CCITT SG XV
Specialists Group on Coding for Visual Telephony

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Title: Coding Control Method for 384 kbit/s Codec (For Information)

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1. Introduction.

This document concerns coding control method. In the previous document #111, coding control method and its hardware aspect have been described. In this document the unit of coding control is discussed. It is shown that the coding control unit should better be as large as possible. The simulation results are also described.

2. Unit of coding control

From picture quality point of view, coding distortion should better be held at a same level as long as possible, not be concentrated in specific area in a picture. In addition, signal to noise ratio can be improved if equal distortion is kept for longer period. These factors support that coding control time unit should be large. On the other hand, when the control unit is small such as "reference model", in which parameters are controlled on GOB unit basis, distortion may be distributed in specific areas. In addition, smaller unit control increase side informaton of coding parameters, then picture quality may be degraded.

3. Several applications

Two coding control units are compared in the following three methods.
(1) Feedback control with GOB unit (corresponds to Reference model)
(2) Feedback control with picture unit
(3) Feedforward control with picture unit

The feedback systems control quantizing distortion depending on buffer memory occupancy. Method (1) controls quantizing distortion with GOB unit. Method (2) controls mainly frame dropping rate. Quantizing distortion is controlled moderately with large time constant. Method (3) first measures information rate of a frame of picture to be coded, then gives a certain distortion to the signal so that the information rate is close to the given transmission rate. The given distortion is kept for one frame period to be coded.

4. Simulation results

Simulation is performed at the rate of 300 kbit/s. Figure 1 and Figure 2 show the results of feedforward control and feedback control. These figures show that picture unit control improves S/N ratio. Demonstration also shows that the picture quality can be improved. Especially, "Checked Jacket" is much improved since it is a picture such that information generation is localized in the middle of the picture.

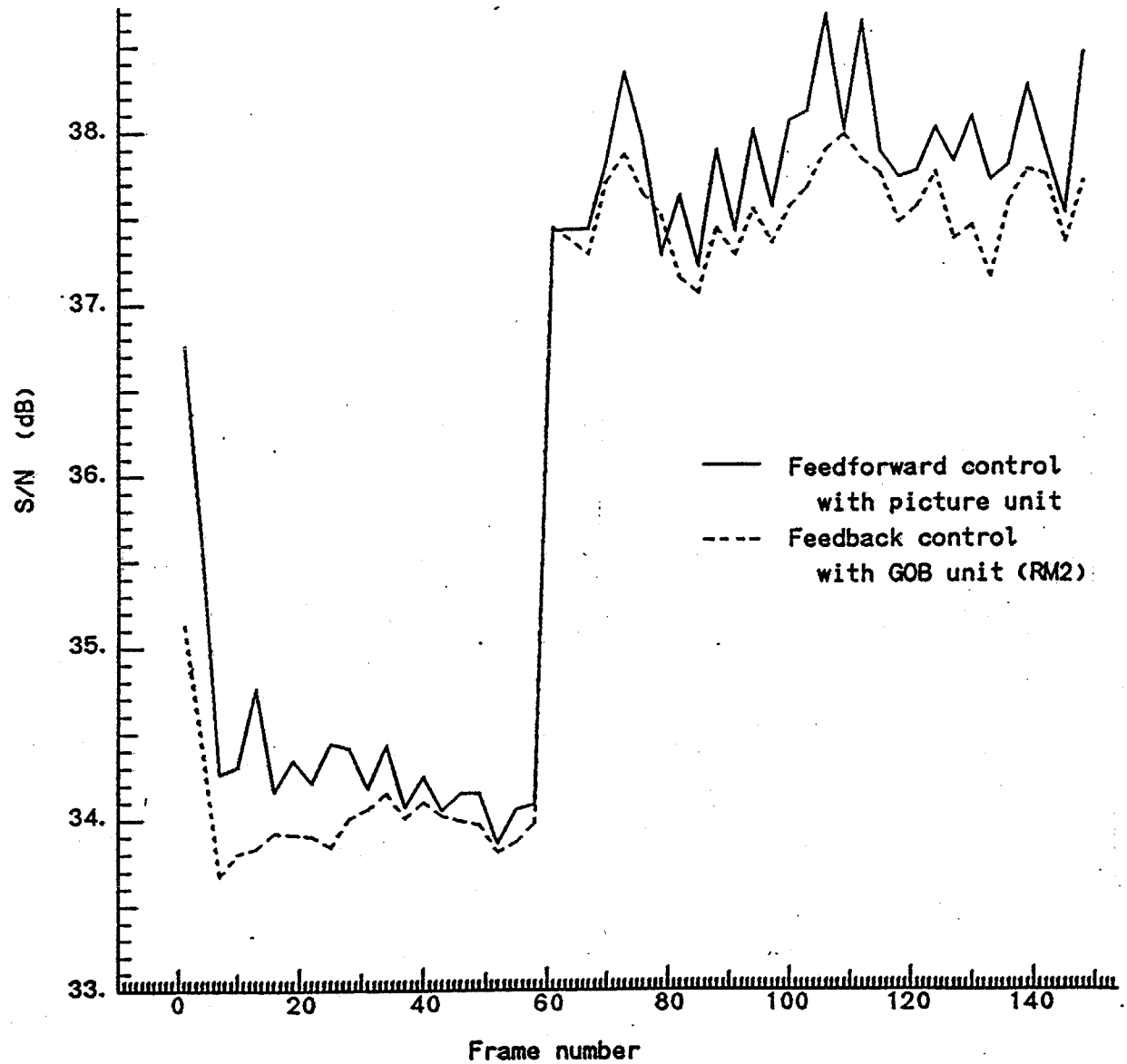

Figure 1 (c) Simulation result for Split-Trevor sequence

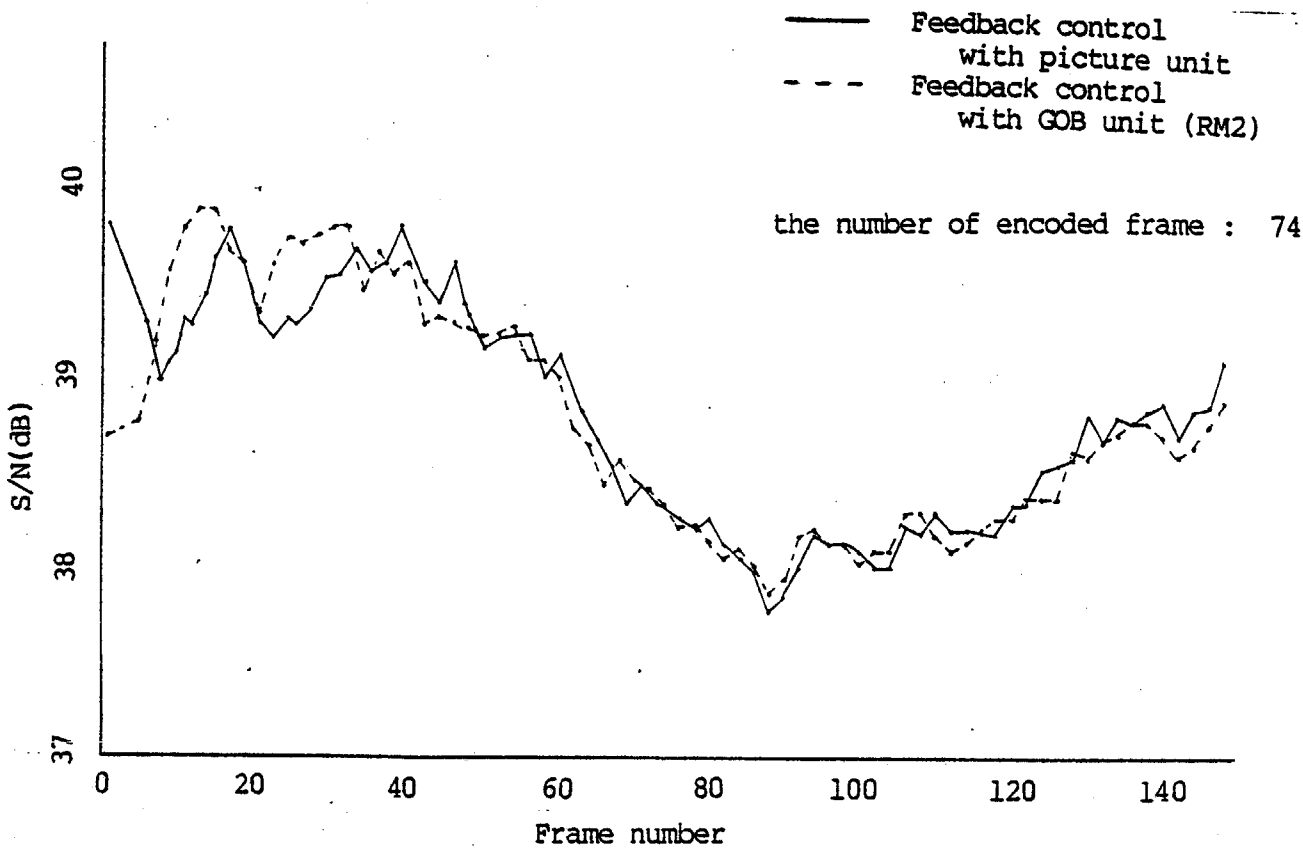

Figure 2 (a) Simulation result for Miss America sequence.

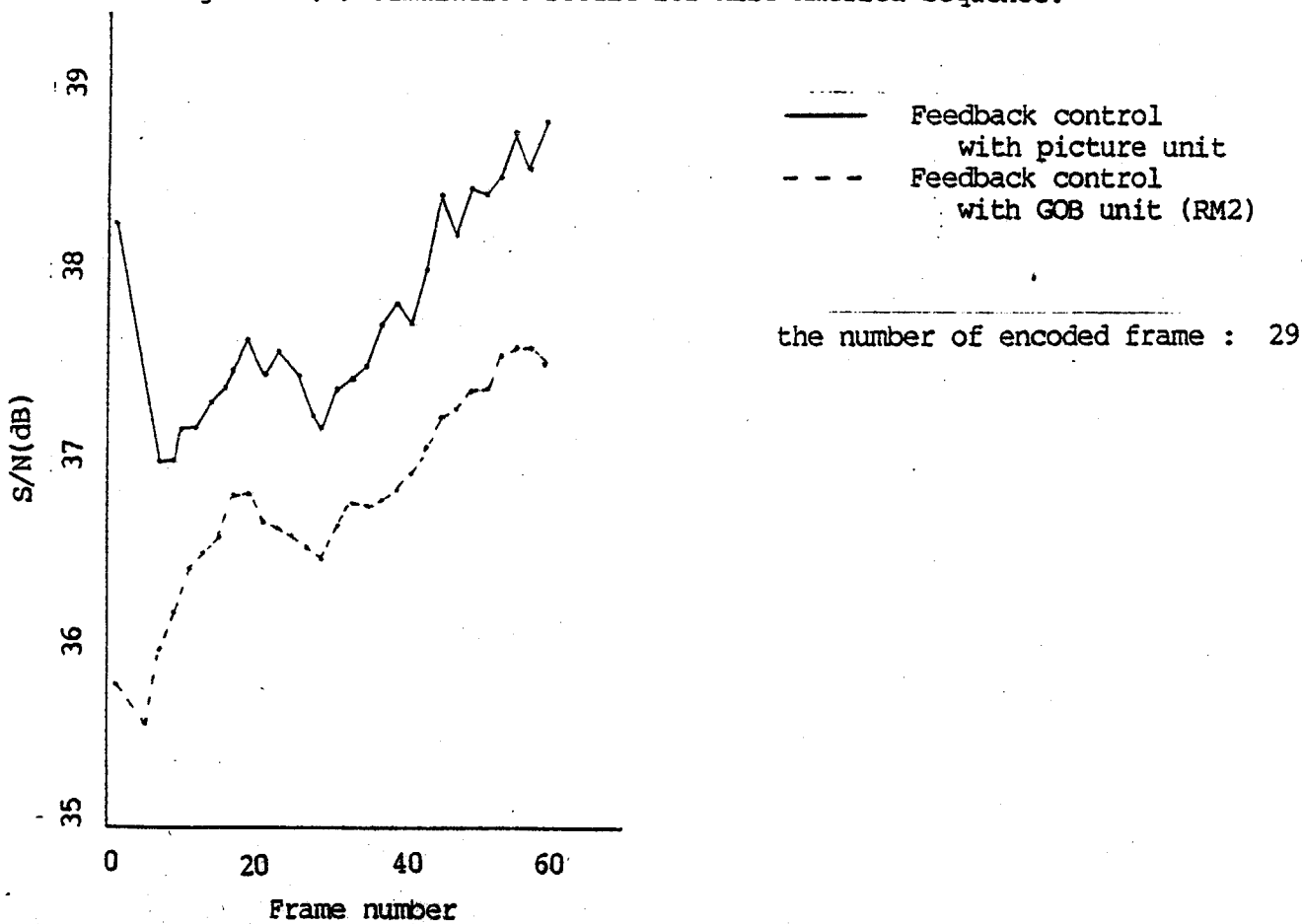

Figure 2 (b) Simulation result for Checked Jacket sequence.