

# FCC REPORT

## (LTE)

**Applicant:** Shenzhen Tuoshi network communicationc co., limited

**Address of Applicant:** 3 Floor A5 Building, Yinlong Industrial park, 292 Shenshan Road, longgang shenzhen China

**Equipment Under Test (EUT)**

Product Name: 4G wireless router

Model No.: LT15F, LT15D, LT15H, LT15, LT10

Trade mark: tuoshi Dionlink

**FCC ID:** 2ATBFLT15

**Applicable standards:** FCC CFR Title 47 Part 2  
FCC CFR Title 47 Part 27 Subpart L

**Date of sample receipt:** 05 May., 2019

**Date of Test:** 06 May., to 21 May., 2019

**Date of report issued:** 23 May., 2019

**Test Result:** PASS\*

\*In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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## 2. Version

| Version No. | Date          | Description |
|-------------|---------------|-------------|
| 00          | 23 May., 2019 | Original    |
|             |               |             |
|             |               |             |
|             |               |             |
|             |               |             |

**Tested by:**

*Carrey Chen*

**Test Engineer**

**Date:**

23 May., 2019

**Reviewed by:**

*Wimer Zhang*

**Project Engineer**

**Date:**

23 May., 2019

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## 4. Test Summary

| Test Items                                                                     | Section in CFR 47                  | Result                                 |
|--------------------------------------------------------------------------------|------------------------------------|----------------------------------------|
| RF Exposure (SAR)                                                              | Part 1.1307<br>Part 2.1093         | Passed<br>(Please refer to SAR Report) |
| RF Output Power                                                                | Part 2.1046<br>Part 27.50 (d)(4)   | Pass                                   |
| Peak-to-Average Ratio                                                          | Part 27.50(d)(5)                   | Pass                                   |
| Modulation Characteristics                                                     | Part 2.1047                        | Pass                                   |
| 99% & -26 dB Occupied Bandwidth                                                | Part 2.1049<br>Part 27.53(h)       | Pass                                   |
| Out of band emission at antenna terminals                                      | Part 2.1053<br>Part 27.53 (h)      | Pass                                   |
| Field strength of spurious radiation                                           | Part 27.53 (h)                     | Pass                                   |
| Frequency stability vs. temperature                                            | Part 27.54<br>Part 2.1055(a)(1)(b) | Pass                                   |
| Frequency stability vs. voltage                                                | Part 27.54<br>Part 2.1055(d)(2)    | Pass                                   |
| <i>Pass: The EUT complies with the essential requirements in the standard.</i> |                                    |                                        |

## 5. General Information

### 5.1 Client Information

|                       |                                                                                          |
|-----------------------|------------------------------------------------------------------------------------------|
| Applicant:            | Shenzhen Tuoshi network communicationc co., limited                                      |
| Address:              | 3 Floor A5 Building, Yinlong Industrial park, 292 Shenshan Road, longgang shenzhen China |
| Manufacturer/Factory: | Shenzhen Tuoshi network communicationc co., limited                                      |
| Address:              | 3 Floor A5 Building, Yinlong Industrial park, 292 Shenshan Road, longgang shenzhen China |

### 5.2 General Description of E.U.T.

|                            |                                                                                                                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:              | 4G wireless router                                                                                                                                                                  |
| Model No.:                 | LT15F, LT15D, LT15H, LT15, LT10                                                                                                                                                     |
| Operation Frequency range: | LTE Band 4: TX: 1710MHz-1755MHz, RX: 2110MHz-2155MHz                                                                                                                                |
| Modulation type:           | QPSK, 16QAM                                                                                                                                                                         |
| Antenna type:              | External Antenna                                                                                                                                                                    |
| Antenna gain:              | LTE Band 4: 2dBi                                                                                                                                                                    |
| Power supply:              | AC 120V / 60Hz                                                                                                                                                                      |
| AC adapter:                | Model: RD120101000-C55-91MG<br>Input: AC100-240V 50/60Hz 0.6A MAX<br>Output: DC 12.0V, 1000mA                                                                                       |
| Test Sample Condition:     | The applicant provided engineering samples for staying in continuously transmitting for testing.                                                                                    |
| Remarks:                   | item No.: LT15F, LT15D, LT15H, LT15, LT10 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name. |

## Operation Frequency List:

| LTE Band 4 (1.4MHz) |                 | LTE Band 4 (3MHz)  |                 |
|---------------------|-----------------|--------------------|-----------------|
| Channel             | Frequency (MHz) | Channel            | Frequency (MHz) |
| 19957               | 1710.70         | 19965              | 1711.50         |
| 19958               | 1710.80         | 19966              | 1711.60         |
| ....                | ....            | ....               | ....            |
| 20174               | 1732.40         | 20174              | 1732.40         |
| 20175               | 1732.50         | 20175              | 1732.50         |
| 20176               | 1732.60         | 20176              | 1732.60         |
| ...                 | ...             | ...                | ...             |
| 20392               | 1754.20         | 20384              | 1753.40         |
| 20393               | 1754.30         | 20385              | 1753.50         |
| LTE Band 4 (5MHz)   |                 | LTE Band 4 (10MHz) |                 |
| Channel             | Frequency (MHz) | Channel            | Frequency (MHz) |
| 19975               | 1712.50         | 20000              | 1715.00         |
| 19976               | 1712.60         | 20001              | 1715.10         |
| ....                | ....            | ....               | ....            |
| 20174               | 1732.40         | 20174              | 1732.40         |
| 20175               | 1732.50         | 20175              | 1732.50         |
| 20176               | 1732.60         | 20176              | 1732.60         |
| ...                 | ...             | ...                | ...             |
| 20374               | 1752.40         | 20349              | 1749.90         |
| 20375               | 1752.50         | 20350              | 1750.00         |
| LTE Band 4 (15MHz)  |                 | LTE Band 4 (20MHz) |                 |
| Channel             | Frequency (MHz) | Channel            | Frequency (MHz) |
| 20025               | 1717.50         | 20050              | 1720.00         |
| 20026               | 1717.60         | 20051              | 1720.10         |
| ....                | ....            | ....               | ....            |
| 20174               | 1732.40         | 20174              | 1732.40         |
| 20175               | 1732.50         | 20175              | 1732.50         |
| 20176               | 1732.60         | 20176              | 1732.60         |
| ...                 | ...             | ...                | ...             |
| 20324               | 1747.40         | 20299              | 1744.90         |
| 20325               | 1747.50         | 20300              | 1745.00         |

Regards to the operating frequency range, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channels as below:

| LTE Band 4 (1.4MHz) |       |                 | LTE Band 4 (3MHz)  |       |                 |
|---------------------|-------|-----------------|--------------------|-------|-----------------|
| Channel:            |       | Frequency (MHz) | Channel            |       | Frequency (MHz) |
| Lowest channel      | 19957 | 1710.70         | Lowest channel     | 19965 | 1711.50         |
| Middle channel      | 20175 | 1732.50         | Middle channel     | 20175 | 1732.50         |
| Highest channel     | 20393 | 1754.30         | Highest channel    | 20385 | 1753.50         |
| LTE Band 4 (5MHz)   |       |                 | LTE Band 4 (10MHz) |       |                 |
| Channel             |       | Frequency (MHz) | Channel            |       | Frequency (MHz) |
| Lowest channel      | 19975 | 1712.50         | Lowest channel     | 20000 | 1715.00         |
| Middle channel      | 20175 | 1732.50         | Middle channel     | 20175 | 1732.50         |
| Highest channel     | 20375 | 1752.50         | Highest channel    | 20350 | 1750.00         |
| LTE Band 4 (15MHz)  |       |                 | LTE Band 4 (20MHz) |       |                 |
| Channel             |       | Frequency (MHz) | Channel            |       | Frequency (MHz) |
| Lowest channel      | 20025 | 1717.50         | Lowest channel     | 20050 | 1720.00         |
| Middle channel      | 20175 | 1732.50         | Middle channel     | 20175 | 1732.50         |
| Highest channel     | 20325 | 1747.50         | Highest channel    | 20300 | 1745.00         |

### 5.3 Test environment and mode

| Operating Environment:                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Temperature:                                                                                                                                                                                                                                                                                                                                                                                                                 | Normal: 15°C ~ 35°C, Extreme: -30°C ~ +50°C                      |
| Humidity:                                                                                                                                                                                                                                                                                                                                                                                                                    | 20 % ~ 75 % RH                                                   |
| Atmospheric Pressure:                                                                                                                                                                                                                                                                                                                                                                                                        | 1008 mbar                                                        |
| Voltage:                                                                                                                                                                                                                                                                                                                                                                                                                     | Nominal: 120Vac, Extreme: Low 114Vac, High 126Vac                |
| Test mode:                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                  |
| LTE QPSK mode                                                                                                                                                                                                                                                                                                                                                                                                                | Keep the EUT communication with simulated station in QPSK mode   |
| LTE 16-QAM mode                                                                                                                                                                                                                                                                                                                                                                                                              | Keep the EUT communication with simulated station in 16-QAM mode |
| Remark: The EUT has been tested under continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for these modes with power adaptor, earphone and Data cable. Just the worst case position (H mode) shown in report. |                                                                  |

### 5.4 Description of Support Units

| Test Equipment    | Manufacturer | Model No. | Serial No. |
|-------------------|--------------|-----------|------------|
| Simulated Station | Anritsu      | MT8820C   | 6201026545 |

### 5.5 Measurement Uncertainty

| Parameters                          | Expanded Uncertainty |
|-------------------------------------|----------------------|
| Radiated Emission (9kHz ~ 30MHz)    | ±3.12 dB (k=2)       |
| Radiated Emission (30MHz ~ 1000MHz) | ±4.54 dB (k=2)       |
| Radiated Emission (1GHz ~ 18GHz)    | ±5.84 dB (k=2)       |
| Radiated Emission (18GHz ~ 40GHz)   | ±3.36 dB (k=2)       |

### 5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

### 5.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

### 5.8 Laboratory Location

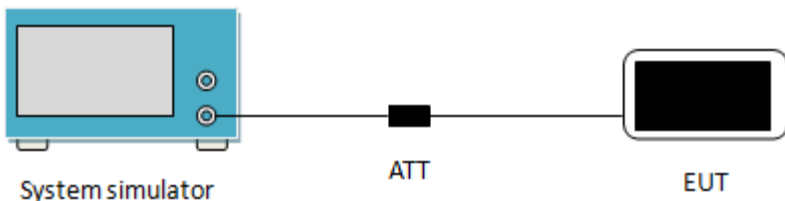
Shenzhen Zhongjian Nanfang Testing Co., Ltd.  
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,  
Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755-23118282, Fax: +86-755-23116366  
Email: info@ccis-cb.com, Website: <http://www.ccis-cb.com>

## 5.9 Test Instruments list

| Test Equipment               | Manufacturer    | Model No.     | Serial No.         | Cal. Date<br>(mm-dd-yy) | Cal. Due date<br>(mm-dd-yy) |
|------------------------------|-----------------|---------------|--------------------|-------------------------|-----------------------------|
| 3m SAC                       | SAEMC           | 9m*6m*6m      | 966                | 07-22-2017              | 07-21-2020                  |
| BiConiLog Antenna            | SCHWARZBECK     | VULB9163      | 497                | 03-18-2019              | 03-17-2020                  |
| Biconical Antenna            | SCHWARZBECK     | VUBA9117      | 359                | 06-22-2017              | 06-21-2020                  |
| Horn Antenna                 | SCHWARZBECK     | BBHA9120D     | 916                | 03-18-2019              | 03-17-2020                  |
| Horn Antenna                 | SCHWARZBECK     | BBHA9120D     | 1805               | 06-22-2017              | 06-21-2020                  |
| Horn Antenna                 | SCHWARZBECK     | BBHA 9170     | BBHA9170582        | 11-21-2018              | 11-20-2019                  |
| EMI Test Software            | AUDIX           | E3            | Version: 6.110919b |                         |                             |
| Pre-amplifier                | HP              | 8447D         | 2944A09358         | 03-18-2019              | 03-17-2020                  |
| Pre-amplifier                | CD              | PAP-1G18      | 11804              | 03-18-2019              | 03-17-2020                  |
| Spectrum analyzer            | Rohde & Schwarz | FSP30         | 101454             | 03-18-2019              | 03-17-2020                  |
| EMI Test Receiver            | Rohde & Schwarz | ESRP7         | 101070             | 03-18-2019              | 03-17-2020                  |
| Spectrum Analyzer            | Agilent         | N9020A        | MY50510123         | 10-29-2018              | 10-28-2019                  |
| Signal Generator             | Rohde & Schwarz | SMX           | 835454/016         | 03-18-2019              | 03-17-2020                  |
| Signal Generator             | R&S             | SMR20         | 1008100050         | 03-18-2019              | 03-17-2020                  |
| RF Switch Unit               | MWRFTTEST       | MW200         | N/A                | N/A                     | N/A                         |
| Test Software                | MWRFTTEST       | MTS8200       | Version: 2.0.0.0   |                         |                             |
| Cable                        | ZDECL           | Z108-NJ-NJ-81 | 1608458            | 03-18-2019              | 03-17-2020                  |
| Cable                        | MICRO-COAX      | MFR64639      | K10742-5           | 03-18-2019              | 03-17-2020                  |
| Cable                        | SUHNER          | SUCOFLEX100   | 58193/4PE          | 03-18-2019              | 03-17-2020                  |
| DC Power Supply              | XinNuoEr        | WYK-10020K    | 1409050110020      | 10-31-2018              | 10-30-2019                  |
| Temperature Humidity Chamber | HengPu          | HPGDS-500     | 20140828008        | 09-24-2018              | 09-23-2019                  |
| Simulated Station            | Rohde & Schwarz | CMW500        | 140493             | 07-16-2018              | 07-15-2019                  |

## 6. Test results

### 6.1 Conducted Output Power, ERP and EIRP

|                   |                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | Part 27.50(d)(4)                                                                                                                                                                                                                                                                                                                                                                                          |
| Test Method:      | ANSI/TIA-603-D 2010                                                                                                                                                                                                                                                                                                                                                                                       |
| Limit:            | LTE Band 4: 1W                                                                                                                                                                                                                                                                                                                                                                                            |
| Test Setup:       |  <p>The diagram illustrates the test setup. On the left is a blue rectangular box labeled 'System simulator'. A line connects its right side to a small black square labeled 'ATT' (attenuator). Another line connects the right side of the 'ATT' to a black rectangular box labeled 'EUT' (Equipment Under Test).</p> |
| Test Procedure:   | The transmitter output was connected to a calibrated attenuator, the other end of which was connected to the CMW500. Transmitter output power was read off in dBm.                                                                                                                                                                                                                                        |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                          |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                          |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                    |

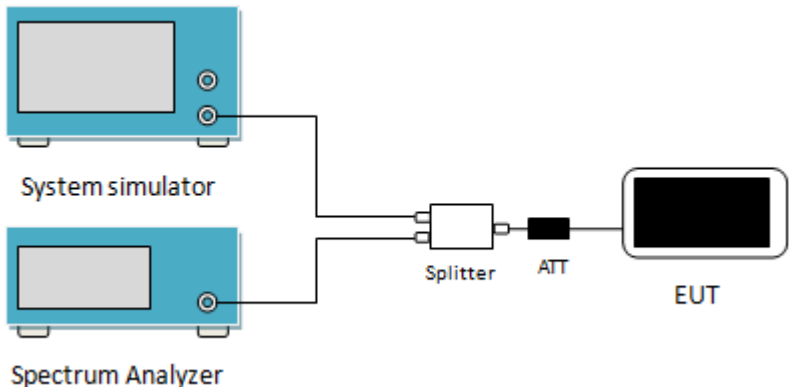
## Measurement Data:

| LTE Band                                                     | Bandwidth (MHz) | Modulation          | RB Size | RB Offset | Average Power (dBm) |           |           |
|--------------------------------------------------------------|-----------------|---------------------|---------|-----------|---------------------|-----------|-----------|
|                                                              |                 |                     |         |           | 19957               | 20175     | 20393     |
|                                                              |                 |                     |         |           | 1710.7MHz           | 1732.5MHz | 1754.3MHz |
| 4                                                            | 1.4             | QPSK                | 1       | 0         | 22.46               | 22.68     | 22.65     |
|                                                              |                 |                     | 1       | 2         | 22.39               | 22.61     | 22.46     |
|                                                              |                 |                     | 1       | 5         | 22.41               | 22.68     | 22.41     |
|                                                              |                 |                     | 3       | 0         | 22.39               | 22.67     | 22.50     |
|                                                              |                 |                     | 3       | 1         | 22.34               | 22.63     | 22.44     |
|                                                              |                 |                     | 3       | 2         | 22.33               | 22.66     | 22.41     |
|                                                              |                 |                     | 6       | 0         | 21.89               | 22.15     | 22.81     |
|                                                              |                 | Antenna Gain (dBi): |         |           | 2.0                 |           |           |
|                                                              |                 | Max. EIRP (dBm):    |         |           | 24.81               |           |           |
|                                                              |                 | EIRP Limit (dBm):   |         |           | 30.00               |           |           |
|                                                              |                 | 16QAM               | 1       | 0         | 21.87               | 22.26     | 21.91     |
|                                                              |                 |                     | 1       | 2         | 21.83               | 22.25     | 21.65     |
|                                                              |                 |                     | 1       | 5         | 21.91               | 22.16     | 22.03     |
|                                                              |                 |                     | 3       | 0         | 21.71               | 22.36     | 21.92     |
|                                                              |                 |                     | 3       | 1         | 21.62               | 22.30     | 21.78     |
|                                                              |                 |                     | 3       | 2         | 21.94               | 22.19     | 21.68     |
|                                                              |                 |                     | 6       | 0         | 21.51               | 21.55     | 21.22     |
|                                                              |                 | Antenna Gain (dBi): |         |           | 2.0                 |           |           |
|                                                              |                 | Max. EIRP (dBm):    |         |           | 24.36               |           |           |
|                                                              |                 | EIRP Limit (dBm):   |         |           | 30.00               |           |           |
|                                                              |                 |                     |         |           |                     |           |           |
| LTE Band                                                     | Bandwidth (MHz) | Modulation          | RB Size | RB Offset | Average Power (dBm) |           |           |
|                                                              |                 |                     |         |           | 19965               | 20175     | 20385     |
|                                                              |                 |                     |         |           | 1711.5MHz           | 1732.5MHz | 1753.5MHz |
| 4                                                            | 3               | QPSK                | 1       | 0         | 22.39               | 22.78     | 22.69     |
|                                                              |                 |                     | 1       | 7         | 21.87               | 21.95     | 21.94     |
|                                                              |                 |                     | 1       | 14        | 22.25               | 22.23     | 22.49     |
|                                                              |                 |                     | 8       | 0         | 21.71               | 21.71     | 21.70     |
|                                                              |                 |                     | 8       | 4         | 21.65               | 21.68     | 21.62     |
|                                                              |                 |                     | 8       | 7         | 21.69               | 21.74     | 21.63     |
|                                                              |                 |                     | 15      | 0         | 21.65               | 21.68     | 21.59     |
|                                                              |                 | Antenna Gain (dBi): |         |           | 2.0                 |           |           |
|                                                              |                 | Max. EIRP (dBm):    |         |           | 24.78               |           |           |
|                                                              |                 | EIRP Limit (dBm):   |         |           | 30.00               |           |           |
|                                                              |                 | 16QAM               | 1       | 0         | 22.12               | 22.36     | 22.40     |
|                                                              |                 |                     | 1       | 7         | 21.46               | 21.81     | 21.41     |
|                                                              |                 |                     | 1       | 14        | 21.70               | 21.32     | 22.08     |
|                                                              |                 |                     | 8       | 0         | 21.19               | 21.11     | 21.12     |
|                                                              |                 |                     | 8       | 4         | 21.04               | 21.16     | 21.16     |
|                                                              |                 |                     | 8       | 7         | 21.06               | 21.24     | 21.06     |
|                                                              |                 |                     | 15      | 0         | 21.08               | 21.14     | 21.19     |
|                                                              |                 | Antenna Gain (dBi): |         |           | 2.0                 |           |           |
|                                                              |                 | Max. EIRP (dBm):    |         |           | 24.40               |           |           |
|                                                              |                 | EIRP Limit (dBm):   |         |           | 30.00               |           |           |
| Note: EIRP (dBm) = Average power (dBm) + Antenna Gain (dBi). |                 |                     |         |           |                     |           |           |

| LTE Band                                                     | Bandwidth (MHz) | Modulation          | RB Size | RB Offset | Average Power (dBm) |           |           |  |
|--------------------------------------------------------------|-----------------|---------------------|---------|-----------|---------------------|-----------|-----------|--|
|                                                              |                 |                     |         |           | 19975               | 20175     | 20375     |  |
|                                                              |                 |                     |         |           | 1712.5MHz           | 1732.5MHz | 1752.5MHz |  |
| 4                                                            | 5               | QPSK                | 1       | 0         | 22.54               | 22.86     | 22.78     |  |
|                                                              |                 |                     | 1       | 12        | 22.09               | 22.31     | 22.16     |  |
|                                                              |                 |                     | 1       | 24        | 22.43               | 22.38     | 22.45     |  |
|                                                              |                 |                     | 12      | 0         | 21.85               | 22.15     | 21.95     |  |
|                                                              |                 |                     | 12      | 6         | 21.71               | 21.89     | 21.73     |  |
|                                                              |                 |                     | 12      | 11        | 21.80               | 21.79     | 21.75     |  |
|                                                              |                 |                     | 25      | 0         | 21.82               | 22.01     | 21.84     |  |
|                                                              |                 | Antenna Gain (dBi): |         |           |                     | 2.0       |           |  |
|                                                              |                 | Max. EIRP (dBm):    |         |           |                     | 24.86     |           |  |
|                                                              |                 | EIRP Limit (dBm):   |         |           |                     | 30.00     |           |  |
|                                                              |                 | 16QAM               | 1       | 0         | 22.00               | 22.48     | 22.64     |  |
|                                                              |                 |                     | 1       | 12        | 21.66               | 22.11     | 21.89     |  |
|                                                              |                 |                     | 1       | 24        | 21.92               | 22.15     | 21.95     |  |
|                                                              |                 |                     | 12      | 0         | 21.32               | 21.66     | 21.29     |  |
|                                                              |                 |                     | 12      | 6         | 21.13               | 21.32     | 21.19     |  |
|                                                              |                 |                     | 12      | 11        | 21.26               | 21.24     | 21.22     |  |
|                                                              |                 |                     | 25      | 0         | 21.27               | 21.50     | 21.28     |  |
| Antenna Gain (dBi):                                          |                 |                     |         | 2.0       |                     |           |           |  |
| Max. EIRP (dBm):                                             |                 |                     |         | 24.64     |                     |           |           |  |
| EIRP Limit (dBm):                                            |                 |                     |         | 30.00     |                     |           |           |  |
|                                                              |                 |                     |         |           |                     |           |           |  |
| LTE Band                                                     | Bandwidth (MHz) | Modulation          | RB Size | RB Offset | Average Power (dBm) |           |           |  |
|                                                              |                 |                     |         |           | 20000               | 20175     | 20350     |  |
|                                                              |                 |                     |         |           | 1715.0MHz           | 1732.5MHz | 1750.0MHz |  |
| 4                                                            | 10              | QPSK                | 1       | 0         | 22.89               | 23.34     | 22.85     |  |
|                                                              |                 |                     | 1       | 24        | 21.85               | 21.09     | 22.34     |  |
|                                                              |                 |                     | 1       | 49        | 23.35               | 23.03     | 23.20     |  |
|                                                              |                 |                     | 25      | 0         | 21.84               | 22.02     | 21.58     |  |
|                                                              |                 |                     | 25      | 12        | 21.70               | 21.83     | 21.91     |  |
|                                                              |                 |                     | 25      | 24        | 21.80               | 21.80     | 21.80     |  |
|                                                              |                 |                     | 50      | 0         | 21.86               | 21.98     | 22.08     |  |
|                                                              |                 | Antenna Gain (dBi): |         |           |                     | 2.0       |           |  |
|                                                              |                 | Max. EIRP (dBm):    |         |           |                     | 25.35     |           |  |
|                                                              |                 | EIRP Limit (dBm):   |         |           |                     | 30.00     |           |  |
|                                                              |                 | 16QAM               | 1       | 0         | 22.19               | 22.95     | 22.68     |  |
|                                                              |                 |                     | 1       | 24        | 21.50               | 21.58     | 21.58     |  |
|                                                              |                 |                     | 1       | 49        | 23.22               | 22.63     | 22.84     |  |
|                                                              |                 |                     | 25      | 0         | 21.27               | 21.48     | 20.92     |  |
|                                                              |                 |                     | 25      | 12        | 21.12               | 21.39     | 21.34     |  |
|                                                              |                 |                     | 25      | 24        | 21.22               | 21.19     | 21.19     |  |
|                                                              |                 |                     | 50      | 0         | 21.28               | 21.46     | 21.50     |  |
| Antenna Gain (dBi):                                          |                 |                     |         | 2.0       |                     |           |           |  |
| Max. EIRP (dBm):                                             |                 |                     |         | 25.22     |                     |           |           |  |
| EIRP Limit (dBm):                                            |                 |                     |         | 30.00     |                     |           |           |  |
| Note: EIRP (dBm) = Average power (dBm) + Antenna Gain (dBi). |                 |                     |         |           |                     |           |           |  |

