

Digital RF Overlay – The Future of CATV Broadcast Networks

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FIGURE 1

Global architecture of the system developed.

FIGURE 2

Laboratory prototype and final system implemented.

Current CATV broadcast systems, even those based on optical fiber transport using Radio over Fiber technology, have many limitations in terms of network range, to ensure the required quality of the signal received at the customer's equipment. For this reason, in the conventional approaches, the number of headends and stations along the network to capture, distribute and regenerate the quality of the signal is relatively high. This aspect is responsible for a substantial part of the installation, operation and maintenance costs of CATV networks currently installed.

The system developed by the Radio Systems group at Instituto de Telecomunicações – Pólo de Aveiro in collaboration with the PT Inovação, under the pro-



ject Digital RF Overlay, allows the full digitalization at a single network headend of the radio frequency spectrum used by CATV systems (47- 870 MHz), its digital transmission over optical fiber, using traditional digital Ethernet connections, in the core network and the efficient reconstruction of the analog CATV signal in the desired network locations (Fig. 1), substituting in this sense a complete and very expensive headend that would be installed using current network architectures and technologies. This allows transmitting the signal to much higher distances with virtually no degradation of the signal quality, allowing a major evolution of the CATV networks in the near future, with significant advantages in terms of quality/cost ratio, distances covered, energy consumption, maintenance costs and space occupied by the equipment.

The system was developed using software defined radio concepts and techniques and implemented in high speed, state-of-the-art FPGAs, DACs and ADCs (Fig. 2). This solution for CATV signal digitalization and its transmission over fiber optic is compatible with any broadcasting system, analog or digital, and was validated in laboratory first, subsequently demonstrated successfully in the operator CATV distribution network and is ready to be deployed in large scale.