**BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS**

**BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE**

**CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS**

**Internal distribution code:**
(A) [ ] Publication in OJ
(B) [X] To Chairmen and Members
(C) [ ] To Chairmen
(D) [ ] No distribution

# Datasheet for the decision of 20 April 2012

**Case Number:** T 0667/08 - 3.4.01

**Application Number:** 05012854.5

**Publication Number:** 1592083

**IPC:** H01Q 1/36, H01Q 1/24, H01Q 1/38, H01Q 9/04

**Language of the proceedings:** EN

**Title of invention:**
Space-filling miniature antennas

**Applicant:**
Fractus, S.A.

**Opponent:**
-

**Headword:**
-

**Relevant legal provisions:**
EPC Art. 123(2)

**Relevant legal provisions (EPC 1973):**
EPC Art. 84, 54, 56
EPC R. 27(1)(e)

**Keyword:**
"Added subject-matter"

**Decisions cited:**
T 0990/07

**Catchword:**
It is essential, when deciding on issues of added subject-matter, to identify the actual teaching conveyed by the original disclosure, i.e. the technical information that the skilled person reading the original disclosure would have derived from its content (description, claims and drawings) considered in its entirety. This approach might lead to the identification of subject-matter which has not been explicitly revealed as such in the application as filed, but nevertheless derives directly and unambiguously from its content. Literal support is not required by the wording of Article 123(2) EPC (cf. Reasons, point 4.1.4).

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

**Case Number:** T 0667/08 - 3.4.01

# D E C I S I O N
**of the Technical Board of Appeal 3.4.01**
**of 20 April 2012**

**Appellant:** (Applicant)
Fractus, S.A.
Alcalde Barnils, 64-68
Edificio Testa - mod. C3
Parque Empresarial san Joan Despi
ES-08190 San Cugat Del Valles (Barcelona) (ES)

**Representative:**
Carpintero Lopez, Francisco
Herrero & Asociados, S.L.
Alcalá 35
ES-28014 Madrid (ES)

Mumbrú Forn, José
Officina Ponti
Consell de Cent, 322
ES-08007 Barcelona (ES)

**Decision under appeal:** **Decision of the Examining Division of the European Patent Office posted 6 November 2007 refusing European patent application No. 05012854.5 pursuant to Article 97(1) EPC 1973.**

**Composition of the Board:**

**Chairman:** G. Assi
**Members:** P. Fontenay
A. Pignatelli

## Summary of Facts and Submissions

I. European patent application No. 05 012 854.5 (publication number 1 592 083) was filed as a divisional application of European patent application No. 00 909 089.5 (the earlier application). It was refused by a decision of the examining division dispatched on 6 November 2007.

The decision was based on the finding that claim 1 of the main request and auxiliary request then on file included subject-matter extending beyond the content of the application as filed, in violation of Article 123(2) EPC 1973.

The examining division also observed *obiter* that further objections as to added subject-matter and clarity applied to various dependent claims in both requests, without however elaborating on this issue, and that the subject-matter of claim 1 according to both requests was not inventive.

II. The appellant (applicant) lodged an appeal against this decision by notice filed on 14 December 2007. The prescribed appeal fee was paid on the same day. The statement setting out the grounds of appeal was filed on 11 March 2008.

In its statement setting out the grounds of appeal, the appellant requested that a patent be granted on the basis of the claims according to a main request, corresponding to the main request underlying the decision under appeal, or, alternatively, on the basis of the claims according to a first auxiliary request

filed with the grounds of appeal and a second auxiliary request, corresponding to the first auxiliary request underlying the decision under appeal.

III. In a communication of 30 December 2010 pursuant to Article 15(1) RPBA, the Board expressed its provisional opinion with regard to the requests then on file. Moreover, the appellant was invited to indicate whether it wished to have the proceedings stayed until the Enlarged Board decided on the questions underlying the referral pending under number G 2/10. This issue was indeed directly relevant to the present case since claim 1 of each request on file included a disclaimer which excluded from the scope of protection structures which had initially been disclosed as embodiments of the invention. At the appellant's request, received on 4 January 2011, the proceedings were stayed. They were then resumed after the Enlarged Board had decided on the referral. A summons to attend oral proceedings was issued on 5 January 2012 together with a further communication of the Board under Article 15(1) RPBA.

