

## **How to Set Up a Low-EMF Internet Connection**

Many people now realize that using Wi-Fi is not wise – both for security and health reasons. Wired Ethernet-based internet access goes a long way toward solving these issues. However, even a wired internet system can cause health effects if setup incorrectly. This is because of the electromagnetic interference (EMI) that many new modems and routers create. This EMI travels along your Ethernet cable to your computer and can become just as problematic as Wi-Fi from a health perspective.

In this article, you will learn how to install a wired internet system that produces very little EMI. For electrically sensitive individuals, this will allow you to use your computer for longer periods of time without symptoms. For health-conscious people, this is the next step in creating a truly low-EMF home for you and your family.

Before we move on to recommended solutions, I want to explain the primary reasons why EMI is created by a wired internet system:

1. Modems and routers all have a switched-mode power supply (SMPS) that is plugged into an outlet. The EMI created by this SMPS can travel along your electrical wiring and Ethernet cables. You can test this with an AM radio and electric field meter (pictured below).
2. Newer “Gigabit” modems and routers that allow for “blazing fast internet speeds” of 500 or 1,000 mbps create excess high frequency EMI that travels along your Ethernet cable to your computer. Here is a [technical explanation](#) as to why this happens. Whenever possible, I suggest you use lower bandwidth equipment rated at 10/100 mbps. This is still fast enough to stream movies on Netflix or YouTube.
3. In some offices and homes, companies will install Power Over Ethernet (PoE). This allows a small amount of electricity to flow through the Ethernet cables, typically to power a phone/modem system in separate rooms. Unfortunately, PoE cables are not shielded for the high amounts of EMI they carry and these systems are very unhealthy for users.
4. Rather than using Wi-Fi or long, shielded Ethernet cables, some people use PLC (power-line communication) systems to transmit internet data around the home on the electrical wiring system. Unfortunately, these PLC systems create an incredibly high amount of EMI (“dirty electricity”) on your home wiring. This EMI then radiates into your living environment and is transmitted to your computer.

## **How to Measure Electric Fields**

In the following images, you can see both high and low EMI readings for a wired laptop. The laptop is running on battery power and utilizes an external keyboard and mouse. The first picture shows very high electric field readings with a typical wired internet system. The second image shows healthy readings (ideally below 3 Volts/meter at your computer). Below the pictures, I explain exactly how to achieve these low EMI readings.



Electric field readings of over 100 V/m are highly problematic. Some people feel drained or experience headaches from sitting at their computer and this EMI issue can be the primary cause. Levels this high greatly reduce the amount of time I can spend on a computer without symptoms.



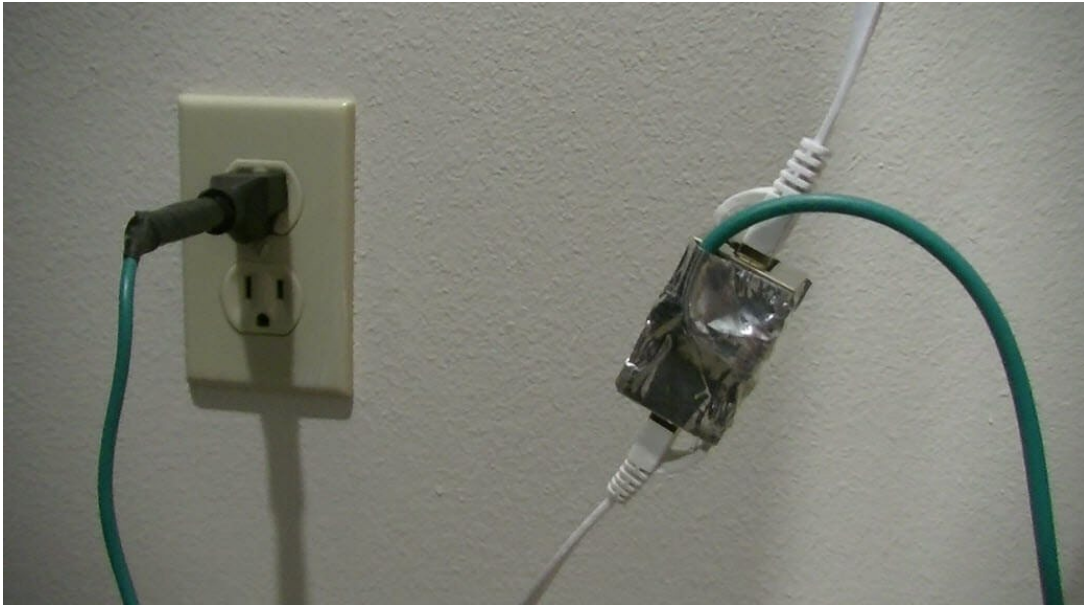
This electric field measurement was taken just a couple minutes later once the proper setup was in place. The only difference is there is now almost no EMI transmitted by the Ethernet cable. Electric field readings below 3 V/m are much healthier for any extended use of your computer.

