

FCC Test Report

(PART 27)

Report No.: RF180821C20-10

FCC ID: V65E6910

Test Model: E6910

Received Date: Aug. 21, 2018

Test Date: Sep. 12, 2018 ~ Sep. 13, 2018

Issued Date: Sep. 28, 2018

Applicant: Kyocera Corporation c/o Kyocera International, Inc.

Address: 8611 Balboa Avenue, San Diego, CA 92123

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

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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 |
|----------------|------------------|---------------|
| RF180821C20-10 | Original Release | Sep. 28, 2018 |

1 Certificate of Conformity

Product: Smart Phone

Brand: Kyocera

Test Model: E6910

Sample Status: Identical Prototype

Applicant: Kyocera Corporation c/o Kyocera International, Inc.

Test Date: Sep. 12, 2018 ~ Sep. 13, 2018

Standards: FCC Part 27, Subpart C, M

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:** Sep. 28, 2018

Ivonne Wu / Supervisor

Approved by :  , **Date:** Sep. 28, 2018

Dylan Chiou / Project Engineer

2 Summary of Test Results

| Applied Standard: FCC Part 27 & Part 2 | | | |
|--|-------------------------------------|--------|---|
| FCC Clause | Test Item | Result | Remarks |
| 2.1046 27.50(h)(2) | Equivalent Isotropic Radiated Power | Pass | Meet the requirement of limit. |
| 2.1047 | Modulation Characteristics | Pass | Meet the requirement. |
| 2.1055 27.54 | Frequency Stability | Pass | Meet the requirement of limit. |
| 2.1049 27.53(m)(6) | Occupied Bandwidth | Pass | Meet the requirement of limit. |
| -- | Peak to Average Ratio | Pass | Meet the requirement of limit. |
| 2.1051 27.53(l)(m) | Out-of-Band Emissions Measurements | Pass | Meet the requirement of limit. |
| 2.1051 27.53(m) | Conducted Spurious Emissions | Pass | Meet the requirement of limit. |
| 2.1053 27.53(m) | Radiated Spurious Emissions | Pass | Meet the requirement of limit. Minimum passing margin is -21.47 dB at 5120.00 MHz. |

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) (\pm) |
|--------------------------------|--------------------|--------------------------------------|
| 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 Agilent Technologies | N9038A | MY52260177 | Aug. 20, 2018 | Aug. 19, 2019 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSU43 | 101261 | Jan. 11, 2018 | Jan. 10, 2019 |
| HORN Antenna ETS-Lindgren | 3117 | 00143293 | Dec. 13, 2017 | Dec. 12, 2018 |
| BILOG Antenna SCHWARZBECK | VULB 9168 | 9168-616 | Dec. 14, 2017 | Dec. 13, 2018 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | 9170-480 | Dec. 01, 2017 | Nov. 30, 2018 |
| HORN Antenna SCHWARZBECK | BBHA 9120D | 9120D-969 | Dec. 12, 2017 | Dec. 11, 2018 |
| Fixed Attenuator Woken | 00801A1GGAM02Y | NA | May 17, 2018 | May 16, 2019 |
| MXG Vector signal generator Agilent | N5182B | MY53050430 | Oct. 24, 2017 | Oct. 23, 2018 |
| Preamplifier Agilent | 310N | 187226 | Jun. 19, 2018 | Jun. 18, 2019 |
| Preamplifier Agilent | 83017A | MY39501357 | Jun. 19, 2018 | Jun. 18, 2019 |
| RF signal cable ETS-LINDGREN | 5D-FB | Cable-CH1-01(RF C-SMS-100-SMS-120+RFC-SMS-100-SMS-400) | Jun. 19, 2018 | Jun. 18, 2019 |
| RF signal cable ETS-LINDGREN | 8D-FB | Cable-CH1-02(RF C-SMS-100-SMS-24) | Jun. 19, 2018 | Jun. 18, 2019 |
| Boresight Antenna Fixture | FBA-01 | FBA-SIP01 | NA | NA |
| Software BV ADT | E3 8.130425b | NA | NA | NA |
| Antenna Tower MF | NA | NA | NA | NA |
| Turn Table MF | NA | NA | NA | NA |
| Antenna Tower & Turn Table Controller MF | MF-7802 | NA | NA | NA |
| Radio Communication Analyzer 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

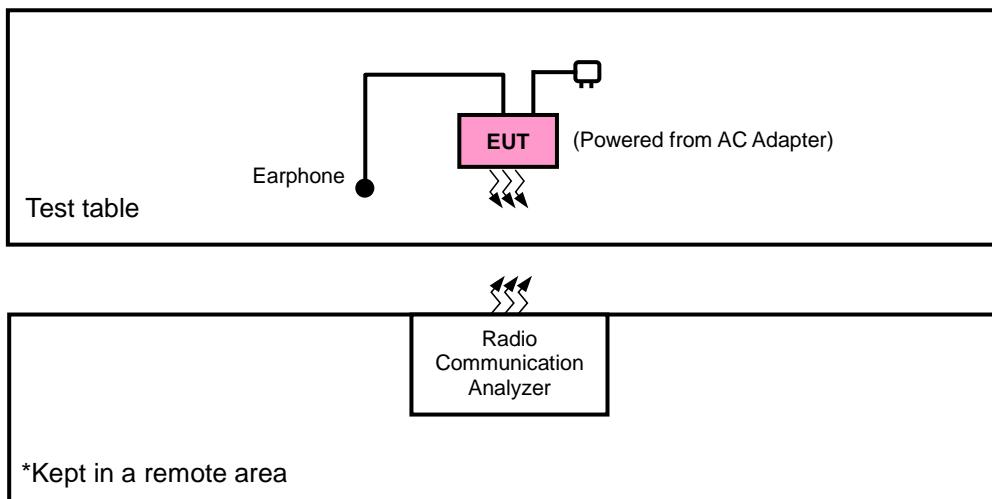
| | | |
|----------------------------|---|---------------------|
| Product | Smart Phone | |
| Brand | Kyocera | |
| Test Model | E6910 | |
| Status of EUT | Identical Prototype | |
| Power Supply Rating | 3.8 Vdc (Battery) 5 Vdc or 9 Vdc or 12 Vdc (Adapter) 5 Vdc (Host equipment) | |
| Modulation Type | QPSK, 16QAM, 64QAM | |
| Frequency Range | LTE Band 7 (Channel Bandwidth: 5 MHz) | 2502.5 ~ 2567.5 MHz |
| | LTE Band 7 (Channel Bandwidth: 10 MHz) | 2505 ~ 2565 MHz |
| | LTE Band 7 (Channel Bandwidth: 15 MHz) | 2507.5 ~ 2562.5 MHz |
| | LTE Band 7 (Channel Bandwidth: 20 MHz) | 2510 ~ 2560 MHz |
| Max. EIRP Power | LTE Band 7 (Channel Bandwidth: 5 MHz) | 282.29 mW |
| | LTE Band 7 (Channel Bandwidth: 10 MHz) | 284.90 mW |
| | LTE Band 7 (Channel Bandwidth: 15 MHz) | 286.88 mW |
| | LTE Band 7 (Channel Bandwidth: 20 MHz) | 289.53 mW |
| Emission Designator | LTE Band 7 (Channel Bandwidth: 5 MHz) | 4M49G7D |
| | LTE Band 7 (Channel Bandwidth: 10 MHz) | 8M92W7D |
| | LTE Band 7 (Channel Bandwidth: 15 MHz) | 13M4G7D |
| | LTE Band 7 (Channel Bandwidth: 20 MHz) | 17M8W7D |
| Antenna Type | Fixed Internal Antenna with -1.1 dBi gain | |
| Accessory Device | Refer to Note as below | |
| Data Cable Supplied | Refer to Note as below | |

Note:

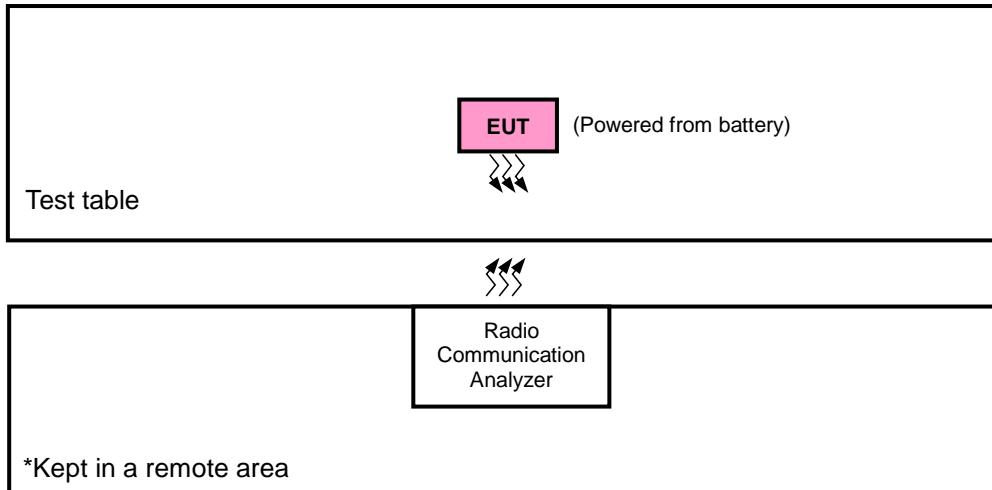
1. The EUT's accessories list refers to Ext. Pho.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

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. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Product | Brand | Model No. | Serial No. | FCC ID |
|-----|----------|--------|-----------|------------|--------|
| 1. | Earphone | Funkey | FK130102 | N/A | N/A |

| No. | Signal Cable Description Of The Above Support Units |
|-----|---|
| 1. | N/A |

Note:

1. All power cords of the above support units are non-shielded (1.8m).

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 |
|------------|---------|-------------------|
| LTE Band 7 | X-plane | Y-axis |

LTE Band 7

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation | Mode |
|--------------------|----------------------------|-------------------|---------------------|-------------------|--------------------|----------------------|
| - | EIRP | 20775 to 21425 | 20775, 21100, 21425 | 5 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| | | 20825 to 21375 | 20825, 21100, 21375 | 15 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100 21350 | 20 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| - | Modulation Characteristics | 20850 to 21350 | 21100 | 5 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| - | Frequency Stability | 20775 to 21425 | 20775, 21425 | 5 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21400 | 10 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20825 to 21375 | 20825, 21375 | 15 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21350 | 20 MHz | QPSK | 1 RB / 0 RB Offset |
| - | Occupied Bandwidth | 20775 to 21425 | 20775, 21100, 21425 | 5 MHz | QPSK, 16QAM, 64QAM | 25 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10 MHz | QPSK, 16QAM, 64QAM | 50 RB / 0 RB Offset |
| | | 20825 to 21375 | 20825, 21100, 21375 | 15 MHz | QPSK, 16QAM, 64QAM | 75 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100 21350 | 20 MHz | QPSK, 16QAM, 64QAM | 100 RB / 0 RB Offset |
| - | Peak to Average Ratio | 20775 to 21425 | 20775, 21100, 21425 | 5 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| | | 20825 to 21375 | 20825, 21100, 21375 | 15 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100 21350 | 20 MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset |
| - | Out-of-Band Emissions | 20775 to 21425 | 20775, 21425 | 5 MHz | QPSK, 16QAM, 64QAM | 25 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21400 | 10 MHz | QPSK, 16QAM, 64QAM | 50 RB / 0 RB Offset |
| | | 20825 to 21375 | 20825, 21375 | 15 MHz | QPSK, 16QAM, 64QAM | 75 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21350 | 20 MHz | QPSK, 16QAM, 64QAM | 100 RB / 0 RB Offset |

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation | Mode |
|--------------------|--------------------|-------------------|---------------------|-------------------|------------|--------------------|
| - | Conducted Emission | 20775 to 21425 | 20775, 21100, 21425 | 5 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20825 to 21375 | 20825, 21100, 21375 | 15 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100 21350 | 20 MHz | QPSK | 1 RB / 0 RB Offset |
| - | Radiated Emission | 20775 to 21425 | 20775, 21100, 21425 | 5 MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100 21350 | 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 | 25 deg. C, 65 % RH | 3.8 Vdc | Harry Hsueh |
| Modulation Characteristics | 25 deg. C, 65 % RH | 3.8 Vdc | Wayne Lin |
| Frequency Stability | 25 deg. C, 65 % RH | 3.8 Vdc | Wayne Lin |
| Occupied Bandwidth | 25 deg. C, 65 % RH | 3.8 Vdc | Wayne Lin |
| Out-of-Band Emissions | 25 deg. C, 65 % RH | 3.8 Vdc | Wayne Lin |
| Peak to Average Ratio | 25 deg. C, 65 % RH | 3.8 Vdc | Wayne Lin |
| Conducted Emission | 25 deg. C, 65 % RH | 3.8 Vdc | Wayne Lin |
| Radiated Emission | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Harry Hsueh |

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 27

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

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

4.1.2 Test Procedures

EIRP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 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.

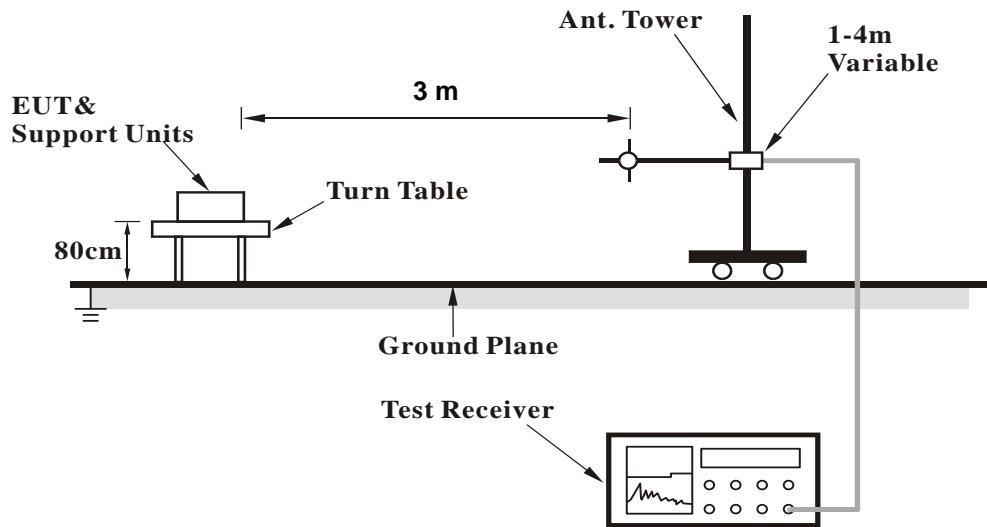
Conducted Power Measurement:

- 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.

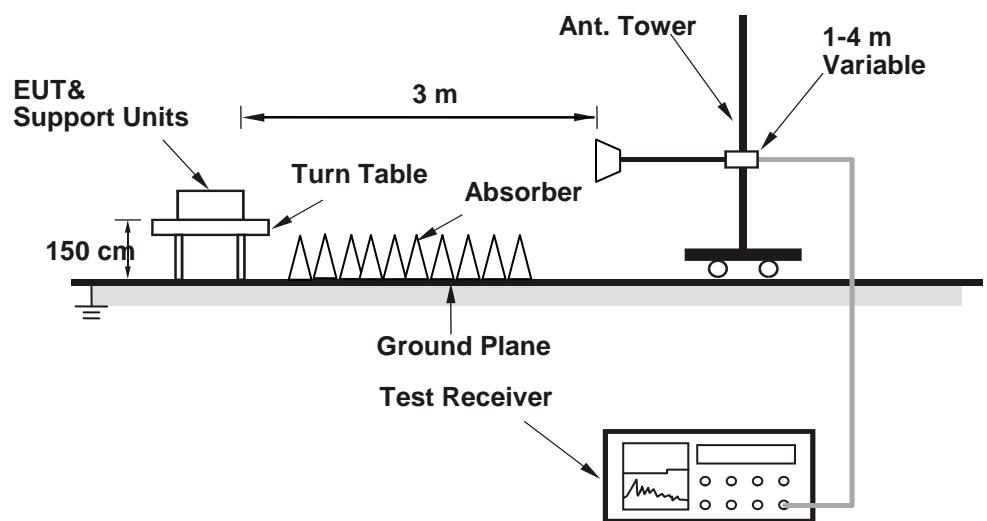
4.1.3 Test Setup

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

Conducted Output Power (dBm)

| LTE Band 7 | | | | | | | | | | | | | | | |
|------------|-----------|-----------------|-----------|--------|--------|--------|---------------|-----|-----------|-----------------|-----------|--------|--------|--------|---------------|
| 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 | | 20850 | 21100 | 21350 | | | | Channel | | 20825 | 21100 | 21375 | |
| | | Frequency (MHz) | | 2510.0 | 2535.0 | 2560.0 | | | | Frequency (MHz) | | 2507.5 | 2535.0 | 2562.5 | |
| 20M | QPSK | 1 | 0 | 23.61 | 23.62 | 23.51 | 0 | 15M | QPSK | 1 | 0 | 23.22 | 23.29 | 23.12 | 0 |
| | | 1 | 50 | 23.54 | 23.55 | 23.44 | 0 | | | 1 | 37 | 23.24 | 23.15 | 23.06 | 0 |
| | | 1 | 99 | 23.52 | 23.53 | 23.42 | 0 | | | 1 | 74 | 23.14 | 23.13 | 23.07 | 0 |
| | | 50 | 0 | 22.64 | 22.65 | 22.54 | 1 | | | 36 | 0 | 22.16 | 22.23 | 22.11 | 1 |
| | | 50 | 25 | 22.60 | 22.61 | 22.50 | 1 | | | 36 | 19 | 22.21 | 22.31 | 22.13 | 1 |
| | 16QAM | 50 | 50 | 22.53 | 22.54 | 22.43 | 1 | | | 36 | 39 | 22.29 | 22.35 | 22.15 | 1 |
| | | 100 | 0 | 22.61 | 22.62 | 22.51 | 1 | | | 75 | 0 | 22.28 | 22.32 | 22.14 | 1 |
| | | 1 | 0 | 22.59 | 22.57 | 22.41 | 1 | | 16QAM | 1 | 0 | 22.16 | 22.16 | 22.06 | 1 |
| | | 1 | 50 | 22.45 | 22.53 | 22.39 | 1 | | | 1 | 37 | 22.21 | 22.13 | 21.99 | 1 |
| | | 1 | 99 | 22.42 | 22.50 | 22.33 | 1 | | | 1 | 74 | 22.08 | 22.15 | 22.03 | 1 |
| 10M | 64QAM | 50 | 0 | 21.49 | 21.44 | 21.34 | 2 | | | 36 | 0 | 21.22 | 21.21 | 20.98 | 2 |
| | | 50 | 25 | 21.56 | 21.59 | 21.42 | 2 | | | 36 | 19 | 21.17 | 21.23 | 21.07 | 2 |
| | | 50 | 50 | 21.61 | 21.64 | 21.49 | 2 | | | 36 | 39 | 21.24 | 21.18 | 21.14 | 2 |
| | | 100 | 0 | 21.57 | 21.52 | 21.47 | 2 | | | 75 | 0 | 21.17 | 21.27 | 21.07 | 2 |
| | | 1 | 0 | 21.58 | 21.54 | 21.43 | 2 | | 64QAM | 1 | 0 | 21.27 | 21.24 | 21.08 | 2 |
| | | 1 | 50 | 21.44 | 21.46 | 21.34 | 2 | | | 1 | 37 | 21.07 | 21.21 | 21.02 | 2 |
| | | 1 | 99 | 21.47 | 21.52 | 21.42 | 2 | | | 1 | 74 | 21.13 | 21.18 | 20.99 | 2 |
| | | 50 | 0 | 20.49 | 20.46 | 20.42 | 3 | | | 36 | 0 | 20.08 | 20.12 | 20.04 | 3 |
| | | 50 | 25 | 20.60 | 20.52 | 20.50 | 3 | | | 36 | 19 | 20.16 | 20.23 | 20.08 | 3 |
| | | 50 | 50 | 20.57 | 20.63 | 20.44 | 3 | | | 36 | 39 | 20.28 | 20.21 | 20.11 | 3 |
| | | 100 | 0 | 20.52 | 20.57 | 20.51 | 3 | | | 75 | 0 | 20.27 | 20.18 | 20.14 | 3 |
| 20M | QPSK | 1 | 0 | 23.14 | 23.20 | 23.12 | 0 | 5M | QPSK | 1 | 0 | 23.31 | 23.24 | 22.98 | 0 |
| | | 1 | 24 | 23.04 | 23.17 | 23.02 | 0 | | | 1 | 12 | 23.06 | 23.15 | 22.83 | 0 |
| | | 1 | 49 | 23.17 | 23.20 | 23.03 | 0 | | | 1 | 24 | 23.03 | 23.16 | 22.89 | 0 |
| | | 25 | 0 | 22.15 | 22.20 | 21.94 | 1 | | | 12 | 0 | 22.13 | 22.20 | 21.89 | 1 |
| | | 25 | 12 | 22.13 | 22.12 | 22.00 | 1 | | | 12 | 6 | 22.18 | 22.17 | 21.95 | 1 |
| | | 25 | 25 | 22.18 | 22.26 | 22.09 | 1 | | | 12 | 13 | 22.22 | 22.23 | 22.10 | 1 |
| | | 50 | 0 | 22.14 | 22.11 | 22.08 | 1 | | | 25 | 0 | 22.25 | 22.18 | 22.02 | 1 |
| | 16QAM | 1 | 0 | 22.21 | 22.24 | 21.98 | 1 | | 16QAM | 1 | 0 | 22.18 | 22.20 | 22.03 | 1 |
| | | 1 | 24 | 22.10 | 22.14 | 21.95 | 1 | | | 1 | 12 | 21.96 | 22.05 | 21.99 | 1 |
| | | 1 | 49 | 21.99 | 22.18 | 22.04 | 1 | | | 1 | 24 | 22.10 | 22.06 | 21.93 | 1 |
| | | 25 | 0 | 20.90 | 20.98 | 20.88 | 2 | | | 12 | 0 | 20.91 | 21.14 | 21.05 | 2 |
| | | 25 | 12 | 21.03 | 21.23 | 21.04 | 2 | | | 12 | 6 | 21.10 | 21.19 | 21.09 | 2 |
| | | 25 | 25 | 21.03 | 21.28 | 21.10 | 2 | | | 12 | 13 | 21.12 | 21.07 | 21.13 | 2 |
| | | 50 | 0 | 21.15 | 21.08 | 21.12 | 2 | | | 25 | 0 | 21.19 | 21.26 | 21.09 | 2 |
| 10M | 64QAM | 1 | 0 | 21.09 | 21.05 | 21.15 | 2 | | 64QAM | 1 | 0 | 21.08 | 21.18 | 21.10 | 2 |
| | | 1 | 24 | 21.05 | 20.96 | 21.03 | 2 | | | 1 | 12 | 21.13 | 21.03 | 20.99 | 2 |
| | | 1 | 49 | 21.02 | 21.14 | 20.91 | 2 | | | 1 | 24 | 21.00 | 21.18 | 20.95 | 2 |
| | | 25 | 0 | 20.09 | 20.15 | 20.05 | 3 | | | 12 | 0 | 20.09 | 19.99 | 19.99 | 3 |
| | | 25 | 12 | 20.12 | 20.18 | 20.10 | 3 | | | 12 | 6 | 20.16 | 20.21 | 20.05 | 3 |
| | | 25 | 25 | 20.24 | 20.04 | 20.07 | 3 | | | 12 | 13 | 20.10 | 20.25 | 20.18 | 3 |
| | | 50 | 0 | 20.12 | 20.11 | 20.05 | 3 | | | 25 | 0 | 20.08 | 20.17 | 20.03 | 3 |

