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SERIES V: DATA COMMUNICATION OVER THE
TELEPHONE NETWORK

Interfaces and voiceband modems

Operational and interworking requirements for DCEs operating in the text telephone mode

ITU-T Recommendation V.18

(Formerly CCITT Recommendation)

ITU-T V-SERIES RECOMMENDATIONS
DATA COMMUNICATION OVER THE TELEPHONE NETWORK

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Operational and interworking requirements for DCEs operating in the text telephone mode

Summary

This Recommendation describes modem procedures to follow for automatic interworking with text telephones. Text telephones use various modem technologies. This Recommendation specifies the signal analysis, signal transmission and logic needed to determine what kind of text telephone there is on a connection. It also specifies the actions needed to communicate in the mode supported by each terminal type.

This Recommendation is intended for use in text telephones, in interworking units, in text relay services, in emergency centres, and in computers to be used for text telephony in the PSTN.

This Recommendation specifies transmission of identification signals to determine when the connection is between two V.18-equipped terminals. For that case, ITU-T V.21 is the default modulation used. For interworking in text conversation between humans, not only the modulation must be specified. Therefore, this Recommendation specifies that when the connection in V.18 mode is established, the presentation protocol specified in ITU-T T.140 should be used, including an internationally useful character set.

The text telephone types supported by this Recommendation are: EDT, 5-bit (or Baudot), DTMF, V.21, V.23, Bell 103 and V.18-based devices.

In originate mode, V.18 identification signals and V.23 stimulation signals are transmitted until a recognized text telephone signal is received and connection can be established in that mode.

In answer mode, this Recommendation specifies stimulation to connection by transmission of probing signals for the different kinds of text telephones while monitoring for text telephone signals. Once determined, the mode of communication is entered.

For cases when it is not obvious if the connection should be made in originate or answer mode, procedures are provided to resolve that and reach communication.

An automode monitor mode is provided for cases when it is desired to have a text telephone device prepared on the same line as a voice telephone and indicate when there is an active text telephone on the connection.

For DTMF and 5-bit text telephone types using character coding not commonly used with modems, conversion is specified in this Recommendation between these codes and ITU-T T.50.

For selection between multimedia protocols and this Recommendation, and also for negotiating procedures for simultaneous voice and text, modem connection procedures based on ITU-T V.8 *bis* are provided.

Source

ITU-T Recommendation V.18 was revised by ITU-T Study Group 16 (2001-2004) and approved under the WTSA Resolution 1 procedure on 17 November 2000.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. 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 Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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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As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Introduction

This Recommendation was revised by ITU-T Study Group 16 (1997-2000) and was approved under the WTSC Resolution 1 procedure on 6 February 1998.

Work with version 3 of this Recommendation was initiated in February 2000 with the following goals:

- 1) Include all amendments collected in implementors' guides.
- 2) Resolution of the open question from the implementors' guide on the contents of the XCI signal. The contents is decided to be 0x"FF",0x"FF".
- 3) Specify full V.8 connection procedures, in order to allow smooth initiation by a receiving terminal and allow modulation negotiation (still maintaining interoperability with the "TXP" based connection procedures of earlier versions). This obsoletes large parts of Appendix III.
- 4) Remind about the risk for false detection of DTMF signals as textphone signals when operating in automode monitor mode.
- 5) Clarify that the probe list may contain 0-6 elements.
- 6) Move the V.8 *bis* procedures specified in Appendix III to the main body of the Recommendation.
- 7) The new Appendix III is dedicated to V.18 implementation text.

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ITU-T Recommendation V.18

Operational and interworking requirements for DCEs operating in the text telephone mode

Background

The ITU-T,

considering

- a) that text telephones place special operational needs on the use of DCEs;
- b) that for historical reasons, many existing text telephones do not use V-series modulation;
- c) that there is a desire to have all future GSTN text telephones employ V-series modulation;
- d) that to provide a migration path from the diverse installed base, it will be necessary to provide interworking with existing text telephones;
- e) that to provide for interworking, the DCE will need to convert the 5-bit character code or ITU-T Q.23 (DTMF) character set used by some existing text telephones into the 7-bit code set as given in ITU-T T.50;
- f) that such character conversion in the DCE will be undertaken solely to enable interworking with existing text telephones and to impose no constraints on character sets used in future text telephones;
- g) that new technology is being developed that could be used to provide additional text telephone modes,

recommends the procedure below

1 Scope

This Recommendation specifies features to be incorporated in DCEs intended for use in, or communicating with, text telephones primarily used by the deaf and hard of hearing. One of the goals of this Recommendation is to provide a platform on which a universal text telephone can be built. To accommodate this goal, procedures for interworking with identified existing text telephones are provided in clause 5. In addition, this Recommendation has the goal of identifying ways in which the multimedia Recommendations could be used to support new modes of operation or create new multi-mode text telephone devices. To accommodate this additional goal, clause 6 identifies some possible uses of this technology to support text telephony and additionally specifies requirements for multi-mode text telephone devices.

