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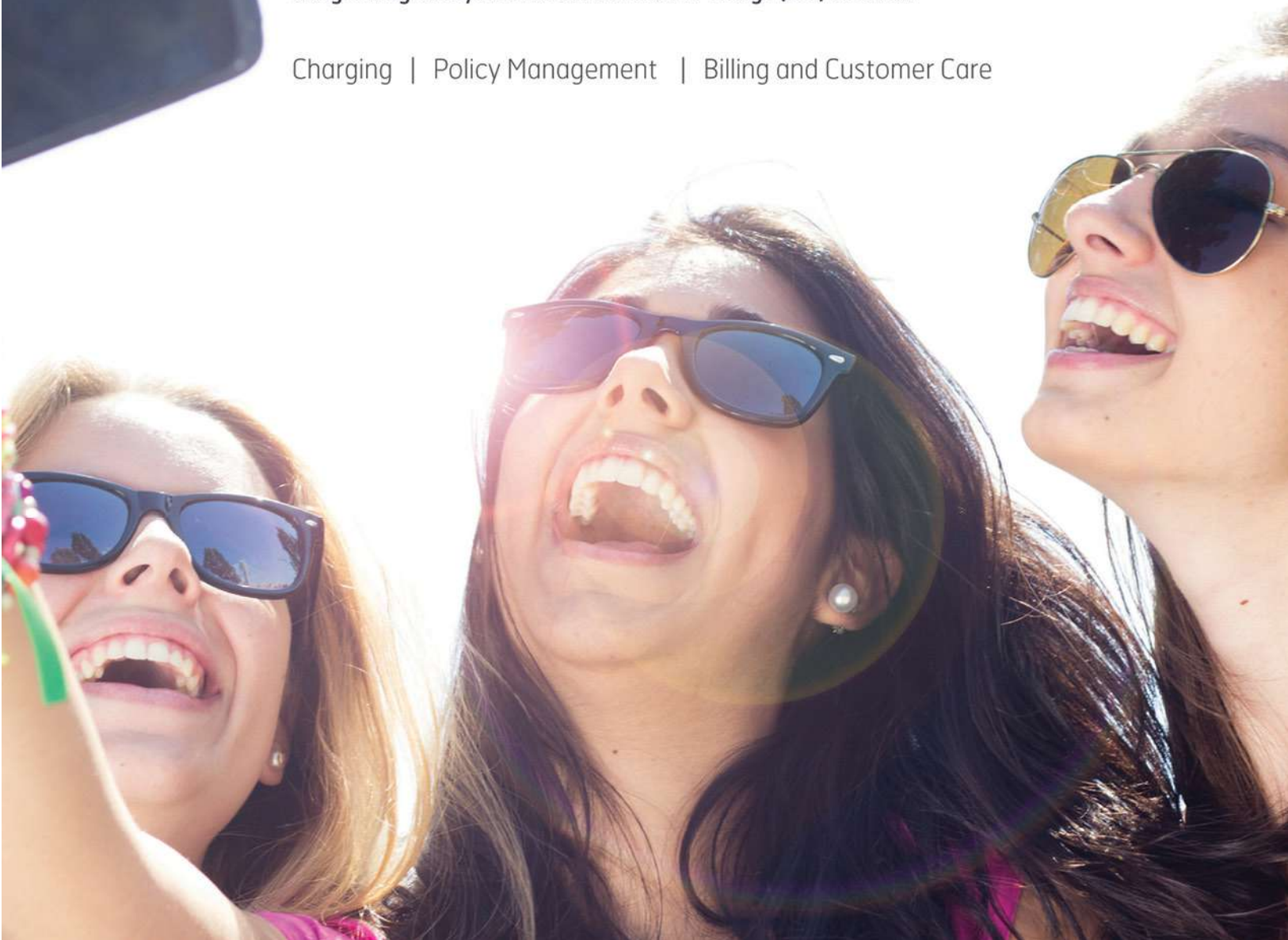
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It's USA versus Asia for 5G leadership

Predicting a future defined by information technology is never easy. It's usually the paradigm shifts that the pundits fail to pick: how a search engine came to dominate the Internet industry and revolutionize the mobile communications industry; how the undisputed leader in the mobile device market was destroyed by the rise of smartphones; how a web site designed to help people communicate with friends grew from college startup to a \$100 billion listed company in just six years.

The rise of Google, Android and Facebook and the demise of Nokia aren't the only examples and certainly won't be the last. All to some extent have been enabled by underlying technologies such as the rise in popularity and capability of the Internet, and by developments in semiconductor and display technologies that have increased the capability and decreased the cost of mobile devices, not to mention the greatly increased bandwidth in mobile networks.

On this point the next major enabler of disruption in mobile communications will be 5G and it's pretty clear that, at present, Asia is in the lead. Not surprisingly this is a cause for some concern in the US.

A paper from the US Congressional Research Service in mid 2014 summarized 5G initiatives in Asia and concluded: "The technological advances of these early rollouts might leapfrog the technologies used by US networks, eroding what is widely perceived as a American competitive advantage in mobile communications."

Ovum analyst Mike Roberts contends that the US led the global 4G LTE market almost from its outset and asks: "Will it be able to establish a similar leadership position in the 5G market?"

His conclusion is that the US will be a 5G leader but not THE 5G leader because:

- It is home to some of the largest telecoms operators in the world (AT&T and Verizon), the largest Internet players (Google, Apple, Amazon, and Facebook), and top mobile and wireless technology supplier Qualcomm, all of which will have huge influence in the definition and evolution of 5G.
- It is a leader in the nascent Internet of Things ecosystem, which will be one of the key drivers of 5G.
- US universities are at the cutting edge of key 5G technologies such as Millimeter Wave, Massive MIMO, cloud, and SDN/NFV.

I'm not so sure. Asian operators are already outstripping their US counterparts in size. Qualcomm will be heavily influenced by its customers, the largest of which will increasingly be Asian. IoT is a new and rapidly evolving part of IT, the global epicenter of which could well shift to Asia in the next few years. And Asian vendors spearheading 5G research, such as Samsung and Huawei, are well aware of the key component technologies and likely to gain ground rapidly thanks to massive R&D budgets and a plentiful supply of research scientists and engineers at costs lower than those in the US.




Stuart Corner
Senior Editorial Manager
Telecom Review Asia Pacific

Telstra to buy Pacnet for \$697m

IT'S HOW
WE CONNECT



Telstra is to acquire, for \$697m, Pacnet, a provider of connectivity, managed services and data center services to carriers, multinational corporations and governments in the Asia-Pacific region. The acquisition includes Pacnet's interest in its China joint venture, PBS, which is licensed to operate a domestic IP-VPN and provide data center

services in most major provinces in China.

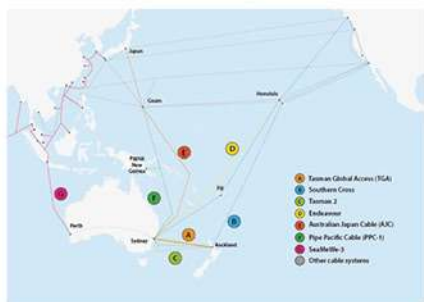
The deal gives Telstra ownership of an extensive range of services including software defined networking, an expanded data center network, an extensive network of submarine cables and major customers across the region. Telstra said the move would almost double the size of its Global Enterprise Services business in Asia and was expected to drive operational and cost synergies.

Pacnet's core assets comprise an integrated network of 109 PoPs across 61

cities in the Asia-Pacific region and eight cities outside the region (US and Europe) aimed at both carrier and enterprise customers, 29 interconnected data centers in 17 cities across the Asia-Pacific region, of which seven have Tier III accreditation.

Pacnet also has Asia's largest privately-owned submarine cable network, which lands at 21 cable landing stations in China, Hong Kong, Japan, the Philippines, Singapore, South Korea and Taiwan. In addition, Pacnet controls two of the five fibre pairs on the Unity trans-Pacific submarine cable network connecting Japan to the United States.

Spark, Vodafone and Telstra to lay new trans-Tasman cable



Spark New Zealand, Vodafone and Telstra have announced details of their planned trans-Tasman submarine cable, the Tasman Global Access (TGA) Cable. Between them they will investment approximately \$70 million

in the project, and will commence construction in early 2015.

Alcatel-Lucent has been selected as the cable laying contractor after a competitive tender process. The TGA Cable is expected to be built and to be providing data traffic by mid-2016. It will have two fiber pairs and a total capacity of 20tbps.

New Zealand's international capacity requirements are growing 60 percent year-on-year and the TGA Cable will support the future needs of consumers and the growth aspirations of New Zealand businesses. Spark New Zealand and Vodafone account for more than 70 percent of the New Zealand broadband market.

Raglan on New Zealand's West Coast has been selected as the New Zealand landing station for the TGA Cable, providing route diversity to the existing Southern Cross and Tasman 2 cables connecting New Zealand with Australia. Oxford Falls, Sydney, provided by Telstra, will be the Australian landing station.

Spark New Zealand managing director, Simon Moutter, and Vodafone CEO, Russell Stanners, issued a joint statement saying: "An additional cable connection with Australia will strengthen the business case for international data servers to be located in New Zealand, and improve access for Australian and other international businesses to New Zealand."

Xiaomi raises \$1b, valuing company at \$45b



Chinese smartphone manufacturer Xiaomi is raising more than \$1 billion in its latest round of funding. According to the Wall Street Journal the move values the fast-growing company at more than \$45b, making it one of the most valuable technology start-ups in the world.

The WSJ cited a source saying the round was led by All-Stars Investment, a tech investment fund run by former Morgan Stanley analyst Richard Ji. Other participants are said to include Russian investment firm DST Global and Singapore sovereign-wealth fund GIC, which are both already shareholders of Xiaomi along with Yunfeng Capital, a private equity firm affiliated with Alibaba executive chairman Jack Ma. The WSJ said that Xiaomi had declined to comment.

It added: "The surge in Xiaomi's valuation over the past year indicates just how high

expectations are as the company expands its business outside China, mainly in emerging markets where there is robust demand for inexpensive smartphones. In its previous round of funding in August 2013, Xiaomi was valued at \$10b."

In August research firm Canalys reported: "In little over a year, Xiaomi has risen from being a niche player to become the leading smartphone vendor in the world's largest market, overtaking Samsung in volume terms in Q2. Xiaomi took a 14 percent share in China, on the back of 240 percent year-on-year growth."

