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This Week's Stories

AT&T In Early Talks With U.S. Officials For Time Warner Approval

July 24, 2017

U.S. antitrust officials have started talking to representatives from AT&T Inc. and Time Warner Inc. about possible conditions that could secure approval of their \$85.4 billion tie-up, according to people familiar with the matter.

The early-stage discussions suggest that government lawyers have nearly finished their months-long look at how AT&T, the biggest pay-TV distributor, would reshape the media landscape with its bid for the owner of CNN and HBO -- and shows that the sides have moved on to talking about how they can make the merger work without harming rivals.

U.S. antitrust officials, who have blocked many tie-ups between direct competitors, rarely step in to stop vertical deals like this one. But the Justice Department is under pressure not to wave this merger through. Media and pay-TV competitors have told department lawyers they fear AT&T would favor the in-house programming that it would acquire, two people familiar with the matter said. Democratic lawmakers have said the deal could lead to higher prices and fewer choices. And President Donald Trump said during the campaign that the tie-up would concentrate media power.

Shares of Time Warner jumped as much as 1.4 percent on the news and were up 0.70 percent at \$100.17 at 10:02 a.m. in New York trading. AT&T shares were little changed at \$36.39.

Good Behavior

What antitrust lawyers are now focusing on, the people say, is whether AT&T could make vows of good behavior that are persuasive enough to satisfy officials -- showing, for example, that it won't use its weight to unfairly advantage its own programming. Such conduct remedies are standard in vertical deals like this one. AT&T is open to conditions to ease concerns, its Chief Executive Officer Randall Stephenson told CNBC last year after the deal was announced.

One challenge: Justice Department lawyers are starting talks without their new boss being able to weigh in on a deal that would make AT&T a media and telecommunications empire. Trump's nominee for the Justice Department's antitrust chief, Makan Delrahim, is awaiting Senate confirmation.

Delrahim doesn't see big issues with the deal, judging by his public statements. He told senators earlier this year that vertical mergers don't typically raise competition problems. He also said last year before his nomination, that the Time Warner deal doesn't raise big antitrust hurdles despite its size because it unites a pay-TV distributor with a content provider. People familiar with his thinking say he isn't a fan of conduct remedies. If he rejects behavioral fixes, he could either sue to block the deal -- or wave it through without changes.

Resist Pressure

Career lawyers at the antitrust division would probably resist pressure to go beyond conduct remedies and recommend a lawsuit to block the deal, said Chris Sagers, a professor at Cleveland-

Marshall College of Law who teaches antitrust law. Going to court to stop the tie-up would be a losing battle for Delrahim, Sagers said.

“He’s going to be very sophisticated and savvy about political issues, so maybe he is the sort of guy who will care a lot about what the White House thinks, but it’s going to be a hard push to get the antitrust division to do something obviously contrary to the division’s own history and the law everyone there believes in,” Sagers said.

The White House has traditionally stayed at arms length and allowed antitrust investigations to run independently. That was before the Twitter president. Trump calls CNN “Fake News CNN” and posted a wrestling video doctored to show him pummeling someone whose head is replaced with CNN’s logo. The White House is closely monitoring the deal because Trump is worried about media concentration, according to one official. At the moment, Trump is leaving the review in the hands of the Justice Department, the official said.

AT&T and Time Warner declined to comment. A White House spokeswoman referred questions about the deal to the Justice Department, which declined to comment.

Worried Companies

The last big deal between a distributor and a content provider was Comcast Corp.’s acquisition of NBCUniversal in 2011. Back then, regulators imposed conduct remedies on the cable giant aimed at preventing it from thwarting online rivals like Netflix Inc. Media companies worry about an AT&T-Time Warner tie-up even more than they did about the NBC deal because it would give the telecom company unprecedented power, one of the people said. Unlike cable companies, which are restricted to regional markets, AT&T reaches the entire country through its satellite and wireless services.

The fear of operators of premium channels such as Showtime and Starz is that AT&T will favor Time Warner’s HBO in marketing, packaging and online distribution. These networks rely on AT&T’s DirecTV to promote their channel to customers. They are concerned that DirecTV could make HBO exclusive to its customers or not count streaming HBO on phones toward AT&T subscribers’ wireless data, the person said. Their concerns were heightened when the telecom giant recently began offering HBO for \$5 a month to subscribers of its new online TV service, DirecTV Now, instead of \$15 customers must pay HBO for its own streaming service, HBO Now.