To provide for maximum flexibility, it is envisaged that any of the text telephone modes of operation specified in this Recommendation will be invoked on an as required basis using the commands specified in ITU-T V.250 or some equivalent mechanism.

It provides for:

- calling identification signals;
- no DCE-initiated disconnect;
- procedures for call establishment;
- procedures for interoperation with existing text telephones;
- specification of requirements for the use of text telephones in a multimedia environment.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- ITU-T H.324 (1998), *Terminal for low bit-rate multimedia communication*.
- ITU-T Q.23 (1988), *Technical features of push-button telephone sets*.
- ITU-T T.50 (1992), *International Reference Alphabet (IRA) (formerly International Alphabet No. 5 or IA5) – Information technology – 7-bit coded character set for information interchange*.
- ITU-T T.140 (1998), *Protocol for multimedia application text conversation*.
- ITU-T V.8 (2000), *Procedures for starting sessions of data transmission over the public switched telephone network*.
- ITU-T V.8 bis (2000), *Procedures for the identification and selection of common modes of operation between Data Circuit-terminating Equipments (DCEs) and between Data Terminal Equipments (DTEs) over the public switched telephone network and on leased point-to-point telephone-type circuits*.
- ITU-T V.21 (1988), *300 bits per second duplex modem standardized for use in the general switched telephone network*.
- ITU-T V.23 (1988), *600/1200-baud modem standardized for use in the general switched telephone network*.
- ITU-T V.25 (1996), *Automatic answering equipment and general procedures for automatic calling equipment on the general switched telephone network including procedures for disabling of echo control devices for both manually and automatically established calls*.
- ITU-T V.61 (1996), *A simultaneous voice plus data modem, operating at a voice plus data signalling rate of 4800 bit/s, with optional automatic switching to data-only signalling rates of up to 14 400 bit/s, for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits*.
- ITU-T V.70 (1996), *Procedures for the simultaneous transmission of data and digitally encoded voice signals over the GSTN, or over a 2-wire leased point-to-point telephone type circuits*.
- ITU-T V.250 (1999), *Serial asynchronous automatic dialling and control*.
- ANSI TIA/EIA-825 (2000), *A Frequency Shift Keyed Modem for use on the Public Switched Telephone Network*.
- ISO/IEC 646:1991, *Information technology – ISO 7-bit coded character set for information interchange*.

3 Definitions

This Recommendation defines the following terms:

3.1 carrierless mode: A mode for communication, where signals are only present on the connection when data is being exchanged (e.g. in response to the pressing of a key on a keyboard).

3.2 carrier mode: A mode for communication, where continuous signals (i.e. carriers) are present on the connection irrespective of whether data is being exchanged or not.

3.3 CI: A signal transmitted from the originating DCE to indicate the general communications function, consisting of a repetitive sequence of bits at 300 bit/s, using modulation in accordance with the low-band channel defined in ITU-T V.21. The cadence of this shall be bursts of 4 CI sequences separated by 2 s of silence. The CI sequence for textphone is defined in ITU-T V.8.

3.4 CM: The Call Menu signal defined in ITU-T V.8.

3.5 JM: The Joint menu signal defined in ITU-T V.8.

3.6 multi-mode text telephone: A device which incorporates simultaneous voice and data in addition to conforming to clauses 4 and 5.

3.7 text telephone: A device incorporating text telephony functions.

3.8 text telephone mode: The operational mode when two devices are interconnected to provide text telephone communications.

3.9 text telephony: A telecommunications capability which supports real-time text conversation on communication networks.

3.10 TXP: A signal transmitted to allow early termination of answer tone, and also to confirm V.18 capability in the answering device. It consists of a repetitive sequence of bits at 300 bit/s modulating V.21(1) if transmitted from the originating DCE, or modulating V.21(2) if transmitted from the answering DCE. The 40-bit TXP sequence in left-to-right order of transmission is given by:

(1 1111 1111 1) (0) 0010 1011 (1) (0) 0001 1011 (1) (0) 0000 1010 (1)

where brackets enclose start and stop bits. TXP is included for compatibility with earlier versions of ITU-T V.18.

3.11 V.18 mode: The operational mode when two devices conforming to this Recommendation are interconnected to provide text telephone capability.

3.12 V.18 text telephone: A communications device conforming to the requirements of this Recommendation.

3.13 XCI: A signal transmitted in high-band V.23 modulation to stimulate V.23 terminals to respond and to allow detection of V.18 capabilities in a DCE.

The 3-s XCI signal uses the V.23 upper channel having periods of "mark" (i.e. 1300 Hz) followed by two bytes XCI marker containing the data pattern (0) 1111 1111(1)(0)1111 1111(1) sent at 1200 bit/s. The signal consists of:

- 400 ms mark;
- XCI marker;
- 800 ms mark;
- XCI marker;
- 800 ms mark;
- XCI marker;
- 800 ms mark;
- XCI marker;
- 100 ms mark.