Cisco partners with ILFS technologies to take Internet of Things to India



Cisco has formed a strategic collaboration with Indian technology solutions company ILFS Technologies (ITL) a subsidiary of Infrastructure Leasing & Financial Services (IL&FS), to use the Internet of Things to develop digital solutions for India's infrastructure and smart cities.

Cisco says the collaboration will focus on bringing together the best-in-class, complementary capabilities

of both companies. "IL&FS's deep expertise in infrastructure development in India along with ITL's excellent technology services capabilities strongly complements Cisco IoE architecture and robust vertical solutions."

Cisco says that it and ITL "recognize the unprecedented value to be created in the way in which many services such as outdoor lighting, parking, mobility services, beacons, kiosks, location-based services, sensor-based water defenses, physical infrastructure monitoring and controls and smart energy grid services, are digitized."

Their planned joint digital solutions will "use intelligent networks to

transform the way cities and communities are designed, built and renewed as well as enable digitally empowered citizens through the availability of government services in real time, online and on mobile platforms."

Cisco and ITL say they will embrace IoE strategies in existing solutions and radical new solutions to digitize the infrastructure sector, smart cities and smart villages in India. These will include public safety and security, command and control services, e-governance and a broader set of next generation urban services such as parking, lighting, traffic and citizen engagement services built on top of Cisco's City Infrastructure Management.

Vserv partners with XL to serve mobile advertisers in Indonesia



www.vserv.com

Vserv, a smart data led mobile marketing platform across emerging markets, has formed a partnership with PT XL Axiata Tbk (XL), the second largest telecom service operator in Indonesia under which it will integrate the Vserv Smart Data platform with XL to help drive higher ROI for mobile entertainment companies.

Vserv says the partnership will enable mobile entertainment marketers to target the most relevant audience, with the right ads at the right time, based on user personas and intent signals. Indonesia's mobile entertainment market is estimated to be worth \$765 million in annual revenues and to be growing at a CAGR of 4.7 percent, according to IE market research.

Vserv claims to be the only company to have inked partnerships with key telcos in emerging markets and says this latest partnership will strengthen

its global leadership in the mobile marketing space.

Herwinto Chandra Sutantyo, head of m-advertising with XL Axiata, said: "We are intrigued with what the Vserv Smart Data platform is capable of achieving by creating value from the petabytes of data we generate every second. Today, the partnership will ensure the compliance of our advertisers, in particular from the mobile entertainment sector, by targeting our mobile subscribers with engaging and relevant advertisements that follow Indonesia's advertising ethics and regulations."

New cable to link Peninsular Malaysia, Sabah and Sarawak



Telekom Malaysia has been awarded a contract from the Malaysian Communications and Multimedia Commission (MCMC) to build the 3,500km Sistem Kabel Rakyat

1Malaysia (SKR1M) submarine cable that will connect Peninsular Malaysia, Sabah and Sarawak.

SKR1M is expected to start carrying commercial traffic by mid-2017. It will have an initial capacity of 4Tbps and is part of the government's initiative to increase the capacity of high-speed broadband, as outlined in the 2014 and 2015 budgets.

The project will be established through a public-private partnership between MCMC and Telekom Malaysia, using the Universal Services Provision Fund. Financial terms were not disclosed.

TM group chief executive officer Zamzamzairanii Mohd Isa said that SKR1M's huge bandwidth would improve user experience by minimizing potential traffic congestion between Peninsular Malaysia, Sabah and Sarawak.

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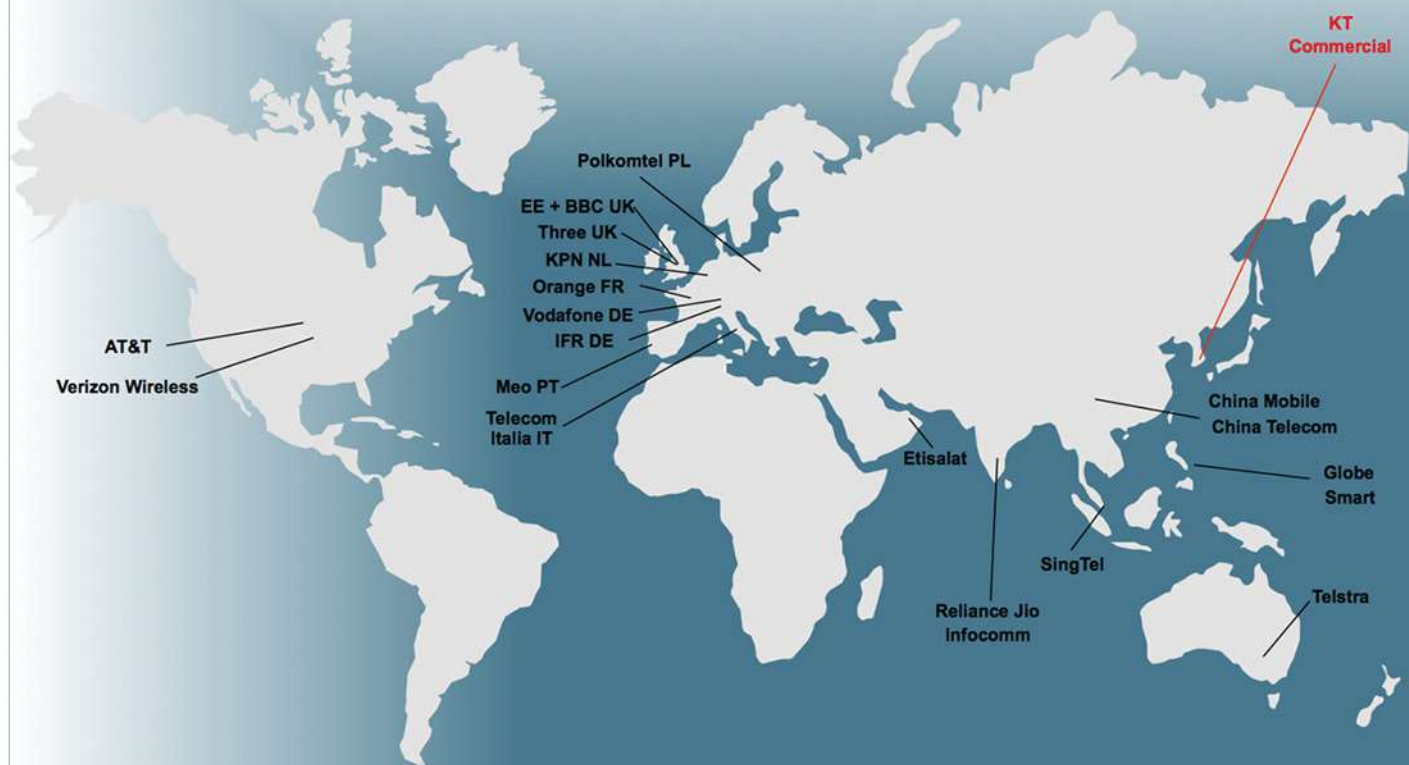
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Commercial deployments, launches trials, studies

October 2014 © GSA

LTE Broadcast:

Korea leads, others will follow

LTE Broadcast technology alleviates pressure on scarce spectrum resources by enabling data destined for multiple users at the same time - such as news or software updates - to be multicast over a single spectrum allocation. There have been numerous trials but a year after launch the world's first commercial network, in Korea, remains alone.

The Global Mobile Suppliers Association (GSA) has a map showing which mobile telcos around the world are embracing LTE Broadcast. Out of a total of 20, one stands out in red: Korean telco KT. It has the distinction of being the first to launch a commercial LTE Broadcast service and,

a year after launch, it remains the only operator to have done so.

In recognition of this achievement, vendor Samsung's US subsidiary, Samsung Telecommunications America, in September 2014 received the US Wireless Association's (CTIA) Emerging Technology Award for its LTE Broadcast technology.

The CTIA award followed Samsung's LTE Broadcast technology receiving the award for Most Innovative Service/Application at the 2014 LTE Awards in Amsterdam. Samsung said it had continued to develop and evolve the technology since launch of the KT service and had conducted additional trials with a number of mobile network operators around the world.

Telstra first with LTE-Broadcast trial

In October 2013 Telstra claimed to have become the first mobile carrier in the world to trial LTE-Broadcast live on a commercial network, in conjunction with supplier Ericsson. Three dedicated streams of content about the Australia vs England cricket match — live coverage, highlights and statistics — were broadcast to those watching the game at the Melbourne Cricket Ground.

LTE Broadcast — also known as evolved Multimedia Broadcast Multicast Service (eMBMS) and in the US as LTE Multicast — was a major new feature introduced in 3GPP LTE Release 9. It is designed for distributing the same content to multiple users using the same spectrum resources to serve all users — in contrast to LTE where each user's content stream consumes a dedicated portion of the available spectrum.

eMBMS is ideal for the delivery of popular real-time video content, such as news or major sporting events and for other situations where the same content needs to be delivered to all users; software updates for example. Because the spectrum is dedicated to the eMBMS service there is no congestion and all users receive the same quality of service (unless they happen to be in a location where the signal is poor).

Mike Wright, Telstra executive director for networks, said that the Telstra trial had "proved that the LTE Broadcast solution worked effectively in a stadium environment. Instead of requiring around 2GB of data per user to stream one content channel of the game, we were able to serve all LTE Broadcast users, with three concurrent streams requiring a total of around 6GB for the entire broadcast, which clearly demonstrates an efficient use of spectrum."

According to Ericsson, the technology can provide network capacity advantages over unicast in a cell with as few as two concurrent users. The GSA claims: "Every LTE network operator can benefit from deploying LTE Broadcast."

eMBMS can be implemented flexibly and turned on and off under software control. So, for example the network serving a major sporting venue could be switched to eMBMS and part of the available spectrum used to deliver content about the event only for the duration of that event.

New standard for LTE Broadcast video

To support the delivery of multicast video over eMBMS networks the Alliance for Telecommunications Solutions (ATIS) in February 2014 released a new standard: Multicast Delivery of Content to Mobile End User Devices (ATIS-0200011). It provides a key protocol by which content from multicast streams can be delivered to mobile end-user devices over eMBMS networks.

