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MAINTENANCE : COMMON CHANNEL SIGNALLING SYSTEMS

INTER-ADMINISTRATION AGREEMENTS ON COMMON CHANNEL SIGNALLING SYSTEM No. 6

Recommendation M.4010

FOREWORD

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Recommendation M.4010 was revised by Study Group IV and was approved under the Resolution No. 2 procedure on the 5th of October 1992.

CCITT NOTE

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

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Abstract

Describes agreements necessary between Administrations which intend to exchange signalling information over common channel Signalling System No. 6. Examples are:

– the number and type of links;

– signalling method (en-bloc or overlap);

– options;

– etc.

The outline of a test programme is provided with information on where further details may be found.

Keywords

– agreement;

– common channel;

– line-up;

– signalling No. 6.

1 Introduction

The bringing into service of new telephone circuits and signalling systems requires that a number of agreements be made in advance by the Administrations involved. Examples of such agreements are:

– routing of circuits (cable, satellite, etc.);

– mode of operation (incoming, outgoing, both-way);

– circuit designations;

– order of selection of both-way circuits.

For common channel signalling systems, a number of agreements are needed in addition to those required for channel-associated signalling systems (e.g. R2).

This Recommendation explains the principal inter-Administration agreements which must be made in advance of opening a Signalling System No. 6 service and is provided as guidance to those Administrations intending to operate such a service.

Many of the aspects covered by this Recommendation relate to matters contained in the specification of Signalling System No. 6, as appearing in the Q-Series Recommendations [1]. Where appropriate, cross references to such Recommendations are given.

2 Common channel Signalling System No. 6 (SS No. 6)

The introduction to the specification of SS No. 6 and Recommendation Q.251 [2] provide general and functional descriptions of the signalling system.

Recommendation M.760 [17] contains a basic diagram of SS No. 6 and a general description of the (signalling) transfer link.

3 Aspects of SS No. 6 requiring inter-Administration agreement

3.1 *Signalling links and signalling security arrangements*

Signals for a given group of speech circuits between two exchanges may be "associated" (routed on a signalling link between the two exchanges), "non-associated" (routed on two or more signalling links in tandem, involving one or more signal-transfer-points) or a mixture of both (see § 1.3.1 of Recommendation Q.253 [3]). The possible modes of operation range from simple arrangements of one signalling link and associated mode of signalling, to more complex arrangements, for example, the fully dissociated mode where signals are transferred via any available path in a signalling "network".

Before entering detailed discussions on the type of signalling security arrangements required, it is desirable that the terminal Administrations exchange information on the type and manufacturer of their international exchanges and the options available within their existing software systems. This information will enable each Administration to have an overall view of available signalling security arrangements; it will avoid misunderstandings and thus enable rapid progress in establishing detailed arrangements. Subsequently, agreement on the following matters will be required:

i) The number of signalling links and reserves to be provided (Recommendations Q.292 [4] and Q.293 [5]). In general, a choice will be made between:

   – regular link plus synchronized reserve(s);

   – regular link plus non-synchronized reserve(s). Such non-synchronized reserves may be reserve transfer links or nominated speech circuit reserves.

   Where the latter is chosen, the measures to be taken to ensure that there is a high probability of one of the chosen speech circuits being free (at both ends) when required should be discussed between Administrations (see § 8.4.3 a) of Recommendation Q.292 [4]);

   – load-sharing.

ii) The order of selection (ranking order) of regular/reserve signalling links, reserve transfer links and nominated speech circuit reserves, as provided. Where non-synchronized reserves are concerned, the time each terminal exchange will attempt to regain synchronization (5 or 7.5 seconds) must be agreed between Administrations (see § 8.6.3.2 of Recommendation Q.293 [5]).

iii) The order of selection between alternative signalling routes (where more than one has been provided).

iv) The need to specify an “automatic load transfer” procedure (see § 8.6.3.2 of Recommendation Q.293 [5]).

v) Which exchange will act as “emergency restart control exchange” (see § 8.7 c) of Recommendation Q.293 [5]).

3.2 *Signalling link routing and line-up aspects*

Administrations must reach agreement on the physical routing and line-up requirements of the signalling links and reserves. Among the aspects which are important are:

i) diversity of routing for alternative signalling links and reserves, as required for security purposes;

ii) the propagation delay of signalling links and reserves. This should be as low as possible and should not be significantly greater than that of any speech circuit with which it is normally associated. By this means the possibility of the called party being distorted or “clipped” is reduced (see Recommendation Q.272 [6]);

iii) the existence or absence of restoration plans to restore transmission facilities over which signalling links and reserves are routed;

iv) the transmission characteristics and limits to be used for the transfer links (see Recommendation M.4030 [18]).

3.3 *Method of signalling*

Signalling System No. 6 provides for two basic methods of sending signalling information namely, "en-bloc" or "overlap" (see Recommendations Q.262 [7] and Q.265 [8]). The method to be used for each direction of traffic should be discussed and agreed between Administrations.

3.4 *Use of optional facilities*

3.4.1 *Network maintenance signals*

Network maintenance signals are specified as an optional facility in the specification of SS No. 6 (see § 9.5 of Recommendation Q.295 [9]). Where both terminal exchanges are equipped with these facilities, the involved Administrations may wish to reach agreement on their use, for example to facilitate recovery from major exchange or signalling system disturbances. In making such agreements, it must be ensured that any "signal-transfer-point" involved between the two terminal exchanges is able to transfer the necessary network maintenance signals.

