ERRATUM

On page 38: The sentence

There is no guard period between the uplink and the downlink however.

should read

There is a time slot before the uplink, which is referred to as a *guard period*, which allows the user to move the uplink and pilot transmission forward in time in order to ensure that its signal is received at the same time as the signals from the other users. The amount of time the uplink is moved depends on the propagation delay of the user. This procedure is called *timing advance* in the LTE standard. The timing advance results in an empty time period in front of both the uplink and the downlink, which can be used to switch the hardware between the uplink and downlink modes. In the Papers C, D and H, which study the uplink, all users are received at the same time and thus it is implicitly assumed that timing advance is used.

Figure 7 should therefore be updated as shown below.

![Figure 7: Massive MIMO frame structure](image-url)