WiMAX, a Wireless Solution for Fixed Wireless Access in Emerging Markets

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APPLICATION NOTE

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Abstract

Emerging markets are hungry for fixed broadband services, however characteristics of ADSL limit the even distribution of fixed broadband services to encompass urban and rural areas. Of late, WiMAX has surfaced to substitute ADSL in these markets and the results are encouraging. This application note discusses why WiMAX is the way forward for fixed broadband and how WiMAX Operators can use the right end user devices to ensure successful deployment.

APPLICATION NOTE

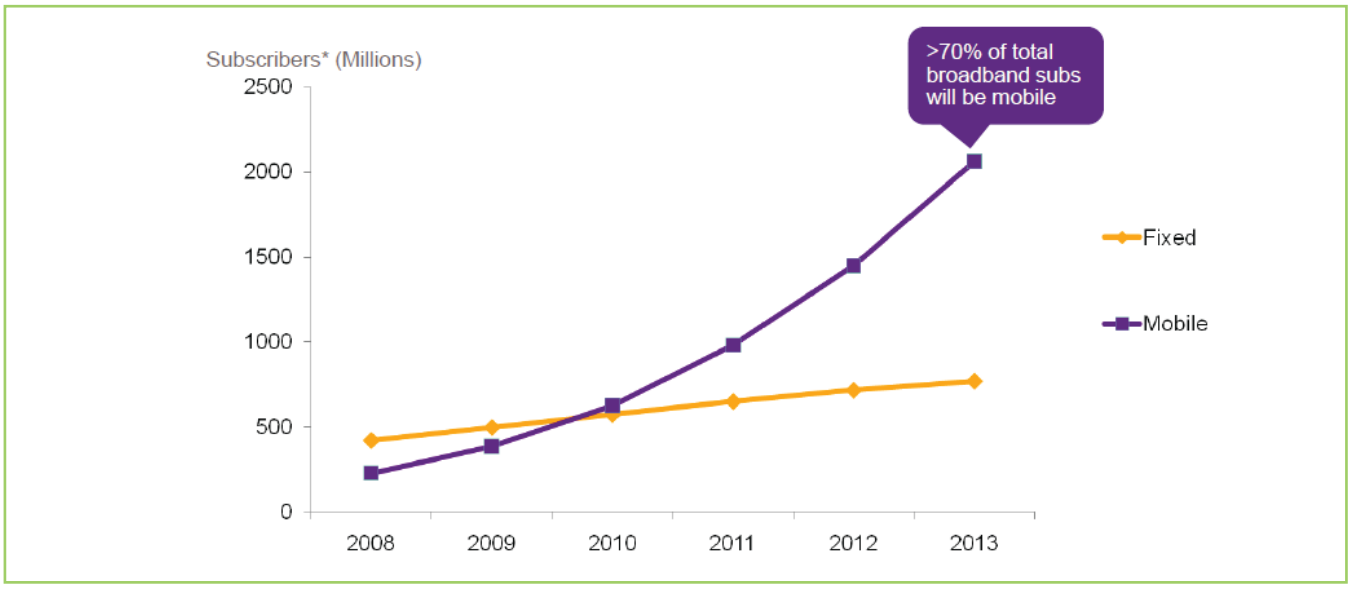
Wireless Broadband Races to Substitute ADSL

For many years, users around the world have relied on fixed Internet connections, from the humble beginnings of dial-up to more generous portions of bandwidth though broadband connectivity.

Recently, the emergence of wireless broadband has begun to challenge the landscape of fixed broadband. Though during its infancy stage, wireless broadband was regarded as a complimentary technology to empower mobile broadband, a sector outside the service perimeters of fixed line broadband operators, the scene has now changed to a competing one.

Especially in emerging markets, wireless broadband technologies such as WiMAX are now in direct competition with fixed (ADSL) operators, where wireless broadband is positioned for fixed, indoor use that caters for home and small office users. WiMAX holds this advantage as it began as a fixed wireless broadband connectivity (IEEE's 802.16d standard).

According to Qualcomm, the year 2010 will see the number of wireless broadband subscribers overtake fixed broadband subscribers as shown in Figure 1 below.



