |
| 30         | 815.499996               | -0.005                | 822.499998      | -0.003                | 2.5         |
| 40         | 815.499997               | -0.004                | 822.499998      | -0.003                | 2.5         |
| 50         | 815.499998               | -0.002                | 822.499997      | -0.004                | 2.5         |

Note: When the EUT temperature is below -20°C, it will shut down and will not work.

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26              |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 3.7                | 816.500002               | 0.002                 | 821.500004      | 0.004                 | 2.5         |
| 3.14               | 816.500001               | 0.001                 | 821.500002      | 0.002                 | 2.5         |
| 4.25               | 816.500001               | 0.001                 | 821.500002      | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 26              |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -20        | 816.500001               | 0.001                 | 821.500002      | 0.003                 | 2.5         |
| -10        | 816.500002               | 0.003                 | 821.500004      | 0.004                 | 2.5         |
| 0          | 816.500001               | 0.002                 | 821.500003      | 0.004                 | 2.5         |
| 10         | 816.500004               | 0.004                 | 821.500001      | 0.002                 | 2.5         |
| 20         | 816.499997               | -0.004                | 821.499998      | -0.002                | 2.5         |
| 30         | 816.499996               | -0.005                | 821.499999      | -0.002                | 2.5         |
| 40         | 816.499997               | -0.004                | 821.499999      | -0.002                | 2.5         |
| 50         | 816.499999               | -0.001                | 821.499999      | -0.001                | 2.5         |

Note: When the EUT temperature is below -20°C, it will shut down and will not work.

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26               |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-------------|
|                    | Channel Bandwidth: 10 MHz |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) |             |
| 3.7                | 819.000003                | 0.003                 | 2.5         |
| 3.14               | 819.000003                | 0.004                 | 2.5         |
| 4.25               | 819.000002                | 0.003                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 26               |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-------------|
|            | Channel Bandwidth: 10 MHz |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) |             |
| -20        | 819.000001                | 0.001                 | 2.5         |
| -10        | 819.000002                | 0.002                 | 2.5         |
| 0          | 819.000003                | 0.004                 | 2.5         |
| 10         | 819.000003                | 0.003                 | 2.5         |
| 20         | 818.999997                | -0.003                | 2.5         |
| 30         | 818.999997                | -0.003                | 2.5         |
| 40         | 818.999997                | -0.003                | 2.5         |
| 50         | 818.999997                | -0.004                | 2.5         |

Note: When the EUT temperature is below -20°C, it will shut down and will not work.

## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Limits of Occupied Bandwidth Measurement

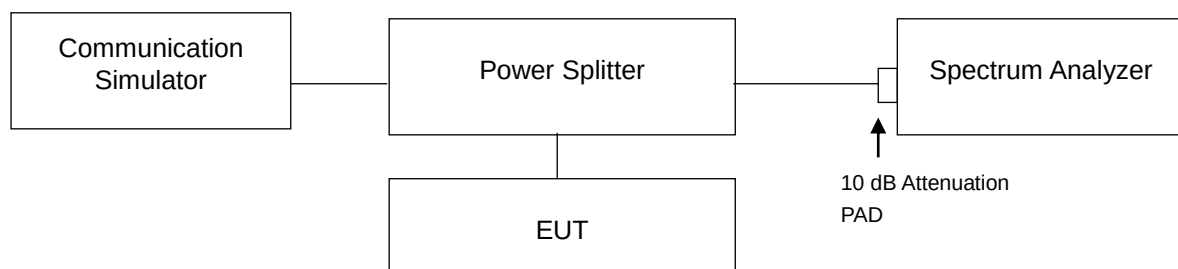
The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

### 4.4.2 Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Measurement method refer to section 5.4.4 of ANSI C63.26. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

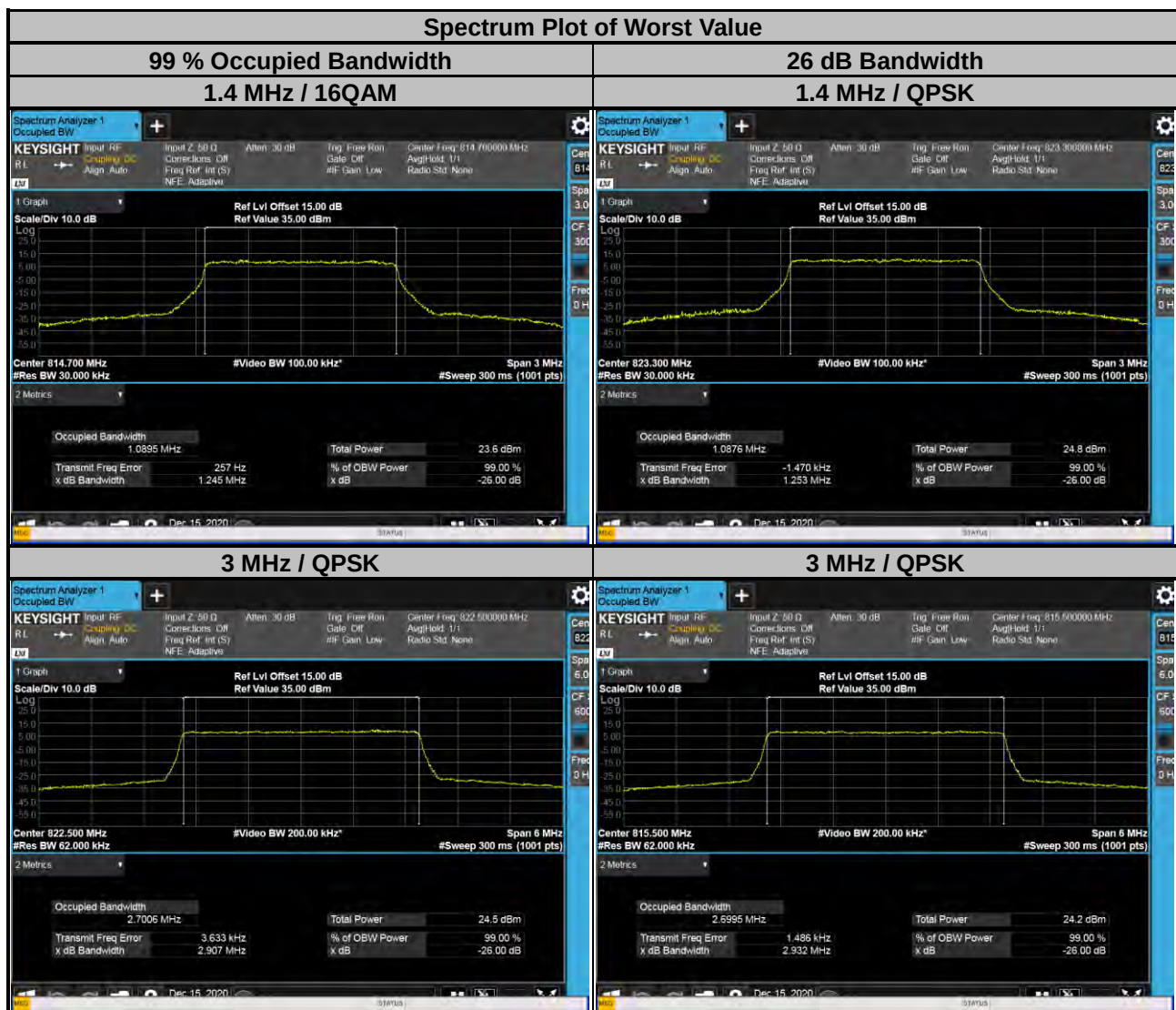
For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

### 4.4.3 Test Setup

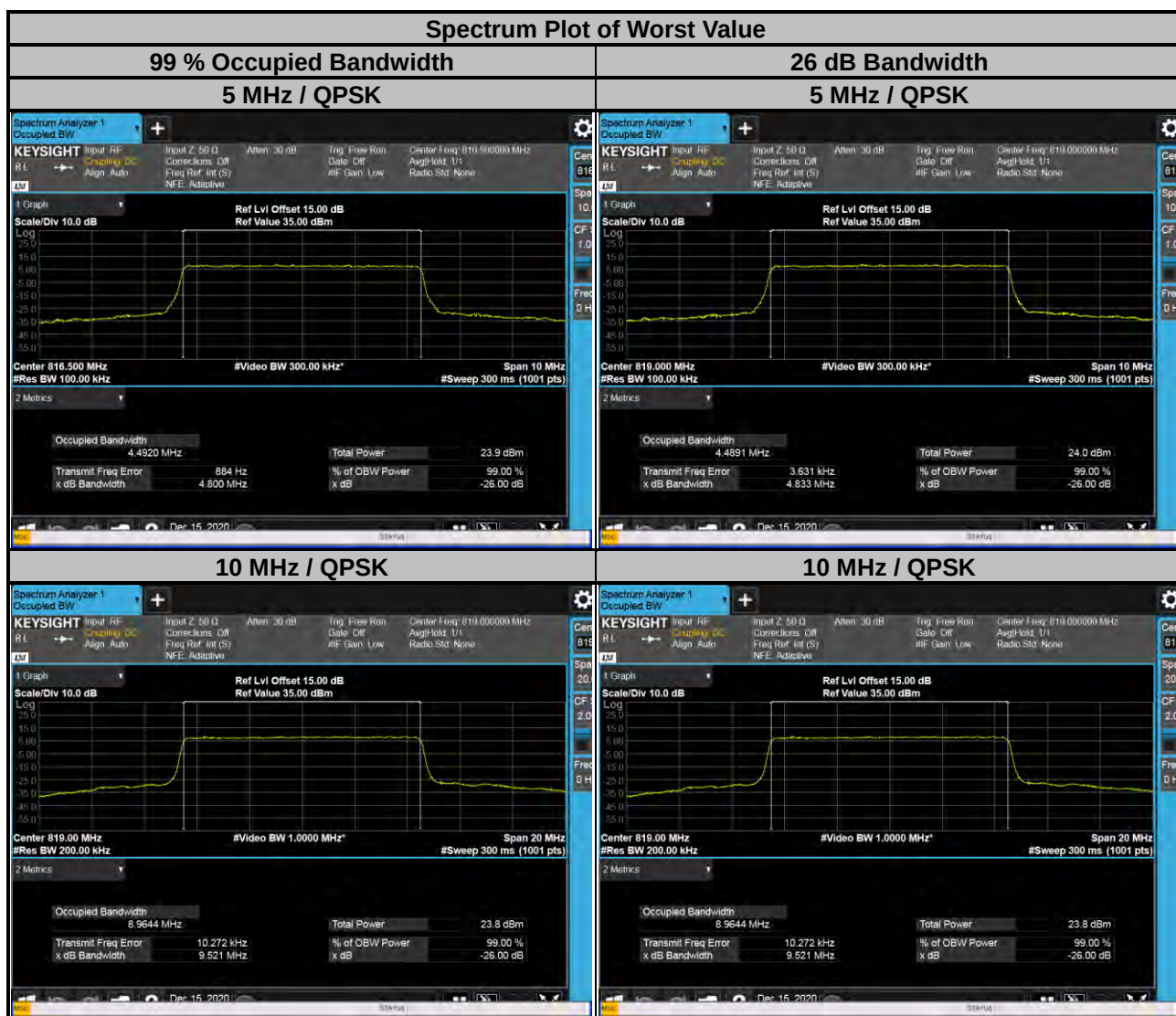


#### 4.4.4 Test Results

| LTE Band 26                |                 |                               |       |                       |       |
|----------------------------|-----------------|-------------------------------|-------|-----------------------|-------|
| Channel Bandwidth: 1.4 MHz |                 |                               |       |                       |       |
| Channel                    | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                            |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 26697                      | 814.7           | 1.09                          | 1.09  | 1.24                  | 1.25  |
| 26740                      | 819.0           | 1.09                          | 1.09  | 1.25                  | 1.25  |
| 26783                      | 823.3           | 1.09                          | 1.09  | 1.25                  | 1.25  |
| Channel Bandwidth: 3 MHz   |                 |                               |       |                       |       |
| Channel                    | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                            |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 26705                      | 815.5           | 2.70                          | 2.70  | 2.93                  | 2.91  |
| 26740                      | 819.0           | 2.70                          | 2.70  | 2.91                  | 2.92  |
| 26775                      | 822.5           | 2.70                          | 2.70  | 2.91                  | 2.93  |



| LTE Band 26               |                 |                               |       |                       |       |
|---------------------------|-----------------|-------------------------------|-------|-----------------------|-------|
| Channel Bandwidth: 5 MHz  |                 |                               |       |                       |       |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                           |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 26715                     | 816.5           | 4.49                          | 4.49  | 4.80                  | 4.82  |
| 26740                     | 819.0           | 4.49                          | 4.48  | 4.83                  | 4.77  |
| 26765                     | 821.5           | 4.49                          | 4.49  | 4.81                  | 4.82  |
| Channel Bandwidth: 10 MHz |                 |                               |       |                       |       |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |       | 26 dB Bandwidth (MHz) |       |
|                           |                 | QPSK                          | 16QAM | QPSK                  | 16QAM |
| 26740                     | 819.0           | 8.96                          | 4.57  | 9.52                  | 5.04  |



## 4.5 Emission Mask Measurement

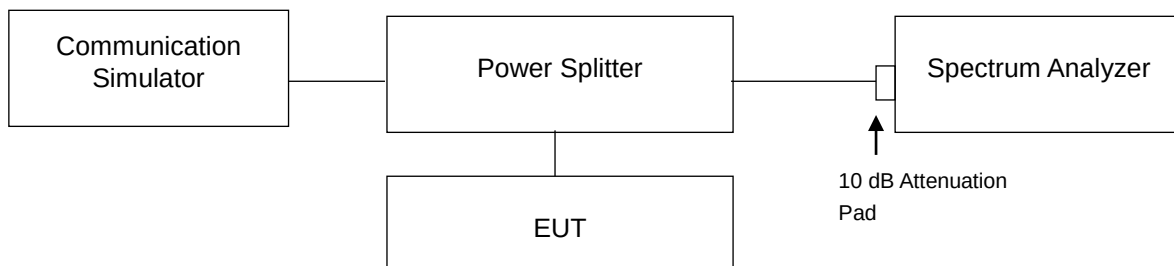
### 4.5.1 Limits of Emission Mask Measurement

According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \log_{10}(f/6.1)$  decibels or  $50 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

For §90.691(a), RBW=300 Hz for offset less than 37.5 kHz from channel edge and RBW=100 kHz for offsets greater than 37.5 kHz is allowed.

