



## Features

- Up to 1Gbps: 5 x 200 Mbps Forward Links\* capacity with 5:1 redundancy
- Up to 3 x 240 Mbps Return Links per rack\* capacity
- Multi-transponder, multi-satellite support
- Geographical redundancy and satellite roaming
- Support for up to 45,000 terminals
- Return Channels: A-SAT-II™ Multi-Mode DVB-RCS, DVB-RCS2 and/or BM-SCPC, and/or DVB-S2 SCPC network architecture support
- Up to 13.122 Mbps inbound per carrier in MF-TDMA and up to 20 Mbps in SCPC Mode of operation
- DVB-S2/DVB-S2X CCM/VCM/ACM outbound maximizes bandwidth efficiency
- Optimized for IP and multi-media content
- Open standard design: DVB-RCS and DVB-RCS2 for Return Links; DVB-S, DVB-S2 and DVB-S2X for Forward Links
- Qualified with multiple IP/DVB broadcast platform vendors
- Interoperable with 3rd party SatLabs certified modems/routers and DVB-S2 modems/routers
- Unique and powerful multi-carrier demodulation (MCD) technology
- World-class scheduling efficiency, maximizing bandwidth utilization up to 100% even in multiple oversubscription scenarios
- Always-on network
- User-friendly Network Management System (IMS)
- VCM/ACM, group QoS, TCP and HTTP acceleration features are standard
- Optional full Mesh: both TDMA or SCPC-DAMA modes of operation (peer-to-peer) connectivity
- Optional header and payload compression, caching and pre-fetching

## Overview

Advantech Wireless, a world leader in broadband satellite communications for the last 15 years, offers the two-way, open standard DVB-RCS and DVB-RCS2, broadband satellite access system. DVB-RCS Hub, and in particular its Return Link Sub-System (RLSS), is at the heart of the broadband access system.

Hubs are turn-key systems which can be installed in hours rather than days to enable a wide range of public and/or private network topologies with satellite interactive terminals.

The RLSS is a modular Hub sub-system which can be integrated with new or installed IP/DVB broadcast platforms and IP switch/routing equipment to provide two-way satellite broadband access services.

The RLSS is designed to receive inbound traffic, handle inbound and outbound signalling, schedule and control networks of satellite interactive terminals (available from multiple suppliers). A single scalable RLSS unit can support networks ranging from just tens to tens of thousands of simultaneously logged-on terminals.

The FLS150 is the outbound equivalent of the RLSS. The FLS150 takes IP traffic and using Multi-Protocol Encapsulation (MPE) transforms the data into an MPEG-TS format or the latest standard Generic Stream Encapsulation (GSE) for transmission on the outbound using its embedded DVB-S2/S2X modulator in CCM/VCM or ACM mode of operation.

# Discovery 300 DVB-RCS VSAT Hub

## System Costs

For the like-for-like performance comparisons, Advantech Wireless offers the best price/performance ratio for both CapEx and OpEx, hence yielding the best Total Cost of Ownership (TCO). Our Hubs and Terminals are highly flexible and several different network architectures are possible. Some key features of the DVB-RCS/RCS2 Hub include:

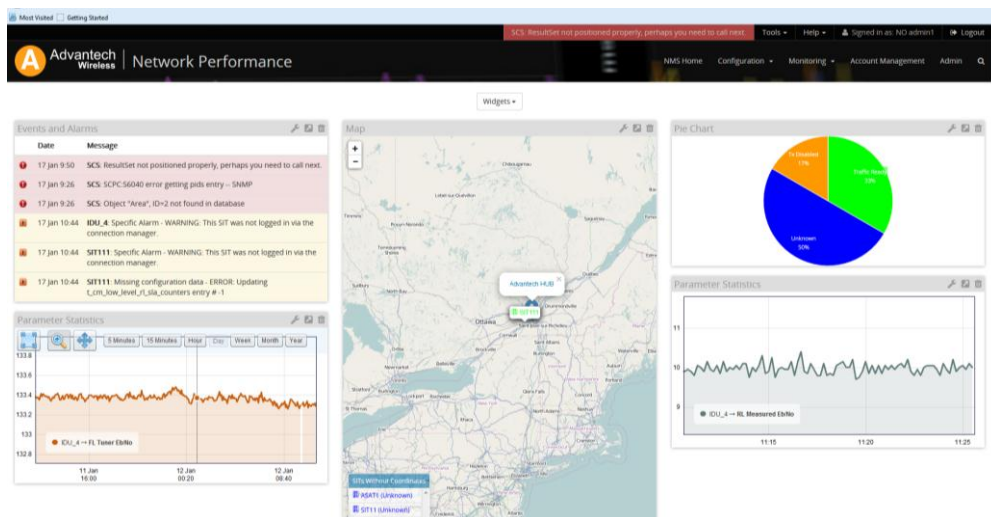
- Multi-carrier demodulation (MCD) card upgradeable up to 96 carriers by remotely installed software license.
- Frequency independent—hubs, terminals and onboard processors interface in L-band and can be operated in C, X, KU and Ka frequency bands (or any combination of these).
- Satellite versatility—the system can operate with the forward and return link on the same satellite, same frequency band, same satellite, different frequency bands, or on different satellites and can seamlessly roam (rapidly switch) from satellite to satellite in make-before-break fashion.
- Multi-mode System capability- As our MF-TDMA Scheduler is two dimensional, it can reassign frequency domain carriers and time bursts every 26.5ms and evolves the DVB-RCS(2) standard one step further by allowing for a centrally managed hybrid DVB-RCS(2), BM-FDMA™ (BM-SCPC) and continuous mode SCPC-DAMA network.
- Terminal diversity—networks can support receive-only satellite routers at the same time as two-way satellite routers (terminals), as well as both mesh and star topologies of terminals.
- Network Architecture supported – DVB-RCS(2), DVB-S2SCPC, Multi-mode (DVB-RCS(2)/DVB-S2SCPC), Mesh/ Star, satellite On-Board-Processing (OBP).

