

iDirect Ka-band Satellite Strategy

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Advancing a Connected World



Introduction

VSAT industry analyst COMSYS reports strong growth of the satellite services market with a year-over-year rise of nearly 20% in 2009 for a total services market of USD\$5.4B. This growth has continued to strain the satellite space segment capacity market, leading satellite operators to look for new ways to meet the demand.

One of the resulting key technologies starting to emerge is the use of Ka-band frequencies on an increasing number of satellite payloads to provide this much needed capacity growth. In fact there have been well over 20 announcements of new satellite capacity already in place or planned for launch in the next several years, and more announcements coming nearly every month. This growth of Ka-band capacity today is testimony to a strong VSAT industry and exciting opportunities for both iDirect and our service provider partners.

This paper will explain the role of Ka-band capacity, provide an overview of the markets that can benefit, and articulate iDirect's strategy to address this opportunity.

The promising economies of Ka-band today

The increasing use of Ka-band satellites is a direct result of the industry's need to provide more satellite capacity at a lower cost. Traditionally, the VSAT market has relied on C-band and Ku-band capacity. However, there are a limited number of geosynchronous orbital slots that can be used for a given frequency band, and almost all orbital slots are accounted for with current and planned C and Ku-band satellites.

This has led to the emerging use of Ka-band satellites: since the frequencies used are different and don't interfere with current capacity, they can be positioned at the same orbital slots as C and Ku-band satellites.

When it comes to dollars, the cost of satellite capacity is directly related to the amount of capacity that a satellite can provide versus the cost of building and launching the satellite, as well as the expected lifetime of the satellite. The cost of building and launching satellites has not dropped significantly over the years, so the only viable strategy that an operator can use to lower capacity cost is to increase the amount of capacity on a single satellite. Ka-band fits this strategy well because the ITU has allocated 1 GHz of bandwidth to the commercial and 1 GHz to the military satellite markets.

Another approach for increasing capacity is to utilize numerous smaller spot beams that allow for frequency re-use, which has the net effect of multiplying the available capacity for a single satellite, lowering costs. Spot beams also allow for more powerful satellite coverage which can lead to the reduction in the size of ground-based antennae and RF equipment.

However, Ka-band frequencies have had a well-documented drawback relative to C and Ku-band: due to the higher frequencies of this band, there is a greater chance for loss of signal quality because of atmospheric weather conditions, otherwise known as rain fade. Though rain fade has been a considerable obstacle to broad adoption of Ka-band frequencies in the past, all that has changed. Recent technology advancements such as DVB-S2 with Adaptive Coding and Modulation (ACM) and adaptive return channels, both core components of iDirect technology today, have overcome this impediment.

All markets will benefit from Ka-band

Ka-band capacity will have a positive impact across a broad range of VSAT markets served today. In fact, we believe the use of Ka-band will actually lead to new market segments and verticals as the capacity grows and lower bandwidth prices emerge.

iDirect categorizes these markets into several broad market segments: consumer broadband, enterprise, mobility and military. Ka-band presents many advantages common to all of these markets, as well as some advantages unique to each.

Consumer Broadband Market

The consumer broadband market has been the first market to adopt Ka-band, and has done so with considerable success in North America. The reason is simple – this market has the most difficult economics and Ka-band has led to a significantly lower cost of space segment. In fact, the majority of new Ka-band satellites and payloads so far have had a strong consumer case driving them.

There are other economic realities that make consumer broadband satellite service a difficult business case, particularly the need for extremely low cost VSAT terminals. As a result, thin margins have forced service providers to become more vertically oriented by owning the satellite, manufacturing the ground equipment, and operating the service.

iDirect strongly believes that while there are opportunities in the consumer broadband market for service providers who are not completely vertically oriented, ultimately success will hinge on including service components from the other higher service value VSAT markets such as enterprise, mobility, and military.

Enterprise Market

The enterprise market has yet to be addressed by Ka-band satellites primarily due to one factor: unlike the consumer market, the enterprise users depending on satellite service cannot expose their critical business connectivity to the risk of an extended service outage in the event of a satellite failure. Backup satellites or alternate satellite capacity from another operator must be in place before the enterprise market makes the transition.

In the near future we see this need being satisfied as more Ka-band capacity is launched. Several operators have already announced plans for primary and backup satellites to address this issue.

Once these risks can be reduced to an acceptable level, we predict a strong and steady component of enterprise service offerings will take advantage of lower bandwidth costs. In fact, we believe these higher margin services will be a critical component of the service provider's business case.

Mobility Market

There are several factors that make the use of Ka-band spot beam satellites attractive to mobile VSAT users in the maritime, aeronautical, and land-based markets.

First, the physics of the higher RF frequency used for Ka-band will allow for smaller satellite dishes than the equivalent Ku-band dishes, and a fraction of the size of C-band dishes. Second, when these Ka-band frequencies are used in smaller but more powerful spot beams, the size of the satellite dish can be reduced even further.

The nature of the mobility market depends on stabilized satellite dishes that track the satellite as the vehicle moves. These stabilized dishes need to be placed on the vehicle in a location that has a direct line of sight to the satellite, such as on the communications tower of a maritime vessel or the top of the fuselage on an airplane. These locations are typically challenged by the area and/or height of the satellite dish that can be used and have impeded the broad adoption in some mobility markets.

Ka-band spot beam satellites will go a long way to overcome these impediments. Ka band dishes can be much smaller and typically range from 60cm-1.2m (2' to 4') in diameter because Ka band satellites have the shortest wavelength compared to the C, X or Ku band beams.

Military Market

In many ways the military market has the same needs as the enterprise market and the mobility markets combined: increasing throughput needs with high assurance of connectivity for fixed and mobile terminals. In fact, the very lives of soldiers often depend on reliable, secure communications.

As a result, the ITU has assigned a separate set of frequencies for military use, and many governments have already launched military Ka-band satellites, with more planning to do the same.

iDirect's role in Ka-band systems

iDirect has studied the Ka-band satellite market thoroughly, and we feel that we have a detailed and broad understanding of the requirements most critical for success. In fact, we work closely with new Ka-band consumer broadband operators to ensure our roadmap and technology paths are in sync.

Simply put, our primary advantage lies in our technology approach: the frequency agnostic nature of iDirect all hubs and remotes means that unlike others we're ready to work with Ka-band today. (All products use a standard L-band RF interface agnostic to the actual satellite frequency. They're already in use on the US Military WGS satellite program.)

Given this, our strategy is straight forward: we will continue to develop leading technology for the markets that we serve best, working closely with our RF suppliers to ensure access to a broad range of cost-effective RF gear that operate at the Ka-band frequencies.

Our industry-leading position in the enterprise, military, and mobility markets is a direct indication of our ability to succeed in Ka-band satellite systems. We will continue to evolve our technology, focused on these core markets today while keeping close eye on the consumer market as well.

As the demand for satellite communications continues to accelerate, we recognize that iDirect satellite operator partners must do everything they can to increase bandwidth efficiency and improve bandwidth management. Speedy adoption of broadband satellite services in Ka-band may well represent the greatest potential for our satellite operator partners to flourish across a broad range of vertical markets.

The bottom line: Ka-band satellites are a win-win for iDirect, our partners, their end users, and the industry as a whole.