



# FCC RF Test Report

**APPLICANT** : Motorola Mobility LLC  
**EQUIPMENT** : Mobile Cellular Phone  
**BRAND NAME** : Motorola  
**MODEL NAME** : XT1921-5, XT1921-3  
**FCC ID** : IHDT56XC2  
**STANDARD** : 47 CFR Part 2, 27  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)

This is partial report. The product was received on Dec. 20, 2017 and completely tested on Mar. 08, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

This report contains data that were produced under subcontract by Laboratory SPORTON INTERNATIONAL INC.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Approved by: James Huang / Manager

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FCC ID: IHDT56XC2

Page Number : 1 of 23

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## REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION                                                                             | ISSUED DATE   |
|------------|---------|-----------------------------------------------------------------------------------------|---------------|
| FG7D2018E  | Rev. 01 | Initial issue of report                                                                 | Mar. 09, 2018 |
| FG7D2018E  | Rev. 02 | Revising emission designator information for LTE Band 41 and Band 41 CA in section 1.6. | Mar. 13, 2018 |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |
|            |         |                                                                                         |               |



## SUMMARY OF TEST RESULT

| Report Section | FCC Rule                | Description                                   | Limit                                 | Result | Remark                                     |
|----------------|-------------------------|-----------------------------------------------|---------------------------------------|--------|--------------------------------------------|
| 3.4            | §2.1046                 | Conducted Output Power                        | Reporting Only                        | PASS   | -                                          |
|                | §27.50(h)(2)            | Equivalent Isotropic Radiated Power (Band 41) | EIRP < 2Watt                          |        |                                            |
| 3.5            | N/A                     | Peak-to-Average Ratio                         | <13 dB                                | PASS   | -                                          |
| 3.6            | §2.1049                 | Occupied Bandwidth                            | Reporting Only                        | PASS   | -                                          |
| 3.7            | §27.53(m)(4)            | Conducted Band Edge Measurement (Band 41)     | §27.53(m)(4)                          | PASS   | -                                          |
| 3.8            | §2.1051<br>§27.53(m)(4) | Conducted Spurious Emission (Band 41)         | $< 55 + 10\log_{10}(P[\text{Watts}])$ | PASS   | -                                          |
| 3.9            | §2.1055<br>§27.54       | Frequency Stability<br>Temperature & Voltage  | Within Authorized Band                | PASS   | -                                          |
| 4.4            | §2.1053<br>§27.53(m)(4) | Radiated Spurious Emission (Band 41)          | $< 55 + 10\log_{10}(P[\text{Watts}])$ | PASS   | Under limit<br>28.88 dB at<br>8012.000 MHz |



# 1 General Description

## 1.1 Applicant

Motorola Mobility LLC

222 W. Merchandise Mart Plaza, Chicago IL 60654, USA

## 1.2 Manufacturer

Motorola Mobility LLC

222 W. Merchandise Mart Plaza, Chicago IL 60654, USA

## 1.3 Product Feature of Equipment Under Test

| Product Feature                 |                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Equipment                       | Mobile Cellular Phone                                                                                           |
| Brand Name                      | Motorola                                                                                                        |
| Model Name                      | XT1921-5, XT1921-3                                                                                              |
| FCC ID                          | IHDT56XC2                                                                                                       |
| IMEI Code                       | 351841090026461 (for Radiation)<br>990005440087469 (for Conducted)                                              |
| EUT supports Radios application | CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/FM/GNSS<br>WLAN 11b/g/n HT20<br>WLAN 11a/n HT20/HT40<br>Bluetooth BR/EDR/LE |
| HW Version                      | DVT1B                                                                                                           |
| EUT Stage                       | Identical Prototype                                                                                             |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

| Accessory List |                                          |
|----------------|------------------------------------------|
| AC Adapter 1   | Brand Name : Motorola                    |
|                | Model Name : C-P35                       |
| AC Adapter 2   | Brand Name : Motorola                    |
|                | Model Name : SSW-2919UMTJ C-P35 SPN5945A |
| AC Adapter 3   | Brand Name : Motorola                    |
|                | Model Name : C-P56                       |
| AC Adapter 4   | Brand Name : Motorola                    |
|                | Model Name : C-P56                       |
| Battery        | Brand Name : Motorola                    |
|                | Model Name : GK40                        |
| USB Cable      | Brand Name : Saibao                      |
|                | Model Name : SWT-A083A                   |

## 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification |                                              |
|-----------------------------------------|----------------------------------------------|
| <b>Tx Frequency</b>                     | LTE Band 41: 2498.5 MHz ~ 2687.5 MHz         |
| <b>Rx Frequency</b>                     | LTE Band 41: 2498.5 MHz ~ 2687.5 MHz         |
| <b>Bandwidth</b>                        | LTE Band 41: 5MHz / 10MHz / 15MHz / 20MHz    |
| <b>Maximum Output Power to Antenna</b>  | LTE Band 41 : 24.48 dBm                      |
| <b>Antenna Gain</b>                     | LTE Band 41 : 1.45 dBi                       |
| <b>Antenna Type</b>                     | PIFA Antenna and Coupling Type (LDS) Antenna |
| <b>Type of Modulation</b>               | QPSK / 16QAM / 64QAM                         |

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Emission Designator

| LTE Band 41 |                       | QPSK                         |                           |                 | 16QAM                        |                           |                 | 64QAM                        |                           |                 |
|-------------|-----------------------|------------------------------|---------------------------|-----------------|------------------------------|---------------------------|-----------------|------------------------------|---------------------------|-----------------|
| BW (MHz)    | Frequency Range (MHz) | Emission Designator (99%OBW) | Frequency Tolerance (ppm) | Maximum EIRP(W) | Emission Designator (99%OBW) | Frequency Tolerance (ppm) | Maximum EIRP(W) | Emission Designator (99%OBW) | Frequency Tolerance (ppm) | Maximum EIRP(W) |
| 5           | 2498.5 ~ 2687.5       | 4M49G7D                      | -                         | 0.3707          | 4M50W7D                      | -                         | 0.3206          | 4M50W7D                      | -                         | 0.2564          |
| 10          | 2501.0 ~ 2685.0       | 9M03G7D                      | 0.0022                    | 0.3917          | 9M05W7D                      | -                         | 0.3184          | 9M05W7D                      | -                         | 0.2594          |
| 15          | 2503.5 ~ 2682.5       | 13M5G7D                      | -                         | 0.3758          | 13M4W7D                      | -                         | 0.3184          | 13M5W7D                      | -                         | 0.2500          |
| 20          | 2506.0 ~ 2680.0       | 18M5G7D                      | -                         | 0.3837          | 18M3W7D                      | -                         | 0.3192          | 18M4W7D                      | -                         | 0.2606          |

| LTE Band 41_CA                  |                                                 |                                                   | QPSK                         |                 | 16QAM                        |                 | 64QAM                        |                 |
|---------------------------------|-------------------------------------------------|---------------------------------------------------|------------------------------|-----------------|------------------------------|-----------------|------------------------------|-----------------|
| CA Combination BW (MHz) PCC/SCC | Primary Component Carrier Frequency Range (MHz) | Secondary Component Carrier Frequency Range (MHz) | Emission Designator (99%OBW) | Maximum EIRP(W) | Emission Designator (99%OBW) | Maximum EIRP(W) | Emission Designator (99%OBW) | Maximum EIRP(W) |
| 20 + 20                         | 2506.0 ~ 2660.2                                 | 2525.8 ~ 2680.0                                   | 37M6G7D                      | 0.3381          | 37M5W7D                      | 0.2871          | 37M5W7D                      | 0.2393          |
| 20 + 15                         | 2506.0 ~ 2665.1                                 | 2523.1 ~ 2682.2                                   | 32M9G7D                      | 0.2871          | 32M8W7D                      | 0.2729          | 32M9W7D                      | 0.2123          |
| 15 + 20                         | 2503.8 ~ 2662.9                                 | 2520.9 ~ 2680.0                                   | 32M7G7D                      | 0.2831          | 32M7W7D                      | 0.2729          | 32M8W7D                      | 0.2099          |
| 20 + 10                         | 2506.0 ~ 2670.1                                 | 2520.4 ~ 2684.5                                   | 28M1G7D                      | 0.2838          | 28M0W7D                      | 0.2786          | 28M0W7D                      | 0.2113          |
| 10 + 20                         | 2501.5 ~ 2665.6                                 | 2515.9 ~ 2680.0                                   | 28M1G7D                      | 0.2786          | 27M9W7D                      | 0.2729          | 27M9W7D                      | 0.2104          |
| 20 + 5                          | 2506.0 ~ 2675.0                                 | 2517.7 ~ 2686.7                                   | 23M4G7D                      | 0.2786          | 23M3W7D                      | 0.2692          | 23M4W7D                      | 0.2143          |
| 5 + 20                          | 2499.3 ~ 2668.3                                 | 2511.0 ~ 2680.0                                   | 23M3G7D                      | 0.2767          | 23M3W7D                      | 0.2761          | 23M4W7D                      | 0.2061          |
| 15 + 15                         | 2503.5 ~ 2667.5                                 | 2518.5 ~ 2682.5                                   | 28M7G7D                      | 0.2793          | 28M5W7D                      | 0.2735          | 28M6W7D                      | 0.2089          |



## 1.7 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

|                           |                                                                                                                                               |           |                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------|
| <b>Test Site</b>          | Sporton International (Kunshan) Inc.                                                                                                          |           |                                       |
| <b>Test Site Location</b> | No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China<br>TEL : +86-512-57900158<br>FAX : +86-512-57900958 |           |                                       |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                                                       |           | <b>FCC Test Firm Registration No.</b> |
|                           | TH01-KS                                                                                                                                       | 03CH03-KS | 630927                                |

## 1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2, 27
- ♦ ANSI / TIA-603-E
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, Subpart B, recorded in a separate test report.



## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168

D01 Power Meas. License Digital Systems v03 with maximum output power.

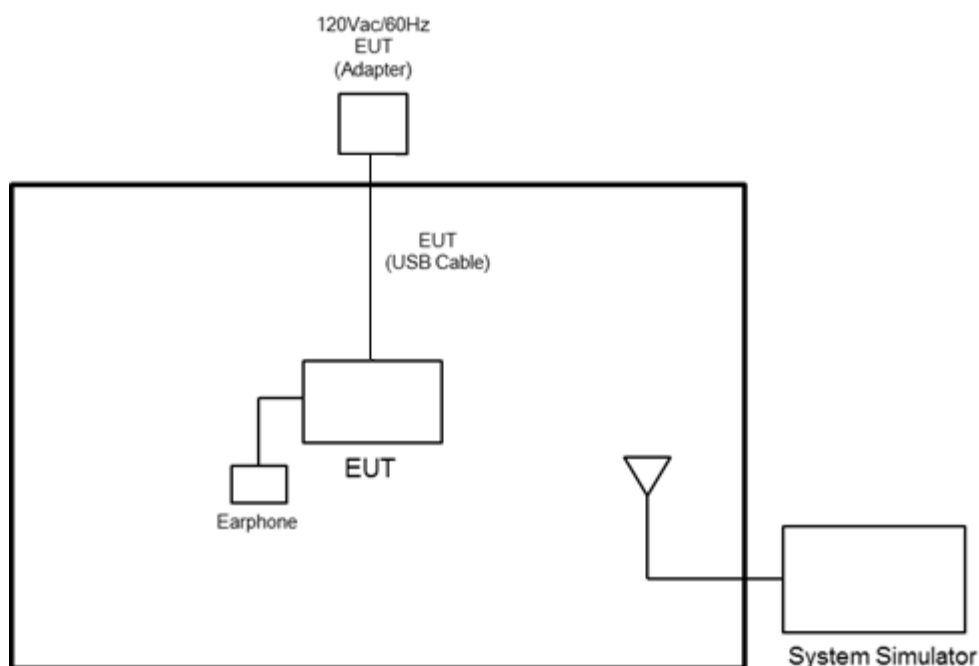
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

| Test Items                  | Band                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bandwidth (MHz) |   |   |    |    |    | Modulation |       |       | RB # |      |      | Test Channel |   |   |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---|---|----|----|----|------------|-------|-------|------|------|------|--------------|---|---|
|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.4             | 3 | 5 | 10 | 15 | 20 | QPSK       | 16QAM | 64QAM | 1    | Half | Full | L            | M | H |
| Max. Output Power           | 41                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -               | - | v | v  | v  | v  | v          | v     | v     | v    | v    | v    | v            | v | v |
| Peak-to-Average Ratio       | 41                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -               | - |   |    |    | v  | v          | v     | v     | v    |      | v    | v            | v | v |
| 26dB and 99% Bandwidth      | 41                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -               | - | v | v  | v  | v  | v          | v     | v     |      |      | v    | v            | v | v |
| Conducted Band Edge         | 41                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -               | - | v | v  | v  | v  | v          | v     | v     | v    |      | v    | v            |   | v |
| Conducted Spurious Emission | 41                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -               | - | v | v  | v  | v  | v          | v     | v     | v    |      |      | v            | v | v |
| Frequency Stability         | 41                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -               | - |   | v  |    |    | v          |       |       |      |      | v    |              | v |   |
| E.R.P / E.I.R.P             | 41                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -               | - | v | v  | v  | v  | v          | v     | v     | v    |      |      | v            | v | v |
| Radiated Spurious Emission  | 3`                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Worst Case      |   |   |    |    |    |            |       |       |      |      |      | v            | v | v |
| Note                        | 1. The mark “v “ means that this configuration is chosen for testing<br>2. The mark “-“ means that this bandwidth is not supported.<br>3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.<br>4. All the radiated test cases were performance with Adapter 1. |                 |   |   |    |    |    |            |       |       |      |      |      |              |   |   |



| Test Items                  | Band                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bandwidth (MHz) |       |       |       |       |      |      |       |       |       | Modulation |       |       | RB # |      |      | Test Channel |   |   |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------|-------|-------|-------|------|------|-------|-------|-------|------------|-------|-------|------|------|------|--------------|---|---|
|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20+20           | 20+15 | 15+20 | 20+10 | 10+20 | 20+5 | 5+20 | 15+15 | 15+10 | 10+15 | QPSK       | 16QAM | 64QAM | 1    | Half | Full | L            | M | H |
| Max. Output Power           | 41_CA                                                                                                                                                                                                                                                                                                                                                                                                                                                  | v               | v     | v     | v     | v     | v    | v    | v     |       |       | v          | v     | v     | v    | v    | v    | v            | v | v |
| 26dB and 99% Bandwidth      | 41_CA                                                                                                                                                                                                                                                                                                                                                                                                                                                  | v               | v     | v     | v     | v     | v    | v    | v     |       |       | v          | v     | v     |      |      | v    | v            | v | v |
| Conducted Band Edge         | 41_CA                                                                                                                                                                                                                                                                                                                                                                                                                                                  | v               | v     | v     | v     | v     | v    | v    | v     |       |       | v          | v     | v     | v    |      | v    | v            |   | v |
| Conducted Spurious Emission | 41_CA                                                                                                                                                                                                                                                                                                                                                                                                                                                  | v               | v     | v     | v     | v     | v    | v    | v     |       |       | v          | v     | v     | v    |      |      | v            | v | v |
| E.I.R.P.                    | 41_CA                                                                                                                                                                                                                                                                                                                                                                                                                                                  | v               | v     | v     | v     | v     | v    | v    | v     |       |       | v          | v     | v     | v    |      |      | v            | v | v |
| Radiated Spurious Emission  | 41_CA                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Worst Case      |       |       |       |       |      |      |       |       |       |            |       |       |      |      |      | v            | v | v |
| Note                        | 1. The mark “v ” means that this configuration is chosen for testing<br>2. The mark “-” means that this bandwidth is not supported.<br>3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.<br>4. All the radiated test cases were performance with Adapter 1. |                 |       |       |       |       |      |      |       |       |       |            |       |       |      |      |      |              |   |   |

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration and system

| Item | Equipment        | Trade Name | Model No. | FCC ID | Data Cable | Power Cord        |
|------|------------------|------------|-----------|--------|------------|-------------------|
| 1.   | System Simulator | Anritsu    | MT8820C   | N/A    | N/A        | Unshielded, 1.8 m |
| 2.   | Earphone         | N/A        | N/A       | N/A    | N/A        | N/A               |

## 2.4 Measurement Results Explanation Example

### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\
 &= 4.2 + 10 = 14.2 \text{ (dB)}
 \end{aligned}$$

## 2.5 Frequency List of Low/Middle/High Channels

| LTE Band 41 Channel and Frequency List |                        |        |        |         |
|----------------------------------------|------------------------|--------|--------|---------|
| BW [MHz]                               | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20                                     | Channel                | 39750  | 40620  | 41490   |
|                                        | Frequency              | 2506   | 2593   | 2680    |
| 15                                     | Channel                | 39725  | 40620  | 41515   |
|                                        | Frequency              | 2503.5 | 2593   | 2682.5  |
| 10                                     | Channel                | 39700  | 40620  | 41540   |
|                                        | Frequency              | 2501   | 2593   | 2685    |
| 5                                      | Channel                | 39675  | 40620  | 41565   |
|                                        | Frequency              | 2498.5 | 2593   | 2687.5  |

| LTE Band 41 Channel and Frequency List |                        |           |        |        |         |
|----------------------------------------|------------------------|-----------|--------|--------|---------|
| BW [MHz]                               | Channel/Frequency(MHz) |           | Lowest | Middle | Highest |
| 20 + 20                                | PCC                    | Channel   | 39750  | 40521  | 41292   |
|                                        |                        | Frequency | 2506.0 | 2583.1 | 2660.2  |
|                                        | SCC                    | Channel   | 39948  | 40719  | 41490   |
|                                        |                        | Frequency | 2525.8 | 2602.9 | 2680.0  |
| 20 + 15                                | PCC                    | Channel   | 39750  | 40546  | 41341   |
|                                        |                        | Frequency | 2506.0 | 2585.6 | 2665.1  |
|                                        | SCC                    | Channel   | 39921  | 40717  | 41512   |
|                                        |                        | Frequency | 2523.1 | 2602.7 | 2682.2  |
| 15 + 20                                | PCC                    | Channel   | 39728  | 40523  | 41319   |
|                                        |                        | Frequency | 2503.8 | 2593.3 | 2662.9  |
|                                        | SCC                    | Channel   | 39899  | 40694  | 41490   |
|                                        |                        | Frequency | 2520.9 | 2600.4 | 2680.0  |
| 20 + 10                                | PCC                    | Channel   | 39750  | 40571  | 41391   |
|                                        |                        | Frequency | 2506.0 | 2588.1 | 2670.1  |
|                                        | SCC                    | Channel   | 39894  | 40715  | 41535   |
|                                        |                        | Frequency | 2520.4 | 2602.5 | 2684.5  |
| 10 + 20                                | PCC                    | Channel   | 39705  | 40526  | 41346   |
|                                        |                        | Frequency | 2501.5 | 2583.6 | 2665.6  |
|                                        | SCC                    | Channel   | 39849  | 40670  | 41490   |
|                                        |                        | Frequency | 2515.9 | 2598.0 | 2680.0  |

| LTE Band 41 Channel and Frequency List |     |           |        |        |        |
|----------------------------------------|-----|-----------|--------|--------|--------|
| 20 + 5                                 | PCC | Channel   | 39750  | 40595  | 41440  |
|                                        |     | Frequency | 2506.0 | 2590.5 | 2675.0 |
|                                        | SCC | Channel   | 39867  | 40712  | 41557  |
|                                        |     | Frequency | 2517.7 | 2602.2 | 2686.7 |
| 5 + 20                                 | PCC | Channel   | 39683  | 40528  | 41373  |
|                                        |     | Frequency | 2499.3 | 2583.8 | 2668.3 |
|                                        | SCC | Channel   | 39800  | 40645  | 41490  |
|                                        |     | Frequency | 2511.0 | 2595.5 | 2680.0 |
| 15 + 15                                | PCC | Channel   | 39725  | 40545  | 41365  |
|                                        |     | Frequency | 2503.5 | 2585.5 | 2667.5 |
|                                        | SCC | Channel   | 39875  | 40695  | 41515  |
|                                        |     | Frequency | 2518.5 | 2600.5 | 2682.5 |

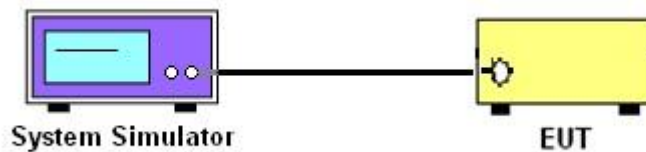
### 3 Conducted Test Items

#### 3.1 Measuring Instruments

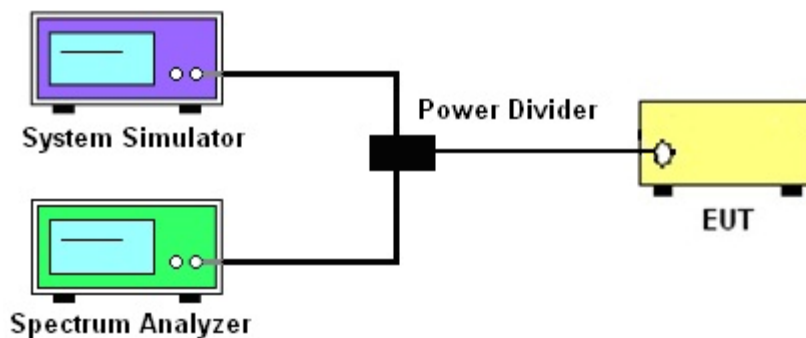
See list of measuring instruments of this test report.

