

Mobile communications

What it is and what it can do

GSM (Global System for Mobiles) is the technology used for the majority of the mobile phones in Europe, although some older analogue systems do still exist in a few countries. GSM was designed to provide good quality mobile voice services and is a significant improvement on the analogue systems that preceded it. It also offers greatly improved security. As a number of prominent public figures learned to their cost, it was very easy to intercept analogue mobile phone transmissions and eavesdrop on private conversations. The coding schemes used on GSM make it very much harder to do this.

A further benefit for the international traveller is that the same system is used throughout Europe and in many other countries around the world. The principal exceptions are North and South America and parts of the Far East, where there are relatively few GSM systems although the number is growing. A complication is that not all GSM networks use the same radio frequencies and, unless you buy a 'dual-band' phone¹, you will not be able to use all of them. However, you can use your phone in almost any country with GSM networks, although call charges can be surprisingly high when abroad².

Most GSM networks also offer a voice mail facility, so that people can leave messages for you if your phone is busy, switched off, or out of range of a transmitter. To support this facility the GSM designers added the ability to send short **text messages** of about 140 characters (this is known as SMS). The original idea was that the network could automatically send you a text message telling you that you had messages in your voice mailbox. However, any GSM phone can send text messages to any other GSM phone. This has now become a major form of communication in some markets, especially amongst younger users, and has encouraged many network operators to develop simple text-based information services giving, for example, traffic information and weather reports.

Seeing the popularity of text messaging, the industry developed a Wireless Applications Protocol (**WAP**) to deliver more sophisticated information services to the display screens of GSM phones. The idea was that users could surf cut-down versions of Internet web pages using their mobile phones. WAP based services were launched in 2000 but, so far, have only had limited success.

It has always been possible to use a modem to connect a GSM phone to a computer and access the Internet, but the data rate of 9.6 kbit/s³ is less than a fifth of what can be delivered by the fixed network and is unacceptably slow for regular use. The 3rd Generation (**3G** or UMTS⁴) networks that are being planned around Europe are expected to make mobile data communication (e.g. Internet access) a practical reality.

Key messages for SMEs

- GSM mobiles provide the ability to keep in touch with your office wherever you are.
- As with all radio systems, the coverage can be patchy. Check how well the service providers cover the areas in which you work and travel before joining a service.
- There is a bewildering array of tariff packages. Estimate how many minutes of peak and off-peak calls you are likely to make and compare the various offers.
- Messaging services and information services are available on GSM phones, and are relatively cheap.
- Although GSM can only handle low-speed data, the data capabilities of GPRS will make the mobile phone a more useful tool for the travelling worker.

¹ To use a GSM phone outside Europe, you may need a 'tri-band' phone. However you can rent one for the duration of your visit. Your travel agent or airline may be able to arrange this for you.

² When using your mobile phone abroad, you will also be charged for incoming calls. The rationale for this is that the person making the call should only have to pay for calling a mobile phone and that you should pay for forwarding the call to wherever you happen to be in the world.

³ You do not need to understand these figures, other than to use them as a comparison for the speed of communication. A PC connected to an ordinary phone line can send data at the rate of about 56 000 bits each second (i.e. 56 kbit/s).

⁴ UMTS – Universal Mobile Telecommunications System

In the meantime, operators are introducing a number of interim solutions, sometimes known as 2.5G. One such is **HSCSD** (High Speed Circuit Switched Data), which will allow data rates of between about 20 and 60 kbit/s. This service is still circuit switched, which means that you pay for the time you are connected, irrespective of whether you are actually transmitting or receiving data. It is therefore a relatively inefficient (i.e. expensive) way of using the network for data and has not been widely offered in Europe. The main operator offering HSCSD is Orange.

