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FASCICLE VI.6

Recommendations Q.601 to Q.699

INTERWORKING OF SIGNALLING SYSTEMS

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SECTION 1

GENERAL CONSIDERATIONS

Recommendation Q.601

1 GENERAL

1.1 *Change from narrative to SDL presentation*

These Recommendations provide a set of interworking specifications for CCITT signalling systems. The specifications are based on the CCITT Specification and Description Language (SDL) described in Recommendations Z.101 to Z.104. In these Recommendations on interworking, the SDL is used as a specification language.

Existing specifications in narrative form have not completely and unambiguously specified interworking of CCITT Signalling Systems. In addition, the introduction of digital switching, transmission and signalling systems creates new interworking demands.

Previous interworking specifications have been analysed and reconsidered in preparation of the present Recommendations. Where discrepancies exist between the previously printed interworking specifications and the interworking specifications of the present Recommendations, the latter shall be binding.

The new SDL interworking specifications will not replace the existing (narrative) specifications of the signalling systems concerned. They will only cover that part of the signalling system procedures which is of importance to interworking. The detailed procedures of the signalling systems are to be found in the existing Recommendations (Red Book, Fascicles VI.2, VI.3, VI.4, VI.7 and VI.8). Furthermore, only those switching procedures are shown that are relevant to interworking.

SDL provides an implementation independent and comprehensive method of presentation. It encompasses the previous interworking Recommendations and ensures that the interworking conditions are included in a regular and formalized manner. The chosen method facilitates the specification of interworking with future signalling systems. The use of well defined events with a graphical presentation reduces readers' language problems.

1.2 *Compatibility between signalling systems*

During the development of CCITT Signalling Systems, the signalling capacity has constantly been increased. In this way it has been possible to incorporate new features. However, it is not always possible to transfer these features when interworking with older systems.

In the case of signalling systems with large signalling capacity, it is possible to transmit distinct statements on certain conditions, e.g. ''busy'', ''type of connection'', etc. On the other hand, however, signalling systems with small signalling capacity require more general meanings to be assigned to the signals. Figure 1/Q.601 illustrates this by an example.

1.3 *Interworking combinations*

Since the CCITT Signalling Systems are to be used for international telephone communication, interworking between the different signalling systems must be ensured. Interworking takes place in a transit exchange which must possess suitable equipment for processing the signals of both signalling systems involved. Interworking of the signalling systems can take place on all levels of the telephone network:

— national,

— regional,

— international.

With a number of *s* | ifferent signalling systems the maximum number of interworking combinations will be:

$$i = s \mid (\mathrm{mu} \mid s - 1)$$

If the present standardized Signalling Systems No. 4, No. 5, No. 6, No. 7, R1 and R2 only are taken into account, a total of 30 different interworking combinations is obtained with $s = 6$.

Figure 1/Q.601, p.

The number of possible combinations becomes even greater if the national signalling systems are taken into account.

The method for interworking of standardized CCITT Signalling Systems described in these Recommendations may also be advantageous for interworking with other signalling systems.

2 INTRODUCTION

interworking is defined to be

— the controlled transfer of signalling information across the interface between different signalling systems where the significance of the transferred information is identical or where the significance is translated in a defined number, and

— the performance of appropriate switching procedures in association with the transfer.

The duration of interworking commences with the instant when an outgoing signalling system is successfully selected and the interworking continues throughout the call until the connection is released. Interworking ceases with the release of the connection whether the release is initiated by reception of a clear-forward signal or in response to some other condition.

2.1 *Functional partitioning*

When interworking is specified in SDL, three separate functional blocks with distinct procedures are used (see Figure 2/Q.602), namely

— the incoming signalling system logic procedures,

— the interworking logic procedures,

— the outgoing signalling system logic procedures.

It is understood that interworking logic procedures are dealt with in the second functional block. This functional subdivision allows only those events which can be processed within the individual incoming and outgoing signalling system logic procedures part to be sent to or from the interworking logic procedures part.

Both the incoming and outgoing signalling system logic procedures cause actions such as the sending of an acknowledgement signal, the starting of time supervision, and the generation of an interworking event that includes additional information, e.g. the use of satellite circuits and echo suppressors.

The action following the reception of an interworking event may be the generation of one or more signals as well as the operation of internal signalling and switching procedures.

The interworking logic procedures are used to specify the action to be taken in all cases, especially when there is no direct translation from an interworking event to a signal.

2.2 *Descriptive tools*

A general approach to specifying interworking — known as events approach — is used.

To prepare SDL diagrams three sets of events are used (see Recommendation Q.603), namely

— Forward Interworking Telephone Events (FITEs)

In the Recommendations on interworking of signalling systems the term ‘‘procedure’’ is used in the same way as the term ‘‘process’’ in Recommendation Z.101, § 2.1

— Backward Interworking Telephone Events (BITEs) and

— Switching Processing Interface Telephone Events (SPITEs).

FITEs perform information transfer in the forward direction from an incoming signalling system to an outgoing signalling system.

BITEs perform information transfer in the backward direction from an outgoing signalling system to an incoming signalling system.

SPITEs describe the information flow at the functional interface between signalling and switching. These events are considered to be internal to the signalling procedures.

In the events approach, all information transfer between any incoming and outgoing signalling system occurs at a standard interface by means of interworking telephone events. This is illustrated in Figure 2/Q.602. The concept of an interworking event is generally valid and applies to all interworking combinations.

To provide a tool for the interworking specifications, *information analysis tables* | see Recommendation Q.604) are prepared. They identify the information elements of all forward and backward signals (which are relevant to interworking) for each signalling system. They also identify the possible information loss, addition or change which occurs in the case of interworking of signalling systems.

FIGURE 2/Q.602, p.

2.3 *Symbols*

The symbols and rules of SDL used for interworking specifications are presented in Recommendation Z.102.

2.4 *Rules for interworking diagrams*

The general objective is to present all the interworking specifications by means of SDL.

The following rules apply to interworking specifications:

2.4.1 The interworking specifications shall be implementation independent.

2.4.2 They shall facilitate the specification of interworking with other signalling systems.

2.4.3 They shall be unambiguous and as complete as possible, this means specifically that:

a) only those switching procedures shall be represented which directly influence the interworking of signalling systems;

b) only those procedures of the outgoing and the incoming signalling system logic are specified which are relevant to interworking, i.e. procedures which are signalling system dependent and others which have no influence on the interworking procedures are not represented in the functional parts of the outgoing and incoming signalling system logic procedures;

c) detailed information, such as the exact description of the compelled signalling cycle, recognition times of signals, encoding, frequencies used, is not described in the outgoing or incoming functional parts. Such details can be found in the specifications of the signalling system;

d) conditions resulting from malfunctions of equipment which have no relevance to interworking, shall not be taken into account.

