

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

100034

7F, New Era Building, 26 Pinganli Xidajie,
Xicheng District, Beijing, China

ZHONGZI LAW OFFICE

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty) (PCT Rule 71.1)

Date of mailing (day/month/year) :
15. Dec. 2021 (15. 12. 2021)

Applicant's or agent's file reference: PF190724PCT

IMPORTANT NOTIFICATION

International application No.

PCT/CN2019/120338

International filing date (day/month/year)

22. Nov. 2019 (22. 11. 2019)

Priority date (day/month/year)

15. Aug. 2019 (15. 08. 2019)

Applicant:

TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

National Intellectual Property Administration, PRC(IPEA/CN)
6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PF190724PCT	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No PCT/CN2019/120338	International filing date (<i>day/month/year</i>) 22. Nov. 2019 (22. 11. 2019)	Priority date (<i>day/month/year</i>) 15. Aug. 2019 (15. 08. 2019)	
International Patent Classification (IPC) or national classification and IPC H04W 48/08 (2009. 01) i			
Applicant TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This **REPORT** consists of a total of 4 sheets, including this cover sheet.

3. This report is also accompanied by **ANNEXES**, comprising:

a. ☒ (*sent to the applicant and to the International Bureau*) a total of 2 sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions).

☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2).

☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)).

b. ☐ (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) _____ containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3ter of Annex C of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	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

Date of submission of the demand 11. Jun. 2021 (11. 06. 2021)	Date of completion of this report 26. Nov. 2021 (26. 11. 2021)
National Intellectual Property Administration, PRC (IPEA/CN) 6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088 Facsimile No. (86-10) 62019451	Authorized officer XUE, Yongxu Telephone No. 86-(10)-53961657

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/CN2019/120338

Box No. I Basis of the report

 1. With regard to the **language**, this report is based on:

- ☒ 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))
 - ☐ publication of the international application (Rule 12.4(a))
 - ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

 2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☒ the international application as originally filed/furnished

☐ the description:	pages _____	as originally filed/furnished	
	pages _____	received by this Authority on _____	
☐ the claims:	Nos. _____	as originally filed/furnished	
	Nos.* _____	as amended (together with any statement) under Article 19	
	Nos.* _____	received by this Authority on _____	_____
☐ the drawings:	pages _____	as originally filed/furnished	
	pages _____	received by this Authority on _____	_____

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.

 3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing (*specify*) _____

 4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rule 70.2(c) and (c-bis)).

- ☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing (*specify*): _____

 5. ☐ This report has been established:

- ☐ taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
☐ without taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rules 66.4bis and 70.2(e)).

6. With regard to top-up searches (Rules 66.1ter and 70.2(f)):

- ☐ A top-up search was carried out by this Authority on
☐ Additional relevant documents have been discovered during the top-up search.
☐ No top-up search was carried out by this Authority because it would serve no useful purpose.

 7. ☐ Supplementary international search report(s) from Authority(ies) _____ has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement:

Novelty (N)	Claims <u>1-34</u>	YES
	Claims <u>None</u>	NO
Inventive step (IS)	Claims <u>None</u>	YES
	Claims <u>1-34</u>	NO
Industrial applicability (IA)	Claims <u>1-34</u>	YES
	Claims <u>None</u>	NO

2. Citations and explanations (Rule 70.7)

D1: S2-1906969 28 June 2019

D2: S2-188915 24 August 2018

I. Novelty and inventive step

D1 discloses (see section 6.3.1): The NF discovery and NF service discovery enable Core Network entities (NFs or Service Communication Proxy (SCP)) to discover a set of NF instance(s) and NF service instance(s) for a specific NF service or an NF type. NF service discovery is enabled via the NF discovery procedure. In order for the requester NF or SCP to obtain information about the NF and/or NF service(s) registered or configured in a PLMN/slice, based on local configuration the requester NF or SCP may initiate a discovery procedure with the NRF by providing the type of the NF and optionally a list of the specific service(s) it is attempting to discover.

