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

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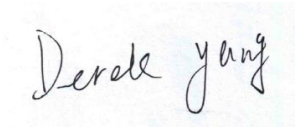
RF Exposure Evaluation Report

Application No.:	SZEM1805004535RG
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):	EP06-A
Trade Mark:	Quectel
FCC ID:	XMR201807EP06A
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:	2018-05-29
Date of Test:	2018-05-30to 2018-06-15
Date of Issue:	2018-06-16
Test Result:	**PASS***

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

Authorized Signature:



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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2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2018-06-16		*Original*

Authorized for issue by:				
		Mike Hu		2018-06-16
		Mike Hu /Project Engineer		
		David Chen		2018-06-16
		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.:	EP06-A
Trade Mark:	Quectel
HW Version (Product)	R1.0
SW Version (Product)	EP06ALAR02A01M4G
Sample Type:	LTE Module
Antenna Type:	external antenna,
Antenna Gain:	WCDMA Band2: 2dBi ; WCDMA Band4: 2dBi ; WCDMA Band5: 3dBi ;LTE B2:2dBi; LTE B4:2dBi; LTE B5:3dBi; LTE B7:2dBi; LTE B12:3dBi; LTE B13:3dBi; LTE B25:2dBi; LTE B26:3dBi; LTE B30:0dBi; LTE B66:2dBi

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)	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: 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/cm^2)	Limit (mW/cm^2)	Max Gain（dBi）	Result
WCDMA Band2	1852.4	2	24	398.1072	0.1255	1.0	11.01	PASS
WCDMA Band4	1712.4	2	24	398.1072	0.1255	1.0	11.01	PASS
WCDMA Band5	826.4	3	24	501.1872	0.1989	0.5509	7.42	PASS
LTE Band 2	1850.7	2	24	398.1072	0.1255	1.0	11.01	PASS
LTE Band 4	1710.7	2	24	398.1072	0.1255	1.0	11.01	PASS
LTE Band 5	824.7	3	24	501.1872	0.1989	0.5498	7.41	PASS
LTE Band 7	2502.5	2	24	398.1072	0.1255	1.0	11.01	PASS
LTE Band 12	699.7	3	24	501.1872	0.1989	0.4664	6.7	PASS
LTE Band 13	779.5	3	24	501.1872	0.1989	0.5197	7.16	PASS
LTE Band 25	1850.7	2	24	398.1072	0.1255	1.0	11.01	PASS

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LTE Band 26	814.7	3	24	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	24	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. SZEM180500453501 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.

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