

## FCC Test Report

### (PART 27)

**Report No.:** RF150730C47-2

**FCC ID:** NM82PQ9100

**Test Model:** 2PQ9100

**Received Date:** Jul. 30, 2015

**Test Date:** Aug. 11, 2015 ~ Aug. 27, 2015

**Issued Date:** Sep. 17, 2015

**Applicant:** HTC Corporation

**Address:** 1F, 6-3 Baoqiang Road, Xindian City, Taipei County 231, Taiwan

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

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

**Test Location (1):** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan  
Hsien 333, Taiwan, R.O.C.

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



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

## Table of Contents

|                                                                 |           |
|-----------------------------------------------------------------|-----------|
| <b>Release Control Record .....</b>                             | <b>3</b>  |
| <b>1 Certificate of Conformity .....</b>                        | <b>4</b>  |
| <b>2 Summary of Test Results .....</b>                          | <b>5</b>  |
| 2.1 Measurement Uncertainty .....                               | 5         |
| 2.2 Test Site And Instruments .....                             | 6         |
| <b>3 General Information .....</b>                              | <b>7</b>  |
| 3.1 General Description of EUT .....                            | 7         |
| 3.2 Configuration of System Under Test .....                    | 8         |
| 3.2.1 Description of Support Units .....                        | 8         |
| 3.3 Test Mode Applicability and Tested Channel Detail .....     | 9         |
| 3.4 EUT Operating Conditions .....                              | 11        |
| 3.5 General Description of Applied Standards .....              | 11        |
| <b>4 Test Types and Results .....</b>                           | <b>12</b> |
| 4.1 Output Power Measurement .....                              | 12        |
| 4.1.1 Limits of Output Power Measurement .....                  | 12        |
| 4.1.2 Test Procedures .....                                     | 12        |
| 4.1.3 Test Setup .....                                          | 13        |
| 4.1.4 Test Results .....                                        | 14        |
| 4.2 Frequency Stability Measurement .....                       | 22        |
| 4.2.1 Limits of Frequency Stability Measurement .....           | 22        |
| 4.2.2 Test Procedure .....                                      | 22        |
| 4.2.3 Test Setup .....                                          | 22        |
| 4.2.4 Test Results .....                                        | 23        |
| 4.3 Occupied Bandwidth Measurement .....                        | 25        |
| 4.3.1 Limits Of Occupied Bandwidth Measurement .....            | 25        |
| 4.3.2 Test Procedure .....                                      | 25        |
| 4.3.3 Test Setup .....                                          | 25        |
| 4.3.4 Test Result .....                                         | 26        |
| 4.4 Band Edge Measurement .....                                 | 30        |
| 4.4.1 Limits of Band Edge Measurement .....                     | 30        |
| 4.4.2 Test Setup .....                                          | 30        |
| 4.4.3 Test Procedures .....                                     | 30        |
| 4.4.4 Test Results .....                                        | 31        |
| 4.5 Peak To Average Ratio .....                                 | 47        |
| 4.5.1 Limits of Peak To Average Ratio Measurement .....         | 47        |
| 4.5.2 Test Setup .....                                          | 47        |
| 4.5.3 Test Procedures .....                                     | 47        |
| 4.5.4 Test Results .....                                        | 48        |
| 4.6 Conducted Spurious Emissions .....                          | 52        |
| 4.6.1 Limits of Conducted Spurious Emissions Measurement .....  | 52        |
| 4.6.2 Test Setup .....                                          | 52        |
| 4.6.3 Test Procedure .....                                      | 52        |
| 4.6.4 Test Results .....                                        | 53        |
| 4.7 Radiated Emission Measurement .....                         | 57        |
| 4.7.1 Limits of Radiated Emission Measurement .....             | 57        |
| 4.7.2 Test Procedure .....                                      | 57        |
| 4.7.3 Deviation from Test Standard .....                        | 57        |
| 4.7.4 Test Setup .....                                          | 57        |
| 4.7.5 Test Results .....                                        | 58        |
| <b>5 Pictures of Test Arrangements .....</b>                    | <b>62</b> |
| <b>Appendix – Information on the Testing Laboratories .....</b> | <b>63</b> |



### Release Control Record

| Issue No.     | Description      | Date Issued   |
|---------------|------------------|---------------|
| RF150730C47-2 | Original Release | Sep. 17, 2015 |

## 1 Certificate of Conformity

**Product:** Smartphone

**Brand:** HTC

**Test Model:** 2PQ9100

**Sample Status:** Identical Prototype

**Applicant:** HTC Corporation

**Test Date:** Aug. 11, 2015 ~ Aug. 27, 2015

**Standards:** FCC Part 27, Subpart C, M

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

**Prepared by :**



**Date:**

Sep. 17, 2015

Ivonne Wu / Supervisor

**Approved by :**



**Date:**

Sep. 17, 2015

Kay Wu / Supervisor

## 2 Summary of Test Results

| Applied Standard: FCC Part 27 & Part 2 |                                     |        |                                                                                     |
|----------------------------------------|-------------------------------------|--------|-------------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                           | Result | Remarks                                                                             |
| 2.1046<br>27.50(h)                     | Equivalent Isotropic Radiated Power | PASS   | Meet the requirement of limit.                                                      |
| 2.1055<br>27.54                        | Frequency Stability                 | PASS   | Meet the requirement of limit.                                                      |
| 2.1049                                 | Occupied Bandwidth                  | PASS   | Meet the requirement of limit.                                                      |
|                                        | Peak to average ratio               | PASS   | Meet the requirement of limit.                                                      |
| 2.1051<br>27.53(l)                     | Band Edge Measurements              | PASS   | Meet the requirement of limit.                                                      |
| 2.1051<br>27.53(m)                     | Conducted Spurious Emissions        | PASS   | Meet the requirement of limit.                                                      |
| 2.1053<br>27.53(m)                     | Radiated Spurious Emissions         | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -16.56dB at 5186.00MHz. |

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                        | Frequency       | Expended Uncertainty (k=2) ( $\pm$ ) |
|------------------------------------|-----------------|--------------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz  | 2.44 dB                              |
| Radiated Emissions up to 1 GHz     | 30MHz ~ 200MHz  | 2.0153 dB                            |
|                                    | 200MHz ~1000MHz | 2.0224 dB                            |
| Radiated Emissions above 1 GHz     | 1GHz ~ 18GHz    | 1.0121 dB                            |
|                                    | 18GHz ~ 40GHz   | 1.1508 dB                            |

## 2.2 Test Site And Instruments

| Description & Manufacturer                     | Model No.       | Serial No.                                                        | Date of Calibration | Due Date of Calibration |
|------------------------------------------------|-----------------|-------------------------------------------------------------------|---------------------|-------------------------|
| Spectrum Analyzer<br>Agilent Technologies      | N9038A          | MY52260177                                                        | May 19, 2015        | May 18, 2016            |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43           | 101261                                                            | Dec. 10, 2014       | Dec. 09, 2015           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB9168        | 9168-472                                                          | Feb. 04, 2015       | Feb. 04, 2016           |
| HORN Antenna<br>ETS-Lindgren                   | 3117            | 00143293                                                          | Jan. 05, 2015       | Jan. 04, 2016           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9170       | 9170-480                                                          | Feb. 04, 2015       | Feb. 04, 2016           |
| Bluetooth Tester                               | CBT             | 100980                                                            | Apr. 27, 2015       | Apr. 26, 2017           |
| Agilent Communications<br>Tester-Wireless      | 8960 Series 10  | MY53201073                                                        | Jul. 03, 2015       | Jul. 02, 2017           |
| Preamplifier<br>Agilent                        | 310N            | 187226                                                            | Jun. 29, 2015       | Jun. 28, 2016           |
| Preamplifier<br>Agilent                        | 83017A          | MY39501357                                                        | Jun. 29, 2015       | Jun. 28, 2016           |
| Power Meter<br>Anritsu                         | ML2495A         | 1232002                                                           | Sep. 17, 2014       | Sep. 16, 2015           |
| Power Sensor<br>Anritsu                        | MA2411B         | 1207325                                                           | Sep. 17, 2014       | Sep. 16, 2015           |
| RF signal cable<br>ETS-LINDGREN                | 5D-FB           | Cable-CH1-01(R<br>FC-SMS-100-SM<br>S-120+RFC-SMS<br>-100-SMS-400) | Jun. 27, 2015       | Jun. 26, 2016           |
| RF signal cable<br>ETS-LINDGREN                | 8D-FB           | Cable-CH1-02(R<br>FC-SMS-100-SM<br>S-24)                          | Jun. 27, 2015       | Jun. 26, 2016           |
| Software<br>BV ADT                             | E3<br>8.130425b | NA                                                                | NA                  | NA                      |
| Antenna Tower<br>MF                            | NA              | NA                                                                | NA                  | NA                      |
| Turn Table<br>MF                               | NA              | NA                                                                | NA                  | NA                      |
| Antenna Tower & Turn<br>Table Controller<br>MF | MF-7802         | NA                                                                | NA                  | NA                      |
| Communications<br>Tester-Wireless<br>Agilent   | 8960 Series 10  | MY53201073                                                        | Jul. 03, 2015       | Jul. 02, 2017           |
| Radio Communication<br>Analyzer<br>Anritsu     | MT8820C         | 6201300640                                                        | Aug. 10, 2015       | Aug. 09, 2017           |

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 149147.
5. The IC Site Registration No. is IC7450I-1.

### 3 General Information

#### 3.1 General Description of EUT

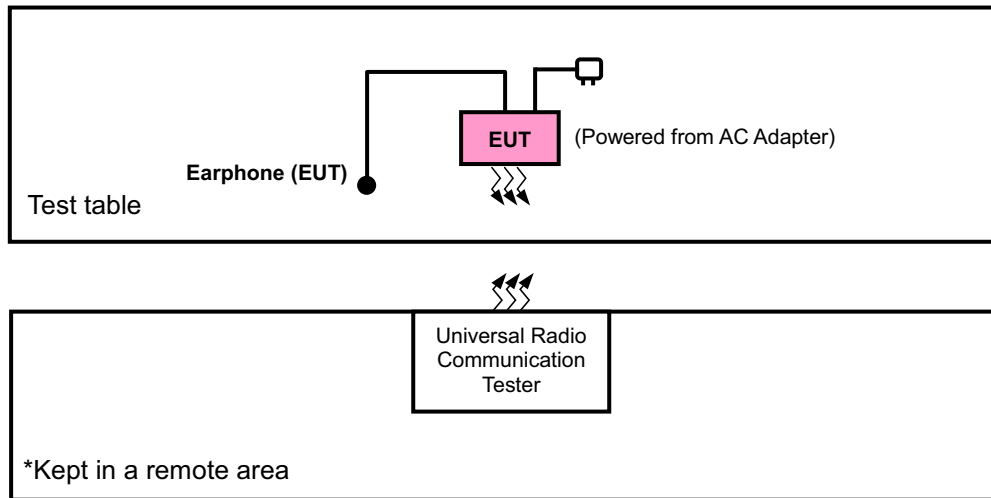
|                     |                                                                |                     |
|---------------------|----------------------------------------------------------------|---------------------|
| Product             | Smartphone                                                     |                     |
| Brand               | HTC                                                            |                     |
| Test Model          | 2PQ9100                                                        |                     |
| Status of EUT       | Identical Prototype                                            |                     |
| Power Supply Rating | 5.0Vdc (adapter or host equipment)<br>3.85Vdc (Li-ion battery) |                     |
| Modulation Type     | QPSK, 16QAM                                                    |                     |
| Frequency Range     | LTE Band 7 (Channel Bandwidth: 5MHz)                           | 2502.5 ~ 2567.5 MHz |
|                     | LTE Band 7 (Channel Bandwidth: 10MHz)                          | 2505 ~ 2565 MHz     |
|                     | LTE Band 7 (Channel Bandwidth: 15MHz)                          | 2507.5 ~ 2562.5 MHz |
|                     | LTE Band 7 (Channel Bandwidth: 20MHz)                          | 2510 ~ 2560 MHz     |
|                     | LTE Band 41 (Channel Bandwidth: 5MHz)                          | 2498.5 ~ 2687.5 MHz |
|                     | LTE Band 41 (Channel Bandwidth: 10MHz)                         | 2501.0 ~ 2685.0 MHz |
|                     | LTE Band 41 (Channel Bandwidth: 15MHz)                         | 2503.5 ~ 2682.5 MHz |
|                     | LTE Band 41 (Channel Bandwidth: 20MHz)                         | 2506.0 ~ 2680.0 MHz |
| Max. EIRP Power     | LTE Band 7 (Channel Bandwidth: 5MHz)                           | 129.06mW            |
|                     | LTE Band 7 (Channel Bandwidth: 10MHz)                          | 137.66mW            |
|                     | LTE Band 7 (Channel Bandwidth: 15MHz)                          | 148.87mW            |
|                     | LTE Band 7 (Channel Bandwidth: 20MHz)                          | 151.98mW            |
|                     | LTE Band 41 (Channel Bandwidth: 5MHz)                          | 139.25mW            |
|                     | LTE Band 41 (Channel Bandwidth: 10MHz)                         | 142.43mW            |
|                     | LTE Band 41 (Channel Bandwidth: 15MHz)                         | 150.73mW            |
|                     | LTE Band 41 (Channel Bandwidth: 20MHz)                         | 157.04mW            |
| Emission Designator | LTE Band 7 (Channel Bandwidth: 5MHz)                           | 4M50G7D             |
|                     | LTE Band 7 (Channel Bandwidth: 10MHz)                          | 8M98W7D             |
|                     | LTE Band 7 (Channel Bandwidth: 15MHz)                          | 13M4G7D             |
|                     | LTE Band 7 (Channel Bandwidth: 20MHz)                          | 17M9W7D             |
|                     | LTE Band 41 (Channel Bandwidth: 5MHz)                          | 4M50W7D             |
|                     | LTE Band 41 (Channel Bandwidth: 10MHz)                         | 8M98W7D             |
|                     | LTE Band 41 (Channel Bandwidth: 15MHz)                         | 13M4G7D             |
|                     | LTE Band 41 (Channel Bandwidth: 20MHz)                         | 17M9G7D             |
| Antenna Type        | Fixed Internal Antenna                                         |                     |
| Accessory Device    | Refer to Note as below                                         |                     |
| Data Cable Supplied | Refer to Note as below                                         |                     |

Note:

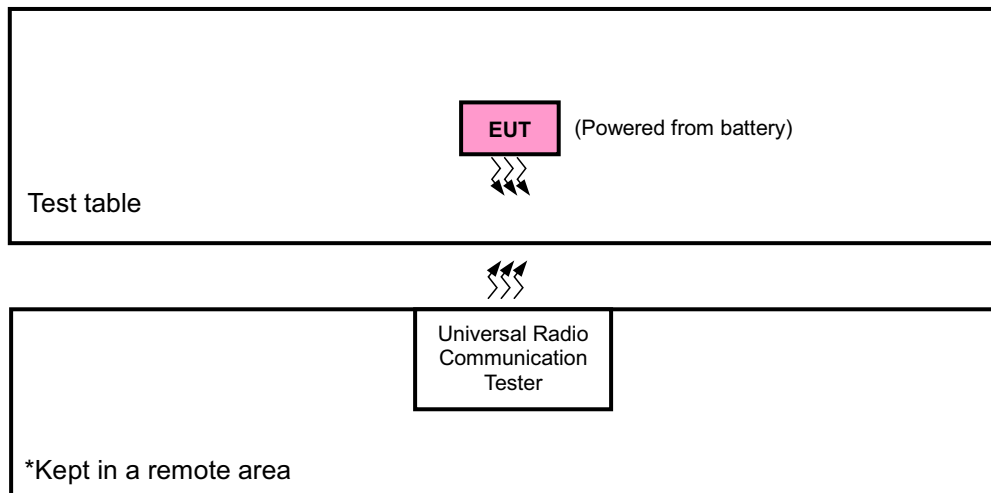
1. The EUT's accessories list refers to Ext. Pho.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

### 3.2 Configuration of System Under Test

#### <Radiated Emission Test>



#### <E.I.R.P. Test>



#### 3.2.1 Description of Support Units

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

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

| Band        | EIRP    | Radiated Emission |
|-------------|---------|-------------------|
| LTE Band 7  | Z-plane | Y-axis            |
| LTE Band 41 | Z-plane | X-axis            |

#### LTE BAND 7

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode                 |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| -                  | EIRP                  | 20775 to 21425    | 20775, 21100, 21425 | 5MHz              | QPSK, 16QAM | 1 RB / 12 RB Offset  |
|                    |                       | 20800 to 21400    | 20800, 21100, 21400 | 10MHz             | QPSK, 16QAM | 1 RB / 24 RB Offset  |
|                    |                       | 20825 to 21375    | 20825, 21100, 21375 | 15MHz             | QPSK, 16QAM | 1 RB / 37 RB Offset  |
|                    |                       | 20850 to 21350    | 20850, 21100 21350  | 20MHz             | QPSK, 16QAM | 1 RB / 50 RB Offset  |
| -                  | Frequency Stability   | 20775 to 21425    | 21100               | 5MHz              | QPSK        | 1 RB / 12 RB Offset  |
|                    |                       | 20800 to 21400    | 21100               | 10MHz             | QPSK        | 1 RB / 24 RB Offset  |
|                    |                       | 20825 to 21375    | 21100               | 15MHz             | QPSK        | 1 RB / 37 RB Offset  |
|                    |                       | 20850 to 21350    | 21100               | 20MHz             | QPSK        | 1 RB / 50 RB Offset  |
| -                  | Occupied Bandwidth    | 20775 to 21425    | 20775, 21100, 21425 | 5MHz              | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                       | 20800 to 21400    | 20800, 21100, 21400 | 10MHz             | QPSK, 16QAM | 50 RB / 0 RB Offset  |
|                    |                       | 20825 to 21375    | 20825, 21100, 21375 | 15MHz             | QPSK, 16QAM | 75 RB / 0 RB Offset  |
|                    |                       | 20850 to 21350    | 20850, 21100 21350  | 20MHz             | QPSK, 16QAM | 100 RB / 0 RB Offset |
| -                  | Peak to Average Ratio | 20775 to 21425    | 20775, 21100, 21425 | 5MHz              | QPSK, 16QAM | 1 RB / 12 RB Offset  |
|                    |                       | 20800 to 21400    | 20800, 21100, 21400 | 10MHz             | QPSK, 16QAM | 1 RB / 24 RB Offset  |
|                    |                       | 20825 to 21375    | 20825, 21100, 21375 | 15MHz             | QPSK, 16QAM | 1 RB / 37 RB Offset  |
|                    |                       | 20850 to 21350    | 20850, 21100 21350  | 20MHz             | QPSK, 16QAM | 1 RB / 50 RB Offset  |
| -                  | Band Edge             | 20775 to 21425    | 20775, 21425        | 5MHz              | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                       | 20800 to 21400    | 20800, 21400        | 10MHz             | QPSK, 16QAM | 50 RB / 0 RB Offset  |
|                    |                       | 20825 to 21375    | 20825, 21375        | 15MHz             | QPSK, 16QAM | 75 RB / 0 RB Offset  |
|                    |                       | 20850 to 21350    | 20850, 21350        | 20MHz             | QPSK, 16QAM | 100 RB / 0 RB Offset |
| -                  | Conducted Emission    | 20775 to 21425    | 21100               | 5MHz              | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       | 20800 to 21400    | 21100               | 10MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       | 20825 to 21375    | 21100               | 15MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       | 20850 to 21350    | 21100               | 20MHz             | QPSK        | 1 RB / 0 RB Offset   |
| -                  | Radiated Emission     | 20850 to 21350    | 21100               | 20MHz             | QPSK        | 1 RB / 50 RB Offset  |

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



A O T

**LTE BAND 41**

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode                 |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| -                  | EIRP                  | 39675 to 41565    | 39675, 40620, 41565 | 5MHz              | QPSK, 16QAM | 1 RB / 12 RB Offset  |
|                    |                       | 39700 to 41540    | 39700, 40620, 41540 | 10MHz             | QPSK, 16QAM | 1 RB / 24 RB Offset  |
|                    |                       | 39725 to 41515    | 39725, 40620, 41515 | 15MHz             | QPSK, 16QAM | 1 RB / 37 RB Offset  |
|                    |                       | 39750 to 41490    | 39750, 40620, 41490 | 20MHz             | QPSK, 16QAM | 1 RB / 50 RB Offset  |
| -                  | Frequency Stability   | 39675 to 41565    | 40620               | 5MHz              | QPSK        | 1 RB / 12 RB Offset  |
|                    |                       | 39700 to 41540    | 40620               | 10MHz             | QPSK        | 1 RB / 24 RB Offset  |
|                    |                       | 39725 to 41515    | 40620               | 15MHz             | QPSK        | 1 RB / 37 RB Offset  |
|                    |                       | 39750 to 41490    | 40620               | 20MHz             | QPSK        | 1 RB / 50 RB Offset  |
| -                  | Occupied Bandwidth    | 39675 to 41565    | 39675, 40620, 41565 | 5MHz              | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                       | 39700 to 41540    | 39700, 40620, 41540 | 10MHz             | QPSK, 16QAM | 50 RB / 0 RB Offset  |
|                    |                       | 39725 to 41515    | 39725, 40620, 41515 | 15MHz             | QPSK, 16QAM | 75 RB / 0 RB Offset  |
|                    |                       | 39750 to 41490    | 39750, 40620, 41490 | 20MHz             | QPSK, 16QAM | 100 RB / 0 RB Offset |
| -                  | Peak to Average Ratio | 39675 to 41565    | 39675, 40620, 41565 | 5MHz              | QPSK, 16QAM | 1 RB / 12 RB Offset  |
|                    |                       | 39700 to 41540    | 39700, 40620, 41540 | 10MHz             | QPSK, 16QAM | 1 RB / 24 RB Offset  |
|                    |                       | 39725 to 41515    | 39725, 40620, 41515 | 15MHz             | QPSK, 16QAM | 1 RB / 37 RB Offset  |
|                    |                       | 39750 to 41490    | 39750, 40620, 41490 | 20MHz             | QPSK, 16QAM | 1 RB / 50 RB Offset  |
| -                  | Band Edge             | 39675 to 41565    | 39675, 41565        | 5MHz              | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                       | 39700 to 41540    | 39700, 41540        | 10MHz             | QPSK, 16QAM | 50 RB / 0 RB Offset  |
|                    |                       | 39725 to 41515    | 39725, 41515        | 15MHz             | QPSK, 16QAM | 75 RB / 0 RB Offset  |
|                    |                       | 39750 to 41490    | 39750, 41490        | 20MHz             | QPSK, 16QAM | 100 RB / 0 RB Offset |
| -                  | Conducted Emission    | 39675 to 41565    | 40620               | 5MHz              | QPSK        | 1 RB / 12 RB Offset  |
|                    |                       | 39700 to 41540    | 40620               | 10MHz             | QPSK        | 1 RB / 24 RB Offset  |
|                    |                       | 39725 to 41515    | 40620               | 15MHz             | QPSK        | 1 RB / 37 RB Offset  |
|                    |                       | 39750 to 41490    | 40620               | 20MHz             | QPSK        | 1 RB / 50 RB Offset  |
| -                  | Radiated Emission     | 39750 to 41490    | 40620               | 20MHz             | QPSK        | 1 RB / 50 RB Offset  |

