

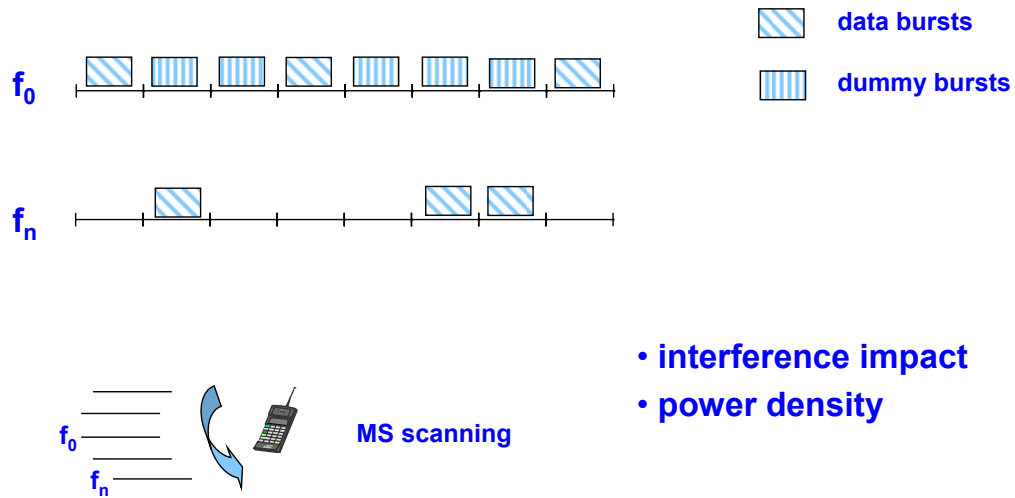
e2.3

The synchronisation process

Politecnico di Torino
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Finding the basic frequency



2

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The MS can pass from a *switched-off* to a state of *activated*. In the former state it is completely ignored by the network, while in the latter, both entities (network and MS) must know all the necessary information needed to perform the TLC processes. Immediately after the switching-on, the terminal tries to recover channels FCCH, SCH and BCCH that allow it to assume the needed system info.

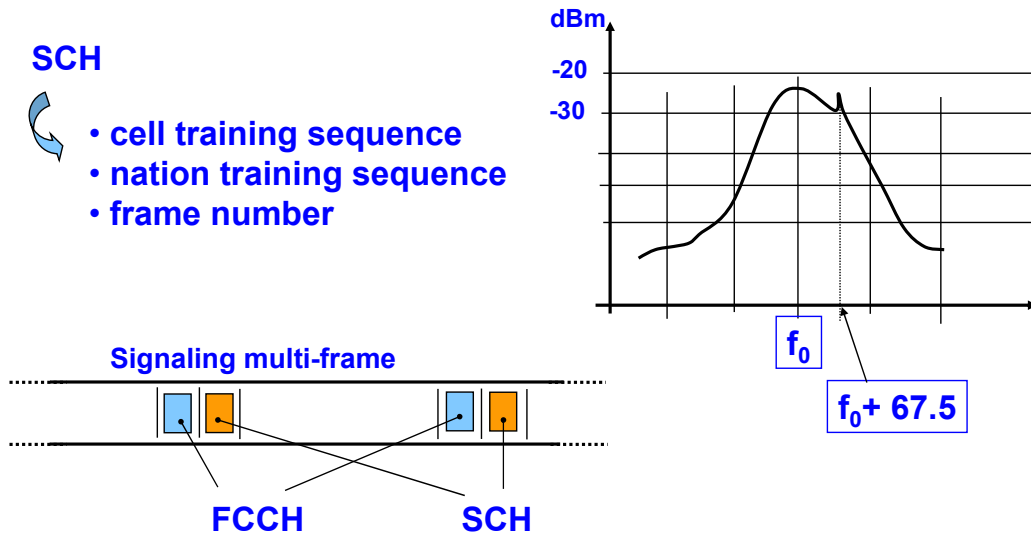
The carrier transporting these channel is treated by the BTS in a particular manner. All the free TSs are occupied with dummy bursts in order to have for this carrier an average power density greater than the one characterizing all the other carriers assigned to the cell.

The terminal can then recognize this particular carrier and *hang* on it.

Finding FCCH and SCH

SCH

- cell training sequence
- nation training sequence
- frame number



3

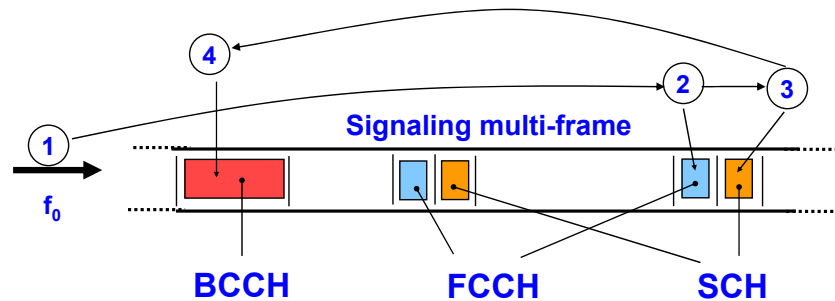
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The FCCH channel transmits in to the assigned slot (along the multi frame) a sequence of zeroes. This results in an un-modulated carrier on a frequency that is shifted of 67.5 kHz with respect to the central frequency of the carrier (see the curve that shows a power spike in correspondence).

The mobile is able to recognize the un-modulated waveform identifying FCCH. At this stage it is able to find-out the SCH as well, since it always follows FCCH in the multi frame structure (see the section on the physical layer).

The SCH is supplying the frame number and the cell training sequence. MS can then identify the BCCH, supplying all the system information.

.. an evolving process looking for basic information



1. Choosing the highest power density
2. Center the FCCH (time and frequency)
3. Read training sequence (the key) and the frame number
4. Hang to BCCH

4



The steps described in the previous slides clarify how the MS can recover all the data necessary to use the system.

It passes from the frequency to the time domain, to the code to be used to *de-cipher* each type of messages within the cell it is camped to. The overall process requires some seconds to be performed.

If the mobile, after having been switched-off, is switched-on again in the same cell, the synchronization time is significantly reduced: the frequency carrying the three channels is provisionally registered in the SIM card in the switching-off phase.