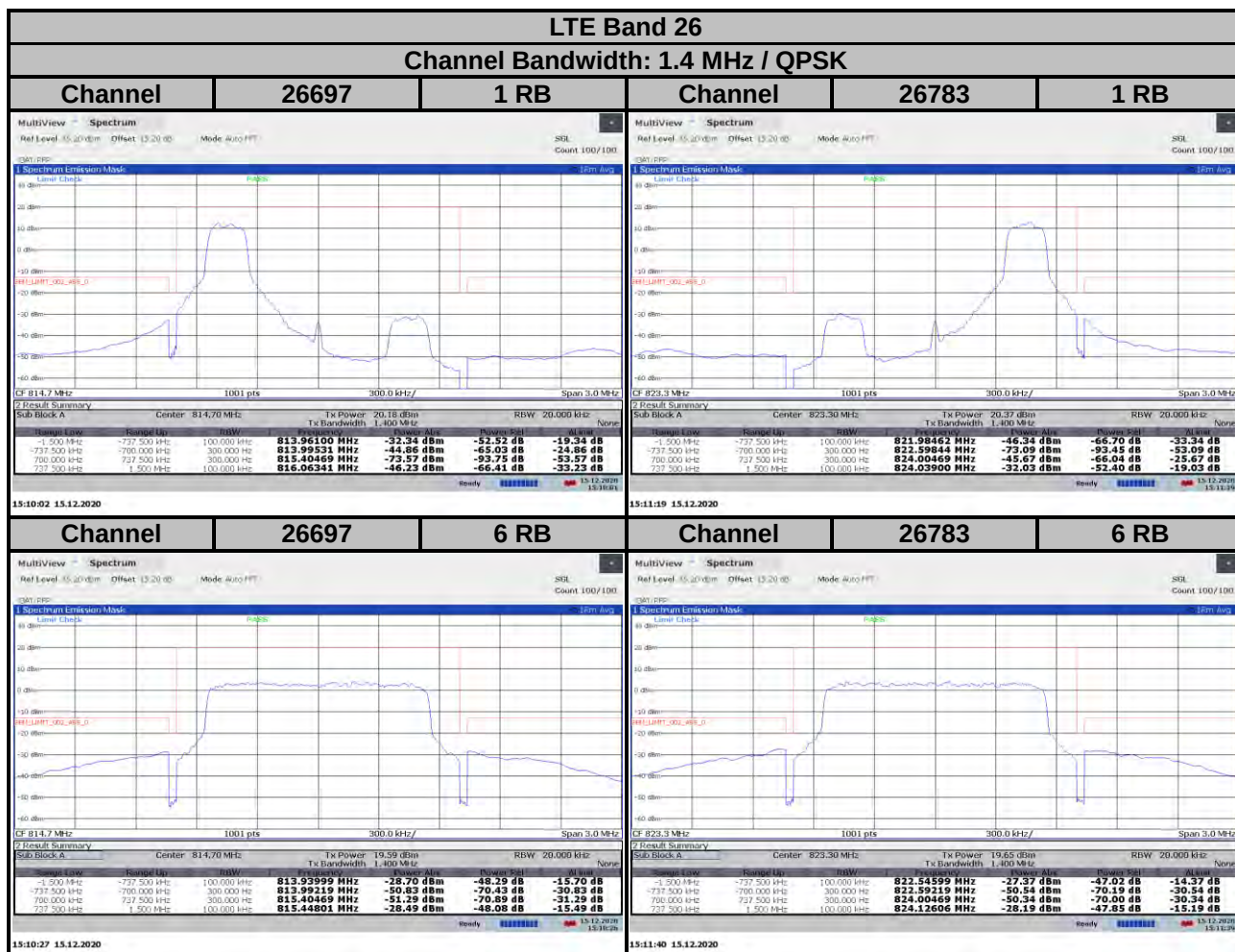
### 4.5.2 Test Setup



### 4.5.3 Test Procedures

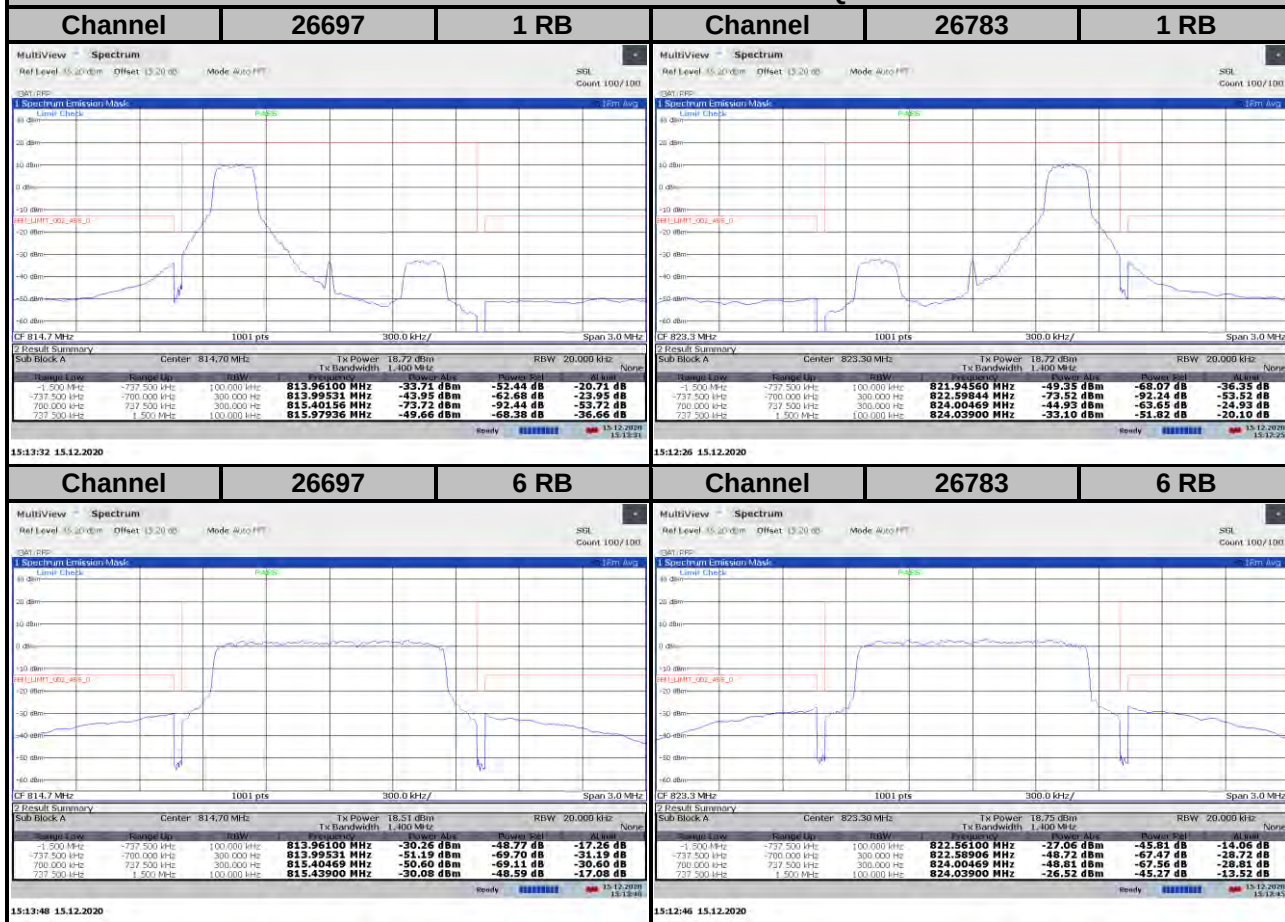
- The measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Record the test plot.

