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MAINTENANCE OF INTERNATIONAL SOUND-PROGRAMME AND TELEVISION TRANSMISSION CIRCUITS

MAINTENANCE OF INTERNATIONAL VIDEOCONFERENCE SYSTEMS OPERATING AT TRANSMISSION BIT RATES OF 1544 AND 2048 kbit/s

ITU-T Recommendation N.90

(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.90 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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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 deals with the maintenance procedures to be applied to international videoconference systems operating at transmission rates of 1544 and 2048 kbit/s.

Keywords

Limits, maintenance, primary rate videoconferencing systems, videoconferencing.

MAINTENANCE OF INTERNATIONAL VIDOCONFERENCE SYSTEMS OPERATING AT TRANSMISSION BIT RATES OF 1544 AND 2048 kbit/s

(Melbourne, 1988; revised at Helsinki, 1993)

1 Scope

This Recommendation deals with the maintenance procedures to be applied to international videoconferencing systems operating at transmission bit rates of 1544 and 2048 kbit/s.

2 General

2.1 The configuration shown in Figure 1 is a simplified description of a typical connection.

2.2 Each participating Administration shall establish an IVC with the same general responsibilities and functions as those set out in Recommendation N.55 [4] for an ITC in respect of international television connections. However, as a videoconference connection is a bidirectional transmission path, the choice of control and sub-control IVCs shall always be established by mutual agreement. This choice should hold for all the international videoconference connections serving two Administrations.

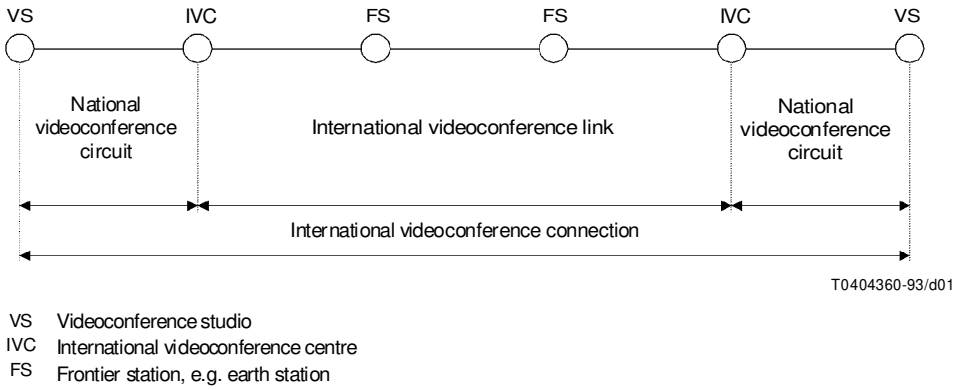

FIGURE 1/N.90

The constituent parts of an international videoconference connection

2.3 The maintenance procedures are designed to facilitate restoration of service when a videoconference connection is broken, or unacceptably degraded, during a videoconference call. At this time it is essential that close cooperation is maintained between control and sub-control IVCs in order to minimize disruption to the call.

2.4 The IVCs will require to be provided with equipment such as codecs, monitors and cameras so as to be able to make limited functional checks (visual and audio) for confirmation of call establishment and rapid fault sectionization.

Additionally, testers should be available for 1544 and 2048 kbit/s data performance tests. The testers should be able to send a structured test signal in accordance with either the Recommendation G.732 [1] or G.733 [2] structures. The test pattern should be a pseudo-random test signal of sequence length 2^{15-1} as described in Recommendation O.151 [3].

The tester conforming to Recommendation G.733 [2] should be able to work at 1536 kbit/s information rate, sending the test signal in time slots 1 to 24.

The tester conforming to Recommendation G.732 [1] should be able to work at 1536 or 1920 kbit/s information rates. When switched to 1536 kbit/s it should send the test signal in time slots 1 to 15 and 17 to 25. When switched to 1920 kbit/s it should use time slots 1 to 15 and 17 to 31.

3 Pre-call tests

It is essential that pre-call tests are made to confirm that a scheduled call will be satisfactory. All equipments and all parts of the international videoconference connection to be used in a call should be checked beforehand on the day of the call. For this purpose tests should be made of the complete transmission path between the appropriate videoconference studio(s) and frontier station(s) by each Administration and between the frontier stations.

These pre-call tests are intended to be simple checks to establish that the transmission paths are acceptable, for example, that the transmitted and received radio frequency carrier levels at each earth station are within their prescribed limits.

