

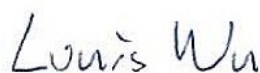


# FCC RADIO TEST REPORT

**FCC ID** : XIA-227  
**Equipment** : 4G LTE Cat 1 Industrial IoT Router  
Vodafone MachineLink 4G Lite  
**Brand Name** :  
NetComm;  NetComm  NetCommWireless  
Casa; Casa Systems  casa systems   
**Model Name** : NWL-22X & NTC-22X (X=7)  
**Applicant** : NetComm Wireless Pty Ltd  
Level 5, 18-20 Orion Road Lane Cove, NSW 2066 Australia  
**Manufacturer** : NetComm Wireless Pty Ltd  
Level 5, 18-20 Orion Road Lane Cove, NSW 2066 Australia  
**Standard** : FCC 47 CFR Part 2, and 90(S)

The product was received on Sep. 09, 2021 and testing was performed from Oct. 22, 2021 to Dec. 04, 2021. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

**Sporton International Inc. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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## History of this test report

| Report No. | Version | Description             | Issued Date   |
|------------|---------|-------------------------|---------------|
| FG171916C  | 01      | Initial issue of report | Dec. 15, 2021 |
|            |         |                         |               |
|            |         |                         |               |
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|            |         |                         |               |

## Summary of Test Result

| Report Clause | Ref Std. Clause    | Test Items                                          | Result (PASS/FAIL) | Remark                                     |
|---------------|--------------------|-----------------------------------------------------|--------------------|--------------------------------------------|
| 3.2           | §2.1046<br>§90.635 | Conducted Output Power and Effective Radiated Power | Pass               | -                                          |
| 3.3           | -                  | Peak-to-Average Ratio                               | Reporting only     | -                                          |
| 3.4           | §2.1049<br>§90.209 | Occupied Bandwidth and 26dB Bandwidth               | Reporting only     | -                                          |
| 3.5           | §2.1051<br>§90.691 | Emission masks – In-band emissions                  | Pass               | -                                          |
| 3.6           | §2.1051<br>§90.691 | Emission masks – Out of band emissions              | Pass               | -                                          |
| 3.7           | §2.1055<br>§90.213 | Frequency Stability for Temperature & Voltage       | Pass               | -                                          |
| 3.8           | §2.1053<br>§90.691 | Field Strength of Spurious Radiation                | Pass               | Under limit<br>38.32 dB at<br>8192.000 MHz |

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

**Reviewed by: Yun Huang**

**Report Producer: Amy Chen**

# 1 General Description

## 1.1 Feature of Equipment Under Test

GSM/WCDMA/LTE and GNSS

| Product Feature |                                                                                  |
|-----------------|----------------------------------------------------------------------------------|
| Antenna Type    | WWAN: Dipole Antenna<br>GPS / Glonass / Galileo / BDS : GPS Active Patch Antenna |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

### <Sample List>

Sample List

| Sample | Model Name | LED Quantity | PCBA                |
|--------|------------|--------------|---------------------|
| 1      | NTC-227    | 8            | A (No Embedded SIM) |
| 2      | NWL-227    | 7            | A (No Embedded SIM) |
| 3      |            |              | B (Embedded SIM)    |

**Note:**

1. Same PCB, antenna and antenna locations and the only differences are in housing, number of LEDs, and with or without embedded SIM.
2. From the above models, Sample 3 was selected as representative models for the test and their data were recorded in this report.

| Accessories Information   |              |                                                 |            |                |
|---------------------------|--------------|-------------------------------------------------|------------|----------------|
| AC Adapter                | Brand Name   | NA                                              | Model Name | S018BAM1200150 |
|                           | Power Rating | I/P: 100-240Vac, 0.5 A, O/P: 12Vdc, 1.5A        |            |                |
|                           | Power Cord   | 1.5 meter, non-shielded cable, w/o ferrite core |            |                |
| RJ45 Cable                | Signal Line  | 1.5 meter, non-shielded cable                   |            |                |
| Antenna 1                 | Brand Name   | NA                                              | Model Name | NANT-00001     |
| Antenna 2                 | Brand Name   | NA                                              | Model Name | NANT-00006     |
| DIN rail mounting bracket | Brand Name   | NA                                              | Model Name | NA             |

## 1.2 Modification of EUT

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

### 1.3 Testing Site

|                       |                                                                                                                        |                                   |
|-----------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Test Site             | Sporton International Inc. EMC & Wireless Communications Laboratory                                                    |                                   |
| Test Site Location    | No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 |                                   |
| Test Site No.         | Sporton Site No.                                                                                                       |                                   |
|                       | TH03-HY                                                                                                                | 03CH07-HY                         |
| Test Engineer         | George Chen                                                                                                            | Jesse Wang, Stan Hsieh and Ken Wu |
| Temperature (°C)      | 23.1~24.2                                                                                                              | 19.5~24.1                         |
| Relative Humidity (%) | 53.3~54.8                                                                                                              | 48.3~65.4                         |

**Note:** The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190

### 1.4 Applied Standards

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

- ♦ FCC 47 CFR Part 2, 90
- ♦ ANSI / TIA-603-E
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01
- ♦ Interim Guidance for Equipment Authorization of Devices with Channel Bandwidths Combined Across Two Contiguous Service Rule Allocations OET/Lab/EACB, June 6, 2013

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. The TAF code is not including all the FCC KDB listed without accreditation.

## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

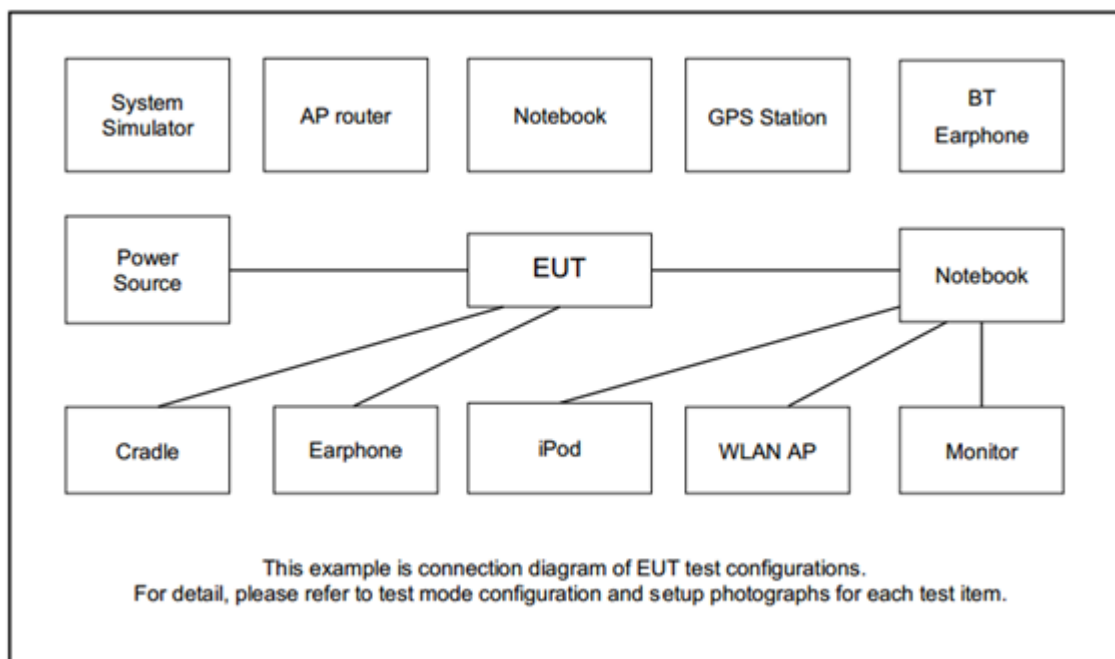
During all testing, EUT is in link mode with base station emulator at maximum power level.

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in two antenna polarization (Horizontal and Vertical), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and find Ant. Vertical as worst plane.

Frequency range investigated for radiated emission is 30 MHz to 9000 MHz.

| Conducted Test Cases                   | Band                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Bandwidth (MHz) |   |   |    |    |    | Modulation |       | RB #       |      |      | Test Channel |   |   |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---|---|----|----|----|------------|-------|------------|------|------|--------------|---|---|
|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1.4             | 3 | 5 | 10 | 15 | 20 | QPSK       | 16QAM | 1          | Half | Full | L            | M | H |
| Max. Output Power                      | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | V               | V | V | V  | V  | -  | V          | V     | V          | V    | V    | V            | V | V |
| Peak-to-Average Ratio                  | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |   |   | V  | V  | -  | V          |       |            |      | V    |              | V |   |
| 26dB and 99% Bandwidth                 | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | V               | V | V | V  | V  | -  | V          | V     |            |      | V    | V            | V |   |
| Emission masks In-band emissions       | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | V               | V | V | V  | V  | -  | V          | V     | V          |      | V    | V            |   | V |
| Emission masks – Out of band emissions | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | V               | V | V | V  | V  | -  | V          |       | V          |      |      | V            | V | V |
| Frequency Stability                    | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -               | - |   | V  | V  | -  | V          |       |            |      | V    | V            | V |   |
| E.R.P.                                 | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | V               | V | V | V  | V  | -  | V          | V     | Max. Power |      |      |              |   |   |
| Radiated Spurious Emission             | 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Worst Case      |   |   |    |    |    |            |       |            |      |      | V            | V | V |
| Remark                                 | 1. The mark “v ” means that this configuration is chosen for testing<br>2. The mark “-“ means that this bandwidth is not supported.<br>3. LTE Band26 transmit frequency for part22 rule is 824MHz-849MHz, for part90 rule is 814MHz-824MHz. ERP over 15MHz bandwidth complies the ERP limit line of part22 rule, therefore ERP of the partial frequency spectrum which falls within part 22 also complies.<br>4. All the radiated test cases were performed with NWL-227 (NANT-00001 Antenna).. |                 |   |   |    |    |    |            |       |            |      |      |              |   |   |

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration and system

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

## 2.4 Measurement Results Explanation Example

### For all conducted test items:

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

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

*Offset = RF cable loss + attenuator factor.*

The following shows an offset computation example with RF cable loss 4.2 dB and a 10dB attenuator.

Example :

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

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

| LTE Band 26 Channel and Frequency List |                        |        |        |         |
|----------------------------------------|------------------------|--------|--------|---------|
| BW [MHz]                               | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 15                                     | Channel                | 26765  | -      | -       |
|                                        | Frequency              | 821.5  | -      | -       |
| 10                                     | Channel                | -      | 26740  | -       |
|                                        | Frequency              | -      | 819    | -       |
| 5                                      | Channel                | 26715  | 26740  | 26765   |
|                                        | Frequency              | 816.5  | 819    | 821.5   |
| 3                                      | Channel                | 26705  | 26740  | 26775   |
|                                        | Frequency              | 815.5  | 819    | 822.5   |
| 1.4                                    | Channel                | 26697  | 26740  | 26783   |
|                                        | Frequency              | 814.7  | 819    | 823.3   |

| LTE Band 26 Channel and Frequency List |                        |   |                     |   |
|----------------------------------------|------------------------|---|---------------------|---|
| BW [MHz]                               | Channel/Frequency(MHz) | - | cross-rule channels | - |
| 15                                     | Channel                | - | 26790               | - |
|                                        | Frequency              | - | 824                 | - |
| 10                                     | Channel                | - | 26790               | - |
|                                        | Frequency              | - | 824                 | - |
| 5                                      | Channel                | - | 26790               | - |
|                                        | Frequency              | - | 824                 | - |
| 3                                      | Channel                | - | 26790               | - |
|                                        | Frequency              | - | 824                 | - |
| 1.4                                    | Channel                | - | 26790               | - |
|                                        | Frequency              | - | 824                 | - |

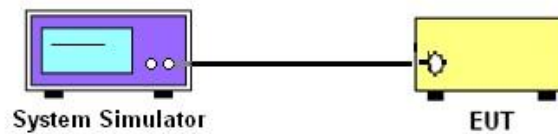
### 3 Conducted Test Items

#### 3.1 Measuring Instruments

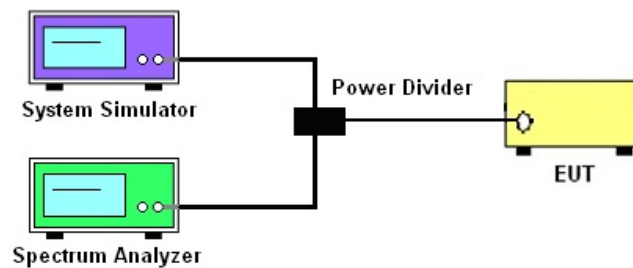
See list of measuring instruments of this test report.

##### 3.1.1 Test Setup

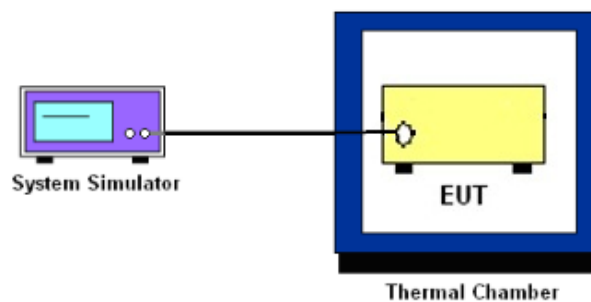
##### 3.1.2 Conducted Output Power



##### 3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge, Emission Mask, Emissions Mask – Out Of Band Emissions, and Conducted Spurious Emission



##### 3.1.4 Frequency Stability



##### 3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

## 3.2 Conducted Output Power Measurement and ERP Measurement

### 3.2.1 Description of the Conducted Output Power Measurement and ERP Measurement

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

The conducted power of mobile transmitters must not exceed 100 Watts for LTE Band 26.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$ , where

$P_T$  = transmitter output power in dBm

$G_T$  = gain of the transmitting antenna in dBi

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

### 3.2.2 Test Procedures

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



### **3.3 Peak-to-Average Ratio**

#### **3.3.1 Description of the PAR Measurement**

Reporting only

#### **3.3.2 Test Procedures**

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



## **3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement**

### **3.4.1 Description of (Occupied) Bandwidth Limitations Measurement**

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### **3.4.2 Test Procedures**

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.



## **3.5 Emissions Mask Measurement**

### **3.5.1 Description of Emissions Mask Measurement**

Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of FCC Part 90.691.(a)

(a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \log_{10}(f/6.1)$  decibels or  $50 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

### **3.5.2 Test Procedures**

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The emissions mask of low and high channels for the highest RF powers were measured.
3. Set RBW and VBW 3 times of RBW to make the measurement with the spectrum analyzer's, and according to KDB 971168 D02 Misc Rev Approve License Devices v02r01 standards, set RBW = 300 Hz to make offsets less than 37.5 kHz from a channel edge , RBW = 100 kHz to make offsets greater than 37.5 kHz, that is allowed.
4. The test results were shown below plots with a correction offset factor including cable loss, insertion loss of power divider.

## 3.6 Emissions Mask – Out Of Band Emissions Measurement

### 3.6.1 Description of Conducted Emissions Out of band emissions measurement

The power of any emission FCC Part 90.691 (a)(2) on any frequency removed from the assigned frequency by out of the authorized bandwidth at least  $43 + 10 \log (P)$  dB. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

### 3.6.2 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. For testing below 1GHz, make the measurement with the spectrum analyzer's RBW = 100 kHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. For testing above 1GHz, make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power P(Watts)

## 3.7 Frequency Stability Measurement

### 3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### 3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

### 3.7.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

## 3.8 Field Strength of Spurious Radiation Measurement

### 3.8.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

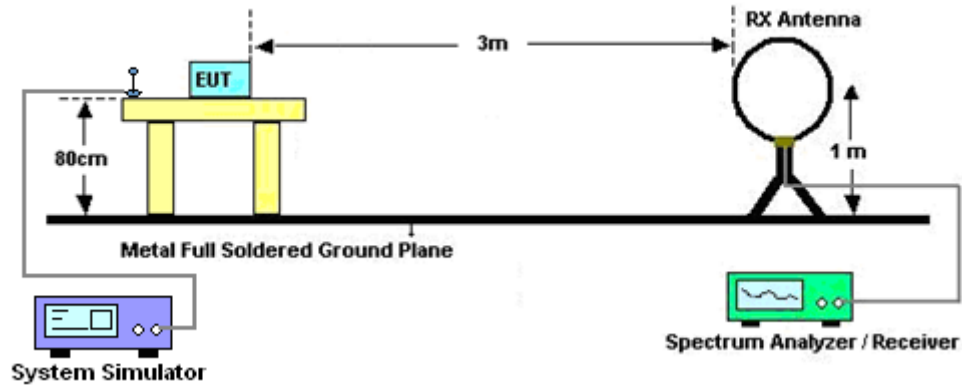
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log_{10}(P[\text{Watts}])$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### 3.8.2 Test Procedures

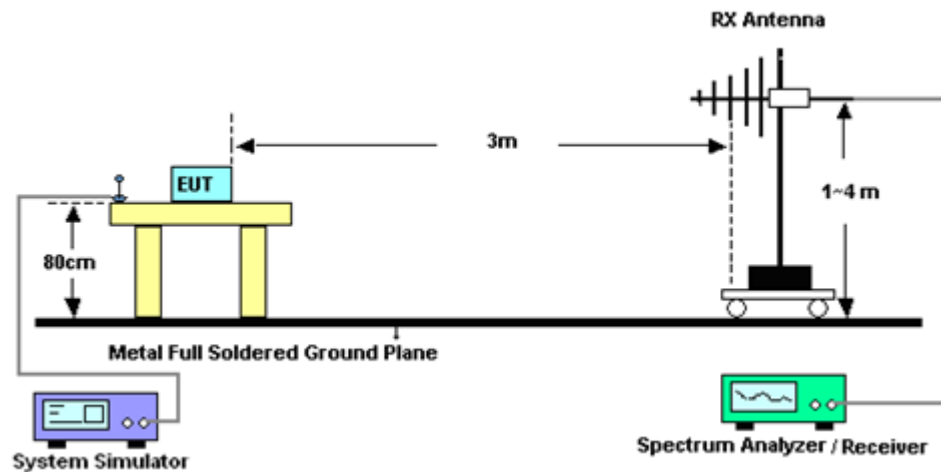
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. For testing below 1GHz, make the measurement with the spectrum analyzer's RBW = 100 kHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. For testing above 1GHz, make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11.  $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
12.  $\text{ERP (dBm)} = \text{EIRP} - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from  $43 + 10 \log(P)$  dB below the transmitter power P(Watts)