‘Must Carry’

Premium channel owners want the Justice Department to impose a “must carry” condition that requires DirecTV to include their channels anywhere they sell HBO, including when it markets products to potential customers, the person said. They also want restrictions barring DirecTV from substituting their channels for HBO’s sister network, Cinemax. Showtime and Starz declined to comment.

Another possible condition would be to bar AT&T from giving slower streaming speeds to Netflix and Amazon.com Inc. users than to those of HBO. Media companies also want the Justice Department to appoint industry experts to regularly check whether AT&T’s conditions are being met and create specific enforceable penalties, the person said.

Lawmakers pressuring the administration over the deal include Senator Amy Klobuchar, a Minnesota Democrat. She wrote to Attorney General Jeff Sessions earlier this month, after the New York Times reported that the White House was considering using the merger review as leverage over CNN, asking him if the White House has had any contact with the Justice Department about the deal. Political interference in antitrust enforcement is “unacceptable,” she wrote. Delrahim told senators he’s had no conversations with the president about the deal.

A group of lawmakers, including Senator Al Franken of Minnesota and Elizabeth Warren of Massachusetts, last month said the deal will lead to higher prices and fewer choices for consumers and urged the Justice Department to consider blocking the deal. They argued that conditions to regulate AT&T's behavior would be unenforceable and unreliable.

"From forcing its customers to buy bigger bundles of Time Warner's programming to foreclosing rival content creators' access to AT&T customers, AT&T-Time Warner could engage in a wide variety of behaviors that would harm competition in the media market," they said.

bloomberg.com

Creepy 'FruitFly' Surveillance Malware Hits American Apple Macs

July 24, 2017

Apple Mac malware outbreaks are rare. So when they happen, people pay attention.

Law enforcement agents are now investigating what appears to be a slice of malicious code that's been hitting Mac users in recent weeks and appears to be purely for targeted surveillance, though it's unclear whether it's for perverse reasons, or if it's government-related. Patrick Wardle, an ex-NSA analyst who now does research for cybersecurity firm Synack, says he saw around 400 infections, but there's likely many more as he only had access to a handful of servers used to control the malware, dubbed FruitFly. "I likely only saw a limited percentage of the total number of victims," Wardle said.

He was able to uncover FruitFly victims after registering one of the domains the attackers had planned to use as back up when the primary servers were offline. For whatever reason, the hackers didn't own the domain.

From there, Wardle could see victim IP addresses, 90% of which were located in the U.S., he told Forbes. He was also able to see the name of victims' Mac computers too, making it "really easy to pretty accurately say who is getting infected." Most appeared to be individuals, though there were some at colleges too, he said. As soon as Wardle saw active infections, he handed what he found to law enforcement. He'll present his findings at the Black Hat conference taking place later this week.

He believes surveillance was the primary purpose of FruitFly, which could spy on the webcam of the user and take screenshots. "This didn't look like cybercrime type behavior, there were no ads, no keyloggers, or ransomware," he said. "Its features had looked like they were actions that would support interactivity: it had the ability to alert the attacker when users were active on the computer, it could simulate mouse clicks and keyboard events."

Old Apple Spy Tool

It appears to be old malware too, said Wardle. Comments in the FruitFly code included references to updates for Mac OS X Yosemite, first released in 2014, indicating the spyware was running before that.

Outside of a lack of insight into the other servers, which could push the infections numbers up drastically, it's also as yet unclear how FruitFly has infected Apple Macs. Apple had not responded to a request for comment.

FruitFly has been seen before too. MalwareBytes first detected it earlier this year apparently targeting biomedical research centers. "The only reason I can think of that this malware hasn't been spotted before now is that it is being used in very tightly targeted attacks, limiting its exposure,"

"Law enforcement agents are now investigating what appears to be a slice of malicious code that's been hitting Mac users in recent weeks and appears to be purely for targeted surveillance, though it's unclear whether it's for perverse reasons, or if it's government-related."

wrote MalwareBytes researcher Thomas Reed in January. "Although there is no evidence at this point linking this malware to a specific group, the fact that it's been seen specifically at biomedical research institutions certainly seems like it could be the result of exactly that kind of espionage."

But there's no indication just what the motivations of the malware's creators are. Looking at the code alone, it may be they're simply trying to spy on random individuals through their webcams.

[forbes.com](#)

Microsoft Paint Could Get Erased After 32 Years

July 24, 2017

Say goodbye to Microsoft Paint?

The iconic Paint application has landed on Microsoft's (MSFT, Tech30) list of "deprecated" features for future software releases.

Although the tech giant said the feature is "not in active development" and could be soon removed, it's unclear whether Paint will be officially absent from its Windows 10 Fall Creators Update, expected this fall.

Paint was released in 1985 with the first version of Windows 1.0. The program has been featured on every software update to date.

The easy-to-use tool lets users crop and resize images, as well as create simple drawings and doodles. Despite its limited features -- it can't be used for complicated photo editing or design -- Paint evokes nostalgia for many Windows users.

As of last year, Paint still had more than 100 million monthly users, according to Microsoft.

Other features that could be removed with the Windows 10 update include Outlook Express, the Microsoft Reader app and Reading List, a bookmarking service. (Microsoft says the latter two will be integrated with its Microsoft Edge browser).

But this doesn't mean Paint is gone forever. It will be available for free in the Windows Store but won't receive updates, a Microsoft spokesperson told CNN Tech on Monday evening. In addition, Microsoft last October revealed Paint 3D, a revamped spinoff that allows users to create 3D images. Paint 3D will come with the current and future versions of Windows.

Paint isn't the only program tugging the heartstrings of Microsoft fans this year. Most recently, a Chrome extension called "Clippy Everywhere!" brought back Clippy, the company's office assistant. The animated paper clip can be embedded onto any website, asking users if they need assistance.

[money.cnn.com](#)

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"Although the tech giant said the feature is "not in active development" and could be soon removed, it's unclear whether Paint will be officially absent from its Windows 10 Fall Creators Update, expected this fall."

Products & Services

Comcast's 'Instant TV' Service For Cord Cutters Could Launch By Year-End

July 27, 2017

Comcast's newest entry into the market of streaming TV services aimed at cord cutters could be launched later this year, according to statements made by executives on the company's earnings call this week. The service, known as "Xfinity Instant TV," would be available to subscribers without the need for a set-top box, challenging rivals like Dish's Sling TV, PlayStation Vue, Hulu Live TV, AT&T's DirecTV Now, and YouTube TV.

News that Comcast was eyeing a streaming service of this kind was previously reported.

Earlier this year, several details emerged about the planned offering, including pricing and feature set. At that time, Comcast's top video exec Matt Strauss confirmed the service's name, "Xfinity Instant TV," and said it would include local broadcast channels, at least one premium channel, and a cloud DVR.

He also said it would be priced starting at \$15 per month for existing Comcast's internet service subscribers. Like Sling TV, subscribers could also choose to add-on various skinny bundles, like a sports, news, entertainment, or kids "pack" to the core product.

The service is largely a rebranding of Comcast's existing Stream service, which already available in select U.S. markets.

Comcast execs now are saying the cost for Xfinity Instant TV is still in flux, noting that various price points are still being tested. They again confirmed that Instant TV would only be sold where Comcast's has an existing cable TV footprint.

The company also came across as fairly skeptical about today's market for these sorts of over-the-top streaming TV services.

When asked on the call about their impact, NBCUniversal CEO Steve Burke said, those that have launched thus far as "doing about as we expected they would do and that is they are not all that material to our business," according to a report from The Hollywood Reporter. "It is a very tough business, and we as before we are skeptical it will be a very large business or profitable business, and they are off to a relatively slow start," he added.

The launch would come at a time when cord cutting is accelerating at a record pace.

AT&T this week lost a record number of traditional TV subscribers, as noted by Variety's coverage of the company's earnings. Comcast, meanwhile, lost 45,000 residential video customers in Q2, compared with a loss of 21,000 during the same period last year, it also reported. Meanwhile, its broadband business is going strong, with 140,000 residential high-speed internet subscribers adds in Q2, to bring that total to 23.36 million.

techcrunch.com

Samsung 'Confirms' Galaxy Note 8 Is Massive

July 23, 2017

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"Multiple leaks from credible sources have shown the Galaxy Note 8 will be the largest premium smartphone Samsung has ever made sporting a whopping 6.3-inch, 19.5:9 aspect ratio display."

Samsung is clearly excited about its (eye wateringly expensive) Galaxy Note 8. Earlier this month the company 'accidentally' leaked it and now Samsung has gone a step further and officially promoted its massive size and new design...

This details came this week when the company sent out official press launch invites for its latest and, arguably, most important smartphone to date. But more importantly, Samsung chose to give away two of the handset's biggest talking points.



Concept Creator
 Galaxy Note 8 based on multiple leaks

#1 Mega Size

Multiple leaks from credible sources have shown the Galaxy Note 8 will be the largest premium smartphone Samsung has ever made sporting a whopping 6.3-inch, 19.5:9 aspect ratio display. Now Samsung's official catchphrase for the event is: "Do Bigger Things".

