Assignment

The objective of the project is to implement the SMS service in the UE and make it fully functional. The study questions and the documentation will be of help. The code itself and the feedback from the UTRAN will also be valuable reference information when implementing the service. Study the RRC-layer code in the UE (presented in "An overview of the 3G network") with the help of the study questions before implementing the assignment.

Functions

The list below is an **example of functions** that need to be implemented to have a fully functional SMS service:

- Receive the SMS data and the message (4) from the client (environment) that a SMS is to be sent.
- Send the bit string '00000100' to UTRAN to indicate that a pair of SMS TrE:s needs to be established.
- Initiate the establishment of a new pair of TrE:s on UE, with TrEId set to SMS_TrEId.
- Send the SMS to UTRAN after the TrE creation process is completed.
- Receive the acknowledgement sent from UTRAN: '00001101'.
- Release the TrE:s.
- Make sure the program waits in the correct state.

Service Requirements

The SMS service that you implement should fulfil the following requirements:

- It must be feasible to send an SMS every ten seconds.
- 90% of the valid SMS:s must appear on UTRAN unaltered.
- The contents of a valid SMS can be arbitrary long as its payload length is between 1 and 140 characters.
- An SMS of size zero must be considered as non-valid and must not be forwarded to UTRAN.
- It must be feasible to send 10 SMSs in a row with at least 9 of them appearing unaltered on UTRAN.

Study questions

The following study questions will help you understand the code. The answers can be found by reading and understanding the other documents for the project.

1) Which signal is used to initialise TrE:s on page 2 in the code and why are two TrE:s created?
2) How does the MAC layer receive the information about created TrE?
3) In which state is the UE ready to receive new information from the client after it has received power on?
4) In which state is the UE ready to receive SMS commands from the client?

5) When the program enters the wait state for the first time, how many TrE:s have been created in the UE?
6) If the UTRAN SMS_TrE_Id is 422, find the UE_SMS_TrE_Id if the second parameter of the signal setupConnection is the UTRAN_SMS_TrE_Id, and the first parameter is the UE_SMS_TrE_Id?
7) When the UE receives a certain signal from the client (environment) the power is shut down and the active TrE:s are released, which signal is it and what value does it have?

Time table

Below, is a suggestion of a time table for your assignment. Remember that this is only a suggestion but if you follow it you will complete the assignment on time.

Week	Action
1	Get an understanding of the RRC code with the help of the study questions.
2-3	Create the SMS TrE:s.
4	Send the SMS to UTRAN.
5	Release the TrE:s.
6	Testing of the solution.