

Greenwave® Broadband EMI Meter



The *Greenwave® Broadband EMI Meter* is a revolutionary device for accurately measuring the level of dirty electricity (a.k.a., electrical noise, line noise, power line EMI) present on the wiring in buildings.

The meter can be used to...

- Find out whether dirty electricity on your electrical wiring is higher than desirable.
- See and hear the difference dirty electricity filters make in reducing the electrical pollution on your wiring.
- Guide the installation of dirty electricity filters for optimal results.

The display screen on the meter (to the left) shows the average level of dirty electricity (EMI) at an electrical outlet before a Greenwave filter was installed in the outlet (506 mV), the new level of dirty electricity (EMI) after the filter was plugged in (48 mV), and the percent reduction in local “electrical noise density” that occurred as a result of installing the dirty electricity filter (90% Reduction).

Key Features

- **Easy to use!**
Simply plug the meter into electrical outlets to find out how much dirty electricity is present on nearby wiring. The electronic display shows readings in millivolts (mV), a standard electrical unit of measure.
- **Makes “BEFORE filter” and “AFTER filter” comparisons easy.**
The meter can display “BEFORE” filter and “AFTER” filter dirty electricity measurements on the same screen simultaneously (in millivolts). The “AFTER filter” display screen also shows the percent reduction in local “electrical noise density” that occurs when a dirty electricity filter is plugged into an outlet.
- **Includes special audio feature that lets you LISTEN to dirty electricity and HEAR the difference filters make!**
The meter converts dirty electricity frequencies into representative audio so you can listen to the electrical noise on your wiring when the meter is plugged in. Hear the noise decrease as dirty electricity filters are installed in outlets.
- **Measures dirty electricity over a broader range of frequencies than similar plug-in meters.**
Measures dirty electricity frequencies from approximately 3 kilohertz up to 10,000 kilohertz (i.e., 10 megahertz), a range that extends approximately 5 times lower and 20 times higher than the range covered by other plug-in dirty electricity meters on the market. The meter is most sensitive starting at around 10 kilohertz.
- **Can be used in many countries around the world.**
The meter is compatible with 50/60Hz AC electrical circuits with voltage anywhere between 100V and 240V.

(Instructions on Next Page)

USING THE GREENWAVE® BROADBAND EMI METER

Read these instructions in their entirety before using the Greenwave Broadband EMI Meter. The first two pages explain how to use the meter to take basic dirty electricity (a.k.a., electrical noise, line noise, power line EMI) measurements. The remaining pages describe how to use the meter to guide installation of dirty electricity filters throughout a home (or other space).

NOTE: Most standard AC electric field meters, gauss meters, and radio frequency (RF) meters are NOT suitable for accurately measuring the dirty electricity present on building wiring or for gauging the effectiveness of plug-in dirty electricity filters.

Special Safety Note

Greenwave recommends that Greenwave Broadband EMI Meter and dirty electricity filters only be used and installed by capable adults who have read and understand the use and installation directions. Filters and meters may be used by children 13 years and above and persons with reduced physical, sensory, or mental capabilities as long as these individuals have been given supervision or instruction concerning the safe use of the meter/filters and clearly understand the hazards involved. Children shall not play with the meter/filters and shall not clean or maintain them in any way without supervision.

STEP 1

Make sure your Greenwave meter is compatible with the input voltage in the building and electrical outlets where you will use it.

The Greenwave Broadband EMI Meter can be used to measure dirty electricity on 50/60Hz AC circuits with voltage anywhere between 100V and 240V. (For example: 100V, 110V, 115V, 120V, 127V, 220V, 230V, 240V)

Do NOT attempt to use the meter to measure dirty electricity on circuits with voltage outside this range. Doing so will damage the meter and void the warranty.

Also, do NOT exchange or adapt the cord/plug that came with the meter in an effort to make it fit non-standard outlets in your environment (e.g., special outlets required for some large appliances such as ovens/ranges, dryers, and electric water heaters). These non-standard outlets typically have a higher voltage rating than the remainder of a building's outlets. Attempting to plug the meter into non-standard outlets will damage the meter and void the warranty.

