ESTELLA™ RLS4 – Return Link System/Multi-Channel Demodulator MCD4L

ESTELLA™ HUB Return Link System is an essential component of SpaceBridge scalable VSAT platform, providing IP and native L2/L3 most effective and BW efficient multiservice satellite networking solution to ISPs, enterprises, mobile operators and governments around the world that increases the RL throughput from 150% to 350%

The ESTELLA™ RLS4L is SpaceBridge's high-capacity Return Link System capable of delivering massive IP and L2/L3 return link capacity with support for tens of thousands of remote User Terminals. It supports the DVB-RCS2 MF-TDMA and WaveSwitch™ carriers up to 128 Msps. Key to the RLS is the SpaceBridge wideband Multi-Channel Demodulator Version 4L (MCD4L) which in combination with Packet Engine, consisting of Network Control Center (NCC) and Packet Handling System, performs essential burst demodulation, decoding and optional decryption for each timeslot per carrier.

Features and Benefits

- Two separate L-band 950-2400MHz interfaces allows each MCD4L to connect to wideband HTS, connect to 128Msps contiguous or dis-contiguous channel(s) on a polarity, or even connect to both satellite polarities at the same time. Optional DIFI interface.

Wideband burst receiver

- MCD4L supports 128Msps across a single continuous or non-contiguous L-band interfaces
- Burst TDMA receive carriers can be defined as small as 160ksps to as large as 128Msps,
- Ability to support from 1 up to 800 carriers over the entire band.
- Massive return capacity: up to 650Mbps

Spectral efficiency

- MCD4L supports 16-state Turbo-Phi FEC and modulations from DSSS-BPSK to 64QAM, supporting 140 Waveforms and providing high spectral efficiency up to 5.14bps/Hz, lowest RSL threshold with constant delay and extremely low jitter
- MCD4L AI modern algorithms and filtering allows for carrier spacing as tight as 5% for all MODCODs, providing lowest occupied BW within the VSAT return technology range.

MODCOD On-Demand and Fade Mitigation

- RLS4L supports standard DVB-RCS2 and SpaceBridge's proprietary advanced WaveSwitch™ with 140 Waveforms combinations available within the Direct Sequence Spread Spectrum BPSK/QPSK (DSSS-BPSK/QPSK) 8PSK/16/32/64QAM modulations.
- In conjunction with the NCC and the remote VSAT User Terminals, the MCD4L performs burst per burst "Virtual Link Budget" analyses to provide the best fit adaptive Symbol Rate and MODCOD assignment and per Super Frame RL ACM to provide highest flexibility, highest return link efficiencies and superior protection for fade mitigation.

WaveSwitch™ mode

- SpaceBridge's DVB-RCS2 enhancement which allows to operate shared or dedicated carrier services with SCPC required services while on the same Platform, providing SCPC-like latency, low jitter and efficiencies >99%
- Ability to jump error free from DVB-RCS2 MF-TDMA to WaveSwitch™ every 20 or 26.5 msec.

Redundancy Mode

- 1:1 redundancy: Operate in load balance mode or as fully active standby failover
- N:1 redundancy: cost savings for larger HUBs with MCD4L redundancy managed by NCC.

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ALL THINGS CONNECTED

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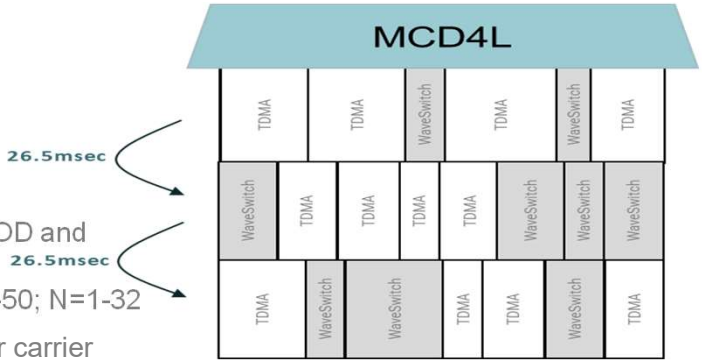
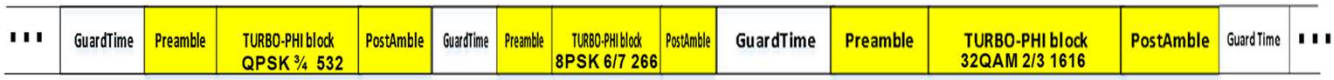
Specifications

DVB-RCS2 Open Standard Benefits:



Dynamic carrier sizing (Symbol Rate), MODCOD and Block Size allocation across MCD4L RF input every 20xM msec or 26.5xN msec, there M=1-50; N=1-32

Dynamic Wavefroms per timeslot, per site, per carrier



SpaceBridge RCS2 enhancement WaveSwitch™ - Dynamic switching between MF-TDMA to high efficiency dedicated carrier with extreme low overhead/jitter, optimizing site power & spectral efficiency.

Burst Demodulator Characteristics

Modulation	16-state Turbo (Turbo-PHI): DSSS-BPSK, BPSK, QPSK, 8PSK, 16QAM, 32QAM, 64QAM
Carrier Options	DVB-RCS2: 160 ksps to 128Msps WaveSwitch: 200 ksps to 128Msps
Number of Carriers	Up to 800
Processing Bandwidth	128 Msps or 134.4MHz at RO 5%, 173MHz at RO 35%
Data Throughput	650 Mbps
Number of terminals	Based on configuration: up to 9,600 simultaneously logged-in UT per MCD4L

Satcom Air Interface(s)

Frequency Range	950MHz to 2400 MHz (DIFI optional)
Input Level Range	<-77 to -21dBm
Input Noise Power Density: -	123dBm/Hz + 8dB/-5dB
Number of L-band Inputs	2, each could process 600MHz
Isolation between Inputs	>35 dB
RF Connector Type	SMA (F), 50 Ohms
Return Loss	> 12 dB
Carrier Signal to Noise ratio	-15.6 to +18.5 dB (lowest is DSSS, spreading factor 16, BPSK, Rate 1/3; highest 64 QAM, Rate 6/7)
Input level Dynamic Range	>35 dB
10 MHz Ref Clock and Connector	-5 to +15 dBm, sinus reference input, BNC (F), 50 Ohms,
1 PPS Input	BNC: 1PPS input TTL/50 Ohm
NTP/PTP	RJ45 (100/1000/10GBT)

Data Interface

User Data Interface	2 x RJ45 (10GBT), or 2 x 40GBT (SFP)
MGMT Interface	2 x RJ45 (100/1000/10GBT)
Monitor and Control	Web Server (HTTPS) Syslog (encrypted)

Traffic Enhancement and Security

QoS	Up to 256 queues, based on TOS/DSCP, IP addresses, protocols and ports
CBH Application Optimization (Xiplink inside)	L2/L3 and 4G/5G header decompression, packet coalescing to reduce 2G/3G overhead of cascaded IP addresses. Acceleration in GTP tunnels
Encryption	Optional: Up to AES256

Mechanical

Form factor	Server format
Dimensions (WxHxD)	19 " x 3.5" x 26"
Weight	8 kg
Power	90-130VAC & 180-260VAC, 47-63 Hz, 477W max
Operating Conditions	0°C to 50°C
Storage Conditions	-20°C to 85°C
Relative Humidity	10% to 90%, non-condensing
Certifications	CE, FCC, ROHS, RCS2: ETSI EN 301-545-2