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MAINTENANCE OF INTERNATIONAL SOUND-PROGRAMME AND TELEVISION TRANSMISSION CIRCUITS

ORGANIZATION, RESPONSIBILITIES AND FUNCTIONS OF CONTROL AND SUB-CONTROL INTERNATIONAL TELEVISION CENTRES AND CONTROL AND SUB-CONTROL STATIONS FOR INTERNATIONAL TELEVISION CONNECTIONS, LINKS, CIRCUITS AND CIRCUIT SECTIONS

ITU-T Recommendation N.55

(Previously "CCITT Recommendation")

FOREWORD

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

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

ITU-T Recommendation N.55 was revised by the ITU-T Study Group IV (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

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

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ABSTRACT

This Recommendation outlines the responsibilities and functions associated with the control and sub-control stations involved with an international television connection, including:

- the establishment of the connection;
- start and stop times and record keeping for charging purposes;
- fault location;
- TVROs.

Keywords

Charging times, control, establishment, fault location, international television centres, sub-control, television, TVRO.

Recommendation N.55

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(Published in 1964; revised in 1968, 1972, 1980, 1988, 1993)

Abbreviations

For the purposes of this Recommendation, the following abbreviations apply:

TVRO Television receive-only station

ITC International television centre

UTC Coordinated universal time

FRC Fault reporting centre

1 Organization

1.1 The international television link is in all cases the sole responsibility of the telecommunication Administrations involved.

1.2 The national television circuits at the ends of the link may be the responsibility of either the telecommunication Administration or the broadcasting organization of the two together, depending on local arrangements in each particular country.

1.3 The ITC at the receiving end (country C in Figure 2/N.51 [3]) is normally the control station for both the international television link and the international television connection and is referred to as the control ITC. The choice of the station which is to have this function is left to the discretion of the Administration concerned.

1.4 The intermediate ITCs, where the international circuit appears at video frequencies, are sub-control stations for the international television link and are referred to as intermediate sub-control ITCs.

1.5 Circuit sections, including satellite sections, also have control and sub-control stations. From the standpoint of overall control arrangements for an international television link, a station controlling a circuit section is referred to herein as an intermediate sub-control station.

1.6 The ITC at the sending end (country A in Figure 2/N.51 [3]) is normally the sub-control station for both the international television link and the international television connection. It is also referred to as the terminal sub-control ITC. However, the choice of the station which is to have this function is left to the discretion of the Administration concerned.

2 Responsibilities

2.1 The control ITC is responsible to the broadcasting organization (receive) for the satisfactory performance of the overall international television connection. When an international television connection does not include a satellite section, the control ITC should exert control through intermediate sub-control ITCs and stations, on that portion of the international television connection extending from the terminal sub-control ITC to the broadcasting organization (receive). When an international television connection does include a satellite section, the control ITC should exert control through intermediate sub-control ITCs and stations, on that portion of the international television connection extending from the transmitting earth station to the broadcasting organization (receive).

2.2 When an international television connection does not include a satellite section, control of that portion of the international television connection extending from the broadcasting organization (send) to the terminal sub-control ITC should be exerted through the terminal sub-control ITC. When an international television connection does include a satellite section, control of that portion of the international television connection extending from the broadcasting organization (send) to the transmitting earth station should be exerted through the terminal sub-control ITC. In each case, the terminal sub-control ITC is, in turn, responsible for the satisfactory performance of that portion of the connection over which the terminal sub-control ITC has control responsibility; the terminal sub-control ITC should co-ordinate the activities of any intermediate sub-control ITCs and stations, both prior to and during the transmission, thus assisting the control ITC and keeping that office informed of developments.

2.3 The received earth station is the control station for the satellite circuit section. Reference to the control station for the satellite circuit section is intended to apply to the station, or portion of the station, manned by personnel of the satellite operator.

2.4 Any intermediate sub-control ITCs, and other intermediate sub-control stations, are responsible for the satisfactory performance of their respective circuits and circuit sections. In the operation of an international television connection, any sub-control ITCs and stations which are intermediate are responsible to either the terminal sub-control ITC or the control ITC, depending upon their location in the overall connection.