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

**Test Condition:**

| Test Item             | Environmental Conditions | Input Power  | Tested By     |
|-----------------------|--------------------------|--------------|---------------|
| EIRP                  | 25deg. C, 65%RH          | 3.85Vdc      | Charles Hsiao |
| Frequency Stability   | 25deg. C, 65%RH          | 3.85Vdc      | Carlos Chen   |
| Occupied Bandwidth    | 25deg. C, 65%RH          | 3.85Vdc      | Carlos Chen   |
| Band Edge             | 25deg. C, 65%RH          | 3.85Vdc      | Carlos Chen   |
| Peak to Average Ratio | 25deg. C, 65%RH          | 3.85Vdc      | Carlos Chen   |
| Concduted Emission    | 25deg. C, 65%RH          | 3.85Vdc      | Carlos Chen   |
| Radiated Emission     | 25deg. C, 65%RH          | 120Vac, 60Hz | Charles Hsiao |

### **3.4 EUT Operating Conditions**

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

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

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

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27**

**ANSI/TIA/EIA-603-C 2004**

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

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

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

#### 4.1.2 Test Procedures

##### **EIRP Measurement:**

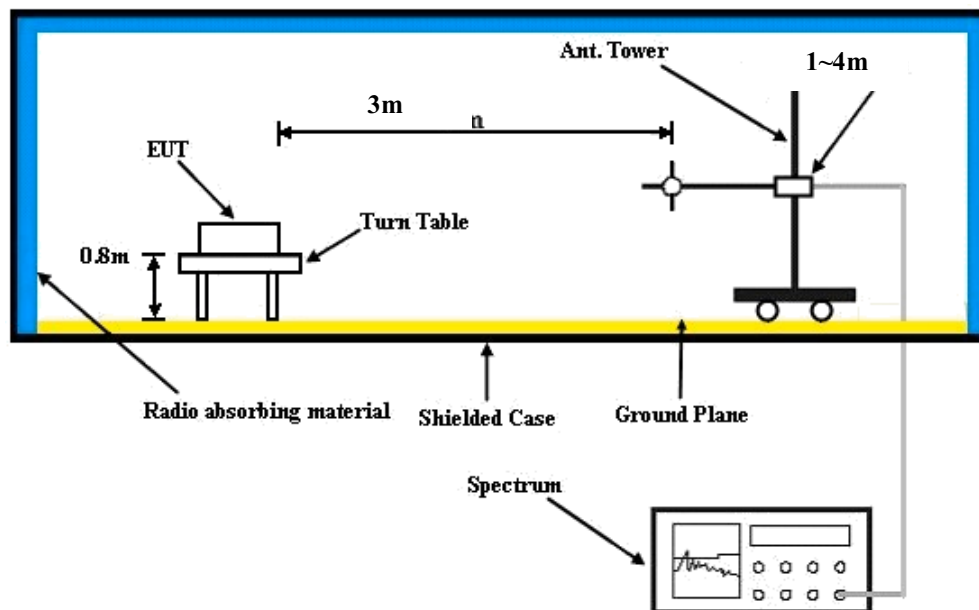
- All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10MHz for LTE mode.
- Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G
- $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

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

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

#### 4.1.3 Test Setup

##### EIRP / ERP MEASUREMENT:



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

##### CONDUCTED POWER MEASUREMENT:



#### 4.1.4 Test Results

##### CONDUCTED OUTPUT POWER (dBm)

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 20775 | Mid Ch 21100 | High Ch 21425 |               | Low Ch 20775 | Mid Ch 21100 | High Ch 21425 |               |
|           |         |           | 2502.5 MHz   | 2535.0 MHz   | 2567.5 MHz    |               | 2502.5 MHz   | 2535.0 MHz   | 2567.5 MHz    |               |
| 7 / 5M    | 1       | 0         | 21.28        | 21.30        | 21.21         | 0             | 20.55        | 20.57        | 20.48         | 1             |
|           | 1       | 12        | 21.55        | 21.95        | 21.84         | 0             | 20.82        | 21.22        | 21.11         | 1             |
|           | 1       | 24        | 21.39        | 21.42        | 20.68         | 0             | 20.66        | 20.69        | 19.95         | 1             |
|           | 12      | 0         | 20.76        | 20.80        | 20.68         | 1             | 20.03        | 20.07        | 19.95         | 2             |
|           | 12      | 6         | 20.75        | 20.69        | 20.72         | 1             | 20.02        | 19.96        | 19.99         | 2             |
|           | 12      | 13        | 20.78        | 20.71        | 20.61         | 1             | 20.05        | 19.98        | 19.88         | 2             |
|           | 25      | 0         | 20.78        | 20.67        | 20.66         | 1             | 20.05        | 19.94        | 19.93         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 20800 | Mid Ch 21100 | High Ch 21400 |               | Low Ch 20800 | Mid Ch 21100 | High Ch 21400 |               |
|           |         |           | 2505.0 MHz   | 2535.0 MHz   | 2565.0 MHz    |               | 2505.0 MHz   | 2535.0 MHz   | 2565.0 MHz    |               |
| 7 / 10M   | 1       | 0         | 21.45        | 21.47        | 21.38         | 0             | 20.58        | 20.60        | 20.51         | 1             |
|           | 1       | 24        | 21.72        | 22.12        | 22.01         | 0             | 20.85        | 21.25        | 21.14         | 1             |
|           | 1       | 49        | 21.56        | 21.59        | 20.85         | 0             | 20.69        | 20.72        | 19.98         | 1             |
|           | 25      | 0         | 20.93        | 20.97        | 20.85         | 1             | 20.06        | 20.10        | 19.98         | 2             |
|           | 25      | 12        | 20.92        | 20.86        | 20.89         | 1             | 20.05        | 19.99        | 20.02         | 2             |
|           | 25      | 25        | 20.95        | 20.88        | 20.78         | 1             | 20.08        | 20.01        | 19.91         | 2             |
|           | 50      | 0         | 20.95        | 20.84        | 20.83         | 1             | 20.08        | 19.97        | 19.96         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 20825 | Mid Ch 21100 | High Ch 21375 |               | Low Ch 20825 | Mid Ch 21100 | High Ch 21375 |               |
|           |         |           | 2507.5 MHz   | 2535.0 MHz   | 2562.5 MHz    |               | 2507.5 MHz   | 2535.0 MHz   | 2562.5 MHz    |               |
| 7 / 15M   | 1       | 0         | 21.61        | 21.63        | 21.54         | 0             | 20.62        | 20.64        | 20.55         | 1             |
|           | 1       | 37        | 21.88        | 22.28        | 22.17         | 0             | 20.89        | 21.29        | 21.18         | 1             |
|           | 1       | 74        | 21.72        | 21.75        | 21.01         | 0             | 20.73        | 20.76        | 20.02         | 1             |
|           | 36      | 0         | 21.09        | 21.13        | 21.01         | 1             | 20.10        | 20.14        | 20.02         | 2             |
|           | 36      | 19        | 21.08        | 21.02        | 21.05         | 1             | 20.09        | 20.03        | 20.06         | 2             |
|           | 36      | 39        | 21.11        | 21.04        | 20.94         | 1             | 20.12        | 20.05        | 19.95         | 2             |
|           | 75      | 0         | 21.11        | 21.00        | 20.99         | 1             | 20.12        | 20.01        | 20.00         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 20850 | Mid Ch 21100 | High Ch 21350 |               | Low Ch 20850 | Mid Ch 21100 | High Ch 21350 |               |
|           |         |           | 2510.0 MHz   | 2535.0 MHz   | 2560.0 MHz    |               | 2510.0 MHz   | 2535.0 MHz   | 2560.0 MHz    |               |
| 7 / 20M   | 1       | 0         | 21.75        | 21.77        | 21.68         | 0             | 20.69        | 20.71        | 20.62         | 1             |
|           | 1       | 50        | 22.02        | 22.42        | 22.31         | 0             | 20.96        | 21.36        | 21.25         | 1             |
|           | 1       | 99        | 21.86        | 21.89        | 21.15         | 0             | 20.80        | 20.83        | 20.09         | 1             |
|           | 50      | 0         | 21.23        | 21.27        | 21.15         | 1             | 20.17        | 20.21        | 20.09         | 2             |
|           | 50      | 25        | 21.22        | 21.16        | 21.19         | 1             | 20.16        | 20.10        | 20.13         | 2             |
|           | 50      | 50        | 21.25        | 21.18        | 21.08         | 1             | 20.19        | 20.12        | 20.02         | 2             |
|           | 100     | 0         | 21.25        | 21.14        | 21.13         | 1             | 20.19        | 20.08        | 20.07         | 2             |



A O T

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 39675 | Mid Ch 40620 | High Ch 41565 |               | Low Ch 39675 | Mid Ch 40620 | High Ch 41565 |               |
|           |         |           | 2498.5 MHz   | 2593.0 MHz   | 2687.5 MHz    |               | 2498.5 MHz   | 2593.0 MHz   | 2687.5 MHz    |               |
| 41 / 5M   | 1       | 0         | 21.50        | 21.70        | 21.36         | 0             | 20.69        | 20.89        | 20.55         | 1             |
|           | 1       | 12        | 21.65        | 22.05        | 21.45         | 0             | 20.84        | 21.24        | 20.64         | 1             |
|           | 1       | 24        | 21.56        | 21.81        | 20.54         | 0             | 20.75        | 21.00        | 19.73         | 1             |
|           | 12      | 0         | 20.55        | 20.74        | 21.09         | 1             | 19.74        | 19.93        | 20.28         | 2             |
|           | 12      | 6         | 20.42        | 20.96        | 20.62         | 1             | 19.61        | 20.15        | 19.81         | 2             |
|           | 12      | 13        | 20.48        | 20.96        | 20.57         | 1             | 19.67        | 20.15        | 19.76         | 2             |
|           | 25      | 0         | 20.46        | 20.87        | 20.61         | 1             | 19.65        | 20.06        | 19.80         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 39700 | Mid Ch 40620 | High Ch 41540 |               | Low Ch 39700 | Mid Ch 40620 | High Ch 41540 |               |
|           |         |           | 2501.0 MHz   | 2593.0 MHz   | 2685.0 MHz    |               | 2501.0 MHz   | 2593.0 MHz   | 2685.0 MHz    |               |
| 41 / 10M  | 1       | 0         | 21.64        | 21.84        | 21.50         | 0             | 20.74        | 20.94        | 20.60         | 1             |
|           | 1       | 24        | 21.79        | 22.19        | 21.59         | 0             | 20.89        | 21.19        | 20.69         | 1             |
|           | 1       | 49        | 21.70        | 21.95        | 20.68         | 0             | 20.80        | 21.05        | 19.78         | 1             |
|           | 25      | 0         | 20.69        | 20.88        | 21.23         | 1             | 19.79        | 19.98        | 20.33         | 2             |
|           | 25      | 12        | 20.56        | 21.10        | 20.76         | 1             | 19.66        | 20.20        | 19.86         | 2             |
|           | 25      | 25        | 20.62        | 21.10        | 20.71         | 1             | 19.72        | 20.20        | 19.81         | 2             |
|           | 50      | 0         | 20.60        | 21.01        | 20.75         | 1             | 19.70        | 20.11        | 19.85         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 39725 | Mid Ch 40620 | High Ch 41515 |               | Low Ch 39725 | Mid Ch 40620 | High Ch 41515 |               |
|           |         |           | 2503.5 MHz   | 2593.0 MHz   | 2682.5 MHz    |               | 2503.5 MHz   | 2593.0 MHz   | 2682.5 MHz    |               |
| 41 / 15M  | 1       | 0         | 21.76        | 21.96        | 21.62         | 0             | 20.81        | 21.01        | 20.67         | 1             |
|           | 1       | 37        | 21.91        | 22.31        | 21.71         | 0             | 20.96        | 21.36        | 20.76         | 1             |
|           | 1       | 74        | 21.82        | 22.07        | 20.80         | 0             | 20.87        | 21.12        | 19.85         | 1             |
|           | 36      | 0         | 20.81        | 21.00        | 21.35         | 1             | 19.86        | 20.05        | 20.40         | 2             |
|           | 36      | 19        | 20.68        | 21.22        | 20.88         | 1             | 19.73        | 20.27        | 19.93         | 2             |
|           | 36      | 39        | 20.74        | 21.22        | 20.83         | 1             | 19.79        | 20.27        | 19.88         | 2             |
|           | 75      | 0         | 20.72        | 21.13        | 20.87         | 1             | 19.77        | 20.18        | 19.92         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 39750 | Mid Ch 40620 | High Ch 41490 |               | Low Ch 39750 | Mid Ch 40620 | High Ch 41490 |               |
|           |         |           | 2506.0 MHz   | 2593.0 MHz   | 2680.0 MHz    |               | 2506.0 MHz   | 2593.0 MHz   | 2680.0 MHz    |               |
| 41 / 20M  | 1       | 0         | 21.90        | 22.10        | 21.76         | 0             | 20.84        | 21.04        | 20.70         | 1             |
|           | 1       | 50        | 22.05        | 22.45        | 21.85         | 0             | 20.99        | 21.39        | 20.79         | 1             |
|           | 1       | 99        | 21.96        | 22.21        | 20.94         | 0             | 20.90        | 21.15        | 19.88         | 1             |
|           | 50      | 0         | 20.95        | 21.14        | 21.49         | 1             | 19.89        | 20.08        | 20.43         | 2             |
|           | 50      | 25        | 20.82        | 21.36        | 21.02         | 1             | 19.76        | 20.30        | 19.96         | 2             |
|           | 50      | 50        | 20.88        | 21.36        | 20.97         | 1             | 19.82        | 20.30        | 19.91         | 2             |
|           | 100     | 0         | 20.86        | 21.27        | 21.01         | 1             | 19.80        | 20.21        | 19.95         | 2             |

EIRP Power (dBm)

| LTE Band 7                     |         |                 |           |                       |           |          |                    |
|--------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                          | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                              | 20775   | 2502.5          | -29.96    | 44.24                 | 14.28     | 26.78    | H                  |
|                                | 21100   | 2535.0          | -29.94    | 44.20                 | 14.26     | 26.65    |                    |
|                                | 21425   | 2567.5          | -30.50    | 44.80                 | 14.30     | 26.92    |                    |
|                                | 20775   | 2502.5          | -23.56    | 44.19                 | 20.63     | 115.64   | V                  |
|                                | 21100   | 2535.0          | -22.98    | 44.09                 | 21.11     | 129.06   |                    |
|                                | 21425   | 2567.5          | -23.79    | 44.50                 | 20.71     | 117.73   |                    |

| LTE Band 7                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                               | 20775   | 2502.5          | -30.44    | 44.24                 | 13.80     | 23.98    | H                  |
|                                 | 21100   | 2535.0          | -30.62    | 44.20                 | 13.58     | 22.79    |                    |
|                                 | 21425   | 2567.5          | -31.51    | 44.80                 | 13.29     | 21.34    |                    |
|                                 | 20775   | 2502.5          | -24.14    | 44.19                 | 20.05     | 101.18   | V                  |
|                                 | 21100   | 2535.0          | -24.36    | 44.09                 | 19.73     | 93.93    |                    |
|                                 | 21425   | 2567.5          | -24.19    | 44.50                 | 20.31     | 107.37   |                    |

| LTE Band 7                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                               | 20800   | 2505.0          | -29.35    | 44.34                 | 14.99     | 31.56    | H                  |
|                                 | 21100   | 2535.0          | -29.86    | 44.20                 | 14.34     | 27.15    |                    |
|                                 | 21400   | 2565.0          | -30.33    | 44.72                 | 14.39     | 27.50    |                    |
|                                 | 20800   | 2505.0          | -23.03    | 44.23                 | 21.20     | 131.70   | V                  |
|                                 | 21100   | 2535.0          | -22.70    | 44.09                 | 21.39     | 137.66   |                    |
|                                 | 21400   | 2565.0          | -23.73    | 44.41                 | 20.68     | 116.84   |                    |

| LTE Band 7                       |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                                | 20800   | 2505.0          | -30.99    | 44.34                 | 13.35     | 21.63    | H                  |
|                                  | 21100   | 2535.0          | -31.03    | 44.20                 | 13.17     | 20.73    |                    |
|                                  | 21400   | 2565.0          | -31.01    | 44.72                 | 13.71     | 23.51    |                    |
|                                  | 20800   | 2505.0          | -24.30    | 44.23                 | 19.93     | 98.31    | V                  |
|                                  | 21100   | 2535.0          | -23.95    | 44.09                 | 20.14     | 103.23   |                    |
|                                  | 21400   | 2565.0          | -24.43    | 44.41                 | 19.98     | 99.45    |                    |

| LTE Band 7                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                               | 20825   | 2507.5          | -29.68    | 44.32                 | 14.64     | 29.09    | H                  |
|                                 | 21100   | 2535.0          | -29.57    | 44.20                 | 14.63     | 29.02    |                    |
|                                 | 21375   | 2562.5          | -30.41    | 44.85                 | 14.44     | 27.78    |                    |
|                                 | 20825   | 2507.5          | -23.08    | 43.99                 | 20.91     | 123.37   | V                  |
|                                 | 21100   | 2535.0          | -22.36    | 44.09                 | 21.73     | 148.87   |                    |
|                                 | 21375   | 2562.5          | -23.10    | 44.51                 | 21.41     | 138.36   |                    |

| LTE Band 7                       |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                                | 20825   | 2507.5          | -30.97    | 44.32                 | 13.35     | 21.62    | H                  |
|                                  | 21100   | 2535.0          | -30.99    | 44.20                 | 13.21     | 20.93    |                    |
|                                  | 21375   | 2562.5          | -30.84    | 44.85                 | 14.01     | 25.17    |                    |
|                                  | 20825   | 2507.5          | -23.72    | 43.99                 | 20.27     | 106.46   | V                  |
|                                  | 21100   | 2535.0          | -24.08    | 44.09                 | 20.01     | 100.18   |                    |
|                                  | 21375   | 2562.5          | -24.54    | 44.51                 | 19.97     | 99.31    |                    |

| LTE Band 7                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                               | 20850.0 | 2510.0          | -29.33    | 44.16                 | 14.83     | 30.41    | H                  |
|                                 | 21100.0 | 2535.0          | -29.23    | 44.20                 | 14.97     | 31.38    |                    |
|                                 | 21350.0 | 2560.0          | -30.17    | 44.81                 | 14.64     | 29.09    |                    |
|                                 | 20850.0 | 2510.0          | -23.42    | 44.78                 | 21.36     | 136.77   | V                  |
|                                 | 21100.0 | 2535.0          | -22.27    | 44.09                 | 21.82     | 151.98   |                    |
|                                 | 21350.0 | 2560.0          | -23.37    | 44.72                 | 21.35     | 136.46   |                    |

| LTE Band 7                       |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                                | 20850.0 | 2510.0          | -30.56    | 44.16                 | 13.60     | 22.91    | H                  |
|                                  | 21100.0 | 2535.0          | -30.50    | 44.20                 | 13.70     | 23.43    |                    |
|                                  | 21350.0 | 2560.0          | -31.56    | 44.81                 | 13.25     | 21.12    |                    |
|                                  | 20850.0 | 2510.0          | -23.81    | 44.78                 | 20.97     | 125.03   | V                  |
|                                  | 21100.0 | 2535.0          | -23.72    | 44.09                 | 20.37     | 108.84   |                    |
|                                  | 21350.0 | 2560.0          | -24.34    | 44.72                 | 20.38     | 109.14   |                    |

| LTE Band 41                    |         |                 |           |                       |           |          |                    |
|--------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                          | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                              | 39675   | 2498.5          | -29.12    | 44.24                 | 15.12     | 32.49    | H                  |
|                                | 40620   | 2593.0          | -28.85    | 44.20                 | 15.35     | 34.25    |                    |
|                                | 41565   | 2687.5          | -29.70    | 44.80                 | 15.10     | 32.37    |                    |
|                                | 39675   | 2498.5          | -23.08    | 44.19                 | 21.11     | 129.15   | V                  |
|                                | 40620   | 2593.0          | -22.65    | 44.09                 | 21.44     | 139.25   |                    |
|                                | 41565   | 2687.5          | -23.10    | 44.50                 | 21.40     | 138.01   |                    |

| LTE Band 41                     |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                               | 39675   | 2498.5          | -30.13    | 44.24                 | 14.11     | 25.75    | H                  |
|                                 | 40620   | 2593.0          | -30.05    | 44.20                 | 14.15     | 25.98    |                    |
|                                 | 41565   | 2687.5          | -30.81    | 44.80                 | 13.99     | 25.07    |                    |
|                                 | 39675   | 2498.5          | -24.16    | 44.19                 | 20.03     | 100.72   | V                  |
|                                 | 40620   | 2593.0          | -23.85    | 44.09                 | 20.24     | 105.63   |                    |
|                                 | 41565   | 2687.5          | -24.31    | 44.50                 | 20.19     | 104.45   |                    |

| LTE Band 41                     |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                               | 39700   | 2501.0          | -29.35    | 44.34                 | 14.99     | 31.56    | H                  |
|                                 | 40620   | 2593.0          | -29.23    | 44.20                 | 14.97     | 31.38    |                    |
|                                 | 41540   | 2685.0          | -29.88    | 44.72                 | 14.84     | 30.50    |                    |
|                                 | 39700   | 2501.0          | -22.89    | 44.23                 | 21.34     | 136.02   | V                  |
|                                 | 40620   | 2593.0          | -22.73    | 44.09                 | 21.36     | 136.71   |                    |
|                                 | 41540   | 2685.0          | -22.87    | 44.41                 | 21.54     | 142.43   |                    |

| LTE Band 41                      |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                                | 39700   | 2501.0          | -30.66    | 44.34                 | 13.68     | 23.34    | H                  |
|                                  | 40620   | 2593.0          | -29.93    | 44.20                 | 14.27     | 26.71    |                    |
|                                  | 41540   | 2685.0          | -30.36    | 44.72                 | 14.36     | 27.31    |                    |
|                                  | 39700   | 2501.0          | -23.50    | 44.23                 | 20.73     | 118.20   | V                  |
|                                  | 40620   | 2593.0          | -23.70    | 44.09                 | 20.39     | 109.35   |                    |
|                                  | 41540   | 2685.0          | -24.10    | 44.41                 | 20.31     | 107.30   |                    |

| LTE Band 41                     |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                               | 39725   | 2503.5          | -29.01    | 44.32                 | 15.31     | 33.95    | H                  |
|                                 | 40620   | 2593.0          | -28.89    | 44.20                 | 15.31     | 33.94    |                    |
|                                 | 41515   | 2682.5          | -29.99    | 44.85                 | 14.86     | 30.61    |                    |
|                                 | 39725   | 2503.5          | -22.21    | 43.99                 | 21.78     | 150.73   | V                  |
|                                 | 40620   | 2593.0          | -22.93    | 44.09                 | 21.16     | 130.56   |                    |
|                                 | 41515   | 2682.5          | -22.84    | 44.51                 | 21.67     | 146.89   |                    |

| LTE Band 41                      |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                                | 39725   | 2503.5          | -29.87    | 44.32                 | 14.45     | 27.85    | H                  |
|                                  | 40620   | 2593.0          | -30.15    | 44.20                 | 14.05     | 25.39    |                    |
|                                  | 41515   | 2682.5          | -31.25    | 44.85                 | 13.60     | 22.90    |                    |
|                                  | 39725   | 2503.5          | -23.18    | 43.99                 | 20.81     | 120.56   | V                  |
|                                  | 40620   | 2593.0          | -23.85    | 44.09                 | 20.24     | 105.63   |                    |
|                                  | 41515   | 2682.5          | -24.10    | 44.51                 | 20.41     | 109.90   |                    |

| LTE Band 41                     |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                               | 39750   | 2506.0          | -28.96    | 44.16                 | 15.20     | 33.11    | H                  |
|                                 | 40620   | 2593.0          | -28.94    | 44.20                 | 15.26     | 33.55    |                    |
|                                 | 41490   | 2680.0          | -29.82    | 44.81                 | 14.99     | 31.53    |                    |
|                                 | 39750   | 2506.0          | -23.23    | 44.78                 | 21.55     | 142.89   | V                  |
|                                 | 40620   | 2593.0          | -22.68    | 44.09                 | 21.41     | 138.29   |                    |
|                                 | 41490   | 2680.0          | -22.76    | 44.72                 | 21.96     | 157.04   |                    |

| LTE Band 41                      |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z                                | 39750   | 2506.0          | -30.03    | 44.16                 | 14.13     | 25.88    | H                  |
|                                  | 40620   | 2593.0          | -30.22    | 44.20                 | 13.98     | 24.99    |                    |
|                                  | 41490   | 2680.0          | -31.05    | 44.81                 | 13.76     | 23.75    |                    |
|                                  | 39750   | 2506.0          | -24.28    | 44.78                 | 20.50     | 112.20   | V                  |
|                                  | 40620   | 2593.0          | -23.67    | 44.09                 | 20.42     | 110.10   |                    |
|                                  | 41490   | 2680.0          | -24.08    | 44.72                 | 20.64     | 115.88   |                    |

