



# EcoLine FiberLink

...designed for perfect signals



## Extended L-Band and Broadband EcoLine FiberLink

The EcoLine TX/RX2450EL and EcoLine TRX2450EL / TRX3000EL Modules represent a cost-effective RF over Fiber solution designed in a compact form allowing a handheld operation as well as population in a 1RU/19" chassis in a locally managed Environment.

EcoLine TX/RX2450EL modules allow a conventional unidirectional links, while EcoLine TRX2450EL / TRX3000EL Modules allow a bidirectional link within one module by utilizing different Wavelengths.

- ▶ Space saving handheld box with an external PSU
- ▶ Could be in EcoLine V8 Chassis populated
- ▶ 1310nm Wavelength as unidirectional variant or 1310nm with 1550nm Wavelength bidirectional variant
- ▶ Variable gain up to 36dB for unidirectional variant and 0dB fix gain for bidirectional transceiver
- ▶ 850 to 2450MHz or 50 to 3000MHz or up to 12GHz\*

*\*under development*



## TECHNICAL SPECIFICATIONS

### EcoLine V8 1RU/19" Chassis

|                        |                                                    |
|------------------------|----------------------------------------------------|
| Dimensions:            | 1RU/19" (260mm deep)                               |
| Power Supply:          | 85 – 265V, 50/60Hz, dual 1:1 redundancy on request |
| Power Consumption:     | <10W (1RU/19")                                     |
| Slots:                 | Eight front side slots for different modules       |
| Operating Temperature: | 0°C to 45°C                                        |
| Storage Temperature:   | -10°C to 70°C                                      |
| Humidity:              | 90%, non-condensing                                |
| RoHS:                  | Compliant                                          |

#### Transmit Module TX2450EL

|                                  |                                               |
|----------------------------------|-----------------------------------------------|
| <b>Frequency Range:</b>          | 850 – 2450MHz                                 |
| <b>RF Input Connector:</b>       | SMA(f) 50Ohm, F-type(f) 75Ohm                 |
| <b>Optical Output Connector:</b> | SC/APC                                        |
| <b>Fiber Type:</b>               | Single mode 9/125                             |
| <b>RF Input Power Level:</b>     | +10dBm max. (damage level)                    |
| <b>Frequency Response:</b>       | ±0,5dB typ., ±1,0dB max.                      |
| <b>Return Loss:</b>              | 14dB typ.                                     |
| <b>Maximum Variable Gain:</b>    | 18dB                                          |
| <b>Noise Figure:</b>             | 12dB, @ full gain                             |
| <b>Laser Type:</b>               | DFB with Isolator, Class 1M, 1310nm or 1550nm |
| <b>Optical Output Power:</b>     | +3dBm min.                                    |
| <b>Switchable LNB-Supply:</b>    | 13/18V/22kHz, 390mA, 400mA max.               |
| <b>Status LED's:</b>             | Link Indicator, LNB DC Supply Indicator       |
| <b>Operating Temperature:</b>    | 0°C to 45°C                                   |
| <b>Storage Temperature:</b>      | -10°C to 70°C                                 |
| <b>Humidity:</b>                 | 90%, non-condensing                           |
| <b>RoHS:</b>                     | Compliant                                     |

#### Receive Module RX2450EL

|                                   |                                  |
|-----------------------------------|----------------------------------|
| <b>Frequency Range:</b>           | 850 – 2450MHz                    |
| <b>Optical Input Connector:</b>   | SC/APC                           |
| <b>Fiber Type:</b>                | Single mode 9/125                |
| <b>RF Output Connector:</b>       | SMA(f) 50Ohm, F-type(f) 75Ohm    |
| <b>Optical Input Power Level:</b> | -5dBm (min. optical sensitivity) |
| <b>Frequency Response:</b>        | ±0,5dB typ., ±1,0dB max.         |
| <b>Return Loss:</b>               | 14dB typ.                        |
| <b>Maximum Variable Gain:</b>     | 18dB                             |
| <b>Link OIP3:</b>                 | +30dBm                           |
| <b>Link SFDR:</b>                 | < -102dB/Hz                      |
| <b>Link Output P1dB:</b>          | +21dBm, @full gain               |
| <b>Operating Wavelength:</b>      | 1290nm – 1560nm                  |
| <b>RF Output Power:</b>           | +5dBm max.                       |
| <b>Status LED's:</b>              | Link Indicator                   |
| <b>Operating Temperature:</b>     | 0°C to 45°C                      |
| <b>Storage Temperature:</b>       | -10°C to 70°C                    |
| <b>Humidity:</b>                  | 90%, non-condensing              |
| <b>RoHS:</b>                      | Compliant                        |

