MPE TEST REPORT

Applicant	Quectel Wireless Solutions Co., Ltd
FCC ID	XMR201605EC25A
Product	LTE Module
Model	EC25-A, EC25-A MINIPCIE
Report No.	R1903A0120-M1V1
Issue Date	April 12 , 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC 47 CFR Part 1 1.1310**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Songyan Fan Guangchang Fan

Performed by: Songyan Fan *Approved by: Guangchang Fan*

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1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.**The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

CNAS (accreditation number:L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
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E-mail:	xukai@ta-shanghai.com

1.4 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 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.	

2 Description of Equipment under Test

Client Information

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

General Technologies

Model	EC25-A, EC25-A MINIPCIE
IMEI	861107039623245
Hardware Version	R1.0
Software Version	EC25AFAR05A04M4G
Date of Testing:	March 18, 2019 ~ March 25, 2019

EC25-A, EC25-A MINIPCIE (Report No: R1903A0120-M1V1) is a variant model of EC25-A, EC25-A MINIPCIE (Report No: RKS160908001-00B). The detailed product change description please refers to *EC25-A Request letter*.

The major change filed under this application is:
The original antenna used to test ERP/EIRP/RSE with the module originally granted on 7/18/2016 and Class II Grant Date: 3/15/2017 is 1dBi, and the new antenna used to test ERP/EIRP/RSE with the module is 5dBi. The module is electrically identical as Class II Granted on 3/15/2017.

3 Maximum conducted output power (measured) and antenna Gain

The numeric gain (G) of the antenna with a gain specified in dB is determined by
Numeric gain (G)=10^(antenna gain/10)

Band	Maximum Conducted Output Power	
	(dBm)	(mW)
WCDMA Band II	23.5	223.872
WCDMA Band IV	23.5	223.872
WCDMA Band V	23.5	223.872
LTE Band 2	24.0	251.189
LTE Band 4	24.0	251.189
LTE Band 12	24.0	251.189

4 Test Result

According to section 1.1310 of FCC 47 CFR Part 1, limits for maximum permissible exposure (MPE) are as following

TABLE 1 – LIMITS FOR MAXIMUN PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0 ……	614	1.63	*(100)	6
3-30 ……	1842/f	4.89/f	*(900/f2)	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/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

Note1. Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

Note2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

The maximum permissible exposure for 300~1500 MHz is f/1500, for 1500~100,000MHz is 1.0.So

Band	The maximum permissible exposure
WCDMA II	1.0mW/cm^2
WCDMA IV	1.0mW/cm^2
WCDMA V	0.55mW/cm^2
LTE Band 2	1.0mW/cm^2
LTE Band 4	1.0mW/cm^2
LTE Band 12	0.47mW/cm^2

Band	Maximum Conducted Output Power (dBm)	EIRP limit (dBm)	Margin1 (dB)	Power density Limit		Margin2 (dB)	Final Margin (dB)
				(mW/cm^2)	(dBm)		
WCDMA II	23.5	33.000	9.500	1.000	37.013	13.513	9.500
WCDMA IV	23.5	30.000	6.500	1.000	37.013	13.513	6.500
WCDMA V	23.5	40.600	17.100	0.550	34.416	10.916	10.916
LTE Band 2	24.0	33.000	9.000	1.000	37.013	13.013	9.000
LTE Band 4	24.0	30.000	6.000	1.000	37.013	13.013	6.000
LTE Band 12	24.0	36.920	12.920	0.470	33.734	9.734	9.734

Note: 1. The Maximum allowed antenna gain per Band should be less than or equal to the **Final Margin** which is the allowable maximum gain value to comply with limits for maximum permissible exposure (MPE). **New antenna Gain is 5dBi less than the Maximum allowed antenna gain.**
2. The Final Margin is determined and selected to the worst-case of Margin1 and Margin2.
3. Margin1=EIRP Limit(dBm)-Maximum Conducted Power (dBm). EIRP limit reference standard part22/ part24 and part27 for each band, EIRP = ERP + 2.15 (dB).
4. Margin2=Power density Limit(dBm)-Maximum Conducted Power (dBm). Power density Limit(dBm): The max. obtained by MPE with 20cm.

IMPORTANT NOTE: To comply with the FCC RF exposure compliance requirements, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. No change to the antenna or the device is permitted. Any change to the antenna or the device could result in the device exceeding the RF exposure requirements and void user's

authority to operate the device.

