

Quectel Wireless Solutions Co., Ltd.

UMTS/HSPA+ Module

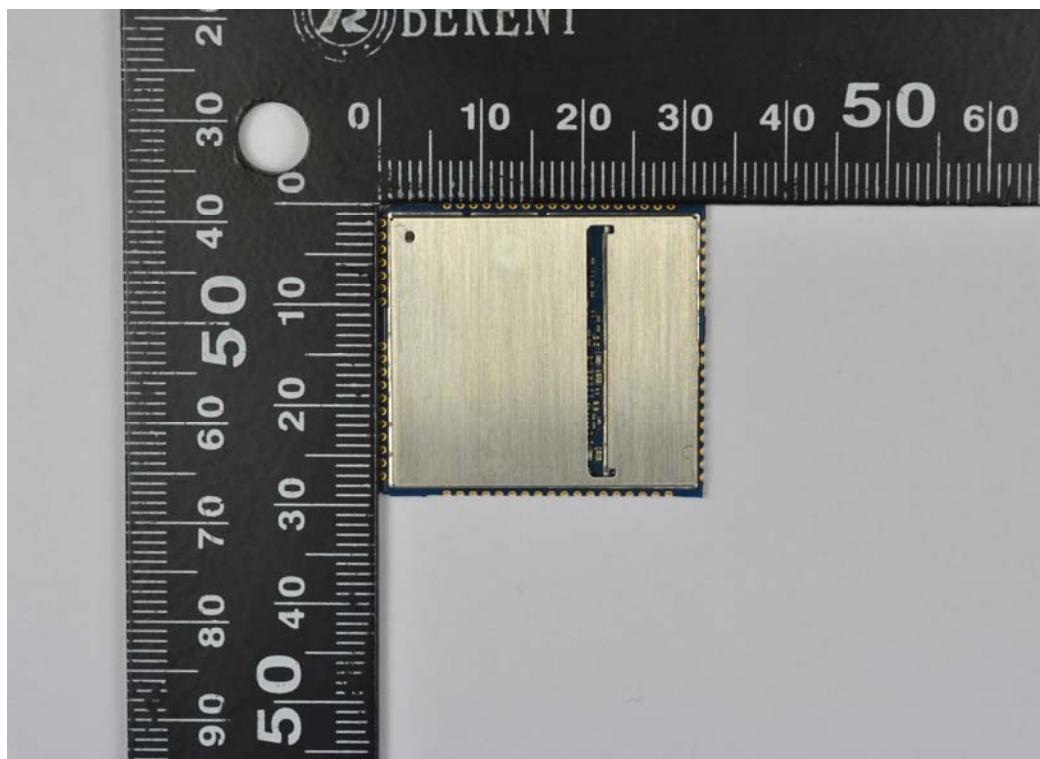
Main Model: UC20

Serial Model: UC20 Mini PCIe

January 9, 2014

Report No.: 13050053-FCC-H1-V1

(This report supersedes 13050053-FCC-H1)



Modifications made to the product : None

This Test Report is Issued Under the Authority of:

		
William Long Compliance Engineer	Alex Liu Technical Manager	

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Test result presented in this test report is applicable to the representative sample only.**

RF Exposure Evaluation Report

SIEMIC, INC.
Accessing global markets

To: FCC 1.1307 FCC 2.1091: 2013

**SIEMIC, INC.**

Accessing global markets

Title: RF Exposure Evaluation Report for UMTS/HSPA+ Module
Main Model: UC20
Serial Model: UC20 Mini PCIe
To: FCC Part 22(H) & FCC Part 24(E): 2013

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Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management through out a project. Our extensive experience with China, Asia Pacific, North America, European, and international compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC , RF/Wireless , Telecom
Canada	EMC, RF/Wireless , Telecom
Taiwan	EMC, RF, Telecom , Safety
Hong Kong	RF/Wireless ,Telecom
Australia	EMC, RF, Telecom , Safety
Korea	EMI, EMS, RF , Telecom, Safety
Japan	EMI, RF/Wireless, Telecom
Singapore	EMC , RF , Telecom
Europe	EMC, RF, Telecom , Safety



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1. EXECUTIVE SUMMARY & EUT INFORMATION

The purpose of this test programme was to demonstrate compliance of the Quectel Wireless Solutions Co., Ltd., UMTS/HSPA+ Module and model: UC20 against the current Stipulated Standards. The UMTS/HSPA+ Module has demonstrated compliance with the FCC Part 22(H) & FCC Part 24(E): 2013.

