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Datasheet for the decision
of 31 May 2017

Case Number: T 1634/11 - 3.4.01
Application Number: 09152354.8
Publication Number: 2088584
IPC: G10L19/14

Language of the proceedings: EN

Title of invention:
Codebook sharing for LSF quantization

Applicant:
Samsung Electronics Co., Ltd.

Headword:

Relevant legal provisions:
RPBA Art. 13(1), 15(3)
EPC Art. 84

Keyword:
Late-filed request - change of subject-matter - request clearly allowable (no) - admitted (no)

Decisions cited:
Catchword:
Case Number: T 1634/11 - 3.4.01

DECISION
of Technical Board of Appeal 3.4.01
of 31 May 2017

Appellant: Samsung Electronics Co., Ltd.
(Applicant)
129, Samsung-ro
Yeongtong-gu
Suwon-si, Gyeonggi-do, 443-742 (KR)

Representative: Appleyard Lees IP LLP
15 Clare Road
Halifax HX1 2HY (GB)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted on 24 January 2011
refusing European patent application No.
09152354.8 pursuant to Article 97(2) EPC.

Composition of the Board:
Chairman G. Assi
Members: T. Zinke
J. Geschwind
Summary of Facts and Submissions

I. The examining division refused European patent application No. 09 152 354.

In its decision the examining division held that the independent claims of a main request, an auxiliary request I, an auxiliary request II and an auxiliary request III, then pending, added subject-matter contrary to the requirements of Art. 123(2) EPC as compared to the originally filed application and of Art. 76(1) EPC as compared to the earlier European patent application No. 99 946 655.

II. The appellant (applicant) filed an appeal against the decision.

With the statement setting out the grounds of appeal, the appellant requested that the decision be set aside and that a patent be granted on the basis of an enclosed set of claims according to a main request, an auxiliary request I or an auxiliary request II.

III. At the appellant's request, a summons to attend oral proceedings was issued.

IV. In a communication pursuant to Art. 15(1) RPBA, the appellant was informed of objections under Art. 123(2) and 76(1) EPC against all pending requests.

V. In reply, with letter of 2 May 2017, the appellant withdrew all requests then on file, filed a set of amended claims according to a new sole main request and provided arguments with regard to the admissibility of the revised claim set and the support of the amendments made. Further, the appellant informed the Board that
the representative would not attend the oral proceedings. A final decision based on the new sole main request and the given argumentation was requested.

VI. The oral proceedings took place as scheduled in the absence of the appellant.

VII. Claim 1 of the new sole main request reads as follows:

"1. A multi-rate CELP speech coding system capable of operating in one of a plurality of coding rates selected from 4.55kbps, 5.8kbps, 6.65kbps, 8.0kbps and 11.0kbps and using a multi-stage vector quantization, the multi-rate speech coding system comprising:

a processing circuitry comprising an analysis block generating linear prediction "LP" parameters, and obtaining line spectrum frequencies "LSFs" by converting the LP parameters; and

a VQ for quantizing the LSFs, the VQ including a plurality of VQ entries;

the processing circuitry being configured to:

determine in which coding rate of the plurality of coding rates the multi-rate speech coding system is configured to operate;

calculate a vector of prediction error fe by subtracting a vector of mean values from the LSFs and using a full-matrix AR(2) predictor on the mean removed LSFs vector with a single predictor being used for the rates 5.8kbps, 6.65kbps, 8.0kbps and 11.0kbps and two sets of prediction coefficients are tested as possible predictors for the rate 4.55kbps;

quantize the vector of prediction error using a multi-stage VQ having five stages, with multi-surviving candidates from each stage to the next stage, wherein the two sets of prediction error
vectors generated for the rate 4.55kbps are considered as surviving candidates for the first stage and the first three stages are used for the rate 4.55kbps, the first four stages are used for the 5.8, 6.65 and 8.0 kbps rates and all five stages are used for the 11.0kbps rate; select a final choice of vector of prediction error from all the surviving candidates by choosing a combined set of vectors which minimises a total error; and generate the quantized LSFs vector by forming a quantized prediction error vector by summing a contribution for all of the stages and by adding a quantized prediction error to the prediction states and the mean LSFs values; wherein the quantizing of the vector of prediction error at each stage includes minimizing a weighted distortion measure $\varepsilon_k$ defined by,

$$
\varepsilon_k = \sum_{i=0}^{9} w_i (f_i - C_i^k)^2
$$

wherein $f_i$ represents in this equation both the initial prediction error to the first stage and the successive quantization error from each stage to the next one,

wherein the code vector $C^k$ with index $k_{\text{min}}$ which minimizes $\varepsilon_k$ such that $\varepsilon_{k_{\text{min}}} < \varepsilon_k$ for all $k$ is chosen to represent the prediction/quantization error, and

wherein the weighted distortion measure uses weights $w_i$ based on the LSFs which are calculated from

$$
w_i = k|P(j_i)|^{0.4}
$$
where \( K \) is a multiplicative constant, \( f_i \) is the \( i^{th} \) LSF value and \( P(f_i) \) is the LPC power spectrum at \( f_i \) and is defined by

\[
P(f_i)^{-1} = \begin{cases} 
(1 - \cos(2\pi f_i))^\frac{1}{2} \prod_{\text{even } j} (\cos(2\pi f_i) - \cos(2\pi f_j))^2 & \text{even } i \\
(1 + \cos(2\pi f_i))^\frac{1}{2} \prod_{\text{odd } j} (\cos(2\pi f_i) - \cos(2\pi f_j))^2 & \text{odd } i
\end{cases}
\]

and the power of \(-0.4\) is calculated using a look-up table and cubic-spline interpolation between table entries."