The standard extends previous ATIS work on multicast-based content delivery methods. It features three use cases where mobile devices can receive multicasts of live events/video content via eMBMS. It also provides delivery processes, assumptions, content delivery network interconnection implications and supporting requirements.

Outside of Korea, despite the lack of commercial services, there is plenty of eMBMS activity in Asia. Globe Telecom demonstrated eMBMS last September and said it planned the launch of commercial services "in selected areas" in 2015.

Rival Smart also trialed eMBMS late in 2013 in conjunction with Huawei. According to Huawei, it was the world's first such trial in the 2.1GHz band. For the pilot Smart streamed videos on three channels from its base station in Quezon City to another base station in Makati from where there were received on LTE handsets provided by Huawei and a smart TV set equipped with LTE connectivity.

Smart claimed that the trials put its network on a par with industry leaders Verizon in the United States and Telstra in Australia, both of which had mounted eMBMS trials at that time. However Smart has still given no timeframe for the launch of commercial services.

Huawei opens eMBMS R&D center

Huawei appears to see a big future for eMBMS. Back in 2012 it opened an eMBMS innovation center in Shenzhen "in order to develop end-to-end eMBMS solutions and LTE applications" and to "serve as an experience center for operators."

Huawei said it would showcase the delivery of video, mobile TV, and advertisements to mobile smart devices employing Huawei's eMBMS solution and that "global operators from Europe, Asia, the South Pacific and other regions have already visited the center to experience its LTE demonstrations."

Despite the existence of KT's commercial eMBMS service, in August 2014 Huawei and China Telecom announced that "the world's first eMBMS" had been deployed for the 2014 Summer Youth Olympic Games (YOG) held from August 16–28 in Nanjing. China Telecom provided 18,000 Huawei C8817 eMBMS-enabled devices to Games volunteers "so that they can enjoy watching HD YOG games on their mobile terminals anytime, anywhere, and free of charge."

Huawei said it had worked with several other carriers such as Telecom Italy and EE in UK to promote eMBMS commercialization and that there were almost 30 global carriers currently building LTE network multicast capabilities.



Few eMBMS handsets

At present few handsets support eMBMS. In its November 2014 eMBMS Global Update, the GSA listed only three: the Samsung Galaxy Note 3, the Huawei C8817 and the TCL P688L. However, it said all future chipsets would support eMBMS.

According to the GSA the Samsung Note 3 has been used in most trials to date with chipset support from Qualcomm, which provides both its Snapdragon 800 processor and the middleware needed to receive multicast content. In September Qualcomm announced general availability of its LTE Broadcast software development kit (SDK).

So, with all this activity around eMBMS why does KT have such a lead? Generally, when new mobile technologies are ready for commercial deployment uptake follows the leader fairly rapidly as operators seek to gain competitive advantage and/or ensure they do not become laggards.

The answer may come from TNO, the Netherlands Organisation for Applied Scientific Research. It conducted a study

in 2014 on eMBMS, in cooperation with KPN, Vodafone NL, Ericsson, Samsung, NPO and SBS Broadcasting and concluded that eMBMS was not quite ready for prime time, despite the fact that the market was ready for it.

eMBMS not ready for prime time

"We are not quite there yet," TNO said. "The technology and its implementation into live mobile networks and mobile devices need to be matured further in order to reach delivery of fully featured end-to-end broadcast services in the mobile domain. A truly convincing business model is needed to get the commercial traction that really opens up the opportunity window."

It explained: "Rather than seeking the real killer application for LTE Broadcast, TNO thinks that the answer lies in a business model set-up which includes a service broker role between content service providers and mobile network operators."

This broker would settle efficiently the demand and supply of broadcast-based connectivity and take care of mediation and planning complexities. "In this way multiple uses cases,

which on their own cannot justify the investments, could be aggregated," TNO said.

"The combined uses can strengthen the overall business case of LTE Broadcast for all stakeholders. In the short term, smaller scale service offerings (pilots) – eg organized around special regional and national outdoor events and involving different content providers – will help to gain further practical experience with this novel way of delivery content in business, technical and organizational sense," TNO said.

TNO's contention that multiple use cases are needed to justify investment in eMBMS is borne out in research conducted by Expway, a company that has been involved in 3G mobile broadcast for seven years and that claims "a significant share of the global mobile broadcast market." It is deploying its solution in all the major LTE Broadcast markets including US, India, Europe and China.

14 possible uses for eMBMS

Expway has produced a white paper detailing 14 LTE Broadcast business cases and says a single use case can rarely justify the launch of LTE Broadcast, but that payback can be quick – and significant profits can be realized – when running multiple use cases at the same time.

Were an operator with 25 million subscribers to implement all 14 use cases, Expway estimates it could generate an additional \$400m in annual revenue, an increase in margin of \$1.35 per user.

The white paper lists the 14 use cases as being mobile TV, digital radio, video kiosk or video on demand, connected car, fixed LTE quadruple play, local information such as coupons, wireless emergency alerts, stadium app, data feeds and notifications, e-newspapers and e-magazines, firmware/OS updates, pushed video ads, last mile CDN and Internet of things (smart meters).

However, it gives no indication of the usage levels of these that would be required to deliver its estimated financial benefits. ■



PCCW's growing global ambitions

Like most major 'domestic' telcos Hong Kong's PCCW sees much of its future growth as being outside the borders of its home territory, and playing a key role in those initiatives is group chief technology officer, Paul Berriman. He talked to Telecom Review Asia Pacific at last November's Telecom Review Summit in Dubai.



Global IP Backbone



Global IP Backbone

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Global IP Backbone

The structure of Hong Kong based global telecoms group PCCW/HKT is nothing if not complicated, and confusing. PCCW Limited (PCCW) is a Hong Kong-based company listed on the Hong Kong Stock Exchange and that holds interests in telecommunications, media, IT solutions, property development and investment, and other businesses.

The most important of these, from a telecoms perspective, are HKT —formerly Hongkong Telecom, the dominant telco in Hong Kong — in which PCCW holds 63 percent, and Now TV, a successful IPTV service provider in Hong Kong.

HKT is listed on the Hong Kong Stock Exchange. It was spun off by PCCW in October 2011 when its shares opened at \$HK4.83, they are now trading at about \$HK9.80

Outside Hong Kong, things start to get confusing. PCCW Global, the business

unit that seeks out and exploits telecoms opportunities around the world, is, despite its name, a subsidiary of HKT rather than of PCCW. Its presence covers more than 3,000 cities and 140 countries where it supports a portfolio of integrated global communications solutions.

Multiple accolades

If accolades are any indication, PCCW Global has been doing rather well in pursuit of its parent's globalization goals. In December PCCW Global CEO, Marc Halbfinger, was named 'Executive of the Year for Industry Contribution' in the Global Carrier Awards. That award capped off a string of awards over the previous two months.

PCCW Global was awarded 'Best International Wholesale Carrier' for the fourth year in a row at the Telecoms World Middle East in Dubai and was recognized for the strength of its wholesale offering in Africa and Asia at the Telecom Review Summit Awards. The Metro Ethernet Forum acknowledged PCCW Global's leadership in carrier ethernet in the

Asia-Pacific region and its ongoing commitment to developing carrier ethernet services.

Straddling all these operations is PCCW's chief technology officer, Paul Berriman who has held that position since May 2007 after joining PCCW in 2002. According to PCCW's web site he "is primarily responsible for leading the group's product and technology roadmap and strategic development."

Speaking to Telecom Review Asia Pacific on the sidelines of the Telecom Review Summit in Dubai in November, Berriman said his primary responsibility was advising the PCCW board on where in the diverse PCCW/HKT business it should direct capital investments, within the commitment given to shareholders that capex would be capped at 10 percent of group revenues, about 85 percent of which come from HKT.

"I'm looking at where we spend our money. Whether it's to speed the rollout of our fiber to the home network in Hong Kong, or the

mobile business, or on global infrastructure on our media business," Berriman said.

Juggling global and domestic priorities

In providing this advice he has to juggle priorities of international expansion, which provides the greatest growth opportunities, with defending HKT's and Now TV's Hong Kong domestic businesses, the main source of cash flow.

"The main thing for us now is working with [PCCW] Global to take our businesses overseas," Berriman said. "Looking at the things that we have done well in Hong Kong and at how can we export those: the smart living stuff, the pay-TV stuff, over the top TV. And we have done some consultancy in FTTH rollouts."

In 2013 PCCW bought African telco, Global Gateway, and has been running global development services through that business. "The purpose of GDS is to take some of the things we have in Hong Kong overseas to other operators who have an interest," Berriman said. "That is why we were down in Africa at AfricaCom two weeks ago and that's why we are here [in Dubai at the Telecom Review Summit]."

One of PCCW's most ambitious forays to date has been in the UK where it has launched broadband wireless Internet access provider Relish. "We are not trying to compete with mobile operators, we are trying to provide broadband. We are competing more with BT where we can deliver a broadband service within two hours by scooter where BT will take for five weeks to provide a fixed broadband service," Berriman said.

Relishing UK broadband market

Relish presently has 120 base station sites in London and intends to expand coverage to a handful of major urban areas throughout the UK.

"We are not planning to do national coverage, it is more a high density high-capacity 3.5 G network," Berriman said. "We will put Relish into five or six major conurbations and hopefully our customers will include mobile operators that will want to offload traffic and offer a high-performance network service."

Relish has also been shortlisted for a new broadband network for Heathrow airport

and plans to bid for the replacement for the UK's emergency services network, which is due to some out soon.

These challenges and opportunities are very different from those in Hong Kong where HKT is the dominant player, and a very stable, high cashflow business, but facing constant challenges from competitors.

Berriman lists one of his top priorities as "Staying ahead of City Telecom in terms of the FTTH rollout [in Hong Kong] because we have a 60 percent market share in broadband and where they are building fiber to the home we have to be there before them because we don't want to be losing customers."

There are no limits on access infrastructure in Hong Kong and Berriman says most residential apartment blocks have several competitors vying to serve customers. "Seventy five percent of buildings in Hong Kong have at least two facilities-based operators, if you include the cable companies, and 55 percent have three. So it is quite a competitive business."

