



## CORTEX Series

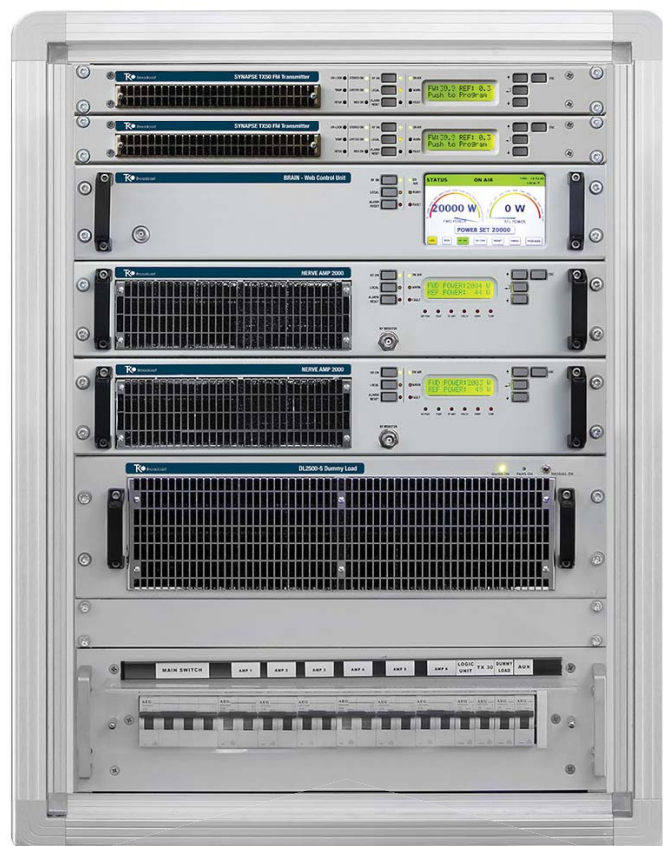
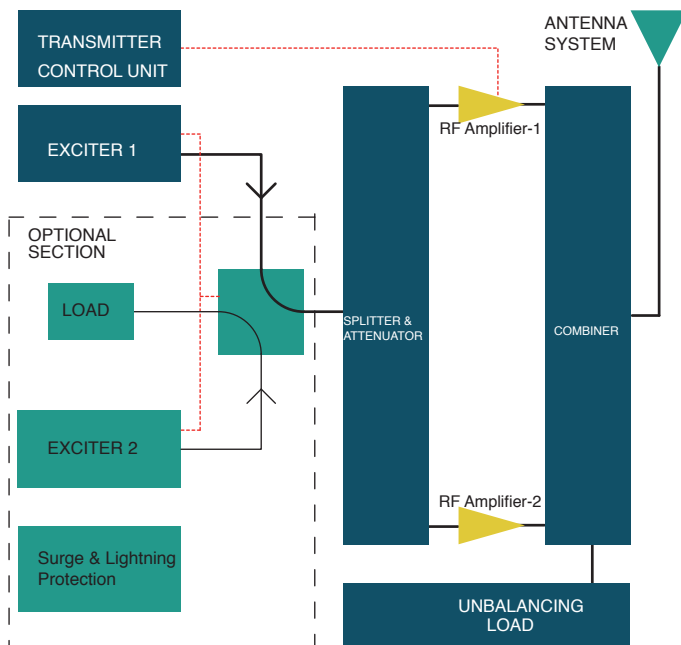
SMP (Superior Modular Philosophy)  
2kW to 80kW FM Transmitter Series  
Standard and HOT PLUG-IN versions

- Analog and Digital Ready for HD Radio and DRM
- Based on VL Series High Efficiency
- LDMOS Amplifiers 1,1kW or 2,2kW
- Hot Plug-in Power Supply
- Up to 75% Overall Efficiency
- PLANAR LDMOS
- 65:1 VSWR Tollerant
- Fully RF and Power Supply Redundant



