

DSPC Technology Report

Title:

Investigation of Third Generation CDMA2000 Cellular Systems.

Group Members:

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Project Description:

Wireless communication has developed from 1G to 4G. Currently 3rd generation communication is being used widely throughout the world. This generation includes cellular technologies like CDMA2000 and W-CDMA. CDMA is a method of multiple access, which shares the data over the same channel by encoding the data, instead of dividing the channel by time (as in TDMA) or frequency (as in FDMA). This project will focus on CDMA2000 which is the most widely deployed 3G technology. In addition, this project will investigate different aspects of the voice coding technology used in CDMA2000 systems.

Project Tasks/ Outcomes:

1. Evolution of CDMA technology (from 1G – 4G).
2. Investigation of the technical aspects of CDMA2000.
3. Understanding the physical layer implementation of Forward link of CDMA2000.
4. Understanding the physical layer implementation of a Reverse link of CDMA2000.
5. Understanding the network layer implementation of CDMA2000 (optional).
6. Comparison of Wide-band CDMA with CDMA2000.
7. Importance of Voice Encoding.
8. Investigation of various major Voice Coding Techniques. They are as follows:
 - Waveform Coders (Based on PCM- Pulse Code Modulation).
 - Source/ Parametric Coders (Based on LPC – Linear Predictive Coding).
 - Hybrid Coders (e.g. CELP – Code Excited Linear Predictive and VSELP – Vector Sum Excited Liner Predictive Vocoders).
9. Vocoders used in CDMA2000 based handsets (Based on CELP – Code Excited Linear Predictive Technology).
10. Vocoders used in GSM based handsets:
 - LPC-RPE – Linear Prediction Coding with Regular Pulse Excitation Vocoders.
 - GSM 06.60 Enhanced Full Rate Encoder.
 - GSM 06.90 Adaptive Multi Rate Encoder.
 - MELP – Mixed-Excitation Linear Predictive Vocoders.
11. MEB – Multi Band Excitation Vocoders.
12. Comparison of the above listed vocoders.
13. Smart Antenna Technology used in CDMA2000 based handsets (optional).

Group responsibilities:

Nandula Lorensuhewa: Tasks 1 – 6
Saba Latif: Tasks 7 – 13