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Datasheet for the decision of 23 July 2026

Case Number: T 1230/25 - 3.5.05

Application Number: 16862871.7

Publication Number: 3353901

IPC: H04W84/12, H03M13/27, H04L25/03, H04L27/26

Language of the proceedings: EN

Title of invention:
Apparatus and method for scrambling control field information for wireless communications

Patent Proprietors:
Atlas Global Technologies LLC
Atlas Global Technologies GmbH

Opponents:
TP-LINK Deutschland GmbH ("opponent 1" until 20 July 2026)
Vantiva SA ("opponent 2" until 9 October 2025)

Headword:
Scrambling HE-SIG-B fields/ATLAS GLOBAL

Relevant legal provisions:
EPC Art. 54, 56, 100(a), 123(2)

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Keywords:

Novelty - main request, auxiliary requests 2, 3, 3a to f (no): "modulation" to be interpreted broadly
Inventive step - auxiliary requests 1, 4, 4a, 5 to 7, 7a, 7b, 8, 9, 11, 11a and 12 (no): arbitrary modifications
Added subject-matter - auxiliary requests 10 and 10a (yes): negative feature not originally disclosed

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Case Number: T 1230/25 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 23 July 2026

Appellant I: (Patent Proprietor 1)	Atlas Global Technologies LLC 3050 Tamarron Blvd, Unit 3305 Austin, TX 78746 (US)
Appellant II: (Patent Proprietor 2)	Atlas Global Technologies GmbH Kronstadter Str. 4 81677 München (DE)
Representative:	Bosch Jehle Patentanwaltsgesellschaft mbH Flüggenstraße 13 80639 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted/electronically transmitted on 8 August 2025 revoking European patent No. 3353901 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	J. Eraso Helguera
	C. Heath

Summary of Facts and Submissions

I. This case concerns the appeal filed by the proprietors against the decision of the opposition division revoking the opposed patent under Article 101(2) and 101(3)(b) EPC for essentially added subject-matter (Articles 100(c) and 123(2) EPC).

II. The decision under appeal mentioned, *inter alia*, the following prior-art document:

D1: US 2015/0117433 A1.

III. During the appeal proceedings, both opponents withdrew their oppositions.

IV. Oral proceedings before the board were held on 23 July 2026. The proprietors' final requests were:

The proprietors (appellants) requested, as their **main request**, that the decision under appeal be set aside and that the patent be maintained as granted, or, as an auxiliary measure, that the patent be maintained in amended form on the basis of one of **auxiliary requests 1 to 3, 3a to 3f, 4, 4a, 5 to 7, 7a, 7b, 8 to 10, 10a, 11, 11a and 12**, all of them underlying the decision under appeal.

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

V. Claim 1 as granted (**main request**) reads as follows:

"A wireless device for transmitting a frame (600), comprising:

one or more memories; and
one or more processors coupled to the one or more memories, the one or more processors configured to cause:
generating a high-efficiency (HE) physical layer protocol data unit (PPDU) including an HE signal B (HE-SIG-B) field,
wherein
the generating comprises:

generating coded HE-SIG-B bits (2306), wherein the coded HE-SIG-B bits (2306) belong to a 20 MHz HE-SIG-B unit of the HE-SIG-B field,
interleaving the coded HE-SIG-B bits (2306) to generate interleaved HE-SIG-B bits (2309),
modulating (2310) the interleaved HE-SIG-B bits (2309) to generate N modulated symbols, N being a positive integer,
generating N phase-rotated symbols (2313) by applying a scrambling sequence to the N modulated symbols,
wherein the scrambling sequence is for reducing peak-to-average power ratio (PAPR) occurring within the 20 MHz HE-SIG-B unit of the HE-SIG-B field, and
transforming the N phase-rotated symbols to an orthogonal frequency-division multiplexing (OFDM) symbol of the HE-SIG-B field; and

transmitting the HE PPDU."

