DIGITAL
TELEVISION
SOLUTIONS

THOMSON
BROADCAST

# MEGATIVY II

## FLEXIBLE MEDIUM POWER TV TRANSMITTER

**Modular high-efficient design for smooth digital migration**

**AIR COOLED**

FROM 500 W
TO 4 KW

**ATSC 1.0 / ATSC 3.0 - DVB-T / DVB-T2 - ISDB-T**

www.thomson-broadcast.com

PHENIXYA

# THOMSON BROADCAST'S DNA

## Thomson Broadcast solutions are recommended for the next generation standard migration.

Backed by more than 60 years experience in transmission systems deployed all around the world, **Thomson Broadcast** has paved the way for smooth and cost-efficient digital switchover -DSO- to benefit from the digital dividend, offering higher quality content and generate potentially greater income.

**Thomson Broadcast** solutions are recommended for the next generation standard migration.

**Thomson Broadcast** is the right partner for transmission turnkey systems. From the very beginning of the migration project, **Thomson Broadcast** can assist governments, ministries or broadcasters in the current analog and digital network diagnosis, in the technical and technological choices, in coverage studies and most importantly, in financial engineering.

Thanks to undeniably gained valuable experience in operational deployments, **Thomson Broadcast** offers a full range of end-to-end professional services to ensure global compatibility and continuous television signal availability.

# WE PROVIDE COMPLETE TELEVISION SOLUTIONS

## PROJECT SUPPORT

Consulting services / Financial engineering / Project management / Coverage studies / Site surveys / Energy & system engineering

## PRODUCTS

Complete TV transmitter range / All digital standards, High-medium & low-power range, RF auxiliaries / Head-ends / Antennas & masts / Network management system

## SERVICES

Installation / Commissioning / Training / Service Level Agreement (SLA)

