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**Datasheet for the decision  
of 9 June 2010**

**Case Number:** T 1788/07 - 3.5.05

**Application Number:** 01981670.1

**Publication Number:** 1329071

**IPC:** H04L 27/26

**Language of the proceedings:** EN

**Title of invention:**

Data allocation for multicarrier transmission

**Applicant:**

MOTOROLA, INC.

**Headword:**

Data allocation within a noncontiguous channel/MOTOROLA

**Relevant legal provisions:**

EPC Art. 56, 84, 114(1)

RPBA Art. 15(3)

**Relevant legal provisions (EPC 1973):**

EPC Art. 106, 107, 108

**Keyword:**

"Clarity and Inventive step (no)"

**Decisions cited:**

J 0010/07

**Catchword:**

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Case Number: T 1788/07 - 3.5.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.05  
of 9 June 2010

**Appellant:** MOTOROLA, INC.  
1303 East Algonquin Road  
Schaumburg, IL 60196 (US)

**Representative:** Cross, Rupert Edward Blount  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 5 March 2007  
refusing European application No. 01981670.1  
pursuant to Article 97(1) EPC 1973.

**Composition of the Board:**

**Chairman:** A. Ritzka  
**Members:** M. Höhn  
F. Blumer

## Summary of Facts and Submissions

I. This appeal is against the decision of the examining division dispatched 5 March 2007, refusing European patent application No. 01981670.1 because of not fulfilling the requirements of Article 84 EPC 1973 and for lack of inventive step (Article 56 EPC 1973) over prior art document:

D2: EP 0 753 948 A1.

II. The notice of appeal was received on 2 May 2007. The appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 16 July 2007. It was requested that a patent be granted on the basis of the set of claims 1 to 24 submitted with the statement setting out the grounds of appeal as the main request. Oral proceedings were requested on an auxiliary basis.

III. A summons to oral proceedings to be held on 9 June 2010 was issued on 12 February 2010. In an annex accompanying the summons the board raised several objections under Article 84 EPC against claims 1, 2, 5 and 20. Of its own motion pursuant to Article 114(1) EPC, the board also introduced *inter alia* the following document (which is referred to in D2) into the proceedings

D3: US 4 679 227.

According to the board's preliminary opinion, the subject-matter of independent claims 1 and 17 did not fulfil the requirements of Article 56 EPC in the light

of the disclosure of D2 and D3. The board presented arguments on which its objections were based and commented on the appellant's submissions, which were not considered to be convincing.

IV. With a letter dated 27 May 2010 the appellant filed an amended set of claims 1 to 24 and submitted arguments in favour of this sole request. The appellant requested that "the summons to oral proceedings be cancelled and the application be allowed to proceed to grant".

V. The appellant was informed that the date for oral proceedings was maintained, with a facsimile communication dated 31 May 2010.

VI. Independent claim 17 according to the sole request reads as follows:

"17. A wireless orthogonal frequency-division multiplex (OFDM) communication system utilizing a plurality of subchannels (30) within a noncontiguous channel (24), said system characterized by:

an OFDM receiver (26) configured to obtain a signal-to-noise and interference ratio (SNR) for each subchannel in said plurality of subchannels (30) within said channel (24);

and

an OFDM transmitter (28) in communication with said OFDM receiver (26) and configured to transmit OFDM data so that said OFDM receiver (26) receives said OFDM data in each subchannel within said plurality of subchannels (30) within said channel (24) at one of zero subchannel signal level, an intermediate subchannel signal level,

and a maximum subchannel signal level in response to said SNR therein."

Independent method claim 1 is directed to a corresponding method of wireless orthogonal frequency-division multiplex (OFDM) communication.

- VII. The appellant requested in writing that the decision under appeal be set aside and that a patent be granted on the basis of the Main Request (claims 1 to 24) as filed with letter dated 27 May 2010.
- VIII. Oral proceedings were held on 9 June 2010. Neither the appellant nor its representative attended the hearing, despite not having informed the board about the intention not to attend the oral proceedings. Upon contacting the appellant's representative by telephone, the board learned that the appellant would not be represented during the oral proceedings, which were therefore held in the absence of the appellant. After due deliberation on the basis of the written submissions and requests, the board announced its decision.

## **Reasons for the Decision**

### **1. Admissibility**

The appeal complies with the provisions of Articles 106 to 108 EPC 1973, which are applicable according to decision J 10/07, point 1 (see Facts and Submissions, point II above). Therefore the appeal is admissible.

2. Non-attendance of oral proceedings

In its letter 27 May 2010 the appellant requested that "the summons to oral proceedings be cancelled and the application be allowed to proceed to grant". In view of the appellant's submissions and amendments, the board considered it to be expedient to maintain the set date for oral proceedings, in particular since not all objections were addressed by the appellant's amendments. Nobody attended the hearing on behalf of the appellant.

Article 15(3) RPBA stipulates that the board shall not be obliged to delay any step in the proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned who may then be treated as relying only on its written case.

Thus, the board was in a position to take a decision at the end of the hearing.

3. Clarity - Article 84 EPC

3.1 In contrast to claim 1 which requires that a clear subchannel is one in which the SNR is "greater than or equal to" the first least-SNR requirement, dependent claim 2 specifies that a clear subchannel has a SNR "greater than" said least-SNR requirement. This is inconsistent and leaves the reader in doubt as to what is the correct criterion to apply in order to designate a subchannel as a clear subchannel.

Thus, claim 2 does not fulfil the requirements of Article 84 EPC.