Claim 1 of **auxiliary request 1** differs from claim 1 of the main request in the insertion of the phrase "*wherein the HE-SIG-B field comprises a common field and a per-station (per-STA) information field,*" right before "*wherein the generates comprises:*".

Claim 1 of **auxiliary request 2** differs from claim 1 of the main request in the insertion of the phrase "*and wherein the scrambling sequence includes a set of complex values which are applied to the N modulated symbols, respectively,*" right before the phrase "*and transforming the N phase-rotated symbols*".

Claim 1 of **auxiliary request 3** differs from claim 1 of auxiliary request 2 in the insertion of the term "*N*" right after the phrase "*a set of*".

Claim 1 of each of **auxiliary requests 3a, 3b, 3c and 3d** differs from claim 1 of auxiliary request 3 in:

- the deletion of the word "*and*" right before the phrase "*wherein the scrambling sequence includes*" and

- the insertion of the phrase "*and wherein at least two complex values in the scrambling sequence are different,*" right before the phrase "*and transforming the N phase-rotated symbols*".

Claim 1 of **auxiliary request 3e** differs from claim 1 of auxiliary request 3a in the replacement of the phrase "*includes a set of N complex values*" by the phrase "*is a sequence of N complex values*".

Claim 1 of **auxiliary request 3f** reads as follows:

"A method for a wireless device to transmit a frame (600), the method comprising:

generating a high-efficiency (HE) physical layer protocol data unit (PPDU) including an HE signal B (HE-SIG-B) field,

wherein the generating comprises:

generating coded HE-SIG-B bits (2306), wherein the coded HE-SIG-B bits belong to a 20 MHz HE-SIG-B unit of the HE-SIG-B field,

interleaving the coded HE-SIG-B bits (2306) to generate interleaved HE-SIG-B bits (2309),

modulating (2310) the interleaved HE-SIG-B bits (2309) to generate N modulated symbols, N being a positive integer,

generating N phase-rotated symbols by applying a first set of N complex phase rotation values to the N modulated symbols respectively, wherein the first set of N complex phase rotation values, which are a scrambling sequence, is for reducing peak-to-average power ratio (PAPR) occurring within the 20 MHz HE-SIG-B unit of the HE-SIG-B field, wherein at least two complex phase rotation values in the first set of N complex phase rotation values are different, and

transforming the N phase-rotated symbols to an orthogonal frequency-division multiplexing (OFDM) symbol of the HE-SIG-B field; and

transmitting the HE PPDU."

Claim 1 of each of **auxiliary requests 4 and 4a** differs from claim 1 of auxiliary request 2 in:

- the insertion of the phrase "*and by applying a single phase rotation value corresponding to the 20 MHz HE-SIG-B unit to each of the modulated symbols*" right before the phrase "*, wherein the scrambling sequence is for reducing*",

- the deletion of the word "*and*" right before the phrase "*wherein the scrambling sequence includes*"

- the insertion of the phrase "*and wherein at least two complex values in the scrambling sequence are*

different," right before the phrase "*and transforming the N phase-rotated symbols*".

Claim 1 of **auxiliary request 5** differs from claim 1 of auxiliary request 4 in the addition, at the end of the claim, of the following text:

"*, wherein the transmitting comprises transmitting the HE PPDU in 40 MHz,*

when the 20 MHz HE-SIG-B unit has a first frequency band, the single phase rotation value is equal to +1, and

when the 20 MHz HE-SIG-B unit has a second frequency band higher than the first frequency band, the single phase rotation value is equal to +j, wherein j is the imaginary unit which satisfies the equation $j^2 = -1$".

