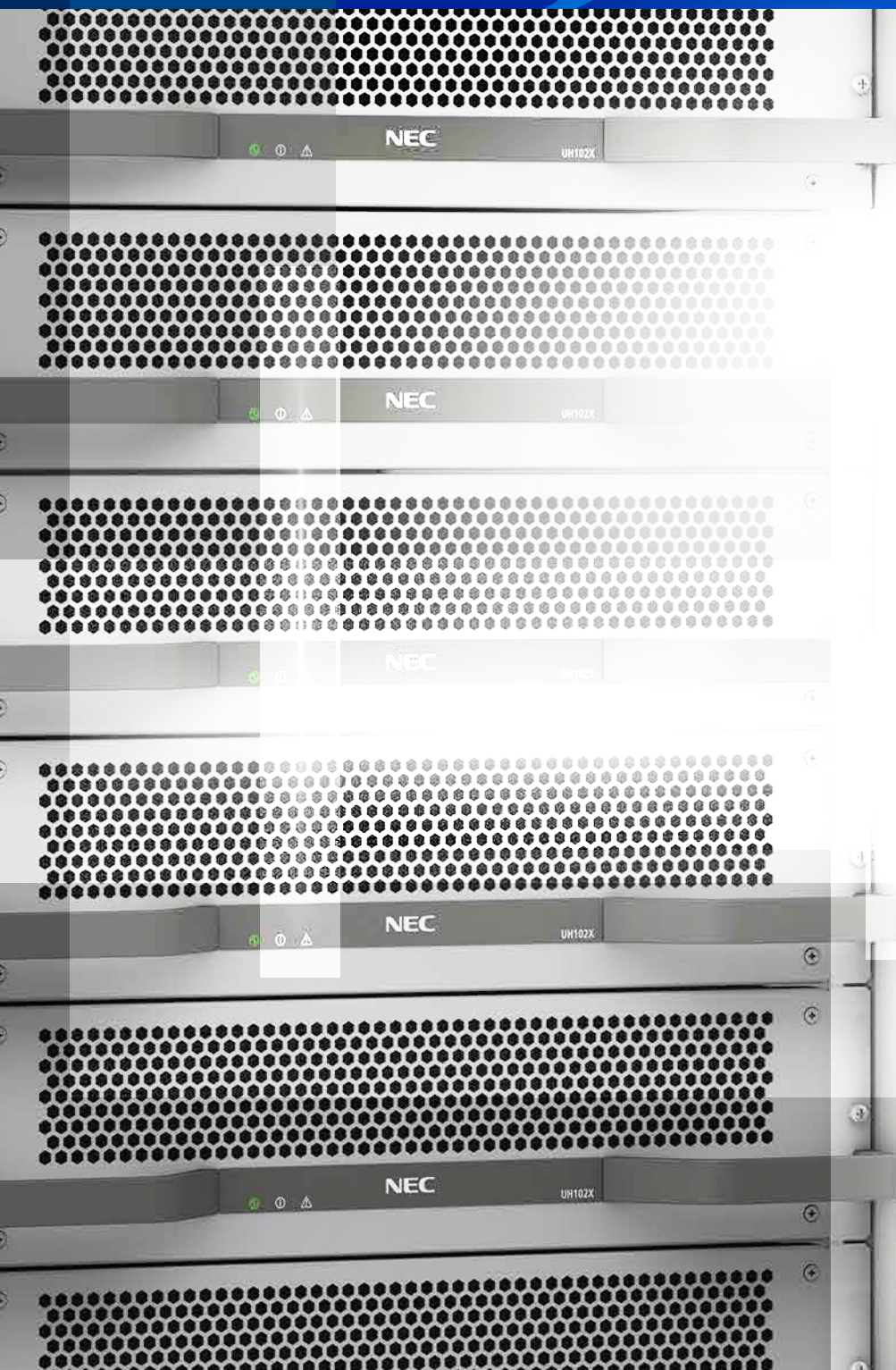


Orchestrating a brighter world

NEC

DTU & DTV Family

UHF/VHF Digital TV Transmitters



The new benchmark for energy efficiency

DTU & DTV series are UHF/VHF digital TV transmitter family made in Japan on the basis of NEC's advanced technology and knowledge gained throughout NEC's Broadcast product history. In addition to the reliability proven by our accumulated experience and achievements over the years, world's top-level power efficiency beyond 38% in UHF and 46% in VHF would strongly satisfy the demands of customers around the world.