EIRP Power (dBm)

| LTE Band 7 | | | | | | | |
|----------------------------------|---------|-----------------|---------------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 5 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| X | 20775 | 2502.5 | -19.80 | 44.24 | 24.44 | 277.84 | H |
| | 21100 | 2535.0 | -19.69 | 44.20 | 24.51 | 282.29 | |
| | 21425 | 2567.5 | -20.38 | 44.80 | 24.42 | 276.76 | |
| | 20775 | 2502.5 | -23.74 | 44.19 | 20.45 | 110.94 | V |
| | 21100 | 2535.0 | -23.61 | 44.09 | 20.48 | 111.63 | |
| | 21425 | 2567.5 | -24.09 | 44.50 | 20.41 | 109.88 | |
| Channel Bandwidth: 5 MHz / 16QAM | | | | | | | |
| X | 20775 | 2502.5 | -20.81 | 44.24 | 23.43 | 220.19 | H |
| | 21100 | 2535.0 | -20.70 | 44.20 | 23.50 | 223.72 | |
| | 21425 | 2567.5 | -21.39 | 44.80 | 23.41 | 219.33 | |
| | 20775 | 2502.5 | -24.74 | 44.19 | 19.45 | 88.13 | V |
| | 21100 | 2535.0 | -24.62 | 44.09 | 19.47 | 88.47 | |
| | 21425 | 2567.5 | -25.10 | 44.50 | 19.40 | 87.08 | |
| Channel Bandwidth: 5 MHz / 64QAM | | | | | | | |
| X | 20775 | 2502.5 | -21.82 | 44.24 | 22.42 | 174.50 | H |
| | 21100 | 2535.0 | -21.71 | 44.20 | 22.49 | 177.30 | |
| | 21425 | 2567.5 | -22.40 | 44.80 | 22.40 | 173.82 | |
| | 20775 | 2502.5 | -25.75 | 44.19 | 18.44 | 69.84 | V |
| | 21100 | 2535.0 | -25.62 | 44.09 | 18.47 | 70.27 | |
| | 21425 | 2567.5 | -26.11 | 44.50 | 18.39 | 69.01 | |

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

| LTE Band 7 | | | | | | | |
|-----------------------------------|---------|-----------------|---------------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 10 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| X | 20800 | 2505.0 | -19.86 | 44.34 | 24.48 | 280.61 | H |
| | 21100 | 2535.0 | -19.65 | 44.20 | 24.55 | 284.90 | |
| | 21400 | 2565.0 | -20.27 | 44.72 | 24.45 | 278.80 | |
| | 20800 | 2505.0 | -23.74 | 44.23 | 20.49 | 111.84 | V |
| | 21100 | 2535.0 | -23.57 | 44.09 | 20.52 | 112.67 | |
| | 21400 | 2565.0 | -23.96 | 44.41 | 20.45 | 110.82 | |
| Channel Bandwidth: 10 MHz / 16QAM | | | | | | | |
| X | 20800 | 2505.0 | -20.86 | 44.34 | 23.48 | 222.89 | H |
| | 21100 | 2535.0 | -20.66 | 44.20 | 23.54 | 225.79 | |
| | 21400 | 2565.0 | -21.27 | 44.72 | 23.45 | 221.46 | |
| | 20800 | 2505.0 | -24.75 | 44.23 | 19.48 | 88.63 | V |
| | 21100 | 2535.0 | -24.58 | 44.09 | 19.51 | 89.29 | |
| | 21400 | 2565.0 | -24.96 | 44.41 | 19.45 | 88.02 | |
| Channel Bandwidth: 10 MHz / 64QAM | | | | | | | |
| X | 20800 | 2505.0 | -21.86 | 44.34 | 22.48 | 177.05 | H |
| | 21100 | 2535.0 | -21.67 | 44.20 | 22.53 | 178.94 | |
| | 21400 | 2565.0 | -22.28 | 44.72 | 22.44 | 175.51 | |
| | 20800 | 2505.0 | -25.76 | 44.23 | 18.47 | 70.24 | V |
| | 21100 | 2535.0 | -25.58 | 44.09 | 18.51 | 70.93 | |
| | 21400 | 2565.0 | -25.97 | 44.41 | 18.44 | 69.76 | |

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

| LTE Band 7 | | | | | | | |
|-----------------------------------|---------|-----------------|---------------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 15 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| X | 20825 | 2507.5 | -19.81 | 44.32 | 24.51 | 282.36 | H |
| | 21100 | 2535.0 | -19.62 | 44.20 | 24.58 | 286.88 | |
| | 21375 | 2562.5 | -20.36 | 44.85 | 24.49 | 281.06 | |
| | 20825 | 2507.5 | -23.47 | 43.99 | 20.52 | 112.77 | V |
| | 21100 | 2535.0 | -23.53 | 44.09 | 20.56 | 113.71 | |
| | 21375 | 2562.5 | -24.02 | 44.51 | 20.49 | 111.94 | |
| Channel Bandwidth: 15 MHz / 16QAM | | | | | | | |
| X | 20825 | 2507.5 | -20.82 | 44.32 | 23.50 | 223.77 | H |
| | 21100 | 2535.0 | -20.63 | 44.20 | 23.57 | 227.35 | |
| | 21375 | 2562.5 | -21.37 | 44.85 | 23.48 | 222.74 | |
| | 20825 | 2507.5 | -24.47 | 43.99 | 19.52 | 89.58 | V |
| | 21100 | 2535.0 | -24.54 | 44.09 | 19.55 | 90.12 | |
| | 21375 | 2562.5 | -25.03 | 44.51 | 19.48 | 88.72 | |
| Channel Bandwidth: 15 MHz / 64QAM | | | | | | | |
| X | 20825 | 2507.5 | -21.82 | 44.32 | 22.50 | 177.75 | H |
| | 21100 | 2535.0 | -21.63 | 44.20 | 22.57 | 180.59 | |
| | 21375 | 2562.5 | -22.38 | 44.85 | 22.47 | 176.52 | |
| | 20825 | 2507.5 | -25.47 | 43.99 | 18.52 | 71.15 | V |
| | 21100 | 2535.0 | -25.54 | 44.09 | 18.55 | 71.58 | |
| | 21375 | 2562.5 | -26.03 | 44.51 | 18.48 | 70.47 | |

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

| LTE Band 7 | | | | | | | |
|-----------------------------------|---------|-----------------|---------------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 20 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | Reading (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| X | 20850.0 | 2510.0 | -19.61 | 44.16 | 24.55 | 285.10 | H |
| | 21100.0 | 2535.0 | -19.58 | 44.20 | 24.62 | 289.53 | |
| | 21350.0 | 2560.0 | -20.29 | 44.81 | 24.52 | 282.94 | |
| | 20850.0 | 2510.0 | -24.22 | 44.78 | 20.56 | 113.76 | V |
| | 21100.0 | 2535.0 | -23.49 | 44.09 | 20.60 | 114.76 | |
| | 21350.0 | 2560.0 | -24.19 | 44.72 | 20.53 | 112.98 | |
| Channel Bandwidth: 20 MHz / 16QAM | | | | | | | |
| X | 20850.0 | 2510.0 | -20.62 | 44.16 | 23.54 | 225.94 | H |
| | 21100.0 | 2535.0 | -20.59 | 44.20 | 23.61 | 229.46 | |
| | 21350.0 | 2560.0 | -21.29 | 44.81 | 23.52 | 224.75 | |
| | 20850.0 | 2510.0 | -25.23 | 44.78 | 19.55 | 90.16 | V |
| | 21100.0 | 2535.0 | -24.50 | 44.09 | 19.59 | 90.95 | |
| | 21350.0 | 2560.0 | -25.19 | 44.72 | 19.53 | 89.74 | |
| Channel Bandwidth: 20 MHz / 64QAM | | | | | | | |
| X | 20850.0 | 2510.0 | -21.62 | 44.16 | 22.54 | 179.47 | H |
| | 21100.0 | 2535.0 | -21.60 | 44.20 | 22.60 | 181.84 | |
| | 21350.0 | 2560.0 | -22.30 | 44.81 | 22.51 | 178.11 | |
| | 20850.0 | 2510.0 | -26.24 | 44.78 | 18.54 | 71.45 | V |
| | 21100.0 | 2535.0 | -25.51 | 44.09 | 18.58 | 72.08 | |
| | 21350.0 | 2560.0 | -26.20 | 44.72 | 18.52 | 71.12 | |

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

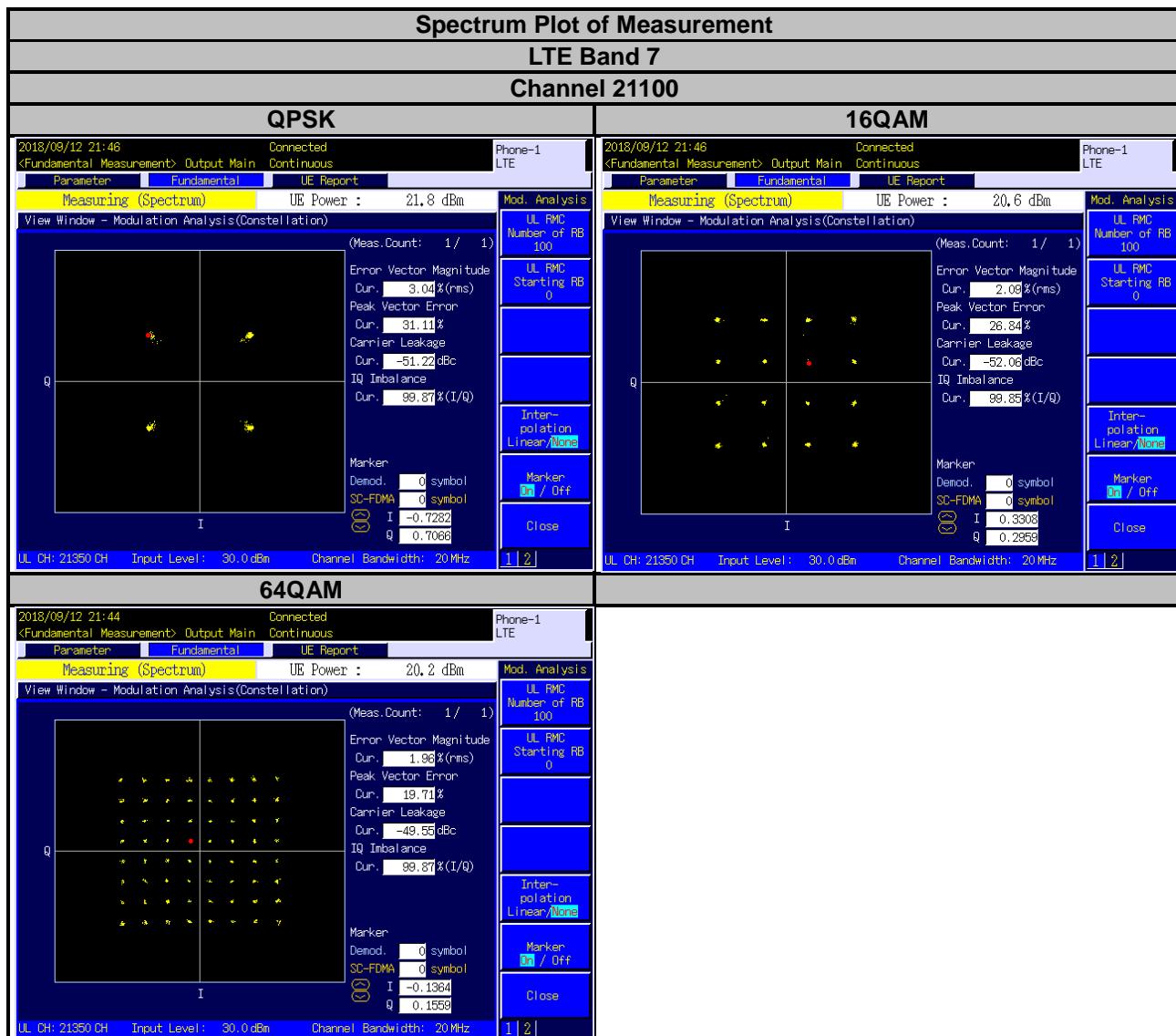
4.2.2 Test Setup



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

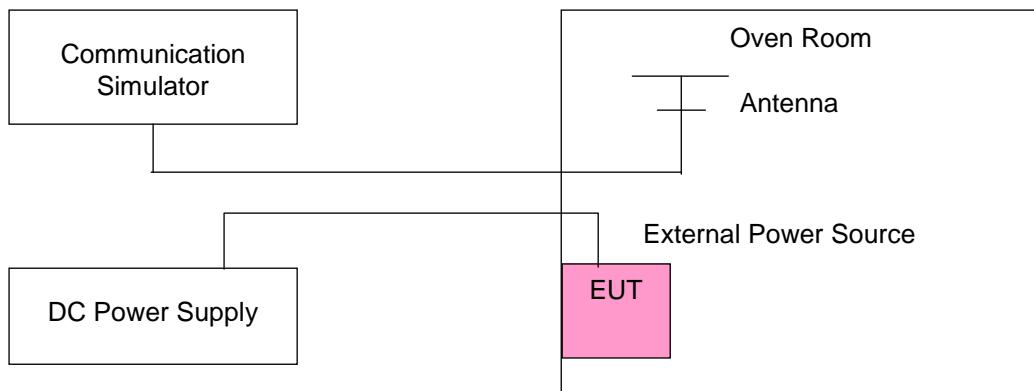
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary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

4.3.2 Test Procedure

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

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 7 | | | | Limit (ppm) | |
|--------------------|--------------------------|-----------------|-----------------------|-------|-------------|--|
| | Channel Bandwidth: 5 MHz | | | | | |
| | Low Channel | | High Channel | | | |
| Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) | | | |
| 3.8 | 2502.500004 | 0.001 | 2567.500003 | 0.001 | 2.5 | |
| 3.23 | 2502.500002 | 0.001 | 2567.500001 | 0.000 | 2.5 | |
| 4.37 | 2502.500003 | 0.001 | 2567.500004 | 0.002 | 2.5 | |

Note: The applicant defined the normal working voltage of the battery is from 3.23 Vdc to 4.37 Vdc.

Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 7 | | | | Limit (ppm) | |
|-----------------|--------------------------|-----------------|-----------------------|--------|-------------|--|
| | Channel Bandwidth: 5 MHz | | | | | |
| | Low Channel | | High Channel | | | |
| Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) | | | |
| -30 | 2502.500004 | 0.001 | 2567.500004 | 0.002 | 2.5 | |
| -20 | 2502.500002 | 0.001 | 2567.500002 | 0.001 | 2.5 | |
| -10 | 2502.500004 | 0.001 | 2567.500002 | 0.001 | 2.5 | |
| 0 | 2502.500001 | 0.000 | 2567.500003 | 0.001 | 2.5 | |
| 10 | 2502.500001 | 0.001 | 2567.500003 | 0.001 | 2.5 | |
| 20 | 2502.499998 | -0.001 | 2567.499997 | -0.001 | 2.5 | |
| 30 | 2502.499996 | -0.001 | 2567.499999 | -0.001 | 2.5 | |
| 40 | 2502.499998 | -0.001 | 2567.499997 | -0.001 | 2.5 | |
| 50 | 2502.499998 | -0.001 | 2567.499999 | -0.001 | 2.5 | |
| 60 | 2502.499998 | -0.001 | 2567.499999 | -0.001 | 2.5 | |

Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 7 | | | | Limit (ppm) | |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|--|
| | Channel Bandwidth: 10 MHz | | | | | |
| | Low Channel | | High Channel | | | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) | | |
| 3.8 | 2505.000002 | 0.001 | 2565.000003 | 0.001 | 2.5 | |
| 3.23 | 2505.000002 | 0.001 | 2565.000003 | 0.001 | 2.5 | |
| 4.37 | 2505.000003 | 0.001 | 2565.000004 | 0.002 | 2.5 | |

Note: The applicant defined the normal working voltage of the battery is from 3.23 Vdc to 4.37 Vdc.

Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 7 | | | | Limit (ppm) | |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|--|
| | Channel Bandwidth: 10 MHz | | | | | |
| | Low Channel | | High Channel | | | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) | | |
| -30 | 2505.000002 | 0.001 | 2565.000003 | 0.001 | 2.5 | |
| -20 | 2505.000004 | 0.002 | 2565.000004 | 0.001 | 2.5 | |
| -10 | 2505.000004 | 0.002 | 2565.000001 | 0.001 | 2.5 | |
| 0 | 2505.000002 | 0.001 | 2565.000002 | 0.001 | 2.5 | |
| 10 | 2505.000004 | 0.001 | 2565.000003 | 0.001 | 2.5 | |
| 20 | 2504.999996 | -0.002 | 2564.999999 | -0.001 | 2.5 | |
| 30 | 2504.999997 | -0.001 | 2564.999998 | -0.001 | 2.5 | |
| 40 | 2504.999996 | -0.001 | 2564.999999 | -0.001 | 2.5 | |
| 50 | 2504.999998 | -0.001 | 2564.999998 | -0.001 | 2.5 | |
| 60 | 2504.999998 | -0.001 | 2564.999998 | -0.001 | 2.5 | |

Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 7 | | | | Limit (ppm) | |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|--|
| | Channel Bandwidth: 15 MHz | | | | | |
| | Low Channel | | High Channel | | | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) | | |
| 3.8 | 2507.500003 | 0.001 | 2562.500004 | 0.001 | 2.5 | |
| 3.23 | 2507.500003 | 0.001 | 2562.500003 | 0.001 | 2.5 | |
| 4.37 | 2507.500002 | 0.001 | 2562.500001 | 0.001 | 2.5 | |

Note: The applicant defined the normal working voltage of the battery is from 3.23 Vdc to 4.37 Vdc.

Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 7 | | | | Limit (ppm) | |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|--|
| | Channel Bandwidth: 15 MHz | | | | | |
| | Low Channel | | High Channel | | | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) | | |
| -30 | 2507.500004 | 0.002 | 2562.500004 | 0.002 | 2.5 | |
| -20 | 2507.500003 | 0.001 | 2562.500001 | 0.001 | 2.5 | |
| -10 | 2507.500002 | 0.001 | 2562.500004 | 0.001 | 2.5 | |
| 0 | 2507.500001 | 0.000 | 2562.500003 | 0.001 | 2.5 | |
| 10 | 2507.500004 | 0.001 | 2562.500001 | 0.000 | 2.5 | |
| 20 | 2507.499998 | -0.001 | 2562.499997 | -0.001 | 2.5 | |
| 30 | 2507.499998 | -0.001 | 2562.499996 | -0.001 | 2.5 | |
| 40 | 2507.499998 | -0.001 | 2562.499997 | -0.001 | 2.5 | |
| 50 | 2507.499998 | -0.001 | 2562.499998 | -0.001 | 2.5 | |
| 60 | 2507.499998 | -0.001 | 2562.499997 | -0.001 | 2.5 | |

Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 7 | | | | Limit (ppm) | |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|--|
| | Channel Bandwidth: 20 MHz | | | | | |
| | Low Channel | | High Channel | | | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) | | |
| 3.8 | 2510.000002 | 0.001 | 2560.000003 | 0.001 | 2.5 | |
| 3.23 | 2510.000003 | 0.001 | 2560.000001 | 0.000 | 2.5 | |
| 4.37 | 2510.000003 | 0.001 | 2560.000003 | 0.001 | 2.5 | |

Note: The applicant defined the normal working voltage of the battery is from 3.23 Vdc to 4.37 Vdc.

Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 7 | | | | Limit (ppm) | |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|--|
| | Channel Bandwidth: 20 MHz | | | | | |
| | Low Channel | | High Channel | | | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) | | |
| -30 | 2510.000002 | 0.001 | 2560.000002 | 0.001 | 2.5 | |
| -20 | 2510.000003 | 0.001 | 2560.000001 | 0.000 | 2.5 | |
| -10 | 2510.000002 | 0.001 | 2560.000002 | 0.001 | 2.5 | |
| 0 | 2510.000004 | 0.002 | 2560.000002 | 0.001 | 2.5 | |
| 10 | 2510.000003 | 0.001 | 2560.000002 | 0.001 | 2.5 | |
| 20 | 2509.999999 | 0.000 | 2559.999997 | -0.001 | 2.5 | |
| 30 | 2509.999997 | -0.001 | 2559.999997 | -0.001 | 2.5 | |
| 40 | 2509.999999 | 0.000 | 2559.999999 | -0.001 | 2.5 | |
| 50 | 2509.999999 | -0.001 | 2559.999997 | -0.001 | 2.5 | |
| 60 | 2509.999999 | -0.001 | 2559.999999 | -0.001 | 2.5 | |

4.4 Occupied Bandwidth Measurement

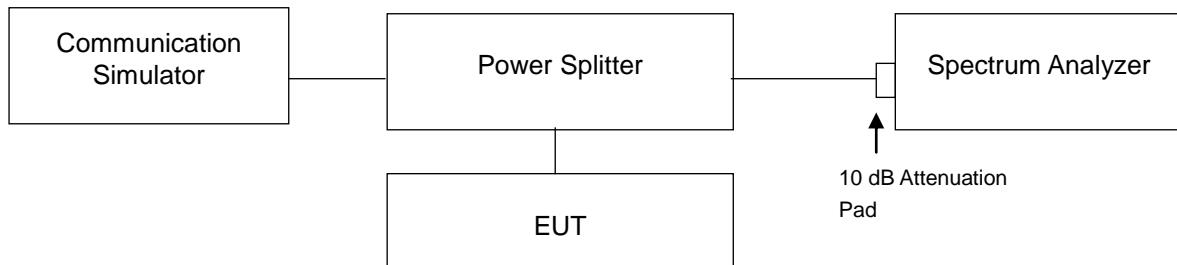
4.4.1 Limits of Occupied Bandwidth Measurement

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

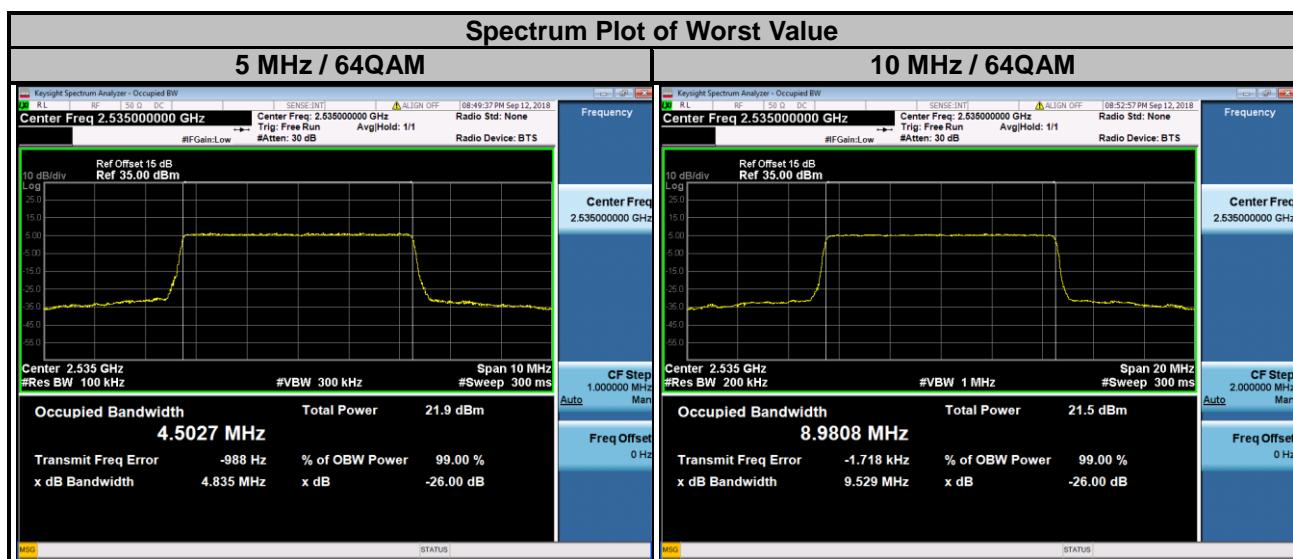
- a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.3 Test Setup

