### DTU-70D Series Liquid-Cooled Digital UHF TV Transmitter

#### Configuration Table

<table>
<thead>
<tr>
<th>Output Power</th>
<th>Model Name*1 (Dual-exciter Type)</th>
<th>Equipment Composition</th>
<th>PA</th>
<th>TX Rack</th>
<th>Cooling Pump and BPF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.9kW</td>
<td>2.5kW</td>
<td>2.9kW</td>
<td>2</td>
<td>1</td>
<td>Built-in TX Rack</td>
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<td>16.5kW</td>
<td>12</td>
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<td></td>
</tr>
</tbody>
</table>

*1: Single-exciter type also available. Power variations are the same as shown above.

#### Specifications*2

**Output Power**
- 2.9kW-16.5kW (2.5kW-14.3kW in wide-band mode) *1

**Output Frequency**
- 470 ~ 862 MHz (Band-IV/V)

**Output Impedance**
- 50Ω

**Power Supply Voltage**
- 380/400/415V, 3-phase 4-wire

**Voltage Fluctuation**
- ±15% ±10%

**Power Supply Frequency**
- 50/60Hz ±2%

**Ambient Temperature Range**
- Indoors: 0ºC - 45ºC
- Outdoors: 0ºC - 45ºC, or -30ºC - 40ºC

**Relative Humidity (max)**
- 90% (no condensation)

#### Standard Performance*3

**Frequency Stability**
- ±2.5 x 10⁻⁷ (internal reference use) (it is also possible to lock an external 10MHz reference)

**Amplitude-frequency Response**
- ±0.5dB (excluding BPF)

**Intermodulation Products**
- DVB-T: 6, 7, 8MHz < -36dB
- DVB-T2: 5, 6, 7, 8MHz < -36dB
- ISDB-T/Tb: 6, 8MHz < -36dB
- ATSC: 6MHz < -36dB

**MER (Modulation Error Ratio)**
- DVB-T: > 32dB
- DVB-T2: > 32dB
- ISDB-T/Tb: > 32dB
- ATSC: > 32dB

**SNR (Signal to Noise Ratio)**
- DVB-T: > 32dB
- DVB-T2: > 32dB
- ISDB-T/Tb: > 32dB
- ATSC: > 32dB

**Spurious Emission**
- DVB-T: ≤60dBc
- DVB-T2: ≤60dBc
- ISDB-T/Tb: ≤60dBc
- ATSC: ≤60dBc

**FCC Emission Mask**
- with Output Filter

### Safety Precautions

To install, make connections and operate this product, please carefully read and observe instructions, precautions and recommendations in our instruction manuals.

The colours in this brochure may differ from those of the actual unit. Designs and specifications of this product is subject to change without prior notice.
New concept transmitter with over a century of accumulated expertise in ICT

DTU-70D series are NEC high-power range digital TV transmitters newly developed on the basis of high technology of ICT and deep wisdom gained in a century of history of NEC. In addition to the "reliability" which has been extensively appreciated in the world, one of the essential elements, "high-efficiency", has been added to this new model. NEC offers you DTU-70D with supreme confidence that surely fulfills your high-level expectations.

Further Contribution to Energy Savings
As well as Doherty technology, various factors newly innovated for the NEC latest transmitters considerably contribute to significant improvement of energy efficiency.

NEC has a rich experience in Doherty technology with the first NEC commercial-based transmitter with Doherty amplifiers manufactured in 2011 for Tokyo Metropolitan area, achieving drastic improvement in power consumption (more than 40% better than the existing model). NEC market share of Doherty TX segment in Tokyo has now reached to nearly 50%. And this time, by making the most of this brilliant experience, NEC proposes DTU-70D series with a new concept of Doherty transmitter for global customers.

