Analysis: Cheap Spectrum – But It Comes at a Price

By Keith Mallinson Wednesday, November 24, 2010

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Doing something different involves distinct costs and risks.

With cellular frequencies so expensive, it’s well seeking to bend the rules by asking for special dispensation to reallocate spectrum from other uses. LightSquared follows a well-beaten path in its plans to redeploy L-band satellite spectrum for terrestrial cellular services using LTE.

Spectrum costs can be a substantial proportion or even the majority of all costs in building cellular networks. In the United States, the AWS-1 and 700 MHz auctions raised totals of $14 billion in 2006 and $19 billion in 2008, respectively. Verizon alone paid $4.7 billion for the nationwide 700 MHz upper C-Block spectrum that came with open access conditions. The European 3G spectrum auctions around the millennium raised in excess of $120 billion for governments while severely hobbling carriers financially. Incumbent carriers felt compelled to seize a piece of these scarce resources so they could secure their futures in next-generation services.

UNCELLULAR NETWORKS

Nextel operated primarily in the same way as a cellular or PCS network and derived most of its revenues as such, but it was licensed for SMR. Its status was by virtue of the different spectrum band it used and its capability to provide push-to-talk —otherwise known as dispatch or direct connect – services. However, the iDEN technology employed also provided phone calling interconnect capabilities like any other 2G cellular technology. In the United States, Canada, Latin America and elsewhere in a few other nations worldwide, iDEN operators always insisted on licensing for lucrative interconnect as well as direct connect services.

Clearwire, now including Sprint’s Xohm, benefits from around 120 MHz of nationwide spectrum at 2.5 GHz. This was hitherto the Instructional Television Fixed Service (ITFS) and then Educational Broadband Service (EBS) spectrum, which also was inexpensive in comparison to cellular auction prices. This is being redeployed for two-way broadband cellular use with WiMAX that can use this unpaired spectrum by operating in TDD mode.

Whereas the EBS spectrum was largely lying fallow until Sprint and Clearwire started WiMAX deployments, some folks are unhappy with the reallocation. According to AccessDelray.org and the Outreach Network, “current rules and policy surrounding the 2.5 GHz EBS have allowed for manipulation as compared to the straightforward auction and transition of the 700 MHz spectrum. In 2008, auction of the 700 MHz spectrum netted $19.2 billion for the FCC. They spent millions on educating all Americans on this transition through TV ads, websites, rebates on equipment, etc. so all Americans still had access to ‘free’ TV. This did not happen with the acquisition of the 2.5 GHz Educational Broadband Service spectrum that Clearwire now controls. This spectrum was not auctioned; it was leased from our cash-starved community anchor institutions at extremely low lease values based upon misinformation and manipulation of the FCC rules and policy. These leases were not made public and no regional public participation was invited prior to enacting the lease.”

DOWN TO EARTH

LightSquared follows suit by being allowed reallocate a total of 40 MHz in mobile satellite services spectrum in the L-band (at around 1.6 GHz) for terrestrial use. This is particularly appealing for cellular use with LTE because it is paired spectrum.

The spectrum was obtained in a $1.8 billion transaction along with other
assets in the acquisition of SkyTerra. LightSquared’s terrestrial network will comprise 40,000 cellular base stations and is expected to cover 92 percent of the U.S. population, equivalent to just 8 percent of geographic coverage, by 2015. LightSquared has an eight-year agreement worth $7 billion with Nokia Siemens Networks to deploy, install, operate and maintain the network. LightSquared is still fundraising for the terrestrial network. Following the successful satellite launch on Nov. 14, 2010, SkyTerra is obliged to offer satellite services using a further 6 MHz of spectrum it also owns. This will cover the 92 percent of the United States the terrestrial network does not reach and provide data speeds of up to several hundreds of kilobits per second versus multimegabit speeds with terrestrial LTE services. In comparison to the terrestrial network, there will be very limited network capacity via satellite, with just one RAD center 22,000 miles high, notwithstanding its 22-meter antenna and 500 spot beams to maximize allocation of these resources and enable use of regular-sized phones and antennas.

NICHES OR MASS MARKET WINDFALLS?
Whereas these spectrum reallocations can save a lot of money in spectrum fees, a drawback can be that technologies required and spectrum bands used might remain niche with relatively low subscriber numbers in comparison to regular cellular markets. The implication is that equipment, including terminals in particular, could be proprietary or rather more costly than mainstream devices. For example, with the exception of a few phones such as some BlackBerries, Motorola was the sole supplier for SMR using iDEN technology. On the other hand, whereas WiMAX is only being used significantly by Clearwire in the United States so far, there are many other WiMAX operators worldwide and several technology vendors for this open standard.

Competition for 2.5 GHz usage and technologies is increasing and international spectrum prices are rising accordingly. The widespread availability of this spectrum band globally has prompted 3GPP to develop a TDD mode for LTE. This will arrest WiMAX technology growth and send it into decline from around 2015 as TD-LTE is deployed in China, India and elsewhere.

Doing something different involves distinct costs and risks. Greatly increased network capacity from much more extensive cellular reuse of frequencies is only possible terrestrially. It remains to be seen whether L band allocations will be refarmed elsewhere in the world, and if so, who will receive the windfall financial gains from this switch.