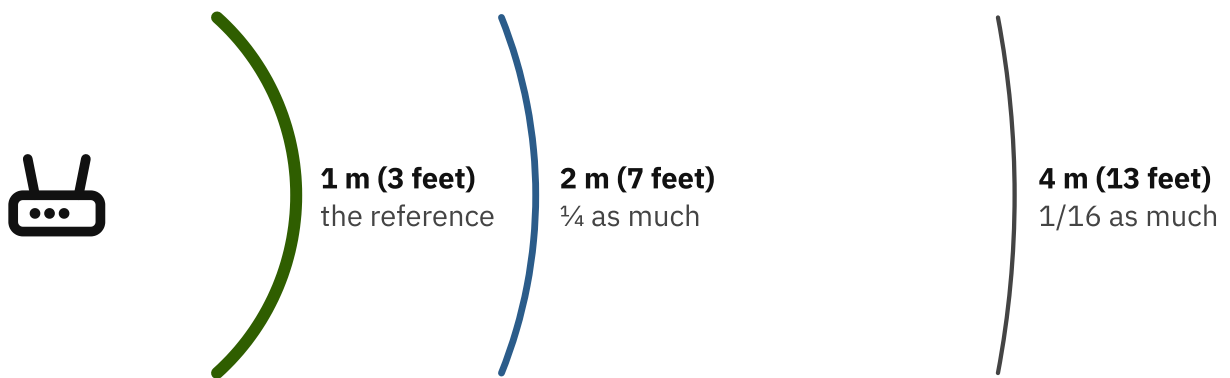


Wi-Fi and Your Health, Explained

How much power Wi-Fi sends, how fast it fades, and what health agencies say about it.



The short answer

A Wi-Fi router sends about a tenth of a watt. That's tiny. The signal also fades fast as it spreads out. In real homes and schools, it measures far below the safety limits.

The power

A router sends about a tenth of a watt. A microwave oven uses thousands of times more, and keeps it inside a metal box.

The distance

Radio power thins out as it spreads. Step twice as far away and you get a quarter as much.

The agencies

Health agencies have looked hard. They have found no consistent evidence that Wi-Fi within the limits harms people.

What's inside

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About this guide

This guide explains the power numbers in plain words. It isn't medical advice. If you have a question about your own health, ask your doctor.

