

Introducing:

L.A.W.N.TM

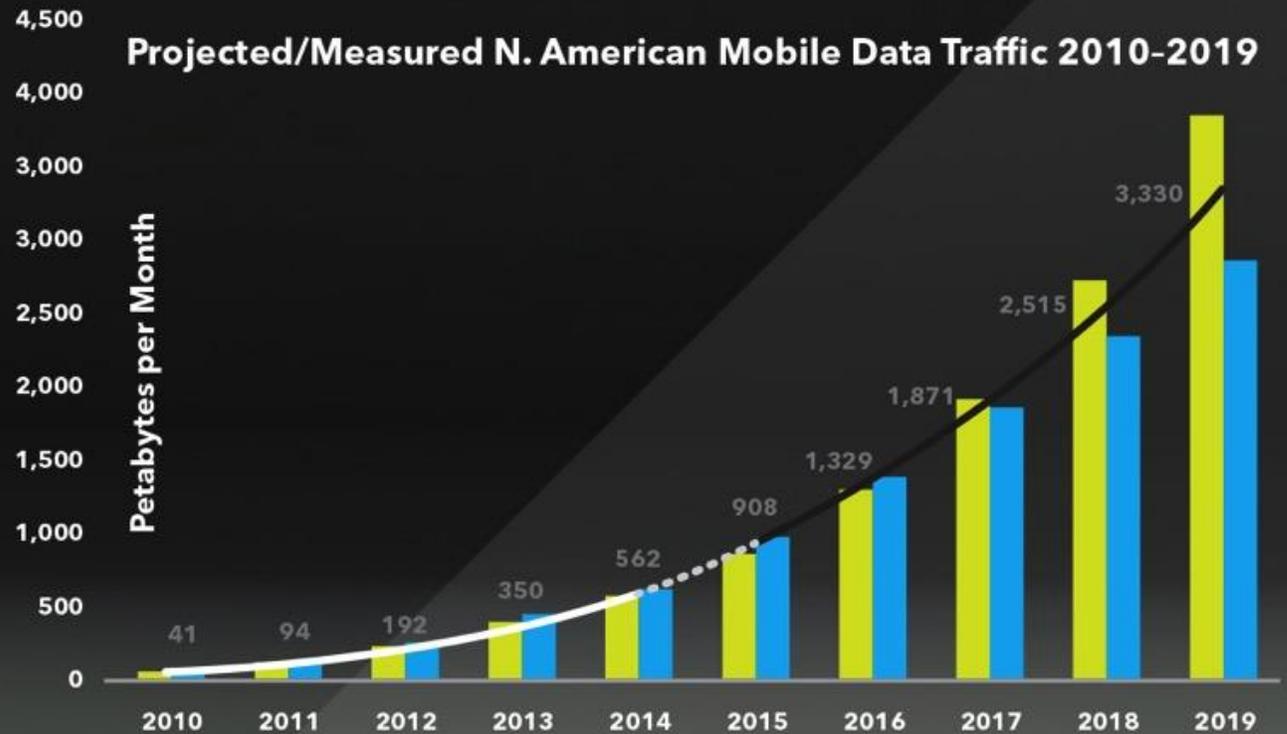
IP-Based Local Area Wireless mic Network

**Leveraging Network Technology to Provide Improved
Wireless Microphones Operation**

Mobile Data Crowding

- Mobile data traffic continues to grow*
- Demand is not stopping

■ Cisco Total Mobile Data Traffic – North America
■ Ericsson Total Mobile Data Traffic – North America
— Projection based on FCC Growth Rate
— Average Mobile Data Traffic Growth for 2015-2019 (Cisco & Ericsson)



* ctia.org

WHY? Think about that previous slide. Mobile data crowding is increasing not only because customers demand it....