### 3.8.3 Test Setup

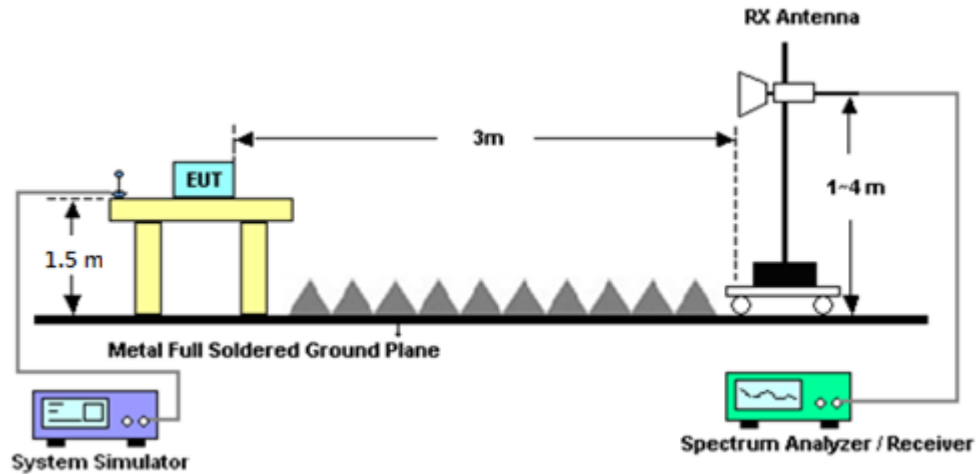
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



### 3.8.4 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix B.

**Note:**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



## 4 List of Measuring Equipment

| Instrument                   | Brand Name      | Model No.                        | Serial No.  | Characteristics               | Calibration Date | Test Date                   | Due Date      | Remark                |
|------------------------------|-----------------|----------------------------------|-------------|-------------------------------|------------------|-----------------------------|---------------|-----------------------|
| Bilog Antenna                | TESEQ           | CBL 6111D & 00800N1D01N-06       | 35419 & 03  | 30MHz~1GHz                    | Apr. 28, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Apr. 27, 2022 | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna    | ESCO            | 3117                             | 00075962    | 1GHz ~ 18GHz                  | Dec. 01, 2020    | Nov. 04, 2021~Nov. 29, 2021 | Nov. 30, 2021 | Radiation (03CH07-HY) |
| Horn Antenna                 | ESCO            | 3117                             | 00066584    | 1GHz~18GHz                    | Oct. 25, 2021    | Nov. 30, 2021~Dec. 04, 2021 | Oct. 24, 2022 | Radiation (03CH07-HY) |
| Loop Antenna                 | Rohde & Schwarz | HFH2-Z2                          | 100315      | 9 kHz~30 MHz                  | Jan. 04, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Jan. 03, 2022 | Radiation (03CH07-HY) |
| Preamplifier                 | MITEQ           | AMF-7D-0010 1800-30-10P          | 1590075     | 1GHz~18GHz                    | Apr. 22, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Apr. 21, 2022 | Radiation (03CH07-HY) |
| Preamplifier                 | COM-POWER       | PA-103A                          | 161241      | 10MHz~1GHz                    | Oct. 04, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Oct. 03, 2022 | Radiation (03CH07-HY) |
| Preamplifier                 | Agilent         | 8449B                            | 3008A02362  | 1GHz~26.5GHz                  | Oct. 04, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Oct. 03, 2022 | Radiation (03CH07-HY) |
| Spectrum Analyzer            | Agilent         | N9030A                           | MY52350276  | 3Hz~44GHz                     | Jul. 22, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Jul. 21, 2022 | Radiation (03CH07-HY) |
| RF Cable                     | HUBER + SUHNER  | SUCOFLEX 104                     | MY15682-4   | 30MHz to 18GHz                | Feb. 24, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Feb. 23, 2022 | Radiation (03CH07-HY) |
| RF Cable                     | HUBER + SUHNER  | SUCOFLEX 104                     | MY24971-4   | 9kHz to 18GHz                 | Feb. 24, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Feb. 23, 2022 | Radiation (03CH07-HY) |
| RF Cable                     | HUBER + SUHNER  | SUCOFLEX 104                     | MY28655-4   | 9kHz to 18GHz                 | Feb. 24, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Feb. 23, 2022 | Radiation (03CH07-HY) |
| RF Cable                     | HUBER + SUHNER  | SUCOFLEX 126                     | 532078/126E | 30MHz~18GHz                   | Sep. 17, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Sep. 16, 2022 | Radiation (03CH07-HY) |
| Controller                   | EMEC            | EM1000                           | N/A         | Control Ant Mast              | N/A              | Nov. 04, 2021~Dec. 04, 2021 | N/A           | Radiation (03CH07-HY) |
| Controller                   | MF              | MF-7802                          | N/A         | Control Turn table            | N/A              | Nov. 04, 2021~Dec. 04, 2021 | N/A           | Radiation (03CH07-HY) |
| Antenna Mast                 | EMEC            | AM-BS-4500E                      | N/A         | Boresight mast 1M~4M          | N/A              | Nov. 04, 2021~Dec. 04, 2021 | N/A           | Radiation (03CH07-HY) |
| Turn Table                   | ChainTek        | Chaintek 3000                    | N/A         | 0~360 Degree                  | N/A              | Nov. 04, 2021~Dec. 04, 2021 | N/A           | Radiation (03CH07-HY) |
| Software                     | Audix           | E3 6.2009-8-24                   | N/A         | N/A                           | N/A              | Nov. 04, 2021~Dec. 04, 2021 | N/A           | Radiation (03CH07-HY) |
| USB Data Logger              | TECPEL          | TR-32                            | HE17XB2495  | N/A                           | Mar. 09, 2021    | Nov. 04, 2021~Dec. 04, 2021 | Mar. 08, 2022 | Radiation (03CH07-HY) |
| Radio Communication Analyzer | Anritsu         | MT8821C                          | 6262025341  | LTE FDD/TDD LTE-2CC ULCA/DLCA | Oct. 15, 2021    | Oct. 22, 2021~Nov. 12, 2021 | Oct. 04, 2022 | Conducted (TH03-HY)   |
| Spectrum Analyzer            | Rohde & Schwarz | FSV40                            | 101397      | 10Hz~40GHz                    | Nov. 27, 2020    | Oct. 22, 2021~Nov. 12, 2021 | Nov. 26, 2021 | Conducted (TH03-HY)   |
| Thermal Chamber              | Ten Billion     | TTH-D3SP                         | TBN-930701  | N/A                           | Oct. 20, 2021    | Oct. 22, 2021~Nov. 12, 2021 | Oct. 19, 2022 | Conducted (TH03-HY)   |
| DC Power Supply              | GW Instek       | PSS-2005GPP-2323                 | GES906037   | 0V~64V : 0A~6A                | Dec. 15, 2020    | Oct. 22, 2021~Nov. 12, 2021 | Dec. 14, 2021 | Conducted (TH03-HY)   |
| Coupler                      | Warison         | 20dB 25W SMA Directional Coupler | #A          | 1-18GHz                       | Jan. 07, 2021    | Oct. 22, 2021~Nov. 12, 2021 | Jan. 06, 2022 | Conducted (TH03-HY)   |



## 5 Uncertainty of Evaluation

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

|                                                                         |         |
|-------------------------------------------------------------------------|---------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 3.16 dB |
|-------------------------------------------------------------------------|---------|

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

|                                                                         |         |
|-------------------------------------------------------------------------|---------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 3.71 dB |
|-------------------------------------------------------------------------|---------|



## Appendix A. Test Results of Conducted Test

### Conducted Output Power (Average power & ERP)

| LTE Band 26 Maximum Average Power [dBm] (GT - LC = 3.13 dB) |              |           |        |        |        |         |           |         |
|-------------------------------------------------------------|--------------|-----------|--------|--------|--------|---------|-----------|---------|
| BW [MHz]                                                    | RB Size      | RB Offset | Mod    | Lowest | Middle | Highest | ERP (dBm) | ERP (W) |
| 15                                                          | 1            | 0         | QPSK   | 22.58  | -      | -       | 23.60     | 0.2291  |
| 15                                                          | 1            | 37        |        | 22.62  | -      | -       |           |         |
| 15                                                          | 1            | 74        |        | 22.40  | -      | -       |           |         |
| 15                                                          | 36           | 0         |        | 21.62  | -      | -       |           |         |
| 15                                                          | 36           | 20        |        | 21.62  | -      | -       |           |         |
| 15                                                          | 36           | 39        |        | 21.33  | -      | -       |           |         |
| 15                                                          | 75           | 0         |        | 21.50  | -      | -       |           |         |
| 15                                                          | 1            | 0         | 16-QAM | 21.88  | -      | -       | 22.86     | 0.1932  |
| 15                                                          | 1            | 37        |        | 21.43  | -      | -       |           |         |
| 15                                                          | 1            | 74        |        | 21.36  | -      | -       |           |         |
| Limit                                                       | Power < 100W |           |        | Result |        |         | Pass      |         |

| LTE Band 26 Maximum Average Power [dBm] (GT - LC = 3.13 dB) |              |           |        |        |        |         |           |         |
|-------------------------------------------------------------|--------------|-----------|--------|--------|--------|---------|-----------|---------|
| BW [MHz]                                                    | RB Size      | RB Offset | Mod    | Lowest | Middle | Highest | ERP (dBm) | ERP (W) |
| 10                                                          | 1            | 0         | QPSK   | -      | 23.05  | -       | 24.03     | 0.2529  |
| 10                                                          | 1            | 25        |        | -      | 23.04  | -       |           |         |
| 10                                                          | 1            | 49        |        | -      | 22.77  | -       |           |         |
| 10                                                          | 25           | 0         |        | -      | 22.12  | -       |           |         |
| 10                                                          | 25           | 12        |        | -      | 22.12  | -       |           |         |
| 10                                                          | 25           | 25        |        | -      | 21.88  | -       |           |         |
| 10                                                          | 50           | 0         |        | -      | 21.94  | -       |           |         |
| 10                                                          | 1            | 0         | 16-QAM | -      | 22.30  | -       | 23.28     | 0.2128  |
| 10                                                          | 1            | 25        |        | -      | 21.88  | -       |           |         |
| 10                                                          | 1            | 49        |        | -      | 21.74  | -       |           |         |
| 10                                                          | 25           | 0         |        | -      | 21.26  | -       |           |         |
| 10                                                          | 25           | 12        |        | -      | 21.25  | -       |           |         |
| 10                                                          | 25           | 25        |        | -      | 21.02  | -       |           |         |
| Limit                                                       | Power < 100W |           |        | Result |        |         | Pass      |         |



| LTE Band 26 Maximum Average Power [dBm] (GT - LC = 3.13 dB) |              |           |        |        |        |         |           |         |
|-------------------------------------------------------------|--------------|-----------|--------|--------|--------|---------|-----------|---------|
| BW [MHz]                                                    | RB Size      | RB Offset | Mod    | Lowest | Middle | Highest | ERP (dBm) | ERP (W) |
| 5                                                           | 1            | 0         | QPSK   | 22.68  | 23.10  | 22.59   | 24.09     | 0.2564  |
| 5                                                           | 1            | 12        |        | 22.65  | 23.11  | 22.58   |           |         |
| 5                                                           | 1            | 24        |        | 22.42  | 22.83  | 22.28   |           |         |
| 5                                                           | 12           | 0         |        | 21.72  | 22.22  | 21.60   |           |         |
| 5                                                           | 12           | 7         |        | 21.69  | 22.19  | 21.71   |           |         |
| 5                                                           | 12           | 13        |        | 21.38  | 21.90  | 21.34   |           |         |
| 5                                                           | 25           | 0         |        | 21.51  | 21.98  | 21.35   |           |         |
| 5                                                           | 1            | 0         | 16-QAM | 21.92  | 22.39  | 21.82   | 23.37     | 0.2173  |
| 5                                                           | 1            | 12        |        | 21.48  | 21.94  | 21.38   |           |         |
| 5                                                           | 1            | 24        |        | 21.37  | 21.83  | 21.19   |           |         |
| 5                                                           | 12           | 0         |        | 20.83  | 21.30  | 20.70   |           |         |
| 5                                                           | 12           | 7         |        | 20.84  | 21.27  | 20.66   |           |         |
| 5                                                           | 12           | 13        |        | 20.61  | 21.02  | 20.54   |           |         |
| 5                                                           | 25           | 0         |        | 20.64  | 21.05  | 20.47   |           |         |
| Limit                                                       | Power < 100W |           |        | Result |        |         | Pass      |         |

| LTE Band 26 Maximum Average Power [dBm] (GT - LC = 3.13 dB) |              |           |        |        |        |         |           |         |
|-------------------------------------------------------------|--------------|-----------|--------|--------|--------|---------|-----------|---------|
| BW [MHz]                                                    | RB Size      | RB Offset | Mod    | Lowest | Middle | Highest | ERP (dBm) | ERP (W) |
| 3                                                           | 1            | 0         | QPSK   | 22.63  | 23.07  | 22.54   | 24.05     | 0.2541  |
| 3                                                           | 1            | 8         |        | 22.63  | 23.07  | 22.57   |           |         |
| 3                                                           | 1            | 14        |        | 22.37  | 22.82  | 22.23   |           |         |
| 3                                                           | 8            | 0         |        | 21.62  | 22.12  | 21.51   |           |         |
| 3                                                           | 8            | 4         |        | 21.65  | 22.16  | 21.68   |           |         |
| 3                                                           | 8            | 7         |        | 21.33  | 21.82  | 21.25   |           |         |
| 3                                                           | 15           | 0         |        | 21.51  | 21.91  | 21.34   |           |         |
| 3                                                           | 1            | 0         | 16-QAM | 21.84  | 22.37  | 21.72   | 23.35     | 0.2163  |
| 3                                                           | 1            | 8         |        | 21.40  | 21.88  | 21.31   |           |         |
| 3                                                           | 1            | 14        |        | 21.34  | 21.76  | 21.15   |           |         |
| 3                                                           | 8            | 0         |        | 20.73  | 21.26  | 20.67   |           |         |
| 3                                                           | 8            | 4         |        | 20.83  | 21.18  | 20.59   |           |         |
| 3                                                           | 8            | 7         |        | 20.51  | 20.92  | 20.51   |           |         |
| 3                                                           | 15           | 0         |        | 20.58  | 21.01  | 20.37   |           |         |
| Limit                                                       | Power < 100W |           |        | Result |        |         | Pass      |         |



# FCC RADIO TEST REPORT

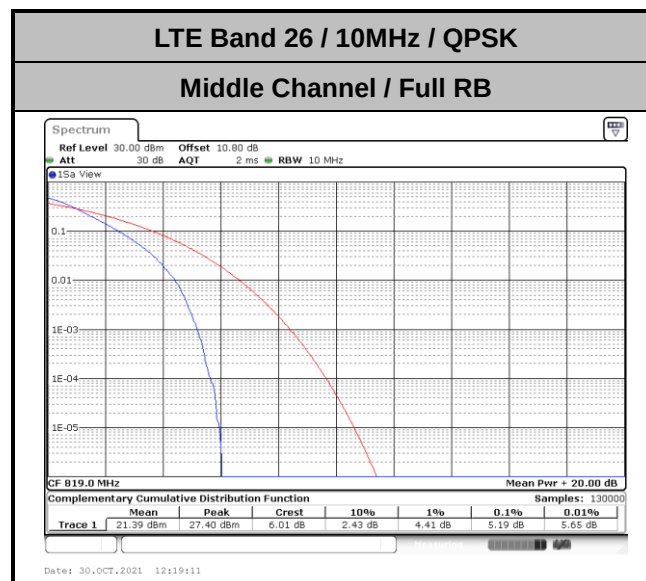
Report No. : FG171916C

| LTE Band 26 Maximum Average Power [dBm] (GT - LC = 3.13 dB) |              |           |        |        |        |         |           |         |
|-------------------------------------------------------------|--------------|-----------|--------|--------|--------|---------|-----------|---------|
| BW [MHz]                                                    | RB Size      | RB Offset | Mod    | Lowest | Middle | Highest | ERP (dBm) | ERP (W) |
| 1.4                                                         | 1            | 0         | QPSK   | 22.62  | 23.09  | 22.49   | 24.07     | 0.2553  |
| 1.4                                                         | 1            | 3         |        | 22.55  | 23.06  | 22.58   |           |         |
| 1.4                                                         | 1            | 5         |        | 22.35  | 22.80  | 22.22   |           |         |
| 1.4                                                         | 3            | 0         |        | 22.59  | 23.03  | 22.49   |           |         |
| 1.4                                                         | 3            | 1         |        | 22.62  | 23.01  | 22.56   |           |         |
| 1.4                                                         | 3            | 3         |        | 22.35  | 22.73  | 22.26   |           |         |
| 1.4                                                         | 6            | 0         |        | 21.49  | 21.96  | 21.31   |           |         |
| 1.4                                                         | 1            | 0         | 16-QAM | 21.92  | 22.29  | 21.77   | 23.33     | 0.2153  |
| 1.4                                                         | 1            | 3         |        | 21.41  | 21.94  | 21.38   |           |         |
| 1.4                                                         | 1            | 5         |        | 21.30  | 21.75  | 21.16   |           |         |
| 1.4                                                         | 3            | 0         |        | 21.89  | 22.35  | 21.80   |           |         |
| 1.4                                                         | 3            | 1         |        | 21.41  | 21.92  | 21.32   |           |         |
| 1.4                                                         | 3            | 3         |        | 21.37  | 21.73  | 21.13   |           |         |
| 1.4                                                         | 6            | 0         |        | 20.55  | 21.00  | 20.46   |           |         |
| Limit                                                       | Power < 100W |           |        | Result |        |         | Pass      |         |