#### 3.2 Test Setup

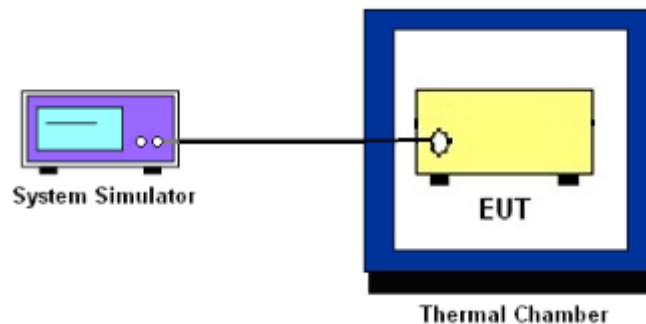
##### 3.2.1 Conducted Output Power



##### 3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



##### 3.2.3 Frequency Stability



#### 3.3 Test Result of Conducted Test

Please refer to Appendix A.

### 3.4 Conducted Output Power and EIRP

#### 3.4.1 Description of the Conducted Output Power Measurement and EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 41.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$ ,  $ERP = EIRP - 2.15$ , where

$P_T$  = transmitter output power in dBm

$G_T$  = gain of the transmitting antenna in dBi

$L_C$  = signal attenuation in the connecting cable between the transmitter and antenna in dB

#### 3.4.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

## 3.5 Peak-to-Average Ratio

### 3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

### 3.5.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 5.7.1

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

## 3.6 Occupied Bandwidth

### 3.6.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is 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 transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

### 3.6.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 4.2

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.  
(this is the reference value)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

## 3.7 Conducted Band Edge

### 3.7.1 Description of Conducted Band Edge Measurement

27.53(m)(4)

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

### 3.7.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW  $\geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.
8. For LTE Band 41, the other 40 dB, and 55 dB have additionally applied same calculation above.

## 3.8 Conducted Spurious Emission

### 3.8.1 Description of Conducted Spurious Emission Measurement

For Band 41:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

### 3.8.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.  
The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. For Band 41

The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)

### 3.9 Frequency Stability

#### 3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

#### 3.9.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 v03 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  step up to  $50^{\circ}\text{C}$ . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

#### 3.9.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 v03 Section 9.0.

1. The EUT was placed in a temperature chamber at  $20 \pm 5^{\circ}\text{C}$  and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

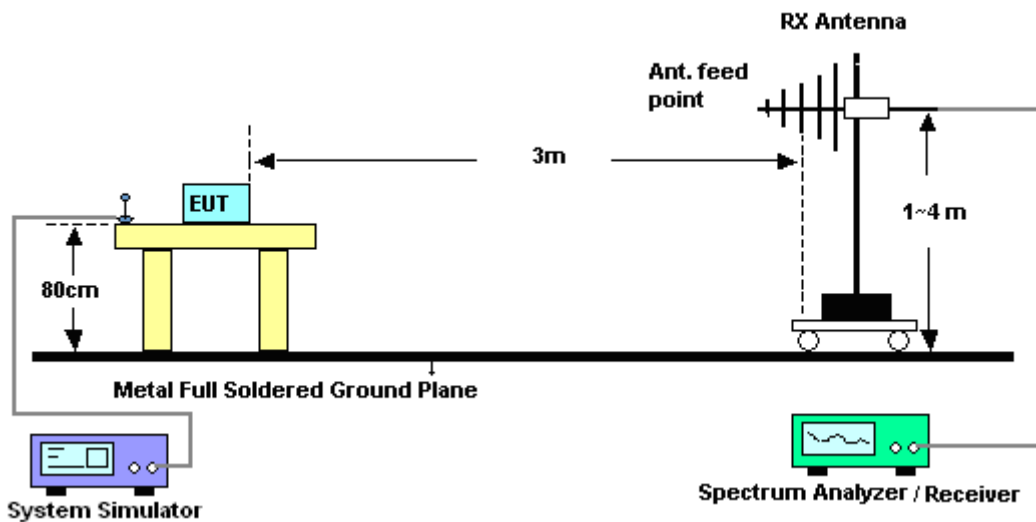
## 4 Radiated Test Items

### 4.1 Measuring Instruments

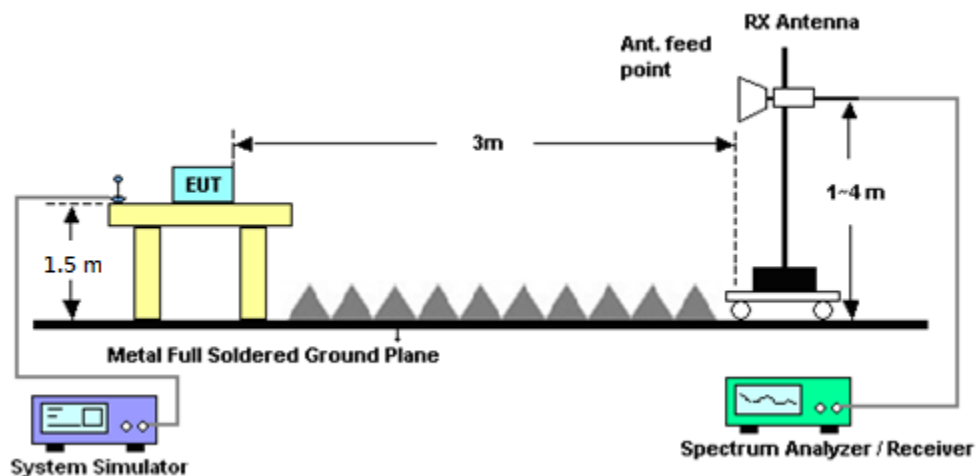
See list of measuring instruments of this test report.

### 4.2 Test Setup

#### 4.2.1 For radiated test from 30MHz to 1GHz



#### 4.2.2 For radiated test above 1GHz



### 4.3 Test Result of Radiated Test

Please refer to Appendix B.

## 4.4 Radiated Spurious Emission

### 4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E.

For Band 41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB.

### 4.4.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 5.8 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. For Band 41:

The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$

$ERP \text{ (dBm)} = EIRP - 2.15$



## 5 List of Measuring Equipment

| Instrument                   | Manufacturer | Model No.     | Serial No.     | Characteristics                                          | Calibration Date | Test Date                       | Due Date      | Remark                   |
|------------------------------|--------------|---------------|----------------|----------------------------------------------------------|------------------|---------------------------------|---------------|--------------------------|
| Spectrum Analyzer            | R&S          | FSV30         | 101338         | 10kHz~30GHz;<br>Max 30dBm                                | May 25, 2017     | Mar. 07, 2018~<br>Mar. 08, 2018 | May 24, 2018  | Conducted<br>(TH01-KS)   |
| Temperature Chamber          | Hongzhan     | LP-150U       | 2306           | Temperature<br>(-40~150°C)<br>Humidity<br>(20~98%RH)     | Apr. 20, 2017    | Mar. 07, 2018~<br>Mar. 08, 2018 | Apr. 19, 2018 | Conducted<br>(TH01-KS)   |
| Radio communication analyzer | Anritsu      | MT8820C       | 620143283<br>0 | GSM / GPRS<br>/WCDMA / LTE<br>FDD/TDD with<br>44) /LTE-3 | Jan. 18, 2018    | Mar. 07, 2018~<br>Mar. 08, 2018 | Jan. 17, 2019 | Conducted<br>(TH01-KS)   |
| Amplifier                    | MITEQ        | TTA1840-35-HG | 1887435        | 18~40GHz,45dB Min                                        | Oct. 12, 2017    | Mar. 08, 2018                   | Oct. 11, 2018 | Radiation<br>(03CH03-KS) |
| Amplifier                    | com-power    | MITEQ         | 2025788        | 100MHz<br>~1800MHz /                                     | Apr. 18, 2018    | Mar. 08, 2018                   | Apr. 17, 2019 | Radiation<br>(03CH03-KS) |
| Bilog Antenna                | TeseQ        | CBL6112D      | 35406          | 25MHz-2GHz                                               | Apr. 22, 2017    | Mar. 08, 2018                   | Apr. 21, 2018 | Radiation<br>(03CH03-KS) |
| Horn Antenna                 | Schwarzbeck  | BBHA9120D     | 9120D-135<br>6 | 1GHz~18GHz                                               | Apr. 22, 2017    | Mar. 08, 2018                   | Apr. 21, 2018 | Radiation<br>(03CH03-KS) |
| Amplifier                    | com-power    | PA-103A       | 161069         | 1MHz<br>~1000MHz / 32<br>dB                              | Apr. 18, 2017    | Mar. 08, 2018                   | Apr. 17, 2018 | Radiation<br>(03CH03-KS) |
| Amplifier                    | Agilent      | 8449B         | 3008A023<br>70 | 1GHz~26.5GHz                                             | Oct. 12, 2017    | Mar. 08, 2018                   | Oct. 11, 2018 | Radiation<br>(03CH03-KS) |
| EXA Spectrum Analyzer        | Keysight     | N9010A        | MY551502<br>44 | 10Hz-44GHz                                               | Apr. 18, 2017    | Mar. 08, 2018                   | Apr. 17, 2018 | Radiation<br>(03CH03-KS) |
| Controller                   | ChamPro      | EM 1000       | 060762         | N/A                                                      | N/A              | Mar. 08, 2018                   | N/A           | Radiation<br>(03CH03-KS) |
| Turn Table                   | ChamPro      | EM 1000-T     | 060762-T       | 0-360°                                                   | N/A              | Mar. 08, 2018                   | N/A           | Radiation<br>(03CH03-KS) |
| Antenna Mast                 | ChamPro      | EM 1000-A     | 060762-A       | 1m-4m                                                    | N/A              | Mar. 08, 2018                   | N/A           | Radiation<br>(03CH03-KS) |
| SHF-EHF Horn                 | com-power    | AH-840        | 101070         | 18Ghz-40Ghz                                              | Dec. 06, 2017    | Mar. 08, 2018                   | Dec. 05, 2018 | Radiation<br>(03CH03-KS) |
| Double Ridge horn Antenna    | ETS-lindgren | 3117          | 75957          | 1GHz~18GHz                                               | Oct. 21, 2017    | Mar. 08, 2018                   | Oct. 20, 2018 | Radiation<br>(03CH03-KS) |
| Signal Generator             | R&S          | SMR40         | 100455         | 10MHz~40GHz                                              | Jan. 18, 2018    | Mar. 08, 2018                   | Jan. 17, 2019 | Radiation<br>(03CH03-KS) |



## 6 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

|                                                                          |      |
|--------------------------------------------------------------------------|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 2.81 |
|--------------------------------------------------------------------------|------|

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

|                                                                          |      |
|--------------------------------------------------------------------------|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 3.27 |
|--------------------------------------------------------------------------|------|



## Appendix A. Test Results of Conducted Test

### Conducted Output Power(Average power)

| LTE Band 41 Maximum Average Power [dBm] |         |           |        |        |        |         |
|-----------------------------------------|---------|-----------|--------|--------|--------|---------|
| BW [MHz]                                | RB Size | RB Offset | Mod    | Lowest | Middle | Highest |
| 20                                      | 1       | 0         | QPSK   | 23.54  | 23.57  | 23.58   |
| 20                                      | 1       | 49        |        | 24.52  | 24.52  | 24.25   |
| 20                                      | 1       | 99        |        | 24.79  | 24.58  | 24.54   |
| 20                                      | 50      | 0         |        | 23.03  | 23.13  | 23.18   |
| 20                                      | 50      | 24        |        | 23.09  | 23.06  | 22.99   |
| 20                                      | 50      | 50        |        | 23.15  | 23.21  | 23.04   |
| 20                                      | 100     | 0         |        | 23.20  | 23.13  | 22.96   |
| 20                                      | 1       | 0         | 16-QAM | 23.24  | 23.23  | 23.06   |
| 20                                      | 1       | 49        |        | 23.18  | 23.18  | 23.00   |
| 20                                      | 1       | 99        |        | 23.50  | 23.21  | 23.28   |
| 20                                      | 50      | 0         |        | 22.03  | 22.18  | 22.23   |
| 20                                      | 50      | 24        |        | 22.20  | 22.19  | 22.04   |
| 20                                      | 50      | 50        |        | 22.27  | 22.14  | 22.09   |
| 20                                      | 100     | 0         |        | 22.30  | 22.25  | 22.09   |
| 20                                      | 1       | 0         | 64-QAM | 22.45  | 22.77  | 22.72   |
| 20                                      | 1       | 49        |        | 22.88  | 22.62  | 22.38   |
| 20                                      | 1       | 99        |        | 22.93  | 22.87  | 22.68   |
| 20                                      | 50      | 0         |        | 21.62  | 21.71  | 21.66   |
| 20                                      | 50      | 24        |        | 21.71  | 21.67  | 21.54   |
| 20                                      | 50      | 50        |        | 21.81  | 21.74  | 21.59   |
| 20                                      | 100     | 0         |        | 21.93  | 21.72  | 21.63   |
| 15                                      | 1       | 0         | QPSK   | 23.96  | 24.01  | 23.85   |
| 15                                      | 1       | 37        |        | 24.92  | 24.76  | 24.40   |
| 15                                      | 1       | 74        |        | 24.93  | 24.56  | 24.60   |
| 15                                      | 36      | 0         |        | 23.02  | 23.07  | 23.12   |
| 15                                      | 36      | 20        |        | 22.97  | 23.13  | 23.03   |
| 15                                      | 36      | 39        |        | 23.15  | 23.18  | 23.06   |
| 15                                      | 75      | 0         |        | 22.97  | 23.06  | 23.06   |
| 15                                      | 1       | 0         | 16-QAM | 23.29  | 23.45  | 23.28   |
| 15                                      | 1       | 37        |        | 23.22  | 23.15  | 22.94   |
| 15                                      | 1       | 74        |        | 23.90  | 23.71  | 23.30   |
| 15                                      | 36      | 0         |        | 21.98  | 22.01  | 22.01   |
| 15                                      | 36      | 20        |        | 22.03  | 22.10  | 21.99   |
| 15                                      | 36      | 39        |        | 22.03  | 22.05  | 21.88   |
| 15                                      | 75      | 0         |        | 22.19  | 22.23  | 21.94   |
| 15                                      | 1       | 0         | 64-QAM | 22.95  | 22.97  | 22.81   |
| 15                                      | 1       | 37        |        | 22.83  | 22.73  | 22.11   |
| 15                                      | 1       | 74        |        | 22.94  | 22.94  | 22.85   |
| 15                                      | 36      | 0         |        | 21.43  | 21.63  | 21.58   |
| 15                                      | 36      | 20        |        | 21.46  | 21.62  | 21.40   |
| 15                                      | 36      | 39        |        | 21.71  | 21.76  | 21.49   |
| 15                                      | 75      | 0         |        | 21.49  | 21.76  | 21.50   |



| LTE Band 41 Maximum Average Power [dBm] |         |           |        |        |        |         |
|-----------------------------------------|---------|-----------|--------|--------|--------|---------|
| BW [MHz]                                | RB Size | RB Offset | Mod    | Lowest | Middle | Highest |
| 10                                      | 1       | 0         | QPSK   | 23.83  | 23.80  | 23.62   |
| 10                                      | 1       | 25        |        | 24.70  | 24.55  | 24.48   |
| 10                                      | 1       | 49        |        | 24.72  | 24.96  | 24.88   |
| 10                                      | 25      | 0         |        | 22.97  | 23.10  | 22.84   |
| 10                                      | 25      | 12        |        | 22.95  | 23.01  | 22.81   |
| 10                                      | 25      | 25        |        | 23.04  | 22.99  | 23.01   |
| 10                                      | 50      | 0         |        | 23.02  | 23.02  | 22.83   |
| 10                                      | 1       | 0         | 16-QAM | 23.27  | 23.31  | 23.29   |
| 10                                      | 1       | 25        |        | 23.21  | 23.16  | 23.22   |
| 10                                      | 1       | 49        |        | 23.56  | 23.39  | 23.29   |
| 10                                      | 25      | 0         |        | 22.08  | 22.01  | 21.83   |
| 10                                      | 25      | 12        |        | 22.03  | 22.01  | 21.88   |
| 10                                      | 25      | 25        |        | 22.07  | 22.16  | 22.17   |
| 10                                      | 50      | 0         |        | 21.97  | 22.04  | 22.07   |
| 10                                      | 1       | 0         | 64-QAM | 22.76  | 22.63  | 22.56   |
| 10                                      | 1       | 25        |        | 22.63  | 22.51  | 22.29   |
| 10                                      | 1       | 49        |        | 22.86  | 22.87  | 22.67   |
| 10                                      | 25      | 0         |        | 21.49  | 21.52  | 21.54   |
| 10                                      | 25      | 12        |        | 21.50  | 21.46  | 21.42   |
| 10                                      | 25      | 25        |        | 21.56  | 21.57  | 21.51   |
| 10                                      | 50      | 0         |        | 21.49  | 21.49  | 21.33   |
| 5                                       | 1       | 0         | QPSK   | 23.69  | 23.83  | 23.84   |
| 5                                       | 1       | 12        |        | 24.35  | 24.56  | 24.09   |
| 5                                       | 1       | 24        |        | 24.71  | 24.60  | 24.53   |
| 5                                       | 12      | 0         |        | 23.09  | 23.09  | 23.01   |
| 5                                       | 12      | 7         |        | 23.14  | 23.08  | 22.94   |
| 5                                       | 12      | 13        |        | 23.12  | 23.07  | 22.83   |
| 5                                       | 25      | 0         |        | 22.93  | 22.91  | 22.96   |
| 5                                       | 1       | 0         | 16-QAM | 23.27  | 23.35  | 23.08   |
| 5                                       | 1       | 12        |        | 23.00  | 23.05  | 23.26   |
| 5                                       | 1       | 24        |        | 23.24  | 23.23  | 23.10   |
| 5                                       | 12      | 0         |        | 21.95  | 22.01  | 21.87   |
| 5                                       | 12      | 7         |        | 22.09  | 22.11  | 22.13   |
| 5                                       | 12      | 13        |        | 22.15  | 22.01  | 22.01   |
| 5                                       | 25      | 0         |        | 22.00  | 22.09  | 22.16   |
| 5                                       | 1       | 0         | 64-QAM | 22.74  | 22.80  | 22.48   |
| 5                                       | 1       | 12        |        | 22.67  | 22.59  | 22.63   |
| 5                                       | 1       | 24        |        | 22.65  | 22.60  | 22.54   |
| 5                                       | 12      | 0         |        | 21.54  | 21.63  | 21.49   |
| 5                                       | 12      | 7         |        | 21.52  | 21.53  | 21.45   |
| 5                                       | 12      | 13        |        | 21.39  | 21.42  | 21.61   |
| 5                                       | 25      | 0         |        | 21.56  | 21.44  | 21.31   |