| LTE Band                                                     | Bandwidth (MHz) | Modulation          | RB Size | RB Offset | Average Power (dBm) |           |           |  |
|--------------------------------------------------------------|-----------------|---------------------|---------|-----------|---------------------|-----------|-----------|--|
|                                                              |                 |                     |         |           | 20025               | 20175     | 20325     |  |
|                                                              |                 |                     |         |           | 1717.5MHz           | 1732.5MHz | 1747.5MHz |  |
| 4                                                            | 15              | QPSK                | 1       | 0         | 22.92               | 23.46     | 22.74     |  |
|                                                              |                 |                     | 1       | 37        | 21.98               | 22.07     | 21.71     |  |
|                                                              |                 |                     | 1       | 74        | 23.07               | 22.68     | 22.98     |  |
|                                                              |                 |                     | 36      | 0         | 21.86               | 22.21     | 21.51     |  |
|                                                              |                 |                     | 36      | 16        | 21.70               | 21.80     | 21.55     |  |
|                                                              |                 |                     | 36      | 35        | 22.35               | 21.83     | 22.03     |  |
|                                                              |                 |                     | 75      | 0         | 21.97               | 21.97     | 21.84     |  |
|                                                              |                 | Antenna Gain (dBi): |         |           |                     | 2.0       |           |  |
|                                                              |                 | Max. EIRP (dBm):    |         |           |                     | 25.46     |           |  |
|                                                              |                 | EIRP Limit (dBm):   |         |           |                     | 30.00     |           |  |
|                                                              |                 | 16QAM               | 1       | 0         | 22.25               | 22.97     | 22.30     |  |
|                                                              |                 |                     | 1       | 37        | 21.46               | 21.47     | 21.23     |  |
|                                                              |                 |                     | 1       | 74        | 22.71               | 22.22     | 22.86     |  |
|                                                              |                 |                     | 36      | 0         | 21.26               | 21.75     | 21.05     |  |
|                                                              |                 |                     | 36      | 16        | 21.14               | 21.30     | 20.95     |  |
|                                                              |                 |                     | 36      | 35        | 21.81               | 21.26     | 21.48     |  |
|                                                              |                 |                     | 75      | 0         | 21.46               | 21.50     | 21.23     |  |
|                                                              |                 | Antenna Gain (dBi): |         |           |                     | 2.0       |           |  |
|                                                              |                 | Max. EIRP (dBm):    |         |           |                     | 24.97     |           |  |
| EIRP Limit (dBm):                                            |                 |                     |         | 30.00     |                     |           |           |  |
|                                                              |                 |                     |         |           |                     |           |           |  |
| LTE Band                                                     | Bandwidth (MHz) | Modulation          | RB Size | RB Offset | Average Power (dBm) |           |           |  |
|                                                              |                 |                     |         |           | 20050               | 20175     | 20300     |  |
|                                                              |                 |                     |         |           | 1720.0MHz           | 1732.5MHz | 1745.0MHz |  |
| 4                                                            | 20              | QPSK                | 1       | 0         | 22.79               | 23.67     | 22.98     |  |
|                                                              |                 |                     | 1       | 49        | 22.67               | 22.34     | 22.03     |  |
|                                                              |                 |                     | 1       | 99        | 23.17               | 22.88     | 23.09     |  |
|                                                              |                 |                     | 50      | 0         | 21.95               | 22.18     | 21.71     |  |
|                                                              |                 |                     | 50      | 24        | 22.17               | 21.81     | 21.63     |  |
|                                                              |                 |                     | 50      | 49        | 22.14               | 21.84     | 22.26     |  |
|                                                              |                 |                     | 100     | 0         | 22.51               | 21.97     | 21.90     |  |
|                                                              |                 | Antenna Gain (dBi): |         |           |                     | 2.0       |           |  |
|                                                              |                 | Max. EIRP (dBm):    |         |           |                     | 25.67     |           |  |
|                                                              |                 | EIRP Limit (dBm):   |         |           |                     | 30.00     |           |  |
|                                                              |                 | 16QAM               | 1       | 0         | 22.27               | 23.25     | 22.56     |  |
|                                                              |                 |                     | 1       | 49        | 21.85               | 22.06     | 21.71     |  |
|                                                              |                 |                     | 1       | 99        | 22.65               | 22.19     | 22.40     |  |
|                                                              |                 |                     | 50      | 0         | 21.38               | 21.73     | 21.02     |  |
|                                                              |                 |                     | 50      | 24        | 21.59               | 21.31     | 21.10     |  |
|                                                              |                 |                     | 50      | 49        | 21.54               | 21.26     | 21.72     |  |
|                                                              |                 |                     | 100     | 0         | 21.94               | 21.47     | 21.40     |  |
|                                                              |                 | Antenna Gain (dBi): |         |           |                     | 2.0       |           |  |
|                                                              |                 | Max. EIRP (dBm):    |         |           |                     | 25.25     |           |  |
| EIRP Limit (dBm):                                            |                 |                     |         | 30.00     |                     |           |           |  |
| Note: EIRP (dBm) = Average power (dBm) + Antenna Gain (dBi). |                 |                     |         |           |                     |           |           |  |

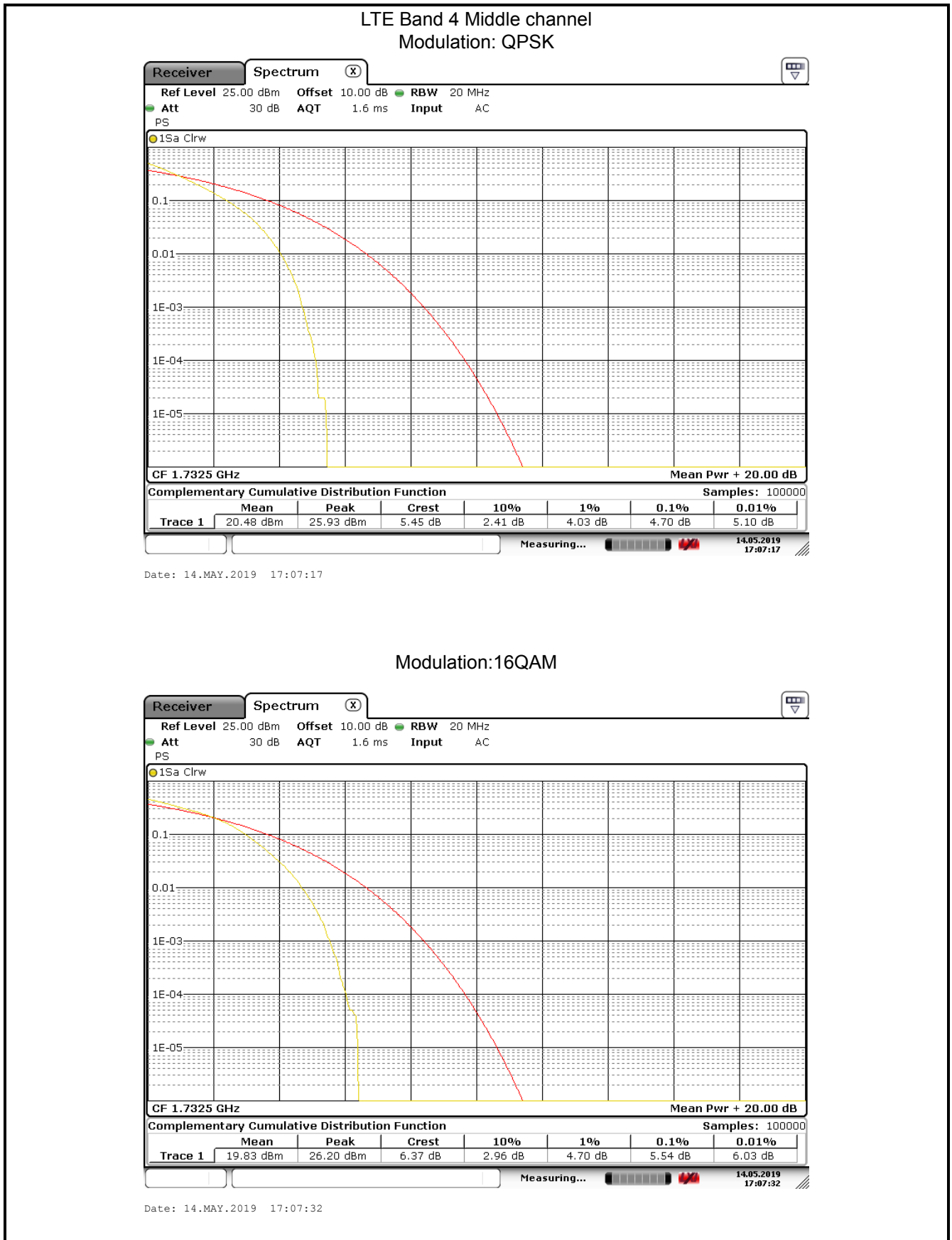
## 6.2 Peak-to-Average Ratio

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | Part 27.50(d)(5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test Method:      | ANSI/TIA-603-D 2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Limit:            | The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Test Setup:       |  <p>The diagram illustrates the test setup. On the left, there are two blue rectangular units: the top one is labeled 'System simulator' and the bottom one is labeled 'Spectrum Analyzer'. Both have a single output port. These two ports are connected to a central 'Splitter' unit. From the 'Splitter', one line goes to an 'ATT' (Attenuator) unit, and another line goes to the 'EUT' (Equipment Under Test), which is represented by a black rectangular unit with a screen.</p> |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.</li> <li>2 Set the CCDF option in spectrum analyzer, <math>RBW \geq OBW</math>,</li> <li>3 Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level.</li> <li>4 Repeat step 1~3 at other frequency and modulations.</li> </ol>                                                                                                                                                             |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

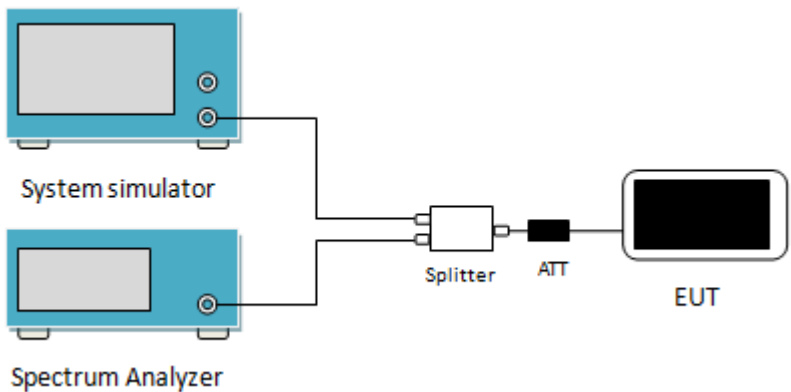
## Measurement Data (Worst case):

| Bandwidth                   | Modulation | RB Size | RB Offset | PAPR |
|-----------------------------|------------|---------|-----------|------|
| LTE Band 4 (Middle Channel) |            |         |           |      |
| 20MHz                       | QPSK       | 100     | 0         | 4.70 |
|                             | 16QAM      | 100     | 0         | 5.54 |

Test plots as below:



### 6.3 Occupy Bandwidth

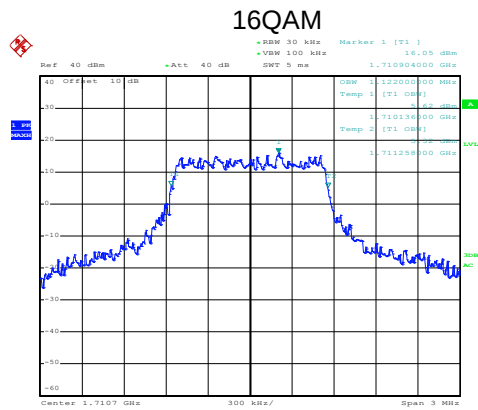
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | Part 27.53(h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test Method:      | ANSI/TIA-603-D 2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Test Setup:       |  <p>The diagram illustrates the test setup. On the left, there are two blue rectangular units: the top one is labeled 'System simulator' and the bottom one is labeled 'Spectrum Analyzer'. Both have a single output port. These two ports are connected to a central 'Splitter' unit. From the 'Splitter', a single line goes to an 'ATT' (Attenuator) unit, which is then connected to the 'EUT' (Equipment Under Test), represented by a black rectangular unit on the right.</p> |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer</li> <li>2. RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW.</li> <li>3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.</li> </ol>                                                                                                                                           |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Measurement Data:

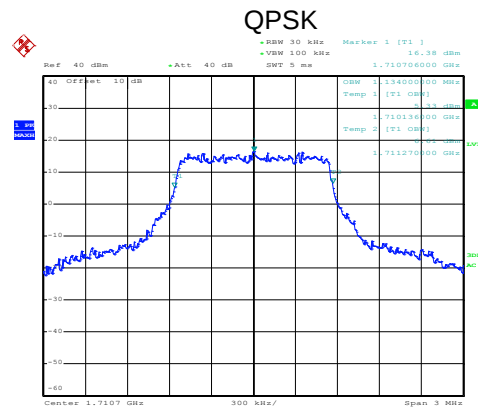
| LTE Band 4 |         |                 |            |               |                 |
|------------|---------|-----------------|------------|---------------|-----------------|
| Bandwidth  | Channel | Frequency (MHz) | Modulation | 99% OBW (kHz) | -26dBcEBW (kHz) |
| 1.4MHz     | 19957   | 1710.7          | 16QAM      | 1122          | 14820           |
|            |         |                 | QPSK       | 1134          | 1512            |
|            | 20175   | 1732.5          | 16QAM      | 1110          | 1446            |
|            |         |                 | QPSK       | 1116          | 1440            |
|            | 20393   | 1754.3          | 16QAM      | 1122          | 1458            |
|            |         |                 | QPSK       | 1122          | 1434            |
| 3MHz       | 19965   | 1711.5          | 16QAM      | 2760          | 3060            |
|            |         |                 | QPSK       | 2760          | 3084            |
|            | 20175   | 1732.5          | 16QAM      | 2748          | 3024            |
|            |         |                 | QPSK       | 2748          | 3084            |
|            | 20385   | 1750.5          | 16QAM      | 2748          | 3060            |
|            |         |                 | QPSK       | 2748          | 3084            |
| 5MHz       | 19975   | 1712.5          | 16QAM      | 4560          | 5100            |
|            |         |                 | QPSK       | 4520          | 5080            |
|            | 20175   | 1732.5          | 16QAM      | 4560          | 5140            |
|            |         |                 | QPSK       | 4540          | 5160            |
|            | 20375   | 1752.5          | 16QAM      | 4540          | 5060            |
|            |         |                 | QPSK       | 4520          | 5240            |
| 10MHz      | 20000   | 1715.0          | 16QAM      | 9120          | 10480           |
|            |         |                 | QPSK       | 9160          | 10640           |
|            | 20175   | 1732.5          | 16QAM      | 9160          | 10480           |
|            |         |                 | QPSK       | 9200          | 10520           |
|            | 20350   | 1750.0          | 16QAM      | 9200          | 10360           |
|            |         |                 | QPSK       | 9240          | 10560           |
| 15MHz      | 20025   | 1717.5          | 16QAM      | 13680         | 15300           |
|            |         |                 | QPSK       | 13680         | 15600           |
|            | 20175   | 1732.5          | 16QAM      | 13680         | 15360           |
|            |         |                 | QPSK       | 13620         | 15780           |
|            | 20325   | 1747.5          | 16QAM      | 13560         | 15480           |
|            |         |                 | QPSK       | 13620         | 15780           |
| 20MHz      | 20050   | 1720.0          | 16QAM      | 18160         | 22560           |
|            |         |                 | QPSK       | 18160         | 22640           |
|            | 20175   | 1732.5          | 16QAM      | 18160         | 22080           |
|            |         |                 | QPSK       | 18160         | 20880           |
|            | 20300   | 1745.0          | 16QAM      | 18080         | 20320           |
|            |         |                 | QPSK       | 18080         | 20880           |

Test plot as follows:  
LTE Band 4 part:

## LTE Band 4: 99% Occupy bandwidth BW: 1.4MHz

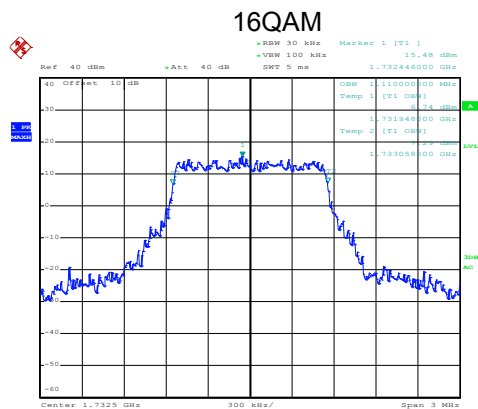


Date: 14.MAY.2019 14:36:37

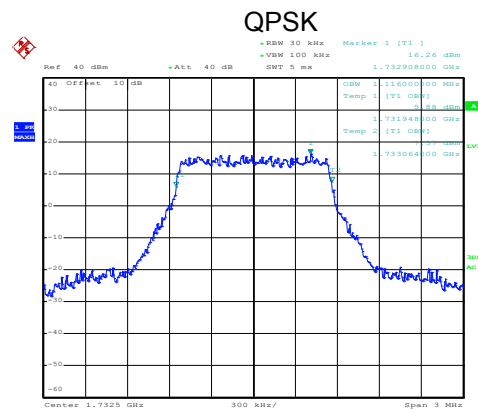


Date: 14.MAY.2019 14:36:28

Lowest channel

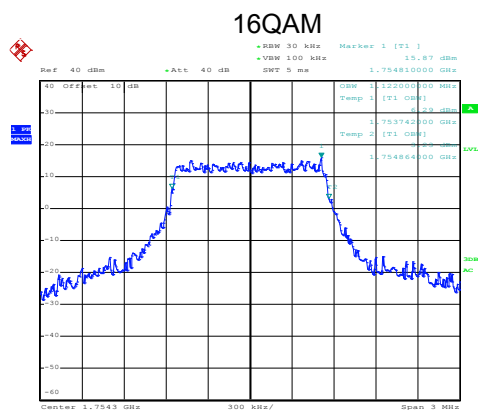


Date: 14.MAY.2019 14:37:37

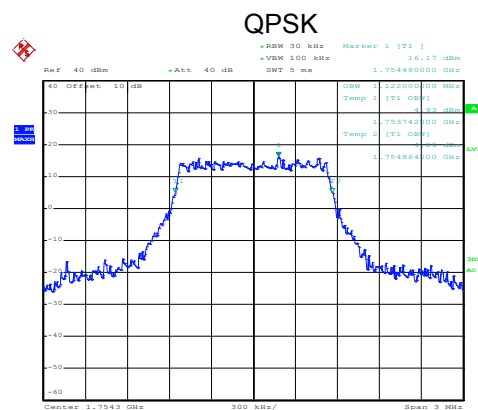


Date: 14.MAY.2019 14:37:31

Middle channel



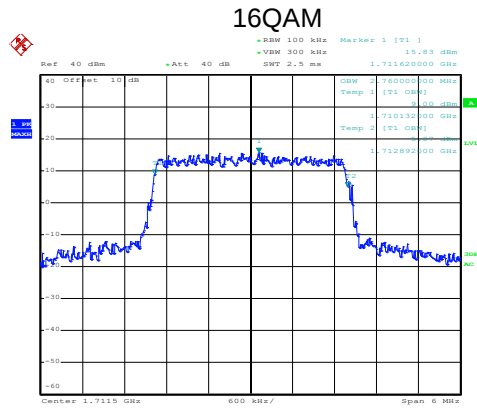
Date: 14.MAY.2019 14:38:03



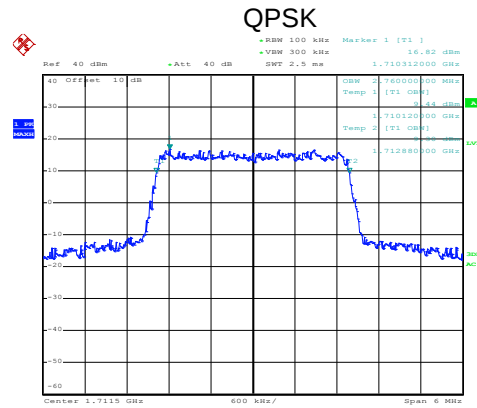
Date: 14.MAY.2019 14:37:57

Highest channel

## LTE Band 4: 99% Occupancy bandwidth BW: 3MHz

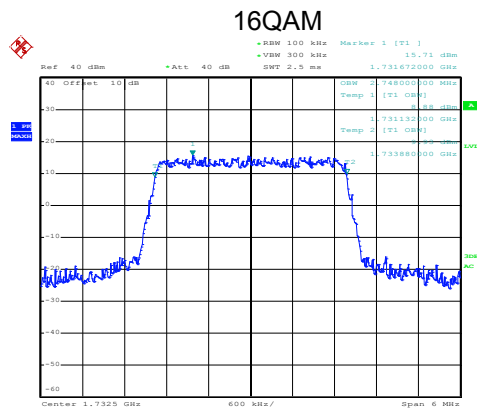


Date: 14.MAY.2019 14:40:40

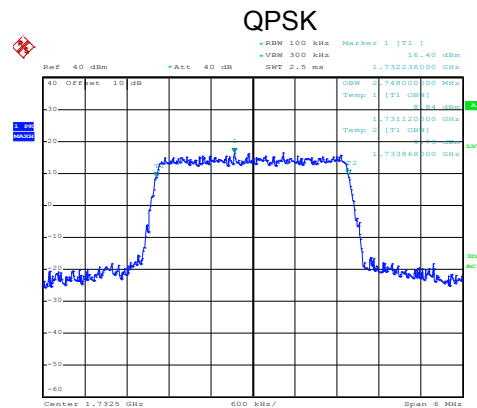


Date: 14.MAY.2019 14:40:35

### Lowest channel

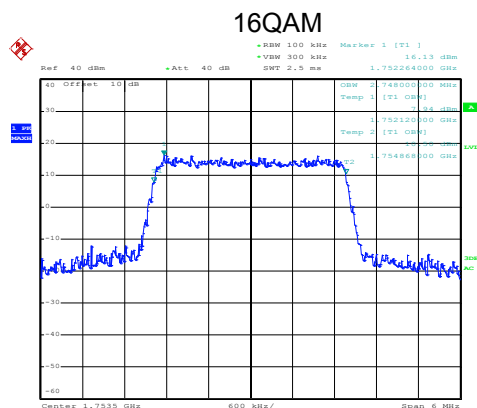


Date: 14.MAY.2019 14:39:47

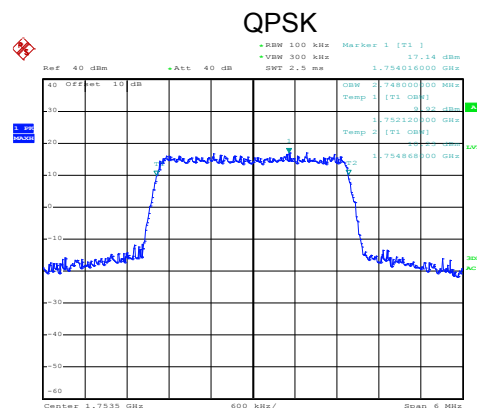


Date: 14.MAY.2019 14:39:41

### Middle channel



Date: 14.MAY.2019 14:39:21

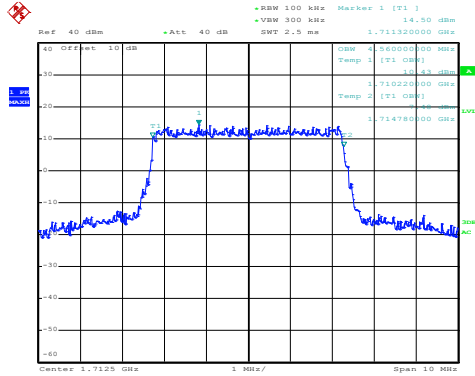


Date: 14.MAY.2019 14:39:13

### Highest channel

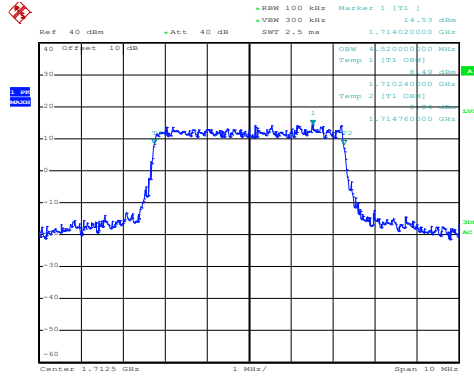
LTE Band 4: 99% Occupancy bandwidth  
BW: 5MHz