3 Functions

3.1 All stations which are designated as control and sub-control stations on an international television connection should perform the following functions:

- ensure that sections under each respective control are condition for service and connected into the international television connection at the appropriate time;
- time the start and conclusion of the transmission in accordance with clause 5 below;
- keep complete and accurate records of all station activities pertaining to the international television transmission. This should include timing and recording service impairment observed or reported, and taking corrective action under the direction of the control or terminal sub-control ITC;
- prepare and forward prescribed reports.

3.2 Control and terminal sub-control ITCs on an international television connection should perform the following additional functions:

- verify the scheduling of the television transmission and the availability of information necessary to furnish it;
- perform and co-ordinate, as required, prescribed pre-transmission line-up tests;
- check the satisfactory receipt, by the broadcasting organization (receive), of the test programme originated by the broadcasting organization (send);
- ensure that the international television connection is handed over to the broadcasting organizations at the scheduled time.

3.3 In order to perform the above functions satisfactorily it is essential that adequate and direct communications be available between terminal ITCs during the line-up and service periods. It is preferable that such communications be provided by direct service circuits (as those specified in Recommendation M.100 [1]), the requirement for television being analogous to the requirements for the service circuits of the telephone and telex networks. In those instances where permanent direct service circuits are not provided and the television service is of an infrequent nature, it will be the responsibility of the control ITC to initiate action for the provision of an adequate means of communications. Use of the public telephone network or electronic text systems should be encouraged in such instances.

4 Pre-transmission procedures

4.1 At some time prior to the scheduled start of television transmission, preferably the day before but not less that two hours prior to the start of service, the control ITC should contact the terminal sub-control ITC and the appropriate intermediate sub-control ITCs or stations, over which it exercises control and confirm that they have the transmission schedule and sufficient information to furnish the service. Similarly, the terminal sub-control ITC should contact the intermediate sub-control ITCs or stations over which it exercises control to verify their readiness.

4.2 The control and sub-control ITCs should initiate circuit section line-up tests for which they are directly responsible. The test should be completed far enough in advance of the scheduled time at which the connection is to be handed over to the broadcasting organization (point *H* in Figure 1/N.54 [4]) to assure completion by that time of the operations given in 4.3. During this same period the control station for any satellite circuit section should perform line-up tests as prescribed by the responsible authority. The test recommended for terrestrial circuit sections and ITC-to-ITC links are those detailed in Recommendation N.62 [5].

4.3 Immediately upon conclusion of the circuit section tests, the control ITC, with the cooperation of the terminal sub-control ITC, should verify that the international television link is continuous between these terminal ITCs and should then proceed to perform overall line-up tests as detailed in Recommendation N.62 [5].

4.4 Upon completion of the overall tests, and if possible 2 or 3 minutes prior to the scheduled start of the transmission from the broadcasting organization (send), the control and sub-control ITCs should establish the connection to the broadcasting organizations and check the test programme between them. Checking the test programme consists of verifying the satisfactory receipt, from the standpoints of quality and level, by the broadcasting organization (receive) of test material originated by the broadcasting organization (send). The sub-control ITC should request this transmission of test material from the broadcasting organization (send), as necessary, and should verify that the material is of suitable quality and level at its location. The control ITC should also check for suitable quality and level at its location. After it is determined that the test programme check is satisfactory, the connection should be handed over to the broadcasting organizations.

5 Timing the international television transmission

5.1 The control ITC and terminal sub-control ITC of the international television connection should record the times of start and conclusion of the transmission, in UTC.

5.2 The starting time to be indicated is defined below:

- If the international television transmission is established for the broadcasting organization at the scheduled starting time indicated on the planning schedule, or before that time without any request for doing so from the broadcasting organization, it is the scheduled starting time indicated on the planning schedule.
- If the international television transmission is established for the broadcasting organization at a certain time before the planning schedule starting time, because the broadcasting organization had wished so, and the Administration had agreed, it is the time when the transmission is actually established for the broadcasting organization.
- If the transmission is not ready at the scheduled time, and is established later, it is the time when the transmission is established for the broadcasting organization.
- In the case of transmissions which are not on the planned schedule, but verbally demanded and accepted by the Administration, and established a little later, it is the time when the transmission is established for the broadcasting organization.

