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Datasheet for the decision of 5 November 2024

Case Number: T 2224/22 - 3.5.05

Application Number: 16176223.2

Publication Number: 3091673

IPC: H04B7/185

Language of the proceedings: EN

Title of invention:
Satellite transponder with a system and a method for processing communication data by analog digital conversion of the signals, formation of frequency channels and combination of them by a switch with a plurality of stages

Patent Proprietor:
The Boeing Company

Opponents:
Airbus Defence and Space Limited/
Airbus Defence and Space SAS

Headword:
Transponder with Clos-switch network/BOEING

Relevant legal provision:
EPC Art. 76(1)

Keyword:
Added subject-matter - claim request held allowable by the opposition division (yes)

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Case Number: T 2224/22 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 5 November 2024

Respondent: (Patent Proprietor)	The Boeing Company 929 Long Bridge Drive Arlington, VA 22202 (US)
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Appellants: (Opponents)	Airbus Defence and Space Limited/ Airbus Defence and Space SAS Gunnels Wood Road/ 51-61 route de Verneuil Stevenage Hertfordshire SG1 2AS/ 78130 Les Mureaux (GB)
Representative:	Cork, Robert Venner Shipley LLP 5 Stirling House Stirling Road The Surrey Research Park Guildford GU2 7RF (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 20 July 2022 concerning maintenance of the European Patent No. 3091673 in amended form.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	J. Eraso Helguera
	C. Almberg

Summary of Facts and Submissions

I. This case concerns the appeal filed by the joint opponents against the decision of the opposition division to maintain the opposed patent as amended in accordance with a "first auxiliary request" filed during the oral proceedings before the opposition division.

II. Oral proceedings before the board were held on 5 November 2024. The final requests of the parties were:

- The joint opponents (joint appellants) requested that the appealed decision be set aside and that the patent be revoked.

- The proprietor (respondent) requested that the appeal be dismissed.

At the end of those oral proceedings, the board announced its decision.

III. Claim 1 of the **"first auxiliary request"** underlying the appealed decision reads as follows:

"An apparatus, comprising:
a transponder (200) comprising a number of transponder slices (202), the number of transponder slices configured to be connected to a backplane (203),
wherein each of the number of transponder slices comprises (202):
an analog front end (204) configured to receive an analog input (214);

an analog to digital converter (222) configured to convert the analog input (214) to digital signals;

a digital channelizer (206) configured to process the digital signals to generate a plurality of frequency slices (224);

a digital combiner (210) configured to assemble the plurality of frequency slices (224) to form output sub-bands (240);

wherein each of the number of transponder slices (202) further comprises:

a digital switch (208) configured to route the plurality of frequency slices (224) from each digital channelizer (206) on a given slice to its respective digital combiner (210) on the same slice, characterised in that the digital switch (208) comprises an at least three stage Clos switch network (232) comprising ingress stage switches (234), middle stage switches (236), and egress stage switches (238)."

Reasons for the Decision

1. FIRST AUXILIARY REQUEST

Claim 1 of the **"first auxiliary request"** underlying the appealed decision comprises the following limiting features:

An apparatus, comprising:

(a) a transponder comprising a number of transponder slices, the number of transponder slices configured to be connected to a backplane,
each of the number of transponder slices comprises:

(b) an analog front end configured to receive an analog input;

(c) an analog to digital converter configured to convert the analog input to digital signals;
(d) a digital channeliser configured to process the digital signals to generate a plurality of frequency slices;
(e) a digital combiner configured to assemble the plurality of frequency slices to form output sub-bands;
each of the number of transponder slices further comprises:
(f_2) a digital switch configured to route the plurality of frequency slices from each digital channeliser on a given slice to its respective digital combiner on the same slice,
(g) the digital switch comprises an at least three stage Clos switch network comprising ingress stage switches, middle stage switches, and egress stage switches.

1.1 Claim 1 - claim interpretation

1.1.1 The proprietor submitted in its written response to the board's preliminary opinion that **feature (f_2)** positively recited that the "digital switch" was configured to route the plurality of frequency slices from each "digital channeliser" on a given slice to its respective "digital combiner" on the same slice. This feature did not exclude inter-slice connections.

1.1.2 The board endorses the proprietor's interpretation of **feature (f_2)**. In the context of claim 1, the digital switch - in each transponder slice - is configured to at least route frequency slices from the digital channeliser in *one* slice to the digital combiner in the *same* slice. But the same digital switch can - in addition - route frequency slices from the digital

channeliser in *one* slice to the digital combiner in a *different* slice. At the same time, the digital switch - in each transponder slice - must comprise a "Clos switch network" as defined by **feature (g)**.

1.2 Claim 1 - added subject-matter (Article 76(1) EPC)

1.2.1 The amendments carried out during the opposition proceedings resulted - among other things - in **feature (g)** of claim 1. According to this feature, the digital switch in each of the number of transponder slices comprises an at least three-stage Clos switch network comprising ingress stage switches, middle stage switches and egress stage switches. The presence of such a "Clos switch network" in each of the transponder slices - with these or other words - does not explicitly appear in the earlier application as filed. The case at hand therefore requires additional argumentation to convincingly justify that the claimed subject-matter indeed complies with Article 76(1) EPC.

1.2.2 The proprietor provided the following basis for the claimed subject-matter in the earlier application as filed:

- claims 1, 2, 3 and 12,
- paragraphs [0009], [0011], [0016], [0025], [0042] to [0046] and [0048] to [0051].

The proprietor acknowledged that original claim 2 did not specify that each of the transponder slices comprised the "analog front end", the "analog to digital converters", the "digital channeliser", the "digital combiner", the "digital switch", the "digital to analog converters" and the "analog back end". Nor did original claim 3 specify that the digital switch in

each of the transponder slices comprises an at least "three stage Clos switch network". But, in the proprietor's view, this information was still directly and unambiguously derivable from the earlier application as a whole. On the one hand, Figure 3 and the corresponding paragraphs of the description disclosed a plurality of transponder slices 302, 304, 306 and 308 with identical configurations connected to backplane 309 (see e.g. paragraph [0044]). On the other hand, transponder 200 of Figure 2 may also comprise a number of transponder slices 202 connected to a backplane 203 (see paragraph [0025]). In addition, according to Figure 2 and paragraph [0034], the

> "multiple stage switch network 230 may comprise Clos switch network 232. For example, without limitation, multiple stage switch network 230 may comprise a three stage or other Clos switch network 232 or other multiple stage switch network 230 comprising ingress stage switches 234, middle stage switches 236, and egress stage switches 238".

Lastly, paragraph [0041] established a direct and unambiguous link between both disclosures: it explicitly recited that "transponder 300 is an example of one implementation of transponder 200 in Figure 2".

1.2.3 The board does not find these arguments persuasive.

(a) To begin with, the board acknowledges that the three-stage digital switch 328 in each of the transponder slices 302, 304 and 306 of Figure 3 and in the corresponding paragraphs of the earlier application as filed provides basis for the "digital switch" of feature (f_2) according to the

proprietor's interpretation, i.e. not excluding inter-slice connections (see point 1.1 above). However, the three-stage switch 328 in each of the transponder slices 302, 304 and 306 does not *explicitly* comprise a "Clos switch network". Generally speaking, not every multi-stage switch network necessarily comprises a Clos switch network either, see e.g. paragraph [0034] of the earlier application as filed:

> "... multiple stage switch network 230 may comprise a three stage or other Clos switch network 232 or other multiple stage switch network 230 comprising ingress stage switches 234, middle stage switches 236, and egress stage switches 238" (emphasis added).

So, Figure 3 and the corresponding paragraphs of the earlier application as filed taken alone cannot directly and unambiguously disclose **feature (f_2)** in combination with **feature (g)**.

(b) Moreover, the board agrees with the joint opponents that Figure 2 and the corresponding paragraphs of the earlier application as filed disclose that "a number of transponder slices 202" comprise "digital switch 208" (see Figure 2 and paragraph [0025]). The "digital switch 208" may include "multiple stage switch network 230" (see Figure 2 and paragraph [0032]). And the "multiple stage switch network 230" may comprise "Clos switch network 232" (see Figure 2 and paragraph [0034]). In summary, Figure 2 and the corresponding paragraphs of the earlier application as filed disclose that the transponder 200 may comprise a digital switch 208 which, in turn, may comprise a

Clos switch network 232, just like claims 1 to 3 of the earlier application as filed. However, neither Figure 2 and the corresponding paragraphs nor said original claims 1 to 3 provide any details about how the different parts of the digital switch 208 and the Clos switch network 232 are distributed across each of the "number of transponder slices 202". Consequently, they fail to provide the level of detail according to **feature (f_2)** in combination with **feature (g)**, since this combination requires the presence of a "digital switch" and a "Clos switch network" in each transponder slice.

(c) The proprietor submitted that paragraph [0041] of the earlier application as filed recites that *transponder 300* of Figure 3 is an example of one implementation of *transponder 200* of Figure 2. This fact does not change the board's assessment, though. The link between Figures 2 and 3 and paragraph [0041] would lead - at most - to the understanding that the plurality of digital switches 328 of the transponder slices 302, 304, 306 and 308 interconnected through the backplane 309, considered as a whole, may comprise a three-stage "Clos switch network" like the one in Figure 2. This is also in line with paragraph [0050] which, referring to Figure 3, explains that "[i]n accordance with an illustrative embodiment, digital switch 328 may be a portion of a three stage switch network" (emphasis added). However, a portion of a "Clos switch network" need not be a "Clos switch network" itself. Consequently, even considering the transponder 300 of Figure 3 as an example of transponder 200, the earlier application as filed still falls short of a

direct and unambiguous disclosure for **feature (f_2)** in combination with **feature (g)**. For the avoidance of doubt, the board stresses that it is immaterial whether the "portion of a Clos switch network" comprised in the "digital switch 328" of each transponder slice 302, 304, 306 and 308 could actually be implemented as a "Clos network switch". For the purposes of Article 76(1) EPC, such possibility, however feasible, is not directly and unambiguously disclosed by the earlier application as filed.

1.2.4 In view of the above, the "first auxiliary request" underlying the appealed decision is not allowable under Article 76(1) EPC.

1.3 Since there is no allowable claim request on file, the patent has to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chair:

B. Brückner K. Bengi-Akyürek

Decision electronically authenticated