Wireless Module Expert

GSM Antenna Detection

Application Note

GSM/GPRS Module Series

Rev: GSM_Antenna_Detection_Application_Note_V1.0

Date: 2013-03-27

Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarter:

Quectel Wireless Solutions Co., Ltd.
Room 501, Building 13, No.99, Tianzhou Road, Shanghai, China, 200233
Tel: +86 21 5108 6236
Mail: info@quectel.com

Or our local office, for more information, please visit:
http://www.quectel.com/quectel_sales_office.html

For technical support, to report documentation errors, please visit:
http://www.quectel.com/tecsupport.aspx

GENERAL NOTES

QUECTEL OFFERS THIS INFORMATION AS A SERVICE TO ITS CUSTOMERS. THE INFORMATION PROVIDED IS BASED UPON CUSTOMERS' REQUIREMENTS. QUECTEL MAKES EVERY EFFORT TO ENSURE THE QUALITY OF THE INFORMATION IT MAKES AVAILABLE. QUECTEL DOES NOT MAKE ANY WARRANTY AS TO THE INFORMATION CONTAINED HEREIN, AND DOES NOT ACCEPT ANY LIABILITY FOR ANY INJURY, LOSS OR DAMAGE OF ANY KIND INCURRED BY USE OF OR RELIANCE UPON THE INFORMATION. ALL INFORMATION SUPPLIED HEREIN ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

COPYRIGHT

About the document

History

Revision	Date	Author	Description
1.0	2013-03-20	David WEI	Initial

Contents

Table Index

Figure Index

1 Introduction

GSM antenna detection application notes will be provided in this document.

Antenna detection is performed by ADC measurement on the voltage of resistor brought by detection circuit, the voltage source can be VDD_EXT in the module or other external voltage. The value is reported by AT command: AT+QADC? (Refer to corresponding Quectel module AT Commands Manual).

The following reference circuits are suitable for all Quectel modules with ADC function, such as M10, M12, M50, M72, M80 etc.

