



Brazil LTE, WiMAX and Broadband Wireless Market Analysis, 2010

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1. Executive Summary

Brazil represents a huge potential market for the fixed and mobile wireless access industry. Cable penetration is low and ADSL has well-known physical distance limitations. Copper quality is also poor, which makes wireless a viable alternative to provide access to consumers and businesses in dense urban areas. The country has the highest population in Latin America – with over 198 million POP as of July 2010, one of the lowest broadband penetrations at 5.6%, and many rural and underserved areas (110 million people still do not have broadband access). As such, there are attractive opportunities for service providers to address this broadband-hungry nation.

This report analyses the present regulatory situation for WiMAX and 4G in Brazil, including the 2.5-2.6GHz, 3.5 GHz and 10.5 GHz bands, as well as 3G bands, including the 850 MHz, 1.8 GHz and 1.9/2.1 GHz. It provides detailed profiles of Brazilian WiMAX players, including their deployment status and their reaction to the recent public consultations N°31 and N°54. We have added a special section dedicated to the [“Latest Regulatory Update on 2.6GHz spectrum refarming”](#). This report also synthesizes the participation of mobile players and the spectrum that they have each been allocated. Finally, it provides Maravedis’ assessment of future prospects for the Brazilian wireless market.

Four years ago, many saw Brazil as a country with a promising future for WiMAX. However, given the unfavorable regulatory environment and the continuous delays of WiMAX spectrum auctions, this perspective changed, leaving room for question as to whether or not WiMAX mass adoption will ever come to fruition. On the other hand, cellular and 3G services have gained tremendous success in the country; with 189 million mobile subscribers reported in August 2010, the country has today a mobile penetration rate of 95%.

Demand for wireless broadband access is intensifying in the country, but the lack of sufficient spectrum has delayed the commercial network deployment plans of many players. 75% of the 3.5 GHz band remains tied up in government red tape, as the auction of this spectrum has been postponed several times over the past 4 years. The 2.5 GHz spectrum band has historically been in the hands of MMDS operators, who have been impeded from deploying mobile WiMAX networks to avoid competition with 3G players, but a recent regulation will permit the use of this band for mobile broadband services by spectrum re-farming. The 700 MHz band is currently being used for broadcasting services, and the 450 MHz spectrum has not been auctioned.

In early 2003 ANATEL allocated five 3.5 GHz licenses to Embratel, Vant Comunicaoes, WKVE, Grupo Sinos, and DirectNet (later was acquired by Neovia). Only 25% of the available spectrum was allocated, and the remainder was to be awarded in a second auction planned for 2006, but numerous irregularities and scandals have postponed this auction several times since then. Of the five 3.5 GHz license holders, only two – Neovia and Embratel – have commercially deployed WiMAX networks. The other three are small service providers who have been using their spectrum to deploy small-scale proprietary systems.

In November 2008, ANATEL held a public consultation (N°54) on the attribution of the remaining 75% of spectrum in the 3.5 GHz band. The regulator proposed to make this band available to three types of companies: Mobile Operators for Mobile Services for Mobile Personal Services (MPS); Wireline Providers of Fixed Commutated Telephone Service (STFC); and Providers of Multimedia Communication Services (SCM). ANATEL also proposed to allow mobile services in this band, and to allocate one portion for the public sector for government, municipal and federal use. Many service providers were not happy with the proposed allocation and openness of the 3.5 GHz band to mobile telcos and wireline companies. Other companies such as Intel, Neovia and Grupo Claro were in favor of the new proposition. For the moment, no operator but Embratel has enough spectrum (21 MHz nationwide, with 35 MHz in Sao Paulo and Rio de Janeiro) to deploy a large scale WiMAX network in Brazil. Embratel launched an 802.16e-2005 WiMAX network with Motorola in March 2008, however the operator is to deploy fixed services only, since ANATEL does not currently permit mobility in the 3.5 GHz band.

The 2.5 GHz band was allocated for MMDS services in 2002, and later in 2006 ANATEL allowed MMDS operators to use 186 MHz of this spectrum to provide data services as well.

