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REQUIREMENTS TO BE MET IN PROVIDING THE TELEX SERVICE

WITHIN THE ISDN

(Melbourne, 1988)

The CCITT,

considering

(a) that there may be economic and operational advantages in using the ISDN switching and transmission technology to support the telex service;

(b) that some Administrations have implemented, or are about to implement, ISDNs;

(c) that the I-series Recommendations define the ISDN concept;

(d) that the telex service is a mature and expanding service and is expected to remain established for many years;

(e) that the maximum number of selection digits on the international telex network, in accordance with the existing U-series signalling Recommendations, is limited to 12 digits,

Recommendation U.202

unanimously declares the view

(1) that the service principles defined in CCITT Recommendation F.60 should be maintained;

(2) that the establishment of a call from a telex terminal on the ISDN, to a terminal on a dedicated telex network shall be by means of a single-stage addressing. The same applies to calls in the opposite direction;

(3) that there should be no difference between the telex service provided on ISDN with the one provided on a dedicated telex network;

(4) that telex terminals in the ISDN should be assigned a number that is part of the telex national numbering plan;

(5) that the provision of a telex service in the ISDN should place no burden on the telex services of other Administrations.

1 Scope

1.1 This Recommendation outlines configuration models for the integration of the telex service into the ISDN.

1.2 The configuration models assume no change in the design of telex terminals and proposals are made for the necessary terminal adapter and network performance parameters.

1.3 The overall subscriber-to-subscriber performance should be related to the hypothetical reference circuit, for telex networks, specified in CCITT Recommendation U.8.

2 Configuration models

2.1 *Two configuration models may be developed:*

a) a minimum integration model, where the switching between telex terminals connected to the ISDN is carried out within the telex network. This model is illustrated by Figure 1/U.202;

b) a maximum integration model, where switching between telex terminals connected to the ISDN may also take place in the ISDN. This model is illustrated by Figure 2/U.202.

Figure 1/U.202, p.

Figure 2/U.202, p.

3 General principles

3.1 *Minimum integration model*

3.1.1 Where Administrations implement the minimum integration model, as in Figure 1/U.202 connection to the telex network should be treated as a telex subscriber line.

3.1.2 The telex subscriber connected to the ISDN should be assigned a number that is part of the national telex numbering plan.

3.1.3 This method of integration is normally intended for situations where both a telex network and an ISDN are provided by the Administration.

3.1.4 The connection across the ISDN may be provided on a permanent, or semi-permanent basis, however, access to the telex network must be provided on a dedicated basis per subscriber.

3.1.5 The B-Channel in circuit mode of the ISDN should be used for the text transmission and the service conditions of CCITT Recommendation F.60 must be maintained. The use of packet mode for text transmission is for further study. The use of B- and D-Channels for packet mode text transmission is for further study.

3.1.6 Administrations should ensure that the distortion limits, as specified in CCITT Recommendation R.20 are not exceeded.

3.1.7 Any signal delay introduced should be in accordance with the limits specified in CCITT Recommendation R.58 | fIbis , for the total national section of the calls.

3.2 *Maximum integration model*

3.2.1 Where Administrations implement the maximum integration model, as shown in Figure 2/U.202, then connection to the telex network should be made at trunk level.

3.2.2 This method of integration may be used where both a telex network and an ISDN are provided by an Administration or where only an ISDN is provided.

3.2.3 The number assigned to the telex terminal connected to the ISDN should be identifiable, from a telex network of other Administrations, as part of a telex national numbering plan.

3.2.4 Where the Administration provides both a telex network and an ISDN, then the signalling system to be used between the interworking function and the telex network is a national matter. However, it is recommended that signalling systems in accordance with CCITT Recommendation U.11 or U.12 be used.

3.2.5 It is recommended that where an ISDN only is provided, then connection to telex networks of other Administrations should be in accordance with CCITT U-series Recommendations, preferably U.11 or U.12.

3.2.6 Interconnection of ISDNs to support the telex service should be agreed bilaterally.

3.2.7 The B-Channel circuit mode of the ISDN should be used for the text transmission and the service conditions of CCITT Recommendation F.60 must be maintained.

The use of packet mode for text transmission is for further study.

3.2.8 Any signal delay introduced, within the total national section of the call, should not exceed the limits specified in CCITT Recommendation R.58 | fIbis .

3.2.9 Any distortion introduced in the national section of the call should not exceed the limits specified in CCITT Recommendation R.58.

3.2.10 The routing of the call through the ISDN is a national matter.

4 Call establishment sequences

4.1 *Minimum integration model*

4.1.1 Where connection across the ISDN is provided on a permanent basis, the telex call establish sequences will take place on the B-Channel.

4.1.2 Typical telex subscriber outgoing and incoming signal sequences will be in accordance with Figure 3/U.202 and Figure 4/U.202 respectively.

4.1.3 The method of establishing the permanent connection across the ISDN is a national matter.

4.1.4 Where connection across the ISDN is on a semi-permanent basis, typical telex subscriber outgoing and incoming signal sequences will also be in accordance with Figure 3/U.202, and Figure 4/U.202 respectively.

4.1.5 The method of establishing the semi-permanent connection is a national matter, but the outgoing and incoming call establishment sequences may be in accordance with Figure 5/U.202 and Figure 6/U.202 respectively.

Figure 3/U.202, p. 3

Figure 4/U.202, p.4

Figure 5/U.202, p. 5

Figure 6/U.202, p. 6

4.2 *Maximum integration model*

4.2.1 Where Administrations implement the maximum integration model, telex subscribers connected to the ISDN may communicate with other telex subscribers connected to the same ISDN and to telex subscribers connected to existing telex networks.

4.2.2 Typical telex subscriber outgoing and incoming signal sequences will be in accordance with Figure 3/U.202 and Figure 4/U.202 respectively.

4.2.3 The outgoing and incoming call establishment sequences should be in accordance with Figure 7/U.202 and Figure 8/U.202 respectively.

Figure 7/U.202, p.

Figure 8/U.202, p.

L´egendes Figures 3 à 8/U.202, p.

4.2.4 The use of the D-Channel or CCITT Signalling System No. 7 is for further study.

4.2.5 Where translation from the international telex number to the ISDN number (E.164) for routing purposes is required, this should be done in the IWF.

4.2.6 The Administration providing the telex service within the ISDN is responsible for providing this translation.

4.2.7 The method for forwarding the service signals issued by the dedicated telex network to the telex subscriber on the ISDN, is for further study.

5 Terminal adapter functions

5.1 The following terminal adapter functions will be required.

5.1.1 *Rate adaption*

The telex speed of 50 bauds will be converted to the ISDN B-Channel speed of 64 kbit/s, and vice versa.

The method of achieving this conversion is for further study.

5.1.2 *Signal sequence mapping*

The telex subscriber signal sequences will be converted to the ISDN D-Channel signalling protocol, and vice versa.

5.2 The interface between the telex terminal and the terminal adpater is considered to be a matter not for international standardization.

6 Adapter unit

6.1 The provision of an adapter unit, for the minimum integration model is a national matter and is not a subject for international standardization. However, similar functions to those identified for the terminal adapter will be required.

7 Interworking facility functions

7.1 The following interworking facility functions will be required.

7.1.1 *Rate adaption*

The IWF will convert the telex speed of 50 bauds to the ISDN B-Channel speed of 64 kbit/s, and vice versa. The method of achieving this conversion is for further study.

7.1.2 *Selection signal mapping*

The telex selection signals will be converted to ISDN selection signal requirements, and vice versa. The method of achieving this conversion is for further study.

7.1.3 *Address translation*

The method for translating the international telex number to the ISDN E.164 number, if required, is a national matter.

8 Other telex service features

8.1 The provision of other telex service features in the ISDN is for further study.

Recommendation U.204

INTERWORKING BETWEEN THE TELEX SERVICE AND THE PUBLIC INTERPERSONAL MESSAGING SERVICE

(Melbourne, 1988)

The CCITT,

considering

(a) that Administrations are introducing public message handling services;

(b) that there are benefits in the provision of an interworking capability between message handling services and the telex service;

(c) that there are already existing arrangements in place for interworking between telex and the interpersonal messaging system;

(d) that Recommendation F.60 defines the service requirements of the telex service;

(e) that the F.400-series of Recommendations define the service requirements of the message handling services;

(f) that Recommendation F.420 defines the service requirements of the public interpersonal messaging service;

(g) that Recommendation F.421 defines the operational procedures for interworking between the public interpersonal messaging service and the telex service;

(h) that the U-series of Recommendations define the technical requirements of the telex service;

(i) that the X.400-series Recommendations define the technical requirements of the message handling services,

unanimously declares

that, for new implementations, the technical aspects of interworking between the telex service and the public interpersonal messaging service shall be in accordance with this Recommendation.

definitions

The following terms used in this Recommendation have the undermentioned definitions:

PTLXAU

The public telex access unit (PTLXAU) is a functional unit which implements the requirements to allow the delivery of messages from telex subscribers to users of the interpersonal messaging service (and vice versa) as specified in the relevant U-series and X-series of Recommendations. The method of implementation of these functions in any physical unit is a national matter.

registered IPMS user

A user of the interpersonal messaging service who has registered with the PTLXAU for the receipt of telex messages and who is assigned a telex number that is part of the telex national numbering plan for this purpose.

