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**Datasheet for the decision
of 8 April 2014**

Case Number: T 0963/10 - 3.4.01

Application Number: 06250430.3

Publication Number: 1686651

IPC: H01Q 1/38, H01Q 1/44,
H01Q 1/22, H01Q 1/24

Language of the proceedings: EN

Title of invention:

Antenna apparatus and electronic device

Applicant:

Fujitsu Component Limited

Opponent:

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Headword:

-

Relevant legal provisions (EPC 1973):

EPC Art. 54(1)(2), 84

Keyword:

"Novelty (no: main request, auxiliary requests 1, 1a, 3 and 4)"

"Clarity (no: auxiliary requests 2 and 2a)"

Decisions cited:

-

Catchword:

-



Case Number: T 0963/10 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 8 April 2014

Appellant:
(Applicant)

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 9 December 2009
refusing European patent application No.
06250430.3 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: G. Assi
Members: H. Wolfrum
C. Schmidt

Summary of Facts and Submissions

I. European patent application 06 250 430.3 (publication No. EP 1 686 651) was refused by a decision of the examining division dispatched on 9 December 2009 refusing the application for the reason of added subject-matter (Article 123(2) EPC) in claim 1 of the main request then on file and for the reason of lack of inventive step (Articles 52(1) and 56 EPC 1973) of the subject-matter of claim 1 of an auxiliary request then on file.

II. The applicant lodged an appeal against the decision on 10 February 2010. The prescribed appeal fee was paid on the same day. A statement setting out the grounds of appeal was filed on 19 April 2010.

With the grounds of appeal the appellant requested that the decision under appeal be set aside and a patent be granted on the basis of sets of claims according to a main request or four auxiliary requests.

III. On 12 November 2013 the appellant was summoned to oral proceedings.

In an annex accompanying the summons pursuant to Article 15(1) RPBA the Board addressed the issues of added subject-matter (Article 123(2) EPC), unity of invention (Article 82 EPC 1973), clarity (Article 84 EPC 1973) and novelty and inventive step (Articles 52(1), 54(1) and (2) and 56 EPC 1973).

IV. By letter of 10 March 2014 the appellant filed new sets of claims according to six auxiliary requests 1, 1a, 2,

2a, 3 and 4, while maintaining the former main request filed with the statement of grounds of appeal.

V. In the oral proceedings, which took place on 8 April 2014, the appellant reiterated its requests made in writing.

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

*"1. An antenna apparatus (100) comprising:
a dielectric substrate (121) on which an element (111) including a conductive material pattern (122) is formed, wherein the dielectric substrate (121) is a flexible film;
wherein:
the element (111) includes a monopole antenna having an element pattern (141) and a ground pattern (142) and the dielectric substrate (121) is bendable such that the element pattern (141) and the ground pattern (142) can be disposed on planes of different orientations;
the conductive material pattern (122) includes a strip-line pattern (143) extending from the element pattern (141) to a distal end of the dielectric substrate (121);
and
the element (111) includes a connection part (151) for connecting the element (111) to an external circuit, the connection part (151) connecting the element (111) to the external circuit via the strip-line pattern (143) to which the connection part (151) is connected at the distal end of the dielectric substrate (121) and including a first connection part (152) connected for communicating signals to and from the element pattern (141) and a second connection part (153) connected to the ground pattern (142)."*

Claim 1 of each of **auxiliary request 1** and **auxiliary request 1a** reads:

"1. An antenna apparatus (100) comprising:
a dielectric substrate (121) on which an element (111) is formed, wherein the dielectric substrate (121) is a flexible film;
wherein:
the element (111) includes a monopole antenna having an element pattern (141) formed of conductive material and a ground pattern (142) formed of conductive material, the element pattern (141) extending in one direction (Y1), the ground pattern (142) extending in the opposite direction (Y2) away from the element pattern, and the dielectric substrate (121) is bendable such that the element pattern (141) can be bent in a prescribed angle with respect to the ground pattern (142) and the element pattern (141) and the ground pattern (142) can be disposed on planes of different orientations;
the element (111) includes a strip-line pattern (143) formed of conductive material and extending from the element pattern (141) to a distal end of the dielectric substrate (121); and
the element (111) includes a connection part (151) for connecting the element (111) to an external circuit at the distal end of the dielectric substrate (121), wherein the connection part (151) includes a first connection part (152) connected to the strip-line pattern (143) for communicating signals to and from the element pattern (141) and a second connection part (153) connected to the ground pattern (142)."

Claim 1 of each of **auxiliary requests 2** and **2a** differs from claim 1 of auxiliary request 1 in that the antenna apparatus is specified to be "*ultra-wide band*", that the flexible film is defined as being "*of thickness from 0.08 mm to 0.14 mm*", that the feature "*the element pattern (141) having a shape similar to a baseball home plate*" is added, and that the strip line pattern (143) is defined as being "*of a width of approximately 200 μ m*".

