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**Datasheet for the decision
of 29 February 2008**

Case Number: T 0930/06 - 3.5.03

Application Number: 00119474.5

Publication Number: 1085666

IPC: H04B 1/40

Language of the proceedings: EN

Title of invention:

Receiver / transmitter apparatus

Applicant:

KABUSHIKI KAISHA TOSHIBA

Opponent:

-

Headword:

Receiver/transmitter apparatus/TOSHIBA

Relevant legal provisions:

EPC Art. 56, 84

Relevant legal provisions (EPC 1973):

-

Keyword:

"Inventive step (no)"

"Clarity (no)"

Decisions cited:

-

Catchword:

-



Case Number: T 0930/06 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 29 February 2008

Appellant:

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Decision under appeal:

Decision of the examining division of the
European Patent Office posted 12 January 2006
refusing European application No. 00119474.5
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. S. Clelland
Members: F. van der Voort
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division to refuse European patent application No. 00119474.5, publication number EP 1 085 666 A.

The reasons given for the refusal were that the subject-matter of the claims of a main request and of two auxiliary requests either lacked novelty or did not involve an inventive step, Articles 52(1), 54 and 56 EPC.

II. In the notice of appeal the appellant requested that the decision be set aside and a patent be granted. Oral proceedings were conditionally requested. With the statement of grounds of appeal the appellant filed claims of a main request and claims of an auxiliary request and submitted arguments in support.

III. The appellant was summoned to oral proceedings. The summons was accompanied by a communication in which the board gave its preliminary opinion and drew the attention to points which needed to be discussed. Those parts of the communication which are relevant to the present decision, i.e. points 6 and 7.1 to 7.7, are reproduced below, in which:

D1 = US 5 400 039 A;

D5 = US 5 592 391 A;

D6 = US 4 861 941 A; and

D7 = DE 38 38 486 A.

"6. *Article 84 EPC - clarity*

Claim 1 of each request includes the feature that the first and second substrate regions are sectioned by means of a plurality of parallel rows of spaced through holes. Even when read in the context of the application as a whole, the meaning of the substrate regions being "sectioned" (divided into sections or cut?) is not clear, thereby contravening the requirements of Article 84 EPC.

From the application as filed it appears that it is the substrate, rather than the first and second substrate regions, which is sectioned in the sense of being segmented in different regions by means of the plurality of parallel rows of spaced through holes, see, e.g., col. 5, lines 49 and 50, Figs 3 and 6 and claim 6 of the application as published. Hereinafter, claim 1 of each request will be interpreted accordingly.

7. *Article 56 EPC - inventive step*

7.1 The examining division considered that D1 is the closest prior art. The board sees no reason to question this. D1, see, in particular Figs 1 and 2B, discloses, using the language of claim 1 of the main request, a microwave circuit forming a receiver/transmitter apparatus and including a multi-layer circuit board substrate 16 having a rear surface and a front surface on which a front ground electrode 11 is formed. The microwave circuit further includes a local oscillator 32, 33 formed on a front surface of the substrate for

generating a local oscillating signal, a transmitter circuit 31 formed on the front surface of the substrate and having a modulator for modulating the local oscillating signal with a transmission signal, the transmitter circuit being located in a first substrate region, and a receiver circuit 30 formed on the front surface of the substrate and having a demodulator for demodulating a received signal by means of a local oscillating signal, the receiver circuit being located in a second substrate region.

Referring to the appellant's arguments as set out in the statement of grounds of appeal, the board notes that in D1 reference sign 11 indicates a "grounding line". From Fig. 1 it is however clear that part of the grounding line is a conductor through which electricity may leave or enter the front surface to/from the grounding layer 3. This part, having a certain width (see Fig. 1), therefore constitutes an electrode.

The board further notes that in the circuit of D1, see col. 9, lines 28 to 35, and col. 12, lines 51 to 60, electromagnetic shielding is provided by means of the grounding layer 3, a power source layer 12 (see Fig. 1), and a metal casing 47 (see Fig. 6).

- 7.2 The subject-matter of claim 1 of the main request differs from the microwave circuit disclosed in D1 particularly in that the substrate is segmented in the first and second substrate regions by means of a plurality of parallel rows of spaced through

holes, arranged in through hole sequences, and electrically connecting the front ground electrode and a rear ground electrode which is formed on the rear surface of the substrate, in which the through holes are suitable for providing electromagnetic isolation of the first and second substrate regions from one another and, hence, between the respective electronic components.

7.3 Starting out from D1, the problem underlying the claimed subject-matter may therefore be seen in improving the electromagnetic shielding.

