



Alon Ironi

Siano Mobile Silicon

Digital TV is expanding from the home to encompass almost everywhere – the street, cars, buses, trains, restaurants and the beach. The TV world is changing from a stationary, satellite or tethered paradigm – a typical group-viewing experience – to include a more personal viewing experience on portable wireless devices.

As the mobile entertainment market matures, mobile devices are rapidly evolving from strictly communications devices into multimedia-centric infotainment devices – with the integration of digital cameras, mp3 players, PDA functionality, GPS services, gaming and video capabilities. Similarly, other mass-market devices – such as Apple’s iPod and iPhone – are changing the habits of millions of consumers when outside the home ... personal video and television capabilities are as close as ever to achieving full realization.

The reality of a fragmented and diversified mobile TV market

Television, the most basic and widely-used multimedia application ever, is going through a dramatic change. New standards and technologies – led by a coalition of leading cellular operators, broadcasters, mobile-phone makers, software and content providers – have set the stage for terrestrial DTV services that are optimized for mobile usage.

However, global segmentation of the new standards, and the variety of regulated spectrum bands being considered in different geographies, is leading to a fragmented market for broadcast Mobile Digital Television (MDTV). Viable technical standards include DVB-H, DVB-T, DAB, T-DMB, DAB-IP, ISDB-T, CMMB, MediaFLO and DTMB (GB20600) and any one of these can be deployed over multiple spectrum bands – VHF, UHF and L-band. In addition to these terrestrial technologies, some satellite-based technologies are also planned, while others are already deployed.

For the sake of rapid industry adoption and takeup, it would have been simpler if there had been a single mobile TV standard using just one spectrum band. However, the reality is that there are a number of these standards throughout the world. In some cases, such as in Germany and the UK, there is even more than one standard per country. Such a market introduces a big challenge for technology vendors and component providers, and calls for a multi-standard, multi-band solution while maintaining small size, low costs, low power, high mobility performance and a high level of integration.

Flexibility for operators

In a traditional cellular communications market, operators are in charge of the entire operation from A to Z – the network, the infrastructure and everything required for delivering services to the consumer. The MDTV market operates differently. Cellular operators won't install the networks and infrastructure but will instead follow a TV service provider model, where companies such as T-Systems and Mediaset will install the mobile TV network, including infrastructure, towers and content aggregation. Operators will then buy the service from the TV service provider to bring it to the end-user as a commercial service.

Because of the market structure, operators will have a presence but they still require some flexibility. With multi-standards a reality, even though operators each have a preference for one particular standard, they have the flexibility to work with two or more different MDTV service providers in order to create competition and get a better deal. This also presents less of a risk than if they were only using one standard.

Streamlined multi-standard design for cellphone manufacturers

Phone manufacturers want the ability to sell their phones in multiple countries or in countries where there is more than one MDTV standard – requiring a multi-standard phone supported by a multi-standard receiver chipset. For phone manufacturers, the multi-standard approach to MDTV presents an opportunity to streamline hardware and software design while reducing the overall design cycle and R&D costs. With a multi-standard chip, manufacturers can invest in one platform which can then yield several commercial models using different standards. A multi-standard chip also assists phone makers in managing their inventory. If one model for one standard suddenly has less volume, the possible inventory overhead can be offset by using the same chip for other models supporting other standards where volumes may exceed the estimate. The handset maker does not have to bet which standard will prevail. With a simple and single design, they can leverage volume to reduce prices.

Multimedia convergence

The emergence of a new era in mobile TV entertainment – focused heavily on phone manufacturers and the growing consumer demand for all-in-one, converged, multimedia devices – is becoming a major driver within the industry. A whole multitude of converged devices – such as notebooks, GPS systems, digital picture frames, add-on devices ... and much more – is fuelling new demand for MDTV companies. PC accessories, such as USB sticks enabled with mobile TV, bring more choice and flexibility for upgrading multimedia capabilities and represent new revenue streams for providers and operators alike. In the same way that phone manufacturers need to streamline hardware and software costs (to be able to sell products across countries where mobile broadcasting standards differ), the same principle holds true for the emerging multimedia devices. Device makers and operators alike can leverage volume, reduce prices and maintain flexibility in selecting end-markets by integrating a multi-standard chip in their devices.

GPS and navigational devices are leading this new trend in infotainment convergence – and represent an important slice of the market for MDTV chip providers.

