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SERIES F: NON-TELEPHONE TELECOMMUNICATION
SERVICES

ISDN services

Broadband connection-oriented bearer service

ITU-T Recommendation F.811

(Previously "CCITT Recommendation")

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For further details, please refer to ITU-T List of Recommendations.

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation F.811 was revised by ITU-T Study Group 1 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 19th of July 1996.

NOTE

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

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SUMMARY

The Broadband Connection-Oriented Bearer Service (BCOBS) provides unrestricted transfer of digital information between T_B reference points, or S_B reference points when T_B and S_B reference points are coincident. This bearer service flexibly supports connection-oriented communications at any bit rate over a virtual channel connection. This bit rate can be approximately constant to support constant bit rate traffic or it can be highly variable to support variable bit-rate traffic.

BROADBAND CONNECTION-ORIENTED BEARER SERVICE

(revised in 1996)

1 Definition

The **Broadband Connection-Oriented Bearer Service** (BCOBS) provides unrestricted transfer of digital information between T_B reference points, or S_B reference points when T_B and S_B reference points are coincident. This bearer service flexibly supports connection-oriented communications at any bit rate over a virtual channel connection. This bit rate can be approximately constant to support Constant Bit Rate (CBR) traffic or it can be highly variable to support Variable Bit Rate (VBR) traffic. Signalling information transfer will be provided over a separate signalling virtual channel.

2 Description

2.1 General description

The service provides cell based communications in a bidirectional symmetric, bidirectional asymmetric or unidirectional fashion using virtual channel connections in the Broadband Integrated Services Digital Network (B-ISDN). For each communication of this service, the user and the SP agree on the use of one of the ATM Transfer Capabilities (ATCs) defined in Recommendation I.371[1].

This service is provided in Permanent, Reserved and on-Demand mode.

In permanent mode the user subscribes to one or more permanent communications, specifying all the parameters to characterize them.

In reserved mode the user gets at subscription the capability to request, to modify and to release reserved communications for the subscription duration. After the subscription, at any time the user can request by management procedures to reserve a communication specifying all the parameters to characterize it.

In (switched) on-demand mode the user gets at subscription the capability to request, to modify and to release a (switched) on-demand call for the subscription duration. After the subscription, at any time the user can request to set up a call specifying all the parameters to characterize it.

This Recommendation focuses on the provisioning of the service in a point-to-point communication configuration for the (switched) on-demand mode and in a point-to-point and unidirectional point-to-multipoint configurations for permanent and reserved modes; other communication configurations are for further study.

The operations (from the user's point of view) necessary for the activation of a communication (from the network point of view) are successively (or simultaneously) as identified in Table 1.

For these complete operations, there are three possibilities:

- 1) per management procedures;
- 2) per signalling procedures;
- 3) per fast allocation procedures.

Table 2 summarises the different options.

This Recommendation specifies only procedures for the simultaneous request of establishment and activation (i.e. according to the third column). It is compatible with the separation of the request of establishment and activation (i.e. column two and three of Table 2) but procedures are for further study.

TABLE 1/F.811

User request and resulting actions in the network

	User request	Resulting actions in the network
1	Request of a route including the ATC in order to be connected to (an)other user(s)	Marking the route: it corresponds to the establishment of the associated ATM connection(s) without the resources supporting the communication
2	Negotiation of the resources, i.e. request of traffic parameter(s), QOS classes and OAM flows per ATM connection supporting the communication	Allocation of the resources: it corresponds to the activation of the communication

TABLE 2/F.811

Establishment and activation requests

Negotiation Modes	Connection establishment request (without resources): i.e. request of the route including the ATC only	Connection activation request, i.e. negotiation of traffic parameter(s), QOS classes and OAM flows per ATM connection only	Simultaneous request of establishment and activation, i.e. simultaneous request of the route and negotiation of the traffic parameter(s), QOS classes and OAM flows per ATM connection
permanent	not applicable	not applicable	at subscription
reserved	M	M compatible S compatible RM	M
(switched) on-demand	S	S compatible M compatible RM	S
M Made by Management procedures S Made by Signalling protocols RM Made by Resource Management cells NOTES 1 According to Recommendation I.371[1], the use of Resource Management Cell is not specified for DBR and SBR ATCs. 2 In order to allow the user to send RM cells, a minimum level of resources is necessary.			

2.2 Specific terminology

For the purposes of this Recommendation, the following definitions apply.

2.2.1 ATM transfer capability: See Recommendation I.371[1]. ATM Transfer capabilities are DBR, SBR, ABR, ABT-DT and ABT-IT. The specification of the relevant switching protocol at UNI to negotiate the ATM Transfer capability is contained in Recommendations Q.2931[9] and Q.2961[11]. The management protocols at UNI to negotiate the ATM Transfer capability are for further study.

2.2.2 cell delay variation: See Recommendation I.356[2].