2.4.4 SDL connector symbols are used to cover some detailed procedures that need not be represented when their descriptions are not important for the interworking procedures.

2.4.5 Equipment terminology, e.g. ‘‘register’’ mentioned in the logic procedures is understood to be functional.

2.4.6 The information analysis tables include only signals relevant to interworking. Any internal signals with a meaning specific to a single signalling system are not listed.

2.4.7 In drawing the SDL diagrams for the interworking specifications, it was assumed that no time elapses between consecutive states; i.e. state transitions are instantaneous. Time elapses only within a state.

Recommendation Q.603

3 EVENTS

All information transfer between incoming and outgoing signalling systems logic procedures occurs as events. These events are represented as FITEs, BITEs and activation signals. In addition, SPITEs are used internally.

The translation of the information content of a signal into its corresponding interworking telephone event must not lead to a change of its information content, i.e. the information content must be translated only into one single interworking telephone event.

See Annex A to Recommendations Q.601-Q.608.
Tables A-1 to A-3 list all of the forward interworking telephone events (FITEs), backward interworking telephone events (BITEs) and switching processing interface telephone events (SPITEs).

There are some events which are the direct result of signals received in some particular call phase. These events perform the transfer of signalling information. However not all signals directly generate interworking events.

There are some events which are the result of signals in a particular call phase and internal logic procedures. This applies particularly to routing, country code indications and echo-suppressor control.

There are some events (e.g. due to time-outs) which are purely the result of internal interworking logic procedures. In addition, it may be useful to consider the internal procedures of the various signalling systems, which do not generate interworking events.

In using the events approach the following rules are observed:

a) In generating events all the circumstances under which the event may arise are examined so that the event description is exact.

b) All events which have been identified by considering the response of a signalling system to events are included in Tables A-1 to A-3.

Recommendation Q.604

4 INFORMATION ANALYSIS TABLES

Information analysis tables are provided for each signalling system. These tables list the information elements of the forward and backward signals for CCITT signalling systems.

Tables A-4 to A-8 show the forward signals relevant to interworking of Signalling Systems No. 4, No. 5, No. 6, No. 7, R1 and R2, split up into their individual information elements. In these tables, comparisons are made between the contents of the signals used by the different systems.

Tables A-9 to A-13 show the backward signals relevant to interworking of Signalling Systems No. 4, No. 5, No. 6, No. 7, R1 and R2, split up into their individual information elements. In the rows headed ‘‘corresponds to signal No. . | | of Signalling System . | | ’’ the signals are entered together with their corresponding signal, if any, in the different systems.

The tables include an indication to the other signalling systems where:

— equivalent signals have the same information content,

— equivalent signals are not provided,

— equivalent signals contain less or substitute information,

— equivalent signals contain additional or changed information.

4.1 *Information content of the signals*

The individual signals are assigned specific information so as to enable messages to be transmitted. The meaning of these signals can be seen from the specifications of CCITT Signalling Systems.

With regard to their information content, a basic distinction can be made between:

— signals containing a single information element, and

— signals containing several information elements.

An information element is understood to be the smallest indivisible component of information (within a signal) considered in this Recommendation.

For the interworking of different signalling systems, the information content of the signals to be translated is of great importance. In the case where two signalling systems interwork, it is possible to assign all signals used in the CCITT Signalling Systems to one of the following categories:

a) signals coinciding in all information elements;

b) signals coinciding at least in one, but not in all information elements;

c) signals coinciding in no information element at all.

4.2 *Consequences*

If signals with identical information content are present in the signalling systems, the interworking condition is fulfilled. No modification of information occurs (refer to a) of § 4.1 above).

If the signal meanings do not agree in all information elements, those signals must be allocated to one another where maximum agreement is to be achieved, so as to minimize the loss or addition of information (refer to b) of § 4.1 above).

If a signal possesses information elements which are not present in the signals of the other signalling system with which interworking should take place, the information concerned cannot be transmitted and the appropriate performance feature cannot be utilized (refer to c) of § 4.1 above).

In a few cases special procedures have to be laid down if the status of the connection does not permit transmission of the intended interworking signal. If conversion is not possible with certain backward signals, it may be necessary to apply a corresponding tone (see Recommendation Q.35).

In addition, there are cases in which the information content of several signals of one of the signalling systems has to be converted so as to obtain one signal of the other signalling system and vice versa.

Recommendation Q.605

5 DRAWING CONVENTIONS

In addition to Recommendations Z.101 to Z.104, the following rules apply to the logic procedures of the interworking specifications.

5.1 *Inputs and outputs*

In accordance with the basic concepts of SDL, *internal* | inputs and outputs are used for logic procedures that do not go beyond the functional block involved. In addition, some SPITEs are used as *internal* inputs to describe the information flow at the interface between the signalling and switching procedures.

All other inputs and outputs, including FITEs and BITEs as well as signals, which pass from one functional block to another are considered as being *external* .

The *external* | inputs and outputs point in the direction of the data flow between the three functional blocks as shown in Figure 2/Q.602.

A multiple input (i.e. a group of signals) which leads to one and the same procedure can be represented by one standard symbol including that group of signals, if possible.

5.2 *States*

State symbols shall contain

— the state number, and

— the descriptive text of the state.

Most frequently the state indicates the input being waited for.

The layout of the state symbol to be used for the interworking specifications is given in Figure 3/Q.605.

Figure 3/Q.605, p.

5.3 *Connectors*

Connectors are represented by a circle. The in-connector labels (within the connector symbol) shall be unique within the same interworking diagram.

The designations used within the connector symbols are as follows (see Figure 4/Q.605):

a) arabic numerals, where the vertical line of flow of the procedure is to be interrupted. Subscripts outside the connector indicate the sheet numbers on which the associated connectors appear;

b) capital letters, where the horizontal line of a multiple branching of the process is to be interrupted. Subscripts outside the connectors indicate the sheet numbers, on which the associated connectors appear;

c) ‘‘P_i’’ to indicate that the procedures are not completed (e.g. a subroutine or another detailed procedure). The connector symbol will then be non-subscripted with sheet numbers but be provided with the comment ‘‘to be completed’’ associated with a reference to the Recommendation concerned, if any.

