



INTERNATIONAL TELECOMMUNICATION UNION

**CCITT**

THE INTERNATIONAL  
TELEGRAPH AND TELEPHONE  
CONSULTATIVE COMMITTEE

**I.221**

(11/1988)

SERIES I: INTEGRATED SERVICES DIGITAL  
NETWORK (ISDN)

Service capabilities – Common aspects of services in  
the ISDN

---

**COMMON SPECIFIC CHARACTERISTICS OF  
SERVICES**

Reedition of CCITT Recommendation I.221 published in  
the Blue Book, Fascicle III.7 (1988)

---

## NOTES

1 CCITT Recommendation I.221 was published in Fascicle III.7 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

## Recommendation I.221

### COMMON SPECIFIC CHARACTERISTICS OF SERVICES

(Melbourne, 1988)

#### 1 Introduction

The principles of telecommunication services supported by an ISDN and the means to describe them are given in Recommendation I.210.

The attribute technique and values of attributes, which form part of the standardized description method, (see Recommendation I.130) for services, are given in Recommendation I.140.

This Recommendation refers to and details the common specific characteristics of services for both basic services and supplementary services.

#### 2 Scope and content of the Recommendation

This Recommendation identifies and describes those common specific characteristics of services which are a common feature of each of the individual services and which help to form a relationship between services.

These characteristics are used in a consistent manner throughout the ISDN services and are intended to be service independent. They are used, for instance, to help to identify the situations under which certain supplementary services are invoked during the operation of basic services.

#### 3 Common specific characteristics

##### 3.1 Definition of "busy" in an ISDN

###### 3.1.1 Scope

This section describes the conditions under which a given ISDN destination is considered "busy". In general, this occurs whenever the resources associated with that destination (and needed to successfully complete the call) exist but are not available for the call. In existing networks, such as the PSTN, this is indicated to the calling subscriber by "busy tone".

In addition, the operation of certain ISDN supplementary services occurs when certain of these resources are busy. Therefore, these "resource busy" conditions are also described herein.

This section does not cover the cases where network resources not associated with a given destination are unavailable, or when such resources are out-of-service or otherwise non-functional.

###### 3.1.2 Resources

Two main categories of resources may become involved in the determination of "busy": interface resources and customer resources.

*Interface resources* include the signalling channel (D-channel), other physical channels (B- and H-channels), logical channels (for packet-mode services) and maximum number of calls supported. It is noted that with the ongoing activities on "calls versus connections" other interface resources may become important in the future.

For the purposes of this Recommendation, the signalling channel is considered to be always available and with sufficient capacity to handle signalling for new calls. Situations where this is not true are considered to be "failure conditions" and are not covered here. For the other interface resources, descriptions are given below of what is meant when they are considered busy.

*Subscriber resources* include the terminal(s) themselves and the persons or processes using them. For the purposes of this Recommendation, it is not considered significant which of the subscriber resources are busy, or why. An indication from the subscriber that (some, necessary) subscriber resources are busy is sufficient.

### 3.1.3 *Resource busy conditions*

Three resource busy conditions have been found necessary to refer to and are defined below:

- 1) channels busy: this condition occurs when there is no appropriate information channel (physical or logical) available for the network to use for the call.
- 2) maximum number of total calls reached: this condition occurs when the maximum number of total calls supported at the given subscriber's interface(s) has been reached.
- 3) subscriber busy: this condition is indicated by the subscriber's terminal equipment, e.g. by having all compatible terminals which could respond to the call request indicate "user busy" either when they are offered a call, or in response to an enquiry from the network.