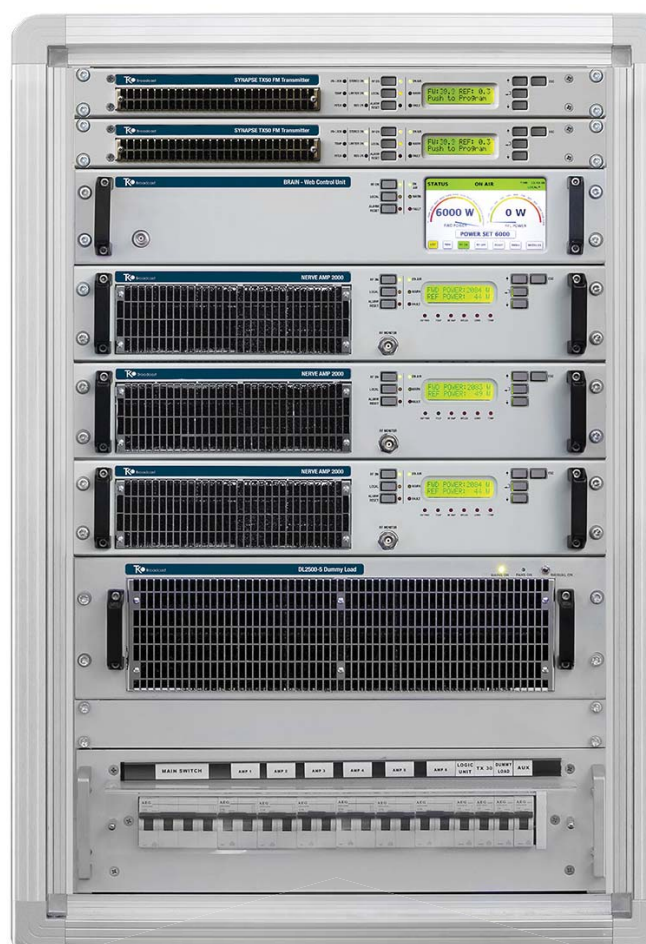
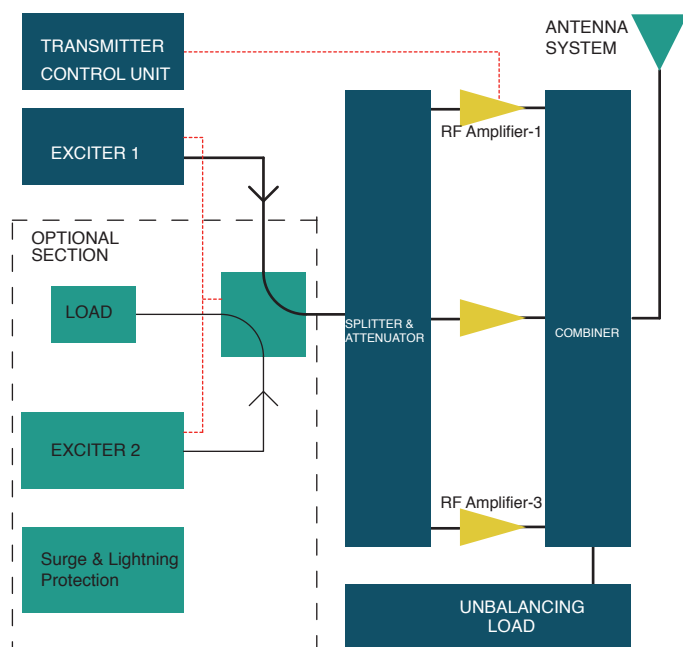
# CORTEX 4/2

4kW WIRED Technology, Superior Modular Philosophy



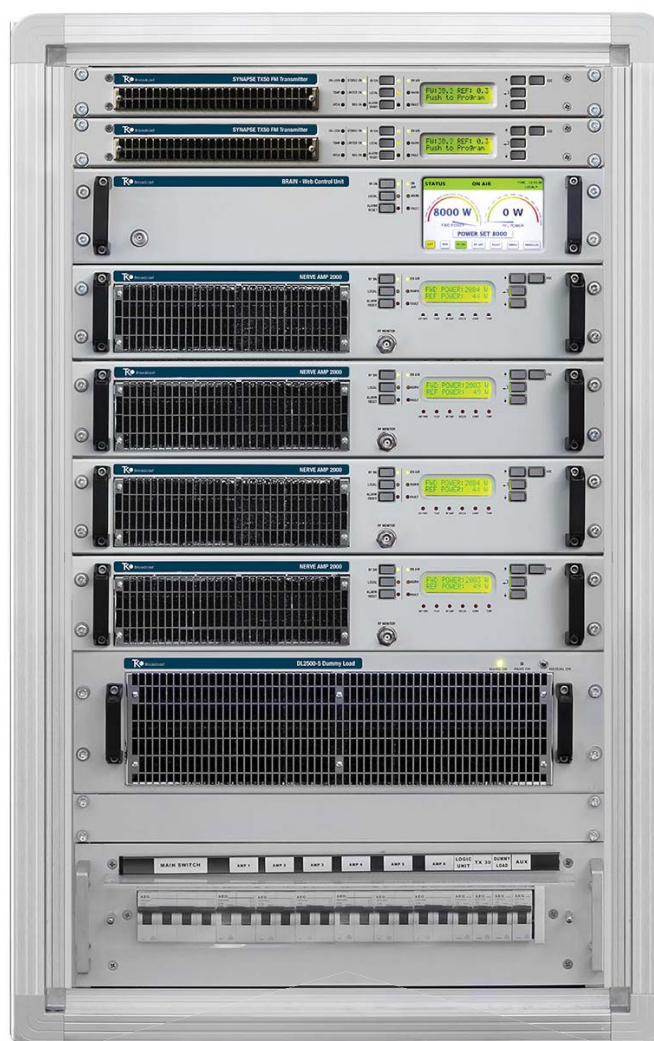
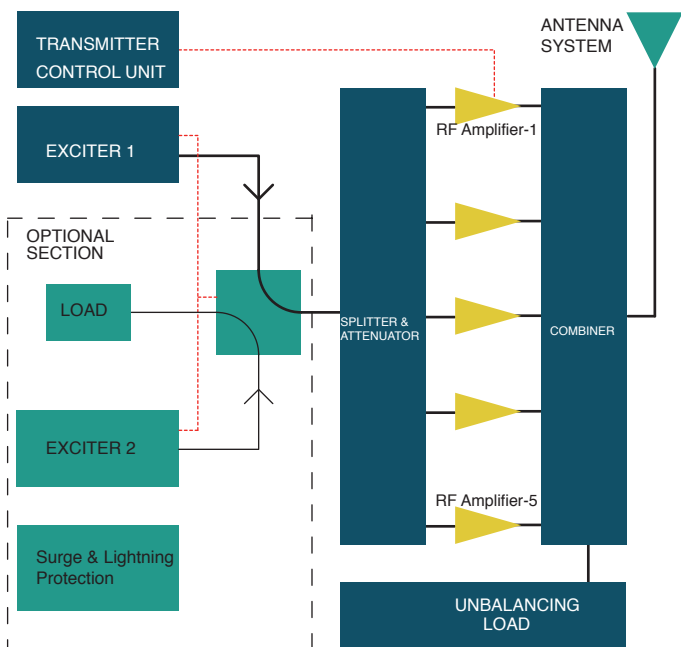
# CORTEX 6/3

