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CBRS UPDATE #1 October 17, 2018

The Trump administration, through the FCC, has released “final” drafts of new rules for “5G” wireless spectrum. These new rules were released in early October and will be ratified by vote of commissioners later this month.

Will these new laws allow Trump to make America’s communication systems great again? I do not know, but they will change the way we communicate. I think that the FCC will make haste in getting these frequencies sold and into the private sector.

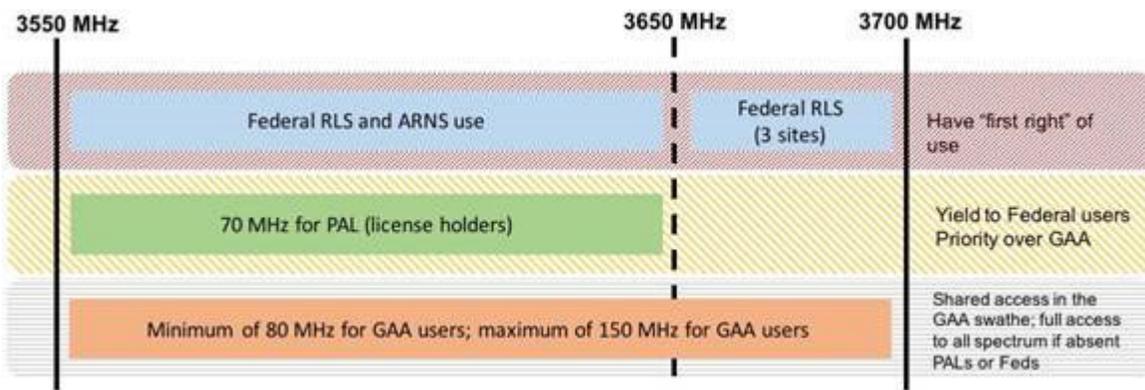
In 2015, the FCC began a process to adopt rules for shared commercial use of the 3.5 GHz band which envisioned a three-tiered access and authorization framework to coordinate shared federal and non-federal use of the band:

1. Incumbents comprise the first tier (Incumbent Access “IA”) - think US Navy systems allowing jets to land on aircraft carriers and certain grandfathered terrestrial internet providers.
2. Followed by auctioned licenses, the second tier (Priority Access “PAL”) – today, think ATT, VZ or TMO, - in the future, think entrepreneurial communication companies; and
3. General Authorized Access (“GAA”) – today think WIFI - in the future think “high def” wireless service.

Citizens Broadband Radio Service (CBRS) is a frequency band plan enhanced and controlled by cloud-based algorithms and artificial intelligence. The spectrum band, commonly known as the “3.5 GHz band”, starts at 3550 MHz and continues uninterrupted to 3700 MHz on the radio electric spectrum....150 MHz of prime “vertical” real estate is up for grabs. The overall regulatory concept is to bring into the 21st century the legal framework of CB Radios of the 1970’s (yes, think 1975 song and movie “Convoy”).

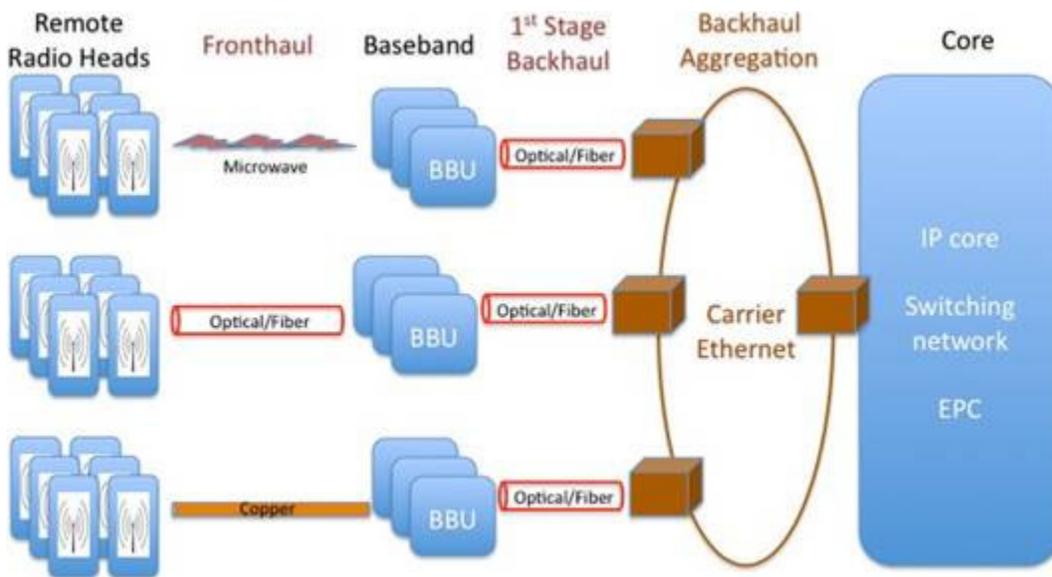
CBRS is not a technology per se....it is a regulatory creation intended to bring high bandwidth, low latency bandwidth to the American people. For comparison, CBRS spectrum is twice the size WIFI. The technology anticipated for CBRS is “5G wireless service”; however, this technology and the ecosystems has not been fully developed or baked. The technology ultimately deployed in this band could be wildly different than what developers anticipate today. But we do know is there is an insatiable demand for bandwidth: bandwidth with low latency, high speeds and security.