| LTE Band 41_CA Maximum Average Power [dBm] |         |           |         |           |        |        |        |         |
|--------------------------------------------|---------|-----------|---------|-----------|--------|--------|--------|---------|
| BW [MHz]                                   | PCC     |           | SCC     |           | Mod    | Lowest | Middle | Highest |
|                                            | RB Size | RB Offset | RB Size | RB Offset |        |        |        |         |
| 20+20                                      | 0       | 0         | 1       | 99        | QPSK   | 23.20  | 23.43  | 23.40   |
| 20+20                                      | 1       | 0         | 0       | 0         |        | 23.29  | 23.84  | 23.81   |
| 20+20                                      | 100     | 0         | 0       | 0         |        | 20.12  | 22.06  | 22.05   |
| 20+20                                      | 100     | 0         | 100     | 0         |        | 22.64  | 21.68  | 21.73   |
| 20+20                                      | 1       | 0         | 1       | 99        |        | 14.88  | 14.57  | 14.53   |
| 20+20                                      | 1       | 0         | 1       | 0         |        | 20.10  | 19.46  | 19.40   |
| 20+20                                      | 1       | 99        | 1       | 0         |        | 23.27  | 23.35  | 23.34   |
| 20+20                                      | 100     | 0         | 1       | 99        |        | 19.97  | 19.21  | 20.18   |
| 20+20                                      | 0       | 0         | 1       | 99        | 16-QAM | 22.17  | 22.45  | 22.35   |
| 20+20                                      | 1       | 0         | 0       | 0         |        | 22.35  | 22.79  | 22.78   |
| 20+20                                      | 100     | 0         | 0       | 0         |        | 21.14  | 21.22  | 21.09   |
| 20+20                                      | 100     | 0         | 100     | 0         |        | 21.37  | 20.59  | 20.55   |
| 20+20                                      | 1       | 0         | 1       | 99        |        | 14.49  | 14.64  | 14.58   |
| 20+20                                      | 1       | 0         | 1       | 0         |        | 19.62  | 19.04  | 19.06   |
| 20+20                                      | 1       | 99        | 1       | 0         |        | 23.13  | 22.31  | 22.16   |
| 20+20                                      | 100     | 0         | 1       | 99        |        | 19.95  | 20.23  | 20.11   |
| 20+20                                      | 0       | 0         | 1       | 99        | 64-QAM | 22.34  | 22.23  | 22.26   |
| 20+20                                      | 1       | 0         | 0       | 0         |        | 22.25  | 22.27  | 22.31   |
| 20+20                                      | 100     | 0         | 0       | 0         |        | 21.52  | 21.49  | 21.49   |
| 20+20                                      | 100     | 0         | 100     | 0         |        | 21.30  | 21.31  | 21.28   |
| 20+20                                      | 1       | 0         | 1       | 99        |        | 14.86  | 14.89  | 14.81   |
| 20+20                                      | 1       | 0         | 1       | 0         |        | 20.03  | 19.96  | 20.00   |
| 20+20                                      | 1       | 99        | 1       | 0         |        | 20.00  | 19.85  | 20.00   |
| 20+20                                      | 100     | 0         | 1       | 99        |        | 19.88  | 19.84  | 19.75   |
| 20+15                                      | 100     | 0         | 75      | 0         | QPSK   | 22.71  | 22.94  | 20.62   |
| 20+15                                      | 1       | 0         | 1       | 74        |        | 14.87  | 14.48  | 13.75   |
| 20+15                                      | 1       | 99        | 1       | 0         |        | 23.13  | 22.21  | 21.03   |
| 20+15                                      | 100     | 0         | 75      | 0         | 16-QAM | 21.60  | 21.66  | 19.81   |
| 20+15                                      | 1       | 0         | 1       | 74        |        | 15.03  | 14.45  | 14.06   |
| 20+15                                      | 1       | 99        | 1       | 0         |        | 22.91  | 22.13  | 21.56   |
| 20+15                                      | 100     | 0         | 75      | 0         | 64-QAM | 21.48  | 21.63  | 21.82   |
| 20+15                                      | 1       | 0         | 1       | 74        |        | 14.81  | 15.08  | 14.90   |
| 20+15                                      | 1       | 99        | 1       | 0         |        | 20.08  | 20.34  | 20.16   |
| 15+20                                      | 75      | 0         | 100     | 0         | QPSK   | 22.62  | 22.82  | 20.60   |
| 15+20                                      | 1       | 0         | 1       | 99        |        | 14.78  | 14.43  | 13.70   |
| 15+20                                      | 1       | 74        | 1       | 0         |        | 23.07  | 22.20  | 21.01   |
| 15+20                                      | 75      | 0         | 100     | 0         | 16-QAM | 21.59  | 21.61  | 19.80   |
| 15+20                                      | 1       | 0         | 1       | 99        |        | 14.98  | 14.42  | 13.98   |
| 15+20                                      | 1       | 74        | 1       | 0         |        | 22.91  | 22.03  | 21.51   |
| 15+20                                      | 75      | 0         | 100     | 0         | 64-QAM | 21.73  | 21.77  | 21.68   |
| 15+20                                      | 1       | 0         | 1       | 99        |        | 15.04  | 14.91  | 14.99   |
| 15+20                                      | 1       | 74        | 1       | 0         |        | 20.16  | 20.27  | 20.20   |

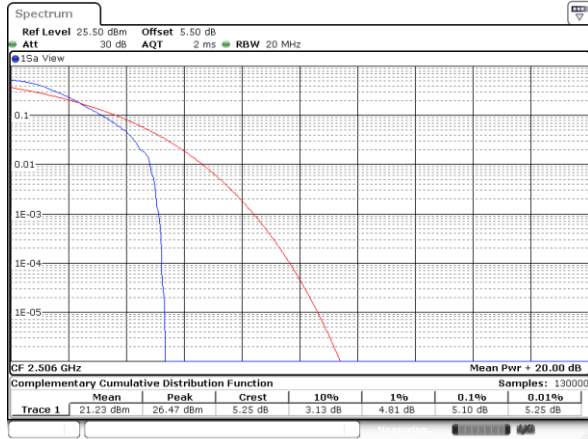


| LTE Band 41_CA Maximum Average Power [dBm] |         |           |         |           |        |        |        |         |
|--------------------------------------------|---------|-----------|---------|-----------|--------|--------|--------|---------|
| BW [MHz]                                   | PCC     |           | SCC     |           | Mod    | Lowest | Middle | Highest |
|                                            | RB Size | RB Offset | RB Size | RB Offset |        |        |        |         |
| 20+10                                      | 100     | 0         | 50      | 0         | QPSK   | 22.66  | 22.91  | 20.55   |
| 20+10                                      | 1       | 0         | 1       | 49        |        | 14.77  | 14.42  | 13.64   |
| 20+10                                      | 1       | 99        | 1       | 0         |        | 23.08  | 22.19  | 20.98   |
| 20+10                                      | 100     | 0         | 50      | 0         | 16-QAM | 21.50  | 21.75  | 19.77   |
| 20+10                                      | 1       | 0         | 1       | 49        |        | 15.03  | 14.47  | 14.03   |
| 20+10                                      | 1       | 99        | 1       | 0         |        | 23.00  | 22.05  | 21.57   |
| 20+10                                      | 100     | 0         | 50      | 0         | 64-QAM | 21.80  | 21.73  | 21.61   |
| 20+10                                      | 1       | 0         | 1       | 49        |        | 14.95  | 15.07  | 15.11   |
| 20+10                                      | 1       | 99        | 1       | 0         |        | 20.28  | 20.31  | 20.26   |
| 10+20                                      | 50      | 0         | 100     | 0         | QPSK   | 22.63  | 22.86  | 20.59   |
| 10+20                                      | 1       | 0         | 1       | 99        |        | 14.76  | 14.43  | 13.68   |
| 10+20                                      | 1       | 49        | 1       | 0         |        | 23.00  | 22.10  | 20.95   |
| 10+20                                      | 50      | 0         | 100     | 0         | 16-QAM | 21.53  | 21.66  | 19.84   |
| 10+20                                      | 1       | 0         | 1       | 99        |        | 15.03  | 14.45  | 13.99   |
| 10+20                                      | 1       | 49        | 1       | 0         |        | 22.91  | 22.09  | 21.59   |
| 10+20                                      | 50      | 0         | 100     | 0         | 64-QAM | 21.71  | 21.78  | 21.67   |
| 10+20                                      | 1       | 0         | 1       | 99        |        | 15.12  | 14.97  | 15.08   |
| 10+20                                      | 1       | 49        | 1       | 0         |        | 20.15  | 20.22  | 20.19   |
| 20+5                                       | 100     | 0         | 25      | 0         | QPSK   | 22.71  | 22.86  | 20.68   |
| 20+5                                       | 1       | 0         | 1       | 24        |        | 14.81  | 14.44  | 13.66   |
| 20+5                                       | 1       | 99        | 1       | 0         |        | 23.00  | 22.13  | 20.98   |
| 20+5                                       | 100     | 0         | 25      | 0         | 16-QAM | 21.56  | 21.66  | 19.82   |
| 20+5                                       | 1       | 0         | 1       | 24        |        | 14.99  | 14.44  | 14.07   |
| 20+5                                       | 1       | 99        | 1       | 0         |        | 22.85  | 22.12  | 21.62   |
| 20+5                                       | 100     | 0         | 25      | 0         | 64-QAM | 21.86  | 21.75  | 21.76   |
| 20+5                                       | 1       | 0         | 1       | 24        |        | 15.02  | 15.14  | 14.98   |
| 20+5                                       | 1       | 99        | 1       | 0         |        | 20.34  | 20.30  | 20.15   |
| 5+20                                       | 25      | 0         | 100     | 0         | QPSK   | 22.70  | 22.85  | 20.57   |
| 5+20                                       | 1       | 0         | 1       | 99        |        | 14.77  | 14.41  | 13.77   |
| 5+20                                       | 1       | 24        | 1       | 0         |        | 22.97  | 22.20  | 21.01   |
| 5+20                                       | 25      | 0         | 100     | 0         | 16-QAM | 21.59  | 21.64  | 19.80   |
| 5+20                                       | 1       | 0         | 1       | 99        |        | 15.05  | 14.44  | 14.00   |
| 5+20                                       | 1       | 24        | 1       | 0         |        | 22.96  | 22.03  | 21.54   |
| 5+20                                       | 25      | 0         | 100     | 0         | 64-QAM | 21.69  | 21.62  | 21.58   |
| 5+20                                       | 1       | 0         | 1       | 99        |        | 15.02  | 14.96  | 14.96   |
| 5+20                                       | 1       | 24        | 1       | 0         |        | 20.18  | 20.12  | 20.18   |
| 15+15                                      | 75      | 0         | 75      | 0         | QPSK   | 22.60  | 22.86  | 20.62   |
| 15+15                                      | 1       | 0         | 1       | 74        |        | 14.77  | 14.50  | 13.69   |
| 15+15                                      | 1       | 74        | 1       | 0         |        | 23.01  | 22.08  | 20.96   |
| 15+15                                      | 75      | 0         | 75      | 0         | 16-QAM | 21.63  | 21.61  | 19.81   |
| 15+15                                      | 1       | 0         | 1       | 74        |        | 15.07  | 14.49  | 14.03   |
| 15+15                                      | 1       | 74        | 1       | 0         |        | 22.92  | 22.10  | 21.56   |
| 15+15                                      | 75      | 0         | 75      | 0         | 64-QAM | 21.74  | 21.75  | 21.62   |
| 15+15                                      | 1       | 0         | 1       | 74        |        | 15.03  | 14.91  | 15.06   |
| 15+15                                      | 1       | 74        | 1       | 0         |        | 20.22  | 20.23  | 20.14   |

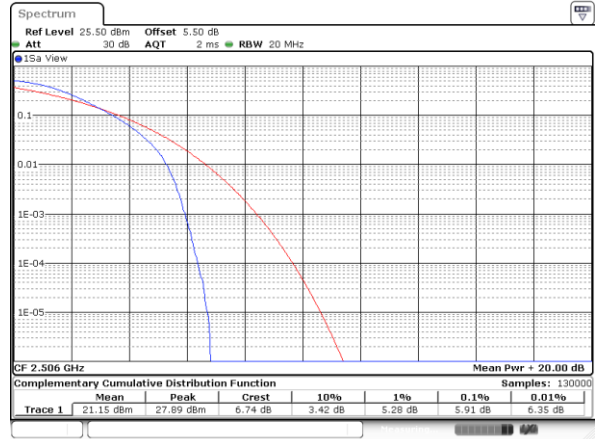
## LTE Band 41

### Peak-to-Average Ratio

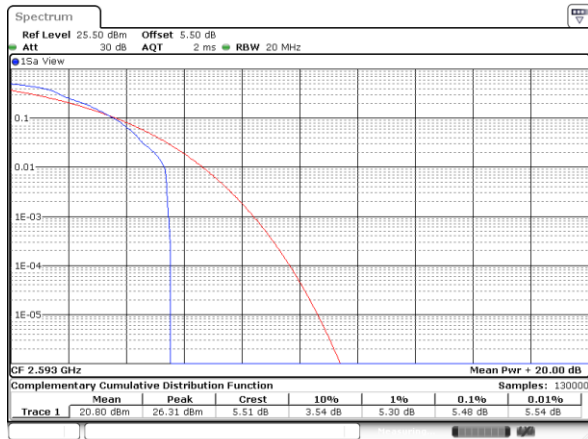
| Mode       | LTE Band 41 / 20MHz |         |             |         |             |
|------------|---------------------|---------|-------------|---------|-------------|
| Mod.       | QPSK                |         | 16QAM       |         | Limit: 13dB |
| RB Size    | 1RB                 | Full RB | 1RB         | Full RB | Result      |
| Lowest CH  | 5.1                 | 5.91    | 5.07        | 5.77    | <b>PASS</b> |
| Middle CH  | 5.48                | 4.93    | 6.06        | 6.2     |             |
| Highest CH | 6.52                | 5.19    | 6.49        | 6.49    |             |
| Mod.       | 64QAM               |         | Limit: 13dB |         |             |
| RB Size    | 1RB                 | Full RB | Result      |         |             |
| Lowest CH  | 6.75                | 6.23    | <b>PASS</b> |         |             |
| Middle CH  | 5.59                | 6.14    |             |         |             |
| Highest CH | 6.7                 | 6.14    |             |         |             |