# How to Set Up a Low-EMF Internet Connection

I have experimented with a lot of computer equipment over the years to find brands and models that allow me to work with fewer symptoms. The following is a home internet system that creates low EMI, measured with both an electric field meter and AM radio.

1. If your cable internet provider is any company except AT&T or Verizon, I suggest you get this [Arris/Motorola Modem](#). It is the lowest bandwidth modem I have found at 172 mbps. This is still much more bandwidth than you can likely purchase from your internet provider. The modem is compatible with Comcast and transmits minimal low-frequency EMI from its SMPS. *Update June 2022:* Several readers have noted that the Arris modem noted above is no longer compatible with Comcast. Instead, I recommend the [Arris Surfboard SB6183](#), [Arris SB6190](#) or the [Arris Surfboard SBV2402](#), which you can rent from Comcast or buy online. You will also need a wired router, such as this inexpensive one from [TRENDnet](#) or this [Netgear router](#) that has an on/off button for WiFi. A router is needed because Comcast and most internet providers do not automatically provide multiple IP addresses. For newer technology with less hassles, I would get the Docsys 3.1 [Netgear CM1150V modem](#) and the [JRS AC1900 Eco-Router](#). These can both be wired and the following will allow you to ground your ethernet connection between them and your computer. Note that you get a 7.5% discount on the JRS eco-router with the code JJ21FHRE at checkout.
2. For your router, I would stay away from high-bandwidth devices (1 gigabit and above), such as [Netgear routers](#) (unless you occasionally need some wireless capability in your home). When I test these routers, they create a high amount of low and high frequency EMI on the Ethernet cables. This will be true for most “Gigabit” routers. Instead, I suggest that you use a simple, low-bandwidth Ethernet switch, such as [this 4-port model from TP-Link](#). Here is an [8-port model](#) if you have many devices. Alternatively, you can use this [wired TRENDnet router](#), which is especially handy if your modem does not split the IP addresses for you. Both are rated at 10/100 mbps, which is now considered slow. However, this is a good thing from an EMF health perspective! 100 mbps is also more bandwidth than your Internet Service Provider is likely bringing to your home. Both the TP-Link switch and the wired TRENDnet router created very little EMI in my tests. If you occasionally need some wireless capability in your home, then I would add in a [JRS Eco-WiFi Router](#).
3. You will then need to purchase two Ethernet cables to connect to your laptop. The reason for purchasing two cables can be seen in the next step. I recommend these thin, [shielded Cat-7 cables](#) or these [shielded Cat-7 cables from Electra Health](#). Two 25-foot cables are ideal, but you can get shorter or longer cables based on your needs. You will also need a [short cable](#) that is shielded and has metal RJ45 endings to place between your modem and the Ethernet switch.
4. The final step to have a low-EMF internet connection is to utilize an [Ethernet ground adapter](#). This ground adapter will be placed in between your two Ethernet cables and will ground most of the lower-frequency EMI (below 1 MHz) so that it is not being transmitted to your computer. You will run the first Ethernet cable from your switch to the ground adapter. Then you will run your second cable from the ground adapter to your computer. Here is a picture showing what the ground adapter looks like. Note that

[LessEMF](#) also has their own [Ethernet ground adapter](#). I have used this as well with good results. If your laptop does not have an Ethernet port, this new groundable [USB to Ethernet adapter](#) is also an excellent choice.



