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Datasheet for the decision
of 17 January 2017

Case Number: T 2142/11 - 3.5.03

Application Number: 00110027.0

Publication Number: 1154585

IPC: H04B1/707

Language of the proceedings: EN

Title of invention:
Receiver for a communication device for a multi-path radio
channel

Patent Proprietor:
IPCom GmbH & Co. KG

Opponent:
Microsoft Mobile Oy

Headword:
Communication device for a multi-path radio channel/IPCOM

Relevant legal provisions:
EPC Art. 56, 83, 123(2)

Keyword:
Inventive step - main request (no)
Added subject-matter - first auxiliary request (yes)
Sufficiency of disclosure - second auxiliary request (no)

Decisions cited:
T 0225/93, T 0260/10

Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: **T 2142/11 - 3.5.03**

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 17 January 2017

Appellant: (Patent Proprietor)	IPCom GmbH & Co. KG Zugspitzstrasse 15 82049 Pullach (DE)
Representative:	Molnia, David Df-mp Dörries Frank-Molnia & Pohlman Patentanwälte Rechtsanwälte PartG mbB Theatinerstrasse 16 80333 München (DE)
Respondent: (Opponent)	Microsoft Mobile Oy Keilalahdentie 2-4 02150 Espoo (FI)
Representative:	Samson & Partner Patentanwälte mbB Widenmayerstraße 6 80538 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 29 July 2011 revoking European patent No. 1154585 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	F. van der Voort
Members:	A. Madenach
	T. Karamanli

Summary of Facts and Submissions

I.   The present appeal arises from the decision of the
        opposition division posted on 29 July 2011 revoking
        European patent No. 1 154 585.

II.   The opposition was based on the grounds of lack of
        novelty and lack of inventive step under Article 100(a)
        EPC in combination with Articles 52(1) and 54 and 56
        EPC.

III.   The opposition division came to the conclusion that the
        subject-matter of claims 1, 9 and 12 of the main
        request and claims 1, 9 and 11 of auxiliary requests 1,
        2 and 4 did not involve an inventive step (Articles
        52(1) and 56 EPC) having regard to document D3 or D4
        and "the knowledge of the skilled person".

        Claims 1, 9 and 11 of auxiliary requests 3, 5 and 6
        were held to lack clarity (Article 84 EPC).

        In an *obiter dictum*, the opposition division held,
        inter alia, that the subject-matter of claims 1, 9 and
        11 of auxiliary requests 3, 5 and 6 also did not
        involve an inventive step (Articles 52(1) and 56 EPC)
        having regard to document D3 or D4 and "the knowledge
        of the skilled person".

IV.   In a communication pursuant to Article 15(1) RPBA
        accompanying a summons to oral proceedings, the board
        gave its preliminary opinion.

V.   Oral proceedings were held on 17 January 2017.

        The parties confirmed their final requests as follows:

The appellant (patent proprietor) requested that the
decision under appeal be set aside and that, as a main
request, the opposition be rejected or, in the
alternative, that the patent be maintained in amended
form on the basis of the claims of a first or a second
auxiliary request, both auxiliary requests filed with
the statement of grounds of appeal.

The respondent (opponent) requested that the appeal be
dismissed.

At the end of the oral proceedings, after deliberation,
the chairman announced the board's decision.

VI.   Claim 1 of the granted patent (main request) reads as
        follows:

        "Receiver arrangement (2), in particular for a mobile
        communication device (1), comprising

        a signal generator (22) for generating at least m
        locally generated signals (S_{L1}, ..., S_{Lm}), which are
        time delayed by a delay time from each other, and

        a correlator for obtaining m correlated signals
        (S_{C1}, ..., S_{Cm}) by correlating a received
        identification signal with the m locally generated
        signals (S_{L1}, ..., S_{Lm}),

        characterized in that

        the receiver arrangement (2) comprises

        a ranking arrangement (23) for identifying j correlated
        signals (S_{R1}, ..., S_{Rj}) of highest power out of the m
        correlated signals (S_{C1}, ..., S_{Cm}), and

an evaluation arrangement (25) for selecting n correlated signals of the i *[sic]* correlated signals (S_{R1}, ..., S_{Rj}) of highest power, wherein n is less than or equal j."