## LTE Band 26

### Peak-to-Average Ratio

| Mode      | LTE Band 26 / 10MHz |             |
|-----------|---------------------|-------------|
| Mod.      | QPSK                | Limit: 13dB |
| RB Size   | Full RB             | Result      |
| Middle CH | 5.19                | PASS        |





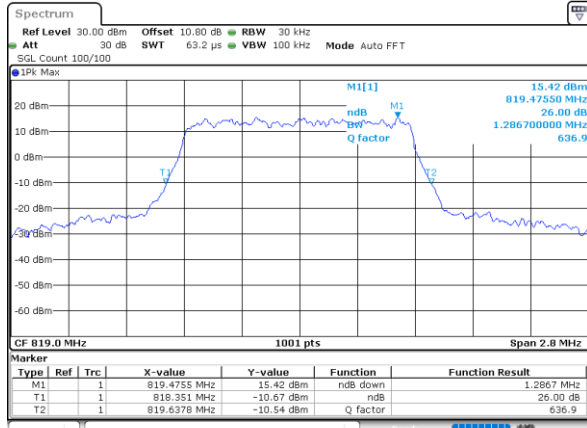
## 26dB Bandwidth

| Mode      | LTE Band 26 : 26dB BW(MHz) |       |      |       |      |       |       |       |       |       |       |       |
|-----------|----------------------------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| BW        | 1.4MHz                     |       | 3MHz |       | 5MHz |       | 10MHz |       | 15MHz |       | 20MHz |       |
| Mod.      | QPSK                       | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM |
| Low CH    | -                          | -     | -    | -     | -    | -     | -     | -     | 14.39 | -     | -     | -     |
| Middle CH | 1.29                       | 1.31  | 2.97 | 3.00  | 4.93 | 4.90  | 9.95  | -     | -     | -     | -     | -     |



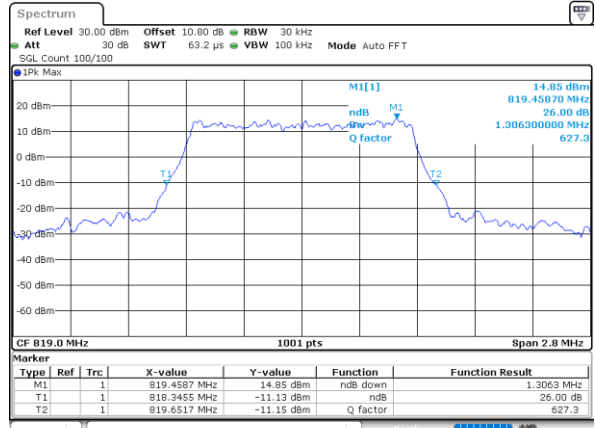
## LTE Band 26

## Middle Channel / 1.4MHz / QPSK



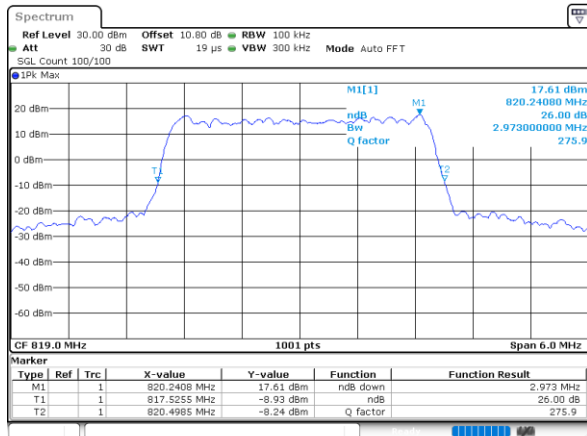
Date: 30.OCT.2021 11:42:13

## Middle Channel / 1.4MHz / 16QAM



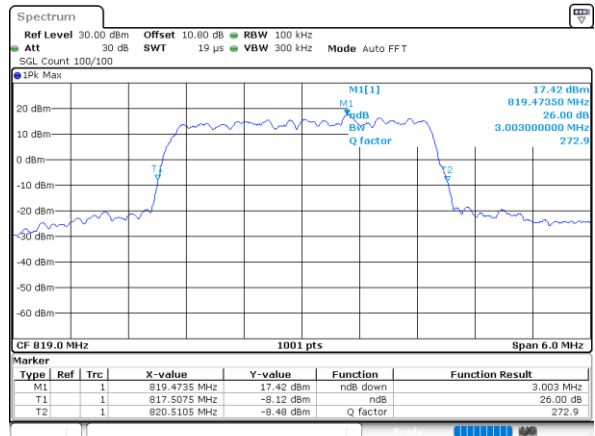
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## Middle Channel / 3MHz / QPSK



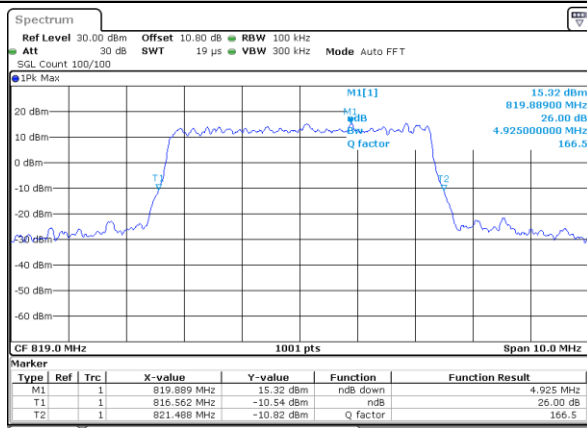
Date: 30.OCT.2021 11:56:51

## Middle Channel / 3MHz / 16QAM



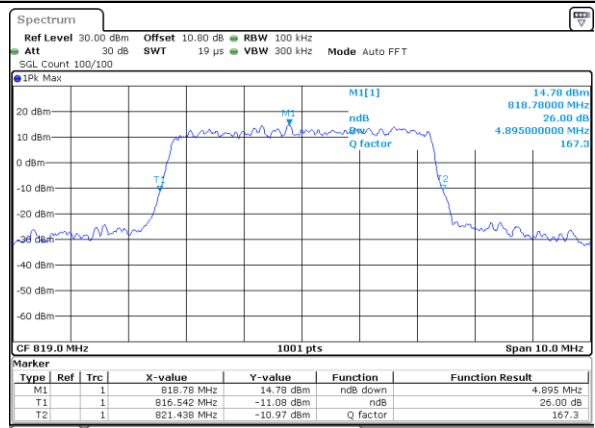
Date: 30.OCT.2021 11:51:13

## Middle Channel / 5MHz / QPSK



Date: 30.OCT.2021 12:01:15

## Middle Channel / 5MHz / 16QAM

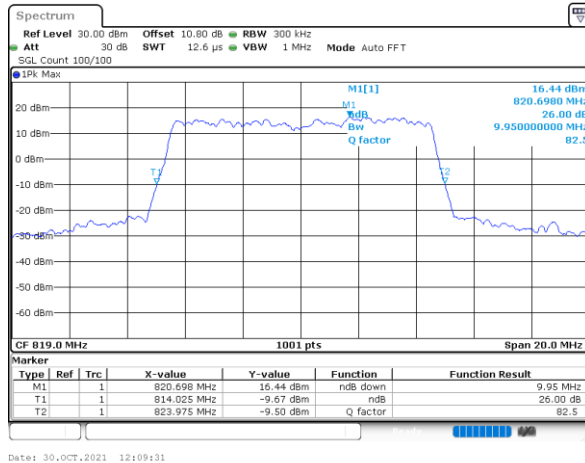


Date: 30.OCT.2021 12:01:36

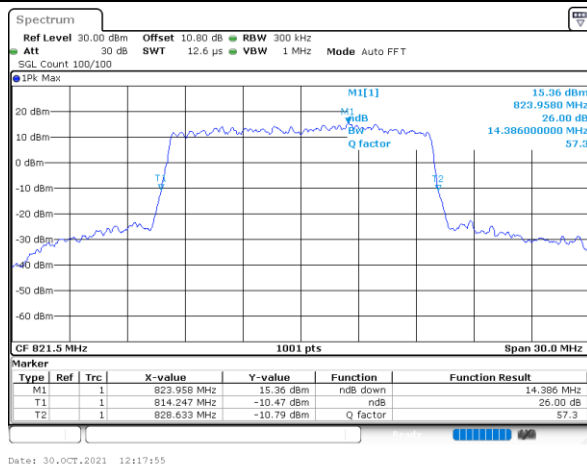


## LTE Band 26

## Middle Channel / 10MHz / QPSK



## Low Channel / 15MHz / QPSK



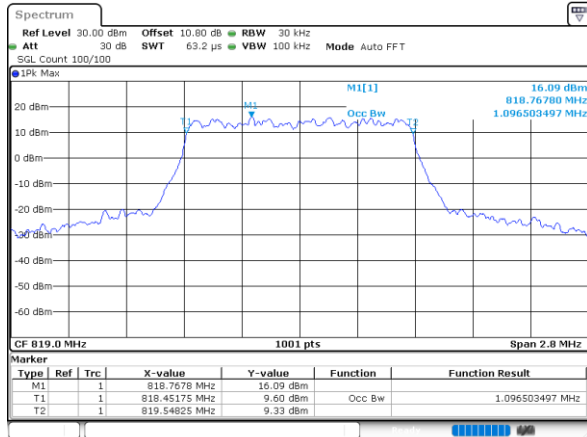
**Occupied Bandwidth**

| Mode      | LTE Band 26 : 99%OBW(MHz) |       |      |       |      |       |       |       |       |       |       |       |
|-----------|---------------------------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| BW        | 1.4MHz                    |       | 3MHz |       | 5MHz |       | 10MHz |       | 15MHz |       | 20MHz |       |
| Mod.      | QPSK                      | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM |
| Low CH    | -                         | -     | -    | -     | -    | -     | -     | -     | 13.46 | -     | -     | -     |
| Middle CH | 1.10                      | 1.11  | 2.72 | 2.71  | 4.49 | 4.50  | 9.03  | -     | -     | -     | -     | -     |



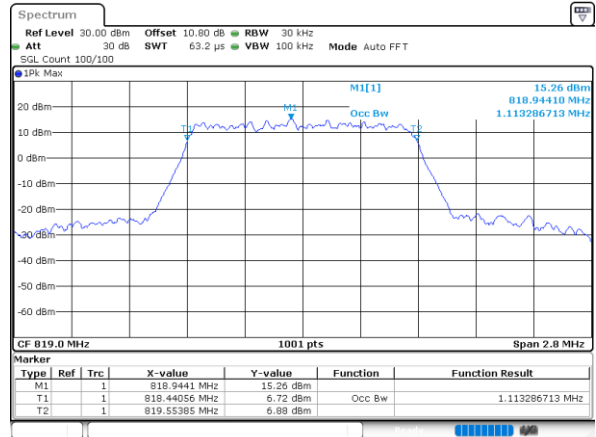
## LTE Band 26

## Middle Channel / 1.4MHz / QPSK



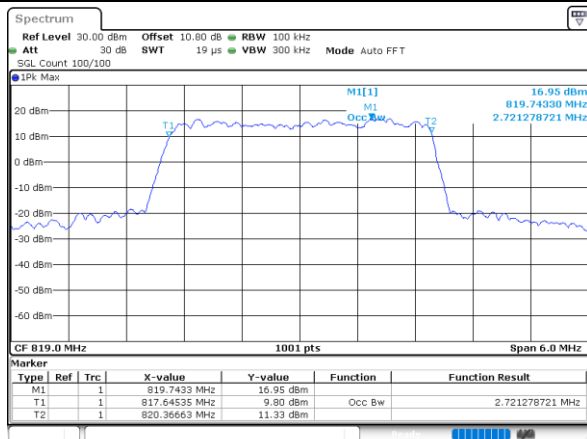
Date: 30.OCT.2021 11:41:29

## Middle Channel / 1.4MHz / 16QAM



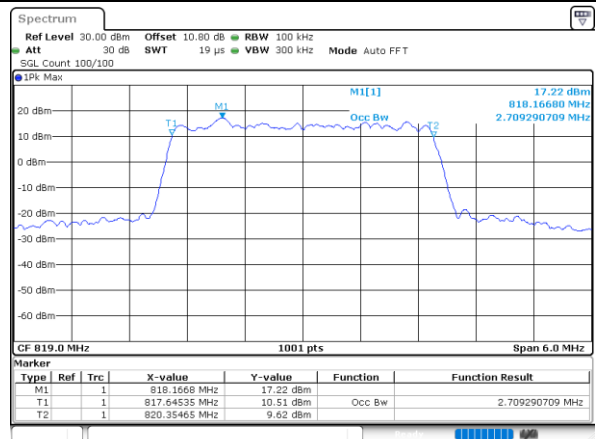
Date: 30.OCT.2021 11:41:51

## Middle Channel / 3MHz / QPSK



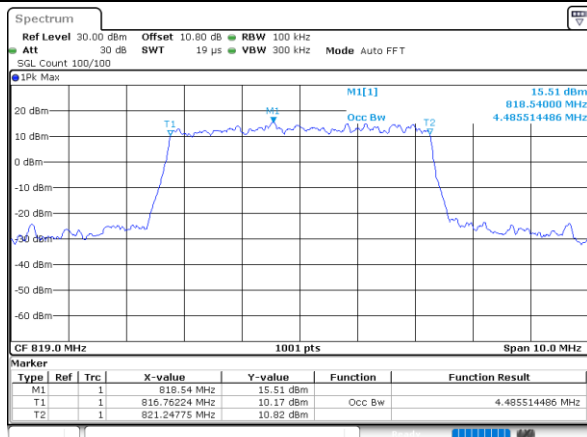
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## Middle Channel / 3MHz / 16QAM



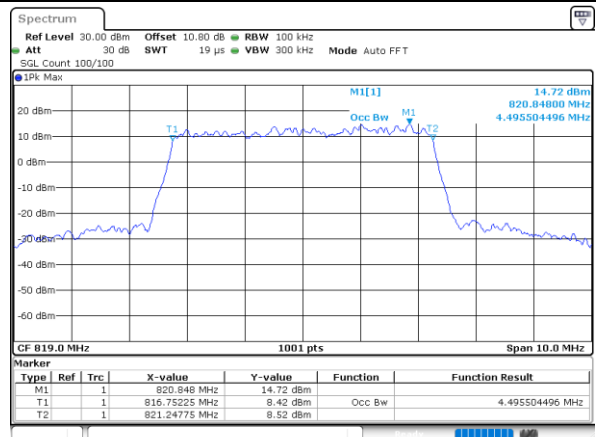
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## Middle Channel / 5MHz / QPSK

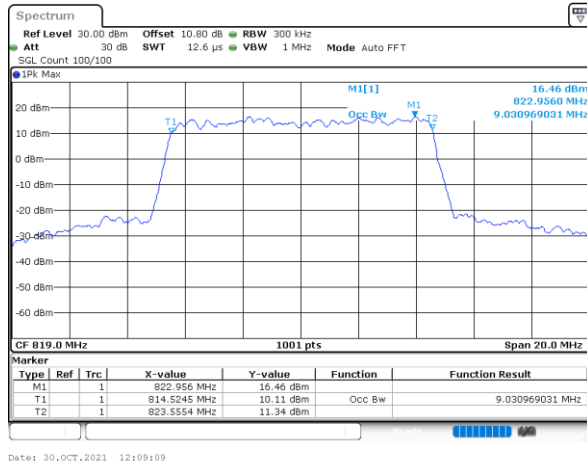
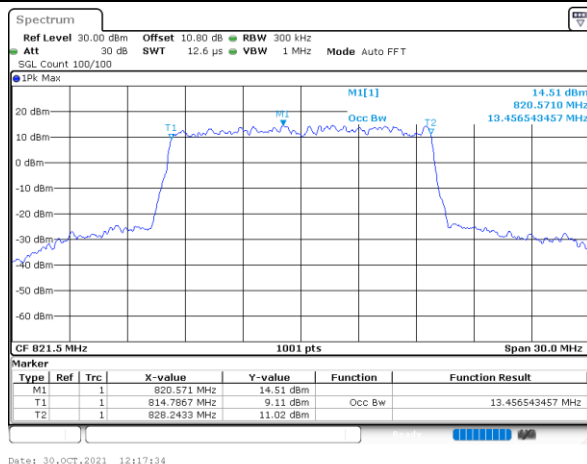


