

TECHNOLOGY BRIEF

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Special points of interest:

- Maxed out on WiMAX? Want to know more about WiMAX, but overwhelmed by the marketing hype? Read Part II of our WiMAX Update Series.
- Check out Wireless Tech Radio live - Wednesday mornings online at 9am CST to learn the latest on wireless equipment, technologies, providers, manufacturers, markets, as well as the 'best practices' of operators and organizations in the forefront of the industry
- What's the best radio for the job? Trango? RedLine? Canopy? RadWin? Tranzeo? Mikrotik? Orthogon? Want to know the "hidden secrets" that salespeople "conveniently forget" to tell you about? Read real-world user reviews at www.wispreviews.com

WISPNOG CHICAGO UPDATE FCC COMING TO TOWN...

The WISPNOG Organizational Committee has been working hard these past few days to finalize the venue, association partnerships and speakers.

Recently, the FCC has expressed an interest in attending WISPNOG. However, they would like to know beforehand what discussion topics to prepare for, so they can be sure to send the correct person.

So, we asked around, and this is the feedback we have received so far:

<opinion 1>

Something more along the line of ideas for new frequencies that allow the smaller broadband wireless operators to compete with the deep pocketed telcos.

<opinion 2>

What about mandates? Tariffs? Are there any in the works? Especially concerning VoIP and VOWLAN.

<opinion 3>

WISPNOG COUPON BOOK PROGRAM GUARANTEED RETURN-ON-INVESTMENT

The WISPNOG Coupon Book provides thousands of dollars of savings on everyday deployed BWA infrastructure solutions. A part of the official WISPNOG show guide, this program provides IMMEDIATE ROI to every registered attendee by providing savings that will more than



I would like to know whether the few UHF TV channels that are grabbed back will be allocated to ISM wireless data.

<opinion 4>

I would like the FCC to send an enforcement person and someone who works with certification. We need to be able to understand what the FCC will and won't permit and be able to grill them with

questions: I.E. "what should I expect if the FCC knocks at my door?" "If my setup matches a certificated set of equipment but I bought it from multiple sources is it still certified?"

Please visit the WISPNOG web site to register your thoughts...

www.wispnog.com

pay the cost of attending WISPNOG through discounts from popular BWA vendors on network infrastructure purchases.

WISPNOG understands that operators today need quantifiable results for actions taken; the

WISPNOG Coupon Book ensures that in the event that the educational discussion forums flop, every registered attendee will still walk away with some method of saving money in their network.

www.wispnog.com/coupon.htm

MAXED OUT ON WiMAX PART II: WHAT IS WiMAX?

As stated in our previous issue, the WiMAX marketing machine has caught the press by storm, leading to story after story about the wonders of WiMAX. However, the buzz created around WiMAX has resulted in a certain degree of misinformation and misunderstanding that needs to be clarified and corrected. For example, although there is nothing in common between the WiFi and WiMAX standards (and we will outline in a future issue how WiFi could become one of the chief competitors of WiMAX), even reputable industry publications like Business Week have mislabeled WiMAX, terming it "Wi-Fi on steroids." The Washington Post, in reporting on WiFi and WiMAX technology, has stated that "the technology [WiFi] will grow more powerful, too, as a type known as WiMAX that sends signals up to 30 miles hits the field." to the casual observer, one would probably believe that WiMAX "upgrades" WiFi, and with the enormous success of Wi-Fi, the evolution into WiMAX is a slam dunk.

WiMAX—What, When, Where, Who and Most Important Why?

Let's get right down to the specifics. There are two distinct standards the WiMAX Forum is

putting together. The first standard, 802.16a revision d, is finished. With all the amendments and changes that were included the standard has been renamed to 802.16-2004. 802.16-2004, by specifying a metropolitan area networking protocol that supports low latency applications such as voice and video, provides Non Line-of-Sight (NLoS) broadband connectivity that will enable a wireless alternative for cable, DSL and T1 level service for last mile broadband access. 802.16-2004 is designed for systems operating in bands between 2 GHz and 11 GHz, frequencies with the ability to support NLoS. Although multiple PHY-layers have been specified in 802.16-2004, the WiMAX Forum has determined that the initial certifications will support the 256 point FFT OFDM PHY.

