



Wirelessly Powered IoT Sensors Evaluation Kit

QUICK START GUIDE

Overview and Box Contents

This guide explains how to set up a wireless power network using the Energous 1W Omnidirectional PowerBridge transmitter and wirelessly powered IoT sensors.

The Energous 1W Omnidirectional PowerBridge transmitter provides over-the-air distance charging and expands wireless charging into new markets including energy harvesting for smart buildings, industrial IoT sensors applications, and retail electronic displays.

This evaluation kit combines an Energous 1W Omnidirectional PowerBridge transmitter with two energy-harvesting battery-free receivers that provide real-time temperature and humidity data.

Box Contents:

- Energous 1W Omnidirectional Transmitter (1)
- 2.4 GHz External Antenna (1)
- 918 MHz External Antenna (1)
- Battery-Free IoT Sensors Receiver Unit (2)
- 5V/1A USB Power Adapter (1)
- USB-A to USB-C Cable (1)
- Receiver Stand (2)
- Wall/Ceiling Mounting Plate (1)



Figure 1: Wirelessly Powered IoT Sensors EVK Contents

1. Energos PowerBridge Setup

The Energos 1W Omnidirectional PowerBridge transmitter incorporates the EN4100 (an integrated wireless power SoC), the EN3210 (a high efficiency power amplifier), and the NRF52840 BLE for communications and control. All antennas are included. See product datasheets for detailed specifications.

- Mount the Energos PowerBridge transmitter on a stand, a wall, or a ceiling using keyhole screw mounts with the front facing toward the receivers.



Figure 2: Mounting Diagram

- Use the supplied power adapter and cable. Connect the USB-C cable to the Energos PowerBridge transmitter, as shown in Figure 6. The other end of the cable connects to the power adapter, which plugs into wall power.



Figure 3: Energos 1W Omnidirectional PowerBridge Transmitter

2. Receiver Setup

The sensor receiver board incorporates the following:

- Energon RF harvesting circuitry
- InPlay NanoBeacon IN100
- e-Peas AEM30940 energy harvester
- Sciosense temperature and humidity sensor
- 188 μ F storage capacitor

The energy harvesting antenna is integrated into the PCB.



Figure 4: Sensor Receiver Boards

Features/Specifications:

- Integrated RX antenna with peak gain of 1.5 dBi
- 188 μ F, 3.3V capacitor energy storage
- The e-Peas AEM30940 energy harvester, charger, and PMIC
- InPlay NanoBeacon IN100 supports Bluetooth low energy beacons in the ISM 2.4 GHz frequency band
- Sciosense ENS210 temperature and humidity sensor

Receiver Setup Cont'd.

- Place the receiver board upright, either horizontally or vertically, away from metal objects or surfaces, facing the Energous PowerBridge transmitter.
- Start with the receiver board about 1 meter away from the Energous PowerBridge transmitter as shown in Figure 5.



Figure 5: Energous 1W Omnidirectional PowerBridge Transmitter and Receivers

3. Mobile Application Setup

The Energon WattUp Mobile Application Software Setup:

- The Energon WattUp mobile application installs on either iOS or Android mobile devices.

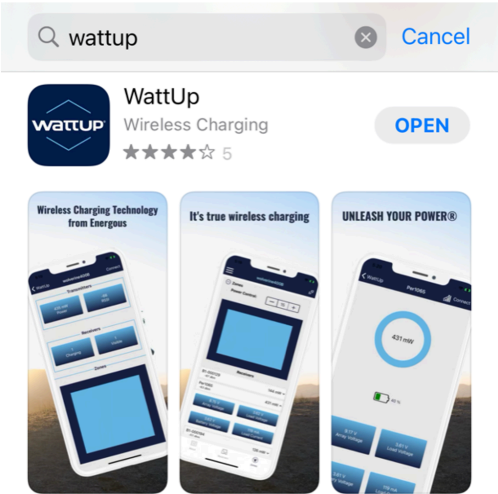


Figure 6: Energon Mobile Application from Apple Store

3. Mobile Application Setup Cont'd.

- Click on the desired Energous PowerBridge transmitter to connect to it. When connecting to the Energous PowerBridge transmitter for first time, it may ask to input a PIN number for pairing. The PIN is "123456".

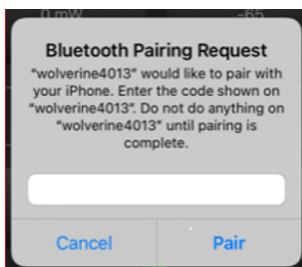


Figure 7: Energous WattUp Mobile Application Transmitter Pairing Window

Enable detail view by tapping the button (right side).

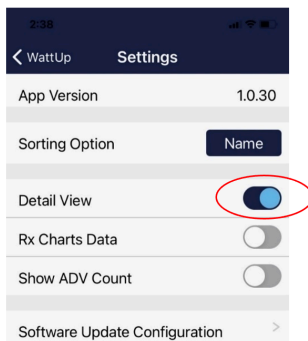


Figure 8: Energous WattUp Mobile Application Detail View Selected

4. Operation

- Connect the Energous PowerBridge transmitter power adapter (only use the provided adapter) to a power source.
- After power-on, the blue LED flashes for 30 seconds to indicate that the Energous PowerBridge transmitter is running.
- The Energous PowerBridge transmitter starts RF power transmission automatically in the 918 MHz band and the white LED turns on solid.
- After about 10 minutes, the receiver board will accumulate enough energy and start broadcasting sensor data automatically.
- At 1 meter, with the receiver board directly in front of the Energous PowerBridge transmitter, and with the storage element completely discharged, the sensor data starts transmitting within a few seconds.
- The sensor data is aggregated, broadcast via BLE, and observed in the Energous WattUp or InPlay mobile apps.
- Transmitter and receiver details including temperature and humidity values appear on the Energous WattUp mobile application.
- Typical Performance:
 - Energous 1W Omnidirectional; charge time 10~15 minutes at 5.5m (18 feet)

4. Operation Cont'd

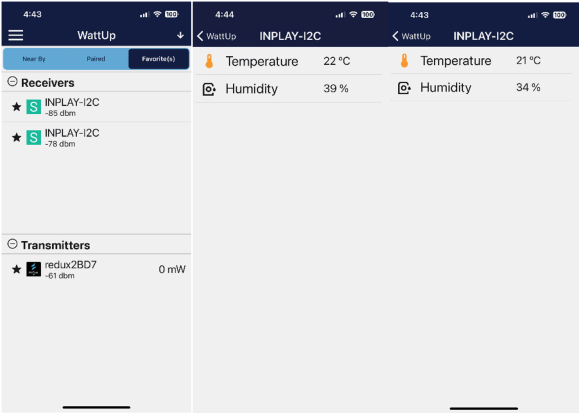


Figure 9: Energous Mobile Application

FCC Warning Statement

FCC NOTICE: This kit is designed to allow:

Product developers evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product.

Software developers to write software applications for use with the end-product.

This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product does not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained. This evaluation kit does not include SAR keep out zone sensors that may be needed in certain use cases. A 20 cm separation distance should be maintained during operation, test, and evaluation to ensure continuing SAR compliance.



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