

Internal distribution code:

- (A) [-] Publication in OJ
- (B) [-] To Chairmen and Members
- (C) [-] To Chairmen
- (D) [X] No distribution

**Datasheet for the decision
of 9 July 2026**

Case Number: T 1008/25 - 3.5.05

Application Number: 22170704.5

Publication Number: 4270817

IPC: H04B7/185

Language of the proceedings: EN

Title of invention:

Method for computing or estimating a specific service time interval or a specific service time information of or related to a user equipment in a mobile communication network being or at least comprising a part corresponding to or being a non-terrestrial network, user equipment, system or mobile communication network, program and computer-readable medium

Applicant:

Deutsche Telekom AG

Headword:

Service time in a satellite network/DEUTSCHE TELEKOM

Relevant legal provisions:

EPC Art. 84

Keyword:

Clarity - all claim requests (no): vague and ambiguous claim features

Decisions cited:

G 0001/24



Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 1008/25 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 9 July 2026

Appellant:

(Applicant)

Deutsche Telekom AG
Friedrich-Ebert-Allee 140
53113 Bonn (DE)

Representative:

Schwöbel, Thilo K.
Kutzenberger Wolff & Partner
Waidmarkt 11
50676 Köln (DE)

Decision under appeal:

**Decision of the Examining Division of the
European Patent Office posted/electronically
transmitted on 6 March 2025 refusing European
patent application No. 22170704.5 pursuant to
Article 97(2) EPC.**

Composition of the Board:

Chair

K. Bengi-Akyürek

Members:

J. Eraso Helguera

R. Romandini

Summary of Facts and Submissions

- I. The appellant lodged an appeal against the decision of the examining division to refuse the present European patent application for lack of clarity and for insufficiency of disclosure with respect to a main request and four auxiliary requests.
- II. Oral proceedings before the board were held on 9 July 2026.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of one of five claim requests: a **main request** and **four auxiliary requests**, all of them underlying the decision under appeal and re-submitted with the statement of grounds of appeal.

At the end of the oral proceedings, the board announced its decision.

- III. Claim 1 of the **main request** reads as follows:

"Method for computing or estimating a specific service time interval or a specific service time information of or related to a user equipment (20) in a mobile communication network (100) being or at least comprising a part corresponding to or being a non-terrestrial network, wherein the user equipment (20) is served by a base station entity (111) being part of that non-terrestrial network or that non-terrestrial network part, wherein the base station entity (111) has or is provided with at least an antenna entity (111') being a satellite-based antenna entity, the antenna

entity (111') moving relative to the earth surface along a direction of movement (115), thereby providing radio coverage to the user equipment (20) and to a moving area corresponding to an earth-moving radio cell (11),

wherein the base station entity (111) transmits, and the user equipment (20) receives, a reference location information and a general service time information, the reference location information relating to a specific part of the currently covered area, and the general service time information relating to at which point in time the base station entity (111) via its satellite-based antenna entity (111') likely stops serving the currently covered area,

wherein, in order to compute or estimate the specific service time interval or the specific service time information of or related to the user equipment (20), the method comprises the following steps:

- in a first step, the user equipment (20) generates a location information of its own position relative to the central part (116) of the earth-moving radio cell (11) indicated by the reference location information,
- in a second step, the user equipment (20) computes or generates an estimation of the specific service time interval or the specific service time information, the estimation being based on the location information of its own position and the reference location information,

wherein the location information of the user equipment (20) is generated using a global navigation satellite system,

wherein the user equipment (20) comprises a global navigation satellite system receiver entity in order to be able to generate the location information,

wherein the user equipment (20), based on the generated location information, determines its lateral distance (25) from the central part (116) of the earth-moving radio cell (11), wherein, based on this lateral distance (25) and based on the general service time information, the specific service time interval or the specific service time information is determined."

Claim 1 of **auxiliary request 1** differs from claim 1 of the main request in that the term "*specific service time information*" is replaced by the expression "*termination point in time of the specific service time*" in each of its four occurrences.

Claim 1 of **auxiliary request 2** differs from claim 1 of auxiliary request 1 in:

- the insertion of the term "*repeatedly*" right before "*transmits*" and right before "*receives*"
- the deletion of the word "*likely*"
- the insertion of the wording "*wherein the repeatedly updated reference location information provides a central trajectory path of the earth-moving radio cell (11),*" right after the phrase "*serving the currently covered area,*"
- the insertion of the phrase "*, comprising the central trajectory path of the moving earth-moving radio cell (11),*" right before the wording "*indicated by the reference location information,*"
- the insertion of the term "*orthogonal*" before each of the two occurrences of the term "*lateral*"

distance"

- the replacement of the wording "*the central part (116) of the earth-moving radio cell (11)*" by the phrase "*the central trajectory path of the moving earth-moving radio cell (11)*".

