

## Laws of Nature Affecting Tower Placement

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Dear Reader:

The following document was created from the MTAS website ([mtas.tennessee.edu](https://www.mtas.tennessee.edu)). This website is maintained daily by MTAS staff and seeks to represent the most current information regarding issues relative to Tennessee municipal government.

We hope this information will be useful to you; reference to it will assist you with many of the questions that will arise in your tenure with municipal government. However, the *Tennessee Code Annotated* and other relevant laws or regulations should always be consulted before any action is taken based upon the contents of this document.

Please feel free to contact us if you have questions or comments regarding this information or any other MTAS website material.

Sincerely,

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The physics of radio signal transmission cannot be altered by the mere adoption of man-made laws and ordinances. Radio signals obey the physical laws of the universe, and government can no more repeal or amend these laws than it can the law of gravity.

One of the physical laws governing the placement of telecommunications towers is that antennas that are placed high in the sky tend to transmit and receive much better than those placed low to the ground. Cities that (inadvertently or otherwise) limit the placement of antennas to low-lying areas may effectively be prohibiting telecommunications towers in their community and inviting legal challenge.

From the perspective of the telecommunications provider, the ideal locations for telecommunications towers include:

- The tops of hills and mountains;
- Atop high-rise office buildings, apartments, water towers, etc.; and
- On existing telecommunications towers, if space is available.

Placement in the downtown area of a community has unique advantages and disadvantages that the tower owner must consider. The obvious advantage is that the central business district is where the city's tallest buildings are likely to be located. They can be used to achieve the altitude needed for radio signal transmission and reception. On the downside, buildings in a downtown area can cause wave reflection that results in poor signal quality. Additionally, certain commercial and industrial activity in a downtown area can contribute to electromagnetic interference of radio signals.

When determining which areas of towns are suitable for the placement of telecommunications facilities, city planners would do well to include locations where the physical environment favors the transmission and reception of radio signals. Conversely, limiting telecommunications towers to areas where radio signal transmissions or reception is weak may invite legal challenge.

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