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Datasheet for the decision of 25 June 2020

Case Number: T 0552/16 - 3.5.02

Application Number: 08793032.7

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Language of the proceedings: EN

Title of invention:
Broadband power amplifier

Applicant:
Wipam, Inc.

Relevant legal provisions:
EPC Art. 84
RPBA 2020 Art. 13(2)

Keyword:
Claims - clarity - main request (no)
Late-filed document - admitted (no)

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Case Number: T 0552/16 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 25 June 2020

Appellant: (Applicant)	Wipam, Inc. 602 Yeo-am Building 254-4 Seohyeon-dong Bundang-gu Seongnam-si Gyeonggi-do 463-824 (KR)
Representative:	Kindermann, Peter Patentanwälte Kindermann Postfach 10 02 34 85593 Baldham (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 28 October 2015 refusing European patent application No. 08793032.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	H. Bronold
	A. Bacchin

Summary of Facts and Submissions

I. The appeal of the patent applicant lies from the decision of the examining division to refuse European patent application No. 08 793 032.7.

The examining division found that the main request lacked clarity in the sense of Article 84 EPC.

II. The appellant requested that the decision under appeal be set aside and that a patent be granted based on the main (and sole) request filed together with the statement setting out the grounds of appeal dated 25 February 2016, claim 1 of which, apart from being drafted in the one-part form and having amended reference signs, is identical to the main request which was the subject of the decision under appeal.

III. The following document cited by the examining division is relevant for this appeal:

D12 : Doherty W H: "A New High Efficiency Power Amplifier for Modulated Waves", Proceedings of the Institute of Radio Engineers, Institute of Radio Engineers, New York, NY, US, vol. 24, no. 9, 1 September 1936, pages 1136 to 1182

IV. In a communication under Article 15(1) RPBA sent together with the summons to oral proceedings on 20 March 2020, the board informed the appellant that it tended to the opinion that claim 1 according to the main request lacked clarity in the sense of Article 84 EPC and that it was inclined to dismiss the appeal. In particular claim 1 defined a Doherty amplifier which

included no phase shift between the carrier and peaking amplifiers, which was contrary to the principle of a Doherty amplifier as set out in the scientific paper introducing the principle of Doherty amplifiers by Mr. Doherty from 1936 (D12). According to that paper a Doherty amplifier requires a phase shift of 90 degrees. Oral proceedings were scheduled for 25 June 2020.

V. With letter dated 23 June 2020 the appellant filed document D18 and provided arguments that from D18 it followed that Doherty amplifiers did not require a 90-degree phase shift.

VI. On 24 June 2020 the appellant's representative informed the registry by telephone that nobody would participate in the oral proceedings on behalf of the appellant.

VII. The oral proceedings before the board took place on 25 June 2020 in the absence of the appellant.

VIII. Claim 1 according to the main request reads as follows:

"A broadband Doherty power amplifier performing two-stage output matching, comprising:
a carrier amplifier (211) and a peaking amplifier (221) that are connected in parallel;
a first quarter wave transformer (213; 215; 217) connected to an output terminal of the carrier amplifier (211);
a second quarter wave transformer (225; 227; 229) connected to an output terminal of the peaking amplifier (221); and
an output matching circuit (231) connected to rear ends of the first quarter wave transformer (213; 215; 217) and the second quarter wave transformer (225; 227; 229),

wherein the first quarter wave transformer (213; 215; 217) and the second quarter wave transformer (225; 227; 229) are connected in parallel to each other, the first quarter wave transformer (213; 215; 217) and the second quarter wave transformer (225; 227; 229) serve as a first stage of the two-stage output matching while the output matching circuit (231) serves as a second stage of the two-stage output matching, and the first quarter wave transformer (213; 215; 217) performs the output matching such that the load line impedance R_{out} of the carrier amplifier (211) is matched to an optimum power source impedance R_{opt} of the carrier amplifier (211), and the second quarter wave transformer (225; 227; 229) performs the output matching such that the load line impedance R_{out}' of the peaking amplifier (221) is matched to an optimum power source impedance R_{opt}' of the peaking amplifier (221), the first quarter wave transformer having characteristic impedance R_o satisfying the condition of $R_{opt} < R_o < R_{out}$ or $R_{opt} > R_o > R_{out}$ and the second quarter wave transformer having characteristic impedance R_o' satisfying the condition of $R_{opt}' < R_o' < R_{out}'$ or $R_{opt}' > R_o' > R_{out}'$."

IX. The appellant's arguments, as far as they are relevant for this appeal, can be summarised as follows:

Claim 1 according to the main request was clear in the sense of Article 84 EPC. In particular, the appellant contested that a Doherty amplifier implied an impedance inverting network introducing a phase shift of 90 degrees between the carrier amplifier and the peaking amplifier. The Doherty amplifier concept in the present application merely meant a carrier amplifier and a peaking amplifier connected in parallel. For this concept no phase shift was required. Further, it

followed from document D18 that Doherty amplifiers without a phase shift of 90 degrees were possible.

