

# **SGCM-W50 User Manual**

## **DNI Smart Grid Communication Module series**

**Rev. 1.0**  
**2014/11/12**



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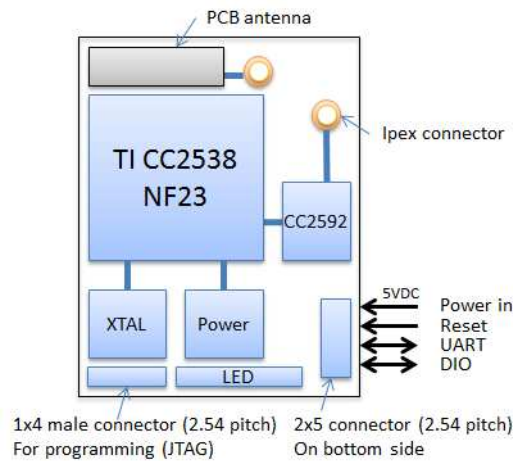
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# 1. Product Overview

## 1.1. General Description

DNI Communication module – SGCM-W50 is a ZigBee communication module based on TI CC2538 SoC solution, which combines a powerful ARM Cortex M3-based MCU and a low power IEEE 802.15.4 radio. In order to increase the application feasibility of SGCM-W50 module, a PA TI CC2592 is adopted to provide +20dBm transmit power for some long distance transmission requirements, especially for applying in outdoor environment. An on board PCB antenna with IPEX connectors can support either internal PCB antenna or external antenna to increase the flexibility of different applications. The module is provided with TI ZigBee Pro compatible Stack and users are easily to develop their application software. It will be conveniently used in various wireless communication scenarios including home automation, building automation, environment monitoring, smart grid as well as internet of things applications.



**Figure 1.** SGCM-W50 ZigBee module block diagram.

## 1.2. Features

- 2.4GHZ, IEEE 802.15.4, ZigBee Pro compatible
- ARM Cortex M3-based MCU with 256kB flash and 32kB RAM.
- Increase transmission power up to +20dBm.
- Support either PCB antenna or external antenna.
- Industrial temperature for outdoor or critical environment (−30°C to +70°C)
- Lead-free and RoHS compliant

## 2. Pin assignment

### 2.1. 2 × 5 pin connector



**Figure 2** SGCM-W50 2x5 connector.

Pin #	Pin Function	Description
1	DI/O 4	General purpose digital I/O (SW define)
2	DI/O 3	General purpose digital I/O (SW define)
3	ZigBee_RST	Reset input
4	DI/O 2 (programming mode detection)	General purpose digital I/O (SW define)
5	5Vin	Power supply +5v (Core voltage range +4v ~ +5v)
6	GND	Ground
7	UART_RxD	Receive data input (to ZigBee)
8	UART_TxD	Transmit data output (from ZigBee)
9	DI/O 0	General purpose digital I/O (SW define)
10	DI/O 1	General purpose digital I/O (SW define)

Note: All the general purpose digital I/O can be defined as other peripheral, such as UART, SSI, I2C, time and so on. For more information, please refer to TI CC2538 specification.

## 2.2. Connect antenna to IPEX

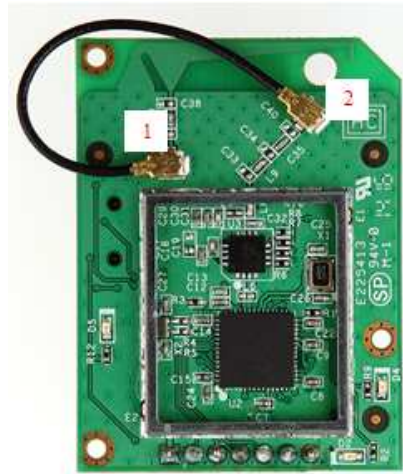


Figure 3 SGCM-W50 IPEX.

Antenna	Description
PCB	Connect IPEX1 and IPEX2 using cable coaxial
External	Connect external antenna using IPEX2

## 2.3. LED

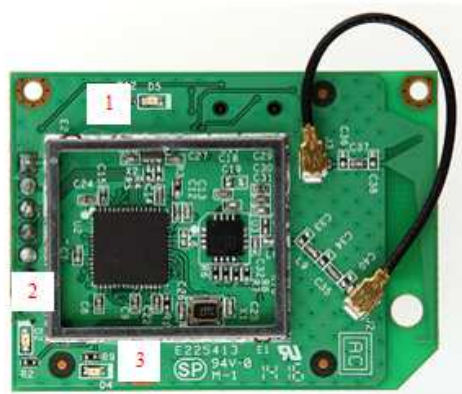
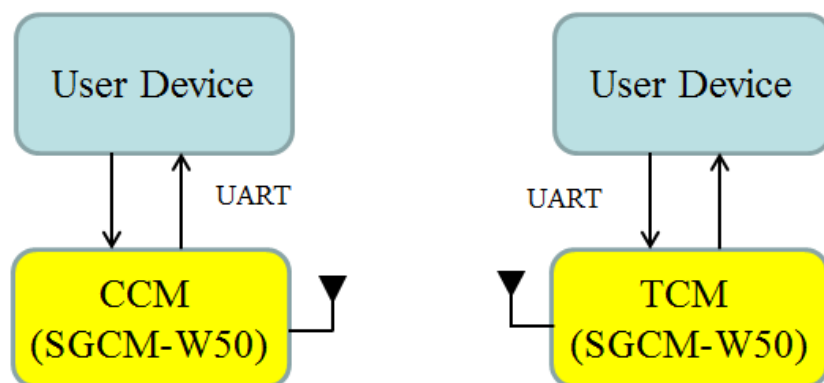


Figure 4 SGCM-W50 LED.

LED	Description
LED1	Power
LED2	User define
LED3	User define

### 3. Software architecture

We can provide two different roles of SGCM-W50, one is Coordinator Communication Module and the other is Terminal Communication Module. The module is provided with TI ZigBee Pro Stack or IEEE802.15.4 Stack. The module will handle network formation, network join, routing, data transmission, data forwarding, and etc. Users can implement UART protocol between user device and the module, and application protocol between CCM and TCM.



**Figure 5** SGCM-W50 software architecture.

#### 4. Revision History

Revision	Date	By Whom	Revised notes
1.0	2014/11/12	YaoChing Hsieh	• 1 <sup>st</sup> released.

## **Federal Communication Commission Interference Statement**

This device 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 operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## **Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.



**This device is intended only for OEM integrators under the following conditions:**

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

**IMPORTANT NOTE:** In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

**End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: PD5SGCM-W50”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

**Manual Information To the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.