The core philosophy of NEC Doherty transmitter is to enable the customer to always enjoy the best energy efficiency of each selected channel (up to 38%). By initially fixing the operational frequency of each PA unit into a single channel, DTU-70D achieves the most beneficial and appropriate form of Doherty transmitter. Once users become needed to change channel frequency, a bit of time and work will be requested. But the process is simple; only a few components of the amplifiers have to be replaced and it neither requires any special instruments nor skills. The customers may have to be asked to take such a little burden, but there is no more concern that the enjoyable performance would be fluctuated depending on the designated channel. Minimal lifetime cost solutions (both CAPEX and OPEX efficient) would be effectively ensured.

How we realize “high-efficiency”

Doherty Power Amplifier
NEC new Doherty amplifier, UX6000GF, has been developed to vigorously support the customer’s power-efficient operation. Each unit can produce approximately 1,500W of output power (average), and it can also greatly contribute to the cost and space saving.

UX6000GF employs LDMOS (Lateral Diffused Metal Oxide Semiconductor) output devices with protection and monitoring circuits, and strongly support the high linearity and reliability of DTU-70D series.

Cooling system with hybrid closed circuit
The liquid cooling system incorporates an automatic air-purge function and no external pump is requested to feed coolant. These features work together to cut noise and installation costs, making the maintenance easier and boosting reliability. Coolant feeding and dust removal have been greatly simplified by a hybrid closed circuit, ensuring the coolant remains clean.

N+1 Configuration
N+1 configuration can be constructed with NEC original controller. N+1 system must further boost up DTU-70D’s reliable operation.

Adaptive Digital Correction (ADC)
The adaptive digital corrector incorporated in NEC digital exciter has linear and non-linear pre-corrective function, and stably keeps signal quality and service coverage optimum. The reliability and stability of DTU-70D are strongly boosted up by this NEC performance advantage.

How does Adaptive Digital Correction work?
Adaptive Digital Correction (ADC) uses an adaptive digital corrector to control the settings of the power amplifier. The settings are adjusted based on the variations in temperature to ensure optimal signal quality.

The Adaptive Digital Corrector (ADC) in NEC digital transmitters is a technology that adjusts the gain of the power amplifiers based on changes in the operating conditions. This is important because it helps to maintain the signal quality and coverage across different operating conditions.

For example, if the operating temperature of the transmitter increases, the power amplifiers may require an adjustment to maintain the desired level of output power. The ADC performs this adjustment automatically, ensuring that the signal remains stable and consistent.

This technology is especially useful in environments where temperature variations are common, such as in outdoor installations. It helps to ensure that the performance of the transmitter remains optimal, even in challenging conditions.

Remote Control/Monitoring System
DTU-70D series is equipped with an IP network interface, the customer can easily access NEC transmitters through a web browser and remotely check the signal quality and actual status of the transmitters.
New concept transmitter with over a century of accumulated expertise in ICT

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Further Contribution to Energy Savings

As well as Doherty technology, various factors newly innovated for the NEC latest transmitters considerably contribute to significant improvement of energy efficiency. Especially DTU-70D can achieve low accumulated power loss by following the excellent design which was dynamically improved for the previous model, DTU-70. Besides, total power consumption of the cooling system has been remarkably improved by renovation of its fundamental designs. These sophisticated skills are multi-rationally supporting stable performance with high energy efficiency.

New Concept of Doherty Transmitter

NEC has a rich experience in Doherty technology with the first NEC commercial-based transmitter with Doherty amplifiers manufactured in 2011 for Tokyo Metropolitan area, achieving drastic improvement in power consumption (more than 40% better than the existing model). NEC market share of Doherty TX segment in Tokyo has now reached to nearly 50%. And this time, by making the most of this brilliant experience, NEC proposes DTU-70D series with a new concept of Doherty transmitter for global customers.

The core philosophy of NEC Doherty transmitter is to enable the customer to always enjoy the best energy efficiency of each selected channel (up to 38%). By initially fixing the operational frequency of each PA unit into a single channel, DTU-70D achieves the most beneficial and appropriate form of Doherty transmitter. Once users become needed to change channel frequency, a bit of time and work will be requested. But the process is simple; only a few components of the amplifiers have to be replaced and it neither requires any special instruments nor skills. The customers may have to be asked to take such a little burden, but there is no more time and work will be requested. But the process is simple; only a few components of the amplifiers have to be replaced and it neither requires any special instruments nor skills. The customers may have to be asked to take such a little burden, but there is no more concern that the enjoyable performance would be fluctuated depending on the designated channel. Minimal lifetime cost solutions (both CAPEX and OPEX efficient) would be effectively ensured.

How we realize “high-efficiency”

Doherty Power Amplifier

NEC new Doherty amplifier, UX5000QF, has been developed to vigorously support the customer’s power-efficient operation. Each unit can produce approximately 1,500W of output power (average), and it can also greatly contribute to the cost and space saving.

UX5000QF employs LDMOS (Lateral Diffused Metal Oxide Semiconductors) output devices with protection and monitoring circuits, and strongly support the high linearity and reliability of DTU-70D series.

Cooling system with hybrid closed circuit

The liquid cooling system incorporates an automatic air-purge function and no external pump is requested to feed coolant. These features work together to cut noise and installation costs, making the maintenance easier and boosting reliability. Coolant feeding and dust removal have been greatly simplified by a hybrid closed circuit, ensuring the coolant remains clean.

N+1 Configuration

Maximum 8+1 configuration can be constructed with NEC original controller. N+1 system must further boost up DTU-70D’s reliable operation.

Adaptive Digital Correction (ADC)

The adaptive digital corrector incorporated in NEC digital exciter has linear and non-linear pre-corrective function, and stably keeps signal quality and service coverage optimum. The reliability and stability of DTU-70D are strongly boosted up by this NEC performance advantage.

Customer-oriented Design

High density design

Cooling pump and band-pass filter can be carried in a single TX rack; this “built-in solution” can contribute to remarkable reduction of total footprint. This solution can be selected with the configuration carrying up to 5 sets of PA.

Easy conversion between Doherty and Wideband mode

The flexibly designed power amplifiers for DTU-70D allows the customer to switch from high-efficiency mode to wideband operation through a little modification work. It could contribute to the savings in the number of spare amplifiers to be held.

Remote Control/Monitoring System

DTU-70D series is equipped with an IP network interface, the customer can easily access NEC transmitters through a web browser and remotely check the signal quality and actual status of the transmitters.
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<tr>
<th>Output Power</th>
<th>Model Name</th>
<th>Equipment Composition [Sets]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doherty</td>
<td>Wideband</td>
<td>TX Rack</td>
</tr>
<tr>
<td>2.9kW</td>
<td>2.5kW</td>
<td>2</td>
</tr>
<tr>
<td>4.9kW</td>
<td>3.9kW</td>
<td>2</td>
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</tr>
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<td>14.3kW</td>
<td>2</td>
</tr>
</tbody>
</table>

Specifications

- Output Power: 2.9kW-16.5kW (2.5kW-14.3kW in wide-band mode)
- Output Frequency: 470 - 862 MHz (Band-IV/V)
- Output Impedance: 50Ω
- Input: 2 x ASI, BNC 75Ω
- Power Supply Voltage: 380/400/415V, 3-phase 4-wire
- Voltage Fluctuation: -15%, +10%
- Power Supply Frequency: 50/60Hz +/-2%
- Ambient Temperature Range: Indoors: 0ºC - 45ºC
- Relative Humidity: 90% (no condensation)

Standard Performance

- Frequency Stability: ±2.5 x 10⁻⁷ (internal reference use)
- Amplitude-frequency Response: ±0.5dB (excluding BPF)
- Intermodulation Products
  - DVB-T: < -36dB
  - DVB-T2: < -36dB
  - ISDB-T/Tb: < -36dB
  - ATSC: < -36dB
- MER (Modulation Error Ratio): > 32dB
- SNR (Signal to Noise Ratio): 27dB

Safety precautions

To install, make connections and operate this product, please carefully read and observe instructions, precautions and recommendations in our instruction manuals.

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Americas and Global Platform Division
Europe, the Middle East and Africa Division
Greater China and Asia Pacific Division

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