

Internal distribution code:

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

**Datasheet for the decision
of 14 March 2019**

Case Number: T 0972/15 - 3.5.05

Application Number: 12725965.3

Publication Number: 2556620

IPC: H04L5/00, H04W72/04, H04W72/12

Language of the proceedings: EN

Title of invention:
Multicarrier OFDM transmission using carrier aggregation

Applicant:
Ofinno Technologies, LLC

Headword:
OFDM-based carrier aggregation/OFINNO

Relevant legal provisions:
EPC Art. 56

Keyword:
Right to be heard - request for decision according to the
state of the file
Inventive step - (no)



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
Fax +49 (0)89 2399-4465

Case Number: T 0972/15 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 14 March 2019

Appellant: Ofinno Technologies, LLC
(Applicant) 13633 Cedar Run Lane
Herndon, VA 20171 (US)

Representative: Westphal, Mussnug & Partner
Patentanwälte mbB
Werinherstrasse 79
81541 München (DE)

Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 24 November
2014 refusing European patent application
No. 12725965.3 pursuant to Article 97(2) EPC**

Composition of the Board:

Chair A. Ritzka
Members: K. Bengi-Akyuerek
D. Prietzel-Funk

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse the present European patent application for lack of inventive step (Article 56 EPC), having regard to the disclosure of

D1: EP-A-2 244 409

or

D2: US-A-2011/0026475.

II. With the statement setting out the grounds of appeal, the appellant filed amended sets of claims according to a first and second auxiliary request. It requested that the examining division's decision be set aside and that a patent be granted on the basis of the claims underlying the appealed decision as its main request or the claims according to either of the above auxiliary requests. In addition, oral proceedings were requested as an auxiliary measure.

III. In a communication under Rule 100(2) EPC, the board expressed its preliminary opinion on the appeal. It introduced the following prior-art document into the appeal proceedings in reaction to the appellant's arguments submitted with the statement setting out the grounds of appeal:

D6: EP-A-1 164 807.

In particular, the board indicated that all the claim requests on file appeared to lack inventive step, having regard to D1, D2 and D6 (Article 56 EPC).

- IV. With a letter of reply dated 7 September 2018, the appellant filed amended claims as its new "first auxiliary request" and submitted counter-arguments to the inventive-step objection raised in the board's communication under Rule 100(2) EPC. It requested that the examining division's decision be set aside and that a patent be granted on the basis of the claims of the main request or the new first auxiliary request or the former auxiliary requests as its second and third auxiliary requests.
- V. In a communication annexed to the summons to oral proceedings pursuant to Article 15(1) RPBA, the board indicated that it maintained its objections under Article 56 EPC, and gave its reasons therefor.
- VI. In a letter of reply, the appellant indicated that it would not be attending the oral proceedings and requested "to make a decision referring to the files". It did not submit any comments on the substance of the board's communication.
- VII. Oral proceedings scheduled for 19 March 2019 were cancelled.
- VIII. The board establishes from the file that the appellant's final requests were that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request underlying the appealed decision or, in the alternative, of the first auxiliary request, as submitted with the letter of 7 September 2018, or of the second and third auxiliary requests, as submitted with the statement setting out the grounds of appeal (then filed as first and second auxiliary requests respectively).

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

"A method comprising:

transmitting, by a base station (802), a first message (803) originated from an application server (808, 809) comprising a content descriptor to a wireless device (801) over a first plurality of subcarriers of a first carrier in a plurality of configured carriers, said content descriptor describing content residing on a content server (808, 809) in a communication network, wherein there is no guard band between any two subcarriers in said first plurality of subcarriers;

receiving, by said base station (802) from said wireless device (801), a second message (804) destined for said application server (808, 809), said second message (804) requesting said content;

transmitting, by said base station (802), a first plurality of content packets to said wireless device (801) over a second plurality of subcarriers of said first carrier, wherein there is no guard band between any two subcarriers in said second plurality of subcarriers, said first plurality of content packets comprising a first portion of said content originating from said content server (808, 809); and

transmitting, by said base station (802), an activation command originating from said base station (802), said activation command configured to cause the activation of at least one additional carrier in said plurality of configured carriers in said wireless device (801); and

transmitting, by said base station (802), a second plurality of content packets to said wireless device (801) over said first carrier and at least one of said at least one additional carrier over a third plurality of subcarriers, wherein there is at least one

guard band between at least two subcarriers in said third plurality of subcarriers, said second plurality of content packets comprising a second portion of said content."

