



Technical Specification 48-6-9

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**Communications Bearers Used for the  
Provision of Teleprotection Channels**

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## Communications Bearers used for the Provision of Teleprotection Channels

### 1 SCOPE

This specification describes the functional and performance requirements for physical layer communication media or bearers used in tandem connection to convey the following teleprotection communication channels.

- Category 1 services as defined within ENA TS 48-6-7
- Category 2 services as defined within ENA TS 48-6-7
- Category 3 services as defined within ENA TS 48-6-7

As such there exist direct interdependencies of the parameters of the tandem connection bearers defined within this specification on the parameters of the teleprotection services, defined in ENA TS 48-6-7 Issue 1, Amendment 1, Feb 2008. The purpose of this document is to detail the modifications to ENA TS 48-6-7 Issue1, Amendment1, Feb 2008, applicable for the specification of tandem connection bearers to convey the services as defined in ENA TS 48-6-7 Issue 1, Amendment1, Feb 2008.

In addition to the common clauses 3 types of performance are defined to enable the engineer to match the performance characteristics of the overall tandem connections of bearers with the overall performance requirements of the teleprotection communication channel. The maximum number of tandem bearer connections used to convey ENA TS 48-6-7 teleprotection communication channels is defined in the table below and as such presupposes the definition of the parameters of this specification.

ENA TS 48-7-7 Teleprotection Service Category	Max Number of Tandem Communication Bearer Type		
	Bearer Type 1	Bearer Type 2	Bearer Type 3
Category 1	3	N/A	N/A
Category 2	5	5	N/A
Category 3	15	15	3

Note: The definition of the overall tandem connection of bearers includes each and all intermediate network elements that may be utilised to interconnect and manage individual bearers. That is it is intended that the performance of such devices should be incorporated and accounted for within the definition of the individual bearers of the tandem connection. The mechanism and demarcation associated with the definition of the components of the individual bearers is outside the scope of this specification and as such is at the discretion of the individual EUCs.

The specification covers inter-substation communication bearers only.

The specification defines augmented requirements for the following types of communication bearers:

- (a) 1024/2048Kbits 120 Ohm; co-directional duplex transmission to ITU-T G.703
- (b) 1024/2048/8448Kbits 75 Ohm; co-directional duplex transmission to ITU-T G.703
- (c) STM 1/4 to ITU G.957
- (d) 10/100BaseT and 100BaseFX to IEEE 802.3 (To Be Advised)
- (e) 1000BaseSX to IEE 802.3z (To Be Advised)

In the event of a conflict between the specified parameters of the above referenced specification and the requirement set out within this specification, then this specification shall take precedence.

## **2 DEFINITIONS**

The following definitions apply for the purposes of this Specification:

### **Communication service or communication link**

The total mechanism or equipment by which information is conveyed between two points.

It may comprise one or more types of bearer and provide one or more communication channels (see below) together with interfacing equipment located within The Electrical Utilities Company (EUC) substations.

### **Communication media or bearer**

The physical layer entity which propagates the communication signals. It may form part or comprise all of the communication link or service.

### **Communication channel**

The part of the communication link or service, which is dedicated to the conveyance of information, (in both directions), for a single prescribed protection function. One medium may support more than one channel by the use of time division, frequency division or wavelength division multiplexing techniques.

### **Differential delay**

Differential delay is caused by delay asymmetry in the go and return path of a particular bearer. It is defined as the difference between the absolute values of go and return path propagation delay.

### **Optical loss margin**

The difference between the installed fibre optic bearer 'end to end' loss, and the optical budget.

### **Optical budget (dB)**

The difference between the guaranteed minimum transmitter optical output (ie the power launched into the core of 1 metre of the specified fibre) and the guaranteed minimum receive power which will enable the receiver to operate at the specified bit error rate over the specified temp range.

### **Optical connector insertion loss (dB)**

The optical loss across a pair of mated connectors.

### **Pulse Code Modulation (PCM)**

A technique used to digitise analogue information for transmission on a multiplexed digital communication link.