

Report No.: SEWM2312000500RG03

Rev.: 01

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TEST REPORT

Application No.: SEWM2312000500RG
Applicant: Quectel Wireless Solutions Co., Ltd.
Address of Applicant: Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Manufacturer: Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer: Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
EUT Description: LTE-A Cat 12 M.2 Module
Model No.: EM120K-GL
Trade Mark: Quectel
FCC ID: XMR2022EM120KGL
Standards: 47 CFR Part 2.1091
FCC KDB 447498 D01 v06
Date of Receipt: 2023/12/07
Date of Issue: 2024/01/08

Test Result:**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Well Wei

Well Wei

Wireless Laboratory Manager



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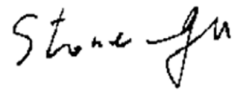
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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2024/01/08		Original

Prepared By	 (Nick Hu) / Test Engineer
Checked By	 (Stone Gu) / Reviewer



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2 General Information

2.1 Client Information

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

2.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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2.3 General Description of EUT

EUT Description:	LTE-A Cat 12 M.2 Module		
Model No.:	EM120K-GL		
Trade Mark:	Quectel		
Hardware Version:	R1.0		
Software Version:	EM120KGLAAR01A05M2G		
Power Supply:	5V		
Antenna Type:	<input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated		
Antenna Gain:	WCDMA Band II:	0.25dBi (Ant0)	WCDMA Band IV: 1.47dBi (Ant0)
	WCDMA Band V:	2.68dBi (Ant0)	
	LTE Band 2:	0.25dBi (Ant0)	LTE Band 4: 1.47dBi (Ant0)
	LTE Band 5:	2.68dBi (Ant0)	LTE Band 7: 0.55dBi (Ant0)
	LTE Band 12:	-0.2dBi (Ant0)	LTE Band 13: 1.54dBi (Ant0)
	LTE Band 14:	2.42dBi (Ant0)	LTE Band 17: -0.2dBi (Ant0)
	LTE Band 25:	0.25dBi (Ant0)	LTE Band 26: 2.87dBi (Ant0)
	LTE Band 30:	-3.06dBi (Ant0)	LTE Band 38: -0.23dBi (Ant0)
	LTE Band 41:	0.78dBi (Ant0)	LTE Band 42: -4.29dBi (Ant0)
	LTE Band 43:	-4.11dBi (Ant0)	LTE Band 48: -4.29dBi (Ant0)
	LTE Band 66:	1.47dBi (Ant0)	LTE Band 71: 1.22dBi (Ant0)
	LTE CA_7C:	0.55dBi (Ant0)	LTE CA_41C: 0.78dBi (Ant0)
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.		
Remark: As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.			



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3 RF Exposure Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 Limits

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6
(B) 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
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

F=frequency in MHz
 *=Plane-wave equivalent power density
 RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Friis Formula

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.



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3.1.2 Test Procedure

Software provided by client enabled the EUT to transmit data at lowest, middle and highest channel individually

3.1.3 EUT RF Exposure Evaluation

Output Power Into Antenna & RF Exposure Evaluation Distance:

This confirmed that the device comply with MPE limit.

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
WCDMA Band II	1852.4	0.25	26.00	26.25	33.00	0.0839	1.0000	7.00	11.01	7.00	Pass
WCDMA Band IV	1712.4	1.47	26.00	27.47	30.00	0.1111	1.0000	4.00	11.01	4.00	Pass
WCDMA Band V	826.4	2.68	26.00	26.53	38.45	0.1468	0.5509	14.60	8.42	8.42	Pass
LTE Band 2	1850.7	0.25	25.00	25.25	33.00	0.0666	1.0000	8.00	12.01	8.00	Pass
LTE Band 4	1710.7	1.47	25.00	26.47	30.00	0.0883	1.0000	5.00	12.01	5.00	Pass
LTE Band 5	824.7	2.68	25.00	25.53	38.45	0.1166	0.5498	15.60	9.41	9.41	Pass
LTE Band 7/LTE CA_7C	2502.5	0.55	25.00	25.55	33.00	0.0714	1.0000	8.00	12.01	8.00	Pass
LTE Band 12	699.7	-0.20	25.00	22.65	34.77	0.0601	0.4665	11.92	8.70	8.70	Pass
LTE Band 13	779.5	1.54	25.00	24.39	34.77	0.0897	0.5197	11.92	9.16	9.16	Pass
LTE Band 14	790.5	2.42	25.00	25.27	34.77	0.1098	0.5270	11.92	9.23	9.23	Pass
LTE Band 17	706.5	-0.20	25.00	22.65	34.77	0.0601	0.4710	11.92	8.74	8.74	Pass
LTE Band 25	1850.7	0.25	25.00	25.25	33.00	0.0666	1.0000	8.00	12.01	8.00	Pass
LTE Band 26(814-824)	814.7	2.87	25.00	NA	NA	0.1218	0.5431	NA	9.36	9.36	Pass
LTE Band 26(824-849)	824.7	2.87	25.00	25.72	38.45	0.1218	0.5498	15.60	9.41	9.41	Pass
LTE Band 30	2307.5	-3.06	25.00	21.94	23.98	0.0311	1.0000	-1.02	12.01	-1.02	Pass
LTE Band 38	2572.5	-0.23	25.00	24.77	33.00	0.0597	1.0000	8.00	12.01	8.00	Pass
LTE Band 41/LTE CA_41C	2498.5	0.78	25.00	25.78	33.00	0.0753	1.0000	8.00	12.01	8.00	Pass
LTE Band 42(3450-3550)	3452.5	-4.29	25.00	20.71	30.00	0.0234	1.0000	5.00	12.01	5.00	Pass
LTE Band 42(3550-3600)	3552.5	-4.29	25.00	20.71	23.00	0.0234	1.0000	-2.00	12.01	-2.00	Pass
LTE Band 43(3600-3700)	3602.5	-4.11	25.00	20.89	23.00	0.0244	1.0000	-2.00	12.01	-2.00	Pass
LTE Band 48	3552.5	-4.29	25.00	20.71	23.00	0.0234	1.0000	-2.00	12.01	-2.00	Pass
LTE Band 66	1710.7	1.47	25.00	26.47	30.00	0.0883	1.0000	5.00	12.01	5.00	Pass
LTE Band 71	665.5	1.22	25.00	24.07	34.77	0.0833	0.4437	11.92	8.48	8.48	Pass

---End of Report---



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