Claim 1 of the first auxiliary request reads as follows:

"Receiver arrangement (2) for a mobile communication device (1) comprising

a signal generator (22) for generating at least m locally generated signals (S_{L1}, ... , S_{Lm}), which are time delayed by a delay time from each other, and

a correlator for obtaining m correlated signals (S_{C1},... , S_{Cm}) by correlating an identification signal received from a base station with the m locally generated signals (S_{L1}, ... , S_{Lm}),

characterized in that

the receiver arrangement (2) comprises

a first filter (21) for removing noise from the correlated signals (S_{C1}, ... , S_{Cm}) and for outputting m filtered correlated signals (S_{CF1}, ... , S_{CFm}),

a ranking arrangement (23) for identifying j correlated signals (S_{R1}, ... , S_{Rj}) of highest power out of the m filtered correlated signals (S_{CF1}, ... , S_{CFm}),

a second filter (24) for obtaining j filtered correlated signals (S_{RF1}, ... , S_{RFj}) of the j correlated signals (S_{R1}, ... , S_{Rj}), wherein the second

filter (24) is a more complex filter for removing noise than the first filter (21), and

an evaluation arrangement (25) for selecting n correlated signals of the j filtered correlated signals (S_{RF1}, ... , S_{RFj}) of highest power, wherein n is less than or equal to j."

Claim 1 of the second auxiliary request differs from claim 1 of the main request in that ", in particular" has been deleted, "a received identification signal" has been replaced by "an identification signal received from a base station", and the following feature has been added:

"and wherein
the evaluation arrangement (25) generates m control parameters ($C_{\tau1}$, ..., $C_{\tau m}$) for controlling the signal generator (22)".

Reasons for the Decision

1.   *Main request: inventive step (Article 100(a) EPC 1973, Article 52(1) EPC and Article 56 EPC 1973)*

1.1   For the present decision it is necessary to determine whether or not the feature "in particular for a mobile communication device (1)", alone or in the context of the claim, limits the receiver arrangement of claim 1 to one for a mobile communication device, as argued by the appellant. In the board's view, all the features of claim 1 can be implemented either in a mobile communication device or in a base station. Further, the board does not accept the appellant's argument that the identification signal would only be received by the receiver arrangement of a mobile communication device,

i.e. not by the base station. The board notes that a
mobile communication device must also be identified by
a base station. Hence, the base station too must
receive an identification signal. Hence, the specific
context of the claim, contrary to the situation
underlying T 260/10 (reasons 2.2) referred to by the
appellant, does not limit the receiver arrangement to
one for a mobile communication device.

1.2   It is further necessary to determine whether the
        ranking arrangement is to be more narrowly construed
        than an arrangement for identifying j correlated
        signals of highest power out of the m correlated
        signals, and whether the evaluation arrangement is to
        be more narrowly construed than an arrangement for
        selecting n correlated signals of the j correlated
        signals of highest power, wherein n is less than or
        equal to j.

        With respect to the ranking arrangement, the appellant
        argued that, apart from identifying j correlated
        signals of highest power, a ranking of these signals
        was implied by the terminology. The board does not
        accept this argument, since the term "ranking
        arrangement" does not specify what is to be ranked and
        according to which criteria. The board notes that the
        correlated signals of highest power are the object of
        the identifying action and, therefore, need not
        necessarily be considered to be the object of the
        alleged ranking action. Hence, the term "ranking
        arrangement" must be given the meaning as defined in
        claim 1, i.e. an arrangement for identifying j
        correlated signals of highest power out of the m
        correlated signals.

Likewise, with respect to the evaluation arrangement, the appellant argued that, apart from selecting n correlated signals of the j correlated signals of highest power, wherein n is less than or equal to j, an evaluation of these signals was implied by the terminology. The board does not accept this argument, since the term "evaluation arrangement" does not specify what is to be evaluated and how. The board notes that the n correlated signals are the object of the selecting action and, therefore, need not necessarily be considered to be the object of the alleged evaluation action. Hence, the term "evaluation arrangement" must be given the meaning as defined in claim 1, i.e. an arrangement for selecting n correlated signals of the j correlated signals of highest power, wherein n is less than or equal to j.

The interpretation of the above features of claim 1 is corroborated by independent method claim 12, according to which "correlated signals (S_{R1}, ..., S_{Rj}) of highest power out of the m correlated signals (S_{C1}, ..., S_{Cm}) are identified and n correlated signals of the j correlated signals (S_{R1}, ..., S_{Rj}) of highest power are selected, wherein n is less than or equal j", i.e. without mentioning ranking and evaluation actions.

1.3   Document D3, which is considered as representing the closest prior art, discloses a CDMA base station or CDMA mobile station and its RAKE receiver (see Figure 4 and page 2, lines 5-10 and claim 3) and, hence, a receiver arrangement which is for a base station or a mobile communication device.