IV. With a letter dated 19 March 2012, the appellant filed three new requests replacing the previous requests on file, taking into account some of the comments and objections made by the Board in its previous communications. The letter further included arguments as to why, in the appellant's view, the new requests met the requirements of the EPC as to clarity, added subject-matter and patentability. With regard, more specifically, to the objection of the examining division later endorsed by the Board according to which the notion of monopole antenna was hardly compatible with a radiating arm defining a closed loop, the

appellant produced three scientific papers providing evidence of the contrary:

- C.T.P. Song, P.S. Hall, H. Ghafouri-Shiraz and D. Wake, "*Multi-circular loop monopole antenna*", Electronics Letters, Vol. 36, No. 5, pages 391-393, March 2000;
- J. Quiu, Z. Du, J. Lu and K. Gong, "*A Planar Monopole Antenna Design With Band-Notched Characteristic*", IEEE Transactions on Antennas and Propagation, Vol. 54, No. 1, pages 288-292, January 2006;
- A.C. Durgun, M.S. Reese, C.A. Balanis, C.R. Birtcher, D.R. Allee and S. Venugopal, "*Flexible Bow-Tie Antennas with Reduced Metallization*", IEEE Radio and Wireless Symposium, pages 50-53, 2011.

V. Oral proceedings before the Board took place on 20 April 2012 in the presence of the appellant and its representative. A new request, replacing all previous requests, was filed. The appellant requested that the decision under appeal be set aside and a patent be granted in the following version:

- claims 1-24 filed during the oral proceedings,

- description pages 1-3, 3a, 4-18 filed during the oral proceedings;

- drawing sheets 1/25 to 25/25 of the application as filed.

Claim 1 of the (sole) request reads:

"*1. - A monopole antenna, said monopole antenna comprising a radiating arm and a ground plane (12), said radiating arm being excited by a transmission line (11),*

*wherein said radiating arm is shaped as a space-filling curve (59—60),*

*wherein said space—filling curve is composed by at least ten connected segments forming a non-periodic portion of said curve, wherein:*

*— each of said segments is shorter than a tenth of the operating free-space wave length of the antenna;*

*— said segments are spatially arranged in such a way that none of said segments form, together with an adjacent segment, a longer straight segment;*

*- said segments are connected in such a way that each segment forms an angle with its neighbours;*

*— none of said segments intersect with another of said segments except at the ends of the curve, whereby said space—filling curve intersects itself at its beginning and end so that said space-filling curve forms a closed loop;*

*— each pair of adjacent segments of said curve forms a corner; and*

*— wherein, if said curve is periodic along a fixed straight direction of space, the corresponding period is defined by the non-periodic portion composed by at least ten connected segments, none of said connected segments forming, together with an adjacent segment, a straight longer segment;*

*said space-filling curve being a curve that features a box-counting dimension larger than one;*

*wherein said curve is not self-similar.*"

Claims 2 to 23 are dependent on claim 1. Claim 24 refers to a method of producing a mobile communication device having a reduced size which comprises the step of incorporating an antenna according to any of claims 1 to 19.

## Reasons for the Decision

1. *Applicable law*

This decision is issued after the entry into force of the EPC 2000 on 13 December 2007 whereas the application was filed before this date. Reference is thus made to the relevant transitional provisions for the amended and new provisions of the EPC, from which it may be derived which Articles and Rules of the EPC 1973 are still applicable to the present application and which Articles and Rules of the EPC 2000 are to apply. When Articles or Rules of the former version of the EPC are cited, their citations are followed by the indication "1973" (cf. EPC, Citation practice).

2. *Admissibility*

The notice of appeal and the corresponding statement of grounds comply with the requirements of Articles 106 to 108 EPC and Rule 99 EPC. The appeal is, thus, admissible.

3. *Clarity (Article 84 EPC 1973)*

3.1 The definition of a Space-Filling Curve (SFC) in current claim 1 reproduces, in essence, the corresponding definition as it appears in the original description and original claim 1. The statement that "*said segments are spatially arranged in such a way that none of said segments form, together with an adjacent segment, a longer straight segment*" excludes any interpretation of the claim according to which a straight segment of a given curve would be artificially construed as two or more straight segments juxtaposed to each other. In this respect, this statement indeed reflects an essential aspect of the SFC according to the invention.

3.2 Despite the fact that the documents filed by the appellant as annexes to its letter of 19 March 2012 were published after the filing date of the present application, they provide evidence that, from a technical point of view, the notion of monopole is not inherently incompatible with the fact that the radiating arm may define a closed loop. This finding describes a technical fact that applied also before the filing date of the present application. The Board is thus convinced that a monopole antenna whose radiating element forms a closed loop indeed defines an enabling antenna structure.

It follows that there is no contradiction in the wording of claim 1 because it cannot be proved that on the filing date of the present application the skilled person would have associated the notion of monopole antenna with only open radiating structures. In fact,

none of the generally accepted definitions of monopole antennas appears to include an open radiating arm as an integral part of the definition.

3.3 Since, moreover, the Board is satisfied that independent claim 1 includes all the essential features actually required to minimize the size of the antenna with respect to conventional antennas, the requirements of Article 84 EPC 1973 as to clarity are met.

4. *Added subject-matter*

4.1 Article 123(2) EPC

In this section, references to the original disclosure or original claims refer to the original version of the present divisional application as published under No. 1 592 083. It is stressed that this version is identical to the original earlier application.

4.1.1 The present application relates to "*Space-filling miniature antennas*". In its original version, the description underlines that a key point of the invention resides in the definition of a "*novel geometry, the geometry of Space-Filling Curves (SFC)*" which is used to shape a part of an antenna (cf. paragraphs [0002] and [0010] of the published application). The original disclosure consistently stresses the general benefit in terms of size reduction which is expected from the use of SFCs when designing antennas or, given a fixed size, in terms of the ability of the antenna to operate at lower frequencies with respect to a conventional antenna of the same size (cf. paragraphs [0002], [0010] and [0014]). The

original disclosure neither provides much detail as to antennas according to the various embodiments described throughout the description nor does it put any particular emphasis on the advantages they offer. In this respect, the dipole antenna, the monopole antenna, the patch antenna, the slot antenna, the loop antenna, the horn antenna and the reflector antenna, to which explicit reference is made in the original application, constitute mere illustrations of possible implementations of the original idea of using SFCs for the design of common antenna types.

The original application discloses various examples of SFCs. In this respect, no clear distinction is made between the various categories of SFCs, in particular, between self-similar curves (i.e. structures which provide repetition in smaller and smaller scales) and non self-similar configurations. As a matter of fact, the original disclosure does not even expressly refer to these different categories of SFCs. Some of the geometries originally considered are "*inspired in the geometries studied already in the XIX century by several mathematicians such as Giusepe Peano and David Hilbert. In all said cases the curves were studied from the mathematical point of view but were never used for any practical engineering application*" (cf. paragraph [0008]). In the following paragraph [0009], mention is made of techniques which might have been used in order to construct SFCs. These include the use of algorithms known as Iterated Function System (IFS), Multireduction Copy Machine (MRCM) or Networked Multireduction Copy Machine (NMRCM). A combination of said various techniques is also envisaged (cf. original claim 16).

However, contrary to the appellant/applicant's assertion, the European search report revealed the existence of various documents from which it followed that the use of SFCs for designing antennas was already known at the time of filing of the application from which a priority right is claimed. While a fractal pattern contributes to the inductive loading of the antenna system according to document WO-A-99/27608 (D2), the further documents WO-A-97/06578 (D1) and ES-A-2 112 163 (D5) describe antennas whose radiating arm is designed as an SFC. In both documents D1 and D5, the radiating portions of the antenna define self-similar (deterministic) curves.

Apart from original claim 6, which reads: "*A monopole antenna comprising a radiating arm and a ground counterpoise in which at least a part of said is shaped either as an SFC, Hilbert, Peano, HilbertZZ, SZ, Peanoinc, Peanodec, PeanoZZ, or ZZ curve according to claim 1, 2, 3 or 4*", the only example of a monopole antenna in the original application documents is given in Figure 4 and the corresponding section of the description.

4.1.2 In the Board's view, the original disclosure provides a sufficient basis for the deletion in present claim 1 of the adjective "*straight*", initially associated with the feature of the "*at least ten connected segments*" in the definition of the space-filling curve in original claim 1. It is observed, in this respect, that the passage of the original description in paragraph [0010], which provides in similar terms a definition of an SFC, does not include said adjective when referring to the "*at least ten connected segments*". The additional

limitation, in the same paragraph, according to which "*no pair of adjacent segments defines a larger straight segment*" does not necessarily imply that the segments, as such, are straight but appears to specify, in the case that these segments are indeed straight, that they cannot be associated so as to define a longer straight segment (cf. point 3.1 above). A further confirmation of the fact that the reference to segments was never intended to be limited to straight configurations can be found in the statements in paragraph [0010], according to which the SFC can be fitted over a curved surface, or in paragraph [0027], according to which a reflector whose perimeter is shaped with an SFC can be either flat or curved. As stressed by the appellant, at least some segments of a pattern that is fitted over a curved surface must themselves be curved.