D2 discloses (see Reason for change, section 4.17): In all the procedures of section 4.17, the described services are exposed by the NRF regardless whether the registering NF is consumer and/or producer of services. (Example: The registration service is exposed by the NRF to all NFs regardless whether the NF is consumer or producer). In addition, in the description of step 1 of NF registration service procedure in section 4.17.1, it is mentioned that the NF profile includes the following based on the description in TS 23.501: "According to clause 6.2.6 of TS 23.501 [2], the NF profile of NF service consumer includes NF type, FQDN or IP address of NF, Names of supported services, Endpoint information of instance(s) of each supported service and other service parameter". However, the following parameters are optional in stage 3 for the NF profile and especially not applicable if the registering NF is not a service producer (e.g. AF, UPF): "Names of supported services, Endpoint information of instance(s) of each supported service and other service parameter".

The distinguishing feature of claims 1,13 as compared with D1 is that: (1) the method comprises receiving a service response from the service discovery entity.

The distinguishing feature of claim 23 as compared with D2 is that: (2) the service producer receives a NF service register response from the NRF.

Therefore claims 1-26 meet PCT Article 33(2).

The distinguishing features (1) and (2) are well known in the art.

Therefore claims 1, 13, 23 do not meet PCT Article 33(3).

The additional features of claims 3-4, 15-16, 24 are either disclosed in D2, or well known in the art. The additional features of claims 2, 5-8, 12, 14, 17-18, 22 are either disclosed in D1, or well known in the art.

The additional features of claims 9-11, 19-21, 25-26 are well known in the art.

Considering the comments on claims 1-26, claims 27-34 meet PCT 33(2) but do not meet PCT 33(3).

II. Industrial applicability

Claims 1-34 meet the criteria set out in PCT Article 33(4).

III. About applicants' argument

The applicant argues that: Names of supported services refer to names of services supported by the NF rather than a client type. As further defined in claim 9 of present disclosure, the client type includes at least one of an emergency service; a value added service; an operator service; a lawful intercept service; a broadcast service; an operator operations & maintenance service; an operator anonymous statistics service; or an operator target mobile station service support service. Therefore D1 and D2 do not disclose "the service request includes a parameter indicating a client type that one or more candidate target NFs can serve".

The authority considers that: As stated by the applicant, the client type is denoted by different service types, D1 discloses "the requester NF or SCP may initiate a discovery procedure with the NRF by providing the type of the NF and optionally a list of the specific service(s) it is attempting to discover", therefore the "specific service(s) it is attempting" of D1 equal to the "client type" of claim 1. Similarly, "names of supported services" of D2 equal to the "client type" of claim 1.

To:

National Intellectual Property Administration, PRC
6, Xitucheng Road, Jimen Bridge
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Beijing 100088
P.R.China

Response to Written Opinion pursuant to Article 34 PCT

Application Number: PCT/CN2019/120338
Application Date: 11/22/2019
Applicant: Telefonaktiebolaget LM Ericsson (publ)
Our Reference: PF190724PCT

Dear Sirs,

With reference to our demand for International Preliminary Examination of the above-identified application under PCT Chapter II, we file herewith the following, without prejudice:

Novelty and Inventive Step

With regard to the Examiner's objections in Item V, Applicant respectfully requests the Examiner to re-consider these objections in view of the following observations.

Claim 1 relates to a method at a network function (NF) service consumer. The method comprises sending a service request to a service discovery entity. The method further comprises receiving (204) a service response from the service discovery entity. **The service request includes a parameter indicating a client type that one or more candidate target NFs can serve.**

D1, as cited by the Examiner, discloses, "the NF discovery and NF service discovery enable Core Network entities (NFs or Service Communication Proxy (SCP)) to discover a set of NF instance(s) and NF service instance(s) for a specific NF service or **an NF type**. NF service discovery is enabled via the NF discovery procedure" and "In order for the requester NF or SCP to obtain information about the NF and/or NF service(s) registered or configured in a PLMN/slice, based on local configuration the requester NF or SCP may initiate a discovery procedure with the NRF by providing **the type of the NF** and optionally a list of the specific service(s) it is attempting to discover".

