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Datasheet for the decision of 4 June 2014

Case Number: T 2401/09 - 3.4.01

Application Number: 04730280.7

Publication Number: 1620925

IPC: H01Q23/00

Language of the proceedings: EN

Title of invention:
ANTENNA ARRANGEMENT AND BASE TRANSCEIVER STATION

Applicant:
Intellectual Ventures I LLC

Headword:

Relevant legal provisions:
EPC Art. 123(2), 52(1)
EPC 1973 Art. 54(1), 54(2), 56

Keyword:
Amendments - allowable (yes)
Novelty - after amendment (yes)
Inventive step - after amendment (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

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Case Number: T 2401/09 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 4 June 2014

Appellant: (Applicant)	Intellectual Ventures I LLC 2711 Centerville Road, Suite 400 Wilmington, DE 19808 (US)
Representative:	Small, Gary James Carpmaels & Ransford LLP One Southampton Row London WC1B 5HA (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 25 June 2009 refusing European patent application No. 04730280.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Assi
Members:	F. Neumann
	M. Vogel

Summary of Facts and Submissions

I. The appeal lies from the decision of the examining division to refuse the European patent application number 04 730 280.7.

II. The appellant requested that the decision under appeal be set aside and, as a main request, that a patent be granted on the basis of claims 1 to 19 submitted during the oral proceedings before the Board of 4 June 2014.
As a first auxiliary request, the appellant requested that a patent be granted on the basis of claims 1 to 19 corresponding to a main request filed by letter of 2 May 2014.
As a second auxiliary request, the appellant requested that a patent be granted on the basis of claims 1 to 18 filed as an auxiliary request by letter of 2 May 2014.

III. During the appeal proceedings, the following documents were referred to:

D1: EP-A-1 143 554;
D2: EP-A-1 124 281;
D3: WO-A-01/06801;
D4: US-A-2003/0040336.

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

"*An antenna arrangement (216) of a base transceiver station (250) of a cellular telecommunication system comprising at least one active antenna (200A, 200B) for performing conversion between a low-frequency digital signal (212A, 212B) and a radio frequency electromagnetic field (206A, 206B), the at least one active antenna (200A, 200B) comprising an antenna element (202A, 202B) for performing conversion between*

a radio frequency signal (204A, 204B) and the radio frequency electromagnetic field (206A, 206B), wherein the at least one active antenna (200A, 200B) further comprises a transceiver (208A, 208B) coupled with the antenna element (202A, 202B), for performing conversion between the low-frequency digital signal (212A, 212B) and the radio frequency signal (204A, 204B), characterized in that the antenna element (202A, 202B) and the transceiver (208A, 208B) are integrated into a common electromechanical structure (504), wherein the common electromechanical structure (504) comprises a printed board or an integrated circuit."

Claims 2 to 19 are dependent on claim 1, claims 12 to 19 defining a base transceiver station comprising an antenna arrangement of claim 1.

V. The wording of the claims of the auxiliary requests is not relevant to the present decision and so will not be reproduced here.

VI. The arguments of the appellant, insofar as they are pertinent to the present decision, are set out below in the reasons for the decision.

Reasons for the Decision

1. The appeal is admissible.

2. Main request

2.1 Amendments (Article 123(2) EPC)

2.1.1 In the decision under appeal, which simply referred to a previous communication of 9 April 2009, the examining division, with regard to claim 1 then pending, held

(point 2) that the feature "*the transceiver is configured to control at least one of the following: ... power control, phase control ...*" could not be derived from the application as originally filed. Claim 1 therefore infringed Article 123(2) EPC.

The offending feature has now been removed from claim 1 and so this objection is no longer applicable.

2.1.2 With regard to the claims currently on file, the Board notes that the wording of claim 1 is based on claims 1 and 12 and page 14, lines 3 to 8 of the original application documents. The dependent claims find their basis in the dependent claims of the original application.

2.1.3 The Board has no further objections.
The claims of the main request therefore do not infringe Article 123(2) EPC.

2.2 Novelty (Article 54(1),(2) EPC 1973)

2.2.1 Document D1 (paragraph [0008]) discloses an antenna system for tower-top installation. Figures 1, 3 to 6 and 9 to 12 show the system configuration for a beamformer/smart antenna system, using tower-top mounted electronics for all of the RF circuits. Paragraph [0021] discusses the basic architecture for the tower-top beamformer subsystem, making reference to the very schematic Figure 7. It is stated that the tower-top subsystem may include all of the RF circuitry but no disclosure is made as to whether the transceiver and the antenna are integrated into a common electromechanical structure.

Nevertheless, according to the above-cited Figures and paragraph [0010], the antenna array is made up of M columns of N antenna elements, each connected via a series or parallel corporate feed network. The corporate feed network could be microstrip, stripline or RF coaxial cables. In addition to this, claim 1 sets out that the antenna elements are operatively interconnected with a backhaul link by means of a corporate feed, the RF circuits being provided between the antenna array and the backhaul link.

