

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

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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:

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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	<u>1-18</u>	YES
	Claims	<u>None</u>	NO
Inventive step (IS)	Claims	<u>None</u>	YES
	Claims	<u>1-18</u>	NO
Industrial applicability (IA)	Claims	<u>1-18</u>	YES
	Claims	<u>None</u>	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	

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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).