## A 3G story that makes sense

# Romania Zapp embraces CDMA

Zapp embarked on the CDMA 2000 journey as early as in late 2001 when it launched commercially the world's first CDMA450 network. In less than six years, Zapp has obtained a subscriber base of over 500 thousand, making it the biggest CDMA operator in Romania.

By Victor Stan, Vice President and CTO of Telemobil S.A.

The telecommunications market is quite robust in Romania. Mobile phone penetration is ranging above 80% these days. Fixed lines are going down, which is quite common worldwide. What is interesting to notice here is that fixed line penetration is even below 20% in 2006, which gives Zapp tremendous opportunity to take additional niches.

## Strategy and key factors to success

Zapp's history started back in 2001 when we were licensed to use 450MHz spectrum. We launched commercially the world's first CDMA450 network in December 2001. Within two-and-half years, we achieved the EBITDA breakeven, which was quite remarkable and surprising given that we hadn't expected to make such a good business with just two kinds of terminals.

The launch of EV-DO Rev.0 450MHz in 2004 was the second one in the world. Later in early 2006, we deployed WLL services in our network. Then in 2006, we successfully acquired the 2100MHz spectrum, the fourth 3G license in Romania. In 2007 we hope to successfully launch the first EV-DO Rev. A network in 450MHz /2100MHz dual-band environment.

The customer base evolution of Zapp is quite linear so far. We have over 500 thousand subscribers today. They are 100% post-paid customer base. We are proud of the market share we achieved in the post-paid market. As the 4th entrant into the market, competing with the multinational GSM operators such as Vodafone, Orange and Cosmote, Zapp managed to succeed thanks to its technology choice, spectrum choice and the strategy choice.

### Technology choice

As far as technology choice is concerned, frankly speaking, CDMA 2000 was the only choice we had, as it was the only 3G technology that fit for 450MHz spectrum, thanks to its 1.25 MHz allocation. No other 3G technology at that time could do the same and basically we are happy to have chosen this technology because it has extremely high capacity in both voice and high speed data offerings with intensive traffic profiles. Also, it offers multi-band support and smart interoperability with Bluetooth and WiFi devices to enable innovative mobile applications.

### Spectrum choice

From the spectrum perspective, 450MHz spectrum enables large and cost-effective coverage whereas 2100MHz is just a foundation for high capacity in metropolitan and urban areas. With our licenses we have the freedom to basically put this capacity plant when and where it's needed. That would be transparent for end users, and users will not see or perceive any difference between rural on-the-road and urban services. They will always perceive that metro offers continuous 3G services countrywide, but in fact, they will just jump from one mode network to dual-band layer in the course of voice or data communications.

### Strategy choice

The strategy choice we made was a convergent strategy. We never look at 450MHz and 2100 MHz spectrum allocation plus CDMA 2000 as good enough ingredients to go mobile. Without the convergent approach the operators can't see much hope to improve ARPU or make money in the future. Therefore we try to look at the future telecom as the "convergence future", a mixture of voice and data, urban and rural, and mobile and fixed, which altogether enable us to cross-sell our products based on different synergies on the market. The synergies don't necessarily mean more money but they are definitely increasing loyalty and making operators invest less in the retention and focus on the growth.

At the service instance level, we adopt a divergent positioning, which is an untypical approach compared to typical 3G

application and solution perceived today in the market. What we are trying to specialize in is end user terminals. The terminal choice is not one or two terminals anymore. There are thousands of terminals ranging from mobile to fixed and broadband modems. None of them is like a typical 3G terminal combining MTS, GSM, Bluetooth and WiFi altogether. They are quite specialized for the function they are mainly used for. We believe that by splitting several types of terminal, we can minimize the handset subsidy, improve the reliability of the service, and therefore enhance our profitability and increase the customer satisfaction.

On the data side there aren't many business models established yet. So we have the luxury to experiment various plans and various fees perception by the market. We have seen that basically only the flat-fee, perceived down-limited tariff plan really flies. In fact this practice should be well-known by the DSL business so far. In all countries, you can immediately pick the differentiator in DSL offering, and get flat-fee unlimited good packages. We believe that if we, as wireless operators, have enough coverage capacity to support that, that's the key to enable 3G applications moving, portable and so forth.

On the market side, we are facing a very stiff competition from GSM which a mobile voice market forces us to stay quite squeezed in the middle segment of SME/SOHO. It isn't sufficient for the long run. We need to conquer the market segments like the corporate and consumer segments. We have several milestones also to be achieved before doing this successfully.

