

WIRELESS COMMUNICATION TECHNOLOGIES FOR MOBILE DEVICE CONNECTIVITY*

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Abstract

This module introduces the wireless communication technologies available for mobile devices.

Wireless Technologies for Mobile Device Connectivity

The modern day mobile device is constantly connected to the rest of the world. In the past, the connection between two mobile phones was initiated only when one party called the other. Today however, modern smart phones and tablets stay continuously connected with the rest of the world through the WWW using a variety of connectivity technologies.

Analogue Cellular Networks (1G)

Analogue cellular networks were the first generation (1G) of wireless communication technologies. These were called analogue cellular networks as the voice was not digitally encoded but was modulated to a high frequency during the conversation. 1G speeds vary between that of a 28k modem(28kbit/s) and 56k modem(56kbit/s)resulting in actual download speeds of 2.9KBytes/s to 5.6KBytes/s.

GSM - Global System for Mobile Communications (2G)

GSM is a cellular network which constantly searches for and connects with cells (transmission towers equipped with antennas) in the immediate vicinity. This dependency on cells gave raise to the term “cellular phone” which is synonymous with mobile phones. The unique feature of GSM was the introduction of Subscriber Identity Module (SIM) or SIM card which allowed the users to retain his/her information and phonebook while switching handsets. This new technology sparked the modern day trend of changing handsets to keep up-to-date with the latest technology. GSM networks commonly operate in the 900 MHz or 1800 MHz bands. The frequency is then divided up into eight timeslots to be shared by concurrent users. The combined channel data rate for all 8 channels is 270.833kbit/s.

GPRS - General packet radio service (2.5G)

GPRS is a packet oriented mobile data service which works on GSM or 3G. When combined with GSM networks, GPRS is called a 2.5G technology. Even though GPRS is considered a best-effort service where the quality of service is dependent on the number of users sharing the data channel, this technology was the first of its kind which allowed users to affordably connect to the internet through their mobile devices. Typical GPRS data rates are around GPRS 56–114kbit/s but vary largely according to the usage of the channel. GPRS was later enhanced with Enhanced Data rates for GSM Evolution (EDGE) which is also known as

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Enhanced GPRS (EGPRS). With peak pit rates of up to 1Mbit/s and typical bit-rates of 400kbit/s this technology was seen as the precursor to 3G.

3G – 3rd Generation Mobile Telecommunications

3G revolutionized the way mobile phones and devices could be used to communicate and access information. With larger bandwidths 3G supports voice telephone, mobile Internet access, video calls and mobile TV in mobile environments. Although the standard for 3G dictates that peak data rates of at least 200kbit/s (about 0.2 Mbit/s) should be maintained in 3G networks, most modern 3G networks offer data rates which are much higher. With recent versions, which are denoted as 3.5G and 3.75G, providing many Mbit/s in data rates, mobile broadband has revolutionized the way online content is delivered to the mobile user.

4G – 4th Generation Mobile Telecommunications

Replacing 2G and 3G, 4G wireless networks provide comprehensive IP based services including voice, video and data. With connection speeds 100Mbit/s for high mobility communication (such as from trains and cars) and 1Gbit/s for low mobility communication (such as pedestrians and stationary users) 4G networks will revolutionise the future of mobile devices and how information is consumed by mobile devices.