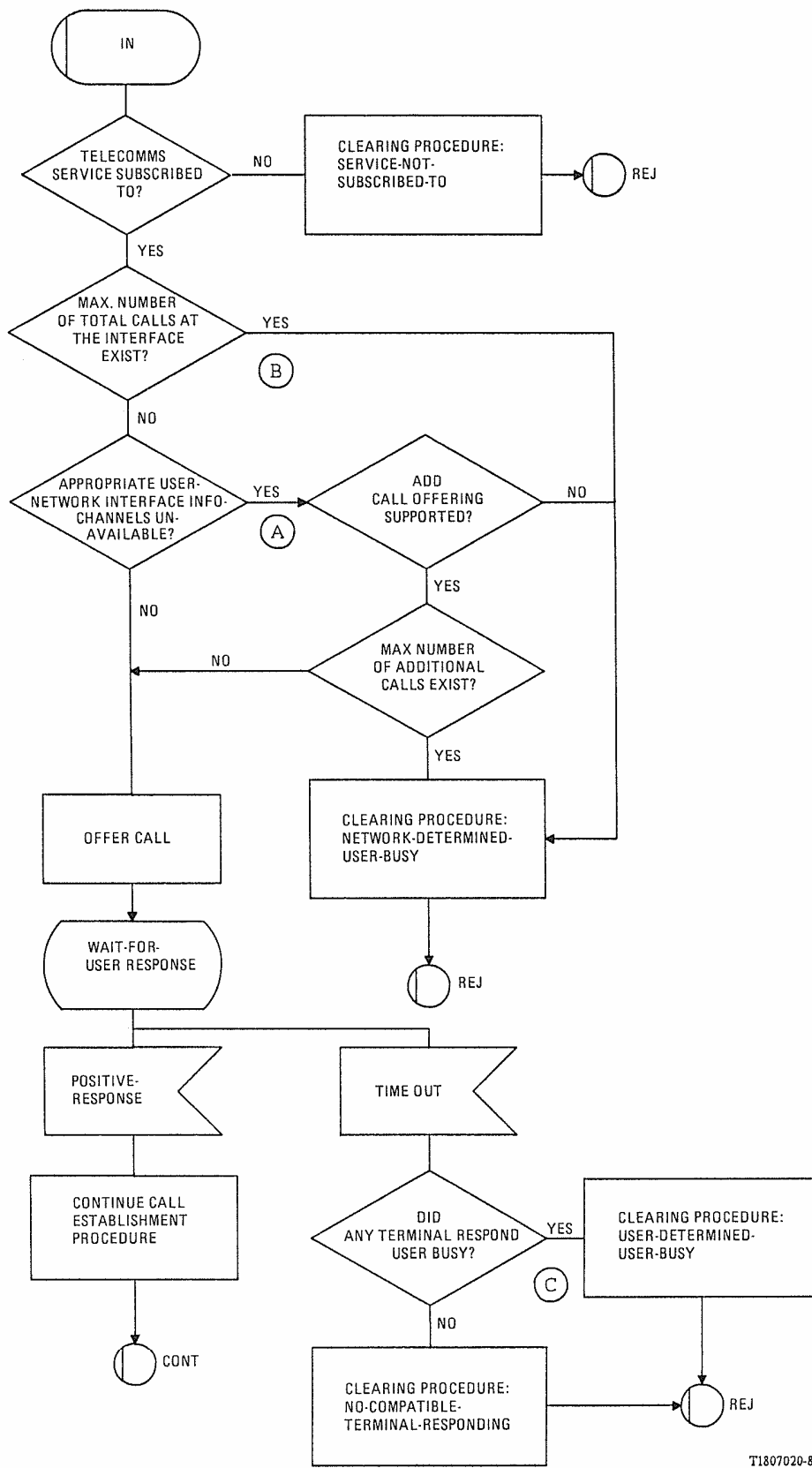
### 3.1.4 *Procedural aspects*

The resource busy conditions described above significantly influence the call offering procedures, both for the basic ISDN calls and for calls that may involve ISDN supplementary services. The procedural aspects of call offering are outlined below and shown in Figure 1/I.221.

- 1) Assume that a call of a telecommunications service subscribed to by the called subscriber is about to be offered.
- 2) If all of the appropriate user-network interface information channels are busy (i.e. channels busy) and either the network does not support the offering of additional calls beyond the number of appropriate channels, or the maximum number of such additional calls has been reached, the network will clear the call [see also item 7, below] and indicate "network determined user busy" back towards the calling subscriber.
- 3) Similarly, if the maximum number of total calls supported at the given subscriber's interface(s) has been reached, the network will clear the call (see also item 7 below) and indicate "network determined user busy" back towards the calling subscriber.
- 4) Otherwise, the network offers the call to the subscriber.
- 5) If any compatible terminal responds "positively" to the call offering, i.e. gives some indication that the call may progress towards successful completion, the normal call offering procedure should continue.
- 6) If no compatible terminal responds "positively" but one or more compatible terminal responds "user busy", then when the response-to-call-offering timeout occurs, the network will clear the call with the indication "user determined user busy".
- 7) It is recognized that for the determination of a "network determined user busy" condition, the network does not assume any knowledge of whether or not a compatible terminal exists at the called interface. This may mask the determination of a "no compatible terminal available" condition, i.e. a NDUB condition may be returned when, in fact, no compatible terminal is connected. The use of an explicit compatibility check to prevent this from occurring is a service provider option and is for further study.

### 3.1.5 *Definition of busy*

An ISDN destination is considered to be busy if either a "network determined user busy" or a "user determined user busy" condition occurs, as described above.



T1807020-88

- Note 1* – This figure illustrates the procedural aspects and the situations which give rise to a clearing procedure containing user busy information. It does not attempt to define any signalling protocol or the design of a network.
- Note 2* – Points (A), (B) and (C) have been identified to assist in the description of ISDN supplementary services.
- Note 3* – The capability to support additional call offerings and the determination of the maximum number of such additional calls, may involve the use of a supplementary service, e.g. call waiting.

FIGURE 1/I.221  
**Macro definition: busy-in-an-ISDN**





## ITU-T RECOMMENDATIONS SERIES

Series A	Organization of the work of the ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
<b>Series I</b>	<b>Integrated services digital network</b>
Series J	Transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure and Internet protocol aspects
Series Z	Languages and general software aspects for telecommunication systems