



‘Thought Leaders in Quadruple Play and Emerging Wireless Technologies

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Rethink Technology Research Notes: WiMAX Series

Despite Yota, TDD market complexity cannot be defined by one carrier

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In 1997, the somewhat downcast head of an industry alliance devoted to an emerging wireless standard said: “I went to places in the world, and people would not know that any carriers had selected the technology or that it was working. They had been told by manufacturers that it was a miserable failure and that they shouldn't have even considered it. They were always very surprised when I had an operator sitting next to me that said they had experienced quite the opposite.”

These words were quoted by *Telephony* magazine, and referred to CDMA – yet 13 years later, they may have unwelcome echoes for WiMAX Forum leaders. But they should also be cheered by how wrong the industry can be, and how it takes more than a wave of negative PR to damage a technology that operators like. CDMA, of course, survived quite happily and went on to take a healthy share of the 2G market and to be the basis of all the 3G standards. Yet back in the late 1990s, many were confidently predicting its imminent demise in the face of the GSM juggernaut. As for the interviewee, Perry LaForge, he remains executive director of the CDMA Development Group to this day, and recently spoke of the need for the CDMA community to work with both 4G standards, WiMAX and LTE. In other words, he learned the lesson from those early digital days – that one platform may not suit all, and that the either/or battle of the networks is largely one fought by suppliers and the media, not carriers or consumers.

WiMAX and TD-LTE – not an either/or:

Others, 13 years and two technology generations later, have not learned the same wisdom. And so we see equally confident assertions that, in the increasingly important TDD portions of the world's spectrum, the established TDD standard, WiMAX, is under serious threat from the emerging alternative, TD-LTE, which is also backed by the powerful GSM community. Yet, as LaForge found for CDMA, an increasing number of operators are happily deploying WiMAX, and are frustrated that they are being told they have chosen a dead end or a second fiddle. Beyond dramatic headlines, the picture of TDD deployments round the world is one of a real and increasingly established platform, delivering benefits now and improving its economics by the month – and another candidate, powerfully supported, but still over the horizon and unproven.

Only one operator has built a TD-LTE network to date – China Mobile's certainly impressive trial system for Shanghai World Expo – and that cellco is boasting that it will have operators working

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with it on TD-LTE trials in three continents. It almost certainly will, given the influence of the Chinese market and the LTE community. But even China Mobile, never one to err on the side of caution when setting out its targets, does not expect those trials to be taking place outside China and Taiwan for at least six months and probably 12. So, in the meantime, what do all those service providers, which have TDD spectrum and urgent market requirements for wireless broadband, do? Carry on deploying WiMAX, is the most probable answer, and when sneered at for choosing the ‘losing team’, remember another quote from the *Telephony* archives: “Western Europe will be isolated if it continues to insist on GSM.” Clearly another cloudy crystal ball – and the speaker, (a wireless operator CEO, but certainly not unusual in his view) went on to assume that low earth-orbiting satellites and satellite telephony would replace both the 2G standards.

In other words, beware of predictions driven by anyone’s commercial agenda, and concentrate on what operators are actually choosing. Of course, the situations are not entirely parallel and the business cases and technologies have changed, but it is salutary to remember how often, as an industry, we make clear assumptions that prove to be deeply flawed. This is particularly so when they are based on the experience of a very atypical, but high profile market. Many GSM vs CDMA analyses focused, in those early days, on Scandinavia vs Korea, yet both nations bear little relation to the ‘average’ mobile user base. The same has happened in the current debate over WiMAX vs TD-LTE, which is pivoting on China and Russia. Both these countries have unique business climates, spectrum rules and market requirements, and despite their size and influence cannot be taken as templates for the rest of the world (the equally important US and India would be far better benchmarks, but despite much speculation, there is no actual commitment to TD-LTE in either country yet).

The Chinese commitment to TD-LTE is vital, of course, since without it the standard probably would not have evolved at all. But this is a political decision, and as at the 3G stage, China Mobile is in the unenviable position of creating a technology and an ecosystem to match the requirements of its government, rather than the other way round. It is likely to succeed, this time around, in securing international support for its standard, because of the greater availability of TDD spectrum in next generation auctions and the rising operator interest in how these unpaired networks can facilitate new data-driven services. But it will still be battling against several factors that will slow down the process of achieving critical mass outside China. These include spectrum fragmentation, with Chinese deployments taking place in different bands to the rest of the world.

