# Partial FCC Test Report

# (PART 24)

| | |
|---|---|
| **Report No.:** | RF180709C05B-6 |
| **FCC ID:** | S9E-EM7455 |
| **Test Model:** | EM7455 |
| **Received Date:** | Jul. 09, 2018 |
| **Test Date:** | Aug. 03, 2018 ~ Aug. 07, 2018 |
| **Issued Date:** | Aug. 28, 2018 |
| **Applicant:** | Trimble Navigation Limited |
| **Address:** | 345 SW Avery Ave Corvallis, Oregon, United States, 97333 |
| **Issued By:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch |
| **Lab Address:** | No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan ( R.O.C ) |
| **Test Location (1):** | No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil, Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C) |
| **Test Location (2):** | No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C |
| **FCC Registration / Designation Number:** | 427177 / TW0011 |

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## Release Control Record

| Issue No. | Description | Date Issued |
|---|---|---|
| RF180709C05B-6 | Original Release | Aug. 28, 2018 |

## 1 Certificate of Conformity

**Product:** Wireless Modules

**Brand:** Trimble

**Test Model:** EM7455

**Sample Status:** Engineering Sample

**Applicant:** Trimble Navigation Limited

**Test Date:** Aug. 03, 2018 ~ Aug. 07, 2018

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

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

**Prepared by :** _____ , **Date:** Aug. 28, 2018

Ivonne Wu / Supervisor

**Approved by :** _____ , **Date:** Aug. 28, 2018

Dylan Chiou / Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 24 & Part 2 | | | |
|---|---|---|---|
| **FCC Clause** | **Test Item** | **Result** | **Remarks** |
| 2.1046<br>24.232 | Effective Isotropic Radiated Power | Pass | Meet the requirement of limit. |
| 2.1047 | Modulation Characteristics | N/A | Refer to Note |
| 2.1046<br>24.232(d) | Peak to Average Ratio | N/A | Refer to Note |
| 2.1055<br>24.235 | Frequency Stability | N/A | Refer to Note |
| 2.1049<br>24.238(b) | Occupied Bandwidth | N/A | Refer to Note |
| 24.238(b) | Band Edge Measurements | N/A | Refer to Note |
| 2.1051<br>24.238 | Conducted Spurious Emissions | N/A | Refer to Note |
| 2.1053<br>24.238 | Radiated Spurious Emissions | Pass | Meet the requirement of limit.<br>Minimum passing margin is -33.30 dB at 3765.00 MHz. |

Note: Only test item of E.I.R.P. and Radiated Spurious Emissions tests were performed for this addendum. For other test data, refer to module report No.: B15W50341-FCC-RF_Rev1.

### 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 | Expended Uncertainty (k=2) (±) |
|---|---|---|
| Radiated Emissions up to 1 GHz | 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 | N9010A | MY52220314 | Nov. 24, 2017 | Nov. 23, 2018 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ | FSU43 | 101261 | Jan. 11, 2018 | Jan. 10, 2019 |
| HORN Antenna<br>ETS-Lindgren | 3117 | 00143293 | Dec. 13, 2017 | Dec. 12, 2018 |
| BILOG Antenna<br>SCHWARZBECK | VULB 9168 | 9168-616 | Dec. 14, 2017 | Dec. 13, 2018 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9170 | 9170-480 | Dec. 01, 2017 | Nov. 30, 2018 |
| Fixed Attenuator<br>Mini-Circuits | 00801A1GGAM02Y | NA | May 17, 2018 | May 16, 2019 |
| MXG Vector signal generator<br>Agilent | N5182B | MY53050430 | Oct. 24, 2017 | Oct. 23, 2018 |
| Preamplifier<br>Agilent | 310N | 187226 | Jun. 19, 2018 | Jun. 18, 2019 |
| Preamplifier<br>Agilent | 83017A | MY39501357 | Jun. 19, 2018 | Jun. 18, 2019 |
| RF signal cable<br>ETS-LINDGREN | 5D-FB | Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400) | Jun. 19, 2018 | Jun. 18, 2019 |
| RF signal cable<br>ETS-LINDGREN | 8D-FB | Cable-CH1-02(RFC-SMS-100-SMS-24) | Jun. 19, 2018 | Jun. 18, 2019 |
| 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 Controller<br>MF | MF-7802 | NA | NA | NA |
| Communications Tester-Wireless<br>Agilent | 8960 Series 10 | MY53201073 | Jun. 28, 2017 | Jun. 27, 2019 |
| Radio Communication Analyzer<br>Anritsu | MT8820C | 6201010284 | Dec. 28, 2017 | Dec. 27, 2018 |

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. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The IC Site Registration No. is IC7450I-1.

## 3 General Information

### 3.1 General Description of EUT

| | | |
|---|---|---|
| **Product** | Wireless Modules | |
| **Brand** | Trimble | |
| **Test Model** | EM7455 | |
| **Status of EUT** | Engineering Sample | |
| **Power Supply Rating** | 19 Vdc (Adapter)<br>7.27 Vdc (Battery) | |
| **Modulation Type** | WCDMA | QPSK |
| | LTE | QPSK, 16QAM |
| **Frequency Range** | WCDMA | 1852.4 ~ 1907.6 MHz |
| | LTE Band 2 (Channel Bandwidth: 1.4 MHz) | 1850.7 ~ 1909.3 MHz |
| | LTE Band 2 (Channel Bandwidth: 3 MHz) | 1851.5 ~ 1908.5 MHz |
| | LTE Band 2 (Channel Bandwidth: 5 MHz) | 1852.5 ~ 1907.5 MHz |
| | LTE Band 2 (Channel Bandwidth: 10 MHz) | 1855.0 ~ 1905.0 MHz |
| | LTE Band 2 (Channel Bandwidth: 15 MHz) | 1857.5 ~ 1902.5 MHz |
| | LTE Band 2 (Channel Bandwidth: 20 MHz) | 1860.0 ~ 1900.0 MHz |
| | LTE Band 25 (Channel Bandwidth: 1.4 MHz) | 1850.7 ~ 1914.3 MHz |
| | LTE Band 25 (Channel Bandwidth: 3 MHz) | 1851.5 ~ 1913.5 MHz |
| | LTE Band 25 (Channel Bandwidth: 5 MHz) | 1852.5 ~ 1912.5 MHz |
| | LTE Band 25 (Channel Bandwidth: 10 MHz) | 1855.0 ~ 1910.0 MHz |
| | LTE Band 25 (Channel Bandwidth: 15 MHz) | 1857.5 ~ 1907.5 MHz |
| | LTE Band 25 (Channel Bandwidth: 20 MHz) | 1860.0 ~ 1905.0 MHz |
| **Max. EIRP Power** | WCDMA | 313.33 mW |
| | LTE Band 2 (Channel Bandwidth: 1.4 MHz) | 207.01 mW |
| | LTE Band 2 (Channel Bandwidth: 3 MHz) | 207.97 mW |
| | LTE Band 2 (Channel Bandwidth: 5 MHz) | 212.47 mW |
| | LTE Band 2 (Channel Bandwidth: 10 MHz) | 216.27 mW |
| | LTE Band 2 (Channel Bandwidth: 15 MHz) | 207.01 mW |
| | LTE Band 2 (Channel Bandwidth: 20 MHz) | 251.36 mW |
| | LTE Band 25 (Channel Bandwidth: 1.4 MHz) | 275.61 mW |
| | LTE Band 25 (Channel Bandwidth: 3 MHz) | 278.80 mW |
| | LTE Band 25 (Channel Bandwidth: 5 MHz) | 281.38 mW |
| | LTE Band 25 (Channel Bandwidth: 10 MHz) | 283.99 mW |
| | LTE Band 25 (Channel Bandwidth: 15 MHz) | 285.96 mW |
| | LTE Band 25 (Channel Bandwidth: 20 MHz) | 288.60 mW |
| **Antenna Type** | Coupling Antenna | |
| **Antenna Gain** | WCDMA | 0.06 dBi (Main) / 0.37 dBi (Aux.) |
| | LTE 2 | 0.06 dBi (Main) / 0.37 dBi (Aux.) |
| | LTE 25 | 0.88 dBi (Main) / -0.34 dBi (Aux.) |
| **Accessory Device** | Refer to Note as below | |
| **Data Cable Supplied** | Refer to Note as below | |

Note:

1. The EUT is authorized for use in specified End-product. Please refer to below for more details.

| Product | Brand Name | Model Name |
|---|---|---|
| Handheld PC | Trimble | 121600 |

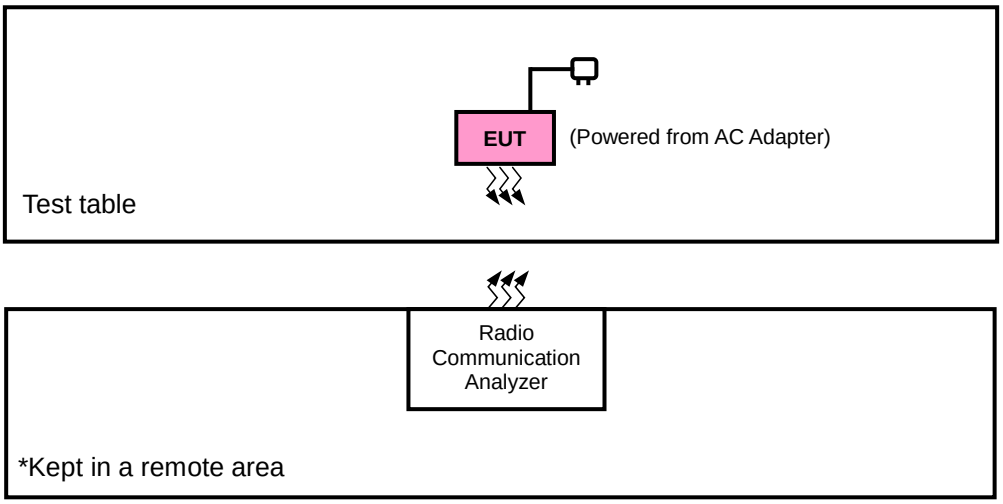
2. The end-product contains following accessory devices.

| Product | Brand | Model | Description |
|---|---|---|---|
| Adapter | DELTA Electronics, INC. | ADP-90MD H | I/P: 100-240 Vac, 50-60 Hz, 1.5 A<br>O/P: 19 Vdc, 4.74 A<br>1.75m shielded cable with 1 core |
| Battery | Trimble | 121300 | 7.27 Vdc, 3150 mAh, 22.9Wh |
| BT/WLAN Module | AzureWave | AW-CB260NF | -- |

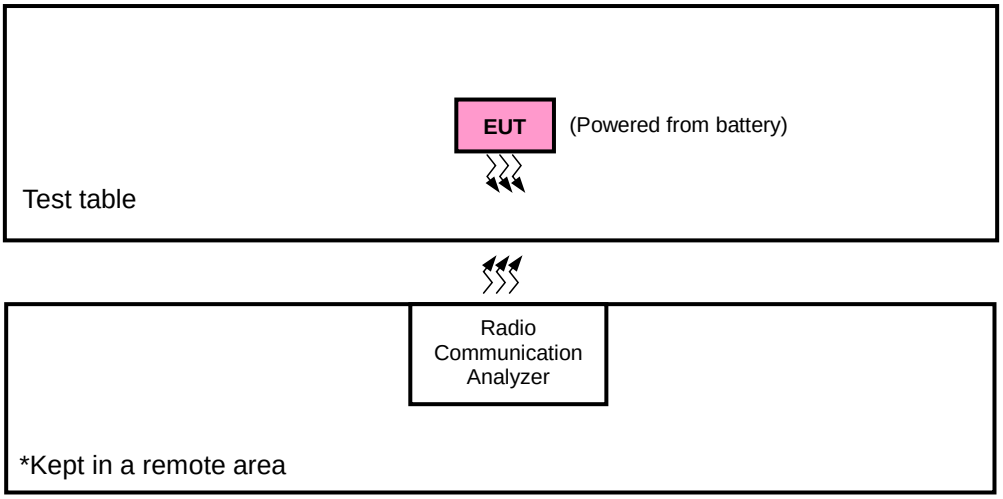
3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

## 3.2 Configuration of System under Test

**<Radiated Emission Test>**




**<E.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:

| Band | EIRP | Radiated Emission |
|---|---|---|
| **WCDMA** | X-plane | Z-axis |
| **LTE Band 2** | Z-plane | Y-axis |
| **LTE Band 25** | Z-plane | Y-axis |

**WCDMA**

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Mode |
|---|---|---|---|---|
| - | EIRP | 9262 to 9538 | 9262, 9400, 9538 | WCDMA |
| - | Radiated Emission | 9262 to 9538 | 9262, 9400, 9538 | WCDMA |

**LTE Band 2**

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation | Mode |
|---|---|---|---|---|---|---|
| - | EIRP | 18607 to 19193 | 18607, 18900, 19193 | 1.4 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18615 to 19185 | 18615, 18900, 19185 | 3 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18650 to 19150 | 18650, 18900, 19150 | 10 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18675 to 19125 | 18675, 18900, 19125 | 15 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| - | Radiated Emission | 18607 to 19193 | 18607, 18900, 19193 | 1.4 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20 MHz | QPSK | 1 RB / 0 RB Offset |

**Note:** This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

**LTE Band 25**

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation | Mode |
|---|---|---|---|---|---|---|
| - | EIRP | 26047 to 26683 | 26047, 26365, 26683 | 1.4 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 26055 to 26675 | 26055, 26365, 26675 | 3 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 26065 to 26665 | 26065, 26365, 26665 | 5 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 26090 to 26640 | 26090, 26365, 26640 | 10 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 26115 to 26615 | 26115, 26365, 26615 | 15 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 26140 to 26590 | 26140, 26365, 26590 | 20 MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| - | Radiated Emission | 18607 to 19193 | 18607, 18900, 19193 | 1.4 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20 MHz | QPSK | 1 RB / 0 RB Offset |

**Note:** This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

**Test Condition:**

| Test Item | Environmental Conditions | Input Power | Tested By |
|---|---|---|---|
| EIRP | 26 deg. C, 58 % RH | 120 Vac, 60 Hz | Karl Lee |
| Radiated Emission | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Karl Lee |

### 3.4 EUT Operating Conditions

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

### 3.5 General Description of Applied Standards

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

**FCC 47 CFR Part 2**
**FCC 47 CFR Part 24**
**KDB 971168 D01 Power Meas License Digital Systems v03r01**
**ANSI/TIA/EIA-603-E 2016**
**ANSI 63.26-2015**

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

# 4 Test Types and Results

## 4.1 Output Power Measurement

### 4.1.1 Limits of Output Power Measurement

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

### 4.1.2 Test Procedures

**EIRP / ERP Measurement:**

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5 MHz for WCDMA and 10 MHz for LTE mode.

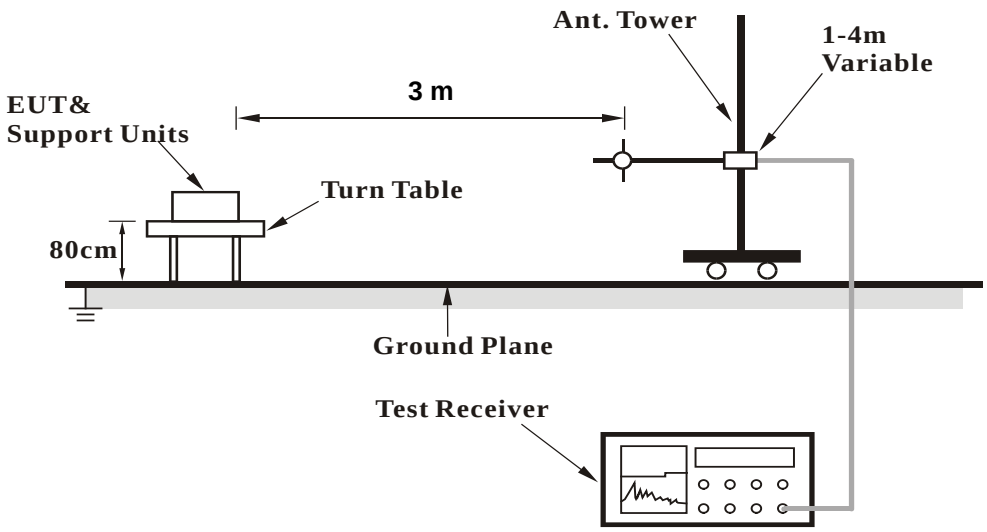
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical 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. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.

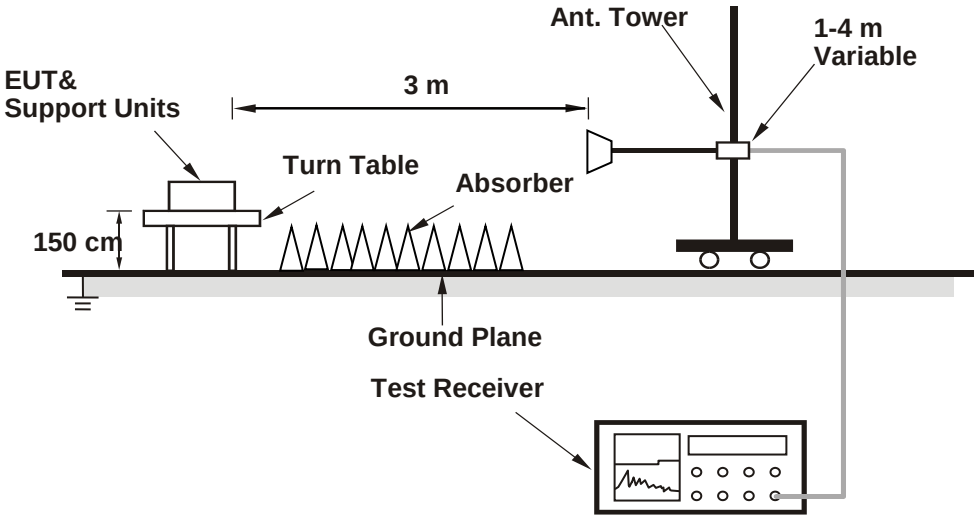
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15 dB.

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).

