2nd Generation Cable

The World's Most Advanced Digital Cable TV System

What is DVB-C2?

DVB-C2 is a digital cable transmission system developed by the DVB Project. It uses the latest modulation and coding techniques to enable highly efficient use of cable networks where, up to now, in many cases downstream transmission capacity is already being used to its limit. DVB-C2 will initially be used for the delivery of innovative new services, such as video-on-demand (VOD) and high definition television (HDTV), helping digital operators to remain competitive and also to meet retransmission requirements; in the longer term the migration of current DVB-C services to DVB-C2 is also foreseen.

April 2010 saw the publication of the DVB-C2 specification (EN302769. An updated version is already available as DVB BlueBook A138) and the Implemention Guidelines Document (DVB BlueBook A147). In the same month, the Technical University of Braunschweig performed the first live DVB-C2 transmission, which validated the strong expected performance boost of the new system.

Background

DVB-C was first published by ETSI in December 1994, subsequently becoming the most widely used transmission system for digital cable television. The standard is deployed worldwide in systems ranging from the larger cable television networks (CATV) down to smaller satellite master antenna TV (SMATV) systems. DVB-C is also integrated as the physical layer for the European version of DOCSIS, Data Over Cable Service Interface Specification (EuroDOCSIS: ITU J.222.1).

A range of factors have combined to create the demand for DVB to create a second generation cable transmission standard, as has been the case with DVB-S2 and DVB-T2 for satellite and terrestrial transmission.

- Many CATV networks are already full to capacity
- Operators with high digital penetration need the flexibility to keep their offering competitive
- CATV networks retransmitting content from other networks, e.g. satellite, must keep pace with their evolution
- New tools are needed to address both private and business customers, particularly with IP-based content
- Performance improvements, e.g. zapping time, are needed to increase digital penetration in some markets

As with all DVB standards, the specification is based on a set of Commercial Requirements. Key requirements include an increase in capacity (at least 30%), support of different input protocols, and improved error performance. DVB-C2 reuses some of the building blocks of other second generation DVB transmission systems - the "DVB Family" approach. The new standard was not required to be backwards compatible with DVB-C, although DVB-C2 receivers will be able to also handle DVB-C services.

How does it work?

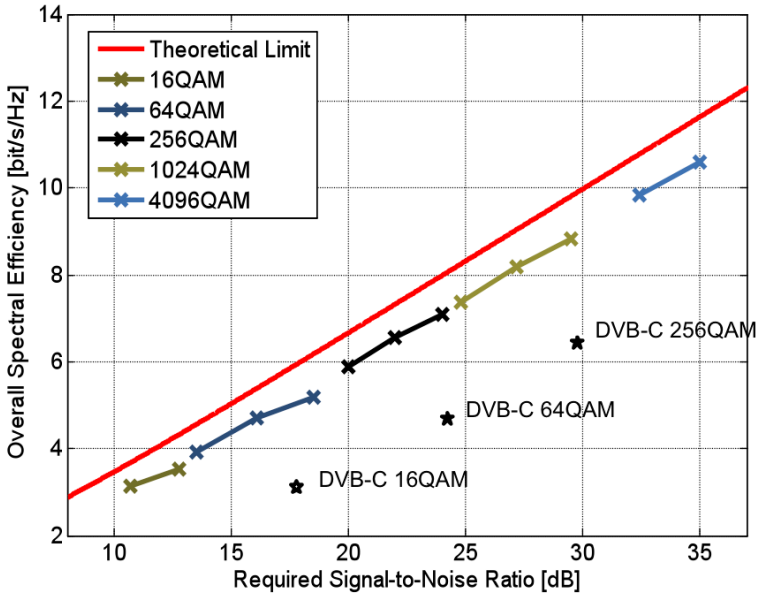
As with its predecessor, DVB-C2 offers a range of modes and options that can be optimised for the different network characteristics and the requirements of the different services planned for delivery to cable customers. (Figure 1. compares the modes and features available in DVB-C and DVB-C2.) By using state of the art coding and modulation techniques it offers greater than 30% higher spectrum efficiency under the same conditions as today's DVB-C deployments. After analogue switch-off the gains in downstream capacity will be greater than 60% for optimized HFC networks.

	DVB-C	DVB-C2
Input Interface	Single Transport Stream (TS)	Multiple Transport Stream and Generic Stream Encapsulation (GSE)
Modes	Constant Coding & Modulation	Variable Coding & Modulation and Adaptive Coding & Modulation
FEC	Reed Solomon (RS)	LDPC + BCH
Interleaving	Bit-Interleaving	Bit- Time- and Frequency-Interleaving
Modulation	Single Carrier QAM	COFDM
Pilots	Not Applicable	Scattered and Continual Pilots
Guard Interval	Not Applicable	1/64 or 1/128
Modulation Schemes	16- to 256-QAM	16- to 4096-QAM

Figure 1. Table comparing available modes and features in DVB-C and DVB-C2

How Does it Work? (cont'd)

The noise performance of DVB-C2 is excellent, coming close to the Shannon limit, the theoretical maximum information transfer rate in a channel for a given noise level. Figure 2 shows the wide range and fine granularity of solutions possible. The chosen COFDM modulation scheme is insensitive to echoes caused by typical in-house coaxial networks and very robust in relation to impulsive noise interference. Notches, both narrowband and broadband, can be used to cope with different interference scenarios. Flexibility in terms of bandwidth is a further important feature of DVB-C2. In the future, cable networks deployed with DVB-C2 will allow very broad signals (e.g. 32 MHz and more) to be transmitted, meeting the operators' requirements for larger pipes allowing a very efficient sharing of the available resources between individual customers and services.



Market Deployment

It is expected that some operators will take advantage of the new DVB-C2 standard as early as 2010, using the extra capacity it offers to enable the delivery of innovative new services including multi-channel HDTV, VOD, and other interactive services. In January 2009 the CTOs of seven European cable network operators representing more than 22 million cable homes released a statement welcoming the development of DVB-C2.

Over time operators will begin migrating services currently delivered using DVB-C to the new system, by replacing the existing receiver population. However, DVB-C2 will coexist alongside DVB-C in many markets for many years. Timetables for analogue switch-off, as well as other regulatory factors, will have an impact on the pace with which operators can conduct such a migration.

Next Steps for DVB-C2

Now that the first professional DVB-C2 products are available, the work for the promotion and implementation of DVB-C2 in new and existing DVB-C markets continues.

Links

www.dvb.org	The main website of the DVB Project
www.dvbservices.com	Register here to download all the DVB and DVB sub-brand logos.