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Datasheet for the decision of 24 April 2020

Case Number: T 2676/16 - 3.5.03

Application Number: 08736378.4

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IPC: H04J11/00, H04L27/26

Language of the proceedings: EN

Title of invention:
Coordinated cyclic shift and sequence hopping for Zadoff-Chu, modified Zadoff-Chu, and block-wise spreading sequences

Applicant:
Nokia Solutions and Networks Oy

Headword:
Cyclic shift and sequence hopping/NOKIA

Relevant legal provisions:
EPC Art. 84, 111(1)
RPBA 2020 Art. 11

Keyword:
Claims - clarity - main request (yes)
Remittal to the first instance for further prosecution - (yes)

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Case Number: T 2676/16 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 24 April 2020

Appellant: (Applicant)	Nokia Solutions and Networks Oy Karakaari 7 02610 Espoo (FI)
Representative:	Brachmann, Roland W. Von Lieres Brachmann Schulze Patentanwälte Grillparzerstrasse 12A 81675 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 3 June 2016 refusing European patent application No. 08736378.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	K. Schenkel
	J. Geschwind

Summary of Facts and Submissions

I. This appeal is against the decision of the Examining Division refusing the present European patent application on the sole ground that claim 1 of a single claim set was not clear (Article 84 EPC).

II. In its statement of grounds of appeal, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of a main request or, in the alternative, of an auxiliary request, both requests filed with the statement of grounds of appeal. The auxiliary request corresponded to the sole request underlying the appealed decision. Oral proceedings were conditionally requested.

III. In a communication under Article 15(1) RPBA 2020, the board indicated that it was not inclined to admit the main request into the appeal proceedings under Article 12(4) RPBA 2007 and gave a positive preliminary opinion as to the compliance of claim 1 of the auxiliary request with Article 84 EPC. The board indicated also that, if the auxiliary request was finally held to comply with Article 84 EPC, it would remit the case to the Examining Division for further prosecution.

IV. In response to the board's communication, the appellant made the auxiliary request the new main request and made the request for oral proceedings conditional on the remittal to the Examining Division on the basis of that new main request.

V. **Claim 1** of the main request (sole request) reads as follows:

"A method comprising:

- quantizing a cyclic shift of a reference signal as a combination of a cell specific cyclic shift with an outcome of a pseudo-random hopping and a user specific cyclic shift;

- wherein quantizing the cyclic shift comprises determining a remainder after division of a sum of the cell specific cyclic shift, the user specific cyclic shift and the outcome of a pseudo-random hopping by the total number of allowed cyclic shifts; and

- broadcasting an indication of the cell specific cyclic shift."

VI. Independent **claim 7** of the main request reads as follows:

"An apparatus comprising

- a processor (12A) configured to quantize a cyclic shift of a reference signal as a combination of a cell specific cyclic shift with an outcome of a pseudo-random hopping and a user specific cyclic shift;

- wherein the processor is configured to quantize the cyclic shift by determining a remainder after division of a sum of the cell specific cyclic shift, the user specific cyclic shift and the

outcome of a pseudo-random hopping by the total number of allowed cyclic shifts;

- and a transmitter (12D) configured to broadcast an indication of the cell specific cyclic shift."

VII. **Claim 16** is directed to a computer-readable memory embodying a program executable by a processor to perform the method of any one of claims 1 to 6.

Reasons for the Decision

1. Background

The present application relates to wireless communication systems and more specifically to the transmission of so-called "Zadoff-Chu (ZC) sequences" which represent standardised uplink pilot sequences for LTE-based mobile networks. When multiple user devices in a cell share the same ZC sequence, a cyclic shift is used specific to each user device in order to keep signal orthogonality. The cyclic shift is calculated or, in other words, quantised based on various inputs.

2. Main request - claim 1 - Article 84 EPC

2.1 Claim 1 of the main request corresponds to claim 1 on which the appealed decision is based (see appealed decision, Reasons 2.1).