4.1.3 The original disclosure also provides sufficient basis for the claimed configuration of a monopole antenna whose radiating arm defines a closed loop. More specifically, original claim 6 defines a monopole antenna comprising a radiating arm and a ground counterpoise, the arm being shaped as an SFC. Claim 6 explicitly refers to original claim 1 in which the possibility of the segments of the SFC intersecting at the tips of the curve is explicitly acknowledged.

4.1.4 A main issue to be considered under the aspect of added subject-matter concerns the definition of the SFC in claim 1, in particular the indication that "*said curve is not self-similar*". More specifically, the question arises whether a sufficient basis exists in the original disclosure allowing a generalisation of the teaching of the monopole antenna of Figure 4. Whilst it

is acknowledged that the SFC disclosed in this example is indeed not self-similar, this aspect is not emphasised in the section of the description relating to Figure 4 nor indeed in the rest of the application, where the terms "*self-similar*", "*self-affine*" or "*deterministic*" are not even employed.

It is an undisputed principle in the jurisprudence of the Boards of Appeal of the EPO that an amendment is allowable under Article 123(2) EPC if the subject-matter resulting from the amendment is directly and unambiguously derivable from the original application documents i.e. the description, the claims and the drawings, using common general knowledge. Thereby it is not necessary that the subject-matter resulting from the amendment was explicitly disclosed in the original application.

It is therefore essential, when deciding on issues of added subject-matter, to identify the actual teaching conveyed by the original disclosure, i.e. the technical information that the skilled person reading the original disclosure would have derived from its content (description, claims, drawings) considered in its entirety.

This approach might lead to the identification of subject-matter which has not been explicitly revealed as such in the application as filed, but nevertheless derives directly and unambiguously from its content. Literal support is not required by the wording of Article 123(2) EPC. An amendment can therefore be allowable if it combines information which has not been disclosed in one and the same section of the original

disclosure, but results, for instance, from information gathered from various embodiments possibly associated with general statements regarding the information derivable from the introductory section of the application.

If this were not the case, the original disclosure would be deprived of a part of the information it actually contains, namely the technical teaching that the skilled person would retrieve from the application but which may typically extend beyond a mere literal interpretation of the original text.

In order to avoid any misunderstanding, it is stressed that the Board does not question the principle according to which embodiments of an invention can normally not be freely combined under Article 123(2) EPC but merely emphasises that each embodiment in a disclosure must be construed with the knowledge and understanding aptitude of the skilled person in the art in the light of the whole application.

Under the present circumstances, the broadest message conveyed by the original application is to design a part of an antenna as an SFC so as to limit its size or the area it occupies. The section "*Background and summary of the invention*" establishes that this idea can be implemented in various types of antennas and, in particular, in monopoles. In the absence of any restriction as to the type of SFC to be associated with each type of antenna, the skilled person would have understood that all types of SFC, as defined in paragraph [0010], could be implemented in any of the antenna types, since the effect in terms of size

reduction resulted solely from shaping the antenna as an SFC irrespective of the type of antenna considered. This also applies *inter alia* to monopole antennas. This interpretation of the original description is further confirmed by the wording of original claim 6 which refers to a monopole antenna comprising a radiating arm shaped, for example, as an SFC. As convincingly put forward by the appellant, the skilled person is aware of the fact that the techniques of IFS and MRCM, referred to in paragraph [0009], generate self-similar structures. In contrast, the use of an NMRCM algorithm permits to avoid said self-similarity. In this context, reference was made to common general knowledge, as for example exemplified in the book: "*Chaos and Fractals - New Frontiers of Science*", Heinz-Otto Peitgen et al., Springer-Verlag, 1992 (cf. in particular section 5.9 "*Breaking Self-Similarity and Self-Affinity or Networking with MRCMs*").

For these reasons, the Board is convinced that the skilled person would have indeed recognised that the evocation of these various techniques actually constitutes an implicit reference to the two families of SFCs, namely those which are self-similar (or self-affine) and those which are not, bearing in mind that IFS is essentially equivalent to MRCM, at least insofar as the result is concerned (cf. Peitgen, Section 5.1).

