BTESA
BROAD TELECOM

AIR COOLED TV TRANSMITTERS

1.3kWrms DVB-T2 / ISDB-T transmitter

Digital / Analogue

VHF / UHF

Doherty available

Power ranges:

300W to 4kWrms in DVB-T/T2/T2Lite
450W to 5.5kWrms in ATSC
300W to 4kWrms in ISDB-T
600W to 5kWps in Analogue

TTD SERIES

The new TTD series of transmitters ranges from 300W up to 4kWrms in DVB / ISDB-T & DAB, up to 5.5kW in ATSC and up to 5kWps in Analogue TV (common amplification).
The highly modular and scaleable architecture allows easy power upgrade. A single power amplifier offers up to 700Wrms in DVB-T2 or ISDB-T and 1000W in ATSC, which allows to house up to 4kWrms DVB-T2 into a single 19" cabinet.

*The **core** of the transmitter are **the driver** and **the amplifiers***

Multistandard driver

This compact driver with LCD screen allows transmission in **all DTV standards** (DVB-T/H, DVB-T2, ATSC and ISDB-T) and DAB. Adaptive pre-correction is an option

It also offers **Dual-Cast** possibility (Software switching from analogue to digital) for countries where the analogue switch-off has not yet taken place.

The change of frequency is immediate thanks to its **agile** Up-Converter. 2 ASI & 2 IP inputs, seamless switching

For SFN GPS reception, it accepts **external GPS** reference or includes **internal GPS** receiver board.

Automatic Switchover unit (hardware) for **dual driver**

Power Amplifier modules

Each **hot-plug** module includes a hot-plug Power Supply.

Efficient cooling is achieved through its **6 redundant** fans

Additional 2nd Power Supply (100% redundant) option.

The module is fitted with its **own Control** micro-processor, with **protections** against temperature, VSWR and transients, connected to the Main Control logic

High efficiency (ultra wide band Doherty) architecture available

*But **a transmitter is not only** a driver and some amplifiers.*

When it comes to 24/7 operating transmitters, **protection** and redundancy, **monitoring** and control, and easy **maintenance** are the key factors you may want to be sure of. For a reliable transmission and user-friendly operation, BTESA transmitters offer:

Control Logic

User-Friendly, with a **7'' Colour Touch-Screen** with intuitive navigation showing complete module info (status, voltage, current, temperature,..)

All events are logged and all modules have their own led indicators to ensure supervision is never a problem.

N+1 and N+R automatic switchover system available

Ethernet connector allows remote monitoring over TCP/IP. BTESA's **own supervision system** is conceived for an optimal performance with a minimum data rate. **SNMP** Agents are also available, allowing the integration in third party Management Systems.

Protection: Electrical system

Self-designed power supplies, adapted to the hard conditions found in a TV station, **using IGBT's** supporting peaks of 1200V

Robust TVSS protections at **transmitter input** and also at **each amplifier**: hot-swappable high energy absorption **varistors**, **Gas discharger**, thermal-magnetic **breakers** (standard IEC 61643-1, class II & III)

Large mains input voltage range (3x220V/380V ± **20%**)

Power factor **> 0.95**

Step-start power switching systems for lower inrush current

Mains **Phase inversion** and **high level monitor** (cuts if voltage >+30%)

Protection: Air cooling system

6 fans per PA module: real redundancy, if one fails, module continues working

In-rack **ducted air-cooling** System, with inlet redundant fans, long-life hot-air extractor, **anti-dust overpressure** system and **Anti-condensation** control system

Protection: Control Logic

Control Logic can be **removed even in operation**, and the transmitter can work SAFELY thanks to all its hardware based protections that can be used when software is failing

Hardware based logic control **protection for every module**, and **hardware back-up unit** (peripheral control**)** that ensures safety operation in case of failure of Central Control Unit

Easy Maintenance

Dedicated **training courses** and hot-line support

Comfortable **rear access**: open space, everything within hand reach, all components (combiners, balance loads) can be replaced in operation

Quick replacement of **fans in operation**

Hot-plug Power Amplifier Modules, with quick-release connectors.

Hot-plug surge protections

Test bench for amplifiers

SPECIFICATIONS

General

Standards	Analogue -- PAL B/G/K/I, NTSC M/N, SECAM Digital -- DVB-T/H-T2/T2Lite, ATSC, ISDB-T Radio -- DAB	Dual cast available NICAM and IRT sound available
Frequency	VHF (174-230 MHz) UHF (470-862 MHz)	Channel bandwidth: 1.7 MHz, 5MHz, 6MHz, 7MHz or 8MHz
Cooling	Forced ventilation, temperature controlled speed	Rack includes 2 or 4 input fans and hot-air extractor
Rack	19" standard with surge protections	
Input Connector	- Analogue: Video CVBS (BNC). 2xAudio balanced XLR or jack 1/4", or unbalanced - Digital: 2xASI (seamless switching) (BNC)	Option hierarchical modulation: 2xASI, option 4xASI (2 backup) Option TSoIP: RJ45 input
Output Connector	1 5/8"	Others upon demand

Quality parameters

MER (at nominal output power)	> 38dB maximizing MER > 32dB maximizing efficiency	Measured in the worst channel, higher in other channels. UHF Adaptive precorrector optional
Shoulders (at nominal output power)	< -41 dB maximizing MER < -35 dB maximizing efficiency	Measured in accordance with ETSI 101 290 before output filter
Intermodulation (analog)	<-60dB	(-5dB, -16dB, -10dB)
Non-essential radiations	< -100 dBc	Referred to average out. power
Short term stability	$\pm 5 \times 10^{-11}$ when locked to GPS (SFN) $\pm 1 \times 10^{-8}$ when locked to optional OCXO (MFN) $\pm 1 \times 10^{-7}$ when locked to VTCXO (MFN)	
LO Phase noise	< -90 dBc/Hz @ 1kHz	For UHF (for VHF is even better)
Frequency resolution	1 Hz steps	Based on DDS

Local and remote control

Interfaces	RS-232, RJ-45, RS-485
Local control	Color Touchscreen GUI, RS-232
Remote control	1. User console to access all parameters 2. BTESA network management system for minimum data rate (Optional) 3. SNMP agent (Optional) 4. Web Server (Optional)

Environmental

Power supply	Single phase 220V ± 20%, or Three-phase 220/380Vac ± 20%, 50Hz/60Hz	Others upon request
Power Factor	> 0.95	Dynamic PF correction
Temperature range	0º to +45º C	
Humidity	Up to 95%	without condensation
Altitude	Up to 2.500 m above sea level	Higher upon request

Specifications subject to change without notice

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