NEC have a rich experience in Doherty technology with its first commercial-based digital TV transmitter with Doherty amplifiers manufactured in 2011 for Tokyo Metropolitan area, achieving significant improvement in power consumption (more than 40% better than the previous model). The DTU & DTV series join the lineup of NEC digital TV transmitters offering three noteworthy features: one step ahead in level of high power-efficiency, sophisticated concept for easier maintenance, and user-oriented design.

OVER 38% (UHF) AND 46% (VHF) OF ENERGY-EFFICIENCY



While increase in electricity tariff is world phenomenon, we, NEC, believe that every user will welcome even a slight increase in energy efficiency. In a comparison between 38% and 32% as one of examples, savings over US\$50,000 in the electricity charge can be achieved through 10-year operation with 10kW output power*1. Moreover, it is, nowadays, important to evaluate products from the viewpoint of environmental impact. More than 200t of CO2 emissions will be saved in a period 10 years with the same conditions *2

Note 1) Electricity tariff is assumed to be \$0.12/kwh
Note 2) The emission coefficient is premised as 500kg/kwh.



UHF 15.1kW Dual-Exciter Model (DTU-H10/15R1P)

NEC History

1899
"Nippon Electric Co., Ltd." was established as the first Japan's joint venture with foreign capital, starting mainly with a business of telephones, switching equipment, etc. with the corporate slogan "Better Products, Better Service,".

Broadcast

1934
NEC manufactured the first short-wave radio and middle-wave radio transmitters with the highest level of power potential at that time.



Symbolic Events

1919
The first common-battery switchboards for domestic long-distance toll calls was produced.

1952
NEC awarded Deming Application Prize, a global quality award, as the first communications-industry company.

NEC feel proud to introduce the world-leading energy efficient models of UHF/VHF digital TV transmitters, which certainly make contribution to save electricity cost and the environment. The new DTU & DTV series which are developed based on NEC's original concept and design effectively achieve energy efficiency of more than 38% in UHF and 46% in VHF operation. Through this achievement, all users can fully enjoy the high-grade performance in any channel they need.

TOP-LEVEL OF OPERABILITY & MAINTAINABILITY

The new lineups of NEC digital transmitters bring top-level of operability and maintainability on the basis of the user-oriented design concept particularly focusing on mitigating operators' heavy works. Along with the high energy efficiency mentioned earlier, this is also a key factor to surely cut the running cost.

A power amplifier unit has been downsized and the weight-saving model which reaches around 20kg with the aim to enable the operators to carry out maintenance operation by a single person.

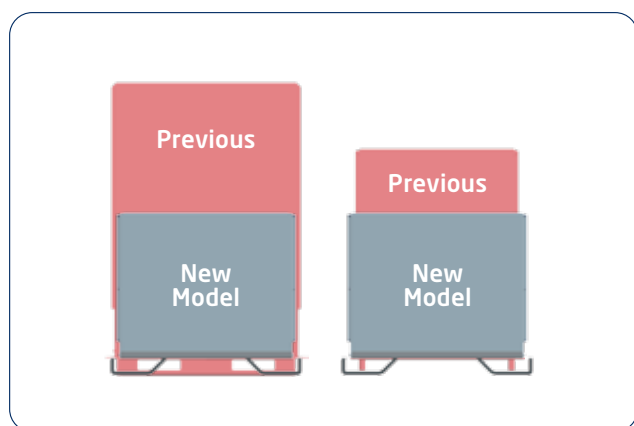


Image 1. Comparison of new-designed PA unit with the former model

This new model certainly makes a great contribution not only to reduce the labor cost for maintenance but also enables ease of operation in case urgent replacement of amplifier unit is required.

Additionally, the PA unit is designed for unlimited channel frequency and therefore the users can own a common PA spare unit in the case of multi-channel operation. Once the alteration of PA unit becomes necessary, the users can simply replace with a spare unit without any other additional process. Neither specific skills nor special instruments would be needed to maintain/replace the PA unit. By virtue of this new design concept, it fulfills the saving of expenditure for spare amplifiers, and what is more, it soundly supports customer's easier operation.

USER-ORIENTED DESIGN

DTU & DTV series are equipped with a user-friendly interface which has been modified on the basis of the past user's recommendations and the concept of human-interface. The improved operation interface at the front panel of the transmitter enables easy-access and easy-management of the most prioritized information to surely support the users' efficient maintenance works. Other than the local operation, the users can check actual status of the equipment through LAN Interface

Software installed in the principal components of TV transmitter*3 can be updated via remote control. This saves the hassle of manually updating the software.