3.4.2 *Automatic repeat attempt*

The specification for SS No. 6 requires that an automatic repeat attempt be made in a number of specified call failure situations. However, the potential exists to use an automatic repeat attempt in circumstances other than those specified. Administrations may wish to discuss the advantages (if any) of additional application of the automatic repeat attempt facility (see Recommendation Q.264 [10]) and the implications, for example, on the load on the signalling data link, of such additional use.

3.5 *Label assignment*

By agreement between Administrations, each SS No. 6 speech circuit must be assigned a "label", comprising a "band number" and a "circuit number" (see Recommendation Q.257 [11]). Any relationship required between the band numbering scheme and the physical routing of the speech circuits (via cable, via satellite, etc.) must also be agreed between Administrations. It may be noted that there need be no relationship between the circuit number part of the label and the circuit designation (which would be in accordance with Recommendation M.1400 [14]). For convenience, however, it is desirable where possible to retain an orderly and consistent equivalence between circuit number and circuit designation.

3.6 *Double seizure of both-way circuits*

Signalling System No. 6 incorporates a procedure for dealing with a situation where a both-way circuit has been simultaneously seized at both ends (see Recommendation Q.263 [12]). This procedure requires that control and non-control exchanges be appointed for each (both-way) circuit. It may be noted that there need be no relationship between control and non-control exchanges for double seizure and the circuit control and sub-control stations as defined in Recommendations M.723 [15] and M.724 [16] (unless so desired by the involved Administrations). For convenience, however, it is desirable where possible that Administrations exercise both dual seizure control and maintenance control over the same circuits.

3.7 *Signal-transfer-point working*

Among the aspects upon which Administrations may need to reach agreement are:

i) label translation and the need for control of label assignment (see § 1.3.3.2 of Recommendation Q.253 [3]);

ii) financial accounting. Where the non-associated mode of signalling has been adopted, either normally or as a signalling security arrangement, signalling information will be relayed via one or more signal-transfer-points and would typically involve one or more transit Administrations. Arrangements for any necessary financial accounting may need to be discussed and agreed between involved Administrations.

3.8 *Test programme*

Details of a test programme to be carried out prior to the start of the SS No. 6 service should be agreed between Administrations. This agreement and the resulting test schedule should take account of the relative experience of the participating Administrations. The following aspects should be covered in such a programme:

i) functional and synchronization aspects of the signalling links and reserves;

ii) signalling security arrangements;

iii) call processing. Tests should cover normal, abnormal, transit and signal-transfer-point signalling sequences;

iv) system failure response. Both signalling system and exchange failures should be covered;

v) tests on individual speech circuits, e.g. using ATME No. 2;

vi) limited period, live traffic tests.

The programme suggested above is given as an example of the broad areas to be covered, and is not intended to be a complete test programme. In considering items to be included in a test programme, attention is drawn to the extensive and detailed publication, CCITT Signalling System No. 6 Test Schedule [13].

3.9 *Maintenance and maintenance organization*

Inter-Administration agreements necessary for the maintenance of SS No. 6 are the subject of other Recommendations in the M-Series. Reference should be made to Recommendations M.760 [17], M.4030 [18], M.762 [19] and M.1510 [20].

4 Timing of inter-Administration agreements

Due to the differing practices and procedures of Administrations, no specific timetable for the inter-Administration agreements necessary on SS No. 6 can be offered. However, experience indicates that initial discussions between involved Administrations concerning a new SS No. 6 service should preferably commence about two years prior to the required "ready for service" date.

References

[1] CCITT Recommendations Q.251 to Q.300 *Specifications of Signalling System No. 6.*

[2] CCITT Recommendation Q.251 *General.*

[3] CCITT Recommendation Q.253 *Association between signalling and speech networks.*

[4] CCITT Recommendation Q.292 *Reserve facilities provided.*

[5] CCITT Recommendation Q.293 *Intervals at which security measures are to be invoked.*

[6] CCITT Recommendation Q.272 *Requirements for the signalling data link.*

[7] CCITT Recommendation Q.262 *Analysis of digital information for routing.*

[8] CCITT Recommendation Q.265 *Speed of switching and signal transfer in international exchanges.*

[9] CCITT Recommendation Q.295 *Testing and maintenance - Overall tests of Signalling System No. 6.*

[10] CCITT Recommendation Q.264 *Potential for automatic repeat attempt and re–routing.*

[11] CCITT Recommendation Q.257 *General.*

[12] CCITT Recommendation Q.263 *Double seizing with both-way operation.*

[13] CCITT Publication *CCITT Signalling System No. 6 Test Schedule, ITU, Geneva, 1982.*

[14] CCITT Recommendation M.1400 *Designations for international network.*

[15] CCITT Recommendation M.723 *Circuit control station.*

[16] CCITT Recommendation M.724 *Circuit sub-control station.*

[17] CCITT Recommendation M.760 *Transfer link for common channel Signalling System No. 6.*

[18] CCITT Recommendation M.4030 *Transmission characteristics for setting-up and lining-up a transfer link for common channel Signalling System No. 6 (analogue version).*

[19] CCITT Recommendation M.762 *Maintenance of common channel Signalling System No. 6.*

[20] CCITT Recommendation M.1510 *Exchange of contact point information for the maintenance of international services and the international networks.*