IEEE Product Safety Engineering Society

Minutes of the IEEE PSES TSTC teleconference held Wednesday, January 22 at 11:00 AM EST

1. **Attendance/Introductions**

   Members present: Don Gies (Alcatel-Lucent), Al Martin (Somewhat retired), Mick Maytum (MJMaytum). Joe Randolph (Randolph Telecom), Anne Venetta-Richard (Alcatel-Lucent) Jim Wiese (Adtran)

   Members absent: Tim Ardley (Adtran), Philip Havens (Littelfuse),Paul Ng (GE Energy),Doug Parker (Adtran), Dan Roman (Colgate Palmolive), Tom Smith (TJS Technical Services Inc), Steve Zugay (Cree), Peter Lim (Alpha Technology), Gary Schrempp (Dell), Peter Tarver (Enphase Energy)

2. **Meeting arrangements**

   Don Gies supplied the call-in number:
   Bridge No. (Toll Free): 1-800-771-8734
   International Access: +1-647-723-3953
   Access Code: 5825978

3. **Previous meeting minutes**

   The minutes from the last meeting were approved as submitted

4. **New business**

   Any new business?

5. **Lightning Surge Damage to Ethernet and POTS Ports Connected to Inside Wiring - Joe Randolph**

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   Per recommendation from TSTC, Joe Randolph has begun to draft a proposed paper to submit at the ISPCE 2014 Conference in San Jose, CA (attached).

   Joe: Mick - Clarify NTT proposal re 13 kV
   Mick: The test is port-port AC to Ethernet (see special requirements in K.44)

   Joe: is there anything in the public domain that could be used as a reference?
   Mick: No

   Joe: What are considered to be high rates of failure?
   Jim: Do you mean acceptable rates of return, or what is being experienced?
   Joe: I think it depends on the number of units in the field (agreement)
   Jim: Less than 1% of yearly sales would be good. We shoot for <0.5% of sales for all causes (not just lightning). We don't have a defined lightning return rate. We would like to get down to <1% due to lightning. The product changes over time, so hard to set a benchmark.

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. We're down to less than 1% in the last 6 months, but that isn't high lightning period.

Joe: That's consistent with what I said. NTT has graph in its powerpoint presentation that seems to say that 0.5% was unacceptable. My conclusion is that for some carriers <0.1% is what we need. As long as that isn't completely wrong, I'll go with it.

Jim: There is a lot of variation of failure rates form customer to customer. The failure rates depend on how the installation is done. Customers that are diligent in their installation practices have a relatively low failure rate. The method of terminating the fiber-locate wire is a particular source of failure, and also leaving the old phone wire connected. Poor installation practices result in the worst damage to equipment. Customers with good installation practices have failures, but they are not massive, and appear to be due to GPR. After 3 years of hard work, including training customers, we expect to get our lightning failure rates down to less than 0.1%.

Joe: What is the typical worst case for surges on the AC mains? It appears that you need at least 6 kV to do damage.
Jim: 2 kV, as long as you have protectors.
Joe: If surges don't exceeed 6 kV I don't see how capacitive coupling is a problem.

Don: The assumption is surges on the AC mains don't exceed 2.5 kV.
Jim: There is an IEEE document on AC surge requirements – says 6 kV
Mick: Yes [C62.41.2]
Jim: We shoot for 6 kV
Don: There is a guide IEEE std 1692 [IEEE Guide for the Protection of Communication Installations from Lightning Effects] that says 6 kV.
Jim: There was a contribution from Thompson Electronics in TR41.7 had a goal of upgrading surge to 10 kV, because they said that their failure rate at 6 k was unacceptably high.

Joe: Y-caps [which bridge the insulation barrier] undergo brutal testing, so they don't usually fail.

Mick: According to IEEE C62.41.2, the size of the test surge depends on the location of the equipment. Varies from 6 kV 500 A to 10 kV 10 kA.