- 2.2.3 cell delay variation tolerance:** See Recommendation I.371[1].
- 2.2.4 cell loss ratio:** See Recommendation I.356[2].
- 2.2.5 cell transfer delay:** See Recommendation I.356[2].
- 2.2.6 initiating manager:** The manager issuing a request to the Service Management Entity (SME).
- 2.2.7 intrinsic burst tolerance:** See Recommendation I.371[1].
- 2.2.8 ISDN number:** A number conforming to the numbering plan and structure specified in Recommendation E.164[4].
- 2.2.9 involved manager:** The manager receiving a request issued by another initiating manager.
- 2.2.10 manager:** In reserved mode, it is the functional entity authorized to send through x reference point (as defined in Recommendation M.3010[3]) the communication registration requests, the communication modification requests and interrogation requests, on behalf of the users to which it is related at the subscription time.
- 2.2.11 maximum cell rate:** See Recommendation I.371[1]. The Maximum Cell Rate is declared by the user as an integer number of cell per second.
- 2.2.12 minimum cell rate:** See Recommendation I.371[1]. The Minimum Cell Rate is declared by the user as an integer number of cell per second.
- 2.2.13 peak cell rate:** See Recommendation I.371[1]. The Peak Cell Rate is declared by the user as an integer number of cell per second.
- 2.2.14 peak re-negotiation rate:** See Recommendation I.371[1]. The peak re-negotiation rate is declared by the user as an integer number of cell per second.
- 2.2.15 periodic communication:** A communication whose same scheme of values of source traffic descriptor and QOS class repeats within each period for the communication duration.
- 2.2.16 quality of service class:** A set of values associated to the following ATM performance parameters: end-to-end Cell Loss Ratio, end-to-end Cell Transfer Delay, end-to-end Cell Delay Variation.
- 2.2.17 service type:** See Recommendation I.371[1].
- 2.2.18 service management entity (SME):** In reserved mode the SME is the functional entity to which manager's communication registration requests, communication modifications requests and interrogation requests are addressed.
- 2.2.19 source traffic descriptor:** The set of traffic parameters associated to an ATM transfer capability. For DBR it is given by the Peak Cell Rate and the associated Cell Delay Variation Tolerance. For SBR it is given by the Peak Cell Rate and the associated Cell Delay Variation Tolerance, the Sustainable Cell Rate, the Intrinsic Burst Tolerance and the associated Cell Delay Variation Tolerance. For ABR it is given by the Peak Cell Rate and the Minimum Cell Rate. For ABT-DT and ABT-IT it is given by the Maximum Cell Rate and the associated Cell Delay Variation Tolerance, the Peak re-negotiation rate and the associated Cell Delay Variation Tolerance, the Sustainable Cell Rate, the Intrinsic Burst Tolerance and the associated Cell Delay Variation Tolerance. See Recommendation I.371[1].
- 2.2.20 sustainable cell rate:** See Recommendation I.371[1]. The Sustainable Cell Rate is declared by the user as an integer number of cell per second.
- 2.2.21 traffic contract:** See Recommendation I.371[1].
- 2.2.22 user:** Each of the subscriber's functional entity that sends or receives ATM cells through T_B or T_B/S_B reference point. It communicates with the manager for the purpose of being controlled and/or monitored.

3 Procedures

3.1 On demand mode

3.1.1 Provision/withdrawal

By arrangement with the SP.

The beginning time of provision corresponds to the time of service subscription; the time of withdrawal to the end time of subscription.

3.1.2 Normal procedures

3.1.2.1 Activation/deactivation/registration

By arrangement with SP.

3.1.2.2 Invocation and operation

User-network signalling is done over a separate signalling channel.

3.1.2.2.1 Call set-up originating the service

Procedures at call set-up are specific for every configuration. However, the following definitions and principles apply to all the configurations.

The source traffic descriptor consists of a pair of values for every parameter to define the communication in both directions.

The QOS class defines the QOS required by the user for the communication. If the value is not specified, a default value is assumed. A pair of values is required to define the communication in both directions.

The call is originated by the user requesting from the network the required bearer service (call set-up request).

The call request includes the following parameters:

Communication configuration

- ISDN number of the called user.

ATM traffic contract on communication basis

- ATM transfer capability (according to 5.5.1.1/I.371[1], the ATC is the same in both directions if the communication is bidirectional);
- source traffic descriptor in each direction (see Recommendation I.371[1]);
- QOS class in each direction;
- Peak Cell Rate of the OAM F5 user cell flow and associated Cell Delay Variation Tolerance (for DBR, ABT-IT, ABT-DT only) in each direction (the support of the separation of the user OAM F5 flow and the user data flow is an SP option).

AAL parameters

- AAL parameters: required by the network only for interworking purpose (e.g. with N-ISDN). Within B-ISDN the user may specify them for end-to-end matter: the AAL is transparent to the network.

Service facilities

- Service type (optional, i.e. it is a user option to use this parameter).

For the time being, the identified service types are the emulated narrowband bearer services (see Annex C). If the service type is provided, the consistency between the service type and the other parameters shall be checked within the network (see Annex C); if there is a lack of consistency, the value of the parameters considered within the network are the implicit values as provided in Annex C; afterwards, any notification to the calling user and any indication to the called user(s) will include the implicit values (considered within the network).

After initiating a call, the calling user will receive an acknowledgement that the network is able to process the call.

An indication of the incoming call is given to the called user (call set-up indication) including all the parameters of the call request. At called end upon receipt of a call set-up request, if able to support it, the called user will accept the call.

3.1.2.2.2 Procedures during the communication phase

3.1.2.2.2.1 Modification of the traffic characteristics during the call

Both user and network may request the change of the traffic characteristics of an already established call.

Traffic characteristics may be changed after negotiation between the user and the network. Notification of this change shall be sent to both users.

3.1.2.2.3 Call release

The call may be terminated by either or both users by sending a request to the network. If one user terminates a call, an appropriate indication is sent to the other user.

3.1.3 Exceptional procedures

3.1.3.1 Activation/deactivation/registration

Not applicable.

