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Title: **On using V.80 in 3G-324M terminals**

Document for: **Discussion**

Agenda Item: **12.3**

1) Introduction

This document presents rationale for using the ITU-T V.80 standard for the DTE-DCE interface when a 3G-324M multimedia terminal is implemented as a separate multimedia application connected to a mobile phone which acts as a "modem".

It is proposed to include a recommendation to this effect in the 3G-324M implementors guide. It is also proposed that 3GPP send a request to ITU-T to study extending the capabilities of V.80 to support higher bit-rates.

2) Background

Many practical video telephony connections are provided using two separate devices in a DTE-DCE configuration where the video application runs in an external DTE (e.g., laptop computer) which is connected to a mobile phone DCE through a standard interface, e.g. an RS-232 port. In this scenario it could be quite common that the two devices are made by different manufacturers and a standardized interface is needed between them. This is the case today for H.324 video telephony PC software and PSTN modems.

In such a DTE-DCE configuration it is essential to be able to transfer control information between the video application and the 'modem', i.e. the DCE. One important aspect of this control information is regulation of the traffic across the interface. This could be thought of as 'flow control fine tuning' through which the video application may adapt its transmission rates quickly and even for relatively short periods of time.

It is also essential that a mechanism for adapting the inherently synchronous video data into an asynchronous format is provided when the DTE-DCE interface is asynchronous.

Both of these features are provided by ITU-T Recommendation V.80: In-band DCE control and synchronous data modes for asynchronous DTE. The V.80 protocol is applied between the DTE and DCE and it does not affect the data stream between the DCEs.

This configurations is shown in Figure 1 below.

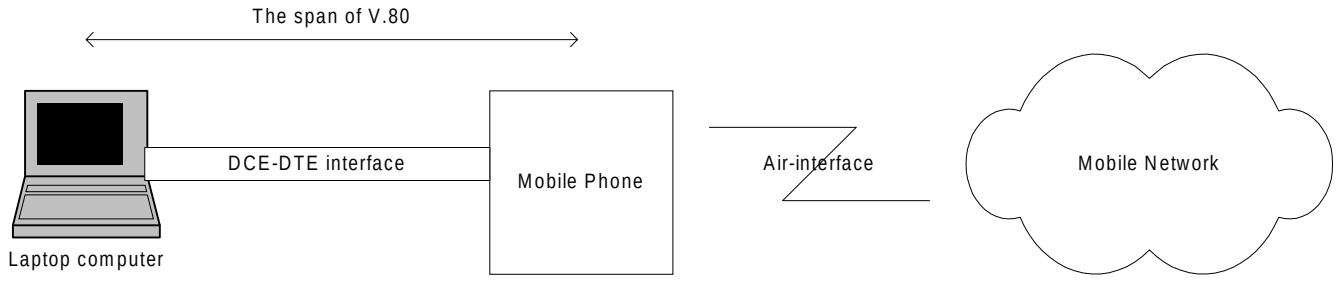

Figure 1: Video telephony configuration with separate DTE-DCE devices.

3) V80 Submodes And General Operating Principles

V80 specifies three operating modes: synchronous mode, frame tunneling mode, and synchronous access mode (SAM). The SAM mode includes support for multimedia services, e.g. ITU-T Recommendation H.324.

The synchronous access mode includes two submodes: namely, transparent and framed modes. The basic difference between these modes is that in the transparent mode the DCE performs only async/sync conversion without modifying the data stream in any other way, whereas in the framed mode the DCE also performs HDLC framing.

The submode used between the DTE and DCE at the responding end of a connection may be different from the one used at the originating end. The used submode can be changed during a call.

In both modes the DCE searches the data stream from the DTE for inband V.80 commands which are separated from the user data by so-called <EM> flags. In the other direction the DCE encodes and inserts the necessary inband commands into the data stream it forwards towards the DTE.

In the transmit direction the DCE removes start and stop bits from the DTE-originated bitstream, translates commands received from the DTE, and transmits the resulting synchronous bit sequence on the line. No other bit processing is done to the data in the transparent submode.

In the receive direction, the precise operation of the DCE depends on the setting of parameters given in the V.80 specific AT-command AT+ESA. But generally it can be said that the DCE partitions the received data into octets and appends start and stop bits. The DCE also EM-shields certain octets and inserts possible inband commands into the data stream forwarded towards the DTE.

In the framed submode the async/sync procedures are applied just as in the transparent mode. Additionally the DCE performs HDLC framing and zero-insertion bit transparency procedures (ISO/IEC 3309) for the DCE-DCE data. The operation of the DCE is controlled by whether or not HDLC frames are correctly received from the remote DCE.

The need for the V.80 inband commands comes from the fact that the optimal operation of a video application requires that the DCE provides the application with information on the connection data rate, how the current video output data stream is handled by the DCE's encoding process (especially the status of DCE buffers is relevant here), and, in the framed submode, on whether the HDLC frames from the remote DCE are correctly received. Commands sent from the video application towards the DCE include requests for synchronous access mode submode transitions and for other connection configuration changes. This information is particular to multimedia terminal operation and cannot be provided through standard PC interface signalling.

4) Proposal 1

In order to support 3G-324M terminal implementation configurations with separate DTE-DCE, it is proposed that the following text will be included in TR 26.911 in Section 14 "Other recommendations"

14.1 Non-integrated terminal implementations with separate DTE and DCE devices

In some cases the 3G-324M terminal may be implemented in two separate parts where the video application runs on a DTE device (e.g., laptop computer) and a 3G mobile phone is used as a DCE device. To facilitate the implementation of independent interoperable DTE and DCE devices for 3G-324M it is recommended that the ITU-T V.80 [x] protocol is used in the DTE-DCE interface.

5) New V.80 Data Rates for 3G-324M Use

V.80 has been widely adopted by multimedia applications based on ITU-T Recommendation H.324. The support for PSTN H.324 has specifically been taken into account in one V.80 operating mode. In this so-called Synchronous Access Mode the information provided to the multimedia application by the DCE includes — among other things — indications and updates on connection data rate and on how the current multimedia output data stream is handled by the DCE's encoding process. This information enables the multimedia application to optimise its output data rate to keep the data stream as smooth as possible.

V.80 was originally specified for use in PSTN modem configurations and thus the connection rates that can be indicated to the multimedia application using V.80 inband messaging between the DCE and DTE have been specified only up to 33 600 bit/s. Considering that V.80 can be directly adopted also into wireless environments and that the connection data rates achievable in 3G systems can be significantly higher than 33 600 bit/s, it is proposed that ITU-T Study Group 16 be approached with a request to update the connection rate set currently supported by Recommendation V.80.

It is recommended that at least rates 32, 56, 64, 128, 144, 256, and 384 kbit/s should be considered when updating the rates in Table 10 of V.80: Synchronous Access Mode Command/Indication Bit Rate Values. Annex 1 includes a possible updated table.

6) Proposal 2

It is proposed that a liaison is sent to ITU-T Question 7/16 to ask for V.80 support for higher bit rates.

ANNEX 1

Table 1. Updated form of Table 10 of ITU-T Recommendation V.80.

Symbol	Hex code	Duplex or primary channel data signalling rate
<p12>	20h	1200 bit/s
<p24>	21h	2400 bit/s
<p48>	22h	4800 bit/s
<p72>	23h	7200 bit/s
<p96>	24h	9600 bit/s
<p120>	25h	12 000 bit/s
<p144>	26h	14 400 bit/s
<p168>	27h	16 800 bit/s
<p192>	28h	19 200 bit/s
<p216>	29h	21 600 bit/s
<p240>	2Ah	24 000 bit/s
<p264>	2Bh	26 400 bit/s
<p288>	2Ch	28 800 bit/s
<p312>	2Dh	31 200 bit/s
<p336>	2Eh	33 600 bit/s
<p320>	**2Fh**	**32 000 bit/s**
<p560>	**31h**	**56 000 bit/s**
<p640>	**32h**	**64 000 bit/s**
<p1280>	**33h**	**128 000 bit/s**
<p2560>	**34h**	**256 000 bit/s**
<p3840>	**35h**	**384 000 bit/s**