**ABSTRACT**

**CELL JAMMER**

A **cell jammer** is an instrument used to prevent [cellular phones](http://en.wikipedia.org/wiki/Mobile_phone) from receiving signals from [base stations](http://en.wikipedia.org/wiki/Base_station). When used, the jammer effectively disables cellular phones. These devices can be used in practically any location, but are found primarily in places where a phone call would be particularly disruptive because silence is expected.

History

The rapid proliferation of cell phones at the beginning of the 21st century to near ubiquitous status eventually raised problems such as their potential use to invade privacy or contribute to rampant and egregious academic cheating. In addition public backlash was growing against the intrusive disruption cell phones introduced in daily life. While older analog cell phones often suffered from chronically poor reception and could even be disconnected by simple interference such as high frequency noise, increasingly sophisticated digital phones have led to more elaborate counters. Cell phone jamming devices are an alternative to more expensive measures against cell phones, such as [Faraday cages](http://en.wikipedia.org/wiki/Faraday_cage), which are mostly suitable as built in protection for structures. They were originally developed for law enforcement and the military to interrupt communications by criminals and terrorists. Some were also designed to foil the use of certain remotely detonated explosives. The civilian applications were apparent, so over time many companies originally contracted to design jammers for government use switched over to sell these devices to private entities. Since then, there has been a slow but steady increase in their purchase and use, especially in major metropolitan areas.

## Operation

As with other [radio jamming](http://en.wikipedia.org/wiki/Radio_jamming), cell phone jammers block cell phone use by sending out [radio waves](http://en.wikipedia.org/wiki/Radio_wave) along the same frequencies that cellular phones use. This causes enough interference with the communication between cell phones and towers to render the phones unusable. On most retail phones, the network would simply appear out of range. Most cell phones use different bands to send and receive communications from towers (called frequency division [duplexing](http://en.wikipedia.org/wiki/Duplex_(telecommunications)), FDD). Jammers can work by either disrupting phone to tower frequencies or tower to phone frequencies. Smaller handheld models block all bands from 800MHz to 1900MHz within a 30-foot range (9 meters). Small devices tend to use the former method, while larger more expensive models may interfere directly with the tower. The radius of cell phone jammers can range from a dozen feet for pocket models to kilometers for more dedicated units. The TRJ-89 jammer can block cellular communications for a 5-mile (8 km) radius.

Less energy is required to disrupt signal from tower to mobile phone, than the signal from mobile phone to the tower (also called base station), because the base station is located at larger distance from the jammer than the mobile phone and that is why the signal from the tower is not as strong.

Older jammers sometimes were limited to working on phones using only analog or older digital mobile phone standards. Newer models such as the double and triple band jammers can block all widely used systems ([CDMA](http://en.wikipedia.org/wiki/CDMA), [iDEN](http://en.wikipedia.org/wiki/IDEN), [GSM](http://en.wikipedia.org/wiki/GSM), et al.) and are even very effective against newer phones which hop to different frequencies and systems when interfered with. As the dominant network technology and frequencies used for mobile phones vary worldwide, some work only in specific regions such as Europe or North America.

**Components of a jammer include:**

### Antenna

Every jamming device has an antenna to send the signal. Some are contained within an electrical cabinet. On stronger devices, antennas are external to provide longer range and may be tuned for individual frequencies.

### Circuitry

The main electronic components of a jammer are:

* Voltage-controlled oscillator — Generates the radio signal that will interfere with the cell phone signal
* Tuning circuit — Controls the frequency at which the jammer broadcasts its signal by sending a particular voltage to the oscillator
* Noise generator — Produces random electronic output in a specified frequency range to jam the cell-phone network signal (part of the tuning circuit)
* RF amplification (gain stage) — Boosts the power of the radio frequency output to high enough levels to jam a signal

### Power supply

Smaller jamming devices are battery operated. Some look like cellphones and use cellphone batteries. Stronger devices can be plugged into a standard outlet or wired into a vehicle's electrical system.

The jammer's effect can vary widely based on factors such as proximity to towers, indoor & outdoor settings, presence of buildings and landscape, even temperature and humidity play a role.

There are concerns that crudely designed jammers may disrupt the functioning of medical devices such as [pacemakers](http://en.wikipedia.org/wiki/Artificial_pacemaker).However, like cellphones, most of the devices in common use operate at low enough power output (<1W) to avoid causing any problems.

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