Claim 1 of **auxiliary request 3** differs from claim 1 of auxiliary request 2 in:

- the insertion of the phrase "*of a low earth orbit, LEO, satellite*" right after the expression "*a satellite-based antenna entity*"
- the insertion of the expression "*being circular*" right after the phrase "*to an earth-moving radio cell (11)*".

Claim 1 of **auxiliary request 4** differs from claim 1 of auxiliary request 3 in the replacement of the phrase "*and based on the general service time information*" by the wording "*, based on the general time information and based on to which side of the central part (116) of the radio cell (11) the user equipment (20) is distanced*".

Reasons for the Decision

1. MAIN REQUEST

Claim 1 of the **main request** comprises the following limiting features (board's outline and emphasis):

- (a) Method for computing or estimating a specific service time interval or a specific service time

information of or related to a user equipment (UE) in a mobile communication network being or at least comprising a part corresponding to or being a non-terrestrial network,

- (b) the UE is served by a base station (BS) entity being part of that non-terrestrial network or that non-terrestrial network part,
- (c) the BS entity has or is provided with at least an antenna entity being a satellite-based antenna entity, the antenna entity moving relative to the earth surface along a direction of movement, thereby providing radio coverage to the UE and to a moving area corresponding to an earth-moving radio cell,
- (d) the BS entity transmits, and the UE receives, a reference location information and a general service time information, the reference location information relating to a specific part of the currently covered area, and the general service time information relating to at which point in time the BS entity via its satellite-based antenna entity likely stops serving the currently covered area,
- (e) in order to compute or estimate the specific service time interval or the specific service time information of or related to the UE, the method comprises the following steps:
- (f) in a first step, the UE generates a location information of its own position relative to the central part of the earth-moving radio cell indicated by the reference location information,
- (g) in a second step, the UE computes or generates an estimation of the specific service time interval or the specific service time information, the estimation being based on the location information

of its own position and the reference location information,

- (h) the location information of the UE is generated using a global navigation satellite system,
- (i) the UE comprises a global navigation satellite system receiver entity in order to be able to generate the location information,
- (j) the UE, based on the generated location information, determines its lateral distance from the central part of the earth-moving radio cell,
- (k) based on this lateral distance and based on the general service time information, the specific service time interval or the specific service time information is determined.

1.1 Claim 1 - clarity (Article 84 EPC)

1.1.1 In Reasons 2.1.1 of the decision under appeal, the examining division found that:

- (1) The expression "*reference location information relating to a specific part of the currently covered area*" of **feature (d)** was vague and unclear. It was not possible to establish any clear geographic position and extent of the "*specific part*".
- (2) The phrase "*general service time information relating to at which point in time the BS entity via its satellite-based antenna entity likely stops serving the currently covered area*" according to **feature (d)** was also unclear. As the "covered area" was moving, without a positively defined area reference, the "(general) service time" for the "covered area" in its entirety would be only instantaneous.

- (3) The wording "*the UE computes or generates an estimation of the specific service time interval or the specific service time information, the estimation being based on the location information of its own position and the reference location information*" used in **feature (g)** together with **feature (k)** did not allow the skilled person to understand how the "specific service time interval or the specific service time information" was actually to be determined.

1.1.2 In that regard, the appellant submitted that:

- (1) The first step of **feature (e)** clearly defined the meaning of the "reference location information" introduced in feature (d), and, hence, also clarified the meaning of the "*specific part of the currently covered area*" according to feature (d) in the context of the present invention. Furthermore, as a support, the present description explicitly explained that the "*specific part of the currently covered area*" typically referred to the *central* part of the earth-moving radio cell (i.e. the "currently covered area"), as shown in Figure 2 of the present application and described in several parts of the text. Hence, the person skilled in the art could safely be assumed to find no difficulty in understanding that this "reference location information" was indeed a defined *geographical point*, typically the projection of the satellite's current position onto the Earth's surface.
- (2) The "nature of the relation" was clarified through the functional use in the method, since the "general service time" was an *upper-bound* or *outer envelope* for coverage loss. This meaning was

unambiguously attributed to the term "general service time information" by means of the description as filed in paragraph [0034]. The "specific service time" was computed from the UE's position relative to the cell centre which demonstrated a technical effect because it enabled the UE to predict handover timing or loss of coverage, improving connection reliability. Moreover, the "reference location information" was regularly updated and defined the *current* position of the cell (e.g. the centre of the "covered area"). The "general service time" reflected the anticipated time when the moving beam would no longer cover the area where the "reference location information" was defined. The present application, however, did not claim that the entire originally "covered area" remained served until that time (cf. definition of an *upper limit* or *outer envelope* in paragraph [0039] as filed). Instead, each UE used its position relative to the moving cell centre to determine its own "service time interval".

