

## INSIGHT

### Case Study: YTL Communications' 4G WiMAX Network

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#### IDC OPINION

As more and more 3G operators in Asia/Pacific (excluding Japan) or APeJ join the long-term evolution (LTE) bandwagon with trials, tests, and planned launches in the 2011–2013 timeframe, we spoke with one carrier in Southeast Asia (commonly referred to as ASEAN) that has been awarded spectrum to build 4G WiMAX 802.16e network. In this case study we discuss a number of unique decisions that YTL has made which IDC believes will impact other future 4G operators in the region:

- ☑ Unlike many of the Phase 1 USB data-card-only plans being laid out for most LTE and WiMAX networks in Asia/Pacific (Japan and Korea are the exceptions), as new 4G WiMAX operator, YTL Communications, is offering both fixed, portable and fully mobile devices from modems to handsets.
- ☑ The tariff plan is a prepaid plan that offers top-op and roll-over credits to resemble postpaid plans for those users that want the regular budgeting that comes with postpaid plans. To this end YTL has deployed a real-time charging and rating billing system.
- ☑ From the outset YTL envisioned offering both Voice over IP (VoIP) over WiMAX and mobile broadband services and is working with handset manufacturers such as Samsung to offer WiMAX handsets in the feature-phone pricing range but the capability to make voice calls.
- ☑ Building on the VoIP offering, YTL is taking the service to the next level by offering multi-device functions over a unified communications software and application platform.

#### IN THIS INSIGHT

We had the opportunity to meet with the leadership team of YTL Communications recently to discuss their plans for their newly launched WiMAX network and in particular to better understand some of the technology choices the company has made. We believe that some of the decisions that YTL has made will be good food for thought as 3G mobile operators start to implement their migration plans to LTE.

#### SITUATION OVERVIEW

YTL Communications was one of four alternative providers to receive 2.3 GHz WiMAX spectrum from the Malaysian regulator, the Malaysia Communications & Multimedia Commission (MCMC). YTL launched its 4G WiMAX service in November 2010 in a market that is considered to be underserved in terms of fixed and wireless broadband access but well served in terms of mobile (GSM) voice access.

In an effort to accelerate broadband take-up, the Malaysian government has established a National Broadband Network plan and has provided a large grant to Telekom Malaysia (TM), the incumbent, to build out fiber to the home (FTTH). In December 2010, Maxis, the largest mobile network operator in terms of market share, signed an agreement with the incumbent fixed-line services provider, buying wholesale access rights into TM's expanding last mile fiber optic network, the High Speed Broadband (HSBB) network. Through this agreement, Maxis will be able to offer fixed-line IP-based services, which include broadband connectivity, IPTV, and VoIP to HSBB connected homes. The agreement includes homes in the expansion plans that will extend the reach of the HSBB network to about 1.3 million homes by end of 2012.

Several years ago the Managing Director of YTL, Dr. Francis Yeoh, saw an opportunity for a non-telecom player to enter the mobile broadband market and after winning the spectrum license from the MCMC, made the decision to allocate up to US\$850 million to build a whole new network from scratch. Thus, when he established the YTL Communications company as a subsidiary of the YTL group, he did so with the intention of competing head-on with the larger and well capitalized 3G operators — Maxis, Celcom, and Digi.

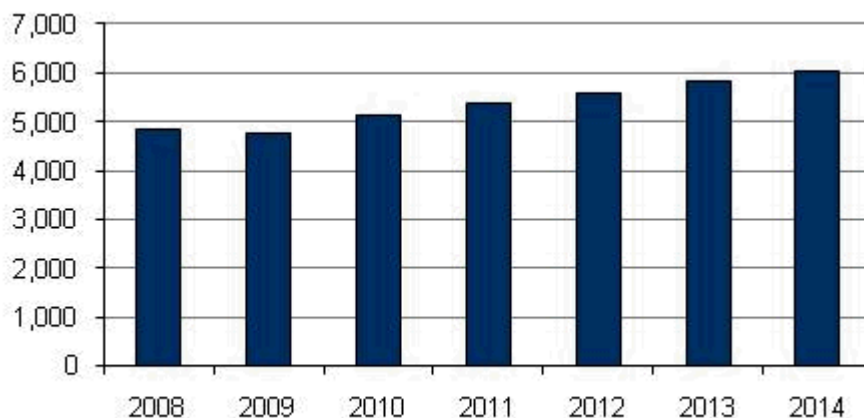
### **Overview of the Malaysian Mobile Cellular and Mobile Broadband Market**