IPMS user answerback

In the case of one-stage selection, the answerback that is returned to the telex network on receipt of a WRU signal and which uniquely identifies the registered IPM user to the telex network.

PTLXAU answerback

In the case of two-stage selection, the answerback of the destination PTLXAU and which is always returned by the PTLXAU in response to a received WRU signal.

PTLXAU identification

When delivering an IP message to a telex subscriber, the sequence transmitted by the PTLXAU which indicates the country of origin of the PTLXAU and IPM service.

TABLE OF CONTENTS

2) Example of message : IPM service-to-telex

1 Introduction

1.1 *Scope*

1.1.1 This Recommendation defines the procedures to be followed for interworking between the telex service and the public interpersonal messaging service (IPMS).

1.1.2 The operational procedures of this interworking capability and the full range of facilities are described in Recommendation F.421 [1].

1.1.3 For calls originated in either service, communication will be affected using the international telex network.

1.2 *Service outline*

1.2.1 Communication between subscribers of the telex service and the IPM service is on a store-and-forward basis; conversational-mode interworking is thus not applicable.

1.2.2 Delivery of messages from telex subscribers to users of the IPM service as well as delivery of messages to the international telex network from IPMS users shall be provided by means of a public telex access unit (PTLXAU) which shall be considered as part of the IPM service.

1.2.3 For calls originated by either telex subscribers or IPMS users, the international connection shall be via the international telex network, as shown in Figure 1/U.204.

Figure 1/U.204, p.

1.2.4 The procedures to be followed by an originating telex subscriber allow for either one-stage or two-stage selection.

1.2.5 The IPMS user will follow normal MHS addressing principles when sending to telex. The rules for naming and addressing in the message handling services are found in Recommendation F.401 [2].

2 Methods of interworking

considering

(a) that different addressing formats may be used within the IPM service;

(b) that these formats may consist of either numeric or mnemonic information,

then the following methods of interworking between the telex service and the IPMS may be provided:

(1) interworking with one-stage selection,

(2) interworking with two-stage selection.

Messages from an IPM service user are sent as normal IP messages using the appropriate elements of service in accordance with Recommendation F.420 [8].

3 Telex access to the IPM service

3.1 *One-stage selection*

In the one-stage selection procedures, the IPM service user is assigned a telex number that is derived from the national telex numbering plan. Figure 2/U.204 shows the recommended access procedures.

3.1.1 *Call establishment*

3.1.1.1 The originating telex subscriber will select the IPM service user using normal telex procedures.

3.1.1.2 The procedures for call establishment between the terminating telex network and the PTLXAU are a national matter.

Figure 2/U.204, p.

3.1.1.3 The telex number received by the PTLXAU from the telex network will be verified by the IPM service as being proper to a registered IPMS user. The method of effecting this verification is a national matter. If the verification fails, the procedures to be adopted shall be in accordance with Recommendation F.421 [1].

3.1.1.4 If the submitted telex number is positively verified, then the PTLXAU shall return the call connected signal to the originating telex subscriber using normal telex signalling procedures.

3.1.1.5 The IPM service user answerback returned by the PTLXAU in response to the WRU signal from the telex network shall conform to Recommendation F.74 [3].

3.1.1.6 If the call originates from a telex automatic emitting device, the calling telex subscriber should indicate this by commencing the procedure with the non-interactive service request (CI).

3.1.2 *Determination of the calling telex address*

3.1.2.1 Following the transmission of the IPMS user answerback, the PTLXAU shall monitor for the receipt of characters from the telex network and shall transmit a WRU signal only after an idle condition has existed for at least 800 ms.

3.1.2.2 The PTLXAU shall determine the calling telex address from the received telex answerback in accordance with the rules laid down in Recommendation U.74 [4].

3.1.2.3 The PTLXAU shall wait 3 seconds from the end of the calling telex answerback to enable the telex subscriber to input the calling telex address. At the end of this period and if the calling telex address cannot be determined from the received telex answerback, then the PTLXAU shall return the prompt signal.

3.1.2.4 If the calling telex address is not received within 15 seconds of the ADD prompt, then another prompt signal shall be returned. If another 15 seconds elapse without the receipt of the calling telex address, the connection shall be cleared by the PTLXAU.

3.1.2.5 The calling telex address shall be input by the telex subscriber in the following format:

[T1.204], p.

e.g. [ADD] 50032266

The calling telex address may optionally be preceded by ADD.

3.1.2.6 The calling telex address, when received, may be preceded by the non-interactive service request CI, which may or may not be associated with carriage-return, line-feed and letter-shift characters. In this case, the call procedure originating from a telex automatic emitting device will be as shown in Figure 3/U.204.

Figure 3/U.204, p.

3.2 *Two-stage selection*

The two-stage selection, the address(es) of the IPMS user(s) is/are given prior to the transmission of the message and after a telex connection has been established between the originating telex subscriber and the gateway to the IPM service, i.e., the PTLXAU. The use of either upper- or lower-case letters by the originating telex subscriber in the input of service identifiers, address attributes, etc., has no significance.

3.2.1 The originating telex subscriber will use normal telex procedures to access the PTLXAU which will be allocated a telex number that is derived from the national telex numbering plan of the country in which the PTLXAU is located.

3.2.2 The procedures to be followed shall be in accordance with Recommendation U.80 [5], except where specified in this Recommendation and are shown in Figure 4/U.204.

Figure 4/U.204, p.

Figure 4/U.204 [T2.204], p.

3.2.3 *O/R address input by the telex subscriber*

3.2.3.1 In the second stage of selection, it will be necessary for the calling telex subscriber to input the O/R address of the desired IPM service user.

Provisions for multi-address calls shall be on a bilateral basis.

3.2.3.2 The second stage of addressing will be prefaced by the service identifier ‘‘IPM’’ to indicate to the PTLXAU that the message is to be delivered to an IPM service user. The use of other service identifiers is for further study. In a multi-address message, the service identifier may optionally be given before each address.

3.2.3.3 The PTLXAU must be able to receive and process the appropriate domain-defined O/R address forms:

Numeric O/R address

Mnemonic O/R address

Terminal O/R address

The rules governing O/R address formats are found in Recommendation F.401 [2].

It is, at all times, the responsibility of the originating telex subscriber to input all the necessary address attributes required by the national IPM service to which the user belongs.

3.2.3.4 The structure of the O/R address input is detailed in Recommendation F.421 [1], § 4.2.2.4 and Table 1/F.421.

3.2.3.5 *Numeric O/R address*

The format of this address type is shown in Figure 5/U.204 where ‘‘CTN’’, etc., are address attribute identifiers with their ‘‘values’’ in accordance with Recommendation F.421 [1].

Figure 5/U.204 [T3.204], p.

An example of such an address is given in Annex A to this Recommendation.

3.2.3.6 *Mnemonic O/R address*

The general format of the Mnemonic O/R address to be input by the calling telex subscriber is shown in Figure 6/U.204 where ‘‘CTN’’, etc., are address attribute identifiers with their ‘‘values’’ in accordance with Recommendation F.421 [1].

Figure 6/U.204 [T4.204], p.

An example of such an address is given in Annex A to this Recommendation.

3.2.3.7 *Terminal O/R address*

The general format of the terminal O/R address to be input by the calling telex subscriber is shown in Figure 7/U.204 where the terminal address forms will be qualified by the preceding strings TLX, TTX, FAX. The use of other terminal address forms and values, e.g. for Videotex, is for further study.

Figure 7/U.204 [T5.204], p.

3.2.3.8 The sequence of input of address attributes is not significant except when an attribute occurs several times in the same O/R address. The attributes shall then be given in the order as specified in the relevant X.400-series of Recommendations.

3.2.3.9 Each address will be delimited by the sequence carriage-return and line-feed.

3.2.3.10 During the input of the O/R address, the PTLXAU shall validate the submitted address for the existence of domain-specific attributes, as follows:

— the existence of mandatory attributes

— the existence of not-allowed attributes

— the minimum and maximum allowed number of characters in each attribute

— the existence of not-allowed characters in an attribute.

