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Linux

Communication

Board

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Specifications

Model: 2AGPT-PLNX

Power		
Input Voltage	5	Vdc
Connector Type	Micro-fit	
Power Consumption	<3	W
Communication interfaces		
RS485 Interfaces	2 ports	
Ethernet Interface	10/100-BaseT	
Wi-Fi interface	802.11b/802.11g/802.11n	
ZigBee interface	O-QSPK	
Power reducer	4/6 pin control, 5V	

ZigBee

Technical Information ZigBee	
Operating Frequencies	2.4 GHz -2.48GHz
Bandwidth	2.25MHz
Clock Frequency	38.4MHz
Maximum RF Power	18.85dBm
Antenna Gain	5dBi

Wi-Fi

Technical Information Wi-Fi	
Operating Frequencies	2.4 GHz -2.48GHz
Bandwidth	20MHz
Clock Frequency	26 MHz
Maximum RF Power	11.32dBm
Antenna Gain	5dBi

Ethernet

Technical Information Ethernet	
Clock Frequency	50MHz
Mode operating	100BASE-TX

RS485

The Linux communication board can be connected to another SolarEdge unit (inverter, another communication board) by RS485. Baud Rate frequency 115200Hz.

Activating, Commissioning and Configuring the System Using SolarEdge Inverter SetApp

If applicable, you can connect communication options at this stage.

Once all connections are made, the system should be activated and commissioned using the SolarEdge Inverter SetApp mobile application. You can download the app from the iTunes and Google Play app stores prior to reaching the site.

Internet connection is required for the download and for the one-time registration, however not required for using SetApp.

Step 1: Activating

During system activation, a Wi-Fi connection is created between the mobile device and the Linux communication board.

Before activation - download, register (first time only) and log-in to SetApp on your mobile device.

► To activate the installation:

1 Turn ON the Linux communication board.

2 Open SetApp and follow the instructions on the screen (scan the Linux communication board bar-code, usually located on inverter; move the ON/OFF/P switch to P position and release within 5 sec. back to ON (1) position). SetApp creates a Wi-Fi connection, upgrades the inverter CPU firmware and activates the inverter.

Step 2: Commissioning and Configuring the Installation

This section describes how to use the SetApp menus for commissioning and configuring the Linux communication board settings.
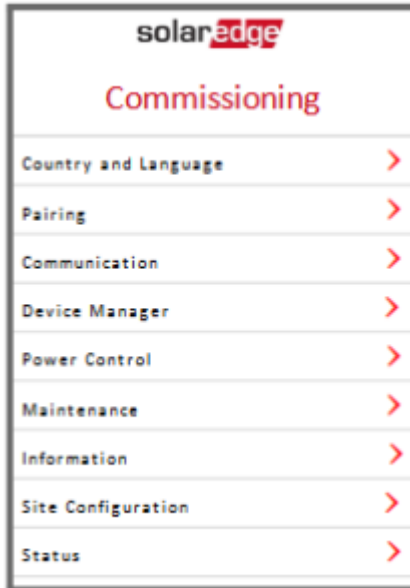
Menus may vary in your application depending on your system type.

▶ ## To access the Commissioning screen:

Do one of the following:

■ During first time installation: Upon Activation completion, in the SetApp, tap **Start Commissioning**.
The main Commissioning menu screen is displayed:

■ If the Linux communication board has already been activated and commissioned:

1. If not already ON - turn ON AC to the inverter by turning ON the circuit breaker on the main distribution panel.

2. If not already ON - move the Connection Unit switch to the ON position.

3. Open SetApp and follow the instructions on the screen (scan the Linux communication board bar-code, usually located on the inverter; move the ON/OFF/P switch to P position (for less than 5 sec) and release).

4. The mobile device creates a Wi-Fi connection with the Linux communication board and displays the main Status screen.

5. Tap **Commissioning** at the bottom of the screen. The main Commissioning menu screen is displayed.

In the main menus, tap the menu red arrows (›) to perform the system commissioning or configuration task. Tap the **Back** arrow (‹) to return to the previous menu.

The next sections provide more information about configuration options.