3.1.3.2 Invocation and operation

3.1.3.2.1 Failure situation due to user error

A user specifying a network-identifiable, improper service request will be given an appropriate failure indication by the network and the call set-up will be ceased.

A user specifying a non-valid destination address will be given an appropriate failure indication by the network and the call set-up will be ceased.

When the user's input cell stream violates the traffic contract, the network may take action and discard cells.

3.1.3.2.2 Failure situation due to resource limitations

During the call set-up, if the requested service resources specified by parameters, in particular QOS or source traffic descriptor, are not available in the network, an appropriate failure indication should be sent to the calling user.

If the network cannot complete the call due to other limitations on network resources, an appropriate failure indication will be given to the requesting user.

3.1.3.2.3 Failure situation due to the called user state

A calling user attempting to establish a call to a user who is not accepting the call will be given an appropriate failure indication by the network.

A user attempting to establish a call to a user whose terminal equipment fails to respond will be given an appropriate failure indication by the network and the call set-up will be ceased.

3.1.4 Alternative procedures

Not applicable.

3.2 Reserved mode

3.2.1 Provision and withdrawal

Provision and withdrawal are based on schedule 1 (see Figure 1).

The beginning time of provision corresponds to the time of service subscription; the time of withdrawal to the end time of subscription.

After the BCOBS is available at time instant t_1 as a result of a BCOBS subscription request at time instant t_0 , a set of management procedures can be used to request, modify and release reserved communications. The notice time $t_1 - t_0$ is greater than or equal to $T_{a_{min}}$.

The time t_3 of service withdrawal is fixed at subscription or is a result of a subscriber request at time t_2 . The duration of the subscription $t_3 - t_1$ is greater than a minimum duration DA_{min} and less than a maximum duration DA_{max} .

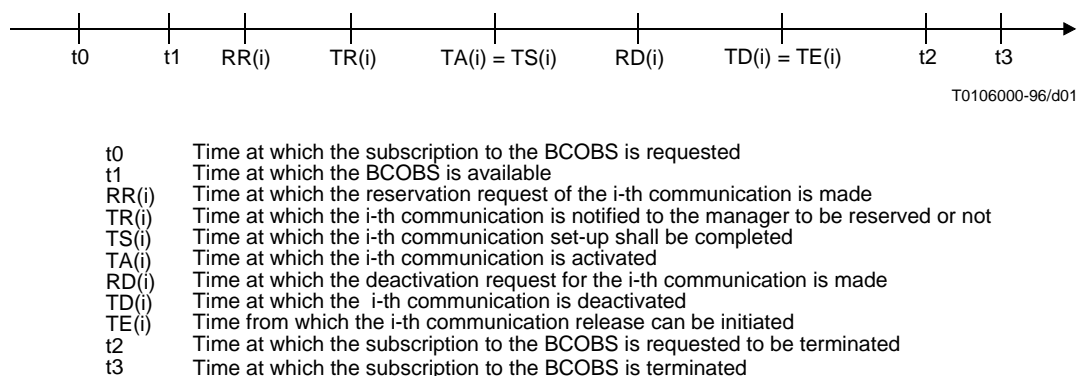
More than one communication can be available at each UNI at the same time. The subscription stated the maximum number NB_{max} of communications that can be available at each UNI.

Either periodic or occasional communications can be reserved. The parameters of each communication are negotiated between the SP and the subscriber in the registration procedure.

In this subclause, $TS(i)$ identifies the time at which the set-up of the i -th communication and connection shall be completed; the set-up time of the connection can be in advance and the exact time is not the purpose of this Recommendation.

In this subclause, $TE(i)$ identifies the time from which the release of the i -th communication and connection can be initiated; the exact release time of the i -th connection is not the purpose of this Recommendation.

The i -th communication can be started at time instant $TA(i)$ explicitly specified at the time instant of communication and connection registration request $RR(i)$. Communication and connection release occurs at time instant $TD(i)$ explicitly specified also at $RR(i)$. Communication and connection duration is predetermined: the communication and connection is set up for a specified period of time. As an option, connection release can be initiated from time instant $TE(i)$ following a release request made at time instant $RD(i)$ during the communication and *a priori* undetermined [$TD(i) - RD(i)$ is as short as possible]. This option corresponds to an unspecified duration of the communication and connection, or to a possibility of unanticipated release. Time $TR(i)$ corresponds to the time instant in which the i -th communication is reserved in response to the request at $RR(i)$.



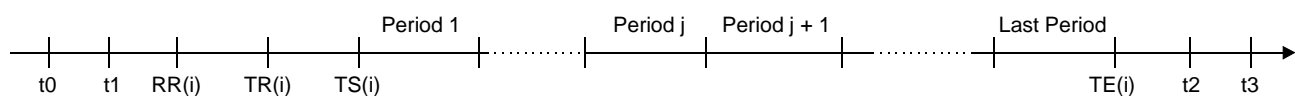
NOTE – This figure indicates the set-up and release time of the i -th communication, however more than one communication is possible within a subscription.

FIGURE 1/F.811

Provision of a BCOBS in reserved mode: occasional communication

For an occasional communication, the value of source traffic descriptor and of QOS class are constant for the communication duration, except as a result of a registration modification procedure.

For a periodic communication (see Figure 2), the same scheme of values of source traffic descriptor and QOS repeats within each period for the communication duration. Within a period, a number of time slots are defined (see Figure 3). A time slot is the interval between an activation time $TA_j(i)$ and the related deactivation $TD_j(i)$.