Source: Qualcomm

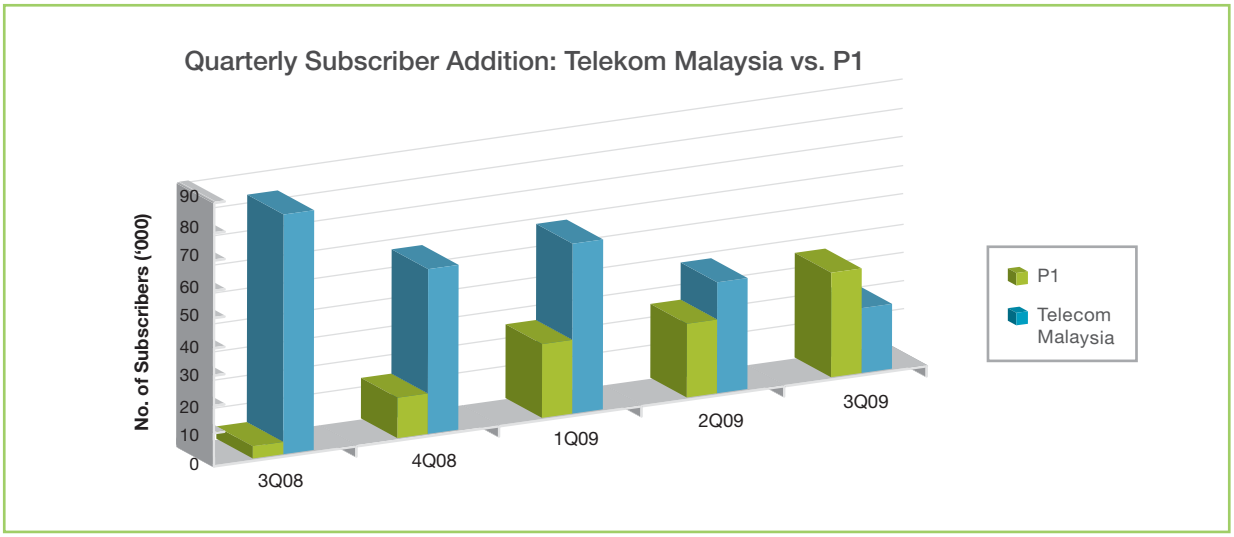
Figure 1: Rapid growth of global wireless broadband subscribers

How WiMAX Operators in Emerging Markets Fare Compared to ADSL?

Several WiMAX Operators in emerging markets around the world have been experiencing exponential growth which poses new threat to fixed broadband operators. Their success proves the fact that an increasing number of subscribers opt to use wireless broadband technologies such as WiMAX for their fixed broadband needs. Here are 2 success stories from emerging countries where subscribers are looking up to WiMAX for their fixed broadband needs.

Packet One Networks (P1), Malaysia

Packet One Networks (P1) is Malaysia's first and leading WiMAX telecommunications company, offering the country's widest WiMAX network. P1 launched commercial services in August 2008 and in less than 18 months, the company established a strong and promising position to challenge the incumbent Telekom Malaysia (TM) in the fixed broadband sector. P1 continued its steady growth and by Q3 2009, P1's quarterly net additions exceeded that of TM's declining numbers, as shown in Figure 2 below.



Source: Informa Telecoms & Media

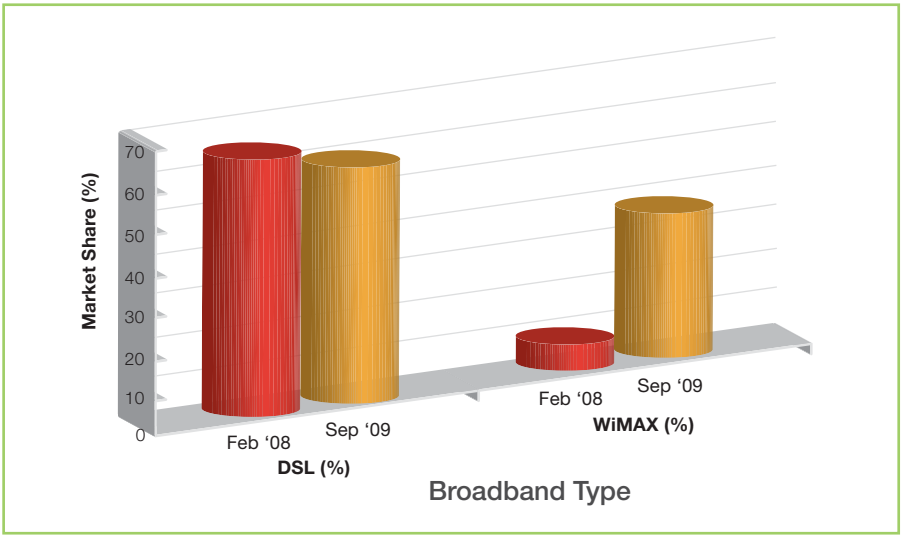
Figure 2: Quarterly subscriber net additions: Telekom Malaysia vs. P1

