☐ problem to be solved before finalization of Recommendation

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CCITT SGXV
Working Party XV/1
Specialists Group on Coding for Visual Telephony

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Title: Maximum Frame Rate Specification According with the Number of Significant Blocks in each Frame

1.Introduction

Current 'maximum frame rate' is defined without regarding to the number of significant blocks in each frame (see sec. 1.1 of Annex 3 to Doc. #445R). Some TV CODEC, which adopts Software Architecture using DSP(s) and / or micro-processor(s), needs variable processing period approximately proportional to the number of significant blocks in each frame. If maximum frame rate is specified with relation to the amount of processing, eg the number of significant blocks in each Frame, Software Architecture TV CODEC will be easy to be implemented.

2.Compatibility between Coder and Decoder

An example of maintaining compatibility is shown as follows;

1)[Minimum Processing period / Significant Block (MPPSB in short)] is transmitted from a Receiver to a Transmitter by negotiation, and
2)The Transmitter counts the number of significant blocks in each Frame and sends dummy signals to ensure the Receiver's processing period.

3.Extra Dummy Bits

Though extra dummy bits are required to ensure the Receiver's processing period, the number of dummy bits is not so large for usual pictures, if [MPPSB] is defined reasonably. The reasons are as follows;

1)From the variable word length tables shown in #446, [minimum number of bits / significant block] is estimated to be only 5 (non zero DC coefficient plus all zero AC coefficients). $\frac{5}{64\,kb/s} = 78\,\mu s$ $3+2^{eoe}=5$

2)The 5 bits mentioned above corresponds to 75 micro second when transmission speed is 64kbps. Software Architecture TV CODEC used for as low bit rate as 64kbps should be designed so that each significant block can be processed within 75 micro second.

3)RM5 simulation results (CLAIRE, MISS AMERICA, SALESMAN, SWING) show that each significant block is coded with 20 or 30 bits on average. This corresponds to 300 or 450 micro second when transmission speed is 64kbps. Then, if [MPPSB] is "150 micro second" for example, no extra dummy bits are needed for usual pictures, though affording twice permissible period comparing with 2). The case when extra dummy bits are required is shown in Fig.1 (b).

4.Conclusion

Flexible Hardware can be manufactured conforming to the current maximum frame rate specification. It is desired, however, to study on how to refine the specification toward the final Recommendation in the light of allowing easier implementation of Software Architecture TV CODEC.

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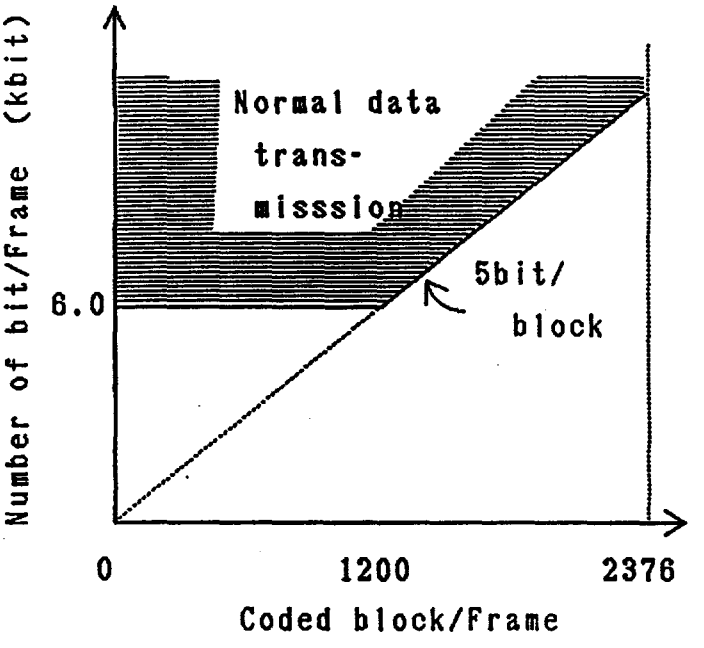
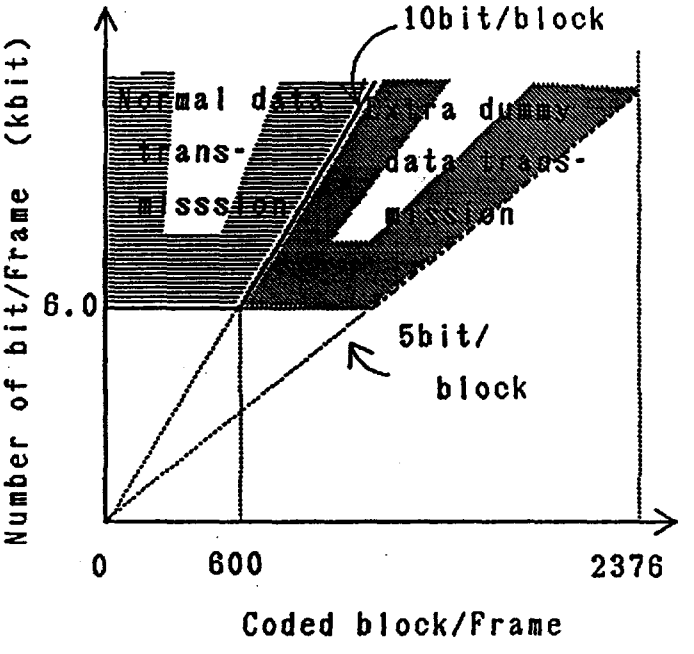


(a) Case of MPPSB not limited



(b) Case of MPPSB = 10

Fig.1 The case extra dummy bits required