

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                       |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------|------------------------------|-------------------------------|------------------|---------------|---------------------|---------------------------------------|---------------------|------------|-----------------------|------------------------|-----------------------|---------------------------|--------------------------|------------------------------------------------------------------|--------------------------|----------|-------------------------|---------|----------------------------------------------------------------------------------------------------------------------------|-------------|
|  <b>MOTOROLA SOLUTIONS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <br>MS ISO/IEC 17025<br>TESTING<br>SAMM No. 0825                                   |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>MOTOROLA PENANG ADV. COMM. LABORATORY</b><br>Motorola Solutions Malaysia Sdn Bhd,<br>Innoplex Plot 2A, Medan Bayan Lepas,<br>Mukim 12 S.W.D, 11900 Bayan Lepas,<br>Penang, Malaysia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>FCC / IC TEST REPORT</b><br><b>Report Revision</b> : Rev.B                                                                                                         |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <table><tr><td><b>Date/s Tested</b></td><td>: 17-Nov-2017 - 17-Apr-2018</td></tr><tr><td><b>Manufacturer/Location</b></td><td>: Motorola Solutions – Penang</td></tr><tr><td><b>Requestor</b></td><td>: RONI KOZIEL</td></tr><tr><td><b>Product Type</b></td><td>: LEX L11 Mission Critical LTE Device</td></tr><tr><td><b>Model Number</b></td><td>: LEX L11n</td></tr><tr><td><b>Frequency Band</b></td><td>: Refer to section 1.4</td></tr><tr><td><b>Applicant Name</b></td><td>: Motorola Solutions, Inc</td></tr><tr><td><b>Applicant Address</b></td><td>: 8000 West Sunrise Boulevard, Fort Lauderdale, Florida<br/>33322</td></tr><tr><td><b>FCC Registrations</b></td><td>: 461337</td></tr><tr><td><b>IC Registrations</b></td><td>: 109AK</td></tr></table> <p><b>The equipment was tested accordance to the requirement listed below:</b></p> <table><tr><td>(LTE Band 7)<br/>FCC 47 CFR Part 2 / 27<br/>ISED RSS GEN Issue 4,<br/>November 2014<br/>ISED RSS 199 Issue 3,<br/>December 2016</td><td><b>PASS</b></td></tr></table> |                                                                                                                                                                       | <b>Date/s Tested</b> | : 17-Nov-2017 - 17-Apr-2018 | <b>Manufacturer/Location</b> | : Motorola Solutions – Penang | <b>Requestor</b> | : RONI KOZIEL | <b>Product Type</b> | : LEX L11 Mission Critical LTE Device | <b>Model Number</b> | : LEX L11n | <b>Frequency Band</b> | : Refer to section 1.4 | <b>Applicant Name</b> | : Motorola Solutions, Inc | <b>Applicant Address</b> | : 8000 West Sunrise Boulevard, Fort Lauderdale, Florida<br>33322 | <b>FCC Registrations</b> | : 461337 | <b>IC Registrations</b> | : 109AK | (LTE Band 7)<br>FCC 47 CFR Part 2 / 27<br>ISED RSS GEN Issue 4,<br>November 2014<br>ISED RSS 199 Issue 3,<br>December 2016 | <b>PASS</b> |
| <b>Date/s Tested</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | : 17-Nov-2017 - 17-Apr-2018                                                                                                                                           |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>Manufacturer/Location</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | : Motorola Solutions – Penang                                                                                                                                         |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>Requestor</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | : RONI KOZIEL                                                                                                                                                         |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>Product Type</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : LEX L11 Mission Critical LTE Device                                                                                                                                 |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>Model Number</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : LEX L11n                                                                                                                                                            |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>Frequency Band</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | : Refer to section 1.4                                                                                                                                                |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>Applicant Name</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | : Motorola Solutions, Inc                                                                                                                                             |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>Applicant Address</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | : 8000 West Sunrise Boulevard, Fort Lauderdale, Florida<br>33322                                                                                                      |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>FCC Registrations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | : 461337                                                                                                                                                              |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <b>IC Registrations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | : 109AK                                                                                                                                                               |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| (LTE Band 7)<br>FCC 47 CFR Part 2 / 27<br>ISED RSS GEN Issue 4,<br>November 2014<br>ISED RSS 199 Issue 3,<br>December 2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>PASS</b>                                                                                                                                                           |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <p>This report shall not be reproduced without written approval from an officially designated representative of the Motorola Penang Adv. Comm. Laboratory. The results and statements contained in this report pertain only to the device(s) evaluated.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                       |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |
| <p>Prepared By:</p> <br><hr/> <b>Maheshvaran Rajagopal</b><br><b>Technician</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>Approved By:</p> <br><hr/> <b>Goh Aik Hong</b><br><b>Responsible Engineer</b> |                      |                             |                              |                               |                  |               |                     |                                       |                     |            |                       |                        |                       |                           |                          |                                                                  |                          |          |                         |         |                                                                                                                            |             |

## Table of Contents

|         |                                                                                   |    |
|---------|-----------------------------------------------------------------------------------|----|
| 1.0.    | Summary of Test Results .....                                                     | 3  |
| 1.1.    | Measurement Uncertainty .....                                                     | 3  |
| 1.2.    | Equipment List.....                                                               | 3  |
| 1.3.    | General Information.....                                                          | 4  |
| 1.4.    | Channel number and frequency info .....                                           | 5  |
| 1.5.    | Test Mode Applicability and Tested Channel Detail.....                            | 6  |
| 1.6.    | Conducted RF Output Power .....                                                   | 8  |
| 1.6.1.  | Test Setup.....                                                                   | 8  |
| 1.6.2.  | Limits .....                                                                      | 8  |
| 1.6.3.  | Conducted RF Output Power – LTE Band 7 (2500 - 2570MHz) .....                     | 8  |
| 1.6.4.  | Equivalent Isotropically Radiated Power (EIRP) – LTE Band 7 (2500 - 2570MHz)..... | 10 |
| 1.7.    | Peak-to-Average Power Ratio.....                                                  | 12 |
| 1.7.1.  | Test Setup.....                                                                   | 12 |
| 1.7.2.  | Test Limit .....                                                                  | 12 |
| 1.7.3.  | Peak-to-Average Power Ratio –LTE Band 7 (2500 - 2570MHz) .....                    | 12 |
| 1.8.    | Occupied Bandwidth.....                                                           | 15 |
| 1.8.1.  | Test Setup.....                                                                   | 15 |
| 1.8.2.  | Test Limit .....                                                                  | 15 |
| 1.8.3.  | Occupied Bandwidth – LTE Band 7 (2500 - 2570MHz) .....                            | 15 |
| 1.9.    | Frequency Stability .....                                                         | 20 |
| 1.9.1.  | Test Setup.....                                                                   | 20 |
| 1.9.2.  | Test Limit .....                                                                  | 20 |
| 1.9.3.  | Frequency Stability – LTE Band 7 (2500 - 2570MHz) .....                           | 20 |
| 1.10.   | Band Edge Conducted Spurious Emission .....                                       | 23 |
| 1.10.1. | Test Setup .....                                                                  | 23 |
| 1.10.2. | Test Limit .....                                                                  | 23 |
| 1.10.3. | Band Edge Conducted Spurious Emission – LTE Band 7 (2500 - 2570MHz) .....         | 23 |
| 1.11.   | Conducted Spurious Emission .....                                                 | 30 |
| 1.11.1. | Test Setup .....                                                                  | 30 |
| 1.11.2. | Test Limit .....                                                                  | 30 |
| 1.11.3. | Conducted Spurious Emissions –LTE Band 7 (2500 - 2570MHz) .....                   | 30 |
| 1.12.   | Radiated Spurious Emission .....                                                  | 41 |
| 1.12.1. | Test Setup .....                                                                  | 41 |
| 1.12.2. | Test Limit .....                                                                  | 41 |
| 1.12.3. | Radiated Spurious Emission – LTE Band 7 (2500 - 2570MHz) .....                    | 42 |

## REVISION HISTORY

| Revision History | Description                                                                                                                                                        | Date        | Originator            |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------|
| Rev A.           | Initial Report                                                                                                                                                     | 17-Apr-2018 | Maheshvaran Rajagopal |
| Rev B.           | i. Applicant name and address has been added.<br>ii. The battery model number has been revised.<br>iii. AC adapter accessories devices information has been added. | 30-May-2018 | Maheshvaran Rajagopal |

|  |                                                                              |  |  |
|--|------------------------------------------------------------------------------|--|--|
|  | iv. The Test report number of page format is corrected.                      |  |  |
|  | v. RSSs version standard have been added to the cover page.                  |  |  |
|  | vi. Justification statement of accessory devices is included at section 1.5. |  |  |

## 1.0. Summary of Test Results

| FCC Clause               | ISED Clause                 | Test Item                                      | Results | Remarks                       |
|--------------------------|-----------------------------|------------------------------------------------|---------|-------------------------------|
| 2.1046<br>27.50(h)(2)    | RSS-Gen 6.12<br>RSS-199 4.4 | Conducted RF Output Power                      | Pass    | Meet the requirement of limit |
| 2.1046<br>27.50(d)(5)    | -                           | Peak-to-Average Power Ratio                    | Pass    | Meet the requirement of limit |
| 2.1049<br>27.53(m)(6)    | RSS-Gen 6.6                 | Occupied Bandwidth (26dBc, 99%)                | Pass    | Meet the requirement of limit |
| 2.1055<br>27.54          | RSS-199 4.3                 | Frequency Stability                            | Pass    | Meet the requirement of limit |
| 2.1051<br>27.53(m)(4)(6) | RSS-Gen 6.13<br>RSS-199 4.6 | Band Edge Conducted Spurious Emission          | Pass    | Meet the requirement of limit |
| 2.1051<br>27.53(m)(4)(6) | RSS-Gen 6.13<br>RSS-199 4.6 | Conducted Spurious Emissions                   | Pass    | Meet the requirement of limit |
| 2.1053<br>27.53(m)(4)(6) | RSS-199 4.6                 | Radiated Spurious Emission                     | Pass    | Meet the requirement of limit |
| 2.1049<br>27.50(h)(2)    | RSS-199 4.4                 | Equivalent Isotropically Radiated Power (EIRP) | Pass    | Meet the requirement of limit |

## 1.1. Measurement Uncertainty

| Measurement                    | Frequency        | Expanded Uncertainty (k=1.96) (±) |
|--------------------------------|------------------|-----------------------------------|
| Radiated Emissions up to 1 GHz | 30MHz ~ 200MHz   | 5.01                              |
|                                | 200MHz ~ 1000MHz | 5.01                              |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz     | 5.01                              |
|                                | 18GHz ~ 25GHz    | 5.01                              |

## 1.2. Equipment List

| Description                         | Model   | Serial Number | Calibration Date | Calibration Due Date |
|-------------------------------------|---------|---------------|------------------|----------------------|
| BROADBAND ATE 1                     |         |               |                  |                      |
| WIDEBAND RADIO COMMUNICATION TESTER | CMW500  | 154550        | 14-FEB-17        | 14-FEB-19            |
| SIGNAL ANALYZER                     | FSV40   | 101431        | 13-JUL-17        | 12-JUL-19            |
| CHAMBER                             | SH-641  | 92002651      | 6-MAR-17         | 6-MAR-18             |
| POWER SUPPLY                        | 6621A   | US37370810    | 5-JUN-17         | 5-JUN-18             |
| RADIATED EMISSION                   |         |               |                  |                      |
| DRG HORN FREQ.                      | SAS-571 | 719           | 18-JUL-17        | 18-JUL-19            |
| DRG HORN FREQ.                      | SAS-571 | 720           | 2-MAR-17         | 2-MAR-19             |
| POWER SUPPLY                        | 6032A   | 2615A01178    | 6-JUN-17         | 6-JUN-18             |

|                                     |                           |             |               |               |
|-------------------------------------|---------------------------|-------------|---------------|---------------|
| MICROWAVE SIGNAL GENERATOR          | SMP04                     | 100127      | 19-JUL-17     | 18-JUL-18     |
| EMI TEST RECEIVER                   | ESIB26                    | 100336      | 13-JUL-17     | 12-JUL-18     |
| SIGNAL ANALYZER                     | FSV40                     | 101103      | 18-JUL-17     | 17-JUL-18     |
| 5M SEMI-ANECHOIC CHAMBER            | S800-HX                   | J2308       | NO CAL. REQ'D | NO CAL. REQ'D |
| BILOG ANTENNA                       | CBL6112D                  | 25224       | 22-JUL-17     | 22-JUL-18     |
| BILOG ANTENNA                       | CBL6112B                  | 2964        | 16-FEB-18     | 16-FEB-20     |
| BROAD-BAND HORN ANTENNA             | BBHA9170                  | BBHA9170255 | 7-NOV-17      | 7-NOV-18      |
| DATA LOGGER                         | SDL500                    | A.016776    | 18-MAR-17     | 18-MAR-19     |
| LOOP ANTENNA                        | 6502                      | 208416      | 27-JUL-17     | 27-JUL-18     |
| SYSTEM CONTROLLER                   | SC104V                    | 050806-1    | NO CAL. REQ'D | NO CAL. REQ'D |
| TURNTABLE FLUSH MOUNT 2M            | FM2011                    | NA          | NO CAL. REQ'D | NO CAL. REQ'D |
| ANTENNA POSITIONING TOWER           | TLT2                      | NA          | NO CAL. REQ'D | NO CAL. REQ'D |
| 18 - 40GHZ PREAMPLIFIER             | MITEQ HI GAIN<br>SUCOFLEX | 002         | NO CAL. REQ'D | NO CAL. REQ'D |
| PREAMPLIFIER                        | PAM-0118P                 | 361         | NO CAL. REQ'D | NO CAL. REQ'D |
| WIDEBAND RADIO COMMUNICATION TESTER | CMW500                    | 153174      | 9-JAN-2017    | 9-JAN-2019    |