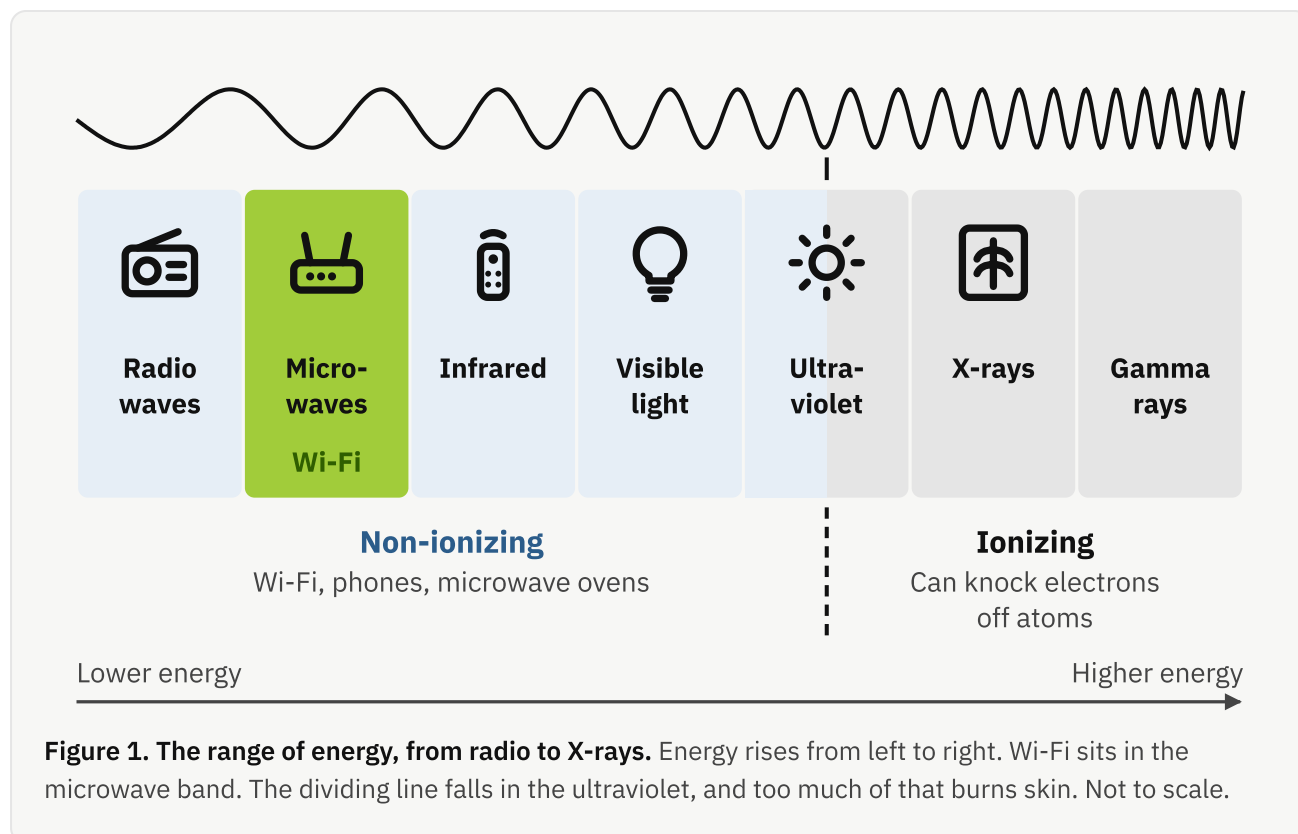
A word on the words

A **watt** measures power. **Radiation** just means energy that travels outward. Light and radio waves count, and so do X-rays. But they are different kinds, as the next page shows.

Radio waves are not X-rays

The word radiation covers everything from radio to X-rays. What matters is which kind.

Scientists split it into two groups. X-rays carry enough energy to knock bits off atoms. That's called **ionizing** radiation. Radio waves and light don't have that much energy. They're called **non-ionizing**. Wi-Fi is on the non-ionizing side.



What radio waves can do, if the power is high enough, is heat things. That's how a microwave oven cooks. The safety limits are built around heating (page 9).

KEITH'S NOTE

“Wi-Fi is low-power, non-ionizing radio energy.”

Keith Parsons, LinkedIn post, 2026

A tenth of a watt

A typical Wi-Fi router sends about a tenth of a watt. Your phone or laptop sends about the same over Wi-Fi.

