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QRF4001 802.11b/g Wlan Module
QRF4001-SDIO Demonstrator Card
# FCC ID W3RQRF4001SDIO
SDIO User Integration Guide

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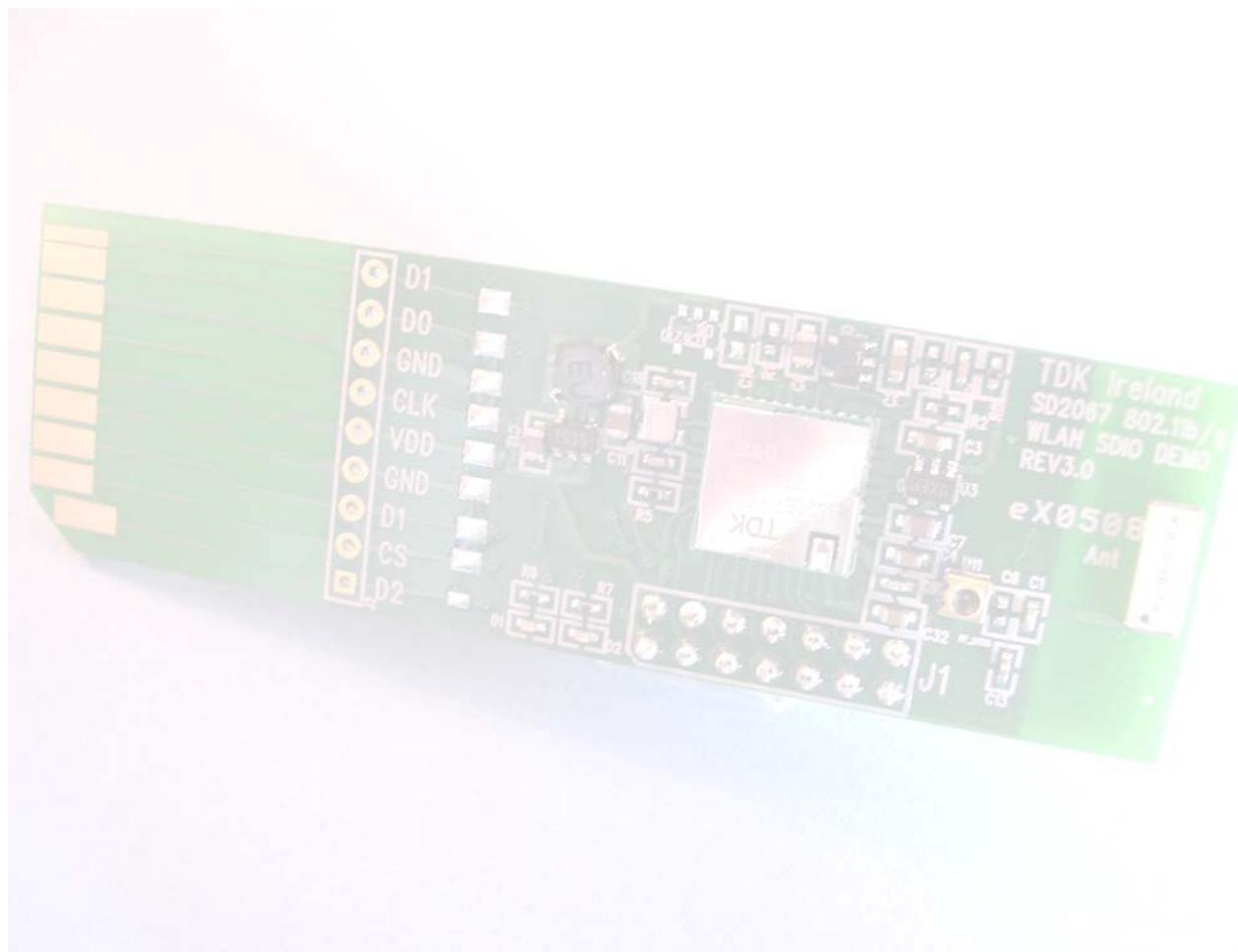
1.0 Revision History

REV. No.	Revision Changes	DATE
1.0	Document of origin	01-Feb-08
1.1	Updated for V3 SDIO	
1.2	Updated for V4.0 SDIO	05-Mar-09

Important:
This is a preliminary document. All specifications are subject to change and are not guaranteed.