Fiber up Hong Kong

He says that HKT has fiber going into 85 percent of buildings and can connect fiber to 79 percent of homes in Hong Kong within three days of receiving an order. In many buildings some customers are served by DSL from fiber hubs in the basement while others get fiber to their apartment. HKT is progressively migrating from fiber to the basement to fiber to the home so it has only one technology to manage in any apartment block. "Once we get to 50 or 60 percent usage of the fiber in the building we start to look at converting the rest to get rid of the electronics," Berriman said. He added: "We have just cleared 500,000 installed fiber to the home customers, out of 1.6 or 1.7 million broadband customers."

In Mobiles, HKT acquired struggling operator Sunday in 2006 and has just bought Telstra's share of the formerly jointly owned CSL. It now has 4.6 million mobile customers and a 31 percent market share, Berriman says.

"We now have two LTE networks, one supplied by ZTE and one from Huawei and we are in the process of merging



those. We have put out a tender to those two companies for the future core network."

HKT also operates a network of 14,000 WiFi hotspots and, according to Berriman, is a leader in the use of EAP-SIM for WiFi-cellular network integration - handing off of connections to a mobile from the WiFi to the cellular network and vice versa.

"Our whole Wi-Fi network is managed by the radio access network guys. It is treated as part of the mobile network there is integration between the HLR and the AAA server."

Leader in cellular - WiFi integration

"We were the first to demonstrate EAP-SIM authentication, at Barcelona two years ago when we demonstrated it with AT&T and with orange and hotspot 2.0 with Cisco. We were the only ones demonstrated overseas roaming WiFi with our own server."

As a provider of fixed and mobile telephone services, broadband Internet access and IPTV services PCCW/HKT is well placed to use bundling as a competitive weapon, but Berriman says it does not favour this approach.

"We have always stayed away from bundling. The big temptation when you are doing quad play is to do a quad play bundle. What we try to do is upsell and cross sell and make the customer earn their discount. The only bundle we have is our big-screen TV with a set-top box and a broadband line, because that enables us to =guarantee high definition quality." ■



Nepalese telecoms market taking off

After many years lagging major Asian nations in the development of its telecommunications the landlocked former Kingdom of Nepal – now the Federal Democratic Republic of Nepal – is catching up fast.

Nepal is a country metaphorically and geographically sandwiched between two Asian giants, China and India. Living with these constrictions has always been both a blessing and a curse to the small former kingdom, now a republic.

Despite its rich cultures and beliefs and its distinct geography, Nepal has remained in the shadow of its neighbors. With eight out of the world's ten highest mountains within its borders the country has long been best known as the home of Mount Everest. Very few other stories about Nepal have captured the global headlines, least of all developments in telecommunications – despite such facilities being essential to the many expeditions that seek to scale Everest.

This year the telecommunication industry in Nepal celebrates its 102nd anniversary. The first telephone line was introduced to its capital Kathmandu in 1913, linking the capital city to India. Twenty years later the first automatic exchange, with a capacity of 25 lines, was installed at the Royal Palace. Progress was slow. By 1962 it had grown only to 300 lines.

More rapid growth happened during the 1990s with assistance from the World Bank. By the late 90s, the country's telecommunication industry was experiencing tremendous growth compared to its South Asian neighbors, and a Telecommunication Act was drafted in 1997. It was followed by the formation of the Nepal Telecommunication Authority in 1998. Then, in 1999, the Government of Nepal passed the Telecom Policy, later replaced by the Telecom Policy of 2004.

Ten years on the country has made great progress in telecommunications. According to the Nepal Telecommunications Authority's (NTA) latest figures for Q3 of 2014, there were about 21.49 million GSM mobile users, almost one million of which had been added in the quarter. Privately owned telco Ncell had 12.03 million and government-backed Nepal Telecom (NT) 9.46 million. NT also had 1.15 million



CDMA-based mobile users, up from 1.09 million in mid-June.

In the fixed broadband sector, NT had 121,570 ADSL subscribers, down from 128,021 in June. The number of cable modem subscribers rose from 31,827 to 33,498 and WiMAX subscribers from 8,859 to 9,891. The number of other broadband connection types such as wireless modems and fiber, increased from 64,181 to 64,304.

In addition, several major projects and policy changes are spurring further growth in the telecoms sector. In May 2014 NT expanded its 3G coverage to an additional 20 districts in eastern, mid-western and far-western regions of the country. It is installing network capacity for a further 10 million mobile services, 45 percent of which will be 3G.

Under these expansions, NT has deployed 33 new 3G base transceiver stations (BTS) in the Morang and Sunsari districts (eastern region); 37 in Banke, Bardiya, Surkhet, Dailekh, Dang, Rolpa, Salyan, Pyuthan and Jumla districts (mid-western region); and a further 37 in Darchula, Bajhang, Bajura, Baitadi, Doti, Achham, Dadeldhura, Kanchanpur and Kailali (far-western region).

FTTP, broadband policy and 4G

NT has also launched fiber-to-the premises (FTTP) services for businesses users only in the Durbarimarg, Kamaladi, Kathmandu Plaza and Jamal areas of capital city Kathmandu. FTTP services will be extended to the hard to reach suburbs of Thamel, Lazimpat,

Sorhakhutte, Chabahil, Swayambhu, Chhetrapati, Bouddha, Kopundole, Patan Durbar and Satdobato, and NT is now making the service available to residential customers.

Separate from NT's FTTP initiatives, the Nepalese Government aims to boost the development of high-speed Internet access services. The National Telecommunications Authority, in 2014, unveiled the National Broadband Policy. It set a target of having at least 30 percent of households subscribing to a broadband service by 2018, compared to 25 percent today. The policy also aimed to bring down the price of an entry-level service to below 3.5 percent of per-capita income, or NPR208 (\$2.10) a month. It is presently 17 percent of average per-capita income.

The Nepalese Government's National Broadband Policy of 2014 also set a target to expand broadband Internet services to 70 percent of village development committees within three years. These services will eventually connect 20 percent of public secondary schools with a service of at least 1Mbps. It also set targets of having broadband services to all state-owned hospitals and at least 15 percent of health posts by 2018.

Meanwhile speculation has been rife that the country is about to get a 4G (LTE) mobile network. It's just another indication that, after almost a century lagging behind much of the world in the development of its telecommunications, the landlocked former kingdom on the Roof of the World is catching up rapidly. 



Philippines' nationwide Wi-Fi plan: boon or bane?

The Philippines Government is planning a nationwide network of Wi-Fi hotspots, but there is poor co-ordination with other communications projects and poor integration with government services that could make use of it.

In its 2015 budget the Philippines Senate allocated a total of P3 billion (\$67m) to the Department of Science and Technology (DOST) to set up Wi-Fi access points throughout the country that would provide free Internet access for the public.

Philippines senator, Ralph Recto, said the project aimed to provide connections to 7917 high schools, 38,694 public elementary schools, 113

colleges, 1118 libraries, and to public spaces in 1490 towns in 895 provincial and regional areas, and in government run medical centers in Metro Manila. Free Wi-Fi would also be provided in 85 airports, 41 seaports and 69 Light Rail Transit, Metro Rail Transit and mainline railway stations to help boost tourism.

The project has been welcomed and its implementation is eagerly awaited, but questions remain as to the rationale behind the scheme and its viability.

According to Cisco Systems, in 2012 one-third of all data traffic from smartphones passed through a Wi-Fi router. Cisco expects that figure to rise to almost half by 2017 as more tablets and other devices that connect only over Wi-Fi come onto the market.

Filipinos have grown used to the idea of unlimited or free services. Cellular network operators have plans that offer unlimited calling and unlimited texts (but not unlimited data) and when Starbucks coffee shops introduced free Wi-Fi it was hugely popular. That service has been discontinued. However many businesses still offer free Wi-Fi services to customers.

There is nothing wrong in having Wi-Fi or creating a nationwide Wi-Fi. However, to reap the full benefits of it and make



it work towards the goals of increasing connectivity to rural areas, improving ICT and literacy a co-ordinated effort between central government, other government agencies and the private sector will likely be needed.

Grand schemes unrealized

Two years ago another headline captured the imagination of many Internet savvy Filipinos: Government Plans Nationwide 'Super Wi-Fi'. Local newspaper the Manila Bulletin noted that, due to the shortage of broadband spectrum, the government planned to harness unused TV channels, known as TV white space (TVWS). The technology was dubbed super Wi-Fi because the lower frequencies - between 54MHz and 806MHz compared to 2.4GHz for Wi-Fi - gave TVWS better propagation properties than Wi-Fi. It is delivering up to 6Mbps of data throughput at a range of 10kms.

The article said that nationwide coverage would be achieved providing connectivity to rural areas, schools and to the health sector, supporting disaster relief services and providing services to businesses. The Information and Communications Technology

Office of the Department of Science and Technology (DOST-ICTO) said that nationwide coverage would be reached by 2015. However to date only trial services have been provided, and these to only a handful of institutions.

Another Wi-Fi project is underway within the City of Manila. Under the leadership of Vice Mayor Isko Moreno, Wi-Fi was installed last year at bus shelters along a 2km stretch of road near the university at a cost of about P1.4million (\$32,000).

The project is part of the Linking Enterprise and People (LEAP) 2025 plan that aims to make Manila the first Wi-Fi city in the country. However, early users of the service have complained that it is slow and say they prefer to use their cellphone's broadband connection instead.

These are just a few of several small and fragmented connectivity projects in the Philippines.

Telco involvement called for

An article entitled Arangkada Philippines 2010, in www.investphilippines.info highlights a decline in the nation's

ranking on the UN's E-governance readiness survey, despite reforms in the telecommunications industry made over the past few years.

The article called on the Philippine government to boost broadband services and to develop a national plan to double computer usage and triple Internet penetration. It also called on the Government to make e-governance a reality for most Filipinos; that is to use the Internet for interactions with government and to enhance government transparency.

It highlighted the need to involve the telcos in these plans, noting that in 2006 when Singapore launched Intelligent Nation 2015 it included a plan to blanket the country with Wi-Fi, and operators like SingTel and M1 were brought in to participate under the Wireless@SG banner.

The Nationwide Wi-Fi initiative is not the first 'grand plan' for communications announced by the Government. Filipinos welcome such schemes but remain skeptical. Too often have they seen such grand schemes unfulfilled. [\[1\]](#)



The technology of international justice

The International Justice Mission is a global not-for-profit-organization dedicated to protecting the poor of the developing world from violence. Director, global systems and infrastructure, Chris McPeck, explains how the company is using Riverbed technology to meet the challenges of running a global network of offices in challenging locations on a tight budget

The International Justice Mission (IJM) is a US-based organization that "partners with local authorities to rescue victims of violence, bring criminals to justice, restore survivors, and strengthen justice systems." It works in 18 communities throughout Africa, Latin America and South and Southeast Asia and like any global organization is heavily dependent on IT systems to run its operations and on communications networks to connect its various regional offices with its headquarters.