BECAUSE THEY CAN: It is increasing because **IMPROVED NETWORK** technologies are making mass adoption of anytime/anywhere/any device use and consumption possible

Consider the many IP-based workflow and interface examples we have heard about today – the industry starts to realize that NETWORKS make our work **Faster / Cheaper / Better**

Why not take advantage of these advanced solutions?
That's what L.A.W.N. does

First it must be fully DIGITAL with No Continuous Carrier Wave –

- Only pulses – purely digital – so everything is easily managed by our small networked operating cell
- No wave to add/subtract/fade – **NO COORDINATION – NO INTERMOD**
- Traditional RF continuous wave is UNCONTROLLABLE – the transmitter signals go wherever they can reach, continuously affecting the RF noise floor and “mixing” with all sorts of other signals

Macro Diversity MIMO –

- Each receiver “talks” to every transmitter. All 24 channels. All the time. No nodes or other limitations.
- Each transmitter “talks” to every receiver creating a true digital **HIGHLY REDUNDANT** receiver diversity

Traditional RF is Risky and Costly –

- Densification and Spectrum loss/changes require constant management of traditional RF systems

L.A.W.N. uses Ubiquitous and Proven Technology –

- Nothing new or complicated from user perspective (we took care of this inside GTX3224)
- Network use is pervasive, mature technology used every day everywhere
- Small (pico) cells also mature, reliable technology used every day everywhere
- No more complicated to use than plugging a computer into a network!

**Like the rapidly advancing mobile industry – L.A.W.N. allows operations to be
Faster / Cheaper / Better**

Just plug into AC, connect Cat5 cables, turn on Transmitters and you are ready to go!

SEE IP OPERATION IN ACTION!

See the GTX Series L.A.W.N. in use at:

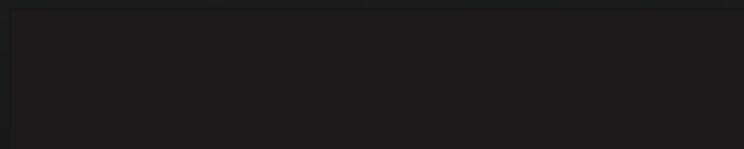
IP Innovation Showcase Theater – Central Hall, booth C12634

Over 60 manufacturers will be demonstrating the benefits and practicality
of moving to IP workflows

Daily demonstrations, presentations and educational sessions

Thanks for your attention

Questions?

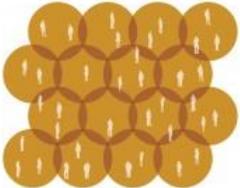


The Value of High-Band Spectrum in a Capacity-Strained Environment

CAPACITY AND FREQUENCY CONCEPTS

- According to former Clearwire CEO Erik Prusch, "2.5 GHz spectrum actually has an advantage over low-band spectrum in dense urban markets because it can carry much more data at higher rates," which is recognized as a key capability in dealing with increased traffic. - Fierce Wireless 1/14/14
- Greater capacity means the network can support more users – and also provide more bandwidth for each user.
- Aggregate capacity is the total capacity of a network across a coverage area.
- The more cells covering an area the greater the aggregate capacity (Shown by size of pipes below).
- In the future, the use of higher frequencies will allow more sophisticated antenna arrays, which will increase spectral efficiency, boost the capacity of each cell site, and allow for faster speeds.
- Higher capacity sites combined with more sites vastly multiplies total capacity.

LOW-CAPACITY RURAL DEPLOYMENT



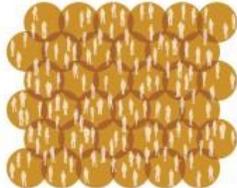
AREA COVERED BY CELL SITE

Lower frequencies can only support a small number of users

RURAL AGGREGATE CAPACITY

- Lower frequency bands enable coverage with fewer cells, but at the expense of capacity.
- Rural networks are typically lower capacity due to less dense populations and lower demand.
- No spectrum crunch in rural areas.

HIGH-CAPACITY URBAN DEPLOYMENT



Higher frequencies can support many users

>10X AGGREGATE CAPACITY VERSUS RURAL

- In the future, most data will flow over higher frequency bands.
- Urban networks are typically higher capacity due to more dense populations and higher demand.
- Urban areas with more user demand experiencing spectrum crunch.

Why operate in higher spectrum?

alteros



HighTech FORUM

"It's said so often that many have accepted it as a truism: "Low-band spectrum is inherently superior. High-band is inferior, undesirable and expensive." This is one of things that everybody just knows, right? Not so fast. This claim fails to account for the demands of macro/microcell engineering, the evolution of technology (particularly with LTE) and for the actual characteristics of high-band frequencies, especially in urban environments. The math is simple: Once you've achieved basic coverage, you're concerned with performance. " ... Richard Bennett, February 5, 2014