### 1.3. General Information

#### General Description of EUT

|                     |                                     |                           |                           |
|---------------------|-------------------------------------|---------------------------|---------------------------|
| Product             | LEX L11 Mission Critical LTE Device |                           |                           |
| Brand               | Motorola Solutions                  |                           |                           |
| Test Model          | LEX L11n                            |                           |                           |
| Power Supply Rating | 3.7Vdc (Battery), 5Vdc (Adapter)    |                           |                           |
| Mode of operation   | LTE Band 7                          |                           |                           |
| Modulation Type     | QPSK, 16QAM                         |                           |                           |
| Operating Frequency | LTE Band 7                          | Channel Bandwidth 5MHz    | 2502.5MHz~2567.5MHz       |
|                     |                                     | Channel Bandwidth 10MHz   | 2505.0MHz~2565.0MHz       |
|                     |                                     | Channel Bandwidth 15MHz   | 2507.5MHz~2562.5MHz       |
|                     |                                     | Channel Bandwidth 20MHz   | 2510.0MHz~2560.0MHz       |
| Max. EIRP Power     | LTE Band 7<br>QPSK                  | Channel Bandwidth 5MHz    | <b>23.854dBm (0.242W)</b> |
|                     |                                     | Channel Bandwidth 10MHz   | 23.834dBm (0.241W)        |
|                     |                                     | Channel Bandwidth 15MHz   | 23.803dBm (0.24W)         |
|                     |                                     | Channel Bandwidth 20MHz   | 23.688dBm (0.234W)        |
|                     | LTE Band 7<br>16QAM                 | Channel Bandwidth 5MHz    | 22.955dBm (0.197W)        |
|                     |                                     | Channel Bandwidth 10MHz   | 22.899dBm (0.194W)        |
|                     |                                     | Channel Bandwidth 15MHz   | 22.778dBm (0.189W)        |
|                     |                                     | Channel Bandwidth 20MHz   | <b>23.102dBm (0.204W)</b> |
| Antenna Type        | LTE Band 7                          | Monopole with 1.1dBi gain |                           |
| SW Version          | L11_D01.00.48                       |                           |                           |
| HW Version          | P4a                                 |                           |                           |

Note:

1. The EUT contains following accessory devices and data cable.

| Item                                                                | Brand              | Model or P/N              | Specification             |
|---------------------------------------------------------------------|--------------------|---------------------------|---------------------------|
| Rechargeable Lithium ion battery                                    | Motorola Solutions | PMNN4545A                 | 2500mAh 3.7V LI-ION STD   |
| Rechargeable Lithium ion battery                                    | Motorola Solutions | PMNN4546A                 | 5000mAh 3.7V LI-ION HICAP |
| Charger Vehicular Adapter VPA                                       | Motorola Solutions | PMLN7779A                 | 18W                       |
| Power Supply Adaptor, Power supply Wall cube, AC, DC (USB type A-C) | Motorola Solutions | PS000150A31 - US/JPN plug | 7.5W, 100V-240V           |
| Power Supply Adaptor (USB type C-C)                                 | Motorola Solutions | PS000278A01 - US/JPN plug | 27W                       |
| Detachable Power/Data Cable USB-A to USB-C                          | Motorola Solutions | CB000756A01               | -                         |
| Detachable Power/Data Cable USB-C to USB-C                          | Motorola Solutions | CB000754A01               | -                         |

### 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   | Wideband Radio Communication Tester | R&S   | CMW500    | 154550     | NA     |

| NO. | Signal Cable Description of The above Support Units |
|-----|-----------------------------------------------------|
| 1   | NA                                                  |

Note:

1. All power cords of the above support units are non-shielded.
2. Item 1 acted as a communication partner to transfer data.

### 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.

### 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**

**KDB 971168 D02 Misc OOB License Digital Systems v02r01**

**ANSI C63.26-2015**

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

1.4. Channel number and frequency info

|      |           |                   | Test Channel Number |     |      | Test Channel Frequency (MHz) |     |      |
|------|-----------|-------------------|---------------------|-----|------|------------------------------|-----|------|
| Band | Bandwidth | Available Channel | Low                 | Mid | High | Low                          | Mid | High |

|            | supported | Number       | Channel | Channel | Channel | Channel | Channel | Channel |
|------------|-----------|--------------|---------|---------|---------|---------|---------|---------|
| LTE Band 7 | 5 MHz     | 20775~ 21425 | 20775   | 21100   | 21425   | 2502.5  | 2535    | 2567.5  |
|            | 10 MHz    | 20800~ 21400 | 20800   | 21100   | 21400   | 2505    | 2535    | 2565    |
|            | 15 MHz    | 20825~ 21375 | 20825   | 21100   | 21375   | 2507.5  | 2535    | 2562.5  |
|            | 20 MHz    | 20850~ 21350 | 20850   | 21100   | 21350   | 2510    | 2535    | 2560    |

### 1.5. 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 Radiated Emission worst case was found when positioned on X-Plane for LTE band 7.

Pre-scan also have been conducted with the accessory devices listed in section table 1.3, only the worst case radiated emission results of the combination test configuration is reported in this report.

The following channel(s) was (were) selected for the final test as listed below:

#### LTE Band 7

| Test Item                                                                        | Available Channel | Tested Channel      | Channel Bandwidth | Uplink Modulation | Mode                                                              |
|----------------------------------------------------------------------------------|-------------------|---------------------|-------------------|-------------------|-------------------------------------------------------------------|
| <b>Conducted RF Output Power/ Equivalent Isotropically Radiated Power (EIRP)</b> | 20775~ 21425      | 20775, 21100, 21425 | 5 MHz             | QPSK, 16QAM       | As per table 1.6.2 & 1.6.4                                        |
|                                                                                  | 20800~ 21400      | 20800, 21100, 21400 | 10 MHz            |                   |                                                                   |
|                                                                                  | 20825~ 21375      | 20825, 21100, 21375 | 15 MHz            |                   |                                                                   |
|                                                                                  | 20850~ 21350      | 20850, 21100, 21350 | 20 MHz            |                   |                                                                   |
| <b>Peak to Average Power Ratio</b>                                               | 20775~ 21425      | 20775, 21100, 21425 | 5 MHz             | QPSK, 16QAM       | 25 RB / 0 RB Offset                                               |
|                                                                                  | 20800~ 21400      | 20800, 21100, 21400 | 10 MHz            |                   | 50 RB / 0 RB Offset                                               |
|                                                                                  | 20825~ 21375      | 20825, 21100, 21375 | 15 MHz            |                   | 75 RB / 0 RB Offset                                               |
|                                                                                  | 20850~ 21350      | 20850, 21100, 21350 | 20 MHz            |                   | 100 RB / 0 RB Offset                                              |
| <b>Occupied Bandwidth</b>                                                        | 20775~ 21425      | 20775, 21100, 21425 | 5 MHz             | QPSK, 16QAM       | 25 RB / 0 RB Offset                                               |
|                                                                                  | 20800~ 21400      | 20800, 21100, 21400 | 10 MHz            |                   | 50 RB / 0 RB Offset                                               |
|                                                                                  | 20825~ 21375      | 20825, 21100, 21375 | 15 MHz            |                   | 75 RB / 0 RB Offset                                               |
|                                                                                  | 20850~ 21350      | 20850, 21100, 21350 | 20 MHz            |                   | 100 RB / 0 RB Offset                                              |
| <b>Frequency Stability</b>                                                       | 20775~ 21425      | 20775, 21425        | 5 MHz             | QPSK              | 25 RB / 0 RB Offset                                               |
|                                                                                  | 20800~ 21400      | 20800, 21400        | 10 MHz            |                   | 50 RB / 0 RB Offset                                               |
|                                                                                  | 20825~ 21375      | 20825, 21375        | 15 MHz            |                   | 75 RB / 0 RB Offset                                               |
|                                                                                  | 20850~ 21350      | 20850, 21350        | 20 MHz            |                   | 100 RB / 0 RB Offset                                              |
| <b>Band Edge Conducted Spurious Emission</b>                                     | 20775~ 21425      | 20775, 21425        | 5 MHz             | QPSK, 16QAM       | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset  |
|                                                                                  | 20800~ 21400      | 20800, 21400        | 10 MHz            |                   | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset  |
|                                                                                  | 20825~ 21375      | 20825, 21375        | 15 MHz            |                   | 1 RB / 0 RB Offset<br>1 RB / 74 RB Offset<br>75 RB / 0 RB Offset  |
|                                                                                  | 20850~ 21350      | 20850, 21350        | 20 MHz            |                   | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset<br>100 RB / 0 RB Offset |

|                                    |              |                     |        |      |                     |
|------------------------------------|--------------|---------------------|--------|------|---------------------|
| <b>Conducted Spurious Emission</b> | 20775~ 21425 | 20775, 21100, 21425 | 5 MHz  | QPSK | 1 RB / 13 RB Offset |
|                                    | 20800~ 21400 | 20800, 21100, 21400 | 10 MHz |      | 1 RB / 24 RB Offset |
|                                    | 20825~ 21375 | 20825, 21100, 21375 | 15 MHz |      | 1 RB / 0 RB Offset  |
|                                    | 20850~ 21350 | 20850, 21100, 21350 | 20 MHz |      | 1 RB / 49 RB Offset |
| <b>Radiated Spurious Emission</b>  | 20775~ 21425 | 20775, 21100, 21425 | 5 MHz  | QPSK | 1 RB / 13 RB Offset |
|                                    | 20800~ 21400 | 20800, 21100, 21400 | 10 MHz |      | 1 RB / 24 RB Offset |
|                                    | 20825~ 21375 | 20825, 21100, 21375 | 15 MHz |      | 1 RB / 0 RB Offset  |
|                                    | 20850~ 21350 | 20850, 21100, 21350 | 20 MHz |      | 1 RB / 49 RB Offset |

**NOTE:**

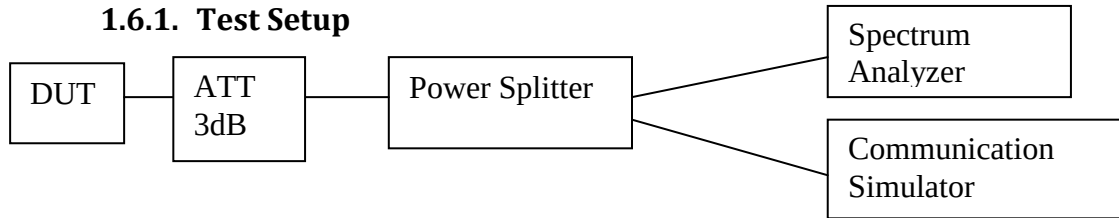
1. The Conducted RF Output Power for QPSK and 16QAM, measured value of QPSK mode is higher than 16QAM mode. Therefore, only Conducted Spurious Emission and Radiated Emission had been tested under QPSK modes.
2. Band Edge was performed with 1 and full Resource Block at the lowest and highest operating frequency band.
3. The Equivalent Isotropically Radiated Power (EIRP) was calculated from Conducted RF Output Power results in QPSK and 16QAM modulation.
4. Peak to Average and Occupied Bandwidth were performed with full Resource Block which is the worst case.
5. Frequency stability was performed with full Resource Block in QPSK modulation.

**Test Condition:**

| Test Item                                                                 | Environmental Conditions | Input Power | Tested By      |
|---------------------------------------------------------------------------|--------------------------|-------------|----------------|
| Conducted RF Output Power/ Equivalent Isotropically Radiated Power (EIRP) | 25°C, 50% RH             | 3.7V DC     | Maheshvaran    |
| Peak-to-Average Power Ratio                                               | 25°C, 50% RH             | 3.7V DC     | Maheshvaran    |
| Occupied Bandwidth                                                        | 25°C, 50% RH             | 3.7V DC     | Maheshvaran    |
| Frequency Stability                                                       | 25°C, 50% RH             | 3.7V DC     | Maheshvaran    |
| Band Edge Conducted Spurious Emission                                     | 25°C, 50% RH             | 3.7V DC     | Maheshvaran    |
| Conducted Spurious Emission                                               | 25°C, 50% RH             | 3.7V DC     | Maheshvaran    |
| Radiated Spurious Emission                                                | 25°C, 63.7% RH           | 3.7V DC     | Nazrin&Qawiman |

## 1.6. Conducted RF Output Power

### 1.6.1. Test Setup



1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. All the measurement was done at low, mid, high channel for each band and different modulation.
5. Record the average power into the test report.

### 1.6.2. Limits

FCC: Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

ISED: For mobile subscriber equipment, the e.i.r.p. shall not exceed 2 watts.

### 1.6.3. Conducted RF Output Power – LTE Band 7 (2500 - 2570MHz)

| Conducted Output Power (dBm) |         |           |                 |         |           |                  |         |           |
|------------------------------|---------|-----------|-----------------|---------|-----------|------------------|---------|-----------|
| LTE Band/BW                  | RB Size | RB Offset | QPSK Modulation |         |           | 16QAM Modulation |         |           |
|                              |         |           | Low CH          | Mid CH  | High CH   | Low CH           | Mid CH  | High CH   |
|                              |         |           | 20775           | 21100   | 21425     | 20775            | 21100   | 21425     |
|                              |         |           | 2502.5MHz       | 2535MHz | 2567.5MHz | 2502.5MHz        | 2535MHz | 2567.5MHz |
| Band 7 / 5.0MHz              | 1       | 0         | 22.256          | 22.701  | 22.578    | 21.136           | 21.754  | 21.843    |
|                              | 1       | 13        | 22.262          | 22.754  | 22.473    | 21.148           | 21.855  | 21.753    |
|                              | 1       | 24        | 22.112          | 22.693  | 22.318    | 21.105           | 21.757  | 21.518    |
|                              | 12      | 0         | 21.321          | 21.743  | 21.596    | 20.3             | 20.667  | 20.669    |
|                              | 12      | 6         | 21.329          | 21.782  | 21.55     | 20.346           | 20.686  | 20.627    |
|                              | 12      | 13        | 21.29           | 21.754  | 21.437    | 20.332           | 20.665  | 20.536    |
|                              | 25      | 0         | 21.282          | 21.719  | 21.52     | 20.285           | 20.705  | 20.635    |

| Conducted Output Power (dBm) |         |           |                 |         |         |                  |         |         |
|------------------------------|---------|-----------|-----------------|---------|---------|------------------|---------|---------|
| LTE Band/BW                  | RB Size | RB Offset | QPSK Modulation |         |         | 16QAM Modulation |         |         |
|                              |         |           | Low CH          | Mid CH  | High CH | Low CH           | Mid CH  | High CH |
|                              |         |           | 20800           | 21100   | 21400   | 20800            | 21100   | 21400   |
|                              |         |           | 2505MHz         | 2535MHz | 2565MHz | 2505MHz          | 2535MHz | 2565MHz |
| Band 7 / 10.0MHz             | 1       | 0         | 22.049          | 22.699  | 22.01   | 21.019           | 21.646  | 21.435  |
|                              | 1       | 25        | 21.899          | 22.734  | 22.384  | 20.981           | 21.628  | 21.799  |
|                              | 1       | 49        | 22.206          | 22.706  | 22.077  | 21.378           | 21.64   | 21.498  |