Claim 1 of **auxiliary request 6** differs from claim 1 of the main request in the addition, at the end of the claim, of the following text:

"*;* wherein, when the HE PPDU is transmitted in 40 MHz,
the HE PPDU comprises a first and a second 20 MHz HE-SIG-B unit,
the HE-SIG-B field consists of a first HE-SIG-B channel and a second HE-SIG-B channel,
and the first HE-SIG-B channel is assigned to the first 20 MHz HE-SIG-B unit and the second HE-SIG-B channel is assigned to the second 20 MHz HE-SIG-B unit; and
wherein, when the HE PPDU is transmitted in 80 MHz,
the HE PPDU comprises a first, a second, a third, and a fourth 20 MHz HE-SIG-B unit,
the HE-SIG-B field consists of a first HE-SIG-B channel and a second HE-SIG-B channel,

and the first HE-SIG-B channel is assigned to the first 20 MHz HE-SIG-B unit and the third 20 MHz HE-SIG-B unit and the second HE-SIG-B channel is assigned to the second 20 MHz HE-SIG-B unit and the fourth 20 MHz HE-SIG-B unit".

Claim 1 of **auxiliary request 7** differs from claim 1 of auxiliary request 4 in the addition, at the end of the claim, of the following text:

"*;* wherein, when the HE PPDU is transmitted in 40 MHz,

when the 20 MHz HE-SIG-B unit has a first frequency band, a first HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +1, and

when the 20 MHz HE-SIG-B unit has a second frequency band higher than the first frequency band, a second HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +j, wherein j is the imaginary unit which satisfies the equation $j^2 = -1$*;*

wherein, when the HE PPDU is transmitted in 80 MHz,

when the 20 MHz HE-SIG-B unit has a first frequency band, a first HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +1,

when the 20 MHz HE-SIG-B unit has a second frequency band higher than the first frequency band, a second HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to -1,

when the 20 MHz HE-SIG-B unit has a third frequency band higher than the second frequency band, the first HE-SIG-B channel is assigned to the HE-SIG-B

unit and the single phase rotation value is equal to -1, and

when the 20 MHz HE-SIG-B unit has a fourth frequency band higher than the third frequency band, the second HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to -1".

Claim 1 of each of **auxiliary requests 7a and 7b** differs from claim 1 of auxiliary request 7 in the insertion of "*N*" right after "*a set of*".

Claim 1 of **auxiliary request 8** differs from claim 1 of auxiliary request 7 in the replacement of the text

"*;* wherein, when the HE PPDU is transmitted in 40 MHz,

when the 20 MHz HE-SIG-B unit has a first frequency band, a first HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +1,

and

when the 20 MHz HE-SIG-B unit has a second frequency band higher than the first frequency band, a second HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +j, wherein j is the imaginary unit which satisfies the equation $j^2 = -1$*;*

wherein, when the HE PPDU is transmitted in 80 MHz,"

by the phrase

", *wherein the transmitting comprises transmitting the HE PPDU in 80MHz,*".

Claim 1 of each of **auxiliary requests 9 and 12** differs from claim 1 of auxiliary request 3a in:

- the replacement of the phrase "*wherein the generating comprises*"

  by the following text:

  "*wherein the HE PPDU comprises a first 20 MHz HE-SIG-B unit of the HE-SIG-B field having a first frequency band, a second 20 MHz HE-SIG-B unit of the HE-SIG-B field having a second frequency band higher than the first frequency band, a third 20 MHz HE-SIG-B unit of the HE-SIG-B field having a third frequency band higher than the second frequency band, and a fourth 20 MHz HE-SIG-B unit of the HE-SIG-B field having a fourth frequency band higher than the third frequency band,*
  wherein the generating comprises for each 20 MHz HE-SIG-B unit of the first, second, third, and fourth 20 MHz HE-SIG-B unit",

- the replacement of the word "*a*" by the word "*the*" right after the expression "*belong to*"

- the insertion of the phrase "*and by applying a single phase rotation value corresponding to the 20 MHz HE-SIG-B unit to each of the modulated symbols*" right before the phrase "*, wherein the scrambling sequence is for reducing*".

