STARTER GUIDE

VHF VS UHF: WHAT'S THE DIFFERENCE?

Most new hams start on two bands: 2 meters, which is VHF, and 70 centimeters, which is UHF. Both are for local contacts, and most handhelds cover both. The differences are in where each one works best.

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THE SHORT VERSION

- VHF runs from 30 to 300 MHz and UHF from 300 MHz to 3 GHz. Both travel mostly in straight lines, so they're for local contacts and repeaters.
- As a rule of thumb, VHF reaches a little farther over open ground and through trees, and UHF does better in cities and inside buildings.
- Technicians have full privileges on every ham band above 50 MHz, so you can use both.
- Pick the band your local repeaters and nets use. A dual-band radio covers both.

The ham bands on each side

Hams name bands by their wavelength. Six of them sit in the VHF and UHF range.

Ham bands in the VHF and UHF range

BAND	FREQUENCIES	SIDE	WHAT IT'S USED FOR
6 m	50–54 MHz	VHF	Called the magic band: mostly local, with occasional openings across the country
2 m	144–148 MHz	VHF	FM repeaters, simplex, nets and satellites
1.25 m	222–225 MHz	VHF	Fewer radios and repeaters, so it's often quiet
70 cm	420–450 MHz	UHF	FM repeaters, simplex, satellites and DMR
33 cm	902–928 MHz	UHF	Shared with other devices; some repeaters, and Meshtastic in licensed mode
23 cm	1240–1300 MHz	UHF	Specialized radios, experiments and some repeaters

TECHNICIANS Full privileges, all modes, on every band in this table.

Which goes farther, and where

- Both travel mostly in straight lines, so height matters more than power. A handheld on a hilltop beats a powerful radio in a valley.
- VHF waves are longer. Over open ground, hills and woodland they bend a little more around obstacles and lose less in trees, so 2 meters often reaches a bit farther.
- UHF waves are shorter. They slip through windows and gaps between buildings more easily, so 70 centimeters often does better in cities and indoors.
- These are rules of thumb. Your local terrain and the repeaters around you matter more than the band.

Antennas

- Antennas scale with wavelength. A quarter-wave antenna is about 19 inches long for 2 meters and about 6 inches for 70 centimeters.
- The antenna on most handhelds is built to work on both bands.
- Coax cable loses more signal at UHF than at VHF, so a long cable run hurts 70 centimeters more. Use good, low-loss coax for long runs.
- A better antenna often helps more than more power. A longer antenna on a handheld is a cheap upgrade.

Repeaters and calling frequencies

A repeater listens on one frequency and transmits on another. The gap is the offset, and it differs by band. On simplex, radio to radio, each band has a calling frequency.

Offsets and calling frequencies

BAND	REPEATER OFFSET	SIMPLEX CALLING FREQUENCY
2 m	600 kHz: minus below 147 MHz, plus from 147 MHz up (most areas)	146.520 MHz
70 cm	5 MHz, plus or minus by area	446.000 MHz

Most repeaters also need a CTCSS tone before they'll relay you. Repeater listings give the output frequency, the offset and the tone.

Good to know

- Most handhelds, like the Baofeng UV-5R, are dual-band: they cover both 2 meters and 70 centimeters.
- The FM satellites use both bands. SO-50 listens on 145.850 MHz, on 2 meters, and transmits on 436.795 MHz, on 70 centimeters, so you need a dual-band radio.
- GMRS and FRS radios are UHF too, around 462 and 467 MHz, but they're separate services. A ham handheld can listen there but isn't legal to transmit on them.

- NOAA Weather Radio is VHF, broadcasting between 162.400 and 162.550 MHz, and most ham handhelds can receive it.

Which should you start with?

1. Look up the repeaters and nets near you. Use the band they're on; in many areas that's both.
2. Program a few of each into a dual-band radio.
3. Listen from home and from the places you go most, and keep the ones you hear well.

> Mostly indoors or in town? Try 70 centimeters first. Out in the country, 2 meters often reaches farther.

TRY IT **How nets work** cqdeck.com/learn/how-nets-work **Radio setup guides** cqdeck.com/radios

Sources

FCC rule 97.301: authorized frequency bands https://www.ecfr.gov/current/title-47/chapter-I/subchapter-D/part-97/subpart-D/section-97.301

ARRL band plan https://www.arrl.org/band-plan

AMSAT: FM satellite frequencies https://www.amsat.org/fm-satellite-frequency-summary/

NOAA Weather Radio https://www.weather.gov/nwr/