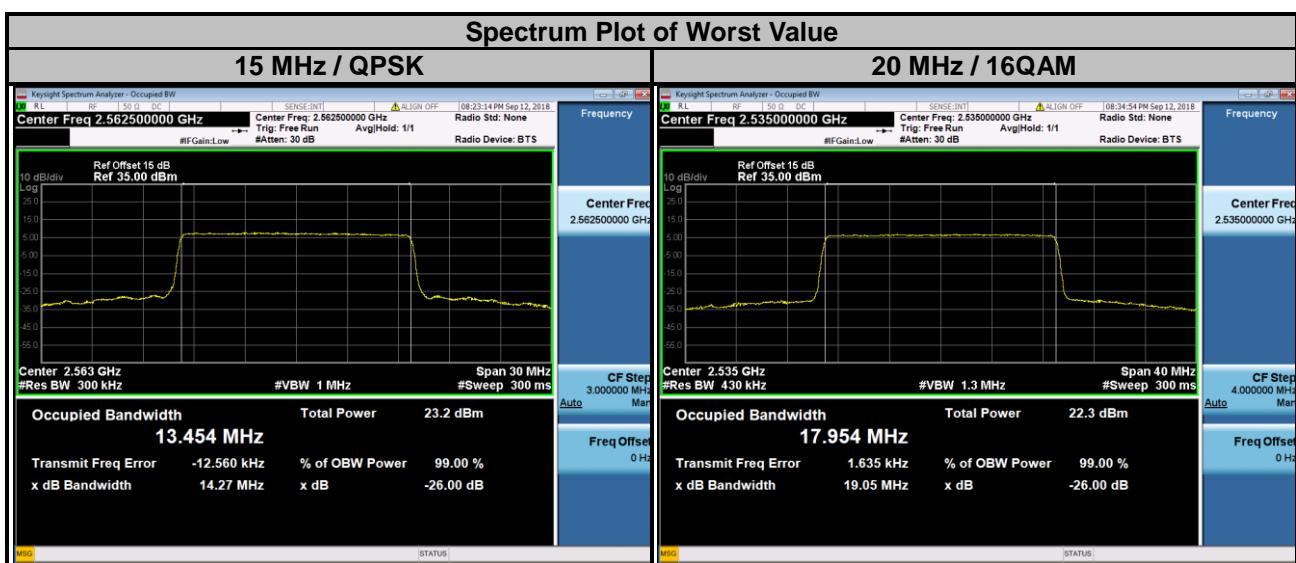


4.4.4 Test Results

| LTE Band 7 | | | | | | | | | | |
|--------------------------|-----------------|-------------------------------|--------|--------|------|---------------------------|-----------------|-------------------------------|--------|--------|
| Channel Bandwidth: 5 MHz | | | | | | Channel Bandwidth: 10 MHz | | | | |
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) | | | | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) | | |
| | | QPSK | 16QAM | 64QAM | QPSK | | | 16QAM | 64QAM | |
| 20775 | 2502.5 | 4.4914 | 4.4932 | 4.4983 | | 20800 | 2505.0 | 8.9638 | 8.9712 | 8.9727 |
| 21100 | 2535.0 | 4.4923 | 4.4935 | 4.5027 | | 21100 | 2535.0 | 8.9716 | 8.9733 | 8.9808 |
| 21425 | 2567.5 | 4.4935 | 4.4939 | 4.5025 | | 21400 | 2565.0 | 8.9738 | 8.9760 | 8.9774 |



| LTE Band 7 | | | | | | | | | |
|---------------------------|-----------------|-------------------------------|--------|--------|---------------------------|-----------------|-------------------------------|--------|--------|
| Channel Bandwidth: 15 MHz | | | | | Channel Bandwidth: 20 MHz | | | | |
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) | | | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) | | |
| | | QPSK | 16QAM | 64QAM | | | QPSK | 16QAM | 64QAM |
| 20825 | 2507.5 | 13.436 | 13.426 | 13.424 | 20850 | 2510.0 | 17.894 | 17.910 | 17.910 |
| 21100 | 2535.0 | 13.453 | 13.445 | 13.442 | 21100 | 2535.0 | 17.923 | 17.954 | 17.950 |
| 21375 | 2562.5 | 13.454 | 13.448 | 13.441 | 21350 | 2560.0 | 17.928 | 17.952 | 17.945 |

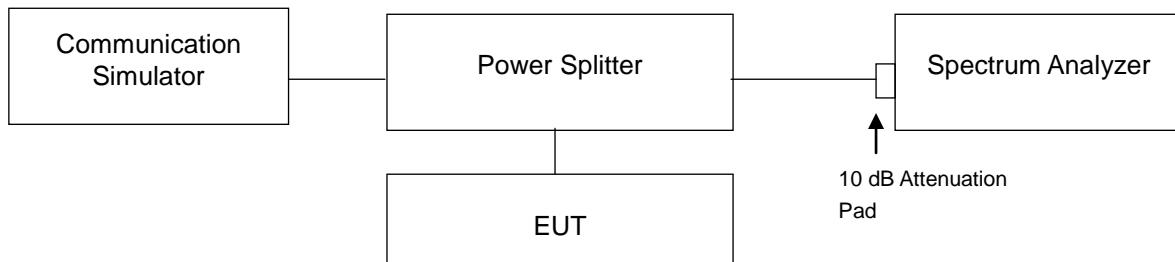


4.5 Out-of-Band Emissions Measurement

4.5.1 Limits of Out-of-Band Emissions Measurement

According to FCC 27.53(l)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

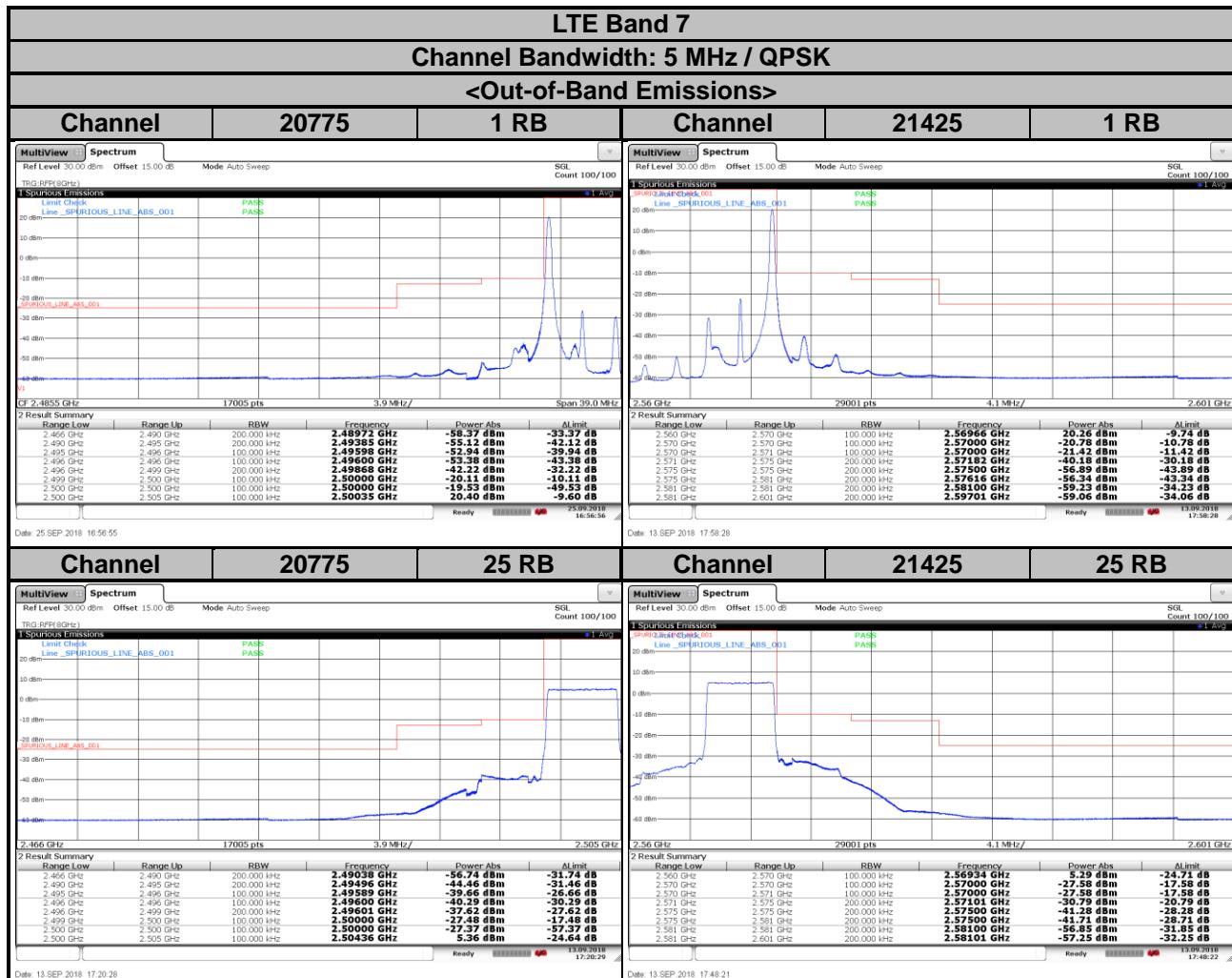
4.5.2 Test Setup

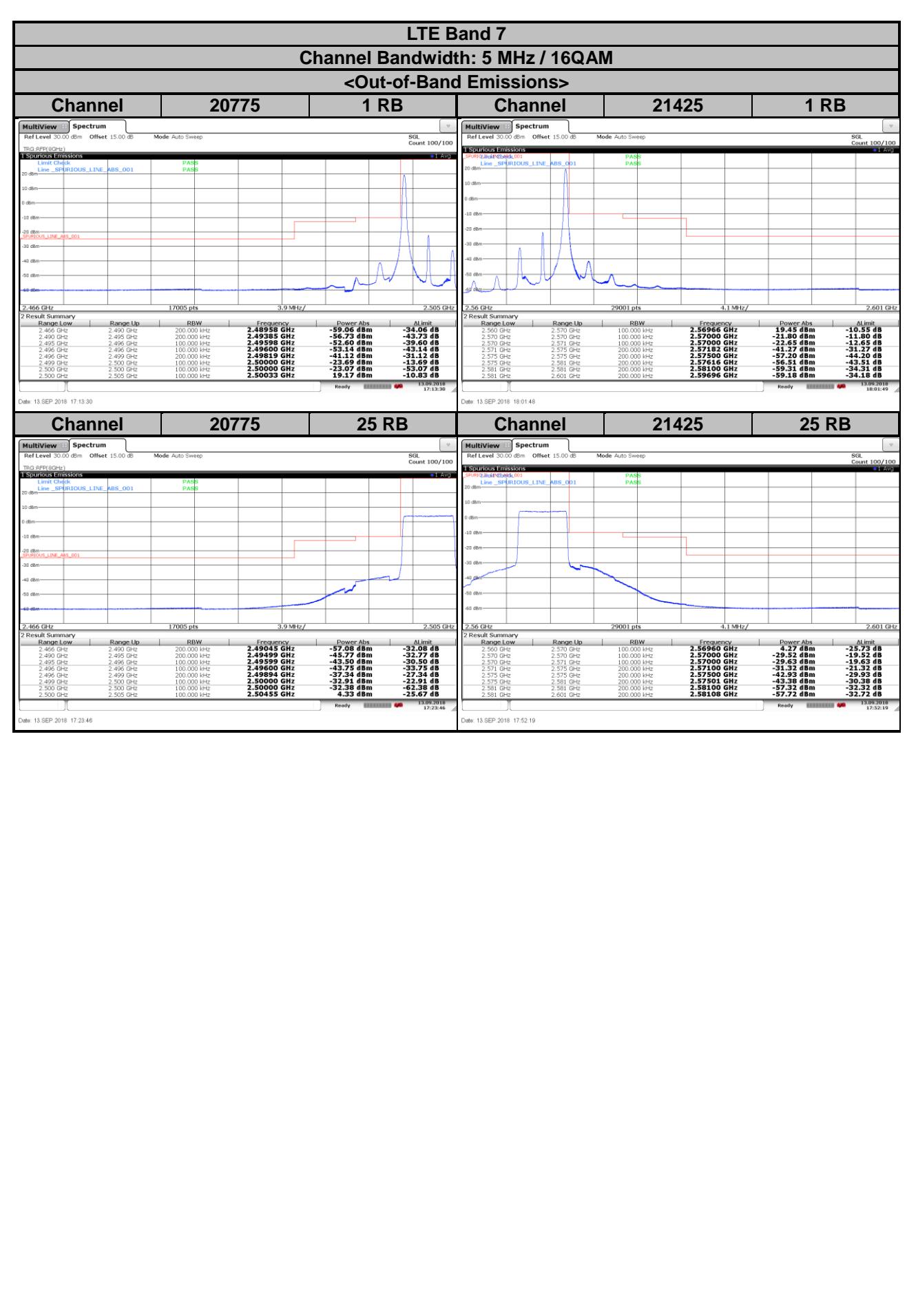


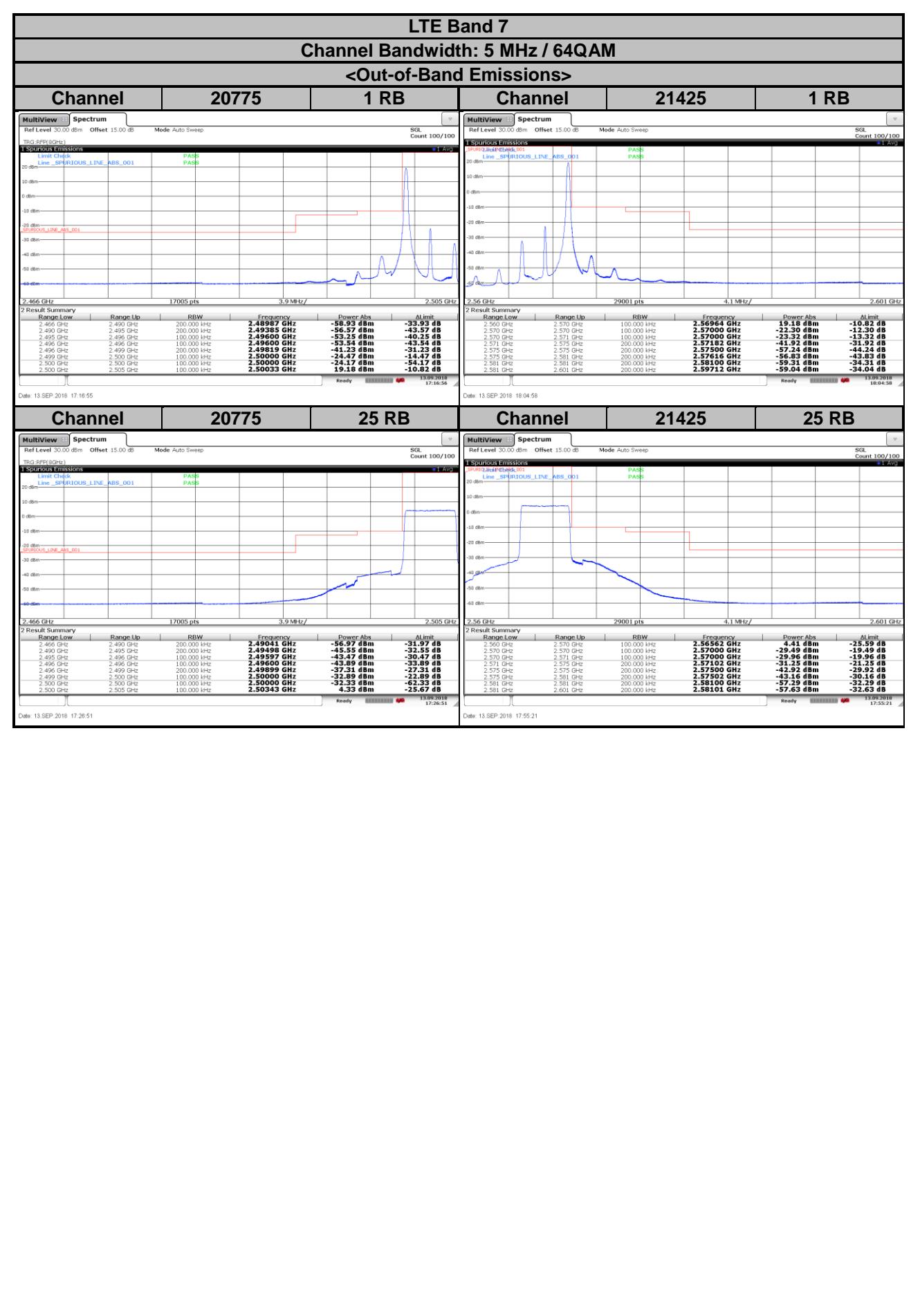
4.5.3 Test Procedures

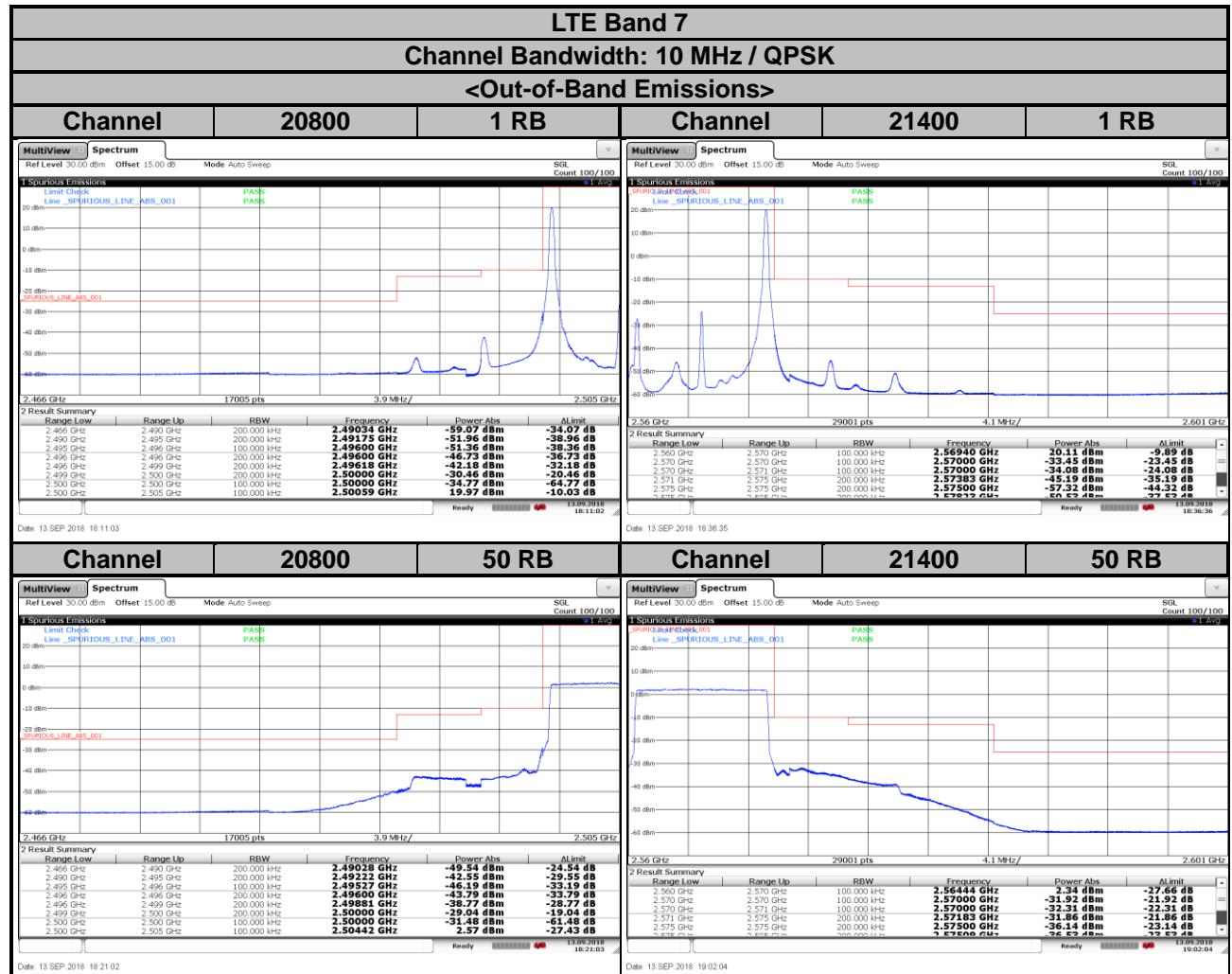
- The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- The out-of-band emissions measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Record the max. trace plot into the test report.

