# FCC RF Test Report

| | |
|---|---|
| APPLICANT | : Motorola Mobility LLC |
| EQUIPMENT | : Mobile Cellular Phone |
| BRAND NAME | : Motorola |
| MODEL NAME | : XT2453-1 |
| FCC ID | : IHDT56AR8 |
| STANDARD | : 47 CFR Part 2, 27(M) |
| CLASSIFICATION | : PCS Licensed Transmitter Held to Ear (PCE) |
| TEST DATE(S) | : Mar. 30, 2024 ~ Apr. 29, 2024 |

**We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown 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. (Kunshan), the test report shall not be reproduced except in full.**

Jason Jia

**Approved by: Jason Jia**

ACCREDITED Cert #5145.02

***Sporton International Inc. (Kunshan)***
***No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300***
***People's Republic of China***

# TABLE OF CONTENTS

# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FG422203-01A | Rev. 01 | Initial issue of report | Apr. 30, 2024 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|
| 3.4 | §2.1046 | Conducted Output Power | - | Report Only | - |
| | §27.50(h)(2) | Equivalent Isotropic Radiated Power (Band 38) | EIRP < 2Watt | PASS | - |
| 3.5 | N/A | Peak-to-Average Ratio | <13 dB | PASS | - |
| 3.6 | §2.1049 | Occupied Bandwidth | - | Report Only | - |
| 3.7 | §27.53(m)(4) | Conducted Band Edge Measurement (Band 38) | §27.53(m)(4) | PASS | - |
| 3.8 | §2.1051 §27.53(m)(4) | Conducted Spurious Emission (Band 38) | < $55+10\log_{10}$(P[Watts]) | PASS | - |
| 3.9 | §2.1055 §27.54 | Frequency Stability Temperature & Voltage | Within Authorized Band | PASS | - |
| 4.4 | §2.1053 §27.53(m)(4) | Radiated Spurious Emission (Band 38) | < $55+10\log_{10}$(P[Watts]) | PASS | Under limit 35.92 dB at 10300.00 MHz |

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

# 1 General Description

## 1.1 Applicant

**Motorola Mobility LLC**
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

## 1.2 Manufacturer

**Motorola Mobility LLC**
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

## 1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | Mobile Cellular Phone |
| **Brand Name** | Motorola |
| **Model Name** | XT2453-1 |
| **FCC ID** | IHDT56AR8 |
| **IMEI Code** | Conducted: 354373470016752<br>Radiation: 354373470019434/354373470019442 |
| **HW Version** | DVT2 |
| **SW Version** | U3UC34.23 |
| **EUT Stage** | Identical Prototype |

## 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification | |
|---|---|
| **Tx Frequency** | LTE Band 38 : 2570 MHz ~ 2620 MHz |
| **Rx Frequency** | LTE Band 38: 2570 MHz ~ 2620 MHz |
| **Bandwidth** | LTE Band 38 : 5MHz / 10MHz / 15MHz / 20MHz |
| **Maximum Output Power to Antenna** | Ant0: LTE CA_38C : 23.55 dBm<br>Ant1: LTE CA_38C : 22.96 dBm<br>Ant2: LTE CA_38C : 23.21 dBm<br>Ant3: LTE CA_38C : 22.98 dBm |
| **Antenna Gain** | Ant0:LTE Band 38 : 0.01 dBi<br>Ant1:LTE Band 38 : -0.66 dBi<br>Ant2:LTE Band 38 : -3.13 dBi<br>Ant3:LTE Band 38 : -3.3 dBi |
| **Type of Modulation** | QPSK / 16QAM / 64QAM / 256QAM |

**Note:** The maximum EIRP is calculated from max output power and max antenna gain, so only the maximum EIRP of Ant.1 for LTE Band 38C is shown in the report.

## 1.5 Modification of EUT

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

## 1.6 Specification of Accessory

| Specification of Accessory | | | | |
|---|---|---|---|---|
| **AC Adapter 1(US)** | **Brand Name** | Motorola(Chenyang) | **Model Name** | MC-331 |
| **AC Adapter 1(EU)** | **Brand Name** | Motorola(Chenyang) | **Model Name** | MC-332 |
| **AC Adapter 1(AU)** | **Brand Name** | Motorola(Chenyang) | **Model Name** | MC-335 |
| **AC Adapter 1(AR)** | **Brand Name** | Motorola(Chenyang) | **Model Name** | MC-336 |
| **AC Adapter 1(BR)** | **Brand Name** | Motorola(Chenyang) | **Model Name** | MC-337 |
| **AC Adapter 1(PRC)** | **Brand Name** | Motorola(Chenyang) | **Model Name** | MC-338 |
| **AC Adapter 2(US)** | **Brand Name** | Motorola(AOHAI) | **Model Name** | MC-331 |
| **AC Adapter 2(EU)** | **Brand Name** | Motorola(AOHAI) | **Model Name** | MC-332 |
| **AC Adapter 2(UK)** | **Brand Name** | Motorola(AOHAI) | **Model Name** | MC-333 |
| **AC Adapter 2(IN)** | **Brand Name** | Motorola(AOHAI) | **Model Name** | MC-334 |
| **AC Adapter 3(US)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-331 |
| **AC Adapter 3(EU)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-332 |
| **AC Adapter 3(UK)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-333 |
| **AC Adapter 3(IN)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-334 |
| **AC Adapter 3(AU)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-335 |
| **AC Adapter 3(AR)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-336 |
| **AC Adapter 3(BR)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-337 |
| **AC Adapter 3(PRC)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-338 |
| **AC Adapter 3(CHILE)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-339 |
| **AC Adapter 3(KR)** | **Brand Name** | Motorola(Salcomp) | **Model Name** | MC-330 |
| **AC Adapter 4(IN)** | **Brand Name** | Motorola(XIHI) | **Model Name** | MC-334 |
| **AC Adapter 5(BR)** | **Brand Name** | Motorola(Cliptech) | **Model Name** | MC-337 |
| **Battery 1** | **Brand Name** | Motorola(ATL) | **Model Name** | QR11 |
| **Battery 2** | **Brand Name** | Motorola(ATL) | **Model Name** | QR31 |
| **USB Cable 1** | **Brand Name** | Motorola(Saibao) | **Model Name** | SC18D22297 |
| **USB Cable 2** | **Brand Name** | Motorola(Cabletech) | **Model Name** | SC18D22298 |
| **Wireless Earphones** | **Brand Name** | Motorola | **Model Name** | XT2441-1 |

## 1.7 Maximum EIRP Power and Emission Designator

| LTE Band 38 CA | QPSK | | 16QAM/64QAM/256QAM | |
|---|---|---|---|---|
| BW (MHz) | Maximum EIRP(W) | Emission Designator (99%OBW) | Maximum EIRP(W) | Emission Designator (99%OBW) |
| 15MHz+15MHz | 0.2123 | 28M7G7D | 0.1718 | 28M4W7D |
| 20MHz+20MHz | 0.2270 | 37M7G7D | 0.1816 | 37M7W7D |

**Note:** All modulations have been tested, and only the worst test results of PSK & QAM are shown in the report.

## 1.8 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

| | | | |
|---|---|---|---|
| **Test Firm** | Sporton International Inc. (Kunshan) | | |
| **Test Site Location** | No. 1098, Pengxi North Road, Kunshan Economic Development Zone<br>Jiangsu Province 215300 People's Republic of China<br>TEL : +86-512-57900158 | | |
| **Test Site No.** | **Sporton Site No.** | **FCC Designation No.** | **FCC Test Firm Registration No.** |
| | 03CH04-KS<br>TH01-KS | CN1257 | 314309 |

## 1.9 Test Software

| Item | Site | Manufacture | Name | Version |
|---|---|---|---|---|
| 1. | TH01-KS | SPORTON | FCC LTE_Ver2.0 Auto_china_210503 | 2.0 |
| 2. | 03CH04-KS | AUDIX | E3 | 210616 |

## 1.10 Applicable Standards

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

- 47 CFR Part 2, 27(M)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

**Remark:**

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

# 2 Test Configuration of Equipment Under Test

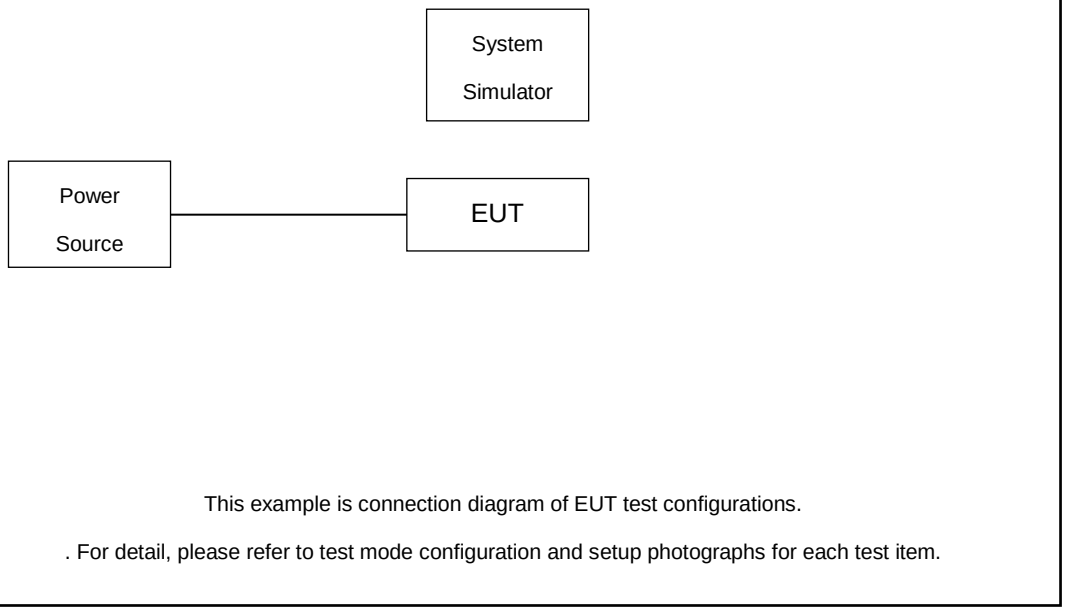
## 2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (Y-Plane)

| Test Items | Band | Bandwidth (MHz) | | | | | | | | | | Modulation | | | | RB # | | | Test Channel | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 20+20 | 20+15 | 15+20 | 20+10 | 10+20 | 20+5 | 5+20 | 15+15 | 15+10 | 10+15 | QPSK | 16 QAM | 64 QAM | 256 QAM | 1 | Half | Full | L | M | H |
| Max. Output Power | 38C_CA | v | - | - | - | - | - | - | v | - | - | v | v | v | v | v | | | v | v | v |
| Peak-to-Average Ratio | 38C_CA | v | | | | | | | | | | v | v | v | v | | | v | | v | |
| 26dB and 99% Bandwidth | 38C_CA | v | - | - | - | - | - | - | v | - | - | v | v | | | | | v | | v | |
| Conducted Band Edge | 38C_CA | v | - | - | - | - | - | - | v | - | - | v | v | v | v | v | | v | v | | v |
| Conducted Spurious Emission | 38C_CA | v | - | - | - | - | - | - | v | - | - | v | | | | v | | | v | v | v |
| E.I.R.P. | 38C_CA | v | - | - | - | - | - | - | v | - | - | v | v | v | v | v | | | v | v | v |
| Frequency Stability | 38C_CA | v | - | - | - | - | - | - | | - | - | v | | | | v | | | | v | |
| Radiated Spurious Emission | 38C_CA | Worst Case | | | | | | | | | | | | | | | | | | v | |
| Note | 1. The mark "**v** " means that this configuration is chosen for testing<br>2. The mark "-" means that this bandwidth is not supported.<br>3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. | | | | | | | | | | | | | | | | | | | | |

## 2.2 Connection Diagram of Test System




This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

## 2.3 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model No. | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | Power Supply | GWINSTEK | PSS-2002 | N/A | N/A | Unshielded, 1.8 m |
| 2. | LTE Base Station | 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 between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

*Offset = RF cable loss.*

Following shows an offset computation example with cable loss 6.0 dB.

Example :

*Offset(dB) = RF cable loss(dB).*

= 6.0 (dB)

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

| LTE Band 38C_CA Channel and Frequency List | | | | | |
|---|---|---|---|---|---|
| **BW [MHz]** | **Channel/Frequency(MHz)** | | **Lowest** | **Middle** | **Highest** |
| 20 + 20 | PCC | Channel | 37850 | 37901 | 37952 |
| | | Frequency | 2580.0 | 2585.1 | 2590.2 |
| | SCC | Channel | 38048 | 38099 | 38150 |
| | | Frequency | 2599.8 | 2604.9 | 2610.0 |
| 15+ 15 | PCC | Channel | 37825 | 37925 | 38025 |
| | | Frequency | 2577.5 | 2587.5 | 2597.5 |
| | SCC | Channel | 37975 | 38075 | 38175 |
| | | Frequency | 2592.5 | 2602.5 | 2612.5 |

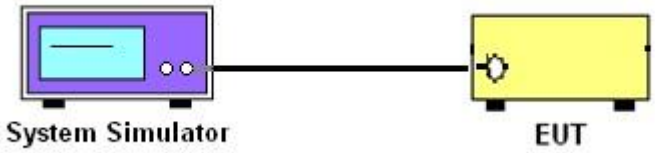
# 3 Conducted Test Items

## 3.1 Measuring Instruments

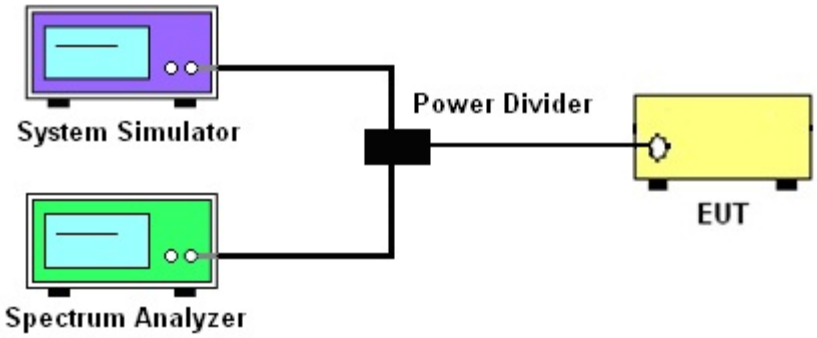
See list of measuring instruments of this test report.