Claim 1 of the **first auxiliary request** reads as follows (amendments compared with claim 1 of the main request highlighted by the board):

"A method comprising:

transmitting, by a base station (802), a first message (803) originated from an application server (808, 809) comprising a content descriptor to a wireless device (801) over a first plurality of subcarriers of a first carrier in a plurality of configured carriers, said content descriptor describing content residing on a content server (808, 809) in a communication network, wherein there is no guard band between any two subcarriers in said first plurality of subcarriers;

receiving, by said base station (802) from said wireless device (801), a second message (804) destined for said application server (808, 809), said second message (804) requesting said content;

transmitting, by said base station (802), a first plurality of content packets to said wireless device (801) over a second plurality of subcarriers of said first carrier, wherein there is no guard band between any two subcarriers in said second plurality of subcarriers, said first plurality of content packets comprising a first portion of said content originating from said content server (808, 809); and

transmitting, by said base station (802), an activation command originating from said base station (802), said activation command configured to cause the activation of at least one additional carrier

in said plurality of configured carriers in said wireless device (801); and

transmitting, by said base station (802) and after the transmission of the first plurality of content packets, a second plurality of content packets to said wireless device (801) over said first carrier and at least one of said at least one additional carrier over a third plurality of subcarriers, wherein there is at least one guard band between at least two subcarriers in said third plurality of subcarriers, said second plurality of content packets comprising a second portion of said content."

Claim 1 of the **second auxiliary request** reads as follows (amendments compared with claim 1 of the main request highlighted by the board):

"A method comprising:

transmitting, by a base station (802), a first message (803) originated from an application server (808, 809) comprising a content descriptor to a wireless device (801) over a first plurality of subcarriers of a first carrier in a plurality of configured carriers, said content descriptor describing content residing on a content server (808, 809) in a communication network, wherein there is no guard band between any two subcarriers in said first plurality of subcarriers;

receiving, by said base station (802) from said wireless device (801), a second message (804) destined for said application server (808, 809), said second message (804) requesting said content, said second message (804) is received over a fourth plurality of subcarriers of said first carrier, there is no guard band between any two subcarriers in said fourth plurality of subcarriers;

transmitting, by said base station (802), a first plurality of content packets to said wireless device (801) over a second plurality of subcarriers of said first carrier, wherein there is no guard band between any two subcarriers in said second plurality of subcarriers, said first plurality of content packets comprising a first portion of said content originating from said content server (808, 809); and

transmitting, by said base station (802), an activation command originating from said base station (802), said activation command configured to cause the activation of at least one additional carrier in said plurality of configured carriers in said wireless device (801); and

transmitting, by said base station (802), a second plurality of content packets to said wireless device (801) over said first carrier and at least one of said at least one additional carrier over a third plurality of subcarriers, wherein there is at least one guard band between at least two subcarriers in said third plurality of subcarriers, said second plurality of content packets comprising a second portion of said content."

Claim 1 of the **third auxiliary request** reads as follows (amendments compared with claim 1 of the main request highlighted by the board):

"A method comprising:

transmitting, by a base station (802), a first message (803) originated from an application server (808, 809) comprising a content descriptor to a wireless device (801) over a first plurality of subcarriers of a first carrier in a plurality of configured carriers, said content descriptor describing content residing on a content server (808, 809) in a

communication network, wherein there is no guard band between any two subcarriers in said first plurality of subcarriers;

receiving, by said base station (802) from said wireless device (801), a second message (804) destined for said application server (808, 809), said second message (804) requesting said content, said second message (804) is received over a fourth plurality of subcarriers of said first carrier, there is no guard band between any two subcarriers in said fourth plurality of subcarriers;

transmitting, by said base station (802), a first plurality of content packets to said wireless device (801) over a second plurality of subcarriers of said first carrier, wherein there is no guard band between any two subcarriers in said second plurality of subcarriers, said first plurality of content packets comprising a first portion of said content originating from said content server (808, 809); and

transmitting, by said base station (802), an activation command originating from said base station (802), said activation command configured to cause the activation of at least one additional carrier in said plurality of configured carriers in said wireless device (801), said activation command is transmitted over a fifth plurality of subcarriers of said first carrier, where there is no guard band between any two subcarriers in said fifth plurality of fourth subcarriers; and

transmitting, by said base station (802), a second plurality of content packets to said wireless device (801) over said first carrier and at least one of said at least one additional carrier over a third plurality of subcarriers, wherein there is at least one guard band between at least two subcarriers in said third plurality of subcarriers, said second plurality

of content packets comprising a second portion of said content."