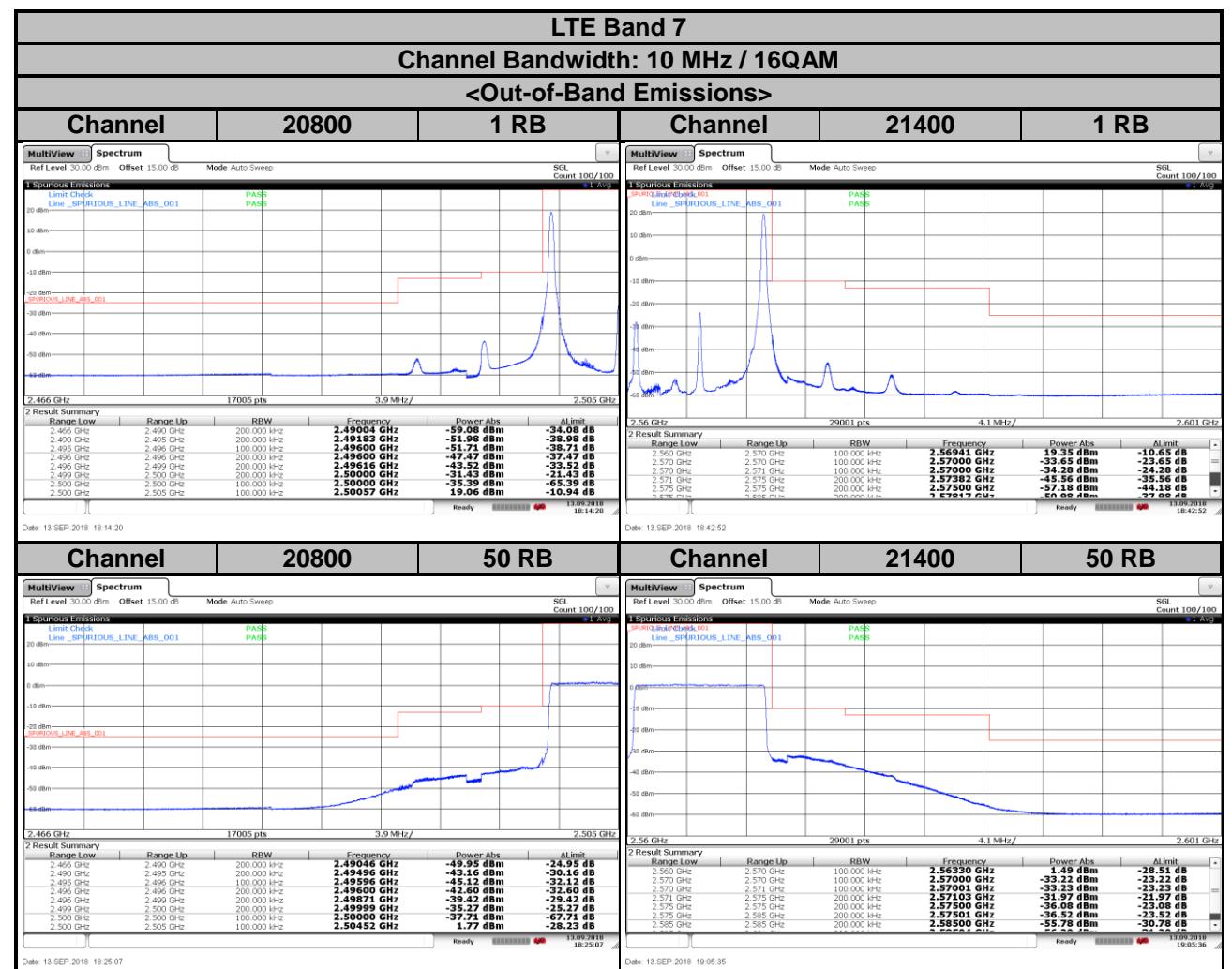
4.5.4 Test Results

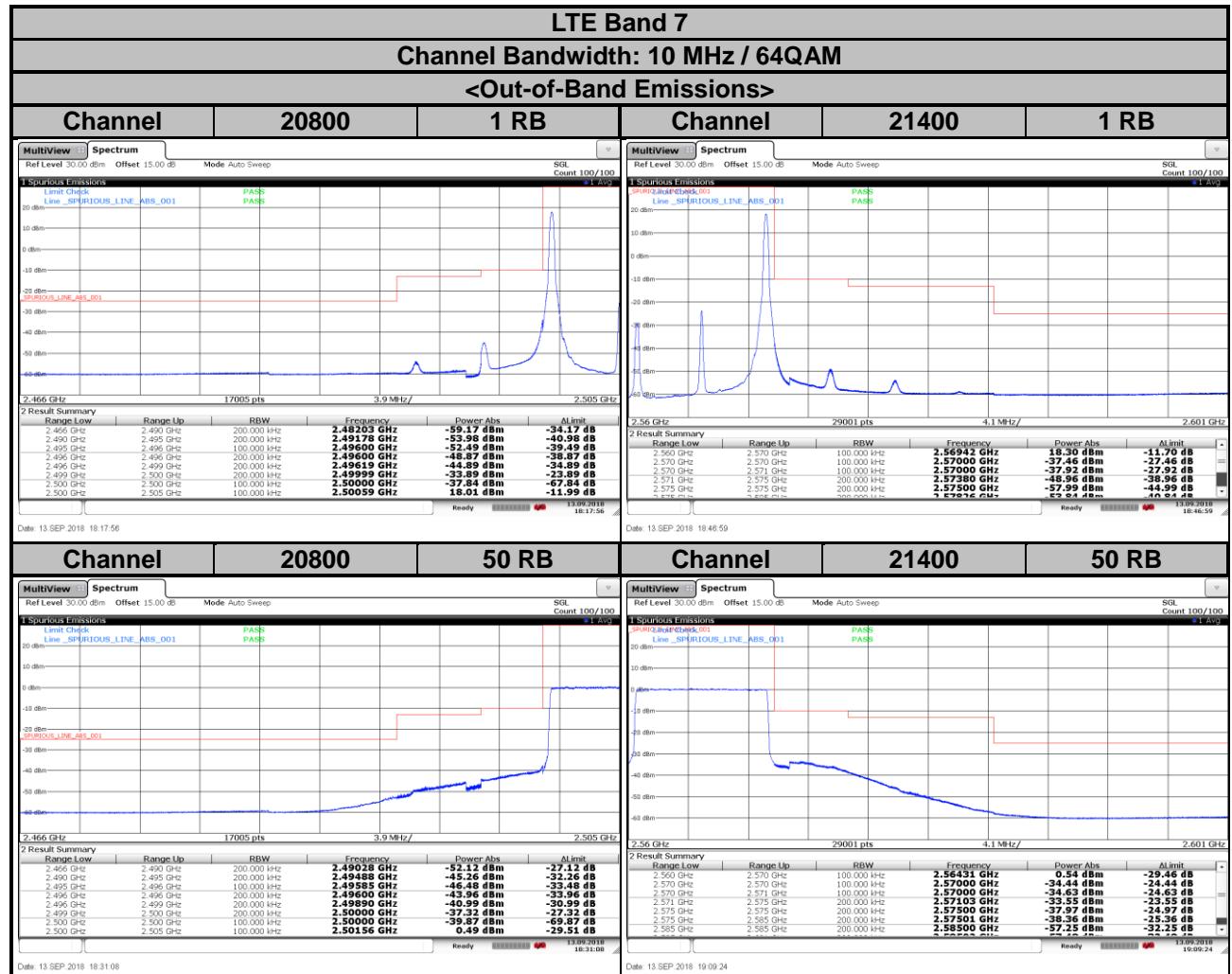


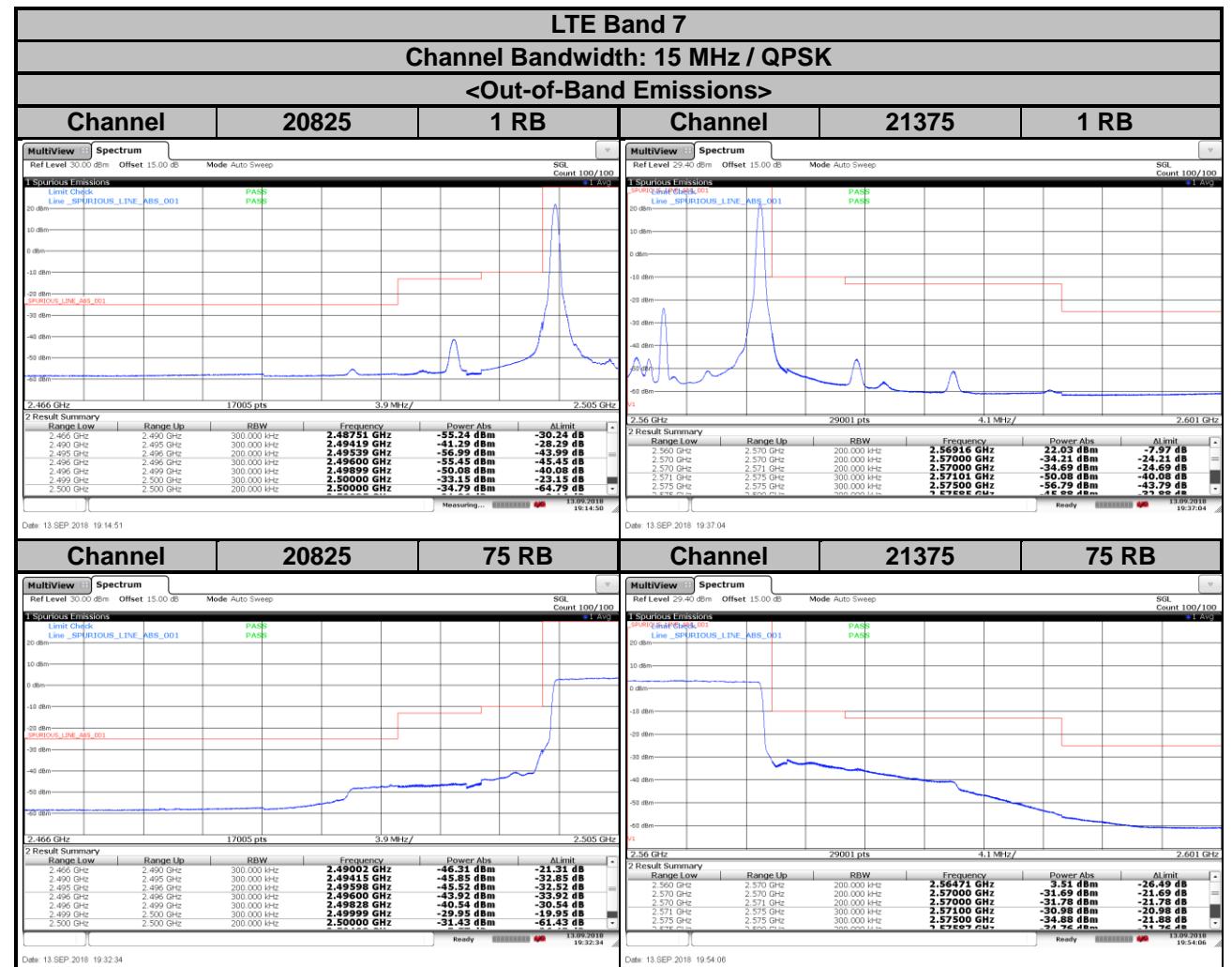


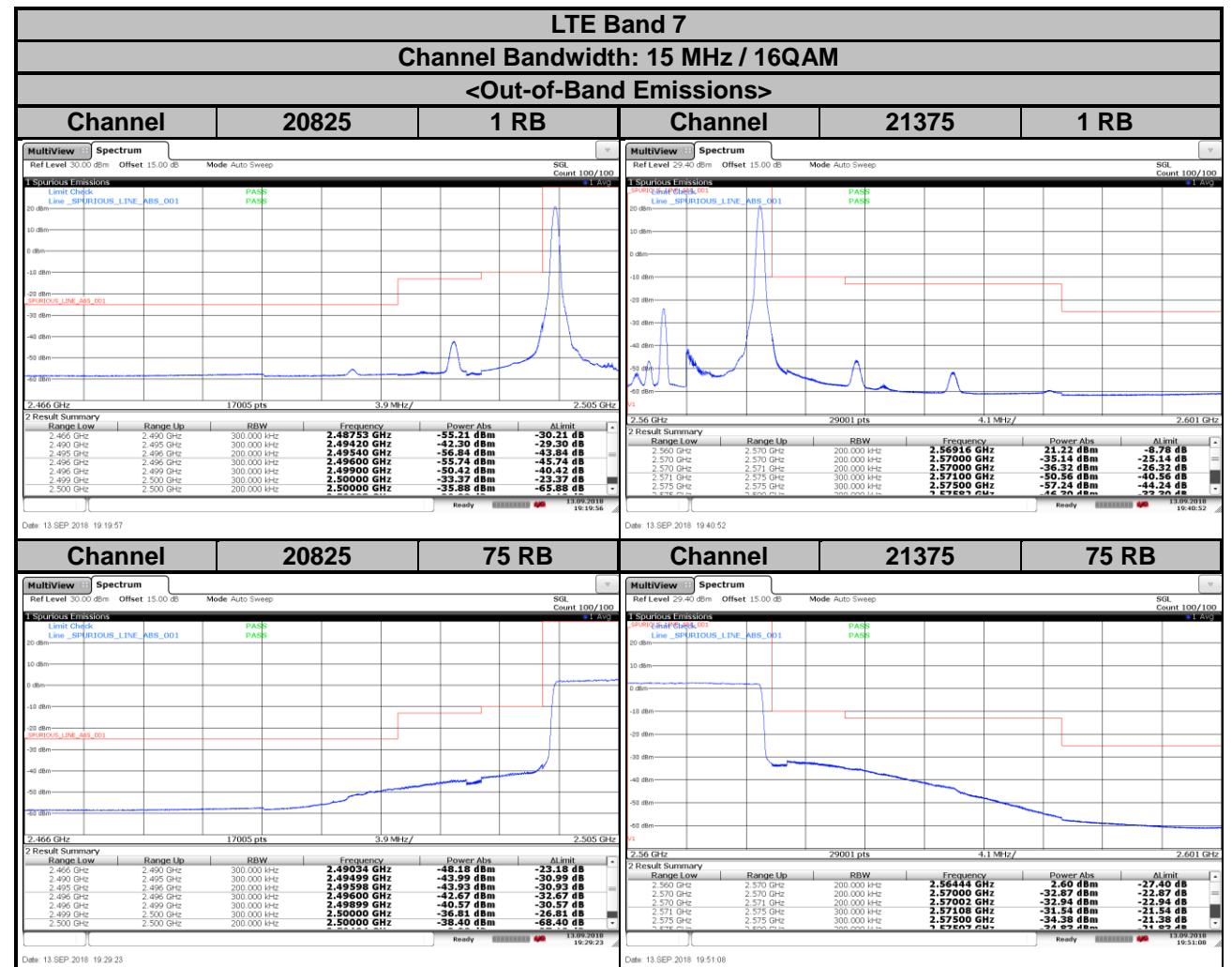


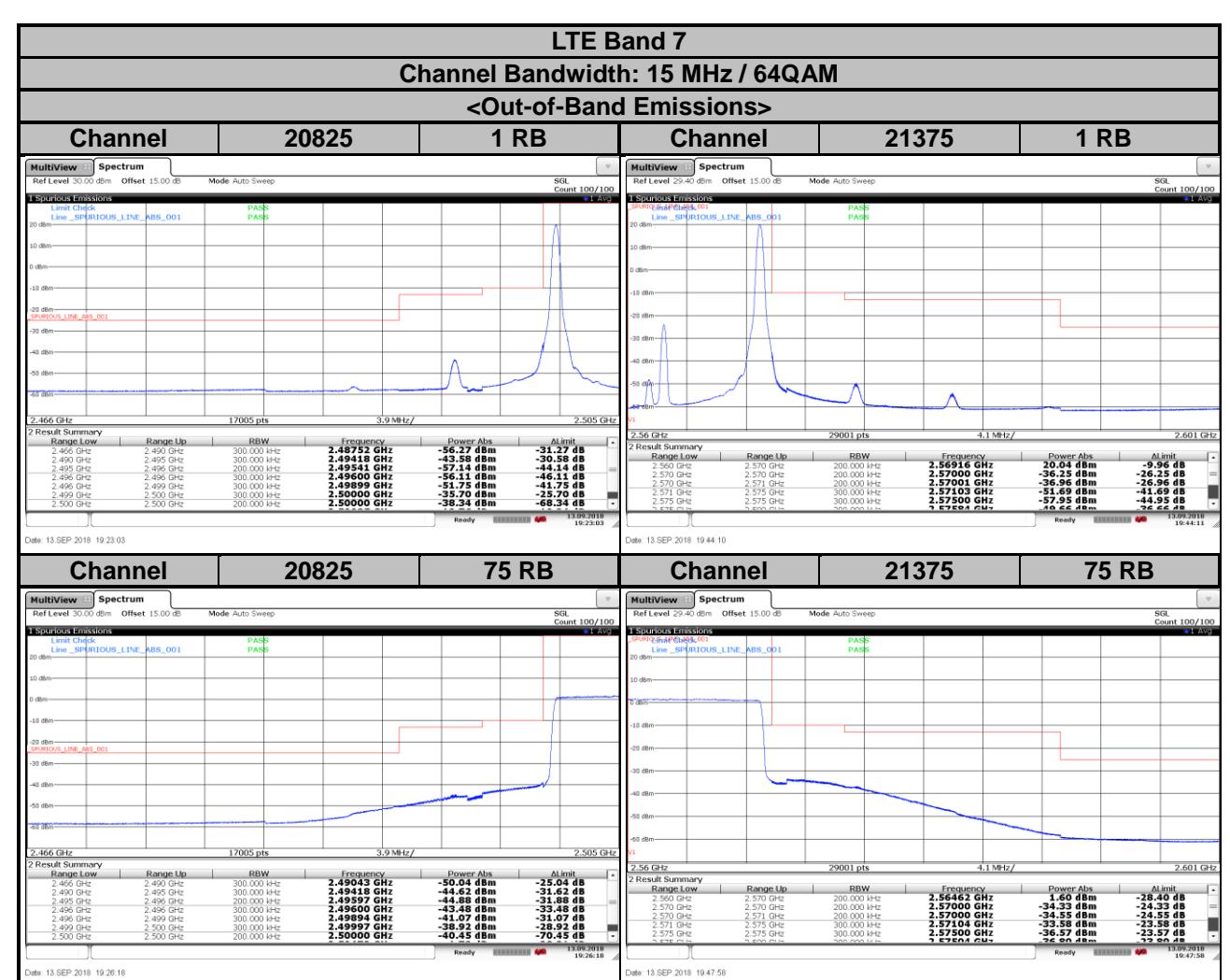


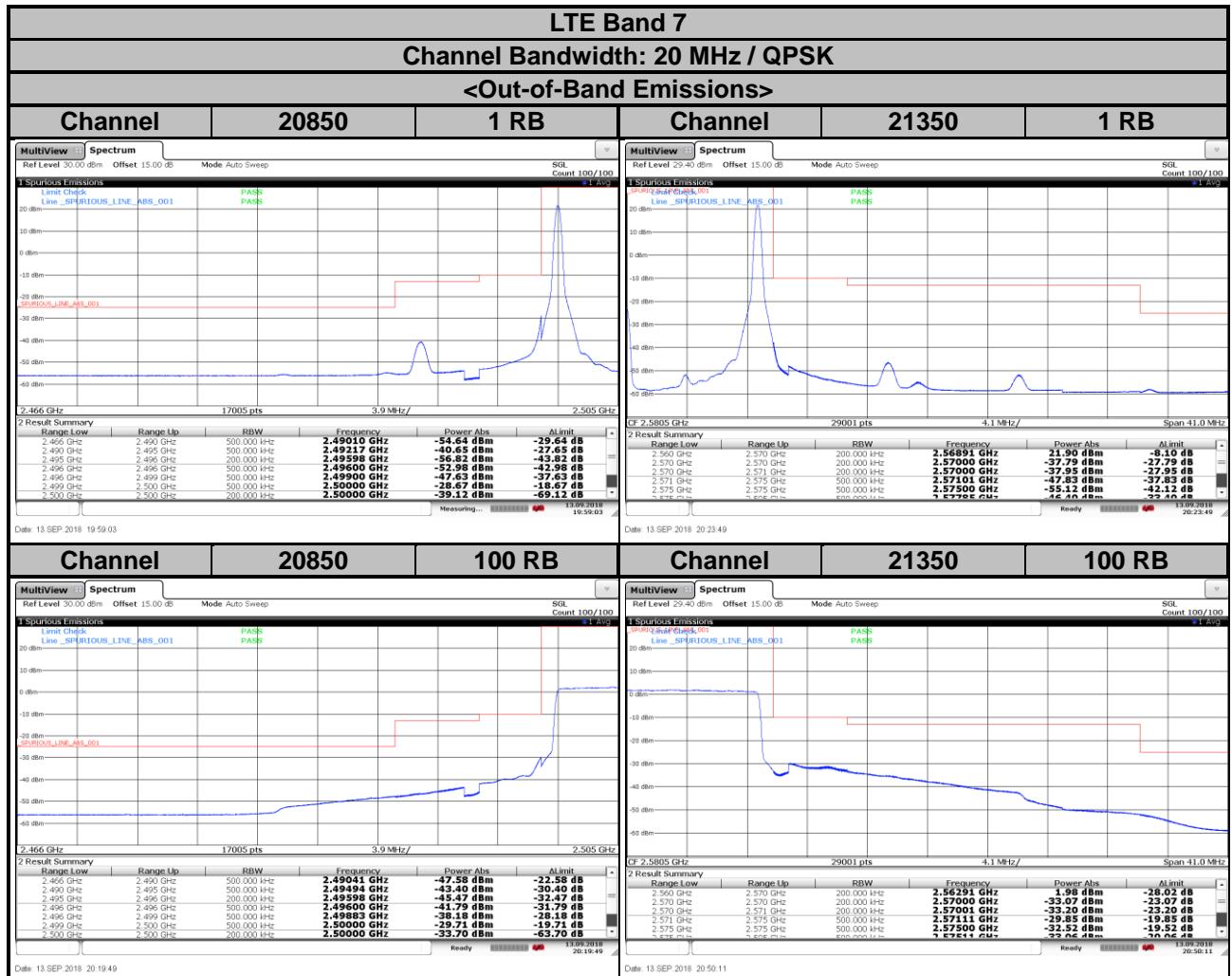


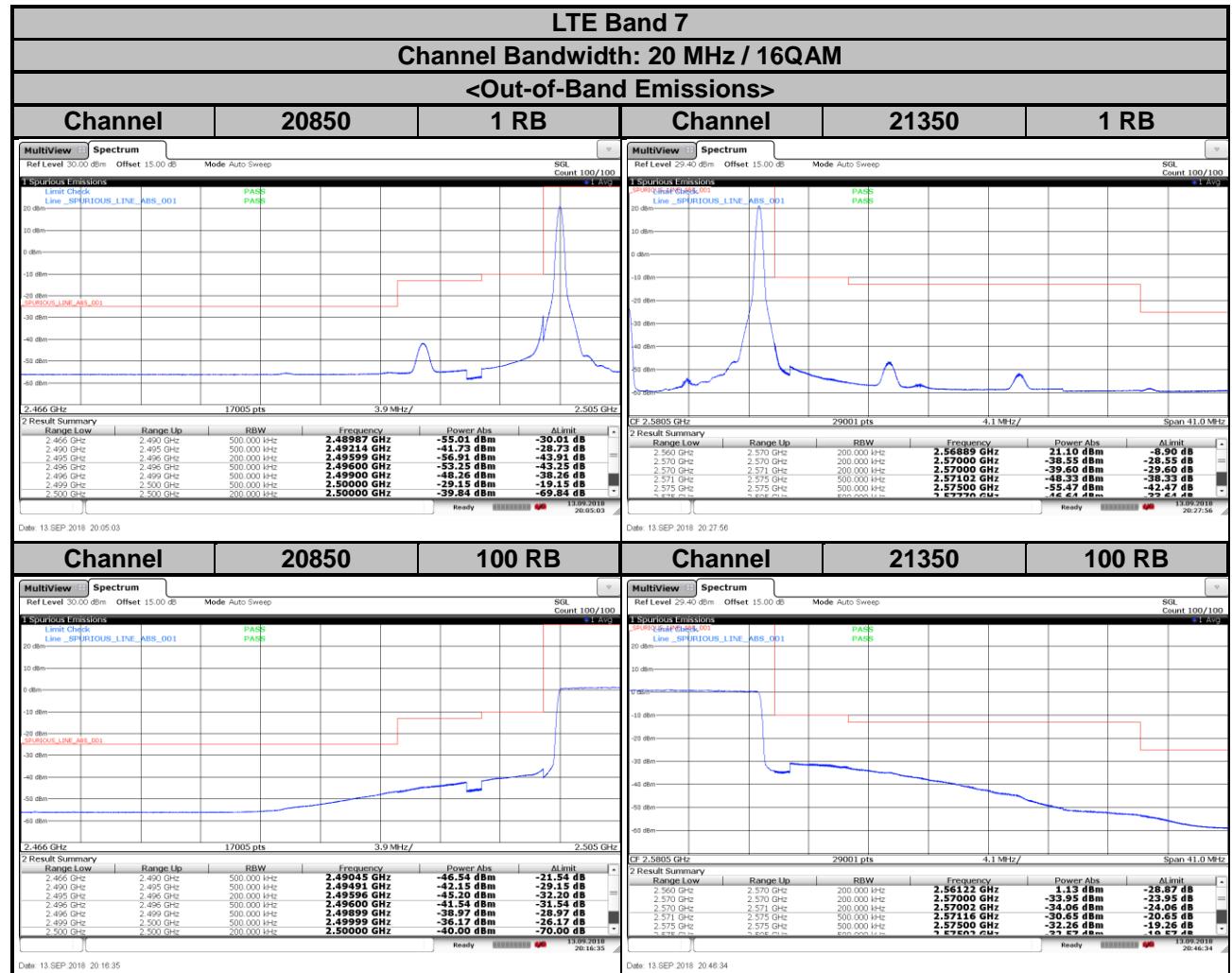


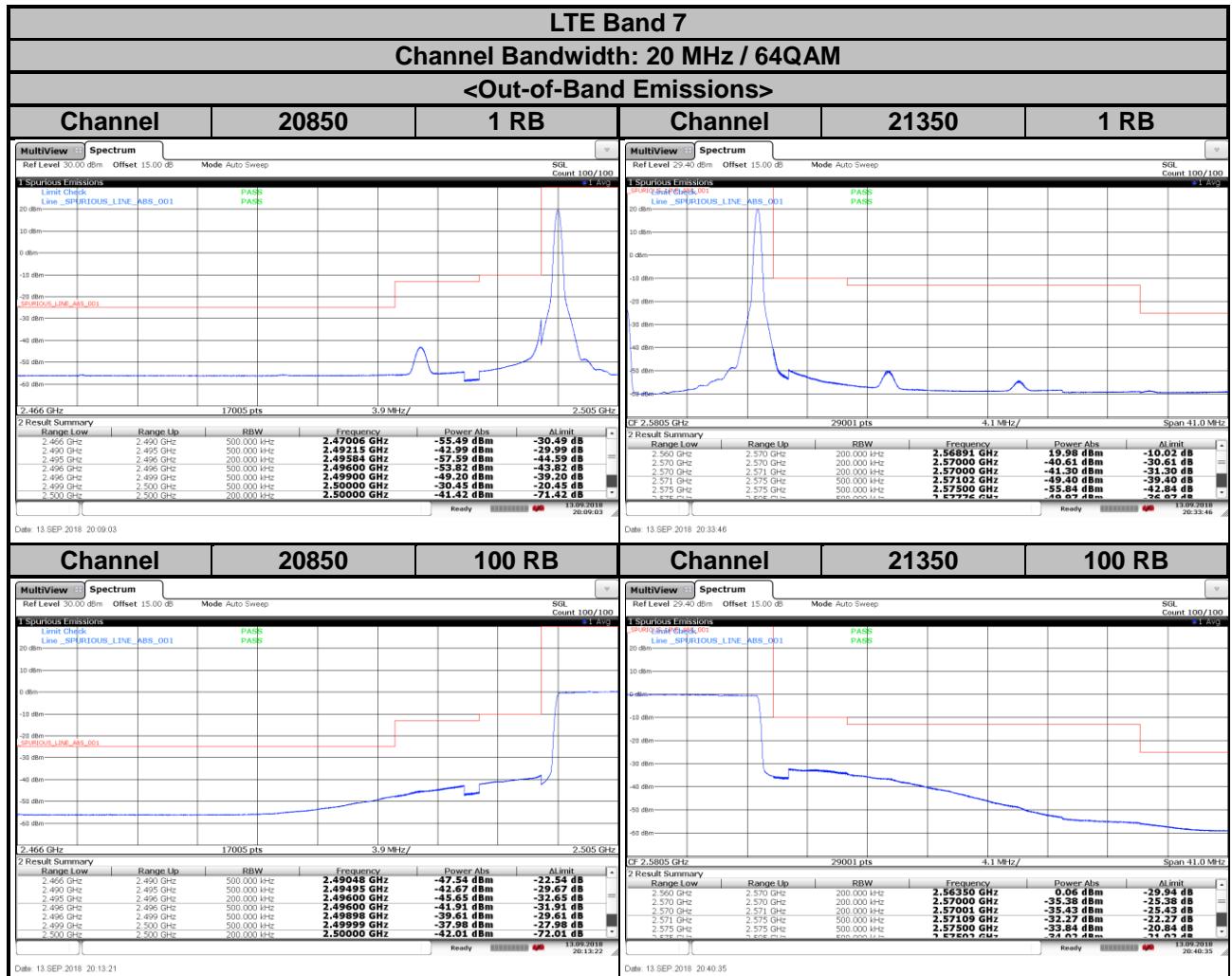










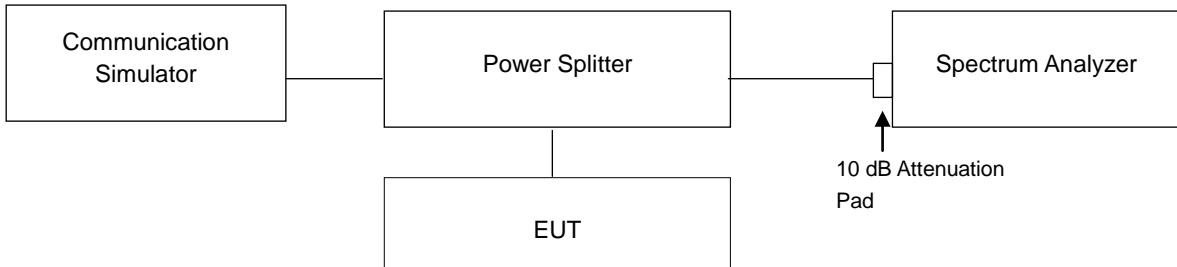


4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

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

4.6.2 Test Setup

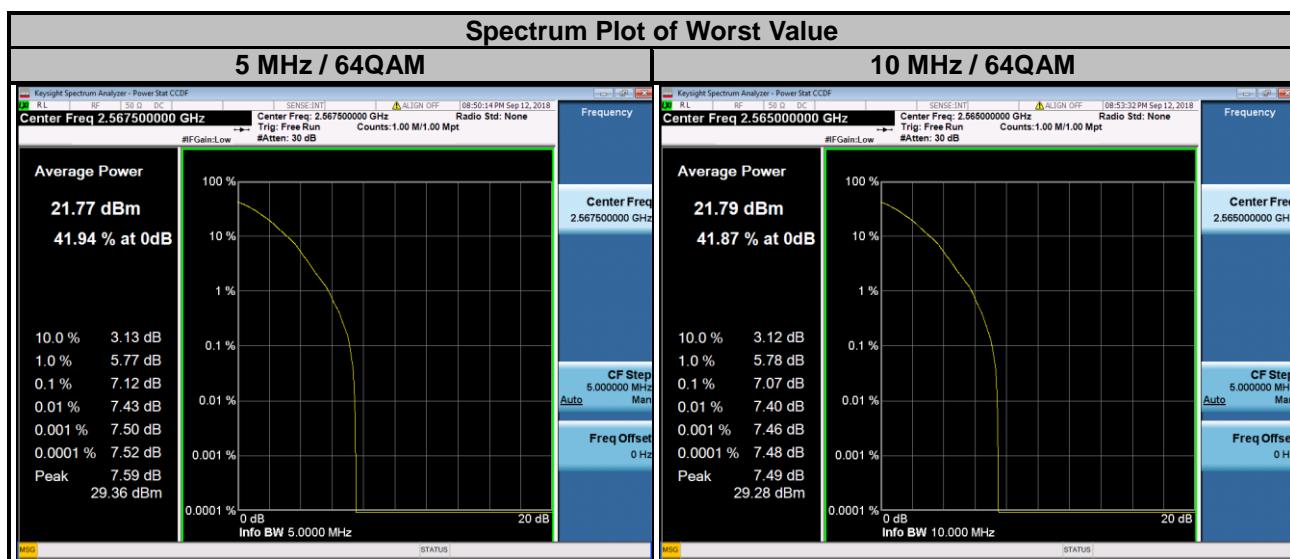


4.6.3 Test Procedures

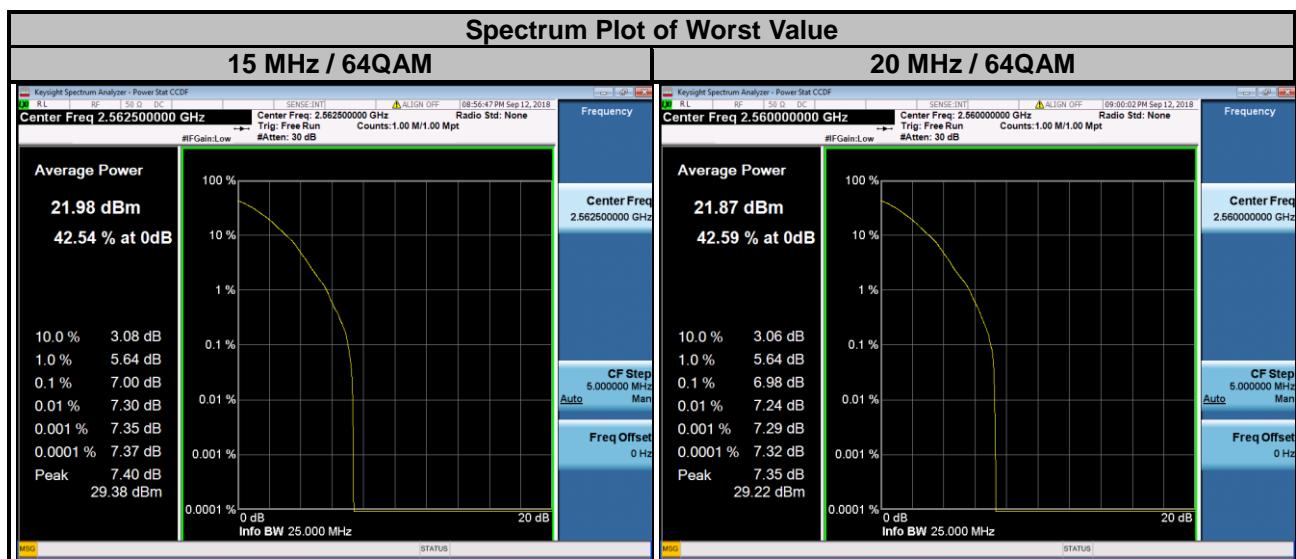
1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.6.4 Test Results

| LTE Band 7 | | | | | | | | | | |
|--------------------------|-----------------|----------------------------|-------|-------|--|---------------------------|-----------------|----------------------------|-------|-------|
| Channel Bandwidth: 5 MHz | | | | | | Channel Bandwidth: 10 MHz | | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | |
| | | QPSK | 16QAM | 64QAM | | | | QPSK | 16QAM | 64QAM |
| 20775 | 2502.5 | 3.47 | 5.09 | 6.47 | | 20800 | 2505.0 | 3.41 | 5.10 | 6.47 |
| 21100 | 2535.0 | 3.77 | 5.56 | 6.91 | | 21100 | 2535.0 | 3.70 | 5.44 | 6.95 |
| 21425 | 2567.5 | 3.84 | 5.58 | 7.12 | | 21400 | 2565.0 | 3.76 | 5.54 | 7.07 |



| LTE Band 7 | | | | | | | | | |
|---------------------------|-----------------|----------------------------|-------|-------|---------------------------|-----------------|----------------------------|-------|-------|
| Channel Bandwidth: 15 MHz | | | | | Channel Bandwidth: 20 MHz | | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | |
| | | QPSK | 16QAM | 64QAM | | | QPSK | 16QAM | 64QAM |
| 20825 | 2507.5 | 3.40 | 5.05 | 6.49 | 20850 | 2510.0 | 3.43 | 5.05 | 6.37 |
| 21100 | 2535.0 | 3.71 | 5.38 | 6.96 | 21100 | 2535.0 | 3.69 | 5.45 | 6.90 |
| 21375 | 2562.5 | 3.68 | 5.48 | 7.00 | 21350 | 2560.0 | 3.62 | 5.32 | 6.98 |

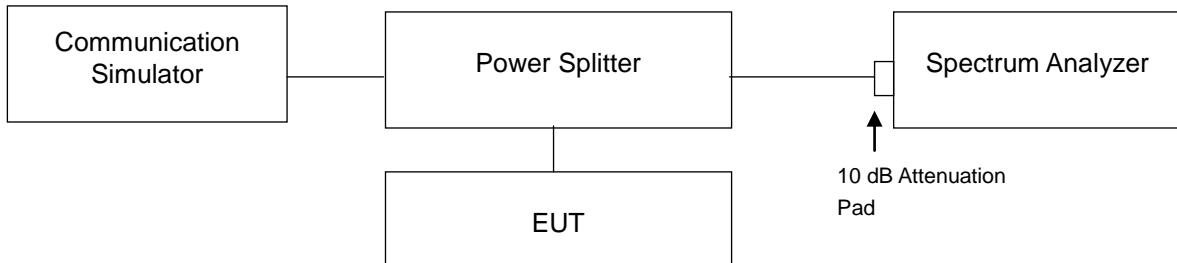


4.7 Conducted Spurious Emissions

4.7.1 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 $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25 dBm.

