

Quectel Wireless Solutions Company Limited

GSM/GPRS Module

Main Model:M35




November 25, 2015

Report No.: 12050041-1-FCC-R2
(This report supersedes NONE)



Modifications made to the product : None

This Test Report is Issued Under the Authority of:

		
Winnie Zhang Compliance Engineer	David Huang Technical Manager	

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RF Exposure Report

To: FCC 2.1091: 2014

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Canada	IC, A2LA, NIST	EMC, RF/Wireless , Telecom
Taiwan	BSMI , NCC , NIST	EMC, RF, Telecom , Safety
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Country/Region	Accreditation Body	Scope
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EU	NB	EMC & R&TTE Directive
Japan	MIC, (RCB 208)	RF , Telecom
Hong Kong	OFTA (US002)	RF , Telecom

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1. EXECUTIVE SUMMARY & EUT INFORMATION

The purpose of this test programme was to demonstrate compliance of the Quectel Wireless Solutions Company Limited, GSM/GPRS Module and model: M35 against the current Stipulated Standards. The GSM/GPRS Module has demonstrated compliance with the FCC 2.1091: 2014.

EUT Information

EUT Description : GSM/GPRS Module
Model : M35
Antenna Gain : GSM 850: 1.5 dBi
 : PCS 1900: 1.5 dBi
SWITCHING POWER SUPPLY
MODEL: P-050B
Input Power : INPUT: 100V-240V, 50/60Hz, 0.3A
 : OUTPUT: 5.0V-2.0A
 : P/N: B2152-1116
Maximum Conducted Peak Power to Antenna
 : GSM850: 32.78 dBm
 : PCS1900: 29.19 dBm
Maximum Radiated ERP/EIRP
 : GSM850: 27.48 dBm / ERP
 : PCS1900: 26.46 dBm / EIRP
Classification Per Stipulated Test Standard : FCC 2.1091: 2014

Main Model	Revision Number	Report Number	Description of Revision	Date of Revision
M95	0	12050015-FCC-R2-V1	Original Report	March 10, 2012
M35	1	12050041-FCC-R2	Amended Report	May 22, 2012
M35	2	12050041-1-FCC-R2	Evaluate the Max. Permissible Antenna Gain	November 25, 2015

Note: This is the amended report application (12050041-1-FCC-R2) of the device, the original submission (12050015-FCC-R2-V1) was granted on March 10, 2012. The difference between the original device and the current one was as following the detail information:

The difference of these two models is for different model names

All above were explained in the attached Declaration Letter. Based on the letter the difference between them will not affect all test items.

2. TECHNICAL DETAILS

Purpose	Compliance testing of GSM/GPRS Module with stipulated standard
Applicant / Client	Quectel Wireless Solutions Company Limited Room 501, Building 13, No.99 TianZhou Road,Xuhui District, Shanghai
Manufacturer	Quectel Wireless Solutions Company Limited Room 501, Building 13, No.99 TianZhou Road,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:info@siemic.com
Test report reference number	12050041-1-FCC-R2
Date EUT received	February 20, 2012
Standard applied	FCC 2.1091: 2014
Dates of test	November 25, 2015
No of Units	#1
Equipment Category	PCB
Trade Name	Quectel
RF Operating Frequency (ies)	GSM850 TX : 824.2 ~ 848.8 MHz; RX : 869.2 ~ 893.8 MHz PCS1900 TX : 1850.2 ~ 1909.8 MHz; RX : 1930.2 ~ 1989.8 MHz
Number of Channels	300CH (PCS1900) and 125CH (GSM850)
Modulation	GSM / GPRS: GMSK
GPRS Multi-slot class	8/10/12
FCC ID	XMR201202M35

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 Result

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)

GSM Mode:

Burst Average Power (dBm);								
Band	GSM850				PCS1900			
Channel	128	190	251	Tune up Power tolerant	512	661	810	Tune up Power tolerant
Frequency (MHz)	824.2	836.6	848.8	/	1850.2	1880	1909.8	/
GSM Voice (1 uplink),GMSK	32.78	32.75	32.66	32.0±1	28.26	28.68	29.19	28.5±1
GPRS Multi-Slot Class 8 (1 uplink),GMSK	32.75	32.68	32.59	32.0±1	27.98	28.47	29.05	28.5±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	32.67	32.60	32.49	32.0±1	27.95	28.44	29.01	28.5±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	31.72	31.58	31.48	31.0±1	27.88	28.34	28.88	28.0±1

Remark :

GPRS, CS1 coding scheme.

Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link

Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link

Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link

Band	Source Based time Average Power (dBm)									
	GSM850					PCS1900				
Channel	128	190	251	Time Average factor	Tune up Power tolerant	512	661	810	Time Average factor	Tune up Power tolerant
Frequency (MHz)	824.2	836.6	848.8	/	/	1850.2	1880	1909.8	/	/
GSM Voice (1 uplink),GMSK	23.75	23.72	23.63	-9.03	23.0±1	19.23	19.65	20.16	-9.03	19.5±1
GPRS Multi-Slot Class 8 (1 uplink),GMSK	23.72	23.65	23.56	-9.03	23.0±1	18.95	19.44	20.02	-9.03	19.5±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	26.65	26.58	26.47	-6.02	26.0±1	21.93	22.42	22.99	-6.02	22.5±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	28.71	28.57	28.47	-3.01	28.0±1	24.87	25.33	25.87	-3.01	25.0±1
Remark : GPRS, CS1 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link										

GSM850

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

Maximum output power at antenna input terminal: 29.0 dBm

Maximum output power at antenna input terminal: 891.25(mW)

Prediction distance: >20 (cm)

Predication frequency: 824.2 MHz Low frequency

Antenna Gain (typical): 1.5 (dBi)

Antenna Gain (typical): 1.413 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.22(mW/cm²)

MPE limit for general population exposure at prediction frequency: 0.55(mW/cm²)

$0.22(\text{mW}/\text{cm}^2) < 0.55 (\text{mW}/\text{cm}^2)$

PCS1900

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

Maximum output power at antenna input terminal: 26.0 dBm

Maximum output power at antenna input terminal: 398.11 (mW)

Prediction distance: >20 (cm)

Predication frequency: 1909.8 (MHz) High frequency

Antenna Gain (typical): 1.5 (dBi)

Antenna Gain (typical): 1.413 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.11(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm²)

$0.11(\text{mW}/\text{cm}^2) < 1.0 (\text{mW}/\text{cm}^2)$

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)
GSM 850	33.0	38.45	5.45
PCS 1900	29.5	33.00	3.5

Step 2 MPE calculate:

Frequency bands	Max Turn-up Conducted Source Based time Average Power (dBm)	Max Turn-up Conducted Source Based time Average Power (mw)	Distance (cm)	Power Density Limit (mW/cm2)	Max allow antenna gain (dBi)
GSM 850	29.0	891.25	20	0.549	5.42
PCS 1900	26.0	446.68	20	1	11.02

Step 3:

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

Frequency bands	Max allow antenna gain (dBi)
GSM 850	5.42
PCS 1900	3.5

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 5.42 dBi of GSM 850 and 3.5 dBi of PCS 1900, 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. 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.

Annex A DECLARATION OF SIMILARITY

Quetel Wireless Solutions Co., Ltd

To SIEMIC Inc
2208 Ringwood Ave
San Jose , CA 95131

Statement

We Quetel Wireless Solutions Co., Ltd agree Quetel M35 to use below information on file to apply a multiple-listing certification.

Name: GSM/GPRS Module
Model number: M95
Multiple listing model number: M35

We hereby state that these models are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.

Your assistance on this matter is highly appreciated.

Sincerely,
Name: Johnny Xiang
Title: Manager
Signature:

