



Antennas: the forgotten chapter, according to Torbjörn Johnson. If the operators began working together a total of 500 towers would be enough to cover Sweden with a UMTS network – instead of 20,000 shorter ones.

# The Rebel on the Chessboard

By Jan-Eric Öhman

*Radio engineer Torbjörn Johnson is one of those people who have the right to call themselves the pioneers of mobile telephony. He has been involved in the field for 30 years as an inventor, design engineer and company founder. Sometimes he won, sometimes he lost, but he has always come back. He has always been the rebel.*

Lambda Mar – the words are poetry to a radio engineer. *Lambda* is Greek for wave, *Mar* is the Latin for ocean. The ocean's wave – could it be any better?

Not, at least, to Torbjörn Johnson. That was his first project after he sold his first company, Radiosystem, to Ericsson for just over SEK 100 million. He invested almost the whole sum – the money was also enough for a summer cottage in the Stockholm archipelago – in his pleasure yacht, the Lambda Mar.

The yacht lay in Nybroviken right in the heart of Stockholm, and passers-by found it to be very beautiful and unusual, with its almost unearthly appearance. Torbjörn Johnson, a technician at heart, described its beauty in another way: *a totally optimized construction with unique performance.*

He had the boat all to himself for a few years. These days it is involved in the Mediterranean charter business. Prime ministers, Hollywood stars, businessmen, and a Spice Girl or two have walked up the gangway. So, not least, have a large number of representatives of mobile telephony operators. That is the world in which Torbjörn Johnson would most prefer to be.

## THE SUCCESS. THE FAILURE

His company, Radio Components, which started up just over a year ago, is his third. The old adage, “third time lucky” hardly applies. Rather, his score so far when it comes to companies is one-all: one fabulous success and one tremendous defeat.

The first company, Radiosystem, became a glittering success, was sold to Ericsson, and in time became Ericsson Radio Access with just over SEK 5 billion in turnover and 1,500 employees. That was when the Lambda Mar could be built. The second company came to be called Radio Design. After a number of setbacks Johnson was finally outmaneuvered when new financiers and new money came in. Today the company is called A Brand New World and has been something of a running story in the Swedish press, not always in the positive sense.

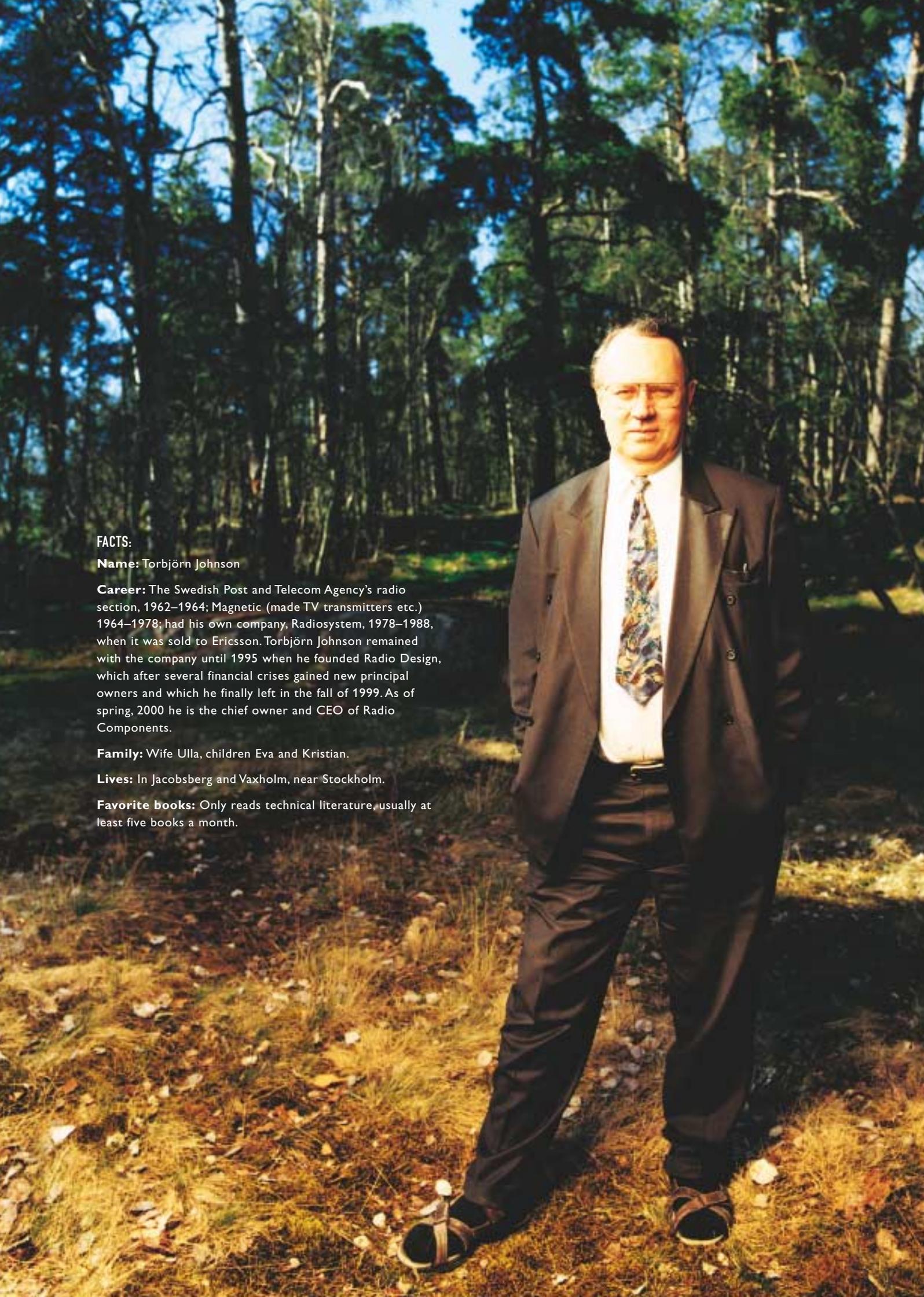
## WHAT WERE THE CAUSES OF JOHNSON'S SUCCESS AND FAILURE?