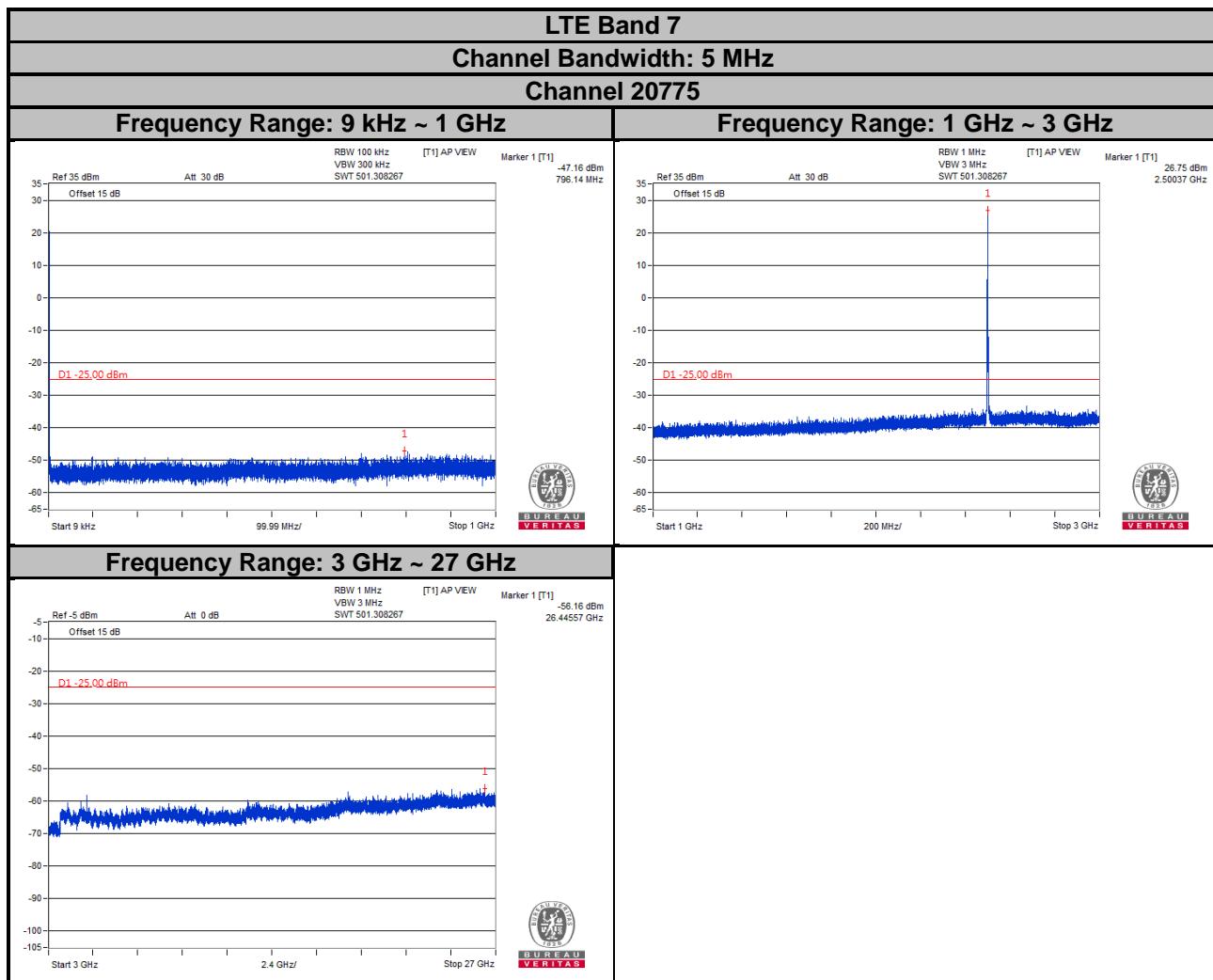
4.7.2 Test Setup

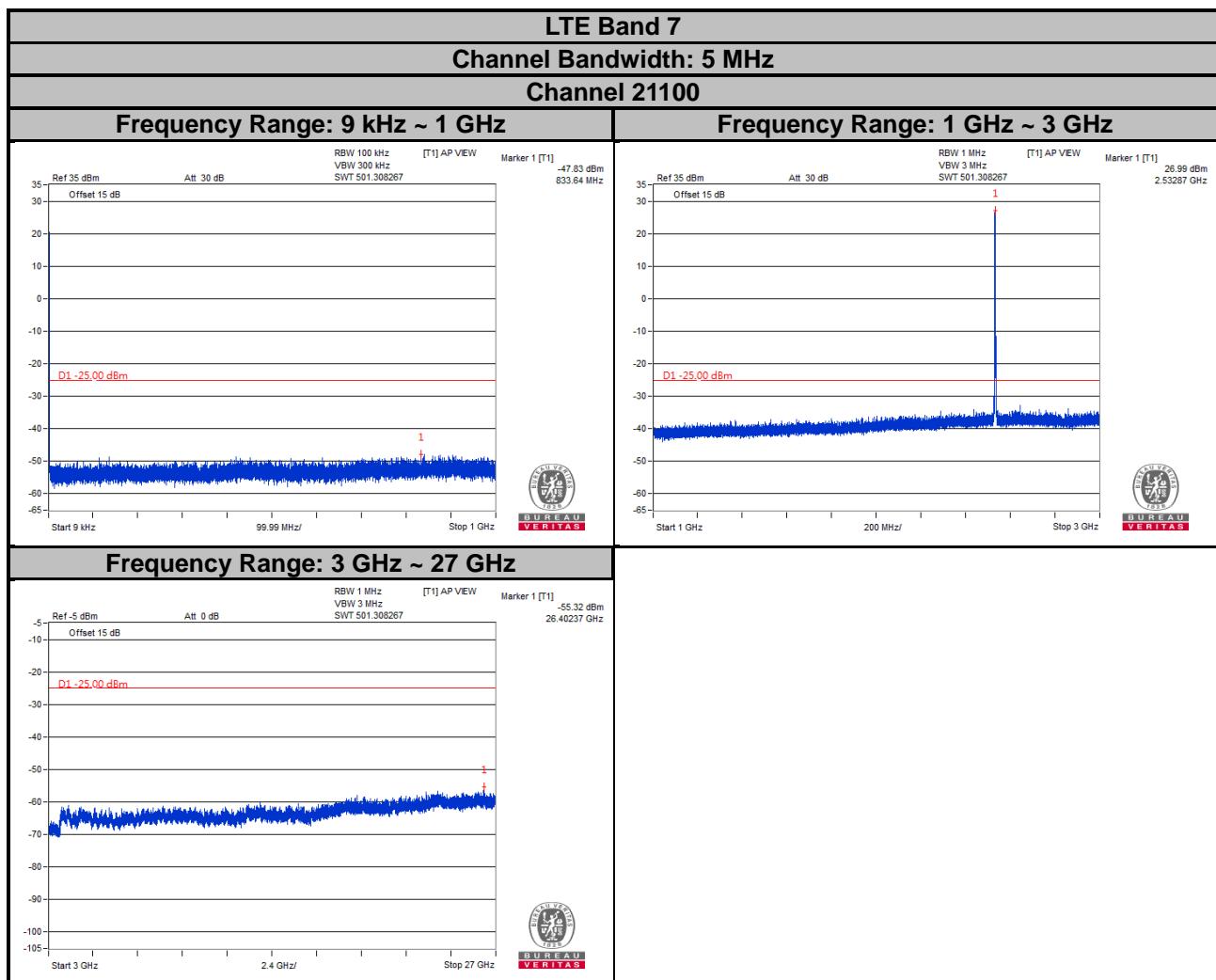


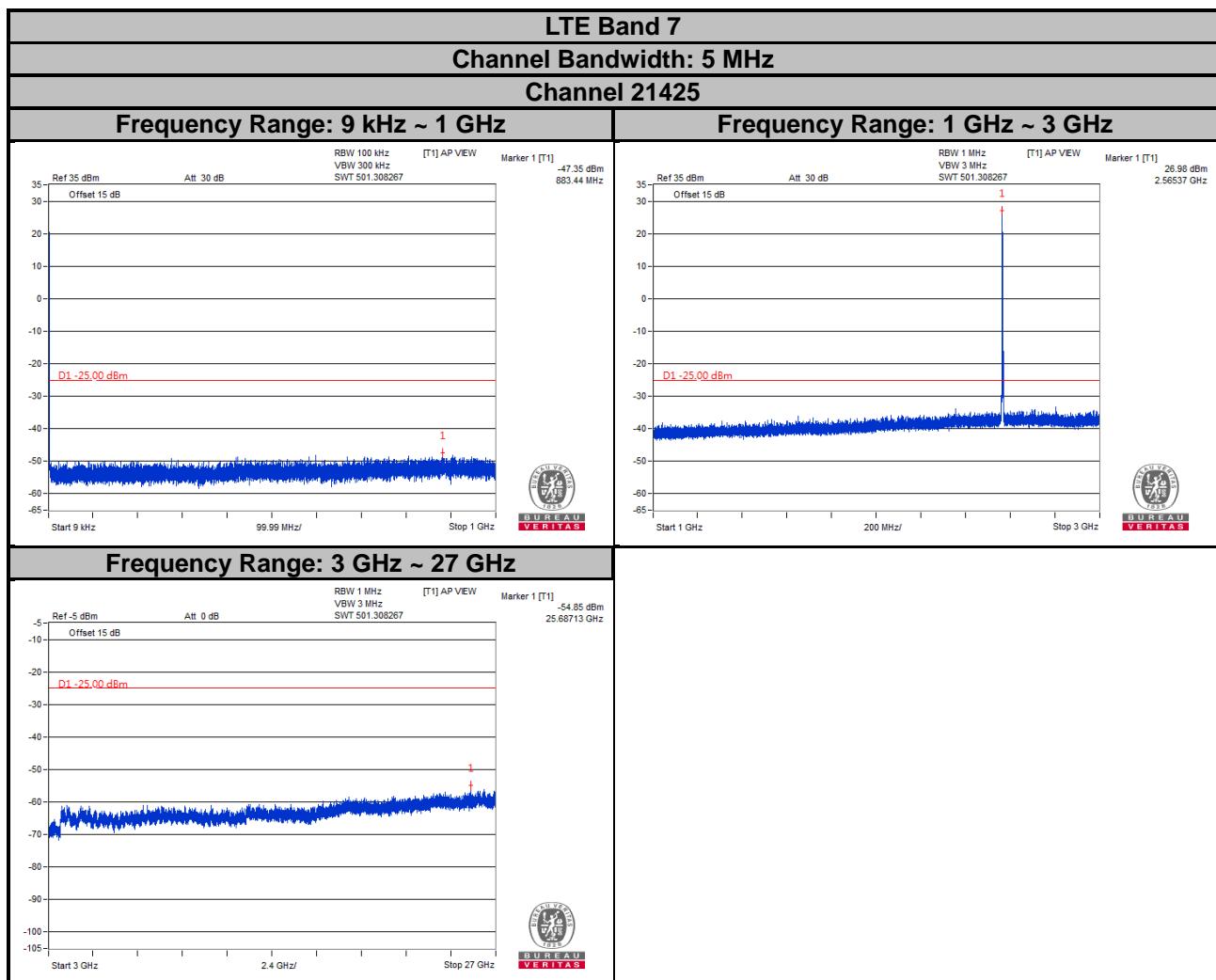
4.7.3 Test Procedure

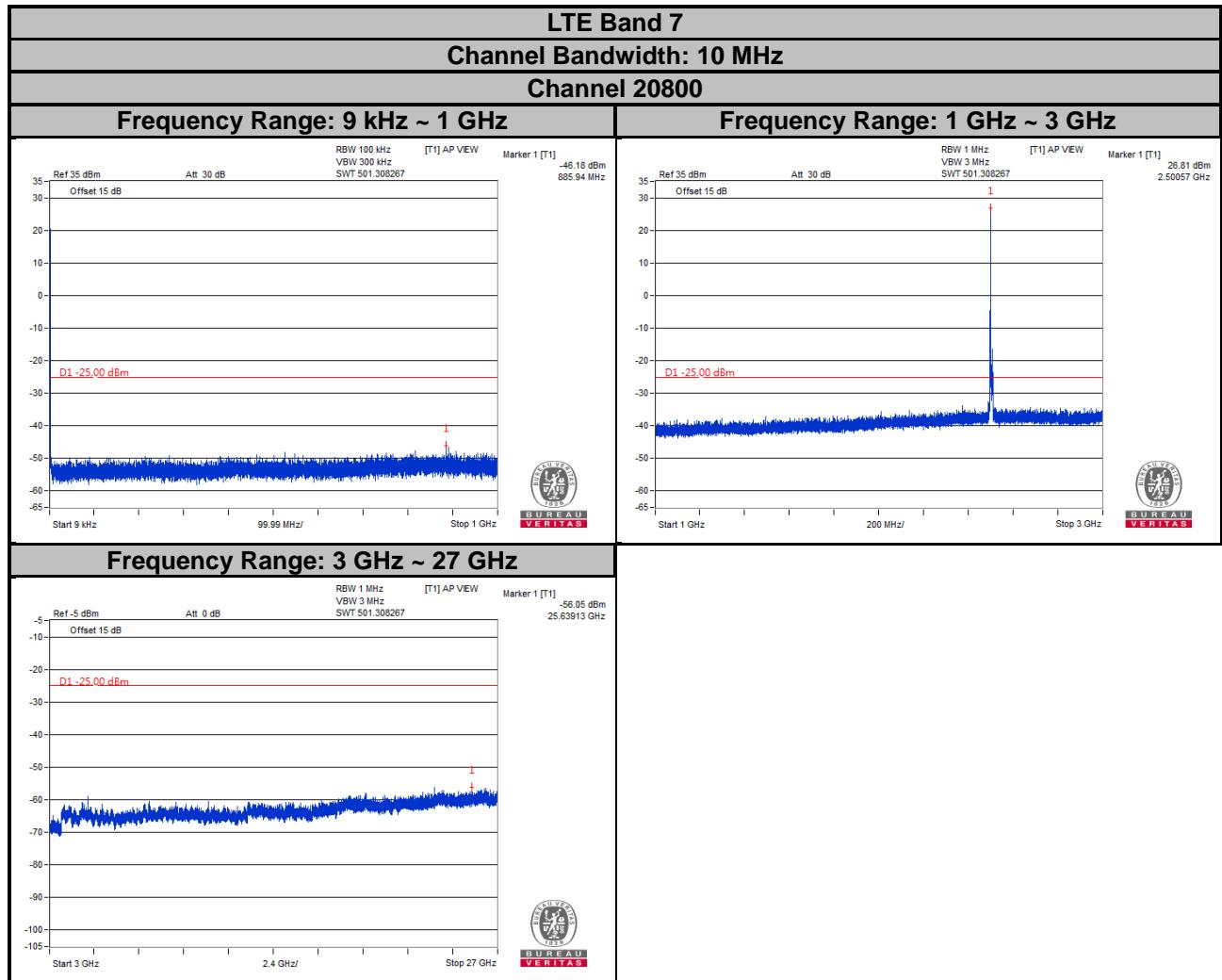
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range from 9 kHz to 3 GHz, 10 dB attenuation pad is connected with spectrum. RBW = 100 kHz and VBW = 300 kHz are used for conducted emission measurement.
- Measuring frequency range is from 3 GHz to 27 GHz, 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.