## 3.2 Test Setup

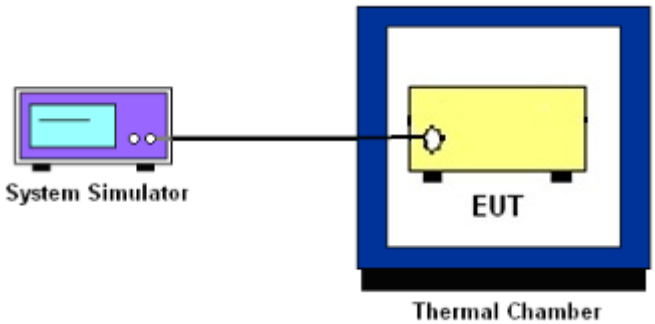
### 3.2.1 Conducted Output Power




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




### 3.2.3 Frequency Stability




## 3.3 Test Result of Conducted Test

Please refer to Appendix A.

## 3.4 Conducted Output Power and EIRP

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

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

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 38.

According to KDB 412172 D01 Power Approach,

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

$P_T$ = transmitter output power in dBm

$G_T$ = gain of the transmitting antenna in dBi

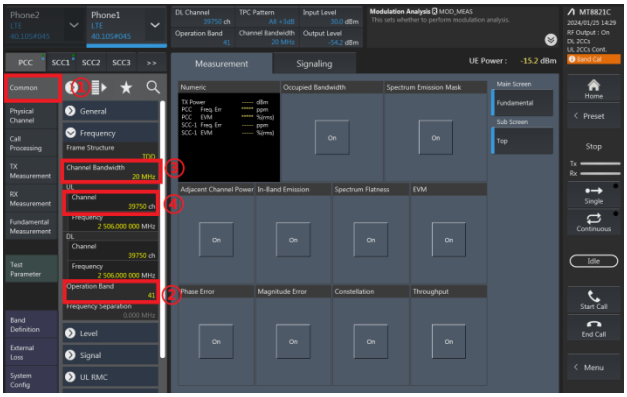
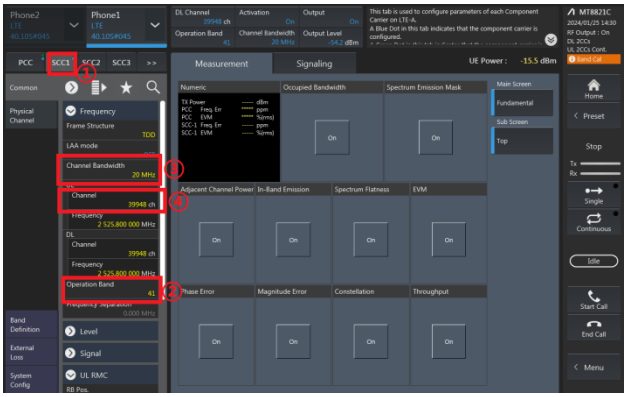
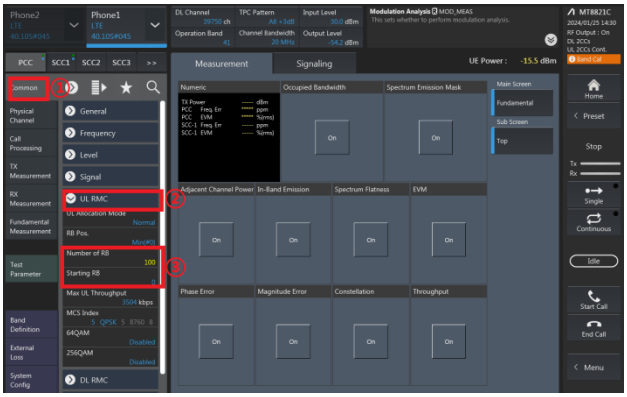
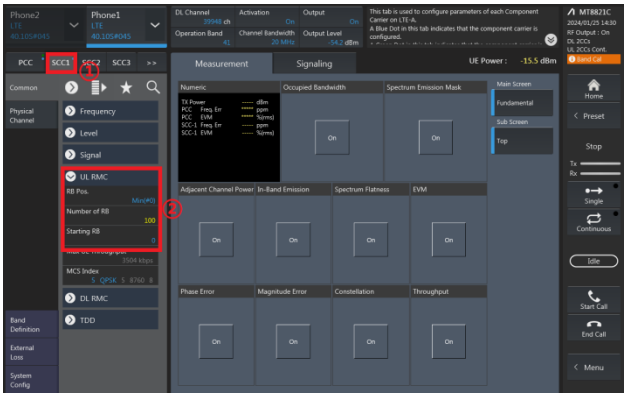
$L_C$ = signal attenuation in the connecting cable between the transmitter and antenna in dB

### 3.4.2 Test Procedures

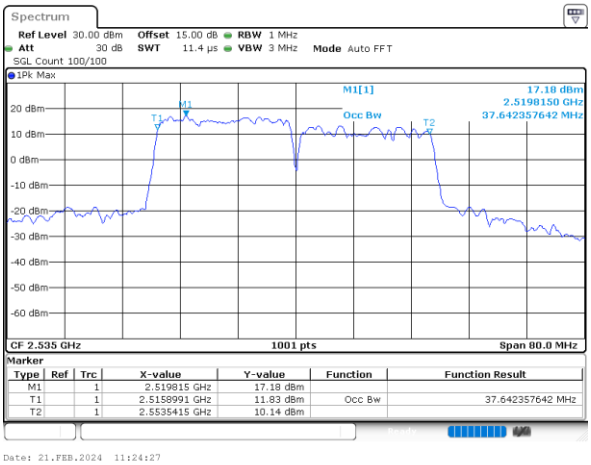
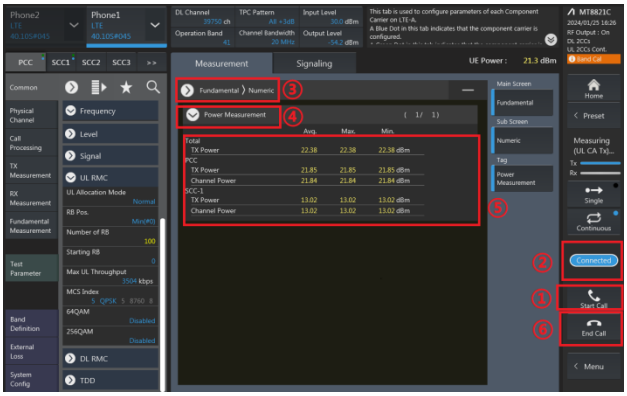
1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

### 3.4.3 Test Procedures for LTE ULCA

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter PCC & SCC output ports were connected to the system simulator.
3. Set EUT at maximum power, set the PCC/SCC CA band, channel, bandwidth and RB config.

| PCC config_(Channel Bandwidth / Channel / Band) | SCC config_(Channel Bandwidth / Channel / Band) |
|---|---|
|  |  |
| **PCC config_(Number of RB / Starting RB)** | **SCC config_(Number of RB / Starting RB)** |
|  |  |

4. Select lowest, middle, and highest channels for each ULCA band and different modulation.
5. Check the ULCA spectrum and record the total power from the system simulator.

| Check the ULCA spectrum (eg. 20M+20M) | Read the Total UL CA output power (PCC+SCC) |
|---|---|
|  |  |

## 3.5 Peak-to-Average Ratio

### 3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

# 3.6 Occupied Bandwidth

## 3.6.1 Description of Occupied Bandwidth Measurement

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

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

## 3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

# 3.7 Conducted Band Edge

## 3.7.1 Description of Conducted Band Edge Measurement

27.53(m)(4)

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

## 3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1%/2% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.
   Example:
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
9. For LTE Band 38, the other 40 dB, and 55 dB have additionally applied same calculation above.
10. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.

# 3.8 Conducted Spurious Emission

## 3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For Band 38:

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

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its $10^{th}$ harmonic.

## 3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. 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.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
11. For Band 38
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55+ 10log(P)] (dB)
    = [30+ 10log(P)] (dBm) - [55+ 10log(P)] (dB)
    = -25dBm.

# 3.9 Frequency Stability

## 3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block.

## 3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. 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.

## 3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

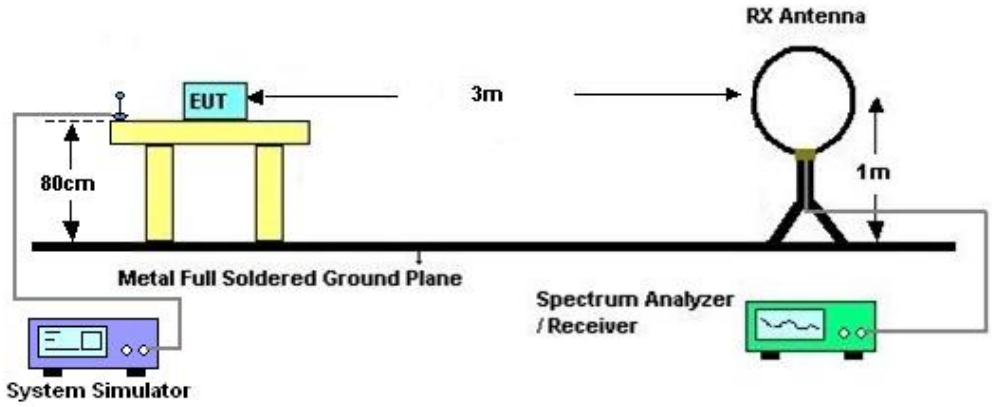
# 4 Radiated Test Items

## 4.1 Measuring Instruments

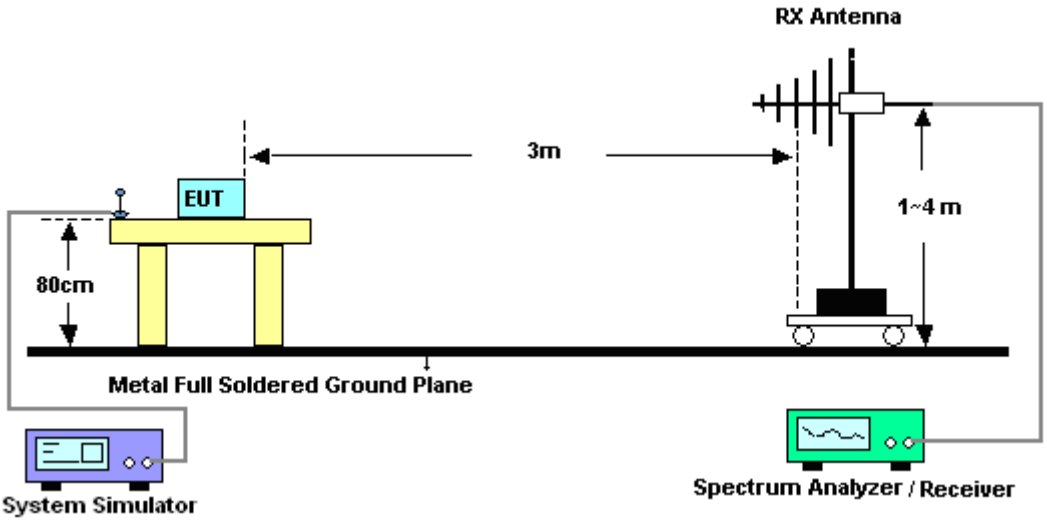
See list of measuring instruments of this test report.

## 4.2 Test Setup

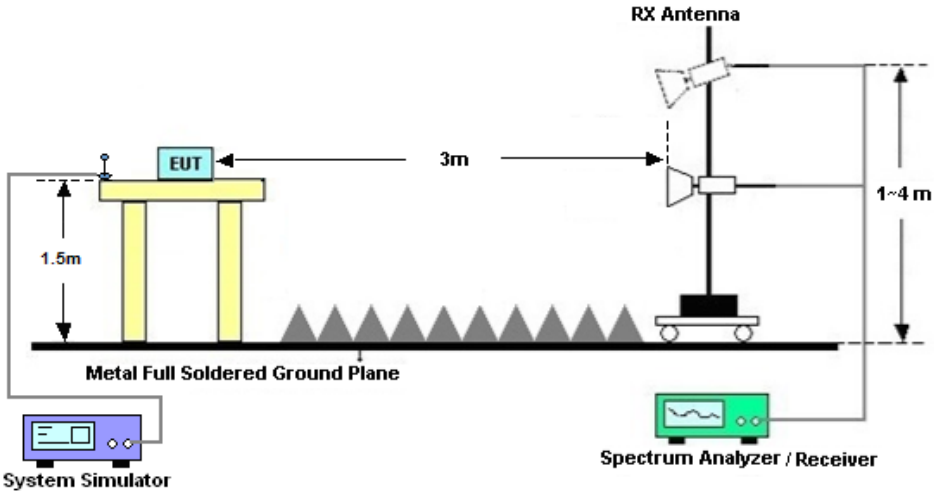
### 4.2.1 For radiated test below 30MHz




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



### 4.2.3 For radiated test above 1GHz




## 4.3 Test Result of Radiated Test

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.

Please refer to Appendix B.

# 4.4 Radiated Spurious Emission

## 4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. 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 (P) dB.

For Band 38

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

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

## 4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
13. For Band 38:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

# 5 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSV40 | 101040 | 10Hz~40GHz | Oct. 11, 2023 | Apr. 02, 2024~ Apr. 29, 2024 | Oct. 10, 2024 | Conducted (TH01-KS) |
| Power divider | STI | STI08-0055 | - | 0.5~40GHz | NCR | Apr. 02, 2024~ Apr. 29, 2024 | NCR | Conducted (TH01-KS) |
| Temperature &humidity chamber | Hongzhan | LP-150U | H2014011440 | -40~+150°C 20%~95%RH | Jul. 06, 2023 | Apr. 02, 2024~ Apr. 29, 2024 | Jul. 05, 2024 | Conducted (TH01-KS) |
| EXA Spectrum Analyzer | Keysight | N9010B | MY57471079 | 10Hz-44G,MAX 30dB | Oct. 10, 2023 | Mar. 30, 2024 | Oct. 09, 2024 | Radiation (03CH04-KS) |
| Loop Antenna | R&S | HFH2-Z2E | 101125 | 9kHz~30MHz | Sep. 11, 2023 | Mar. 30, 2024 | Sep. 10, 2024 | Radiation (03CH04-KS) |
| Bilog Antenna | TeseQ | CBL6111D | 49922 | 30MHz-1GHz | Apr. 09, 2023 | Mar. 30, 2024 | Apr. 08, 2024 | Radiation (03CH04-KS) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 00251694 | 1GHz~18GHz | Jul. 12, 2023 | Mar. 30, 2024 | Jul. 11, 2024 | Radiation (03CH04-KS) |
| SHF-EHF Horn | Com-power | AH-840 | 101070 | 18GHz~40GHz | Jan. 05, 2024 | Mar. 30, 2024 | Jan. 04, 2025 | Radiation (03CH04-KS) |
| Amplifier | SONOMA | 310N | 380827 | 9KHz-1GHz | Jul. 06, 2023 | Mar. 30, 2024 | Jul. 05, 2024 | Radiation (03CH04-KS) |
| Amplifier | MITEQ | EM18G40GGA | 060728 | 18~40GHz | Jan. 05, 2024 | Mar. 30, 2024 | Jan. 04, 2025 | Radiation (03CH04-KS) |
| high gain Amplifier | EM | EM01G18GA | 060840 | 1Ghz-18Ghz | Oct. 10, 2023 | Mar. 30, 2024 | Oct. 09, 2024 | Radiation (03CH04-KS) |
| Amplifier | Agilent | 8449B | 3008A02370 | 1Ghz-18Ghz | Oct. 10, 2023 | Mar. 30, 2024 | Oct. 09, 2024 | Radiation (03CH04-KS) |
| AC Power Source | Chroma | 61601 | F104090004 | N/A | NCR | Mar. 30, 2024 | NCR | Radiation (03CH04-KS) |
| Turn Table | ChamPro | EM 1000-T | 060762-T | 0~360 degree | NCR | Mar. 30, 2024 | NCR | Radiation (03CH04-KS) |
| Antenna Mast | ChamPro | EM 1000-A | 060762-A | 1 m~4 m | NCR | Mar. 30, 2024 | NCR | Radiation (03CH04-KS) |

