

The invention relates to a method according to the preamble to Patent Claim 1.

Within the framework of the prior art radio data system (RDS) as is described, for example, in the technical document No. 3244 of the Europäische Rundfunk-Union, it is inter alia possible to transmit a list of alternative frequencies (AF) as the contents of a data signal modulated onto a 57 kHz auxiliary carrier. This information is particularly conceived for mobile reception and states on which frequencies a specific programme is irradiated by the same transmitter chain (e.g. BR 3). It is thus possible for suitably constructed receivers with a memory to store this list and so to reduce the time for tuning the receiver to what is the optimum frequency of this list (e.g. according to optimum reception conditions). According to agreement, the list is limited to a maximum of 25 frequencies or channel numbers. In the case of transmitter networks having more than 25 transmitters, as is true, for instance, of the Bavaria 3 network of transmitters, it is not possible to emit one list which is common to all the transmitters in the network; instead, each transmitter or each group of spatially adjacent transmitters must send out its own list which may not contain more than 25 frequencies. The difficulty with this lies in the fact that by reason of the multiplicity of demodulator paths in the transmitter network structure within the radio companies formed under public law within the Federal Republic of Germany, the list issued by the mother station may not be appropriate to the daughter station; it has to be filtered out according to the demodulator receiver and replaced by a list which is appropriate to the particular daughter station. This filtering-out and re-feeding incurs increased costs. In addition, filtering-out also impairs the quality of the programme signal. In the case of transmitter chains with fewer than 25 transmitters, it would be possible to incorporate all the transmitter frequencies in one joint list, but if there are very many transmitter frequencies, this would lead to correspondingly long receiver tuning times.

In contrast, the problem on which the invention is based is to indicate a method of the type indicated at the outset in which filtering and re-feeding of the list of alternative frequencies can be avoided and, as a rule, a relatively short tuning time of the receivers can be guaranteed.

According to the invention, this problem is resolved by the characterising features of Patent Claim 1.

A preferred application of the digital information transmitted by the method according to the invention for tuning a mobile radio receiver is disclosed in Patent Claim 2.

Where the method according to the invention is concerned, each transmitter radiates not only its own list but sequentially also the lists of all the other stations in the same chain, the operating frequencies of the individual transmitters being in each case at the start of the individual lists. Therefore, after reception of all the lists, the receiver can on a basis of its tuning frequency at the given time is able to select the list belonging to the transmitter adjusted at the time in that it compares the tuning frequency with the first frequency of each list within the sequence of lists. Thus, with demodulator reception, filtering and re-feeding become superfluous. Furthermore, the receiver also recognises the alternative frequencies on which, when leaving the area of supply of whichever is the transmitter set at the time, it can continue to receive the same programme without having to check the alternative frequencies of the other lists. Switchover to a different transmitter in the same chain can be carried out very rapidly as a rule in this same manner.

The invention will be explained in greater detail with reference to the accompanying drawing which shows a diagrammatic view of the sequence of lists of alternative frequencies transmitted by each transmitter. In the example in question, the premise adopted is a radio signal into which is incorporated an auxiliary

carrier of 57 kHs. The auxiliary carrier may contain an amplitude modulation the contents of which is recognition of a traffic signal. By way of modulation or as further modulation, there is imprinted on the auxiliary carrier a data signal which is coded in a specific manner which is not of greater interest here. This data signal is concordantly transmitted by all the transmitters in one chain of transmitters, for example by all 29 stations of the "Bavaria 3" chain in the area of supply within the Bavarian Radio system. The concordantly transmitted data signal contains a series of lists of alternative frequencies for all the stations in the chain; in the example shown this is the list of Station No. 1, the list of Station No. 2, the list of Station No. 3 and as far as the list of Station No. 29 in the case of a chain consisting of 29 stations. Each list is specially tailored to the particular station and according to the agreement within the European Radio Union, contains a maximum of 25 frequencies although the number will generally be considerably fewer. According to the invention, each list starts with the working frequency of the associated station, i.e. in the case of the list for Station No. 1, there is at the beginning the working frequency of Station No. 1, e.g. 98.5 mHz. As mentioned, the illustrated sequence of 29 lists of each station in the series of stations is transmitted as a data signal.

The receiver receives and decodes the transmitted data signal, i.e. the sequence of lists of alternative frequencies. In order to select from the sequence of lists received the list which is valid for the particular station which is tuned at the time, the receiver only has to compare the first frequency on each list with the particular tuning frequency at the time which even with 29 lists can be carried out in an extremely short time. This selection can take place either in on-line operation or in off-line operation, i.e. with or without the intermediate storage of the received sequence of lists. In each case, the selected list is stored. During the processing of the received and possibly intermediately stored sequence of lists, the receiver selects that list of which the first frequency (equal

to the working frequency of the associated transmitter) coincides with the particular tuning frequency at the time. If the first frequency on several lists coincides with the tuned working frequency, then all these lists must be selected. Only the selected list(s) is/are used for the subsequent optimising of tuning. This optimising process takes place either by a corresponding command of the listener or automatically if, for instance, the station being received at the time is no longer reception worthy. Where the tuning process is concerned, the receiver automatically tunes into the alternative frequencies mentioned in the selected list(s), selecting that alternative frequency which offers the best possible reception.

By means of the data signal transmitted according to the invention, it is possible even with chains of more than the established maximum number of alternative frequencies to carry out rapid optimisation of the tuning of mobile receivers without any need for filtering out and re-feeding frequency lists at the location of daughter stations.



P a t e n t c l a i m

1. A method for the optimum tuning of a mobile radio receiver by means of digital information which is transmitted within a radio signal by radio stations and which working frequencies of such radio stations, described as "alternative frequencies" indicate by which the same programme signal can be received, wherein
 - the alternative frequencies received are stored,
 - the radio receiver is tuned one after another to the stored alternative frequencies for test purposes, and
 - as a reception frequency at any given time, that alternative frequency is selected which at the time offers the best possible reception,characterised in that
 - a) the alternative frequency of each radio station determines its working frequency so that there is a marked relationship between station and its associated alternative frequencies,
 - b) each radio station in the chain receives as digital information
 - its working frequency together with its associated alternative frequencies, and
 - the working frequencies of all the other radio stations in the chain together with their associated alternative frequenciesas a series of individual frequency lists optimised to the relevant stations in the chain, and
 - c) of the alternative frequencies received on all the frequency lists, only those alternative frequencies on those lists are stored and used for tuning of which the relevantly associated preset working frequency coincides with the reception frequency of the mobile radio receiver which happens to be set at that time.