The connector reference is always shown in the left-hand column of each sheet of the interworking diagrams.

Figure 4/Q.605 p.

5.4 *Procedures not presented*

In general, possible signals which are not shown as inputs in a given state are to be considered as consumed but discarded, i.e. ignored. A special treatment may be required in the following cases:

a) electrical conditions not recognized as regular signals (e.g. 1 out of 6 frequencies in the case of MFC signalling);

b) regular signals, but not relevant to interworking (e.g. blocking, identification);

c) any other regular signal recognized as an abnormality (e.g. out of sequence).

In the cases a) and c), the appropriate actions to be taken are not specified in the existing Recommendations. Further study is required.

The reactions in case of signals out of sequence can be shown by means of a state/signal matrix as auxiliary documentation. The interpretation of the diagrams will then be unambiguous.

5.5 *Presentation of time supervision*

The method of time supervision presentation to be used is shown in Figure 5/Q.605.

If two timers are running in a state such that the longer timer can never mature, the input ‘‘time release’’ should nevertheless be shown for both timers in order that no misunderstanding can result. The meaning of start t_1 also includes the possibility of restart t_1, t_1 means the expiry of t_1.

Figure 5/Q.605, p.5

5.6 *Storage of inputs*

During the method of register function activation, all inputs are implicitly stored and the sequence of FITEs is also recorded. When the register function is not activated, inputs must explicitly be stored if required in a later state transition.

5.7 *Method of changing the order of signals*

In several interworking situations, the order in which signals are received is not necessarily the order of their utilization. Therefore, a rearrangement of the order is necessary. To change the signalling sequence in the interworking diagrams, the method indicated in Figure 6/Q.605 should be applied. Figure 6/Q.605 shows how such a situation can be coped with by SDL.

5.8 *Multiple sending of FITEs 1 or digits*

The case of multiple sending of FITEs 1 or digits often occurs in the logic procedures: in the former case in the incoming or interworking procedures, and in the latter case in the outgoing procedures of the en-bloc Signalling Systems No. 5 and R1. The presentation of Figure 7/Q.605 should be used. *a)* of Figure 7/Q.605 is used for multiple FITEs 1, while *b)* of Figure 7/Q.605 is used for outgoing Signalling Systems No. 5 or R1. In *b)* of Figure 7/Q.605 the outgoing logic has already received all the FITEs 1 and has established the ‘‘ST condition’’ prior to the logic sequence shown.

Figure 6/Q.605, p.6

Figure 7/Q.605, p.7

5.9 *Different signalling speeds*

In interworking cases where the signalling system at the outgoing end uses the overlap signalling mode with acknowledgements (Signalling Systems No. 4 and R2) or where the signalling speed of the system at the outgoing end is lower than that at the incoming end, the presentation method indicated in Figure 8/Q.605 should be used.

Figure 8/Q.605, p.

Recommendation Q.606

6 LOGIC PROCEDURES

The logic procedures are prepared as:

a) logic procedures for incoming signalling systems,

b) interworking logic procedures,

c) logic procedures for outgoing signalling systems.

A state overview diagram is provided with each procedure. The state overview diagram:

— lists the states for the logic,

— provides a sheet reference for each state, and

— shows permitted transitions between states.

In addition, notes and timers are provided.

6.1 *Incoming signalling system logic procedures*

In specifying the logic procedures the following elements are used:

a) inputs in the form of forward signals,

b) outputs in the form of FITEs,

c) inputs in the form of BITEs,

d) outputs in the form of backward signals,

e) time supervision arrangements,

f) routing and switching aspects that are needed for interworking (SPITEs).

Incoming signalling system logic procedures are provided for:

— Signalling System No. 4 in Recommendation Q.611,

— Signalling System No. 5 in Recommendation Q.612,

— Signalling System No. 6 in Recommendation Q.613,

— Signalling System No. 7 (TUP) in Recommendation Q.614,

— Signalling System R1 in Recommendation Q.615,

— Signalling System R2 in Recommendation Q.616.

6.2 *Interworking logic procedures*

In specifying the logic procedures the following elements are used:

a) inputs in the form of FITEs from the incoming signalling system,

b) outputs in the form of FITEs to the outgoing signalling system,

c) inputs in the form of BITEs from the outgoing signalling system,

d) outputs in the form of BITEs to the incoming signalling system,

e) routing and switching aspects that are needed for interworking (SPITEs).

Interworking logic procedures can be provided for every possible combination of CCITT Signalling Systems.

The following interworking combinations are provided:

— Signalling System No. 4 to R2 in Recommendation Q.634,

— Signalling System No. 5 to No. 6 in Recommendation Q.642,

— Signalling System No. 5 to No. 7 (TUP) in Recommendation Q.643,

— Signalling System No. 5 to R1 in Recommendation Q.644,

— Signalling System No. 5 to R2 in Recommendation Q.645,

— Signalling System No. 6 to No. 5 in Recommendation Q.652,

— Signalling System No. 6 to No. 7 (TUP) in Recommendation Q.653,

— Signalling System No. 6 to R1 in Recommendation Q.654,

— Signalling System No. 6 to R2 in Recommendation Q.655,

— Signalling System No. 7 (TUP) to No. 5 in Recommendation Q.662,

— Signalling System No. 7 (TUP) to No. 6 in Recommendation Q.663,

— Signalling System No. 7 (TUP) to No. 7 in Recommendation Q.664,

— Signalling System No. 7 (TUP) to R1 in Recommendation Q.665,

— Signalling System No. 7 (TUP) to R2 in Recommendation Q.666,

— Signalling System R1 to No. 5 in Recommendation Q.671,

— Signalling System R1 to No. 6 in Recommendation Q.672,

— Signalling System R1 to No. 7 (TUP) in Recommendation Q.673,

— Signalling System R1 to R2 in Recommendation Q.674,

— Signalling System R2 to No. 4 in Recommendation Q.681,

— Signalling System R2 to No. 5 in Recommendation Q.682,

— Signalling System R2 to No. 6 in Recommendation Q.683,

— Signalling System R2 to No. 7 (TUP) in Recommendation Q.684,

— Signalling System R2 to R1 in Recommendation Q.685.

6.3 *Outgoing signalling system logic procedures*

In specifying the logic procedures, the following elements are used:

a) inputs in the form of FITEs,

b) outputs in the form of forward signals,

c) inputs in the form of backward signals,

d) outputs in the form of BITEs,

e) time supervision arrangements,

f) routing and switching aspects that are needed for interworking (SPITEs).

Outgoing logic procedures are provided for:

— Signalling System No. 4 in Recommendation Q.621,

— Signalling System No. 5 in Recommendation Q.622,

— Signalling System No. 6 in Recommendation Q.623,

— Signalling System No. 7 (TUP) in Recommendation Q.624,

— Signalling System R1 in Recommendation Q.625,

— Signalling System R2 in Recommendation Q.626.

Recommendation Q.607

7 INTERWORKING REQUIREMENTS FOR NEW SIGNALLING SYSTEMS

7.1 *Treatment of new signals in another signalling system*

In order to facilitate the interworking between new signalling systems and existing ones, it is desirable to elaborate rules to be taken into account when specifying the new signalling system(s). Since compatibility between all CCITT Signalling Systems must be ensured, any newly developed system has to meet the following requirements with regard to interworking:

a) new signalling systems should be capable of processing all interworking events specified for the existing signalling systems without losing or adding information elements.

This is best achieved by the concept of transparency, whereby the signals of all existing systems have a unique translation into the new system and back again. In this way a tandem connection via an interposed link employing the new signalling system will neither add nor subtract from the information transfer that would otherwise have occurred had the new signalling system not been present;

b) newly developed systems should not lead to any modification to the specifications covering the present signalling systems except that the translation of new interworking events arising from the meanings of new signals in the new system will need to be defined for the existing signalling systems.

In order that the new signals should cause the minimum loss or gain of information when interworking with existing signalling systems, any new signals should, if possible, not contain any information elements already existing. Hence it is better that these new signals convey only a single meaning rather than a multiple meaning as occurs in some

existing systems (e.g. Signalling System R2 signal I-14 corresponds to FITE 8 which combines the elements of FITE 3 and FITE 5). Therefore, only one new information element will be associated with the new signal and only one new FITE or BITE will be needed.

In some cases the new signal will be translated into a presently defined signal of an existing system and hence will cause the addition or, more often, the loss of information. In some cases, no electrical signal being available, all the information may be lost or a tone may need to be used. In the case of Signalling Systems R2, No. 6 and No. 7, some reserved signals exist within the capacity of these systems and such signals may be introduced to enhance the signalling system and provide an interworking capability.

However it should be borne in mind that with such existing systems, it may not be easy or desirable to modify existing equipment, and even if such modification were possible, in the transitional period the interworking of existing and enhanced signalling equipment of the same system must also be considered.

In view of the difficulties of interworking with existing signalling systems, new features of signals should only be introduced in a new system if there are good operational reasons for doing so.

7.2 *Reserve for national use*

In practice, provision of appropriate spare signalling capacity in a new system reserved for national/regional use cannot be avoided. In such a case, precautions must be taken to prevent signals with an individual national meaning from entering the international network.

One general objective of a new signalling system should be to meet also the national requirements in order to avoid national versions of a given signalling system as far as possible.

7.3 *Unambiguous specifications*

After a clear specification of a new feature to be included in a signalling system, the related signalling procedures should be specified in a unique and standard form. The same applies to the signals involved.

The designation of signals of different signalling systems, which carry the same information, should be the same.

7.4 *Escape codes*

It is obvious that appropriate spare capacity should be provided in order to cope with future demands. One way of doing so is the provision of escape codes.

Recommendation Q.608

8 MISCELLANEOUS INTERWORKING ASPECTS

In producing the interworking specifications in the present form some interworking aspects were found, which are not covered by the specifications of the signalling systems themselves and need to be taken into account when using the SDL diagrams for interworking specification.

8.1 *Transfer of no charge information*

Difficulties related to the use of charge or no charge information were recognized by CCITT for the following reasons:

In the case of interworking with systems not able to provide the no charge information together with the answer signal, a *no charge* call is only possible by withholding the answer signal. In the international network, the absence of the answer signal results in a time-out within a delay period of 2 to 4 minutes as described in Recommendation Q.118, which considers this

situation to be abnormal. Thus for certain cases of interworking, intentional withholding of the answer signal would be identical with the abnormal condition. Thus discrimination is impossible.

It is recommended that:

a) withholding the answer signal cannot be a satisfactory solution since

— the connection may remain in the abnormal transmission condition (e.g. failure to enable the echo suppressor in Signalling System R2 and retention of band-stop filter in Signalling System R1),

— the time supervision will interrupt the connection after 2 or 4 minutes,

and the answer signal should thus be retained (be used) even in the case of a *no charge* condition over the international network;

b) there is no necessity to modify existing equipment to provide *charge/no charge* information transfer capabilities.

From a technical viewpoint, international *no charge* | alls are possible without restrictions only when the Signalling Systems No. 6, No. 7 (TUP) or R2 are used exclusively throughout the entire international network (assuming that *no charge* information is received from the national network).

In the case of interworking with systems not able to transfer the *no charge* | nformation, a *no charge* call can at present only be provided by withholding the answer signal. Consequently the transfer of *no charge* information must not be performed in these cases.

In the case of Signalling System No. 6, the information *no charge*
| hould be sent together with the *address-complete, no charge* information is contradicted by the subsequent *answer, charge* signal the call should nevertheless not be charged (§ 4.1.9, Signalling System No. 6 specification).

When interworking from Signalling System No. 6 or No. 7 (TUP) to Signalling System R2 the comments of § 8.1 have to be taken into account.
The transfer of *no charge* | nformation is possible when interworking:

from any of the Signalling Systems: No. 6 , No. 7 (TUP) and R2 to any of the Signalling Systems: No. 6, No. 7 (TUP) and R2.

8.2 *Time-out guidelines*

8.2.1 *Time-outs connected with subscribers' behaviour*

The specified register time-out of 4 to 6 seconds (after each digit is received which is resorted to when address complete cannot be identified in another way) has proved to give satisfactory technical functioning at least in those cases where the exception described in Recommendation Q.261, § 4.1.5, e) does not apply.

Insufficient information is obtained to motivate a change at this stage of the duration of the 4 to 6 seconds time-out specified in the outgoing register in cases where no address-complete indication is available.

It is recommended that the 4 to 6 seconds interdigital time-out procedure should be used where needed only. It is furthermore recommended that Administrations make their network numbering known to their respondents so that maximum use of number length analysis can be made whenever address-complete information cannot be given.