According to Michael Lai, CEO of P1, 90% of P1's subscribers opt for P1's desktop modem for fixed broadband services which proves that Malaysians keen to adopt wireless broadband technologies for their fixed broadband needs.

Pakistan

The WiMAX-mania has certainly hit Pakistan's broadband market and is intimidating DSL services of Pakistan Telecommunications (PTCL).

DSL currently reaches 12% of Pakistan's 29 million households, it is no wonder that WiMAX is fast emerging as the preferred fixed wireless broadband network and is contributing to the overall growth of broadband in Pakistan. With 2/3 of Pakistani population residing in rural areas unreached by DSL, WiMAX has risen as the 'saviour' broadband technology to bridge the digital divide between urban and rural markets. Findings from Business Monitor International (BMI) show WiMAX experiencing rapid growth against DSL's diminishing market share as shown in Figure 3.



Source: BMI

Figure 3: Growth rates of DSL and WiMAX

During the early stages, WiMAX faced a slow start in spite of launching services as early as December 2007, however this changed when Mobilink stepped into the WiMAX market in October 2008. Today, collectively four WiMAX Operators (Wateen Telecom, Wi-Tribe, Qubee and market leader, Mobilink) are challenging DSL services in Pakistan with subscriber growth as high as 350%[1] within one year.

[1]Informa Telecoms & Media, growth rate from Q3 2008 to Q3 2009

Why WiMAX is the Way Forward for Fixed Broadband?

Cheaper and Faster to Deploy

Broadband experts believe that WiMAX can provide a more cost-effective broadband access solution compared to ADSL for the simple reason that signals are carried through the air via radio waves as opposed to ADSL's copper lines. Absence of copper lines eliminates the need for soil digging and cable burials which lowers deployment costs.

According to Roberto Martinez, Regional Director of Canieti (Mexico's electronics, telecommunications and IT association), WiMAX is cheaper to deploy than DSL and should result in the widespread of broadband at higher connection speeds.

How much cheaper is WiMAX' deployment cost? A network's cost is generally determined by its Total Cost of Ownership (TCO) which involves Capital Expenditures (CAPEX) and Operation Expenditures (OPEX). While CAPEX and OPEX calculation may differ from operator to operator, for the purpose of cost comparison, Greenpacket treats CAPEX as the cost involved in purchasing network as well as supporting equipment and the cost of deploying the network which range from site acquisition and installation. On the other hand, OPEX incurs on a recurring basis, encompassing site rental, power consumption and maintenance costs.

Greenpacket selected a town within a South East Asian country* to examine the CAPEX difference between WiMAX and ADSL deployment in this town.

WiMAX Network Deployment CAPEX

Phase	Cost (USD)
Network Planning	$52,500.00
System Equipment	$528,000.00
Software	$66,000.00
Installation & Configuration	$151,000.00
Miscellaneous	$2,500.00
TOTAL CAPEX	**$800,000.00**

ADSL Network Deployment CAPEX

Phase	Cost (USD)
Network Planning	$67,500.00
System Equipment	$1,503,000.00
Software	$56,500.00
Installation & Configuration	$934,000.00
Miscellaneous	$5,000.00
TOTAL CAPEX	**$2,566,000.00**

Figure 4: Cost comparison of WiMAX and ADSL network deployment CAPEX

Total Savings (via WiMAX deployment) = USD $1,766,000.00 (221%)

The above calculation proves that it is more cost-effective to deploy a WiMAX network compared to ADSL. The CAPEX spending for ADSL network deployment exceeds WiMAX by USD $1,766,000.00 or 221%.

**Location details have been withheld to protect the interest of WiMAX and ADSL Operators in the country. Figures stated in the table may vary significantly in different regions and countries.*

Aside from lower cost of deployment, WiMAX is easier and faster to deploy compared to ADSL – this presents an attractive opportunity in emerging markets where wired infrastructure is not widely available or requires costly upgrades to support broadband services.

