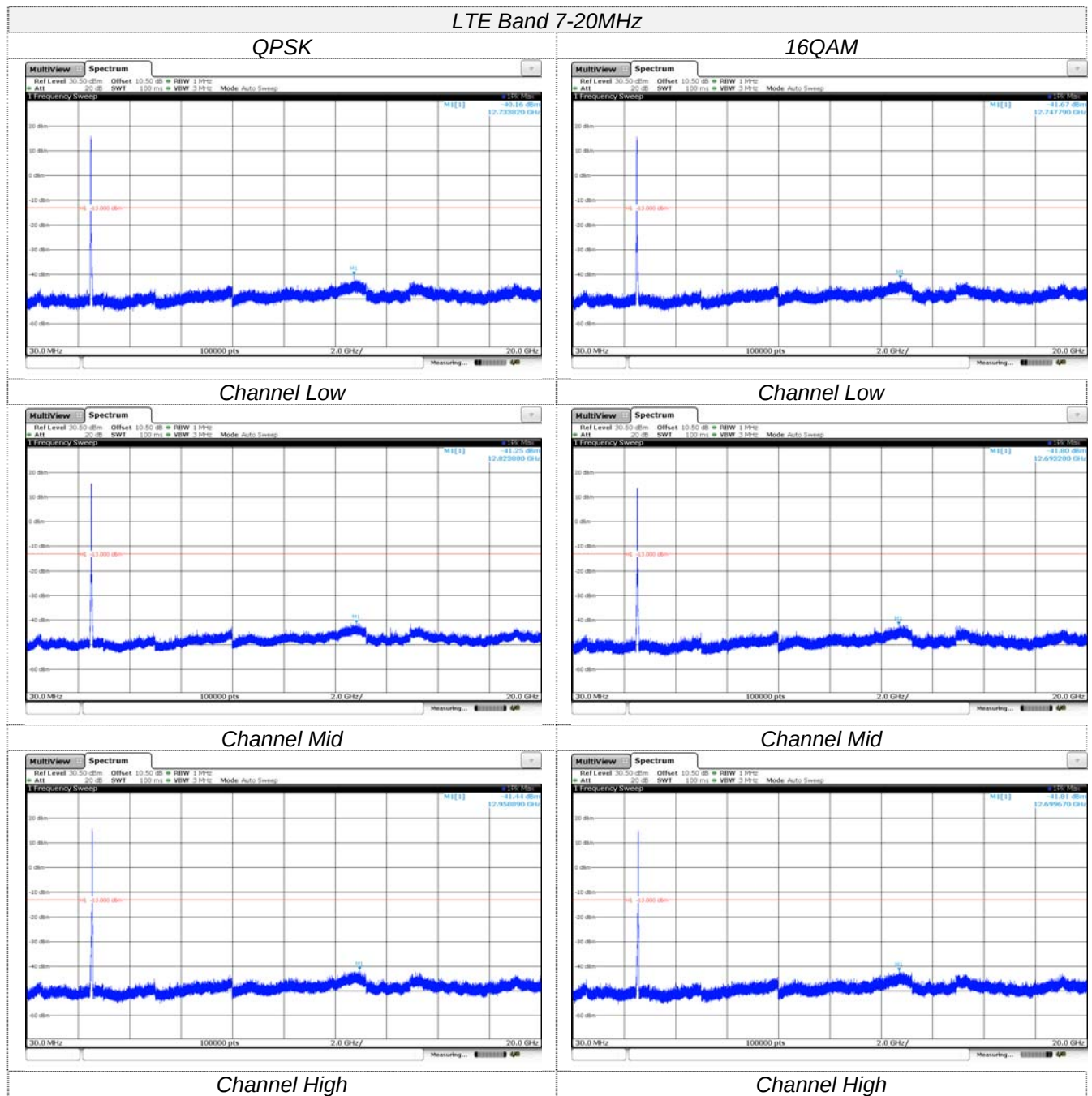




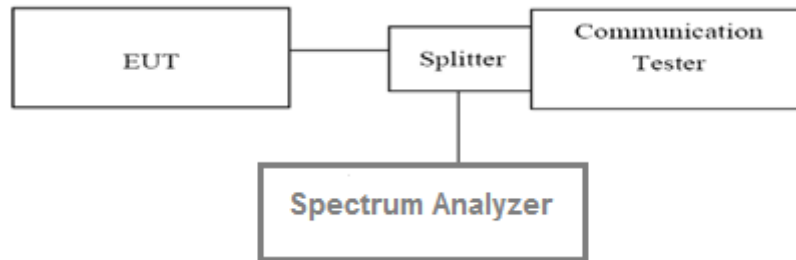
#### 4.4. Band Edge compliance

##### LIMIT

Part 24.238 and 27.53(h) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

##### TEST CONFIGURATION

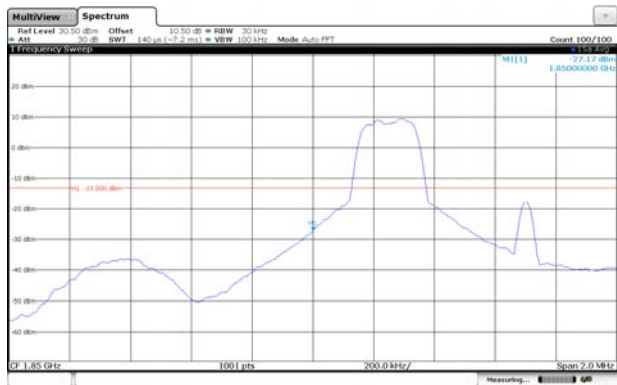


##### TEST PROCEDURE

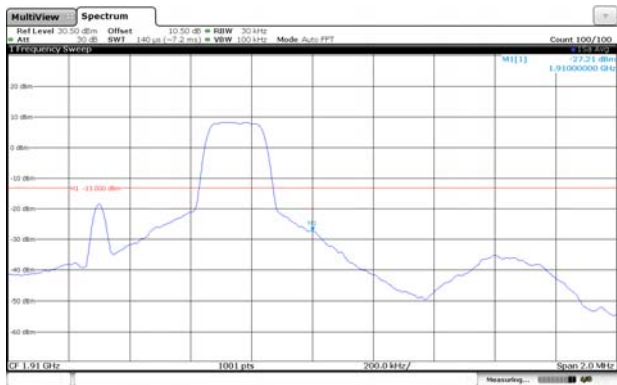
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW  $\geq$  1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.