**LTE Band 41 / 20MHz / QPSK**
**Lowest Channel / 1RB**


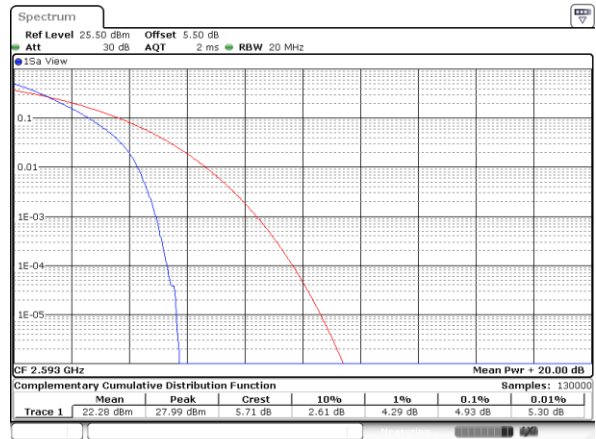
Date: 8 MAR 2019 04:37:21

**Lowest Channel / Full RB**


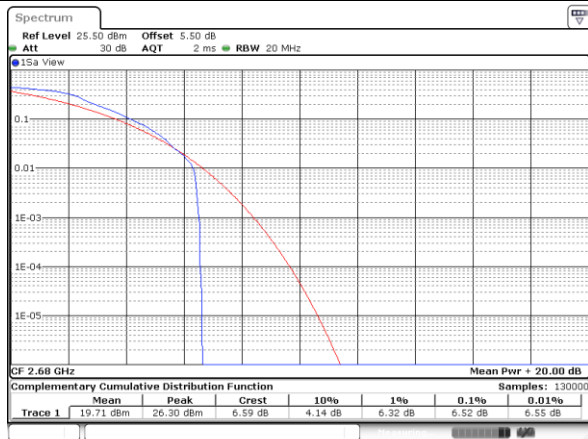
Date: 8 MAR 2019 04:35:09

**Middle Channel / 1RB**


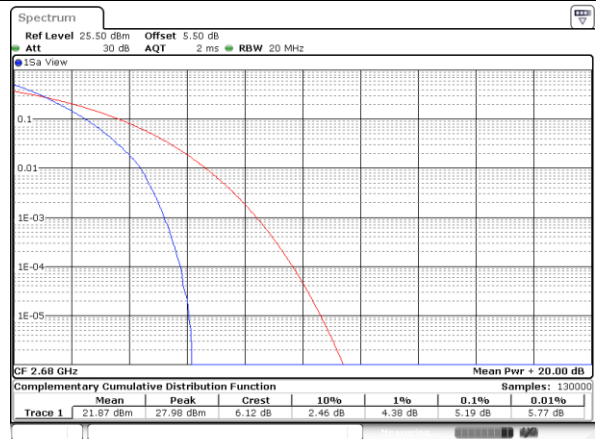
Date: 8 MAR 2019 04:38:08

**Middle Channel / Full RB**


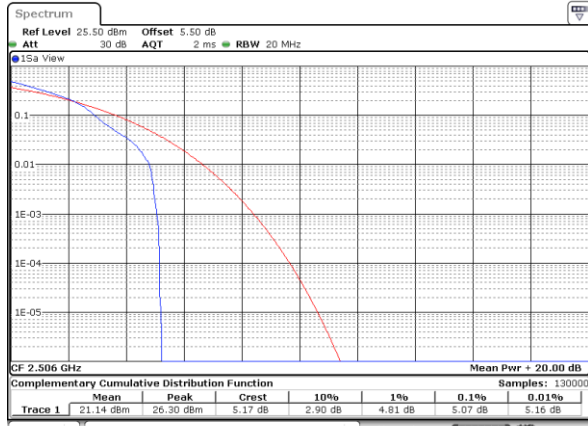
Date: 8 MAR 2019 04:40:06

**Highest Channel / 1RB**


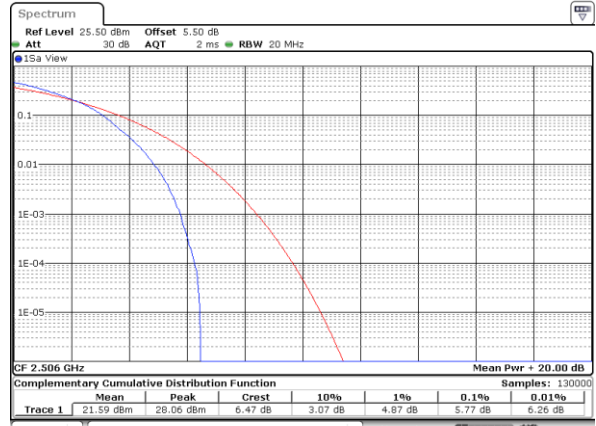
Date: 8 MAR 2019 04:42:25

**Highest Channel / Full RB**


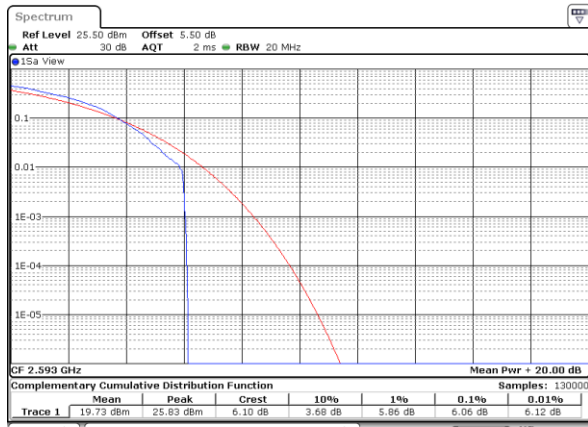
Date: 8 MAR 2019 04:44:35

**LTE Band 41 / 20MHz / 16QAM**
**Lowest Channel / 1RB**


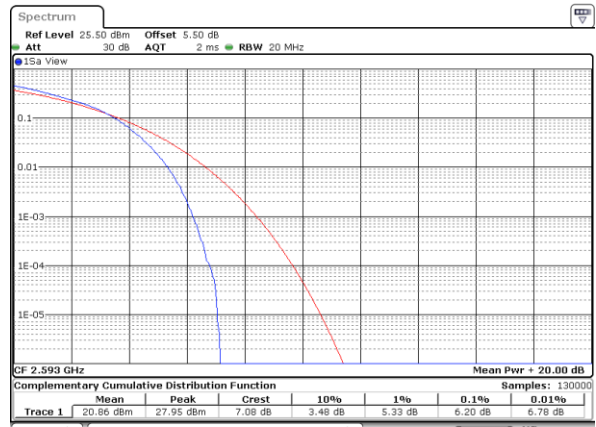
Date: 8 MAR 2019 04:37:03

**Lowest Channel / Full RB**


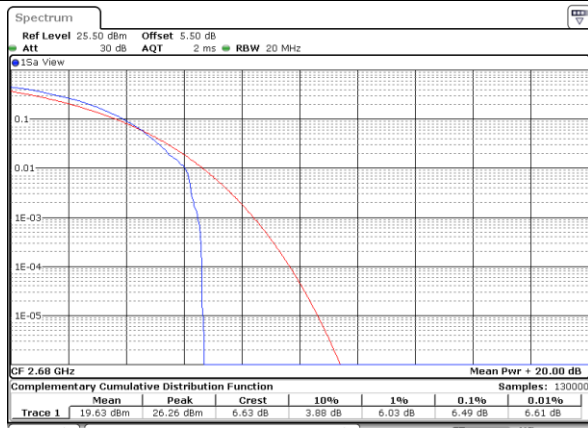
Date: 8 MAR 2019 04:35:51

**Middle Channel / 1RB**


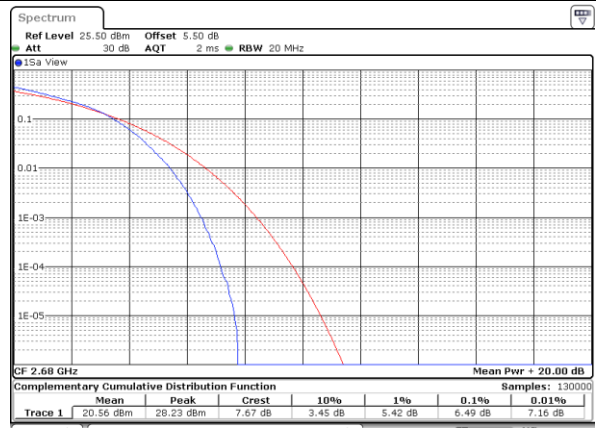
Date: 8 MAR 2019 04:41:06

**Middle Channel / Full RB**


Date: 8 MAR 2019 04:39:47

**Highest Channel / 1RB**


Date: 8 MAR 2019 04:42:57

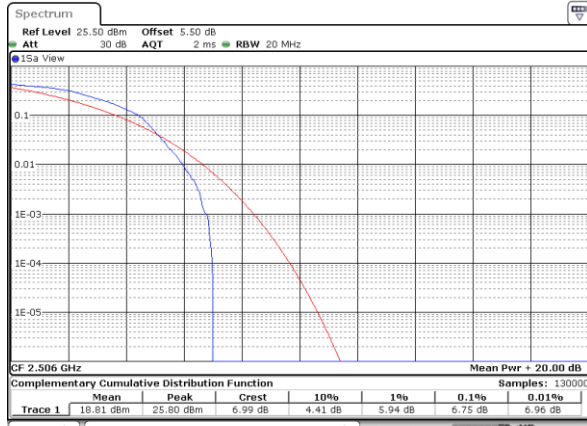
**Highest Channel / Full RB**


Date: 8 MAR 2019 04:44:06

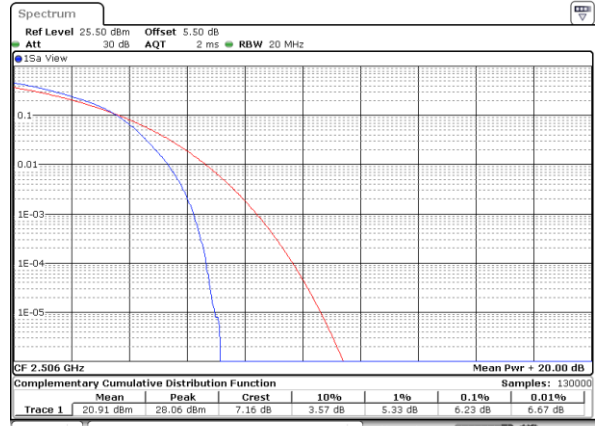


## LTE Band 41 / 20MHz / 64QAM

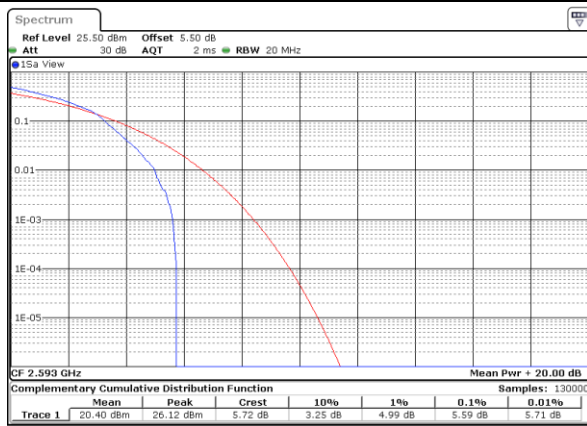
## Lowest Channel / 1RB



## Lowest Channel / Full RB



## Middle Channel / 1RB



## Middle Channel / Full RB



## Highest Channel / 1RB



## Highest Channel / Full RB



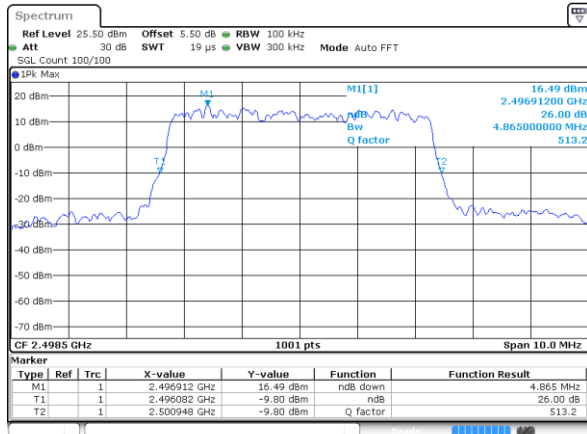
**26dB Bandwidth**

| Mode       | LTE Band 41 : 26dB BW(MHz) |       |      |       |       |       |       |       |        |        |       |       |
|------------|----------------------------|-------|------|-------|-------|-------|-------|-------|--------|--------|-------|-------|
| BW         | 1.4MHz                     |       | 3MHz |       | 5MHz  |       | 10MHz |       | 15MHz  |        | 20MHz |       |
| Mod.       | QPSK                       | 16QAM | QPSK | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM | QPSK   | 16QAM  | QPSK  | 16QAM |
| Lowest CH  | -                          | -     | -    | -     | 4.865 | 4.845 | 9.65  | 9.67  | 14.146 | 14.176 | 20.1  | 20.14 |
| Middle CH  | -                          | -     | -    | -     | 4.875 | 4.805 | 9.75  | 9.61  | 14.416 | 14.116 | 20.22 | 20.18 |
| Highest CH | -                          | -     | -    | -     | 4.945 | 4.905 | 9.65  | 9.69  | 14.505 | 14.386 | 20.06 | 20.1  |
| Mode       | LTE Band 41 : 26dB BW(MHz) |       |      |       |       |       |       |       |        |        |       |       |
| BW         |                            |       |      |       | 5MHz  |       | 10MHz |       | 15MHz  |        | 20MHz |       |
| Mod.       |                            |       |      |       | 64QAM |       | 64QAM |       | 64QAM  |        | 64QAM |       |
| Lowest CH  | -                          | -     | -    | -     | 4.875 |       | 9.63  |       | 14.296 |        | 20.5  |       |
| Middle CH  | -                          | -     | -    | -     | 4.845 |       | 9.65  |       | 14.176 |        | 20.22 |       |
| Highest CH | -                          | -     | -    | -     | 4.875 |       | 9.75  |       | 14.086 |        | 20.06 |       |



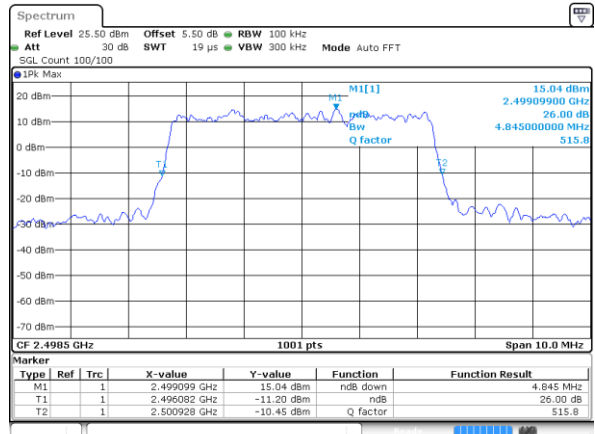
## LTE Band 41

## Lowest Channel / 5MHz / QPSK



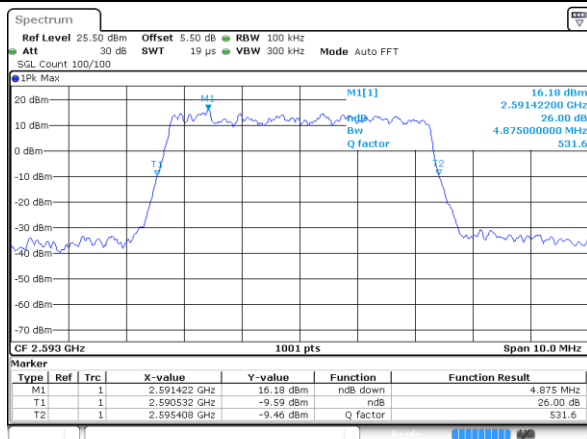
Date: 7 MAR 2019 23:48:26

## Lowest Channel / 5MHz / 16QAM



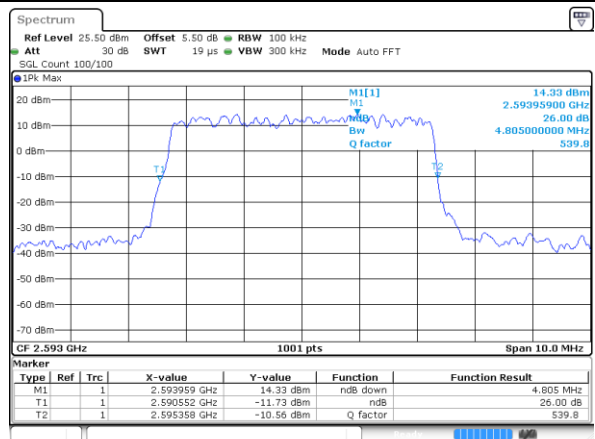
Date: 7 MAR 2019 23:48:51

## Middle Channel / 5MHz / QPSK



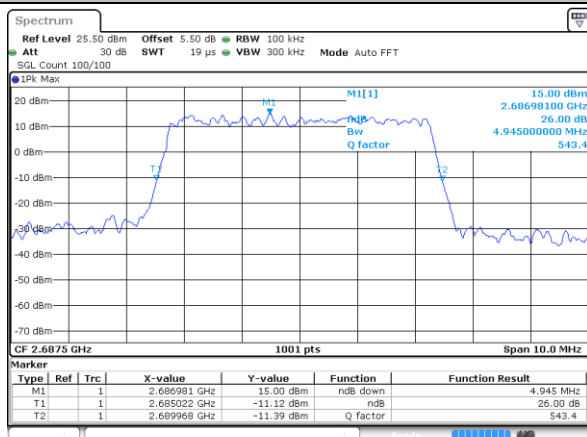
Date: 7 MAR 2019 23:52:33

## Middle Channel / 5MHz / 16QAM



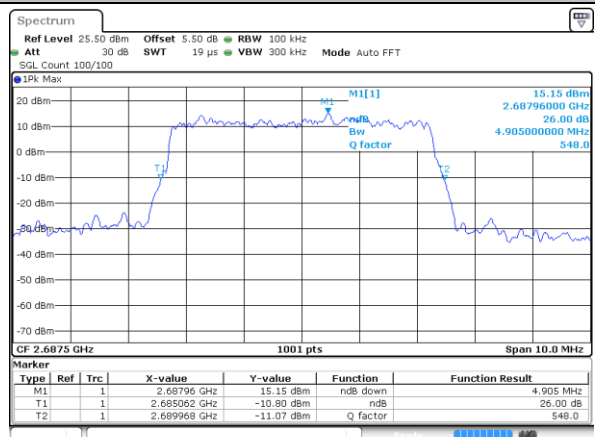
Date: 7 MAR 2019 23:52:09

## Highest Channel / 5MHz / QPSK

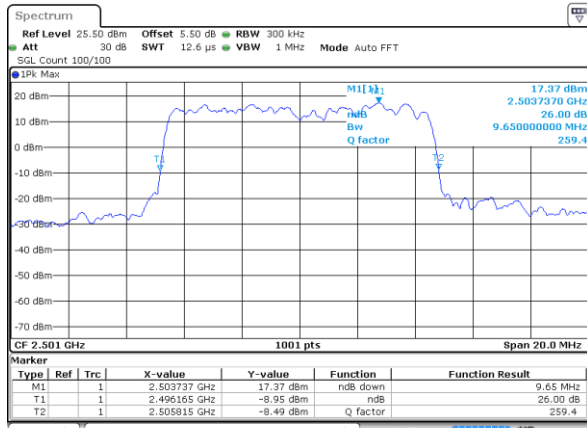
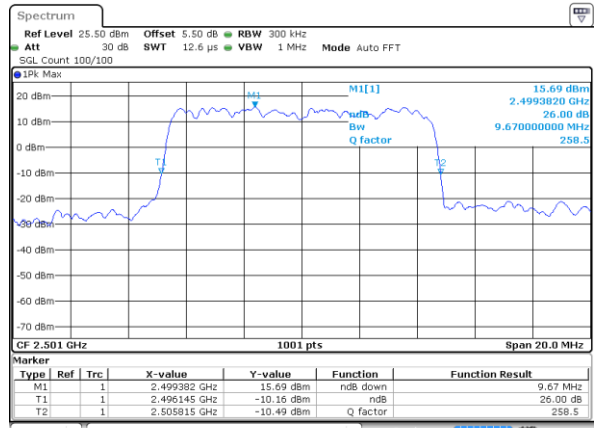
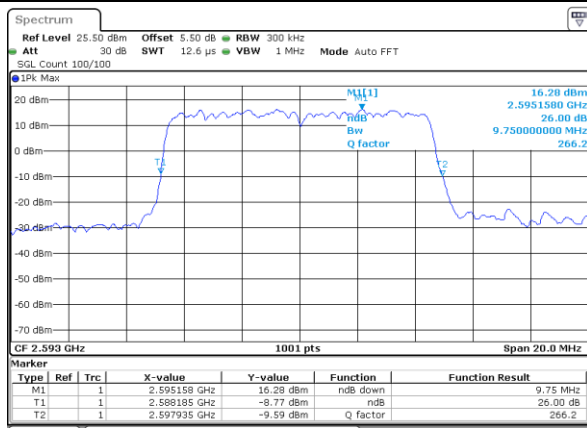
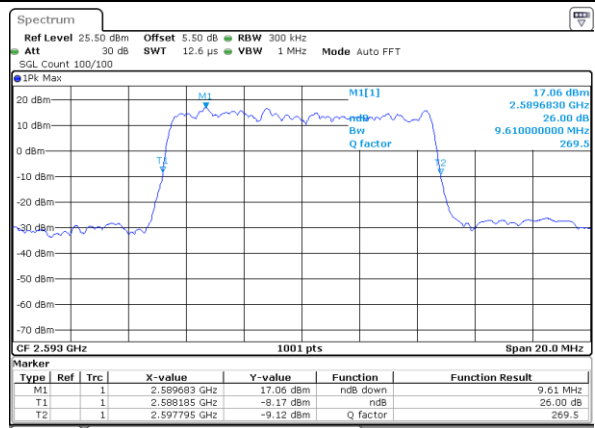
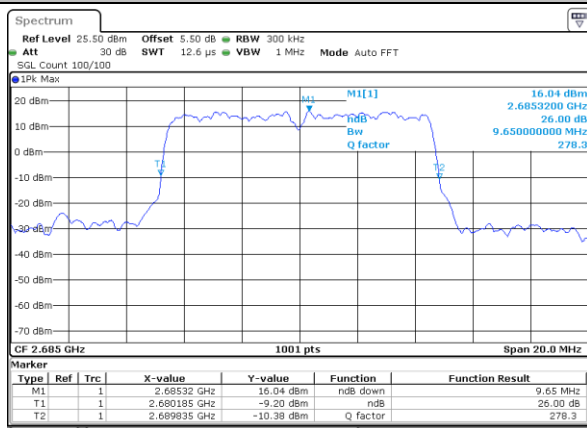
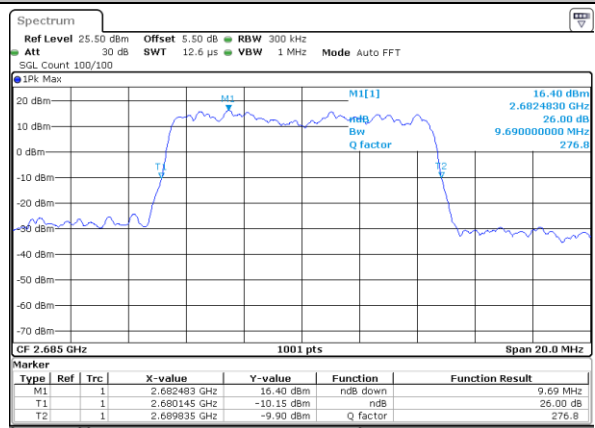


