



RF Test Report

Applicant: Quectel Wireless Solutions Co., Ltd.
Address: Building 5, Shanghai Business Park Phase III (Area B), No.1016
Tianlin Road, Minhang District, Shanghai, 200233 China
Product: LTE Cat 4 Module
Model No.: EC300R-LA
Brand Name: QUECTEL
FCC ID: XMR2024EC300RLA
Standards: 47 CFR Part 2.1091
FCC KDB 447498 D01 v06
Report No.: PD20240004RF02
Issue Date: 2024/02/06
Test Result: PASS *

* The above equipment has been tested and compliance with the requirement of the relative standards by Hefei Panwin Technology Co., Ltd.

Reviewed By: Jerry Zhang

Approved By: Alec Yang

Hefei Panwin Technology Co., Ltd.

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Revision History

Report No.	Version	Description	Issue Date	Note
PD20240004RF02	1	Initial Report	2024/02/06	Valid

Remark:

- We, Hefei Panwin Technology Co., Ltd., would like to declare that the tested sample has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Hefei Panwin Technology Co., Ltd., the test report shall not be reproduced except in full.

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1 Test Laboratory

1.1 Notes of the Test Report

This report is invalid without signature of auditor and approver or with any alterations. The report shall not be partially reproduced without written approval of the testing company. Entrusted test results are only responsible for incoming samples. If there is any objection to the testing report, it shall be raised to the testing company within 15 days from the date of receiving the report. In the test results, "NA" means "not applicable", and the test items marked with "Δ" are subcontracted projects.

1.2 Testing Laboratory

Company Name	Hefei Panwin Technology Co., Ltd.
Address	Floor 1, Zone E, Plant 2#, Mingzhu Industrial Park, No.106 Chuangxin Avenue, High-tech Zone, Hefei City, Anhui Province, China
Telephone	+86-0551-63811775
Post Code	230031

2 General Description of Equipment under Test

2.1 Details of Application

Applicant	Quectel Wireless Solutions Co., Ltd.
Applicant Address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, 200233 China
Manufacturer	Quectel Wireless Solutions Co., Ltd.
Manufacturer Address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, 200233 China

2.2 Details of EUT

Product		LTE Cat 4 Module	
Model		EC300R-LA	
Hardware Version		R1.0	
Software Version		EC300RLAAAR03A03M2G	
SN		Conducted: D1N23LB0F000011 Radiated: D1N23LB0F000062	
Antenna Type		☒ External ☐ Integrated	
Frequency Band(s)	Band	Tx (MHz)	Rx (MHz)
	GSM 850	824 to 849	869 to 894
	GSM 1900	1850 to 1910	1930 to 1990
	WCDMA Band II	1850 to 1910	1930 to 1990
	WCDMA Band IV	1710 to 1755	2110 to 2155
	WCDMA Band V	824 to 849	869 to 894
	LTE Band 2	1850 to 1910	1930 to 1990
	LTE Band 4	1710 to 1755	2110 to 2155
	LTE Band 5	824 to 849	869 to 894
	LTE Band 7	2500 to 2570	2620 to 2690
	LTE Band 66	1710 to 1780	2110 to 2180
Note: The declared of product specification for EUT and/or Antenna presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.			

3 Test Condition

3.1 Laboratory Environment

Temperature	Min.= 18℃, Max.=25℃
Relative Humidity	Min.= 30%, Max.=70%
Ground System Resistance	< 1 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

4 Maximum Permissible Exposure (MPE)

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Table 1 to § 1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)				
Frequency Range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3–3.0	614	1.63	*(100)	≤6
3.0–30	1842/f	4.89/f	*(900/f ²)	<6
30–300	61.4	0.163	1.0	<6
300–1,500	--	--	f/300	<6
1,500–100,000	--	--	5	<6
(ii) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	<30
1.34–30	824/f	2.19/f	*(180/f ²)	<30
30–300	27.5	0.073	0.2	<30
300–1,500	--	--	f/1500	<30
1,500–100,000	--	--	1.0	<30
f = frequency in MHz. * = Plane-wave equivalent power density.				

The transmitter is using external antennas that operate at 20 cm or more from nearby persons. The maximum permitted level is calculated using the general equation:

$$S = PG / 4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. Wm²)

P = power input to the antenna (in appropriate units, e.g., W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., m)

Solve S, the power density at 20 cm is shown in Appendix A, so the limit is kept.

Appendix A – Test Results

A.1 Maximum Measured Conducted Output Power and Antenna Gain

Band	Burst Turn up Power(dBm)	Division Factors (dB)	Time-Averaged Tune up Power (dBm)
GSM850	35.00	-9.03	25.97
GSM1900	32.00	-9.03	22.97
Remark: To average the power, the division factor is as follows, 1Txslot = 1 transmit time slot out of 8 time slots => conducted power divided by (1/8) => -9.03 dB			

Band	TX Freq. (MHz)	Maximum conducted output power (dBm)	Maximum Antenna Gain (dBi)
GSM 850	824 to 849	25.97	2.13
GSM 1900	1850 to 1910	22.97	1.59
WCDMA Band II	1850 to 1910	25.00	1.59
WCDMA Band IV	1710 to 1755	25.00	2.00
WCDMA Band V	824 to 849	25.00	2.13
LTE Band 2	1850 to 1910	25.00	1.59
LTE Band 4	1710 to 1755	25.00	2.00
LTE Band 5	824 to 849	25.00	2.13
LTE Band 7	2500 to 2570	25.00	3.00
LTE Band 66	1710 to 1780	25.00	2.00

A.2 Test Results of Maximum Permissible Exposure

Band	Maximum Power (dBm)	Maximum Antenna Gain (dBi)	Maximum EIRP (dBm)	PG (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	The EMF Ratio
GSM 850	25.97	2.13	28.10	645.65	0.128	0.549	0.2340
GSM 1900	22.97	1.59	24.56	285.76	0.057	1.000	0.0568
WCDMA Band II	25.00	1.59	26.59	456.04	0.091	1.000	0.0907
WCDMA Band IV	25.00	2.00	27.00	501.19	0.100	1.000	0.0997
WCDMA Band V	25.00	2.13	27.13	516.42	0.103	0.549	0.1871
LTE Band 2	25.00	1.59	26.59	456.04	0.091	1.000	0.0907
LTE Band 4	25.00	2.00	27.00	501.19	0.100	1.000	0.0997
LTE Band 5	25.00	2.13	27.13	516.42	0.103	0.549	0.1871
LTE Band 7	25.00	3.00	28.00	630.96	0.126	1.000	0.1255
LTE Band 66	25.00	2.00	27.00	501.19	0.100	1.000	0.0997

Note 1: For mobile or fixed location transmitters, minimum separation distance is 20cm, even if calculations indicate EMF distance is less.

Note 2: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.

Note 3: Chose the maximum RF output tune up power of all antennas among same frequency WWAN bands and the maximum antenna gain to perform MPE calculation conservatively.

Appendix B – The EUT Appearance

Refer to “Attachment 1: External Photograph” and “ Attachment 2: Internal Photograph” file.

***** End of the Report *****