## 4.5.4 Test Results



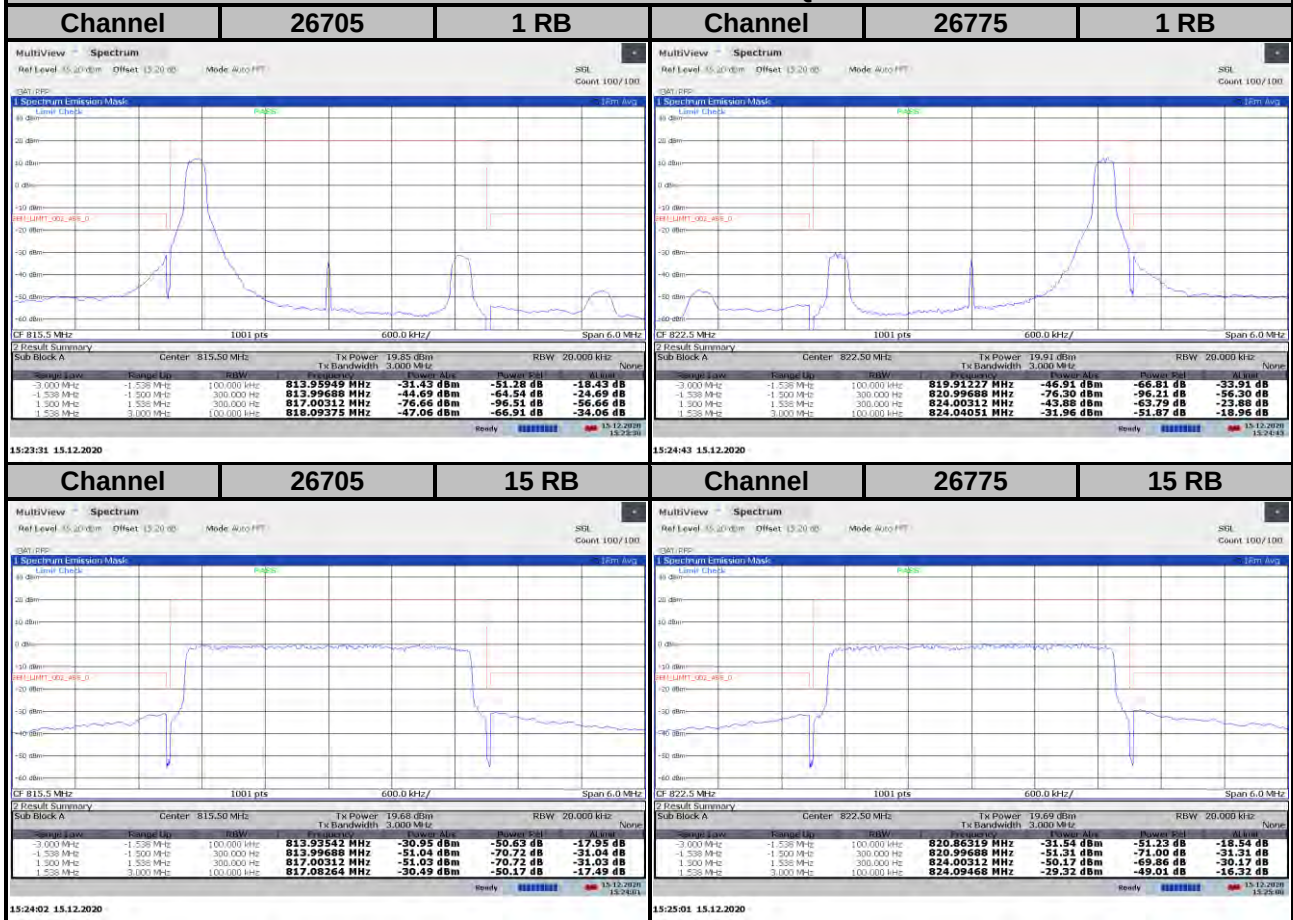
## LTE Band 26

Channel Bandwidth: 1.4 MHz / 16QAM



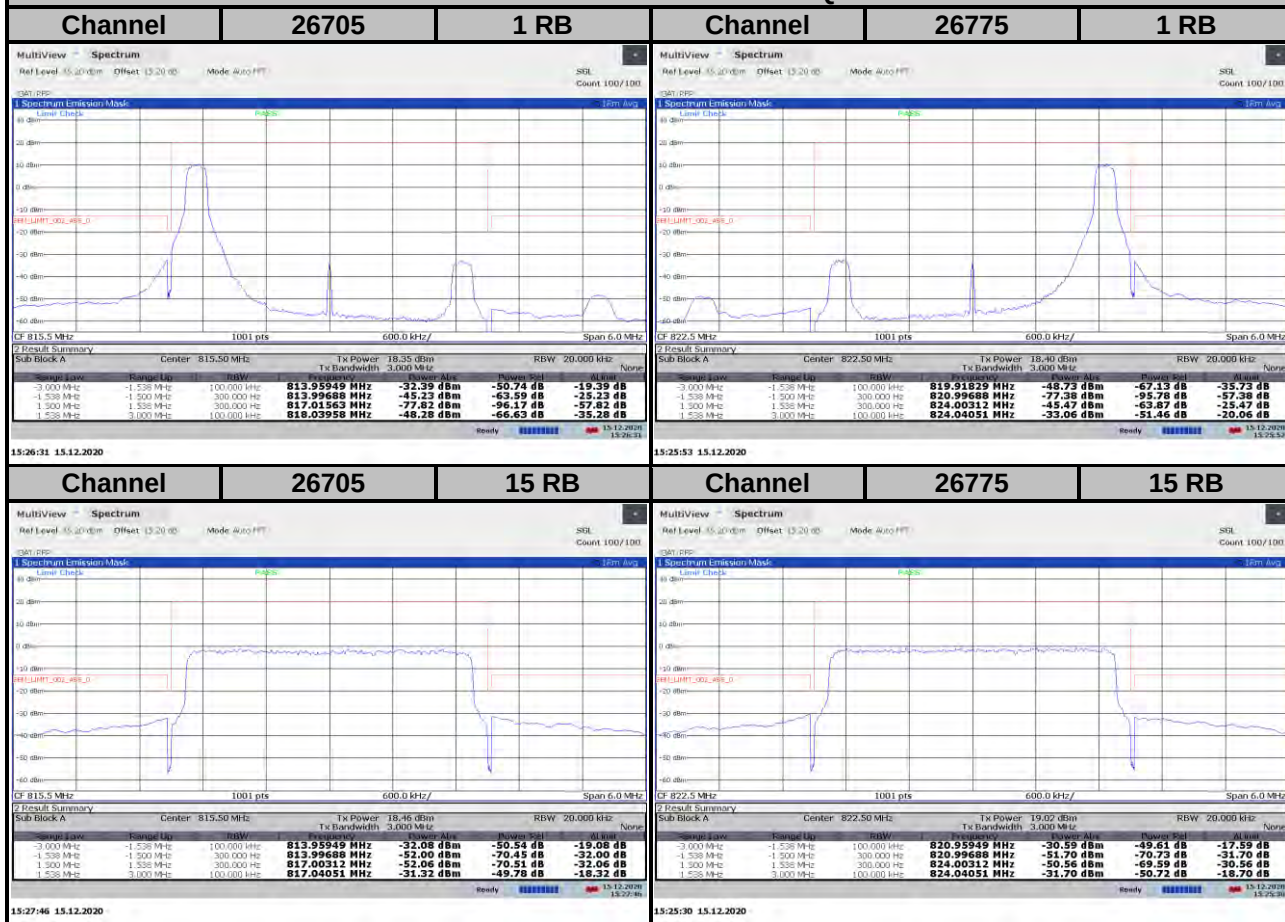
## LTE Band 26

### Channel Bandwidth: 3 MHz / QPSK



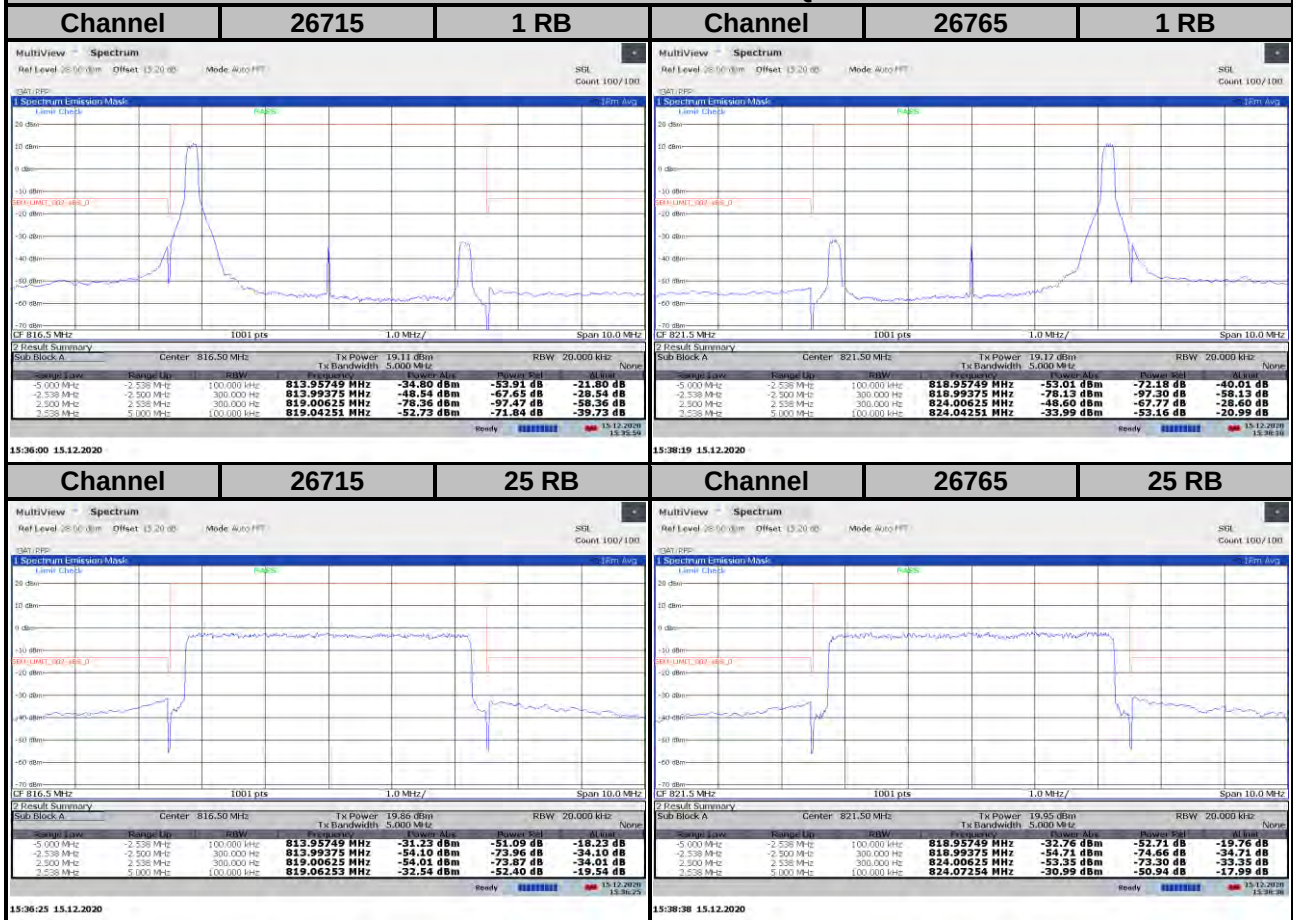
## LTE Band 26

Channel Bandwidth: 3 MHz / 16QAM



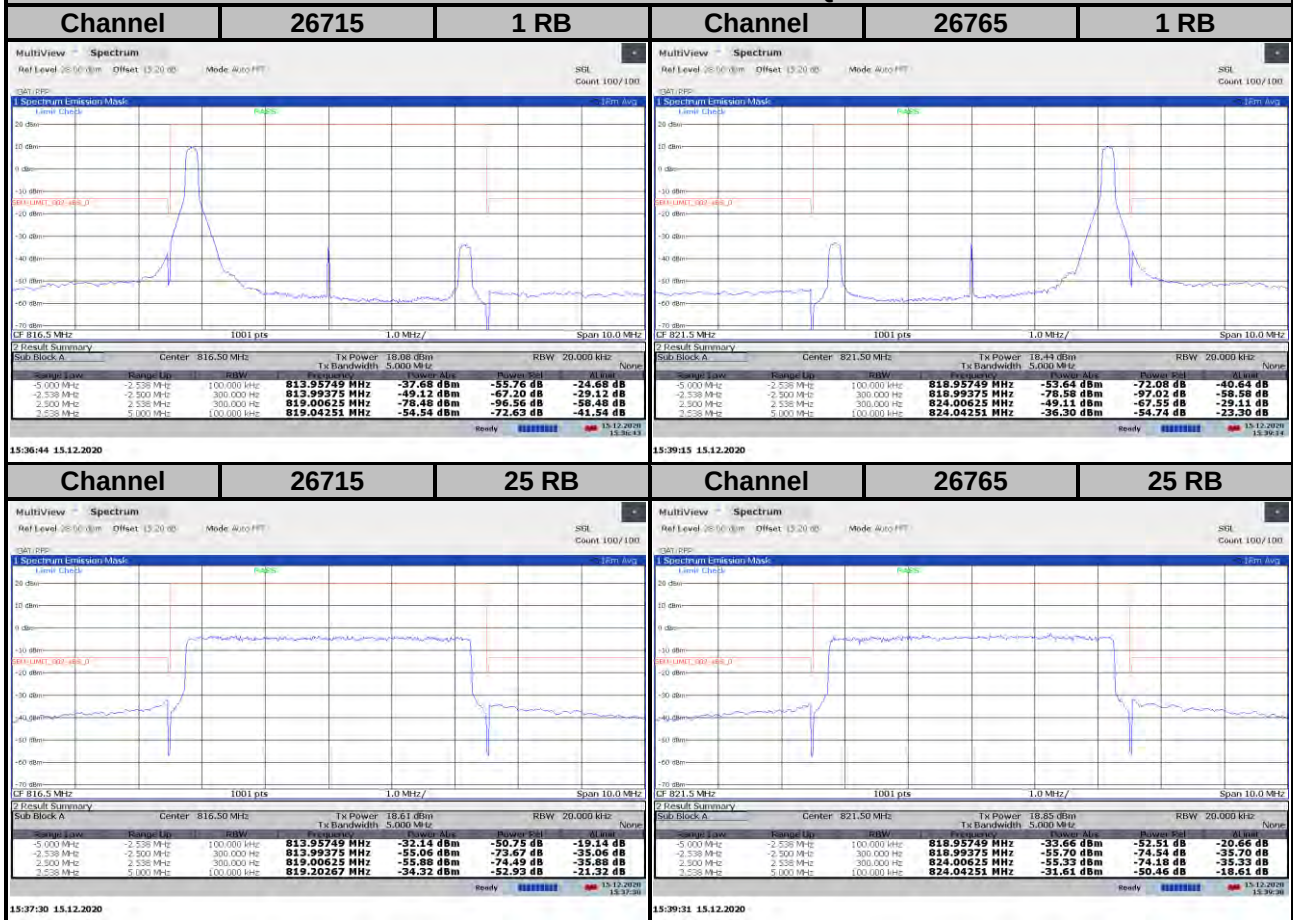
## LTE Band 26

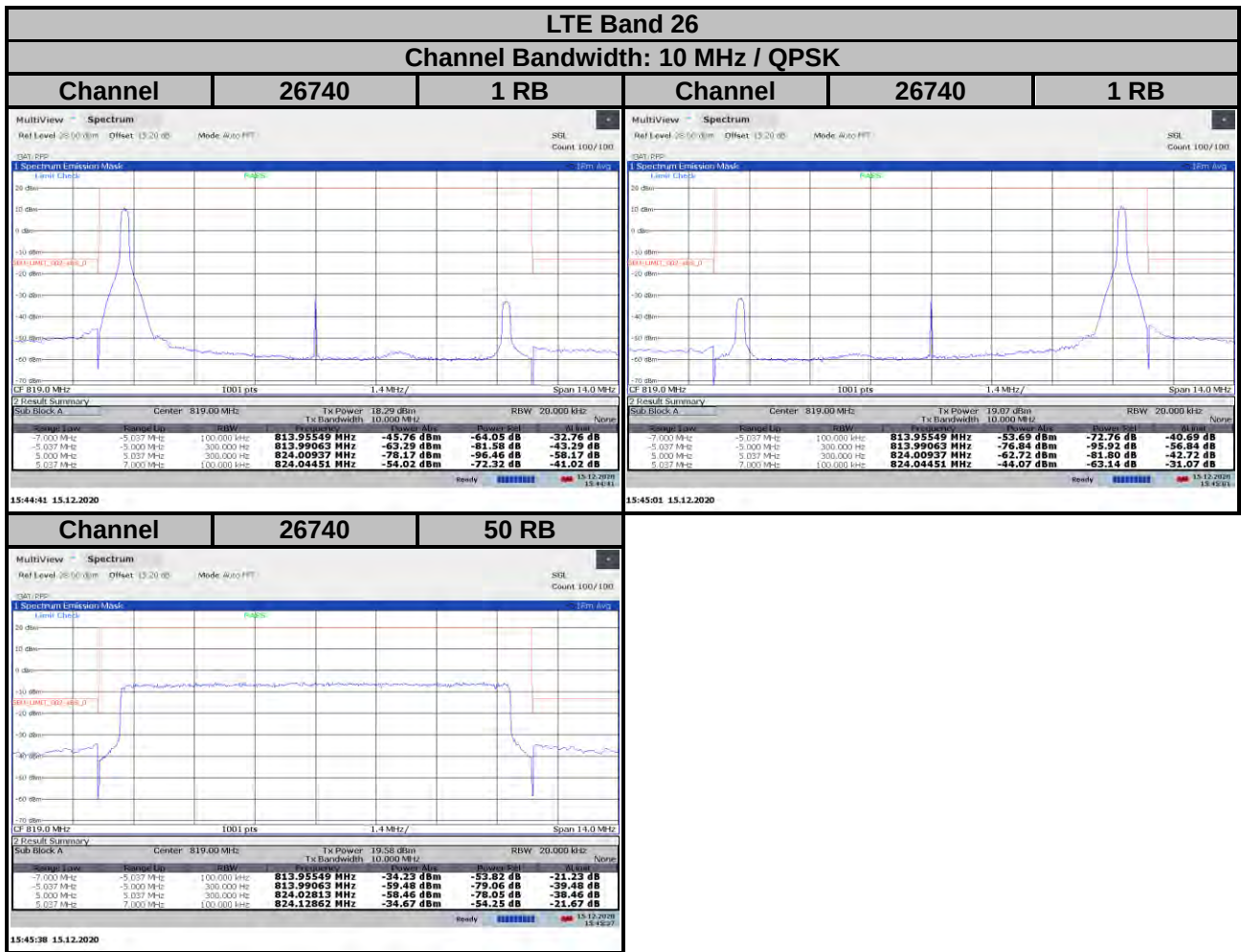
Channel Bandwidth: 5 MHz / QPSK



## LTE Band 26

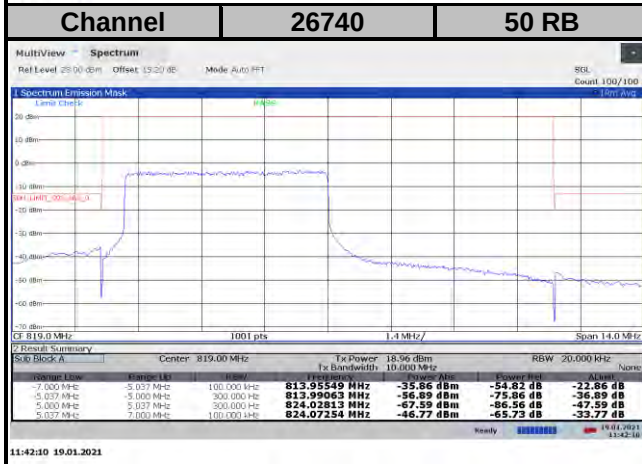
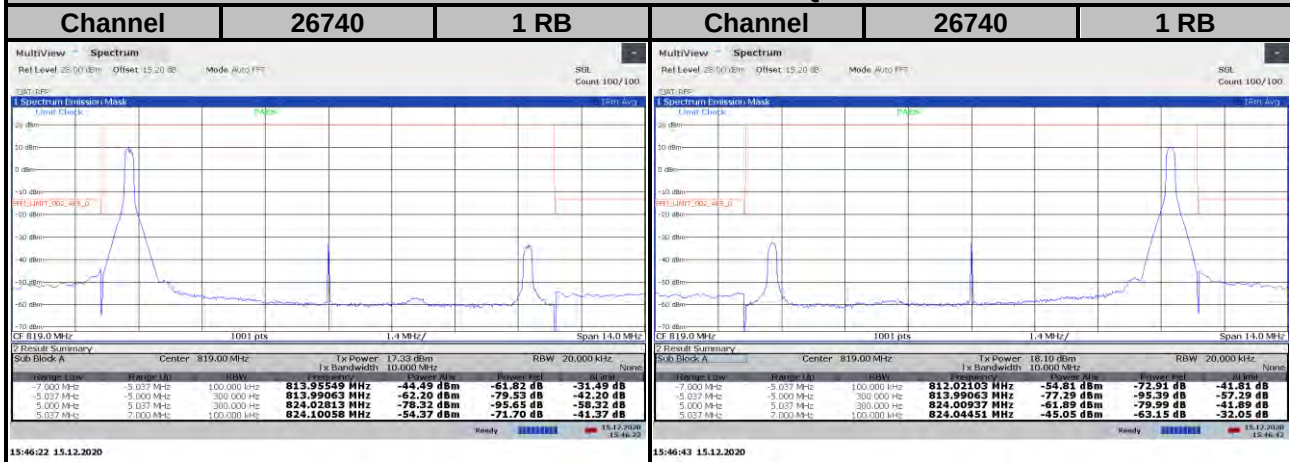
Channel Bandwidth: 5 MHz / 16QAM