Date: 30.OCT.2021 12:00:32

## Middle Channel / 5MHz / 16QAM



Date: 30.OCT.2021 12:00:54

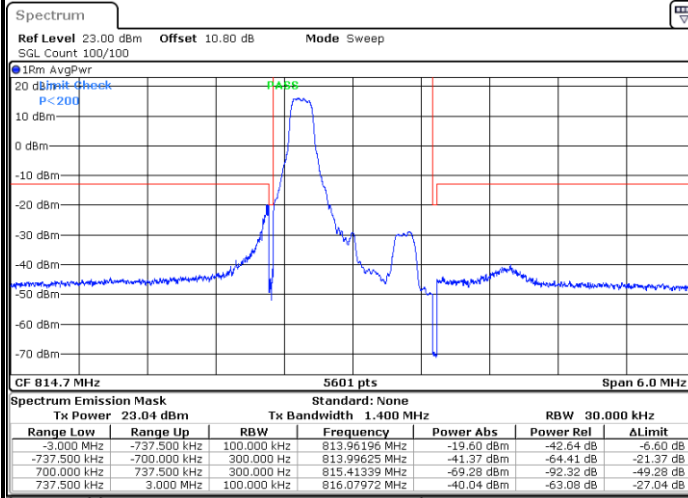
**LTE Band 26****Middle Channel / 10MHz / QPSK****Low Channel / 15MHz / QPSK**



