

## Increases the Bandwidth Delivered in the ‘Last Mile’ of the Copper Pair Between a DSLAM and the Subscriber over 200% Automatically Adjusts for all ADSL / ADSL2+ Line Conditions

Internet subscribers are hungry for higher speed and expect their Internet Service Provider to deliver ever increasing bandwidth for applications such as Triple-Play (video, voice and data) and Over-The-Top (OTT) video streaming services from content providers like Netflix and others.

While subscribers in many urban areas have access to 50-100 Mbps services or higher this is not the case in suburban and rural markets where subscribers cannot get higher speeds and are unable to access more advanced services and applications.

Regulators are setting new targets for broadband access. For instance, in the USA, the FCC now defines broadband as 25 Mbps in the downstream direction and 3 Mbps in the upstream direction. Suburban and rural subscribers are often served over copper loops of 9,000 to 12,000 feet (3 to 4 km), which is beyond the reach of the DSLAM or MSAN to adequately serve these subscribers. Delivering higher speed Internet services to these customers allows Broadband Service Providers to improve the Average Revenue per User (ARPU) and address customer discontent and loss.

### About the BRX-XLR

The Broadband Reach Extender – eXtra Long Reach (BRX-XLR) is a fully integrated solution that **extends the reach of deployed ADSL2+ / ADSL DSLAMs or MSANs to deliver at least 10 Mbps per pair to subscribers at 14,500 feet (4.4 km) in underserved or unserved markets.** An increase in the available bandwidth capacity on existing last mile infrastructure results in higher ARPU, lowered attrition and increased customer satisfaction.

The BRX-XLR offers “new life” for installed DSLAMs and the ‘last mile’ of copper with an optimal way to deliver higher speed services. Broadband Service operators can instantly provide higher bandwidth to subscribers without the heavy expenditures of bringing Fiber to the Home (FTTH).

**THE POSITRON ACCESS BRX-XLR IS THE ONLY PRODUCT IN THE MARKET THAT ELIMINATES MOST OF THE BANDWIDTH LOSS IN THE ‘LAST COPPER MILE’ TO THE SUBSCRIBER.**

### Challenges Addressed by the BRX-XLR

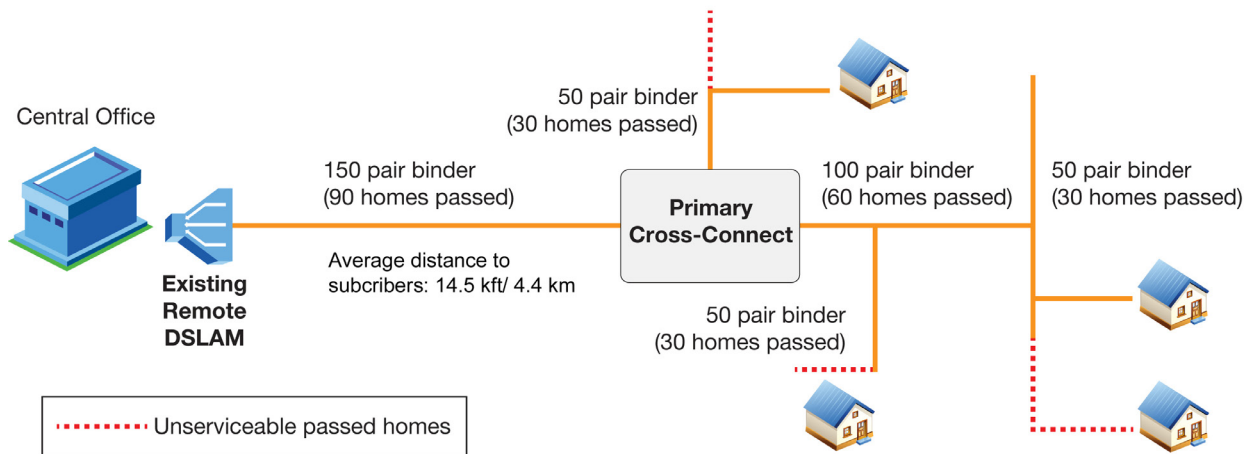
Cost of reaching the subscriber	Time to Market	Customer Satisfaction and Retention
<p>In remote suburbs and rural markets, the cost of reaching subscribers with higher speed services can be an order or magnitude higher than in urban markets. Bringing a DSLAM closer to the subscribers with a fiber link is often cost prohibitive. The BRX-XLR increases bandwidth in the downstream and upstream direction and does not require changes to the subscriber equipment or the deployed DSLAM/ MSAN.</p>	<p>Subscribers are increasingly presented with wireless or satellite alternatives for HDTV and Video streaming. The delays associated with fiber projects may result into lost customers. With the BRX-XLR, subscribers can be served with higher bandwidth in days rather than months.</p>	<p>Operators find that customer churn increases unless they are able to achieve suitable broadband speeds. On the other hand, customers that enjoy higher speed tiers and sign up for Triple Play/IPTV services are a lot easier to retain. A lost customer is very expensive to get back. With the BRX-XLR, customer satisfaction and the ARPU are improved.</p>