2 For Antenna Assembly (Recommended)

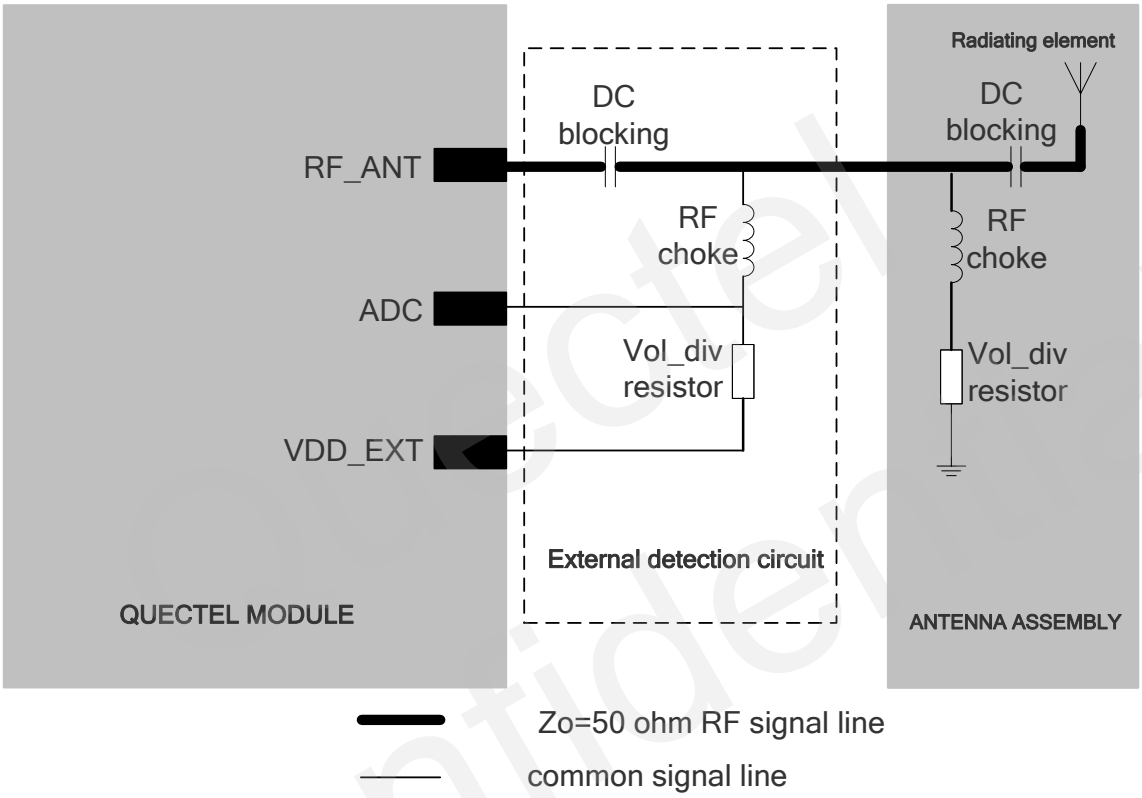

Figure 1: Reference circuit for antenna assembly

It is recommended to use antenna assembly for antenna detection. The detection components are usually embedded in the antenna base. This kind of antenna assembly is often customized.

Table 1: An Example of Components for Antenna Assembly Detection

Description	Recommended Value
DC blocking capacitor	56pF
RF choke inductor	68nH
Vol_div resistor	10K Ohm

The response of “AT+QADC?” is:
+QADC: < status>, <value>
The parameter <status>=0 means ADC reports fail, <status>=1 means ADC reports success. The <value> indicates the report voltage with the unit mV.

Suppose: using the recommended components in the above table; VDD_EXT is 2.8V
Then:

- If antenna is normal, the response value will be 1400±100;
- If antenna is removed, the response value will be 2800±100.

3 For DC Short Antenna (e.g. PIFA Antenna)

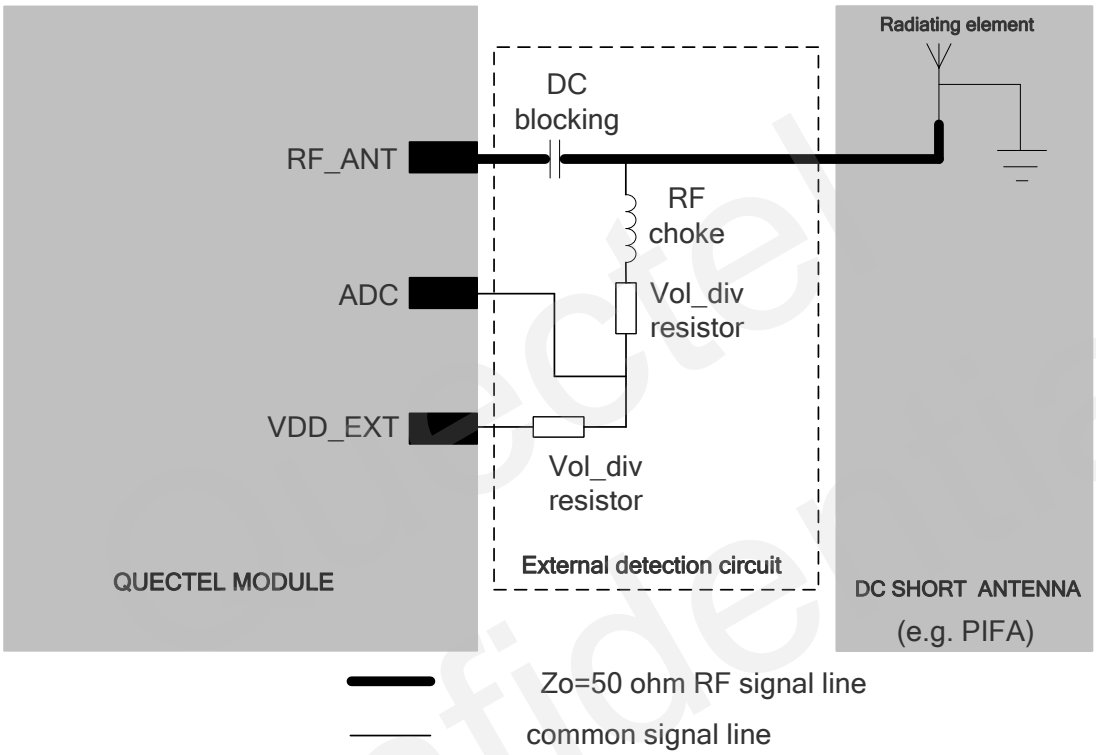

Figure 2: Reference circuit for DC short antenna

If the DC impedance between antenna radiating element and ground is zero, the antenna is called DC short antenna, just like PIFA antenna which is often used and very popular now days. The recommended antenna detection circuit is given as Figure 2.