8.2.2 *General time-out guidelines for new signalling systems*

i) 20-30 seconds is considered to be the proper time-out interval for outgoing registers for non-receipt of address signals, or address complete.

ii) When backward signals are provided, if the address-complete signal is not available before 15-20 seconds after the last received address signal at the incoming register, then an address incomplete signal should be sent. If, however, it is known that the address is complete, then the time-out should be extended to 20-30 seconds.

iii) If it is known that a positive (real) address-complete signal is available but will *not* be returned within the lower limit of the 20-30 second time-out period of the outgoing register then an artificial address-complete signal should be sent within 15-20 seconds. The indiscriminate use of such a signal should be avoided. A new ''call-in-progress'' signal should not be used instead of the ''artificial address-complete'' signal.

iv) When backward signals are not available and complete number length analysis in the outgoing register is not practical, then the 4-6 seconds time-out is used to determine address complete instead of the 20-30 seconds time-out mentioned in point i). This time-out commences when the minimum number length has been reached. The number length is determined when the time-out matures or if the known maximum number length is received.

8.2.3 *General time-out guidelines for existing signalling systems*

These guidelines are primarily intended for signalling on international calls where fully overlap digit sending can occur. Other guidelines may be appropriate to some national applications.

During call set up both incoming and outgoing registers are normally supervised by timers. The duration of the time-out interval is defined in the relevant Recommendations defining the signalling systems. These are summarised in the table below. In the case of a multi-link connection with overlap signalling, the time between digit transmission or reception will be supervised at each exchange, and according to existing Recommendations, at both incoming and outgoing registers in each exchange. It is considered that this situation is unsuitable since the cleardown of a call where insufficient digits are dialled can lead to unpredictable results because of the possibility of

timers expiring in a different order on subsequent call attempts. In some cases this can lead to different tones being returned to the calling subscriber on subsequent calls. Since the first to expire and therefore normally the controlling time-out will be the incoming register time-out of around 15-20 seconds, it is recommended that this time-out should only be activated at a single point in the connection at any stage of call set up. The most suitable point is the incoming register at the exchange closest to the called subscriber at any point in the call set up. To achieve this it is recommended that the incoming register time-out should be inhibited at each exchange once the outgoing circuit has been seized. The longer time-out of around 20-30 seconds which will be active at outgoing registers, and in some cases incoming registers also, should not be inhibited.

This feature need not be implemented at existing exchanges or for Signalling System No. 4 which has time-outs not in conformance with modern practice.

8.2.4 *Summary of inter-digital time-outs*

H.T. [T1.608]

Type of time-out	Signalling System					
	4	5	6	7	R1	R2
Outgoing	15-30 s Q.127 § 4.4.1.2a.2		20-30 s Q.268 § 4.8.5.1(a)	20-30 s Q.724 § 6.4.1		> | 4 s Q.476 § 5.5.1.2
Incoming Receipt of digit (to KP signal) 20-40 s typical (to ST signal) }	30-60 s Q.127 § 4.4.3(2)a	10-20 s { Annex 2 Tables 4 and 6	15-20 s (to ST signal) Q.261 § 4.1.6	15-20 s (15-24 s) (preferred) Q.724 § 1.7	10-20 s Q.325 § 3.6.2.2	8-24 s Q.476 § 5.5.2.1

Outgoing
{
Determination of
ST condition
}
		4-6 s
		
		Q.152 § 3.2.1
					4-6 s
					
					Q.321 § 3.2.1b(ii)	

Incoming
{
Time-out after
ST received
}
			20-30 s
			
			Q.268 § 4.8.5.3(a)
				20-30 s
				
				Q.724 § 6.4.3(a)		

TABLE [T1.608], p.

8.3 *Reset procedures*

8.3.1 When the reset signal is received on an incoming Signalling System No. 6 or 7 (TUP) circuit the succeeding circuit is released by the clear-forward procedure in all cases.

8.3.2 When the reset signal is received on an outgoing Signalling System No. 6 or 7 (TUP) circuit the response is:

i) to initiate the clear-forward sequence on the outgoing circuit;

ii) to release exchange equipment as appropriate, i.e. SPITE 3 in the register phase and SPITE 5 in the speech phase;

iii) to return an appropriate signal and/or tone on the incoming circuit as shown in the following table.

H.T. [T2.608]

Signalling System No.	Register phase	Wait for answer	Answered	Clear-back
|	Busy flash	Busy flash		
Clear-back + congestion tone if possible				
}	Congestion tone if possible			
|	Busy flash	Busy flash	{	
|	CFL	CFL		
7 (TUP)	CFL	CFL		
R1	Congestion tone	Congestion tone		
R2	A4/B4	Congestion tone		

Tableau [T2.608], p.10

ANNEX A
(to Recommendations Q.601-Q.608)

Lists and meanings of FITEs, BITEs and SPITEs.

Representation of information contents of signals
of the Signalling Systems.
H.T. [1T3.608]

TABLE A-1
List of forward interworking telephone events (FITEs)

No. {

		No. 4	No. 5	No. 6	No. 7 (TUP)	R1
1 Digit 1, 2, . | | 9 or 0, code 11 or 12, end-of-pulsing (ST) signal	{ } 1	1	1	1	1	1
2 Country-code indicator, country code not included	{ } 8	8	2	2		18
3 Country-code indicator, country code included	{ } 9	9	3	3		
4 Echo-suppressor indicator, outgoing half-echo suppressor not included, incoming half-echo suppressor not required	{ }		6	6		19
5 Echo-suppressor indicator, outgoing half-echo suppressor included, incoming half-echo suppressor required	{ } 10		7	7		11
6 Country-code indicator, country code included; echo-suppressor indicator, outgoing half-echo suppressor not included, outgoing half echo suppressor required	{ }					8
7 Country-code indicator, country code included; echo-suppressor indicator, outgoing half-echo suppressor not included, no echo suppressor required	{ }					9
8 Country-code indicator, country code included; echo-suppressor indicator, outgoing half-echo suppressor included, incoming half-echo suppressor required	{ }					10
9 Calling-party's-category indicator, operator, language French	{ } 2	2	8	8		2
10 Calling-party's-category indicator, operator, language English	{ } 3	3	9	9		3
11 Calling-party's-category indicator, operator, language German	{ } 4	4	10	10		4
12 Calling-party's-category indicator, operator, language Russian	{ } 5	5	11	11		5
13 Calling-party's-category indicator, operator, language Spanish	{ } 6	6	12	12		6

14 Calling-party's-category indicator, operator with forward-transfer facility }	{					15
15 Calling-party's-category indicator, subscriber }	{					7
16 Calling-party's-category indicator, subscriber or operator without forward-transfer facility }	{					12

Tableau [1T3.608] p.11

H.T. [2T3.608]

TABLE A-1 *(cont.)*

No.	{	No. 4	No. 5	No. 6	No. 7 (TUP)	R1
17 Calling-party's-category indicator, subscriber, ordinary call }	{ 7	7	13	13		
18 Calling-party's-category indicator, subscriber, call with priority }	{		14	14		14
19 Calling-party's-category indicator, data call }	{		15	15		13
20 Nature-of-circuit indicator, no satellite circuit in the connection }	{		4	4		20
21 Nature-of-circuit indicator, one satellite circuit in the connection }	{		5	5		21
22	Clear-forward	11	10	16	16	3
23	Forward-transfer	12	11	17	17	2
24	Continuity			18	18	
25 Continuity-check indicator, continuity check not required }	{			21		
26 Continuity-check indicator, continuity check required on this circuit }	{			20		
27 Continuity-check indicator, continuity check being done on previous circuit }	{			22		
28	Spare					
29	Spare					
30	Service information				23	
31 General set-up message (GSM) }	{			24		

Tableau [2T3.608] p.12

A.1 *Explanatory notes on the meanings and uses of FITEs*
| see Table A-1)

These are Forward Interworking Telephone Events sent from an incoming procedure to an interworking procedure, or from an interworking procedure to an outgoing procedure.

A.1.1 FITE 1 means one of the digits 1-9, 0, code 11, code 12 and code 15 (ST), when used as an *address signal* (i.e. not including their use for other information, e.g. language digits). Each FITE 1 represents one digit only and that digits value is implicit in the signal.

A.1.2 FITEs 2, 3, 6, 7 and 8 are events representing *country code indicators* . These signals are not sent from the incoming procedure to the interworking procedure, since the country code indicator is a link dependent signal and is used by the incoming procedure as part of the input information to the digit analysis. These FITEs are generated in the interworking procedure by the use of SPITE 22 (see Table A-3).

A.1.3 FITEs 4-8 are events representing *echo-suppressor indicators* . These signals are not sent from the incoming procedure to the interworking procedure, since the echo-suppressor indicator is a link dependent signal and is used by the incoming procedure as part of the input information to the digit analysis. These FITEs are generated in the interworking procedure by the use of SPITE 21 (see Table A-3).

A.1.4 FITEs 9-19 are events representing *calling-party's category indicators* | nd include telephone events derived from language digits, discriminating digits and calling-party's-category signals.

A.1.5 FITEs 20 and 21 are events representing *nature-of-circuit indicators* . These signals are not sent from the incoming procedure to the interworking procedure, but the nature-of-circuit indicator is used by the incoming procedure as part of the input information to the digit analysis. These FITEs are generated in the interworking procedure by the use of SPITE 20 (see Table A-3). These signals are not completely link dependent, since if the nature-of-circuit indicator on the incoming circuit implies one satellite

in the connection, the same signal (FITE 21) will be sent to the outgoing procedure.

A.1.6 FITE 22 is an event representing the *clear-forward signal*
| nd overrides all other procedures. It should therefore be shown as an input in all call states except idle, even though the waiting state might not appear to be capable of receiving FITE 22.

A.1.7 FITE 23 is an event representing the *forward-transfer signal* | nd is assumed to be capable of reception after the state *Address-complete* when the register function is deactivated and the speech condition is set up.

A.1.8 FITE 24 is an event representing the *continuity signal* | n common channel signalling systems. When interworking from a channel associated signalling system to a common channel signalling system, FITE 24 must be generated by the interworking procedure.

A.1.9 FITEs 25, 26, 27 are events which define the continuity check requirements on outgoing circuits for common channel systems.

A.1.10 FITE 30 is an event which defines the Services which have been requested and can be provided e.g., Speech, Closed User Group, Digital Connectivity, etc.

A.1.11 FITE 31 is an event which defines the information to be carried by the General Set-up Message (GSM).

A.2 *Explanatory notes on the meanings and uses of BITEs*
| see Table A-2)

These are Backward Interworking Telephone Events sent from an outgoing procedure to an interworking procedure, or from an interworking procedure to an incoming procedure.

A.2.1 BITE 2 is an *address-complete event* | hich may be originated either by the receipt of an address complete signal or by the simulation of the address complete condition from a signalling system not employing address complete signals. This latter event is designated BITE 26, when signalling from the outgoing procedure to the interworking procedure. Since in most cases the forward signalling continues beyond the time that the address-complete is simulated, BITE 2 does not cause register deactivation in the incoming logic in the way that BITEs 3-7 do. The incoming procedure must wait for the subsequent reception of BITE 27 or BITE 28 (see §§ A.2.7 and A.2.8).

A.2.2 BITEs 3-7 are *address-complete events* | hich cause the speech condition to be set up and the register function to be deactivated.

A.2.3 BITEs 8-17, 19, 20 are *call unsuccessful events* | hich cause the return of a corresponding event to the incoming procedure where the register function will be deactivated. They are separated according to the reasons of an unsuccessful call.

A.2.4 BITEs 21-24 are *answer events* , differentiated where possible.

A.2.5 BITE 25 is the event representing the *clear-back signal* .

A.2.6 BITE 26 is an event signalling the *simulation of address-complete* | ondition by an outgoing signalling system which does not employ address-complete signals (e.g. No. 5 or R1). If the incoming signalling system uses address-complete signals, BITE 26 is translated to BITE 2 in the interworking procedures, in other cases it is discarded.

A.2.7 BITE 27 means that an outgoing signalling system which does not employ address-complete signals has *completed forward signalling*
| e.g. ST has been sent) and the *speech condition should be set up* used, it will follow after BITE 26.

For incoming signalling systems employing address-complete signals, BITE 27 will always be expected after BITE 2. Therefore when both interworking systems employ address-complete signals, the interworking procedure must translate BITE 2 to BITE 2 + BITE 27.

A.2.8 BITE 28 is used only from an interworking procedure to an incoming procedure in the case where a BITE is received from the outgoing procedure which has no corresponding BITE in the incoming procedure. A tone will be returned by the use of SPITE 6 in the interworking procedure, and BITE 28 is used solely to deactivate the register function in the incoming procedure.

A.2.9 BITE 29 *release incoming side* , is used from an interworking procedure to an incoming procedure for incoming systems where release procedures may be initiated in the backward direction (e.g. the INMARSAT signalling system).

A.2.10 BITE 30 *switchthrough may be completed* | s used to signal from an outgoing procedure to an incoming procedure via the relevant interworking, that the speech path may be connected through.

A.2.11 BITE 31 is an event which requests the information asked for by the General Request Message (GRQ).

A.2.12 BITE 35 is a call unsuccessful event corresponding to the receipt of the Access Barred Signal (ACB). This BITE is used e.g. in Closed User Group calls.

A.2.13 BITE 36 is a call unsuccessful event that occurs when a digital path cannot be provided.

Note — Bites 35 and 36 are only used in No. 7 originated calls.

H.T. [1T4.608]

TABLE A-2

List of backward interworking telephone events (BITEs)

No.	{				
		No. 4	No. 5	No. 6	No. 7 (TUP)
1	Spare				
2	Address-complete, charge	1		1	1
3 Address-complete, no charge }	{		2	2	
4	Address-complete, coin box			3	3
5 Address-complete, subscriber free, charge }	{		4	4	
6 Address-complete, subscriber free, no charge }	{		5	5	
7 Address-complete, subscriber free, coin box }	{		6	6	
8	Call unsuccessful	2	1		
9 Call unsuccessful, switching-equipment congestion }	{		7	7	
10 Call unsuccessful, circuit-group congestion }	{		8	8	
11 Call unsuccessful, switching-equipment congestion or circuit group congestion }	{				
12 Call unsuccessful, national-network congestion }	{		9	9	
13 Call unsuccessful, address-complete, national network congestion }	{				
14 Call unsuccessful, address incomplete }	{		10	10	
15 Call unsuccessful, (address-complete), unallocated number }	{		11	11	
16 Call unsuccessful, address-complete, subscriber busy (elec.) }	{		12	12	
17 Call unsuccessful, address-complete, line out of service }	{		13	13	
18	Spare				
19 Call unsuccessful, call-failure }	{		15	15	
20 Call unsuccessful, send special information tone }	{		14	14	
21	Answer, subscriber free				

22 Answer, subscriber free, charge }	{ 3	2	16	16	1	
23 Answer, subscriber free, no charge }	{		17	17		
24	Answer, re-answer			18	18	
25	Clear-back	4	3	19	19	

Tableau [1T4.608] p.13

H.T. [2T4.608]

TABLE A-2 *(cont.)*

No.	{	No. 4	No. 5	No. 6	No. 7 (TUP)	R1	R2
26 Artificial address complete is sent | ua) }	{	4			3		
27 Sending-finished; set up speech condition | ua) }	{	5			4		
28 Deactivate register function | ua) }	{						
29 Release incoming side | ua) }	{						
30 Switchthrough may be completed | ua) }	{						
31	General request message (GRQ)				20		
32	Spare						
33	Spare						
34	Spare						
35 Call unsuccessful, access barred }	{			21			
36 Call unsuccessful, digital patch not provided (DPN) } 22	{						

a) These signals do not necessarily correspond to a backward signal but correspond to logic events.

Tableau [2T4.608] p.14

H.T. [1T5.608]

TABLE A-3

List of switching processing interface telephone events (SPITEs)

No.	Designation	Symbol
1	{	
Activate register function (physical register or equivalent function)		
}	Task	
2	Register function activated	Internal input
3	Deactivate register function	Task
4	Set up speech condition	Task
4A	Speech path may be set up	Task
5	{	
Release speech condition (of the speech path in the exchange)		
}	Task	
6	Return appropriate tone	Task
7	Disconnect tone	Task
8	{	
Release all equipment (covers also disconnection of tones; exclusively used at the incoming procedures)		
}	Task	
9	Spare	
10	Spare	
11	{	
Shall digit analysis be started?		
}	Decision	
12	Perform digit analysis	Task
13	{	
Digit analysis cannot be completed (covers insufficient information, waiting for enough digits for routing, etc.)		
}	Internal input	
14	{	
Routing information and service provided		
}	Internal input	
15	Unallocated number	Internal input
16	{	
Unprovided routing (e.g. transit connection received at an exchange handling termination traffic only)		
}	Internal input	
17	Barred routing	Internal input
18	{	
Switching equipment congestion		
}	Internal input	
19	Circuit group congestion	Internal input
20	Satellite link included?	Decision
21	{	
Incoming half-echo suppressor to be included at distant end?		
}	Decision	
22	{	
Transit connection following? (otherwise a terminal connection is following)		
}	Decision	
23	Has Z-digit been received?	Decision
24	Is this the Z-digit?	Decision
31	{	
Perform continuity check at the outgoing end (covers all necessary switching procedures: — connecting of the transceiver — disabling of echo suppressors — sending check tone — automatic reattempts, where applicable)		
}	Task	
32	{	

Insert check loop at the incoming end (including disabling of echo suppressors) }	Task {	
33 Continuity check OK (covers also receiving of checktone and removal of the transceiver) }	Internal input {	
34 Remove check loop at the incoming end (including enabling of echo suppressors) }	Task {	
35 Ignore further register signals }	Task {	
36 Is continuity check required on outgoing circuit? }	Decision	

Tableau [1T5.608] p.15

H.T. [2T5.608]
TABLE A-3 *(cont.)*

No.	Designation	Symbol
37 Analyze and store information (received in GSM) }	{ Task	
38	Access barred	Internal input
39	Digital path not possible	Internal input
40	Store services provided	Task
41	Spare	
42 Additional information required }	{ Internal input	
43 Set IAM fields as defined by services }	{ Task	
44 Analyze information requested (applicable to GRQ) }	{ Task	
45 Is service allowed? (applicable to GRQ) }	{ Decision	
46 Is information available? (applicable to GRQ) }	{ Decision	
47 Construct request message (applicable to GRQ) }	{ Task	
48 Construct information message (applicable to GSM) }	{ Task	
49	Spare	
50	Spare	

Tableau [2T5.608] p.16

A.3 *Explanatory notes on the meanings and uses of SPITEs*
| see Table A-3)

SPITEs are Switching Processing Interface Telephone Events used in all three procedures. For convenience the three signalling procedures are considered to be processes within a larger switching process and all SPITEs are considered to be *internal to the signalling procedures* but having, where necessary, full access to any switching information provided by other signalling procedures. For example digit analysis is initiated by the incoming procedure, but the results are available to both the interworking and outgoing procedures, where necessary. By contrast all FITEs, BITEs and telephone signals are external signals. The SPITEs are grouped into three categories:

a) SPITEs 1-10 are allocated or reserved for *switching SPITEs* ;

b) SPITEs 11-30 are allocated or reserved for *digit analysis SPITEs;*

c) SPITEs 31-40 are allocated or reserved for SPITEs used by a *restricted number of signalling systems* .