- (3) An engineer specialised in the field of satellite communications would find no difficulty in applying the "specific service time interval" or the "general service time information", the "lateral distance" and the "UE position" and a "reference time" (e.g. measured as an absolute point of time using an internal clock of the UE), together with basic trigonometric equations, to arrive at the specific "service time interval". As a support, the present description disclosed a conceptual algorithm in paragraph [0039] as filed. Thus, while no mathematical equation was presented, the functional method was described well enough for a

skilled person in the art of satellite communications to implement it.

In summary, the objection under Article 84 EPC was not justified because claim 1 was clear in terms of the respective structure and inputs for the computation and the description provided adequate guidance for a skilled person to understand how to carry out the claimed "estimation", even if not down to mathematical detail. The question raised in the discussion with the examining division of how a boundary of an NTN radio cell (influencing the service time quantities) could or should actually be defined was simply irrelevant to the question at hand, namely the question whether claim 1 was sufficiently clear. The essence of the invention was to derive a "specific service time interval" starting from a given "general service time information", the latter being a predefined quantity. Therefore, questioning the meaningfulness of this quantity (or its definition) was simply outside the scope of the present invention.

- 1.1.3 The board agrees with the examining division. The appellant has repeatedly used references to the description as filed (e.g. paragraphs [0034] and [0039]) and the figures (e.g. Fig. 2) to clarify the objected terminology.

Even though **G 1/24** (see Reasons 18) has established the principle that *"the description and any drawings are always referred to when interpreting the claims, and not just in the case of unclarity or ambiguity"*, this cannot be construed to mean that unclarity should be accepted. Rather, as the Enlarged Board of Appeal subsequently explains in Reasons 21, *"[t]he correct response to any unclarity in a claim is amendment."*

1.2 It follows that the main request is not allowable under Article 84 EPC.

2. AUXILIARY REQUESTS

Claim 1 of the auxiliary requests differs from claim 1 of the main request in:

- the replacement of the term "*specific service time information*" by the phrase "*termination point in time of a/the specific service time*" in **features (a), (e) and (k) [i.e. first to fourth auxiliary requests]**,
- the addition of the feature that:
 - (l) the repeatedly updated reference location information provides a central trajectory path of the earth-moving radio cell [i.e. **second to fourth auxiliary requests**],
- and the following amendments:
 - (d') the BS entity repeatedly transmits, and the UE repeatedly receives, a reference location information and a general service time information, the reference location information relating to a specific part of the currently covered area, and the general service time information relating to at which point in time the BS entity via its satellite-based antenna entity ~~likely~~ stops serving the currently covered area,
 - (f') in a first step, the UE generates a location information of its own position relative to the central part of the earth-moving radio cell,

comprising the central trajectory path of the moving earth-moving radio cell, indicated by the reference location information,

- (j') the UE, based on the generated location information, determines its orthogonal lateral distance from ~~the central part of the earth-moving radio cell~~ the central trajectory path of the moving earth-moving radio cell,
- (k') based on this orthogonal lateral distance and based on the general service time information, the specific service time interval or the ~~specific service time information~~ termination point in time of the specific service time is determined [i.e. **second to fourth auxiliary requests**],
- (c') the BS entity has or is provided with at least an antenna entity being a satellite-based antenna entity of a low earth orbit (LEO) satellite, the antenna entity moving relative to the earth surface along a direction of movement, thereby providing radio coverage to the UE and to a moving area corresponding to an earth-moving radio cell being circular [i.e. **third and fourth auxiliary requests**],
- (k'') based on this orthogonal lateral distance and based on the general service time information and based on to which side of the central part of the radio cell the UE is distanced, the specific service time interval or the ~~specific service time information~~ termination point in time of the specific service time is determined [i.e. **fourth auxiliary request**].