Unlike many global organizations, most of its locations are in areas with inadequate, unreliable and/or expensive communications facilities and, as a not-for-profit, it operates on a tight budget that it would prefer to spend directly on achieving rather than merely supporting its goals.

As IJM's director, global systems and infrastructure, Chris McPeck, explains, the IJM can only dream of what many multinationals would implement to connect their global branches.

MPLS not an option

"Because Internet access is so expensive in our field offices, having a dedicated MPLS network would be impossible for us," McPeck told Telecom Review Asia Pacific. "We priced that once and the cost of doing it for every one of our offices was going to be more per month than our entire information systems budget for the whole year."

So the IJM has to rely on public Internet services. "We have four regions outside the US where we are working. We are down in Latin America, we have five offices in Africa and five in Southeast Asia. The infrastructure in those areas is very, very poor," McPeck said.

"A lot of offices have very low bandwidth and very high latency. Internet services go up and down all the time, power outages may happen for a couple of hours or a couple of days. We also face things like political instability. We have an office in northern Uganda that has to deal with military factions.

"The other thing we see at a lot of our offices is that the ISPs themselves don't have the same sense of urgency as they do in the developed world. In a lot of these countries, when the connection goes down and you call the ISP they say 'Yes sure. We will get on to it'. But it can take two or three days of calling constantly and actually showing up at their office to get them to do anything about the problem."

Since 2008 IJM has been using wide area network technology from Riverbed Corporation to support and optimize its IT infrastructure and at Riverbed's recent Riverbed Force user conference in San Jose McPeck explained how Riverbed's technology had helped and how it planned to expand usage in the future.

SteelHead slashes bandwidth requirements

IJM initially deployed Riverbed's SteelHead wide area network optimization devices across all its offices to support a private cloud initiative, including centralization of Exchange 2007 servers, and achieved a return on investment in less than a year.

McPeck said: "We are saving a lot of money by using SteelHeads so we do not have to upgrade Internet connectivity. We save about \$72,000 a year by having the SteelHead appliance in every office. That money can then go directly to saving lives."

He added: "In Kenya we have a 6Mbps connection and on average we are seeing about 70 percent reduction [in data volume as a result of using the SteelHead] and we are peaking at 99 percent."

Following the SteelHead deployment, IJM deployed Riverbed's SteelCentral devices that provide end-user, application and network performance management and centralized control.

According to Riverbed, "SteelCentral drastically reduces the time and effort required to develop, deploy and ensure application performance ... providing a centralized and common solution to maximize efficiency, performance, and productivity in today's application driven world."



IJM clients at its Haven Aftercare facility in Pampanga, Philippines

McPeck said: "We have only six engineers to look after all our offices around the world, so we have to have a way that we can centrally manage all our devices. Our engineering team is managing about 800 users worldwide and about 1000 devices."

A third Riverbed product that is helping IJM is SteelStore, which was previously named Whitewater and which Riverbed sold to NetApp in late 2014. It enables companies to use a wide range of public cloud services for backup. It deduplicates, compresses and encrypts data and to the attached servers appears to be a tape backup system. It is claimed to reduce data volumes by up to 90 percent. SteelStore technology encrypts IJM's data as it travels to the cloud with SSLv3, and while it is at rest using 256-bit AES encryption.

SteelStore streamlines backup

McPeck said: "We are running all the backups in our main data centre using SteelStore. Right now we have about 80TB of expanded data. De-duplicated that drops down to about 8TB and what gets pushed out the cloud is about 6TB. If you do the financials on that, that cost is about \$10 per terabyte per month."

Before deploying SteelStore McPeck had been planning to acquire tape backup systems or network attached storage (NAS) devices for each field office. These are no longer necessary.

The final piece of Riverbed technology in IMJ's IT arsenal is the SteelFusion, described by Riverbed as a device that "simplifies your branch IT footprint, converging your branch servers and storage into a single appliance while centralizing your data."

Riverbed says it enables users to "store, backup and manage your branch virtual servers, applications and data in the data center without sacrificing any of the benefits of running branch services locally for your users."

McPeck says this is a great advantage to an organization like IJM trying to manage a global branch network without local IT expertise.

"We no longer need the server in the field office. We no longer need the backup in the field office. It gives us the ability to deploy the field office by pre-propagating everything onto a SteelFusion and sending it out to the site without having to have an engineer on site to get everything set up. That is a big win. It is also very easy to manage."

"SteelFusion will allow us to have the data stored in our data center and projected out to the field offices. It will feel like a virtual machine locally for use in the field, but with the data served from our data center." **TE**



Upstarts upturning the smartphone market

In the past four years one-time king of the smartphone market, Nokia, has all but disappeared and leading Chinese brands Huawei and ZTE have risen to prominence. Now the market is set for another disruption as a host of Chinese and Indian brands offering feature-rich, low-cost Android phones gain market share.

In Gartner's 2011 year-end report the research firm noted that Apple had overtaken LG in the smartphone stakes taking the number three spot in terms of worldwide shipments of 1.7 billion smartphones. At that time Nokia and Samsung held the number one and number two spots.

Although these two manufacturers - one from Finland and one from Korea - led the pack, their Chinese counterparts were not far behind.

ZTE was in fifth position and Huawei seventh and by the fourth quarter of

that year were considered to be the fastest growing vendors.

Unsurprisingly these brands were grabbing the headlines, but there were other forces at work shaping the smartphone market. Gartner also reported that 597 million devices shipped across the globe in 2011 were of an unknown brand. They accounted for about 33 percent of the total market, considerably more than market leader Nokia's 23 percent.

That was the situation four years ago. Fast forward to 2014. Gartner has reported that Samsung and Apple hold the number one and number two spots respectively with Chinese

manufacturers Huawei, Xiaomi and Lenovo in hot pursuit in third, fourth and fifth places. In Q3 of 2014 Samsung took number one spot selling about 73.2 million units. Huawei sold 15.9 million, Xiaomi 15.7 million and Lenovo 15.0 million. But as these new well-known Chinese brands gain ground more and more unknown manufacturers are in hot pursuit.

Competition intensifies

These trends are reflected in a report from research firm Canalys. According to Canalys VP and principal analyst, Chris Jones, "The global market is becoming more competitive, with vendors beyond Samsung and Apple enjoying growing success. Together they had 48 percent of the market in 2013 but this fell to 38 percent in 2014."

He predicted that this trend would continue as competition from Chinese manufacturers increases. With Chinese manufacturers making strenuous efforts to offer a strong value proposition and an increasing quality of product across different price points. Canalys says six of the top 10 global vendors in Q3 were based in China.



But this raises some interesting questions: 'What is it that drives the demand?' and 'Where is it coming from? These can clearly be answered by one phenomenon: a big smartphone manufacturer like China creating, and meeting, more demand than the second most populous nation on the planet, India.

One solid example is the Chinese brand Xiaomi. In its home market it is a brand to be reckoned with: the Apple iPhone cannot compete with it. According to Xiaomi's latest annual report, the company booked 74.3 billion yuan (\$12 billion) in pre-tax sales last year, an increase of 135 percent from 2013. It sold a total of just over 61 million phones in 2014, up 227 percent from the year prior. It is currently the top smartphone maker in China and is now expanding towards its neighbors in Asia including India.

According to International Data Corporation (IDC), India has experienced a flood of these devices and experienced the highest rate of growth — over 18 percent — in smartphone sales in the Asia-Pacific region during January-March 2014, outpacing countries like China. In the first quarter of 2014 smartphone

shipments reached a total of 17.59 million, compared to 6.14 million units in the same period of 2013.

Aside from Xiaomi another Chinese brand, OnePlus, is on the rise. The company touts itself as being "born a global brand". It is already present in 16 countries including the US and UK and is ranked the seventh best smartphone in India according to www.digit.in.

These handsets have been driving prices down to as little as \$50, compared to \$200 a couple of years ago. In an article about Chinese smartphone manufacturers the Economist noted that these inexpensive handsets were a boon for Chinese consumers particularly for first timers, and further that local demand has enabled these companies to launch themselves in the global market.

Increasingly in the smartphone market brand and country of origin are no longer the main differentiators. Features and price are everything.


Indian smartphones on the rise

In India for example, as more and more Chinese manufacturers, including Xiaomi, enter the foray homegrown

India handsets are gaining a significant portion of the market with their main differentiator being price. According to www.digit.in, several India handsets have come on the market at Rs10,000 (\$160).

Local manufacturers like Karbonn, from Bangalore, Micromax and Xolo all have their appeal in a market that has contributed to their significant local growth. And with the Chinese players entering the India market, competition on price and features is likely to intensify.

According to Melissa Chaum, a senior research manager with IDC, "The impact of upstart Chinese players in the global market will be reflected in a race to the bottom when it comes to price. While premium phones aren't going anywhere, we are seeing increasingly better specs in more affordable smartphones. Consumers no longer have to go with a top-of-the-line handset to guarantee decent hardware quality or experience."

With all this happening, the tide is surely turning. Gone are the days when buying a phone was all about the brand. In today's mobile driven era, the main factor for consumers looking for a smartphone is value for money: feature-rich handsets that are not expensive. 



Thailand's national backhaul company: a step towards reform?

A mass of regulation shared between multiple government bodies compounded by political instability thwarts attempts at telecommunications reform in Thailand. The latest such reform is the plan for a National Backhaul company to own and rent access to network assets. Not surprisingly, its prospects are uncertain.

Each New Year brings a sense of new beginnings and hopes that things will change for the better. In Thailand, telco operators and customers alike have started 2015 on an optimistic note.

Everyone is excited about Jasmine's IPO, expected to happen sometime

this year. Additionally, the rollout of 4G services is eagerly awaited after delays in previous years. These developments should bring opportunities and benefits for operators and customers alike.

However, as the dawn of the New Year was being celebrated these expectations of better things to come were being dampened by lack of progress on a series of

telecoms reforms promised by the government but bedeviled by corruption, bureaucracy and political shenanigans. New infrastructure projects, network sharing between operators, partnership negotiations and, most of all, regulatory reforms are all progressing too slowly.

