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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:

Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: **T 1634/11 - 3.4.01**

D E C I S I O N
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 ε_k defined by,

$$\varepsilon_k = \sum_{i=0}^{9} w_i \left(fe_i - C_i^* \right)^2$$

wherein fe 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_{min} which minimizes ε_k such that $\varepsilon_{kmin} < \varepsilon_k$ 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

$$w_i = K \left| P(f_i) \right|^{0.4}$$

*where K is a multiplicative constant, f_i is the ith
LSF value and $P(f_i)$ is the LPC power spectrum at f_i
and is defined by*

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

*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 ε_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: The Chairman:

R. Schumacher   G. Assi

Decision electronically authenticated