

A simple method to measure “alien crosstalk”

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0. Summary

Here the definitions of crosstalk parameters as defined in the latest draft of ASTM D 4566 20XX are used [1].

Alien NEXT can still be envisioned to be measured from the equipment room side, where it is the most pronounced, using conventional equipment. However ACR – F is practically impossible to measure, using the actual measurement principles.

Therefore, it is proposed here to use a radically different measurement principle, which is easy to use and is field adaptable.

1. Background

While near end crosstalk measurements can be carried out relatively easily from the equipment (EQ) side of the channels, i.e. at the floor distributor (FD) in the equipment room, the picture is totally different for the assessment of far end crosstalk performance. This is mainly due to the fact that the telecommunication outlets (TO) are spread out over the floor area where the network is installed.

To get out of the dilemma of the alien crosstalk problem, it seems that mitigation techniques have to be deployed and the installation practices may have to be revised.

However, for installation acceptance purposes we will need nevertheless a test method for the alien crosstalk. We can state that it is to all practical purposes impossible to use active remotes which have to be necessarily linked via wireless connections.

Why not select right away with wireless LAN installations?

Hence, the only reasonable way is to use white noise sources, and to use a local instrument which works in the time domain like a spectrum analyzer. The closest example to the knowledge of the author is the Fluke LAN tester.

A preliminary study, using a random noise generator and a spectrum analyzer for such testing has been made in 2000, using an HP spectrum analyzer. The results have been presented at the IWCS in Atlantic City [2]. In the, to this article

connected, presentation the alien crosstalk measurement has already been addressed [3].

2. Outline

What is required is a multitude of 100 Ohm terminations for the four pairs of each channel. These terminations have to be combined either with the appropriate connectivity based upon RJ-45. The implementation of such terminations may include the equipment cord and work area cord, including both their peripheral connectors into the measurement.

Here it is proposed to use, at least for the purpose of the alien crosstalk measurements complete channels, i.e. channels including the connectors at the equipment itself and the terminal equipment. Thus the use of peripheral pig-tails is for the ease of deployment of the measurement procedure avoided.

On the powering side of each channel it is proposed to use a white noise generator, which is either battery operated or which is powered by a plug-in readily available power supply. These powering devices should have as a main component a white noise generator, with 100 Ohm balanced output and a bi-polar random noise. The output has to be amplified, and shall have a flat voltage level in the range of approximately 1-2000 MHz. The amplified output runs through a power splitter, into all four pairs of a channel simultaneously.

The main instrument with its remote (to be able to carry out also the most common measurements) has to work in frequency domain like a spectrum analyzer. It is estimated that the measurement time is less than 5 minutes. The time of course shortens with the number of white noise power supplies increasing.

In the following the schematic for such a test configurations for alien NEXT and alien FEXT are indicated in the Fig. 1 and Fig. 2.

3. References

- [1] ASTM 4566-20XX Draft as being actually revised.
- [2] J.-H. Walling and R. Pederian: Cross - Talk Measurements with Random Noise Sources.
Proc. 49th IWCS, 2000 in Atlantic City
p. 129-134
Presented here in full with permission of IWCS
- [3] J.-H. Walling: Cross - Talk Measurements with Random Noise Sources.
Presentation given at the 49th IWCS 2000 in Atlantic City.

Note: The figures 1 and 2 are given in separate pdf files.