##### TEST RESULTS

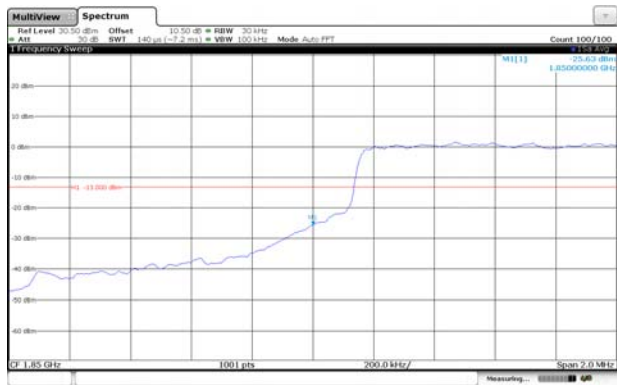
LTE Band 2-1.4MHz-QPSK



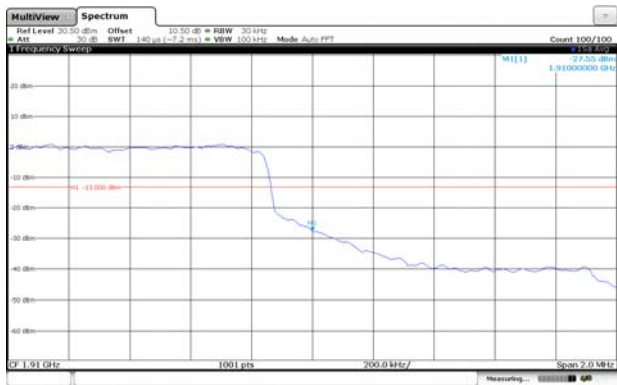
Channel Low-1RB#



Channel High-1RB#

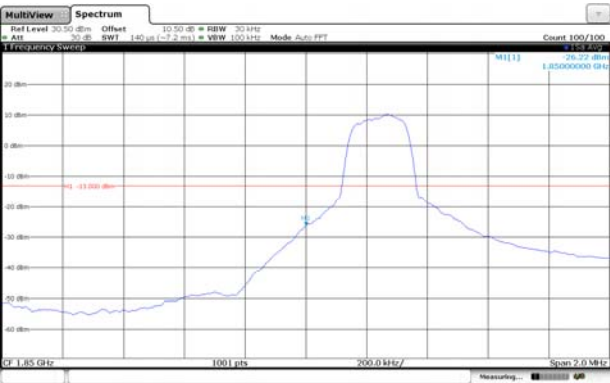


Channel Low-Full RB#

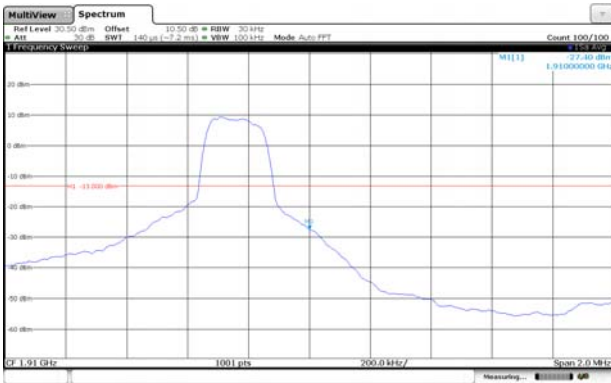


Channel High-Full RB#

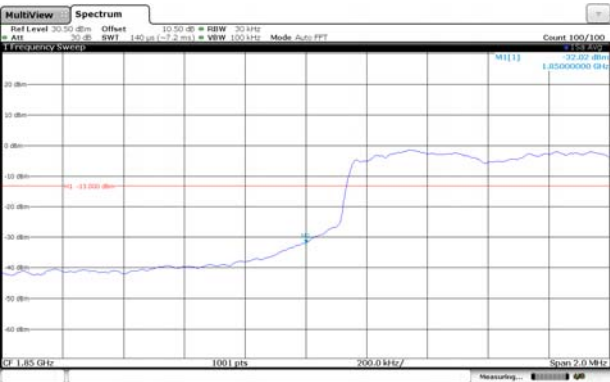
LTE Band 2-1.4MHz-16QAM



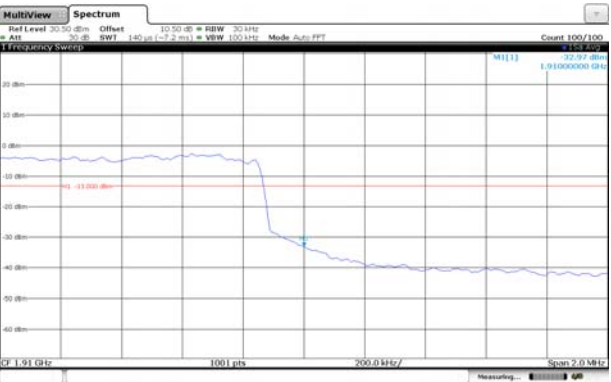
Channel Low-1RB#



Channel High-1RB#

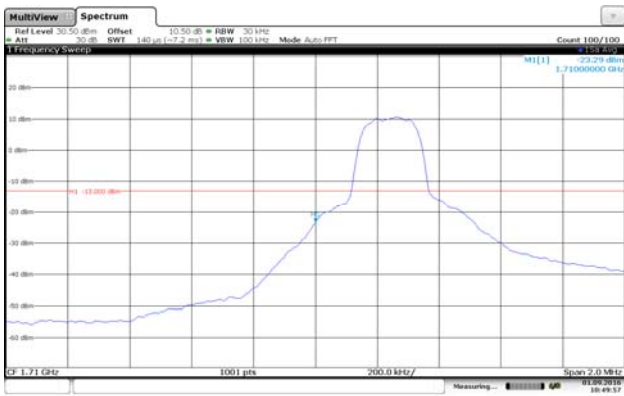


Channel Low-Full RB#

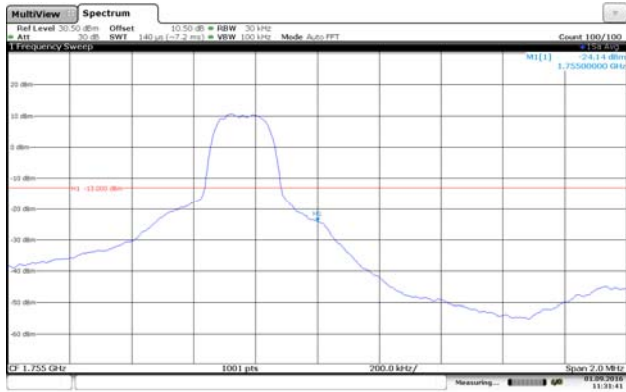


Channel High-Full RB#

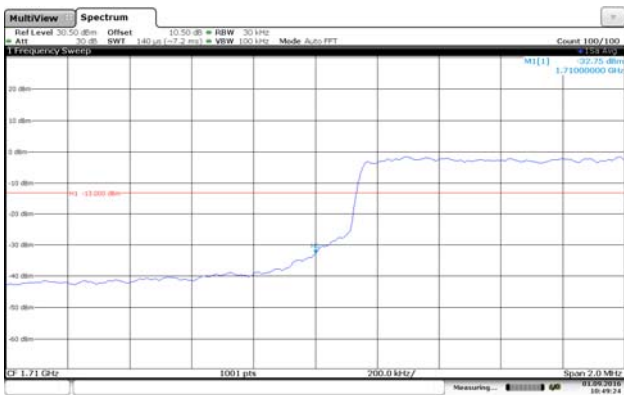
LTE Band 2-3MHz-QPSK



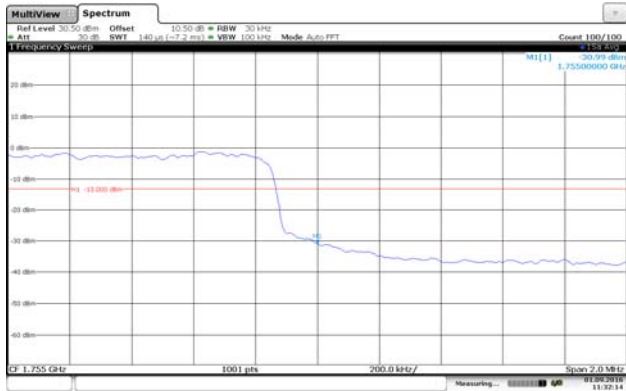
Channel Low-1RB#



Channel High-1RB#

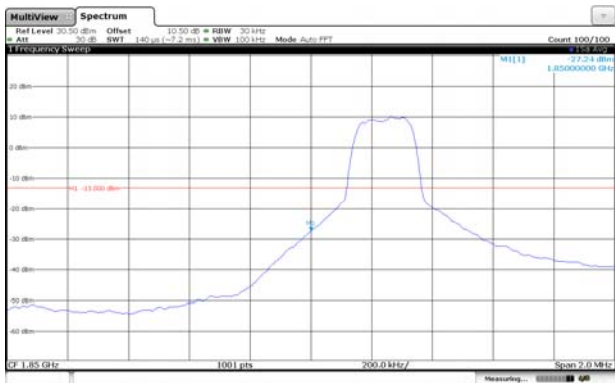


Channel Low-Full RB#

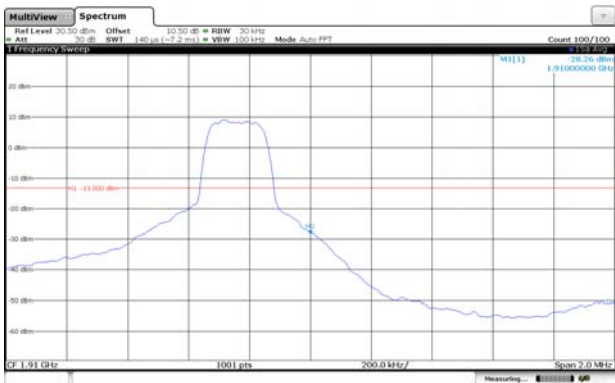


Channel High-Full RB#

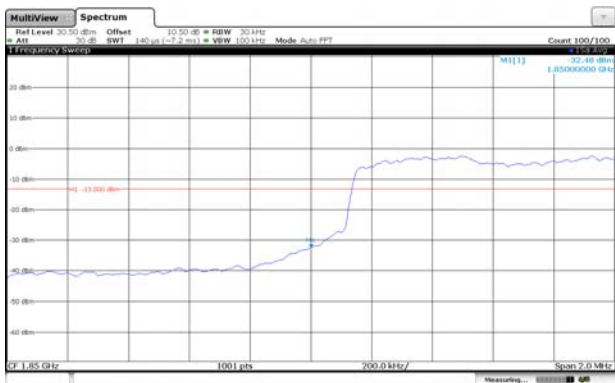
LTE Band 2-3MHz-16QAM



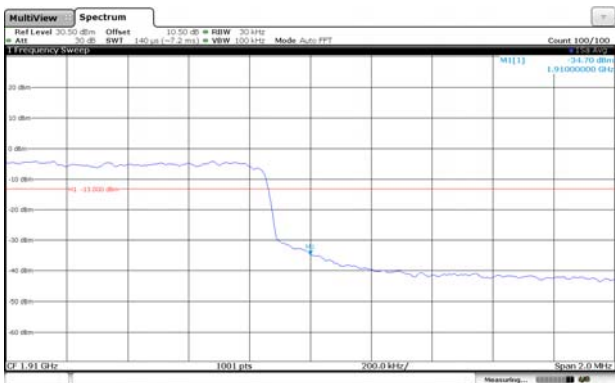
Channel Low-1RB#



Channel High-1RB#

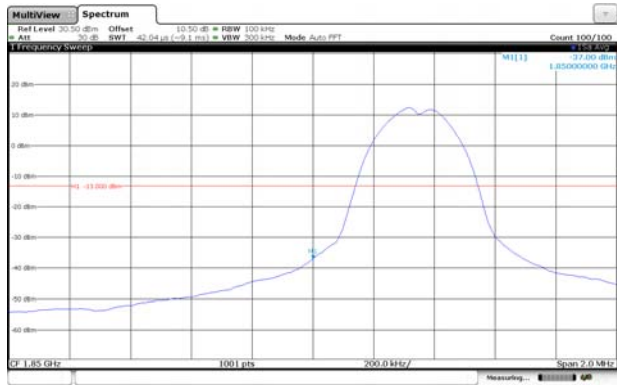


Channel Low-Full RB#

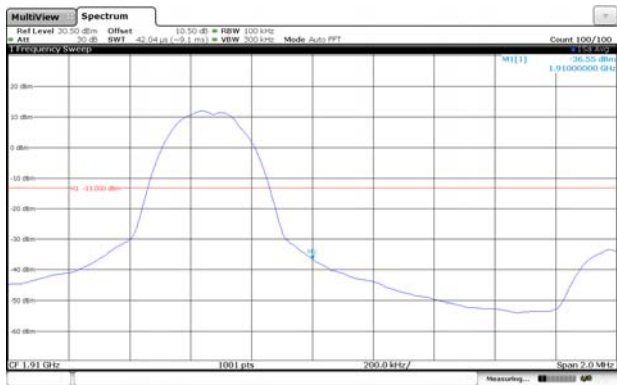


Channel High-Full RB#

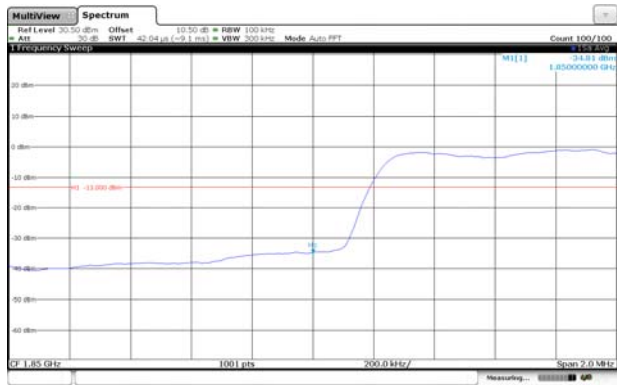
LTE Band 2-5MHz-QPSK



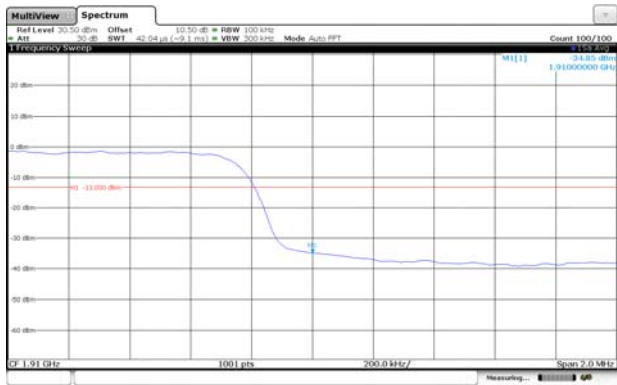
Channel Low-1RB#



Channel High-1RB#

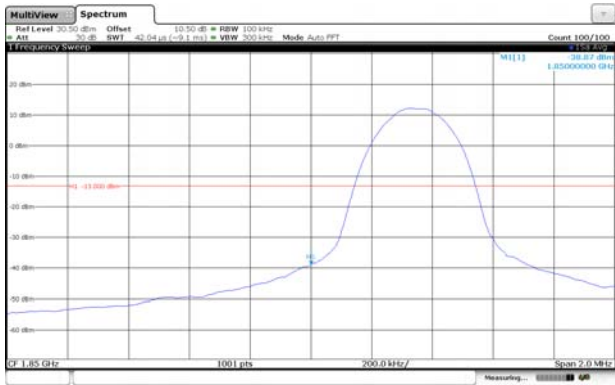


Channel Low-Full RB#

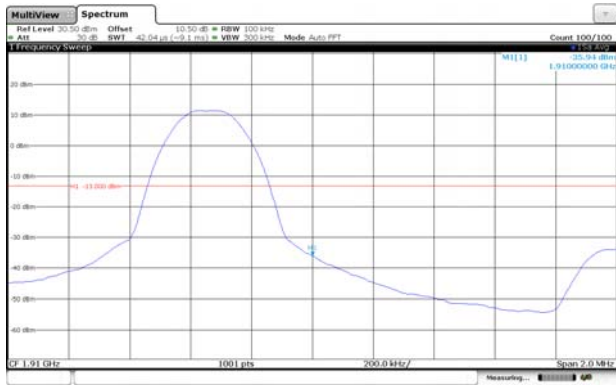


Channel High-Full RB#

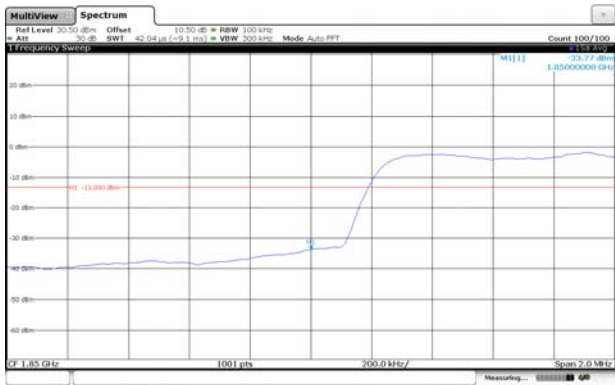
LTE Band 2-5MHz-16QAM



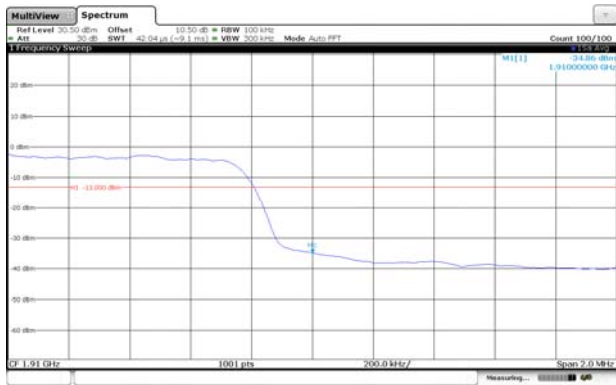
Channel Low-1RB#



Channel High-1RB#

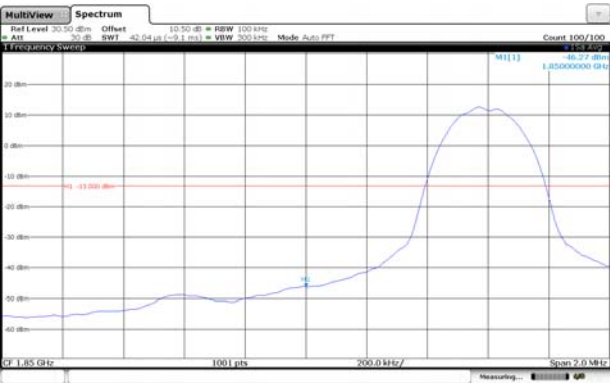


Channel Low-Full RB#

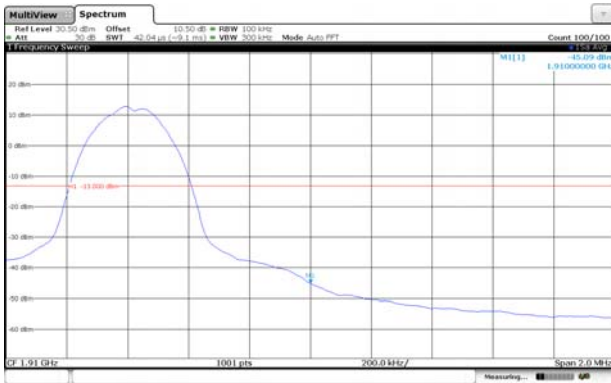


Channel High-Full RB#

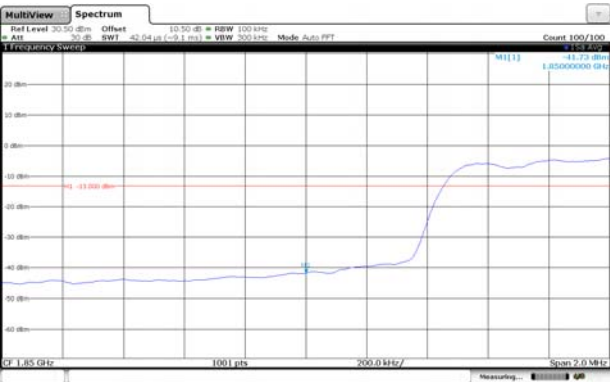
LTE Band 2-10MHz-QPSK



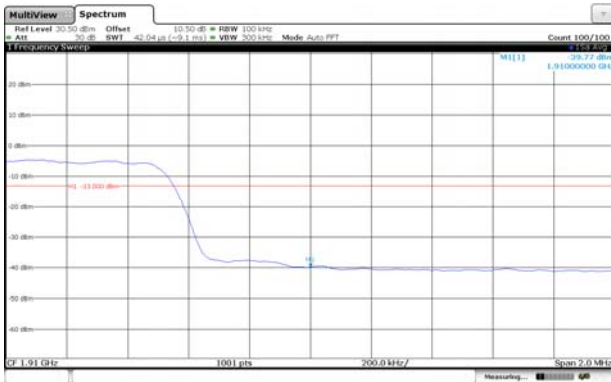
Channel Low-1RB#



Channel High-1RB#

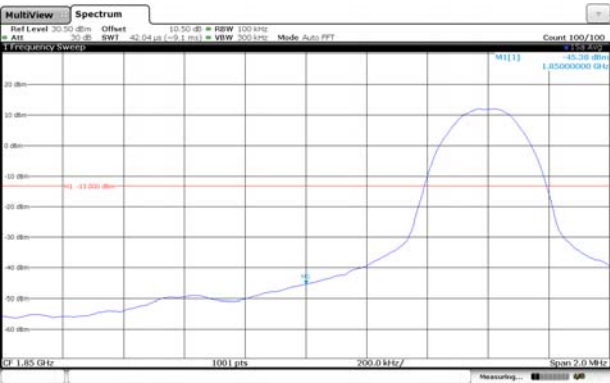


Channel Low-Full RB#

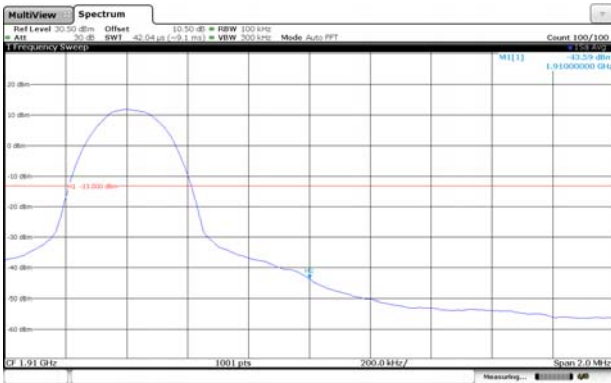


Channel High-Full RB#

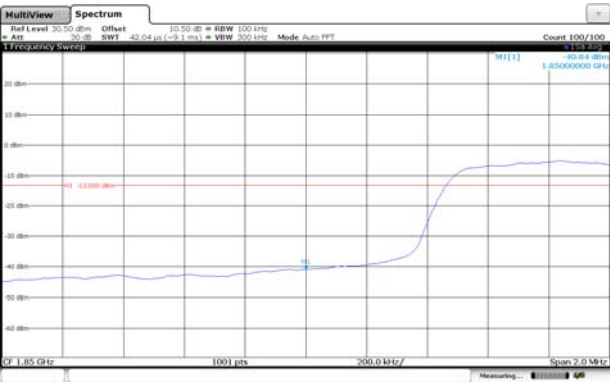
LTE Band 2-10MHz-16QAM



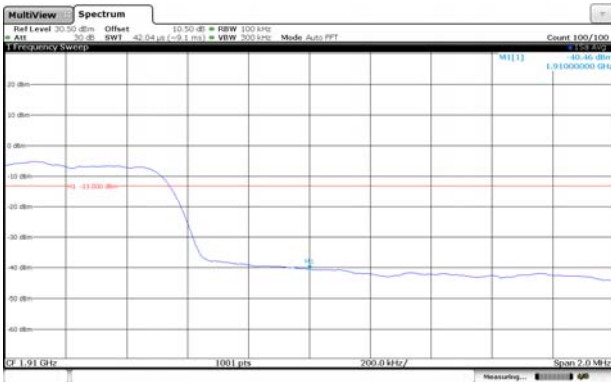
Channel Low-1RB#



Channel High-1RB#

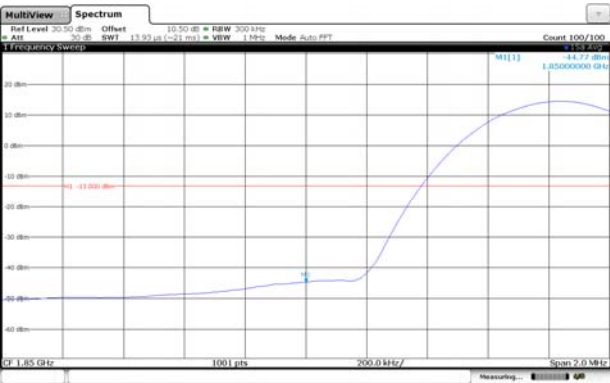


Channel Low-Full RB#

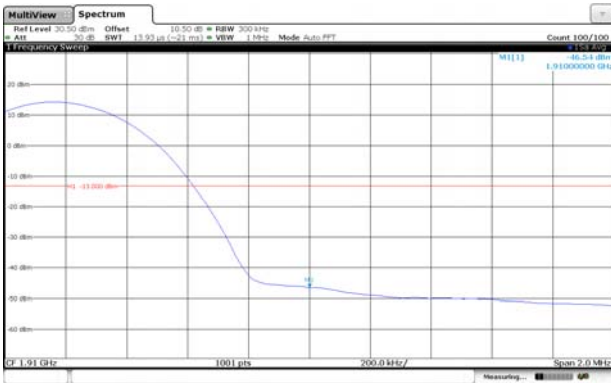


Channel High-Full RB#

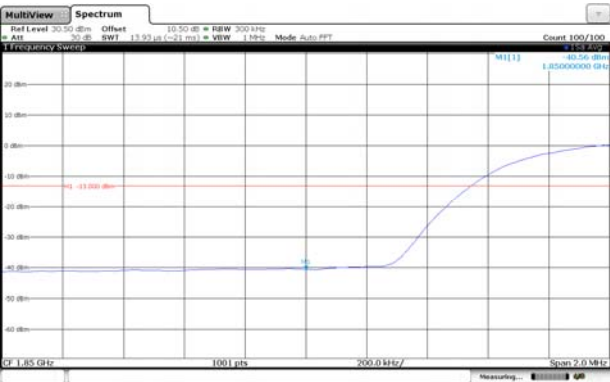
LTE Band 2-15MHz-QPSK



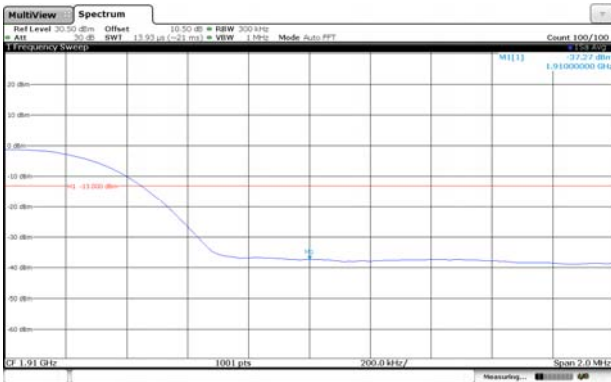
Channel Low-1RB#



Channel High-1RB#

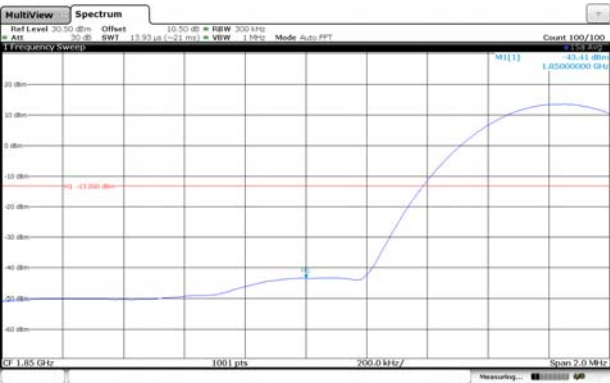


Channel Low-Full RB#

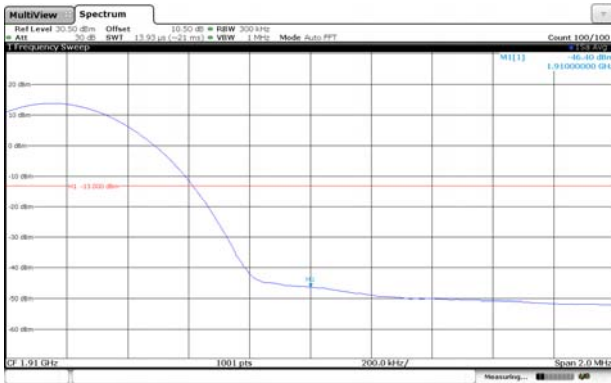


Channel High-Full RB#

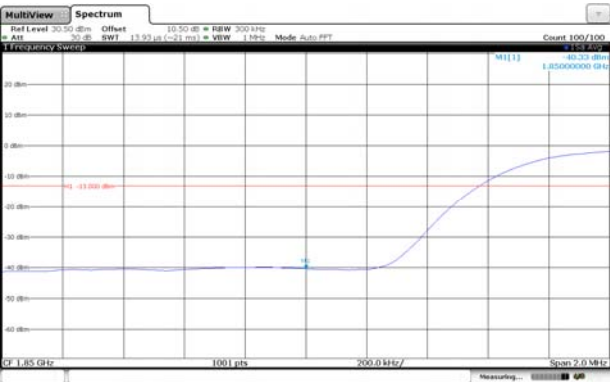
LTE Band 2-15MHz-16QAM



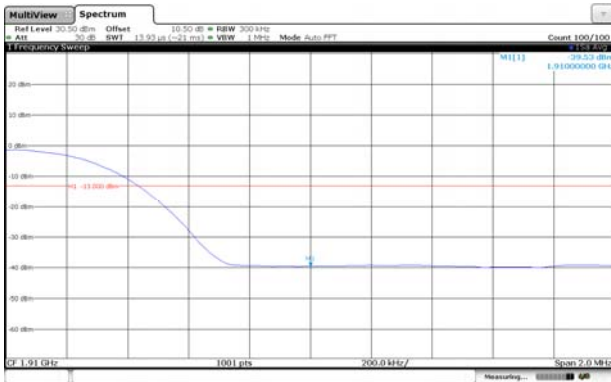
Channel Low-1RB#



Channel High-1RB#

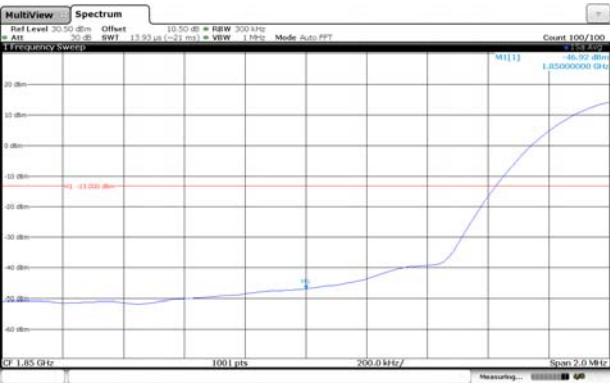


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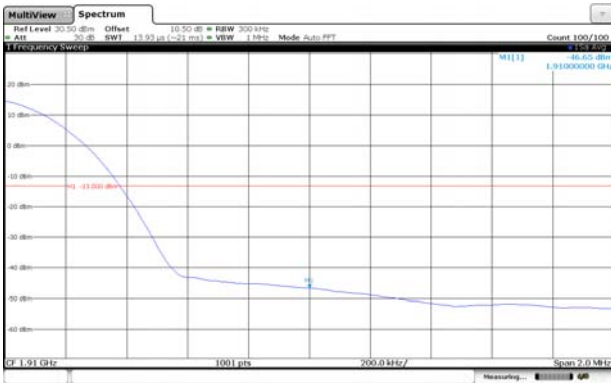