THOMSON BROADCAST

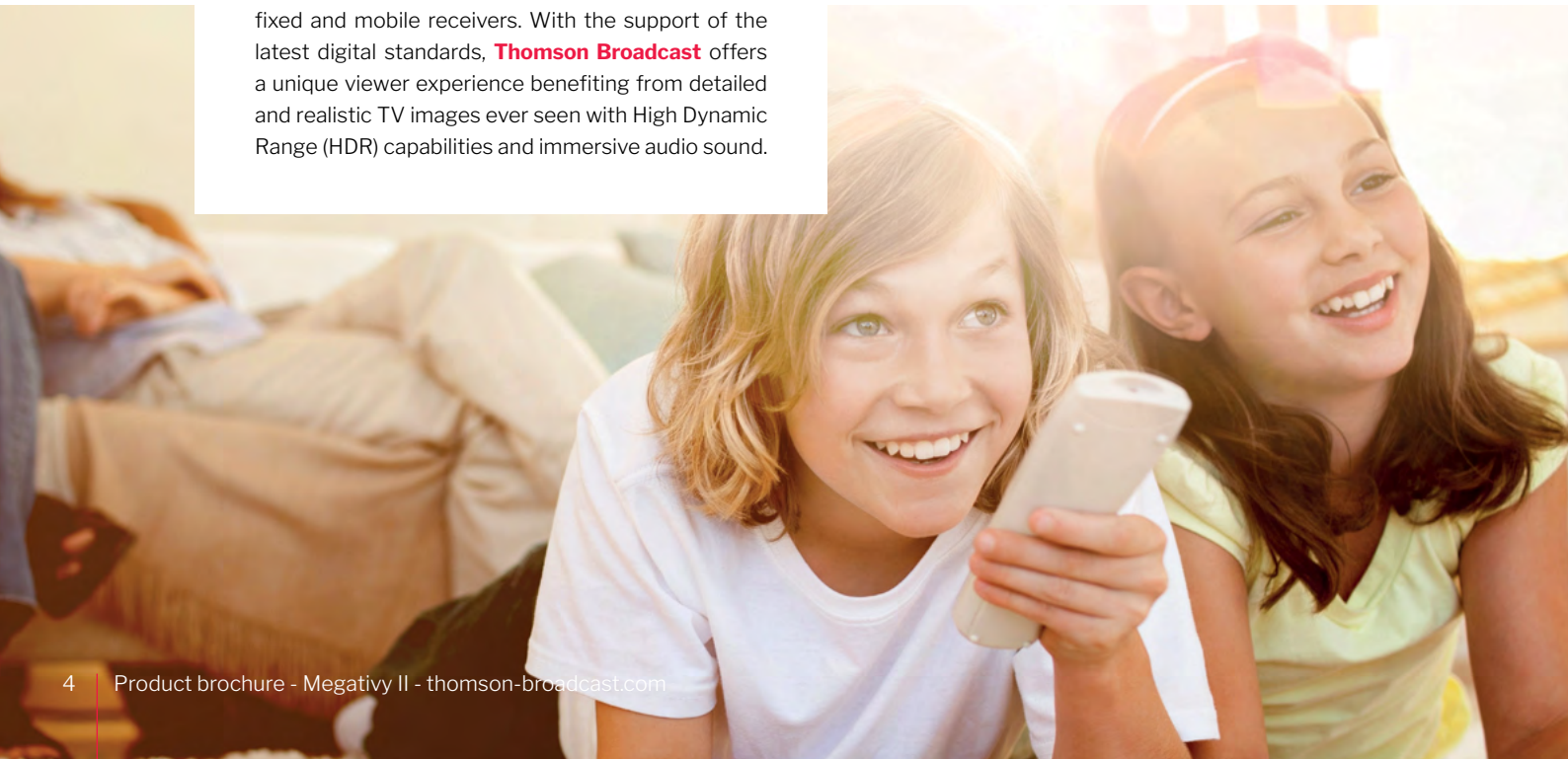
# MEGATIVY II : BENEFITS

Global interoperability is a crucial factor of success in any network deployment. As part of its long-standing history, **Thomson Broadcast** is optimizing its digital systems with flexible Megativy II transmitters and a smart integration of best in class technologies, from the headend, satellite downlink, receiver-decoder to the antenna and mast.

**Thomson Broadcast** guarantees the complete system interoperability and quality of services, from the site survey to the commissioning, passing through the installation and the training.

## For UHD video & immersive sound

Latest digital standards have been developed to be more efficient and flexible for fixed and mobile TV. New H265 or coming H266 video with enhanced compression mode allow to transmit 4K and 8K for fixed and mobile receivers. With the support of the latest digital standards, **Thomson Broadcast** offers a unique viewer experience benefiting from detailed and realistic TV images ever seen with High Dynamic Range (HDR) capabilities and immersive audio sound.



## Global energy efficiency

Transmitter energy savings comes in addition to the optimization of transmission station consumption Thomson Broadcast offers in overall System design.

## Lowest total cost of ownership

Maximized power density for highest output power with minimized preventive and corrective maintenance operations.

## Modular design

Easily upgradable in power, with ducted or non-ducted air-cooling solution, thanks to an outstanding design or each amplifier is only 2RU and weight is lower than 20 kg (17 kg with 1 PS) for an output rms power capability of more than 500W at nominal performances.

## Quick installation & easy monitoring

Easy operations via MMI, SNMP and Web server in standard for local and remote operations.

# MEGATIVY II : PRODUCT DATA SHEET

## Global energy efficiency

While transmitter efficiency is a critical part of the Operational Expenditures - OPEX - global energy efficiency of the transmission stations must be evaluated and optimized. **Megativy II** has been designed for high-efficiency performances. With transmitters networks deployed for an average 20-year lifecycle, minimizing operating cost is crucial.

In the **Megativy II** product line, the implementation of the latest generation and version of 50-V LDMOS transistor technology in Doherty operation mode, combined with managed peak to average power ratio (PAPR) and Multiple-Input Single-Output (MISO) technologies allows increased power for maximum coverage while maintaining exemplary RF performance. Also, the high gain architecture ensures complete amplifiers redundancy for continuous system availability.

Power supply voltage is also monitored and controlled to automatically optimize its tuning according to the optimal point of operation for an enhanced transmitter efficiency.

As part of a global system, the embedded or external cooling system has been designed with a specific focus on highest efficiency results, while keeping a minimal footprint.

