

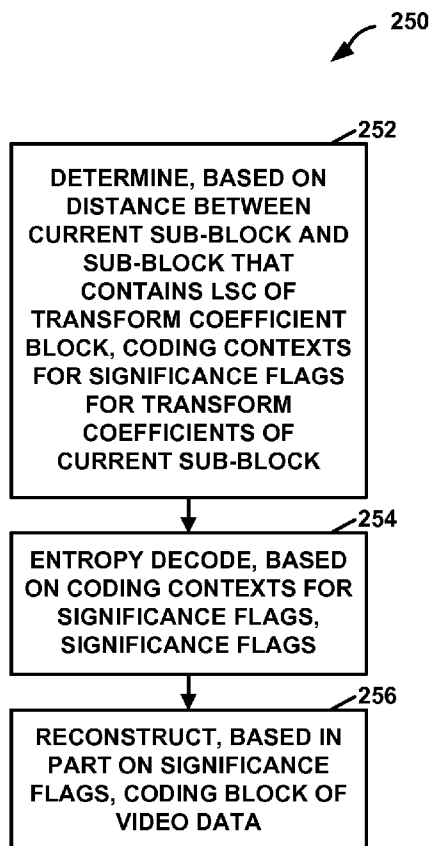


- (51) International Patent Classification: *H04N 7/26* (2006.01)
- (21) International Application Number: PCT/US2013/048698
- (22) International Filing Date: 28 June 2013 (28.06.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:

61/666,690	29 June 2012 (29.06.2012)	US
13/929,287	27 June 2013 (27.06.2013)	US
- (71) Applicant: **QUALCOMM INCORPORATED** [US/US];
ATTN: International IP Administration, 5775 Morehouse Drive, San Diego, California 92121-1714 (US).
- (72) Inventors: **JOSHI, Rajan Laxman**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **SOLE ROJALS, Joel**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US). **KARCZEWICZ, Marta**; 5775 Morehouse Drive, San Diego, California 92121-1714 (US).
- (74) Agent: **VREDEVELD, Albert W.**; Shumaker & Sieffert, P.A., 1625 Radio Drive, Suite 300, Woodbury, Minnesota 55125 (US).
- (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, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,

[Continued on next page]

(54) Title: CODING OF SIGNIFICANCE FLAGS



(57) Abstract: A video coder determines, based at least in part on a distance between a current sub-block of a transform coefficient block and a sub-block that contains a last significant coefficient (LSC) of the transform coefficient block, coding contexts for significance flags for transform coefficients of the current sub-block. Furthermore, the video coder entropy codes, based on the coding contexts for the significance flags for the transform coefficients of the current sub-block, the significance flags for the transform coefficients of the current sub-block.

WO 2014/005081 A3



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))*

(88) Date of publication of the international search report:
20 February 2014

Published:

— *with international search report (Art. 21(3))*

INTERNATIONAL SEARCH REPORT

International application No PCT/US2013/048698
--

A. CLASSIFICATION OF SUBJECT MATTER INV. H04N7/26 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, 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.
Y	KUMAKURA T ET AL: "Non-CE3: Simplified context derivation for significance map", 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-I0296, 17 April 2012 (2012-04-17), pages 1-8, XP030112059,	26-28
A	sections 1 and 2 ----- -/--	1-25
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> 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	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent but published on or after the international filing date	"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	
"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)	"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	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search	Date of mailing of the international search report	
10 December 2013	19/12/2013	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Kontopodis, D	

INTERNATIONAL SEARCH REPORT

International application No PCT/US2013/048698

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>NGUYEN T; SCHWARZ H; KIRCHHOFFER H; MARPE D; WIEGAND T;: "Improved Context Modeling for Coding Quantized Transform Coefficients in Video Compression", PICTURE CODING SYMPOSIUM 2010; 8-12-2010 - 10-12-2010; NAGOYA, JAPAN, 8 December 2010 (2010-12-08), pages 378-381, XP030082008, section 3.2</p> <p align="center">-----</p>	26-28
A	<p>WINKEN M ET AL: "Video coding technology proposal by Fraunhofer HHI", 1. JCT-VC MEETING; 15-4-2010 - 23-4-2010; DRESDEN; (JOINTCOLLABORATIVE TEAM ON VIDEO CODING OF ISO/IEC JTC1/SC29/WG11 AND ITU-TSG.16); URL: HTTP://WFTP3.ITU.INT/AV-ARCH/JCTVC-SITE/, 24 April 2010 (2010-04-24), pages 1-43, XP030007557, ISSN: 0000-0049 page 17, paragraph 2</p> <p align="center">-----</p>	1-28

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/048698

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: 1-25

Determining context models for significance flags of transform coefficients based on the distance between the current sub-block and the sub-block containing the least significant coefficient of the transform block.

2. claims: 26-28

Determining context models for significance flags of transform coefficients based on a weighted count of transform coefficients greater than a threshold in previously coded sub-blocks.
