Network Application

RTN 360 is tailored for service backhaul for small cell base stations that are deployed on buildings or at the street level. RTN 360 plays an important role in the Huawei radio backhaul solution for small cell base stations.

As V-band full-outdoor radio equipment, RTN 360 has the following characteristics:

- RTN 360 operates at the frequency band ranging from 59 GH to 64 GHz. It requires unobstructed line of sight (LOS) and features low inter-site interference and rich idle frequency spectrum resources. A V-band link can span a maximum distance of 300 m, meeting the requirements of service backhaul for small cell base stations. RTN 360 can provide large-capacity microwave links for small cell base stations densely deployed in downtown areas.
- RTN 360 is a highly integrated full-outdoor radio transmission product. Its antenna, RF unit, and baseband unit are integrated into an outdoor unit that supports zero-footprint installation, providing carriers with cost-effective full-outdoor radio solutions.

RF Performance

This section describes major RF performance of RTN 360, including the frequency band, transmit power, and receiver sensitivity.

Table1 RF performance

Item	Performance
Working mode	200 MHz/16QAM
Operating frequency band	59 GHz to 64 GHz
Transmit power	3 dBm
Receive power	• Maximum receive power: -23 dBm • Minimum receive power: -70 dBm
Receiver Sensitivity (BER = 10-6)	-60 dBm
Ratio of timeslots for uplink data to those for downlink data	3:1, 2:1, 1:1, 1:2, and 1:3

Antenna Performance

This section describes the major antenna performance of RTN 360, including the antenna gain, standing wave ratio (SWR), and cross polarization discrimination (XPD).

Table2 Antenna performance

Item	Performance
Antenna gain	34.5 dBi
SWR	10 dB
3 dB beamwidth	1.9 °
XPD	21 dB
Front-to-back ratio (FBR)	> 48 dB
Regulatory compliance	ETSI class 2

Mechanical Performance and Power Consumption

Table3 Mechanical Performance and Power Consumption

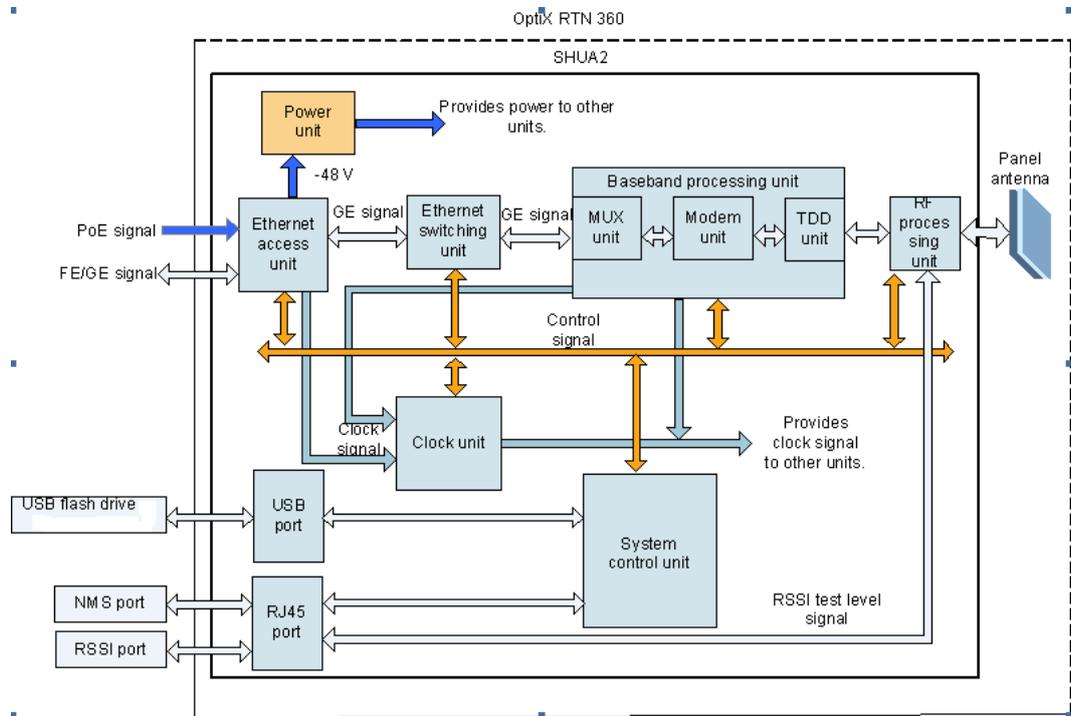| Item	Performance
Dimensions (H x W x D)	192.5 mm x 192.5 mm x 70 mm
Weight	2.5 kg
Typical power consumption	20 W
Power supply	- Supports power over Ethernet. - The input PoE voltage ranges from −38.4 V to −57.6 V.

System Architecture

RTN 360 integrates its functional units into a single chassis.

An RTN 360 has a panel antenna and one physical board, the SLV1SHUA2 board. The SLV1SHUA2 board is displayed as SHUA2 on the network management system (NMS) and occupies logical slot 1.

The SHUA2 board is physically divided into multiple functional units based on logical functions.

Block Diagram

Figue1 Block diagram of RTN 360

Functional Units

Table4 Functional units

Functional Unit	Description
Ethernet access unit	• Receives/Transmits one channel of Ethernet service signals and one channel of PoE signals. • Splits PoE signals into -48 V power signals and FE/GE signals. • Transmits the power signals to the power unit. • Converts serial Ethernet signals into parallel Ethernet signals. • Performs frame delimitation, preamble stripping, and cyclic redundancy checks (CRCs).
Ethernet switching unit	• Processes VLAN tags in Ethernet service signals. • Performs quality of service (QoS) processing for Ethernet frames. • Grooms services and processes protocols.

Functional Unit	Description
Baseband processing unit	• Maps and demaps service signals to/from microwave frame signals. • Processes overhead bytes in microwave frames. • Performs forward error correction (FEC) coding and decoding. • Modulates and demodulates digital signals. • Converts between analog and digital signals. • Uses the TDD unit to control signal receiving/transmitting according to the specified ratio of receive/transmit timeslots.
RF processing unit	• Performs frequency conversion and power amplification, and sends RF signals to antennas in the transmit direction. • Performs isolation, filtering, down-conversion, and power amplification for RF signals, and converts RF signals into low-frequency analog signals in the receive direction.
Antenna	Performs conversion between RF signals and electromagnetic waves.
System control unit	• Configures and manages the system. • Collects alarms and monitors performance. • Processes signals to and from the USB port.
Clock unit	• Traces the specified clock source signals. • Provides clock signals required by the system.
Power unit	• Processes power over Ethernet signals. • Performs DC/DC conversion and provides power signals to other units.

Service Signal Processing Flow

This section describes how the functional units of RTN 360 process power over Ethernet (PoE) signals.
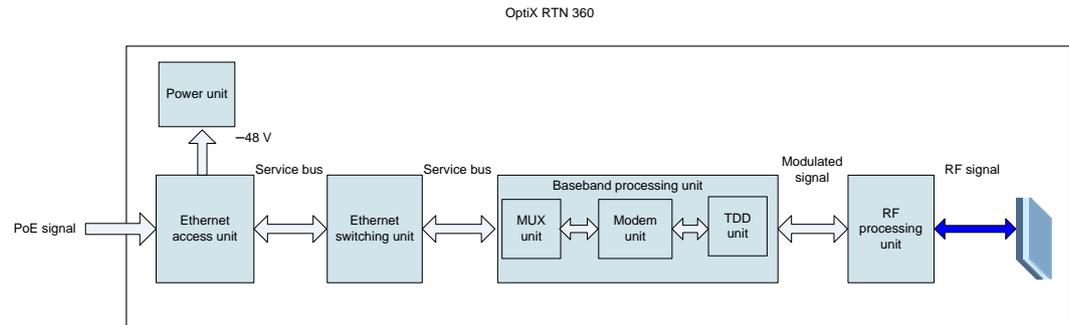
Figue2 Signal processing flow

Table5 Signal processing in the transmit direction

St ep	Functional Unit	Processing Flow
1	Ethernet access unit	• Receives PoE signals. • Splits PoE signals into Ethernet service signals and -48 V power signals. • Transmits the power signals to the power unit. • Extracts Ethernet frames from Ethernet service signals.
2	Ethernet switching unit	• Performs Layer 2 protocol processing and quality of service (QoS) processing for the Ethernet frames. • Transmits processed Ethernet service signals to the baseband processing unit.
3	Baseband processing unit	• Receives Ethernet service signals from the Ethernet switching unit. • Combines Ethernet service signals and microwave frame overheads into microwave frames. • Performs forward error correction (FEC) coding. • Selects a proper modulation scheme based on the current channel quality. • Performs modulation and converts digital signals to analog signals. • Transmits the modulated signals to the RF processing unit using the transmit timeslot specified by the TDD electronic switch.
4	RF processing unit	• Performs up-conversion and power amplification to convert the modulated signals into RF signals. • Transmits the RF signals to the antenna through a flexible waveguide.

Signal processing in the receive direction

St ep	Functional Unit	Processing Flow
1	RF processing unit	• Isolates and filters RF signals. • Performs down-conversion and power amplification. • Transmits the modulated signals to the baseband processing unit.
2	Baseband processing unit	• Receives modulated signals from the RF processing unit using the receive timeslot specified by the TDD electronic switch. • Converts analog signals to digital signals. • Demodulates signals. • Performs FEC decoding. • Extracts overhead signals and Ethernet frames from microwave frames. • Transmits the Ethernet frames to the Ethernet switching unit.
3	Ethernet switching unit	• Receives Ethernet frames from the baseband processing unit. • Processes the Ethernet frames based on service configurations and Layer 2 protocols. • Transmits the Ethernet frames to the Ethernet access unit.
4	Ethernet access unit	Converts parallel Ethernet signals to serial Ethernet signals and transmits them.

Complete bill of material

Attachment

Complete Circuit Diagrams

Attachment

Instruction/Installation Manual

Attachment