The OFDM signaling format was selected due to its ability to support NLoS performance while maintaining a high level of spectral efficiency maximizing the use of available spectrum. In addition, other PHY layer features of 802.16-2004 that are instrumental in giving WiMAX the power to deliver robust performance in a broad range of channel environments include flexible channel widths, adaptive burst profiles, forward error correction with concatenated Reed-Solomon and convolutional encoding, optional

AAS (advanced antenna systems) to improve range/capacity, DFS (dynamic frequency selection) - which helps in minimizing interference, and STC (space-time coding) to enhance performance in fading environments through spatial diversity.

WiMAX systems control access to the "shared wireless medium" by utilizing a slotted TDMA protocol scheduled by the BTS to allocate capacity to subscribers in a point-to-multipoint network technology. In addition, beyond just mere prioritization, the MAC layer in WiMAX has also been designed to address the harsh physical layer environment where interference, fast fading and other phenomena are prevalent in outdoor operation.

At this time, the WiMAX forum is expecting to see the first round of certification happen sometime in the second quarter of 2005 but this date could be pushed off further. Reality is that the WiMAX Forum has nearly doubled the amount of specific tests that will be required in order to pass certification. Currently, there are more than 900 individual tests that will need to be performed on

(Opposite Page)

"the WiMAX forum is expecting to see the first round of certification happen sometime in the second quarter of 2005 but this date could be pushed off further...with more than 900 individual tests to be performed on each manufacturer's equipment."

CWLAB TECHNOLOG-E-ADVISORS APPEARING AS WIRELESS-TECH-GURUS

Starting this January, joining Jim Sutton, Marlon Schafer, Steve Stroh and guests from throughout the wireless world, CWLab Technolog-E-Advisors will now be hosting a 15 minute bi-monthly "Wireless-Tech-Guru" segment on Wireless Tech Radio. Wireless Tech Radio is dedicated to the subject of wireless equipment, technologies, providers, manufacturers, mar-

kets, as well as the 'best-practices' of operators and organizations in the forefront of the wireless industry.

The initial Wireless-Tech-Guru sessions, scheduled to air on January 12 and 26th, will focus on 700 MHz and IEEE 802.22.



Wireless Tech Radio is broadcast Wednesday mornings online at 10:00 am EST and 7:00 am PST.

www.wirelesstechradio.com

MAXED OUT ON WiMAX PART II: WHAT IS WiMAX?

each manufacturer's equipment.

One thing that appears universal across every manufacturer we talked to is the availability of "Pre-certified" WiMAX equipment to the public sometime in the first quarter of 2005. RedLine Communications and Alvarion already have plans to release equipment within the next few months that could be considered WiMAX compliant but will not be able to carry the WiMAX logo. Remember, this equipment is only for the non-US market as it is currently tuned to the 3.5 GHz band. When will we see gear that is made to be used in the US? The truth of the matter is that nobody is saying. About the best information I could get was that there "may" be a US version of WiMAX available for use in the 5 GHz band sometime next year.

The second standard has been dubbed 802.16e and it specifically deals with mobility. As to the date we will see certification testing begin for this standard, the best guess is sometime in late 2007. At this time the mobility standard is still being defined. I had a very interesting conversation with Jim Orr (Principle Wireless Network Architect at Fujitsu)

about where he thinks this standard will take us. From my perspective, I don't see the average consumer paying extra for a WiMAX equipped notebook but Jim feels differently.

At this time, there are only two frequencies that the WiMAX Forum is specifying, 3.5 GHz and 5 GHz. There was quite a bit of interest in where the standard might head for other frequencies. There is certainly some interest in the 2.3 & 2.5 GHz Licensed band but there seems to be no great demand for WiMAX to enter either the 700, 900 MHz and/or 2.5 GHz band.

What does WiMAX mean to the Independent Operator?

What will WiMAX do for you? Well, as we all know that is dependent on a number of variables. If you are deploying in a metropolitan area devoid of foliage, WiMAX will certainly outshine just about anything out there for hardware right now. Built specifically to solve all the issues of first generation Wireless WAN deployments with hoped-for sub-\$100 CPE price point, WiMAX seems to be the magic bullet that we are all asking for.

At the November 2004 ISPCON show, I moderated and was involved with several speaking pan-

els that dealt with WiMAX. A statement that especially caught my attention about WiMAX was made by Jeff Or, Manager of Marketing & Business Development for Proxim Corporation. It is summed up as: "WiMAX 802.16-2004, was created for you [WISPs & independent operators] to address your needs [do everything that WiFi cannot] in bridging the last mile. Initially, you guys will be our market, utilizing WiMAX technologies to replace expensive leased line backhauls; as volumes increase and later standards are ratified, mass market adopters will accept WiMAX, and we will soon see it everywhere..." I don't know about you, but with Canopy and Trango solutions in the \$200-300 range today getting the job done fine, I can't imagine going back to buying \$1,500+ CPEs in order to become a stepping stone for some large carrier...

