

Some Questions and Answers about Wireless Internet Safety

[\[See the Glossary of Terms and Acronyms on the Last Page\]](#)

*Note: The Internet system that is planned for Florida, Hawley, Monroe and Savoy using MBI funding is a **Fixed Wireless Network**. It is different from Wi-Fi, Mi-Fi, Cell Phone and Satellite-based systems in that it generally uses lower-strength signals and focuses them carefully from point to point, rather than spraying them in all directions over a wide area.*

- Q.** Does a fixed wireless system actually use microwaves?
- A.** Yes, as do many other devices and networks. The term “microwave” simply refers to radio waves at a frequency over about 1000 MHz (1 GHz). Cell phones, Bluetooth, Wi-Fi, Mi-Fi, cordless phones, baby monitors, satellite TV and radio, satellite Internet, garage door openers and many other devices also use the microwave radio spectrum.
- Q.** Is there a risk to health from the microwave radiation in a **fixed wireless network**?
- A.** No. The power levels and antenna placement of a wireless ISP network ensure that there is no risk to anyone from its microwave signals.
- Q.** How much transmitter power will a fixed wireless network use?
- A.** According to FCC standards, no network can have a transmitter power higher than one watt, and most will be lower, between a tenth and half a watt. A radio interconnecting sites is allowed to transmit with up to 0.179 watt – which is less power than it takes to run a night light.
- Q.** How much power is that, compared to other personal radio devices and systems?
- A.** Wireless ISP transmitters are all much weaker than a CB radio and various other “personal” devices, which are approved for use right next to your head or body.
- Q.** How much power does an indoor Wi-Fi system generate?
- A.** Wi-Fi is allowed up to one watt, and some systems use that, though typical home systems generally use about a tenth of that. But many office systems, and even some home systems, do come close to the full watt.

- Q.** Would a cable TV-Internet system subject us to less microwave radiation?
A. Probably not. The amount reaching the inside of a house, or ground level, from a fixed wireless system is extremely low.

On the other hand, while a cable itself doesn't radiate, Comcast's current Wireless Gateway, their standard cable modem/telephone/Wi-Fi system, transmits indoors, on two bands, with nearly a full watt. That way it broadcasts its Xfinity Wi-Fi as widely as possible, and can also use Wi-Fi to distribute TV to rooms that aren't wired for cable, using a Wi-Fi cable box. A fixed wireless system, in contrast, is outdoors, and the home antenna is always pointing away from the house.

Cable systems also sometimes hang outdoor Wi-Fi access points from their cable. The cable companies are also going into the mobile business, using small cells attached to their cables or to poles in areas they serve. That reduces the amount of airtime they have to purchase from national mobile carriers.

- Q.** Will you be putting up a microwave tower?
A. We will have one new "tower," in Savoy, though it's really just a fiberglass pole, called a monopole. All of the other vertical structures we will add are ordinary wooden utility poles. They look nothing like big microwave towers or cell towers. They will not be more than 70' high; most will be shorter. The height of the pole generally depends on the nearby tree cover.
- Q.** What about the antennas – don't they make the signal more powerful?
A. A fixed wireless system's antennas are all directional. What they do is focus the signal to put it where it is needed, keeping most of it away from where it isn't, like downward, or at houses.
- Q.** How high up will your pole-mounted antennas be?
A. They will be in the upper reaches of the poles. The shortest poles with antennas on them will be at least 35 feet up. The tallest poles will reach about 70 feet, keeping the antennas 60 feet above ground.
- Q.** What will the home antennas be and how high will they be mounted?
A. The customer premise antennas will all be directional, point-to-point type antennas aimed at the serving site, and ***aimed away from the house.***
- Q.** How much microwave radiation will the customer premise antennas put into the home?
A. Virtually none. The walls of a house substantially weaken the signal. The antenna always points away from the house, so the power level in the direction of the house is minimal.

- Q.** Will the transmitters be running all the time?
- A.** The customer-premise radios will only transmit when they are being actively used by someone in the house, except for some management transmissions.
- Q.** How are the locations of base stations determined?
- A.** The design of the network is based on the terrain. Hills totally block the signals and trees severely weaken them. In the rough terrain of western New England, sites are selected to shoot across valleys, or to serve an immediate neighborhood. Base station siting is a very painstaking process.
- Q.** Does the government have standards for radiation safety?
- A.** Yes. There are very specific limits on exposure set by the FCC, which all wireless providers must meet.

Want more details?

Visit <http://www.townofhawley.com/wp-content/uploads/docs/Broadband/FAQ-s.html>

Observations on Fixed Wireless Internet Systems

1. The American Cancer Society lists 188 proven carcinogens. Of those, three, or 1.596% of the total list, are related to radiation -- ultraviolet types A, B, and C (UV). Their major sources are certain types of welding, lightning storms and the Sun, not low-power microwave transmissions.
2. Aside from fiber, which costs almost three times as much to build and maintain, **fixed wireless** is the only type of Internet system which focuses its transmissions on specific receivers. Cell, satellite Internet and satellite TV all broadcast their signals in every direction, making them less safe and more difficult to manage.
3. In the event of a catastrophic storm, because it is deployed on every telephone pole, a fiber system is much more vulnerable to damage than a fixed wireless network. This is because there is nothing strung between the poles in a wireless network that falling trees can knock down.
4. The radio waves that the fixed wireless network uses are called "RF Energy." These occupy the "non-ionizing" part of the electromagnetic spectrum and cannot change cells at the molecular level, as can ionizing electromagnetic waves, like X-Rays and Gamma Rays.
5. From the point of view of continuity of service, a fixed wireless network is more reliable than both satellite- and cell-based systems, as it is less affected by weather events like thunderstorms, sleet and fog.

Glossary of Terms and Acronyms

Term	Definition
Bluetooth	A wireless technology standard for exchanging data over short distances.
GHz	Gigahertz. Also a unit of measure for electronic signal frequency. 1 GHz = 1000 MHz.
ISP	Internet System Provider. Any group or individual that provides Internet services to a group of users, usually for a fee.
MHz	Megahertz. Unit of measure for electronic signal frequency.
Mi-Fi	A wireless router that acts as mobile Wi-Fi hotspot. There are a few of these in Hawley, and their performance at your home will be about like that of your cell phone.
Milliwatt	Electrical measurement equaling one one-thousandth of a watt.
Monopole	Tapered or tubular metal or fiberglass poles that can typically be erected in one day.
Point-to-Point	Signal is focused and directed from one point (or antenna) to another.
Radio	In this context, a generic term for a device that sends or receives Internet signals from one point to another.
RF Energy	Radio Frequency energy. A form of non-ionizing electromagnetic radiation, e.g., radio waves and cell signals. Non-cancer-causing.
UV	Ultraviolet radiation. Main source is sunlight. Often referred to by type: UVA, UVB, and UVC.
Wi-Fi	Technology for radio wireless local area networking of devices. Omnidirectional. Most likely use would be for distributing an internet signal within a home, office or business.