## 4.2 Frequency Stability Measurement

### 4.2.1 Limits of Frequency Stability Measurement

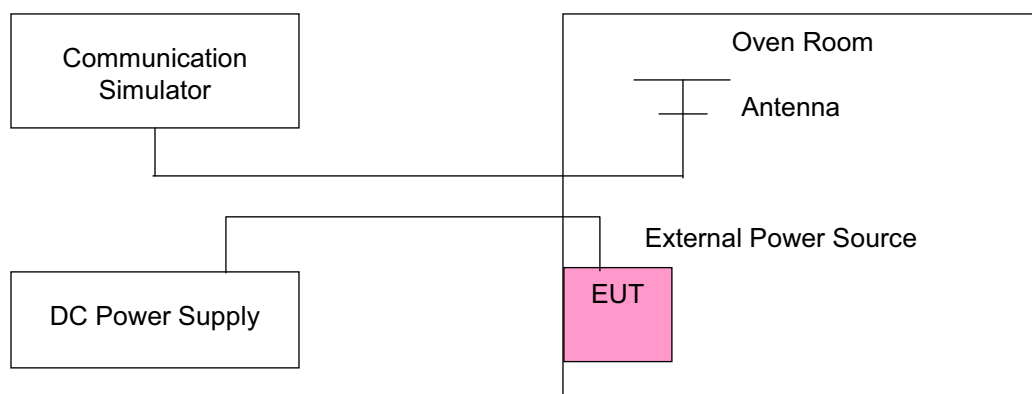
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 4.2.2 Test Procedure

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

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

### 4.2.3 Test Setup



#### 4.2.4 Test Results

##### Frequency Error vs. Voltage

| Voltage<br>(Volts) | Frequency Error (ppm) |         |         |         | Limit (ppm) |
|--------------------|-----------------------|---------|---------|---------|-------------|
|                    | LTE Band 7            |         |         |         |             |
|                    | 5MHz                  | 10MHz   | 15MHz   | 20MHz   |             |
| 3.85               | 0.00033               | 0.00043 | 0.00099 | 0.00027 | 2.5         |
| 3.6                | 0.00056               | 0.00099 | 0.00148 | 0.00016 | 2.5         |
| 4.40               | 0.00090               | 0.00056 | 0.00099 | 0.00015 | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.40Vdc.

##### Frequency Error vs. Temperature

| Temp. (°C) | Frequency Error (ppm) |          |          |          | Limit (ppm) |
|------------|-----------------------|----------|----------|----------|-------------|
|            | LTE Band 7            |          |          |          |             |
|            | 5MHz                  | 10MHz    | 15MHz    | 20MHz    |             |
| -30        | 0.00126               | 0.00201  | -0.00103 | -0.00162 | 2.5         |
| -20        | 0.00001               | 0.00114  | 0.00125  | 0.00104  | 2.5         |
| -10        | 0.00110               | 0.00151  | 0.00092  | 0.00027  | 2.5         |
| 0          | 0.00039               | 0.00067  | 0.00045  | 0.00123  | 2.5         |
| 10         | 0.00077               | 0.00095  | 0.00081  | 0.00004  | 2.5         |
| 20         | -0.00143              | -0.00103 | -0.00118 | -0.00140 | 2.5         |
| 30         | -0.00015              | -0.00004 | -0.00112 | -0.00125 | 2.5         |
| 40         | -0.00084              | -0.00100 | -0.00021 | -0.00127 | 2.5         |
| 50         | -0.00102              | -0.00011 | -0.00080 | -0.00042 | 2.5         |
| 60         | -0.00072              | -0.00087 | -0.00117 | -0.00138 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | Frequency Error (ppm) |         |         |         | Limit (ppm) |
|--------------------|-----------------------|---------|---------|---------|-------------|
|                    | LTE Band 41           |         |         |         |             |
|                    | 5MHz                  | 10MHz   | 15MHz   | 20MHz   |             |
| 3.85               | 0.00103               | 0.00108 | 0.00103 | 0.00002 | 2.5         |
| 3.6                | 0.00010               | 0.00028 | 0.00149 | 0.00144 | 2.5         |
| 4.40               | 0.00014               | 0.00095 | 0.00148 | 0.00013 | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.40Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | Frequency Error (ppm) |         |         |         | Limit (ppm) |
|------------|-----------------------|---------|---------|---------|-------------|
|            | LTE Band 41           |         |         |         |             |
|            | 5MHz                  | 10MHz   | 15MHz   | 20MHz   |             |
| -30        | 0.0006                | -0.0012 | -0.0016 | 0.0004  | 2.5         |
| -20        | 0.0004                | 0.0013  | 0.0001  | 0.0004  | 2.5         |
| -10        | 0.0003                | 0.0015  | 0.0002  | 0.0010  | 2.5         |
| 0          | 0.0006                | 0.0000  | 0.0014  | 0.0001  | 2.5         |
| 10         | 0.0010                | 0.0008  | 0.0013  | 0.0014  | 2.5         |
| 20         | -0.0014               | -0.0013 | -0.0004 | -0.0004 | 2.5         |
| 30         | -0.0001               | -0.0013 | -0.0012 | -0.0012 | 2.5         |
| 40         | -0.0013               | -0.0013 | -0.0004 | -0.0011 | 2.5         |
| 50         | -0.0011               | -0.0003 | -0.0013 | -0.0011 | 2.5         |
| 60         | -0.0013               | -0.0012 | -0.0005 | -0.0002 | 2.5         |

### 4.3 Occupied Bandwidth Measurement

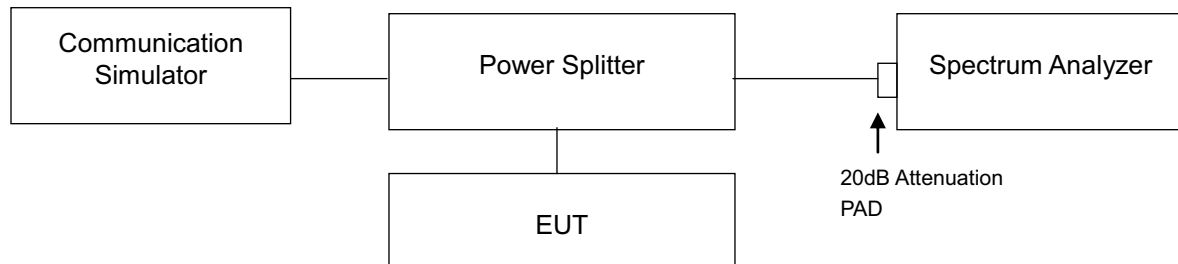
#### 4.3.1 Limits Of Occupied Bandwidth Measurement

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

#### 4.3.2 Test Procedure

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

#### 4.3.3 Test Setup

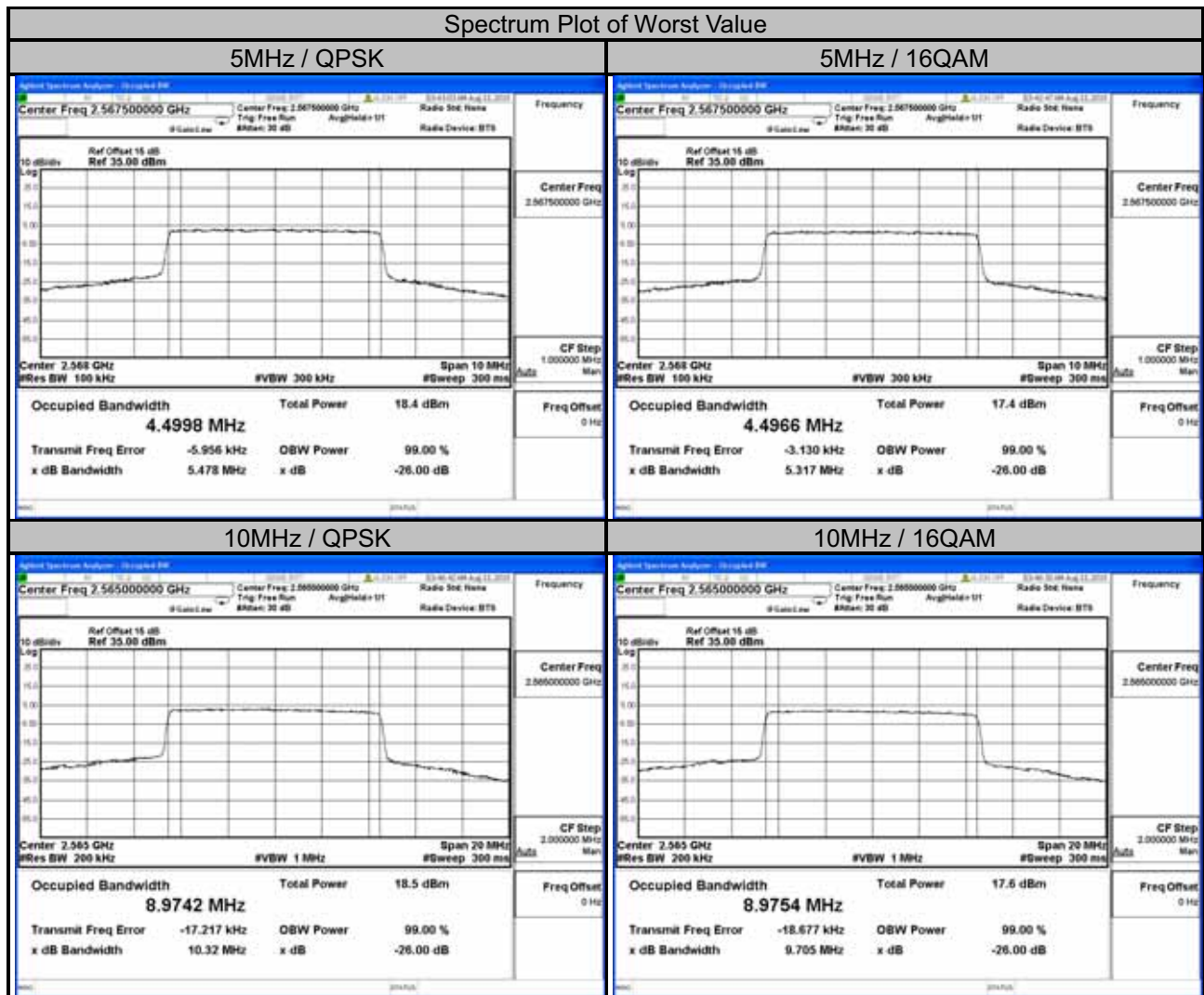




A O T

## 4.3.4 Test Result

| LTE Band 7              |                 |                              |        |                          |                 |                              |        |
|-------------------------|-----------------|------------------------------|--------|--------------------------|-----------------|------------------------------|--------|
| Channel Bandwidth: 5MHz |                 |                              |        | Channel Bandwidth: 10MHz |                 |                              |        |
| Channel                 | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        | Channel                  | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        |
|                         |                 | QPSK                         | 16QAM  |                          |                 | QPSK                         | 16QAM  |
| 20775                   | 2502.5          | 4.4884                       | 4.4851 | 20800                    | 2505.0          | 8.9565                       | 8.9536 |
| 21100                   | 2535.0          | 4.4875                       | 4.4839 | 21100                    | 2535.0          | 8.9552                       | 8.9471 |
| 21425                   | 2567.5          | 4.4988                       | 4.4966 | 21400                    | 2565.0          | 8.9742                       | 8.9754 |





A O T

## LTE Band 7

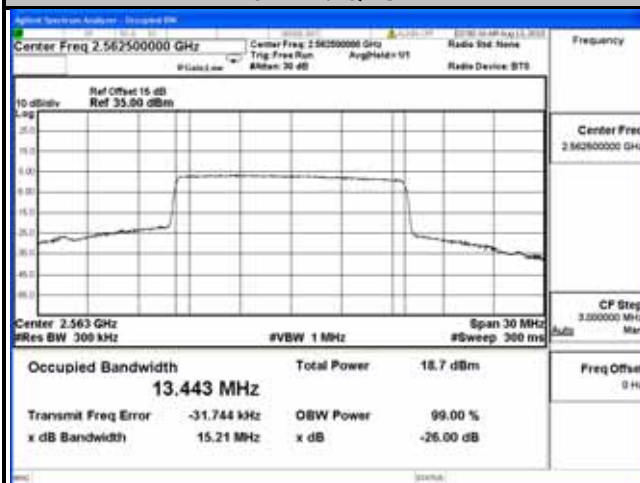
## Channel Bandwidth: 15MHz

## Channel Bandwidth: 20MHz

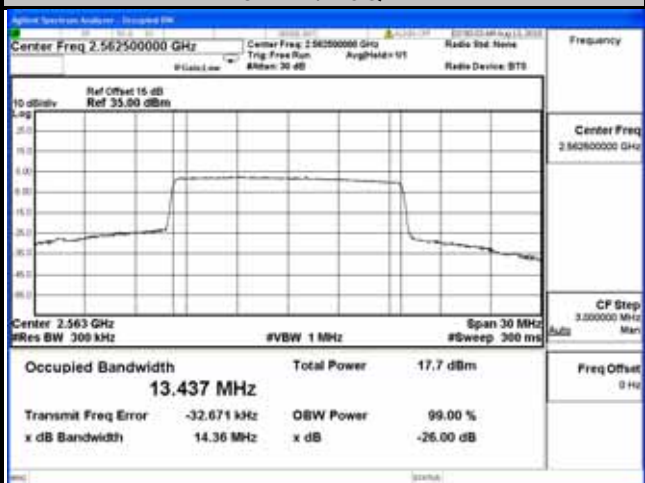
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        |
|---------|-----------------|------------------------------|--------|---------|-----------------|------------------------------|--------|
|         |                 | QPSK                         | 16QAM  |         |                 | QPSK                         | 16QAM  |
| 20825   | 2507.5          | 13.427                       | 13.415 | 20850   | 2510.0          | 17.856                       | 17.869 |
| 21100   | 2535.0          | 13.431                       | 13.414 | 21100   | 2535.0          | 17.875                       | 17.888 |
| 21375   | 2562.5          | 13.443                       | 13.437 | 21350   | 2560.0          | 17.887                       | 17.889 |

## Spectrum Plot of Worst Value

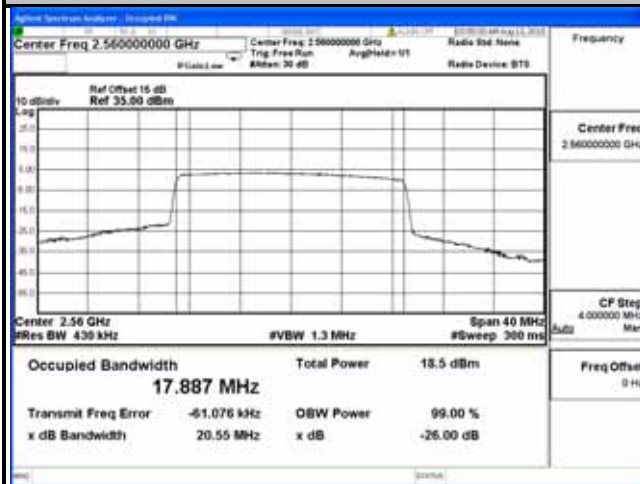
## 15MHz / QPSK



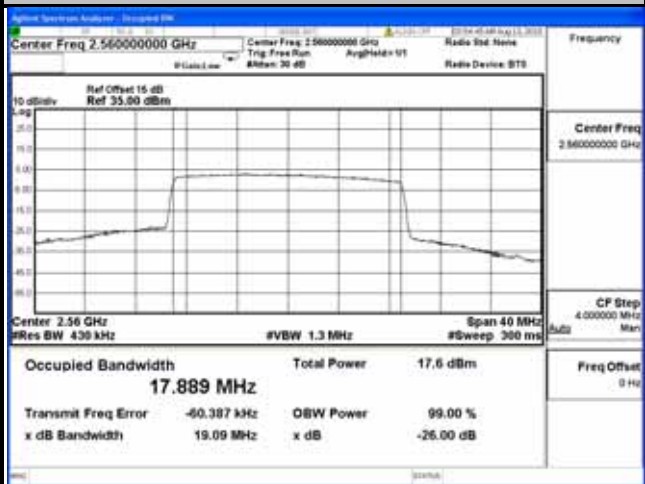
## 15MHz / 16QAM



## 20MHz / QPSK



## 20MHz / 16QAM



# LTE Band 41

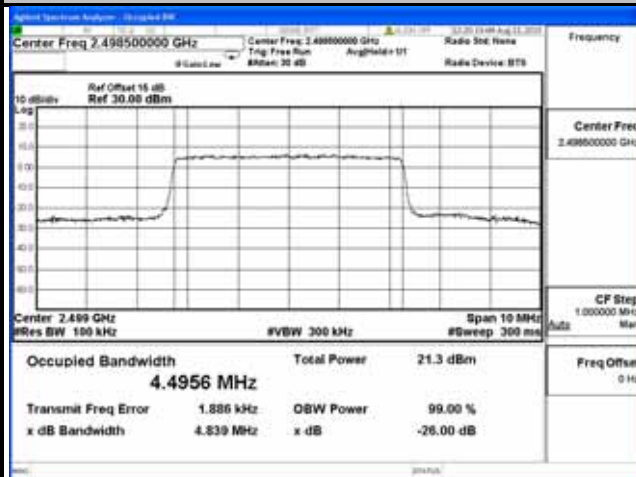
## Channel Bandwidth: 5MHz

## Channel Bandwidth: 10MHz

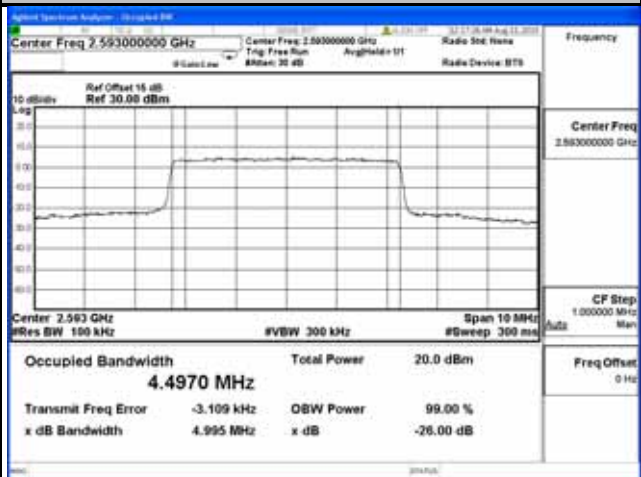
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        |
|---------|-----------------|------------------------------|--------|---------|-----------------|------------------------------|--------|
|         |                 | QPSK                         | 16QAM  |         |                 | QPSK                         | 16QAM  |
| 39675   | 2498.5          | 4.4956                       | 4.4902 | 39700   | 2501.0          | 8.9650                       | 8.9758 |
| 40620   | 2593.0          | 4.4947                       | 4.4970 | 40620   | 2593.0          | 8.9693                       | 8.9693 |
| 41565   | 2687.5          | 4.4913                       | 4.4850 | 41540   | 2685.0          | 8.9451                       | 8.9588 |

## Spectrum Plot of Worst Value

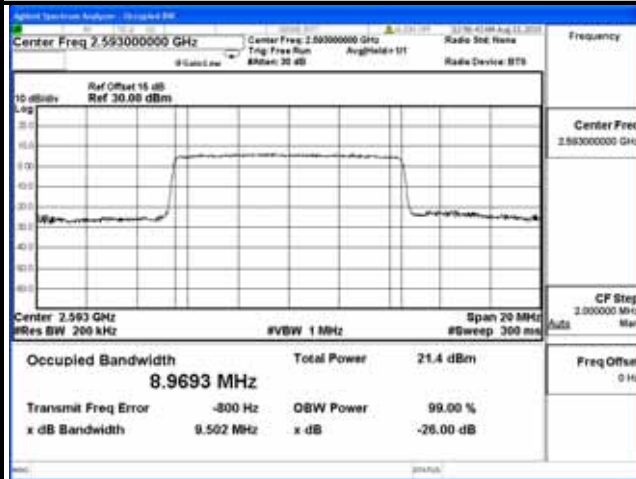
### 5MHz / QPSK



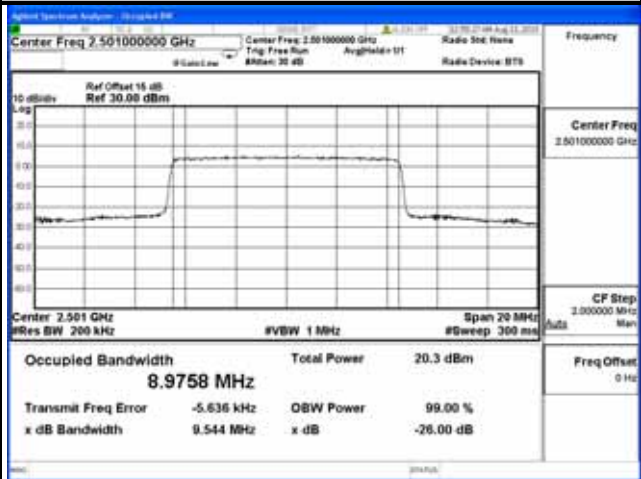
### 5MHz / 16QAM



### 10MHz / QPSK



### 10MHz / 16QAM





A O T

## LTE Band 41

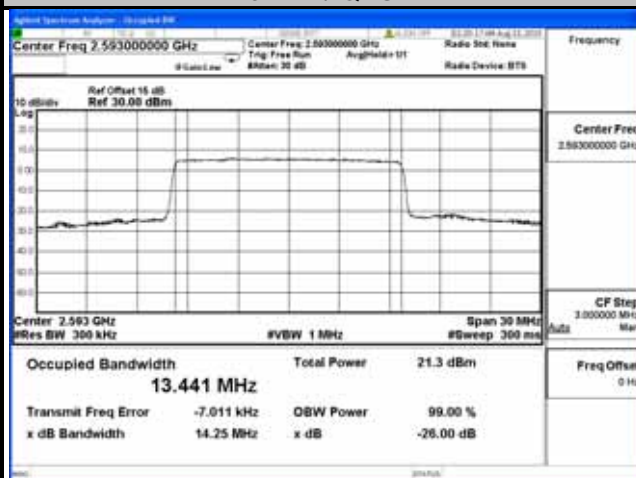
Channel Bandwidth: 15MHz

Channel Bandwidth: 20MHz

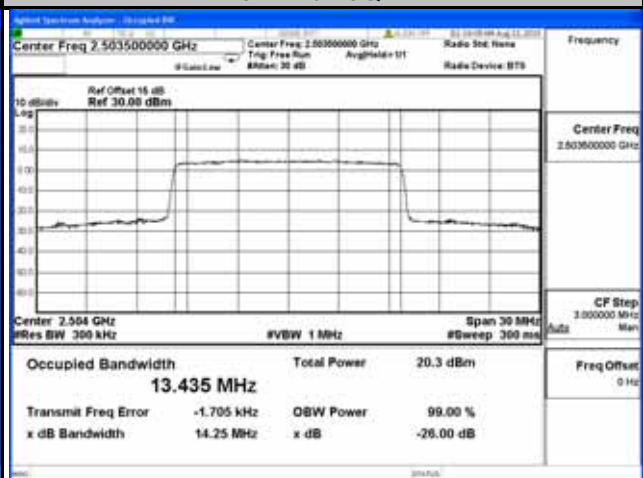
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        |
|---------|-----------------|------------------------------|--------|---------|-----------------|------------------------------|--------|
|         |                 | QPSK                         | 16QAM  |         |                 | QPSK                         | 16QAM  |
| 39725   | 2503.5          | 13.432                       | 13.435 | 39750   | 2506.0          | 17.887                       | 17.879 |
| 40620   | 2593.0          | 13.441                       | 13.430 | 40620   | 2593.0          | 17.896                       | 17.890 |
| 41515   | 2682.5          | 13.411                       | 13.405 | 41490   | 2680.0          | 17.858                       | 17.859 |