7.4 In the board's preliminary view, neither the formulation of this problem nor the proposed solution can contribute to an inventive step. Firstly, the desirability of providing electromagnetic shielding is well-known, see, e.g., D1 (see point 7.1. above), D5 (the abstract and col. 8, lines 38 to 45), D6 (the abstract and col. 1, lines 15 to 19), and D7 (the abstract). Secondly, it is also part of the common general knowledge of the skilled person that electromagnetic shielding can be improved by using double-sided printed substrates with grounding layers on both surfaces and by using plated through holes to electrically interconnect the grounding layers, see, e.g., D5 (the abstract ("Faraday cage"), col. 3, lines 16 to 24, and Fig. 2A), D6 (the abstract, col. 1, lines 15 to 24, col. 3, lines 25 to 30, and Figs 2B and 3B), and D7 (the abstract, col. 1, line 57 to col. 2, line 41, and Fig. 1).

7.5 It would therefore have been obvious to the skilled person, when faced with the above problem, to apply this common general knowledge to D1 accordingly, i.e. providing extended grounding layers on the front and rear surfaces, which are interconnected by means of a plurality of appropriately spaced through holes, and such that the various potentially interfering electronic components, e.g. 30, 31, 34 (see D1, Fig. 2B), are surrounded or separated by the through holes of the grounding layers and thereby electromagnetically shielded from each other.

7.6 It therefore appears that the subject-matter of claim 1 of the main request does not involve an inventive step, Article 56 EPC.

7.7 The above considerations apply, *mutatis mutandis*, to claim 1 of the auxiliary request."

IV. In response to the summons to oral proceedings, the appellant informed the board that he would not attend the oral proceedings and that no further written submission would be filed. Further, the appellant withdrew the request for oral proceedings and requested a decision according to the state of the file.

V. In a subsequent communication the board informed the appellant that the oral proceedings were cancelled.

VI. Claim 1 of the main request reads as follows:

"A receiver/transmitter apparatus comprising:

a multi-layer circuit board substrate (11, 21) having a rear surface on which a rear ground electrode (22b) is formed, and a front surface on which a front ground electrode (22a) is formed;

a local oscillator (14) formed on a front surface of said substrate (11, 21) for generating a local oscillating signal;

a transmitter circuit (12) formed on said front surface of said substrate (11, 21) and having a mixer for mixing a transmission signal and said local oscillating signal, said transmitter circuit (12) being located in a first substrate region (A); and

a receiver circuit (13) formed on said front surface of said substrate (11, 21) and having a mixer (133) for mixing a received signal and said local oscillating signal, said receiver circuit (13) being located in a second substrate region (C),

wherein the first and second substrate regions (A, C) on said same circuit board are sectioned by means of a plurality of parallel rows of spaced through holes (T_1 , T_2 , R_1 , R_2), arranged in through hole sequences, through said substrate (11, 21) and electrically joining said front and rear ground electrodes (22b, 22a) to provide electromagnetic isolation of said first and second substrate regions (A, C) from one another."

Claim 1 of the auxiliary request differs from claim 1 of the main request in that the second and last paragraphs are respectively amended to read as follows (amendments in comparison with claim 1 of the main request are indicated by means of underlining and strikeouts):

"a planar multi-layer circuit board substrate (11, 21) having a rear surface on which a rear ground electrode (22b) is formed, and a front surface on which a front ground electrode (22a) is formed;"

and

"wherein the first and second substrate regions (A, C) on said same circuit board are sectioned by means of a plurality of parallel rows of spaced through holes (T₁, T₂, R₁, R₂), ~~arranged~~ disposed in one or more through hole sequences between said first region (A) and said second region (C), passing through said substrate (11, 21) and electrically joining said front and rear ground electrodes (22b, 22a) to provide electromagnetic isolation of said first and second substrate regions (A, C) from one another in a direction parallel to the plane of the board."

Reasons for the Decision

1. *Articles 52(1), 56, and 84 EPC*

1.1 After having reconsidered the objections raised in its communication and having noted that the appellant did not file any substantive submissions in reply to the communication, the board confirms the reasoning as

expressed in its communication and therefore maintains the objections raised, see point III above.

- 1.2 With respect to the amendments made in claim 1 of the auxiliary request (see point VI above) the board notes that the circuit board substrate 16 of D1 is also planar, see D1, Figs 1, 2A and 2B. Further, through holes as referred to in points 7.4 and 7.5 of the communication (see point III above) which would separate potentially interfering electronic components, e.g. the transmitter circuit 31 which is in the first substrate region and the receiver circuit 30 which is in the second substrate region of the microwave circuit of D1 (see point III above), would also provide electromagnetic isolation in a direction parallel to the plane of the board, namely between the first and second substrate regions. Hence, the inventive step objections raised in respect of the claim 1 of the main request apply *mutatis mutandis* to claim 1 of the auxiliary request.
2. Accordingly, the board concludes that claim 1 of both the main request and the auxiliary request does not comply with the requirements of Article 84 EPC and that the respectively claimed subject-matter does not involve an inventive step having regard to the disclosure of D1 and taking into account the common general knowledge of the person skilled in the art, Articles 52(1) and 56 EPC.
3. In the absence of an allowable request, the board concludes that the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Magliano

A. S. Clelland