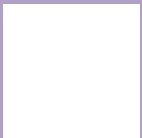




# Alcatel 7342 Intelligent Service Access Manager (ISAM) Fiber to the User (FTTU)

OPTICAL ACCESS AT ITS BEST — AN IP-BASED GPON SYSTEM WITH GIGABIT SPEEDS FOR TRIPLE PLAY



B R O A D E N   Y O U R   L I F E



The Alcatel 7342 ISAM FTTU enables IP converged triple play services by offering maximum bandwidth and QoS over fiber access. Its FSAN standards compliant GPON implementation is unmatched in features — 2.5 Gb/s bandwidth, 20 km reach, ONT Management and Control Interface (OMCI), and the most robust QoS for triple play services. The Alcatel 7342 ISAM FTTU integrates smoothly with legacy voice and RF video networks, and allows customers to grow new service revenue and offer true gigabit download speeds. With the Alcatel 7342 ISAM FTTU, customers can decrease OPEX for technicians and service representatives, and reduce churn with attractive service bundles, increasing ARPU and decreasing subscriber acquisition cost.





# Optical Broadband from the Broadband Leader

Exhibit IX.B.1.a - Attachment 3 (Page 3 of 12)

The Alcatel 7342 Intelligent Services Access Manager (ISAM) Fiber to the User (FTTU) system provides a 21st century platform for bundled services and offers a range of network applications including fiber access to residential and business subscribers, as well as subscribers in multiple dwelling or tenant units (MDU/MTU). With the Alcatel 7342 ISAM FTTU, service providers gain a long-term strategic advantage over their competition. They can offer any service mix with increased reliability and performance, while significantly lowering operational costs.

The Alcatel 7342 ISAM FTTU uses Full Service Access Network (FSAN) standards compliant gigabit passive optical network (GPON) technology to multiplex any mix of voice, video or data in the central office (CO) onto a single fiber that is terminated at the subscriber's premise. Each PON line supports 2.5 Gb/s downstream and 1.2 Gb/s upstream. In addition to GPON performance, PON lines can be extended up to 20 km or shared by up to 64 residential or business subscribers, provided that they are within the 28 dB optical loss budget.

Forming the foundation for a cost-effective all-IP optical access network, the Alcatel 7342 ISAM FTTU system can support next-generation voice, data, and video services over IP using Ethernet interfaces while maintaining robust support for legacy services such as plain old telephone service (POTS) and radio frequency (RF) video. The Alcatel 7342 ISAM FTTU shares common components with Alcatel's market-leading ISAM platform. The Alcatel 7342 ISAM FTTU uses Alcatel's ISAM technology for intelligent IP-based access allowing reusability of network deployment models and management systems.

As an evolution of the Alcatel 7340 ISAM FTTU, the Alcatel 7342 ISAM FTTU shares the same chassis and backplane, and some common cards. An existing Alcatel 7340 ISAM FTTU can be easily upgraded to an Alcatel 7342 ISAM FTTU by simply replacing the two network termination (NT) cards. The Alcatel 7340 ISAM FTTU broadband passive optical network (BPON) cards can be plugged into an Alcatel 7342 ISAM FTTU.

**The Alcatel 7342 ISAM FTTU system offers a GPON solution with unparalleled scalability.**



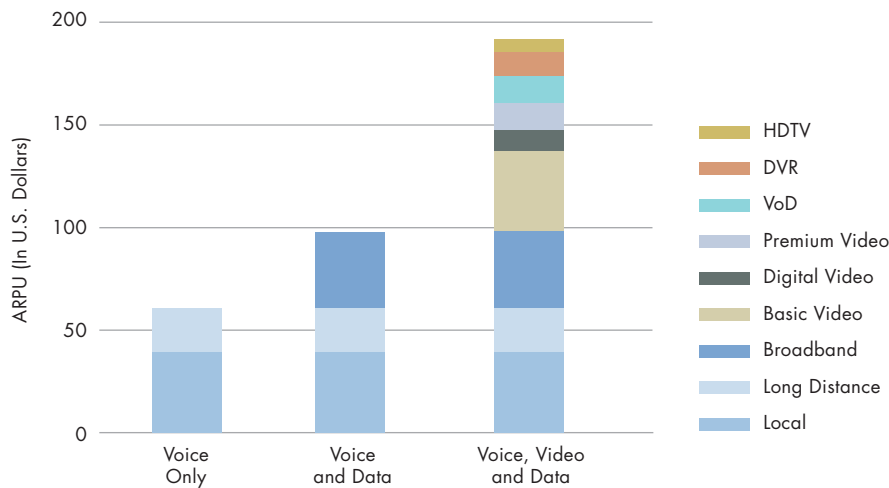
### INCREASE SERVICE REVENUE

Gaining a competitive edge often means offering more services to increase revenue and reduce churn; however, most service provider access networks today are not designed to deliver a full suite of services. The Alcatel 7342 ISAM FTTU is a strategic access platform that enables delivery of these and future services. Offering a complete suite of voice, data, and video can dramatically change top-line revenue as shown in Figure 1.

