

**Smart Connectivity and Multiradio:  
Giving mobile users a smart connection to multiple networks**



As people around the world embrace increasingly mobile lifestyles, there is surging demand for mobile devices that support several different types of radio connections. Many devices are already powering this. For instance, handsets use Bluetooth to connect to a headset or a PC, in addition to cellular networks, and those that connect to WLAN or DVB-H broadcast networks.

Multiradio devices that accommodate and manage multiple connections will support existing mobile services and enable creation of new ones, allowing manufacturers to create devices that better support different consumer needs.

There are several groups of wireless radio technologies that multiradio devices encompass beyond traditional wide-area cellular networks like GSM and WCDMA/HSPA: proximity solutions like Bluetooth and NFC; broadcast technologies like DVB-H; satellite technologies such as GPS; and hotspot and portable solutions like WLAN and WiMAX. With a multiradio device, users can always be 'best connected' for the services they are using. Having the right connection to the right service at the right time means people will choose the technology they need, on their favourite device.

## Driving new services

Access to innovative new services is a clear benefit of the multiradio user experience. Innovation' derives not only from the radio technologies designed to support a particular type of application, e.g. GPS navigation or DVB-H mobile TV, but also because developments in multiradio technologies will provide new business opportunities for operators. For example, fixed-mobile converged services using UMA have already been launched. UMA services switch over connections from cellular to a home access point or public hotspot over WLAN when within range, without complications. This means improved indoor coverage for consumers, as well as enabling operators to set separate tariffs for calls made from within home zones or other specified areas.

Innovation, however, isn't necessarily limited to mobile operators: fixed-line or broadband providers could use a model similar to UMA in order to offer VoIP services of their own. Other businesses can also take advantage of multiradio devices: broadcasters can offer mobile TV using DVB-H, with or without a simultaneous link to cellular networks delivering additional data services. Credit card companies could even be in a position to offer mobile payment services using NFC, while car manufacturers can utilize GPS and Bluetooth for navigation and audio control.

## The challenges of multiradio

Of course, adding this increased functionality is not without its challenges: integrating multiple radios into a single device and ensuring they can function when used simultaneously is a significant hurdle that is not obvious to consumers.

In order to harmonise multiple radios into a single device, a significant amount of attention is paid to engineering. This is because certain radios can't operate simultaneously. Concurrent connections can interfere with each other, or drain power from batteries; and roaming from one network to another without seamless handovers can result in dropped connections or lost information.

Finally, simplifying use of multiradio devices, making connections more intuitive and more of a pleasure to use is a top priority. There are plenty of multiradio devices available on the market today, but the task of managing multiple connections is complex. In many cases, very little happens automatically or "invisibly" to allow for seamless connectivity across multiple types of connections.

## Smart Connectivity will deliver the optimal user experience

Nokia has a strong track record in multiradio devices, encompassing handsets like:

- Nokia 6630, the first dual-mode, tri-band phone to work with WCDMA and GSM/EDGE networks.
- The Nokia 9500 Communicator, the first cellular/WLAN device to be certified by the Wi-Fi Alliance.
- The Nokia N92, the world's first commercial DVB-H device.

The Nokia N95 multimedia computer features six different radios operating in ten different frequency bands. Nokia aims to build on this success and use multiradio technologies to enhance the user experience - by solving complex implementation and integration issues in a manner that's invisible to the end user.

In future, Nokia devices will continue to keep people connected in such a way that the "how" part isn't a concern. The device will just do it, enabling Smart Connectivity. Smart Connectivity solutions ensure the most "hassle-free" and cost-effective experience for consumers. By offering users the ultimate connection management in a device, Smart Connectivity, for instance, enables devices to automatically change connection type seamlessly, based on the user's settings, to select the best network available for coverage or cost. Not only will this supercharge the user experience, but in future, Smart Connectivity will be managing connections of 100 Mbps and upwards, activate seamless roaming and feed the user contextual information based on where they are and how they feel.

Nokia is well ahead in enhancing the intelligence of mobile devices through innovations in Smart Connectivity and multiradio. Not only will these innovations deliver increased value, but complex underlying technologies will be masked to create an optimum user experience.

Nokia's innovations will also allow for easy integration and interoperability of new radios in future devices, as well as optimizing power usage to conserve and prolong battery life. In the near future, Nokia devices will keep people connected in the best and most delightful ways.