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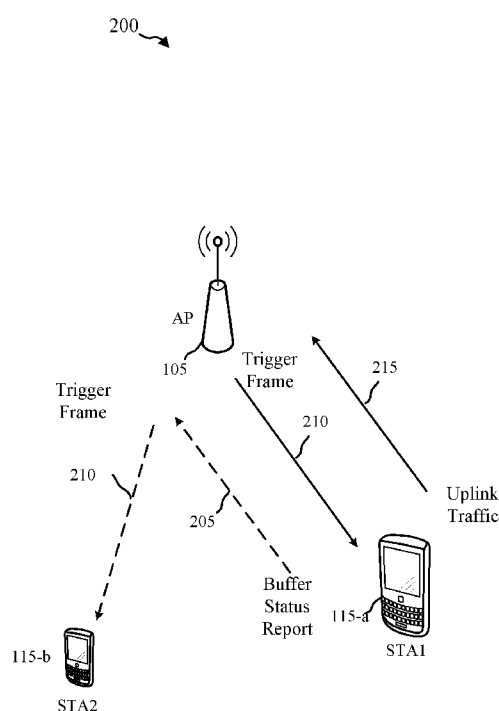
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(54) Title: TRIGGER FRAME IN WIRELESS LOCAL AREA NETWORK



(57) Abstract: The present disclosure provides various aspects related to techniques for generating trigger frames, at an access point (AP), that reduce the overhead associated with triggering an uplink transmission from the wireless station (STA). Features of the present disclosure achieve this by, for example, utilizing a single per-user information field of the trigger to signal a plurality of random access resource units that may be allocated to the one or more STAs in the network. Such a technique is an improvement over the conventional system that require each random access resource unit to be signaled separately in a separate per-user information field (thus increasing the overhead). Additionally, aspects of the present disclosure allow the AP to effectively signal to the STA whether the one or more resources allocated to the at least one STA are a single user resource unit allocation or a multi-user resource unit allocation.

GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, 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).

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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) H04W		
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, INSPEC		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	Section 9.3.1.23, 25.5.2.2, 25.5.2.6, 26.3.12.4; figures 9-51-a,9-51b,9-1	19-23,30
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A	the whole document -/-	19-23,30
☒ 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 "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 20 October 2017		Date of mailing of the international search report 27/10/2017
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 Romaszko, Sylwia

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	Slides 12, 13, 15, 17	32,38, 43,47
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2017/031349

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2016/119881 A1 (MERLIN SIMONE [US] ET AL) 28 April 2016 (2016-04-28)	31, 33-37, 39-42, 44-46, 48-50
A	paragraphs [0068], [0069], [0096], [0129], [0130], [0132]; figures 2b,13 -----	32,38, 43,47
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A	paragraphs [0036], [0040], [0043] - [0046]; figures 5,6 -----	32,38, 43,47
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/031349

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: 1-30

Claim 1: Determining, by an AP, whether to trigger STA for UL transmission,
Generating a trigger frame identifying whether one or more resources allocated to STA are single user resource unit allocation or multi user resource unit allocation, Transmitting the trigger frame to STA.

Claim 13: Receiving, by a STA, a trigger frame from the AP, with per-user information field,
Decoding the per-user information field identifying whether one or more resource allocated to STA are single user resource unit allocation or multi user resource unit allocation.

Communicating with the AP on the one or more resources allocated to STA based on the decoding.

2. claims: 31-50

Receiving, by a STA, a trigger frame from a first AP,
Decoding at least a spatial reuse subfield in the trigger field frame to identify one or more of transmit power of the first AP or acceptable interference level of the first AP,
Calculating a transmit power of the STA based at least in part on the transmit power of the first AP or the interference level of the first AP.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2017/031349

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