



LTE TEST REPORT

Report Number: C21T00079-RF02-V00

Applicant Doro AB
Product Name 4G Bar Feature Phone
Model Name DFB-0370
Brand Name Doro
FCC ID WS5DFB0370

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part 2/27, ANSI/TIA-603-E, ANSI C63.26, KDB 971168 D01.

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2021-10-18

Industrial Internet Innovation Center (Shanghai) Co., Ltd.

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Test Laboratory:

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Revision Version

| Report Number | Revision | Date | Memo |
|--------------------|----------|------------|---------------------------------|
| C21T00079-RF02-V00 | 00 | 2021-10-18 | Initial creation of test report |

CONTENTS

| | |
|---|----|
| 1. TEST LABORATORY..... | 6 |
| 1.1. TESTING LOCATION..... | 6 |
| 1.2. TESTING ENVIRONMENT..... | 6 |
| 1.3. PROJECT INFORMATION..... | 6 |
| 2. CLIENT INFORMATION..... | 7 |
| 2.1. APPLICANT INFORMATION..... | 7 |
| 2.2. MANUFACTURER INFORMATION..... | 7 |
| 3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)..... | 8 |
| 3.1. ABOUT EUT..... | 8 |
| 3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST..... | 8 |
| 3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST..... | 8 |
| 4. REFERENCE DOCUMENTS..... | 9 |
| 4.1. REFERENCE DOCUMENTS FOR TESTING..... | 9 |
| 5. TEST SUMMARY..... | 10 |
| 5.1. SUMMARY OF TEST RESULTS..... | 10 |
| 5.2. STATEMENTS..... | 12 |
| 6. MEASUREMENT RESULTS..... | 13 |
| 6.1. OUTPUT POWER..... | 14 |
| 6.2. EMISSION LIMIT..... | 22 |
| 6.3. FREQUENCY STABILITY..... | 27 |
| 6.4. OCCUPIED BANDWIDTH..... | 29 |
| 6.5. EMISSION BANDWIDTH..... | 34 |
| 6.6. BAND EDGE COMPLIANCE..... | 39 |
| 6.7. CONDUCTED SPURIOUS EMISSION..... | 47 |

| | |
|---|----|
| 6.8. PEAK-TO-AVERAGE POWER RATIO..... | 49 |
| 6.9. TEST EQUIPMENT LIST..... | 49 |
| CONDUCTED TEST SYSTEM..... | 49 |
| RADIATED EMIS9SION TEST SYSTEM..... | 50 |
| ANNEX A: MEASUREMENT UNCERTAINTY..... | 51 |
| ANNEX B: ACCREDITATION CERTIFICATE..... | 52 |



1. Test Laboratory

1.1. Testing Location

| | |
|----------------------|--|
| Company Name | Industrial Internet Innovation Center (Shanghai) Co., Ltd. |
| Address | Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China |
| FCC Registration No. | 958356 |
| FCC Degistration No. | CN1177 |

1.2. Testing Environment

| | |
|--------------------|-------------|
| Normal Temperature | 15°C~35°C |
| Relative Humidity | 30%RH~60%RH |
| Supply Voltage | 120V/60Hz |

1.3. Project Information

| | |
|--------------------|------------|
| Project Leader | XU Yuting |
| Testing Start Date | 2021-07-20 |
| Testing End Date | 2021-10-09 |

2. Client Information

2.1. Applicant Information

| | |
|--------------|---|
| Company Name | Doro AB |
| Address | Jörgen Kocksgatan 1B, SE 211 20 MÄLMO, SWEDEN |
| Telephone | +46 46 280 5000 |

2.2. Manufacturer Information

| | |
|--------------|---|
| Company Name | Doro AB |
| Address | Jörgen Kocksgatan 1B, SE 211 20 MÄLMO, SWEDEN |
| Telephone | +46 46 280 5000 |

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

| | |
|--------------------------------------|--|
| Product Name | 4G Bar Feature Phone |
| Model name | DFB-0370 |
| Supported Radio Technology and Bands | GSM900/DCS1800/PCS1900 WCDMA Band I/VIII LTE Band 1/3/7/8/20/28/38 BT EDR FM |
| Hardware Version | V01(HW code: 2011/2021) |
| Software Version | DFB-0370_SL272_N_S01A_V01_0_M210723_CE |
| FCC ID | WS5DFB0370 |
| Extreme Temperature | -15°C~55°C |
| Nominal Voltage | 3.7V |
| Extreme High Voltage | 4.2V |
| Extreme Low Voltage | 3.6V |

3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of Receipt |
|---------|-----------------|--------------------|--|-----------------|
| N02 | 354661370003601 | V01(HW code: 2011) | DFB-0370_SL272_N_S01A_V01_0_M210723_CE | 2021-07-20 |
| N04 | 354661370009111 | V01(HW code: 2011) | DFB-0370_SL272_N_S01A_V01_0_M210723_CE | 2021-08-25 |

*EUT ID: is internally used to identify the test sample in the lab.

3.3. Internal Identification of AE used during the test

| AE ID* | Description | Model | SN/Remark |
|--------|-------------|-------|-----------|
| AE1 | RF cable | N/A | N/A |

*AE ID: is internally used to identify the test sample in the lab.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|----------------|---|------------|
| FCC Part 2 | FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS | 2018-10-01 |
| FCC Part 22 | PUBLIC MOBILE SERVICES | 2018-10-01 |
| FCC Part 24 | PERSONAL COMMUNICATIONS SERVICES | 2018-10-01 |
| FCC Part 27 | MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES | 2018-10-01 |
| ANSI/TIA-603-E | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards | 2016 |
| ANSI C63.26 | American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio | 2015 |
| KDB 971168 D01 | Measurement Guidance for Certification of Licensed Digital Transmitters | v03r01 |

5. Test Summary

5.1. Summary of Test Results

LTE Band 7

| Items | Test Name | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1 | Output Power | 27.50(d)(4) | Pass |
| 2 | Emission Limit | 27.53(m), 2.1051 | Pass |
| 3 | Frequency Stability | 27.54, 2.1055 | Pass |
| 4 | Occupied Bandwidth | 2.1049(h)(i) | Pass |
| 5 | Emission Bandwidth | 27.53(m) | Pass |
| 6 | Band Edge Compliance | 27.53(m) | Pass |
| 7 | Conducted Spurious Emission | 27.53(m), 2.1057 | Pass |
| 8 | Peak to Average Power Ratio | 27.50(a) | Pass |

LTE Band 38

| Items | Test Name | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1 | Output Power | 27.50(h)(2) | Pass |
| 2 | Emission Limit | 27.53(m), 2.1051 | Pass |
| 3 | Frequency Stability | 27.54, 2.1055 | Pass |
| 4 | Occupied Bandwidth | 2.1049(h)(i) | Pass |
| 5 | Emission Bandwidth | 27.53(m) | Pass |
| 6 | Band Edge Compliance | 27.53(m) | Pass |
| 7 | Conducted Spurious Emission | 27.53(m), 2.1057 | Pass |
| 8 | Peak to Average Power Ratio | 27.50(a) | Pass |

Test Conditions

| | |
|------------------|--------------------|
| T _{nom} | Normal Temperature |
| T _{min} | Low Temperature |
| T _{max} | High Temperature |
| V _{nom} | Normal Voltage |
| V _{min} | Low Voltage |
| V _{max} | High Voltage |
| H _{nom} | Norm Humidity |
| A _{nom} | Norm Air Pressure |

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

| | | |
|--------------|------------------|---------|
| Temperature | T _{nom} | 25°C |
| Voltage | V _{nom} | 3.7V |
| Humidity | H _{nom} | 48% |
| Air Pressure | A _{nom} | 1010hPa |



5.2. Statements

The DFB-0370, manufactured by Doro AB is a new product for testing.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

6. Measurement Results

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

| | |
|--------------------------|----------------------------|
| Temperature | Min. = 15 °C, Max. = 35 °C |
| Relative humidity | Min. = 20 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Ground system resistance | < 0.5 |
| Temperature | Min. = 15 °C, Max. = 35 °C |

Control room did not exceed following limits along the EMC testing:

| | |
|--------------------------|----------------------------|
| Temperature | Min. = 15 °C, Max. = 35 °C |
| Relative humidity | Min. = 30 %, Max. = 60 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 10 k |
| Ground system resistance | < 0.5 |

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

| | |
|------------------------------|--|
| Temperature | Min. = 15 °C, Max. = 35 °C |
| Relative humidity | Min. = 25 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 10 k |
| Ground system resistance | < 0.5 |
| VSWR | Between 0 and 6 dB, from 1GHz to 18GHz |
| Site Attenuation Deviation | Between -4 and 4 dB, 30MHz to 1GHz |
| Uniformity of field strength | Between 0 and 6 dB, from 80MHz to 3000 MHz |

6.1. Output Power

6.1.1. Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.

In all cases, output power is within the specified limits.