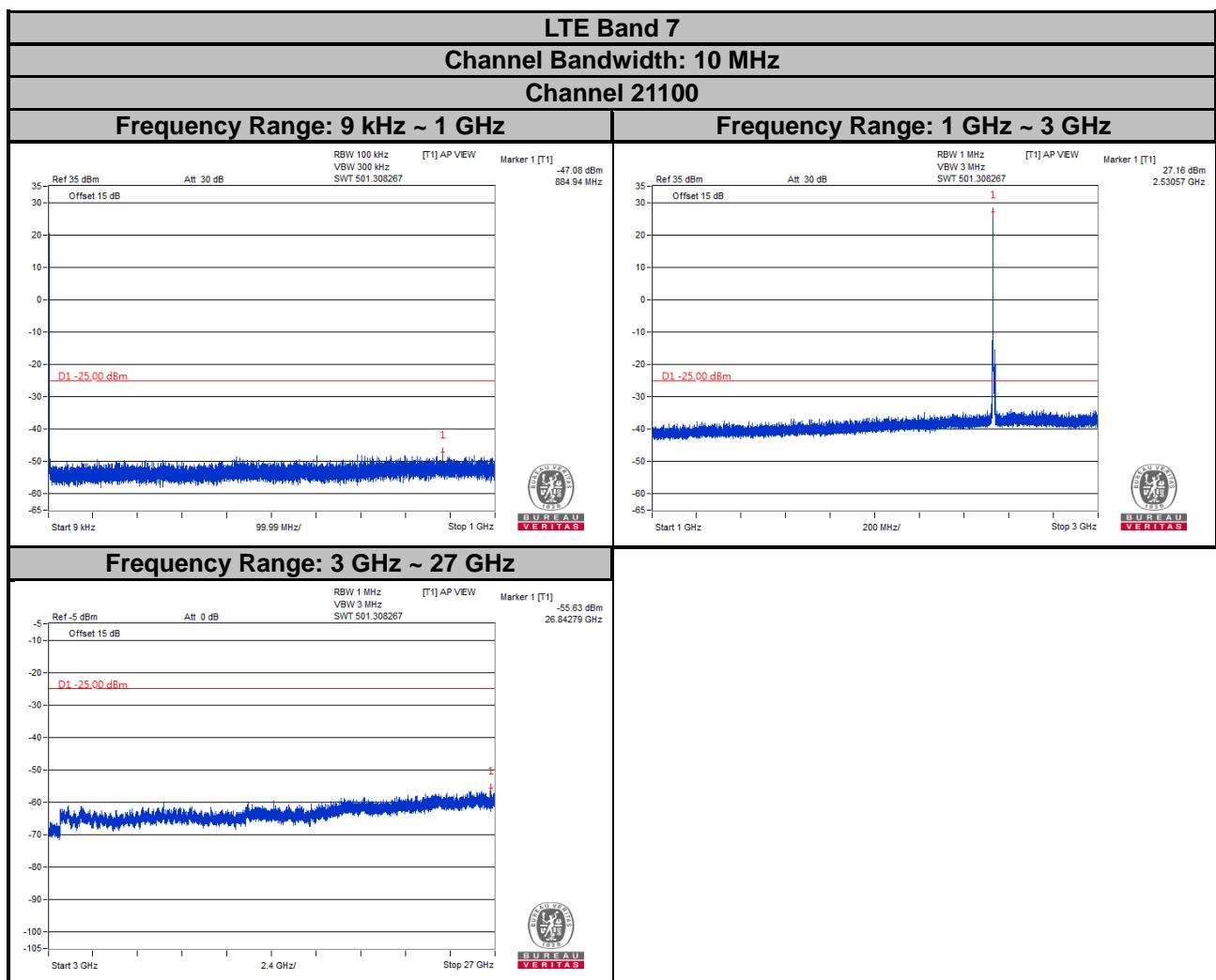
4.7.4 Test Results

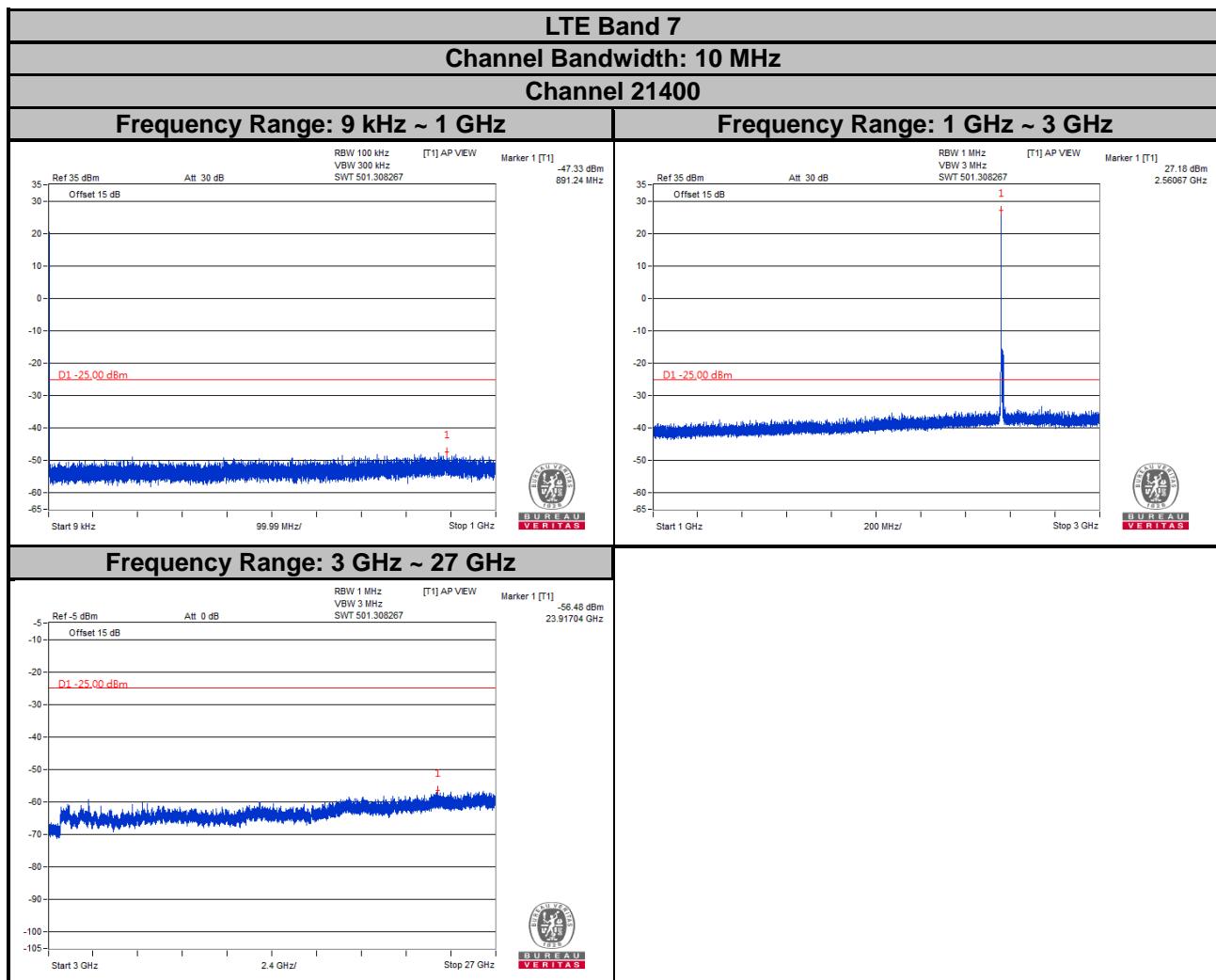


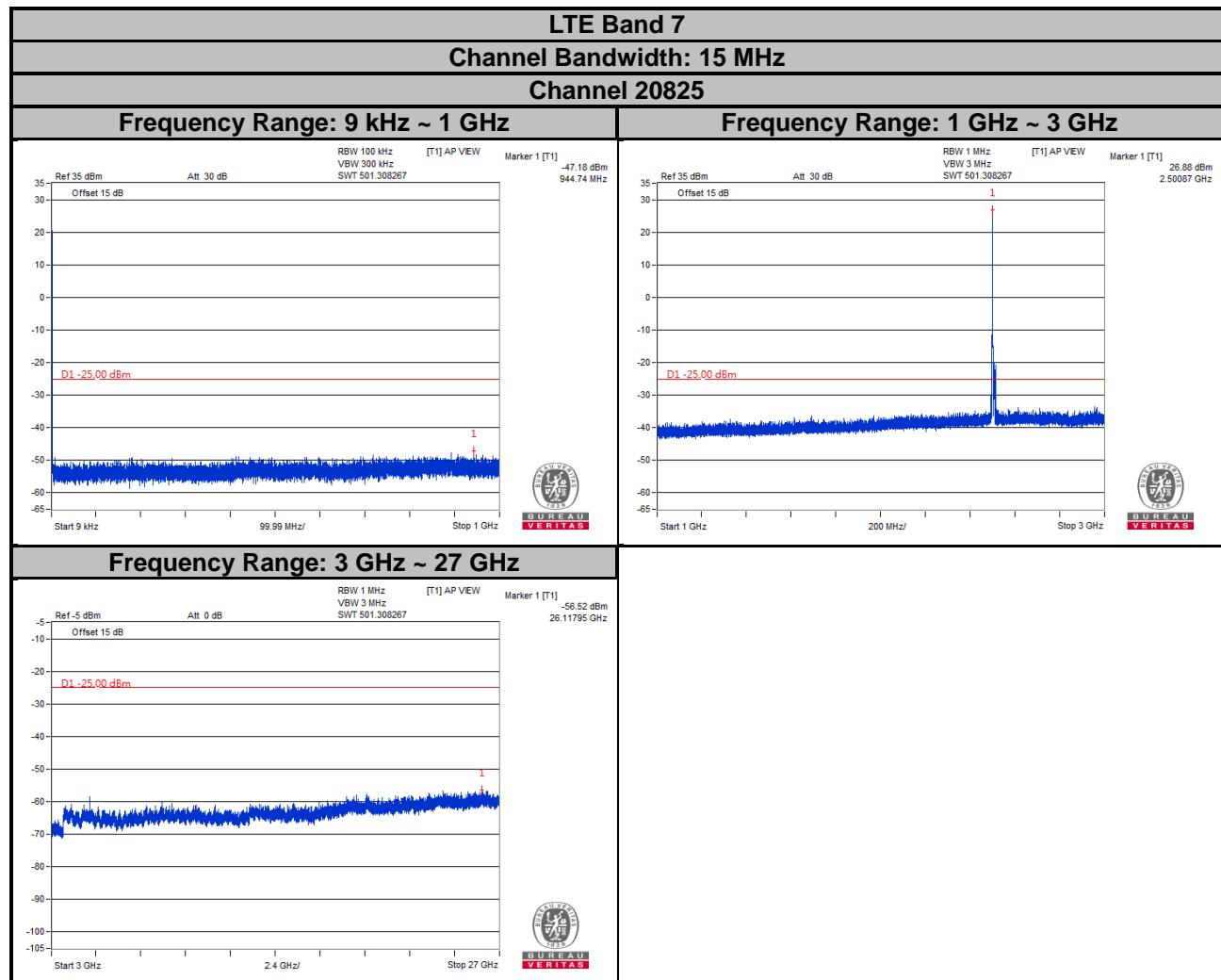


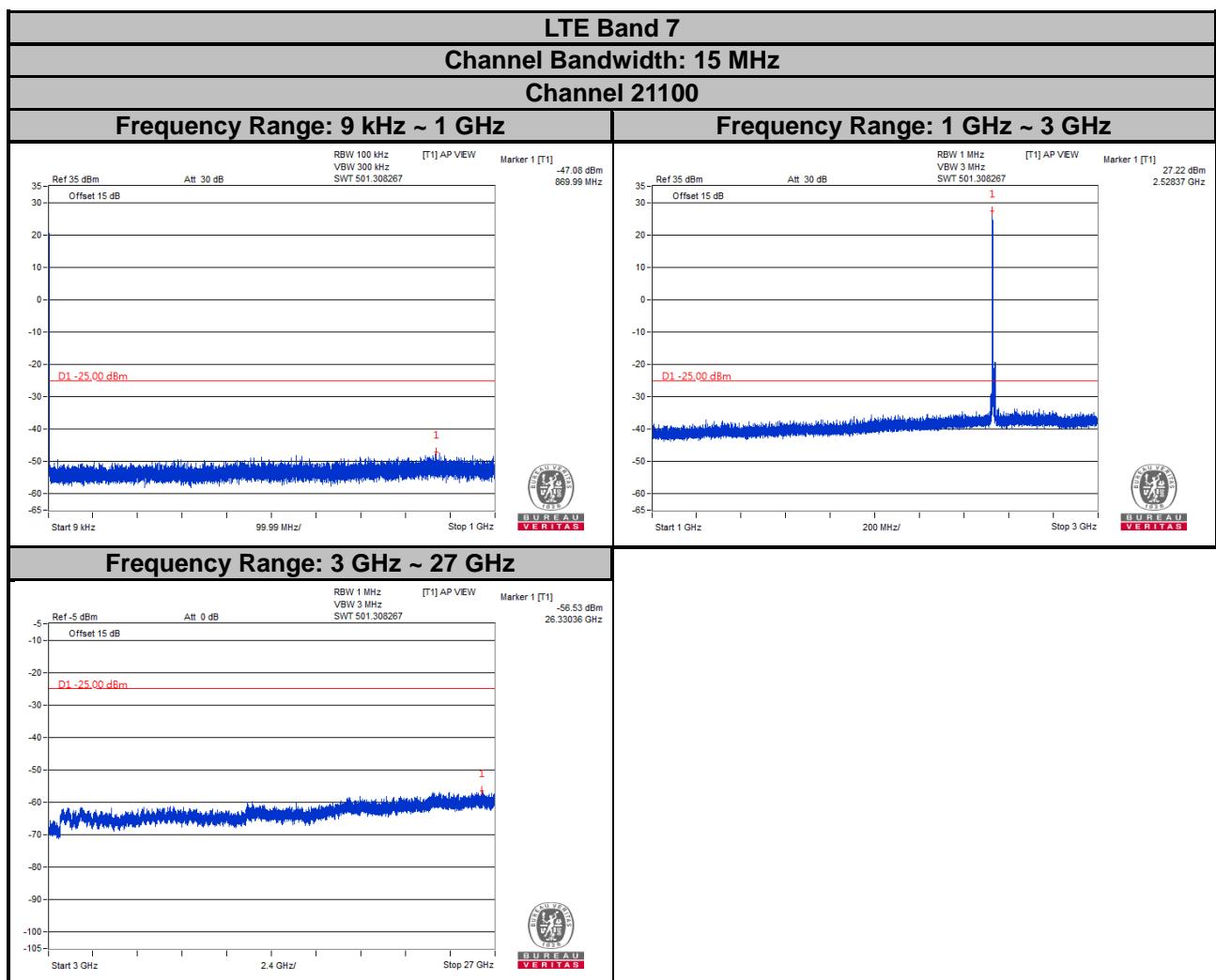


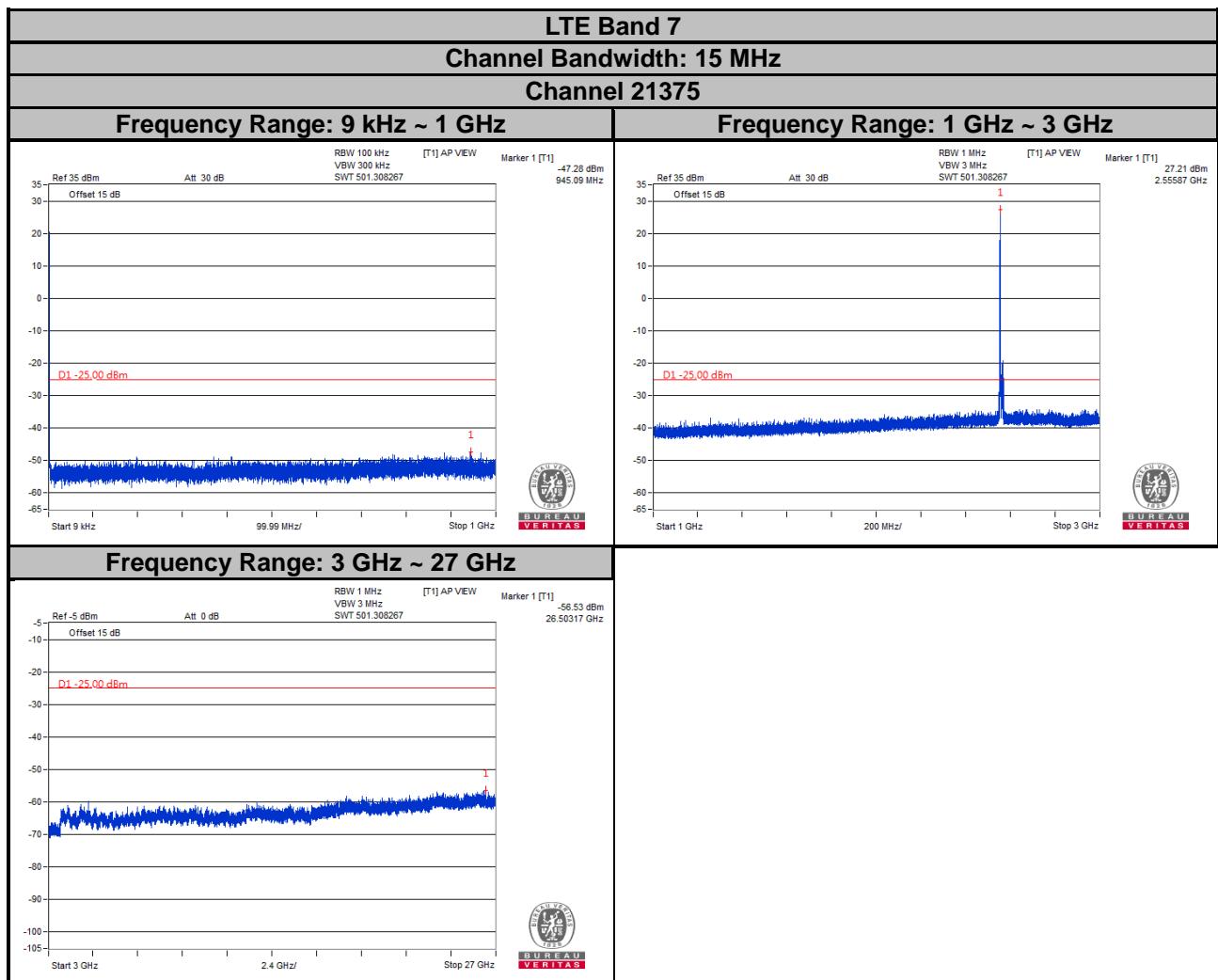


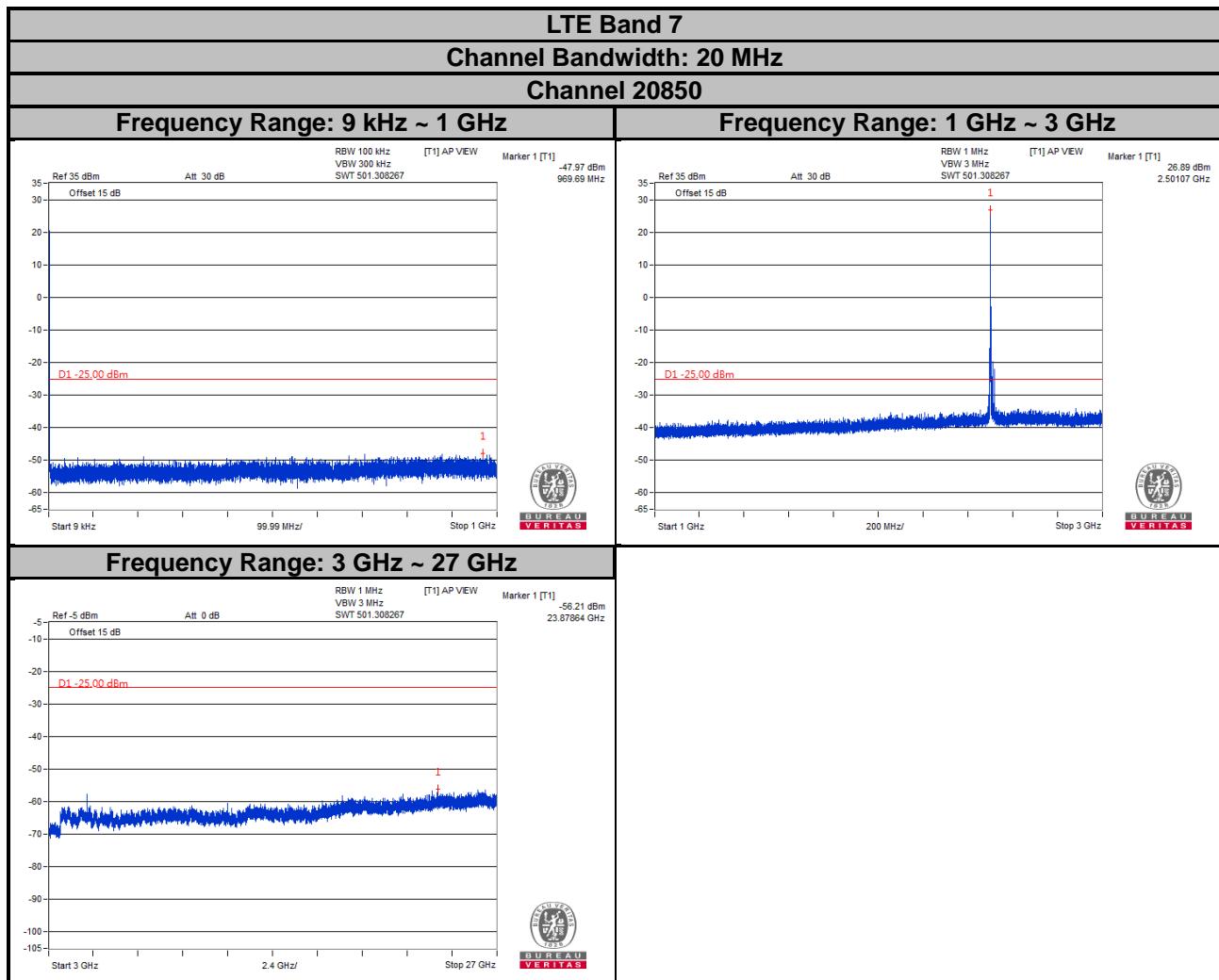


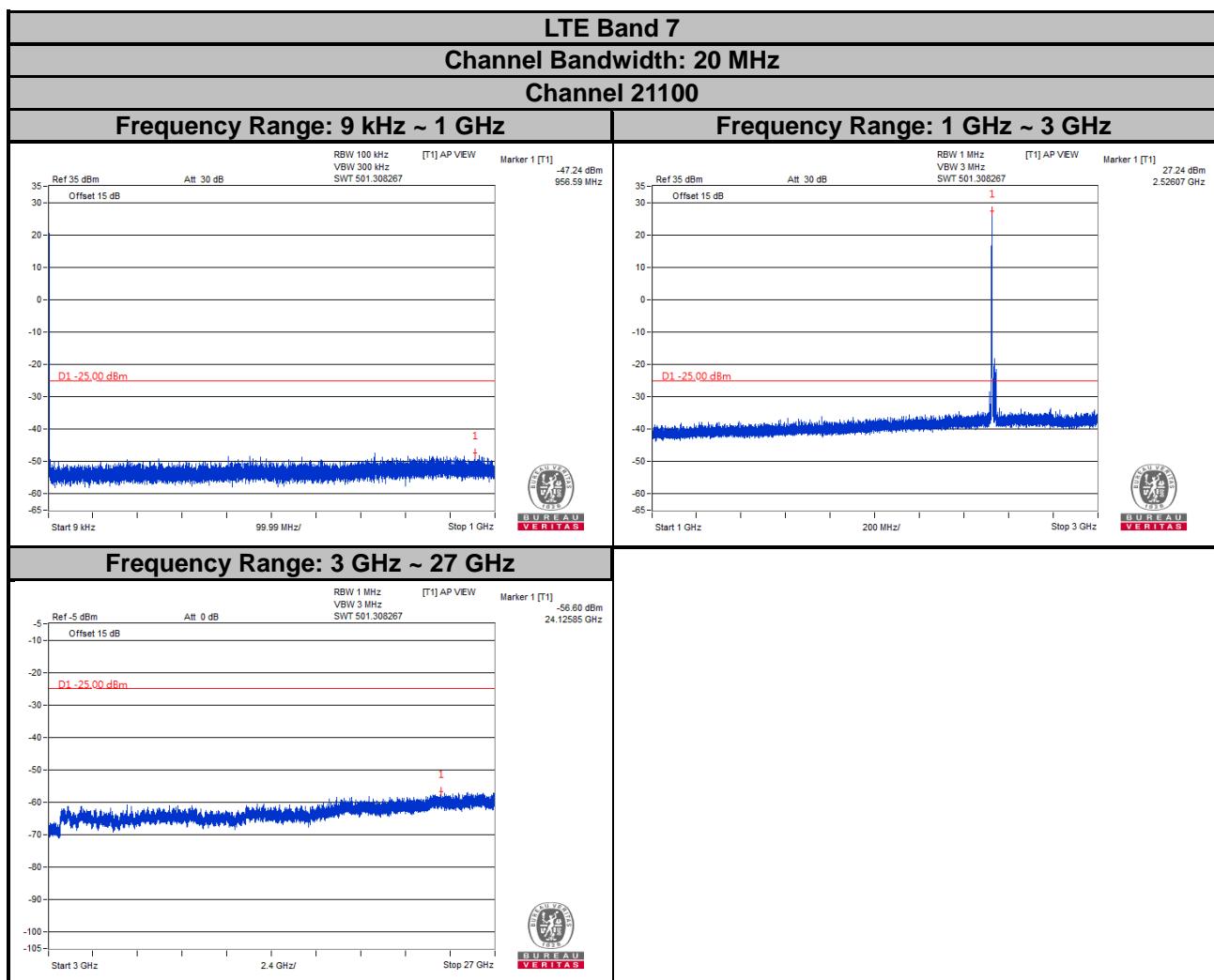


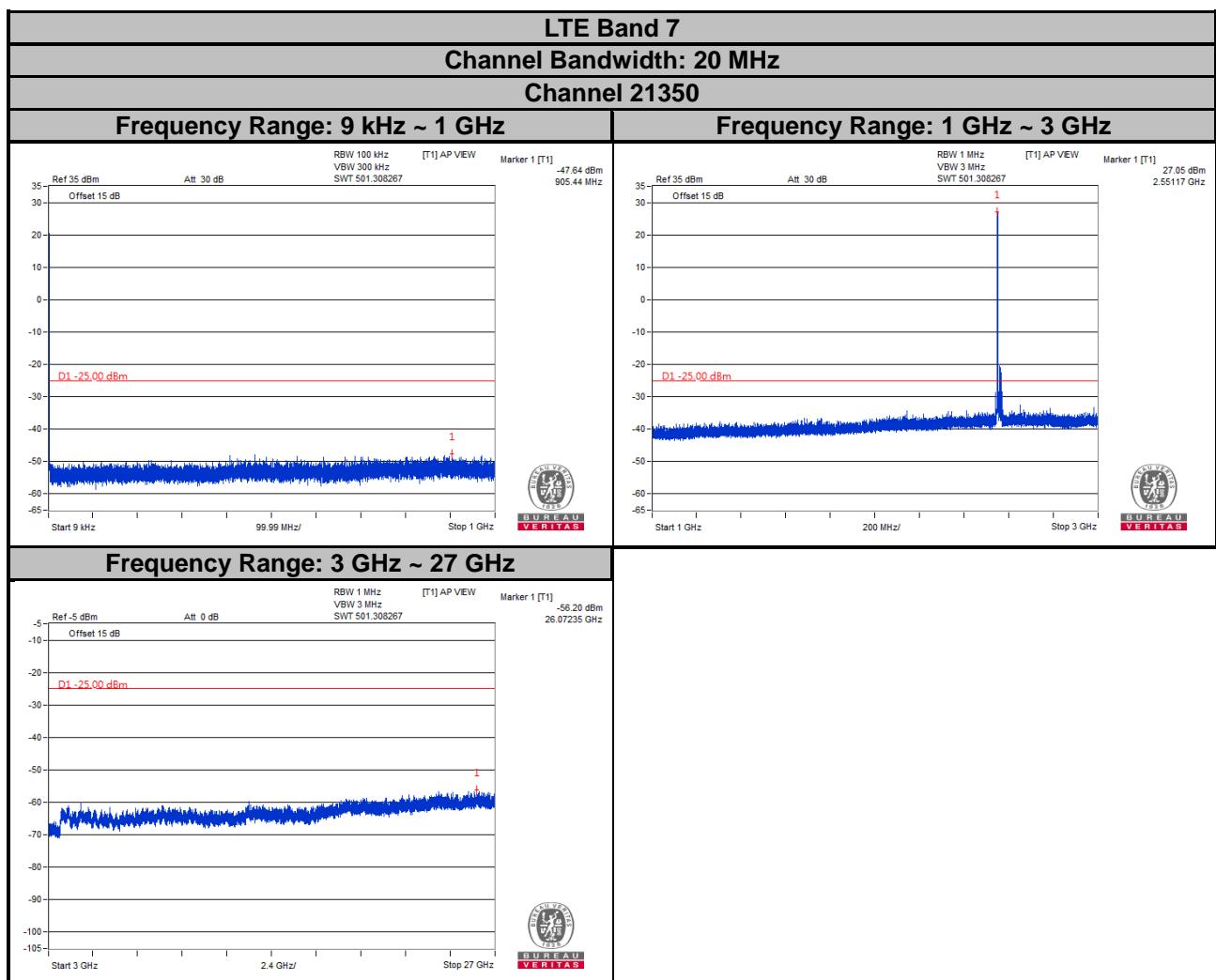












4.8 Radiated Emission Measurement

4.8.1 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 $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25 dBm.

4.8.2 Test Procedure

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

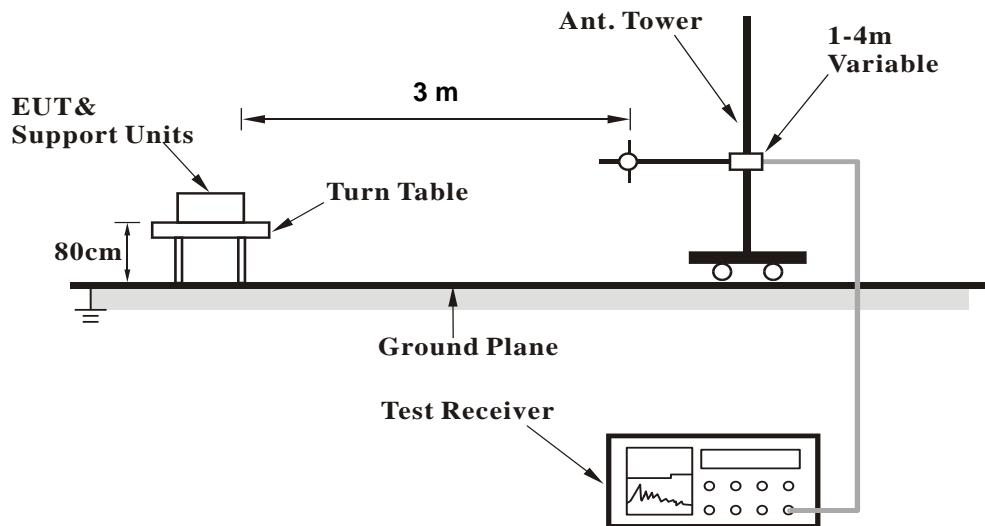
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.8.3 Deviation from Test Standard

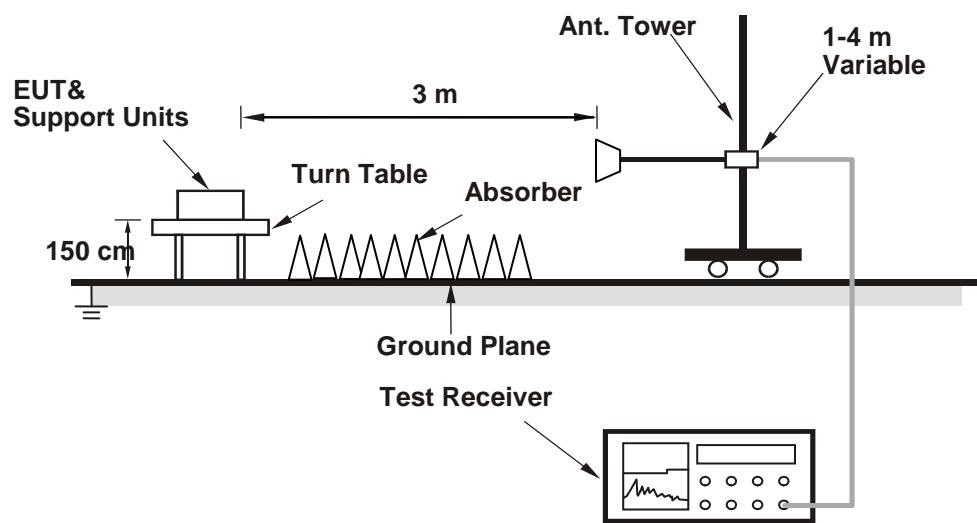
No deviation.

4.8.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

4.8.5 Test Results

LTE Band 7

Channel Bandwidth: 5 MHz / QPSK

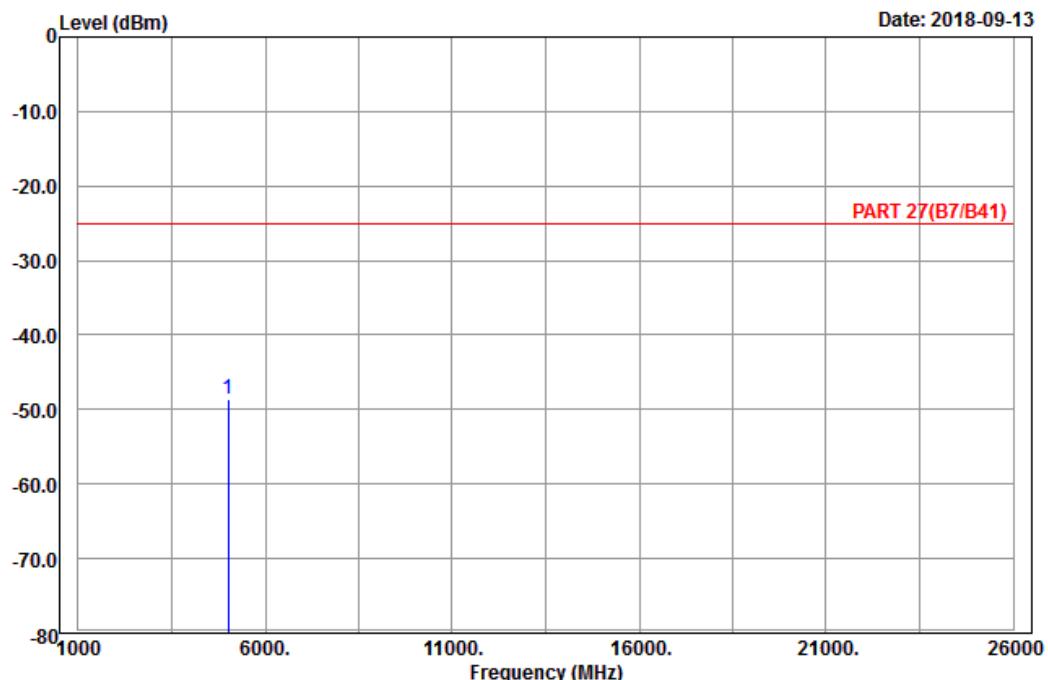
Low Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 7_Link_CH20775

Tested by: Harry Hsueh

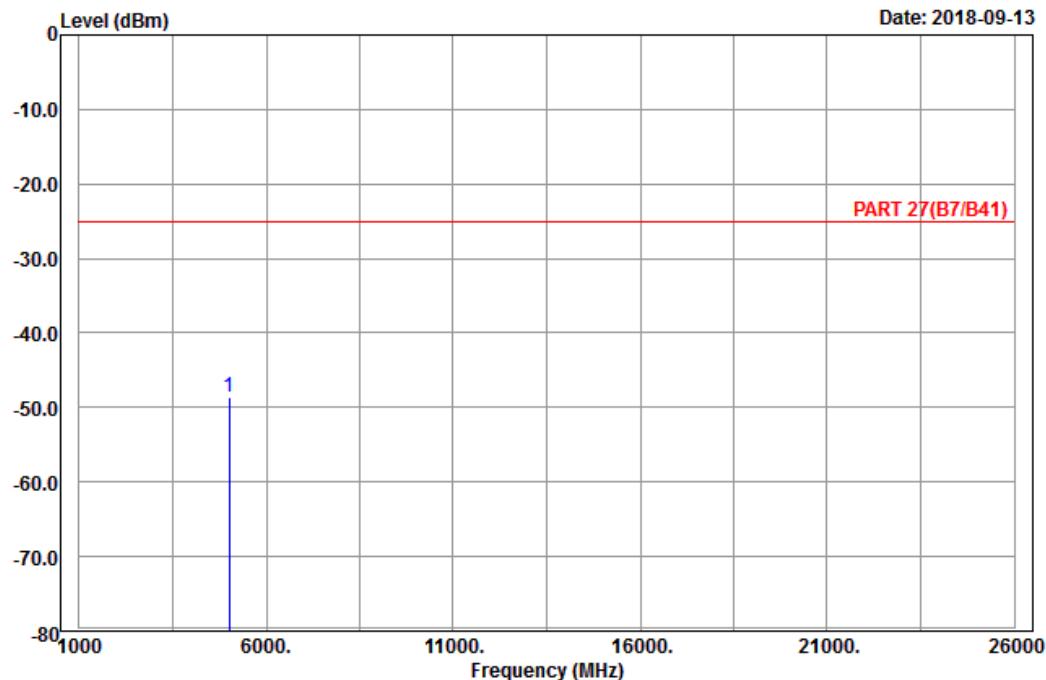
| Freq | Level | Read | | | Over | Factor | Remark |
|------|---------|--------|--------|--------|--------|--------|--------|