Non-significant characters, either preceding or following an attribute value, shall not prevent validation.

An example of such an address is given in Annex A to this Recommendation.

3.2.3.11 When a positive delivery notification facility is provided by the PTLXAU, it shall be requested by the originating telex subscriber on a per-message basis by extending the end-of-address signal, as follow:

$$\leftarrow \equiv \downarrow \mathrm{BT} \uparrow , \downarrow \mathrm{ACK}$$

where ‘‘BT’’ is the EOA signal and ‘‘ACK’’ the request for positive delivery notification. See §§ 3.3.3 and 5.1.

3.2.3.12 Address line editing facilities, where provided, shall operate as follows:

Any part of the address (either address attribute or element of service) may be cancelled by the receipt of four consecutive = characters (combination 22 in Figure case).

3.2.3.13 The provision of address format validation and the corresponding actions to be taken if a particular address is rejected is left for further study.

3.2.3.14 The action to be taken when abnormal conditions are encountered during O/R address input shall be in accordance with § 7.

3.2.4 The methodology of providing the originating telex subscriber with a prompt-driven procedure and a simpler method for the input of the O/R address is left for further study.

3.3 *IPM elements of service in the telex to IPM direction*

3.3.1 The elements of service activated by the PTLXAU when delivering a message to the IPM service are listed in Recommendation F.421 [1], § 4.3.

3.3.2 In the two-stage selection case, the originating telex subscriber can, when supported by the PTLXAU, select the following elements of service:

— Disclosure of other recipients

— Deferred delivery

The PTLXAU, if it receives either or both of these from the originating telex subscriber, shall convert them into the form required by the IPM service. These elements of service are fully described in Annex B to Recommendation F.400 [6].

3.3.2.1 *Disclosure of other recipients*

If this element of service is present, then disclosure of other recipients of the telex message will be enabled within the IPM service. The calling telex subscriber will request it in the following format:

DUR ← ≡

3.3.2.2 *Deferred delivery*

This element of service will be used if deferred delivery of the submitted message to the required IPM user is requested. Omission of this element of service indicates that standard delivery for telex is required.

Note — The PTLXAU shall set the Grade of Delivery element of service to the value ''URGENT'' in accordance with Recommendation F.421 [1].

The element of service will be selected by the calling telex subscriber in the following format:

DEF
_ XY ← ≡

where ‘‘XY’’ are numeric characters which specify the minimum delivery delay in hours from 01 — 23.

3.3.3 While the position of the above specified elements of service in the submitted O/R address(es) is not significant, it is recommended that they, when selected, be input at the end of the O/R address(es) and immediately before the end-of-address(es) signal (EOA) which shall be

← ≡ ↓ BT

3.3.4 It shall be possible to set the elements of service on either a per-message basis, i.e. applying to all requested O/R addresses, or on an individual address basis, an example of which is shown in Figure 8/U.204.

Figure 8/U.204 [T6.204], p.

3.3.5 In the case of the deferred delivery IPM element of service, the possibility for an originating telex subscriber to set this value to any specific time in the future, other than as provided for in § 3.3.2.2 is left for further study.

3.4 *Message desposit and format*

3.4.1 The PTLXAU shall store all received telex characters (with the exception of the WRU signal) and shall convert these from ITA2 coding to IA5 coding in accordance with Recommendation S.18 [7] for inclusion as an IA5 body type in the IP message.

3.4.2 Any conversion which might be applied as part of the IPM service will be handled in accordance with the F.400-series Recommendations and is outside the scope of this Recommendation. Specifically, the application of the element of service ‘‘conversion prohibition in case of loss of information’’, when considering interworking between the telex service and the IPM service is left for further study.

3.4.3 A valid message shall be deemed to exist if at least one printable character is received from the telex network, excluding any WRU signals or spaces.

3.4.4 Under normal conditions, message input will be terminated with an end-of-message (EOM) or end-of-transaction (EOT) signal. These signals are defined in Recommendation U.80, §§ 4.9 and 4.10.

3.4.5 The actions to be taken when abnormal conditions are encountered during message input are described in § 7.

3.5 *Telex message delivery inside the IPM service*

3.5.1 The received telex message will be delivered by the PTLXAU to the IMPS user(s) in accordance with the submitted elements of service and the rules laid down in Recommendation F.421 [1], § 4.3.

3.5.2 Despite the acceptance by the PTLXAU of the submitted address (either telex number or O/R address), and the subsequent storage of the submitted message, there is no guarantee that the message will be delivered to the addressed IPMS user. In this case, the originating telex subscriber may be charged for a message which was not delivered.

3.5.3 When the message cannot be delivered to the requested IPM user, the PTLXAU shall return a non-delivery notification message to the orginating telex subscriber. These procedures are described in § 5.

3.6 *Follow-on call facility*

The provision of a follow-on call facility by the PTLXAU is for further study.

4 Access from the IPM service to telex

4.1 *General principles*

4.1.1 Messages from an IPM service use are sent as normal IP messages using the appropriate elements of service in accordance with Recommendation F.420 [8].

4.1.2 IP messages received by the PTLXAU will be converted into the format and character repertoire specific to the telex service and forwarded to the addressed telex subscriber.

4.1.3 The PTLXAU shall be responsible for the action to be taken for all received IPM/MT elements of service in accordance with Recommendation F.420. The expected elements of service, when interworking with telex, are listed in Annex B to Recommendation F.421 [1] along with the desired response of the PTLXAU.

4.2 *Conversion*

If the originating IPMS user does not conform to the conversion rules of the IPM service, then loss of information may result. In particular, the element of service ‘‘implicit conversion’’ should be handled by the PTLXAU in accordance with Recommendation X.408 [9].

4.3 *Message delivery to telex*

4.3.1 Call establishment by the PTLXAU and delivery of the message to the telex subscriber shall be in accordance with Recommendation U.81 [12], except where specified in this Recommendation, and are shown in Figure 9/U.204.

4.3.2 During call establishment, the answerback sequence sent by the PTLXAU to the called telex subscriber should be either

— The F.74 [3] answerback of the originating IPMS user for a one-stage selection PTLXAU, or

— The PTLXAU answerback for a two-stage selection PTLXAU.

4.3.3 The IP message sent to the called telex subscriber should be preceded by the PTLXAU identification. The format of the identification is a national matter but it is recommended that, as a minimum, it should contain the sequence CI, the sequence IPM and the telex network identification code, as follows:

← ≡ ↓ CI IPM ȼ

where ȼ is the TNIC of the country in which the PTLXAU is located in accordance with Recommendation F.69 [10].

4.3.4 The delivered IP message shall have two components, a ‘‘message header’’ and a ‘‘body’’.

4.3.5 The ‘‘ message header ´service associated with the IP message converted by the PTLXAU into printable text. The language of the text is a national matter.

4.3.6 The ‘‘ body’’ part shall comprise the text of the message and may include multiple ‘‘body’’ parts.

Figure 9/U.204 [T7.204], p.

4.3.7 In some implementations, the PTLXAU may transmit additional information in a user-friendly form to assist telex recipients in recalling the originator. This field will be the first element of the message heading and, when used, will be titled ‘‘FOR RECALL’’. The contents of this field is a national matter.

4.3.8 In particular, the PTLXAU shall transmit the O/R address of the originating IPMS user to the called telex subscriber in the form necessary for recall by the telex subscriber. This shall be done in accordance with Figure 10/U.204.

Figure 10/U.204 [T8.204], p.

4.3.9 If requested by the originating IPMS user, the PTLXAU shall return a delivery notification message upon successful delivery of the message to the requested telex subscriber.

4.3.10 For delivery attempts which fail within the telex network, the PTLXAU shall initiate a retry procedure in accordance with Recommendation U.40 [11].

If delivery is still unsuccessful, then a mandatory non-delivery notification shall be returned to the IPMS user by the PTLXAU.

4.3.11 If the service signals RDI or NCH are received during call set up more than once in any one delivery or notification attempt cycle, then the message shall be considered undeliverable and the appropriate non-delivery notification returned as described in § 5.

5 Notification messages

Automatic advice of delivery/non-delivery, where appropriate, shall be given by the PTLXAU as soon as the message retry cycle applicable within the IPM service has been terminated. In the particular case of multi-address messages, the notification may be either on a per-message or per-address basis, the former being preferred in order to minimise the number of call attempts.

Notification messages on a per-address basis shall be in accordance with §§ 5.1 and 5.2. Notification messages on a per-message basis shall be in accordance with § 5.3.

5.1 *Delivery notification*

5.1.1 In the telex to IPMS direction, the provision of a positive delivery notification to the originating telex subscriber is a national matter. Where such a feature is provided, it is recommended that the provisions of Recommendation U.81 [12], § 4.3.6.2 should apply.