The Malaysian mobile landscape has increased at a 2.6% three-year compound annual growth rate (CAGR) from US\$4.9 billion in 2008 to US\$5.1 billion in 2010. Total subscribers were approximately 33 million in 2010 (please see Figures 1 and 2).

IDC anticipates a more rapid growth rate going forward to achieve a CAGR of 4.2% from 2010 until 2014 due to increased demand for mobile data.

**FIGURE 1**

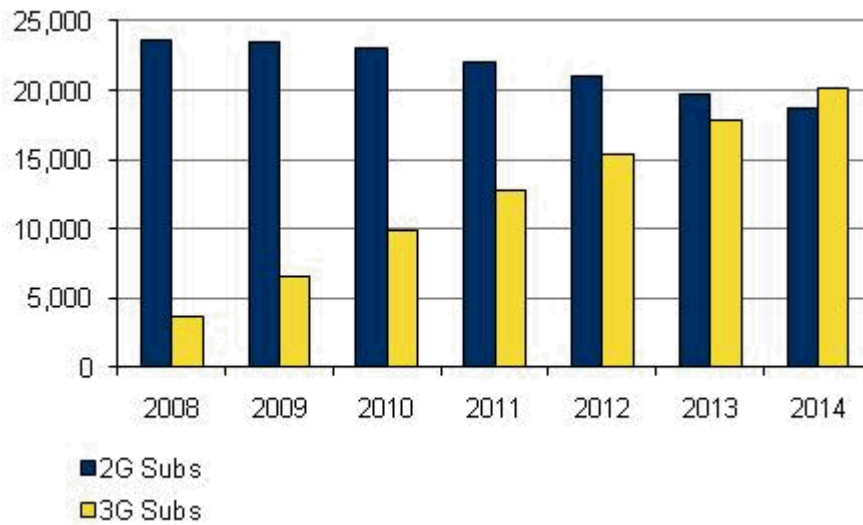
Malaysia Mobile Services Market (US\$M)



Source: IDC, 2011

**FIGURE 2**

Malaysia Mobile Subscribers (000)