4.1.4 Test Results

**EIRP Power (dBm)**

| WCDMA | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Plane** | **Channel** | **Frequency (MHz)** | **Reading (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (mW)** | **Polarization (H/V)** |
| **X** | 9262 | 1852.4 | -13.23 | 38.19 | 24.96 | 313.33 | H |
| | 9400 | 1880.0 | -13.94 | 38.70 | 24.76 | 299.23 | |
| | 9538 | 1907.6 | -14.85 | 39.35 | 24.50 | 281.84 | |
| | 9262 | 1852.4 | -17.21 | 38.48 | 21.27 | 133.97 | V |
| | 9400 | 1880.0 | -17.56 | 38.59 | 21.03 | 126.77 | |
| | 9538 | 1907.6 | -17.71 | 38.87 | 21.16 | 130.62 | |

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

| LTE Band 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Channel Bandwidth: 1.4 MHz / QPSK** | | | | | | | |
| **Plane** | **Channel** | **Frequency (MHz)** | **Reading (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (mW)** | **Polarization (H/V)** |
| **Z** | 18607 | 1850.7 | -21.65 | 44.70 | 23.05 | 201.84 | H |
| | 18900 | 1880.0 | -21.54 | 44.70 | 23.16 | 207.01 | |
| | 19193 | 1909.3 | -21.42 | 44.57 | 23.15 | 206.68 | |
| | 18607 | 1850.7 | -23.01 | 44.27 | 21.26 | 133.66 | V |
| | 18900 | 1880.0 | -23.33 | 44.87 | 21.55 | 142.72 | |
| | 19193 | 1909.3 | -23.51 | 44.61 | 21.10 | 128.91 | |
| **Channel Bandwidth: 1.4 MHz / 16QAM** | | | | | | | |
| **Z** | 18607 | 1850.7 | -22.35 | 44.70 | 22.35 | 171.79 | H |
| | 18900 | 1880.0 | -22.54 | 44.70 | 22.16 | 164.40 | |
| | 19193 | 1909.3 | -22.03 | 44.57 | 22.55 | 179.80 | |
| | 18607 | 1850.7 | -23.45 | 44.27 | 20.83 | 120.92 | V |
| | 18900 | 1880.0 | -24.53 | 44.87 | 20.34 | 108.14 | |
| | 19193 | 1909.3 | -24.57 | 44.61 | 20.04 | 101.00 | |

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

| LTE Band 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 3 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 18615 | 1851.5 | -21.62 | 44.70 | 23.08 | 203.24 | H |
| | 18900 | 1880.0 | -21.52 | 44.70 | 23.18 | 207.97 | |
| | 19185 | 1908.5 | -21.41 | 44.57 | 23.16 | 207.16 | |
| | 18615 | 1851.5 | -22.58 | 44.27 | 21.69 | 147.57 | V |
| | 18900 | 1880.0 | -22.97 | 44.87 | 21.90 | 154.90 | |
| | 19185 | 1908.5 | -23.26 | 44.61 | 21.35 | 136.55 | |
| Channel Bandwidth: 3 MHz / 16QAM | | | | | | | |
| Z | 18615 | 1851.5 | -22.65 | 44.70 | 22.05 | 160.32 | H |
| | 18900 | 1880.0 | -22.42 | 44.70 | 22.28 | 169.04 | |
| | 19185 | 1908.5 | -22.10 | 44.57 | 22.47 | 176.73 | |
| | 18615 | 1851.5 | -23.91 | 44.27 | 20.36 | 108.64 | V |
| | 18900 | 1880.0 | -24.25 | 44.87 | 20.62 | 115.35 | |
| | 19185 | 1908.5 | -24.37 | 44.61 | 20.24 | 105.75 | |

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

| LTE Band 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 5 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 18625 | 1852.5 | -21.65 | 44.70 | 23.05 | 201.84 | H |
| | 18900 | 1880.0 | -21.52 | 44.70 | 23.18 | 207.97 | |
| | 19175 | 1907.5 | -21.30 | 44.57 | 23.27 | 212.47 | |
| | 18625 | 1852.5 | -22.85 | 44.27 | 21.42 | 138.68 | V |
| | 18900 | 1880.0 | -23.22 | 44.87 | 21.65 | 146.22 | |
| | 19175 | 1907.5 | -23.42 | 44.61 | 21.19 | 131.61 | |
| Channel Bandwidth: 5 MHz / 16QAM | | | | | | | |
| Z | 18625 | 1852.5 | -22.41 | 44.70 | 22.29 | 169.43 | H |
| | 18900 | 1880.0 | -22.62 | 44.70 | 22.08 | 161.44 | |
| | 19175 | 1907.5 | -22.27 | 44.57 | 22.30 | 169.98 | |
| | 18625 | 1852.5 | -23.99 | 44.27 | 20.28 | 106.68 | V |
| | 18900 | 1880.0 | -24.31 | 44.87 | 20.56 | 113.76 | |
| | 19175 | 1907.5 | -24.25 | 44.61 | 20.36 | 108.72 | |

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

| LTE Band 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 10 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 18650 | 1855.0 | -21.35 | 44.70 | 23.35 | 216.27 | H |
| | 18900 | 1880.0 | -21.52 | 44.70 | 23.18 | 207.97 | |
| | 19150 | 1905.0 | -21.48 | 44.57 | 23.10 | 204.08 | |
| | 18650 | 1855.0 | -22.85 | 44.27 | 21.42 | 138.68 | V |
| | 18900 | 1880.0 | -23.41 | 44.87 | 21.46 | 139.96 | |
| | 19150 | 1905.0 | -23.26 | 44.61 | 21.35 | 136.55 | |
| Channel Bandwidth: 10 MHz / 16QAM | | | | | | | |
| Z | 18650 | 1855.0 | -22.54 | 44.70 | 22.16 | 164.44 | H |
| | 18900 | 1880.0 | -22.59 | 44.70 | 22.11 | 162.55 | |
| | 19150 | 1905.0 | -22.14 | 44.57 | 22.43 | 175.11 | |
| | 18650 | 1855.0 | -23.76 | 44.27 | 20.51 | 112.46 | V |
| | 18900 | 1880.0 | -24.10 | 44.87 | 20.77 | 119.40 | |
| | 19150 | 1905.0 | -24.23 | 44.61 | 20.39 | 109.33 | |

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

| LTE Band 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 15 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 18675 | 1857.5 | -21.62 | 44.70 | 23.08 | 203.24 | H |
| | 18900 | 1880.0 | -21.54 | 44.70 | 23.16 | 207.01 | |
| | 19125 | 1902.5 | -21.44 | 44.57 | 23.13 | 205.68 | |
| | 18675 | 1857.5 | -22.87 | 44.27 | 21.40 | 138.04 | V |
| | 18900 | 1880.0 | -23.21 | 44.87 | 21.66 | 146.55 | |
| | 19125 | 1902.5 | -23.35 | 44.61 | 21.26 | 133.75 | |
| Channel Bandwidth: 15 MHz / 16QAM | | | | | | | |
| Z | 18675 | 1857.5 | -22.61 | 44.70 | 22.09 | 161.81 | H |
| | 18900 | 1880.0 | -22.14 | 44.70 | 22.56 | 180.22 | |
| | 19125 | 1902.5 | -22.14 | 44.57 | 22.43 | 175.11 | |
| | 18675 | 1857.5 | -23.82 | 44.27 | 20.45 | 110.92 | V |
| | 18900 | 1880.0 | -24.22 | 44.87 | 20.65 | 116.14 | |
| | 19125 | 1902.5 | -24.36 | 44.61 | 20.26 | 106.10 | |

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

| LTE Band 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 20 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 18700 | 1860.0 | -21.52 | 44.70 | 23.18 | 207.97 | H |
| | 18900 | 1880.0 | -21.44 | 44.70 | 23.26 | 211.84 | |
| | 19100 | 1900.0 | -20.57 | 44.57 | 24.00 | 251.36 | |
| | 18700 | 1860.0 | -22.85 | 44.27 | 21.42 | 138.61 | V |
| | 18900 | 1880.0 | -23.34 | 44.87 | 21.53 | 142.36 | |
| | 19100 | 1900.0 | -23.28 | 44.61 | 21.33 | 135.93 | |
| Channel Bandwidth: 20 MHz / 16QAM | | | | | | | |
| Z | 18700 | 1860.0 | -22.56 | 44.70 | 22.14 | 163.68 | H |
| | 18900 | 1880.0 | -21.58 | 44.70 | 23.12 | 205.12 | |
| | 19100 | 1900.0 | -22.54 | 44.57 | 22.03 | 159.70 | |
| | 18700 | 1860.0 | -23.81 | 44.27 | 20.46 | 111.17 | V |
| | 18900 | 1880.0 | -24.55 | 44.87 | 20.32 | 107.65 | |
| | 19100 | 1900.0 | -24.61 | 44.61 | 20.00 | 100.07 | |

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

| LTE Band 25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 1.4 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 26047 | 1850.7 | -20.36 | 44.70 | 24.34 | 271.64 | H |
| | 26365 | 1882.5 | -20.33 | 44.70 | 24.37 | 273.53 | |
| | 26683 | 1914.3 | -20.17 | 44.57 | 24.40 | 275.61 | |
| | 26047 | 1850.7 | -22.94 | 44.27 | 21.33 | 135.83 | V |
| | 26365 | 1882.5 | -23.49 | 44.87 | 21.38 | 137.40 | |
| | 26683 | 1914.3 | -23.19 | 44.61 | 21.42 | 138.77 | |
| Channel Bandwidth: 1.4 MHz / 16QAM | | | | | | | |
| Z | 26047 | 1850.7 | -21.37 | 44.70 | 23.33 | 215.28 | H |
| | 26365 | 1882.5 | -21.34 | 44.70 | 23.36 | 216.77 | |
| | 26683 | 1914.3 | -21.18 | 44.57 | 23.39 | 218.42 | |
| | 26047 | 1850.7 | -23.95 | 44.27 | 20.32 | 107.65 | V |
| | 26365 | 1882.5 | -24.50 | 44.87 | 20.37 | 108.89 | |
| | 26683 | 1914.3 | -24.21 | 44.61 | 20.40 | 109.72 | |

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

| LTE Band 25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 3 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 26055 | 1851.5 | -20.32 | 44.70 | 24.38 | 274.16 | H |
| | 26365 | 1882.5 | -20.30 | 44.70 | 24.40 | 275.42 | |
| | 26675 | 1913.5 | -20.12 | 44.57 | 24.45 | 278.80 | |
| | 26055 | 1851.5 | -22.90 | 44.27 | 21.37 | 137.09 | V |
| | 26365 | 1882.5 | -23.45 | 44.87 | 21.42 | 138.68 | |
| | 26675 | 1913.5 | -23.16 | 44.61 | 21.45 | 139.73 | |
| Channel Bandwidth: 3 MHz / 16QAM | | | | | | | |
| Z | 26055 | 1851.5 | -21.33 | 44.70 | 23.37 | 217.27 | H |
| | 26365 | 1882.5 | -21.31 | 44.70 | 23.39 | 218.27 | |
| | 26675 | 1913.5 | -21.13 | 44.57 | 23.44 | 220.95 | |
| | 26055 | 1851.5 | -23.92 | 44.27 | 20.35 | 108.39 | V |
| | 26365 | 1882.5 | -24.45 | 44.87 | 20.42 | 110.15 | |
| | 26675 | 1913.5 | -24.17 | 44.61 | 20.44 | 110.74 | |

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

| LTE Band 25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 5 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 26065 | 1852.5 | -20.28 | 44.70 | 24.42 | 276.69 | H |
| | 26365 | 1882.5 | -20.26 | 44.70 | 24.44 | 277.97 | |
| | 26665 | 1912.5 | -20.08 | 44.57 | 24.49 | 281.38 | |
| | 26065 | 1852.5 | -22.87 | 44.27 | 21.40 | 138.04 | V |
| | 26365 | 1882.5 | -23.42 | 44.87 | 21.45 | 139.64 | |
| | 26665 | 1912.5 | -23.12 | 44.61 | 21.49 | 141.03 | |
| Channel Bandwidth: 5 MHz / 16QAM | | | | | | | |
| Z | 26065 | 1852.5 | -21.29 | 44.70 | 23.41 | 219.28 | H |
| | 26365 | 1882.5 | -21.27 | 44.70 | 23.43 | 220.29 | |
| | 26665 | 1912.5 | -21.08 | 44.57 | 23.49 | 223.51 | |
| | 26065 | 1852.5 | -23.88 | 44.27 | 20.39 | 109.40 | V |
| | 26365 | 1882.5 | -24.43 | 44.87 | 20.44 | 110.66 | |
| | 26665 | 1912.5 | -24.13 | 44.61 | 20.48 | 111.76 | |

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

| LTE Band 25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 10 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 26090 | 1855.0 | -20.23 | 44.70 | 24.47 | 279.90 | H |
| | 26365 | 1882.5 | -20.22 | 44.70 | 24.48 | 280.54 | |
| | 26640 | 1910.0 | -20.04 | 44.57 | 24.53 | 283.99 | |
| | 26090 | 1855.0 | -22.83 | 44.27 | 21.44 | 139.32 | V |
| | 26365 | 1882.5 | -23.38 | 44.87 | 21.49 | 140.93 | |
| | 26640 | 1910.0 | -23.08 | 44.61 | 21.53 | 142.33 | |
| Channel Bandwidth: 10 MHz / 16QAM | | | | | | | |
| Z | 26090 | 1855.0 | -21.24 | 44.70 | 23.46 | 221.82 | H |
| | 26365 | 1882.5 | -21.23 | 44.70 | 23.47 | 222.33 | |
| | 26640 | 1910.0 | -21.05 | 44.57 | 23.52 | 225.06 | |
| | 26090 | 1855.0 | -23.84 | 44.27 | 20.43 | 110.41 | V |
| | 26365 | 1882.5 | -24.39 | 44.87 | 20.48 | 111.69 | |
| | 26640 | 1910.0 | -24.10 | 44.61 | 20.51 | 112.54 | |

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

| LTE Band 25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel Bandwidth: 15 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z | 26115 | 1857.5 | -20.20 | 44.70 | 24.50 | 281.84 | H |
| | 26365 | 1882.5 | -20.18 | 44.70 | 24.52 | 283.14 | |
| | 26615 | 1907.5 | -20.01 | 44.57 | 24.56 | 285.96 | |
| | 26115 | 1857.5 | -22.79 | 44.27 | 21.48 | 140.60 | V |
| | 26365 | 1882.5 | -23.35 | 44.87 | 21.52 | 141.91 | |
| | 26615 | 1907.5 | -23.04 | 44.61 | 21.57 | 143.65 | |
| Channel Bandwidth: 15 MHz / 16QAM | | | | | | | |
| Z | 26115 | 1857.5 | -21.22 | 44.70 | 23.48 | 222.84 | H |
| | 26365 | 1882.5 | -21.20 | 44.70 | 23.50 | 223.87 | |
| | 26615 | 1907.5 | -21.02 | 44.57 | 23.55 | 226.62 | |
| | 26115 | 1857.5 | -23.81 | 44.27 | 20.46 | 111.17 | V |
| | 26365 | 1882.5 | -24.35 | 44.87 | 20.52 | 112.72 | |
| | 26615 | 1907.5 | -24.04 | 44.61 | 20.57 | 114.10 | |

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

| LTE Band 25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Channel Bandwidth: 20 MHz / QPSK** | | | | | | | |
| **Plane** | **Channel** | **Frequency (MHz)** | **Reading (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (mW)** | **Polarization (H/V)** |
| **Z** | 26140 | 1860.0 | -20.16 | 44.70 | 24.54 | 284.45 | H |
| | 26365 | 1882.5 | -20.14 | 44.70 | 24.56 | 285.76 | |
| | 26590 | 1905.0 | -19.97 | 44.57 | 24.60 | 288.60 | |
| | 26140 | 1860.0 | -22.75 | 44.27 | 21.52 | 141.91 | V |
| | 26365 | 1882.5 | -23.32 | 44.87 | 21.55 | 142.89 | |
| | 26590 | 1905.0 | -23.00 | 44.61 | 21.61 | 144.98 | |
| **Channel Bandwidth: 20 MHz / 16QAM** | | | | | | | |
| **Z** | 26140 | 1860.0 | -21.17 | 44.70 | 23.53 | 225.42 | H |
| | 26365 | 1882.5 | -21.15 | 44.70 | 23.55 | 226.46 | |
| | 26590 | 1905.0 | -20.98 | 44.57 | 23.59 | 228.72 | |
| | 26140 | 1860.0 | -23.75 | 44.27 | 20.52 | 112.72 | V |
| | 26365 | 1882.5 | -24.33 | 44.87 | 20.54 | 113.24 | |
| | 26590 | 1905.0 | -24.01 | 44.61 | 20.60 | 114.89 | |

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

## 4.2 Radiated Emission Measurement

### 4.2.1 Limits of Radiated Emission Measurement

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

### 4.2.2 Test Procedure

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

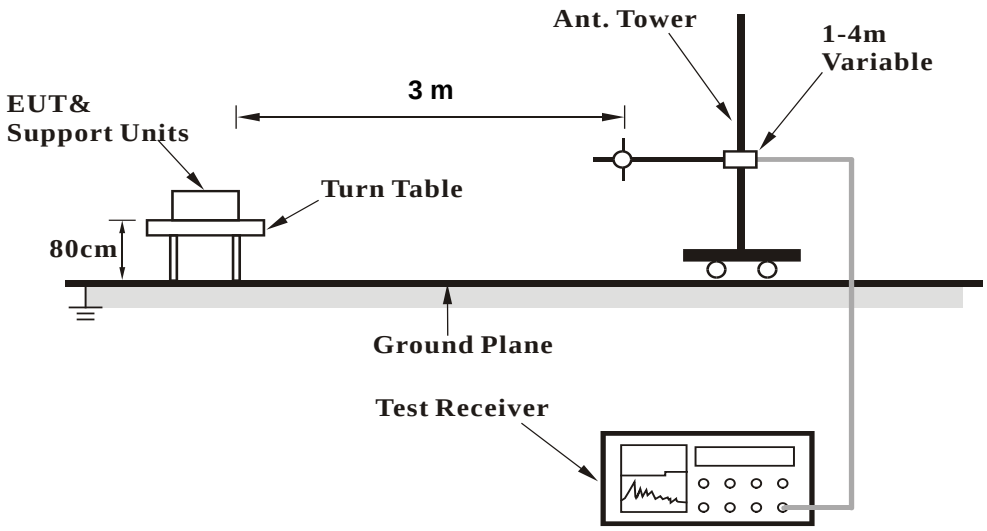
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

### 4.2.3 Deviation from Test Standard

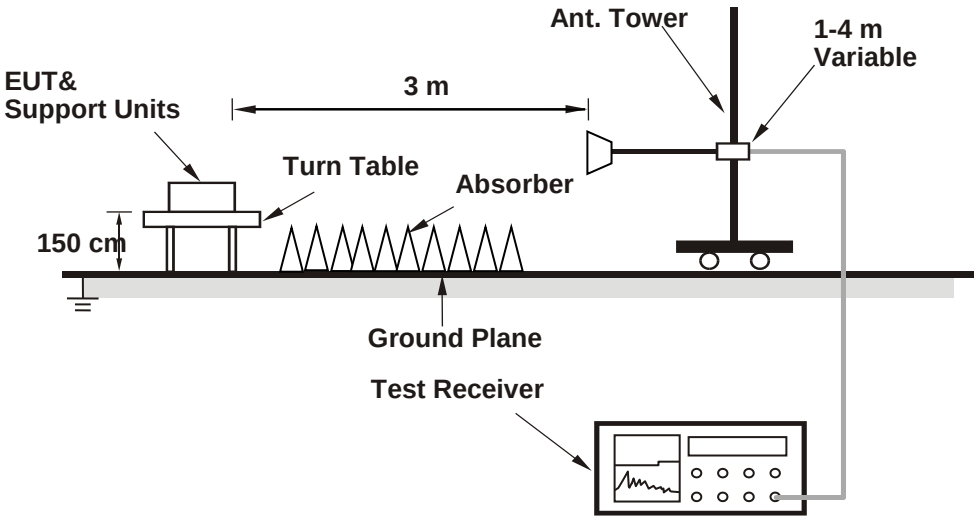
No deviation.