NCR: No Calibration Required

# 6 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

**Uncertainty of Conducted Measurement**

| Test Item | Uncertainty |
|---|---|
| Conducted Spurious Emission & Bandedge | ±2.26 dB |
| Occupied Channel Bandwidth | ±0.1% |
| Conducted Power | ±0.46 dB |
| Peak to Average Ratio | ±0.46 dB |
| Frequency Stability | ±0.4 ppm |

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

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 3.82dB |

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

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 3.56dB |

**Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 3.54dB |

**---------- THE END ----------**

# Appendix A. Test Results of Conducted Test

| Test Engineer : | Smile Wang | Temperature : | 22~23℃ |
|---|---|---|---|
| | | Relative Humidity : | 40~42% |

## Conducted Output Power(Average power) and EIRP

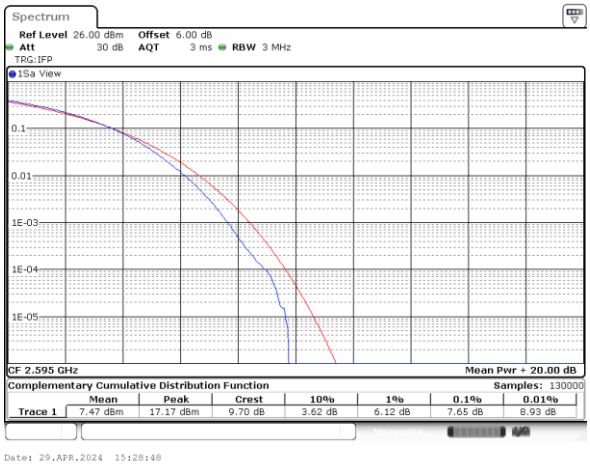
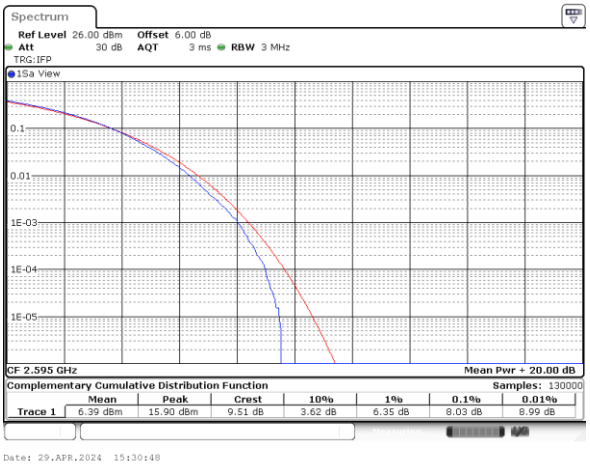
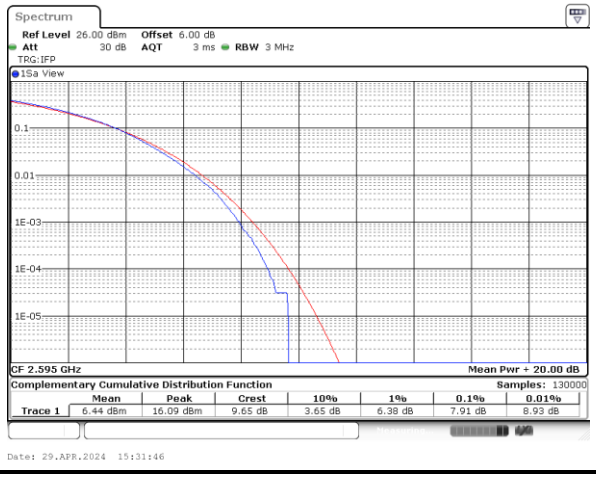
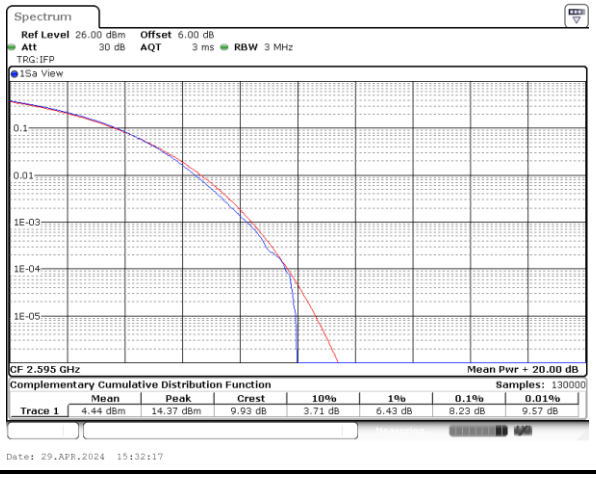
**LTE CA_38C:**

| Combination 20MHz+20MHz (100RB+100RB) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Modulation | PCC | | SCC | | Measured Power | EIRP(W) |
| | | RB Size | RB offset | RB Size | RB offset | | |
| L | QPSK | 1 | Max | 1 | 0 | 23.55 | 0.2270 |
| M | QPSK | 1 | Max | 1 | 0 | 23.36 | 0.2173 |
| H | QPSK | 1 | Max | 1 | 0 | 23.32 | 0.2153 |
| L | 16QAM | 1 | Max | 1 | 0 | 22.58 | 0.1816 |
| M | 16QAM | 1 | Max | 1 | 0 | 22.44 | 0.1758 |
| H | 16QAM | 1 | Max | 1 | 0 | 22.39 | 0.1738 |
| L | 64QAM | 1 | Max | 1 | 0 | 20.18 | 0.1045 |
| M | 64QAM | 1 | Max | 1 | 0 | 20.16 | 0.1040 |
| H | 64QAM | 1 | Max | 1 | 0 | 20.11 | 0.1028 |
| L | 256QAM | 1 | Max | 1 | 0 | 18.45 | 0.0701 |
| M | 256QAM | 1 | Max | 1 | 0 | 18.41 | 0.0695 |
| H | 256QAM | 1 | Max | 1 | 0 | 18.39 | 0.0692 |
| Combination 15MHz+15MHz (75RB+75RB) | | | | | | | |
| Channel | Modulation | PCC | | SCC | | Measured Power | EIRP(W) |
| | | RB Size | RB offset | RB Size | RB offset | | |
| L | QPSK | 1 | Max | 1 | 0 | 23.26 | 0.2123 |
| L | 16QAM | 1 | Max | 1 | 0 | 22.34 | 0.1718 |

# LTE Band 38C

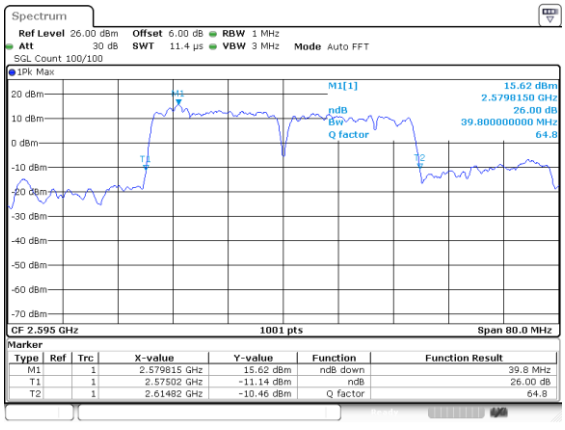
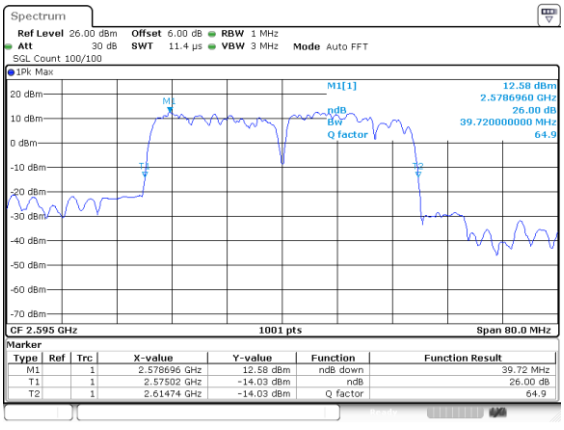
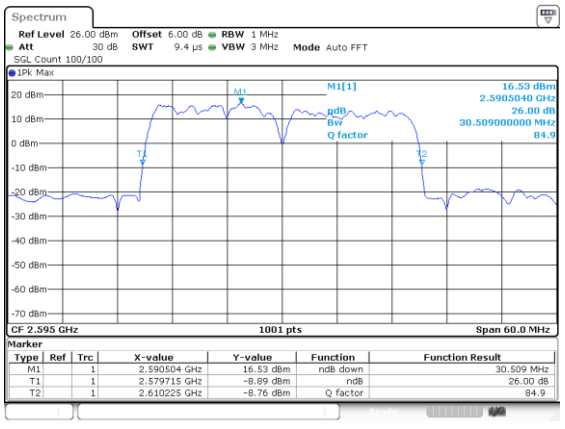
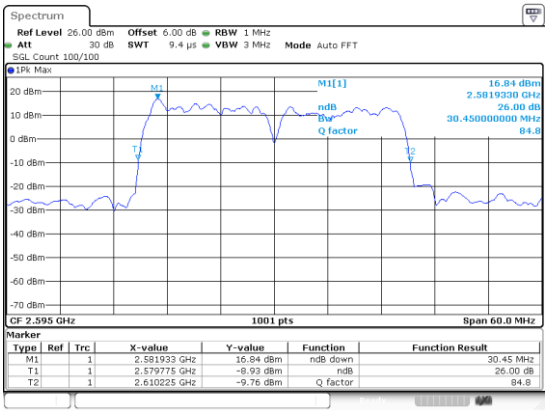
## Peak-to-Average Ratio

| Mode | LTE Band 38CA / 20+20MHz | | | | |
|---|---|---|---|---|---|
| Mod. | QPSK | 16QAM | 64QAM | 256QAM | Limit: 13dB |
| RB Size | Full RB | | | | Result |
| Middle CH | 7.65 | 8.03 | 7.91 | 8.23 | PASS |

| LTE Band 38CA / 20+20MHz / Full RB / Middle Channel | |
|---|---|
| QPSK | 16QAM |
|  |  |
| 64QAM | 256QAM |
|  |  |

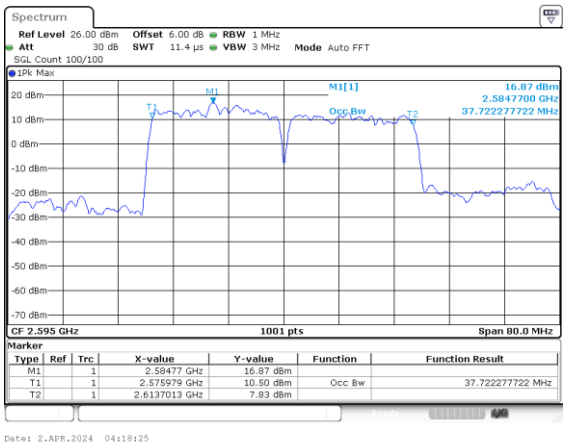
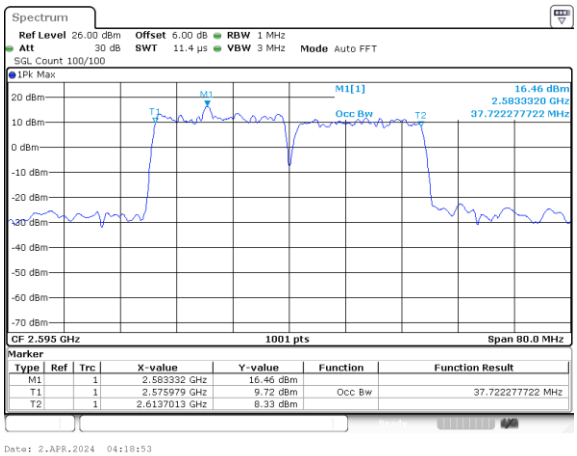
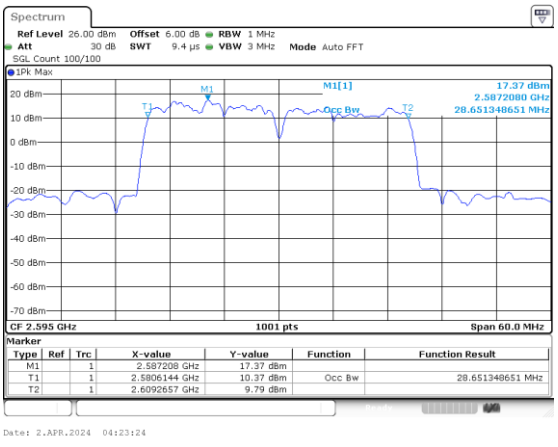
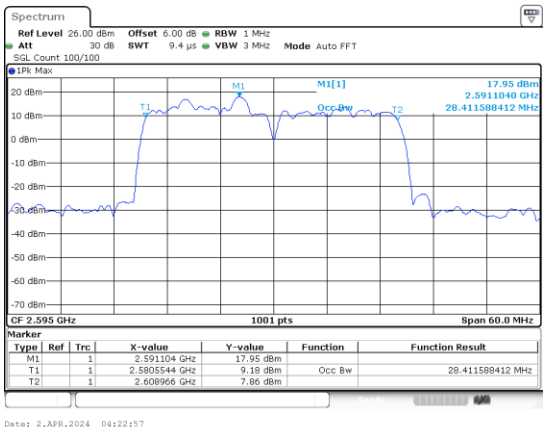
# 26dB Bandwidth

| Mode | LTE Band 38C : 26dB BW(MHz) | |
|---|---|---|
| Mod. | QPSK | 16QAM |
| BW | 20MHz+20MHz | 20MHz+20MHz |
| Middle CH | 39.8 | 39.72 |
| Mod. | QPSK | 16QAM |
| BW | 15MHz+15MHz | 15MHz+15MHz |
| Middle CH | 30.51 | 30.45 |

| LTE Band 38C | |
|---|---|
| QPSK | 16QAM |
| Middle Channel / 20MHz+20MHz | Middle Channel / 20MHz+20MHz |
|  |  |
| QPSK | 16QAM |
| Middle Channel / 15MHz+15MHz | Middle Channel / 15MHz+15MHz |
|  |  |