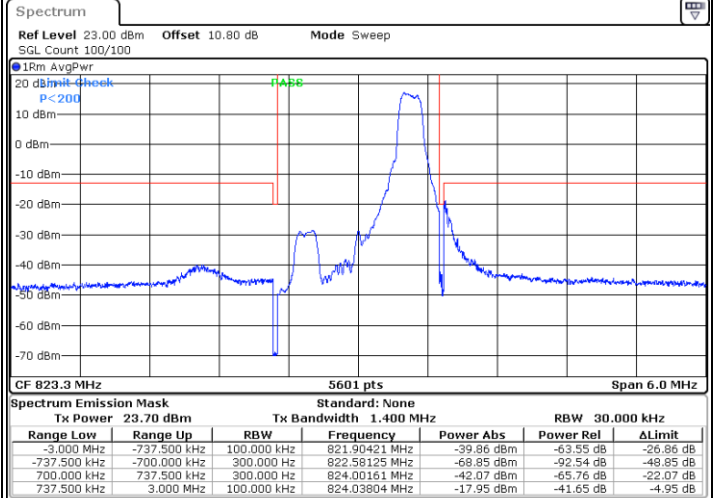
# Emission masks – In-band emissions

## LTE Band 26 / 1.4MHz / QPSK

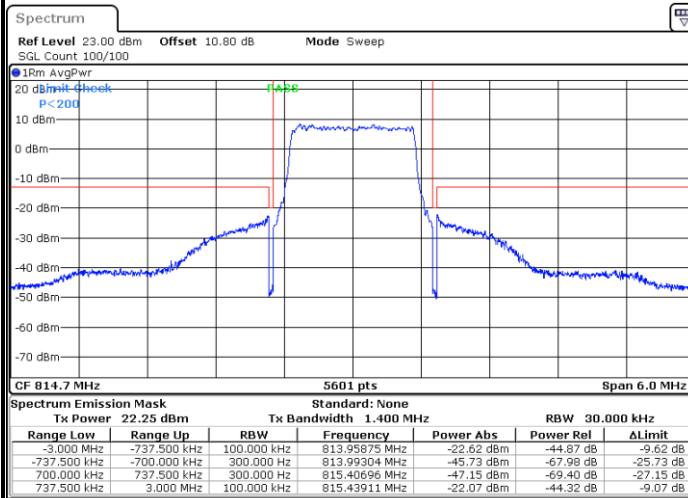
### Lowest Band Edge / 1RB



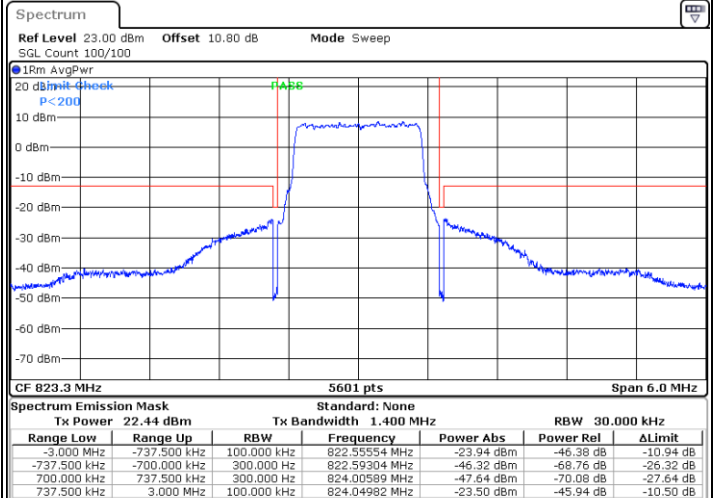
### Highest Band Edge / 1RB



### Lowest Band Edge / Full RB



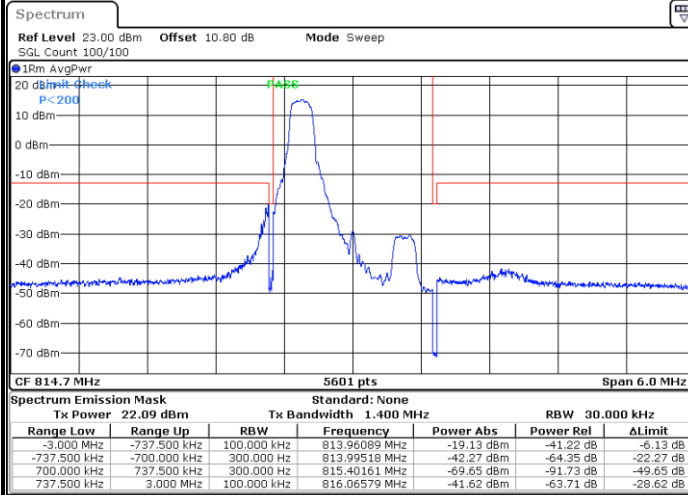
### Highest Band Edge / Full RB





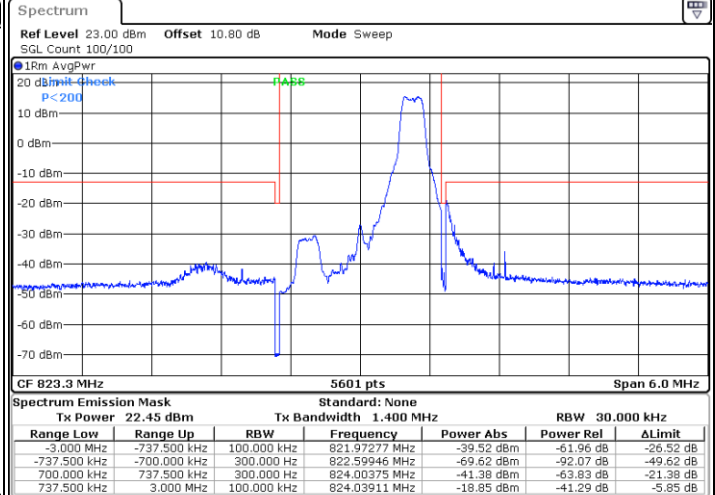
## LTE Band 26 / 1.4MHz / 16QAM

## Lowest Band Edge / 1 RB



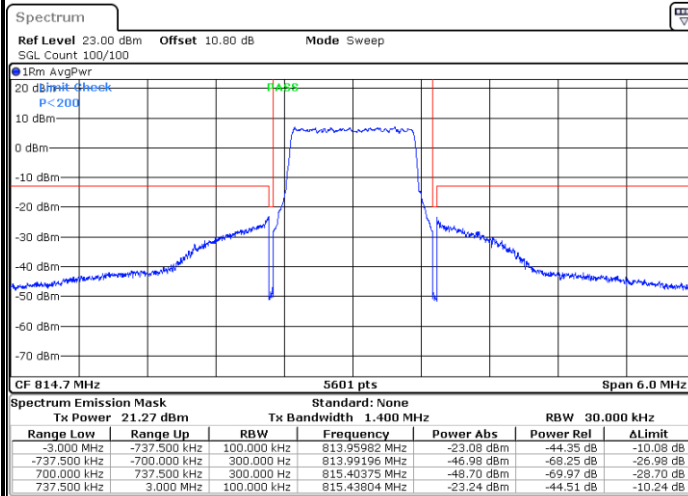
Date: 30.OCT.2021 11:45:39

## Highest Band Edge / 1 RB



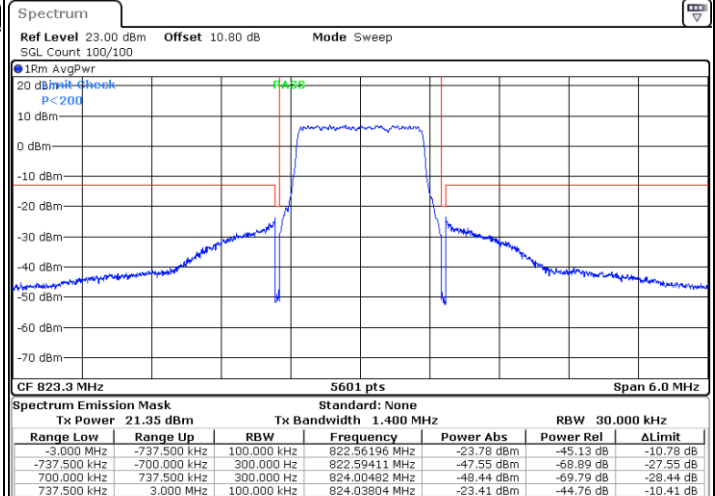
Date: 30.OCT.2021 11:48:22

## Lowest Band Edge / Full RB



Date: 30.OCT.2021 11:47:00

## Highest Band Edge / Full RB

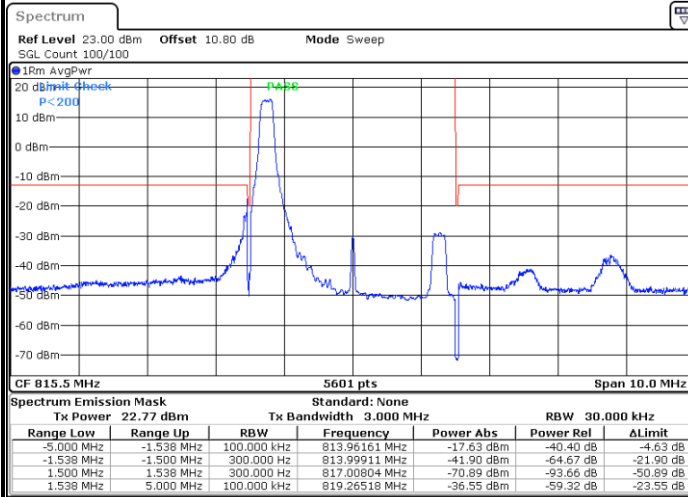


Date: 30.OCT.2021 11:49:44

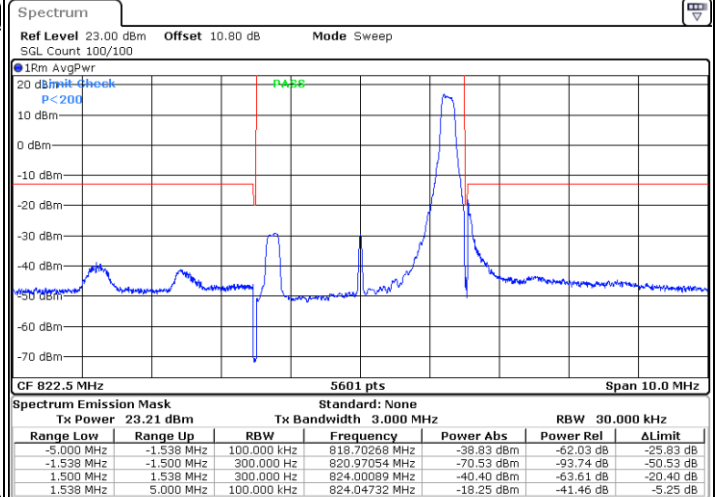


## LTE Band 26 / 3MHz / QPSK

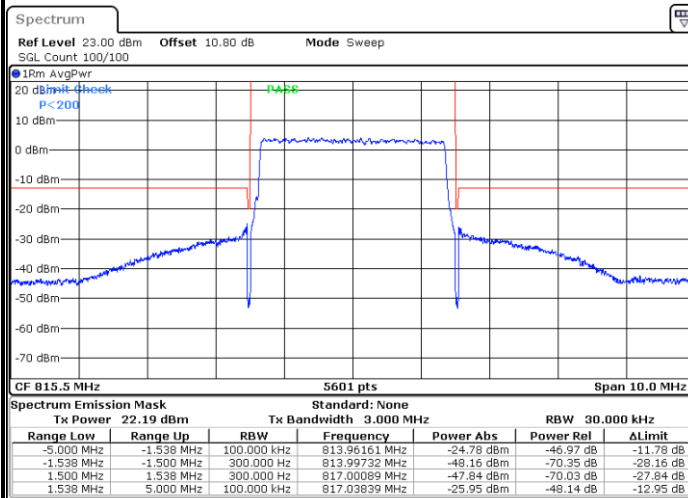
## Lowest Band Edge / 1RB



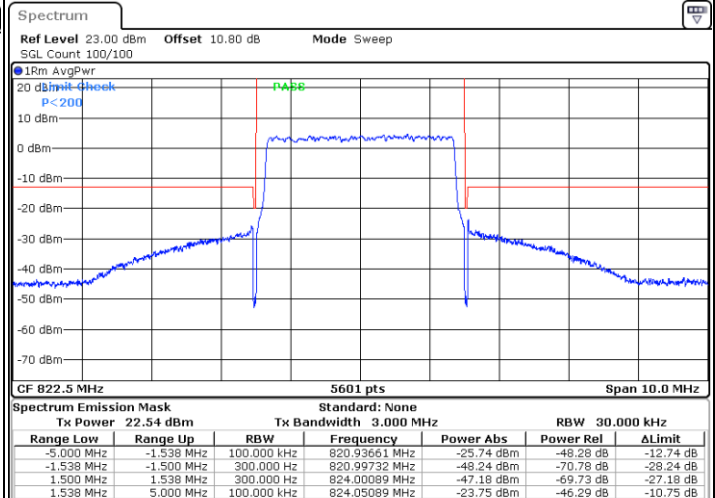
## Highest Band Edge / 1 RB



## Lowest Band Edge / Full RB



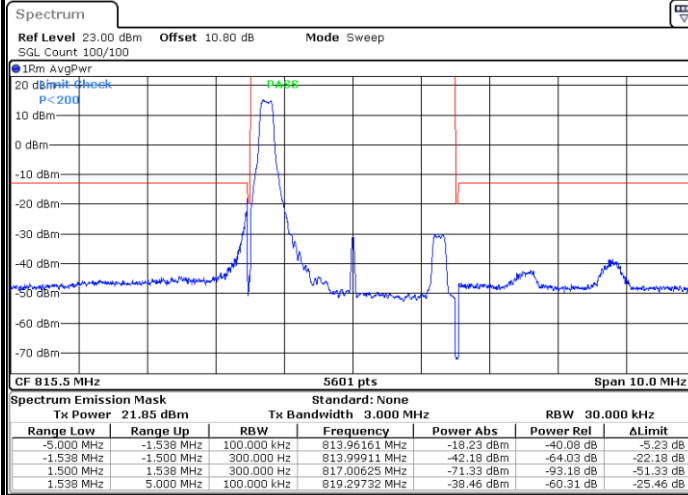
## Highest Band Edge / Full RB



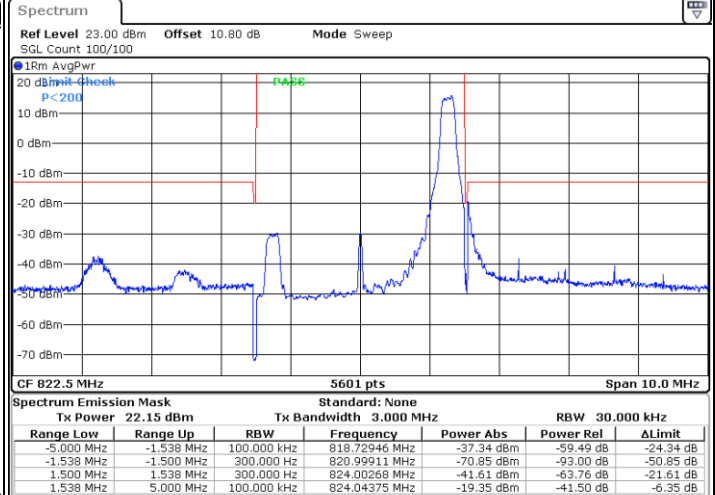


## LTE Band 26 / 3MHz / 16QAM

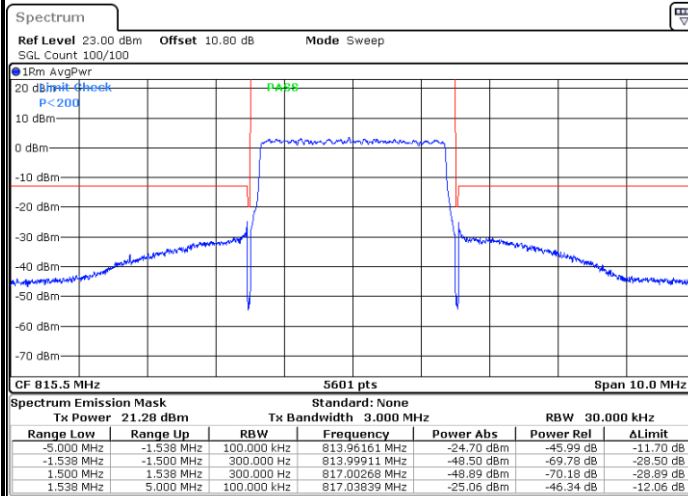
## Lowest Band Edge / 1 RB



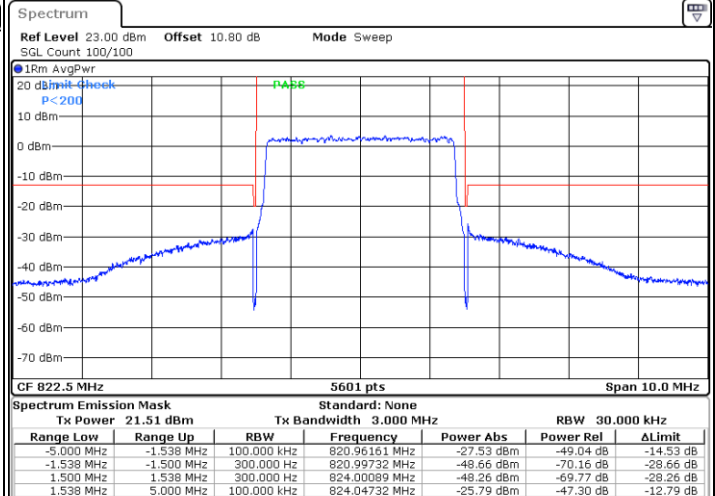
## Highest Band Edge / 1 RB



## Lowest Band Edge / Full RB



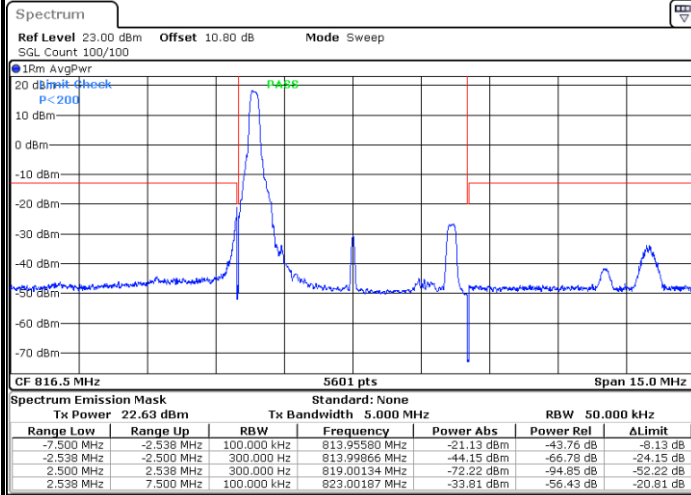
## Highest Band Edge / Full RB



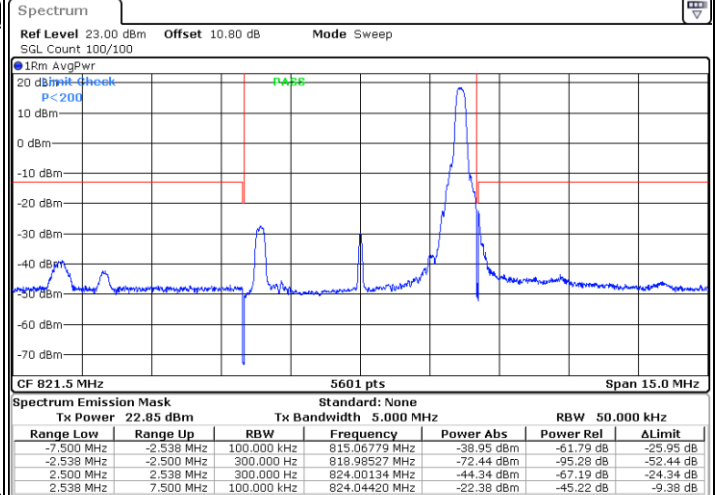


## LTE Band 26 / 5MHz / QPSK

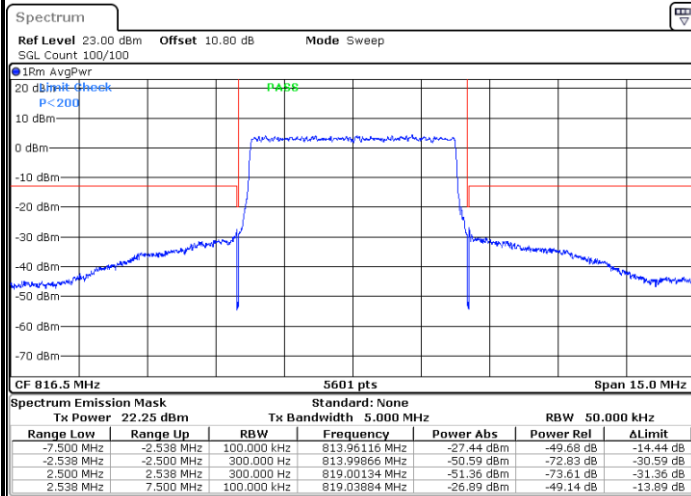
## Lowest Band Edge / 1 RB



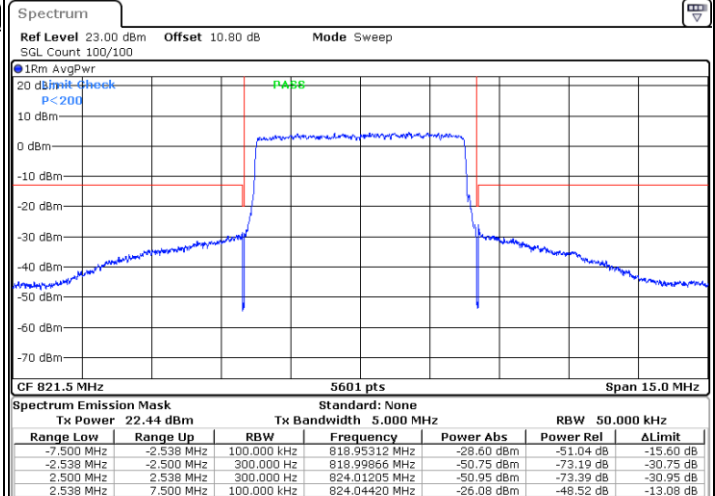
## Highest Band Edge / 1 RB



## Lowest Band Edge / Full RB



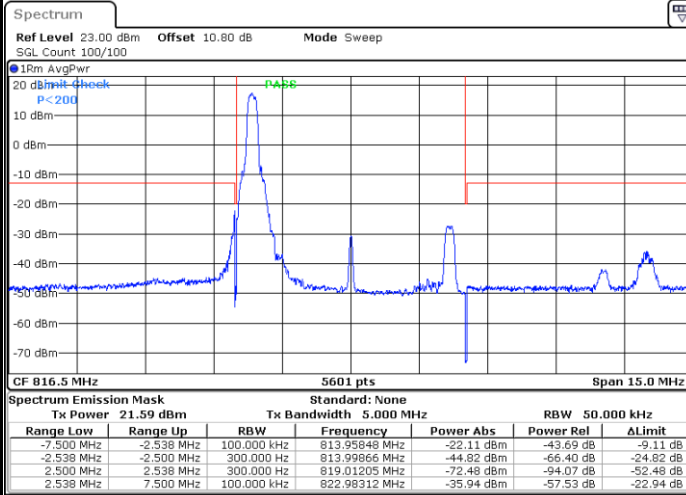
## Highest Band Edge / Full RB



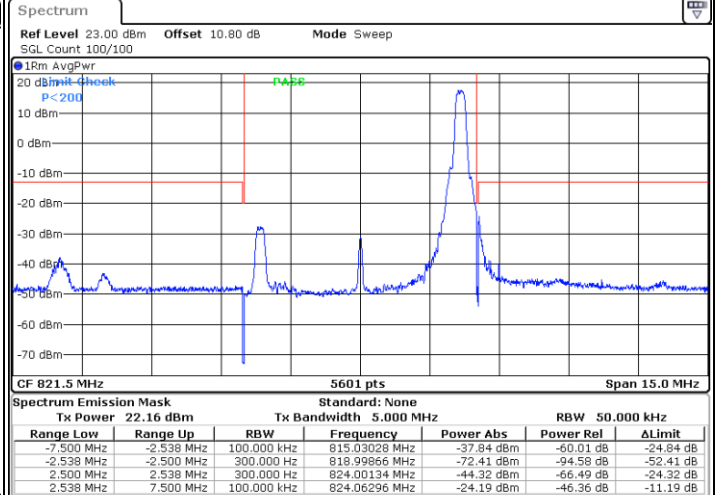


## LTE Band 26 / 5MHz / 16QAM

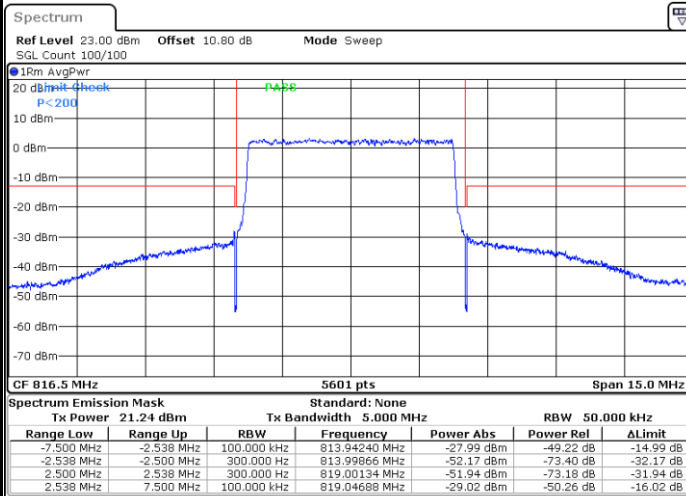
## Lowest Band Edge / 1RB



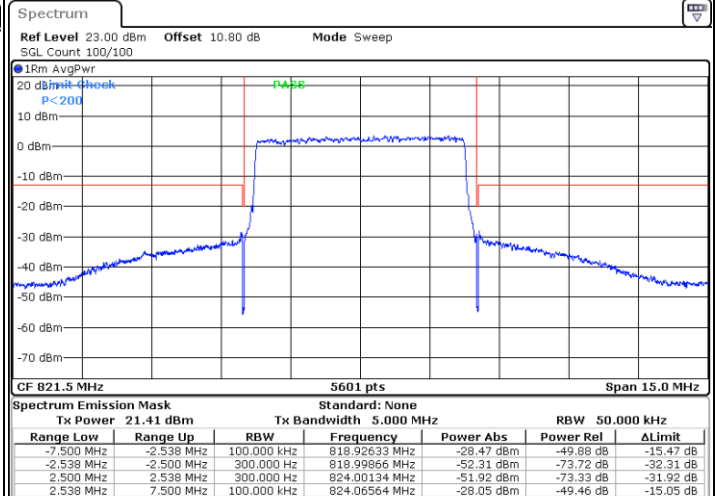
## Highest Band Edge / 1 RB



## Lowest Band Edge / Full RB



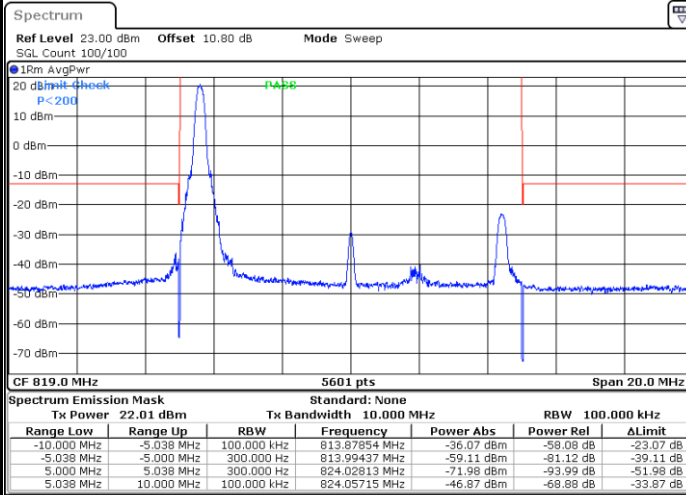
## Highest Band Edge / Full RB



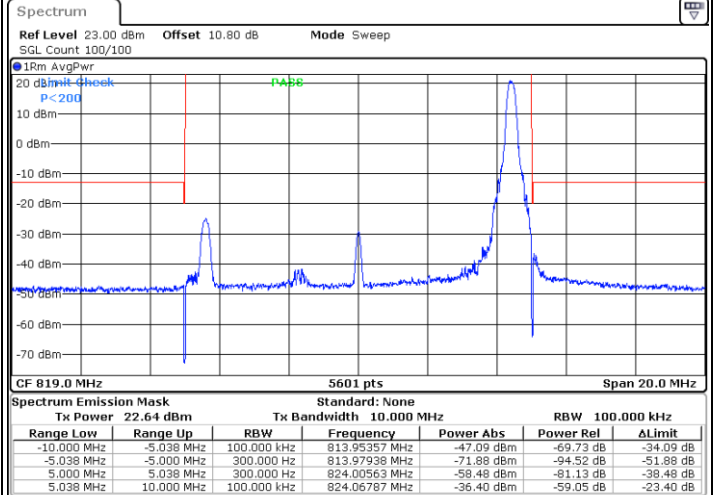


## LTE Band 26 / 10MHz / QPSK

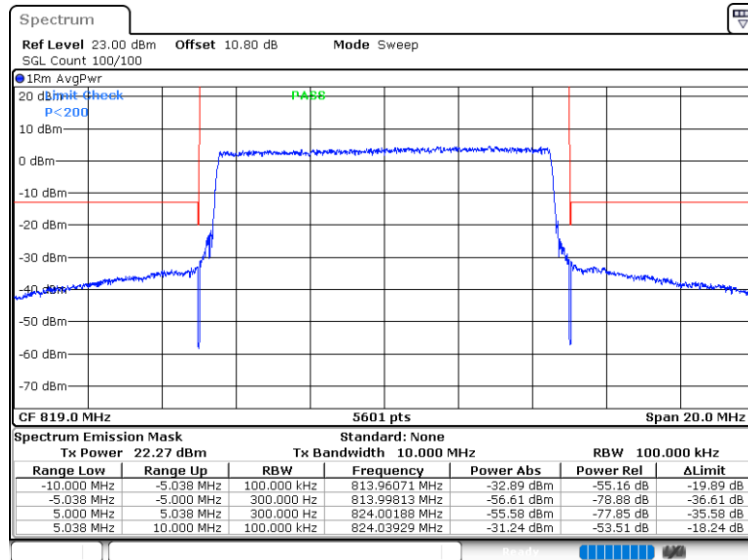
## Lowest Band Edge / 1 RB



## Highest Band Edge / 1 RB



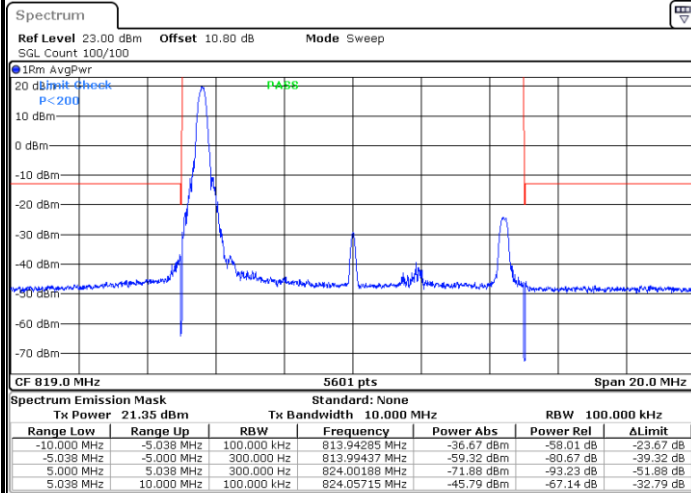
## Lowest Band Edge / Full RB



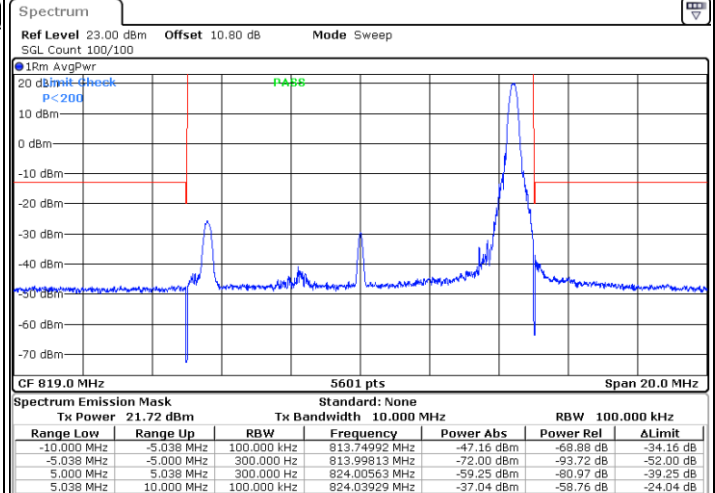


## LTE Band 26 / 10MHz / 16QAM

## Lowest Band Edge / 1 RB



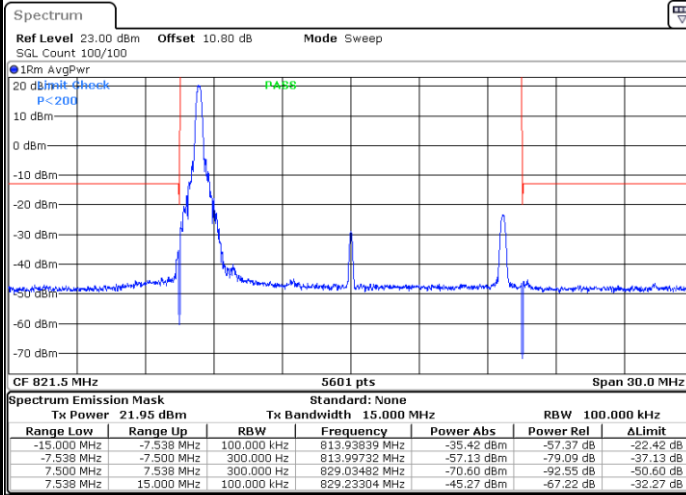
## Highest Band Edge / 1 RB



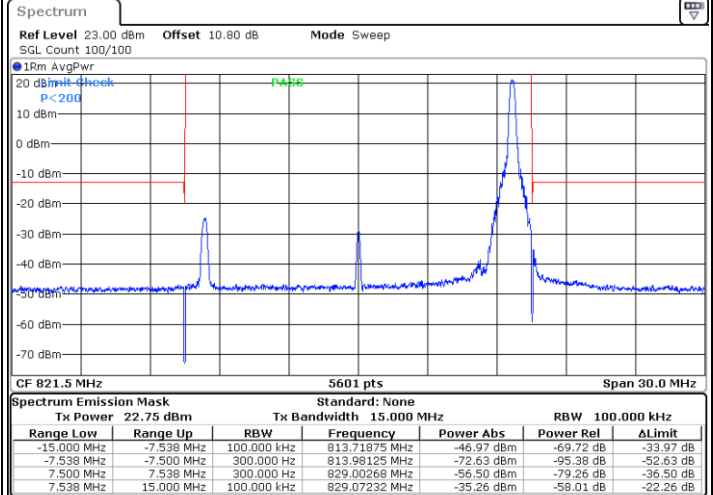


## LTE Band 26 / 15MHz / QPSK

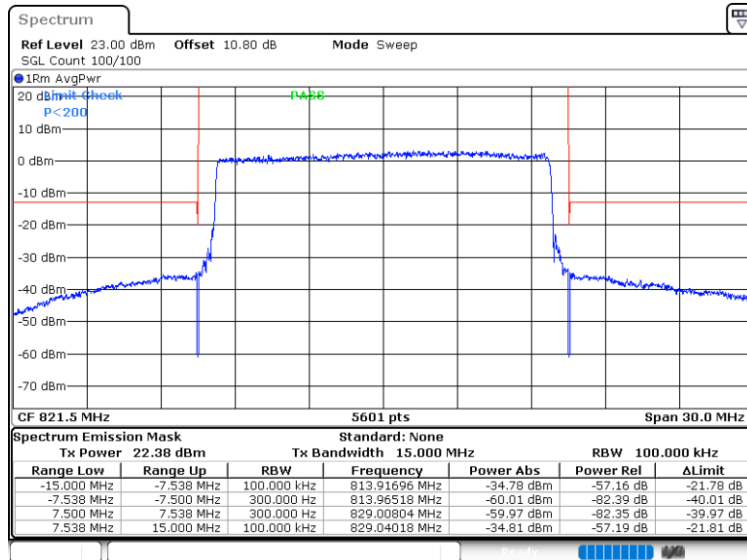
## Lowest Band Edge / 1 RB



## Highest Band Edge / 1 RB



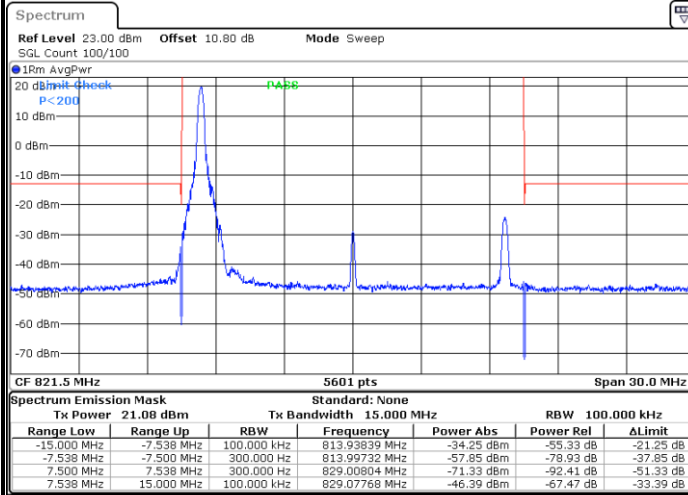
## Lowest Band Edge / Full RB





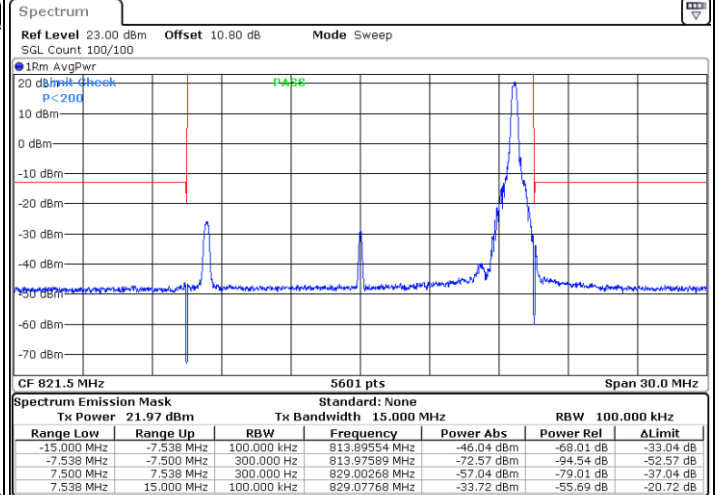
## LTE Band 26 / 15MHz / 16QAM

## Lowest Band Edge / 1 RB



Date: 30.OCT.2021 12:15:08

## Highest Band Edge / 1 RB



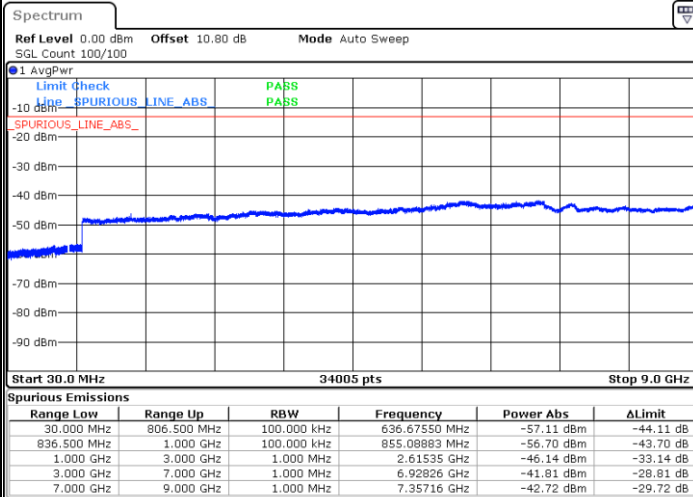
Date: 30.OCT.2021 12:16:30



## Emission masks – Out of band emissions

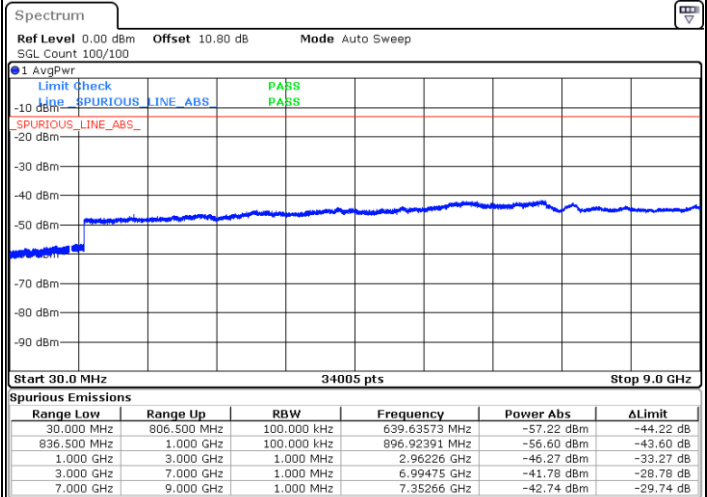
### LTE Band 26 / 1.4MHz

#### Lowest Channel / QPSK



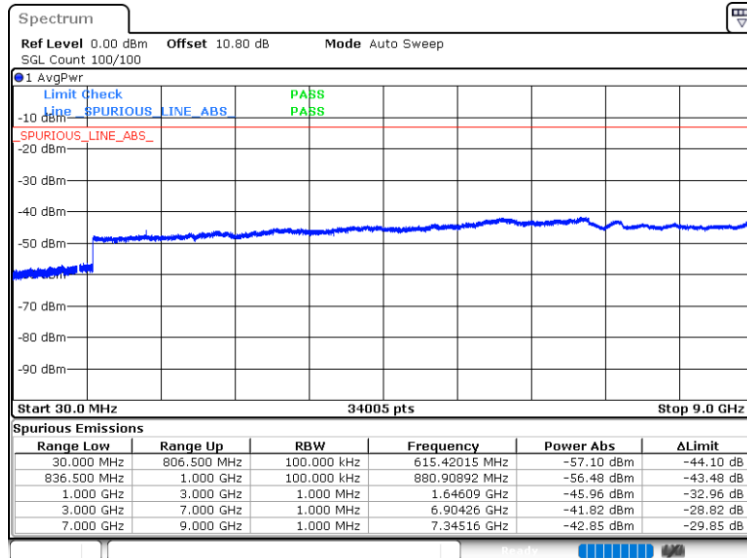
Date: 30.OCT.2021 11:41:07

#### Middle Channel / QPSK



Date: 30.OCT.2021 11:43:26

