

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 ARR01339-PCT	FOR FURTHER ACTION	See item 4 below
International application No. PCT/US2019/028002	International filing date (<i>day/month/year</i>) 17 April 2019 (17.04.2019)	Priority date (<i>day/month/year</i>) 29 May 2018 (29.05.2018)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant ARRIS ENTERPRISES LLC		

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).																								
2.	This REPORT consists of a total of 9 sheets, including this cover sheet.																								
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.																									
3.	This report contains indications relating to the following items: <table style="width: 100%;"> <tr> <td style="width: 5%; text-align: center;">☒</td> <td style="width: 25%;">Box No. I</td> <td style="width: 70%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;">☒</td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;">☒</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 style="text-align: center;">☐</td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;">☒</td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;">☒</td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	☒	Box No. I	Basis of the report	☐	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 Article 35(2) with regard to novelty, inventive step or 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
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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).																								

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Date of issuance of this report 01 December 2020 (01.12.2020) Authorized officer Xiaofan Tang e-mail: pct.team2@wipo.int
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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference see form PCT/ISA/220		FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/US2019/028002	International filing date (day/month/year) 17.04.2019	Priority date (day/month/year) 29.05.2018
International Patent Classification (IPC) or both national classification and IPC INV. H04L12/26 H04L12/24		
Applicant ARRIS ENTERPRISES LLC		

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 usually 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:  European Patent Office P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Fax: +31 70 340 - 3016	Date of completion of this opinion see form PCT/ISA/210	Authorized Officer Hanigk, Sebastian Telephone No. +31 70 340-0
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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 43bis.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:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
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 forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

☐ the entire international application

☒ claims Nos. 8-15

because:

☒ the said international application, or the said claims Nos. 8-15 relate to the following subject matter which does not require an international search (*specify*):

see separate sheet

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☒ no international search report has been established for the whole application or for said claims Nos. 8-15

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing in the form of an Annex C/ST.25 text file, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.

☐ furnish a sequence listing on paper or in the form of an image file complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13~~ter~~.1(a) or (b).

☒ See Supplemental Box for further details

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>7</u>
	No: Claims	<u>1-6, 16-20</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-7, 16-20</u>
Industrial applicability (IA)	Yes: Claims	<u>1-7, 16-20</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1 **Re Item III**

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

- 1.1 Independent **claim 8** specifies an adaptive traffic modeler for a network using samples of actual utilization. While it is unclear if this utilization refers to network utilization, subscriber utilization, or another kind of utilization, this term in its breadth does not clearly specify a technical feature; similarly, the providing of content to subscribers also does not specify a technical feature per se.
- 1.2 As the subject-matter of **claim 8** therefore merely recites a mathematical or mental act according to Rule 39(i) PCT resp. Rule 39(iii) PCT, and as the dependent **claims 9-15** do not provide any further clear technical features, the subject-matter of the **claims 8-15** therefore constitutes subject-matter for which the International Searching Authority is not required to carry out a search (Art. 17(2)(a)(i) PCT).

2 **Re Item V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 2.1 Reference is made to the following documents:
- | | |
|----|--|
| D1 | EP 2 701 344 A1 (SANDVINE INC ULC [CA]) 26 February 2014 (2014-02-26) |
| D2 | US 2007/299746 A1 (HALEY MICHAEL R [US] ET AL) 27 December 2007 (2007-12-27) |
- 2.2 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of **claim 1** is not new.
- D1 discloses a system comprising:
- a first module that receives information from a network providing content to each of a plurality of subscribers (*cable subscribers 104 and three mobile subscribers 104 have been illustrated as connected to the network 108, par. [0050]; system 102 is able to monitor traffic, ibid.*) and uses the information to generate a first model, the first model modeling quality of experience, QoE, of at least one subscriber as a function of capacity of at least one network element (*producing data records for each subscriber,*

broken down by application, a broadband access router sending RADIUS accounting records or the like. The data source module 118 collects utilization data relating to resource metrics and attributes and transfers the utilization data to a metric aggregation module 120, par. [0052]; KPIs are measured at the level of a network resource, so they can be more precisely extracted and analyzed. One example of a useful KPI is usage per subscriber. This KPI can be averaged to provide an average usage per subscriber during the peak period. Other examples of useful KPIs include, for example, usage per application or a quality of experience metric (QoE), such as round-trip time, Voice over Internet Protocol (VoIP) mean opinion score (MOS), and video quality of experience score, par. [0065]);

- *a second module that generates a second model that models future capacity of the at least one network element based on receipt of information measuring actual usage of the network (business intelligence module 130 extracts data for aggregated KPIs from the data warehouse module 128 and outputs the data, for example, in graphical format, in order to provide historical, current and predictive views of peak periods and their impact on different levels in the network 108, which enables ISPs to make network capacity planning and optimization decisions. For example, one predictive technique is to look at the historical trend of a KPI, and use, for example, a mathematical model such as a linear regression to project the KPI into the future, par. [0056]; aggregated results can then be analyzed over a predetermined time period by the business intelligence module 130 and used to determine 210 a growth rate for each KPI. A regression analysis, such as a linear regression, may be used to project future growth rate based on a series of past data points, par. [0068]); and*
- *a third module that uses the first model and the second model to generate a forecast of required capacity over a future interval (capacity planning, see above).*

2.3 As independent **claim 16** recasts these features in terms of a corresponding method, the same reasoning as provided above is also applicable, mutatis mutandis. Thus, the subject-matter of **claim 16** is also not novel within the meaning of Art. 33(2) PCT.

- 2.4 Dependent **claims 2-7, 9-15, and 17-20** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step.
- 2.4.1 Regarding **claims 2 and 17**: Due to the clarity issue as mentioned below, no further features over independent claims 1 resp. 16 are present.
- 2.4.2 Regarding **claims 3-5, 19, and 20**: *Generally speaking, the period may be determined by the data collection technology, as well as business decisions on how "aggressively" the network should be built to satisfy short-term peaks in bandwidth demand* (par. [0062]).
- 2.4.3 Regarding **claim 6**: *an average of at least one KPI for each resource is determined over the peak period for each of the plurality of network resources by the peak KPI module 124. In this embodiment, the KPIs are measured at the level of a network resource, so they can be more precisely extracted and analyzed* (par. [0065]).
- 2.4.4 Regarding **claim 7**: As D1 already discloses network capacity planning based on future usage predictions (see passages as cited above), it would be a normal design option for the person skilled in the art to rank network resources according to different criteria such as most over- or under-utilised, etc.
- 2.4.5 Regarding **claim 18**: See pars. [0056] and [0068] as cited above.

3 Re Item VII

Certain defects in the international application

- 3.1 The independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art D1 being placed in the preamble (Rule 6.3(b)(i) PCT) and the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).
- 3.2 The features of the preambles of the independent claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- 3.3 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 and D2 is not mentioned in the description, nor are these documents identified therein.

4 Re Item VIII

Certain observations on the international application

- 4.1 The application does not meet the requirements of Article 6 PCT, because **claims 2** and **17** are not clear.

The passage "future capacity in a QoE space" is unclear as it suggests a restriction over capacity forecasting in general but does not provide clear technical features what a "QoE space" means.