|  |    |    |        |        |        |        |        |        |
|--|----|----|--------|--------|--------|--------|--------|--------|
|  | 25 | 0  | 21.201 | 21.686 | 21.301 | 20.275 | 20.768 | 20.378 |
|  | 25 | 13 | 21.183 | 21.718 | 21.55  | 20.277 | 20.772 | 20.592 |
|  | 25 | 25 | 21.234 | 21.696 | 21.447 | 20.429 | 20.752 | 20.547 |
|  | 50 | 0  | 21.243 | 21.689 | 21.415 | 20.285 | 20.718 | 20.507 |

| Conducted Output Power (dBm) |         |           |                 |         |            |                  |         |           |
|------------------------------|---------|-----------|-----------------|---------|------------|------------------|---------|-----------|
| LTE Band/BW                  | RB Size | RB Offset | QPSK Modulation |         |            | 16QAM Modulation |         |           |
|                              |         |           | Low CH          | Mid CH  | High CH    | Low CH           | Mid CH  | High CH   |
|                              |         |           | 20825           | 21100   | 21375      | 20825            | 21100   | 21375     |
|                              |         |           | 2507.5MHz       | 2535MHz | 2562.5 MHz | 2507.5MHz        | 2535MHz | 2562.5MHz |
| Band 7 / 15.0MHz             | 1       | 0         | 21.92           | 22.663  | 21.84      | 20.957           | 21.599  | 21.216    |
|                              | 1       | 38        | 22.179          | 22.703  | 22.105     | 21.234           | 21.642  | 21.464    |
|                              | 1       | 74        | 22.593          | 22.491  | 22.026     | 21.678           | 21.483  | 21.36     |
|                              | 36      | 0         | 21.12           | 21.679  | 20.997     | 20.201           | 20.685  | 20.101    |
|                              | 36      | 19        | 21.394          | 21.733  | 21.233     | 20.482           | 20.71   | 20.291    |
|                              | 36      | 39        | 21.527          | 21.709  | 21.403     | 20.601           | 20.667  | 20.481    |
|                              | 75      | 0         | 21.297          | 21.653  | 21.143     | 20.387           | 20.651  | 20.263    |

| Conducted Output Power (dBm) |         |           |                 |         |         |                  |         |         |
|------------------------------|---------|-----------|-----------------|---------|---------|------------------|---------|---------|
| LTE Band/BW                  | RB Size | RB Offset | QPSK Modulation |         |         | 16QAM Modulation |         |         |
|                              |         |           | Low CH          | Mid CH  | High CH | Low CH           | Mid CH  | High CH |
|                              |         |           | 20850           | 21100   | 21350   | 20850            | 21100   | 21350   |
|                              |         |           | 2510 MHz        | 2535MHz | 2560MHz | 2510MHz          | 2535MHz | 2560MHz |
| Band 7 / 20.0MHz             | 1       | 0         | 21.815          | 22.537  | 22.065  | 21.315           | 21.943  | 21.14   |
|                              | 1       | 49        | 22.417          | 22.588  | 21.913  | 22.002           | 21.973  | 20.986  |
|                              | 1       | 99        | 22.402          | 22.28   | 21.88   | 21.943           | 21.717  | 20.961  |
|                              | 50      | 0         | 21.197          | 21.66   | 21.006  | 20.247           | 20.675  | 20.09   |
|                              | 50      | 25        | 21.538          | 21.719  | 21.124  | 20.593           | 20.7    | 20.171  |
|                              | 50      | 50        | 21.665          | 21.685  | 21.273  | 20.747           | 20.686  | 20.355  |
|                              | 100     | 0         | 21.307          | 21.678  | 21.081  | 20.398           | 20.675  | 20.151  |

### 1.6.4. Equivalent Isotropically Radiated Power (EIRP) – LTE Band 7 (2500 - 2570MHz)

| EIRP (dBm)      |         |           |                 |         |           |                  |         |           |
|-----------------|---------|-----------|-----------------|---------|-----------|------------------|---------|-----------|
| LTE Band/BW     | RB Size | RB Offset | QPSK Modulation |         |           | 16QAM Modulation |         |           |
|                 |         |           | Low CH          | Mid CH  | High CH   | Low CH           | Mid CH  | High CH   |
|                 |         |           | 20775           | 21100   | 21425     | 20775            | 21100   | 21425     |
|                 |         |           | 2502.5MHz       | 2535MHz | 2567.5MHz | 2502.5MHz        | 2535MHz | 2567.5MHz |
| Band 7 / 5.0MHz | 1       | 0         | 23.356          | 23.801  | 23.678    | 22.236           | 22.854  | 22.943    |
|                 | 1       | 13        | 23.362          | 23.854  | 23.573    | 22.248           | 22.955  | 22.853    |
|                 | 1       | 24        | 23.212          | 23.793  | 23.418    | 22.205           | 22.857  | 22.618    |
|                 | 12      | 0         | 22.421          | 22.843  | 22.696    | 21.4             | 21.767  | 21.769    |
|                 | 12      | 6         | 22.429          | 22.882  | 22.65     | 21.446           | 21.786  | 21.727    |
|                 | 12      | 13        | 22.39           | 22.854  | 22.537    | 21.432           | 21.765  | 21.636    |
|                 | 25      | 0         | 22.382          | 22.819  | 22.62     | 21.385           | 21.805  | 21.735    |

| EIRP (dBm)       |         |           |                 |         |         |                  |         |         |
|------------------|---------|-----------|-----------------|---------|---------|------------------|---------|---------|
| LTE Band/BW      | RB Size | RB Offset | QPSK Modulation |         |         | 16QAM Modulation |         |         |
|                  |         |           | Low CH          | Mid CH  | High CH | Low CH           | Mid CH  | High CH |
|                  |         |           | 20800           | 21100   | 21400   | 20800            | 21100   | 21400   |
|                  |         |           | 2505MHz         | 2535MHz | 2565MHz | 2505MHz          | 2535MHz | 2565MHz |
| Band 7 / 10.0MHz | 1       | 0         | 23.149          | 23.799  | 23.11   | 22.119           | 22.746  | 22.535  |
|                  | 1       | 25        | 22.999          | 23.834  | 23.484  | 22.081           | 22.728  | 22.899  |
|                  | 1       | 49        | 23.306          | 23.806  | 23.177  | 22.478           | 22.74   | 22.598  |
|                  | 25      | 0         | 22.301          | 22.786  | 22.401  | 21.375           | 21.868  | 21.478  |
|                  | 25      | 13        | 22.283          | 22.818  | 22.65   | 21.377           | 21.872  | 21.692  |
|                  | 25      | 25        | 22.334          | 22.796  | 22.547  | 21.529           | 21.852  | 21.647  |
|                  | 50      | 0         | 22.343          | 22.789  | 22.515  | 21.385           | 21.818  | 21.607  |

| EIRP (dBm)          |            |              |                 |         |               |                  |         |           |
|---------------------|------------|--------------|-----------------|---------|---------------|------------------|---------|-----------|
| LTE<br>Band/BW      | RB<br>Size | RB<br>Offset | QPSK Modulation |         |               | 16QAM Modulation |         |           |
|                     |            |              | Low CH          | Mid CH  | High CH       | Low CH           | Mid CH  | High CH   |
|                     |            |              | 20825           | 21100   | 21375         | 20825            | 21100   | 21375     |
|                     |            |              | 2507.5MHz       | 2535MHz | 2562.5<br>MHz | 2507.5MHz        | 2535MHz | 2562.5MHz |
| Band 7 /<br>15.0MHz | 1          | 0            | 23.02           | 23.763  | 22.94         | 22.057           | 22.699  | 22.316    |
|                     | 1          | 38           | 23.279          | 23.803  | 23.205        | 22.334           | 22.742  | 22.564    |
|                     | 1          | 74           | 23.693          | 23.591  | 23.126        | 22.778           | 22.583  | 22.46     |
|                     | 36         | 0            | 22.22           | 22.779  | 22.097        | 21.301           | 21.785  | 21.201    |
|                     | 36         | 19           | 22.494          | 22.833  | 22.333        | 21.582           | 21.81   | 21.391    |
|                     | 36         | 39           | 22.627          | 22.809  | 22.503        | 21.701           | 21.767  | 21.581    |
|                     | 75         | 0            | 22.397          | 22.753  | 22.243        | 21.487           | 21.751  | 21.363    |

| EIRP (dBm)          |            |              |                 |         |         |                  |         |         |
|---------------------|------------|--------------|-----------------|---------|---------|------------------|---------|---------|
| LTE<br>Band/BW      | RB<br>Size | RB<br>Offset | QPSK Modulation |         |         | 16QAM Modulation |         |         |
|                     |            |              | Low CH          | Mid CH  | High CH | Low CH           | Mid CH  | High CH |
|                     |            |              | 20850           | 21100   | 21350   | 20850            | 21100   | 21350   |
|                     |            |              | 2510 MHz        | 2535MHz | 2560MHz | 2510MHz          | 2535MHz | 2560MHz |
| Band 7 /<br>20.0MHz | 1          | 0            | 22.915          | 23.637  | 23.165  | 22.415           | 23.043  | 22.24   |
|                     | 1          | 49           | 23.517          | 23.688  | 23.013  | 23.102           | 23.073  | 22.086  |
|                     | 1          | 99           | 23.502          | 23.38   | 22.98   | 23.043           | 22.817  | 22.061  |
|                     | 50         | 0            | 22.297          | 22.76   | 22.106  | 21.347           | 21.775  | 21.19   |
|                     | 50         | 25           | 22.638          | 22.819  | 22.224  | 21.693           | 21.8    | 21.271  |
|                     | 50         | 50           | 22.765          | 22.785  | 22.373  | 21.847           | 21.786  | 21.455  |
|                     | 100        | 0            | 22.407          | 22.778  | 22.181  | 21.498           | 21.775  | 21.251  |

The maximum ERP/EIRP from the measured RF output power is given in Equation as follows:

$$\text{EIRP} = \text{P}_{\text{Meas}} + \text{G}_T$$

$$\text{ERP} = \text{EIRP} - 2.15$$

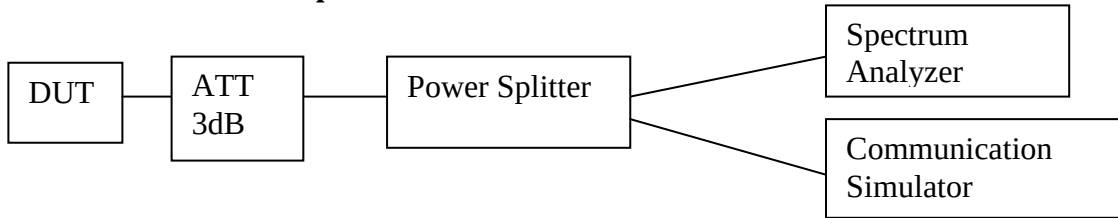
Where, ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively  
 (Expressed in the same units as P<sub>Meas</sub>, e.g., dBm)

P<sub>Meas</sub> measured transmitter output power, in dBm

G<sub>T</sub> gain of the transmitting antenna, in dBi (EIRP)

## 1.7. Peak-to-Average Power Ratio

### 1.7.1. Test Setup



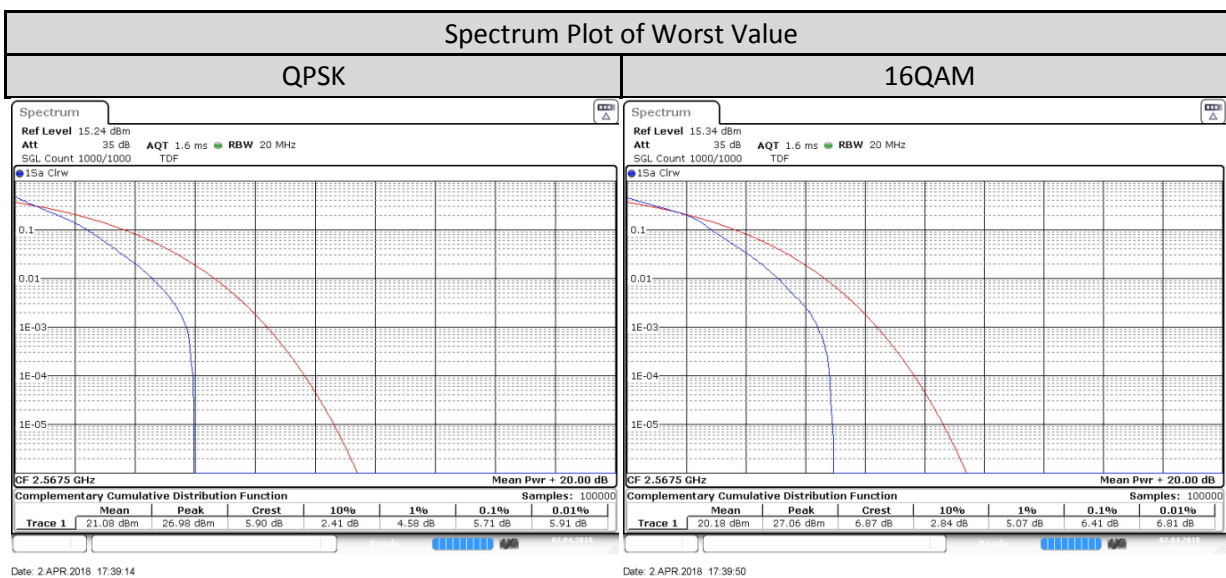
1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. Set the CCDF (Complementary Cumulative Distribution Function) option in the spectrum analyzer.
5. Spectrum Analyzer setting, RBW = 20MHz.
6. Recorded the maximum PAR level associated with a probability of 0.1% as Peak to Average Ratio.
7. All the measurement was done at low, mid, high channel for each band and different modulation.

### 1.7.2. Test Limit

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.