## LTE Band 26

Channel Bandwidth: 16 MHz / QPSK

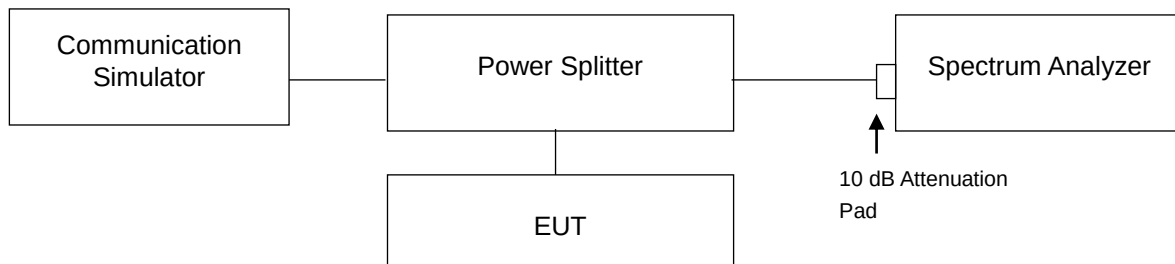


## 4.6 Conducted Spurious Emissions

### 4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission is equal to -13 dBm.

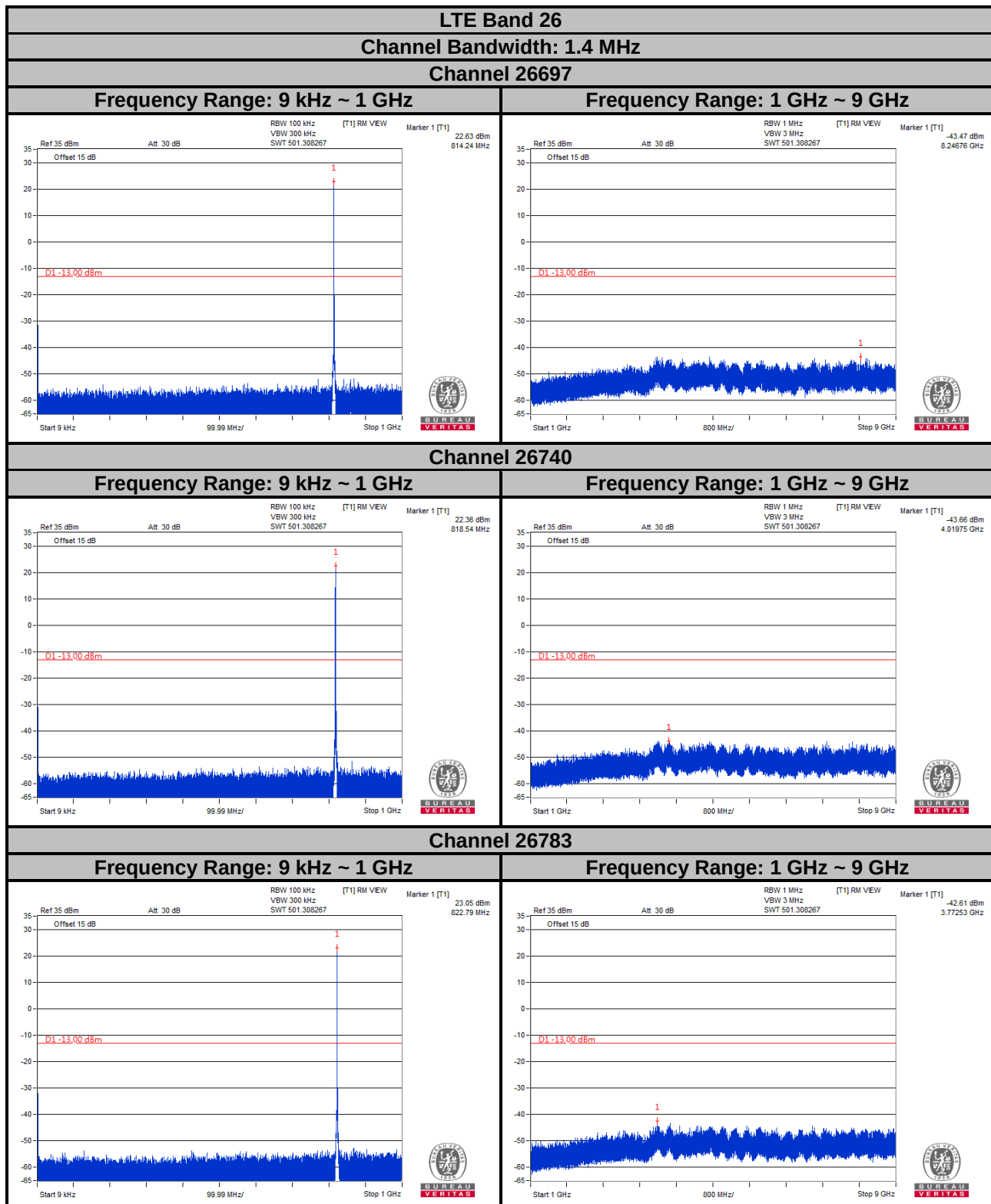
### 4.6.2 Test Setup



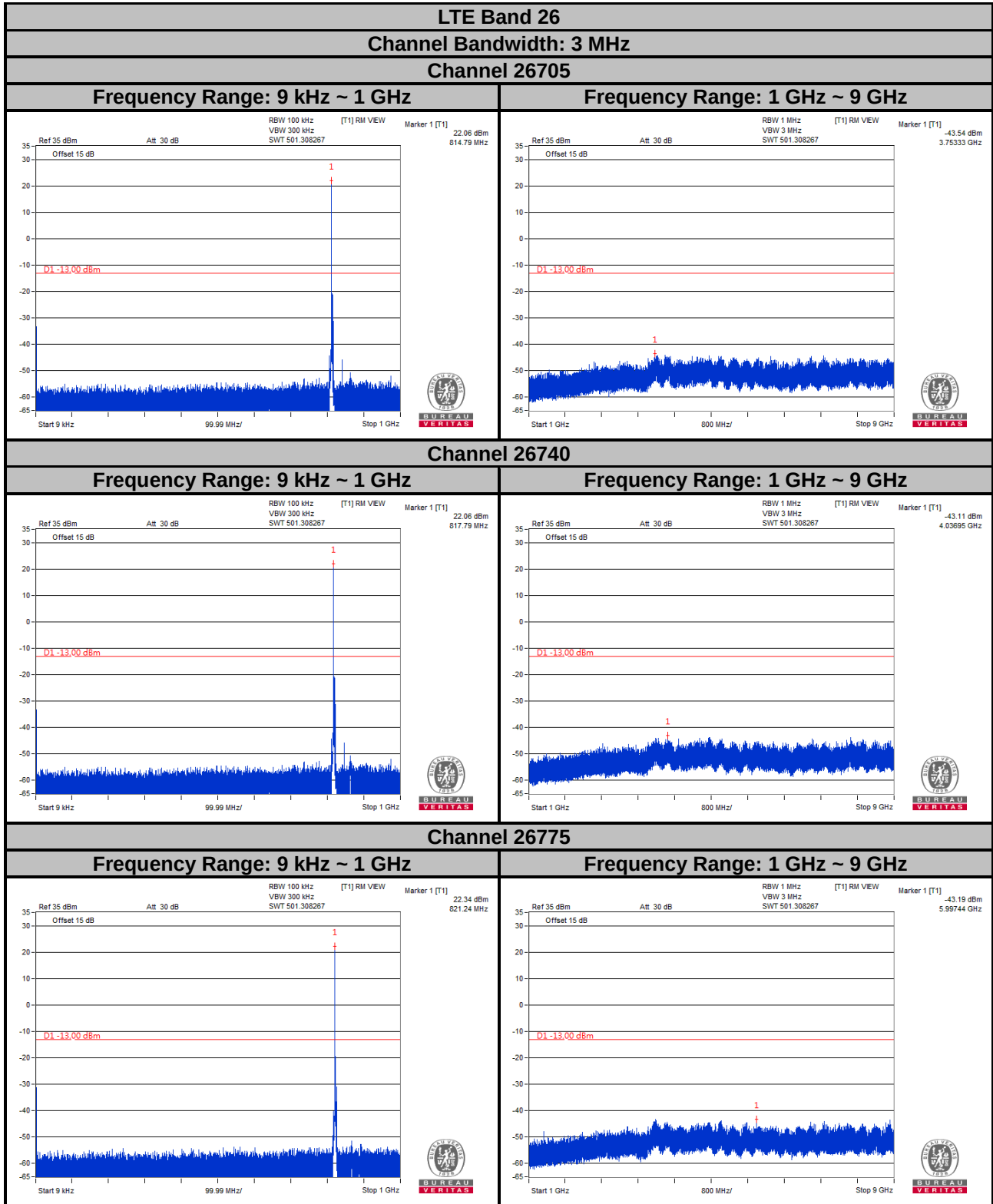
### 4.6.3 Test Procedure

- 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 are used for conducted emission measurement.
- Measuring frequency range is from 1 GHz to 9 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.