Please find below a graphical representation of the band plan.



Source: IGR

Please find below a high-level graphical overview of possible network architecture.



Source: IGR

The most recent release from the FCC was almost 100 pages. My summary/cliff note version of the most recent rulings from the FCC is found below. Mexcap was involved in a similar project in Mexico and additional reference materials can be found at www.mexcap.com.

Summary:

In this most recent filing, the FCC firms up some very critical business and technical details around CBRS.

The FCC will create licenses for every county in the United States (the auctioned frequencies referred to as "PALs"). There are 3200 counties in the United States ranging in size from 13 square miles to over 20,000 square miles and with populations of less than 100 to over 10,000,000. These licenses are smaller in size compared to the traditional mobile frequencies auctioned by the FCC and intended to allow for the development of new telecommunication companies.

In each county, the FCC will auction seven (7) 10-megahertz unpaired channel licenses, wherein all channels will be assigned by the "brain" of the network employing algorithms and artificial intelligence (the FCC refers to this as the "SAS"). The exact frequencies of specific assigned channels may be changed by the SAS, if necessary, to facilitate sharing between the three tiers of authorized users. Licensees will not receive an allocation of specific spectrum blocks; rather, the SAS assigns frequencies based on the amount of spectrum that a PAL licensee is authorized to use in a given county. Licensees may request a channel or frequency range from the SAS, but they are not guaranteed an assignment.

A buyer will be limited to purchasing four (4) licenses (40MHz) in any one county. If during the upcoming auction licenses go unsold, the FCC will offer licenses via an application and filing process at a later date. I believe the rules would allow a duopoly: one carrier with 40MHz and the other with 30MHz?

Coupled with the requirement that base stations (think WIFI router) will be capable of operating across the entire 3.5 GHz Band, SAS-controlled assignments will ensure individual users are provided with flexible, stable access to the band.

The licenses shall be renewable and have minimal build requirements. The service rules for the 3.5 GHz band must create incentives for investment, encourage efficient spectrum use, support a variety of different use cases, and promote network deployments in both urban and rural communities. The smaller license size is intended to support rapid changes in the mobile marketplace to facilitate rapid deployment of next generation mobile networks. Considering the critical importance this band will play in the United States' competitiveness in the global 5G arena, the FCC believes it is also important to ensure that these and future regulation support robust investment in large scale mobile deployments like 5G, as well as other use cases.

The FCC requires licensees to provide a bona fide communications service that meets a "substantial service" standard of performance, and the FCC adopts two specific safe harbors to meet this standard; one for mobile or point-to-multipoint services and a second for point-to-point services. A licensee providing a mobile service or point-to-multipoint service may demonstrate substantial service by showing that it provides reliable signal coverage and offers service over at least 50 percent of the population in the license area. A licensee deploying a point-to-point service may demonstrate substantial service by showing that it has constructed and operates four links in rural counties and at least one link per 33,500 people in urban counties.

To incentivize new and small operators, the FCC shall grant bid credits in the upcoming auction to achieve its statutory objective of promoting the participation of designated entities in the provision of spectrum-based service. An entity with average annual gross revenues for the preceding three years not exceeding \$55 million will be eligible to qualify for a bidding credit of 15 percent. While an entity with less than \$20 million will be eligible for a credit of 25 percent.

The FCC anticipates auctioning the PAL licenses in 2019. However, anyone can use the 80 MHz of "unlicensed" frequencies as soon as the commission adopts the rules later this month (I think?).

The FCC will allow for Licensees to partition and disaggregate their licenses. Essentially, you can split up your county licenses into "neighborhoods" and sell or sublease these smaller tracts to a third party. The FCC would like to see a "EBAY" like online auction environment created where users can gain access to the frequencies and allow the marketplace to determine the correct size of licenses on a market-specific and needs-based basis.

Question:

1. How do you make money?
2. Interference issues related to incumbent users including federal radiolocation users, Fixed Satellite Service (FSS) earth stations, and for a finite period, certain grandfathered terrestrial wireless (Google estimates there are 2,047 active licenses with nearly 46,000 registered sites being used in the 3650-3700 MHz band).
3. The fundamental benefit of a PAL (and why you paid money to buy the licenses) is the right to prioritize, interference protected use of 10 megahertz of spectrum in a given geographic area. But how does this work if priority access user can kick you off air? Is it really specific geographic concern?
4. Would you be able to make quality of service commitments to users if you do not have complete control of your frequencies?
5. How will this ecosystem work indoors and outdoors and related propagation characteristics?
6. How does the “shared access” attributes increase and/or decrease the value of these licenses?
7. How do owners of buildings and venues use these new laws to their advantage?
8. Will we finally see the creative destruction at the network layer similar to what we have experienced at the application layer?
9. Should operators now begin to “fence new territory” by installing bases stations operating in this band?
10. Will the BBU be physically separated from the Antennas/RRU? Would this create need for edge data centers. Will these be macro sites or will newly built CO/MTSO?
11. Importance of EPC? Interoperability between 4G EPC and 5G Service and vice versa?
12. Will the FCC allow for duopoly?