Note 3) Control Unit, Digital Exciter and Power Amplifier.

1956
TV transmitters (Band-I/III) exclusively made in Japan were first delivered to the Japanese broadcasters.



1963
Automatic Program Control System with relay circuits was supplied and some kept playing a role till the 90's.



1974
NEC released a Frame-Synchronizer as the world's first product and won the 1st Emmy Award.



1980
NEC received the 2nd Emmy Award for Digital Video Effect with the highest advanced technology and operability.



1964
NEC-supplied satellite communication facilities were successfully performed at the Olympiad in Tokyo.

1977
Concept of "C&C", integration of Computers and Communications, was first presented at INTELCOM '77.

Apart from the features mentioned earlier, the DTU & DTV series are fitted with some functions worthy to be introduced here.

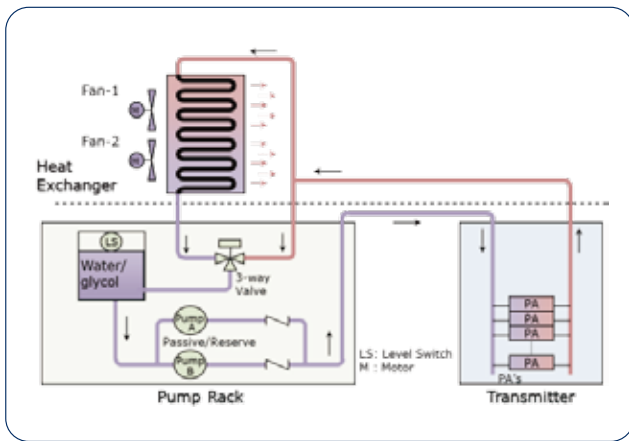


Image 2. Schematic Block Diagram of Liquid Cooling System (with redundancy)

The liquid cooling system, available in NEC's high-power transmitters^{**4} incorporates an automatic air-purge function that eliminates the need for an external pump to feed the coolant. These features work together to cut noise and installation costs, making the maintenance easier and boosting the reliability. Coolant feeding and dust removal have been greatly simplified by a hybrid closed circuit, ensuring that the coolant remains clean with single or dual pump (selectable) for both internal and external design. Furthermore, a new method adopted on the cooling circuit effectively works at preventing the coolant from oxidation. Thus, the users can be eased by much less periodic exchange of the cooling liquid.

Note 4) The following two models are the liquid cooling types;
DTU-H10 (UHF) and DTV-H20 (VHF) series.

A new design concept is incorporated in a form to mount exciter and transmitter control unit. Card-type modules with each different function are equipped in a common control box. This renewed implementation method enhances the mounting efficiency inside the transmitter rack, thereby achieving to offer diversified configuration such as multiple transmitters and N+1 redundant system in a single rack.

Besides, this high density solution promotes to reduce the footprint of transmission system. A pump unit can be built in single rack with up to six power amplifiers, and it gives the customers greater savings of installation in space and the installation costs.

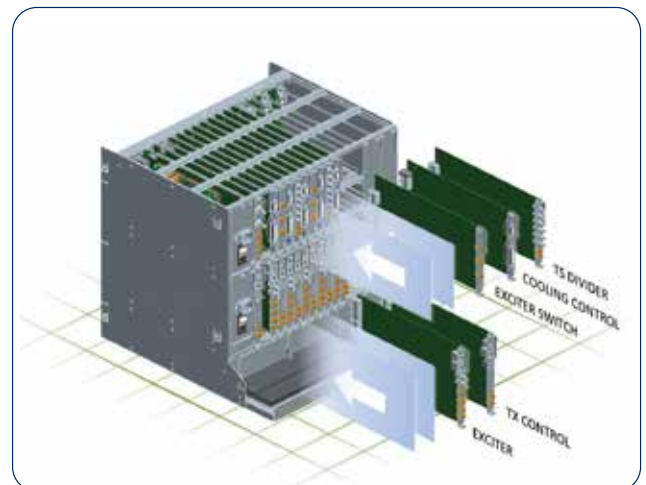


Image 3. System Enclosure with Multi-Functional Modules

1984

NEC announced a Full Solid-State UHF TV Transmitter composed of original transistor amp-circuits.



1997

NEC supplied the first TV transmitter for digital terrestrial service in Europe.



2011

The first commercial-based digital TV transmitter with Doherty amplifiers was manufactured for Tokyo Metropolitan area.



2014

Ahead of others in the world, NEC released FPGA-based Real-Time Encoder for 4K/UHD.



