SPSDEVK1-PCB: User Manual

ON Semiconductor®

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Introduction;
The SPSDEVK1 Predictive Maintenance Turnkey Solution kit enables fast installation of full Smart Passive Sensor ™ systems.
This evaluation kit includes:

- 1 SPSDEVR1-8 UHF SPS Reader
- 1 SPS1DEVA1-W UHF Antenna

A 12V DC power supply is suggested and recommended for use with the SPSDEVR1-8.

Software Tools
ON Semiconductor has developed a web based application specifically for reading Smart Passive Sensors that unlocks the full functionality of the tags. This application utilizes a REST API that includes advanced reader settings, graphing/logging of sensor data, and a Certification mode.

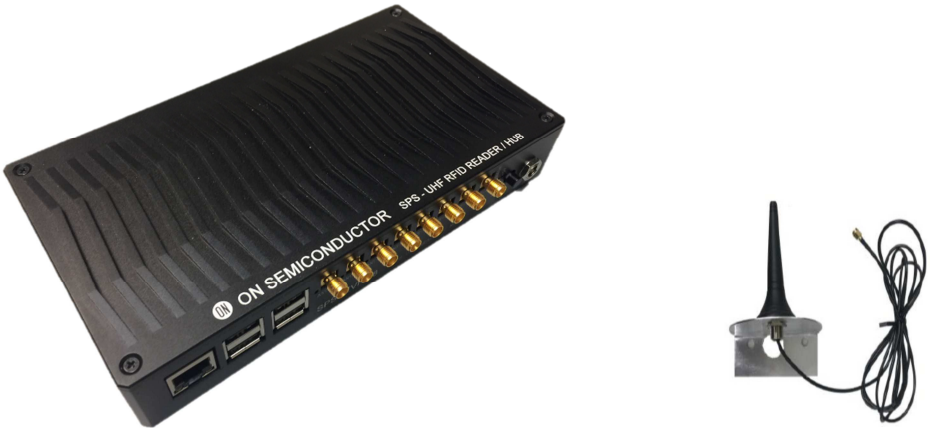

Figure 1. SPSDEVK1 Hardware Setup

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Hardware Setup

The SPSDEVK1 requires three hardware connections to be made in the following order:

- Connect at least one antenna to the RF SMA port on the SPSDEVR1-8 reader
- Connect an Ethernet cable from the SPSDEVR1-8 to the host computer that will be running the application software
- Plug in a power supply suitable for the SPSDEVR1-8

Note: please refer to SPS tag datasheets to verify optimal positioning to achieve best results.

TagReader Software Setup

After the reader is powered on, open a web browser and type in the IP address of the reader into the search bar. The SPS Reader App startup page will then be shown as seen on left in Figure 2. Toggling the "Connect to Reader" slider button will allow the rest of the parameters on the page to be set, such as frequency region, individual antenna activation, and individual antenna power as shown on the right side of Figure 2. The "Advanced Configuration" tab allows precise tuning of various parameters related to the UHF protocol and is pictured in Figure 3.