RF Exposure Calculations:

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the conducted power, considering maximum power and antenna gain. The formula shown in KDB 447498 D01 is used in the calculation.

Equation from KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) is:

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

Where: S = power density (in appropriate units, e.g. mW/cm^2)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = the numeric gain of the antenna

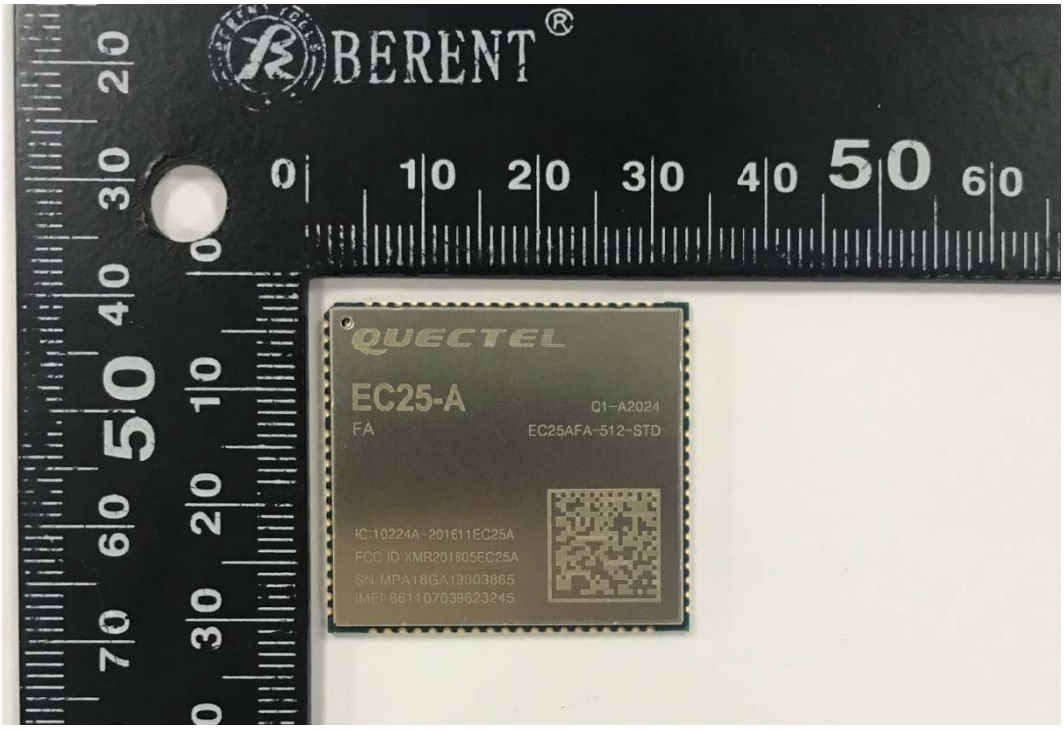
R = distance to the center of radiation of the antenna (20 cm = limit for MPE)

