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**Datasheet for the decision
of 23 February 2010**

Case Number: T 0990/07 - 3.4.01
Application Number: 04255379.2
Publication Number: 1585187
IPC: H01Q 1/24, H01Q 7/00,
H01Q 1/36, H01Q 1/38
Language of the proceedings: EN

Title of invention:
Portable terminal apparatus

Applicant:
FUJITSU LIMITED

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 83, 84, 54, 56
EPC R. 27(1)(e)

Relevant legal provisions (EPC 1973):

EPC Art. 123(2)

Keyword:

"Sufficiency of disclosure despite the absence of examples
embodying the invention (yes)"
"Intermediate generalisation (allowable)"
"Clarity (yes)"
"Novelty -inventive step (yes)"

Decisions cited:

T 0389/87, T 0561/96, T 0134/82

Headnote:

The purpose of the "examples" evoked in Rule 27(1)(e) EPC 1973 appears primarily to be to complete an otherwise incomplete teaching. As a consequence, the application cannot be refused under this provision if the description is considered to describe, despite the presence of erroneous drawings and the resulting lack of examples actually embodying the invention, "one way of carrying out the invention" (cf. point 3).



Case Number: T 0990/07 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 23 February 2010

Appellant:

FUJITSU LIMITED
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Representative:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 18 December 2006
refusing European application No. 04255379.2
pursuant to Article 97(1) EPC 1973.

Composition of the Board:

Chairman: B. Schachenmann
Members: P. Fontenay
F. Neumann

Summary of Facts and Submissions

I. The appeal lies from the decision of the examining division to refuse European patent application No. 04 255 379.2. The decision was based on the grounds of added subject-matter (Article 123(2) EPC 1973) and insufficiency of disclosure (Rule 27(1)(e) and Article 83 EPC 1973). It was dispatched on 18 December 2006.

II. The appellant (applicant) lodged an appeal against this decision by a notice filed by facsimile on 15 February 2007. The prescribed appeal fee was paid on 19 February 2007 and the statement setting out the grounds of appeal was received at the EPO on 27 April 2007.

The appellant requested that the impugned decision be cancelled and a patent be granted on the basis of a set of claims according to the main request or, alternatively, on the basis of the claims of auxiliary requests 1 to 11.

Oral proceedings were requested in the case the Board intended to refuse the main request.

III. During the examination proceedings, the examining division had raised an objection of lack of sufficiency of disclosure under Article 83 EPC 1973 because none of the examples contained in the description and drawings disclosed an antenna in a helical loop form incorporating a plurality of mutually separate antenna wiring portions included in a flat cable antenna as claimed. In fact, as observed by the examining division, the antenna of Figure 7 when associated with the

connecting patterns of Figures 8 and 11, as filed, would lead to a multiplicity of independent loops, i.e. loops which would not be connected together so as to form a single loop.

The attempt by the applicant to correct Figures 8 and 11 and the corresponding portions of the description so as to define a single loop incorporating all the antenna wiring portions of the flat cable antenna failed since it was considered to offend Article 123(2) EPC. The examining division noted, in this respect, that there existed a multiplicity of ways to draw the connections between the various antenna portions to arrive at a single loop and that the selection of a specific non-disclosed configuration introduced fresh matter in the application.

In a further attempt to remedy to the objections raised, the applicant proposed to cancel Figures 8 and 11 and the corresponding portions of the description. The examining division however concluded that such a request was not allowable since the description and drawings did not henceforth describe in detail at least one way of carrying out the connection of the separate antenna wiring portions in the multilayer printed-wiring board to yield a helical loop form as then claimed. The examining division hence decided that the requirements of Article 83 and Rule 27(1)(e) EPC 1973 were not met.