# Lowest total cost of ownership

With operational cost surpassing initial transmitter investment by more than 5 times over their lifetime, expensive costs such as unexpected on–site maintenance operations may overload the global balance.

**Megativy II** has been designed to offer best power density up to 5kW in a single cabinet minimizing floor space requirements.

The high modularity of **Megativy II** transmitter based on more than 30 years of field implementation contributes to lower operational costs. Indeed, easy scalability in output power allows quick change of geographical coverage.

Simplified maintenance procedures, easy access to all modules and fast interventions time minimize maintenance costs. Most of the modules are hot pluggable and may be replaced (MTTR) within less than 15 minutes. The use of standard power supply units referenced for main telecom applications guarantees its market availability. An active reserve and in the N+1 device power supply is also available in the control system.

Maintenance procedures are easily achieved by a single person with no specific technical skills and no fine tuning is required after modules exchanges due to the Digital Adaptive Pre-correction (DAP).

Moreover, to enhance the serviceability of medium-power **Megativy II** and high–power Gigativy ranges share the same spare control systems and exciters. This leads to fewer overall spare parts, a great ease in the training of the maintenance staff, and a straightforward repair policy.

# Modular design

## Several transmitters configurations

Single Drive (SD)

Dual Drive (DD)

Passive Reserve (PR)

N+1

## Model overview from 500W to 5kW in a single cabinet

Based on a 500W amplifier rack, Megativy II transmitters are easily scalable to fit about numerous power requirements.

| RMS output power * | Number of amplifier in 1 TX | | Number of TXs in a single 42U cabinet | | | |
|---|---|---|---|---|---|---|
| | SD / DD | PR / 1+1 | SD | DD | PR | 1+1 |
| 500W | 1 | 2 | 7 | 6 | 4 | 3 |
| 1000W | 2 | 4 | 4 | 3 | 2 | 1 |
| 1500W | 3 | 6 | 3 | 3 | 1 | 1 |
| 2000W | 4 | 8 | 2 | 2 | 1 | 1 |
| 2500W | 5 | 10 | 2 | 2 | 1 | 1 |
| 3000W | 6 | 12 | 2 | 2 | 1 | 1 |
| 4000W | 8 | 16 | 1 | 1 | - | - |
| 5000W | 10 | 20 | 1 | 1 | - | - |

With up to 7 transmitters installed in a single cabinet, Megativy II meets broadcasters' highest requirements delivering so up to 7 channels. Footprint and rental costs are thus optimized.

TX 1 Dual drive

TX 2 Dual drive

TX 3 Dual drive

TX 4 Dual drive

TX 5 Dual drive

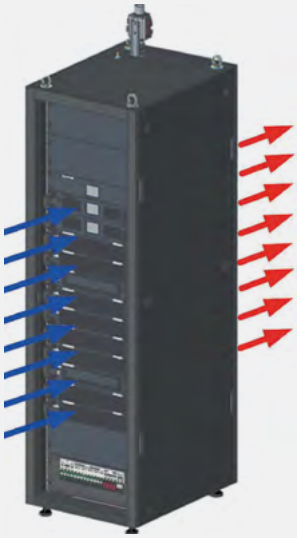
TX 6 Dual drive

## Multi TX and/or N+1 in a single or multi cabinets design

With 1 ≤ N ≤ 6, and depending on power, cabinet foot print can be minimized by integrating several TX per cabinet.

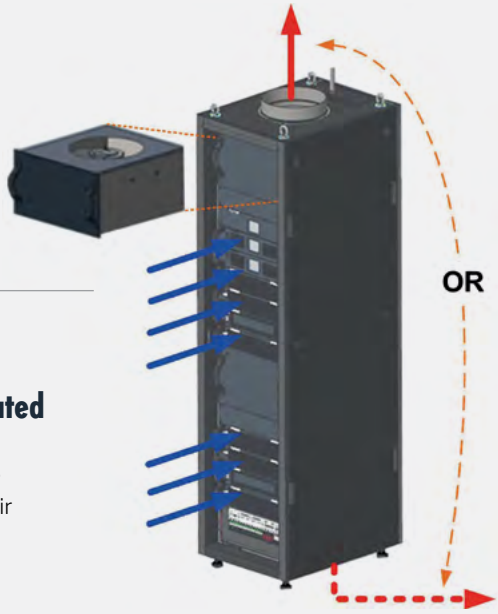
## Cooling system adaptable to any station and environmental conditions

A very efficient cooling system has been developed with high dissipating capacity, low-noise level and maximum safety.