### LOWER OPERATIONAL COSTS

Increasing revenue from new services is only part of the value offered by the Alcatel 7342 ISAM FTTU solution. Service providers are beginning to document the advantages of optical access networks in terms of operational savings. The fiber-based Alcatel 7342 ISAM FTTU solution using passive elements delivers cost savings that can result in up to 40 to 60 percent lower cash expenses for labor compared with using existing copper

**Figure 1 - Incremental Revenue from FTTU**



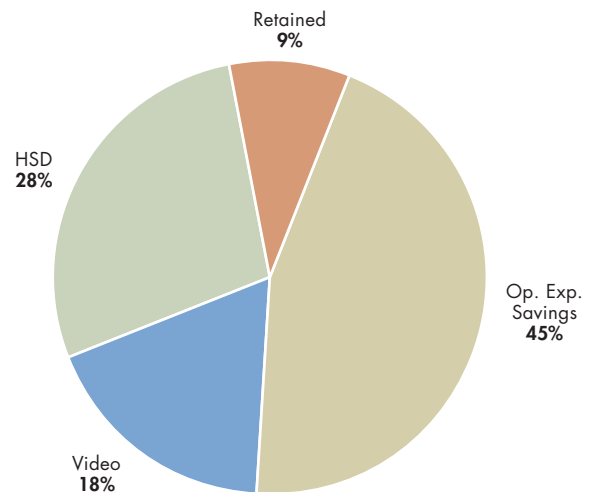
Source: The Yankee Group, 2004

networks. Savings are accounted for in customer contact associated with service orders and trouble reporting, outside plant operations, CO operations, and network operations. As shown in Figure 2, financial analysts see the opportunity to replace operating expenses with capital investment in FTTU.

The high degree of integration and the passive nature of the outside plant used in the Alcatel 7342 ISAM FTTU solution greatly simplify network operations. Service provisioning can be largely automated because the network is designed to support a spectrum of services from day one (not the case in today's copper networks). Services can be initiated and terminated by customers, saving labor costs that can be used for other customer care such as improving customer loyalty. In addition, because multiple services are provided via a single network, customer care can be much more effective and offer many more opportunities for up-selling. This also decreases customer churn, cutting back on marketing costs for individual services and order generation.



**Figure 2 - Incremental EBITDA from FTU Build**



Source: ARMIS database and Bernstein Analysis

# A Scalable Full-Service Solution

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The Alcatel 7342 ISAM FTTU system is the best-in-class solution for deployment of GPON-compliant full service access networks. It is the result of many years of research and development going back to the mid-1990s. Alcatel is a leader in PON technology development and instrumental in the formation of the FSAN Group and standardization of optical access by the ITU-T.

The Alcatel 7342 ISAM FTTU platform has throughput capacity and operational enhancements unmatched by its competitors. In addition to utilizing Alcatel's market-leading GPON technology, this

platform leverages Alcatel's leadership position in DSL and next-generation DLC in two key ways:

- > The Alcatel 7342 ISAM FTTU uses the same chassis and common modules as the industry-leading Alcatel 730x platform for DSL
- > The Alcatel 7342 ISAM FTTU uses the same management system (Alcatel 5526 Access Management System [AMS] in the ANSI markets or Alcatel 5523 ADSL Work Station [AWS] in the ETSI markets) as the Alcatel DSL and Litespan platforms