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t0	Time at which the subscription to the BCOBS is requested
t1	Time at which the BCOBS is available
RR(i)	Time at which the reservation request of the i-th communication is made
TR(i)	Time at which the i-th communication is notified to the manager to be reserved or not
TS(i)	Time at which the i-th communication set-up shall be completed
TE(i)	Time from which the i-th communication release can be initiated
t2	Time at which the subscription to the BCOBS is requested to be terminated
t3	Time at which the subscription to the BCOBS is terminated

NOTE – This figure indicates the set-up and release time of the i_th communication, however more than one communication is possible within a subscription.

FIGURE 2/F.811

Provision of a BCOBS in reserved mode: periodic communication

The following parameters shall be specified at subscription as mandatory subscription parameters:

Communication configuration

- Manager identifier;
- ISDN numbers of the users controlled by the manager.

Time constraints

- Subscription beginning time t1;
- Subscription end time t3.

Access constraints

- Maximum number NB_{max} of communications that can be available at each UNI.

3.2.2 Procedures

3.2.2.1 Activation, deactivation

The activation procedure leads to the effective availability of the resources corresponding to the request source traffic descriptor for the communication. The deactivation procedure leads to deallocate the resources corresponding to the request source traffic descriptor for the communication.

For an occasional communication i, according to Figure 1, activation occurs at time $TA(i)$ and deactivation at time $TD(i)$.

For a periodic communication i-th according to Figure 3, in every period activation occurs at each time $TA_k(i)$ with $k = 1$ to n, and deactivation at each time $TD_k(i)$ with $k = 1$ to n.

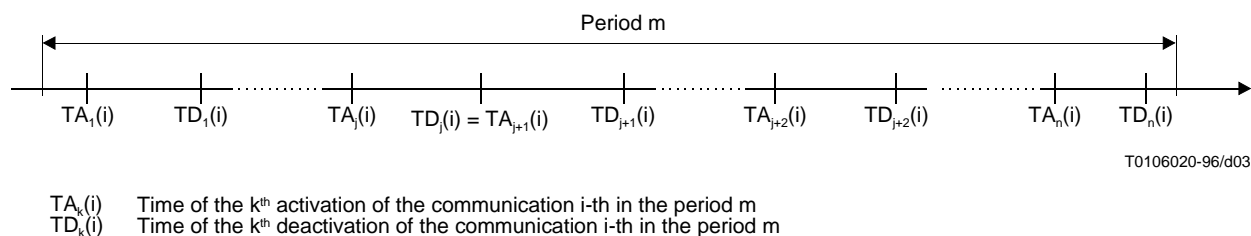


FIGURE 3/F.811

Definition of time slots within a period

As an SP option for a periodic communication, a deactivation may be simultaneous with an activation. This shall correspond to a source traffic descriptor modification ensuring the continuity of the communication when the QOS class of the previous time slot is equal to the QOS class of the following one.

3.2.2.2 Registration

The registration procedure inserts the parameters of a communication in the network after a negotiation between the subscriber(s) and the SP.

The following parameters are relevant for an occasional communication:

Communication configuration

- Configuration;
- ISDN numbers of the users.

Time constraints

- Time $TS(i)$;
- Time $TE(i)$ (optional).

ATM traffic contract on communication basis

- ATM transfer capability (according to 5.5.1.1/I.371[1], the ATC is the same in both directions if the communication is bidirectional);
- Source traffic descriptor, in each direction, (see Recommendation I.371[1]);
- QOS Class, in each direction;
- Peak Cell Rate of the OAM F5 user cell flow and associated Cell Delay Variation Tolerance (for DBR, ABT-IT, ABT-DT only) in each direction (the support of the separation of the user OAM F5 flow and the user data flow is an SP option).

AAL parameters

- AAL parameters: required by the network only for interworking purpose (e.g. with N-ISDN). Within B-ISDN the user may specify them for end-to-end matter: the AAL is transparent to the network.

Service facilities

- Service type (optional, i.e. it is a user option to use this parameter).

Otherwise for a periodic communication the following set of parameters is relevant:

Communication configuration

- Configuration;
- ISDN numbers of the users.

Time constraints

- Period: e.g. day, week, etc.;
- Time TS(i);
- Time TE(i) that corresponds to the end of the last period (optional);
- Number N of time slots;
- Beginning time of each time slot in the period: TA_i (with 1 ≤ i ≤ N);
- End time of each time slot in the period: TD_i (with 1 ≤ i ≤ N).

ATM traffic contract on communication basis

- ATM transfer capability (according to 5.5.1.1/I.371[1], the ATC is the same in both directions if the communication is bidirectional);
- Source traffic descriptor for each time slot, in each direction (see Recommendation I.371[1]);
- QOS class for each time slot, in each direction;
- Peak Cell Rate of the OAM F5 user cell flow and associated Cell Delay Variation Tolerance (for DBR, ABT-IT, ABT-DT only) in each direction (the support of the separation of the user OAM F5 flow and the user data flow is an SP option).

AAL parameters

- AAL parameters: required by the network only for interworking purpose (e.g. with N-ISDN). Within B-ISDN the user may specify them for end-to-end matter: the AAL is transparent to the network.

Service facilities

- Service type (optional, i.e. it is a user option to use this parameter).

For the time being, the identified service types are the emulated narrowband bearer services (see Annex C). If the service type is provided, the value of ATM transfer capability, source traffic descriptor, AAL parameters and QOS class shall not be specified by the subscriber and the network shall assign to them the implicit values as provided in Annex C; afterwards, any notification to the calling user and any indication to the called user(s) will include the implicit values (considered within the network).

