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AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,  
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HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,  
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MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,  
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(54) Title: DYNAMIC CHAIN CONFIGURATION SELECTION

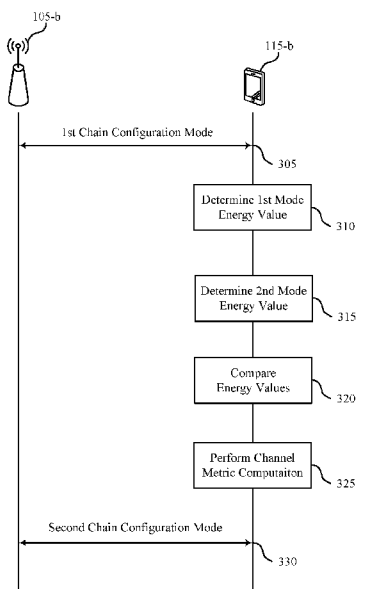


FIG. 3

(57) Abstract: Methods, systems, and devices for wireless communication are described. A wireless device (*e.g.*, an access point or a station) capable of supporting multiple chain configuration modes may dynamically select a chain configuration mode via channel analysis and energy efficiency analysis. A wireless device may monitor traffic on a wireless channel using a first chain configuration mode. The wireless device may determine an energy value associated with monitoring the traffic using the first (*e.g.*, single) chain configuration, and further determine or infer an energy value associated with monitoring the traffic using a second (*e.g.*, multi) chain configuration. The wireless device may perform a channel metric computation on the traffic (*e.g.*, perform a QR decomposition of a channel matrix associated with the monitored traffic). The wireless device may then switch or select a chain configuration mode for operation based on a comparison between the determined energy values and the channel metric computation.



**Published:**

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INTERNATIONAL SEARCH REPORT

International application No  
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A. CLASSIFICATION OF SUBJECT MATTER  
INV. H04B7/06  
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)  
H04B

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, 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	US 2009/168914 A1 (CHANCE GREGORY W [US] ET AL) 2 July 2009 (2009-07-02)	1-5, 8-14, 16-20, 23-29
Y	paragraphs [0015], [0056]	6,7,21,
A	paragraph [0070] - paragraph [0075]	22
A	figures 2, 4, 6-7	15,30
A	----- US 2009/103486 A1 (HUNUKUMBURE MYTHRI [GB] ET AL) 23 April 2009 (2009-04-23) paragraph [0050]	4,19
A	----- US 2005/237971 A1 (SKRAPARLIS DIMITRIOS [GB]) 27 October 2005 (2005-10-27) paragraphs [0009], [0020]	5,20
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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

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"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

18 December 2018

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17/01/2019

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2018/041491

## 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.

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2018/041491

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2012/062421 A1 (SU CHI-LIN [TW] ET AL) 15 March 2012 (2012-03-15) paragraph [0045] -----	6,21
Y	US 2004/203476 A1 (LIU JUNG-TAO [US]) 14 October 2004 (2004-10-14) paragraph [0042] - paragraph [0047] -----	7,22
Y	US 2004/100897 A1 (SHATTIL STEVE J [US]) 27 May 2004 (2004-05-27) paragraph [0100] - paragraph [0103] -----	7,22

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2018/041491
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
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			US 2004203476 A1	14-10-2004
US 2004100897	A1	27-05-2004	NONE	

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-5, 8-20, 23-30

How to compute a channel metric?

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2. claims: 6, 7, 21, 22

How to obtain measurement samples in a wireless communications system?

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