

Chapter: 9 GSM System Overview

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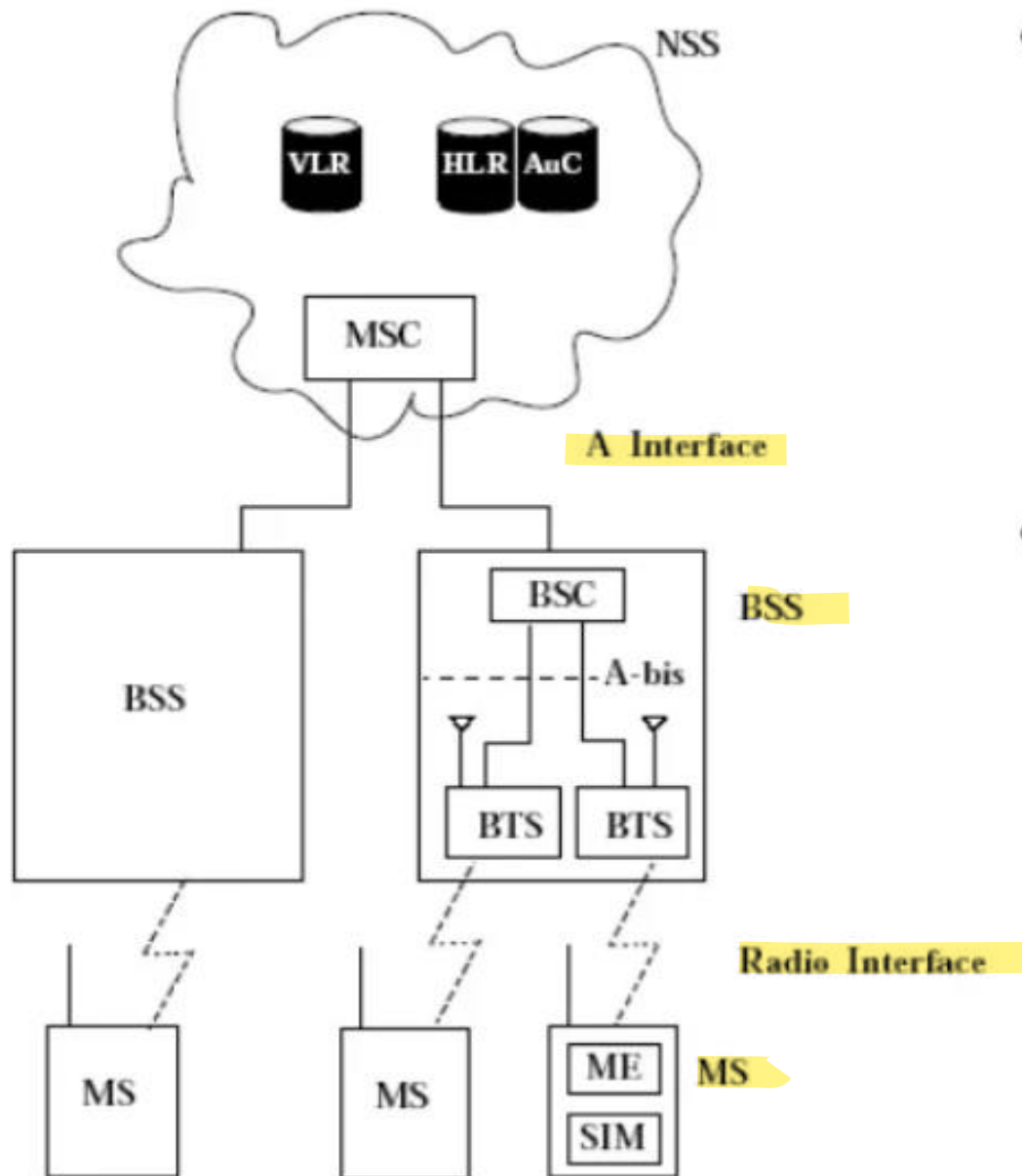
Introduction

- Global System for Mobile Communications (GSM) is a digital wireless network standard designed by standardization committees from major European telecommunications operators and manufacturers.
- Provides a common set of compatible services and capabilities to all mobile users across Europe and several million customers world wide.