Claim 1 of each of **auxiliary requests 10 and 10a** differs from claim 1 of auxiliary request 3a in the insertion of the phrase "*wherein the N modulated symbols do not comprise copied blocks of modulated*

symbols," right before the phrase "*generating N phase-rotated symbols*".

Claim 1 of each of **auxiliary requests 11 and 11a** differs from claim 1 of auxiliary request 1 in the insertion of the phrase "*and resulting from repeated information in the per-STA information field, wherein the scrambling sequence includes a set of N complex values which are applied to the N modulated symbols, respectively, and wherein at least two complex values in the scrambling sequence are different*," right before the wording "*and transforming*".

Reasons for the Decision

1. MAIN REQUEST

1.1 **Claim 1 as granted** comprises the following limiting features:

1. A wireless device for transmitting a frame, comprising:

1.1 one or more memories; and

1.2 one or more processors coupled to the one or more memories, the one or more processors configured to cause:

1.2.1 generating a high-efficiency (HE) physical layer protocol data unit (PPDU) including an HE signal B (HE-SIG-B) field, wherein the generating comprises:

1.2.1.1 generating coded HE-SIG-B bits, wherein the coded HE-SIG-B bits belong to a 20 MHz HE-SIG-B unit of the HE-SIG-B field,

1.2.1.2 interleaving the coded HE-SIG-B bits to generate interleaved HE-SIG-B bits,

1.2.1.3 modulating the interleaved HE-SIG-B bits to generate N modulated symbols, N being a positive integer,

1.2.1.4 generating N phase-rotated symbols by applying a scrambling sequence to the N modulated symbols, wherein the scrambling sequence is for reducing peak-to-average power ratio (PAPR) occurring within the 20 MHz HE-SIG-B unit of the HE-SIG-B field,

1.2.1.5 transforming the N phase-rotated symbols to an OFDM symbol of the HE-SIG-B field;

1.2.2 transmitting the HE PPDU.

1.2 Although present claim 1 does not indicate to which type of data communication unit the generated "HE PPDU frame" is eventually transmitted, the board assumes, in the appellants' favour, that the claimed "frame" is supposed to be sent to a data receiving unit that is indeed capable of properly decoding, deinterleaving, demodulating and descrambling the respective data fields of the transmitted "frame" - in a mirrored way - at the receiver side.

1.3 Claim 1 - novelty (Articles 100(a) and 54 EPC)

1.3.1 Prior-art document **D1** discloses in terms of present claim 1:

1. A wireless device (see Fig. 1: "ACCESS POINT") for transmitting a frame, comprising:

1.1 one or more memories (see paragraph [0353]);

1.2 one or more processors (see paragraph [0353]) coupled to the one or more memories, the one or more processors configured to cause:

1.2.1 generating a HE PPDU (see Fig. 10B: "*data unit 1050*") including a HE-SIG-B field (see Fig. 10B: "*HEW-SIGB 714*"), wherein the generating comprises:

1.2.1.1 generating coded HE-SIG-B bits (see Fig. 19A: "*FEC ENCODER 1906*"), wherein the coded HE-SIG-B bits belong to a 20 MHz HE-SIG-B unit of the HE-SIG-B field (see paragraph [0111]: "*[...] if the data unit [...] is an OFDM data unit that occupies a cumulative bandwidth such as 20 MHz [...] the HEW-SIGB [...] data portion occupy the corresponding whole bandwidth of the data unit.*"),

1.2.1.2 interleaving (see Fig. 19A: "*INTERLEAVER 1910*") the coded HE-SIG-B bits to generate interleaved HE-SIG-B bits,

1.2.1.3 modulating (see Fig. 19A: "*CONSTELLATION MAPPER 1914*", "*BLOCK CODER 1916*") the interleaved HE-SIG-B bits to generate N modulated symbols, N being a positive integer,