Reasons for the Decision

1. *The present invention*

The present application is concerned with a wireless client/server system providing content from a content server to a wireless device via one or additional OFDM carriers consisting of a plurality of contiguous and non-contiguous sub-carriers, i.e. sub-carriers without or with guard bands. It describes two embodiments, a *first embodiment* relating to downlink data transmissions initiated by the content server (see page 8, line 15 to page 16, line 29 and Fig. 6 of the application as filed) and a *second embodiment* relating to uplink data transmissions initiated by the wireless device (see page 16, line 30 to page 20, line 21 and Fig. 7 as filed).

The alleged technical problem to be solved by the present application is to improve the scheduling efficiency of a wireless multi-carrier OFDM transmission system.

2. MAIN REQUEST

Claim 1 of the main request comprises the following features, as labelled by the board:

A method comprising the steps of

- A) transmitting, by a base station, a first message originated from an application server comprising a content descriptor to a wireless device over a

first plurality of subcarriers of a first carrier in a plurality of configured carriers, said content descriptor describing content residing on a content server in a communication network, wherein there is no guard band between any two subcarriers in said first plurality of subcarriers;

- B) receiving, by said base station from said wireless device, a second message destined for said application server, said second message requesting said content;
- C) transmitting, by said base station, a first plurality of content packets to said wireless device over a second plurality of subcarriers of said first carrier, wherein there is no guard band between any two subcarriers in said second plurality of subcarriers, said first plurality of content packets comprising a first portion of said content originating from said content server;
- D) transmitting, by said base station, an activation command originating from said base station, said activation command configured to cause the activation of at least one additional carrier in said plurality of configured carriers in said wireless device;
- E) transmitting, by said base station, a second plurality of content packets to said wireless device over said first carrier and at least one of said at least one additional carrier over a third plurality of subcarriers, wherein there is at least one guard band between at least two subcarriers in said third plurality of subcarriers, said second plurality of content packets comprising a second portion of said content.

2.1 *Inventive step (Article 56 EPC)*

2.1.1 The board agrees with the finding of the decision under appeal that present claim 1 does not meet the requirements of Article 56 EPC, for the reasons set out below.

2.1.2 It is common ground that neither **D1** nor **D2** anticipates that the underlying carrier management scheme is extended to the exchange of application-layer messages for the purpose of content provision (see appealed decision, Reasons 1; Grounds of Appeal, section 2.1, penultimate paragraph).

2.1.3 Based on these distinguishing features, the board takes the view that the objective technical problem to be solved by present claim 1 may be framed as "how to apply the carrier management scheme of D1 or D2 to application-layer data transmissions".

2.1.4 The appellant argued that there was no discernible reason that the skilled person, starting from D1 or D2, could and actually *would* arrive at the solution of present claim 1.

However, it is apparent to the board that, for example, document **D6**, which is also related to OFDM-based carrier management relying on a plurality of OFDM channels (carriers) including several subcarriers (see e.g. D6, paragraph [0051]; Fig. 8), teaches the activation of additional OFDM carriers (e.g. switching from one to four OFDM channels) in a multi-carrier OFDM system. Moreover, this is performed for the purpose of providing application-layer content ("data a5, c5") from a content server 11 to a mobile terminal 30 via a base station 20 following an exchange of application

signalling messages ("request packets a4, c4"; "confirmation packets b3, d3") in an Internet-based client/server content provision system (see e.g. D6, paragraphs [0024] to [0030] and [0060] to [0064] in conjunction with Figs. 4, 12 and 14).

Hence, the board holds that the above-mentioned distinguishing features constitute a straightforward implementation measure which the skilled person would choose, dictated by the specific practical application of content provisioning. Moreover, the person skilled in the field of wireless communication networks would have no difficulties in, i.e. would not have been deterred from, applying the content-provision concept of D6 to the carrier management scheme of D1 or D2.

- 2.1.5 As to features A) and B), the appellant argued that, in the decision under appeal, the mapping of the "first message" and "second message" to PHY/MAC signalling messages as regards D1 and D2 was inconsistent.

In this regard, the board finds that in D1 or D2 the first and second messages as claimed correspond to the traffic (e.g. "data traffic"; "control signal") exchanged prior to the activation of an additional carrier (see e.g. D1, Fig. 4, steps S100 and S110 and D2, Figs. 4(a) and 4(b)).

- 2.1.6 As to the distinguishing features of present claim 1, the appellant argued that they implied that the "application signalling" was carried over the first carrier, while the "application content" was carried over both the first and second carriers and that thus the base station implemented a different number of carriers for "application signalling" and "application content".