MMDS services have made almost no progress, except to a small extent in some rural areas. All MMDS operators are using their 2.5-2.7 GHz spectrum to provide broadband wireless services, however these are not WiMAX services, since ANATEL did not allow them to operate WiMAX equipment in this band. MMDS operators are providing broadband wireless using a DOCSIS system and NextNet (Now Motorola) equipment. In previous years MMDS operators conducted several WiMAX trials in Brazil with Samsung, Nortel and Motorola; however ANATEL did not provide certification for the equipment that operates in the 2.5 GHz band, which it considered could represent a threat to 3G services.

ANATEL launched another public consultation (N°31) in March 2009 to consider changes to the 2.5 GHz band regulation. The consultation proposed a 2.5 GHz band plan with FDD 2x70 MHz for MPS and the 50 MHz center for fixed applications. With this consultation ANATEL proposed to take a big chunk of spectrum from MMDS operators and allocate it to mobile services. Considering the responses received from the public consultation N° 31, ANATEL resolved to re-form this spectrum in a the resolution N° 544 published on August 11, 2010. ANATEL's decision will permit to allocate spectrum in the 2.6GHz band to support nationwide deployment of Next-Generation Mobile Broadband services under a technology neutral scheme, meaning that either WiMAX or LTE can be deployed in this band.

Under the new regulation MMDS operators will be operating in the entire 2,500-2,690MHz frequency until June 30, 2013. After that date, MMDS operators will be removed part of their 2.5GHz spectrum and will only keep 50MHz of TDD and 2 x 10MHz of FDD (a total of 70MHz). The remaining spectrum will be auctioned off by 2012 for the provision of mobile broadband services; 120MHz will be allocated in this auction, however winning bidders are expected to deploy until 2013 after the spectrum is freed from MMDS operators. 15MHz will be allocated for Limited Private Services (SLP), for governmental use. A special section of this report is dedicated to **"The Latest Regulatory Update on 2.6GHz Spectrum Refarming"**

It is well known that if this spectrum is allocated to mobile operators, the last thing they would do is to deploy a WiMAX network, in favor of providing 4G/LTE services. If the later is true, WiMAX has no chance to be deployed in the 2.5 GHz band in Brazil.

Brazilian mobile operators don't have enough 3G spectrum to satisfy the increasing demand of mobile services, nor to deploy 4G at this moment. Out of 198 million of inhabitants, over 189 million are mobile subscribers – 3G has been a complete success. Major Brazilian 3G players include Portugal Telecom, Telefonica, Telecom Italia, Claro, Oi, and others.

WiMAX's progress in Brazil has been difficult, and there are limited opportunities for its future. Many obstacles will have to be overcome before it can reach market momentum. One of these is the regulatory environment; second, if the 2.5GHz spectrum is allocated to mobile operators, this band will be used for 4G/LTE services rather than WiMAX. Brazilian WiMAX service providers do not have the financial resources to invest in a WiMAX network and bid for the spectrum against the 3G operators, except for some such as Telefonica, who could opt to deploy LTE rather than a mobile WiMAX network. Finally, 3G has been a tremendous success in Brazil, and mobile operators need additional spectrum to keep expanding and upgrading their networks. Given that no other band is available (such as 700 MHz, which is used for broadcasting services), the only option available is to wait for the new 2.5 GHz auction.

Broadband in Brazil demonstrates high growth potential. First of all, Brazilian broadband density is still significantly lower than developed countries – for every 100 inhabitants only 2.1 have broadband access. Residential access is still strongly based on dial-up connection (52% of the population). Low cable penetration and limited availability of ADSL have contributed to low broadband penetration.

Fixed WiMAX still has a good chance to develop in Brazil once the remaining 3.5 GHz spectrum is auctioned. 2010 is a landmark year for the Brazilian telecom market. The new regulation on the usage for the 2.5GHz spectrum will foster competition, investment in the sector, new entrants, and the opportunity for mobile carriers to benefit from economies of scale that the GSM ecosystem offers. Furthermore, auctions are expected to occur for the 3.5 GHz, and 450 MHz bands and the remaining 3G spectrum.