Claim 1 of **auxiliary request 3** is based on claim 1 of auxiliary request 1 and further specifies that the dielectric substrate is bendable "*at the border area between the element pattern (141) and the ground pattern (142)*".

Claim 1 of **auxiliary request 4** is based on claim 1 of auxiliary request 3 and further specifies that the element pattern (141) is formed "*on a first surface of the dielectric substrate (121)*" and that the ground pattern (142) is formed "*on a second surface of the dielectric substrate (121)*".

None of the other claims of the requests on file is pertinent for the purposes of the present decision.

VII. The appellant's arguments, as far as relevant for the present decision, may be summarized as follows:

The claimed subject-matter of each of the requests on file was novel and inventive with respect to the cited prior art, in particular with respect to the teaching of document D2. The claimed subject-matter was distinguished from the known antenna apparatus in two respects, that is in a bendability of the substrate in a manner such that

the element pattern and the ground pattern could be disposed on planes of different orientations and in a connection part which included a first connection part connected for communicating signals to and from the element pattern and a second connection part connected to the ground pattern.

The dielectric substrate of the antenna apparatus known from D2 was not bendable in the claimed manner. The passing reference to a flexible film substrate in paragraph [0018] of document D2 did not imply any bendability, let alone a degree of bendability such that the element pattern could be bent in a prescribed angle with respect to the ground pattern. The teaching of D2 was not at all concerned with a bendable antenna structure but with the desire to provide a planar monopole antenna. In fact, according to the sole concrete embodiment described in D2, the dielectric substrate was more or less rigid, having a thickness of 0.4 mm, which was substantially thicker than the upper limit of 0.1 mm that was foreseen in the present invention.

Moreover, the mere reference to an SMA connector in document D2 did not constitute a clear and unambiguous teaching of using a connector which included a first connection part connected for communicating signals to and from the element pattern and a second connection part connected to the ground pattern, as specified in claim 1 of all requests on file.

The various additional features according to the respective claim 1 of the auxiliary requests further emphasised the differences to the antenna apparatus known from document D2.

Having regard specifically to auxiliary requests 2 and 2a, the amendments "*ultra-wide band*" and "*a shape similar to a baseball home plate*" had both a clearly recognizable meaning. The latter term implied a basically pentagonal shape of the element pattern, wherein the word "*similar*" only indicated the absence of a perfect apex due to the connection to a strip line at this location.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 99 EPC and is, therefore, admissible.
2. Main request - novelty
 - 2.1 Document D2 (US-A-2004/0090366) discloses an antenna apparatus which consists of a dielectric substrate 14 that carries an electrically conductive element in the form of a monopole antenna (D2: Figure 1; paragraphs [0017] and [0018]). The monopole antenna comprises an element pattern 10 and a strip-line pattern 11, 15 on one surface of the substrate and a ground pattern 13 on the other surface of the substrate. The dielectric substrate is formed as a printed circuit board which, in one alternative, is made of "*a flexible film substrate made of polyimide*" (paragraph [0018]). The strip-line pattern extends from the element pattern to a distal end of the substrate where it is connected to an SMA (SubMiniature version A) connector (paragraph [0017]). As is known, an SMA connector is a specific type of coaxial connector, which as such possesses a first, central connection part, that is connected to the strip-line pattern for

communicating signals to and from the element pattern, and a second, surrounding connection part, that is connected to the ground pattern. In the option of being a flexible film, the dielectric substrate is necessarily "bendable" in any manner and direction. Moreover, given the fact that the element pattern does not vertically overlap the ground pattern (Figure 1), the substrate can be bent in such a manner that the element pattern and the ground pattern can be disposed on planes of different orientations.

Consequently, the known monopole antenna shows all features of the antenna apparatus as claimed by claim 1 of the main request on file.

2.2 The appellant's analysis of the teaching of document D2 and the respective arguments in support of novelty of the claimed subject-matter do not take due account of the facts and evidence at hand.

2.2.1 As regards the claimed bendability of the dielectric substrate, there can be no reasonable doubt that a flexible film of polyimide, as expressly listed in paragraph [0018] of document D2, is bendable. In view of this piece of disclosure in D2, it is irrelevant that D2 also mentions other options for which the substrate would not be bendable or describes a particular embodiment for which the bendability would be doubtful.

As an aside, it is added that the description of the present application consistently refers to the dielectric substrate as being a "*flexible printed wiring board*" (paragraphs [0027], [0029] to [0036], [0049], [0050], [0056], [0058], [0061], [0062], [0067], [0069], [0075],

[0089], [0093], [0106], [0126], [0189] and [0190]) or qualifies the dielectric substrate simply as being "*flexible*" (original claim 2; paragraph [0140]). It is only in this context that an occasional reference is made to the substrate being bendable or bent (original claim 10; paragraphs [0036], [0043] and [0189]). In paragraph [0030] even the same material "*polyimide*" is listed as a suitable substrate material.