STEP 2

Measure the local level of dirty electricity (EMI) at an outlet.**

Plug the Greenwave Broadband EMI Meter into the top socket of an outlet.

Initial Dirty Electricity (EMI) Reading:

After you plug the meter in, the top mV (millivolt) reading on the display screen will flash numbers until the average level of dirty electricity (EMI) at the outlet is calculated. Once this average is calculated, the top mV reading will stop flashing.

[NOTE: Once the average dirty electricity level has been calculated and locked in as the top mV reading, the bottom mV reading will continue to flash numbers, showing the ongoing fluctuations in dirty electricity at the outlet. It will continue to flash until you either unplug the meter or plug a dirty electricity filter into the outlet.]

Audio function:

When you plug the meter in, you will be able to hear the dirty electricity "noise" on the wiring. It will sound similar to the static you hear on a radio when the radio is not tuned to a station.

Continue to STEP 3 if you would like to install a dirty electricity filter in the outlet and see the new (AFTER-filter) local level of dirty electricity (EMI) and the percent reduction in "electrical noise density."

If you do NOT want to continue to STEP 3 at this time, simply unplug the meter.

Repeat STEP 2 in outlets throughout your environment. This is important because dirty electricity levels can vary in different rooms due to the concentration of electronics, appliances, energy efficient lights, and other electrical devices used in each area. (When you are done, unplug the meter. Do NOT leave it plugged in unless you are actively using it to take measurements.)

** Local level of dirty electricity (EMI) refers to the level of dirty electricity (EMI) on an AC circuit in the vicinity of a particular electrical outlet.

STEP 3

Find out how much the local level of dirty electricity (EMI) decreases by installing a dirty electricity filter in the outlet**

Leave the Greenwave Broadband EMI Meter plugged into the top socket of the outlet. It will continue to show the average local level of dirty electricity (EMI) at the outlet as the top mV reading on the screen.

Plug a dirty electricity filter into the bottom socket of the same outlet.

AFTER-Filter Dirty Electricity (EMI) Reading:

The new local level of dirty electricity (EMI) following installation of the filter will appear in millivolts (mV) below the original reading on the meter's display screen. In the example on the previous page, the initial local level of dirty electricity (EMI) at the outlet was 506 mV. The new local level, after plugging a dirty electricity filter into the outlet, was 48 mV.

% Reduction Reading:

The AFTER-filter display screen will also show the percent reduction in "electrical noise density" that occurs on nearby wiring as a result of installing the filter. In the example on the previous page, there was a 90% reduction in local noise density when a dirty electricity filter was installed in the outlet.

NOTE: The % Reduction reading relates to "electrical noise density" NOT the percent change in voltage. If you would like to calculate the percent reduction in voltage, subtract the AFTER-filter dirty electricity mV measurement from the initial mV measurement and divide the result by the initial mV measurement. In the example on the previous page, the % reduction in voltage would be calculated as follows:

$$(48 \text{ mV} - 506 \text{ mV}) \div 506 \text{ mV} = -.91$$

This is a 91% reduction.

Audio function:

When you plug in the filter, the sound of the dirty electricity "noise" coming from the meter should decrease.

Unplug the meter.

Do NOT leave the meter plugged in unless you are actively using it to take measurements.

** Local level of dirty electricity (EMI) refers to the level of dirty electricity (EMI) on an AC circuit in the vicinity of a particular electrical outlet.

RECOMMENDED EMI LEVELS

Ideally, dirty electricity (EMI) levels should be below 50 millivolts (mV).

Levels between 50 and 70 mV are marginal and should be reduced if possible.

Levels above 70 mV are undesirable and steps should be taken to lower them.

A good rule of thumb is to reduce local levels of dirty electricity (EMI) to less than 50 mV or by at least 80% on a majority of outlets in your environment. The lower you can get dirty electricity, the better!