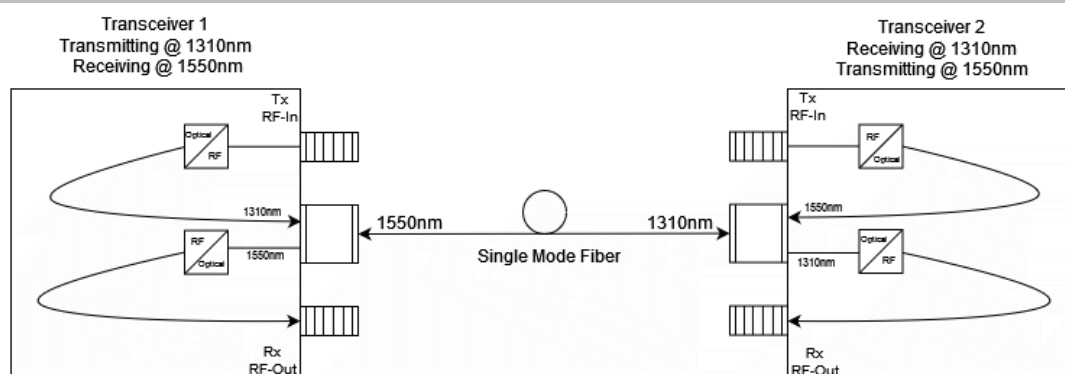
## Transceiver Module TRX2450EL

|                             |                                                |
|-----------------------------|------------------------------------------------|
| Frequency Range:            | 850 – 2450MHz                                  |
| RF-Input/Output Connectors: | SMA(f) 50Ohm                                   |
| Optical Connector:          | SC/APC                                         |
| Transmit:                   | DFB with Isolator, Class 1M, 1310nm and 1550nm |
| Receive:                    | 1290nm – 1560nm                                |
| Frequency Response:         | ±1.0dB typ. ±2.0dB max.                        |
| Insertion Loss:             | 0dB                                            |
| Input RF Power:             | -70dBm to 0dBm max.                            |
| Input Return Loss:          | 14dB                                           |
| Output Return Loss:         | 14dB                                           |
| Link Noise Figure:          | 24dB                                           |
| TX/RX Isolation:            | >40dB typ.                                     |
| P1dB:                       | +1dBm                                          |
| IMA3 @ -5dBm Output Level:  | < -40dBc                                       |
| SFDR:                       | < -70dBm                                       |
| Status LED's:               | Link Indicator                                 |

## Transceiver Module TRX3000EL

|                             |                                                |
|-----------------------------|------------------------------------------------|
| Frequency Range:            | 50 – 3000MHz                                   |
| RF-Input/Output Connectors: | SMA(f) 50Ohm                                   |
| Optical Connector:          | SC/APC                                         |
| Transmit:                   | DFB with Isolator, Class 1M, 1310nm and 1550nm |
| Receive:                    | 1290nm – 1560nm                                |
| Frequency Response:         | ±2.0dB typ. ±3.0dB max.                        |
| Insertion Loss:             | 0dB                                            |
| Input RF Power:             | -70dBm to 0dBm max.                            |
| Input Return Loss:          | 12dB min.                                      |
| Output Return Loss:         | 12dB min.                                      |
| Link Noise Figure:          | 24dB                                           |
| TX/RX Isolation:            | >40dB typ.                                     |
| P1dB:                       | +1dBm                                          |
| IMA3 @ -5dBm Output Level:  | < -40dBc                                       |
| SFDR:                       | < -70dBm                                       |
| Status LED's:               | Link Indicator                                 |

