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CODING OF MOVING PICTURES AND ASSOCIATED AUDIO

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Source: NHK(Japan Broadcasting Corporation)
Title: Proposal for MPEG2 Video Coding Algorithm (#26)
Purpose: Proposal

1. INTRODUCTION

This document provides a description of the video coding algorithm we propose for the Kurihama tests. The proposal is submitted by a group composed of NHK, NEC, Sharp, Toppan, GCT, and Waseda Univ. in the framework of a subgroup of Japanese collaboration. The preregistration number is 26.

This scheme is based on hybrid DCT coding with motion compensated prediction. The coding is carried out on a field basis with interlaced scanning. Both interfield and interframe motion compensated prediction are adopted. There are two fundamental modes; one is intra-mode applying two-dimensional DCT to the intrafield blocks, and the other is inter-mode applying horizontal one-dimensional DCT to the interfield or interframe blocks in consideration of statistical characteristics of each signal. B-Code is adopted for variable length coding to obtain better word synchronism recovery properties.

2. GENERAL CODEC OUTLINE

Block diagrams of the encoder and the decoder are shown in Figures 2.1 and 2.2. The coding is carried out on a field basis with interlaced scanning.

The input and output signal format meets CCIR Rec. 601. Preprocessing is done using a two-dimensional low-pass filter which eliminates the spatial diagonal higher frequency region.

Forward motion estimated prediction is performed for both interfield and interframe. Neither backward prediction nor temporal interpolation technique is applied.

Depending on the prediction mode, signals to be coded have distinctive characteristics. Different transform coding, quantization, and variable length coding suitable for each prediction mode should be employed to achieve both higher coding efficiency and higher picture quality, accordingly.

Intra-pictures and inter-pictures are transformed by two-dimensional DCT and horizontal one-dimensional DCT respectively.

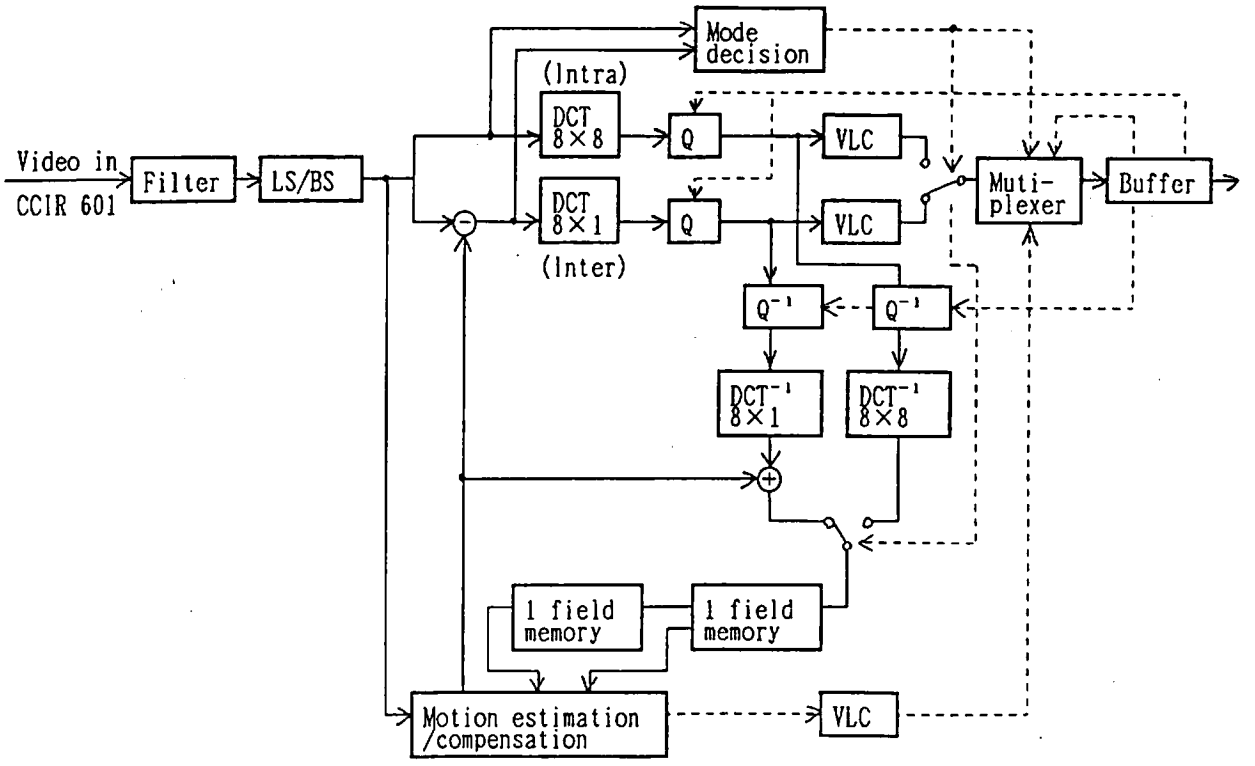


Figure 2.1 Block diagram of the encoder

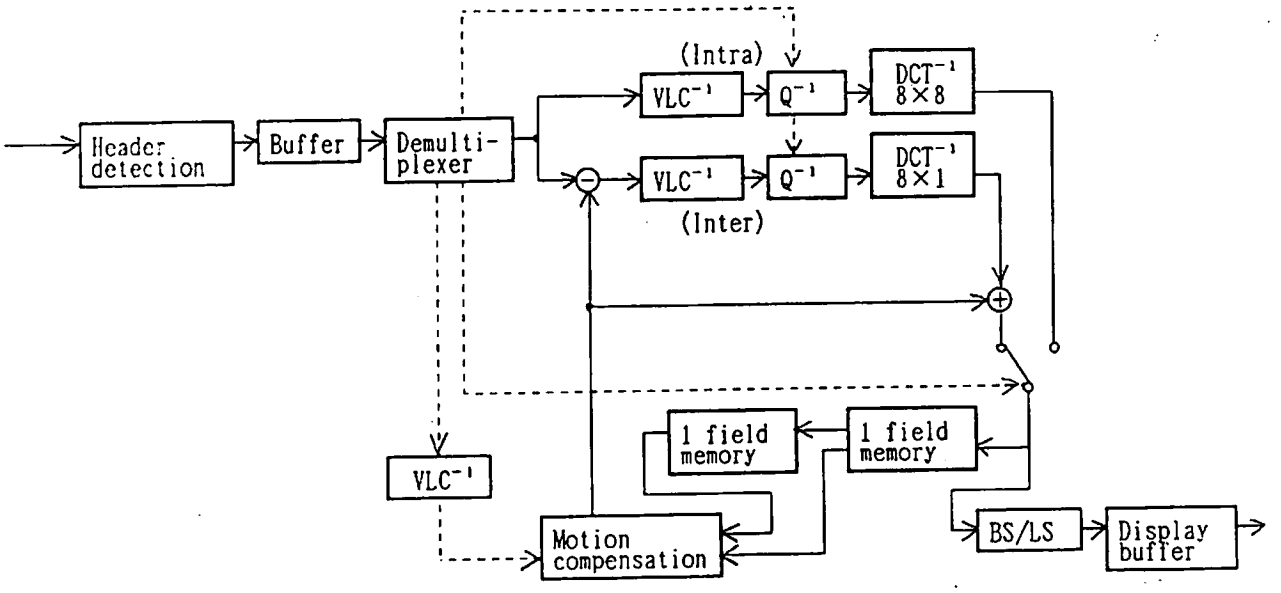


Figure 2.2 Block diagram of the decoder

The quantization characteristics to be used are coarser for higher frequency coefficients of intra-picture, and coarser for luminance than for chrominance. On the other hand, flat characteristics are used for inter-picture. The quantization parameter controls bit rate.

B-Code is employed for the variable length coding.
As for the DCT coefficients, combinations of zero-run length and the following nonzero value are encoded with different code assignments depending on the prediction mode, luminance or chrominance, and the target bit rate.

As for motion vectors, the differential vectors between the global motion vector of a field and the local motion vector of each macroblock are encoded.

A periodic structure of inserted intra-pictures ensures random access and fast search functions, etc.

3. SOURCE FORMAT

3.1 Input and Output Signals

The input and output picture format is the 525-line version of the 4:2:2 level of CCIR Rec. 601.
The coded region is 704 pixels x 240 lines for the luminance signal and 352 pixels x 240 lines for the chrominance signal, respectively, by cropping the left and right edges of input signals. The field rate is 59.94 Hz.
For processing purposes an offset of -128 is added to each video signal. Thus, the range of the video signal level is -128 to 127.

3.2 Pre- and Postprocessing

Two-dimensional low-pass filter eliminates the spatial diagonal higher frequency region of the input signal for both luminance and chrominance. This is based on the human visual property which has lower resolution in diagonal directions. Using this preprocessing, higher coding efficiency can be obtained while degradation of picture quality remains minimal.
Filtering is performed on a field signal. The filter coefficients are shown in Table 3.1.
Although postprocessing is also possible in the same manner, it is not done in this simulation.

Table 3.1 Filter coefficients of the two-dimensional low-pass filter

```
 0   2   0   2   0   2   0
 3   0  -8   0  -8   0   3        +------>Horizontal
 0 -11  -2  40  -2 -11   0        |
 3   0  47 136  47   0   3        |
 0 -11  -2  40  -2 -11   0        v
 3   0  -8   0  -8   0   3         Vertical
 0   2   0   2   0   2   0 //256
```

4. LAYERED STRUCTURE OF VIDEO DATA

4.1 BLOCK

A block consists of an array of 8 pixels x 8 lines of either luminance or one

of the color difference signals. Each block is field-based. Transformation and quantization are performed at the block level.

4.2 MACROBLOCK (MB)

A macroblock consists of 2 horizontally adjacent luminance blocks (16 pixels x 8 lines) and the co-sited single 8 x 8 Cb block and single 8 x 8 Cr block. The MB type (intra or inter) is determined on the MB level. Motion compensation is also performed at the MB level.

4.3 SLICE

A slice consists of a row of 44 MBs across the complete width of the picture field (704 pixels x 8 lines for luminance and 352 x 8 for chrominance). Adjustment of quantization is also done on the slice level to control bit rate.

4.4 PICTURE

A picture consists of 30 slices (704 pixels x 240 lines for luminance and 352 x 240 for chrominance).
The picture type (intra or predicted) is determined on the picture level.

4.5 GROUP OF PICTURES (GOP)

A GOP consists of 24 fields. The first field is intra-coded, the second predicted from the previous field, and the following 22 predicted from the previous field and frame within a GOP. This facilitates random access and fast forward/reverse. Also, it assures a total renewal of data every GOP to prevent errors from spreading.

5. MOTION ESTIMATION AND COMPENSATION

Forward motion compensated prediction technique is employed on both interfield and interframe to exploit temporal redundancy. Neither backward prediction nor temporal interpolation is used. This helps reduce processing delay, hardware complexity and memory cost.

Motion estimation is performed on a 16-pixel x 8-line area of luminance signals of each macroblock by means of block matching method. Motion vectors are calculated on comparison between the decoded picture and the original picture. The range of motion vectors are +/- 15.5 pixels and +/- 6.5 lines (field lines) in half pel and line accuracy.

Motion estimation is carried out in two steps. At the first stage, one candidate motion vector is obtained by an integer pel and line search in the range of +/- 15 pixels and +/- 6 lines. At the second stage, a final motion vector is obtained by searching half pel and line displaced positions around the candidate vector.
The picture values at picture edges are interpolated outward when searching motion vectors.

The interpolation filter to provide half pel accuracy is a bilinear filter in both directions.
The matching criteria are based on the sum of the 16 x 8 absolute differences of luminance samples in a macroblock. The motion vector which gives the mini-

mum value is chosen. If two or more positions have the same total value, the shortest vector is chosen.

Motion compensation is performed on both the luminance and chrominance signals within each macroblock. The horizontal component of the motion vector for the chrominance signal is derived by halving that of the luminance signal in the same macroblock. The vertical component is identical to that of the luminance.

6. MODES AND MODE SELECTION

6.1 Picture Types

There are three types of picture field:

(1) Intra: All the macroblocks are coded intrafield.

(2) Predicted-1: Macroblocks may be coded intrafield or motion compensated interfield.

(3) Predicted-2: Macroblocks may be coded intrafield or motion compensated interfield or motion compensated interframe.

Three types of picture are used periodically. The first field of a GOP is coded as "Intra", the second one is coded as "Predicted-1", and the remaining 22 in a GOP are coded as "Predicted-2".

6.2 Macroblock Types in Predicted-picture

Macroblock selection in a predicted-picture is done in the following order:
(1) MC/No MC: The decision whether to make use of the motion compensation is based on the comparison between the sum of absolute field (frame) differences and that of displaced field (frame) differences of all the luminance pels in a macroblock. The selection is to minimize the value. If the both have the equal value, the motion compensation is not used.

(2) Interfield/Interframe: Selection is based on the smallest sum of absolute prediction errors in a macroblock. If both values are equal, the interfield-mode has priority.

(3) Intra/Inter: Decision is based on the comparison between the sum of absolute values subtracted by the mean value of a macroblock of the intra-signal and that of absolute prediction errors multiplied by 134/128 of the inter-signal in a macroblock. If both values are equal, intra-mode is selected.

7. TRANSFORMATION

For each component (Y, Cb, or Cr), discrete cosine transform (DCT) is applied to each block.
Two-dimensional (8 pixels x 8 lines) DCT is applied for intra-mode blocks, and horizontal one-dimensional (8 pixels x 1 line) DCT is applied for those of inter-mode depending on macroblock types.

Because of the well-known fact that interlaced images produce aliasing components in the vertical higher frequency region, motion compensated prediction errors to be coded have little correlation in the vertical direction. Thus,

applying DCT in the vertical direction is not efficient for inter-mode signals in interlaced images. Moreover, the mosquitoes caused by edges in a DCT block do not spread vertically in the case of horizontal one-dimensional DCT, where picture quality will be improved.

8. QUANTIZATION

The DCT coefficients are quantized based on blocks of 8 pixels x 8 lines. Transform coefficients are first weighted with individual weighting factors which is function of the coefficient order, and then divided linearly by the quantization parameter which is the quantizer's rate control parameter, and last quantized by the nearly linear characteristic. These processes are described by the formula;

$$i[u,v] = f(c[u,v] \times 8 / w[u,v] / QP) \qquad (8.1)$$

where c[u,v] is the DCT coefficient, w[u,v] is the corresponding element of the weighting matrix, QP is the quantization parameter, f(.) is the nearly linear function, and i[u,v] is the resultant index.

The weighting factors are different according to the macroblock type. As for intra-blocks, the factors vary two-dimensionally so as to provide coarser quantization for spatial diagonal higher frequency coefficients and differ from each other for luminance and chrominance signals. These characteristics are based on CCIR Rec. 723. On the other hand, for inter-blocks, 8 horizontal DCT blocks are combined vertically to make 8 x 8 blocks. The weighting factors have a flat characteristic for both luminance and chrominance signals. The weighting factors are shown in Figures 8.1 and 8.2.

8	8	10	16	22	38	54	64
8	13	13	19	32	38	54	64
8	13	19	27	38	45	64	64
10	13	22	32	38	45	64	64
13	22	27	32	45	54	64	64
19	27	27	38	54	64	64	64
27	32	32	38	54	64	64	64
27	38	38	45	64	64	64	64

Luminance

8	8	10	10	13	16	16	17
8	9	10	11	13	16	17	17
10	10	10	11	15	17	17	17
10	11	12	12	16	17	17	17
12	13	13	15	17	17	17	17
15	16	17	17	17	17	17	17
17	17	17	17	17	17	17	17
17	17	17	17	17	17	17	17

Chrominance

Figure 8.1 Weighting matrices for intra-block

16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16

Figure 8.2 Weighting matrix for inter-block

The quantization parameter varies from 1 to 255 according to rate control.

The nearly linear quantizer has characteristics which are linear within the

range of +/-255 with step 1, from +/-256 to +/-511 with step 2, from +/-512 to +/-1024 with step 4, and from +/-1025 to +/-2047 with step 8.

The arithmetic operation of integer division for intra-block DC coefficients rounds up or down to the nearest integer, and that for other coefficients truncates towards zero.

For inter-blocks, the same variable thresholding as SM3 is performed before quantization, and isolated value removal, which replaces +/-1 between zero-runs along the scanning order with 0, is performed after quantization. These operations occur only at the encoder. The scanning orders are described in 9.5 (Figures 9.1 and 9.2).

9. CODING

9.1 B-Code

For variable length coding (VLC), we adopted B-Code which is one of the candidates in CCIR Rec. 723. In B-Code, a word consists of an even number of bits, organized as follows: bits holding odd positions called "continuation bits" are all set to 1 with the exception of the last one in each word, while even ones called "information bits" are freely encoded by information. The words expressed in B-Code have the following structure where X denotes the information bit;

Table 9.1 B-Code structure

word length (bits)	number of words	word structure
2	2	0X
4	4	1X0X
6	8	1X1X0X
8	16	1X1X1X0X
:	:	:
:	:	:

Word synchronism information can be easily obtained from the odd bits, thus B-Code has the desirable features of better word synchronism recovery properties.

9.2 Picture Type

Three kinds of picture types are coded with a 2-bit word.

Table 9.2 Code for picture types

Picture Types	Code
Intra	00
Predicted-1	01
Predicted-2	10

9.3 Macroblock Type

Each picture field has one of the three modes, intra, predicted-1, or predict-

ed-2. According to these three modes, different VLC tables are used for each macroblock type.

Since intra-fields have only the intra-MB type, no code for MB type is assigned for them.

Predicted-1-fields have the following MB types, with their respective codes.

Table 9.3 Code for macroblock types for predicted-1-fields

Macroblock Types	Code
Intra	00
MC Interfield	01
No MC Interfield	1000

Predicted-2-fields have the following MB types, with their respective codes.

Table 9.4 Code for macroblock types for predicted-2-fields

Macroblock Types	Code
Intra	1000
MC Interfield	01
No MC Interfield	1001
MC Interframe	00
No MC Interframe	1100

9.4 Motion Vector

Motion vectors are coded by means of both global motion vector and local motion vector.
The global motion vector represents the motion as a full picture, while the local motion vector does that of each macroblock. In this simulation, the global motion vector is obtained by the motion vectors of macroblocks having the same macroblock types (MC interfield or MC interframe) averaged over a picture.
It is preferable that the global motion vector be derived by a global motion estimation.

The global motion vectors are coded with a 6-bit word per picture for each horizontal and vertical component.

The local motion vectors are represented as differential motion vectors between the global motion vector and the local motion vector in each macroblock, and then coded according to the B-Code principle.
A 1-bit flag for each horizontal and vertical component is assigned to inform whether the vector is zero or not, and only if it is not zero, the vector is coded using the following VLC table. Even though this table shows only the word length, code words are easily obtained according to the B-Code principle. Both horizontal and vertical components are coded with the same VLC table.

Table 9.5 Number of bits used for the VLC for motion vectors

Motion Vector	word length(bits)
+/- 0.5	2
+/- 1.0 .. 1.5	4
+/- 2.0 .. 3.5	6
+/- 4.0 .. 7.5	8
+/- 8.0 .. 15.5	10
+/-16.0 .. 31.0	12

9.5 Transform Coefficient

After the DCT coefficients have been quantized, they are coded in different manners for intra-picture and predicted-picture.

The suitable VLC tables depend on the target bit rate. In this simulation, two kinds of tables are available for each target bit rate (4M and 9M) at the encoder and the decoder, and the table to be used is identified by the sequence header.

9.5.1 Intra-picture

The DC coefficients are coded without loss by DPCM technique from left to right in a slice. At the left edge of the slice, the value itself is coded. The VLC table for these DC coefficients are shown in Table 9.6.

Table 9.6 Number of bits used for the VLC for DC coefficients of intra-picture.

LEVEL					word length(bits)
	0,	-1			2
+1 ..	+2,	-2 ..	-3		4
+3 ..	+6,	-4 ..	-7		6
+7 ..	+14,	-8 ..	-15		8
+15 ..	+30,	-16 ..	-31		10
+31 ..	+62,	-32 ..	-63		12
+63 ..	+126,	-64 ..	-127		14
+127 ..	+254,	-128 ..	-255		16
+255 ..	+510,	-256 ..	-511		18
+511 ..	+1022,	-512 ..	-1023		20
+1023 ..	+1278,	-1024 ..	-1278		22

The AC coefficients are sequentially transmitted according to the zigzag scanned orders shown in Figure 9.1 in a 8 x 8 block. These scanned orders differ between luminance and chrominance signals. The combinations of zero-run length (RUN) and the following nonzero value (LEVEL) are coded. EOB (End of block) is appended to the last coded data in a block. When the last data in a block is zero-run, the zero-run is replaced by EOB.

0	2	6	12	20	28	36	44
1	5	11	19	27	35	43	51
3	7	13	21	29	37	45	52
4	10	18	26	34	42	50	57
8	14	22	30	38	46	53	58
9	17	25	33	41	49	56	61
15	23	31	39	47	54	59	62
16	24	32	40	48	55	60	63

Luminance

0	2	3	9	10	20	21	35
1	4	8	11	19	22	34	36
5	7	12	18	23	33	37	48
6	13	17	24	32	38	47	49
14	16	25	31	39	46	50	57
15	26	30	40	45	51	56	58
27	29	41	44	52	55	59	62
28	42	43	53	54	60	61	63

Chrominance

Figure 9.1 Zigzag scanned orders for intra-block

The most commonly occurring combinations of successive zeros and following value are encoded with two-dimensional (RUN,LEVEL) VLC tables as listed in Tables 9.7 to 9.10.

Other combinations are encoded by the ESC-sequence with a word consisting of 12-bit ESCAPE, RUN and LEVEL as listed in Tables 9.11 and 9.12. The excuse is that these tables contain only word lengths. Although duplicate code words are assigned to both RUN and LEVEL, it is able to distinguish between RUN and LEVEL according to its order in sequences.
Different VLC tables are used for luminance and chrominance.
The EOB word length for intra-pictures is 4 bits.

