

GSM / GPRS / EDGE/ 3G / HSDPA / HSPA (plus) and LTE

It can be confusing trying to understand the differences between the various mobile connectivity options listed in the specifications of smartphones and touted by the mobile networks as the best way to connect to the internet. In this guide we will try to summarise these technologies and point out the advantages and disadvantages of each technology.

GSM

GSM (Global system for mobile communications) is the standard by which the vast majority of mobile handsets work in Europe and is becoming dominant in other parts of the world with over 2 billion people currently using the system. When you purchase a mobile or smartphone it is important to understand what frequencies are used by each technology because manufacturers and networks have a tendency to quote these figures with little explanation as to what they mean.

The majority of GSM networks use 900MHz and 1800MHz but in the US the 850MHz and 1900MHz are prominent. If these are quoted the phone will be classed as a tri-band phone and can be used in Europe, the US and many other territories (provided your SIM is enabled). If you require mobile access in the Far East and areas such as Scandinavia you will need to check with your mobile provider because at the minimum a quad-band phone will be required and in some areas only a phone purchased in the country will work.

Most GSM phones are primarily used for voice but can be used for mobile internet access via the GPRS Core Network.

GPRS(General Packet Radio Service)

GPRS is a system used to transmit data at speeds of up to 60 kbits per second and is a battery friendly way to send and receive emails and to browse the internet but in these days of broadband connectivity it will be seen as slow by some. To set up GPRS connections on your smartphone you will need to obtain specific information from your mobile provider to input into your phone. Most are happy to provide this information and some manufacturers such as Nokia offer pre-configured files that you can install onto your phone for your network.

GPRS is a tried and tested system and is therefore very reliable for standard mobile data use and will suit people with moderate data needs. Once you have the required settings in place you can use the network whenever you like and it requires no further adjustment as it works in the background of your internet enabled applications.

EDGE

EDGE (Enhanced Data rates for GSM Evolution) is a recent development based on the GPRS system and has been classified as a '3G' standard due to the fact that it can run at up to 473.6 kbits per second. If a smartphone is EDGE compliant it can be used for heavy mobile data transmission such as receiving large email attachments and browsing complex web pages at great speed. To use EDGE cell sites must be modified to accept transmissions of this type so coverage can be patchy in certain areas- it is a technology well worth having built in to any smartphone though.

3G

3G was initially marketed as a way to make video calls on the mobile network but is also a highly efficient way of browsing the internet and communicating on your smartphone using voice over IP and by email and instant messaging. Most UK and some European networks now have 3G networks and with speeds similar to EDGE it is fast becoming a common way to connect while on the road.

In areas where 3G coverage is poor the handset will constantly try to find a 3G signal and this can have a dramatic affect on battery life. Some phones handle constant 3G enablement well but some can have their battery life reduced by up to 50% so it is worth checking that your potential purchase is able to cope with this. At this time though 3G has good coverage and enables high speed internet access from your phone and is fast becoming a standard for mobile connectivity.

HSDPA

HSDPA (High Speed Downlink Packet Access) is a technology based on the 3G network which can support speeds of up to 7.2 Mbits per second. In reality you will most likely get a top speed of around 3 Mbits but this is useful for mobile TV streaming and other high end data transmissions. To use HSDPA your phone must be able to support the technology and of course you will need to be located within range of a cell site that has been upgraded to offer the service.

HSUPA (High Speed Uplink Packet Access) is the other side of this coin, although for mobile devices it is rarely mentioned as download speeds are considered more important. Together the 2 technologies make HSPA (High Speed Packet Access).

HSPA (Plus)

This is an evolution of the HSPA (HSDPA & HSUPA) standard and allows for faster speeds. The maximum download speed allowed by the standard is 168 Mbit/s although in reality networks that support HSPA (plus) will offer 21 Mbit/s download. This is because the existing 3G network architecture operators would have deployed and made compatible was never designed to handle such massive bandwidth.

The idea of HSPA (plus) was to allow network carriers to move towards 4G speeds (defined as 100 Mbit/s download) without having to use new masts and radios. Networks which have been upgraded to allow HSPA (plus) traffic are backwards compatible so phones with standard HSDPA receivers will work on them but to take advantage of the higher speeds you must have a device with an HSPA (plus) receiver. Many devices fitted with an LTE receiver are also capable of HSPA (plus).

LTE

Long Term Evolution or LTE is the first step towards true 4G technologies. To be a truly 4G technology, download speeds of 100 Mb/s and 1Gb/s should be available from moving (i.e. in a car) or pedestrian points respectively. It was however widely decided across the world that companies could market LTE as "4G LTE" due to some having already taken that step and to avoid further consumer confusion with the terms 3.5G or 3.9G that were starting to surface.

LTE offers maximum download speeds of 299.6 Mb/s although there has been controversy over the speeds some operators running LTE networks are providing, sometimes being lower than the supposedly 'inferior' HSPA (plus) technology. Commercially available speeds vary wildly and using the (at the time of writing) recently launched UK LTE network, tests have shown anywhere in between 8-50 Mb/s in available areas. LTE requires brand new network technology and masts / radios. This also means that the devices that support LTE will also need to have a compatible receiver. Much like the available 3G technologies, connection to an LTE signal will cause an extra strain on your device's battery and it is recommended to manage your connections.

LTE frequency bands vary quite a lot across the world and as a result it is very possible that an LTE compatible device may work in one territory but not another. Due to the difference in frequency bands

this could even happen within territories (with different network providers supporting different bands) and is possibly more likely than with previous GSM based technologies where frequency issues existed but were less likely to cause a problem unless you travelled internationally.

A list of the frequency band numbers, their corresponding frequency ranges and the countries which support the band are available either from [Wikipedia](#) or by clicking [HERE](#)

True 4G

There are technologies (LTE-Advanced, Mobile Wimax) that are capable of reaching the recommended speeds for 4G. At the time of writing these are not yet deployed and commercially available in any country. Some countries will have these networks available in 2013 for testing, but it is not expected that these true 4G technologies will be commercially available globally for some time.

The key to all of these technologies is to understand what your typical usage will be and which of the above suit your needs. It could also be worth future proofing your needs because well connected devices often cost little more than phones with basic connectivity.

Useful links-

UK GPRS settings- <http://www.filesaveas.com/gprs.html>