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2.0 SDIO Connector Pins
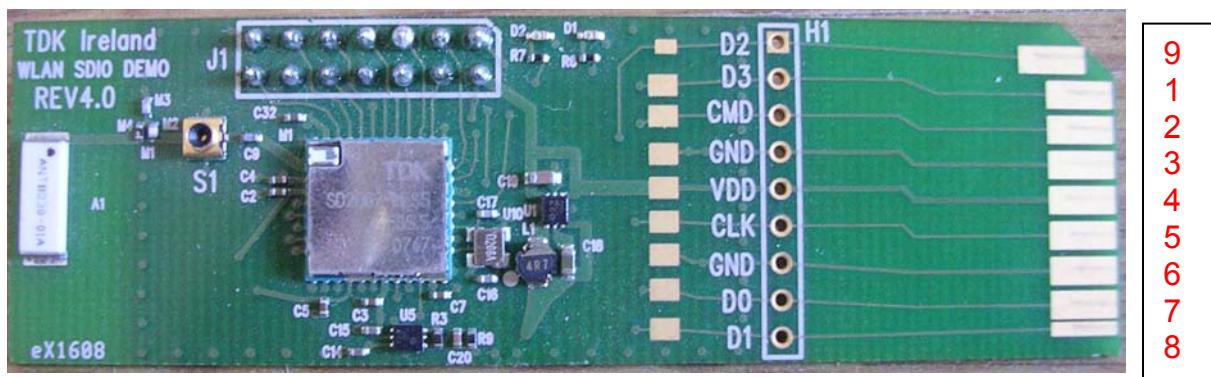
Pin No	Pin Name	Description
8	Dat1	Data Line 1
7	Dat0	Data Line 0
6	Gnd	Ground
5	Clock	Clock
4	Vdd	Voltage Supply 3.3V
3	Gnd	Ground
2	Cmd	Command Line
1	Dat3	Data Line 3
9	Dat2	Data Line 2

NB for version 3.0 of the SDIO card the silkscreen for the SDIO connectors are incorrect on some connections

3.0 Test and I/O Header Connections
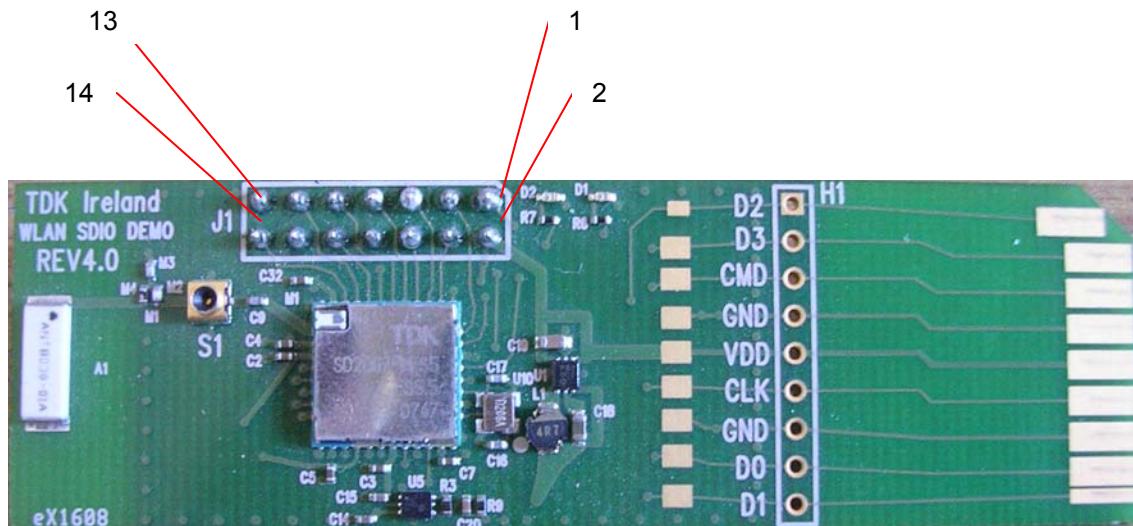
Pin No.	Name	Description
1	Gnd	Common Ground Connection
2	VDD_PA_I/O_SDIO	3.3V Power Supply Input
3	BT_PIO(4)	Bluetooth Co-existence connection/general purpose i/o
4	BT_PIO(6)	Bluetooth Co-existence connection/general purpose i/o
5	BT_PIO(5)	Bluetooth Co-existence connection/general purpose i/o
6	BT_PIO(3)	Bluetooth Co-existence connection/general purpose i/o
7	BT_ACTIVE_PIO(7)	Bluetooth Co-existence connection/general purpose i/o
8	Reset	Reset Wlan module – pull low to reset
9	SPI_CS	Test SPI interface Chip Select
10	E2_WP	Module EEprom for MIB values Pull low to write enable
11	SPI_MISO	Test SPI interface Data Out
12	SPI_CLK	Test SPI interface Clock Input
13	Gnd	Common Ground Connection
14	SPI_MOSI	Test SPI interface Data Input