During the oral proceedings, it was discussed whether this disclosure could be regarded as implying that the RF circuitry is provided on the same circuit board as the antenna elements. In this respect, the appellant convincingly argued that paragraph [0010] only referred to a corporate feed network connecting the antenna elements and did not in any way suggest that the RF circuitry located between the antenna array and the backhaul link was connected to the antenna by means of the same microstrip network. The Board notes that column 2, lines 53 to 57, from which it may be derived that the output of the corporate feed is provided between the antenna elements and the radio frequency circuits, confirms this understanding.

There is therefore no disclosure in D1 that the antenna elements and transceiver are integrated into a common electromechanical structure.

2.2.2 Document D4 (paragraphs [0034], [0035], claim 1) discloses a base transceiver station (BTS) for communicating with a mobile station through an antenna supported on the top of a tower in a cellular communication system, the BTS being configured to be affixed to the tower-top in a location proximal to the

antenna. There is, however, no disclosure that the antenna element and the transceiver are integrated into a common electromechanical structure.

2.2.3 The remaining prior art documents on file are further removed from the claimed subject-matter. In particular, neither D2 nor D3 concerns tower-top transceiver stations.

2.2.4 The subject-matter of claim 1 is therefore new (Article 52(1) EPC and Article 54(1),(2) EPC 1973).

2.3 Inventive step (Article 56 EPC 1973)

2.3.1 D4 is considered to represent the closest prior art since this document not only discloses an antenna arrangement having the most features in common with the antenna arrangement of claim 1, but also discusses the same problem as the current application.

2.3.2 Specifically, D4 (paragraph [0005]) explains that conventional communication networks having an antenna on top of a tower and a BTS located on the ground suffer from signal intensity or power losses in both received and transmitted signals due to the long feed cable which is required to provide the connection between the BTS and the antenna. In order to reduce such losses, D4 (paragraphs [0033] to [0036]) teaches to locate the BTS at the top of the tower, near or proximal to the antenna. However, in spite of this teaching, the BTS is completely contained in its own module and kept separate from the antenna. This is apparent from Figure 2 and paragraphs [0033] and [0035].

2.3.3 Compared to the arrangement of D4, the arrangement of claim 1 achieves a further reduction of losses between the antenna and the transceiver by integrating the transceiver and antenna into a common electromechanical structure. This dispenses with the need to provide the tower-top antenna line 118 and feed line 126 between the transceiver and antenna in D4.

2.3.4 The Board notes that D4 actually teaches away from integrating the antenna and the transceiver into a common electromechanical structure, teaching instead that there are a number of desirable advantages associated with the modular architecture which it adopts. In particular, the modularity facilitates installation, repair, upgrade and replacement of the BTS (paragraph [0035]). In the light of this teaching and in view of the fact that none of the available prior art documents prompt the skilled person to depart from the modular nature of D4, the Board considers that the integration of the transceiver with the antenna is not obvious.

2.3.5 Even starting from D1, although it does not mention a modular arrangement, the skilled person would not be prompted in any way to integrate the antenna and the transceiver into a common electromechanical structure. Whilst Figure 7 of this document schematically shows a block containing the panel antenna and all RF circuitry, this cannot be understood as an explicit and unambiguous teaching - or even as a suggestion - to integrate all tower-top components. In this respect the Board avoids any *ex post facto* reading of D1 by which knowledge of the invention would influence the interpretation of D1. In the absence of any incentive in the prior art to modify the tower-top components in the manner defined in claim 1, the Board does not see

any reason why the skilled person would be motivated to do so.

2.3.6 The examining division held in the communication of 9 April 2009 (page 2, "*ad 1.*") that, in order to provide a compact structure for the active antenna, it was "*a common approach in the technical field of array antennas to integrate transceivers with antenna elements*".

The Board does not contest that compactness of the tower-top transceiver station would have certain advantages which the skilled person would strive to achieve. Nevertheless, in the absence of any disclosure concerning the integration of a transceiver and an antenna element in a base transceiver station, the skilled person would not be guided in an obvious manner to the claimed subject-matter. The Board emphasises that none of the available prior art documents disclose an antenna arrangement of a base transceiver station exhibiting the claimed integration. The lack of evidence for the alleged "*common approach*" leads the Board to disagree with the cited assertion of the examining division.

2.3.7 The subject-matter of claim 1 is therefore considered as involving an inventive step (Article 52(1) EPC and Article 56 EPC 1973).

2.3.8 Claims 2 to 19 are all dependent on claim 1.

2.4 Conclusion

The Board has no further objections against the claims of the main request.

In conclusion, the appellant's main request is allowable.

3. Auxiliary requests

Since the main request is allowable, it is not necessary to address the auxiliary requests.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The case is remitted to the department of first instance with the order to grant a patent with claims 1 to 19 according to the main request as filed during the oral proceedings before the Board of 4 June 2014 and a description to be adapted thereto.

The Registrar: The Chairman:

R. Schumacher G. Assi

Decision electronically authenticated