Date: 7 MAR 2019 23:52:58

## Highest Channel / 5MHz / 16QAM



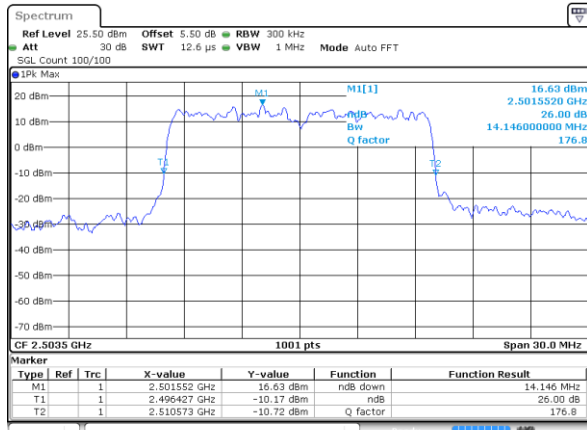
Date: 7 MAR 2019 23:53:17

**LTE Band 41**
**Lowest Channel / 10MHz / QPSK**

**Lowest Channel / 10MHz / 16QAM**

**Middle Channel / 10MHz / QPSK**

**Middle Channel / 10MHz / 16QAM**

**Highest Channel / 10MHz / QPSK**

**Highest Channel / 10MHz / 16QAM**


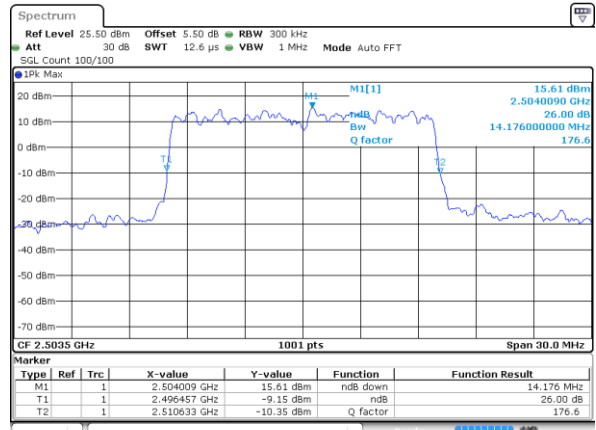


## LTE Band 41

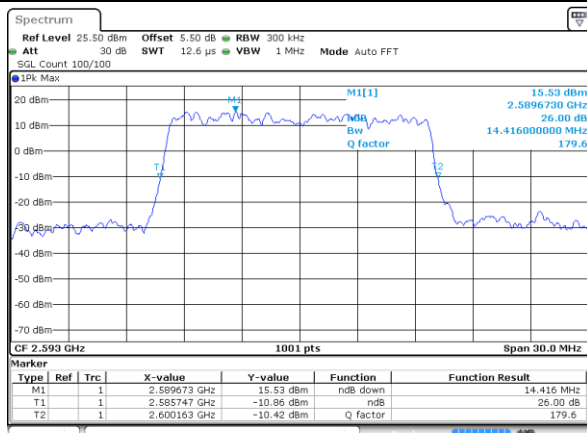
## Lowest Channel / 15MHz / QPSK



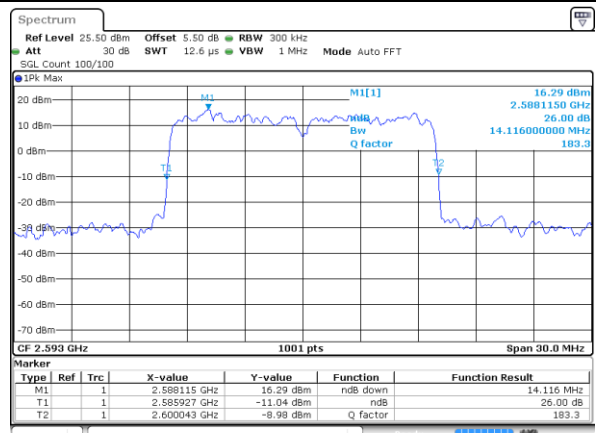
## Lowest Channel / 15MHz / 16QAM



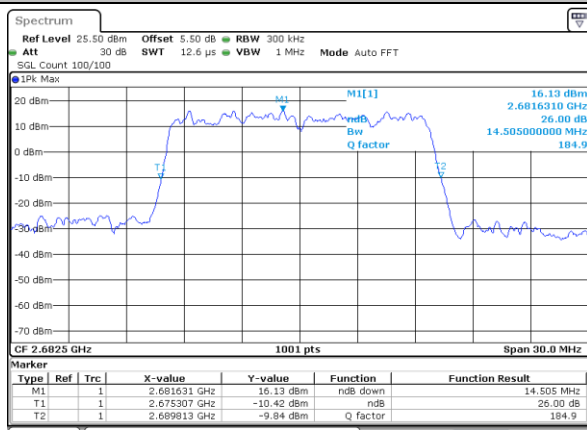
## Middle Channel / 15MHz / QPSK



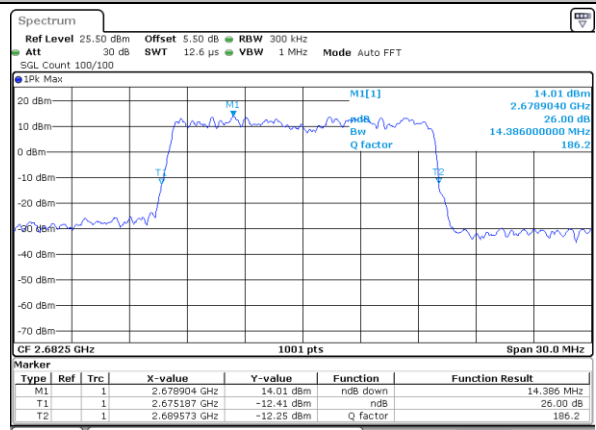
## Middle Channel / 15MHz / 16QAM



## Highest Channel / 15MHz / QPSK



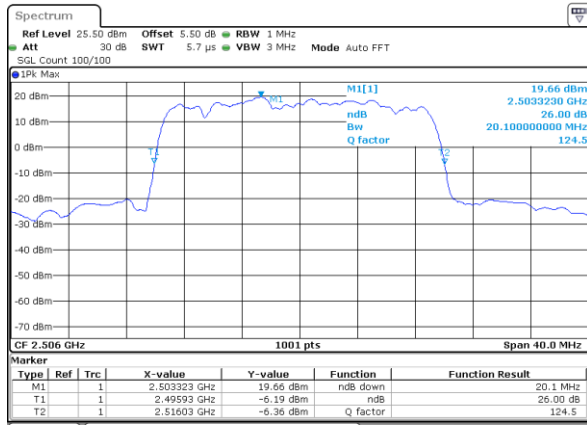
## Highest Channel / 15MHz / 16QAM



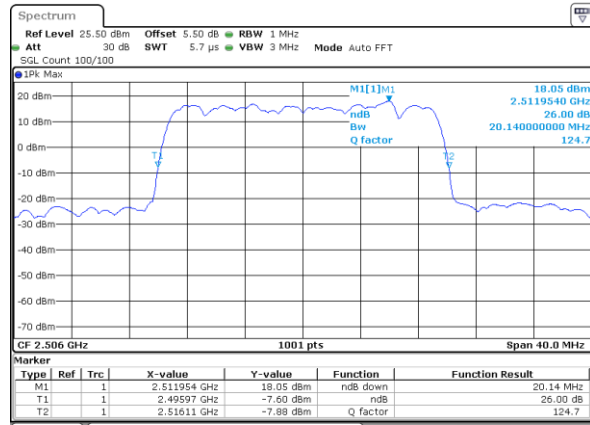


## LTE Band 41

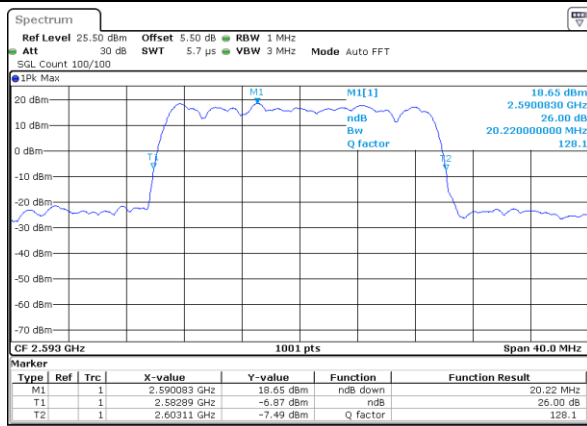
## Lowest Channel / 20MHz / QPSK



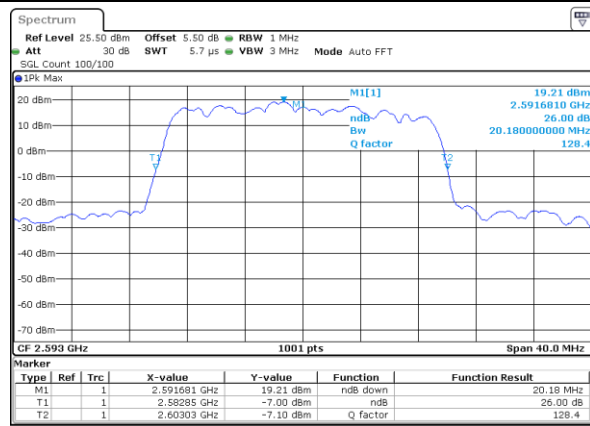
## Lowest Channel / 20MHz / 16QAM



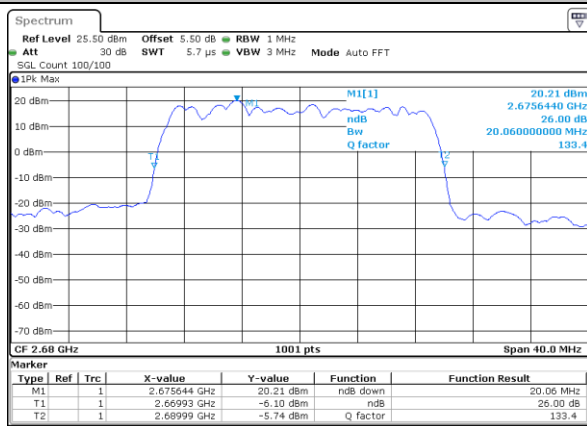
## Middle Channel / 20MHz / QPSK



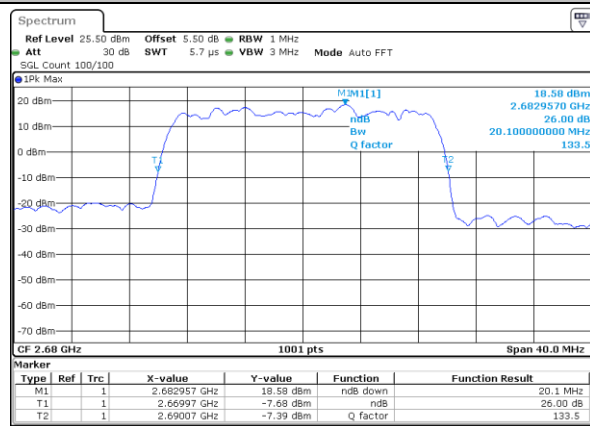
## Middle Channel / 20MHz / 16QAM



## Highest Channel / 20MHz / QPSK



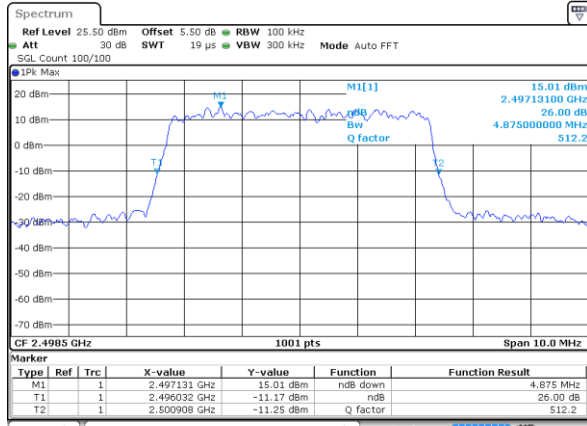
## Highest Channel / 20MHz / 16QAM





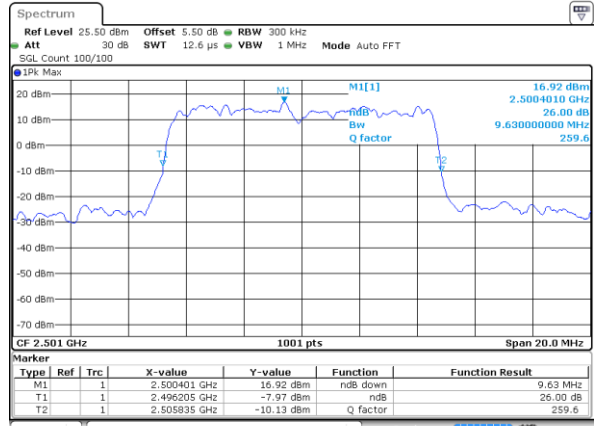
## LTE Band 41

## Lowest Channel / 5MHz / 64QAM



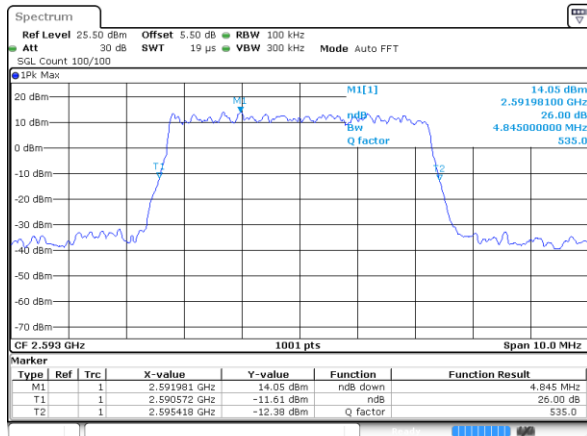
Date: 7 MAR 2019 23:50:38

## Lowest Channel / 10MHz / 64QAM



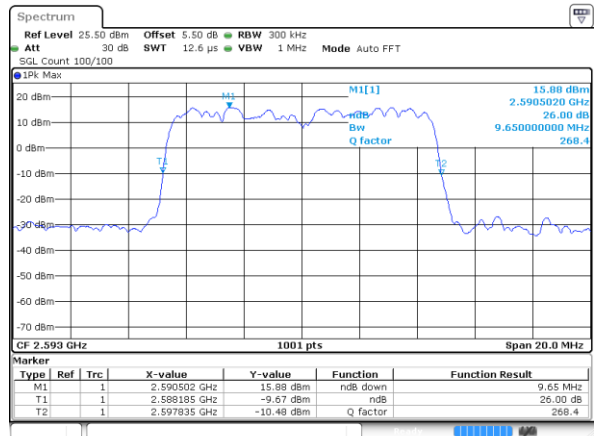
Date: 8 MAR 2019 00:53:09

## Middle Channel / 5MHz / 64QAM



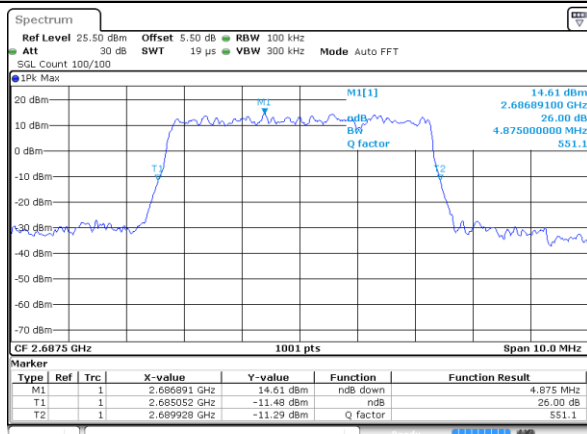
Date: 7 MAR 2019 23:51:50

## Middle Channel / 10MHz / 64QAM



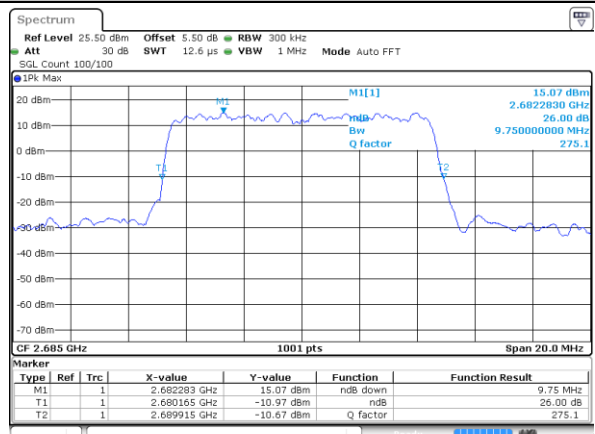
Date: 8 MAR 2019 00:53:32

## Highest Channel / 5MHz / 64QAM



Date: 7 MAR 2019 23:53:35

## Highest Channel / 10MHz / 64QAM

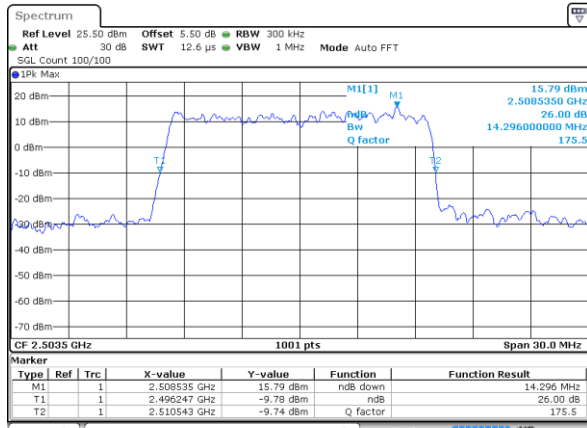


Date: 8 MAR 2019 00:56:01



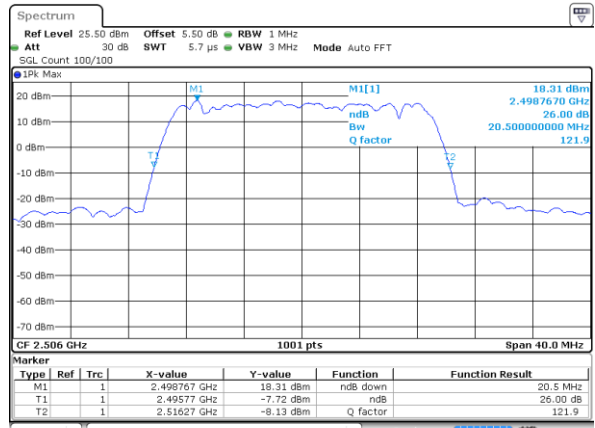
## LTE Band 41

## Lowest Channel / 15MHz / 64QAM



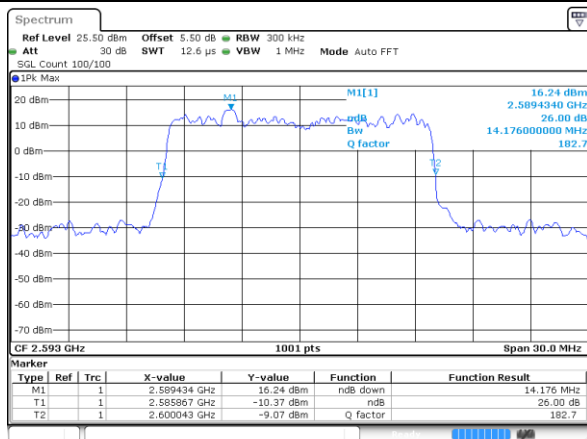
Date: 8 MAR 2019 02:41:42

## Lowest Channel / 20MHz / 64QAM



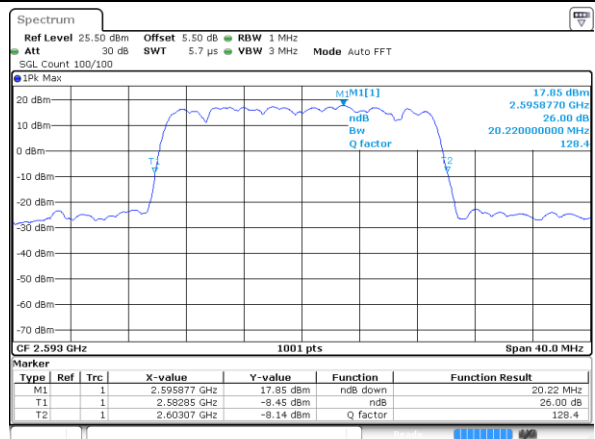
Date: 8 MAR 2019 04:28:38

## Middle Channel / 15MHz / 64QAM



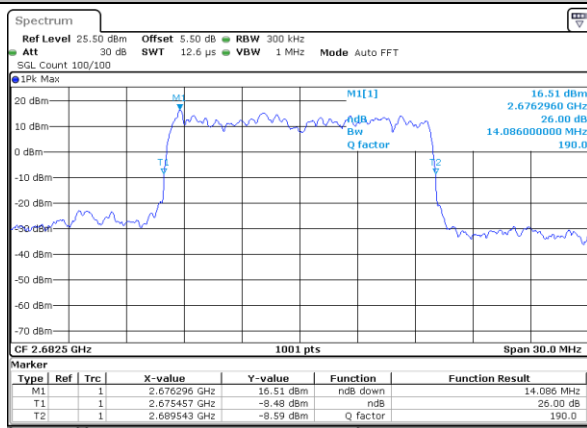
Date: 8 MAR 2019 02:42:54

## Middle Channel / 20MHz / 64QAM



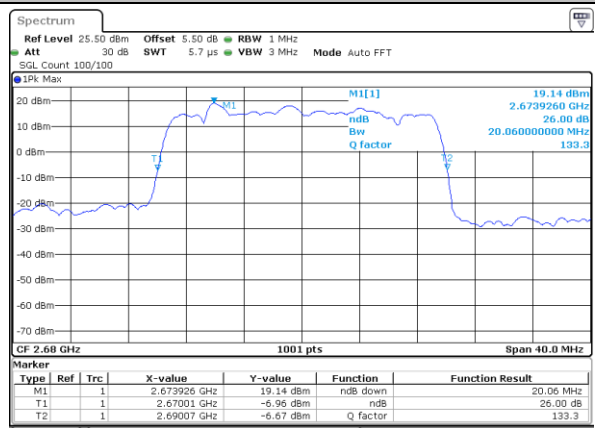
Date: 8 MAR 2019 04:28:10

## Highest Channel / 15MHz / 64QAM



Date: 8 MAR 2019 02:46:32

## Highest Channel / 20MHz / 64QAM



Date: 8 MAR 2019 04:31:50

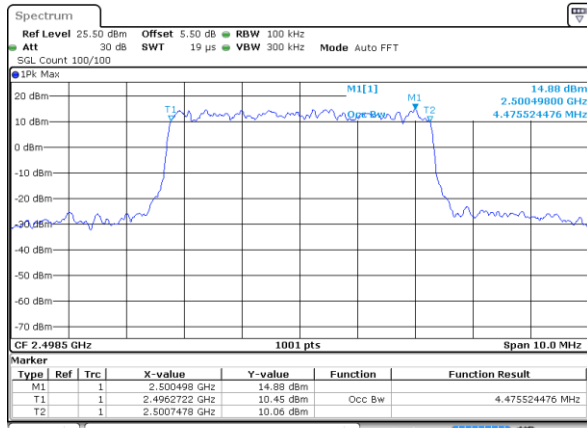
**Occupied Bandwidth**

| Mode       | LTE Band 41 : 99%OBW(MHz) |       |      |       |       |       |       |       |       |       |       |       |
|------------|---------------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| BW         | 1.4MHz                    |       | 3MHz |       | 5MHz  |       | 10MHz |       | 15MHz |       | 20MHz |       |
| Mod.       | QPSK                      | 16QAM | QPSK | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM |
| Lowest CH  | -                         | -     | -    | -     | 4.48  | 4.44  | 9.01  | 9.03  | 13.49 | 13.43 | 18.26 | 18.34 |
| Middle CH  | -                         | -     | -    | -     | 4.47  | 4.5   | 9.03  | 9.05  | 13.46 | 13.52 | 18.34 | 18.18 |
| Highest CH | -                         | -     | -    | -     | 4.49  | 4.48  | 9.01  | 9.03  | 13.34 | 13.46 | 18.5  | 18.18 |
| Mode       | LTE Band 41 : 99%OBW(MHz) |       |      |       |       |       |       |       |       |       |       |       |
| BW         |                           |       |      |       | 5MHz  |       | 10MHz |       | 15MHz |       | 20MHz |       |
| Mod.       |                           |       |      |       | 64QAM |       | 64QAM |       | 64QAM |       | 64QAM |       |
| Lowest CH  |                           |       |      |       | 4.49  |       | 9.05  |       | 13.49 |       | 18.42 |       |
| Middle CH  | -                         | -     | -    | -     | 4.5   |       | 9.05  |       | 13.47 |       | 18.38 |       |
| Highest CH | -                         | -     | -    | -     | 4.47  |       | 9.05  |       | 13.43 |       | 18.38 |       |