4.2.4 Test Setup

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




**<Radiated Emission above 1 GHz>**



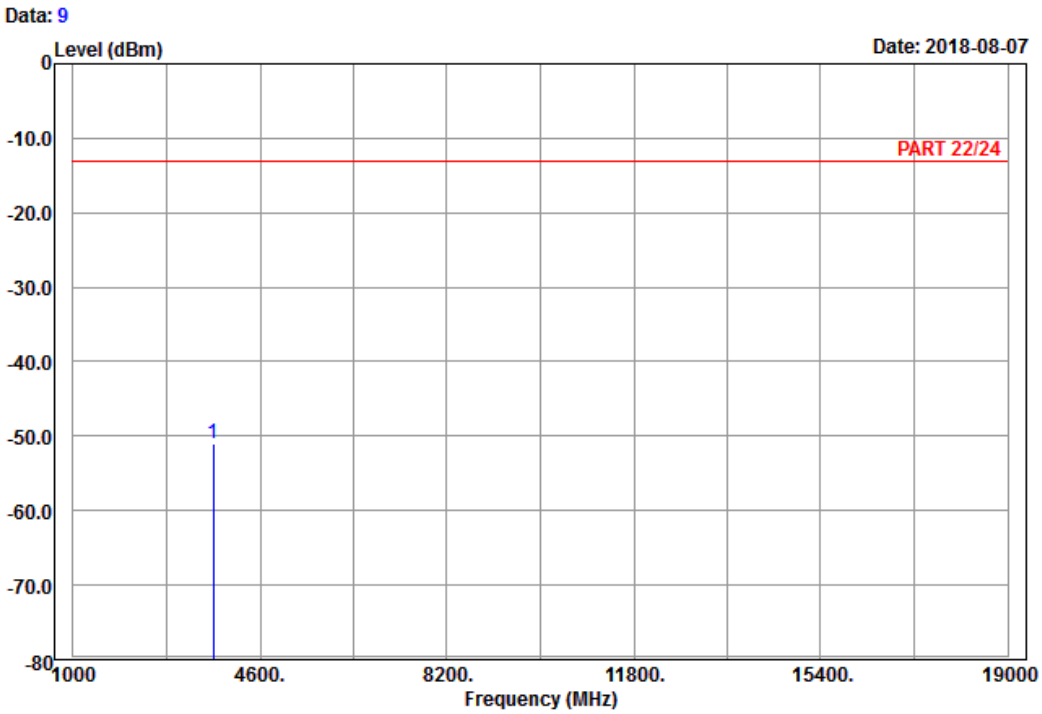

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.5 Test Results

**WCDMA:**

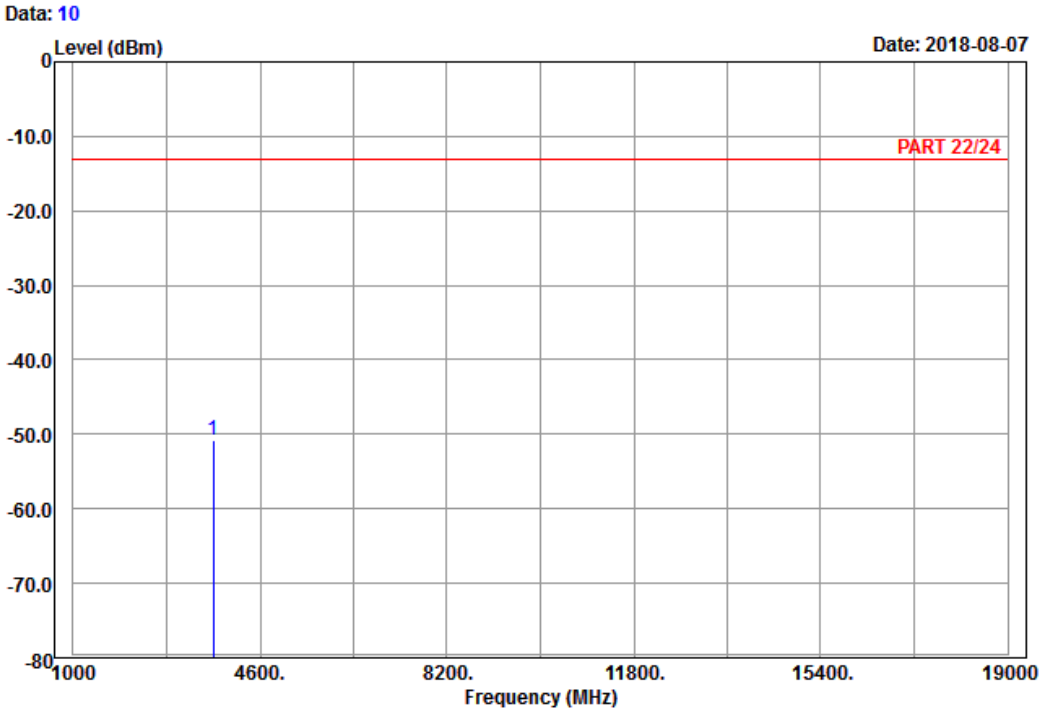
**Low Channel**

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




```
Site      : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark    : Band II_Link_CH9262
Tested by: Karl Lee
                        Read  Limit   Over
          Freq  Level  Level   Line  Limit Factor Remark
      ________ ______ ______ ______ ______ ______ __________
           MHz    dBm    dBm    dBm     dB     dB

  1 pp  3704.80 -50.94 -66.82 -13.00 -37.94  15.88 Peak
```

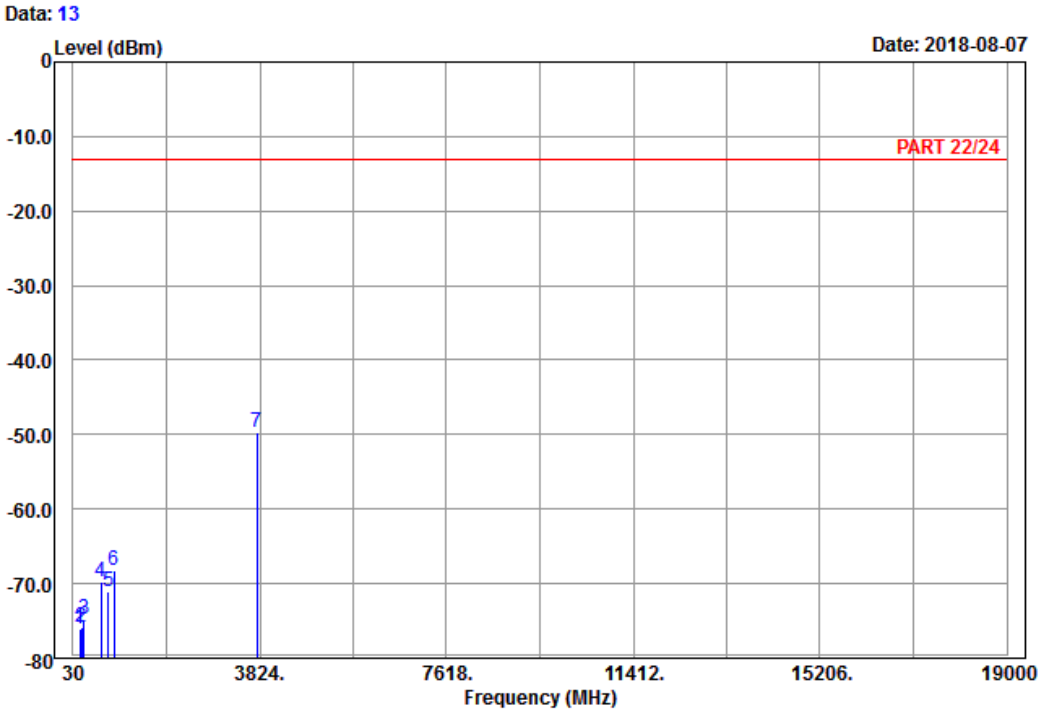



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band II_Link_CH9262
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3704.80 | -50.82 | -66.70 | -13.00 | -37.82 | 15.88 | Peak |

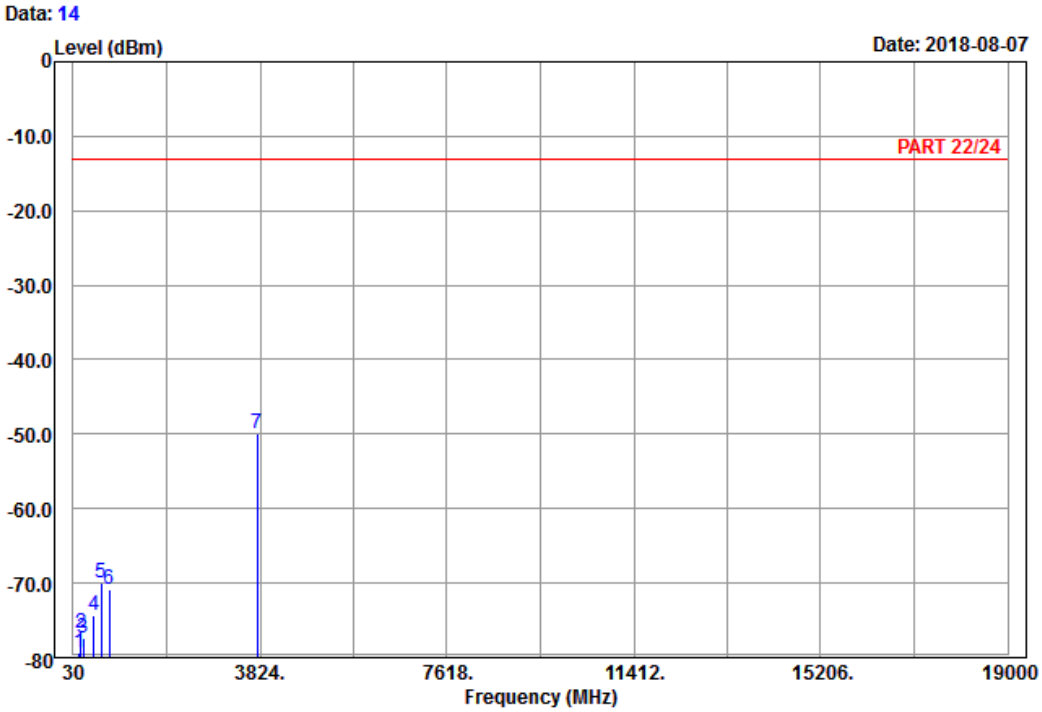
## Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band II_Link_CH9400
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 170.67 | -76.11 | -69.51 | -13.00 | -63.11 | -6.60 | Peak |
| 2 | 201.72 | -75.87 | -69.71 | -13.00 | -62.87 | -6.16 | Peak |
| 3 | 250.05 | -74.82 | -69.31 | -13.00 | -61.82 | -5.51 | Peak |
| 4 | 596.80 | -69.74 | -70.01 | -13.00 | -56.74 | 0.27 | Peak |
| 5 | 744.50 | -71.02 | -69.80 | -13.00 | -58.02 | -1.22 | Peak |
| 6 | 856.50 | -68.15 | -69.79 | -13.00 | -55.15 | 1.64 | Peak |
| 7 pp | 3760.00 | -49.75 | -65.89 | -13.00 | -36.75 | 16.14 | Peak |

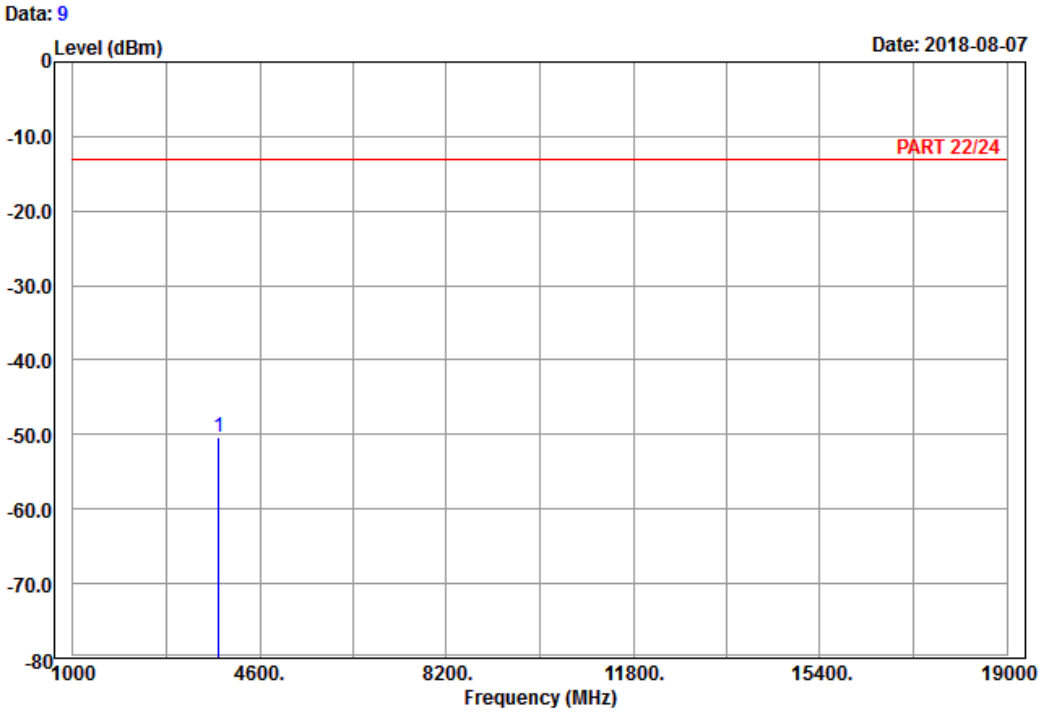



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band II_Link_CH9400
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 153.39 | -79.35 | -71.49 | -13.00 | -66.35 | -7.86 | Peak |
| 2 | 193.35 | -76.73 | -70.86 | -13.00 | -63.73 | -5.87 | Peak |
| 3 | 229.53 | -77.28 | -71.50 | -13.00 | -64.28 | -5.78 | Peak |
| 4 | 451.90 | -74.31 | -70.41 | -13.00 | -61.31 | -3.90 | Peak |
| 5 | 596.80 | -69.95 | -70.22 | -13.00 | -56.95 | 0.27 | Peak |
| 6 | 764.10 | -70.88 | -70.53 | -13.00 | -57.88 | -0.35 | Peak |
| 7 pp | 3760.00 | -50.01 | -66.15 | -13.00 | -37.01 | 16.14 | Peak |

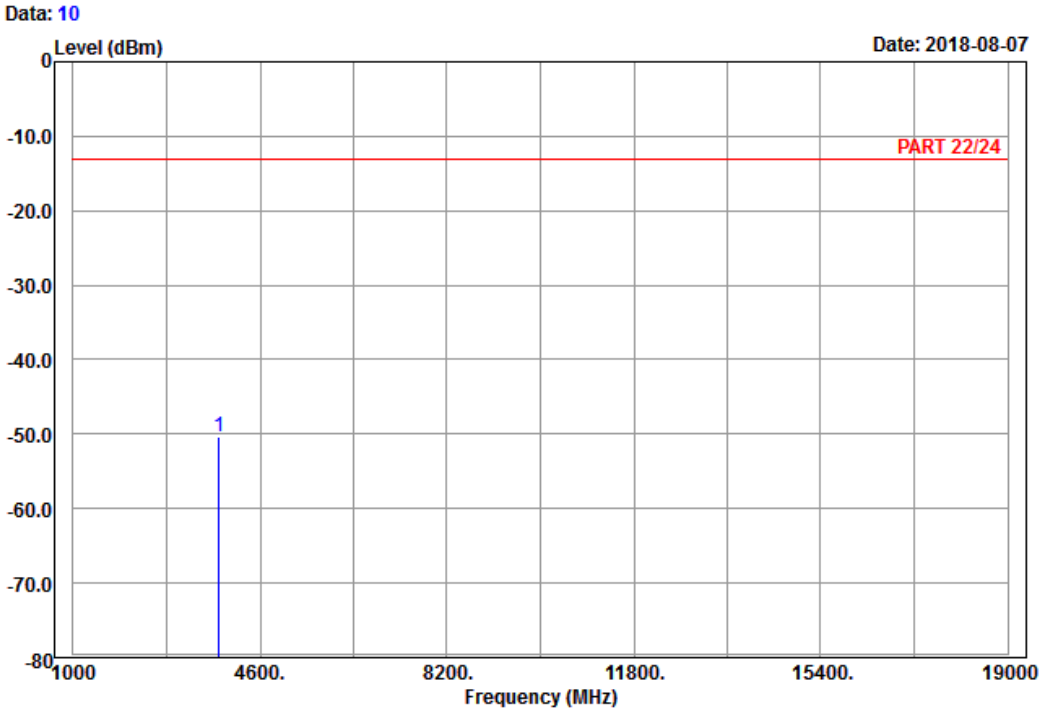
## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band II_Link_CH9538
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3815.20 | -50.38 | -66.79 | -13.00 | -37.38 | 16.41 | Peak |




Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band II_Link_CH9538
Tested by: Karl Lee

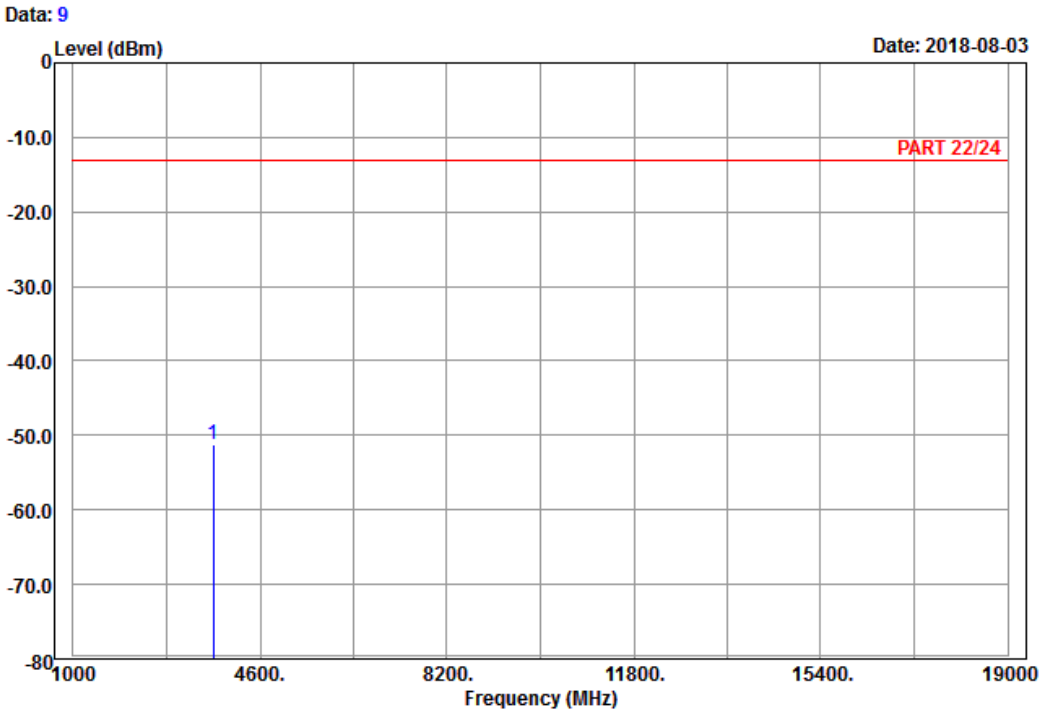
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3815.20 | -50.29 | -66.70 | -13.00 | -37.29 | 16.41 | Peak |

**LTE Band 2**

**Channel Bandwidth: 1.4 MHz / QPSK**

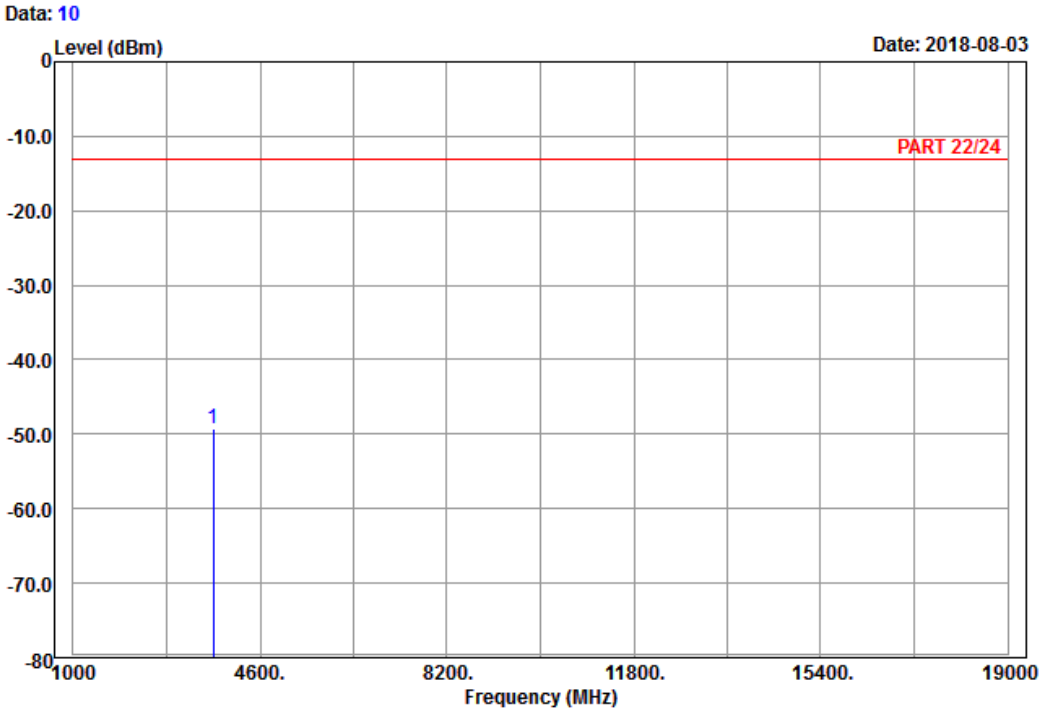
**Low Channel**

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18607
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3701.40 | -51.22 | -67.10 | -13.00 | -38.22 | 15.88 | Peak |

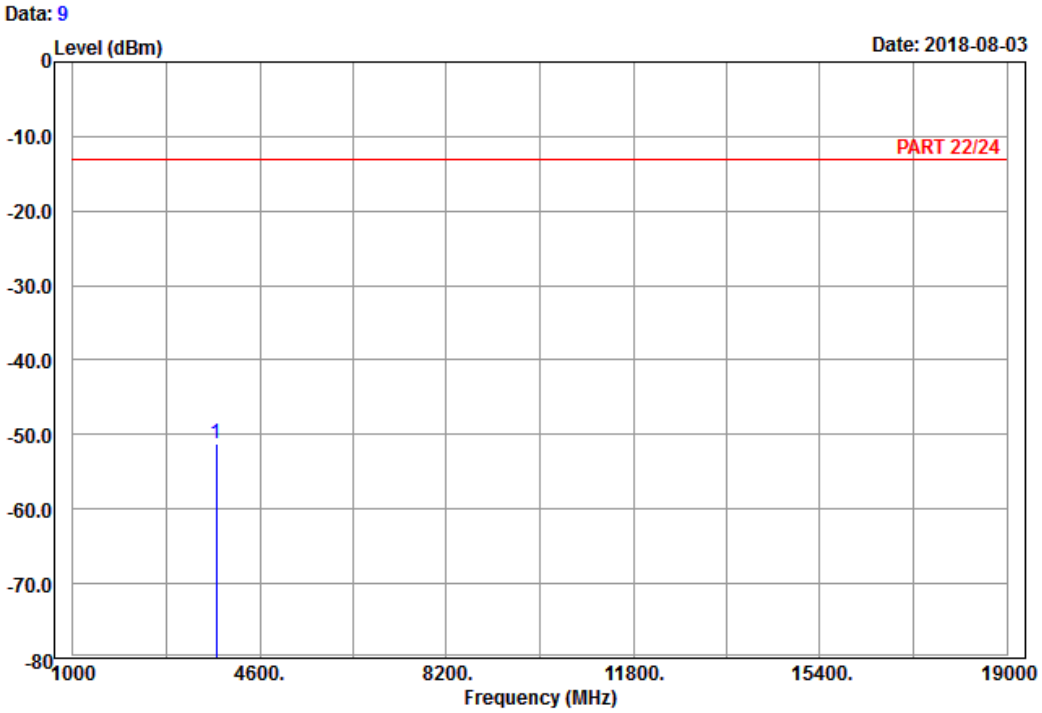



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18607
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3701.40 | -49.24 | -65.12 | -13.00 | -36.24 | 15.88 | Peak |

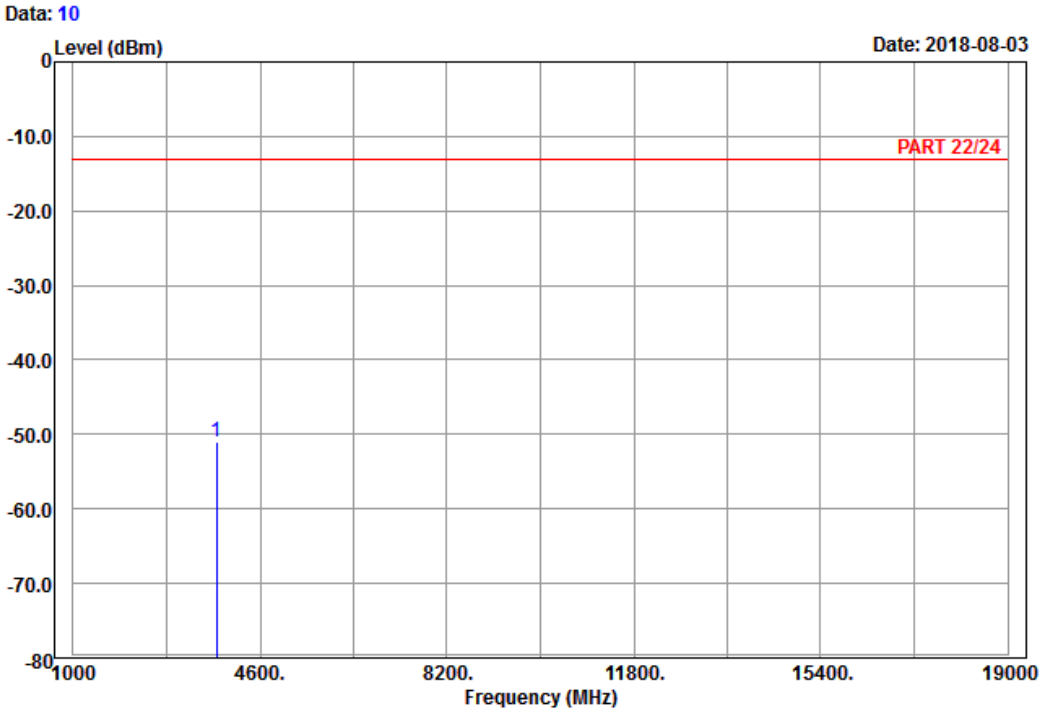
## Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3760.00 | -51.31 | -67.45 | -13.00 | -38.31 | 16.14 | Peak |

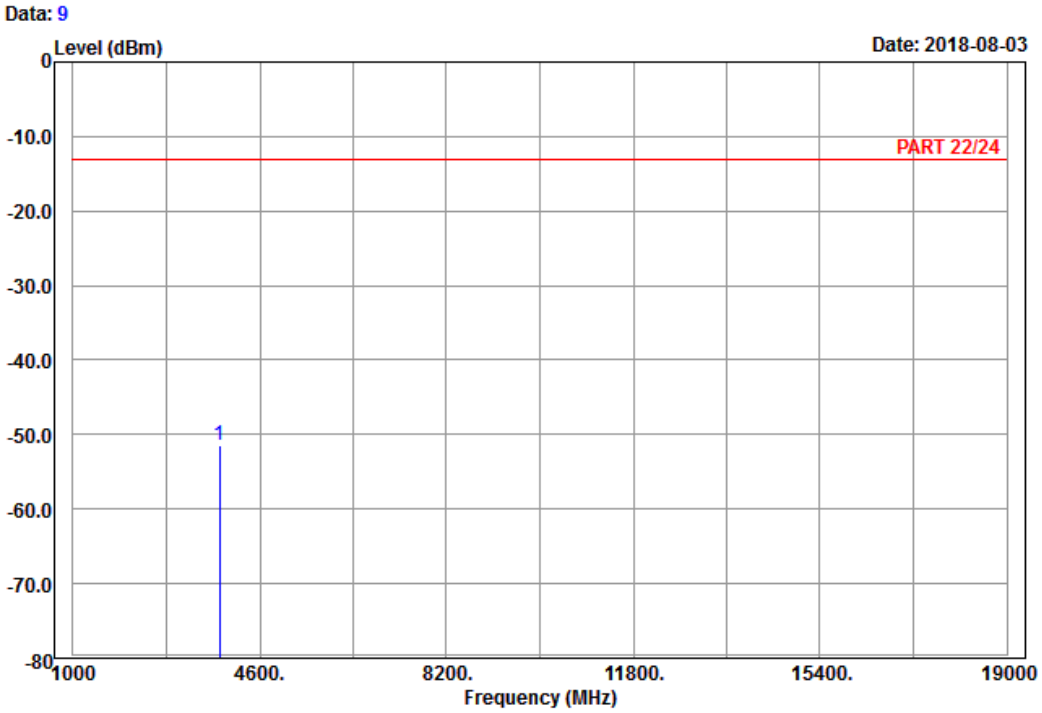



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3760.00 | -51.03 | -67.17 | -13.00 | -38.03 | 16.14 | Peak |

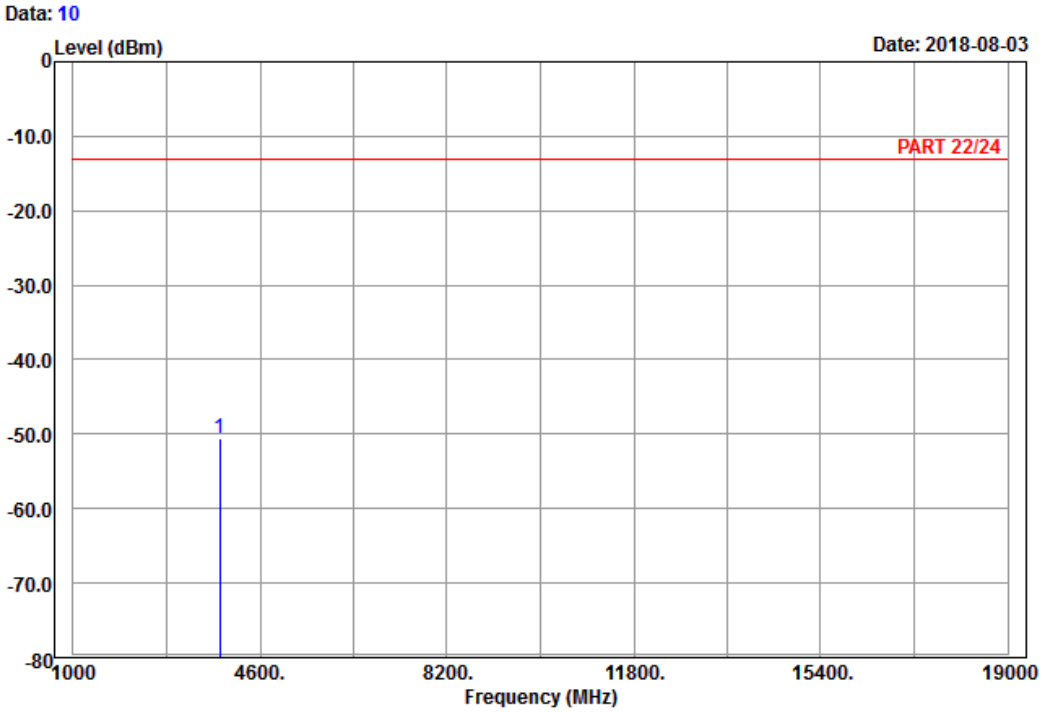
## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH19193
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3818.60 | -51.44 | -67.94 | -13.00 | -38.44 | 16.50 | Peak |

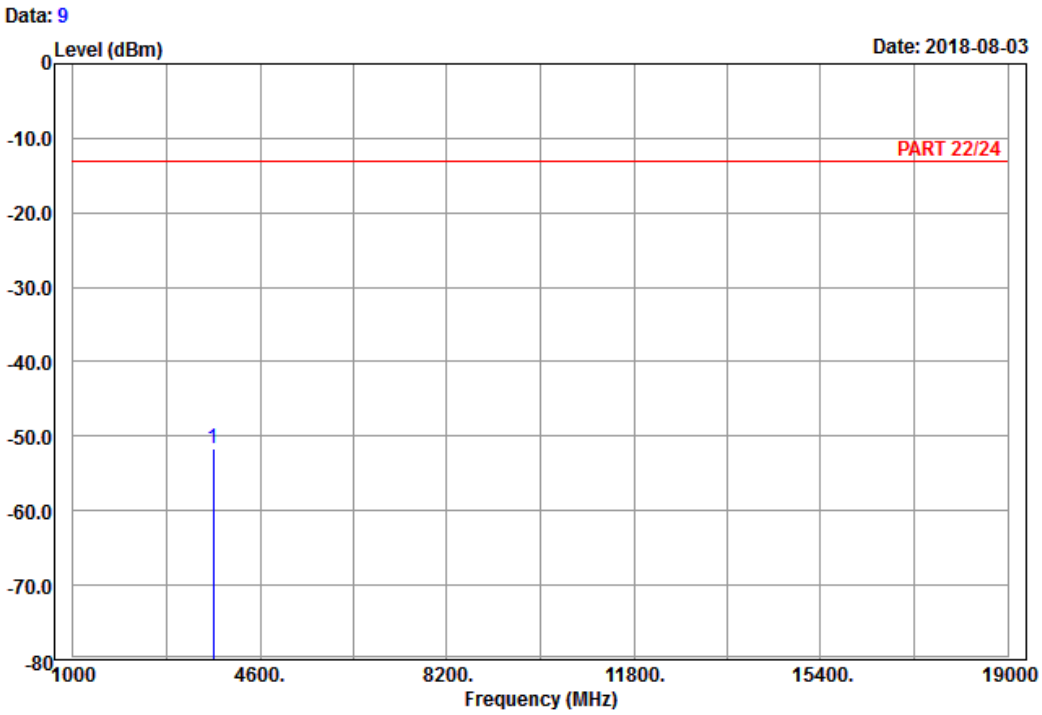



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH19193
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3818.60 | -50.46 | -66.96 | -13.00 | -37.46 | 16.50 | Peak |

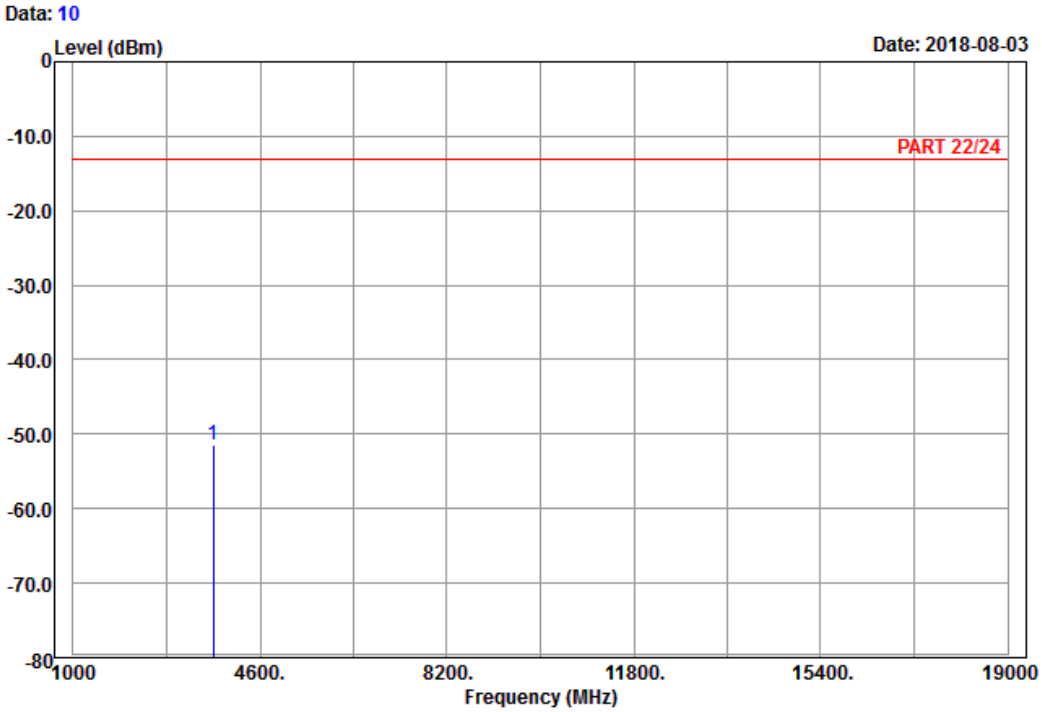
## Channel Bandwidth: 5 MHz / QPSK
## Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18625
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3705.00 | -51.59 | -67.47 | -13.00 | -38.59 | 15.88 | Peak |