This is because WiMAX signals transmit through radio waves and does not require the hassle of laying cables and extensive digging. Hence, WiMAX provides a faster and more efficient method of providing broadband connection, particularly in archipelagoes and countries with mountainous terrains. Additionally, selected WiMAX modems are plug and play, so subscribers can enjoy instant connectivity hassle free. On the contrary, ADSL requires house-to-house visits which lengthens the installation process and involves high labour cost.

WiMAX is also used to complement ADSL in dead zones caused by difficult deployment and aging copper cables.

Answer to Underserved Areas

Quite often users living in remote areas are deprived of broadband connectivity due to geographical limitations. One of the primary advantages of WiMAX is its ability to extend broadband access to rural areas which are beyond the reach of ADSL and cables making it a cost-effective last-mile solution for stretching broadband beyond urban areas to narrow the digital gap.

In emerging markets, the rural population ranges from 32% to 67% of total population and thus, should not be neglected as far as broadband connectivity is concerned. There are several reasons that positions WiMAX as the ideal fixed broadband candidate in rural areas.

- Ease of deployment lowers cost
  In rural areas, consequences of scattered residential areas, lack of main infrastructure such as electricity and roads, plus unfriendly environmental conditions complicates the installation process. With WIMAX' NLOS and LOS coverage advantage, WiMAX Operators benefit from high installation success rates and controlled deployment cost.

- Wide coverage
  Thanks to its OFDM technology, WiMAX is optimized to provide excellent NLOS coverage in the most economical way.

- Scalability
  WiMAX can be deployed according to market demands (which keeps CAPEX low during initial deployment) and easily scalable to support growing bandwidth needs without heavy financial strain.

WiMAX' capability of reaching underserved areas has indeed propelled its popularity over a short period of time. WiMAX Forum® reported 430 million POPs worldwide as of March 2009 and expects this number to reach 800 million by 2010 and hit the billion mark by 2011.

There have been numerous success cases where WiMAX provides connectivity to underserved areas.

WiMAX @ Lai Cai, Vietnam

In Lao Cai, one of Vietnam's most remote and mountainous provinces, Internet dial-up connections were slow and unreliable while broadband options were very limited and expensive.

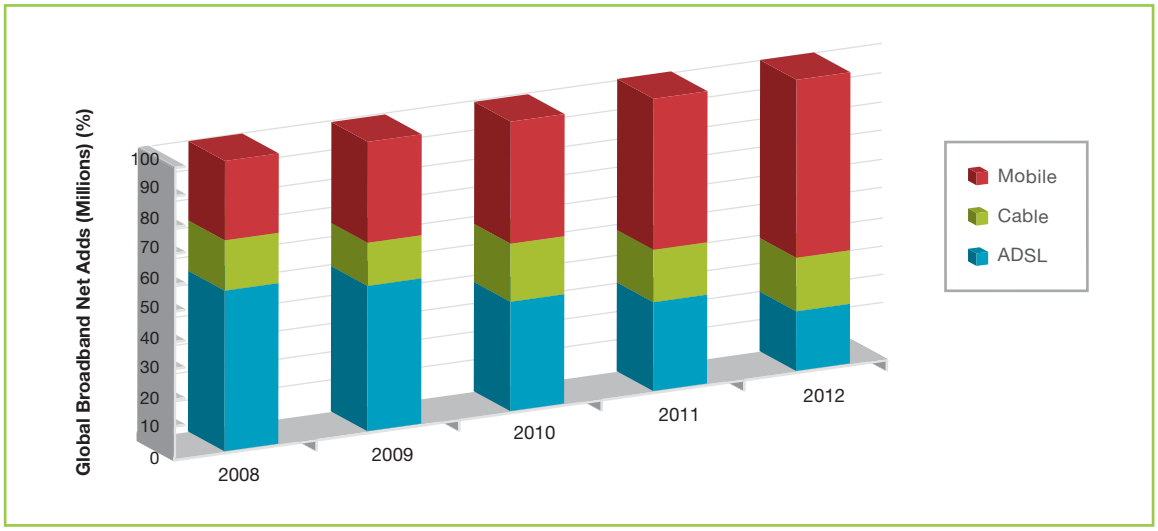
As part of Intel World Ahead program to bring uncompromised technology to developing countries to improve accessibility, connectivity, education and content, Intel, United States Agency for International Development (USAID) and Vietnam Data Communication Company (VDC) used WiMAX to extend fixed broadband and VoIP telephony to Lao Cai. WiMAX indoor modems were installed at the local post office, Internet cafés, government offices, schools, healthcare centers and hotels.