Table 9.11 Number of bits used for one-dimensional VLC for RUN of intra-picture

RUN	VLC Length(bits)
0 .. 1	2
2 .. 4, EOB	4
5 .. 12	6
13 .. 28	8
29 .. 60	10
61 .. 63, ESC	12

Table 9.12 Number of bits used for one-dimensional VLC for LEVEL of intra-picture

LEVEL			VLC Length(bits)
	+9, -9		2
+10 ..	+11, -10,	EOB	4
+12 ..	+15, -11 ..	-14	6
+16 ..	+23, -15 ..	-22	8
+24 ..	+39, -23 ..	-38	10
+40 ..	+70, -39 ..	-70, ESC	12
+71 ..	+134, -71 ..	-134	14
+135 ..	+262, -135 ..	-262	16
+263 ..	+518, -263 ..	-518	18
+519 ..	+639, -519 ..	-639	20

Table 9.7 Number of bits used for two-dimensional VLC for luminance of intra-picture at 4Mbps

LEVEL \ RUN	0	1	2	3	4	5	6	7	8	9	10··15	16	17··21	22··31	32··61	62··63
1	2	6	6+	8	8+	10	10	10	12	12	14	14	16	16	16	18
2	4	8	10	10	12	12	12	14	14	16	16	16	16	16	18	18
3	4+	8	10	12	12	14	14	14	16	16	16	18	18	18	18	18
4	6	10	12	12	14	14	14	16	16	16	16	18	18	18	18	18
5	6	10	12	14	14	16	16	16	18	18	18	18	18	18	18	18
6	8	12	14	14	14	16	16	16	18	18	18	18	18	18	18	18
7	8	12	14	14	16	16	16	16	18	18	18	18	18	20	20	20
8	8	12	14	14	16	16	16	16	20	20	20	20	20	20	20	20
9	8	12	14	14												
10 : 11	10	12	14	16												
12	10	14	14	16												
13 : 16	10	14	16	16												
17	10+	14														
18 : 24	12	14														
25 : 32	12	16														
33 : 54	14	20														
55 : 64	16	20														
65 : 128	20	20														
129 : 639	EACAPE + RUN + LEVEL															

Note : "+" means that additional 2 bits are required for negative LEVEL.

Table 9.8 Number of bits used for two-dimensional VLC
for chrominance of intra-picture at 4Mbps

LEVEL \ RUN	0	1	2	3	4	5	6	7	8··9	10	11··15	16··17	18··21	22··25	26··31	32··63
1	2	4+	6	8	8	8	8	10	10	10	12	12	14	14	16	16
2	4	8	10	10	10	12	12	12	12	14	14	16	16	16	16	18
3	6	8+	10+	12	12	14	14	14	16	16	16	18	18	18	18	18
4	6	10	12	12	14	14	14	14	16	16	16	18	18	18	18	18
5	6+	10	12	14	14	14	16	16	18	18	18	18	18	18	18	18
6	8	12	12	14	14	16	16	16	18	18	18	18	18	18	18	18
7	8	12	14	14	14	16	16	16	18	18	18	18	18	20	20	20
8	10	12	14	14	16	16	16	16	20	20	20	20	20	20	20	20
9	10	14	14	14												
10 : 13	10	14	14	16												
14	12	14	14	16												
15 : 16	12	14	16	16												
17 : 19	12	14														
20 : 23	12	16														
24 : 32	14	16														
33 : 38	14	20														
39 : 62	16	20														
63 : 64	18	20														
65 : 128	20	20														
129 : 639	EACAPE + RUN + LEVEL															

Note : "+" means that additional 2 bits are required for negative LEVEL.

Table 9.9 Number of bits used for two-dimensional VLC for luminance of intra-picture at 9Mbps

LEVEL \ RUN	0	1	2	3	4	5	6	7	8	9··14	15	16··21	22··29	30··63
1	2	6	8	8	10	10	10	12	12	14	16	16	16	16
2	4	8	10	12	12	12	14	14	16	16	16	16	16	18
3	4+	10	12	12	14	14	14	16	16	16	16	18	18	18
4	6	10	12	14	14	14	16	16	16	16	16	18	18	18
5	6	10	14	14	14	16	16	16	18	18	18	18	18	18
6	6+	12	14	14	16	16	16	16	18	18	18	18	18	18
7	8	12	14	14	16	16	16	16	18	18	18	18	20	20
8	8	12	14	16	16	16	16	16	20	20	20	20	20	20
9 : 10	8	12	14	16										
11	8+	14	16	16										
12 : 16	10	14	16	16										
17 : 19	10	14												
20	10+	14												
21 : 24	12	14												
25 : 32	12	16												
33 : 38	12	20												
39 : 64	14	20												
65 : 128	20	20												
129 : 639														

EACAPE + RUN + LEVEL

Note : "+" means that additional 2 bits are required for negative LEVEL.

Table 9.10 Number of bits used for two-dimensional VLC
for chrominance of intra-picture at 9Mbps

LEVEL \ RUN	0	1	2	3	4	5	6	7	8··10	11··12	13··14	15	16··17	18··21	22··31	32··62	63
1	2	4+	6+	8	8	10	10	10	10	12	12	14	14	16	16	16	18
2	4	8	10	10	12	12	12	12	14	14	16	16	16	16	16	18	18
3	6	8+	12	12	14	14	14	14	16	16	16	16	18	18	18	18	18
4	6	10	12	14	14	14	14	16	16	16	16	18	18	18	18	18	18
5	6	10+	14	14	14	16	16	16	18	18	18	18	18	18	18	18	18
6	8	12	14	14	16	16	16	16	18	18	18	18	18	18	18	18	18
7	8	12	14	16	16	16	16	16	18	18	18	18	18	18	20	20	20
8	8	12	14	16	16	16	16	16	20	20	20	20	20	20	20	20	20
9	8	12	14	16													
10 : 15	10	14	16	16													
16	12	14	16	16													
17 : 18	12	14															
19 : 31	12	16															
32	14	16															
33 : 62	14	20															
63 : 64	16	20															
65 : 128	20	20															
129 : 639																	

EACAPE + RUN + LEVEL

Note : "+" means that additional 2 bits are required for negative LEVEL.

9.5.2 Predicted-picture

The DCT coefficients of intra-blocks in predicted-pictures are scanned accordng to the same zigzag scanned orders as shown in Figure 9.1. On the other hand, the coefficients of inter-blocks are scanned according to the vertical scanned order shown in Figure 9.2, common to both luminance and chrominance signals.

0	15	16	31	32	47	48	63
1	14	17	30	33	46	49	62
2	13	18	29	34	45	50	61
3	12	19	28	35	44	51	60
4	11	20	27	36	43	52	59
5	10	21	26	37	42	53	58
6	9	22	25	38	41	54	57
7	8	23	24	39	40	55	56

Figure 9.2 Vertical scanned order for inter-block

The combinations of zero-run length and the following nonzero value are encoded in the same manner as intra-picture AC coefficients. The two-dimensional VLC tables for predicted-pictures are listed in Tables 9.13 to 9.16. The remaining combinations are coded by the same ESC-sequence as intra-picture with VLC tables listed in Tables 9.17 and 9.18.
The EOB word length for predicted-pictures is 2 bits.

Table 9.17 Number of bits used for one-dimensional VLC for RUN of predicted-picture

RUN	VLC Length(bits)
0, EOB	2
1 .. 4	4
5 .. 12	6
13 .. 28	8
29 .. 60	10
61 .. 63, ESC	12

Table 9.18 Number of bits used for one-dimensional VLC for LEVEL of predicted-picture

LEVEL				VLC Length(bits)
	+9,	EOB		2
+10 ..	+11,	-9 ..	-10	4
+12 ..	+15,	-11 ..	-14	6
+16 ..	+23,	-15 ..	-22	8
+24 ..	+39,	-23 ..	-38	10
+40 ..	+70,	-39 ..	-70, ESC	12
+71 ..	+134,	-71 ..	-134	14
+135 ..	+262,	-135 ..	-262	16
+263 ..	+518,	-263 ..	-518	18
+519 ..	+639,	-519 ..	-639	20

Table 9.13 Number of bits used for two-dimensional VLC
for luminance of predicted-picture at 4Mbps

LEVEL \ RUN	0	1	2	3	4	5	6	7	8··10	11	12··15	16··17	18··21	22··31	32··52	53··63
1	2+	4+	6	6+	8	8	8	8	10	10	10	12	12	12	14	16
2	4	6	8	8	8	10	10	10	10	10+	12	12	14	14	18	18
3	6	10	12	12	12	12	12	12	14	14	14	18	18	18	18	18
4	8+	12	14	14	14	14	14	14	14	14	16	18	18	18	18	18
5	12	14	14	14	14	14	14	16	18	18	18	18	18	18	18	18
6	12	14	16	16	16	16	16	16	18	18	18	18	18	18	18	18
7	14	16	16	16	16	16	16	16	18	18	18	18	18	20	20	20
8	14	16	16	16	16	16	16	16	20	20	20	20	20	20	20	20
9 : 10	14	16	16	16												
11 : 16	16	16	16	16												
17 : 32	16	16														
33 : 62	16	20							EACAPE + RUN + LEVEL							
63 : 64	18	20														
65 : 128	20	20														
129 : 639																

Note : "+" means that additional 2 bits are required for negative LEVEL.

Table 9.14 Number of bits used for two-dimensional VLC for chrominance of predicted-picture at 4Mbps

LEVEL \ RUN	0	1	2	3	4	5	6	7	8··10	11	12	13	14	16··17	18	19··21	22··31	32··59	60··63
1	2+	4+	6	6	6	6+	8	8	8	8	8+	10	10	10	10+	12	12	14	16
2	4	10	10	10	10	10	10	10	12	12	12	12	12	12	14	14	14	18	18
3	8	12	12	12	12	14	14	14	14	14	14	14	16	18	18	18	18	18	18
4	10	12	14	14	14	14	14	14	14	16	16	16	16	18	18	18	18	18	18
5	10	14	14	14	16	16	16	16	18	18	18	18	18	18	18	18	18	18	18
6	10	16	16	16	16	16	16	16	18	18	18	18	18	18	18	18	18	18	18
7	12	16	16	16	16	16	16	16	18	18	18	18	18	18	18	18	20	20	20
8	12	16	16	16	16	16	16	16	20	20	20	20	20	20	20	20	20	20	20
9	12	16	16	16															
10	14	16	16	16															
11 : 16	16	16	16	16															
17 : 32	16	16																	
33 : 62	16	20							EACAPE + RUN + LEVEL										
63 : 64	18	20																	
65 : 128	20	20																	
129 : 639																			

Note : "+" means that additional 2 bits are required for negative LEVEL.

Table 9.15 Number of bits used for two-dimensional VLC
for luminance of predicted-picture at 9Mbps

LEVEL \ RUN	0	1	2	3	4	5	6	7	8	9··13	14	15	16	17··21	22··23	24··31	32··41	42··63
1	2+	6	6+	8	8	8	8+	10	10	10	10+	12	12	12	12	14	14	16
2	4	6	8	8	10	10	10	10	10	12	12	12	12	14	14	14	18	18
3	4+	8	10	12	12	12	12	12	12	14	14	14	18	18	18	18	18	18
4	6	10	12	12	12	14	14	14	14	14	16	16	18	18	18	18	18	18
5	8	12	14	14	14	14	14	16	18	18	18	18	18	18	18	18	18	18
6	10	12	14	14	14	16	16	16	18	18	18	18	18	18	18	18	18	18
7	12	14	14	16	16	16	16	16	18	18	18	18	18	18	20	20	20	20
8	12	14	16	16	16	16	16	16	20	20	20	20	20	20	20	20	20	20
9	12	16	16	16														
10 : 13	14	16	16	16														
14 : 16	16	16	16	16														
17 : 32	16	16																
33 : 62	16	20								EACAPE + RUN + LEVEL								
63 : 64	18	20																
65 : 128	20	20																
129 : 639																		

Note : "+" means that additional 2 bits are required for negative LEVEL.

Table 9.16 Number of bits used for two-dimensional VLC
for chrominance of predicted-picture at 9Mbps

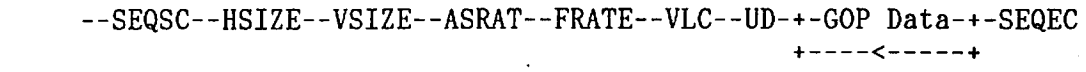
LEVEL \ RUN	0	1	2	3	4	5	6··7	8	9	10	11··15	16	17	18	19··21	22··30	31	32··50	51··63
1	2+	4+	6	6	6	6+	8	8	8	8	10	10	10+	12	12	12	14	14	16
2	4	8	8+	10	10	10	10	10	10	12	12	12	12	12	14	14	14	18	18
3	8	12	12	12	12	14	14	14	14	14	14	18	18	18	18	18	18	18	18
4	10	14	14	14	14	14	14	14	16	16	16	18	18	18	18	18	18	18	18
5	10	14	14	14	14	16	16	18	18	18	18	18	18	18	18	18	18	18	18
6	12	14	16	16	16	16	16	18	18	18	18	18	18	18	18	18	18	18	18
7	12	16	16	16	16	16	16	18	18	18	18	18	18	18	18	20	20	20	20
8 : 10	12	16	16	16	16	16	16	20	20	20	20	20	20	20	20	20	20	20	20
11 : 16	14	16	16	16															
17	14	16																	
18 : 32	16	16																	
33 : 62	16	20									EACAPE + RUN + LEVEL								
63 : 64	18	20																	
65 : 128	20	20																	
129 : 639																			

Note : "+" means that additional 2 bits are required for negative LEVEL.

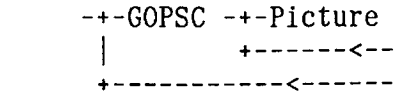
10. VIDEO MULTIPLEX CODER

The video multiplex is arranged in a hierarchical structure with six layers. A syntax diagram of the video multiplex coder is shown in Figure 10.1.

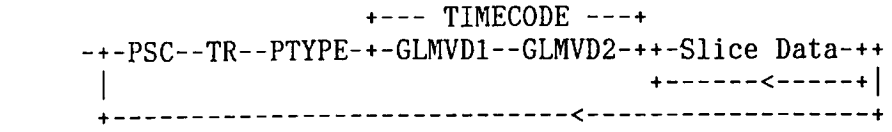
Sequence Layer



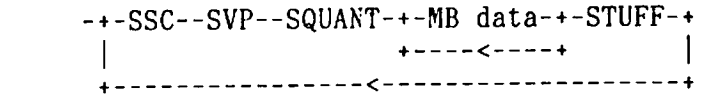
Group of Picture Layer



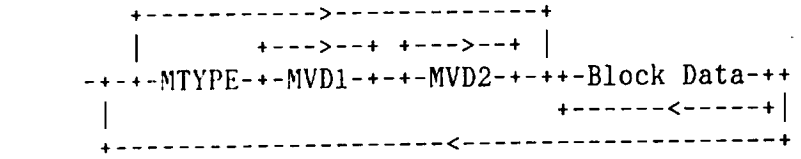
Picture Layer



Slice Layer



Macroblock Layer



Block Layer

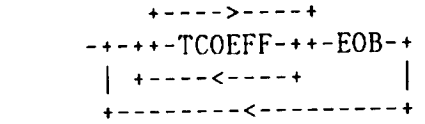


Figure 10.1 Syntax diagram of the video multiplex coder

Each layer consists of the following data.

10.1 Sequence Layer

Data for the Sequence Layer consists of:

- Sequence start code (SEQSC) [32 bits]
  0000 0000 0000 0000 0000 0001 1011 0011
- Horizontal picture size (HSIZE) [12 bits]
  0010 1100 0000
- Vertical picture size (VSIZE) [12 bits]
  0000 1111 0000

- Pixel aspect ratio (ASRAT) [4 bits]
  1100
- Picture rate (FRATE) [4 bits]
  0100
- VLC indicator (VLC) [2 bits]
  01 for 4M, 10 for 9M
- User data (UD) [30 bits]
- Data for Group of Pictures
- Sequence end code (SEQEC) [32 bits]
  0000 0000 0000 0000 0000 0001 1011 0111

10.2 Group of Picture Layer

Data for the Group of Pictures Layer consists of:
- Group of Pictures start code (GOPSC) [32 bits]
  0000 0000 0000 0000 0000 0001 1011 1000
- Data for Pictures

10.3 Picture Layer

Data for the Picture Layer consists of:
- Picture start code (PSC) [32 bits]
  0000 0000 0000 0000 0000 0001 0000 0000
- Temporal reference (TR) [6 bits]
- Picture type information (PTYPE) [2 bits]
- Global motion vector data for MC Interfield(GLMVD1) [6+6 bits]
- Global motion vector data for MC Interframe(GLMVD2) [6+6 bits]
- Timecode for Intra picture (TIMECODE) [24 bits]
- Data for Slices

10.4 Slice Layer

Data for the Slice Layer consists of:
- Slice start code (SSC) [16 bits]
  0000 0001 0000 0001
- Slice vertical position (SVP) [8 bits]
- Quantization parameter(SQUANT) [8 bits]
- Data for Macroblocks
- Stuffing bits (STUFF) [0-15 bits]

10.5 Macroblock Layer

Data for the Macroblock Layer consists of:
- Macroblock type (MTYPE) [VLC]
- Differential motion vector data for MC Inter field (MVD1) [VLC]
- Differential motion vector data for MC Inter frame (MVD2) [VLC]
- Data for Blocks

10.6 Block Layer

Data for the Block Layer consists of:
- Transform coefficients (TCOEFF) [VLC]
- End of block (EOB) [VLC]

11. RATE CONTROL

Rate control is achieved by variation of quantization.
The target number of bits and initial value of the corresponding quantization parameter for each picture type are determined in advance.

The reference buffer occupancy (REFB) is calculated at each slice from the target number of bits, the initial buffer occupancy, and the target bit rate. Meanwhile, the current buffer occupancy (CURB) is observed at each slice. The difference value (DIF) between the reference value and the current value is used to control the quantization parameter (QP). If the current value is smaller than the reference value, the quantization parameter should be made smaller than the initial quantization parameter (QP0). These operations are described as follows;

DIF[kbits] = CURB[kbits] - REFB[kbits] (11.1)

QP = DIF / 10 + QP0 (11.2)

The averaged value of the quantization parameters in the current field is used to update the initial quantization parameter for the next same picture type.

12. IMPLEMENTATION ANALYSIS

12.1 Encoder

12.1.1 Buffer

There are two kinds of buffer, one is a picture buffer for motion estimation and motion compensation, the other is a coded data buffer.

- Picture buffer: 2 Fields x 8 bits
  = 338k x 8 bits, 13.5MHz,
  for motion estimation.

  1 Frame x 8 bits
  = 338k x 8 bits, 13.5MHz,
  for motion compensation of chrominance.

- Coded data buffer: 2048k bits

12.1.2 Prefilter

- 7 x 7 two-dimensional low-pass filter (symmetrical filter)

  Memory: 2(Y/C) x 6 H x 8 bits
  = 8k x 8 bits, 13.5MHz
  H: Horizontal scanning line

  Adder: 2(Y/C) x 48, 16bits, 13.5MHz

  Multiplier: 2(Y/C) x 16, 9bits, 13.5MHz

  Delay time: 3 H/13.5MHz

12.1.3 LS/BS

A scan conversion from line scanning (LS) to block scanning (BS) is performed after the preprocessing. This process is illustrated in Figure 12.1.

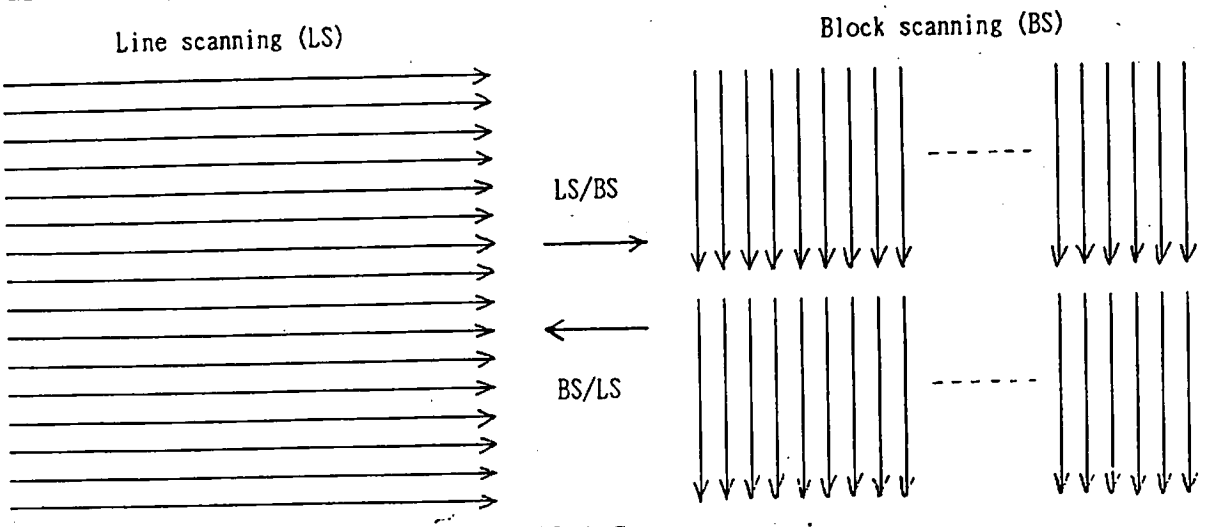


Figure 12.1 Scan conversion

- Line/Block scan conversion

Memory: 2(Y/C) x 16 H x 8 bits
= 22.5k x 8 bits, 13.5MHz

Delay time: 8 H/13.5MHz

12.1.4 Mode Decision

- Intra/Inter mode decision

Multiplication factor 134/128 equals 1 + 1/32 + 1/64.

Memory: 2 MB x 8 bits = 256 x 8 bits, 13.5MHz
MB: Macroblock size = 128 samples

Adder: 3, 15 bits, 13.5MHz, for integration.
2, 8 bits, 13.5MHz, for subtraction and comparison.
2, 15 bits, 13.5MHz, as a multiplier.