IV. The Board issued a summons to attend oral proceedings, which were due to take place on 12 January 2010.

On 12 November 2009, the Board issued a communication pursuant to Article 15(1) Rules of Procedure of the Boards of Appeal (RPBA), expressing its provisional opinion with regard to the requests then on file. In the Board's preliminary view, all the requests which included corrected Figures 8 and 11 and a correspondingly corrected version of the description contained added subject-matter and were likely to be refused under Article 123(2) EPC. In this respect, the Board concurred with the examining division in its finding that the multiplicity of ways of connecting the antenna wiring portions to arrive at a single loop constituted an insurmountable obstacle to the correction of the original disclosure.

The Board further expressed its doubts as to the reference in the independent claims to the concept of "helical loops" which, in its view, was not clear and lacked a basis in the original disclosure.

The attention of the appellant was further drawn to the fact that document US-A-4 894 663 (D1) appeared particularly relevant for deciding on the patentability of the subject-matter of claim 1 of the main, first and second auxiliary requests.

- V. Taking into account the observations of the Board in its communication of 12 November 2009, the appellant filed, with letter dated 22 December 2009, a new main request and five auxiliary requests replacing all previous requests on file. In particular, all previous requests which contained a corrected version of Figures 8 and 11 had been withdrawn and the reference to the notion of "helical loop" had been abandoned.

VI. On 7 January 2010, the appellant was informed that the Board considered that the requirements of Article 83 and Rule 27(1)(e) EPC 1973 were met by the main request but that the description had to contain statements clearly indicating that the examples of Figures 8 and 11 did not fall under the definition of the invention.

On 8 January 2009, the appellant confirmed that he agreed to the amendments to the description which had been discussed over the phone the day before. The appellant was informed that the proceedings were to be continued in writing and the oral proceedings cancelled.

During a phone conversation on 29 January 2010, the appellant confirmed that he agreed to further amendments suggested by the board for reasons of clarity and consistency relative to the main request (cf. annex to the attendance note about a phone conversation held on 29 January 2010).

VII. Independent claim 1 of the main request reads as follows:

"1. A portable terminal apparatus (20) comprising:
a housing (24);
an antenna (25) accommodated in said housing; and
a wiring pattern connected to said antenna;

wherein:

said portable terminal apparatus further comprises a multilayer printed-wiring board (26) accommodated in said housing, said printed-wiring board having said wiring pattern;

said antenna is a flat cable antenna and includes a plurality of mutually separate antenna wiring portions (31) formed on a flexible base (30);

an intersection part is provided in said printed-wiring board (26) where a part of said wiring pattern crosses another part of said wiring pattern so as to connect said antenna wiring portions in a loop form; and

said flat cable antenna (25) is arranged such that its width direction is substantially upright to a plane of said printed-wiring board (26)."

Claims 2 to 5 of the main request are dependent claims.

According to this main request, Figures 8 and 11 were not amended and the corresponding sections of the description were, in substance, maintained as filed.

The content of auxiliary requests 1 to 5 is not relevant for the present decision.

VIII. This decision is issued after the entry into force of the EPC 2000 on 13 December 2007. In accordance with Article 7(1), 2nd sentence of the Revision Act of 29 November 2000 ("Act revising the Convention on the Grant of European Patents (European Patent Convention) of 5 October 1973, last revised on 17 December 1991"), the revised version of the Convention shall not apply to European patent applications pending at the time of its entry into force, unless otherwise decided by the Administrative Council of the European Patent Organisation. Attention is drawn in this respect to Article 1 of the Decision of the Administrative Council of 28 June 2001 (cf. 13th Edition of the EPC, page 497).

Where Articles or Rules of the former version of the EPC apply, their citations are followed by the indication "1973" (cf. EPC 2000, Citation practice, pages 4-6).