However, also in D6, the respective application signalling messages ("request packets a4, c4"; "confirmation packets b3, d3") are exchanged via one OFDM channel while the application-layer content ("data a5, c5") is transmitted via four OFDM channels in the underlying Internet-based client/server content provision system (see e.g. D6, paragraphs [0060] and [0064] in conjunction with Figs. 12 and 14).

- 2.1.7 As to features C) and E) of claim 1, the appellant submitted that the skilled person would not have applied the carrier management scheme described in D1 or D2 to application-layer transmissions where the first carrier is used for transmitting the first portion of the requested content and then later used together with additional carriers for transmitting a second portion of the content before the activation of additional carriers. By utilising the first carrier prior to the activation of additional carriers, the latency of time-sensitive data could be reduced.

The board is not convinced by this argument for the following reasons:

- Firstly, the board recalls that it regards D1 or D2 as suitable starting points, so the question is not whether or not the skilled person would have applied the carrier management scheme of D1 or D2 to application-layer transmissions, but whether the skilled person would apply the content provision concept of D6 to the carrier management scheme of D1 or D2 (see point 2.1.4 above).
- Secondly, at least D2 already discloses that "data traffic" is first transmitted over a first carrier ("P-Carrier") before the subsequent "data traffic"

is transmitted over both the first carrier and a second carrier ("T-Carrier") which has been additionally activated (see e.g. Fig. 4(a) of D2).

- Thirdly, the actual technical effect achieved by the fact that the content's first portion is transmitted from the base station to the wireless device *before* the activation of additional carriers is not derivable from the present application. In this regard, the present description as filed merely indicates that the "decision of activating additional carriers may be made by the base station packet scheduler and may or may not be based on the packet transmission rate or transmission rate variations of the content originated from the server ... based on information available to the scheduler, such as carrier load, size of buffer that queues packets for transmission to the wireless device, and/or the like" (see page 11, lines 6-11 as filed). Furthermore, the original application teaches that the base station packet scheduler "may initially transmit content on a first carrier and then later may add additional carrier(s) for content packet transmission" (see page 11, lines 11-12 as filed). No specific benefit is provided in this context. Consequently, the board considers that the question whether to transmit a content's first portion *before* or *after* activating additional carriers is a matter of design choice, dictated solely by practical needs.

- Lastly, the board cannot see that the "latency of time-sensitive data could be reduced", as put forward by the appellant, through the mere fact that the (possibly time-sensitive) content's second portion is transmitted after an activation delay of

8 ms (see e.g. page 10, lines 21-23 and page 14, lines 3-6 of the application as filed), instead of activating the respective carriers (including the above delay) in advance and then transmitting all the portions of the content without any further activation delay.

2.2 In view of the above, the main request is not considered to be allowable under Article 56 EPC.

3. AUXILIARY REQUESTS

Claim 1 of the first to third auxiliary requests differs from claim 1 of the main request in that it further specifies that (emphasis added by the board)

F) the second plurality of content packets is transmitted after the transmission of the first plurality of content packets (**first auxiliary request**);

G) said second message is received over a fourth plurality of subcarriers of said first carrier, there is no guard band between any two subcarriers in said fourth plurality of subcarriers (**second and third auxiliary requests**);

H) said activation command is transmitted over a fifth plurality of subcarriers of said first carrier, where there is no guard band between any two subcarriers in said fifth plurality of fourth subcarriers (**third auxiliary request**).

3.1 *Inventive step (Article 56 EPC)*

3.1.1 The feature analysis and reasoning with respect to claim 1 of the main request outlined in point 2.1 above apply *mutatis mutandis* to claim 1 of the auxiliary

requests on file.

- 3.1.2 As to added feature F), the board notes that the transmission of the content's second portion *after* the transmission of the content's first portion is already taken into account in the reasoning of the main request.
- 3.1.3 As to added features G) and H), the board holds that they are not directly and unambiguously derivable from D1, D2 or D6, and that they evidently relate to the question *which* subcarrier constellations are to be used for *which* messages. However, it is apparent to the board that documents D1 and D2 provide hints towards using contiguous and non-contiguous carriers (see D1, paragraph [0015] and D2, paragraph [0068]). Hence, the board takes the view that the question whether certain groups of subcarriers should involve guard bands or not constitutes an obvious implementational design matter for the skilled person, conditional on straightforward carrier-interference considerations.
- 3.2 In sum, the first to third auxiliary requests are likewise not considered to be allowable under Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated