The explosion of Internet-Protocol based broadband services has created a new demand for interactive multimedia systems that deliver high-speed data services via satellite.

In this new market, a limiting factor remains to be bandwidth. Solutions implemented up to now are not sufficient for the strong demand of broadband data communication.

Among all technologies, satellite is undoubtedly a key solution. Satellite-based infrastructure is available today and provides the most economic carrier for simultaneously delivering broadband data to anyone around the world.

The Alcatel interactive satellite systems offer a large range of advantages for the development of broadband data networks:

- Complement congested or poor terrestrial infrastructure,
- Rapid and scalable deployment thanks to its large coverage
- Benefit from DVB standard for economies of scale
- Flexible bandwidth allocation
- Guaranteed Quality of Service
- Support of the various services envisaged in Internet

The Alcatel 9780 DVB-RCS two-way satellite system is a natural solution for high quality, high-speed broadband interactive services. The open standard aspect of DVB-RCS has been a key point in its adoption by Alcatel for its professional satellite broadband access offering. It is simply based on the long experience of Alcatel in Telecommunications proving that it is very difficult if not impossible to create a large market without standardization.

Key Features

- Two-way broadband interactive satellite system
- Supports all Internet Protocols (IP) applications, including Fast Internet/Intranet, Push Distribution, Caching Streaming Video & Audio
- DVB-S forward link
- Return Channel, based on DVB-RCS standard, up to 2 Mbps
- Advanced bandwidth allocation mechanism optimized for IP packets
- Guaranteed Quality of Service and advanced SLA
- Comprehensive management system with FCAPS support
- Low cost remote terminal
- Operates on standard geostationary Ku & Ka band Satellite
- High flexibility, scalability and reliability

The Alcatel 9780 DVB-RCS product gives a powerful solution to implement broadband services. It is engineered around state-of-the-art technologies and design concept, while being based on an open standard and having been field tested on several systems.

The Alcatel 9780 DVB-RCS product provides Service Providers with a communication network that support multimedia services over geostationary bent pipe satellites in Ku and Ka band. It is a cost-effective, proven, and immediately deployable solution that supports a spectrum of broadband applications, including Fast Internet, Distance Learning, Videoconferencing, Direct Video Broadcasting (DVB) and more.
By using satellites to provide direct communication between different locations over vast territories, the system bypasses the bottlenecks inherent in terrestrial infrastructures.

The *Alcatel 9780 DVB-RCS* users enjoy unprecedented speeds. The forward-link DVB-S technology enables download data rates reaching 48 Mbps in multiple TCP/IP sessions. The return path based on DVB-RCS standard offers data rates of up to 2048 kbps. The system’s inherent bandwidth flexibility optimizes performance and maximizes capacity.

### Applications

**Fast Internet Access**

*Alcatel 9780 DVB-RCS* provides Internet users high-speed satellite downstream transmissions with a return path via satellite. This is ideal for corporations, SOHOs, local Internet Access or Service Provider and other business users who need super fast multimedia over the Internet.

**Global ISP services**

A global Internet Service Provider can operate a multinational network for local ISPs connected to *Alcatel 9780 DVB-RCS* Remote Gateways.

**Virtual Private Networks (VPN)**

Corporate LANs and WANs can take advantage of diverse Internet/Intranet multimedia services by linking remote sites to access providers or corporate HQs. *Alcatel 9780 DVB-RCS* enhances corporate connectivity and network reliability while cutting overhead expenses.

**Videoconferencing**

High-speed return path via *Alcatel 9780 DVB-RCS* enables remote users to enjoy two-way videoconferencing over IP, overcoming infrastructure limitations to meet customer needs.

**Business Training**

*Alcatel 9780 DVB-RCS* enables corporations with multiple offices to remotely train engineers, customer support staff, and sales personnel in a timely and cost-effective manner.

**Distance Learning**

With *Alcatel 9780 DVB-RCS*, education knows no boundaries. Students at remote locations can interact directly with lecturers via two-way live videoconferencing while simultaneously exchanging data files and browsing through the university’s Intranet network or Internet.

**Teledemecine**

Doctors at remote clinics can consult with each other and communicate with the regional medical centers via live two-way videoconferencing, efficiently exchanging high-resolution images, test results and other data.

### Alcatel 9780 DVB-RCS System Architecture

The *Alcatel 9780 DVB-RCS* system consists of a central HUB (which can be collocated in existing operator infrastructure) and *Alcatel 9780 DVB-RCS* Remote Terminals which are located at the remote users premises. The information to the individual user/group of users is multiplexed into the DVB-S broadcasting stream at the Hub.

The *Alcatel 9780 DVB-RCS* Remote Terminal communicates directly with the interactive server at the Hub station via satellite, using a highly efficient multiple-access scheme. The Terminal contains all the necessary components to provide a full two-way satellite communication services.