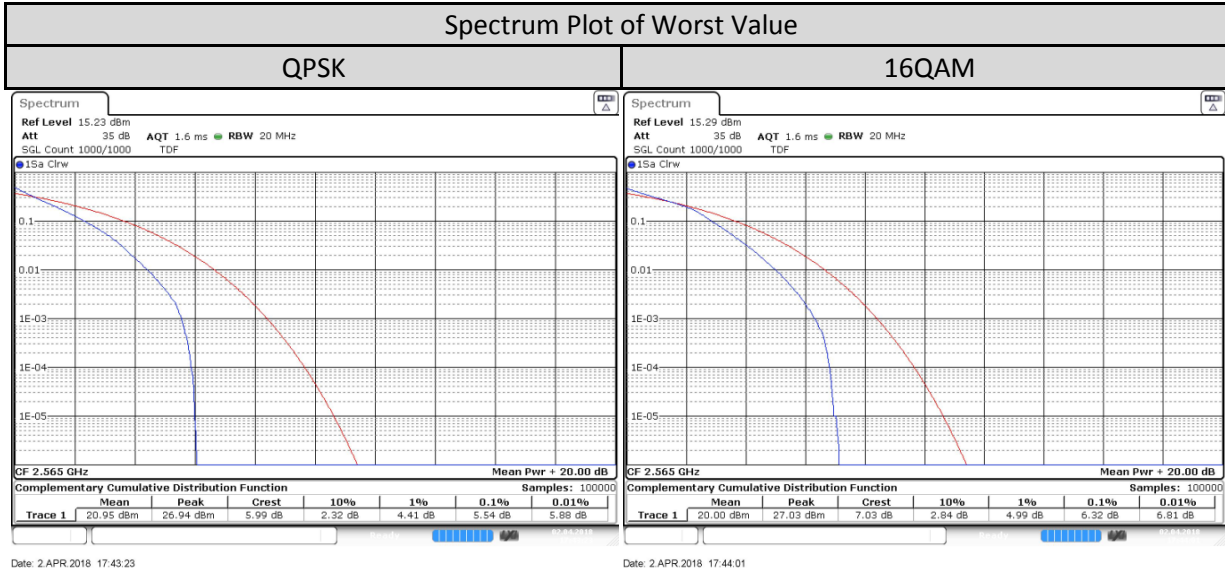
### 1.7.3. Peak-to-Average Power Ratio –LTE Band 7 (2500 - 2570MHz)

| LTE Band/BW/RB Size/RB Offset | Channel Number | Tx Frequency | Peak To Average (dB) |                  |
|-------------------------------|----------------|--------------|----------------------|------------------|
|                               |                |              | QPSK Modulation      | 16QAM Modulation |
| <b>Band 7/5MHz/25/0</b>       | Low CH 20775   | 2502.5 MHz   | 4.551                | 5.507            |
|                               | Mid CH 21100   | 2535 MHz     | 4.58                 | 5.594            |
|                               | High CH 21425  | 2567.5 MHz   | <b>5.71</b>          | <b>6.406</b>     |

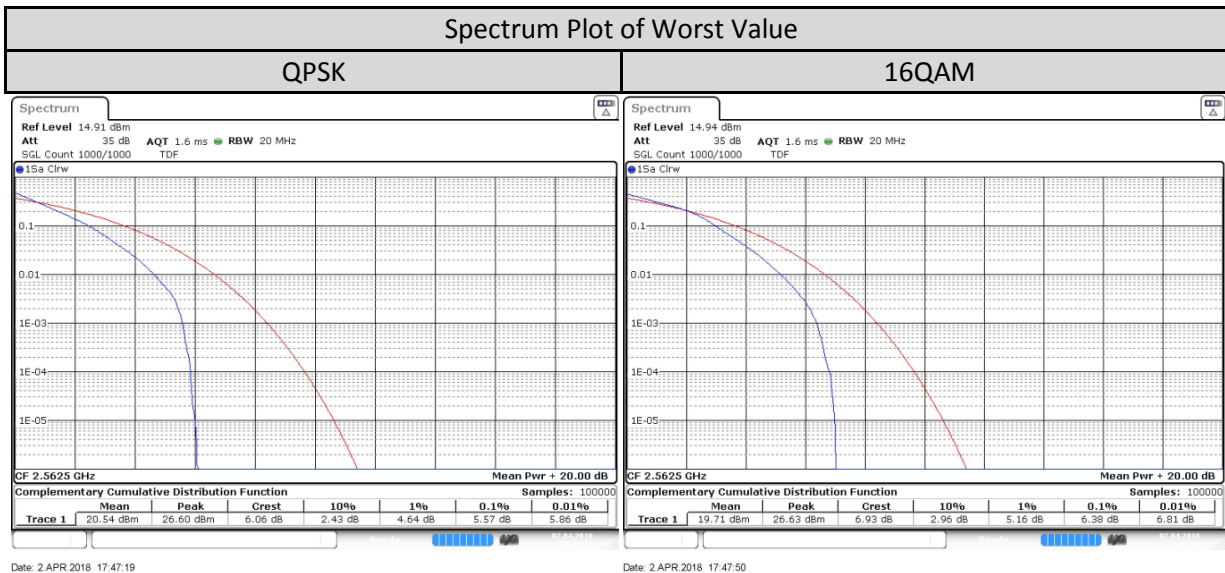


| LTE Band/BW/RB | Channel Number | Tx | Peak To Average (dB) |
|----------------|----------------|----|----------------------|
|----------------|----------------|----|----------------------|

| Size/RB Offset               |               | Frequency | QPSK Modulation | 16QAM Modulation |
|------------------------------|---------------|-----------|-----------------|------------------|
| <b>Band<br/>7/10MHz/50/0</b> | Low CH 20800  | 2505 MHz  | 4.696           | 5.594            |
|                              | Mid CH 21100  | 2535 MHz  | 4.493           | 5.565            |
|                              | High CH 21400 | 2565 MHz  | <b>5.536</b>    | <b>6.319</b>     |

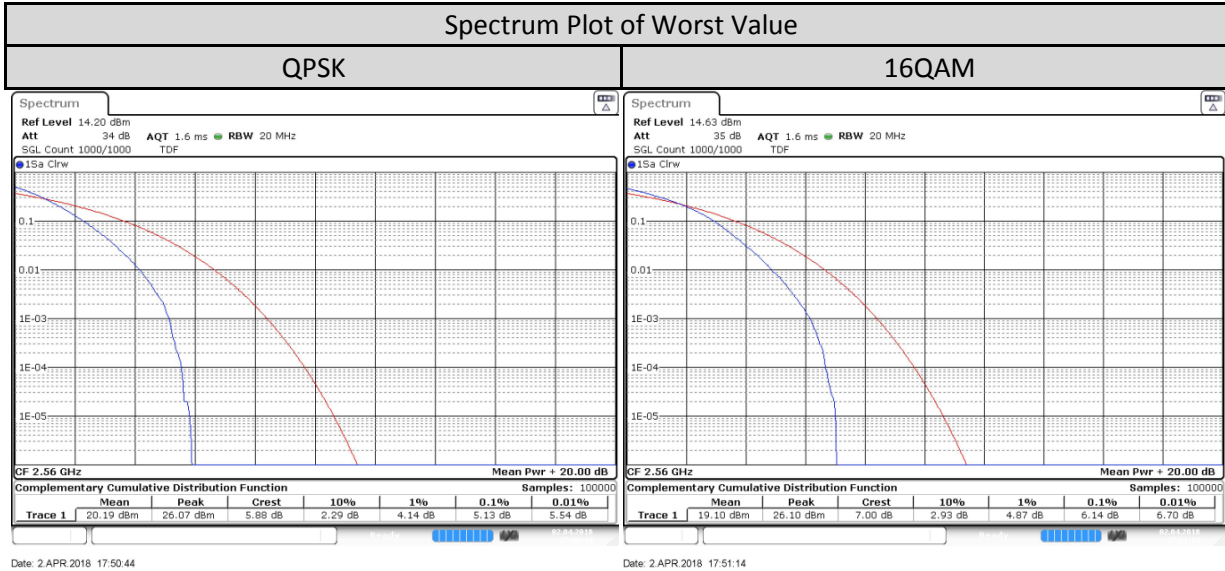


| LTE Band/BW/RB<br>Size/RB Offset | Channel Number | Tx<br>Frequency | Peak To Average (dB) |                  |
|----------------------------------|----------------|-----------------|----------------------|------------------|
|                                  |                |                 | QPSK Modulation      | 16QAM Modulation |
| <b>Band<br/>7/15MHz/75/0</b>     | Low CH 20825   | 2507.5 MHz      | 4.986                | 5.913            |
|                                  | Mid CH 21100   | 2535 MHz        | 4.522                | 5.536            |
|                                  | High CH 21375  | 2562.5 MHz      | <b>5.565</b>         | <b>6.377</b>     |



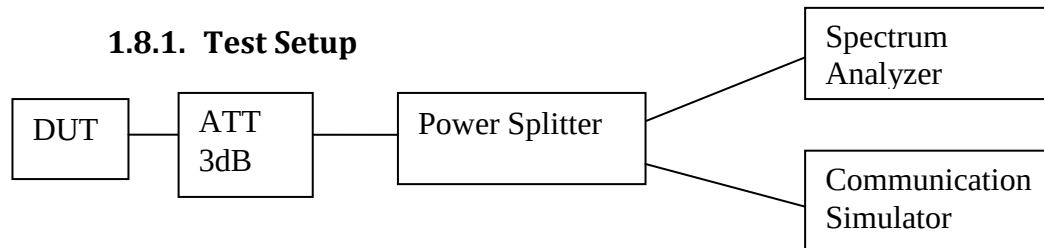
| LTE Band/BW/RB | Channel Number | Tx | Peak To Average (dB) |
|----------------|----------------|----|----------------------|
|----------------|----------------|----|----------------------|

| Size/RB Offset                 |               | Frequency | QPSK Modulation | 16QAM Modulation |
|--------------------------------|---------------|-----------|-----------------|------------------|
| <b>Band 7/<br/>20MHz/100/0</b> | Low CH 20850  | 2510 MHz  | 4.986           | 5.942            |
|                                | Mid CH 21100  | 2535 MHz  | 4.406           | 5.507            |
|                                | High CH 21350 | 2560 MHz  | <b>5.13</b>     | <b>6.145</b>     |



## 1.8. Occupied Bandwidth

### 1.8.1. Test Setup



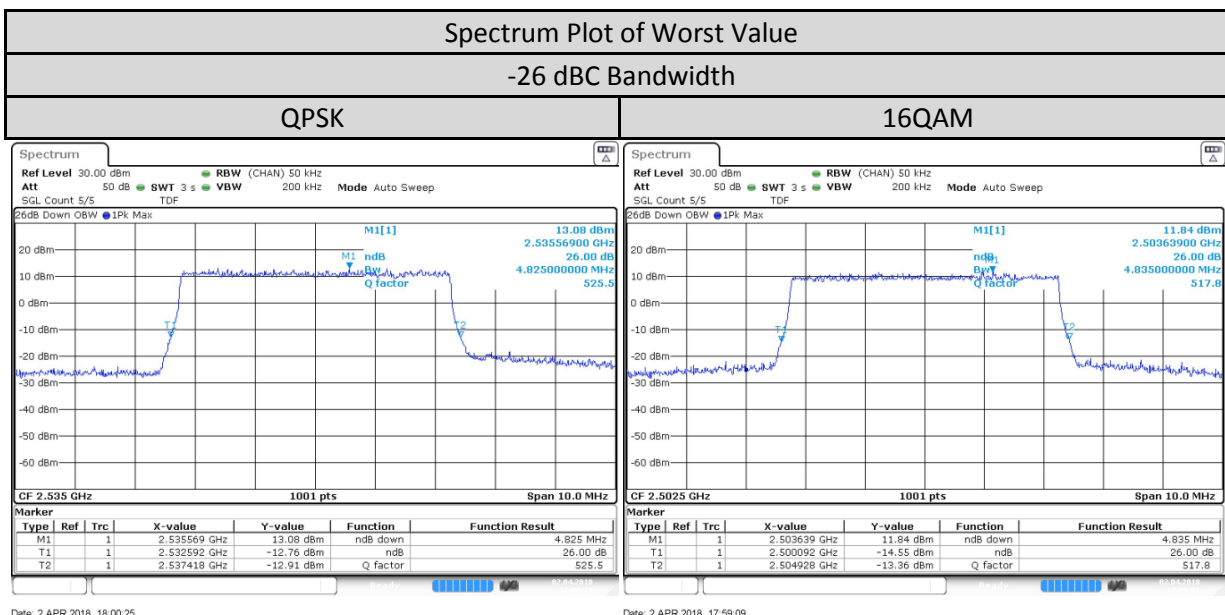
- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) For LTE measurement, set DUT to transmit maximum power & full RB size through communication simulator.
- 4) For LTE measurement, set DUT to transmit maximum power through communication simulator.
- 5) Spectrum Analyzer setting, RBW is 1% of OBW and VBW is 3 times of RBW.
- 6) Measure & record -26dBc and 99% occupied bandwidth (BW).
- 7) All the measurement was done at low, mid, high channel for each band and different modulation.