5.3 The concluding time of the service is the time at which the connection is released by the broadcasting organization (receive) (end of chargeable duration – sometimes called the *Good-night time*).

When satellites are used to establish international television connections, the start of service and end of service times for the space segment are specified in accordance with procedures of the satellite system operating authority. For example, the receive earth station must be notified in order to comply with the satellite system operating authority requirements for space segment deactivation. The corresponding chargeable time only applies to the space segment and may be different from the one of the whole transmission, such as defined in 5.2 above and which might be the only one known by the broadcasting organization.

The conditions for the provision and lease of circuits for television transmissions are given in Recommendation D.180 [2].

6 Monitoring

6.1 The control ITC should monitor in connection with the pre-transmission check of test television programmes and continuously thereafter until the conclusion of the transmission. Continuous monitoring at other stations is not required, except as directed by their respective Administrations, and as required to discharge their responsibilities with regard to fault location.

7 Fault location and handling

7.1 The control and sub-control ITCs and stations are responsible for recording times-of-day and details of service impairments observed and/or reported to them and for initiating corrective actions. However, except when the impairment has rendered the programme unusable, no action which would interrupt the transmission path should be taken except at the direction of the control ITC.

7.2 Although composed of a variety of national and/or international circuits and circuit sections, an overall international television connection without a satellite section may be considered as two segments:

a) the terrestrial facilities between the broadcasting organization (send) and the terminal sub-control ITC;

b) the terrestrial facilities between the terminal sub-control ITC and the broadcasting organization (receive).

When an overall international television connection includes a satellite section the connection may be considered as three major segments:

i) the terrestrial facilities between the broadcasting organization (send) and the transmitting earth station;

ii) the satellite circuit section between earth stations;

iii) the terrestrial facilities between the receiving earth station and the broadcasting organization (receive).

7.3 Faults encountered during service will be observed by the broadcasting organization (receive) and reported to the control ITC or observed by the control ITC, or both.

7.4 Normal fault sectionalization for an overall connection without a satellite section, should be as follows:

– The control ITC shall immediately check the television signal at its location to determine if the fault lies between the broadcasting organization (receive) and the control ITC. If the signal is satisfactory at the control ITC, further sectionalization is carried out by the control ITC, directly or via sub-control stations should they exist, between the control ITC and the broadcasting organization (receive).

– If the signal is unsatisfactory as it appears incoming to the control ITC, the control ITC shall determine from the terminal sub-control ITC whether the signal is satisfactory as it arrives at the terminal sub-control ITC. If the signal incoming to the terminal sub-control ITC is unsatisfactory, the terminal sub-control ITC shall further sectionalize the fault between the broadcasting organization (send) and the terminal sub-control ITC. Such sectionalization shall begin by checking the television signal at its source.

– If the signal incoming to the terminal sub-control ITC is satisfactory, the control ITC should further sectionalize the fault via the appropriate intermediate sub-control ITCs, or stations, and take whatever corrective action is indicated.

7.5 Normal fault sectionalization for an overall international connection containing a satellite section, should be as follows:

– The control ITC shall immediately check the television signal at its location to determine if the fault lies between the broadcasting organization (receive) and the control ITC. If the signal is satisfactory at the control ITC, further sectionalization is carried out by the control ITC, directly or via sub-control stations should they exist, between the control ITC and the broadcasting organization (receive).

– If the signal is unsatisfactory as it appears incoming to the control ITC, the control ITC shall determine from the terminal sub-control ITC whether the signal is satisfactory as it arrives at the terminal sub-control ITC. If the signal incoming to the terminal sub-control ITC is unsatisfactory, the terminal sub-control ITC shall further sectionalize the fault between the broadcasting organization (send) and the terminal sub-control ITC. Such sectionalization shall begin by checking the television signal at its source.