An [Ethernet Ground Adapter](#) will reduce much of the EMI flowing to your computer.

<https://youtu.be/ULV0jKXcnJo>

[The above video will show you some of the steps I take to reduce the EMI at my computer.]

## How to Properly Ground Your Wired Internet System

The following videos and sections will help you see how I ground my wired Ethernet system.

<https://youtu.be/oUdEYBIVz1Q>

[This video shows you the specific items that will allow you to ground your Ethernet connection if you do not have access to an electrical ground in your home. You will need two [shielded CAT-7 or CAT-6](#) cables, a [ground adapter](#), a [gator-to-gator clip](#), a [50' extension cable](#) and a thin 2' copper stake that you can buy for about \$2 at your local hardware store or from [LessEMF](#). The total cost for this setup is approximately \$75. If you create your own system, just make sure you have metal-to-metal all the way to the ground outside and that the electric fields at your computer are below 2 V/m.]

The following video shows why I typically ground my Ethernet system to the outside - there can be EMI on your electrical safety ground.

<https://youtu.be/bMIWSPXb6Zc>

Whether you are electrically sensitive or you simply want to have a healthier home for your family, the above solution will make quite a difference. Many people are now aware that Wi-Fi is dangerous. However, microwave radiation from wireless technology is only one part of the EMF equation. Electromagnetic interference can be just as problematic and could be the reason why you experience symptoms from computer use. Hopefully this article will help you have a truly healthy, low-EMF internet connection for many years to come.

**Note:** If you would like to obtain an EMF meter to check the electric fields at your computer, I suggest either the [Gigahertz Solutions ME3830B](#) or [ME3851A](#) (pictured above). You get a 10% discount on your Safe Living Technologies purchase with my distributor code of **EMFA**. I also suggest the Radio Shack AM Radio Model 12-467 or 12-464 that can be found on ebay. Or this [TECSUN shortwave radio](#). You can always [contact me](#) to discuss how to do this.

*Addendum June 2022:*

## **Why Re-Measuring Electric Fields Is Important**

I recently had a situation (Spring 2022) where I wasn't feeling well working at my computer. It was similar to what I had felt with high 60 Hz electric field exposures in the past, so I re-measured the fields at my laptop. They were incredibly high. It turned out that my Ethernet ground system had failed and extreme electric fields were transmitting from my router. The Gator-to-Gator clip had corroded and was no longer connected to the Earth outside my home.

Here are the electric fields which were giving me a headache and causing fatigue while I worked. Anything over 20 V/m is considered extreme, so these readings were much more than I would ever want to be exposed to while working.



Below are the grounded Electric Field measurements at my workstation *without* an Ethernet internet connection (background levels with the laptop not charging or connected via Ethernet). Being under 1 V/m at your workstation is really ideal.



I then replaced my corroded Gator-to-Gator clip with thick electrical wire (4 gauge) and a grounding rod that I got from the local electrical store for under \$20. This is what my setup now looks like:



Once I had my Ethernet system properly grounded again, the electric fields at my laptop went back down to a healthy level ~ just above 1 V/m. After I accomplished this, my symptoms while computing greatly diminished over the next week.



[Electric Field levels at my laptop once the proper grounding had been reestablished.]

The lesson learned here is to double check the EMF levels at your laptop every once in a while. Parts fail, especially once they are over five years old. EMF levels will change over time as you bring in new equipment and things change in your home and neighborhood. Here are the [EMF meters I recommend](#) to stay on top of this. Hopefully this knowledge will keep you computing in a safe way for many years and decades to come.

This article was updated June 2022. Originally published April 2017.

*Disclosure: EMF Analysis is partly supported by a small commission for purchases made through some product links on this page. This income enables me to continue to research and write about this important topic.*