Absoluter: 2, 9 bits, 13.5MHz

Delay time: 2 MB/13.5MHz

12.1.5 DCT

- 8 x 1 one-dimensional DCT

Scan conversion
Memory: 2(Y/C) x 1 MB x 8 bits, 13.5MHz

DCT processor (e.g. Fujitsu MB630603)
2(Y/C) x 1, 13.5MHz

(on chip)
Tables: 64 x 14 bits, 13.5MHz, fixed

Adder: 8, 26 bits, 13.5MHz

Multiplier: 8, 14 bits, 13.5MHz

- 8 x 8 two-dimensional DCT

Two-dimensional DCT can be performed by double one-dimensional DCT.

DCT processor (e.g. Inmos IMS A121)
2(Y/C) x 1, 13.5MHz
(on chip)
Tables: 64 x 14 bits, 13.5MHz, fixed

Adder: 8, 26 bits, 13.5MHz, for 1st 1-D DCT.
8, 33 bits, 13.5MHz, for 2nd 1-D DCT.

Multiplier: 8, 14 bits, 13.5MHz, for 1st 1-D DCT.
8, 16 bits, 13.5MHz, for 2nd 1-D DCT.

Memory: 128 x 16 bits, 13.5MHz, for results of 1st DCT.

Delay time: 128/13.5MHz

12.1.6 Quantizer

- Variable thresholding

Table: 2(Y/C) x 64 x 6 bits
= 128 x 6 bits, 13.5MHz, fixed, for scanned orders.

Memory: 2(Y/C) x 128 x 12 bits
= 256 x 12 bits, 13.5MHz

Adder: 2(Y/C), 8 bits, 13.5MHz

- Quantizer

Table: 2(Y/C) x 2(Intra/Inter) x 64 x 7 bits
= 256 x 7 bits, 13.5MHz, fixed, for weighting factors.

2(Y/C) x 2(Intra/Inter) x 2048 x 11 bits
= 8k x 11 bits, 13.5 MHz, fixed, for nearly linear quantizer.

Multiplier: 2(Y/C) x 2(Intra/Inter) x 2, 15 bits, 13.5 MHz

- Isolated value removal

Adder: 2(Y/C) x 2, 11 bits, 13.5 MHz

12.1.7 Inverse Quantizer

Table: 2(Y/C) x 2(Intra/Inter) x 64 x 7 bits
= 256 x 7 bits, 13.5MHz, fixed, for weighting factors.

2(Y/C) x 2(Intra/Inter) x 640 x 12 bits
= 2.6k x 12 bits, 13.5 MHz, fixed, for nearly linear quantizer.

Multiplier: 2(Y/C) x 2(Intra/Inter) x 2, 15 bits, 13.5 MHz

12.1.8 Inverse DCT

- 8 x 1 one-dimensional DCT

Scan conversion
Memory: 2(Y/C) x 1 MB x 8 bits, 13.5MHz

DCT processor x 2(Y/C) (e.g. Fujitsu MB630603)
(on chip)
Tables: 64 x 14 bits, 13.5MHz, fixed

Adder: 8, 29 bits, 13.5MHz

Multiplier: 8, 14 bits, 13.5MHz

- 8 x 8 two-dimensional DCT

Two-dimensional DCT can be performed by double one-dimensional DCT.

DCT processor x 2(Y/C) (e.g. Inmos IMS A121)
(on chip)
Tables: 64 x 14 bits, 13.5MHz, fixed

Adder: 8, 29 bits, 13.5MHz, for 1st 1-D DCT.
8, 33 bits, 13.5MHz, for 2nd 1-D DCT.

Multiplier: 8, 14 bits, 13.5MHz, for 1st 1-D DCT.
8, 16 bits, 13.5MHz, for 2nd 1-D DCT.

Memory: 128 x 16 bits, 13.5MHz, for results of 1st DCT.

Delay time: 128/13.5MHz

12.1.9 Motion Estimation

- The 1st search (integer accuracy)

Motion estimation processor(e.g. Thomson STI3220)
2(Field/Frame) x 2, 13.5 MHz
(on chip)
Adder: 384, 9bits, 13.5MHz

(off chip)
Memory: 2(Field/Frame) x 2 x 16 H x 8 bits
= 45k x 8 bits, 13.5MHz

Adder: 2, 8bits, 13.5MHz

- The 2nd search (half pel accuracy):

Interpolation filter
Memory: 2(Field/Frame) x 1k x 8 bits
= 2k x 8 bits, 54MHz

Adder: 2(Field/Frame) x 1, 8bits, 13.5MHz
2(Field/Frame) x 1, 8bits, 27MHz

Motion estimation processor
2(Field/Frame) x 1, 13.5MHz
(on chip)
Adder: 384, 9bits, 13.5MHz

(off chip)
Memory: 16 H x 8 bits
= 11k x 8 bits, 13.5MHz, for MC by 1st vector.

2(Field/Frame) x 2 x 16H x 8 bits
= 45k x 8 bits, 13.5MHz

Adder: 2, 8bits, 13.5MHz

12.1.10 Motion Compensation (MC) and Prediction

- Interpolation filter for chrominance

Memory: 2(Field/Frame) x 1k x 8 bits
= 2k x 8 bits, 54MHz

Adder: 2(Field/Frame) x 1, 8 bits, 13.5MHz
2(Field/Frame) x 1, 8 bits, 27MHz

- Compensation

Memory: 16 H x 8 bits
= 11k x 8 bits, 13.5MHz, for luminance.

For chrominance, mentioned above (12.1.1).

- Prediction

Adder: 2(Y/C), 8 bits, 13.5MHz

Memory: 2(Y/C) x 14 H x 8 bits
= 20k x 8 bits, 13.5MHz,
for the timing adjustment between input and prediction signal.

Delay time: 14 H/13.5MHz

12.1.11 VLC

- DCT coefficients

  - Scanned order
    Table: 2(Y/C) x 64 x 6 bits
    = 128 x 6 bits, 13.5MHz, fixed, for scanned orders of intra-field.

    64 x 6 bits, 13.5MHz, fixed,
    for scanned orders of predicted-field.

    Memory: 2(Y/C) x 2(Intra/Inter) x 128 x 11bits
    = 512 x 11 bits, 13.5MHz

  - VLC
    Table: 2(Y/C) x 2(Intra/Inter) x 256 x 10 bits
    = 1024 x 10 bits, 13.5MHz, downloaded, for 2-D table-1.

    512 x 10 bits, 13.5MHz, downloaded, for 2-D table-2.

    1024 x 10 bits, 13.5 MHz, downloaded, for 2-D table-3.

- Motion vectors

  Memory: 2(Field/Frame) x 1320 x 5 bits
  = 2.6k x 5 bits, 13.5MHz/128

  Adder: 2(Field/Frame) x 1, 16 bits, 13.5MHz/128
  2(Field/Frame) x 1, 5 bits, 13.5MHz/128

  Multiplier: 2(Field/Frame) x 1, 16 bits, 13.5MHz/128

  Delay time: 1 Field

12.1.12 Rate Control

- Current parameter
  Adder: 1, 8 bits, 1.8kHz, for difference.
  1, 8 bits, 1.8kHz, for reference buffer.
  1, 8 bits, 13.5MHz, for current buffer.
  table: 1 x 8 x 8 bits, -, for initial value.
  1.8kHz = 60Hz x number of slices = 60Hz x 30

- Initial parameter
  Adder: 1, 8 bits, 1.8kHz, for averaging parameters.
  Multiplier: 1 x 13 bits, 1.8kHz

12.2 Decoder

12.2.1 Buffer

- Coded data buffer: 2048k bits

- Picture buffer: 2(Y/C) x 1 Frame x 8 bits
  = 676k x 8 bits, for motion compensation.

  1 Frame x 8 bits
  = 338k x 8 bits, for display buffer.

12.2.2 Inverse VLC

- DCT coefficients

  Inverse VLC
  Table: 2(Y/C) x 2(Intra/Inter) x 1024 x 6 bits
  = 4k x 6 bits, 13.5MHz, downloaded, for RUN.

  2(Y/C) x 2(Intra/Inter) x 1024 x 11 bits
  = 4k x 11 bits, 13.5MHz, downloaded, for LEVEL.

  Scanned order
  Table: 2(Y/C) x 64 x 6 bits
  = 128 x 6 bits, 13.5MHz, fixed, for scanned orders of intra-field.

  64 x 6 bits, 13.5MHz, fixed,
  for scanned orders of predicted-field.

  Memory: 2(Y/C) x 2(Intra/Inter) x 128 x 11bits
  = 512 x 11 bits, 13.5MHz

- Motion vectors

  Adder: 2(Field/Frame) x 1, 6 bits, 13.5MHz/128

12.2.3 Inverse Quantizer

This is the same processing as that of the encoder.

12.2.4 Inverse DCT

This is the same processing as that of the encoder.

12.2.5 Motion Compensation

- Interpolation filter
  Memory: 2(Y/C) x 2(Field/Frame) x 1k x 8 bits
  = 4k x 8 bits, 54MHz

  Adder: 2(Y/C) x 2(Field/Frame) x 1, 8 bits, 13.5MHz
  2(Y/C) x 2(Field/Frame) x 1, 8 bits, 27MHz

- Compensation
  Memory: mentioned above (12.2.1).

- Prediction
  Adder: 2(Y/C), 8 bits, 13.5MHz

12.2.6 BS/LS

A scan conversion from block scanning to line scanning is performed after decoding. This process is illustrated in Figure 12.1.

- Block/Line scan conversion

  Memory: 2(Y/C) x 16 H x 8 bits
  = 22.5k x 8 bits, 13.5MHz

  Delay time: 8 H/13.5MHz

12.3 Global

VLC tables for DCT coefficients are loaded on RAM look-up-tables in both the encoder and the decoder according to coding conditions.

It is preferable that mode decision may be done after VLC coding by comparing the number of bits of both intra-mode and inter-mode. This will improve the hardware complexity and coding efficiency.

There is no non-automatic adjustment of coding parameters.
The target number of bits and initial value of the corresponding quantization parameter for each picture type are determined in advance. They are independent of picture sequences.

13. FUNCTIONALITY

13.1 Compatibility

This coding scheme has "switchable" compatibility. It has neither forward/backward nor upward/downward compatibility by itself. To achieve such compatibility, it needs another standard's encoder and decoder to be embedded.

13.2 Random Access

To achieve random access, a periodic structure of picture types is introduced. In a GOP, every first field is coded intra and the following fields are coded predicted. Every intra-picture has TIMECODE in each picture header. Thus random access to an arbitrary point can be used to search TIMECODE and start intra-picture decoding.

13.3 Coding/Decoding Delay

The coding or decoding delay in each module is listed in Table 13.1 based on the implementation analysis.
According to the simulation results, 1.2M bits at 4Mbps and 1.5M bits at 9Mbps are enough size of the coded data buffer with the initial buffer occupancy of 512k bits. Delay time at the coded data buffer was calculated by these values.

Table 13.1 Coding/Decoding delay

	Module	Delay(msec)	
Encoder	Prefilter	0.2	
	LS/BS	0.4	
	Prediction(MC)	0.7	
	Mode decision	negligible	
	DCT	negligible	
	VLC	17	
---------	Data Buffer	300(4Mbps)	167(9Mbps)
Decoder	MC	0.3	
	Inverse VLC	negligible	
	Inverse DCT	negligible	
	BS/LS	0.4	
Total		319(4Mbps)	186(9Mbps)

14. CODING PARAMETER

The following parameters have been used throughout the simulation. No manual adjustment has been used to adapt each picture sequence. The other parameters have been stated above.

- Buffer size : 2048k bits

- Initial buffer occupancy : 512k bits

- Target number of bits per field:

Table 14.1 Target number of bits per field for each picture type

Picture Type	4M	9M
Intra	490k	900k
Predicted-1	110k	220k
Predicted-2	45k	110k

- Target number of bits per second : 3975k bits for 4M
  8850k bits for 9M

- Initial quantization parameter

Table 14.2 Initial quantization parameter for each picture type

Picture Type	4M	9M
Intra	11	5
Predicted-1	22	10
Predicted-2	27	15

15. STATISTICS

15.1 Number of bits and SNR for each field

(Annex I)

15.2 Cumulative bit count once every 0.4 second

(Annex II)

15.3 Other Statistics

(Annex III)

15.4 Paper listing of coded bit stream file

Table 15.1 Coded bit stream file

```
-rw-rw-r--  1 ynishida  2519446 Oct 16 20:47 flw4.bit
-rw-rw-r--  1 ynishida  5589438 Oct 17 10:24 flw9.bit
-rw-rw-r--  1 ynishida  2516566 Oct 17 10:37 fot4.bit
-rw-rw-r--  1 ynishida  2515734 Oct 16 21:01 mob4.bit
-rw-rw-r--  1 ynishida  5585136 Oct 17 10:32 mob9.bit
-rw-rw-r--  1 ynishida  5588154 Oct 17 10:42 pop9.bit
-rw-rw-r--  1 ynishida  2517404 Oct 16 20:55 tbl4.bit
-rw-rw-r--  1 ynishida  5582850 Oct 17 10:17 tbl9.bit
```

16. CONCLUSION

The main features of this coding scheme are as follows:

(1) Forward motion estimated prediction is performed on a field basis for both interfield and interframe. Neither backward prediction nor temporal interpolation technique is applied. This helps reduce processing delay and hardware complexity.

(2) Horizontal one-dimensional DCT is introduced for inter-blocks as well as two-dimensional DCT for intra-blocks. For the inter-mode signals it prevents mosquitoes from spreading vertically without deterioration in the coding efficiency.

(3) B-Code which has better word synchronism recovery properties is adopted for variable length coding.

17. REFERENCES

(1) MPEG Video Simulation Model Three (SM3).

(2) CCIR Recommendation 723, "Transmission of component-coded digital television signals for contribution-quality applications at the third hierarchical level of CCITT Recommendation G.702".

(3) H.Meyer, et.al., "Optimum Run Length Codes", IEEE Trans. Communications, Vol.COM-22, No.6, June 1974.

Annex I

Number of bits and SNR for each field

Sequence : flower garden
Bit rate : 4Mbps

Institute : NHK
Date : / /91

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
0	502048	32.22	37.89	38.41	50	36272	28.02	34.86	35.66
1	80736	29.49	34.56	35.56	51	34880	27.41	33.37	34.21
2	38560	29.79	35.64	36.41	52	34464	28.38	34.44	35.19
3	42960	28.91	33.74	34.81	53	39088	27.72	33.30	34.13
4	48448	29.53	34.66	35.46	54	39184	28.78	34.26	35.00
5	53152	29.20	33.51	34.57	55	50048	28.15	33.16	34.00
6	50528	29.64	34.44	35.23	56	52592	28.69	33.84	34.73
7	53536	29.52	33.53	34.41	57	63456	28.29	32.89	33.85
8	53456	29.84	34.17	34.94	58	56416	28.50	33.32	34.11
9	53088	29.32	33.19	34.10	59	49344	28.24	32.65	33.54
10	56480	29.05	33.45	34.40	60	48288	28.56	33.09	33.86
11	57328	28.50	32.59	33.69	61	46592	28.66	32.74	33.47
12	53088	28.12	32.68	33.78	62	46656	28.69	32.97	33.75
13	42848	27.69	32.08	33.27	63	46480	28.44	32.56	33.28
14	37856	27.59	32.13	33.28	64	44928	28.37	32.69	33.44
15	37280	27.30	31.69	32.96	65	47152	28.18	32.32	33.07
16	39120	27.10	31.70	33.06	66	51696	27.91	32.26	33.17
17	37552	26.95	31.31	32.73	67	55968	27.54	31.97	33.02
18	35776	26.94	31.46	32.80	68	56304	27.12	31.80	32.92
19	36080	26.77	31.18	32.53	69	46400	26.78	31.50	32.79
20	38896	26.68	31.14	32.46	70	38496	26.68	31.41	32.66
21	47424	26.48	30.92	32.29	71	34624	26.60	31.18	32.46
22	52880	26.54	30.97	32.29	72	501824	31.19	37.18	37.23
23	52176	26.57	30.89	32.28	73	66736	27.77	34.03	34.81
24	522688	31.66	37.56	37.86	74	29920	29.26	35.63	36.33
25	74336	28.72	34.28	35.14	75	33040	27.36	33.44	34.42
26	43504	28.16	34.82	35.74	76	37728	28.22	34.40	35.32
27	38448	27.97	33.61	34.81	77	42384	27.36	32.95	34.04
28	39200	27.80	33.98	34.76	78	44848	28.03	33.76	34.80
29	36224	27.86	33.17	34.26	79	55088	27.83	32.78	34.02
30	37808	27.77	33.53	34.38	80	60864	28.13	33.19	34.49
31	43456	27.83	32.83	34.04	81	62208	28.18	32.61	33.86
32	55920	27.77	32.89	33.93	82	54128	27.96	32.63	33.96
33	53472	27.87	32.50	33.80	83	48256	27.85	32.24	33.52
34	54400	27.70	32.36	33.50	84	45360	27.46	32.17	33.48
35	58368	27.64	32.29	33.63	85	44768	27.25	31.78	33.20
36	58112	27.26	31.99	33.30	86	48944	26.92	31.58	33.15
37	55312	26.97	31.64	33.01	87	53456	26.77	31.48	32.98
38	46592	26.83	31.60	32.95	88	52912	26.53	31.15	32.77
39	41072	26.42	31.19	32.58	89	43648	26.30	30.96	32.62
40	37024	26.38	31.26	32.65	90	41760	26.02	30.74	32.34
41	37136	26.26	30.96	32.34	91	39136	25.87	30.58	32.21
42	35888	26.15	31.05	32.36	92	37952	25.82	30.48	32.06
43	36176	26.04	30.76	32.13	93	35744	25.75	30.37	31.97
44	37232	25.99	30.82	32.13	94	36000	25.75	30.31	31.93
45	40112	26.05	30.62	32.02	95	35728	25.67	30.20	31.85
46	43632	26.19	30.74	32.13	96	542160	30.77	36.65	36.88
47	46192	26.34	30.67	31.96	97	63744	27.24	33.60	34.38
48	541648	31.51	37.45	37.64	98	36736	27.03	34.21	35.19
49	69648	28.13	34.29	34.87	99	35904	26.94	33.29	34.51

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
100	44928	26.32	32.83	33.85	150	59216	27.21	32.99	34.12
101	33888	26.99	32.85	34.04	151	56224	27.18	32.31	33.62
102	36256	26.56	32.60	33.56	152	44208	27.05	32.41	33.53
103	35616	27.16	32.58	33.84	153	37312	27.24	31.99	33.26
104	48416	27.08	32.24	33.46	154	38528	27.37	32.22	33.41
105	60992	27.65	32.39	33.85	155	45984	27.47	31.90	33.21
106	71648	27.40	31.93	33.41	156	57936	27.28	31.82	33.07
107	69632	27.33	31.73	33.16	157	55232	27.08	31.48	32.75
108	54992	27.23	31.67	33.27	158	48096	26.94	31.43	32.65
109	44832	26.74	31.35	32.85	159	42400	26.87	31.25	32.53
110	41920	26.74	31.29	32.80	160	41280	26.91	31.28	32.53
111	38896	26.62	31.09	32.54	161	41616	27.00	31.22	32.41
112	41136	26.50	31.05	32.63	162	38000	27.24	31.35	32.50
113	45360	26.31	30.89	32.51	163	37936	27.05	31.20	32.30
114	48016	25.99	30.78	32.40	164	40768	27.01	31.18	32.35
115	41584	26.02	30.60	32.24	165	47872	26.87	30.98	32.09
116	35264	26.03	30.59	32.11	166	53552	26.85	30.97	32.10
117	35904	26.13	30.48	32.13	167	54384	26.83	30.80	31.90
118	36688	26.03	30.46	32.05	168	528064	30.52	36.35	36.58
119	40912	26.03	30.31	31.99	169	49776	26.21	33.57	34.22
120	556688	31.04	36.73	37.18	170	33408	29.44	35.44	35.72
121	55248	26.91	33.67	34.48	171	55424	27.64	33.26	33.98
122	30368	28.15	35.10	35.76	172	51520	28.51	34.24	34.83
123	37856	26.78	33.10	34.32	173	55744	27.86	32.82	33.62
124	48304	26.57	33.04	34.18	174	51536	27.93	33.33	34.11
125	44160	26.88	32.66	34.12	175	46752	27.74	32.48	33.36
126	43280	26.61	32.45	33.65	176	44640	27.90	32.99	33.80
127	43680	27.00	32.29	33.78	177	43872	27.80	32.27	33.20
128	49472	26.87	32.10	33.39	178	47344	27.72	32.51	33.48
129	52048	27.05	32.01	33.46	179	47392	27.48	31.88	32.87
130	56768	27.01	31.76	33.05	180	44528	27.31	32.01	33.05
131	53200	26.96	31.54	32.95	181	45728	27.14	31.53	32.63
132	47456	26.99	31.50	32.70	182	48352	26.82	31.44	32.71
133	44608	26.98	31.38	32.63	183	48656	26.59	31.10	32.44
134	42528	27.04	31.45	32.53	184	43936	26.32	31.00	32.27
135	40560	27.08	31.35	32.49	185	38928	26.29	30.80	32.10
136	38688	27.16	31.39	32.51	186	40960	26.18	30.73	32.06
137	41888	27.10	31.27	32.46	187	40080	26.14	30.60	32.00
138	49920	27.08	31.21	32.36	188	42544	26.12	30.58	32.01
139	54832	27.02	31.04	32.28	189	40272	26.12	30.50	31.97
140	56384	26.93	30.97	32.15	190	38528	26.31	30.63	31.94
141	52240	26.71	30.75	31.95	191	39456	26.31	30.51	31.85
142	46800	26.52	30.67	31.87	192	551920	30.65	36.38	36.67
143	40672	26.34	30.47	31.69	193	48048	25.99	33.37	34.29
144	524416	30.13	36.06	36.27	194	41600	27.95	34.53	35.32
145	52224	26.24	33.31	33.97	195	50464	27.14	33.20	34.43
146	27968	28.85	35.21	35.71	196	60608	26.79	32.79	33.78
147	41120	26.84	33.05	33.90	197	49376	27.08	32.63	33.94
148	37376	27.86	34.25	35.04	198	47280	26.40	32.15	33.13
149	50928	27.04	32.56	33.78	199	46816	26.45	31.89	33.31

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
200	51024	26.13	31.60	32.92	250	42160	26.75	31.58	32.65
201	49232	25.98	31.28	32.76	251	37248	26.86	31.50	32.74
202	45184	25.96	31.28	32.77	252	40464	26.74	31.43	32.50
203	43360	25.55	30.97	32.45	253	46096	26.61	31.20	32.46
204	44848	25.51	30.86	32.47	254	60016	26.46	30.94	32.10
205	43712	25.11	30.52	32.12	255	64768	26.41	30.88	32.20
206	42400	24.97	30.30	31.93	256	60912	26.05	30.68	31.95
207	38144	24.81	30.11	31.72	257	48096	25.86	30.47	31.89
208	39168	24.68	29.99	31.51	258	38016	25.65	30.35	31.69
209	41952	24.71	29.93	31.54	259	36544	25.43	30.15	31.58
210	43280	24.54	29.91	31.45	260	34464	25.39	30.10	31.48
211	44048	24.52	29.73	31.37	261	34928	25.11	29.88	31.36
212	42704	24.63	29.76	31.33	262	36592	24.92	29.75	31.31
213	42512	24.50	29.57	31.15	263	40304	24.79	29.61	31.14
214	42160	24.57	29.53	31.14	264	552912	29.56	35.51	35.72
215	42864	24.60	29.46	31.04	265	41840	24.73	32.71	33.36
216	563888	30.09	35.96	36.16	266	26304	28.49	34.63	35.02
217	44480	25.37	33.10	33.73	267	40960	25.61	32.41	33.10
218	30448	27.20	34.39	34.91	268	34864	27.17	33.38	34.16
219	36912	25.87	32.79	33.63	269	49696	25.99	31.90	32.94
220	45520	25.81	32.71	33.53	270	47008	26.77	32.51	33.50
221	41184	26.28	32.59	33.65	271	50240	26.47	31.60	32.70
222	45936	25.66	31.97	32.96	272	46112	27.01	32.27	33.25
223	41408	26.34	32.14	33.34	273	49872	27.00	31.70	32.66
224	54912	26.00	31.51	32.59	274	47936	27.46	32.24	33.29
225	58752	26.31	31.66	32.86	275	54224	27.17	31.60	32.45
226	63872	26.23	31.45	32.64	276	54272	27.63	32.02	32.94
227	60752	25.93	31.11	32.28	277	56752	27.46	31.49	32.25
228	41264	26.19	31.23	32.41	278	62384	27.51	31.61	32.48
229	36992	25.78	30.87	32.13	279	58992	27.23	31.16	32.08
230	43696	25.86	30.93	32.24	280	48720	26.95	31.25	32.15
231	49872	25.43	30.47	31.88	281	37296	27.07	31.07	31.91
232	47840	25.31	30.43	31.90	282	35248	27.00	31.17	32.05
233	45248	25.15	30.15	31.75	283	34576	26.89	30.92	31.79
234	42496	25.03	30.10	31.72	284	35104	26.81	31.08	31.98
235	38272	24.96	29.90	31.60	285	36160	26.65	30.78	31.75
236	37520	24.84	29.81	31.43	286	37344	26.39	30.76	31.79
237	38992	24.97	29.76	31.40	287	40128	26.30	30.42	31.39
238	36896	24.94	29.77	31.40	288	564576	29.65	35.51	35.68
239	36720	25.11	29.74	31.37	289	38256	24.47	32.52	33.32
240	560320	30.11	36.03	36.17	290	30592	28.12	34.29	34.70
241	42960	25.28	33.06	33.83	291	64864	26.44	32.19	32.96
242	27232	28.40	34.90	35.40	292	55616	27.13	32.84	33.69
243	39968	26.07	32.67	33.67	293	57808	26.59	31.74	32.71
244	46528	26.81	33.17	34.37	294	60656	26.25	31.63	32.69
245	50656	26.56	32.39	33.64	295	45376	26.19	31.22	32.40
246	55488	26.48	32.17	33.51	296	37936	25.82	31.13	32.29
247	49936	26.72	31.95	33.34	297	42000	25.79	30.75	32.18
248	58432	26.51	31.65	32.90	298	46496	25.30	30.55	31.82
249	51360	26.77	31.60	33.06	299	40640	25.42	30.32	31.90

Sequence : flower garden
Bit rate : 9Mbps

Institute : NHK
Date : / /91

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
0	900560	35.04	40.96	41.43	50	103376	32.04	36.73	37.18
1	223280	33.96	37.04	37.29	51	92672	32.22	35.84	35.83
2	73616	32.63	37.39	37.88	52	98960	32.72	36.73	36.98
3	99184	33.06	36.33	36.50	53	120672	33.16	36.16	36.04
4	135744	33.60	36.94	37.28	54	119216	33.41	36.77	36.92
5	133360	33.71	36.37	36.53	55	125824	33.23	36.00	35.88
6	120048	33.72	36.75	36.96	56	119904	32.64	35.92	36.31
7	111232	33.65	36.30	36.26	57	117328	32.12	35.16	35.23
8	111184	33.75	36.64	36.63	58	94736	31.67	35.14	35.37
9	116768	33.38	35.98	35.99	59	88496	31.62	34.80	34.75
10	120032	32.84	35.71	35.94	60	95984	32.02	35.19	35.14
11	122784	32.36	34.98	35.25	61	118112	32.74	35.38	35.01
12	106880	31.75	34.74	35.05	62	120400	32.79	35.58	35.42
13	87968	31.39	34.41	34.59	63	116672	32.69	35.41	35.06
14	81808	31.38	34.50	34.61	64	114832	32.66	35.48	35.17
15	105008	31.79	34.51	34.57	65	113680	32.53	35.15	34.92
16	111120	31.81	34.55	34.63	66	115152	31.98	34.82	34.80
17	125776	32.36	34.85	34.75	67	128304	31.51	34.37	34.58
18	116656	32.45	34.90	34.84	68	125200	30.87	33.92	34.24
19	118416	32.66	35.03	34.88	69	96256	30.29	33.61	34.01
20	115136	32.34	34.81	34.77	70	80752	30.32	33.56	33.86
21	120400	31.92	34.41	34.49	71	77424	30.46	33.63	33.74
22	124096	31.52	34.06	34.30	72	921072	34.15	40.39	40.37
23	120528	31.05	33.74	34.08	73	235136	33.05	36.42	36.43
24	857312	34.27	40.39	40.61	74	52016	31.98	37.77	38.26
25	225824	33.33	36.58	36.83	75	86832	32.44	36.15	36.00
26	114720	32.14	36.55	36.95	76	136000	32.89	36.70	37.03
27	103424	32.23	35.83	36.10	77	145056	32.90	35.85	35.72
28	92624	31.98	35.91	35.99	78	129024	32.75	36.08	36.36
29	92784	32.27	35.67	35.74	79	123136	32.27	35.26	35.42
30	106576	32.43	35.84	35.91	80	121504	31.92	35.10	35.63
31	122752	32.71	35.57	35.65	81	115568	31.73	34.64	34.90
32	139808	32.59	35.31	35.52	82	100704	31.35	34.49	34.87
33	112000	32.20	35.03	35.22	83	88720	31.11	34.34	34.43
34	115024	31.98	34.79	34.97	84	89216	30.85	34.18	34.36
35	128400	31.52	34.32	34.71	85	98640	30.92	34.00	34.12
36	123584	30.89	33.97	34.40	86	125792	31.10	33.89	34.14
37	103824	30.03	33.43	33.95	87	131696	30.97	33.62	33.87
38	90160	29.85	33.29	33.77	88	125920	30.61	33.42	33.69
39	79776	29.74	33.18	33.54	89	104496	30.11	33.11	33.41
40	85200	30.01	33.31	33.58	90	96528	29.95	32.98	33.20
41	99920	30.54	33.58	33.61	91	95728	29.91	32.95	33.10
42	125424	31.14	33.87	33.85	92	101040	30.28	33.17	33.19
43	135872	31.55	34.03	34.00	93	105104	30.56	33.27	33.26
44	116992	31.50	34.12	34.04	94	113840	31.07	33.55	33.52
45	108368	31.52	34.16	34.09	95	116384	31.24	33.68	33.62
46	112512	31.54	34.13	34.08	96	920048	33.49	39.62	39.73
47	100720	31.39	34.09	33.98	97	224368	32.58	35.85	35.93
48	894496	34.25	40.54	40.59	98	108160	31.30	35.87	36.49
49	235952	33.27	36.60	36.49	99	107984	31.34	34.97	35.41

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
100	117248	30.97	34.58	34.94	150	136960	31.24	34.77	35.34
101	83744	31.18	34.79	34.89	151	123984	30.93	34.25	34.62
102	97568	31.40	34.96	34.96	152	90624	30.67	34.28	34.54
103	98528	31.97	35.19	35.06	153	80080	30.99	34.27	34.30
104	139120	32.09	34.79	34.94	154	91120	31.45	34.67	34.63
105	149696	31.54	34.45	34.92	155	110224	31.69	34.47	34.45
106	132560	30.56	33.77	34.34	156	135056	31.53	34.20	34.35
107	111920	30.00	33.42	33.97	157	124640	31.18	33.91	33.97
108	84192	29.53	33.16	33.91	158	107600	30.97	33.86	33.89
109	72240	29.23	32.90	33.55	159	93760	30.96	33.85	33.81
110	77872	29.56	32.95	33.48	160	97712	31.14	33.93	33.92
111	98784	30.24	33.17	33.48	161	104992	31.54	34.13	33.93
112	125184	30.84	33.48	33.67	162	111984	32.04	34.62	34.25
113	145584	31.13	33.45	33.75	163	122704	32.09	34.57	34.20
114	130560	30.59	33.25	33.55	164	116352	32.00	34.60	34.31
115	107728	30.41	33.14	33.41	165	109952	31.69	34.36	34.10
116	87104	30.50	33.31	33.38	166	116864	31.52	34.11	34.01
117	95968	30.87	33.45	33.49	167	112480	31.21	33.87	33.74
118	108080	31.10	33.57	33.63	168	891920	33.29	39.37	39.48
119	112768	31.07	33.51	33.58	169	224144	32.37	35.72	35.73
120	913232	33.70	39.84	39.95	170	79344	32.61	37.61	37.53
121	224656	32.60	35.96	35.99	171	114608	32.59	35.80	35.54
122	81808	31.62	37.01	37.35	172	131264	32.41	36.14	36.30
123	122800	31.65	35.10	35.46	173	123616	32.06	35.09	35.01
124	146736	31.29	34.77	35.20	174	110768	31.80	35.24	35.32
125	112128	30.68	34.15	34.66	175	97280	31.61	34.81	34.67
126	85600	30.41	34.00	34.38	176	96352	31.71	35.08	34.98
127	90080	30.38	33.83	34.21	177	107760	31.97	34.93	34.61
128	103104	30.47	33.74	34.00	178	113472	31.82	34.83	34.76
129	120000	30.71	33.74	34.00	179	121216	31.81	34.64	34.33
130	123264	30.62	33.48	33.69	180	113536	31.71	34.60	34.41
131	114112	30.62	33.49	33.62	181	112576	31.61	34.35	34.10
132	101520	30.59	33.53	33.53	182	108672	31.15	34.00	34.00
133	99776	30.87	33.74	33.64	183	108896	30.78	33.73	33.70
134	105360	31.11	33.91	33.70	184	98768	30.58	33.57	33.49
135	105072	31.36	34.10	33.80	185	101504	30.79	33.67	33.44
136	114864	31.76	34.41	34.07	186	111088	30.93	33.65	33.44
137	121488	31.96	34.40	34.16	187	107152	30.95	33.57	33.47
138	125296	31.89	34.22	34.11	188	111264	31.05	33.65	33.52
139	121072	31.55	33.94	33.91	189	108976	31.07	33.71	33.58
140	119136	31.21	33.69	33.72	190	105744	31.28	33.85	33.61
141	105968	30.60	33.32	33.39	191	107856	31.43	33.93	33.61
142	89440	30.28	33.15	33.22	192	925856	33.38	39.45	39.56
143	90656	30.27	33.22	33.16	193	223408	32.28	35.76	35.80
144	916976	32.96	39.12	39.16	194	104304	31.59	36.37	36.75
145	225136	32.03	35.45	35.40	195	117456	31.26	34.93	35.28
146	51760	31.35	37.23	37.50	196	130224	30.56	34.30	34.62
147	95632	31.73	35.46	35.34	197	115632	30.11	33.79	34.32
148	143472	32.26	36.22	36.69	198	96240	29.77	33.47	33.75
149	144048	31.80	34.87	35.13	199	94944	29.39	33.16	33.62

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
200	98704	29.18	32.78	33.30	250	74240	29.89	33.41	33.36
201	110352	29.30	32.73	33.16	251	94448	30.49	33.73	33.55
202	109072	29.45	32.72	33.10	252	116464	30.81	33.80	33.68
203	116336	29.54	32.68	33.01	253	133200	30.94	33.67	33.59
204	117008	29.33	32.45	32.89	254	137040	30.57	33.30	33.28
205	111584	29.04	32.28	32.68	255	135904	30.11	32.87	33.10
206	108144	28.92	32.05	32.43	256	122816	29.43	32.50	32.73
207	97840	28.78	32.02	32.27	257	100864	29.03	32.33	32.55
208	105744	28.93	32.03	32.20	258	74048	28.70	32.15	32.34
209	121968	29.05	31.98	32.22	259	77872	28.73	32.14	32.26
210	119728	28.85	32.02	32.19	260	98080	29.24	32.37	32.34
211	114848	28.61	31.89	32.16	261	115712	29.58	32.42	32.39
212	109632	28.55	31.79	32.06	262	127840	29.80	32.46	32.47
213	96768	28.47	31.72	31.96	263	120608	29.74	32.44	32.40
214	100080	28.49	31.63	31.88	264	914448	32.13	38.44	38.47
215	108464	28.65	31.66	31.88	265	215184	30.95	34.73	34.60
216	917536	32.70	38.95	38.98	266	65088	31.45	36.86	36.89
217	220416	31.68	35.18	35.12	267	113920	31.22	34.74	34.49
218	70160	30.31	36.00	36.39	268	139744	31.61	35.43	35.71
219	99152	30.69	34.46	34.66	269	139168	30.95	34.08	34.18
220	136080	30.49	34.34	34.63	270	103568	30.67	34.45	34.70
221	129072	30.29	33.72	34.11	271	98672	30.48	33.79	33.74
222	108112	29.86	33.50	33.73	272	90320	30.52	34.22	34.32
223	102432	29.91	33.38	33.68	273	95440	30.85	34.00	33.80
224	118176	29.85	33.15	33.29	274	119776	31.19	34.37	34.44
225	127920	29.53	32.86	33.26	275	119840	31.11	33.97	33.70
226	119072	29.07	32.73	33.18	276	118000	31.31	34.27	34.12
227	113936	28.78	32.35	32.77	277	114096	31.20	33.93	33.55
228	75472	28.88	32.63	32.89	278	123264	31.10	33.85	33.61
229	83408	29.03	32.49	32.73	279	119248	30.66	33.37	33.23
230	116352	29.50	32.65	32.83	280	97536	30.36	33.40	33.19
231	130528	29.39	32.29	32.52	281	83312	30.55	33.45	33.17
232	119664	29.23	32.27	32.52	282	96768	30.90	33.71	33.29
233	120000	29.22	32.14	32.39	283	118992	31.20	33.72	33.42
234	107680	29.11	32.12	32.40	284	119536	31.36	33.92	33.54
235	96208	28.98	32.05	32.25	285	115920	31.42	33.88	33.57
236	93856	29.07	32.14	32.24	286	114704	31.18	33.79	33.44
237	95168	29.20	32.19	32.26	287	102288	30.87	33.54	33.19
238	110736	29.79	32.54	32.44	288	916592	32.27	38.42	38.40
239	112224	30.05	32.70	32.61	289	205440	30.70	34.55	34.48
240	934320	32.77	39.05	39.00	290	97888	31.58	36.30	36.44
241	210768	31.63	35.34	35.20	291	126304	30.98	34.22	34.14
242	70144	31.78	37.14	37.36	292	131952	30.85	34.53	34.91
243	111520	31.76	35.22	35.07	293	121456	30.09	33.39	33.54
244	151904	31.69	35.30	35.77	294	110816	29.53	33.14	33.48
245	136544	31.12	34.39	34.60	295	92384	29.25	32.80	33.01
246	114544	30.58	34.10	34.49	296	84096	29.17	32.85	32.97
247	106272	30.19	33.56	33.94	297	107264	29.33	32.54	32.76
248	105840	29.83	33.29	33.60	298	125424	29.35	32.44	32.56
249	89728	29.63	33.12	33.50	299	103840	29.23	32.39	32.49

Sequence : mobile & calendar
Bit rate : 4Mbps

Institute : NHK
Date : / /91

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
0	476928	26.71	35.67	36.51	50	33104	25.65	34.63	35.12
1	105824	26.19	33.54	34.39	51	33264	25.63	32.96	33.53
2	51792	25.54	34.21	34.75	52	48016	25.61	33.97	34.39
3	48448	25.63	33.42	34.01	53	53200	25.59	32.67	33.20
4	59936	25.32	33.37	33.77	54	54544	25.65	33.50	33.87
5	55008	25.09	33.00	33.36	55	53104	25.54	32.38	32.84
6	47520	24.97	32.90	33.19	56	51600	25.62	33.08	33.42
7	47488	24.77	32.50	32.78	57	48288	25.43	32.15	32.57
8	45776	24.67	32.49	32.80	58	47376	25.51	32.75	33.05
9	44464	24.45	32.11	32.48	59	48800	25.35	31.94	32.29
10	44320	24.25	32.11	32.34	60	47616	25.36	32.48	32.71
11	41696	24.18	31.87	32.07	61	44160	25.09	31.72	32.00
12	39776	24.10	31.81	31.99	62	42480	25.08	32.16	32.40
13	40368	23.97	31.67	31.79	63	40416	24.93	31.47	31.80
14	41104	23.82	31.58	31.65	64	40928	25.00	31.90	32.14
15	40352	23.77	31.38	31.49	65	40320	24.84	31.32	31.60
16	38896	23.85	31.39	31.42	66	40976	24.94	31.75	31.91
17	40704	23.92	31.22	31.36	67	42928	24.84	31.20	31.49
18	44480	24.05	31.18	31.34	68	44400	24.91	31.54	31.77
19	43568	24.03	31.09	31.19	69	45888	24.81	31.10	31.35
20	41488	23.98	31.01	31.16	70	45824	24.87	31.37	31.55
21	43104	24.10	31.02	31.17	71	45552	24.81	30.94	31.22
22	45696	24.23	31.00	31.20	72	470688	26.32	35.40	36.13
23	46224	24.28	30.91	31.19	73	134608	26.61	33.35	34.16
24	481264	26.60	35.62	36.43	74	35872	25.52	34.61	35.05
25	119664	26.47	33.47	34.38	75	37056	25.53	32.93	33.59
26	35024	25.47	34.69	35.25	76	44992	25.38	33.74	34.10
27	35792	25.60	33.23	33.90	77	44080	25.36	32.51	33.05
28	45376	25.53	34.15	34.64	78	46032	25.39	33.28	33.61
29	47344	25.48	32.91	33.48	79	46048	25.29	32.23	32.68
30	51632	25.49	33.77	34.16	80	47408	25.30	32.87	33.19
31	57920	25.43	32.64	33.15	81	48496	25.16	31.96	32.45
32	52016	25.40	33.30	33.67	82	51456	25.21	32.43	32.80
33	48144	25.22	32.39	32.88	83	51184	25.03	31.70	32.12
34	49120	25.24	32.94	33.38	84	48544	24.92	32.12	32.42
35	47904	25.17	32.21	32.71	85	44336	24.76	31.47	31.91
36	45104	25.05	32.66	33.00	86	42416	24.73	31.88	32.14
37	43328	24.87	31.99	32.39	87	41296	24.63	31.30	31.62
38	44048	24.84	32.34	32.64	88	42096	24.69	31.61	31.91
39	46096	24.73	31.77	32.11	89	42912	24.59	31.10	31.43
40	45664	24.78	32.10	32.39	90	44624	24.66	31.38	31.66
41	44864	24.72	31.60	31.97	91	45888	24.54	30.93	31.25
42	44992	24.73	31.93	32.23	92	46256	24.56	31.22	31.40
43	42896	24.54	31.40	31.73	93	46112	24.49	30.79	31.04
44	44512	24.59	31.69	32.00	94	44768	24.53	31.02	31.21
45	44080	24.52	31.27	31.53	95	44816	24.50	30.69	30.94
46	44304	24.56	31.52	31.80	96	471408	26.32	35.28	36.00
47	44208	24.52	31.12	31.40	97	131728	26.62	33.29	33.96
48	467456	26.37	35.41	36.21	98	32400	25.47	34.51	34.90
49	127504	26.53	33.37	34.15	99	33248	25.55	32.93	33.35

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
100	44512	25.43	33.72	34.05	150	48144	24.77	32.19	32.32
101	47392	25.42	32.58	32.97	151	51744	24.74	31.73	31.88
102	50192	25.60	33.30	33.59	152	52448	24.56	31.76	31.78
103	51536	25.46	32.30	32.72	153	47056	24.54	31.39	31.40
104	54480	25.54	32.83	33.19	154	42144	24.49	31.34	31.37
105	52096	25.37	32.03	32.47	155	41360	24.58	31.12	31.12
106	47264	25.25	32.42	32.76	156	40352	24.62	31.13	31.21
107	49200	25.10	31.75	32.11	157	40272	24.71	30.97	30.97
108	47280	25.07	32.08	32.35	158	44512	24.81	30.99	31.10
109	43888	24.78	31.47	31.72	159	48320	24.84	30.86	30.94
110	42912	24.76	31.73	31.95	160	47376	24.85	30.90	30.99
111	43584	24.65	31.26	31.49	161	44768	24.91	30.77	30.82
112	44272	24.64	31.42	31.61	162	44176	24.95	30.74	30.86
113	46704	24.52	31.03	31.25	163	44048	24.97	30.63	30.69
114	46224	24.51	31.13	31.25	164	42800	25.02	30.65	30.78
115	46112	24.36	30.79	30.94	165	48256	25.14	30.56	30.72
116	43568	24.32	30.81	30.96	166	49248	25.21	30.61	30.72
117	40544	24.20	30.60	30.74	167	47536	25.22	30.48	30.65
118	40960	24.27	30.59	30.80	168	458640	25.98	34.89	35.55
119	41344	24.24	30.47	30.61	169	136880	26.68	33.19	33.83
120	471504	26.23	35.15	35.83	170	40576	25.51	34.05	34.59
121	131216	26.46	33.19	33.82	171	40160	25.80	32.72	33.22
122	31728	25.20	34.12	34.51	172	46512	25.76	33.49	33.87
123	31440	25.33	32.75	33.10	173	49024	25.83	32.34	32.77
124	42160	25.02	33.36	33.57	174	54240	25.81	32.89	33.26
125	43760	25.20	32.36	32.67	175	50208	25.68	31.98	32.34
126	50288	25.16	32.65	32.88	176	50528	25.66	32.50	32.75
127	53472	25.29	32.06	32.46	177	48512	25.47	31.72	31.99
128	50816	25.11	32.22	32.57	178	44016	25.45	32.15	32.34
129	50128	25.13	31.80	32.19	179	42960	25.30	31.40	31.67
130	50496	25.01	31.89	32.14	180	42752	25.24	31.76	31.94
131	46864	24.91	31.53	31.83	181	44608	25.16	31.16	31.38
132	44016	24.79	31.57	31.73	182	45616	25.17	31.48	31.67
133	45152	24.61	31.27	31.46	183	48064	25.05	30.92	31.14
134	44000	24.51	31.27	31.39	184	46144	25.02	31.19	31.34
135	43056	24.39	31.05	31.22	185	43952	24.83	30.68	30.91
136	44512	24.43	31.03	31.16	186	41488	24.80	30.93	31.11
137	45680	24.39	30.85	31.06	187	44080	24.77	30.57	30.70
138	45536	24.35	30.81	30.97	188	44352	24.83	30.80	30.92
139	44144	24.34	30.66	30.79	189	44720	24.80	30.48	30.59
140	45184	24.39	30.58	30.75	190	42144	24.79	30.63	30.77
141	45744	24.31	30.47	30.62	191	41552	24.72	30.34	30.45
142	45088	24.37	30.43	30.54	192	458192	25.89	34.84	35.49
143	46608	24.32	30.34	30.51	193	145248	26.69	33.13	33.64
144	457840	25.94	34.92	35.62	194	33040	25.33	33.96	34.28
145	137184	26.61	33.15	33.77	195	32032	26.05	32.62	32.93
146	36176	24.97	33.84	34.16	196	37760	25.43	33.31	33.43
147	38368	25.40	32.61	32.98	197	38096	26.00	32.22	32.51
148	47456	24.91	32.80	33.02	198	46160	25.75	32.85	33.00
149	46928	25.02	32.15	32.41	199	50368	26.20	31.98	32.26

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
200	57232	26.08	32.45	32.72	250	49216	26.21	32.64	32.98
201	55200	26.29	31.77	32.05	251	48128	26.16	31.85	32.28
202	54672	26.20	32.17	32.38	252	47440	26.10	32.48	32.70
203	48496	26.21	31.54	31.77	253	44768	26.01	31.72	32.04
204	46976	26.18	31.84	32.07	254	40608	26.01	32.26	32.54
205	47648	26.15	31.37	31.64	255	40256	26.11	31.68	32.08
206	44384	26.13	31.60	31.76	256	42480	26.26	32.31	32.58
207	43280	26.06	31.18	31.39	257	39904	26.37	31.73	32.10
208	47568	26.09	31.40	31.54	258	41824	26.62	32.35	32.65
209	46592	25.99	31.02	31.22	259	42624	26.71	31.79	32.20
210	44608	25.96	31.18	31.33	260	43440	26.80	32.34	32.70
211	41760	25.84	30.83	30.97	261	48128	26.92	31.82	32.29
212	40896	25.79	31.00	31.04	262	50240	26.88	32.29	32.65
213	42464	25.73	30.69	30.79	263	52784	26.90	31.77	32.24
214	40416	25.66	30.80	30.85	264	458000	26.84	34.89	35.67
215	40720	25.51	30.50	30.59	265	135392	27.71	33.14	33.80
216	460272	26.07	34.90	35.51	266	50208	26.91	34.17	34.73
217	143632	26.91	33.15	33.66	267	41488	27.18	32.84	33.45
218	37136	25.58	33.94	34.11	268	47760	27.03	33.76	34.25
219	36768	26.04	32.61	32.87	269	47536	27.08	32.59	33.17
220	45168	25.51	33.26	33.34	270	47280	27.00	33.34	33.86
221	44192	25.67	32.23	32.38	271	46272	26.90	32.31	32.84
222	44016	25.57	32.74	32.85	272	43744	26.72	32.97	33.38
223	43472	25.76	31.91	32.12	273	41792	26.59	32.12	32.59
224	49040	25.68	32.41	32.46	274	44496	26.54	32.72	33.04
225	48112	25.74	31.65	31.78	275	46576	26.54	31.94	32.38
226	50144	25.76	32.07	32.16	276	46480	26.44	32.46	32.72
227	50384	25.77	31.47	31.58	277	44816	26.39	31.80	32.22
228	50160	25.74	31.74	31.95	278	43936	26.39	32.32	32.57
229	48016	25.58	31.25	31.40	279	42752	26.34	31.71	32.11
230	46944	25.63	31.54	31.67	280	42160	26.40	32.23	32.44
231	48992	25.56	31.13	31.25	281	42240	26.43	31.73	32.08
232	46192	25.47	31.34	31.40	282	47968	26.53	32.26	32.45
233	44656	25.33	30.96	31.04	283	55008	26.38	31.64	32.04
234	42736	25.26	31.16	31.20	284	50784	26.15	32.02	32.20
235	43888	25.16	30.80	30.81	285	49392	26.09	31.47	31.80
236	43808	25.19	30.97	31.02	286	49984	25.96	31.84	31.97
237	43808	25.14	30.63	30.77	287	45664	25.76	31.28	31.50
238	43152	25.11	30.80	30.89	288	444416	25.90	34.44	35.08
239	40832	24.99	30.52	30.63	289	148672	27.02	32.77	33.38
240	455344	26.28	34.80	35.51	290	41952	25.78	33.70	34.19
241	139312	27.20	33.05	33.66	291	35696	26.19	32.40	32.98
242	33328	25.61	34.05	34.32	292	47408	25.75	33.23	33.63
243	32016	26.07	32.65	32.94	293	43920	25.85	32.10	32.53
244	45488	25.76	33.44	33.66	294	47856	25.64	32.78	33.09
245	45296	25.99	32.41	32.71	295	43632	25.53	31.79	32.17
246	49776	26.00	33.17	33.39	296	43392	25.37	32.38	32.58
247	48752	26.12	32.21	32.57	297	42624	25.31	31.51	31.80
248	53216	26.10	32.84	33.17	298	42928	25.27	32.06	32.21
249	50944	26.21	32.02	32.44	299	41344	25.23	31.31	31.54

Sequence : mobile & calendar
Bit rate : 9Mbps

Institute : NHK
Date : / /91

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
0	872160	29.95	39.42	40.35	50	73488	28.69	37.30	37.93
1	246544	29.80	35.46	36.56	51	105760	29.06	34.78	35.67
2	100304	28.25	36.10	36.85	52	133488	29.34	36.28	36.93
3	98416	28.35	34.91	35.75	53	121296	28.87	34.44	35.20
4	120800	28.03	34.85	35.54	54	109008	28.85	35.49	36.17
5	112992	27.82	34.22	34.87	55	111552	28.66	34.13	34.81
6	109968	27.81	34.20	34.79	56	110912	28.78	34.94	35.55
7	112656	27.80	33.70	34.35	57	114304	28.67	33.93	34.54
8	110128	27.76	33.79	34.39	58	108464	28.75	34.59	35.10
9	114192	27.65	33.33	33.99	59	110496	28.63	33.78	34.33
10	111856	27.48	33.37	33.90	60	109056	28.63	34.26	34.74
11	102784	27.29	33.01	33.56	61	111168	28.46	33.57	34.08
12	106112	27.46	33.10	33.64	62	105248	28.44	33.92	34.37
13	103568	27.17	32.84	33.34	63	106688	28.44	33.40	33.94
14	109888	27.21	32.81	33.34	64	109536	28.58	33.76	34.21
15	110528	27.20	32.66	33.18	65	108496	28.48	33.35	33.83
16	106816	27.31	32.69	33.17	66	110864	28.58	33.70	34.14
17	107728	27.44	32.60	33.13	67	119552	28.67	33.36	33.88
18	117328	27.66	32.72	33.19	68	111712	28.51	33.51	33.96
19	112672	27.54	32.57	33.04	69	103088	28.27	33.12	33.63
20	107952	27.54	32.58	33.09	70	109440	28.44	33.30	33.77
21	106896	27.57	32.54	33.04	71	111344	28.38	33.01	33.57
22	106672	27.68	32.60	33.10	72	874608	29.57	39.24	40.07
23	108496	27.77	32.57	33.10	73	240400	29.33	35.04	36.02
24	896688	29.83	39.49	40.37	74	99904	28.94	37.03	37.64
25	245920	29.70	35.25	36.26	75	112464	28.81	34.63	35.43
26	81568	28.46	37.10	37.76	76	115680	28.83	35.65	36.29
27	98320	28.80	34.85	35.74	77	114096	28.61	34.11	34.85
28	122192	29.08	36.24	36.93	78	110080	28.66	34.94	35.51
29	129280	29.05	34.54	35.35	79	112192	28.48	33.82	34.49
30	122752	28.82	35.55	36.20	80	110416	28.55	34.43	34.97
31	103568	28.27	34.11	34.81	81	111744	28.39	33.61	34.20
32	100704	28.26	34.84	35.46	82	110512	28.40	34.03	34.53
33	105312	28.13	33.78	34.47	83	112176	28.21	33.35	33.94
34	107872	28.24	34.41	35.03	84	105824	28.03	33.59	34.11
35	109488	28.22	33.63	34.33	85	108368	28.04	33.12	33.63
36	110176	28.30	34.11	34.77	86	111664	28.12	33.44	33.90
37	111344	28.16	33.46	34.10	87	107744	28.08	33.01	33.56
38	110704	28.23	33.83	34.44	88	107536	28.16	33.30	33.74
39	112560	28.14	33.30	33.91	89	110176	28.13	32.93	33.46
40	109776	28.16	33.60	34.18	90	111936	28.11	33.12	33.61
41	110208	28.13	33.18	33.84	91	111952	28.02	32.77	33.33
42	110352	28.16	33.43	33.99	92	112256	28.05	32.94	33.38
43	111760	28.03	33.04	33.61	93	111232	27.95	32.70	33.16
44	110320	28.07	33.27	33.79	94	109632	28.04	32.80	33.27
45	110176	27.98	32.92	33.51	95	108784	27.97	32.61	33.06
46	110192	28.03	33.13	33.66	96	873376	29.50	39.04	39.84
47	108112	27.97	32.88	33.41	97	240336	29.39	34.95	35.82
48	888096	29.70	39.40	40.25	98	88896	28.77	36.93	37.49
49	248400	29.54	35.17	36.16	99	107328	28.88	34.53	35.31

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
100	126768	29.05	35.71	36.24	150	107040	27.92	33.72	34.21
101	112736	28.60	34.13	34.85	151	105104	27.65	33.10	33.50
102	107472	28.79	35.01	35.56	152	104288	27.44	33.05	33.44
103	108944	28.36	33.76	34.41	153	108320	27.53	32.78	33.13
104	111088	28.56	34.43	34.99	154	104448	27.70	32.79	33.18
105	114656	28.35	33.56	34.14	155	106544	27.91	32.67	33.06
106	111792	28.35	33.99	34.46	156	104944	28.07	32.78	33.15
107	112992	28.16	33.30	33.82	157	115984	28.36	32.80	33.25
108	110240	28.22	33.60	34.04	158	110272	28.23	32.80	33.31
109	111616	28.08	33.10	33.53	159	108240	28.19	32.78	33.17
110	110512	28.10	33.30	33.75	160	107664	28.29	32.84	33.18
111	109968	27.96	32.93	33.36	161	106240	28.44	32.82	33.24
112	110368	28.03	33.06	33.53	162	117984	28.62	32.91	33.37
113	110672	27.85	32.75	33.18	163	108608	28.55	32.82	33.25
114	106608	27.76	32.78	33.16	164	106720	28.69	32.91	33.28
115	110544	27.72	32.57	32.94	165	113424	28.62	32.79	33.21
116	109760	27.72	32.54	32.97	166	108448	28.58	32.80	33.22
117	105328	27.69	32.44	32.83	167	107856	28.60	32.71	33.19
118	109872	27.86	32.48	32.89	168	898624	29.52	39.10	39.86
119	109968	27.86	32.43	32.79	169	231664	29.28	34.92	35.82
120	882320	29.53	39.14	39.89	170	93120	28.76	36.48	37.08
121	239152	29.29	34.86	35.73	171	110512	28.85	34.34	35.09
122	87936	28.50	36.61	37.07	172	114864	29.17	35.52	36.13
123	115760	28.83	34.47	35.12	173	124464	29.02	34.02	34.70
124	128640	28.87	35.39	35.91	174	111760	28.95	34.74	35.24
125	117568	28.73	33.99	34.63	175	114688	28.79	33.67	34.24
126	105184	28.46	34.46	34.95	176	111184	28.77	34.23	34.71
127	112400	28.52	33.69	34.27	177	103504	28.55	33.38	33.89
128	113664	28.36	33.87	34.42	178	107248	28.72	33.85	34.27
129	102448	28.02	33.28	33.82	179	112992	28.56	33.23	33.69
130	99728	27.90	33.37	33.87	180	109360	28.68	33.55	33.99
131	102864	27.87	33.03	33.50	181	111456	28.54	33.06	33.51
132	109264	27.95	33.11	33.59	182	111376	28.57	33.28	33.71
133	112992	27.87	32.84	33.25	183	115008	28.46	32.87	33.33
134	109072	27.81	32.84	33.26	184	110560	28.40	33.04	33.50
135	113792	27.80	32.69	33.08	185	111936	28.24	32.73	33.17
136	112016	27.73	32.69	33.11	186	99296	28.13	32.81	33.22
137	110896	27.70	32.52	32.98	187	108336	28.24	32.67	33.07
138	115264	27.81	32.56	32.99	188	109744	28.30	32.80	33.17
139	111088	27.80	32.37	32.80	189	109472	28.35	32.64	33.04
140	110832	27.80	32.42	32.82	190	115328	28.49	32.79	33.19
141	111568	27.76	32.31	32.71	191	113152	28.45	32.65	33.04
142	109888	27.81	32.33	32.74	192	870768	29.25	38.84	39.56
143	111312	27.71	32.23	32.59	193	240160	29.19	34.84	35.57
144	877856	29.35	38.97	39.72	194	90960	29.20	36.43	36.99
145	235792	29.21	34.87	35.75	195	116992	29.58	34.62	35.26
146	95760	28.35	36.14	36.64	196	117760	29.71	35.44	36.01
147	110672	28.52	34.24	34.92	197	111312	29.67	34.31	34.92
148	128032	28.42	34.68	35.21	198	118064	29.84	34.89	35.44
149	121424	28.28	33.70	34.29	199	115360	29.69	34.05	34.63

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
200	109408	29.66	34.41	34.91	250	110160	29.69	34.80	35.38
201	104192	29.48	33.75	34.25	251	110512	29.65	33.96	34.65
202	109536	29.58	34.01	34.54	252	112848	29.64	34.63	35.19
203	113376	29.47	33.53	34.05	253	112272	29.61	33.88	34.57
204	107424	29.56	33.73	34.26	254	103296	29.80	34.53	35.14
205	109792	29.51	33.46	33.96	255	108336	30.04	34.03	34.75
206	108640	29.65	33.63	34.16	256	105824	30.37	34.75	35.42
207	112480	29.63	33.45	33.94	257	115248	30.74	34.45	35.21
208	111728	29.63	33.47	33.94	258	115152	31.08	35.10	35.82
209	111296	29.47	33.27	33.78	259	109280	31.14	34.74	35.49
210	114016	29.46	33.35	33.79	260	108336	31.17	35.17	35.85
211	101776	29.17	33.03	33.44	261	113248	30.97	34.66	35.42
212	111392	29.26	33.16	33.61	262	107168	30.52	34.82	35.44
213	113888	29.07	32.99	33.45	263	110896	30.42	34.41	35.13
214	109936	29.08	33.05	33.45	264	874864	30.33	39.06	39.89
215	107856	29.03	32.95	33.37	265	225728	30.34	34.94	35.87
216	880144	29.39	38.86	39.58	266	119216	30.53	37.19	37.90
217	231440	29.31	34.88	35.66	267	115648	30.31	34.73	35.67
218	104848	29.30	36.26	36.71	268	108480	30.43	36.30	37.02
219	114912	29.24	34.27	34.83	269	114736	30.26	34.53	35.37
220	124064	29.24	35.24	35.72	270	107168	30.36	35.59	36.29
221	115648	28.80	33.84	34.33	271	111616	30.15	34.32	35.16
222	103200	29.12	34.53	35.03	272	110480	30.14	35.06	35.75
223	102048	28.98	33.58	34.06	273	105120	29.86	34.09	34.84
224	111536	29.05	34.11	34.48	274	106784	29.92	34.70	35.33
225	112912	28.89	33.31	33.76	275	114240	29.93	34.04	34.74
226	100640	28.83	33.73	34.10	276	109792	29.92	34.47	35.10
227	108080	28.82	33.16	33.65	277	108096	29.87	33.98	34.63
228	109952	28.90	33.50	33.91	278	105472	30.03	34.44	35.04
229	111312	28.76	33.02	33.52	279	99200	30.04	34.06	34.69
230	111568	28.78	33.35	33.76	280	115200	30.47	34.76	35.36
231	110736	28.62	32.93	33.42	281	119120	30.56	34.48	35.16
232	109136	28.63	33.19	33.59	282	120096	30.64	34.91	35.57
233	111920	28.57	32.88	33.35	283	119168	30.06	34.31	34.96
234	110384	28.57	33.03	33.51	284	108256	29.67	34.45	34.96
235	112400	28.53	32.79	33.25	285	102752	29.42	33.97	34.57
236	108960	28.55	32.92	33.36	286	104608	29.21	34.03	34.51
237	108368	28.55	32.76	33.21	287	100352	29.00	33.62	34.13
238	108384	28.52	32.81	33.33	288	884848	29.55	38.83	39.60
239	110400	28.53	32.75	33.24	289	247904	29.60	34.63	35.50
240	885392	29.81	39.01	39.81	290	84464	28.96	36.68	37.44
241	224880	29.67	34.78	35.65	291	108096	29.31	34.31	35.11
242	101248	29.35	36.91	37.50	292	122768	29.42	35.69	36.34
243	120800	29.44	34.51	35.23	293	113056	29.20	34.03	34.68
244	114448	29.40	35.86	36.41	294	112016	29.17	34.93	35.53
245	112304	29.27	34.16	34.87	295	121600	29.11	33.76	34.40
246	108512	29.47	35.39	35.92	296	111760	28.96	34.37	34.87
247	109840	29.45	34.01	34.71	297	106336	28.70	33.40	33.93
248	108992	29.51	35.00	35.59	298	99888	28.73	33.96	34.28
249	117712	29.57	33.97	34.70	299	105920	28.80	33.28	33.78

Sequence : table tennis
Bit rate : 4Mbps

Institute : NHK
Date : / /91

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
0	427056	26.24	40.89	42.73	50	44816	26.01	39.51	41.25
1	141440	25.09	38.45	40.01	51	50800	26.40	39.18	40.72
2	25792	25.57	40.18	41.57	52	51088	26.57	39.21	40.58
3	36304	24.91	38.28	39.71	53	45632	27.09	39.16	40.43
4	49152	25.98	40.04	41.22	54	47440	27.10	39.18	40.28
5	71120	25.82	38.46	39.69	55	44096	27.41	39.02	40.08
6	67312	26.52	40.07	41.16	56	44288	27.57	39.12	39.87
7	81328	25.83	38.47	39.64	57	45248	27.45	38.83	39.60
8	57600	25.47	39.56	40.68	58	43552	27.74	38.87	39.62
9	49936	25.00	38.43	39.46	59	44048	27.56	38.69	39.39
10	40544	24.65	39.00	40.07	60	42848	27.89	38.80	39.40
11	34656	24.40	38.39	39.11	61	45136	28.18	38.69	39.45
12	28416	24.28	38.78	39.48	62	45984	28.35	38.75	39.35
13	31616	24.31	38.21	38.71	63	46000	28.97	38.77	39.45
14	35168	24.25	38.60	39.06	64	45792	28.77	38.77	39.24
15	41984	24.31	38.24	38.56	65	43440	29.16	38.75	39.25
16	50576	24.21	38.40	38.89	66	45040	29.29	38.80	39.15
17	49856	24.36	38.44	38.77	67	43568	29.66	38.80	39.11
18	52784	24.23	38.13	38.64	68	48736	29.70	38.55	38.60
19	48816	24.24	38.39	38.60	69	44416	29.90	38.60	38.70
20	47808	23.97	37.97	38.52	70	43056	30.27	38.60	38.64
21	39296	24.02	38.24	38.63	71	44848	30.52	38.59	38.77
22	39264	23.89	37.79	38.66	72	450016	34.25	44.76	46.61
23	46480	24.03	38.11	38.62	73	75232	33.26	42.67	44.50
24	462128	26.70	41.28	43.21	74	69152	33.20	42.44	43.86
25	143520	25.13	38.44	40.12	75	90592	33.60	41.98	43.36
26	34288	25.02	40.45	41.50	76	69472	33.20	41.61	42.78
27	40352	24.34	38.38	39.73	77	58960	33.18	41.40	42.50
28	37056	25.12	40.20	41.12	78	53696	32.78	41.10	42.00
29	48928	24.28	38.45	39.59	79	45824	32.45	40.66	41.52
30	46432	24.66	39.71	40.57	80	42416	32.47	40.53	41.21
31	53712	24.23	38.46	39.29	81	39184	32.44	40.35	40.81
32	36432	24.56	39.58	40.19	82	39616	32.25	40.03	40.28
33	46272	24.38	38.35	39.05	83	39632	32.21	39.84	39.90
34	46960	25.03	39.75	40.02	84	39536	32.27	39.58	39.62
35	63792	24.34	38.18	38.84	85	40736	32.35	39.36	39.31
36	43600	24.95	39.60	39.64	86	42288	32.43	39.21	39.17
37	46624	24.45	38.09	38.58	87	43680	32.66	39.07	39.09
38	42528	24.94	39.49	39.38	88	46512	32.59	38.97	38.82
39	43680	24.59	38.01	38.39	89	45072	32.72	38.84	38.72
40	41712	25.10	39.22	39.06	90	44288	32.71	38.80	38.70
41	46944	24.58	37.94	38.17	91	45184	32.86	38.72	38.69
42	43184	24.61	38.92	38.75	92	47520	33.00	38.73	38.69
43	43216	24.07	37.76	37.92	93	46288	32.90	38.67	38.72
44	41808	24.13	38.39	38.33	94	46512	32.89	38.68	38.57
45	45856	23.96	37.81	37.75	95	45664	32.96	38.64	38.51
46	51264	24.06	37.93	37.99	96	461632	36.68	45.53	47.25
47	47296	24.20	37.77	37.76	97	97296	36.10	43.05	44.16
48	449584	27.68	41.40	43.34	98	51008	34.85	42.05	42.24
49	112944	26.72	39.45	41.31	99	57664	34.77	41.48	41.67

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
100	63232	34.59	41.02	41.16	150	22000	29.77	40.65	38.60
101	59200	34.53	40.64	40.73	151	21840	30.13	39.44	37.76
102	53360	34.14	40.23	40.10	152	22672	29.74	40.40	38.41
103	51408	33.94	39.75	39.61	153	24448	30.33	39.30	38.00
104	47024	33.63	39.42	39.15	154	27104	30.10	40.19	39.14
105	43616	33.12	38.93	38.51	155	38432	31.28	39.38	39.28
106	42480	32.99	38.73	38.14	156	97232	31.98	40.85	41.33
107	42192	32.81	38.31	37.85	157	99184	32.34	40.15	40.63
108	41584	32.58	38.07	37.50	158	83936	32.49	41.08	41.78
109	39504	32.52	37.83	37.45	159	66528	32.50	40.31	40.83
110	40800	32.46	37.76	37.28	160	52416	32.48	41.01	41.70
111	39616	32.29	37.55	37.14	161	46672	32.43	40.24	40.71
112	40208	32.44	37.64	37.09	162	43696	32.45	40.87	41.60
113	40576	32.38	37.39	37.00	163	47168	32.46	40.21	40.69
114	39856	32.41	37.37	37.08	164	55072	32.57	40.87	41.65
115	41520	32.30	37.33	37.06	165	46480	32.50	40.18	40.63
116	41584	32.27	37.33	37.03	166	37888	32.43	40.79	41.37
117	43696	32.41	37.37	37.16	167	42384	32.45	40.17	40.61
118	45424	32.49	37.35	37.17	168	459376	31.12	42.10	42.81
119	46416	32.71	37.45	37.42	169	135392	31.80	40.11	40.60
120	503360	36.69	45.11	46.53	170	58352	32.02	41.48	42.04
121	103968	36.21	42.70	44.00	171	40208	31.80	40.04	40.42
122	36736	34.27	41.31	42.15	172	38304	31.96	41.26	41.72
123	41008	33.99	40.72	41.24	173	45296	31.93	40.05	40.42
124	45264	33.93	40.34	40.80	174	42048	32.05	41.16	41.68
125	46448	33.88	40.04	40.47	175	45920	32.07	40.08	40.44
126	50784	33.76	39.84	40.19	176	41920	32.12	41.16	41.67
127	50672	33.79	39.73	39.92	177	46112	32.13	40.13	40.50
128	53472	33.71	39.63	39.87	178	42480	32.20	41.07	41.60
129	51024	33.59	39.37	39.52	179	43712	32.17	40.16	40.51
130	48224	33.36	39.13	39.24	180	43440	32.28	41.07	41.63
131	45824	33.08	38.71	38.86	181	44704	32.25	40.15	40.59
132	42608	33.03	38.66	38.72	182	42672	32.34	41.04	41.63
133	42176	32.76	38.31	38.37	183	56880	32.43	40.24	40.73
134	194352	27.09	37.18	36.81	184	53120	32.47	41.04	41.67
135	46320	27.24	36.77	36.17	185	45712	32.41	40.22	40.69
136	30512	27.27	37.23	36.43	186	44272	32.43	41.00	41.60
137	28048	27.19	36.81	35.66	187	45760	32.46	40.20	40.68
138	28176	27.21	37.20	35.87	188	43984	32.46	40.93	41.60
139	27808	27.12	36.65	35.30	189	46304	32.50	40.21	40.76
140	27712	27.13	37.06	35.47	190	43760	32.49	40.83	41.58
141	27344	27.05	36.63	34.98	191	45264	32.53	40.22	40.73
142	27040	27.02	36.88	35.19	192	455184	30.99	41.95	42.69
143	26944	26.98	36.53	34.89	193	138608	31.77	40.08	40.64
144	453040	31.45	42.44	43.30	194	274992	26.55	37.41	37.23
145	149840	31.89	40.26	40.90	195	51152	26.09	36.65	36.65
146	20752	30.43	41.29	40.32	196	26288	26.47	37.25	36.84
147	22128	30.75	39.83	38.19	197	24832	25.80	36.62	36.23
148	22288	29.97	40.79	38.26	198	24208	26.03	37.11	36.28
149	22512	30.29	39.61	37.78	199	24144	25.38	36.56	35.66

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
200	24096	25.40	37.12	35.79	250	41936	28.25	39.44	39.10
201	23872	24.86	36.55	35.33	251	35440	28.14	38.29	37.97
202	23296	24.92	37.16	35.49	252	25392	28.46	38.99	38.53
203	23424	24.61	36.57	35.15	253	27984	28.67	38.00	37.69
204	23392	24.90	37.07	35.34	254	42336	28.47	38.65	38.27
205	22880	24.61	36.59	35.00	255	43360	28.40	37.84	37.61
206	22416	24.90	37.05	35.02	256	49072	28.65	38.39	38.11
207	22368	24.61	36.58	34.79	257	51984	28.71	37.76	37.58
208	22480	24.84	37.07	35.04	258	47472	28.89	38.26	38.03
209	22576	24.60	36.51	34.73	259	45744	28.91	37.71	37.50
210	23296	24.80	37.01	35.05	260	47120	28.99	38.12	38.03
211	22800	24.56	36.51	34.78	261	44352	28.91	37.68	37.50
212	23104	24.74	36.98	34.93	262	41760	29.01	38.04	37.95
213	23328	24.58	36.49	34.97	263	41984	29.06	37.72	37.52
214	25072	24.88	36.99	35.33	264	488608	30.62	42.19	43.18
215	30224	25.08	36.50	35.18	265	106336	30.41	39.48	40.03
216	673472	30.63	42.61	43.64	266	23840	30.20	41.50	41.95
217	127520	30.20	39.72	40.31	267	32176	30.32	39.47	39.65
218	18016	29.55	41.68	42.24	268	51520	30.61	41.03	41.36
219	18496	29.45	39.53	39.76	269	69824	30.43	39.29	39.38
220	18752	29.12	41.39	41.53	270	57792	30.24	40.32	40.65
221	19104	29.07	39.44	39.48	271	58736	30.10	39.06	39.16
222	20336	28.60	41.16	41.12	272	50880	29.74	39.67	39.98
223	23600	28.71	39.35	39.22	273	51920	29.70	38.67	38.82
224	40752	29.24	41.18	40.96	274	46896	29.70	39.03	39.40
225	67008	30.07	39.38	39.45	275	34224	29.53	38.29	38.53
226	93856	30.81	41.19	41.46	276	36496	29.55	38.59	39.01
227	88000	30.79	39.65	40.04	277	35712	29.48	38.06	38.30
228	59328	30.98	41.11	41.54	278	36880	29.68	38.34	38.73
229	55504	30.83	39.75	40.10	279	41328	29.60	38.01	38.16
230	52496	30.97	41.02	41.43	280	45760	29.48	38.11	38.47
231	49392	30.78	39.73	40.06	281	51248	29.41	37.93	38.04
232	46848	30.88	40.91	41.33	282	51008	29.15	37.94	38.30
233	42272	30.61	39.63	39.92	283	48224	28.92	37.72	37.80
234	41568	30.77	40.78	41.21	284	49072	28.70	37.68	37.97
235	47632	30.59	39.55	39.89	285	50192	28.63	37.61	37.59
236	47072	30.67	40.56	41.01	286	47008	28.44	37.55	37.73
237	48288	30.46	39.41	39.74	287	41280	28.35	37.39	37.44
238	41824	30.35	40.33	40.72	288	468768	30.19	41.70	42.82
239	42160	30.13	39.28	39.54	289	114528	30.17	39.29	39.84
240	486736	29.96	41.98	42.90	290	33376	28.97	40.83	41.45
241	110336	29.80	39.50	40.00	291	39120	29.07	39.05	39.35
242	41504	30.00	41.26	41.84	292	46208	29.00	40.21	40.63
243	46816	29.92	39.43	39.69	293	48208	29.12	38.82	38.95
244	50944	30.00	41.00	41.26	294	54752	29.34	39.72	40.09
245	55696	29.75	39.25	39.32	295	53312	29.08	38.57	38.63
246	60064	29.57	40.58	40.52	296	48720	28.90	39.20	39.59
247	47664	28.75	39.03	38.87	297	48064	28.74	38.30	38.41
248	44896	28.69	40.07	39.78	298	52576	28.70	38.76	39.02
249	46272	28.23	38.68	38.37	299	47664	28.38	38.03	37.86

Sequence : table tennis
Bit rate : 9Mbps

Institute : NHK
Date : / /91

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
0	856528	29.20	44.31	46.16	50	116880	28.28	40.10	42.11
1	285552	27.43	38.83	40.46	51	116016	28.56	39.41	41.28
2	41152	27.92	42.36	43.83	52	117648	28.78	39.51	41.16
3	113328	27.93	38.74	40.29	53	101248	29.27	39.29	40.86
4	114992	28.84	42.24	43.67	54	112064	29.44	39.41	40.89
5	142368	29.03	39.03	40.49	55	114864	30.00	39.32	40.72
6	128144	29.04	42.04	43.32	56	107248	30.08	39.47	40.61
7	136896	28.17	38.95	40.25	57	111200	30.00	39.24	40.41
8	105952	27.30	40.71	42.24	58	103440	30.27	39.28	40.33
9	96640	26.94	38.68	39.95	59	112000	30.21	39.12	40.18
10	92768	26.54	39.64	41.35	60	106368	30.53	39.26	40.28
11	92400	26.61	38.46	39.61	61	118464	31.00	39.27	40.32
12	89120	26.86	39.41	40.88	62	108784	31.01	39.31	40.21
13	103440	27.30	38.42	39.48	63	104176	31.60	39.43	40.33
14	121504	27.57	39.33	40.74	64	118992	31.63	39.46	40.22
15	137552	27.77	38.42	39.46	65	109360	32.02	39.51	40.34
16	131584	27.41	39.02	40.45	66	109392	32.05	39.58	40.23
17	111136	27.02	38.34	39.31	67	104784	32.41	39.74	40.37
18	109808	26.58	38.36	39.92	68	111552	32.37	39.64	40.12
19	109600	26.22	38.31	39.25	69	105840	32.68	39.71	40.22
20	94352	25.99	38.09	39.62	70	108720	33.09	39.81	40.28
21	82560	26.26	38.23	39.28	71	117888	33.56	39.95	40.56
22	108976	26.74	38.11	39.86	72	880384	37.00	47.46	49.57
23	124096	26.84	38.22	39.43	73	184288	35.82	43.61	45.68
24	888368	29.29	44.41	46.40	74	147568	35.26	43.27	44.95
25	253488	26.91	38.70	40.41	75	122144	34.92	42.64	44.13
26	85424	27.17	42.11	43.42	76	122288	34.78	42.29	43.71
27	112016	26.75	38.68	40.25	77	108512	34.84	42.12	43.34
28	107056	27.62	41.72	42.85	78	113456	34.75	41.90	43.01
29	126928	26.87	38.62	39.98	79	107552	34.62	41.63	42.67
30	105408	26.82	40.71	41.81	80	110656	34.96	41.72	42.57
31	107120	26.59	38.50	39.69	81	104880	35.05	41.54	42.44
32	88448	27.12	40.60	41.60	82	100576	34.89	41.41	42.09
33	109248	27.36	38.57	39.68	83	109888	35.08	41.32	42.08
34	127008	27.70	40.89	41.62	84	118896	35.40	41.35	42.15
35	131488	27.03	38.47	39.43	85	110720	35.42	41.26	42.03
36	104064	27.40	40.70	41.22	86	109760	35.47	41.25	41.91
37	100736	27.17	38.40	39.31	87	110416	35.66	41.23	42.02
38	100384	27.48	40.51	40.90	88	108928	35.48	41.14	41.71
39	104928	27.46	38.39	39.24	89	110288	35.68	41.13	41.85
40	113504	27.99	40.18	40.88	90	109232	35.72	41.20	41.75
41	126112	27.73	38.32	39.19	91	109488	35.81	41.21	41.81
42	116176	27.64	39.84	40.50	92	109712	35.88	41.28	41.77
43	111472	27.18	38.10	38.98	93	110368	35.85	41.25	41.81
44	111360	27.03	39.07	39.86	94	109328	35.86	41.23	41.78
45	109024	26.56	38.00	38.72	95	110384	36.00	41.30	41.82
46	110128	26.30	38.28	39.01	96	874480	39.34	48.31	50.37
47	109408	26.26	37.95	38.58	97	236528	38.19	44.39	46.12
48	869040	30.34	44.45	46.50	98	111504	36.83	43.41	44.50
49	207696	28.67	39.95	42.01	99	121872	36.75	42.90	44.09

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
100	109840	36.34	42.31	43.15	150	109552	33.65	42.98	44.08
101	105408	36.22	42.06	42.84	151	111008	33.56	41.63	42.43
102	108368	36.09	41.78	42.39	152	107792	33.67	42.80	43.81
103	111440	36.20	41.66	42.38	153	110320	33.62	41.63	42.42
104	109440	36.10	41.50	42.11	154	110640	33.72	42.70	43.76
105	109808	35.88	41.19	41.90	155	110240	33.74	41.68	42.55
106	109536	36.03	41.17	41.79	156	108720	33.79	42.73	43.88
107	111456	36.10	41.08	41.71	157	110688	33.83	41.76	42.61
108	108848	35.92	40.88	41.47	158	120192	33.91	42.73	43.91
109	111392	36.09	40.96	41.61	159	119744	33.92	41.81	42.72
110	108320	36.05	40.92	41.45	160	110928	33.91	42.70	43.85
111	111568	36.03	40.83	41.45	161	109056	33.91	41.84	42.74
112	109136	36.08	40.94	41.42	162	109984	33.94	42.67	43.85
113	111248	36.11	40.86	41.38	163	109232	33.96	41.83	42.75
114	109088	36.06	40.83	41.23	164	113152	33.97	42.66	43.84
115	111600	36.01	40.76	41.26	165	110368	34.01	41.88	42.79
116	108192	35.95	40.71	41.18	166	108912	33.96	42.64	43.77
117	111136	35.99	40.76	41.22	167	107760	33.99	41.88	42.78
118	109744	35.88	40.67	41.05	168	878672	33.52	45.18	46.09
119	109472	35.94	40.67	41.16	169	228256	33.13	41.58	42.44
120	915200	39.14	47.72	49.38	170	124032	33.67	43.42	44.58
121	217792	38.14	43.93	45.56	171	100336	33.37	41.59	42.36
122	90128	36.34	42.77	43.94	172	108960	33.75	43.18	44.34
123	111744	36.42	42.43	43.38	173	110192	33.60	41.71	42.55
124	117984	36.42	42.31	43.17	174	110496	33.83	43.09	44.25
125	112400	36.27	41.94	42.80	175	120208	33.80	41.79	42.72
126	111920	36.11	41.65	42.45	176	99616	33.81	43.01	44.11
127	112432	36.12	41.49	42.27	177	108720	33.83	41.85	42.85
128	109360	35.93	41.30	41.99	178	110096	33.94	42.95	44.14
129	111920	35.94	41.17	41.90	179	120256	33.99	41.93	42.95
130	110112	35.80	41.06	41.63	180	110160	34.01	42.98	44.18
131	109696	35.65	40.77	41.35	181	109344	34.01	41.97	42.99
132	108784	35.75	40.89	41.42	182	109984	34.04	42.94	44.14
133	111056	35.63	40.69	41.16	183	109760	34.03	41.99	43.00
134	263904	28.75	38.49	38.53	184	112160	34.05	42.92	44.12
135	52896	28.63	37.66	37.45	185	109680	34.04	41.96	42.95
136	30512	29.02	38.49	38.17	186	109488	34.05	42.91	44.07
137	36896	29.03	37.85	37.36	187	109184	34.08	41.93	42.98
138	53728	30.14	38.79	38.54	188	109984	34.06	42.83	44.03
139	114000	31.51	39.19	39.20	189	111408	34.11	41.97	43.02
140	136624	32.18	39.73	40.04	190	108368	34.06	42.76	44.03
141	140016	32.63	40.05	40.47	191	111584	34.13	41.93	42.97
142	127952	32.83	40.23	40.81	192	882832	33.52	45.12	46.15
143	113408	33.02	40.38	40.93	193	234592	33.15	41.77	42.60
144	897008	33.65	45.35	46.38	194	309872	27.06	37.87	37.88
145	247296	32.94	41.54	42.34	195	63104	27.17	37.24	37.18
146	73840	33.08	43.22	44.24	196	32688	27.50	37.84	37.52
147	114448	33.27	41.65	42.46	197	31200	27.19	37.24	36.97
148	115136	33.51	43.02	44.11	198	42096	27.95	37.89	37.60
149	110384	33.45	41.65	42.42	199	80080	28.93	37.84	37.69

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
200	121248	30.21	38.52	38.82	250	109616	31.32	40.80	41.13
201	149664	30.65	38.82	39.38	251	107520	31.57	39.77	40.38
202	140224	31.00	39.25	39.78	252	109776	32.17	41.01	41.60
203	124832	31.18	39.21	39.88	253	122880	32.24	39.81	40.73
204	117360	31.30	39.48	40.06	254	116480	31.80	40.39	40.82
205	107392	31.34	39.43	40.03	255	106752	31.57	39.56	40.33
206	107008	31.42	39.56	40.16	256	104688	31.59	40.16	40.47
207	117712	31.55	39.50	40.17	257	102448	31.42	39.34	39.91
208	110576	31.51	39.67	40.22	258	110064	31.81	39.88	40.21
209	107712	31.61	39.55	40.30	259	107760	31.82	39.43	40.08
210	109776	31.64	39.69	40.32	260	116928	32.12	39.97	40.48
211	109312	31.72	39.70	40.41	261	109248	31.97	39.46	40.09
212	111088	31.69	39.72	40.39	262	108112	32.14	39.96	40.46
213	108976	31.78	39.76	40.49	263	110112	32.17	39.53	40.35
214	109952	31.74	39.85	40.48	264	922176	32.63	44.97	46.20
215	109952	31.81	39.81	40.57	265	191568	31.97	40.85	41.67
216	914608	31.91	44.75	45.80	266	100064	32.75	43.26	44.49
217	213680	31.40	40.82	41.73	267	122416	32.65	41.08	42.07
218	92768	31.94	43.14	44.26	268	122720	32.92	42.61	43.74
219	120224	31.89	41.00	42.08	269	110864	32.20	40.59	41.43
220	109616	32.25	42.94	44.09	270	98576	32.07	41.68	42.48
221	111024	32.07	40.99	42.16	271	109520	32.11	40.31	41.18
222	108688	32.22	42.76	43.86	272	111344	32.21	41.10	41.81
223	111520	32.13	41.02	42.14	273	111680	32.16	40.06	40.87
224	108944	32.25	42.59	43.51	274	111072	32.39	40.60	41.29
225	110544	32.19	40.98	42.11	275	103856	32.55	39.92	40.78
226	108640	32.28	42.61	43.60	276	107008	32.74	40.58	41.23
227	111392	32.19	40.93	42.08	277	118112	32.95	40.07	40.95
228	107360	32.28	42.42	43.38	278	110624	33.00	40.44	41.20
229	111664	32.26	41.00	42.12	279	108768	32.91	39.97	40.87
230	109344	32.32	42.31	43.31	280	114080	32.70	40.06	40.84
231	111264	32.28	41.05	42.18	281	114000	32.29	39.58	40.39
232	108976	32.36	42.37	43.32	282	103408	31.80	39.57	40.33
233	110944	32.32	41.05	42.22	283	101136	31.64	39.30	40.05
234	109216	32.41	42.29	43.31	284	111712	31.58	39.25	40.02
235	110144	32.37	41.03	42.17	285	110352	31.50	39.11	39.81
236	109440	32.40	42.16	43.09	286	114256	31.54	39.16	39.80
237	111088	32.34	40.96	42.10	287	108208	31.59	38.96	39.72
238	110800	32.34	42.03	42.89	288	918704	32.44	44.59	46.00
239	110128	32.26	40.93	42.04	289	206880	31.87	40.60	41.55
240	920784	31.96	44.80	45.92	290	96800	32.00	42.44	43.59
241	198016	31.28	40.72	41.58	291	102800	31.82	40.33	41.04
242	109696	32.11	43.09	44.29	292	112144	31.89	41.44	42.47
243	116368	31.75	40.80	41.72	293	109808	31.70	40.01	40.80
244	109664	32.04	42.74	43.68	294	110464	31.87	40.95	41.98
245	114464	31.72	40.62	41.41	295	111056	31.62	39.87	40.51
246	105968	31.63	42.11	42.60	296	110192	31.65	40.50	41.36
247	103696	31.21	40.21	40.82	297	111584	31.54	39.67	40.37
248	99728	31.14	41.40	41.74	298	113008	31.53	40.22	40.84
249	109312	31.06	39.96	40.57	299	110144	31.43	39.45	40.08

Sequence : popple
Bit rate : 9Mbps

Institute : NHK
Date : / /91

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
0	888048	35.36	45.91	45.96	50	88512	32.45	37.62	37.87
1	221152	33.95	39.45	39.78	51	97344	32.52	36.86	37.20
2	94896	32.43	37.70	38.13	52	115664	32.71	37.74	38.01
3	107120	32.60	37.00	37.46	53	117888	32.74	37.16	37.45
4	115744	32.63	37.53	37.79	54	113984	32.65	37.39	37.64
5	123184	32.59	37.03	37.38	55	116112	32.58	37.09	37.33
6	119584	32.58	37.20	37.65	56	114496	32.49	37.01	37.35
7	115504	32.32	36.54	36.90	57	114800	32.33	36.56	36.91
8	107808	32.09	36.36	36.80	58	108512	32.12	36.40	36.81
9	106368	31.83	35.68	36.12	59	103424	31.94	35.98	36.30
10	110208	31.86	35.97	36.34	60	110192	31.97	36.10	36.57
11	106688	31.90	35.80	36.23	61	109568	31.92	35.88	36.35
12	110704	31.89	36.09	36.42	62	110736	31.92	35.90	36.38
13	107936	31.83	35.73	36.21	63	111616	31.89	35.70	36.29
14	108544	31.98	35.81	36.29	64	110784	31.93	35.85	36.39
15	110544	31.94	35.79	35.97	65	113600	31.80	35.70	36.19
16	111664	31.81	35.79	36.07	66	107440	31.81	35.68	36.19
17	110288	31.80	35.62	35.97	67	113424	31.82	35.53	35.97
18	113984	31.78	35.67	36.08	68	111136	31.73	35.53	36.10
19	111360	31.66	35.32	35.81	69	106336	31.53	35.25	35.70
20	111568	31.57	35.34	35.74	70	107184	31.60	35.31	35.85
21	106608	31.36	35.00	35.38	71	108368	31.58	35.18	35.69
22	108336	31.37	35.08	35.50	72	920608	35.45	45.93	46.17
23	110928	31.33	34.92	35.50	73	206480	33.93	39.58	39.81
24	919472	34.92	45.52	45.73	74	87280	32.22	37.43	37.84
25	211216	33.51	39.14	39.43	75	95280	32.32	36.80	37.18
26	87856	31.95	37.00	37.22	76	104272	32.43	37.29	37.81
27	88368	31.93	36.27	36.70	77	114320	32.56	37.05	37.48
28	101680	32.11	36.68	37.20	78	117776	32.71	37.45	37.93
29	113872	32.25	36.55	36.99	79	130032	32.80	37.25	37.73
30	123472	32.50	37.21	37.58	80	121232	32.62	37.11	37.67
31	128320	32.68	36.94	37.39	81	113664	32.46	36.55	37.13
32	121808	32.60	37.07	37.40	82	111856	32.38	36.46	37.10
33	114208	32.36	36.52	36.96	83	112832	32.24	36.17	36.73
34	105968	32.08	36.40	36.73	84	111232	32.12	36.29	36.84
35	108384	31.94	35.79	36.38	85	106944	31.90	35.77	36.34
36	101376	31.76	35.59	36.14	86	103920	31.75	35.70	36.41
37	109328	31.92	35.67	36.17	87	102304	31.69	35.38	36.09
38	110736	31.93	35.79	36.22	88	108720	31.70	35.68	36.26
39	109088	31.92	35.60	36.04	89	110960	31.67	35.46	36.11
40	114160	31.84	35.75	36.19	90	111872	31.70	35.52	36.15
41	108480	31.82	35.40	35.85	91	108192	31.69	35.32	35.96
42	110096	31.82	35.58	36.01	92	107392	31.73	35.44	36.18
43	112880	31.79	35.55	35.95	93	109072	31.78	35.40	36.01
44	107872	31.82	35.49	36.03	94	107056	31.89	35.56	36.01
45	110256	31.81	35.44	35.87	95	109824	31.88	35.44	35.94
46	112816	31.87	35.47	36.08	96	923008	35.01	45.63	45.83
47	111136	31.87	35.38	35.84	97	211424	33.93	39.50	39.79
48	916848	35.54	45.92	46.03	98	86384	32.24	37.77	38.15
49	207712	33.94	39.36	39.63	99	95296	32.43	36.96	37.46

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
100	107840	32.43	37.17	37.75	150	114304	34.36	37.71	37.94
101	117040	32.72	37.10	37.63	151	105600	34.16	37.24	37.48
102	125936	32.83	37.60	38.10	152	104656	34.06	37.04	37.19
103	117440	32.60	36.77	37.24	153	108400	34.28	37.18	37.26
104	116064	32.44	36.64	37.32	154	107792	34.34	37.10	37.25
105	115536	32.25	36.29	36.74	155	111744	34.36	37.06	37.08
106	108272	32.05	36.04	36.55	156	113088	34.35	36.75	36.89
107	106400	31.68	35.61	36.15	157	109952	34.44	36.80	36.83
108	109168	31.72	35.68	36.20	158	110992	34.40	36.80	36.79
109	115376	31.75	35.47	36.03	159	113504	34.38	36.69	36.73
110	110640	31.68	35.51	36.04	160	112000	34.20	36.40	36.40
111	105440	31.36	35.08	35.68	161	109968	34.06	36.05	36.02
112	110352	31.45	35.20	35.66	162	106272	34.03	35.74	35.70
113	112000	31.45	35.22	35.59	163	104064	33.91	35.43	35.55
114	111216	31.48	35.05	35.49	164	108640	33.99	35.58	35.68
115	106800	31.34	34.92	35.40	165	109712	33.96	35.39	35.61
116	106240	31.36	35.08	35.44	166	111488	33.94	35.42	35.50
117	106896	31.34	35.02	35.57	167	112832	34.06	35.50	35.56
118	103568	31.59	35.20	35.56	168	882944	39.57	48.70	48.02
119	107504	31.79	35.15	35.62	169	225536	36.65	41.61	41.36
120	931264	35.98	46.36	46.41	170	100848	34.73	37.18	37.34
121	214720	34.26	39.91	40.13	171	116928	34.70	36.91	36.99
122	87888	32.19	37.17	37.38	172	117120	34.57	36.55	36.58
123	98880	32.24	36.72	37.17	173	110080	34.50	36.11	36.23
124	107728	32.36	36.94	37.32	174	110304	34.29	35.55	35.68
125	119392	32.45	36.77	37.24	175	118192	34.35	35.74	35.89
126	124048	32.31	36.64	37.19	176	110240	34.18	35.34	35.43
127	121680	32.23	36.45	36.93	177	114048	34.00	35.01	35.19
128	118384	32.20	36.25	36.74	178	118864	33.80	34.78	34.84
129	111936	32.10	36.03	36.56	179	114160	33.64	34.32	34.45
130	106768	31.93	35.65	36.31	180	113136	33.35	33.90	33.97
131	104672	31.78	35.25	35.92	181	103952	33.15	33.54	33.72
132	102304	31.68	35.28	35.97	182	102224	32.92	33.30	33.54
133	102976	31.61	35.05	35.80	183	106384	32.75	33.19	33.28
134	101040	31.84	35.16	35.84	184	111920	32.66	32.98	33.10
135	106320	31.98	35.27	35.93	185	109008	32.52	32.55	32.80
136	103184	32.25	35.30	35.97	186	111088	32.52	32.57	32.86
137	108096	32.39	35.64	36.20	187	107840	32.12	32.27	32.52
138	116272	32.59	35.78	36.37	188	110432	31.84	32.21	32.44
139	117712	32.77	35.94	36.46	189	114272	31.81	32.20	32.37
140	117136	32.89	36.02	36.50	190	116288	31.53	31.94	31.98
141	110192	33.02	35.92	36.45	191	113584	31.51	31.72	31.81
142	108704	33.05	35.91	36.33	192	883104	38.48	47.48	47.76
143	110656	33.07	35.86	36.37	193	253152	35.05	38.56	38.59
144	907952	37.71	47.30	47.31	194	83680	31.64	32.75	32.96
145	191072	35.90	41.14	41.25	195	104640	31.23	32.01	32.14
146	102736	34.40	38.50	38.78	196	102480	31.02	31.74	31.96
147	119408	34.54	38.55	38.83	197	107424	31.28	32.02	32.25
148	118928	34.58	38.39	38.66	198	108768	31.41	32.18	32.55
149	119456	34.56	38.09	38.41	199	111856	31.14	32.06	32.28

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
200	113104	30.99	32.12	32.10	250	111312	29.52	30.06	30.40
201	116656	30.78	31.92	32.00	251	112784	29.50	30.00	30.28
202	113664	30.86	31.69	31.76	252	103120	29.28	29.79	29.94
203	112352	30.88	31.50	31.70	253	101616	29.09	29.75	29.97
204	111040	30.79	31.53	31.71	254	104752	29.19	29.86	30.20
205	107008	30.27	31.17	31.34	255	108064	29.32	30.13	30.34
206	109280	30.00	31.04	31.14	256	111072	29.53	30.05	30.34
207	101568	29.99	30.58	30.69	257	112704	29.65	30.12	30.37
208	112496	30.12	30.80	30.77	258	113920	29.56	30.05	30.22
209	111664	30.21	30.61	30.74	259	119392	29.41	30.11	30.22
210	106000	30.24	30.78	30.85	260	110624	29.41	30.13	30.19
211	106784	30.22	30.93	31.05	261	109392	29.46	30.04	30.20
212	112304	30.30	31.02	30.97	262	117136	29.48	29.82	30.05
213	114624	30.34	30.94	31.00	263	105120	29.54	29.62	29.93
214	120352	30.43	30.79	30.94	264	902624	37.28	46.16	46.97
215	119360	30.38	30.76	30.90	265	225456	32.77	35.71	35.95
216	880080	37.52	46.42	47.11	266	89216	29.71	31.08	31.33
217	232960	34.04	37.19	37.37	267	106720	29.69	30.92	31.07
218	100944	30.77	31.87	32.13	268	106672	29.43	30.52	30.61
219	113104	30.50	31.23	31.43	269	116144	29.69	30.32	30.57
220	103840	30.42	30.78	31.09	270	118560	29.52	30.39	30.71
221	105488	30.44	30.67	30.93	271	113472	29.16	30.34	30.56
222	105168	30.42	30.78	31.12	272	109600	29.23	30.30	30.45
223	102288	30.35	30.95	31.02	273	112688	29.11	30.15	30.31
224	113120	30.34	30.72	30.99	274	111136	29.25	30.10	30.16
225	115104	30.46	30.50	30.90	275	108976	29.25	29.89	30.07
226	117824	30.65	30.58	30.87	276	110560	28.96	29.93	30.03
227	112688	30.76	30.57	30.89	277	103600	28.72	29.60	29.83
228	106736	30.61	30.73	30.92	278	104912	28.86	29.76	30.03
229	105424	30.61	30.83	31.05	279	111184	29.09	29.71	30.08
230	109808	30.56	30.79	30.94	280	106640	29.56	30.16	30.35
231	117472	30.53	30.45	30.71	281	109824	29.79	29.97	30.27
232	116864	30.53	30.46	30.71	282	122592	29.65	30.05	30.48
233	103040	30.49	30.20	30.38	283	121488	29.19	30.11	30.43
234	101696	30.30	30.28	30.47	284	110112	29.06	30.09	30.36
235	99888	30.19	30.37	30.59	285	106672	29.07	29.76	30.16
236	108320	30.10	30.47	30.59	286	108240	29.33	30.00	30.31
237	117600	30.26	30.41	30.61	287	105760	29.29	29.87	30.14
238	122016	30.22	30.32	30.54	288	888416	37.14	45.96	46.81
239	114944	30.18	30.25	30.45	289	235056	32.75	35.93	36.17
240	886896	37.48	46.35	47.22	290	96624	29.56	31.13	31.37
241	232944	33.63	36.59	36.71	291	108880	29.51	31.07	31.13
242	97280	29.99	31.22	31.43	292	108592	29.58	30.82	30.96
243	115840	29.83	30.91	31.00	293	105488	29.87	30.83	30.92
244	109792	29.85	30.59	30.82	294	121712	29.79	30.76	31.03
245	110736	29.85	30.50	30.73	295	119152	29.42	30.61	30.78
246	108512	29.70	30.45	30.60	296	112832	29.12	30.48	30.59
247	112368	29.53	30.46	30.54	297	112160	29.07	30.28	30.52
248	109728	29.39	30.37	30.39	298	110096	29.13	30.09	30.32
249	111680	29.43	30.19	30.39	299	104656	29.08	29.97	30.13

Sequence : football
Bit rate : 4Mbps

Institute : NHK
Date : / /91

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
0	423504	37.27	42.91	43.85	50	39136	30.51	36.27	38.32
1	67728	33.64	39.75	40.82	51	46288	29.81	35.60	37.66
2	54224	32.70	38.47	39.72	52	45312	29.78	35.15	37.42
3	73200	33.10	38.25	39.40	53	46672	29.60	34.96	37.02
4	82496	32.69	37.98	39.07	54	48976	29.87	34.78	36.69
5	73104	32.70	37.80	38.87	55	47136	29.42	34.50	36.32
6	71936	32.34	37.40	38.67	56	45056	29.37	34.34	36.16
7	64064	31.67	36.81	38.17	57	45856	29.40	34.33	36.06
8	55712	31.27	36.30	37.74	58	43344	29.48	34.38	36.12
9	49936	30.80	35.76	37.30	59	43248	29.52	34.39	36.12
10	45104	30.38	35.38	37.10	60	43088	29.56	34.32	36.02
11	44400	30.04	35.20	36.87	61	44176	29.40	34.40	36.08
12	42160	29.93	35.08	36.87	62	43024	29.60	34.35	36.05
13	41856	29.68	34.73	36.64	63	44368	29.49	34.23	36.06
14	40016	29.01	34.25	36.05	64	44064	29.60	34.21	35.90
15	38800	28.81	34.02	35.75	65	47104	29.70	34.27	35.91
16	38272	28.81	33.76	35.68	66	48448	29.61	34.26	35.89
17	38384	28.68	33.61	35.68	67	46896	29.87	34.21	35.92
18	39184	28.24	33.46	35.70	68	46656	29.72	34.09	35.81
19	37312	28.23	33.26	35.56	69	43872	29.86	33.95	35.79
20	36608	28.23	33.22	35.47	70	44816	29.60	33.85	35.72
21	38608	28.27	33.32	35.39	71	43440	29.68	33.80	35.72
22	38256	28.37	33.35	35.46	72	495056	35.76	41.51	42.10
23	38144	28.28	33.37	35.48	73	87952	33.53	39.02	40.08
24	506800	36.76	42.42	43.12	74	37600	31.64	37.68	39.26
25	92800	33.35	38.86	40.09	75	45728	31.11	36.89	38.61
26	34544	29.97	36.40	38.33	76	48080	31.50	36.57	38.41
27	39008	29.64	35.39	37.66	77	50432	31.03	36.08	37.84
28	39664	29.53	34.89	37.42	78	52080	31.11	35.81	37.73
29	41760	29.56	34.62	36.92	79	55504	30.88	35.66	37.36
30	43488	29.79	34.48	36.69	80	53872	30.40	35.40	37.08
31	46096	29.85	34.46	36.44	81	48224	30.76	35.32	37.05
32	48192	29.87	34.44	36.40	82	48208	30.33	35.18	36.88
33	49824	30.09	34.40	36.16	83	44992	30.31	35.05	36.73
34	53840	29.93	34.28	35.92	84	42832	29.98	34.87	36.48
35	54960	30.21	34.31	35.91	85	43712	29.65	34.69	36.43
36	56400	29.91	34.21	35.73	86	41648	29.71	34.53	36.33
37	54016	30.06	34.26	35.77	87	40832	29.78	34.47	36.31
38	50400	29.74	34.09	35.83	88	41344	29.50	34.24	36.15
39	47728	29.70	33.99	35.72	89	42480	29.77	34.36	36.07
40	49056	29.45	33.95	35.53	90	43120	29.35	34.07	35.84
41	46944	29.37	33.78	35.40	91	44304	29.54	34.10	35.75
42	46720	29.11	33.62	35.33	92	46832	29.27	34.01	35.57
43	44176	29.11	33.60	35.34	93	46096	29.43	34.11	35.63
44	44832	28.95	33.56	35.37	94	44848	29.26	33.94	35.44
45	45568	28.86	33.40	35.19	95	43952	29.43	33.84	35.35
46	45648	28.56	33.12	34.93	96	494208	35.63	41.24	41.86
47	43008	28.48	32.88	34.86	97	95136	33.83	38.67	39.84
48	484576	35.92	41.51	42.22	98	43536	30.55	36.69	38.40
49	95136	33.12	38.48	39.83	99	45424	30.74	36.11	37.83

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
100	45856	30.08	35.69	37.29	150	50240	30.41	35.49	37.47
101	45680	30.33	35.45	37.02	151	48096	30.34	35.22	37.26
102	45424	30.00	35.05	36.75	152	49056	30.19	35.04	36.98
103	45328	29.89	34.92	36.64	153	47360	30.13	34.87	36.79
104	47200	29.57	34.68	36.38	154	44832	29.87	34.49	36.43
105	45696	30.03	34.70	36.28	155	45296	29.60	34.36	36.34
106	49632	29.77	34.61	36.04	156	44880	29.51	34.03	36.11
107	47840	29.85	34.57	36.05	157	43600	29.36	33.91	35.97
108	45968	29.83	34.49	35.98	158	44384	29.24	33.81	35.77
109	47456	29.99	34.41	35.93	159	45152	29.21	33.70	35.67
110	46624	29.49	34.21	35.77	160	47280	29.15	33.56	35.44
111	42768	29.56	34.05	35.75	161	44448	28.99	33.46	35.21
112	43888	29.09	33.89	35.37	162	44400	28.84	33.33	35.13
113	43680	29.31	33.78	35.32	163	44000	28.66	33.16	34.93
114	44656	29.06	33.69	35.17	164	43344	28.49	32.95	34.81
115	41696	29.32	33.62	35.11	165	43584	28.43	32.83	34.72
116	41168	29.10	33.57	35.11	166	45072	28.46	32.80	34.60
117	42608	29.50	33.67	35.27	167	43856	28.41	32.80	34.52
118	44784	29.31	33.63	35.21	168	494720	35.14	40.85	41.63
119	44944	29.67	33.75	35.30	169	101552	33.53	38.31	39.78
120	503152	35.33	41.09	41.85	170	36800	30.11	36.64	38.57
121	95552	33.43	38.56	39.77	171	40672	29.75	35.91	37.84
122	39184	30.80	37.28	38.85	172	41776	29.51	35.32	37.31
123	41424	30.93	36.88	38.34	173	44000	29.41	34.90	36.97
124	44544	30.71	36.47	37.91	174	47552	29.37	34.63	36.60
125	47376	30.89	36.19	37.63	175	46592	29.41	34.46	36.34
126	50512	30.75	35.94	37.40	176	49440	29.45	34.32	36.10
127	48464	30.69	35.69	37.16	177	47408	29.30	34.21	36.02
128	51200	30.52	35.52	36.99	178	47024	29.24	34.15	35.84
129	49232	30.62	35.33	36.97	179	47056	29.27	34.14	35.84
130	50112	30.37	35.12	36.82	180	48016	29.27	34.10	35.71
131	45760	30.44	35.05	36.74	181	46576	29.24	34.05	35.70
132	43264	30.08	34.83	36.48	182	46640	29.25	33.84	35.54
133	42272	30.04	34.71	36.34	183	45232	29.22	33.84	35.57
134	42720	29.74	34.49	36.09	184	46032	29.33	33.78	35.47
135	44848	29.87	34.47	35.99	185	43840	29.30	33.72	35.37
136	44816	29.56	34.32	35.85	186	44880	29.40	33.64	35.30
137	42880	29.72	34.33	35.91	187	43104	29.35	33.60	35.22
138	42912	29.61	34.20	35.76	188	45712	29.34	33.52	35.07
139	44576	29.66	34.10	35.77	189	45088	29.29	33.53	35.03
140	43136	29.63	33.96	35.71	190	48288	29.20	33.47	34.93
141	43904	29.46	33.91	35.64	191	46800	29.17	33.51	34.84
142	44496	29.60	33.87	35.60	192	479600	35.10	40.89	41.49
143	46240	29.71	34.03	35.60	193	101152	34.19	38.97	39.91
144	499824	35.40	41.23	41.94	194	39888	30.88	37.33	38.72
145	90896	33.74	38.88	40.20	195	46448	30.55	36.50	38.00
146	39824	31.15	37.34	39.25	196	50192	30.16	35.97	37.34
147	47024	30.94	36.79	38.67	197	48368	29.97	35.70	37.00
148	49600	30.92	36.25	38.22	198	48720	29.74	35.29	36.56
149	49184	30.66	35.88	37.81	199	51296	29.66	35.14	36.25