CMW500 setting:

1: CMW500 is connected to the DUT

2: Set RX Expected PEP to 30 dBm

6.1.2. Conducted

6.1.2.1. Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

6.1.2.2 Measurement result

LTE band 7

| LTE7 | | | Output power (dBm) | | | |
|------------|------------|-----------|--------------------|-------|-------|-------|
| Modulation | RB | RB Offset | Tune up | 5MHz | | |
| | | | | 20775 | 21100 | 21425 |
| QPSK | 1 | Low | 21.5 | 20.72 | 20.68 | 20.78 |
| | | Middle | | 20.60 | 20.71 | 20.83 |
| | | High | | 20.64 | 20.71 | 20.86 |
| | 50% | Low | 20.5 | 19.84 | 19.71 | 20.00 |
| | | Middle | | 19.74 | 19.72 | 19.86 |
| | | High | | 19.70 | 19.73 | 19.92 |
| | 100% | / | 20.5 | 19.64 | 19.76 | 20.03 |
| | 1 | Low | 21 | 20.29 | 20.48 | 20.33 |
| | | Middle | | 20.24 | 20.46 | 20.27 |
| | | High | | 20.03 | 20.43 | 20.32 |
| 16QAM | 5 | Low | 20.5 | 19.36 | 19.64 | 19.55 |
| | | Middle | | 19.47 | 19.67 | 19.70 |
| | | High | | 19.27 | 19.41 | 19.57 |
| | 100% | / | 20.5 | 19.31 | 19.50 | 19.53 |
| | Modulation | RB | RB Offset | 10MHz | | |
| | | | | 20800 | 21100 | 21400 |
| QPSK | 1 | Low | 21.5 | 20.72 | 20.61 | 20.79 |
| | | Middle | | 20.60 | 20.67 | 20.75 |
| | | High | | 20.67 | 20.64 | 20.79 |
| | 50% | Low | 20.5 | 19.71 | 19.77 | 19.89 |
| | | Middle | | 19.68 | 19.82 | 19.89 |
| | | High | | 19.76 | 19.79 | 20.00 |
| | 100% | / | 20.5 | 19.76 | 19.85 | 19.92 |
| 16QAM | 1 | Low | 21 | 20.42 | 20.25 | 20.60 |

| | | | | | | | |
|------------|------|-----------|---------|-------|-------|-------|-------|
| | | Middle | | 20.22 | 20.11 | 20.68 | |
| | | | | 20.28 | 20.24 | 20.67 | |
| | | 50% | Low | 20.5 | 19.62 | 19.81 | 19.48 |
| | | | Middle | | 19.59 | 19.71 | 19.65 |
| | | | High | | 19.68 | 19.69 | 19.90 |
| | | 100% | / | 20.5 | 19.63 | 19.75 | 19.71 |
| | | | | | 15MHz | | |
| Modulation | RB | RB Offset | Tune up | 20825 | | | |
| | | | | 21100 | 21375 | | |
| QPSK | 1 | Low | 21.5 | 20.59 | 20.42 | 20.59 | |
| | | Middle | | 20.56 | 20.60 | 20.61 | |
| | | High | | 20.61 | 20.72 | 20.72 | |
| | 50% | Low | 20.5 | 19.67 | 19.74 | 19.86 | |
| | | Middle | | 19.78 | 19.83 | 19.95 | |
| | | High | | 19.71 | 19.89 | 19.97 | |
| | 100% | / | 20.5 | 19.76 | 19.78 | 20.02 | |
| 16QAM | 1 | Low | 21 | 20.45 | 20.41 | 20.60 | |
| | | Middle | | 20.35 | 20.43 | 20.56 | |
| | | High | | 20.47 | 20.54 | 20.69 | |
| | 50% | Low | 20.5 | 19.71 | 20.03 | 19.54 | |
| | | Middle | | 19.51 | 19.70 | 19.60 | |
| | | High | | 19.62 | 19.57 | 19.86 | |
| | 100% | / | 20.5 | 19.66 | 19.81 | 19.68 | |
| Modulation | RB | RB Offset | Tune up | 20MHz | | | |
| | | | | 20850 | 21100 | 21350 | |
| QPSK | 1 | Low | 21.5 | 20.75 | 20.70 | 20.67 | |
| | | Middle | | 20.58 | 20.76 | 20.68 | |
| | | High | | 20.67 | 20.80 | 20.82 | |
| | 50% | Low | 20.5 | 19.60 | 19.71 | 19.87 | |
| | | Middle | | 19.78 | 19.81 | 19.76 | |
| | | High | | 19.87 | 19.83 | 19.93 | |
| | 100% | / | 20.5 | 19.75 | 19.65 | 19.91 | |
| 16QAM | 1 | Low | 21 | 20.43 | 20.02 | 20.10 | |
| | | Middle | | 20.54 | 20.10 | 20.04 | |
| | | High | | 20.65 | 20.17 | 20.18 | |
| | 50% | Low | 20.5 | 19.63 | 19.91 | 19.29 | |
| | | Middle | | 19.61 | 19.73 | 19.41 | |
| | | High | | 20.08 | 19.79 | 19.92 | |
| | 100% | / | 20.5 | 19.82 | 19.81 | 19.59 | |

| LTE | | | | Output power (dBm) | | |
|------------|------|-----------|---------|--------------------|-------|-------|
| Modulation | RB | RB Offset | Tune up | 5MHz | | |
| | | | | 37775 | 38000 | 38225 |
| QPSK | 1 | Low | 22 | 21.14 | 21.26 | 21.51 |
| | | Middle | | 21.23 | 21.32 | 21.55 |
| | | High | | 21.33 | 21.42 | 21.41 |
| | 50% | Low | 21 | 20.21 | 20.38 | 20.36 |
| | | Middle | | 20.35 | 20.41 | 20.41 |
| | | High | | 20.24 | 20.49 | 20.40 |
| | 100% | / | 21 | 20.23 | 20.29 | 20.45 |
| | 1 | Low | 21 | 20.04 | 20.13 | 20.16 |
| | | Middle | | 20.11 | 20.13 | 20.18 |
| | | High | | 20.07 | 20.29 | 20.14 |
| 16QAM | 5 | Low | 20 | 19.36 | 19.51 | 19.59 |
| | | Middle | | 19.50 | 19.54 | 19.62 |
| | | High | | 19.50 | 19.60 | 19.58 |
| | 100% | / | 20 | 19.66 | 19.58 | 19.66 |
| Modulation | RB | RB Offset | Tune up | 10MHz | | |
| | | | | 37800 | 38000 | 38200 |
| QPSK | 1 | Low | 22 | 21.38 | 21.46 | 21.41 |
| | | Middle | | 21.35 | 21.54 | 21.61 |
| | | High | | 21.50 | 21.51 | 21.60 |
| | 50% | Low | 21 | 20.29 | 20.31 | 20.58 |
| | | Middle | | 20.37 | 20.46 | 20.53 |
| | | High | | 20.45 | 20.43 | 20.57 |
| | 100% | / | 21 | 20.43 | 20.48 | 20.58 |
| 16QAM | 1 | Low | 21 | 20.17 | 20.02 | 20.18 |
| | | Middle | | 20.03 | 20.08 | 20.27 |
| | | High | | 20.19 | 20.23 | 20.34 |
| | 50% | Low | 20 | 19.62 | 19.59 | 19.65 |
| | | Middle | | 19.56 | 19.57 | 19.77 |
| | | High | | 19.56 | 19.74 | 19.78 |
| | 100% | / | 20 | 19.60 | 19.57 | 19.79 |
| Modulation | RB | RB Offset | Tune up | 15MHz | | |
| | | | | 37825 | 38000 | 38175 |
| QPSK | 1 | Low | 22 | 21.40 | 21.32 | 21.37 |
| | | Middle | | 21.41 | 21.50 | 21.58 |
| | | High | | 21.44 | 21.46 | 21.50 |
| | 50% | Low | 21 | 20.45 | 20.45 | 20.61 |
| | | Middle | | 20.40 | 20.47 | 20.66 |
| | | High | | 20.51 | 20.62 | 20.60 |

| | | | | | | |
|------------|------|-----------|---------|-------|-------|-------|
| | 100% | / | 21 | 20.38 | 20.42 | 20.55 |
| 16QAM | 1 | Low | 21 | 20.12 | 20.04 | 20.11 |
| | | Middle | | 20.13 | 20.18 | 20.24 |
| | | High | | 20.14 | 20.24 | 20.30 |
| | 50% | Low | 20 | 19.45 | 19.54 | 19.51 |
| | | Middle | | 19.41 | 19.58 | 19.60 |
| | | High | | 19.55 | 19.56 | 19.70 |
| | 100% | / | 20 | 19.55 | 19.66 | 19.62 |
| Modulation | RB | RB Offset | Tune up | 20MHz | | |
| | | | | 37850 | 38000 | 38150 |
| QPSK | 1 | Low | 22 | 21.23 | 21.24 | 21.39 |
| | | Middle | | 21.30 | 21.37 | 21.55 |
| | | High | | 21.44 | 21.40 | 21.57 |
| | 50% | Low | 21 | 20.29 | 20.35 | 20.48 |
| | | Middle | | 20.35 | 20.38 | 20.51 |
| | | High | | 20.48 | 20.49 | 20.69 |
| | 100% | / | 21 | 20.49 | 20.42 | 20.46 |
| 16QAM | 1 | Low | 21 | 20.04 | 20.09 | 20.10 |
| | | Middle | | 20.07 | 20.11 | 20.25 |
| | | High | | 20.15 | 20.25 | 20.32 |
| | 50% | Low | 20 | 19.55 | 19.62 | 19.65 |
| | | Middle | | 19.43 | 19.58 | 19.75 |
| | | High | | 19.47 | 19.54 | 19.79 |
| | 100% | / | 20 | 19.40 | 19.55 | 19.63 |

6.1.3 Radiated

6.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

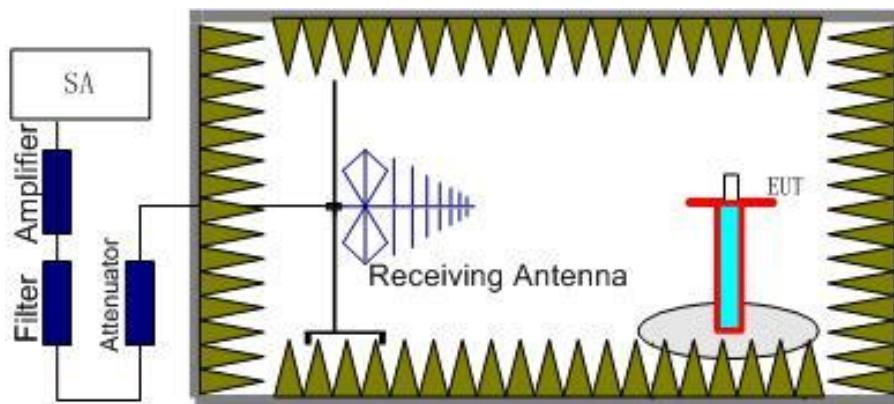
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 27.50(d) specifies "Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP".