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 EPC 1973 and Rule 64 EPC 1973. It is, thus, admissible.
2. *Main request - Article 83 EPC 1973*
 - 2.1 Claim 1 of the main request requires that the antenna wiring portions of the flat cable antenna be connected in a loop form. In view of the somewhat contradictory teaching contained in the present disclosure regarding the loop form, the first issue to be addressed in the present decision relates to the meaning which should be attributed to this term in independent claim 1 of the main request (cf. point 2.2 below). Only following this preliminary analysis can a decision be taken on the second issue to be elucidated, namely, whether the skilled person would have been able to carry out the invention, as may be understood from the present wording of the claims, on the basis of a partly erroneous original description and the common technical knowledge prevailing at the priority date (cf. point 2.3 below).
 - 2.2 During proceedings before the examining division, the applicant submitted that claim 1 can be interpreted to

mean that the antenna wiring portions can be connected so as to constitute a multiplicity of independent loops, as for example illustrated in the examples of Figures 8 and 11 when combined with the antenna of Figure 7. The Board considers, however, that such an interpretation is to be excluded. To reach its conclusion, the Board notes that such an interpretation would, firstly, not make technical sense and, secondly, be at odds with the general teaching of the invention as resulting from the description considered in its entirety.

In fact, the Board is convinced that no real confusion would have arisen from the presence in the description of the examples of Figures 8 and 11. In its view, the risk that the skilled person would have indeed been misled by the incorporation of these examples in the description, and would thus have been unable to appreciate whether a single loop or a multiplicity of separate loops was actually intended, is in reality excluded. It has to be stressed that a skilled person is in a position to discern, in his technical field of competence, which effects are actually achieved by the various components of an apparatus and by their association with each other. In a case like the present one, the person skilled in the art of antennas would immediately recognize that the antenna structures resulting from the combination of Figure 7 with Figures 8 or 11 are technically meaningless insofar as the feature of a loop antenna is concerned. It is indeed common knowledge that the strength of the electrical signal measured by a coil antenna in its receiving mode is directly proportional to the number of turns constituting it. Similarly, for a predetermined current flowing through a coil, the

intensity of the signal it generates is directly proportional to its number of turns. A reduced number of turns in the coil would thus prejudice its ability to emit or receive signals.

Moreover, in the case of a configuration like the one resulting from the combination of Figure 7 with Figures 8 or 9, the closed loops which are not actually connected to the electronic parts of the circuit would nevertheless directly interfere with the function of the loop whose signal is to be processed by these electronic components. More specifically, as a consequence of Lenz's law, they would generate a magnetic field opposing the magnetic signal to be received or emitted thus further prejudicing the receiving or emitting ability of the antenna.

In addition, although the configuration resulting from Figures 7 and 8 shows intersection parts, such parts are actually not required for separate loops. In fact, the antenna of Figures 7 and 8 could even be realised on a single layer flexible support member in the form of concentric loops. Such a configuration would, however, contradict the general teaching of the present disclosure which is based on the finding that the presence of such intersection parts is indeed indispensable when seeking an alternative to conventional spiral antennas.

For these reasons, the skilled person would immediately appreciate that the examples of Figures 8 and 11 contain a number of errors and cannot thus be taken into account to interpret the concept of "a loop form" in independent claim 1 of the main request.

Consequently, relying on the general teaching of the present disclosure, the skilled person would recognize that the only interpretation making technical sense is to equate the expression "in a loop form" of claim 1 with a single loop incorporating all antenna wiring portions provided on the flexible base of the flat cable antenna.

2.3 Since Figures 7, 8 and 11 constituted, in combination, the only examples in the description showing loops, the claimed invention is thus devoid of any concrete example including a loop in the sense of independent claim 1, i.e. a single loop. The lack of an embodying example does not, however, constitute a bar to the realisation of such a single loop. The connection of a plurality of wiring portions so as to include all of them in a single loop configuration is straightforward and simply requires that a first wiring portion formed on the flexible base be connected to another wiring portion and so on until all wiring portions have been included, the order in which they are connected together being irrelevant. This configuration inexorably leads to a single loop encompassing all the wiring portions of the flat antenna. For the reasons provided above, the presence of the erroneous examples of Figures 8 and 11 does not affect this finding, the "summary of the invention" or claim 1 itself containing sufficient information to allow the skilled person to arrive at the intended configuration.

The requirements set out in Article 83 EPC 1973 are therefore met by the application.