5.1.2 For a two-stage selection PTLXAU, the format of the delivery notification returned to the originating telex subscriber (where provided) shall be as shown in Figure 11/U.204. The delivery advice shall be sent as a normal IP message, the notification forming the ‘‘body’’ part of the message.

Figure 11/U.204 [T9.204], p.

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5.2 *Non-delivery notification*

The provision of a non-delivery notification shall be mandatory for calls originated within the telex service.

5.2.1 *Telex to IPMS direction*

5.2.1.1 *Case of one-stage selection PTLXAU*

Where the originating telex subscriber uses a conventional telex address to attempt to forward a message to an IPMS user, and which subsequently cannot be delivered, the PTLXAU shall return to the telex subscriber a non-delivery notification in accordance with Figure 12/U.204. This notification shall be delivered as a normal message to the telex subscriber.

Figure 12/U.204 [T10.204], p.

5.2.1.2 *Case of two-stage selection PTLXAU*

Where an originating telex subscriber uses an O/R address to attempt to forward a message to an IPMS user, and which subsequently cannot be delivered, the non-delivery notification message returned by the PTLXAU, sent as a normal IP message to telex, shall be in accordance with Figure 13/U.204.

5.2.1.3 *Translation between MTS non-delivery-reason-codes and telex service signals*

5.2.1.3.1 Messages which fail to be delivered to the destination IPMS user will have a non-delivery-reason-code and a non-delivery diagnostic code associated with the non-delivery advice sent by the MTS to the PTLXAU. The precise details of such failures and codes are contained in Recommendation X.411 [13].

5.2.1.3.2 It is desirable to include the reason code or diagnostic code in the non-delivery notification returned by the PLTXAU to the originating telex subscriber. The method is indicated in Figure 11/U.204 and Figure 12/U.204.

5.2.1.3.3 The reason code or diagnostic code will be by the PTLXAU in printable text to the originating telex subscriber. The language to be used is a national matter.

5.2.1.3.4 The list of possible reason codes and diagnostic codes which may be returned to the telex subscriber is given in Table 1/U.204.

Figure 13/U.204 [T11.204], p.

H.T. [T12.204]

TABLE 1/U.204

List of MTS non-delivery-reason-codes and non-delivery-diagnostic-codes returned to the originating telex subscriber as part of the non-delivery notification message

{
MTS non-delivery-reason-code
}

Transfer failure Unable-to-transfer Conversion not performed

{
MTS non-delivery-diagnostic-codes
}

Unrecognised-O/R-name
Ambiguous-O/R-name
MTS-congestion
Loop-detected
Recipient-unavailable
Maximum-time-expired
{
Encoded-information-types-unsupported
}
Content-too-long
Conversion-impractical
{
Implicit-conversion prohibited
}
Invalid-arguments
{
Implicit-conversion-not-subscribed
}
{
Content-type-not-supported
}
Too-many-recipients
No-bilateral-agreement
{
No-DL-submit-permission
}

Table 1/U.204 [T12.204], p.

5.3 *Comined delivery and non-delivery notifications*

5.3.1 *Telex-to-IPM service direction*

5.3.1.1 In order to minimize the number of call attempts by the PTLXAU into the telex network for the purpose of returning notification reports on a multi-address message, it is recommended that the PTLXAU shall only forward one notification report to the originating telex subscriber which shall comprise the results of the various delivery attempts within the IPM service, both successful and unsucessful.

5.3.1.2 This combined notification report shall be formatted in accordance with Figure 14/U.204.

Figure 14/U.204 [T13.204], p.

6 Clearing procedures

6.1 In the telex to IPMS direction, the call shall be cleared using normal telex call clearing procedures or after the procedures for ITD have been concluded, where relevant.

The PTLXAU should only clear the connection in the event of an abnormal condition being encountered, as described in § 7.

6.2 In the IPMS to telex direction, the PTLXAU shall clear the connection in accordance with the procedures described in Recommendation S.20 [15].

7 Abnormal conditions

7.1 *Telex-to-IPMS direction*

7.1.1 *Inter-character timeout during input of address information*

If there is a delay in excess of 15 seconds at the start of address input or during address input in the case of two-stage selection, the PTLXAU shall transmit the code expression NP to the calling telex subscriber and clear the connection.

7.1.2 *Clear by the telex subscriber without the EOM or EOT signal*

If a clearing signal is received by the PTLXAU without having first received the EOM or EOT signal, the PTLXAU shall forward the text received to the addressed IPM user with the following text appended in the appropriate language:

‘‘This message may be incomplete’’

7.1.3 *Pause during input of message text*

After a period of 30 seconds of idle condition, the PTLXAU shall return the prompt GA to request more text (or the EOI signal). If after an additional 30 seconds without receipt of either additional text (or the EOI signal), the PTLXAU shall clear the connection and forward the text received so far to the addressed IPM service user, with the following text appended in the appropriate language:

‘‘This message may be incomplete’’

7.1.4 *Receipt of WRU during text input*

a) In the case of one-stage selection, the PTLXAU shall return the IPM user answerback (see § 3.1).

b) In the case of two-stage selection, the answerback returned shall be that of the PTLXAU.

In all cases, the WRU signal is not stored as part of the received message.

If the WRU is followed by text, message input is suspended and continued after the return of the appropriate answerback.

If the WRU is followed by a clearing signal, the PTLXAU shall proceed as in § 7.1.2.

If the WRU is followed by an idle condition, the PTLXAU shall proceed as in § 7.1.3.

7.1.5 *Receipt of characters after the EOT signal*

Any character received after the EOT signal will be discarded i.e., not stored as part of the message. The PTLXAU shall attempt to stop the transmission by the user of the TTT | | | procedure and shall expect to receive a clearing signal from the calling telex subscriber in the normal way.

If the transmission is not stopped within 20 seconds of the TTT | | | sequence, the PTLXAU shall immediately clear the connection.

If the transmission is stopped and no clear signal is received within 30 seconds, the PTLXAU shall clear the connection.

These above procedures do not apply in the case of a PTLXAU which offers a follow-on call facility.

7.1.6 *Receipt of national variants of telex characters (F, G, H in figure-case)*

If ITA2 combinations 6, 7 or 8 are received in figure-case, the provisions of Recommendation S.18 shall apply. This is regarded as a national matter.

7.1.7 *Receipt of combination 10 in figure case (Bell)*

Receipt of a ‘‘bell’’ signal shall be handled in accordance with Recommendation S.22 [16].

7.1.8 *Lack of storage capacity during text input*

The PTLXAU shall be so dimensioned as to guarantee a message length of 24 | 00 characters, taking into account the expected calling rate, the offered grade of service and the rate of message delivery. The method of achieving this is a national matter.

If, during call establishment, the minimum storage cannot be guaranteed, the procedures to be followed shall be in accordance with Recommendation U.45 [17].

Any message which exceeds the guaranteed length will continue to be accepted if storage is available and in accoradance with Recommendation F.60 [14], § 3.2.5.

If, during message input, storage capacity becomes exhausted, the PTLXAU shall clear the connection in accordance with Recommendation U.45 [17]. Any received text will be forwarded to the addressed IPM user with the following text appended in the appropriate language:

‘‘This message may be incomplete’’

7.1.9 *MT service unavailable*

The PTLXAU shall monitor for the availability of the MT service and shall not accept any call when the MT service is not available to deliver the message to the addressed IPM user. The procedures to be followed shall be in accordance with Recommendation U.45 [17].

7.2 *IPMS-to-telex direction*

The procedures to be followed in the event of abnormal conditions being encountered in the IPMS-to-telex direction shall be in accordance with the F.400-series and X.400-series Recommendations.

7.2.1 *Receipt of telex characters while delivering message*

If telex characters are received on the backward path by the PTLXAU while it is delivering a message to a telex subscriber, it should behave in accordance with Recommendation S.20 [15]. If the backward path signals are sustained, the PTLXAU shall clear the connection and make one additional re-attempt to deliver the message. If backward path signals are again received, the message should be deemed undeliverable.

If, however, the second attempt is successful and the message is fully delivered, the PTLXAU should precede the message with the text

POSSIBLE DUPLICATE MESSAGE

7.2.2 *Receipt of recorded message from telex subscriber*

a) If the recorded message is followed by a clear, the IP message should be deemed undeliverable and no re-attempt made.

b) The action to be taken by the PTLXAU when the recorded message is not followed by a clear requires further study.

7.2.3 *Failure to deliver notification message*

The action to be taken when a notification message cannot be delivered shall be the responsibility of the Operating Agency of the PTLXAU and is a national matter.