D2, as cited by the Examiner, discloses, "In all the procedures of section 4.17, the described services are exposed by the NRF regardless whether the registering NF is consumer and/or producer of services. (Example: The registration service is exposed by the NRF to all NFs regardless whether the NF is consumer or producer)". In addition, in the description of step 1 of NF registration service procedure in section 4.17.1, it is mentioned that the NF profile includes the following based on the description in TS 23.501: "According to clause 6.2.6 of TS 23.501 [2], the NF profile of NF service consumer includes **NF type**, FQDN or IP address of NF, Names of supported services, Endpoint information of instance(s) of each supported service and other service parameter". However, the following parameters are optional in stage 3 for the NF profile and especially not applicable if the registering NF is not a service producer (e.g. AF, UPF): "Names of supported services, Endpoint information of instance(s) of each supported service and other service parameter".

The examiner may equal "the NF type or Names of supported services" of D1 and D2 to "client type" of claim 1 of present disclosure. However they are totally different. The NF type refers

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to the type of the NF rather than a client type. For example, according to 3GPP TS 23.502 V15.5.1, "the NF type is set to AMF", "if NF Type is AMF, SMSF", "when the NF type indicates AMF or SMSF". Names of supported services refer to names of services supported by the NF rather than a client type. In other words, both "the NF type and Names of supported services" are related to NF rather than client. As further defined in claim 9 of present disclosure, the client type includes at least one of an emergency service; a value added service; an operator service; a lawful intercept service; a broadcast service; an operator operations & maintenance service; an operator anonymous statistics service; or an operator target mobile station service support service. Therefore the NF type is the type of the NF and is not equivalent to "client type that one or more candidate target NFs can serve" as recited by claim 1.

Therefore D1 and D2 at least does not disclose **"The service request includes a parameter indicating a client type that one or more candidate target NFs can serve"** as recited by claim 1.

A problem to be solved is that "the NRF doesn't support any indication that an NF can serve one or more certain service types and/or client types in service registration and service discovery, which may result in some problems. For example, an NF service producer cannot register the information that it is serving one or more certain service types and/or client types, when registering its NF profile into the NRF. An NF service consumer cannot query the specific NF service producer instance serving a certain service type and/or a certain client type. In the delegate mode, the NF service consumer cannot inform SCP that the service request is related to a certain service type and/or a certain client type, thus SCP can not select a specific NF service producer serving the required service type and/or client type".

In order to solve the problem, an indication of client type may be introduced in both service registration procedure and service discovery procedure. For example, when an NF service producer registered into the NF service framework (e.g. into NRF), it can carry the indication of client type (e.g. emergency service, lawful intercept service, value added service, etc.). When an NF service consumer wants to discover a NF service producer(s) that can serve a client type, it can pass the indication of client type as query parameter in the discovery request (e.g. NRF discovery request). The NF service framework (e.g. NRF) can match the registered NF service producers by using the client type in the discovery request and return matched one or more NF service producers with the supported client type in their NF profiles. If no registered NF producer instance matching the required client type, the service framework (e.g. NRF) may return other available producer instances.

Therefore, Applicant respectfully believes that Claim 1 is novel and inventive over the cited prior art. All dependent claims of Claim 1 are also novel and inventive.

For the same reasons, other claims with the distinguishing technical feature are novel and inventive over the prior art.

Conclusion

In view of the above, the claims are believed to satisfy the patentability requirements of the PCT.

However, if the Examiner still has any objections that might preclude the issuance of a favorable opinion in the forthcoming International Preliminary Report on Patentability (IPRP) regarding the patentability of all pending claims, we would be grateful for an opportunity to respond to the remaining objections.

Respectfully submitted

Zhong

June