#### Highest Channel / QPSK

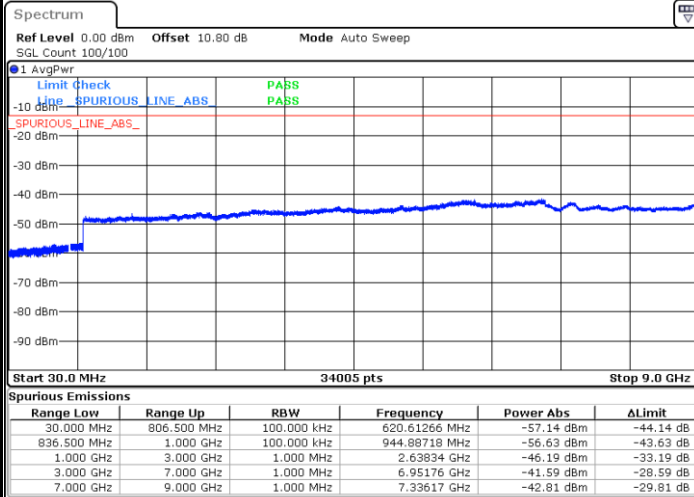


Date: 30.OCT.2021 11:44:19



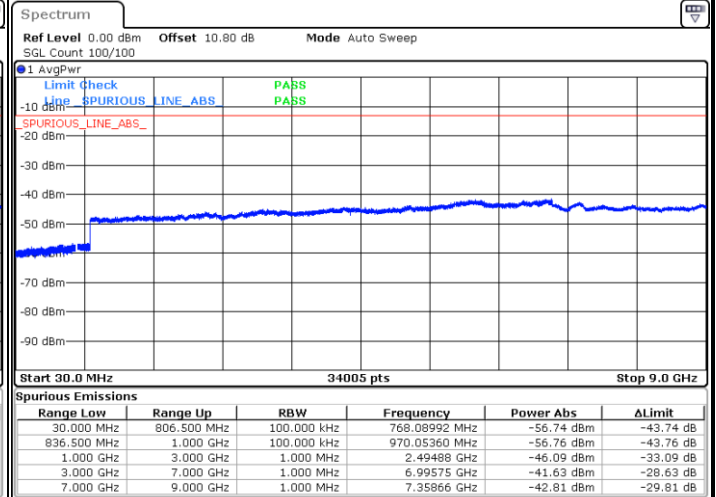
## LTE Band 26 / 3MHz

## Lowest Channel / QPSK



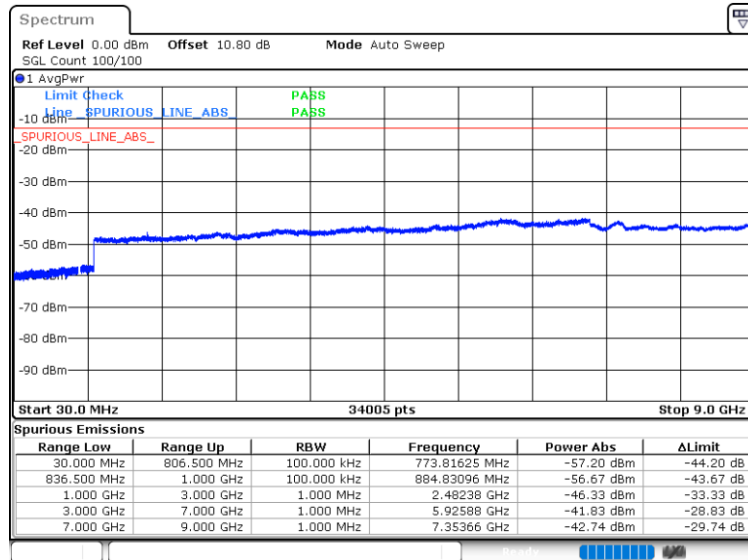
Date: 30.OCT.2021 11:52:05

## Middle Channel / QPSK



Date: 30.OCT.2021 11:52:58

## Highest Channel / QPSK

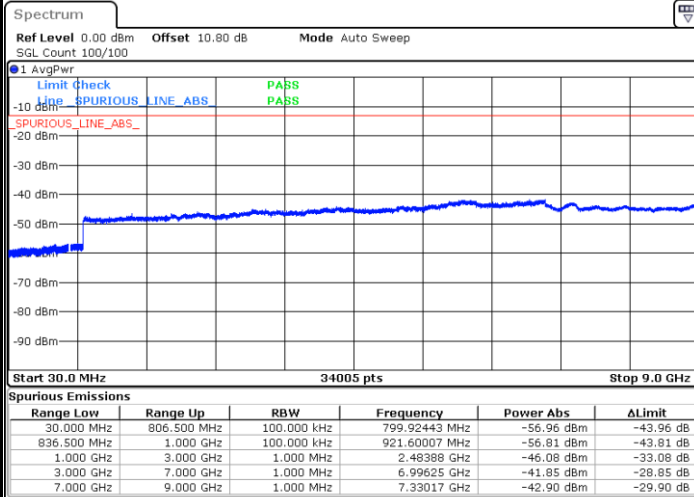


Date: 30.OCT.2021 11:53:51



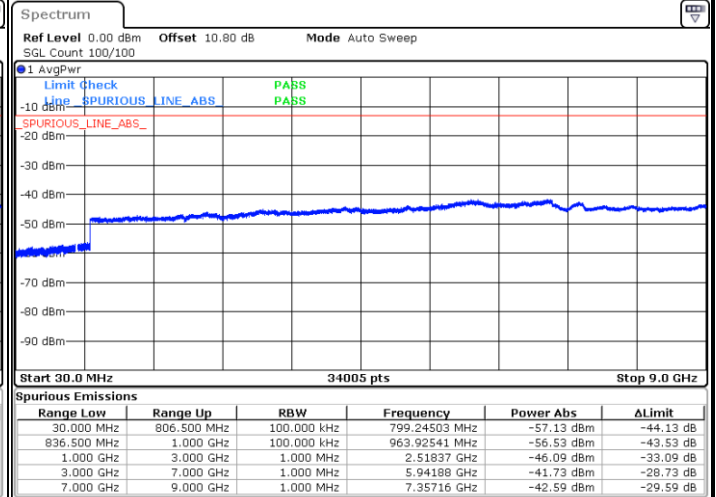
## LTE Band 26 / 5MHz

## Lowest Channel / QPSK



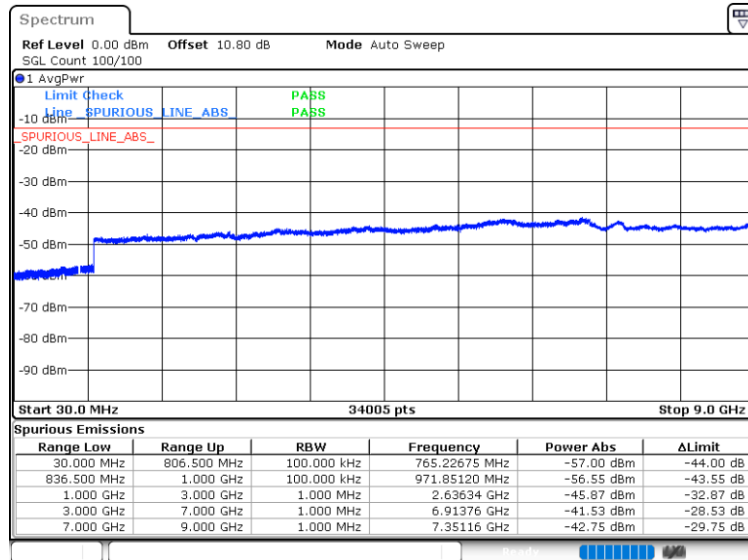
Date: 30.OCT.2021 12:00:10

## Middle Channel / QPSK

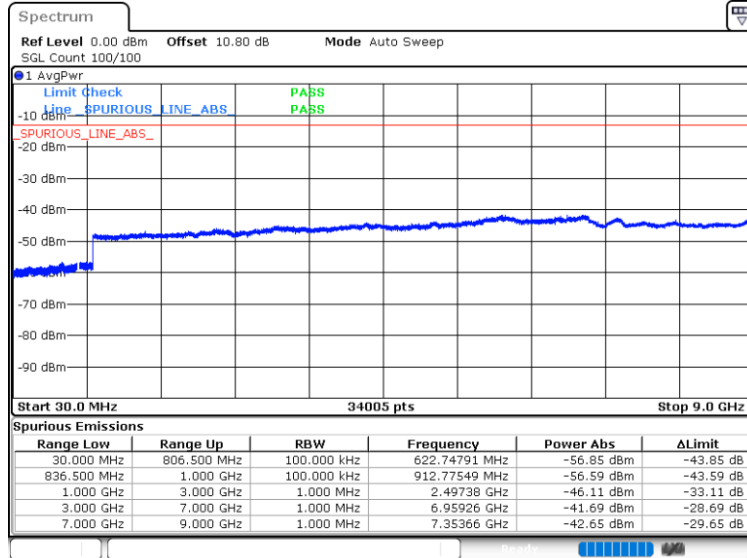


Date: 30.OCT.2021 12:02:28

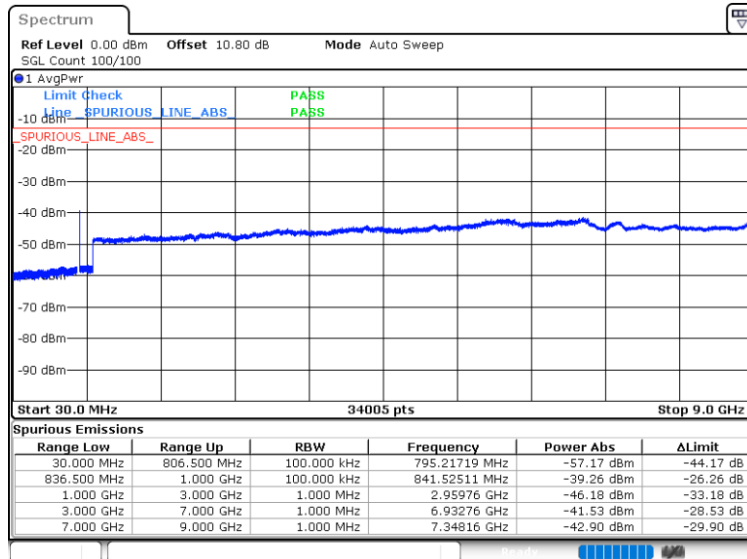
## Highest Channel / QPSK



Date: 30.OCT.2021 12:03:20

**LTE Band 26 / 10MHz****Middle Channel / QPSK**

Date: 30.OCT.2021 12:10:22

**LTE Band 26 / 15MHz****Lowest Channel / QPSK**

Date: 30.OCT.2021 12:18:47

## Frequency Stability

| Test Conditions     |                   | LTE Band 26 (QPSK) / Middle Channel | Limit   |
|---------------------|-------------------|-------------------------------------|---------|
| Temperature<br>(°C) | Voltage<br>(Volt) | BW 10MHz                            | Note 2. |
|                     |                   | Deviation (ppm)                     | Result  |
| 50                  | Normal Voltage    | 0.0048                              | PASS    |
| 40                  | Normal Voltage    | 0.0104                              |         |
| 30                  | Normal Voltage    | 0.0012                              |         |
| 20(Ref.)            | Normal Voltage    | 0.0000                              |         |
| 10                  | Normal Voltage    | 0.0053                              |         |
| 0                   | Normal Voltage    | 0.0054                              |         |
| -10                 | Normal Voltage    | 0.0116                              |         |
| -20                 | Normal Voltage    | 0.0024                              |         |
| -30                 | Normal Voltage    | 0.0111                              |         |
| 20                  | Maximum Voltage   | 0.0070                              |         |
| 20                  | Normal Voltage    | 0.0000                              |         |
| 20                  | Battery End Point | 0.0072                              |         |

**Note:**

1. Normal Voltage =12.00 V. ; Battery End Point (BEP) =8.00 V. ; Maximum Voltage =40.00 V.
2. The frequency fundamental emissions stay within the authorized frequency block.

| Test Conditions  |                   | LTE Band 26 (QPSK) / Low Channel | Limit   |
|------------------|-------------------|----------------------------------|---------|
| Temperature (°C) | Voltage (Volt)    | BW 15MHz                         | Note 2. |
|                  |                   | Deviation (ppm)                  | Result  |
| 50               | Normal Voltage    | 0.0041                           | PASS    |
| 40               | Normal Voltage    | 0.0149                           |         |
| 30               | Normal Voltage    | 0.0180                           |         |
| 20(Ref.)         | Normal Voltage    | 0.0000                           |         |