One of them is to achieve complete and full nationwide coverage of 450MHz network which is not completely done yet, as GSM 900 is still better than us. 2100MHz network enables us to launch several attractive products like flat-fee voice and flat-fee data services. New terminals appear in the market, and the pressure for the lower pricing of terminals keeps increasing. Many people think that 3G just gives access to Internet and Internet has an infinite range of applications. We need to bring them more new mobile data features and applications, such as Brew, My Casting, VoIP and multimedia content. Prepaid services

introduction is one of the most important milestones for us. We failed to do that so far because we missed the right price and the right prerequisite for prepaid terminals as we can't just put money on the street and subsidize terminals to compete against GSM, and to match their pricing on the terminals. Regarding services convergence, Zapp plans to put equal weighting on voice and data which are both mobile and fixed and on the wireless local loop voice and data services.

## Network performance and usage profiles

### Superior network to GSM

For the mobile service coverage, the network consists of 520 base stations covering over 180,000 square km of outdoor level of service, over 17,000 km of roads for in-car level of service, and over 1,500 localities for the indoor level of mobile service. In contrast, the same network utilizing the WLL terminal covers much more. It covers 10,000 localities for indoor level of service. All of these are with the same network, but just different types of usage and terminal capability.

The reliability of the network is quite high. It records 99.9% on traffic, geographical and time wise. It is built in a very strong architecture with protective link, 5 switches spread evenly in the country. Key performance indexes indicate that call success rate (98.57%), drop call rate (0.59%) are better than GSM networks. However, from the coverage perspective we still have some work to do even in the 450MHz network.

### Faster network, less traffic pressure

We have also done experiments analyzing customer usage profiles. The following is a translation based on our own measurement

experiment on our quite large number of customers based in Romania. The experiments use a sample customer base of about 10,000 subscribers who are exposed to this kind of experiment for 6 months, which means it is quite reliable information. We try to keep the experience quite constant, making sure the average data speed of the 1X network and DO are quite consistent. We have seen that if you try to sell unlimited voice services based on flat-fee you might end up with 450-500 MOU a month, but with not extremely high pressure on BH, not more than 25mErl at busy hours. If you attempt to sell data with different caps, volume or time, you end up with 300 MOU & 40 MB which are quite low figures. However if you switch to unlimited plan with the same customer, giving a chance basically to pay the same fee but the use is unlimited, the numbers multiply to 5600 MOU & 800 MB in the 1X network. That explains for the huge usage which ends up almost 1GB MOU a month. The network is being heavily used and being quite slow as 1X data is not of broadband network category.

On the broadband data side we don't see the same evolution. We only see the 3 times multiplication of the traffic profile once you move from cap tariff plan to uncap and complete unlimited flat-fee, an evolution of almost 2000 MOU to 5000 MOU, from 600 MB a month to 2 GB a month. That means the faster the data network the less they expose the operators to being congested or blocked or jeopardizing the end users experience. Especially because end users don't use the network for their own pleasures just
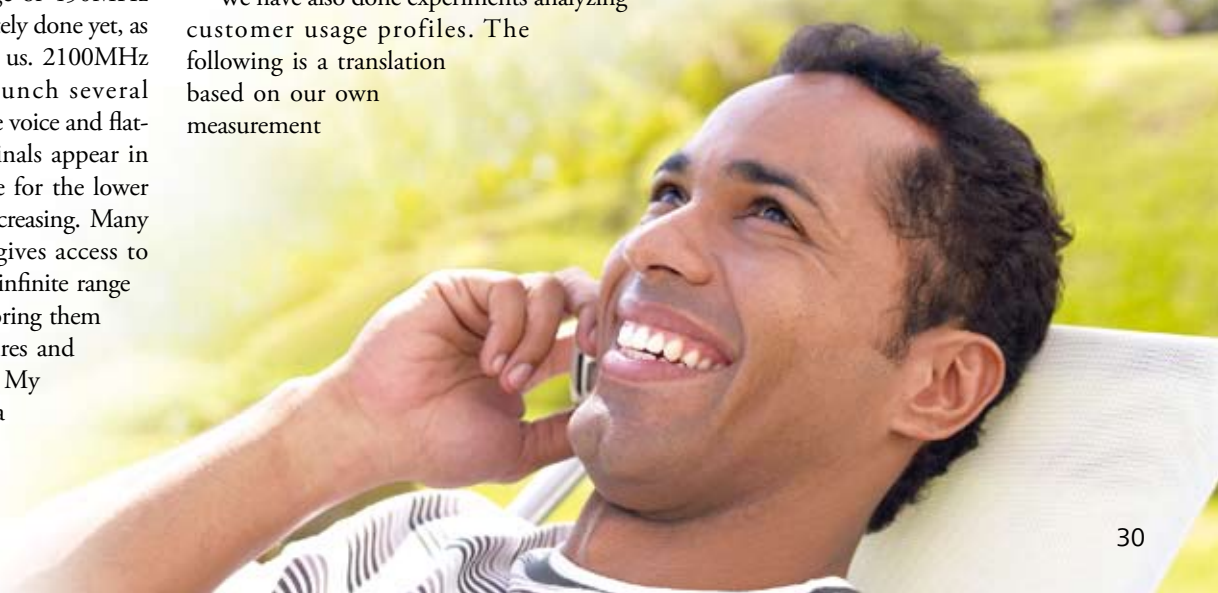
to keep them busy, but to get something from it. And if they get something faster, they will use the network less. Therefore the pressure during busy hours will not be proportionally high like on 1X side.