2.1 Claim 1 - clarity (Article 84 EPC)

2.1.1 The appellant submitted the following arguments concerning the auxiliary requests:

- (a) In claim 1 of the **first to fourth auxiliary requests**, the wording "*termination point in time of a/the specific service time*" had been used. Thereby, it was made clear that the subject-matter claimed related to the point in time until which radio coverage provided by the specific satellite (from which the respective information - i.e. a "SIB19" information - had been received by the user equipment) was no longer to be expected. For a person skilled in the art, it was perfectly clear what the expression "*reference location information relating to a specific part of the currently covered area*" related to: with the information which the UE received from the satellite - typically by means of "SIB19" data - the UE knew, for instance, the so-called "*ntn-ephemerisInfo*" of the satellite, which might relate to its position as well as to its direction of travel, i.e. its position vector and its velocity vector. Alternatively, the "*ntn-ephemerisInfo*" might also relate to the satellite's orbital parameters, i.e. its semi-major axis, eccentricity, etc., but this information likewise led to the information of the satellite's position that is, thus, able to be determined by the user equipment.
- (b) In claim 1 of the **second to fourth auxiliary requests**, it was explicitly stated that this transmission, by the base station (i.e. the serving satellite), to the UE occurred "repeatedly", and that the repeatedly updated reference location

information provided a "central trajectory path" of the earth-moving radio cell (i.e. the succession of the satellite's "nadir points"). From the point in time of its first reception of the SIB19 pieces of information, the UE was able to determine to what extent it was located outside of the "central trajectory path" of the satellite. To this end, the UE assessed whether the difference vector between the positions of the satellite and the UE was in (or near) the vertical plane of the velocity vector of the satellite or considerably outside of that vertical plane.

- (c) In claim 1 of the **third and fourth auxiliary requests**, it was explicitly stated that the satellite was a "LEO satellite" and that the earth-moving radio cell was "circular" in shape. If the radio cell on the Earth's surface was (at least roughly) "circular" in shape, its diameter was more or less the same irrespective of the considered direction. When the UE received the "SIB19" information for the first time, it was possible to "estimate" the current elevation angle of the satellite, based e.g. on the knowledge of the satellite's position and/or velocity. A comparable elevation angle could be assumed at the last point at which radio coverage from that specific satellite was still provided. On this basis, a person skilled in the art was able to compute an "estimate" not only of the service time but also, taking into account the velocity of the satellite, of the spatial extension of the applicable radio cell. As the shape thereof was defined to be "circular", this spatial extension applied (at least roughly) both in the direction parallel to the direction of travel of the satellite and in the

direction perpendicular thereto.

- (d) The **fourth auxiliary request** introduced a final layer of technical precision to the method claimed in the third auxiliary request.

- 2.1.2 The board concurs with the examining division that the amendments in those auxiliary requests fail to meet the outstanding clarity objections.

The appellant's argumentation relies on the following technical assumption: the "reference location information" transmitted by the "base station entity" specifically comprises "location information" of the "satellite-based antenna entity" in the form of "SIB19" data which, according to the appellant, corresponds to the "position of the satellite" or its projection onto the Earth's surface, e.g. the satellite's "nadir point", or at least allows the UE to compute it. On the basis of this information received over time, the UE can derive the "*central trajectory path of the earth-moving radio cell*" and, knowing the cell's shape, compute or approximate the UE's relative position to its central part.

Yet, this fundamental technical information is not present in claim 1 of any of the claim requests on file. Rather, claim 1 vaguely refers to "*reference location information relating to a specific part of the currently covered area*", i.e. information relating to an undetermined part of the cell rather than the position of the satellite carrying the antenna. Likewise, in **auxiliary requests 2 to 4**, the phrase "*the reference location information provides a central trajectory path*" is ambiguous. It is not clear whether the claimed "*central trajectory path of the*

earth-moving radio cell" is included as part of the "reference location information" or whether the "reference location information" must somehow enable the UE to indirectly derive the *"central trajectory path of the earth-moving cell"*. Furthermore, the appellant explained (see point 1.1.2, item (1) above) that the *"specific part of the currently covered area"* to which the "reference location information" typically referred was *"the central part of the earth-moving cell"*. However, the wording of claim 1 of the auxiliary requests establishes no relationship whatsoever between the two "parts".

2.2 Thus, none of the auxiliary requests is allowable under Article 84 EPC.

3. Since there is no allowable claim request on file, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



B. Brückner

K. Bengi-Akyürek

Decision electronically authenticated