## BRX-XLR in Action

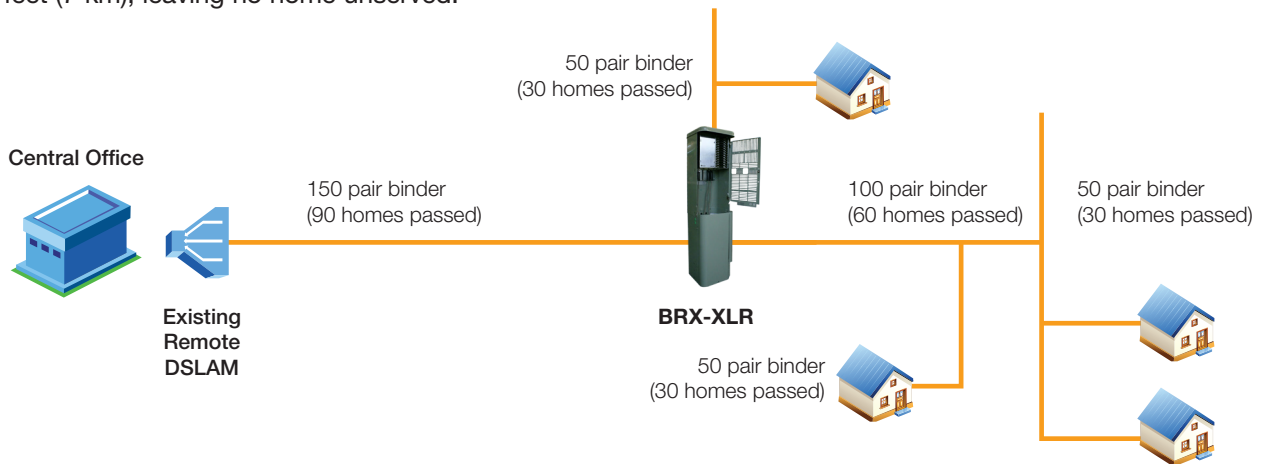
The traditional approach to deliver higher bandwidth to subscribers from a DSLAM is to locate it closer to the subscriber base it is serving. While this is a proven approach in denser markets, it is not always feasible or economical in less dense suburban and rural markets where the BRX-XLR is the ideal solution. It is designed to multiply the bandwidth on each copper pair serving subscribers without having to relocate the existing DSLAM. The BRX-XLR is preferably deployed mid-point between the DSLAM and the typical subscriber location. Precise placement is not critical. It does not have the limitations of other repeaters or boosters.

**THE BRX-XLR SIGNIFICANTLY INCREASES THE BANDWIDTH AND THE SIGNAL TO NOISE RATIO. IT AUTOMATICALLY ADJUSTS TO THE LINE CONDITIONS AND DOES NOT INJECT NOISE INTO OTHER PAIRS IN THE CABLE BINDER.**

Looking at a typical sub-division diagram below, the existing DSLAM is located at an average distance of 14,500 feet (4.4 km) from the subscribers. The service delivered is limited to 1-3 Mbps in the downstream direction and 0.5-1Mbps in the upstream direction with all homes located beyond the 14,500 feet (4.4 km) distance unserved and unserviceable.



