

Fundamentals of DVB and MPEG: From Studio To Receiver

Course Overview

This 3 day technical course focuses on the practical design and development of the digital terrestrial television programme chain from encoding to transmission. The fundamental principles underlying each technology are explained in detail. This theoretical material is enhanced with much practical and anecdotal content based upon the presenter's extensive experience in rolling out the UK Freeview service and involvement in specification and standards bodies.

The full range of appropriate MPEG and DVB standards and specifications are covered, including DVB-T and T2, MPEG2 and 4. Although not yet implemented on the terrestrial platform there is also a look forward to the enhancements promised by HEVC. Practical demonstrations illustrate the principles to provide a complete overview of the various technology elements that make up the complete broadcast system.

Course Programme

The course programme covers:

- MPEG encoding
- DVB multiplexing
- COFDM transmission
- Distribution

Technical Level

This is a technical course and although no prior knowledge of the subject matter is required, the ability to assimilate and understand technical concepts is essential. A technical background in analogue audio-visual and radio frequency techniques is desirable in order to derive maximum benefit from the course. Please contact us if you are unsure about the technical level of this course.

Who will benefit?

This technical course is aimed primarily at engineers, technicians and managers working in the broadcast and consumer electronics industry. It is suitable for both new entrants to the field and more experienced staff with gaps in their knowledge. Technical sales and technical marketing personnel involved in selling and marketing broadcast products and services will also benefit from the course.

Learning outcomes

Upon completion of this course, participants will be able to:

- Understand the need for compression
- Describe modern video and audio compression methods
- Explain trends in MPEG compression
- Understand DVB transport streams
- Explain the need for coded orthogonal frequency division multiplexing (COFDM)
- Understand key coding and modulation principles
- Understand the basic principles of DVB-T2 and the relationship to DVB-T
- Appreciate how standards are implemented in a distribution network

Course Location

The course will be held at the Ubi-Tech training centre or on the customer premises

Course Content

MPEG Encoding (15 topics)

- Need for compression
- Psycho-sensory perception

- Video compression
- Intra-frame compression
- Discrete cosine transform
- Entropy encoding
- Inter-frame compression
- Motion prediction
- Group of pictures (GOP)
- Statistical multiplexing
- Audio Compression
- Sub-band masking
- Temporal masking
- Development trends in MPEG
- MPEG2 > MPEG4 > HEVC
- Key features of HEVC

DVB Multiplexing (17 topics)

- DVB transport stream
- Packetized elementary streams
- Transport stream structure
- Program clock reference (PCR)
- MPEG program specific information
- PAT and PMT
- DVB service information
- Basic syntax
- Overview of SI table types
- Concept of descriptors
- Private tables and descriptors
- SI tables in detail
- Network information table (NIT)
- Service description table (SDT)
- Time and date tables (TDT and TOT)
- Event information tables (EIT)
- Present/following and schedule

COFDM Transmission (16 topics)

- Need for COFDM
- Combatting multipath propagation
- Orthogonality (the 'magic sauce')
- Guard Interval
- Coding principles
- Forward coding
- Time and frequency interleaving
- Modulation principles
- Phase and QAM modulation
- Constellation diagram
- Reference carrier insertion
- Transmission parameter signaling (TPS)
- Overview of DVB-T2 and how it builds on DVB-T
- Enhanced FEC and coding/modulation parameters
- Rotated constellations
- Physical layer pipes (PLPs)

Distribution (3 topics)

- Regionality and the implementation of DVB SI
- Physical distribution network
- Typical transmitting station (including pictures)