# Occupied Bandwidth

| Mode | LTE Band 38C : 99%OBW(MHz) | |
|---|---|---|
| Mod. | QPSK | 16QAM |
| BW | 20MHz+20MHz | 20MHz+20MHz |
| Middle CH | 37.72 | 37.72 |
| Mod. | QPSK | 16QAM |
| BW | 15MHz+15MHz | 15MHz+15MHz |
| Middle CH | 28.65 | 28.41 |

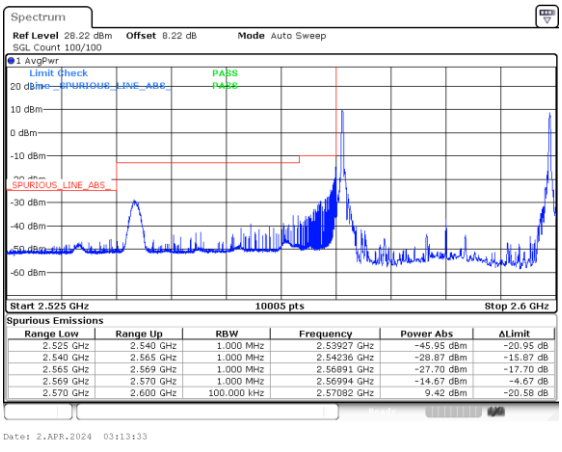
| LTE Band 38C | |
|---|---|
| QPSK | 16QAM |
| Middle Channel / 20MHz+20MHz | Middle Channel / 20MHz+20MHz |
|  |  |
| QPSK | 16QAM |
| Middle Channel / 15MHz+15MHz | Middle Channel / 15MHz+15MHz |
|  |  |