[NOTE TO CUSTOMERS IN EUROPE]

Dirty Electricity is a dynamic and unpredictable form of energy. The levels present on electrical wiring and the ability to decrease these levels may vary from country to country, building to building, and even room to room. There may be some countries or situations where it will not be possible to lower dirty electricity to levels below 70-100 mV (or possibly higher), even with large numbers of filters. In these situations, it is important to focus on the net change in EMI measurements when installing filters. The goal is to reduce dirty electricity to the greatest degree possible in the particular environment/situation at hand.

Continue reading for information about using Greenwave's Broadband EMI Meter to guide the installation of dirty electricity filters throughout a home (or other space).

USING THE GREENWAVE BROADBAND EMI METER TO HELP INSTALL DIRTY ELECTRICITY FILTERS THROUGHOUT A HOME

STEP 1

Check for wiring errors.

Prior to installing Greenwave filters, we recommend testing the electrical outlets in your environment for wiring errors. To do this, you can use an outlet (receptacle) tester to check EACH outlet prior to plugging in Greenwave filters. These testers are inexpensive and can be purchased at most hardware stores.

If any wiring errors are found, please contact an electrician to correct the error(s) before installing filters. Wiring errors can cause electrical hazards in homes and other settings, and can also create very high magnetic fields in buildings. These magnetic fields can be amplified when any electrical devices, including Greenwave filters, are plugged into outlets.]

STEP 2

Select a room in which to start the installation process. Turn on lights, electronics, and other electrical devices commonly used in the room.

We recommend beginning in the room with the heaviest concentration of devices known to create dirty electricity. Examples include computers, printers, TVs and other entertainment systems, compact fluorescent lights, light dimmer switches, appliances with transformers or variable speed motors.

STEP 3

Choose an outlet in the room that is close to one or more devices known to create dirty electricity. Take an initial dirty electricity (EMI) reading in the top socket of the outlet.

- If the dirty electricity (EMI) reading is BELOW 50mV, move to STEP 4.
- If the dirty electricity (EMI) reading is ABOVE 50mV, leave the meter plugged in. Then, plug a dirty electricity filter into the bottom socket of the outlet. The meter will show the new level of dirty electricity (EMI) at the outlet and the percent reduction in local “electrical noise density.”

Leave the filter plugged into the outlet and move to STEP 4.

STEP 4

Move to another outlet in the same room. Take an initial dirty electricity (EMI) reading in the top socket of the outlet.

- If the dirty electricity (EMI) reading is BELOW 50mV, move to STEP 5.
- If the dirty electricity (EMI) reading is ABOVE 50mV, leave the meter plugged in. Then, plug a dirty electricity filter into the bottom socket of the outlet. The meter will show the new level of dirty electricity (EMI) at the outlet and the percent reduction in local “electrical noise density.”

Leave the filter plugged into the outlet and move to STEP 5.

STEP 5

Repeat this process for all of the outlets in the room. When you are done, move to STEP 6.

NOTE: You will likely NOT need to install a dirty electricity filter in every outlet in the room. It typically takes between 1 and 4 filters to reduce dirty electricity to acceptable levels in a room. Only install a filter in an outlet if the dirty electricity (EMI) measurement in the outlet is higher than you want it to be.)

STEP 6

Repeat this process in all rooms within the home.

Work on rooms with heavy concentrations of devices known to create dirty electricity before rooms with fewer devices.

The overall goal is to reduce local levels of dirty electricity (EMI) to less than 50 mV on a majority of outlets in all rooms. The farther below 50 mV, the better.

STEP 7

Once you've installed filters throughout your home, go back and take dirty electricity (EMI) readings in each room to confirm that levels are reasonable.

IMPORTANT NOTE TO CUSTOMERS IN EUROPE

Do NOT install more than the maximum number of filters suggested for the type of electrical power supply and total number of circuit lines in your home, flat, or office. (See *European General Installation Guidelines* on next page for details.)