Setting Country and Language

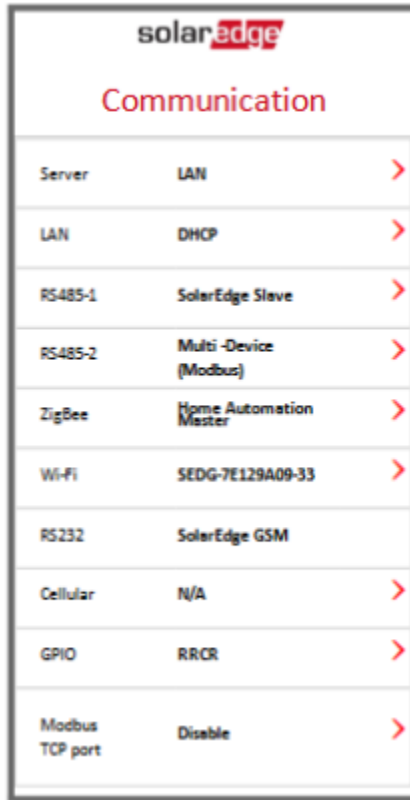**1** From the Commissioning screen select **Country and Language.**

2 From the Country drop-down list, select the required country setting.

1. From the **Language** drop-down list, select the language.
2. Tap **OK**.

Communication

1. Select the **Communication** menu to define and configure the following:

- The communication option used by the inverter to communicate with the SolarEdge monitoring platform

- The communication option used to communicate between multiple SolarEdge devices or other external non-SolarEdge devices, such as electricity meters or loggers.

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Communication		
Server	LAN	>
LAN	DHCP	>
RS485-1	SolarEdge Slave	>
RS485-2	Multi -Device (Modbus)	>
ZigBee	Home Automation Master	>
Wi-Fi	SEDG-7E129A09-33	>
RS232	SolarEdge GSM	
Cellular	N/A	>
GPIO	RRCR	>
Modbus TCP port	Disable	>

2. Tap the **Server** red arrow to set the communication method to be used for communication between devices and the SolarEdge monitoring platform. The default is LAN. Refer to *Setting Up Communication* for a full description of these communication options.
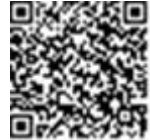
NOTE
The Server menu shows only the communication options installed in the inverter.

For detailed information about all the configuration options, refer to the *Communication Options Application Note*, available on the SolarEdge website at https://www.solaredge.com/sites/default/files/solaredge-communication_options_application_note_v2_250_and_above.pdf.

Information

From the main menu, select **Information** to view and set various system settings, as described below.

- **CPU Version**: The communication board firmware version
- **DSP 1/2 Version**: The digital board firmware version

  > **NOTE**
  >
  > Please have these numbers ready when you contact SolarEdge Support.

- **Serial Number** - The inverter serial number as appears on the enclosure sticker
- **Hardware IDs**: Displays the following HW serial numbers (if exist, and connected to the inverter):
    - **This inverter**: the inverter's ID
    - **Meter #** : Modbus meter ID (up to 3 meters can be connected)
    - **ZB**: ZigBee Card MAC address
    - **WiFi**: Wi-Fi MAC address
- **Error Log**: Displays the last five errors, and enables resetting (clearing) the log.
- **Warning Log:** Displays the last five warnings, and enables resetting (clearing) the log.

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Communication Status

This screen displays the status of connection option(s): LAN, RS485, Wi-Fi, GSM or ZigBee card.

Communication		
LAN Connected	**RS485-1** SE Slave NC	**RS485-2** Modbus 2 of 2
Cellular N/A	**Wi-Fi** NC	**ZigBee** NC

For each communication option, one of the following statuses is displayed:

- **Connected**: The inverter established a successful connection and communication with the specified server port/device
- **NC**: Not Connected.
- **S_OK**: The connection to the SolarEdge monitoring platform is successful (should appear only if the inverter is connected to the server)
- **N/A**: Not Applicable
- **x of y**: Number of devices connected out of all devices
- Temporarily displayed (with a 🕐 clock sign):
  - Initializing communication
  - **Connecting** to a network
  - **Connecting** to SolarEdge servers
- **Error message** (with the ⚠ sign).

