

BASE STATION CONTROLLING CALLS, USED IN A CELL OF A
DIGITAL CELLULAR MOBILE RADIO NETWORK, AND CORRESPONDING
CONTROL METHOD

The field of the invention is that of digital
5 communications in cellular mobile radio systems. The
invention applies in particular to digital transmission
systems (voice, data, signalling, ...) employing the time
division multiple access (TDMA) technique, for example
GSM (Global System for Mobile Communications) networks.

10 In conventional cellular communication networks each
cell includes a base station which assures communication
with the mobile stations in that cell.

Each base station is therefore in the form of a
single entity equipped with means for transmitting and
15 receiving radio signals in the geographical area covered
by the cell.

The base station uses several broadcast frequencies
and can employ a frequency hopping mechanism. The sets
of frequencies allocated to adjoining cells are different
20 to prevent inter-cell interference problems.

The success of cellular mobile radio systems has
given rise to problems. The cells are designed to handle
a given number of calls (depending in particular on the
number of frequencies allocated per cell, the time-
25 division multiplexing rule and the required grade of
service, represented for example by the blocking rate
combined with the call loss rate). When this limiting
number is reached, it is no longer possible to accept new
calls.

30 This situation is frequently encountered, in
particular in an urban environment, where it is not
uncommon for a high number of calls to be required
simultaneously within a small perimeter. The user is
then unable to make a call.

35 Another problem arises, in particular in an urban
environment: that of continuity of coverage under correct
conditions. It is not uncommon for communication to be

impossible in some places (areas that are not covered because of an obstacle or a source of interference, for example). When the mobile station is moving, this leads to untimely interruption of the call.

5 To solve the first problem, consideration can be given to increasing the broadcast resource allocated to each cell. However, the available frequency spectrum is limited (all the available resources are already reserved for application of the GSM and DCS system). Thus this
10 solution is not realistic.

Another technique that has been proposed is to reduce the size of the cells (which are then called microcells). In this way the overall number of calls is increased. As a consequence there are additional
15 problems with inter-cell interference and the system become difficult to manage.

This technique has a number of drawbacks, however. It is routine practice to add an umbrella cell which covers a plurality of microcells to pick up calls that
20 have not been successful on the microcell level. This technique therefore defines a multilayer structure. This consequently increases the complexity of the system.

Also, reducing the size of the cells clearly leads to large numbers of handovers (in an urban environment, for example, a microcell can have a very short range of
25 less than 300 m !). Handover requires negotiation between the cells and has disagreeable consequences for the user (temporary loss of call).

What is more, the difficulty of adjusting the
30 parameters of handover negotiations between cells makes this operation difficult when the cells are very small (less than 300 meters). This causes calls in progress to be lost.

A particular object of the invention is to mitigate
35 the various drawbacks of the prior art.

To be more precise, one object of the present invention is to provide a base station and a method of

controlling calls used in a cell of a digital cellular mobile radio network that improve the geographical radio coverage controlled by a base station (and therefore do not necessitate the use of microcells in the conventional way described above).

In other words, one object of the invention is to limit handovers whilst assuring a high traffic capacity, a good grade of service and good call quality.

A complementary object of the invention is to provide a base station of the above kind and a method of the above kind increasing the number of calls handled in a cell whilst retaining good call quality.

Another complementary object of the invention is to provide a base station of the above kind and a method of the above kind obtaining better tracking of the mobile station within the same cell compared to standard techniques.

Another object of the invention is to provide a base station of the above kind and a method of the above kind that do not necessitate any additional layer (umbrella cell).

Another object of the invention is to provide a base station of the above kind and a method of the above kind optimizing the power of the signals transmitted by the base station and the mobile station and consequently reducing the cost of transmission and reducing interference.

Another object of the invention is to provide a base station of the above kind and a method of the above kind improving the quality of signals compared to the standard techniques.

The above object encompasses the following subsidiary objects:

- limiting the level of interference;
- reducing the probability of call loss;
- improving the quality of reception of signals from the mobile station.

The quality of a digital cellular mobile radio network can be characterized by the GoS (Grade of Service) which is expressed as follows:

$$\text{GoS} = \text{Pb} + 10 \cdot \text{Pfct}$$

5 where:

- Pb is the call blocking probability;
- Pfct is the probability of losing a call in progress.