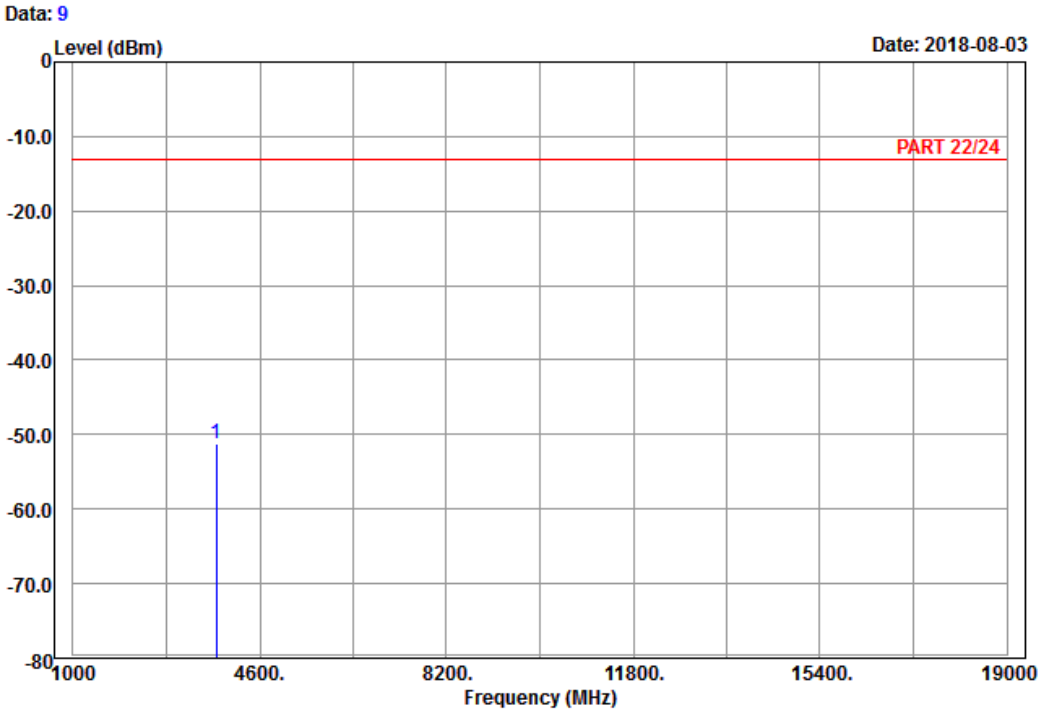



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18625
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3705.00 | -51.35 | -67.23 | -13.00 | -38.35 | 15.88 | Peak |

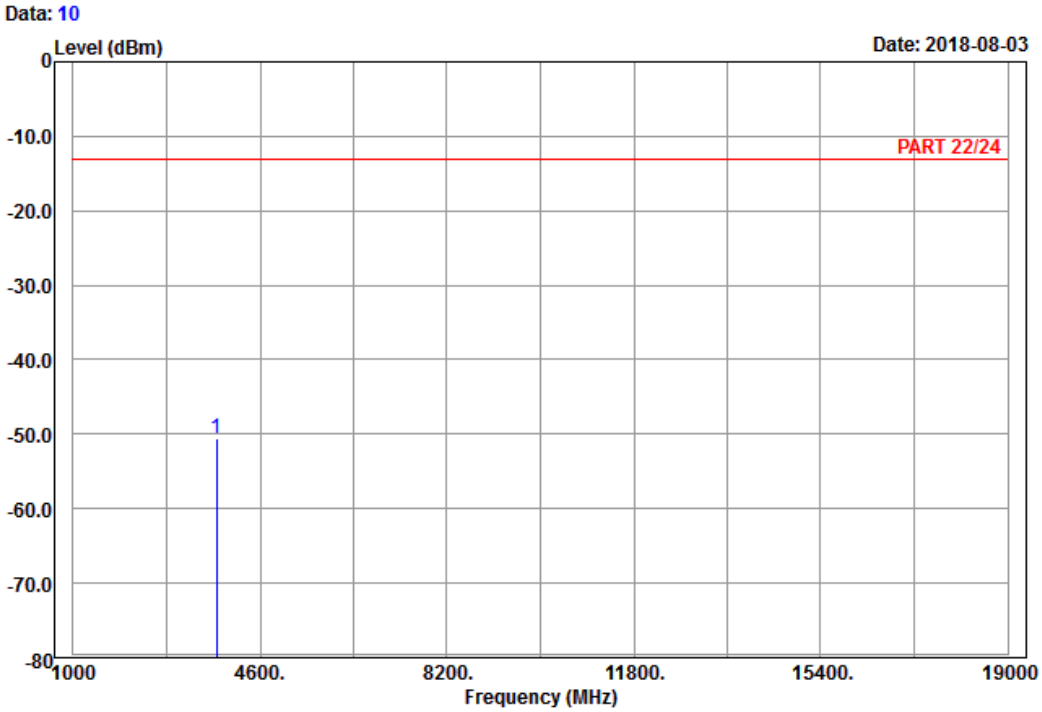
## Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3760.00 | -51.13 | -67.27 | -13.00 | -38.13 | 16.14 | Peak |

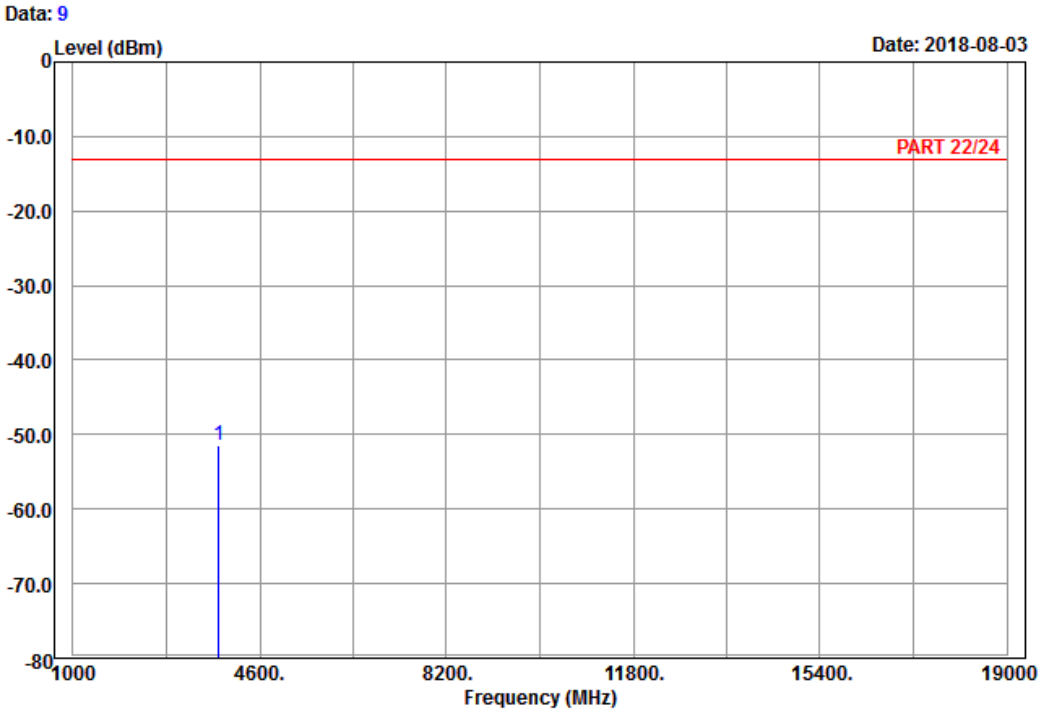



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3760.00 | -50.63 | -66.77 | -13.00 | -37.63 | 16.14 | Peak |

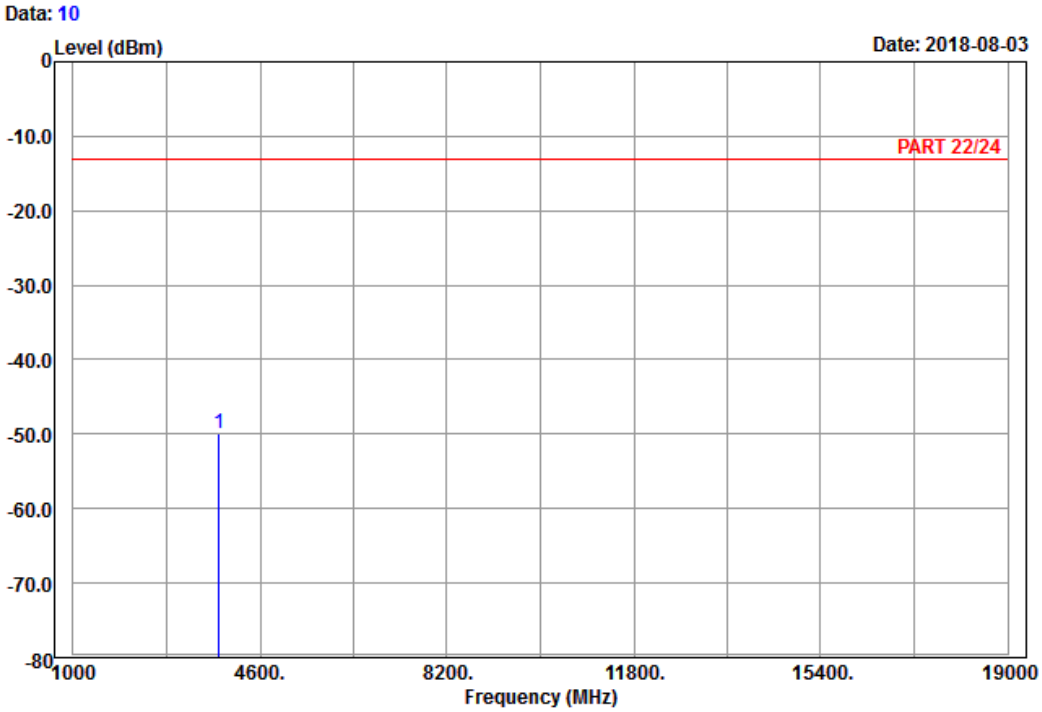
## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH19175
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3815.00 | -51.47 | -67.88 | -13.00 | -38.47 | 16.41 | Peak |

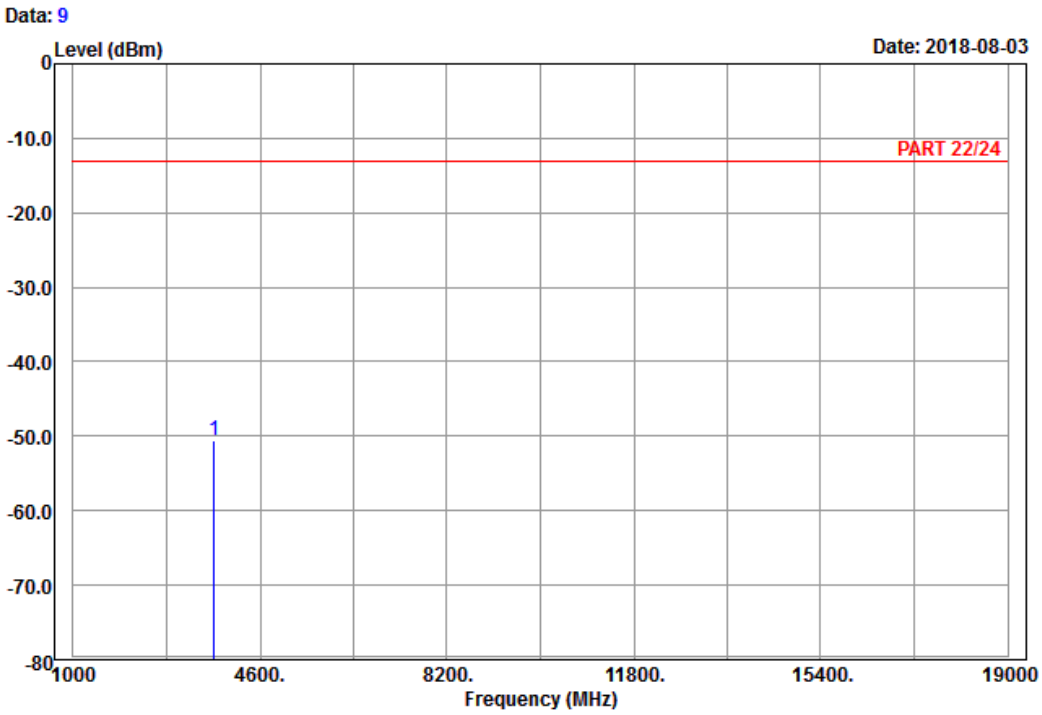



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH19175
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3815.00 | -49.91 | -66.32 | -13.00 | -36.91 | 16.41 | Peak |

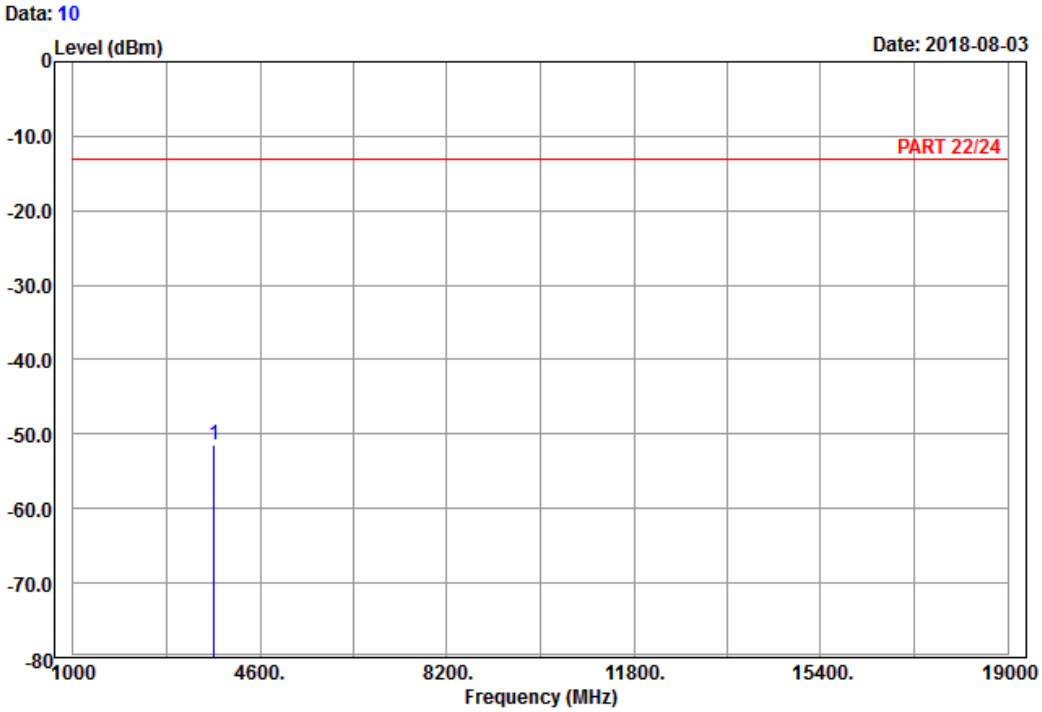
## Channel Bandwidth: 20 MHz / QPSK
## Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18700
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3720.00 | -50.57 | -66.54 | -13.00 | -37.57 | 15.97 | Peak |

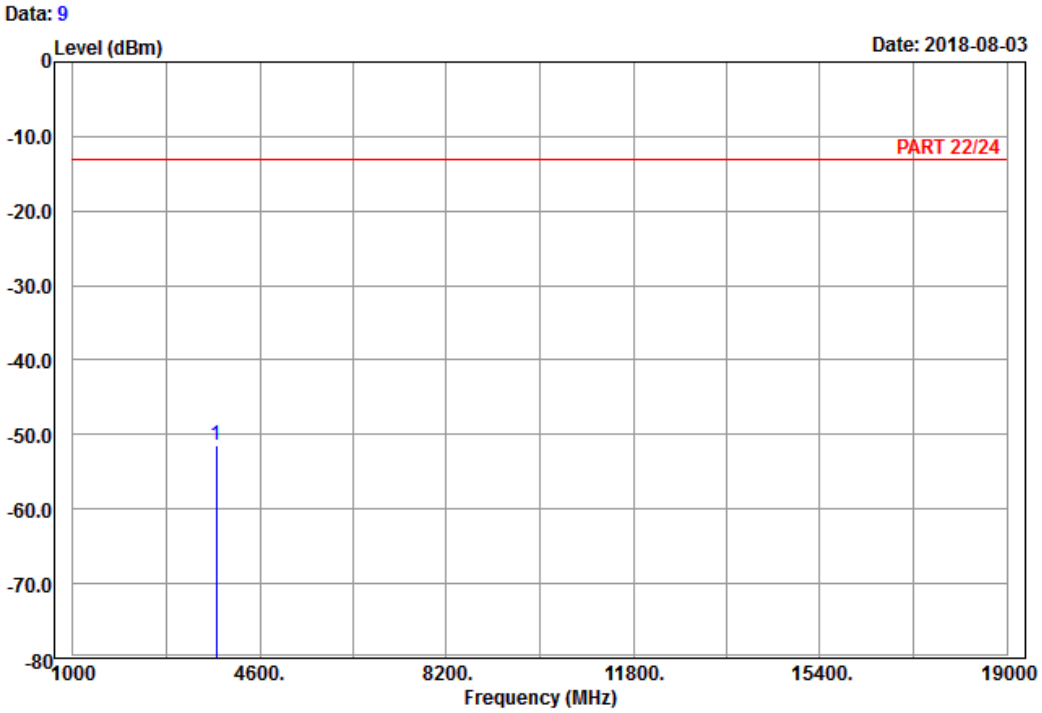



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18700
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3720.00 | -51.48 | -67.45 | -13.00 | -38.48 | 15.97 | Peak |