After the military junta took over the government of Thailand, it pressed on with the development of the nation's telecommunications infrastructure and reviewed existing projects. One outcome of this process was the announcement of plans to create a National Backhaul Company to address issues concerning infrastructure sharing between telco, but questions remain as to whether this will really solve the problem.

Where did it start?

Telecommunications in Thailand continues to rely upon a complex set

of policy guidelines and regulations responsibility for which is shared among several government agencies and government-owned service providers under monopoly law.

There are two government owned telcos: TOT, originally the Telephone Organization of Thailand, founded in 1954 and corporatized in 2002; and CAT Telecom, established in 1976 as the Communications Authority of Thailand and corporatized in 2003.

TOT, the former monopoly domestic telco, is now a State Owned Enterprise (SOE) under MOTC charged with operating and develop national telephone services and carrying out all business relating or beneficial to telecommunications activities in Thailand.

CAT Telecom was formerly the monopoly international telco. Its responsibilities today include providing the domestic and international postal services and domestic telegraph and telex services. CAT also operates the radiotelephone service, HF and UHF radio telegraph service, maritime mobile radio service, VHF radio service, VHF radio mobile service and radio paging. It also plays an active role in both as a regulator of local and international telecommunications services.

With the corporatization of these entities, the market was opened up to competition, but with foreign ownership restrictions. The Telecommunication Business Operation Act (TBOA) of 2001 prohibits foreign nationals from holding more than 25 percent equity in a facility-based Thai telecommunication operator. It also requires that three quarters of the board members of Thai telecommunication operators must be Thai nationals. The Act also created the Ministry of Information and Communication Technology (MICT) and the National Telecommunications Commission (NTC). MICT is responsible for all the policy and planning while the NTC is in charge of the sector regulation and dispute management.



Under the current telecommunications regulatory regime, the Ministry of Transport and Communications (MOTC) has control of certain aspects of the domestic telecommunications industry.

The new legislation brought the telecom industry into line with other sectors where national infrastructures must be owned by the state. To attract foreign investment in the telecom sector Thailand introduced the Build-Transfer-Operate (BTO) model. Both cellular operators Advanced Info Services (AIS) and DTAC are based on a BTO model.

The BTO model has enabled foreign players to partner with incumbent Thai operators and provide their services. The end result has been an improvement in services to consumers. However the BTO scheme has created a barrier to private telecom companies wanting to compete with the BOT companies: the latter cannot own physical network assets.

The BOT scheme has been the subject of debate for several years, but it delivers hundreds of millions of dollars annually to state coffers, so the Government has been reluctant to abandon or modify it.

Solution or scheme

However, last December the Thai government's Digital Economy Policy Panel finally revealed plans to create a National Backbone Holding Company to build an operate national telecoms infrastructure.

Reports suggest that the holding company would operate all existing telecom network assets - fixed and mobile -and rent these to service providers, the aim being to reduce redundancies in network equipment and reduce the prices for broadband services.

If the plan goes ahead the new company would inherit the 150,000km of fiber owned by state-owned operators TOT and CAT and also, possibly, the 50,000km of fiber owned by private players and the Electricity Generating Authority of Thailand.

To progress the plan, Thailand's National Council for Peace and Order (NCPO) will establish an official national digital economy committee to be chaired by prime minister Prayut Chan-ocha, the leader of May's military coup.

The announcement of the National Backbone Holding Company is a promising move towards streamlining the process for managing infrastructure. It may also address the issue of varying rates in terms of payment for the use of infrastructure since telecom operators will only be dealing with one government office.

However, the issues of the entwined responsibilities of various government agencies like MICT and PTDC; and TOT and CAT remains. For as long as these overlapping functions exists, there will never be a level the playing field and true, transparent competition will never be achieved. **IT**



South Korea leads the 5G pack

The first things that come to mind when the subject of South Korea is raised are Kimchi, K-Pop and Connection – a very fast Internet connection, but South Korea is also heading for a world lead in 5G - the next generation of mobile technology

According to Akamai's State of Internet report for the second quarter of 2014, South Korea clocked an average Internet connection speed of 24.6Mbps, and a peak speed of 72.1Mbps. But the country is not being complacent about the speed of

its connectivity. When it launched the world's first LTE-Advanced network in 2014 it clocked a speed of 150Mbps and promised to reach a peak of 500Mbps. And it is not stopping there. South Korea aims to lead the pack in the race to develop and deploy 5G mobile networks.

When 5G made the headlines about a year ago, industry experts greeted it

with both awe and reluctance. Many mobile users were only just beginning to enjoy the benefits that 4G brings, so discussions of its successor seemed somewhat premature. Nevertheless it is timely to start discussion on the next iteration of the technology, for which the consensus is that commercial reality is only about five years away.

In South Korea the 5G discussion began when the Ministry of Education, Science and Technology (MEST) announced a year ago that the country would invest 1.6 trillion won (\$1.5 billion) to develop 5G technologies.

MEST also announced that it planned to roll out the service by 2017, to have



a commercial service by 2020 and to develop new services such as Ultra HD streaming, hologram transmission and upgraded social networking services that would make use of the higher speeds of 5G networks. MEST said it would implement the plan in partnership with operators SK Telecom and Korea Telecom and device manufacturers like Samsung and LG.

The race is on

South Korea leads the pack in the 5G race. It is currently working with various companies to roll out core 5G wireless technologies by 2018 for the upcoming PyeongChang Winter Olympics. According to MEST, it is through this event that the country will introduce the world's first 5G network services by 2020.

Six months after MEST made that announcement the European Union (EU) announced that it was forming a joint research project with South Korea as a partner. This research will focus on ultra-fast 5G mobile broadband technology. According to Neelie Kroes, the EU commissioner for telecoms, 5G will become the

lifeblood of the digital economy and digital society once it is established.

Kroes added that the partnership aimed to push forward further standardization and that it expected to announce common standards and the rollout timetable within this year.

The EU and South Korea will collaborate with the Third Generation Partnership Project (3GPP), a group of telecommunications standards organizations, and with the International Telecommunication Union (ITU), which is responsible for setting global policies for spectrum use. Under the new agreement, the EU and South Korea aim to launch jointly funded research projects in 2016 or 2017.

Aside from carving out new standards, the partnership also aims to unify radio frequencies used for 5G. Also, its move is geared towards making cheaper smartphones that are easier to manufacture. The EU plans to spend 700 million Euros (\$825 million) on research over the next seven years while telecom companies

expect to contribute around 3 billion Euros. Europe's 5G Infrastructure-Association will work directly with South Korea's 5G forum.

Huawei heads for South Korea

In November, Huawei announced that it would work with three service providers in South Korea on 5G networking technologies. The Chinese group is also considering the setting up of an R&D facility in South Korea.

But not far behind is its neighboring country Japan. NTT Docomo also announced last year that it was working with six mobile vendors. It has already started its test run of 5G technologies across a range of frequencies. Vendors involved in Docomo's 5G efforts to exploit frequency bands above 6GHz are Alcatel-Lucent, Ericsson, Fujitsu, NEC, Nokia, and Samsung. The company also announced last year that it was aiming to deploy 5G commercially by 2020 in time for the 2020 Tokyo Olympics and Paralympics. By this, the Japanese technology can be further promoted on the world stage. It aims to debut the technology with speeds up to 10Gbps. **TR**



WELCOME TO



Papua New Guinea

Mountain microwave in Papua New Guinea

Building a microwave network in the mountains of Papua New Guinea where roads and grid power are non-existent presents some formidable challenges. Here's how they were overcome.

Microwave radio is regarded as the ideal solution for transmitting information over long distances in remote areas where access to sites may be difficult. Antennas have been installed in all extremes—from the most arid deserts to the entire length of the Trans-Siberian Railway. So, when a

requirement arose for a high capacity backbone network in Papua New Guinea, microwave radio was the technology of choice.

Papua New Guinea is one of the world's least explored countries and many undiscovered species of plants and animals are thought to exist in its interior. In the heart of this territory is Mount Otto, which stands at around 3,500 meters above sea level. Very few

people climb this giant of a mountain because of its steep slopes, small summit area and the difficulty of access: there are virtually no roads in the surrounding area.

When CommScope customer, Aviat Networks, was tasked with installing microwave radios and antenna systems on this mountain summit and in the surrounding area, the company had to design a system that would be reliable and that would require little maintenance. Thus, it was imperative to select a supplier and products that they could rely on.

Demanding design considerations

Things that had to be carefully considered when designing the network included:

- **Network capacity** – The end-customer wanted to maximize capacity by transmitting over eight channels in both vertical and horizontal polarizations, running cross-polarization interference cancelation (XPIC), with link distances of up to 91 kilometers.
- **Topography** – Papua New Guinea has very good propagation conditions and lots of high mountains. This, combined with powerful radios, XPIC, adaptive modulation and an all-ethernet architecture, allowed huge capacity of up to 4Gbps.
- **Spectrum re-use** – Antennas with high quality radiation pattern envelopes were needed for side lobe suppression to maximize the re-use of the available spectrum.
- **Space diversity** – Because the curvature of the earth impedes line of sight communication over such long links, space diversity configurations (with two antennas at each end of the link) had to be used on some of the links to ensure continued service and maximum throughput.
- **Reduced shipping volume** – Large antennas were required but these would be difficult to transport and handle. So they had to be able to be shipped disassembled and then assembled on site.
- **Reliability of the antenna systems** – The chosen sites would have little or no supervision for extended periods of time, so there needed to be a high level of confidence in the products being installed. Return visits would be difficult and expensive.
- **Power** – Solar panels were ideal for the remote location but generators were also required as backup for extended periods of cloudy weather.

After taking everything into consideration, Aviat selected CommScope's Andrew HSX-series microwave antennas and ancillary products for the links. The extremely high cross-polar discrimination (XPD) and excellent radiation pattern

performance of the HSX antenna made it the ideal choice for these high capacity links over long distances.


Getting these products to the installation locations was a challenge in itself. To assist with this, CommScope supplied its 2.4 meter, 3.0 meter and 3.7 meter antennas with split reflectors to reduce the shipping costs from the manufacturing location to Papua New Guinea and to ease their transfer to the tower sites. There are no roads to these sites so everything had to be flown in by helicopter, which would have been far more difficult, or impossible, if antennas with one-piece reflectors had been used.