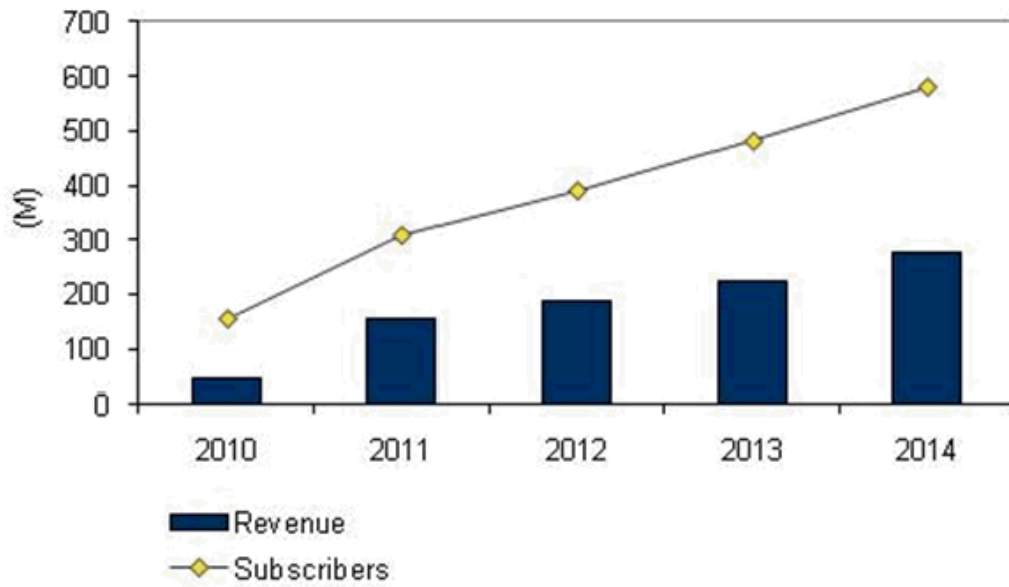
Source: IDC, 2011

Apart from YTL's WiMAX service, the other WiMAX competitors in the market are Packet One (P1) and REDtone. In West Malaysia, P1 has achieved some success in penetrating the consumer market with its home and nomadic broadband offerings. REDtone, on the other hand, focuses on the East Malaysian Market. YTL's venture into the WiMAX space would represent the first in Asia/Pacific and possibly globally to offer mobile voice services over the WiMAX data channel putting it ahead of its 4G competitors; but this also means YTL will be in competition with the three big mobile players Maxis, Celcom, and Digi.

Consumers' choice in terms of broadband prior to WiMAX was between the cheaper xDSL, 3G offerings, and the more expensive fiber offerings (i.e., UniFi). WiMAX is seeing adoption for those wanting a better balance between speed and price, assuming acceptable coverage by operators. IDC expects a very strong growth in WiMAX services going forward, growing at a four-year CAGR of 78%. Figures 3 and 4 illustrate the WiMAX forecast in Malaysia.

**FIGURE 3**

Malaysia WiMAX Market Revenue and Subscribers



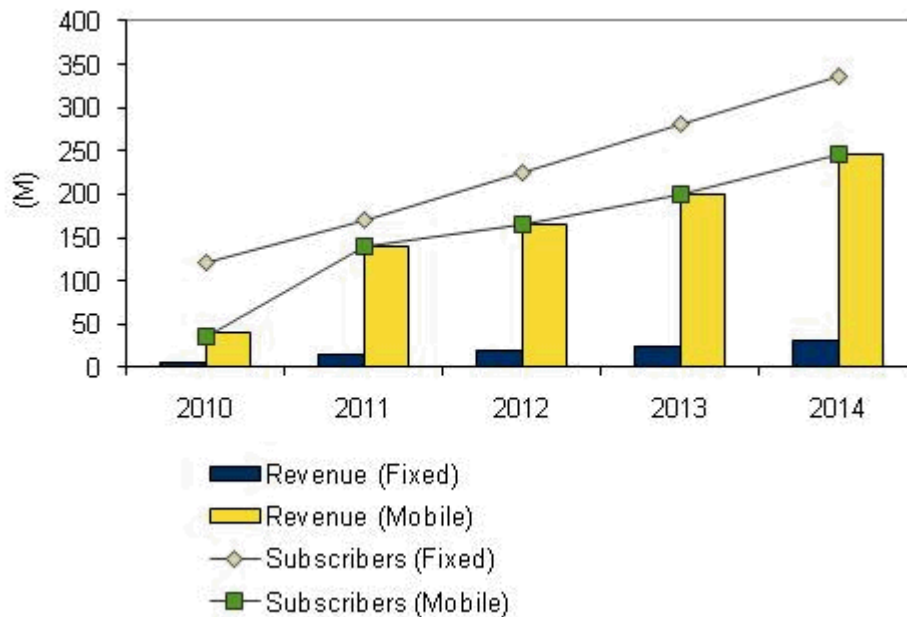
Notes:

- Numbers cover mobile subscriptions which include phone and USB modem subscribers.
- Revenue numbers are in US\$M while subscriber numbers are in thousands (000).

Source: IDC, 2011

**FIGURE 4**

Malaysia WiMAX Market by Mobility

**Notes:**

- Mobile subscriptions include phone and USB modem subscribers.
- Revenue numbers are in US\$M while subscriber numbers are in thousands (000).