| | | Line | Limit | Limit | | | |
| MHz | dBm | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5005.00 | -48.61 | -68.19 | -25.00 | -23.61 | 19.58 | Peak |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band 7_Link_CH20775
Tested by: Harry Hsueh

| Freq | Read | | Limit | Over | Remark | |
|------|---------|--------|--------|--------------|--------|------------|
| | Level | Level | Line | Limit Factor | | |
| MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5005.00 | -48.53 | -68.11 | -25.00 | -23.53 | 19.58 Peak |

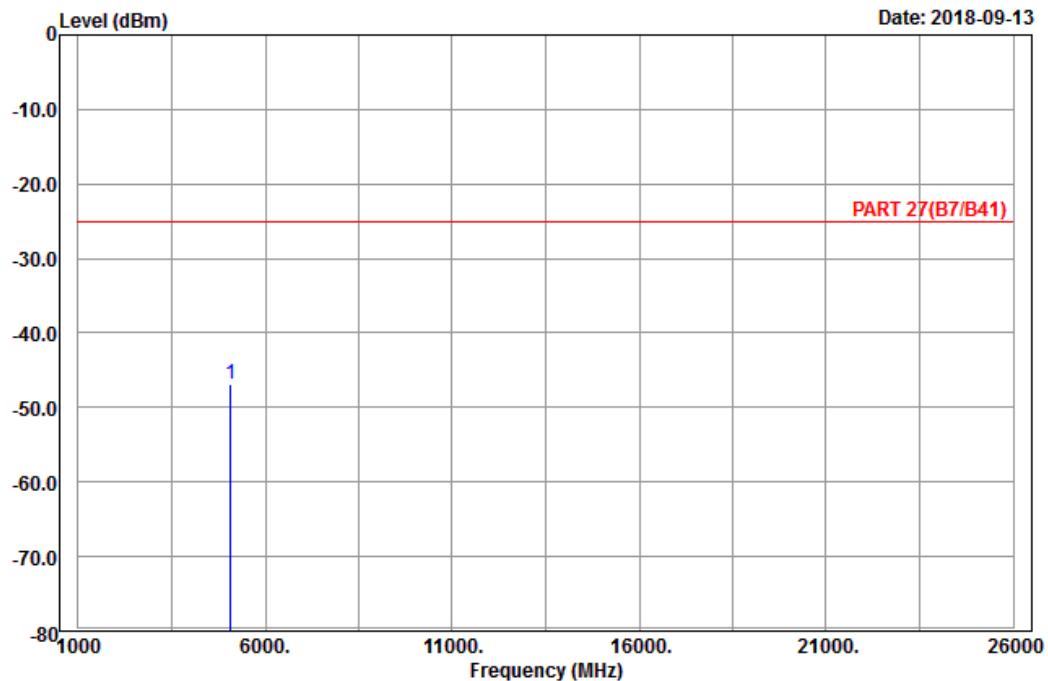
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band_7_Link_CH21100

Tested by: Harry Hsueh

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

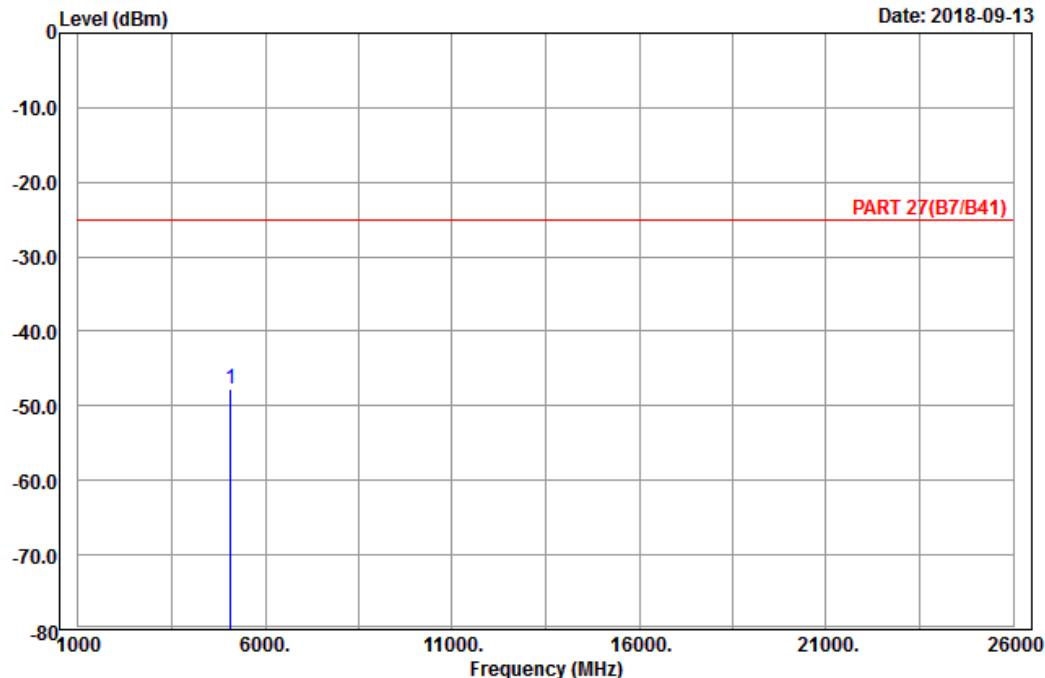
1 pp 5070.00 -46.97 -66.36 -25.00 -21.97 19.39 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band_7_Link_CH21100
Tested by: Harry Hsueh

| Freq | Read Level | | Limit Line | Over Limit | Factor | Remark |
|------|------------|--------|------------|------------|--------|------------|
| | MHz | dBm | dBm | dB | | |
| 1 pp | 5070.00 | -47.67 | -67.06 | -25.00 | -22.67 | 19.39 Peak |

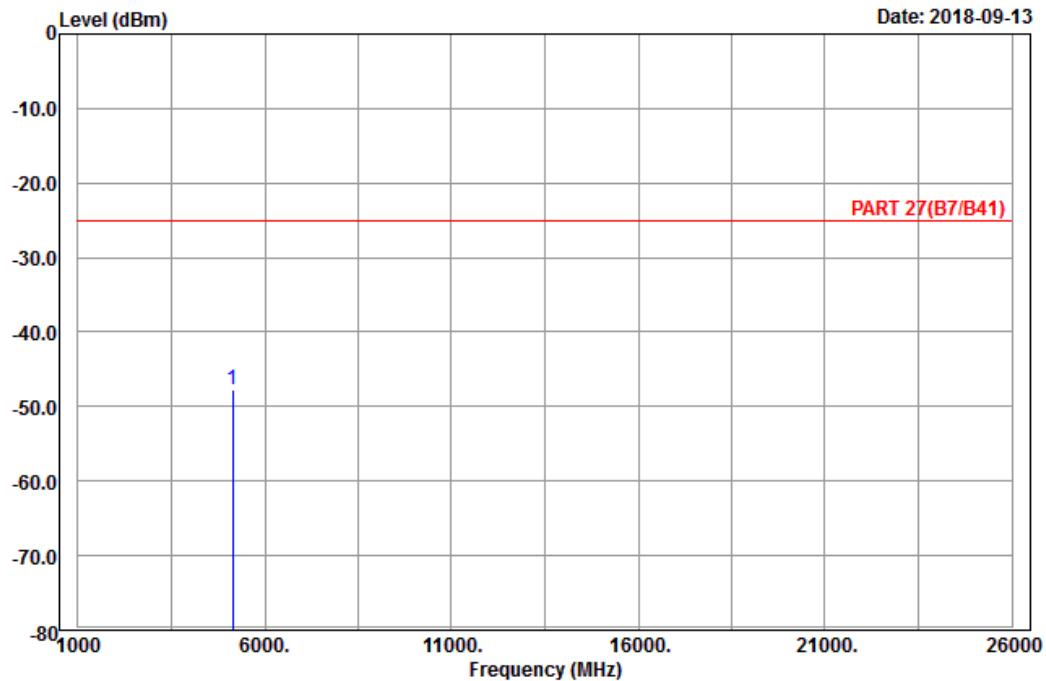
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band_7_Link_CH21425

Tested by: Harry Hsueh

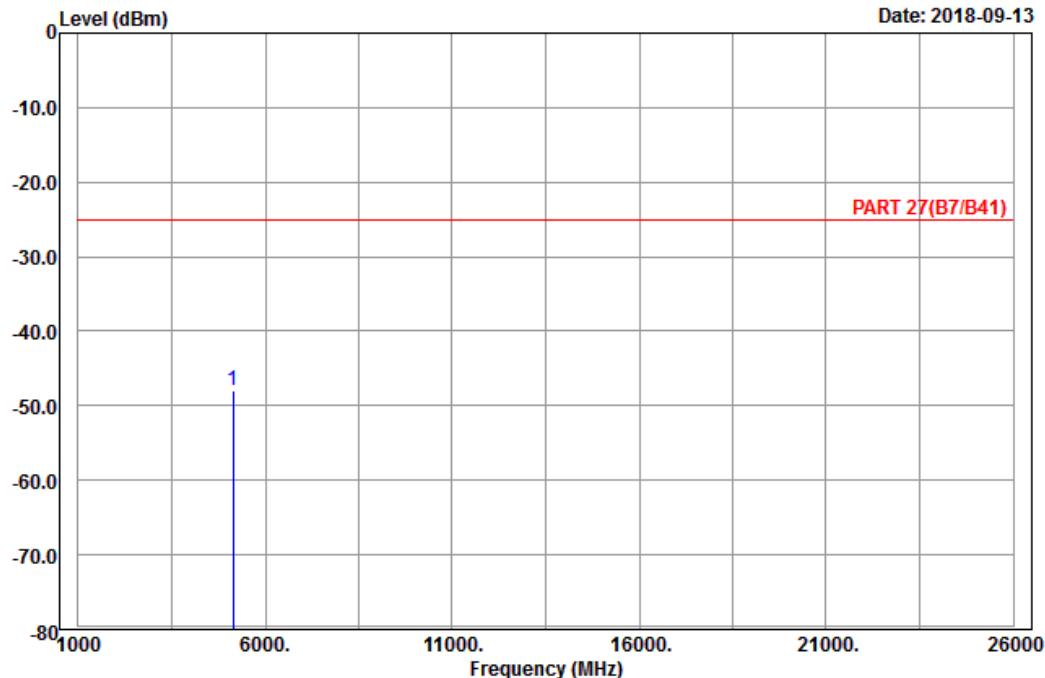
| Freq | Read | Limit | Over | Factor | Remark |
|------|---------|--------|--------|--------|-------------------|
| | Level | Level | Line | | |
| MHz | dBm | dBm | dBm | dB | dB |
| 1 pp | 5135.00 | -47.79 | -67.60 | -25.00 | -22.79 19.81 Peak |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band 7_Link_CH21425
Tested by: Harry Hsueh

| Freq | Read | | Limit | Over | Factor | Remark |
|------|---------|--------|--------|--------|--------|------------|
| | Level | Level | | | | |
| MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5135.00 | -48.03 | -67.84 | -25.00 | -23.03 | 19.81 Peak |

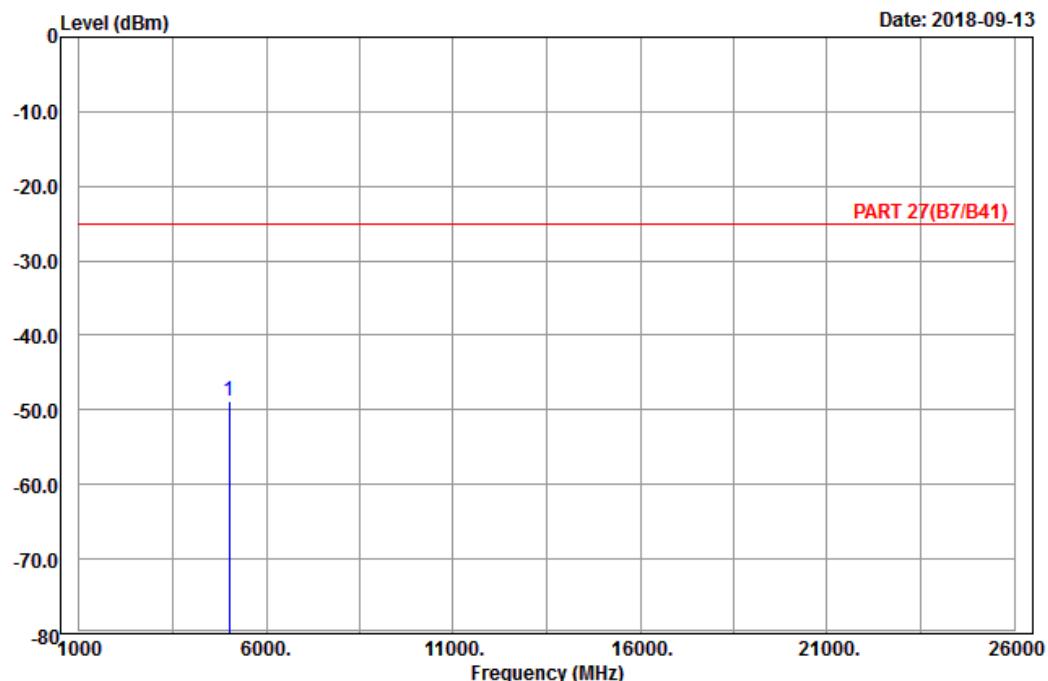
Channel Bandwidth: 20 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
 Condition: PART 27(B7/B41) Horizontal
 Remark : LTE_Band 7_Link_CH20850
 Tested by: Harry Hsueh

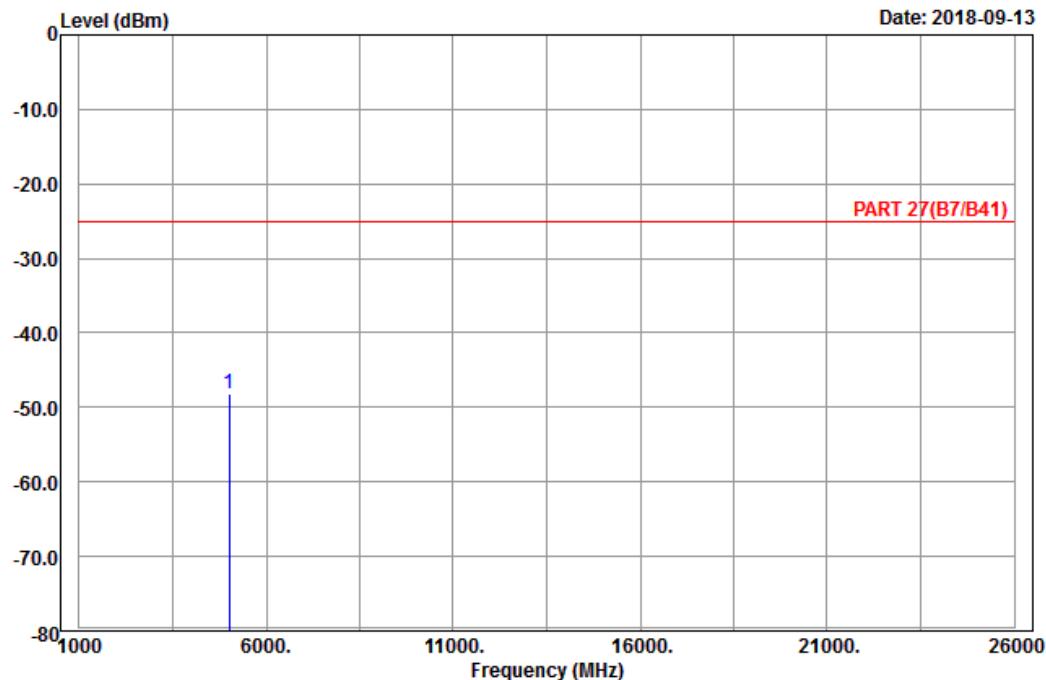
| Freq | Read | | Limit | Over | Factor | Remark |
|------|---------|--------|--------|--------|--------|------------|
| | Level | Level | Line | Limit | | |
| MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5020.00 | -48.73 | -67.81 | -25.00 | -23.73 | 19.08 Peak |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band 7_Link_CH20850
Tested by: Harry Hsueh

| Freq | Read Level | | Limit Level | Over Line | Limit Factor | Remark |
|------|------------|--------|-------------|-----------|--------------|------------|
| | MHz | dBm | dBm | dBm | dB | |
| 1 pp | 5020.00 | -48.10 | -67.18 | -25.00 | -23.10 | 19.08 Peak |

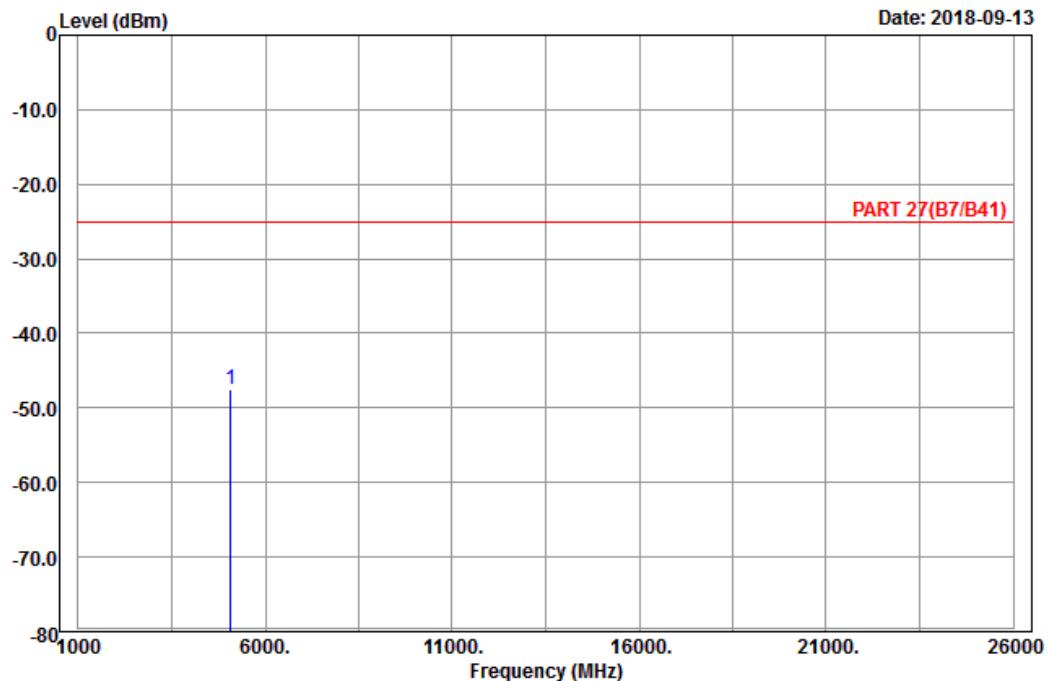
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band_7_Link_CH21100

Tested by: Harry Hsueh

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

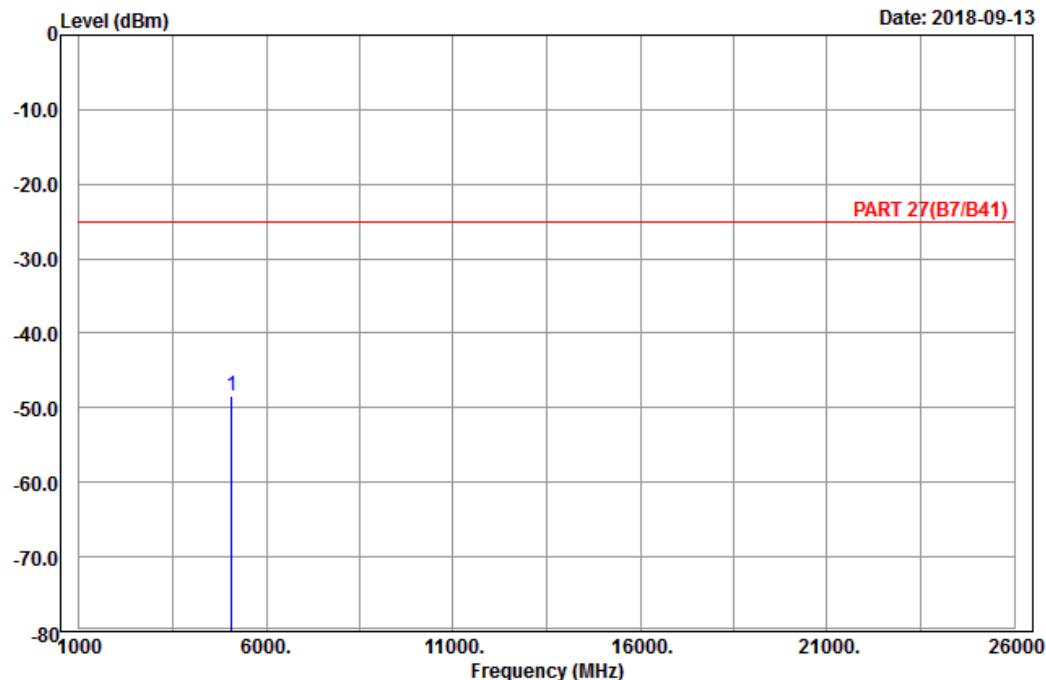
1 pp 5070.00 -47.55 -66.94 -25.00 -22.55 19.39 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band 7_Link_CH21100
Tested by: Harry Hsueh

| Freq | Read Level | | Limit Line | Over Limit | Factor | Remark |
|------|------------|--------|------------|------------|--------|------------|
| | MHz | dBm | dBm | dB | | |
| 1 pp | 5070.00 | -48.30 | -67.69 | -25.00 | -23.30 | 19.39 Peak |

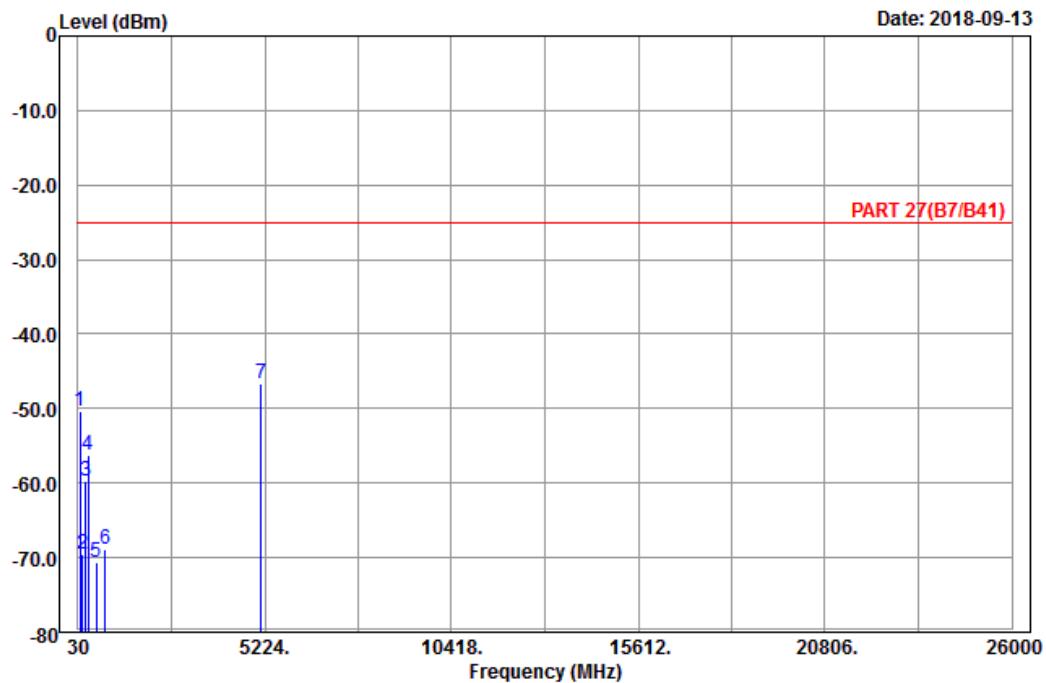
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 7_Link_CH21350

Tested by: Harry Hsueh

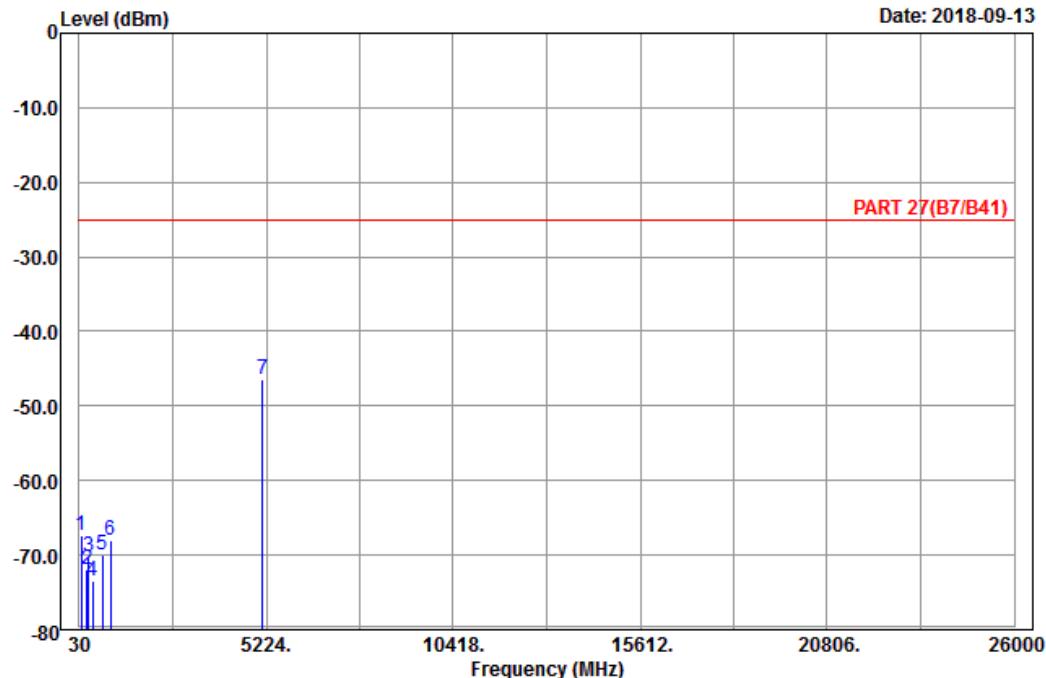
| | Freq | Read Level | Limit Level | Over Line | Over Limit | Factor | Remark |
|------|---------|------------|-------------|-----------|------------|--------|--------|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 92.64 | -50.40 | -39.89 | -25.00 | -25.40 | -10.51 | Peak |
| 2 | 152.58 | -69.44 | -61.55 | -25.00 | -44.44 | -7.89 | Peak |
| 3 | 246.27 | -59.62 | -54.06 | -25.00 | -34.62 | -5.56 | Peak |
| 4 | 314.70 | -56.22 | -50.44 | -25.00 | -31.22 | -5.78 | Peak |
| 5 | 547.10 | -70.52 | -68.65 | -25.00 | -45.52 | -1.87 | Peak |
| 6 | 792.10 | -68.93 | -70.43 | -25.00 | -43.93 | 1.50 | Peak |
| 7 pp | 5120.00 | -46.74 | -66.45 | -25.00 | -21.74 | 19.71 | Peak |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 14



Site : 966 chamber 1

Condition: PART 27(B7/B41) Vertical

Remark : LTE_Band 7_Link_CH21350

Tested by: Harry Hsueh

| | Freq | Read Level | Limit Level | Over Line | Limit Factor | Remark |
|------|---------|------------|-------------|-----------|--------------|-------------|
| | MHz | dBm | dBm | dBm | dB | |
| 1 | 91.83 | -67.46 | -56.90 | -25.00 | -42.46 | -10.56 Peak |
| 2 | 242.76 | -71.90 | -66.29 | -25.00 | -46.90 | -5.61 Peak |
| 3 | 279.48 | -70.22 | -64.45 | -25.00 | -45.22 | -5.77 Peak |
| 4 | 393.10 | -73.36 | -70.26 | -25.00 | -48.36 | -3.10 Peak |
| 5 | 671.70 | -70.06 | -69.82 | -25.00 | -45.06 | -0.24 Peak |
| 6 | 895.00 | -67.92 | -70.67 | -25.00 | -42.92 | 2.75 Peak |
| 7 pp | 5120.00 | -46.47 | -66.18 | -25.00 | -21.47 | 19.71 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:

Linko EMC/RF Lab

Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---