If a manager requests the registration of a communication between two or more users all controlled by that manager, the following procedure applies:

- 1) The manager requests to the SME the registration of a communication providing the relevant parameters.
- 2) The SME shall issue a positive notification (including the global identifier of the communication, the value of VPIs and VCIs assigned to the ATM connection at each UNI, and the values of the relevant network traffic parameters) or negative notification. In the case of positive notification, the communication shall be established as requested. Together with a negative notification, the SME can propose the parameter values that would have made the request viable.

If a manager (initiating manager) requests the registration of a communication between two or more Users controlled by other managers (involved manager), the following procedure applies:

- 1) The initiating manager requests to the SME the registration of a communication providing the relevant parameters.
- 2) The SME shall provide either a negative notification to the initiating manager or an indication to each other involved manager reporting the relevant parameters of the communication. Together with the negative notification, the SME can propose the parameter values that would have made the request viable. In the case of negative notification, the procedure stops.
- 3) Each involved manager shall provide the SME either a positive or negative notification. Together with the negative notification, the involved manager can propose the parameter values that would have made the request viable.

- 4) If each involved manager sends a positive notification, the SME shall provide to all the involved managers and to the initiating manager a positive notification (including the global identifier of the communication, the value of VPIs and VCIs assigned to the ATM connection at each UNI, and the values of the relevant network traffic parameters). Otherwise the SME shall provide a negative notification to the initiating manager together with the parameter values that would have made the request viable for all the involved managers.

As a service provider option, the manager may request a communication be established as soon as possible [TS(i) = “as soon as possible”]. This manager shall be notified:

- 1) if the network is not able to establish the communication within a limit time fixed by the SP (Note);
- 2) when the communication is effectively established.

NOTE – The establishment time foreseen by the network may be notified.

3.2.2.3 Erasure

The erasure for the i-th communication applies at the release time TE(i).

The erasure leads to the deletion of all the parameters in the network of the relevant communication.

3.2.2.4 Invocation and operation

After the registration of a communication, the service can be used without invocation during each active phase. Every attempt to send information outside an active phase shall result in cells discarded by the network. In addition, any violation of the traffic contract during the active phases may result in cells discarded by the network; if the traffic contract is violated, the QOS class agreed at registration is not assured.

3.2.2.5 Registration modification

The registration modification procedure modifies the parameters in the network of a previously registered communication after negotiation among the SME and all the involved managers. It is not possible to modify an occasional communication in a periodic one or vice versa.

For an occasional communication the following parameters can be modified in the registration modification procedure:

- configuration;
- time TE(i);
- source traffic descriptor in each direction.

Otherwise, for a periodic communication the following parameters can be modified in the registration modification procedure:

- configuration;
- time TE(i);
- beginning time of one or more time slots in the period: TA_i (with $1 \leq i \leq N$);
- end time of one or more time slots in the period: TD_i (with $1 \leq i \leq N$);
- source traffic descriptor for one or more time slots, in each direction.

If a manager requests the modification of a communication between two or more users all controlled by that manager, the following procedure applies:

- 1) The manager requests the modification of the communication to the SME, providing the relevant parameters.
- 2) The SME shall issue a positive notification (including the values of the relevant network traffic parameters if the source traffic descriptor has changed) or a negative notification. In the case of a positive notification, the communication shall be established as requested. Together with the negative notification, the SME can propose the parameter values that would have made the request viable.

If a manager (initiating manager) requests the registration of a communication between two or more users controlled by other managers (involved managers), the following procedure applies:

- 1) The initiating manager requests the modification of the communication to the SME, providing the relevant parameters.
- 2) The SME shall provide either a negative notification to the initiating manager or an indication to each involved manager reporting the parameters to be changed and their values. Together with the negative notification, the SME can propose the parameter values that would have made the request viable. In the case of negative notification, the procedure stops.
- 3) Each involved manager shall provide the SME either a positive or negative notification. Together with the negative notification, the involved manager can propose the parameter values that would have made the request viable.
- 4) If each involved manager sends a positive notification, the SME shall provide to all the involved managers and to the initiating manager a positive notification (including the values of the relevant network traffic parameters if the source traffic descriptor has changed). Otherwise the SME shall provide a negative notification to the initiating manager, together with the parameter values that would have made the request viable for all the involved managers.

3.3 Permanent mode

3.3.1 Provision and withdrawal

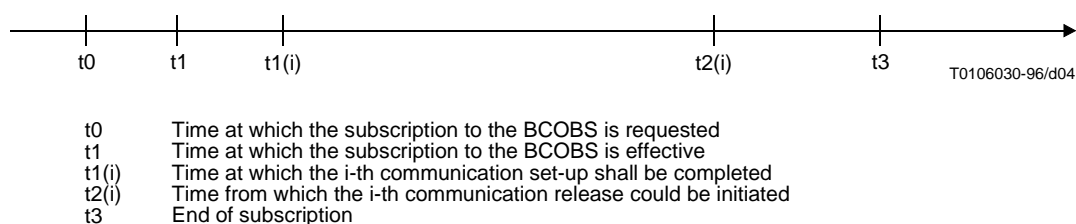
Provision and withdrawal are based on schedule 1 (see Figure 4).

The beginning time of provision corresponds to the time of service subscription; the time of withdrawal to the end time of subscription.

The permanent communication i of the BCOBS can be started after the connection set-up is completed at time instant $t1(i)$ in response to a request for the subscription of the BCOBS in permanent mode at time instant $t0$ [$t0 < t1(i)$].