1.2.1.4 generating (see Fig. 19A: "*PAPR REDUCTION 1614*") N phase-rotated symbols by applying a scrambling sequence to the N modulated symbols, wherein the scrambling sequence is for reducing PAPR occurring within the 20 MHz HE-SIG-B unit of the HE-SIG-B field (see paragraph [0111]: when the "HEW-SIGB" occupies the whole 20 MHz bandwidth, the "phase shift" sequences of paragraph [0172] are applied to the 48 symbols within the 20 MHz and the PAPR is reduced within those 20 MHz),

1.2.1.5 transforming (see Fig. 19A: "*IDFT 1618*", "*CSD 1622*", "*GI & WINDOW 1626*") the N phase-rotated symbols to an OFDM symbol of the HE-SIG-B field;

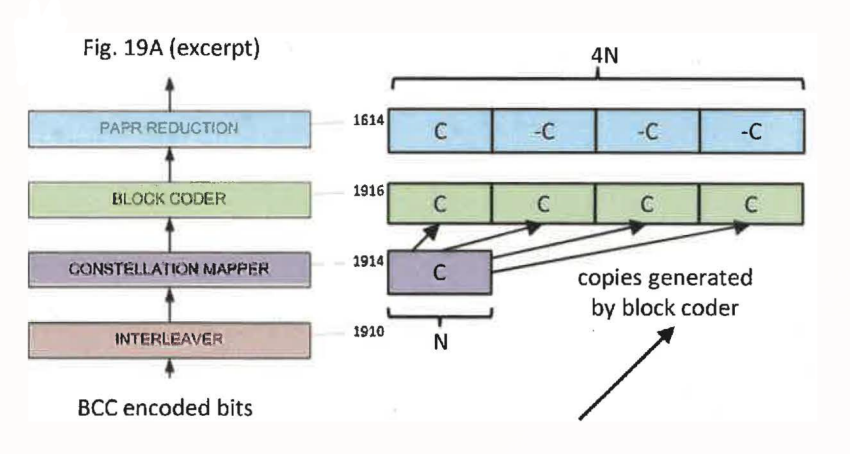
1.2.2 transmitting (see Fig. 19A: "*ANALOG & RF 1630*"; see paragraph [0143], last sentence: "*[...] unit 1630 that converts the signal to analog signal and upconverts the signal to RF frequency for transmission.*") the HE PPDU.

1.3.2 The appellants submitted that document **D1** addressed a different problem, taught a different solution and failed to disclose at least the following features:

(a) **feature 1.2.1.3**:

The number of modulated symbols obtained after the "constellation mapper" of D1 ("N" in the document presented to the board during the oral proceedings, see excerpt below) was not the same as the number of phase-rotated symbols after the PAPR reduction ("4N" in the same document) because the "block coder" in between had generated *copies* of the

constellation symbols.



(b) **feature 1.2.1.4:**

Consequently, D1 did not disclose scrambling of "*modulated symbols*" because the input of the "PAPR reduction" was the output of the "block coder", which comprised "*copies of the modulated symbols*" and not the "*modulated symbols*" themselves. Moreover, document D1 applied "phase shifts" to whole blocks, without any mention of a "scrambling sequence".

1.3.3 These arguments are not persuasive. The board maintains that D1 discloses all the features of claim 1, including:

(a) **feature 1.2.1.3:**

The board does not agree with the appellants' construction of "modulation". In the board's view, "modulating" may encompass further actions beyond "constellation mapping". Such interpretation is also in line with the patent description (see paragraph [0123]: "*[...] the modulation operation*

2310 may comprise constellation mapping"). The board thus sees no (technical) reason to exclude "block coding" from such "modulation operation".

(b) **feature 1.2.1.4:**

The "scrambling sequence" according to present claim 1 does not necessarily imply a "per-symbol sequence", but even if it did, paragraph [0172] of D1 enumerates concrete *per-symbol* "phase shifts" which amount to "scrambling sequences" in the claimed sense. This is because "phase shifts" introduced by the "PAR reduction unit" have to be length-matched to the 48 symbols at the output of the "block coder" to obtain the "resulting sequences".