Mountainous province of Lao Cai.

Natives of Lao Cai.

Easily Scalable For Nomadic Use

While fixed broadband has encountered phenomenal growth around the globe, today's trend is inclining towards mobile broadband for the simple reason of anywhere, anytime Internet access. Mobile broadband growth is forecasted to double or triple that of fixed broad¬band over the next few years. According to In-Stat, the net adds for mobile broadband is expected to exceed ADSL by 3 times, as shown in Figure 5.



Source: In-Stat

Figure 5: Global Broadband Net Adds

The beauty of WiMAX (based on the IEEE 802.16e standard) is its ability to support nomadic and mobile use which is not an option with ADSL.

WiMAX Operators have the flexibility of offering both fixed broadband and eventually graduate to economically offer nomadic broadband without major disruption to existing core network infrastructure. Infact, some Operators are bundling both fixed and nomadic WiMAX for a wholesome connectivity experience.

Additionally, once mobile WiMAX devices such as smartphones are available retail, WiMAX will meet its vision of enabling true Internet mobility.

Better Data Application Support

Compared to the dial-up era, emergence of broadband has tremendously fueled the data-craze globally. The availability of attractive bandwidth-hungry applications and services, such as YouTube, gaming, IPTV and more challenge the bandwidth capabilities of wired and wireless networks in a greater manner. According to Senza Fili Consulting, 80% of traffic usage occurs indoor which means users rely on their fixed broadband connections to enjoy data applications.

As the demand for data is surely set to increase every year, Figure 6 illustrates that not all broadband networks are able to cope with the demand. WiMAX upholds a higher bandwidth (both downlink and uplink) compared to ADSL+2. Additionally, WiMAX's core strength since conception is that this network is designed for data optimization which gives WiMAX an edge over other broadband technologies in the market. Hence, with the overwhelming demand for data, WiMAX handles data traffic efficiently and is easily scalable to contain future radical data needs.

