

---

Waikiki, Hawaii, 29 June – 3 July 1998

Question: 4/15

SOURCE<sup>1</sup>: VOCAL Technologies Ltd. (<http://www.vocal.com>)

TITLE: G.hs: Cross-talk Impairment Identification.

---

### **ABSTRACT**

xDSL modems will be sensitive to impairments created from excessive cross-talk with other lines carrying ISDN, T1/E1 or even other xDSL modems. Some studies have indicated that xDSL operation may not be possible if another pair of wires in the same cable bundle is carrying ISDN or T1/E1. Since the wiring plant for a telephone operating company evolved over many years, it is unrealistic that the routing of these digital signals can be determined in advance when a customer orders xDSL service. We propose the addition of some relatively simple functions in a xDSL modem in order to aid with the determination of these potential problems.

---

<sup>1</sup> Contact: Victor Demjanenko, Ph. D.  
Alberto Torres, Ph. D.  
VoCAL Technologies Ltd.  
Buffalo, NY 14228, USA

E: victord@vocal.com  
E: jatorres@vocal.com  
T: +1-716-688-4675  
F: +1-716-639-0713

## **1. Introduction:**

xDSL modems will be sensitive to impairments created from excessive cross-talk with other lines carrying ISDN, T1/E1 or even other xDSL modems. Some studies have indicated that xDSL operation may not be possible if another pair of wires in the same cable bundle is carrying ISDN or T1/E1. Since the wiring plant for a telephone operating company evolved over many years, it is unrealistic that the routing of these digital signals can be determined in advance when a customer orders xDSL service. We propose the addition of some relatively simple functions in a xDSL modem in order to aid with the determination of these potential problems.

## **2. Cross-talk Impairment:**

The telephone network has systems that work in different allocation bands. Those systems potentially can disturb xDSL modems in a way that the functionality of the modem is very far away from the expectations due, to the cross-talk of other systems. We propose a method for the identification of this disturbances.

This consideration shall consider the different characteristics of each country and region (such as the different allocation of the European and North-American ISDN).

With measurements in the different frequency bands it will be possible to determine the cross-talk level, from different systems (ISDN, T1/E1, HDSL, ADSL, VDSL, etc.) carried in the same cable bundle with the xDSL modem.

We propose that G.hs support additional messages to request and respond with the signal level measurements at the frequencies of interest. A general approach would be to specify the frequency to be measured. Known tone detector algorithms, such a Goertzel tone detector, can be used in a programmable fashion using a coefficient for the center frequency and number of iterations for evaluation controlling the sharpness of the tone detector. G.hs should provide for a message requesting the remote modem to perform a power measurement at a particular frequency or set of frequencies and report the measurement information in a reply G.hs message.

The DFT procedure used in the receiver can be by-passed for this measurement procedure. It is also possible to measure power of frequency using the DFT coefficients themselves. Alternatively, the DFT coefficients can be used to recreate the time domain signal for the frequency measurement .

## **3. Summary:**

1. This paper should be present in the G.hs agenda.
2. We proposed that the G.hs include this algorithm to determine the effect of the cross-talk in the xDSL modems.