10 The call blocking probability depends directly on the fact that all physical resources are used and/or that unused resources are unavailable (for example, if the interference level is too high and/or the resource is reserved for a call being handed over) and therefore prohibits any new call.

15 The probability of losing a call in progress is directly related to the problems of handover.

One object of the invention is to assure at least a GoS with the values generally accepted in mobile radio systems (for example, 2% outdoors and 0.5% indoors).

20 The above objects and others that will become apparent hereinafter are achieved in accordance with the invention by a base station controlling calls used in a cell of a digital cellular mobile radio network, said base station comprising a set of at least two
25 transmitter-receiver relay stations geographically distributed in said cell, each of said relay stations being able to transmit signals to mobile stations present in an area of said cell and to receive signals transmitted by said mobile stations in said area, and a
30 concentration center processing the signals received by each of said relay stations and delivering signals to be transmitted to each of said relay stations, the base station selectively allocating a set of at least two of said relay stations to each call with a mobile station.

35 The general principle of the invention is therefore based on decentralizing the base station using a plurality of relay stations each covering part of the

cell. A base station of this kind is called a "distributed" base station.

Thus each relay station needs less power than a standard base station and is associated with only some of the mobile stations present and active in the cell.

What is more, this distribution of the relay stations provides improved coverage of the cell, in particular in an urban environment or in an environment with a high density of obstacles.

The base station of the invention comprises a concentration center which "collects" the signals that the relay stations receive and supplies to the relay stations the signals that they must transmit.

The invention does not impose any constraint on the number of relay stations that constitute the same cell or on the nature of the relay stations or the concentration center. Note however that for a given area the greater the number of relay stations the better the radio coverage and the lower the power needed for transmission by the base station and the mobile stations.

A cell can therefore include any number of relay stations greater than or equal to two. The relay stations can be simple transmit/receive antennas. The concentration center communicates with them by radio and/or by cable and/or by means of infrared links. It can itself manage the activation of the relay stations involved in a call and constitutes the decision-making unit. The relay stations may also include means for analyzing signal quality.

Note that this approach will be entirely new to the skilled person. The invention is based on adding distributed dedicated additional means, which goes against the ingrained concept of cells controlled by a geographically unique base station. Nevertheless, it is apparent that the invention improves the call capacity of the network, reduces the risk of interference, improves the radio coverage of a cell, limits the number of inter-

cell handovers and eliminates temporary interruptions of calls at the time of handover.

Finally, only the relay stations necessary for a call are selected and therefore activated and/or reserved
5 for that call while the others are deactivated and therefore available for other calls.

Note that quality is optimized because at least two relay stations are selected at all times. In particular, the risk of temporary loss of signals and the power of
10 each relay station are low.

In a preferred embodiment of the invention allocating a relay station to a call allows for at least one item of information representing the quality of communication between the mobile station and the
15 corresponding relay station for the uplink channel.

In other words, the optimum relay stations for the call to be set up and/or in progress are selected.

In one embodiment, said allocation constitutes the determination of the approximate position of said mobile
20 station in said cell.

During a phase of initializing a call with a mobile station said allocation advantageously covers all the relay stations of said cell so as to pre-select the optimum relay stations to continue said call.

25 This provides the benefit of allocating the optimum relay stations from the beginning of a call, for example the nearest relay stations, which then track the mobile stations throughout the call.

During a phase of active communication with a mobile
30 station, in order to update the selection of the optimum relay stations, said allocation preferably covers only the relay stations already allocated and at least some available relay stations.

This restricts the search for the optimum relay
35 stations to those already activated for the call in progress and those not already reserved for other calls.

Said information is preferably selected from the group comprising:

- the signal to noise ratio for said call;
- the carrier to interference ratio for said call;
- 5 - the power received by said relay station for said call;
- a raw bit error rate and/or a bit error rate after decoding for said call;
- a frame loss rate for said call;
- 10 - a geographical position indication.

The above list is not limiting, of course.

The above information related to the quality of communication can be the carrier to interference ratio of the call, which appears to be particularly effective in
15 characterizing the quality of the call to be set up. Clearly the information can be based on a combination of items from the above list.

Note that the information can also take account of data from another system, in particular a positioning
20 system such as the Global Positioning System (GPS) which provides an indication of the geographical position of the mobile station involved in the call, for example to select the nearest relay stations.

