

by Marlene Orton

## What it is

The portable cellular telephone, cell phone or mobile telephone, which some still insist is the proper reference, is essentially a small portable radio.

Analog cellular is the oldest technology for cellular calls. Analog transmits calls over continuously variable radio waves similar to FM radio. It's available across the continent but provides limited data services and networks are often easily plugged when call volume rises.

Digital cellular is encoded so voices are converted to digital 1s and 0s for transmission, then converted back to voices at the receiving end. Digital coverage is increasing rapidly across Canada, but may still not work in rural areas and on some highways. Call quality is improved over analog with less static. Network capacity is also increased. Other advantages include better privacy, extended battery life and more features such as caller ID, short text messaging and message waiting indicators and wireless Internet access.

## How they work

A city or region is divided into small cells, usually around 25 square kilometres shaped in a hexagon. Every cell has a base station with a tower, which uses low-power transmitters, and a small building containing the radio equipment. Cell phones are also equipped with low-power transmitters.

However, transmissions from a base station are limited to the mobile phones within its cell boundaries. To solve this problem, a city will have a lot of base stations and hundreds of towers. So, as a mobile phone moves from one cell to the next it continuously catches transmission signals. Understandably, service in areas of Canada with sparse population is spotty.

Each cellular system carrier also runs a central mobile telephone switching office that handles all phone connections to the normal land-based phone system and controls all base stations in the region.

## Service and hardware

The limited coverage explains why some carriers, such as Bell Canada, which controls phone systems in Eastern Canada – mainly in Ontario and Quebec – partners with companies such as Telus for coverage in Western Canada to produce a more complete national cellular system.

When choosing a product, telecommunications purchasers are urged to strongly consider the:

- travel requirements of individual users,
- network area coverage (the local area serviced) offered by the telecom carriers, and
- roaming charges – the fee a local carrier charges for phone time utilized from out-of-area carriers.

Canada's telecom carriers include: Bell Mobility, Island Tel, NB Tel Mobility, Rogers/AT&T Wireless, SaskTel Mobility, Thunder Bay Mobility, NewTel Mobility, MTS Mobility, Fido and MTT.

Cell phone models include: Audiovox, Motorola, Nokia, Ericsson, Kyocera, Mitsubishi and Panasonic.

## Cell help

A comprehensive consumer website, *Compare Cellular*, offers a coast-to-coast comparison of cellular phone plans and offerings by the carriers. ([www.comparecellular.com](http://www.comparecellular.com))

## More about cell phones

### Decoding cell talk

Dual-band phone: switches automatically between analog and digital whenever needed providing the best of both worlds.

Tri-mode: rising in popularity for people who travel a lot and require the international GSM service for Europe and Asia.

Digital network standards:

- a) CDMA: Code Division Multiple Access in digital communication technology for PCS (personal communications service), a wireless phone service similar to cell phone service but focused more on a bundling of personal services such as paging, caller ID and email.
- b) TDMA: Time Division Multiple Access is used as the access technology for Global System for Mobile (GSM) communications. However, GSM systems use encryption to make phone calls more secure and operate in the 900-MHz and 1800-MHz bands in Europe and Asia, and in the 1900-MHz band in the United States. It is used in digital cellular and PCS-based systems.
- c) GSM: Global System for Mobile communications is considered the most broadly implemented digital wireless standard in the world with more than 400 million customers in at least 150 countries.

### Feeling secure

The wireless industry has developed technology to make life more difficult for eavesdroppers and phone-number thieves. Digital cellular and PCS transmissions require sophisticated equipment in order to listen in on calls. CDMA is regarded as the most secure technology and has been used by the military for secure phone calls. Analog phone signals can be monitored by anyone with a radio scanner.

### The "other" SARs

SAR (specific absorption rates) is the measure used by clinical researchers studying the potential relationship between wireless phones and cancer. SAR monitors the amount of radiation absorbed by human tissue when using a cell phone. There is no known link to cancer despite many studies and ongoing controversy.

The US Federal Communications Commission requires SAR data on newly manufactured phones in the United States and forbids the sale of handsets that exceed government SAR limits.

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