2.2 In its decision, the Examining Division held that in the method of claim 1 the quantisation is performed on the basis of three parameters and that one of them, namely an outcome of a pseudo-random hopping, was not clear and claim 1 thus contravened Article 84 EPC. The

allegedly unclear parameter has been introduced by an amendment made during the oral proceedings before the Examining Division (see appealed decision, Reasons 2).

2.3 The Examining Division argued that the parameter "an outcome of a pseudo-random hopping" was not a defined, well-known term in the field of telecommunications and, since it was not defined in claim 1, the claim was not clear. The Examining Division further argued, on the basis of the word "outcome", that the feature "outcome of a pseudo-random hopping" could have many interpretations to a skilled person and gave four examples thereof (see appealed decision, Reasons 2.4).

It was also put forward that the skilled person might resort to the present description as filed and in particular to paragraph [0097] which is the only part of the description directed to the quantisation based on the three parameters mentioned in claim 1. That paragraph, which does not provide a definition of these parameters, includes a reference to equation "Eq. 2" (indicated in paragraph [0053]). However, neither this equation nor the explanation of its parameters in paragraph [0053] mention a parameter called "outcome of the pseudo-random hopping".

2.4 The cyclic shift of the reference signal is disclosed to be a single number or scalar (paragraph [0051], fifth sentence: "The possible cyclic shift values (*cyclic_shift_value*) are then [0, 1, ... 11]"). To calculate the cyclic shift, first the outcome of the pseudo-random hopping is added to the other two parameters, the cell-specific cyclic shift and the user-specific shift, both of which were found to be clear in the appealed decision (Reasons 2.3). The cell-specific shift is furthermore disclosed to be a

scalar as well (see the table in Fig. 10 and paragraph [0072]). The total sum of the three parameters is divided by a scalar (number of allowed cyclic shifts) and subject to a modulo operation. The kind of calculation of the cyclic shift therefore implies clearly that the outcome of the pseudo-random hopping is a *single* number.

The board concludes that the term "outcome" has in the present context the same meaning as "result". Thus, it is clear that by means of the "pseudo-random hopping" operation the actual input for the addition and modulo operations, *i.e.* a scalar number, is to be produced. The meaning of the term "pseudo-random" is also clear for the skilled reader. Since a number is provided as its result, "hopping" is here to be understood as simply selecting a number which may also be seen as hopping across the range of the respective number class, here in the class of *natural* numbers.

The board further notes with respect to point 2.4 of the reasons of the appealed decision that the mere fact that a feature may be implemented in various ways does not necessarily render this feature unclear.

2.5 Hence, claim 1 of the main request is clear (Article 84 EPC). The same applies *mutatis mutandis* to independent apparatus claim 7 and the computer-readable memory claim 16. As a consequence, the board is satisfied that claims 1, 7 and 16 of the main request comply with the requirements of Article 84 EPC.

2.6 Furthermore, in view of the above findings, the board is also satisfied that the claimed invention according to the present main request is disclosed in a manner sufficiently clear and complete for it to be carried

out by a person skilled in the art (Article 83 EPC), contrary to the *obiter dicta* statement in point 5 of the reasons of the decision under appeal.

3. *Remittal (Article 111(1) EPC and Article 11 RPBA 2020)*

3.1 Given that claims 1, 7 and 16 of the main request now comply with Article 84 EPC, the sole ground for refusal is overcome. However, the main request has to be examined for compliance with the other requirements of the EPC, in particular novelty and inventive step, which was not decided upon by the Examining Division. Under the present circumstances it is therefore not appropriate to take a final decision on novelty and inventive step for the first time in these appeal proceedings. The board considers that the above represents "special reasons" within the meaning of Article 11 RPBA 2020 for remittal of the case.

3.2 In view of the above, the board decides to remit the case to the Examining Division for further prosecution under Article 111(1) EPC, on the basis of the claims of the main request on file.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution.

The Registrar: The Chair:

B. Brückner K. Bengi-Akyürek

Decision electronically authenticated