

TAKING 3G IN HAND

Handset performance and availability scares plague each new generation of mobile technology, but can device manufacturers achieve a steeper learning curve when it comes to 3G?

Unreliable, expensive and bulky is the verdict of mobile operators from across Europe on the first generation of 3G handsets currently under test on their networks.

According to press reports from the recent UMTS Deployment Congress, the operators said that none of the phones was capable of delivering the desired combination of high-speed data, clear voice and video, and smooth handover between base stations, and none was yet suitable to put into the hands of consumers.

Dissatisfaction with the first crop of 3G mobile phones should come as no surprise. After all, we have been here before – with both GSM and GPRS. Early examples of handset technology inevitably seem to arrive later than anticipated, and fall short of expectations; the problem is that with each successive generation of devices those expectations become that much higher. ▶



So how are the manufacturers responding to these criticisms? Not surprisingly, they are reluctant to own up to any shortcomings with their first 3G products, but are still at pains to point out that these early efforts at cracking the technology will lead to improvements with each successive launch that follows.

Motorola was one of the first to market, and along with NEC is one of only two companies to supply handsets to Hutchison's '3' which launched service in the UK and Italy in March.

"We shared the same vision as '3', and given our ability from a technical standpoint we knew we could provide a handset for them to launch with," says Bob Schukai, director of 3G products at Motorola.

Problem areas

However, issues such as handover between 3G and 2G networks remain a knotty problem for the manufacturers. From further back in the supply chain, Chris Tunsley, head of protocol software at Cambridge, UK-based handset technology provider TTPCom, views these early 3G phones as still "not quite there" in terms of interoperability. He believes that the terminals currently available on the '3' network should be termed "double mode" as they only work up to a point as dual mode (GSM and 3G) phones.

If the user in a data session goes out of a 3G cell and into a GSM cell, the data session won't be maintained and provide the handover functionality, says Tunsley. "You cannot handover between the two modes in one go. Once you fall off a 3G cell you drop the call and you have to re-initiate it on GSM."

However, the handover process is a complex one to manage, says Tunsley. It hinges on the ability of the 3G phone to monitor neighbouring 3G and GSM cells at the same time as receiving and transmitting a signal, so that it can make decisions about handover between base stations. There are no free timeslots available with 3G as there are with the GSM system's TDMA-based technology for the phone to do this, thus so-called compressed mode gaps have to be created.

"The management and the scheduling of these gaps and the ability in that 3G gap to have a look at GSM, and do

all the things it has to do and then come back to 3G, is a very difficult challenge for the device. That's something that is being implemented today but obviously it's taken the industry a little by surprise," Tunsley explains.

The current handover situation on 3's network led the company to refute press reports that the process could be protracted, taking several minutes in some cases. The operator estimates that when moving from its own 3G network on to the 2G network of its partner O2, registration on the O2 network typically takes users around a minute.

The service was launched only "after many months of intense hour-by-hour development work" adds '3' while stressing the importance of putting 3G handsets into the hands of its customers.

However, 3's position is unusual in that it does not own its own 2G network. In future, roaming with dual mode networks should be possible using a 3G handset in any country in Europe, argues Pekka Isosomppi, communications manager at Nokia Mobile Phones. "I switch on my 3G phone and it picks up a GSM network, and that's seamless to me. Whether I get routed to a W-CDMA network of course depends on the operator." In theory, a 3G handset should work on any network that is 3GPP compliant, says Isosomppi.

Nokia's recently announced 6650, the company's first 3G handset, is one of the models currently on test with mobile operators. The phone uses a dual-mode chipset says Isosomppi, but Nokia's claims that the 6650 is the world's first 3GPP compliant mobile phone, and that it is capable of seamless handover between 2G and 3G networks, is challenged by Motorola. "We would dispute a lot of Nokia's claims," says Schukai.

Nevertheless, Isosomppi believes the technology is working well. "I understand from the consumers point of view that the 6650 is a handset that works perfectly fine," he says. "Our target from the outset was to produce a handset that fully integrated GSM and W-CDMA technologies. In terms of performance, power consumption, and size it could not be inferior to current GSM handsets, and also cost was very crucial."

The product, which started to ship in June of 2003, is already being delivered to 3G operators that have started

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service, according to Matti Alahuhta, chief executive of Nokia Mobile Phones in June. “We will see the high volume phase in the second half of 2004,” he says.

Some operators have already placed commercial orders for the 6650, and in Japan the phones have been selling for some time through Nokia’s own independent shops, says Isosomppi. “It is very useful and competitive in Japan, because by owning this phone you can travel in Japan as well as in Europe, and roam with a single phone.”

Size and functionality

One problem that the handset manufacturers face is arguably of their own making. With savvy customers already owning lightweight, reasonably priced GSM phones with extensive battery life, how can they match these with 3G?

“For the consumer to put that down and pick up a 3G handset, it’s got to be competitive, and to be competitive it’s got to be designed efficiently. There isn’t the luxury of starting with a big chunky phone, you’ve got to be there straight off,” says Tunsley.

The manufacturers’ dilemma is that the 3G specification allows the networks to choose which functionality or which parameters they wish to use, and there are a lot of optional features or functionality that network operators can choose from, Tunsley explains. “Because the handsets have to run and interoperate globally they don’t get that luxury and are obliged pretty much to support every feature in the specifications.”

The interoperability difficulties that this creates have been recognised and acknowledged by the GSM Association. It too notes that problems arise when different vendors create devices that incorporate different combinations of mandatory and optional specifications. While the products that emerge may comply with the standards, they are rarely interoperable with other manufacturers’ products says the GSMA.

The GSMA’s approach is straightforward: it is asking the operators what they actually want. This might not sound revolutionary but, generally speaking, the technologists have a tendency to create technology then think about how it can be used, says the Association. This time around the GSMA is leading by driving consensus between operators to establish prioritised requirements – first at the service level, then on the enabler side – so that technical solutions are actually informed by real-world priorities.

Back to basics

The task of providing terminals that actually meet operators’ needs should become easier with time. First efforts, such as the 6650 are still largely traditional, vertically integrated mobile phones.

“The 6650 is a radio optimised device,” says Isosomppi. “We wanted to get the radio part right at the time when the development started, and it’s taken a long time. If you look at the 6650 it’s a traditional mobile phone. It has a digital camera and many cool features, but it is a rather typical mobile phone, especially when you compare it to the rest of our portfolio.”

In the future, W-CDMA technology will proliferate throughout Nokia’s product portfolio, says Isosomppi, and will be introduced in due course into different types of terminal category. “It’s going to be comparable to GPRS and EDGE technologies, which are proliferating throughout the categories.”

Motorola, meanwhile, is putting out two more new 3G handsets this year, in addition to the current A830 model which is in service with Hutchison ‘3’ and Austria’s Mobilkom, and which has also been re-badged by Siemens as the E-10.

“Everybody’s got to do their first product, and go through some massive teething activities especially in terms of the infrastructure testing,” says Bob Schukai.

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“The advantage we’ve got is that now we’ve been through this and as we bring out our second and third and fourth products it gets progressively easier for us.”

The first of these new “second generation” handsets – the A835 – will be based completely on Motorola’s i300 semiconductor platform. Rather than adding new features, the focus will be on making the new products smaller, lighter, cheaper, and able to support longer battery life, says Schukai. “The first generation of anything you do is always your biggest, your most expensive, with your worst battery performance, and

Meeting at the interface

An industry initiative announced in July aims to tackle one area of handset development where proprietary technology is still said to be stifling innovation and keeping costs unnecessarily high.

Chipmakers STMicroelectronics and Texas Instruments along with chip designer ARM have joined forces with Nokia to create the Mobile Industry Processor Interface (MIPI) Alliance. It is a move, say the founders, in response to criticism that the lack of affordable new features have delayed consumer take up of the new devices.

The MIPI Alliance is intended to complement existing standards bodies such as the Open Mobile Alliance and 3GPP, but with a focus on microprocessors, peripherals and software interfaces. Although not specifically formed to tackle 3G handsets, they will undoubtedly be a large part of the alliance's remit. The four companies plan to recruit other phone, hardware and software vendors to help define the technology building blocks of new phone features.

"A whole range of proprietary interfaces are used on the processors that go to create 3G phones," explains Oliver Gunasekara, director of wireless at ARM and MIPI Alliance board member. "If a manufacturer is designing a 3G phone, then they have to work together at the start of the design with the different components: the LCD, the camera, the

application processor, maybe even some of the operating system characteristics."

That stops innovation because only those components will work together, explains Gunasekara. By creating open interfaces, handset manufacturing companies will be able to mix and match different components even though they may not have initially been designed together.

The MIPI Alliance plans to publish its Version one standards by Q4 2003, which will be a subset of its various working groups covering areas like power management, memory interface, camera and display, and testing and debugging. Components and semi-conductor products compliant with MIPI Version 1 should be available in the first half of 2004, and be delivered as technology within handsets a further six to nine months later.

"It may not be overnight, but I think it will see end user benefits in the range and the cost of these new advanced devices," says Gunasekara.

But the big question say analysts, is whether companies such as Intel, Samsung, Motorola, Microsoft and Qualcomm, will be prepared to join the new alliance. Alliance backers said they expect to announce by the end of Q3 that dozens of companies have signed up alongside the initial four.

never the one you want to sell millions," he admits.

However, both phones will have point to point video support, and will carry a lot of the design and feature sets from the A830, so both will be going to be capable of doing video streaming, and feature an integrated digital camera.

Motorola's second offering, the A920 launched in September 2003, runs on a version of Symbian OS v7.0 and incorporates a pen-based user interface by UIQ. Applications can be downloaded, such as games based on Java and C++, from 3. This will allow consumers to update their handsets regularly with new applications and content.

The Motorola A920 can also double up as a separate, hand-held gaming console. It's possible to flip the phone on its side and use the console-style game controls, including a five-way navigation key to play Java-based games.

An expansion memory card is available for up to 256 extra Mb of space for multimedia files. The phone also

offers more basic mobile phone functionality such as text and picture messaging.

"Next year I think you'll see us segmenting our products a little bit more," says Schukai. "What we've done right now is a phone that does everything, but next year in the portfolio offering you'll see we're going after specific consumer segments – we can do that because we've got the right size, weight, and cost." New handset costs must also be within 10 per cent of those for GSM before mass-market take-up is likely, Schukai believes.

All of which should hopefully win the approval of the operators at the UMTS Deployment Congress, who questioned whether consumers would be willing to pay more for heavier, less reliable handsets with a shorter battery life. ■