

# Hypercable

Integral-E is specifically designed for use with wide channel bandwidths up to 2 Gigahertz , outdoor unit includes radio, modem, PoE splitter with surge arrestor and integrated antenna in a single hardware design. Direct radio and antenna integration guarantees weather-proof factory sealing and fast installation. Carefully selected materials for best corrosion resistance and simplified installation with a 50% weight reduction compared to other microwave systems.



## HyperBridge integral-E

Faisceau Hertzien Bande E 71 – 86 GHz 10 Gigabits à haut niveau d'intégration

integral-E



**Integrated carrier-grade microwave radio, delivering up to 10 Gbits Duplex.**

Hypercable , experienced professional in compact full outdoor microwave radio technology – is glad to introduce the newest member of outstanding Integral-series radios.

As result of steadily stepping higher into microwave frequency spectrum, Integral-E ensures unbelievable 10 Gbps capacity utilizing e-Band expanse in hand with most modern technology.

Integral-E solutions are easy to carry out in most countries due to the minimal licensing requirements and simplified procedures.

Lack of license fee also reduces TCO of Integral-E solution comparing to conventional microwave bands.

Integral-E supports Adaptive Code Modulation and Baud (ACMB) in which the coding rate, modulation and bandwidth changes are set in real time based on the link's conditions.

This feature enables significant increase in the payload capacity and link availability.

ACMB switching is hitless: link stays locked, and data is transmitted without errors.

## Technical specification

| General  |  |   |
|--|--|---|
| Concept / form factor  | FODU with antenna  |   |
| Frequency band   | 71 - 76 GHz paired with 81 - 86 GHz  |   |
| Duplex spacing   | 10 GHz   |   |
| Frequency stability  | ± 10 ppm   |   |
| Capacity   | Up to 10 Gbps at 2000 MHz 128QAM   |   |
| Max modulation   | 128QAM   |   |
| Configurations   | 1+0  |   |
| ATPC   | Yes  |   |
| ACM  | Adaptive Code Modulation and Baud (ACMB), Hitless  |   |
| Channel bandwidth  | 250, 500, 1000, and 2000 MHz   |   |
| Ports  |  |   |
| Ethernet   | 2 x SFP+   | 1 x SFP+ for Fiber Optics up to 10 Gbps<br>1 x SFP+ for Fiber Optics up to 2.5 Gbps |
|  | 1 x RJ-45  | Gigabit Ethernet electrical port with built-in PoE splitter and surge arrestor      |
| Power  | DC port  | Screw type terminal block, pluggable, 2 pin, centerline 5.08mm / 0.2 inches         |
|  | 3.5 mm   | Audible alignment and RSSI  |
| Service ports  | USB B  | RS232 serial over USB B-Type  |
|  | LED  | Power On, Link Synchronization, RSL   |
| Ethernet   |  |   |
| Ethernet   | Built-in Carrier Ethernet 10 Gigabit Switch  |   |
| Gigabit Switch functionality   | 802.1Q VLANs with QoS/CoS incl. <i>WRED*</i> , shaping, DWRR and on MPLS-TP exp. bit; <i>Spanning Tree Protocol*</i> , Jumbo frames <i>and more*</i>               |   |
| Synchronization  | SyncE, <i>IEEE 1588v2 PTP*</i>   |   |
| Carrier Ethernet functionality   | Provider Bridging, MEF9&14, <i>OAM*</i>  |   |
| Jumbo frames   | Yes, 9600 bytes  |   |
| Encryption   | -  |   |
| Management   | SNMP v1/2c/3, SSH, Telnet, HTTPS, Serial, RADIUS, Network Time Protocol<br>In-band Management over same ETH port. Out-band Management is configurable using VLANs. |   |
| Performance monitoring   | Performance graphs, constellation diagram, alarms, detailed counters   |   |
| Electrical   |  |   |
| Power consumption  | Up to 74 W depending on operating mode   |   |
| Voltage range  | Integral   | 36...57 V DC  |
|  | PoE Injector*  | 36...60 V DC  |
| Temperature range  | -33...+55 °C / -28...+130 °F   |   |
| <i>*with I0ATPI24 Power over Ethernet Injector over electrical GE port</i> |  |   |