See next page for some additional filter installation tips and ideas for trouble shooting possible problems.

Suggested European General Installation Guidelines

There is great variation in internal electrical wiring across Europe, from country to country and even within the same country, with homes and flats having different electrical power supplies. There will also be some variation from home to home, based on the types of electronics and electrical devices present, as well as other factors, such as solar power, power source in building, etc.

USE THE CHART BELOW TO DETERMINE THE SUGGESTED NUMBER OF FILTERS FOR YOUR SITUATION. To use the chart, you will need to know the type of electrical power supply to your home (Single Phase/Tri-Phase and 3, 6 or 10 KW). You can get this information by looking at your home's electric meter or your electric bill. You can also call your electricity provider's customer service department. They will be able to tell you the type of power supply you have.

Type of Electrical Power Supply	Number of Circuit Lines for the Entire House/Flat	Number of DE Filters per Circuit Line	Total Number of DE Filters Suggested (To be distributed coherently throughout the house)	Maximum Number of DE Filters *
SINGLE PHASE 3 KW	1	3-4	3-4	4
SINGLE PHASE 3 KW	2 OR MORE	2-3	4-6	6
SINGLE PHASE 6 KW	2	2-3	4-6	6
SINGLE PHASE 6 KW	3	2-3	6-9	9
SINGLE PHASE 6 KW	4 or more	2-3	8-10	10
SINGLE PHASE 10 KW	3 or more	2-3	6-15	15

Type of Electrical Supply-Power	Number of Circuit Lines for the Entire House/Flat	Number of DE Filters per Circuit Line	Total Number of DE Filters Suggested (To be distributed coherently throughout the house)	Maximum Number of DE Filters *
TRI- PHASE LESS THAN 10 KW	---	2-3	6-12	12
TRI- PHASE 10 KW	---	2-3	As determined	---

* Do NOT install more than the maximum number of dirty electricity (DE) filters suggested for the type of electrical power supply and the total number of circuit lines in your home/flat.

Additional Filter Installation Tips

- Do NOT plug Greenwave filters into electrical outlets that are incompatible with the voltage (V) or amp (A) specifications shown on the back label of the filters. (See the table of voltage and amp specifications contained within these instructions for more details.)
- European filters are certified specifically for the European electrical standard, and European filters should only be used per proper usage guidelines as outlined in these directions.
- Install filters as close as possible to known sources of dirty electricity, for example: computers, printers, cordless phones, TVs, video game consoles, Wi-Fi systems, fax machines, copiers, scanners, and other electronic equipment; light dimmer switches; fluorescent and compact fluorescent lights; SMART meters; and appliances/devices with variable-speed motors such as blenders/mixers and hair dryers. (Installing additional filters in outlets near computers, printers, cordless phones, TVs, video game systems, and other similar electronic equipment is recommended.)
- When possible, install at least 2 filters (1 filter in Europe) near the main electrical panel in your home. (This is the point where electricity enters your home from neighborhood power distribution lines.) This will help reduce the amount of dirty electricity that enters your home's electrical system from outside sources.
- To minimize exposure to electromagnetic fields (EMF), it is generally advisable to plug electronics of ALL kinds, including Greenwave filters, into outlets that are located at least 1 meter away from specific locations where people stand, sit, or recline for extended periods of time (for example: beds, office chairs, couches, easy chairs, etc). When possible, 2 meters from beds is preferable. All electronics emit magnetic fields when operating. These fields generally decrease rapidly within 1/3 to 1 meter of their sources.
- If possible, avoid plugging a Greenwave filter into an outlet controlled by a light switch. If the switch is turned off, the filter will be unable to do its job. If you need to plug a filter into a switch-controlled outlet, remember to leave the switch turned on.
- Plug-in dirty electricity filters are not always compatible with solar energy systems and the storage back-up units they use. Check with your solar system manufacturer before installing Greenwave filters.

Greenwave-SOLS European Filters Voltage and Amp Specifications

This table shows the voltage and amp specifications for each Greenwave-SOLS European filter model. The model number for your filters is shown on the back label of the filters.

