System and Equipment Parameters

### System Parameters

<table>
<thead>
<tr>
<th>Frequency Band</th>
<th>4 GHz</th>
<th>5 GHz</th>
<th>L6 GHz</th>
<th>U6 GHz</th>
<th>7 GHz</th>
<th>8 GHz</th>
<th>11 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX Output Power (dBm) (excluding BR CKT loss)</td>
<td>109.0/106.0</td>
<td>109.0/106.0</td>
<td>109.0/106.0</td>
<td>109.0/106.0</td>
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<td>109.0/106.0</td>
<td>109.0/106.0</td>
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<tr>
<td>System Gain (dB at BER = 10^-6) (excluding BR CKT loss)</td>
<td>104.4/101.4</td>
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### Equipment Parameters

#### Transmission Capacity

- STM-1 or OC-3 (155.52 Mbps, electrical or optical interface)
- 64 QAM System: 2 x 2.048 Mbps or 2 x 1.544 Mbps
- 128 QAM System: 1 x 2.048 Mbps or 1 x 1.544 Mbps

#### Power Supply Requirement

- 4 W / 2 W (For 4GHz to 7GHz, excluding BR CKT loss): -48 VDC (-40.5 to -57 VDC)
- 4 W / 2 W (For 8GHz to 11GHz, excluding BR CKT loss): +48 VDC (+36 to +60 VDC) (Optionally available)
- 2 W / 1 W (For 5GHz to 7GHz, excluding BR CKT loss): -24 VDC (-20 to -35 VDC) / +24 VDC (+20 to +35 VDC) (Optionally Available)

#### Total Power Consumption

- Approx. 250 W (for 4 to U6 GHz, 1 + 1 Terminal, e/w SD)

#### Mounting Rack

- ETSI – Rack (ETS 300 119-3)
- 600 (W) x 300 (D) x 2,200 (H) mm
- 600 (W) x 300 (D) x 2,000 (H) mm

#### Operating Temperature (Guaranteed)

- -5 to +50°C

### Abbreviations

- A: Automatic Signal Protection
- ATDE: Adaptive Time Domain Equalizer
- BB: Base Band
- BER: Bit Error Rate
- BR CKT: Branching Circuit
- CAPEX: Capital Expenditure
- CTRL: Control
- BB: Base Band
- DSC: Digital Service Channel
- ETSI: European Telecommunications Standards Institute
- EXT: Extension
- fd: Frequency Diversity
- FEC: Forward Error Correction
- FOTS: Fiber Optic-Transmission System
- GbE: Gigabit Ethernet
- HS: Hot-Standby
- IDB: Interface Distribution Board
- IF: Intermediate Frequency
- ITU: International Telecommunications Union
- LDPC: Low-Density Parity Check
- MDP: Modulator/Demodulator Equipment
- MST: Multiplex Section Termination
- MUX: Multiplexer
- NMS: Network Management System
- NMT: Network Management Terminal
- OC-3: Optical Carrier level 3
- OH: Overhead
- OPEX: Operating Expenditure
- PDH: Plesiochronous Digital Hierarchy
- QAM: Quadrature Amplitude Modulation
- RF: Radio Frequency
- RFCOH: Radio Frame Complementary Overhead
- RST: Regenerator Section Termination
- SD: Space Diversity
- SDH: Synchronous Digital Hierarchy
- STM-1: Synchronous Transport Module level 1
- TRP: Transmitter/Receiver Equipment
- V/H-pol: Vertical/Horizontal Polarization
- XPIC: Cross Polarization Interference Canceller

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5000S

Integrated and Compact SDH Microwave Radio System for Long-Haul Transmission

5000S

Advanced solution for your current and future needs
The ultimate in speed and capacity at the core of broadband transmission

As the demand for high-volume data transmission accelerates, radio systems need capacity large enough to accommodate the evolving market. The optimal solution for more stable, reliable long-term performance is the 5000S—the high-capacity Synchronous Digital Hierarchy (SDH) long-haul microwave radio system made by NEC for synchronous transport module level 1 (STM-1) and optical carrier level 3 (OC-3) data transmission.

NEC SDH (Synchronous Digital Hierarchy) transmission equipment for a range of configurations includes an add-drop-multiplexer and an NMS (Network Management System). Various systems applications such as N+1 Frequency Diversity (FD)/Space Diversity (SD) and Hot-Standby (HS) protection switching systems are available. Expand an existing system configuration simply by adding modules and/or sub-racks to boost transmission capacity. Up to 10 systems with MUX (Multiplexer) can be built into a single ETSI rack.

A complete NEC broadband transmission package, including training and managed service, can maximize the value of your capital and operating expenditures (CAPEX and OPEX). Upgrade speed and capacity at every stage from feasibility study to survey and up to implementation. Gain advantage and apply it on a global scale. The long-term success of your broadband transmission operation depends on it.

**Total Design Concept**

The NEC family of SDH system equipment features a highly-compatible, unified designplatform. The 5000S microwave system technology is based on the longstanding integrity of NEC expertise. With its advanced integrated design, the 5000S accommodates higher data density than other systems of its kind. The equipment comprises two main shelves on a single European Telecommunications Institute (ETSI) rack. Branching (BR) and Transmitter/Receiver Equipment (TRP) sections are built on the upper shelf, with Modulator/Demodulator Equipment (MDP) and Multiplexer (MUX) sections on the lower shelf (Fig. 2).

**Key Specifications**

- **Frequency bands**: 4 to 11 GHz
- **Capacity**: 155.52 Mbps per system
- **Modulation**: 64 QAM, 128 QAM
- **Interface**: STM-1 Electrical/Optical, GbE (with built-in MUX)
- **SDH Termination**: RST (MST available with built-in MUX)
- **Configuration**:
  - N = 0 (1 to 10), N = 1 (1 to 2)
  - Back to Back: 2 x (N = 0) (N = 1 to 2)
  - Repeater: 2 x (N = 0) (N = 1 to 2)
  - XPIB system: 2 x (N = 0) (N = 1 to 2)
  - 1 + 1 Hot-Standby/Twin Path/Space Diversity
  - 1 x 1 Hot-Standby/Twin Path/Space Diversity
  - IF Combined (up to 3 antennas)

**Main Features**

- **Excellent Characteristics**
  - Enhanced modem characteristics
  - Automatic Transmit Power Control
  - Automatic Protection Switch for optical interface
  - Adaptive Equalizer
  - Space Diversity system, available to retrofit
  - Redundant configuration of SRC equipment

- **Improved Error Correction Performance with FEC**
  - Low-Density Parity Check (LDPC) Codes are employed as a forward error correction (FEC) to ensure superior error correction performance.

- **Abundant Digital Service Channels and Way-side Traffic**
  - DSC: 1ch 64 kbps + 1ch 192 kbps or 4ch 64 kbps
  - WS: 1ch (128 QAM) 2 Mbps or 2ch (64 QAM) 1.5 Mbps

- **Alarm, Status and Performance Monitoring**
  - Built-in Performance Monitoring function
  - The operator can perform monitoring and control functions by using the NMT (Network Management Terminal), or by using a Network Management System (NMS).

- **Built-in MUX for 5000S**
  - NEC’s Small Multiplexers offer various types of traffic interfaces such as PDH, SDH and Gigabit Ethernet with flexible network configurations of linear, ring, multiple rings, etc.

- **Conforms to Latest Standards (ITU/ETSI)**

**Fig. 1 SDH Network Application**

**Fig. 2 System Downsizing**