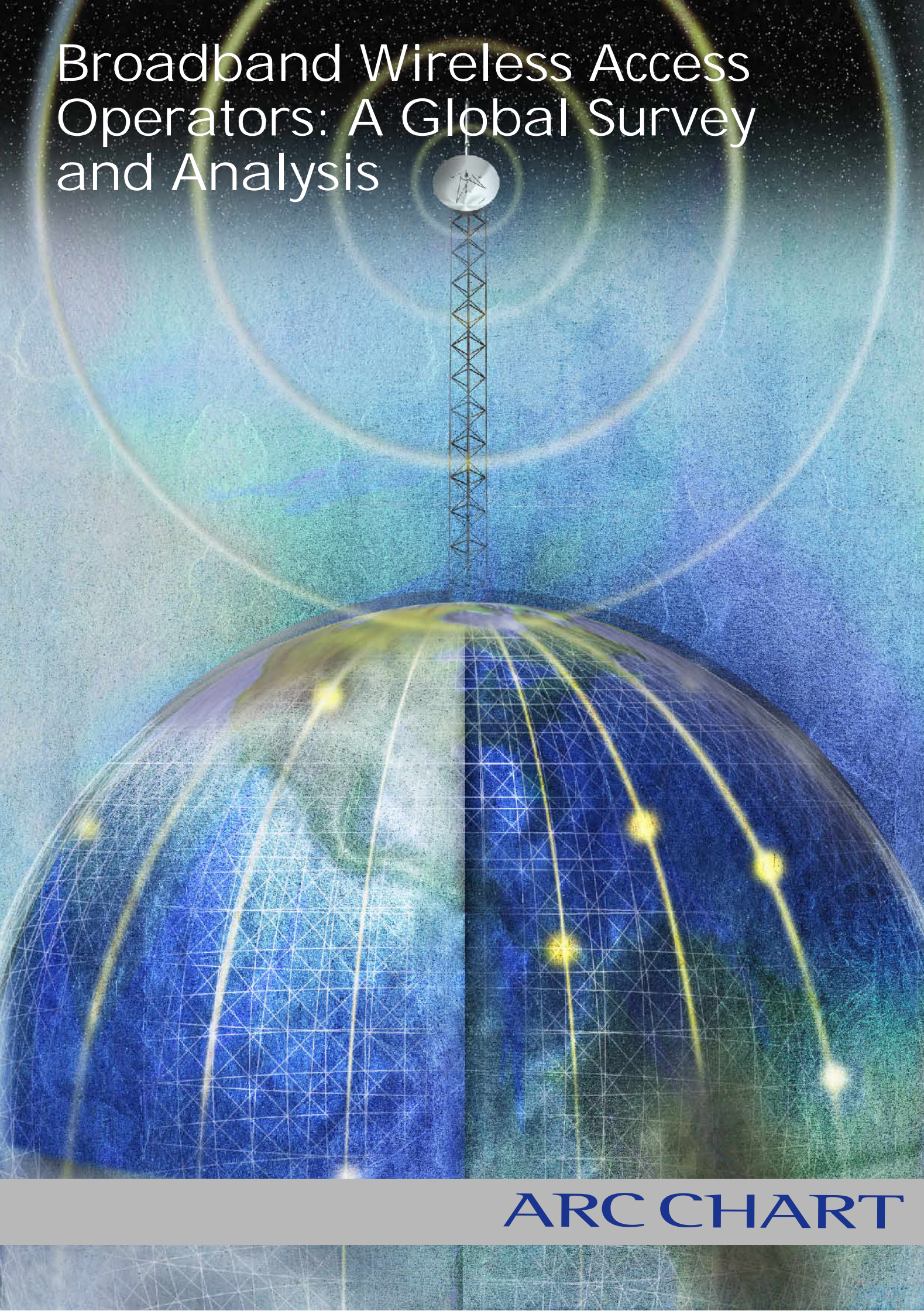


# Broadband Wireless Access Operators: A Global Survey and Analysis



**ARC CHART**

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## Executive Summary

New broadband connections in many world markets are growing at rates comparable with the expansion of 2G cellular networks during the 1990s. The majority of these new customers are being connected using wire-line technologies, such as DSL, cable and fibre. In places where wired networks either do not exist or are not enabled for broadband, service providers have turned to fixed, point-to-multipoint wireless as an access method that can cope with difficult geographical and demographic conditions. Broadband wireless access (BWA) operators have proliferated in recent years, yet, to date, few have reached the kind of scale that would make them a serious threat to their wire-line competitors. Rather, they are seen by many as niche players, who are willing to work the stony soil of the marginal areas, where others are unwilling to venture.

If we believe only a fraction of the hype about WiMAX, the industry is poised for a radical transformation, but how well do we understand the diverse set of companies who can be grouped under the general rubric of BWA operators? ARCchart canvassed 179 of the approximately 600 operators worldwide providing a wireless broadband service during 2006, creating what we believe to be the most comprehensive and up to date BWA operator study currently available. The objective of this survey is to create an accurate profile of the global BWA operator landscape. Operators were asked about their revenue; spectrum holdings; subscriber numbers; equipment suppliers; plans for future technologies, such as WiMAX; geographical coverage and residential/business split. This study provides a detailed analysis of this quantitative and qualitative research, along with in-depth profiles for 50 selected BWA operators from around the world, including: ClearWire (US), EarthLink (US), Aircable (Mexico), NEOTEC (Brazil), Telecom Namibia, Skyband Wireless (Malawi), Ektoo (Bangladesh), Lintasarta (Indonesia), Afranet (Iran), UK Broadband and Woosh (New Zealand).