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ANNEX A

(to Recommendation U.204)

Figure A1/U.204 [T14.204], p.

Figure A2/U.204 [T15.204], p.

References

[1] CCITT Recommendation *Intercommunication between the IPM Service and the Telex Service* , Rec. F.421.

[2] CCITT Recommendation *Message Handling Services: Naming and addressing for public message handling services* , Rec. F.401.

[3] CCITT Recommendation *Operational provisions relating to mailbox devices connected to the telex network* , Rec. F.74.

[4] CCITT Recommendation *Extraction of telex selection information from a calling telex answerback* , Rec. U.74.

[5] CCITT Recommendation *International telex store and forward access from telex* , Rec. U.80.

[6] CCITT Recommendation *Message handling: system and service overview* , Rec. F.400.

[7] CCITT Recomendation *Conversion between International Telegraph Alphabet No. 2 and International Alphabet No. 5* , Rec. S.18.

[8] CCITT Recommendation *Message handling services: Public Interpersonal messaging service (IPM service)* , Rec. F.420.

[9] CCITT Recommendation *Message handling systems: encoded information type conversion rules* , Rec. X.408.

[10] CCITT Recommendation *Plan for telex destination codes* , Rec. F.69.

[11] CCITT Recommendation *Reaction by automatic terminals connected to the telex network in the event if ineffective call attempts or signalling incidents* , Rec. U.40.

[12] CCITT Recommendation *International telex store and forward delivery to telex* , Rec. U.81.

[13] CCITT Recommendation *Message handling systems: message transfer layer* , Rec. X.411.

[14] CCITT Recommendation *Operational provisions for the international telex service* , Rec. F.60.

[15] CCITT Recommendation *Automatic clearing procedure for a telex terminal* , Rec. S.20.

[16] CCITT Recommendation *Use of ‘‘Conversation impossible’’ response to J/bell signals from a telex terminal* , Rec. S.22.

[17] CCITT Recommendation *The not-ready condition of the telex terminal* , Rec. U.45.

[18] CCITT Recommendation *Teletex Service, Recommenation F.200* .

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PART II

SUPPLEMENTS TO THE

SERIES U RECOMMENDATIONS

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Supplement No. 1

SIGNALLING CHARACTERISTICS AND TIMING OF THE

MARISAT TELEX SERVICE

(*Source:* COMSAT)

1 Introduction

In response to Recommendation U.4, this Supplement describes the characteristics and time sequences of the international telex service operated over the MARISAT maritime satellite communication system.

2 Ship terminal originated telex call

Figure 1 shows the signalling sequence for a telex call originated from a ship terminal in the MARISAT system. Figure 2 illustrates the telex signalling and timing sequence. The following is a general description of the sequence of events in establishing a telex call from a ship terminal to a gateway switch.

2.1 To initiate a call, the ship terminal sends a telex request message in the *out-of-band* request channel. The coast earth station receiving the valid request message will send back an *out-of-band* assignment message instructing the ship terminal equipment to tune to the assigned channel.

2.2 On the receipt of a valid *out-of-band* assignment message from the coast earth station, the ship terminal can then access its assigned channel. The terminal will normally achieve carrier and bit timing synchronization within 0.58 seconds after receipt of the assignment message. This time includes assignment message decoding, carrier recovery and clock recovery. Transmission will normally start upon frame synchronization, which occurs in less than 5.25 seconds. Therefore, the normal ship terminal response time will be less than 5.8 seconds as seen at the ship or 6.6 seconds as seen at the coast earth station. The time that the assignment message remains active in the coast earth station is in addition to this 6.6 seconds, allowing enough time for the ship terminal to start transmitting.

2.3 The coast earth station, which is continually transmitting a spacing signal, makes the transition space to mark indicating call confirmation within one character (150 milliseconds not counting framing delays) after the assignement message is formatted. In cases of heavy traffic, the assignment message may be delayed in queue until after the transition has occurred, i.e., it is possible for the space to mark transition to be received by the ship terminal before the assignment message.

2.4 The initial ship terminal transmission is in the spacing state. When a mark is received from the coast earth station, the terminal changes its transmission from space to mark. In the case when the space to mark transition on the coast earth station to ship terminal link reaches the terminal before the assignement message, the terminal inserts no more than two space characters in the initial burst.

2.5 Once the coast earth station has received the terminal's space to mark transition, it sends a WRU (figure case D) to the ship terminal. The coast earth station must receive a 20 character answerback within 7 seconds from the end of the WRU character sequence or it will clear the call. In addition, the coast earth station sends a *request not acceptable* assignment message (out-of-band) back to the terminal. The coast earth station does not check if the answerback code corresponds to the ship terminal's destination code (ID).

2.6 The received answerback is stored by the coast earth station. Call processing is now started between the coast earth station and the gateway switch. The coast earth station presents a mark to the gateway switch and the gateway responds with a *call confirmation* within 1 second. Within 3 seconds after the *call confirmation* , the gateway returns a *call connect* . The coast earth station then connects the gateway switch to the ship terminal. The gateway then sends its header (if any) and a WRU to the ship terminal. After transmission of these signals, the coast earth station disconnects the circuit and sends the ship's answerback in storage to the gateway switch within 850 milliseconds. The ship terminal will send an answerback in response to the WRU from the gateway switch. However, this second answerback is blocked by the coast earth station. The coast earth station will connect the circuit after the 19th character of the ship's answerback is received, and the ship terminal can then send selection digits to the gateway switch.

2.7 After this second connection, the coast earth station does not respond to any data on the line until it detects clearing.

2.8 The gateway switch, upon receipt of the selection sequence from the ship terminal, proceeds to process the call to the desired terrestrial subscriber. As the MARISAT system interfaces with various gateway switches, the signalling sequences proceed according to the protocol between the particular gateway switch and the terrestrial network.

Note — The signalling sequences shown between the gateway switch and terrestrial network in Figure 1 illustrates one method of signalling which can be employed.

3 Telex call originated by a coast earth station

3.1 Figures 3 and 4 illustrate the telex signalling and timing sequences for a telex call originated in a terrestrial network to a ship terminal via the MARISAT system. As the signalling sequences between the terrestrial networks and each gateway switch are not identical, that portion of the signalling sequences in Figure 3 are for illustrative purposes only and no attempt is made to describe all the possible sequences.

3.2 The following paragraphs provide a description of the sequence of events which occurs between a gateway switch and a ship terminal for a telex call originated by a coast earth station.

3.2.1 Upon receit of the selection digits from the terrestrial network, the gateway switch starts the signalling sequence by sending a *call request* signal on an idle circuit to the coast earth station. Upon receipt, the coast earth station returns both a *call confirmation* and *proceed-to-select* signal within the proper intervals as shown in Figure 4. The gateway switch can then proceed to send the selection digits to the coast earth station.

3.2.2 The coast earth station checks the validity of the selection digits and if correct, sends an *out-of-band* assignment message to the ship terminal requested. When the assignment message has been transmitted, the signalling proceeds in the same manner as a call from a ship terminal to a coast earth station described in § 2. Once the ship has accessed its assigned channel, the coast earth station sends a WRU to the ship terminal. The terminal responds with its answerback which is stored by the coast earth station.

3.2.3 When the answerback is stored, the coast earth station sends a *call connect* signal to the gateway switch. The gateway then sends a WRU and its header toward the coast earth station. These signals are blocked at the coast earth station and prevented from going to the ship terminal. The coast earth station responds to the gateway's WRU with the ship terminal answerback it had previously stored. The coast earth station then interconnects the circuit between the gateway switch and the ship terminal. From this point, the coast earth station is essentially transparent to all data on the line until it detects a *clearing* signal.

4 Telex clearing sequence

4.1 The coast earth station recognizes a *clearing* signal as a spacing condition of 400 to 1000 milliseconds from either the gateway switch or a ship terminal. After recognition of the *clearing* signal, the coast earth station will disconnect the circuit and send a *clear confirmation* signal in both directions.

4.2 Release of the satellite circuit section is under the control of the coast earth station. The ship terminal does not stop transmission of its RF carrier until;

a) it has returned a *clear confirmation* signal following the receipt of a *clearing* signal from the coast earth station; or

b) a *clear confirmation* signal is received from the coast earth station. In either case, the ship terminal maintains a spacing signal for a maximum of 3.09 seconds before transmission is terminated.

4.3 For 6 seconds after the successful receipt of the *clearing* and *clear confirmation* signals over a circuit section between the coast earth station and a gateway switch, the coast earth station will not process any calls on that circuit section. The ship terminal is also considered busy during this 6-second interval. This 6-second guard time is necessary to allow for proper clearing of the ship terminal over the satellite circuit section. If another telex call is received for that ship terminal during the 6-second guard time, the coast earth station will send back an **OCC** service signal.