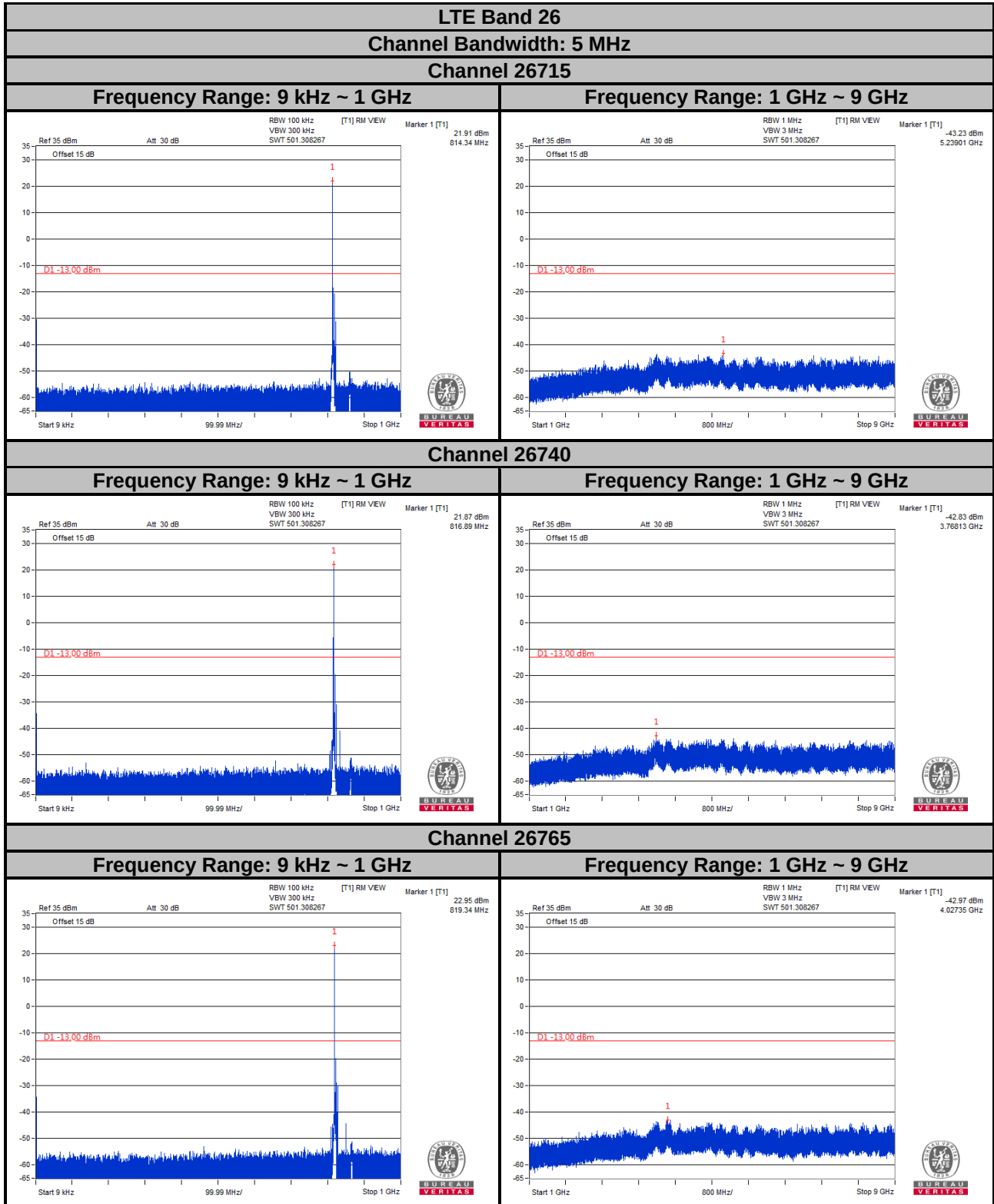
#### 4.6.4 Test Results



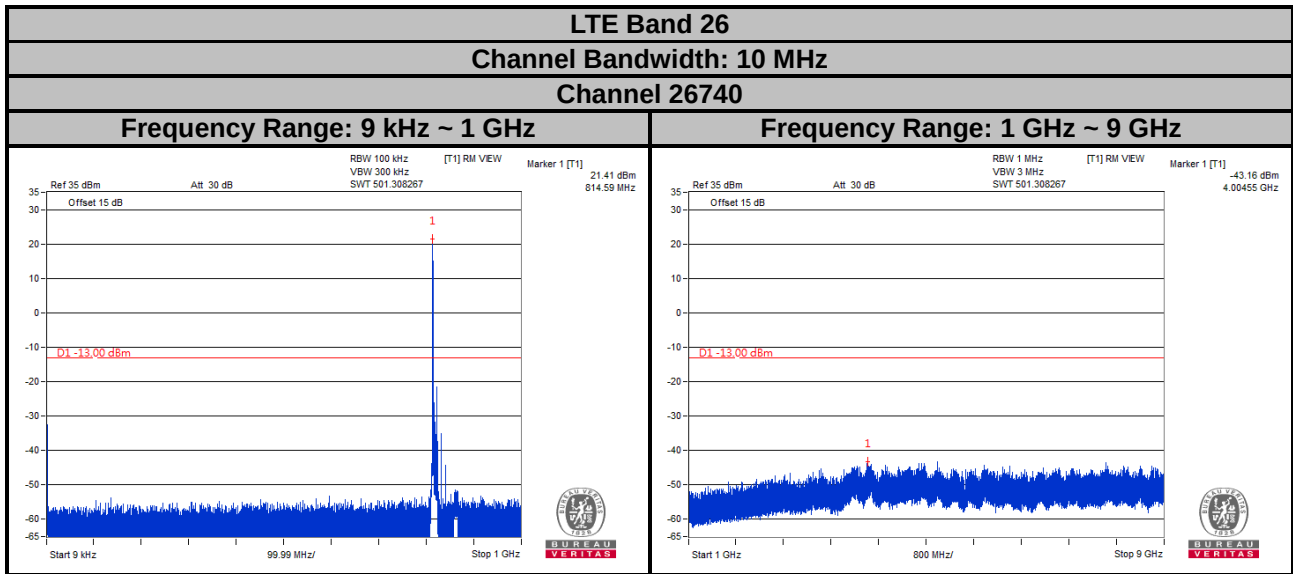
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



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.

## 4.7 Radiated Emission Measurement

### 4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. The limit of emission is equal to -13 dBm.

### 4.7.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
- c. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dB. Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. – Tx cable loss. Measurement method refers to ANSI C63.26 section 5.5.3.2.

#### Note:

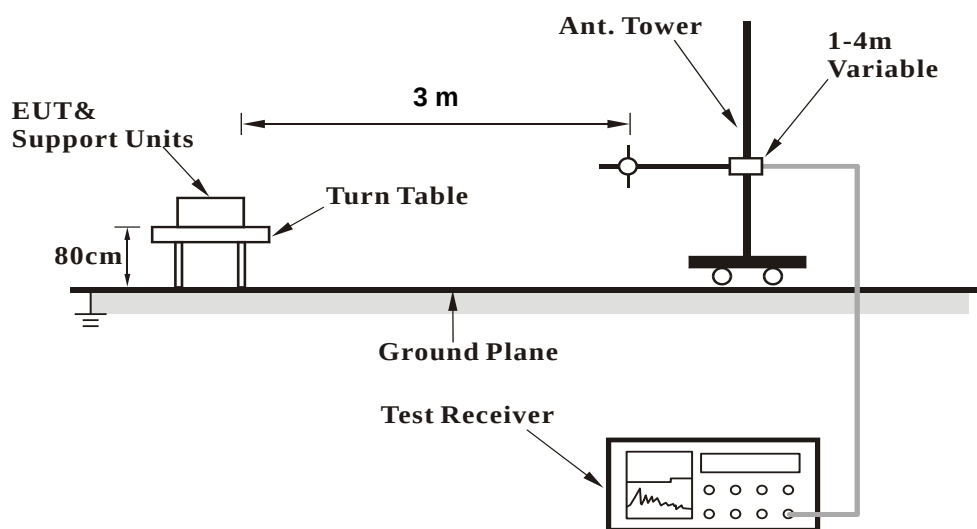
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:  
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report

### 4.7.3 Deviation from Test Standard

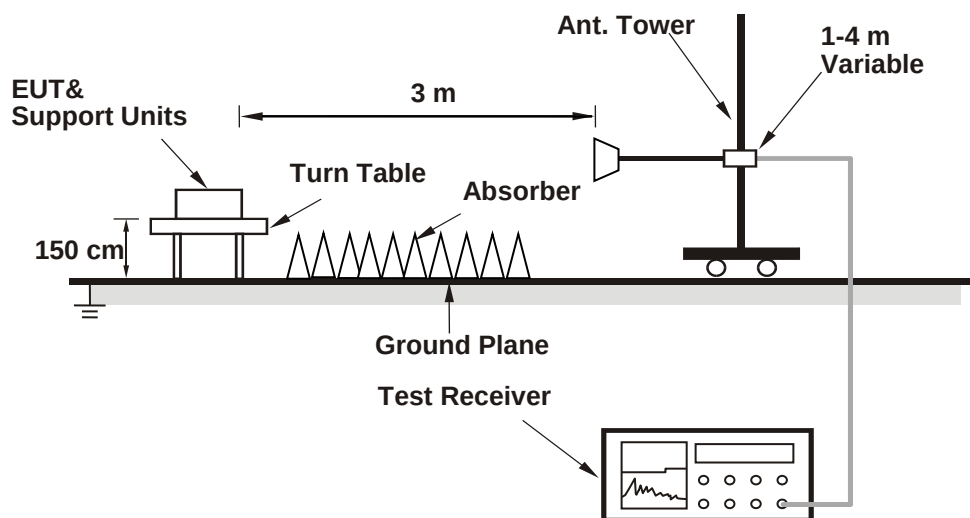
No deviation.

#### 4.7.4 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).

#### 4.7.5 Test Results

LTE Band 26

Channel Bandwidth: 1.4 MHz / QPSK

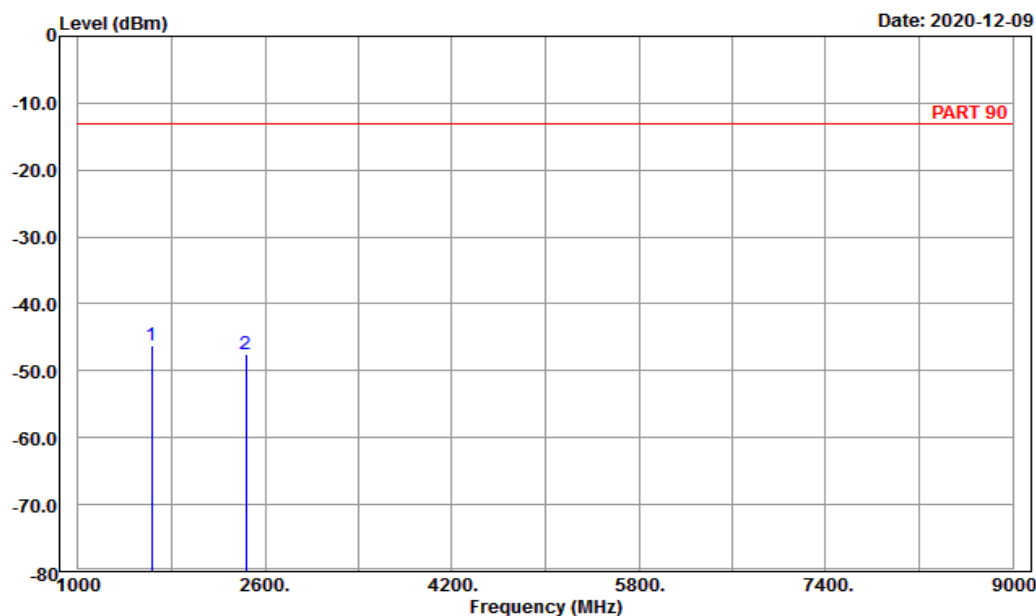
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
Condition: PART 90 Horizontal  
Remark : LTE\_Band 26\_Link\_L-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1 pp | 1632.00 | -46.30 | -53.86     | 7.56   | -13.00     | -33.30     | Peak   |
| 2    | 2440.00 | -47.52 | -58.52     | 11.00  | -13.00     | -34.52     | Peak   |

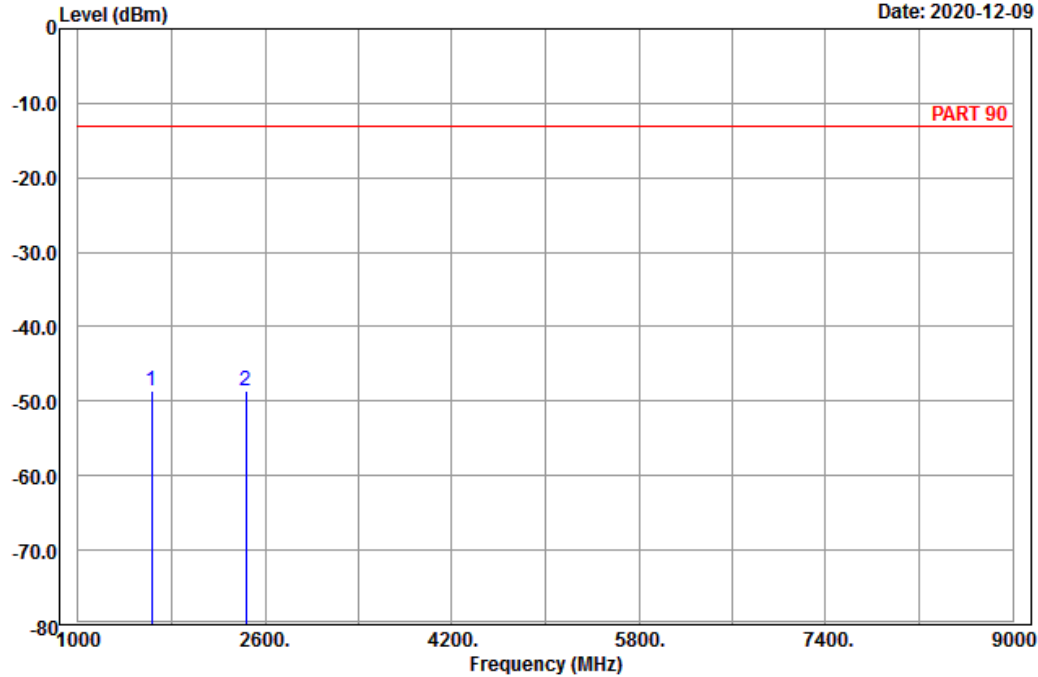


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Vertical  
Remark : LTE\_Band 26\_Link\_L-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1 pp | 1632.00 | -48.52 | -56.08     | 7.56   | -13.00     | -35.52     | Peak   |
| 2    | 2440.00 | -48.67 | -59.67     | 11.00  | -13.00     | -35.67     | Peak   |

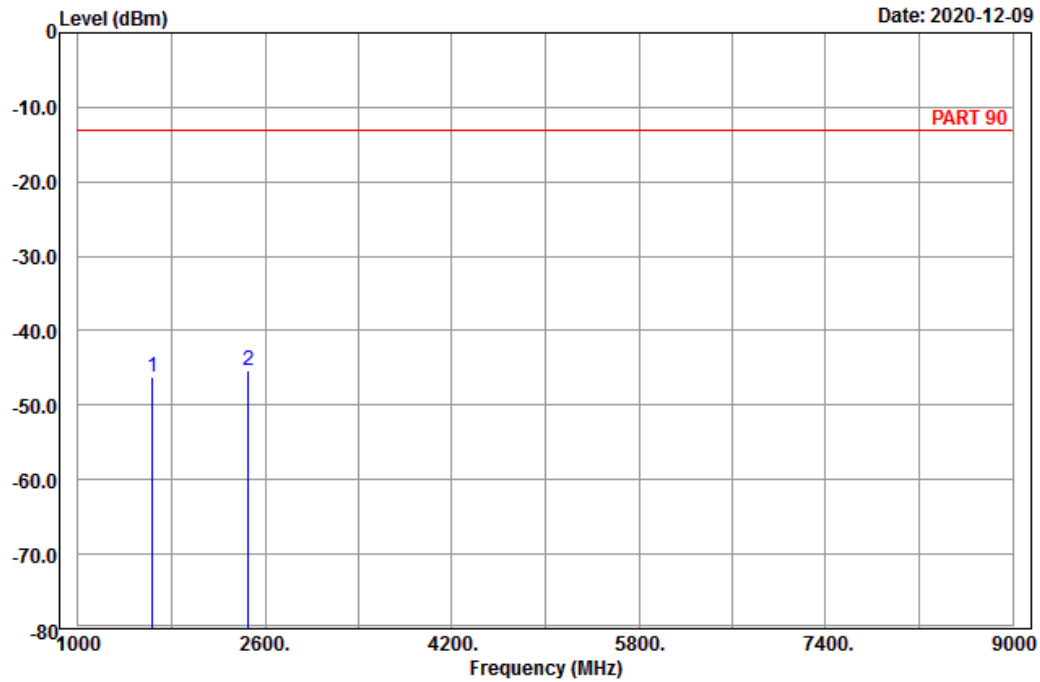
## Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_M-Ch  
 Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1    | 1638.00 | -46.27 | -53.83     | 7.56   | -13.00     | -33.27     | Peak   |
| 2 pp | 2457.00 | -45.32 | -56.34     | 11.02  | -13.00     | -32.32     | Peak   |

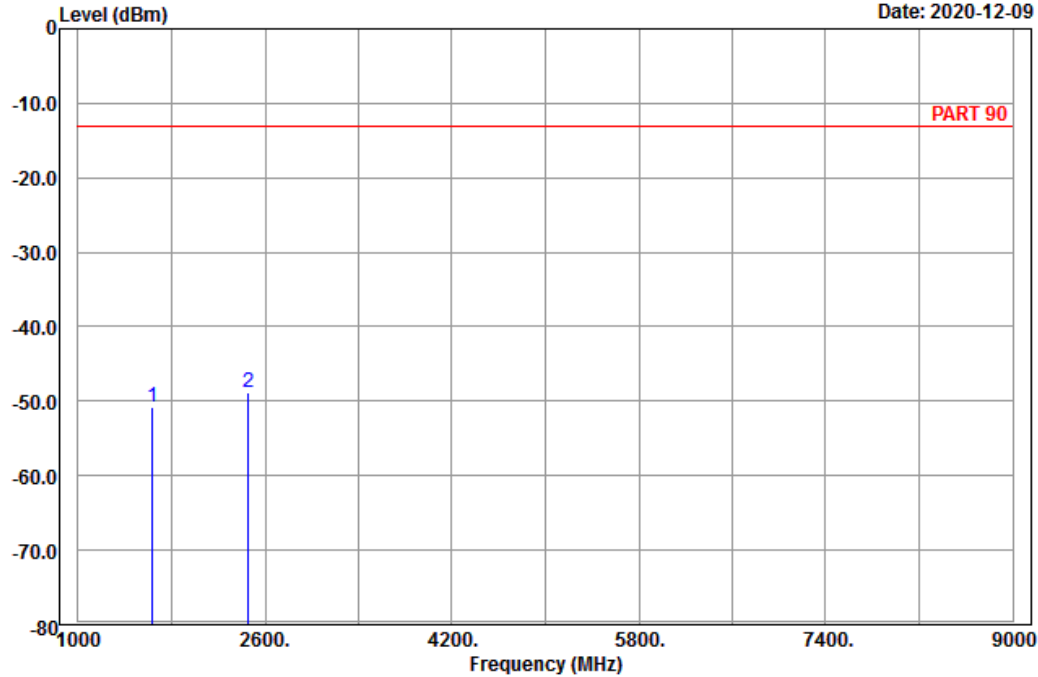


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Vertical  
Remark : LTE\_Band 26\_Link\_M-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1    | 1638.00 | -50.76 | -58.32     | 7.56   | -13.00     | -37.76     | Peak   |
| 2 pp | 2457.00 | -48.74 | -59.76     | 11.02  | -13.00     | -35.74     | Peak   |

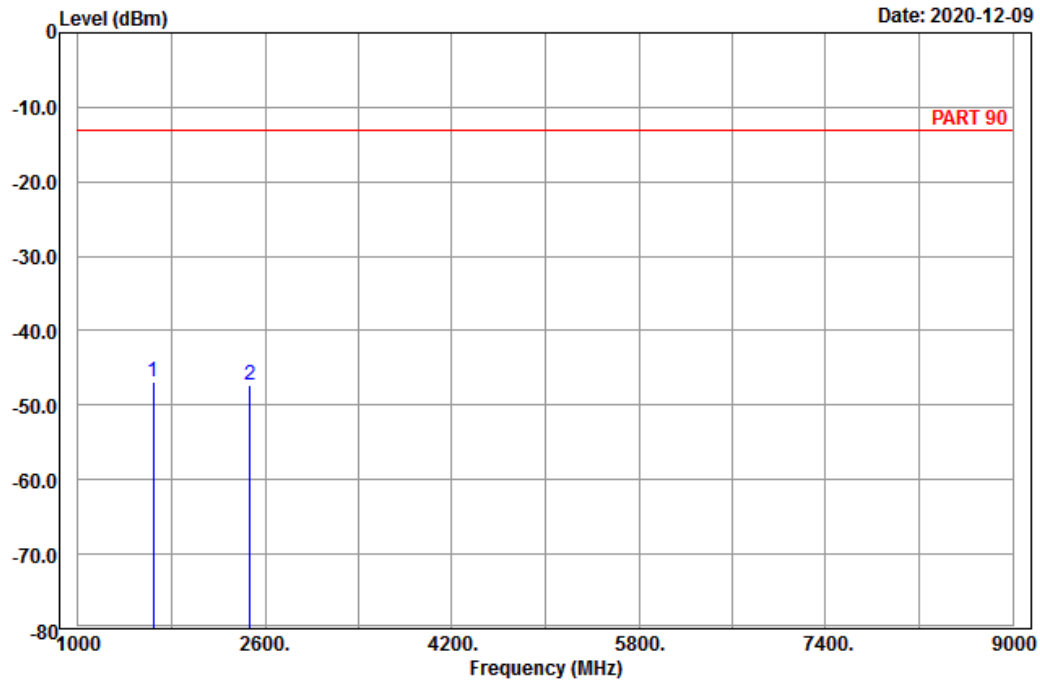
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
Condition: PART 90 Horizontal  
Remark : LTE\_Band 26\_Link\_H-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read<br>Level | Factor | Limit<br>Line | Over<br>Limit | Remark |
|------|---------|--------|---------------|--------|---------------|---------------|--------|
|      | MHz     | dBm    | dBm           | dB     | dBm           | dB            |        |
| 1 pp | 1646.60 | -46.88 | -54.61        | 7.73   | -13.00        | -33.88        | Peak   |
| 2    | 2469.90 | -47.34 | -58.37        | 11.03  | -13.00        | -34.34        | Peak   |

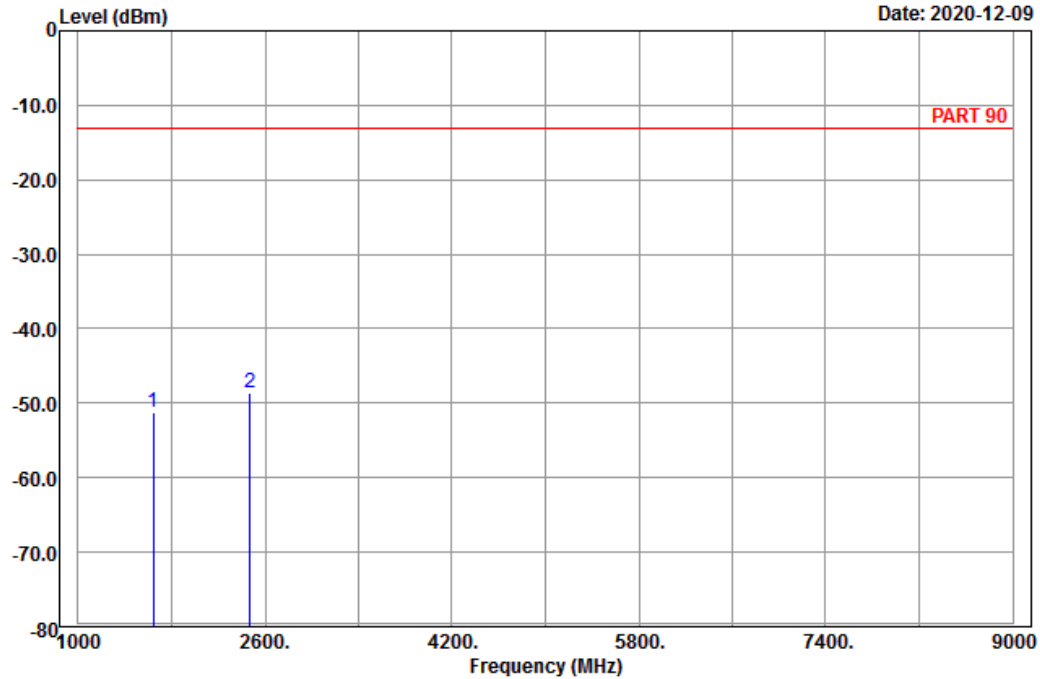


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Vertical  
Remark : LTE\_Band 26\_Link\_H-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1    | 1646.60 | -51.23 | -58.96     | 7.73   | -13.00     | -38.23     | Peak   |
| 2 pp | 2469.90 | -48.66 | -59.69     | 11.03  | -13.00     | -35.66     | Peak   |