Also, Rethink’s research indicates that, while up to two-thirds of current 3G cellcos will seek TDD allocations and use them actively at the 4G stage (in contrast to 3G, where most TDD licenses lay fallow), they aim to do this after a first wave of FDD-oriented roll-out. In Europe, for instance, many operators are saying they will sit on TDD spectrum – or acquire it at a later date – with a view to doing TDD deployments around 2014. That’s a long wait for a global roaming partnership with true economies of scale. And, while Mobile has eloquently called on the industry to support TDD and FDD modes in LTE devices from day one, this will only happen if the vendors see sufficient market mass. Vodafone may have backed up Mobile’s plea on several conference stages,

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but in the areas where it may plan TDD build-outs before 2014, such as India (if it wins a BWA license), even the lion of GSM networks says it is likely to use WiMAX.

This pattern has been identified by the WiMAX Forum too. Its chairman, Ron Resnick, speaking last week, agreed that TD-LTE would gain ground among LTE-oriented tier one cellcos. But he told IDC News Service: "The biggest mobile operators around the world are betting on LTE. But then you have a few big mobile operators who are just saying, 'heck, I can do something now'." He particularly singled out India and Indonesia, where there is huge pent-up demand for broadband access and mobile data, and where even the largest carriers will be hugely price sensitive in their phase one roll-outs (as Vodafone India has indicated).

So China will make TD-LTE happen, but not necessarily in a way that will ensure global adoption in the first wave of 4G, and this will leave a window of four years or more for WiMAX in many markets. One of these is actually Russia, another entirely atypical mobile economy, but one that has recently become the poster child for the idea that TD-LTE is about to crush its rival. Ironically, this notion is based on the experiences of one operator, Yota (the brand name for Scartel), itself a maverick in a maverick mobile nation, and previously second only to Clearwire as the cheerleader for WiMAX. This is, of course, why its decision to deploy LTE in some cities from this year has attracted so much attention. Yota says it aims to deploy FD-LTE in 15 cities by the end of 2011, reversing a previous plan to use WiMAX in these areas. It plans to spend \$100m in five cities this year and \$2bn in total.

Yota's decision and dual-mode:

Any technology community will seize eagerly on supporters with the eloquence and enthusiasm of Yota's executives, and make them key spokespeople, but the risk is that their point of view drowns out those of others – in this case, the dozen or so other Russian WiMAX providers, and most of the 500-odd WiMAX operators round the world. And when they change tack, their voice once again is heard over all those operators which remain happy with their strategy – the same complaint LaForge made all those years ago about the unheard 'happy customers' for early CDMA.

Yota is an exciting case study in a country of huge potential, deploying full scale mobile broadband rather than the fixed or last mile activities of many WiMAX early adopters. It claims to carry more data traffic in its first markets, Moscow and St Petersburg, than the 3G cellcos combined, and has experienced rapid customer uptake. But, rather like Korea Telecom at the start of CDMA, it cannot be taken as a bellwether for the whole sector. Nothing about Yota is 'normal' in wireless carrier terms. For a start, it has a non-typical combination of FDD and TDD spectrum in the 2.5/2.6GHz band, with different and varying rules attached to different portions (the relic of acquiring some of it piecemeal). This means its key supplier, Samsung, has delivered a customized implementation. That has gone into Yota's 30MHz of TDD spectrum, but as the operator's need for capacity grows, it is turning to the 2x20MHz paired spectrum is also holds on either side of that block.

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Discussions of an FDD profile for WiMAX were long ago sidelined by the need to focus on the growth area of TDD, so in paired spectrum, LTE is the logical OFDM-based technology and this explains Yota’s decision. Whether or not it switches to LTE in its TDD bands over time is undecided, but if that were its aim, it would wait at least a year to get commercial equipment, and several years for the prices, devices and economies of scale to match those available for WiMAX in TDD. Resnick said in a letter to members: “Yota currently offers WiMAX service in some of Russia’s most populated cities, including Moscow and St Petersburg, and from what we understand the company has no plans to shut that network down, but rather will continue marketing to and adding new WiMAX subscribers. We expect Yota to take full advantage of its WiMAX network while it waits for LTE to be ready. In our view, this is a decision based on Yota’s spectrum holdings and less of a technology decision.”

