

Is cooperation better than competition?

A closer look at the Sprint and Clearwire deal

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Many operators worldwide have begun planning or are already deploying the first networks using Mobile WiMAX (IEEE 802.16e). As they do, the specific requirements of wireless broadband networks become better defined and to some extent challenge the view that competition among operators with separate network infrastructure is necessary to ensure good performance and affordable services for the subscribers.

The proposed agreement between Sprint Nextel and Clearwire for network sharing and joint distribution of WiMAX services allows both operators to achieve national coverage and to reduce their capital expenditure. Sprint and Clearwire expect to seal this partnership soon, after which it will require FCC approval before becoming operational. It has been welcomed with wide support, even by those who remain skeptical about the long-term prospects of the two operators.

The planned deal, however, has deeper implications that extend well beyond the US market and that directly relate to the emerging dynamics in the mobile broadband market.

I recently had the opportunity to discuss the motivations that led to this proposed partnership with Scott Richardson, Chief Strategy Officer at Clearwire, and Ali Tabassi, Vice President of Technology Development at Sprint Nextel. In this article, I explore the Sprint and

Clearwire expected deal from the business model and service requirements perspective, on the basis of my previous experience in developing business plans for 3G, Wi-Fi and WiMAX operators.

Background: a divide and conquer approach

Sprint and Clearwire both have substantial spectrum allocations in the 2.5GHz band—a band that is already available in many markets (especially throughout the Americas) or that will soon become available in other regions (e.g., Japan and Western Europe). It is also the flagship spectrum band for Mobile WiMAX.

However, neither can have complete US national coverage and, in some markets, limitations in spectrum availability make a rollout overly expensive. To address these issues, Sprint and Clearwire plan to allow their subscribers to roam across the two networks and to divide between them coverage areas within the US (Figure 1). According to this plan, Sprint spectrum holdings will eventually cover an area with 185 million POPS and Clearwire 115 million, as shown on the map. The proposed partnership has Sprint focusing on the

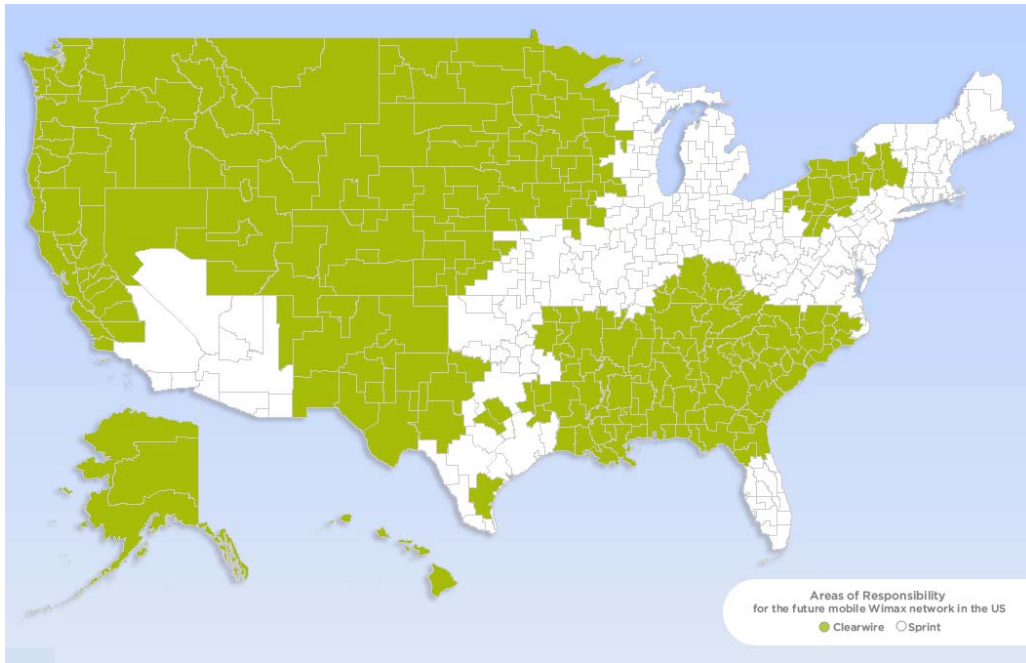


Figure 1. Clearwire coverage areas (Source: Clearwire)

