

### Overview

DVB-S2 Adaptive Coding and Modulation (ACM) converts satellite link margin into useful bandwidth by dynamically adapting the strength of error correction applied to the satellite data stream to match the link conditions. This results in a variable data rate, which at any moment in time is the optimal throughput level for the prevailing channel conditions. Links using ACM have seen throughput increases of over 100%.

ACM allows links to continue to operate even during exceptional deep fades, albeit at reduced throughput levels.

Paradise DVB-S2 ACM is supported for IP point-to-point bidirectional links and can be used to optimize the forward link and, optionally, the return link at the same time. It works at all DVB-S2 data rates in all Paradise Quantum and Vision modems. No additional hardware is required.

### Novel Approach

Paradise undoubtedly has the easiest-to-use ACM system on the market. Simply set up your satellite link as normal, including the return link, and switch on ACM. It couldn't be easier. The groundbreaking Paradise ACM control software handles every conceivable link problem and decision automatically, so you don't have to.

Once the satellite link is established, the built-in ACM controller automatically adjusts modulation and FEC settings to maximize throughput, using channel-condition information fed back from the receiver. There is no re-acquisition process at the receiver when these changes to the service are made - changes are accommodated seamlessly without interrupting or degrading the service. The satellite transponder is also unaffected by changes to the service, as a constant symbol rate and fixed power is always maintained. In relation to bit error rate, Paradise ACM is designed to provide error free performance at all times.

Quantum modems can use either a conventional SCPC return channel or a DVB-S2 return. ACM itself consumes virtually none of the bandwidth of the return channel, which can be set for user data as required.

### Integrated IP Suite

Paradise modems support an extensive suite of IP features including TCP acceleration, header compression, traffic shaping/Quality of Service, bridging, dynamic routing, VLAN trunking, web pre-fetch, etc. These have now been integrated with ACM to adapt to data rate changes in a controlled manner.

In particular, traffic shaping allows bandwidth to be allocated to specific IP streams in a precise way - bandwidth for high-priority streams can be guaranteed and any excess bandwidth can be distributed between competing streams as required. The nature of ACM means that the link data rate can increase or reduce at any time and the use of a sophisticated traffic shaper avoids the alternative of a free-for-all, where packets are passed or dropped at random. At a lower level, upstream flow control is also exercised in order to avoid packet loss for fading links.

### Options

DVB-S2 ACM is available as a Software Activated Feature (SAF) option:

- ▶ Operation up to 2Mbps.
- ▶ SAF upgrade to 5Mbps.
- ▶ SAF upgrade to 10Mbps.
- ▶ SAF upgrade to 20Mbps.
- ▶ SAF upgrade to 60Mbps.
- ▶ SAF upgrade to 100Mbps.
- ▶ SAF upgrade to 155Mbps.

Note that ACM operation is subject to the prevailing data rates available in the modem.

ACM operation supports the use of all DVB-S2 modulation and FEC rates from QPSK 1/4 up to 16APSK 9/10.

DVB-S2 ACM is fully compatible with Paired Carrier.

### Availability

- ▶ Available as a field software upgrade on all existing Quantum and Vision modems.
- ▶ Also available on the new Quantum PD155i modem/router.