Hence, the subject-matter of claim 1 as granted is not new in view of D1.

1.4 It follows that the ground for opposition under Article 100(a) EPC in conjunction with Article 54 EPC prejudices the maintenance of the patent as granted.

2. AUXILIARY REQUESTS

2.1 Claim 1 of each of the present auxiliary requests differs from claim 1 as granted in the following features:

(a) the HE-SIG-B field comprises a common field and a per-station (per-STA) information field [**auxiliary requests 1, 11 and 11a**];

(b) the scrambling sequence includes a set of complex values which are applied to the N modulated

symbols, respectively [**auxiliary requests 2, 3, 3a to 3d, 4, 4a, 5, 7, 7a, 7b, 8 to 10 and 10a**];

(c) a set of N complex values [**auxiliary requests 3, 3a to 3d, 7a, 7b, 9, 10 and 10a**];

(d) the scrambling sequence is a sequence of N complex values which are applied to the N modulated symbols, respectively [**auxiliary request 3e**];

(e) applying a single phase rotation value corresponding to the 20 MHz HE-SIG-B unit to each of the modulated symbols [**auxiliary requests 4, 4a, 5, 7, 7a, 7b, 8 and 9**];

(f) at least two complex values in the scrambling sequence are different [**auxiliary requests 3a to 3e, 4, 4a, 5, 7, 7a, 7b, 8 to 10 and 10a**];

(g) the transmitting comprises transmitting the HE PPDU in 40 MHz,
when the 20 MHz HE-SIG-B unit has a first frequency band, the single phase rotation value is equal to +1, and
when the 20 MHz HE-SIG-B unit has a second frequency band higher than the first frequency band, the single phase rotation value is equal to +j, wherein j is the imaginary unit which satisfies the equation $j^2 = -1$ [**auxiliary request 5**];

(h) when the HE PPDU is transmitted in 40 MHz,
the HE PPDU comprises a first and a second 20 MHz HE-SIG-B unit,
the HE-SIG-B field consists of a first HE-SIG-B channel and a second HE-SIG-B channel, and

the first HE-SIG-B channel is assigned to the first 20 MHz HE-SIG-B unit and the second HE-SIG-B channel is assigned to the second 20 MHz HE-SIG-B unit; and

when the HE PPDU is transmitted in 80 MHz,

the HE PPDU comprises a first, a second, a third, and a fourth 20 MHz HE-SIG-B unit,

the HE-SIG-B field consists of a first HE-SIG-B channel and a second HE-SIG-B channel, and

the first HE-SIG-B channel is assigned to the first 20 MHz HE-SIG-B unit and

the third 20 MHz HE-SIG-B unit and the second HE-SIG-B channel is assigned to the second 20 MHz HE-SIG-B unit and the fourth 20 MHz HE-SIG-B unit [**auxiliary request 6**].

(i) when the HE PPDU is transmitted in 40 MHz,

when the 20 MHz HE-SIG-B unit has a first frequency band, a first HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +1, and

when the 20 MHz HE-SIG-B unit has a second frequency band higher than the first frequency band, a second HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +j, wherein j is the imaginary unit which satisfies the equation $j^2 = -1$;

when the HE PPDU is transmitted in 80 MHz,

when the 20 MHz HE-SIG-B unit has a first frequency band, a first HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +1,

when the 20 MHz HE-SIG-B unit has a second frequency band higher than the first frequency band, a second HE-SIG-B channel is assigned to

the HE-SIG-B unit and the single phase rotation value is equal to −1,
when the 20 MHz HE-SIG-B unit has a third frequency band higher than the second frequency band, the first HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to −1, and
when the 20 MHz HE-SIG-B unit has a fourth frequency band higher than the third frequency band, the second HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to −1 [**auxiliary requests 7, 7a and 7b**];

