

This brochure has been developed as part of the **Consumer Education Programme** of the **Communications Commission of Kenya**. It was compiled as a result of a review of material from various sources and presents the current perception of the information available on productive use of the Internet, with particular reference to Kenya.

What is the internet?

The Internet is a worldwide, publicly accessible series of interconnected computer networks, which enables users to access resources and information within the network. Essentially, the Internet is a loose confederation of autonomous databases and networks, which was originally developed for academic use, but which now offers a global infrastructure of millions of sites, which are accessible by anyone.

Dial up Internet services

Dial-up Internet access allows access to the Internet via a conventional telephone line and a modem. It is of use to those who travel and require an easily available cost-effective service for the transmission of light data. Once the Internet is engaged, the phone line is no longer available to make or receive calls. The dial-up connection speed for a standard 56k modem can theoretically transfer 56 **Kilobits** of data a second. To put this in perspective - the average web page (with images) is around 50 **Kilobytes**, so the transfer such a page would take around 7 seconds. Since some Internet Service Providers charge by the minute for a connection – this can have financial impact.

Cable Internet Services

Some cable television companies provide an Internet service, which uses their cables to deliver a fast, continuous connection. Connection speeds range from 500 Kbps to more than 1 Mbps. However the speed of download is often faster than the speed of data transmission. Such services are normally offered for a monthly subscription fee (plus an initial fee for the cable modem), and may be cheaper if the consumer is already a client of the cable company.

ISDN services

The ISDN digital access service is delivered via existing telephone lines and offers the possibility of initializing end to end digital connection, which can support a variety of services such as:

Web browsing

ISDN enables the user to surf the internet at speeds up to four times faster than those attainable when using an analogue modem

Faxing at high speed

ISDN enables a user to exchange (on plain paper) a high quality document with another fax machine in less than 10 seconds

Interconnecting a local area network

ISDN can be used to interconnect LANs located at different places thus creating a fast wide area network

Desktop video-conferencing

An ISDN line can enable the use of a desktop video conferencing system.

ADSL services

The ADSL service uses a conventional telephone line and a modem and works by splitting the phone line into two separate channels: one for data (e.g. Internet access) and the other for voice (phone calls), thus allowing simultaneous Internet and phone use. ADSL offers:

Remote LAN access/High speed internet access

By means of ADSL, remote LAN access/internet access services have been made available in Kenya in the following bandwidth ranges.

- 32/128 kbps

- 64/256 kbps

- 128/1MB

- 512/2MB

Note: two values are offered for each configuration - the first figure gives the upload speed and the second figure gives the maximum download speed.

Access to E-Commerce – by provision of the bandwidth necessary to allow instant transactions

Security surveillance – via the provision of cost-effective solutions for

the monitoring of remote locations, which can be streamed via the Internet on closed circuit television (CCTV)

Wireless technology

The two most common types of wireless phone technology currently in use in Kenya are:

GSM (Global System for Mobile Communication) and

CDMA (Code Division Multiple Access).

For the purposes of comparison, consumers should know that about seventy three per cent of the global market uses GSM technology, while about fourteen per cent uses.

GSM technology

GSM is a second-generation wireless telecommunications standard for mobile cellular services.

First deployed in Europe, it is based on TDMA (Time Division Multiple Access) technology. GSM technology uses three frequency bands: 900 MHz, 1800 MHz and 1900 MHz. Dual-band phones operate on two out three of these frequencies, while tri-band phones operate on all three frequencies.

CDMA technology

CDMA digital wireless technology employs a special coding scheme (whereby each transmitter is assigned a specific code), which allows multiple users to share common access to the network. Using technology known as ‘spread spectrum’, a signal is spread across a broad spectrum of radio frequencies, allowing for the provision of a signal with wider bandwidth and increased resistance to interference.

Third generation (3G) technology

Third generation (3G) technology is the newest and most innovative form of communication technology available today. Third generation (3G) mobile phones and networks offer high data transfer rates, wide bandwidth and increased capacity, all of which are required to support the new range of mobile phone digital services. These include the provision of: Internet access, multimedia applications, global roaming and access to such things as: sports news, weather updates, horoscopes, competitions, films, video messages, and online gaming.

Wireless Internet services

There are a number of wireless Internet services, such as;

iBurst

iBurst is a mobile broadband wireless access system, which offers high performance, high speed, secure, mobile wireless access for business, home and office applications. iBurst offers the following benefits:

- Up to 1 Mbps data connectivity

- Wide area wireless access, which means that larger cell sizes can be accommodated

- Continuous connectivity

- The service is fully compatible with existing laptops, PDAs and desktop computers: therefore upgrades and/or new devices are not required

- the iBurst service is more secure than existing wireless delivery modes.

Worldwide Inter-operability for Microwave Access WiMAX

Worldwide Inter-operability for Microwave Access (WiMAX) is a third generation protocol for wireless communications that makes more efficient use of bandwidth and better avoidance of interference. WiMAX is capable of transmitting wireless data over long distances and its usage varies from the provision of point-to-point links to provision of full mobile cellular access.

