

ConceptTest 34.4

Radio Antennas

If a radio transmitter has a vertical antenna, should a receiver's antenna be **vertical** or **horizontal** to obtain the best reception?

- 1) **vertical**
- 2) **horizontal**
- 3) **doesn't matter**

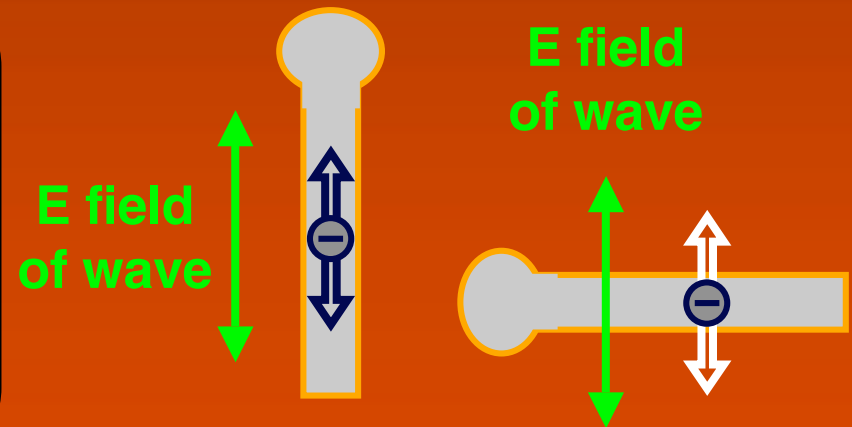
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- 1) **vertical**
- 2) **horizontal**
- 3) **doesn't matter**

If a wave is sent out from a vertical antenna, the electric field oscillates up and down. Thus, the receiver's antenna should also be vertical so that the arriving electric field can set the charges in motion.



ConceptTest 34.5

Heat Insulation

Imagine you are an alien from another planet with *infrared eyes*.
What do you see when you look around the room?

- 1) **Bright spots where the bodies are and dark elsewhere.**
- 2) **Dark spots where the bodies are and bright elsewhere.**
- 3) **The same as what we see, only everything looks red.**
- 4) **The same as what we see, except that red is invisible.**

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Bodies are sources of heat and therefore **emit infrared radiation**.
An alien with an instrument to detect infrared would see these **sources as bright spots**.

Infrared photo of a building to check the heat insulation – where are the problem spots in this case?



Question

Suppose that a beam of radiation is polarized with the E-field in the vertical. The wave moves through a polarizing grid of wires most easily when:

- 1) The wires are vertical, parallel to the E-field
- 2) The wires are horizontal, perpendicular to the E-field

Answer

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- 1) The wires are vertical, parallel to the E-field
- 2) The wires are horizontal, perpendicular to the E-field

If the E-field is parallel to the wires, then the wave can more easily put into motion the free electrons in the rod; the power is effectively transferred to the electrons and the wave is absorbed.