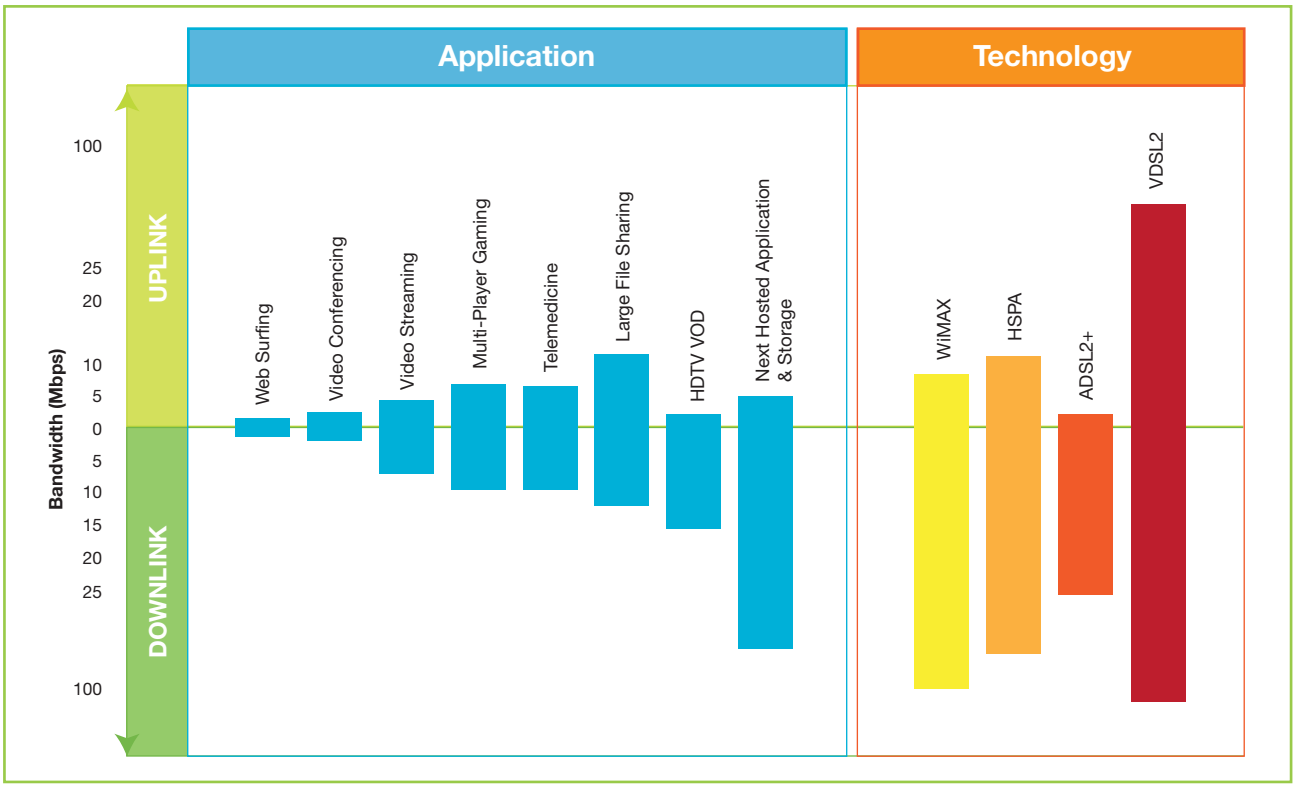


Figure 6: WiMAX provides better data application support compared to ADSL2+

Greenpacket, Partnering Operators to Build a Strong Wireless Fixed Broadband Network

Many factors play a role in ensuring subscribers receive robust and good quality connectivity. Aside from reliable core network infrastructure and a well planned network layout, WiMAX modems play a vital role in channeling connectivity to the last mile. Furthermore, the modem is a subscriber's direct interface with the network connectivity, hence it is essential that WiMAX Operators offer dependable and field-proven modems to subscribers.

Tower, World's Leading WiMAX Indoor Modem

Tower is part of Greenpacket's portfolio of next generation Wave 2 compliant WiMAX Modems for residential and enterprise users. It is a WiMAX Integrated Access Device (IAD) that features a blend of aesthetics, data and voice access ports, high gain antennas with omni directional performance to offer best-in-class performance. Tower is packaged with a high speed wireless LAN access point that enables multiple WiFi-enabled devices to enjoy WiMAX connectivity anytime within indoor perimeters.

Tower is designed to support WiMAX Operators in building a strong fixed wireless broadband network by focusing on 3 key areas:

Figure 7: How Tower supports WiMAX Operators to build a strong fixed wireless broadband network

Optimized for Indoor Use

Indoor coverage has always been a known challenge for wireless technologies and it does not differ with WiMAX, though high spectrum utilization and throughput are the prominent advantages of this technology. As such, WiMAX Operators need to optimize indoor coverage as fixed broadband users access the network from indoor locations.

There are frequent initiatives on the backend system (Radio Access Network or Core Network) to optimize the network however, indoor coverage remains unsatisfactory. The WiMAX ecosystem, particularly Operators need to understand that WiMAX modems also play an active role as part of the subsystem to improve indoor coverage. With this formula in place, WiMAX is no longer subject indoor penetration issues and equals ADSL as far as reliable indoor coverage is concerned.

As a result of Greenpacket's extensive R&D efforts, Tower features the following qualities that make it supreme for indoor use.

- High gain omni antenna
  The omni antenna radiates and receives WiMAX signals from any direction for great flexibility in modem placement and all-direction performance while the high gain (5dBi) antenna ensures WiMAX signals are transmitted in spite of penetration loss, resulting in improved indoor signal indoors.

- Reduces signal penetration loss
  Since WiMAX signals are emitted through radio waves, placing the indoor modem near the window significantly boosts penetration as opposed to a location deeper into the room. This is because radio wave penetration loss for glass (6dB) is much lower than the penetration loss for concrete walls (13dB or more) and lower loss of dB translates to better indoor coverage.

  As such, the exterior design of Tower is built with high quality material that withstands high temperatures so that it can be placed near the window.