6kW WIRED Technology, Superior Modular Philosophy



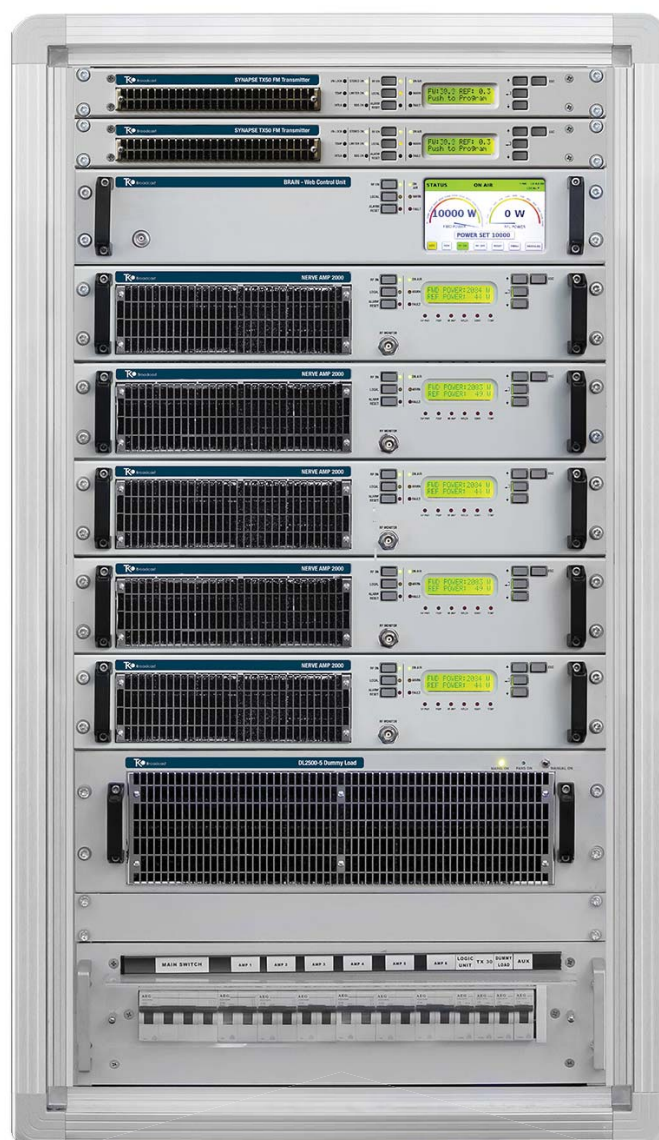
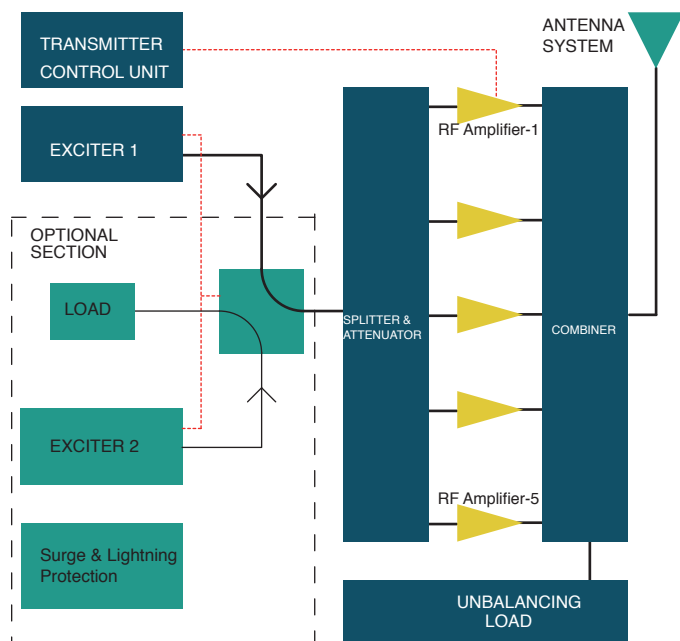
## CORTEX 8/4