(a) On an ordinary ruler

Wi-Fi router, typical

← 0.1 W is here, too small to see at this scale

Phone, top power

← 0.2 W is here, too small to see at this scale

US cap for a Wi-Fi radio

← 1 W is here, too small to see at this scale

Microwave oven

1,200 W

Watts

0 200 400 600 800 1,000 1,200

(b) The same four powers as money, if the router were one penny

Wi-Fi router, typical

● 1 penny

Phone, top power

● 2 pennies

US cap for a Wi-Fi radio

● a dime

Microwave oven

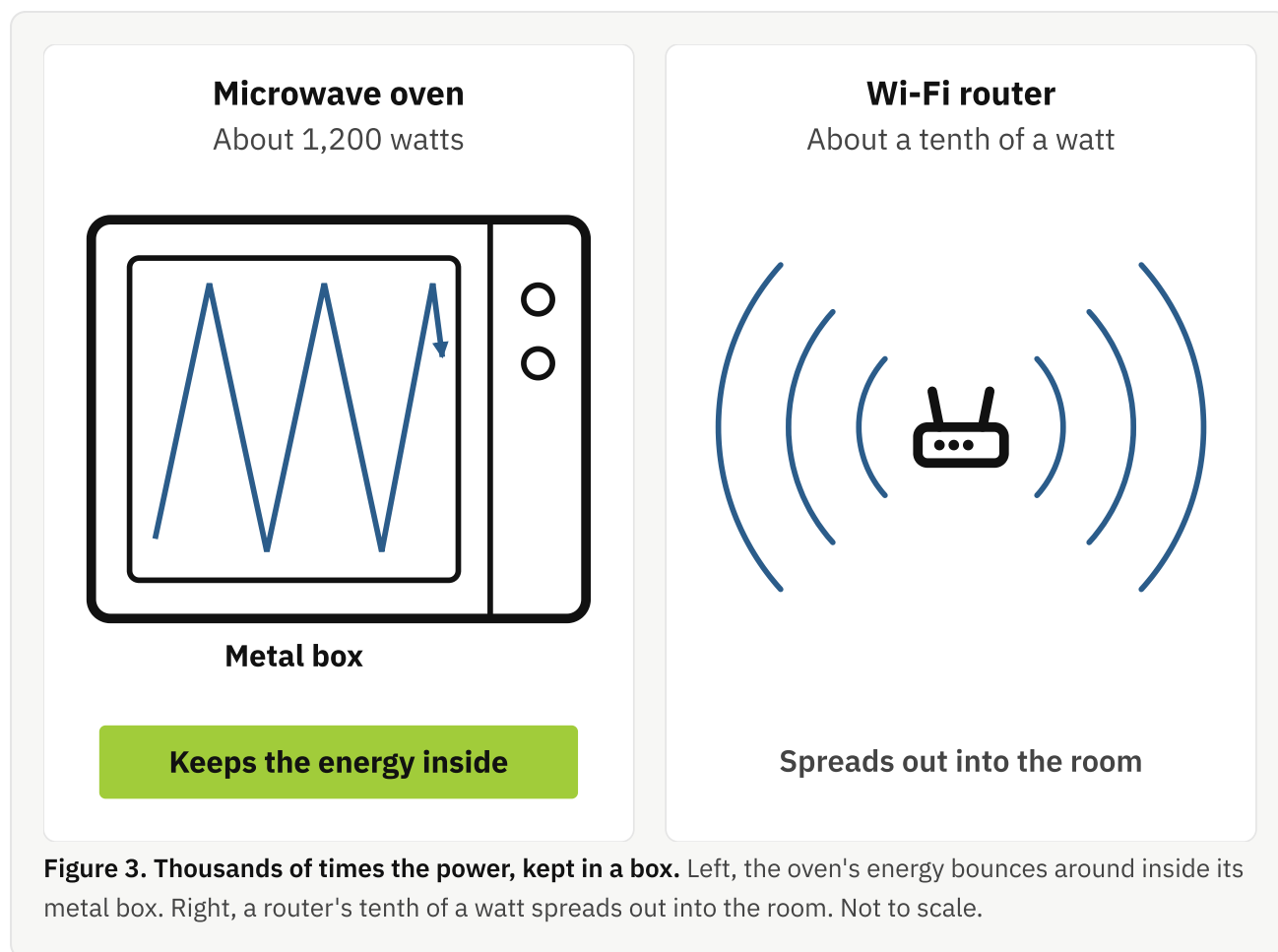
● \$120: twelve thousand pennies

Figure 2. The same four powers, drawn two ways. (a) On an ordinary ruler the oven fills the width. The router, phone and Wi-Fi cap are too thin to see. (b) The same four as money: if the router were one penny, the microwave oven would be \$120.

Scales and Ratios, Explained shows how these power numbers work.

