Whitepaper: AirTime

A look at Repeatit's AirTime technology and how it boosts wireless network performance

Repeatit had been in the wireless backhauling business almost ten years when we decided to develop our own access protocol. The reason was that in order to guarantee outstanding performance in unlicensed frequency bands and be spectrum effective you have to be able to control the available spectrum and optimize link performance even under harsh and highly interfered conditions.

After many pre-studies, field tests, lab tests and evaluated solutions, the AirTime protocol was developed. Although not required for the AirTime protocol to function, a dedicated synchronization solution (SyncMaster©, described in a separate white paper) was also developed as part of the scope in order to allow for aligned Tx/Rx operation and optimized spectrum efficiency per site.

The basic concepts for the AirTime protocol are described in the figure below where two Subscriber Units (SUs) are connected to a Base Station (BS). As described in the figure, the BS can use the available downlink slots to transmit to any SU while the uplink slots are dedicated to specific SUs.
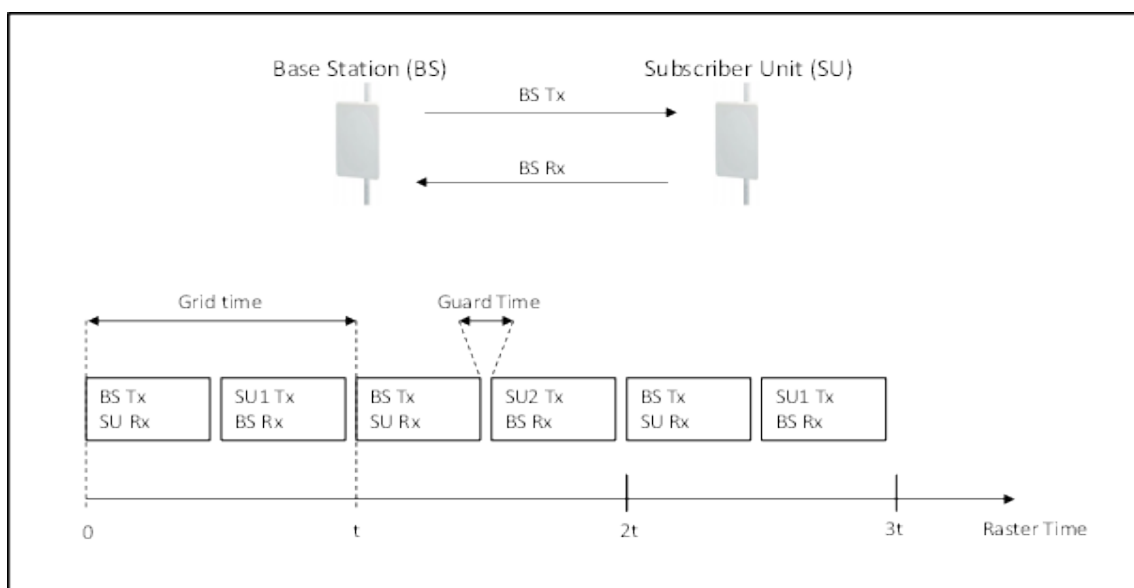

Figure 6 - Repeatit AirTime protocol basic functionality.

The AirTime protocol divides the available resources among the BS and all connected SUs, so that every user is guaranteed their fair share of bandwidth. The allocation does not have to be equal for all SUs or even equal in uplink/downlink directions. There might for example be a scenario where some surveillance cameras get a couple of uplink timeslots each while an office building (handled by the same Base Station) gets ten times more capacity for Internet connectivity. The AirTime protocol creates a highly scalable and flexible environment that supports any type of multipoint scenario.

When combined with the SyncMaster, each Trinity unit (operating in PtP link or MultiFlex PtF mode) aligns the Tx and Rx windows so transmission is done synchronously per site. This effectively removes in-band interference from any Repeatit equipment operating on the same channel and the result is state of the art spectrum efficiency.

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