EUT Information

EUT Description	UMTS/HSPA+ Module
Main Model	UC20
Serial Model	UC20 Mini PCIe
Antenna Gain	<p>UMTS-FDD Band V/GSM850: 1 dBi UMTS-FDD Band II/PCS1900: 1 dBi (Note: The radio module will be sold without antenna, the 3G antenna in this report only used limited to ERP/EIRP or radiated spurious emission test.)</p>
Maximum Conducted AV Power to Antenna	<p>UMTS-FDD Band V : 22.53 dBm UMTS-FDD Band II : 22.53 dBm</p>
Maximum Radiated ERP/EIRP	<p>UMTS-FDD Band V : 23.22dBm / ERP UMTS-FDD Band II : 23.33 dBm / EIRP</p>
Temperature	-10°C - 55°C
Classification Per Stipulated Test Standard	FCC Part 22(H) & FCC Part 24(E): 2013

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2. TECHNICAL DETAILS

Purpose	Compliance testing of UMTS/HSPA+ Module with stipulated standard
Applicant / Client	Quectel Wireless Solutions Co., Ltd. Room 501, Building 13, No.99 TianZhouRoad,Xuhui District, Shanghai
Manufacturer	Quectel Wireless Solutions Co., Ltd. Room 501, Building 13, No.99 TianZhouRoad,Xuhui District, Shanghai
Laboratory performing the tests	SIEMIC (Nanjing-China) Laboratories NO.2-1,Longcang Dadao, Yuhua Economic Development Zone, Nanjing, China Tel: +86(25)86730128/86730129 Fax: +86(25)86730127 Email: China@siemic.com.cn
Test report reference number	13050053-FCC-H1-V1
Date EUT received	December 30, 2013
Standard applied	FCC Part 22(H) & FCC Part 24(E): 2013
Dates of test	January 3, 2014
No of Units	#1
Equipment Category	PCB
Trade Name	N/A
RF Operating Frequency (ies)	UMTS-FDD Band V TX : 826.4 ~ 846.6 MHz; RX : 871.4 ~ 891.6 MHz UMTS-FDD Band II TX : 1852.4 ~ 1907.6 MHz; RX : 1932.4 ~ 1987.6 MHz
Number of Channels	UMTS-FDD Band V : 102CH UMTS-FDD Band II : 277CH
Modulation	UMTS-FDD: QPSK
FCC ID	XMR201312UC20

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3. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FCC §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to §1.1307(b)(1), 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 of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
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

Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)



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For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

WCDMA

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

Band V

Maximum peak output power at antenna input terminal: 22.53(dBm)

Maximum peak output power at antenna input terminal: 179.061 (mW)

The Max Tune up power output at antenna input terminal: $22.5 + 1 = 23.5$ dBm = 223.872 mW

Prediction distance: >20 (cm)

Predication frequency: 826.4(MHz) lowest frequency

Antenna Gain (typical): 1 (dBi)

Antenna Gain (typical): 1.259 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.056102(mW/cm²)

MPE limit for general population exposure at prediction frequency: 0.551 (mW/cm²)

$0.056102 \text{ (mW/cm}^2\text{)} < 0.551 \text{ (mW/cm}^2\text{)}$

Band II

Maximum peak output power at antenna input terminal: 22.53(dBm)

Maximum peak output power at antenna input terminal: 179.061 (mW)

The Max Tune up power output at antenna input terminal: $22.5 + 1 = 23.5$ dBm = 223.872 mW

Prediction distance: >20 (cm)

Predication frequency: 1852.4(MHz) lowest frequency

Antenna Gain (typical): 1 (dBi)

Antenna Gain (typical): 1.259 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.056102 (mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.056102 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

Result: Pass

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Additional: (For Max allowed antenna calculate)

Step 1 ERP/EIRP calculate:

Frequency bands	Max Turn-up Conducted power (dBm)	ERP/EIRP Limit (dBm)	Margin (dB)
WCDMA band V	23.5	38.45	14.95
WCDMA band II	23.5	33.00	9.5

Step 2 MPE calculate:

Frequency bands	Max Turn-up Conducted power (dBm)	Max Turn-up Conducted power (mW)	Distance (cm)	Power Density Limit (mW/cm ²)	Max allow antenna gain (dBi)
WCDMA band V	23.5	223.872	20	0.551	10.92
WCDMA band II	23.5	223.872	20	1	13.51

Step 3:

If meet above step 1 and 2, the Max allows antenna gain show is below:

Frequency bands	Max allow antenna gain (dBi)
WCDMA band V	10.92
WCDMA band II	9.5

Note:

Single Modular Approval.

Output power is conducted. This device is to be used in mobile or fixed applications only. Antenna gain including cable loss must not exceed 10.92 dBi of WCDMA band V and 9.5 dBi of WCDMA band II for the purpose of satisfying the requirements of 2.1043 and 2.1091. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operated in conjunction with any antenna or transmitter not described under this FCC id. The final product operating with this transmitter must include operating instructions and antenna installation instructions, for end-users and installers to satisfy RF exposure compliance requirements. Compliance of this device in all final product configurations is the responsibility of the Grantee. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate.