**EL470**

**IP Satellite Modem**

**Elevation Product Family**

**Description**

The EL470 is a state-of-the-art satellite modem designed for the transmission and reception of IP streams over satellite at rates of up to 133 Mbit/s in full compliance with the DVB standards. The EL470 modem connects directly to terrestrial IP network infrastructures via a dual auto-switching Gigabit Ethernet interface.

The EL470 comes with several hardware and software options and can be used in Point-to-Point links as well as in Point-to-Multi Point networks. It is compatible with a wide range of encapsulation protocols: data piping, MPE, ULE, GSE (Generic Stream Encapsulation) and Newtec’s XPE (Extended Performance Encapsulation).

The EL470 is capable of receiving DVB-S2 Multistream and VCM signals and can optionally transmit in VCM mode. For maximum bandwidth efficiency, the EL470 can also be used in Adaptive Coding and Modulation (ACM) mode, modifying the modulation parameters dynamically in function of the link conditions. The modem incorporates the renowned FlexACM® technology which fully optimizes the satellite link at optimal availability.

At the output of the modulator, the signal is available on an L-band interface. Extended L-band, IF-band as well as BUC power supply and reference frequency are available as configuration options, providing a compact and cost effective solution.

The EL470 has a dual L-band input. The active input is selected by the user and can provide DC power and frequency band selection signals compatible with most professional and commercial LNBs. Optionally, one L-band input can be replaced by an IF input.

The integrated Noise & Distortion Estimator (NoDE) tool provides an accurate reading of the satellite link margin even in presence of non-linear distortion and allows the user to find the optimum input back-off setting very easily for 16APSK or 32APSK operation, whether or not non-linear predistortion is applied.

Clean Channel Technology™ is available on the EL470 IP modulator as an option. Clean Channel Technology™ further improves satellite efficiency by up to 15% compared to the current DVB-S2 standard. Newtec’s customers will be able to immediately benefit from Clean Channel Technology, as it is available as a software field upgrade for existing Newtec equipment.

**Key features**

- DVB-S2 and DVB-DSNG/S compliant
- QPSK, 8PSK, 16APSK and 32APSK
- XPE, GSE, ULE encapsulation
- Data rates up to 133 Mbit/s in each direction
- Adaptive equaliser (demodulator input)
- L-band monitoring output
- Programmable amplitude slope equalizer (L-band output)
- Noise & Distortion Estimator (NoDE) tool
- DVB-S2 Multistream
- Optional extended L-band
- 2 Mbaud for low rate applications
- Optional VCM and ACM operation
- Optional embedded point-to-point ACM controller and ACM client (FlexACM™)

**Main advantages**

- Lower operational costs thanks to highest bandwidth efficiency
- Highest bandwidth efficiency through the most efficient IP encapsulation protocols.
- Integrated hardware and software offering for end-to-end solution
- Secure and encrypted satellite transmissions
- High versatility and flexibility
- Fit for operations over Inclined Orbit Satellites

**Applications**

- Corporate networks
- IP Backhauling
- IP Trunking and Backbone
- Government and Defence networks

**Related products**

EL170 IP satellite modulator
EL178 High speed IP satellite modulator
EL478 High speed IP satellite modem
EL940 IP satellite receiver
EL970 IP satellite demodulator
EL978 High speed IP satellite demodulator
EL8xx Protocol Enhancement Proxy IP appliances
AZ7x0 Frequency converters
AZ2xx Universal Switching System

**Related Documents**

White paper Equalink™
White paper optimization of satellite capacity
Care Pack Brochure
Reference cases
Application notes
Specifications – EL470(R9)

Input/output interface
- Auto switching 10/100/1000Base-T Ethernet interface
- Maximum rate: 133 Mbit/s in each direction, or 200 Mbit/s in each direction per second Tx + Rx
- Layer 2 bridge mode: Ethernet frames over satellite
- Layer 3 bridge or router mode: IP packets over satellite
- Supported encapsulation modes:
  - Data piping
  - Ultra Lightweight Encryption (ULE)
  - Multi Protocol Encryption (MPE)
  - Extended Performance Encryption (XPE) - Newtec's highly efficient encapsulation protocol for the encapsulation of Ethernet/IP frames in DVB-S2 base-band frames
- Generic Stream Encapsulation (GSE)
- Filtering and routing capabilities (uplink):
  - Up to 32 VLAN filters
  - Up to 255 MAC filters
- To 255 IP routes/air-MAC addresses
- To 256 PID filters
- Up to 16 DVB-S2 Streams
- Data filtering (downlink):
  - Up to 32 streams in DVB-S2 Multistream
  - Up to 32 configurable PID filters
  - one air MAC address filter per PID or stream
- Proxy ARP support
- Base Band Frame Input/Output (Optional)
- AES 64 bit encryption

