INFORMATION ABOUT INTERNET ACCESS SERVICE QUALITY

General Information

The quality of the Internet Access Service depends on several parameters such as the flow rate, the latency, the jitter and the loss in the data packets.

The flow rate represents the speed of transmission of data traffic and differs according to whether the internet is accessed by using the mobile network or the fixed network. Further details on the flow rates are provided below.

The latency is the time elapsed between the request for information and the reception of this information. In a simplified manner, when you want to open a Web page, the latency corresponds to the time elapsed between the moment where you click on «Enter» and the moment where the Web page actually opens. Therefore, shorter this time, the faster the internet service.

The jitter corresponds to the variation in latency. Indeed, the requested information by the user can be delayed, for example because of the load on the network. This is an important fluidity parameter of the Internet Access Service and the lower the jitter, the smother the service.

In computing, information is composed of several data packets and this for a better transmission on the network. However, it may be that, for example after a network congestion, some packets may not transmitted and they must be transmitted again. The loss of data packets, expresses then the number of packets which must be sent several times. Thus, a loss of the weak data packets means a faster reception of the requested information and a faster Internet Access Service.

Although each technical parameter described here above has its importance, it should be noted that their level of importance is not always the same for all possible uses of the Internet. Indeed, the latency can be important for online games, but it has little impact on the downloading of a file. The table below provides, for illustration purposes, the importance of these parameters for different applications:

Application	Flow download	Flow upload	Latency	Jitter	Loss of packets
Voice on IP	-	-	+++	+++	+++
Downloading of a file	+++	-	+	-	++
Games on line	+	+	+++	++	+++
Streaming Video / music	+++	-	+	-	++
Consultation of Web page	+	-	++	-	++

Reading guide:

"-" represents a weak importance
"+++" represents a high importance
Table reading example: for downloading of a file, the download flow rate and the loss of packets are very importants while the upload flow rate and the jitter are less important.

As an example of reading, the download flow rate is important for the streaming video or musical, whereas it is not for games online. On the other hand, for the games on line, the download flow rate is less important than the latency as well as the loss of the packets is very important, these two last parameters influence the fluidity of the game.

The latency, the jitter and the loss of the packets a not only dependent on the mobile network, but also an equipment installed at content providers (for example, the servers installed on social networking premises) and the equipments used by the final clients (router, Smartphone, connectivity Wifi etc.). Depending on the load to be managed by these equipments, the technical parameters could be impacted and the Internet Access Service slowed down.

The performance of the Internet Access Service can be measured by the following technical parameters:

1. **The flow rates:**

   - The **announced flow rate** is the one used in the commercial and corresponds to the **estimated maximum flow rate.** It represents the maximum speed of transmission of the traffic data that the Customer can reach in optimal conditions:
     - o   the technology deployed in the Customer's area,
     - o   the capacity of the terminal used by the Customer,
     - o   the configuration of the terminal selected by the Customer,
     - o   the number of persons connected simultaneously on the same cell,

     - o   the meteorological conditions,
     - o   the position of the customer client in relation to the relay antenna, etc

     Therefore, e-LUX Mobile cannot give a specific guarantee on the actual flow rate reached which can diverge in practice from the maximum estimated flow rate.
     More information on www.e-luxmobile.com
     The higher the actual flow rate, the more efficient the mobile Internet Access Service.
     For example, the downloading of a file with a size of 100 MB can be done in less than 45 seconds at a downstream flow rate of 20 Mbit/s and in less than 10 seconds, at a flow rate of 100 Mbit.
     Mbit/s = Mega bits per seconds. Indicates the quality of numerical data transmitted second.

2. **Other parameters:**

   Other parameters (not guaranteed by e-LUX Mobile) influence the performance of the Internet Access Service:
   - the **latency** : it corresponds to the time passed between the request of information (for example, opening of a web page) and the receiving of this information. The shorter this time, faster the Internet Access Service.
   - the **jitter** : it corresponds to the variation of the latency. The weaker the jitter, faster the Internet Access Service.
   - the **loss of data packets**: in computing, the information is composed of several data packets and this for better transmission on the network. However, it may be that, for example, due to network congestion, some packets are not transmitted and must be retransmitted. As a result, a weak loss of data packets implies a faster reception of the requested information and a faster Internet Access Service.

The download and upload flow rates on the mobile network

Here are some examples of how to use your mobile with estimated download times:

	3G
Theoretical download rate	**42 Mbps**
Theoretical upload rate	**20 Mbps**
Download of a musical album[2] (approx. 50 MB)	10 sec.
Download of a film HD[2] (approx. 1,5 GB)	3 min. 20 sec.
Upload 10 photos HD (approx. 50 MB)	1 min. 22 sec.

Table 2: These estimations are indicative and are based on the theoretic maximum rates. The download times cannot be guaranteed.

Can these theoretical rates be achieved in practice?

In order to respond to this question, it is important to understand the operation of a mobile communications network.

A mobile network consists of a set of antennas-relay which is installed either on the roofs of the buildings, pillars or water towers. The antennas are linked to each other and to the internet via fiber-optic cables in order to enable users to communicate between them, or to access the Internet.

These antennas use frequency bands, each of which has its own physical characteristics in terms of its ability to carry traffic or the range of waves. The connection between the antenna-relay and your mobile terminal (for example, Smartphone or tablet) is carried out using the waves emitted by the antenna and received by the mobile terminal. From a technical point, this connection is realised by a «carrier» which can be seen as an invisible wire carrying the signal between the antenna-relay and the terminal. It is this signal that is processed and interpreted by your terminal in order to let you for example to watch your favourite show when you are on the move.

For a good connection, the following points, among others, must be considered: the range of the signal sent by the antenna-relay, the terminal's ability to receive it and process and the number of users that are connected. Indeed the signal sent by the antenna can be confused by various factors as the presence of the buildings in the urban area, the relief of the landscape or also the thickness of the walls in your building. Furthermore the distance between the receiving terminal and the emitting antenna-relay plays also an important role. Indeed, the greater this distance, the more the signal received is weakened.

Then, the capacity of the terminal to receive and to process it is decisive to exploit to the maximum the possibilities of a mobile network. Finally, as the mobile network covers an entire population, it is shared by the population; the traffic generated by all the users connected at the same time is distributed in a non-discriminatory way between all. E-LUX Mobile naturally ensures the right dimensioning of the network to meet the needs of its customers, but cannot exclude temporary congestion resulting in a slowdown of the Internet Access Service.

e-LUX Mobile is a MVNO, the service provided is a roaming service thus whether the network is 4G or 3G is related with the operator e-LUX Mobile linked to.