19

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

Document #415
December 1988

SOURCE: JAPAN
TITLE : COMMENTS ON DOC. #373 (px64 FLEXIBLE HARDWARE SPECIFICATION)

In order to realize the plan (p. 7/Doc. #395R) agreed in Paris, px64 Flexible Hardware specification should be completed as soon as possible. This document provides some proposals <P>, comments <C> or questions <Q> to the first draft specification in Doc. #373 for discussion toward the above target. See also Doc. #414.

Since the flexible hardware specification stipulates minimum requirements with some programmability, we assume the following categories to each item;

fx = fixed part to be transplanted in the Recommendation in principle.
fl = flexible part where wider range of parameters or control input signals are stipulated but may be narrowed down based on experimental results.
ve = voluntary effort part not defined as one of minimum requirements.

Note: Section numbers correspond to those in Doc. #373.

1. Source Coder

1.1 Source format =fx

<C> Minimum coded frame interval should be specified.

Alternative 1: Decoder capability is indicated to the coder as one of 1, 2, 3 or 4 times 1/29.97 sec (see Doc. #318). The coder sends out coded frames keeping this limitation.
Alternative 2: Decoder capability is defined as a function of p and picture format.

eg	p	FCIF	4/9CIF	QCIF
	1,2	15	15	15
	3-30	30	30	not exist

Should hardware evolution be taken into account in the final Recommendation? If so, "Alternative 1" is preferable. Bits 5, 6 of TYPE1 may be used for this purpose. For the flexible hardware, a manual switch may be applied.

1.2 Video source coding algorithm

1.2.1 Prediction =fx

<C> Description may be modified according to the loop filter position.

1.2.2 Motion compensation

1) Motion vector which decoder accepts =fx

<Q> Why one vector per 16x16 block is not sufficient?

2) Indication of coder without MC =fx

<Q> Bit 2/Type 2 is used? MVD is not sent or sent as 0 by such coders?

3) Range of permitted vectors =fl

<P> +/-15 x +/-15. Reason: same considerations as for nx384 Flexible Hardware. See Doc. #405.

4) Motion compensation for chrominance =fx

<P> Applied by use of the vector derived from the corresponding luminance vector.

1.2.3 Loop filter =fx

<C> At least the hardware structure should be specified to start designing. See Doc. #406.

1.2.4 Transformer =fx

<P> Inclusion of Doc. #397 as Annex for detailed arithmetic procedure.
<C> Specification on the number of bits for DCT output and IDCT input is not required. The number of bits representing the quantizer output should only be specified.

1.2.5 Quantisation =fl

1) Characteristics of unit quantizers

<P> In order to cope with overload in INTRA mode, two-piece linear characteristics should be specified for lower step sizes. See Doc. #285.

2) Number of unit quantizers

<P> 16 or 32. For $p \geq 6$, 8 quantizers may be sufficient (see Doc. #285).

3) Adaptive quantization

<P> Alternative 1: Same specification as for nx384, Fig. 10/Doc. #249.
Alternative 2: Fixed quantizer for INTRA dc and dynamic allocation of quantizers for other coefficients, but one quantizer throughout a block.

1.2.6 Clipping =fx

1.3 Data rate control =fx

1.4 Forced updating =fx

<P> Inclusion of "at least once every 128 coded frames".

2. Video Multiplex Coder

2.1 Data Structure =fx

<C> Description of "hierarchical structure" in 2.2.1 moved here?
<P> Two layer structure. See Doc. #410.

2.2 Video multiplex arrangement

2.2.1 Picture Layer =fx

1) TYPE1

<P> Inclusion of 4/9CIF (if agreed) in Bit 4,5.
<P> Minimum coded frame interval of decoder in Bit 6,7.
<P> Bit 2,3 of current Type 2 moved here.
<P> Indication whether current TYPE4 is decodable or not in Bit 8.

Note: Negotiation of these parameters to ensure intercommunication among different codecs may be carried out in other channels such as BAS, AC etc. as part of communication procedure to be defined in AV242.

2.2.2 Group of Blocks Layer

<P> This layer is all removed. See Doc. #410.
<C> "All the transmitted macroblocks are coded in INTRA" information is coded as macroblock type with number of such macroblocks to follow in macroblock layer? This point is for further study. See Doc. #407, #410.

2.2.3 Macroblock layer =fl

1) Structure

<P> Inclusion of "Coded Block Pattern (CBP)" after MVD in the structure. See Doc. #409.

2) MBA

<P> Transmission order of macroblocks: simple horizontal scanning for each format. See Doc. #410.

3) MVD

<P> Calculation of the vector data: Differential vector as in RM6.

2.2.4 Block layer =fl

1) Structure

<Q> TYPE4 decoding capability is mandatory or optional? If optional, it should be indicated in TYPE1? Only a mechanism for future TYPE4 inclusion is required?

<P> Details of transmission elements: See Doc. #410, #407.

2) CLASS

<C> Necessity depends upon the VLC for TCOEFF. If VLC is two-dimensional, scanning class is not necessary. See Doc. #220.

3) TCOEFF

<C> Possibility of adaptive encoding is considered?

2.3 Multipoint considerations =ve

<C> Experiments are not possible until MCUs become available.

3. Transmission Coder

3.1 Bit rate =fx

<P> Provision of both of self timing and loop timing.
<C> In compatibility checks, at least the following arrangements should be verified somewhere(?);

- Channel of p=1, video: around 40 kbit/s
- Channel of p=2, video: 64 kbit/s without TSSI
  Is this arrangement is a common minimum for every hardware?
- Channel of p=2, video: around 96 kbit/s with TSSI
- Channel of p=6, video: 320 kbit/s with TSSI
- Channel of p=24/30, video: 1472 or 1856 kbit/s with TSSI

3.2 Video data buffering =fx

1) Overflow prevention

<P> - Minimum coded picture interval: eg. 1/2/3/4 x 1/29.97 sec
- Maximum coded picture interval: eg. 12 x 1/29.97 sec.
See Doc. #413.

2) Underflow prevention

<P> Use of FEC framing. See Doc. #413.

3.3 Video clock justification =fx

3.4 Frame structure =fx

<C> Applicable Recommendations are;

for p=1	H.221
for p=2	H.221 for audio plus, no frame structure for video
for p=6, 24/30	H.222

3.5 Audio coding =fx

<C> Compatibility checks are carried out as follows;

for p=1	without audio
for p=2 (64+64)	G.722
for p=2 (32+96)	without audio
for p=6, 24/30	G.722

3.6 Data transmission =ve

3.7 Error handling =fx

<P> Use of (511,493)BCH with independent framing. See Doc. #413.

3.8 Encryption =ve

3.9 Bit sequence independence restrictions =ve

3.10 Network interface =fx

END