The basic requirements of GSM

- **Services:** The system shall provide service portability
- **QoS and Security:** The quality for voice telephony of GSM shall be at least as good as the previous analog systems over the practical operating range.
- **Radio Frequency Utilization:** permit a high level of spectrum efficiency and state-of-the-art subscriber facilities
- **Network:** The identification and numbering plans shall be based on relevant ITU recommendations.
- **Cost:** The system parameters shall be chosen with a view to limiting the cost of the complete system, in particular the MSs.

GSM Architecture



- **Mobile station (MS)** communicates with a base station system (BSS) through the radio interface.
- **BSS** is connected to the network and switching subsystem (NSS) by communicating with a mobile switching center (MSC) using the A

Mobile Station (MS)

- The MS consists of two parts : the subscriber identity module (SIM) and the mobile equipment (ME).
- A SIM can be a smart card, a smaller sized “plug-in SIM”, a smart card that can be performed, which contains a plug-in SIM that can be broken out of it.
- The ME contains the non-customer-related hardware and software specific to the radio interface.
- When the SIM is removed from an MS, the remaining ME cannot be used for reaching the service except for emergency calls.

Base Station System (BSS)

- The BSS connects the MS and the NSS.
- The BSS consists of two parts : the base transceiver station (BTS) and the base station controller(BSC).
- The BTS contains transmitter, receiver, and signaling equipment specific to the radio interface in order to contact the MSs.
- The BSC is responsible for the switching functions in the BSS, and is in turn connected to an MSC in the NSS.
- The BSC supports radio channel allocation/ release and handoff management.

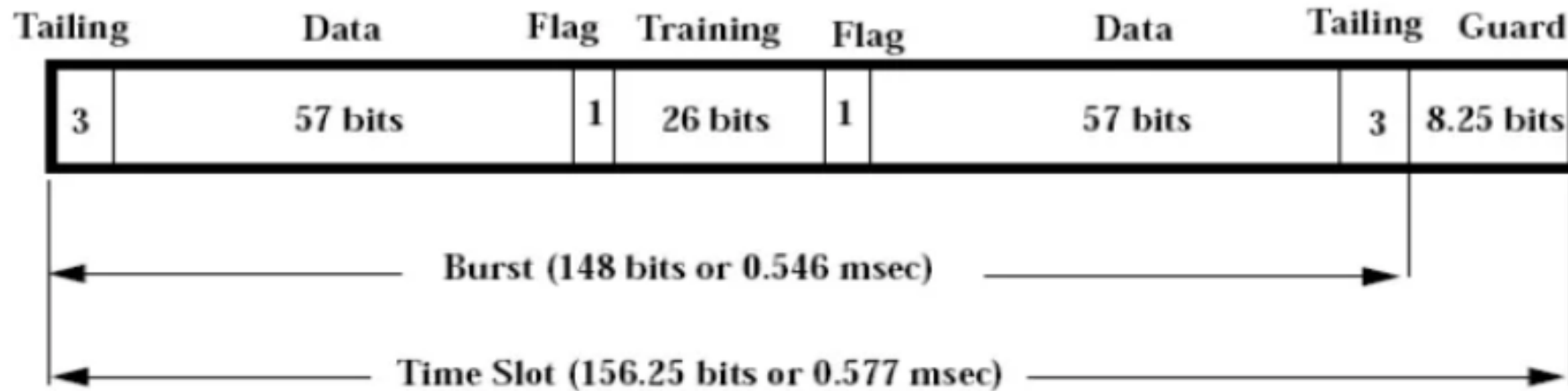
Network and Switching Subsystem (NSS)

- The NSS supports the switching functions, subscriber profiles, and mobility management.
- The basic switching function in the NSS is performed by the MSC.
- An incoming call is routed to an MSC, unless the fixed network is able to interrogate the HLR directly. That MSC is called the gateway MSC (GMSC).

Radio Interface

- The GSM radio link uses both FDMA and TDMA technologies.
- The frequency bands for the GSM down link signal and the uplink signal are 935-960 MHz and 890-915 MHz, respectively.
- The frequency band is divided into 124 pairs of frequency duplex channels with 200 KHz carrier spacing.
- To save MS power, uplink frequencies in mobile systems are always the lower band of frequencies.

GSM Burst Structure



- The length of a GSM frame in a frequency channel is 4.615 msec.
- The frame is divided into 8 bursts (timeslots) of length 0.577 msec.

Thank you