1.4   The receiver arrangement shown in Figure 4 of D3 comprises a search and tracking unit STU (page 3, lines 8-11, page 4, lines 21-23, and page 7, lines 20 and 21)

which is shown in Figure 6. Whereas Figure 6 shows
multiple searchers "S1, ..., SL" for corresponding
sectors, it implicitly follows from claim 3 that D3
also embraces a search and tracking unit with only one
searcher (see also page 11, lines 31-33). Figure 7
shows details of a single searcher S1, which comprises
a code generator "PN-GEN" controlled by a control unit
"CNTRL". According to feature c33 of claim 2 of D3, the
control unit PN-CNTRL shifts the phase between a de-
spreading sequence generated by a de-spreader PN-GEN
and the extracted and stored pilot and data symbols
(PSi and PDi) a given number of times. The same
procedure is further described on page 9, lines 35-37
("Durch diese Steuerung wird sichergestellt, dass die
PN-Generator-Entspreizsequenz zeitlich ausgerichtet und
- für die Berechnung des Verzögerungsprofils DPS -
bezüglich der jeweiligen extrahierten
Demodulatorausgabedaten verschoben ist.") and on page
9, line 50, in combination with Figure 9 ("Der
Startpunkt der PM-Sequenz wird durch die
Phasensteuervorrichtung PH-CNTRL gesteuert." (obvious
clerical error: PM should read PN)). This means that
the search and tracking unit of D3 as part of a RAKE
receiver comprises a signal generator PN-GEN for
generating a given number, namely the number of times
to shift the phase of the de-spreading sequence and
designated m in claim 1, of locally generated signals,
i.e. the de-spreading sequences, which are time-delayed
by the phase shift from each other.

According to D3, a searcher comprises a de-spreader
"DESP" (see Figure 7) for producing a delay profile
"DPS" by correlating the pilot symbols, which are
extracted from the signals received by the antennas
(page 8, lines 28-30), with the generated PN sequence
(Figure 9 and page 9, lines 46-50). Hence, D3 shows a

correlator (DESP) for obtaining m correlated signals by
correlating a received signal with the m locally
generated signals. Since the received signal can be de-
spread with the de-spreading code PN, there must be a
unique relation with the mobile station within a given
radio cell from which the received signal originates.
Hence, the received signal including the pilot symbols
can be considered an "identification signal"
identifying the originating mobile station.

D3 further discloses a path selection unit ("PSU" in
Figure 6) for determining a number N of paths from the
searchers which are the paths of highest power (page 7,
lines 64-66: "Aus den Verzögerungsprofilen DPS wird im
wesentlichen eine Interimszahl von N (vorzugsweise 8)
Pfaden d_1'... d_N' (d. h. Verzögerungswerten) und
entsprechende Sektorauswahlinformation s_1'... s_N' durch
die Pfadauswahleinheit PSU bestimmt."; page 11, lines
31-33: "Es wird jedoch darauf hingewiesen, dass jeder
der Sucher 1 ... L getrennt die gleichen Vorrichtungen
enthält, um jeweilig die dominierendsten (stärksten)
Pfade in jeweiligen Sektoren auszugeben."; page 11,
lines 40-42: "Die primäre Funktion dieser
Pfadauswahleinheit PSU, wie bereits mit Bezug auf Fig.
6 beschrieben, ist es, die N-stärksten Pfade d_1'...
d_N' (d. h. Verzögerungswerte) aus den jeweiligen
Verzögerungsprofilen DPS1, DPS2 durch ein Inbezugnehmen
von Interferenz(rausch-)Schätzwerten zu extrahieren.").

D3 also shows on page 12, lines 28-30, in combination
with Figure 10, irrespective of the board's
interpretation of the term "ranking arrangement" at
point 1.2 above, a ranking of the correlated signals
("Die Maximaerfassungsvorrichtung ordnet die Maxima in
einer absteigenden Reihefolge").

Hence, D3 discloses a ranking arrangement for identifying j (N in D3) correlated signals of highest power out of the correlated signals from **all** searchers.

Further, in the tracking and control unit TRCU of Figure 6, a final selection of P paths of the previously identified N paths is performed (page 8, lines 1-4, and page 12, lines 48-50).

Hence, D3 discloses an arrangement for selecting a given number of the correlated signals of highest power previously identified, where the given number is less than or equal to the number of previously identified signals.