- Boosting indoor coverage with WiFi
  It is not always convenient to restrict computer usage to an area that is next to the window. Tower uses WiFi to complement the WiMAX signals, enabling WiMAX-In-WiFi-Out. Thus, although the modem is placed near the window, WiMAX signals are projected to the entire home or office (single floor) via WiFi. Additionally, subscribers can enjoy the convenience and flexibility of sharing the WiMAX connection with multiple users.

- VoIP Capabilities
  With 2 built-in VoIP ports, Tower enables WiMAX Operators to extend fixed-voice services for a more wholesome package above data services. Voice can be leveraged as an add-on feature to increase revenue gains.

Reduces Customer Support Effort

Fast deployment should not only apply to the backend system but last mile access as well. For this reason, Tower is designed to be truly plug and play, enabling subscribers to enjoy instant WiMAX access minus the complexity. Easy installation reduces education efforts and aids in subscriber acquisition efforts. Additionally, with plug and play, onsite installation is not required which reduces reliance on customer support personnel.

Tower also supports state-of-the-art device update and management mechanisms based on the Open Mobile Alliance (OMA) standard. It enables device provisioning and over-the-air software/firmware updates as well as configuration to ensure Tower is kept up-to-date. Through fault management and diagnosis procedures, device errors can be escalated for immediate troubleshooting and real-time resolution. These measures help WiMAX Operators reduce onsite support demands and heavy maintenance efforts.

Increases Subscriber Adoption

The old school of broadband merely concentrated on extending connectivity. In today's generation of broadband, style and rich content matters. Tower is created with strong aesthetic value so that it appeals to trend conscious subscribers.

Aside from style, Greenpacket's Tower offers more than a modem. It can be integrated with Infinit Services Management Platform (ISMP), a carrier-grade solution that enables Operators to host and manage their own Application Store, affording them the opportunity to increase subscriber adoption efforts and grow ARPU through the sale of applications. It's an all-in-one solution that handles the complete works of an application store platform, from content submission to billing.

ISMP is designed to integrate with Operators' existing billing system. This provides a secure payment environment for subscribers (no need for credit cards) and for Operators, billing can be managed from a single touch point.

ISMP is also architectured to intelligently utilize available CRM data and recommend relevant applications to subscribers, based on lifestyle patterns and purchase behaviour.

Figure 8: Infinit Services Management Platform (ISMP)

Go Wireless and Build Your Fixed Broadband Network Today!

Operators around the world have selected have successfully leveraged on WiMAX to build next generation fixed broadband networks that cater to urban and rural population. At Greenpacket, we have helped many WiMAX Operators establish a successful fixed broadband network through our best-in-class and award-winning indoor modems. Let us show you new perspectives on how to effectively improve connectivity and impress subscribers.

With Greenpacket, limitless freedom begins now!

Free Consultation

If you would like a free consultation on selecting WiMAX modems for your fixed broadband network, please contact us at marketing.gp@greenpacket.com (kindly quote the reference code, APFB10 when you contact us).

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About Greenpacket

Greenpacket is the international arm of the Green Packet Berhad group of companies which is listed on the Main Board of the Malaysian Bourse. Founded in San Francisco's Silicon Valley in 2000 and now headquartered in Kuala Lumpur, Malaysia, Greenpacket has a presence in 9 countries and is continuously expanding to be near its customers and in readiness for new markets.

We are a leading developer of Next Generation Mobile Broadband and Networking Solutions for Telecommunications Operators across the globe. Our mission is to provide seamless and unified platforms for the delivery of user-centric multimedia communications services regardless of the nature and availability of backbone infrastructures.

At Greenpacket, we pride ourselves on being constantly at the forefront of technology. Our leading carrier-grade solutions and award-winning consumer devices help Telecommunications Operators open new avenues, meet new demands, and enrich the lifestyles of their subscribers, while forging new relationships. We see a future of limitless freedom in wireless communications and continuously commit to meeting the needs of our customers with leading edge solutions.

With product development centers in USA, Shanghai, and Taiwan, we are on the cutting edge of new developments in 4G (particularly WiMAX and LTE), as well as in software advancement. Our leadership position in the Telco industry is further enhanced by our strategic alliances with leading industry players.

Additionally, our award-winning WiMAX modems have successfully completed interoperability tests with major WiMAX players and are being used by the world's largest WiMAX Operators. We are also the leading carrier solutions provider in APAC catering to both 4G and 3G networks and aim to be No. 1 globally by the end of 2010.

For more information, visit: **www.greenpacket.com**.