The Trainguard Euroloop S21 F is a continuous (up to 800 m) supplement to the Trainguard Eurobalise S21. It is used for automatic changeover to a less restrictive signal aspect or departure hindrance at a stop signal.

A coaxial leaky cable laid in the inner or outer base of the rail transmits the ETCS telegram to the train. Information programmed in a balise group announces a Euroloop transmission to the on-board computer. The ETCS telegrams of the lineside electronic unit (LEU) are modulated onto the carrier signal in accordance with the selected spread spectrum code (loop key) in the Euroloop modem (ELM S21 F).

Semi-continuous transmission enables a movement authority to be directly transmitted to a vehicle (also to stationary vehicles). In this way, continuous cab signaling is implemented at ETCS Level 1.

<table>
<thead>
<tr>
<th>Benefits</th>
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<tbody>
<tr>
<td>Compliance with all relevant European standards</td>
</tr>
<tr>
<td>Highly reliable data transmission</td>
</tr>
<tr>
<td>Higher performance thanks to optimal usage of existing infrastructure</td>
</tr>
<tr>
<td>Energy savings thanks to efficient train control</td>
</tr>
<tr>
<td>No maintenance required</td>
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<tr>
<td>High levels of safety and availability</td>
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<tr>
<td>Low purchase and life-cycle costs</td>
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</tbody>
</table>
Technical data

**ELM S21 F (Euroloop modem)**

- **Power supply**
  - 85 V<sub>rms</sub> to 264 V<sub>rms</sub> AC (50/60 Hz)
  - 150 V<sub>rms</sub> to 264 V<sub>rms</sub> AC (16.7 Hz)
  - 120 V to 340 V DC
- **Input power**
  - < 50 W (standby: < 10 W)
- **HF output power**
  - +44 dBm (26 W) at 50 Ω
- **Ambient temperature range**
  - –40 °C to +70 °C
- **Reliability (MTBF as per SN 29500)**
  - 48 years (40 °C)
- **Dimensions (l x w x h)**
  - 220 x 226 x 133 mm
- **Weight**
  - 3 kg

**Leaky cable**

- **Type**
  - FILORADIO radiating coaxial cable
- **Internal conductor diameter**
  - 4.05 mm
- **Outer diameter**
  - 15.4 mm
- **Impedance**
  - 50 ±2 Ω
- **Attenuation**
  - 10 MHz 1.3 dB /100 m
  - 30 MHz 2.8 dB /100 m
  - 80 MHz 6.3 dB /100 m
  - 160 MHz 11.3 dB /100 m
- **Resistance of internal conductor**
  - 2.1 Ω/km
- **Resistance of external conductor**
  - 7.1 Ω/km
- **Capacitance**
  - 81 pF/m
- **Weight**
  - 0.19 kg/m RoHS-compliant in line with IEC 60754-1

**Euroloop subsystem**

- **Data transmission rate**
  - 9.567 bits/s
- **Transmitting frequency**
  - 9 MHz to 18 MHz
- **Field strength**
  - 32 to 67 dBμA / m in center of track
- **Spread spectrum code**
  - 472 Bits (15 key codes)
- **Modem activation**
  - 27.095 MHz (balise / loop antenna)
- **ETCS specification**
  - UNISIG SUBSET-044 FFFIS for Euroloop
- **Distance LEU S21–ELM S21 F**
  - max. 2,500 m (cable impedance: 120 Ω)

**LKA S21 (loop cable termination)**

- **Input resistance**
  - 47 Ω ± 15 % (DC up to 50 MHz)
- **Input power**
  - max. 25 W (rail-mounted)
- **Isolation**
  - 2 kV AC (50 Hz, 60 s)
- **Reliability (MTBF as per SN 29500)**
  - 25 years (60 °C)
- **Dimensions (l x w x h)**
  - 310 x 40 x 40 mm
- **Weight**
  - 3.6 kg
- **IP rating**
  - IP67

The information in this document contains general descriptions of the technical options available. The required features should therefore be specified in each individual case at the time of closing the contract. For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action and integrate each component into a holistic, state-of-the-art security concept. Third-party products that may be in use should also be considered.