



Bill Hearmon

## Winning with 3G in Africa

by Hans van de Groenendaal, features editor

*Basic wireless propagation physics determines that free space loss is a reality. The higher the frequency, the greater is the loss and therefore the shorter the range of a wireless signal. This poses a problem for Africa, says Bill Hearmon, chairman of the African CDMA Forum, which held a two-day conference in Johannesburg early this month.*

With a population of 800-million and over 600-million surviving as subsistence farmers in wide-spread rural settlements, the widest range possible from a base station is a pre-requisite in order to provide basic telecommunication services.

It is on this argument that Hearmon bases his contention that 3G is a better technology for rural Africa than WiMAX. He may have a good point!

There is a trade-off between frequency and the capacity of a wireless link to carry information and data. The higher the frequency, the greater is the capacity. This is defined in Shannon's law. In information theory, Shannon's law is any statement defining the theoretical maximum rate at which error-free digits can be transmitted over a bandwidth-limited channel in the presence of noise.

"Should free space loss not be a problem then we would all be using the highest frequencies. We could get and perhaps would use WiMAX in the 10 or 20 GHz band", Hearmon says. According to the members of the CDMA African forum the bottom line is that in the real world of African basic mobile telephony with GSM at 900 MHz has been the most successful. In sub-Saharan Africa there are 48 countries with 72 GSM mobile operators and 153-million SIM cards issued. (The actual number of users is more likely around the 80-million mark) If GSM is so successful why is there a call for 3G?

GSM uses a time division method (TDMA) to get many customers talking within the same frequency slot, 3G uses code division multiple access (CDMA) to get as many customers as possible talking within the same frequency band. The big difference is that when a time slot is allocated in GSM it is consumed even if callers remain silent during periods of their call. With CDMA the system sees that there is spare capacity available and uses it. The bottom line is that with a CDMA mobile system an operator

can service 1600 subscribers as opposed to 200 in the GSM system.

There is no simple migration from GSM to 3G, new networks are needed. So why did the world opt for GSM? One of the reasons is that CDMA was not ready at the time. With CDMA being a latecomer its acceptance was very much slower, mainly as at the time it lacked volume, making the CDMA phone much more expensive than a GSM phone, a crucial factor in the developing world. "That has all changed with many operators now opting for CDM", says Bill Hearmon.

The Africa CDMA Forum was founded in March 2006 with seed money from Qualcomm, the developers of CDMA. At the end of 2006 the forum became self-funded by the operators, with the manufacturing industry taking a back seat, as associate members of the forum with no voting rights.

The primary objective of the African CDMA Forum is to lead the rapid evolution and deployment of 3G CDMA-based systems, based on open standards and encompassing all core architectures, to meet the needs of markets in greater Africa.

The first problem the Africa CDMA forum identified was the still high cost of CDMA handsets compared to the GSM equivalent. In August last year the Forum formed a handset aggregation buying group. The first task was to draw-up a specification for a handset with a view to reducing the wholesale cost of around \$75 to below \$40. The first aggregated order amounted to 1,5-million handsets and resulted in reducing the cost to around \$33 for the most basic handsets, which formed 80% of the order.

An interesting point made by Hearmon at the conference was about the small farmer and rural business entrepreneur who can empower himself with telephony and internet access by linking into the 3G network emanating from his

cities. CDMA 2000 system in the 850 MHz band has a cell area of 2712 km<sup>2</sup> and in 450 MHz a cell area of 7521 km<sup>2</sup>. The range is 29,4 and 48,9 km respectively.

CDMA is also making its appearance in South Africa with Neotel having been granted an 800 MHz licence for a fixed network and some of the USALs will be using CDMA

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