



In addition to building out existing licenses, mobile operators may also have the opportunity to scoop up more spectrum in the coming years, particularly in the mid-to-high band frequencies. The FCC has previously explored auctioning off 150 MHz of 3.5 GHz although the process hasn't progressed and timing is unclear. The FCC has agreed to auction off various mmWave bands (>28 GHz and higher). Most recently, Intelsat and Intel jointly responded to an FCC NOI seeking to offer a commercial solution to freeing up some of its valuable C-band spectrum 500 MHz of C-band (3.7-4.2 GHz), but FCC has yet to weigh in on the proposal or set out a path forward. As we can see, the focus on mid-to-high-band fits nicely with the carriers eyes set on 5G so we expect conversations around freeing up more of those frequencies to heat up throughout the year.

Competitive Landscape: Since the last round of major M&A in the wireless industry back in 2013, which established the current 4-player national landscape we know today, the market has not only seen stiff competition, but a material shift in the way management teams have done business. T-Mobile's Un-carrier initiatives created device financing plans, altered funding options, and unleashed a slew of plan offerings that has pressured ARPUs for years. Sprint and T-Mobile positioned themselves in the market as the mobile companies with the best value, which opened up more GBs / \$, and eventually led the Big-2 to offer Unlimited plans at price points below existing plans while also eliminating overages, which had a large impact especially in 1H17.

While it has been a difficult few years across the industry, lately we've seen more rational behavior with respect to pricing. Sprint, who considers itself the "price leader" in the industry, implemented a price increase in CY3Q17 with the intent of raising prices again in coming quarters. Management has spoken of service revenue inflection in the back-end of 2018 so we expect Sprint's pricing to continue to improve from here. T-Mobile's pricing has been generally stable all year and any future pressure in coming quarters will likely come from contra-revenue items such as the recent Netflix add-on. We expect T-Mobile to remain disciplined in pricing as it seeks to achieve its FCF CAGR guidance of 45-48% over the next 3 years. After taking big hits early on in the Unlimited adoption and no overages phase, the Big-2 are moderating as well. Wireless CPI trends have been more of less stable since April 2017 so the carrier specific anecdotes and broader sentiments are being reflected in the macro data.

The other sources of competition that are really coming into view now are the cable companies. Three of the four largest cable companies in the US now have some sort of agreements in place with a nationwide carrier to offer wireless services over their network. In our opinion, the most at risk are the Big-2 given their dominant market share in many geographies. The arrival of a competing service utilizing the same infrastructure could put new pressure on the likes of Verizon and AT&T, particularly since cable is primarily utilizing the quad-play bundle to extend the lifetime value of customers and reduce churn as opposed to chase profits.

Still at the center of the discussion around the future of wireless is DISH Network. Another year goes by and DISH acquires more spectrum (low band auction in January 2017) but also still keeps its strategy around a 5G broadband network fairly mysterious. While we now know of their intention to build a narrowband IoT network, even this is likely a temporary step along an evolutionary path to rolling out a true wireless 5G network of the future. Chatter from earlier in the year on potential partners for DISH are not worth repeating here. Our experience with the company over many years tells us that talk surrounding DISH is never spurred by the company itself as senior management is notoriously tight-lipped with everyone about anything strategic. When will we know more? Well, our best guess does lead us to the back half of 2018. With 5G standards progressing through 3GPP for both consumer as

In just a few short years the focus of carriers on spectrum has gone from low and mid band to mid and high band and ultra-high band frequencies. Not too long ago Sprint's 2.5 GHz spectrum was considered commercially challenged, now it is in a sweet spot.

Verizon and AT&T have been dragged into the world of truly unlimited data and are re-pricing their existing base of ARPUs.

The industry has seemingly taken a pause in terms of its competitive intensity, bringing about more rational behavior with respect to pricing.

It remains to be seen whether cable's entry into wireless will allow it to truly grow revenue (offense) or simply just lower churn in the bundle (defense). Either way, cable seems to be here to stay.

DISH still feels like a bit of a mystery, with much of its future plans still shrouded in secrecy. We do think that the back half of 2018 is a sensible timeline around which we might see more concrete for around DISH's plans for the future of its wireless broadband 5G network.