### 1.8.2. Test Limit

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### 1.8.3. Occupied Bandwidth – LTE Band 7 (2500 - 2570MHz)

| LTE Band/BW/RB Size/RB Offset | Channel Number | Tx Frequency | -26 dBc Bandwidth (MHz) |                  |
|-------------------------------|----------------|--------------|-------------------------|------------------|
|                               |                |              | QPSK Modulation         | 16QAM Modulation |
| Band 7/5MHz/25/0              | Low CH 20775   | 2502.5 MHz   | 4.815                   | <b>4.835</b>     |
|                               | Mid CH 21100   | 2535 MHz     | <b>4.825</b>            | 4.785            |
|                               | High CH 21425  | 2567.5 MHz   | 4.815                   | 4.825            |

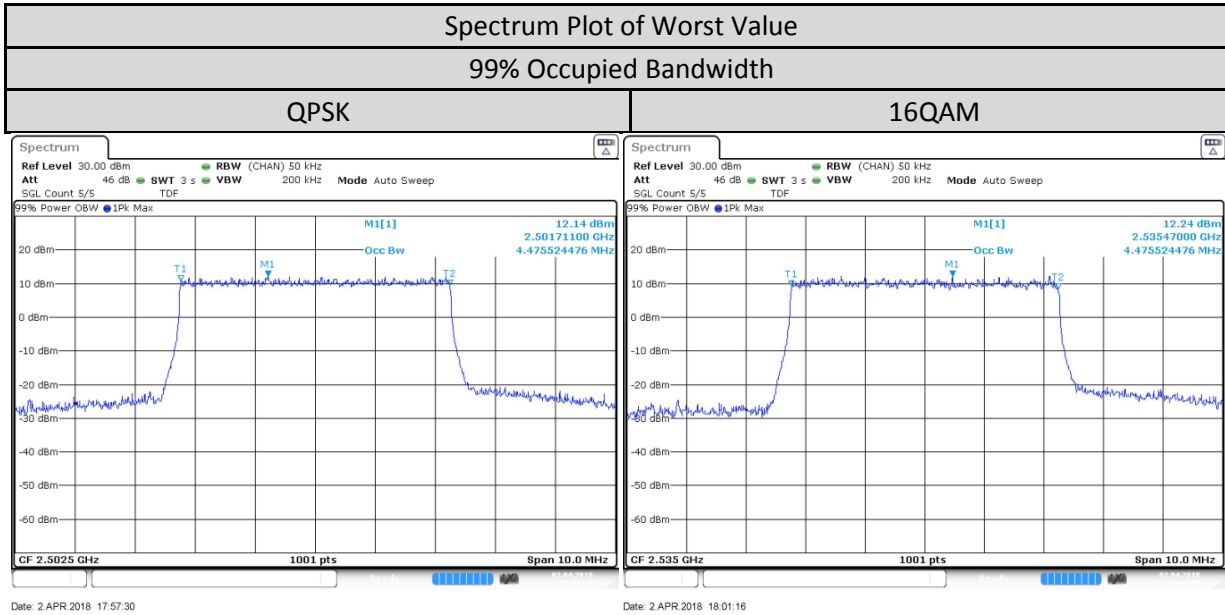


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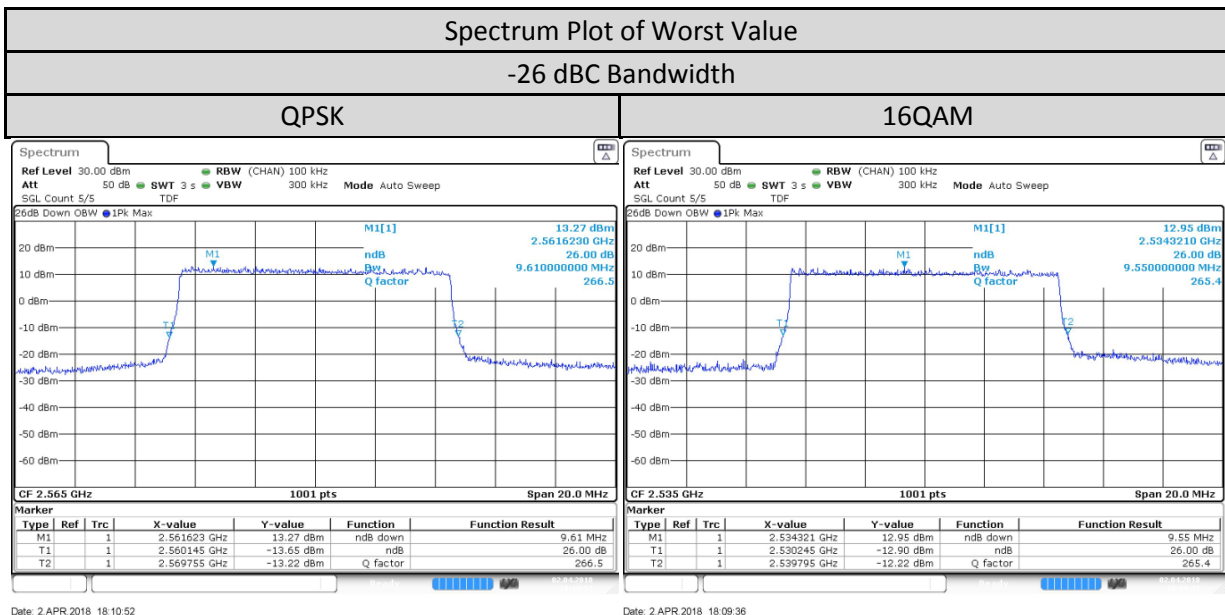
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| LTE Band/BW/RB | Channel | Tx Frequency | 99% Occupied Bandwidth (MHz) |
|----------------|---------|--------------|------------------------------|
|----------------|---------|--------------|------------------------------|

| Size/RB Offset          | Number        |            | QPSK Modulation | 16QAM Modulation |
|-------------------------|---------------|------------|-----------------|------------------|
| <b>Band 7/5MHz/25/0</b> | Low CH 20775  | 2502.5 MHz | 4.476           | 4.466            |
|                         | Mid CH 21100  | 2535 MHz   | 4.456           | 4.476            |
|                         | High CH 21425 | 2567.5 MHz | <b>4.476</b>    | <b>4.476</b>     |

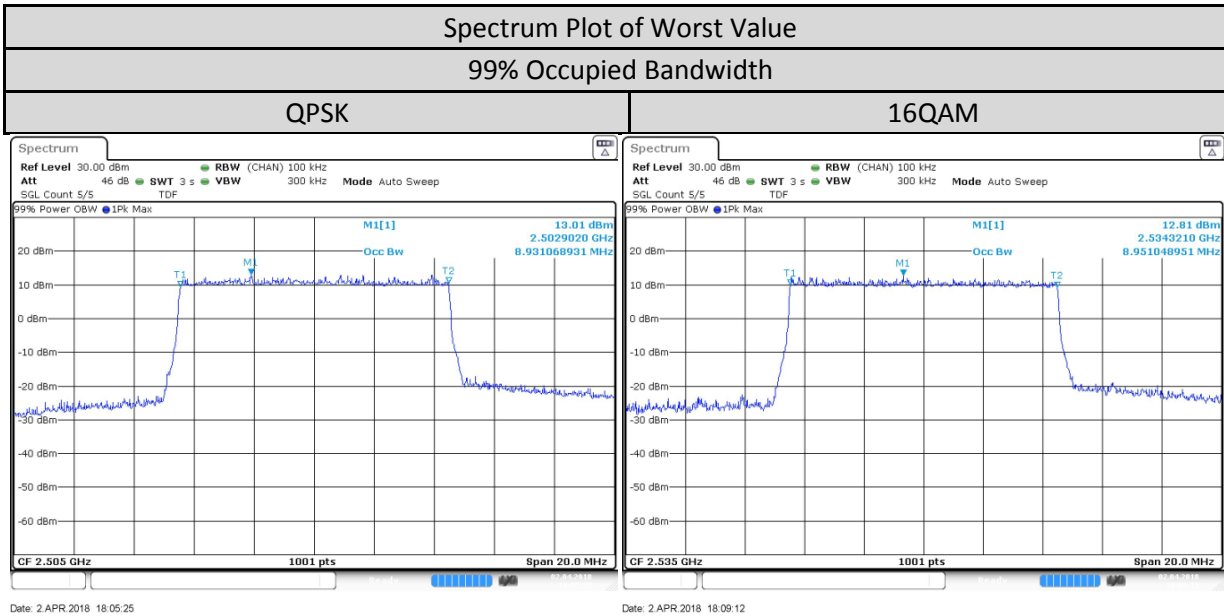


| LTE Band/BW/RB<br>Size/RB Offset | Channel<br>Number | Tx Frequency | -26 dBc Bandwidth (MHz) |                  |
|----------------------------------|-------------------|--------------|-------------------------|------------------|
|                                  |                   |              | QPSK Modulation         | 16QAM Modulation |
| <b>Band 7/10MHz/50/0</b>         | Low CH 20800      | 2505 MHz     | 9.55                    | 9.53             |
|                                  | Mid CH 21100      | 2535 MHz     | 9.51                    | 9.55             |
|                                  | High CH 21400     | 2565 MHz     | <b>9.61</b>             | <b>9.55</b>      |

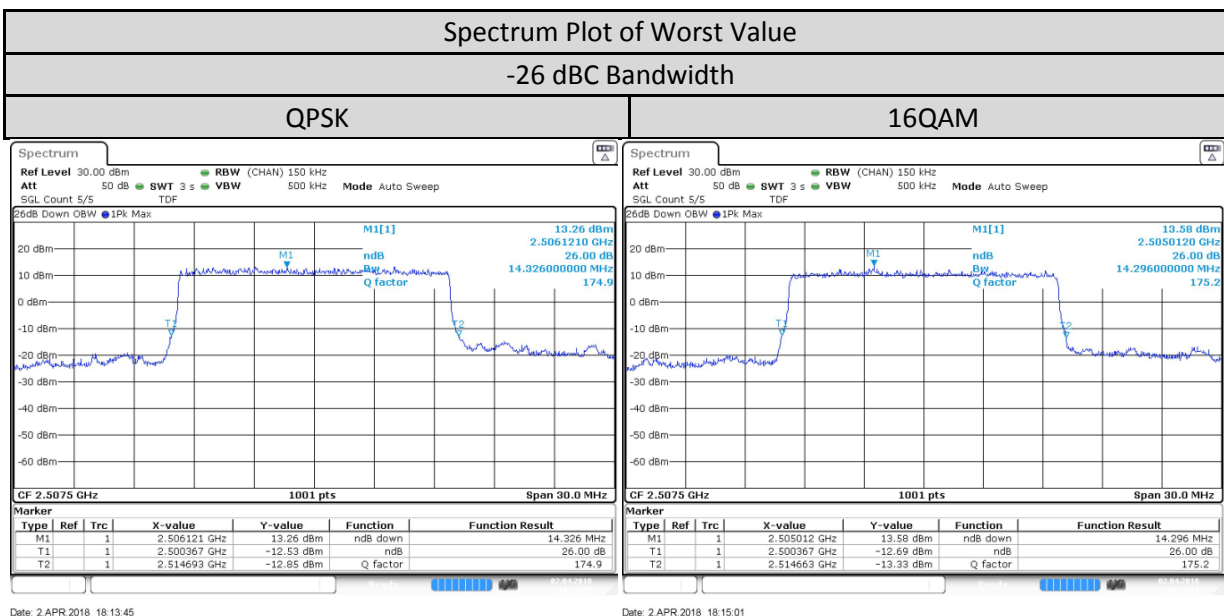


| LTE Band/BW/RB<br>Size/RB Offset | Channel<br>Number | Tx Frequency | 99% Occupied Bandwidth (MHz) |                  |
|----------------------------------|-------------------|--------------|------------------------------|------------------|
|                                  |                   |              | QPSK Modulation              | 16QAM Modulation |

|                                    |               |          |              |              |
|------------------------------------|---------------|----------|--------------|--------------|
| <b>Band</b><br><b>7/10MHz/50/0</b> | Low CH 20800  | 2505 MHz | 8.931        | 8.911        |
|                                    | Mid CH 21100  | 2535 MHz | 8.931        | <b>8.951</b> |
|                                    | High CH 21400 | 2565 MHz | <b>8.931</b> | 8.931        |

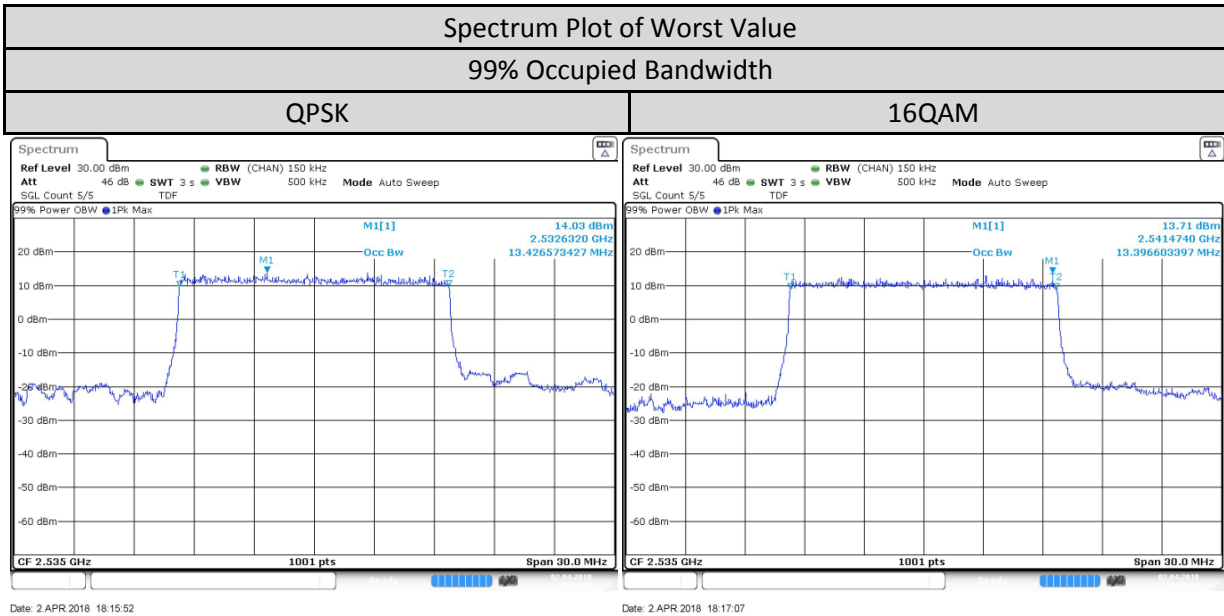


| LTE Band/BW/RB Size/RB Offset      | Channel Number | Tx Frequency | -26 dBc Bandwidth (MHz) |                  |
|------------------------------------|----------------|--------------|-------------------------|------------------|
|                                    |                |              | QPSK Modulation         | 16QAM Modulation |
| <b>Band</b><br><b>7/15MHz/75/0</b> | Low CH 20825   | 2507.5 MHz   | <b>14.326</b>           | <b>14.296</b>    |
|                                    | Mid CH 21100   | 2535 MHz     | 14.296                  | 14.236           |
|                                    | High CH 21375  | 2562.5 MHz   | 14.266                  | 14.176           |