## Transceiver Diagram



**Transmit Module TX12GHzEL \*\*\* Specification in Evaluation \*\*\* Preliminary**

|                                             |                                                   |
|---------------------------------------------|---------------------------------------------------|
| <b>Frequency Range:</b>                     | 2GHz – 12GHz, optionally 10MHz – 12GHz on request |
| <b>RF Input Connector:</b>                  | Frontside                                         |
| <b>Optical Output Connector:</b>            | SC/APC                                            |
| <b>Fiber Type:</b>                          | Single mode 9/125                                 |
| <b>RF Input Power Level:</b>                | +20dBm max. (damage level)                        |
| <b>Frequency Response:</b>                  | ±2dB typ., ±2,5dB max.                            |
| <b>Return Loss:</b>                         | 12dB typ.                                         |
| <b>Input 1dB Compression:</b>               | 18dBm                                             |
| <b>Input 3<sup>rd</sup> Order Intercept</b> | 28dBm                                             |
| <b>SFDR:</b>                                | < -107dB/Hz                                       |
| <b>Noise Figure:</b>                        | 24dB                                              |
| <b>Laser Type:</b>                          | Cooled DFB Laser with Isolator, Class 1M, 1310nm  |
| <b>Optical Output Power:</b>                | 3mW                                               |
| <b>Status LED's:</b>                        | OK, Fail, Stand-By                                |
| <b>Operating Temperature:</b>               | 0°C to 45°C                                       |
| <b>Storage Temperature:</b>                 | -10°C to 70°C                                     |
| <b>Humidity:</b>                            | 90%, non-condensing                               |
| <b>RoHS:</b>                                | Compliant                                         |

**Receive Module RX12GHzEL \*\*\* Specification in Evaluation \*\*\* Preliminary**

|                                   |                                                   |
|-----------------------------------|---------------------------------------------------|
| <b>Frequency Range:</b>           | 2GHz – 12GHz, optionally 10MHz – 12GHz on request |
| <b>Optical Input Connector:</b>   | SC/APC                                            |
| <b>Fiber Type:</b>                | Single mode 9/125                                 |
| <b>RF Output Connector:</b>       | 50Ohm SMA                                         |
| <b>Optical Input Power Level:</b> | -5dBm (min. optical sensitivity)                  |
| <b>Frequency Response:</b>        | ±1,5dB typ., ±2,0dB max.                          |
| <b>Return Loss:</b>               | 14dB typ.                                         |
| <b>IMA3:</b>                      | -75dBc                                            |
| <b>Operating Wavelength:</b>      | 1290nm – 1560nm                                   |
| <b>RF Output Power:</b>           | +5dBm max.                                        |
| <b>Status LED's:</b>              | OK, Fail, Stand-By                                |
| <b>Operating Temperature:</b>     | 0°C to 45°C                                       |
| <b>Storage Temperature:</b>       | -10°C to 70°C                                     |
| <b>Humidity:</b>                  | 90%, non-condensing                               |
| <b>RoHS:</b>                      | Compliant                                         |



| Type               | Type-No.: | Short Description                                                                                       | Optical I/O Connector | Frequency Range |
|--------------------|-----------|---------------------------------------------------------------------------------------------------------|-----------------------|-----------------|
| TX2450EL-1310      | 9001357   | Optical Transmitter Module 850 – 2450MHz, 1310nm                                                        | SC/APC                | 850 – 2450MHz   |
| TX2450EL-1550      | 9001359   | Optical Transmitter Module 850 – 2450MHz, 1550nm                                                        | SC/APC                | 850 – 2450MHz   |
| RX2450EL           | 9000917   | Optical Receiver Module 1310-1560nm                                                                     | SC/APC                | 850 – 2450MHz   |
| TRX2450EL-1310     | 9001361   | Ext.-L-Band Optical Transceiver Module TX 1310nm, RX 1290-1560nm, 2x50Ohm SMA(f), SC/APC                | SC/APC                | 850 – 2450MHz   |
| TRX2450EL-1550     | 9001362   | Ext.-L-Band Optical Transceiver Module TX 1550nm, RX 1290-1560nm, 2x50Ohm SMA(f), SC/APC                | SC/APC                | 850 – 2450MHz   |
| TRX3000EL-1310     | 9001363   | Ext.-L-Band Optical Transceiver Module TX 1310nm, RX 1290-1560nm, 2x50Ohm SMA(f), SC/APC                | SC/APC                | 50 – 3000MHz    |
| TRX3000EL-1550     | 9001364   | Ext.-L-Band Optical Transceiver Module TX 1550nm, RX 1290-1560nm, 2x50Ohm SMA(f), SC/APC                | SC/APC                | 50 – 3000MHz    |
| TX12GHzEL-1310     | 9001365   | 2 -12GHz Optical Transmitter Module 1310nm, SMA(f), SC/APC *** Specification in Evaluation ***          | SC/APC                | 2 – 12GHz       |
| RX12GHzEL          | 9001366   | 2 - 12GHz Optical Receiver Module 1290-1560nm, 50Ohm SMA(f), SC/APC *** Specification in Evaluation *** | SC/APC                | 2 – 12GHz       |
| EcoLine V8 Chassis | 9001358   | Eight Slot Chassis for EcoLine Modules, Red. PSU                                                        |                       |                 |