And dual-mode WiMAX/LTE systems are not out of the question, according to many vendors that offer both systems, from Motorola to chip start-up Beceem. Lars Johnsson, VP of business development at Beceem, wants to differentiate itself by supporting dual-mode devices and believes this will be a pattern for advanced carriers, especially those with different types of spectrum in different markets. The 4G game will be all about securing as much spectrum as possible to support massive data capacity, and while carriers might dream of a single 100MHz block in a single band, a la Clearwire, most will have to make do with a patchwork – and to choose a variety of technologies to suit each piece of the quilt. Yota, says Johnsson, is “not dumping WiMAX for LTE, but rather identifying the best technologies for the spectrum it holds. The new LTE networks it plans to launch are over the 2.6GHz split-channel band, which carriers all over Europe are targeting for FD- LTE.” Resnick also recently hinted that the Forum could consider participating in dual-mode certification programs in future.

Few have quite such a patchwork as Yota, a fact that has been widely misunderstood, with many analysts assuming Yota must be in TDD spectrum alone because that is the WiMAX norm. The Russian firm has been atypical all the way. At first it was limited by restrictions on mobile devices in its 2.5GHz band; then was unable to charge for its services for over six months because of onerous paperwork (each base station has to be individually approved); and then it was hit with accusations from rivals, of going beyond the terms of its license. This is because Yota gained much of its spectrum by buying up former operators of MMDS services in 2.5GHz, whose licenses did not permit mobility and certain other applications. Even with its latest decision, there is dispute over the notoriously complex terms and conditions of Russian licenses. The regulator, Roskomnadzor, is said to be questioning whether Yota’s license should be confined to WiMAX, even though it includes FDD spectrum.

The wider Russian picture:

If we do want to see Russia as a blueprint for wireless broadband – and it is certainly an important market, and influential in the ecosystem – other players may provide more broadly applicable insights than Yota. One trend is for larger players to buy up TDD spectrum – which they once would have ignored – but then to defer building it out while they focus initially on FDD. For

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instance, a national license in the 2.3GHz/2.4GHz band was recently auctioned, for a mixture of paired and unpaired usage, with state-run long distance carrier Rostelecom gaining most of the assets (to the fury of WiMAX independents). Like many operators round the world, it will focus on FDD first and seek to gain a headstart on Russia’s three major 3G carriers – MTS, VimpelCom and MegaFon – which will not get to bid for 4G licenses until 2012. Rostelecom will not address TDD services until a second wave of deployment around 2013.

Among the WiMAX operators in Russia, some are targeting regional or underserved offerings, while the largest players are Summa Telecom and Comstar-UTS (the latter has become part of a larger telecoms group controlled by Sistema and is gaining significant scale). There is also activity, mainly by start-ups, in the 3.5GHz band, which is only supported by WiMAX. For instance, Icon Private Equity owns a national license in this frequency, and is launching services under the Freshtel brand in Russia and Ukraine. Another important player is Enforta, which has attracted fewer headlines than Yota but has a broader footprint. It aims to build out 25 metros this year, which would make a total of 93 cities by mid-2011. By the end of 2010, and after a spend of \$25m next year, Enforta services will be in reach of 70m people.

This wider view of the Russian mobile broadband map tells a more complex story than the isolated example of Yota – one in which companies wanting to leverage TDD spectrum to launch data-intensive services right now are selecting WiMAX; while some traditional cellcos are looking to focus initially on FDD, which means LTE, and make their TDD decisions at a later stage. They may be intensely interested in TD-LTE, and under pressure from their traditional suppliers to adopt it, but they have time to make their decision. When they start doing serious RFPs, in a couple of years’ time, their choice will depend on the economics, performance and availability of WiMAX and TD-LTE, not anyone’s political agenda.

With the huge diversity of spectrum bands/regulations and of business models for 4G, it is very unlikely that one technology will fit all. As Resnick wrote in a letter to Forum members in the wake of Yota’s decision: “Clearly every operator’s network is different and requires ongoing network optimization to improve its coverage and capacity.” Just as CDMA and GSM both carved out their own markets, with some operators even using both platforms, so the same will happen in the TDD bands as the world moves towards true mobile broadband.

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