Radiosystem developed base stations better than anyone else's, while Radio Design never really got to show that its renewal of the NMT mobile network, the predecessor to GSM, was superior to everything else, at least according to Torbjörn Johnson himself. It was supposed to be used primarily in developing countries and would be a short-cut past land-based telephony.

“Right when we started, the markets collapsed in Russia and Asia.”

That was one of the explanations. The other, he says, was that the investors in the company came too close to the decisionmaking. They could decide the direction the company should take, and did not have the staying power that is needed in industrial development.

In Radio Components Johnson is the one who gets to decide things. He is both the owner and the CEO. It's best that way. >

A full-page photograph of a man in a dark suit, white shirt, and patterned tie, standing in a forest. He is wearing sandals and has his hands in his pockets. The background is a dense forest of tall trees with sunlight filtering through the canopy.

**FACTS:**

**Name:** Torbjörn Johnson

**Career:** The Swedish Post and Telecom Agency's radio section, 1962–1964; Magnetic (made TV transmitters etc.) 1964–1978; had his own company, Radiosystem, 1978–1988, when it was sold to Ericsson. Torbjörn Johnson remained with the company until 1995 when he founded Radio Design, which after several financial crises gained new principal owners and which he finally left in the fall of 1999. As of spring, 2000 he is the chief owner and CEO of Radio Components.

**Family:** Wife Ulla, children Eva and Kristian.

**Lives:** In Jacobsberg and Vaxholm, near Stockholm.

**Favorite books:** Only reads technical literature, usually at least five books a month.



**Torbjörn Johnson:** a stubborn player.

Outside the company's office in Kista south of Stockholm, he has raised a 36-meter tower. It is a prototype for Torbjörn Johnson's and Radio Components' contribution to second and third generation mobile telephony. When the 3G operators' calculations were presented last fall, he clutched at his brow. Four telecom operators in Sweden were each given government permission to build a 3G system at a cost of just over SEK 100 billion in infrastructure alone. That will lead to considerable sacrifices among consumers. Johnson asked himself if they are willing to make that sacrifice.

"With those investment costs, it will cost a hundred kronor at cost price to download a video with acceptable picture quality. Then we can presume that the operators want some profit. It will take a long time before 3G will be profitable for all the interested parties."

"It's the antennas which are the forgotten chapter here. They are responsible for a mere three percent of all the investment. That's unreasonably low."

If the four telecom operators follow their original plans, then 20,000 towers with a height of 60 meters will be required in Sweden. What Torbjörn Johnson suggests instead is that the towers should be considerably higher, from 120 to 240 meters. Then the radio signals will be able to pass over problematic hills, and the high towers will cover an area which is 40 times the size.

If the operators began working together, which is already happening, then a total of 500 towers would be enough to cover Sweden with a UMTS network.

#### THE KEY RATIOS

"The times favor broad-based cooperation. Even the financial analysts have started to doubt 3G's future profitability. It worked in the UK a few decades ago when four new TV channels were launched simultaneously. They shared a common infrastructure but competed on content.

"The environment would also benefit from the high towers, because they use a lot less energy, and ground-level radiation around the towers would be less."

Johnson has calculated and analyzed, and has subsequently identified 28 key ratios to make the towers cost effective.

His thoughts can be compared to those of someone facing a chessboard. Radio and all its waves can't be fiddled with or lied about. They follow their own laws, which must be taken into account. Glamour, glitter and beautiful speeches can't disturb or divert the frequency patterns.