Figure 1/suppl. 1 p.105

Figure 2/suppl. 1 p.106

Figure 3/suppl. 1 p.107

Figure 4/suppl. 1 p.108

Supplement No. 2

SIGNALLING ARRANGEMENTS IN THE MARITIME SATELLITE TELEX SERVICE VIA THE MARISAT SYSTEM

[*Source:* Kokusai Denshin Denwa Co., Ltd. (KDD)]

1 Introduction

In response to Recommendation U.4, this supplement describes the characteristics and signalling conditions of the Maritime Satellite Service being provided by KDD in Japan. The coast earth station at Yamaguchi was built by KDD to access the Indian Ocean MARISAT satellite.

Coast earth stations can be grouped into two types. As shown in Figure 1 *a)* , a coast earth station can be viewed as a gateway to accommodate international circuits directly by giving it routing, charging and other functions. On the other hand [Figure 1 *b)*] to simplify its functions the coast earth station can be regarded as a line concentrator, or local switch.

The Yamaguchi station is regarded as a local switch in the KDD telex network and uses domestic signalling, conforming to Recommendation U.1 (type B), between the station and a Tokyo gateway (CT10). Figure 1 shows the network configuration.

2 Numbering and routing

Ship stations are accessed by 3-digit destination codes of Recommendation F.69 [1] assigned to each maritime satellite (583 is assigned to the Indian Ocean satellite) and 7-digit ship numbers. Ship stations gain access by means of 2- or 3-digit destination codes of Recommendation F.69 [1] and subscriber numbers. When a ship station accesses a KDD operator for number inquiry, etc., the coast earth station converts the 2-digit number before sending it to the gateway.

Generally, maritime telex calls are connected automatically, while distress, urgent and safety calls have come to be operated manually.

3 Charging and accounting

At present, information, based on conversation time, about both subscribers' charging and international accounting is recorded onto the same toll ticket by transferring the originating subscriber's number to the gateway in the KDD network where it is recorded.

One of the tariff parameters in maritime satellite communications is space segment utilization. In order to base the accounting on holding times (including the time required for setting-up calls), recording at coast earth stations will be necessary. Fortunately, the MARISAT system has the same accounting structure as telex networks (i.e. based on conversation time). It is, therefore, possible to get charging and accounting information (including the space segment) from only one record, by transferring ship station numbers to gateways, and by utilizing the charging and accounting function of gateways.

Items recorded for ship originated calls are:

a) ship station number,

b) address number,

c) outgoing route information,

d) date and time at start of charging and accounting,

e) time at release of the connection.

Items recorded for calls originated by domestic subscribers are:

1) domestic subscriber number,

2) ship station number,

3) date and time at start of charging and accounting,

4) time at release of the connection.

Figure 1/Suppl. 2 p.109

Items recorded for calls originated by foreign subscribers are:

i) incoming route information,

ii) ship station number,

iii) date and time at start of accounting,

iv) time at release of the connection.

Ship station numbers up to nine digits can be handled. Time information is recorded in units of seconds.

The above information is recorded at the outgoing gateway, or at gateways which have operator positions. For ship originated calls, a reference number consisting of the date, time in Japanese Standard Time (JST), and circuit number is sent by the charging gateway to the ship station when calls are accepted. The chargeable duration of communications is sent when signals indicating the end of call are received.

4 Signalling

When introducing a new service, the first consideration must be to minimize the impact on the existing network. For example, a call setting-up procedure from a ship station meeting this objective must be like the one shown in Figure 2. However, considering that shipboard operators are already familiar with the procedure at the U.S. coast earth stations, the procedure shown in Figure 3 has been adopted to unify the call setting-up procedure.

Figure 2/Suppl. 2 p.110

Figure 3/Suppl. 2 p.111

4.1 *Ship originated call*

See Figure 2.

4.1.1 *Acceptance of requests*

Ship stations sending request signals are checked to determine whether or not they are authorized in the MARISAT system. Requests from ship stations that are not authorized are neglected. However, requests for distress calls are unconditionally accepted.

Request signals are of two types — release requests and assignment requests. On reception of a release request, a *channel release* is sent if a channel has already been assigned to that station; if an assignment request is waiting in a queue, it is deleted from that queue.

In the case of assignment requests, a *request not acceptable* is sent if assignment requests have already been accepted. Requests from ships to which the coast earth station is broadcasting are accepted. *Request not acceptable* is sent when request signals contain errors.

For routine requests, a circuit is assigned to the ship if there is an idle circuit. If there is no idle circuit, the request signal is put into the queue, and *acknowledged message (queue)* is sent. The length of a queue can vary up to a maximum size of 10.

In the case of distress requests, the request is handled in the same manner as for routine calls if there is an idle circuit. If there is no idle circuit, one circuit is pre-empted automatically. The priority order for this is as follows:

a) a circuit in setting-up procedure;

b) a circuit in progress.

For urgent or safety requests, the same procedure that is applied to routine calls is taken.

A circuit is selected from the higher order channel numbers.

After the request is accepted, the polarity of the transmission line on the gateway side is immediately inverted from an A polarity to Z polarity (backward busy). This backward busy signal is released on reception of the end-of-selection signal (+) from the ship station. However, in the case of distress, urgent, or safety requests, this signal is released after the second answerback is received from the ship.

During this time, the receive channel from the gateway is not monitored.

4.1.2 *Response to assignment*

If the carrier does not arrive at the coast earth station within ten seconds of sending the assignment signal, a second identical *assignment* signal is sent. The call is released if carrier is not received within a further ten seconds.

4.1.3 *Response to coast earth station identification*

The ‘‘Who are you?’’ signal is sent out after receiving a carrier, but the call is released unless a group of 20 characters (ship’s answerback) is received within ten seconds. After receiving the answerback, the coast earth station identification (←≡↓**KDD** ↑**xx xxxx** ↓**Z** where **xx** and **xxxx** are the date and time in UTC) and ‘‘Who are you?’’ are sent. Unless a further answerback is received within ten seconds, the call is released. Any characters received from ship stations while sending *Who are you* ? or coast earth station identification signals are neglected, and character groups received are not checked as to whether answerbacks are those of eligible ship stations, or not.

4.1.4 *Processing of selection signals* (except distress, urgent and safety)

The numerical information received from the ship station between the end of the ship’s answerback and the end-of-selection signal is stored. It is checked to see that the inter-digit pause does not exceed 16 seconds. The call is also released should the numerical information exceed 15 digits.

In cases where the first-digit numerical information is ‘‘1’’, the following conversion is performed:

a) Numbers 10 and 19 are converted to a number for the information position at the Tokyo gateway.

b) Number 18, to a number for the telephone booking position at the Tokyo international telephone office.

c) Numbers 17 and 16 are also accepted for the connection to the technical operator’s position at the shore station and automatic test code sender respectively.

d) Any characters received from ships between the end-of-selection signal and connect-through are ignored.

4.1.5 *Transmission of a calling signal*

After releasing the backward-busy signal, reception of the clear-confirmation signal (A polarity for 450-600 ms) is confirmed. Three seconds later, a calling signal (inversion from A to Z polarity) is sent to the gateway. Unless the clear-confirmation signal is received within five seconds, the circuit is released after returning the service signal **NC** to ship station.

4.1.6 *Response to a calling signal*

Unless proceed-to-select (a Z polarity pulse for 20-40 ms followed by A polarity for 20 ms) is received from the gateway within three seconds of it sending a calling signal, the calling signal is repeated after sending an A polarity for three seconds. If no proceed-to-select signal is received in this time, the circuit is released after returning **NC** to the ship. The gateway side is cleared after detecting the clear confirmation signal and *carrier off* (three sequential TDMA bursts missing) from the ship. Three seconds thereafter, a retest signal (a Z polarity pulse for two seconds) is periodically sent to the gateway. If the proceed-to-select signal is received while sending the Z polarity, the retest is stopped, and the circuit status is made idle three seconds after receiving a clear-confirmation signal from the gateway. If a calling signal is detected while sending the A polarity, retest is stopped and the call is accepted.

Failure to receive a proceed-to-select signal after making five retests at one-minute intervals and, thereafter, an additional five at 30-minute intervals, causes the circuit status to be changed to a fault condition.

A head-on collision is registered and the gateway side is released if Z polarity is received continuously for more than 40 ms against a calling signal. Three seconds after receiving a clear-confirmation signal, a calling signal is again sent out. Failure to receive a clear-confirmation signal within five seconds causes the ship station to be released after returning **NC** , and the gateway is released after detecting the clear-confirmation signal and *carrier off* condition from the ship station.