## 8kW WIRED Technology, Superior Modular Philosophy



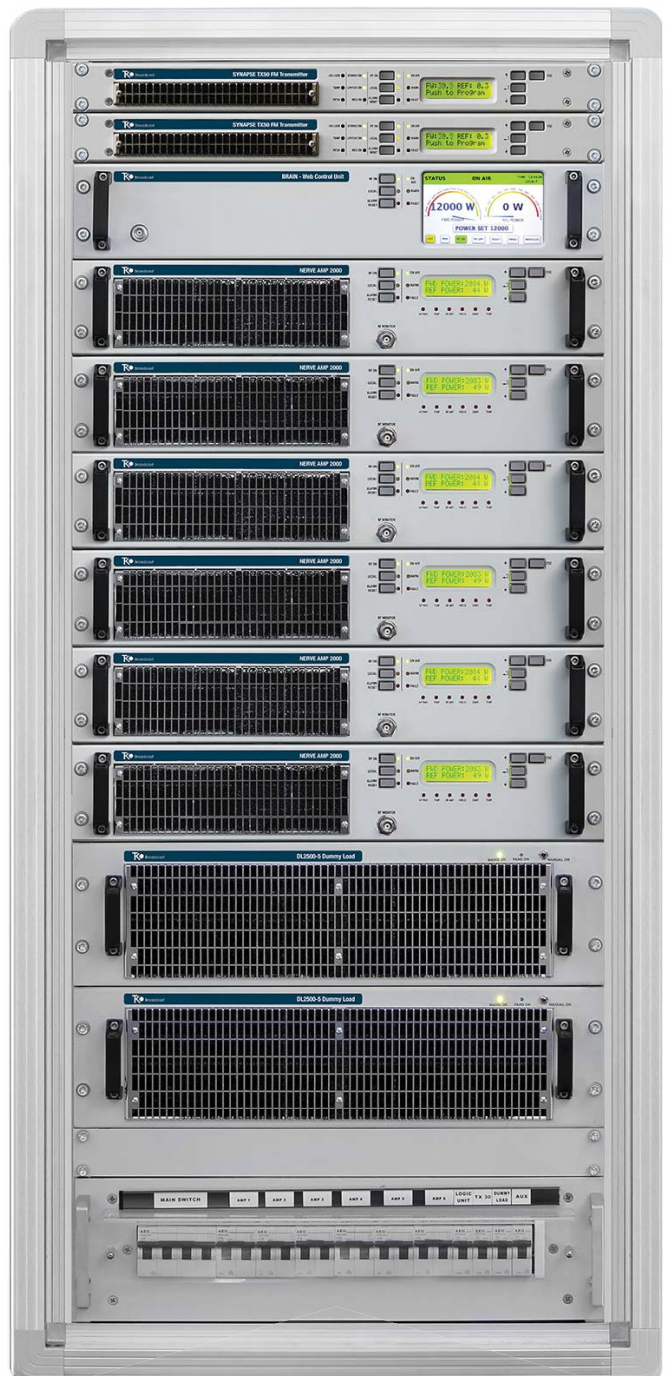
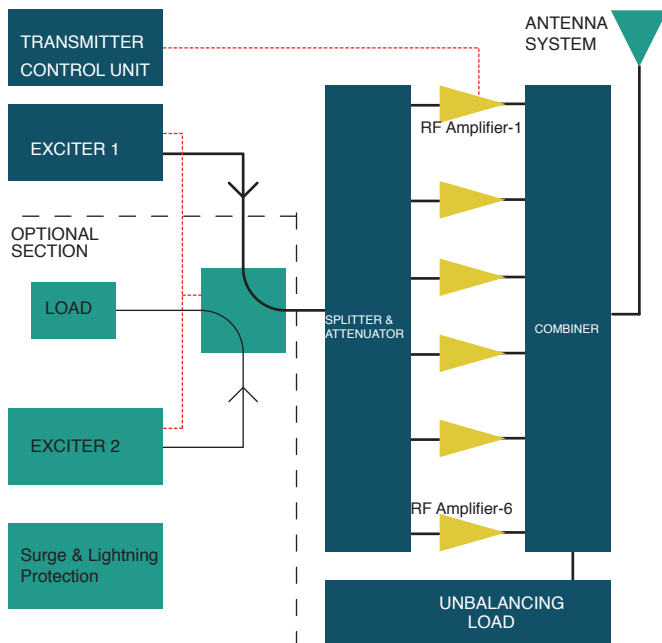
# CORTEX 10/5