Benefits of a one-stop-shop

The ability of CommScope to manufacture and consolidate the entire microwave antenna system including antennas, elliptical waveguide cable, connectors, pressurization equipment and accessories at one central location also greatly eased the logistics burden for the project and ensured that all components were designed to work together. There is nothing worse than getting to a site and finding that components from different suppliers are incompatible.

Richard Malley, regional manager for Aviat Networks, said: "This was a real help. We then split the materials by site. All the installers and the customer are very familiar with the CommScope name so they were happy using 'best in class' technology and products."

Installation of each tower and antennas required dozens of flights airlifting the personnel and materials necessary to build the tower and install the equipment. It was an amazing accomplishment by Aviat taking into account the technical, geographical and logistics challenges its team had to face. Malley added, "We have used CommScope for all large projects like this. We can install it and forget it for 10 years."

The job is not yet finished: more links in the network are planned with distances of up to 142 kilometers, some of which will be over water. The Aviat team, supported by CommScope microwave products, is confident it will be up to the challenge. 



Author bio

Jim Syme

Jim Syme is product line manager for CommScope's Microwave Systems division, responsible for business development in the European region with additional global management responsibility for several major OEM customers. Jim began his 23-year career with Andrew Corporation in the microwave antenna design engineering group and is a regular participant at conferences on microwave antenna systems.



Industry embraces the 'Third Network'

The message delivered to the audience of 1,100 attendees representing some 350 companies from 36 countries at the Gen14 conference held in Washington DC last November was clear: the world is ready to embrace the Metro Ethernet Forum's vision of the Third Network.

The Metro Ethernet Forum's GEN14 conference was the global gathering of the carrier ethernet (CE) community that is defining the future of network-enabled cloud, data, and mobile services powered by the convergence of CE 2.0, software defined networking (SDN) and virtualization technologies.

It demonstrated that industry is working to build upon the strengths of both the Internet and CE 2.0 to define lifecycle service orchestration and develop NFV and SDN implementations enabling agile, assured and orchestrated network as a service.

Attendees to GEN14 were witness to live demonstrations of elements of Third Network in action, only two months after its launch. The focal point of the GEN14 exhibition area was the Proof of

Concept (PoC) Showcase. Six participant groups provided live demonstrations of leading-edge implementations of dynamic cloud-centric carrier ethernet services with SDN, NFV, automated provisioning, service orchestration and other innovations.

Comments and reactions from the six PoC groups and industry leaders attending GEN14 included:

CenturyLink

"The Third Network vision, as recently outlined by the MEF, lines up with the proof of concept that CenturyLink and Ciena are demonstrating at GEN14. The implementation of MEF Third Network functionality in a single and multicarrier network is an essential step in moving towards a cloud and network orchestration vision."

- Jack Pugaczewski, Principal Architect, CenturyLink.

Cyan

"MEF's Third Network is about delivering agile, assured and orchestrated services. As presented in our Showcase demo and validated with deployments at customers such as Colt and KVH, Cyan's Blue Planet SDN and NFV orchestration platform delivers automated, dynamic and on-demand carrier ethernet services in multivendor production networks today. Innovative carriers that fully embrace multi-vendor SDN and NFV will drive the industry forward, creating new content and application services that seamlessly combine the WAN and virtual resources to deliver unique new product offerings."

- **Abel Tong, director of solutions marketing, Cyan.**

Ericsson

"Ericsson's work in MEF provides one of the most crucial APIs to support the implementation of Agile enabling the potential of the Third Network vision to be embraced and realized today."

- **Scott Mansfield, principal engineer, Ericsson.**

InfoVista

"With the MEF's Third Network vision we are entering a new era, where CSP market leadership will be defined based on the commercial launch of state-of-the-art performance assured services. InfoVista is thrilled to cooperate with Oracle in demonstrating how CSPs can implement and reap the benefits of the Third Network vision."

- **Cyril Doussau, senior director, head of service assurance product line, InfoVista.**

Oracle

"With the MEF's Third Network vision service providers can offer a more dynamic network control experience to their enterprise customers as they increasingly embrace cloud-based services. Oracle's and InfoVista's demonstration of the Third Network service orchestration and assurance with full business process integration at MEF GEN14 showcases the core tenets of this vision and provides a design blueprint for transforming it into a business reality."

- **Nigel Ball, vice president of marketing, Oracle Communications.**

Overture Networks

"With the advent of the Third Network and its APIs service providers will



be able to leverage today's tried and true CE 2.0 networks to enable new technologies such as SDN and NFV to deliver exciting new services. The Third Network is a powerful strategy that will help the industry transition to this exciting new world of dynamic service creation and delivery."

- **Prayson Pate, CTO & senior vice president of R&D, Overture Networks.**

Wedge Networks

"Security is a key indicator of a high quality network service as promised by the Third Network and Wedge is committed to promoting security as a service as a key contribution to the MEF's vision. Wedge's technology is high performance, software defined, that can seamlessly embed security within the network and orchestrate a personalized service across multiple network segments with built-in automated security functions."

- **Dr Hongwen Zhang, CEO of Wedge Networks.**

XO Communications

"With capabilities like SDN and NFV being developed, the industry needs a unifying vision. The Third Network fills that void. It represents the pinnacle of what we hope to achieve with some of these newer technologies that are so disruptive to the status quo. While there's still a lot of standardization work ahead, network efficiency, service delivery, customer service, and customer control will all be maximized when we realize the Third Network vision." **TE**



Slow growth tipped for telecoms in 2015



Technology market research firm, Infonetics has released its latest Global Telecom and Datacom Market Trends and Drivers report, saying that growth in telecom revenue continues to slow in every geographic region.

"Europe's five largest service providers — Deutsche Telekom, Orange, Telecom Italia, Telefónica, and Vodafone — continue to experience declining revenue, though less pronounced than

in the past three years," Infonetics says. "And in North America, AT&T and Verizon have signaled that the mobile services price war started by T-Mobile US is taking a bite."

Co-author of the report, Matthias Machowinski, said: "After a weak 2013, enterprise networking and communication revenue growth accelerated in 2014 thanks to a resurging North American market and stepped-up investments in security infrastructure. We expect similar results in 2015 when strong end-user demand in North America and Asia Pac is likely to be offset by a slowdown in Europe."

Infonetics says that macroeconomic indicators point to moderate global economic growth of three percent for the full-year 2014 due to persistent weaknesses in the Eurozone and a significant slowdown in Brazil and Russia. "Global mobile service revenue barely budged in the first half of 2014, up just 0.5 percent from the same period a year ago, badly dragged by Europe again. ... Key trends affecting the enterprise networking and communication markets include the adoption of cloud services, the use of cloud architectures in enterprise data centers, and security becoming a part of every IT decision."

Telecom services assurance market forecasts



Research and Markets has published a "Telecom Service Assurance Market by Software, Service, Deployment Type & by Region - Global Forecast & Analysis to 2019". It describes the telecom

service assurance market as "a compendium of service provider's effectiveness in customer service, and promptness in responding issues and network faults," and says that problems handling and service quality monitoring are among the key aspects which help in leveraging the customer experience.

The report predicts that the telecom service assurance market will

grow from \$3.18 billion in 2014 to \$4.59 billion by 2019, a CAGR of 7.6 percent. The market for telecom service assurance software is expected to grow from \$1.94 billion in 2014 to \$2.72 billion by 2019, a CAGR of 7.0 percent.

The market for telecom service assurance services is expected to grow from \$1.24 billion in 2014 to \$1.87 million by 2019, a CAGR of 8.5 percent.

Akamai assesses the state of the Internet



Akamai has released its third quarter 2014 'State of the Internet' Report saying that, for the second consecutive quarter, the global average connection speed remained above the 4Mbps 'broadband' threshold. However, it saw a slight decline in the third quarter of 2014 with the average speed dropping 2.8 percent to 4.5 Mbps.

Six of the top 10 countries saw increases in average connection speeds, and all of the top 10 remained well above the 10Mbps 'high broadband' threshold. Among those increasing their average connection speed quarter-over-quarter, Singapore experienced the largest rise (12.2Mbps), an 18 percent improvement. The smallest growth was in Japan (15Mbps), which was up only 0.8 percent from the second quarter. In addition, Ireland (13.9Mbps) joined Singapore in seeing an increase of 10 percent or more from the previous quarter. Yearly increases were seen in 129 qualifying countries/regions, with rates ranging from 150 percent in Jersey (9.7Mbps)

down to a modest 0.2 percent in Ecuador (3.6Mbps).

Hong Kong once again had the highest average peak connection speed at 84.6Mbps, followed closely by Singapore (83Mbps). All 10 countries/regions saw significant increases in average peak connection speeds compared to the previous year. Uruguay (58.6Mbps) led the group with a year-over-year change of 334 percent and Luxembourg (54.4Mbps) saw speeds more than double. A total of 135 qualifying countries/regions saw average peak connection speeds increase from the third quarter of 2013.

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- How you can implement your own Mobile First strategy by learning from the best
- Developments in Cloud Networking, and lessons to learn from organisations who have implemented cloud
- Understanding the developments in Telecom Applications and how telcos and app developers can come together to create winning partnerships
- Comprehend the value proposition of Software Defined Networks and Infrastructures
- Opportunities in Asian Satellite Industry

Track Highlights!

Tuesday, 2nd June 2015

- Broadband – Sustaining Growth in Asia's Broadband Markets
- Internet of Things
- Getting into the Digital Dialogue – Telco Apps Development
- Cloud Networking

Wednesday, 3rd June 2015

- Broadband – From 3G to LTE and Beyond
- Asia's Satellite Industry – The Next Decade
- Mobile Marketing – Marketing on the 7th Mass Media
- Software-Defined Infrastructures for Networks, Clouds and Services

Thursday, 4th June 2015

- Broadband – Maximising your Revenue Via DSL, Fiber and Wireless
- The 'New' Value Proposition for Satellite End Users
- Enterprise Mobility
- Big Data – Turning Your Big Data into Smart Data

Friday, 5th June 2015

- Big Data Workshop
- Mobile Marketing Workshop
- CyberSecurity Workshop

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ASIA-PACIFIC

GSA

Pacific Telecommunications Council

TELECOM Review
telecomreview.com

WTA

wimax forum

SingTel trials Ericsson's Radio Dot to boost indoor coverage



SingTel is trialling Ericsson's Radio Dot System at Changi Business Park across both WCDMA (3G) and LTE (4G) live networks to improve in-building coverage.