## 16QAM



Date: 14.MAY.2019 14:41:27

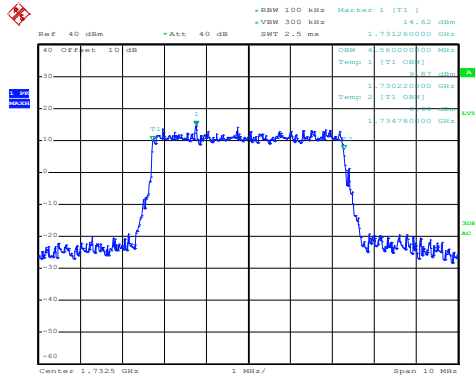
## QPSK



Date: 14.MAY.2019 14:41:18

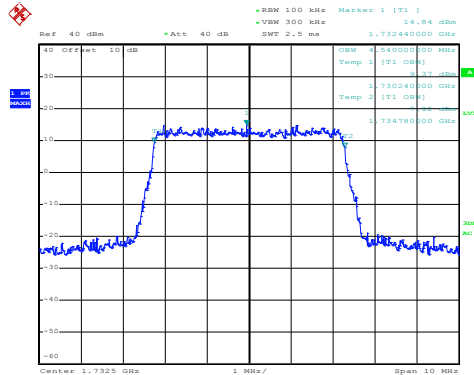
## Lowest channel

## 16QAM



Date: 14.MAY.2019 14:42:18

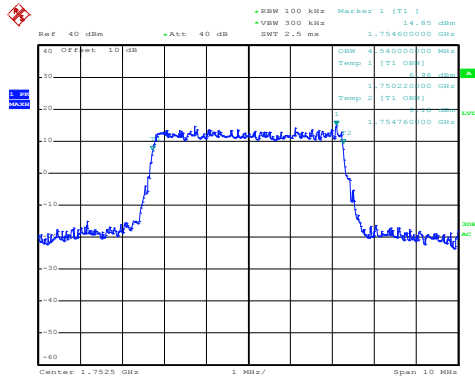
## QPSK



Date: 14.MAY.2019 14:43:34

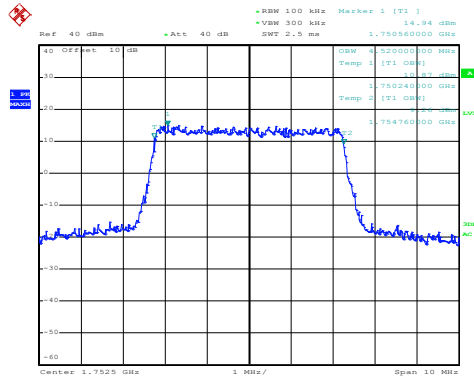
## Middle channel

## 16QAM



Date: 14.MAY.2019 14:43:21

## QPSK

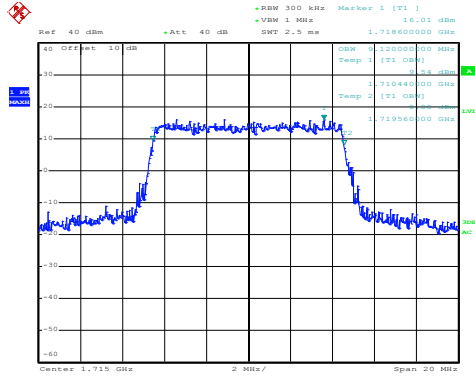


Date: 14.MAY.2019 14:43:13

## Highest channel

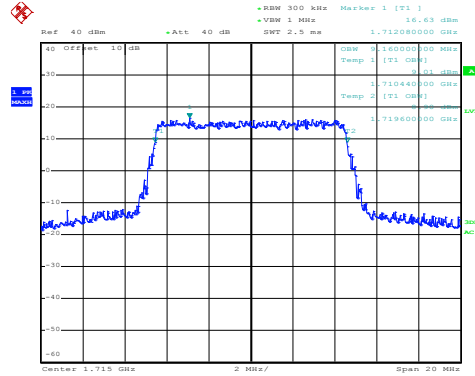
## LTE Band 4: 99% Occupancy bandwidth BW: 10MHz

### 16QAM



Date: 14.MAY.2019 14:44:34

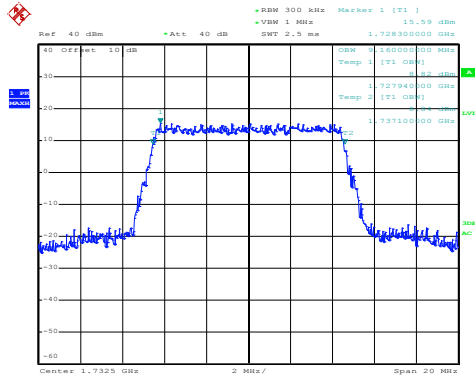
### QPSK



Date: 14.MAY.2019 14:44:29

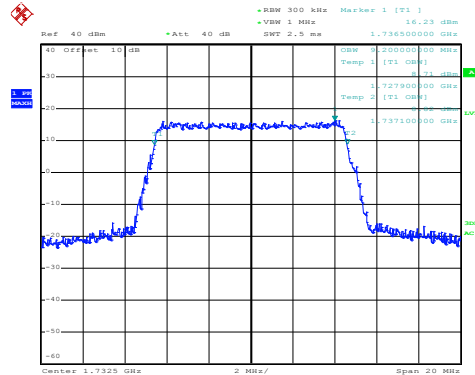
### Lowest channel

### 16QAM



Date: 14.MAY.2019 14:45:20

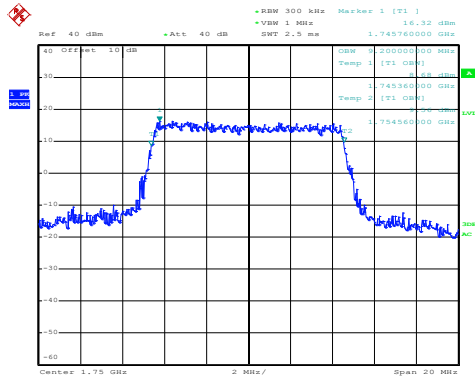
### QPSK



Date: 14.MAY.2019 14:45:14

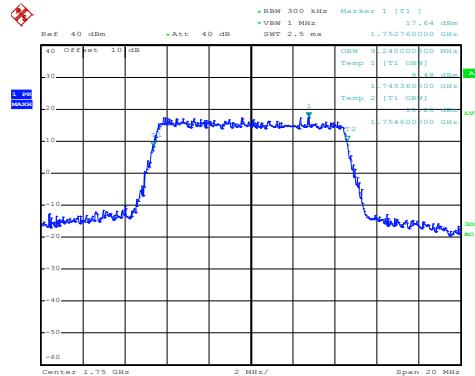
### Middle channel

### 16QAM



Date: 14.MAY.2019 14:45:46

### QPSK

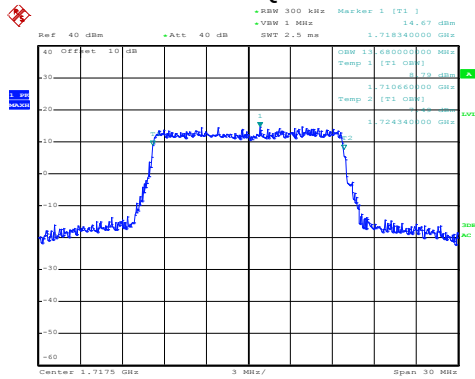


Date: 14.MAY.2019 14:45:38

### Highest channel

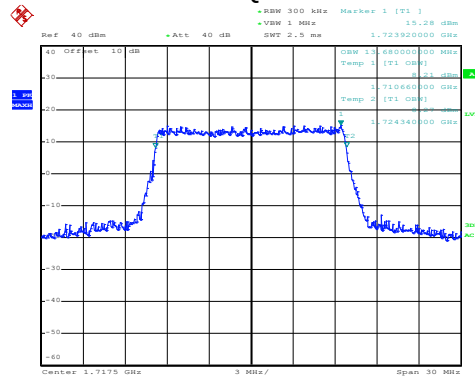
LTE Band 4: 99% Occupancy bandwidth  
BW: 15MHz

## 16QAM



Date: 14.MAY.2019 14:48:06

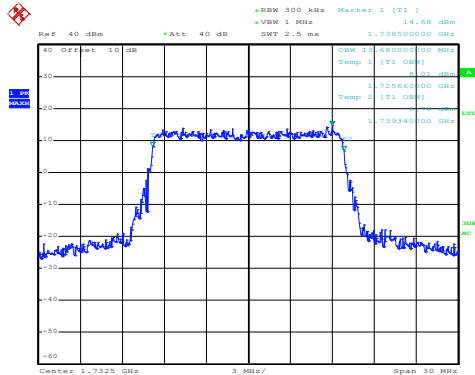
## QPSK



Date: 14.MAY.2019 14:47:58

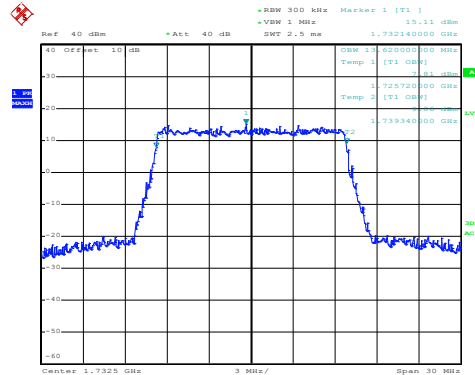
## Lowest channel

## 16QAM



Date: 14.MAY.2019 14:47:12

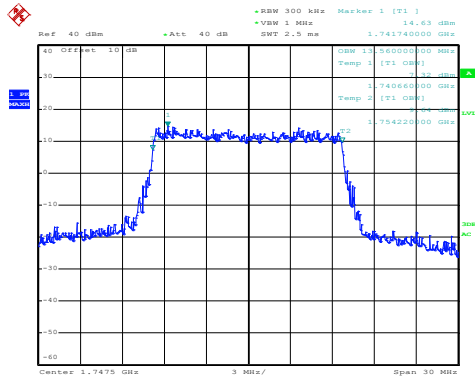
## QPSK



Date: 14.MAY.2019 14:47:06

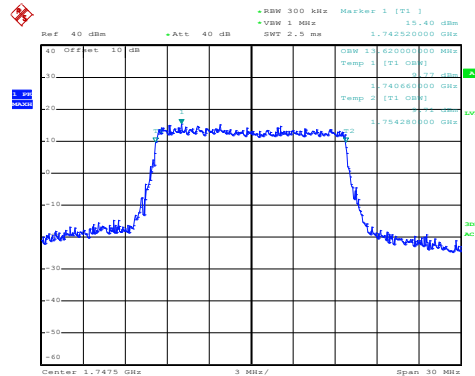
## Middle channel

## 16QAM



Date: 14.MAY.2019 14:46:51

## QPSK

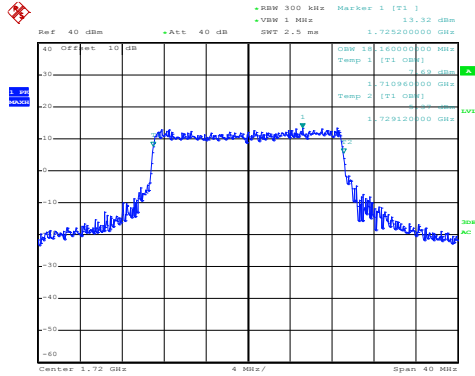


Date: 14.MAY.2019 14:46:47

## Highest channel

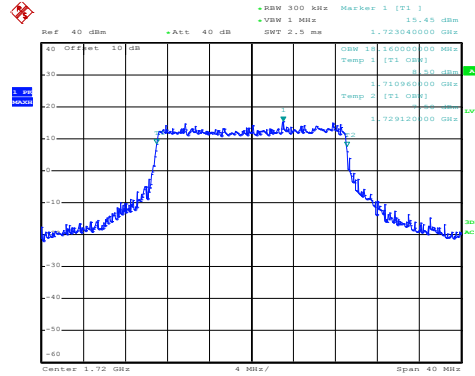
## LTE Band 4: 99% Occupancy bandwidth BW: 20MHz

### 16QAM



Date: 14.MAY.2019 14:48:43

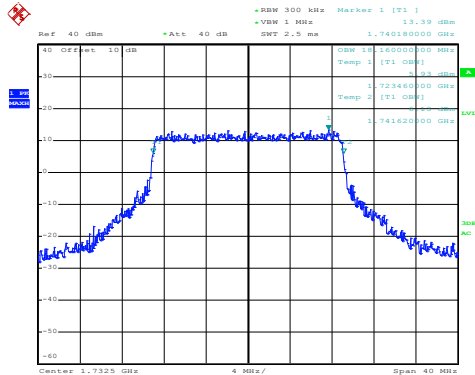
### QPSK



Date: 14.MAY.2019 14:48:38

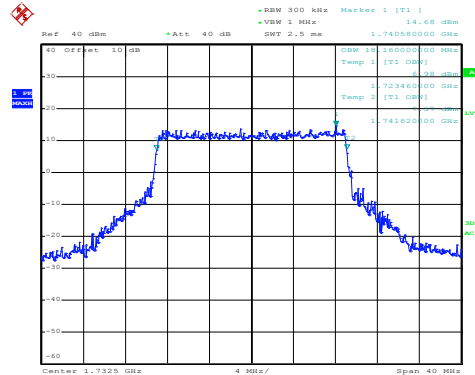
### Lowest channel

### 16QAM



Date: 14.MAY.2019 14:49:35

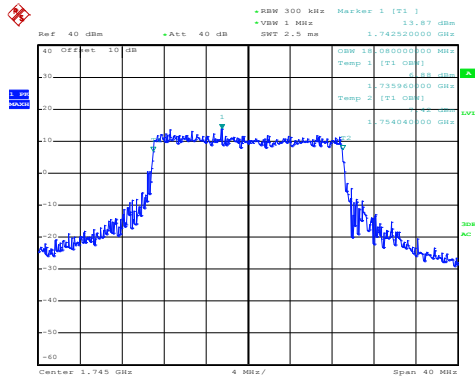
### QPSK



Date: 14.MAY.2019 14:49:28

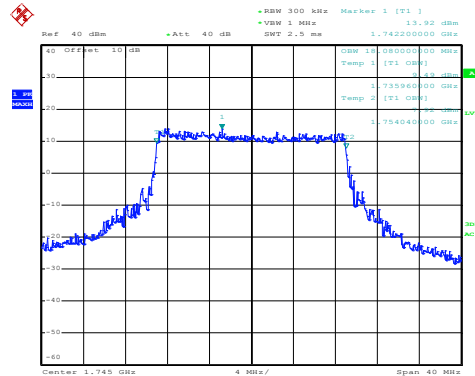
### Middle channel

### 16QAM



Date: 14.MAY.2019 14:49:56

### QPSK

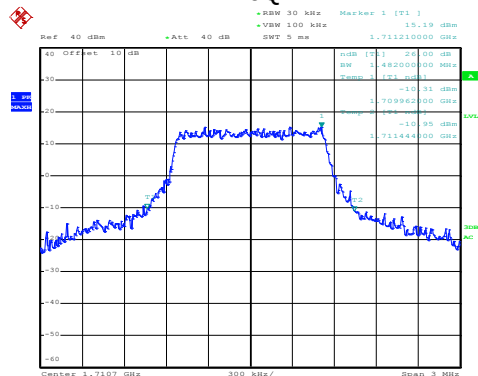


Date: 14.MAY.2019 14:49:51

### Highest channel

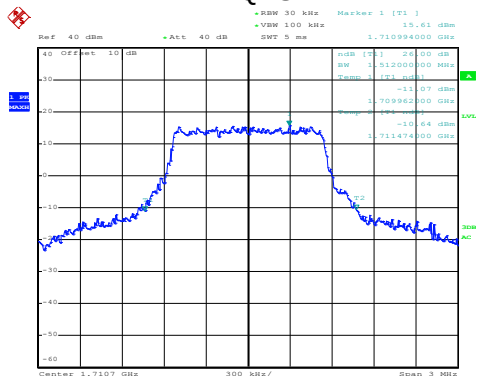
LTE Band 4: -26dBc bandwidth  
BW: 1.4MHz