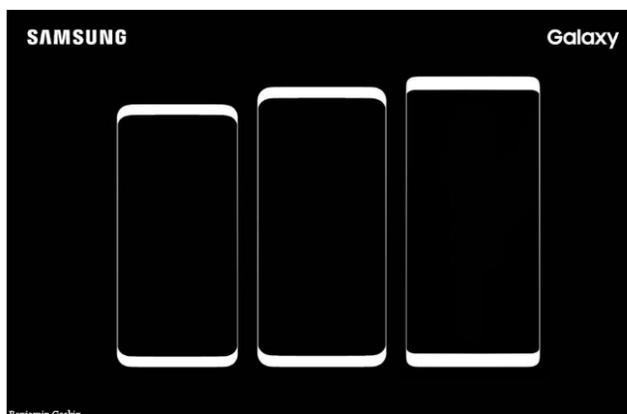
It's a nice pun given the Galaxy Note range's famous stylus driven focus on productivity (the stylus is also highlighted in the invite), but it is also clearly a way for Samsung to prepare people for a display size that may initially seem off-putting.

This is a smart move because of reason number two...

#2 All New Design

While a 6.3-inch smartphone is obviously a big device, what will minimize its footprint is switching the range to the almost bezel-less Infinity Display used in the Galaxy S8 and Galaxy S8 Plus. In fact, this allowed Samsung to enlarge the Galaxy S8 Plus to 6.2-inches and keep it (just about) usable in one hand (with one still-stupid exception).

Furthermore, the Galaxy Note 8 invite repeats the trick Samsung used with the Galaxy S8 and Galaxy S8 Plus whereby the silhouette shown was the outline of the phone and its minimal bezels. Extrapolating this image, my regular collaborator Benjamin Geskin was able to compare the Galaxy Note 8 (right) with the Galaxy S8 (left) and Galaxy S8 Plus (middle).



Benjamin Geiskin
Galaxy S8 (left) Vs Galaxy S8 Plus Vs Galaxy Note 8 (right) proportional comparison

Yes, the Galaxy Note 8 is one big phone. But it is also a phone with slightly more squared bezels, a potential last minute design alternation which leaked in detail earlier this week.

Price Barrier

Of course, the problem Samsung faces is convincing users to pay an asking price which is expected to start from \$1,100. Some help will come from Apple, which is dramatically hiking the iPhone 8's price as well. As such when you also throw in Google's gorgeous Pixel 2 XL, 2017 is likely to finish with three of the most impressive smartphones ever made.

But the question remains: have handset makers finally asked too much? We won't have to wait much longer to find out...

forbes.com

Emerging Technology

Hearing Implants Can Now Stream Sound Right From An iPhone

July 26, 2017

People with hearing implants will soon be able to stream music and take phone calls wirelessly from Apple devices.

Apple is teaming up with medical device maker Cochlear Limited to develop the first-ever cochlear implant sound processor that allows users to stream sound right from their iPhone, iPad and iPod touch.

The Cochlear Nucleus 7 device, which was announced on Wednesday, received FDA approval in June.

In recent years, Apple has worked with other medical device makers like GN ReSound to create iOS-compatible hearing aids. There are now more than 50 hearing aids that work with iPhones.

For many, there is still a stigma surrounding hearing aids. But the high-tech versions intend to reduce some of that stress because users can discreetly make device adjustments using their phone as if they were checking an email or sending a text.

There are 360 million people with disabling hearing loss worldwide -- and 32 million of whom are children, according to the World Health Organization.

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"Apple is teaming up with medical device maker Cochlear Limited to develop the first-ever cochlear implant sound processor that allows users to stream sound right from their iPhone, iPad and iPod touch."

Hearing aids and cochlear implants are quite different. Cochlear implants are for those with severe and profound hearing loss and used when hearing aids are not sufficient.

Hearing aids amplify sound, while a cochlear implant stimulates the hearing nerve directly. It has an internal component that's surgically inserted under the skin behind the ear. The external part looks similar to a traditional hearing aid.

The new Cochlear Nucleus 7 pairs with iOS devices using a combination of Bluetooth and a proprietary Apple protocol, which the tech giant previously created for hearing aids.



The Cochlear Nucleus 7.

Simple commands, such as changing the hearing device's volume or checking battery status, can be done through iOS without a separate app. More advanced functions, like finding a cochlear implant if it gets lost, are accessed via Cochlear's app.