Diversity reception

Reception of MDTV whilst travelling at high speeds opens up the issue of diversity – a crucial element to its success. Technical issues – such as processing techniques, maximum ratio-combining, static and mobile reception, shadowing/screening effects, space-versus-time diversity,

and selective fading – are all indicative of the requirement for diversity receivers to be integrated into multi-standard chips.

Diversity receivers work by combining the signal from more than a single antenna and applying advanced algorithms thereafter to improve the minimum C/N that is required to receive a television programme without any flaws.

Fig. 1 shows a comparison between normal and diversity reception when travelling at 120 km/h between Hannover and Braunschweig in Germany. Good reception along the route is indicated in dark green, while stretches of poor reception are coloured lighter green and red.

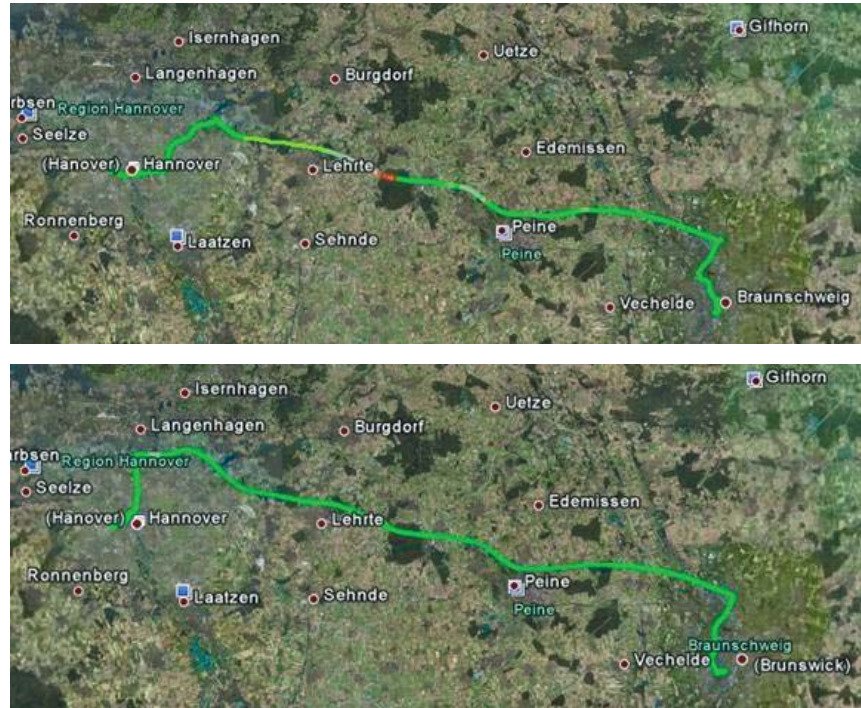


Figure 1
Reception while driving at 120 km/h between Hannover and Braunschweig
Top image shows reception quality when using a single-antenna receiver
Bottom image shows reception quality when using a dual-antenna receiver

Looking ahead

In five years or so, end-users will have access to a collection of TV services carried over various wireless technologies:

- multiple-standard broadcast TV;
- IPTV over Wi-Fi;
- streaming television over HSDPA, and perhaps also;
- WiMAX or LTE (“3.9G”).

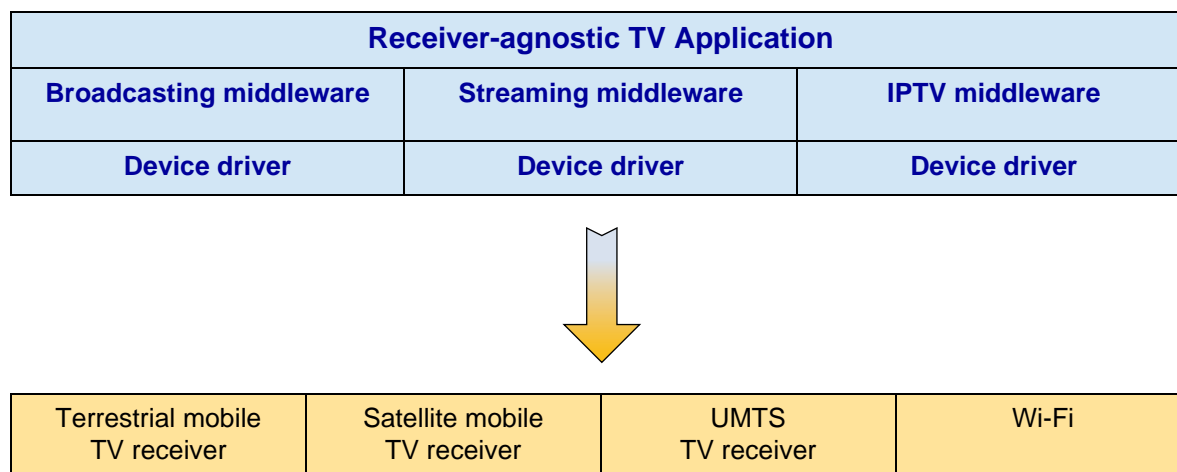
For the end-users, all these technologies should be accessible through one simple, easy-to-use application on their mobile or PDA device, that can access different TV services operated by different service providers.