Setting Up Communication

The inverter sends the following information to the monitoring platform:

- Power optimizer information received via the DC power lines (the PV output circuit)
- Inverter information
- Information of any other connected devices

This chapter describes setting up communication between:

- the inverter and the monitoring platform through the Internet (wired/ wireless), or through a cellular connection
- multiple inverters for a master/slave configuration

Communication setup is not required for power harvesting, however it is needed for using the SolarEdge monitoring platform.

NOTE

It is recommended to connect communication connections before connecting the AC. for easier access to the communication board.

CAUTION!

When connecting the communication cables, make sure that the ON/OFF/P switch at the bottom of the inverter is turned OFF, and the AC is turned OFF.

When configuring the communication parameters, make sure that the ON/OFF/P switch is in P position, and the AC is turned ON.

When connecting the communication cables, make sure that the ON/OFF/P switch on the Connection Unit is turned OFF, and the AC is turned OFF.

When configuring the communication parameters, make sure that the ON/OFF/P switch on the Connection Unit is OFF, and the AC is turned ON.

Communication Options

The following types of communication can be used to transfer the monitored to the SolarEdge monitoring platform.

Only communication products offered by SolarEdge are supported.

Ethernet

Ethernet is used for a LAN connection

RS485

RS485 is used for the connection of multiple SolarEdge devices on the same bus in a master-slave configuration. RS485 can also be used as an interface to external devices, such as meters and third party data loggers.

- RS485-1: Enables the connection of multiple inverters over the same bus, such that connecting only one inverter to the Internet

is sufficient to provide communication services for all the inverters on the bus. RS485-1 has built-in surge protection.

■ RS485-2: Enables connection of non-SolarEdge devices.

Wi-Fi/ZigBee

Wi-Fi and ZigBee are implemented in the Linux communication board.

GSM

This wireless communication option (purchased separately) enables using a GSM connection to connect one or several devices (depending on the data plan used) to the SolarEdge monitoring platform.

The GSM cellular modem is provided with a user manual, which should be reviewed prior to connection. Refer to http://www.solaredge.com/sites/default/files/cellular_ gsm_installation_guide.pdf
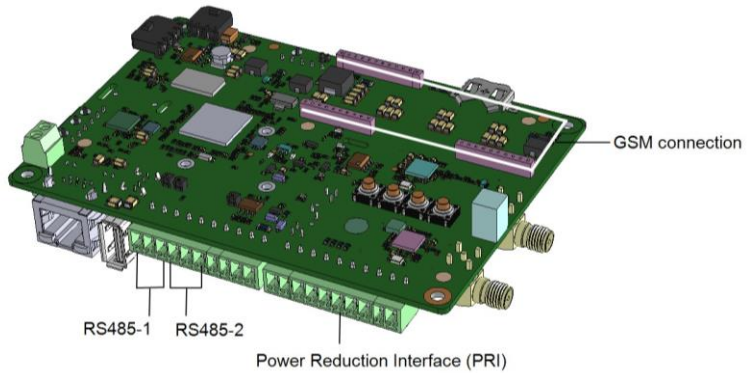
Linux Communication Board

Primary Unit Communication Board

Use this communication board to:

■ GSM - connect a GSM modem.
■ RS485-1 - connected to the Connection Unit communication board. For connecting multiple inverters over the same bus, connect RS485 wires to the terminal blocks on the Connection Unit Communication Board.
■ RS485-2 - connect a non-SolarEdge device, such as a meter or a third party data logger, to the RS485-2 connector. Every pair of in and out wires are connected to the same pin.
■ Power Reduction Interface (PRI) - connect a power reduction device. See application_note_power_ control_configuration.pdf
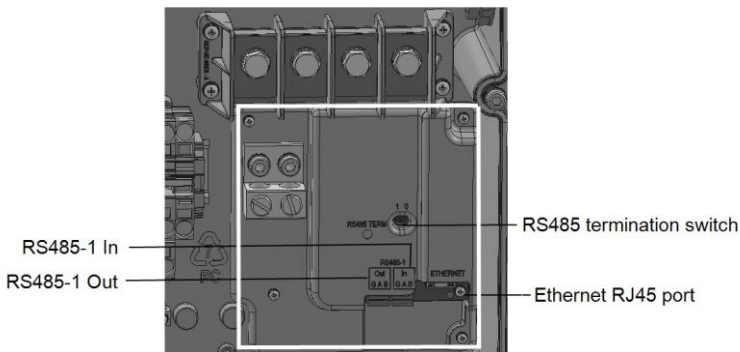
Connection Unit Communication Board

Use this communication board to:
- connect a standard RJ45 connector for Ethernet.
- connect RS485 wires to the terminal blocks for RS485 connection. There are two 3-pin terminal blocks, one for connecting the preceding device in the bus and one for connecting the following device. Additionally, the RS485 port has a built-in surge protection.

Creating an Ethernet (LAN) Connection

This communication option enables using an Ethernet connection to connect the Linux communication board to the monitoring platform through a LAN.

Ethernet cable specifications:
- Cable type – a shielded Ethernet cable (Cat5/5E STP) may be used
- Maximum distance between the inverter and the router – 100 m/ 330 ft.

► To connect the Ethernet cable:

You can use either wiring standard, as long as both sides of the cable have the same pin-out and color-coding.

RJ45 Pin #	Wire Color[1]		10Base-T Signal 100Base-TX Signal
	T568B	T568A	
1	White/Orange	White/Green	Transmit+
2	Orange	Green	Transmit-
3	White/Green	White/Orange	Receive+
4	Blue	Blue	Reserved
5	White/Blue	White/Blue	Reserved
6	Green	Orange	Received-
7	White/Brown	White/Brown	Reserved
8	Brown	Brown	Reserved
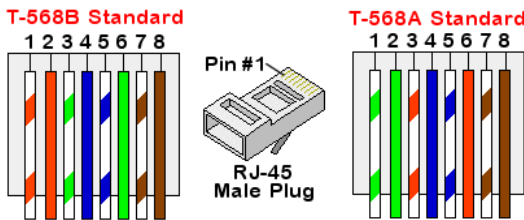
1 Connect the cable RJ45 connector to the RJ45 port of the Ethernet switch or router. You can connect more than one Linux communication board to the same switch/router or to different switches/routers, as needed. Each Linux communication board sends its monitored data independently to the SolarEdge monitoring platform.

NOTE
There are no LED indicators on the Ethernet connector, if the inverter is not communicating with the monitoring platform through a LAN.

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[1] The connection does not support RX/TX polarity change. Supporting crossover Ethernet cables depends on the switch capabilities.
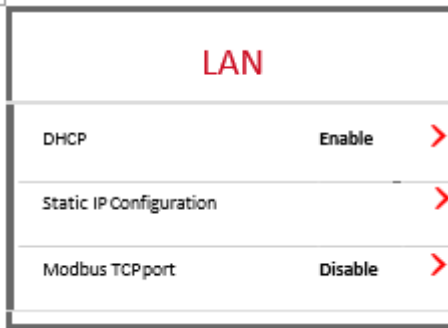
2 The inverter is configured by default to LAN. If reconfiguration is required:

1. Use the SolarEdge SetApp to access the **Commissioning** main menu screen
2. From the main menu tap **Communication**. The Communication screen is displayed:

3. Select the following to configure the connection:

- Server ⟩ **LAN**
- LAN ⟩ DHCP ⟩ **Enable**

4. Verify the connection.

> **NOTE**
>
> The system automatically establishes communication with the monitoring platform as it is configured to LAN by default.

> **NOTE**
>
> If your network has a firewall, you may need to configure it to enable the connection to the following address:
> - Destination Address: prod.solaredge.com
> - Modbus TCP Port: 22222 (for incoming and outgoing data)

Creating an RS485 Bus Connection

The RS485 option enables creating a bus of connected Linux communication board, consisting of up to 31 slave boards and 1 master. Using this option, Linux communication boards are connected to each other in a bus (chain) via their RS485 connectors, thus allowing to connect only the master board to the monitoring platform. The first and last board in the chain must be terminated.