In an advantageous variant said allocation takes
25 account of weighting of information on the power received by said relay station by information on the carrier to interference ratio or the signal to noise ratio for said call.

It is possible for one or more relay stations
30 allocated to the call to be set up and/or in progress to be intermittently located in a shadow area because of a passing obstacle, for example a passing truck, in which case the relay stations in question experience a sudden drop in signal reception level (and therefore a
35 respective drop in the power level received by the relay stations concerned). In this case other relay stations offering better reception (in terms of the power level

received by the relay station) take over the call in question.

Also, one or more sources of interference may come between the mobile station and one or more relay stations, but this has no effect on the power level received by the relay stations allocated to the call concerned. However, the carrier to interference ratio is degraded and so a new relay station can be allocated, possibly receiving the signals at a lower power level compared to the relay stations previously selected but with a better carrier to interference ratio.

Said at least one item of information advantageously represents:

- an average of values measured over a predetermined period during an active call phase;
- a single value measured during a call initialization phase.

Accordingly, when a call is set up, the information taken into account corresponds to average values calculated over a certain period corresponding to a finite and predetermined number of frames, for example. This avoids reacting to localized and impulsive interference.

On the other hand, when the call is to be set up, each item of information taken into account corresponds to a single value (for each relay station) measured in a single frame, for example.

All the relay stations of the same cell preferably transmit synchronously.

Furthermore, the accuracy with which signals transmitted by the relay stations are synchronized is compatible with the equalization capability of the receiver of the mobile station. (for example a length of a few symbols).

There is therefore no interference, even though the data comes from a plurality of relay stations. The data

received and offset in time is processed by the mobile station in the same way as for multipath reception.

The set of relay stations allocated is advantageously updated periodically and/or if a parameter
5 representative of call quality is below a predetermined threshold.

In an advantageous embodiment each of said relay stations transmits:

- all of the signalling data concerning said cell on
10 at least one broadcast control frequency common to said cell;
- only call data concerning calls to which it is allocated on at least one call frequency.

Each relay station therefore transmits the data
15 specific to calls to the mobile station on at least one call frequency. What is more, all the relay stations systematically transmit all the signalling data (on the broadcast control channel BCCH in the case of GSM networks).

20 Each of said relay stations advantageously transmits to said concentration center at least one of the following:

- an analogue signal in the radio frequency or intermediate frequency band;
- 25 - samples of the signal received in the base band before demodulation;
- soft decisions as to the content of the received signal after demodulation;
- hard decisions as to the content of the received
30 signal after demodulation;
- a bit error rate;
- an indication of the radio power of the received signal;
- an indication of the signal to noise ratio of the
35 received signal;
- an indication of the carrier to interference ratio of the received signal.

To improve the quality of communication said information is combined in said concentration center.

This improves the quality of communication for the uplink channel.

5 Said base station preferably employs a frequency hopping technique for each call.

 This limits interference with other calls in an adjoining cell and therefore reduces the call loss probability due to bad communication quality (which
10 depends on the quality of the radio link characterized by the carrier to interference ratio (C/I) or the signal to noise ratio (SNR)).

 The invention also concerns a method of controlling calls managed by a base station of the above kind. In
15 this method:

- at least two transmitter-receiver relay stations are geographically distributed in said cell, each of said relay stations being able to transmit signals to mobile stations present in an area of said cell and to receive
20 signals transmitted by said mobile stations in said area;
- the signals received by all of said relay stations are processed in a concentration center;
- signals to be transmitted to each of said relay stations are broadcast from said concentration center;
- 25 - a set of at least two of said relay stations is allocated selectively to each of said calls in said cell. In other words, the method is based on the distribution within a cell of a plurality of relay stations which, among other things, offer better radio geographical
30 coverage than a standard cell. The relay stations act as intermediaries in calls. In other words, they retransmit (possibly after processing them) signals transmitted from the mobile station to the concentration center and they retransmit signals received from the concentration center
35 to the mobile station involved in a call.

 The concentration center "monitors" everything reaching it and groups all the signals from the relay

stations that receive signals from a mobile station involved in a call.

The concentration center also broadcasts signals to be transmitted to each relay station of the cell.

5 For a given number of relay stations to be selected the allocation of relay stations to a call preferably maximizes the quality of the call in accordance with a pre-determined criterion. In a preferred embodiment of the invention said set of relay stations allocated is
10 updated periodically and/or when a parameter representative of call quality is below a predetermined threshold.