10kW WIRED Technology, Superior Modular Philosophy



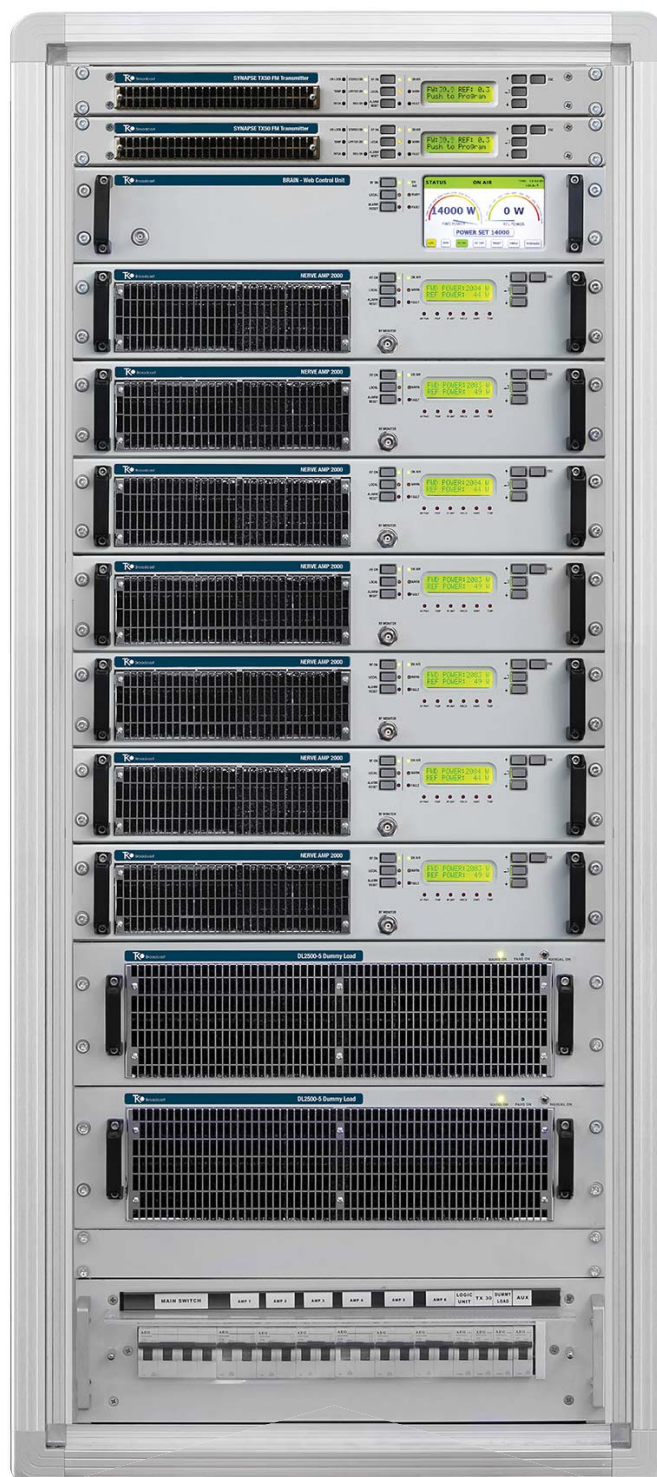
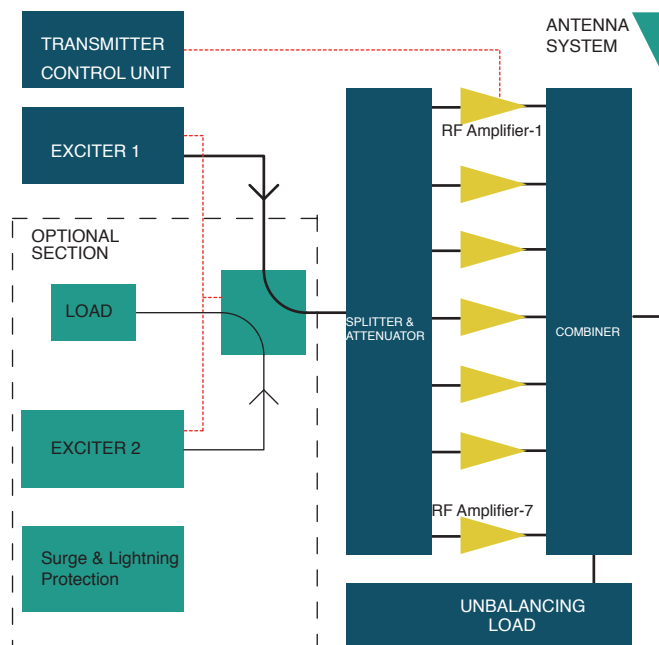
# CORTEX 12/6

12kW WIRED Technology, Superior Modular Philosophy



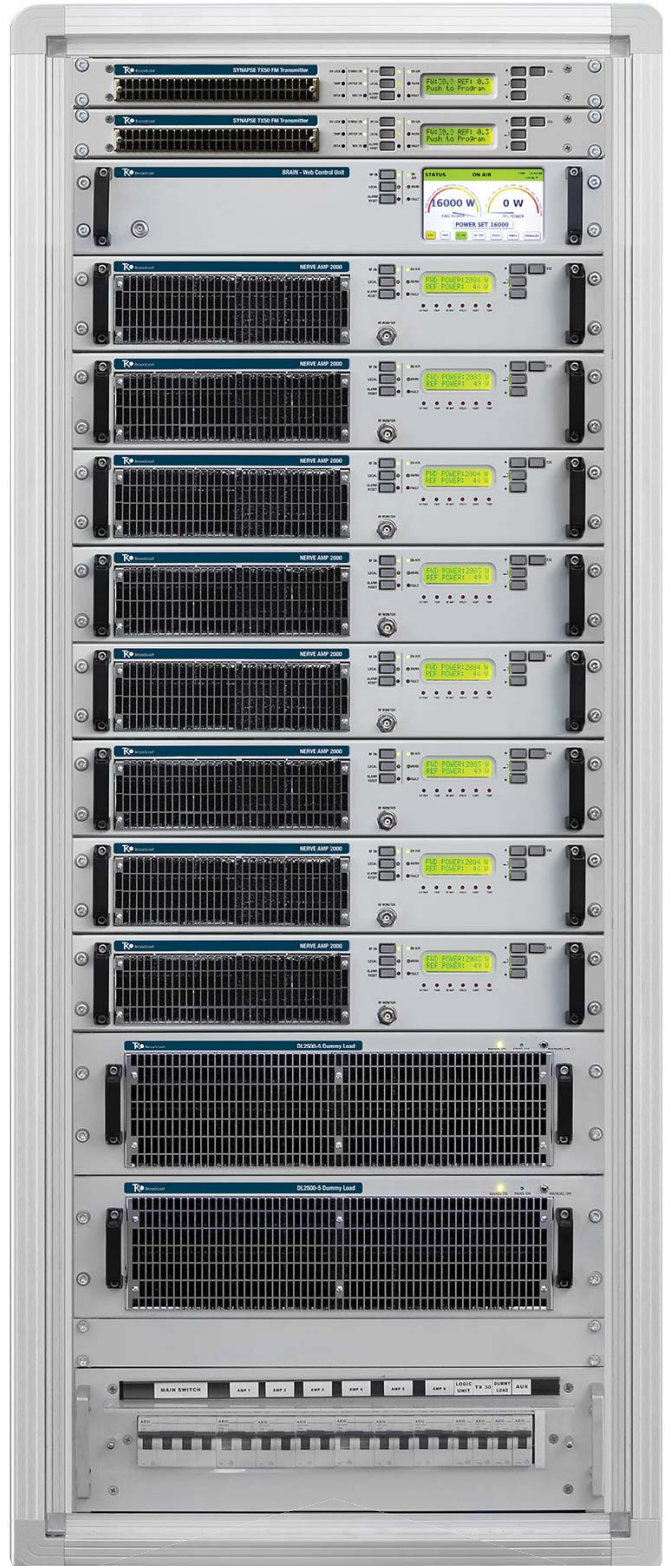
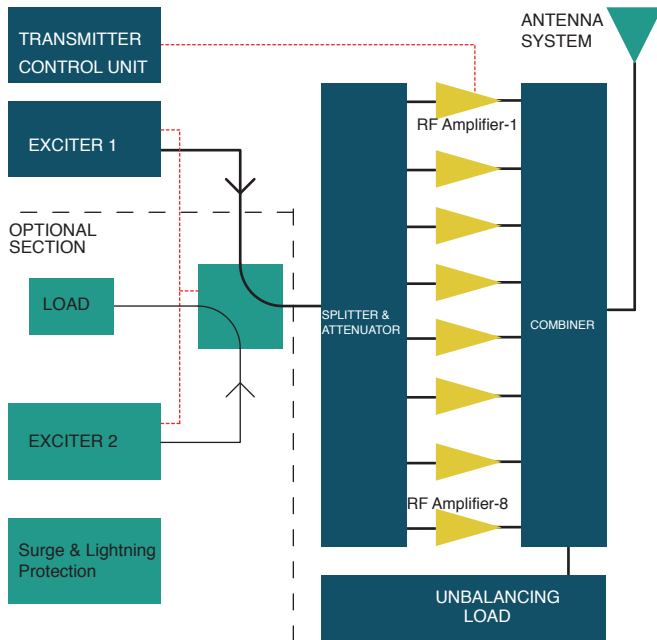
# CORTEX 14/7

