



## Overview

INTRALINK™ comprises a homogeneous family of Point-to-Point (PtP) digital microwave products supporting a wide range of radios, from 6 GHz to 38 GHz. Employing hybrid technology, INTRALINK™ is a native TDM and native Ethernet solution for cost-effective backhaul at the last mile and high-density aggregation sites. INTRALINK™ is offered as a split system, mainly composed of a compact 1RU indoor unit (ISR or IDR-LC), and the ODU-CF outdoor radio unit with integrated antenna (0.3 / 0.6 / 1.2 / 1.8 m). ODU-CF can also accommodate an integrated symmetrical or asymmetrical coupler to increase link configuration flexibility.

## System Specifications

	Indoor Units	
	ISR (Modular PDH / Super PDH / SDH / Ethernet indoor unit)	IDR-LC (Low-capacity PDH / Ethernet indoor unit)
Max. Throughput, Mbit/s	<ul style="list-style-type: none"> <li>• 355</li> <li>• 710 (w/ XPIC &amp; 56 MHz channel)</li> </ul>	34
Channel Size, MHz	7 / 14 / 28 / 56	3.5 / 7 / 14 / 28
Link Modes	<ul style="list-style-type: none"> <li>• 1+0</li> <li>• 1+1 (HSB / SD / FD)</li> <li>• 2+0 (East-East / East-West)</li> </ul>	<ul style="list-style-type: none"> <li>• 1+0</li> <li>• 1+1 (HSB / SD / FD)</li> </ul>
Modulation (software-defined)	QPSK, 16 / 32 / 64 / 128 / 256QAM	QPSK, 16QAM
Operating Voltage, V	-40 to -60 (-48 typ.)	
Max. Power Consumption, W	55	20
Dimensions (HxWxD), mm	45 (1U) x 437 x 360	
Weight, kg	3	3.5
Operating Temperature	-5 °C to +55 °C	
Relative Humidity	0 % to 95 %, non-condensing	
Interfaces	<ul style="list-style-type: none"> <li>• 2 x E1 to 63 x E1, with add/drop multiplexer</li> <li>• 2 x FE</li> <li>• 4 x GbE, plus one extra GbE SFP</li> <li>• 3 x STM-1 (VC-12), elect./optical</li> <li>• Voice Order Wire (VOW), 64kbit/s</li> <li>• Data Order Wire (DOW), 64 kbit/s (RS-422 synchronous) &amp; 19.2 kbit/s (RS-232 asynchronous)</li> <li>• 2 x FE (outband management)</li> </ul>	<ul style="list-style-type: none"> <li>• 16 x E1</li> <li>• 1 or 2 x FE</li> <li>• 2 x RS-232 data service channels (asynchronous V.28 / V.24), up to 19.2 kbit/s</li> <li>• 1 x wayside (2 Mbit/s), for 16 x E1 operation</li> <li>• Engineering Order Wire (EOW)</li> <li>• 2 x FE (outband management)</li> </ul>



	Outdoor Units (ODU-CF)									
	6L-CF & 6U-CF (6 GHz)	71-CF (7 GHz)	81-CF (8 GHz)	11-CF (11 GHz)	13-CF (13 GHz)	15-CF (15 GHz)	18-CF (18 GHz)	23-CF (23 GHz)	26-CF (26 GHz)	38-CF (38 GHz)
Operating Frequency Band, GHz	5.9 - 7.1	7.1 - 7.9	7.7 - 8.5	10.7 - 11.7	12.75 - 13.25	14.5 - 15.35	17.7 - 19.7	21.2 - 23.6	24.5 - 26.5	37.0 - 39.5
RF Channel Arrangement	ITU-R F.383 / 384	ITU-R F.385-8	ITU-R F.386-6	ITU-R F.387-7	ITU-R F.497-6	ITU-R F.636-3	ITU-R F.595-8	ITU-R F.637-3	T/R 13-02E	ITU F.749-2
Radio	ETSI EN 302217-2-2									
Tx/Rx Spacing, MHz	252.04 / 240 / 340	154 / 161 / 245	119 / 126 / 266	490 / 530	266	420 / 490 / 728	1010	1008 / 1232	1008	1260
Tx Output Power, dBm (Upper, QPSK)	28	28	27	27	24	24	24	23	23	22
Output Power Accuracy (-33 °C to +55 °C)	±2 dB (max.)									
Max. Rx Level (No Damage)	+10 dBm									
RSSI (RSL) Accuracy (+25 °C)	±2 dB (typ.)									
Frequency Stability	±7 ppm (max.)									
Frequency Resolution, kHz	250									
System Gain (dB) @ BER=10 <sup>-6</sup> (typical values)										
256QAM, 360 Mbit/s (56 MHz)	83.5	82.5	81.5	79.5	78.5	78.5	77.5	76.5	76.0	73.0
128QAM, 2xSTM-1 (56 MHz)	91.5	90.5	89.5	87.5	86.5	86.5	85.5	84.5	84.0	81.0
128QAM, STM-1 (28 MHz)	94.5	93.5	92.5	90.5	88.5	88.5	88.5	87.5	87.0	84.0
128QAM, 63xE1 (28 MHz)	95.5	94.5	93.5	91.5	90.5	90.5	89.5	88.5	88.0	85.0
64QAM, 58xE1 (28 MHz)	97.5	96.5	95.5	93.5	92.5	92.5	91.5	90.5	90.0	87.0
64QAM, 48xE1 (28 MHz)	99.5	98.5	97.5	95.5	94.5	94.5	93.5	92.5	92.0	89.0
32QAM, 42xE1 (28 MHz)	105.5	104.5	103.5	101.5	100.5	100.5	99.5	98.5	98.0	95.0
16QAM, 32xE1 (28 MHz)	109.5	108.5	107.5	105.5	104.5	104.5	103.5	102.5	102.0	99.0
16QAM, 16xE1 (14 MHz) <sup>(1)</sup>	112.5	111.5	110.5	108.5	107.5	107.5	106.5	105.5	105.0	102.0
16QAM, 8xE1 (7 MHz) <sup>(1)</sup>	115.5	114.5	113.5	111.5	110.5	110.5	109.5	108.5	108.0	105.0
16QAM, 4xE1 (3.5 MHz) <sup>(2)</sup>	116.0	115.0	114.0	112.0	111.0	111.0	110.0	109.0	108.5	105.5
QPSK, 32xE1 (56 MHz)	114.5	113.5	112.5	110.5	109.5	109.5	108.5	107.5	107.0	104.0
QPSK, 16xE1 (28 MHz) <sup>(3)</sup>	117.5	116.5	115.5	113.5	112.5	112.5	111.5	110.5	110.0	107.0
QPSK, 8xE1 (14 MHz) <sup>(3)</sup>	120.5	119.5	118.5	116.5	115.5	115.5	114.5	113.5	113.0	110.0
QPSK, 4xE1 (7 MHz) <sup>(3)</sup>	123.5	122.5	121.5	119.5	118.5	118.5	117.5	116.5	116.0	113.0
DC Operating Voltage, V	-40 to -60 (-48 typ.)									
Power Consumption, W (typ.)	34			26			23			
Dimensions (W x H x D), mm	250 x 247 x 106			237 x 247 x 89						
Weight, kg	< 6			< 4						
Operating Temperature	-33 °C to +55 °C (ETSI EN 300019-2-4 v2.1.2 Class 4.1) / Operational at -50 °C									
Transportation & Storage Temperature	-40 °C to +70 °C (ETSI EN 300019-2-2 v2.1.2 Class 2.3)									
Waveguide Flange	UBR70	UBR84	UBR84	UBR120	UBR120	UBR140	UBR220	UBR220	UBR220	UBR320

<sup>(1)</sup> Values are given for ISR indoor units. For IDR-LC units, subtract 2.5 dB.

<sup>(2)</sup> IDR-LC indoor units only.

<sup>(3)</sup> Values are given for ISR indoor units. For IDR-LC units, subtract 1.5 dB.

## Networking

### • TDM

- ITU-T G.703 / G.704 / G.706 / G.732
- ITU-T G.783 / G.811 / G.812 / G.813 / G.823 / G.825 synchronization)

### • Ethernet

- VLANs
  - Up to 16 user-defined VLANs
  - Ports (front panel & radio link) may be assigned to one or more VLANs
  - Configurable ingress packet filtering
- VLAN Tagging
  - Tagging of ingress frames / untagging of egress frames
  - Single- /double-tagging (Q-in-Q)
  - Transparent pass of VLAN-tagged frames

### ▪ Ethernet QoS

- Port-based, both automatically (1+0/1+1 link mode) & user-selectable (2+0 link mode)
- 802.1q (VLAN tag priority)
- IPv4 TOS
- DiffServ
- Other
  - Flow control (both full-duplex and half-duplex operation)
  - Egress traffic control on physical port
  - Support of jumbo frames (4000 / 9728 bytes)
  - 802.1d – 2004 (bridging)

## Standards

### • Radio

- ETSI EN 302 217-2-2

### • EMC / EMI

- ETSI EN 301 489-4 v1.3.1
- ETSI EN 301 489-1

### • Electrical Safety

- EN 60950-1
- EN 50385 (Radiation Safety)

### • Environmental

- ETSI EN 300 019-2-1 v2.1.2, Class 1.2
- ETSI EN 300 019-2-2 v2.1.2, Class 2.3
- ETSI EN 300 019-2-3 v2.2.2, Class 3.2 (indoor units)
- ETSI EN 300 019-2-4 v2.2.2, Class 4.1 (outdoor units)

### • Power Supply

- ETSI EN 300 132-2