Said method can be used indoors or outdoors or in a combined environment (part indoors and part outdoors).

15 Said relay stations dedicated to the same call advantageously transmit the same signal addressed to a communicating mobile station synchronously.

Other features and advantages of the invention will become apparent on reading the following description of a
20 preferred embodiment of the invention given by way of illustrative and non-limiting example and from the accompanying drawings, in which:

- Figure 1 is a block diagram of the base station of the invention;
- 25 - Figure 2 is a simplified block diagram of one particular embodiment of the allocation of a set of relay stations to a call to be handled by the base station from Figure 1;
- Figure 3 is a flowchart of the method of the
30 invention as implemented in the cells of a system comprising a base station from Figure 1.

Thus the invention is concerned in particular with improving the capacity of digital cellular mobile radio systems whilst retaining good call quality and a good
35 grade of service.

The general principle of the invention is based on adding intermediate means, namely relay stations and a

concentration center for each cell of the network attached to a base station. Relay stations of the same cell retransmit signals transmitted by a mobile station to a concentration center specific to that cell. They
5 also retransmit signals transmitted from the concentration center to a mobile station.

The concentration center groups together the signals transmitted by the relay stations and controls the transmission of signals to the various relay stations of
10 the cell with which it is associated. At least two relay stations which handle the call with the mobile station are selected in accordance with one or more items of information representative of the quality of the call.

Thus a base station adapts the channels used for a
15 call to obtain optimal call quality.

In accordance with the invention only the two (or more) relay stations that provide the optimum call quality are activated (taking account, for example, of the power received weighted by the carrier to
20 interference ratio and/or the signal to noise ratio) and the others are deactivated and are therefore available, in particular for other calls.

The operation of one particular embodiment of the invention will now be described with reference to the
25 Figure 1 block diagram.

During a call initialization phase all the relay stations 13 of the same cell monitor the mobile station 11. In the call initialization phase the mobile station 11 transmits in a burst 12 (on the random access channel RACH in the case of GSM networks) either a request
30 (outgoing call) or an acknowledgment message (incoming call). Accordingly, all the relay stations 13 demodulate the signals 12 transmitted by the mobile stations and periodically send the demodulated signals and reports 14
35 by radio and/or by cable and/or by an infrared link (or by any other transmission means) to a concentration center 15.

In a different embodiment, the processing effected by the relay stations (demodulation,...) can be performed at the concentration centers.

5 All the relay stations 13 systematically transmit the signalling data common to the cell on a broadcast control frequency specific to the cell.

10 The concentration center 15 then groups together all the signals 14 from all the relay stations 13 and is in communication 16 with the remainder of the mobile network.

To assure outdoor coverage in an urban area the relay stations 13 can be placed at the corner of two streets and/or below roof level at distances of a few tens of meters, for example.

15 During a call initialization phase the reports 14 include the power level received (on the uplink channel) by each relay station of the cell involved in the call. The received power level can be weighted by the carrier to interference ratio or the signal to noise ratio. Such
20 weighting consists in multiplying the power level received by 0 or 1 according to whether the carrier to interference ratio or the signal to noise ratio is below or above a particular predetermined threshold, for example. The values of the information taken into
25 account in this phase are single values, for example values measured in a single frame. The concentration center 15 preselects the optimum relay stations to continue the call according to the reports 14 received from the various relay stations 13.

30 Thus the concentration station can compare the quality of reception from the various relay stations and select the optimum stations for each call. The n (= 4 or 5, for example) optimum relay stations can advantageously be selected. Note that in the active call phase,
35 described in detail hereinafter, the optimum 2 or 3 relay stations are selected, for example.

Following this selection, the mobile station 21 communicates (22) with the optimum two relay stations 23. Only these relay stations 23 are activated to handle the call. The other relay stations 24 are deactivated for the call. This limits the resources used for a call and enables the relay stations that remain free to be used for other calls. Energy is focused in the area useful to the call concerned.

In the active call phase, the concentration center 26 calculates the average power level received by each relay station from the reports that it receives from the station. This calculation also takes account of the quality of demodulation of each relay station. In other words, the average power received by each relay station is weighted by the quality of demodulation of each relay station. This weighting consists in multiplying the level of the average power received by 0 or 1 according to whether the carrier to interference ratio or the signal to noise ratio is below or above a particular predetermined threshold, for example. The values of the information used for this phase are averaged values, for example values measured over a precise period, for example a fixed number of frames.