(j) the transmitting comprises transmitting the HE PPDU in 80 MHz,
when the 20 MHz HE-SIG-B unit has a first frequency band, a first HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to +1,
when the 20 MHz HE-SIG-B unit has a second frequency band higher than the first frequency band, a second HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to −1,
when the 20 MHz HE-SIG-B unit has a third frequency band higher than the second frequency band, the first HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to −1, and
when the 20 MHz HE-SIG-B unit has a fourth frequency band higher than the third frequency band, the second HE-SIG-B channel is assigned to the HE-SIG-B unit and the single phase rotation value is equal to −1 [**auxiliary request 8**];

(k) the HE PPDU comprises a first 20 MHz HE-SIG-B unit of the HE-SIG-B field having a first frequency band, a second 20 MHz HE-SIG-B unit of the HE-SIG-B field having a second frequency band higher than the first frequency band, a third 20 MHz HE-SIG-B unit of the HE-SIG-B field having a third frequency band higher than the second frequency band, and a fourth 20 MHz HE-SIG-B unit of the HE-SIG-B field having a fourth frequency band higher than the third frequency band, and the generating comprises for each 20 MHz HE-SIG-B unit of the first, second, third and fourth 20 MHz HE-SIG-B unit" [**auxiliary requests 9 and 12**];

(l) the N modulated symbols do not comprise copied blocks of modulated symbols [**auxiliary requests 10 and 10a**];

(m) [PAPR is] resulting from repeated information in the per-STA information field [**auxiliary requests 11 and 11a**].

2.2 Claim 1 of **auxiliary request 3f** is the same as claim 13 of auxiliary request 3e and relates to a "method for a wireless device" to transmit a frame corresponding to claim 1 of auxiliary request 3e.

2.3 **Auxiliary requests 3e, 3f, 4a, 7b, 10a, 11a and 12** were not admitted by the opposition division into the proceedings.

2.3.1 In accordance with Article 12(6), first sentence, RPBA, the board shall not admit requests which were not admitted in the proceedings leading to the decision under appeal, unless the decision not to admit them suffered from an error in the use of discretion or

unless the circumstances of the appeal case justify their admittance.

2.3.2 Irrespective of the above admittance issues, the board assesses those auxiliary requests on their merits.

2.4 Claim 1 - novelty (Article 54 EPC) and inventive step (Article 56 EPC)

The board considers that:

- Paragraph [0172] of D1 discloses **features (b), (c), (d) and (f)**, and correspondingly, the method of claim 1 of **auxiliary request 3f** (Article 54 EPC). According to this paragraph, the "PAPR reduction unit" adds "phase shifts" to each of the 48 symbols from the "block coder". Those "phase shifts" in turn constitute a series of complex values, such as +1, -1, j and -j, of which at least two are different. For instance, to obtain the "resulting sequence" [C, j*C, j*C, j*C], the "PAPR reduction unit" adds the 48-symbol phase-shift sequence [1...1, j...j, j...j, j...j] to the sequence [C C C C], C being the block of 12 constellation symbols repeated four times by the "block coder".

- As to **features (a) and (m)**, regardless of the board's concerns as to whether specifying some generated data fields (like "HE-SIG-B fields") to convey additional information by a data transmitter in a *data structure* like a "data frame", absent any details about the receiving/decoding/demodulating/descrambling process itself to be performed at the receiver side (see point 1.2 above), necessarily and credibly produces any tangible technical effect, the board takes into account, again in the

appellants' favour, the alleged technical effect of "*further reducing the PAPR in the HEW-SIGB units of D1 at the symbol level*". At any rate, even in view of this alleged effect, the introduction of features (a) and (m) would be at least not inventive (Article 56 EPC) in view of the skilled person's common technical knowledge about multi-user operation. The HEW-SIGB field of D1 is intended, by definition, to send *user-specific* control information for MU-MIMO operation, i.e. *per-STA* information. The use in this context of a "*common field*" and "*per-STA information fields*" would be, if not necessary, at least a straightforward design option. And the "block coding" of D1 would lead to the repetition of those "*per-STA information fields*".

