Broadcasting DTV





MP Series - EX9001 High Efficiency UHF Transmitters ISDB-T TV Digital: 150 to 300 Watts RMS



English





MP Series

E-Compact Family of UHF Medium-Power Digital TV Transmitters. Fully solid-state, air-cooled, and featuring a standard 19" rack modular structure.

Compact, with high density and efficiency, embedded with adaptive nonlinear pre-correction technology; allowing for the recovery of typical MER values in case changes occur in the equipment's output power.

It includes the option of Dual Exciter, providing automatic redundancy to the equipment without the need for separate control module management.

Power Drawer with Doherty topology amplifiers, high-energy performance, with efficiency up to 38%.

Highlights



- ISDB-T EX9001 Exciter with System on Chip (SoC) technology.
- Measurement tools through the WEB interface. In a graphical environment, it provides visualization of measurements such as Intermodulation and MER, eliminating the need for expensive measurement equipment.
- Equipment control, including Power Drawer, executed by the Exciter, eliminating the need for external control units.
- Power Drawers with high-efficiency Doherty topology, operating at 215 or 400W RMS @ ISDB-Tb.
- Real-Time adaptive nonlinear pre-correction and linear pre-correction functions.
- Parametrizable embedded BTS decompressor, allowing compatibility with other brands.
- Embedded remux, enabling signal adjustment according to transmission needs.
- Embedded satellite receiver, with optional licenses for Free to Air, IRDETO², CONAX², VERIMATRIX², NAGRAVISION², BISS-1, and BISS-E.
- Automatic control of fan speed, resulting in low noise levels, energy savings, and extended device life.
- Up to two power supplies per transmitter, operating in shared mode, providing different levels of energy redundancy.
- "Easy Maintenance" concept offering, among other features, Plug-In connection for Power Drawer power supplies.



Available Features

System on Chip (SoC) Technology

The SoC hardware integrates various system elements into a single chip, allowing the embedding of high-processing-power software. This makes it a compact system with significant processing power and high reliability.	AVAILABLE
Measurement Tool MER, Intermodulation, Power, Temperature, and other measurements via WEB in a graphical environment. Enables the visualization of constellation and spectral density diagrams, among others, providing a cost-effective alternative for measuring these parameters.	AVAILABLE
Remote Software Update It is possible to update the equipment's software remotely through the WEB interface.	AVAILABLE
Power supplies with plug-in connection, eliminating the need for cables and wiring and allowing for quick and secure replacement. Power supplies can be removed via the front panel of the Power Drawer.	AVAILABLE
Embedded WEB Server	
Remote access to transmitter settings and management is possible via PC or Smartphone through the Ethernet ¹ port. It utilizes the PC or Smartphone's own browser, eliminating the need for driver or application installations.	AVAILABLE
Adaptive Linear and Nonlinear Pre-Correction Adaptive pre-correction applied due to changes in the transmitter's output power to imperceptibly recover MER and intermodulation values.	AVAILABLE
BTS Decompression	
Parametrizable BTS decompressor, embedded in the transmitter, eliminates the need for auxiliary equipment in the system and enables interoperability with other brands.	AVAILABLE
Remux and Embedded Table Generator Table generator embedded in the transmitter, with the ability to filter PIDs, insert static PSI/SI tables, parameterize TMCC, among other functionalities.	AVAILABLE
Exciter Inputs/Outputs	
Inputs: BTS/TS over IP, 2x ASI/310M, 1PPS, 10MHz, and GPS ANTENNA. Outputs: 2x ASI/310M, 1PPS, 10MHz, and Ethernet ¹ RJ45. The BTS/TS over IP input can be converted to ASI and made available in the ASI/310M outputs without interfering with the modulated signal	AVAILABLE
Possive Elements	
Mask filter, directional coupler with integrated FWD and REF signal samples, combined with a low-pass filter. HITACHI 1200W Power Supply	AVAILABLE
Power supplies with a plug-in connection ("Easy Maintenance" concept), eliminating the need for cables and wiring, enabling quick and secure replacements.	
EC702MP: 01 power supply present in the Power Module.	AVAILABLE
EC704MP operating up to 250 Watts RMS after the filter: 01 power supply present in the Power Module.	
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General Features

Exciter model EX9001 with System on Chip (SoC) technology.

19" Rack Standard.	
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Fully solid-state;

Doherty Power Drawers of 215 or 400 Watts RMS with LDMOS transistors;

Air-cooled;

Automatic restart in case of power outage;

Operates in SFN (Single Frequency Network) and MFN (Multiple Frequency Network);

Control firmware managing the entire equipment;

Access to settings and parameter management via the display interface on the Exciter's front panel or remotely via Ethernet¹ (WEB server or SNMP);

Alarm signaling LEDs on the Exciter's front panel and Power Drawer;

Access to the list of current or past alarms via the display interface on the Exciter's front panel or remotely via the WEB interface;

VSWR and Overpower protection via hardware and software, with automatic power reduction;

Software protection against module temperature increase, with alarm signaling and power reduction;

Automatic fan speed control;

Automatic compensation of the power transistor bias quiescent current based on temperature;

Adjustment of the transistor AGING compensation via the display on the Exciter's front panel;

Automatic and programmable input switching in hold-on and hold-off modes;

Power supply with Power Factor Correction (PFC) and soft start with In-Rush limitation.

Specific Features (EX9001 - ISDB-Tb)

	EC702MP	EC704MP
Output power after the filter (W) ³	150	300
Output power before the filter (W) ³	211	400
AC power consumption (W) ³	750	1170
Thermal dissipation (BTU/h) ³	2047	2969
Efficiency after the filter (%) ³	20,0	25,6
Efficiency before the filter (%) ³	28,1	34,2
Exciter dimensions height x width x length (mm)	1 RU x 19" x 505	
Power Drawer dimensions height x width x length (mm)	2 RU x 19" x 635	
Weight of the Exciter and Power Drawer assembly (Kg)	23,2	26,0
19" Rack Units (RU) Rack-mount version		8

Transmission Spectrum Mask (Intermodulation) 4

	Critical Mask	Subcritical Mask	Non-critical Mask
±3,15 MHz @ BW = 6 MHz	≥50 dB	≥43 dB	≥36 dB
±4,50 MHz @ BW = 6 MHz	≥67 dB	≥60 dB	≥53 dB
±9,00 MHz @ BW = 6 MHz	≥97 dB	≥90 dB	≥83 dB
±15,00 MHz @ BW = 6 MHz	≥97 dB	≥90 dB	≥83 dB

Transmission spectrum mask according to ABNT NBR 15601:2007



Technical Specifications

RF	
Standard	ISDB-T
Operation frequency	470 MHz to 806 MHz (Chanel 14 to Chanel 69)
Bandwidth	6 MHz / 8 MHz
Minimum operating power	1 % of rated power
Pré-correction	Adaptive Nonlinear Linear
MER	Minimum ≥35 dB. Typical 38 dB (depends on channel, power, and transmitter efficiency)
Out-of-channel spurs and harmonic distortions	Better than -60 dBc
Transmission Mask (Intermodulation) ⁴	Critical Subcritical Non-critical
Power stability	±2 %
RF output impedance	50 Ω
Output Connections	N-Female DIN 7/16" Female EIA 7/8" EIA 1 5/8"
ASI Inputs / Outputs	
Quantity	02 inputs, 02 Outputs
Standard	DVB-ASI 188 /204 BYTES
Connectors	BNC Female
Impedance	75 Ω
Input TSoIP	
Standard	IEEE802,3u 10 Base-T /100Base TX
Connector	RJ45
Encapsulation	UDP/RTP
IP assignment	Static
Multicast	IGMP v2
GPS antenna input (optio	nal)
Connectors	SMA Female
Impedance	50 Ω
Accessories	External antenna, cable and surge protector
UHF / VHF-BIII Tuner Inpu	it (optional)
Reception band	UHF / VHF-BIII
Standard	ISDB-T
Connectors	SMA Female (Exciter) N Female (input UHF filter)
Impedance	50 Ω

Satellite tuner input (optional)		
Reception band	L band	
Polarization	Vertical / Horizontal	
LNB voltage	+13 V, +18 V	
Standard	DVB-S / DVB-S2	
Connectors	SMA Female (Exciter) F Female (connection w/ LNB)	
Impedance	75 Ω	
Accessories	surge protector	
CAS tuner input (optional))	
Reception band	L band	
Polarization	Vertical / Horizontal	
LNB voltage	+13 V, +18 V	
Standard	DVB-S / DVB-S2	
Connectors	SMA Female (Exciter) F Female (connection w/ LNB)	
Impedance	75 Ω	
Optional decryption licenses ³	IRDETO ² CONAX ² NAGRAVISION ² VERIMATRIX ² BISS-1 BISS-E	
Accessories	surge protector	
10MHz external references	s - Input / output	
Quantity	01 input, 01 output	
Connector	BNC Female	
Impedance	50 Ω	
Input level	0 a +10dBm	
Output Level	+10 dBm	
1PPS external references	- Input / output	
Quantity	1 input, 1 output	
Connectors	Female BNC	
Impedance	1 kΩ	
Input Level	3.3V LVTTL	
Output Level	3.3V LVTTL	
Linearization inputs After	F. / Before F.	
After Filter Input	Linear pre-correction	
Before Filter Input	Nonlinear pre-correction	
Connector	SMA Female	
Impedance	50 Ω	
Input level	-5 to +5 dBm	



Local oscillator		
Oscillator	Synthesized by PLL	
Frequency stability	±1 Hz (with Internal GPS) ±35 Hz (without Internal GPS)	
Phase noise	≤-95 dBc/Hz @ 1 kHz	
ISDB-T Modulation		
Mode OFDM	Mode 1: 2K (2048/3,96 KHz) Mode 2: 4K (4096/1,98 KHz) Mode 3: 8K (8192/0,99 KHz)	
Guard interval	1/4, 1/8, 1/16, 1/32	
Partial reception	Single segment for mobile devices (1-Sec)	
Hierarchical Transmission	Support for 3 layers (A, B and C)	
Segments	1 to 13	
Modulation	QPSK, DQPSK, 16QAM, 64QAM	
FEC	1/2, 2/3, 3/4, 5/6, 7/8	
Time Interleaving	0, 1, 2, 4	

Local Equipment Control Interface	Graphic display 256x64 pixels	
Signaling LEDs	Navigation cursor keys	
Remote Access	Alarm LEDs on the Exciter	
(Management)	RJ45 connector	
Operating Environment C	haracteristics	
Operating altitude	Up to 2500 meters ⁵ (8200 ft) ⁵ above sea level	
Environment temperature range	0°C (32°F) to + 45°C (113°F) +25°C (77°F) recommended	
Environment humidity range	0 to 95 % non-condensing	
Power amplifier cooling	Forced ambient air, front-to- rear flow through high-volume integral fans	

Electrical Characteristics

Model	PSU	AC Power	Maximum power after the filter
EC702MP	1	80 to 254 VAC	150 Watts
EC702MP	2	00 to 254 VAC	150 Watts
EC704MP	1	80 to 254 VAC	250 Watts
EC704MP	2	00 to 254 VAC	250 Watts
EC704MP	2	80 to 254 VAC	300 Watts
AC Freq	Frequency 43~63 Hz		
	PFC	0.95 (typical), 0.9 (minimum)	

Mounting Options



Desktop

Equipment mounted on a mechanical support for fixing all peripherals and accessories to the transmitter, including the optional ones;

Interfaces

Transmitter and its peripherals/fixed accessories, forming a single set; Support compatible with fixation on 19" Racks;

Filter attached directly to the mechanical support.



Rack

Standard 19" rack in 8U size aluminum with reinforced frame; Connection interfaces available on the top panel of the Rack; Filter attached to independent rack support Removable coin-beam rack side and rear panels: easy access and organization of internal devices; AC power protection circuit; Three to four vacant slots to accommodate options or other standard 19" rack equipment;

Notes:

¹ Ethernet is a trademark of Xerox Corporation.

² Module with PCMCIA CAM slot (Irdeto, Conax, Nagravision, and Verimatrix systems), SMARTCARD, and CAM not included.

³ Considering optimized channel and environmental conditions. May vary according to channel frequency and operating conditions.

⁴ Transmission mask depends on the type of filter used.

⁵ Nominal power up to 2500m. Above 2500m, consult the factory.

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