## 16QAM



Date: 14.MAY.2019 14:36:54

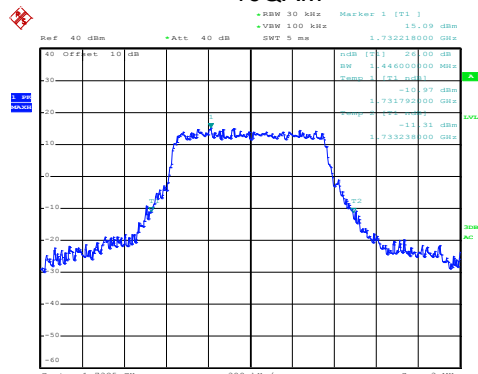
## QPSK



Date: 14.MAY.2019 14:36:47

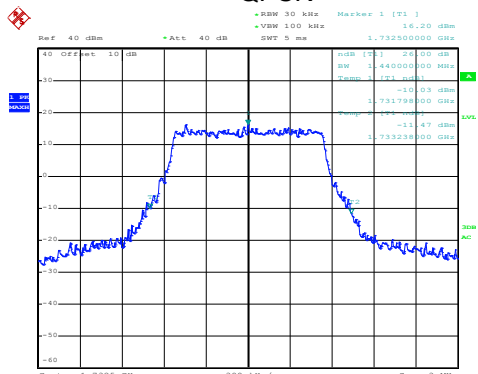
## Lowest channel

## 16QAM



Date: 14.MAY.2019 14:37:22

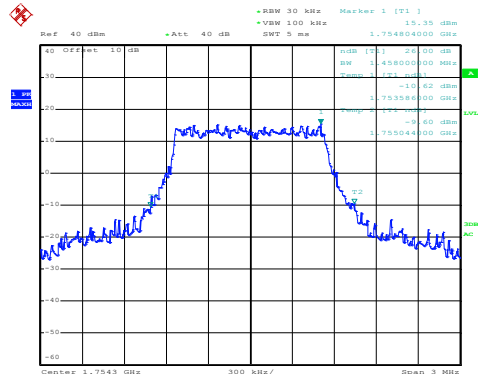
## QPSK



Date: 14.MAY.2019 14:37:15

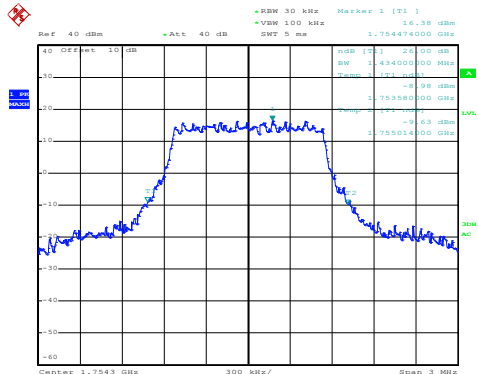
## Middle channel

## 16QAM



Date: 14.MAY.2019 14:38:18

## QPSK

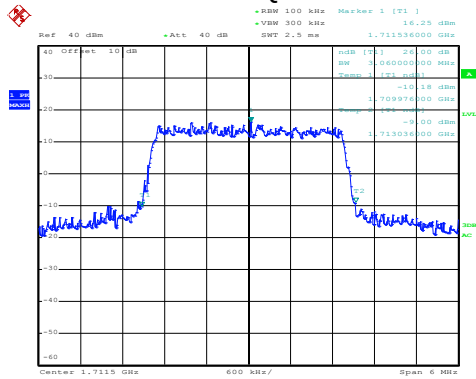


Date: 14.MAY.2019 14:38:12

## Highest channel

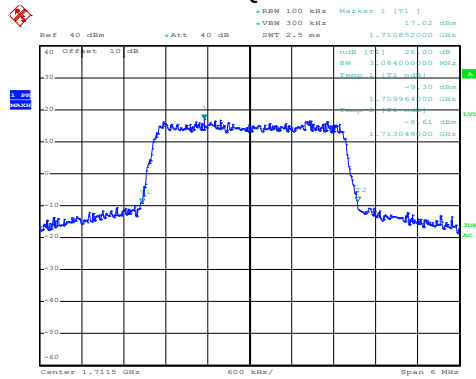
LTE Band 4: -26dBc bandwidth  
BW: 3MHz

## 16QAM



Date: 14.MAY.2019 14:40:29

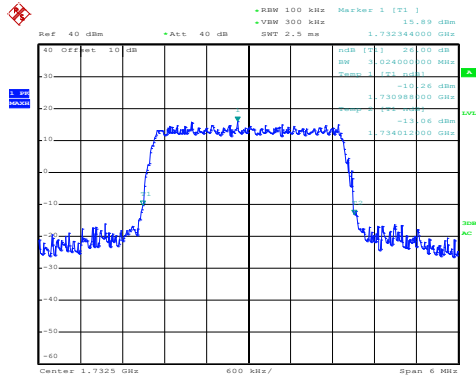
## QPSK



Date: 14.MAY.2019 14:40:24

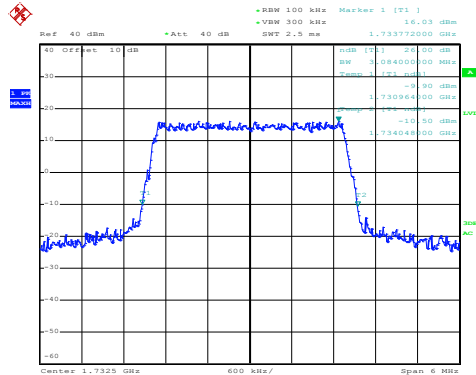
## Lowest channel

## 16QAM



Date: 14.MAY.2019 14:40:06

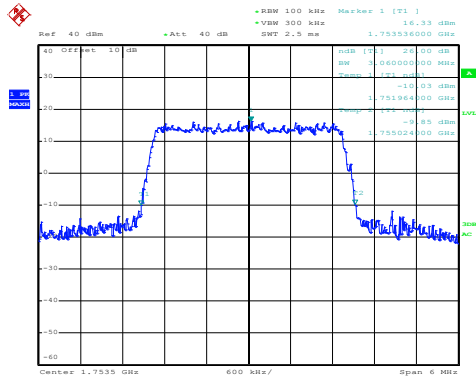
## QPSK



Date: 14.MAY.2019 14:40:01

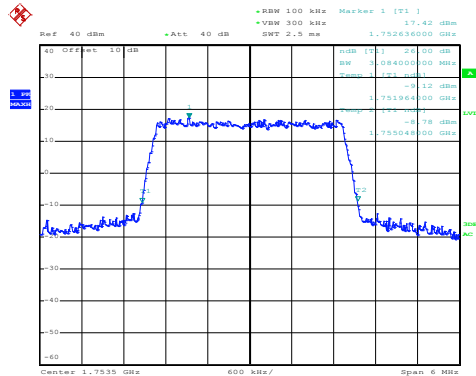
## Middle channel

## 16QAM



Date: 14.MAY.2019 14:39:04

## QPSK

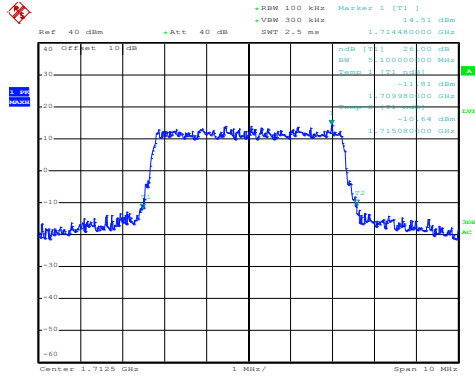


Date: 14.MAY.2019 14:38:58

## Highest channel

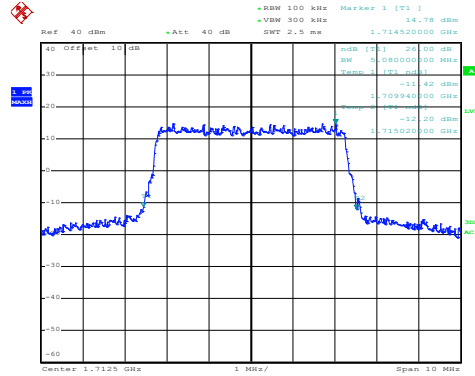
LTE Band 4: -26dBc bandwidth  
BW: 5MHz

## 16QAM



Date: 14.MAY.2019 14:41:43

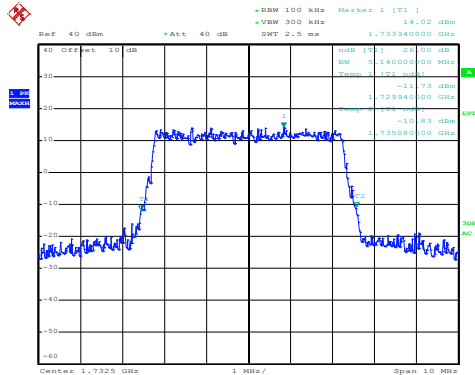
## QPSK



Date: 14.MAY.2019 14:41:36

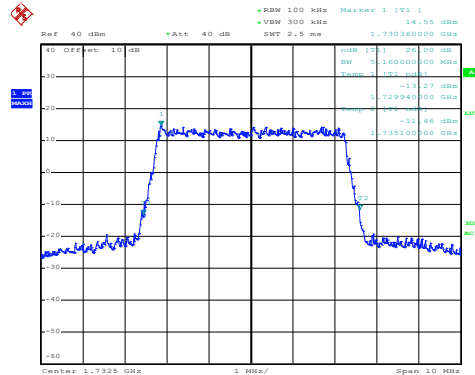
## Lowest channel

## 16QAM



Date: 14.MAY.2019 14:42:02

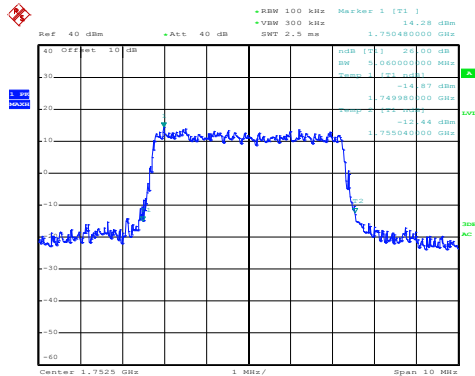
## QPSK



Date: 14.MAY.2019 14:41:55

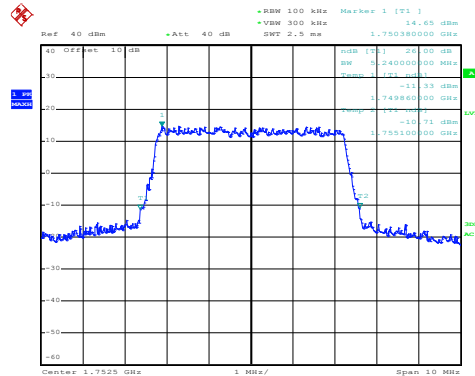
## Middle channel

## 16QAM



Date: 14.MAY.2019 14:43:02

## QPSK

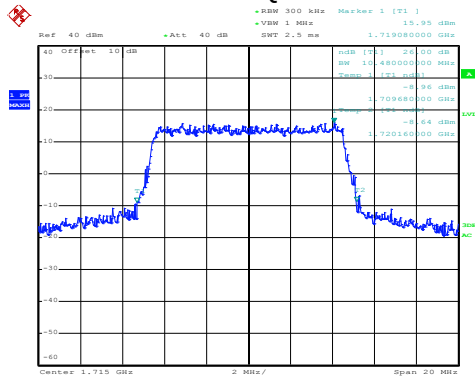


Date: 14.MAY.2019 14:42:48

## Highest channel

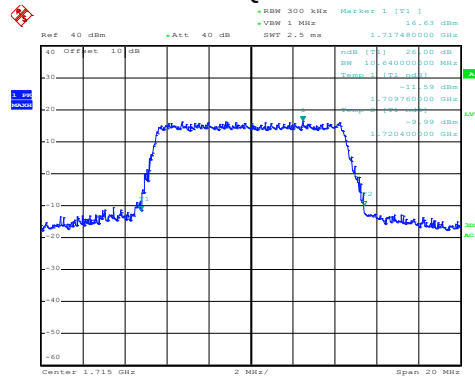
LTE Band 4: -26dBc bandwidth  
BW: 10MHz

## 16QAM



Date: 14.MAY.2019 14:44:47

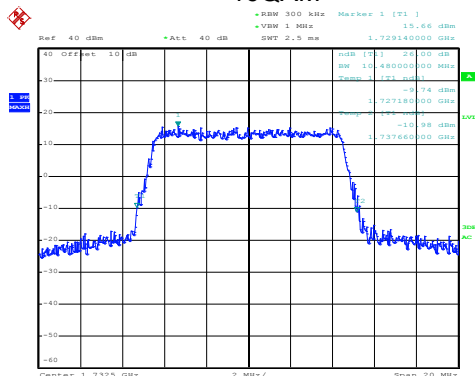
## QPSK



Date: 14.MAY.2019 14:44:41

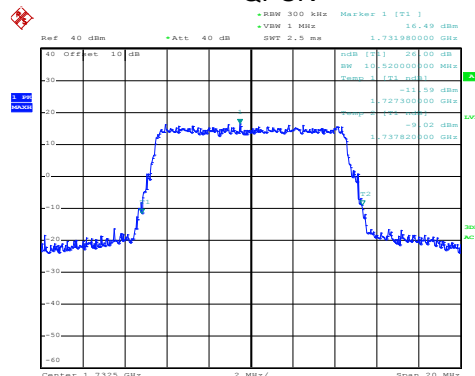
## Lowest channel

## 16QAM



Date: 14.MAY.2019 14:45:05

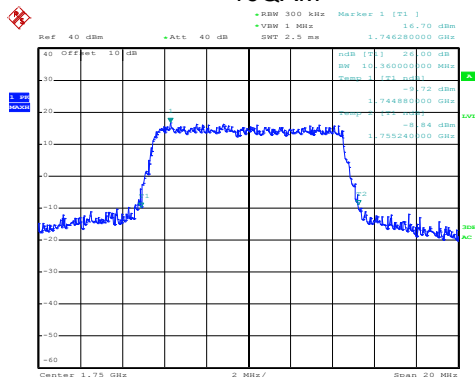
## QPSK



Date: 14.MAY.2019 14:45:01

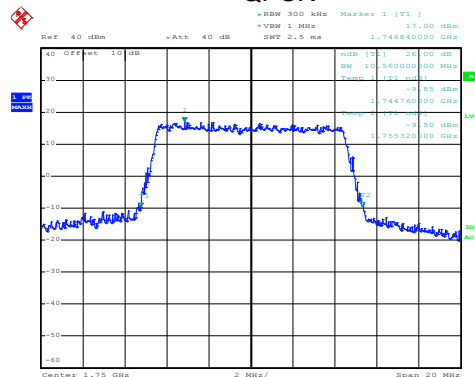
## Middle channel

## 16QAM



Date: 14.MAY.2019 14:45:59

## QPSK



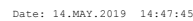
Date: 14.MAY.2019 14:45:53

## Highest channel

16QAM



QPSK

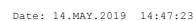


Lowest channel

## 16QAM



QPSK



Middle channel

## 16QAM



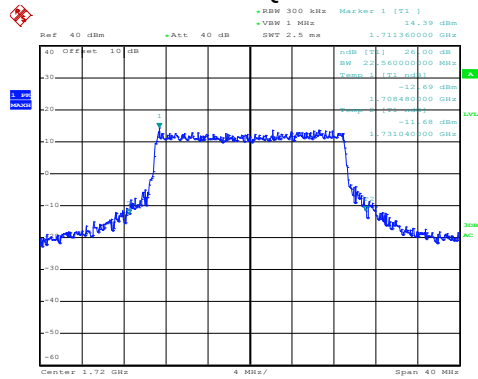
QPSK



Highest channel

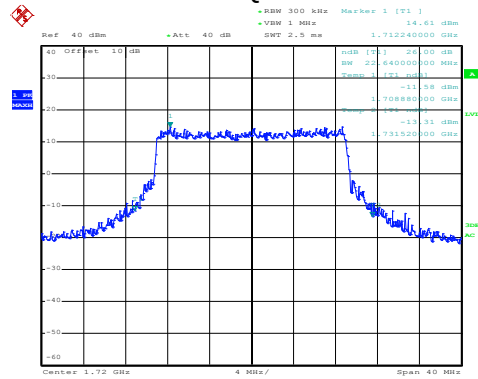
LTE Band 4: -26dBc bandwidth  
BW: 20MHz

## 16QAM



Date: 14.MAY.2019 14:48:57

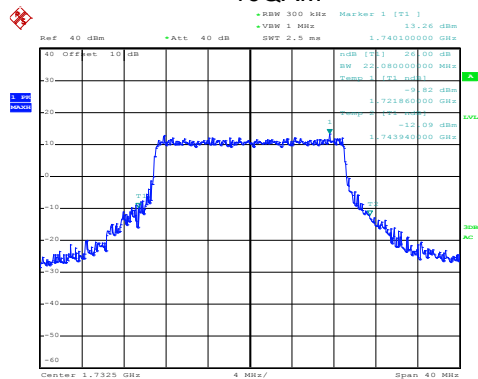
## QPSK



Date: 14.MAY.2019 14:48:51

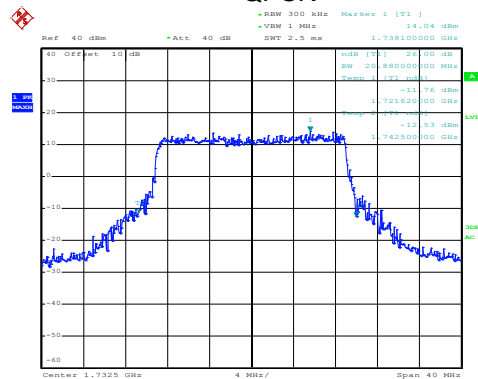
## Lowest channel

## 16QAM



Date: 14.MAY.2019 14:49:19

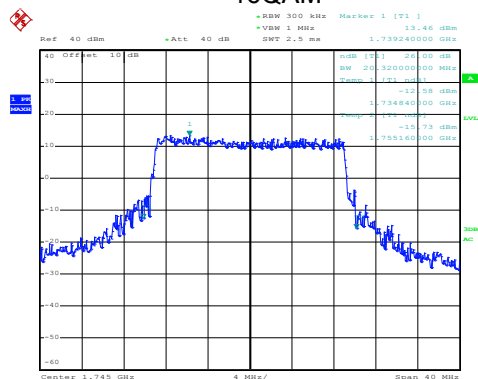
## QPSK



Date: 14.MAY.2019 14:49:12

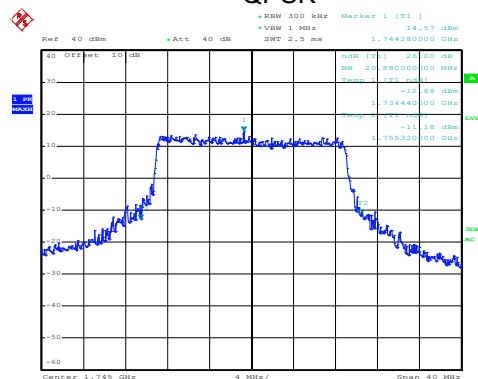
## Middle channel

## 16QAM



Date: 14.MAY.2019 14:50:08

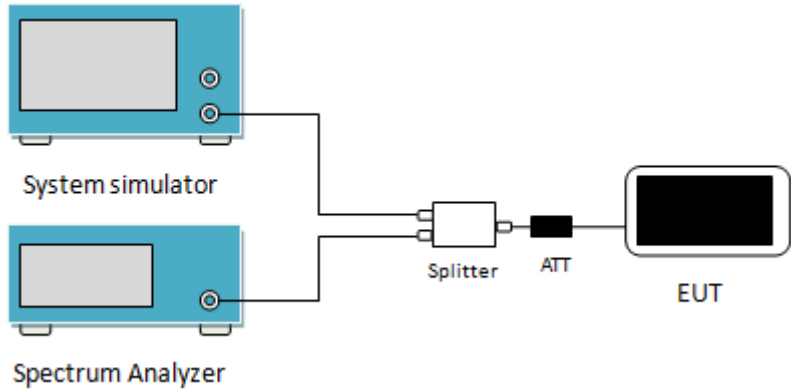
## QPSK



Date: 14.MAY.2019 14:50:04

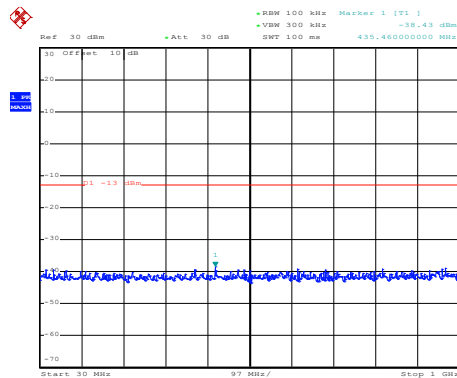
## Highest channel

## 6.4 Out of band emission at antenna terminals

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | part 27.53(h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test Method:      | ANSI/TIA-603-D 2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Limit:            | The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB (-13 dBm).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Test Setup:       |  <p>The diagram illustrates the test setup. On the left, there are two blue rectangular units: the top one is labeled 'System simulator' and the bottom one is labeled 'Spectrum Analyzer'. Both have a single output port. These two ports are connected to a single input port of a white rectangular unit labeled 'Splitter'. The 'Splitter' has two output ports. One output port is connected to a black rectangular unit labeled 'ATT' (Attenuator). The other output port of the 'Splitter' is connected to the input port of a black rectangular unit labeled 'EUT' (Equipment Under Test).</p>                                                                                                                                            |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.</li> <li>2 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.</li> <li>3 For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic.</li> <li>4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.</li> </ol> |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Remark:           | Pre-scan all RB Size and offset, and found the RB Size and offset of worst case, so the report shows only the worst case test data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

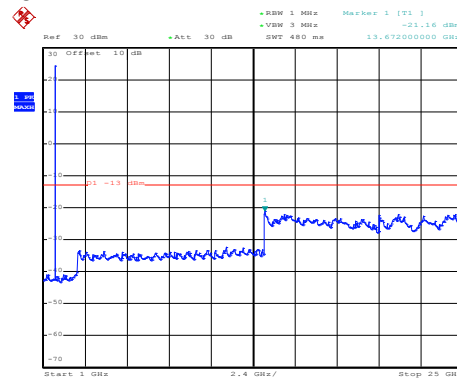
Test plots as follows (Conducted spurious emission) (worst case):  
LTE Band 4 part:

## LTE Band 4: 16 QAM & RB Size 1 BW: 1.4MHz Lowest channel



Date: 14.MAY.2019 14:51:07

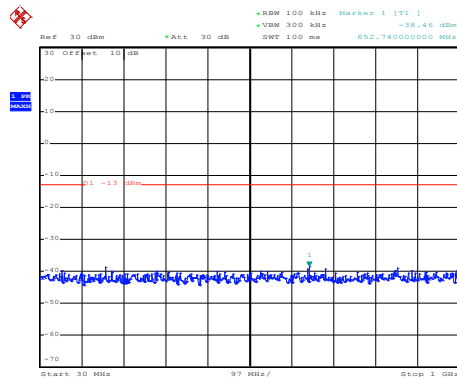
30MHz~1GHz



Date: 14.MAY.2019 16:22:40

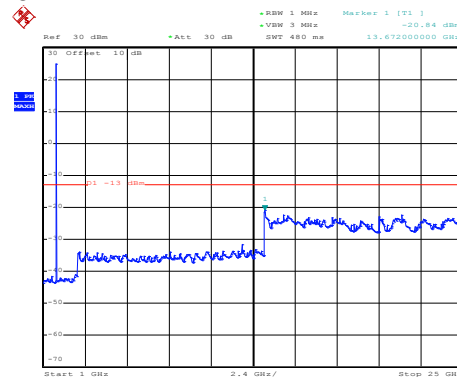
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 14:51:42

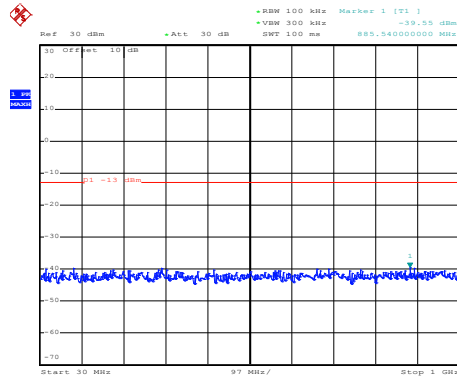
30MHz~1GHz



Date: 14.MAY.2019 16:20:44

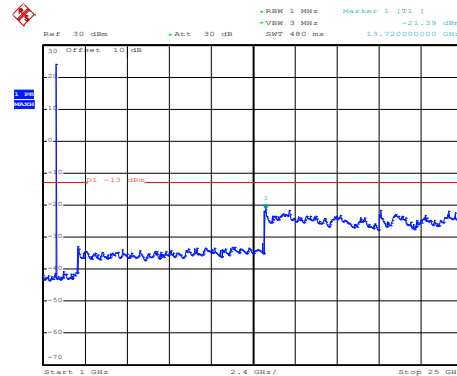
1GHz~25GHz

## High channel



Date: 14.MAY.2019 14:51:50

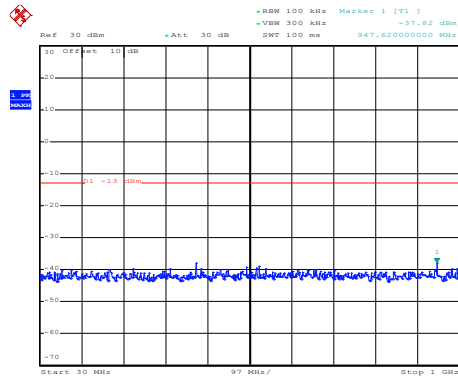
30MHz~1GHz



Date: 14.MAY.2019 16:20:08

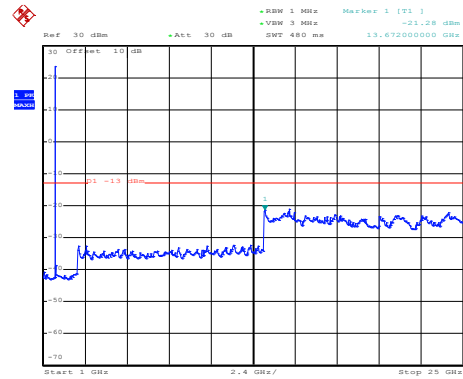
1GHz~25GHz

## LTE Band 4: 16 QAM & RB Size 6 BW: 1.4MHz Lowest channel



Date: 14.MAY.2019 14:51:22

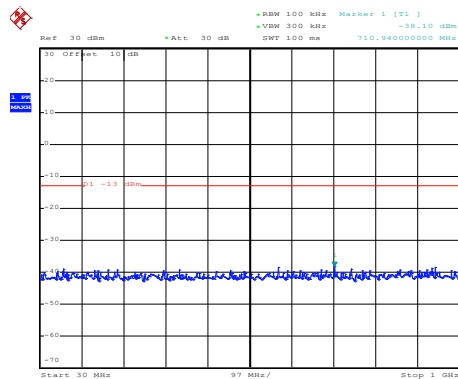
30MHz~1GHz



Date: 14.MAY.2019 16:21:56

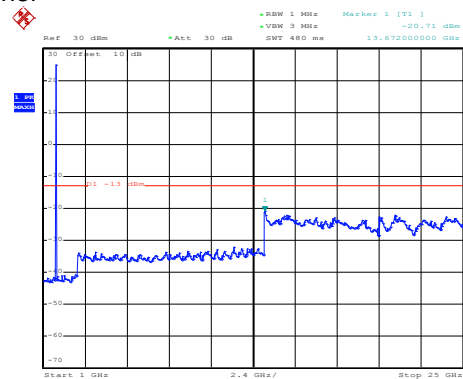
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 14:51:33

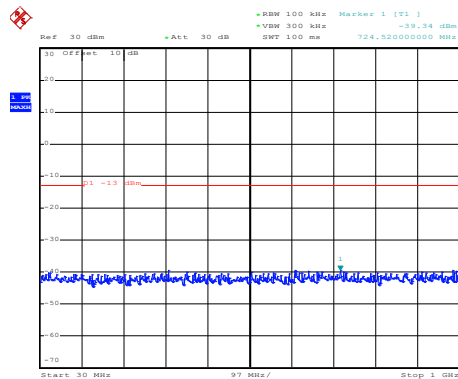
30MHz~1GHz



Date: 14.MAY.2019 16:21:29

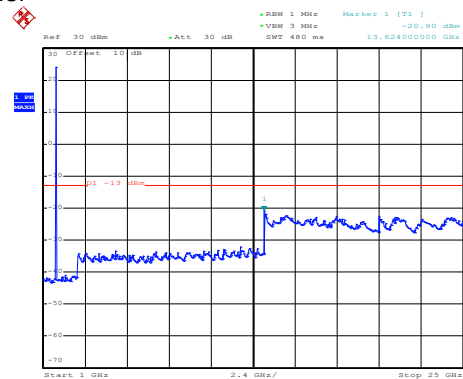
1GHz~25GHz

## High channel



Date: 14.MAY.2019 14:52:03

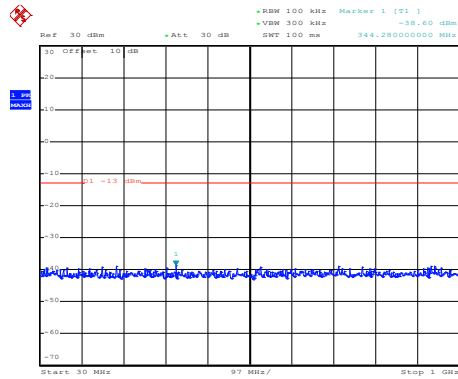
30MHz~1GHz



Date: 14.MAY.2019 16:19:39

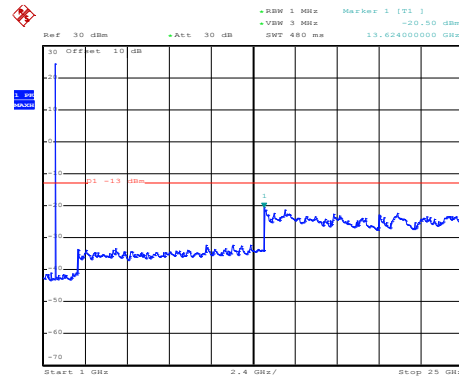
1GHz~25GHz

## LTE Band 4: QPSK & RB Size 1 BW: 1.4MHz Lowest channel



Date: 14.MAY.2019 14:51:03

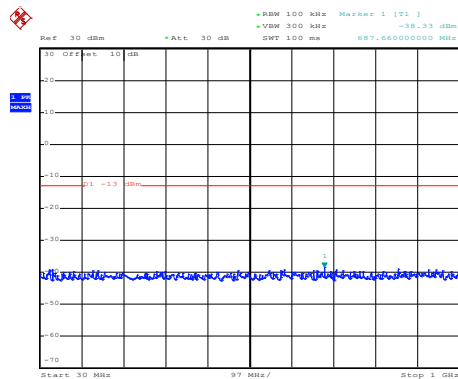
30MHz~1GHz



Date: 14.MAY.2019 16:22:26

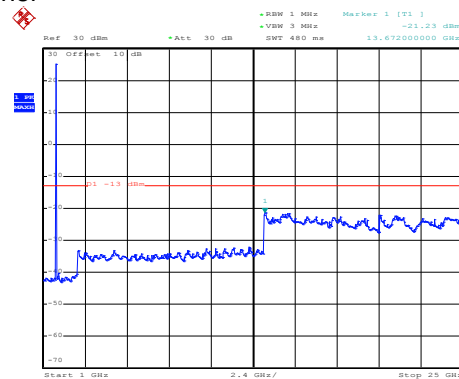
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 14:51:39

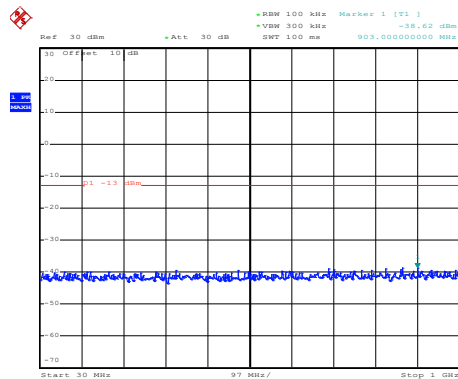
30MHz~1GHz



Date: 14.MAY.2019 16:20:34

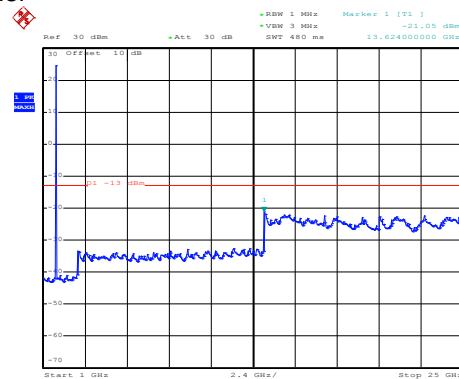
1GHz~25GHz

## High channel



Date: 14.MAY.2019 14:51:47

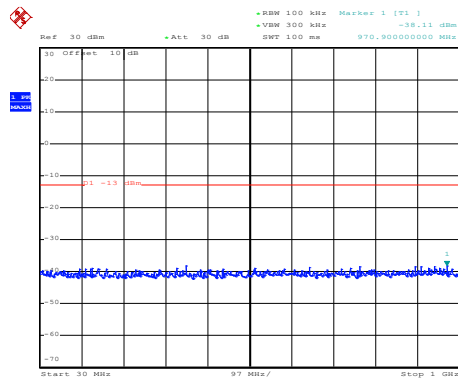
30MHz~1GHz



Date: 14.MAY.2019 16:19:58

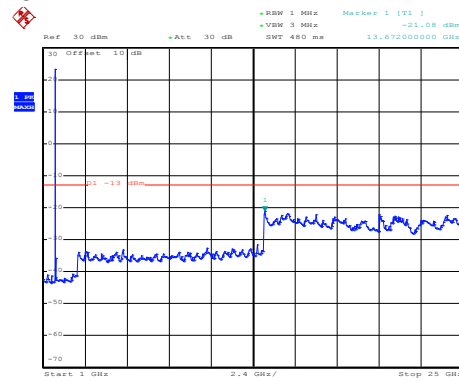
1GHz~25GHz

## LTE Band 4: QPSK & RB Size 6 BW: 1.4MHz Lowest channel



Date: 14.MAY.2019 14:51:17

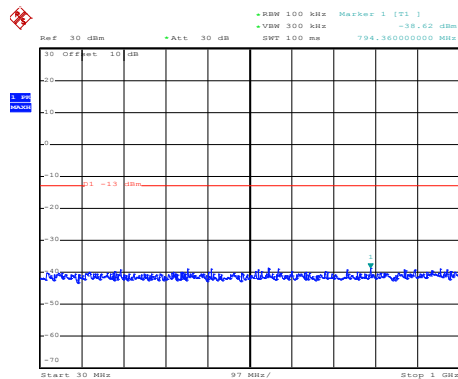
30MHz~1GHz



Date: 14.MAY.2019 16:21:42

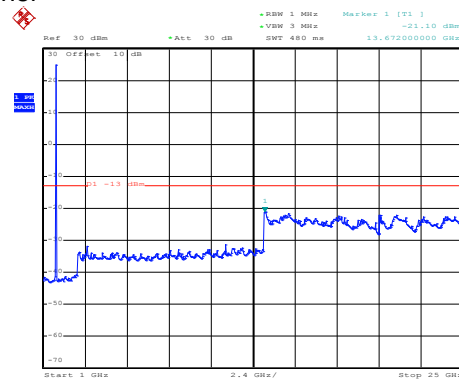
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 14:51:27

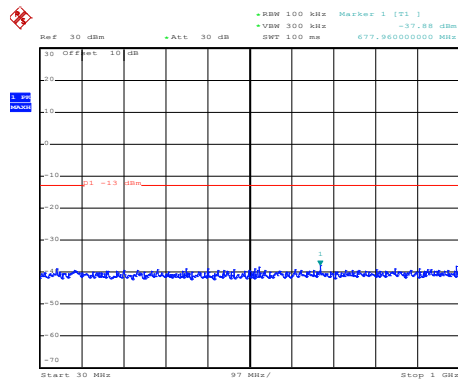
30MHz~1GHz



Date: 14.MAY.2019 16:21:15

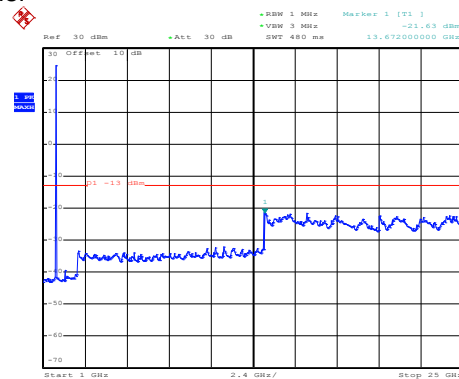
1GHz~25GHz

## High channel



Date: 14.MAY.2019 14:51:59

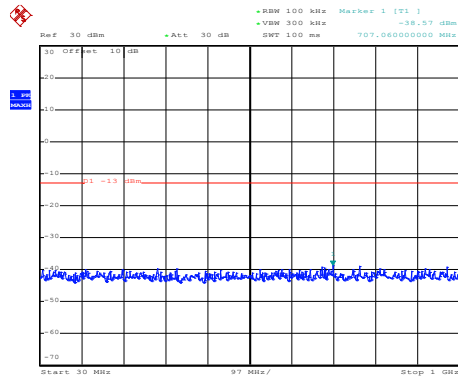
30MHz~1GHz



Date: 14.MAY.2019 16:19:27

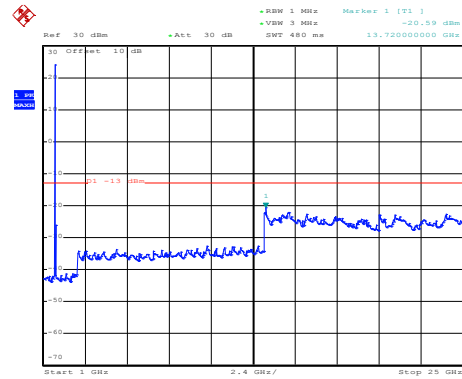
1GHz~25GHz

## LTE Band 4: 16 QAM & RB Size 1 BW: 5MHz Lowest channel



Date: 14.MAY.2019 14:54:47

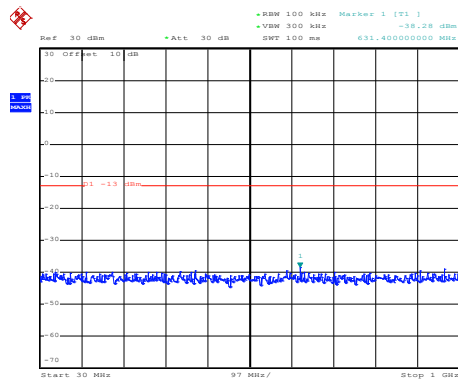
30MHz~1GHz



Date: 14.MAY.2019 16:15:11

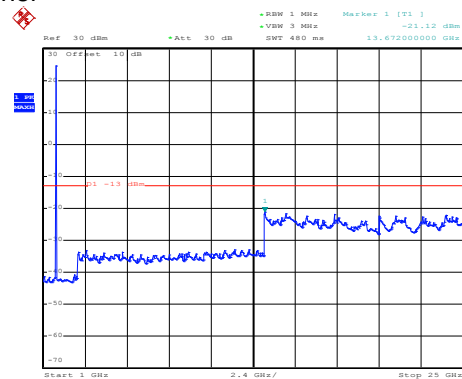
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 14:54:55

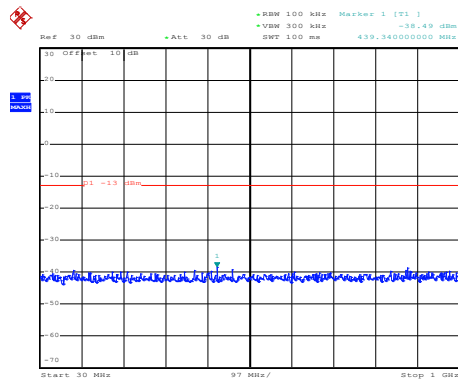
30MHz~1GHz



Date: 14.MAY.2019 16:13:41

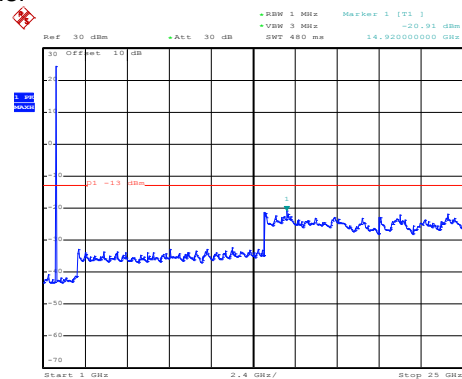
1GHz~25GHz

## High channel



Date: 14.MAY.2019 14:55:04

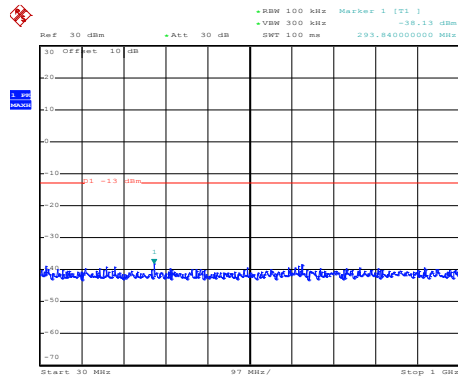
30MHz~1GHz



Date: 14.MAY.2019 16:13:14

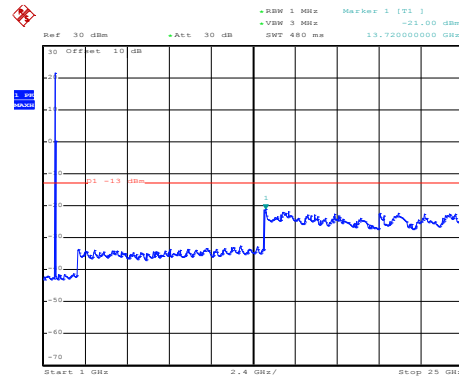
1GHz~25GHz

## LTE Band 4: 16 QAM & RB Size 25 BW: 5MHz Lowest channel



Date: 14.MAY.2019 14:55:38

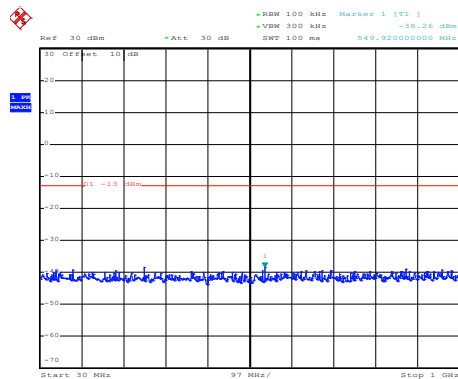
30MHz~1GHz



Date: 14.MAY.2019 16:14:39

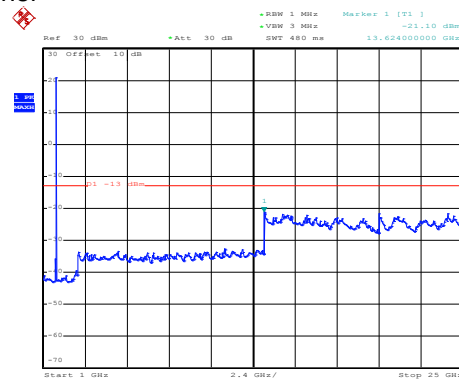
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 14:55:28

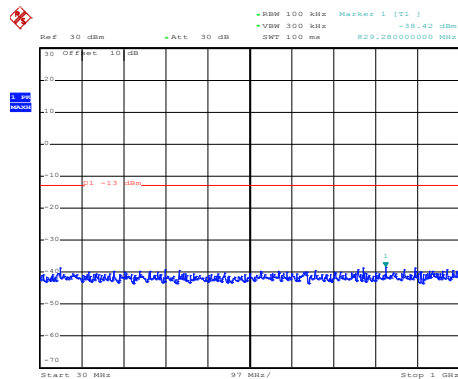
30MHz~1GHz



Date: 14.MAY.2019 16:14:09

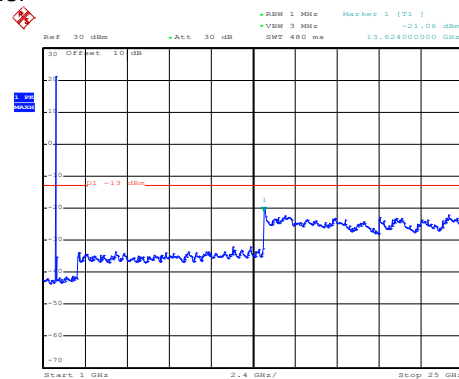
1GHz~25GHz

## High channel



Date: 14.MAY.2019 14:55:18

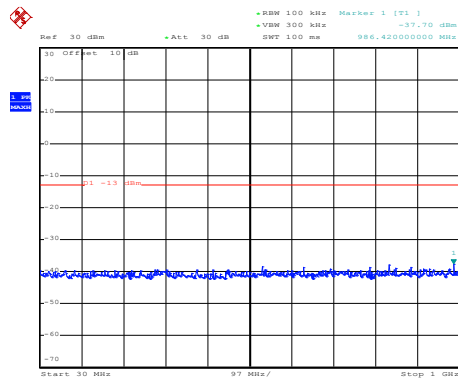
30MHz~1GHz



Date: 14.MAY.2019 16:12:49

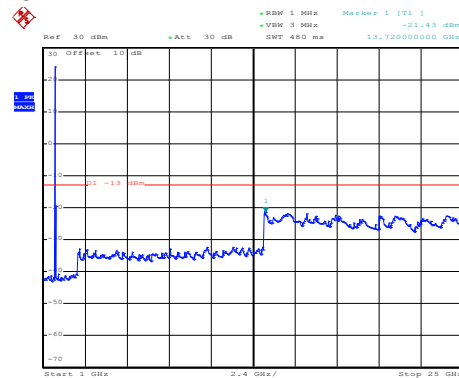
1GHz~25GHz

## LTE Band 4: QPSK & RB Size 1 BW: 5MHz Lowest channel



Date: 14.MAY.2019 14:54:43

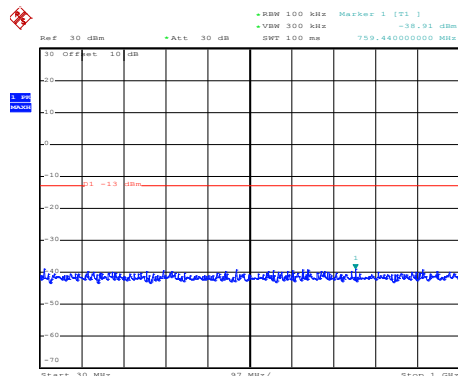
30MHz~1GHz



Date: 14.MAY.2019 16:15:02

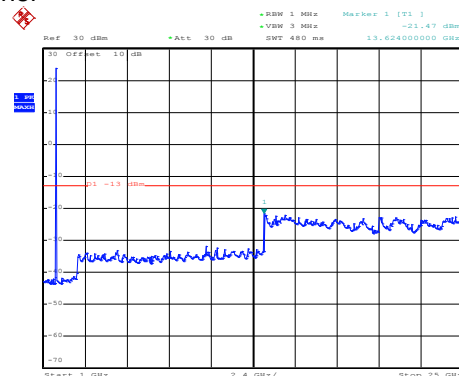
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 14:54:51

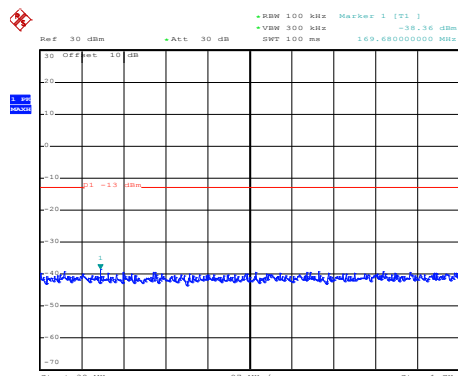
30MHz~1GHz



Date: 14.MAY.2019 16:13:31

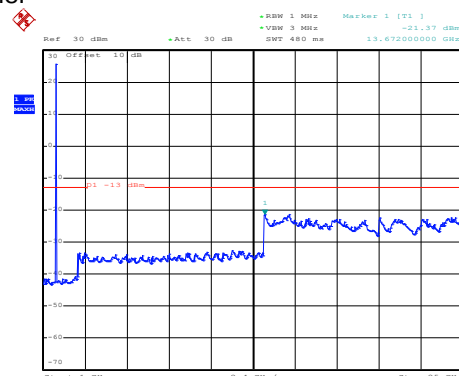
1GHz~25GHz

## High channel



Date: 14.MAY.2019 14:55:00

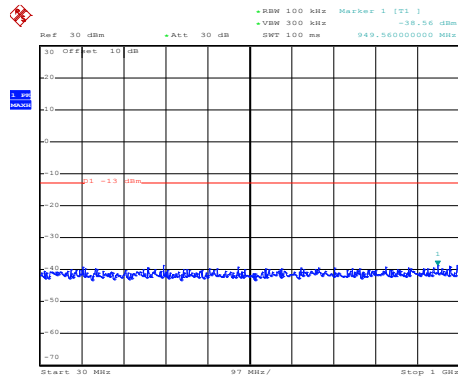
30MHz~1GHz



Date: 14.MAY.2019 16:13:06

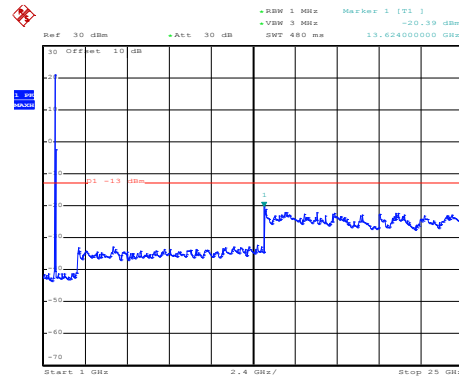
1GHz~25GHz

## LTE Band 4: QPSK & RB Size 25 BW: 5MHz Lowest channel



Date: 14.MAY.2019 14:55:33

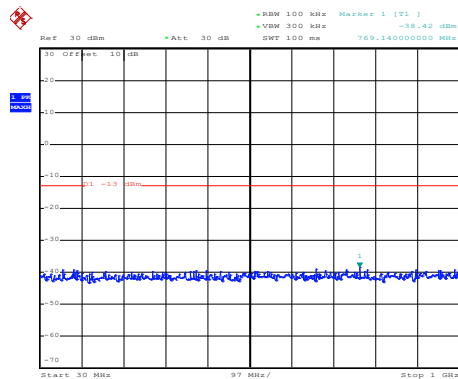
30MHz~1GHz



Date: 14.MAY.2019 16:14:25

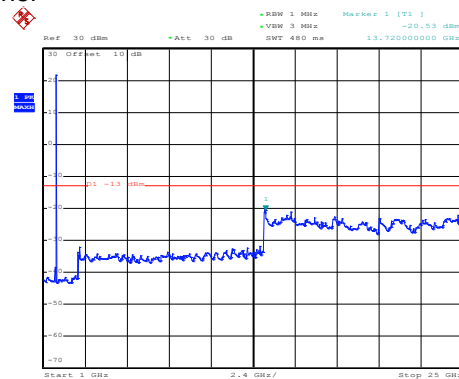
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 14:55:24