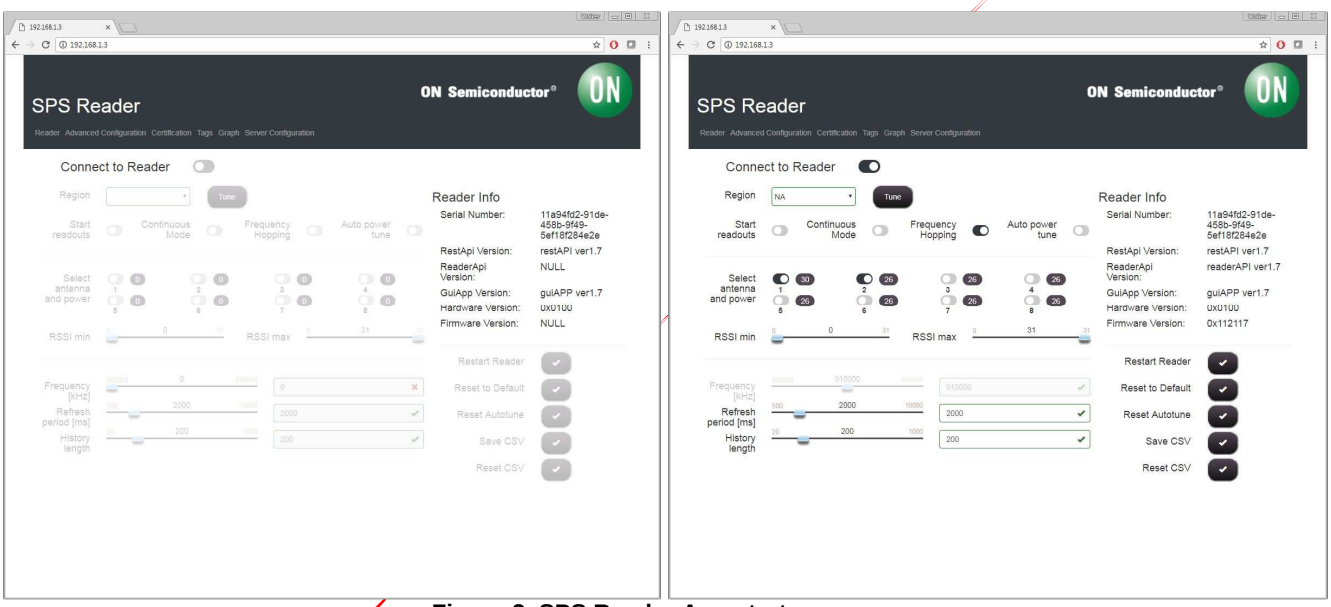

Figure 2. SPS Reader App startup screen

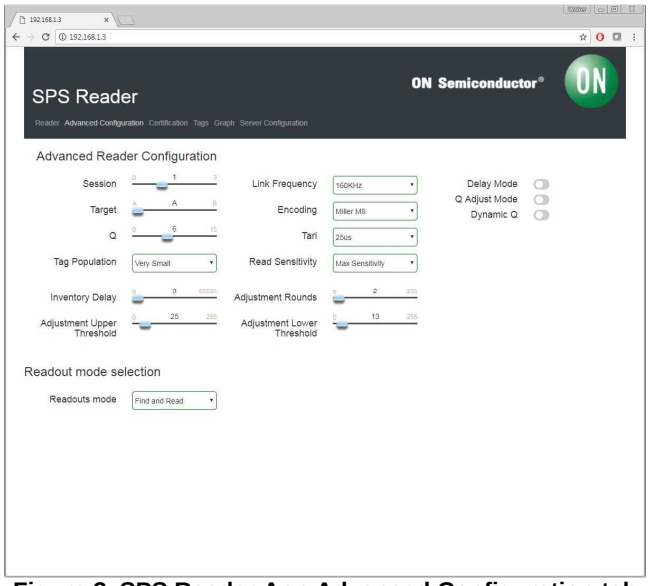

Figure 3. SPS Reader App Advanced Configuration tab

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Data Collection and Logging

The SPS Reader App offers three ways to view the SPS sensor data. In the “Tags” tab, a tabulated list of all sensor tags found is shown. Various pieces of the data can be toggled on or off with the slider buttons at the top, such as Sensor Code, Temp Code, or RSSI. Tags shown in this tab can have their data plotted visually versus time in the “Graph” tab. Please see Figure 4 below for sample screens showing RSSI code information for a SPS tag.