4 Operational requirements

The DCE, when configured to support text telephone mode, shall:

- 1) not initiate a disconnect;
- 2) have the capability to be configured to automatically reassume the initial interworking state, (e.g. re-initiate the calling id signal and activate the appropriate detectors) whenever transmission has ceased for a period of 10 s (e.g. a call transfer). When this capability is not invoked, the DCE shall stay in the selected transmission mode awaiting resumption of the communication (e.g. in alternating between voice and text);
- 3) implement the CI signal coded as specified in this Recommendation. The use of CI is required by the calling DCE except where it is known *a priori* that the called terminal supports ITU-T V.8 *bis* (see clause 6);
- 4) provide call progress indications to the DTE. These signals shall include, but not be limited to: BUSY, RINGING, CARRIER, LOSS OF CARRIER and CONNECT(x) where x indicates the mode of connection (e.g. V.18, EDT, etc.);
- 5) implement circuit 135 – Received energy present (or its equivalent) (see Note).

NOTE – Because of the subjective nature of this indication, the operational thresholds of this circuit are left to the discretion of the implementors; however, means should be provided to prevent the presence of CI signal specified in this Recommendation from interfering with the indication of call progress signals.

5 Connecting in text telephone mode including procedures for interworking with the installed base of existing text telephones

This clause specifies procedures for connecting in text telephone mode. This includes procedures for establishing communications between two V.18 text telephones, and procedures for establishing communications between a V.18 text telephone and the existing text telephones specified in Annexes A to F. Although it is envisaged that for most connections the user will have *a priori* knowledge of the type of device being called and will preset the DCE to the correct mode, automatic procedures are provided for originating and answering calls and for connection in text mode in an established call. These procedures are provided for automoding and, where required for interworking, modulation and protocol conversion.

When a connection between two V.18 text telephones is established, the DTEs shall apply the protocols and procedures specified in Annex G.

Although the obvious functionality of a DTE operating with a V.18 DCE, is to convert all forms of text telephone operation to and from the T.140 presentation protocol, for consistent application handling, this Recommendation does not specify any such conversion because it is out of scope of this DCE related Recommendation.

Clause 6 specifies procedures for cases when V.8 *bis* is supported.

Recommended common procedures for user terminals using the V.18 DCE are specified in Appendix II.

Further background information on text telephony and the user requirements behind it can be found in the bibliography, clause 7.

5.1 Automoding originating

The following procedures assume that the DCE has been placed in the V.18 mode and that the called party is expected to be equipped with a text telephone. The procedure is defined below, and represented in Figure 1 as an aid to the reader.

5.1.1 After connecting to line, the DCE shall transmit no signal for 1 s, and then transmit V.18 identification signals starting with the CI signal as specified in this Recommendation with the ON/OFF cadence defined in clause 3. After three CI signals have been sent, the DCE shall transmit 2 s of silence followed by signal XCI. This cycle shall be repeated until terminated by one of the events described below. In summary, the transmission sequence is as follows:

Silence	1 s
CI	400 ms
Silence	2 s
CI	400 ms
Silence	2 s
CI	400 ms
Silence	2 s
XCI	3 s
Silence	1 s
CI	400 ms
Silence	2 s
etc.	

The DCE shall condition its receiver to detect the following signals:

- 2100 Hz modulated (ANSam) as defined in ITU-T V.8;
- 2100 Hz (ANS) as defined in ITU-T V.25;
- 2225 Hz;
- 1300 Hz;
- 1650 Hz;
- 1400 or 1800 Hz;
- DTMF tones;
- 980 or 1180 Hz (Note);
- 1270 Hz;
- 390 Hz (only when sending XCI).

NOTE – Care should be taken in the design of 980 and 1180 Hz detectors to prevent incorrect triggering by echoes of transmitted CI signals.

If any of the above signals are detected, the DCE shall stop transmitting. No disconnect timers shall be started.

During the transmission of the XCI signal, the DCE shall be conditioned to detect a 390 Hz signal. The detection of 390 Hz shall be disabled at other times during the above sequence.

5.1.2 If modulated 2100 Hz ANSam is detected, the V.8 connection procedures should be followed as explained in clause 6.

5.1.3 If ANS is detected, the DCE shall stop transmitting, transmit no signal for 0.5 s, and then initiate the transmission of signal TXP in V.21(1) mode. The DCE shall then monitor for 1650 Hz, 1850 Hz, 1300 Hz and loss of ANS.

5.1.3.1 When the DCE detects the absence of ANS, it shall stop transmission of signal TXP after completion of the current TXP sequence and continue to monitor for 1650 Hz and 1300 Hz.

5.1.3.2 If the DCE detects TXP in 1650 Hz/1850 Hz, it shall connect as V.18, i.e. ITU-T V.21 with the operational characteristics given in clause 4. See Annex G.

5.1.3.3 If the DCE detects 1650 Hz for ≥ 0.5 s, it shall connect as per Annex F.

5.1.3.4 If the DCE detects 1300 Hz **only** for 1.7 s, it shall connect as per Annex E, transmitting on the 75 bit/s channel.

5.1.4 If the DCE detects 2225 Hz for 0.5 s, it shall connect as per Annex D.

5.1.5 If 1650 Hz is detected for 0.5 s, the DCE shall connect as per Annex F.

5.1.6 If 1300 Hz is detected for 1.7 s, the DCE shall connect as per Annex E, transmitting on the 75 bit/s channel.

5.1.7 If 390 Hz is received during transmission of XCI and is present during the last mark period of XCI, the mark transmission shall be extended until either 3 s of 390 Hz has been detected or the 390 Hz signal ceases. If 390 Hz was detected for 3 s, the DCE shall initiate a connection as per Annex E, transmitting on the 1200 bit/s channel.

5.1.8 If a sequence of 1400 Hz or 1800 Hz FSK signals (i.e. valid 5-bit characters) are detected, the DCE shall analyse the bit duration and connect in the appropriate signalling rate as per Annex A.

5.1.9 If Dual Tone Multi-Frequency (DTMF) signals are detected, the DCE shall connect in the DTMF mode using the character conversion and the operational characteristics specified in Annex B.

5.1.10 If 980 Hz or 1180 Hz signals are detected, the DCE shall start a 2-s timer (T_r) and attempt to determine the data signalling rate of the sequence.

5.1.10.1 If the data signalling rate is 110 bit/s, the DCE shall connect as per Annex C.

5.1.10.2 If 980 Hz only is detected for 1.5 s, the DCE shall connect as per Annex F in answer mode.

5.1.10.3 If the signal ceases for 0.4 s or timer T_r expires, the DCE shall return to monitoring, as specified in 5.1.1.

5.1.11 If 1270 Hz is detected for 0.7 s, the DCE shall connect as per Annex D in answer mode.

5.2 Automoding answering

5.2.1 When in the answer mode, the DCE shall connect to the line and condition its receiver to detect:

- V.23 high-band signals;
- 1300 Hz;
- 1400 Hz or 1800 Hz;
- DTMF tones;
- 980 Hz or 1180 Hz;
- signal CI;
- 2100 Hz;
- Modulated 2100 Hz according to ANSam specification in ITU-T V.8;
- 1270 Hz;
- 2225 Hz;
- 1650 Hz.

The 3-s timer Ta shall be started. No disconnect timers shall be started. The procedures are defined below, and are provided in Figures 2a and 2b as an aid to the reader.

5.2.2 If signal CI coded for text telephone is detected, or XCI marker in signal XCI (as described in 3.13) is detected, the DCE shall initiate transmission of answer tone, ANSam, as defined in ITU-T V.8, monitor for signals CM and TXP and start a 3-s timer (Tt).

5.2.2.1 If V.8 signal CM is detected, the V.8 procedures shall be entered to determine which call function and modulation to use. See clause 6 and Annex G.

5.2.2.2 If signal TXP is detected, the DCE shall transmit no signal for 75 ± 5 ms, transmit 3 TXP sequences in V.21(2) mode, and then proceed as V.18 (i.e. ITU-T V.21 with the operational requirements specified in clause 4). See Annex G.

5.2.2.3 If Tt expires, the DCE shall return to monitoring, as specified in 5.2.1.

5.2.3 If 2100 Hz is detected for 0.7 s, the DCE shall continue to monitor for 980 Hz, 1300 Hz or 1650 Hz.

5.2.3.1 If 980 Hz is detected for 0.4 s, the DCE shall connect as per Annex F in answer mode.

5.2.3.2 If 1300 Hz is detected for 1.7 s, the DCE shall connect as per Annex E, transmitting on the 75 bit/s channel.

5.2.3.3 If 1650 Hz is detected for 0.4 s, the DCE shall connect as per Annex F in the calling mode.

5.2.4 If 980 Hz is detected, the DCE shall start a 2.7-s timer Te and monitor for 1650 Hz, 980 Hz and 1180 Hz.

5.2.4.1 If 1650 Hz is detected for 0.4 s, the DCE shall connect as per Annex F in the calling mode.

5.2.4.2 If a V.25 calling tone consisting of 980 Hz **only** for more than 470 ms but less than 730 ms is detected and followed by 1 s of silence, the DCE shall enter probing state as specified in 5.2.12.

5.2.4.3 If 980 Hz only is detected for 1.5 s, the DCE shall connect as per Annex F in answer mode.

5.2.4.4 If a low-channel V.21-modulated signal is detected, the DCE shall start a 2-s timer (Tr) and attempt to determine the data signalling rate of the data sequence.

5.2.4.4.1 If the data signalling rate is 110 bit/s, the DCE shall connect as per Annex C.

5.2.4.4.2 If the data signalling rate is 300 bit/s and it is neither CI nor TXP, the DCE shall connect as per Annex F.

5.2.4.4.3 If timer Tr expires, the DCE shall return to monitoring as specified in 5.2.1.

5.2.4.5 If timer Te expires, the DCE shall return to monitoring as specified in 5.2.1.

5.2.4.6 If CI is detected, the DCE shall continue the connection procedure according to the V.18 mode as detailed in 5.2.2, 5.2.2.1, 5.2.2.2 and 5.2.2.3 above.

5.2.5 If a sequence of 1400 Hz and 1800 Hz FSK signals (i.e. valid 5-bit characters) are detected, the DCE shall analyse the bit duration and connect in the appropriate signalling rate as per Annex A.

5.2.6 If Dual Tone Multi-Frequency (DTMF) signals are detected, the DCE shall connect in the DTMF mode using the character conversion and the operational characteristics specified in Annex B.

5.2.7 If 1270 Hz is detected for 0.7 s, the DCE shall connect as per Annex D in answer mode.

5.2.8 If 2225 Hz is detected for 1 s, the DCE shall connect as per Annex D in the calling mode.

5.2.9 If 1650 Hz is detected for 0.4 s, the DCE shall connect as per Annex F in the calling mode.

5.2.10 If 1300 Hz is detected for more than 470 ms but less than 730 ms followed by 1 s of silence, the DCE shall immediately enter the probing state specified in 5.2.12.

5.2.11 If 1300 Hz only (i.e. no XCI) is detected for 1.7 s, then the DCE shall connect as per Annex E, transmitting on the 75 bit/s channel. If XCI is detected, the DCE shall proceed as described in 5.2.2.

5.2.12 If timer Ta expires, the DCE shall enter the probing state, starting by sending ANSam, and then sending signals intended to stimulate the calling text telephone or its user to respond. The DCE shall select a mode to probe in and proceed as described in either 5.2.12.1 or 5.2.12.2 depending on the most likely scenario preset by the user (see Appendix I).

5.2.12.1 When probing in the modes specified in Annexes A or B or C, the DCE shall transmit a buffered message in the selected mode and start variable timer Tm (default 3 s) to allow for a response from the caller. The DCE shall monitor for all the signals specified in 5.2.1.

The DCE shall have a stored, user-changeable, default buffered message (e.g. V.18 pls type). Although the primary use of this stored message is to stimulate a response from a carrierless text telephone, it may also be optionally sent after a connection is established with a continuous carrier-based text telephone.

5.2.12.1.1 If any valid signal as defined in 5.2.1 is detected, the DCE shall act according to the specification in 5.2.2 to 5.2.11 and 5.2.13 with the exception that if no connection has been made within 20 s, the probing sequence shall be continued from where it was interrupted by the signal detection.

5.2.12.1.2 If timer Tm expires and no response is received, the DCE shall proceed to the next appropriate probe (e.g. next carrier mode, or next carrierless mode). If the probe list is exhausted, start again from the beginning of the appropriate list.

5.2.12.2 When probing in the modes specified in Annexes D or E or F, the DCE shall transmit ANSam with preference for the type with phase reversals, for 1 s, then remain silent for 75 ± 5 ms and then transmit, for the duration of variable timer Tc (default 6 s) depending on the mode, 1300 Hz carrier, 1650 Hz or 2225 Hz. The DCE shall monitor for all appropriate signals while transmitting one of the above carriers. When 1300 Hz is transmitted, the DCE shall also monitor for 390 Hz.

5.2.12.2.1 If 390 Hz is detected for 3 s while 1300 Hz is being sent, the DCE shall connect as per Annex E, transmitting on the 1200 bit/s channel.

5.2.12.2.2 When any other valid signal as defined in 5.2.1 is detected, the DCE shall act according to the specification in 5.2.2 to 5.2.11 with the exception that if a connect attempt from 5.2.12.2.1 or from this clause has not succeeded within 4 s, the probing sequence shall be continued where it was interrupted by the signal detection.

5.2.12.2.3 If timer Tc expires, the DCE shall proceed to the next appropriate probe (e.g. next carrier mode or next carrierless mode). If the probe list is exhausted, start again from the beginning of the appropriate list.

5.2.12.3 If V.8 signal CM is detected, the V.8 procedures are entered to determine which call function and modulation to use. See clause 6 and Annex G.

5.2.13 If V.8 signal ANSam is detected, the V.8 procedures shall be entered, in calling mode, as explained in clause 6 and Annex G.

5.3 Automodging monitor mode

An automodging monitor mode shall be implemented for the purpose of detection of text telephone connection attempts from voice mode and for use in automatic voice/text answering systems.

The function of this mode is identical to the automodging answering mode as specified in 5.2, except that the timer Ta is not set and 5.2.4.2 and 5.2.10 shall not result in entering the probing state. Instead, if either of the conditions in 5.2.4.2 or 5.2.10 is detected, this shall be reported to the DTE as a V.25 calling tone.

When operating in automode monitor mode it may be desirable to handle the line interface so that parallel use for voice is enabled.

When operating in automode monitor mode, precautions must be taken not to enter textphone mode on indications of DTMF signals on the line that may occur during voice mode from other applications than text telephony.

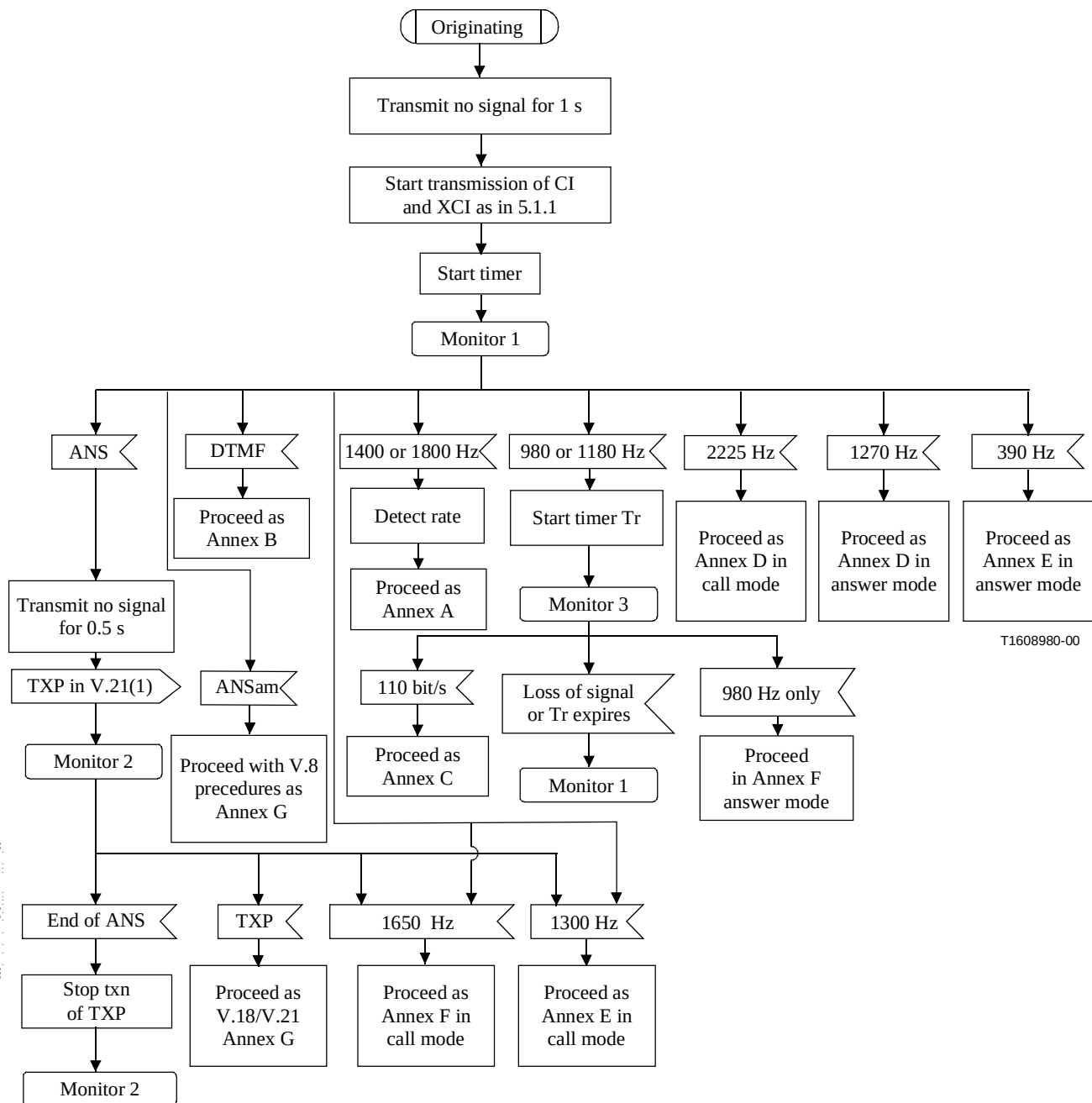


Figure 1/V.18 – Start-up procedure in the originating V.18 DCE with automoding to existing types of text telephone without use of ITU-T V.8 bis

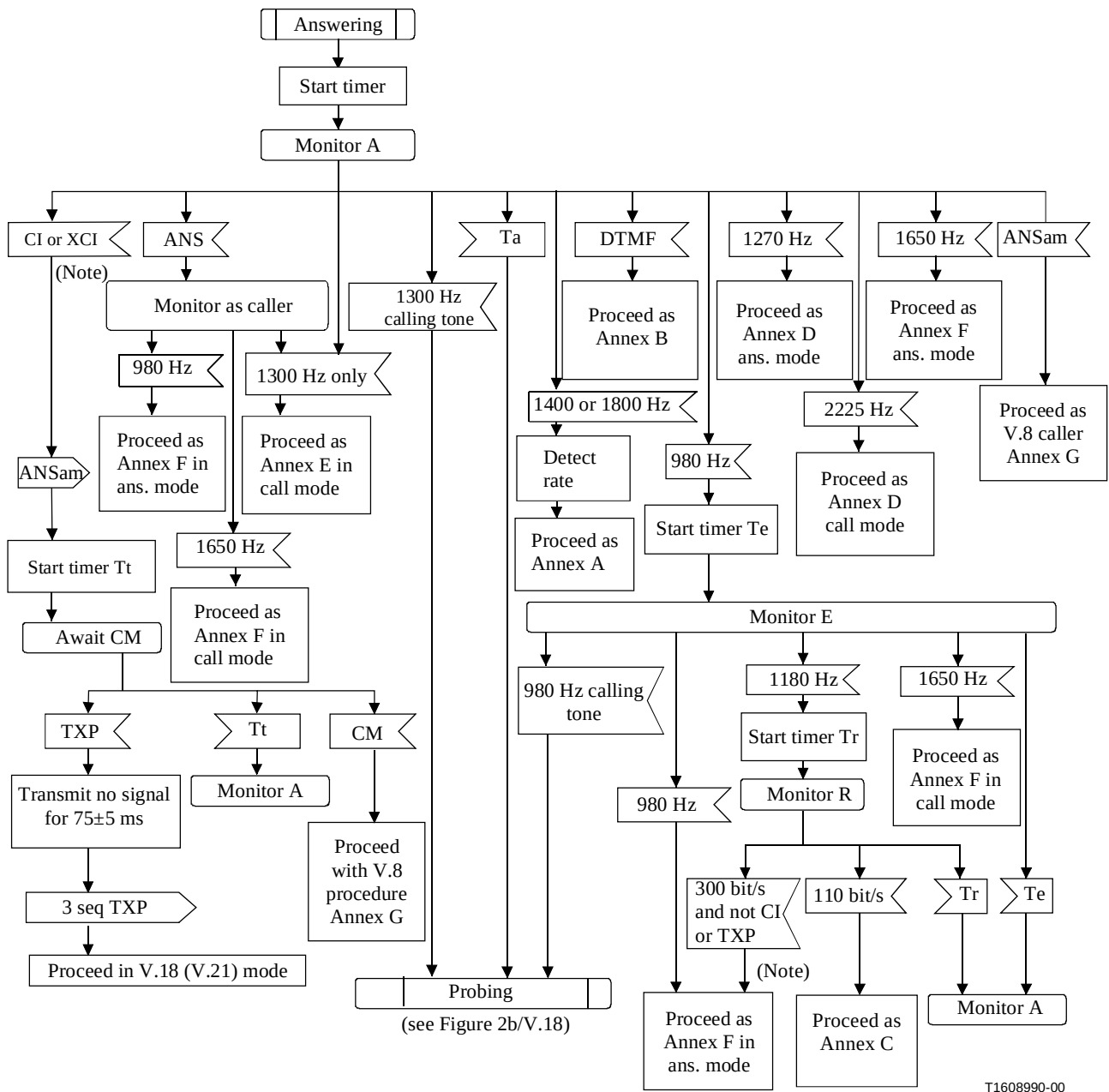


Figure 2a/V.18 – Start-up procedure in the answering V.18 DCE showing automoding without use of V.8 bis procedures

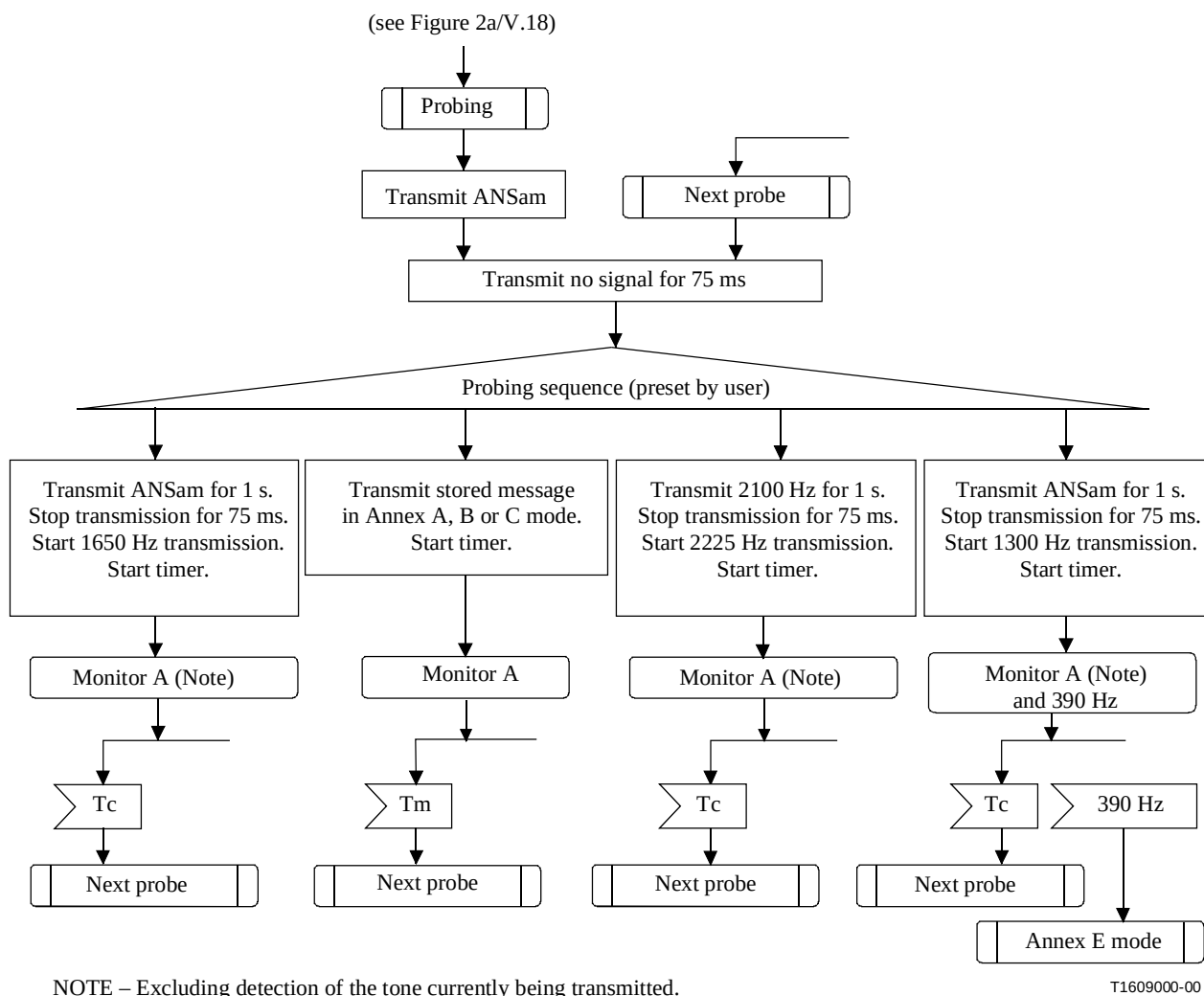


Figure 2b/V.18 – Automode probing

6 Connection in text telephone mode with V.8 and V.8 bis procedures

The procedures in this clause are used when both DCEs have capability to perform a V.8 or V.8 *bis* negotiation. Negotiation on the reason for the call and modulation to use in the call can be performed. This enables possibilities to select optional modes of operation.

6.1 V.8 procedures

For connection in V.18 mode, using the V.8 procedures, the "textphone" call type and V.21 modulation shall always be offered. Other valid modulations may also be offered.

If the V.8 procedure results in an agreement to start a textphone session, then the connection shall proceed as V.18 with modulation selected in the V.8 procedure and the operational requirements specified in Annex G.

6.1.1 Originate mode

In originate mode, CI and XCI should be transmitted and detection of ANSam, ANS and text telephone signals should be enabled.

If ANSam is received, a CM signal should be transmitted according to the V.8 procedure and the connection procedure according to V.8 should be completed. If the text telephone function selection

is completed, the selected modulation should be started and V.18 text telephone presentation protocol T.140 invoked as specified in Annex G.

If ANS is received, the TXP signal exchange is followed.

If other text telephone signals are detected, the V.18 procedures should be followed to enter a suitable mode.

6.1.2 Answer mode

In answer mode, detection of a CI with any call function or a XCI should cause ANSam to be sent.

If CM is received, the V.8 procedures should be followed to select a common call function and mode. If the selected call function is "textphone", the selected modulation should be started and V.18 text telephone presentation protocol T.140 invoked and the procedures of Annex G applied.

If "txp" is received, the original "txp" signal exchange is continued that normally ends in V.18 mode, V.21 modulation and T.140 presentation protocol as specified in Annex G.

If another text telephone signal is detected, the V.18 procedures should be followed to enter a suitable mode.

If no signal is detected within 3 seconds, the V.18 probing procedures should be initiated, still monitoring for V.8 signals.

6.1.3 V.8 procedure initiated by the answering terminal

If the V.8 sequence is started with ANSam by a DCE with the intention to start the textphone mode, the calling DCE has no indication on the purpose of the call, and may select to indicate another, unacceptable, call type in CM.

The answering DCE may then indicate the call type "textphone" in JM. The calling DCE can accept this mode by starting the DCE in the mode indicated in JM or deny it by not responding.

6.1.4 Enter text mode from voice

If the DCE is activated during a call without evident association to calling or answering, a 7-second timer should be started and the V.18 originating procedures described in 6.1.1 above should be initiated. If no text telephone signal and no V.8 signal is detected during this time, the V.18 modem should revert to answer mode as described in 6.1.2.

NOTE – This clause is intended to address the transfer from voice mode to text. The procedure implies a small risk of connecting in one of the compatibility modes between two V.18 capable devices. The V.8 *bis* procedures should be preferred for entering text telephone mode during a voice call.

6.2 Simultaneous voice and text telephony (SVT)

The capability for Simultaneous Voice and Data (SVD) provided by ITU-T H.324, V.61 and V.70 can be used to support expanded modes of text telephony without the need for any special modifications. When this capability is added to a device that supports the provisions of clauses 4 and 5, the device shall be considered a V.18 multi-mode text telephone device. In this case, V.8 *bis* procedures should be used, for the exchange and negotiation of capabilities as well as to provide the means for switching between supported text telephone modes and between text telephone mode and voice.

When Simultaneous Voice and Data (SVD) capability is included, in a V.18 text telephone, connections with functionality suitable for deaf, hearing-impaired, speech-impaired and hearing people are facilitated. In these cases, after the SVD capability is established, text and voice can be used simultaneously in any combination as required by the users.

NOTE – The audio channel provided by SVD DCEs (e.g. V.61, H.324) can, in many cases, support V.18 text telephony. In this case, the V.18 devices could be connected to the audio input of such devices and the text