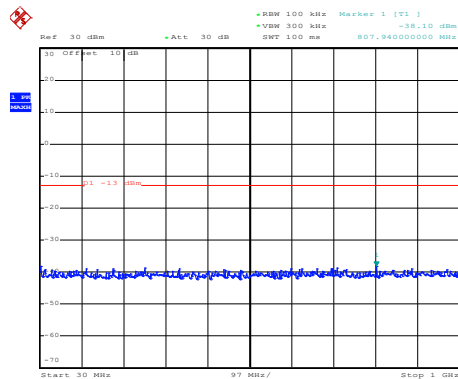
30MHz~1GHz



Date: 14.MAY.2019 16:13:54

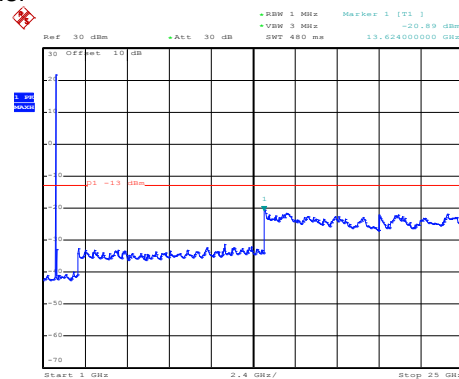
1GHz~25GHz

## High channel



Date: 14.MAY.2019 14:55:14

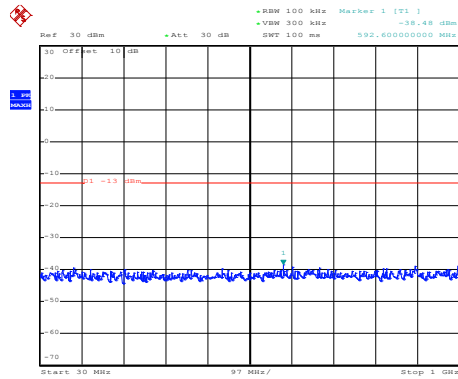
30MHz~1GHz



Date: 14.MAY.2019 16:12:37

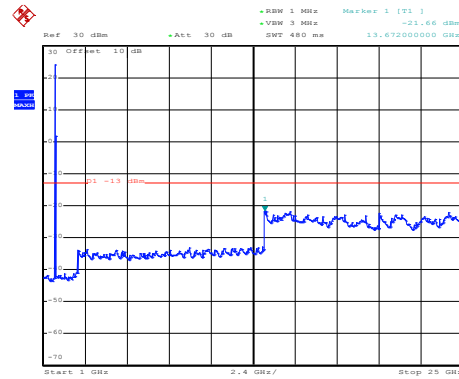
1GHz~25GHz

## LTE Band 4: 16 QAM & RB Size 1 BW: 10MHz Lowest channel



Date: 14.MAY.2019 15:01:01

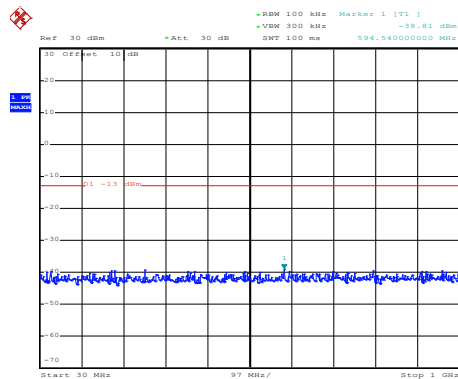
30MHz~1GHz



Date: 14.MAY.2019 16:08:39

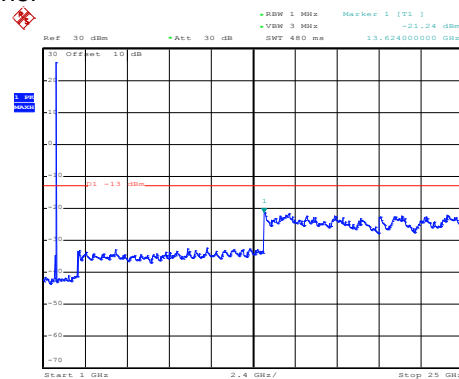
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 15:01:10

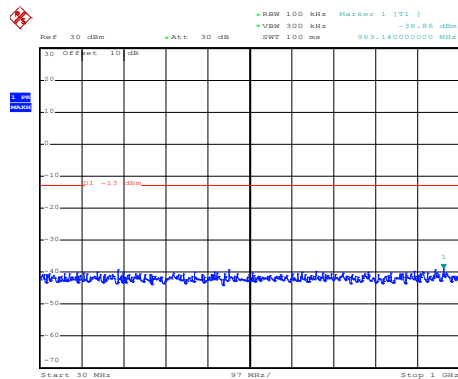
30MHz~1GHz



Date: 14.MAY.2019 16:10:31

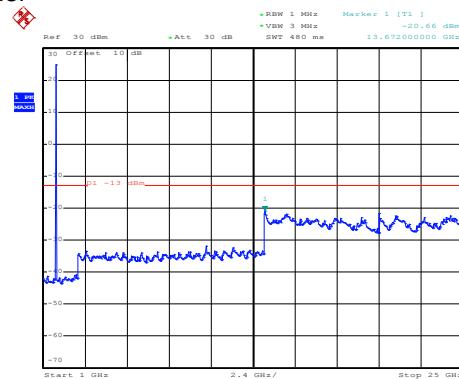
1GHz~25GHz

## High channel



Date: 14.MAY.2019 15:01:24

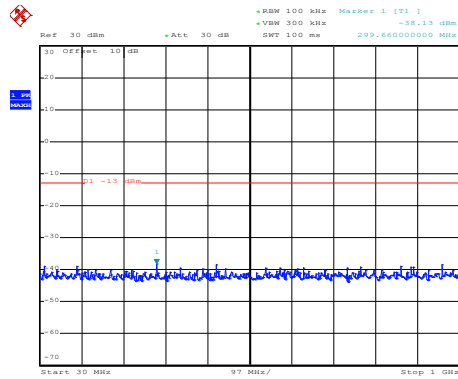
30MHz~1GHz



Date: 14.MAY.2019 16:11:09

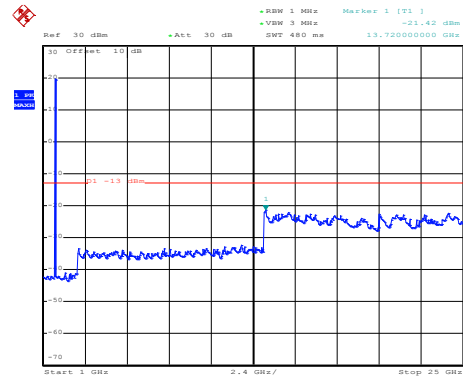
1GHz~25GHz

## LTE Band 4: 16 QAM & RB Size 50 BW: 10MHz Lowest channel



Date: 14.MAY.2019 15:02:02

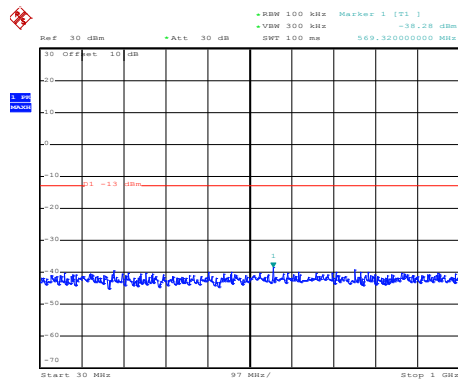
30MHz~1GHz



Date: 14.MAY.2019 16:09:13

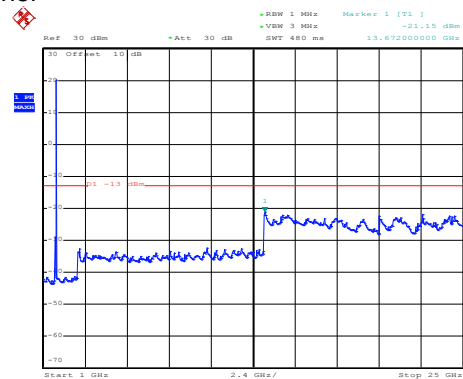
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 15:01:51

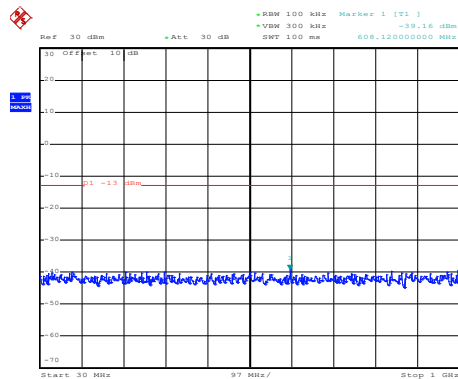
30MHz~1GHz



Date: 14.MAY.2019 16:09:54

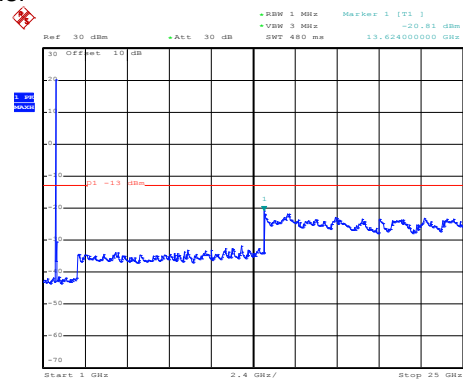
1GHz~25GHz

## High channel



Date: 14.MAY.2019 15:01:42

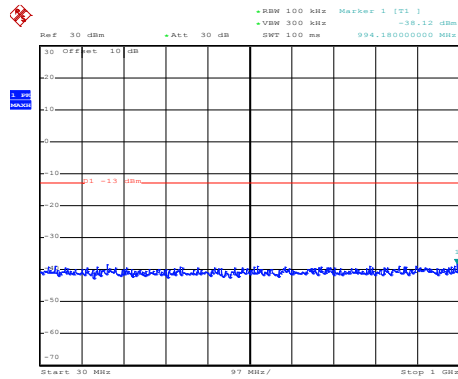
30MHz~1GHz



Date: 14.MAY.2019 16:11:37

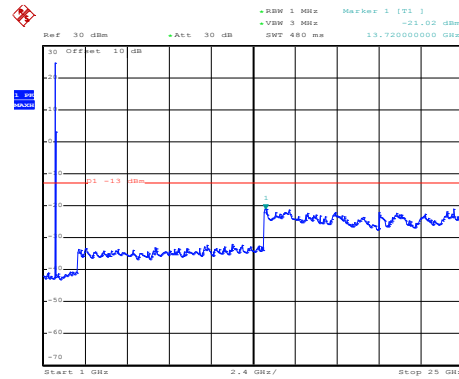
1GHz~25GHz

## LTE Band 4: QPSK & RB Size 1 BW: 10MHz Lowest channel



Date: 14.MAY.2019 15:00:57

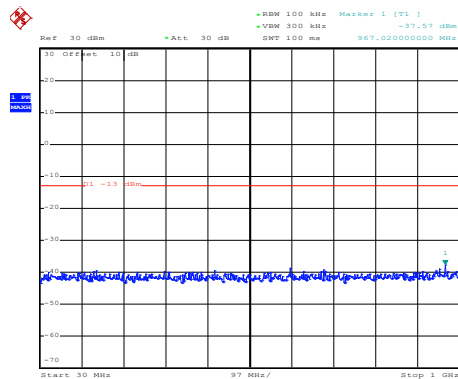
30MHz~1GHz



Date: 14.MAY.2019 16:08:24

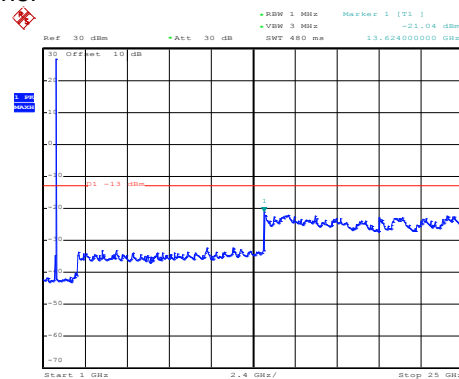
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 15:01:06

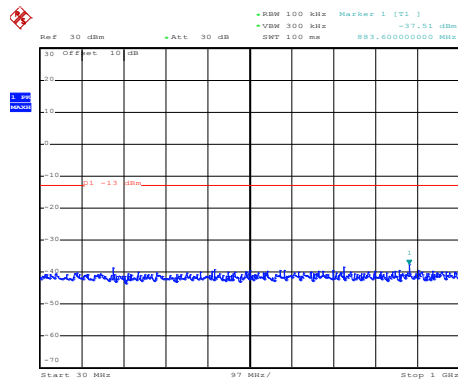
30MHz~1GHz



Date: 14.MAY.2019 16:10:09

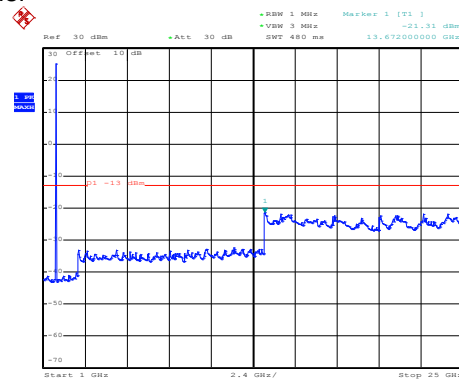
1GHz~25GHz

## High channel



Date: 14.MAY.2019 15:01:19

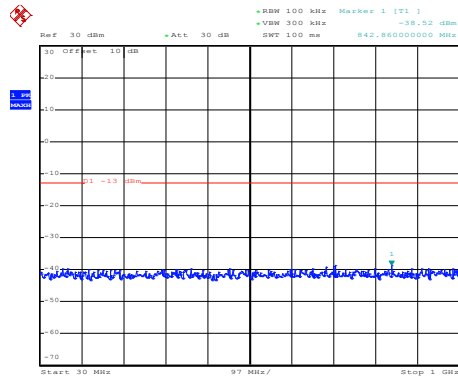
30MHz~1GHz



Date: 14.MAY.2019 16:10:57

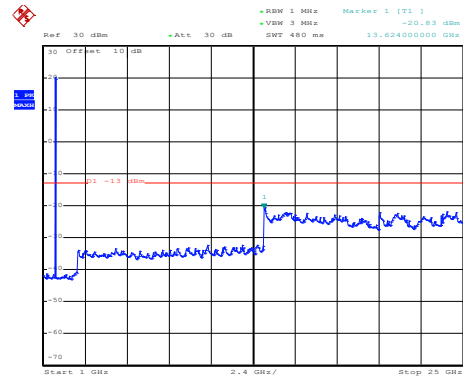
1GHz~25GHz

## LTE Band 4: QPSK & RB Size 50 BW: 10MHz Lowest channel



Date: 14.MAY.2019 15:01:55

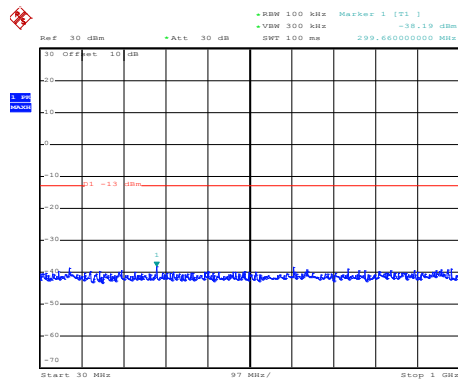
30MHz~1GHz



Date: 14.MAY.2019 16:08:59

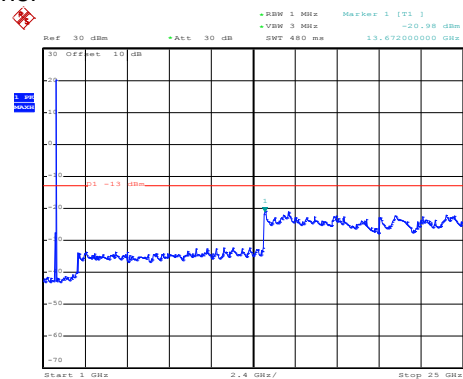
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 15:01:47

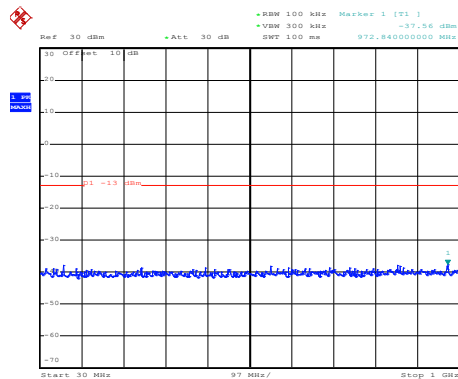
30MHz~1GHz



Date: 14.MAY.2019 16:09:42

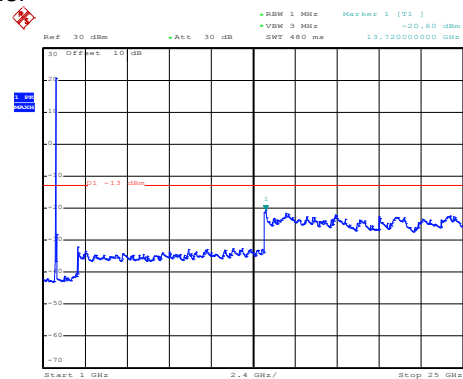
1GHz~25GHz

## High channel



Date: 14.MAY.2019 15:01:39

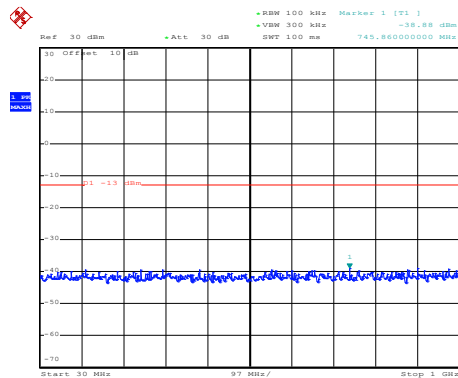
30MHz~1GHz



Date: 14.MAY.2019 16:11:29

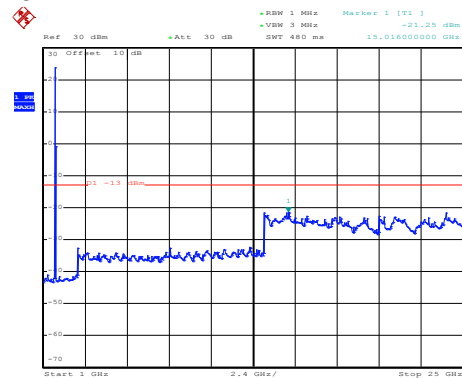
1GHz~25GHz

LTE Band 4: 16 QAM & RB Size 1  
BW: 20MHz  
Lowest channel



Date: 14.MAY.2019 15:04:03

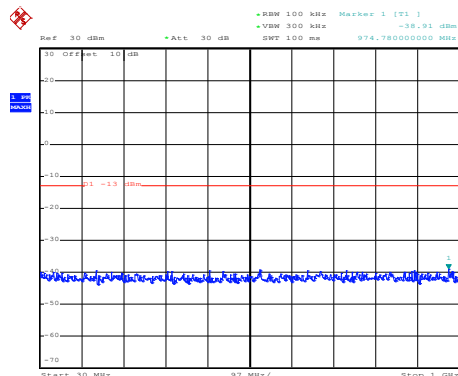
30MHz~1GHz



Date: 14.MAY.2019 14:46:11

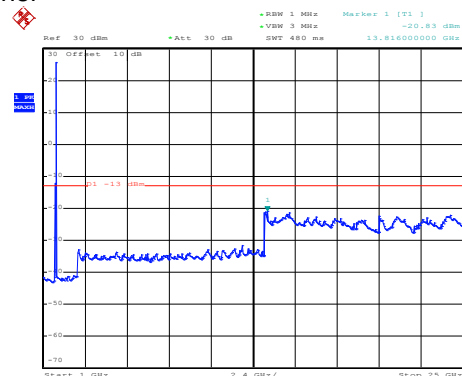
1GHz~25GHz

Middle channel



Date: 14.MAY.2019 15:03:54

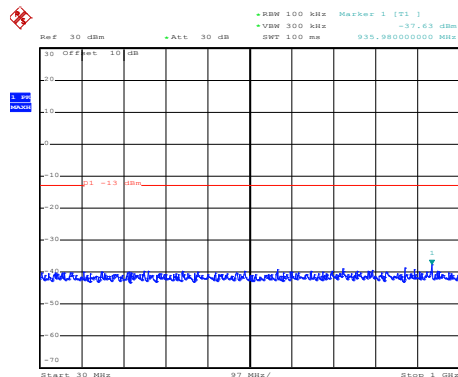
30MHz~1GHz



Date: 14.MAY.2019 14:49:29

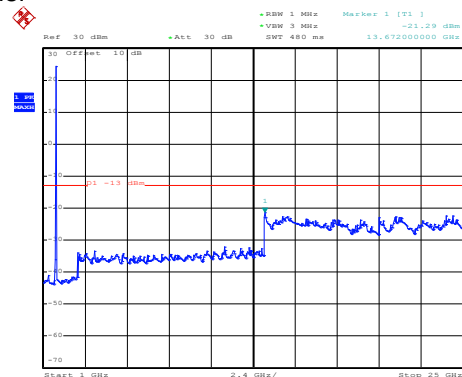
1GHz~25GHz

High channel



Date: 14.MAY.2019 15:03:45

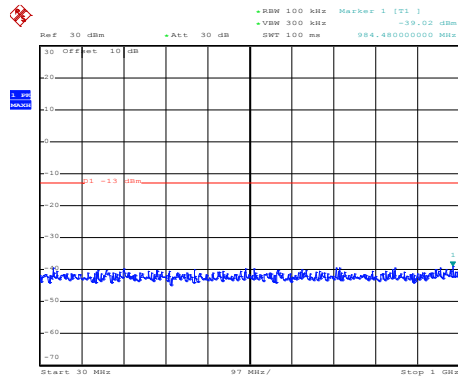
30MHz~1GHz



Date: 14.MAY.2019 14:49:57

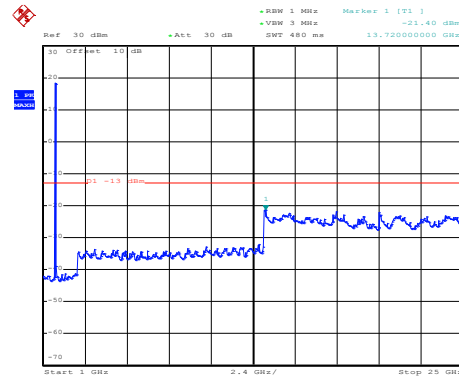
1GHz~25GHz

## LTE Band 4: 16 QAM & RB Size 100 BW: 20MHz Lowest channel



Date: 14.MAY.2019 15:03:15

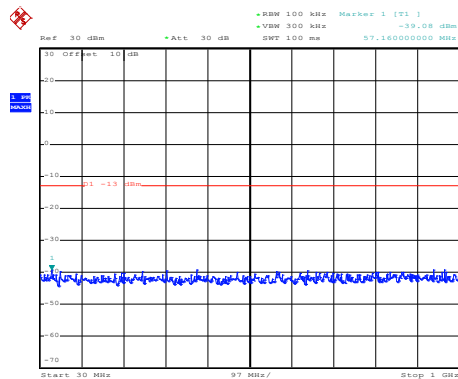
30MHz~1GHz



Date: 14.MAY.2019 14:46:55

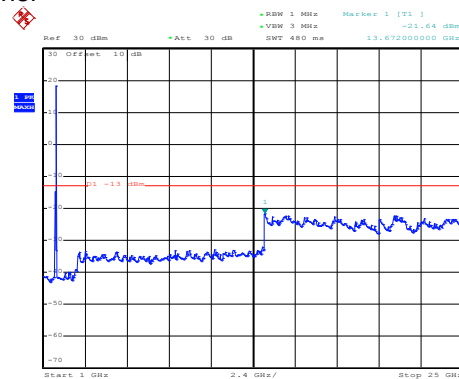
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 15:03:23