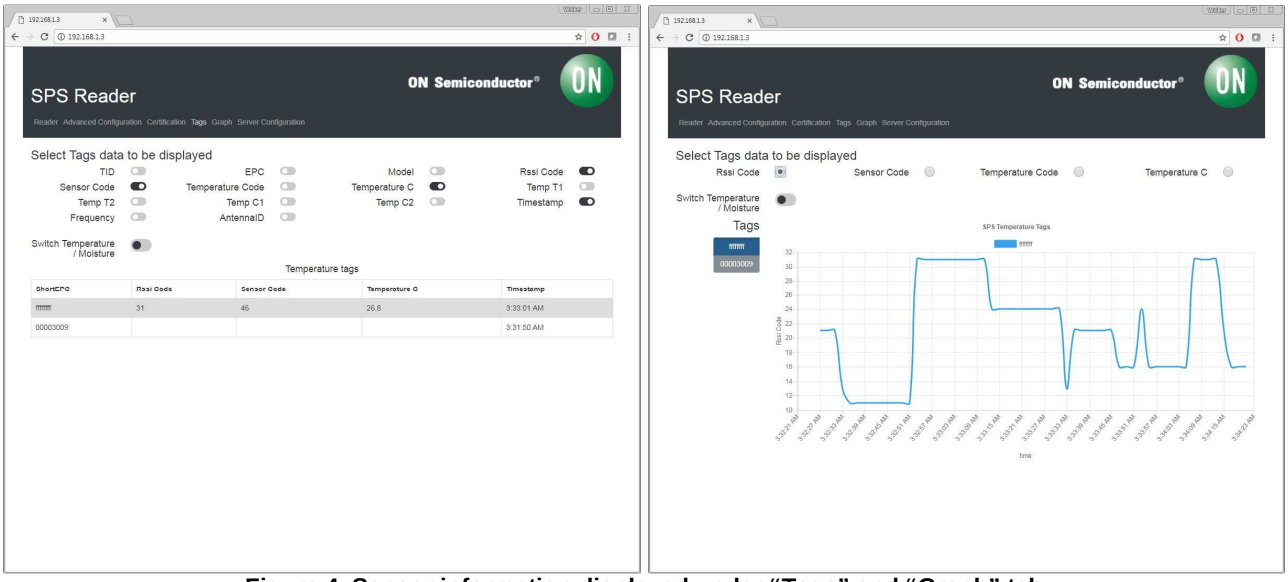

Figure 4. Sensor information displayed under “Tags” and “Graph” tab

Certification

The SPS Reader App has a Certification Mode that should only be used for Certification testing purposes. Toggling the slider button will put the reader into Certification Mode slider and the rest of the options on the page will be enabled. Frequency, Power, and Wave Time are the three main test parameters which can be set by the tester. The certification mode also allows for a random data mode which can be activated by the slider button at the bottom of the list of options.

For Certification testing please follow the steps outlined below:

1. Select Frequency with the [Slider] or enter a number to the right using keyboard
2. Select Power with the [Slider] or enter a number to the right using keyboard
3. Click on [Send Wave] button
4. Repeat Steps 1-3 for all required frequencies and power levels.

