

## CLAIMS

What is claimed is:

1. A base station (BS) comprising:
  - a coverage loss detection timer associated with a base station;
  - a mobile station;
  - a transmitter configured to, on a condition that the coverage loss detection timer expires, transmit an uplink (UL) allocation to the mobile station;
  - a receiver configured to receive packet data from the mobile station via the UL allocation; and
  - a processor configured to reset the coverage loss detection timer;wherein the transmitter is further configured to transmit a message to the mobile station for resetting a periodic ranging timer of the mobile station.
  
2. The base station of claim 1, wherein the message is an advanced air interface ranging acknowledgement (AAI-RNG-ACK) message.
  
3. The base station of claim 1, wherein the mobile station is in a registered state, and the receiver is further configured to receive the periodic ranging request message from the mobile station.
  
4. The base station of claim 1, wherein on a condition that the coverage loss detection timer expires while the mobile station is in a scanning period, the UL allocation indicates a next available UL interval associated with the mobile station.
  
5. A method for wireless communications, comprising:
  - monitoring air link status between a Subscriber Station (SS) and a Base Station (BS);

maintaining air link downlink (DL) and uplink (UL) synchronization between the BS and SS according to an air link up/down protocol (ALUDP).

6. The method of claim 5, wherein one of the BS and SS acts as a slave to a master within the ALUDP.

7. The method of claim 6, wherein the SS is the slave and the BS is the master, and the BS provides link status information and UL transmission parameter adjustments.

8. The method of claim 7, further comprising the SS sending a follow-up UL transmission to the BS.

9. The method of claim 5, further comprising:  
detecting an air link timeout between the SS and BS;  
determining whether the timeout occurred during a scheduled SS absence; and  
on a condition that the timeout occurred during a scheduled SS absence, adjusting the ALUDP.

10. The method of claim 9, further comprising providing a timer for coverage loss detection that starts after network entry or re-entry.

11. The method of claim 10, wherein the timer for coverage loss detection is reset on a condition that an uplink is received from the SS with its identification information known to the BS.

12. The method of claim 9, further comprising providing a timer for periodic ranging that starts when the air link is in an UP status.

13. The method of claim 12, wherein during coverage loss detection, the periodic timer for periodic ranging is reset using an AAI-RNG-ACK signal on a condition that the BS confirms that the SS is still connected to the BS.

14. The method of claim 13, wherein the timeout occurs during a scanning interval and the method takes place when performing coverage loss detection.

15. The method of claim 14, further comprising starting at least one timer, and wherein subsequent to the timer's start, the at least one timer expires.

16. The method of claim 15, wherein the at least one timer expires during a scanning interval, and wherein on a condition that the at least one timer expires, the ALUDP grants an uplink burst for coverage loss detection in a next interval.

17. The method of claim 16, wherein the timer is a periodic ranging timer.

18. The method of claim 5, wherein the scheduled SS absence takes place during on a condition that the SS is in an idle mode.

19. The method of claim 18, wherein on a condition that the SS is in idle mode, the BS suspends monitoring the air link status to the SS in idle mode.

20. The method of claim 5, wherein the ALUDP temporarily suspends coverage loss detection and periodic ranging on a condition that the SS is in the scheduled SS absence.