Joe: I want to understand better how NTT established the 13 kV test.

Jim: Look at background material for UL1449.

Al: C62.50 [IEEE Standard for Performance Criteria and Test Methods for Plug-in (Portable) Multiservice (Multiport) Surge-Protective Devices for Equipment Connected to a 120 V/240 V Single Phase Power Service and Metallic Conductive Communication Line(s)] is useful for assessing multiport devices such as surge-protected plug strips. C62.72 [IEEE Guide for the Application of Surge-Protective Devices for Low-Voltage (1000 V or Less) AC Power Circuits] deals with protection of AC circuits.

Joe: The way surge protectors interact can cause problems

Don: Placing a surge arrestor inside the building invites the surge to enter the building – not a good thing.

Joe: Surge protectors remote from ground create problems when the surge is trying to get back to ground. Theory 1 [catastrophic breakdown of insulation] blows up characterizes surges that blow up equipment. Could look for that in field failures. Theories 2 and 3 characterize failures that don't result in blown up equipment. In analyzing field failures, try to figure out what the failure mechanism was.

Mick: A recent paper from NTT looked at surge on Ethernet port. It showed that a surge can route through the Ethernet port and out the POTS port.

Jim: that can happen to ONTs that don't have a ground [typically located inside a structure]. The insulation barrier from Ethernet to POTs is lower than that from Ethernet or POTS to AC line.

Mick: Test level >13 kV [AC mains to Ethernet] is what NTT felt that was needed to get below 0.1% failure. Ethernet to POTS needs to be > 7kV

Jim: the 13 kV needs to be on mains insulation, because POTS ports have a ground.

Don: Japan bases testing on IEC 60950.

Joe: Test levels in UL 60950 are lower than needed in Europe [120 V vs 240 V main].

Don: Japan mains practice is close to the North American one. But generally products are designed for world-wide use, so take worst case.

Joe: It's Possible that AC mains problem that NTT is struggling with is the result of the mains breaking down at lower voltages than those in the US.

6. Proposed Changes to UL50/UL50E – Don Gies

In the latest proposed revision to UL 50, 12 Edition, UL is proposing disallowing the use of magnesium cast enclosures under UL 50. However, outdoor telecommunication enclosures are evaluated using UL 50 and UL 50E in conjunction with one another, and manufacturers are choosing magnesium/aluminum alloy enclosures for outdoor equipment such as remote radio heads for aerial mounting because they are lighter than aluminum enclosures.

7. **Additional agenda items**

   None

8. **Old Business**

   None.

Next meeting

Proposed Wednesday, 26 February 2014, at 11:00AM EST

Respectfully submitted,

Al Martin

Secretary

Participant	Employer	Telephone	E-mail	IEEE Member?	PSES Member?	Linkedin Subgroup	Other Committee
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Peter Lim	Alpha Technologies	+1-604-638-8687	peter.lim@alpha.ca				
Al Martin	Tyco Electronics	+1-650-361-5822	amartin@tycoelectronics.com	X		X	3
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Anne Venetta-Richard	Alcatel-Lucent						
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Steve Zugay	Cree	+1-919-850-6219	szugay@bellsouth.net			X	

Guest: Jack Burns, Dell, IEEE PSES, VP Technical Activities

Chair: Peter Tarver

Vice Chair: Don Gies
Secretary: Al Martin

1) UL Standards Technical Panel for Subjects 60950-1, -21, -22, -23
2) TIA TR 41.7, TR41.7.1
3) IEEE Surge Protective Devices Committee
4) ATIS Protection Engineers Group
5) ITU-T, SG5, WP1
6) Canadian National Subcommittee for IEC TC108
7) TIA TR 41.7.10 (Smart Grid)
8) US TAG to IEC TC 108

Other LinkedIn members:
hifi cha, China (Independent Consumer Electronics Professional)
Jeff Whitmire (Manager, Regulatory Compliance at Adtran)