2.2.2 Likewise, an SMA connector is a normed device and as such encompasses beyond question a first connection part for communicating signals to and from the (active) antenna element and a second connection part to be connected to the ground pattern. Besides, the appellant did not substantiate its position by any concrete technical argument.

2.3 In summary, the subject-matter of claim 1 of the main request on file lacks novelty over the prior art according to document D2.

3. Auxiliary requests 1 and 1a - novelty

3.1 The wordings of claim 1 of each of auxiliary requests 1 and 1a are identical, the two requests differing only in the number of their claims.

3.2 These wordings differ from that of claim 1 of the main request by a number of clarifications. These include the specification that the element pattern, the ground pattern and the strip-line pattern are all formed of conductive material. Moreover, it is specified that the element pattern and the ground pattern extend in opposite directions (Y1 and Y2, respectively), that the element

pattern can be bent in a prescribed angle with respect to the ground pattern, that the connection part connects the element to an external circuit at the distal end of the dielectric substrate, and that the first connection part is connected to the strip line pattern.

3.3 None of these clarifications adds a novel feature to the claim definitions.

In fact, each of them is already encompassed in the analysis of the teaching of document D2, as given in point 2.1 above.

The appellant argued that document D2 did not teach that the substrate should be bendable in the claimed manner. This argument is without merits, because the general property of being bendable which has to be attributed to the flexible substrate as known from document D2 implies the capability for any particular kind of bending.

3.4 Therefore, also the subject-matter of claim 1 of each of auxiliary requests 1 and 1a lacks novelty over the teaching of document D2.

4. Auxiliary requests 2 and 2a - clarity

4.1 As for auxiliary requests 1 and 1a, the wordings of claim 1 of each of auxiliary requests 2 and 2a are identical.

4.2 One of the purposes of the requirement of Article 84 EPC (1973) is that it should be readily apparent to a skilled reader what exactly is intended to be protected by and thus would fall under the definitions of a patent claim.

- 4.3 Claim 1 of each of auxiliary requests 2 and 2a specifies the element pattern as having a shape "*similar to a baseball home plate*".

The appellant asserted that a baseball home plate had a well known pentagonal shape. In the case of the element pattern of the antenna apparatus according to the invention the apex of the pentagon had to merge into the beginning of the strip-line so that the shape of the element pattern was not a perfect pentagon as in the case of the baseball home plate but only similar to that shape.

- 4.4 The Board does not find the appellant's explanations convincing because the term "*similar to a baseball home plate*" is ambiguous in several respects.

Although one may be familiar with the general shape of the home plate of a baseball field (which, in geometrical terms, is composed of a rectangle and an adjacent triangle, wherein one of the long sides of the rectangle tapers towards the free apex of the triangle), it remains uncertain as to whether the claimed definition would imply certain relationships as regards for instance the lengths of the sides of the rectangle, the height of the triangle or the angle at the apex.

Moreover, the term "*similar*" is vague in itself and has no clearly recognizable meaning as regards the manner and extent of deviations from the exact shape of a baseball home plate which would fall under the claimed definition. Indicative of the term's ambiguity is a disagreement between the appellant and the Board as regards the possible relevance of Figure 5c of document D2. This figure shows an element pattern which is composed of a

rectangle and an adjacent area that tapers from one of the long sides of the rectangle into a fairly broad rectangular piece of strip line. The appellant opined in the oral proceedings that the shape of the element pattern shown by Figure 5c of document D2 did not meet the definitions of claim 1 at hand, whereas the Board disagreed.

4.5 For the above reasons, claim 1 of each of auxiliary requests 2a and 2a does not meet the requirements of Article 84 EPC 1973 having regard to clarity.

5. Auxiliary requests 3 and 4 - novelty

5.1 Claim 1 of each of auxiliary requests 3 and 4 differs from claim 1 of auxiliary request 1 by the additional specification that the dielectric substrate is bendable "*at the border area between the element pattern (141) and the ground pattern (142)*".

Claim 1 of auxiliary request 4 still further defines that the element pattern is formed "*on a first surface of the dielectric substrate (121)*" and that the ground pattern is formed "*on a second surface of the dielectric substrate (121)*".

5.2 These amendments do not add further features to the claimed antenna apparatus but only explicitly state clarifications of the definitions of claim 1 of each of the main request and auxiliary request 1 which are already implied in the analysis of the teaching of document D2, as given in point 2.1 above.

5.3 It follows, that also the subject-matter of claim 1 of

each of auxiliary requests 3 and 4 lacks novelty over the prior art according to document D2.

6. In summary, none of the appellant's requests on file is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

R. Schumacher

G. Assi