4.1.7 *Sending of selection signals*

After receiving a proceed-to-select signal from the gateway, the coast earth station sends a selection signal in one of the formats shown in Table 1. The numerical information is coded using a 2-out-of-5 code.

Priority calls are connected to a special operator position at the Tokyo gateway.

The class of calling party is used for barring and other uses in the KDD network. Number 02 is assigned to MARISAT ship stations, and number 21, to priority calls.

H.T. [T1.204]

↑	F.69 code	national telex number	<	≡	<	≡

Table 1/Suppl.2 [T1.2], p.112 (Recup.)

4.1.8 *Response to selection*

After sending the end-of-selection signal to the gateway, the coast earth station inspects the return channel for 10 seconds to detect the gateway call-connected signal (Z polarity for 100-150 ms). The circuit is connected through if this is successfully detected.

Failure to detect the call-connected signal results in the release of the ship station after returning **NC** , the channel to the gateway being released after receiving the clear-confirmation signal, and *carrier off* from the ship station.

4.1.9 *Monitoring after through-connection*

See Figure 4.

The circuit is monitored at the coast earth station. When a clearing signal (an A polarity for 450-600 ms) is detected, either from the ship station or the gateway, the circuit is split at this point.

When clearing from the ship station, the clear-confirmation signal is returned to the ship station after splitting the circuits without waiting for a clear-confirmation signal from the gateway or a *carrier off* from the ship station.

The ship status is changed to the idle condition when *carrier off* has been detected, and the circuit's status is changed to the idle condition three seconds after a clear-confirmation signal has been received from the gateway and the conditions for the detection of *carrier off* have been fulfilled.

In the case of clearing from the gateway, the circuits are split when the clearing signal is detected. Then, the ship station status is changed to the idle condition when *carrier off* is detected after the arrival of a clear-confirmation signal from the ship station. At the same time, the clear-confirmation signal is returned to the gateway, and the circuits status changed to the idle condition after three seconds.

Unless a clear-confirmation signal and *carrier off* | are received from the ship within 60 seconds of sending a clearing signal to the ship, or unless *carrier off* is received from the ship within 60 seconds of sending a clear-confirmation signal to the ship, a backward busy signal is sent to the gateway, and *channel release* command is sent to the ship, five times at intervals of one minute. *Carrier off* is then expected. Failure to detect *carrier off* causes the circuits and ship stations to be regarded as having failure status.

If *carrier off* is detected when release is not detected in both directions, the circuits are split, and clearing signals are sent to both the ship station and the gateway. A backward busy signal is sent to the gateway after receiving a clear-confirmation signal from the gateway. When *carrier off* is detected prior to a clear-confirmation signal after sending a clearing signal to the ship, an A polarity is sent for three seconds to the gateway, following which a backward busy signal is sent. In either case, a backward busy signal is sent for 50 seconds after receiving *carrier off* , and the circuits are made idle three seconds thereafter. The ship station is made idle when *carrier off* is detected.

If five continuous *full stops* | (ITA 2 combination No. 13) or *commas* (ITA 2 combination No. 14) are received from the ship station together with release and *carrier off* , the circuits are split for 600 ms. During this time, an A polarity is continuously sent to the gateway, and a Z polarity, to the ship stations.

For *carrier off* | with less than three sequential TDMA bursts, the circuits are maintained in a condition of through-connection, and characters stored are sent to the ship station when the carrier recovers.

4.2 *Shore originated call*

See Figure 5.

4.2.1 *Sending of proceed-to-select signal*

When a calling signal from the gateway is detected (Z polarity for 100 ms), a proceed-to-select signal (Z polarity for 25 ms) is sent in response to it.

4.2.2 *Processing of selection signal*

After sending a proceed-to-select signal to the gateway, the coast earth station monitors the channel for 16 seconds to detect the start-of-selection signal (ITA 2 combination No. 29). If it fails to receive it, the circuit status is changed to a hold condition until the receiving line from the gateway is cleared. The characters received after receiving the start-of-selection signal are stored while performing inter-digit pause monitoring for 16 seconds, until an end-of-selection (ITA 2 combination No. 5) is received. Should a failure be detected the gateway is released after returning the service signal **NC** .

Figure 4/Suppl. 2 p.113

Figure 5/Suppl. 2 p.114

The formats of selection signal received are as follows. Numerical information is coded using the 2-out-of-5 code.

–v'1P'

H.T. [T2.204]

Notes to Figure 4/U.204:

Note 1

— This WRU signal is transmitted 800 ms after transmission of the PTLXAU answerback if the backward path remains idle.

Note 2

— One additional WRU signal shall be transmitted by the PTLXAU if:

a)
there was no response to the first WRU, or

b)
signals were received after the first WRU which could not be identified as an answerback.

This second WRU should be transmitted at least 10 seconds after the transmission of the first WRU and only after a period of 300 ms of idle condition has been detected.

Note 3

— Case A: Procedure to be followed when the calling telex address can be determined from the received telex answerback.

Note 4

— Case B: Procedure to be followed when the calling telex address cannot be determined from the received telex answerback.

Note 5

— In Case A, the prompt GA shall be transmitted 5 seconds after detection of the processable answerback.

— In Case B, the prompt GA shall normally be transmitted 5 seconds after receipt of the calling telex address.

Note 6

— The prompt ADD is used only in Case B and is sent immediately a nonprocessable answerback has been detected and if the calling telex subscriber has not voluntarily input the proper calling telex address. The procedures to be followed shall be in accordance with §§ 3.1.2.4 and 3.1.2.5.

Note 7

— The service request CI is usually sent when the calling telex terminal is operating in a non-interactive mode.

Note 8

— The procedures to be followed shall be in accordance with §§ 3.1.2.4 and 3.1.2.5.

Note 9

— The prompt GA is not sent in Case B if CI has been received.

Note 10

— The provision of a follow-on call facility is for further study.

Note 11

— Following receipt of the EOT signal, the PTLXAU shall proceed as follows:

a)

If the calling telex terminal is operating in non-interactive mode, then the PTLXAU may wait up to 2 seconds for a WRU signal. If this is received, the PTLXAU shall return its answerback followed by the ITD sequence. If the WRU signal is not received within the 2 seconds, then the PTLXAU shall return the ITD sequence.

b)

If the calling telex terminal is operating in a manual mode, the PTLXAU shall return the ITD sequence as soon as possible.

c) In all cases, the ITD sequence and any associated reference information must be returned within a maximum of 5 seconds from the receipt of the EOT signal.

H.T. [T3.204]

CTN _ <value>
ADM _ <value>
PRI _ <value>
NUS _ <value>
DDT _ <value> (Note)
{
DDV
_ <value> (Note)
}

Note — A maximum of four separate pairs of these attributes may be given sequentially.

FIGURE 5/U.204 **Numeric O/R address input by telex subscriber**

Table [T2.2], p.115 (Recup.)

–v'1P' Checks made to the ship station number and to the service signals returned to the gateway are given in Table 2.

–v'1P' –v'6p'

H.T. [T3.204]

CTN _ <value>
ADM _ <value>
PRI _ <value>
NUS _ <value>
DDT _ <value> (Note)
{
DDV
_ <value> (Note)
}

Note — A maximum of four separate pairs of these attributes may be given sequentially.

FIGURE 5/U.204 **Numeric O/R address input by telex subscriber**

Table 2/Suppl. 2 [T3.2], p.116 (Recup.)

–v'1P' –v'6p' Checks made to selection signals and service signals are given in Table 3.

H.T. [T4.204]

CTN _ <value>
ADM _ <value>
PRI _ <value>
SUR _ <value>
GIV _ <value>
INI _ <value>
GEN _ <value>
ORG _ <value>
OUN _ <value> (Note 1)
DDT _ <value> (Note 2)
DDV _ <value> (Note 2)
{
COM
_ <value>
}

Note 1 — A maximun of four separate attributes may be given. Each attribute may be given sequentially on a separate line.

Note 2 — Similar to Note, Figure 5/U.204.

FIGURE 6/U.204 **Mnemonic O/R address input by telex subscriber**

Table 3/Suppl. 2 [T4.2], p.117 (Recup.)

–v'1P' –v'6p' The kinds of class of calling party are: 1) foreign subscribers, 2) domestic subscribers and 3) service. At present, only service calls are accepted for broadcast calls.

4.2.3 *Response to assignment*

If a carrier is not received in the assigned channel within 10 seconds of sending an assignment, the call to the ship station is repeated by sending an assignment of the same content. If a carrier is not received within a further 10 seconds, the ship station is released, and the gateway is released by returning the service signal **ABS** .

4.2.4 *Response to coast earth station identification*

After receiving a carrier from the ship station, the coast earth station identification and ‘‘Who are you?’’ signal are sent. If the answerback sequence (group of 20 characters) is not received from the ship station within 10 seconds of the completion of the coast earth station identification, the gateway is released by returning **DER** . Characters from the ship other than the 20-character group are ignored until the sending of the station identification has been completed. Characters received between the end of the 20-character group and connect-through are returned to the ship station as they are received.

4.2.5 *Through-connection*

After receiving the answerback sequence from the ship station, a call-connected signal (a polarity inversion to a Z polarity) is sent to the gateway. Three seconds thereafter, the stored answerback sequence from the ship station is sent.

4.2.6 *Monitoring after through-connection*

This is the same as the procedure for a ship originated call.

4.3 *Broadcast*

See Figure 6.

Figure 6/Suppl. 2 p.118 (Recup.)

4.3.1 *Call-connected signal*

Seven seconds after sending an assignment, a call-connected signal is returned to the gateway.

4.3.2 *Coast earth station identification and dummy answerback*

Three seconds after returning a call-connected signal, a dummy answerback in the following format is returned to the gateway, and coast earth station identification is returned to the ship:

↓←≡↓↓**GA** ↑**xxxxxxx** ↓←≡↓

Where **xxxxxxx** is the ship station number in the selection signals from the gateway.

The circuit is connected through after completing the return of the dummy answerback.

Reference

[1] CCITT Recommendation *Plan for telex destination codes* , Rec. F.69.

Supplement No. 3

TELEX SIGNALLING ARRANGEMENTS IN THE

NORDIC MARITIME SATELLITE COAST EARTH STATION

(*Source:* Norway)

1 Introduction

1.1 In response to Recommendation U.4, this supplement describes the signalling conditions of the Nordic maritime satellite coast earth station.

1.2 The coast earth station is planned to commence operation in the autumn of 1981. The station will be located at Eik in the south western part of Norway.

1.3 The station will provide fully automatic telex service to ships in the Maritime Satellite Service operating in the Indian Ocean region. The station will operate as an international gateway exchange connected to the international exchange in Oslo which for this purpose will act as a transit exchange.

Since the station has full switching capabilities for telex, it may also be connected to other international gateway exchanges but the traffic is expected to be too small at the outset to merit such a solution.

1.4 It should be noted that some of the timings required in order to interwork properly with the maritime satellite system will be different from those otherwise encountered towards the gateway exchange in Oslo.

2 Numbering and routing

2.1 At the outset the station will accept ship identities in accordance with the MARISAT numbering plan, i.e. seven digit octal numbers. The station is prepared for accepting six digit decimal numbers in accordance with Recommendation F.120/E.210 [1] and will furthermore be capable of operating with a mixed numbering plan during the period of transition from MARISAT numbers to CCITT numbers.

2.2 The F.69 [2] code to be used towards the coast earth station will be 583.

2.3 Provisions for group calls to ships will be made available. However, only calls to all ships in the ocean region will be provided at the outset (i.e. using MARISAT numbers 1 | 00 | 00 or CCITT numbers 000 | 00).

When the new numbering plan of Recommendation F.120/E.210 [1] is introduced, group calls to other groups of ships will also be provided for.

The procedure used for authorization of the calling subscriber is that defined in Recommendation U.61. At the outset a group call facility may be offered to 100 subscribers.

3 Operator facilities

No operator facilities will be provided at the coast earth station. However, such facilities will be offered at the gateway exchange in Oslo for traffic from other countries.

4 Telegram service

Telegrams to ships from telegram positions may be sent automatically using telex procedures.

5 Signalling

5.1 The timing diagrams for incoming traffic which is routed in transit via Oslo are shown in Figure 1. For completeness Figure 2 shows diagrams for traffic routed directly to the coast earth station. In both cases fully automatic working using type A signalling is provided for.

5.2 *Traffic via Oslo*

See Figure 1.

5.2.1 The first selection signal (combination No. 30) should be received within 15 s after sending the proceed-to-select signal. All selection signals including the F.69 [2] code, 583, of the Maritime Satellite Service must be sent en bloc at machine speed. The selection signals must always include the end-of-selection signal, combination No. 26 (**+**).

The class-of-traffic signal must be one of the combinations, No. 1, 11 or 21.

Note — Since the gateway exchange in Oslo now will offer transit routing to the coast earth station, the selection signals for calls terminating in Norway must include the F.69 [2] code (56) allocated to Norway.

5.2.2 The selection signals are acknowledged by a group of three digits.

5.2.3 The call-connected signal is sent by the coast earth station when the first character of the ship’s answerback has been received at the coast earth station. The call connected signal may in exceptional cases be delayed by as much as 43 seconds relative to the last selection signal. This delay takes into account maximum delays encountered in the various stages of connecting the maritime terminal, i.e.

— through-connection delay at the gateway exchange in Oslo,

— transmission delays,

— queuing delays at the coast earth station (number analysis, access to the assignment channel),

— framing delays of the satellite telex channels,

— delays in repeating the assignment message at the Network Coordinating Station (NCS),

— response time of the ship station to return the answerback.

5.2.4 The outgoing exchange must not send the WRU signal in order to obtain the ship's answerback because the answerback will be sent automatically by the coast earth station, 2 to 3 seconds after the call connected signal.

Note — The ship's answerback will be stored at the coast earth station so that it may be returned at the machine speed whenever a WRU signal is detected on the forward path during conversation. This has been done because the 20 characters of the answerback as received from the ship may contain intervals of Z polarity of one character duration due to speed differences between the synchronous satellite channel and the on-board teleprinter. This would avoid misoperation of automatic sending equipment at the outgoing end such as store-and-forward facilities. However, the WRU signal thus received will be sent to the ship so that the continuity of the connection is verified before the answerback is returned.

Figure 1/Suppl. 3 p.119

Figure 2/Suppl. 3 p.120

5.2.5 The coast earth station is capable of returning the service signals **OCC** , **NA** , **NP** , **NC** , **DER** and **ABS** .

The service signals are sent subject to the following conditions:

— **NA** : access barred (e.g. group call from nonauthorized subscriber or ordinary call to nonauthorized ship);

— **OCC** : ship terminal busy (in most cases this will imply that the ship is busy with either another telex call or a telephone call);

— **NC** : congestion at the coast earth station or at the network coordinating station;

— **NP** : nonallocated ship number (e.g. incomplete selection information);

— **ABS** : ship is unavailable (e.g. ship is not within the coverage area of the satellite or ship terminal is out of service);

— **DER** : ship terminal equipment out of order (e.g. call set-up failure or no response to WRU).

Service signals **OCC** , **NA** , **NP** or **NC** will in the worst case not be delayed by more than a few seconds. However, **ABS** , will always be delayed by at least 10 seconds.

5.3 *Calls to operator position*

See Figure 1.

5.3.1 The selection signals must in this case be composed of the F.69 [2] code to Norway (56) followed by the three digits 000, the end-of-selection signal (combination No. 26) and a class of traffic signal which may be any of the combinations No. 1, 11 or 21. The selection signals must be sent en bloc at machine speed.

5.3.2 The call connected signal will be sent within 5 seconds after receipt of the last selection signal.

5.3.3 The call connected signal will be followed by a time signal within 2 seconds.

If the operator position is free, the position's name code followed by WRU will be sent immediately after the time signal.

5.3.4 If the position is busy, the call connected signal will be followed by a time signal and the **MOM** service signal. The **MOM** signal will be repeated every 30 seconds until an operator position becomes available. When the operator position is connected, the position's name code followed by Who Are You? will be sent.

5.3.5 The answerback of the outgoing operator position must be received within 15 seconds. Otherwise the call will be cleared without a service signal. (See Note 4 to Figure 1.)

5.4 *Direct connections to the coast earth station*

See Figure 2.

The same signalling procedures apply as for calls transitted through Oslo. However, the following should be noted:

5.4.1 The selection signals must in this case also be composed of the F.69 [2] code 583 followed by the ship's number, the end-of-selection signal combination No. 26 and a class of traffic signal which may be any of the combinations No. 1, 11 or 21. The selection signals must be sent en bloc at machine speed.

5.4.2 The proceed-to-select signal will be returned approximately 0.7 seconds after receipt of the call confirmation signal.

5.4.3 The first character of the selection signal must be received within 5 seconds relative to the proceed-to-select signal.

5.4.4. The time delay between the last character of the selection signal and the call connected signal will not exceed 35 seconds.

References

[1] CCITT Recommendation *Ship station identification for VHF/UHF and maritime mobile-satellite services* , Rec. F.120.

[2] CCITT Recommendation *Plan for telex destination codes* , Rec. F.69.

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