## Spectrum Plot of Worst Value

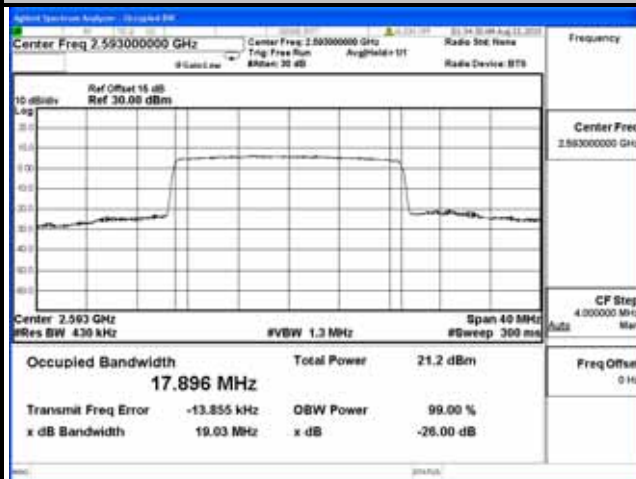
15MHz / QPSK



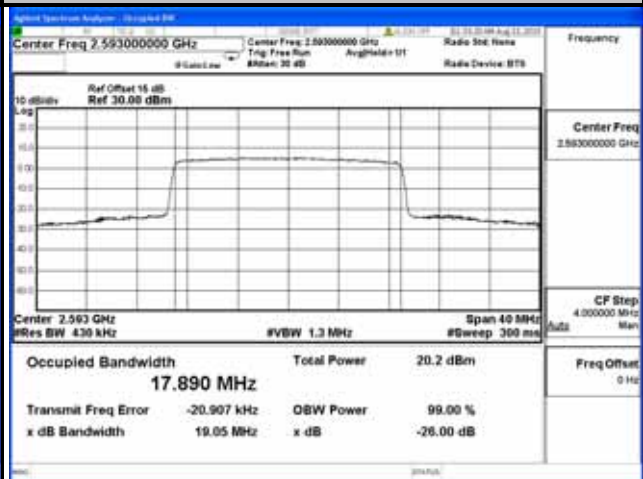
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

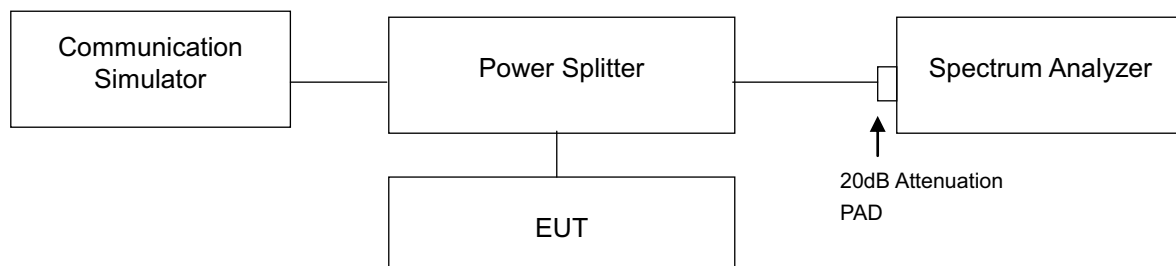


## 4.4 Band Edge Measurement

### 4.4.1 Limits of Band Edge Measurement

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

### 4.4.2 Test Setup



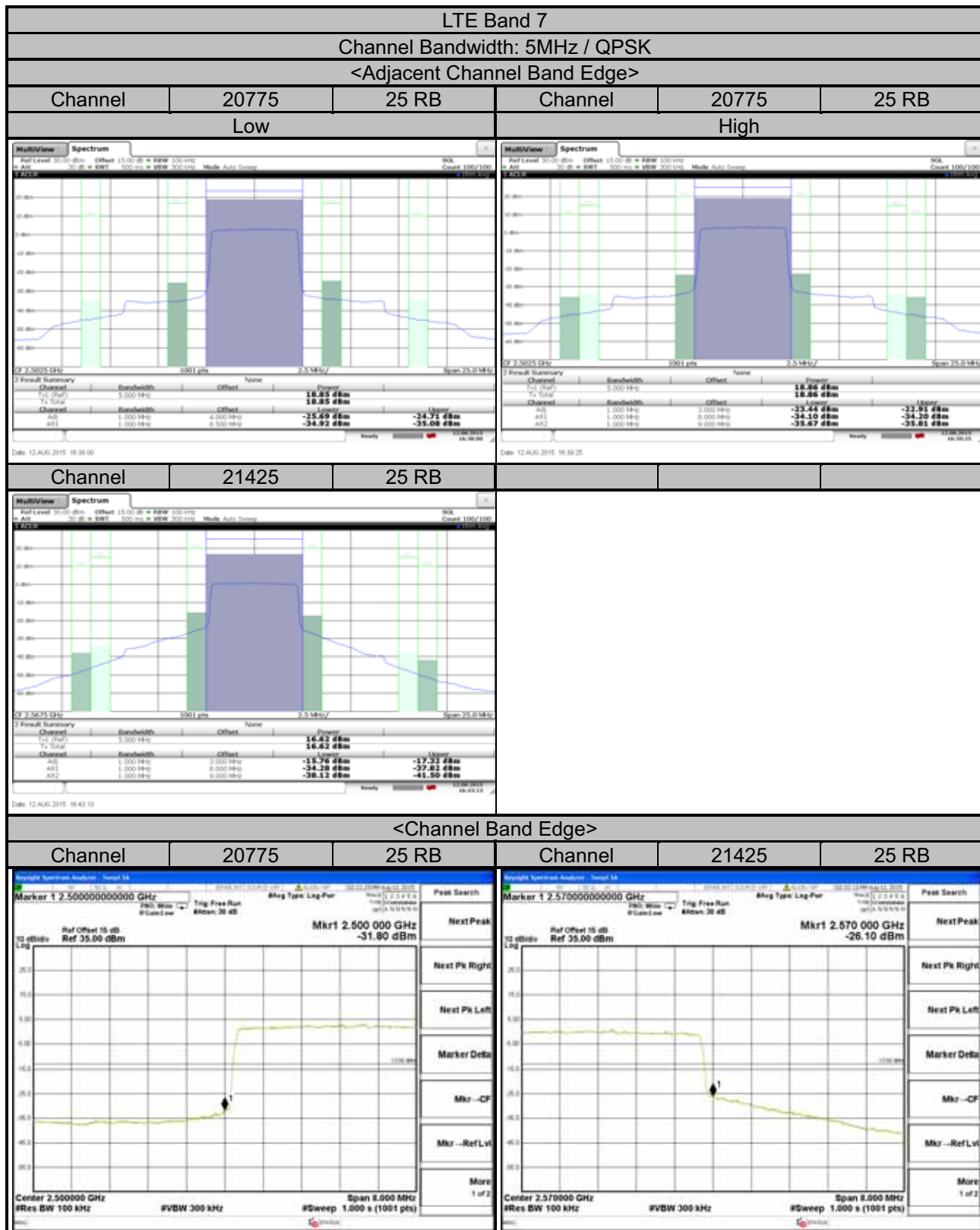
### 4.4.3 Test Procedures

- The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- The center frequency of spectrum is the band edge frequency and span is 8MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Band 7 Channel Bandwidth 5MHz/10MHz/15MHz/20MHz).
- The center frequency of spectrum is the band edge frequency and span is 8MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Band 41 Channel bandwidth 5MHz/10MHz).
- The center frequency of spectrum is the band edge frequency and span is 8MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Band 41 Channel bandwidth 15MHz).
- The center frequency of spectrum is the band edge frequency and span is 8MHz. RB of the spectrum is 180kHz and VB of the spectrum is 510kHz (Channel bandwidth 20MHz).
- Record the max trace plot into the test report.



A O T

## 4.4.4 Test Results





A O T

## LTE Band 7

Channel Bandwidth: 5MHz / 16QAM

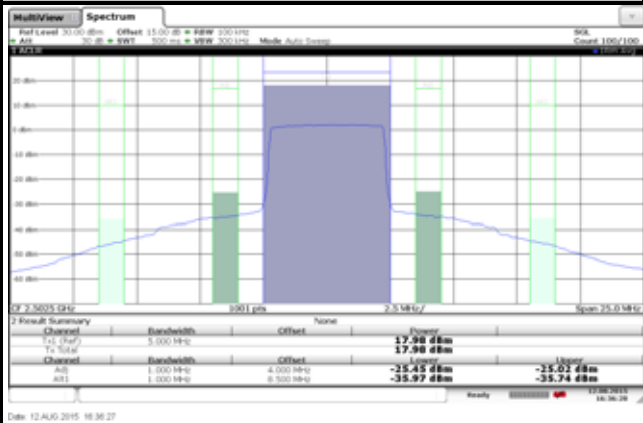
&lt;Adjacent Channel Band Edge&gt;

Channel

20775

25 RB

Low



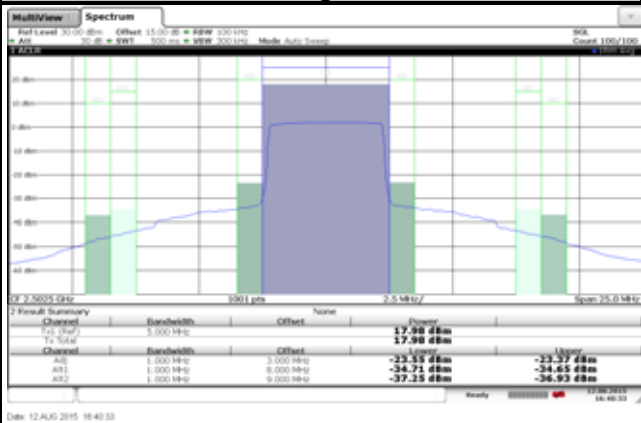
Date: 12.AUG.2015 16:36:27

Channel

20775

25 RB

High

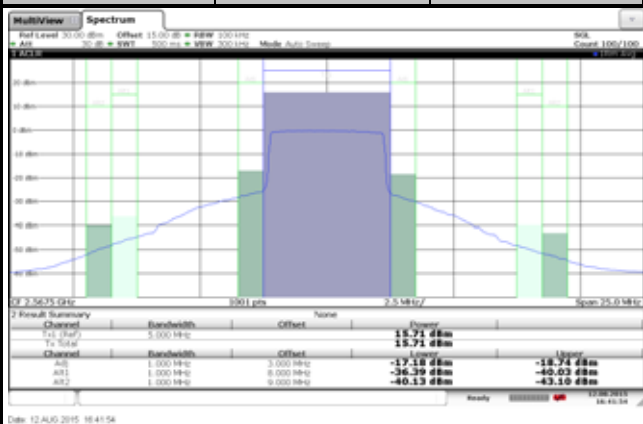


Date: 12.AUG.2015 16:40:33

Channel

21425

25 RB



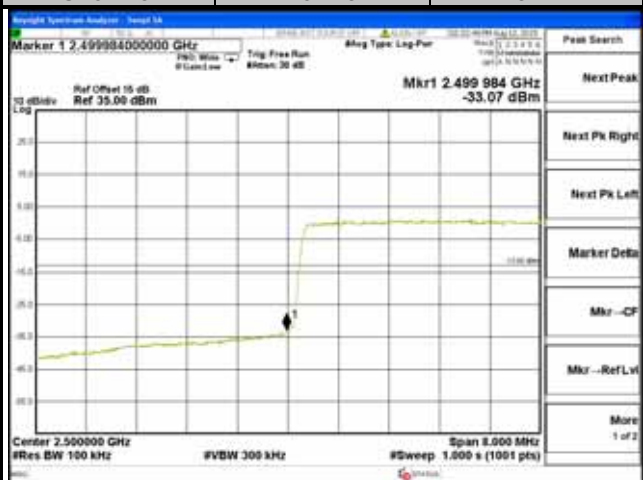
Date: 12.AUG.2015 16:41:54

&lt;Channel Band Edge&gt;

Channel

20775

25 RB



Channel

21425

25 RB





A O T

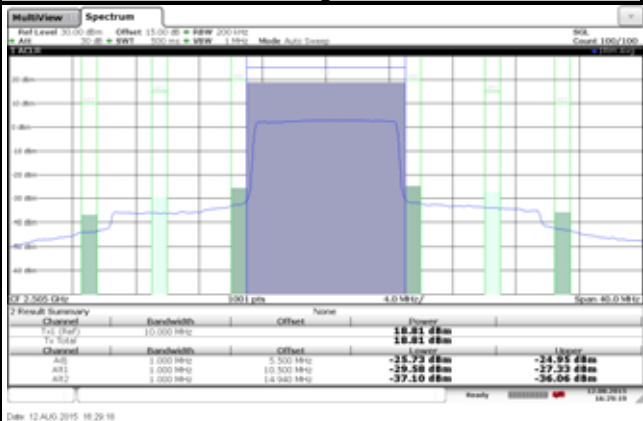
## LTE Band 7

Channel Bandwidth: 10MHz / QPSK

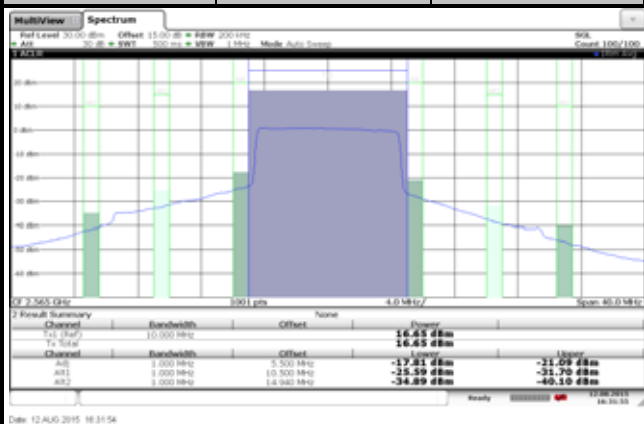
&lt;Adjacent Channel Band Edge&gt;

Channel  
20800  
Low

50 RB

Channel  
20800  
HighChannel  
21400  
Low

50 RB



&lt;Channel Band Edge&gt;

Channel  
20800  
Low

50 RB

Channel  
21400  
Low

50 RB





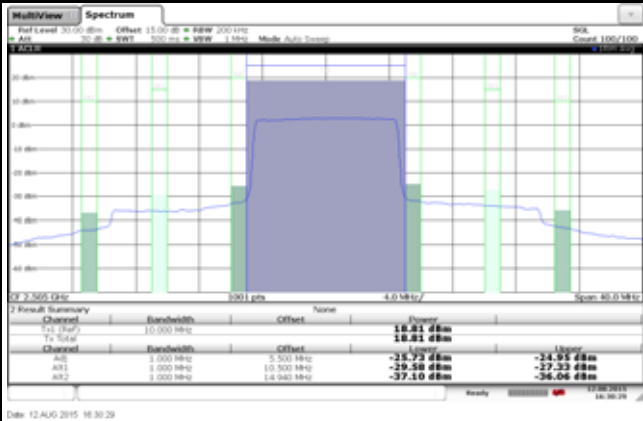
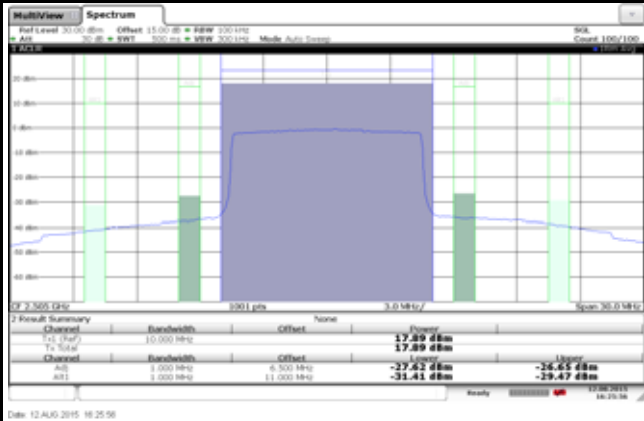
A O T

## LTE Band 7

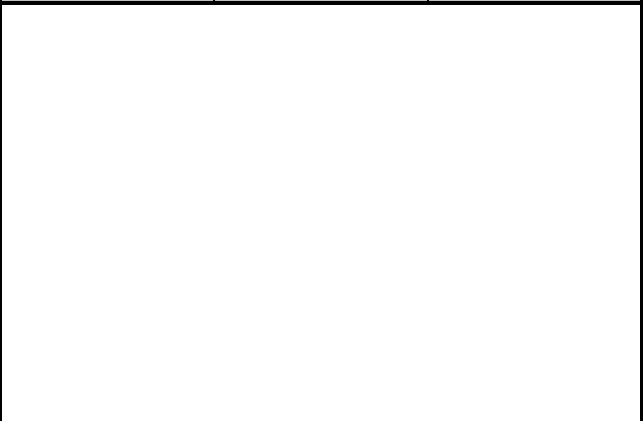
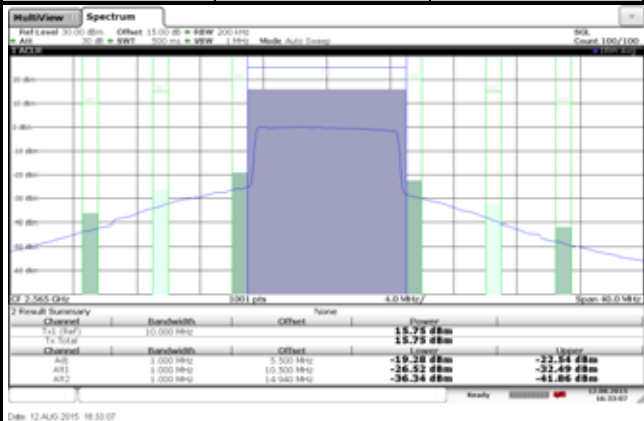
Channel Bandwidth: 10MHz / 16QAM

&lt;Adjacent Channel Band Edge&gt;

| Channel | 20800 | 50 RB | Channel | 20800 | 50 RB |
|---------|-------|-------|---------|-------|-------|
| Low     |       |       | High    |       |       |



| Channel | 21400 | 50 RB |
|---------|-------|-------|
|---------|-------|-------|



## &lt;Channel Band Edge&gt;

| Channel | 20800 | 50 RB | Channel | 21400 | 50 RB |
|---------|-------|-------|---------|-------|-------|
|---------|-------|-------|---------|-------|-------|





A O T

## LTE Band 7

Channel Bandwidth: 15MHz / QPSK

&lt;Adjacent Channel Band Edge&gt;

Channel

20825

75 RB

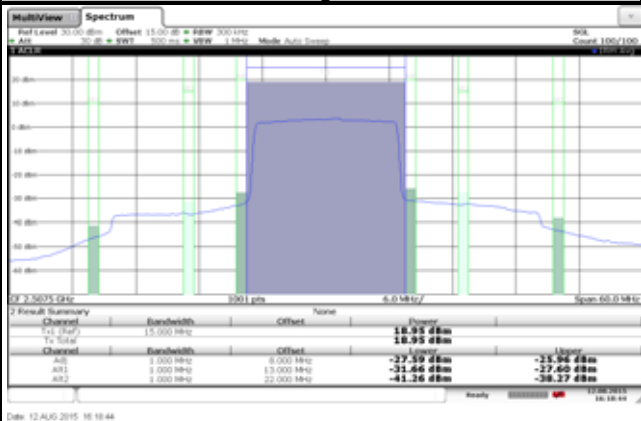
Channel

20825

75 RB

Low

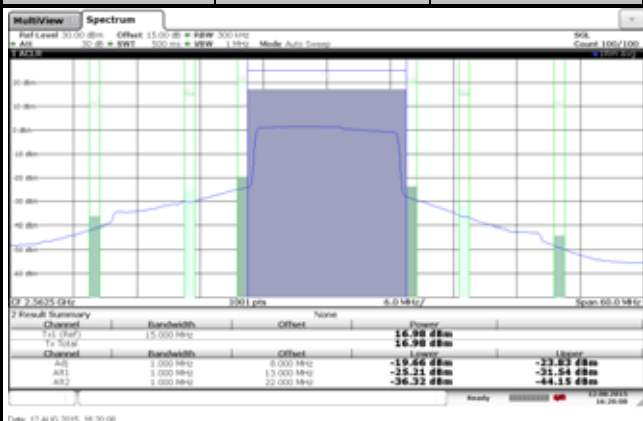
High



Channel

21375

75 RB



&lt;Channel Band Edge&gt;