Rule Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP".

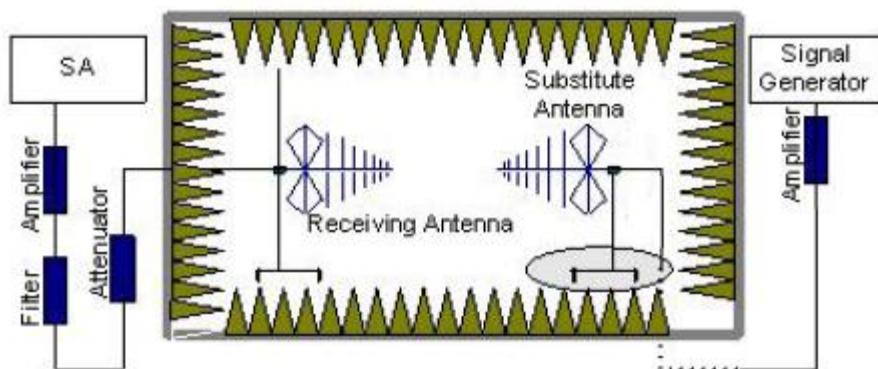
Rule Part 27.50(c) specifies "Portable stations (hand-held devices) are limited to 3 watts ERP".

6.1.3.2 Method of Measurement



The measurements procedures in TIA-603E-2016 are used.

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 1.5m. The test setup refers to figure below. 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. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (P_r).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a 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 (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.

The cable loss (P_{cl}), the substitution antenna Gain (G_a) and the amplifier Gain (P_{Ag}) should be

recorded after test.

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{\text{Mea}} + P_{\text{Ag}} - P_{\text{cl}} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$.

6.1.3.3 Measurement result

LTE Band 7- EIRP 27.50(h)(2)

Limits: $\leq 33 \text{ dBm}$ (2W)

LTE Band 7_5MHz_QPSK

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2502.5 | 19.22 | 33.00 | H |
| 2535 | 19.21 | 33.00 | H |
| 2567.5 | 19.36 | 33.00 | H |

LTE Band 7_10MHz_QPSK

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2505 | 19.22 | 33.00 | H |
| 2535 | 19.17 | 33.00 | H |
| 2565 | 19.29 | 33.00 | H |

LTE Band 7_15MHz_QPSK

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2507.5 | 19.09 | 33.00 | H |
| 2535 | 19.22 | 33.00 | H |
| 2562.5 | 19.22 | 33.00 | H |

LTE Band 7_20MHz_QPSK

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2510 | 19.25 | 33.00 | H |
| 2535 | 19.30 | 33.00 | H |
| 2560 | 19.32 | 33.00 | H |

LTE Band 7_5MHz_16QAM

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2502.5 | 18.79 | 33.00 | H |
| 2535 | 18.98 | 33.00 | H |
| 2567.5 | 18.83 | 33.00 | H |

LTE Band 7_10MHz_16QAM

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2505 | 18.92 | 33.00 | H |
| 2535 | 18.75 | 33.00 | H |
| 2565 | 19.18 | 33.00 | H |

LTE Band 7_15MHz_16QAM

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2507.5 | 18.95 | 33.00 | H |
| 2535 | 19.04 | 33.00 | H |
| 2562.5 | 19.19 | 33.00 | H |

LTE Band 7_20MHz_16QAM

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2510 | 19.15 | 33.00 | H |
| 2535 | 18.67 | 33.00 | H |
| 2560 | 18.60 | 33.00 | H |

LTE Band 38- EIRP 27.50(h)(2)

Limits: ≤33 dBm (2W)

LTE Band 38_5MHz_QPSK

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2572.5 | 18.83 | 33.00 | H |
| 2595 | 18.92 | 33.00 | H |
| 2617.5 | 19.05 | 33.00 | H |

LTE Band 38_10MHz_QPSK

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2575 | 18.88 | 33.00 | H |
| 2595 | 19.04 | 33.00 | H |
| 2615 | 19.11 | 33.00 | H |

LTE Band 38_15MHz_QPSK

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2577.5 | 18.94 | 33.00 | H |
| 2595 | 19.00 | 33.00 | H |
| 2612.5 | 19.08 | 33.00 | H |

LTE Band 38_20MHz_QPSK

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2580 | 18.94 | 33.00 | H |
| 2595 | 18.90 | 33.00 | H |
| 2610 | 19.07 | 33.00 | H |

LTE Band 38_5MHz_16QAM

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2572.5 | 17.61 | 33.00 | H |
| 2595 | 17.79 | 33.00 | H |
| 2617.5 | 17.56 | 33.00 | H |

LTE Band 38_10MHz_16QAM

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2575 | 17.69 | 33.00 | H |
| 2595 | 17.73 | 33.00 | H |
| 2615 | 17.84 | 33.00 | H |

LTE Band 38_15MHz_16QAM

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2577.5 | 17.64 | 33.00 | H |
| 2595 | 17.74 | 33.00 | H |
| 2612.5 | 17.8 | 33.00 | H |

LTE Band 38_20MHz_16QAM

| Frequency(MHz) | EIRP(dBm) | Limit(dBm) | Polarization |
|----------------|-----------|------------|--------------|
| 2580 | 17.57 | 33.00 | H |
| 2595 | 17.75 | 33.00 | H |
| 2610 | 17.82 | 33.00 | H |

ANALYZER SETTINGS:

RBW = VBW = 8MHz for occupied bandwidths equal to or less than 5MHz.

RBW = VBW = 20MHz for occupied bandwidths equal to or greater than 10MHz.

6.2. Emission Limit

Reference

CFR 2.1051, 27.53(g), 27.53(h), 27.53(m).

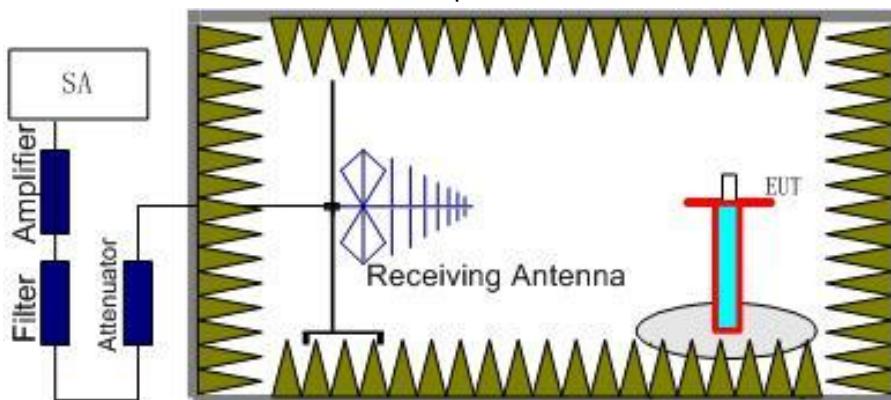
6.2.1 Measurement Method

The measurements procedures in TIA-603E-2016 are used. This measurement is carried out in fully-anechoic chamber FAC-3.

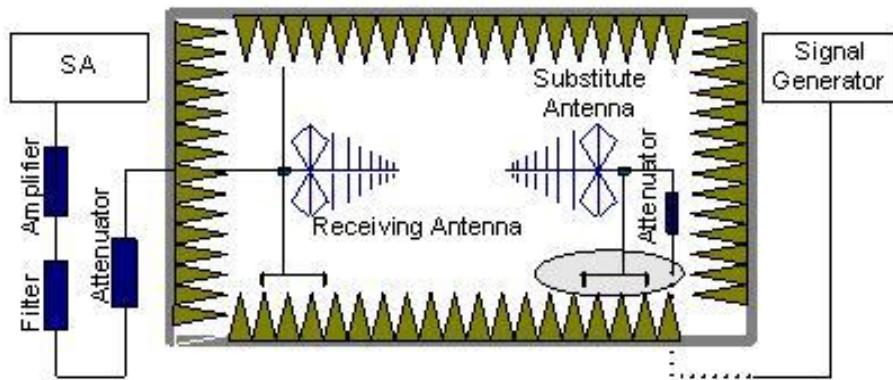
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 27.53(g), Part 27.53(h), Part 27.53(m). The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Bands 7.

The procedure of radiated spurious emissions is as follows:

1. Below 1 GHz, EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. Above 1 GHz, EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. 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 1.5m. The test setup refers to figure below. 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 non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



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 (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.

An amplifier should be connected in for the test.