Additionally, where the international videoconference connection is new or where previous, similar calls have suffered problems a complete studio-to-studio functional test should be made. This should take the form of a visual and, if appropriate, audio subjective assessment of the end-to-end performance. Such tests should be sufficiently in advance of the start of the call (15 to 30 minutes) to give some opportunity for clearing any problem which may be found. As experienced and confidence is gained, the time required for pre-call testing should reduce.

4 Fault localization

4.1 A general outline of the fault localization procedure for international videoconference connections is given below. This approach aims to rapidly localize a fault to a circuit section.

4.2 Fault reports may be received by either IVC on a connection but shall only be accepted from points within their own country.

4.3 On receipt of a fault report the IVC shall monitor the connection where possible to broadly localize the fault unless this is obvious from the fault report or from other information, e.g. system alarms. The IVC should then immediately advise the distant IVC of the reported fault and any information which may assist to determine the course of action to be taken.

4.4 If the source of the problem is not known then both IVCs shall work together to determine in which circuit section the fault lies, e.g. by means of loopback. Preferably this should be in accordance with an agreed planned procedure. If these procedures do not localize the fault then the IVCs shall agree the further action to be taken.

4.5 If at any stage the fault is localized then the appropriate clearance procedures should be put in hand.

4.6 Both IVCs should be in constant telephone contact during these procedures. The IVCs should report to their respective VSs no longer than 10 minutes after receipt of the fault report advising on localization progress and estimated time to restore service. A second status report should be given after a further maximum period of 10 minutes. If, at 20 minutes following the fault report, the time to restore service has not been determined then the customers should be so advised and a decision made as to whether or not to abort the call.

4.7 If, during localization, the overall connection is found to be satisfactory, the problem may be caused by the interworking of the studio equipment (e.g. codecs). In this case it may prove necessary to monitor and test the connection VS to VS.

4.8 Minor problems that are reported for correction but which do not make a call unusable, shall be accepted for clearance and entered in the fault record but shall not count against the service availability of the connection. Action to deal with such problems should not interrupt an ongoing call, except at the direction of the control IVC.

4.9 Where a videoconference call transmission is encrypted, the VSs shall be required to remove the encryption for fault localization and clearance purposes when requested by the IVCs.

5 Maintenance parameters

5.1 The maintenance limits for 1544 and 2048 kbit/s transmission paths are given in Table 1. Where the national videoconference circuit includes wideband analogue or higher order digital system sections then the national maintenance standards should apply to these sections.

5.2 Because of the need to restrict the time taken for dealing with faults during scheduled videoconference calls, any assessment of the 1544 and 2048 kbit/s performance that may be required should be based on BER measurements only. The measuring time should be kept to the minimum necessary for the investigation in hand.

5.3 Where maintenance activities do not risk the establishment or completion of a scheduled videoconference call then any assessment of the 1544 and 2048 kbit/s performance should be against all the parameters shown in Table 1. Such measurements should be made over a minimum period of 15 minutes.

TABLE 1/N.90

Maintenance limits[a)]

	Nominal data rate[b)] (kbit/s)	Bit error ratio (BER)	Max. errors in 15 minutes	Severely errored seconds (SES) in 15 minutes	Error-free seconds (EFS) (%)
National videoconference circuit	1544	1×10^{-6}	1382	0	92
	2048	1×10^{-6}	1728	0	92
International videoconference link	1544	1×10^{-6}	1382	0	92
	2048	1×10^{-6}	1728	0	92
International videoconference connection	1544	3×10^{-6}	4147	0	92
	2048	3×10^{-6}	5882	0	92

a) The limits are provisional and subject to further study.

b) Structured formatting required with a consequent reduction in actual test data rate as follows:
at 2048 kbit/s, test data rate = 1920 kbit/s (time slots 1-15 and 17-31 only)
at 1544 kbit/s, test data rate = 1536 kbit/s (8 kbit/s used for frame alignments).

6 Abbreviations

For the purpose of this Recommendation, the following abbreviations are used:

FS Frontier station

IVC International videoconference centre

ITC International television centre

VS Videoconference studio

BER Bit error ratio

SES Severely errored second

EFS Error-free second

References

[1] CCITT Recommendation G.732 *Characteristics of primary PCM multiplex equipment operating at 2048 kbit/s*.

[2] CCITT Recommendation G.733 *Characteristics of primary PCM multiplex equipment operating at 1544 kbit/s*.

[3] CCITT Recommendation O.151 *Error performance measuring equipment for digital systems at the primary bit rate and above*.

[4] CCITT Recommendation N.55 *Organization, responsibilities and functions of control and sub-control ITCs and sub-control stations for international television connections, links, circuits and circuit sections*.