Channel

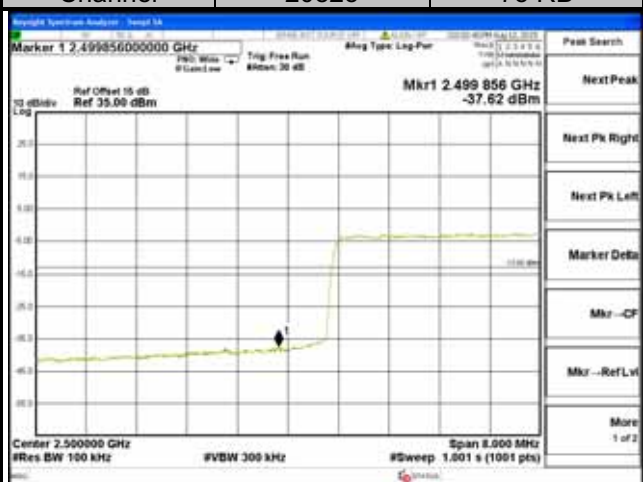
20825

75 RB

Channel

21375

75 RB





<Adjacent Channel Band Edge>

Channel 21375 75 RB

MultiView Spectrum

Ref Level: 30.00 dBm Offset: 15.00 dB BW: 300 kHz

Att: 70.00 dB Span: 500.00 MHz Mode: Auto Sweep

1 RBW

30.00 dBm

20.00 dBm

10.00 dBm

0.00 dBm

-10.00 dBm

-20.00 dBm

-30.00 dBm

-40.00 dBm

0.00 dBm

10.00 dBm

20.00 dBm

30.00 dBm

40.00 dBm

50.00 dBm

60.00 dBm

70.00 dBm

80.00 dBm

90.00 dBm

100.00 dBm

110.00 dBm

120.00 dBm

130.00 dBm

140.00 dBm

150.00 dBm

160.00 dBm

170.00 dBm

180.00 dBm

190.00 dBm

200.00 dBm

210.00 dBm

220.00 dBm

230.00 dBm

240.00 dBm

250.00 dBm

260.00 dBm

270.00 dBm

280.00 dBm

290.00 dBm

300.00 dBm

310.00 dBm

320.00 dBm

330.00 dBm

340.00 dBm

350.00 dBm

360.00 dBm

370.00 dBm

380.00 dBm

390.00 dBm

400.00 dBm

410.00 dBm

420.00 dBm

430.00 dBm

440.00 dBm

450.00 dBm

460.00 dBm

470.00 dBm

480.00 dBm

490.00 dBm

500.00 dBm

510.00 dBm

520.00 dBm

530.00 dBm

540.00 dBm

550.00 dBm

560.00 dBm

570.00 dBm

580.00 dBm

590.00 dBm

600.00 dBm

610.00 dBm

620.00 dBm

630.00 dBm

640.00 dBm

650.00 dBm

660.00 dBm

670.00 dBm

680.00 dBm

690.00 dBm

700.00 dBm

710.00 dBm

720.00 dBm

730.00 dBm

740.00 dBm

750.00 dBm

760.00 dBm

770.00 dBm

780.00 dBm

790.00 dBm

800.00 dBm

810.00 dBm

820.00 dBm

830.00 dBm

840.00 dBm

850.00 dBm

860.00 dBm

870.00 dBm

880.00 dBm

890.00 dBm

900.00 dBm

910.00 dBm

920.00 dBm

930.00 dBm

940.00 dBm

950.00 dBm

960.00 dBm

970.00 dBm

980.00 dBm

990.00 dBm

1000.00 dBm

1010.00 dBm

1020.00 dBm

1030.00 dBm

1040.00 dBm

1050.00 dBm

1060.00 dBm

1070.00 dBm

1080.00 dBm

1090.00 dBm

1100.00 dBm

1110.00 dBm

1120.00 dBm

1130.00 dBm

1140.00 dBm

1150.00 dBm

1160.00 dBm

1170.00 dBm

1180.00 dBm

1190.00 dBm

1200.00 dBm

1210.00 dBm

1220.00 dBm

1230.00 dBm

1240.00 dBm

1250.00 dBm

1260.00 dBm

1270.00 dBm

1280.00 dBm

1290.00 dBm

1300.00 dBm

1310.00 dBm

1320.00 dBm

1330.00 dBm

1340.00 dBm

1350.00 dBm

1360.00 dBm

1370.00 dBm

1380.00 dBm

1390.00 dBm

1400.00 dBm

1410.00 dBm

1420.00 dBm

1430.00 dBm

1440.00 dBm

1450.00 dBm

1460.00 dBm

1470.00 dBm

1480.00 dBm

1490.00 dBm

1500.00 dBm

1510.00 dBm

1520.00 dBm

1530.00 dBm

1540.00 dBm

1550.00 dBm

1560.00 dBm

1570.00 dBm

1580.00 dBm

1590.00 dBm

1600.00 dBm

1610.00 dBm

1620.00 dBm

1630.00 dBm

1640.00 dBm

1650.00 dBm

1660.00 dBm

1670.00 dBm

1680.00 dBm

1690.00 dBm

1700.00 dBm

1710.00 dBm

1720.00 dBm

1730.00 dBm

1740.00 dBm

1750.00 dBm

1760.00 dBm

1770.00 dBm

1780.00 dBm

1790.00 dBm

1800.00 dBm

1810.00 dBm

1820.00 dBm

1830.00 dBm

1840.00 dBm

1850.00 dBm

1860.00 dBm

1870.00 dBm

1880.00 dBm

1890.00 dBm

1900.00 dBm

1910.00 dBm

1920.00 dBm

1930.00 dBm

1940.00 dBm

1950.00 dBm

1960.00 dBm

1970.00 dBm

1980.00 dBm

1990.00 dBm

2000.00 dBm

2010.00 dBm

2020.00 dBm

2030.00 dBm

2040.00 dBm

2050.00 dBm

2060.00 dBm

2070.00 dBm

2080.00 dBm

2090.00 dBm

2100.00 dBm

2110.00 dBm

2120.00 dBm

2130.00 dBm

2140.00 dBm

2150.00 dBm

2160.00 dBm

2170.00 dBm

2180.00 dBm

2190.00 dBm

2200.00 dBm

2210.00 dBm

2220.00 dBm

2230.00 dBm

2240.00 dBm

2250.00 dBm

2260.00 dBm

2270.00 dBm

2280.00 dBm

2290.00 dBm

2300.00 dBm

2310.00 dBm

2320.00 dBm

2330.00 dBm

2340.00 dBm

2350.00 dBm

2360.00 dBm

2370.00 dBm

2380.00 dBm

2390.00 dBm

2400.00 dBm

2410.00 dBm

2420.00 dBm

2430.00 dBm

2440.00 dBm

2450.00 dBm

2460.00 dBm

2470.00 dBm

2480.00 dBm

2490.00 dBm

2500.00 dBm

2510.00 dBm

2520.00 dBm

2530.00 dBm

2540.00 dBm

2550.00 dBm

2560.00 dBm

2570.00 dBm

2580

[illegible]





A O T

## LTE Band 7

Channel Bandwidth: 20MHz / 16QAM

&lt;Adjacent Channel Band Edge&gt;

Channel

20850

100 RB

Low



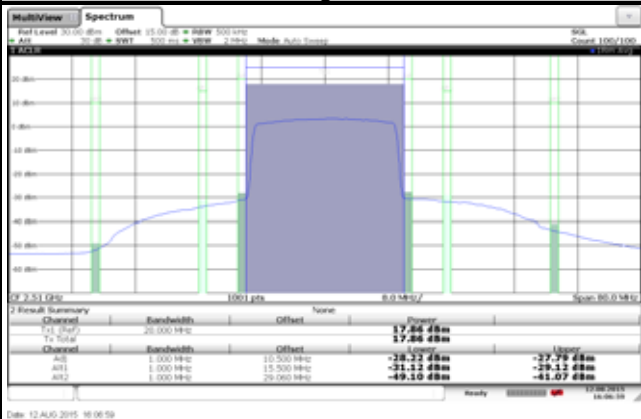
Date: 12.AUG.2015 15:41:19

Channel

20850

100 RB

High

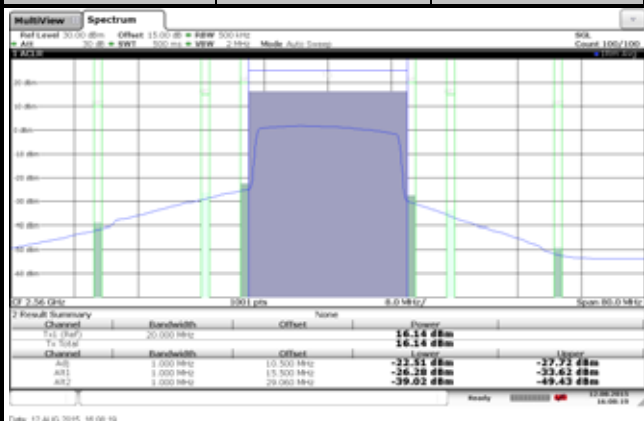


Date: 12.AUG.2015 16:06:59

Channel

21350

100 RB



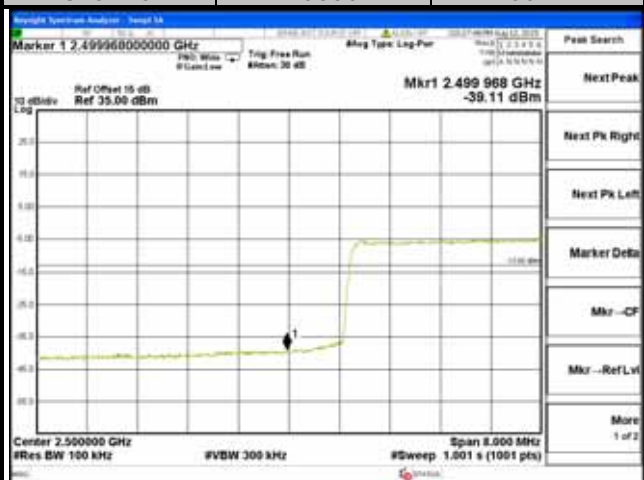
Date: 12.AUG.2015 16:06:19

&lt;Channel Band Edge&gt;

Channel

20850

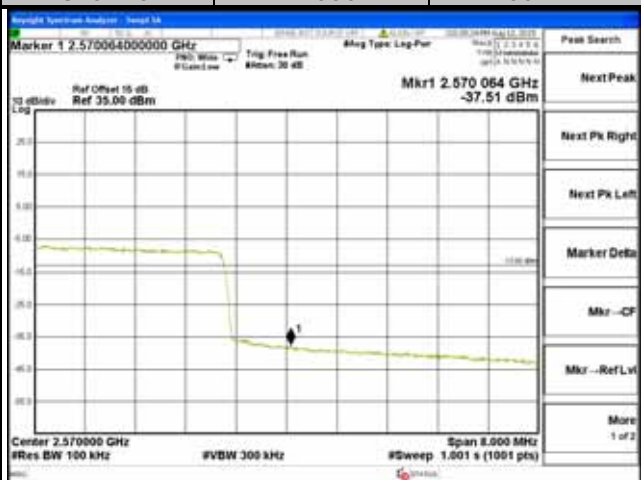
100 RB



Channel

21350

100 RB





A O T

## LTE Band 41

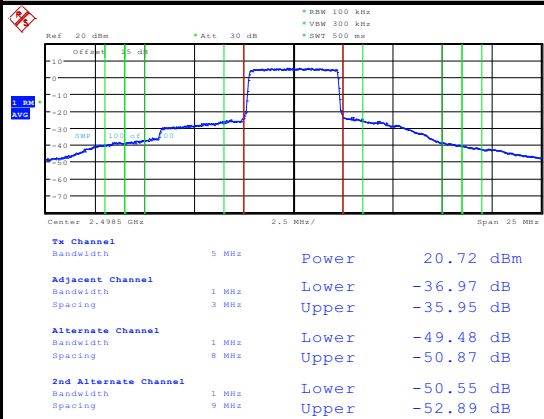
Channel Bandwidth: 5MHz / QPSK

<Adjacent Channel Band Edge>

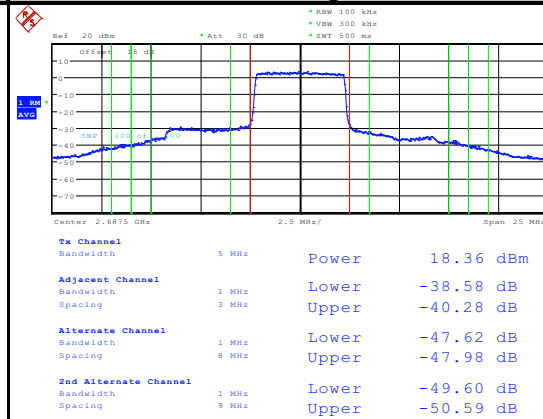
| Channel | 39675 | 25 RB | Channel | 41565 | 25 RB |
|---------|-------|-------|---------|-------|-------|
|---------|-------|-------|---------|-------|-------|

Low

High



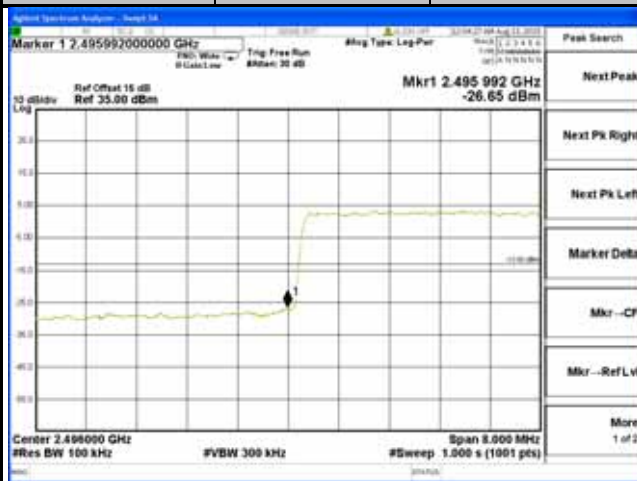
Date: 15.AUG.2015 01:47:25



Date: 15.AUG.2015 01:50:31

<Channel Band Edge>

| Channel | 39675 | 25 RB | Channel | 41565 | 25 RB |
|---------|-------|-------|---------|-------|-------|
|---------|-------|-------|---------|-------|-------|



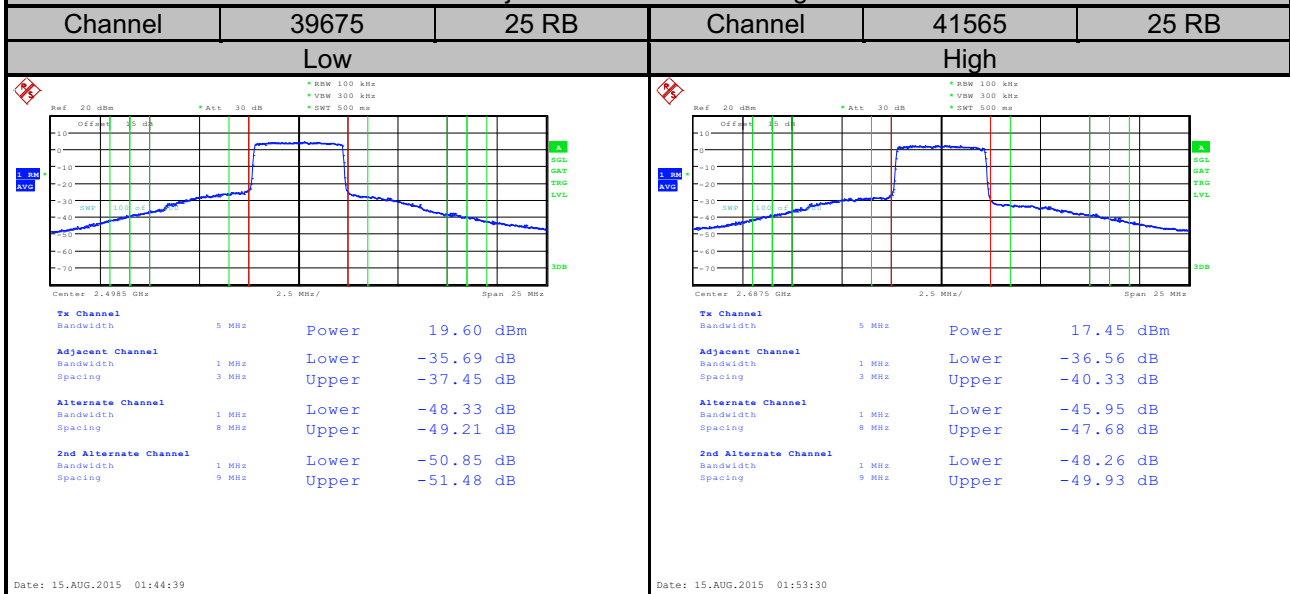


A O T

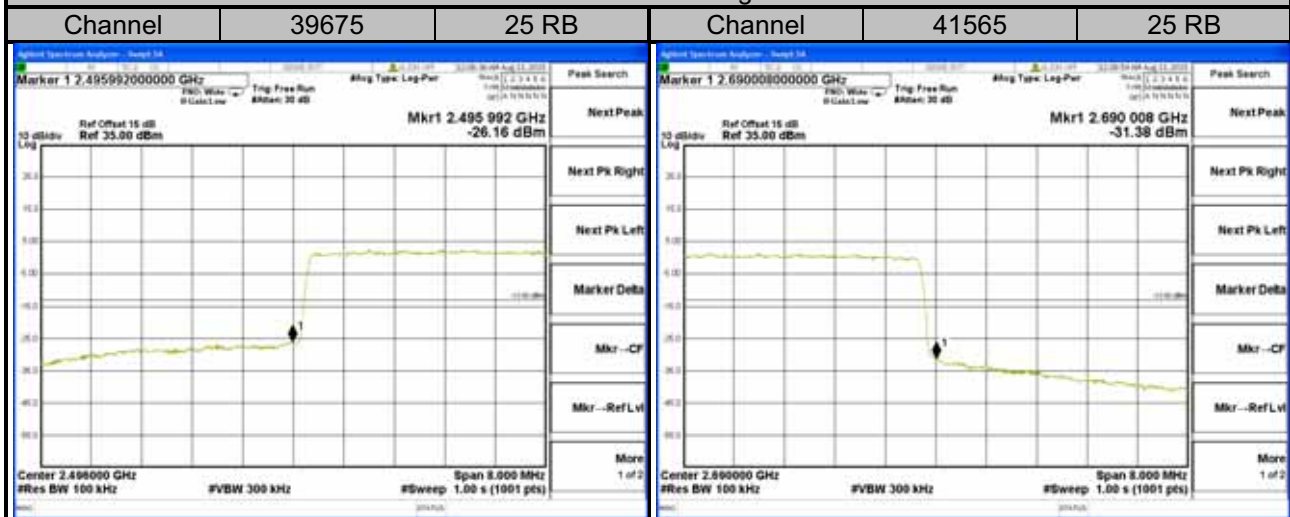
### LTE Band 41

Channel Bandwidth: 5MHz / 16QAM

<Adjacent Channel Band Edge>

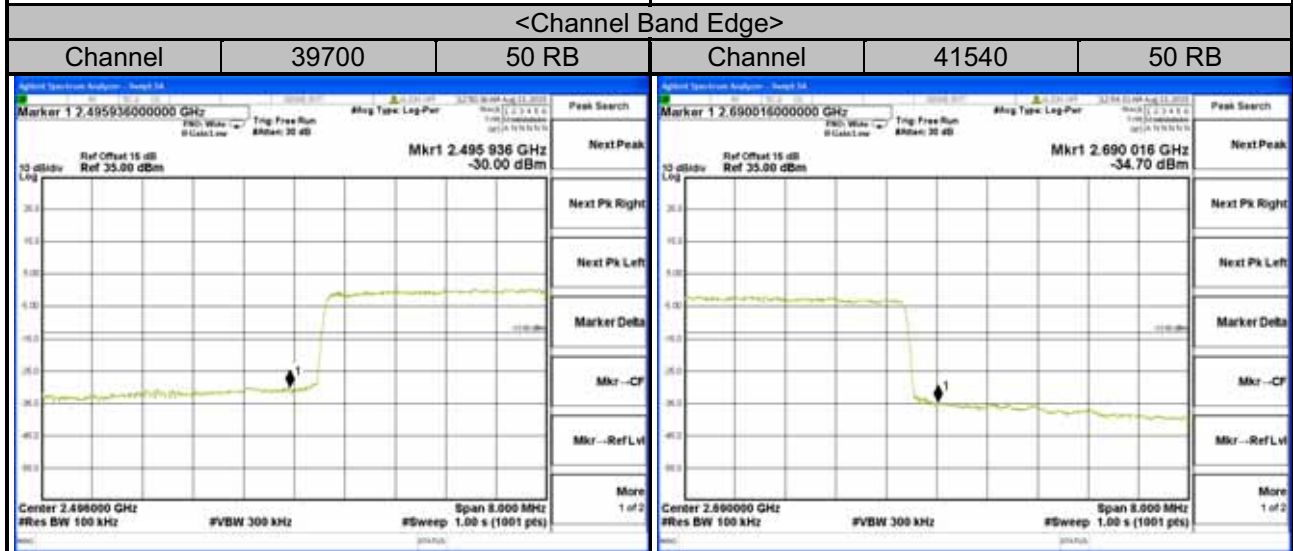
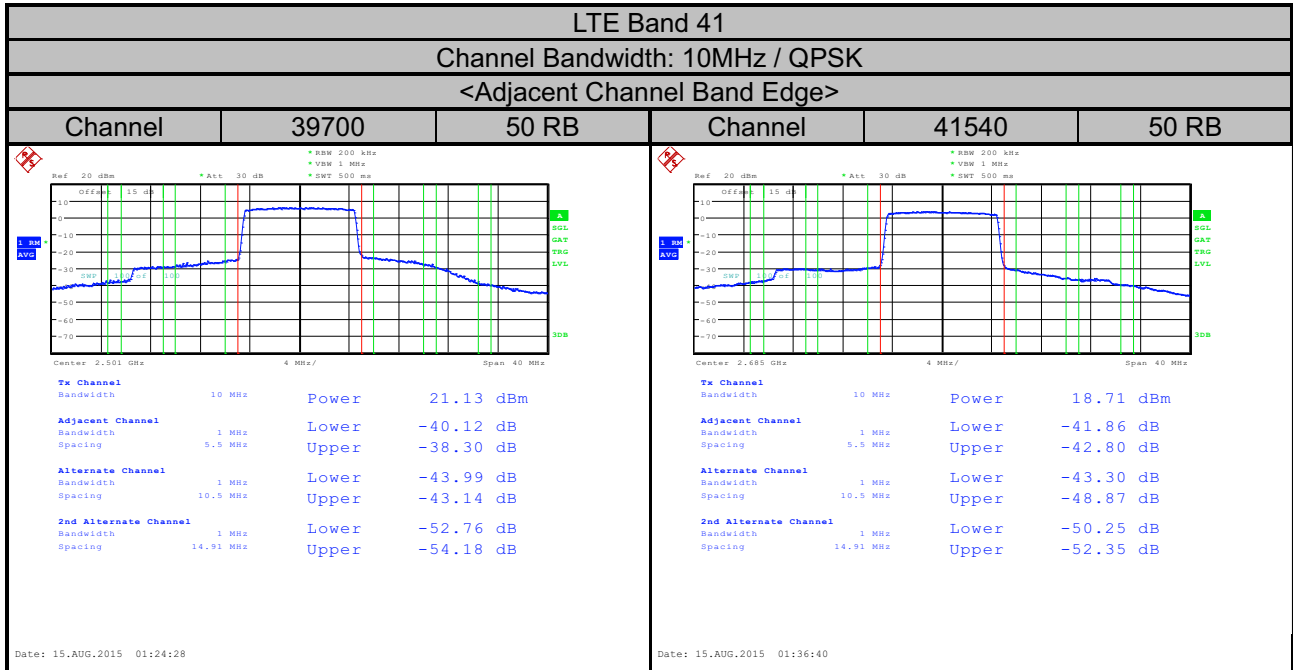


<Channel Band Edge>





A O T





Date: 15.AUG.2015 01:39:53

Center 2.498000 GHz Span 8.000 MHz  
#Res BW 100 kHz #VBW 300 kHz #Sweep 1.00 s (1001 pts)

