



# FCC RADIO TEST REPORT

**FCC ID** : XMR2023RM520NGLT  
**Equipment** : 5G Sub-6 GHz M.2 Module  
**Brand Name** : Quectel  
**Model Name** : RM520N-GL  
**Applicant** : Quectel Wireless Solutions Co., Ltd.  
Building 5, Shanghai Business Park Phase III  
(Area B), No.1016 Tianlin Road, Minhang  
District, Shanghai, China, 200233  
**Manufacturer** : LCFC (HeFei) Electronics Technology Co., Ltd.  
No. 3188-1, Yungu Road (Hefei Export  
Processing Zone), Hefei Economics &  
Technology Development Area, Anhui, CHINA  
**Standard** : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)

Equipment: Quectel RM520N-GL tested inside of Lenovo Notebook Computer.

The product was received on Nov. 13, 2023 and testing was performed from Nov. 28, 2023 to Dec. 01, 2023. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

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

*Louis Wu*

Approved by: Louis Wu

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



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### Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Pass	-
	§22.913 (a)(5)	Effective Radiated Power (WCDMA Band V)		
	§24.232 (c)	Equivalent Isotropic Radiated Power ( WCDMA Band II)		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (WCDMA Band IV)		
-	§24.232 (d)	Peak-to-Average Ratio	Pass	See Note
-	§2.1049 §22.917 (b) §24.238 (b) §27.53 (g)	Occupied Bandwidth (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Pass	See Note
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (g)	Band Edge Measurement (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Pass	See Note
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (g)	Conducted Emission (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Pass	See Note
-	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	Pass	See Note
-	§2.1053 §22.917 (a) §24.238 (a) §27.53 (h)	Field Strength of Spurious Radiation (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Pass	See Note

**Remark:**

1. For host device, Field Strength of Spurious Radiation, Effective Radiated Power and Equivalent Isotropic Radiated Power are verified and complies with the limit in this test report.
2. For host device, the Conducted Output Power is no difference after compared to module (Model: RM520N-GL)
3. The measurement evaluation of Radiation Spurious Emissionis based on the module report measurement results, with the worst case from module report. The measurement results of RSE are included in the Sporton report: FG3N1058B.



**Conformity Assessment Condition:**

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/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.

**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.

**Reviewed by: Sheng Kuo**

**Report Producer: Rebecca Wu**



# 1 General Description

## 1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	5G Sub-6 GHz M.2 Module
Brand Name	Quectel
Model Name	RM520N-GL
FCC ID	XMR2023RM520NGLT
Sample 1	EUT with Host 1
Sample 2	EUT with Host 2
EUT supports Radios application	WCDMA/HSPA/LTE/5G NR/GNSS
EUT Stage	Production Unit

**Remark:**

1. The above EUT's information was declared by manufacturer.
2. Equipment: Quectel RM520N-GL tested inside of Lenovo Notebook Computer.

The product was installed into Notebook Computer (Brand Name: Lenovo, Model Name: TP00150A, TP00159B) during test, and the host information was recorded in the following table.

Host Information	
Host 1	Host with Amphenol Taiwan Corporation Antenna
Host 2	Host with AWAN Antenna

WWAN Antenna Information for Host				
Main Antenna	Manufacturer	Amphenol Taiwan Corporation	Peak gain (dBi)	WCDMA Band II: -1.41 WCDMA Band IV: -0.25 WCDMA Band V: -0.22
	Part number	DC330022K00 DC330022K70	Type	PIFA Antenna
	Manufacturer	AWAN	Peak gain (dBi)	WCDMA Band II: -1.41 WCDMA Band IV: -0.25 WCDMA Band V: -0.22
	Part number	DC330022H00 DC330022H70	Type	PIFA Antenna

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

## 1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard	
<b>Tx Frequency</b>	<b>WCDMA:</b> Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz Band IV: 1712.4 MHz ~ 1752.6 MHz
<b>Rx Frequency</b>	<b>WCDMA:</b> Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz Band IV: 2112.4 MHz ~ 2152.6 MHz
<b>Maximum Output Power to Antenna</b>	<b>WCDMA:</b> Band V: 24.23 dBm Band II: 23.75 dBm Band IV: 23.85 dBm
<b>Type of Modulation</b>	WCDMA: BPSK (Uplink) HSDPA: 64QAM (Downlink) HSUPA: QPSK (Uplink)

## 1.3 Modification of EUT

No modifications made to the EUT during the testing.

## 1.4 Testing Location

<b>Test Site</b>	Sporton International Inc. EMC & Wireless Communications Laboratory
<b>Test Site Location</b>	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333
<b>Test Site No.</b>	<b>Sporton Site No.</b>
	TH03-HY
<b>Test Engineer</b>	Diego Huang
<b>Temperature (°C)</b>	23.1~24.8
<b>Relative Humidity (%)</b>	50.1~52.6

FCC Designation No.: TW1190



## 1.5 Applicable Standards

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

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

**Remark:**

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.





## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

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

All modes, data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes	
Band	Conducted TCs
WCDMA Band V	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link
WCDMA Band IV	■ RMC 12.2Kbps Link

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

Frequency List				
Band	Channel/Frequency(MHz)	Lowest	Middle	Highest
WCDMA Band V	Channel	4132	4182	4233
	Frequency	826.4	836.4	846.6
WCDMA Band II	Channel	9262	9400	9538
	Frequency	1852.4	1880.0	1907.6
WCDMA Band IV	Channel	1312	1413	1513
	Frequency	1712.4	1732.6	1752.6

### 3 Conducted Test Result

#### 3.1 Measuring Instruments

Please refer to the measuring equipment list in this test report.

##### 3.1.1 Test Setup

##### 3.1.2 Conducted Output Power



##### 3.1.3 Test Result of Conducted Test

Please refer to Appendix A.



## 3.2 Conducted Output Power and ERP/EIRP

### 3.2.1 Description of the Conducted Output Power and ERP/EIRP

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

The ERP of mobile transmitters must not exceed 7 Watts for WCDMA Band V

The EIRP of mobile transmitters must not exceed 2 Watts for WCDMA Band II

The EIRP of mobile transmitters must not exceed 1 Watts for WCDMA Band IV

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

### 3.2.2 Test Procedures

1. The transmitter output port is connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select the lowest, middle, and the highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.



## 4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Radio Communication Analyzer	Anritsu	MT8821C	6262025353	LTE FDD/TDD LTE-2CC DLCA/ULCA	Oct. 03, 2023	Nov. 28, 2023~ Dec. 01, 2023	Oct. 02, 2024	Conducted (TH03-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#B	1-18GHz	Jan. 06, 2023	Nov. 28, 2023~ Dec. 01, 2023	Jan. 05, 2024	Conducted (TH03-HY)



## Appendix A. Test Results of Conducted Test

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

WCDMA Band V Maximum Average Power [dBm] (GT - LC = -0.22 dB)					
Channel	4132	4182	4233	ERP (dBm)	ERP (W)
Frequency	826.4	836.4	846.6		
RMC 12.2K	24.14	24.23	24.22	21.86	0.1535
HSDPA Subtest-1	23.15	23.24	23.22		
HSDPA Subtest-2	23.17	23.20	23.20		
HSDPA Subtest-3	22.62	22.69	22.68		
HSDPA Subtest-4	22.63	22.38	22.68		
HSUPA Subtest-1	23.14	23.21	23.16		
HSUPA Subtest-2	21.15	21.19	21.18		
HSUPA Subtest-3	22.11	22.22	22.17		
HSUPA Subtest-4	21.13	21.24	21.16		
HSUPA Subtest-5	23.10	23.20	23.20		
Limit	ERP < 3W				

WCDMA Band II Maximum Average Power [dBm] (GT - LC = -1.41 dB)					
Channel	9262	9400	9538	EIRP (dBm)	EIRP (W)
Frequency	1852.4	1880	1907.6		
RMC 12.2K	23.54	23.71	23.75	22.34	0.1714
HSDPA Subtest-1	22.57	22.80	22.76		
HSDPA Subtest-2	22.53	22.72	22.78		
HSDPA Subtest-3	22.04	22.22	22.23		
HSDPA Subtest-4	22.07	22.29	22.27		
HSUPA Subtest-1	22.61	22.81	22.81		
HSUPA Subtest-2	20.57	20.79	20.74		
HSUPA Subtest-3	21.57	21.79	21.77		
HSUPA Subtest-4	20.58	20.75	20.79		
HSUPA Subtest-5	22.60	22.80	22.80		
Limit	EIRP < 2W				

WCDMA Band IV Maximum Average Power [dBm] (GT - LC = -0.25 dB)					
Channel	1312	1413	1513	EIRP (dBm)	EIRP (W)
Frequency	1712.4	1732.6	1752.6		
RMC 12.2K	23.72	23.81	23.85	23.60	0.2291
HSDPA Subtest-1	22.78	22.81	22.83		
HSDPA Subtest-2	22.72	22.80	22.84		
HSDPA Subtest-3	22.24	22.26	22.28		
HSDPA Subtest-4	22.20	22.26	22.31		
HSUPA Subtest-1	22.74	22.78	22.85		
HSUPA Subtest-2	20.73	20.82	20.84		
HSUPA Subtest-3	21.71	21.82	21.79		
HSUPA Subtest-4	20.75	20.82	20.88		
HSUPA Subtest-5	22.80	22.80	22.80		
Limit	EIRP < 1W				