An alternative, and more widely adopted solution, is the General Packet Radio System (**GPRS**). This is packet-based, rather than circuit switched, and can offer data rates up to a theoretical maximum of 171.2 kbit/s. However, you share this with everybody else within range of the mobile transmitter, so the practical maximum rates will be significantly lower. Because it is packet-based, you only pay when you are transmitting or receiving data. It makes much more efficient use of the GSM radio network and is therefore expected to be cheaper than HSCSD. For the user, the main advantages are the increased data speed and the fact that it is an always-on service. The main disadvantage is that most operators charge for the amount of data that you send and receive. This means that, unlike voice calls, it is relatively difficult to work out how much calls are costing before you receive the bill.

The first GPRS services were launched at the end of 1999 and most major mobile operators now offer the service, although it may not be available to all customers.



Handsets for mobile internet services (courtesy of Nokia)

Advantages and Disadvantages

GSM is now a major access technology and, in some countries, there are more mobile than fixed-line phones. It has the ability to send short messages and carry slow-speed data. However, it still has severe limitations for anything other than voice or very basic information services. It also suffers from the usual radio problems of a finite spectrum and reception dead areas.

The GSM system is used throughout Europe and in many other countries around the world. However, not all GSM networks use the same radio frequencies and, unless you buy a multi-band phone you will not be able to use all of them. You can use your phone in almost any country with GSM networks, although it can be a surprisingly expensive experience. Not only are the rates for international calls significantly higher than those on the fixed network, you are also charged for the international leg of incoming calls received when you are abroad and call charges within another country can be high.

HSCSD overcomes some of the data limitations but is expensive to use and is not widely available. GPRS provides a higher bandwidth for data communication (similar to that provided over a phone line) and can be reasonable in cost compared to mobile voice calls. It is now widely available around Europe.

Both HSCSD and GPRS suffer from the same coverage problems as GSM and are therefore unlikely to be universally available in sparsely populated areas with mountainous terrain.

There is some concern that the radio waves emitted by mobile phone handsets can damage the brain. Scientific studies are inconclusive but many people who use their phones a lot use 'hands-free' adapters that keep the actual transmitter a metre or so away from the head.

What to buy

Most countries have several GSM networks and competition between them is intense. Some suppliers sell handsets at heavily discounted prices on condition that you sign up for their service for a year or more. There is a bewildering array of tariff packages on offer. In general, the lower the monthly rental, the higher the call charges. A further complication is that many of these packages include a number of minutes of 'free' calls each month. There are also rent-free prepayment packages, where you buy, say €20 worth of calls in advance and 'top up' your credit whenever it is running low.

When choosing a mobile phone, you need to think carefully about how the phone is going to be used. If it is going to be used heavily, you should look carefully at the amount of 'standby time' and 'talk time' that the battery will provide. If you are likely to use it a lot in your car, you should use a 'hands-free' adapter; in many countries, it is against the law to use a mobile phone whilst driving unless you use a hands-free system.



*Hands-free headset
courtesy of Plantronics*

If you want to hook up your computer to your mobile phone, you should buy a mobile phone with a built-in modem. Because of the limitations of GSM, these only work at about a fifth of the speed of an ordinary modem, although they are significantly faster when connected via GPRS or HSCSD. You need to get advice from your supplier about compatibility between your computer and phone.

When selecting the tariff package, you really need to estimate how many minutes of peak and off-peak calls you are likely to make and compare the various offers. A prepayment package is unlikely to be good value for a business user because of the high call charges. You should also check how well the service providers cover the areas in which you work and travel before joining a service.

Finally, it is important to realise that handset technology is evolving rapidly and most mobile phone users regularly upgrade their phones to take advantage of the latest features (e.g. voice-activated dialling, bigger display screens or mobile internet services). Be cautious about any contract that commits you to keeping the handset for much more than a year.

Questions to ask suppliers

- Which of your tariff packages would you recommend to someone who uses a mobile phone the way I do?
- What is the minimum contract period for each of these tariff packages?
- What standby time and talk time are provided by the battery on this handset?
- Does this handset have a built-in modem for connecting my PC or PDA to the Internet?
- How much do hands-free and in-car adapters cost?
- How well does your network cover the areas in which I work or travel regularly? What are the costs when used abroad?
- How can I access my voice messages from another phone or when abroad?