



National Radio Astronomy Observatory

www.nrao.edu

quietskies@nrao.edu

Be a Quiet Skies Detective!



Radio astronomers study the radio waves produced by cosmic objects--objects like comets, exploding stars, and even black holes in distant galaxies! Astronomers need gigantic radio telescopes to detect these signals from space. The Green Bank Telescope in West Virginia (above) is so big you could fit two football fields in its dish!

Astronomers use radio telescopes both day and night to study the universe. Regular telescopes work only at night because the sun makes the daytime sky too bright. But radio telescopes see radio waves, not light. And the sky is not nearly so bright in the radio.

But, did you know that radio waves transmitted by things like your electronic games, your remote control toy or your microwave oven can also be detected by radio telescopes? And these signals are **much, much stronger** than the signals we detect from space. Radio Astronomers call man-made radio waves “radio frequency interference” or RFI. RFI is the radio equivalent of “light pollution”! Where optical telescopes need **dark skies**, we need **quiet skies**!

At the National Radio Astronomy Observatory we work hard to reduce RFI levels and keep our skies quiet around our giant radio telescopes. We don't allow microwave ovens, digital cameras, or cell phones near the telescopes. We don't allow “game boys” or remote control toys either!

You might think that makes life pretty dull at a radio observatory, but it's not so bad—we can tune in to the Universe!

So, do you think **your** skies are quiet enough for radio telescopes? Why don't you find out? Use a simple AM radio and become a Quiet Skies Detective. Let us know what you learn at www.quietskies.org

Make and detect RFI!

What you need:

A radio - preferably a portable one - that has an AM and FM dial.
A small battery (if you raid the flashlight - don't forget to put it back!)
A piece of wire

What to do:

Turn on your radio. Choose AM and find a place low down on the dial where there are no stations.

What do you notice? Can you hear anything? _____

Record the Dial setting: _____ kHz.

Tape one end of the wire (the end needs to be bare) to one end of the battery. Or just hold it there. Tap the other end of the wire to the other end of the battery. When do you hear static from RFI??

Try an experiment: Change the dial on the radio and repeat the battery experiment. Is the interference better or worse?

Dial Setting (kHz)	RFI Noise (1 = soft, 5 = loud)

Try the FM dial.

Dial Setting (MHz)	RFI (1 = soft, 5 = loud)

How does the RFI level compare between the AM and FM bands on the radio? Maybe you have discovered why FM was invented! Want to know more? Visit: <http://www.howstuffworks.com/radio.htm>

Look for Sources of RFI!

This is where it is nice to have a portable radio. Turn it on (AM or FM – which is best?) and listen as you try different sources.



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