1991

The world's first notebook-sized PC with color LCD was announced.

2010

"Hayabusa", unmanned spacecraft that NEC coordinated its system design, succeeded in bringing asteroid samples back to the Earth

Configuration Table

Liquid-cooled Model

	DTU-H10(UHF)		DTV-H20(VHF)				
PA Quantity	Output power [kW] (AVG) *1	Output Feeder Size	Output power [kW] (AVG) *1	Output Feeder Size	Dimensions (H x W x D) mm	Number of transmitters per rack with MultiTX	
	Doherty/Normal 470-790 MHz		Doherty/Normal 170-230 MHz				
1	1.30	1+5/8"(39D)	1.30	1+5/8"(39D)	2000 x 590 x 1000	4	
2	2.60		2.60				
3	3.90		3.90				
4	5.20	3+1/8"(77D)	5.20	3+1/8"(77D)			3
5	6.40		6.50				2
6	7.70		7.80				
7	9.00		9.10				
8	10.2		10.4				
9	11.5		11.7				
10	12.7		4+1/2"(103D)			12.9	
11	13.9	14.2					
12	15.1	15.5					

*1: Measured before mask filter.

Air-cooled Model

	DTU-M10(UHF)		DTV-M20(VHF)			
PA Quantity	Output power [kW] (AVG) *1	Output Feeder Size	Output power [kW] (AVG) *1	Output Feeder Size	Dimensions (H x W x D) mm	Number of transmitters per rack with MultiTX
	Doherty/Normal 470-790 MHz		Doherty/Normal 170-230 MHz			
1	0.65	7/8"(20D)	0.74	7/8"(20D)	2000 x 590 x 800	6
2	1.30	1+5/8"(39D)	1.45	1+5/8"(39D)		4
3	1.90		2.20			3
4	2.50		2.90			2
5	3.20		3.60			1
6	3.80	3+1/8"(77D)	4.30			
7	4.40		5.00			
8	5.10		5.70			

*1: Measured before mask filter.

Specifications

Broadcast Standards* ²	DVB-T	DVB-T2	ISDB-T/Tb	ATSC
Output Power	Refer the Configuration Table			
Output Frequency* ³	DTU Series: 470 - 790 MHz (Band-IV/V)		DTV Series: 170-230MHz (Band-III)	
Output Impedance	50Ω			
Input	2 x ASI, BNC 75Ω 2 x IP	2 x ASI (TS/T2-MI), BNC 75Ω 2 x IP	2 x ASI, BNC 75Ω 2 x IP	2 x SMPTE310/ASI, BNC 75Ω 2 x IP
Power Supply Voltage	380/400/415V, 3-phase 4-wire			
Voltage Fluctuation	-15%, +10%			
Power Supply Frequency	50/60Hz +/-2%			
Ambient Temperature Range	Indoors: 0°C - 45°C			
	Outdoors: 0°C - 45°C or, -30°C - 40°C (This value is applied for Liquid Cooled Model)			
Relative Humidity (max)	90% (no condensation)			

*2: The latest standards not listed here shall also be complied with as needed.

*3: In case more than 790MHz is to be required, the request will be considered accordingly in each time.

Standard Performance *⁴

Broadcast Standards* ²	DVB-T	DVB-T2	ISDB-T/Tb	ATSC
Frequency Stability	$\pm 1.0 \times 10^{-7}$ /year (internal reference use) (it is also possible to be locked by an external reference)			
Amplitude-frequency Response	± 0.5 dB (excluding BPF)			
Bandwidth	6, 7, 8MHz	6, 7, 8MHz	6, 8MHz	6MHz
Intermodulation Products	< -36dB	< -36dB	< -36dB	< -36dB
MER (Modulation Error Ratio)	> 32dB	> 32dB	> 32dB	> 32dB
SNR (Signal to Noise Ratio)	---	---	---	≥ 27 dB
Spurious Emission	≤ -60 dBc	≤ -60 dBc	≤ -60 dBc	FCC Emission Mask with Output Filter

*4: The values shown above are our standard specifications for practical use and higher performance can be set on request.

ISO/IEC 27001

ISO/IEC 27001 JQA-IM1064
Broadcast and Media Division

ISO 9000 Series

ISO 9001 JMI-0119
Broadcast and Media Division

ISO 14001

JQA-E-90066
NEC

Safety Precautions

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

● The Colors in this brochure may differ from those of the actual unit. Designs and specifications of this product is subject to be changed without prior notice.

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