Source: IDC, 2011

**Overview of Products and Services**

YTL launched its "Yes" 4G services in November 2010 with two device offerings. These devices were the Go (a USB modem) and the Huddle (a mobile hotspot) as shown in Figure 5. These devices were, however, along the more traditional mobile broadband offerings. In March 2011, YTL extended its device offerings to include a richer and integrated unified communications (UC) solution. The latest devices offered are the Zoom, YTL's home and office gateway unit, and the Buzz, a WiMAX mobile phone (see Figure 5).

With respect to tariffs, YTL offers a multidevice, flat rate, prepaid model without contracts. Subscribers pay a single rate of RM0.09 (US\$0.03) for either 3MB of data, one minute of voice calls, or one SMS message with credits useable across all their product lines — be it on their handset or through other connectivity device offerings. All users are eligible for up to 30% rebates on data usage which kicks in when monthly usage reaches 2.5GB and above. Heavy users can also upsize their account on-demand for any given 30-day period with Yes Valuepacks, which currently comes in RM68 (US\$22) and RM150 (US\$49) denominations. The former adds an extra 3.5GB of data, 150 free voice minutes, and 150 free SMS messages to any standard account while the latter adds on 10GB of data, 250 free voice minutes, and 250 free SMS messages. All unused credits can be carried forward to the following month; however, a monthly minimum usage requirement of RM30 applies. Subscribers can top up either through reload cards, online Web portal, at various Yes Stores, IT shops, and convenience stores such as 7-11.

**FIGURE 5**

Yes Products



Source: YTL Communications, 2011

## Network Architecture

YTL wants to differentiate its service from its competitors by offering true mobile broadband speeds with more consistent coverage than what the 3G operators are delivering today. At the same time, YTL wants its users to experience broadband UC such as video calling in the mobile environment, which is virtually impossible with 3G today in Malaysia. LTE would be a strong competitor of WiMAX in the future but it is highly doubtful that the future LTE operators in Malaysia would be serious about VoIP over LTE for fear of cannibalizing 3G voice cash flows. LTE in the long term could be a more viable technology than WiMAX in terms of more variety of end-user customer premises equipment (CPE) but in the medium term, WiMAX appears to have the momentum and upper hand in Malaysia for high-speed mobile broadband.

Thus, YTL had to make some early tough choices and selected WiMAX because of the availability of the spectrum and the early performance results of WiMAX tests and trials and commercial deployments around the globe including Sprint and Clearwire. YTL had to then select a radio access network (RAN) partner and a mobile core partner that can deliver, from day one, VoIP over WiMAX with quality of service (QoS) that rivals circuit-switched GSM voice. Figure 6 provides an overview of YTL's WiMAX network. The overall network is divided into three parts: CPE, RAN, and Core, which are further elaborated in the following subsections.

### Customer Premises Equipment and Handsets

CPEs used by the end user to access the Yes 4G network include handsets, USB dongles, and modems powered by WiMAX chipsets supplied by various

manufacturers. The 4G converged WiMAX handsets comes in two price ranges: a feature phone (Buzz), with a slide-out, full QWERTY keyboard (Samsung was selected for this handset and chipset), and soon a touchscreen; and an Android-based smartphone with built-in multimode 2G/3G/WiMAX/WiFi and a slot for a SIM card. The supplier of this handset had not been announced at the time writing. The USB dongles (Go) and mobile hotspot (Huddle) are supplied by Infomark, while the home/office gateway (Zoom) by Gemtek. The chipset is provided by leading WiMAX chip maker GCT Semiconductor.

YTL wanted from the outset an Internet compatible, SIM-less architecture that offers users device independence. Thus, the handset does not need to use a SIM card to access the network. Entry into Yes service begins with the selection of a User ID (Yes ID) and each Yes ID comes with a Malaysian mobile number. YTL has also designed a novel mechanism to enable service concurrency. The end result is that for the first time, a customer can use the same account for all his devices and products. This simple but elegant approach results in tangible savings and added convenience for the customer.

