TEST REPORT

No. 2014SAR0062

For

Client :	**Quectel Wireless Solutions Co. Ltd**
Production :	**UMTS/HSDPA module**
Model Name :	**UC15 Mini PCIe**
FCC ID:	**XMR201404UC15M**
Hardware Version:	**R1.0**
Software Version:	**UC15AQAR02A01E1G**
Issued date:	**2014-11-17**

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

Add: 7F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: welcome@ecit.org.cn

Revision Version

Report Number	Revision	Date	Memo
2014SAR0062	00	2014-11-17	Initial creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

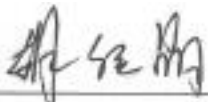|	
Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area,No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301
FCC Registration NO.:	489729

1.2. Testing Environment
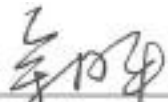
NormalTemperature:	15-35℃
Relative Humidity:	20-75%
Ambient noise & Reflection:	< 0.012 W/kg

1.3. Project Data

Project Leader:	Gong Yujuan
Testing Start Date:	2014-11-10
Testing End Date:	2014-11-11

1.4. Signature

Hu Jiajing
(Prepared this test report)

Yu Naiping
(Reviewed this test report)

Zheng Zhongbin
Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Quectel Wireless Solutions Co. Ltd
Address /Post:	Room 501, Building 13, No.99 Tianzhou Road, Xuhui District, Shanghai,China
Country:	China
Telephone:	+86-21-51086236
Postal Code:	200233
Contact	Hu Zhiqin

2.2. Manufacturer Information

Company Name:	Quectel Wireless Solutions Co. Ltd
Address /Post:	Room 501, Building 13, No.99 Tianzhou Road, Xuhui District, Shanghai,China
Country:	China
Telephone:	+86-21-51086236
Postal Code:	200233
Contact	Hu Zhiqin

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	UMTS/HSDPA module
Model name	UC15 Mini PCIe
GSM Frequency Band	GSM850/GSM900/GSM1800/GSM1900
WCDMA Frequency Band	WCDMA band II/WCDMA band V
Antenna Type	External Antenna
FCC ID:	XMR201404UC15M

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version:
N01	IMEI:N/A	R1.0	UC15AQAR02A01E1G

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Cable	N/A	N/A	N/A
AE2	N/A	N/A	N/A	N/A

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.

The limits standard is based on the Council Recommendation 1999/519/EC.

FCC CFR 47, Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS, Oct 1,2011

Section 2.1091   Radiofrequency radiation exposure evaluation: mobile devices, Oct 1,2011

4.2. Test Limits

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

Limits for Occupational / Controlled Exposure

Frequency Range [MHz]	Electric Field Strength (E) [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm2]	Averaging Times |E|2, |H|2 or S [miniutes]
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1824/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	--	--	F/300	6
1500 - 100000	--	--	5	6

Limits for General Population / Uncontrolled Exposure

Frequency Range [MHz]	Electric Field Strength (E) [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm2]	Averaging Times |E|2, |H|2 or S [miniutes]
0.3 – 1.34	614	1.63	(100)*	30
1.34 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	--	--	F/1500	30
1500 - 100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.

5. Test Results

5.1. Conducted RF Power Output

Table 5.1: The Conducted Power For GPRS 4TS 850MHz and 1900MHz

GPRS 4TS 850MHz	Conducted Power (dBm)		
	Channel 128 (824.2MHz)	Channel 190 (836.6MHz)	Channel 251 (848.8MHz)
	28.27	28.18	28.23
GPRS 4TS 1900MHz	Conducted Power (dBm)		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
	25.64	25.49	25.53

Table 5.2: Tolerance Power For GPRS 4TS 850MHz and 1900MHz

GPRS 4TS 850MHz	Conducted Power (dBm)		
	Channel 128 (824.2MHz)	Channel 190 (836.6MHz)	Channel 251 (848.8MHz)
	27.5~29.5	27.5~29.5	27.5~29.5
GPRS 4TS 1900MHz	Conducted Power (dBm)		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
	24.5~26.5	24.5~26.5	24.5~26.5

Table 5.1: The Conducted Power For WCDMA

WCDMA Band II	Conducted Power (dBm)		
	Channel 9262 (1852.4MHz)	Channel 9400 (1880MHz)	Channel 9538 (1907.6MHz)
	22.52	22.5	22.23
WCDMA Band V	Conducted Power (dBm)		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
	22.81	22.61	22.91

Table 5.2: Tolerance Power For WCDMA

WCDMA Band II	Conducted Power (dBm)		
	Channel 9262 (1852.4MHz)	Channel 9400 (1880MHz)	Channel 9538 (1907.6MHz)
	21.5~23.5	21.5~23.5	21.5~23.5
WCDMA Band V	Conducted Power (dBm)		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
	21.5~23.5	21.5~23.5	21.5~23.5

5.2. Calculation Information

From the antenna specifications provided by the applicant, the antenna gain is 1 dBi in GSM and WCDMA.

So for conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

5.3. Result of GSM850

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 824.2 – 848.8 MHz; as per the original test report the highest power is GSM850, Low channel 128. The maximum tune up procedure power is 29.5 dBm . The maximum gain is 1 dBi.The resulted power density at a distance of 20cm can be deducted as follows:

EIRP=29.5+1 =30.5 dBm=1122.02 mW

Power Density=EIRP*Duty Cycle/(4 π R^2)=1122.02*(4/8)/(4* π *20^2)=0.112 mW/cm^2

Where Duty Cycle is 4/8 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = 824.2/1500 = 0.549 mW/cm^2

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.4. Result of GSM1900

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1850.2 – 1909.8 MHz; as per the original test report the highest power is GSM1900, Low channel 512. The maximum tune up procedure power is 26.5 dBm . The maximum gain is 1 dBi. The resulted power density at a distance of 20cm can be deducted as follows:

EIRP=26.5+1=27.5 dBm=562.34 mW

Power Density=EIRP*Duty Cycle/(4 π R^2)=562.34*(4/8)/(4* π *20^2)=0.056 mW/cm^2

Where Duty Cycle is 4/8 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = 1 mW/cm^2

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.5. Result of WCDMA band II

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1852.4-1907.6 MHz; as per the original test report the highest power is WCDMA band II, Low channel 9262. The maximum tune up procedure power is 23.5 dBm . The maximum gain is 1 dBi. The resulted power density at a distance of 20cm can be deducted as follows:

$$EIRP=23.5+1=24.5 \text{ dBm}=281.84 \text{ mW}$$

Power Density=EIRP*Duty Cycle/$(4 \pi R^2)$=281.84*1/$(4* \pi *20^2)$=0.056 mW/cm^2

Where Duty Cycle is 1 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit =1 mW/cm^2

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.6. Result of WCDMA band V

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 826.4-846.6 MHz; as per the original test report the highest power is WCDMA band V, High channel 4233. The maximum tune up procedure power is 23.5 dBm . The maximum gain is 1 dBi. The resulted power density at a distance of 20cm can be deducted as follows:

EIRP=23.5+1=24.5 dBm=281.84 mW

Power Density=EIRP*Duty Cycle/$(4 \pi R^2)$=281.84*1/$(4* \pi *20^2)$=0.056 mW/cm^2

Where Duty Cycle is 1 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = 826.4 /1500 = 0.551 mW/cm^2

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

Note: π=3.1416

So the product is under the MPE limits. All is pass.

**********End The Report**********