FAN-IN/FAN-OUT NETWORKS

iDirect Government's (iDirectGov's) Evolution 4.2 software gives operators the ability to configure their actual frequencies directly from cut sheets and frequency plans when configuring fan-in/fan-out (FIFO) networks. Configuration changes in 4.2 make it easier to understand without having to calculate non-standard local oscillator (LO) frequencies on block up convertors (BUCs) and low noise block convertors (LNBs). Instead, the system will automatically calculate those differences at the satellite transponder channel when information is routed from Ka- to X-band frequencies and vice versa. In other words, the system will cross-strap or combine multiple spot beams and frequencies into a single frequency provided to the hub (fan-in), or take a single frequency from the hub out to multiple spot beams and out to the remotes (fan-out).

Wideband Global Satellite Constellation Translation

The Wideband Global Satellite (WGS) constellation can take a single frequency from a hub transmit and fan-out to multiple X or Ka frequency spot beams. On return to the hub, the channelizer can fan-in multiple spot beams from remotes or groups of remotes into a single frequency to the hub. In some cases, cross-strapping (X to Ka, or Ka to X) is not configured when going from X to X, or Ka to Ka. However, each of these spot beams can have completely different non-static LO frequencies based on the frequency plan, essentially fanning-out or fanning-in on the same frequency bands.

Figure 1 shows how a WGS channelizer can re-route or combine a single frequency to multiple spot beams for the frequency based on the remote's operating frequency.

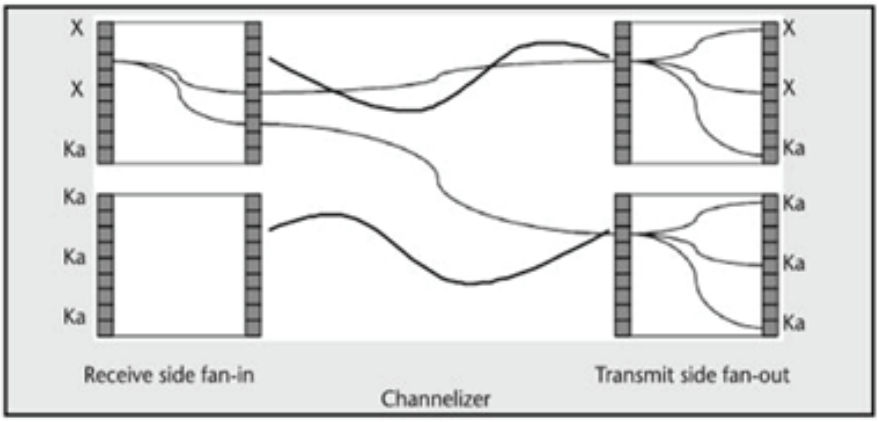

Figure 1

Figure 2 shows how this concept is applied to the iDirectGov system. The hub and remotes do not share common frequencies or carriers. A hub architecture makes it much easier to configure these types of hybrid networks on a hub system, which make a hub/spoke architecture much more complicated.

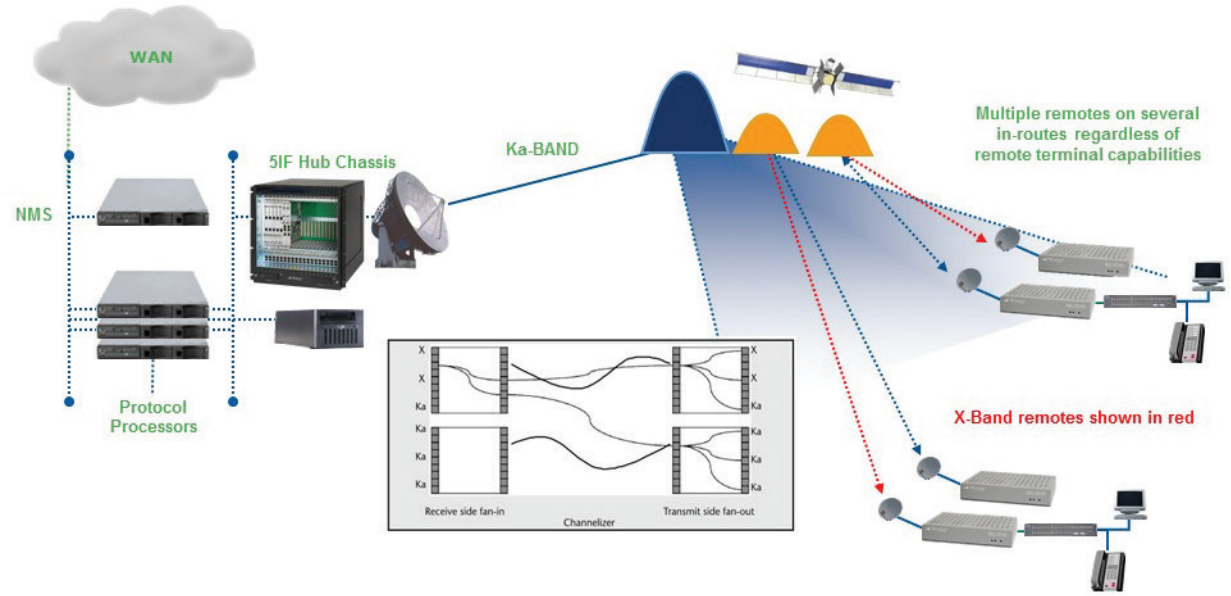

Figure 2

Understanding iBuilder and Heterodyning

In iBuilder, the software will automatically calculate the transponder LO frequency when actual frequency inputs of each remote and hub are configured. That frequency can be assigned to a single remote or groups of remotes and line cards.

Heterodyning is the ability to take two different frequencies to produce one of four results: The sum, the difference and the two original frequencies. This takes place in all oscillators throughout the iDirectGov system. In most cases, what we care about is the lower of those frequencies or the difference when combining the two originals as seen in “Figure 3” below.

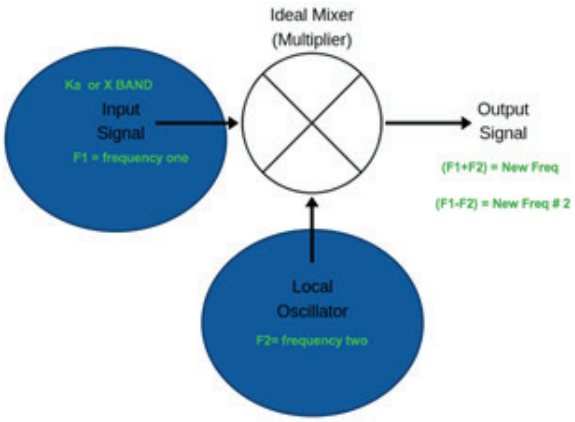

Figure 3

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