The time at which the release of the communication is initiated [$t2(i)$] can be specified or unspecified; if the duration is unspecified, the communication (and the connection to support it) is released at the end or after the end of subscription $t3$.

More than one communication can be subscribed within the same subscription. The minimum duration of a communication [$t2(i)-t1(i)$] is DA_{min} . The set-up time $t1(i)-t0$ is greater than or equal to Ta_{min} . DA_{min} and Ta_{min} are fixed by the SP.



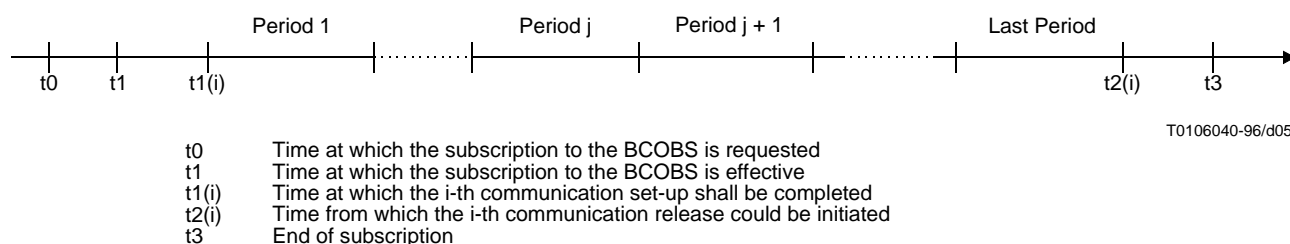
NOTE – This figure indicates the set-up and release time of the i -th communication. However, more than one communication is possible within a subscription.

FIGURE 4/F.811
Provision of a BCOBS in permanent mode

Either periodic or occasional communications can be subscribed. The parameters of each communication are negotiated between the SP and the subscriber at the subscription.

For an occasional communication, the value of the source traffic descriptor and of the QOS are constant for the subscription duration.

For a periodic communication (see Figure 5), the same scheme of values of the source traffic descriptor and the QOS class is repeated within each period for the subscription duration.



NOTE – This figure indicates the set-up and release time of the i_th communication. However, more than one communication is possible within a subscription.

FIGURE 5/F.811
Provision of a BCOBS in permanent mode: periodic communication

3.3.1.1 Occasional communication

The following subscription parameters shall be agreed by the SP and the subscriber:

Communication configuration

- Configuration;
- ISDN numbers of the users.

Time constraints

- Time t1(i);
- Time t2(i) (optional).

ATM traffic contract on communication basis

- ATM transfer capability (according to 5.5.1.1/I.371[1], the ATC is the same in both directions if the communication is bidirectional);
- Source traffic descriptor in each direction, (see Recommendation I.371[1]);
- QOS class, in each direction;
- Peak Cell Rate of the OAM F5 user cell flow and associated Cell Delay Variation Tolerance (for DBR, ABT-IT, ABT-DT only) in each direction (the support of the separation of the user OAM F5 flow and the user data flow is an SP option).

AAL parameters

- AAL parameters: required by the network only for interworking purpose (e.g. with N-ISDN). Within B-ISDN the user may specify them for end-to-end matter: the AAL is transparent to the network.

Service facilities

- Service type (optional, i.e. it is a user option to use this parameter).

For the time being, the identified service types are the emulated narrowband bearer services (see Annex C). If the service type is provided, the value of ATM transfer capability, source traffic descriptor, AAL parameters and QOS class shall not be specified by the subscriber and the network shall assign to them the implicit values as provided in Annex C.

3.3.1.2 Periodic communication

The subscription allows the specification of a period and of a number N of time slots within the period (see Figure 3). The number N of time slots shall be within 1 and N_{\max} (fixed by the service Provider).

For each time slot the values of the source traffic descriptor and of the QOS class can be specified independently from the values they have in other time slots.

The following subscription parameters shall be agreed by the SP and the subscriber:

Communication configuration

- ISDN numbers of the users;
- Configuration.

Time constraints

- Period: e.g. day, week, etc.;
- Time $t_1(i)$;
- $t_2(i)$ that corresponds to the end of the last period (optional);
- Number N of time slots;
- Beginning time of each time slot in the period: $TA_k(i)$ (with $1 \leq k \leq N$);
- End time of each time slot in the period: $TD_k(i)$ (with $1 \leq k \leq N$).

ATM traffic contract on communication basis

- ATM transfer capability (according to 5.5.1.1/I.371[1], the ATC is the same in both directions if the communication is bidirectional);
- Source traffic descriptor for each time slot, in each direction (see Recommendation I.371[1]);
- QOS class for each time slot, in each direction;
- Peak Cell Rate of the OAM F5 user cell flow and associated Cell Delay Variation Tolerance (for DBR, ABT-IT, ABT-DT only) in each direction (the support of the separation of the user OAM F5 flow and the user data flow is an SP option).

AAL parameters

- AAL parameters: required by the network only for interworking purpose (e.g. with N-ISDN). Within B-ISDN the user may specify them for end-to-end matter: the AAL is transparent to the network.

Service facilities

- Service type (optional, i.e. it is a user option to use this parameter).

For the time being, the identified service types are the emulated narrowband bearer services (see Annex C). If the service type is provided, the value of ATM transfer capability, source traffic descriptor, AAL parameters and QOS class shall not be specified by the subscriber and the network shall assign to them the implicit values as provided in Annex C.