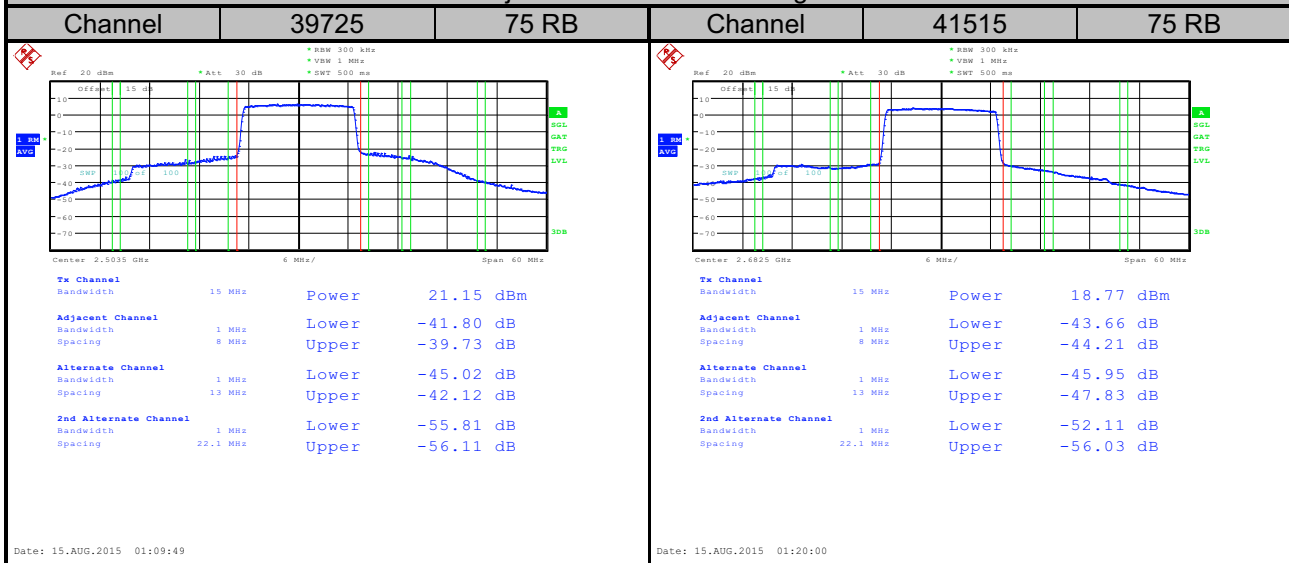


A O T

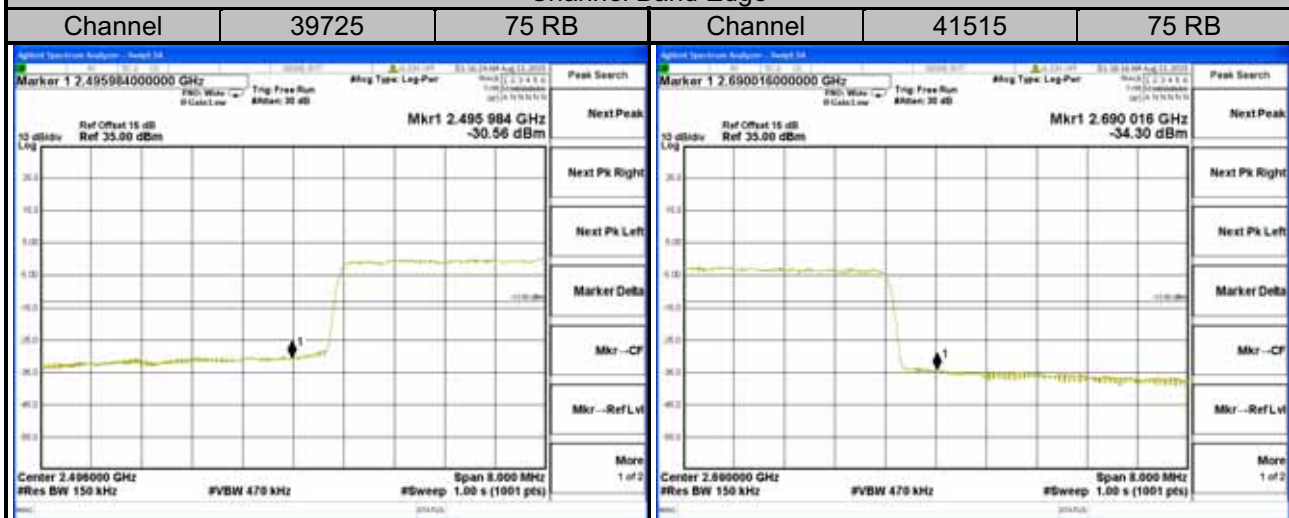
### LTE Band 41

Channel Bandwidth: 15MHz / QPSK

<Adjacent Channel Band Edge>



### <Channel Band Edge>



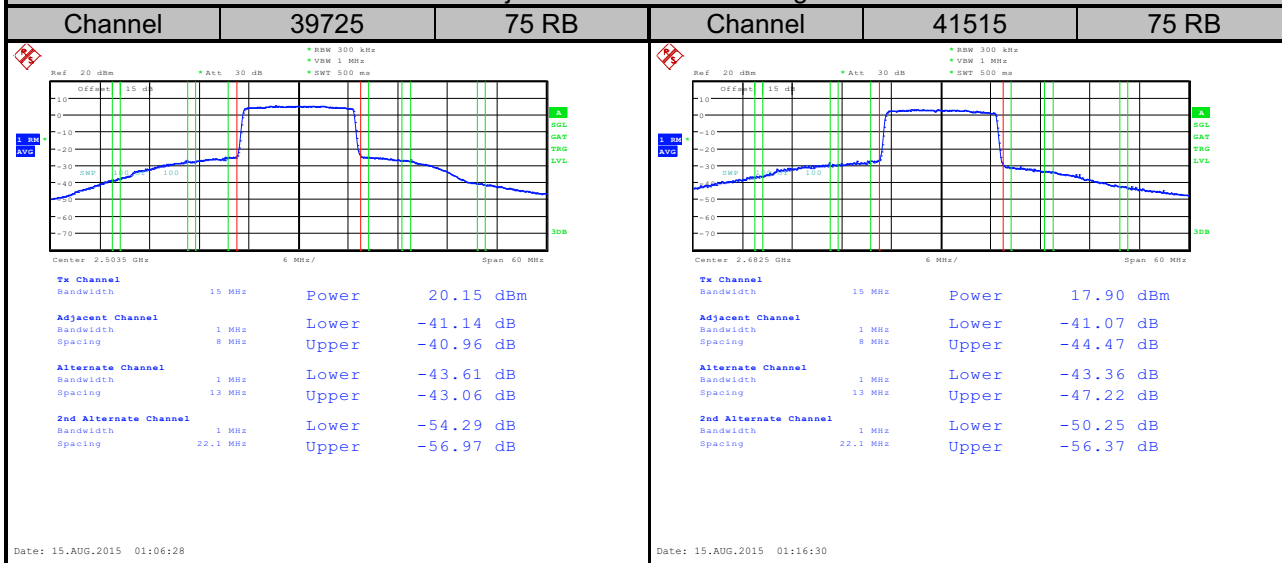


A O T

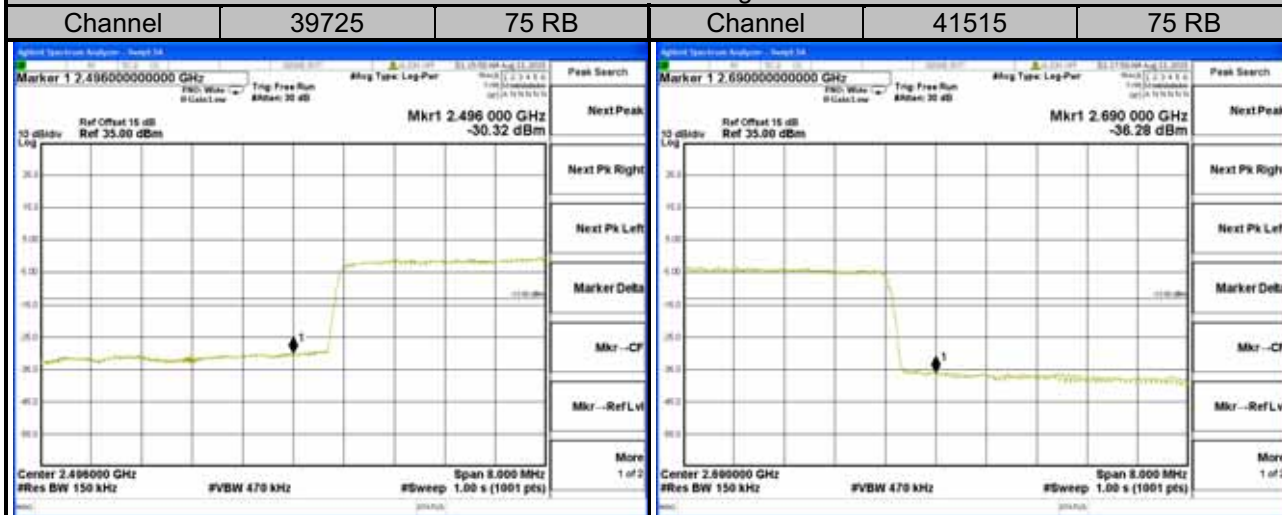
### LTE Band 41

Channel Bandwidth: 15MHz / 16QAM

<Adjacent Channel Band Edge>



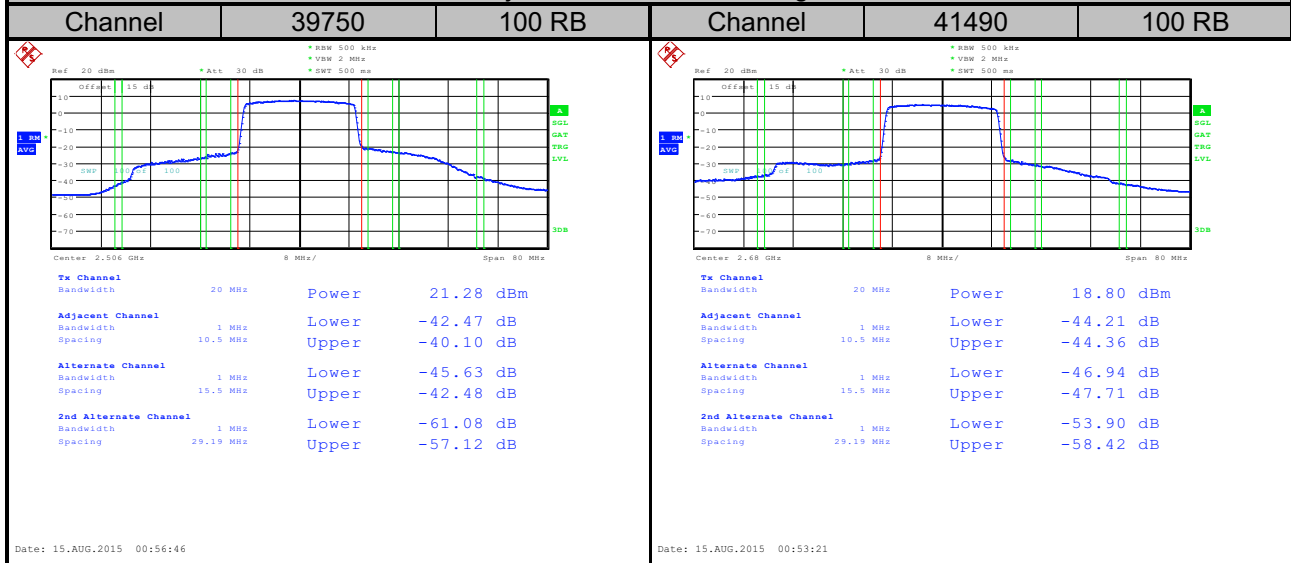
### <Channel Band Edge>



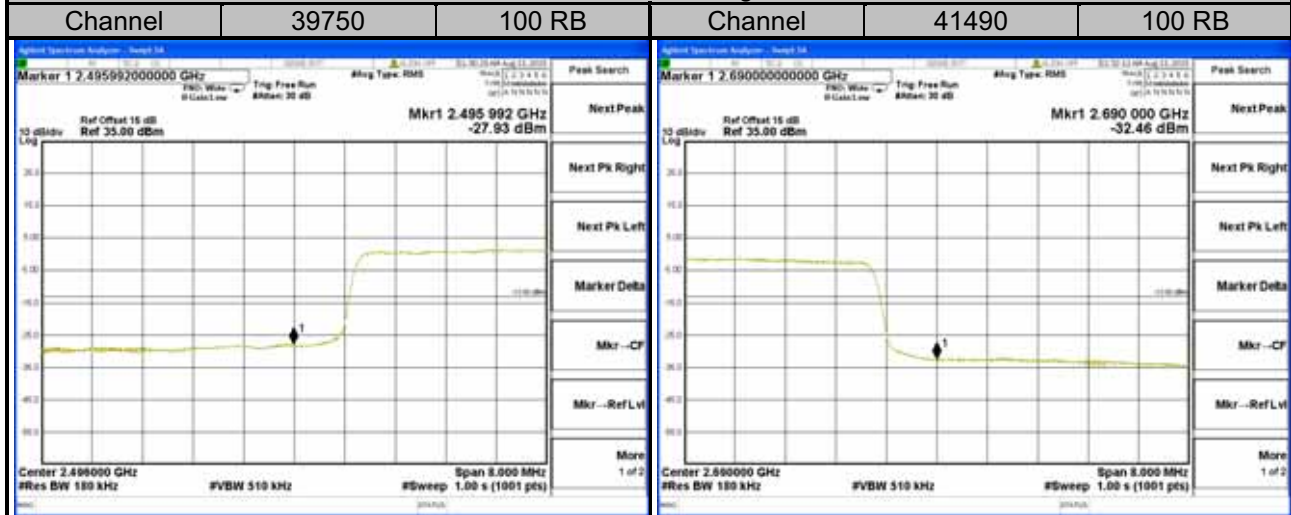


A O T

LTE Band 41  
Channel Bandwidth: 20MHz / QPSK  
<Adjacent Channel Band Edge>



<Channel Band Edge>



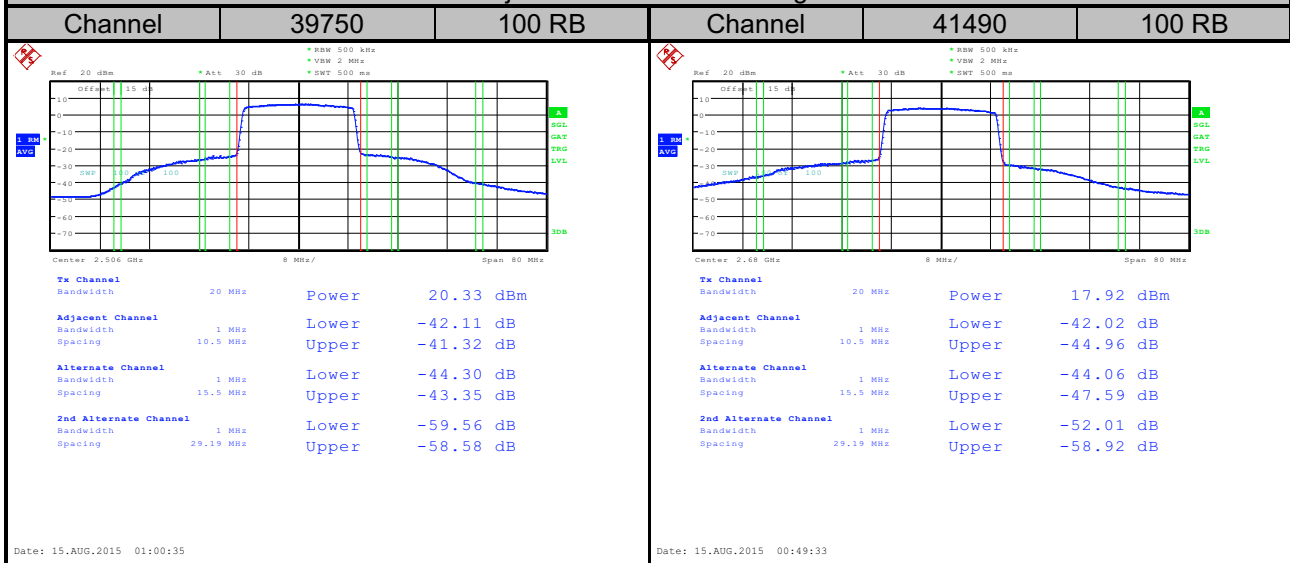


A O T

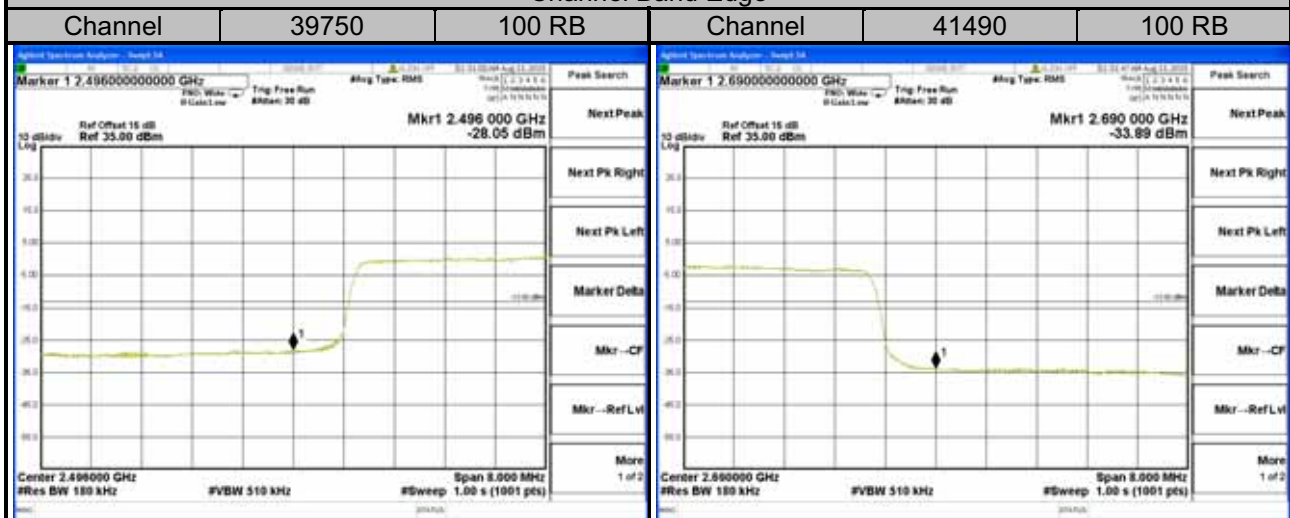
### LTE Band 41

Channel Bandwidth: 20MHz / 16QAM

<Adjacent Channel Band Edge>



### <Channel Band Edge>

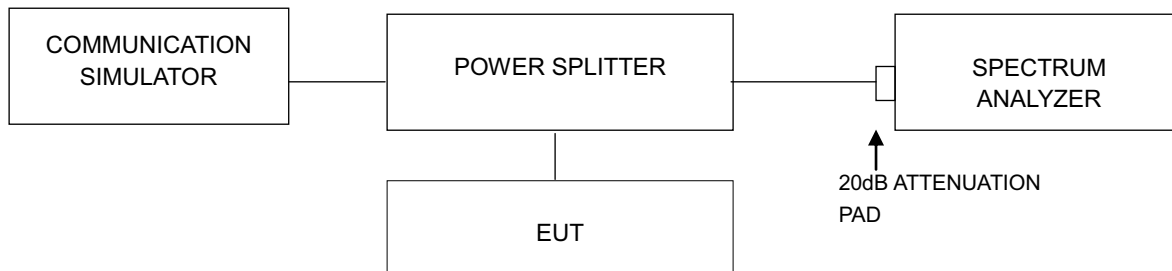


## 4.5 Peak To Average Ratio

### 4.5.1 Limits of Peak To Average Ratio Measurement

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

### 4.5.2 Test Setup

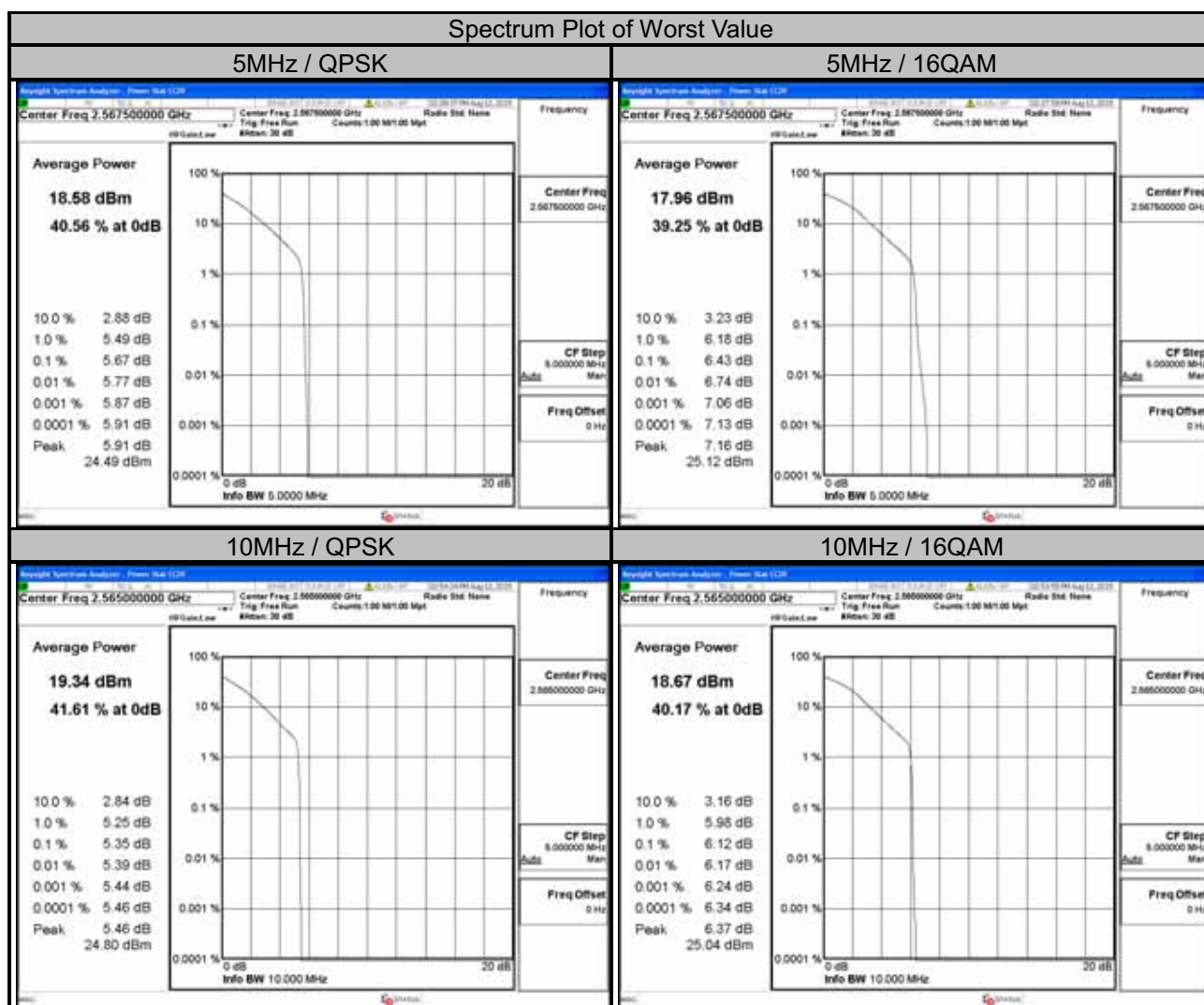


### 4.5.3 Test Procedures

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

#### 4.5.4 Test Results

| LTE Band 7              |                 |                            |       |                          |                 |                            |       |
|-------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 5MHz |                 |                            |       | Channel Bandwidth: 10MHz |                 |                            |       |
| Channel                 | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                         |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 20775                   | 2502.5          | 4.66                       | 6.05  | 20800                    | 2505.0          | 4.58                       | 5.32  |
| 21100                   | 2535.0          | 4.83                       | 6.14  | 21100                    | 2535.0          | 4.77                       | 5.49  |
| 21425                   | 2567.5          | 5.67                       | 6.43  | 21400                    | 2565.0          | 5.35                       | 6.12  |