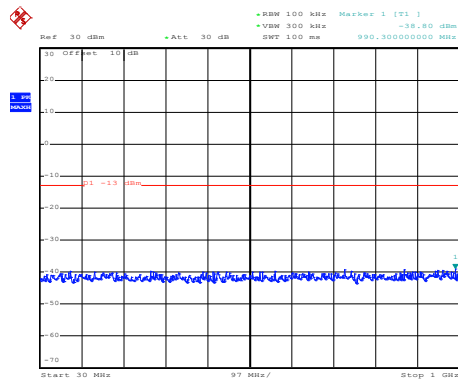
30MHz~1GHz



Date: 14.MAY.2019 14:48:44

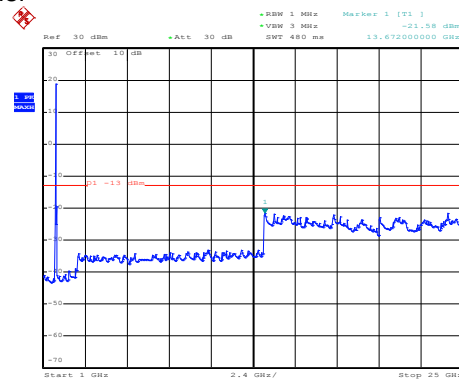
1GHz~25GHz

## High channel



Date: 14.MAY.2019 15:03:34

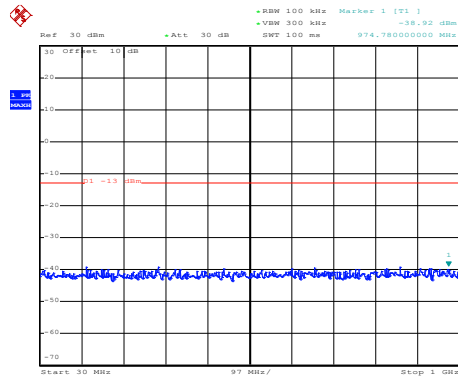
30MHz~1GHz



Date: 14.MAY.2019 14:50:27

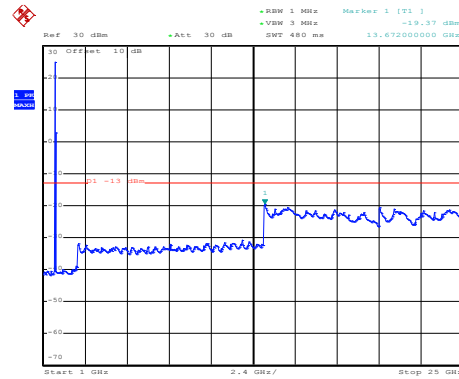
1GHz~25GHz

## LTE Band 4: QPSK & RB Size 1 BW: 20MHz Lowest channel



Date: 14.MAY.2019 15:03:58

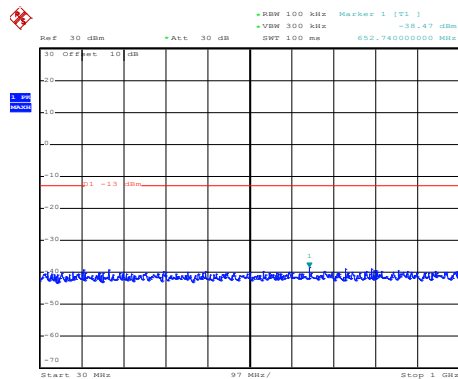
30MHz~1GHz



Date: 14.MAY.2019 14:46:01

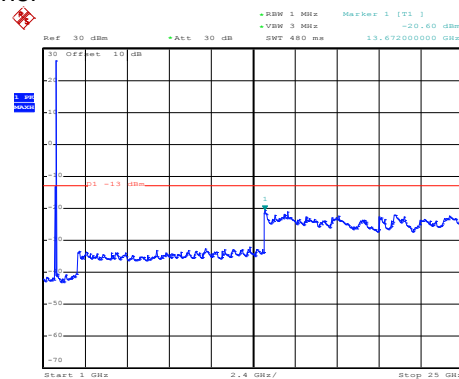
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 15:03:50