– If the signal incoming to the terminal sub-control ITC is satisfactory, the terminal sub-control ITC should contact the transmitting earth station to determine if the signal is unsatisfactory incoming to that station; simultaneously, the control ITC should contact the receiving earth station to determine if the signal is satisfactory incoming to the receiving earth station.

– If the fault is located between the terminal sub-control ITC and the transmitting earth station, the terminal sub-control ITC shall contact the appropriate intermediate sub-control ITCs or stations, to further sectionalize the fault and take whatever corrective action is indicated.

– If the fault is located in the satellite circuit section, the control ITC should request the receiving earth station (satellite section control) to take corrective action.

– If the fault is located between the receiving earth station and the control ITC, the control ITC should contact the appropriate intermediate sub-control ITCs or stations, to further sectionalize the fault and take whatever corrective action is indicated.

7.6 Intermediate sub-control ITCs and stations should keep the ITCs, to which they are subordinate in the provision of the television service, informed of the status of the fault investigation. Similarly, the control ITC should keep the broadcasting organization (receive) informed. In so doing these stations and ITCs should exchange times-of-day at which faults are encountered, and should attempt to reconcile any differences.

8 Record keeping and monitoring for charging purposes

8.1 The several telecommunication Administrations will prescribe the reports required from their respective stations and the distribution to be made of these reports. To a consideraable extent, however, the subject content of these reports will be essentially the same. The following paragraphs will suggest the records of television transmissions to be kept by the stations, and to some extent the information from which the prescribed reports can be prepared.

8.2 The reports prepared by the control ITC normally will provide the information from which bills rendered to the broadcasting organizations will be prepared, including any credit allowances for any transmission interruptions or other serious impairments experienced. Usually a carefully kept and detailed log record in itself will constitute a satisfactory source for this purpose.

8.3 The terminal sub-control ITC and the intermediate sub-control ITCs and stations should also keep detailed log records of their activities in connection with each television transmission. Thus, whether or not these stations are required by their Administrations to submit reports, any needed information will be available to satisfy inquiries or investigations which my arise subsequent to transmissions.

8.4 The following paragraphs suggest the nature and extent of the log record detail. Times-of-day should be shown to the second, in UTC; the record should be keep chronologically from the beginning of service preparations to the final exchange of time-of-day and comments. Abbreviations and condensations should be used carefully and discreetly; initials or names should identify the recorder.

8.5 Record exchanges and discussions with other stations and with broadcasting organizations. These records should include initials, names or other identification of the individuals contacted.

8.6 Record the results of pre-transmission tests, including the test programme check.

8.7 The technical staff of the designated ITC should come to an agreement among themselves so that at the end of the television transmission they have accurate knowledge of:

a) the starting time as defined in 5.2 (beginning of chargeable duration);

b) the concluding time as defined in 5.3 (end of chargeable duration);

c) where appropriate, the times and duration of every interruption or incident which may have occurred (in order that the operating services can determine whether a rebate is due and, if so, its amount).

The times of the beginning and of the end of the chargeable duration, a well as the time of occurrence and duration of any breakdowns which may occur, are entered on a daily report. This daily report is sent on the same day to the service responsible for coordinating all the details necessary for the establishment of the international accounts.

However, it is recommended that a verbal contact (telephone for instance) is established between the broadcasting organization and the Administration responsible for telecommunications, (this may be the receive earth station in those cases where the transmission path includes a satellite segment) at the beginning and at the end of each international television transmission, in order to get a mutual agreement about start and stop times, chargeable duration of transmission, time and duration of incidents during transmission. This way there could be very few to no disputes between the two parties while settling the cost for the transmission.

8.8 In recording the times of programme start and conclusion, indicate when agreement is reached with other stations or with broadcasting organizations with respect to these times. Where discrepancies cannot be reconciled, record the differing times with suitable identifications of each.

8.9 For any period of impairment, record the time it began, its duration, the time it was reported, and the nature and degree of the impairment, and note whether in the opinion of the broadcasting organization the programme was rendered unusable.