Channel High-Full RB#

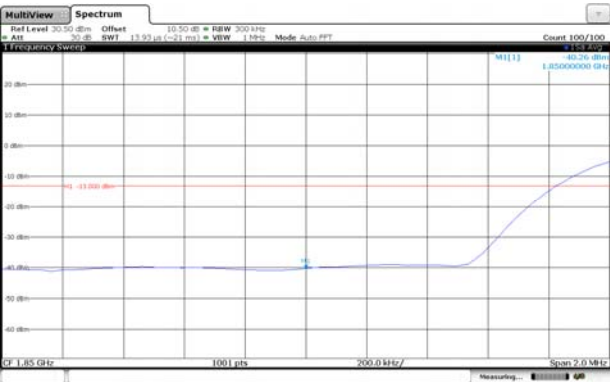
LTE Band 2-20MHz-QPSK



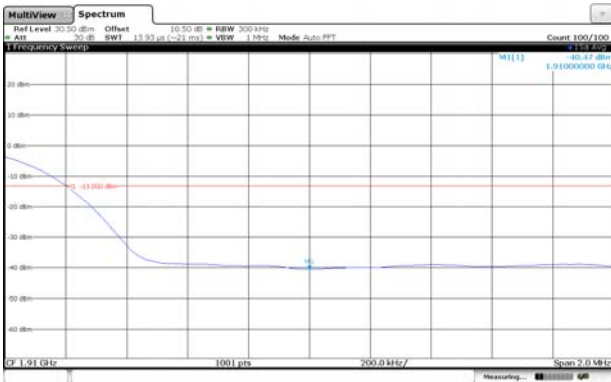
Channel Low-1RB#



Channel High-1RB#

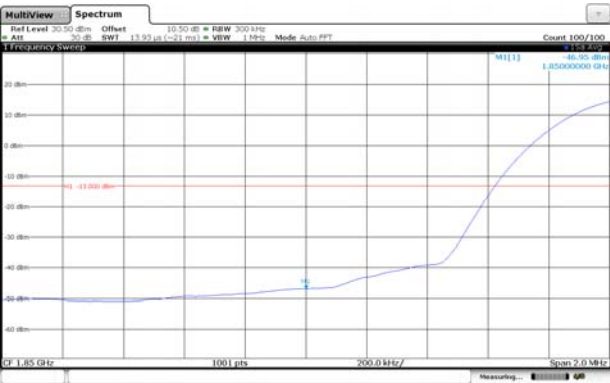


Channel Low-Full RB#

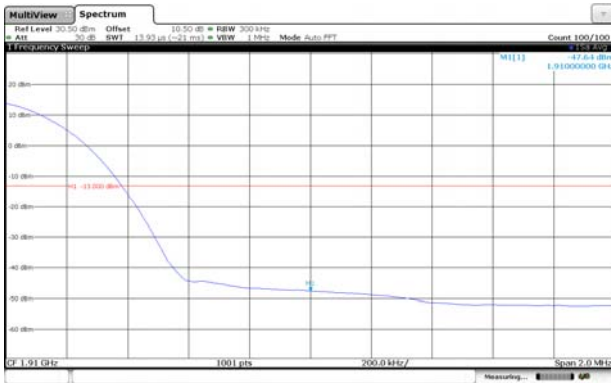


Channel High-Full RB#

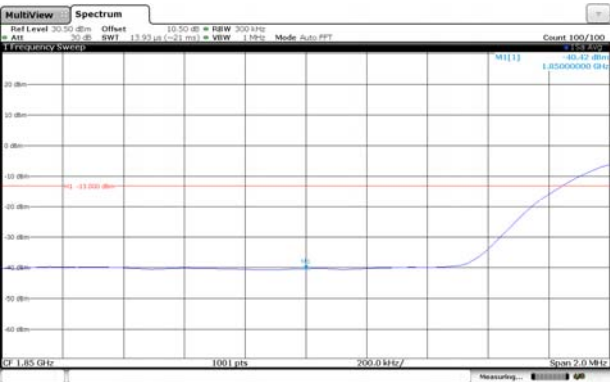
LTE Band 2-20MHz-16QAM



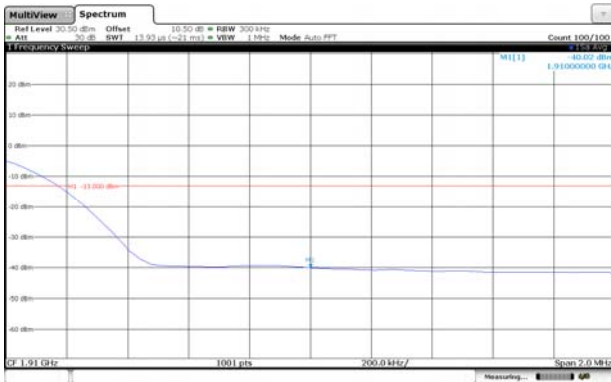
Channel Low-1RB#



Channel High-1RB#

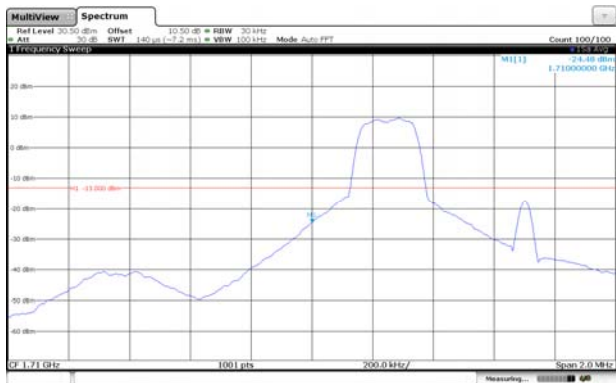


Channel Low-Full RB#

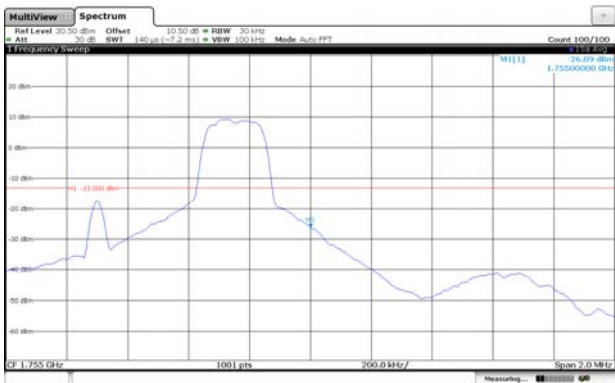


Channel High-Full RB#

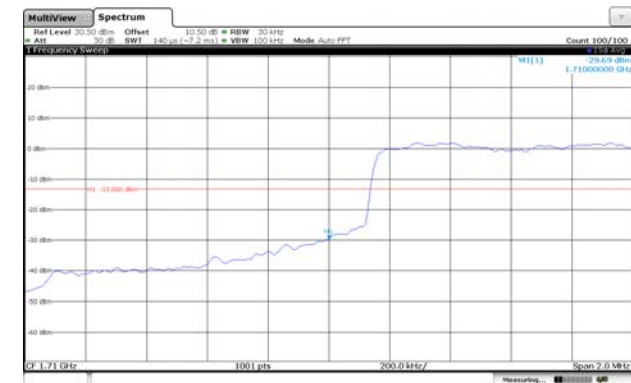
LTE Band 4-1.4MHz-QPSK



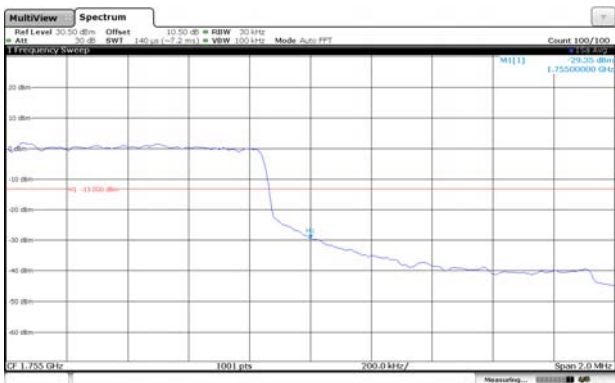
Channel Low-1RB#



Channel High-1RB#

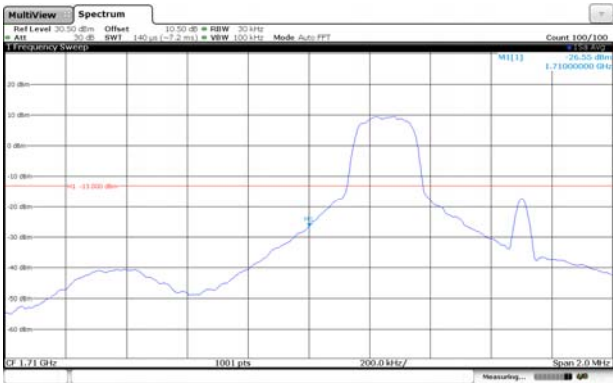


Channel Low-Full RB#

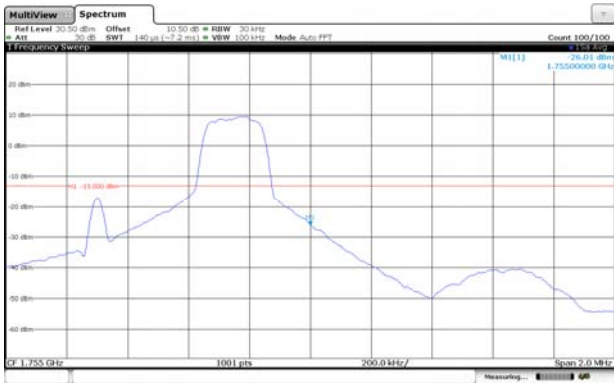


Channel High-Full RB#

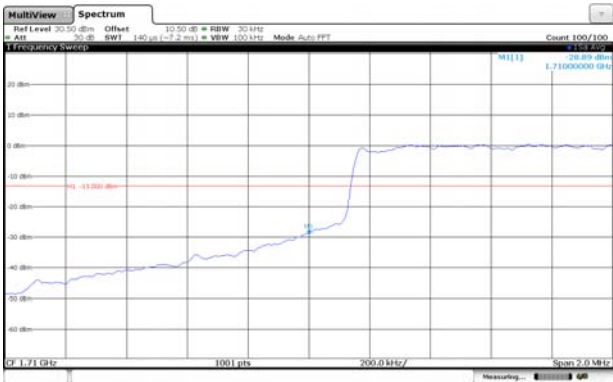
LTE Band 4-1.4MHz-16QAM



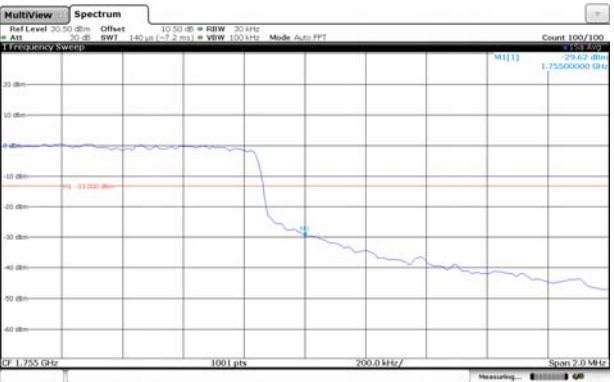
Channel Low-1RB#



Channel High-1RB#

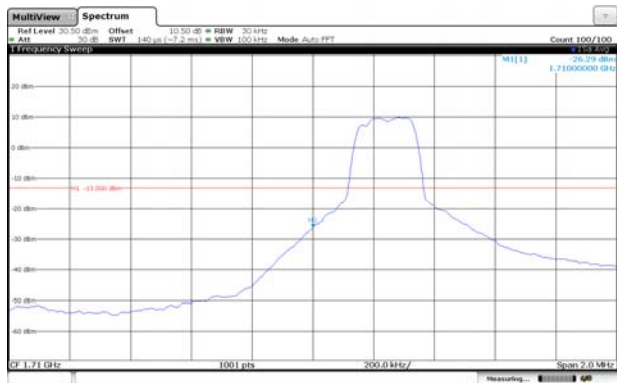


Channel Low-Full RB#

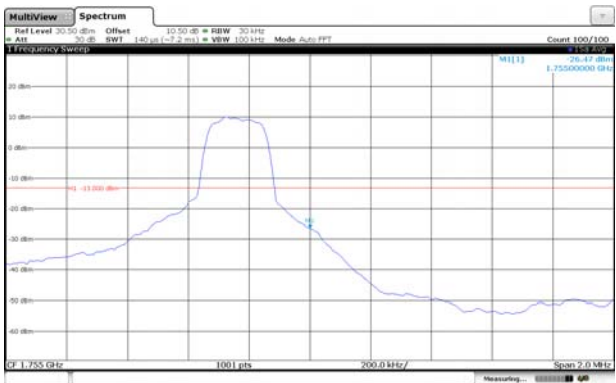


Channel High-Full RB#

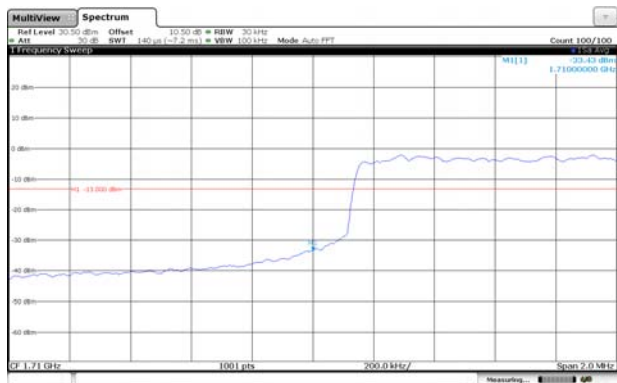
LTE Band 4-3MHz-QPSK



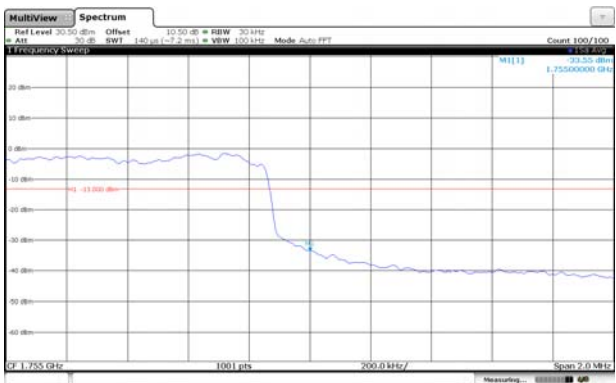
Channel Low-1RB#



Channel High-1RB#

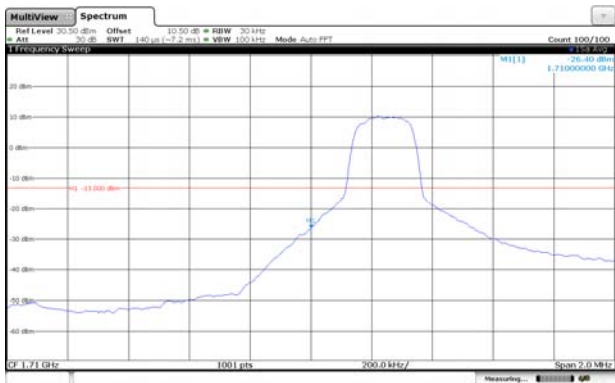


Channel Low-Full RB#

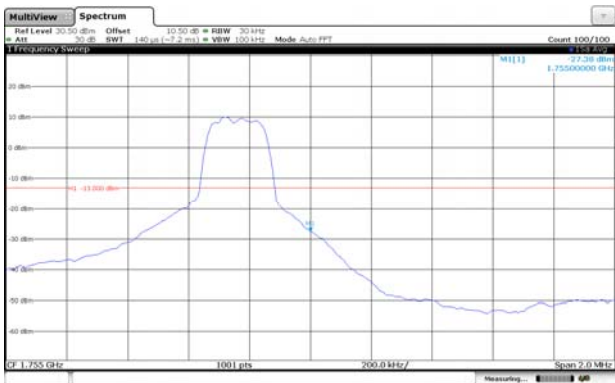


Channel High-Full RB#

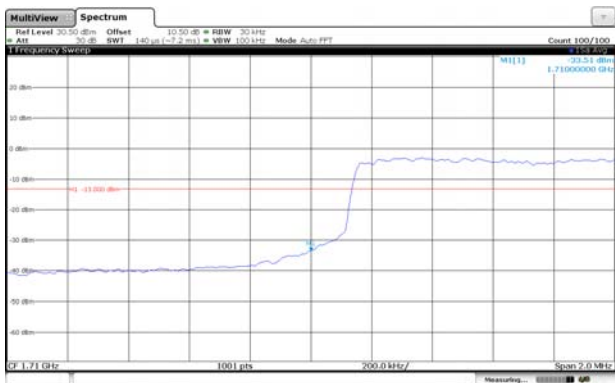
LTE Band 4-3MHz-16QAM



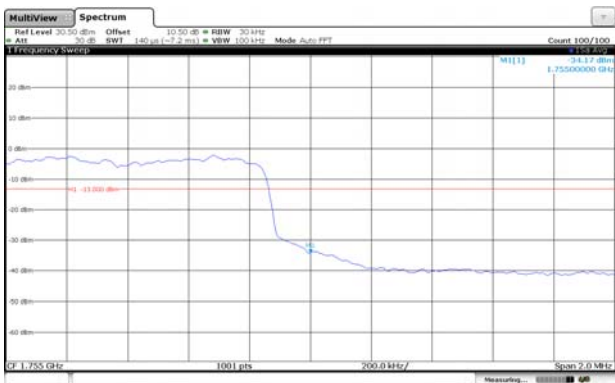
Channel Low-1RB#