Furthermore, the Board holds that the lack of a reference in the independent claims to the NMRCM algorithm, possibly associated with IFS or MRCM algorithms, to generate non self-similar curves as disclosed in original claim 16, is allowable. As pointed out by the appellant during the oral

proceedings, the SFC disclosed in relation to Figure 4, or its reproduction in cascade in Figure 2 is not obtainable by NMRCM. The skilled person would have thus recognised that the monopole antenna actually disclosed in the original application was limited neither to the specific shape of Figure 4 nor by the technique of NMRCM to generate non self-similar structures but did in fact encompass possible alternatives. The skilled person would therefore have understood that what really mattered was just to break the similarity of self-similar patterns, independently of the technique required to reach this objective.

4.1.5 In conclusion, the subject-matter of present claim 1 derives directly and unambiguously from the original disclosure. It therefore meets the requirements of Article 123(2) EPC.

4.2 Article 76(1) EPC 1973

The passages of the description referred to above under section 3.1 reproduce corresponding passages of the earlier application as originally filed. This also applies to the claims of the divisional application which correspond to those of the original earlier application. It follows that present claim 1 also meets the requirements of Article 76(1) EPC 1973 for the reasons mentioned above.

5. *Rule 27(1)(e) EPC 1973 - Example embodying the invention*

A consequence of the amendments made in the course of the examination and appeal proceedings is that the

claimed invention is devoid of any concrete example. It is pointed out, in this respect, that the sole illustration of a monopole antenna in Figure 4 depicts an open radiating arm contrary to the claim's wording. The present Board (in a different composition) has, however, already decided in decision T 990/07 (not published) that it is not always necessary under Rule 27(1)(e) EPC 1973 to include an example embodying the invention if the earlier application is considered to fulfil the requirements of Article 83 EPC 1973 (cf. T 990/07, point 3 of the Reasons). In the present circumstances, the Board has no doubts that the realisation of a radiating arm defining an SFC which is not self-similar for the realisation of a monopole antenna can be carried out on the basis of present disclosure. It is observed, in this respect, that the printed circuit fabrication techniques referred to in relation to Figure 3 could be applied irrespective of the actual nature of the SFC considered. The requirements of Rule 27(1)(e) EPC 1973 are therefore met.

6. *Patentability*

6.1 The following documents were considered relevant when deciding on the issues of novelty and inventive step:

D1: WO-A-97/06578;
D2: WO-A-9927608;
D3a: EP-A-0 253 608;
D4: EP-A-0 969 375;
D5: ES-A-2 112 163.

6.2 Novelty - Article 54 EPC 1973

6.2.1 Document D1 discloses in Figure 7D-5 and the corresponding passage of the description on page 30, lines 4-24, an antenna system in which fractal ground elements and a fractal vertical element are both used. As a first iteration Minkowski curve, the vertical radiating element of Figure 7D-5 does not reproduce any repetitive pattern, whether self-similar or not. The radiating element of Figure 7D-5 does also not define any closed loop.

Various other examples of antennas are provided in D1, but no mention is made of any monopole antenna whose radiating element is shaped as a non self-similar SFC which intersects itself at its beginning and end only so as to define a closed loop. As a matter of fact, the teaching of D1 relies on the very insight that multiple scale self-similarity could be exploited when designing antennas and accordingly does not disclose any SFC which is not self-similar (cf. D1, page 4, lines 1-8; page 7, lines 8-19; page 8, lines 14-32; page 9, lines 10-29; page 10, lines 17-29).

6.2.2 Document D2 discloses a monopole antenna whose radiating arm includes, at the distal end of a straight portion, a complex pattern defining an inductive loading (cf. D2, Figures 3A to 3C, page 2, lines 10-22; page 3, lines 1-7). This complex structure may reproduce deterministic as well as non-deterministic, i.e. non self-similar, patterns (cf. page 5, lines 4-10; lines 29-34). The essential portion of the radiating arm is straight and there is no mention in document D1

of a monopole antenna being constituted of a closed loop.

6.2.3 Document D5 discloses, amongst other things, monopole antennas whose radiating elements reproduce geometries of self-similar fractals.

6.2.4 Documents D3a and D4 relate, more generally, to the application of fractals (Peano curves) in various fields of technology, but are not relevant for the technical field of antennas.

6.2.5 Hence, none of the documents on file discloses the subject-matter of claim 1 which is therefore new in the sense of Article 54 EPC 1973. It follows that also the method of independent claim 24, which comprises the step of incorporating an antenna as defined in claim 1, is new.