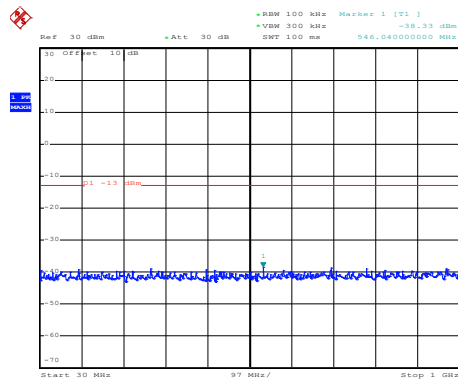
30MHz~1GHz



Date: 14.MAY.2019 14:49:12

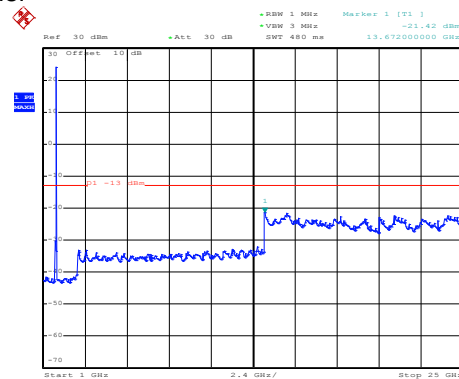
1GHz~25GHz

## High channel



Date: 14.MAY.2019 15:03:40

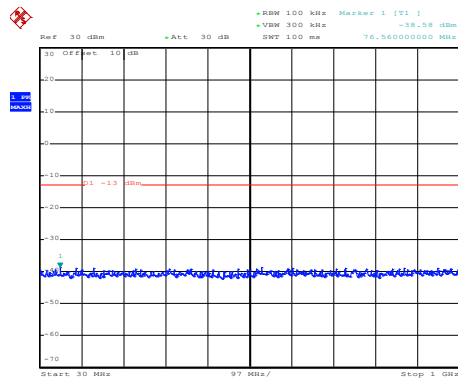
30MHz~1GHz



Date: 14.MAY.2019 14:49:50

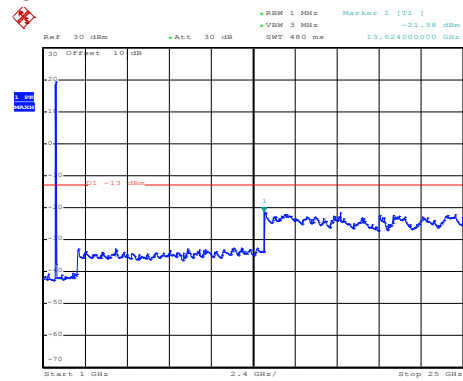
1GHz~25GHz

## LTE Band 4: QPSK & RB Size 100 BW: 20MHz Lowest channel



Date: 14.MAY.2019 15:03:11

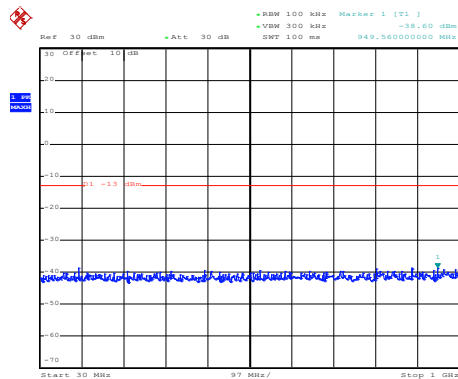
30MHz~1GHz



Date: 14.MAY.2019 14:46:45

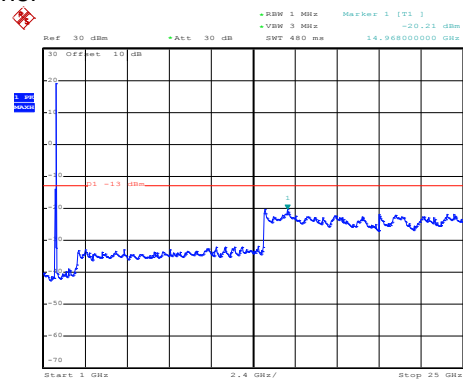
1GHz~25GHz

## Middle channel



Date: 14.MAY.2019 15:03:20

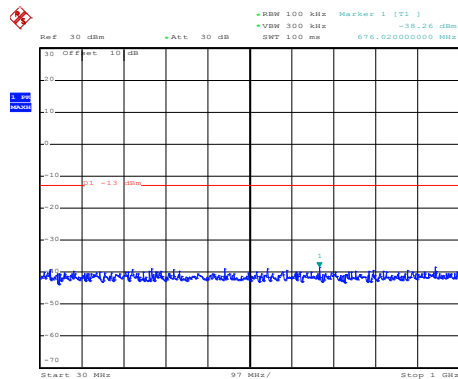
30MHz~1GHz



Date: 14.MAY.2019 14:48:22

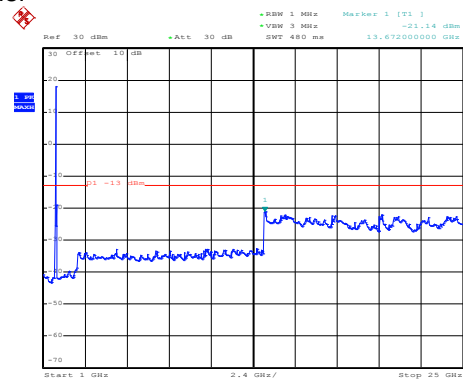
1GHz~25GHz

## High channel



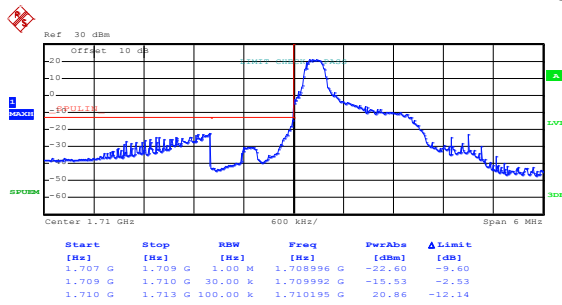
Date: 14.MAY.2019 15:03:29

30MHz~1GHz



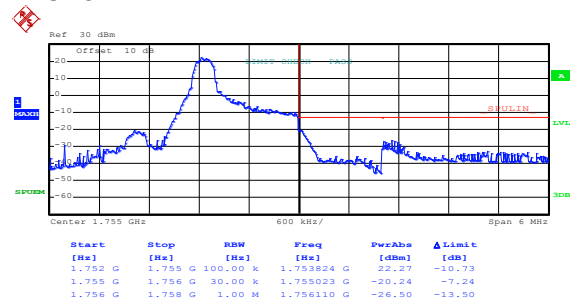
Date: 14.MAY.2019 14:50:18

1GHz~25GHz

**Band edge emission:****LTE Band 4 part:****LTE Band 4, BW: 1.4MHz  
16QAM & RB Size 1**

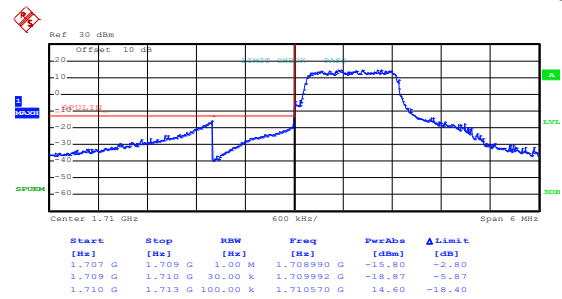
Date: 14.MAY.2019 14:11:32

Lowest channel



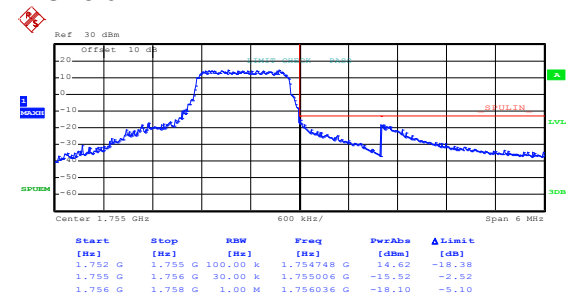
Date: 14.MAY.2019 14:12:48

Highest channel

**16QAM & RB Size 6**

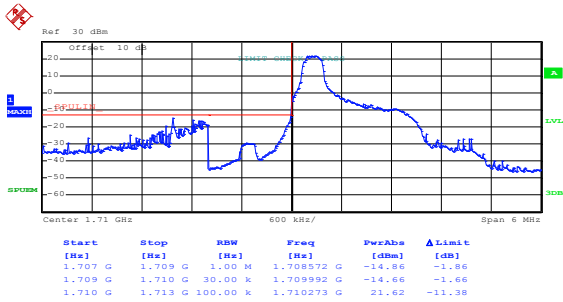
Date: 14.MAY.2019 14:12:02

Lowest channel



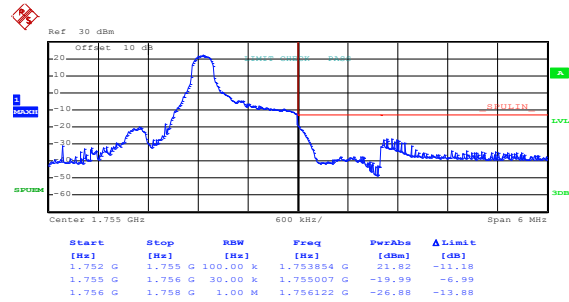
Date: 14.MAY.2019 14:12:26

Highest channel

LTE Band 4, BW: 1.4MHz  
QPSK & RB Size 1

Date: 14.MAY.2019 14:11:06

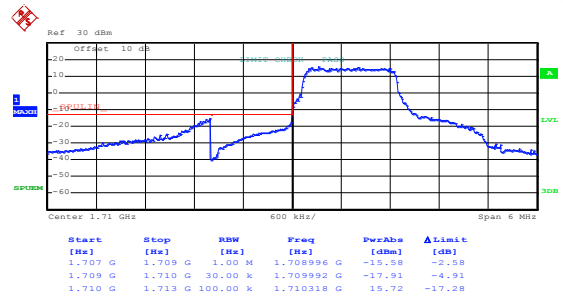
Lowest channel



Date: 14.MAY.2019 14:12:38

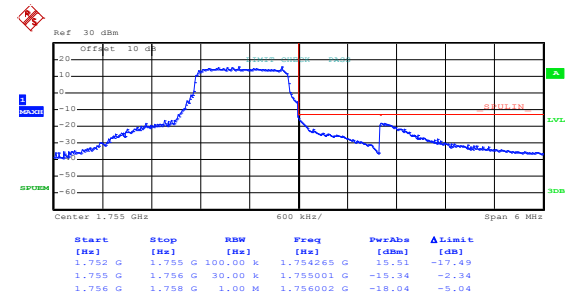
Highest channel

## QPSK &amp; RB Size 6



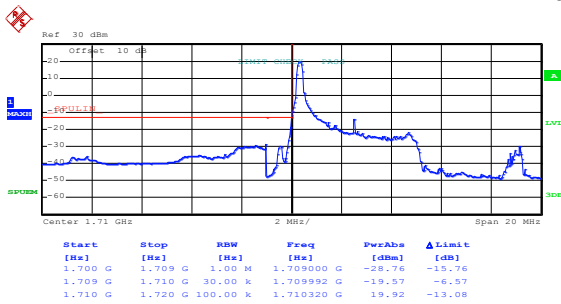
Date: 14.MAY.2019 14:11:54

Lowest channel



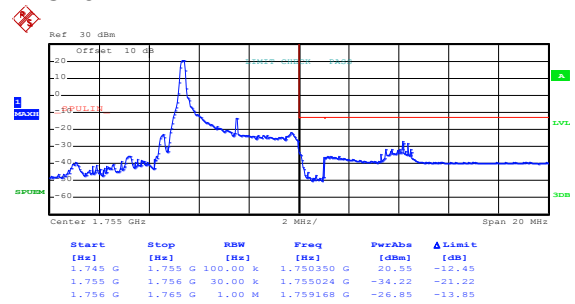
Date: 14.MAY.2019 14:12:19

Highest channel

LTE Band 4, BW: 5MHz  
16QAM & RB Size 1

Date: 14.MAY.2019 14:18:31

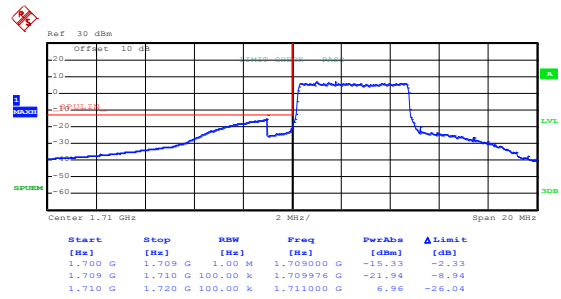
Lowest channel



Date: 14.MAY.2019 14:19:54

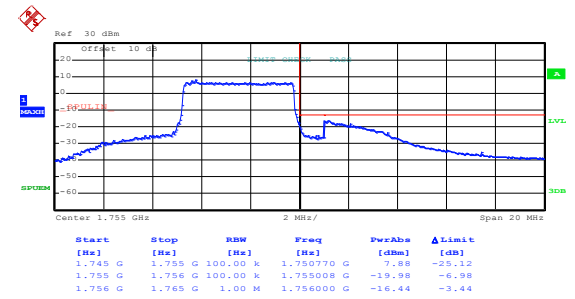
Highest channel

## 16QAM &amp; RB Size 25



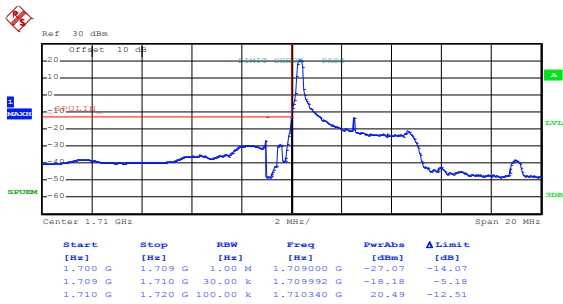
Date: 14.MAY.2019 14:18:56

Lowest channel



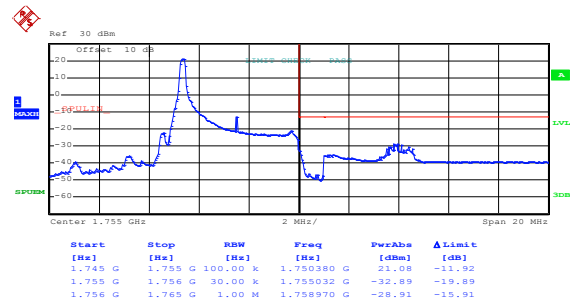
Date: 14.MAY.2019 14:19:20

Highest channel

LTE Band 4, BW: 5MHz  
QPSK & RB Size 1

Date: 14.MAY.2019 14:18:21

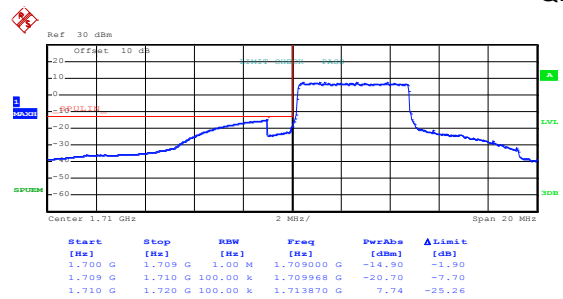
Lowest channel



Date: 14.MAY.2019 14:19:44

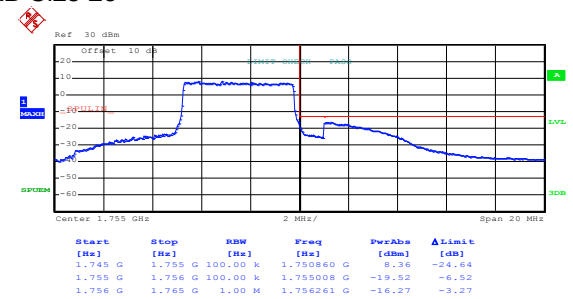
Highest channel

## QPSK &amp; RB Size 25



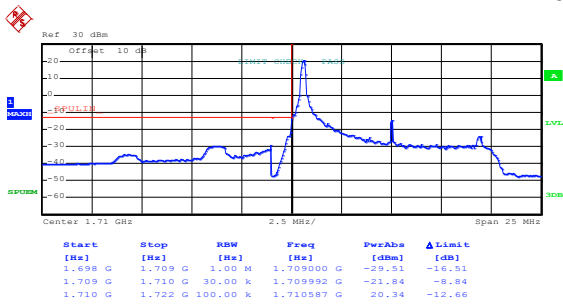
Date: 14.MAY.2019 14:18:49

Lowest channel



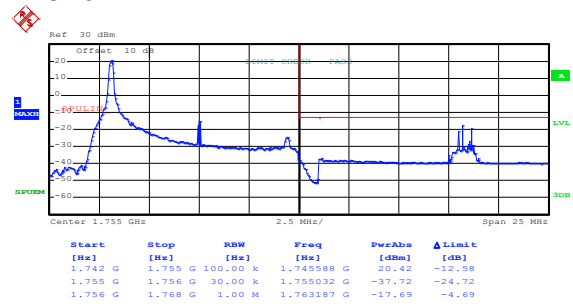
Date: 14.MAY.2019 14:19:13

Highest channel

LTE Band 4, BW: 10MHz  
16QAM & RB Size 1

Date: 14.MAY.2019 14:23:20

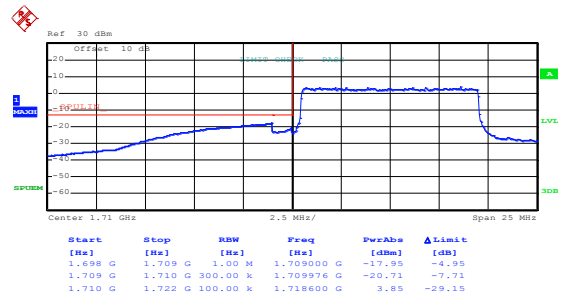
Lowest channel



Date: 14.MAY.2019 14:21:32

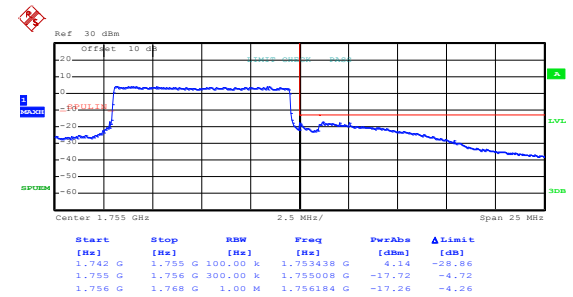
Highest channel

## 16QAM &amp; RB Size 50



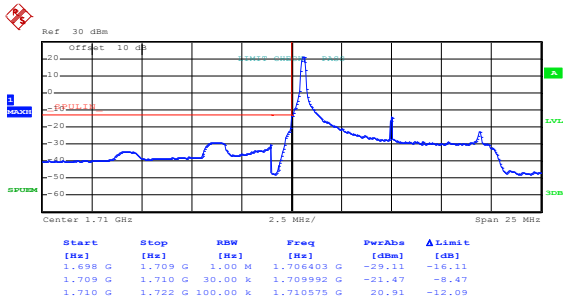
Date: 14.MAY.2019 14:22:55

Lowest channel



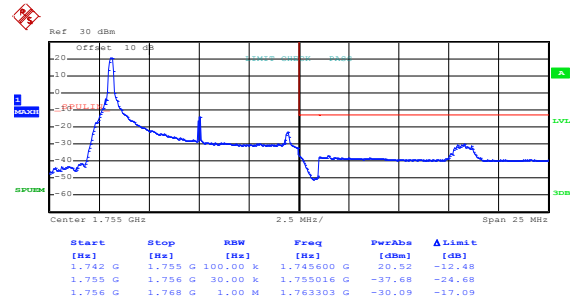
Date: 14.MAY.2019 14:21:58

Highest channel

LTE Band 4, BW: 10MHz  
QPSK & RB Size 1

Date: 14.MAY.2019 14:23:10

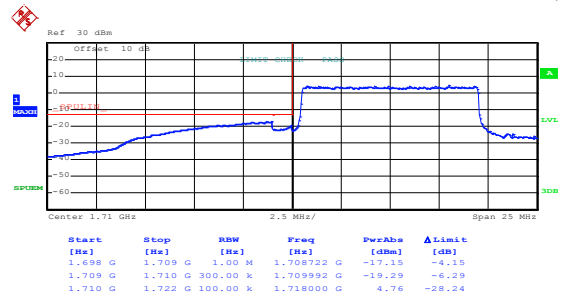
Lowest channel



Date: 14.MAY.2019 14:21:25

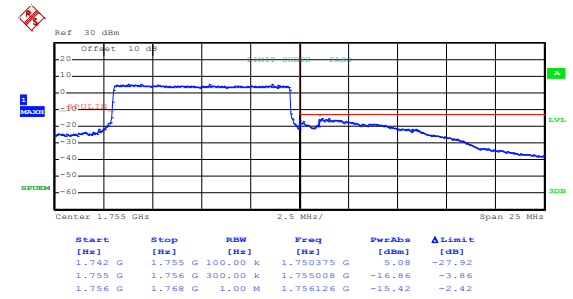
Highest channel

## QPSK &amp; RB Size 50



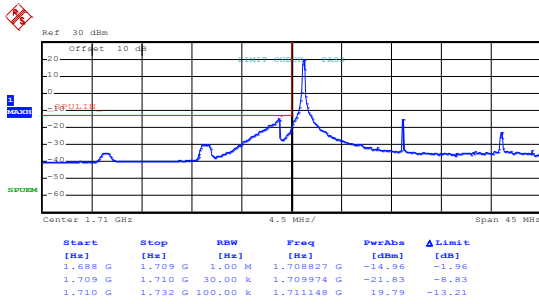
Date: 14.MAY.2019 14:22:47

Lowest channel



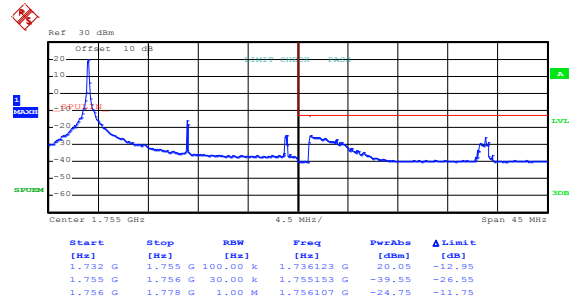
Date: 14.MAY.2019 14:21:51

Highest channel

LTE Band 4, BW: 20MHz  
16QAM & RB Size 1

Date: 14.MAY.2019 14:27:59

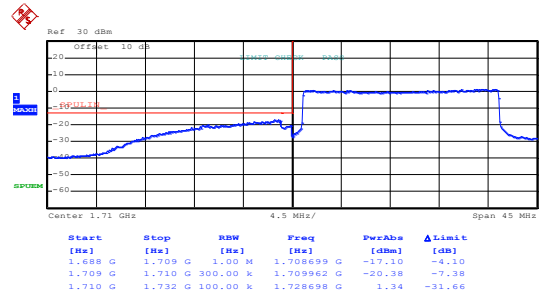
Lowest channel



Date: 14.MAY.2019 14:26:26

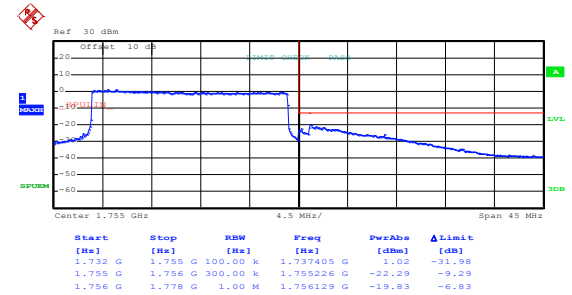
Highest channel

## 16QAM &amp; RB Size 100



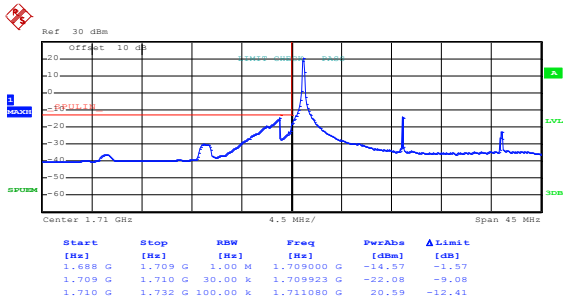
Date: 14.MAY.2019 14:27:16

Lowest channel



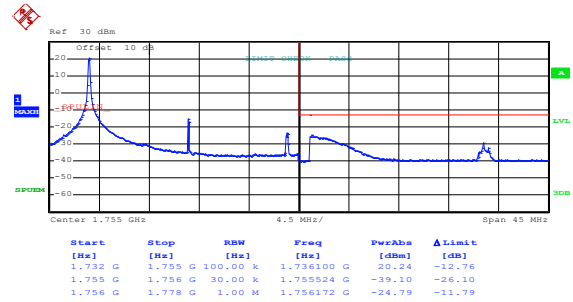
Date: 14.MAY.2019 14:26:50

Highest channel

LTE Band 4, BW: 20MHz  
QPSK & RB Size 1

Date: 14.MAY.2019 14:27:51

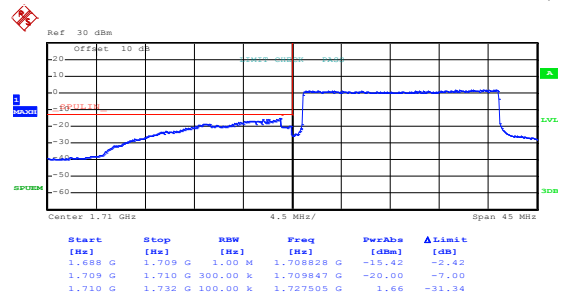
Lowest channel



Date: 14.MAY.2019 14:26:18

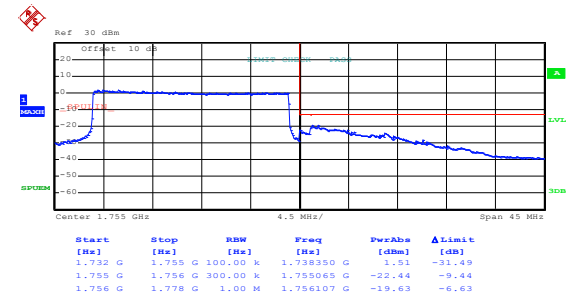
Highest channel

## QPSK &amp; RB Size 100



Date: 14.MAY.2019 14:27:07

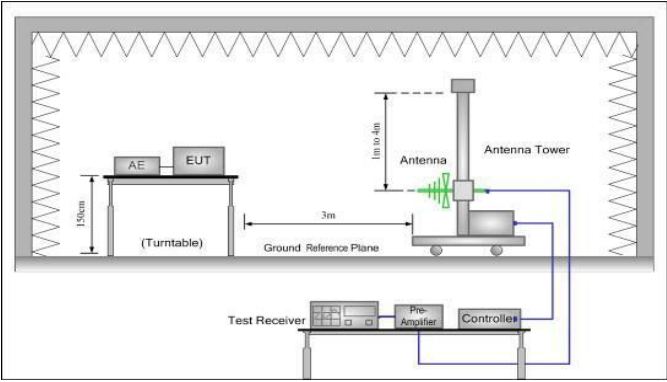
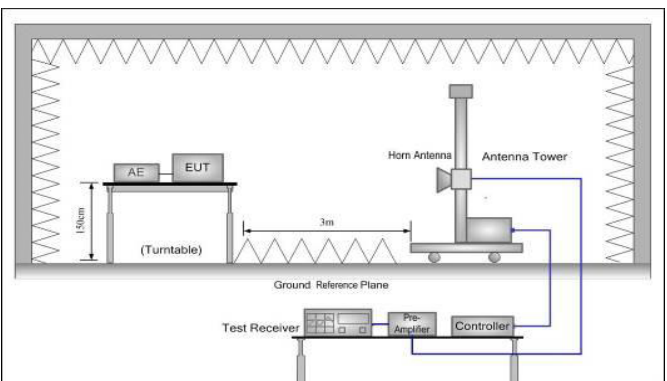
Lowest channel



Date: 14.MAY.2019 14:26:42

Highest channel

## 6.5 Field strength of spurious radiation measurement

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | Part 27.53(h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Test Method:      | ANSI/TIA-603-D 2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Limit:            | The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB (-13 dBm).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Test setup:       | <p>Below 1GHz</p>  <p>Above 1GHz</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.</li> <li>2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.</li> <li>3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.</li> <li>4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.<br/> <math display="block">\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}</math> </li> </ol> |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test mode:        | Refer to section 5.3 for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Measurement Data:**

**LTE Band 4 part:**

| LTE Band 4, WB: 1.4MHz                                                                                                                                                                                       |                   |             |             |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|-------------|--------|
| RB size 1 & RB offset 0                                                                                                                                                                                      |                   |             |             |        |
| Frequency (MHz)                                                                                                                                                                                              | Spurious Emission |             | Limit (dBm) | Result |
|                                                                                                                                                                                                              | Polarization      | Level (dBm) |             |        |
| Lowest Channel                                                                                                                                                                                               |                   |             |             |        |
| 3421.40                                                                                                                                                                                                      | Vertical          | -37.65      | -13.00      | Pass   |
| 5132.10                                                                                                                                                                                                      | V                 | -45.99      |             |        |
| 6842.80                                                                                                                                                                                                      | V                 | -39.80      |             |        |
| 3421.40                                                                                                                                                                                                      | Horizontal        | -43.68      |             |        |
| 5132.10                                                                                                                                                                                                      | H                 | -45.29      |             |        |
| 6842.80                                                                                                                                                                                                      | H                 | -40.02      |             |        |
| Middle Channel                                                                                                                                                                                               |                   |             |             |        |
| 3465.00                                                                                                                                                                                                      | Vertical          | -38.52      | -13.00      | Pass   |
| 5197.50                                                                                                                                                                                                      | V                 | -44.68      |             |        |
| 6930.00                                                                                                                                                                                                      | V                 | -40.38      |             |        |
| 3465.00                                                                                                                                                                                                      | Horizontal        | -42.69      |             |        |
| 5197.50                                                                                                                                                                                                      | H                 | -45.91      |             |        |
| 6930.00                                                                                                                                                                                                      | H                 | -39.41      |             |        |
| Highest Channel                                                                                                                                                                                              |                   |             |             |        |
| 3508.60                                                                                                                                                                                                      | Vertical          | -36.45      | -13.00      | Pass   |
| 5262.90                                                                                                                                                                                                      | V                 | -46.25      |             |        |
| 7017.20                                                                                                                                                                                                      | V                 | -39.47      |             |        |
| 3508.60                                                                                                                                                                                                      | Horizontal        | -44.72      |             |        |
| 5262.90                                                                                                                                                                                                      | H                 | -43.49      |             |        |
| 7017.20                                                                                                                                                                                                      | H                 | -41.22      |             |        |
| Note:<br>1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.<br>2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report. |                   |             |             |        |

| LTE Band 4, WB: 5MHz                                                                             |                   |             |             |        |
|--------------------------------------------------------------------------------------------------|-------------------|-------------|-------------|--------|
| RB size 1 & RB offset 0                                                                          |                   |             |             |        |
| Frequency (MHz)                                                                                  | Spurious Emission |             | Limit (dBm) | Result |
|                                                                                                  | Polarization      | Level (dBm) |             |        |
| Lowest Channel                                                                                   |                   |             |             |        |
| 3425.00                                                                                          | Vertical          | -37.34      | -13.00      | Pass   |
| 5137.50                                                                                          | V                 | -45.51      |             |        |
| 6850.00                                                                                          | V                 | -39.69      |             |        |
| 3425.00                                                                                          | Horizontal        | -43.46      |             |        |
| 5137.50                                                                                          | H                 | -45.19      |             |        |
| 6850.00                                                                                          | H                 | -40.93      |             |        |
| Middle Channel                                                                                   |                   |             |             |        |
| 3465.00                                                                                          | Vertical          | -38.63      | -13.00      | Pass   |
| 5197.50                                                                                          | V                 | -44.91      |             |        |
| 6930.00                                                                                          | V                 | -40.38      |             |        |
| 3465.00                                                                                          | Horizontal        | -42.32      |             |        |
| 5197.50                                                                                          | H                 | -45.11      |             |        |
| 6930.00                                                                                          | H                 | -39.89      |             |        |
| Highest Channel                                                                                  |                   |             |             |        |
| 3505.00                                                                                          | Vertical          | -36.29      | -13.00      | Pass   |
| 5257.50                                                                                          | V                 | -46.16      |             |        |
| 7010.00                                                                                          | V                 | -39.94      |             |        |
| 3505.00                                                                                          | Horizontal        | -44.91      |             |        |
| 5257.50                                                                                          | H                 | -43.68      |             |        |
| 7010.00                                                                                          | H                 | -41.42      |             |        |
| Note:                                                                                            |                   |             |             |        |
| 1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report. |                   |             |             |        |
| 2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.  |                   |             |             |        |

| LTE Band 4, WB: 10MHz                                                                            |                   |             |             |        |
|--------------------------------------------------------------------------------------------------|-------------------|-------------|-------------|--------|
| RB size 1 & RB offset 0                                                                          |                   |             |             |        |
| Frequency (MHz)                                                                                  | Spurious Emission |             | Limit (dBm) | Result |
|                                                                                                  | Polarization      | Level (dBm) |             |        |
| Lowest Channel                                                                                   |                   |             |             |        |
| 3430.00                                                                                          | Vertical          | -37.42      | -13.00      | Pass   |
| 5145.00                                                                                          | V                 | -45.12      |             |        |
| 6860.00                                                                                          | V                 | -39.42      |             |        |
| 3430.00                                                                                          | Horizontal        | -43.45      |             |        |
| 5145.00                                                                                          | H                 | -45.24      |             |        |
| 6860.00                                                                                          | H                 | -40.11      |             |        |
| Middle Channel                                                                                   |                   |             |             |        |
| 3465.00                                                                                          | Vertical          | -38.84      | -13.00      | Pass   |
| 5197.50                                                                                          | V                 | -44.08      |             |        |
| 6930.00                                                                                          | V                 | -40.12      |             |        |
| 3465.00                                                                                          | Horizontal        | -42.26      |             |        |
| 5197.50                                                                                          | H                 | -45.42      |             |        |
| 6930.00                                                                                          | H                 | -39.91      |             |        |
| Highest Channel                                                                                  |                   |             |             |        |
| 3500.00                                                                                          | Vertical          | -36.46      | -13.00      | Pass   |
| 5250.00                                                                                          | V                 | -46.91      |             |        |
| 7000.00                                                                                          | V                 | -39.19      |             |        |
| 3500.00                                                                                          | Horizontal        | -44.37      |             |        |
| 5250.00                                                                                          | H                 | -43.81      |             |        |
| 7000.00                                                                                          | H                 | -41.25      |             |        |
| Note:                                                                                            |                   |             |             |        |
| 1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report. |                   |             |             |        |
| 2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.  |                   |             |             |        |

| LTE Band 4, WB: 20MHz                                                                            |                   |             |             |        |
|--------------------------------------------------------------------------------------------------|-------------------|-------------|-------------|--------|
| RB size 1 & RB offset 0                                                                          |                   |             |             |        |
| Frequency (MHz)                                                                                  | Spurious Emission |             | Limit (dBm) | Result |
|                                                                                                  | Polarization      | Level (dBm) |             |        |
| Lowest Channel                                                                                   |                   |             |             |        |
| 3440.00                                                                                          | Vertical          | -37.57      | -13.00      | Pass   |
| 5160.00                                                                                          | V                 | -45.59      |             |        |
| 6880.00                                                                                          | V                 | -39.59      |             |        |
| 3440.00                                                                                          | Horizontal        | -43.46      |             |        |
| 5160.00                                                                                          | H                 | -45.76      |             |        |
| 6880.00                                                                                          | H                 | -40.22      |             |        |
| Middle Channel                                                                                   |                   |             |             |        |
| 3465.00                                                                                          | Vertical          | -38.74      | -13.00      | Pass   |
| 5197.50                                                                                          | V                 | -44.45      |             |        |
| 6930.00                                                                                          | V                 | -40.24      |             |        |
| 3465.00                                                                                          | Horizontal        | -42.57      |             |        |
| 5197.50                                                                                          | H                 | -45.70      |             |        |
| 6930.00                                                                                          | H                 | -39.84      |             |        |
| Highest Channel                                                                                  |                   |             |             |        |
| 3490.00                                                                                          | Vertical          | -36.41      | -13.00      | Pass   |
| 5235.00                                                                                          | V                 | -46.65      |             |        |
| 6980.00                                                                                          | V                 | -39.39      |             |        |
| 3490.00                                                                                          | Horizontal        | -44.24      |             |        |
| 5235.00                                                                                          | H                 | -43.66      |             |        |
| 6980.00                                                                                          | H                 | -41.81      |             |        |
| Note:                                                                                            |                   |             |             |        |
| 1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report. |                   |             |             |        |
| 2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.  |                   |             |             |        |

## 6.6 Frequency stability V.S. Temperature measurement

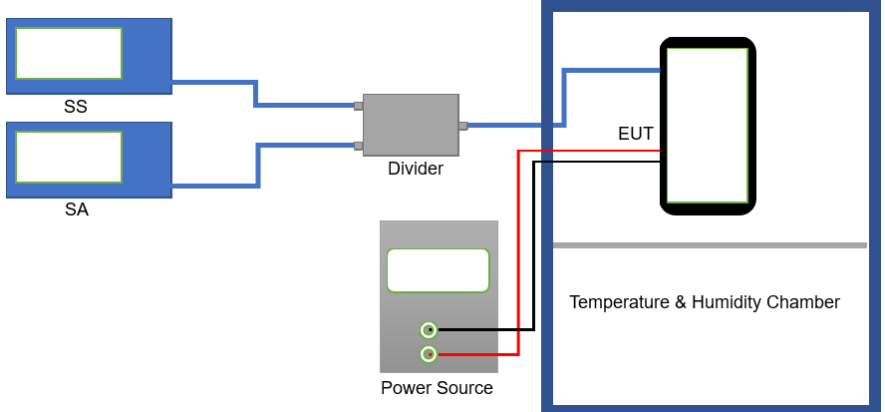
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | Part 27.54, Part 2.1055(a)(1)(b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test Method:      | ANSI/TIA-603-D 2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Limit:            | ±2.5ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Test setup:       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Test procedure:   | <ol style="list-style-type: none"> <li>1. The equipment under test was connected to an external DC power supply and input rated voltage.</li> <li>2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.</li> <li>3. The EUT was placed inside the temperature chamber.</li> <li>4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.</li> <li>5. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.</li> <li>6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached</li> </ol> |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Measurement Data (worst case):

## LTE Band 4 part:

| Reference Frequency: LTE Band 4 (10MHz) Middle channel=20175 channel=1732.50MHz |                  |                 |          |             |        |
|---------------------------------------------------------------------------------|------------------|-----------------|----------|-------------|--------|
| Power supplied<br>(Vac)                                                         | Temperature (°C) | Frequency error |          | Limit (ppm) | Result |
|                                                                                 |                  | Hz              | ppm      |             |        |
| QPSK                                                                            |                  |                 |          |             |        |
| 120                                                                             | -30              | 198             | 0.114286 | ±2.5        | Pass   |
|                                                                                 | -20              | 155             | 0.089466 |             |        |
|                                                                                 | -10              | 163             | 0.094084 |             |        |
|                                                                                 | 0                | 123             | 0.070996 |             |        |
|                                                                                 | 10               | 188             | 0.108514 |             |        |
|                                                                                 | 20               | 174             | 0.100433 |             |        |
|                                                                                 | 30               | 114             | 0.065801 |             |        |
|                                                                                 | 40               | 105             | 0.060606 |             |        |
|                                                                                 | 50               | 150             | 0.086580 |             |        |
| 16QAM                                                                           |                  |                 |          |             |        |
| 120                                                                             | -30              | 123             | 0.070996 | ±2.5        | Pass   |
|                                                                                 | -20              | 150             | 0.086580 |             |        |
|                                                                                 | -10              | 166             | 0.095815 |             |        |
|                                                                                 | 0                | 122             | 0.070418 |             |        |
|                                                                                 | 10               | 144             | 0.083117 |             |        |
|                                                                                 | 20               | 140             | 0.080808 |             |        |
|                                                                                 | 30               | 156             | 0.090043 |             |        |
|                                                                                 | 40               | 133             | 0.076768 |             |        |
|                                                                                 | 50               | 138             | 0.079654 |             |        |
| Note: Only the worst case shown in the report.                                  |                  |                 |          |             |        |

## 6.7 Frequency stability V.S. Voltage measurement

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | Part 27.54, Part 2.1055(d)(2)                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Test Method:      | ANSI/TIA-603-D 2010                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Limit:            | $\pm 2.5\text{ppm}$                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test setup:       |  <p>The diagram illustrates the test setup. A Signal Source (SS) and a Spectrum Analyzer (SA) are connected to a Divider. The output of the Divider is connected to the EUT (Equipment Under Test) inside a Temperature &amp; Humidity Chamber. A Power Source is also connected to the EUT.</p>                                                             |
| Test procedure:   | <ol style="list-style-type: none"> <li>1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.</li> <li>2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.</li> <li>3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.</li> </ol> |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                               |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                               |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## Measurement Data (worst case):

## LTE Band 4 part:

| Reference Frequency: LTE Band 4(10MHz) Middle channel=20175 channel=1732.50MHz |                      |                 |          |             |        |
|--------------------------------------------------------------------------------|----------------------|-----------------|----------|-------------|--------|
| Temperature (°C)                                                               | Power supplied (Vac) | Frequency error |          | Limit (ppm) | Result |
|                                                                                |                      | Hz              | ppm      |             |        |
| QPSK                                                                           |                      |                 |          |             |        |
| 25                                                                             | 114                  | 98              | 0.056566 | ±2.5        | Pass   |
|                                                                                | 120                  | 65              | 0.037518 |             |        |
|                                                                                | 116                  | 74              | 0.042713 |             |        |
| 16QAM                                                                          |                      |                 |          |             |        |
| 25                                                                             | 114                  | 80              | 0.046176 | ±2.5        | Pass   |
|                                                                                | 120                  | 96              | 0.055411 |             |        |
|                                                                                | 116                  | 48              | 0.027706 |             |        |
| Note: Only the worst case shown in the report.                                 |                      |                 |          |             |        |