The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{Mea} - P_{pl} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

6.2.2 Measurement Limit

Part 27.53(g), 27.53(h), 27.53(m) state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P , in Watts) by at least $43 + 10\log(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

According to KDB 971168 6, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

Part 27.53(m) states that for mobile digital stations, the attenuation factor shall be not less than $40 + 10\log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10\log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10\log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10\log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10\log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating

on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

6.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Bands. Into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. The evaluated frequency range is from 30MHz to 26GHz.

Band 7

| Band 7 | Channel | | Result |
|--------|---------|-------|--------|
| | L | 20775 | |
| | M | 21100 | |
| | H | 21425 | |

Band 38

| Band 38 | Channel | | Result |
|---------|---------|-------|--------|
| | L | 37775 | |
| | M | 38000 | |
| | H | 38225 | |

RSE-LTE7-L

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit (dBm) | Polarization |
|-----------------|------------|-----------|----------|----------------|-------------|--------------|
| 3742.4 | -51.56 | 6.6 | 7.9 | -50.26 | -25 | H |
| 5000.8 | -46.74 | 7.8 | 9.6 | -44.94 | -25 | H |
| 6059.6 | -49.43 | 8.6 | 10.2 | -47.83 | -25 | V |
| 7500.8 | -37.23 | 9.7 | 11.6 | -35.33 | -25 | H |
| 10001.2 | -38.76 | 11.2 | 12.5 | -37.46 | -25 | H |
| 12501.5 | -33.5 | 12.7 | 12.3 | -33.9 | -25 | H |



RSE-LTE7-M



| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit (dBm) | Polarization |
|-----------------|------------|-----------|----------|----------------|-------------|--------------|
| 3941.6 | -50.94 | 6.8 | 8.6 | -49.14 | -25 | H |
| 5065.6 | -45.35 | 7.8 | 9.6 | -43.55 | -25 | H |
| 6284.4 | -49.48 | 8.8 | 10.3 | -47.98 | -25 | H |
| 7598.4 | -40.14 | 9.7 | 11.6 | -38.24 | -25 | V |
| 10131.6 | -38.43 | 11.3 | 12.5 | -37.23 | -25 | H |
| 12664.2 | -30.32 | 12.7 | 12.3 | -30.72 | -25 | H |

RSE-LTE7-H

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit (dBm) | Polarization |
|-----------------|------------|-----------|----------|----------------|-------------|--------------|
| 3943.2 | -51.68 | 6.8 | 8.6 | -49.88 | -25 | H |
| 5130.4 | -44.51 | 7.9 | 9.4 | -43.01 | -25 | H |
| 6368.4 | -48.91 | 8.8 | 10.3 | -47.41 | -25 | V |
| 7696.0 | -42.86 | 9.8 | 11.8 | -40.86 | -25 | H |
| 10261.2 | -39.25 | 11.5 | 12.3 | -38.45 | -25 | H |
| 12827.0 | -27.58 | 12.5 | 12.3 | -27.78 | -25 | H |

RSE-LTE38-L

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit (dBm) | Polarization |
|-----------------|------------|-----------|----------|----------------|-------------|--------------|
| 3872.8 | -50.93 | 6.7 | 7.9 | -49.73 | -25 | V |
| 5140.8 | -44.81 | 7.9 | 9.4 | -43.31 | -25 | H |
| 6407.6 | -50.26 | 8.9 | 10.6 | -48.56 | -25 | V |
| 7710.8 | -39.95 | 9.8 | 11.8 | -37.95 | -25 | V |
| 10281.6 | -36.41 | 11.5 | 12.3 | -35.61 | -25 | V |
| 12851.5 | -26.85 | 13.0 | 12.3 | -27.55 | -25 | H |



RSE-LTE38-M



| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit (dBm) | Polarization |
|-----------------|------------|-----------|----------|----------------|-------------|--------------|
| 3878.8 | -52.01 | 6.8 | 8.6 | -50.21 | -25 | H |
| 5186.0 | -41.97 | 8.0 | 9.4 | -40.57 | -25 | V |
| 6408.0 | -49.94 | 8.9 | 10.6 | -48.24 | -25 | V |
| 7778.4 | -39.24 | 9.9 | 11.8 | -37.34 | -25 | V |
| 10371.2 | -34.45 | 11.6 | 12.3 | -33.75 | -25 | H |
| 12963.5 | -25.65 | 13.2 | 12.3 | -26.55 | -25 | H |

RSE-LTE38-H

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit (dBm) | Polarization |
|-----------------|------------|-----------|----------|----------------|-------------|--------------|
| 3946.8 | -51.58 | 6.8 | 8.6 | -49.78 | -25 | H |
| 5230.8 | -42.52 | 8.0 | 9.4 | -41.12 | -25 | H |
| 6636.4 | -49.13 | 9.1 | 10.9 | -47.33 | -25 | V |
| 7846.0 | -36.32 | 9.9 | 11.8 | -34.42 | -25 | H |
| 10461.6 | -36.29 | 11.6 | 12.3 | -35.59 | -25 | H |
| 13077.2 | -28.11 | 13.0 | 12.3 | -28.81 | -25 | H |

6.3. Frequency Stability

Reference

CFR Part 2.1055, 27.54.

6.3.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 7. Measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -10°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C decrements from +50°C to -10°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

6.3.2 Measurement Limit

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d) (2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.6VDC and 4.35VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. For the purposes of measuring frequency stability these voltage limits are to be used.

6.3.3 Measurement results

LTE Band 7, 5MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

| Voltage (V) | Frequency error (Hz) | | Frequency error (ppm) | |
|----------------|----------------------|--------|-----------------------|-------|
| | QPSK | 16QAM | QPSK | 16QAM |
| 3.60 | -45.748 | 35.062 | 0.018 | 0.014 |
| 3.70 | -29.569 | 28.296 | 0.012 | 0.011 |
| 4.20 | -49.939 | 10.142 | 0.019 | 0.004 |

Frequency Error vs Temperature

| Temperature (°C) | Frequency error (Hz) | | Frequency error (ppm) | |
|---------------------|----------------------|---------|-----------------------|-------|
| | QPSK | 16QAM | QPSK | 16QAM |
| 50° | -29.225 | 27.838 | 0.011 | 0.011 |
| 40° | -11.587 | -31.514 | 0.005 | 0.012 |
| 30° | -41.456 | 25.291 | 0.016 | 0.010 |
| 20° | -47.750 | -8.326 | 0.019 | 0.003 |
| 10° | -25.363 | 7.467 | 0.010 | 0.003 |
| 0° | -49.224 | -17.567 | 0.019 | 0.007 |
| -10° | -30.355 | -12.817 | 0.012 | 0.005 |
| -20° | -31.528 | -15.092 | 0.012 | 0.006 |
| -30° | -25.806 | -17.853 | 0.010 | 0.007 |

LTE Band 38, 20MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

| Voltage (V) | Frequency error (Hz) | | Frequency error (ppm) | |
|----------------|----------------------|---------|-----------------------|-------|
| | QPSK | 16QAM | QPSK | 16QAM |
| 3.60 | 44.217 | -21.701 | 0.017 | 0.008 |
| 3.70 | 15.750 | -68.278 | 0.006 | 0.026 |
| 4.20 | 46.234 | -67.019 | 0.018 | 0.026 |

Frequency Error vs Temperature

| Temperature (°C) | Frequency error (Hz) | | Frequency error (ppm) | |
|---------------------|----------------------|---------|-----------------------|-------|
| | QPSK | 16QAM | QPSK | 16QAM |
| 50° | 57.249 | -37.708 | 0.022 | 0.015 |
| 40° | 17.366 | -62.485 | 0.007 | 0.024 |
| 30° | -15.993 | -70.996 | 0.006 | 0.027 |
| 20° | 20.428 | -63.200 | 0.008 | 0.024 |
| 10° | 32.086 | -64.030 | 0.012 | 0.025 |
| 0° | 43.702 | -49.324 | 0.017 | 0.019 |
| -10° | 12.074 | -34.976 | 0.005 | 0.013 |
| -20° | 19.212 | 15.779 | 0.007 | 0.006 |
| -30° | 25.163 | -51.184 | 0.010 | 0.020 |

6.4. Occupied Bandwidth

Reference

CFR Part 2.1049(h) (i)

6.4.1 Occupied Bandwidth Results

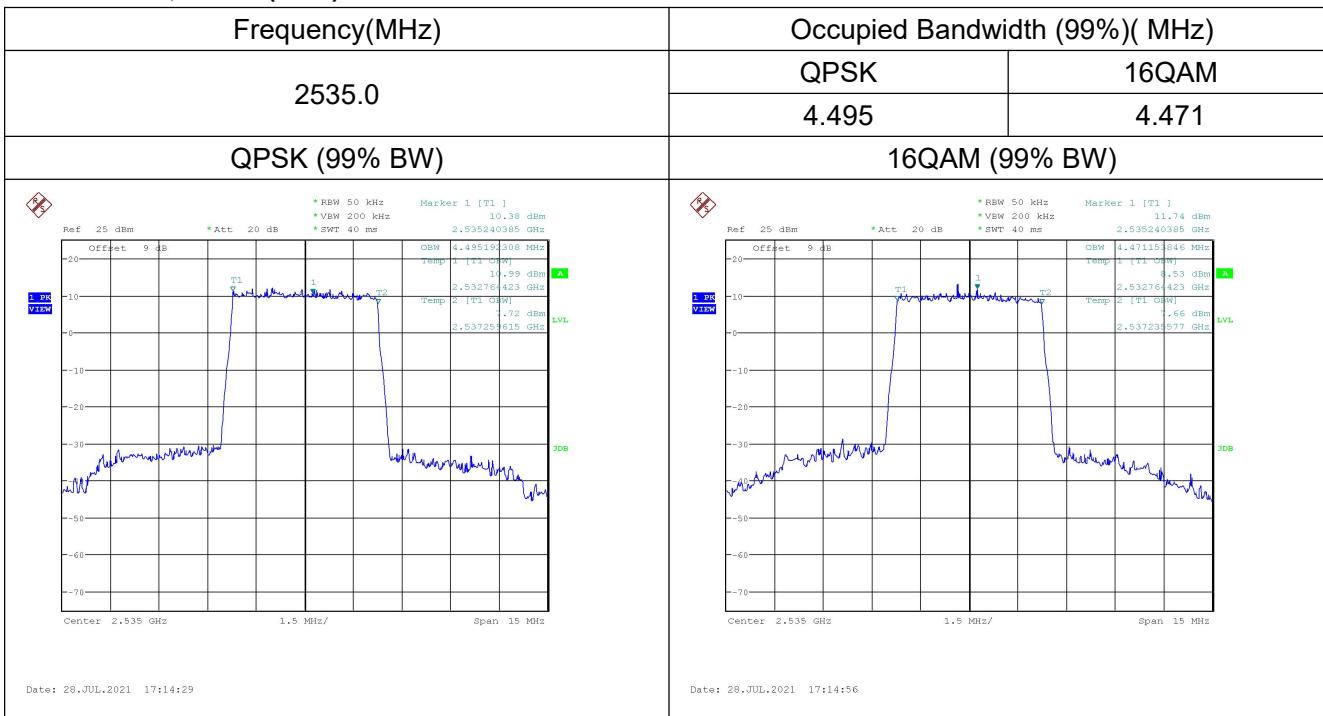
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from KDB 971168 4:

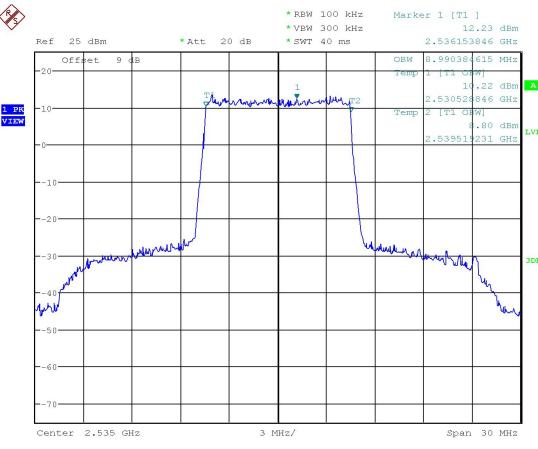
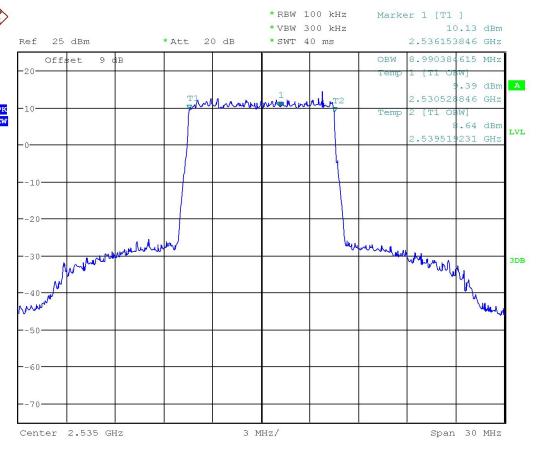
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

Occupied Bandwidth Measurement Results:

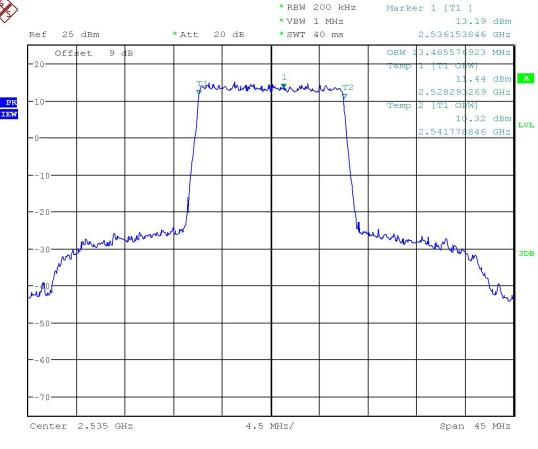
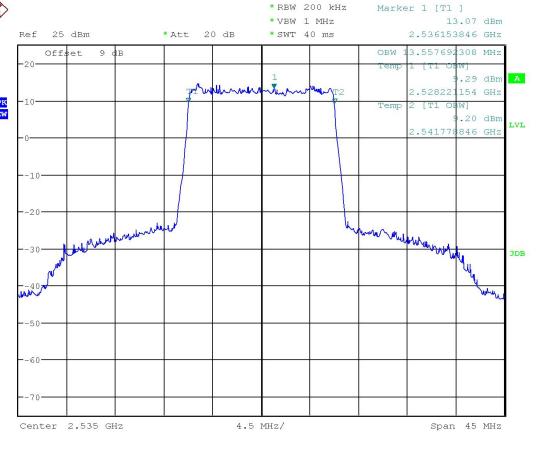
LTE band 7, 5MHz (99%)



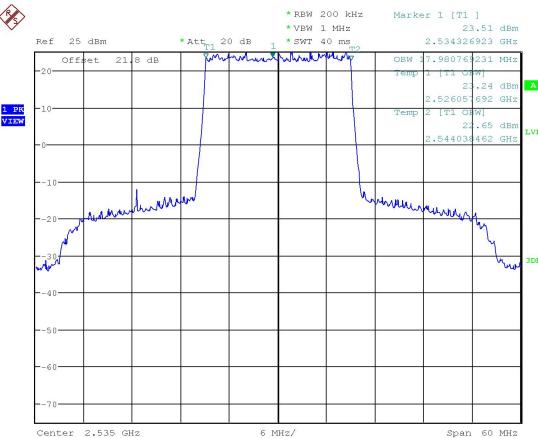
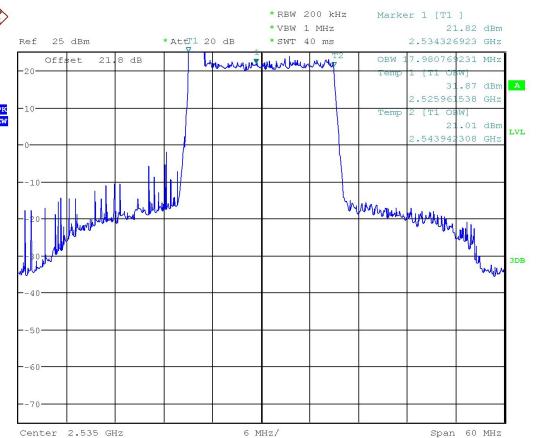
LTE band 7, 10MHz (99%)

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | |
|--|---|----------------|
| 2535.0 | QPSK | 16QAM |
| | 8.99 | 8.99 |
| QPSK (99% BW) | | 16QAM (99% BW) |
|  <p>Ref 25 dBm * Att 20 dB * RBW 100 kHz * VBW 300 kHz * SWT 40 ms Offset 9 dB Temp 1 [T1] 12.23 dBm 2.536153846 GHz Temp 2 [T2] 12.23 dBm 2.530523846 GHz OBW 0.990304615 MHz Date: 18.OCT.2021 16:34:58</p> |  <p>Ref 25 dBm * Att 20 dB * RBW 100 kHz * VBW 300 kHz * SWT 40 ms Offset 9 dB Temp 1 [T1] 10.13 dBm 2.536153846 GHz Temp 2 [T2] 10.13 dBm 2.530523846 GHz OBW 0.990304615 MHz Date: 18.OCT.2021 16:35:25</p> | |

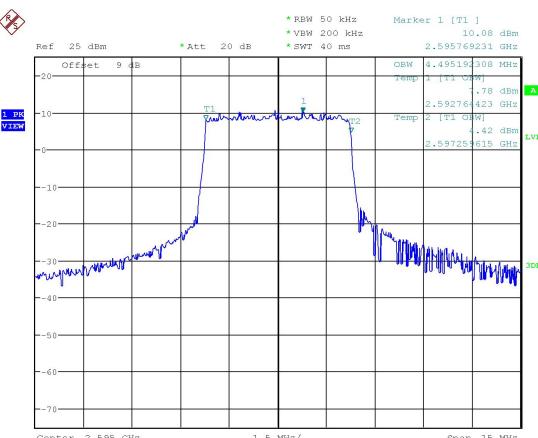
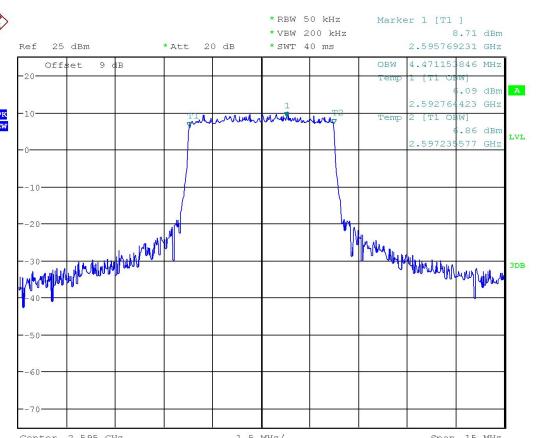
LTE band 7, 15MHz (99%)

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | |
|--|--|----------------|
| 2535.0 | QPSK | 16QAM |
| | 13.486 | 13.558 |
| QPSK (99% BW) | | 16QAM (99% BW) |
|  <p>Ref 25 dBm * Att 20 dB * RBW 200 kHz * VBW 1 MHz * SWT 40 ms Offset 9 dB Temp 1 [T1] 13.19 dBm 2.536153846 GHz Temp 2 [T2] 11.44 dBm 2.528293269 GHz OBW 3.485574923 MHz Date: 18.OCT.2021 16:36:26</p> |  <p>Ref 25 dBm * Att 20 dB * RBW 200 kHz * VBW 1 MHz * SWT 40 ms Offset 9 dB Temp 1 [T1] 13.07 dBm 2.536153846 GHz Temp 2 [T2] 9.29 dBm 2.528221154 GHz OBW 3.557694306 MHz Date: 18.OCT.2021 16:36:53</p> | |

LTE band 7, 20MHz (99%)

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | |
|---|--|--------|
| 2535.0 | QPSK | 16QAM |
| | 17.981 | 17.981 |
| QPSK (99% BW) | 16QAM (99% BW) | |
|  <p>RBW 200 kHz VBW 1 MHz SWT 40 ms Ref 25 dBm Offset 21.8 dB Att 20 dB Center 2.535 GHz Span 60 MHz Temp 1 (T1) 23.51 dBm Temp 2 (T1) 23.24 dBm OBW 2.534326923 GHz 2.526051692 GHz 2.544033462 GHz</p> |  <p>RBW 200 kHz VBW 1 MHz SWT 40 ms Ref 25 dBm Offset 21.8 dB Att 20 dB Center 2.535 GHz Span 60 MHz Temp 1 (T1) 21.82 dBm Temp 2 (T1) 21.87 dBm OBW 2.534326923 GHz 2.525961538 GHz 2.543942308 GHz</p> | |
| Date: 13.AUG.2021 14:45:31 | Date: 13.AUG.2021 14:45:58 | |

LTE band 38, 5MHz (99%)

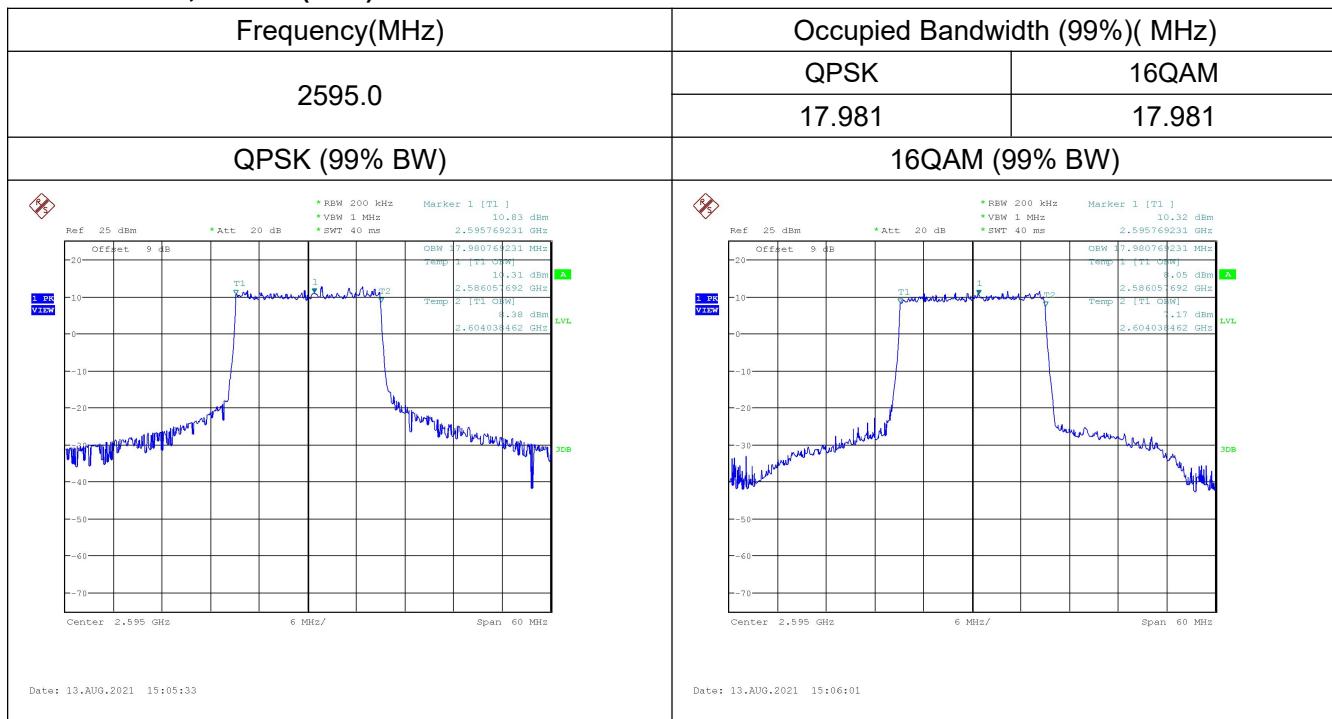
| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | |
|--|--|-------|
| 2595.0 | QPSK | 16QAM |
| | 4.495 | 4.471 |
| QPSK (99% BW) | 16QAM (99% BW) | |
|  <p>RBW 50 kHz VBW 200 kHz SWT 40 ms Ref 25 dBm Offset 9 dB Att 20 dB Center 2.595 GHz Span 15 MHz Temp 1 (T1) 10.08 dBm Temp 2 (T1) 7.78 dBm OBW 2.595769231 GHz 2.592764423 GHz 2.597259615 GHz</p> |  <p>RBW 50 kHz VBW 200 kHz SWT 40 ms Ref 25 dBm Offset 9 dB Att 20 dB Center 2.595 GHz Span 15 MHz Temp 1 (T1) 8.71 dBm Temp 2 (T1) 4.86 dBm OBW 2.595769231 GHz 2.592764423 GHz 2.597259577 GHz</p> | |
| Date: 13.AUG.2021 15:02:29 | Date: 13.AUG.2021 15:02:56 | |

LTE band 38, 10MHz (99%)

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | |
|----------------------------|--------------------------------|----------------------------|
| 2595.0 | QPSK | 16QAM |
| | 8.942 | 8.99 |
| QPSK (99% BW) | | 16QAM (99% BW) |
| | | |
| Date: 13.AUG.2021 15:03:30 | | Date: 13.AUG.2021 15:03:58 |

LTE band 38, 15MHz (99%)

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | |
|----------------------------|--------------------------------|----------------------------|
| 2595.0 | QPSK | 16QAM |
| | 13.486 | 13.486 |
| QPSK (99% BW) | | 16QAM (99% BW) |
| | | |
| Date: 13.AUG.2021 15:04:32 | | Date: 13.AUG.2021 15:04:59 |

LTE band 38, 20MHz (99%)


6.5. Emission Bandwidth

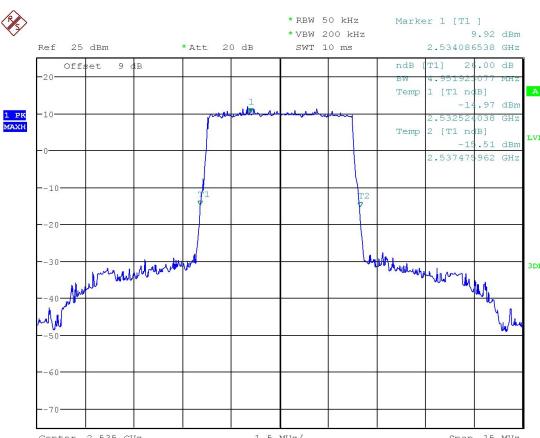
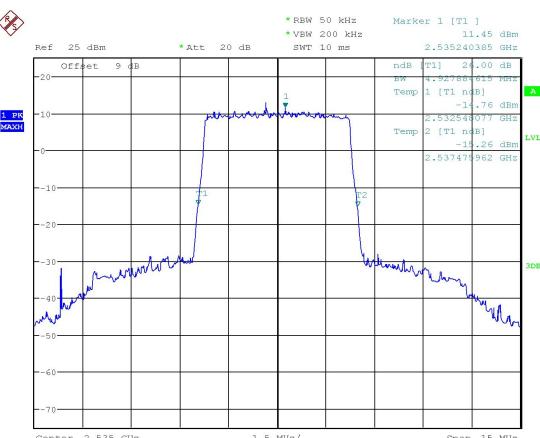
Reference

CFR Part 27.53(g), 27.53(h), 27.53(m)

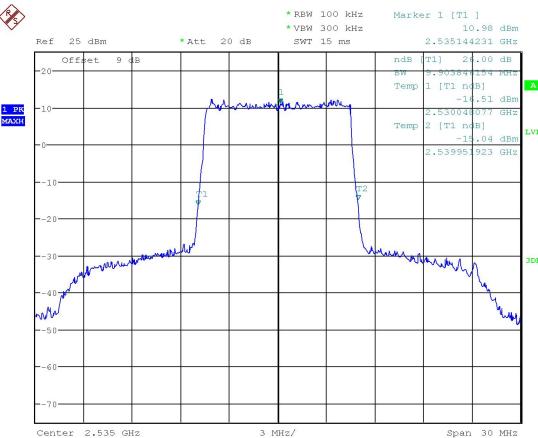
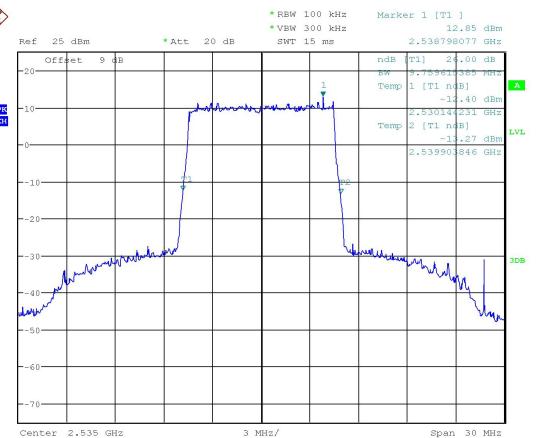
6.5.1 Emission Bandwidth Results

