

Hanover, Germany

30. August – 03. September 1999

Agenda Item: Ad Hoc 6

Source: Panasonic

Feedback message in case of beamforming

1. Introduction

At Ad hoc 6, several transmit diversity scheme discussed and conclusion will be achieved in this meeting. We propose the feedback message in case of transmit beamforming.

2. Proposal

When beamforming is introduced at the Node B, direction of transmission is determined using uplink beamforming receiver, DOA detection or some scheme. Basically, lack of channel reciprocity in FDD mode may not cause transmission direction error. But lack of equipment vector (amplitude and phase) reciprocity between receiver and transmitter causes transmission direction error.

If beamformer transmits wrong direction to the UE (UE#A), received signal power at the UE#A is small and UE#A requests more transmission power of the Node B. But the received signal power at the UE#A will not increase because of wrong directional transmission. After while the capacity of the system will decrease. To avoid this situation, the UE should report whether direction of beamformer is true or false.

When beamforming is applied to the UE (UE#A), UE#A measures the received signal power of CPCCH transmitted from fixed directional antenna and that of DPCH transmitted from beamformer. To reduce the fluctuations of fading, that is supposed to be different between fixed directional and beamformer, averaging is done. After averaging the received signal power respectively, the UE calculate the ratio of DPCH and CCPCH. Then the UE compares with threshold broadcasted from Node B and determine the message.

When the Node B received the message, which indicate the wrong direction, the Node B switches the transmission mode from beamforming to fixed directional.

3. Conclusion

This document raised a discussion on necessity of the message, which indicate the direction is wrong when beamforming is applied. At this time, more detailed research on beamforming and detection of wrong directional transmission should be needed.