Automatic Frequency Selection - AFS

**Product Description**

**Automatic Frequency Selection (AFS) applies only the CPE operation.**

AFS is a directed method by which the operator provides a given set of preferred channel center frequencies to a Subscriber Station (CPE). The AFS algorithm checks this channel set, eliminating any duplicate or invalid frequencies, and best determines the channel scanning order.

When AFS is enabled, on boot the CPE will scan through all frequencies, taking measurements of RSSI over several seconds, and saving the results for analysis. After the CPE has scanned all configured frequencies, it will then determine the best RSSI, and then attempt to connect on the AFS channels in priority order of RSSI. If no valid PM2000’s are found, it will stay in scan mode indefinitely until it finds one.

The AFS routine operates until a valid link is established. After the wireless link has been established, the CPE will follow the management information as given by the Base Station. If the link is lost, then the CPE will re-enter the AFS process.

For example, if after a wireless link is created, the channel has sufficient interference such that communications on the channel is not possible due to packet loss, but a link is still operational, the CPE will not re-enter the AFS until the link is severed. By Severed we mean that no valid management frames are seen by the CPE for at least 700ms.

The PM2000 will in such cases of interference will reduce the modulation automatically every two second, step by step to the lowest value allowed in the EMS. If the link is maintained at these reduced values, the CPE will not enter the AFS loop.

**Key Considerations**

It is important to understand the limitations and deployment considerations for AFS.

- The PM315’s operational frequency bandwidth is greater than the PM2000. It is possible to set frequencies in the AFS list that the PM2000 may not support, such as 5450000.

- Only those channel center frequencies listed in the AFS table of Subscriber Station will be used. If no PM2000’s are operating on those frequencies, no wireless communications will be available.

- The channel bandwidth value must be the same for the Base Station and the Subscriber. If the CPE is configured at 5 MHz, and all PM2000’s are configured at 10 MHz for example, then no wireless communications will be available.
• AFS is not to be confused with Dynamic Frequency Selection. The Subscriber Station will "camp on" a frequency for a given period of time before moving to an alternate selection. This is to allow the interferer time to change before the Aperto equipment changes, thus keeping the Aperto equipment from cycling too rapidly.

• As the channel map for AFS is set before the wireless communication is set up, the installer must enter the list of desired frequencies in the web interface of the CPE during installation.

• As the channel scanning occurs prior to link, Channel priority is based on the signal received from the PM2000 (RSSI), and not the on other values like CINR.

• If the PM2000’s transmitter is disabled for 700ms or more, the CPE will enter AFS. This could result in CPE devices moving to another PM2000 during maintenance periods, resulting in an otherwise unplanned number of clients on a PM2000. Care should be exercised in planning AFS to ensure that sectors do not become bandwidth loaded beyond desired operation.

• AFS operation has best performance when GPS sync is enabled.

• When two or more PM2000’s are in operation on the same Center Frequency within operational range of each other (radio line of site), the default BS ID of 00134f000000 cannot be used. The BS ID must be unique for each PM2000 device in this use case.

WaveCenter AirSync can be used to update the CPE’s AFS channel list as of Server Build 3.5MR8 and CPE firmware 1.3.0.