| 10               | Normal Voltage    | 0.0112                           |         |
| 0                | Normal Voltage    | 0.0002                           |         |
| -10              | Normal Voltage    | 0.0134                           |         |
| -20              | Normal Voltage    | 0.0016                           |         |
| -30              | Normal Voltage    | 0.0043                           |         |
| 20               | Maximum Voltage   | 0.0101                           |         |
| 20               | Normal Voltage    | 0.0000                           |         |
| 20               | Battery End Point | 0.0058                           |         |

**Note:**

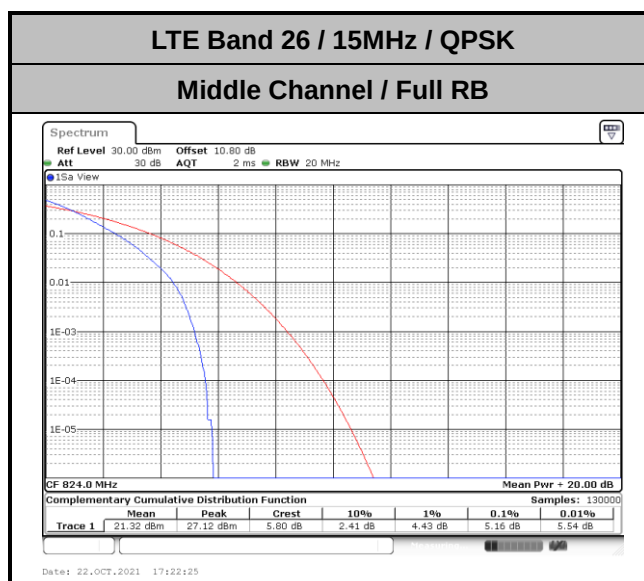
1. Normal Voltage =12.00 V. ; Battery End Point (BEP) =8.00 V. ; Maximum Voltage =40.00 V.
2. The frequency fundamental emissions stay within the authorized frequency block.



## LTE Band 26\_824MHz

## Peak-to-Average Ratio

| Mode      | LTE Band 26 / 15MHz |             |
|-----------|---------------------|-------------|
| Mod.      | QPSK                | Limit: 13dB |
| RB Size   | Full RB             | Result      |
| Middle CH | 5.16                | PASS        |





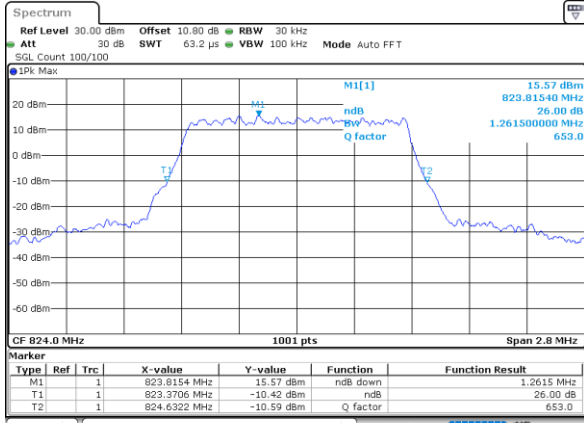
**26dB Bandwidth**

| Mode      | LTE Band 26 : 26dB BW(MHz) |       |      |       |      |       |       |       |       |       |       |       |
|-----------|----------------------------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| BW        | 1.4MHz                     |       | 3MHz |       | 5MHz |       | 10MHz |       | 15MHz |       | 20MHz |       |
| Mod.      | QPSK                       | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM |
| Middle CH | 1.26                       | 1.28  | 3.05 | 3.03  | 4.98 | 4.99  | 9.93  | -     | 14.27 | -     | -     | -     |



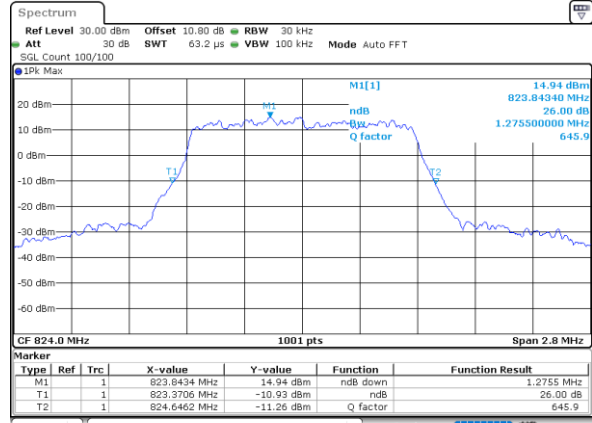
## LTE Band 26

## Middle Channel / 1.4MHz / QPSK



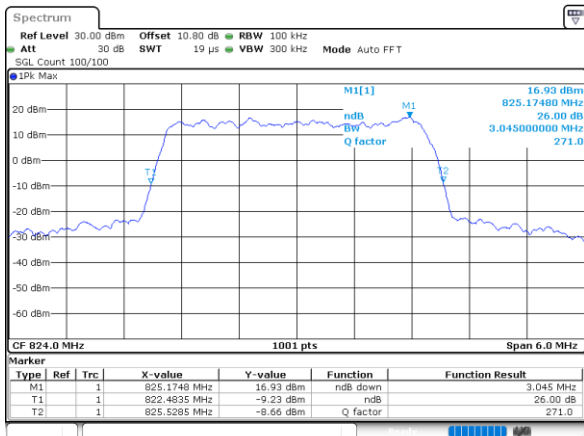
Date: 22.OCT.2021 17:15:47

## Middle Channel / 1.4MHz / 16QAM



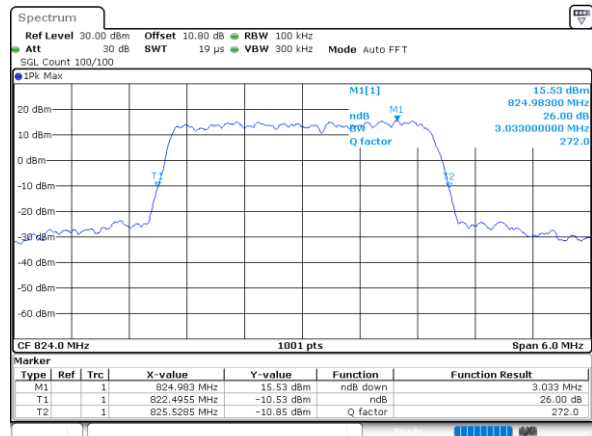
Date: 22.OCT.2021 17:16:08

## Middle Channel / 3MHz / QPSK



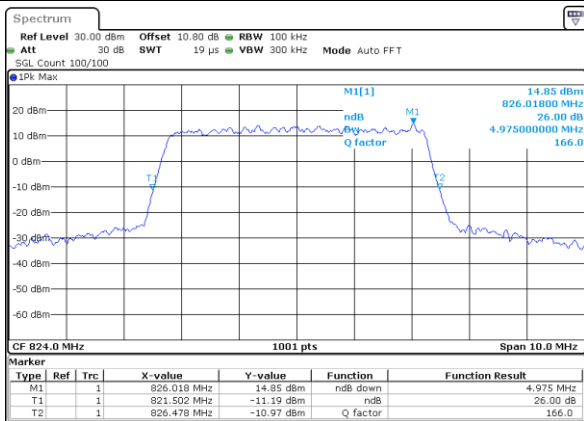
Date: 22.OCT.2021 17:17:13

## Middle Channel / 3MHz / 16QAM



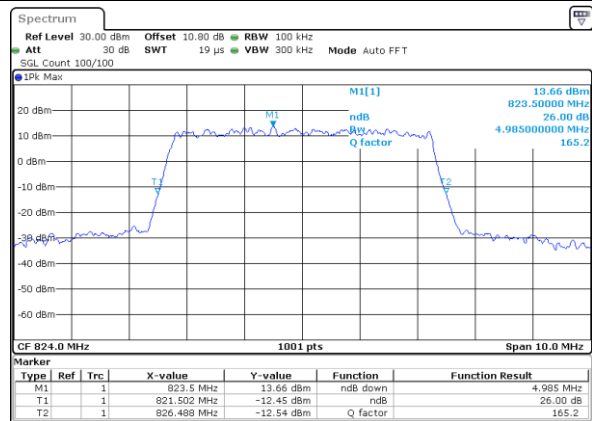
Date: 22.OCT.2021 17:17:34

## Middle Channel / 5MHz / QPSK

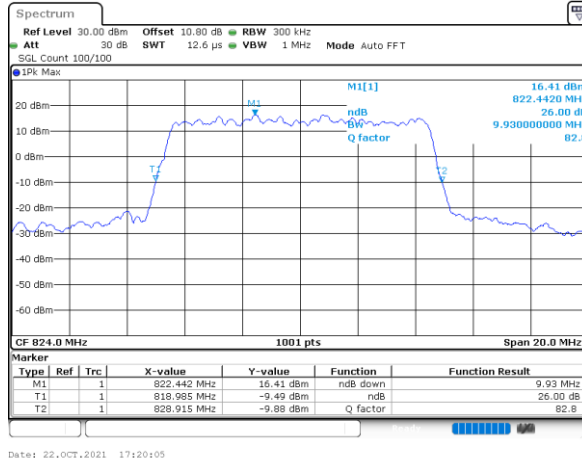
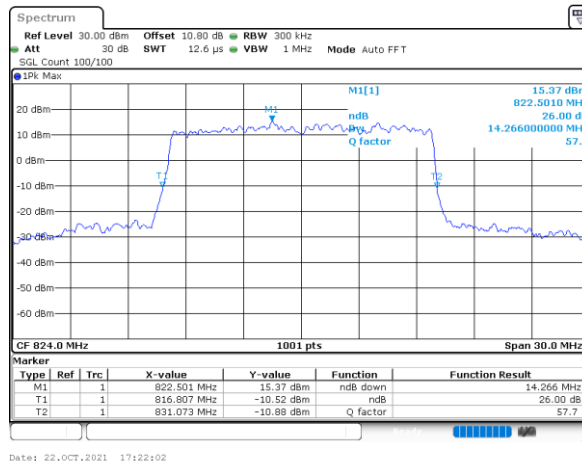


Date: 22.OCT.2021 17:18:39

## Middle Channel / 5MHz / 16QAM



Date: 22.OCT.2021 17:19:00

**LTE Band 26**
**Middle Channel / 10MHz / QPSK**

**Middle Channel / 15MHz / QPSK**




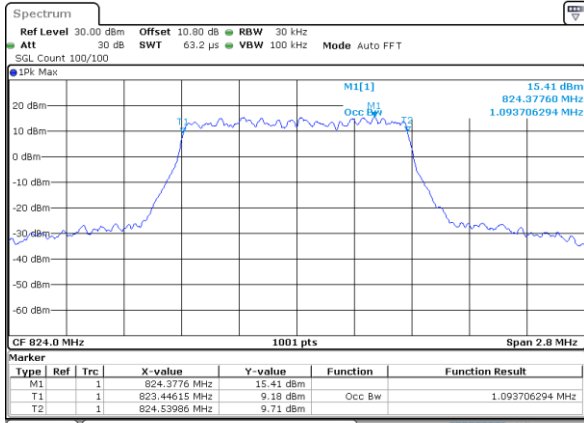
## Occupied Bandwidth

| Mode      | LTE Band 26 : 99%OBW(MHz) |       |      |       |      |       |       |       |       |       |       |       |
|-----------|---------------------------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| BW        | 1.4MHz                    |       | 3MHz |       | 5MHz |       | 10MHz |       | 15MHz |       | 20MHz |       |
| Mod.      | QPSK                      | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM | QPSK  | 16QAM |
| Middle CH | 1.09                      | 1.09  | 2.72 | 2.71  | 4.47 | 4.47  | 9.03  | -     | 13.37 | -     | -     | -     |