3. *Main Request - Rule 27(1)(e) EPC 1973*

3.1 Rule 27(1)(e) EPC 1973 requires the description to "describe in detail at least one way of carrying out the invention claimed using examples where appropriate and referring to the drawings, if any". The only concrete examples disclosed in the present application are those of Figures 7, 8 and 11 which, however, do not embody the claimed subject-matter. Moreover, even if there is no doubt that these Figures are erroneous, their correction and the correction of the corresponding passages in the description is not permitted under Rule 139 EPC (former Rule 88 EPC 1973). Such corrections would only have been allowable if it had been immediately evident what the correction should have been. Since, however, a multiplicity of distinct configurations describing single loops exist, this condition cannot be fulfilled, several different corrections being possible. Moreover, the selection of one specific configuration and the inclusion of the details necessary to define this configuration would necessarily contain fresh matter and thus contravene Article 123(2) EPC.

In the absence of any other example actually embodying the claimed invention, the Board has to decide whether a request which fulfils the requirements of Article 83 EPC 1973 should nevertheless be rejected on the basis of Rule 27(1)(e) EPC 1973.

3.2 It has already been decided that where the application disclosed the claimed invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, it then necessarily

disclosed "*at least one way of carrying out the invention claimed*", as required by Rule 27(1)(e) EPC 1973, with the necessary details being derivable from the description including the prior art referred to therein (cf. T 389/87, points 5.3 and 5.4; T 561/96, point 4.3). Although the case underlying decision T 561/96 differs from the present situation in that the description and the drawings were not erroneous (cf. point 4.2), the Board also held in this decision that in cases where examples were not indispensable, their omission did not contravene Rule 27(1)(e) EPC 1973 which only required the insertion of such examples "where appropriate".

The jurisprudence of the boards of appeal draws thus a clear distinction between the concepts of "way of carrying out the invention claimed" and "examples" referred to in Rule 27(1)(e) EPC 1973. According to this jurisprudence, the detailed description of one way of carrying out the invention claimed has to be interpreted in the light of Article 83 EPC. It constitutes a condition to be met by the description as a whole and is clearly mandatory. In contrast, the presence of examples would only be indispensable if the description would otherwise not be sufficient to meet this requirement. Hence, the purpose of the "examples" evoked in Rule 27(1)(e) EPC 1973 appears primarily to be to complete an otherwise incomplete teaching.

In the case underlying decision T 134/82, relied upon by the examining division in its refusal of the present application, the Board held that a misleading example or the absence of example was not appropriate and eventually refused the application. This decision was

the consequence of the finding that crucial information for carrying out the invention was actually missing in the application. The conclusion reached in decision T 134/82 is thus consistent with the case law referred to above in that it applied the same criterion, namely, whether sufficient information for reproducing the invention could have been gathered from the application as a whole. The present case differs however from the situation underlying decision T 134/82 in that the examples of Figures 8 and 11, although erroneous, are not as such misleading since the skilled person would have undoubtedly been able to appreciate that they contained errors and would have realised how they should have been adapted to describe a (single) loop in the sense of independent claim 1.

The description of the connection structure contained in paragraphs [0035] to [0042] of the published application makes it clear that the antenna wiring portions are connected into a loop form by means of vias and intralayer wiring. The Board considers that this passage - although it relates to erroneous drawings - describes in detail one way of carrying out the invention in that the skilled reader is provided with the teaching necessary to enable the connection of the antenna wiring portions.

- 3.3 Consequently, since the present description contains sufficiently detailed information to carry out the invention, as set forth above under section 2, the Board concludes that it is not necessary to include an example embodying the invention and that the requirements of Rule 27(1)(e) EPC 1973 are therefore met.

4. *Main request - Added subject-matter*

In the following, references to the original description apply to the application as published under No. EP-A-1 585 187.

Claim 1 results, in essence, from a combination of original claim 1 with the feature according to which the flat cable antenna is arranged such that its width direction is substantially upright to a plane of said printed-wiring board. This feature was originally presented only in combination with the features according to which a part of the flat cable is twisted so that an end of the cable is parallel to the plane of the printed-wiring board in the vicinity of the connection portion (cf. paragraphs [0019], [0035], [0036], original claim 5), which are now recited in dependent claim 4.

