Handover Algorithm for Hybrid Broadcast Networks

11.1 Introduction

DVB-H is a mobile broadcast standard. There are other different mobile broadcast standards being developed and deployed around the world.

1. Terrestrial - Digital Multimedia Broadcasting (T-DMB)
   - T-DMB is developed in Korea and is based on the DAB standard. DAB already has time slicing features and it was planned to be used in a mobile environment. However, basic DAB’s error protection is insufficient for video services and T-DMB adapts DAB by adding additional error protection, the Reed-Solomon error correction coding. In addition, T-DMB has incorporated AAC+ audio codec.

2. Digital Multimedia Broadcasting - Terrestrial (DMB-T)
   - The core technique of DMB-T is Time Domain Synchronous Orthogonal Frequency Division Multiplex (TDS-OFDM) modulation, at the same time it also implements better FEC (that is LDPC code) and adopts hierarchical modulation structure for different services. At the physical layer, it provides a very flexible channel coding rate with the combination of different modulation constellations to achieve a wide range of bit rates (5 - 33 Mbit/s). DMB-T carries the MPEG-2 Transport Streams containing any combination of video, audio and data. DMB-T chooses the PN sequence as the guard interval of the OFDM symbol to achieve much quicker synchronization (time domain processing). This is very important for the packet switching at a high transmission rate. A similar idea can be found in the WLAN system. DMB-T allows IP multicast and unicast on top of MPEG-2, which lays the foundation of the interactive services. Especially in the IPv6 system, every digital device connected to this network can be assigned an IP address, DMB-T devices can therefore use the IP network for multicasting and unicasting. DMB-T can also work for very high-speed (more than 130km/h) mobile reception with less than 1e-10 BER [14].
3. MediaFlo

- MediaFlo, also called FLO, is a mobile broadcast standard developed by Qualcomm and is expected to be widely deployed within the USA. It is claimed that FLO offers better performance for mobility and spectral efficiency with minimal power consumption. FLO also utilizes Time Division Multiplexing (TDM) to reduce power consumption. The other features of FLO includes: FLO supports the coexistence of local and wide-area coverage within a single Radio Frequency (RF) channel; layered modulation; incorporation of a turbo inner code and a Reed Solomon (RS) outer code [165].

4. Integrated Services Digital Broadcasting - Terrestrial (ISDB-T)

- ISDB-T is developed in Japan and is designed to provide various services, including HDTV, multi-channel SDTV, data services, etc. for portable and mobile reception. ISDB-T is characterized by: flexible use of modulation schemes or hierarchical transmission (digital contents can be simultaneously transmitted with the appropriate modulation schemes and appropriate bit-rates for each type of content integrated in the ISDB stream); use of a control signal that informs the receiver of the multiplexing and modulation configuration; partial reception (some of the services can be received by a lightweight, inexpensive narrow-band receiver) [162].

5. Digital Video Broadcasting - Satellite and Terrestrial (DVB-SH)

- DVB-SH is derived from DVB-T, DVB-H and DVB-S2. It is a transmission system for hybrid satellite and terrestrial digital video broadcasting to mobile terminals. DVB-SH transmission system consists of two parts: a Satellite Component (SC) and a Complementary Ground Component (CGC). The SC ensures geographical global coverage while the CGC provides cellular type coverage. DVB-SH has two different kinds of transmission modes: OFDM mode which is based on DVB-T and TDM mode which is based on DVB-S2. New features incorporated into DVB-SH includes FEC encoding using 3GPP2 turbo code. In the modulation modes, FFT length 1K, 2K, 4K and 8K are specified [89] [90].

6. China Multimedia Mobile Broadcasting (CMMB)

- CMMB is similar to DVB-SH, but developed and specified in China. CMMB is based on the Satellite and terrestrial interactive multiservice infrastructure (STiMi) which is also developed by China. STiMi works in the frequency range 30MHz - 3000 MHz and supports 2MHz and 8MHz bandwidth. It utilizes Low Density Parity Check (LDPC) channel coding and OFDM modulation. Modulation modes BPSK, QPSK and 16QAM are supported [141].

The rest of the chapter is organized as follows: