



Wireless without
Boundaries

ETSI

IP170 Series Microwave Radio System



Indoor Unit



Outdoor Unit

Outdoor Unit +
Antenna



6 - 38
GHz

L

170
Mbps

LOS

FE

PTP

S
I/O

High Capacity Ethernet up to 170 Mbps

Features & Benefits

- Cost-effective high-capacity Ethernet IDU for microwave and millimeter-wave radios
 - up to 170 Mbps throughput
- Optimized for efficient cellular backhaul and private network applications
- Flexible modem and multiplexer
 - Programmable Bandwidths and Symbol Rates
 - Programmable Modulation Modes (up to 256 QAM)
 - Programmable FEC
- FlexBand™ technology allows arbitrary bandwidth occupancy from a single IDU via software command
- Built-in Ethernet line interfaces
 - Built-in 2-port Ethernet with port-based VLAN & QoS features
- Single cable interface to Outdoor Unit
- Extensive link management interface support
 - Web-based link management
 - SNMP monitoring and craft menu applications
- Low-power design -20 to -72 VDC
- Uses less than 58 Watts
- Field-upgradeable firmware
- 1U 19-inch indoor rack mount unit

IP170o

The **IP170** is a low-cost point to point digital microwave radio system for Ethernet payload.

The **IP170** Series products support capacities up to 170 Mbps and Wayside Ethernet Full Duplex capacity up to 8.4 Mbps.

The **IP170** operates in frequency ranges from 6 to 38 GHz. It can be mounted directly on properly equipped antenna, or it can be mounted separately and connected using standard UBR flange series waveguide.

The **IP170** meets carrier-grade standards for performance, reliability, and quality.

- Flexible combinations of interfaces:
 - IP interfaces: 2x10/100Base-T
 - NMS interfaces: 2x10/100Base-T
- Software-configurable:
 - Capacity (8 Mbps to 170 Mbps)
 - Modulation (QPSK, 8QAM, 16QAM, 32QAM, 64QAM 128QAM and 256QAM)
 - Channel bandwidth (3.5, 7 MHz, 14 MHz, and 28 MHz)
 - IP payload throughput-allocation
- Support of ring applications with East/West aggregate payload
- Auxiliary EOW voice and data channels
- SNMP management with integral routing
- Configuration backup via removable NVRAM
- Common 1RU IDU for all frequency bands, capacities, modulations and channel bandwidths
- Built-in BER Monitor
- Superior receiver sensitivity and system gain performance



Technical Information

The Indoor Unit is an extremely versatile high-capacity IDU solution. A single, low-cost design is approved for the CEPT market.

The IDU offers Flexible Signal Processing™ architecture allows complete flexibility for packet data (Ethernet) within the selected transport capacity.

The transport capacity can be provisioned and monitored via the web-based Link Manager or craft interface. SNMP monitoring is provided.

The IP170 provides significant flexibility in a low-cost mechanical design. It is feature-rich including SNMP, auxiliary control and alarms, and a craft command-line interface

KEY FEATURES

- 1RU Standalone
- Flexible Tx and Rx IF to ODU
- Standard Interfaces
- Supports Customized NMS, SNMP

BENEFITS

- Low Cost Means Better Margins
- Quick to Deploy
- Network Option Cards for Easy Upgrade and Expansion
- Easily Deployed and Activated

APPLICATIONS

- Ethernet IP
- Cellular Backhaul
- Trunking or Access Networks

SERVICES

AVAILABLE

- Technical Support
- Installation and Setup
- Maintenance
- Application Support
- Hardware Support
- Guaranteed Warranty

For more information on any of our products or services please visit us on the Web at:

www.wniglobal.com

Customer Network Data Interface Options

Physical

- Ethernet Full duplex 100BaseTX

Connector

- Ethernet RJ-45

Compliance

- Ethernet IEEE 802.3

Auxiliary Connections

- RS232 Data Service Channel
- Alarm Port Two Form C relay alarm outputs and two TTL inputs

Programmable Modulation Modes	QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM		
Programmable Channel BWs (FlexBand™)	CEPT/ETSI—3.5, 7, 14, and 28 MHz		
Programmable Symbol Rates	• 2 to ~24 M baud • 2 Mbps – 170 Mbps		
Programmable Forward Error Correction	• Configurable Reed-Solomon coding • Configurable interleaving frame length		
End-to-end latency	≤ 1 ms		
Link quality metrics	Supports ITU-T G.826		
Spurious and Out-of-Band Emissions	ETSI compliant		
Interference Immunity	ETSI compliant		
	Modulation	Net bps	Eb/No (dB)
	QPSK	1.81	8.8 dB
	8PSK	2.72	12.2 dB
	16QAM	3.62	12.3 dB
	32 QAM	4.53	14.4 dB
	64 QAM	5.44	16.9 dB
	128 QAM	6.34	19.4 dB
	256 QAM	7.24	21.9 dB
Sensitivity Threshold for BER of 10-8 (RS-encoded with T=12 error-correcting)			

RF/ODU Specifications

Description	Specifications - Typical														
Frequency Range	6L	6U	7	8	10	11	13	15	18	23	26	28	32	38	
	Frequency Bands (GHz)														
	5.9 to 6.4	6.4 to 7.1	7.1 to 7.9	7.9 to 8.5	10.0 to 10.685	10.7 to 11.7	12.7 to 13.3	14.4 to 15.4	17.7 to 19.7	21.2 to 23.6	24.2 to 26.5	27.5 to 29.5	31.8 to 33.4	37.0 to 40.0	
T/R Spacing (MHz)	240, 252.04	340	154, 160, 161, 168, 196, 245	119, 126, 151.614, 208, 266, 311.32	65, 91, 143.5, 230, 350	490, 500, 530	266	315, 420, 475, 490, 640, 644, 728	1010, 1560	1008, 1200, 1232	TBA	TBA	TBA	TBA	
Transmitter															
Type	Dual Conversion – Transmitter Power by Modulation Type														
Xmit Power (dBm)	30.0	30.0	27.0	27.0	27.0	27.0	20.0	20.0	19.0	19.0	19.0	N/A	N/A	19.0	
Xmtr Attn Step (dB)	1	1	1	1	1	1	1	1	1	1	1	N/A	N/A	1	
Xmit Pwr Range (dBm)	-10+27	-10+27	-10+27	-10+27	-10+27	-10+27	-1+20	-10+20	-10+19	-10+19	-10+19	N/A	N/A	-10+19	
TX Power Accuracy at Maximum Command(s) Slew Rate	± 1.5 dB (max) 7.85 kHz/us Group Delay over 48MHz														
Linear	< 5.0 ns														
Parabolic	< 7.0 ns														
Channel Flatness	2 dB, within ±43% of channel BW referenced from center frequency														
TX Spectrum Mask	Meets ESTI Requirements														
Tx Power Accuracy over Command Range (Max)	± 2.0 dB (max)														
Output Power Muted	< -50 dBm														
Frequency Accuracy	± 7 ppm maximum, includes temp variation and aging, ± 8 ppm for 8GHz TR31 1.32 and TR151 .614, ± 9 ppm for 6GHzTR252.04														
Synthesizer Step Size Modulation	250 (except for 8GHz TR311.32:529.464 and TR151.614:530.091, 6GHz TR252.04:352.976) QPSK, 16QAM, 32QAM, 64QAM														
Output Return Loss	> 10 dB										> 6 dB (> 10 Opt.)				
Receiver															
Receiver Noise Figure @ -65 dBm RSL (dB)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	7.0	7.0	N/A	8.0	8.0	
Synthesizer Step Size (KHz)	250 (except for 8 GHz TR 311.32 : 529.464 and TR 151.614 : 530.091, 6 GHz TR 252.04 : 352.976)														
Typical High RSL* (dBm)	-20 (QPSK, 16/32 QAM)														
Typical Thresholds (-dBm)*	QPSK ~92, 16 QAM ~85, 32 QAM ~78, 64 QAM ~75, 128 QAM ~69, 256 QAM ~63														
CW Interferences*	Meets ETSI Requirements														
Receive Signal Level Indicator (V _{BNC})	4.5 (typical) @ -20 dBm RSL, 0.1 (typical) @ -90 dBm RSL, monotonic														
RSL versus V _{BNC}	RSL (dBm) = 15.77 V _{BNC} - 91.58														
RSL Accuracy** (@V _{BNC}) (dB) (Max)	± 3.0, -70 ≤ RSL ≤ -30 dBm														
RSL Accuracy** (dB)	±2 -70 dBm to -30 dBm, ±3 -90 dBm to -20 dBm over temperature and frequency														
Input Return Loss (dB)	≥ 10										≥ 6 (≥ 10 optional)				
Group Delay	Total over 12 MHz (Narrow)					Linear over 28 MHz (Wide)					Parabolic over 28 MHz (Wide)				
Typical (ns)	100					10					10				
ODU Interface															
Connector Type	N Type														
Cable Impedance	50 Ohms														
TX IF Frequency	350 MHz														
RX IF Frequency	140 MHz														
ODU's Primary Power															
Power Dissipation	33.0 to 72.0 VDC, either polarity: 52 (Nom @ 48), 58 (Max @ 33) Watts						19.2 to 72.0 VDC, either polarity: 40 (Nom @ 48), 48 (Max @ 19.2)								
Protection Circuit	Power and protected by IDU (inrush current – ETS 300 132-2)														
CW Rejection															
CW Rejection to adjacent channels	56 MHz (Wide) ± 56 MHz >9 dB ± 112 MHz >20 dB						14 MHz (Narrow) ± 14 MHz >9 dB ± 28 MHz >20 dB								
Environmental, Etc.															
Operating	ETS 300 019-2-4 Class 4M5 to (-33 +55°C)														
Cold Start Conditions	Power Supply Operational @ -45°C, ODU will transmit, no guarantee of quality of service.														
Storage	ETS 300-019-2-1														
Transport	ETS 300-019.2-2														
Mechanical	Weight (3.7 kg), Size (107mm D x 225mm H x 225mm W)														
Finish	(Corro-Coat PE 71-190Z (Powder Coat), Gloss White														
Ground Lug	M5 x .8 x 9.5 long														
Antenna Interface (WR and/or Circ. Inch)	***	***	1.025	1.025	75 or .740	75 or .740	75 or .620	62 or .560	42 or .455	42 or .375	42 or .370	N/A	28 or .250	.219	

* Compliance depends on Customer's unique MODEM attributes.

** An additional offset in accuracy should be expected for customer modulation bandwidths different than those used for receiver calibration.

*** Dielectrically loaded rectangular waveguide interface (non-standard). Requires external waveguide transition to WR137.

Contact Factory for Test Conditions and Specification Changes

Compliance - Summation

Outdoor Unit (ODU) Interface

Intermediate Freq. Range Tx: 350 MHz, Rx: 140 MHz
Emissions Bandwidths ETSI
ODU Command Interface ODU specific

Modem Capability

Capacity Options Throughput from 1 - 170 Mbps
Modulation Programmable: QPSK, 16-QAM, 32-QAM, 64-QAM, 128-QAM, or 256-QAM
FEC (Trellis Coded Modulation concatenated with Reed-Solomon Coding)

Network Management

Support SNMP
Connector 2x10/100BaseTX

Environmental

Temperature -5° to +45°C (IDU)
Relative Humidity 0 to 95%, non-condensing
Power 50-75 Watts (depending on Network Data Interface and ODU version)
ODU: -33° to +55°C, 100% Humidity

Mechanical

Dimensions 1RU, ETSI compliant

Payload Parameters

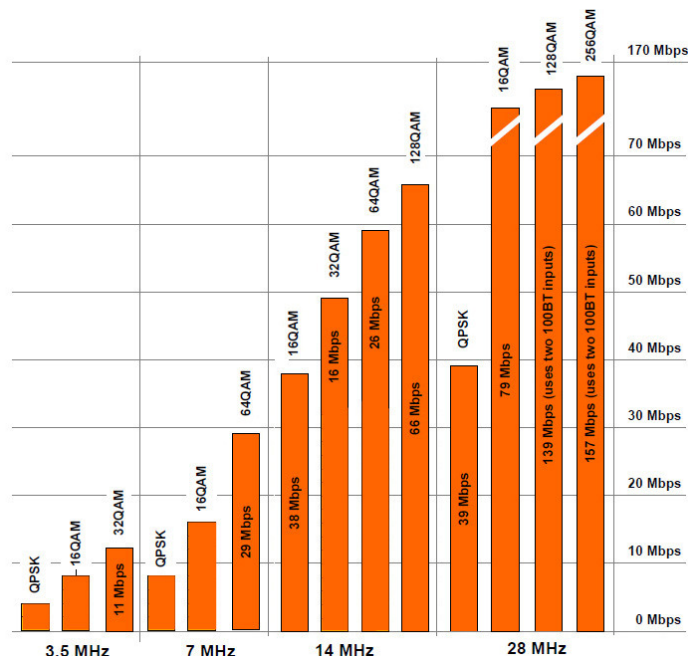
IP Interface 2x10/100BaseT, RJ-45 connector
Standards Compliance IEEE 802.3ab, 802.1Q
User Data Channel 64 kbps, V.11, DB-15 connector
Voice Orderwire 19.2 kbps, Standard handset interface

Mechanical/Environmental

Dimensions IDU: 1U, 444.5 mm W x 240 mm D x 44.5 mm H
Operating Temperature IDU: -5° to +45°C, ODU: -33° to +55°C (ODU)
Altitude 4500 meters
Humidity IDU: 95% non-condensing, ODU: 100% all-weather
Power Input nominal +24 or -48V DC (-20 to -72 VDC)
Power Consumption IDU+ODU: 1+0: ≤60 watts, 1+1 ≤115W
Power Connector 2-pin male
Cooling Natural Convection
IDU-ODU Interface Coaxial N-type connector
ODU Cable Belden 9913/RG-8, up to 300m*
Standards Compliance ETSI ETS 300 019
* longer with LMR400 or equivalent

Management

Protocol SNMPv1
Local Access Ethernet 10Base-T, RJ-45
Remote IDU Access Out-of-band integrated routing over link and interconnected LANs
Craft Interface VT-100, via local craft RS-232/DB-9 port or remote via telnet session
External Alarms 4 inputs and 3 Form-C outputs, DB-25 connector



ODU—Front/Back

Standards Compliance ETSI EN 302 217-2, ETSI EN 301 489, ETSI EN 300 132-2, IEC EN 60950

WNI Global, Inc. 3064 Scott Blvd. Santa Clara, California 95054 USA
Phone +1 408 982.9454 Fax +1 408 982.9456
Email: sales@wnint.com—Web: www.wniglobal.com

Specifications and availability are subject to change without notice.

Performance specifications are for 1+0 configurations and optimum conditions and may be affected by location, environment, and other operating conditions.

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