Previously, phones could interfere with hearing devices and cause high-pitched noises for the person using it. Streaming music was also difficult because users had to wear an earphone and hearing aid at the same time. The only solutions were bulky third-party devices.

The new device is expected to launch in the United States and Canada in September. The cost of the device has not yet been announced.

money.cnn.com

Orii Smart Ring Turns Your Fingertip Into A Bluetooth Earpiece

July 24, 2017

It's made for folks who don't want the dorky look... except when you're on a call.



"It's a similar use case with the Orii: you wear the ring on your index finger, and when it vibrates with an incoming call, simply lift your hand up, touch your fingertip on a sweet spot just before your ear, then chat away."

While modern Bluetooth earpieces are more compact than ever, chances are you'll still need to leave at least one stuck in your ear. This can get uncomfortable over time, not to mention the dorkiness that's been haunting this form factor since day one. Hong Kong startup Origami Labs thinks it has an alternative solution to this problem: why not repackage the Bluetooth earpiece as a ring, and then use bone conduction to transmit audio to the fingertip? That's the basic concept behind the Orii smart ring.

Using bone conduction for audio transmission is hardly a new idea. It's a commonly used technology in the hearing aid market, as this transmits sound directly to the inner ear, thus bypassing hearing issues caused by the middle or outer ear. But most of us know bone conduction better in the form of wireless headphones -- most notably the ones from AfterShokz, which let you enjoy music or take calls while leaving your ears open for the sake of safety.

It's a similar use case with the Orii: you wear the ring on your index finger, and when it vibrates with an incoming call, simply lift your hand up, touch your fingertip on a sweet spot just before your ear, then chat away. An earlier crowdfunding project, the Sgnl smart strap (formerly TipTalk) by Korea's Innomdle Lab, had the same idea, but it has yet to ship to backers long after its February target date this year.

The Orii is essentially an aluminum ring melded to a small package containing all the electronics. The main body on the latest working prototype came in at roughly 30 mm long, 20 mm wide and 12 mm thick. These figures don't do Orii any justice, as its curved design makes it look smaller than it sounds. At least I'd be fine with wearing it for a while, depending on how comfortable the final design feels.

It's pretty impressive when you consider what's housed inside the splash-proof ring: a dual Bluetooth 4.0 radio with Bluetooth Low Energy support, dual-mic noise cancellation, a gyroscope, an LED (for customizable notifications in the app), a 50 mAh battery and, most importantly, a bone conduction actuator near the bottom side of the main body. It's worth pointing out that the seemingly tiny battery provides about 1.5 hours of continuous listening time and at least 40 hours of standby time, both of which should be plenty for general daily use.



Much like some of the latest Bluetooth earpieces these days, Orii supports both iPhone's Siri and Android's Google Assistant, meaning you can simply wave your hand up, stick your fingertip to near your ear and start talking to your voice assistant right away. I can imagine this gesture becoming an excuse for me to use voice assistant more often, mainly because this feels like a more natural way of interacting with my virtual assistant.

But on a more serious note, CEO Kevin Wong sees this screen-free input method serving a greater purpose for those in need -- especially his father, Peter, who inspired him as a visually impaired software engineer and also a founding member of Microsoft's accessibility team.

Given the nature of the Orii prototypes I saw recently, I could only try the sound quality and get a feel of what it's like wearing one. To my surprise, the audio sounded much better than I expected, and I could hear it well even inside the busy cafe. This would also come in handy when I want to summon my voice assistant, but alas, that part of the prototypes didn't behave well that day, so there's still some work to be done.

To ensure each Orii fits well before it ships in February next year, Origami Labs will be sending out a ring sizing gauge to all backers for measurements, as well as gathering final color requests: matte black, sandblasted silver, metallic dark gray or armor red. Each ring will also include three silicone inserts for minor adjustments.

At the time of writing this post, Orii's crowdfunding campaign had already pledged over four times its funding goal, courtesy of some 835 backers. These folks either really hate Bluetooth earpieces or they just want to play spies. Or both.

engadget.com

Mergers and Acquisitions

Exclusive: Spotify, Warner Hope To Clinch Royalty Deal By September

July 24, 2017

Music streaming company Spotify is close to agreeing a new licensing pact with Warner Music Inc., the last big music royalty deal it needs before pushing ahead with a U.S. stock market listing, four sources familiar with the situation said.

The parties are positive a deal could be signed by September as major issues such as granting loss-making Spotify a more favorable revenue split in return for making some new albums accessible only to its paying subscribers for a defined period have already been agreed, the sources said.

