

Internal distribution code:

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

**Datasheet for the decision
of 25 July 2013**

Case Number: T 1427/10 - 3.5.05

Application Number: 06256354.9

Publication Number: 1802062

IPC: H04L 25/03, H04L 27/38,
H04L 1/00

Language of the proceedings: EN

Title of invention:
Decision feedback equalization with composite trellis slicer

Applicant:
Tamiras Per Pte. Ltd., LLC

Headword:
DFE with trellis decoder/TAMIRAS

Relevant legal provisions:
EPC Art. 116, 123(2)

Relevant legal provisions (EPC 1973):
EPC Art. 83

Keyword:
"Request for oral proceedings by videoconference - refused"
"Oral proceedings held in absence of appellant"
"Sufficiency of disclosure - no"
"Added subject-matter - yes (all requests)"

Decisions cited:
T 0037/08, T 1266/07, T 0663/10, T 0689/90

Catchword:
-



Case Number: T 1427/10 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 25 July 2013

Appellant: Tamiras Per Pte. Ltd., LLC
(Applicant) 160 Greentree Drive, Suite 101
Dover, DE 19904 (US)

Representative: Kazi, Ilya
Mathys & Squire LLP
120 Holborn
London EC1N 2SQ (GB)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 5 February 2010
refusing European patent application
No. 06256354.9 pursuant to Article 97(2) EPC.

Composition of the Board:

Chair: A. Ritzka
Members: P. Cretaine
G. Weiss

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division, posted on 5 February 2010, refusing European patent application No. 06256354.9. The decision under appeal was a decision according to the state of the file which referred to the communication of the examining division dated 12 June 2008. In this communication, objections were raised under Articles 54, 56, 83 and 84 EPC.
- II. The notice of appeal was received on 25 March 2010 and the appeal fee was paid on 27 March 2010. The statement setting out the grounds of appeal was received on 15 June 2010. The appellant requested that the appealed decision be set aside and that a patent be granted on the basis of claims 1 to 8 according to a main request or claims 1 to 8 according to a first auxiliary request filed with the statement setting out the grounds of appeal. As second and third auxiliary requests, the appellant requested that a patent be granted on the basis of the specification without the material previously added from cross-referenced prior-art document
- D1: US 5 974 091
- and with the claims according to the main and first auxiliary requests, respectively. The appellant also requested that any oral proceedings be preferably held by videoconference.
- III. A summons to oral proceedings scheduled for 25 July 2013 was issued on 11 April 2013. In an annex

to this summons, the board expressed the preliminary opinion that the amendments to the description and claims of the main and first, second and third auxiliary requests were in breach of Article 123(2) EPC. Further the board expressed the preliminary opinion that the four requests did not meet the requirements of Article 83 EPC 1973. The board gave its reasons for these objections and explained that the appellant's arguments were not convincing. The appellant was further informed that his request for holding the oral proceedings by videoconference would have to be rejected and that - if, and only if, the objections under Articles 123(2) EPC and 83 EPC 1973 were not maintained - the case would have to be remitted to the department of first instance for a further (supplementary) search.

IV. With a letter of reply dated 24 June 2013, the board was informed that the appellant would not be attending the oral proceedings. The appellant made no further submissions in response to the communication of the board dated 11 April 2013.

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

"A decision feedback equalizer system configured to equalize an input signal and to compensate for a phase factor component generated in the system such that an output signal decoded by the system reduces the influence by the phase factor component, the system comprising:

a linear feed-forward filter circuit (604) configured to provide a linearly filtered output signal based on the input signal, the linearly filtered output signal