Sprint	Clearwire
National coverage through seamless roaming	
Lower capex and opex, due to a smaller footprint	
Higher capacity and efficiency in usage of spectrum because of pooled spectrum holdings	
No head-to-head competition in markets where they both own spectrum	
Co-branding and joint marketing initiatives under consideration	
Responsible for the development of national partnerships (including cable operators); the ability to offer national coverage increases the attractiveness of the network to prospective partners	Access to Sprint cellular infrastructure, with possibility for Clearwire to become an MVNO and to offer EV-DO and voice services to its subscribers
	Access to Sprint infrastructure (cell sites and backhaul)

Table 1. The proposed deal between Sprint Nextel and Clearwire

more densely populated top 50 areas, where it will cover 75% of the population. In each area, one operator has the exclusive right to market the service and also has

control over the spectrum that the two operators jointly own or lease. The planned agreement allows them to pool and optimize the distribution of spectrum resources, and to eliminate the need for geographically overlapping deployments. At the same time, this approach will enable both Sprint and Clearwire to compete more effectively against wireline and wireless operators that target the same addressable market.

The most innovative part of the agreement is that it will not be limited to network sharing and spectrum trading, but it will also extend to wholesale marketing opportunities and additional services (Table 1). As the two operators will not offer service in the same area, cooperation at the national level will become possible and indeed advantageous to both, while at the same time each operator will be able to develop a distinct set of service offerings.

Greedy for spectrum?

In comparison to many WiMAX operators worldwide, Sprint and Clearwire each have large amounts of spectrum available (up to 105MHz in some markets). So why do they feel the need to combine their spectrum holdings where they overlapped?

The answer to this question depends more on physics than on a specific technology. It applies to WiMAX as much as it does to HSPA, EV-DO or LTE. WiMAX is the first technology to support mobile data access that uses wide channels (up to 10MHz; EV-DO uses 1.25MHz channels and HSPA 3.84MHz channels). As a result, the capacity of a WiMAX base station is higher, but so are the spectrum requirements. The increase in spectral efficiency of WiMAX compared to 3G technologies is not sufficient to offset the need for more spectrum, as the overall capacity requirements for WiMAX are much higher.

The use of wide channels is crucial to the success of WiMAX, as it not only allows higher capacity, but also effectively lowers the capex and opex in areas of dense demand where networks are capacity constrained. The higher capacity associated with larger channels results in fewer base stations to install and maintain in order to support the same number of subscribers. In the future, wider channels of 20MHz and above will provide improved performance and further cost savings, but also more substantial spectrum requirements.

The need to manage interference creates further spectrum requirements. Whenever possible, WiMAX operators choose a frequency reuse of 3:1, which effectively requires three times as much spectrum as a frequency reuse of 1:1, but also allows better performance and further cost reduction.

In cellular networks, where voice and narrowband data applications dominate, traffic requirements are moderate and narrow channels have so far been adequate. With mobile broadband this is set to change dramatically. Subscribers expect a reliable experience that approximates the DSL, cable modem or Wi-Fi connection they are accustomed to. They also commonly demand flat-fee pricing for services with unlimited traffic allowances and are likely to run bandwidth-intensive applications like video streaming more often than they do on a cellular device. Furthermore, most usage takes place from indoor locations where mobile subscriber devices tend to use modulation schemes that support lower data rates, thus putting a heavier drain on network resources.

Higher capacity requirements, wider channels and frequency reuse patterns higher than 1:1 all point in the

same direction: mobile broadband operators need more spectrum than cellular 2G and 3G operators do for voice and narrowband data. Without more spectrum operators will be unable to meet the demand from subscribers for true broadband access and VoIP, and become financially profitable.