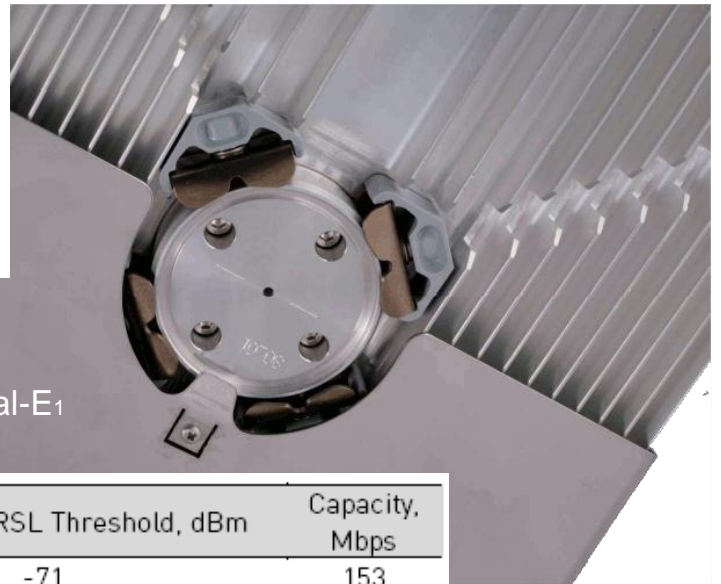
## Mechanical specification

| Antenna                    | External antenna                                     |
|----------------------------|--|
| Mechanical & Environmental |  |
| Stationary use             | Conforms to ETSI EN 300 019 Class 4.1, IP66, NEMA 4X |
| Size                       | 280 x 437 x 100 mm / 11.02" x 17.2" x 3.9"           |
| Weight                     | 6.5 kg / 14.3 lbs                                    |
| Mount                      | Mount on antenna                                     |

## Maximum Tx Power for Integral-E

| Modulation | Tx power, dBm <sup>1</sup> |
|------------|----------------------------|
| BPSK       | +15                        |
| 16 QAM     | +14                        |
| 32 QAM     | +13                        |
| 64 QAM     | +12                        |
| 128 QAM    | +11                        |

<sup>1</sup> Preliminary data



## RSL Thresholds and Capacity for Integral-E<sub>1</sub>

| Bandwidth, MHz | Modulation    | Guaranteed RSL Threshold, dBm | Capacity, Mbps |
|----------------|---------------|-------------------------------|----------------|
| 250            | BPSK RS FEC   | -71                           | 153            |
|                | QPSK RS FEC   | -68                           | 358            |
|                | 16QAM RS FEC  | -65                           | 715            |
|                | 32QAM RS FEC  | -62                           | 894            |
|                | 64QAM RS FEC  | -59                           | 1073           |
|                | 128QAM RS FEC | -56                           | 1252           |
| 500            | BPSK RS FEC   | -68                           | 306            |
|                | QPSK RS FEC   | -65                           | 715            |
|                | 16QAM RS FEC  | -62                           | 1431           |
|                | 32QAM RS FEC  | -59                           | 1788           |
|                | 64QAM RS FEC  | -56                           | 2146           |
|                | 128QAM RS FEC | -53                           | 2504           |
| 1000           | BPSK RS FEC   | -65                           | 612            |
|                | QPSK RS FEC   | -62                           | 1431           |
|                | 16QAM RS FEC  | -59                           | 2861           |
|                | 32QAM RS FEC  | -56                           | 3576           |
|                | 64QAM RS FEC  | -53                           | 4292           |
|                | 128QAM RS FEC | -50                           | 5007           |
| 2000           | BPSK RS FEC   | -62                           | 1224           |
|                | QPSK RS FEC   | -59                           | 2859           |
|                | 16QAM RS FEC  | -56                           | 5719           |
|                | 32QAM RS FEC  | -53                           | 7148           |
|                | 64QAM RS FEC  | -50                           | 8578           |
|                | 128QAM RS FEC | -47                           | 10008          |

<sup>1</sup> Preliminary data