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T-MOBILE'S EUROPEAN WIRELESS BROADBAND OPERATIONS PROVE THAT THE TECHNICAL RULES FOR THE FCC'S "LIFELINE BROADBAND" WILL NOT INTERFERE WITH ADJACENT BANDS:

Selective Use of Interference Arguments in the AWS-3 Proceeding Is Designed to Prevent New Competitive Broadband Services from Reaching American Consumers

Overview

Non-Standard and Overly Stringent Technical Rules in the AWS-3 Proceeding Would Be Detrimental to the U.S.' Global Competitiveness by Limiting Choices for Affordable Broadband for American Consumers

- The opponents of free broadband in AWS-3 would have the FCC ignore its own precedents, international precedent, and T-Mobile's own European experience when calling for technical rules with severe power limits and unnecessarily large guard bands.

- These parties are asking the FCC to go backward and act out of step with modern spectrum regulations and state of the art interference management techniques.

- The draconian rules proposed by these parties will exacerbate the U.S.' declining global competitiveness by denying millions of American consumers the benefit of a free nationwide broadband service.

Incumbent Carriers Falsely Claim that TDD Operations Cannot Operate Adjacent to FDD Operations

- "While manufacturers could develop specialized filters that could screen out AWS-3 frequencies (which are part of the AWS-1 band in other countries), *that would not prevent harmful interference absent a large guard band and significant restrictions on AWS-3 power levels and out-of-band emissions*." Ex Parte Presentation by T-Mobile filed July 18, 2008

- "Without guard bands between the adjacent services, that task is exceedingly difficult if not impossible." Reply Comments Filed by AT&T on January 14, 2008

- T-Mobile and other incumbents claim that it is practically impossible for TDD (un-paired) operations to be deployed adjacent to its FDD (paired) operations in the 2.1 GHz band regardless of available interference mitigation techniques because AWS-1 downlink operations would be irreparably harmed from mobile-to-mobile interference.

T-Mobile's TDD Deployment in the Czech Republic Demonstrates the Fallacy of these Impossibility Arguments

- T-Mobile is currently providing broadband service equivalent to ADSL using a TDD spectrum band next to an FDD band in the Czech Republic.
- In the Czech case, mobile downlink operations are protected from adjacent band mobile uplink operations by out of band emission ("OOBE") limits that are the equivalent of the FCC's 43 + 10 log (P) requirement -- the very same requirement that T-Mobile and other incumbents now claim does not work for the U.S. See http://www.erodocdb.dk/doks/filedownload.aspx?fileid=3451&fileurl=http://www.erodocdb.dk/Docs/doc98/official/pdf/CEPTREP019.PDF
- Using traditional power limits set by the FCC and other international regulators, T-Mobile is deploying TDD operations proximate to FDD operations despite the potential for mobile-to-mobile interference. Moreover, the Czech Republic mandates a minimal (100 kHz) guardband between FDD and TDD operations. T-Mobile has never provided this ostensibly material information on the record to the FCC.

T-Mobile Continues to Successfully Operate Wireless Broadband Network on TDD Spectrum Adjacent to an FDD Network

- The links below demonstrate T-Mobile's hypocrisy between what it says in the U.S. and what it is doing in Europe. Not only has the service been successfully implemented but it has been expanded to more than 600 base stations covering 60% of the Czech population since it was rolled out 2 years ago.
  - See "T-Mobile's new network seeks to fill Internet access gap" The Prague Post, (10/26/2005) http://www.praguepost.com/articles/2005/10/26/generation-tdd.php
  - See http://www.ipwireless.com/news/press_062005.html (June 2006) (describing the technical parameters of T-Mobile's TDD system in the Czech Republic).
  - See also IPWirless expands T-Mobile Czech wireless broadband deployment http://www.mobileeurope.co.uk/news_wire/113384/IPWireless_expands_T-Mobile_Czech_wireless_broadband_deployment.html (November 2007).

***For Full Text of the Above Referenced Articles, See Appendix**

U.K. Regulator's Very Recent Exhaustive Study Concludes Adjacent TDD/FDD Operations Can Coexist Using Standard OOBE Limits

- In April 2008, Ofcom, the independent spectrum regulator for the United Kingdom, exhaustively examined TDD/FDD interference issues in the 2500 MHz band and dismissed claims that it was impossible to deploy TDD next to FDD or that more stringent OOBE limits were necessary for TDD operations.
  - Ofcom's findings report that: "The low potential for terminal-to-terminal interference in the 2.6 GHz band means that FDD terminals which are designed for operation in the band-plan specified in ECC Decision (05)05 will also work in other band-plans (i.e., different FDD/TDD splits) that are consistent with CEPT Report 19." See Ofcom Report, "On the impact of interference from TDD terminal stations to FDD terminal stations in the 2.6 GHz band" (April 21, 2008) http://www.ofcom.org.uk/consult/condocs/2ghzregsnotice/tech.pdf
  - Ofcom protects adjacent FDD and TDD operations from mobile-to-mobile interference by utilizing an OOBE limit which effectively requires attenuation of 43 + 10 log (P) or less (depending on frequency offset). See Ofcom Report.
- Indeed, FDD/TDD coexistence has been harmonized across at least two separate TDD/ FDD bands (1900-1980 MHz and 2500-2690 MHz) throughout Europe without requiring guard bands or imposing overly burdensome technical restrictions that opponents of free broadband are proposing in the FCC's AWS-3 proceeding.

In the U.S. Adjacent TDD/FDD Operations Can Coexist with Minimal Interference Using a Standard OOBE Limit of 43 + 10 log (P)

- The FCC has consistently used 43 + 10 log (P) out-of-band emissions in multiple bands and that is why the FCC has described the 43 + 10 log (P) OOBE limit as “standard” in September 2007 and as “traditional” in June 2008.
- Moreover, this is the rule that has been successfully used in auctioning 272 MHz of broadband spectrum in the PCS (120 MHz), AWS-1 (90 MHz), and 700 MHz (62 MHz) bands.
- The rule was also used in the restructuring of the BRS band (190 MHz) in order to permit adjacent TDD and FDD operations for provisioning wireless broadband services.

FCC Wireless Broadband Emission Limits Adjusted Over 1 MHz

EMISSION BAND	Permitted Channel Adjacencies	OOBE Limit	OOBE Measurement Bandwidth	Adjusted OOBE LIMIT @ 1 MHZ bandwidth[1]
BROADBAND PCS	FDD Downlink only	43 + 10 log (P)	1 MHz	43 + 10 log (P)
BRS	FDD and TDD (mobile-to-mobile)	43 + 10 log (P)	1 MHz	43 + 10 log (P)
AWS-1	FDD Downlink only	43 + 10 log (P)	1 MHz	43 + 10 log (P)
700 MHZ– PUBLIC SAFETY	FDD and TDD (mobile-to-mobile)	65 + 10 log (P)	6.25 KHz	43 + 10 log (P)
700 MHZ	FDD and TDD (including mobile-to-mobile)	43 + 10 log (P)	100 kHz	33 + 10 log (P)

[1] Conversion from A + 10 log (P) over bandwidth BW (in kilohertz) to B + 10 log (P) over 1 MHz bandwidth is B = A + 10 log (BW/1000). Thus 65 + 10 log (P) over 6.25 kHz computes to B = 65 + 10 log (6.25/1000) = 65 – 22 = 43, and thus is equal to 43 + 10 log (P) over 1 MHz.

Appendix

- See “T-Mobile's new network seeks to fill Internet access gap” The Prague Post, (10/26/2005) http://www.praguepost.com/articles/2005/10/26/generation-tdd.php
- See http://www.ipwireless.com/news/press_062005.html (June 2006) (describing the technical parameters of T-Mobile’s TDD system in the Czech Republic).
- See also IPWireless expands T-Mobile Czech wireless broadband deployment http://www.mobileeurope.co.uk/news_wire/113384/IPWireless_expands_T-Mobile_Czech_wireless_broadband_deployment.html (November 2007).
- See also IPWireless Scores at T-Mobile http://www.unstrung.com/document.asp?doc_id=75977&print=true

Generation TDD

T-Mobile's new network seeks to fill Internet access gap

By Katya Zapletnyuk
Staff Writer, The Prague Post
October 26th, 2005 issue

High-speed Internet access and data retrieval are the hallmarks of T-Mobile's new UMTS TDD network, which was launched Oct. 19. Company officials say half of the nation's population will have access to the new service by the middle of next year.

"We decided that our customers who use voice services don't need the 3G network, as our voice services are well covered by the EDGE technology [enchancing wireless data transmission]," said Jiří Dvorjančanský, T-Mobile's marketing director.

"We chose not to go the way of an integrated technology but rather focus on the demand for data services."

T-Mobile chose to offer TDD technology here instead of the regular 3G network others are set to launch soon because of the country's relatively low Internet penetration compared with Western Europe. The company can use that gap to carve a market niche for itself providing high-speed Internet access via wireless technology.

"We see good growth potential here, Dvorjančanský said. "český Telecom has not been able to build the infrastructure and we see good potential for conquering those customers."

Data in demand

The UMTS TDD technology allows up to a 2-megabyte-per-second Internet connection via modems and PCMCI cards. This year the service will only be available in Prague, but next year it will be available across the nation, and the company expects to attract thousands of clients next year and hundreds of thousands more over the next couple of years.

The service is available in two speeds, 512 and 1,024 kilobytes per second, for a monthly fee of 832 Kč ($33.45) and 1,189 Kč, respectively. Dvorjančanský expects T-Mobile's customer base to be equally divided between corporate and individual clients.

According to John Gole, a telecom analyst with market research company IDC, in the short and medium term the service will primarily be in demand by business people whose jobs involve traveling.

However, analysts point out that TDD technology is not compatible with the current generation of networks, including GPRS and EDGE, and the service will be restricted in terms of geographical areas during the initial implementation stages. "Devices that support TDD do not support the current technologies. When they are placed out of reach of the network signal, they stop functioning," said Eva Sepešiová, managing director of telecom consulting company ES Consult.

Challenging fixed lines

With its new technology, T-Mobile will compete with broadband and ADSL Internet connection services offered by dominant fixed-line provider český Telecom. T-Mobile recently claimed its TDD network will soon phase out cable Internet connections.

"I hope we get [our technologies] to the point where there is no more need for fixed lines," T-Mobile General Director Roland Mahler told reporters.

However, analysts say T-Mobile's boasting may be a bit far-fetched. Still, Gole said that T-Mobile's service is definitely blurring the lines between fixed and mobile broadband, and it could make fixed lines redundant for a certain group of customers.

"That does not mean, however, that they are going to make the fixed-line network and český Telecom and all of its competitors obsolete," Gole said.

The new wireless technology actually enables a convergence of the fixed and mobile businesses, he said, and opens opportunities for both to compete. "[Fixed-lines] operators can also take advantage of these same wireless technologies and potentially challenge the mobile operators for part of their business," he said.

First UMTS in the Czech Republic to be Launched by T-Mobile

First UMTS in the Czech Republic to be Launched by T-Mobile

* Launch of the world's fastest UMTS network - UMTS TDD
* Complementary data services - high speed data anytime, anywhere
* Substitution of fixed DSL brings real freedom to users

Prague, June 20, 2005 - T-Mobile Czech Republic today announced a new data access strategy tailored to address the needs of the Czech market. The company will launch a wireless broadband network based on UMTS TDD technology from IPWireless in Prague by year-end, nationwide coverage to be built during consequent months. The new technology will bring businesses and individuals faster, more economical data access services which can fully substitute fixed ADSL.

The Czech market has one of the lowest broadband penetration rates in Central Europe but increasing computer penetration has only whetted the appetite for true broadband services - a hunger that T-Mobile plans to satiate with its world-class wireless broadband offering at very attractive prices. Broadband currently reaches only 2 per cent of the Czech population while EU average is around 10 per cent.

"Today we announce a major step in our strategy based on customers´ wishes - we commit ourselves to broadband data as the second business focus area," says Roland Mahler, Managing Director of T-Mobile CZ, adding: "We firmly believe the wireless broadband technology will provide all fixed network services and the strategy will clearly give T-Mobile further boost on its way to being the number one operator in the Czech Republic."

T-Mobile aims to maximize the value of its acquired UMTS license by using UMTS TDD technology operating in its "unpaired" 1.9 GHz UMTS spectrum. It will be the world's fastest commercial UMTS network, capable of delivering peak sector speeds of up to 4.5 Mbps (average user experience runs to 512 Kbps).

T-Mobile also plans to extend its wireless broadband footprint in first phase till summer 2006 to cover nearly half of the Czech population by leveraging the same UMTS TDD technology in the 872 MHz spectrum that it recently acquired. In this manner, T-Mobile will be able to offer its superior performance in more than 85 cities. By introducing this "portable DSL" product, T-Mobile will be able to build on the success of its fixed-mobile substitution effort. For the first time, Czech customers will be able to completely give up their fixed lines provided by the incumbent operator and become completely unwired both for voice and data access while increasing the comfort, speed, flexibility and reliability of their communication experience.

To further fortify its mobile data leadership on the Czech market, T-Mobile Czech Republic also continues to upgrade its existing 2.5G GPRS network to the significantly faster EDGE technology. EDGE can deliver the most relevant 3G UMTS services, but with much broader coverage and lower rollout costs. The build-out of the nationwide EDGE network will provide a solid base from which to deliver a high performance, "3G-like" user experience anytime, anywhere. By combining UMTS TDD wireless broadband and EDGE in easy-to-use, plug-and-play devices, T-Mobile Czech Republic will provide the best "seamless access" and an "always best connected" user experience.

T-Mobile Czech Republic will also enhance its 3G offering by introducing the next generation of UMTS FDD technology (HSDPA/HSUPA) as soon as it has proven to be a stable and viable commercial offering.

This focus on bringing to market only the most advanced technologies also ensures alignment between technology performance, economics and the Czech customers´ demand for value added data services.

UMTS TDD
UMTS TDD, a 3GPP-based technology, is the mobile broadband solution designed for GSM operators. Its high average sector capacity, strong cell edge performance, and low cost per megabit make it an ideal technology for mass market mobile broadband networks. UMTS TDD has emerged as a leading global standard for mobile broadband with commercial deployments in numerous countries around the world including Australia, Germany, Lithuania, Malaysia, New Zealand, Nigeria, Portugal, South Africa, Sweden, the United Kingdom, and the United States.

About IPWireless
IPWireless offers advanced standards-based mobile broadband technology that drastically improves the way people connect and communicate at home, at the office, or on the road. With a full range of commercially available network solutions and devices based on the UMTS standard, IPWireless allows operators to offer Complete 3G, a spectrum of completely mobile, portable, or stationary packet-based services with unmatched economics and true broadband performance. The IPWireless Partner Program and chipsets allow device manufacturers and infrastructure vendors to very quickly bring innovative new TD-CDMA solutions to market. IPWireless is a founding member of the Global UMTS TDD Alliance. For more information, visit the company's Web site at www.ipwireless.com

About T-Mobile
T-Mobile Czech Republic a.s. has been operating in the Czech market since 1996 and provides its services to individuals and corporations, as well as public authorities. Besides tariff programs, it also offers services for users of prepaid Twist cards and services tailored to the needs of the business segment. As of the end of 1Q 2005, almost 4.4 million customers were using its services.

T-Mobile is a member of the international telecommunications group T-Mobile International which is one of the world's leading companies in mobile communications By Q1 2005, nearly 80 million customers were served in nine T-Mobile markets.

For more information, please visit www.t-mobile.cz or www.t-mobile.net.

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IPWireless expands T-Mobile Czech wireless broadband deployment

14 November, 2007 11:56

NextWave Wireless has announced that its IPWireless subsidiary, a provider of UMTS mobile broadband and multimedia broadcast technologies, has now shipped more than 600 UMTS TD-CDMA wireless broadband base stations with more than 2,000 sectors of network capacity to T-Mobile for deployment in the Czech Republic. IPWireless' TD-CDMA technology provides T-Mobile with a cost-effective and scalable mobile broadband solution designed to maximize revenues and drive rapid market adoption.

Building on the success of its initial deployment of IPWireless network equipment in Prague, T-Mobile continues to expand its "Internet 4G" network and now offers high-speed, mobile Internet and residential broadband access to more than 60 percent of the Czech population including the republic's largest cities; Prague, Ostrava, Opava, Prerov, Hradec Kralove, Lysa nad Labem, Kurim, Litvinov, Slapanice and Rajhrad. The TD-CDMA network now delivers over 10 terabytes of data each day which translates into each subscriber downloading several gigabytes of data per month - an amount several orders of magnitude greater than subscribers of conventional 3G data networks.

T-Mobile Czech Republic's Internet 4G service, powered by IPWireless' UMTS TD-CDMA technology, provides users with the fastest, fully-mobile Internet service in the Czech Republic whether they are in their home, office or traveling at high speeds. With Internet 4G users get broadband access to rich, web-based multimedia content such as streaming video, music and games. As part of a complete mobile broadband solution, IPWireless also supplies T-Mobile with multi-mode PCMCIA data cards that support TD-CDMA, EDGE, and GPRS and USB modems.

"IPWireless technology from NextWave provides the performance and reliability that enables T-Mobile to stand out from the competition," said Roland Mahler, managing director, T-Mobile CZ. "Both we and our customers have been extremely pleased with the performance of the network and we look forward to continued subscriber growth as we increase the network's coverage."

"We are delighted to see T-Mobile continue to expand its IPWireless network in the Czech Republic to meet the growing demand for broadband services," said Dr. Bill Jones, chief executive officer of IPWireless. "Our experience powering one of the world's largest true mobile broadband networks further deepens our unique expertise in next-generation mobile broadband and multimedia technologies, and enables NextWave and IPWireless to rapidly evolve our solutions to provide operators with the most reliable, scalable, and competitive solutions available."

- Mobile Europe

IPWireless Scores at T-Mobile

JUNE 20, 2005

Alternative infrastructure provider IPWireless Inc. has confirmed a high-profile commercial win at T-Mobile Czech Republic a.s., a deal flagged by Unstrung last month (see IPWireless Talks Up Deals).

Founded in April 1999, IPWireless has developed a high-speed, time-division duplex (TDD) data system that conforms to universal mobile telecommunications standards (UMTS) but -- unlike standard frequency-division duplex (FDD) 3G cellular systems -- uses unpaired spectrum, sending and receiving data on one channel rather than two (OCRTT).

Most European 3G license holders were allocated a tranche of TDD spectrum when they acquired UMTS licenses. T-Mobile's Czech subsidiary plans to launch services in the capital city of Prague by "year-end," using the unpaired 1.9GHz UMTS spectrum band. This will be followed by "nationwide coverage" in "more than 85 cities," with services deployed in the 872MHz spectrum band by summer 2006 (see T-Mobile Deploys IPWireless).

The carrier has a total subscriber base of approximately 4.4 million customers. IPWireless declined to reveal financial details of the deal.

Today's announcement is the first commercial European deployment for IPWireless with a Tier 1 carrier name. The vendor has previously announced trials with Orange France (Paris: OGE - message board) and Sonae.com SGPS SA in Portugal, and commercial deals at the likes of Airdata AG and PCCW Ltd.'s (NYSE: PCW - message board; Hong Kong: 0008) subsidiary UK Broadband Ltd. (See Orange Trials IPWireless, Sonaecom Trials IPWireless, Airdata Goes With IPWireless, and IPWireless Powers PCCW.)

T-Mobile was unable to provide comment by press time. A joint statement is, however, keen to stress that the carrier will continue with its planned 3G deployments. "T-Mobile Czech Republic will also enhance its 3G offering by introducing the next generation of UMTS FDD technology (HSDPA/HSUPA) as soon as it has proven to be a stable and viable commercial offering."

— Justin Springham, Senior Editor, Europe (JSSEE), Unstrung