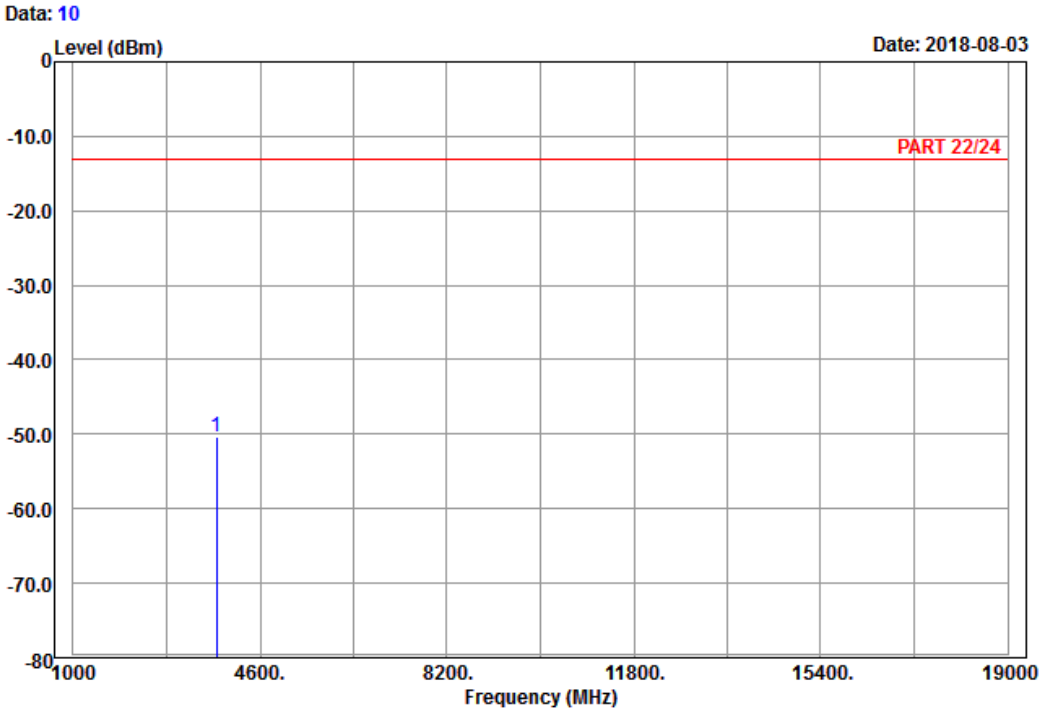
## Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3760.00 | -51.52 | -67.66 | -13.00 | -38.52 | 16.14 | Peak |

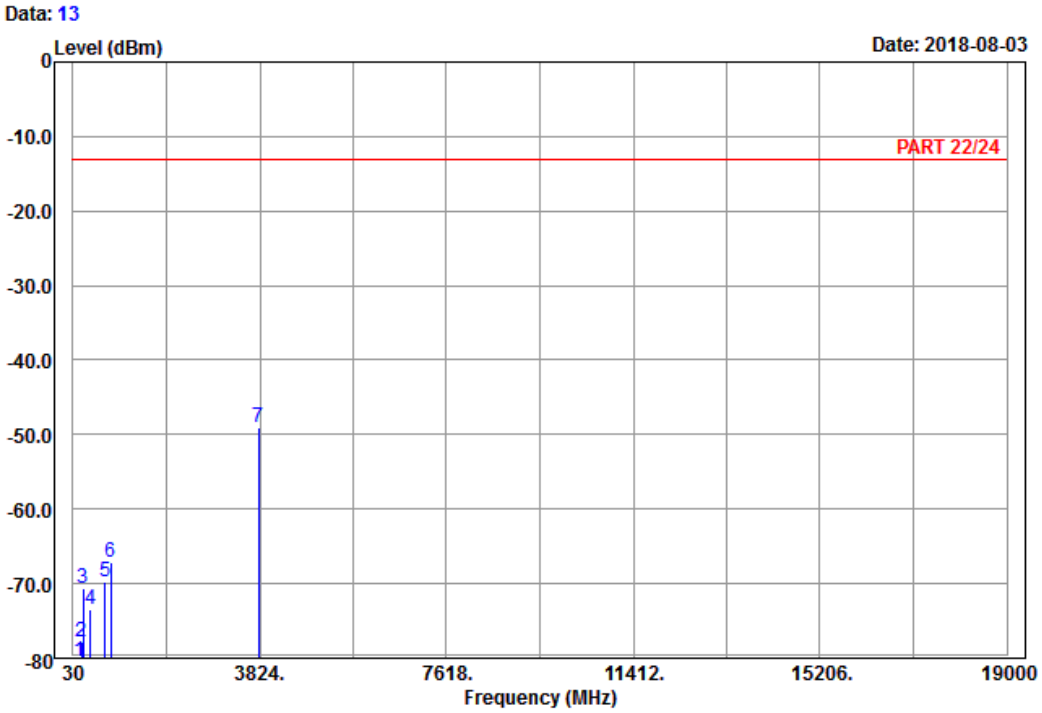



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3760.00 | -50.37 | -66.51 | -13.00 | -37.37 | 16.14 | Peak |

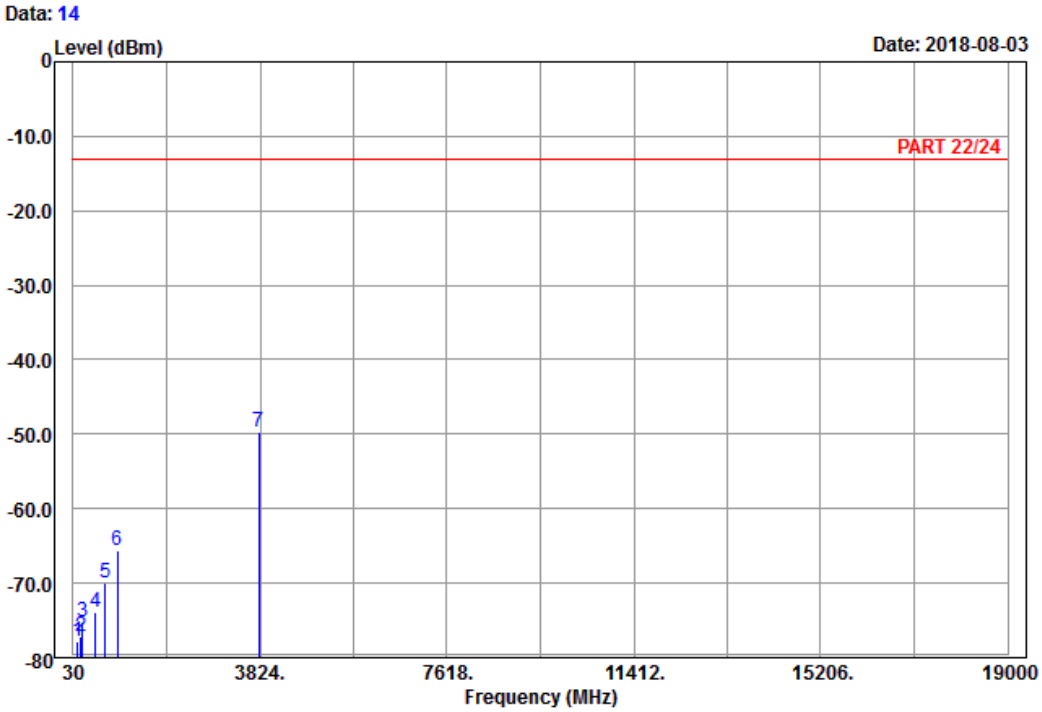
## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH19100
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 154.20 | -80.49 | -72.65 | -13.00 | -67.49 | -7.84 | Peak |
| 2 | 199.29 | -77.93 | -71.75 | -13.00 | -64.93 | -6.18 | Peak |
| 3 | 236.82 | -70.68 | -64.99 | -13.00 | -57.68 | -5.69 | Peak |
| 4 | 381.20 | -73.37 | -69.65 | -13.00 | -60.37 | -3.72 | Peak |
| 5 | 683.60 | -69.68 | -69.38 | -13.00 | -56.68 | -0.30 | Peak |
| 6 | 803.30 | -67.15 | -69.13 | -13.00 | -54.15 | 1.98 | Peak |
| 7 pp | 3800.00 | -49.09 | -65.50 | -13.00 | -36.09 | 16.41 | Peak |




Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH19100
Tested by: Karl Lee

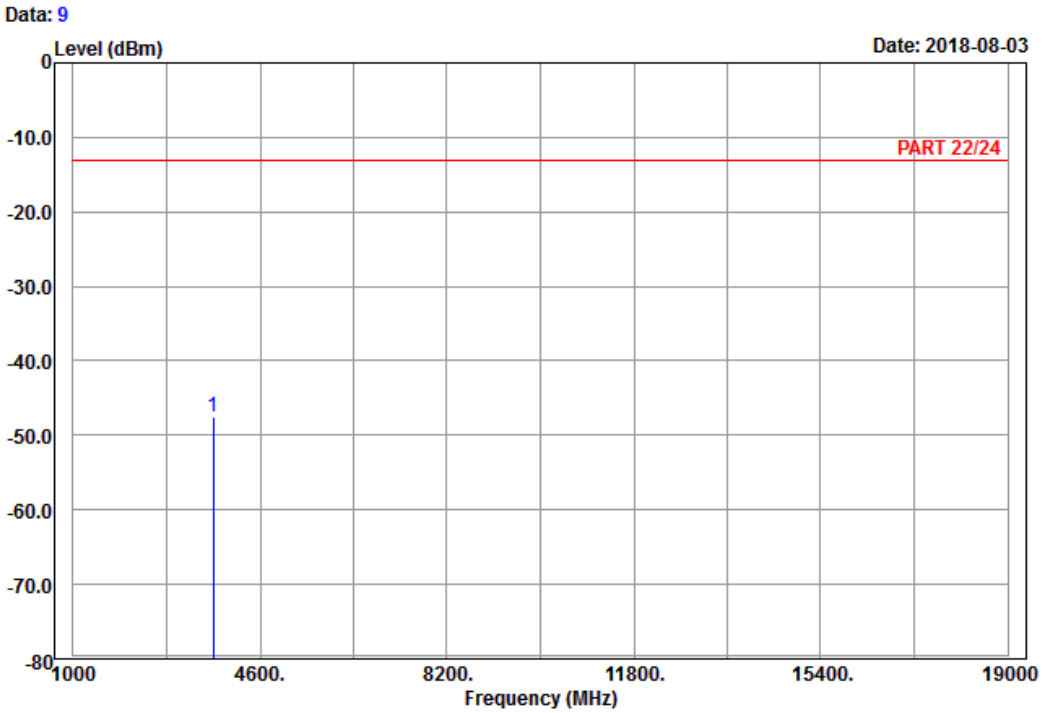
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 122.34 | -77.93 | -69.80 | -13.00 | -64.93 | -8.13 | Peak |
| 2 | 186.06 | -77.23 | -71.56 | -13.00 | -64.23 | -5.67 | Peak |
| 3 | 219.81 | -75.15 | -69.24 | -13.00 | -62.15 | -5.91 | Peak |
| 4 | 491.10 | -73.94 | -68.93 | -13.00 | -60.94 | -5.01 | Peak |
| 5 | 685.00 | -69.87 | -69.57 | -13.00 | -56.87 | -0.30 | Peak |
| 6 | 931.40 | -65.60 | -69.88 | -13.00 | -52.60 | 4.28 | Peak |
| 7 pp | 3800.00 | -49.77 | -66.18 | -13.00 | -36.77 | 16.41 | Peak |

**LTE Band 25**

**Channel Bandwidth: 1.4 MHz / QPSK**

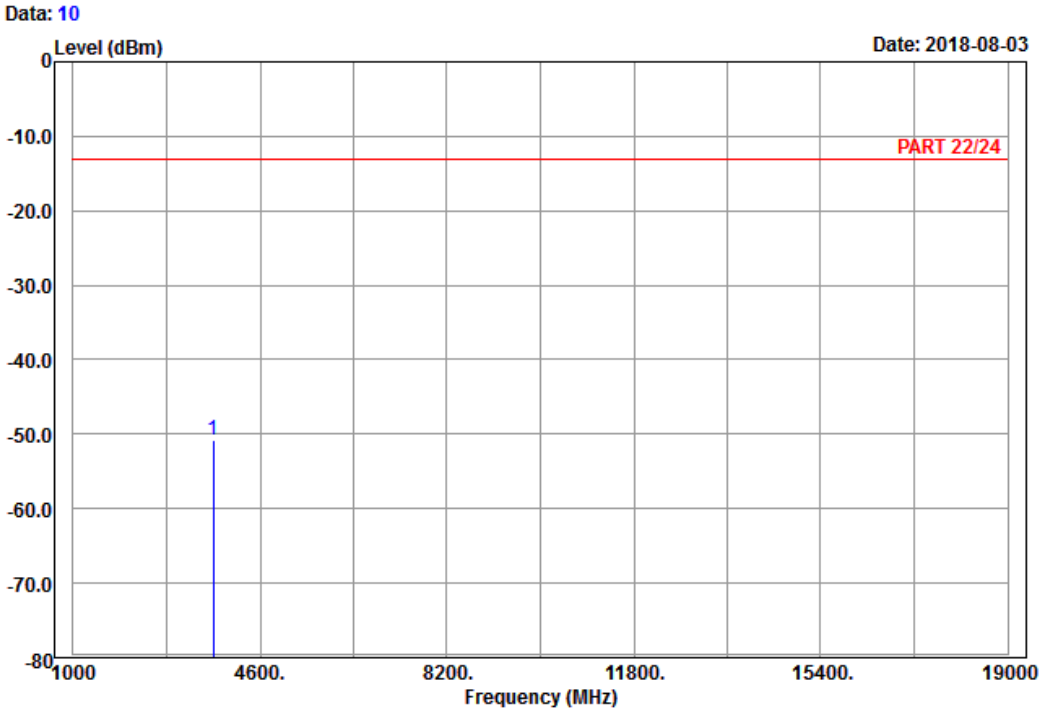
**Low Channel**

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26047
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3701.40 | -47.62 | -63.50 | -13.00 | -34.62 | 15.88 | Peak |

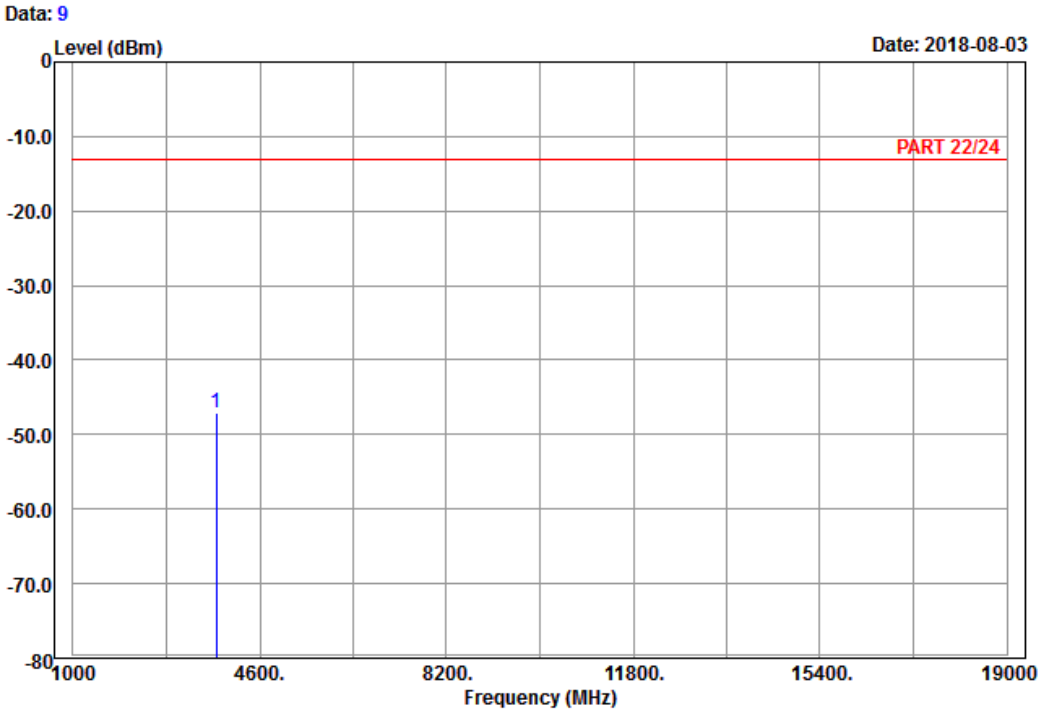



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26047
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3701.40 | -50.71 | -66.59 | -13.00 | -37.71 | 15.88 | Peak |

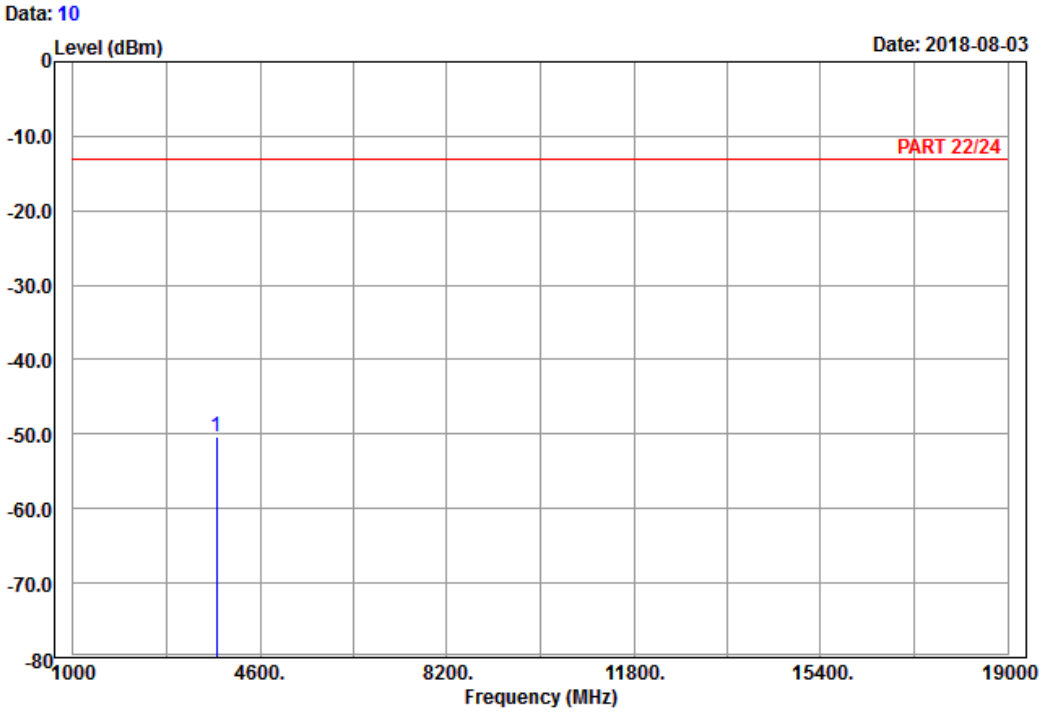
## Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26365
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3765.00 | -47.12 | -63.35 | -13.00 | -34.12 | 16.23 | Peak |