Independent claim 2 is a correspondingly formulated method claim.

**Reasons for the Decision**

1. The appeal is admissible.

2. Admissibility of the new sole main request (Art. 13(1) RPBA)

2.1 The amended claims of the new sole main request were filed in response to the communication of the Board under Art. 15(1) RPBA.

2.2 Under Art. 13(1) RPBA, any amendment to a party's case after it has filed its grounds of appeal may be admitted at the Board's discretion.

In accordance with established jurisprudence of the boards of appeal (cf. Case Law of the Boards of Appeal of the European Patent Office, 8th edition, July 2016, section IV.E.4.4, "Criteria for consideration of amended claims", pages 1151-1160), "As a rule, the board's decisions should be based on the issues in dispute at first instance, which does not rule out the
admission of new submissions, but does subject it to the fulfillment of certain criteria, given that no entirely "fresh case" should be created on appeal ... . Thus, in addition to the factors referred to in Art. 13(1) RPBA, the following criteria may ... likewise be decisive: there must be sound reasons for filing a request at a late stage in the proceedings, as may be the case where amendments are occasioned by developments during the proceedings or where the request addresses still outstanding objections. The amendments must be prima facie clearly allowable ...", i.e. it must be immediately apparent to the board that the amendments made successfully address the issues raised, without giving rise to new ones.

2.3 In the present case, the appellant removed the feature "sharing vector quantizer "VQ" entries among the coding rates" from independent claims, which feature had been considered by the Board in its communication under Art. 15(1) RPBA as not being disclosed in the application as filed or the earlier application and, therefore, as contravening Art. 123(2) and 76(1) EPC. Hence, the removal of this feature could be considered as a sound reason for filing amended claims.

2.4 However, apart from said removal, the appellant added a plurality of further features dealing with vector quantization of LPC parameters, as taken from the description. These amendments lead to a shift from the aspect of "sharing vector quantizer entries among the coding rates", which had been the subject considered throughout the whole examination proceedings and the appeal proceedings so far, to a particular method of vector quantizing LPC parameters for different coding rates, wherein no vector quantizer entries are shared. Hence, a "fresh case" resulted. Such a major shift in
the claimed subject-matter should not be allowed in a late stage of the proceedings. An admission of these claims would indeed result in a complete new case requiring a further search and examination of the newly claimed subject-matter.

2.5 Furthermore, the amendments made also give rise to new objections under Art. 84 EPC. For instance, attention is drawn to the following points, the list not being exhaustive:

- The term "the mean removed LSFs vector" seems to imply that the LSFs are arranged as a vector; this, however, is not specified in the claim.

- The term "the two sets of prediction error vectors" has no antecedent basis, only "two sets of prediction error coefficients" being mentioned in claim 1 before.

- The feature "which minimises a total error" leaves open, what is meant by "total error".

- The claimed equation for $\varepsilon_k$ includes a sum from $i=0$ to 9, but it is unclear, why exactly ten values are summed up and how these ten values are obtained.

Since these features are directly copied from pages 35 to 37 of the originally filed earlier application, it is not apparent, how these features could be clarified.

2.6 Hence, the new sole main request is not prima facie clearly allowable.

The new sole main request representing a "fresh case" which is not prima facie clearly allowable, the Board
did not admit it into the appeal proceedings in accordance with Art. 13(1) RPBA.

3. According to established case law (cf. Case Law of the Boards of Appeal of the European Patent Office, 8th edition, July 2016, section IV.E.4.2.6 d), "Applicant (proprietor) absent from oral proceedings", pages 1137-1138) that an appellant filing amended claims in response to a Board's communication under Art. 15(1) RPBA has to expect that the admissibility of the newly filed claims will be considered during forthcoming oral proceedings.

For this reason, in the present case, the appellant refraining from participating at the oral proceedings de facto renounced to submit its comments orally, if any. In accordance with the provisions of Art. 15(3) RPBA, the appellant was then treated as relying only on its written submissions.

Since the new sole main request was not admitted into the proceedings and all previous requests had been withdrawn, there were no further requests on file, so that the appeal had to be dismissed.

Order

For these reasons it is decided that:

1. The appeal is dismissed.
The Registrar:  

R. Schumacher

The Chairman:  

G. Assi

Decision electronically authenticated