

U7900 – High-Performance 500 MHz DVB-2X/DVB-RCS2/WaveSwitch Satellite Networking Appliance Modem/Router/Bridge Optimized for GEO, MEO and LEO Satellites

The U7900 is a professional satellite modem designed for hybrid operation across GEO, MEO, and LEO satellite constellations, seamlessly integrating with the ESTELLA VSAT platform to deliver high performance connectivity over High Throughput Satellite (HTS) networks and LEO and MEO Constellations. Fully compliant with the DVB-RCS2 open standard, the modem incorporates SpaceBridge's innovative WaveSwitch™ technology, enabling error-free dynamic switching between TDMA and SCPC return link waveforms to maximize spectral efficiency and optimize network performance under varying traffic and weather conditions. With support for both Layer 2 and Layer 3 networks, the U7900 provides exceptional deployment flexibility for a wide range of mission-critical and commercial applications, Homeland Security, Defense, Enterprise, Cellular Backhaul (CBH) and Government fixed, mobile and on-the-move communications

The U7900 is a high-performance TDM/MF-TDMA/BM-FDMA L2/L3 satellite modem/switch/router receiving up to 1500 Mbps and delivering up to 200 Mbps downstream and 100 Mbps upstream throughput. Supporting the OpenAMIP standard and DVB-RCS2 Annex M-compliant multi-beam mobility technology, it enables seamless beam switching and uninterrupted connectivity for maritime, land-mobile, airborne and other mobility applications across HTS and multi-orbit satellite networks. With integrated L2/L3 optimization, the U7900 is ideally suited for LEO/MEO/GEO; cellular backhaul and enterprise networks, featuring cellular traffic compression, 4G/LTE/5G GTP acceleration, and satellite optimization of IP traffic transported within VLANs and Layer 2 tunnels

Key Features and Applications,

- 500MHz DVB-S2X forward link. Highest spectral efficiency via highly granular MODCODs, low roll-off rates and Adaptive Coding and Modulation (ACM)
- DVB-RCS2 MF-TDMA return channels supporting QPSK to 16QAM, roll-off from 5% to 25%. The optional DSSS, BPSK and 32/64QAM supported. The modem dynamically transmits the optimal waveform, adapting burst size, MODCOD, roll-off and transmit power every frame to maximize spectral efficiency, capacity, and throughput. Up to 1000 carriers could be assigned from the Hub
- SpaceBridge WaveSwitch™ RL waveforms outperform SCPC spectral efficiency as it assigns BW on frame-by-frame to max MODCOD and minimize symbol rate for requested capacity, returning unused capacity back to the pool of frequencies, having fixed latency and very low jitter
- WaveSwitch™: Hitless (error-free), dynamic switching between 3D-TDMA and dSCPC services could be accomplished every 26.5msecs
- Traffic optimization: PEP/QoS, enhancing user experience and conserving satellite bandwidth
- Layer-3 routing and Layer-2 bridging, CBH optimization for easy integration with MNOs
- Cellular backhaul and enterprise traffic optimization ideal for 2.5G/3G/4G and LTE/5G
- Optional: Cellular traffic decryption/GTP acceleration/encryption and HD/PL compression

Applications: True broadband capabilities for L2/L3 applications ranging from SMB office, productivity, Multi-dwelling units to high traffic use urban communities connectivity;

- LEO/MEO/GEO for heavy users such as Enterprise and mission-critical connectivity;
- High capacity 2.5G, 3G, 4G and LTE/5G Cellular Backhaul links;
- Satellite-as-Backup for Critical Communications



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FORWARD LINK (Rx)

Instantaneous Bandwidth	Up to 500 MHz
Frequency Range	950-2150 MHz
Waveforms	DVB-S2/S2X: SS-BPSK, BPSK, QPSK to 256 APSK, all Code Rates
FEC	LDPC/BCH, Short and Normal Frames
Symbol Rate	Up to 476 Msps
Encapsulation Modes	GSE and GSE-Lite (Optional for DVB-NIP)
Link Variation Mitigation	Adaptive Coding Modulation (ACM)
Roll-off/ Spacing	5%, 10%, 15%, 20%, 25%
Input Connector	F-type, female, 75 Ohm
Terminal IF RX Interface	L-band, satellite independent DiSEqC: LNB power/freq. selection OFF/13VDC/18VDC, 22KHz tone

RETURN LINK DVB-RCS2 MF-TDMA (Tx)

Waveform Technology	DVB-RCS2, all MODCOD and WaveSwitch™
FEC	16-state 2D-Turbo Φ
MODCOD	QPSK, 8PSK, 16QAM, all Coding Rates Optional: DSSS-BPSK, BPSK and 32/64QAM
Synchronization	NCR/PCR integrated
Encapsulation	RLE Encapsulation
Symbol Rate	From 160 Ksps to 36 Msps
Roll-off/ Spacing	5%, 10%, 15%, 20%, 25%, 35%
Link Variation Mitigation	• Built-in Uplink Power Control (ULPC)
Dynamic Rate Assignment (DRA)	• Adaptive return carrier sizing every 26.5msecs • Adaptive Symbol rate/block size, MODCOD and power every timeslot every 26.5msec
Tx Power	-30 dBm to 0 dBm
Connector	F-type, female, 75 Ohm,
Terminal IFL TX Interface	900~2400 MHz satellite band independent, BUC 10MHz reference ON/OFF BUC Power – On/Off 100W@ 24V DC

Return Link WaveSwitch™ (Tx)

dSCPC	SpaceBridge's proprietary BM-FDMA dynamic SCPC delivers higher efficiency than conventional SCPC. The Hub Scheduler continuously analyzes each subscriber's bandwidth demand and, every 26.5 ms, assigns one of up to 1,000 dedicated carriers with the minimum required symbol rate and the highest sustainable MODCOD. This provides up to 112% higher spectral efficiency than TDMA while also delivering statistical multiplexing gain by dynamically returning unused bandwidth to the shared pool
Dynamic Rate Assignment	WaveSwitch™ assigns to dedicated carrier max possible MODCOD every 26.5 msec
WaveSwitch™	WaveSwitch™ performs error-free switching between 3D-TDMA and BM-FDMA dSCPC

Symbol Rate	Rate 200Ksps to 36Msps
MODCOD	QPSK, 8PSK, 16QAM, all Coding Rates Optional DSSS-BPSK, BPSK and 32/64QAM

QoS, PEP and IP Performance

QoS	Multi level, up to 8 flows QoS, based on ToS/DSCP, IP addresses, protocol and ports L2/L3 and GTP Performance Enhancement Proxy (PEP), compresses streams and significantly reduces return link TCP ACK (improves return link utilization and saves up to >50% return link ACK related bandwidth)
Application Optimization	
Authentication	X.509 Certificate-based Authentication
Security	Optional: IPsec encryption up to AES256
Packets/second	2,000,000 pps
IP Stack	Dual IPv4/IPv6 stack
Routing architecture	Layer 3 routing and Layer 2 switching or bridging mode, multibeam roaming
OpenAMIP	Doppler compensation, Geofencing with preloaded coverage maps,
Redundancy	L3 and L2 self contain redundancy, no external equipment required, redundant PS
Freq. bands	C (spectral inversion), X, Ku (App30B and Extended), Ka, including GEO/MEO/LEO satellites

TRAFFIC PORTS AND PERFORMANCE

Interfaces	User: 4 x 1/10GbE SFP+; 4 x 2.5GbE; MGMT: 2.5GbE; USB3; USB2 RS232 (RJ45)
Download speed	Up to 200Mbps
Upload Speed	Up to 100Mbps
Packet Processing	2Mpps with full QOS and PEP enabled, 1Mpps with IPsec enabled
Network Services	• Support Layer-2 and Layer-3 traffic modes at the same time • Layer 2 VLAN and bridging • Layer 3 NAT, DHCP server • IP Routing

Environmental and Mechanical

Form factor	Indoor 1U rack-mount enclosure
Dimensions (WxHxD)	17.125 x 1.75x 10.7 inches 435 x 45 x 272 mm
Weight	7.5 lbs (3.4kg)
Power	• 24V DC input: Dual fuse protection supporting 50W to U7900 modem and LNB and up to 100W to the BUC. • Option: 100-240VAC, 47-63 Hz
Operating Conditions	32°F to 122°F (0°C to 50°C)
Relative Humidity	10% to 90%, non-condensing