Why share?

Spectrum is a scarce and expensive resource that operators have limited opportunity to increase, at least in the short term. Assuming the same amount of spectrum available in a market, we can look at two scenarios (Table 2): one where spectrum is fragmented among multiple operators, and one where spectrum is consolidated and shared by multiple operators (as in the pending Sprint and Clearwire deal). The consolidated spectrum scenario can accommodate more than one operator within the same band if there is sufficient spectrum.

Fragmented spectrum	Consolidated spectrum
Higher cost per Mbps and per subscriber	Fewer base stations needed
Spectrum resources may not be used evenly	More efficient use of spectrum, especially for mobile users, whose location changes frequently
Fewer subscribers supported	Can support high density of subscribers, but it is not required in coverage-driven deployments
Higher number of operators leads to more competition and wider choice for subscribers (but operators may be financially weak)	Wholesale access to service providers increases traffic and revenues for operators and enables subscribers to choose among multiple operators
Adequate to support voice and best-effort data applications	Better support for bandwidth-intensive applications

Table 2. Fragmented versus consolidated spectrum holdings

Assuming that the overall number of subscribers remains constant, in the consolidated spectrum scenario the cost to deploy and operate the network decreases while the efficiency of spectrum used increases. This can be achieved if multiple service providers have access to the network through wholesale relationships with the network operator.

The planned Sprint and Clearwire networks offer an example of how this type of arrangement can be advantageous to network operators: allow deeper reach into the addressed market (thereby increasing revenues), and allow new ways to bundle new, richer services. For instance, the partnership between Clearwire and satellite TV operators DirecTV and EchoStar will enable each party to offer a triple-play service and leverage their brand and relationship with the subscribers. At the same time, an increased number of subscribers using the network will lead to a more cost-efficient infrastructure.

Cooperation trumps competition

The planned partnership between Sprint and Clearwire shows how cooperation can be more beneficial to the market than competition. Cooperation enables both operators to deploy a more robust network that supports better performance and to do so in a cost effective way while also developing a combined footprint that is more attractive to subscribers and wholesale partners.

In turn, cost reduction should lead to the ability to offer affordable services to subscribers. Prices are unlikely to stay high due to lack of competition because there are other operators offering comparable wireline or wireless services using different technologies, so subscribers still have a choice.

In many markets, however, a fragmented spectrum scenario dominates. This is often due to regulatory efforts to ensure healthy levels of competition through the allocation of a high number of licenses with limited spectrum. This has worked very well for cellular networks

with limited capacity requirements, but it will not be as effective for mobile broadband unless spectrum allocations for mobile broadband licenses are substantially increased. In many countries there is not sufficient spectrum available to do so, and regulators are often reluctant to reduce the number of licenses to increase bandwidth per license.

This is, for instance, what is currently happening with the 700MHz spectrum in the US, which will be partitioned in licenses ranging from 10MHz to 22MHz. Despite all the talk about the development of a national wireless data network, to a large extent prompted by Google's declared interest for the spectrum, it is difficult to see how these spectrum allocations can be used to build a network that delivers true broadband in high-density urban and suburban areas. While the amount of spectrum required for a wireless broadband network will vary depending on the services to be supported and the expected number of subscribers, at least 30MHz of spectrum are likely to be required by an operator to be able to rollout the infrastructure in a cost-effective way—especially if it is a new entrant.

In some countries, operators also face restrictions in leasing or buying spectrum in the secondary market, and in establishing infrastructure sharing agreements with other operators. In other countries, the competitive environment or the operators' strategies are simply not conducive to infrastructure sharing and joint distribution agreements.

Whatever the causes are, spectrum fragmentation and lack of cooperation among operators will likely lead to intense competition among financially weak operators that will find it very difficult to reach profitability.

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