

Quectel Wireless Solutions Co., Ltd.

UMTS/HSPA Module

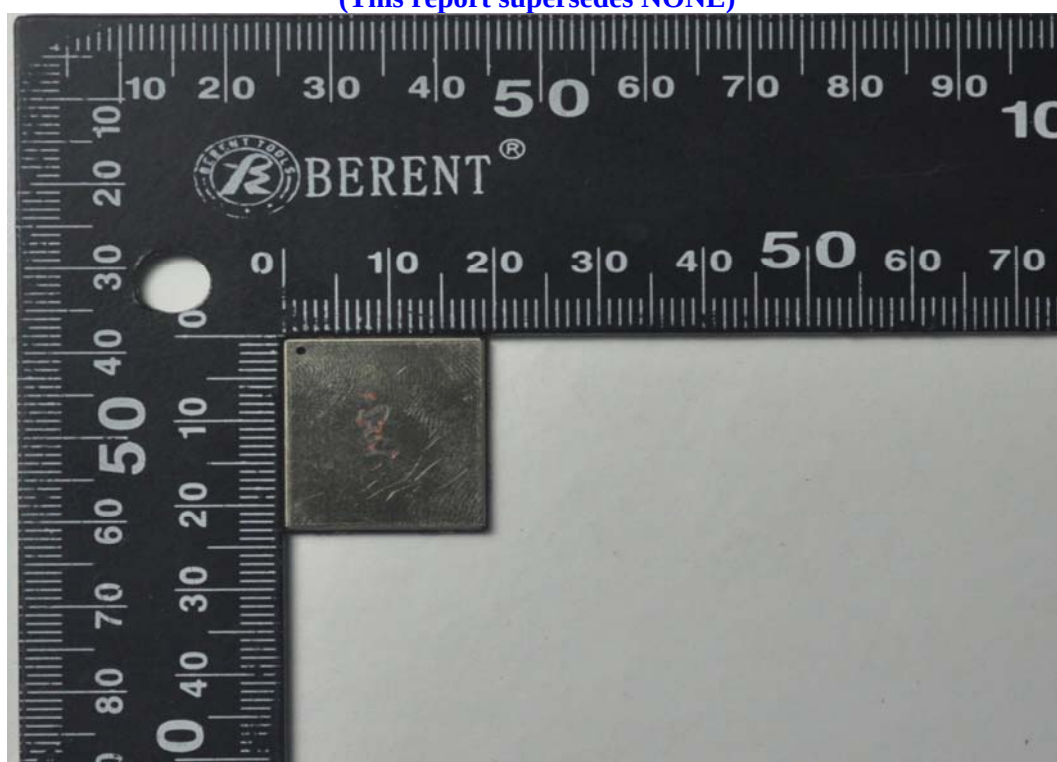
Main Model: UG95

Serial Model: N/A

August 29, 2014

Report No.: 14050052-FCC-H2

(This report supersedes NONE)



Modifications made to the product : None

This Test Report is Issued Under the Authority of:

		
Herith Shi Compliance Engineer	Alex Liu Technical Manager	

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

EMC Test Report
To: FCC 2.1091

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Country/Region	Scope
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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 programmers was to demonstrate compliance of the Quectel Wireless Solutions Co., Ltd., UMTS/HSPA Module and Model: UG95 against the current Stipulated Standards. The UMTS/HSPA Module has demonstrated compliance with the FCC 2.1091.

EUT Information

EUT Description : UMTS/HSPA Module

Main Model : UG95

Serial Model : N/A

Antenna Gain : UMTS-FDD Band V:1dBi
UMTS-FDD Band II:1dBi
(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.)

Input Power : UMTS/HSPA Module:
Model: UG95
Input: DC 3.8V; 550mA

Classification Per Stipulated Test Standard : Class B Emission Product Per
FCC 2.1091

2 TECHNICAL DETAILS

Purpose	Compliance testing of UMTS/HSPA Module with stipulated standards
Applicant / Client	Quectel Wireless Solutions Co., Ltd. Room 501, Building 13, No. 99 TianZhou Roud, Xuhui District, Shanghai
Manufacturer	Quectel Wireless Solutions Co., Ltd. Room 501, Building 13, No. 99 TianZhouRoud, Xuhui District, Shanghai
Laboratory performing the tests	SIEMIC (Shenzhen-China) Laboratories Zone A, Floor 1, Building 2, Wan Ye Long Technology Park, South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong, China Tel: +86-0755-2601 4629 / 2601 4953 Fax: +86-0755-2601 4953-810 Email: China@siemic.com.cn
Test report reference number	14050052-FCC-H2
Date EUT received	August 22, 2014
Standard applied	FCC 2.1091
Dates of test (from – to)	August 29, 2014
No of Units	#1
Equipment Category	PCB
Trade Name	Quectel
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
GPRS Multi-slot class	N/A
FCC ID	XMR201408UG95

3 FCC §2.1091 - Maximum Permissible exposure (MPE)

3.1 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

3.2 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)

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: 21.84(dBm)

Maximum peak output power at antenna input terminal: 152.757 (mW)

The Max Tune up power output at antenna input terminal: $22.25 + 1 = 23.25\text{dBm} = \underline{211.349 \text{ mW}}$

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: 0.05293(mW/cm²)

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

$0.05293 \text{ (mW/cm}^2\text{)} < 0.551 \text{ (mW/cm}^2\text{)}$

Band II

Maximum peak output power at antenna input terminal: 21.92(dBm)

Maximum peak output power at antenna input terminal: 155.597 (mW)

The Max Tune up power output at antenna input terminal: $22.25 + 1 = 23.25\text{dBm} = \underline{211.349\text{mW}}$

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: 0.05293 (mW/cm²)

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

$0.05293 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

Result: Pass

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	23.25	38.45	15.2
WCDMA band II	23.25	33.00	9.75

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	23.25	211.349	20	0.551	11.17
WCDMA band II	23.25	211.349	20	1	13.76

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	11.17
WCDMA band II	9.75

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 11.17 dBi of WCDMA band V and 9.75 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.