Channel High-1RB#

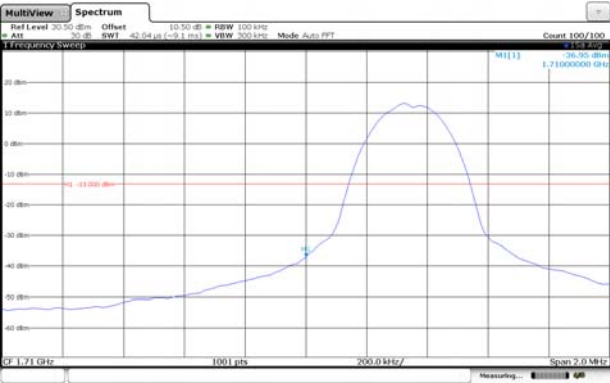


Channel Low-Full RB#

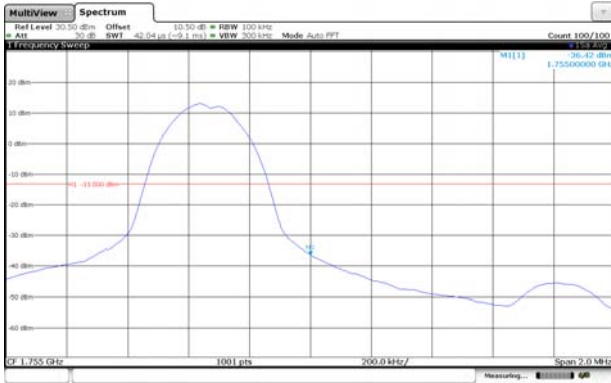


Channel High-Full RB#

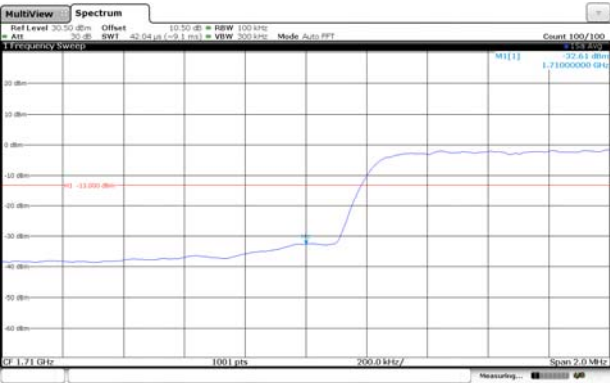
LTE Band 4-5MHz-QPSK



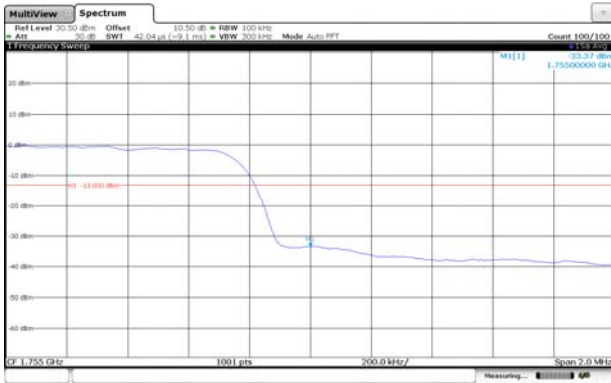
Channel Low-1RB#



Channel High-1RB#

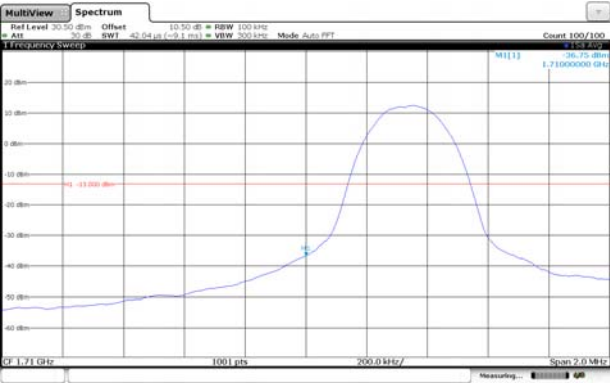


Channel Low-Full RB#

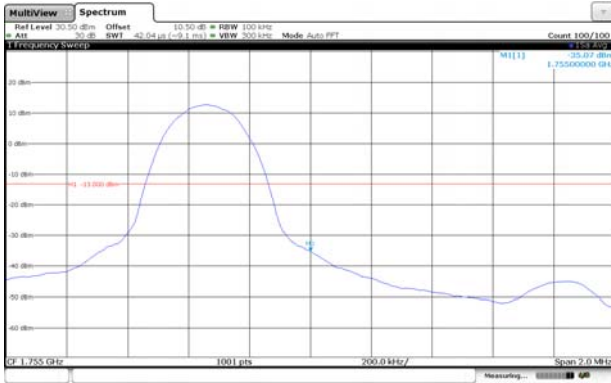


Channel High-Full RB#

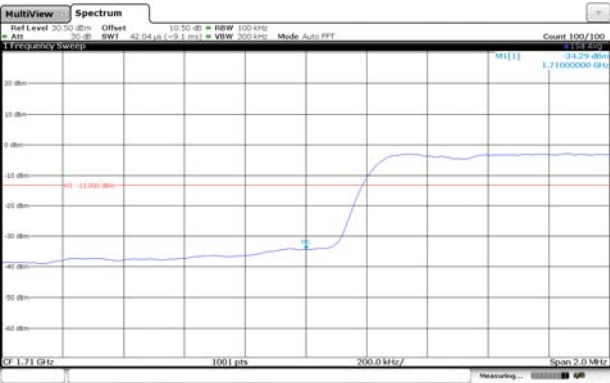
LTE Band 4-5MHz-16QAM



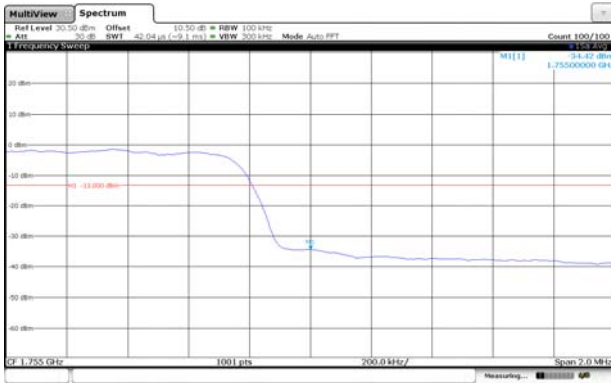
Channel Low-1RB#



Channel High-1RB#

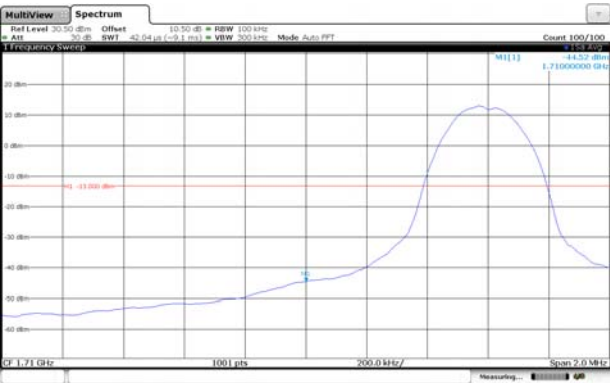


Channel Low-Full RB#

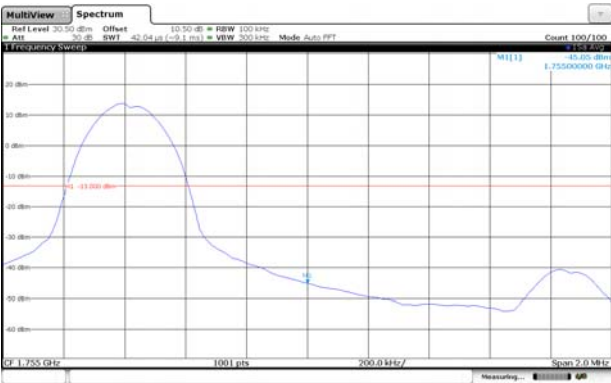


Channel High-Full RB#

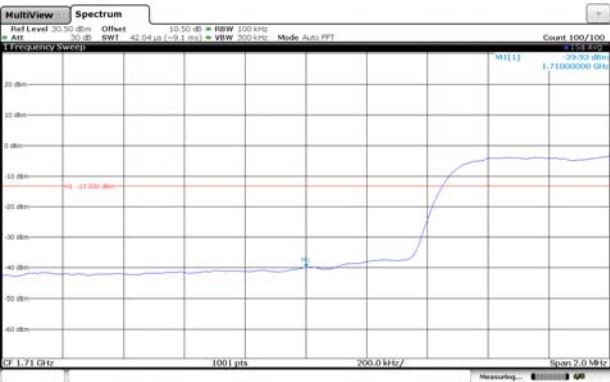
LTE Band 4-10MHz-QPSK



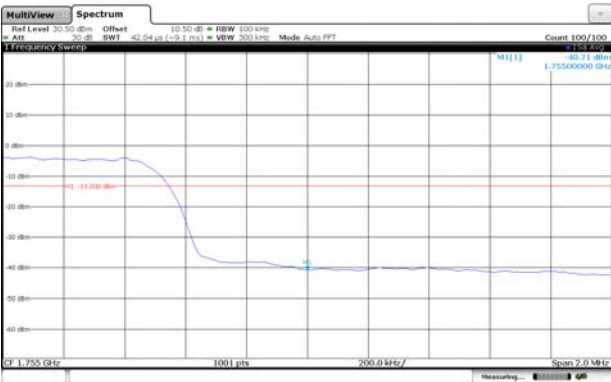
Channel Low-1RB#



Channel High-1RB#

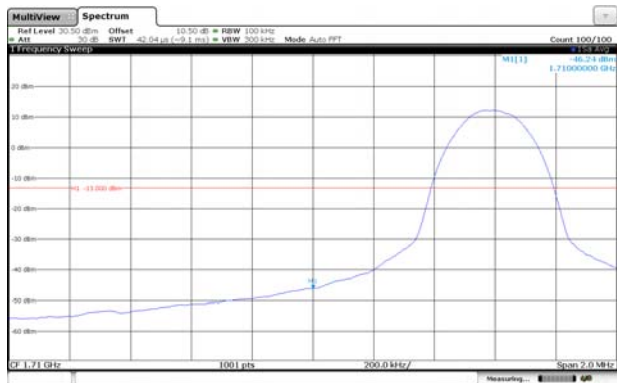


Channel Low-Full RB#

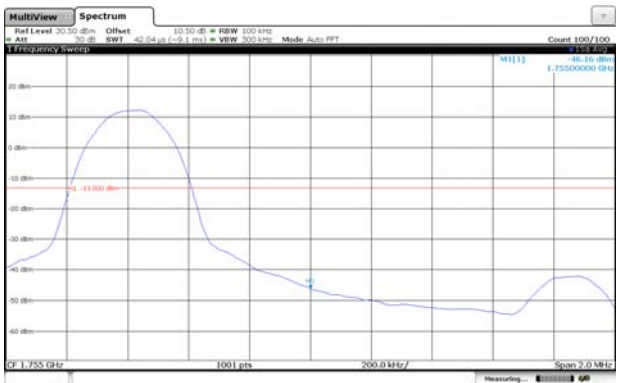


Channel High-Full RB#

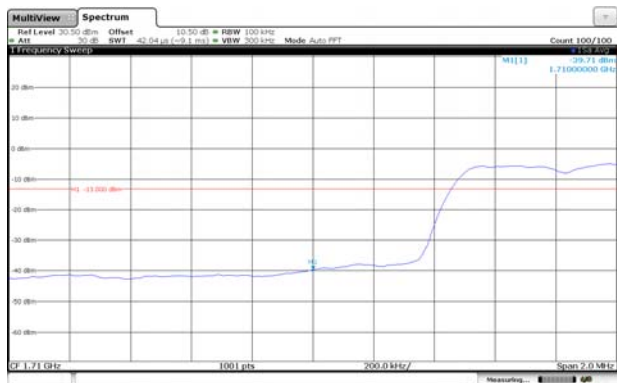
LTE Band 4-10MHz-16QAM



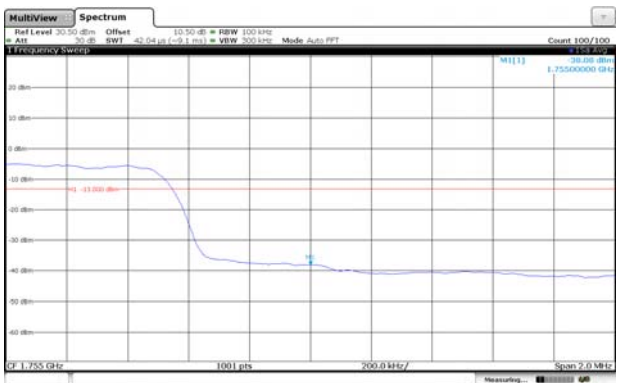
Channel Low-1RB#



Channel High-1RB#

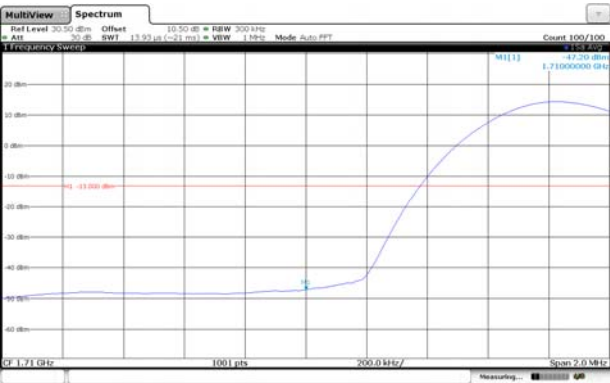


Channel Low-Full RB#

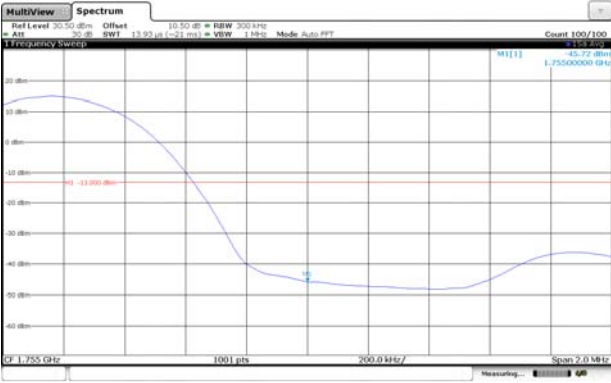


Channel High-Full RB#

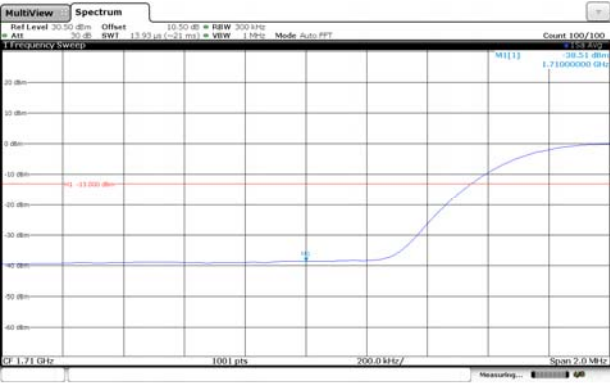
LTE Band 4-15MHz-QPSK



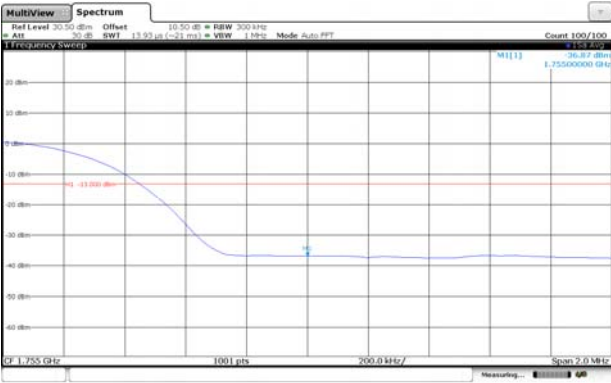
Channel Low-1RB#



Channel High-1RB#

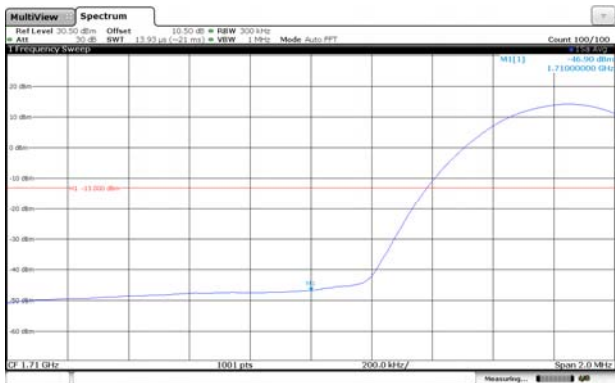


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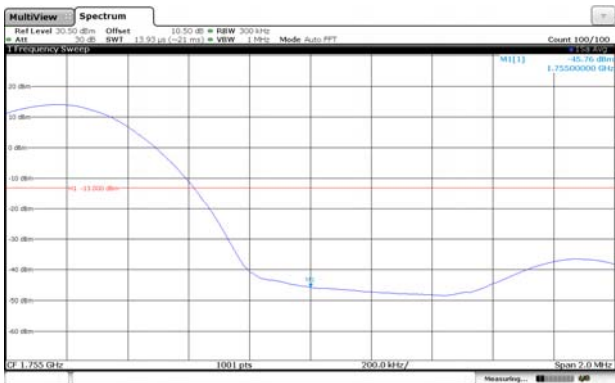


Channel High-Full RB#

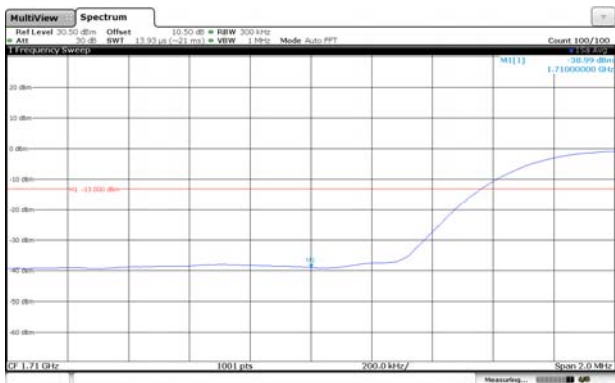
LTE Band 4-15MHz-16QAM



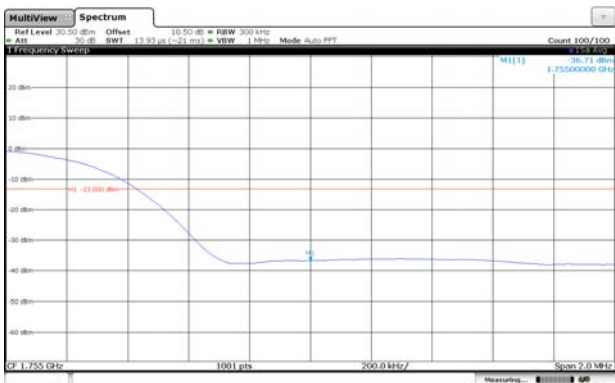
Channel Low-1RB#



Channel High-1RB#

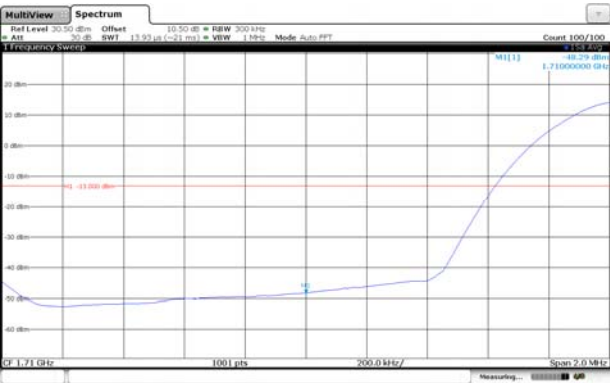


Channel Low-Full RB#

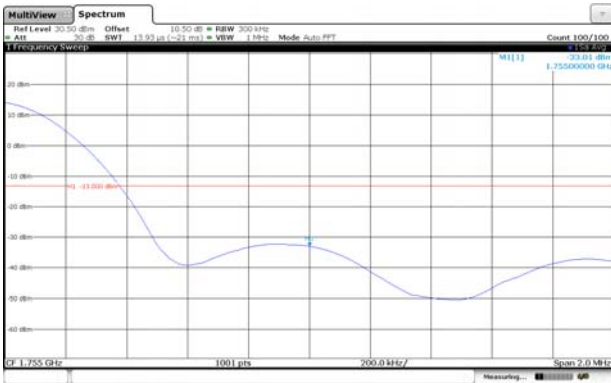


Channel High-Full RB#

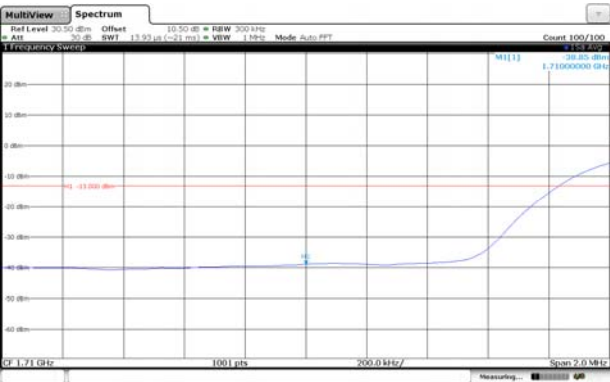
LTE Band 4-20MHz-QPSK



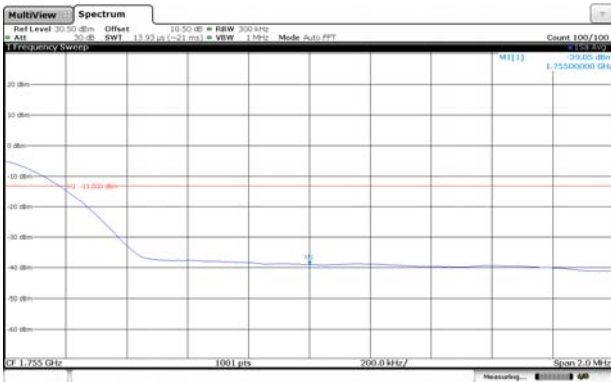
Channel Low-1RB#



Channel High-1RB#

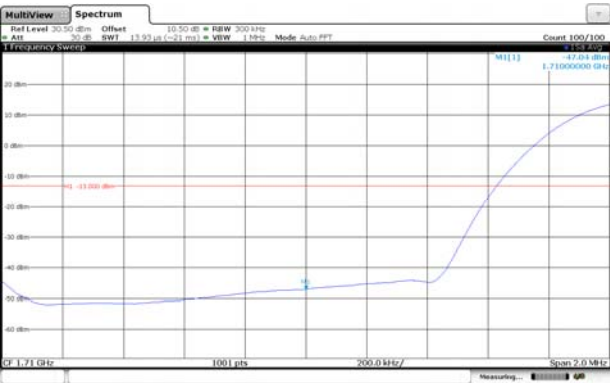


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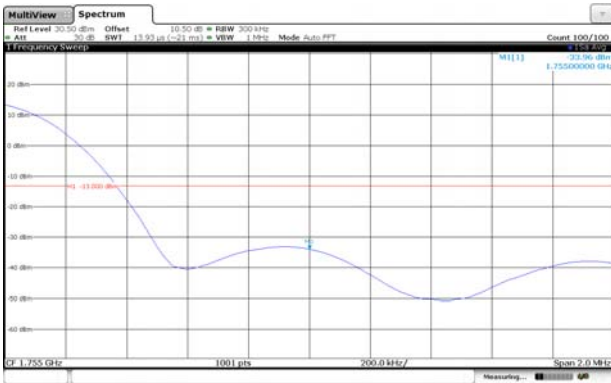


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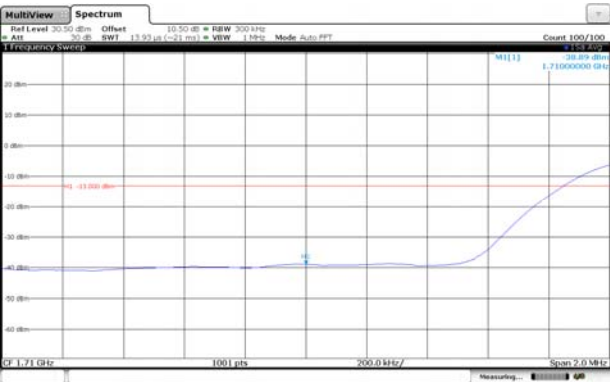
LTE Band 4-20MHz-16QAM



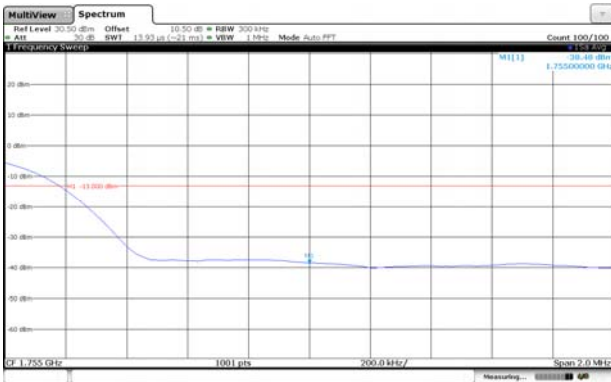
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Channel High-1RB#

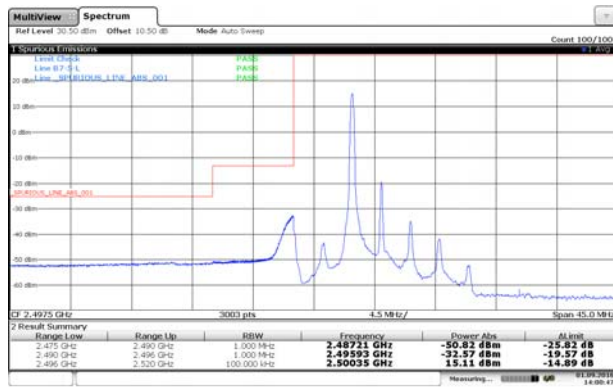


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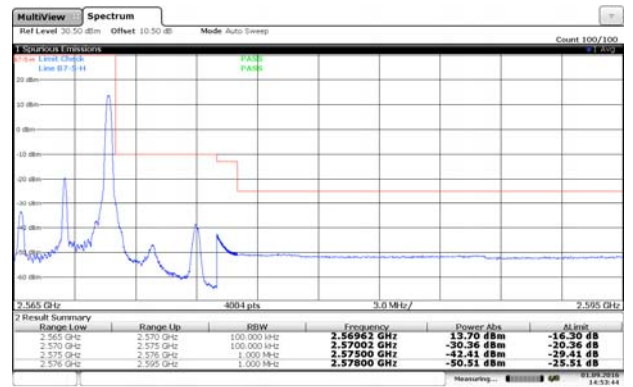


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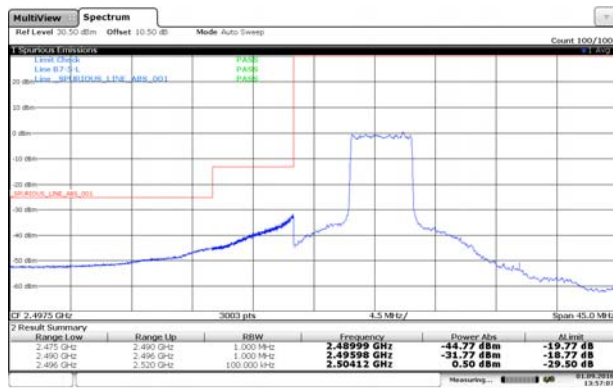
LTE Band 7-5MHz-QPSK



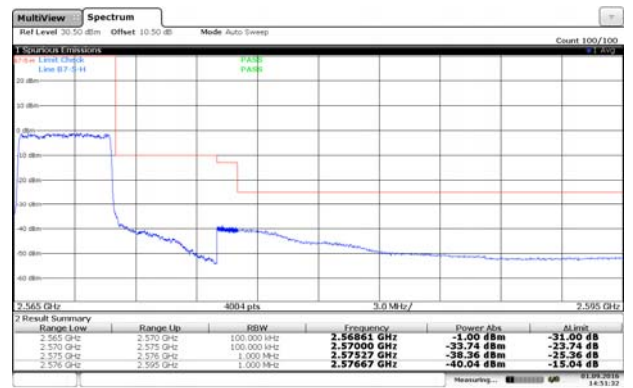
Channel Low-1RB#



Channel High-1RB#

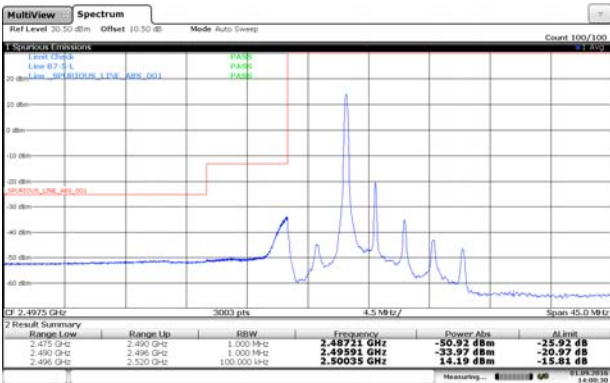


*Channel Low-Full RB#*

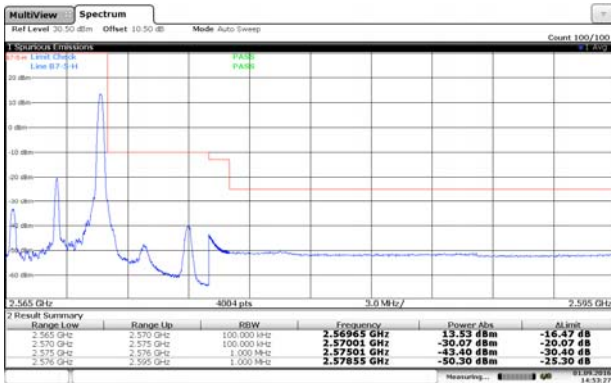


Channel High-Full RB#

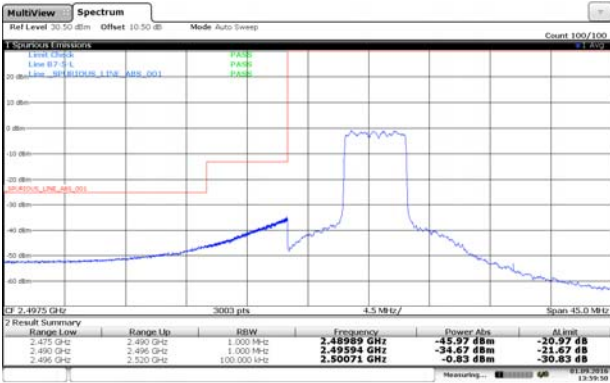
LTE Band 7-5MHz-16QAM



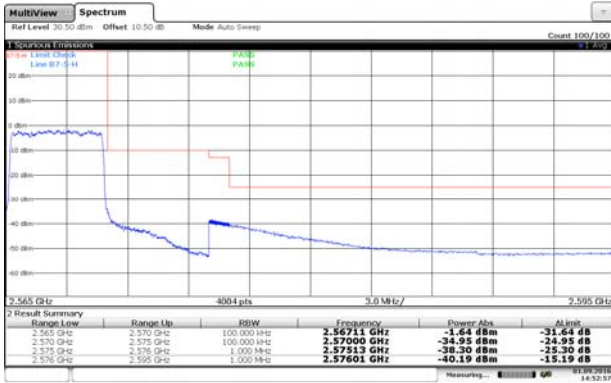
Channel Low-1RB#



Channel High-1RB#

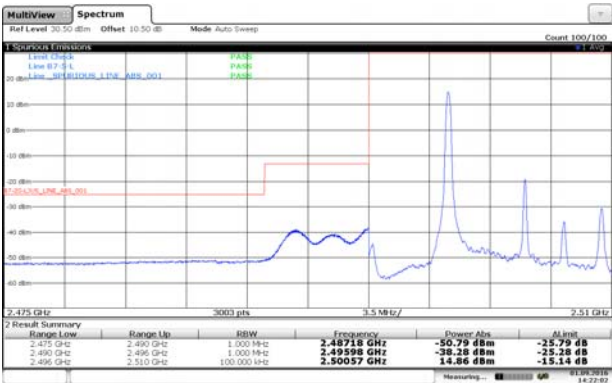


Channel Low-Full RB#

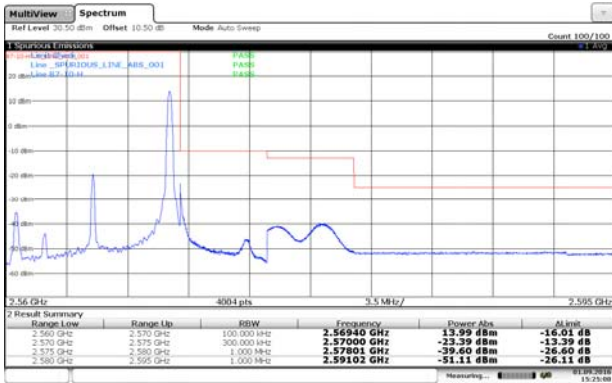


Channel High-Full RB#

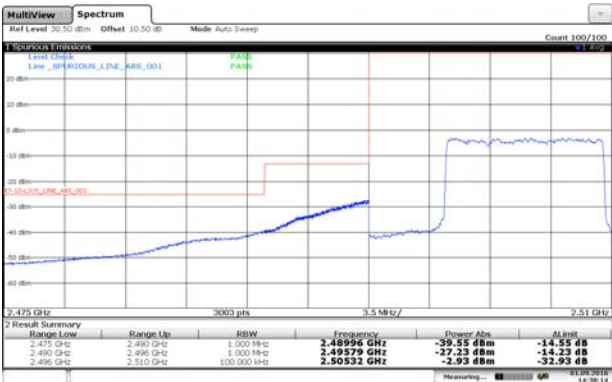
LTE Band 7-10MHz-QPSK



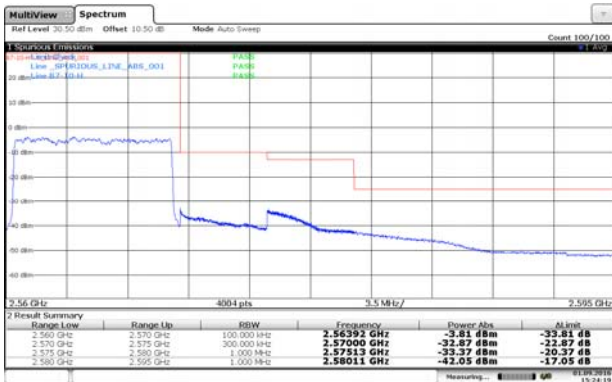
Channel Low-1RB#



Channel High-1RB#

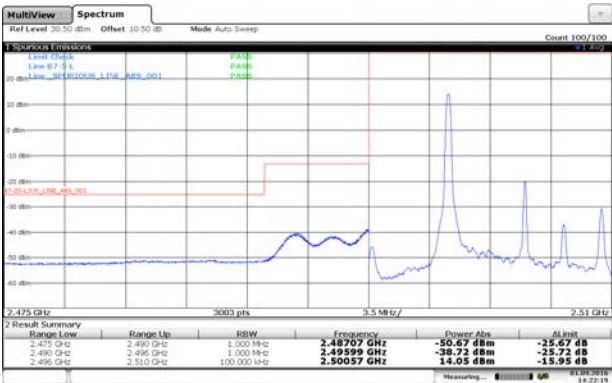


Channel Low-Full RB#

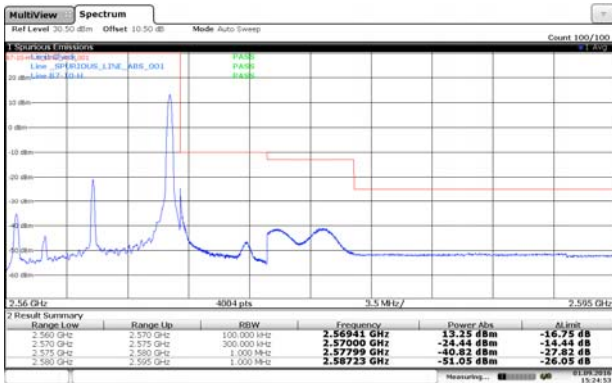


Channel High-Full RB#

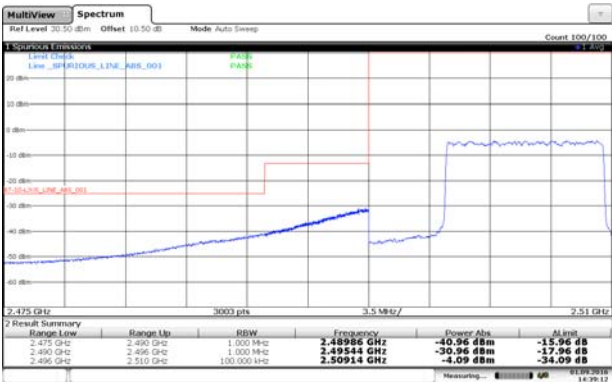
LTE Band 7-10MHz-16QAM



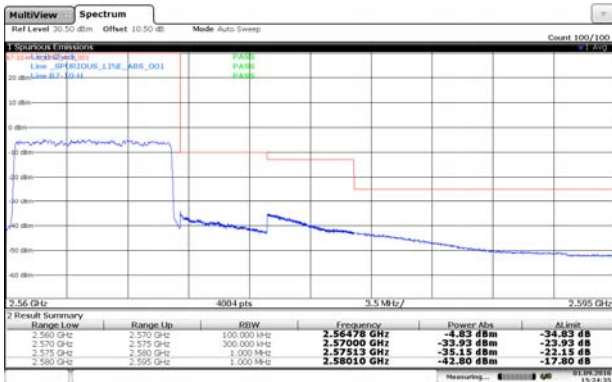
Channel Low-1RB#



Channel High-1RB#

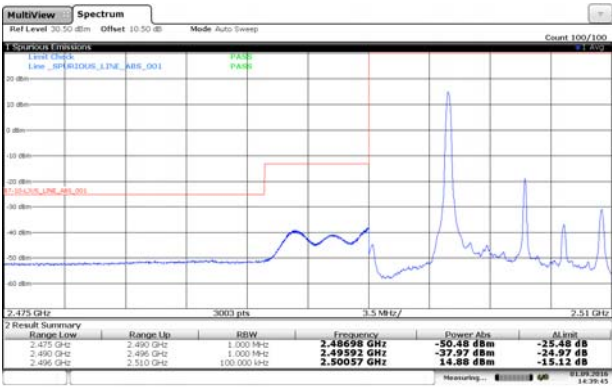


Channel Low-Full RB#

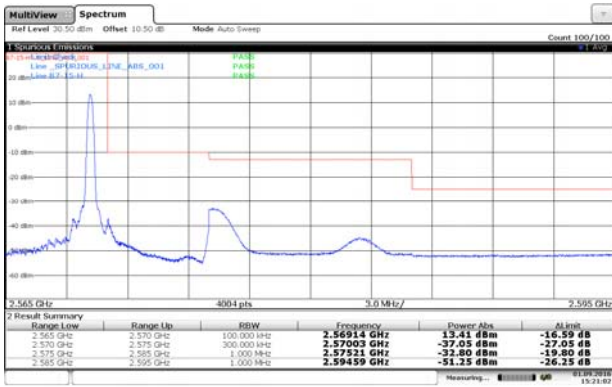


Channel High-Full RB#

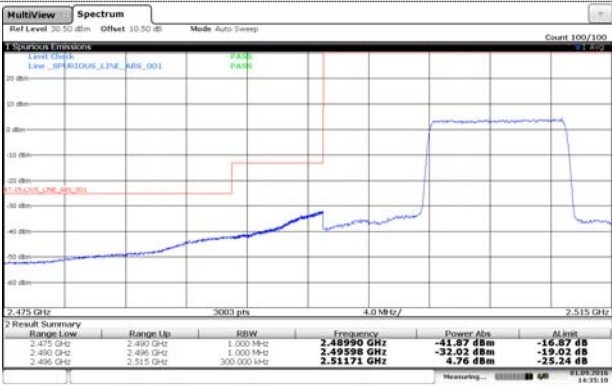
LTE Band 7-15MHz-QPSK



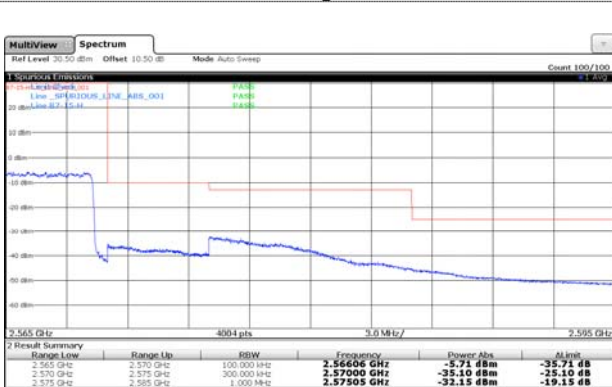
Channel Low-1RB#



Channel High-1RB#

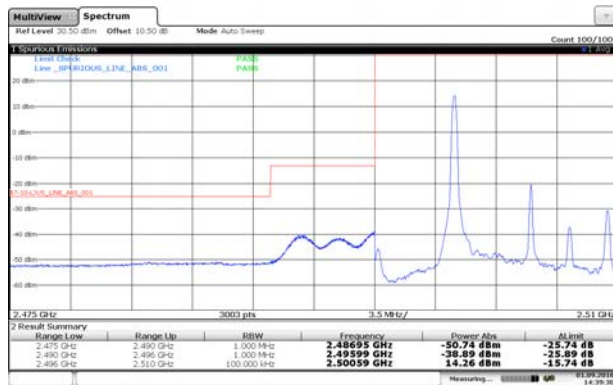


Channel Low-Full RB#



Channel High-Full RB#

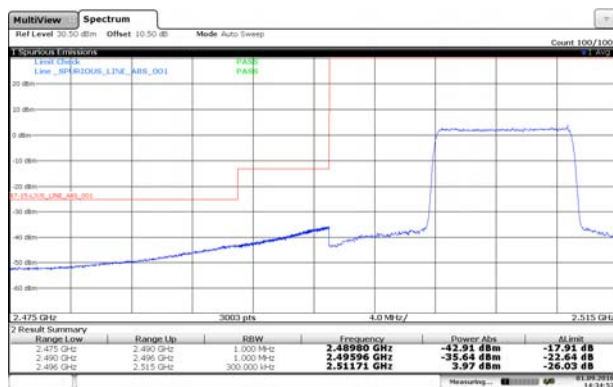
## LTE Band 7-15MHz-16QAM



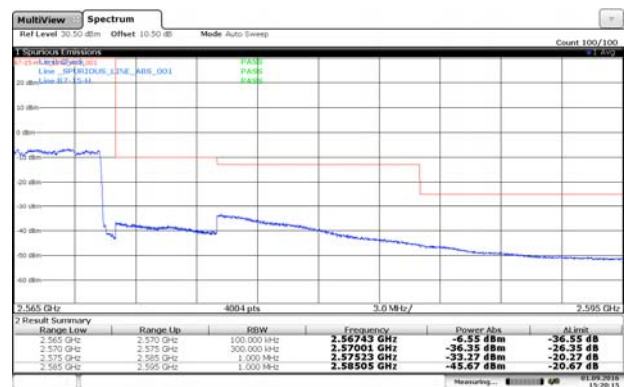
Channel Low-1RB#



Channel High-1RB#

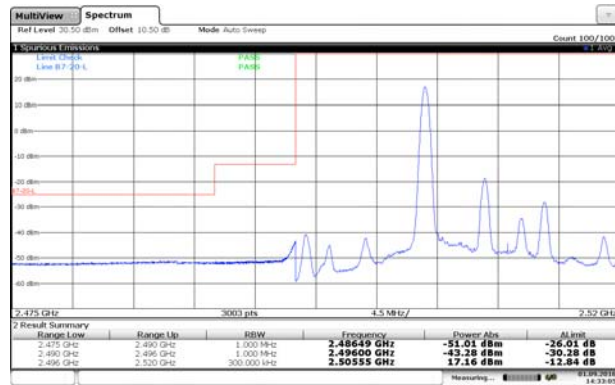


Channel Low-Full RB#

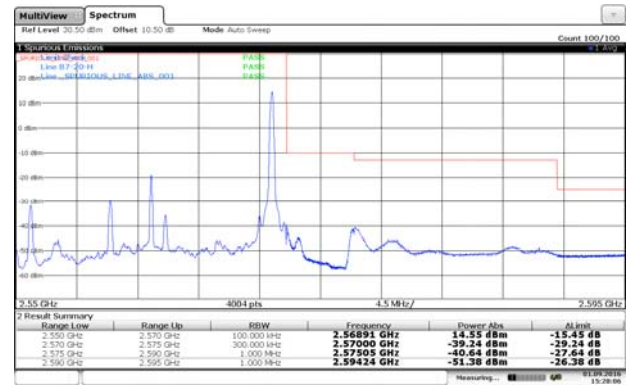


Channel High-Full RB#

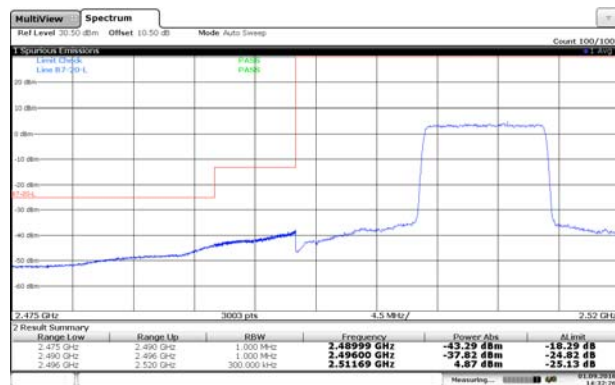
*LTE Band 7-20MHz-QPSK*



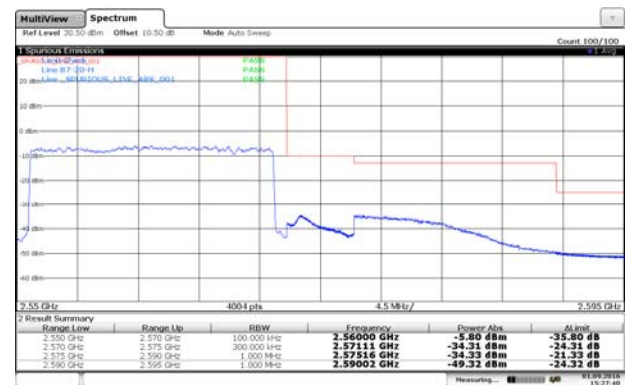
Channel Low-1RB#



Channel High-1RB#

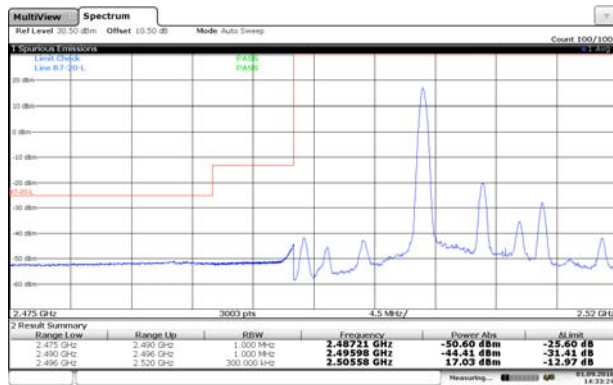


Channel Low-Full RB#

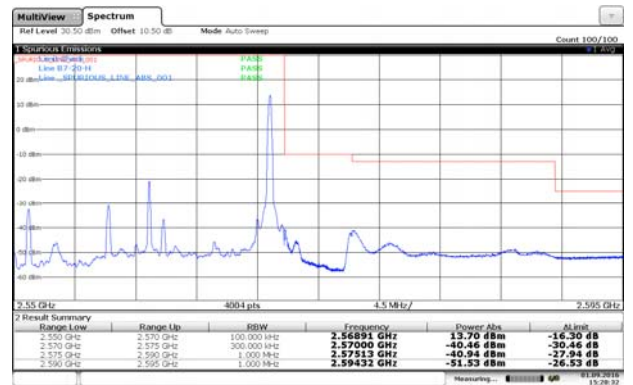


Channel High-Full RB#

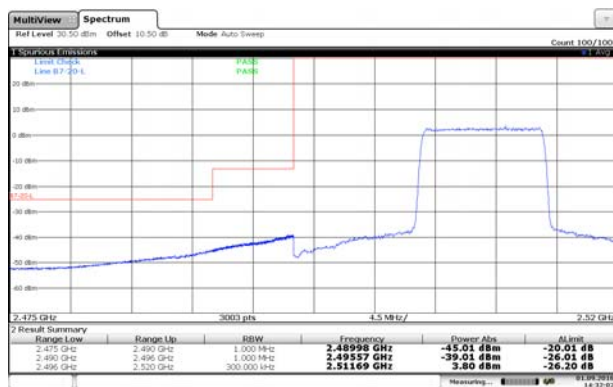
*LTE Band 7-20MHz-16QAM*



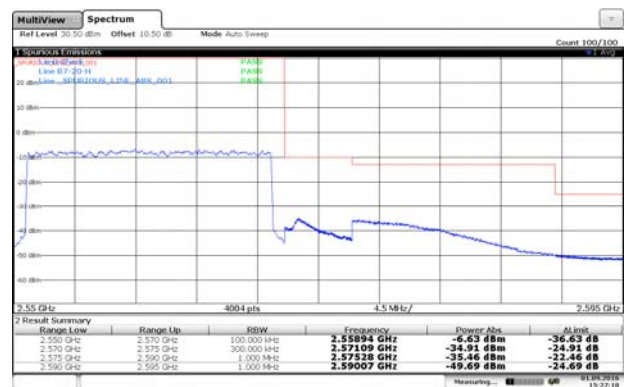
Channel Low-1RB#



Channel High-1RB#



*Channel Low-Full RB#*



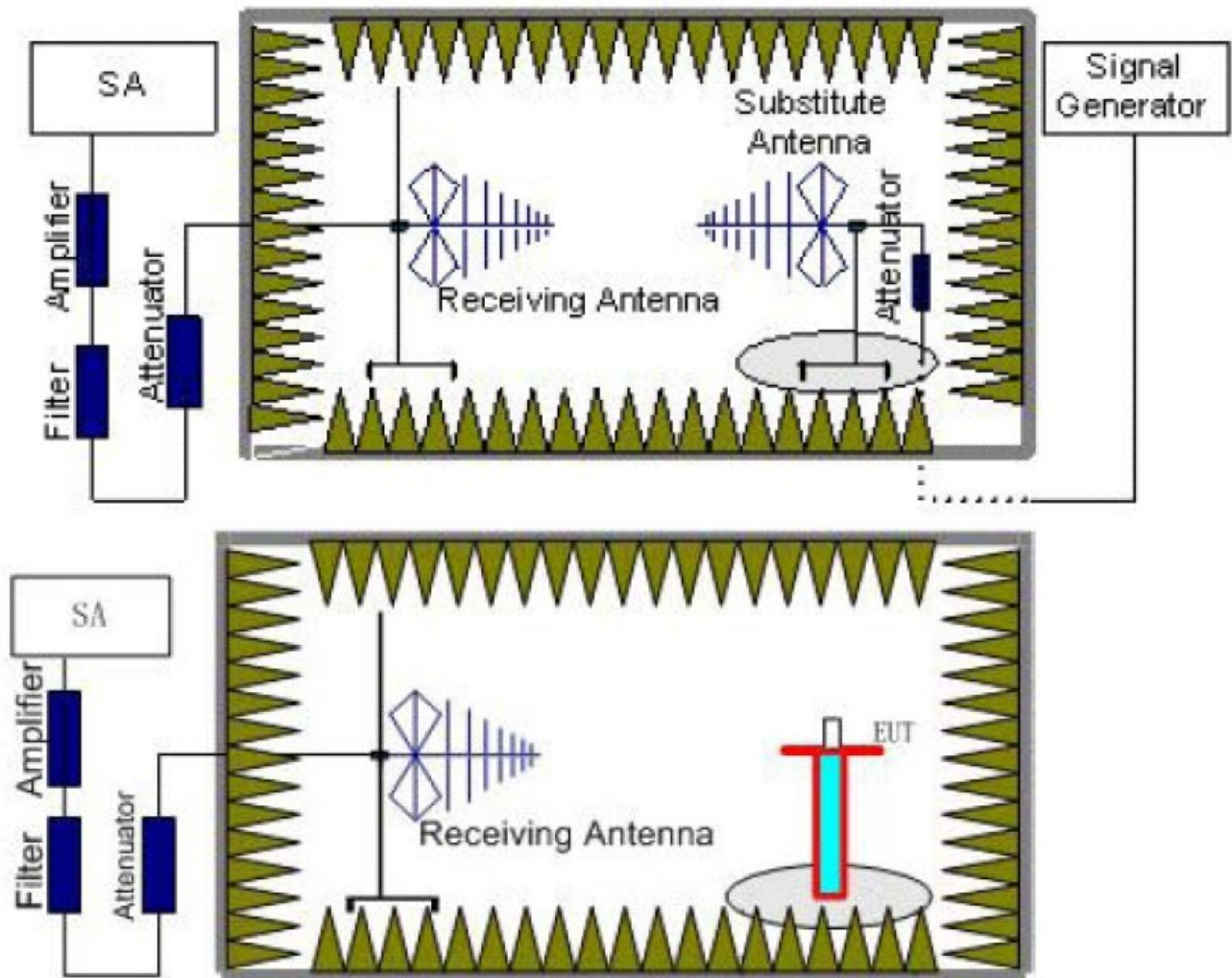
Channel High-Full RB#

## 4.5. Radiated Power Measurement

### LIMIT

LTE Band 2: EIRP <2W, LTE Band 4: EIRP <1W, LTE Band 7: ERP <2W

### TEST CONFIGURATION



### TEST PROCEDURE

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz for above 1GHz and RBW=100kHz, VBW=300kHz for 30MHz to 1GHz,, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be

performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:  
Power(EIRP)=PMea- PAg - Pcl + Ga  
We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:  
Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.  
ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

## **TEST RESULTS**

| LTE Band 2-1.4MHz |         |            |            |             |        |
|-------------------|---------|------------|------------|-------------|--------|
| Modulation        | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                   |         | Vertical   | Horizontal |             |        |
| QPSK              | Low     | 18.45      | 20.66      | 30          | PASS   |
|                   | Mid     | 19.02      | 21.14      |             |        |
|                   | High    | 18.36      | 20.84      |             |        |
| 16QAM             | Low     | 18.69      | 20.73      |             | PASS   |
|                   | Mid     | 18.71      | 21.07      |             |        |
|                   | High    | 19.00      | 20.77      |             |        |

| LTE Band 2-3MHz |         |            |            |             |        |
|-----------------|---------|------------|------------|-------------|--------|
| Modulation      | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                 |         | Vertical   | Horizontal |             |        |
| QPSK            | Low     | 18.35      | 20.52      | 30          | PASS   |
|                 | Mid     | 18.43      | 20.19      |             |        |
|                 | High    | 18.52      | 19.76      |             |        |
| 16QAM           | Low     | 18.04      | 20.46      |             | PASS   |
|                 | Mid     | 17.97      | 20.07      |             |        |
|                 | High    | 18.55      | 19.77      |             |        |

| LTE Band 2-5MHz |         |            |            |             |        |
|-----------------|---------|------------|------------|-------------|--------|
| Modulation      | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                 |         | Vertical   | Horizontal |             |        |
| QPSK            | Low     | 18.74      | 20.52      | 30          | PASS   |
|                 | Mid     | 18.36      | 20.41      |             |        |
|                 | High    | 18.43      | 20.33      |             |        |
| 16QAM           | Low     | 17.94      | 20.52      |             | PASS   |
|                 | Mid     | 17.56      | 20.41      |             |        |
|                 | High    | 19.07      | 20.47      |             |        |

| LTE Band 2-10MHz |         |            |            |             |        |
|------------------|---------|------------|------------|-------------|--------|
| Modulation       | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical   | Horizontal |             |        |
| QPSK             | Low     | 18.39      | 20.36      | 30          | PASS   |
|                  | Mid     | 18.94      | 20.41      |             |        |
|                  | High    | 17.69      | 19.92      |             |        |
| 16QAM            | Low     | 18.26      | 19.73      |             | PASS   |
|                  | Mid     | 19.18      | 20.54      |             |        |
|                  | High    | 17.48      | 19.68      |             |        |

| LTE Band 2-15MHz |         |            |            |             |        |
|------------------|---------|------------|------------|-------------|--------|
| Modulation       | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical   | Horizontal |             |        |
| QPSK             | Low     | 18.38      | 20.15      | 30          | PASS   |
|                  | Mid     | 18.47      | 20.36      |             |        |
|                  | High    | 18.86      | 20.33      |             |        |
| 16QAM            | Low     | 17.87      | 20.15      |             | PASS   |
|                  | Mid     | 18.47      | 20.36      |             |        |
|                  | High    | 18.73      | 20.33      |             |        |

| LTE Band 2-20MHz |         |            |            |             |        |
|------------------|---------|------------|------------|-------------|--------|
| Modulation       | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical   | Horizontal |             |        |
| QPSK             | Low     | 17.43      | 19.65      | 30          | PASS   |
|                  | Mid     | 18.52      | 20.66      |             |        |
|                  | High    | 18.58      | 20.14      |             |        |
| 16QAM            | Low     | 16.95      | 19.55      |             | PASS   |
|                  | Mid     | 17.81      | 20.48      |             |        |
|                  | High    | 18.65      | 20.16      |             |        |

| LTE Band 4-1.4MHz |         |            |            |             |        |
|-------------------|---------|------------|------------|-------------|--------|
| Modulation        | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                   |         | Vertical   | Horizontal |             |        |
| QPSK              | Low     | 15.43      | 18.96      | 30          | PASS   |
|                   | Mid     | 16.36      | 19.78      |             |        |
|                   | High    | 15.44      | 18.85      |             |        |
| 16QAM             | Low     | 15.76      | 19.09      |             | PASS   |
|                   | Mid     | 15.80      | 19.66      |             |        |
|                   | High    | 16.32      | 18.73      |             |        |

| LTE Band 4-3MHz |         |            |            |             |        |
|-----------------|---------|------------|------------|-------------|--------|
| Modulation      | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                 |         | Vertical   | Horizontal |             |        |
| QPSK            | Low     | 15.66      | 18.84      | 30          | PASS   |
|                 | Mid     | 16.98      | 19.52      |             |        |
|                 | High    | 15.75      | 18.89      |             |        |
| 16QAM           | Low     | 15.10      | 18.72      |             | PASS   |
|                 | Mid     | 16.15      | 19.31      |             |        |
|                 | High    | 15.85      | 18.91      |             |        |

