Figure 1: Broadband Technologies and Examples of Applications Performing at Various Speeds Broadband download and upload speed ranges (in megabits per second) Slower ◆ Down: 0.256 0.768 10 15 100 0.384 0.384 0.768 0.768 Satellite Wireless Digital Subscriber Line (DSL) Cable Fiber-optic Speeds required for good results^a from selected applications Web browsing E-mail large attachments Download small files (8 sec.) (1 sec.) (16 sec.) (1 sec.) Download large files Videoconferencing streaming at 384 kilobits per second (single user) Videoconferencing streaming at 768 kilobits per second (multi-users) Upload videos, presentations (1 gigabyte) Download high-definition video in real time (2 gigabytes) Speeds required for good results from selected off-site activities Teleworking^b

Source: GAO analysis of Small Business Administration information.

Distance Learning^c

Telemedicine^d

^a The figure above depicts applications, and the off-site activities they allow, that perform well at given speeds. While it is possible for the applications to perform at speeds lower than those indicated above, that performance is generally at a fair or unacceptable level, and is therefore undesirable for business and residential users.

^b Many people telework (also known as telecommuting), which is the ability for an organization's employees and contractors to perform work from locations other than the organization's facilities. Most teleworkers use remote access, which is the ability for an organization's users to access its non-public computing resources from external locations other than the organization's facilities. National