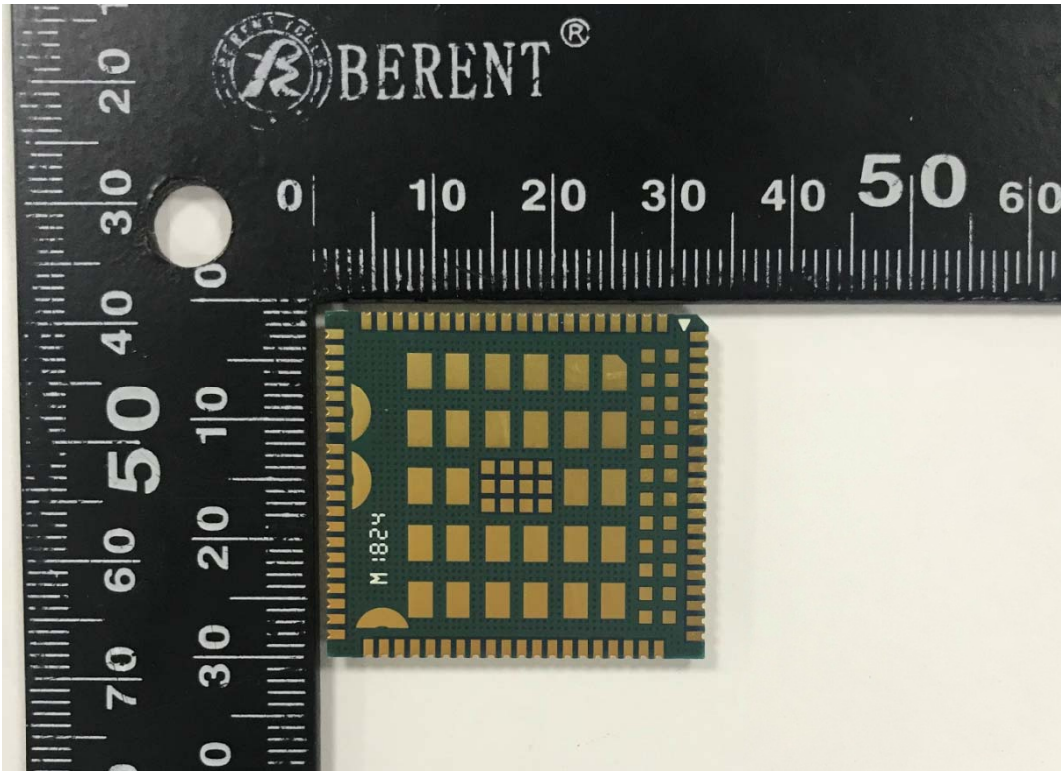
Band	PG (mW)	Test Result (mW/cm^2)	Limit Value (mW/cm^2)	Conclusion
WCDMA II	1995.262	0.397	1.000	Pass
WCDMA IV	1000.000	0.199	1.000	Pass
WCDMA V	2764.394	0.550	0.550	Pass
LTE Band 2	1995.262	0.397	1.000	Pass
LTE Band 4	1000.000	0.199	1.000	Pass
LTE Band 12	2362.653	0.470	0.470	Pass
Note: **R** = 20cm ∏= 3.1416				

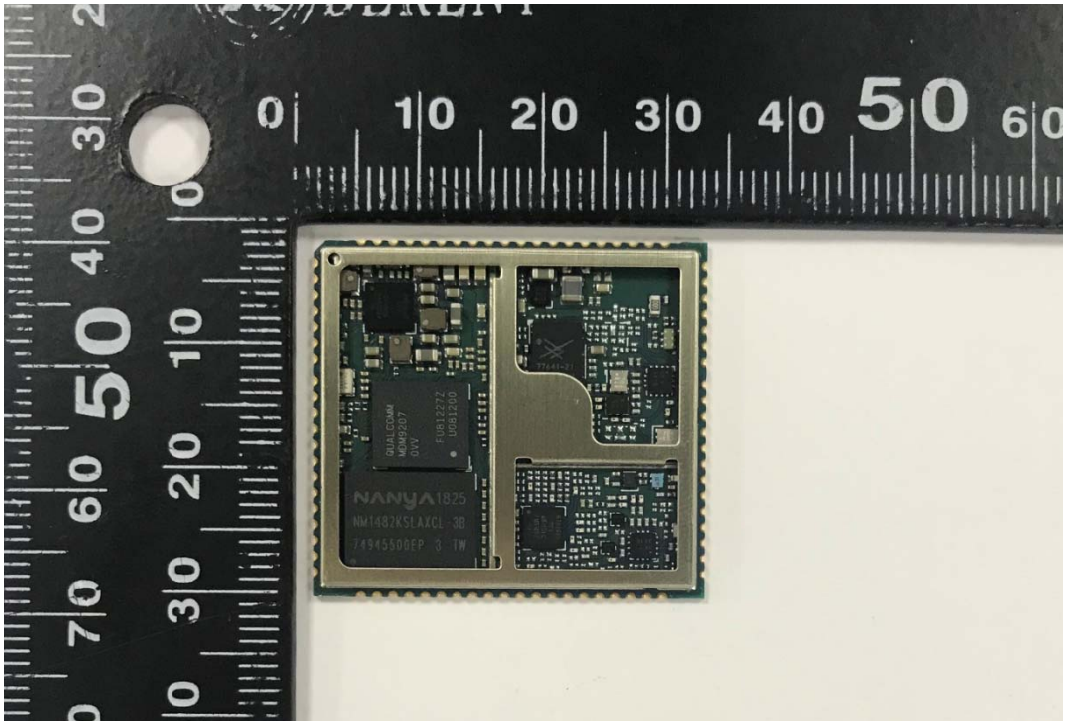
Note: For transmitters, minimum separation distance is 20cm, even if calculations indicate MPE distance is less.

ANNEX A： The EUT Appearance

A.1 EUT Appearance







a: EUT

Picture 1 EUT