| LTE Band 4-5MHz |         |            |            |             |        |
|-----------------|---------|------------|------------|-------------|--------|
| Modulation      | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                 |         | Vertical   | Horizontal |             |        |
| QPSK            | Low     | 15.39      | 19.75      | 30          | PASS   |
|                 | Mid     | 15.24      | 19.67      |             |        |
|                 | High    | 15.08      | 19.76      |             |        |
| 16QAM           | Low     | 14.65      | 19.59      |             | PASS   |
|                 | Mid     | 15.98      | 19.81      |             |        |
|                 | High    | 14.49      | 19.63      |             |        |

| LTE Band 4-10MHz |         |            |            |             |        |
|------------------|---------|------------|------------|-------------|--------|
| Modulation       | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical   | Horizontal |             |        |
| QPSK             | Low     | 15.76      | 18.32      | 30          | PASS   |
|                  | Mid     | 16.35      | 19.15      |             |        |
|                  | High    | 15.38      | 18.33      |             |        |
| 16QAM            | Low     | 16.24      | 18.34      |             | PASS   |
|                  | Mid     | 16.33      | 19.13      |             |        |
|                  | High    | 16.34      | 18.31      |             |        |

| LTE Band 4-15MHz |         |            |            |             |        |
|------------------|---------|------------|------------|-------------|--------|
| Modulation       | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical   | Horizontal |             |        |
| QPSK             | Low     | 15.82      | 18.76      | 30          | PASS   |
|                  | Mid     | 15.49      | 18.52      |             |        |
|                  | High    | 16.35      | 19.08      |             |        |
| 16QAM            | Low     | 16.45      | 18.76      |             | PASS   |
|                  | Mid     | 15.49      | 18.52      |             |        |
|                  | High    | 16.51      | 19.08      |             |        |

| LTE Band 4-20MHz |         |            |            |             |        |
|------------------|---------|------------|------------|-------------|--------|
| Modulation       | Channel | EIRP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical   | Horizontal |             |        |
| QPSK             | Low     | 15.34      | 18.79      | 30          | PASS   |
|                  | Mid     | 15.85      | 18.47      |             |        |
|                  | High    | 15.47      | 19.32      |             |        |
| 16QAM            | Low     | 15.92      | 18.91      |             | PASS   |
|                  | Mid     | 16.72      | 18.69      |             |        |
|                  | High    | 14.64      | 19.14      |             |        |

| LTE Band 7-5MHz |         |           |            |             |        |
|-----------------|---------|-----------|------------|-------------|--------|
| Modulation      | Channel | ERP (dBm) |            | Limit (dBm) | Result |
|                 |         | Vertical  | Horizontal |             |        |
| QPSK            | Low     | 19.43     | 21.33      | 33.0        | PASS   |
|                 | Mid     | 19.25     | 21.36      |             |        |
|                 | High    | 19.36     | 21.78      |             |        |
| 16QAM           | Low     | 19.32     | 21.42      |             | PASS   |
|                 | Mid     | 19.33     | 21.28      |             |        |
|                 | High    | 18.99     | 21.86      |             |        |

| LTE Band 7-10MHz |         |           |            |             |        |
|------------------|---------|-----------|------------|-------------|--------|
| Modulation       | Channel | ERP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical  | Horizontal |             |        |
| QPSK             | Low     | 19.47     | 21.85      | 33.0        | PASS   |
|                  | Mid     | 19.27     | 21.43      |             |        |
|                  | High    | 19.35     | 21.74      |             |        |
| 16QAM            | Low     | 19.10     | 21.77      |             | PASS   |
|                  | Mid     | 18.72     | 21.29      |             |        |
|                  | High    | 19.39     | 21.75      |             |        |

| LTE Band 7-15MHz |         |           |            |             |        |
|------------------|---------|-----------|------------|-------------|--------|
| Modulation       | Channel | ERP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical  | Horizontal |             |        |
| QPSK             | Low     | 18.95     | 20.25      | 33.0        | PASS   |
|                  | Mid     | 18.76     | 20.23      |             |        |
|                  | High    | 18.74     | 20.65      |             |        |
| 16QAM            | Low     | 18.20     | 20.41      |             | PASS   |
|                  | Mid     | 19.34     | 20.10      |             |        |
|                  | High    | 19.30     | 20.77      |             |        |

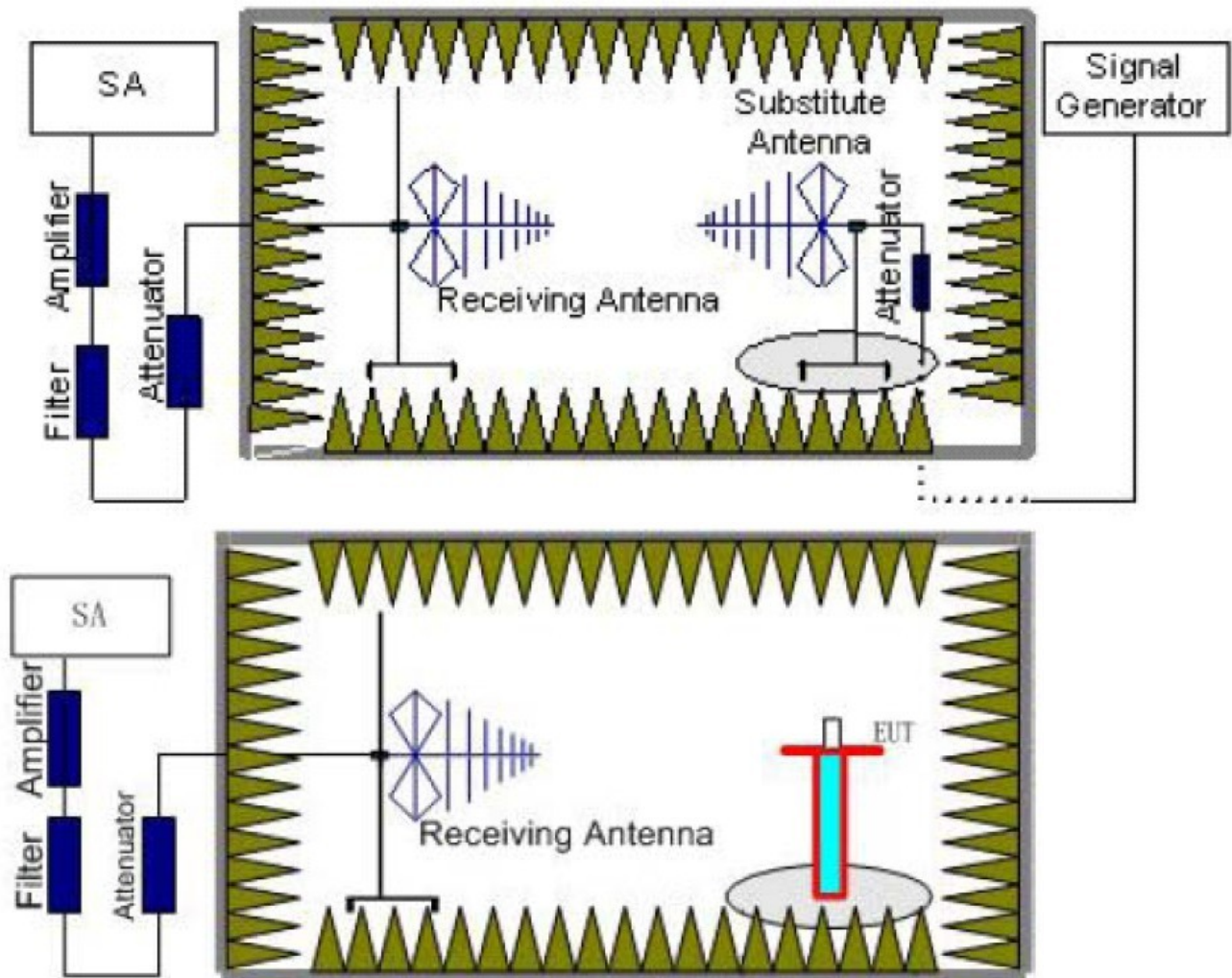
| LTE Band 7-20MHz |         |           |            |             |        |
|------------------|---------|-----------|------------|-------------|--------|
| Modulation       | Channel | ERP (dBm) |            | Limit (dBm) | Result |
|                  |         | Vertical  | Horizontal |             |        |
| QPSK             | Low     | 18.94     | 20.25      | 33.0        | PASS   |
|                  | Mid     | 18.37     | 20.47      |             |        |
|                  | High    | 19.36     | 20.66      |             |        |
| 16QAM            | Low     | 19.77     | 20.61      |             | PASS   |
|                  | Mid     | 18.95     | 19.97      |             |        |
|                  | High    | 20.23     | 20.89      |             |        |

## 4.6. Radiated Spurious Emission

### LIMIT

-13dBm

### TEST CONFIGURATION



### TEST RESULTS

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz for above 1GHz and RBW=100kHz, VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be

performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:  
Power(EIRP)=PMea- PAg - Pcl + Ga  
We used SMF100A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:  
Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.  
ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

## **TEST RESULTS**

| LTE Band 2-1.4MHz |                 |                   |             |             |        |
|-------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel           | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                   |                 | Polarization      | Level (dBm) |             |        |
| Low               | 3701.4          | Vertical          | -43.52      | -13.00      | Pass   |
|                   | 5552.1          | V                 | -44.75      |             |        |
|                   | 7402.8          | V                 | ---         |             |        |
|                   | 3701.4          | Horizontal        | -46.38      | -13.00      | Pass   |
|                   | 5552.1          | H                 | -47.85      |             |        |
|                   | 7402.8          | H                 | ---         |             |        |
| Mid               | 3760            | Vertical          | -42.60      | -13.00      | Pass   |
|                   | 5640            | V                 | -44.94      |             |        |
|                   | 7520            | V                 | ---         |             |        |
|                   | 3760            | Horizontal        | -46.18      | -13.00      | Pass   |
|                   | 5640            | H                 | -47.65      |             |        |
|                   | 7520            | H                 | ---         |             |        |
| High              | 3818.6          | Vertical          | -42.94      | -13.00      | Pass   |
|                   | 5727.9          | V                 | -45.26      |             |        |
|                   | 7637.2          | V                 | ---         |             |        |
|                   | 3818.6          | Horizontal        | -46.24      | -13.00      | Pass   |
|                   | 5727.9          | H                 | -47.59      |             |        |
|                   | 7637.2          | H                 | ---         |             |        |

Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 2-3MHz |                 |                   |             |             |        |
|-----------------|-----------------|-------------------|-------------|-------------|--------|
| Channel         | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                 |                 | Polarization      | Level (dBm) |             |        |
| Low             | 3703            | Vertical          | -44.39      | -13.00      | Pass   |
|                 | 5554.5          | V                 | -45.04      |             |        |
|                 | 7406            | V                 | ---         |             |        |
|                 | 3703            | Horizontal        | -43.05      | -13.00      | Pass   |
|                 | 5554.5          | H                 | -45.32      |             |        |
|                 | 7406            | H                 | ---         |             |        |
| Mid             | 3760            | Vertical          | -43.27      | -13.00      | Pass   |
|                 | 5640            | V                 | -46.20      |             |        |
|                 | 7520            | V                 | ---         |             |        |
|                 | 3760            | Horizontal        | -43.46      | -13.00      | Pass   |
|                 | 5640            | H                 | -46.90      |             |        |
|                 | 7520            | H                 | ---         |             |        |
| High            | 3817            | Vertical          | -42.26      | -13.00      | Pass   |
|                 | 5725.5          | V                 | -46.67      |             |        |
|                 | 7634            | V                 | ---         |             |        |
|                 | 3817            | Horizontal        | -43.37      | -13.00      | Pass   |
|                 | 5725.5          | H                 | -46.90      |             |        |
|                 | 7634            | H                 | ---         |             |        |

Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 2-5MHz |                 |                   |             |             |        |
|-----------------|-----------------|-------------------|-------------|-------------|--------|
| Channel         | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                 |                 | Polarization      | Level (dBm) |             |        |
| Low             | 3705            | Vertical          | -43.45      | -13.00      | Pass   |
|                 | 5557.5          | V                 | -45.22      |             |        |
|                 | 7410            | V                 | ---         |             |        |
|                 | 3705            | Horizontal        | -42.66      | -13.00      | Pass   |
|                 | 5557.5          | H                 | -45.38      |             |        |
|                 | 7410            | H                 | ---         |             |        |
| Mid             | 3760            | Vertical          | -42.79      | -13.00      | Pass   |
|                 | 5640            | V                 | -45.90      |             |        |
|                 | 7520            | V                 | ---         |             |        |
|                 | 3760            | Horizontal        | -42.26      | -13.00      | Pass   |
|                 | 5640            | H                 | -45.17      |             |        |
|                 | 7520            | H                 | ---         |             |        |
| High            | 3815            | Vertical          | -43.53      | -13.00      | Pass   |
|                 | 5722.5          | V                 | -45.41      |             |        |
|                 | 7630            | V                 | ---         |             |        |
|                 | 3815            | Horizontal        | -44.09      | -13.00      | Pass   |
|                 | 5722.5          | H                 | -45.53      |             |        |
|                 | 7630            | H                 | ---         |             |        |

Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 2-10MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 3710            | Vertical          | -42.89      | -13.00      | Pass   |
|                  | 5565            | V                 | -45.51      |             |        |
|                  | 7420            | V                 | ---         |             |        |
|                  | 3710            | Horizontal        | -41.54      | -13.00      | Pass   |
|                  | 5565            | H                 | -45.79      |             |        |
|                  | 7420            | H                 | ---         |             |        |
| Mid              | 3760            | Vertical          | -41.76      | -13.00      | Pass   |
|                  | 5640            | V                 | -46.69      |             |        |
|                  | 7520            | V                 | ---         |             |        |
|                  | 3760            | Horizontal        | -40.87      | -13.00      | Pass   |
|                  | 5640            | H                 | -47.94      |             |        |
|                  | 7520            | H                 | ---         |             |        |
| High             | 3810            | Vertical          | -38.70      | -13.00      | Pass   |
|                  | 5715            | V                 | -47.53      |             |        |
|                  | 7620            | V                 | ---         |             |        |
|                  | 3810            | Horizontal        | -37.94      | -13.00      | Pass   |
|                  | 5715            | H                 | -47.37      |             |        |
|                  | 7620            | H                 | ---         |             |        |

Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 2-15MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 3705            | Vertical          | -41.94      | -13.00      | Pass   |
|                  | 5557.5          | V                 | -45.91      |             |        |
|                  | 7410            | V                 | ---         |             |        |
|                  | 3705            | Horizontal        | -40.16      | -13.00      | Pass   |
|                  | 5557.5          | H                 | -46.27      |             |        |
|                  | 7410            | H                 | ---         |             |        |
| Mid              | 3760            | Vertical          | -40.45      | -13.00      | Pass   |
|                  | 5640            | V                 | -47.46      |             |        |
|                  | 7520            | V                 | ---         |             |        |
|                  | 3760            | Horizontal        | -39.27      | -13.00      | Pass   |
|                  | 5640            | H                 | -48.01      |             |        |
|                  | 7520            | H                 | ---         |             |        |
| High             | 3815            | Vertical          | -38.31      | -13.00      | Pass   |
|                  | 5722.5          | V                 | -47.83      |             |        |
|                  | 7630            | V                 | ---         |             |        |
|                  | 3815            | Horizontal        | -38.56      | -13.00      | Pass   |
|                  | 5722.5          | H                 | -47.88      |             |        |
|                  | 7630            | H                 | ---         |             |        |

Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 2-20MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 3720            | Vertical          | -40.68      | -13.00      | Pass   |
|                  | 5580            | V                 | -46.35      |             |        |
|                  | 7440            | V                 | ---         |             |        |
|                  | 3720            | Horizontal        | -38.67      | -13.00      | Pass   |
|                  | 5580            | H                 | -46.76      |             |        |
|                  | 7440            | H                 | ---         |             |        |
| Mid              | 3760            | Vertical          | -39.00      | -13.00      | Pass   |
|                  | 5640            | V                 | -48.10      |             |        |
|                  | 7520            | V                 | ---         |             |        |
|                  | 3760            | Horizontal        | -37.67      | -13.00      | Pass   |
|                  | 5640            | H                 | -49.28      |             |        |
|                  | 7520            | H                 | ---         |             |        |
| High             | 3800            | Vertical          | -35.62      | -13.00      | Pass   |
|                  | 5700            | V                 | -48.89      |             |        |
|                  | 7600            | V                 | ---         |             |        |
|                  | 3800            | Horizontal        | -37.04      | -13.00      | Pass   |
|                  | 5700            | H                 | -49.19      |             |        |
|                  | 7600            | H                 | ---         |             |        |

Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 4-1.4MHz |                 |                   |             |             |        |
|-------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel           | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                   |                 | Polarization      | Level (dBm) |             |        |
| Low               | 3421.4          | Vertical          | -38.47      | -13.00      | Pass   |
|                   | 5132.1          | V                 | -42.52      |             |        |
|                   | 6842.8          | V                 | ---         |             |        |
|                   | 3421.4          | Horizontal        | -43.36      | -13.00      | Pass   |
|                   | 5132.1          | H                 | -45.25      |             |        |
|                   | 6842.8          | H                 | ---         |             |        |
| Mid               | 3465            | Vertical          | -38.31      | -13.00      | Pass   |
|                   | 5197.5          | V                 | -42.67      |             |        |
|                   | 6930            | V                 | ---         |             |        |
|                   | 3465            | Horizontal        | -43.56      | -13.00      | Pass   |
|                   | 5197.5          | H                 | -45.41      |             |        |
|                   | 6930            | H                 | ---         |             |        |
| High              | 3508.6          | Vertical          | -38.05      | -13.00      | Pass   |
|                   | 5262.9          | V                 | -42.42      |             |        |
|                   | 7017.2          | V                 | ---         |             |        |
|                   | 3508.6          | Horizontal        | -43.60      | -13.00      | Pass   |
|                   | 5262.9          | H                 | -45.45      |             |        |
|                   | 7017.2          | H                 | ---         |             |        |

Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 4-3MHz |                 |                   |             |             |        |
|-----------------|-----------------|-------------------|-------------|-------------|--------|
| Channel         | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                 |                 | Polarization      | Level (dBm) |             |        |
| Low             | 3423            | Vertical          | -37.77      | -13.00      | Pass   |
|                 | 5134.5          | V                 | -42.93      |             |        |
|                 | 6846            | V                 | ---         |             |        |
|                 | 3423            | Horizontal        | -43.97      | -13.00      | Pass   |
|                 | 5134.5          | H                 | -45.63      |             |        |
|                 | 6846            | H                 | ---         |             |        |
| Mid             | 3465            | Vertical          | -37.47      | -13.00      | Pass   |
|                 | 5197.5          | V                 | -42.64      |             |        |
|                 | 6930            | V                 | ---         |             |        |
|                 | 3465            | Horizontal        | -43.64      | -13.00      | Pass   |
|                 | 5197.5          | H                 | -45.90      |             |        |
|                 | 6930            | H                 | ---         |             |        |
| High            | 3507            | Vertical          | -37.92      | -13.00      | Pass   |
|                 | 5260.5          | V                 | -42.22      |             |        |
|                 | 7014            | V                 | ---         |             |        |
|                 | 3423            | Horizontal        | -43.82      | -13.00      | Pass   |
|                 | 5134.5          | H                 | -45.73      |             |        |
|                 | 6846            | H                 | ---         |             |        |

Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 4-5MHz |                 |                   |             |             |        |
|-----------------|-----------------|-------------------|-------------|-------------|--------|
| Channel         | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                 |                 | Polarization      | Level (dBm) |             |        |
| Low             | 3425            | Vertical          | -36.47      | -13.00      | Pass   |
|                 | 5137.5          | V                 | -43.10      |             |        |
|                 | 6850            | V                 | ---         |             |        |
|                 | 3425            | Horizontal        | -44.00      | -13.00      | Pass   |
|                 | 5137.5          | H                 | -45.89      |             |        |
|                 | 6850            | H                 | ---         |             |        |
| Mid             | 3465            | Vertical          | -36.33      | -13.00      | Pass   |
|                 | 5197.5          | V                 | -42.98      |             |        |
|                 | 6930            | V                 | -           |             |        |
|                 | 3465            | Horizontal        | -43.71      | -13.00      | Pass   |
|                 | 5197.5          | H                 | -45.66      |             |        |
|                 | 6930            | H                 | ---         |             |        |
| High            | 3505            | Vertical          | -36.73      | -13.00      | Pass   |
|                 | 5257.5          | V                 | -43.34      |             |        |
|                 | 7010            | V                 | -           |             |        |
|                 | 3505            | Horizontal        | -43.83      | -13.00      | Pass   |
|                 | 5257.5          | H                 | -45.77      |             |        |
|                 | 7010            | H                 | ---         |             |        |

## Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 4-10MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 3430            | Vertical          | -35.91      | -13.00      | Pass   |
|                  | 5145            | V                 | -43.40      |             |        |
|                  | 6860            | V                 | ---         |             |        |
|                  | 3430            | Horizontal        | -43.41      | -13.00      | Pass   |
|                  | 5145            | H                 | -45.42      |             |        |
|                  | 6860            | H                 | ---         |             |        |
| Mid              | 3465            | Vertical          | -36.13      | -13.00      | Pass   |
|                  | 5197.5          | V                 | -43.61      |             |        |
|                  | 6930            | V                 | ---         |             |        |
|                  | 3465            | Horizontal        | -43.09      | -13.00      | Pass   |
|                  | 5197.5          | H                 | -45.16      |             |        |
|                  | 6930            | H                 | -           |             |        |
| High             | 3500            | Vertical          | -36.58      | -13.00      | Pass   |
|                  | 5250            | V                 | -44.02      |             |        |
|                  | 7000            | V                 | -           |             |        |
|                  | 3500            | Horizontal        | -42.93      | -13.00      | Pass   |
|                  | 5250            | H                 | -45.00      |             |        |
|                  | 7000            | H                 | ---         |             |        |

## Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 4-15MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 3435            | Vertical          | -34.95      | -13.00      | Pass   |
|                  | 5152.5          | V                 | -43.79      |             |        |
|                  | 6870            | V                 | ---         |             |        |
|                  | 3435            | Horizontal        | -43.32      | -13.00      | Pass   |
|                  | 5152.5          | H                 | -44.64      |             |        |
|                  | 6870            | H                 | ---         |             |        |
| Mid              | 3465            | Vertical          | -35.25      | -13.00      | Pass   |
|                  | 5197.5          | V                 | -44.07      |             |        |
|                  | 6930            | V                 | ---         |             |        |
|                  | 3465            | Horizontal        | -43.77      | -13.00      | Pass   |
|                  | 5197.5          | H                 | -45.00      |             |        |
|                  | 6930            | H                 | ---         |             |        |
| High             | 3490            | Vertical          | -34.62      | -13.00      | Pass   |
|                  | 5235            | V                 | -43.49      |             |        |
|                  | 6980            | V                 | ---         |             |        |
|                  | 3490            | Horizontal        | -43.72      | -13.00      | Pass   |
|                  | 5235            | H                 | -44.95      |             |        |
|                  | 6980            | H                 | ---         |             |        |

Remark :

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 4-20MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 3440            | Vertical          | -33.70      | -13.00      | Pass   |
|                  | 5160            | V                 | -43.93      |             |        |
|                  | 6880            | V                 | ---         |             |        |
|                  | 3440            | Horizontal        | -43.30      | -13.00      | Pass   |
|                  | 5160            | H                 | -45.30      |             |        |
|                  | 6880            | H                 | ---         |             |        |
| Mid              | 3465            | Vertical          | -33.39      | -13.00      | Pass   |
|                  | 5197.5          | V                 | -44.39      |             |        |
|                  | 6930            | V                 | ---         |             |        |
|                  | 3465            | Horizontal        | -43.75      | -13.00      | Pass   |
|                  | 5197.5          | H                 | -44.94      |             |        |
|                  | 6930            | H                 | ---         |             |        |
| High             | 3490            | Vertical          | -32.75      | -13.00      | Pass   |
|                  | 5235            | V                 | -44.73      |             |        |
|                  | 6980            | V                 | ---         |             |        |
|                  | 3490            | Horizontal        | -42.99      | -13.00      | Pass   |
|                  | 5235            | H                 | -45.01      |             |        |
|                  | 6980            | H                 | ---         |             |        |

Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 7-5MHz |                 |                   |             |             |        |
|-----------------|-----------------|-------------------|-------------|-------------|--------|
| Channel         | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                 |                 | Polarization      | Level (dBm) |             |        |
| Low             | 5005            | Vertical          | -37.47      | -13.00      | Pass   |
|                 | 7507.5          | V                 | -43.58      |             |        |
|                 | 10010           | V                 | ---         |             |        |
|                 | 5005            | Horizontal        | -43.14      | -13.00      | Pass   |
|                 | 7507.5          | H                 | -46.67      |             |        |
|                 | 10010           | H                 | ---         |             |        |
| Mid             | 5070            | Vertical          | -37.15      | -13.00      | Pass   |
|                 | 7605            | V                 | -43.28      |             |        |
|                 | 10140           | V                 | ---         |             |        |
|                 | 5070            | Horizontal        | -42.81      | -13.00      | Pass   |
|                 | 7605            | H                 | -46.40      |             |        |
|                 | 10140           | H                 | ---         |             |        |
| High            | 5135            | Vertical          | -37.61      | -13.00      | Pass   |
|                 | 7702.5          | V                 | -43.70      |             |        |
|                 | 10270           | V                 | -           |             |        |
|                 | 5135            | Horizontal        | -42.99      | -13.00      | Pass   |
|                 | 7702.5          | H                 | -46.57      |             |        |
|                 | 10270           | H                 | ---         |             |        |

## Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 7-10MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 5010            | Vertical          | -37.58      | -13.00      | Pass   |
|                  | 7515            | V                 | -43.47      |             |        |
|                  | 10020           | V                 | ---         |             |        |
|                  | 5010            | Horizontal        | -43.63      | -13.00      | Pass   |
|                  | 7515            | H                 | -46.78      |             |        |
|                  | 10020           | H                 | ---         |             |        |
| Mid              | 5070            | Vertical          | -37.97      | -13.00      | Pass   |
|                  | 7605            | V                 | -43.81      |             |        |
|                  | 10140           | V                 | ---         |             |        |
|                  | 5070            | Horizontal        | -43.47      | -13.00      | Pass   |
|                  | 7605            | H                 | -46.90      |             |        |
|                  | 10140           | H                 | ---         |             |        |
| High             | 5130            | Vertical          | -38.51      | -13.00      | Pass   |
|                  | 7695            | V                 | -44.69      |             |        |
|                  | 10260           | V                 | ---         |             |        |
|                  | 5130            | Horizontal        | -44.36      | -13.00      | Pass   |
|                  | 7695            | H                 | -47.74      |             |        |
|                  | 10260           | H                 | ---         |             |        |

## Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 7-15MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 5015            | Vertical          | -37.63      | -13.00      | Pass   |
|                  | 7522.5          | V                 | -43.42      |             |        |
|                  | 10030           | V                 | ---         |             |        |
|                  | 5015            | Horizontal        | -43.81      | -13.00      | Pass   |
|                  | 7522.5          | H                 | -46.82      |             |        |
|                  | 10030           | H                 | ---         |             |        |
| Mid              | 5070            | Vertical          | -37.77      | -13.00      | Pass   |
|                  | 7605            | V                 | -43.55      |             |        |
|                  | 10140           | V                 | ---         |             |        |
|                  | 5070            | Horizontal        | -43.55      | -13.00      | Pass   |
|                  | 7605            | H                 | -44.44      |             |        |
|                  | 10140           | H                 | ---         |             |        |
| High             | 5125            | Vertical          | -38.66      | -13.00      | Pass   |
|                  | 7687.5          | V                 | -45.03      |             |        |
|                  | 10250           | V                 | ---         |             |        |
|                  | 5125            | Horizontal        | -44.05      | -13.00      | Pass   |
|                  | 7687.5          | H                 | -44.92      |             |        |
|                  | 10250           | H                 | ---         |             |        |

## Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| LTE Band 7-20MHz |                 |                   |             |             |        |
|------------------|-----------------|-------------------|-------------|-------------|--------|
| Channel          | Frequency (MHz) | Spurious Emission |             | Limit (dBm) | Result |
|                  |                 | Polarization      | Level (dBm) |             |        |
| Low              | 5015            | Vertical          | -37.54      | -13.00      | Pass   |
|                  | 7522.5          | V                 | -43.51      |             |        |
|                  | 10030           | V                 | ---         |             |        |
|                  | 5015            | Horizontal        | -43.44      | -13.00      | Pass   |
|                  | 7522.5          | H                 | -46.74      |             |        |
|                  | 10030           | H                 | ---         |             |        |
| Mid              | 5070            | Vertical          | -37.24      | -13.00      | Pass   |
|                  | 7605            | V                 | -43.25      |             |        |
|                  | 10140           | V                 | ---         |             |        |
|                  | 5070            | Horizontal        | -44.30      | -13.00      | Pass   |
|                  | 7605            | H                 | -46.89      |             |        |
|                  | 10140           | H                 | ---         |             |        |
| High             | 5125            | Vertical          | -37.51      | -13.00      | Pass   |
|                  | 7687.5          | V                 | -43.01      |             |        |
|                  | 10250           | V                 | -           |             |        |
|                  | 5125            | Horizontal        | -44.24      | -13.00      | Pass   |
|                  | 7687.5          | H                 | -46.95      |             |        |
|                  | 10250           | H                 | ---         |             |        |

## Remark:

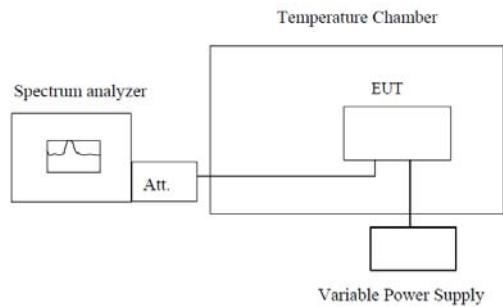
1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

#### 4.7. Frequency stability V.S. Temperature measurement

##### LIMIT

2.5ppm

##### TEST CONFIGURATION



**Note :** Measurement setup for testing on Antenna connector

##### TEST PROCEDURE

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

##### TEST RESULTS

##### Worst case

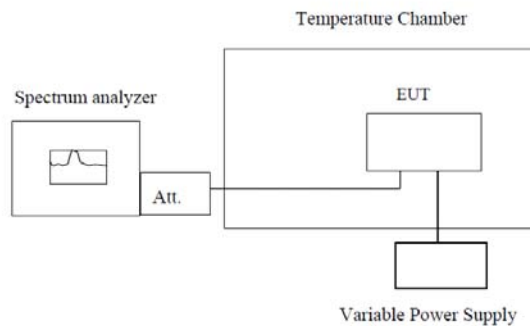
| Reference Frequency: LTE Band 2 Middle channel=1880MHz,20MHz Bandwidth   |                  |                 |        |             |        |
|--------------------------------------------------------------------------|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc)                                                     | Temperature (°C) | Frequency error |        | Limit (ppm) | Result |
|                                                                          |                  | Hz              | ppm    |             |        |
| 3.80                                                                     | -30              | 18              | 0.0096 | 2.5         | Pass   |
|                                                                          | -20              | 23              | 0.0122 |             |        |
|                                                                          | -10              | 21              | 0.0112 |             |        |
|                                                                          | 0                | 24              | 0.0128 |             |        |
|                                                                          | 10               | 19              | 0.0101 |             |        |
|                                                                          | 20               | 17              | 0.0090 |             |        |
|                                                                          | 30               | 19              | 0.0101 |             |        |
|                                                                          | 40               | 22              | 0.0117 |             |        |
|                                                                          | 50               | 24              | 0.0128 |             |        |
| Reference Frequency: LTE Band 4 Middle channel=1732.5MHz,20MHz Bandwidth |                  |                 |        |             |        |
| Power supplied (Vdc)                                                     | Temperature (°C) | Frequency error |        | Limit (ppm) | Result |
|                                                                          |                  | Hz              | ppm    |             |        |
| 3.80                                                                     | -30              | 24              | 0.0139 | 2.5         | Pass   |
|                                                                          | -20              | 29              | 0.0167 |             |        |
|                                                                          | -10              | 23              | 0.0133 |             |        |
|                                                                          | 0                | 21              | 0.0121 |             |        |
|                                                                          | 10               | 17              | 0.0098 |             |        |
|                                                                          | 20               | 19              | 0.0110 |             |        |
|                                                                          | 30               | 22              | 0.0127 |             |        |
|                                                                          | 40               | 26              | 0.0150 |             |        |
|                                                                          | 50               | 28              | 0.0162 |             |        |
| Reference Frequency: LTE Band 7 Middle channel=2535MHz,20MHz Bandwidth   |                  |                 |        |             |        |
| Power supplied (Vdc)                                                     | Temperature (°C) | Frequency error |        | Limit (ppm) | Result |
|                                                                          |                  | Hz              | ppm    |             |        |
| 3.80                                                                     | -30              | 22              | 0.0087 | 2.5         | Pass   |
|                                                                          | -20              | 20              | 0.0079 |             |        |
|                                                                          | -10              | 19              | 0.0075 |             |        |
|                                                                          | 0                | 23              | 0.0091 |             |        |
|                                                                          | 10               | 22              | 0.0087 |             |        |
|                                                                          | 20               | 21              | 0.0083 |             |        |
|                                                                          | 30               | 29              | 0.0114 |             |        |
|                                                                          | 40               | 27              | 0.0107 |             |        |
|                                                                          | 50               | 25              | 0.0099 |             |        |

#### 4.8. Frequency stability V.S. Voltage measurement

##### LIMIT

2.5ppm

##### TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

##### TEST PROCEDURE

1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.
2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

##### TEST RESULTS

###### Worst case

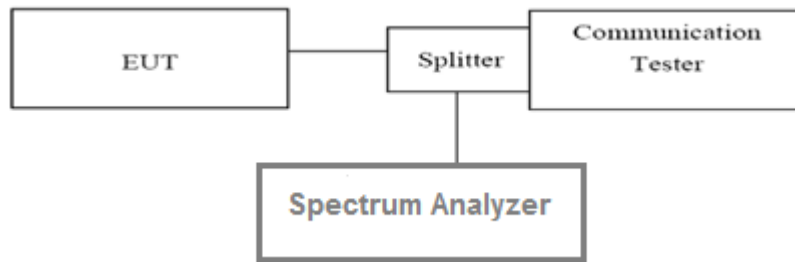
| Reference Frequency: LTE Band 2 Middle channel=1880MHz,20MHz Bandwidth   |                      |                 |        |             |        |
|--------------------------------------------------------------------------|----------------------|-----------------|--------|-------------|--------|
| Temperature (°C)                                                         | Power supplied (Vdc) | Frequency error |        | Limit (ppm) | Result |
|                                                                          |                      | Hz              | ppm    |             |        |
| 25                                                                       | 4.35                 | 19              | 0.0101 | 2.5         | Pass   |
|                                                                          | 3.80                 | 17              | 0.0090 |             |        |
|                                                                          | 3.60                 | 21              | 0.0112 |             |        |
| Reference Frequency: LTE Band 4 Middle channel=1732.5MHz,20MHz Bandwidth |                      |                 |        |             |        |
| Temperature (°C)                                                         | Power supplied (Vdc) | Frequency error |        | Limit (ppm) | Result |
|                                                                          |                      | Hz              | ppm    |             |        |
| 25                                                                       | 4.35                 | 18              | 0.0104 | 2.5         | Pass   |
|                                                                          | 3.80                 | 19              | 0.0110 |             |        |
|                                                                          | 3.60                 | 20              | 0.0115 |             |        |
| Reference Frequency: LTE Band 7 Middle channel=2535MHz,20MHz Bandwidth   |                      |                 |        |             |        |
| Temperature (°C)                                                         | Power supplied (Vdc) | Frequency error |        | Limit (ppm) | Result |
|                                                                          |                      | Hz              | ppm    |             |        |
| 25                                                                       | 4.35                 | 22              | 0.0087 | 2.5         | Pass   |
|                                                                          | 3.80                 | 21              | 0.0083 |             |        |
|                                                                          | 3.60                 | 23              | 0.0091 |             |        |

#### 4.9. Peak-Average Ratio

##### LIMIT

13dB

##### TEST CONFIGURATION



##### TEST PROCEDURE

According with KDB 971168

1. The signal analyzer' s CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals(>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal " RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the " on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

##### TEST RESULTS

###### Worst case

| LTE Band 2-20MHz |      |          |       |          |           |        |
|------------------|------|----------|-------|----------|-----------|--------|
| Modulation       | QPSK |          | 16QAM |          | Limit(dB) | Result |
| Channel          | 1RB# | Full RB# | 1RB#  | Full RB# |           |        |
| Low              | 7.08 | 7.16     | 7.1   | 7.15     | 13        | Pass   |
| Mid              | 7.09 | 7.13     | 7.14  | 7.12     | 13        | Pass   |
| High             | 7.05 | 7.11     | 7.12  | 1.17     | 13        | Pass   |

| LTE Band 4-20MHz |      |          |       |          |           |        |
|------------------|------|----------|-------|----------|-----------|--------|
| Modulation       | QPSK |          | 16QAM |          | Limit(dB) | Result |
| Channel          | 1RB# | Full RB# | 1RB#  | Full RB# |           |        |
| Low              | 6.11 | 6.17     | 6.16  | 6.15     | 13        | Pass   |
| Mid              | 6.19 | 6.2      | 6.18  | 6.21     | 13        | Pass   |
| High             | 6.16 | 6.29     | 6.19  | 6.24     | 13        | Pass   |

| LTE Band 7-20MHz |      |          |       |          |           |        |
|------------------|------|----------|-------|----------|-----------|--------|
| Modulation       | QPSK |          | 16QAM |          | Limit(dB) | Result |
| Channel          | 1RB# | Full RB# | 1RB#  | Full RB# |           |        |
| Low              | 5.49 | 5.53     | 5.48  | 5.52     | 13        | Pass   |
| Mid              | 5.59 | 5.49     | 5.47  | 5.51     | 13        | Pass   |
| High             | 5.61 | 5.63     | 5.62  | 5.65     | 13        | Pass   |

## 5. Test Setup Photos of the EUT

Radiated emission:



## **6. External and Internal Photos of the EUT**

Reference to the test report No. TRE1608017801

.....End of Report.....