According to Ericsson, the Radio Dot System enables operators to

deliver high-performance coverage and capacity in any size or type of building and is designed to integrate seamlessly with LTE and 3G networks. It is claimed to use a revolutionary antenna element or 'dot' that delivers mobile broadband access to users. Dots are connected and powered via standard Internet LAN cables to indoor radio units that link to a base station.

Ericsson says: "The Radio Dot System leverages the same

industry-leading features found in Ericsson's macro base station. Deployments and upgrades are simple and the user experience is consistent wherever they go. The indoor network evolves in lockstep with the outdoor network."

The system also integrates with Ericsson's carrier Wi-Fi portfolio enabling features such as real-time traffic steering to ensure the best user experience across both Wi-Fi and cellular networks.

SK Telecom launches tri-band 300Mbps LTE-Advanced



SK Telecom has launched the world's first commercial tri-band LTE-Advanced (LTE-A) service offering data speeds of up to 300Mbps, four times faster than LTE and 21 times faster than 3G services.

It has achieved this by aggregating three component carriers in three different frequency bands: 20MHz in the 1.8GHz band, 10MHz in the 800MHz band and 10MHz in the 2.1GHz band.

Tri-band LTE-A is presently offered in areas where coverage of all three

component carriers intersects. SK Telecom says it has already secured wideband LTE-A coverage in the main areas of all 84 cities nationwide - meaning that it already has in place 800MHz and 1.8GHz base stations - and can offer tri-band LTE-A service by simply adding 2.1GHz base stations.

The company plans to build more than 26,000 2.1GHz base stations within the first quarter of 2015 to provide its customers with tri-band LTE-A in Seoul, the Seoul Metropolitan Area, central areas of all cities nationwide as well as all subway lines in Korea.

The Galaxy Note 4 S-LTE will be the first tri-band LTE-A capable device and will be provided initially to a limited number of consumers who will provide feedback on issues including

its performance (speed, transmission stability, etc) and convenience features.

SK Telecom has offered 150Mbps LTE-A services by aggregating 10MHz in the 1.8GHz band and 10MHz in the 800MHz band since June 2013, and began 225Mbps Wideband LTE-A service by aggregating 20MHz bin the 1.8GHz band and 10MHz bandwidth in the 800MHz band in June 2014, both world firsts.

The company developed the world's first tri-band LTE-A carrier aggregation technology in January 2014 and successfully demonstrated the 450Mbps tri-band LTE-A by binding three 20MHz bands at the Mobile World Congress 2014 in Barcelona in February 2014.

Ericsson supports China Mobile's LTE/EPC in Hong Kong



中国移动通信
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China Mobile Hong Kong has selected Ericsson as the sole supplier to enhance its converged LTE FDD/TDD and evolved packet core network with a wide range of capabilities including voice over LTE (VoLTE) and Ericsson's Charging System, evolved IP network solution and Proactive Support Services.

VoLTE enables superior HD voice call quality, instant call-set-up and superfast LTE data services during calls. Through the Ericsson Charging System solution, users will have greater

control of their roaming expenditure and will be able to subscribe to personalized offers.

According to Ericsson, "The solution also enables an easy and visual way of creating and testing new services and bundles, shortening the time to market for China Mobile Hong Kong. Ericsson SSR 8000 Smart Services Routers, used in evolved packet core and evolved IP network solution, will allow China Mobile Hong Kong to simplify network design and operation."

New Asia Pacific VP for Orange Business Services



Orange Business Services has appointed Dr Patrick Sim as senior vice president Asia Pacific, a region that for the company includes, Australia, New Zealand, ASEAN, China, Hong Kong, India, Japan and Korea. Orange Business Services described his appointment as "a step forward in the company's strategy for global growth and the expansion of its international business," saying he would "lead Orange Business Services' ambition to become the trusted partner for customers' digital transformation in the Asia Pacific." Sim said: "The region is an engine of global growth for Orange with huge demand for network expansion, cloud services, unified communications and customer experience solutions. We have made significant investments and partnerships in the Asia Pacific, and are positive about growing the business substantially in the coming years." He has been with Orange Business Services for the past eight years as vice president of sales and marketing for Asia Pacific and has held several leadership roles in the past with Bridge Mobile, Nortel Networks, Oracle Corporation, and NEC Australia.

New CEO for Alcatel-Lucent Shanghai Bell



Alcatel-Lucent has appointed Luis Martinez-Amago as CEO of Alcatel-

Lucent Shanghai Bell, its flagship company in China. He will be based in Shanghai and will be responsible for Alcatel-Lucent Shanghai Bell's business in and outside of China and for the company's contribution to the Alcatel-Lucent group's R&D and global operation supply chain.

He was previously president of Alcatel-Lucent's activities in Europe, Middle East and Africa and prior to that ran several Alcatel-Lucent businesses, including its fixed access, applications and wireless transmission divisions. He has been based in London, Vienna, Antwerp, Paris, Madrid and Barcelona, where he joined the company 26 years ago.

New president and CEO for SK Telecom



SK Telecom has named the COO of SK Planet, Jang Dong-hyun, as its new CEO and president. He joined SK Telecom in 2000 and has served in various key positions including head of the strategic planning division and head of the marketing division. He was appointed COO of SK Planet, the platform subsidiary of SK Telecom, in January 2014. He is expected to "steer the company to sustained growth amidst rapidly changing market conditions by focusing on its core strength as a network operator and developing new businesses."

SK Planet was established in October 2011 as a wholly owned subsidiary of SK Telecom to "lead the revolution of online and mobile service platform with its integrated commerce, digital contents, and advertising and marketing businesses." It was merged with SK Marketing in February 2013 to become "a truly integrated service platform that encompasses both the online and offline marketing channels."

Nokia Networks names new head for Korea



Nokia Networks has appointed Andrew Cope as head of its business in Korea. He was previously head of sales development for Bangladesh, Cambodia, Laos, Maldives, Sri Lanka, Thailand and Vietnam (categorized as Asia North by Nokia Networks). Cope has been with Nokia for 15 years, holding a number of senior management positions across different areas including sales and marketing, operations and strategy. In 2008 he was engaged in the Korean market to drive the company's growth in the Asia Pacific region. Nokia Networks claims to be the only foreign LTE infrastructure supplier to all three LTE operators in Korea, one of the world's most advanced and demanding markets for mobile telecommunications..

Hitachi Data Systems names new Asia Pacific chief



Hitachi Data Systems (HDS) has appointed Mark Ablett as senior vice president and general manager, Asia Pacific "to capitalise on the fast growing opportunities in the Asia Pacific region, boost revenue growth and expand the business." He joins HDS from Juniper Networks where he was vice president for Australasia. His predecessor, Neville Vincent, will move to a role focused on expanding HDS's global systems integrator partner program.

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Mobile World Congress



The GSMA Mobile World Congress is the place for mobile leaders to gather, collaborate and conduct business. The annual event provides the planet's best venue for mobile industry networking, new business opportunities and deal-making.

Date: 2-5 March, 2015
Place: Barcelona, Spain

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Date: 2 - 5 June 2015
Place: Marina Bay Sands, Singapore
<http://www.CommunicAsia.com/>

May 2015

Broadband TV Connect Asia 2015



The show is the region's top networking forum bringing together 800+ senior level decision makers and buyers from the broadband and connected entertainment industry from across the Asia-Pacific region and beyond.

Date: 12th-13th May 2015
Place: Suntec, Singapore

July 2015

Mobile World Congress Shanghai



Previously known as Mobile Asia Expo, Mobile World Congress Shanghai will celebrate the amazing possibilities that mobile brings. It will feature a massive technology exhibition with 250+ exhibitors, including Alcatel-

Lucent Shanghai Bell, China Mobile, Huawei, LeTV, Mozilla, Nokia, NTT Docomo, Visa, SK Telecom, Visa and ZTE and world-class thought-leadership conference with engaging keynote speakers and compelling panel sessions Incredible C-Level networking opportunities.

Date: 15-17th July 2015
Place: Shanghai New International Expo Centre, China

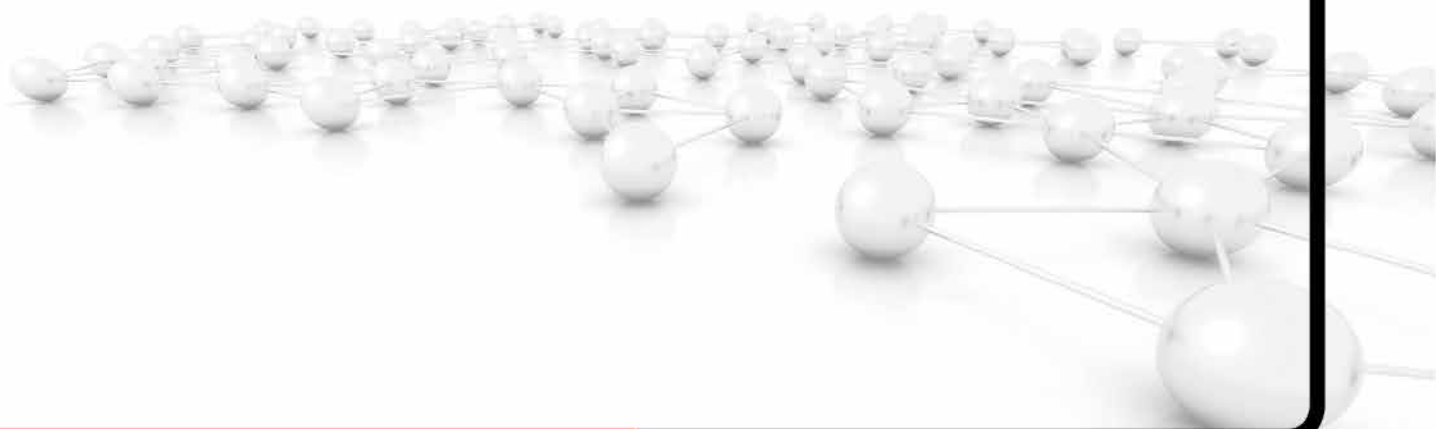
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