



**CONSPEC®**

## **T1427 - CPM WIRELESS CARD**

### **Operations Manual**

**Revision 1.00**

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Date

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## Document/Revision History

Revision #	Date	Description of Changes/Reference	Superseded

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## 1 INTRODUCTION

The wireless module uses a System on Chip (SoC) transceiver (transmitter and receiver) which is the core component of the system. The transceiver has a number of different capabilities including: frequency channel selection within the 900MHz ISM band, transmit output power variation up to +13dBm, excellent sensitivity and blocking immunity, and a digital processing engine. The transceiver is an easy to use SoC device with many built-in high level modem-like capabilities to manage data exchange between different wireless modules and low level network management.

## 2 SPECIFICATIONS

### Circuit Description:

The circuit's core component is the transceiver device. The transceiver requires a number of different passive components to ensure steady voltage regulation, filtering, and clean transmit power, etc. In addition, the circuit includes a RF switch before the antenna connector that allows switching between transmit and receive. The circuit does not include a printed PCB antenna on board, instead an external antenna is needed. The interface to the module is via a 20 pin through-hole connector. The connector can be plugged into host board via female header, or soldered directly to the board.

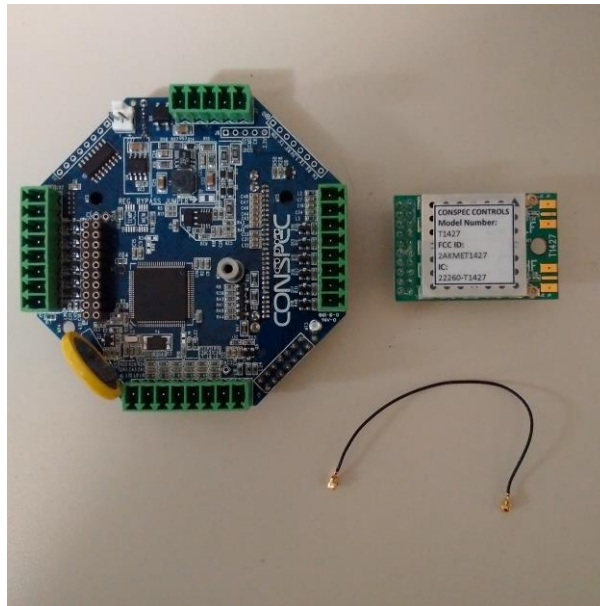
### RF Specifications:

1. Controllable output power up to +13dBm ( $\pm 1$ dBm) max at approximately 30mA ( $\pm 3$ mA) current consumption
2. Low power receiver operation at approximately 10mA ( $\pm 1$ mA)
3. Internal RSSI measurement capabilities with high dynamic range up to 125 dB ( $\pm 2$ dB)
4. Sensitivity down to -145 dBm ( $\pm 3$ dBm)
5. Programmable data-rate up to 300Kbps in addition to baseband digital coding
6. Programmable modulations: FSK, GFSK, MSK, GMSK, OOK
7. Operates in the standard 900MHz ISM band (North America)
8. Built in baseband digital processor and CRC generator
9. Absolute maximum ratings: +10 dBm RF input, supply voltage range: -0.5V to +3.9V, Operating Temperature: -40C to 85C

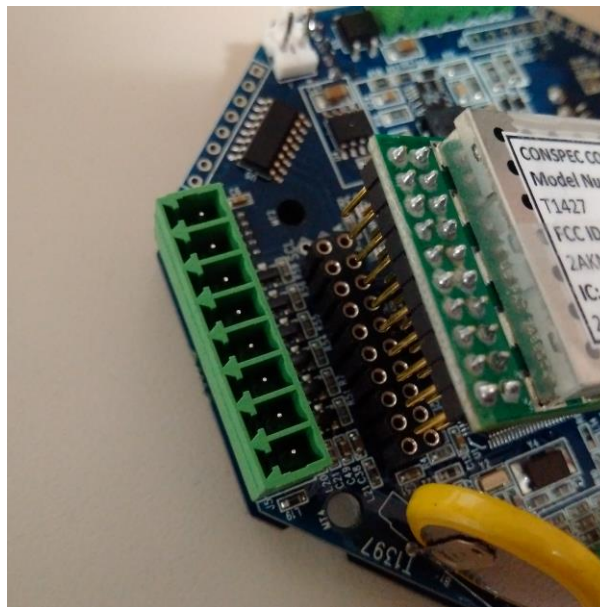
### 3 INSTALLATION

The installation procedure for the module is described below:

1. The user will begin with the required components for the installation. This includes the T1427 Module, the U.FL cable assembly, as well as the device that it will be connected to:



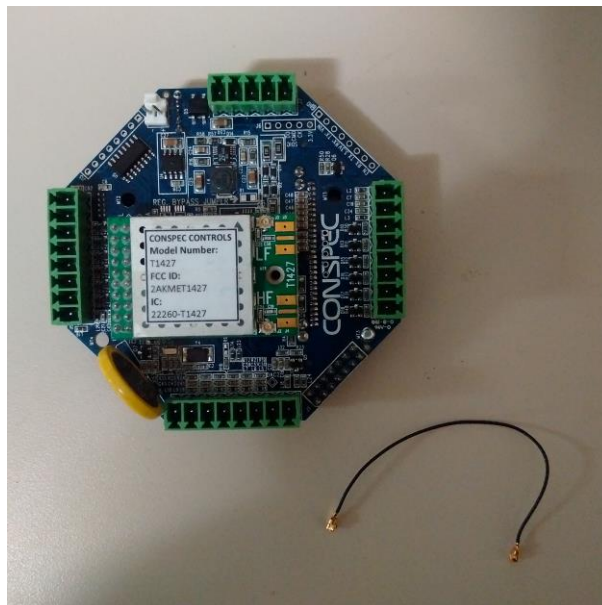
2. The module's pins will then be inserted into the receptacle on the mating device:



3. The module can then be pressed down for a firm fit and connection with the mating device:



4. Once the module has been connected to the device, the cable needs to be connected:



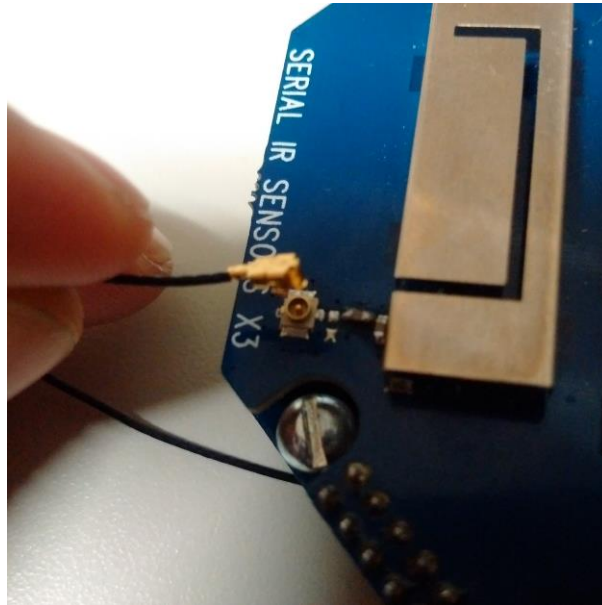
5. One end of the cable assembly will be connected to the module's HF connector:



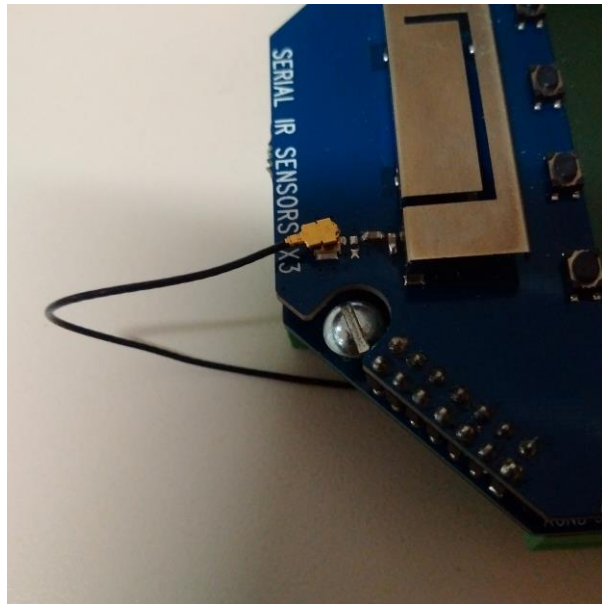
6. Press down on the connector to ensure a firm connection:



7. Once one end of the connector has been firmly connected to the module, the other end can be connected to the device:

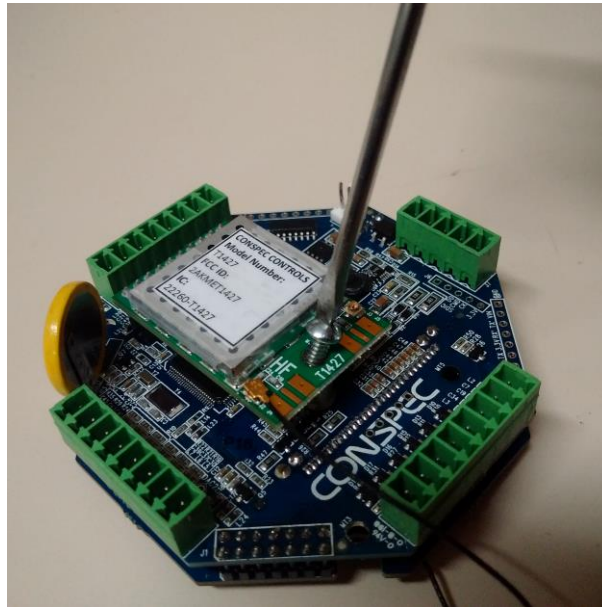


8. Secure the connector in place:





9. The final step is to secure the module in place by screwing in the set screw:



## 4 WARNINGS

### FCC statements:

“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.”

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

If the device has removable antennas then a list of the antennas that may be used with the device must be included in the user manual. The list should identify the type of antenna, impedance (usually 50 ohms), and the maximum gain in dBi.

### IC Statements:

“This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.”

“Cet appareil est conforme avec Industrie Canada exempts de licence standard RSS (s). Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence, y compris celles pouvant causer un mauvais fonctionnement de l'appareil.”

### **Health Canada RF Exposure Warning Statement**

“This device complies with Health Canada’s Safety Code. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada’s requirement. Information can be obtained at [http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct/index-eng.php)”

### **French version:**

*“Cet appareil est conforme avec Santé Canada Code de sécurité 6. Le programme d’installation de cet appareil doit s’assurer que les rayonnements*

*RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues:*

*[http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct/index-fra.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct/index-fra.php)*

Other statements for special circumstances:

Industry Canada:

Devices with removable antennas (usually WLAN devices):

“Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.”

“Conformément à la réglementation d'Industrie Canada, cet émetteur radio ne peut fonctionner à l'aide d'une antenne d'un type et maximum (ou moins) Gain approuvé pour l'émetteur par Industrie Canada. Pour réduire le risque d'interférence avec d'autres utilisateurs, le type d'antenne et son gain doivent être choisis afin que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas ce qui est nécessaire pour une communication réussie.”

“This radio transmitter **T1427** has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.”

Cet émetteur radio **T1427** a été approuvé par Industrie Canada pour fonctionner avec les types d'antennes énumérés ci-dessous avec le gain maximal admissible et l'impédance d'antenne requise pour chaque type d'antenne indiqué. Types d'antennes ne figurent pas dans cette liste, ayant un gain supérieur au gain maximum indiqué pour ce type, sont strictement interdites pour une utilisation avec cet appareil.”

**Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi) and required impedance for each.**

802.11a devices must contain the following statements in the manual:

“Operation in the band 5150–5250 MHz is only allowed for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems”

"Operation dans la bande 5150-5250 MHz est autorisée uniquement pour un usage intérieur afin de réduire les risques d'interférence nuisible aux systèmes mobiles par satellite co-canal"

## 5 REGULATORY MODULE INTEGRATION INSTRUCTIONS

This module has been granted modular approval for mobile applications. OEM integrators for host products may use the module in their final products without additional FCC / IC (Industry Canada) certification if they meet the following conditions. Otherwise, additional FCC / IC approvals must be obtained.

- The host product with the module installed must be evaluated for simultaneous transmission requirements.
- The users manual for the host product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC / IC RF exposure guidelines.
- To comply with FCC / IC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed [3dBi](#).
- A label must be affixed to the outside of the host product with the following statements:

This device contains FCCID: [2AKMET1427](#)

This equipment contains equipment certified under ICID: [22260-T1427](#)

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

If the final host / module combination is intended for use as a portable device (see classifications below) the host manufacturer is responsible for separate approvals for the SAR requirements from FCC Part 2.1093 and RSS-102.

## 6 DEVICE CLASSIFICATIONS

Since host devices vary widely with design features and configurations module integrators shall follow the guidelines below regarding device classification and simultaneous transmission, and seek guidance from their preferred regulatory test lab to determine how regulatory guidelines will impact the device compliance. Proactive management of the regulatory process will minimize unexpected schedule delays and costs due to unplanned testing activities.

The module integrator must determine the minimum distance required between their host device and the user's body. The FCC provides device classification definitions to assist in making the correct determination. Note that these classifications are guidelines only; strict adherence to a device classification may not satisfy the regulatory requirement as near-body device design details may vary widely. Your preferred test lab will be able to assist in determining the appropriate device category for your host product and if a KDB or PBA must be submitted to the FCC.

Note, the module you are using has been granted modular approval for mobile applications. Portable applications may require further RF exposure (SAR) evaluations. It is also likely that the host / module combination will need to undergo testing for FCC Part 15 regardless of the device classification. Your preferred test lab will be able to assist in determining the exact tests which are required on the host / module combination.

## 7 FCC DEFINITIONS

**Portable:** (§2.1093) — A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is / are within 20 centimeters of the body of the user.

**Mobile:** (§2.1091) (b) — A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Per §2.1091d(d)(4) In some cases (for example, modular or desktop transmitters), the potential conditions of use of a device may not allow easy classification of that device as either Mobile or Portable. In these cases, applicants are responsible for determining minimum distances for compliance for the intended use and installation of the device based on evaluation of either specific absorption rate (SAR), field strength, or power density, whichever is most appropriate.

## 8 SIMULTANEOUS TRANSMISSION EVALUATION

This module has **not** been evaluated or approved for simultaneous transmission as it is impossible to determine the exact multi-transmission scenario that a host manufacturer may choose. Any simultaneous transmission condition established through module integration into a host product **must** be evaluated per the requirements in KDB447498D01(8) and KDB616217D01,D03 (for laptop, notebook, netbook, and tablet applications).

These requirements include, but are not limited to:

- Transmitters and modules certified for mobile or portable exposure conditions can be incorporated in mobile host devices without further testing or certification when:
- The closest separation among all simultaneous transmitting antennas is  $\geq 20$  cm,

Or

- Antenna separation distance and MPE compliance requirements for **ALL** simultaneous transmitting antennas have been specified in the application filing of at least one of the certified transmitters within the host device. In addition, when transmitters certified for portable use are incorporated in a mobile host device, the antenna(s) must be  $\geq 5$  cm from all other simultaneous transmitting antennas.
- All antennas in the final product must be at least 20 cm from users and nearby persons.



## **9 OEM INSTRUCTION MANUAL CONTENT**

Consistent with §2.909(a), the following text must be included within the user's manual or operator instruction guide for the final commercial product T1427.

### **Operating Requirements and Conditions:**

The design of T1427 complies with U.S. Federal Communications Commission (FCC) guidelines respecting safety levels of radio frequency (RF) exposure mobile devices.

### **FCC ID:**

This product contains FCCID: 2AKMET1427

### **Mobile Device RF Exposure Statement (If Applicable):**

RF Exposure - This device is only authorized for use in a mobile application. At least 20 cm of separation distance between the T1427 device and the user's body must be maintained at all times.

### **Caution Statement for Modifications:**

CAUTION: Any changes or modifications not expressly approved by Conspec Controls Inc. could void the user's authority to operate the equipment.