# Conducted Band Edge

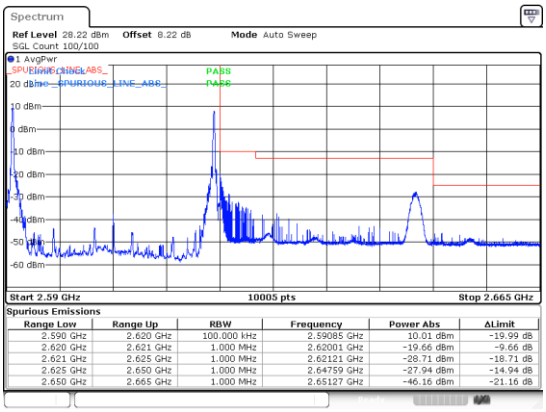
## LTE Band 38C / 15MHz+15MHz

### QPSK

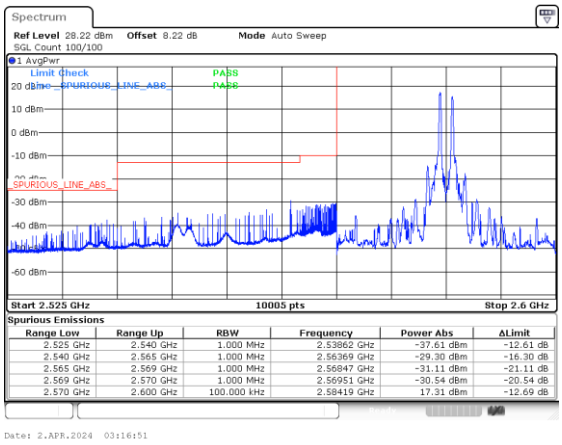
#### Lowest Band Edge / 1RB0 and 1RB74



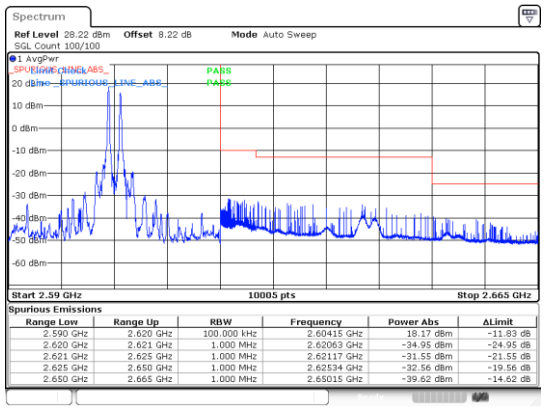

#### Highest Band Edge / 1RB0 and 1RB74



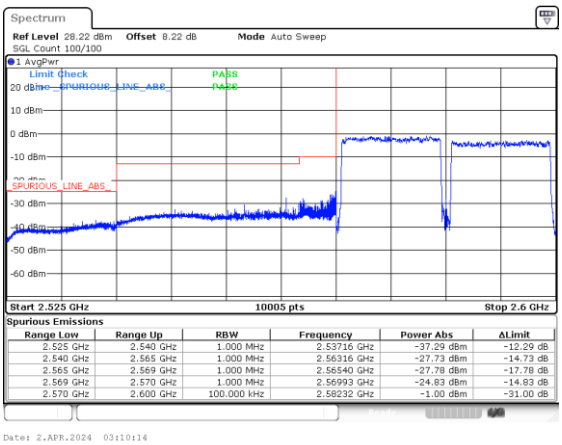

#### Lowest Band Edge / 1RB74 and 1RB0



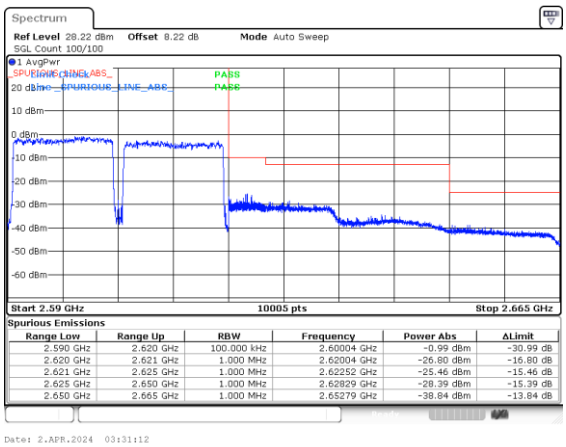

#### Highest Band Edge / 1RB74 and 1RB0




#### Lowest Band Edge / Full RB



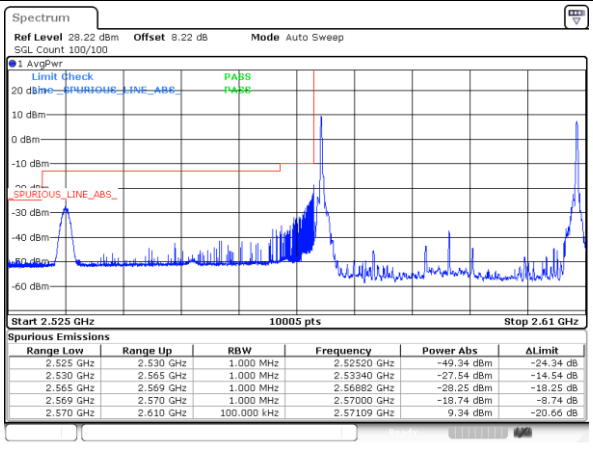

#### Highest Band Edge / Full RB



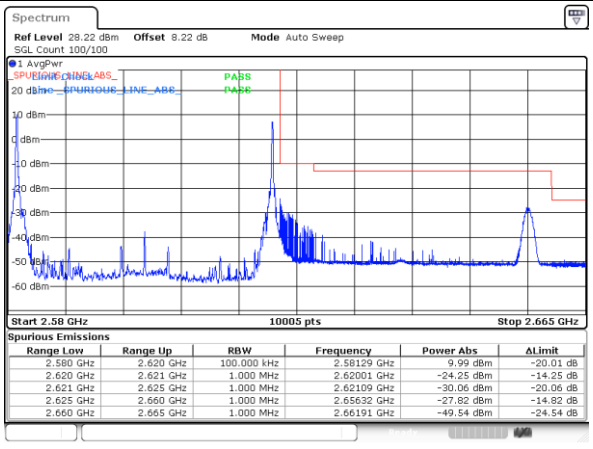
## LTE Band 38C / 20MHz+20MHz

### QPSK

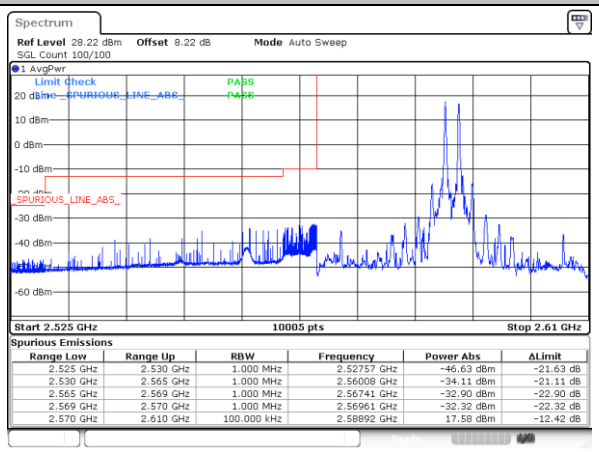
#### Lowest Band Edge / 1RB0 and 1RB99



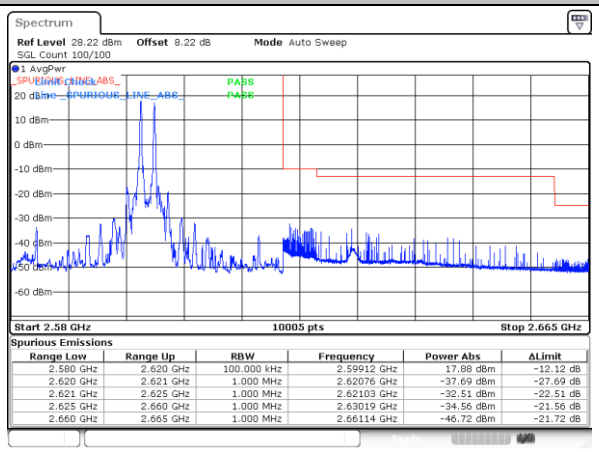

#### Highest Band Edge / 1RB0 and 1RB99



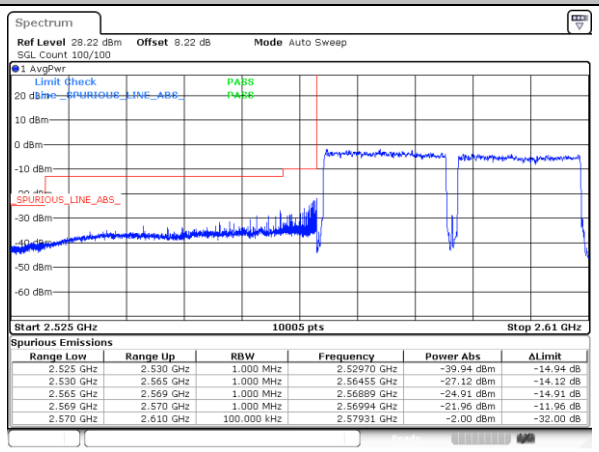

#### Lowest Band Edge / 1RB99 and 1RB0



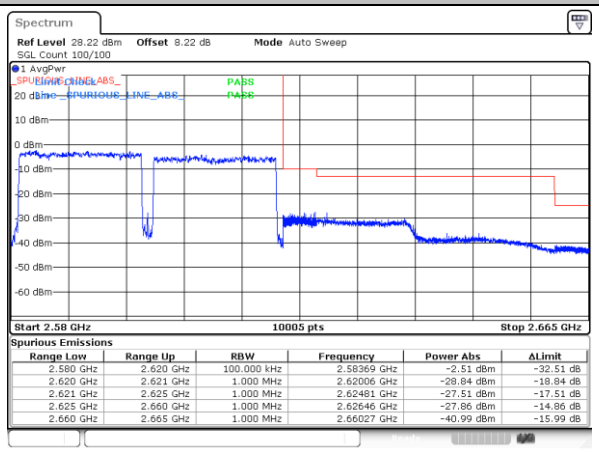

#### Highest Band Edge / 1RB99 and 1RB0

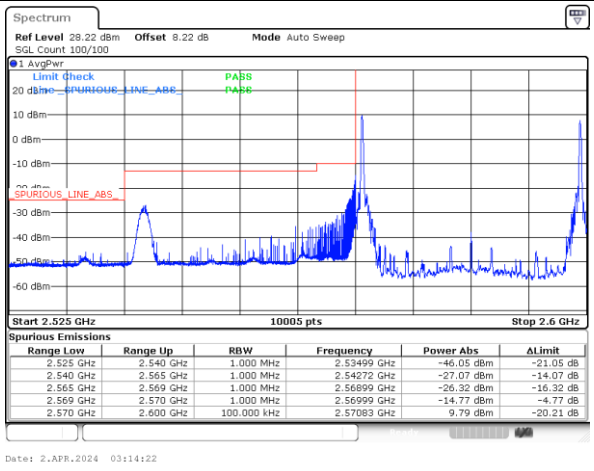
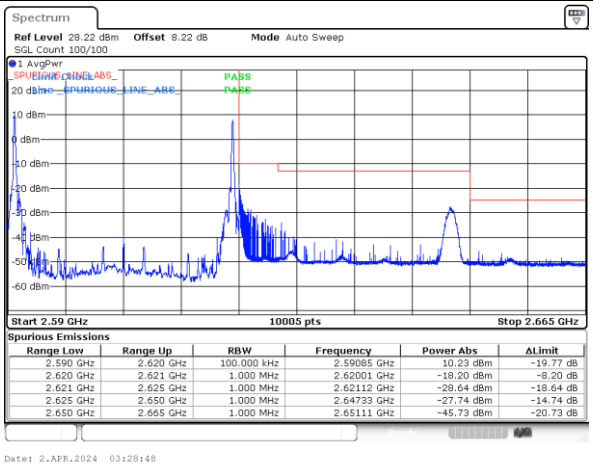
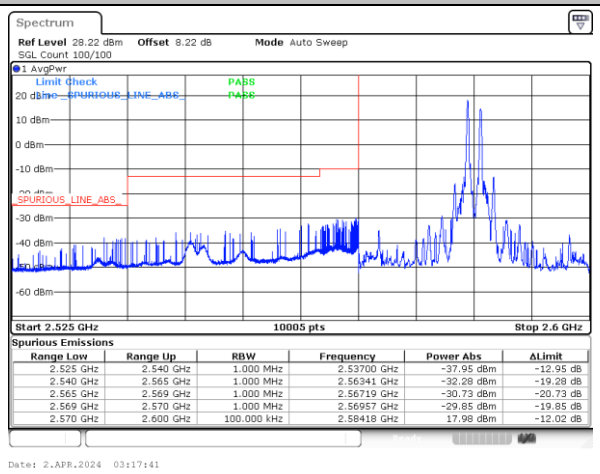
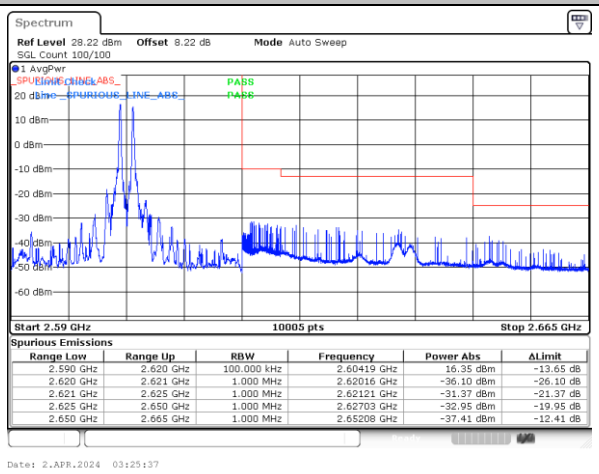
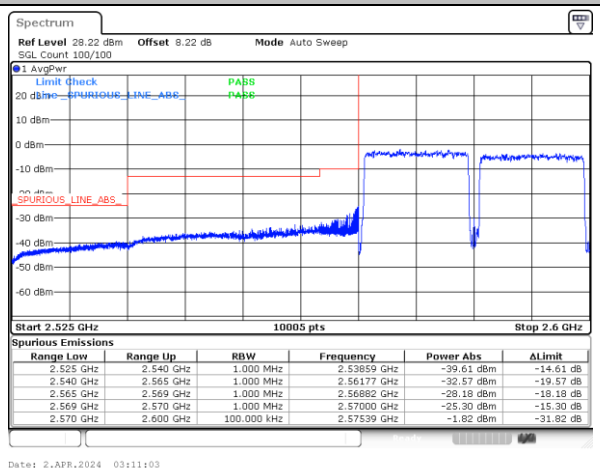
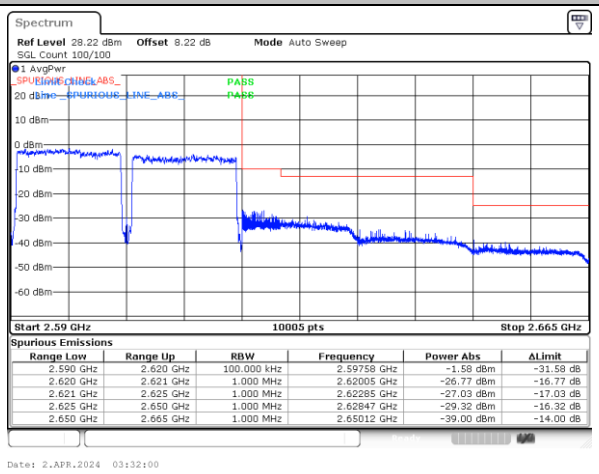



#### Lowest Band Edge / Full RB




#### Highest Band Edge / Full RB

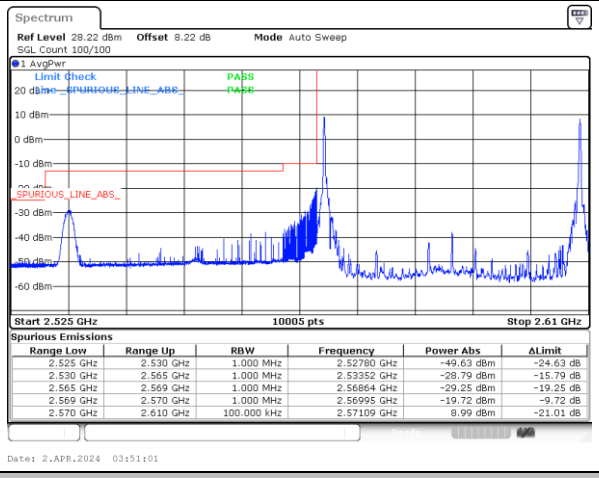


| LTE Band 38C / 15MHz+15MHz | |
|---|---|
| 16QAM | |
| Lowest Band Edge / 1RB0 and 1RB74 | Highest Band Edge / 1RB0 and 1RB74 |
|  |  |
| Lowest Band Edge / 1RB74 and 1RB0 | Highest Band Edge / 1RB74 and 1RB0 |
|  |  |
| Lowest Band Edge / Full RB | Highest Band Edge / Full RB |
|  |  |

## LTE Band 38C / 20MHz+20MHz

### 16QAM

#### Lowest Band Edge / 1RB0 and 1RB99

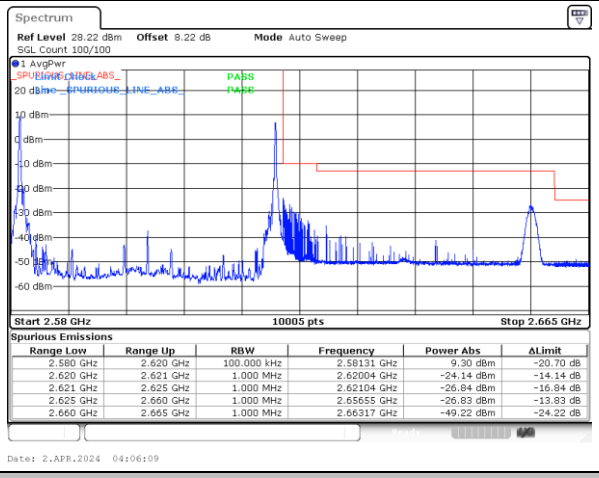



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.525 GHz | 2.530 GHz | 1.000 MHz | 2.52780 GHz | -49.63 dBm | -24.63 dB |
| 2.530 GHz | 2.565 GHz | 1.000 MHz | 2.53352 GHz | -28.79 dBm | -15.79 dB |
| 2.565 GHz | 2.569 GHz | 1.000 MHz | 2.56864 GHz | -29.25 dBm | -19.25 dB |
| 2.569 GHz | 2.570 GHz | 1.000 MHz | 2.56995 GHz | -19.72 dBm | -9.72 dB |
| 2.570 GHz | 2.610 GHz | 100.000 kHz | 2.57109 GHz | 8.99 dBm | -21.01 dB |

Date: 2.APR.2024 03:51:01

#### Highest Band Edge / 1RB0 and 1RB99

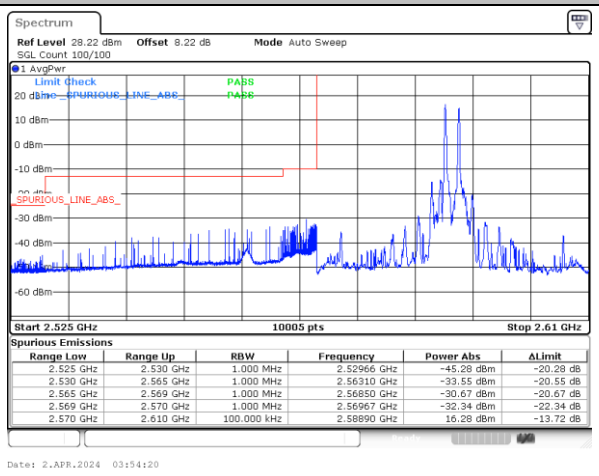



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.580 GHz | 2.620 GHz | 100.000 kHz | 2.58131 GHz | 9.30 dBm | -20.70 dB |
| 2.620 GHz | 2.621 GHz | 1.000 MHz | 2.62004 GHz | -24.14 dBm | -14.14 dB |
| 2.621 GHz | 2.625 GHz | 1.000 MHz | 2.62104 GHz | -26.84 dBm | -16.84 dB |
| 2.625 GHz | 2.660 GHz | 1.000 MHz | 2.65655 GHz | -26.83 dBm | -13.83 dB |
| 2.660 GHz | 2.665 GHz | 1.000 MHz | 2.66317 GHz | -49.22 dBm | -24.22 dB |

Date: 2.APR.2024 04:06:09

#### Lowest Band Edge / 1RB99 and 1RB0

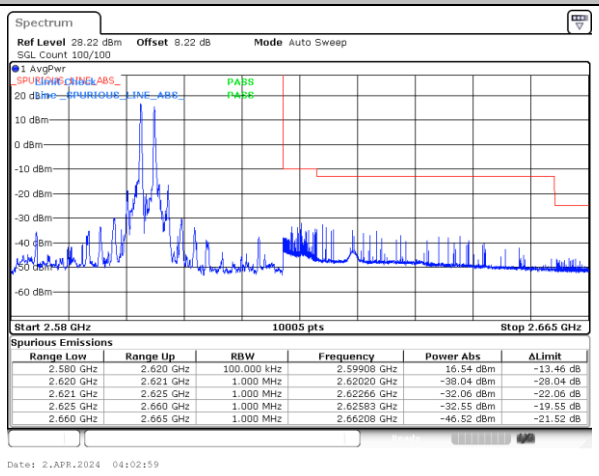



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.525 GHz | 2.530 GHz | 1.000 MHz | 2.52966 GHz | -45.28 dBm | -20.28 dB |
| 2.530 GHz | 2.565 GHz | 1.000 MHz | 2.56310 GHz | -33.55 dBm | -20.55 dB |
| 2.565 GHz | 2.569 GHz | 1.000 MHz | 2.56850 GHz | -30.67 dBm | -20.67 dB |
| 2.569 GHz | 2.570 GHz | 1.000 MHz | 2.56967 GHz | -32.34 dBm | -22.34 dB |
| 2.570 GHz | 2.610 GHz | 100.000 kHz | 2.58890 GHz | 16.28 dBm | -13.72 dB |

Date: 2.APR.2024 03:54:20

#### Highest Band Edge / 1RB99 and 1RB0

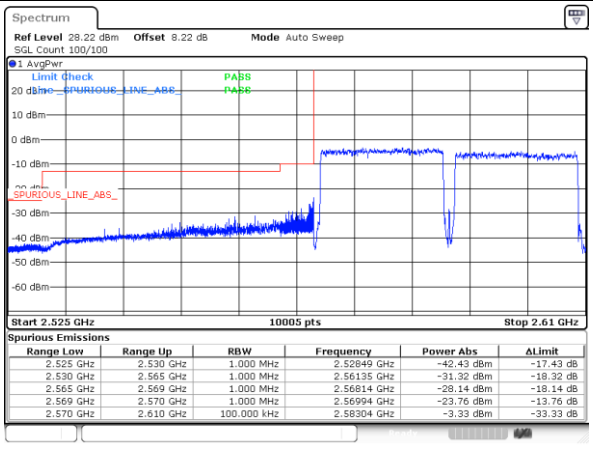



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.580 GHz | 2.620 GHz | 100.000 kHz | 2.59908 GHz | 16.54 dBm | -13.46 dB |
| 2.620 GHz | 2.621 GHz | 1.000 MHz | 2.62020 GHz | -38.04 dBm | -28.04 dB |
| 2.621 GHz | 2.625 GHz | 1.000 MHz | 2.62266 GHz | -32.06 dBm | -22.06 dB |
| 2.625 GHz | 2.660 GHz | 1.000 MHz | 2.62583 GHz | -32.55 dBm | -19.55 dB |
| 2.660 GHz | 2.665 GHz | 1.000 MHz | 2.66208 GHz | -46.52 dBm | -21.52 dB |

Date: 2.APR.2024 04:02:59

#### Lowest Band Edge / Full RB

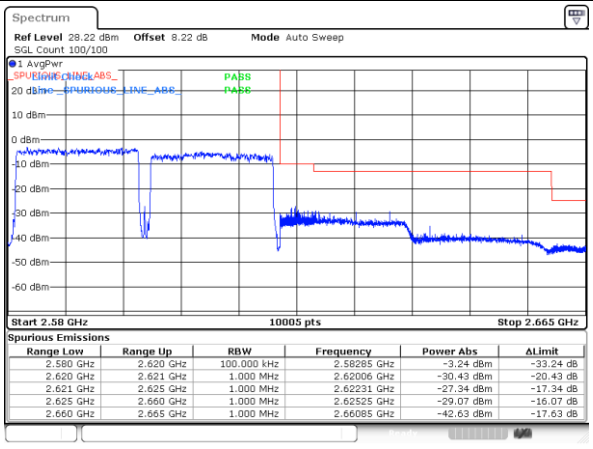



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.525 GHz | 2.530 GHz | 1.000 MHz | 2.52849 GHz | -42.43 dBm | -17.43 dB |
| 2.530 GHz | 2.565 GHz | 1.000 MHz | 2.56135 GHz | -31.32 dBm | -18.32 dB |
| 2.565 GHz | 2.569 GHz | 1.000 MHz | 2.56814 GHz | -28.14 dBm | -18.14 dB |
| 2.569 GHz | 2.570 GHz | 1.000 MHz | 2.56994 GHz | -23.76 dBm | -13.76 dB |
| 2.570 GHz | 2.610 GHz | 100.000 kHz | 2.58304 GHz | -3.33 dBm | -33.33 dB |

Date: 2.APR.2024 03:47:43

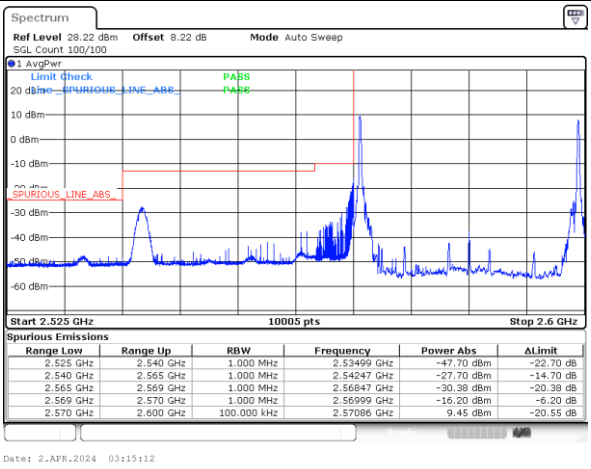
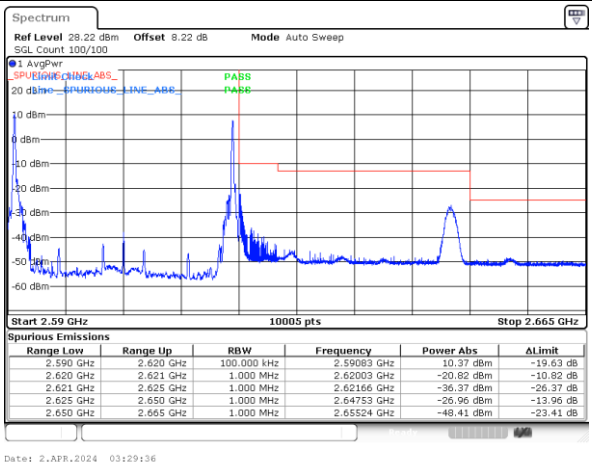
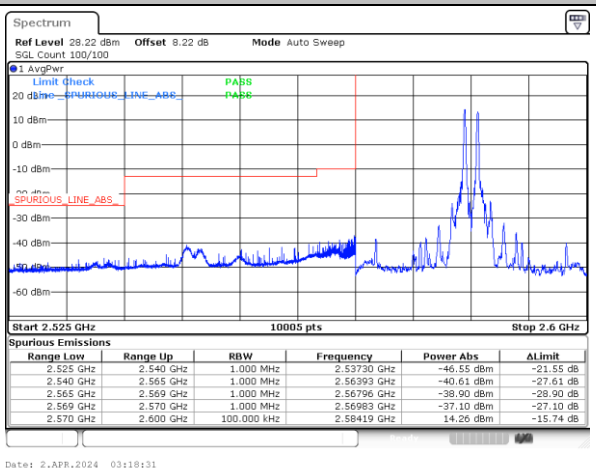
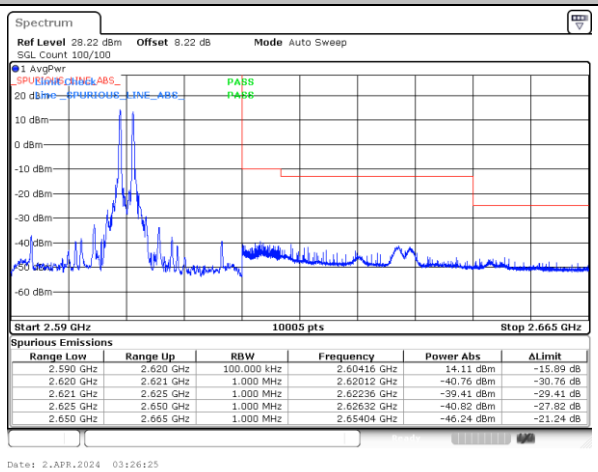
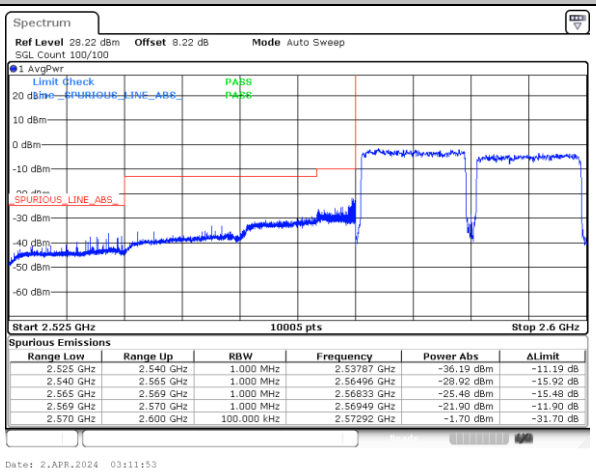
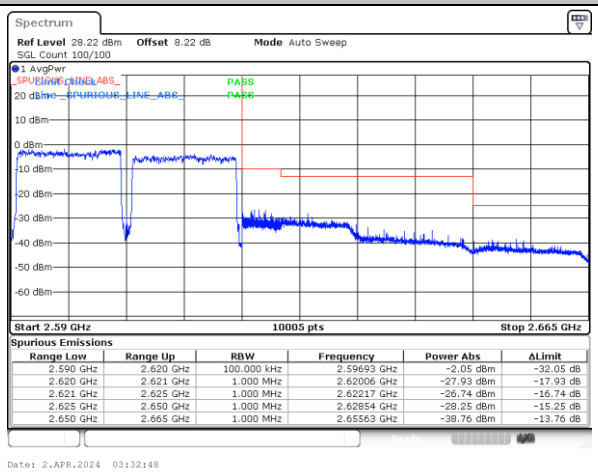
#### Highest Band Edge / Full RB




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.580 GHz | 2.620 GHz | 100.000 kHz | 2.58285 GHz | -3.24 dBm | -33.24 dB |
| 2.620 GHz | 2.621 GHz | 1.000 MHz | 2.62006 GHz | -30.43 dBm | -20.43 dB |
| 2.621 GHz | 2.625 GHz | 1.000 MHz | 2.62231 GHz | -27.34 dBm | -17.34 dB |
| 2.625 GHz | 2.660 GHz | 1.000 MHz | 2.62525 GHz | -29.07 dBm | -16.07 dB |
| 2.660 GHz | 2.665 GHz | 1.000 MHz | 2.66085 GHz | -42.63 dBm | -17.63 dB |

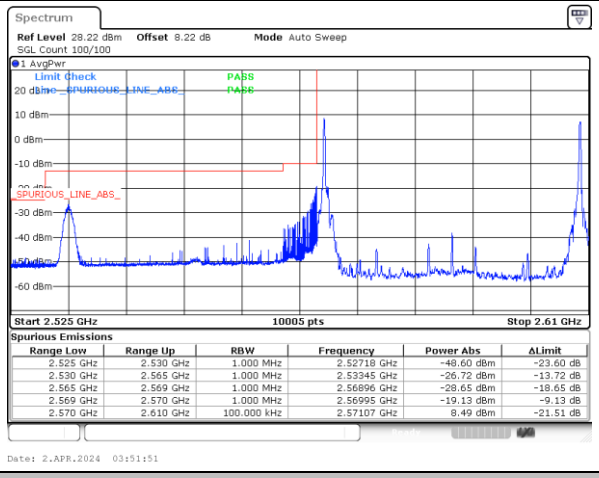
Date: 2.APR.2024 04:09:19

| LTE Band 38C / 15MHz+15MHz | |
|---|---|
| 64QAM | |
| Lowest Band Edge / 1RB0 and 1RB74 | Highest Band Edge / 1RB0 and 1RB74 |
|  |  |
| Lowest Band Edge / 1RB74 and 1RB0 | Highest Band Edge / 1RB74 and 1RB0 |
|  |  |
| Lowest Band Edge / Full RB | Highest Band Edge / Full RB |
|  |  |

## LTE Band 38C / 20MHz+20MHz

### 64QAM

#### Lowest Band Edge / 1RB0 and 1RB99

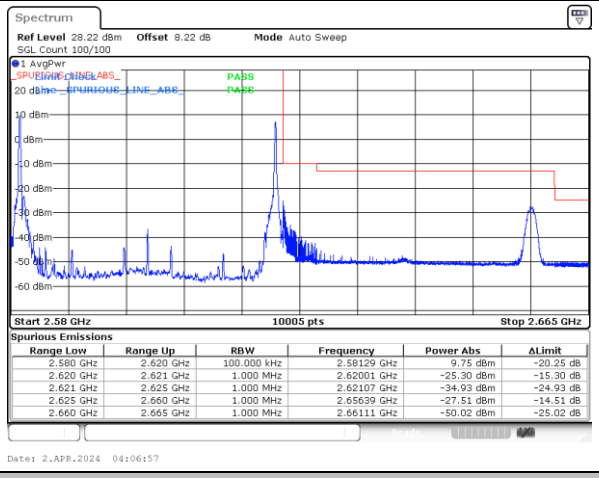



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.525 GHz | 2.530 GHz | 1.000 MHz | 2.52718 GHz | -48.60 dBm | -23.60 dB |
| 2.530 GHz | 2.565 GHz | 1.000 MHz | 2.53345 GHz | -26.72 dBm | -13.72 dB |
| 2.565 GHz | 2.569 GHz | 1.000 MHz | 2.56896 GHz | -28.65 dBm | -18.65 dB |
| 2.569 GHz | 2.570 GHz | 1.000 MHz | 2.56995 GHz | -19.13 dBm | -9.13 dB |
| 2.570 GHz | 2.610 GHz | 100.000 kHz | 2.57107 GHz | 8.49 dBm | -21.51 dB |

Date: 2.APR.2024 03:51:51

#### Highest Band Edge / 1RB0 and 1RB99

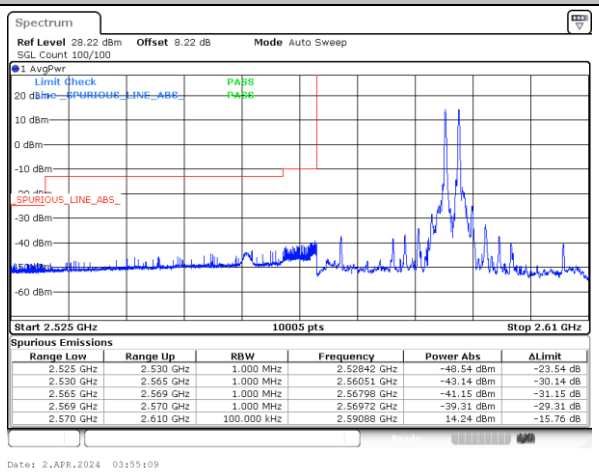



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.580 GHz | 2.620 GHz | 100.000 kHz | 2.58129 GHz | 9.75 dBm | -20.25 dB |
| 2.620 GHz | 2.621 GHz | 1.000 MHz | 2.62001 GHz | -25.30 dBm | -15.30 dB |
| 2.621 GHz | 2.625 GHz | 1.000 MHz | 2.62107 GHz | -34.93 dBm | -24.93 dB |
| 2.625 GHz | 2.660 GHz | 1.000 MHz | 2.65639 GHz | -27.51 dBm | -14.51 dB |
| 2.660 GHz | 2.665 GHz | 1.000 MHz | 2.66111 GHz | -50.02 dBm | -25.02 dB |

Date: 2.APR.2024 04:06:57

#### Lowest Band Edge / 1RB99 and 1RB0

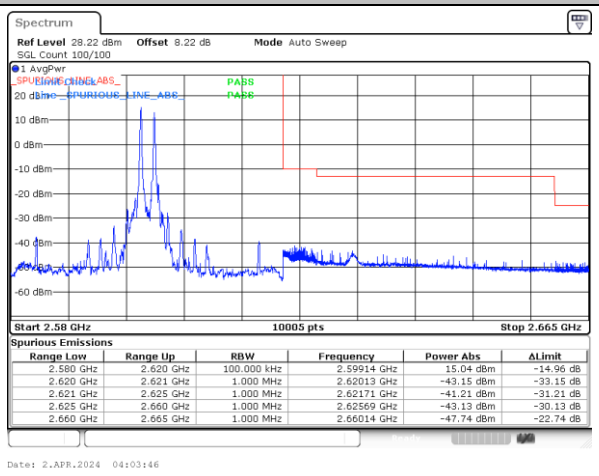



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.525 GHz | 2.530 GHz | 1.000 MHz | 2.52842 GHz | -48.54 dBm | -23.54 dB |
| 2.530 GHz | 2.565 GHz | 1.000 MHz | 2.56051 GHz | -43.14 dBm | -30.14 dB |
| 2.565 GHz | 2.569 GHz | 1.000 MHz | 2.56798 GHz | -41.15 dBm | -31.15 dB |
| 2.569 GHz | 2.570 GHz | 1.000 MHz | 2.56972 GHz | -39.31 dBm | -29.31 dB |
| 2.570 GHz | 2.610 GHz | 100.000 kHz | 2.59088 GHz | 14.24 dBm | -15.76 dB |

Date: 2.APR.2024 03:55:09

#### Highest Band Edge / 1RB99 and 1RB0

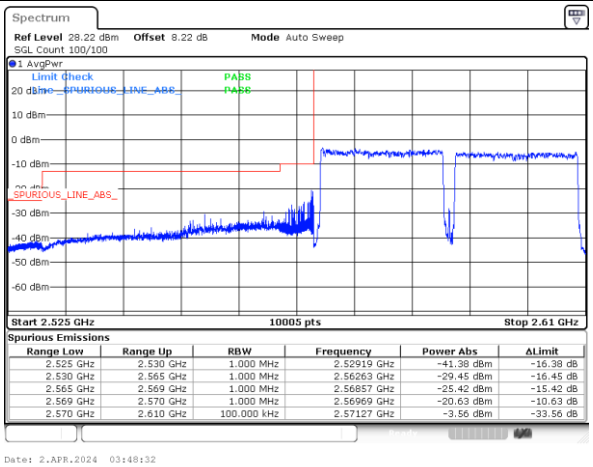



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.580 GHz | 2.620 GHz | 100.000 kHz | 2.59914 GHz | 15.04 dBm | -14.96 dB |
| 2.620 GHz | 2.621 GHz | 1.000 MHz | 2.62013 GHz | -43.15 dBm | -33.15 dB |
| 2.621 GHz | 2.625 GHz | 1.000 MHz | 2.62171 GHz | -41.21 dBm | -31.21 dB |
| 2.625 GHz | 2.660 GHz | 1.000 MHz | 2.62569 GHz | -43.13 dBm | -30.13 dB |
| 2.660 GHz | 2.665 GHz | 1.000 MHz | 2.66014 GHz | -47.74 dBm | -22.74 dB |

Date: 2.APR.2024 04:03:46

#### Lowest Band Edge / Full RB

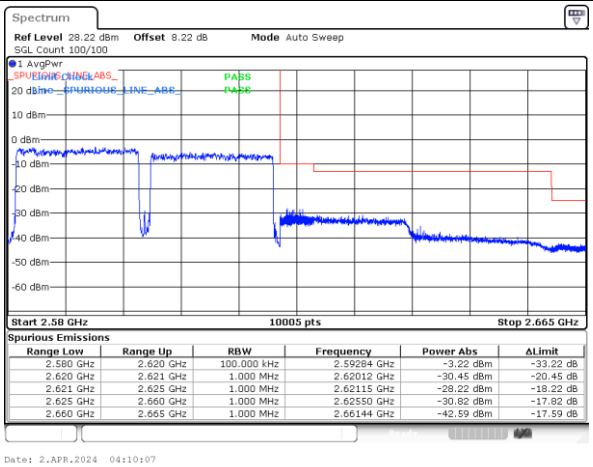



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.525 GHz | 2.530 GHz | 1.000 MHz | 2.52919 GHz | -41.38 dBm | -16.38 dB |
| 2.530 GHz | 2.565 GHz | 1.000 MHz | 2.56263 GHz | -29.45 dBm | -16.45 dB |
| 2.565 GHz | 2.569 GHz | 1.000 MHz | 2.56857 GHz | -25.42 dBm | -15.42 dB |
| 2.569 GHz | 2.570 GHz | 1.000 MHz | 2.56969 GHz | -20.63 dBm | -10.63 dB |
| 2.570 GHz | 2.610 GHz | 100.000 kHz | 2.57127 GHz | -3.56 dBm | -33.56 dB |

