

DSL MODEM SPECIFICATIONS AND REQUIREMENTS

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General Information

Background

Cimarron Telephone Company and / or its affiliates (herein referred to as Cintel) provide broadband access to its customers utilizing copper access technologies including ADSL2+, VDSL2, and fiber access technologies including Active Ethernet and Passive GPON technologies.

The deployment of these technologies vary by market and are used to deliver basic high speed Internet access and tiered broadband services such as linear and non-linear IP based video services (IPTV), and Voice of IP (VoIP) services.

As a general rule, basic Internet access services contain a minimal number of specifications for modem and gateway interoperability with our broadband access technologies. All specifications are derived from the International Telecommunications Union (ITU), and the American National Standards Institute (ANSI).

For tiered broadband services specifications are expanded and include specific configurations and expanded protocol support to ensure proper operation and service delivery of the tiered services. In these cases Cintel provides the necessary customer premise device and configurations required.

How DSL Works

ADSL uses two pieces of equipment, one on the customer end (the Customer Premise Equipment or CPE) and one at the Service Provider end (the SP). The CPE is traditionally referred to as a modem, and more modernly referred to as the Residential Gateway (RG) which incorporates the traditional services of a modem (termination of the DSL service) and incorporation of an Internet Protocol (IP) router. The incorporation of the routing capability enhances the services of the CPE and provides capability to deliver expanded services and functionality such as firewalls, parental controls, remote management, etc.

On the SP end, DSL Access Multiplexers (DSLAM) generates the DSL signals and transmits them over the Telephone companies copper facilities. Depending on the DSLAM, RG's may require support of a variety of standards and modes and connection methods. A DSLAM takes connections from many customers and aggregates them onto a single, high-capacity connection to the Internet. DSLAMs are generally flexible and able to support multiple types of DSL in a single central office, and different varieties of protocol and modulation standards

The DSLAM provides one of the main differences between user service through ADSL and through cable modems. Because cable-modem users generally share a network loop that runs through a neighborhood, adding users means lowering performance in many instances. ADSL provides a

dedicated connection from each user back to the DSLAM, meaning that users won't see a performance decrease as new users are added -- until the total number of users begins to saturate the single, high-speed connection to the Internet. At that point, an upgrade by the service provider can provide additional performance for all the users connected to the DSLAM.

Section B

ANSI and ITU Standards

ANSI

- ANSI T1.413 Issue 2

ITU

- G992.1 (G.DMT)
- G992.2 (G.Lite)
- G992.3 (ADSL2)
- G992.5 (ADSL2+)
- G993.2 (VDSL2)

Modem Configurations Support Requirements

For general Internet access, RGs connecting to Cintel's broadband network should support the following configurations:

- RFC1483 Bridged and Route Bridged
- Support for common access methods PPPoA and PPPoE
- Support for ATM and PTM modes of operation

Certified Modem (RG) and Models

The following RGs have been tested and certified within the Cintel network

- Cisco DDR2200

- BEC 5200W
- Comtrend 5361T
- Comtrend 5374
- Comtrend 3100u
- ClearAccess AG10W
- ClearAccess EG10W

Cimtel Interoperability Lab

Customers who own their own RG from a previous SP's network can request assistance for testing their RG's operation in Cimtel's Interoperability Lab. Cimtel doesn't guarantee interoperability, however Cimtel will provide reasonable effort to test any customer's asset in our lab prior to customer deployment. Customer's wishing to have their RG's tested must provide a working device, any required passwords to configure the device, and sign an equipment liability release.

In the event a customer doesn't wish to have their CPE tested, Cimtel will provide reasonable effort to communicate the necessary parameters required for the customer to configure their device for operations within Cimtel's network.

In these situations our installation department will ensure services are functioning using standard test equipment prior to closing the installation work order and ensure the proper parameters are provided to the customer at the time of installation specific to the DSLAM the customers broadband services are provided from.