

Introduction

What is technology that make a person most conveniently on modern society? Perhaps, it may be hand phone, Mobile wireless communication technology. Mobile wireless communication changed our life epochally. As moving, communicate with other person, and conduct business, and is developed as can do internet. 'Hand phone' is acting big role by present our country's main export goods. Also, Mobile service prides frontier. Already, image communication is available and 3G's practical use in close at hand.

Field called Mobile wireless communication that get into important technology to our country so was available work by electric wave. We observed in Mobile wireless communication. We decided to search problems and solutions that happen in Mobile wireless communication.

First, We think that 'Hand off'. Hand off refers to that busy terminal passes over one cell moving. Recognized whether solve how in these case.

Second, We think that 'Multipath Fading'. In the case of electric wave, not that enter for direction, enter through various kinds path. That electric wave of one kind comes being reflected in wall, pass glass, and come directly, all cases has different phase. In these case, demodulation is hard. Therefore, we searched method to solve these problem.

Hand off

1. What is Hand off?

- When some mobile unit moves to other base station from one base station, and When base station move by power level's decline and change of use frequency, it is Hand off that case MTSO (mobile telephone switching office) to do moves base station.

For example, case that some mobile unit moves to cell B from cell A, level, when level that be given by cell A base station falls down below some datum point, MSTO expects that cell B base station is enough near and mobile does Hand off by cell B base station.

2. Class of Hand off

1) Hard Hand off

: When client moves to switching station (B) from switching station (A) in conservation by phone. Or it is that hand off way between different switching station in FDMA, TDMA, and CDMA.

2) Soft Hand off

: When client moves to base station ② from base station ① in conservation by phone. use in CDMA mode.

3) Softer handoff

: When client moves to section γ from section α of equal base station transceiver system in conservation by phone. use in CDMA mode.



<figure 1> example of hand off

3. Solution of Hand off

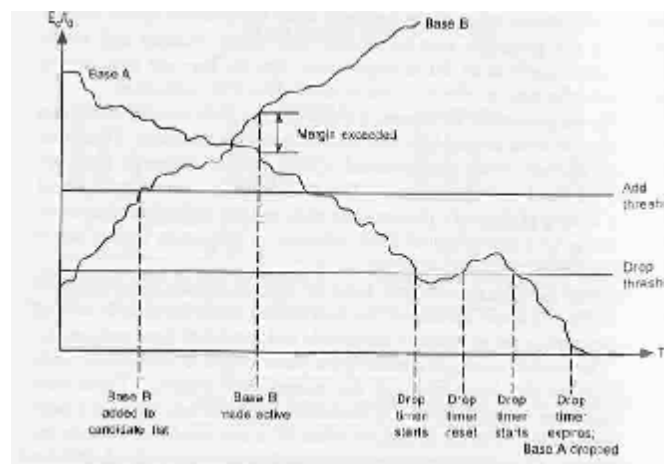
1) Hard hand off

: In analog system, when there is no expense channel in the contiguity base station, or client does not receive channel conversion message, hand off fails and conversation cuts.

Hand off in analog system is hard hand off form. It is cuts link with existing base station, before begin conversation with new base station. Accordingly, When hand off happens, connection is expired for short time and voice quality is dwindled.

2) Soft hand off

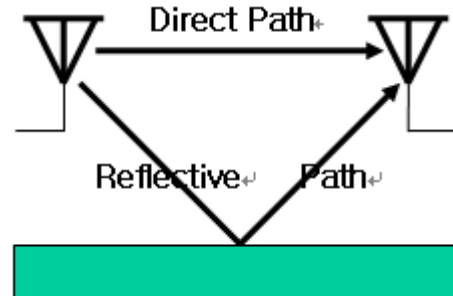
: In CDMA system, when client gets out of existing cell region and enters new cell region, not breaks link with existing base station before makes link with new base station(break - before- make), makes link with new base station before breaks link with existing base station. Exactly, Hand off in CDMA system formality is as following. First, connect with existing base station. Second, connect with existing base station and new base station in same time, Last, disconnect with existing base station. These hand off is 'soft hand off'. The following is signal level graph of two base station transceiver systems.



<figure 2>signal level graph of base station transceiver systems.

3) Softer hand off

Generally, One cell is consisted of three sectors. When client moves to other sector from one sector in same cell, process similar to soft hand off that refer above happens. This time, base station combines and demodulates signals that receive through antenna of two sectors.



<figure 3> Multipath fading

Multipath Fading

1. What is the Multipath Fading?

- In a typical wireless environment, no direct line-of-sight (LOS) path between the transmitter and the receiver exists. In fact, the electromagnetic waves emitted by the transmitter usually take different paths to get to the receiver, depending upon the obstacles in the environment. As a result, the received signal comprises a sum of the various contributions, each of which differs in both amplitude and phase. In many cases, the signals combine in a destructive manner, thereby severely degrading the signal's strength. The receiver faces the difficult task of properly demodulating and decoding the signal into something that resembles the original. Despite the emerging receiver technologies multipath problems can still seriously inhibit a wireless system's performance.
- The range of output power of the transmitter and dynamic of the receiver must be selected it will be able to accommodate the fluctuation of the signal which it follows in Multipath fading and path loss.

2. Solution of Multipath Fading

⇒ Diversity

- To decrease the effect of fading, make the variety of extra in transmission or reception.

1) Space diversity

- Space diversity scheme implies RF link established by more than one antenna. In the so-called antenna diversity multiple antennas (or antenna arrays) are configured in different ways and located with specified spatial separations. Therefore, each spatially-separated antenna receives the signal experiencing different extent of fading (as a result of distinct transceive paths involved) and hence constitutes the set of distinct multiple copies required.

[There is a method which composes the signals which comes in two antennas.]

- ① Selective : selecting the best signal (the largest energy or SNR) among all of the signals received
- ② Equal Gain : Composite two signals in same rate
- ③ Maximal Rate : It compares the SNR of two signals and it gives an important to the good piece

2) Frequency diversity

- Frequency diversity method can be achieved by transmitting the same message over a number of carrier frequencies, keeping these carrier frequencies well separated. The frequency-separation provides the receiver with multiple copies of adequately decorrelated and independently faded signals available at distinct frequencies.

3) Time diversity

- In this technique, a given message is transmitted repeatedly over different time-slots, thereby enabling the receiver to get a decorrelated set of multiple copies of the message sent at different time-instants.- It uses the Rake receiver to use Time Diversity in CDMA.
- Rake receiver is a receiver technique which uses several baseband correlators to individually process several signal multipath components. The correlator outputs are combined to achieve improved communications reliability and performance.

conclusion

We check problems which is caused by wave properties and solutions that are used at present. We talk about multipath fading and hand off. One is caused by no transmission line. The other is caused by free movement of mobile communication instrument. It is impossible that wave property is changed, so the solution is the way of different realms. Those methods are used broadly. But, those may not be perfect techniques. Advance of mobile communication is continued in the future. And new technology, solution will be developed, too. We can feel changes. And we want to have a ability that can make a change in mobile communication.

reference

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