## 450MHz/2100MHz rollout roadmap

First, I will explain basically the limitation of 450MHz spectrum as unique spectrum allocation. The three cases of which we were licensed in Romania couldn't accommodate any further the broadband growth in Romania. One single carrier available for DO is by far insufficient to grow cost-effectively the capacity of 450MHz network. So we chose the multi-band environment with more abundant carrier allocation. We've got 15MHz spectrum in 2100MHz, which is able to accommodate up to 12 additional CDMA 2000 carriers. Hopefully we won't ever use them all. But that would still allow us an option to mitigate one of our worst shortages in 450MHz. With UMTS we would be allowed to put network just to capture some inbound traffic roaming for in-visitors. We also build up to offer plastic roaming solution to our customers roaming abroad using both voice and data network overseas, UMTS and GSM network worldwide but especially in Europe.

So 2100MHz spectrum has this benefit also for us with the help of infrastructure vendors. Huawei has been very supportive to this side. We can count now on dual-band base stations. They are very good. Dual-band modem is focusing on EV-DO Rev. A dual-band. We are putting all the pieces and puzzles, and all the ingredients requirements for the successful rollout. Ultimately if we look in the future on the roadmap of the technologies, EV-DO was the king for the past years of the broadband data side. Currently with the evolution of DBA, it might suffer a drawback if the operators don't have enough spectrums to go further with Rev. A, Rev. B, Rev. C, UMB and other technology evolution scenarios.

As 450MHz operator, we need to escape from the trap of being left behind of the peak data rate offering. Especially when we are in Romania, we conquer the market share and we are committed to maintaining that as a leader in wireless



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data solution. So we don't want to see our competitors come from behind and step over our dead bodies. 2100MHz will enable us to evolve mostly towards Rev. B and Rev. C. Ultimately we plan to do this rollout to offer similar seamless 3G services available everywhere even in rural environment serving both voice and data needs with no divide between urban and rural areas. All of these are with the same terminal, with the same network, not basically using multi-layer sandwich network as GSM/UMTS. We are complementing the next few years the complete coverage of 450MHz and adding gradually the capacity requirement for 2100MHz. We'll be an island capacity plumbing scenario on top of coverage layer provided by 450MHz network.

## Abundant applications

On the application side, Zapp Brew application was implemented in Romania back to 2004. Since then, we achieved a growth up to like quarter million downloads

during 2006 and we divided the market share between games utilities, informational tools and communication tools. However, because of poor market penetration, the Brew-enabled terminals are not cash cow for us yet. However it's a strategic investment and we bet on it for enabling future mobile data application which in time they generate more royalty and increase ARPU.

On the fixed solution, everyone is familiar with WiFi. In Romania what we have done is to do WiFi mobile with the help of EV-DO, basically backhauling WiFi with EV-DO using this solution to power hundreds of taxis, cabins, buses, trains, so people traveling in Romania with a cab and in other major cities should not be surprised to have WiFi coverage with full broadband. This is cost-effective by just combining WiFi with EV-DO modem sitting somewhere in the car. With such a solution we also improve our brand awareness. So Zapp is the largest perceived WiFi operator in Romania but only with the help of EV-DO backhauling. We have more than 250 hotspots working now.

For the laptop and desktop users, when we launched in 2001, we also launched our own portal, trying to bundle all sorts of contents available for the end users. And with EV-DO introduction we move this to a new level with multimedia support. Everyone is talking about mobile TV, mobile video, mobile personal video recorder, mobile file access system and stuff like that. But very few people realize that this could be done free of charge with only exception being flat-fee 3G player. I have a Rev. A modem in Romania connected to my home computer so I can watch all channel services with my satellite box at my home plus all the movies, music collection, photo collection at my finger tip all over the world, basically with broadband connectivity which doesn't need to be EV-DO by the way. With EV-DO we can support the fixed connectivity requirement for the local computers in the office or at home. Also with EV-DO we can support the displaying of multimedia content. Such applications are those that possibly will take off in the future powered by free softer solutions. That's a good thing for the users. 

**Editor: Xue Hua** xuehua@huawei.com