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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, 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, 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.

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(H))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(in))

Published:

- with international search report (Art. 21(3))
- 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:**

13 June 2013

(54) **Title:** SYSTEMS AND METHODS FOR DETECTING TRANSMISSIONS BASED ON 32-POINT AND 64-POINT FAST FOURIER TRANSFORMS

(57) **Abstract:** Systems, methods, and devices for communicating and detecting training sequences are described herein. In one aspect, a method of wireless communication is provided. The method comprises receiving one or more short training field (STF) sequences comprising sixty-four values or less. The STF sequences comprise zero and non-zero values. The non-zero values are located at one or more indices of the STF that are separated by a multiple of at least four. The method further comprises determining a first correlation between the STF and the STF shifted by a first shift length. The method further comprises determining a second correlation between the STF and the STF shifted by a second shift length. The method further comprises determining a fast Fourier transform (FFT) size based on the first correlation and the second correlation. The method further comprises decoding one or more data symbols based at least in part on the determined FFT size.



INTERNATIONAL SEARCH REPORT

International application No PCT/US2012/052053
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A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L27/26
 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)
H04L

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, IBM-TDB, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	wo 2011/008740 A2 (QUALCOMM INC [US] ; YANG LIN [US] ; VAN NEE DIDIER JOHANNES RICHARD [NL]) 20 January 2011 (2011-01-20) paragraph [0048] -----	1, 18,29 , 46,57 , 74,85 , 102
A	US 2011/194545 A1 (YANG LIN [US] ET AL) 11 August 2011 (2011-08-11) paragraph [0065] -----	1, 18,29 , 46,57 , 74,85 , 102

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 25 April 2013	Date of mailing of the international search report 03/05/2013
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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 Farese, Luca
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/052053

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: 1-17 , 29-45 , 57-73 , 85-101

Determination of the FFT size

2. claims: 18-28, 46-56, 74-84, 102-112

Generation of STF sequences with low PAPR

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/052053

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2011008740 A2	20-01-2011	TW 201129034 A	16-08-2011
		US 2011013583 A1	20-01-2011
		WO 2011008740 A2	20-01-2011

US 2011194545 A1	11-08-2011	US 2011194545 A1	11-08-2011
		WO 2011130363 A1	20-10-2011
