

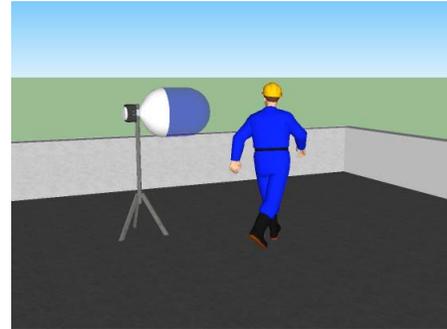
# Microwave Point-to-Point Antennas and RF Safety

**Sitesafe's guidance is to not touch microwave antennas, or place any part of your body into or directly in front of them, i.e. within two feet of the antenna face.**

There continues to be misunderstanding on RF safety issues around point-to-point microwave dish and panel antennas. For the purpose of this analysis we consider microwaves to be 2 GHz and above.

In most cases there is no location, even within a few inches of the antenna face, which exceeds exposure limits.

**For antennas where this is not the case, RF safety measures should be implemented.**



Microwave antennas have very high gains and hence are very directive, almost all the energy goes straight forward. The actual RF power applied to the antenna is typically very low. Almost always transmit power is less than 1 watt and usually around 1/10th of a watt which can be described as 100 mW or 20 dBm. **Satellite uplink (transmit) dishes that point toward the sky can have higher power and may require RF safety measures.**

A 2010 IEEE paper<sup>1</sup> calculated the maximum input power for an antenna to remain below FCC General Public exposure limits at any distance greater than 1 wavelength (6 inches at 2 GHz and less at higher frequencies). Because power is spread over the antenna area this shows that smaller dishes produce higher power densities given the same input. **Areas between the feed horn and the dish could exceed limits, don't reach into a dish.**



Dishes 3 feet in diameter or greater can have an input of up to 1 Watt with no areas exceeding FCC General Public exposure limits. The more common 1 foot dish can have input powers up to 100 mW and remain below limits. Square antennas can have slightly higher power for their size (width) and remain below limits.

Practically this means that exposure from dishes greater than 1' in diameter will be below limits, no matter how close they are approached. For operational as well as safety reasons, it is recommended that no one puts themselves directly in front of the aperture of any antenna. Obstructing the path will interrupt the communications link.

**One important note:** the RF exposure from a microwave point-to-point antenna must be considered with respect to other antennas nearby. A dish on its own may be safe but next to an array of mobile wireless antennas may contribute to creating areas in close proximity of the antennas that exceed limits.

For more information and specific site assessment, contact Sitesafe.

Matthew J Butcher, PE  
VP Engineering & Development



<sup>1</sup> Kizer, George; , "Microwave antenna near field power estimation," *Antennas and Propagation (EuCAP), 2010 Proceedings of the Fourth European Conference on* , vol., no., pp.1-5, 12-16 April 2010  
URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5505204&isnumber=5504894>