

# ATAAB ADVISORY NOTE

## TRAC Analogue Type Approval Advisory Board

ATAAB Advisory Note Number: AN 16R000

Date: 1999-10-13

**Subject:** Amendment of the test for compliance for resistance to earth to reduce the influence of the feeding bridge on the results of the measurement.

### APPLICABILITY

This note is applicable for Terminal Equipment intended for connection to Public Switched Telephone Networks, in addition to:

X	"CTR 21"
X	"CTR 37"

### In consideration of the following:

- The results of the current test in TBR 21 Clauses A.4.4.4 and A.4.7.5 are subject to significant levels of uncertainty resulting from the design of the feeding bridge.

### Background:

#### Terminal Equipment Off-line (On-hook)

The reason for the requirement in clause 4.4.4 is to enable network operators to test their lines for maintenance purpose. When doing that, the normal feeding voltage is disconnected and a test voltage is connected between the line and earth. The TE should then have a sufficient high resistance to earth not to interfere with this maintenance test.

This means that when testing the TE there is no need for a feeding voltage during this test.

With this approach we will prevent the problem with having the feeding voltage and the test voltage in series and at the same time the test will be done under the same circumstances as when the network operator is performing maintenance tests.

#### Terminal Equipment On-Line (Off-Hook) state

The problem to measure the resistance to earth in the loop state in TBR 21 clause A.4.7.5 is that the voltage from the feeding bridge has significant influence on the measurement result. This proposal tests

the TE with both polarities for the feeding voltage and the 100V test voltage.

This method takes into account the fact that the resistance from La to earth and from Lb to earth, as seen at the NTP, will be identical to the resistance between La and Lb in loop state and this is very low when compared to the required resistance to earth. As a result of this proposal, the eight measurements originally required are reduced to four.

**ATAAB advises the following:**

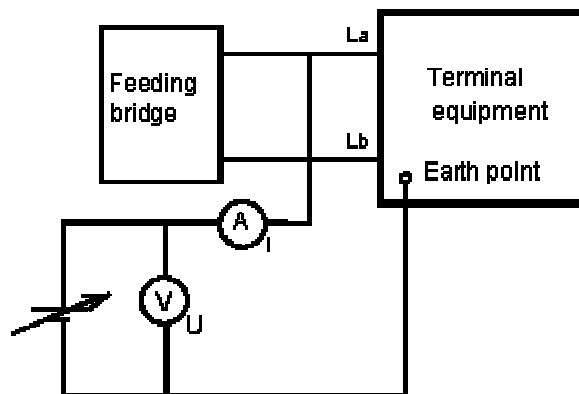
**For the purpose of Clause 4.4.4 and the tests of Clause A.4.4.4**

The Terminal Equipment is no longer required to meet the resistance about earth in the off-line state for both line polarities (See Clause A.4.2.1). For the purpose of the test of Clause A.4.4.4, the feeding bridge shown in Figure A.8 is removed and the test equipment is directly connected to the TE under test.

**For the purpose of Clause 4.7.5 and the tests of Clause A.4.7.5**

**The following revised test for resistance to earth measurement in the on-line state (TBR 21 clause: A.4.7.5):**

Test configuration:



Measurement execution:

- 1) Connect the positive side of the feeding voltage to line terminal La of the TE;  
Connect the positive side of the test voltage to line terminal La of the TE;  
Measure the current  $I_1$ .
- 2) Connect the negative side of the feeding voltage to line terminal La of the TE;  
Connect the positive side of the test voltage to line terminal La of the TE;  
Measure the current  $I_2$ .
- 3) Connect the negative side of the feeding voltage to line terminal La of the TE;  
Connect the negative side of the test voltage to line terminal La of the TE;  
Measure the current  $I_3$ .
- 4) Connect the positive side of the feeding voltage to line terminal La of the TE;  
Connect the negative side of the test voltage to line terminal La of the TE;

Measure the current  $I_4$ .

Formal processing:

Calculate the resistance to earth in branch La and Lb according to the formula:  $R_p=100/(I_1+I_2)/2$   
and  $R_n=100/(I_3+I_4)/2$

Verdict: If  $R_p$  and  $R_n$  is greater or equal to 1Mohm then Pass; else Fail. (from TBR 21)