- In addition, the introduction of an undefined "*single rotation value*" as per **feature (e)** is not capable of achieving the purported reduction of PAPR. Such an additional rotation applied to the 20 MHz HEW-SIGB field of D1 would not have any technical effect on the PAPR because all the symbols in the "20 MHz HEW-SIGB unit" would undergo the same "phase shift". Hence, this feature constitutes an arbitrary modification of the teaching of D1 which cannot contribute to the presence of an inventive step (Article 56 EPC).

- **Features (g), (i) and (j)** relate to the application of a so-called "*gamma rotation*" - with specific values depending on the amount of 20-MHz bands used - in addition to the "phase rotation" achieved by applying a "*scrambling sequence*" to the "*modulated symbols*". The appellants submitted that the additional rotation of blocks relative to each

other was particularly effective to further reduce the high PAPR caused by long sequences of zeros in the "*per-STA fields*".

This is however not convincing. Rather, at the symbol level, the addition of a *second* phase rotation (Y2) after a *first* phase rotation (Y1) has the same technical effect as a *single* phase rotation Yg = Y1 * Y2. Thus, the *second* phase rotation alone - without considering the specific "*scrambling sequences*" applied beforehand on each 20-MHz band - cannot convincingly bring about any technical effect *per se*, and no inventive step can be recognised in the addition of those features (Article 56 EPC).

- **Features (h), (i) and (j)** further relate to the use of different "HE-SIG-B channels" assigned to the different "20 MHz HE-SIG-B units". The appellants submitted that these features proposed specific structures which could be tailored to either provide more *information* - if the channels carried different information - or more *robustness* - if the channels carried the same information. Starting from D1 and facing an environment with multiple "20 MHz HE-SIG-B units" in different 20-MHz sub-bands (e.g. using a 4x-repetition over a cumulative bandwidth of 80 MHz), the skilled person would have easily realised the trade-off involved in performing symbol repetition across different channels: in other words, the trade-off would be about more robustness *vs* more information. In accordance with the specific needs, the skilled person would have been aware how to choose one possibility or the other without the involvement of any inventive skills. Furthermore, as far as the

impact on the PAPR is concerned, the skilled person would have readily recognised that what actually matters in this context is whether bits and the symbols derived therefrom are ultimately repeated, irrespective of its cause. Put differently, it is immaterial whether the respective bit/symbol repetition is caused by an attempt to improve *robustness* or by the fact that the same information is *repeated* among different information fields. **Feature (k)**, relating to the use of four 20-MHz sub-bands, is for the same reason at least not inventive starting from D1 (Article 56 EPC).

2.5 Thus, **auxiliary requests 2, 3 and 3a to f** are not allowable under Article 54 EPC and **auxiliary requests 1, 4, 4a, 5 to 7, 7a, 7b, 8, 9, 11, 11a and 12** are not allowable under at least Article 56 EPC.

2.6 Added subject-matter (Article 123(2) EPC)

2.6.1 The appellants submitted that **feature (l)** ensured that the term "*modulating*" in claim 1 corresponded to how the term was used in the patent description. The definition of "*modulating*" in the application as filed was at least implicitly defined such that the "*modulated symbols*" did not comprise copied blocks. Even if this feature was considered a "disclaimer", it was still disclosed in the original disclosure.

2.6.2 The board disagrees. As explained in point 1.3.3 above, the board does not agree with the appellants' limited interpretation of "modulating". Thus, the board agrees with the respondent that **feature (l)** indeed constitutes a negative feature which finds no basis in the application as filed.

2.7 Hence, **auxiliary requests 10 and 10a** are not allowable under Article 123(2) EPC.

3. As there is no allowable claim request on file, the appeal has to 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