Table 2: An Example of Components for DC Short Antenna

Description	Recommended Value
DC blocking capacitor	56pF
RF choke inductor	68nH
Vol_div resistor	10K Ohm

The response of “AT+QADC?” is:

+QADC: < status>, <value>

The parameter <status>=0 means ADC reports fail, <status>=1 means ADC reports success. The <value> indicates the report voltage with the unit mV.

Suppose: using the recommended component in the above table; VDD_EXT is 2.8V

Then:

- if antenna is normal, the response value will be 1400±100;
- if antenna is removed, the response value will be 2800±100.

4 For DC Open Antenna (e.g. MONO POLE Antenna)

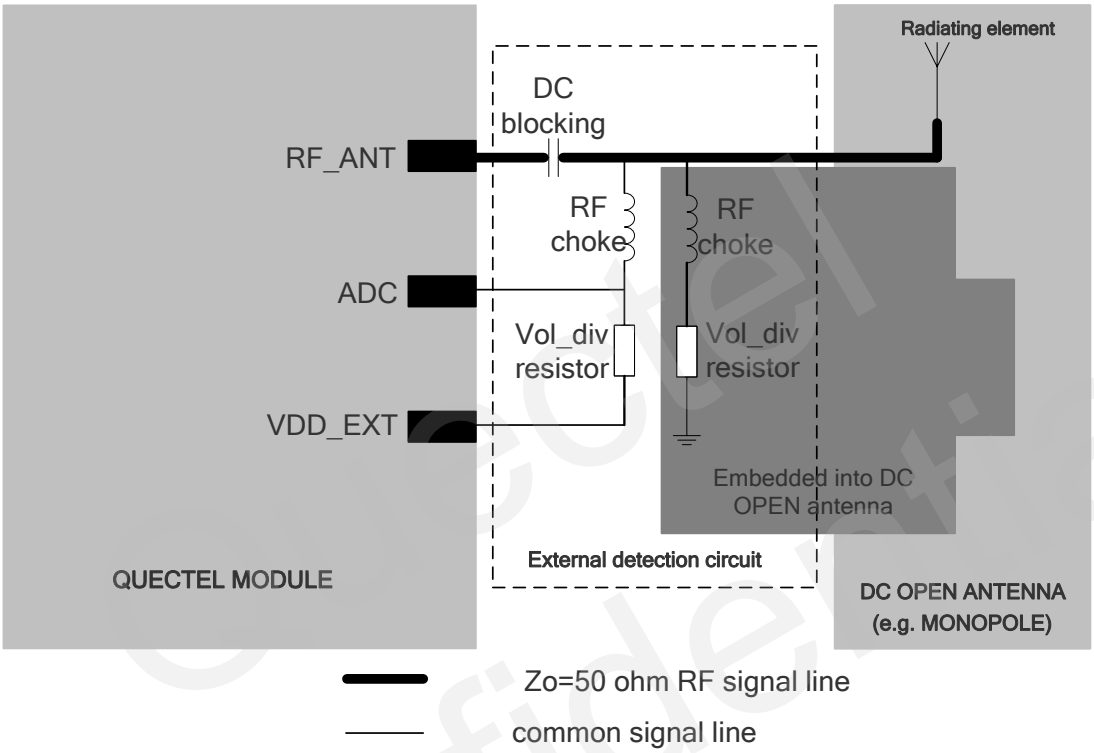

Figure 3: Reference circuit for DC open antenna

If the DC impedance between the antenna radiating element and ground is infinite, the antenna is called DC open antenna, just like MONOPOLE antenna and some vehicle antenna. The recommended antenna detection circuit is given as Figure 3.

Table 3: An Example of Components for DC Open Antenna Detection

Description	Recommended Value
DC blocking capacitor	56pF
RF choke inductor	68nH
Vol_div resistor	10K Ohm

The response of “AT+QADC?” is:

+QADC: < status>, <value>

The parameter <status>=0 means ADC reports fail, <status>=1 means ADC reports success. The <value> indicates the report voltage with the unit mV.

Suppose: using the recommended component in above table; VDD_EXT is 2.8V

Then:

- If antenna is normal, the response value will be 1400±100;
- If antenna is removed, the response value will be 2800±100.