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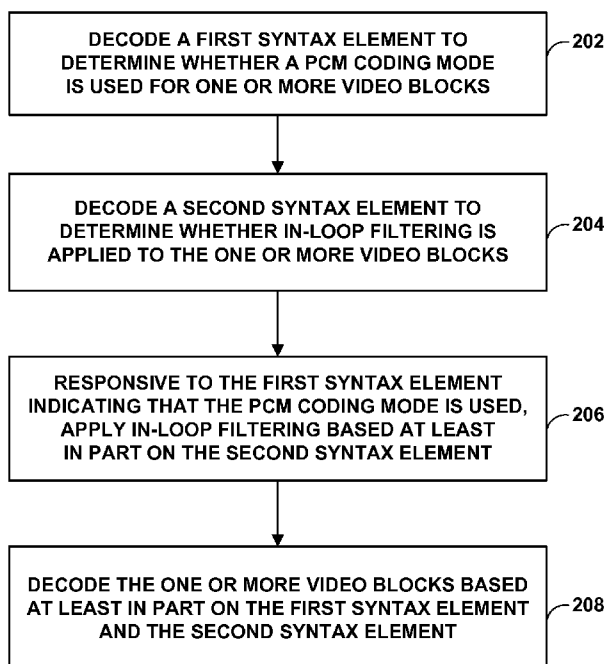
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(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC,
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(54) Title: UNIFICATION OF SIGNALING LOSSLESS CODING MODE AND PULSE CODE MODULATION (PCM) MODE
IN VIDEO CODING



(57) Abstract: Techniques described herein are related to harmonizing the signaling of coding modes and filtering in video coding. In one example, a method of decoding video data is provided that includes decoding a first syntax element to determine whether PCM coding mode is used for one or more video blocks, wherein the PCM coding mode refers to a mode that codes pixel values as PCM samples. The method further includes decoding a second syntax element to determine whether in-loop filtering is applied to the one or more video blocks. Responsive to the first syntax element indicating that the PCM coding mode is used, the method further includes applying in-loop filtering to the one or more video blocks based at least in part on the second syntax element and decoding the one or more video blocks based at least in part on the first and second syntax elements.



UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER

INV. H04N19/82 H04N19/70
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, COMPENDEX, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CHONO K ET AL: "BoG report on I PCM / lossless loop filtering unification", 100. MPEG MEETING; 30-4-2012 - 4-5-2012; GENEVA; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11), no. I0586-r3, 4 May 2012 (2012-05-04), pages 1-3, XP030053573,	1-3,5-9, 11-15, 17-31, 33-37, 39-43, 45-50
Y	the whole document	4,10,16
A	in particular, page 1, last but one paragraph	32,38,44
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Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/046289

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Chono, K.: "BoG report on I_PCM / lossless loop filtering unification, Powerpoint slides to JCTVC-I0586-r3", 100. MPEG MEETING; 30-4-2012 - 4-5-2012; GENEVA; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11) 4 May 2012 (2012-05-04), pages 1-6, XP002726734, Retrieved from the Internet: URL:http://phenix.it-sudparis.eu/jct/doc_e nd_user/documents/9_Geneva/wg11/JCTVC-I0586-v5.zip [retrieved on 2014-07-07]	1-3,5-9, 11-15, 17-28
Y A	slide 4 "Interaction between I_PCM and cu_transquant_bypass_flag" -----	4,10,16 29-50
X	VAN DER AUWERA G ET AL: "AHG6: Deblocking of IPCM Blocks Containing Reconstructed Samples", 99. MPEG MEETING; 6-2-2012 - 10-2-2012; SAN JOSE CA ; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11), no. m23324, 27 January 2012 (2012-01-27), XP030051849,	1,2,7,8, 13,14, 19-22, 25,26
Y A	abstract sections 1-3 and 6, lines 23-27	3,9,15, 23,27 4-6, 10-12, 16-18, 24,28-50
X	----- KEIICHI CHONO ET AL: "Proposal of enhanced PCM coding in HEVC", 96. MPEG MEETING; 21-3-2011 - 25-3-2011; GENEVA; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11), no. m19710, 21 March 2011 (2011-03-21), XP030048277,	1,2,7,8, 13,14, 19-22, 25,26
Y A	abstract sections 2.2-3, A.1 and A.2	3,9,15, 23,27 4-6, 10-12, 16-18, 24,28-50
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/046289

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	HENRY F ET AL: "AHG 13: Proposed bugfix for tickets 410 and 470 related to lossless coding", 9. JCT-VC MEETING; 100. MPEG MEETING; 27-4-2012 - 7-5-2012; GENEVA; (JOINT COLLABORATIVE TEAM ON VIDEO CODING OF ISO/IEC JTC1/SC29/WG11 AND ITU-T SG.16);, [Online] no. JCTVC-I0529r1, 28 April 2012 (2012-04-28), pages 1-11, XP002726735, Retrieved from the Internet: URL: http://phenix.it-sudparis.eu/jct/doc_end_user/documents/9_Geneva/wg11/JCTVC-I0529-v2.zip [retrieved on 2014-07-07]	3,4,9, 10,15, 16,23,27
A	abstract sections 1-3 and pages 7,8 and 11	1,2,5-8, 11-14, 17-22, 28-50
A	----- BROSS B ET AL: "High Efficiency Video Coding (HEVC) text specification draft 6, pages 46-49", 99. MPEG MEETING; 6-2-2012 - 10-2-2012; SAN JOSE CA; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11), no. JCTVC-H1003, 2 April 2012 (2012-04-02), XP002726787, page 49, table ,line 5 "no_residual_data_flag"	1-50
A	----- BROSS B ET AL: "High Efficiency Video Coding (HEVC) text specification draft 7", 9. JCT-VC MEETING; 100. MPEG MEETING; 27-4-2012 - 7-5-2012; GENEVA; (JOINT COLLABORATIVE TEAM ON VIDEO CODING OF ISO/IEC JTC1/SC29/WG11 AND ITU-T SG.16); URL: HTTP://WFTP3.ITU.INT/AV-ARCH/JCTVC-SITE/ , no. JCTVC-I1003, 10 May 2012 (2012-05-10), XP030112373, cited in the application sections 7.3.2.1, 7.3.6-7.3.7, 7.4.2.1, 7.4.6 in particular, 7.3.6-7.3.7 with "pcm_flag" and "no_residual_data_flag"	1-50

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/046289

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-28

Signaling loop-filter disabling in PCM coding mode

2. claims: 29-50

Hierarchical signaling of PCM and lossless coding modes
