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Datasheet for the decision of 19 September 2013

Case Number: T 2121/09 - 3.4.01

Application Number: 05024563.8

Publication Number: 1657777

IPC: H01P 1/15, H01P 1/213

Language of the proceedings: EN

Title of invention:
High-frequency module

Applicant:
TDK Corporation

Headword:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 2121/09 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 19 September 2013

Appellant: (Applicant)
TDK Corporation
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Representative:
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Decision under appeal:
Decision of the Examining Division of the European Patent Office posted 9 March 2009 refusing European patent application No. 05024563.8 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: G. Assi
Members: H. Wolfrum
A. Pignatelli

Summary of Facts and Submissions

I. European patent application 05 024 563.8 (publication No. EP 1 657 777) was refused by a decision of the examining division dispatched on 9 March 2009 for reasons of added subject-matter (Article 123(2) EPC) and lack of inventive step (Articles 52(1) and 56 EPC 1973) of the subject-matter of the claims of the request then on file.

II. The applicant lodged an appeal against the decision on 12 May 2009. The prescribed appeal fee was paid on the same day. A statement setting out the grounds of appeal was filed on 17 July 2009.

The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of a new set of claims filed with the statement setting out the grounds of appeal.

Furthermore, an auxiliary request for oral proceedings was made.

III. On 9 April 2013 the appellant was summoned to oral proceedings to take place on 7 November 2013.

In an annexed communication pursuant to Article 15(1) RPBA the Board commented on the issues to be addressed during the oral proceedings. In this context, the Board *inter alia* expressed doubts as to the presence of an inventive step for the subject-matter of claim 1 on file. In view of the amendments made to the claims, the Board introduced two further documents (documents D4

and D5), cited in the parallel examination proceedings before the US patent office.

IV. The appellant did not comment on the Board's observations nor did it file any further amendments. Instead, by letter of 21 June 2013, the appellant withdrew its request for oral proceedings and requested a decision according to the state of the file.

V. Oral proceedings were cancelled by notification of 13 September 2013.

VI. Independent claim 1 of the appellant's sole request reads as follows:

"*1. A high frequency module (1) comprising:*

an antenna terminal (ANTi, ANT2) connected to an antenna (101, 102);

a plurality of diplexers (11, 12) each of which separates signals in a first frequency band from signals in a second frequency band higher than the first frequency band;

a switch circuit (10) for connecting one of the diplexers to the antenna terminal; and

a substrate for integrating the foregoing components, wherein:

the switch circuit (10) is designed to receive a control signal for controlling switching of a state;

each of the diplexers (11, 12) incorporates: first to third ports (P1 1...P13; P21...P23), the first port (P11, P21) being connected to the switch circuit (10); a first filter (20, 50) that is provided between the first (P11, P21) and second (P 12, P22) ports and that allows signals in the first frequency band to pass; a

second filter (30, 60) that is provided between the first (P11, P21) and third (P 13, P23) ports and that allows signals in the second frequency band to pass; and a node (Ni, N2) between a signal path to the first filter (20, 50) and a signal path to the second filter (30, 60) that are seen from the first port (P11, P21),

characterized in that

each of the diplexers (11, 12) further incorporates:

a first capacitor (15, 16) that is provided between the node (N1, N2) and the first filter (20, 50) and that blocks passage of direct currents resulting from the control signal; and

a second capacitor (83, 93) that is provided between the node (Ni, N2) and the second filter (30, 60) and that blocks passage of direct currents resulting from the control signal,

wherein no capacitor for blocking passage of direct currents resulting from the control signals is provided between the first port (P11, P21) and the node (Ni, N2)."

Claims 2 to 15 are dependent claims.

Reasons for the Decision

1. In the following reference is made to the provisions of the EPC 2000 ("EPC"), which entered into force as of 13 December 2007, unless the former provisions of the EPC 1973 still apply to pending applications.

2. The appeal complies with the requirements of Articles 106 to 108 and Rule 99 EPC and is, therefore, admissible.

3. *Procedural matters*

In view of the withdrawal of the appellant's former request for oral proceedings and its request for a decision according to the state of the file there was no need for the Board to hold oral proceedings or to wait for issuing a decision until the scheduled date of 7 November 2013.

Therefore, the Board decided to cancel the said oral proceedings and to continue the case in writing.

4. *Inventive step (Articles 52(1) and 56 EPC 1973)*

4.1 Reference is made to the following documents:

Dl : EP-A-1 152543;
D4 : EP-A-1 418 680; and
D5 : US-B-6 496 083.

4.2.1 Document Dl (see in particular Figures 5 and 6 with the corresponding description) shows a high frequency module which includes, in addition to the features listed in the preamble of claim 1 on file, in each of the diplexers (9 and 11 or 11 a) a capacitor (18 and 56) in the signal path from the node to one of the second or third ports, respectively. As regards diplexer 9, capacitor 18 is provided between the corresponding node and one end of a filter for a first transmission band that is constituted by a series resonance circuit (*ie* a

filter) consisting of inductor 32 and capacitor 20 (D1 : paragraph [0045]). As regards diplexer 11 a, corresponding capacitor 56 is provided in the signal path from the respective node and forms part of a phase shifter (D1 : column 9, lines 32 to 39). Arguably, capacitor 56, which inevitably blocks passage of direct currents resulting from the control signal, can be regarded to constitute a "second capacitor" separate from a filter, as required by claim 1 under consideration.

At any rate, there is no capacitor for blocking passage of direct currents resulting from the control signal provided between the first port and the node in any of the diplexers of the modules according to Figures 5 and 6 of document D1.

4.2.2 Consequently, the subject-matter of claim 1 under consideration differs from the prior art according to document D1 in the provision of a respective DC-blocking capacitor separate from the respective filter in each of the signal paths through the two diplexers.

The technical effect associated with this difference is to be seen in an absolute blocking of the passage of DC currents through the diplexers, which blocking can be suitably optimised for the individual frequency bands.

4.2.3 As argued in the Board's communication of 9 April 2013 annexed to the summons to oral proceedings, it would not have required the exercise of inventive skill for the notional skilled person to recognize that direct currents may not be sufficiently blocked in all branches of the diplexers of the module known from D1;

the more so, as the need for such blocking was known to him from document D5 (see Figure 10 and the corresponding description in columns 7 to 9).

Moreover, it would not have required inventive ingenuity to realize the fact that by providing the necessary blocking capacitor in each of the signal paths through the diplexers of document Dl and separate from the respective filters signal transmission can be optimized for each of the respective frequency bands.

This assessment is confirmed by document D4 which, similar to the embodiment of Figure 6 of document Dl, shows in each of Figures 15, 16, 18 and 24 a high frequency module which has in each of the diplexers (Dipl, Dip2) a capacitor (C9, C5) between the node and the second filter (HPF). In this context, the description of Figure 10 of D4 (paragraph [0062]) expressly states that capacitor C5 serves inter alia for cutting a DC component in the control voltage.

4.3 The appellant did not put forward any arguments against the above assessment as presented in the Board's communication.

The Board has thus come to the conclusion that the subject-matter of claim 1 of the appellant's sole request does not involve an inventive step within the meaning of Articles 52(1) and 56 EPC.

5. The appellant's request is therefore not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar The Chairman

R. Schumacher G. Assi