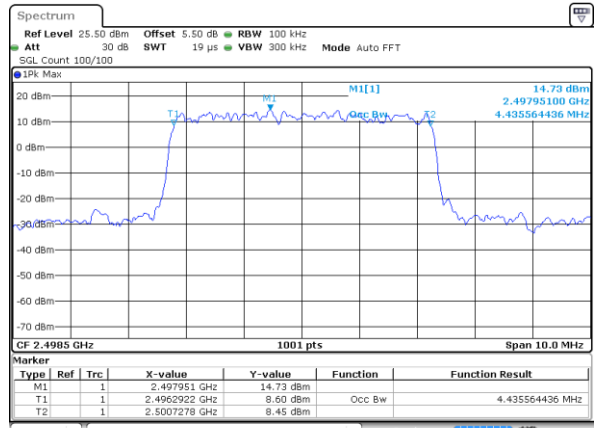
## LTE Band 41

## Lowest Channel / 5MHz / QPSK



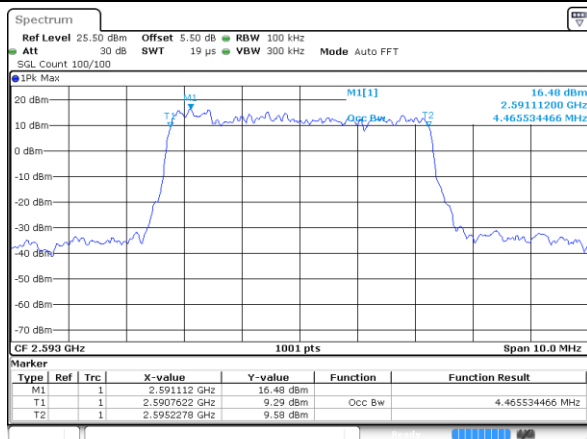
Date: 7 MAR 2019 23:48:16

## Lowest Channel / 5MHz / 16QAM



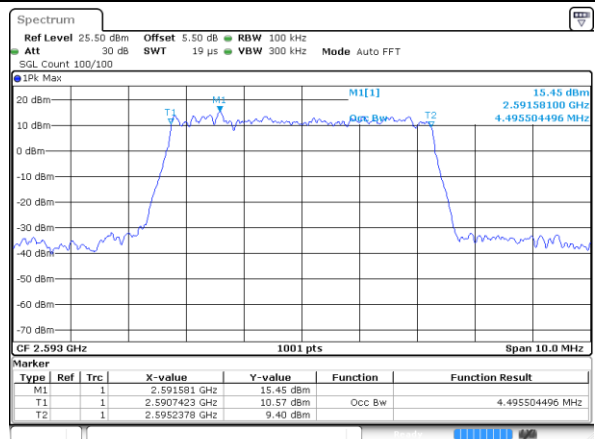
Date: 7 MAR 2019 23:48:40

## Middle Channel / 5MHz / QPSK



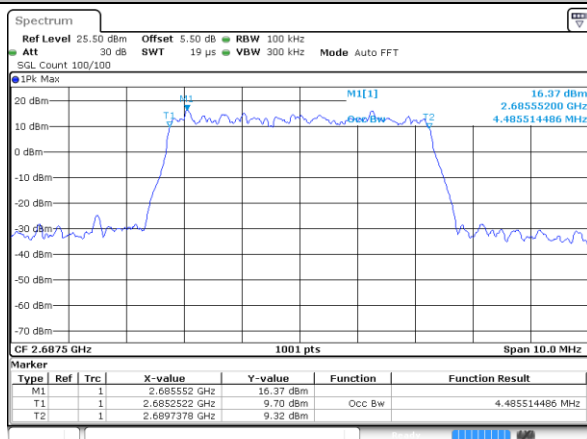
Date: 7 MAR 2019 23:52:21

## Middle Channel / 5MHz / 16QAM



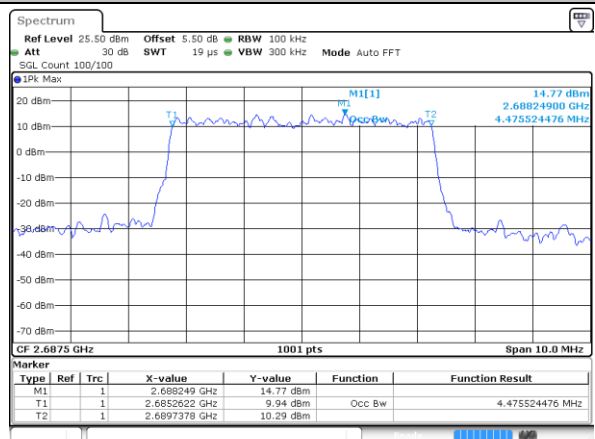
Date: 7 MAR 2019 23:52:01

## Highest Channel / 5MHz / QPSK



Date: 7 MAR 2019 23:52:47

## Highest Channel / 5MHz / 16QAM

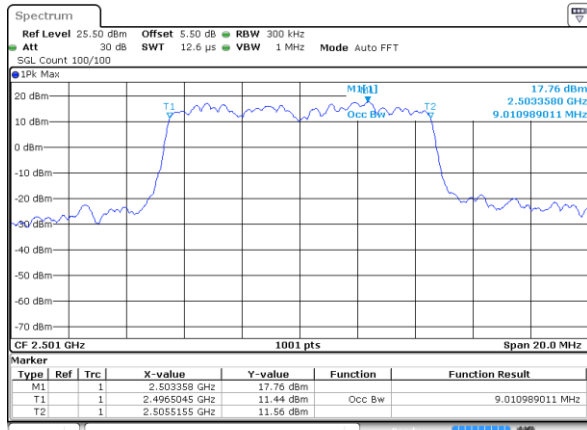


Date: 7 MAR 2019 23:53:08



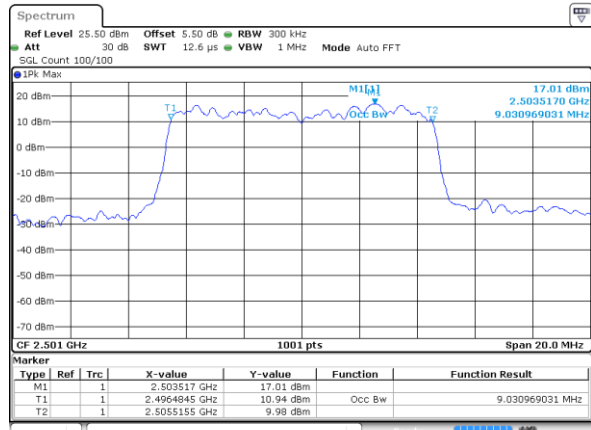
## LTE Band 41

## Lowest Channel / 10MHz / QPSK



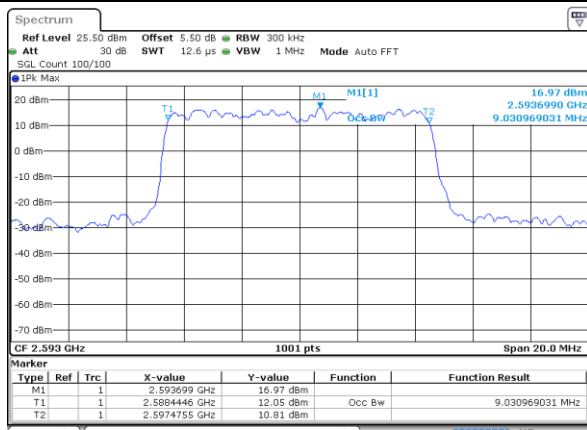
Date: 8 MAR 2019 00:52:17

## Lowest Channel / 10MHz / 16QAM



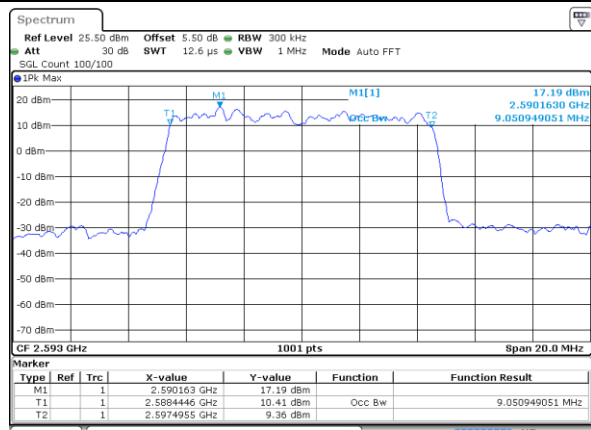
Date: 8 MAR 2019 00:52:36

## Middle Channel / 10MHz / QPSK



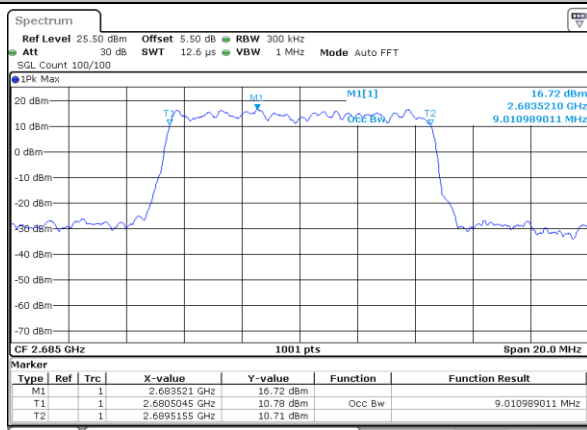
Date: 8 MAR 2019 00:54:17

## Middle Channel / 10MHz / 16QAM



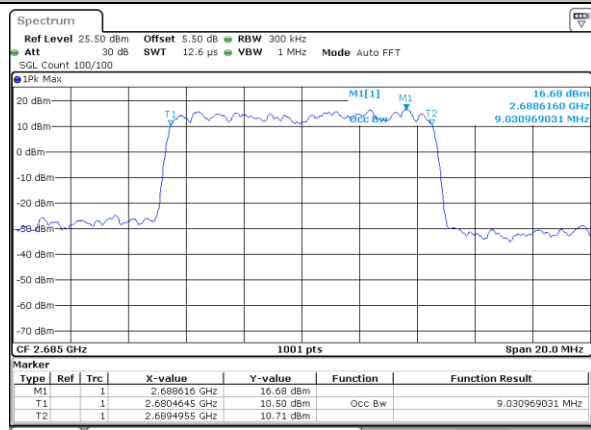
Date: 8 MAR 2019 00:53:44

## Highest Channel / 10MHz / QPSK



Date: 8 MAR 2019 00:55:04

## Highest Channel / 10MHz / 16QAM

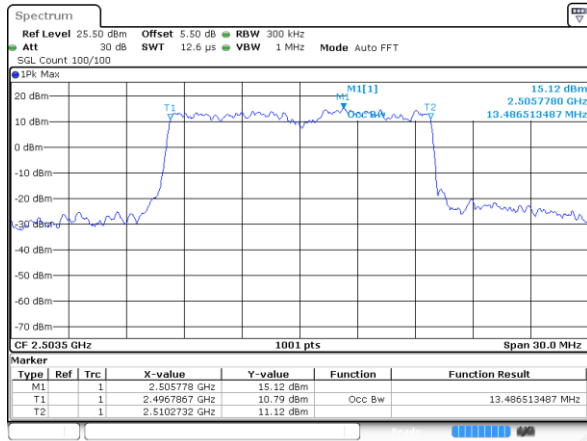


Date: 8 MAR 2019 00:55:25

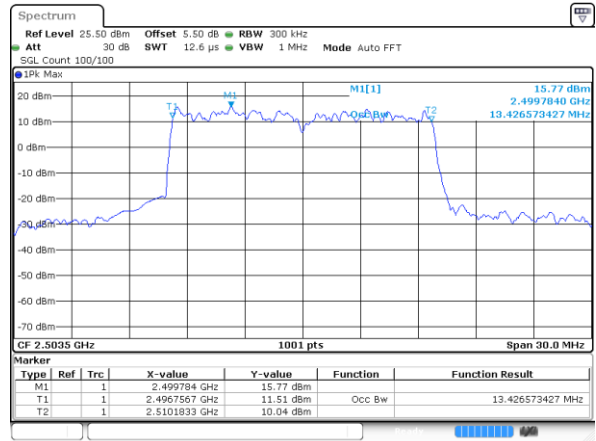


## LTE Band 41

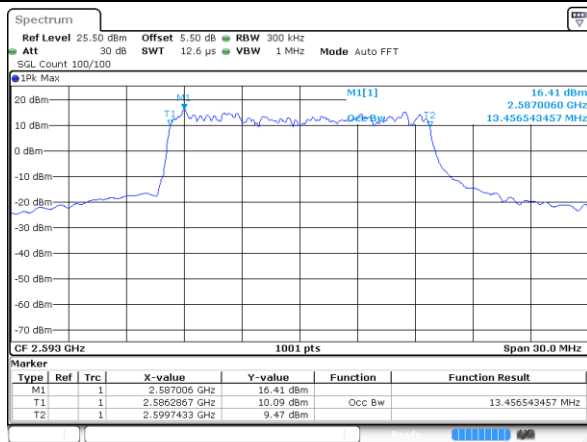
## Lowest Channel / 15MHz / QPSK



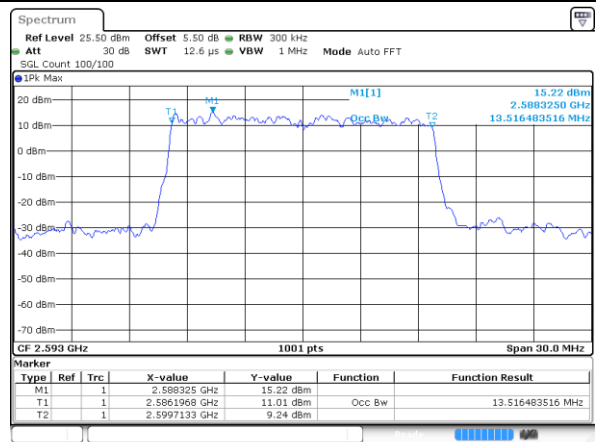
## Lowest Channel / 15MHz / 16QAM



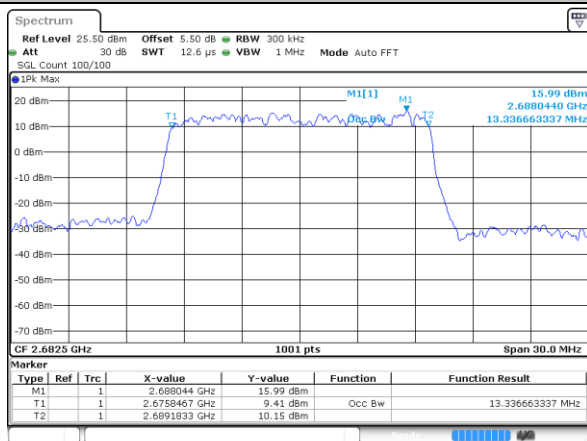
## Middle Channel / 15MHz / QPSK



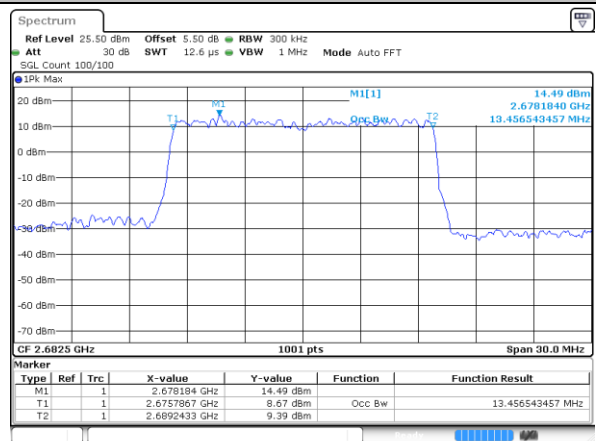