However, the precise revenue split and the size of a potential guaranteed upfront payment to the label, home to artists including Ed Sheeran and Muse, have yet to be agreed, said two of the sources.

"The negotiations are at a crossroads," said one of the sources, asking not to be named because the talks are private, adding discussions were taking place daily. "There are still a number of key points that remain to be agreed. If we manage to come to terms on these points, then it could lead to a very quick transaction. If not, any deal would remain at bay."

Others saw a deal being done by late summer.

"Given the way talks are progressing, I would be surprised if we don't have a deal in September," said another source on the other side of the table.

Spotify Takes Wing

Sweden's Spotify has grown in less than a decade into the world's most popular streaming music service, but its financial sustainability hinges on its ability to strike music licensing contracts at less onerous royalty rates..

Basic features of Spotify are free and supported by advertising while paying subscribers enjoy unlimited listening and other premium features.

It faces mounting competition from far bigger internet players such as Apple and Amazon, which can afford to subsidize their push into music by drawing on money they make in other businesses.

The streaming firm, which was recently valued at \$13 billion, is pushing for a 50-50 revenue split but Warner Music is demanding it retains at least 52 percent of the royalties, in line with the other labels, according to the sources.

Under the terms of their current agreement, Spotify pays 55 percent of royalties to Warner.

Warner is also pushing to receive a guaranteed upfront payment regardless of subscription growth, said one of the sources. The label, owned by billionaire investor Len Blavatnik's Access Industries, is also asking for protection against the potential rise of unsigned artists who could over time reduce its revenue share.

This follows recent press reports that Spotify was filling its playlists with anonymous or little known artists to reduce the influence of the majors, said one of the sources. Warner would be ready to reduce its royalties rate from 55 percent to 52 percent provided these issues were resolved, said the same person. Spotify declined to comment.

Other Deals

Earlier this year, the Swedish company struck a licensing deal with Vivendi's (VIV.PA) Universal Music Group (UMG) to pay the world's largest label a lower royalty rate. This was recently followed by a similar agreement with Sony Music.

Spotify didn't disclose the terms of the deals but it was widely reported that the streaming firm had managed to lower the royalty rate from about 57 percent to 52 percent, based on growing volumes of paying listeners.

In return, the streaming service agreed to restrict new albums to paying subscribers for a couple of weeks before offering access to free users.

As of June, Spotify had 53 million paying users or 40 percent of streaming music subscribers worldwide, according to MIDiA Research. It has more than 140 million active users, including free listeners.

By comparison, Apple had 19 percent, or 28.2 million music subscribers, in June, up from 20 million in December, while Amazon held 12 percent, or 16 million subscribers, MIDiA estimated.

Heading For The Market

One of the sources said Spotify, which hired Goldman Sachs and Morgan Stanley to advise it on a stock market listing, is still aiming to go public via a direct listing toward the end of this year or the beginning of the next.

Spotify recorded revenues of 2.9 billion euros for 2016, up 51 percent from 2015, according to company filings in Luxembourg in June.

Operating losses grew 48 percent to 349.4 million euros, but including financing costs, its losses before tax leapt 133 percent to 539 million euros.

Last year, Universal held a 28.9 percent share of global music label revenue, Sony Music generated 22.4 percent and Warner 17.4 percent. Independent labels made up the remaining 31.3 percent, according to MIDiA Research.

The company has faced boycotts from some top music artists who have complained its free services undercut the value of their work but the major label licensing deals have gone some way toward easing these tensions, according to analysts.

reuters.com

Industry Reports

Editor's Corner – The Economics Of Fixed Wireless, From LTE To 5G, And What It Means For Verizon

July 27, 2017

“It’s certainly possible that next year Verizon could offer a compelling bundle combining its nationwide cellphone service with a high-speed, fixed wireless internet offering for residential and business customers in select markets.”

Verizon has indicated it will launch fixed wireless services using its 5G network technology standard sometime next year, after tests in 11 markets this year. The company hasn’t provided many exact details about how it plans to go to market—such as planned pricing, speeds and coverage—but a review of the current fixed wireless landscape indicates Verizon will need to overcome a number of hurdles to successfully challenge its wired cable and telco rivals with a wireless service.

First, it’s worth noting that fixed wireless services have been around for years, and have been transmitted through a variety of technologies including WiMAX, 3G and proprietary protocols. Fixed wireless deployments usually rely on a central tower (connected to some kind of high-speed backhaul) that broadcasts a signal to outdoor receivers, usually those installed on the rooftop of a residential or business location. Ergo: Fixed.