The bandwidth and reach of WiMAX make it suitable for the following potential applications:

- Connecting Wi-Fi hotspots with each other and to other parts of the Internet.

- Providing high-speed mobile data and telecommunications services.

- Providing a diverse source of Internet connectivity as part of a business continuity plan.

Wireless Fidelity (Wi-Fi)

Wireless Fidelity (Wi-Fi) is a wireless data network, which allows Wi-Fi enabled devices (such as PCs or mobile phones) to connect to the Internet – at such time as they are in the vicinity of the wireless data network. Offering low-cost implementation and high-access, WiFi areas are sometimes termed 'hot spots' and are typically deployed in public areas – such as airports, universities, bookstores, coffee shops, offices and hotels.

General Packet Radio Service GPRS

General Packet Radio Service (GPRS) is a packet-based wireless communication service, which provides continuous Internet connection for mobile phone users. GPRS allows 2G (2nd generation) mobile phones to connect to the Internet for such purposes as the collection of emails or for the access of WAP pages. The cost of the service is based on the amount of data that is downloaded.

High-Speed Downlink Packet Access (HSDPA)

HSDPA is a new mobile telephone data transmission protocol, which is technically known as 3.5G. Essentially, it offers download speeds on a mobile phone, which are equivalent to those offered on an ADSL (Asymmetric Digital Subscriber Line), thus removing any limitations deriving from a slow connection. In theory, HSDPA can achieve data transmission speeds of 8-10 Mbps (megabits per second).

Enhanced Data-rates for GSM Evolution EDGE

Enhanced Data-rates for GSM Evolution (EDGE) refers to a faster version of the standard GSM wireless service, which is based on GSM standards while using TDMA technology. It allows for the transmission of data at speeds of up to 384 Kbps on a broadband connection.

VSAT services

The services that can be made available through VSAT (Very Small Aperture Terminal) include:

- Electronic mail
- WAN/LAN networking
- Broadband internet/intranet access

- Automatic teller machine interconnection
- Electronic point of sale terminal interconnection
- Credit card verification
- Multimedia service delivery
- Distance learning and training

Internet terms

Bandwidth: In the context of computer science, bandwidth can be used to refer to a measure of the information carrying capacity (rate/speed) of a communication line. It is often used as a synonym for data transfer rate - the amount of data that can be carried from one point to another in a given time period (usually a second). This kind of bandwidth is usually expressed in bits (of data) per second (bps). **Broadband:** This is a term used to depict a data rate greater than the ISDN basic rate. It is the generic term for high-speed digital Internet connections, such as wire line, DSL or cable modems and wireless 3G technologies. Broadband service is 'always on' so you do not have to dial-up for a connection. Broadband is capable of supporting a variety of voice and data applications like voice telephony, internet access, pay TV and multimedia services. Broadband connections can be divided into two major categories: shared and dedicated. Shared Internet connections include DSL and cable broadband connections. Dedicated connections are related to leased lines such as E1, T1. **Download;** (or data downloaded) is any data retrieved from another computer on a network, for example, text, pictures or sound. **Upload;** is to send text, pictures, sound files or software programmes via a telecommunication network to another computer. **MB;** or Megabyte (MB) is the term used to describe a measure of data. A MB is equal to 1,048,576 bytes, or roughly one million bytes. As a guide:

- One can view approximately 20 pages on the internet for each MB of download;
- An average four minute MP3 (music file) is approximately four MB; and
- A five minute movie trailer can be as much as 30 MB.

Modem; A modem short for MODulator - DEModulator is a device used to connect a computer to a telephone line to enable the transmission of data through the line.

How to measure the speed of an internet or data connection

The type of connection you use has a direct effect on the speed with which you will be able to use the Internet. The capacity of an Internet connection is referred to as its bandwidth, and is measured in bits of data per second (a bit being an on or off, 1 or 0 signal). A thousand bits equal one Kilobit (Kb); a million bits equal one Megabit (Mb); a thousand million bits equal one Gigabit (Gb). Data files are measured in Bytes and KiloBytes (KB) with one Byte consisting of eight bits. It therefore follows that:

A 1MB file is 8,000,000 bits and will take 200 seconds (3 minutes 20 seconds) to transfer over a perfect 40kb/s (40,000 bits per second) connection.

Need to know more?

For further information on the above topic or any other aspect of health and safety with regard to communication equipment, please contact:

Disclaimer: while every attempt has been made to ensure that the information included in this document is accurate, it is intended ONLY as a guideline towards the safe operation of communications equipment and should not be regarded as (or used in lieu of) legal advice. The Communications Commission of Kenya will not, therefore, accept any liability for the consequences of any actions taken, or decisions made upon the information offered. **Acknowledgements:** This brochure was developed as part of the Consumer Education Outreach Programme of the Communications Commission of Kenya, working in partnership with Teknobyte (Kenya).

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Productive use of the Internet



Communications
Commission
of Kenya

**CHUKUA
HATUA**
Pata huduma ya
mawasiliano unayostahili