Modulation and demodulation

Supported modulation schemes and FEC
- DVB-S/DVB-S2/DVB-DVB/S2/DVB-S2X/DVB-C/MPEG-2/MPEG-4 AVC
- MODCODS:
  - QPSK: 1/2, 2/3, 3/4, 5/6, 7/8
  - 8PSK: 1/2, 3/4, 5/6, 7/8
  - 64QAM: 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8
  - 256QAM: 1/2, 3/4, 4/5, 5/6, 6/7, 7/8
- DVB-S2: Outer/Inner FEC, BCH/AC-01
- DVB-S2X: Outer/Inner FEC, BCH/AC-01
- DVB-DVB/S2X: Outer/Inner FEC, BCH/AC-01
- DVB-C/DMB: Outer/Inner FEC, BCH/AC-01
- MPEG-2: Outer/Inner FEC, BCH/AC-01
- MPEG-4 AVC: Outer/Inner FEC, BCH/AC-01
- DVB-S/DVB-S2/DVB-DVB/S2/DVB-S2X/DVB-C/MPEG-2/MPEG-4 AVC

Baud rate range
- DVB-S2: QPSK/8PSK 0.256 – 45 Mbaud
- E8PSK/64APSK 0.256 – 33 Mbaud
- DVB-DVB/S2/DMB: QPSK/8PSK/16QAM 1 – 45 Mbaud

Frame length
- DVB-S2 Short Frames 16200 bits
- DVB-S2 Long Frames 64800 bits
- DVB-S/DVB/S2/DMB 188 bytes

Modulation interface
- L-band output (default):
  - Connector: SMA (F), 50 ohms
  - Return loss > 14 dB
  - Level > 7 dB
  - Frequency: 950 – 1750 MHz (50 Hz steps)
  - Spurious: < -65 dBc/4 kHz @ +5 dBm level and > 256 kbaud

Extended L-band output (optional):
- Connector: SMA (F), 50 ohms
- Return loss > 14 dB
- Level > 7 dB
- Frequency: 950 – 1750 MHz (50 Hz steps)
- Spurious: < -65 dBc/4 kHz @ +5 dBm level and > 256 kbaud

IF-band (optional):
- Connector: BNC (F), 75 ohms
- Return loss: 50 ohms: > 14 dB
  75 ohms: > 20 dB
- Level: > -30 dBm (+3 dB)
- Frequency: 50 – 180 MHz (50 Hz steps)
- Spurious: < -65 dBc/4 kHz @ -10 dBm level and > 256 kbaud

L-band monitoring output (default):
- Connector: SMA (F), 50 ohms
- Return loss: > 7 dB
- Level: > -45 dBm
- Spurious: default: identical to L-band output
- Frequency: options AA-02: 1080 MHz
- Frequency range: 10 kHz

BUC power and reference frequency (optional):
- Connector: BNC (F), 50 ohms
- Input level: -3dbm up to 7dbm
- Output level: +7dBm

Demodulator interface
- Dual L-band input:
  - Connector: x 2 F-type (F), 75 Ohms
  - Return loss > 7 dB (75 Ohm - FFI)
  - Level: > -55-25dBm
  - Frequency: < (Co+7) dBm with Co = signal level density
- IF-band input (optional, replaces one L-band input):
  - Connector: BNC (F), 50 ohms
  - Input level: -3dbm up to 7dbm
  - Output level: +7dBm

LNB power and control
- Maximum power: 500 mA (on selected IFL input)
- Voltage: 11.5 – 14 V
- Current: 500 - 750 mA

Alarm interface
- Electrical double dual contact alarm contacts
- Connector 9-pin sub-D (F)
- Logical interface and general device alarm

Physical
- 1RU, width: 19", depth 51 cm, 6 kg
- Power supply: 90-130 & 180-260 Vac, 105 VA
- Temperature:
  - Operational: 0°C to 40°C
  - Storage: -40 to +70°C
- Humidity: 5% to 85% non-condensing
- CE label

Ordering information

Specifications EL470(R9)

Order n°

Default Configuration
- DVB-S/DVB-S2/DVB-DVB/S2/DVB-S2X/DVB-C/MPEG-2/MPEG-4 AVC
- Input interface DVB-S2/DSNG: 10MHz reference
- Physical layer interface
- Modulator output interface
- Interface: IF+L-band output with IF Mod Output
- Maximum rate: 133 Mbit/s in each direction, or 200 Mbit/s in each direction per second Tx + Rx
- Power supply: 90-130 & 180-260 Vac, 105 VA
- Temperature:
  - Operational: 0°C to 40°C
  - Storage: -40 to +70°C
- Humidity: 5% to 85% non-condensing
- CE label

Configuration options
- Category: Max. 1 option per category
- Modulator & Baud rate
- Modulation & Baud rate
- IF/L-band output with IF Mod Output

Additional options
- Category: Max. 1 option per category
- 100MHz reference
- Encryption/Decryption
- Services
- Assistance

Contact sales representative for details (sales@newtec.eu)