Introduction to 4G-LTE Synchronization

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Introduction to LTE and Synchronization

• 3GPP Long Term Evolution, usually referred to as LTE, is a standard for wireless communication of high-speed data for mobile phones and data terminals.

• In LTE a terminal must perform some certain steps before it receives or transmits data. After these steps called initial access procedure the terminal is able to receive and transmit its user data.
Introduction to LTE and Synchronization

• Cell Search is the first thing that happens in the access procedure.
• After cell search, the user can get information of the base-station and synchronizes with it.
• PSS(Primary Synchronization Signal) and SSS(Secondary Synchronization Signal) are the important signals which broadcast from the cell periodically and they can offer some useful information to user.
Positions of PSS and SSS in LTE Frame
Decoding the Synchronization Signals

• For a 3GPP LTE receiver, cross-correlation needs to be performed to estimate cell identity, time and frequency synchronization error.

• After decoding the synchronization signals, the user finishes the initial synchronization and can establish the connection to the base-station.
Simulation by MATLAB

- Performing cross-correlation between two signals.
- The appearance of high peak means two signals get synchronizations to each other.