### ***Radio Access Network and Mobile Backhaul***

The Access Service Network (ASN) comprises the radio base stations (BTS), transmission, ASN gateways (ASN-GW), and the mobile backhaul. NGN Packet Microwave is used extensively by YTL since it does not own fiber (see Figure 6).

One of the key challenges in the planning of the Yes network was to ensure that there would be enough coverage and capacity from day one so that users can experience continuous mobile broadband service even along the highways. YTL launched its Yes 4G service in November 2011 with coverage of 65% of the population with 1,200 BTS. Over the last six months, it has increased coverage to 1,700 cell sites including full mobile Internet coverage of Malaysia's North-South Expressway that runs from the Singapore border to the Thai border — a first in Malaysian history. So far, YTL has invested some US\$250 million. It has contracted Samsung to provide 2,500 BST which means it still has the ability to deploy and cover more areas and to further increase capacity.

In terms of its speed, at the time of writing, its average download and upload speeds surpasses all other major mobile operators including its 4G rival, P1. The Yes 4G service offers what IDC would consider true mobile broadband bandwidth (i.e., more than 1mbps downlink most of the time) with consistent coverage, so that users can experience UC with video calling in a mobile environment which is virtually impossible with 3G today. The only technologies that can compete with 802.16e in terms of performance would be HSPA+ and LTE. LTE will not come into the picture until 2013 in Malaysia. As for HSPA+, Maxis just rolled out this service in a limited scale last year and Celcom has only moved forward with upgrade plans this year.

Since fiber capacity is in high demand in Malaysia, YTL deployed next-generation network (NGN) microwave packet on most of the backhaul with individual link capacity of 250mbps. During the same period, YTL launched its service with full interconnectivity with all domestic wireless and landline operators. Also, a number of cooperative agreements were signed between Celcom Axiata and Digi, Telekom Malaysia and Celcom, and Digi and Timedotcom to share cellular infrastructure and/or to get access to fiber backhaul capacity.

## The Core Network and IT Systems

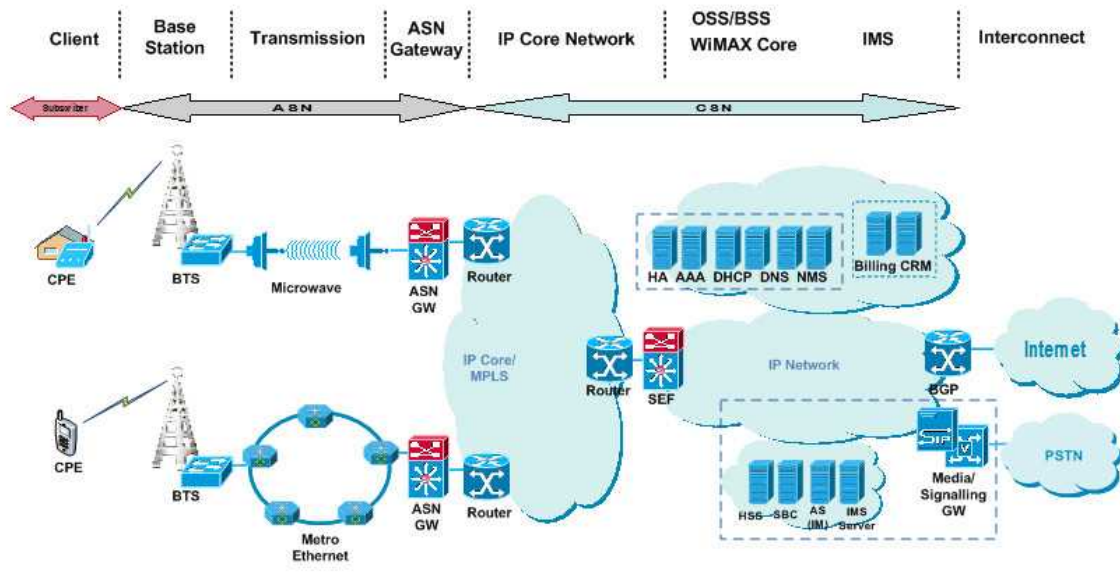
The Connectivity Service Network (CSN) comprises the IP Core Network, WiMAX Core Network, Internet Multimedia Subsystem (IMS), operations support system/billing support system (OSS/BSS), and Interconnect to PSTN/public land mobile network (PLMN) and Internet network performance and coverage.

