P802. Static Discharge in Copper Cables Ad hoc
Unconfirmed minutes

The Chair, Dan Dove, called the meeting to order at 7:10PM in room 1624 of the Marriott Downtown in Portland, Oregon.

Minutes of the last meeting in Hilton Head were not confirmed, as the attendees had not reviewed them.

Introduction

Chris DiMinico -   last meeting we discussed a need to have a load characteristic model.

Rick Brooks reported that he provided a SPICE model to the web-site. It's a simple model of cable discharge; W model in HSPICE for single twisted pair.   The SPICE model simulates different pins of the RJ-45 making contact at different times, resulting in a differential voltage into the PHY.

Rick - Believe that differential discharge through the transformer is the source of device failures.

Chris - TIA has started a committee to look at cable discharge, independent of 802.3 activities.   802.3 can send work to TIA, or request specific information from TIA. There is an active group in TIA ready to take this on. TIA group agreed that a model is the first step.

Dan - Question of how much charge is on cables in the field, how does it get there, how long does it last?

Chris - Humidity may be the most significant variable in cable charging.

Dan - the issue at hand is relatively high field failures. The destruction of a single port results in entire box being sent back to the vendor. The goal is to define a method of measurement, in order to develop a specification that vendors must meet.

Chris: Need to define what is the waveform to which the interface must be subjected

There was an open action item from Hilton Head, in which Terry Cobb and Chris volunteered the absent Henry Hinrichs to provide transformer model / details for non-linear behaviour of transformers during cable discharge. Terry will Cobb to contact Henry regarding this.

Dan Dove presentation: "HP's Test Methodology for CDE"

Dan is not recommending HP's procedure as a standard approach. HP has seen correlation to field failures, but the test is not truly the same environment. Failures occur when cable is inserted, or when opposite end is inserted. Result is damage to the PHY IC. Some devices more susceptible to others, modes of failure are different. ESD production diodes or other structure experience punch through effects.

The basic experimental method is to plug in a cable to the DUT, with the opposite end having wires exposed. A Human Body Model ESD gun is applied to each wire individually, so that the DUT sees a differential ESD hit. 6KV is the pass/fail criteria.
Dan's hypothesis: : The integral of voltage x time (total energy dissipated) is the issue.

Proposed further experiments:
        Evaluate specific devices for their characteristic point of failure.
        Vary V, I, and T independently to how point of failure tracsk
        Determine if a "Low Voltage" method of test can be constructed.

There is anecdotal evidence that the trouble does not occur with STP (fewer failures in Europe).

Chris: Cable testers used to see failures, but now they're protected.

Geoff Thompson - we need to know mode of accumulation of charge, and rate of accumulation (so we know how fast charge has to be bled off).

Action Items:

1. Dan: Experimentation of I vs. T, total energy relationship.
        See if can come up with a low voltage test methodology.

2. Rick: Will point to the appropriate NEBS testing ("Lightning Immunity")

3. Chris to communicate to TIA requested information for how cable charges, how charge is dissipated.

This adhoc will not meet in Copenhagen

Dan Dove adjourned meeting at 8:45PM

Attendees:

Name	**Affiliation**	**E-Mail**
Alan Flatman	LAN Technologies	a_flatman@compuserve.com
Tom Debiec	Berk-Tek	thomas.w.debiec@berktek.com
Terry Cobb	Avaya	tcobb@ixpres.com
Chris DiMinico	CDT Corporation	cd@mohawk-cdt.com
Kevin Brown	Broadcom	kbrown@broadcom.com
Rick Brooks	Nortel	ribrooks@nortelnetworks.com
Cindy Monstream	Ortronics	cmontstream@ortronics.com
Michel Bohbot	Nordx / CDT	michel.bohbot@nordx.com
Andy Baldman	UNH IOL	aab@iol.unh.edu
Naresh Raman	LSI Logic	naresh@lsil.com
Eric Lynskey	UNH IOL	elynskey@iol.unh.edu
Bob Noseworthy	UNH IOL	ren@iol.unh.edu
Robert Busse	Transition Networks	robertb@transition.com
Bob Grow	Intel	bob.grow@intel.com
Geoff Thompson	Nortel	thompson@ieee.org
Mike McCormack	3Com	mike_s_mccormack@3com.com
Dave Dwelley	Linear Technology	ddwelley@linear.com

Meeting notes submitted by Kevin Brown, 7/11/01