System architecture of a unified mobile TV application – multiple-tuner single application

Table 1 shows the system architecture of a unified multi-radio mobile TV system.

The user will be agnostic about the technologies used and how they work, and will enjoy a rich user experience and fast deployment by having access to all available content. This combination of software and chipset is designed and packaged in a way that users can access all types of services anywhere in the world – while roaming with a single mobile phone. The end-user can receive his/her selected channel in countries that use a different standard from the home country, or more than one different standard, thus providing the full mobile TV experience anywhere.

Table 1
Systems architecture of a unified multi-radio mobile TV system



Standards overview

There is no doubt that in the future the higher performing, more deployable standards will dominate in certain regions ... but a fragmented market for MDTV broadcasts is certain to remain. There was much speculation in 2008 about the future of DVB-H (previously predicted to gain the largest footprint for MDTV broadcast and to take precedence in Europe) – due to its high roll-out costs and high up-front investment for operators.

Conversely, DVB-T broadcast – which used to be problematic regarding power consumption – is not only looking like the more cost-efficient solution but, combined with improved chip technologies over the last 2 years that address the initial problems and doubts, is today presenting a high-performing, more realistic, standard for global roll-out.

CMMB, the MDTV broadcasting standard within China, has reported phenomenal usage within only a few months of launching and is predicted to spread into the Middle East and other areas in Asia – and is a potential competitor to the anticipated DVB-SH system in Europe and elsewhere. Overall, there may be some consolidation of mobile broadcasting standards in Europe and the rest of the world, but no single standard will dominate and a highly differentiated standards market will remain into the future.

Siano's SMS1100 – a milestone towards MDTV convergence

The challenges of MDTV have been addressed with the creation by Siano of a multi-standard chip that is smaller in size than competing solutions which support only one or two standards. The multi-standard chip also has lower power consumption while maintaining a high level of performance – securing good reception even with weak signal strengths such as in an elevator or garage.

The multi-standard approach – which is currently being expanded to a “multi-technology” approach – aims to solve the challenges that all these emerging standards, technologies and spectrum



Figure 2
SMS1130 – multiple spectrum bands, multiple TV formats, single-chip, two-way DVB-T Diversity



Alon Ironi has 15 years of experience in fabless IC management, product roadmap definition and strategy, SoC architecture and design, and building and maintaining commercial relationships with Asian customers. Over the years, he has been CEO of Emblaze Semiconductor Ltd., Entrepreneur in Residence at Concord VC, General Manager of Zoran Israel, and VP Engineering of Zoran Corporation in charge of the overall engineering activity of Zoran worldwide.

Mr Ironi is experienced in leading the entire activity of a fabless IC company, including building its vision, mission, strategy and daily tactics and revenue generation. He has proven records in building partnerships with market leaders (e.g., cellphone platform providers). He holds a BSEE (Cum Laude) from the Technion (Israel Institute of Technology) and completed the MSEE programme at Santa Clara University in California.

bands have created. Without this approach, this enormous diversity would largely prevent mobile DTV handsets, multimedia devices and services ever reaching the mass market.

European outlook

The MDTV industry is now entering a new phase in its development – by providing advanced multi-standard chip architectures to enable MDTV across multiple devices and differing geographical regions. For a market that is approaching the beginning of its anticipated hyper-curve – the emphasis for growth lies with flexibility. Operators, phone manufacturers and device makers all need to address the continuing and complex issue of multi-standards. This holds true especially for Europe. With speculation rife about the future of standards such as DVB-H, DAB and DVB-T, and rising consumer demand for converged multimedia entertainment devices, the multi-standard approach represents an ideal platform for growth – enabling players to adapt to changing standards and technologies without impacting their initial R&D costs. For European players, a multi-standard chip controls the risks and maximizes the potential opportunities – representing a win-win model for future growth.