8.10 Record the quality assessment of the overall transmission given by the broadcasting organization (receive), using the quality assessment scale (see Recommendation N.64 [6] for Impairment and Quality Scales).

8.11 The log record of each station at which the transmission was monitored continuously should include the assessment of the overall transmission by the attendant at that station using the quality assessment scale.

9 Responsibilities of control and sub-control stations for multiple destination transmissions

9.1 International multiple destination transmissions on communications satellite systems differ in a number of respects from those routed on terrestrial systems. A common transmitting path extends from the terminal ITC sub-control station through the transmitting earth station to a satellite repeater and separate receiving paths extend from the satellite repeater through the applicable receiving earth station to a number of terminal ITC control stations (see Figure 5/N.51 [3]). Operations on the common path will affect transmission to all the receiving stations whereas operations on any receiving path will only effect transmission to the terminal ITC control station on the particular path concerned. To coordinate the setting-up, lining-up and maintenance of a multiple destination transmission on a communications satellite system, it is recommended that a send reference station be designated for each multiple destination circuit section, circuit and link.

The responsibilities of a send reference station are given in 9.2 below. The additional responsibilities and functions of control stations for a multiple destination television transmission are contained in 9.3 below.

9.2 Send reference stations

i) The send reference station for a multiple destination television circuit section is the intermediate circuit sub-control station at the transmitting earth station (R in Figure 4/N.51 [3]).

ii) The send reference station for a multiple destination television circuit and link is the terminal sub-control station for the circuit and link respectively (R′ and R″ in Figure 5/N.51 [3].

In addition to the normal control and sub-control station responsibilities specified in this Recommendation, stations designated as send reference stations are required to perform the following functions:

a) coordinate the setting-up, and lining-up, of the multiple destination circuit section, circuit or link;

b) coordinate maintenance action on the multiple destination circuit section, circuit or link when requested by the control stations;

c) keep records of measurements made during the initial line-up of the multiple destination circuit section, circuit or link and incidents reported by the control stations during transmissions.

9.3 Additional responsibilities of control stations

In addition to the control station responsibilities in clauses 1 to 8 above, the control stations of mulitple destination circuit sections, circuits or links, having a designated send reference station should perform the following functions:

a) report to the appropriate send reference station the results of line-up measurements made on the multiple destination circuit section, circuit or link;

b) report any incidents observed during transmissions to the appropriate send reference station;

c) cooperate with the appropriate send reference station in locating fault conditions.

10 International television transmissions for television receive-only stations (TVROs) not related to an ITC

For international television transmissions for TVROs not related to an ITC (see Figure 6/N.51 [3]), a fault reporting centre (FRC) should perform the following functions:

– Deal with enquiries concerning service performance and fault reports.

– Deal with general enquiries from other TVROs/FRCs.

– Make contact with the ISTC (see below) in the originating country for fault reporting and general service liaison.

In an originating country the Administration concerned should nominate an international satellite transmission centre (ISTC) for every transmitted service. Where possible, all services transmitted by an Administration shall be handled by the same ISTC.

The ISTC should perform the following functions:

– To be a contact point for FRCs and for the programme originators making enquiries concerned with service continuity.

– To liaise with the transmitting earth station and any intermediate sub-control station for fault investigations and technical coordination.

– To monitor transmissions from programme originators' premises and to have the capability to monitor the transmission from the satellite.

In the case where programme material is received by TVROs in the country of origination, the ISTC and the FRC should be co-located where possible and the duties combined.

References

[1] CCITT Recommendation, *Service circuits*, Rec. M.100.

[2] CCITT Recommendation, *Occasional provision of circuits for international sound- and television-programme transmissions*, Rec. D.180.

[3] CCITT Recommendation, *Definitions for application to international television transmission*, Rec. N.51

[4] CCITT Recommendation, *Definition and duration of the line-up period and the preparatory period*, Rec. N.54.

[5] CCITT Recommendation, *Tests to be made during the line-up period that precedes a television transmission*, Rec. N.62.

[6] CCITT Recommendation, *Quality and impairment assessment*, Rec. N.64.