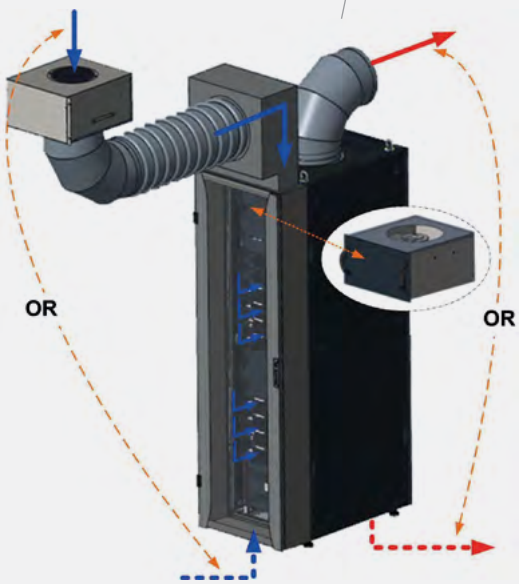
### Subsets integrated cooling

Air taken & Air exhaust inside the technical room




### Cabinet integrated cooling

Air taken inside the technical room & Air exhaust outside




### External cooling

Air is taken and exhausted outside the technical room. Exhaust-fan unit and blower features the same EC centrifugal fans for adjustment flow rate to the required output power, optimization of energy consumption via EC motor technology and limited acoustic noise due to air flow adjustment.

## Design on request

Depending on client need, Thomson Broadcast may study the most appropriate design in terms of cooling efficiency, energy efficiency and mechanical fit. With all these possibilities, Megativy II is the perfect medium-power transmitter for integration into a mobile station or a shelter.

# Quick installation & easy monitoring

## Latest generation of exciter and control system for any standard

The latest exciters have been designed to support all modulation schemes in a highly compact 1U rack. For the highest performances, it integrates leading-edge FPGA technology and sophisticated Digital Signal Processing (DSP) algorithms.

Leveraging digital modulation technologies, advanced modes i.e. SISO-MISO, multiple PLP and composite T2-base / T2-Lite (option) for DVB standards, are supported. SISO-MISO allows a maximum coverage and a high-quality guarantee. Composite T2-base / T2-Lite, multiple PLP and composite T2-Base & T2 Lite provide high flexibility while adapting specific robustness to broadcasters needs. Within a single channel, UHD, SD, Mobile and Radio Services may be transmitted at the same time using existing infrastructures.

To offer outstanding signal availability, real-time DAP technology compensates the performance variances due to changes in environmental conditions, component aging, and reduction of output power. Optimal RF signal quality and stability are always guaranteed without the need of user intervention. It also allows to run transmitters close to their saturation point by adapting power amplifiers' inherent non-linearities and minimizing the memory effects of the circuitry. High power peaks are corrected by PAPR reduction system and protection clipping for the best possible coverage. Automatic Gain Control (AGC) feature also drives power amplifier stage to automatically adjust output power.

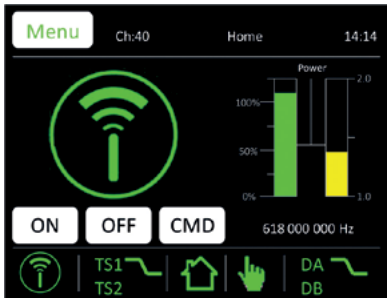
In terms of inputs, the exciters feature 2 ASI input streams and 2 IP input streams which can be used for stream redundancy with primary and secondary streams. The exciters integrate T2-MI stream on both ASI and IP inputs, monitored by an intelligent input switching mechanism and management.

