The AT+CGDCONT command is a key element in the configuration of mobile data connectivity for GSM, UMTS, LTE, and 5G modems. It is used to define a PDP (Packet Data Protocol) context, which specifies the parameters needed for the modem to establish an IP data session with the mobile network. This includes defining the APN (Access Point Name) — a network-specific identifier provided by the mobile network operator — as well as the PDP type (typically IP, IPV6, or IPV4V6) and, optionally, the IP address (if statically assigned), data compression settings, and more. For example, the command AT+CGDCONT=1,"IP","internet" sets the first context (CID=1) to use IPv4 with the APN "internet". The APN acts as a gateway between the modem and the public or private packet-switched network (like the internet), and its configuration determines whether the modem connects to the correct service type (e.g., public internet, enterprise VPN, or private M2M platform).

In practical deployments, especially in IoT, telematics, and embedded systems, configuring the APN correctly is vital to ensure the device can send and receive data over the cellular network. A real modem, such as those from Quectel, SIMCom, Telit, Cavli, or Sierra Wireless, uses the AT+CGDCONT command as a first step before activating the context using AT+CGACT=1,1, and often after attaching to the network via AT+CGATT=1. The modem may also respond with context information using AT+CGDCONT?, which queries current settings. If the APN is incorrectly entered or does not match the SIM card’s mobile network operator, the modem will fail to establish a PDP context, resulting in errors like "NO CARRIER" or "CONNECT FAIL".

Moreover, in modern LTE and 5G networks, multiple PDP contexts can be defined simultaneously (e.g., CID=1, CID=2) to support various services or network slices. Some modems even allow setting authentication credentials (username and password) for the APN through additional commands like AT+CGAUTH. Since different operators may require unique APNs for different data plans (e.g., public vs. M2M), it's important for developers and system integrators to consult operator documentation and test configurations thoroughly using AT command terminals or diagnostic tools.