YTL selected a RAN technology and a mobile core partner that can deliver, from day one, a QoS VoIP over WiMAX with quality that rivals legacy circuit-switched GSM voice. Cisco designed and built YTL's IP core network while Samsung supplied the RAN and IMS. This allowed for an integrated voice and data offering right from the beginning.

YTL chose a prepaid billing system with real-time charging but offers postpaid-like service packages. In particular, users can use their credit cards to top up their accounts on a pay-as-you-go basis or purchase reload cards. On top of that, YTL has provided the ability to carry over unused data, minutes, or SMS to the next month with its Valuepack offerings. The advantage of the prepaid billing system is that it has real-time charging capabilities and the postpaid services are actually provisioned on top of the prepaid system. This architecture gives YTL great flexibility to offer packages suitable to the changing needs of the market. Oracle was selected for the BSS.

**FIGURE 6**

### Yes Network Architecture



Source: YTL Communications, 2011



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## **Unified Communications Software Platform**

YTL developed a UC software platform on the core and Yes Life, a suite of software clients that runs on Windows and Mac OS X computers and mobile devices, enabling users to make and receive VoIP calls and SMS messages. Mobile devices supported at the time of writing this paper are all Apple™ iOS devices (as App Store download) and Yes 4G handsets (with embedded UC functionalities). Support for more devices in the works. The UC client is not specifically geared for enterprises but rather for consumers in the sense that it provides an experience similar to that found in leading social network sites such as Facebook but with the added ability to make and receive voice calls and SMS messages from phones and smart devices.

YTL's UC solution is unique in that it would work even if users do not have a WiMAX device. The Yes service allows inbound and outbound calls and SMS messaging through their mobile devices and desktop/laptop software, while still tied to the same mobile station international ISDN (MSISDN) number. YTL is pioneering the multidevice UC concept where the receiver of a call, when contacted via his phone number, will have a concurrent ring across devices. This gives the user the choice of accepting the call either on his/her mobile phone, computer, or regular PSTN phone connected through the Yes home gateway.

In addition to offering voice calls with QoS and SMS messaging seamlessly across various devices, the UC platform also allows YTL to make available various advanced cloud-based services to its subscribers — all linked to the same Yes ID. Most notable is the Network Address Book (NAB), which is a cloud-based address book that is accessible from any Yes 4G handsets, UC clients, and Yes Mail, a multiplatform push email service. The users' Yes ID with a @yes.my domain name simply becomes their email address.

## **FUTURE OUTLOOK**

IDC believes that YTL, despite its network being new and needing more time to build a critical mass of users, has made technology and business choices that offer an excellent example of innovation that 4G operators (LTE and WiMAX) will need in order to survive the challenge of exploding traffic usage, broadband + social networking + video, and to have the tools to better understand user usage patterns in real time. Unlike most of the 3G community, that are extremely cautious in deploying VoIP over LTE, YTL is not shying away from it but rather embracing it wholeheartedly.

YTL's Yes service currently offers two distinct competitive advantages compared to the other operators. It is the only provider to offer a UC solution with a single-number-reach concept for the consumer. On top of that, network performance is above its competition. If YTL can execute its coverage expansion as planned and can deliver mobile broadband smoothly to end users while managing exploding traffic demands, then IDC believes it can play an exciting and disruptive role in the Malaysia mobile market by raising the bar for mobile broadband on the go and in the home or office.

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