As wireless technologies have improved (think 2G to 4G), so have the speeds available through fixed wireless services. Australia’s NBN wholesale TD-LTE network (currently run by former Clearwire chief Bill Morrow) provides a great example of this wireless progression: The service initially launched in 2012 with 25 Mbps downloads, and by 2018 that’s expected to increase to 100 Mbps downloads thanks to NetComm Wireless’ modems, Qualcomm’s chips and kit from Ericsson. Current NBN monthly data allotments range from 6 GB for \$27 per month to 2.6 TB for \$66 per month.

Fixed Wireless In Rural Areas

Closer to home, Rise Broadband offers an even clearer look at the economics of LTE-powered fixed wireless services. Specifically, the company’s cofounder and chief development officer, Jeff Kohler, said recently that fixed deployments typically cost a fifth to a tenth what it would cost to build a comparable wired service. Rise operates fixed wireless services in rural locations in Colorado, Idaho, Nevada, Oklahoma, Texas, Utah and elsewhere in the West. The company’s data allotments range from 250 GB per month to 500 GB per month.

Although Rise currently operates various nonstandards-based network systems, like those from vendors Cambium Network and Mimosa, the company today is mostly building out LTE network technology in 2.5 GHz and 3.65 GHz. Kohler explained that LTE equipment typically costs roughly twice as much as nonstandard equipment, but fixed LTE services can generally provide speeds up to 100 Mbps—twice the speed of most nonstandard equipment—as well as support for more customers. (While Kohler wouldn’t give a specific price for Rise’s LTE tower equipment, he said that “these things do cost tens of thousands of dollars.”)

Kohler cautioned that actual, real-world speeds are often determined by receivers’ distance from Rise towers. He said most Rise customers live 3 to 4 miles away from the company’s towers. As for customers’ receivers, often called customer premises equipment (CPE) Kohler said that an LTE receiver typically costs \$100 to \$200, or around half the cost of most nonstandard receivers.

As for the backhaul on its towers, Kohler said Rise typically pays pennies per gigabyte, or around 5-10% of its revenues (he noted though that those prices are often based on total volume, which means that smaller providers might pay more per gigabyte than Rise, which counts around 200,000 customers).

As a result of these economics, Kohler said today Rise usually deploys LTE in locations where it expects to service more than 100 customers per tower. He said that, depending on the weight restrictions on the tower it's using, Rise can increase its capacity by adding additional access points on its towers. He said one Rise tower serves roughly 800 customers, mainly thanks to the installation of a handful of additional access points on the tower. Rise customers usually pay \$50-\$60 per month for service.

Rise and other, smaller providers aren't the only ones playing in the fixed LTE game. AT&T recently said its "Fixed Wireless Internet" offering for rural and underserved areas is now available through 70,000 locations across nine states (using outdoor TD-LTE antennas from NetComm). The company said it plans to serve more than 400,000 locations with the service by the end of the year, growing to 1.1 million locations by 2020.

As CCS Insight noted, AT&T's fixed service provides download speeds of up to 10 Mbps and 160 GB of data per month at a price of \$70 per month or \$60 on a contract. Each additional gigabyte costs \$10. Users must have an external fixed antenna installed outside their home or business; the installation fee is \$99.

"The offering may be more expensive than traditional fixed-line services such as cable and DSL, which usually allow unmetered broadband access, but it's a bargain when compared with other LTE broadband services or satellite, which cost about \$60 for 10 GB of data," CCS added.

Fixed Wireless In Urban Areas

But there's a big difference between Verizon's fixed 5G plans and Australia's NBN, Rise Broadband and AT&T's fixed wireless adventures: Verizon is targeting urban areas with fixed wireless services running in millimeter-wave spectrum, not rural locations with lower-band spectrum.

Rise's Kohler noted that high-band fixed wireless services running in the 28 GHz, 39 GHz and even 60 GHz blocks are "great for high-capacity, high-speed services. [But] the stuff travels about two blocks. So that's your problem," he said. "So in a dense, urban situation, it will take a lot of small cells to make that work because you'll have to have it travel over some distances."

Rise isn't alone in noting such concerns. "Despite millimeter wave bandwidth capacity, the propagation remains challenging," noted the analysts at Wells Fargo in a recent report on 5G. "We heard estimates that mmWave could cover possibly 0.2 to 0.25 square miles (essentially several hundred feet), but that something as simple as a hand or any physical barrier could block signals for mobile devices."

