

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 September 2011 (29.09.2011)

(10) International Publication Number
WO 2011/118965 A3

- (51) **International Patent Classification:**
H04L 1/18 (2006.01) *H04J 11/00* (2006.01)
- (21) **International Application Number:**
PCT/KR2011/001962
- (22) **International Filing Date:**
22 March 2011 (22.03.2011)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**

61/316,134	22 March 2010 (22.03.2010)	US
61/352,164	7 June 2010 (07.06.2010)	US
61/352,623	8 June 2010 (08.06.2010)	US
- (71) **Applicant (for all designated States except US):** **SAM-SUNG ELECTRONICS CO., LTD.** [KR/KR]; 416, Maetan-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do 442-742 (KR).
- (72) **Inventors:** **PAPASAKELLARIOU, Aris**; 2128 Harold Street, Unit B, Houston, TX 77098 (US). **KIM, Young-Bum**; #109-1402, Samsung Raemian 2-cha Apt., Imun 2-dong, Dongdaemun-gu, Seoul 130-794 (KR).
- (74) **Agent:** **LEE, Keon-Joo**; Mihwa Bldg., 110-2, Myongryun-dong 4-ga, Chongro-gu, Seoul 110-524 (KR).

- (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, 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, KM, 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, PE, PG, PH, PL, PT, RO, RS, RU, 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, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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, ML, MR, NE, SN, TD, TG).

Published:
— with international search report (Art. 21(3))

(88) Date of publication of the international search report:
15 March 2012

(54) **Title:** MULTIPLEXING CONTROL AND DATA INFORMATION FROM A USER EQUIPMENT IN A PHYSICAL DATA CHANNEL

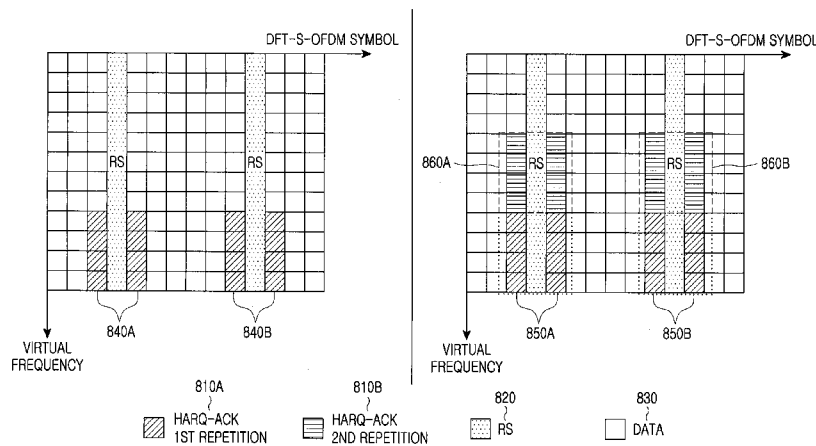
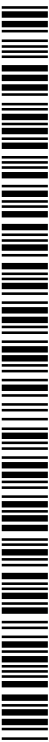


FIG. 8

(57) **Abstract:** Methods and apparatus are described for a User Equipment (UE) to transmit HARQ-ACK information in a Physical Uplink Shared Channel (PUSCH) in response to a reception of at least one Transport Block (TB) when the UE is configured by a base station with multiple DownLink (DL) Component Carriers (CCs), for selecting a single PUSCH for transmitting of Uplink Control Information (UCI), when the UE has multiple PUSCH transmissions, for improving the reliability of the HARQ-ACK reception when it is encoded using a block code relative to when it is encoded using the repetition code, and for applying transmission diversity to the HARQ-ACK transmission in a PUSCH.



WO 2011/118965 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2011/001962**A. CLASSIFICATION OF SUBJECT MATTER****H04L 1/18(2006.01)i, H04J 11/00(2006.01)i**

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)

H04L 1/18; G06F 11/14; H04B 1/66; H04W 72/04

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: UE, PUSCH, PDSCH, code, rate, block, codeword, HARQ, control, information, transmission

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009-0241004 A1 (JOON KUI AHN et al.) 24 September 2009 See abstract; paragraphs [0081]-[0103]; claims 1-10 and figures 8-9.	1-19
A	WO 2009-142436 A2 (LG ELECTRONICS INC. et al.) 26 November 2009 See abstract; paragraphs [40]-[80]; claims 1-7 and figures 6-9.	1-19
A	US 2009-0129461 A1 (SUNDARARAJAN VIJAY et al.) 21 May 2009 See abstract; paragraphs [0043]-[0058]; claims 1-8 and figures 5-7.	1-19

 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 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

"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

"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

27 DECEMBER 2011 (27.12.2011)

Date of mailing of the international search report

27 DECEMBER 2011 (27.12.2011)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 189 Cheongsu-ro,
Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Jung, Gu Ung

Telephone No. 82-42-481-8598



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2011/001962

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009-0241004 A1	24.09.2009	CN 101689984 A	31.03.2010
		EP 2104263 A1	23.09.2009
		JP 2010-521942 A	24.06.2010
		KR 10-0905385 B1	30.06.2009
		TW 2010-04212 A	16.01.2010
		US 2010-0281326 A1	04.11.2010
		US 7774686 B2	10.08.2010
		WO 2009-116760 A2	24.09.2009
		WO 2009-116760 A3	24.09.2009
		WO 2009-142436 A2	26.11.2009
US 2011-0051824 A1	03.03.2011		
WO 2009-142436 A3	26.11.2009		
US 2009-0129461 A1	21.05.2009	None	