
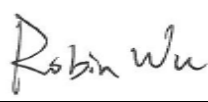


MEASUREMENT REPORT

FCC PART 96

FCC ID: XMR2020EM120RGL
Application: Quectel Wireless Solutions Company Limited

Application Type: Class II Permissive Change
Product: LTE-A Cat 12 M.2 Module
Model No.: EM120R-GL
Brand Name: Quectel
FCC Rule Part(s): Part 96
Test Procedure(s): ANSI C63.26: 2015
Test Date: January 10 ~ 24, 2021

Reviewed By: 
Sunny Sun
Approved By: 
Robin Wu



The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.26-2015. Test results reported herein relate only to the item(s) tested.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

| Report No. | Version | Description | Issue Date | Note |
|---------------|---------|----------------|------------|-------|
| 2101RSU059-U1 | Rev. 01 | Initial Report | 02-04-2021 | Valid |
| | | | | |

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2. PRODUCT INFORMATION

2.1. Equipment Description

| | |
|------------------------|---|
| Product Name: | LTE-A Cat 12 M.2 Module |
| Model No.: | EM120R-GL |
| Brand Name: | Quectel |
| IMEI: | 864292050000700 |
| LTE Specification: | Band 2, 4, 5, 7, 12, 13, 14, 25, 26, 30, 38, 41, 48, 66 |
| Intra-Band: | CA_41C |
| Category: | Category 16 |
| Operating Temperature: | -25 ~ 75 °C |
| Power Type: | 3.1 ~ 4.4Vdc, type 3.7Vdc |

2.2. Product Specification Subjective to this Report

| | |
|---------------------|---------------------------------|
| Frequency Range: | TDD Band 48: 3550 ~ 3700 MHz |
| Device Type: | End User Device |
| Type of Modulation: | QPSK, 16QAM, 64QAM, 256QAM (DL) |

Note: For other features of this EUT, test report will be issued separately.

2.3. Test Methodology

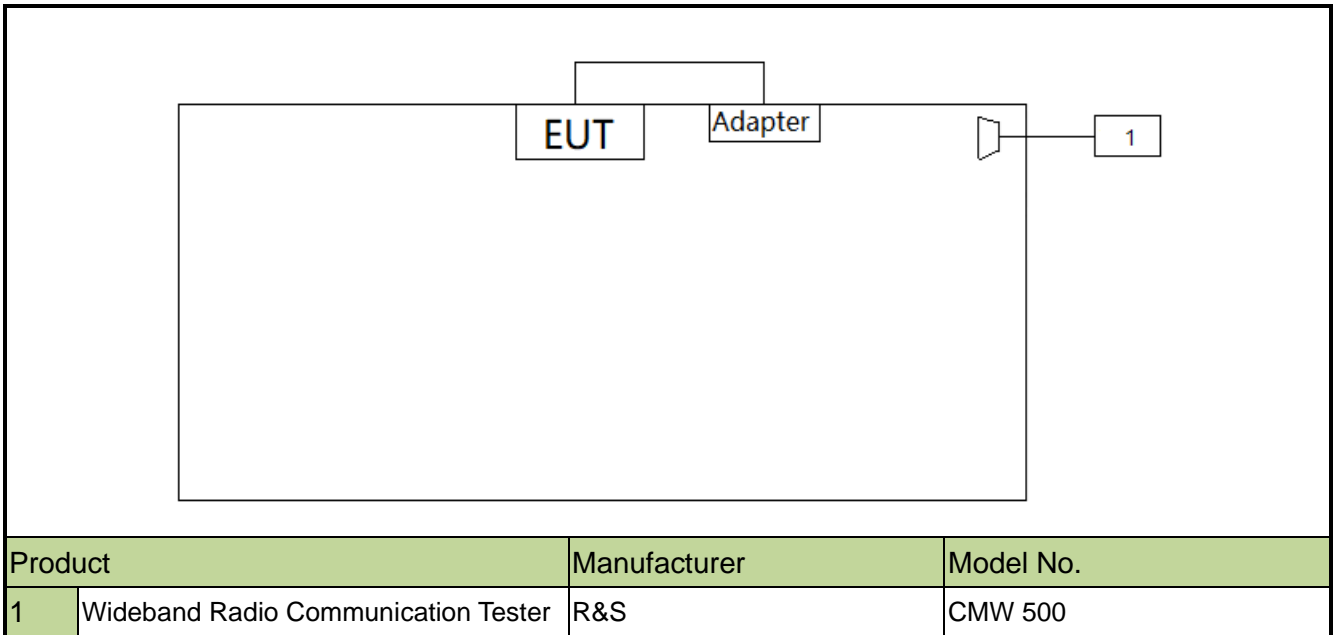
According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26:2015
- FCC CFR 47 Part 96
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP
- FCC KDB 940660 D01 v03 Part 96 CBRS Eqpt
- WINNF-TS-0122 V1.0.0: Test and Certification for Citizens Broadband Radio Service (CBRS); Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT)