Reasons for the Decision

1. Admissibility of the appeal (Rule 99 EPC)

The appeal was filed in due time and form. It was sufficiently substantiated. The appeal is therefore admissible.

2. Consideration and admission of document D18 (Article 13(2) RPBA 2020)

Document D18 was filed on 23 June 2020, i.e. only two days before the oral proceedings. Thus, its admissibility is to be determined by the provisions of Article 13(2) RPBA 2020, which is applicable according to Article 25 RPBA 2020 because the summons to oral proceedings were notified after entry into force of the RPBA 2020 on 1 January 2020.

Article 13(2) RPBA 2020 imposes the most stringent limitations on a party wishing to amend its appeal case at an advanced stage of the proceedings, namely after expiry of a period set by the board of appeal in a communication under Rule 100(2) EPC or, where no such communication is issued, after notification of the summons to oral proceedings. The basic principle applying to such an advanced stage of the proceedings, is that amendments to a party's appeal case, such as

facts and evidence, are not to be taken into consideration, unless the party concerned has shown compelling reasons why the circumstances are exceptional. Where such circumstances are shown to exist, the board may exercise its discretion and decide to admit the amendment (see document CA/3/19, section VI, Explanatory Remarks on Article 13(2) RPBA 2020 and Supplementary publication 2 to OJ EPO 2020).

In the present case, document D18 has been filed at an advanced stage of the appeal proceedings. Exceptional circumstances for its late filing in the sense of Article 13(2) RPBA 2020 were neither presented nor are they evident from the case. Document D18 is further not *prima facie* relevant to address the clarity objection under Article 84 EPC, as raised in the board's preliminary opinion pursuant to Article 15(1) RPBA 2020 and in the decision of the examining division, because it only establishes that for a Doherty amplifier it is not necessary that the phase shift between the carrier and peaking amplifiers should be "exactly" 90 degrees. This is firstly not disputed by the board, and secondly not relevant because the board's objection under Article 84 EPC is based on the fact that the alleged invention as claimed and described does not require any phase shift.

Consequently, document D18 is not taken into account under Article 13(2) RPBA 2020 and is not admitted into the proceedings.

3. Clarity (Article 84 EPC)

The appellant disputes that an impedance inverting network introducing a 90 degrees phase shift between

the carrier and peaking amplifiers is implied by a so-called "Doherty amplifier".

As already set out in its communication under Article 15(1) RPBA, the board does not agree with the appellant in this respect.

Document D12 is a scientific paper written by Mr. Doherty, who first introduced the concept of high efficiency power amplifiers in 1936, which are now known as "Doherty amplifiers". It may be assumed that the inventor of the Doherty amplifier had full knowledge of its underlying technical concept. The board thus considers document D12 as a perfectly suitable source of background art regarding Doherty amplifiers.

In this context, the board concludes that document D12 is absolutely clear about the question whether a Doherty amplifier requires the disputed phase shift of 90 degrees. In particular as stated on pages 1174 and 1175 of D12, there is no doubt about the fact that "In applying this modulated input to the amplifier it is necessary to have the voltages on the two grids ninety degrees apart in phase in order that each may be opposite in phase to the related potential" and that merely "by the introduction of two phase shifts it becomes possible to make use of a variable load distribution to establish the necessary conditions for high efficiency at outputs much smaller than the peak output".

Thus, contrary to the appellant's arguments, the board concludes that a Doherty amplifier implies an impedance inverting network introducing a 90 degrees phase shift between the carrier and peaking amplifiers.

In reply to the board's communication the appellant merely argued with respect to document D18, that a Doherty amplifier was possible without 90 degree phase shift (see appellant's letter dated 23 June 2020, page 1, first paragraph). The reason given by the appellant for their conclusion is that D18 allegedly discloses that Doherty amplifiers are possible with a phase shift of "not exactly" 90 degrees.

The board is not convinced by this argument. Even if document D18 were taken into account in the proceedings, it could merely disclose that Doherty amplifiers are possible with a phase shift of not exactly 90 degrees, as even stated by the appellant (see appellant's letter dated 23 June 2020, page 2, fifth paragraph).

Moreover, this argument is irrelevant because according to claim 1, as well as according to the description, no impedance inverting network introducing a 90 degrees phase shift between the carrier and peaking amplifiers is foreseen at all in the claimed invention.

The board therefore sees no reason to deviate from its preliminary opinion that a Doherty amplifier implies a mandatory phase shift of (at least approximately) 90 degrees.

Consequently, the board concludes that the examining division was correct in deciding that claim 1 according to the main request lacks clarity in the sense of Article 84 EPC.

4. Conclusion

Since there is no allowable request on file, the board cannot accede to the appellant's request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann R. Lord

Decision electronically authenticated