14kW WIRED Technology, Superior Modular Philosophy



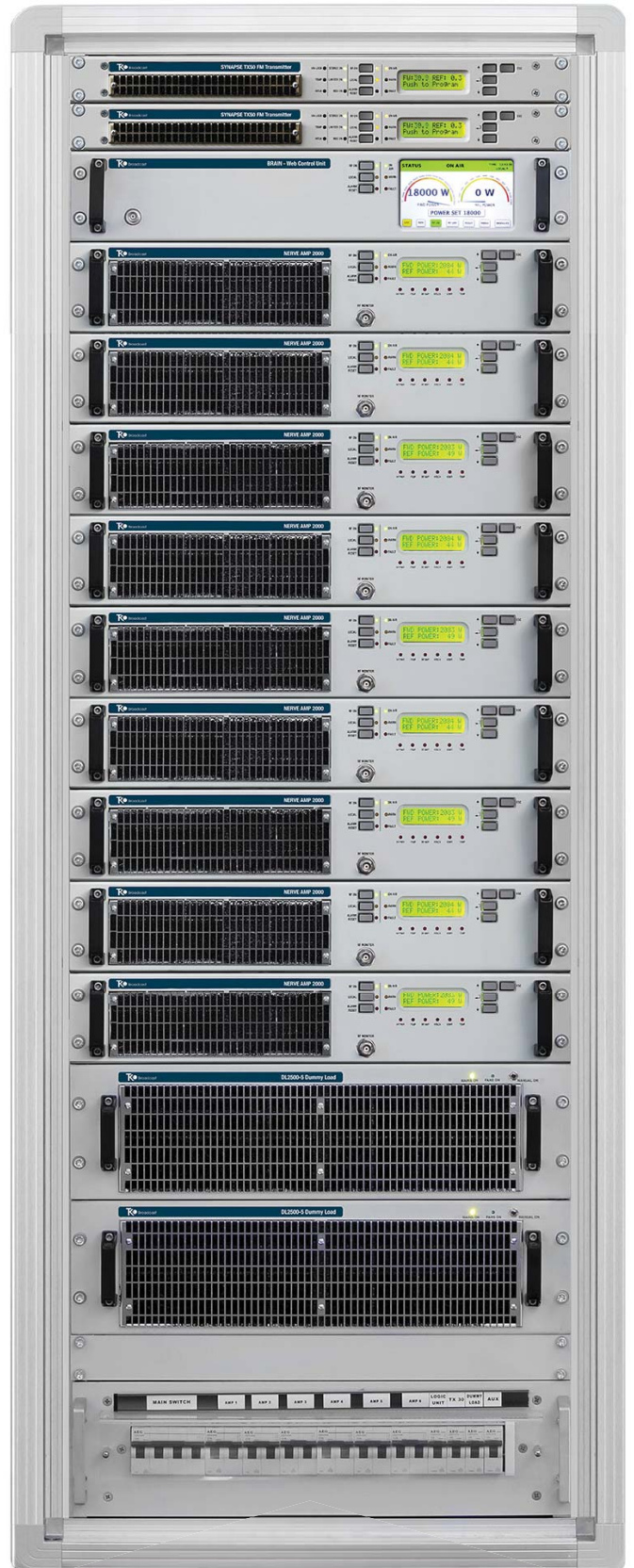
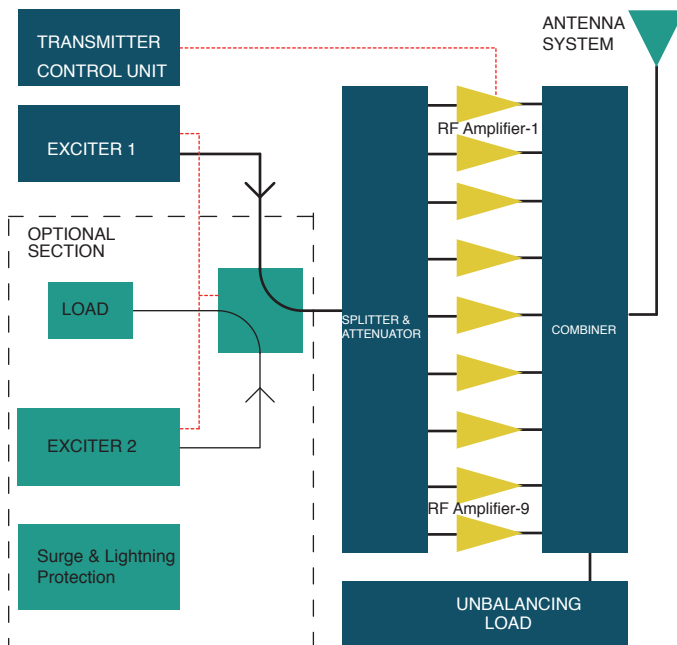
# CORTEX 16/8