2.4. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.5. Configuration of Tested System



2.6. Test Environment Condition

| | |
|---------------------|-------------|
| Ambient Temperature | 15 ~ 35°C |
| Relative Humidity | 20% ~ 75%RH |

3. TEST EQUIPMENT CALIBRATION DATE

Radiated Emission (WZ-AC1)

| Instrument | Manufacturer | Type No. | Asset No. | Cali. Interval | Cali. Due Date |
|--|--------------|-------------|-------------|----------------|----------------|
| EMI Test Receiver | R&S | ESR7 | MRTSUE06001 | 1 year | 2021/08/01 |
| Wideband Radio Communication Tester | R&S | CMW 500 | MRTSUE06243 | 1 year | 2021/11/07 |
| PXA Signal Analyzer | Keysight | 9030B | MRTSUE06395 | 1 year | 2021/09/03 |
| Loop Antenna | Schwarzbeck | FMZB 1519 | MRTSUE06025 | 1 year | 2021/11/10 |
| Bilog Period Antenna | Schwarzbeck | VULB 9168 | MRTSUE06172 | 1 year | 2021/03/31 |
| Broad Band Horn Antenna | Schwarzbeck | BBHA 9120D | MRTSUE06023 | 1 year | 2021/10/13 |
| Broad Band Horn Antenna | Schwarzbeck | BBHA 9170 | MRTSUE06597 | 1 year | 2021/02/23 |
| Microwave System Amplifier | Agilent | 83017A | MRTSUE06076 | 1 year | 2021/11/15 |
| Preamplifier | Schwarzbeck | BBV 9721 | MRTSUE06121 | 1 year | 2021/06/11 |
| Thermohyrometer | Testo | 608-H1 | MRTSUE06403 | 1 year | 2021/08/08 |
| Anechoic Chamber | TDK | Chamber-AC1 | MRTSUE06212 | 1 year | 2021/04/30 |

Radiated Emission (WZ-AC2)

| Instrument | Manufacturer | Type No. | Asset No. | Cali. Interval | Cali. Due Date |
|--|--------------|-------------|-------------|----------------|----------------|
| Spectrum Analyzer | Keysight | N9038A | MRTSUE06125 | 1 year | 2021/08/01 |
| Wideband Radio Communication Tester | R&S | CMW 500 | MRTSUE06243 | 1 year | 2021/11/07 |
| Loop Antenna | Schwarzbeck | FMZB 1519 | MRTSUE06025 | 1 year | 2021/11/10 |
| Bilog Period Antenna | Schwarzbeck | VULB 9162 | MRTSUE06022 | 1 year | 2021/10/13 |
| Horn Antenna | Schwarzbeck | BBHA9120D | MRTSUE06171 | 1 year | 2021/10/27 |
| Broad Band Horn Antenna | Schwarzbeck | BBHA 9170 | MRTSUE06597 | 1 year | 2021/02/23 |
| Broad Band Coaxial Preamplifier | Schwarzbeck | BBV 9718 | MRTSUE06176 | 1 year | 2021/11/15 |
| Preamplifier | Schwarzbeck | BBV 9721 | MRTSUE06121 | 1 year | 2021/06/11 |
| Temperature/Humidity Meter | Minggao | ETH529 | MRTSUE06170 | 1 year | 2021/12/15 |
| Anechoic Chamber | RIKEN | Chamber-AC2 | MRTSUE06213 | 1 year | 2021/04/30 |

| Software | Version | Function |
|--------------|---------|-------------------|
| EMI Software | V3 | EMI Test Software |

4. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Radiated Spurious Emissions

Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$):

Horizontal: 9kHz~300MHz: 5.04dB

300MHz~1GHz: 4.95dB

1GHz~40GHz: 6.40dB

Vertical: 9kHz~300MHz: 5.24dB

300MHz~1GHz: 6.03dB

1GHz~40GHz: 6.40dB

5. TEST RESULT

5.1. Summary

| FCC Part Section(s) | Test Description | Test Limit | Test Condition | Test Result | Reference |
|---------------------|--------------------|----------------------|----------------|-------------|-------------|
| 2.1053, 96.41(e) | Spurious Emissions | Refer to section 5.2 | Radiated | Pass | Section 5.2 |

Notes:

- 1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations the worst-case was found.
- 3) This report is supplemented to MRT Original "2101RSU060-U1" Report, FCC ID: XMR2020EM160RGL updating product name and model number.

5.2. Radiated Spurious Emissions Measurements

5.2.1. Test Limit

Out of band emissions: The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz .

$E \text{ (dB}\mu\text{V/m)} = \text{EIRP (dBm)} - 20 \log D + 104.8$; where D is the measurement distance in meters. The emission limit equal to $55.3\text{dB}\mu\text{V/m}$.

5.2.2. Test Procedure Used

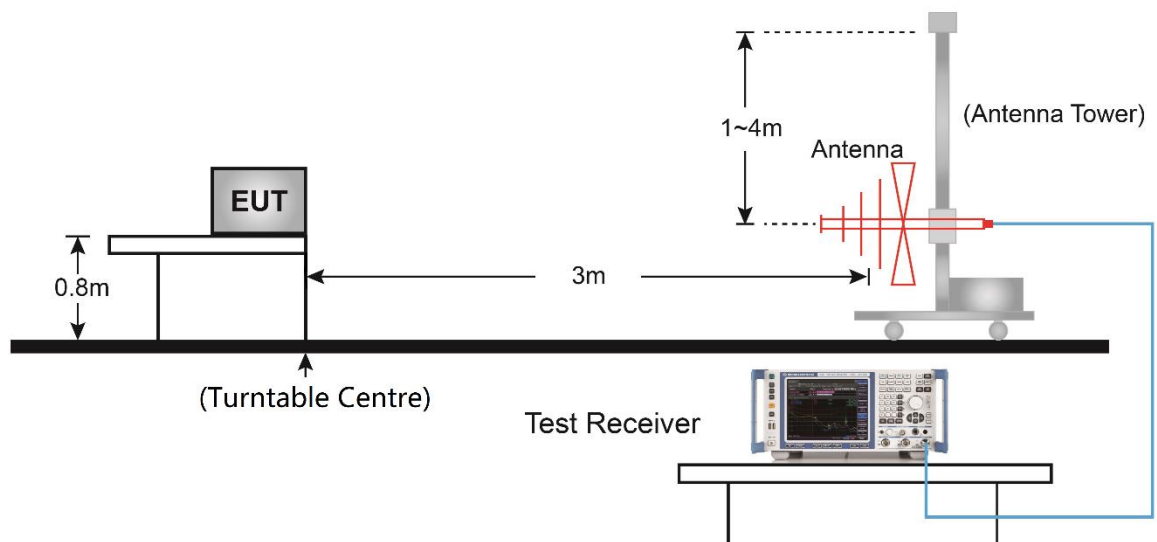
ANSI C63.26-2015 - Section 5.2.7 & 5.5

5.2.3. Test Setting

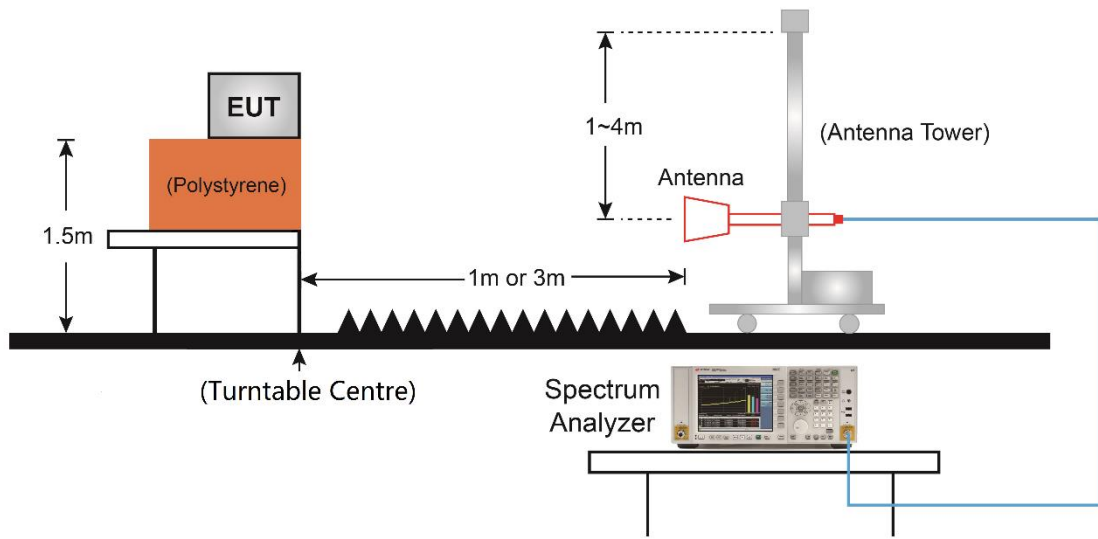
1. RBW = 1MHz
2. VBW $\geq 3 \times \text{RBW}$
3. Sweep time $\geq 10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})$
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

5.2.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.2.5. Test Result

| | | | |
|---------------|---|-----------|------------|
