

BACKHAUL DEMAND DRIVES INNOVATION

DESPITE THE RECENT GLOBAL ECONOMIC SLOWDOWN, DATA USAGE IS INCREASING FAST IN MOBILE AND CELLULAR NETWORKS, DRIVING DEMAND FOR INVESTMENT IN THE BACKHAUL OF TRAFFIC FROM CELL SITES TO THE CORE NETWORK. KEITH DYER TALKS TO ANDY SINGER, PRESIDENT OF RADIO WAVES INC, A MANUFACTURER OF HIGH QUALITY MICROWAVE ANTENNAS, TO HEAR HOW THE ECONOMY LOOKS FROM WHERE HE SITS, AND HOW MICROWAVE CAN PLAY A PART IN DRIVING THE BUSINESSES OF THE WORLD'S CELLULAR OPERATORS AND WIRELESS DATA SERVICE PROVIDERS.

Keith Dyer:

Andy, one of the great things about speaking to someone on a regular basis at this length is that we get a chance to gauge market developments over a period of time. What are your thoughts on current market conditions? As a supplier of high quality microwave antennas to service providers, carriers, and systems developers, how have you been affected over the past year or so?

Andy Singer:

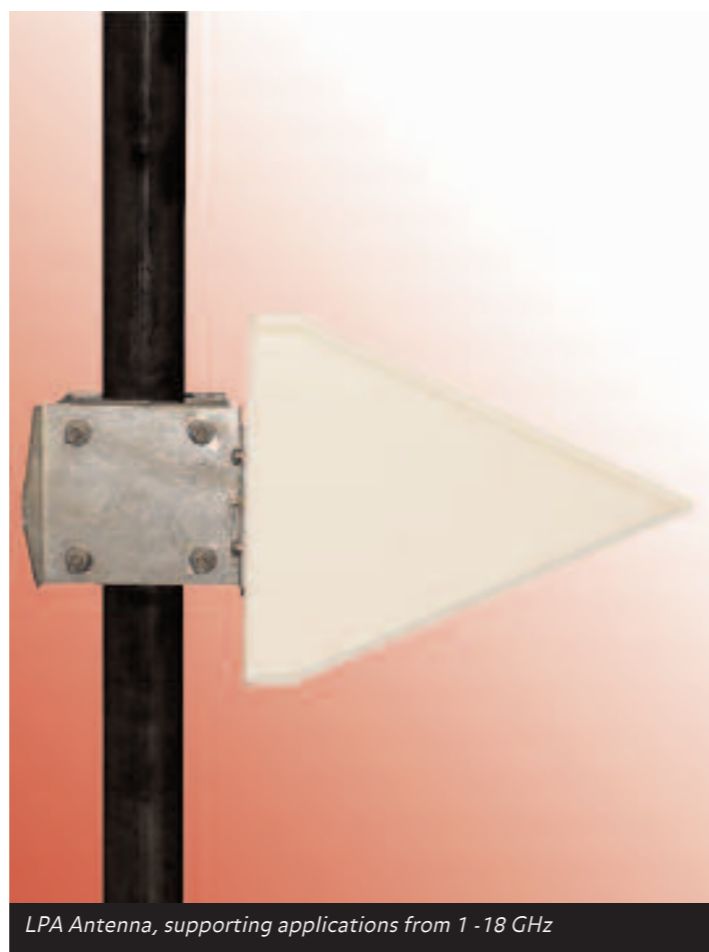
It has been a tough year especially the last winter, and it's clear the global economy has been through a severe recession, in terms of all the indicators you look at such as GDP, trade and growth, the numbers are pretty abysmal. But recessions happen, they are part of the normal cycle, and that means that recoveries happen as well. I think in terms of this recession we have

moved to the bottom and we are in a position to start the recovery now. The signs are that it's here: stock markets tend to anticipate recoveries and rise before economies themselves get turned around. People tend to talk about the recent history of a market and project that into the future, but that moment when everyone is talking about moving out is the time to invest.

I think we're seeing enough now to make us optimistic. The markets themselves are up in some cases 40% on the trough levels. We are seeing governments implement stimulus projects that are unprecedented in peace time, certainly in the USA, and this is beginning to find its way through the financial systems.

Keith Dyer:

So you are optimistic about the economy?



LPA Antenna, supporting applications from 1 - 18 GHz



Andy Singer

“As more and more people use 3G devices, we are going to see a doubling year on year of traffic for global cellular operators”

Andy Singer:

I am, and in fact I think that one of the things we will have to deal with as we recover will be inflation over the next decade. There will be a big effect on commodities such as oil, aluminium, iron and nickel, and you have to consider the effect that will have on a manufacturing business like ours. But even there that will drive the global community to push for substitutes to those commodities, and that will become a driver in turn for technical advancements. I think we will see that more and more over the next year or two.

Keith Dyer:

Apart from the global factors, what do you think will drive growth for your business – the supply of high quality microwave antennas.

Andy Singer:

Radio Waves is still focused on microwave antennas – they are what we design, develop and manufacture, and bring to the market on a global basis. One of the chief drivers for that is microwave in cellular backhaul, and the growth of that in that industry. There is a requirement for backhaul capacities to increase rapidly, as operators move from 2, to 3G and 4G. If you consider that on a global basis today 80% of all users are still on a 2G phone, then as users, and especially the younger generation, increasingly upgrade to 3G and then 4G

phones, you can see that the demand for high bandwidth services is going to be incredible.

The iPhone, for example, is a data hog, when AT&T put the iPhone on its network it represented 1% of mobiles on network in the USA, and 50% of the backhaul needs of the network. When you consider that even that was a 2G device, then it offers just a glimpse of what is going to be required in the future. As more and more people send pictures and videos over their devices, we are going to see a doubling, at least, of traffic year on year for global cellular operators.

Another driver is that thirst for high speed data is creating a market for data only service providers. These could be WISPs that provide robust, data only services to businesses, such as a customer of ours, Rapid Systems, provides in Tampa, Florida.

Keith Dyer:

Additionally, businesses like that demand quality and reliability above all else, as they provide data communications infrastructure to enterprise customers who demand top level service.

Andy Singer:

Rapid Systems provides data services to businesses over a 29 square mile area using a dedicated wireless network built on our equipment, and

rely on the provision of a high quality service delivery. They actually purchased a new radio with an integrated antenna system and found that they lost 20% of their coverage in one sector. So they replaced the antenna with a Radiowaves sector antenna and got that sector coverage back. It's an example of a business where high quality components are very important to a WISP, and shows how important they could be to a cellular operator as well.

Keith Dyer:

Predicting increased demand for microwave from cellular backhaul relies on microwave staying as part of the mix. Are we not seeing more fibre rolled out to base stations?

Andy Singer:

Yes, in urban area we are starting to see fibre where it is available, but we still see operators using microwave outside of that. To be honest, I think there is enough demand to generate huge growth in fibre as well as microwave deployments. It will depend on the operator, of course, and how their own business models are worked out.

Keith Dyer:

One innovation in microwave for backhaul has been in point to multi-point microwave, rather than point to point. The argument is that it provides more coverage and capacity at reduced costs.

Andy Singer:

Point to multipoint is certainly shaping up to be an interesting market that, in fact, almost died in 2001. You may remember the LMDS market in the past that crashed, but now the technology is back in a much more robust manner.

Point-to-multipoint (PMP) wireless access systems cost-effectively deliver high-speed, high-capacity video, voice and data services to multi-tenant buildings, large corporations, small offices, and medium-sized businesses. Radio Waves designs and manufactures an extensive line of quality point to multi-point antennas ranging from 1.5 to 40 GHz. PMP solutions include base station sector and hub antennas with varying azimuth beamwidths and low-profile customer premises or subscriber antennas.

Cambridge Broadband Networks Ltd is one company that has a very robust point to multi-point solution using 28GHz. It uses a specially designed Radio Waves antenna that gives Cambridge Broadband the performance it needs. The technology is having success with Tier One operators and in emerging markets. I think you will probably see take up where there are limited fibre networks, as using point to multi-point means operators can more cost effectively cover an area than point to point

“Products such as the ones I have mentioned will give operators and service providers the flexibility they will need”



links can manage.

Keith Dyer:

So is the growth in demand for these technologies driving new product development on your part?

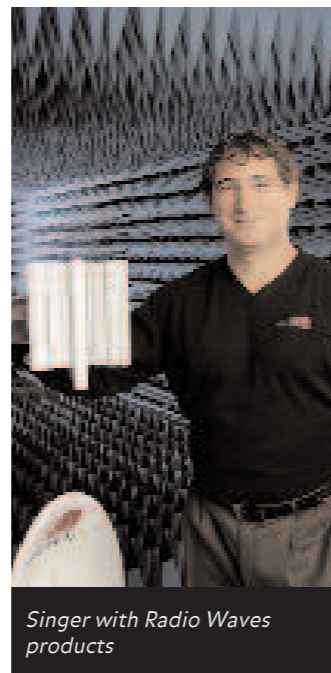
Andy Singer:

I think it's inevitable that new microwave bands will have to be opened up to support the higher bit rates we have mentioned, and we want to make sure that when the radios are ready, we are already in place to deploy networks as soon as possible.

One new product is a new line of SP microwave antennas called the SPX-1.8NS series, which provides coverage from 1.7 – 1.9 GHz, available in all sizes from 1 foot to 8 feet in diameter. We designed these antennas to cover a number of services including the Canadian smart grid network band of 1800 – 1830 MHz and the U.S. federal government band of 1755 – 1850 MHz, but I think European countries will also have to look at licensing these bands.

Another area of innovation for us in terms of frequency is an antenna that will cover applications from 1 - 18 GHz. This Log Periodic Dipole Array antenna is very broad-band in nature, and is ideal for those “unusual” frequencies that I think we will start to see an increased requirement for.

I think we are going to see links at the 28/32/38 and E-bands increase in the near future. When you are talking about a Gigabit of connectivity then I definitely think there is going to be a place for E-Band,



especially as operators move to LTE. Products such as the ones I have mentioned will give operators and service providers the flexibility they will need in their networks, and in turn the requirements of the next generation cellular networks will drive developments in antenna design.

Keith Dyer:

So when might you expect to see the benefits of LTE networks start to accrue for you?

Andy Singer:

I think that's tough to predict because of the timing and nature of the global economy, and I think operators will only move when they find they really have to invest in and deploy increased backhaul capacity. Certainly I see

growth in the market again, but not 20-30% growth. Those days are over with, because of the pressures constraining operators themselves, in terms of their own revenues and pricing.

But like any other market we will see some people that will buy quality and some who are more attracted by pricing. Wireless is no different than any other market in that regard. But we remain committed to high quality service and support. Just recently our UK manufacturing plant achieved ISO9901, 14001 and 18001 certifications. It shows our commitment to quality hasn't abated, in fact it has increased. Europe, and the Middle East and Africa, remains a key market for us, and I think our local presence demonstrates that, and enables us to respond to the needs of those markets.

About Andy Singer, President, Radio Waves Inc: Prior to joining Radio Waves, Andy held senior marketing and product management positions with a number of antenna system companies, including RFS(Alcatel) and ATG. Andy began his career as an antenna design engineer and has a B.S.E.E. and M.B.A.

He has received multiple patents in regards to remote tilt antenna systems. Andy is a well-known speaker in the industry and a member of a number of industry organizations such as the IEEE.