Digital Satellite TV Broadcasting (DVB-S)

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DVB-S

What is it?

- It describes the modulation and channel coding system for satellite TV, HDTV for primary. And for secondary the FSS and BSS band.

- It is intended for DTH services who use a Integrated Receiver Decoder.

The Final Frontier

The Standard

- There are two Generations of the DVB-S standard. Standards are done by ETSI and particular in this case the Digital Video Broadcast Project.
  - DVB-S:
    - Was developed from 1993-1997.
    - Defined by European Standard EN 300 421.
    - Just describes the physical link characteristics and the framing. The overload transport stream delivery falls under MPEG-2.
  - DVB-S2:
    - Was developed in 2003.
    - Defined by European Standard EN 302 307
    - The standard was ratified in March 2005.
    - Mainly designed to accommodate larger data rates to provide HDVT, Internet access, and data distribution.

Comparison Table of the two Standards

	DVB-S	DVB-S2
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) 1/2, 2/3, 3/4, 5/6, 7/8	LDPC + BCH 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Modulation	Single Carrier QPSK	Single Carrier QPSK with Multiple Streams
Modulation Schemes	QPSK, 8PSK, 16QAM	QPSK, 8PSK, 16APSK, 32APSK
Interleaving	Bit-Interleaving	Bit-Interleaving
Pilots	Not Applicable	Pilot symbols

Standard Specifics

DVB-S

- Uses the MPEG-2 video standard

DVB-S2

- Uses the MPEG-4 AVC video standard.

For Satellite TV:
- C-band (4-8GHz), 24 channels
- Ku band(12-18GHz), 32 channels
- Bandwidth is about 27-50MHz

Market Estimates

- US market is estimated at $40 billion according to IBIS world report.

- In 2006 it is an estimated 9,396,000 users. At roughly $40 a month plus initial cost of $80 dish and $200 receiver.

- This adds up to about $375 million /month.

Security of DVB-S

- There is a security problem of people modifying the DTH receiver to allow bypass of the scramble system to get subscriptions.

- Uses the ETSI TS 143 020 standard.

- Main concern is to keep the same security standard that is used in terrestrial standards.
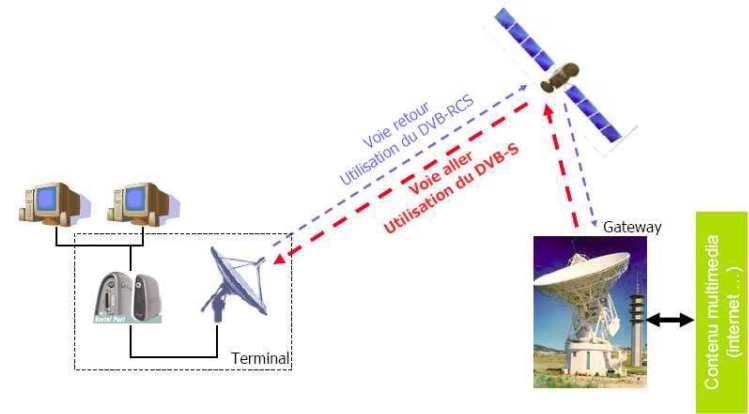
Example Link Budget

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Table A.1 ECS-FI satellite TVRO link budget for London

Parameter	Value		Units
ECS-F1 satellite EIRP	40.0	40.0	dBW
Free-space loss (11.7 GHz)†	−205.65	−205.65	dB
Annual availability	clear weather	99.5%	
Downlink fade depth	−	0.7	dB
Received satellite EIRP	−165.6	−166.4	dBW
Antenna diameter	23.	2.9	metres
Antenna gain	46.6	48.8	dBi
Antenna pointing loss	−0.8	−1.4	dB
Misalignment/ageing losses	−0.2	−0.2	dB
Waveguide losses	−0.3	−0.3	dB
Received carrier power	−120.4	−119.5	dBW
Boltzmann constant	−228.6	−228.6	dBW/Hz/K
Received carrier power	108.2	109.1	dBW
System noise temperature	22.3	23.2	dBK
Receiver bandwidth	74.3	74.3	dBHz
Received C/N ratio	11.6	11.6	dB
Received weighted S/N ratio	42.3	42.3	dB
CCIR grade 4 required S/N ratio	42.3	42.3	dB
Link margin	0.0	0.0	dB

† The uplink free-space loss includes a 0.11 dB clear-weather fade

References

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