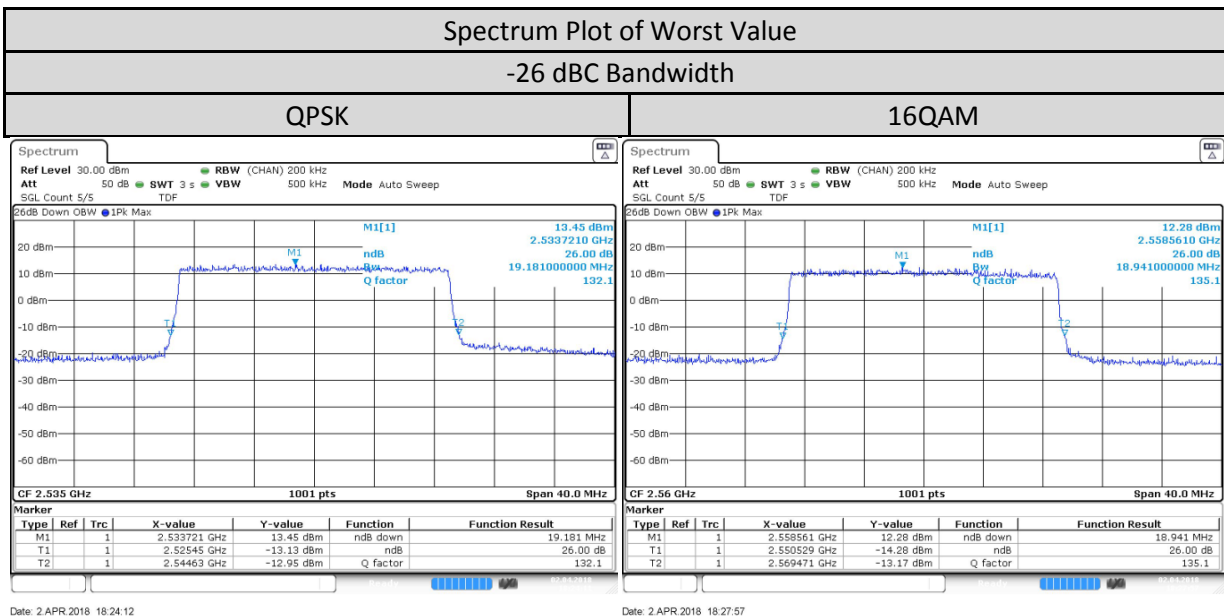


| LTE Band/BW/RB Size/RB Offset | Channel Number | Tx Frequency | 99% Occupied Bandwidth (MHz) |                  |
|-------------------------------|----------------|--------------|------------------------------|------------------|
|                               |                |              | QPSK Modulation              | 16QAM Modulation |
| <b>Band</b>                   | Low CH 20825   | 2507.5 MHz   | 13.367                       | 13.367           |

|              |               |            |        |        |
|--------------|---------------|------------|--------|--------|
| 7/15MHz/75/0 | Mid CH 21100  | 2535 MHz   | 13.427 | 13.397 |
|              | High CH 21375 | 2562.5 MHz | 13.367 | 13.397 |



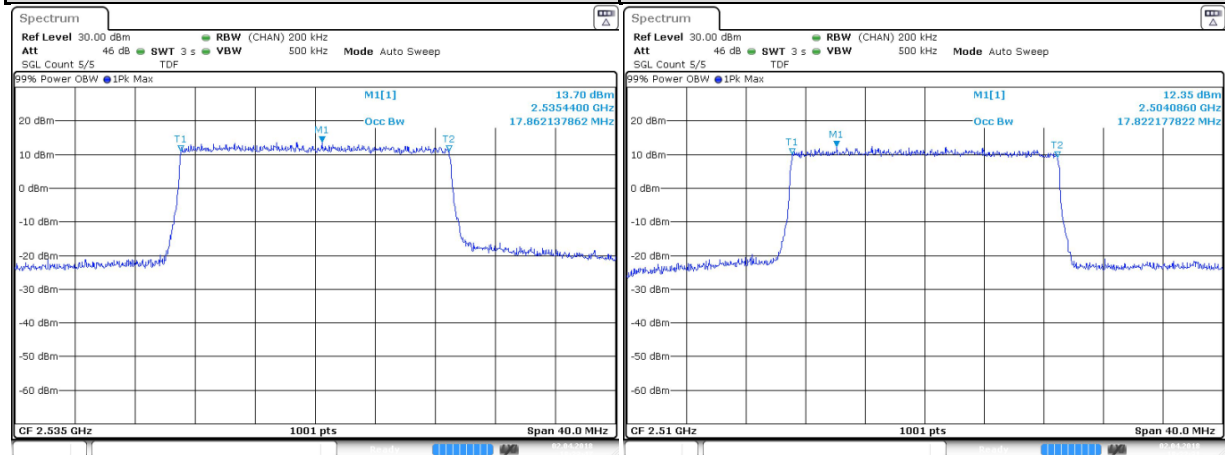
| LTE Band/BW/RB Size/RB Offset | Channel Number | Tx Frequency | -26 dBc Bandwidth (MHz) |                  |
|-------------------------------|----------------|--------------|-------------------------|------------------|
|                               |                |              | QPSK Modulation         | 16QAM Modulation |
| Band 7/20MHz/100/0            | Low CH 20850   | 2510 MHz     | 19.061                  | 18.901           |
|                               | Mid CH 21100   | 2535 MHz     | 19.181                  | 18.901           |
|                               | High CH 21350  | 2560 MHz     | 18.701                  | 18.941           |



| LTE Band/BW/RB Size/RB Offset | Channel Number | Tx Frequency | 99% Occupied Bandwidth (MHz) |                  |
|-------------------------------|----------------|--------------|------------------------------|------------------|
|                               |                |              | QPSK Modulation              | 16QAM Modulation |
| Band 7/20MHz/100/0            | Low CH 20850   | 2510 MHz     | 17.822                       | 17.822           |
|                               | Mid CH 21100   | 2535 MHz     | 17.862                       | 17.822           |

|  |               |          |        |        |
|--|---------------|----------|--------|--------|
|  | High CH 21350 | 2560 MHz | 17.822 | 17.822 |
|--|---------------|----------|--------|--------|

|                              |       |
|------------------------------|-------|
| Spectrum Plot of Worst Value |       |
| 99% Occupied Bandwidth       |       |
| QPSK                         | 16QAM |

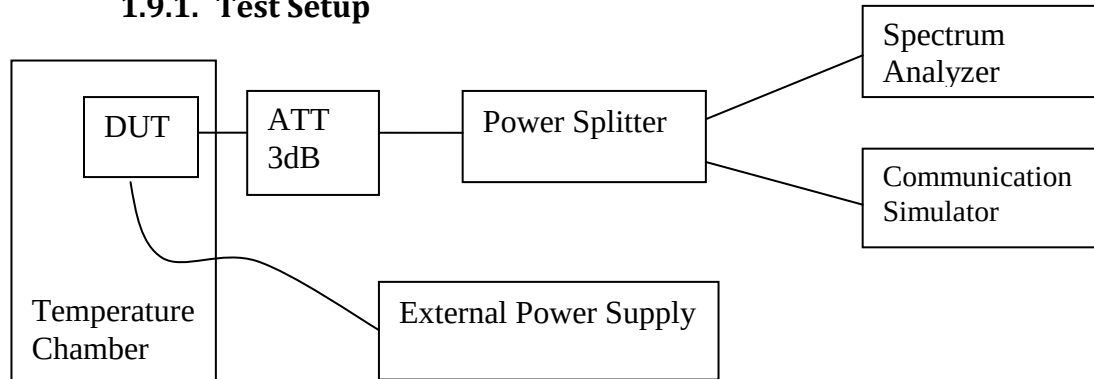


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## 1.9. Frequency Stability

### 1.9.1. Test Setup



- 1) The DUT is placed in the temperature chamber and DUT is power up by external power supply to control the DC input voltage.
- 2) The temperature chamber could control the temperature and humidity and external power supply could control the test voltage range from minimum to maximum operating voltage.
- 3) Measured frequency error from the communication simulator by vary below step :
  - i. Vary temperature of the temperature chamber from -30 ~ 50 deg C (10 deg C / Step) and set external supply voltage constant at nominal voltage.
  - ii. Vary external supply voltage from minimum to maximum operation voltage support by DUT and set temperature chamber constant at room temp.
- 4) All the measurement was done at mid channel for each band.

### 1.9.2. Test Limit

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

### 1.9.3. Frequency Stability – LTE Band 7 (2500 - 2570MHz)

| Band          | Temp<br>( Deg C ) | Frequency Error VS Temperature |                       |                 |                       |
|---------------|-------------------|--------------------------------|-----------------------|-----------------|-----------------------|
|               |                   | Channel Bandwidth: 5 MHz       |                       |                 |                       |
|               |                   | Low Channel                    |                       | High Channel    |                       |
|               |                   | 2502.5MHz                      |                       | 2567.5MHz       |                       |
|               |                   | Frequency (MHz)                | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| LTE<br>Band 7 | 50                | 2502.499982                    | -0.007014             | 2567.499986     | -0.005332             |
|               | 40                | 2502.499985                    | -0.006099             | 2567.499982     | -0.007204             |
|               | 30                | 2502.499982                    | -0.007334             | 2567.499982     | -0.006926             |
|               | 20                | 2502.499985                    | -0.006191             | 2567.499986     | -0.005304             |
|               | 10                | 2502.499984                    | -0.006219             | 2567.499984     | -0.006123             |
|               | 0                 | 2502.499986                    | -0.005419             | 2567.499986     | -0.005605             |
|               | -10               | 2502.499981                    | -0.007448             | 2567.499993     | -0.002624             |
|               | -20               | 2502.499985                    | -0.006156             | 2567.499987     | -0.004953             |
|               | -30               | 2502.499984                    | -0.006442             | 2567.499985     | -0.005995             |

| Band | Voltage | Frequency Error VS Voltage |
|------|---------|----------------------------|
|------|---------|----------------------------|

|               | (V)  | Channel Bandwidth: 5 MHz |                       |                 |                       |
|---------------|------|--------------------------|-----------------------|-----------------|-----------------------|
|               |      | Low Channel              |                       | High Channel    |                       |
|               |      | 2502.5MHz                |                       | 2567.5MHz       |                       |
| LTE<br>Band 7 |      | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
|               | 4.35 | 2502.499982              | -0.007237             | 2567.499983     | -0.006714             |
|               | 3.7  | 2502.499982              | -0.007283             | 2567.499985     | -0.005672             |
|               | 3.2  | 2502.499984              | -0.006379             | 2567.500014     | 0.005516              |

| Band          | Temp<br>( Deg C) | Frequency Error VS Temperature |                       |                 |                       |
|---------------|------------------|--------------------------------|-----------------------|-----------------|-----------------------|
|               |                  | Channel Bandwidth: 10 MHz      |                       |                 |                       |
|               |                  | Low Channel                    |                       | High Channel    |                       |
|               |                  | 2505MHz                        |                       | 2565MHz         |                       |
| LTE<br>Band 7 |                  | Frequency (MHz)                | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
|               | 50               | 2505.000014                    | 0.005488              | 2565.000013     | 0.005237              |
|               | 40               | 2504.999979                    | -0.008218             | 2564.999985     | -0.005956             |
|               | 30               | 2505.000013                    | 0.005351              | 2564.999988     | -0.004869             |
|               | 20               | 2505.000014                    | 0.005539              | 2564.999986     | -0.005382             |
|               | 10               | 2505.000014                    | 0.005591              | 2565.000026     | 0.010156              |
|               | 0                | 2505.000016                    | 0.006476              | 2565.000014     | 0.005566              |
|               | -10              | 2505.000014                    | 0.005556              | 2565.000015     | 0.005973              |
|               | -20              | 2505.000013                    | 0.005317              | 2565.000013     | 0.005164              |
|               | -30              | 2505.000013                    | 0.005334              | 2565.000014     | 0.005499              |

| Band          | Voltage<br>(V) | Frequency Error VS Voltage |                       |                 |                       |
|---------------|----------------|----------------------------|-----------------------|-----------------|-----------------------|
|               |                | Channel Bandwidth: 10 MHz  |                       |                 |                       |
|               |                | Low Channel                |                       | High Channel    |                       |
|               |                | 2505MHz                    |                       | 2565MHz         |                       |
| LTE<br>Band 7 |                | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
|               | 4.35           | 2505.000017                | 0.006916              | 2565.000013     | 0.004913              |
|               | 3.7            | 2504.999986                | -0.005602             | 2565.000017     | 0.006586              |
|               | 3.2            | 2505.000015                | 0.00615               | 2565.000012     | 0.004612              |

| Band          | Temp<br>( Deg C) | Frequency Error VS Temperature |                       |                 |                       |
|---------------|------------------|--------------------------------|-----------------------|-----------------|-----------------------|
|               |                  | Channel Bandwidth: 15 MHz      |                       |                 |                       |
|               |                  | Low Channel                    |                       | High Channel    |                       |
|               |                  | 2507.5MHz                      |                       | 2562.5MHz       |                       |
| LTE<br>Band 7 |                  | Frequency (MHz)                | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
|               | 50               | 2507.500018                    | 0.007268              | 2562.499982     | -0.007218             |
|               | 40               | 2507.500021                    | 0.008187              | 2562.499981     | -0.007391             |
|               | 30               | 2507.500028                    | 0.01113               | 2562.499981     | -0.00728              |
|               | 20               | 2507.50002                     | 0.008084              | 2562.499982     | -0.007079             |
|               | 10               | 2507.500021                    | 0.008483              | 2562.49998      | -0.00762              |

|  |            |             |          |             |           |
|--|------------|-------------|----------|-------------|-----------|
|  | <b>0</b>   | 2507.500023 | 0.008985 | 2562.499981 | -0.007263 |
|  | <b>-10</b> | 2507.500022 | 0.008694 | 2562.499982 | -0.00714  |
|  | <b>-20</b> | 2507.500023 | 0.008974 | 2562.499985 | -0.005968 |
|  | <b>-30</b> | 2507.500019 | 0.00757  | 2562.499984 | -0.006107 |