### ACCESS PLATFORM FOR A COMPETITIVE EDGE

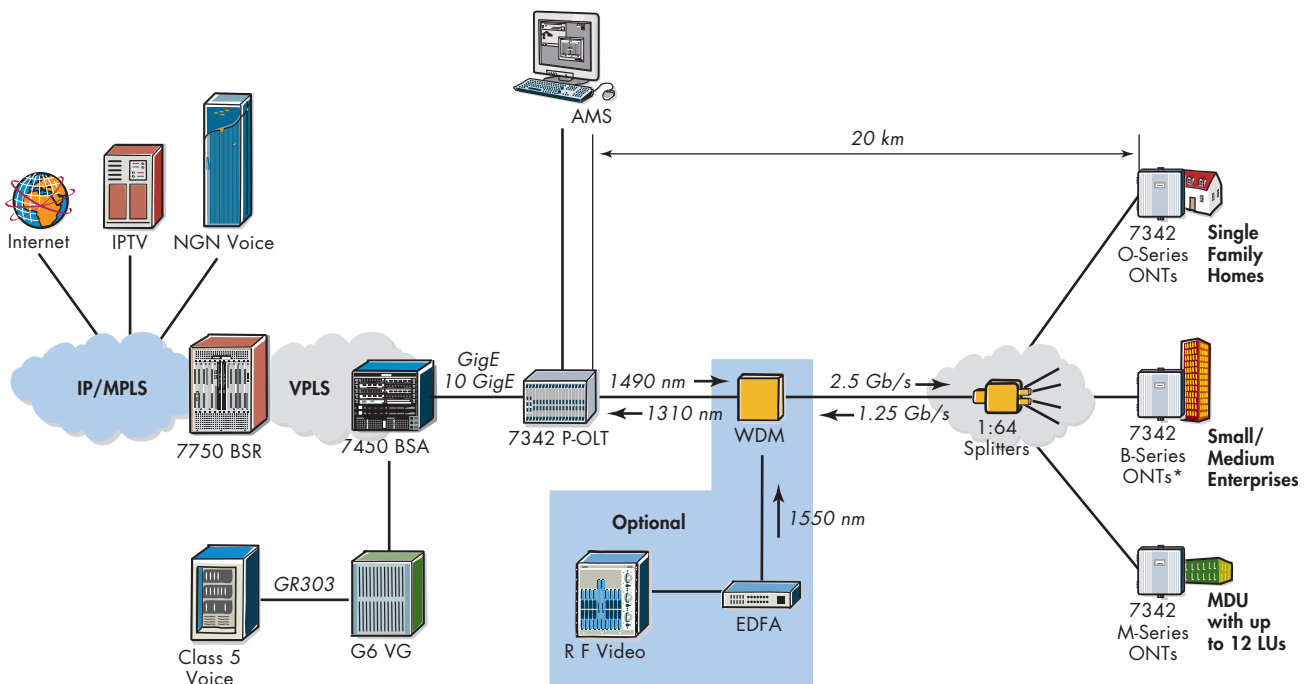
The Alcatel 7342 ISAM FTTU platform provides unmatched, scalable bandwidth using GPON technology for video, voice, and high-speed data services. Services are delivered using a single fiber with receive and transmit wavelengths multiplexed together — along with an optional wavelength for downstream RF video. FTTU enables service providers to cost-effectively deliver high-revenue, next-generation services today.

Figure 3 shows the elements of a complete Alcatel 7342 ISAM FTTU end-to-end solution. The Alcatel 7342 ISAM

FTTU system includes a packet optical line terminal (P-OLT), located in the CO, that terminates PON interfaces connected to many outlying ONTs. The Alcatel FTTU solution includes three different types of ONTs: an indoor ONT (ONT I-Series, ETSI only) for homes, an outdoor ONT (ONT O-Series) for homes, and a multiple dwelling/tenant ONT for up to 12 living units or small businesses (ONT M-Series).

The Alcatel 7342 ISAM FTTU solution supports long reach from the CO to the user, up to 20 kilometers (12.4 miles). Each fiber terminated at the OLT in the CO can be split using optical splitters, which enables the Alcatel 7342 ISAM FTTU to serve up

**Figure 3 - Alcatel 7342 ISAM FTTU in a Network**



\*B-Series ONT available Release 5.0

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to 64 ONTs located at outlying subscriber sites. The Alcatel 7342 FTTU performs service differentiation and traffic flow prioritization in the ONT and P-OLT. It grooms voice traffic and forwards it to a voice gateway such as the General Bandwidth G6 using GigE interfaces. Data traffic is groomed and forwarded to a broadband service aggregator (BSA) using multiple GigE and 10 GigE interfaces. Traffic flow prioritization is performed at all interfaces using up to 8 queues for different service types. Traffic flow grooming is performed by using per service virtual LANs (VLANs) in the Alcatel 7342 and virtual private LAN service (VPLS) instances in the BSA. The VPLS instances are terminated at the BSR, which connects to the IP routed network.

For IPTV, the Alcatel 7342 ISAM FTTU supports the Internet group management protocol (IGMP) proxy/snooping function within the OLT and ONT, permitting dynamic multicast of video channels. The GigE interfaces at each P-OLT, the GPON interfaces, and the ONTs receive and forward IP video traffic using multicasting. In addition to IP video, the Alcatel 7342 ISAM FTTU system includes an optional integrated RF overlay solution for video services. A video optical line terminal (V-OLT) is

used to amplify the video signal using erbium-doped fiber amplifiers (EDFAs) for transmission downstream.

### RESIDENTIAL SERVICE ACCESS

A full bundle of services — voice, data, and video — can be provided over a single fiber cable to any residential customers whether they are living in single family units (SFUs) or MDU/MTUs, for indoor or outdoor deployment. Alcatel ONTs are compliant with ITU-T standards and managed through an ONT management and control interface (OMCI).

The Alcatel 7342 ONT O-Series is designed to deliver triple play services to single-family home owners that need a telco demarcation point outside the home. The ONT O-Series is a temperature-hardened unit ready for outdoor deployment with battery backup for lifeline services. It includes two or four POTS interfaces and one or two Ethernet interfaces and one optional F connector for RF video.

The Alcatel 7342 ONT I-Series available in FTTU Release 4.1 is designed to deliver triple play services to residential, single-family home customers. I-Series ONTs can either be mounted inside the home or placed free-standing on a desk, and

A scalable architecture, full GPON standards compliance with unmatched performance, and a common management system for all access networks make the Alcatel 7342 ISAM FTTU the most cost-effective optical access solution on the market.



can be equipped with a battery backup for lifeline services. They include two POTS interfaces for voice and up to two Ethernet interfaces for high-speed data and one F connector for video. Subscribers can self-install this ONT if the customer is pre-provisioned with a fiber drop.

The Alcatel 7342 ONT M-Series is designed to provide services to residential subscribers in MDUs such as apartment buildings or multi-tenant units such as business buildings. It has a scalable architecture and can be equipped with up to three service units. Each service unit terminates eight POTS and four very high bit rate digital subscriber line (VDSL) interfaces for four living units per service unit. Service units can be added as needed and are hot-pluggable. The Alcatel ONT M-Series is temperature-hardened and can be deployed outdoors or inside the building with battery backup for lifeline services. It supports IGMP snooping for IPTV and ITU-T H.248/SIP for voice loop emulation and softswitch-based legacy voice services.

All of the ONTs support Internet gateway message protocol (IGMP) snooping for Internet protocol television (IPTV) multicast, and ITU-T H.248/session initiation protocol (SIP) for voice loop emulation and softswitch-based legacy voice services.



# End-to-End Solution



The Alcatel 7342 ISAM FTU is part of a complete end-to-end solution for optical broadband from Alcatel. Leveraging our leadership in broadband access, Alcatel has developed a solution that has a robust feature set and is ideal for mass deployment. It uses a cost-effective, standards-compliant passive optical network that revolutionizes the service providers' access network infrastructure. It gives service providers a long-term competitive edge and delivers a range of broadband services to consumers over a single optical fiber.

The Alcatel FTU product suite consists of the following key components:

- > Alcatel 7342 Packet Optical Line Terminal (P-OLT)
- > Alcatel 7342 Indoor Optical Network Terminal (ONT I-Series)
- > Alcatel 7342 Outdoor Optical Network Terminal (ONT O-Series)
- > Alcatel 7342 Multiple Dwelling Unit Optical Network Terminal (ONT M-Series)
- > Alcatel 5526 Access Management System (AMS)
- > Alcatel 5523 ADSL Work Station (AWS)
- > Alcatel 5528 Web-Based Access Manager (WAM)
- > Alcatel 5020 Softswitch Platform
- > Video Optical Line Terminal (V-OLT)
- > Media and Voice Gateways

# 21st Century Access from a Leader in Access

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Optical technology has been successfully deployed within the network core to increase capacity. The access network — the “last mile” — has remained a bottleneck, limiting the deployment of new services. Demand for broadband services has resulted in DSL technologies being deployed on the existing copper-based access network to increase capacity. As service providers look to the future, they want optical technology in the last mile to provide the assurance that their networks will support the needs of today and the demands of tomorrow.

As new homes and communities are built, or aged plants are refurbished, fiber access is becoming the preferred choice for build-out by traditional and non-traditional carriers alike. The capital investment is more than justified by the long-term operational cost savings and increased revenues that are gained while leveraging an access network with virtually limitless capacity. Alcatel understands access networks. Alcatel understands fiber optics. An Alcatel 7342 ISAM FTTU solution, the world’s first standards-compliant GPON system, is sure to provide your network with years of profitable service.

## GLOBAL MARKET AND TECHNOLOGY LEADERSHIP

Alcatel is the world leader in access systems for both digital subscriber line (DSL) and digital loop carrier (DLC) equipment. With over 25 years of access deployment experience and a demonstrated track record of successful broadband deployment, Alcatel remains a proven choice for carrier-grade access solutions. Alcatel has designed the Alcatel 7342 ISAM FTTU system to provide a future-proof all-optical access solution that enables service providers of all types to offer any service mix their subscribers demand while realizing the benefits of increased reliability and lower maintenance expenses.

Alcatel has led the industry from technology innovations to standardization. It is a key member of the ITU-T and FSAN standards bodies and a major contributor to the broadband PON (BPON) and GPON standards. Alcatel’s innovation and expertise demonstrate commitment to delivering to our customers a long-term strategic advantage in their access network — the access network for the next hundred years.



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