

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference WOCN1612747	FOR FURTHER ACTION		See item 4 below
International application No. PCT/CN2016/108152	International filing date (<i>day/month/year</i>) 30 November 2016 (30.11.2016)	Priority date (<i>day/month/year</i>)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant SHENZHEN TINNO WIRELESS TECHNOLOGY CO., LTD			

<p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p>																								
<p>3. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> <p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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	Date of issuance of this report 04 June 2019 (04.06.2019)
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From the INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Applicant's or agent's file reference WOCN1612747		Date of mailing (day/month/year) 21 August 2017
		FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/CN2016/108152	International filing date (day/month/year) 30 November 2016	Priority date (day/month/year)
International Patent Classification (IPC) or both national classification and IPC H04W 40/10(2009.01)i; H04W 40/02(2009.01)i; H04W 84/20(2009.01)i		
Applicant SHENZHEN TINNO WIRELESS TECHNOLOGY CO., LTD		

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/	Date of completion of this opinion	Authorized officer

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/CN2016/108152

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed.
 - a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a)).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
 - a. (means)
 - on paper
 - in electronic form
 - b. (time)
 - in the international application as filed
 - together with the international application in electronic form
 - subsequently to this Authority for the purposes of search
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2016/108152

Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement			
1. Statement	Novelty (N)	Claims	1-18 <hr/> None <hr/> None	YES <hr/> NO <hr/> YES <hr/> NO <hr/> YES <hr/> NO
Inventive step (IS)	Industrial applicability (IA)	Claims	1-18 <hr/> None	YES <hr/> NO
2. Citations and explanations :				
[1] D1: CN 103269485 A, which is the prior art closest to claims 1-18				
[2] D2: CN 103945484 A				
[3] 1. Novelty				
[4] Neither D1 nor D2 individually discloses the technical solutions of claims 1-18, and thus, claims 1-18 are novel and comply with PCT Article 33(2).				
[5] 2. Inventive step				
[6] 2.1 D1 discloses a method for clustering the maximum convergence degree of a wireless sensor network, the method comprising: at the beginning of a round of clustering, all nodes (except for a convergence node) synchronously starting a cluster head timer; if the remaining energy of the nodes is greater than threshold value energy, setting a timing length $T_c = T_{max} / A$, wherein A is a normalized convergence degree, and A is greater than or equal to 1; otherwise, setting the timing length $T_c = T_{max}$, wherein T_{max} is the maximum cluster head timing length; when the cluster head timer of a certain pending node arrives at a time, the node becoming a temporary cluster head node, and broadcasting a cluster head message to a neighbor node; and when a certain pending node receives a cluster head message sent by a node X, the node becoming an ordinary cluster member node, and immediately stopping the cluster head timer and marking the node X as a cluster head thereof (see description, paragraphs [0038] - [0055]). It can be seen from the above-mentioned features that when the remaining energy of a node is greater than a threshold value, a timing length T_c is less than a timing length T_{max} when the remaining energy of the node is lower than the threshold value.				
[7] 2.2 Independent claim 1 sets forth a message broadcasting method for a distributed network, and the difference between said claim and D1 lies in: 1) in claim 1, immediately broadcasting, when the value of the remaining energy of a node is not less than a set threshold value, a message for requesting selection as a cluster head. With regard to difference 1), D1 provides the motivation that a delay length when the remaining energy of a node is greater than threshold value energy is less than a delay length when the remaining energy of the node is less than the threshold value energy. A person skilled in the art would also have been able to directly send, according to actual requirements and when the remaining energy of a node is greater than threshold value energy, a message for requesting selection as a cluster head, and this is a common technical means in the art.				
[8] 2.2 Independent claims 10 and 11 both set forth a distributed network node. The differences between claim 10 and D1 lie in: difference 1); and difference 2), using corresponding functional modules to complete functions of the node. The differences between claim 11 and D1 lie in: difference 1); and difference 3), comprising a sender and a receiver for respectively executing the functions of sending and receiving a message, comprising a memory for storing a computer instruction, and comprising a processor for executing the computer instruction so as to complete the functions of a node. Differences 2) and 3) are both common technical means in the art.				
[9] 2.3 Claims 1, 10 and 11 do not comply with PCT Article 33(3) with respect to a combination of D1 and common general knowledge.				
[10] 2.4 With regard to dependent claims 4 and 14, D2 discloses: calculating an election weight of a node, wherein the election weight $W_i = V_i * (1 + ND_i / 10)$, ND_i is a node degree, and V_i is an energy level				

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/CN2016/108152

Box No. V

**Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability;
citations and explanations supporting such statement**

of the node; and the node *i* broadcasting the election weight to a neighbor node, and not sending the weight thereof if received weight information of the neighbor node is greater than information thereof (see description, paragraphs [0121] - [0124]). In D2, the election weight is proportional to the energy of a node, and a person skilled in the art would also have been able to select, according to actual requirements, the remaining energy of the node for comparison. Claims 4 and 14 do not comply with PCT Article 33(3) with respect to a combination of D1, D2 and common general knowledge.

[11] 2.5 The additional features of dependent claims 2, 3, 5-9, 12, 13 and 15-18 are either disclosed in D1 (see above), or common general knowledge in the art, and thus, where the claims referred to thereby do not involve an inventive step, claims 2, 3, 5-9, 12, 13 and 15-18 do not comply with PCT Article 33(3).

[12] **3. Industrial applicability**

[13] Claims 1-18 comply with PCT Article 33(4).