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

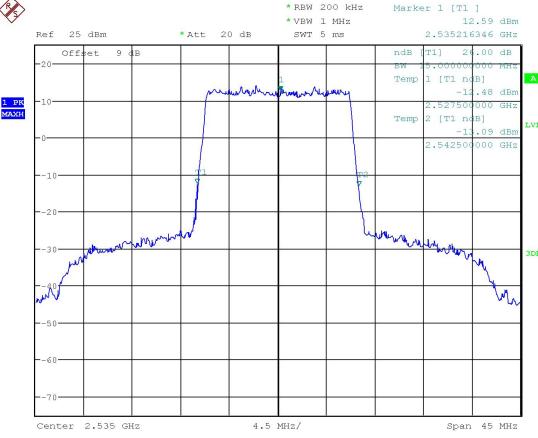
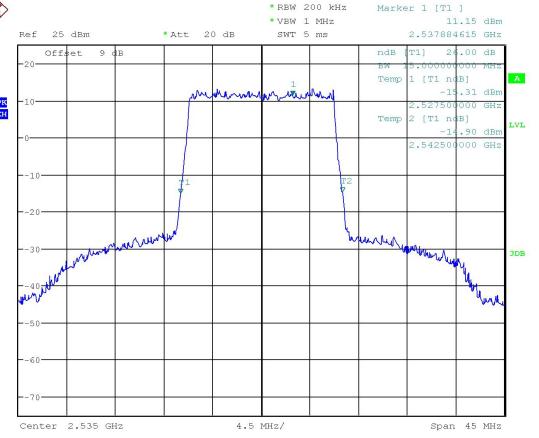
LTE band 7, 5MHz (-26dBc)

| Frequency(MHz) | Occupied Bandwidth (-26dBc)(MHz) | |
|--|--|---------------|
| 2535.0 | QPSK | 16QAM |
| | 4.95 | 4.93 |
| QPSK (-26dBc) | | 16QAM(-26dBc) |
|  <p>Ref 25 dBm *Att 20 dB Marker 1 [T1] 9.92 dBm RBW 50 kHz VBW 200 kHz SWT 10 ms Offset 9 dB 2.534086538 GHz Temp 1 [T1 dBm] -14.97 dBm Temp 2 [T1 dBm] -15.51 dBm ndB T1) 24.00 dB BW 0.03220577 MHz 2.534086538 GHz 2.537475962 GHz</p> |  <p>Ref 25 dBm *Att 20 dB Marker 1 [T1] 11.45 dBm RBW 50 kHz VBW 200 kHz SWT 10 ms Offset 9 dB 2.535240385 GHz Temp 1 [T1 dBm] -14.76 dBm Temp 2 [T1 dBm] -15.26 dBm ndB T1) 24.80 dB BW 0.03220577 MHz 2.535240385 GHz 2.537475962 GHz</p> | |
| Date: 18.AUG.2021 11:03:51 | Date: 18.AUG.2021 11:04:50 | |

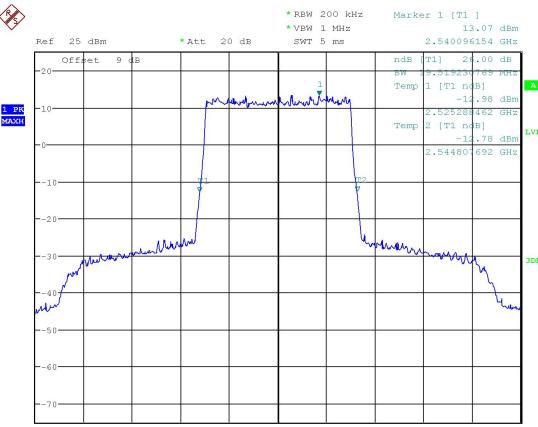
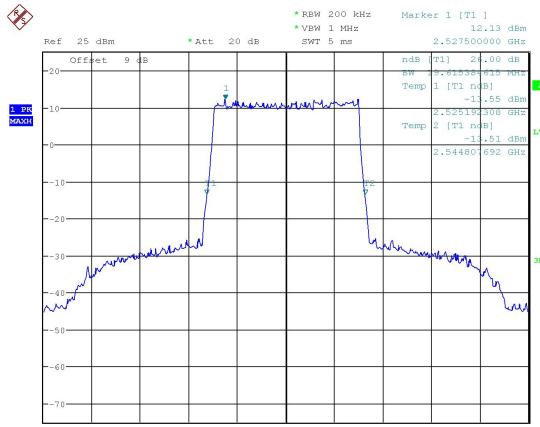
LTE band 7, 10MHz (-26dBc)

| Frequency(MHz) | | Occupied Bandwidth (-26dBc)(MHz) | |
|---|--|--|-------|
| 2535.0 | | QPSK | 16QAM |
| 9.90 | | 9.76 | |
| QPSK (-26dBc) | | 16QAM(-26dBc) | |
|  | |  | |
| Date: 18.AUG.2021 11:05:55 | | Date: 18.AUG.2021 11:06:54 | |

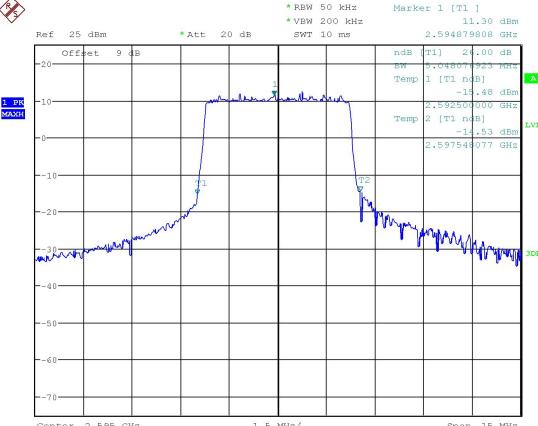
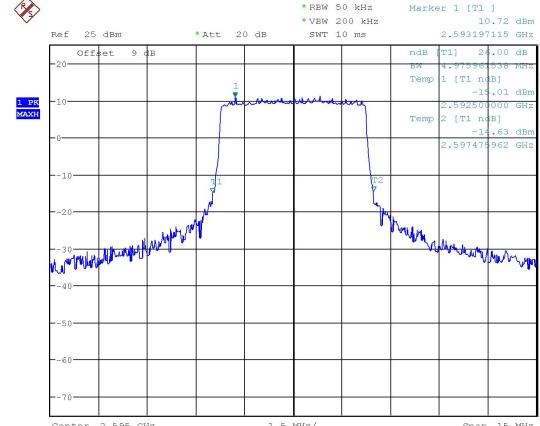
LTE band 7, 15MHz (-26dBc)

| Frequency(MHz) | | Occupied Bandwidth (-26dBc)(MHz) | |
|---|--|--|-------|
| 2535.0 | | QPSK | 16QAM |
| 15.00 | | 15.00 | 15.00 |
| QPSK (-26dBc) | | 16QAM(-26dBc) | |
|  | |  | |
| Date: 18.AUG.2021 11:08:00 | | Date: 18.AUG.2021 11:08:59 | |

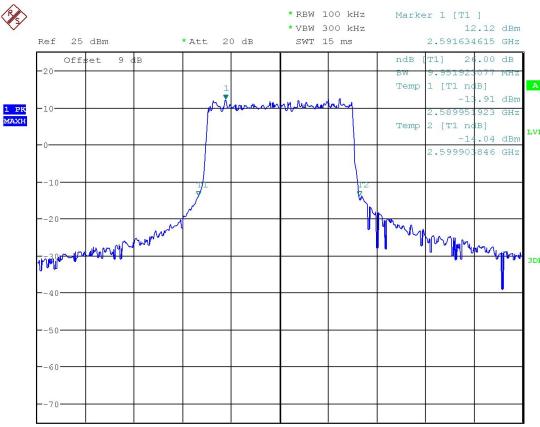
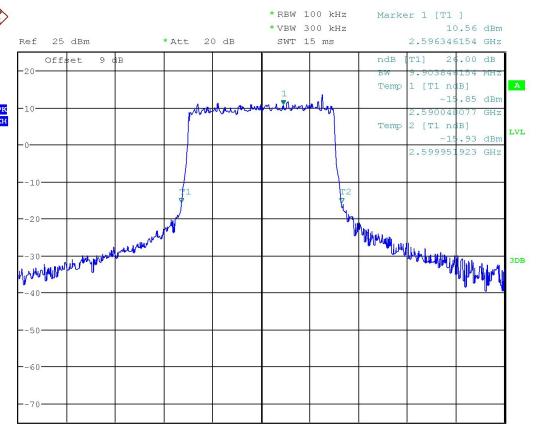
LTE band 7, 20MHz (-26dBc)

| Frequency(MHz) | | Occupied Bandwidth (-26dBc)(MHz) | |
|---|--|--|-------|
| 2535.0 | | QPSK | 16QAM |
| 19.52 | | 19.62 | |
| QPSK (-26dBc) | | 16QAM(-26dBc) | |
|  <p>RBW 200 kHz, VBW 1 MHz, SWT 5 ms, Center 2.535 GHz, Span 60 MHz, Ref 25 dBm, Att 20 dB, Offset 9 dB. Marker 1 [T1] 13.07 dBm, ndB [T1] 24.00 dB, BW 2.5252533789.101 MHz, Temp 1 [T1 dBm] -12.98 dBm, Temp 2 [T1 dBm] -12.78 dBm, LVL 2.544807692 GHz.</p> | |  <p>RBW 200 kHz, VBW 1 MHz, SWT 5 ms, Center 2.535 GHz, Span 60 MHz, Ref 25 dBm, Att 20 dB, Offset 9 dB. Marker 1 [T1] 12.13 dBm, ndB [T1] 24.00 dB, BW 2.5251933915.701 MHz, Temp 1 [T1 dBm] -11.55 dBm, Temp 2 [T1 dBm] -11.51 dBm, LVL 2.544807692 GHz.</p> | |
| Date: 18.AUG.2021 11:10:05 | | Date: 18.AUG.2021 11:11:04 | |