3.3.1.3 Subscription modification

As an SP option, after time t_1 , it is possible to modify a subscription by:

- modifying the parameters of a subscribed communication;
- releasing a communication before the time instant fixed at subscription;
- adding a communication not included in the subscription.

A subscription modification shall be agreed by the SP and the subscriber with a minimum anticipation T_{\min} with respect to the time instant at which the subscription modification is required to be effective.

3.3.2 Procedures

3.3.2.1 Activation, deactivation

The activation procedure leads to the effective availability of the resources corresponding to the requested source traffic descriptor for the communication. The deactivation procedure leads to the deallocation of the resources corresponding to the requested source traffic descriptor for the communication.

For an occasional communication i , according to Figure 4, activation occurs at time $t1(i)$ and deactivation at time $t2(i)$.

For a periodic communication i according to Figure 3, in every period activation occurs at each time $TA_k(i)$ with $k = 1$ to N , and deactivation at each time $TD_k(i)$ with $k = 1$ to N .

As an SP option for a periodic communication, a deactivation may be simultaneous with an activation. This shall correspond to a source traffic descriptor modification ensuring the continuity of the communication when the QOS class of the previous time slot is equal to the QOS class of the following one.

3.3.2.2 Registration

The registration is done at subscription. It is managed by the SP.

With the registration the parameters of each subscribed communication are stored in the network. A global identifier is assigned to each subscribed communication.

3.3.2.3 Erasure

The erasure is done at the end of the subscription. It is managed by the SP.

The erasure leads to the deletion of all the parameters of the subscribed communications.

3.3.2.4 Invocation and operation

After the subscription, the service can be used without invocation during each active phase. Every attempt to send information outside an active phase shall result in cells discarded by the network. In addition, any violation of the traffic contract during the active phases may result in cells discarded by the network.

3.3.2.5 Registration modification

The registration modification corresponds to a subscription modification.

4 Network capabilities for charging

Charging principles are outside the scope of this Recommendation.

5 Interworking requirements

Interworking between the B-ISDN and narrow-band ISDN for the cases included in Annex C is required. A caller should be able to originate a call at the S_B or T_B reference point and terminate at an S or T reference point on the B- or D-channel (and vice versa).

Interworking between B-ISDN and PSTNs, for data calls which have information transfer characteristics within the capability of the PSTNs, requires the use of an interworking function (including a modem).

NOTE – The end-to-end delay limits for B-ISDN interactive services are not yet established. It will be necessary to take into consideration the implication of propagation delay on real-time interactive services (e.g. interactive video/audio) introduced by use of satellites when determining these end-to-end delay limits. This is for further study.

6 Interaction with supplementary services

Each supplementary service description identifies the applicability to this bearer service.

Annex A

Broadband connection-oriented bearer service

(This annex forms an integral part of this Recommendation)

Bearer service attributes	Values of attributes
<i>Information transfer attributes</i>	
1 Information transfer mode	ATM
2 Information transfer capability	Unrestricted
3 Structure	Cell sequence integrity
4 Establishment of communication	(Switched) On-demand, reserved, permanent
5 Symmetry of communication	Bidirectional symmetric, bidirectional asymmetric, unidirectional
6 Communication configuration	Point-to-point, point-to-multipoint (for reserved and permanent mode only). Others for further study (ffs)
<i>Access attributes</i>	
7 Access channel and rate	
7.1 For user information	
Type of connection	VCC
ATM Transfer Capability	DBR, SBR, ABR or ABT-IT, ABT-DT (see Rec. I.371 [1])
QOS class	See Rec. I.356 [2]
Information Transfer Rate	Declared by the user on a per connection basis (separately for each time slot for a periodic communication). Values are specified individually for each direction of transmission. Specific parameters apply depending on the ATM transfer capability (see Rec. I.371 [1])
7.2 For signalling	
Type of connection	VCC
ATM Transfer Capability	DBR (see Rec. I.371 [1])
QOS class	Class 1 (See Rec. I.356 [2])
Information Transfer Rate	Ffs
7.3 For Management	
Type of connection	VCC
ATM Transfer Capability	DBR (see Rec. I.371 [1])
QOS class	Class 1 (See Rec. I.356 [2])
Information Transfer Rate	Ffs
7.4 For fast allocation procedures	Ffs
8 Access protocols (Note)	
8.1 Physical layer	Rec. I.432 [5]
8.2 ATM layer	Recs. I.150 [6], I.361 [7]
8.3 Signalling access protocol ATM adaptation layer (AAL)	Recs. Q.2100 [8], Q.2110 [16] and Q.2130 [17]
8.4 Signalling access protocol layer 3 (above AAL)	Recs. of the Q.2900 (DSS 2) Series, Q.2931 [9], Q.2961 [11], Q.2962 [18] and Q.2963.1 [19]
8.5 Information access protocol ATM adaptation layer (AAL)	Type 1 (see Rec I.363.1 [12]), or type 3/4 (see Rec I.363.3 [10]), or type 5 (see Rec. I.363.5 [20]), or empty
8.6 Information access protocol – Layers above AAL up to layer 3	Specific service dependent
<i>General attributes</i>	
9 Supplementary services provided	Ffs
10 Interworking possibilities	See Rec. I.580 [21]
11 Operational and commercial aspects	Out of the scope of this Recommendation
NOTE – Management access protocols are for further study.	