Date: 2.APR.2024 03:48:32

#### Highest Band Edge / Full RB




Spurious Emissions

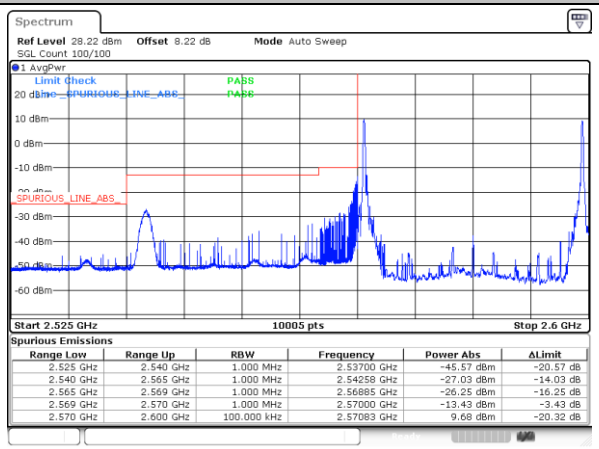
| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 2.580 GHz | 2.620 GHz | 100.000 kHz | 2.59284 GHz | -3.22 dBm | -33.22 dB |
| 2.620 GHz | 2.621 GHz | 1.000 MHz | 2.62012 GHz | -30.45 dBm | -20.45 dB |
| 2.621 GHz | 2.625 GHz | 1.000 MHz | 2.62115 GHz | -28.22 dBm | -18.22 dB |
| 2.625 GHz | 2.660 GHz | 1.000 MHz | 2.62550 GHz | -30.82 dBm | -17.82 dB |
| 2.660 GHz | 2.665 GHz | 1.000 MHz | 2.66144 GHz | -42.59 dBm | -17.59 dB |

Date: 2.APR.2024 04:10:07

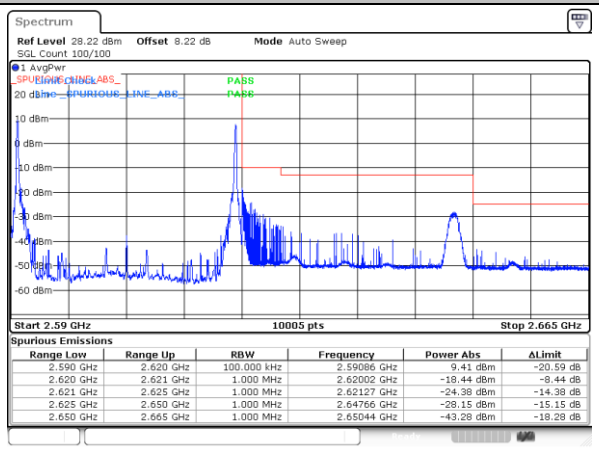
## LTE Band 38C / 15MHz+15MHz

### 256QAM

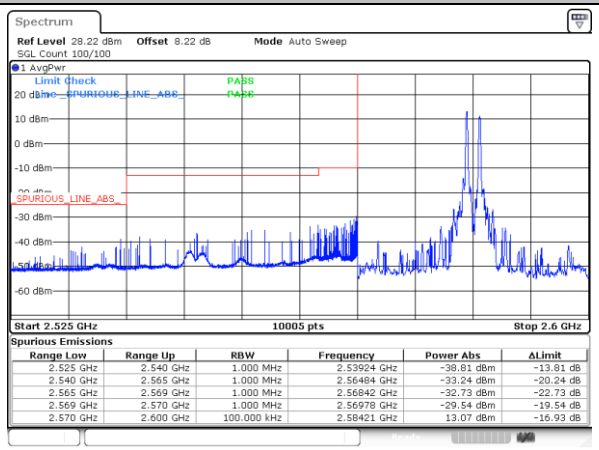
#### Lowest Band Edge / 1RB0 and 1RB74



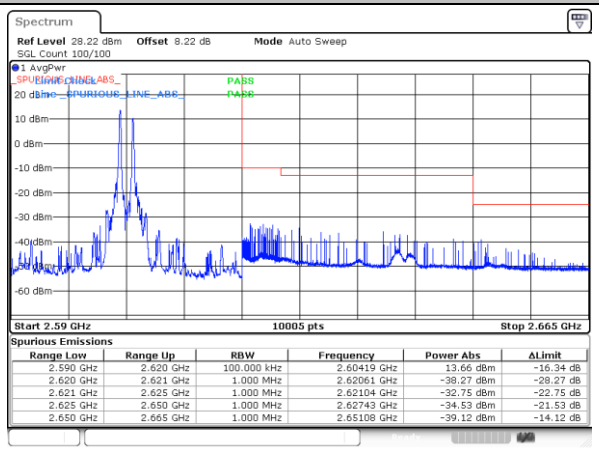

#### Highest Band Edge / 1RB0 and 1RB74



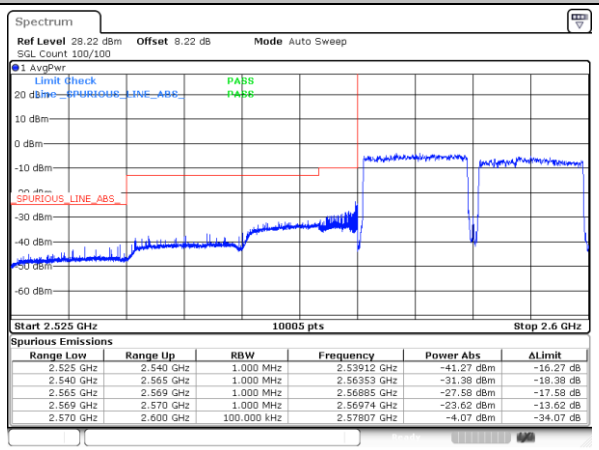

#### Lowest Band Edge / 1RB74 and 1RB0



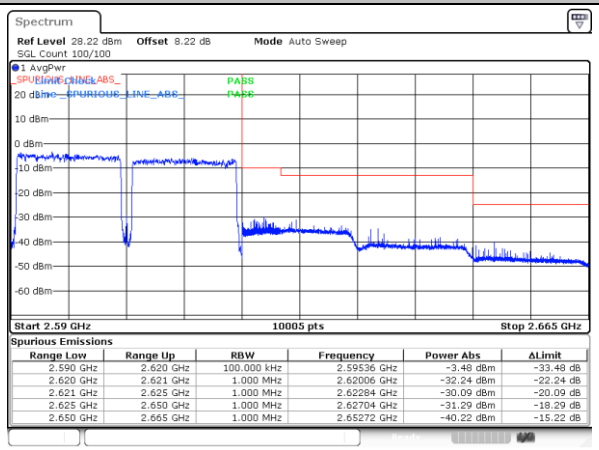

#### Highest Band Edge / 1RB74 and 1RB0

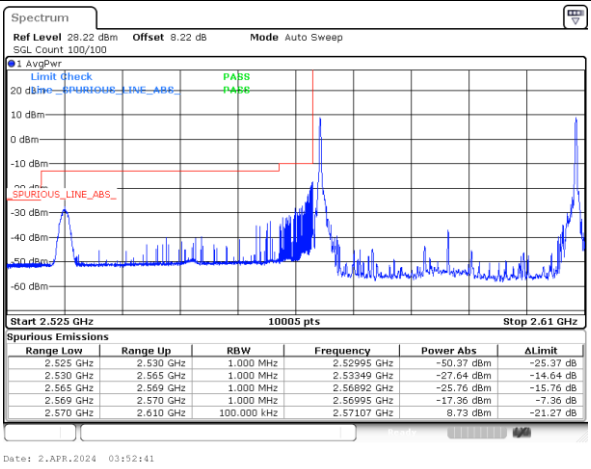
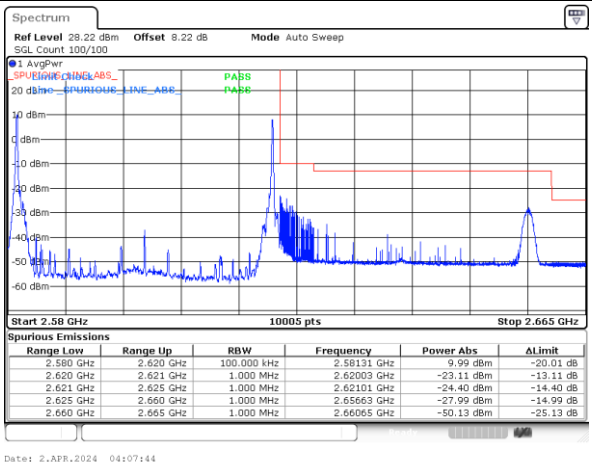
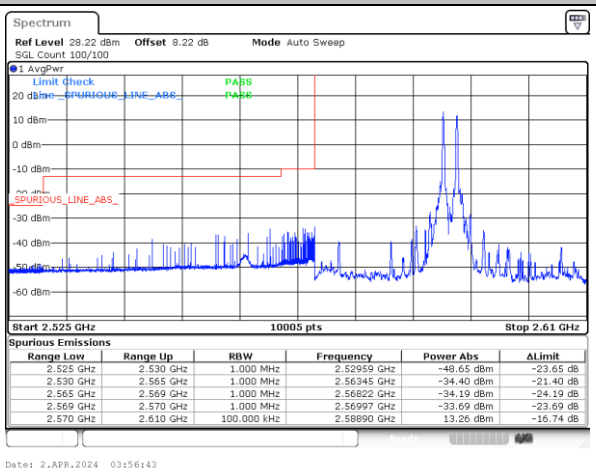
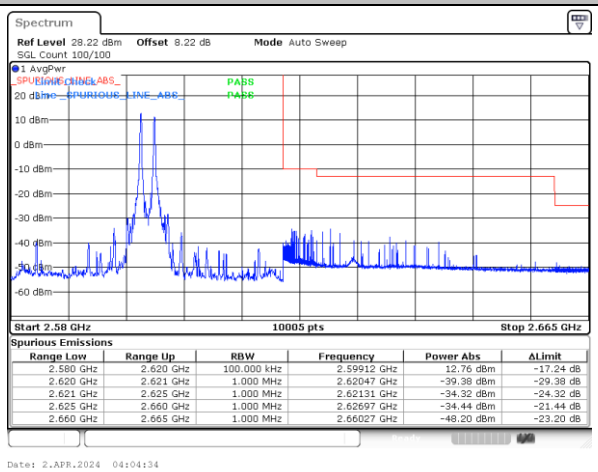
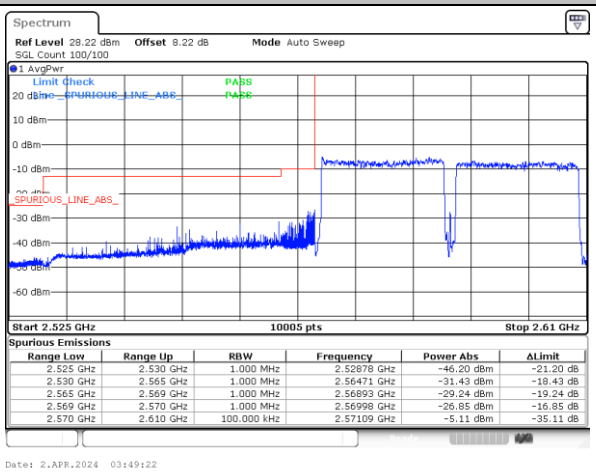
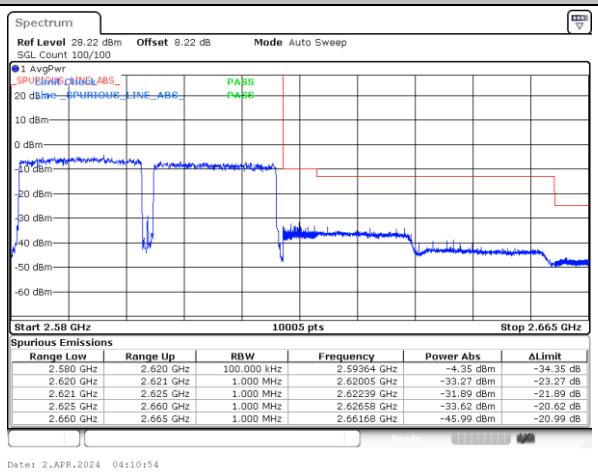



#### Lowest Band Edge / Full RB




#### Highest Band Edge / Full RB



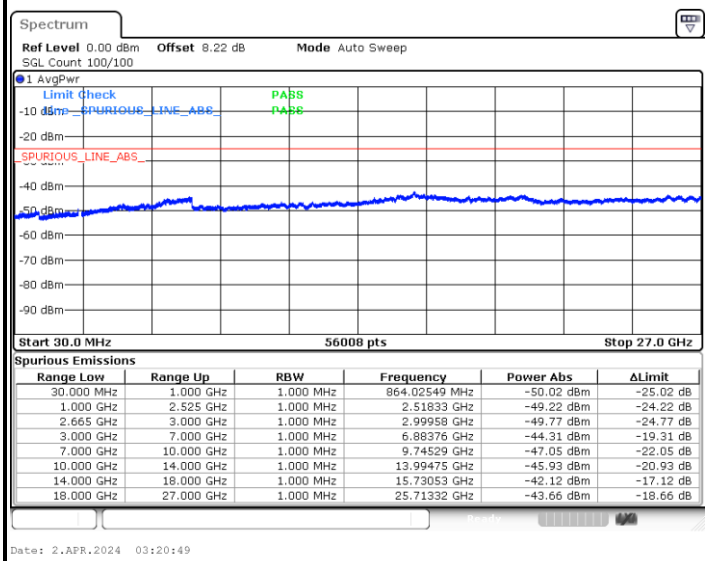
| LTE Band 38C / 20MHz+20MHz | |
|---|---|
| 256QAM | |
| Lowest Band Edge / 1RB0 and 1RB99 | Highest Band Edge / 1RB0 and 1RB99 |
|  |  |
| Lowest Band Edge / 1RB99 and 1RB0 | Highest Band Edge / 1RB99 and 1RB0 |
|  |  |
| Lowest Band Edge / Full RB | Highest Band Edge / Full RB |
|  |  |