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4.0 Intended Use

The QRF4001SDIO card is intended for the evaluation of TDK's QRF4001 802.11b/g Wlan module.

It has been fitted to an SDIO card format so that it may be readily installed into a suitable development system. Such a development system may be a PDA or single board computer running a Windows CE or Linux operating system.

If using the SDIO card connectors please refer to pin diagram in section 2.0

The SDIO module can only function when used in conjunction with firmware and drivers obtained from CSR Ltd, according to the operating system used. There is no other software available that can operate on this module.

The firmware is available as a prebuilt object code image that is downloaded from the host processor onto the module, and the drivers are available as source code (from CSR) for incorporating into the host processor operating system. The QRF4001SDIO has an on onboard EEProm that has been programmed in production, and is read by the firmware at boot time and ensures that the RF stages are compliant with the data specification and all relevant regulatory requirements. This EEprom cannot be reprogrammed by the host system

Pin headers on the card allow it to be connected to a development system when an SDIO connector is not available. This allows for a slower data rate over an SPI interface.

For rapid operational evaluation (Transmit and Receive performance), the SDIO card may be connected via a suitable interface (SPI4001) to a Personal Computer and driven with the Unitest software utility from CSR Ltd.

Using this software the device may be placed into transmit, and as such will automatically transmit WiFi compliant packet data at data rates applicable to 802.11b and 802.11g.

4.1 Transmit testing

The transmit channels are set to be compliant with the 802.11 specifications and are selectable as:

FCC compliance – Channels 1 to 11, frequencies 2412Mhz to 2462MHz respectively.

The transmit power for 802.11g is fixed at +13dBm at the antenna output.

The transmit power for 802.11b is fixed at +16dBm at the antenna output.

There is an antenna integrated onto the SDIO card – TDK part no. ANT3080-2R4 and has an antenna gain of 2dBi maximum. The module is designed to only allow transmission using the integral antenna and no attempt should be made to replace or bypass this antenna.

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Transmission is initiated under control of the software test program and appropriate duty cycles may be set therein. For more details see the Unitest manual from CSR Ltd.

4.2 Receive Testing

Receive testing may also be conducted and again the system is compliant for the reception of Wlan packets, over the channels as listed above.

Note that the SDIO card requires no tuning procedure and the frequencies and power levels are preset within the TDK Wlan module contained on the QRF4001SDIO card. Any software utilised, including Unitest is restricted to selecting the 802.11b/g channels and associated pre-set power levels.

For further details of connection to a PC and operation of Unitest, please refer to the User's Guide – QRF4001 SDIO Demonstration Board User's Guide.

5.0   FCC Notification

The QRF4001SDIO board complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions.

1   this device may not cause harmful interference, and

2   this device must accept any interference received, including interference that may cause undesired operations.

In addition, this equipment complies with FCC radiation exposure limits set forth for an occupational/controlled environment. The FCC limitation for Power density is has been set for the frequency of operation of this module as $1mW/cm^2$. The QRF4001SDIO has maximum power density of $0.015mW/cm^2$ at 20cm from the antenna.

This equipment should be operated with a minimum distance of 20cm between the antenna and your body.

Additional information on SAR and RF Exposure can be obtained off the FCC website at:

 www.fcc.gov/oet/rfsafety

This device must be used at a separation distance of at least 20cm from all persons and must not be collocated or operated in conjunction with any antenna or transmitter.

If used in the vicinity of another transmitting device the connections on the header of the SDIO card should be used to perform an approved coexistence protocol that ensures that only one radio (Bluetooth or Wlan) is operating at any given time.

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The FCC ID (W3RQRF4001SDIO) is detailed on a label, attached to the reverse of the module. If when integrating this module into an end piece of equipment, this label cannot be seen externally, then the FCC ID must be clearly shown on the outside of the equipment.