| Product | LTE-A Cat 12 M.2 Module | Test Site | WZ-AC2 |
| Test Engineer | Buter Shi | Test Date | 2021/01/24 |
| Test Band | LTE Band 48 - 5MHz Bandwidth, 1RB, QPSK | | |

| Frequency (MHz) | Reading Level (dB μ V) | Factor (dB) | Measure Level (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Detector | Polarization |
|------------------------------------|----------------------------|-------------|------------------------------|----------------------|-------------|----------|--------------|
| Bottom CH 55265 (3552.5MHz) | | | | | | | |
| 4669.0 | 37.3 | 4.4 | 41.7 | 55.3 | -13.6 | Peak | Horizontal |
| 5596.0 | 36.7 | 5.5 | 42.2 | 55.3 | -13.1 | Peak | Horizontal |
| 4681.0 | 36.1 | 4.6 | 40.7 | 55.3 | -14.6 | Peak | Vertical |
| 5572.0 | 36.1 | 5.6 | 41.7 | 55.3 | -13.6 | Peak | Vertical |
| Middle CH 55900 (3625.0MHz) | | | | | | | |
| 4642.0 | 35.6 | 4.3 | 39.9 | 55.3 | -15.4 | Peak | Horizontal |
| 5947.0 | 35.5 | 6.9 | 42.4 | 55.3 | -12.9 | Peak | Horizontal |
| 5431.0 | 35.5 | 5.3 | 40.8 | 55.3 | -14.5 | Peak | Vertical |
| 6649.0 | 35.6 | 9.7 | 45.3 | 55.3 | -10.0 | Peak | Vertical |
| Top CH 56715 (3697.5MHz) | | | | | | | |
| 5194.0 | 36.0 | 5.0 | 41.0 | 55.3 | -14.3 | Peak | Horizontal |
| 6679.0 | 35.0 | 9.9 | 44.9 | 55.3 | -10.4 | Peak | Horizontal |
| 5131.0 | 35.3 | 5.2 | 40.5 | 55.3 | -14.8 | Peak | Vertical |
| 6541.0 | 34.6 | 9.5 | 44.1 | 55.3 | -11.2 | Peak | Vertical |

6. CONCLUSION

The data collected relate only the item(s) tested and show that unit is compliance with FCC Rules.

Appendix A - Test Setup Photograph

Refer to "2101RSU059-UT" file.

Appendix B - EUT Photograph

Refer to "2101RSU059-UE" file.