containing the phase factor component;
a linear or non-linear feedback filter circuit (606)
configured to provide an output feedback filter circuit
signal; and
a composite trellis decoder circuit (602) coupled to
the linear feed-forward filter circuit, the composite
trellis decoder circuit including a state metrics
comparator (902) and configured to:
process a combined signal input into the composite
trellis decoder circuit in accordance with state
metrics generated by processing a composite trellis
diagram relative to the combined signal in the state
metrics comparator, the combined signal being based on
a combination of at least the linearly filtered output
signal and the output feedback filter circuit signal
(606);
provide a trellis-decoded output signal (610)
determined by a state metrics comparator output signal,
the state metrics comparator output signal being
produced by the state metrics comparator as a result of
processing the composite trellis diagram, wherein the
trellis-decoded output signal is supplied as an input
to the linear or nonlinear feedback filter circuit
(606), and
generate a particular phase output of the combined
signal determined by the state metrics comparator
output signal as the decoded output signal (608),
wherein
the linear or non-linear feedback filter circuit is
coupled to the composite trellis decoder circuit and
configured to receive and process the trellis-decoded
output signal from the composite trellis decoder
circuit, and wherein

the processing the combined signal input into the composite trellis decoder circuit compensates for the phase factor component present in the linearly filtered output signal."

The main request comprises a further independent claim (claim 5) directed to a corresponding method.

Claim 1 according to the first auxiliary request reads as follows:

"A decision feedback equalizer system configured to equalize an input signal and to compensate for a phase factor component generated in the system such that an output signal decoded by the system reduces the influence by the phase factor component, the system comprising:

a linear feed-forward filter circuit (604) configured to provide a linearly filtered output signal based on the input signal, the linearly filtered output signal containing the phase factor component;

a linear or non-linear feedback filter circuit (606) configured to provide an output feedback filter circuit signal; and

means for producing a plurality of combined signals, wherein a first one of the combined signals is based on a combination of the linearly filtered output signal and the feedback filter circuit signal, and wherein one or more further ones of the combined signals are each based on a combination of a respective phase shifted version of the linearly filtered output signal and the feedback filter circuit signal;

a composite trellis decoder circuit (602) coupled to the linear feed-forward filter circuit, the composite

trellis decoder circuit including a state metrics comparator (902) and configured to:
receive the plurality of combined signals;
process the plurality of combined signals in accordance with state metrics generated by processing a respective trellis diagram (#0-#M-1) relative to each of the combined signals;
provide a trellis-decoded output signal (610) determined by a state metrics comparator output signal, the state metrics comparator output signal being produced by the state metrics comparator as a result of processing the trellis diagrams for the combined signals, wherein the trellis-decoded output signal is supplied as an input to the linear or non-linear feedback filter circuit (606), and
generate a particular phase output of the combined signals determined by the state metrics comparator output signal as the decoded output signal (608),
wherein
the linear or non-linear feedback filter circuit is coupled to the composite trellis decoder circuit and configured to receive and process the trellis-decoded output signal from the composite trellis decoder circuit, and wherein
the processing the combined signals input into the composite trellis decoder circuit compensates for the phase factor component present in the linearly filtered output signal."

Like the main request, the first auxiliary request comprises a further independent claim (claim 5) directed to a corresponding method.

The claims according to the second and third auxiliary requests are identical to the claims according to the main and first auxiliary requests respectively.

- VI. Oral proceedings were held as scheduled on 25 July 2013 in the absence of the appellant. After due deliberation on the basis of the written submissions, the chair announced the board's decision.

Reasons for the Decision

1. *Admissibility*

The appeal complies with the provisions of Articles 106 to 108 EPC (cf. paragraph II above). Therefore it is admissible.

2. *Request for oral proceedings by videoconference*

The appellant's request that oral proceedings be held by videoconference is rejected since the boards of appeal do not at present have the facilities and procedures for holding public oral proceedings by videoconference (following T 0037/08 of 9 February 2011, T 1266/07 of 21 November 2009 and T 0663/10 of 23 March 2012).

3. *Non-attendance at oral proceedings*

By letter dated 24 June 2013 the appellant's representative announced his intention not to attend the oral proceedings. The appellant did not however withdraw his request for the oral proceedings. The

board considered it expedient to maintain the date set for oral proceedings. Nobody attended on behalf of the appellant.

Article 15(3) RPBA stipulates that the board is not obliged to delay any step in the proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned who may then be treated as relying only on its written case.

Hence, the board was in a position to announce a decision at the end of the oral proceedings.

4. *Article 123(2) EPC*

4.1 Main request

4.1.1 Amendments to the description

The appellant amended the description as originally filed by incorporating passages and drawings of cross-referenced prior art document D1 in order to overcome an objection under Article 83 EPC 1973 raised by the examining division. These passages from pages 4a to 4f and the figures 12, 13A, 13B and 14, filed in examining proceedings with letter dated 3 August 2007, were based on D1, column 19, line 60 to column 20, line 30; column 20, line 42 to column 22, line 54; column 22, lines 56 to 60; and column 22, line 62 to column 24, line 4, and figures 6, 7A, 7B and 8. The board notes that on page 4 of the application as filed reference was only made to US 5 974 091, i.e. D1, without indicating any specific passages. The extract added as pages 4a to 4f introduces a considerable number of

technical features which go far beyond acknowledgement of the state of the art and, in the board's judgement, clearly present to the skilled person information which is not directly and unambiguously derivable from that previously presented by the application, even when taking into account matter which is implicit to a person skilled in the art of trellis coding. These added features in the description introduce subject-matter extending far beyond the content of the application as originally filed, contrary to the requirements of Article 123(2) EPC.

The appellant (see page 7 of the statement setting out the grounds of appeal) referred to earlier submissions in the examination proceedings in support of its argumentation that the incorporation of material from D1 into the present application did not contravene Article 123(2) EPC. In these earlier submissions (see letters of 3 August 2007 and 14 May 2008), the appellant argued that the amendments to the description complied with the requirements of the Guidelines for Examination, C-II-4.19 (now H-IV-2.3.1) regarding incorporation of material into the specification from a referenced document, which had also been quoted by the examining division. However, the appellant further argued (see the same page 7 of the statement setting out the grounds of appeal) that the above-mentioned requirements of the Guidelines did not apply to the present case since they arose from decision T 0689/90 and related specifically to the situation where a feature was added to the claims which was found only in the referenced document. In the present case the feature of a "composite trellis decoder" was mentioned in the description and claims as originally filed. In

the letter dated 3 August 2007 the appellant indicated that the application had been amended so that the description contained all subject-matter from US 5 974 091 **essential** to the invention. The board notes that, in the application as originally filed, reference was made to US 5 974 091 without indicating that specific passages were essential to the invention. The selected specific passages added to the application constitute, in the board's judgement, added subject-matter since the arguments of the appellant presented in the earlier submissions in that respect are not convincing.

Therefore the board judges that the amendments to the description do not comply with the provisions of Article 123(2) EPC.

4.1.2 Amendments to the claims

Independent claims 1 and 5 have been amended with respect to the claims as originally filed by incorporating features related to the composite trellis decoder and which are allegedly based on figure 9. In particular, claim 1 recites that the composite trellis decoder is configured to process a combined signal in accordance with state metrics generated by processing a composite trellis diagram relative to the combined signal in the state metrics comparator, and that a trellis-decoded output signal is determined by a state metrics comparator output signal. According to the description (see [0018] of the published application), figure 9 displays a composite trellis decoder. It is however not straightforward for the skilled person to deduce from figure 9 alone that the displayed boxes

labelled "Trellis #M-1" to "Trellis #0" represent together a "composite trellis diagram relative to the combined signal" and that states metrics are generated by processing this "composite trellis diagram" in the states metrics comparator. The board considers that the mere representation on figure 9 of connection lines between circuit parts, even if these circuits have a known denomination like the trellis and the state metrics comparator or are represented by a known symbol like the multiplexers, does not unambiguously define how the circuit parts precisely operate and interact with each other as claim 1 attempts to define. For instance, a skilled person looking at figure 9 could contemplate that the trellises are relative to a signal other than the combined signal, or that the state metrics comparator output signal is not produced as a result of processing a trellis diagram, as defined in claim 1, but is produced based on signals merely transmitted through the boxes "Trellis #M-1", "Trellis #1" and "Trellis #0" and not processed by trellis diagrams.

For these reasons the board judges that the amendments to claim 1 and the corresponding method claim 5 do not meet the requirements of Article 123(2) EPC.

4.2 First auxiliary request

4.2.1 Amendments to the description

Since the description is identical to the description according to the main request, the findings of paragraph 4.1.1 above apply.

4.2.2 Amendments to the claims

Claim 1 contains all the features of claim 1 according to the main request. Therefore the findings of paragraph 4.1.2 above apply.

Claim 1 has been further amended with respect to claim 1 according to the main request by defining "respective trellis diagram relative to each of the combined signals". The board considers that figure 9 alone does not unambiguously disclose that the boxes labelled "Trellis #M-1", "Trellis #1" and "Trellis #0" are **relative** to the combined signal in the sense that each of the displayed boxes is able to output a decoded signal for its input signal.

For these reasons the board judges that the amendments to claim 1 and the corresponding method claim 5 are in breach of Article 123(2) EPC.

4.3 Second and third auxiliary requests

The claims according to the second and third auxiliary requests are identical to the claims of the main and first auxiliary requests, respectively, and as such, in the board's judgement, are in breach of Article 123(2) EPC.

4.4 Concluding remarks

None of the requests complies with the requirements of Article 123(2) EPC.

5. *Article 83 EPC 1973*

5.1 The examining division objected in the summons to oral proceedings referred to in the decision that a skilled person would not be able to implement the system represented in figures 6 and 9 and claimed in claim 1 according to the then single request. In the board's view, this objection is still valid for independent claim 1 according to the main request and the auxiliary requests, all the more so since these claims has been amended to include more features allegedly derived from figure 9 alone.

5.2 The appellant argued that the basic principle behind a composite trellis decoder was apparent to the skilled person from figure 9 alone. The board however considers that the skilled person would not find in figures 6 and 9 and the related passages of the description ([0015] and [0018] of the published application) any clear information relating to the implementation of the "composite trellis diagram relative to the combined signal" or to the "combined signal being based on a combination of at least the linearly filtered output signal and the output feedback filter circuit". In particular, the boxes labelled "Trellis" displayed in figure 9 are not referred to in the description and the phase shifters in figure 9 are provided with parameters α which are also not referred to in the description passages relating to figures 6 and 9.

The appellant further argued that the skilled person would look in the referenced document D1 for the general principle behind a composite trellis decoder, summarised as being formed "by combining multiple

component trellis diagrams which are each a phase displaced version of a root trellis diagram" (see column 12, lines 2 to 3 of D1). However, even if this reference to D1 is taken into account, the board is not convinced that the skilled person would be able to implement the boxes labelled "Trellis #M-1", "Trellis #1" and "Trellis #0" in figure 9 as phase-displaced versions of a root trellis diagram without further indications as to how said root trellis diagram and its phase displaced versions should be designed. Moreover, the reference to the basic principle of a composite trellis decoder would not give the skilled person any information as to how the parameters α_{M-1} to α_1 of the phase shifters shown in figure 9 should be determined.

The appellant further argued that the passages and drawings of D1 incorporated into the description provide the skilled person with sufficient information to implement the composite trellis decoder. The board is however of the opinion that the skilled person would not be able to reconcile without undue efforts the complex teaching of these passages of D1 with the limited information given by figure 9. In that respect, the board notes that figures 6 and 8 and the related passages in D1 disclose a composite trellis processor having double-indexed input signals $Y_{i,1}(n)$, $Y_{q,1}(n)$, $Y_{i,nttmax}(n)$ and $Y_{q,nttmax}(n)$, issued from receiver- and vector-matched filters, which do not fit to any input signal of figure 9.

- 5.3 The board thus judges that the application does not meet the requirement of Article 83 EPC 1973.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:

K. Götz

A. Ritzka