RS485 wiring specifications:

- Cable type: Min. 3-wire shielded twisted pair (a shielded Ethernet cable (Cat5/5E STP) may be used)
- Wire cross-section: 0.2- 1 mm²/ 24-18 AWG
- Maximum distance between first and last devices: 1 km /3300 ft.

The following sections describe how to physically connect the RS485 bus and how to configure the bus.
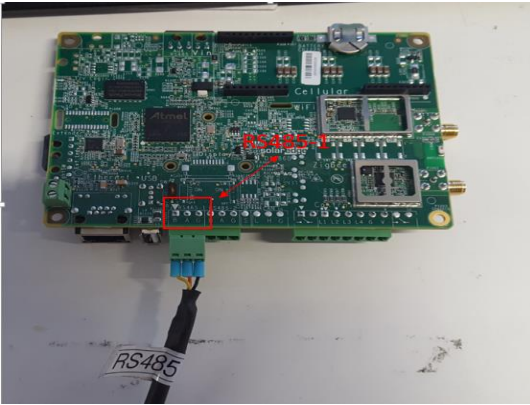
1 Loosen the screws of pins A(+), B(-), and G in either the 'Out' or 'In' RS485 terminal block.
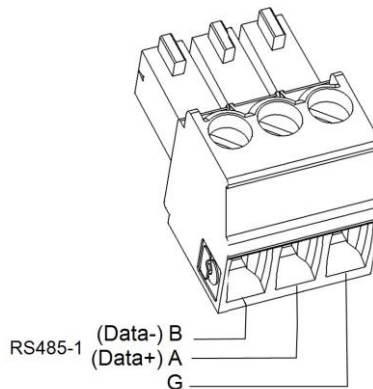
2 Insert the wire ends into the **G**, **A** and **B** pins shown above. Use one terminal block for the previous Linux communication board in the bus and the other terminal block for the next Linux communication board in the bus,. You can use any color wire for each of the **A**, **B** and **G** connections, as long as the same color wire is used for all A pins, the same color for all B pins and the same color for all G pins.

3 Tighten the terminal blocks screws.

4 Check that the wires are fully inserted and cannot be pulled out easily.

5 Push the RS485 terminal blocks firmly all the way into the connectors on the communication board.

RS485 Bus Configuration

▶ To connect to the monitoring platform:

1. Designate a single communication board as the connection point between the RS485 bus and the SolarEdge monitoring platform. This board will serve as the master board.
2. Connect the master to the SolarEdge monitoring platform via the LAN option or any of the other options.

▶ To configure the RS485 bus:

All inverters are configured by default as slaves. To configure the master:

1. Verify switch is OFF.
2. Verify the AC is on.
3. Turn ON the Connection Unit.
4. Use SetApp to access the **Commissioning** main menu screen.
5. From the main menu tap **Communication**. The Communication screen is displayed:

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Communication		
Server	LAN	>
LAN	DHCP	>
RS485-1	SolarEdge Slave	>
RS485-2	Multi -Device (Modbus)	>
ZigBee	Home Automation Master	>
Wi-Fi	SEDG-7E129A09-33	>
RS232	SolarEdge GSM	
Cellular	N/A	>
GPIO	RRCR	>
Modbus TCP port	Disable	>
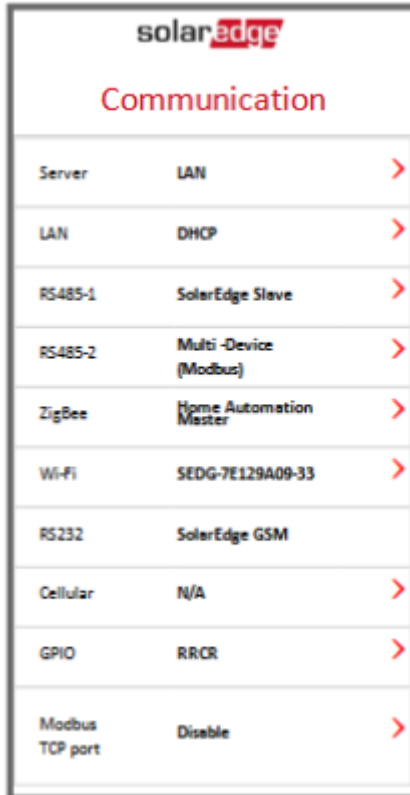
6. Select the following to configure the connection:

- Server ＞ **LAN**
- RS485-1 ＞ Protocol ＞ **SolarEdge Master**
- RS485-1 ＞ **Slave Detect**

The system starts automatic detection of the SolarEdge slave inverters connected to the master inverter. The inverter should report the correct number of slaves. If it does not, verify the connections and terminations.

RS485-1		
Protocol	SolarEdge (Master)	＞
Device ID	1	
Slave Detect	3 Slaves	＞
Long Slave Detect	3 Slaves	＞
Slave List	3 Slaves	＞

7. To check the slave IDs and last communication time, select **RS485-1 ＞ Slave List**.

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Verifying the Connection

1. Check that **S_OK** - **Server Connected** status appears in the main inverter section:

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Status

Inverter		
SN 07318000C		

Power	Voltage	Frequency
100 kW	277 Vac	60.9 Hz

P_OK: 138 of 141	S_OK
Optimizers Connected	Server Connected

Status	Switch
Production	ON

CosPhi	Limit	Country
1.00	No Limit	Netherlands

Voltage	Temp	Fan
850 Vdc	156 F	OK

Commissioning

2. Scroll down to the **Communication** section and check that the communication options are as required.

Communication		
LAN	**RS485-1**	**RS485-2**
	SE Slave	Modbus
Connected	NC	2 of 2
Cellular	**Wi-Fi**	**ZigBee**
N/A	NC	NC

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.

FOR MOBILE DEVICE USAGE (>20cm/low power)
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.

FOR COUNTRY CODE SELECTION USAGE (WLAN DEVICES)

Note: The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all WiFi product marketed in US must fixed to US operation channels only.

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.
3)Module approval valid only when the module is installed in the tested host or compatible series of host which have similar RF exposure characteristic with equal or larger antenna separation distance.

As long as 3 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
FOR MOBILE DEVICE USAGE (>20cm/low power)
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: 2AGPT-PLNX". 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.

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Industry Canada statement:

This device complies with ISED's licence-exempt RSSs. 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.

Le présent appareil est conforme aux CNR d' ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

FOR MOBILE DEVICE USAGE (>20cm/low power)
Radiation Exposure Statement:
This equipment complies with ISED 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.

Déclaration d'exposition aux radiations:
Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This device is intended only for OEM integrators under the following conditions: (For module device use)
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.
3)   Module approval valid only when the module is installed in the tested host or compatible series of host which have similar RF exposure characteristic with equal or larger antenna separation distance.

As long as 3 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.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)
1)L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et
2)Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.
3)Approbation du Module valable que lorsque le module est installé dans l'hôte testé ou de la série de l'hôte compatible qui ont même caractéristique de l'exposition aux RF avec la distance égale ou supérieure séparation antenne.

Tant que les 3 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:
In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC 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 Canada authorization.
NOTE IMPORTANTE:
Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.
End Product Labeling FOR MOBILE DEVICE USAGE (>20cm/low power)
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 IC: 20916-PLNX ".
Plaque signalétique du produit final
Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 20916-PLNX   ".

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.
Manuel d'information à l'utilisateur final
L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.
Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

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DETACHABLE ANTENNA USAGE

This radio transmitter (IC: 20916-PLNX / Model: 2AGPT-PLNX) has been approved by ISED to operate with the antenna type listed below with maximum permissible gain 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.

Le présent émetteur radio (IC: 20916-PLNX / Model: 2AGPT-PLNX) a été approuvé par ISED pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Approved antenna(s) list

Type	Gain	Brand	Manufacturer
Dipole	5dBi	FEI TENG WIRELESS TECHNOLOGY CO., LTD	FEI TENG WIRELESS TECHNOLOGY CO., LTD
Dipole	5dBi	SolarEdge	SolarEdge