The calculation is done over a finite and predetermined number of frames on the uplink channel.

The quality of demodulation depends on the ratio of the power level of the carrier to the level of interference (C/I) and/or the signal to noise ratio (SNR).

Only the selected relay stations 23 specifically transmit data relating to the call with the corresponding mobile station 21 on one frequency or on a set of frequencies. When a set of frequencies is used a predetermined frequency hopping law is used to change from one frequency to another.

In the downlink direction the concentration center 26 receives (27) signals from the network and

redistributes them to the relay stations selected for the corresponding call. The selected relay stations 23 transmit identical signals 22 synchronously to the mobile station 21.

5 In the uplink direction the relay stations 23 transmit synchronously to the concentration center 26 signals 25 that include samples of the signal received in the base band before demodulation, weighting coefficients allocated to each relay station, information on the radio
10 power of the signal received by each relay station and an indication of demodulation quality, for example. The concentration center 26 combines this information to improve call quality.

Figure 3 is a flowchart of the method employed in
15 the cells of a system as previously described.

During a call initialization phase (31) all the relay stations of the cell concerned monitor the mobile stations (32). Thus it is possible to pre-select the optimum relay stations if a mobile station sends a
20 request (outgoing call) or an acknowledgment message (incoming call) in a burst on the GSM random access channel RACH. The pre-selection is reviewed and modified afterwards, during the active call phase.

If the call has been set up (or during an active
25 call phase) (33), all the relay stations already allocated to the call in progress and some of the available relay stations monitor (34) the call in progress. In other words, for the purpose of selecting new relay stations, relay stations other than those
30 already selected also monitor the mobile stations (for example those nearest them).

For each call monitored by a concentration center reception quality (on the uplink channel) of the relay stations selected for monitoring is measured (35)
35 regularly (for example every one or two seconds).

The quality measurements are then analyzed (36). For each relay station a value measured in a single frame

during call initialization and values measured over a fixed number of frames during an active call phase are analyzed, for example. These measured values have already been discussed in detail (see above). The
5 analysis (36) consists in locating the n optimum relay stations, for example.

Depending on the analysis (36) of the quality measurements, a decision (37) is taken as to whether to modify the selection of relay stations.

10 If the selected relay stations are found to be no longer the optimum ones, for example because the mobile station has moved, new relay stations identified as being the optimum ones are selected (38) and the previous relay stations are deactivated.

15 The next step (39) is executed after selecting the new relay station(s) or if there was no need to modify the selection of relay stations.

When a new monitoring procedure is to be initiated the aforementioned operations (steps 31 through 38) are
20 repeated to refresh the selection of relay stations.

Nothing happens for as long as there is no monitoring procedure to be initiated (there is a time-delay of predetermined duration, for example).



CLAIMS

1. A base station controlling calls used in a cell (17) of a digital cellular mobile radio network, characterized in that it comprises a set of at least two transmitter-receiver relay stations (13) geographically distributed in said cell, each of said relay stations being able to transmit signals to mobile stations present in an area of said cell and to receive signals (12) transmitted by said mobile stations in said area, and a concentration center (15) processing the signals (14) received by each of said relay stations (13) and delivering signals (14) to be transmitted to each of said relay stations, and in that it selectively allocates a set of at least two of said relay stations (23) to each call with a mobile station (11).
2. A base station according to claim 1, characterized in that allocating a relay station (23) to a call takes account of at least one item of information representative of the quality (31) of the call between said mobile station (11) and the corresponding relay station (23) for the uplink channel.
3. A base station according to claim 1 or claim 2, characterized in that in a phase of initializing a call with a mobile station said allocation covers all the relay stations (13) of said cell in order to pre-select the optimum relay stations to continue said call.
4. A base station according to any one of claims 1 to 3, characterized in that in an active call phase with a mobile station said allocation covers only the relay stations (23) already allocated and at least some of the available relay stations (24) in order to update the selection of the optimum relay stations.



5. A base station according to any one of claims 2 to 4, characterized in that said information is selected from the group comprising:

- the carrier to interference ratio for said call;
- 5 - the signal to noise ratio for said call;
- the power received by said relay station for said call;
- a raw bit error rate and/or a bit error rate after decoding for said call;
- 10 - a frame loss rate for said call;
- a geographical position indication;

6. A base station according to any one of claims 1 to 5, characterized in that said allocation takes account of
15 weighting of information on the power received by said relay station (23) by information on the carrier to interference ratio or on the signal to noise ratio for said call.