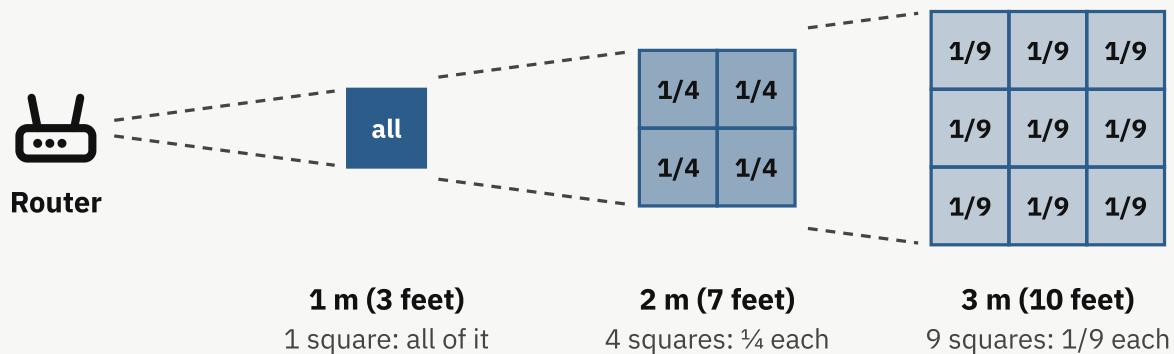
THE POWER

A kitchen microwave oven uses about 1,200 watts. That's thousands of times more than a router. And the oven's metal box keeps the energy inside.



Why distance matters so much

A router's signal spreads out as it travels. The same power has to cover a bigger and bigger area.



Twice as far: a quarter each

Figure 4. The same power, spread over more area. Twice as far away, the power covers four squares. So each square gets a quarter. Not to scale.

Scientists call this the inverse-square law. Step twice as far away, and you get a quarter of the power. Step four times as far, and you get a sixteenth.

DISTANCE

Walls and furniture soak up some of the signal too. So in a real home, it fades even faster.

No walls



Through a wall



Figure 5. Walls soak up signal too. Top, open air. Bottom, the same distance through a wall: less reaches the far side. Not to scale.

KEITH'S NOTE

“Walls, floors, furniture, and distance all chew up the radio signal between you and the box on the wall, and the further away you sit, the more gets chewed up.”

Keith Parsons, *Fix Your Own Wi-Fi* (WLAN Pros, in preparation, 2026), chapter 5

DISTANCE

How far below the limit?

Now compare a router with the safety limit for the public.

Picture a router sending nonstop, with nothing in the way. At 1 m (3 feet), it reaches about a thousandth of the limit.

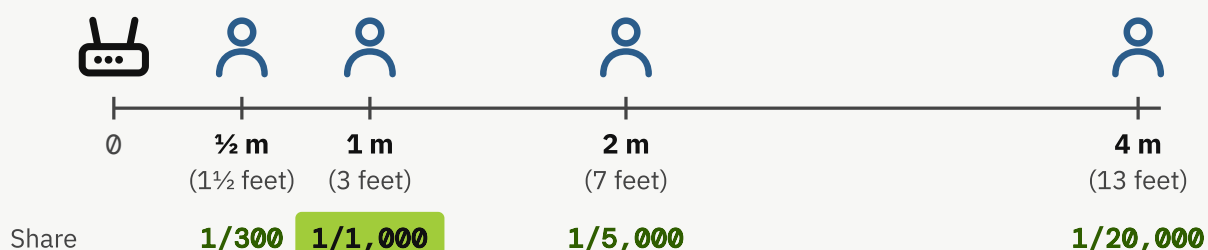


Figure 6. How much of the public limit a router reaches. A router sending nonstop, with no walls in the way. Distances to scale.

Real routers send in short bursts, only when there's data to move. So real levels are lower still.

The math:
sending nonstop



A real router:
short bursts

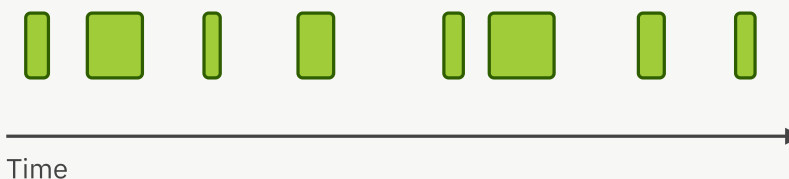


Figure 7. A real router sends in short bursts. Top, the math on this page. Bottom, a real router, sending only when there's data to move. Not to scale.

