

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.767

Corrigendum 1
(05/2006)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Digital terminal equipments – Principal characteristics of
transcoder and digital multiplication equipment

Digital circuit multiplication equipment using
16 kbit/s LD-CELP, digital speech interpolation and
facsimile demodulation/remodulation

Corrigendum 1

ITU-T Recommendation G.767 (1998) – Corrigendum 1

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ITU-T Recommendation G.767

Digital circuit multiplication equipment using 16 kbit/s LD-CELP, digital speech interpolation and facsimile demodulation/remodulation

Corrigendum 1

Summary

This Recommendation specifies the elements of DCME using 16 kbit/s LD-CELP, Digital Speech Interpolation (DSI) and Facsimile Demodulation/Remodulation in order to achieve interworking of such equipment. It specifies extensions and deviations for ITU-T Recs G.763 and G.766 which specify a 32 kbit/s ADPCM DCME, and Facsimile Demodulation/Remodulation.

Corrigendum 1 corrects a number of defects identified in the base text which had been previously documented in Implementors' Guides.

Source

Corrigendum 1 to ITU-T Recommendation G.767 (1998) was approved on 29 May 2006 by ITU-T Study Group 16 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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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.

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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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ITU-T Recommendation G.767

Digital circuit multiplication equipment using 16 kbit/s LD-CELP, digital speech interpolation and facsimile demodulation/remodulation

Corrigendum 1

Modifications introduced by this corrigendum are shown in revision marks. Unchanged text is replaced by ellipsis (...). Some parts of unchanged texts (clause numbers, etc.) have been kept to indicate the correct insertion points.

...

1 Scope

This Recommendation specifies the elements of DCME using 16 kbit/s LD-CELP, Digital Speech Interpolation (DSI) and facsimile demodulation/remodulation (~~namely a 16 kbit/s DCME~~) in order to achieve interworking of such equipment. It is an extension to ITU-T Recs G.763 (Digital Circuit Multiplication Equipment Using 32 kbit/s ADPCM and Digital Speech Interpolation) and G.766 (Facsimile Demodulation/Remodulation for DCME), as it specifies only the deviations of the 16 kbit/s DCME from the G.763 32 kbit/s DCME.

...

5.1.1 Supported services

The 16 kbit/s DCME frame structure accommodates the following services:

- 8-bit channels to support 64 kbit/s transparent calls.
- 2-bit channels to support voice calls at LD-CELP 16 kbit/s, 12.8 kbit/s, 9.6 kbit/s according to ITU-T Rec. G.728 and its Annex H.
- 5-bit channels to support VBD calls at LD-CELP at 40 kbit/s according to ITU-T Rec. G.728 and its ~~draft~~ Annex J.
- 4-bit channels to support fax banks carrying demodulated fax calls similar to ITU-T Recs G.763 and G.766.
- 8-, 5-, 2-bit channels to support 64 kbit/s, 40 kbit/s, 16 kbit/s, 12.8 kbit/s and 9.6 kbit/s pre-assigned channels.

...

5.1.4 DCME multiframe

The IT related circuit supervision/alarm condition field of the asynchronous word supports up to 360 ITs, ~~from carried over~~ up to 12 primary rate interfaces. The G.767 DCME multiframe of 72 DCME frames is used to accommodate that.

...

6.1.1 Number of cliques

With LD-CELP, small cliques (compared to G.763 DCME) can support a fairly large amount of traffic. Therefore the maximum number of cliques (pools) carried on a single bearer in 16 kbit/s DCME is increased to 4. Each pool starts and ends on TS boundaries (and therefore occupies an integral number of time slots); a clique shall not be split across bearers.

6.1.2 Number of destinations

The maximum number of destinations is 4 including the cases of mixed operation between multi-clique and multi-destination modes.

~~6.1.3 Multiple outgoing bearers~~

~~Optionally, a 16 kbit/s DCME will support up to 4 outgoing bearers. A single bearer will be able to carry up to 4 cliques. A clique shall not be split across bearers.~~

6.2 Assignment Messages (AM)

...

6.4 Control Channel (CC)

A single AM control channel of the 16 kbit/s DCME occupies 4 bits every PCM frame, i.e., 2 QBs. The single AM control channel holds the synchronization word, an assignment message (IT and BC numbers and synchronous data word), the asynchronous data word and some error correction bits. When an additional assignment message in the same DCME frame is required (double AM), one additional QB supports it and the additional error correction bits.

6.5 BC numbering and the use of the bearer frame

...

6.5.2 5-bit (VBD optimized 40 kbit/s LD-CELP) BCs

The BC number in the assignment message indicates the BC which carries the first 2 bits (MSB, MSB – 1) of the 5-bit sample. The next higher BC carries the next 2 bits ((MSB – 2, MSB – 3) \equiv (LSB + 2, LSB + 1)). The 5th bit (LSB) is obtained from a different 4-bit bearer channel which is independently assigned as a Bit Bank~~bit bank~~; the procedure is as in 6.1.7/G.763. Also, similar~~Similarly~~ to ITU-T Rec. G.763, all 4-bit BCs (Data, FB or BB) occupy either the four MSBs or the four LSBs of a G.704 time slot. This implies that the BC number in the assignment message, for such BCs, is an odd number.

6.5.3 4-bit BCs (BB, FB)

16 kbit/s DCME fax banks and bit banks are used in the same manner as they are used in ITU-T Recs G.763/G.766. The BC number in the assignment message indicates the BC which carries the first 2 bits of the 4-bit sample. The next higher BC carries the remaining 2 bits~~2 more bits~~.

6.5.4 Normal range 2-bit BCs (LD-CELP voice)

...

7.2.2 Total number of assignment messages

The total number of assignment messages per transmit unit (see clause 6/G.763) ~~Tx-unit~~ is 5.

7.3 Control channel content

...

7.3.2.1 IT Identification word

The 9 bits of the IT identification word is used to identify the ITs. IT numbering is given in Table 1.

Table 1/G.767 – Numbers of ITs used in assignment messages

IT number	IT identification
...	
511	Ineffective CC message when all traffic is pre-assigned.
<u>all others</u>	<u>Reserved for future use</u>

7.3.2.2 BC identification word

...

~~9~~ **ABPS calculations**

~~For the purpose of DLC calculations and thresholds and performance statistic, given an ADPCM bit per sample measure, its equivalent LD-CELP measure is:~~

$$~~B_L = 0.4 \times (B_A + 1)~~$$

~~where B_L is the LD-CELP bit per sample measure and B_A is the ADPCM bit per sample measure. For example, the LD-CELP equivalent of an ADPCM ABPS of 3.7 bits/sample is $0.4 \times (3.7 + 1) = 1.88$ bits/sample.~~

~~10~~ **Channel check procedure**

...

~~11~~ **Facsimile demodulation/remodulation**

~~11.1~~ **General**

...

~~11.2~~ **Facsimile blocks, facsimile transport channels and fax banks**

...

~~11.3~~ **Facsimile data channel**

...

~~4~~**10.4** Facsimile control channel and forward error correction

...

The generator polynomial for BCH(63,51) is:

$$\underline{x^{12} + x^{10} + x^8 + x^5 + x^4 + x^3 + 1}$$

~~4~~**10.5** FCC location on the bearer

...

~~4~~**21** System statistics measurement

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