4. Inventive step - Article 56 EPC

4.1 Interpretation of the independent claims

Since independent system claim 17 is not affected by the aforementioned deficiency under Article 84 EPC, the subject-matter of claim 17 is considered to be sufficiently clear for assessing inventive step.

The board interprets the feature of a non-contiguous channel in the light of the disclosure on page 2, lines 16 to 28 of the present application, such that a channel can be regarded as non-contiguous, if "some subchannels contain excessive noise or other interference, or are disallowed for any reason" (see lines 26 to 28). This includes the possibility that specific subchannels are not being used for the reason of e.g. noise, but also for other reasons such as that some subchannels have been disallowed. The board is not convinced by the appellant's argument that the term "usable" in the formulation "when all usable subchannels are not contiguous" was an indication that there was a difference between subchannels that are not being used and subchannels that have been disallowed. In the board's view disallowed subchannels are still usable in the sense that they are capable of being used simply by changing their status to allowed. Considering the statement on page 2, lines 23 to 25 of the present application in this context, as argued by the appellant in its letter of 27 May 2010, does not change the board's view. It is not clear which prior art the appellant is referring to in his argument presented under point 9 of the statement setting out the grounds of appeal. This issue could not be clarified because of

the appellant's absence during oral proceedings. This argument therefore does not convince the board. In addition, the present application does not provide a basis for a limitation of the interpretation of the feature of a non-contiguous channel according to the appellant's arguments for the aforementioned reasons. The board therefore judges that any channel having gaps in the frequency spectrum for whatever reason constitutes a non-contiguous channel according to claim 17.

- 4.2 Document D2 which was considered to be the closest prior art in the appealed decision is still considered the most pertinent prior art. D2 discloses an orthogonal frequency-division multiplex OFDM communication system using a plurality of subchannels (see abstract and figure 2). The system implicitly comprises an OFDM transmitter and an OFDM receiver. D2 further discloses a determination of a required SNR (Signal Noise Ratio) and SNR measurements for each subchannel (see abstract). In the light of page 9, lines 3 to 5 of the present application, the SNR of D2 can be regarded as a signal-to-noise and interference ratio according to claim 17.

The appellant argued that D2 did not disclose a teaching for wireless transmission. However, D2 discloses that the teaching can also be implemented in mobile communication systems (see page 7, lines 54 to 57), i.e. wireless transmission. Furthermore, according to page 21, line 22 onwards, the present application also considers a use of the invention in wireline OFDM systems and, hence, in the board's view the skilled



person would also consider wireline prior art solutions to be pertinent.

4.3 As far as the feature of a non-contiguous channel is concerned, the board agrees with the reasoning in section II 4d iii) of the appealed decision that the channel in D2 can be regarded as non-contiguous because of the gaps in the channel (see e.g. the right hand side of figure 2). In contrast to the appellant's argument (see e.g. on page 2, paragraph 4, of the letter dated 27 May 2010) the board therefore does not see the feature of a non-contiguous channel as making any contribution to an inventive step.

4.4 That a subchannel which cannot be used transmits with zero signal level is implicitly disclosed in D2, which teaches that unusable channels have no transmission energy (see figure 2, right hand side). In addition, the board considers it obvious that subchannels without any impairments are used with the maximum available signal level in order to optimize transmission efficiency.

4.5 The introductory portion of D2 makes reference to US Patent 4 679 227 entitled 'Ensemble modem structure for imperfect transmission media', which was introduced into the proceedings as D3, and in which it is disclosed to assign the available transmitter power sequentially over the increasing marginal powers of the carrier frequencies (i.e. subchannels) until the available power is exhausted (see column 11, line 9 onwards, in particular lines 41-43). Like the present application (see page 19, line 31 onwards - "water-pouring routine"), D2 (see page 3, line 29 onwards -

"waterfilling principle") as well as D3 (see column 10, line 66 onwards - "waterfilling concept") make use of very similar concepts and algorithms. In particular, it is disclosed in D3 that "The noise component at each frequency is measured and a decision is made whether to transmit at each carrier frequency" (see column 10, lines 20 to 22). It is further stated that "An implementation of the waterfilling concept is to allocate an increment of available power to the carrier having the lowest equivalent noise floor until the allocated [sic] power level reaches the equivalent noise level of the second lowest carrier" (see column 10, line 66 onwards).

- 4.6 This teaching solves the problem of minimizing the overall power transmission for transmitting a given set of data dependent on the SNR in each subchannel (the more data to be transmitted per channel, the higher the required signal or power level; see e.g. table 1 of D3). The board considers this as a hint for the skilled person to additionally make use of an intermediate power level or signal level for carrier frequencies having a state with regard to the SNR somewhere between a clear subchannel and a subchannel having too much noise for being used, thereby rendering obvious an intermediate subchannel signal level in response to the SNR in a subchannel.
- 4.7 The board notes that the appellant did not present any argument with regard to document D3 and, hence, did not overcome the aforementioned argument presented by the board in the summons for oral proceedings. Neither did the appellant submit arguments with regard to the board's objections against independent claim 17 which

has a broader scope of protection compared with independent claim 1 on which the appellant's arguments were based.

4.8 In the light of the disclosure of D2 (see in particular figure 2 and page 2, lines 6-19 and lines 39-42, page 3, lines 25-46) and the incorporated aforementioned important aspects of D3, the subject-matter of independent system claim 17 does not involve an inventive step (Article 56 EPC).

## **Order**

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

The appeal is dismissed.

The Registrar

The Chair

K. Götz

A. Ritzka