6.3 Inventive step - Article 56 EPC 1973

6.3.1 Document D1 pertains to the field of the invention and depicts antennas whose radiating arms define SFCs in the sense of the present application. Moreover, D1 also addresses the issue of size reduction (cf. D1, page 8, lines 14-20; page 18, lines 19 and 20; page 32, lines 9-14) and thus appears to be relevant when deciding on the inventive merits of the claimed invention.

The claimed antenna differs from the embodiment of Figure 7D-5 in that the SFC defining the radiating arm is, in the absence of repetitive pattern in smaller and

smaller scales, of a non self-similar type and defines a closed loop.

As reiterated by the appellant during the oral proceedings, the claimed geometry results in the advantages conferred by self-similar SFCs in terms of resonance frequencies and size reduction while also allowing a greater flexibility in the elaboration of the antenna compared with known self-similar configurations. Although not acknowledged as such in the original application documents, the Board considers that the skilled person would have indeed been in a position to deduce, on the date of filing of the application, this effect from the mere absence of self-similarity. It is an undisputed fact that the absence of constraint regarding self-similar patterns greatly increases the possibilities offered in their design. This further permits the manufacture of antennas for which the position of the resonating frequency bands is not determined by the iterative nature of their self-similar counterparts. In other words, the non self-similar structure permits the provision of antennas whose characteristics in terms of resonating frequencies and bandwidths cope better with the actual needs. Concerning the further distinguishing feature of the closed loop defined by the radiating arm, it permits an improved bandwidth to be achieved.

Since the whole teaching of document D1 is actually based on the use of deterministic (self-similar) fractals and on the advantages resulting from such structures (cf. page 7, lines 8-19; page 8, lines 14-20; page 9, lines 10-14, page 10, lines 17-22), it actually leads away from SFC configurations which would

imply renouncing this aspect considered so essential in D1.

The same finding applies with regard to document D5 which exclusively considers self-similar fractals (cf. D5, column 2, lines 60-68) and does not envisage alternative configurations.

Finally, it is emphasised that there is also no indication to be found in the prior art that the bandwidth of a monopole antenna may be improved by defining the radiating arm as a closed loop.

6.3.2 Document D2 discloses a monopole antenna. Moreover, a distal portion of the radiating arm depicted therein is configured as an SFC which is not self-similar. For these reasons, D2 is regarded as illustrating the closest prior art.

The claimed monopole antenna differs from the antenna disclosed in D2 in that:

- the radiating arm is shaped as an SFC and
- said SFC forms a closed loop.

By shaping the whole radiating arm as an SFC, given a particular operating frequency, the antenna can be reduced in size (cf paragraphs [0002], [0010]).

Contrary to the view expressed by the examining division, the Board holds that there is no convincing argument as to why the skilled person would have indeed shaped the whole radiating arm of D2 as an SFC. It is observed, in this respect, that a clear distinction is made in document D2 between two functionally distinct

parts of the monopole antenna, namely, the straight radiating portion and the inductive loading portion 40. The advantages provided by the antenna of D2, in terms of size, are explicitly attributed to the loading part of the antenna. This loading part consists of the inductive loading portion of the antenna in combination with the capacitive loading portion obtained from the presence of an additional patch spaced apart from the complex pattern (cf. D2, page 3, lines 1-14). As a matter of fact, much emphasis is put on the possibilities offered by the antenna disclosed in D2 to tune its characteristics by manipulating the various parameters defining its loading, that is, the shape of the inductive pattern, the configuration and/or the relative position of the capacitive patch. There is accordingly no incentive in document D2 to alter the other functional unit of the antenna, namely its radiating portion. Relying on the sole teaching of document D2, the skilled person would thus not have arrived at the claimed subject-matter.

Even if the skilled person, when looking for a solution to the problem defined above, had recognised in documents D1 or D5 the benefits in terms of size of the antenna which would have resulted from the shaping of the radiating arm as an SFC, he would then have opted for self-similar curves, as taught in both documents in contrast to the non self-similar curves defined in the independent claim.

6.3.3 The subject-matter of claim 1 is therefore inventive in the sense of Article 56 EPC 1973. The same conclusion applies to the method of producing a mobile communication device of independent claim 24 which

incorporates, as an antenna for the device, an antenna as defined in claim 1.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.

2. The case is remitted to the first instance department with the order to grant a patent with the following documents:

   - claims 1-24 as filed during the oral proceedings before the Board;

   - description pages 1-3, 3a, 4-18 as filed during the oral proceedings before the Board;

   - drawing sheets 1 to 25 of the application as filed.

The Registrar: The Chairman:

R. Schumacher G. Assi