Channel Bandwidth: 5 MHz / QPSK  
Low Channel

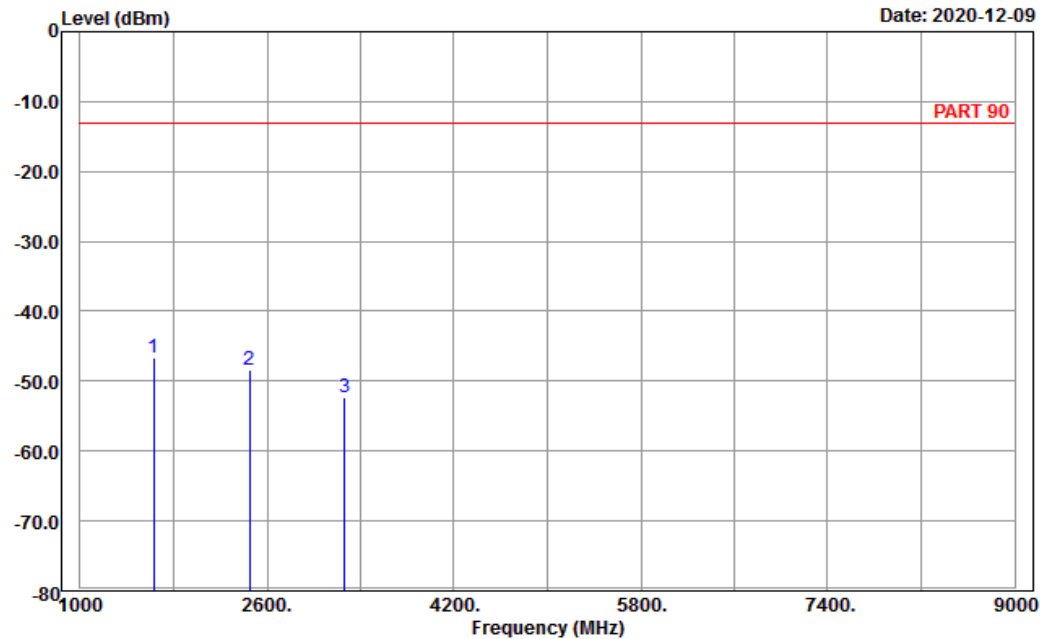


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Horizontal  
Remark : LTE\_Band 26\_Link\_L-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read<br>Level | Factor | Limit<br>Line | Over<br>Limit | Remark |
|------|---------|--------|---------------|--------|---------------|---------------|--------|
|      | MHz     | dBm    | dBm           | dB     | dBm           | dB            |        |
| 1 pp | 1633.00 | -46.60 | -54.16        | 7.56   | -13.00        | -33.60        | Peak   |
| 2    | 2449.50 | -48.37 | -59.39        | 11.02  | -13.00        | -35.37        | Peak   |
| 3    | 3266.00 | -52.42 | -66.56        | 14.14  | -13.00        | -39.42        | Peak   |

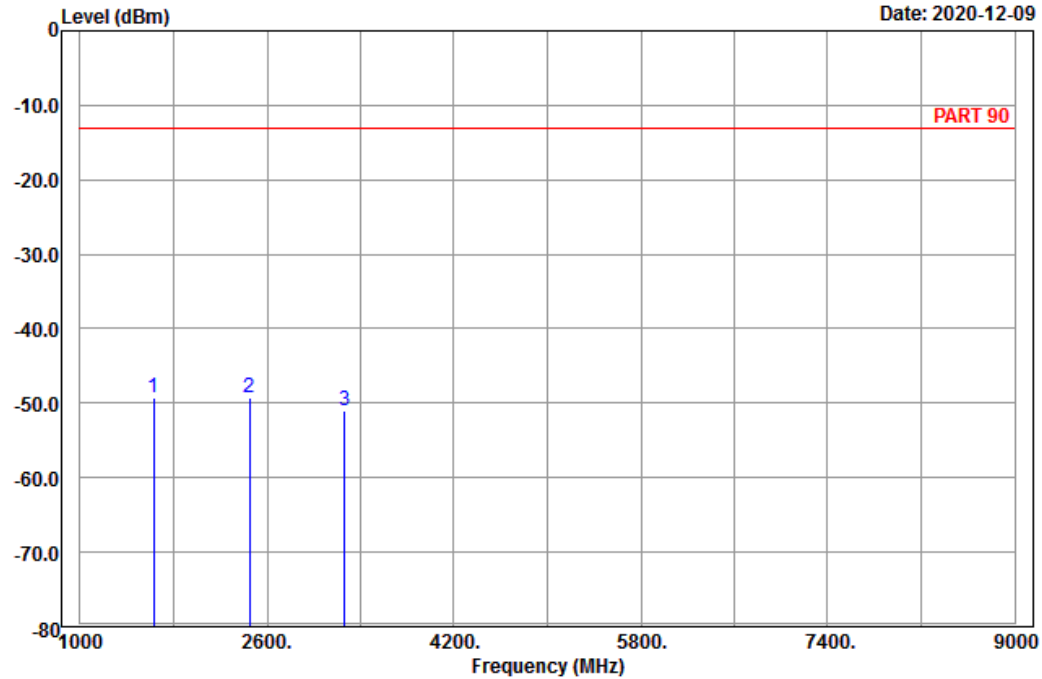


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Vertical  
Remark : LTE\_Band 26\_Link\_L-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1 pp | 1633.00 | -49.22 | -56.78     | 7.56   | -13.00     | -36.22     | Peak   |
| 2    | 2449.50 | -49.33 | -60.35     | 11.02  | -13.00     | -36.33     | Peak   |
| 3    | 3266.00 | -50.95 | -65.09     | 14.14  | -13.00     | -37.95     | Peak   |

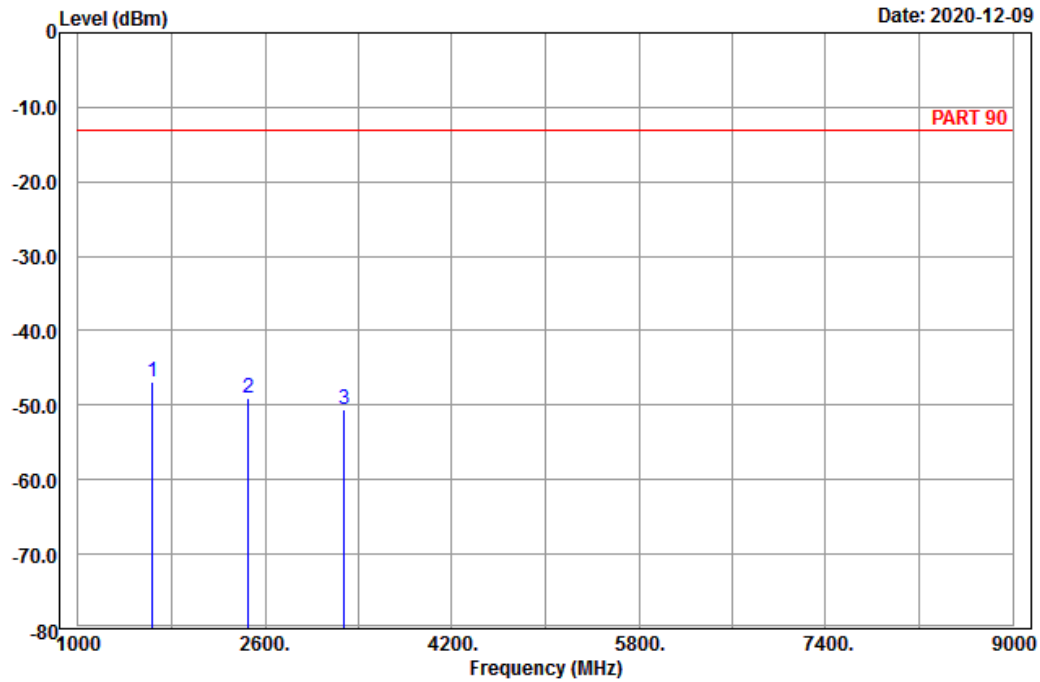
## Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
Condition: PART 90 Horizontal  
Remark : LTE\_Band 26\_Link\_M-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1 pp | 1638.00 | -46.88 | -54.44     | 7.56   | -13.00     | -33.88     | Peak   |
| 2    | 2457.00 | -49.12 | -60.14     | 11.02  | -13.00     | -36.12     | Peak   |
| 3    | 3276.00 | -50.66 | -64.80     | 14.14  | -13.00     | -37.66     | Peak   |

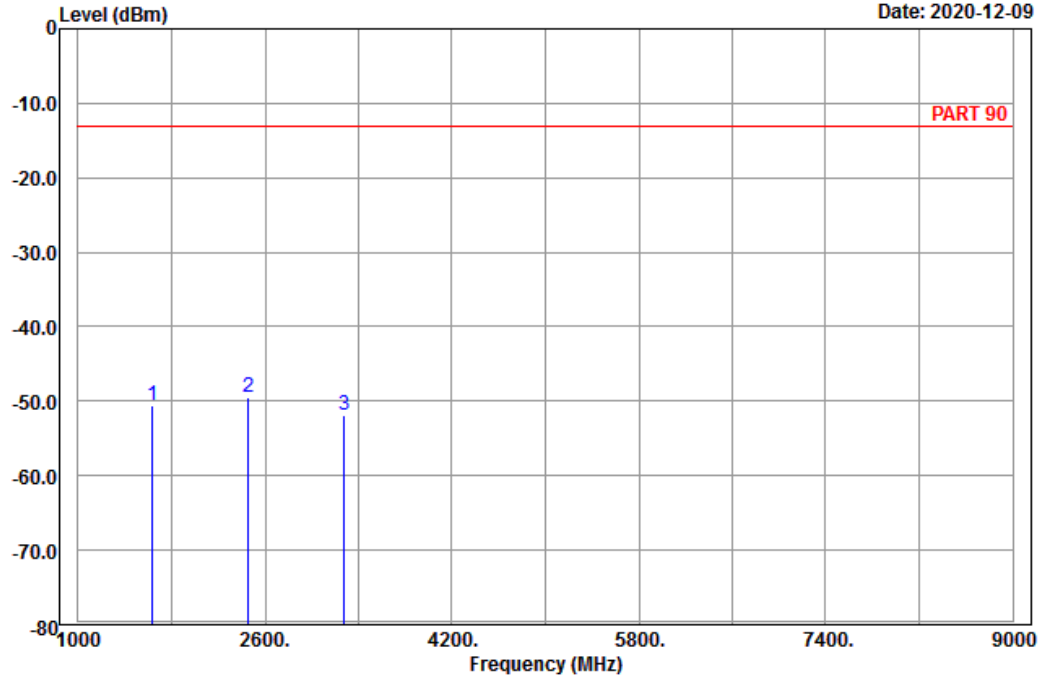


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Vertical  
Remark : LTE\_Band 26\_Link\_M-Ch  
Tested by: Karl Lee

|   | Freq       | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|---|------------|--------|------------|--------|------------|------------|--------|
|   | MHz        | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1 | 1638.00    | -50.63 | -58.19     | 7.56   | -13.00     | -37.63     | Peak   |
| 2 | pp 2457.00 | -49.57 | -60.59     | 11.02  | -13.00     | -36.57     | Peak   |
| 3 | 3276.00    | -51.81 | -65.95     | 14.14  | -13.00     | -38.81     | Peak   |