Indeed, high-band signals can be affected by rain, trees or vehicles parked between a transmitter and a receiver. For example, an AT&T executive told RCR Wireless News recently that the company's 5G tests in Austin found that AT&T could bounce 28 GHz signals around obstructing foliage in order to reach a receiver almost a mile away. But the executive added that indoor receivers were stymied by reflective window coating, forcing the carrier to test an indoor system through more traditional dual-pane glass.

And signal reliability is just one of the challenges that Verizon will have to face in the market for urban fixed wireless services. Unlike rural areas, urban locations in the United States already likely have some kind of internet service, be it DSL or DOCSIS. In order to combat existing, incumbent

wireline internet providers, Verizon's fixed 5G service will have to provide faster speeds at a lower cost than the alternative.

In evaluating Verizon's fixed 5G economics, it's actually worth looking at a tiny startup that's attempting essentially the same model in the same sorts of locations. Starry, founded by the serial entrepreneur Chet Kanojia, is currently testing fixed wireless services in Boston.

"The key to Starry's technology, which uses beamforming to deliver symmetrical broadband speeds as high as 1 Gbps using millimeter wave spectrum over distances as far as 1.5 kilometers, is cost," wrote the Wall Street analysts at MoffettNathanson in a detailed report on Starry issued in April. "With all-in costs for a base station of perhaps \$25K, they have already driven their total cost to 'pass' a home to as low as \$10 in a dense city like Boston. Their next target is lowering the costs of their CPE equipment, which is currently more than \$1,000, to perhaps \$200 per home."

Continued MoffettNathanson: "With costs that low, they could offer competitive broadband speeds for a fraction of the current price of wired broadband."

Importantly, the firm added that Starry is looking at deployments in areas with more than 1,000 homes per square mile in order to make its service economical, and that Starry hasn't yet settled on a price for its service but discussed options ranging from \$20 to \$50 per month.

Tweaking The Economics

Verizon is likely looking at similar economics, and is surely looking to drive the costs out of its own model through its massive purchasing power, its growing war chest of millimeter-wave spectrum and potentially its own fiber backhaul network, like the one it's building in Boston.

Although the final economics of Verizon's planned 5G fixed wireless service remain unclear, it's telling that T-Mobile has specifically spoken out against using 5G for fixed scenarios. T-Mobile of course doesn't have the millimeter-wave spectrum holdings or fiber assets that Verizon does, but it's reasonable to assume T-Mobile would at least consider the business if it offered exceptional economics.

That said, Verizon's existing wired internet business has set a relatively low bar in terms of selling internet services. As Leichtman Research Group reported, the nation's cable operators—led by the likes of Comcast, Charter and Altice—continue to make significant gains on telco internet providers like Verizon, CenturyLink and AT&T. The firm noted that the nation's cable operators collectively accounted for fully 90% of the total wired broadband internet net additions the industry recorded in the first quarter of 2017. For its part, Verizon lost 27,000 customers during the period.

It's certainly possible that next year Verizon could offer a compelling bundle combining its nationwide cellphone service with a high-speed, fixed wireless internet offering for residential and business customers in select markets—a bundle that might combat cable's gains in the broadband internet market. But Verizon is also the company behind the Go90 video app, which clearly hasn't lived up to expectations. The jury is definitely still out on the economics of a fixed 5G service.

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The FCC Just Granted Apple Approval To Test 5G Cellular Technology

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The FCC has officially granted Apple approval to begin testing experimental 5G technology, according to DSLR Reports.

The iPhone maker now has permission to begin using something called "short-range millimeter wave spectrum" at two locations in California. The technology could be used in next-generation broadband, also known as 5G.

Apple applied for the license back in May, with few details about its plans or objectives other than a goal that the tests would range from the 28 GHz and 39 GHz bands. The company's hope is that the results "will provide engineering data relevant to the operation of devices on wireless carriers' future 5G networks."

In other words, Apple is most likely testing 5G so it has an edge on making future iPhones ultra fast and efficient when 5G finally rolls out to the public.

The millimeter wave tests are slated to take place at two different locations in Silicon Valley, one in Milpitas and another close to Apple HQ in Cupertino. The testing will last for no longer than a year, according to the company's original application.

Apple is far ahead of the trend, especially since the 5G standard isn't set yet. In fact, most experts don't expect common use of 5G technology until 2020. We're starting to see signs of progress toward the new standard, like Qualcomm's upcoming Snapdragon X50 chip. Intel also announced it will roll out limited 5G connectivity for the 2018 Winter Olympic village next year.

We reached out to Apple for comment on the FCC approval and its plans for testing 5G tech, but haven't heard back. We'll update the story if we get a response.

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