

# Customer Success Story

TRN, a medium-sized Swiss cable operator based in Nyon on the Lake of Geneva, delivers cable television services to private households. In order to respond to the high request for internet services TRN needed to provide secure and cost-effective return path facilities. Finding the right solution appeared to be very difficult.



Télé réseau de la Région Nyonnaise SA

## Legacy Network

The layout of the network built by Swisscom in the 90's is a typical passive Point-to-Multipoint fiber network delivering 1550nm CATV broadcast services over EDFAs and splitter tree type architecture. Each distribution network serves 256 homes. The Head End is designed to serve totally approx. 10,000 homes.

An optical receiver located at the subscriber's home converted the optical downstream signals into RF signals.

## Requirements

In 2002, EMC SA was asked by TRN to provide an offer for the implementation of the Return Path (RP) on existing infrastructure. A meeting was arranged for TRN to explain the nature of the challenge and the difficulty in finding the right technical solution.

Four main requirements were formulated:

- Fast deployment and good ROI are essential.
- Compatibility with DOCSIS-Standards.
- Compatibility with present CATV broadcast services.
- No intervention in the outside plant.

## Approach

EMC SA accepted the challenge to design and manufacture a complete solution. In order to provide TRN with the best suitable solution a three-point critical decision path approach was adopted:

### Solution selection:

consisted in the analysis and feasibility study among four possible solutions.

Based upon this analysis, an idea for a solution was presented and mutually agreed upon.

### Testing and prototyping:

After various preliminary tests EMC SA built the first prototypes in a very short time. The aim of these prototypes was to demonstrate the basic functionality of the idea and verify

its behaviour when operating in the existing network. These prototypes enabled TRN to simulate various operating conditions and thus identify any limitation of the system.

### Product design & manufacturing:

After customer acceptance, and completion of the product design, TRN placed the order. Realisation of the products started immediately beginning 2003.

## Key issues

Although a dual fiber infrastructure was deployed, the use of the second fiber for the RP was not economically viable. Thus only the one fiber solution for both directions could be considered.

One of the most critical issues in a tree network environment is the particularly high optical budget of approx. 30 dB due to the cascade of 4x1:4 splitters. Another key issue was the high number of subscribers connected to the tree structure. So one of the great challenges we were faced with was to ensure an outstanding signal quality (S/N) of the return path at the CMTS.

## Solutions and Products

At the Head End the **OptiMux** platform consisting of a Multiple Return Path Receiver **RXR-4000** in conjunction with the **OWM-2110** was designed for handling a large range of level inputs without further deteriorating the S/N on the return channels. At the subscriber's home the Home Receiver **RX86-2000** incorporating the **OWM-0010** module performs the signal conversion in both directions.

## Achievements

Mid 2003 EMC SA installed and commissioned the OptiMux for the entire network. The plug & play design enabled switching from a one-way to a bi-directional network with almost no interruptions of the down-

stream signals. In August the first series of new Home Receivers were simply connected to the network. Since then further connections to internet have been made gradually, directly by TRN.

## Conclusion

The scenario described above is, in fact, what **EMC** excels at. Besides a clear understanding of CATV technologies, design capability and engineering flexibility are absolutely necessary to ensure the realisation of such very qualified solutions.

The fact is that the implemented solution enables the operator to provide cost effective interactive services on a tree architecture network.