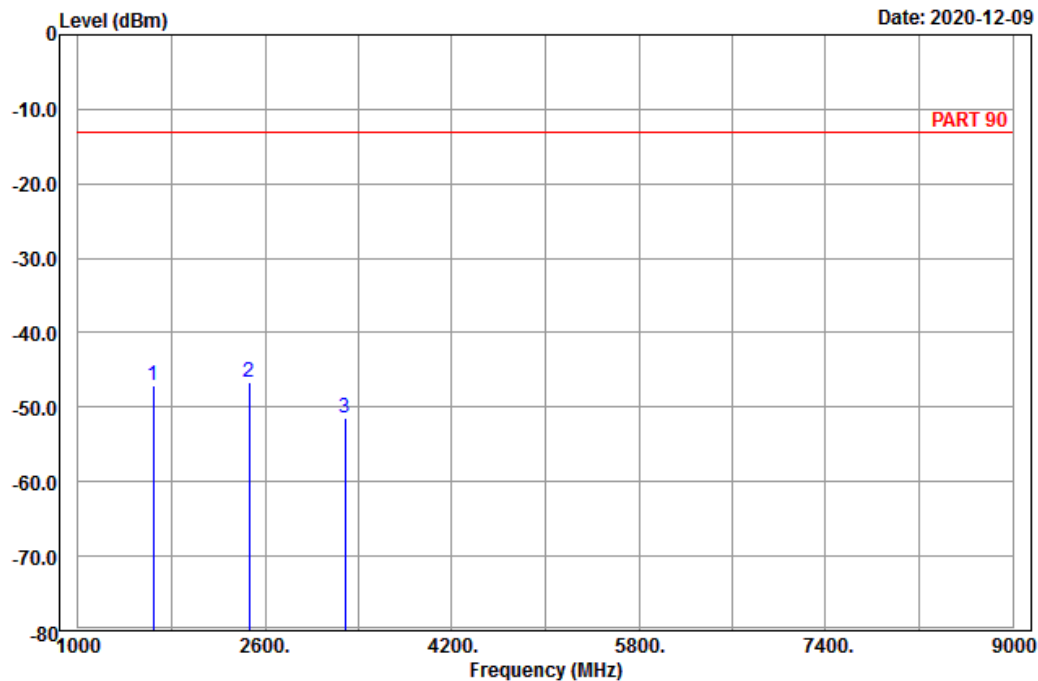
## High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 90 Horizontal  
 Remark : LTE\_Band 26\_Link\_H-Ch  
 Tested by: Karl Lee

|   | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|---|---------|--------|------------|--------|------------|------------|--------|
|   | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1 | 1643.00 | -47.10 | -54.83     | 7.73   | -13.00     | -34.10     | Peak   |
| 2 | 2464.50 | -46.58 | -57.60     | 11.02  | -13.00     | -33.58     | Peak   |
| 3 | 3286.00 | -51.48 | -65.70     | 14.22  | -13.00     | -38.48     | Peak   |

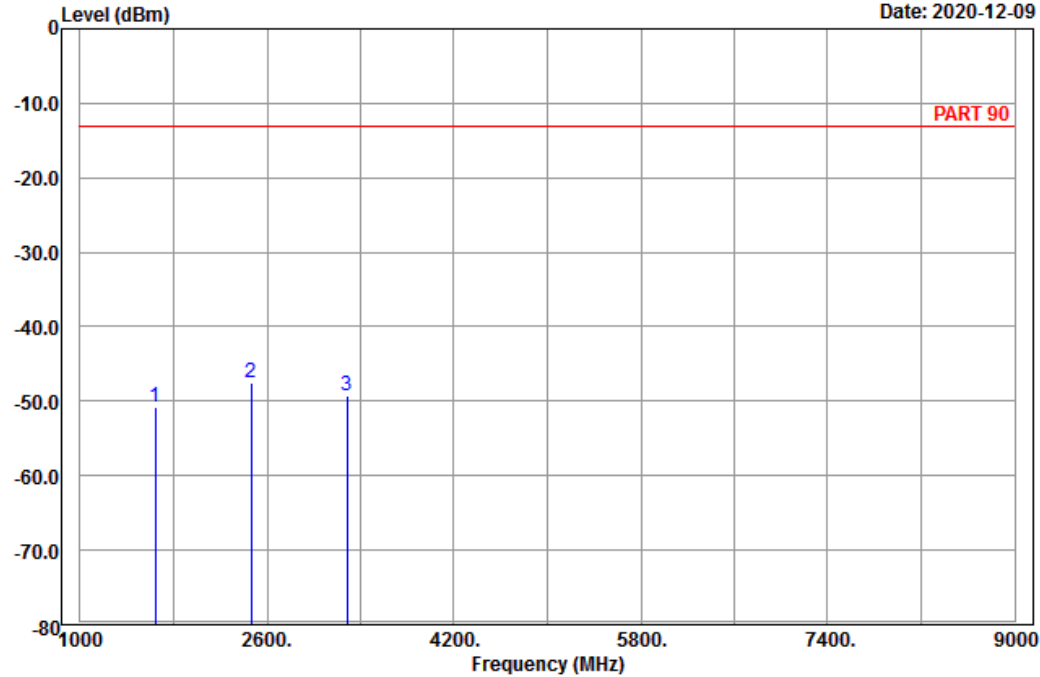


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Vertical  
Remark : LTE\_Band 26\_Link\_H-Ch  
Tested by: Karl Lee

|   | Freq       | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|---|------------|--------|------------|--------|------------|------------|--------|
|   | MHz        | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1 | 1643.00    | -50.77 | -58.50     | 7.73   | -13.00     | -37.77     | Peak   |
| 2 | pp 2464.50 | -47.60 | -58.62     | 11.02  | -13.00     | -34.60     | Peak   |
| 3 | 3286.00    | -49.37 | -63.59     | 14.22  | -13.00     | -36.37     | Peak   |

Channel Bandwidth: 10 MHz / QPSK  
Middle Channel

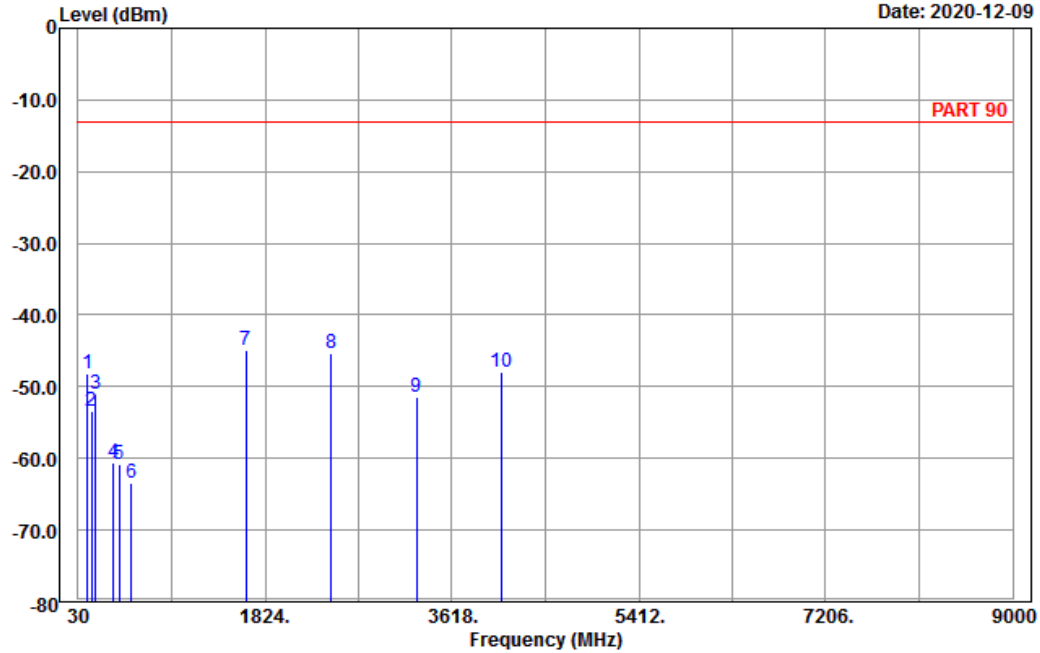


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 7

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Horizontal  
Remark : LTE\_Band 26\_Link\_M-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1    | 122.34  | -48.23 | -40.10     | -8.13  | -13.00     | -35.23     | Peak   |
| 2    | 155.01  | -53.51 | -45.70     | -7.81  | -13.00     | -40.51     | Peak   |
| 3    | 200.10  | -51.11 | -44.93     | -6.18  | -13.00     | -38.11     | Peak   |
| 4    | 367.90  | -60.56 | -56.11     | -4.45  | -13.00     | -47.56     | Peak   |
| 5    | 422.50  | -60.85 | -57.60     | -3.25  | -13.00     | -47.85     | Peak   |
| 6    | 540.10  | -63.47 | -61.10     | -2.37  | -13.00     | -50.47     | Peak   |
| 7 pp | 1638.00 | -45.00 | -52.56     | 7.56   | -13.00     | -32.00     | Peak   |
| 8    | 2457.00 | -45.43 | -56.45     | 11.02  | -13.00     | -32.43     | Peak   |
| 9    | 3276.00 | -51.50 | -65.64     | 14.14  | -13.00     | -38.50     | Peak   |
| 10   | 4095.00 | -47.98 | -64.93     | 16.95  | -13.00     | -34.98     | Peak   |

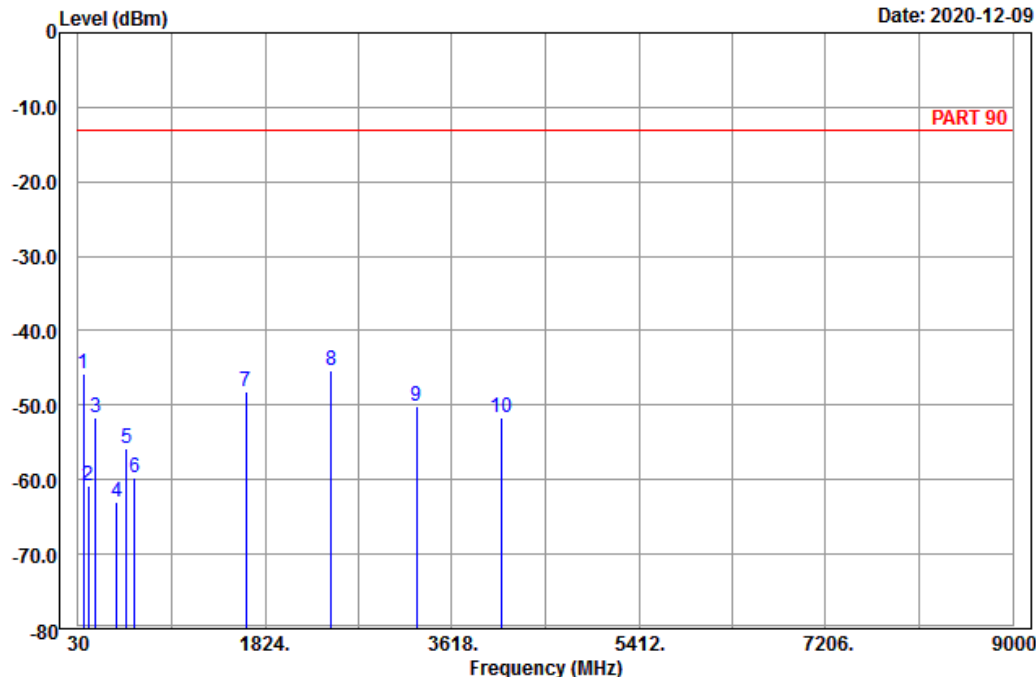


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 8

Date: 2020-12-09



Site : 966 chamber 1  
Condition: PART 90 Vertical  
Remark : LTE\_Band 26\_Link\_M-Ch  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Factor | Limit Line | Over Limit | Remark |
|------|---------|--------|------------|--------|------------|------------|--------|
|      | MHz     | dBm    | dBm        | dB     | dBm        | dB         |        |
| 1    | 79.68   | -45.70 | -33.85     | -11.85 | -13.00     | -32.70     | Peak   |
| 2    | 128.82  | -60.81 | -53.10     | -7.71  | -13.00     | -47.81     | Peak   |
| 3    | 199.83  | -51.62 | -45.44     | -6.18  | -13.00     | -38.62     | Peak   |
| 4    | 398.00  | -62.90 | -60.06     | -2.84  | -13.00     | -49.90     | Peak   |
| 5    | 491.10  | -55.80 | -50.79     | -5.01  | -13.00     | -42.80     | Peak   |
| 6    | 573.00  | -59.81 | -59.11     | -0.70  | -13.00     | -46.81     | Peak   |
| 7    | 1638.00 | -48.22 | -55.78     | 7.56   | -13.00     | -35.22     | Peak   |
| 8 pp | 2457.00 | -45.27 | -56.29     | 11.02  | -13.00     | -32.27     | Peak   |
| 9    | 3276.00 | -50.09 | -64.23     | 14.14  | -13.00     | -37.09     | Peak   |
| 10   | 4095.00 | -51.69 | -68.64     | 16.95  | -13.00     | -38.69     | Peak   |

## 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.

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

**Lin Kou EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

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

Tel: 886-3-6668565

Fax: 886-3-6668323

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

Tel: 886-3-3183232

Fax: 886-3-3270892

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

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

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

--- END ---