1.5   The board concludes, as did the opposition division, that the subject-matter of claim 1 differs from the receiver arrangement of D3 at most in that in claim 1 the ranking arrangement is for identifying j correlated signals of highest power out of the m correlated signals of a single correlator, whereas in D3 the correlated signals of highest power of all searchers which perform the correlation are identified.

Considering that claim 6 of D3 makes explicit reference to the case of a single searcher ("der zumindest einen Sucheinheit"), the case of just one searcher, which corresponds to the subject-matter of claim 1 with just one correlator, is, if not disclosed, at least rendered obvious to the skilled person. This is further corroborated by the fact that D3 teaches to rank and select the best signals of a number of multipath signals in two stages. The number of finally selected signals corresponds to the number of RAKE fingers (page 8, lines 1-4, and page 13, lines 13-16). Given this teaching, the skilled person would use the solution

proposed in D3 also for a single searcher if the number
of usable multipath candidates exceeds the number of
RAKE fingers, without any inventive activity.

1.6   For the above reasons, the subject-matter of claim 1 of
        the granted patent does not involve an inventive step
        (Article 52(1) EPC and Article 56 EPC 1973).

1.7   The appellant's arguments other than those related to
        the interpretation of the features of claim 1, which
        have been dealt with in paragraphs 1.1 and 1.2 above,
        may be summarised as follows:

        (i) D3 taught to correlate a **single** locally generated
        signal, i.e. the PN sequence, with a plurality of
        received identification signals, namely the demodulator
        output data, so as to generate a delay profile. A new
        PN sequence was not locally generated until a new set
        of demodulator output data requiring a different time
        alignment was to be processed. The claimed invention,
        however, taught correlation with at least m locally
        generated signals.

        (ii) D3 disclosed a method for path delays selection
        based on the computation of a threshold. The claimed
        invention, however, taught the ranking of the signals.

        (iii) D3 taught that pilot signals and additional data
        are used to obtain the delay profiles, whereas the
        claimed invention used only a received identification
        signal.

        (iv) D3 taught that as many of the previously selected
        path delays were selected as there were fingers in the
        RAKE receiver, whereas the claimed invention required a

true evaluation going beyond the selection of a certain
number of paths.

Re (i): The board notes that claim 1 does not require
that the m locally generated signals are generated at
once. The claim also embraces the possibility that the
signals are generated in sequence in the same way as
the appellant understands D3. The skilled person
reading the patent would also understand the patent to
describe both possibilities in view of Figures 3 and 4,
which show serial correlation (Figure 3) and parallel
correlation (Figure 4). Whereas parallel correlation
might require the generation of the locally generated
signals (S_{L1}, ... , S_{Lm}) at once, serial correlation
does not.

Re (ii): As already discussed in point 1.1 above, in
the board's view, the claimed receiver arrangement does
not necessarily include means for ranking correlated
signals. Hence, identifying correlated signals above a
given threshold, as in D3, is embraced by the claim
wording.

Re (iii): Claim 1 does not exclude the possibility that
the received identification signal comprises additional
data. Hence, the pilot symbols including additional
data as in D3 are comprised in the wording of the
claim.

Re (iv): As already discussed in point 1.1 above, in
the board's view, the claimed receiver arrangement does
not necessarily include means for evaluating correlated
signals. Hence, selecting correlated signals in such a
way that the number matches the number of RAKE fingers,
as in D3, is embraced by the claim wording.

1.8   For these reasons, the ground for opposition according
        to Article 100(a) EPC 1973 in combination with Article
        52(1) EPC and Article 56 EPC 1973 prejudices the
        maintenance of the European patent as granted.

2.   *Auxiliary request 1: amendments (Article 123(2) EPC)*

2.1   Claim 1 of auxiliary request 1 comprises, compared to
        claim 1 of the patent, *inter alia* the added feature
        "for removing noise" as a property of the second
        filter.

2.2   The appellant relies on column 4, lines 27-37, of the
        application as published as a basis for this feature.
        This passage reads:

        "They are inputs to a first filter 21 removing noise
        from the signals. The output signals of the filter are
        denoted S_{CF1}, ..., S_{CFm}. These signals are fed into a
        ranking arrangement 23 which is shown in more detail in
        FIG. 5. The ranking arrangement 23 identifies the j
        signals S_{R1}, ..., S_{Rj} of highest power out of the m
        correlated signals S_{CF1}, ..., S_{CFm}. The signals of
        highest power S_{R1}, ..., S_{Rj} are outputs of the ranking
        arrangement 23 and inputs to a second filter 24. The
        second filter 24 is preferably a more complex
        filter than the first filter 21."