In the Board's judgement, in the present case, it is allowable to isolate the feature that the flat cable is arranged such that its width direction is upright to a plane of the printed-wiring board from the original combination of features. It is the selected feature itself which improves the space efficiency of the antenna in the housing, as stated in paragraph [0035] of the description and, as such, this feature is functionally independent from the other features of the original combination (i.e. the features recited in current claim 4 of the main request), which serve to guarantee the reliability of the connection between the antenna and the printed-wiring board (cf. paragraph [0036]). The skilled person would, hence, have

recognised that these features can be dissociated from one another.

For these reasons, the subject-matter of claim 1 of the main request is considered to fulfil the requirements of Article 123(2) EPC.

5. *Main request - Clarity*

It is the object of the claimed invention to provide a portable terminal apparatus which can attain a cost reduction and miniaturisation (cf. paragraph [0013]). It is emphasized that the problem of cost addressed by the present invention covers two aspects. Firstly, the fact that conventional antennas had to be formed on expensive multilayer flexible boards contributed to the high price of such products (cf. paragraph [0010]). Secondly, the very shape of a spiral antenna wiring further contributed to the high cost of the antenna in that it limited the number of antennas which could be obtained from a single material board and thus decreased the manufacturing efficiency (cf. paragraph [0011]).

Whilst it is acknowledged that the wording of claim 1 of the main request does not exclude that the flexible base referred to may consist of a multilayer flexible base, the indication that it carries the plurality of separate antenna wiring portions combined with the additional indication that the cable antenna extends upright to a plane of the printed wiring board makes clear that the antenna does not comprise a conventional spiral antenna. This implies that at least the aspect of the cost problem related to the manufacturing

efficiency of spiral antennas is indeed solved by the claimed apparatus.

Independent claim 1 of the main request appears thus to include all the essential features required to solve this aspect of the problem and thus meets the requirements of Article 84 EPC 1973.

6. *Main request - Novelty, Inventive step*

6.1 Prior art

The following prior art documents were considered more particularly relevant when deciding on the novelty and inventive merits of the claimed invention:

D1: US-A-4 894 663;

D2: JP-08195618;

D3: JP-57186802;

D4: JP-60057703.

6.2 Novelty

6.2.1 Document D1 discloses a radio housing with a printed circuit loop antenna accommodated in the walls and surfaces of the housing. According to some embodiments in D1 (cf. Figures 7-10), intersection portions of the wiring pattern may be provided in a multilayer printed-wiring board disposed on the interior surface of the housing (cf. D1, column 6, lines 37-46). Alternatively, the wiring pattern and antenna wiring portions may be formed on a conductive printed circuit adhesively bonded to a substrate to be disposed in the housing (cf. D1, Figure 1, column 4, lines 40, 41).

D1 does not however disclose a flat cable antenna including a plurality of mutually separate antenna wiring portions formed on a flexible base.

Consequently, D1 also fails to disclose the feature of a cable antenna being connected to a printed-wiring board incorporating an intersection part.

- 6.2.2 Document D2 discloses a connection substrate on which a connection pattern comprising an intersection part is formed. An antenna for portable electronic equipment is defined by a plurality of parallel wiring bodies extending in a direction upright to the plane of the connection substrate and connected to said substrate so as to constitute a single loop. The wiring bodies of D2 do not fall under the definition of a flat antenna with a plurality of wiring portions formed on a flexible base as required by the claim's wording.

A similar construction is disclosed in document D4 in which a reception antenna is obtained by folding an electric wire strip incorporating various separate wiring portions and connecting both ends of the thus obtained U-formed strip to a printed-wiring board. Printed wires on said board are arranged so as to form a single antenna loop incorporating all wiring portions of the wire strip. D2 discloses neither a flat antenna nor any intersection part in the printed-wiring board.