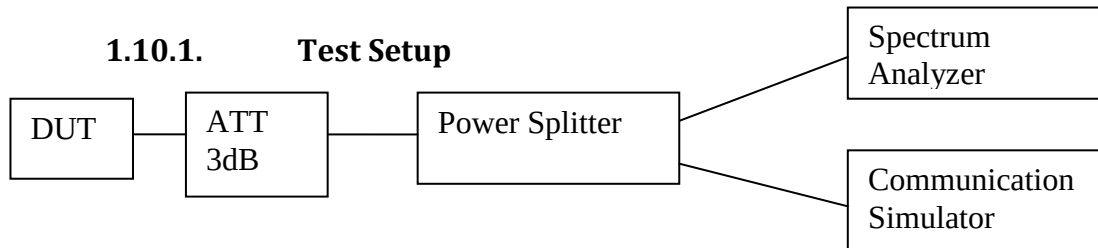
| Band       | Voltage (V) | Frequency Error VS Voltage |                       |                 |                       |
|------------|-------------|----------------------------|-----------------------|-----------------|-----------------------|
|            |             | Channel Bandwidth: 15 MHz  |                       |                 |                       |
|            |             | Low Channel                |                       | High Channel    |                       |
|            |             | 2507.5MHz                  |                       | 2562.5MHz       |                       |
| LTE Band 7 |             | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
|            | <b>4.35</b> | 2507.500019                | 0.00761               | 2562.499981     | -0.007347             |
|            | <b>3.7</b>  | 2507.500019                | 0.007645              | 2562.499982     | -0.006855             |
|            | <b>3.2</b>  | 2507.500021                | 0.008409              | 2562.499982     | -0.006839             |

| Band       | Temp ( Deg C) | Frequency Error VS Temperature |                       |                 |                       |
|------------|---------------|--------------------------------|-----------------------|-----------------|-----------------------|
|            |               | Channel Bandwidth: 20 MHz      |                       |                 |                       |
|            |               | Low Channel                    |                       | High Channel    |                       |
|            |               | 2510MHz                        |                       | 2560MHz         |                       |
| LTE Band 7 |               | Frequency (MHz)                | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
|            | <b>50</b>     | 2509.999986                    | -0.005625             | 2560.000022     | 0.008538              |
|            | <b>40</b>     | 2510.000013                    | 0.005363              | 2560.000018     | 0.006985              |
|            | <b>30</b>     | 2510.000013                    | 0.005021              | 2560.000018     | 0.006907              |
|            | <b>20</b>     | 2510.000016                    | 0.006229              | 2560.000019     | 0.007454              |
|            | <b>10</b>     | 2510.000014                    | 0.005665              | 2560.00002      | 0.007857              |
|            | <b>0</b>      | 2510.000014                    | 0.005762              | 2560.000019     | 0.007264              |
|            | <b>-10</b>    | 2510.000017                    | 0.0066                | 2560.000021     | 0.008309              |
|            | <b>-20</b>    | 2510.000015                    | 0.006053              | 2560.00002      | 0.007907              |
|            | <b>-30</b>    | 2509.999984                    | -0.006429             | 2560.00002      | 0.007823              |

| Band       | Voltage (V) | Frequency Error VS Voltage |                       |                 |                       |
|------------|-------------|----------------------------|-----------------------|-----------------|-----------------------|
|            |             | Channel Bandwidth: 20 MHz  |                       |                 |                       |
|            |             | Low Channel                |                       | High Channel    |                       |
|            |             | 2510MHz                    |                       | 2560MHz         |                       |
| LTE Band 7 |             | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
|            | <b>4.35</b> | 2510.000014                | 0.005505              | 2560.00002      | 0.007968              |
|            | <b>3.7</b>  | 2510.000014                | 0.005608              | 2560.000022     | 0.008734              |
|            | <b>3.2</b>  | 2510.000015                | 0.005956              | 2560.00002      | 0.007711              |

## 1.10. Band Edge Conducted Spurious Emission

### 1.10.1. Test Setup

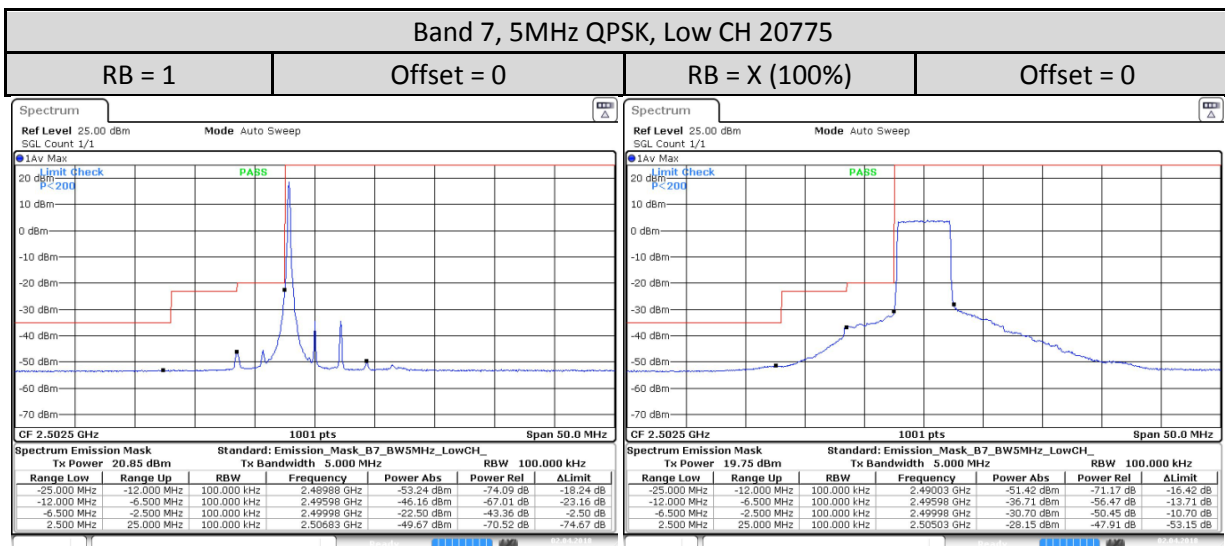


- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) Set DUT to transmit maximum power through communication simulator.
- 4) The band edges of lowest and highest channels with the highest RF powers were measured.
- 5) The center frequency of spectrum is the band edge frequency, span is 3MHz, RBW is 2% of EBW and VBW is at least 3 times of RBW.
- 6) Record the maximum trace plot into the test report.

### 1.10.2. Test Limit

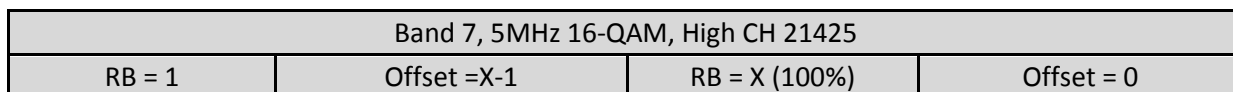
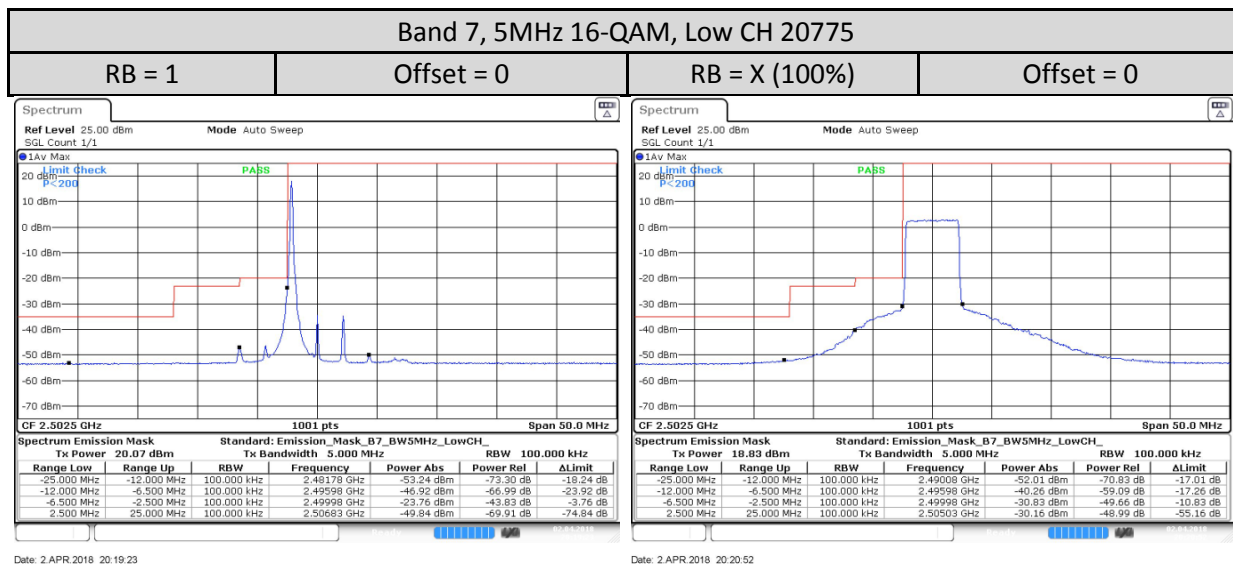
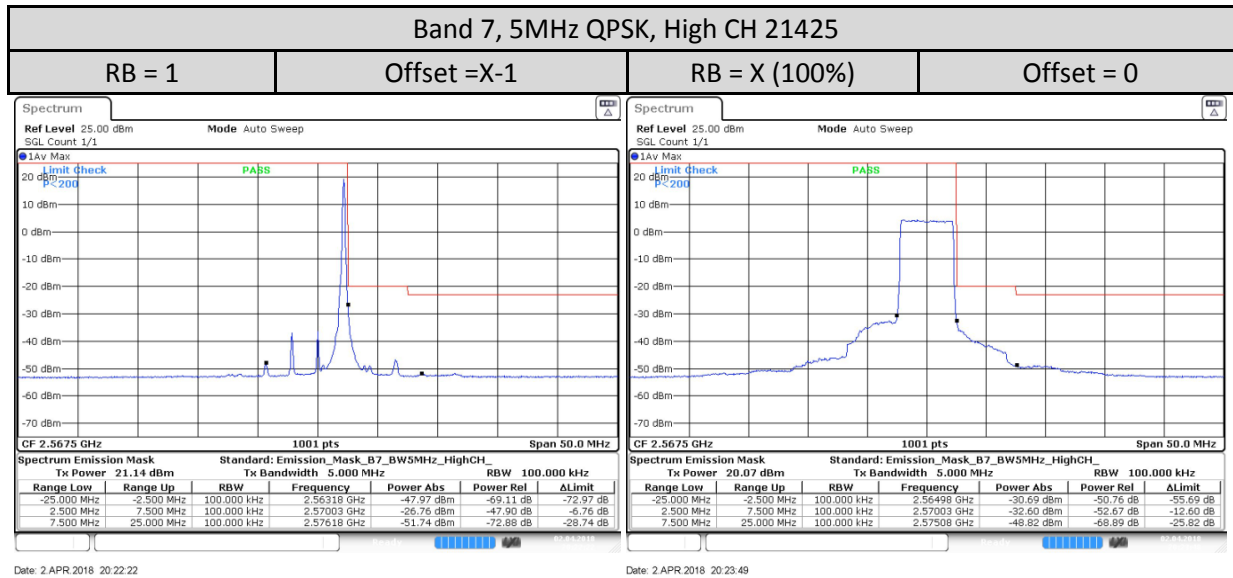
For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the *channel* edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  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 as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

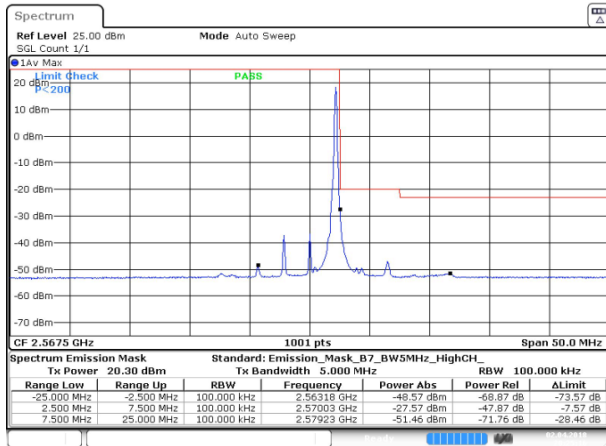
### 1.10.3. Band Edge Conducted Spurious Emission – LTE Band 7 (2500 - 2570MHz)