A O T

## LTE Band 7

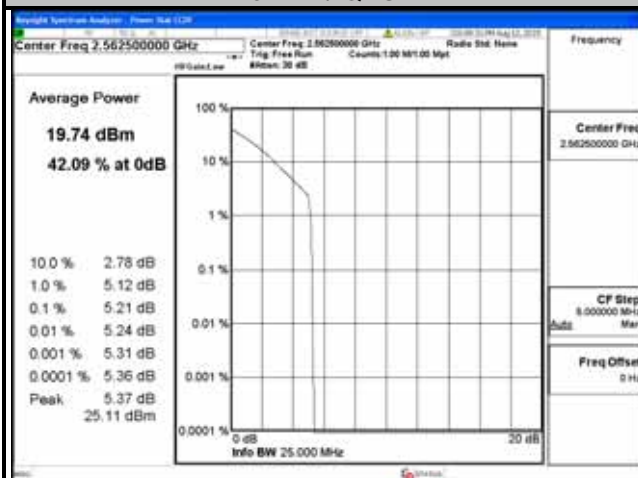
Channel Bandwidth: 15MHz

Channel Bandwidth: 20MHz

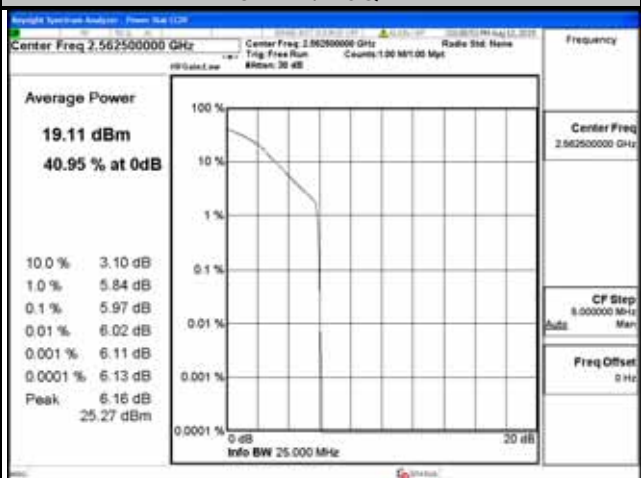
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|---------|-----------------|----------------------------|-------|---------|-----------------|----------------------------|-------|
|         |                 | QPSK                       | 16QAM |         |                 | QPSK                       | 16QAM |
| 20825   | 2507.5          | 4.60                       | 5.32  | 20850   | 2510.0          | 4.86                       | 5.88  |
| 21100   | 2535.0          | 4.72                       | 5.89  | 21100   | 2535.0          | 4.89                       | 5.61  |
| 21375   | 2562.5          | 5.21                       | 5.97  | 21350   | 2560.0          | 5.34                       | 6.43  |

## Spectrum Plot of Worst Value

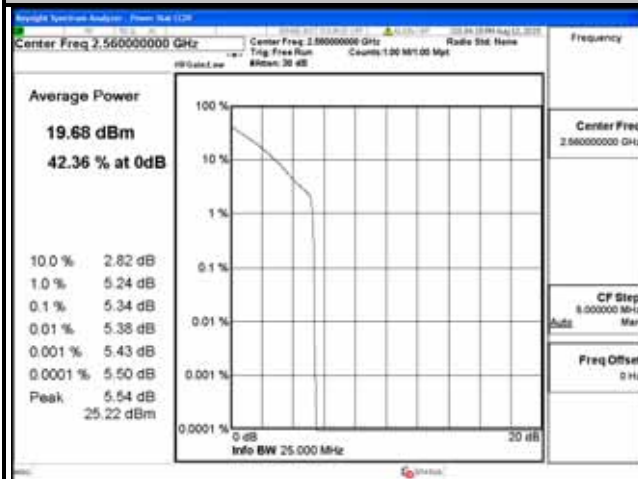
15MHz / QPSK



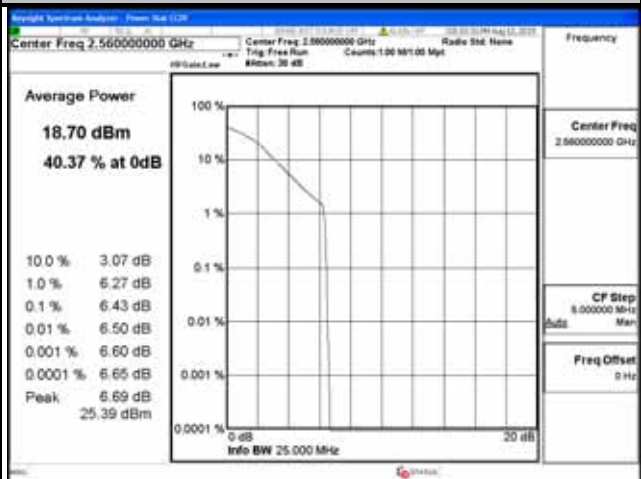
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

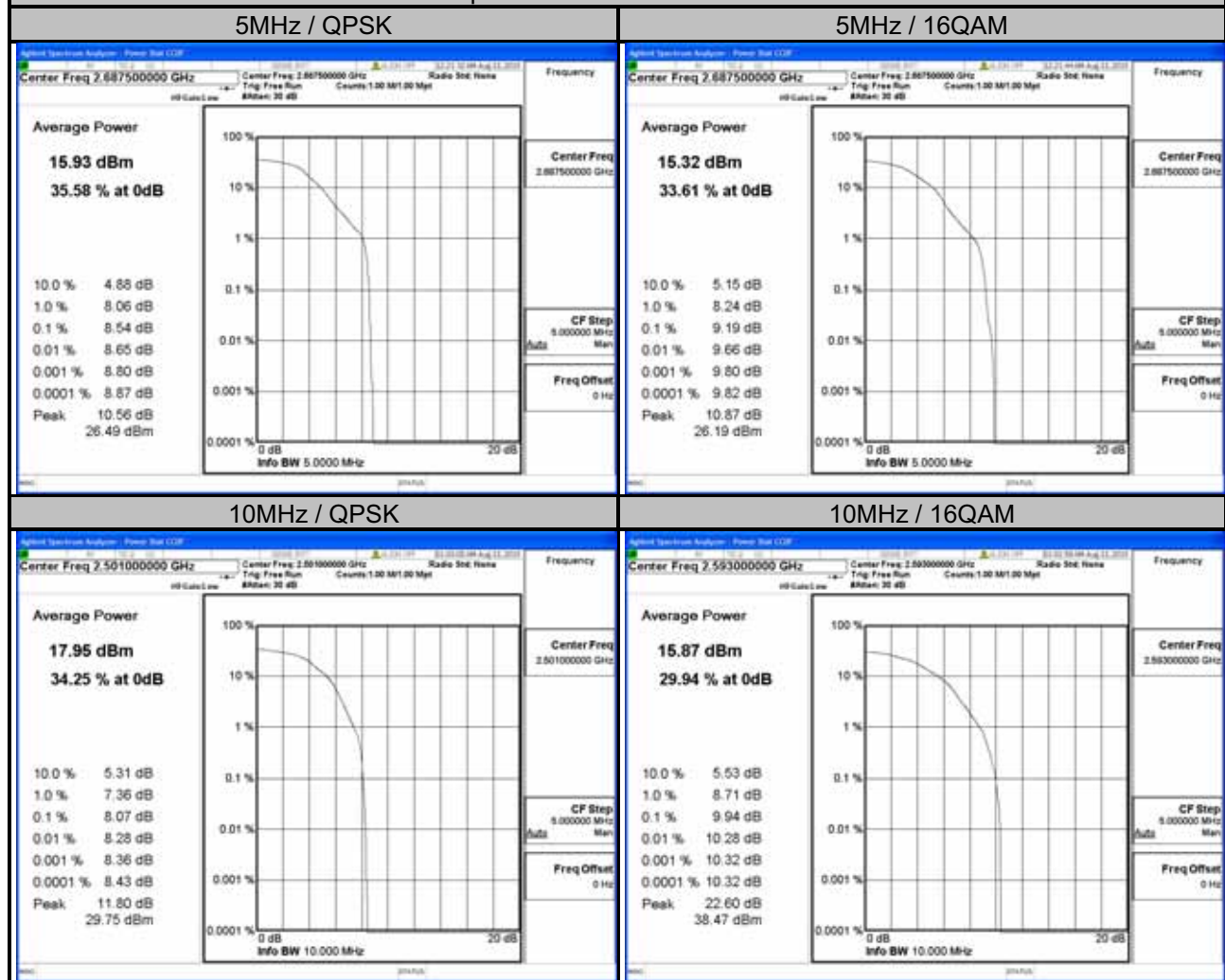




## LTE Band 41

| Channel Bandwidth: 5MHz |                 |                            |       | Channel Bandwidth: 10MHz |                 |                            |       |
|-------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel                 | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                         |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 39675                   | 2498.5          | 7.91                       | 9.19  | 39700                    | 2501.0          | 8.07                       | 9.35  |
| 40620                   | 2593.0          | 8.34                       | 9.14  | 40620                    | 2593.0          | 7.84                       | 9.94  |
| 41565                   | 2687.5          | 8.54                       | 9.19  | 41540                    | 2685.0          | 7.94                       | 9.26  |

## Spectrum Plot of Worst Value





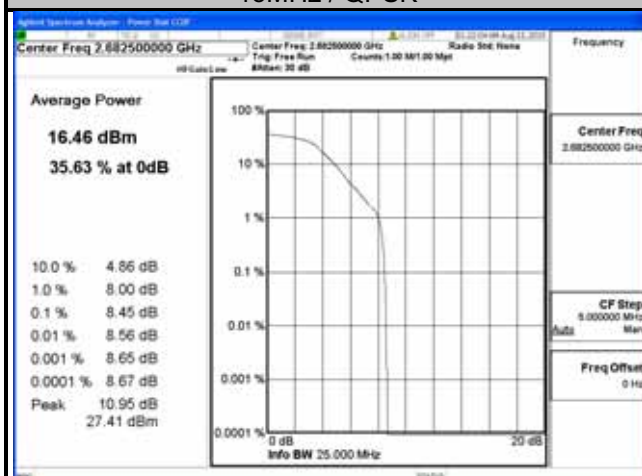
A O T

## LTE Band 41

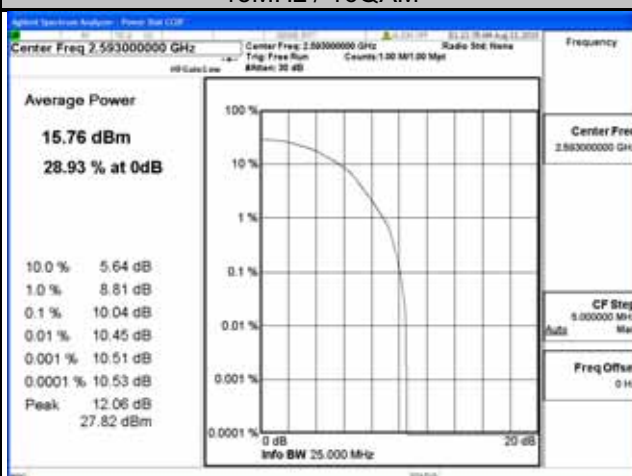
| Channel Bandwidth: 15MHz |                 |                            |       | Channel Bandwidth: 20MHz |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                          |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 39725                    | 2503.5          | 6.51                       | 8.75  | 39750                    | 2506.0          | 8.68                       | 9.07  |
| 40620                    | 2593.0          | 8.11                       | 10.04 | 40620                    | 2593.0          | 6.95                       | 7.83  |
| 41515                    | 2682.5          | 8.45                       | 9.98  | 41490                    | 2680.0          | 8.89                       | 9.59  |

## Spectrum Plot of Worst Value

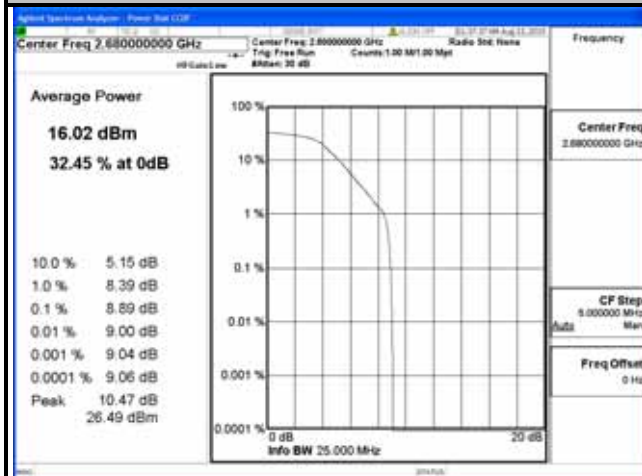
## 15MHz / QPSK



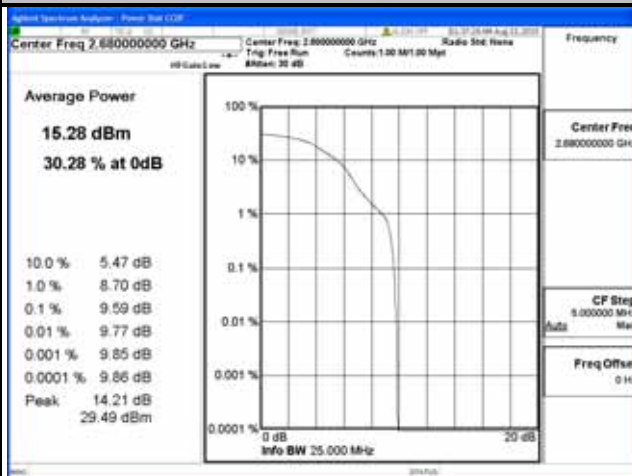
## 15MHz / 16QAM



## 20MHz / QPSK



## 20MHz / 16QAM

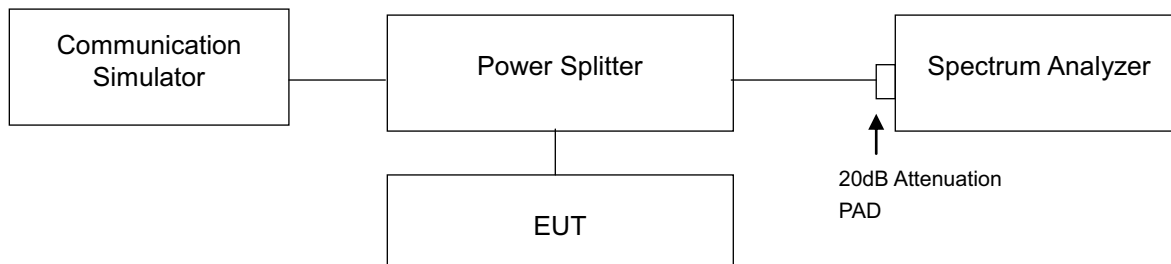


## 4.6 Conducted Spurious Emissions

### 4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $55 + 10 \log_{10}(P)$  dB. The limit of emission is equal to -25dBm.

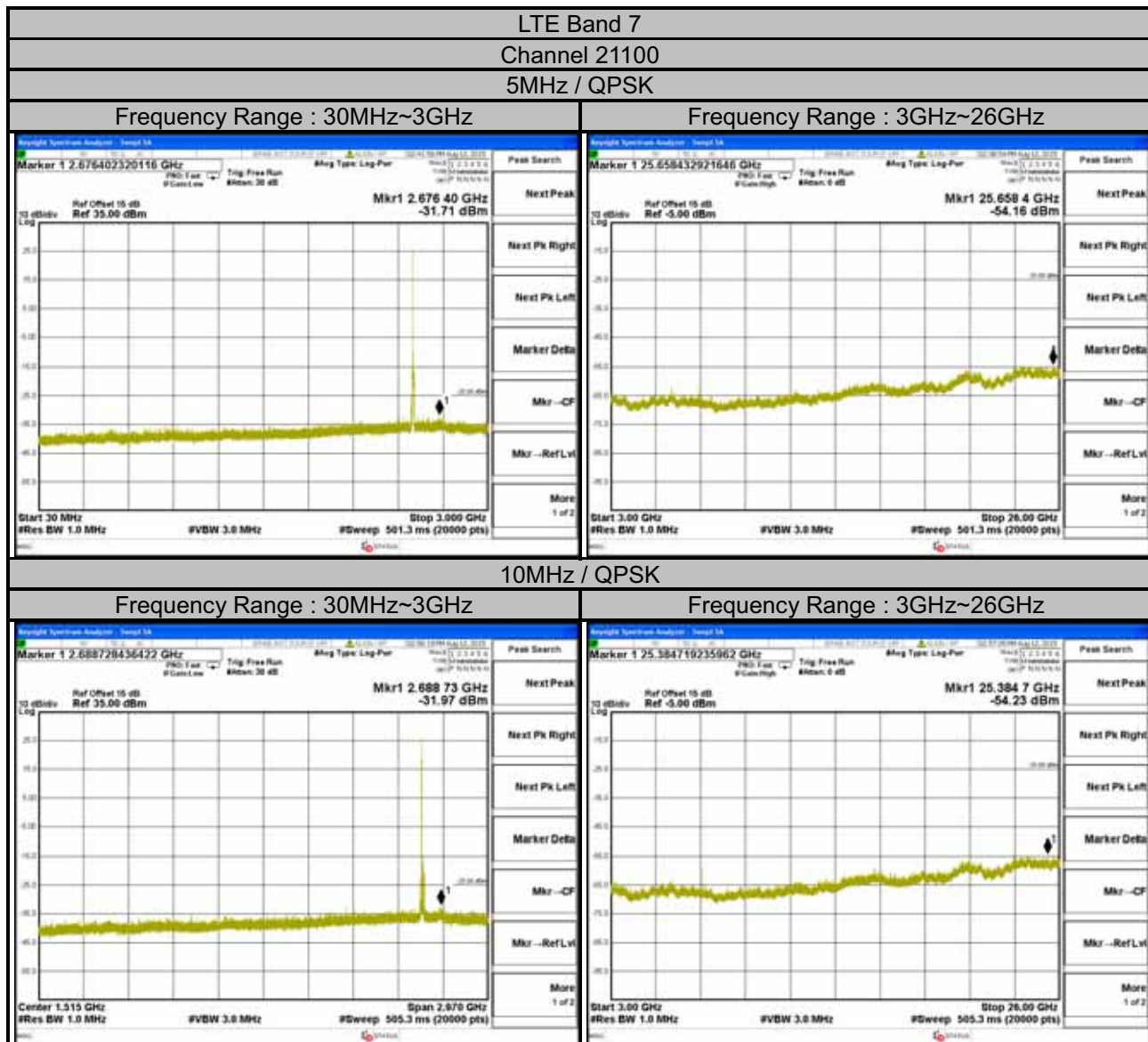
### 4.6.2 Test Setup



### 4.6.3 Test Procedure

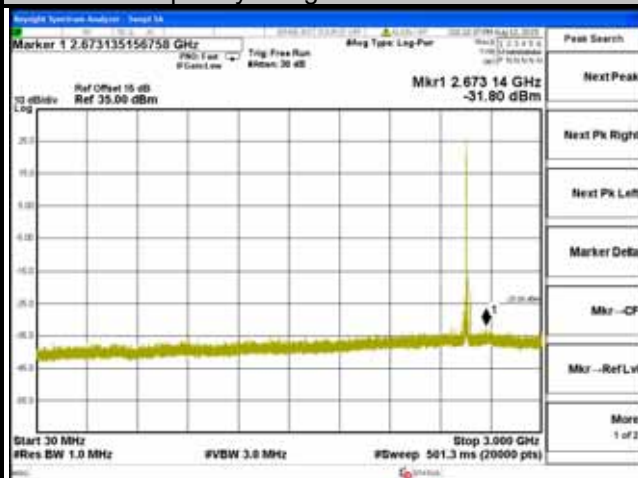
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 30 MHz to 26GHz for LTE Band 7 and from 30MHz to 27GHz for LTE Band 41. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

#### 4.6.4 Test Results



## 15MHz / QPSK

Frequency Range : 30MHz~3GHz

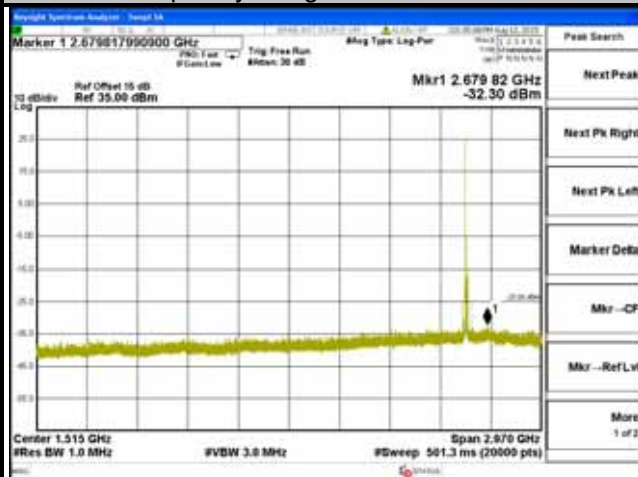


Frequency Range : 3GHz~26GHz



## 20MHz / QPSK

Frequency Range : 30MHz~3GHz



Frequency Range : 3GHz~26GHz





A O T

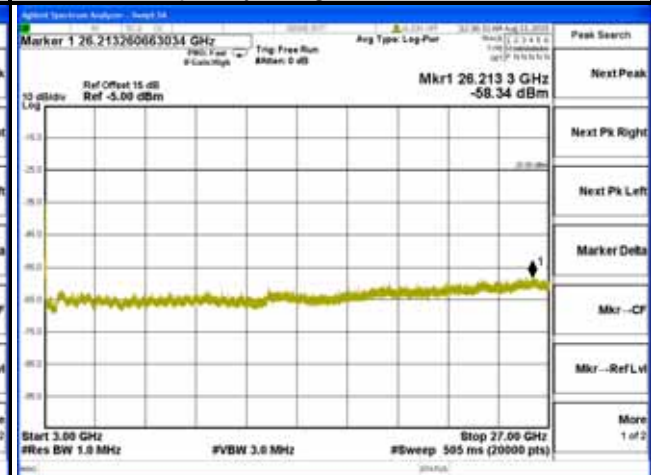
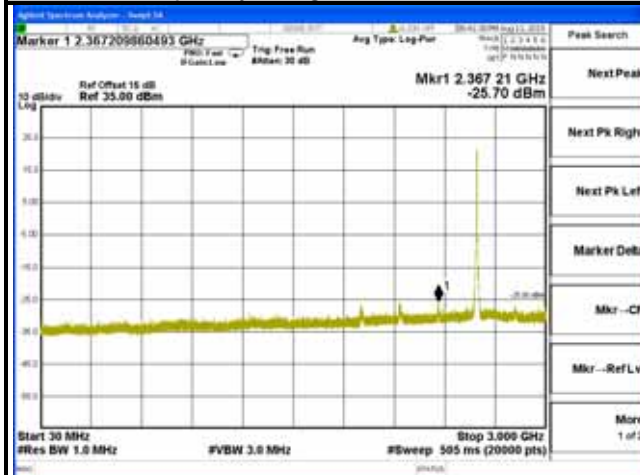
LTE Band 41