GNSS receiver using GPS and GLONASS systems can be included. For monitoring operations, an RJ45 port on the front of the equipment is available for IP stream. Embedded web server and SNMP agent are also embedded in standard. The in-house new designed control system manages and monitors operation on the entire transmission chain, switching exciters, amplifiers, and transmitters in case of N+1 configuration, ensuring 7/7 television signal availability. It also monitors the cooling system. Local operation can be achieved on the touch screen or remotely via the Web server.

This latest generation of exciters provides an open and adaptive platform ready for any future development.

## Intuitive normal and remote control and monitoring

In normal operational conditions, the transmitter system may be intuitively operated directly via the local control touchscreen for advanced control and monitoring. All required information is available through a two to three clicks navigation.



For quick remote monitoring purposes, each Megativy II includes as a standard feature, Web server and SNMP agent to remotely deliver a real-time comprehensive display of the transmitter's status as well as the identification and precise location of any fault. This monitoring interface is also accessible locally via a dedicated RJ45 LAN port. Control and monitoring can be achieved with any standard devices including smartphones, tablets, or personal computer. The web interface has been in-house designed so to interoperate with a complete transmission Network Management System such as the **Thomson Broadcast Manager** or an existing one.

# MEGATIVY II : TECHNICAL SPECIFICATIONS

## Standards

| MODULATION | MODES | CHANNEL BANDWITH |
|---|---|---|
| DVB-T DVB-T2<br>Dualcast DVB-T/DVB-T2<br>Composite T2-base and T2-Lite | MISO – MPLP – PAPR- T2- Lite | 5/6/7/8 MHz |
| ISDB-T<br>ISDB-Tb | | 6 MHz |
| ATSC 1.0<br>ATSC 3.0 | MPLP - PAPR LDM | 6 MHz |

## Frequency range

| | |
|---|---|
| **UHF band** | 470 - 700 MHz |

## Output

| | | | |
|---|---|---|---|
| **Output** | **CONNECTORS** | up to 1500 W Rms<br>for 2000 W Rms<br>From 2500 W<br>up to 4000 W Rms | 7-16<br>7/8" EIA<br>1" 5/8 IEC |
| | **CHARACTERISTICS** | Shoulder level<br>MER | > 37 dB<br>> 34 dB |

## Supply voltage

| | | |
|---|---|---|
| **Main power supply** | AC PHASES | Single or three phases : non-floating, neutral, earth |
| | STANDARD VOLTAGES (neutral phase) | from 120V - 15% to 230V + 15% |
| | SINGLE PHASE FOR 500W OR 1000W | 230V + 15% / 120V - 15% |
| | FREQUENCY | + 50 or 60 Hz ( ± 3 Hz) |
| | POWER FACTOR AT NOMINAL OPERATION | > 0.95 |

| | | |
|---|---|---|
| **Separate mains power supply connections for exciter & control system** | AC PHASES | Two single phase AC inputs |
| | STANDARD VOLTAGES | 230V+15% / 120V-15% |
| | CONNECTORS | CEE 22 available on the cabinet roof |

## Environmental conditions

| Guaranteed specifications with VSWR= 1.5:1 | |
|---|---|
| **External air temperature** | 0° to + 45° C up to 1500 m |
| **Derating** | 5°C per 1000 m on max. Tempe-rature |
| **Ambient Air temperature** | + 5° to + 45° C |
| **Maximum altitude** | 3000 m / 10 000 ft. |
| **Storage temperature** | -30° C to + 60° C |
| **Relative humidity** | <- 95% without condensation |
| **Acoustic noise** | < 65 dB(A) @ 1m / 1.5m height |

## Local & Remote Control & Monitoring

| | |
|---|---|
| **Locally & remotely** | Dry loop |
| | LCD touchscreen |
| | Control by push button in case of CPU failure |
| | HTML5 / CSS3 Web interface |
| | SNMP V2 interface |

## Clock & synchronisation

| | | | | |
|---|---|---|---|---|
| **Frequency range** | 10 MHz | 50 Ω | -15 to +15 dBm | BNC female |
| **Timing reference** | 1 PPS | 50 Ω | LVTTL | BNC female |
| **Internal GNSS** | GPS, GLONASS | 50 Ω | Max sensitivity: -138 dBm | SMA female |



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# REVOLUTIONIZING THE BROADCAST EXPERIENCE

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