Even the strongest router the rules allow stays well under the limit at arm's length.

How the limits are set

The limits start with the level of radio energy that warms the body. Then they add a big safety margin.

Scientists found the level that warms the whole body by about 1 °C (2 °F).

For workers who know about the exposure, the limit is a tenth of that level. For everyone else, it's a fiftieth.

Warms the body

about 1 °C (2 °F) warmer

Workers

a tenth

Everyone else

a fiftieth

Figure 8. The safety margin. The public limit is a fiftieth of the level that warms the body. Each bar is drawn to scale.

The limit also assumes you're in the signal all day, every day, with no end.

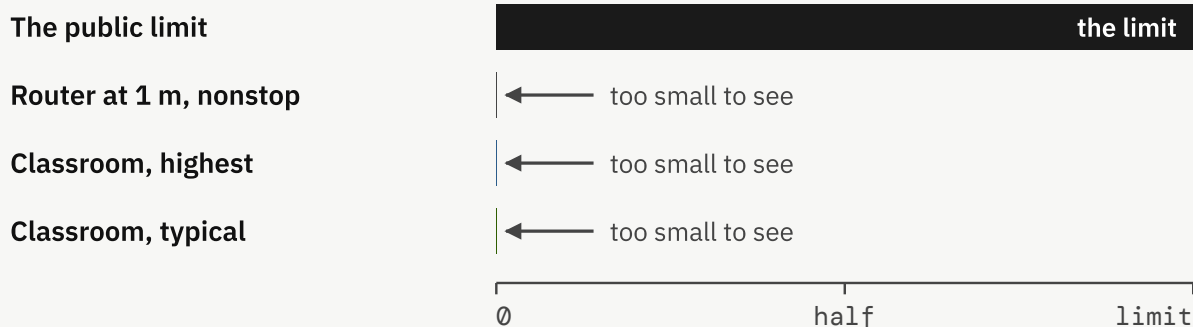
Phones held to your head are a different question from Wi-Fi. They get their own test, and this guide doesn't cover them.

What was measured, and what agencies say

Math shows the most a router could reach. Australia's radiation agency went into schools to measure what was there.

They measured Wi-Fi in 23 schools. In a typical classroom, Wi-Fi was about a millionth of the limit. That's far below the math on page 8.

(a) On an ordinary ruler



(b) The same shares as a walk, if the limit were 1 km

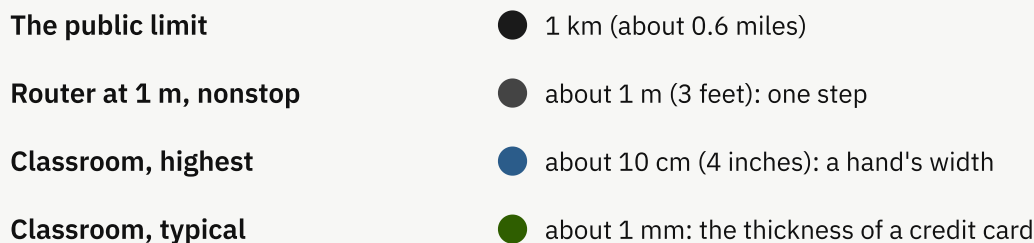


Figure 9. Figured and measured, against the public limit. (a) On an ordinary ruler, only the limit shows. (b) The same shares as a walk: if the limit were 1 km, a typical classroom would be about 1 mm. Classroom values are rounded, so they are shown as "about."

The UK's health agency tested schools too. It found Wi-Fi exposure was small compared with the limits.

What the agencies say

UK HEALTH SECURITY AGENCY

“There is no consistent evidence that exposure to radio signals from Wi-Fi devices adversely affects the health of the general population.”

