International Telecommunication Union

# ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

# V.152

**Amendment 1**

(03/2009)

SERIES V: DATA COMMUNICATION OVER THE TELEPHONE NETWORK

Interworking with other networks

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## Procedures for supporting voice-band data over IP networks

## Amendment 1: New Annex B – Use of data signal detection and silence insertion in voiceband data, and new Annex C on use of V.21 preamble for echo canceller control in a V.152 gateway

Recommendation ITU-T V.152 (2005) – Amendment 1

ITU-T V-SERIES RECOMMENDATIONS

**DATA COMMUNICATION OVER THE TELEPHONE NETWORK**

| | |
|---|---|
| General | V.1–V.9 |
| Interfaces and voiceband modems | V.10–V.34 |
| Wideband modems | V.35–V.39 |
| Error control | V.40–V.49 |
| Transmission quality and maintenance | V.50–V.59 |
| Simultaneous transmission of data and other signals | V.60–V.99 |
| **Interworking with other networks** | **V.100–V.199** |
| Interface layer specifications for data communication | V.200–V.249 |
| Control procedures | V.250–V.299 |
| Modems on digital circuits | V.300–V.399 |

*For further details, please refer to the list of ITU-T Recommendations.*

# Recommendation ITU-T V.152

## Procedures for supporting voice-band data over IP networks

## Amendment 1

## New Annex B – Use of data signal detection and silence insertion in voiceband data, and new Annex C on use of V.21 preamble for echo canceller control in a V.152 gateway


**Summary**

Annex B to Recommendation ITU-T V.152 defines a method that uses data signal detection and silence insertion in voiceband data that adds a means of providing bandwidth savings during transmission.

Annex C to Recommendation ITU-T V.152 addresses a problem discovered during the implementation of V.152 gateways with the transmission of facsimile terminals. While this issue has been resolved by an amendment to Recommendation ITU-T T.30, due to the extremely large numbers of terminals deployed in the field and the low probability that they would be corrected retroactively, it was considered pre-emptive to include a solution in a V.152 media gateway.



**Source**

Amendment 1 to Recommendation ITU-T V.152 (2005) was approved on 16 March 2009 by ITU-T Study Group 16 (2009-2012) under Recommendation ITU-T A.8 procedures.

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## CONTENTS

# Recommendation ITU-T V.152

## Procedures for supporting voice-band data over IP networks

## Annex B

## Use of data signal detection and silence insertion in voiceband data

(This annex forms on integral part of this Recommendation)

### B.1 Introduction

Data signal detector (DSD) and silence insertion in VBD mode is a technique that reduces the transmission bandwidth over IP networks by inserting silence indicator descriptors during the silence periods of a voiceband data modem connection. This is especially efficient for half-duplex data transmissions. This annex provides guidance on DSD and silence insertion for gateways compliant to this Recommendation.

### B.2 Guideline for use of DSD

When in the VBD state, a data signal detector (DSD) monitors and analyses the voiceband analogue input signals. The data signal detector categorizes the analysed signal to be either a correct voiceband modem signal or silence. The means of determining this signal categorization is implementation specific and this Recommendation does not describe any particular method in detail. However, an example is: once in the VBD state, a gateway may monitor the signal energy level (this is the same signal as used for driving Recommendation ITU-T V.24 Circuit 109) and use that for determining the presence of silence. In this instance, echo levels must be accounted for in the analysis process.

Most modem procedures include a short silence between different training and data mode phases. These vary from 70 ± 5 ms for Recommendation ITU-T T.30, to 75 ± 5 ms for high speed duplex data modems. In these instances, it is important to maintain the fidelity of these short silence periods. A DSD detector shall use a silence validation time greater than 80 ms.

Upon the qualified detection of silence, the gateway transmits a silence insertion description (SID) frame to inform the peer gateway of the beginning of the silence period. The SID frame format shall be that specified for use with the selected VBD codec. For example if G.711 is the codec being used, then the SID format shall comply with Appendix II of Recommendation ITU-T G.711.

In the SID frame, the level field is set to zero and the N1~Nm fields are set to zero. Only an initial SID frame needs to be transmitted per silence period.

The receiving gateway upon receiving a SID frame or packet shall play out the SID frame zero level data as silence. The level of the transmitted analogue silence shall be less than –55 dBm. The receiving gateway shall continue to play out silence until it receives a valid VBD data packet.

To ensure that the signal can be detected at the receiver side, the maximum response time for a DSD detector to detect the silence to data transition should less than 1.5 ms. The transmitting gateway shall detect the presence of a voiceband signal and transmit a valid VBD packet without delay.

## B.3 Negotiation of the DSD capability with SDP

Gateways shall mutually negotiate the capability of DSD. Clause 7.1 of Recommendation ITU-T V.152 explains the detailed procedure for negotiation using SDP. The DSD negotiation shall comply with the procedures described in clause 7.1, and use two a-line attributes to indicate support of DSD capability.

If VBD MGW supports DSD capability, the SDP attribute should indicate:

```
m=audio 3456 RTP/AVP 0 18 98 99
a=rtpmap:98 PCMA/8000
a=gpmd:98 vbd=yes
a=rtpmap:99 CN/8000
a=gpmd:99 dsd=yes
```

"a=gpmd:99 dsd=yes" indicates that the device supports the DSD capability; "a=rtpmap:99 CN/8000" shows that the device sends SID frame with payload type 99. If mutually negotiated, both gateways can use the DSD procedures described in this annex.

If a VBD MGW does not support DSD capability, the SDP attribute should indicate:

```
m=audio 3456 RTP/AVP 0 18 98 99
a=rtpmap:98 PCMA/8000
a=gpmd:98 vbd=yes
a=rtpmap:99 CN/8000
a=gpmd:99 dsd=no
```

"a=gpmd:99 dsd=no" indicates that the device does not support or does not want to use DSD.

To maintain compatibility with gateways using a previous version of V.152 that would not support DSD capability, the absence of the gpmd attribute for DSD is interpreted to be the same as "dsd=no" capability.

## B.4 Negotiation of the DSD capability with H.245

Clause 7.2 of Recommendation ITU-T V.152 explains the use of VBD in H.323 systems. H.323 systems support V.152 through the use of the **VBDCapability** capability defined in Recommendation ITU-T H.245. This capability, which is a type of **AudioCapability**, is used during capability exchange and in the open logical channel (OLC) signalling to indicate support for VBD channels and to signal the opening of those channels. An extension to the **VBDCapability** is needed to indicate the DSD capability.

```
VBDCapability                          ::=SEQUENCE
{
      type                             AudioCapability,    -- shall not be "vbd"
      dsd                              BOOLEAN
      ...
}
```

If VBD MGW supports DSD capability, the dsd attribute should indicate "TRUE". If a VBD MGW does not support the DSD capability, the dsd attribute should indicate "FALSE". The absence of the dsd attribute for DSD is interpreted as no support for the DSD capability.

# Annex C

## Use of V.21 preamble for echo canceller control in a V.152 gateway

(This annex forms an integral part of this Recommendation)

For the scenario where a V.34 facsimile terminal is being called by a standard G3 facsimile terminal, the procedures defined in Recommendation ITU-T T.30 stipulate that the connection proceed as a standard G3 facsimile. Also, Recommendation ITU-T T.30 recommends that the V.34 facsimile terminal should transmit a V.8 answer tone with phase reversals, thereby tone disabling any gateway echo cancellers in the connection. In this situation, the gateway echo cancellers will be left in the disabled state when proceeding into T.30 standard G3 modes. This has a direct impact upon the performance of standard G3 facsimile terminals as described in Recommendations ITU-T G.168 and G.161, which require that echo cancellers be in their initial cancelling state in order to provide the best conditions for a facsimile transmission.

Recommendation ITU-T T.30 (2006) was updated to correct this situation and defines how the T.30 procedures will allow for the re-enabling of echo cancellers to their initial cancelling state. However, this particular scenario remains an issue to be considered as there are many millions of facsimile terminals that do not support the 2006 version of T.30.

This annex describes a method that may be used to rectify this condition in gateways compliant to this Recommendation. This method consists in using the detected presence of the V.21High Channel HDLC encoded FLAG preamble as defined in Recommendation ITU-T T.30 to initiate a transition from the tone disabled state back to the initial cancelling state. Once the echo canceller has returned to its initial state, the standard G3 facsimile procedure will operate as intended. (See Figure C.1)

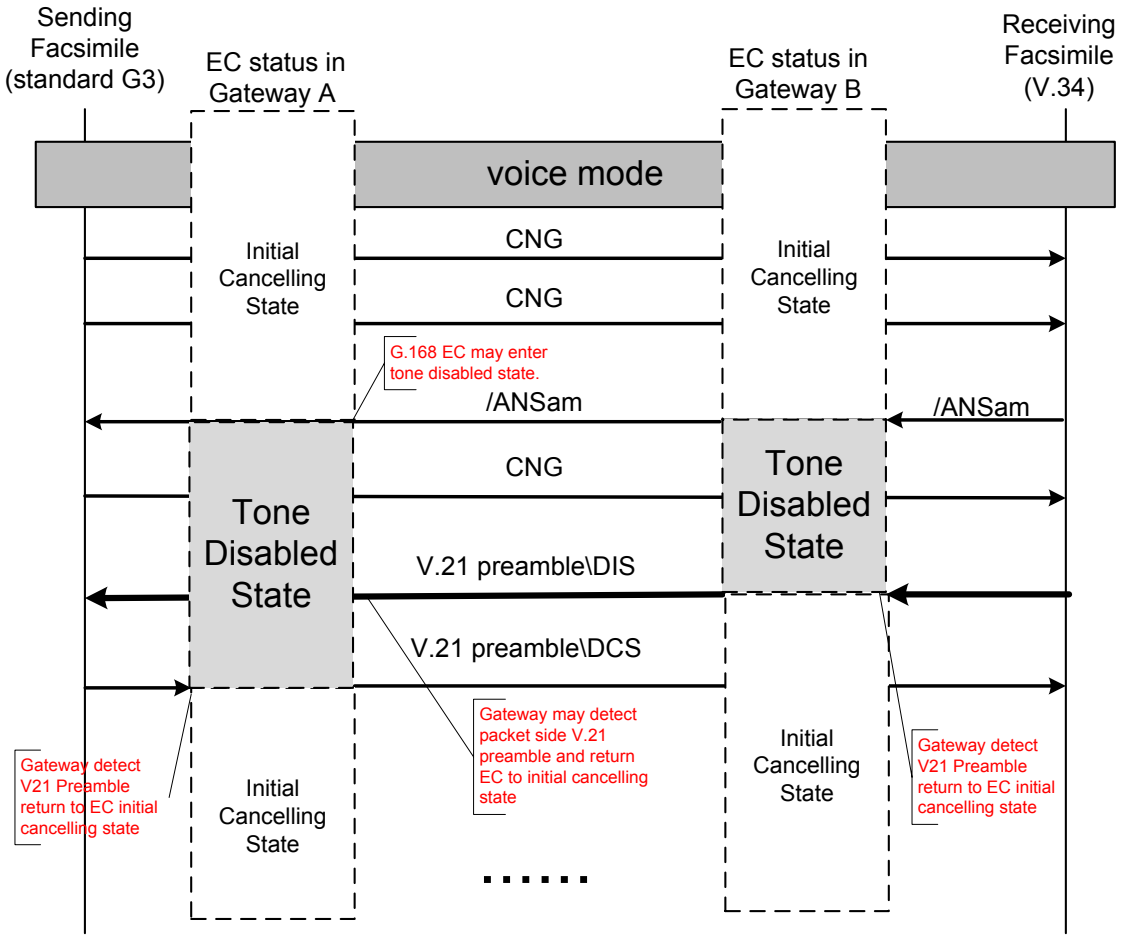


**Figure C.1 – Fax procedure and echo canceller status after enabling by V.21 preamble**

### Gateway to echo canceller signalling

This procedure is only valid for media gateways compliant to this Recommendation. Note that in this application echo cancellers may be embedded within the media gateway or be external to it. The signalling of the gateway to the echo canceller can be via proprietary means, if it is an embedded type in the gateway, or by some standardized means, if connected to an external echo canceller. The means definition of external echo canceller control is for further study.

## SERIES OF ITU-T RECOMMENDATIONS

| | |
|---|---|
| Series A | Organization of the work of ITU-T |
| Series D | General tariff principles |
| Series E | Overall network operation, telephone service, service operation and human factors |
| Series F | Non-telephone telecommunication services |
| Series G | Transmission systems and media, digital systems and networks |
| Series H | Audiovisual and multimedia systems |
| Series I | Integrated services digital network |
| Series J | Cable networks and transmission of television, sound programme and other multimedia signals |
| Series K | Protection against interference |
| Series L | Construction, installation and protection of cables and other elements of outside plant |
| Series M | Telecommunication management, including TMN and network maintenance |
| Series N | Maintenance: international sound programme and television transmission circuits |
| Series O | Specifications of measuring equipment |
| Series P | Terminals and subjective and objective assessment methods |
| Series Q | Switching and signalling |
| Series R | Telegraph transmission |
| Series S | Telegraph services terminal equipment |
| Series T | Terminals for telematic services |
| Series U | Telegraph switching |
| **Series V** | **Data communication over the telephone network** |
| Series X | Data networks, open system communications and security |
| Series Y | Global information infrastructure, Internet protocol aspects and next-generation networks |
| Series Z | Languages and general software aspects for telecommunication systems |

Printed in Switzerland
Geneva, 2009