Filter Model	Appropriate Voltage Range	Maximum Amps
Spectrum 2500-EF	AC 220V – 240V	Up to 16A (@ 40C)
Spectrum 2500-EF filters are designed for use in European countries and other areas around the world with <u>Type E or Type F electrical sockets</u> . Do NOT plug Spectrum 2500-EF filters into electrical outlets with voltage outside the 220V – 240V range or an amp rating higher than 16A. Also, do NOT use the built-in outlet in these filters with devices that will draw more than 16A of electrical current. *		
Filter Model	Appropriate Voltage Range	Maximum Amps
Spectrum 2500-J	AC 220 V – 240V	Up to 10A (@ 40C)
Spectrum 2500-J filters are designed for use in Switzerland and other countries with <u>Type J electrical sockets</u> . Do NOT plug Spectrum 2500-J filters into electrical outlets with voltage outside the AC 220 – 240V range or an amp rating higher than 10A. Also, do NOT use the built-in outlet in these filters with devices that will draw more than 10A of electrical current. *		

* The maximum amount of electrical current (i.e., amps) that a device will draw from an outlet is typically listed on the label of the device.

Plug-Through Technology (Built-In Outlet)

Most Greenwave filters include a built-in outlet at their base for plug-through convenience. When you need an outlet, most electronics and other devices can be plugged into Greenwave filters to access power to run. Keep the following in mind when using the built-in outlet in Greenwave filters:

- The built-in outlet in the filters can be used **ONLY** when the filters are plugged into outlets that are compatible with the voltage (V) and amp (A) specifications shown on the back label of the filters and **ONLY** with devices that are also compatible with these specifications. See the table of voltage and amp specifications within these directions for more details.
- Some battery-charging devices are not compatible with the high capacitance technology employed by dirty electricity filters. For this reason, we recommend that you do **NOT** plug battery chargers, back-up power supplies, and electric devices that include built-in chargers (such as electric toothbrushes and shavers) into the built-in outlet of Greenwave filters or into the same wall outlet or power strip as Greenwave filters.

Greenwave SOLS Filters and Greenwave Meters are imported into the European Union and Switzerland and distributed by SOLS Sagl Swiss Optimal Living Society, via Tavernola 22 6949 Comano Switzerland.

Trouble Shooting Possible Installation Problems

I plugged a filter into an outlet and it started to buzz. Is there a problem?

This usually means the filter is overloaded. In other words, there is more dirty electricity on nearby wiring than the filter can reduce sufficiently on its own. This problem can usually be resolved by installing another filter in the same outlet (using an electrical tee or power strip) or an additional 1 to 2 filters in nearby outlets or power strips. If the buzzing doesn't stop after installing additional filters, contact Swiss Optimal Living Society (SOLS) or Greenwave.

I saw a small spark and heard a popping sound as I plugged in a Greenwave filter. Is this normal?

Yes, this is normal as electrical energy "loads into" the capacitor technology used by the filters. It is not dangerous to you, your Greenwave filters, or other equipment you have plugged into outlets. Greenwave filters undergo rigorous safety testing and are safety certified.

When disconnecting a filter, it may take a few seconds for small accumulations of electrical charge to completely discharge from the filter. It is advisable to avoid touching the plug on the filter for a few moments after removing the filter from the outlet.

I plugged a filter into an outlet in my kitchen and the dirty electricity reading on my Greenwave meter went up rather than down. What should I do?

This is unusual, but does occur on occasion. First, use an outlet (receptacle) tester to check the outlet for the following wiring errors: open ground, open neutral, open hot, hot/ground reverse, and hot/neutral reverse. If any of these wiring errors exists, we recommend contacting an electrician to repair it. If none of these errors is present, the trouble may be a shared neutral wire. Occasionally, the two receptacles (sockets) in an outlet will share a neutral connection. This tends to be more common in kitchens than other rooms, and is not an ideal wiring configuration. You may want to talk with an electrician about rewiring the outlet.