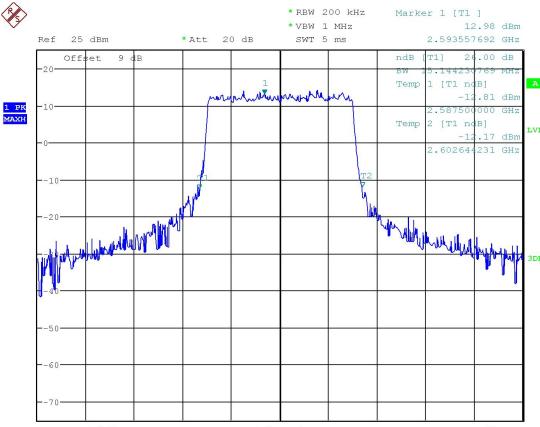
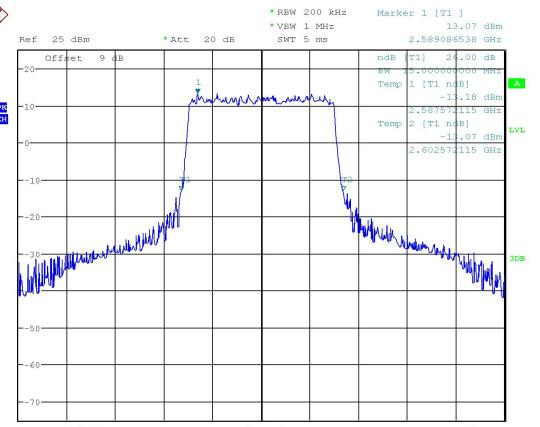
LTE band 38, 5MHz (-26dBc)

| Frequency(MHz) | | Occupied Bandwidth (-26dBc)(MHz) | |
|---|--|--|-------|
| 2595.0 | | QPSK | 16QAM |
| 5.05 | | 4.98 | |
| QPSK (-26dBc) | | 16QAM(-26dBc) | |
|  <p>RBW 50 kHz, VBW 200 kHz, SWT 10 ms, Center 2.595 GHz, Span 15 MHz, Ref 25 dBm, Att 20 dB, Offset 9 dB. Marker 1 [T1] 11.30 dBm, ndB [T1] 24.00 dB, BW 2.5925000000 GHz, Temp 1 [T1 dBm] -15.48 dBm, Temp 2 [T1 dBm] -14.53 dBm, LVL 2.597548077 GHz.</p> | |  <p>RBW 50 kHz, VBW 200 kHz, SWT 10 ms, Center 2.595 GHz, Span 15 MHz, Ref 25 dBm, Att 20 dB, Offset 9 dB. Marker 1 [T1] 10.01 dBm, ndB [T1] 24.00 dB, BW 2.5925000000 GHz, Temp 1 [T1 dBm] -15.01 dBm, Temp 2 [T1 dBm] -14.63 dBm, LVL 2.597475962 GHz.</p> | |
| Date: 18.AUG.2021 11:13:08 | | Date: 18.AUG.2021 11:14:07 | |

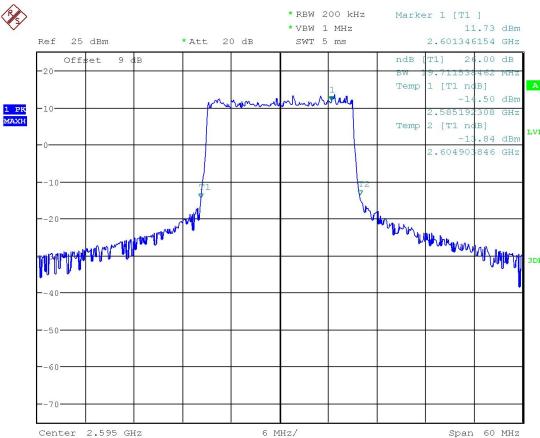
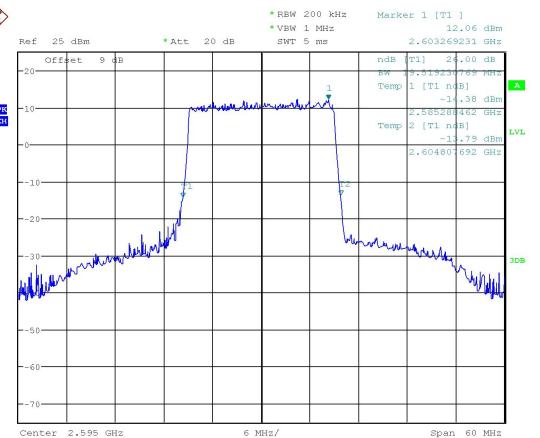
LTE band 38, 10MHz (-26dBc)

| Frequency(MHz) | Occupied Bandwidth (-26dBc)(MHz) | |
|--|---|---------------|
| 2595.0 | QPSK | 16QAM |
| | 9.95 | 9.90 |
| QPSK (-26dBc) | | 16QAM(-26dBc) |
|  <p>RBW 100 kHz VBW 300 kHz SWT 15 ms Ref 25 dBm Offset 9 dB Att 20 dB Temp 1 [T1 dB] 24.00 dB Temp 2 [T1 dB] -13.91 dBm ndB [T1] 24.00 dB BW 0.951524077 GHz Marker 1 [T1] 12.12 dBm 2.591634615 GHz Temp 1 [T1 dB] -13.91 dBm Temp 2 [T1 dB] -14.04 dBm 2.599901846 GHz LVL</p> |  <p>RBW 100 kHz VBW 300 kHz SWT 15 ms Ref 25 dBm Offset 9 dB Att 20 dB Temp 1 [T1 dB] 24.00 dB Temp 2 [T1 dB] -15.85 dBm ndB [T1] 24.00 dB BW 0.953684154 GHz Marker 1 [T1] 10.56 dBm 2.596346154 GHz Temp 1 [T1 dB] -15.85 dBm Temp 2 [T1 dB] -15.93 dBm 2.599951923 GHz LVL</p> | |
| Date: 18.AUG.2021 11:15:12 | Date: 18.AUG.2021 11:16:11 | |

LTE band 38, 15MHz (-26dBc)

| Frequency(MHz) | Occupied Bandwidth (-26dBc)(MHz) | |
|---|--|---------------|
| 2595.0 | QPSK | 16QAM |
| | 15.14 | 15.00 |
| QPSK (-26dBc) | | 16QAM(-26dBc) |
|  <p>RBW 200 kHz VBW 1 MHz SWT 5 ms Ref 25 dBm Offset 9 dB Att 20 dB Temp 1 [T1 dB] 24.00 dB Temp 2 [T1 dB] -13.81 dBm ndB [T1] 24.00 dB BW 0.144239789 GHz Marker 1 [T1] 12.98 dBm 2.593557692 GHz Temp 1 [T1 dB] -13.81 dBm Temp 2 [T1 dB] -13.17 dBm 2.602644231 GHz LVL</p> |  <p>RBW 200 kHz VBW 1 MHz SWT 5 ms Ref 25 dBm Offset 9 dB Att 20 dB Temp 1 [T1 dB] 24.00 dB Temp 2 [T1 dB] -13.18 dBm ndB [T1] 24.00 dB BW 0.000000000 GHz Marker 1 [T1] 13.07 dBm 2.589086538 GHz Temp 1 [T1 dB] -13.18 dBm Temp 2 [T1 dB] -13.07 dBm 2.602572115 GHz LVL</p> | |
| Date: 18.AUG.2021 11:17:17 | Date: 18.AUG.2021 11:18:16 | |

LTE band 38, 20MHz (-26dBc)

| Frequency(MHz) | Occupied Bandwidth (-26dBc)(MHz) | |
|--|-----------------------------------|----------------------------|
| 2595.0 | QPSK | 16QAM |
| | 19.71 | 19.52 |
| QPSK (-26dBc) | | 16QAM(-26dBc) |
|  | | |
|  | | |
| Date: 18.AUG.2021 11:19:22 | | Date: 18.AUG.2021 11:20:21 |

6.6. Band Edge Compliance

Reference

CFR Part 27.53(g), 27.53(h), 27.53(m)

6.6.1 Measurement limit

Part 27.53(g), 27.53(h), 27.53(m) state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least $43 + 10 \log (P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

According to KDB 971168 6, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

Part 27.53(m) states that for mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.