Channel 40620

5MHz / QPSK

Frequency Range : 30MHz~3GHz

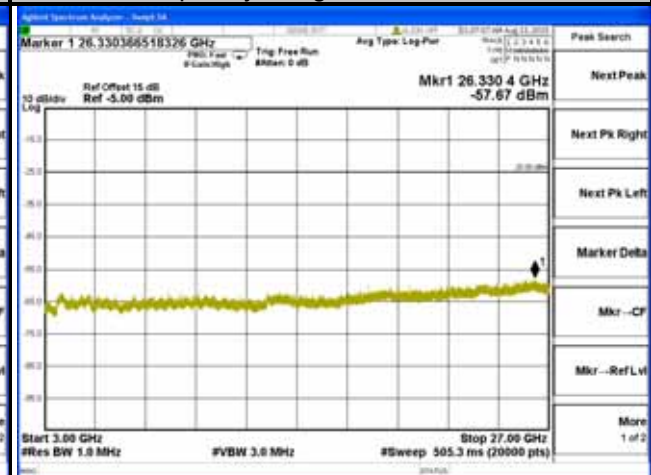
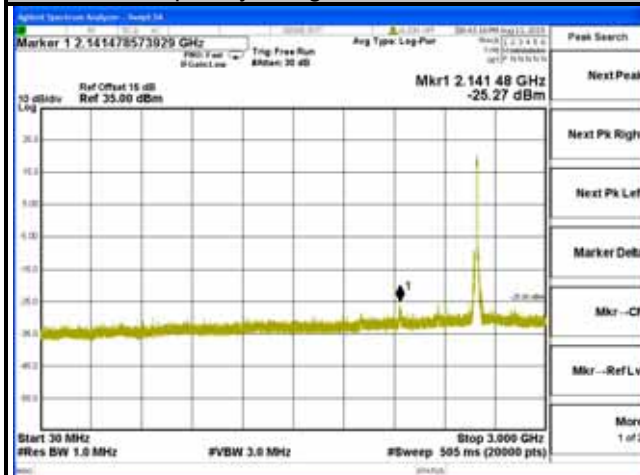
Frequency Range : 3GHz~27GHz



10MHz / QPSK

Frequency Range : 30MHz~3GHz

Frequency Range : 3GHz~27GHz





A O T

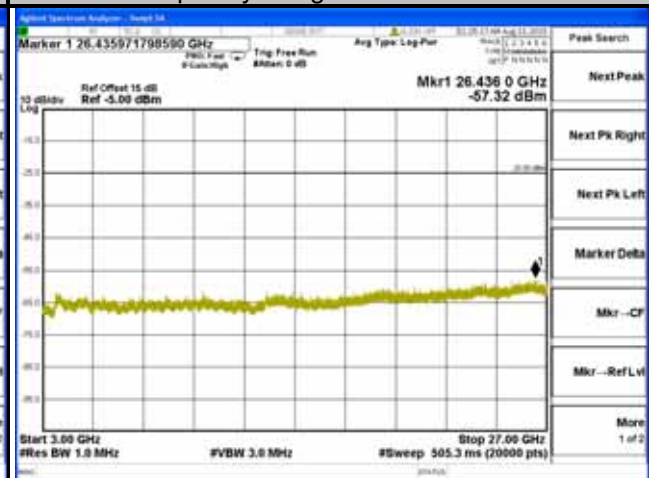
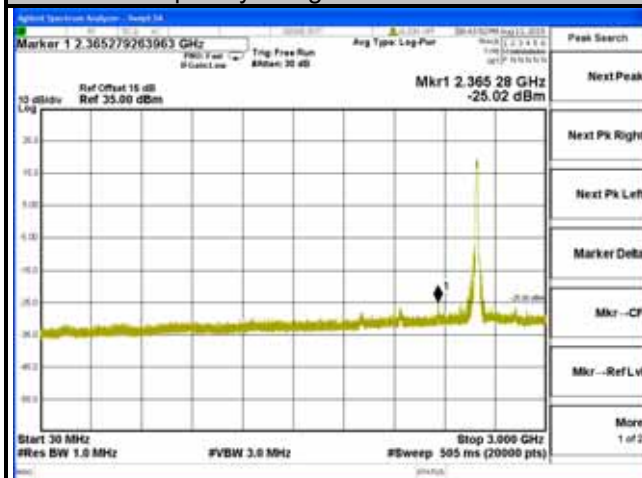
LTE Band 41

Channel 40620

15MHz / QPSK

Frequency Range : 30MHz~3GHz

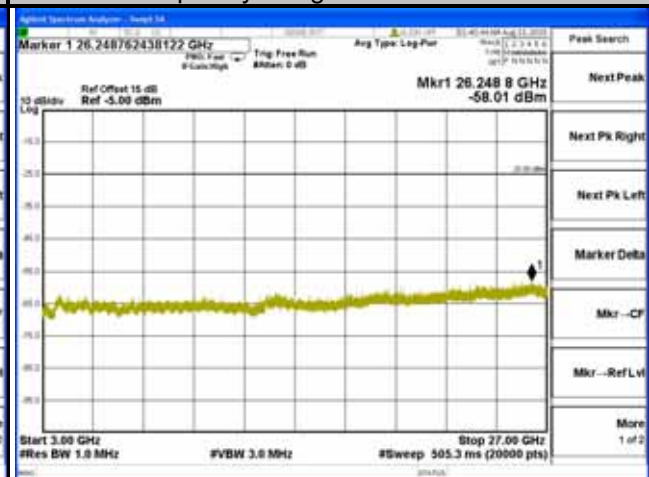
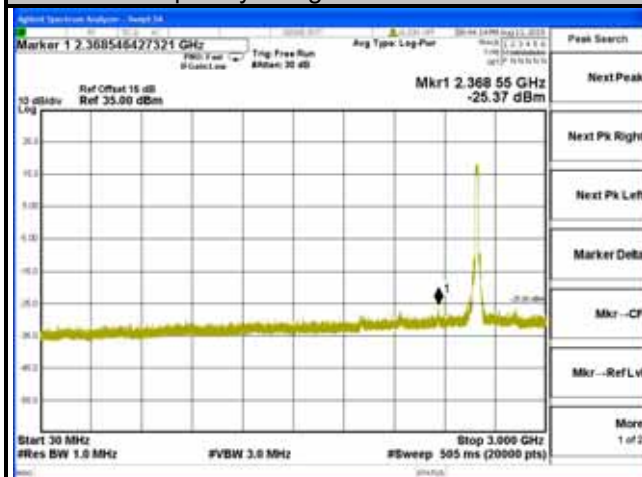
Frequency Range : 3GHz~27GHz



20MHz / QPSK

Frequency Range : 30MHz~3GHz

Frequency Range : 3GHz~27GHz



## 4.7 Radiated Emission Measurement

### 4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $55 + 10 \log_{10}(P)$  dB. The limit of emission equal to -25dBm.

### 4.7.2 Test Procedure

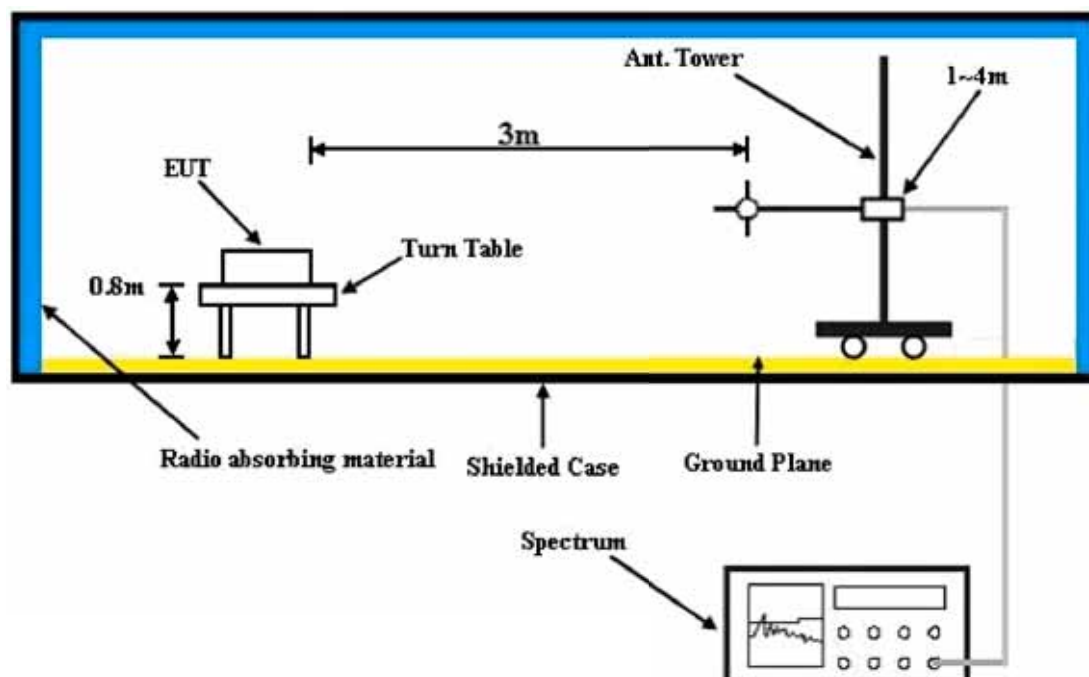
- Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from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

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

### 4.7.3 Deviation from Test Standard

No deviation.

### 4.7.4 Test Setup



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

# 4.7.5 Test Results

LTE Band 7

Channel Bandwidth: 20MHz / QPSK

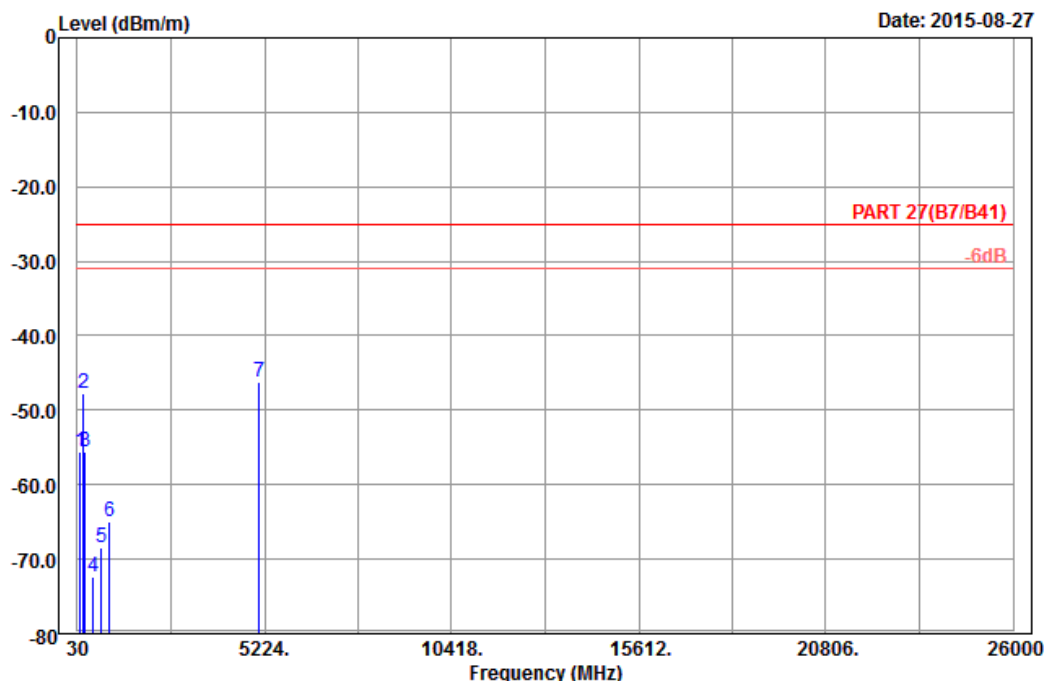


Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 13

Date: 2015-08-27



Site : 966 chamber 1  
Condition: PART 27(B7/B41) 3m Horizontal  
Remark : LTE\_Band 7\_QPSK(1,50)\_20M\_CH21100  
Tested by: Charles Hsiao  
Plane : Y

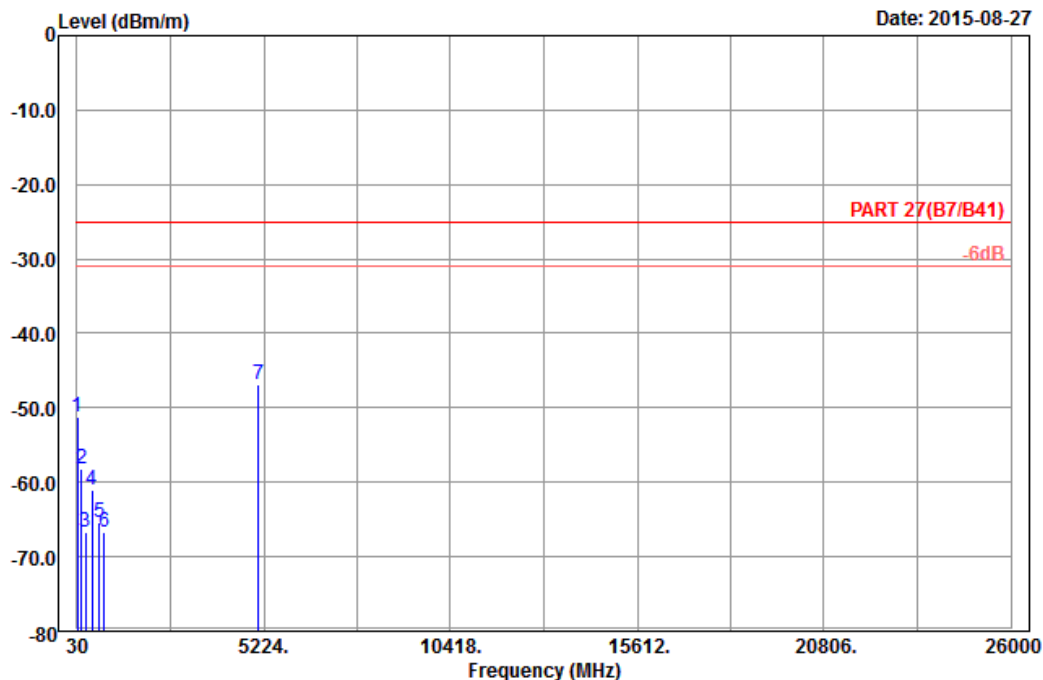
|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 101.55  | -55.61 | -45.72     | -25.00     | -30.61     | -9.89  | Peak   |
| 2    | 192.27  | -47.77 | -41.95     | -25.00     | -22.77     | -5.82  | Peak   |
| 3    | 240.33  | -55.54 | -49.90     | -25.00     | -30.54     | -5.64  | Peak   |
| 4    | 465.90  | -72.31 | -68.02     | -25.00     | -47.31     | -4.29  | Peak   |
| 5    | 688.50  | -68.43 | -68.11     | -25.00     | -43.43     | -0.32  | Peak   |
| 6    | 920.20  | -64.97 | -68.77     | -25.00     | -39.97     | 3.80   | Peak   |
| 7 pp | 5070.00 | -46.27 | -65.66     | -25.00     | -21.27     | 19.39  | Peak   |



# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 14



Site : 966 chamber 1  
Condition: PART 27(B7/B41) 3m Vertical  
Remark : LTE\_Band 7\_QPSK(1,50)\_20M\_CH21100  
Tested by: Charles Hsiao  
Plane : Y

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 47.55   | -51.15 | -38.04     | -25.00     | -26.15     | -13.11 | Peak   |
| 2    | 154.20  | -58.26 | -50.42     | -25.00     | -33.26     | -7.84  | Peak   |
| 3    | 258.15  | -66.75 | -61.17     | -25.00     | -41.75     | -5.58  | Peak   |
| 4    | 454.00  | -61.14 | -57.18     | -25.00     | -36.14     | -3.96  | Peak   |
| 5    | 649.30  | -65.33 | -65.21     | -25.00     | -40.33     | -0.12  | Peak   |
| 6    | 776.00  | -66.75 | -67.16     | -25.00     | -41.75     | 0.41   | Peak   |
| 7 pp | 5070.00 | -46.96 | -66.35     | -25.00     | -21.96     | 19.39  | Peak   |

LTE Band 41

Channel Bandwidth: 20MHz / QPSK

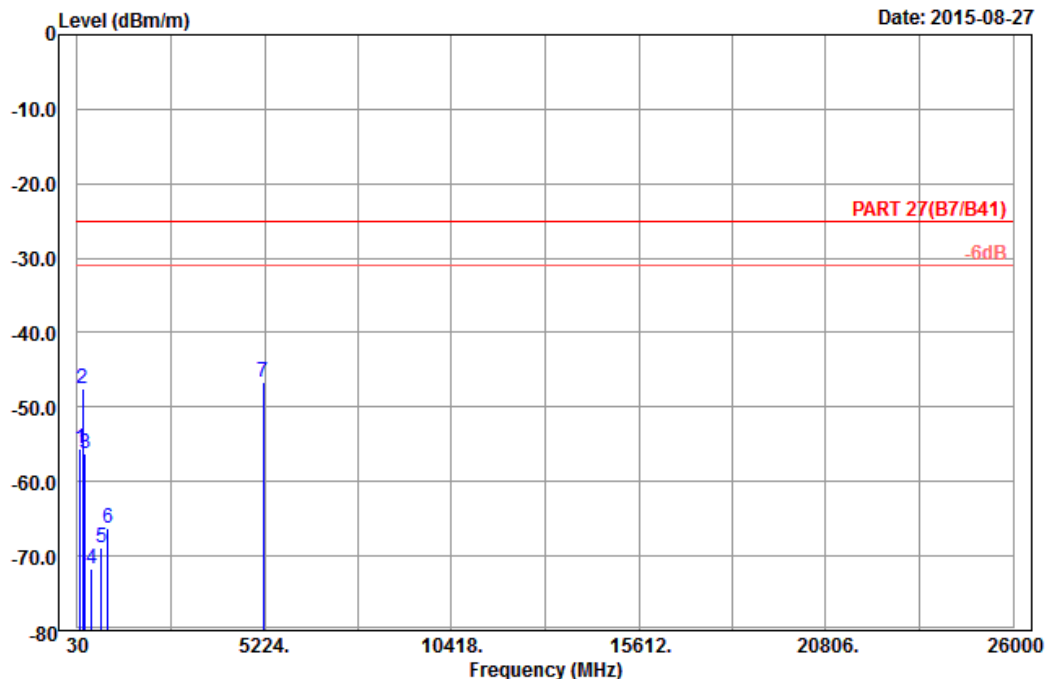


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13

Date: 2015-08-27



Site : 966 chamber 1

Condition: PART 27(B7/B41) 3m Horizontal

Remark : LTE\_Band 41\_QPSK(1,50)\_20M\_CH40620

Tested by: Charles Hsiao

Plane : X

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 101.01  | -55.49 | -45.49     | -25.00     | -30.49     | -10.00 | Peak   |
| 2    | 181.20  | -47.41 | -41.82     | -25.00     | -22.41     | -5.59  | Peak   |
| 3    | 247.35  | -56.25 | -50.70     | -25.00     | -31.25     | -5.55  | Peak   |
| 4    | 420.40  | -71.69 | -68.50     | -25.00     | -46.69     | -3.19  | Peak   |
| 5    | 694.80  | -68.78 | -68.43     | -25.00     | -43.78     | -0.35  | Peak   |
| 6    | 888.00  | -66.18 | -68.73     | -25.00     | -41.18     | 2.55   | Peak   |
| 7 pp | 5186.00 | -46.55 | -66.67     | -25.00     | -21.55     | 20.12  | Peak   |

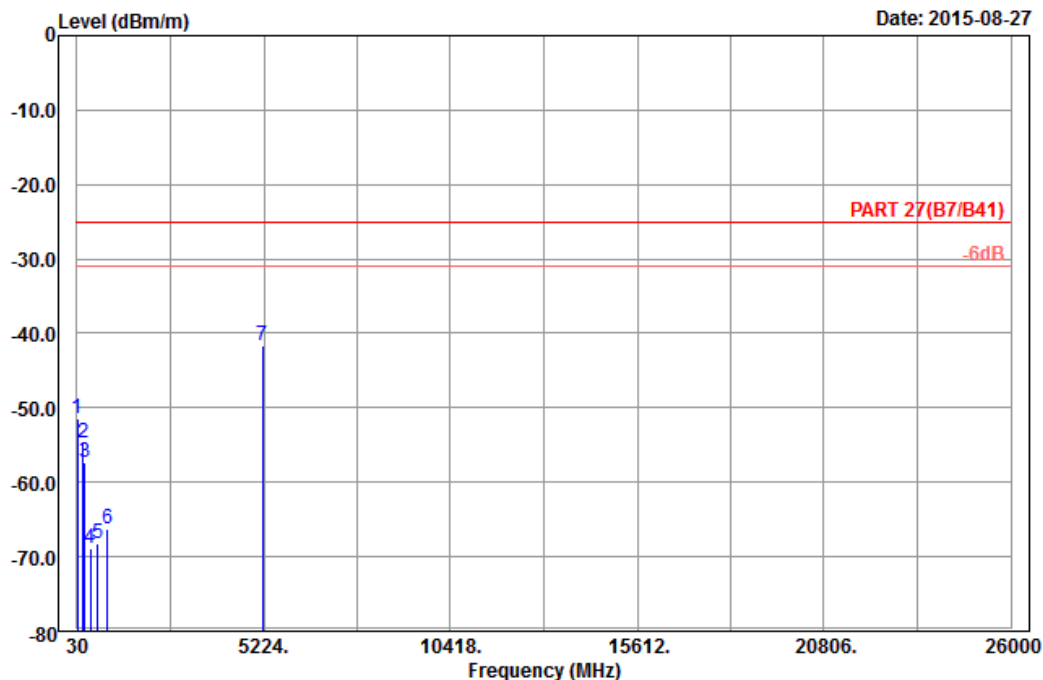


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 14

Date: 2015-08-27



Site : 966 chamber 1  
Condition: PART 27(B7/B41) 3m Vertical  
Remark : LTE\_Band 41\_QPSK(1,50)\_20M\_CH40620  
Tested by: Charles Hsiao  
Plane : X

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 47.55   | -51.46 | -38.35     | -25.00     | -26.46     | -13.11 | Peak   |
| 2    | 191.46  | -54.62 | -48.84     | -25.00     | -29.62     | -5.78  | Peak   |
| 3    | 251.13  | -57.31 | -51.79     | -25.00     | -32.31     | -5.52  | Peak   |
| 4    | 411.30  | -68.94 | -65.94     | -25.00     | -43.94     | -3.00  | Peak   |
| 5    | 605.20  | -68.13 | -68.50     | -25.00     | -43.13     | 0.37   | Peak   |
| 6    | 882.40  | -66.33 | -68.72     | -25.00     | -41.33     | 2.39   | Peak   |
| 7 pp | 5186.00 | -41.56 | -61.68     | -25.00     | -16.56     | 20.12  | Peak   |

## 5 Pictures of Test Arrangements

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

## Appendix – Information on the Testing Laboratories

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

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

**Linko EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

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

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety**

Tel: 886-3-3183232

Fax: 886-3-3270892

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

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

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

--- END ---