Advantech Wireless' entire system, as well as the DVB-RCS/RCS2 standards, have been designed to minimize the cost of scaling a broadband access network from terminal populations as small as a few terminals to tens of thousands.

Performance of access layer protocols is highly dependent on traffic profile. Advantech Wireless' implementation of the MF-TDMA access scheme, utilizing dynamic assignment techniques including CF-DAMA, has been specifically designed and tuned for multi-media traffic, hence yielding near 100% channel throughput with no blockage. In comparison, other VSAT systems are **drastically less dynamic and less flexible**. The Advantech Wireless 26.5ms TDMA superframe length is the shortest in the industry resulting in unparalleled dynamic response to the changing traffic requirements in any broadband network.

## IMS100

Advantech Wireless' has responded to market demands by developing a powerful network management system capable of meeting the functional and scalability requirements of a variety of system configurations. The Hubs feature the IMS100, which provides Hub & Network Operator Tools, Service Provisioning Tools and Multiple User Interfaces. The management of SLAs, Return Link and Forward Link Quality of Service (QoS) and the daily management of remote satellite routers is made easy with the use of the IMS100.



**Advantech Wireless Network Management System - Network Performance**

# Discovery 300 DVB-RCS VSAT Hub

**Advantech Wireless Network Management System - Hub Configuration**

**Advantech Wireless Network Management System - Hub Equipment M&C**

## Advantech Wireless Multi-Mode Architecture A-SAT-II™





The Advantech Wireless multi-mode connectivity offering revolves around taking the DVB-RCS/RCS2 standards and evolving it one step further. The Advantech multi-mode approach delivers open standard benefits to fixed and mobile users. The S5420 VSAT terminal has the ability to reconfigure Return Link waveforms between continuous mode SCPC-DAMA DVB-S/S2/TCC (CM-SCPC) and DVB-RCS/RCS2 (MF-TDMA), as well as the burst mode DVB-S2X like SCPC BM-FDMA™ (BM-SCPC). The acquisition of the BM-FDMA is as fast as MF-TDMA and has variable LDPC block size (from 808 bps to 16Kbps) to minimize the latency for small data rate channels. On the other hand, the DVB-S2X CM-SCPC waveform has the lowest S/N for the given data rate and hence the highest spectral efficiency of the physical layer, if a channel is loaded continually, like video streaming or G.702/G.703 and 3G/4G backhauling. Multi-mode operation brings an extra dimension to networks where the need for SCPC connectivity is frequent within the population of terminals but occasional at the individual terminal level.

# Discovery 300 DVB-RCS VSAT Hub

The hub provides the forward link DVB-S2(X) modulated service to the multi-mode terminal using the open standard DVB-RCS(2) return link. The return link operates typically in DVB-RCS or RCS2 mode but can switch to a DVB-S/S2/TCC SCPC mode through the hub station NMS which provides centralized management of the system. The switching mechanism, on the return link, between the DVB-RCS MF-TDMA system and the DVB-S/S2/TCC SCPC modes is based on the customer chosen switching algorithms and thresholds that are fully configurable to a variety of triggers and can be commanded by the hub Operator.

The Multi-Mode solution, with its scalability and flexible mix of DVB-S2 SCPC and DVB-RCS terminals, offers a very cost-competitive solution for any size network. With the addition of the Mesh (optional) capability, Advantech Wireless offers a powerful network architecture that can meet the most demanding requirements for virtually any application.

## Advantech Wireless Hub Systems Offerings

	Discovery 100	Discovery 200	Discovery 300	Raptor
				
	<b>Standard Rates Supported</b>			
Forward Link Mbps*	Up to 200	Up to 3 x 200	Up to 5 x 200	200
Return Link Mbps*	Up to 48	Up to 144 (3x48)	240 (5x48)	32
# of remote routers (Terminals) Supported	Up to 500	Up to 1,500	Up to 45,000	Up to 500
*Maximum. Other rates are available on special order.				

# Discovery 300 DVB-RCS VSAT Hub



## Air Interface—Outbound

Modulation  
Information Rates  
Encapsulation  
Coding  
Forward Link Roll-off

DVB-S2, DVB-S2X, CCM/VCM/ACM,  
DVB-S2: QPSK, 8PSK, 16APSK, 32APSK (DVB-S2), DVB-S2X: 64APSK  
Up to 200 Mbps (from 1Msps to 45Msps)  
IP over MPEG with section packing (MPE), GSE or HDLC  
LDPC concatenated with BCH  
0.05, 0.10, 0.12, 0.15, 0.20

## Air Interface—Inbound

Modulation  
Burst Info rates  
Encapsulation  
Coding  
Return Link Roll-off  
Carrier Spacing

MF-TDMA or SCPC, both burst and continuous modes  
BPSK, QPSK, 8PSK, 16APSK  
64 kbps—13.122 Mbps  
IP over ATM or MPEG, RLE or GSE Multiple Access methods (waveforms)  
Turbo Coding or LDPC/BCH  
0.15, 0.20, 0.25,  
Same as Roll-off factors listed above

## MAC Layer—Outbound

Protocol  
QoS  
Capacity Requesting

RIP-1, RIP-2, BGP, OSPF, MPLS  
9 levels based on ACM MODCOD and 5 levels based on priorities  
QoS based assignment due to ACM capacity change

## MAC Layer—Inbound

Protocol  
QoS  
Capacity Requesting  
Bandwidth on Demand  
(Return Link)

CF-DAMA (Combined Free & Demand-Assigned Multiple Access)  
Constant Rate Assignment (CRA), Volume Based Dynamic Capacity (VBDC),  
Rate Based Dynamic Capacity (RBDC), Free Capacity Assignment (FCA)  
0-13.122 Mbps updated every 26.5ms, framed in 1 or 2 ATM (16kbps or 32  
kbps) or 1 MPEG packet (56,75kbps), RLE; with in-band and out-of-band  
capacity requesting mechanisms

## Interfaces

Network  
NMS

IP over Ethernet (10/100/1000BaseT)  
NetManager™, web interface control, remote terminal management, VNO,  
Optional Northbound Interface and Billing System  
Integration of 3rd Party Equipment—through standard SNMP interfaces  
Frequency Independent (can use any combination of C, X, Ku or Ka-band etc.)  
Can interface with any band at L-band frequency

Tx & Rx

## RLS400 Expansion Options

Additional Return Link  
Carriers and Rates  
Maximum number of MCDs  
Up to 3 chassis per Rack  
(15 MCD)  
Additional Terminals  
Units/Racks

Demodulator is programmable up to 96 carriers per MCD Card, at rates from  
64 kbps—13.122 Mbps up to a maximum total of 48 Mbps per MCD card  
5 MCD per RLS400 chassis (4RU)  
Each additional demodulator can provide up to 48 Mbps of throughput  
  
Each additional processor can support hundreds to thousands of terminals  
Non-redundant and redundant Hub solutions available in standard rack  
configurations  
The RLS400 is assembled in standard 19" telecom racks  
All RLSS functions are housed in the same unit  
Scaling involves adding additional cards, then additional units and then  
additional racks as required to expand terminal and throughput capacity

## FLSS Expansion Options

Additional Forward Link  
Transport Streams and Rates

Up to 5 Forward Links supported plus one Hot STDBY (1:5 Redundancy)  
Each forward link symbol rate is from 1Msps to 45Msps up to 200 Mbps, softkey  
controlled  
Up to 6 FL per rack with 1:N redundancy (5 working and one Hot STDBY)

# Discovery 300 DVB-RCS VSAT Hub



## Included Features

Fade Countermeasure  
PEP & Compression  
VoIP  
Multicast

VCM/ACM, ClearSky™  
TCP/HTTP Acceleration & Header and Data Compression  
Virtual Telephony™, Advanced QoS, C2P (CCP)  
From hub or from behind remote

## Options

Redundancy  
Multiple Satellites/Beams  
Network Architecture  
Geographic Redundancy

Non-Redundant, Hitless Hot 1:1 Redundant, 1:N Redundant  
Designed to support multiple transponders, satellites in mix of frequencies  
MF-TDMA, SCPC, Multi-mode (DVB-RCS(2)/DVB-S2 SCPC), Mesh/Star  
Automatic switchover between same satellites through geographically redundant gateways

Satellite Roaming

Fast automatic switchover and roaming between different satellites from the same gateway or through geographically diverse gateways

Scalability

Scalable forward & return link capacities and number of supported remotes

Mesh

Mesh overlay

Higher Layer Protocol Options

IPSec/VPN, VLAN, Transec

Access Technology

MF-TDMA, SCPC, A-SAT™

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