That is probably why his system suits the suburbs and

### HIGH TOWERS – ARE THEY A GOOD IDEA, AND IF SO, WHY?

**Torbjörn Johnson would be happy to see towers of about 240 meters in height. That sounds unusually high, but in fact it's not. There are about 50 radio and TV broadcast towers in Sweden which are 300 meters high or higher. The Nacka tower in Stockholm, which many can see flashing at night, is 300 meters high.**

The Swedish radio and TV operator Teracom is responsible for the broadcasts and thereby even the towers.

What are the advantages and disadvantages of such high towers? **Jan Peter Bengtsson**, head of frequency planning, responds:

"Obviously the higher up you get, the greater the range. That is correct, and I can confirm that without having any knowledge of Torbjörn Johnson's technical specifications.

"It's also easier for cellphones to be able to 'see' and find the base stations the higher up they are.

"The disadvantage with high antennas can be that any interference also reaches further, and can affect other cells. But if one is aware of that during the network planning process then I don't think it has any decisive effect on the quality. The system also best suits places outside the dense urban areas, so that the capacity in each individual cell in a base station doesn't reach a maximum."

» *Torbjörn Johnson relies on the fact that his technological improvements are in a class of their own.* «

rural areas better than the urban centers. He would not get much accomplished in Hong Kong, Singapore or the Netherlands, so he focuses on Sweden and other areas of Europe instead. One of the Swedish operators has tested Radio Components' products. The results are being compiled over the autumn.

Torbjörn Johnson relies on the fact that his technological improvements are in a class of their own. It was only when his success company, Radiosystem, had achieved over

### JOHNSON'S RADIO TRIO

Radiosystem was founded in 1978. Torbjörn Johnson – along with his family, it is best to add – mortgaged their townhouse for a loan of SEK 120,000. From the beginning there were no customers, but the company's business concept was to develop peripheral products for the upcoming NMT mobile system. Eighteen months later came the first big order, from Telia, or Televerket as it was then called. Then things took off. In the financial year 1981–82, turnover had already reached approx. SEK 16 million. Those people who had been involved from the start look back on the early years as incredibly creative but also chaotic. Everything worked via Post-it notes, and Torbjörn Johnson himself accounted for every cable and screw.

In 1984 Torbjörn Johnson decided to develop base stations for the continuation of Swedish mobile telephony, NMT 900. Radiosystem beat out competition from Ericsson, Nokia, Siemens and Philips.

In 1988 Radiosystem was sold to Ericsson.

Radio Design was founded in 1995. Torbjörn Johnson had stayed on with Ericsson, but now wanted to test different business ideas. He wanted to develop the NMT system and sell it to countries like Russia and developing countries. There was never any demand. Radio Design's biggest order was 10,000 telephones to Russia and eastern Europe. The economies of his target countries crashed and new owners joined Radio Design, led by the founder of Icon Medialab, Johan Staël von Holstein. Radio Design was restructured in 1999 into A Brand New World.

Radio Components was founded later that same year in what could be called a trend-breaking step, since Torbjörn Johnson abandoned analog for digital mobile telephony. The company plans to specialize in turbo antennas which are more effective than traditional antennas, but which require higher towers. The company has about 15 employees.

SEK 15 million in turnover that he employed a sales agent and began sketching out something resembling a marketing department.

Anyone who innocently asks Johnson about the wind and weather soon realizes that the answer has nothing to do with the day's sunshine or cloud. What follows instead is a cascade of technical facts about his own product family of antennas, base stations and booster filters, followed by all his calculations of lower kilowatt costs, installation costs per meter in height and the towers' range.

### THE PIRATE TEACHER

He's sure of what he's talking about. He was just the same when he was young.

Johnson was born in Karlskoga, home of Sweden's weaponry, and the place where his father was involved in developing cannons. Originally Johnson wanted to be an aircraft designer, but when he entered the telecommunications secondary school in Örebro in central Sweden, it was instead the possibilities of radio which he chose to develop.

When he was 20 he visited Sida, the Swedish International Development Cooperation Agency. He thought he had solved some of India's educational problems. Fourteen aircraft with TV antennas would cover the demand. The planes would circle 12 kilometers above the earth and send down radio signals to antennas on the village schools. It was a cheap and effective way of teaching the abc's.

During the 1960s he became a rebel in his own way. That was when he was responsible for ensuring that the pirate broadcaster Radio Syd could start sending out TV signals from a boat in the Sound between Sweden and Denmark. It lasted three months before the Swedish Riksdag passed new laws, a ban was introduced and the TV screens went black.

Now he is a rebel again. Everything can be made cheaper and better. His opponents are the big systems houses, which is what he calls Nokia, Ericsson, Nortel, Lucent, and Motorola.

"They want to sell many base stations and have never bothered to develop either the stations or the antenna systems in order to give the best overall economics for the operators and consumers."

Torbjörn Johnson believes he's done just that. □

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