Field	Bits	SNR(dB) Y	Cb	Cr	Field	Bits	SNR(dB) Y	Cb	Cr
200	48672	29.74	34.93	35.93	250	44960	28.23	32.64	34.03
201	44848	29.41	34.72	35.84	251	44992	28.10	32.54	33.91
202	44192	29.36	34.51	35.67	252	44032	28.00	32.31	33.78
203	42896	29.17	34.42	35.63	253	43888	27.81	32.11	33.65
204	44208	29.20	34.27	35.51	254	43872	27.70	31.90	33.46
205	42960	29.07	34.19	35.32	255	42992	27.50	31.83	33.28
206	44736	29.16	34.03	35.06	256	41696	27.24	31.53	33.14
207	44592	29.05	33.99	34.95	257	40368	27.20	31.45	33.22
208	44960	29.08	33.88	34.93	258	39824	27.08	31.35	33.05
209	45616	29.07	33.77	34.83	259	39728	27.14	31.24	32.93
210	44576	29.04	33.70	34.76	260	40176	27.06	31.20	32.77
211	43728	29.03	33.66	34.71	261	38432	27.13	31.20	32.72
212	43264	29.10	33.57	34.68	262	38912	27.26	31.30	32.87
213	44880	29.06	33.57	34.70	263	40096	27.50	31.41	33.03
214	46480	29.08	33.43	34.73	264	517920	34.59	40.20	40.84
215	44064	28.95	33.38	34.61	265	113200	33.18	37.60	38.60
216	490240	34.81	40.56	41.12	266	31584	29.27	35.78	37.10
217	117296	33.82	38.45	39.24	267	36016	29.07	35.01	36.37
218	35568	31.02	36.70	38.00	268	36864	28.77	34.42	36.05
219	42128	30.46	35.79	37.20	269	38624	28.84	34.13	35.82
220	46480	30.14	35.31	36.72	270	38560	28.95	33.82	35.56
221	47056	30.11	34.85	36.34	271	40848	29.25	33.66	35.41
222	46784	29.98	34.56	36.09	272	43344	29.46	33.64	35.36
223	47312	29.79	34.31	35.73	273	48736	29.63	33.66	35.27
224	46032	29.77	34.09	35.63	274	55200	30.19	33.73	35.20
225	46384	29.64	33.89	35.38	275	54640	30.37	33.86	35.19
226	45328	29.60	33.73	35.22	276	57120	30.51	33.82	35.17
227	45216	29.39	33.70	35.06	277	53872	30.62	33.87	35.16
228	45792	29.30	33.59	34.94	278	54384	30.54	33.74	35.00
229	45232	29.36	33.59	34.90	279	50960	30.49	33.56	34.84
230	44400	29.24	33.39	34.68	280	48704	30.09	33.33	34.63
231	45344	29.28	33.29	34.58	281	45232	29.69	33.18	34.45
232	46192	29.18	33.14	34.44	282	44272	29.32	32.98	34.27
233	44192	29.07	33.06	34.41	283	38400	29.12	32.93	34.21
234	43600	28.97	32.94	34.35	284	41616	28.93	32.79	34.12
235	44560	29.11	32.98	34.42	285	44272	28.66	32.67	33.96
236	45312	28.98	32.87	34.30	286	45104	28.64	32.51	33.81
237	46256	28.94	32.84	34.26	287	43984	28.68	32.51	33.72
238	45520	28.83	32.73	34.14	288	484864	33.90	39.57	40.20
239	45168	28.86	32.72	34.06	289	104880	32.88	37.30	38.29
240	481696	34.64	40.24	40.79	290	35136	30.68	36.18	37.57
241	127008	33.67	37.84	38.75	291	41408	30.45	35.53	36.87
242	37808	30.61	36.10	37.59	292	47936	30.12	35.18	36.39
243	42944	29.92	35.21	36.63	293	48336	30.28	34.89	36.07
244	44368	29.49	34.61	36.08	294	47920	29.97	34.62	35.83
245	45856	29.20	34.16	35.51	295	47696	29.89	34.36	35.56
246	49072	29.09	33.77	35.08	296	48352	29.71	34.08	35.41
247	48624	28.70	33.27	34.72	297	49104	29.48	33.84	35.22
248	48528	28.44	33.02	34.39	298	50096	29.61	33.65	35.06
249	45344	28.31	32.80	34.24	299	47696	29.31	33.52	34.93

Annex II

Cumulative bit count once every 0.4 second

Institute : NHK
Date : / /91

Sequence : flower garden
Bit rate : 4Mbps

GOP No.	BITS
1	1601296
2	1572304
3	1630624
4	1552432
5	1585424
6	1627648
7	1574576
8	1567440
9	1592704
10	1583872
11	1603488
12	1578944
AVE	1589229(3.973 Mbps)

Sequence : table tennis
Bit rate : 4Mbps

GOP No.	BITS
1	1594304
2	1597584
3	1562400
4	1607072
5	1570896
6	1625824
7	1565712
8	1594992
9	1398032
10	1783296
11	1576864
12	1606960
AVE	1590328(3.976 Mbps)

Sequence : mobile & calendar
Bit rate : 4Mbps

GOP No.	BITS
1	1574960
2	1605296
3	1587744
4	1591984
5	1592848
6	1592592
7	1588512
8	1591728
9	1583808
10	1595520
11	1585312
12	1611728
AVE	1591836(3.980 Mbps)

Sequence : football
Bit rate : 4Mbps

GOP No.	BITS
1	1573008
2	1625472
3	1570688
4	1589728
5	1581200
6	1592576
7	1595232
8	1594800
9	1580336
10	1597392
11	1555216
12	1623456
AVE	1589925(3.975 Mbps)

Sequence : flower garden
Bit rate : 9Mbps

GOP No.	BITS
1	3601584
2	3493600
3	3514400
4	3559152
5	3537008
6	3537168
7	3564112
8	3507776
9	3554336
10	3523360
11	3560720
12	3538832
AVE	3541004(8.853 Mbps)

Sequence : table tennis
Bit rate : 9Mbps

GOP No.	BITS
1	3530448
2	3559296
3	3513664
4	3539712
5	3539424
6	3520464
7	3556400
8	3540944
9	3539248
10	3542016
11	3530080
12	3537520
AVE	3537434(8.844 Mbps)

Sequence : popple
Bit rate : 9Mbps

GOP No.	BITS
1	3538768
2	3542848
3	3535680
4	3533120
5	3535840
6	3551952
7	3534560
8	3559392
9	3543360
10	3526416
11	3536784
12	3542848
AVE	3540130(8.850 Mbps)

Sequence : mobile & calendar
Bit rate : 9Mbps

GOP No.	BITS
1	3517456
2	3549344
3	3551456
4	3541376
5	3531840
6	3545648
7	3521664
8	3559648
9	3538112
10	3532992
11	3546704
12	3526192
AVE	3538536(8.846 Mbps)

Annex III

Other statistics

Sequence : flower garden
Bit rate : 4Mbps

Institute : NHK
Date : / /91

	ALL	Intra	P1	P2
MSE				
Y	134.73	56.20	148.52	137.80
Cb	42.39	14.57	29.04	44.34
Cr	32.10	13.80	24.40	33.34
RMS				
Y	11.61	7.50	12.19	11.74
Cb	6.51	3.82	5.39	6.66
Cr	5.67	3.72	4.94	5.77
SNR				
Y	26.84	30.63	26.41	26.74
Cb	31.86	36.50	33.50	31.66
Cr	33.07	36.73	34.26	32.90
QP	28.41	8.35	33.85	29.10
SC	4.05	14.90	4.64	3.50
ZC	8.33	11.60	7.19	8.23
NZB	1252.96	5279.92	1253.31	1061.88
Macroblock type				
Intra	69.25	1320.00	19.85	12.25
Interfield	6.81	0.00	8.38	7.05
MC Interfield	413.24	0.00	1291.77	391.16
Interframe	6.73	0.00	0.00	7.37
MC Interframe	823.97	0.00	0.00	902.16
Number of bits				
MBT	2575.06	0.00	2656.77	2693.36
MCV	8909.75	0.00	8486.00	9352.58
EOB	11017.60	21120.00	10560.00	10560.00
Y	34008.02	327617.08	32138.92	20166.34
Cb	5138.23	97708.00	586.62	962.19
Cr	4300.69	91792.00	346.00	337.27
OVH+STUFF	1235.87	1236.15	1228.15	1236.23
TOTAL	67185.23	539473.23	56002.46	45307.97

QP : Mean value of quantization parameter
SC : Mean value of the number of coded nonzero coefficients
ZC : Mean value of the number of coded zero coefficients
NZB : Mean value of the number of nonzero blocks
MBT : Macroblock types
MCV : Moton vectors
EOB : End of block
OVH+STUFF : Headers and stuffing bits

Sequence : flower garden
Bit rate : 9Mbps

Institute : NHK
Date : / /91

	ALL	Intra	P1	P2
MSE				
Y	52.17	30.15	38.78	53.85
Cb	24.93	7.27	17.41	26.13
Cr	24.30	7.15	17.43	25.44
RMS				
Y	7.22	5.49	6.23	7.34
Cb	4.99	2.70	4.17	5.11
Cr	4.93	2.67	4.18	5.04
SNR				
Y	30.96	33.34	32.24	30.82
Cb	34.16	39.51	35.72	33.96
Cr	34.27	39.59	35.72	34.08
QP	12.04	3.87	9.14	12.56
SC	7.72	23.84	12.33	6.74
ZC	13.17	15.23	12.88	13.09
NZB	2408.54	5280.00	2716.46	2257.69
Macroblock type				
Intra	66.45	1320.00	15.46	9.39
Interfield	5.81	0.00	6.69	6.04
MC Interfield	364.01	0.00	1297.85	336.98
Interframe	6.58	0.00	0.00	7.20
MC Interframe	877.15	0.00	0.00	960.39
Number of bits				
MBT	2567.53	0.00	2653.38	2685.27
MCV	8701.32	0.00	8337.08	9131.44
EOB	11017.60	21120.00	10560.00	10560.00
Y	100055.05	511986.15	182668.15	76591.28
Cb	14269.34	186567.85	9661.69	6313.20
Cr	11205.37	188667.54	7467.54	2962.97
OVH+STUFF	1235.47	1225.23	1245.38	1235.49
TOTAL	149051.68	909566.77	222593.23	109479.65

QP : Mean value of quantization parameter
SC : Mean value of the number of coded nonzero coefficients
ZC : Mean value of the number of coded zero coefficients
NZB : Mean value of the number of nonzero blocks
MBT : Macroblock types
MCV : Moton vectors
EOB : End of block
OVH+STUFF : Headers and stuffing bits

Sequence : mobile & calendar Institute : NHK
Bit rate : 4Mbps Date : / /91

	ALL	Intra	P1	P2
MSE				
Y	189.61	153.97	138.04	193.75
Cb	41.00	20.19	31.04	42.46
Cr	38.49	17.14	26.60	40.07
RMS				
Y	13.77	12.41	11.75	13.92
Cb	6.40	4.49	5.57	6.52
Cr	6.20	4.14	5.16	6.33
SNR				
Y	25.35	26.26	26.73	25.26
Cb	32.00	35.08	33.21	31.85
Cr	32.28	35.79	33.88	32.10
QP	26.11	12.73	18.61	27.10
SC	4.53	12.92	8.06	3.97
ZC	17.07	10.13	17.81	17.37
NZB	1245.37	5259.38	2350.08	1002.51
Macroblock type				
Intra	79.29	1320.00	35.00	22.52
Interfield	11.03	0.00	12.31	11.49
MC Interfield	268.22	0.00	1272.69	233.29
Interframe	9.86	0.00	0.00	10.80
MC Interframe	951.60	0.00	0.00	1041.89
Number of bits				
MBT	2608.53	0.00	2664.62	2729.63
MCV	5329.57	0.00	6264.46	5538.07
EOB	11017.60	21120.00	10560.00	10560.00
Y	37703.53	279558.77	107989.69	22893.90
Cb	4367.50	80663.38	2306.00	845.43
Cr	4827.97	81421.85	2583.38	1300.45
OVH+STUFF	1231.55	1232.31	1236.77	1231.26
TOTAL	67086.24	463996.31	133604.92	45098.74

QP : Mean value of quantization parameter
SC : Mean value of the number of coded nonzero coefficients
ZC : Mean value of the number of coded zero coefficients
NZB : Mean value of the number of nonzero blocks
MBT : Macroblock types
MCV : Moton vectors
EOB : End of block
OVH+STUFF : Headers and stuffing bits

Sequence : mobile & calendar
Bit rate : 9Mbps

Institute : NHK
Date : / /91

	ALL	Intra	P1	P2
MSE				
Y	87.58	70.82	72.92	89.07
Cb	26.49	7.99	20.73	27.64
Cr	23.37	6.65	16.85	24.47
RMS				
Y	9.36	8.42	8.54	9.44
Cb	5.15	2.83	4.55	5.26
Cr	4.83	2.58	4.11	4.95
SNR				
Y	28.71	29.63	29.50	28.63
Cb	33.90	39.10	34.96	33.72
Cr	34.44	39.90	35.86	34.24
QP	12.46	4.79	10.63	12.91
SC	8.30	23.41	12.14	7.40
ZC	22.42	14.92	18.51	22.96
NZB	2231.44	5277.69	3005.38	2050.19
Macroblock type				
Intra	72.75	1320.00	17.46	16.20
Interfield	7.21	0.00	10.38	7.40
MC Interfield	223.63	0.00	1292.15	183.54
Interframe	8.52	0.00	0.00	9.33
MC Interframe	1007.89	0.00	0.00	1103.53
Number of bits				
MBT	2586.65	0.00	2660.77	2705.86
MCV	5076.67	0.00	6157.69	5266.25
EOB	11017.60	21120.00	10560.00	10560.00
Y	104671.60	499649.23	201302.62	81347.10
Cb	11886.09	183885.38	8355.69	3893.04
Cr	12462.96	175637.69	8057.23	4930.12
OVH+STUFF	1235.39	1226.46	1238.31	1235.67
TOTAL	148936.96	881518.77	238332.31	109938.04

QP : Mean value of quantization parameter
SC : Mean value of the number of coded nonzero coefficients
ZC : Mean value of the number of coded zero coefficients
NZB : Mean value of the number of nonzero blocks
MBT : Macroblock types
MCV : Moton vectors
EOB : End of block
OVH+STUFF : Headers and stuffing bits

Sequence : table tennis Institute : NHK
Bit rate : 4Mbps Date : / /91

	ALL	Intra	P1	P2
MSE				
Y	96.96	65.05	75.54	99.49
Cb	8.17	3.75	6.48	8.46
Cr	8.33	2.79	5.18	8.74
RMS				
Y	9.85	8.07	8.69	9.97
Cb	2.86	1.94	2.55	2.91
Cr	2.89	1.67	2.28	2.96
SNR				
Y	28.26	30.00	29.35	28.15
Cb	39.01	42.39	40.01	38.86
Cr	38.92	43.67	40.99	38.71
QP	21.78	5.07	11.16	23.07
SC	4.98	13.51	9.60	4.36
ZC	17.74	13.04	20.43	17.83
NZB	997.86	5279.38	1624.15	765.00
Macroblock type				
Intra	90.33	1320.00	36.31	34.55
Interfield	26.72	0.00	27.62	27.94
MC Interfield	465.32	0.00	1256.08	449.88
Interframe	313.99	0.00	0.00	343.78
MC Interframe	423.64	0.00	0.00	463.84
Number of bits				
MBT	3270.13	0.00	2695.23	3452.56
MCV	6725.31	0.00	9046.77	6934.26
EOB	11017.60	21120.00	10560.00	10560.00
Y	36702.91	323231.69	90210.77	20569.79
Cb	3963.57	68064.00	2837.69	975.73
Cr	4217.85	66265.23	3196.77	1322.44
OVH+STUFF	1233.39	1239.08	1218.92	1233.81
TOTAL	67130.77	479920.00	119766.15	45048.58

QP : Mean value of quantization parameter
SC : Mean value of the number of coded nonzero coefficients
ZC : Mean value of the number of coded zero coefficients
NZB : Mean value of the number of nonzero blocks
MBT : Macroblock types
MCV : Moton vectors
EOB : End of block
OVH+STUFF : Headers and stuffing bits

Sequence : table tennis
Bit rate : 9Mbps

Institute : NHK
Date : / /91

	ALL	Intra	P1	P2
MSE				
Y	50.49	37.31	50.02	51.14
Cb	5.75	1.91	5.16	5.96
Cr	4.76	1.37	3.84	4.97
RMS				
Y	7.11	6.11	7.07	7.15
Cb	2.40	1.38	2.27	2.44
Cr	2.18	1.17	1.96	2.23
SNR				
Y	31.10	32.41	31.14	31.04
Cb	40.54	45.32	41.01	40.38
Cr	41.35	46.76	42.28	41.17
QP	7.59	2.13	6.74	7.89
SC	8.69	24.61	12.63	7.75
ZC	25.22	18.39	22.46	25.67
NZB	2110.51	5280.00	2542.54	1939.64
Macroblock type				
Intra	81.32	1320.00	47.38	24.16
Interfield	14.82	0.00	17.85	15.38
MC Interfield	430.95	0.00	1254.77	412.31
Interframe	376.89	0.00	0.00	412.65
MC Interframe	416.03	0.00	0.00	455.50
Number of bits				
MBT	3353.13	0.00	2675.69	3544.36
MCV	6130.46	0.00	8809.23	6294.23
EOB	11017.60	21120.00	10560.00	10560.00
Y	106483.61	563978.46	182189.85	81185.75
Cb	10088.58	160772.77	8899.38	2995.75
Cr	10570.03	146641.54	9153.38	4181.30
OVH+STUFF	1232.58	1239.85	1222.62	1232.71
TOTAL	148876.00	893752.62	223510.15	109994.10

QP : Mean value of quantization parameter
SC : Mean value of the number of coded nonzero coefficients
ZC : Mean value of the number of coded zero coefficients
NZB : Mean value of the number of nonzero blocks
MBT : Macroblock types
MCV : Moton vectors
EOB : End of block
OVH+STUFF : Headers and stuffing bits

Sequence : popple
Bit rate : 9Mbps

Institute : NHK
Date : / /91

	ALL	Intra	P1	P2
MSE				
Y	45.58	14.52	25.57	48.00
Cb	29.39	1.50	9.48	31.66
Cr	27.68	1.40	9.07	29.81
RMS				
Y	6.75	3.81	5.06	6.93
Cb	5.42	1.23	3.08	5.63
Cr	5.26	1.18	3.01	5.46
SNR				
Y	31.54	36.51	34.05	31.32
Cb	33.45	46.36	38.36	33.13
Cr	33.71	46.66	38.55	33.39
QP	16.04	1.82	8.20	17.09
SC	6.37	23.18	9.02	5.45
ZC	9.34	20.98	10.15	8.75
NZB	2559.57	5280.00	3406.85	2390.30
Macroblock type				
Intra	320.78	1320.00	377.23	270.69
Interfield	6.64	0.00	7.00	6.94
MC Interfield	601.85	0.00	935.77	614.56
Interframe	38.02	0.00	0.00	41.63
MC Interframe	352.72	0.00	0.00	386.19
Number of bits				
MBT	3109.38	0.00	2654.00	3278.51
MCV	11097.35	0.00	9312.46	11708.55
EOB	11017.60	21120.00	10560.00	10560.00
Y	66308.11	459597.54	118567.54	45168.93
Cb	29875.99	209865.23	42505.23	20737.15
Cr	26378.62	210593.69	35857.69	17188.75
OVH+STUFF	1230.39	1228.46	1226.15	1230.69
TOTAL	149017.44	902404.92	220683.08	109872.58

QP : Mean value of quantization parameter
SC : Mean value of the number of coded nonzero coefficients
ZC : Mean value of the number of coded zero coefficients
NZB : Mean value of the number of nonzero blocks
MBT : Macroblock types
MCV : Moton vectors
EOB : End of block
OVH+STUFF : Headers and stuffing bits

Sequence : football
Bit rate : 4Mbps

Institute : NHK
Date : / /91

	ALL	Intra	P1	P2
MSE				
Y	68.85	19.11	28.92	73.11
Cb	23.53	5.15	9.25	25.08
Cr	16.38	4.42	7.17	17.39
RMS				
Y	8.30	4.37	5.38	8.55
Cb	4.85	2.27	3.04	5.01
Cr	4.05	2.10	2.68	4.17
SNR				
Y	29.75	35.32	33.52	29.49
Cb	34.41	41.01	38.47	34.14
Cr	35.99	41.67	39.57	35.73
QP	24.35	5.55	10.84	25.88
SC	4.58	13.55	6.55	4.07
ZC	7.92	11.44	9.33	7.68
NZB	1173.40	5279.69	1985.92	940.03
Macroblock type				
Intra	80.77	1320.00	17.00	25.00
Interfield	56.11	0.00	79.15	57.68
MC Interfield	702.44	0.00	1223.85	711.03
Interframe	95.34	0.00	0.00	104.38
MC Interframe	385.34	0.00	0.00	421.91
Number of bits				
MBT	2874.16	0.00	2798.31	3014.12
MCV	8793.27	0.00	8545.08	9222.24
EOB	11017.60	21120.00	10560.00	10560.00
Y	33805.02	304719.54	70874.15	19192.66
Cb	5407.07	87797.69	3593.54	1584.07
Cr	3974.73	74062.31	1648.92	759.75
OVH+STUFF	1236.58	1235.85	1232.92	1236.79
TOTAL	67108.43	488935.38	99252.92	45569.64

QP : Mean value of quantization parameter
SC : Mean value of the number of coded nonzero coefficients
ZC : Mean value of the number of coded zero coefficients
NZB : Mean value of the number of nonzero blocks
MBT : Macroblock types
MCV : Moton vectors
EOB : End of block
OVH+STUFF : Headers and stuffing bits

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