UKHSA, Wi-Fi radio waves and health, updated 19 February 2025

WORLD HEALTH ORGANIZATION

“To date, and after much research performed, no adverse health effect has been causally linked with exposure to wireless technologies.”

WHO, Radiation: 5G mobile networks and health, 27 February 2020

In plain words: after a lot of research, they have not found that Wi-Fi within the limits harms people. They keep watching new studies.

Four things people get wrong

Each of these comes up often. Each one has a simple answer.

MYTH A router puts out about as much power as a microwave oven.

FACT The typical oven uses 1,200 W. A router uses thousands of times less. And the oven's metal box keeps the energy inside.

MYTH Turning Wi-Fi off at night makes a big difference.

FACT Across a room, a router reaches a tiny sliver of the limit. Health agencies say no extra steps are needed. Turning it off is still your choice (page 13).

MYTH Newer Wi-Fi raised the power.

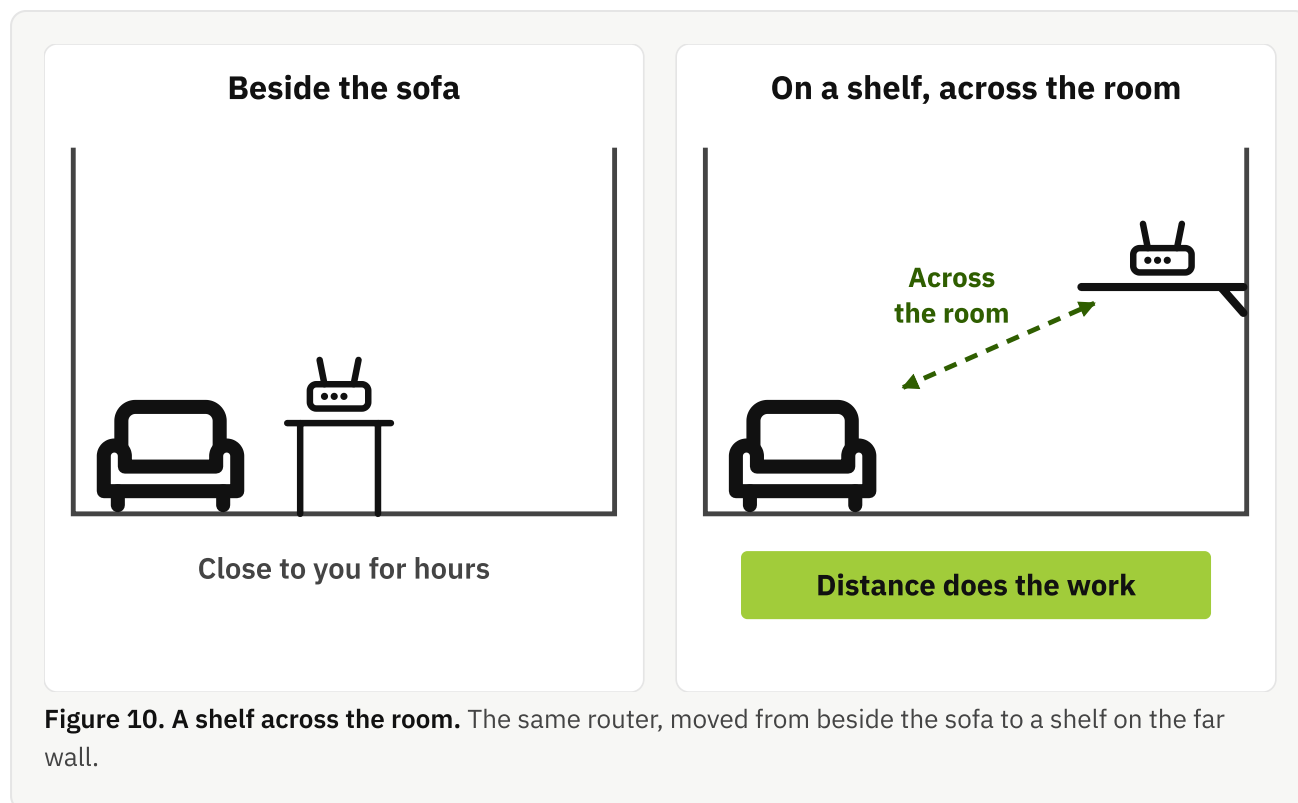
FACT Power rules are set for each band of radio frequencies, not for each version of Wi-Fi. A new version doesn't get a bigger allowance.