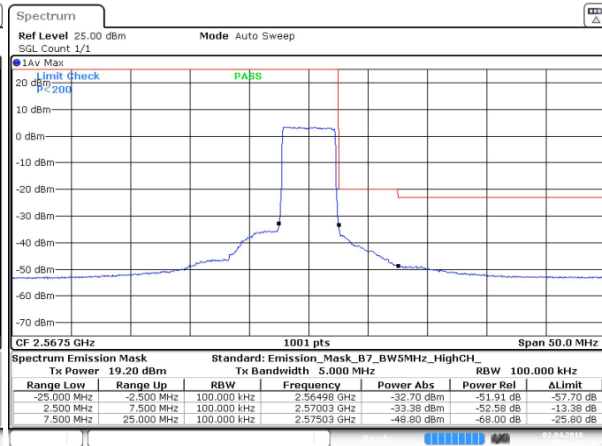
Date: 2 APR 2018 20:16:26

Date: 2 APR 2018 20:17:55





Date: 2 APR 2018 20:25:16



Date: 2 APR 2018 20:26:43

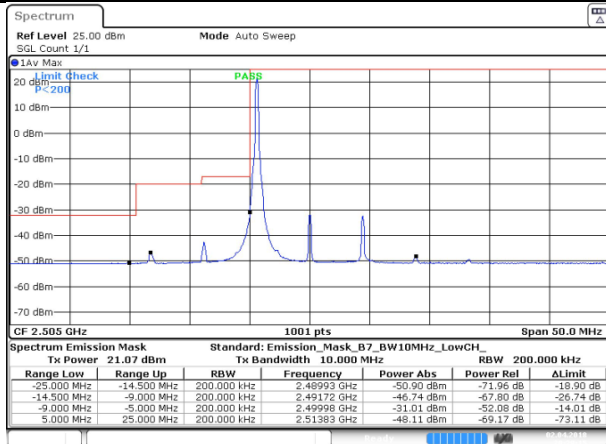
Band 7, 10MHz QPSK, Low CH 20800

RB = 1

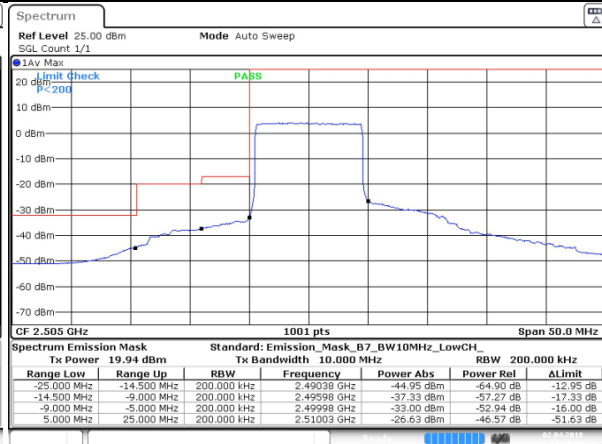
Offset = 0

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:28:15



Date: 2 APR 2018 20:29:45

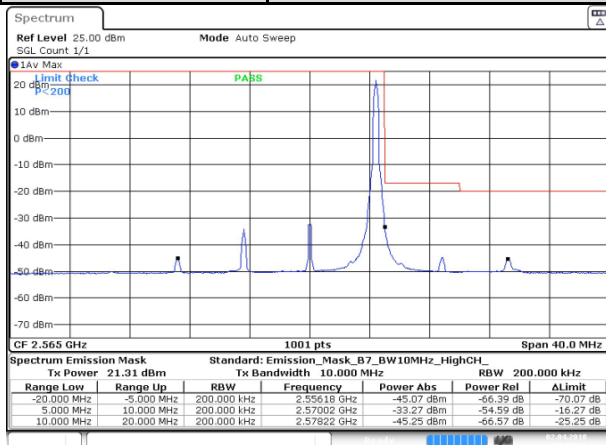
Band 7, 10MHz QPSK, High CH 21400

RB = 1

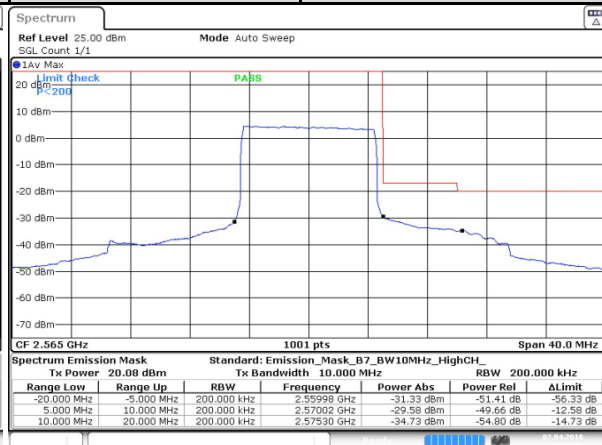
Offset = X-1

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:34:14



Date: 2 APR 2018 20:35:42

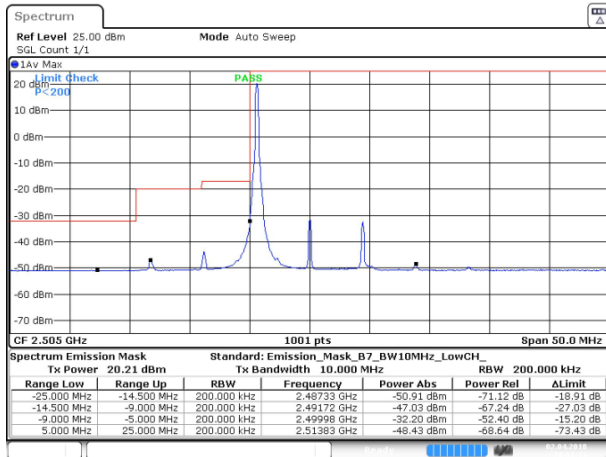
Band 7, 10MHz 16-QAM, Low CH 20800

RB = 1

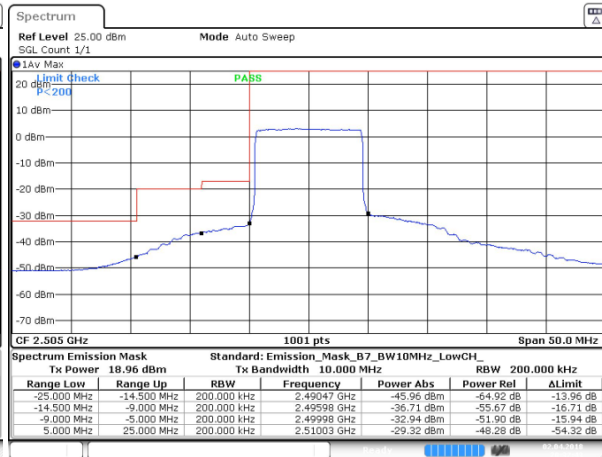
Offset = 0

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:31:13



Date: 2 APR 2018 20:32:43

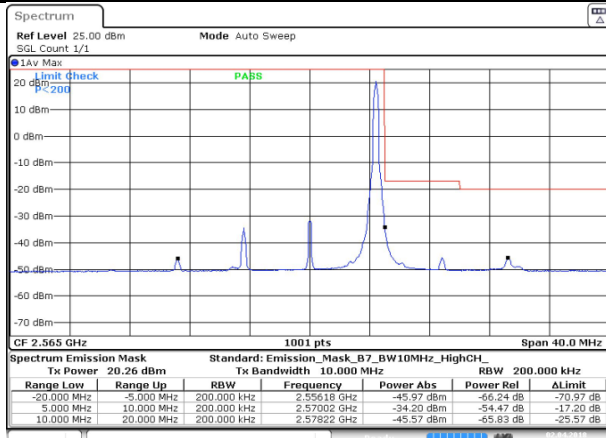
Band 7, 10MHz 16-QAM, High CH 21400

RB = 1

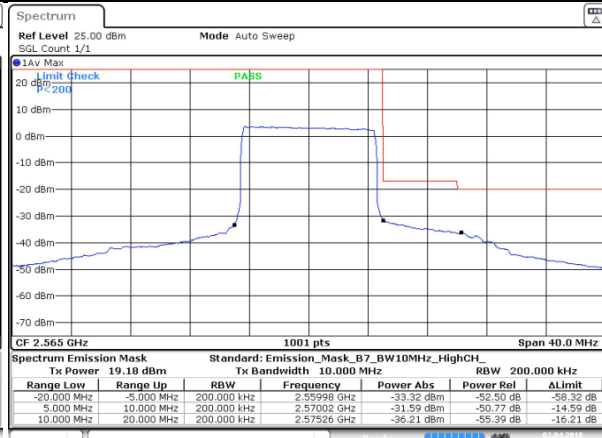
Offset = X-1

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:37:09



Date: 2 APR 2018 20:38:36

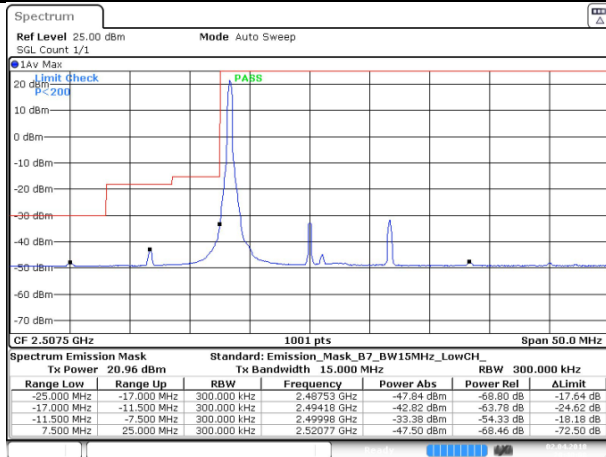
Band 7, 15MHz QPSK, Low CH 20825

RB = 1

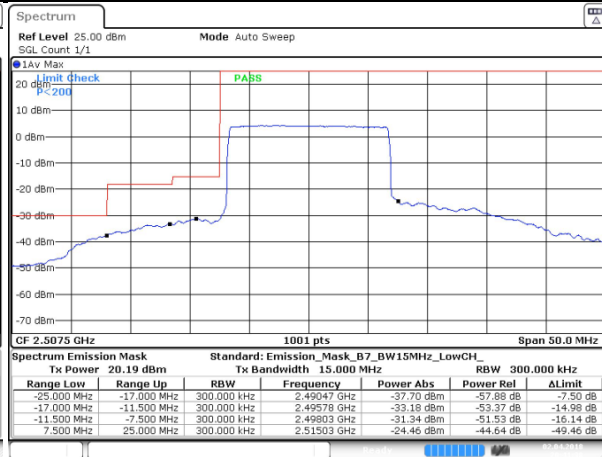
Offset = 0

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:40:09



Date: 2 APR 2018 20:41:38

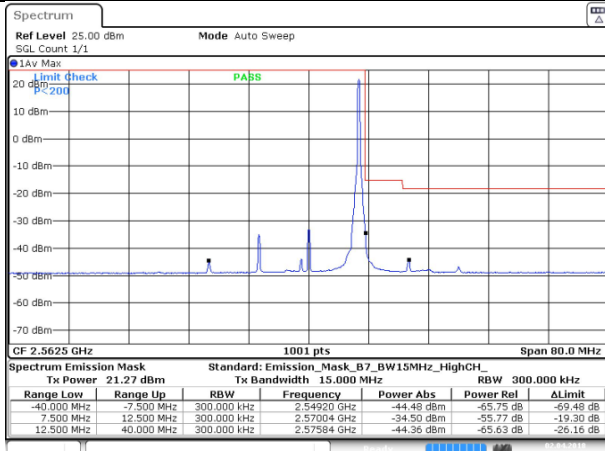
Band 7, 15MHz QPSK, High CH 21375

RB = 1

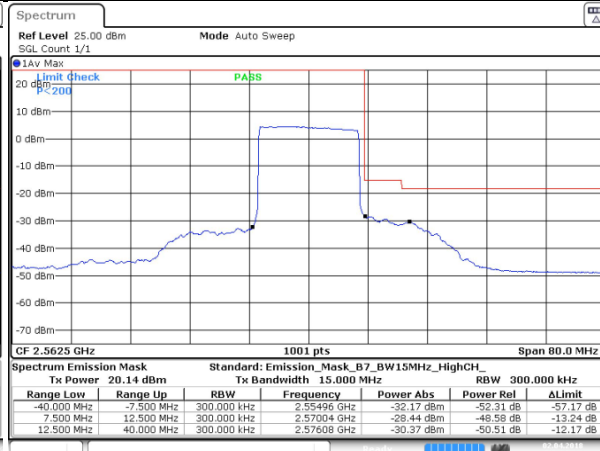
Offset =X-1

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:46:08



Date: 2 APR 2018 20:47:34

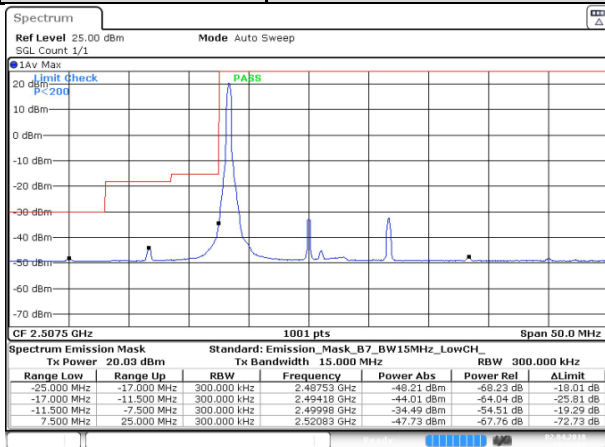
Band 7, 15MHz 16-QAM, Low CH 20825

RB = 1

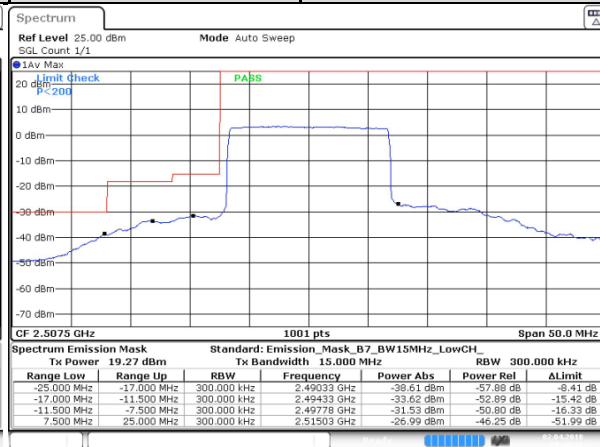
Offset = 0

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:43:07



Date: 2 APR 2018 20:44:37

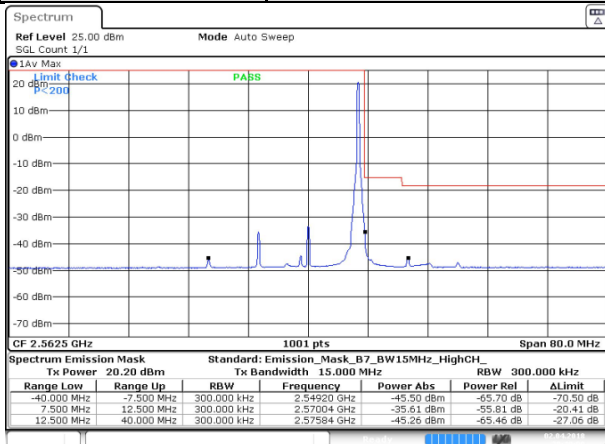
Band 7, 15MHz 16-QAM, High CH 21375

RB = 1

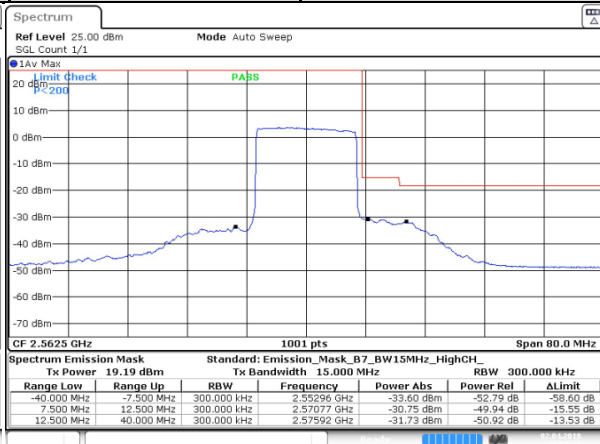
Offset =X-1

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:49:01



Date: 2 APR 2018 20:50:28