A major conclusion is that BWA operators can be grouped into five basic types, each with its own approach to the market and prospects for the future. Our five Operator Types are: Large National, Early Stage Licensed, Mid-Sized Regional, Mom and Pop and Underdeveloped Opportunist.

The survey also reveals that the industry is still dominated by small-to-medium-scale operators. Most BWA operators turned over less than \$10 million during 2005; over 30% less than \$1 million; the majority have networks that cover less than 1000 km<sup>2</sup> and have fewer than 1000 subscribers. The majority of operators use unlicensed spectrum, in the 5 – 5.9GHz and the 2.4GHz bands. However, there is some evidence that the licensed bands – in particular 3.5GHz – are growing in popularity, as operators prepare for WiMAX deployment and respond to customers' increasing service expectations. A substantial minority still use Wi-Fi between CPE and base station, but the trend is for decreasing use of Wi-Fi in favour of more robust access technologies that are less prone to interference and better able to provide QoS.

The impact of competition from DSL in BWA markets is also illuminating. The great majority of our survey experienced some level of DSL competition, but far from ruining their business cases, it seems to have had a healthy Darwinian effect on the bloodline. In markets where DSL is present, BWA operators respond by offering faster bandwidths and cheaper tariffs than they do in non-DSL markets.

Possibly the starkest observation from the survey is the extent to which subscribers in the least developed regions pay more for their wireless broadband compared to those in developed economies, where mass market conditions have brought down prices dramatically over the last few years. Some of our Underdeveloped Opportunist operators are able to charge Club Class prices for Package Tour broadband. We believe that this situation will persist until BWA services can be accessed from radically low-priced end-user devices, based primarily on handheld rather than PC/laptop formats. ARCchart suggests that this will be a significant hindrance to the availability of low-cost broadband in the developing markets for at least the next three years.

In line with what is happening in wired broadband markets, most operators now offer maximum bandwidths in excess of 512kbps. The most common bandwidths are in the 1 – 2Mbps category, but a substantial percentage of operators offer speeds in the 2 – 10Mbps and >10Mbps ranges. Unsurprisingly, it is in regions where broadband penetration is at its lowest (Africa, The Middle East, parts of Asia and Latin America) that BWA operators tend to offer the lowest bandwidths.

The study identifies a top-five list of BWA equipment suppliers (Alvarion, Motorola, Airspan Networks, Aperto Networks and Navini Networks) but it is clear a wide range of vendors are competing in this game. Some seem to be subsisting on a tiny share of operators. We suggest, as the world converges on a small number of global BWA standards, that the highly fragmented BWA vendor market will become ripe for consolidation.

Large form factor and externally mounted CPE still predominate. Only a small percentage of operators offer exclusively indoor CPE. Those who do source their equipment from the recognised vendors of true indoor CPE, which include IP Wireless, Navini Networks and NextNet (now Motorola).

Given the fragmented and generally small-scale nature of the BWA service provider market, ARCchart believes that some consolidation is inevitable. This will probably be driven by large players expanding through acquisition of smaller competitors, but also, in a 3 - 5 year timeframe, through less technically advanced operators being forced out of business because they cannot offer their customers the advantages of mobility and guaranteed QoS.

The majority of operators in our survey said that they were either already using WiMAX (fixed) or were intending to use it within one year (mostly mobile). A similar majority believe that mobility is either important or very important for the future of their businesses. This will be welcome news for those who champion WiMAX, although we do sound a note of caution: some of the more serious BWA operators are being quite sanguine about when they will begin deploying WiMAX on a large scale. In markets where there is no competition from DSL or other technologies, operators still have little incentive to upgrade to WiMAX or to consider adopting lower-cost business models.

There are also variations in the challenges faced by our five main Operator Types. For the Large Nationals and Early Stage Licensed, the key challenge will be timely availability of access devices. Generally, these operators will be competing in metropolitan areas with established access to both fixed broadband (e.g. DSL) and wireless broadband (e.g. HSDPA and EV-DO). They will only be able to compete by offering mobility, requiring the availability of portable WiMAX devices i.e. laptops and handsets. The Underdeveloped Opportunists will need to adapt their business models and pricing structures as broadband penetration increases in their home markets. Mom and Pop will start to feel the squeeze as Large Nationals and Early Stage Licensed move into their neighbourhoods. The latter will become more of a significant presence as they

start to exploit their spectrum licences more fully, pushing out into new areas and achieving full national coverage. Also, the Mom and Pop reliance on unlicensed spectrum renders them unable to provide mobility, relegating them to niche areas where there is no competition from either fixed or wireless carriers. All operators will be under pressure to form roaming alliances as WiMAX becomes more ubiquitous, from 2010 onwards.

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