The *Alcatel 9780 DVB-RCS* Remote Terminal can be operated as part of a complete digital network, with the Hub station serving as the gateway to other satellite or terrestrial networks. To provide seamless internetworking with other networks, industry standards are used for carrying data from the Terminals to the Hub station.
Alcatel 9780 DVB-RCS
Technical Characteristics
System Overview

System
Open standard air interface that complies with DVB-S and DVB-RCS
Support of IP protocols
Designed to support telecommunication services such as Internet Access, Multicasting, Virtual Private Networks (layer 3 VPNs)
4Mbps-48Mbps downstream; 144Kbps-2.048 Mbps upstream
Both uplink and downlink can be offered in Ku or Ka band
Packet based satellite resource allocation scheme with fast allocation process (DAMA)
Multiple Service Provider or corporations supported within the same system
Allows creation and control of broadband Service Level Agreements (SLA) through advances QoS and resource allocation mechanisms
Synergy with existing DBS/DTH infrastructure (DVB downlink, potential for shared equipment)

Hub
High availability
Modular expansion capability
Support of large number of Terminals (> 10,000)
Remote management with client/server architecture
Several network interface available

Terminals
DVB-RCS based indoor unit
Set-up box design
Ethernet 10/100BaseT user interface
Local and remote management with Web user friendly interface

Qualified RF equipment and antennas
Compatible with Ku and Ka bands
Dish sizes as from 0.75 up to 1.8 m
SSPA from 1W up to 4W
**Network**

**Architecture**
- **Type**: Star with DVB-S forward link, MF-TDMA
  - (DVB-RCS) on return link
- **Signalling to Terminals**: broadcasted within DVB-S carrier
- **RF Protocols Supported**: Ku-band and Ka-band
- **IP Protocols Supported**:
  - IP, TCP, UDP, HTTP, FTP, SMTP/POP3, TELNET

**Forward link**
- **Carrier**: DVB-S per EN 300-421 and EN 301-192
- **Data Rate**: 4 to 48 Mbps
- **Modulation**: QPSK
- **FEC**: Conv. and Reed Solomon (204,188)

**Return Channel**
- **Carrier**: MF-TDMA / DVB-RCS per EN 301-790 and TR 101-790
- **Data Rate**: From 144 Kbps up to 2048 Kbps
- **Modulation**: QPSK
- **FEC**: Conv. ½ and Reed Solomon encoding
- **Access modes**: Dedicated channels, on-demand capacity and free capacity (as per DVB-RCS)

**IP Encapsulation**
- **AAL5/ATM**

**Network Sizing**
- **Terminals**: Maximum of 1500 Terminals per Multi-Carrier Demodulator (MCD)
- **MCDs**: Maximum of 6 MCD per rack (number of racks may be expanded according to network size)

**Routing**
- **IP Routing Capabilities**
  - **Modes**: Unicast, Broadcast, Multicast
  - **Protocols**: IGMP, ICMP, FTP, HTTP, ARP
  - **Addressing**: DHCP & NAT (Optional)

**SLA/QoS**
- **SLA mechanisms**: Simultaneous support of several Service Providers in the same Hub
- **Each Service Provider bandwidth can be partitioned between different services**
- **Type of services**: Best effort
- **Guaranteed bandwidth plus best effort**
- **QoS mechanisms**: Fairness between subscribers (within the same group)
- **Priorities may be set to favour some types of subscribers for accessing the resource**

**Accounting**
- **Flat fee**
- **Volume based (exportation of traffic information per subscriber)**

**Security**
- **Authentication of Terminals**
- **IPSec (Option)**

**Network Management System**
- **Open platform based on SNMP protocol and Java/Linux languages**
- **Remote management with client/server architecture**
- **Equipment and network management through graphical MMI [maps, icons, etc.]**
- **Capability to import and export files with Service Providers (for automatic service provisioning, network and traffic analysis, etc.)**

**Hub Station**
- **Interfaces**
  - **RF Package**: 70-MHz or L-band on coaxial
  - **User**: 100BaseT, ATM OC-3, etc.
- **Redundancy Features**
  - All equipment involved in traffic are 1:1 or 1:N redundant
  - Switching is automatically controlled by the system
- **Main IF Specifications**
  - **Output Levels**: -30 to −5 dBm
  - **Input Levels**: -72 to −36 dBm
- **Rack Physical Specifications**
  - **Sizes**: 2 to 3 19-inch racks depending on redundancies
  - **Power Consumption**: 2,200-watts maximum
  - **Power Supply**: 115- or 230-VAC, 50- or 60-Hz nominal
  - **Operating Range**: 5 to 30 degrees C, 85% non-condensing humidity

**Terminals**
- **Antenna Sizes**
  - **Ku-band**: 0.95, 1.2 or 1.8 meters
  - **Ka-band**: 0.75, 0.9 or 1.2 meters
- **RF Output**
  - **Power**: 1 or 2 watt; 4 watt option
  - **Power step size**: 0.5 dB
  - **Transmit spurious**: 55dBc typical
- **Indoor Unit**
  - **User Interface**: 10/100BaseT on RJ-45 Connector
  - **Traffic capabilities**: up to 9 Mbps
  - **Uplink power control capability**: Terminal automatic standby and wake up mode
- **Software download through HTTP**
- **Management**
  - Remote management through SNMP
  - Local management with HTTP server (installer and superuser mode)
  - Software download through HTTP

**Physical and environment specifications**
- **Size (L, D, H)**: 432m, 305 mm, 45 mm
- **Weight**: 432m, 305 mm, 45 mm
- **Power Consumption**: < 120 watts (inc. RF power consumption)
- **Power Supply**: 100 – 230 VAC, 50 / 60-Hz nominal