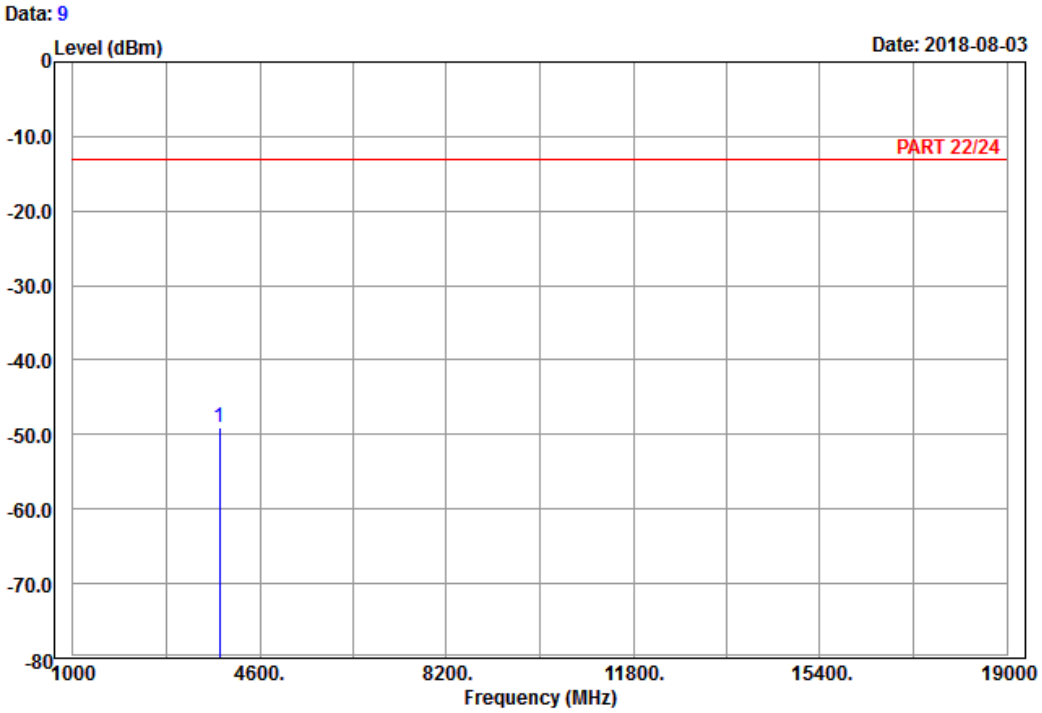



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26365
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3765.00 | -50.33 | -66.56 | -13.00 | -37.33 | 16.23 | Peak |

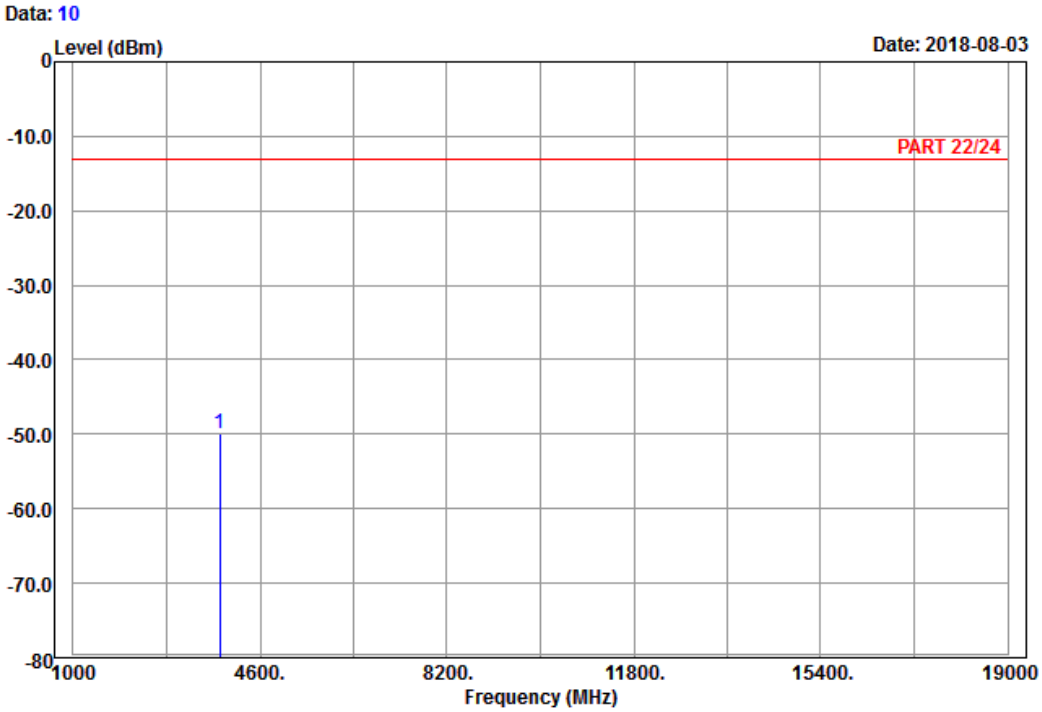
## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26683
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3828.60 | -49.10 | -65.60 | -13.00 | -36.10 | 16.50 | Peak |

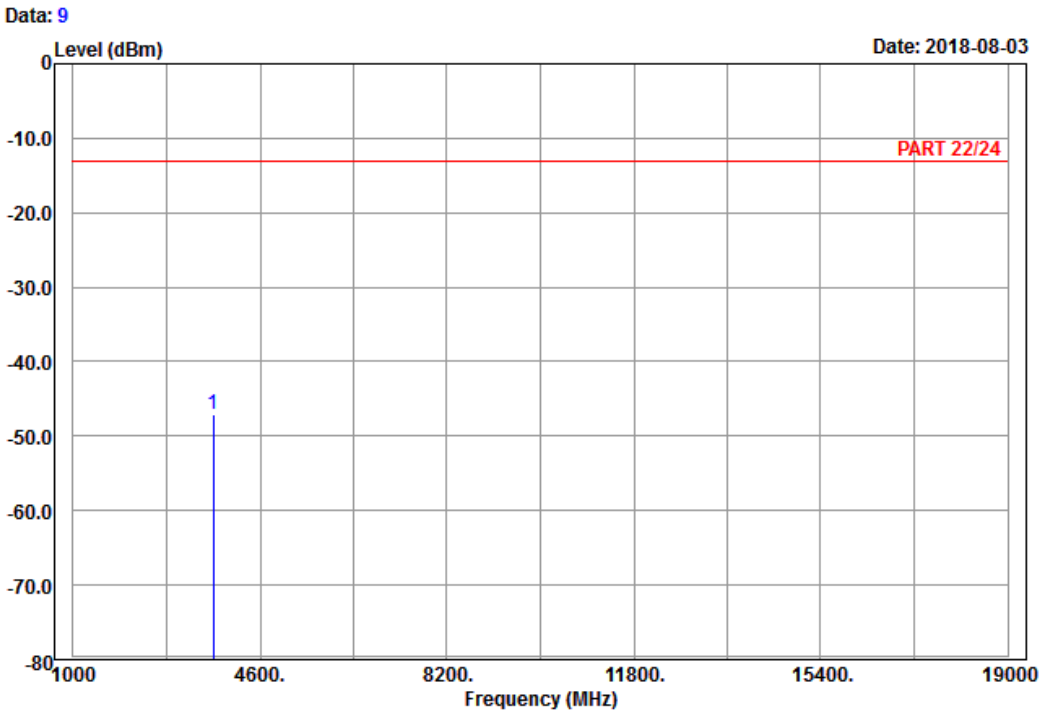



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26683
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3828.60 | -49.84 | -66.34 | -13.00 | -36.84 | 16.50 | Peak |

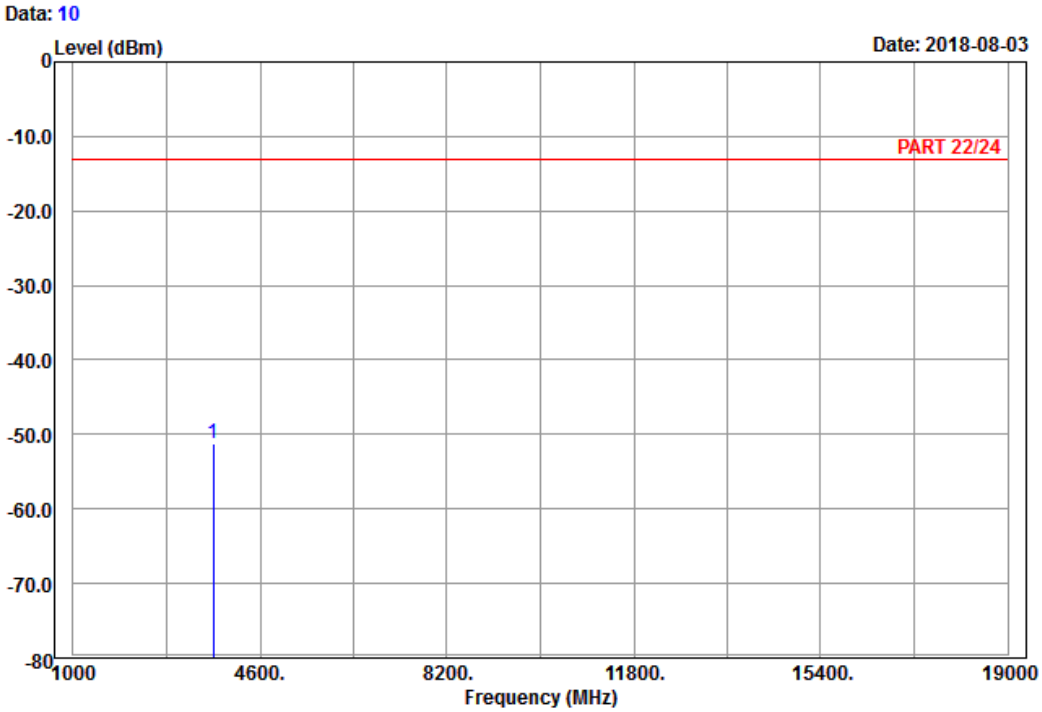
## Channel Bandwidth: 5 MHz / QPSK
## Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26065
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3705.00 | -46.99 | -62.87 | -13.00 | -33.99 | 15.88 | Peak |

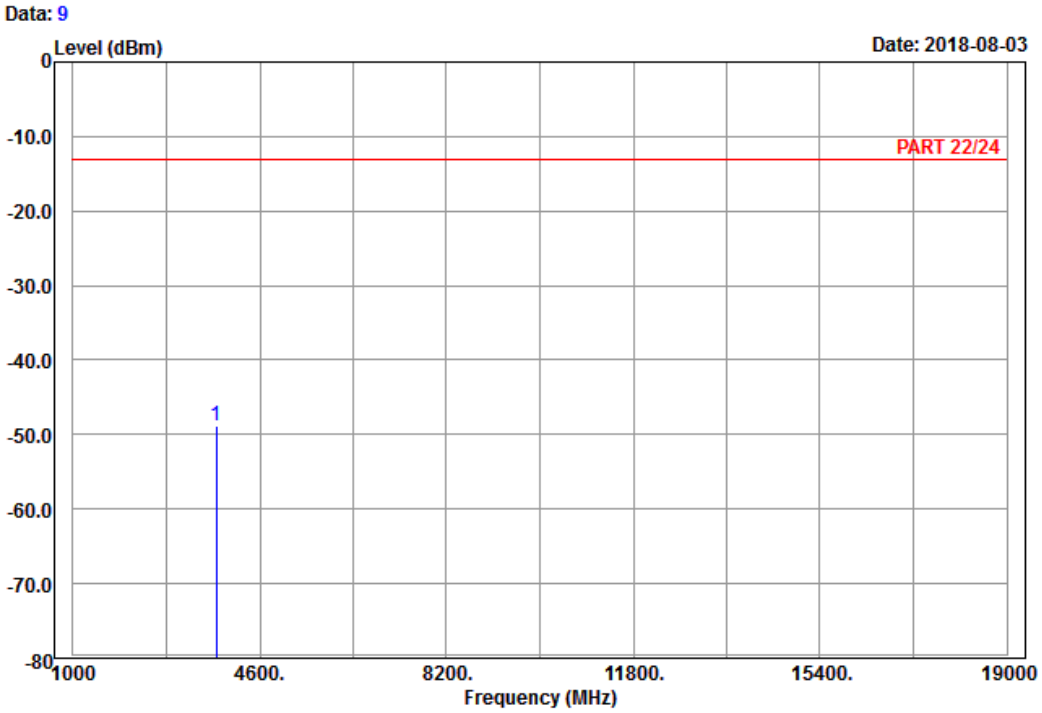



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26065
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3705.00 | -51.20 | -67.08 | -13.00 | -38.20 | 15.88 | Peak |

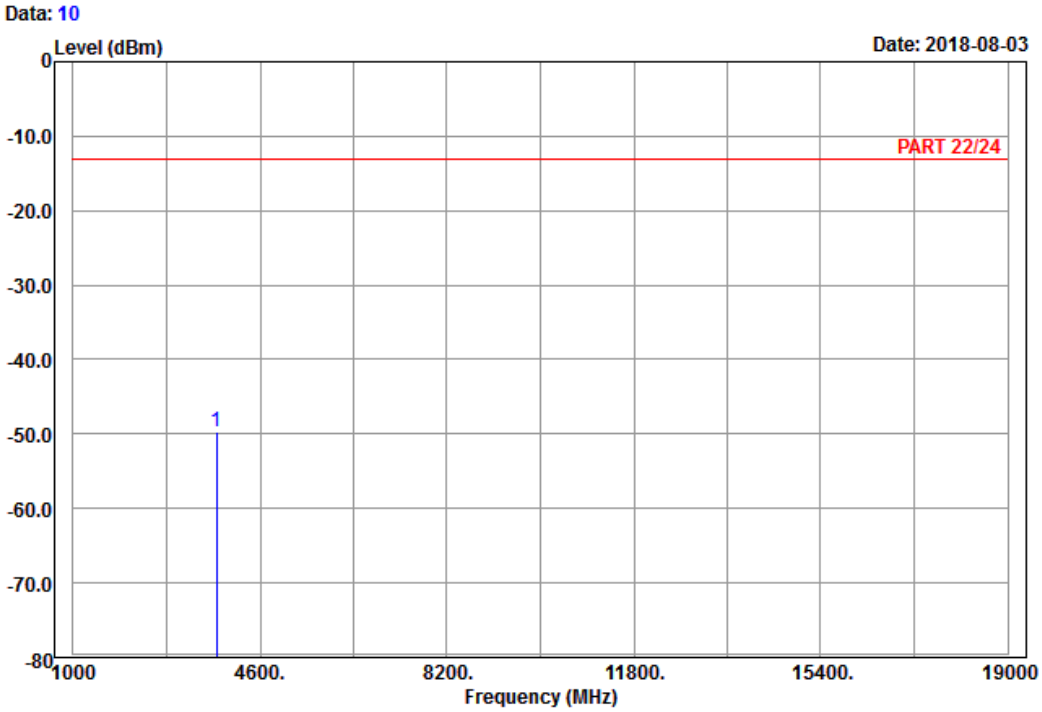
## Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26365
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3765.00 | -48.84 | -65.07 | -13.00 | -35.84 | 16.23 | Peak |

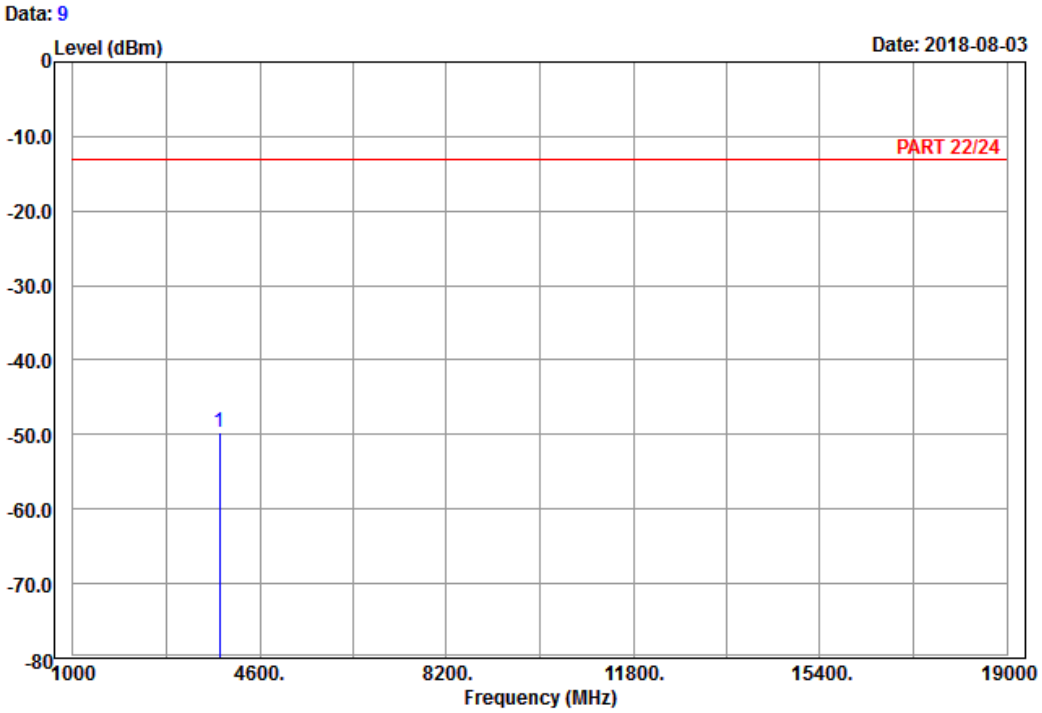



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26365
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3765.00 | -49.66 | -65.89 | -13.00 | -36.66 | 16.23 | Peak |

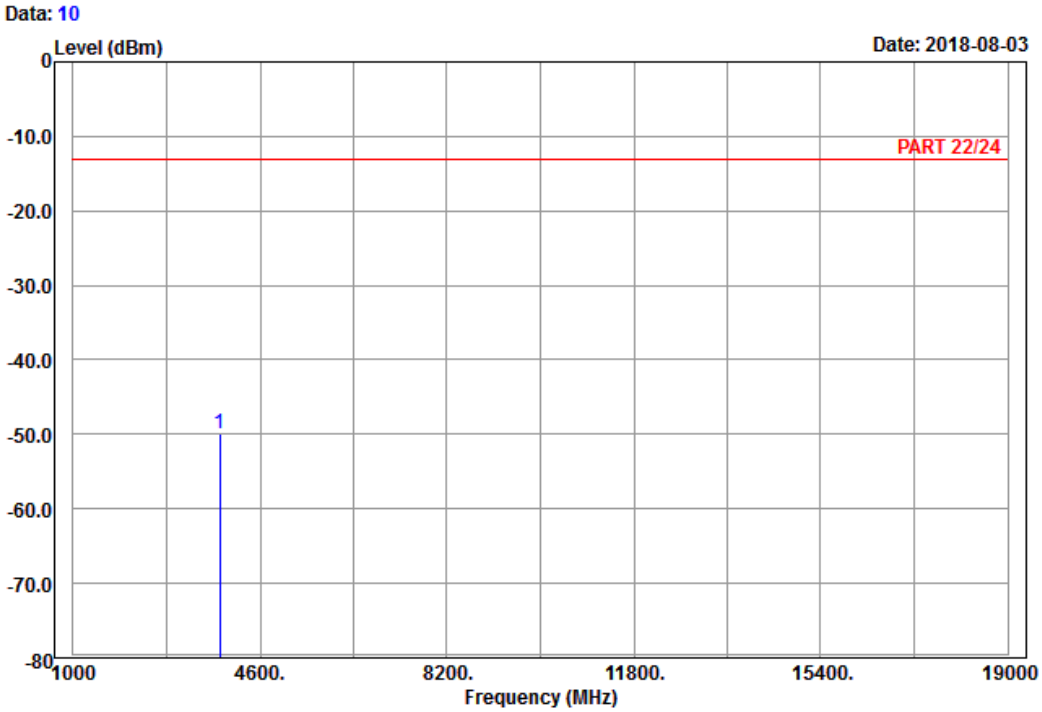
## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26665
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3825.00 | -49.76 | -66.26 | -13.00 | -36.76 | 16.50 | Peak |

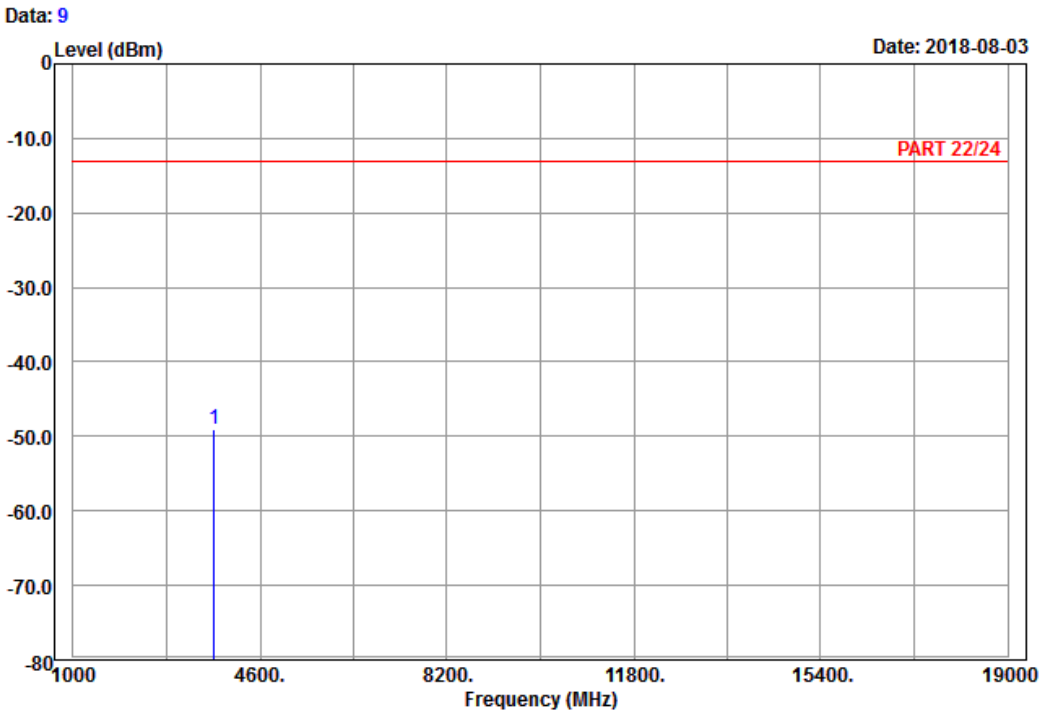



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26665
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3825.00 | -49.99 | -66.49 | -13.00 | -36.99 | 16.50 | Peak |

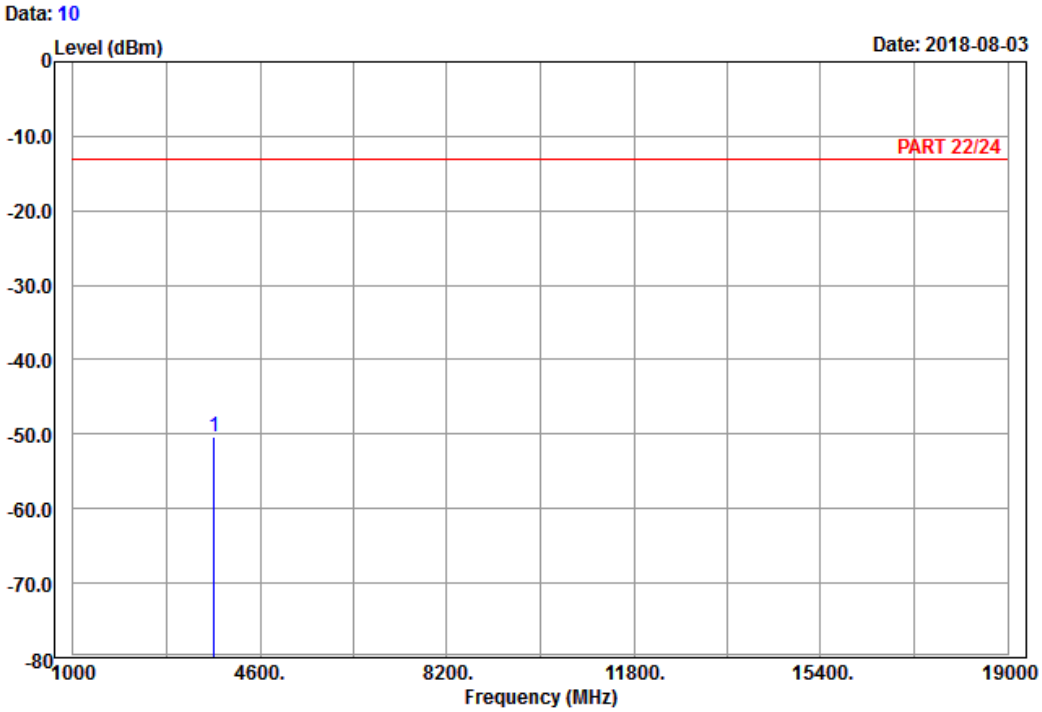
## Channel Bandwidth: 20 MHz / QPSK
## Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26140
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3720.00 | -49.00 | -64.97 | -13.00 | -36.00 | 15.97 | Peak |

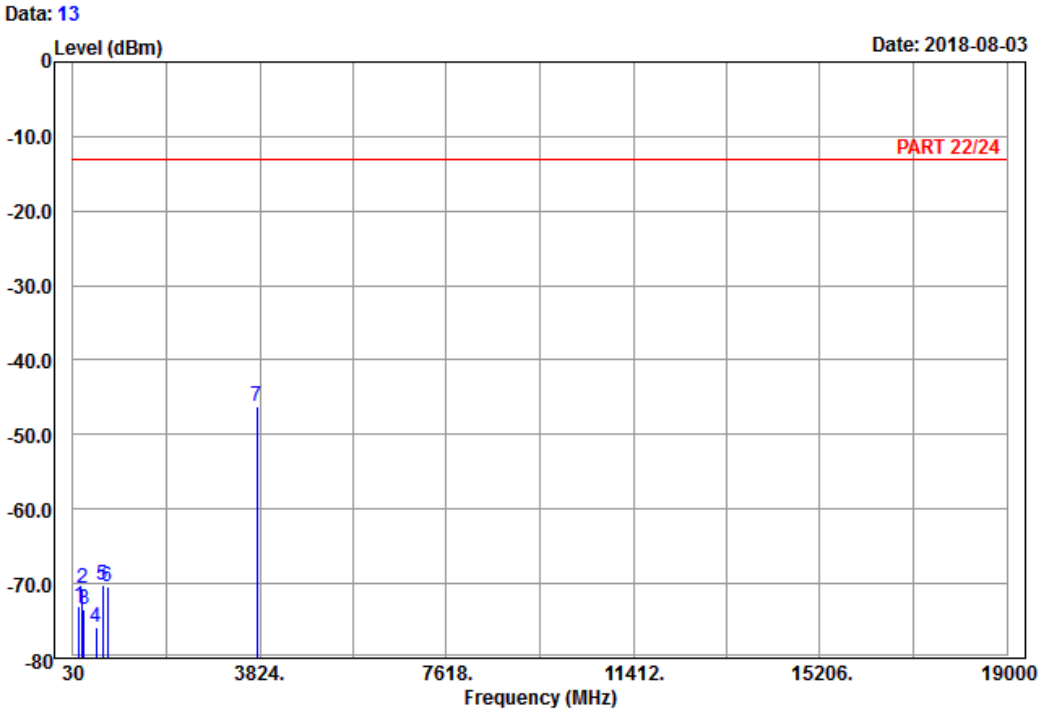



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26140
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3720.00 | -50.36 | -66.33 | -13.00 | -37.36 | 15.97 | Peak |

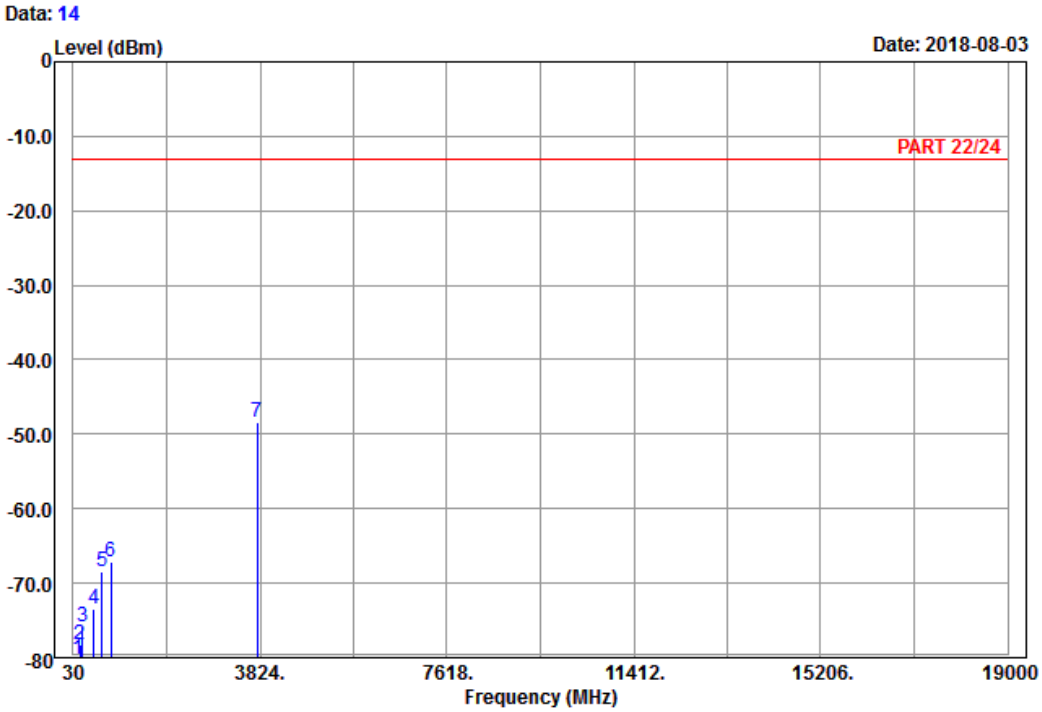
## Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26365
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 161.76 | -73.07 | -65.60 | -13.00 | -60.07 | -7.47 | Peak |
| 2 | 219.54 | -70.52 | -64.60 | -13.00 | -57.52 | -5.92 | Peak |
| 3 | 249.51 | -73.36 | -67.84 | -13.00 | -60.36 | -5.52 | Peak |
| 4 | 500.90 | -75.92 | -70.64 | -13.00 | -62.92 | -5.28 | Peak |
| 5 | 624.80 | -70.23 | -70.38 | -13.00 | -57.23 | 0.15 | Peak |
| 6 | 729.10 | -70.50 | -69.57 | -13.00 | -57.50 | -0.93 | Peak |
| 7 pp | 3765.00 | -46.30 | -62.53 | -13.00 | -33.30 | 16.23 | Peak |

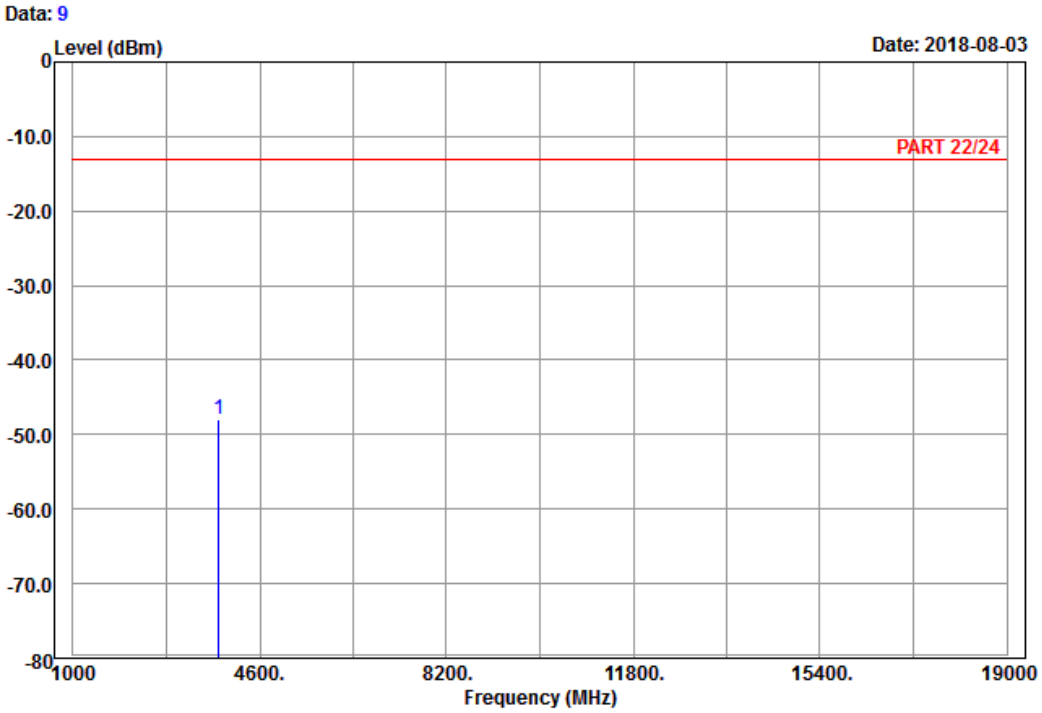



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26365
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 115.86 | -80.31 | -71.80 | -13.00 | -67.31 | -8.51 | Peak |
| 2 | 177.96 | -78.34 | -72.56 | -13.00 | -65.34 | -5.78 | Peak |
| 3 | 222.51 | -75.94 | -70.06 | -13.00 | -62.94 | -5.88 | Peak |
| 4 | 443.50 | -73.51 | -69.81 | -13.00 | -60.51 | -3.70 | Peak |
| 5 | 615.70 | -68.43 | -68.68 | -13.00 | -55.43 | 0.25 | Peak |
| 6 | 798.40 | -67.18 | -69.06 | -13.00 | -54.18 | 1.88 | Peak |
| 7 pp | 3765.00 | -48.34 | -64.57 | -13.00 | -35.34 | 16.23 | Peak |

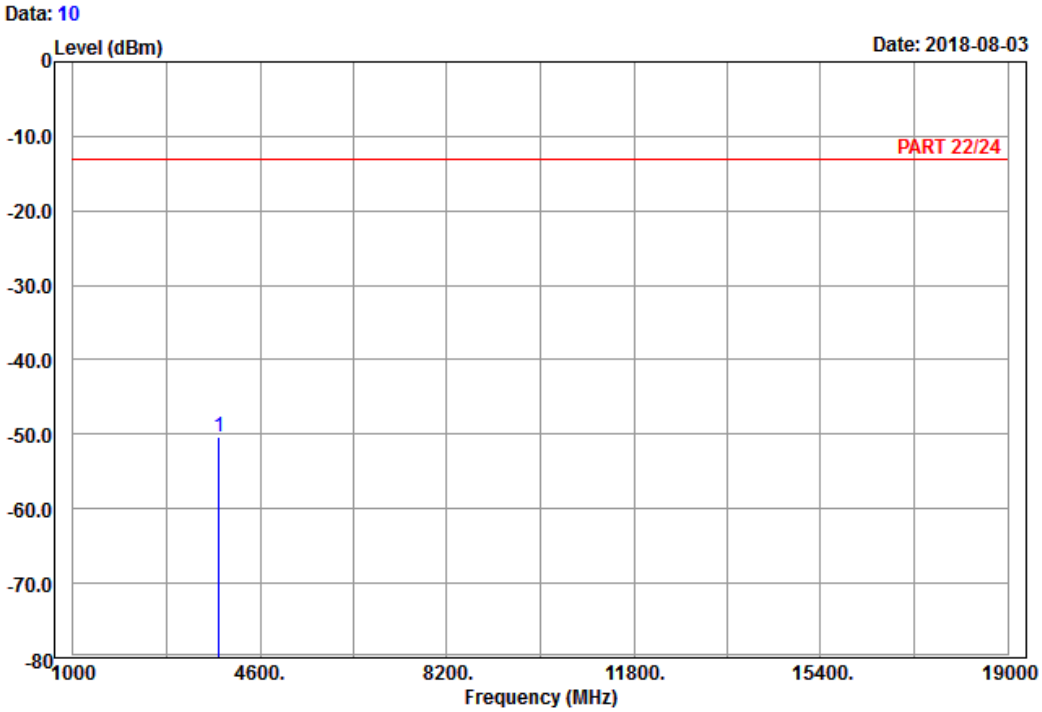
## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 25_Link_CH26590
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3810.00 | -47.89 | -64.30 | -13.00 | -34.89 | 16.41 | Peak |




Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 25_Link_CH26590
Tested by: Karl Lee

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 3810.00 | -50.30 | -66.71 | -13.00 | -37.30 | 16.41 | Peak |

## 5 Pictures of Test Arrangements

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

**Appendix – Information on the Testing Laboratories**

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

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