

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination Semester 2:

Academic Year : 2005

Date : 13 December 2005

Time : 9.00 – 12.00

Subject : 240-544 Telecom., Wireless and Mobile Networking

Room : A401

Instruction:

- Make sure that there are 7 questions (85 marks) in your exam paper.
 - This exam is closed book and you have 3 hours to complete your exam.
 - All of your answers can be written in either Thai or English.
 - Dictionary and Calculator are allowed.
 - Palm pilots or other hand held computers are not allowed.
1. Describe the Signaling System number 7 (SS7) protocol architecture and also compare the SS7 protocol level functionality to other well-known protocols such as OSI or TCP/IP. [10 points]
 2. Answer the following questions
 - 2a) Explain why most commonly used (Layer 4) Internet protocols, such as UDP or TCP, are not suitable to transport SS7 signaling within IP networks and inter-working with other networks. Also, give the name of the transport protocol over IP protocol recommended by the IETF Sigtrans working group. [10 points]
 - 2b) If you have to design a voice-over-IP system that allows inter-networking signaling between voice services in traditional public switched telephone network (PSTN) and IP network, explain the concept of your design, especially details of functional units that reside at the telephone gateway. [10 points]
 3. Compare the “Mobile assisted handover” done in WCDMA network against “Base Station handover” found in analog cellular networks. [10 points]
 4. Answer the following questions
 - 4a) Explain the term Location Area as used in a cellular radio communications system. [5 points]
 - 4b) Based on the guideline provided in the figure 1 below, explain the message sequence flows between a mobile station and other parts of a GSM network when a Location Area Update is performed (i.e. when moving from PLMN1 to PLMN2). Please draw pictures to support your explanation. [10 marks]

Suntorn Witosurapot
December 2005

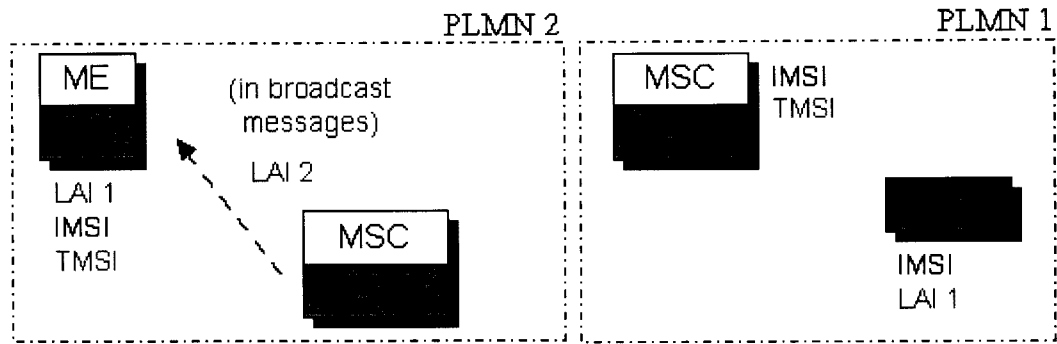


Figure 1

5. From the given GSM network architecture in Figure 2 below,
- Draw a picture of how the GPRS network is integrated to the GSM system.
 - Explain the significance of each functional part added.

[10 points]

GSM: circuit switched connections

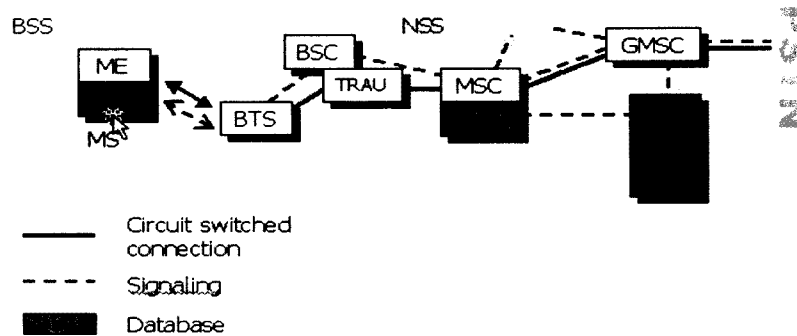


Figure 2

6. Give the characteristics and explain how are implemented the following WCDMA physical layer procedures: [10 points]
- a) Paging Procedure
 - b) Random Access Channel (RACH) Procedure
7. Describe the security methods (e.g. authentication and ciphering over the air interface) used in GSM. [10 points]