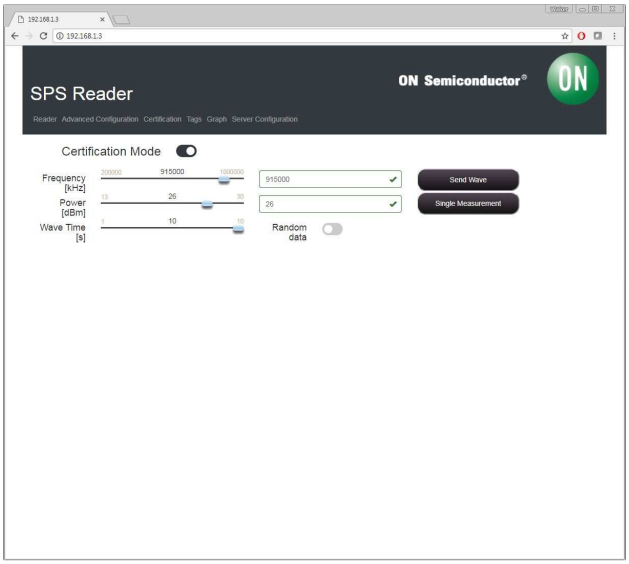

Figure 5. Sensor information displayed under “Tags” and “Graph” tab

IMPORTANT SAFETY INSTRUCTIONS

To reduce the risk of bodily injury, electrical shock, fire, and damage to the equipment observe the following precautions:
1. READ these instructions.
2. KEEP these instructions.
3. PAY ATTENTION to all warnings.
4. FOLLOW all instructions.
5. DO NOT use this apparatus near water.
6. CLEAN ONLY with dry cloth.
7. DO NOT block any ventilation openings.
Allow sufficient distances for adequate ventilation and install in accordance with the manufacturer's instructions.
8. DO NOT install near any heat sources such as open flames, radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
Do not place any open flame sources on the product.
9. DO NOT defeat the safety purpose of the polarized or grounding type plug.
A polarized plug has two blades with one wider than the other.
A grounding type plug has two blades and a third grounding prong.
The wider blade or the third-prong is provided for your safety.
If the provided plug does not fit into your outlet,
consult an electrician for replacement of the obsolete outlet.
10. PROTECT the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. ONLY USE attachments/accessories specified by the manufacturer.
12. UNPLUG this apparatus during lightning storms or when unused for long periods of time.
13. REFER all servicing to qualified service personnel.
Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. DO NOT expose the apparatus to dripping and splashing.
DO NOT put objects filled with liquids, such as vases, on the apparatus.
15. The MAINS plug or an appliance coupler shall remain readily operable.
16. The airborne noise of the Apparatus does not exceed 0dB (A).
17. Apparatus with CLASS I construction shall be connected to a MAINS socket outlet
with a protective earth connection.
18. To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
19. Do not attempt to modify this product.
Doing so could result in personal injury and/or product failure.
20. Operate this product within its specified operating temperature range.
21. Protecting Against Electrostatic Discharge
Static electricity can harm delicate components inside the system.
To prevent static damage, discharge static electricity from your body
before touching any of the electronic components, such as SMA Antenna, USB and Ethernet connectors. This can be done by periodically touching an unpainted metal surface on the chassis.
The following steps can also be taken prevent damage from electrostatic discharge (ESD):
21.1. When unpacking a static-sensitive component from its shipping carton,
do not remove the component from the antistatic packing material
until ready to install the component in the system.
Just before unwrapping the antistatic packaging,
be sure to discharge static electricity from your body.
21.2. When transporting a sensitive component,
first place it in an antistatic container or packaging.
21.3. Handle all sensitive components in a static-safe area.
If possible, use antistatic floor pads, workbench pads and an antistatic grounding strap.
22. Equipment intended for installation in Restricted Access Location

WARNING:
No user-serviceable parts inside.

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Refer all servicing to qualified service personnel.
The safety certifications do not apply when the operating voltage is changed from the factory setting.

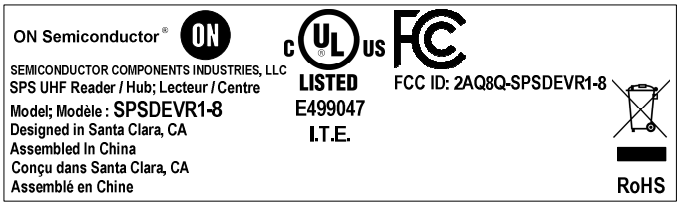
SPSDEVR1-8 is with compliance to IEC/EN/UL/CSA 60950 "Safety of information technology equipment" is one of the world's most widely-used electrical product safety standards.
Thousands of manufacturers rely on this standard to show that their products meet the safety requirements for markets around the world.
It is one of the relatively few standards to be harmonized by standards-writing bodies globally to make the process as efficient as possible for manufacturers.

Caution according to FCC Rule part 15.21
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

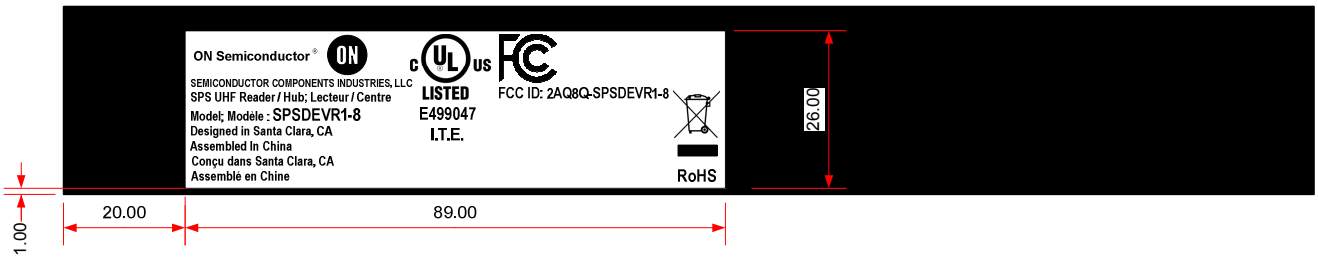
Caution according to FCC Rule part 15.105
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RF exposure
Maintain a distance greater than 20 cm between the antenna of this device and persons during device operation, which is consistent with how the device is tested for compliance with RF exposure requirements and satisfies Federal Communications Commission (FCC) exposure requirements.
Operations at closer than this distance are not recommended.

Label



Attach the label on the back side of the Enclosure as recommended on this picture



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