MYTH Nobody has studied it.

FACT Health agencies have studied it a lot. Some even measured Wi-Fi in schools (page 10).

If you want less exposure anyway

Health agencies say no extra steps are needed. Some people want to take steps anyway. For Wi-Fi, distance does almost all the work.



YOUR CHOICE

Keep a little distance from the router.

Four times farther away means a sixteenth of the power.

Put the router where nobody sits right beside it for hours.

A shelf across the room does more than any gadget.

Turning Wi-Fi off at night is your choice.

It isn't needed. If you do it, know what stops working.

CAUTION

Turning Wi-Fi off at night stops what depends on it

Security cameras and video doorbells stop. So does anything else that uses your Wi-Fi. They start again when it comes back on. *Cameras, Doorbells and Baby Monitors, Explained* covers what each kind still does offline.

Other guides in this series

Scales and Ratios, Explained covers power and why distance costs so much signal. *Mesh, Extenders and Wired Access Points, Explained* covers where to put Wi-Fi gear in a home.

SOURCES

Where these facts come from

Checked 28 September 2026. Agency pages are quoted as they read that day, with the date each one carries.

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- WHO, "Radiation: 5G mobile networks and health," questions and answers, 27 February 2020: heating as the main effect; no adverse health effect causally linked
- US Code of Federal Regulations, 47 CFR 1.1310 (FCC public exposure limit of 1.0 mW/cm² at Wi-Fi frequencies, 30-minute average, for continuous exposure); 47 CFR 15.247 and 15.407 (Wi-Fi power caps set by band; 1 W and 6 dBi at 2.4 GHz)
- ICNIRP, "Guidelines for Limiting Exposure to Electromagnetic Fields (100 kHz to 300 GHz)," *Health Physics*, 2020: 4 W/kg and a rise of about 1 °C; reduction factors of 10 for workers and 50 for the public
- 3GPP TS 38.101-1 (ETSI TS 138 101-1 V17.5.0, 2022), Table 6.2.1-1: default phone power of 23 dBm (0.2 W)
- US Department of Energy, "DOE Microwave Oven Active Mode Test Procedure Investigations," September 2010: "a typical 1,200 watt (W)-rated microwave oven"
- FDA, "Microwave Ovens," content current as of 12 October 2023: microwaves reflect off the oven's metal interior
- CDC, "Non-ionizing Radiation," 15 June 2026: not enough energy to remove electrons; the dividing line in the ultraviolet; effects of too much UV
- K. Karipidis and others, "Exposure to Radiofrequency Electromagnetic Fields From Wi-Fi in Australian Schools," *Radiation Protection Dosimetry* 175 (2017) 432: 23 schools; typical classroom Wi-Fi of the order of 10⁻⁴% of the guidelines
- Figure 4 and 6 math: 0.1 W spread evenly, sending nonstop, against 10 W/m². At 1 m, $0.1 \div (4 \times \pi \times 1^2) = 0.008 \text{ W/m}^2$, about 1/1,257 of the limit. The strongest 2.4 GHz case (1 W at 6 dBi) is about 1/32 at 1 m.
- Keith Parsons, *Fix Your Own Wi-Fi* (WLAN Pros, in preparation, 2026), chapter 5; Keith Parsons, LinkedIn, 2026

About the author

Keith Parsons, CWNE #3, has designed, installed and troubleshot Wi-Fi for over 25 years. He runs Wireless LAN Professionals and the WLPC conferences.