## Middle Channel / 15MHz / 16QAM



## Highest Channel / 15MHz / QPSK



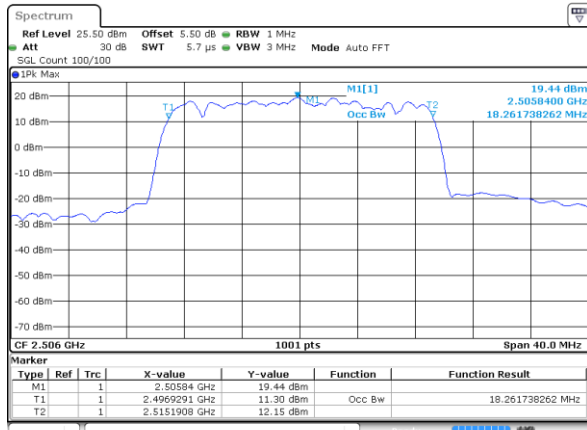
## Highest Channel / 15MHz / 16QAM



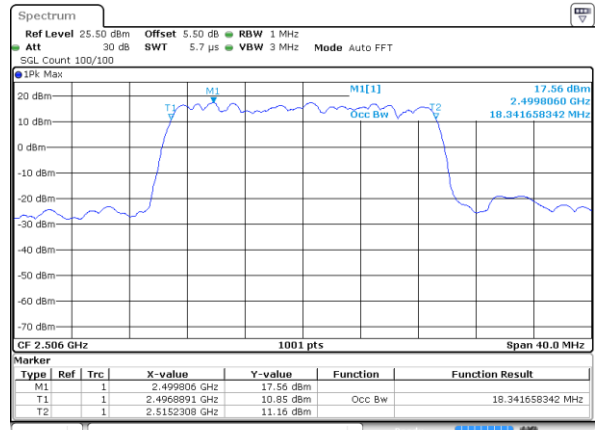


## LTE Band 41

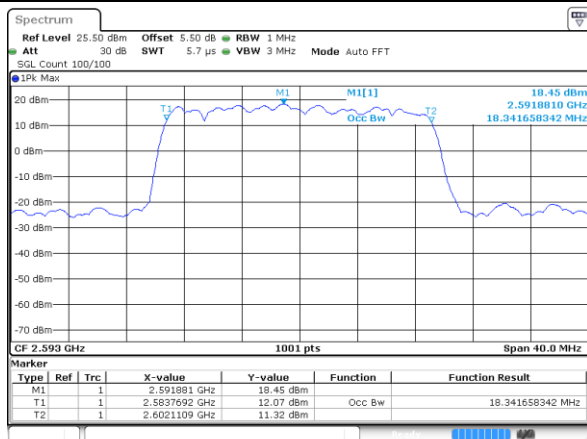
## Lowest Channel / 20MHz / QPSK



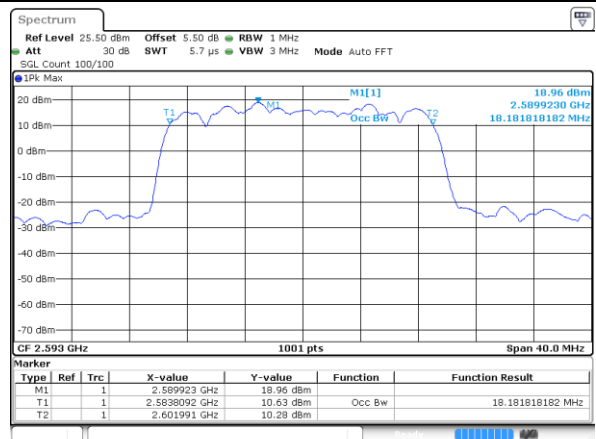
## Lowest Channel / 20MHz / 16QAM



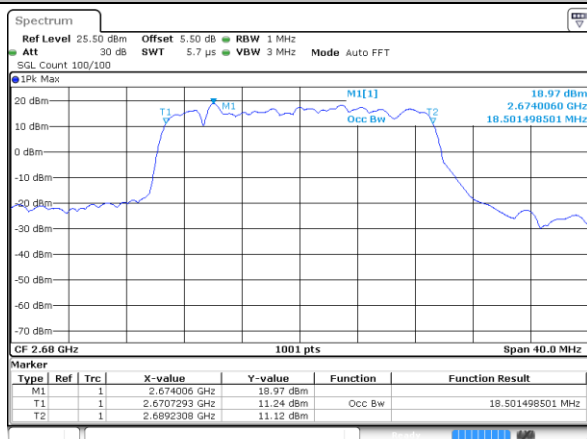
## Middle Channel / 20MHz / QPSK



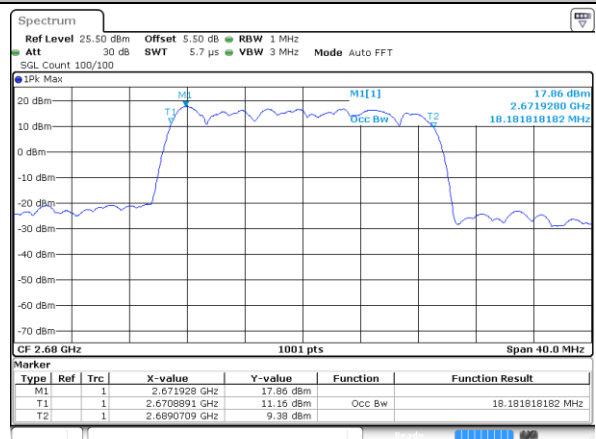
## Middle Channel / 20MHz / 16QAM



## Highest Channel / 20MHz / QPSK



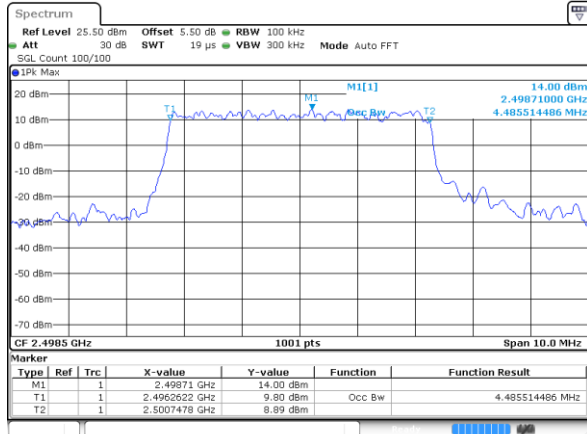
## Highest Channel / 20MHz / 16QAM



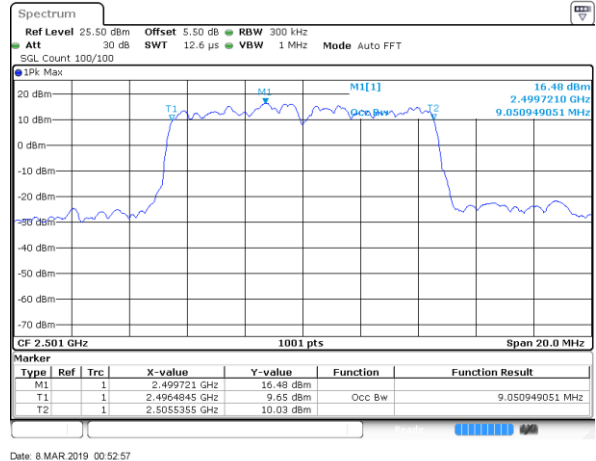


## LTE Band 41

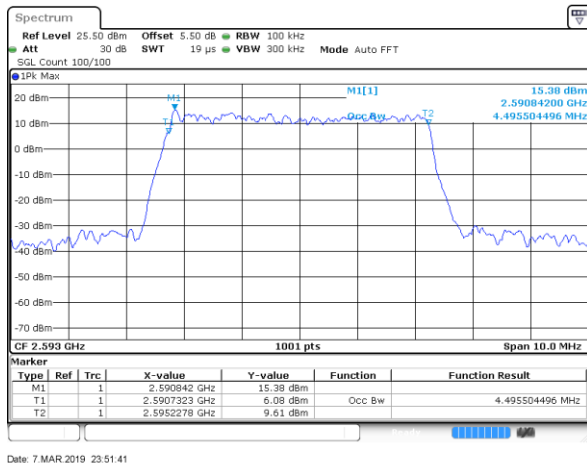
## Lowest Channel / 5MHz / 64QAM



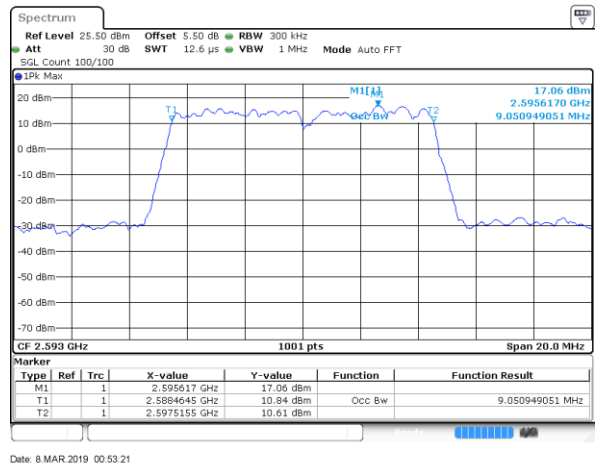
## Lowest Channel / 10MHz / 64QAM



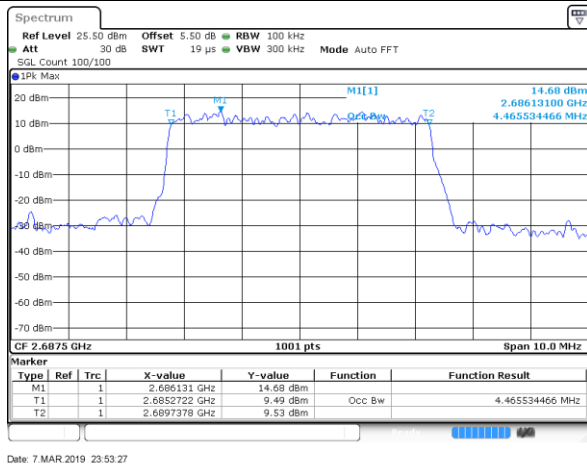
## Middle Channel / 5MHz / 64QAM



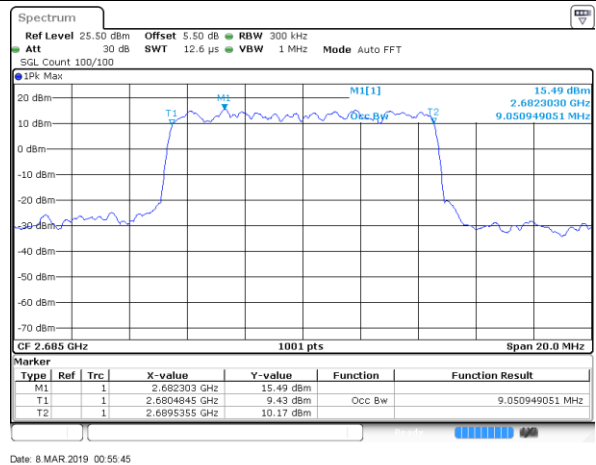
## Middle Channel / 10MHz / 64QAM



## Highest Channel / 5MHz / 64QAM



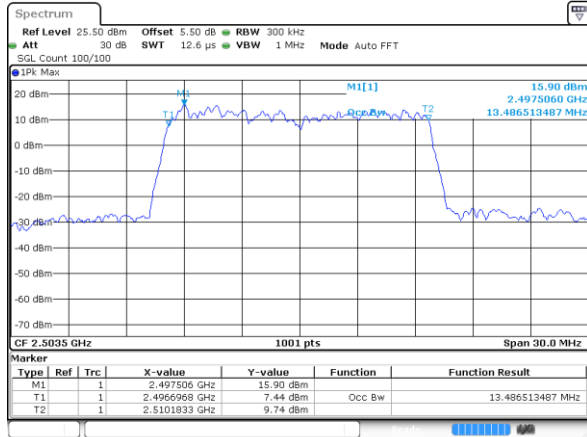
## Highest Channel / 10MHz / 64QAM



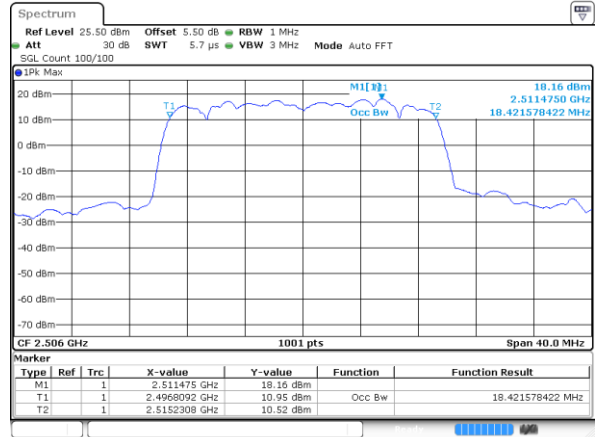


## LTE Band 41

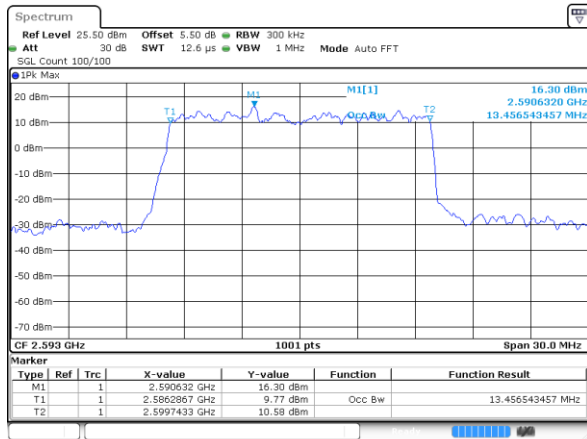
## Lowest Channel / 15MHz / 64QAM



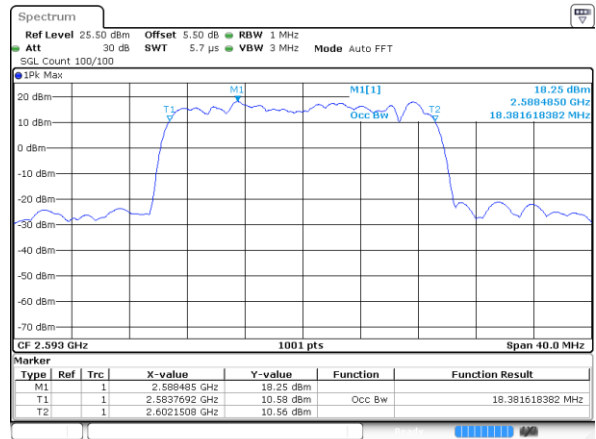
## Lowest Channel / 20MHz / 64QAM



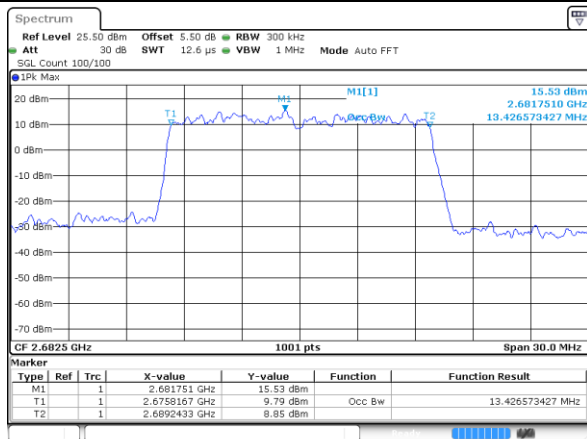
## Middle Channel / 15MHz / 64QAM



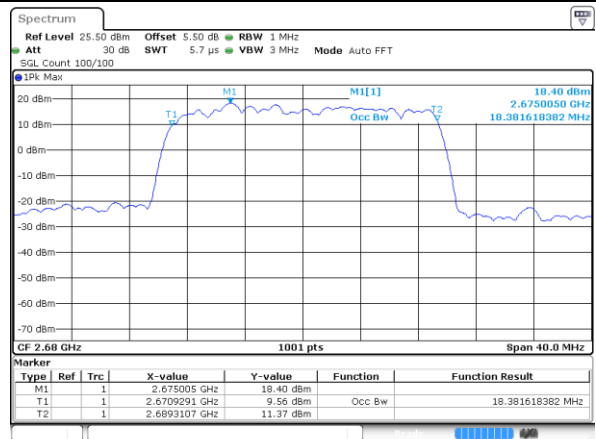
## Middle Channel / 20MHz / 64QAM

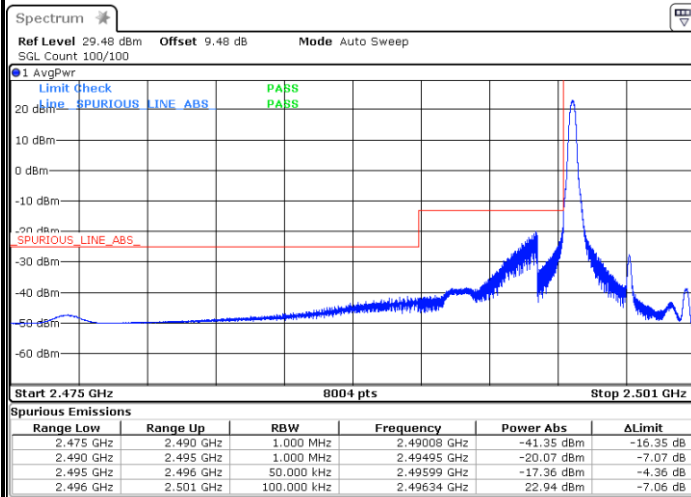
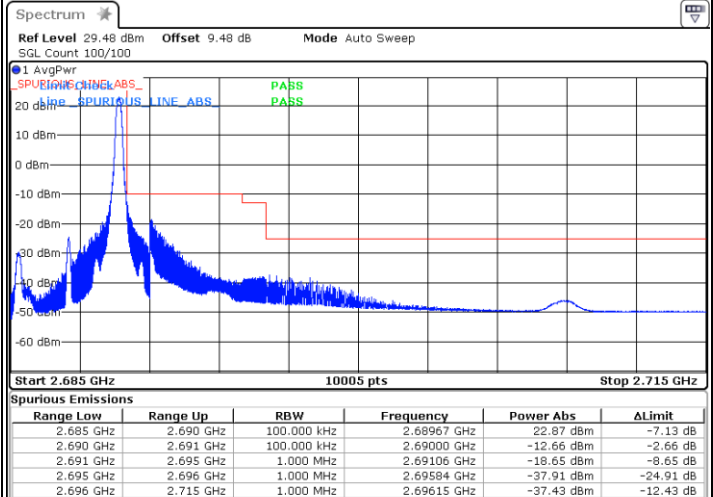
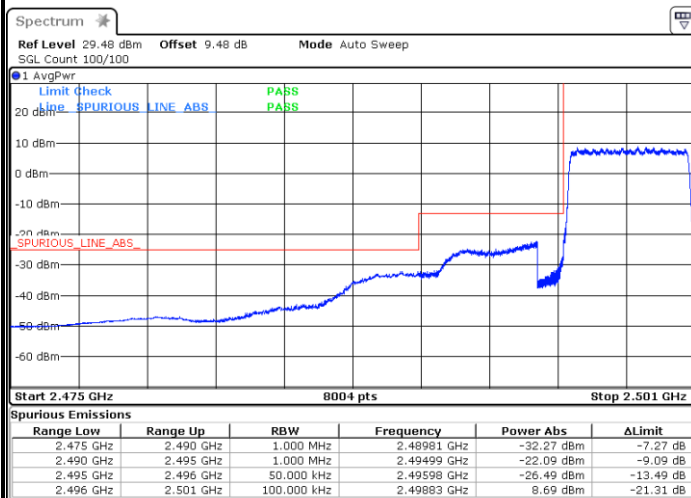
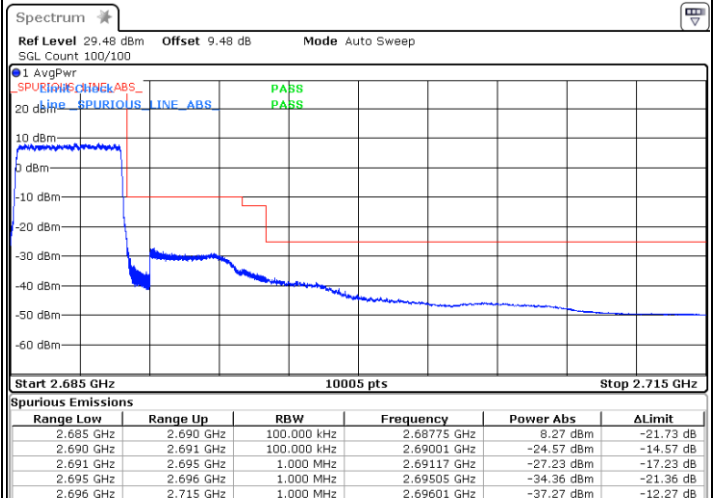