        Hence, in this passage, the feature "for removing
        noise" characterises only the first filter explicitly.
        The appellant argued that the statement that the second
        filter was preferably a more complex filter than the
        first filter made it clear that the increased
        complexity referred to the first filter's ability to
        remove noise. Hence, the second filter was also for
        removing noise.

2.3   The board does not accept this argument. The above-
        quoted passage does not give a direct and unambiguous
        disclosure for the complexity of the second filter
        being related to the first filter's noise removing
        ability. The quoted passage and the application as a
        whole do not specify what the complexity of the filter
        should be. The skilled person would consider various
        filter properties which could be qualified as more
        complex when comparing different filters, e.g. the
        number of poles, the number of adjustable parameters,
        the type of transfer function. These properties are not
        necessarily related to a filter's noise removing
        ability. Hence, in the absence of an unambiguous
        statement relating the second filter's complexity to
        the first filter's noise removing ability, there is no
        direct and unambiguous disclosure of the above-
        mentioned feature, contrary to the requirement of
        Article 123(2) EPC.

2.4   For this reason, the first auxiliary request is not
        allowable.

3.   *Auxiliary request 2: sufficiency of disclosure (Article
        83 EPC 1973)*

3.1   Claim 1 of auxiliary request 2 comprises, compared to
        claim 1 of the main request, *inter alia* the additional
        feature:

        "and wherein

        the evaluation arrangement (25) generates m control
        parameters ($C_{\tau 1}$, ..., $C_{\tau m}$) for controlling the signal
        generator (22)".

3.2   The only disclosure for "m" control parameters is in
        Figure 3, where m control parameters are generated by
        the evaluation arrangement 25, which, on the basis of j
        output signals of the second filter 24, determines n
        delay times (cf. column 4, lines 53-55, of the patent
        specification). Claim 1 stipulates that n is less than
        or equal j. Further, since j signals out of m signals
        are identified, j must be less than or equal to m.
        Hence, claim 1 embraces situations in which n is less
        than j which, in turn, is less than m. The patent does
        not however disclose how m control parameters are
        generated when n is less than m. On the contrary,
        according to paragraph [0028] $\underline{n}$ control parameters
        $C_{\tau 1}, \ldots, C_{\tau \underline{n}}$ are generated. In the absence of an
        explicit teaching as to how m control parameters are to
        be determined on the basis of j or n signals, in which
        $m > j > n$, the skilled person would be confronted with
        a variety of choices with different outcomes. One
        possibility would be to have a number of identical
        parameters for the same delay time. However, it would
        remain open whether such a method would lead to the
        intended result, i.e. an improved receiver (cf.
        paragraph [0006]). In addition, in view of the large
        number of possibilities even for this single example
        and in the absence of any guidance as to how to perform
        the determination, the skilled person would not arrive
        at the claimed result in an obvious manner. This case
        is thus comparable to the situation considered in
        T 225/93 (see reasons 2), in which different methods
        were known to the skilled person, whilst the choice of
        an appropriate method was considered to amount to an
        undue burden and contrary to the requirement of Article
        83 EPC.

3.3   The appellant argued that the skilled person would
        understand the multipath identification arrangement

shown in Figure 3 of the patent to work iteratively in
such a way that n control parameters would be generated
on the basis of n delay times, which, in turn, would be
renumbered to m in order to match in a subsequent
iteration step the then reduced number of m locally
generated signals. If the situation required an
increase in the number of locally generated signals,
e.g. in situations with an increased number of
multipath interferences, the multipath identification
arrangement would be reset to its initial state.

The board fails to see how the skilled person could
arrive at such an interpretation. First of all, the
patent does not mention an iterative process. This
could only be inferred from the loop shown in Figure 3.
More importantly, there is no indication in the patent
that the control parameters would be renumbered from n
to m, nor could the appellant convincingly show that
this would be the skilled person's interpretation of
Figure 3. Likewise, a "reset" of the multipath
identification arrangement, although technically
possible, would not occur to the skilled person without
any indication in the patent or the prior art.

3.4   For these reasons, the patent and the application from
        which it derives do not disclose the invention as
        claimed in claim 1 in a manner sufficiently clear and
        complete for it to be carried out by a person skilled
        in the art, contrary to the requirement of Article 83
        EPC.

3.5   For these reasons, the second auxiliary request is not
        allowable.

4.   Since one ground for opposition prejudices the
        maintenance of the European patent as granted and since

neither of the first and second auxiliary requests is
allowable, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Schneider   F. van der Voort

Decision electronically authenticated