Annex B

Alphabetical list of abbreviations used in this Recommendation

(This annex forms an integral part of this Recommendation)

AAL	ATM adaptation layer
ABR	Available Bit Rate
ABT-DT	ATM Block Transfer – Delayed Transmission
ABT-IT	ATM Block Transfer – Immediate Transmission
ATC	ATM Transfer Capability
ATM	Asynchronous Transfer Mode
B-ISDN	Broadband Integrated Services Digital Network
BCOBS	Broadband Connection-Oriented Bearer Service
CBR	Constant Bit Rate
CDV	Cell Delay Variation
DBR	Deterministic Bit Rate
DSS 2	Digital Subscriber Signalling System 2
N-ISDN	Narrow-band Integrated Services Digital Network
OAM	Operation and Maintenance
PSTN	Public Switched Telephone Network
QOS	Quality of Service
SBR	Sustainable Bit Rate
SME	Service Management Entity
SP	Service Provider
UNI	User-Network Interface
VBR	Variable Bit Rate
VCC	Virtual Channel Connection
VCI	Virtual Channel Identification
VPI	Virtual Path Identifier

Annex C

Narrow-band emulated services

(This annex forms an integral part of this Recommendation)

This annex does not include a complete list of narrow-band emulated services. Additional narrow-band emulated services are for further study.

C.1 64 kbit/s bearer communication usable for speech

The parameters applied to a call requiring this connection-oriented bearer communication are:

ATM traffic contract on communication basis

- ATM transfer capability: DBR;
- Source traffic descriptor: Peak Cell Rate, 171 Cell/s in both directions (no OAM cell shall be sent);
- QOS class: class 1 (see Recommendation I.356[2]);
- Peak Cell Rate of the OAM F5 user cell flow and associated Cell Delay Variation Tolerance: 0.

AAL parameters

- AAL parameters: AAL1 for voice band signal transport as defined in Recommendation I.363.1[12] in both directions.

Service facilities

- Service type: 64 kbit/s bearer communication usable for speech.

Inter-operability with “Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer” [13] is required. In this case the generation and transport of tones and/or announcements should be compliant with Recommendation Q.2931[9].

C.2 64 kbit/s bearer communication usable for 3.1 kHz audio

The parameters applied to a call requiring this connection-oriented bearer communication are:

ATM traffic contract on communication basis

- ATM transfer capability: DBR;
- Source traffic descriptor: Peak Cell Rate, 171 Cell/s in both directions (no OAM cell shall be sent);
- QOS class: class 1 (see Recommendation I.356[2]);
- Peak Cell Rate of the OAM F5 user cell flow and associated Cell Delay Variation Tolerance: 0.

AAL parameters

- AAL parameters: AAL1 for voice band signal transport as defined in Recommendation I.363.1[12] in both directions.

Service facilities

- Service type: 64 kbit/s bearer communication usable for 3.1 kHz audio.

Inter-operability with “Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3.1 kHz audio information transfer” [14] is required. In this case the generation and transport of tones and/or announcements should be compliant with Recommendation Q.2931[9].

C.3 64 kbit/s unrestricted bearer service

The parameters applied to a call requiring this connection-oriented bearer communication are:

ATM traffic contract on communication basis

- ATM transfer capability: DBR;
- Source traffic descriptor: Peak Cell Rate, 171 Cell/s in both directions (no OAM cell shall be sent);
- QOS class: class 1 (see Recommendation I.356[2]);
- Peak Cell Rate of the OAM F5 user cell flow and associated Cell Delay Variation Tolerance: 0.

AAL parameters

- AAL parameters: AAL1 for circuit transport as defined in Recommendation I.363.1[12].

Service facilities

- Service type: 64 kbit/s unrestricted bearer service.

Inter-operability with “Circuit-mode 64 kbit/s unrestricted, 8 kHz structured bearer service category” [15] is required.

Annex D

References

(This annex forms an integral part of this Recommendation)

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- [2] ITU-T Recommendation I.356 (1993), *B-ISDN ATM layer cell transfer performance*.
- [3] ITU-T Recommendation M.3010 (1996), *Principles for a telecommunications management network*.
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- [7] ITU-T Recommendation I.361 (1995), *B-ISDN ATM layer specification*.
- [8] ITU-T Recommendation Q.2100 (1994), *B-ISDN Signalling ATM Adaptation Layer (SAAL) overview description*.
- [9] ITU-T Recommendation Q.2931 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.
- [10] ITU-T Recommendation I.363.3 (1996), *B-ISDN ATM Adaptation Layer specification: types 3/4 AAL*.
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- [12] ITU-T Recommendation I.363.1 (1996), *B-ISDN ATM Adaptation Layer specification: types 1 and 2 AAL*.
- [13] CCITT Recommendation I.231.2 (1988), *64 kbit/s, 8 kHz structured, usable for speech information transfer*.
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- [16] ITU-T Recommendation Q.2110 (1994), *B-ISDN ATM Adaptation Layer – Service Specific Connection Oriented Protocol (SSCOP)*.
- [17] ITU-T Recommendation Q.2130 (1994), *B-ISDN signalling ATM Adaptation Layer – Service specific coordination function for support of signalling at the User-Network Interface (SSCF at UNI)*.
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- [19] ITU-T Recommendation Q.2963.1 (1996), *Broadband Integrated Services Digital Network (B-ISDN) Digital Subscriber Signalling System No. 2 (DSS 2) – Connection modification – Peak cell rate modification by connection owner*.
- [20] ITU-T Recommendation I.363.5 (1996), *B-ISDN ATM Adaptation Layer specification: type 5 AAL*.
- [21] ITU-T Recommendation I.580 (1995), *General arrangements for interworking between B-ISDN and 64 kbit/s based ISDN*.

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