When installing filters, you can choose to skip this outlet or try the following installation strategy. Plug a separate power strip or electrical tee into each receptacle (socket) of the outlet. Plug your Greenwave meter into one of the power strips or electrical tees and then plug a filter into the same power strip (or tee). The dirty electricity reading should go down. Repeat this process with the second power strip or electrical tee. If the dirty electricity readings do not go down, contact Swiss Optimal Living Society (SOLS) or Greenwave for additional help.

If you have any questions about installing or using your Greenwave filters, please contact us via e-mail at sales@solsociety.swiss or customerservice@greenwavefilters.com.

**Swiss Optimal Living Society (SOLS)
WARRANTY INFORMATION
For Greenwave® Broadband EMI Meters**

Swiss Optimal Living Society SOLS Sagl offers a two (2) year Limited Warranty for the **Greenwave Broadband EMI Meter** (from the time of initial purchase) against manufacturing defects in material or workmanship.

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, accident, neglect, exposure to excess moisture, fire, lightning, power surges, or other acts of nature. To maintain the device warranty, the device must be used in accordance with the manufacture's stated instructions for installation and operation.

SOLS will repair or replace, at its discretion, any meters meeting these limited warranty conditions that are found to be defective within the scope of normal and appropriate use and are within the Two (2) Year Limited Warranty period.

Warranty claims must include receipt of purchase to validate warranty. For service, present the device and proper documentation to the place of purchase of the meter, or contact the SOLS customer service department (sales@solsociety.swiss or +41 (0)91 228 0640). In the case of return for replacement to Swiss Optimal Living Society, SOLS will cover return shipping charges with advance authorization of shipment from the customer service department.

Disposal Guidelines

Greenwave Dirty Electricity (EMI) meters and filters include electronic components, and therefore, should NOT be thrown away as part of your unsorted municipal waste (i.e., regular trash).



Instead, the meters and filters should be taken to a location that can handle the proper treatment, recycling, or environmentally sound disposal of electronic/electrical equipment. (For example, in many European countries, you can take old electronics and other electrical equipment to a local WEEE collection point.) If you are not sure where to take your old filters, please contact Swiss Optimal Living Society (SOLS) or Greenwave for help.

By disposing of your old Greenwave meter and filters properly, you are helping protect the environment, human health, and raw material supplies, and maintain sustainable development.

(NOTE: The estimated lifespan of Greenwave filters (i.e., the mean time before failure) is approximately 200,000 hours, which is 22.8 years.)

**Swiss Optimal Living Society (SOLS)
RETURN POLICY
For Greenwave® Broadband EMI Meters**

The **Greenwave Broadband EMI Meter** may be returned only due to manufacturer defects covered under warranty. If you are not completely satisfied with **Greenwave Filters** purchased from the Swiss Optimal Living Society (SOLS), you may return them to SOLS within 60 days of purchase for a refund or credit.

Restocking Charge:

A 5% restocking fee may be imposed on all returns, unless the return is due to a manufacturer defect in the product(s) or a shipping error.

Return Shipping Charges:

The customer is responsible for return shipping charges, unless the return is due to a manufacturer defect in the product(s) or a shipping error.

Return Shipping Requirements:

- An original invoice/receipt must accompany all returns.
- Return products **MUST** be wrapped/protected in bubble wrap and sturdy packaging similar to that in which they were received.
- **Returns will be accepted only if they are undamaged and in saleable condition, unless the return is due to a manufacturer defect in the product(s).**
- Return shipments **MUST** be able to be tracked. Contact Swiss Optimal Living Society with a tracking number for your return shipment.

+41 (0)91 228 0640
sales@solsociety.swiss

Returns Due To Product Defects or Shipping Errors:

For defective products or shipping errors, contact our customer service department at sales@solsociety.swiss or +41 (0)91 228 0640. In these cases, Swiss Optimal Living Society will cover return shipping charges with advance authorization of shipment from the customer service department.