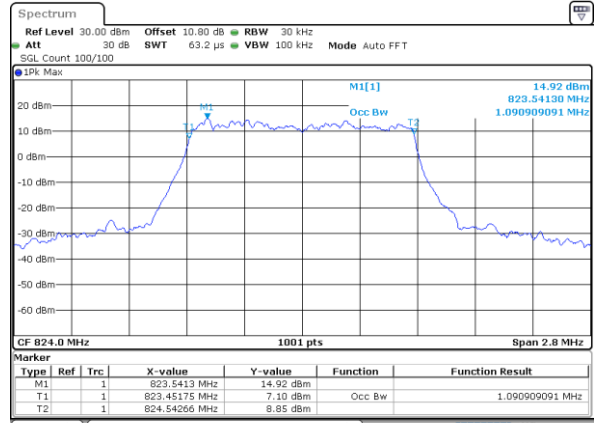


## LTE Band 26

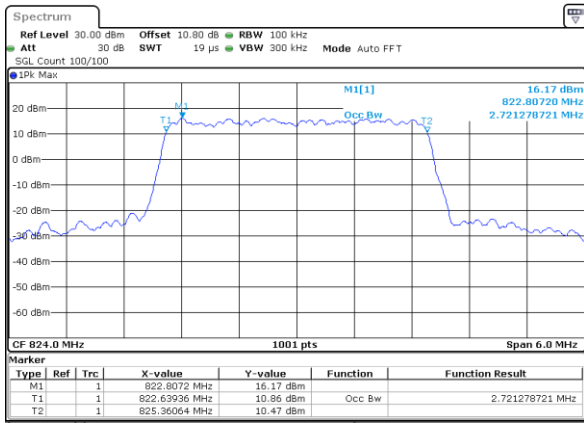
## Middle Channel / 1.4MHz / QPSK



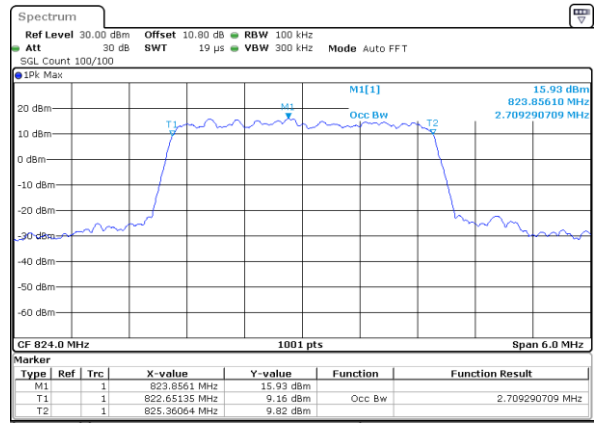
## Middle Channel / 1.4MHz / 16QAM



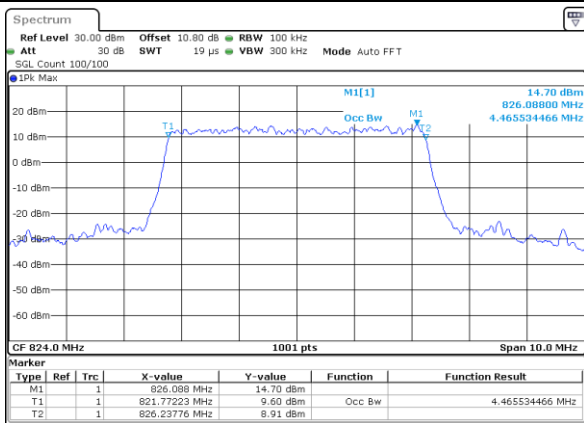
## Middle Channel / 3MHz / QPSK



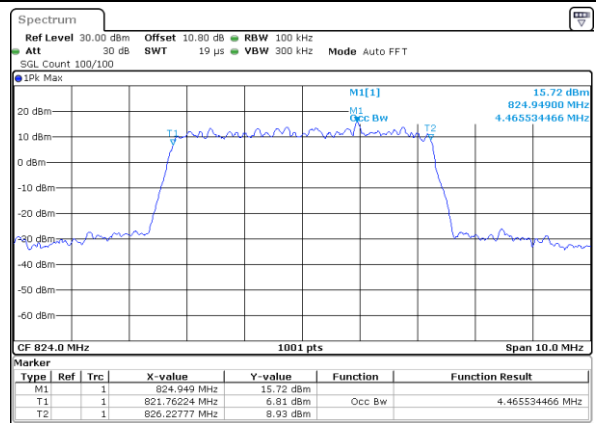
## Middle Channel / 3MHz / 16QAM

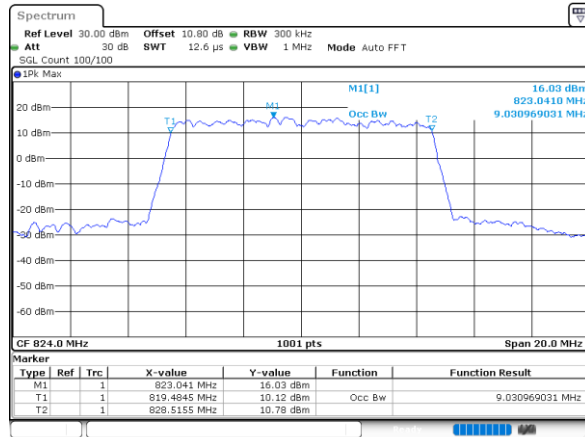
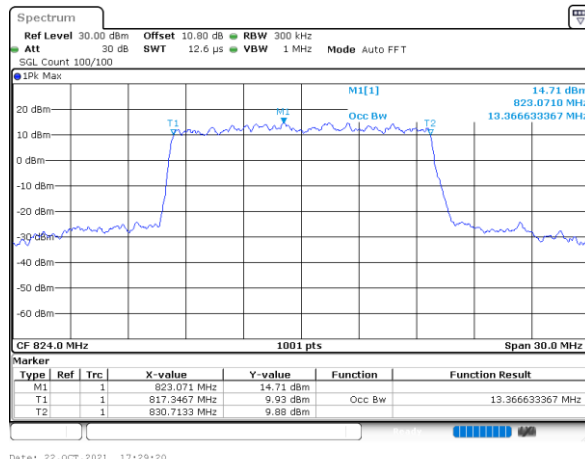


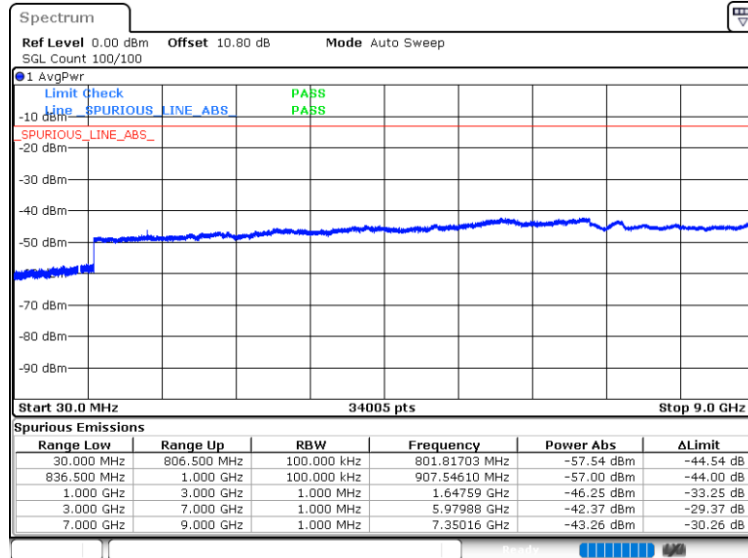
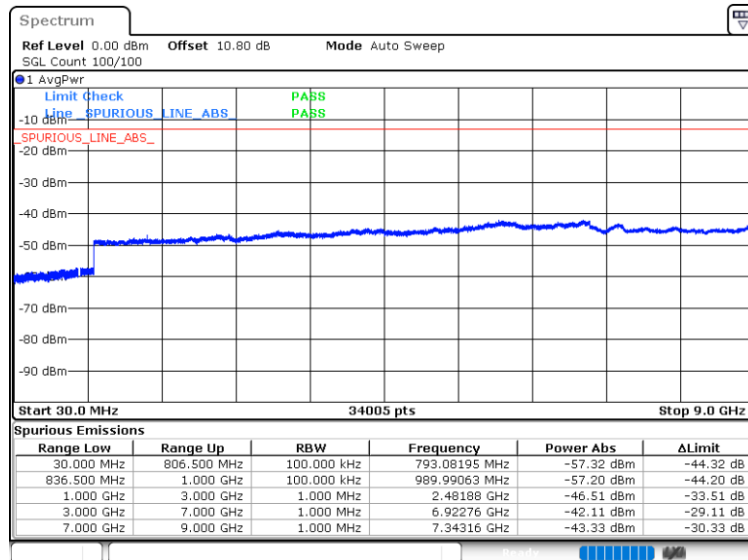
## Middle Channel / 5MHz / QPSK

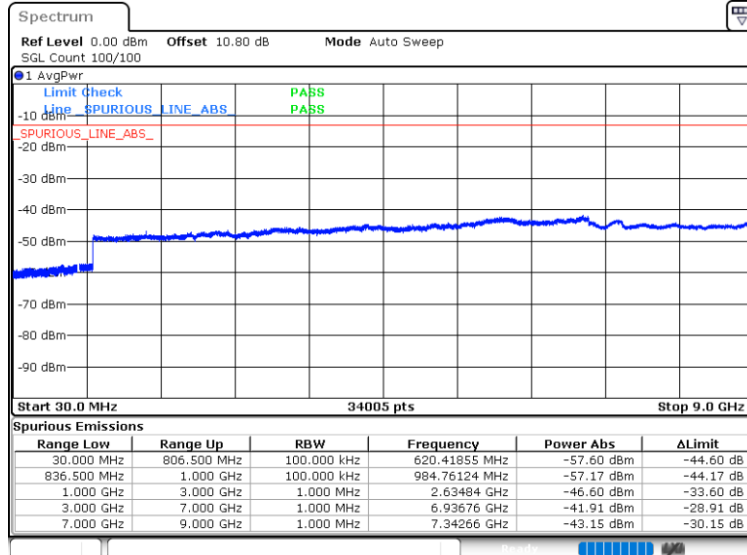


## Middle Channel / 5MHz / 16QAM

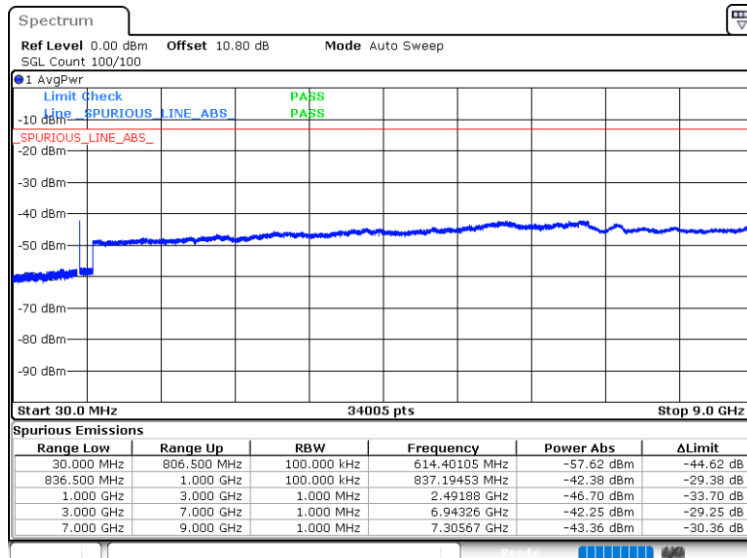


**LTE Band 26****Middle Channel / 10MHz / QPSK****Middle Channel / 15MHz / QPSK**

**Emission masks – In-band emissions****LTE Band 26 / 1.4MHz****Middle Channel / QPSK****LTE Band 26 / 3MHz****Middle Channel / QPSK**

**LTE Band 26 / 5MHz****Middle Channel / QPSK**

Date: 22.OCT.2021 17:26:34

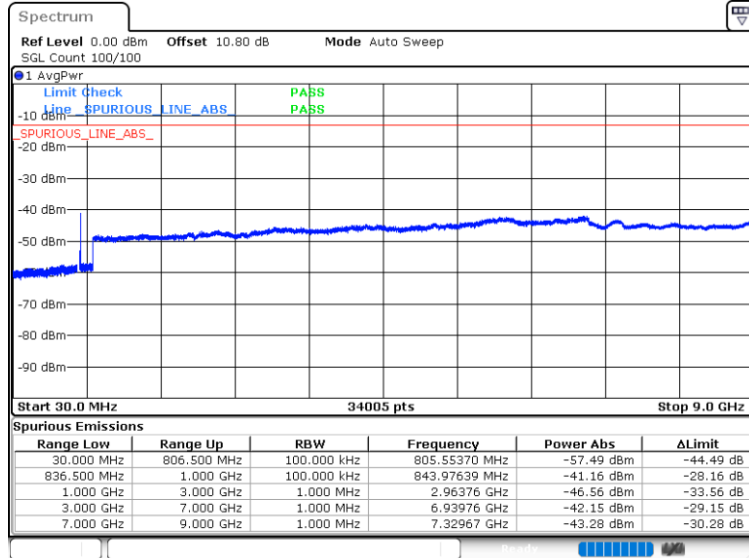
**LTE Band 26 / 10MHz****Middle Channel / QPSK**

Date: 22.OCT.2021 17:27:46



## LTE Band 26 / 15MHz

## Middle Channel / QPSK



Date: 22.OCT.2021 17:28:58



## Appendix B. Test Results of Radiated Test

### LTE Band 26

| LTE Band 26 / 5MHz / QPSK |                      |                |                  |                         |                         |                          |                            |                             |                       |
|---------------------------|----------------------|----------------|------------------|-------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|-----------------------|
| Channel                   | Frequency<br>( MHz ) | ERP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>(dBm) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>(dBi) | Polarization<br>(H/V) |
| Lowest                    | 1632                 | -57.29         | -13              | -44.29                  | -69.03                  | -59.1                    | 0.97                       | 4.93                        | H                     |
|                           | 3264                 | -52.73         | -13              | -39.73                  | -71.9                   | -56.01                   | 1.53                       | 6.96                        | H                     |
|                           | 4080                 | -54.03         | -13              | -41.03                  | -74.59                  | -58.69                   | 1.81                       | 8.62                        | H                     |
|                           | 4896                 | -54.27         | -13              | -41.27                  | -77.74                  | -59.33                   | 2.28                       | 9.49                        | H                     |
|                           |                      |                |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                |                  |                         |                         |                          |                            |                             | H                     |
|                           | 1632                 | -54.54         | -13              | -41.54                  | -66.76                  | -56.35                   | 0.97                       | 4.93                        | V                     |
|                           | 3264                 | -52.94         | -13              | -39.94                  | -72.51                  | -56.22                   | 1.53                       | 6.96                        | V                     |
|                           | 4080                 | -53.29         | -13              | -40.29                  | -74.01                  | -57.95                   | 1.81                       | 8.62                        | V                     |
|                           | 4896                 | -53.06         | -13              | -40.06                  | -76.39                  | -58.12                   | 2.28                       | 9.49                        | V                     |
|                           | 5712                 | -53.42         | -13              | -40.42                  | -79.02                  | -58.31                   | 2.75                       | 9.78                        | V                     |
|                           | 7348                 | -52.98         | -13              | -39.98                  | -80.33                  | -59.85                   | 2.48                       | 11.50                       | V                     |
|                           |                      |                |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                |                  |                         |                         |                          |                            |                             | V                     |



| LTE Band 26 / 5MHz / QPSK |                      |                 |                  |                         |                         |                          |                            |                             |                       |
|---------------------------|----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|-----------------------|
| Channel                   | Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>(dBm) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>(dBi) | Polarization<br>(H/V) |
| Middle                    | 1640                 | -59.10          | -13              | -46.10                  | -70.98                  | -60.88                   | 0.97                       | 4.91                        | H                     |
|                           | 3280                 | -52.62          | -13              | -39.62                  | -71.86                  | -55.97                   | 1.54                       | 7.03                        | H                     |
|                           | 4096                 | -53.27          | -13              | -40.27                  | -73.86                  | -57.92                   | 1.82                       | 8.62                        | H                     |
|                           | 4912                 | -54.01          | -13              | -41.01                  | -77.51                  | -59.1                    | 2.29                       | 9.52                        | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           | 1640                 | -54.38          | -13              | -41.38                  | -66.74                  | -56.16                   | 0.97                       | 4.91                        | V                     |
|                           | 2456                 | -58.19          | -13              | -45.19                  | -75.81                  | -60.03                   | 1.28                       | 5.27                        | V                     |
|                           | 3280                 | -52.50          | -13              | -39.50                  | -72.12                  | -55.85                   | 1.54                       | 7.03                        | V                     |
|                           | 4096                 | -53.09          | -13              | -40.09                  | -73.84                  | -57.74                   | 1.82                       | 8.62                        | V                     |
|                           | 4912                 | -53.23          | -13              | -40.23                  | -76.57                  | -58.32                   | 2.29                       | 9.52                        | V                     |
|                           | 5736                 | -53.88          | -13              | -40.88                  | -79.56                  | -58.76                   | 2.76                       | 9.79                        | V                     |
|                           | 7368                 | -52.87          | -13              | -39.87                  | -80.23                  | -59.78                   | 2.47                       | 11.54                       | V                     |
|                           | 8192                 | -51.32          | -13              | -38.32                  | -80.05                  | -59.11                   | 2.31                       | 12.25                       | V                     |



| LTE Band 26 / 5MHz / QPSK |                      |                 |                  |                         |                         |                          |                            |                             |                       |
|---------------------------|----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|-----------------------|
| Channel                   | Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>(dBm) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>(dBi) | Polarization<br>(H/V) |
| Highest                   | 1640                 | -59.55          | -13              | -46.55                  | -71.43                  | -61.33                   | 0.97                       | 4.91                        | H                     |
|                           | 2464                 | -57.83          | -13              | -44.83                  | -74.99                  | -59.69                   | 1.28                       | 5.29                        | H                     |
|                           | 3288                 | -52.46          | -13              | -39.46                  | -71.8                   | -55.84                   | 1.54                       | 7.07                        | H                     |
|                           | 4104                 | -53.08          | -13              | -40.08                  | -73.74                  | -57.73                   | 1.82                       | 8.62                        | H                     |
|                           | 4928                 | -54.23          | -13              | -41.23                  | -77.75                  | -59.34                   | 2.30                       | 9.56                        | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           | 1640                 | -54.73          | -13              | -41.73                  | -67.08                  | -56.51                   | 0.97                       | 4.91                        | V                     |
|                           | 2464                 | -55.56          | -13              | -42.56                  | -73.16                  | -57.42                   | 1.28                       | 5.29                        | V                     |
|                           | 3288                 | -51.54          | -13              | -38.54                  | -71.21                  | -54.92                   | 1.54                       | 7.07                        | V                     |
|                           | 4104                 | -51.78          | -13              | -38.78                  | -72.59                  | -56.43                   | 1.82                       | 8.62                        | V                     |
|                           | 4928                 | -52.50          | -13              | -39.50                  | -75.86                  | -57.61                   | 2.30                       | 9.56                        | V                     |
|                           | 5752                 | -53.63          | -13              | -40.63                  | -79.36                  | -58.51                   | 2.77                       | 9.80                        | V                     |
|                           | 7392                 | -52.50          | -13              | -39.50                  | -79.85                  | -59.47                   | 2.46                       | 11.58                       | V                     |

**Remark:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.