## Highest Channel / 15MHz / 64QAM



## Highest Channel / 20MHz / 64QAM

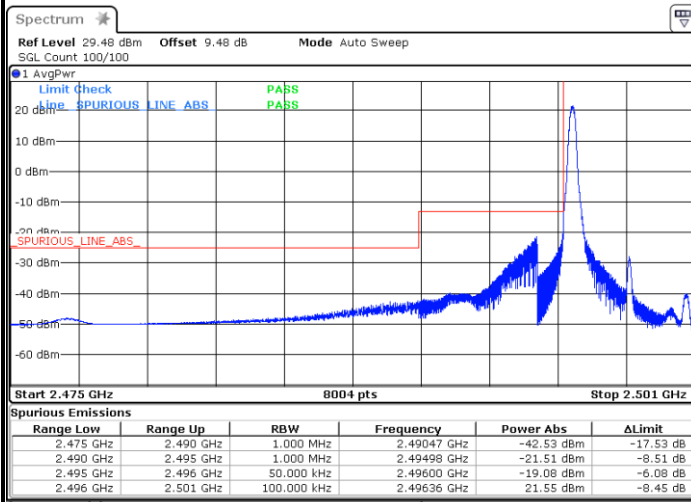


**Conducted Band Edge****LTE Band 41 / 5MHz / QPSK****Lowest Band Edge / 1 RB****Highest Band Edge / 1 RB****Lowest Band Edge / Full RB****Highest Band Edge / Full RB**



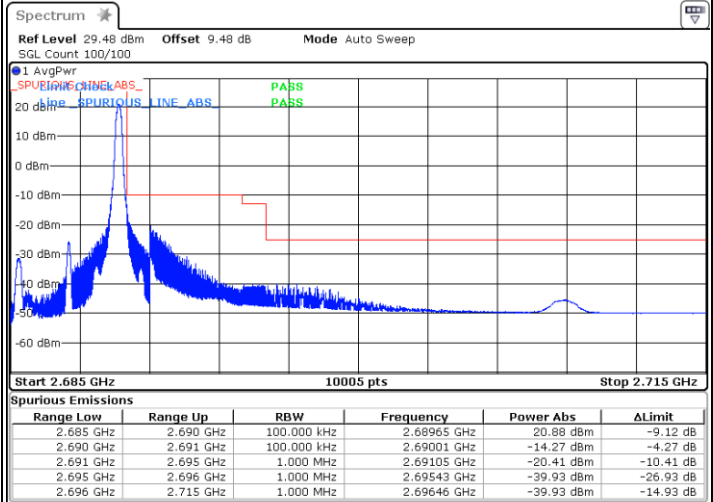
## LTE Band 41 / 5MHz / 16QAM

## Lowest Band Edge / 1RB



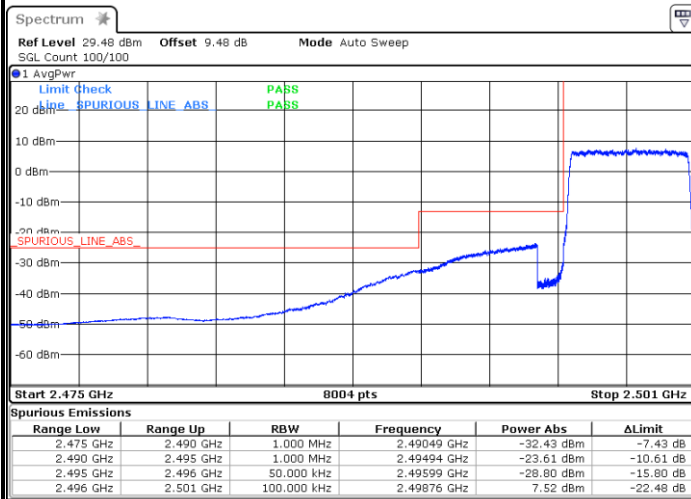
Date: 8 MAR 2019 00:01:49

## Highest Band Edge / 1 RB



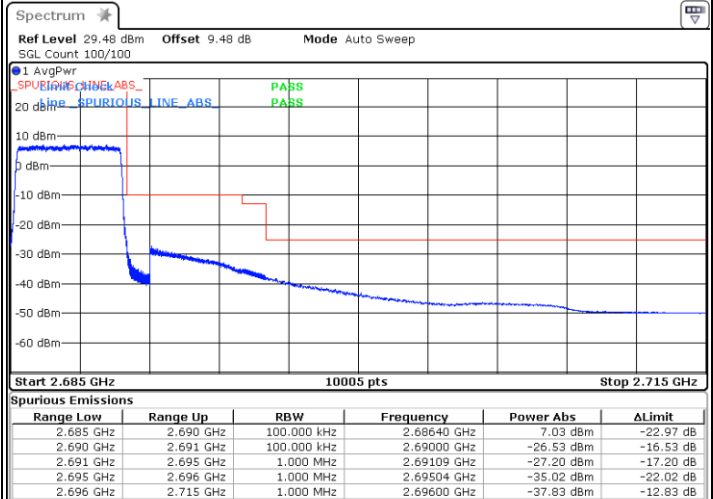
Date: 8 MAR 2019 00:17:13

## Lowest Band Edge / Full RB



Date: 8 MAR 2019 00:06:52

## Highest Band Edge / Full RB

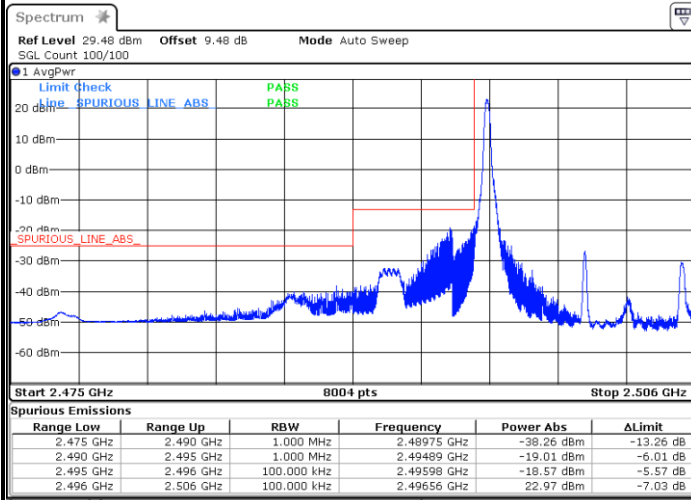


Date: 8 MAR 2019 00:12:02

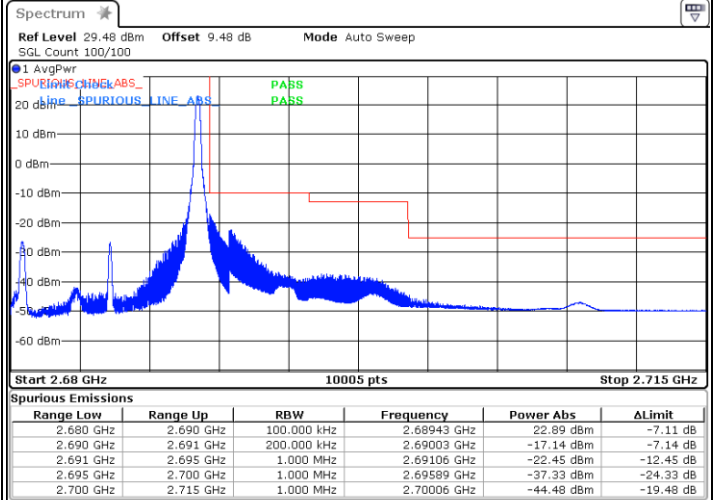


## LTE Band 41 / 10MHz / QPSK

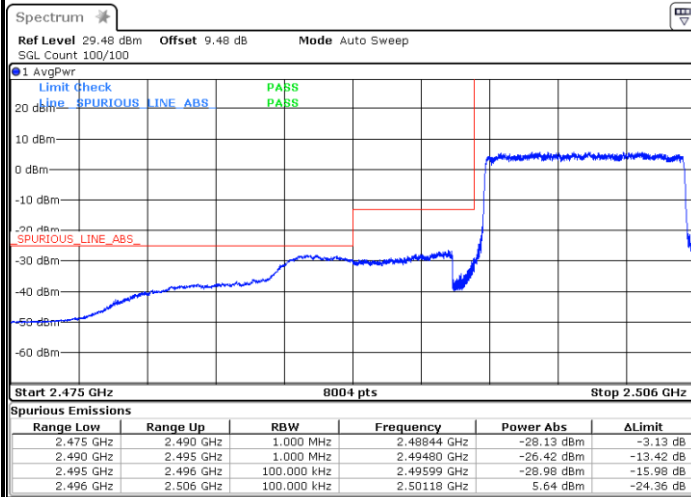
## Lowest Band Edge / 1 RB



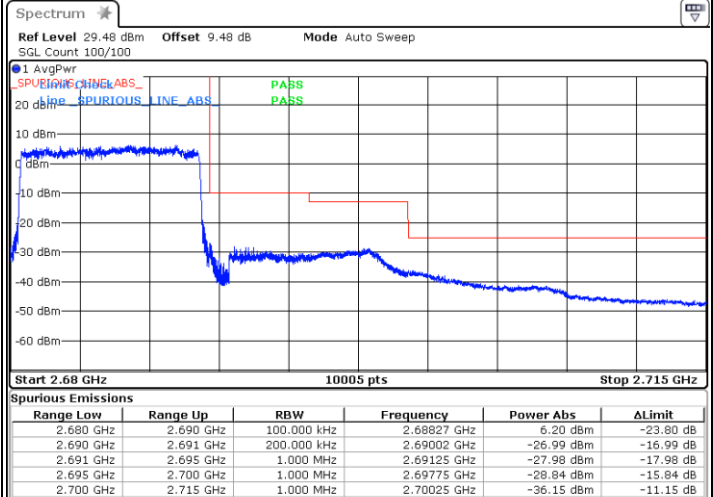
## Highest Band Edge / 1 RB



## Lowest Band Edge / Full RB



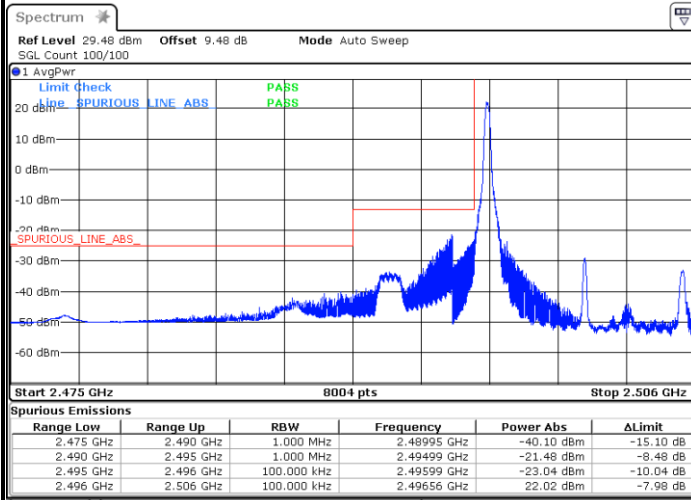
## Highest Band Edge / Full RB





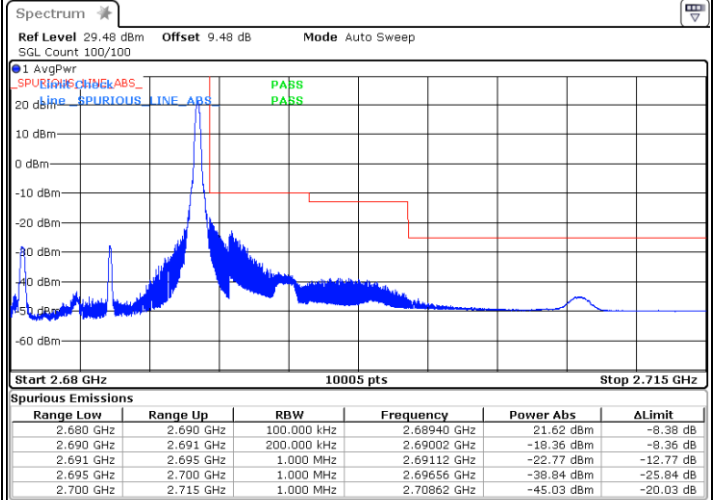
## LTE Band 41 / 10MHz / 16QAM

## Lowest Band Edge / 1 RB



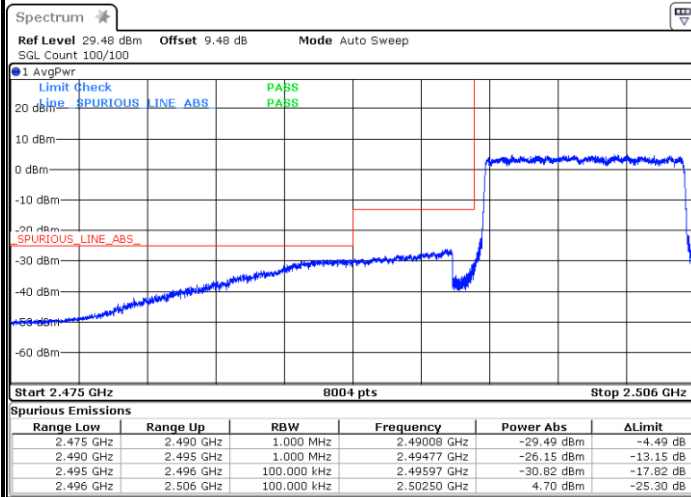
Date: 8 MAR 2019 00:30:52

## Highest Band Edge / 1 RB



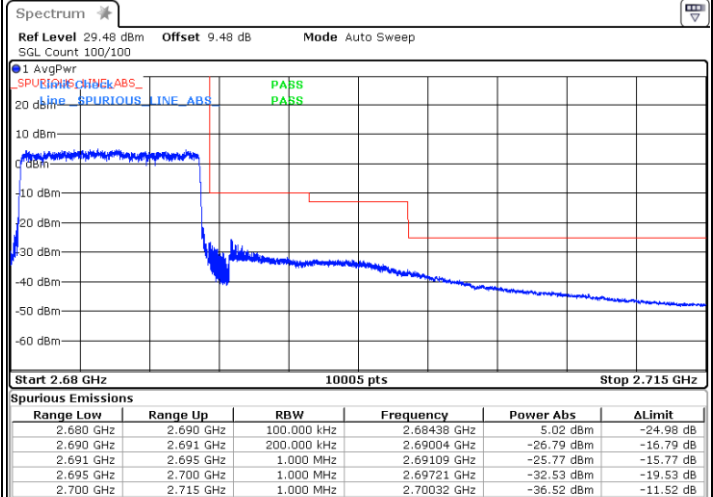
Date: 8 MAR 2019 00:42:24

## Lowest Band Edge / Full RB



Date: 8 MAR 2019 00:33:56

## Highest Band Edge / Full RB

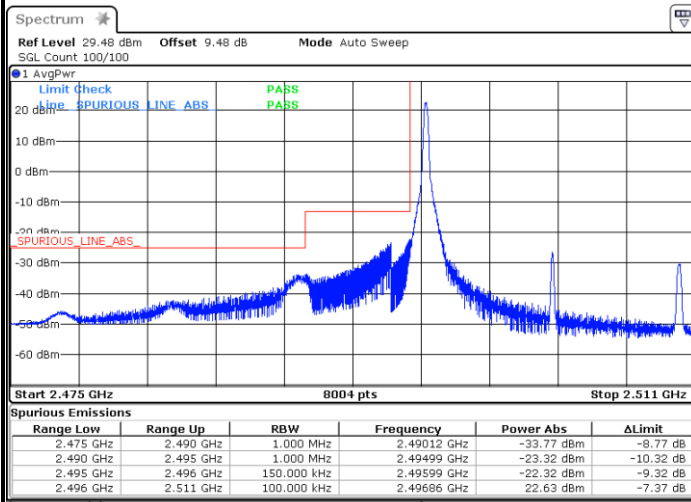


Date: 8 MAR 2019 00:36:15

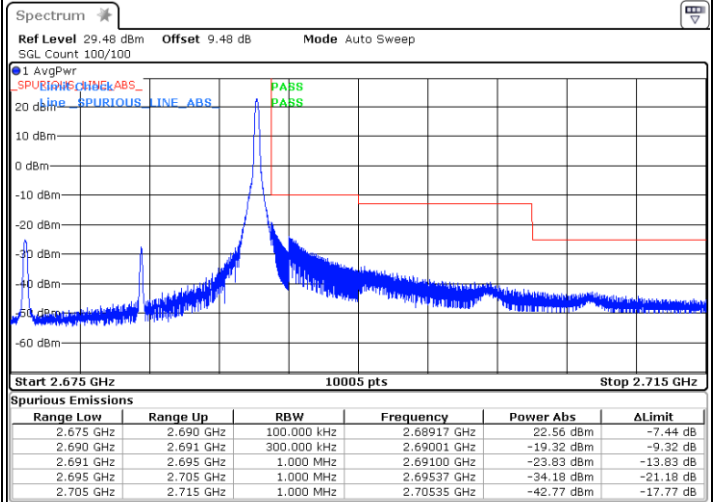


## LTE Band 41 / 15MHz / QPSK

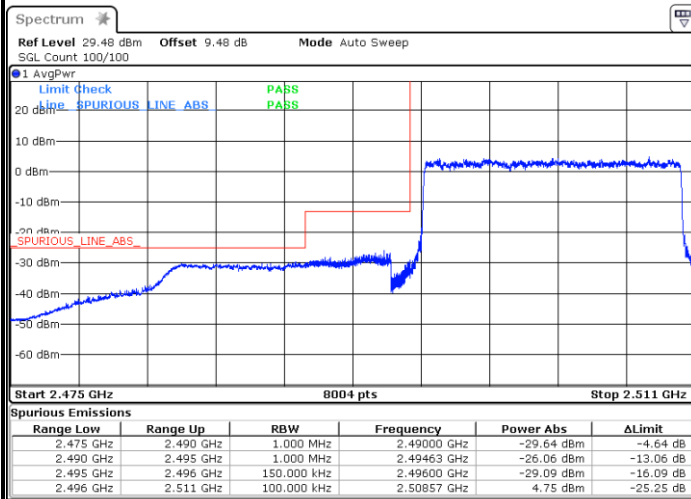
## Lowest Band Edge / 1 RB



## Highest Band Edge / 1 RB



## Lowest Band Edge / Full RB



## Highest Band Edge / Full RB

