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Report No.: SZEM180500453602

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## **RF Exposure Evaluation Report**

Application No.: SZEM1805004536RG

Applicant: Quectel Wireless Solutions Co., Ltd.

Address of Applicant 7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District,

Shanghai 200233, China

**Manufacturer:** Quectel Wireless Solutions Co., Ltd.

Address of Manufacturer 7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District,

Shanghai 200233, China

Product Name: LTE-A Cat6 Module

Model No.(EUT): EG06-A
Trade Mark: Quectel

FCC ID: XMR201807EG06A

Standards: 47 CFR Part 2

47 CFR Part 22 subpart H 47 CFR Part 24 subpart E 47 CFR Part 27 subpart C

**Date of Receipt:** 2018-06-25

**Date of Test:** 2018-06-27 to 2018-07-9

**Date of Issue:** 2018-07-11

Test Result: PASS\*

Authorized Signature:

Derele yang

Derek Yang

Wireless Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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## 2 Version

Revision Record							
Version	Chapter	Date	Modifier	Remark			
01		2018-07-11		Original			

Authorized for issue by:		
	Mike Mu	2018-07-11
	Mike Hu /Project Engineer	-
	David Chen	2018-07-11
	Jim Huang /Reviewer	-



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### 3 General Information

### 3.1 Client Information

Applicant:	Quectel Wireless Solutions Co., Ltd.
Address of Applicant:	7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China
Manufacturer:	Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer:	7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China

### 3.2 General Description of EUT

Product Name:	LTE-A Cat6 Module			
Model No.:	EG06-A			
Trade Mark:	Quectel			
HW Version (Product )	R1.0			
SW Version (Product )	EG06ALAR02A01M4G			
Sample Type:	_TE Module			
Antenna Type:	external antenna,			
	WCDMA BAND II: 2dBi ;			
	WCDMA BAND IV: 2dBi ;			
	WCDMA BAND V: 3dBi ;			
Antenna Gain:	LTE BAND2:2dBi; LTE BAND4:2dBi;			
Antenna Gain.	LTE BAND5:3dBi; LTE BAND7:2dBi;			
	LTE BAND12:3dBi; LTE BAND13:3dBi;			
	LTE BAND25:2dBi; LTE BAND26:3dBi;			
	LTE BAND30:0dBi; LTE BAND66:2dBi			

### 3.3 Test Mode

Test Mode	Test Modes Description			
UMTS/TM1	UMTS system, WCDMA, QPSK modulation			
UMTS/TM2	UMTS system, WCDMA, 16QAM modulation			
LTE/TM1	LTE system, QPSK modulation			
LTE/TM2	LTE system, 16QAM modulation			
LTE/TM3	LTE system, 64QAM modulation			

NOTE: The test mode(s) are selected according to relevant radio technology specifications.



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#### 3.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

### 3.5 Test Facility

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

#### • CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

#### • A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

#### VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

#### • FCC -Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

#### • Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

#### 3.6 Deviation from Standards

None.

#### 3.7 Abnormalities from Standard Conditions

None.

## 3.8 Other Information Requested by the Customer

None.



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## 4 RF Exposure Evaluation

### 4.1 RF Exposure Compliance Requirement

#### **4.1.1 Limits**

Frequency range (MHz)			Power density (mW/cm²)	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/f²)	6				
30-300	61.4	0.163	1.0	6				
300-1500	/	1	f/300	6				
1500-100,000	1	/	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/f²)	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: Pd = (Pout\*G)/(4\* Pi \* R 2)

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd id 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.

#### 4.1.2 Test Procedure

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



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### 4.1.3 EUT RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0 / 2.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Operating Band	Frequency (MHz)	Max Conducted Average Output Power (dBm)	EIRP(ERP) Limit (dBm)	Gain according to EIRP (dBi)
WCDMA Band2	1852.4	24	33	9
WCDMA Band4	1712.4	24	30	6
WCDMA Band5	826.4	24	38.5	14.5
LTE Band 2	1850.7	24	33	9
LTE Band 4	1710.7	24	30	6
LTE Band 5	824.7	24	38.5	14.5
LTE Band 7	2502.5	24	33	9
LTE Band 12	699.7	24	34.77	10.77
LTE Band 13	779.5	24	34.77	10.77
LTE Band 25	1850.7	24	33	9
LTE Band 26	814.7	24	38.5	14.5
LTE Band 30	2307.5	24	24	0
LTE Band 66	1710.7	24	30	6

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Average Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm²)	Limit (mW/cm²	Max Gain	Result
WCDMA Band2	1852.4	2	26	398.1072	0.1255	1.0	11.01	PASS
WCDMA Band4	1712.4	2	26	398.1072	0.1255	1.0	11.01	PASS
WCDMA Band5	826.4	3	27	501.1872	0.1989	0.5509	7.42	PASS
LTE Band 2	1850.7	2	26	398.1072	0.1255	1.0	11.01	PASS
LTE Band 4	1710.7	2	26	398.1072	0.1255	1.0	11.01	PASS
LTE Band 5	824.7	3	27	501.1872	0.1989	0.5498	7.41	PASS
LTE Band 7	2502.5	2	26	398.1072	0.1255	1.0	11.01	PASS
LTE Band 12	699.7	3	27	501.1872	0.1989	0.4664	6.7	PASS
LTE Band 13	779.5	3	27	501.1872	0.1989	0.5197	7.16	PASS
LTE Band 25	1850.7	2	26	398.1072	0.1255	1.0	11.01	PASS

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LTE Band 26	814.7	3	27	501.1872	0.1989	0.5431	7.36	PASS
LTE Band 30	2307.5	0	24	251.1886	0.0500	1.0	13.01	PASS
LTE Band 66	1710.7	2	26	398.1072	0.1255	1.0	11.01	PASS

The Max allowed antenna gain is as following table showed:

Operating Band	Antenna Gain (dBi)
WCDMA Band2	9
WCDMA Band4	6
WCDMA Band5	7.42
LTE Band 2	9
LTE Band 4	6
LTE Band 5	7.41
LTE Band 7	9
LTE Band 12	6.7
LTE Band 13	7.16
LTE Band 25	9
LTE Band 26	7.36
LTE Band 30	0
LTE Band 66	6

Note: Refer to report No. SZEM180500453601 for EUT test Max Conducted Peak Output Power value. The distancer (6th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.