However, this statement made me immediately think of one of the most common misconceptions I hear today about WiMAX. Contrary to widespread belief, WiMAX is NOT the ONLY substitute for BWA. Although they are closely related, they are COMPLETELY SEPARATE TOPICS OF DISCUSSION...

www.cwlab.com/wimax/

I don't know about you, but with Canopy and Trango solutions in the \$200-300 range today getting the job done fine, I can't imagine going back to buying \$1,500+ CPEs in order to become a stepping stone for some large carrier...

IEEE 802.22: WRANS & 700 MHz NLOS NO NEED FOR WiMAX?

As the "Wait for WiMAX" drags on, an increasing interest in NLoS technologies and new FCC spectrum policies regarding the UHF channels (NPRM 04-186) have created the new IEEE 802.22 WRAN working group and some interesting controversy and discussion.

The IEEE 802.22 Standard has been created to tap open re-

gions in the TV spectrum for wireless broadband services. This "white space" in the broadcast spectrum varies with the channels present in a locale and creates opportunities for other applications. The 802.22 standard will enable the deployment of 20+ miles NLoS Wireless Regional Area Networks using the unused TV channels while not interfering with existing licensed services.

In the upcoming months, the CWLab Technology Brief will monitor and discuss the developments of this IEEE standard, comparing the pros and cons of this emerging technology against WiMAX; continuing our analysis of the necessary steps Independent Operators should take in today's "pre-WiMAX" world.

www.cwlab.com/802-22/



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Wednesday 10 AM EST Online
www.wirelesstechradio.com

Upcoming Events



January 12-14 2005
www.wcai.com/event/05/ts11gen.htm



January 30-February 1 2005
<http://www.nanog.org>



February 17-18 2005
<http://www.wispnog.org>

More Good Enough Network Debate...

It's the start of a New Year, and License Exempt Wireless Broadband is finally starting to gain a foothold within the mass market (unfortunately mislabeled as WiMAX), but hey, all news is good news, right? However, before "shooting off into the horizon," it's necessary to take a quick breath in order to refrain from getting caught up in the "hype" of technology; lets get back to basics and focus on the fundamentals of the "WISP game."

Most WISPs operate towns with populations <10,000. Grocery stores in these towns do not carry sushi, cavier, escargot or other similar type foods. Car dealerships don't sell Ferrari's, BMWs or Mercedes. Apartments sit in the \$250/month range - nothing very luxurious.

On the contrary, in Chicago, IL, there are dozens of grocery stores importing food from everywhere under the sun. Cars from any corner of the world can be found, and apartment parking spaces alone exceed \$250 / month.

In the majority of these small rural towns, smart business sense precludes the existence of gourmet grocers, exotic car dealerships , and luxury apartments.

In building your network, remember to access the market economics and stay true to the laws of supply and demand - if the town only has 10,000 people, don't, for the sake of winning a science fair award (or for bragging rights at the upcoming WISPNOG show), build a 10,000 user wireless network with multiple redundant OC12 feeds when competition sets the market rate for broadband at \$29.95 and the realistic penetration rate of your WISP sits at about 300 accounts.

When competing with DSL and cable modem service, remember that data access is a commodity market. Also remember that those "enhanced value-add" services that vendors like to use to talk up the features and price of their products, are also commodity services. Remember, your customer is mostly agnostic to the method he receives his bits, and all commodity things ultimately boil down to price.

In this time of tumultuous technological change, does this mean adopting a "wait and see" position? That's like asking whether the dialup operator was foolish to build out a NOC and mail/web services in 1988. To many, it would seem stupid to invest in infrastructure and then immediately have to upgrade one's network from 1200 to 2400 to 9600 baud; to 14.4 and 28.8 and 33.6 and 56k and v.90 and so on...However, at the end, the ones who took the "plunge" and built up customer base got the last laugh, as they were able to sell to big-time operators like AOL, MSN, Earthlink, Verio for a nice profit.

So, what's the time-proven formula for success? Perhaps the answer lies in building "good enough" networking – I know it's chicken of me to say this, but sometimes, it's not necessarily bad to be the SECOND guy to adopt new technology. Remember, the early bird does get the worm, but the second rat (to the trap) gets the cheese.