Satellite Services to Handhelds

The most advanced Satellite Broadcasting system in the world

What is DVB-SH?

DVB-SH is the name of a transmission system standard designed to deliver video, audio and data services to small handheld devices, such as mobile telephones and PDAs, using S-band frequencies. The key feature of DVB-SH is the fact that it is a hybrid satellite/terrestrial system that will allow the use of a satellite to achieve coverage of large regions or even a whole country. In areas where direct reception of the satellite signal is not possible, a terrestrial gap filler can be used to provide coverage. It is designed to use frequencies below 3GHz, typically around 2.2GHz. The system and waveform specifications have been published as ETSI standards (TS 102 585 and EN 302 583).

Background

Mobile TV is expected by many to become the next big mass media market. There has been significant activity in this regard since the publication in November 2004 of the DVB-H standard, now the basis of a growing number of mobile TV services around the world. DVB-H is primarily targeted for use in the UHF bands, currently occupied in most countries by analogue and digital terrestrial television services. DVB-SH seeks to exploit opportunities in the higher frequency S-band, where there is less congestion than in UHF. DVB began work on the DVB-SH specifications in 2006.

How does it work?

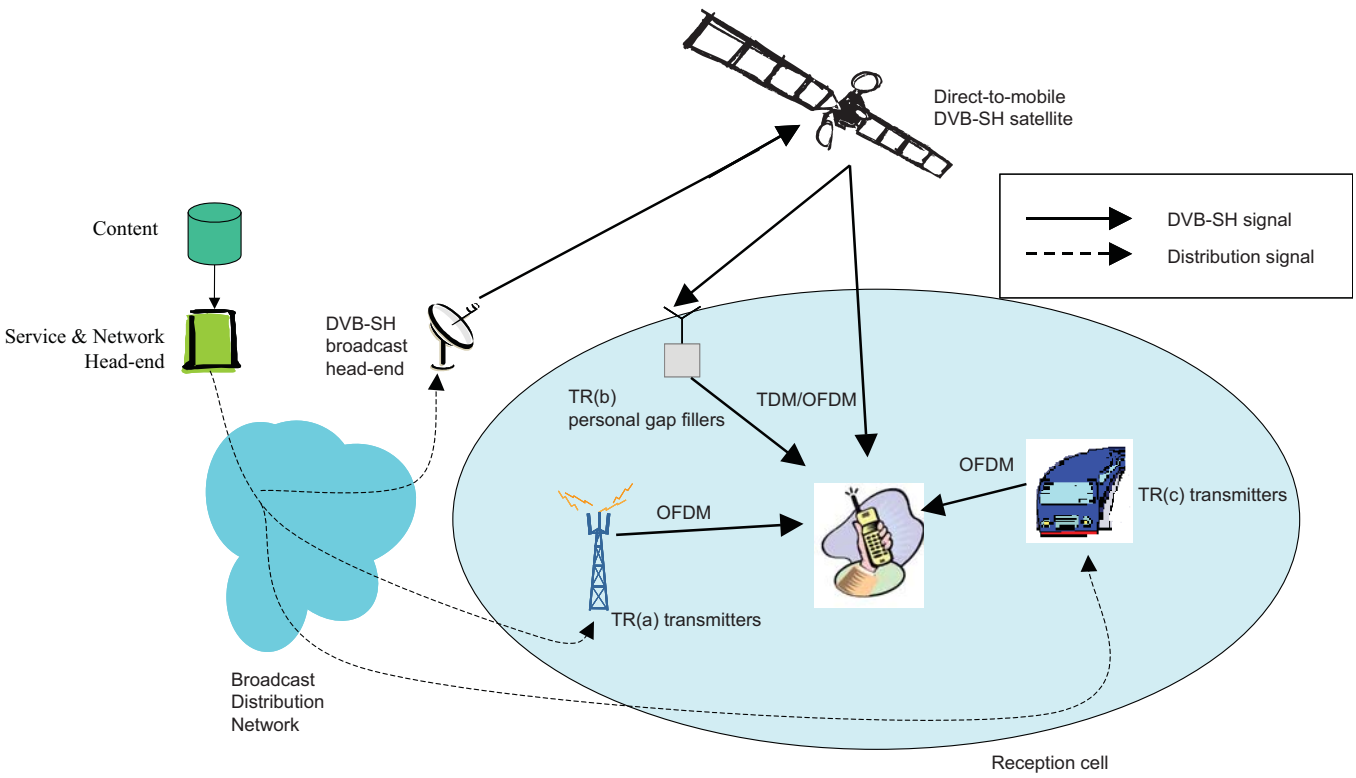

Figure 1. Figure 1. DVB-SH Network Architecture

OFDM (Orthogonal Frequency Division Multiplexing) is the natural choice for terrestrial modulation and is the basis of both the DVB-H and DVB-T systems. DVB-SH introduces a second scheme, a Time Division Multiplex (TDM), leading to two reference architectures termed SH-A and SH-B:

- SH-A uses OFDM both on the satellite and the terrestrial link
- SH-B uses TDM on the satellite link and OFDM for the terrestrial link

The S-Band is very demanding in terms of signal coverage. Its short wavelength (approx. 13 cm) requires a quite dense terrestrial repeater network in towns and cities. Naturally the cost of this network can be reduced if the signal-to-noise-ratio (SNR) required for stable reception is low. The burden placed on DVB-SH by the high frequency band in which it operates is compensated for by a selection of tools that enhance the signal robustness. For example a state-of-the-art forward error correction (FEC) scheme, 3GPP2 Turbocode, is used. In addition, DVB-SH uses a highly flexible channel interleaver that offers time diversity from about one hundred milliseconds to several seconds depending on the targeted service level and corresponding capabilities (essentially memory size) of terminal class.

DVB-SH does not define transport protocols, an Electronic Service Guide (ESG) etc. As in all other DVB transmission systems such “higher layer” issues are defined elsewhere. The DVB-IPDC specifications were originally defined with the DVB-H transmission system in mind and work is now continuing to ensure that they can also act as the “higher layer” of DVB-SH.

The combination of a satellite footprint and a terrestrial complement in S-band can deliver nationwide coverage to terminals which could implement the TDM and OFDM modes of SH, a combination of SH and DVB-H, or simply the OFDM mode of DVB-SH operating in SFN. Key to deployment will be DVB-SH’s interface with the existing DVB-IPDC layer and the services based on it.

Market Deployment

In December 2006 the European Commission confirmed that a slice of S-Band spectrum can be used for mobile satellite services and that complementary ground components of a hybrid satellite/terrestrial system are also permitted.

In September 2007 the regulatory authorities in France indicated that mobile TV services in that country will be provided using a combination of DVB-H and DVB-SH.

At the DVB World conference in March 2008, the European Commissioner Viviane Reding indicated her support for DVB-SH, stressing its advantages as an open, flexible and affordable standard.

April 2008 saw the launch in the USA of a dedicated geostationary satellite dedicated to the deployment of a nationwide DVB-SH network providing video services, navigation information and emergency messaging. Alpha trials of this service are already under way.

In Europe, the first DVB-SH technical pilots have been successfully completed and a satellite due for launch in 2009 will target six large European markets.

Next Steps for DVB-SH

The DVB-SH system and waveform specifications have been published as formal ETSI standards. Work is continuing within the DVB Project’s Technical Module on items such as the development of a set of implementation guidelines and the validation of the interfaces with DVB-IPDC.

Links

- www.dvb-h.org – mobile TV website of the DVB Project; information about service launches; technical documentation
- www.dvb.org – the main website of the DVB Project
- www.etsi.org – all DVB standards are available for download directly from the ETSI website