A.3.1 SPITE 1 *activate register function* | s used in the incoming procedure to activate the register function following the receipt of the seizing signal or the initial address message. The register function keeps a memory of all received signals.

A.3.2 SPITE 2 *register function activated* | s used following SPITE 1 where a proceed to send signal must be sent.

A.3.3 SPITE 3 *deactivate register function* is used in the incoming procedure to deactivate the register function. It is used after one of the following events:

— clear-forward,

— register timeout,

— SPITEs 15-19 (reasons of unsuccessful calls),

— BITEs 3-17, 19, 20, 27, 28 or any other error condition indicating an unsuccessful call.

A.3.4 SPITE 4 *set-up speech condition* is used in the incoming procedure to set-up the speech condition at the end of the register phase. It is therefore used in conjunction with SPITE 3 after reception of BITEs 3-7 and 27.

A.3.4(a) SPITE 4A *speech path may be set up* , is used in the incoming procedure on calls where a BITE 30, has been received in order to allow early switchthrough of the speech circuits.

A.3.5 SPITE 5 *release speech condition* | s used in the incoming or interworking procedure where a call unsuccessful BITE is received after SPITE 4. If the BITE is returned to the incoming procedure, SPITE 5 is used there but if the BITE is translated to a tone in the interworking procedure using SPITE 6, then SPITE 5 is used in the interworking procedure.

A.3.6 SPITE 6 *return appropriate tone* | s used in the incoming procedure where no electrical signal corresponds to SPITEs 15-19, and also in the interworking procedure when a BITE is received for which no corresponding BITE exists in the incoming procedure.

A.3.7 SPITE 7 *disconnect tone* , is used to disconnect a tone at a point in the logic procedures other than the release of the call, i.e. when SPITE 8 is not appropriate. An example is the disconnection of ringing tone in the outgoing INMARSAT procedures.

A.3.8 SPITE 8 *release all equipment* | s used in the incoming procedure when a clear-forward signal is received after the register phase.

A.3.9 SPITE 11 *shall digit analysis be started?* is used in the incoming procedure to determine, when sufficient digits have been received, that digit analysis may begin.

A.3.10 SPITE 12 *perform digit analysis* | s used in the incoming procedure to perform digit analysis. The analysis takes into account the following information, where available:

— address information,

— Z-digit (L- or D-digit),

— country-code indicator,

— echo-suppressor indicator,

— nature-of-circuit indicator,

— calling-party's-category.

— service requested.

SPITE 12 will be followed by one of the SPITEs 13-19 which indicate the result of the analysis, and are only used in the incoming procedure.

A.3.11 SPITE 13 *digit analysis cannot be completed* | ndicates that insufficient address information is available to complete the digit analysis.

A.3.12 SPITE 14 *routing information and service provided* | ndicates that digit analysis has been completed and the following information determined:

— type of outgoing signalling system,

— transit or terminal connection,

— echo-suppressor indicator,

— nature-of-circuit indicator,

— position of Z-digit.

— service provided.

SPITEs 15-19 are results of digit analysis.

A.3.13 SPITE 15 *unallocated number* | ndicates that the received address digits represent an unallocated number (country code, area code, etc.).

A.3.14 SPITE 16 *unprovided routing* | ndicates that the received address digits represent a valid code but that the required destination cannot be reached via this exchange.

A.3.15 SPITE 17 *barred routing* | ndicates that the received address digits represent a valid code but that access to it is barred by reason of, for example:

— wrong calling party's category,

— prohibited route-route combination.

A.3.16 SPITE 18 *switching equipment congestion* | ndicates that the switching attempt to the outgoing circuit met switching equipment congestion.

A.3.17 SPITE 19 *circuit group congestion* | ndicates that all circuit groups to the required destination were congested.

SPITEs 20-24 ask for information from the results of digit analysis.

A.3.18 SPITE 20 *satellite link included?* is used in the interworking procedure to determine the required nature of circuit indicator that should be transmitted. This information is available from the results of digit analysis.

A.3.19 SPITE 21 *incoming half-echo-suppressor to be included at distant end?* is used in the interworking procedure to determine the required echo suppressor indicator that should be transmitted. This information is available from the results of digit analysis.

A.3.20 SPITE 22 *transit connection following?* is used in the interworking procedure to determine the required country code indicator that should be transmitted. This information is available from the results of digit analysis.

A.3.21 SPITE 23 *has Z-digit been received?* is used in the incoming procedure following digit analysis to decide whether the Z-digit has already been received. The position of the Z-digit is determined as part of the digit analysis.

A.3.22 SPITE 24 *is this the Z-digit?* is used in the incoming procedure to decide whether a received register signal is the Z-digit or an address digit. This can be determined, since the position of the Z-digit is known after digit analysis.

A.3.23 SPITE 31 *perform continuity check* | s used in the outgoing procedure of common channel signalling systems to perform the continuity check including all necessary switching procedures.

A.3.24 SPITE 32 *insert check loop* | s used in the incoming procedure of common channel signalling systems to insert the continuity check loop.

A.3.25 SPITE 33 *continuity check O.K.* | s used in the outgoing procedure of common channel signalling systems to indicate a successful continuity check.

A.3.26 SPITE 34 *remove check loop* | s used in the incoming procedure of common channel signalling systems to remove the continuity check loop.

A.3.27 SPITE 35 *ignore further register signals* | s used in the incoming procedure of Signalling System No. 5 and R1 following the receipt of the ST signal to indicate that all further register signals should be ignored.

A.3.28 SPITE 36 *is continuity check required on outgoing circuit?* is used in conjunction with information received on the incoming link to determine the continuity check indicator required on the outgoing link.

A.3.29 SPITE 37 *analyze and store information* | s used in the incoming procedure on receipt of a General Set-up information Message (GSM).

A.3.30 SPITE 38 *access barred* | ndicates that a requested service cannot be completed (e.g. closed user group).

A.3.31 SPITE 39 *digital path not possible* | ndicates that a digital path cannot be provided.

A.3.32 SPITE 42 *additional information required* | ndicates that the I/C procedure must send a GRQ message.

Tableau A-4 p.17

Tableau A-5 p.18

Tableau A-5 | is p.19

Tableau A-6 p.20

Tableau A-7 p.21

Tableau A-8 p.22

Tableau A-9 p.23

Tableau A-9 | is p.24

Tableau A-10 p.25

Tableau A-11 p.26

MONTAGE: PAGE 40 = PAGE BLANCHE