# Conducted Spurious Emission

## LTE Band 38C / 15MHz+15MHz

### QPSK

#### Lowest Channel / 1RB74 and 1RB0

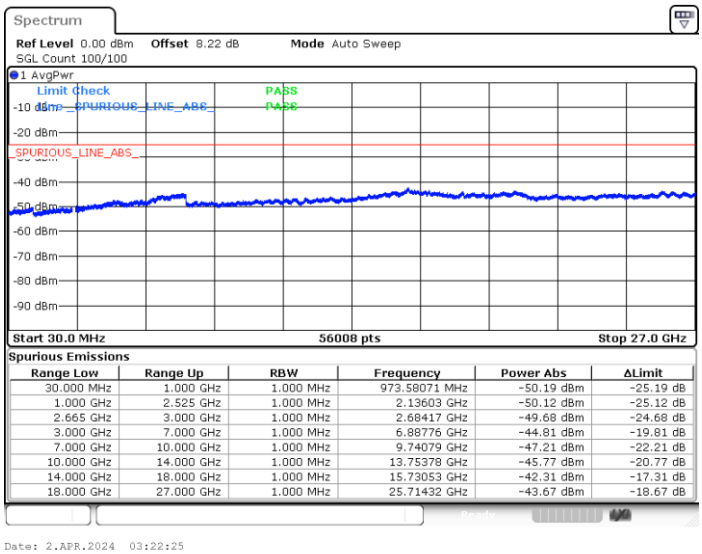



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 864.02549 MHz | -50.02 dBm | -25.02 dB |
| 1.000 GHz | 2.525 GHz | 1.000 MHz | 2.51833 GHz | -49.22 dBm | -24.22 dB |
| 2.665 GHz | 3.000 GHz | 1.000 MHz | 2.99958 GHz | -49.77 dBm | -24.77 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.88376 GHz | -44.31 dBm | -19.31 dB |
| 7.000 GHz | 10.000 GHz | 1.000 MHz | 9.74529 GHz | -47.05 dBm | -22.05 dB |
| 10.000 GHz | 14.000 GHz | 1.000 MHz | 13.99475 GHz | -45.93 dBm | -20.93 dB |
| 14.000 GHz | 18.000 GHz | 1.000 MHz | 15.73053 GHz | -42.12 dBm | -17.12 dB |
| 18.000 GHz | 27.000 GHz | 1.000 MHz | 25.71332 GHz | -43.66 dBm | -18.66 dB |

Date: 2.APR.2024 03:20:49

#### Middle Channel / 1RB74 and 1RB0

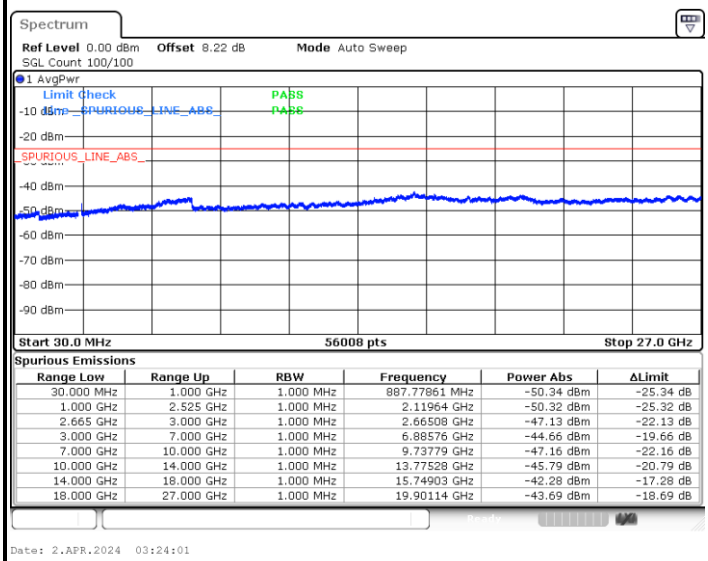



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 973.58071 MHz | -50.19 dBm | -25.19 dB |
| 1.000 GHz | 2.525 GHz | 1.000 MHz | 2.13603 GHz | -50.12 dBm | -25.12 dB |
| 2.665 GHz | 3.000 GHz | 1.000 MHz | 2.68417 GHz | -49.68 dBm | -24.68 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.88776 GHz | -44.81 dBm | -19.81 dB |
| 7.000 GHz | 10.000 GHz | 1.000 MHz | 9.74079 GHz | -47.21 dBm | -22.21 dB |
| 10.000 GHz | 14.000 GHz | 1.000 MHz | 13.75378 GHz | -45.77 dBm | -20.77 dB |
| 14.000 GHz | 18.000 GHz | 1.000 MHz | 15.73053 GHz | -42.31 dBm | -17.31 dB |
| 18.000 GHz | 27.000 GHz | 1.000 MHz | 25.71432 GHz | -43.67 dBm | -18.67 dB |

Date: 2.APR.2024 03:22:25

#### Highest Channel / 1RB74 and 1RB0




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 887.77861 MHz | -50.34 dBm | -25.34 dB |
| 1.000 GHz | 2.525 GHz | 1.000 MHz | 2.11964 GHz | -50.32 dBm | -25.32 dB |
| 2.665 GHz | 3.000 GHz | 1.000 MHz | 2.66508 GHz | -47.13 dBm | -22.13 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.88576 GHz | -44.66 dBm | -19.66 dB |
| 7.000 GHz | 10.000 GHz | 1.000 MHz | 9.73779 GHz | -47.16 dBm | -22.16 dB |
| 10.000 GHz | 14.000 GHz | 1.000 MHz | 13.77528 GHz | -45.79 dBm | -20.79 dB |
| 14.000 GHz | 18.000 GHz | 1.000 MHz | 15.74903 GHz | -42.28 dBm | -17.28 dB |
| 18.000 GHz | 27.000 GHz | 1.000 MHz | 19.90114 GHz | -43.69 dBm | -18.69 dB |

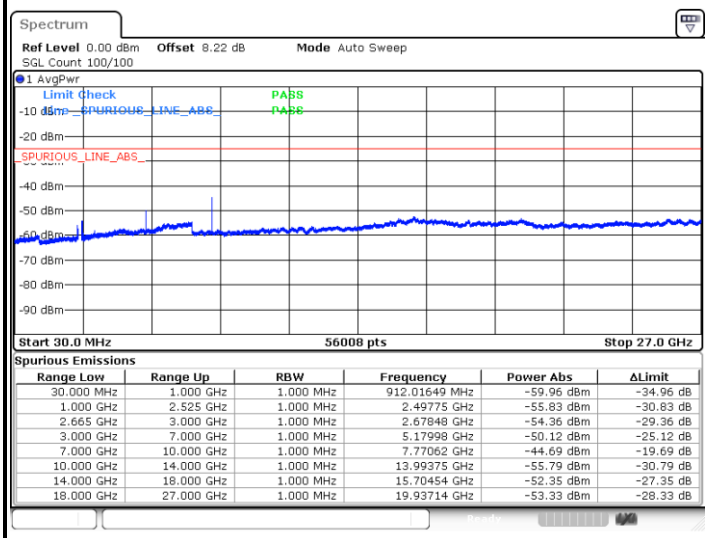
Date: 2.APR.2024 03:24:01

#### N/A

## LTE Band 38C / 20MHz+20MHz

### QPSK

#### Lowest Channel / 1RB99 and 1RB0

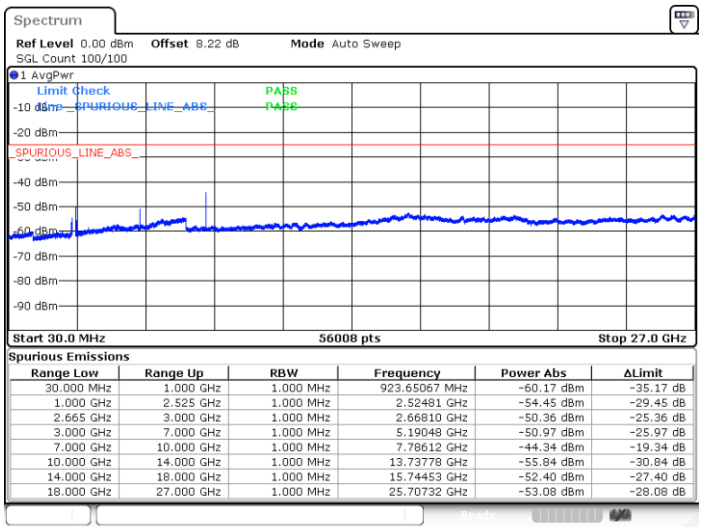



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 912.01649 MHz | -59.96 dBm | -34.96 dB |
| 1.000 GHz | 2.525 GHz | 1.000 MHz | 2.49775 GHz | -55.83 dBm | -30.83 dB |
| 2.665 GHz | 3.000 GHz | 1.000 MHz | 2.67848 GHz | -54.36 dBm | -29.36 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 5.17998 GHz | -50.12 dBm | -25.12 dB |
| 7.000 GHz | 10.000 GHz | 1.000 MHz | 7.77062 GHz | -44.69 dBm | -19.69 dB |
| 10.000 GHz | 14.000 GHz | 1.000 MHz | 13.99375 GHz | -55.79 dBm | -30.79 dB |
| 14.000 GHz | 18.000 GHz | 1.000 MHz | 15.70454 GHz | -52.35 dBm | -27.35 dB |
| 18.000 GHz | 27.000 GHz | 1.000 MHz | 19.93714 GHz | -53.33 dBm | -28.33 dB |

Date: 2.APR.2024 03:58:12

#### Middle Channel / 1RB99 and 1RB0

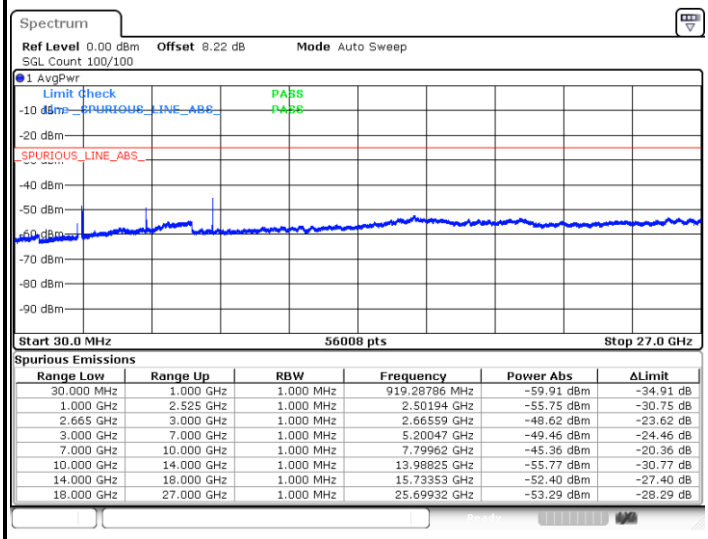



Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 923.65067 MHz | -60.17 dBm | -35.17 dB |
| 1.000 GHz | 2.525 GHz | 1.000 MHz | 2.52481 GHz | -54.45 dBm | -29.45 dB |
| 2.665 GHz | 3.000 GHz | 1.000 MHz | 2.66810 GHz | -50.36 dBm | -25.36 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 5.19048 GHz | -50.97 dBm | -25.97 dB |
| 7.000 GHz | 10.000 GHz | 1.000 MHz | 7.78612 GHz | -44.34 dBm | -19.34 dB |
| 10.000 GHz | 14.000 GHz | 1.000 MHz | 13.73778 GHz | -55.84 dBm | -30.84 dB |
| 14.000 GHz | 18.000 GHz | 1.000 MHz | 15.74453 GHz | -52.40 dBm | -27.40 dB |
| 18.000 GHz | 27.000 GHz | 1.000 MHz | 25.70732 GHz | -53.08 dBm | -28.08 dB |

Date: 2.APR.2024 03:59:48

#### Highest Channel / 1RB99 and 1RB0




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 1.000 GHz | 1.000 MHz | 919.28786 MHz | -59.91 dBm | -34.91 dB |
| 1.000 GHz | 2.525 GHz | 1.000 MHz | 2.50194 GHz | -55.75 dBm | -30.75 dB |
| 2.665 GHz | 3.000 GHz | 1.000 MHz | 2.66559 GHz | -48.62 dBm | -23.62 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 5.20047 GHz | -49.46 dBm | -24.46 dB |
| 7.000 GHz | 10.000 GHz | 1.000 MHz | 7.79962 GHz | -45.36 dBm | -20.36 dB |
| 10.000 GHz | 14.000 GHz | 1.000 MHz | 13.98825 GHz | -55.77 dBm | -30.77 dB |
| 14.000 GHz | 18.000 GHz | 1.000 MHz | 15.73353 GHz | -52.40 dBm | -27.40 dB |
| 18.000 GHz | 27.000 GHz | 1.000 MHz | 25.69932 GHz | -53.29 dBm | -28.29 dB |

Date: 2.APR.2024 04:01:24

#### N/A

# Frequency Stability

| Test Conditions | | LTE Band 38C (QPSK) / Middle Channel | Limit |
|---|---|---|---|
| Temperature (°C) | Voltage (Volt) | BW 40MHz | Note 2. |
| | | Deviation (ppm) | Result |
| 50 | Normal Voltage | 0.0039 | PASS |
| 40 | Normal Voltage | 0.0016 | |
| 30 | Normal Voltage | 0.0056 | |
| 20(Ref.) | Normal Voltage | 0.0000 | |
| 10 | Normal Voltage | 0.0064 | |
| 0 | Normal Voltage | 0.0044 | |
| -10 | Normal Voltage | 0.0023 | |
| -20 | Normal Voltage | 0.0029 | |
| -30 | Normal Voltage | 0.0061 | |
| 20 | Maximum Voltage | 0.0012 | |
| 20 | Normal Voltage | 0.0000 | |
| 20 | Battery End Point | 0.0046 | |

**Note:**

1. Normal Voltage =3.88 V. ; Battery End Point (BEP) =3.4 V. ; Maximum Voltage =4.48 V.
2. Note: The frequency fundamental emissions stay within the authorized frequency block.

# Appendix B. Test Results of Radiated Test

## Radiated Spurious Emission

| Test Engineer : | Bruce | Temperature : | 23~25℃ |
|---|---|---|---|
| | | Relative Humidity : | 41~42% |

**RSE pretest all the supported antennas, only the worst results are recorded in the report.**

| LTE Band 38C/ 20+20MHz / QPSK/ Ant2 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel | Condition | Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) |
| Middle | PCC | 5148 | -62.85 | -25 | -37.85 | -73.06 | 3.03 | 13.24 | H |
| | | 7724 | -61.54 | -25 | -36.54 | -70.99 | 3.56 | 13.01 | H |
| | | 10300 | -60.92 | -25 | -35.92 | -70.44 | 3.92 | 13.44 | H |
| | | 5148 | -63.08 | -25 | -38.08 | -73.29 | 3.03 | 13.24 | V |
| | | 7724 | -62.03 | -25 | -37.03 | -71.48 | 3.56 | 13.01 | V |
| | | 10300 | -61.35 | -25 | -36.35 | -70.87 | 3.92 | 13.44 | V |
| | SCC | 5190 | -62.58 | -25 | -37.58 | -72.79 | 3.03 | 13.24 | H |
| | | 7794 | -61.60 | -25 | -36.60 | -71.05 | 3.56 | 13.01 | H |
| | | 10384 | -61.19 | -25 | -36.19 | -70.71 | 3.92 | 13.44 | H |
| | | 5190 | -62.69 | -25 | -37.69 | -72.90 | 3.03 | 13.24 | V |
| | | 7794 | -61.65 | -25 | -36.65 | -71.10 | 3.56 | 13.01 | V |
| | | 10384 | -61.76 | -25 | -36.76 | -71.28 | 3.92 | 13.44 | V |

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