- 6.2.3 The radio antenna of D3 comprises a flexible cable including mutually separate wiring portions. The two terminals of the cable are connected to a printed circuit on which a circuit pattern is provided so as to create a single loop incorporating all wiring portions

within the cable. The printed circuit extends in the same direction as the terminals of the cable. There is also no disclosure in D3 of a multilayer printed board with an intersection part being provided therein.

6.2.4 None of the available documents discloses the features of claim 1 in combination. The subject-matter of claim 1 of the main request is thus new in the sense of Article 54 EPC 1973.

6.3 Inventive step

6.3.1 Since D1 relates to the same field as the present invention, i.e. portable terminal apparatuses, and shares many features with the claimed invention, it would constitute a suitable starting point in order to decide on the inventive merits of the claimed invention. More specifically, the embodiments of Figures 7 to 10, which disclose intersection parts provided in a printed-wiring Board, appear to be particularly relevant.

As pointed out above under section 6.2.1 the claimed apparatus differs from the radio housing and antenna disclosed in these embodiments of D1, essentially in that it includes a flat cable antenna with wiring portions formed on a flexible base.

The provision of a flat cable comprising a flexible base contributes to the miniaturisation of the portable terminal apparatus since it allows the deformable antenna to adapt to the presence of various components in the housing, such as e.g. the battery (cf. application, paragraph [0033]).

In D1, the optimization of the space available in the housing is achieved by integrating the antenna in the walls and surfaces of the housing (cf. D1, column 2, lines 18-24, Figures 1-10). Even if it is suggested in column 4, lines 40, 41 to provide printed circuit patterns (including the antenna circuit patterns) on a foil, this foil is to be adhesively bonded to the substrate. It follows that the provision of a flexible deformable antenna cable is explicitly excluded. In fact, the integration of the antenna in the walls housing is an essential aspect of the invention disclosed in D1 and leads away from the alternative of a flexible cable as presently claimed.

6.3.2 In the Board's view the prior art spiral antenna referred to by the applicant in the present disclosure and illustrated in Figure 3 could also constitute a suitable starting point when deciding on the inventive merits of the claimed invention.

The claimed apparatus is distinguished from this known structure essentially in that the antenna is a flat cable antenna including a plurality of separate antenna wiring portions formed on a flexible base and in that an intersection part is provided in a printed-wiring board incorporating a wiring pattern connected to the antenna, the width direction of the flat cable antenna being substantially upright to a plane of the printed-wiring board.

As recited in the description (cf. paragraphs [0010] to [0013]) the invention not only solves the problem of

cost resulting from the conventional use of spiral antennas, but also improves miniaturisation.

As set forth hereabove, the problem of space efficiency is addressed in D1 which however teaches to integrate the antenna wiring portions in the walls of the housing, thus leading away from the use of a flexible base for the antenna.

There is also no suggestion to be found in D2 or D4 to use flat cable antennas.

Although the use of such flat cable antennas is disclosed in D3, the Board notes that the configuration disclosed therein addresses a different problem, namely, the need to make antennas adaptable to a broad band of carrier frequencies. There is accordingly no indication to be found in D3 which would incite the person skilled in the art to consider said teaching and to replace conventional spiral antennas in portable apparatuses by flat cables. Moreover, the width direction of the flat antenna in D3 is parallel to a plane of the printed circuit contrary to the wording of claim 1.

6.3.3 Consequently, the claimed subject-matter does not result in an obvious manner from the available prior art. It therefore meets the requirements of Article 56 EPC 1973.

7. Since the appellant's main request has been deemed allowable, there is no need to examine the auxiliary requests.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a patent on the basis of the appellant's main request, i.e.:
 - claims: 1-5 as approved by the appellant (cf. annex to the attendance note about a phone conversation held on 29 January 2010).
 - description pages: 1-14 as approved by the appellant (cf. annex to the attendance note about a phone conversation held on 29 January 2010).
 - drawing sheets 1/9 - 9/9 as originally filed.

The Registrar:

The Chairman:

R. Schumacher

B. Schachenmann