20 7. A base station according to any one of claims 2 to 6, characterized in that said at least one item of information represents:
- an average of values measured over a predetermined period during an active call phase;
25 - a single value measured during a call initialization phase.

8. A base station according to any one of claims 1 to 7, characterized in that all the relay stations of the same
30 cell transmit synchronously.

9. A base station according to any one of claims 1 to 8, characterized in that each of said relay stations (23) transmits (22):

- 35 - all of the signalling data concerning said cell on at least one broadcast control frequency common to said cell;



- only call data concerning the call or calls to which it is allocated on at least one call frequency.

10. A base station according to any one of claims 1 to 9,
5 characterized in that each of said relay stations (13) transmits (14) to said concentration center (15) at least one of the following items of information:

- a radio frequency band or intermediate frequency band analogue signal;
- 10 - samples of the signal received in the base band before demodulation;
- soft decisions as to the content of the received signal after demodulation;
- hard decisions as to the content of the received
15 signal after demodulation;
- a bit error rate;
- an indication of the radio power of the received signal;
- an indication of the signal to noise ratio of the
20 received signal;
- an indication of the carrier to interference ratio of the received signal;

and in that said information is combined in said concentration center (15) to improve call quality.

25

11. A base station according to any one of claims 1 to 10, characterized in that it employs a frequency hopping technique for each call.



30 12. A method of controlling calls used in a cell (17) of a digital cellular mobile radio network, characterized in that:

- at least two transmitter-receiver relay stations (13) are geographically distributed in said cell, each of
35 said relay stations being able to transmit signals to mobile stations present in an area of said cell and to



receive signals (12) transmitted by said mobile stations in said area;

- the signals (14) received by all of said relay stations (13) are processed (36) in a concentration

5 center (15);

- signals (14) to be transmitted to each of said relay stations (13) are broadcast from said concentration center (15);

- a set of at least two of said relay stations is
10 allocated selectively to each of said calls in said cell (17).

13. A method according to claim 12, characterized in that allocating a relay station (23) to a call takes account
15 of at least one item of information representative of the quality of the call between the mobile station and the corresponding relay station.

14. A method according to claim 12 or 13, characterized
20 in that the set of relay stations (38) allocated is updated periodically and/or if a parameter representative of the quality of the call is below a predetermined threshold (36).

25 15. A method according to any one of claims 12 to 14, characterized in that it is implemented indoors and/or outdoors.

16. A method according to any one of claims 12 to 15,
30 characterized in that the relay stations (23) dedicated to the same call transmit (22) the same signal to a communicating mobile station (21) synchronously.

17. A method according to any one of claims 12 to 16,
35 characterized in that said selection constitutes a determination of an approximate position of said mobile station in said cell.



18. A method according any one of claims 12 to 17,
characterized in that during a phase of initialization of
a call with a mobile station said selection covers all
5 the relay stations of said cell in order to preselect the
optimum relay stations to continue said call.

19. A method according to any one of claims 12 to 18,
characterized in that during a phase of active
10 communication with a mobile station said selection covers
only the relay stations already allocated and at least
some of the available relay stations in order to update
the selection of optimum relay stations.

15 20. A method according to any one of claims 13 to 19,
characterized in that said at least one item of
information is selected from the group comprising:
- the carrier to interference ratio for said call;
- the signal to noise ratio for said call;
20 - the power received by said relay station for said
call;
- a raw bit error rate and/or a bit error rate after
decoding for said call;
- a frame loss rate for said call.

25 21. A method according to any one claims 12 to 20,
characterized in that said selection takes account of
weighting of information on the power received by said
relay station by information on the carrier to
30 interference ratio or on the signal to noise ratio for
said mobile station.

22. A method according to any one of claims 13 to 21,
characterized in that said at least one item of
35 information represents, for each relay station:
- an average of values measured over a predetermined
period during an active call phase;



- a single value measured during a call initialization phase.

23. A method according to any one of claims 12 to 22,
5 characterized in that the set of relay stations allocated
is updated periodically and/or if a parameter
representative of call quality is below a predetermined
threshold.