By inserting the BRX-XLR at (or adjacent to) the Primary Cross Connect location, the average per pair bandwidth delivered to each subscriber is significantly increased. **Subscribers previously limited to 1-3 Mbps services now receive 10 Mbps downstream and 1 Mbps upstream service per copper pair.** By bonding 2 pairs together with ADSL2+, this means these subscribers have enough bandwidth for 2-3 HD TV channels in addition to Internet access. Furthermore, the previously unserved homes can now be served with a minimum 5 Mbps downstream / 1 Mbps upstream service per pair up to 23,000 feet (7 km), leaving no home unserved.



With the BRX-XLR, true broadband services are available significantly deeper into the access network unlocking additional revenues from existing subscribers and from new subscribers as well.

## BRX-XLR Inner Workings

Each copper pair is automatically, individually and dynamically handled for optimal performance. There is no limitation on minimum distance from the BRX-XLR. Customers can be across the street or 6,000 to 9,000 feet (2 to 3 km) away. Based on real-life testing on copper plants, the BRX-XLR achieves up to 200% (and more) bandwidth improvement in the downstream direction and it can achieve 1 Mbps per pair in the upstream direction with Annex A on 24 AWG / 0.5 mm copper pairs.

The advanced processing and adjustment to each copper pair by the BRX-XLR is 100% compliant with applicable international ADSL and ADSL2+ standard. It improves the signal to noise ratio (SNR) in the binder cable therefore reducing the impact of data crosstalk within the cable binders. There is no need to replace the subscriber CPE with the BRX-XLR.

The BRX-XLR is extremely simple to install and operate. It is powered from the low voltage sealing current already found on the copper pairs. Since it can be located adjacent or as a replacement to an existing primary cross-connect or neighborhood wiring pedestal, it does not typically require any new right-of-way negotiation or permit.

## BRX-XLR Deployment Considerations

Looking at a typical access network, there are multiple locations recommended for the installation of the BRX-XLR:

- An ideal location is the **Primary Cross-Connect Panel**, usually found within 4,000 to 6,000 feet (1.2 to 1.8 km) from the subscribers and 6,000 to 8,000 feet (1.8 to 2.4 km) from the DSLAM. Operators may find that this location is best suited for ADSL2+ technology to deliver a solid 10 Mbps performance over each copper pairs.
- Other locations are at splice points in the cable binder between the DSLAM and the subscriber(s).

### Key Benefits

With the BRX-XLR, operators can cost effectively extend the reach of existing DSLAMs over the copper loops and deliver Triple-Play and Premium Internet services to subscribers. The BRX-XLR offers significant Capital and Operational savings for a superior Return on Investment. In addition to extending the reach and delivering reliable bandwidth services, the BRX-XLR is designed to:

- **Allow re-use of existing right of way** when installing the BRX-XLR at or adjacent to an existing Primary Cross Connect or Neighborhood Wiring Pedestal, eliminating the need for any new city permits. This is especially true when compared to alternate solutions such as installing a DSLAM or MSAN closer to the subscriber base or deploying Passive Optical Network (PON) solutions
- **Achieve shorter time to market (and revenues)** The BRX-XLR can be installed in hours, not months. All that is needed is to insert the BRX-XLR between the existing DSLAM and the subscribers to multiply the bandwidth available from the existing copper infrastructure. The BRX-XLR is powered from the sealing current already present on the copper pairs serving the subscribers: there is no need for local power
- **Eliminate complex civil engineering** work when re-using the existing copper infrastructure from the existing DSLAM through the BRX-XLR toward the subscriber serving area
- **Flexible and extensible packaging:** the BRX-XLR is offered in packages consisting of a sealed 1 or 2-pair enclosure. For larger deployments serving a cluster of subscribers, the BRX-XLR comes in a small footprint sealed enclosures or in standard low-rise telecom pedestals to host 24 or 48 pairs.

### Summary Features

- Strict adherence to xDSL standards for optimal performance under all conditions
- Operates with ADSL and ADSL2+
- Optional alarm and diagnostics module to reduce OPEX and truck rolls
- Powered from the existing sealing current on the copper pairs
- Extended operating temperature: -40°C to +65°C