16kW WIRED Technology, Superior Modular Philosophy



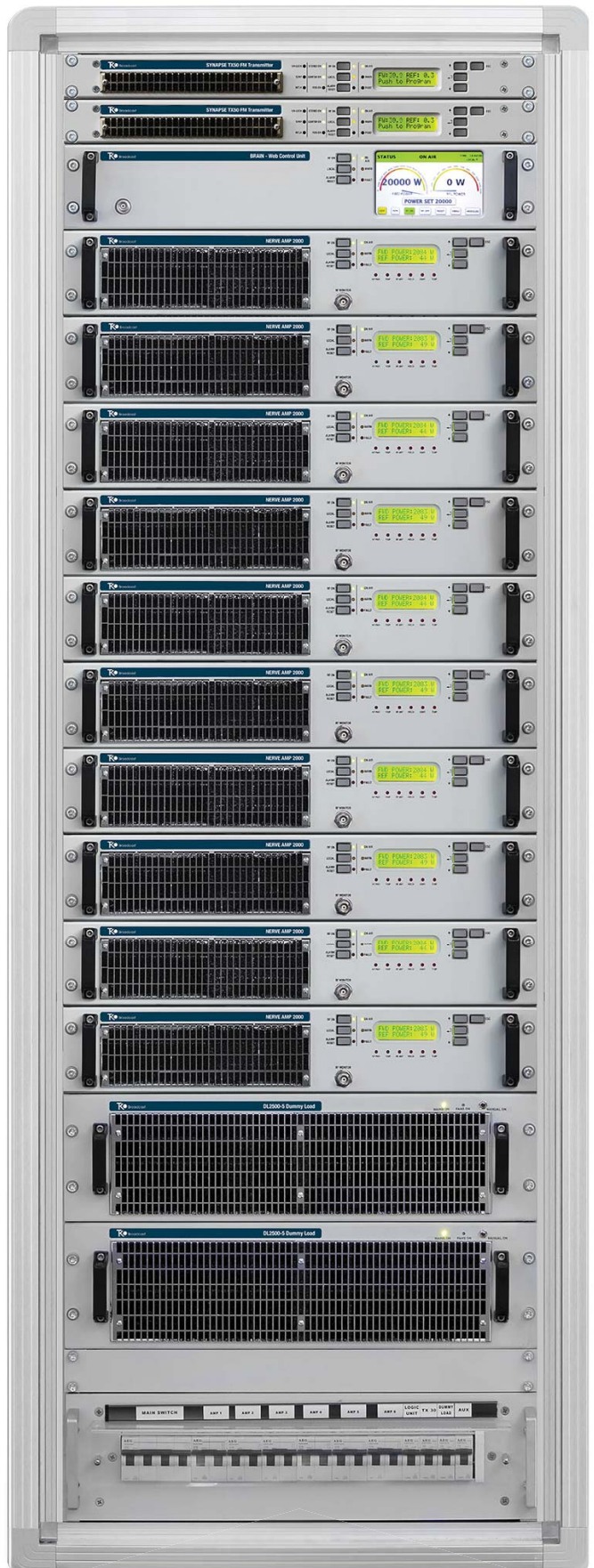
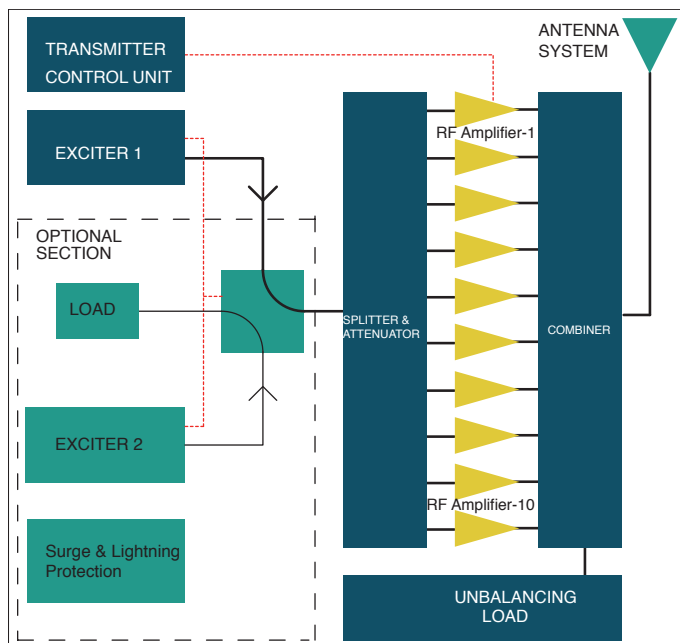
# TXM 18/9

18kW WIRED Technology, Superior Modular Philosophy



# CORTEX 20/10

20kW WIRED Technology, Superior Modular Philosophy



# HOT PLUG-IN POWER SUPPLY

Replace the power supply in 2 minutes

Remove the front pannel, operating only  
fourscrews

Pull Off the sliding power supply



## CORTEX HOT PLUG-IN Option

With this option it is possible to connect and disconnect the amplifier modules from the front of the rack without the need to open the rear door or other types of intervention inside the rack. All operations can be carried out with the transmitter in the air and without service interruptions



## WCU - WEB CONTROL UNIT

Fully WEB Based controls and remote all the transmitter's parameters



# REVOLUTIONARY MODULAR COMBINER

## BROKEN THE PORT NUMBER LIMITS.

- Ultra Compact Design.
- Low power to high power direct stepping.
- Low loss.
- Non Hierarchy Arbitrary odd and even port number.
- Ground referred balancing loads.
- Extremely high isolation value: more than 26dB.
- Up to 10 input way for 20 kW Output Power.
- Ultra-wideband, exceeds more stringent specifications.
- Phase stable.
- Best in class low loss performance: less than 0.1dB
- More than 12 dB of additive harmonic filtering.
- Low Cost vs Power ratio.

The Combining system is composed by the COMBINER itself, the ISO-LATED SPLITTER 2-10 way and the UNBALANCED POWER LOAD 2-10 way

# TXM SMP

## Superior Modular Philosophy

When developing SMP Technology, Superior Modular Philosophy, the main target was: Always on Air, Less than 15 kg (35 lbs) of modules-weight, Easy maintenance, Low consumption and High Efficiency

The only way to reach this goal consists in the creation of a modular structure where each block of the system has been obsessively optimized for best results.

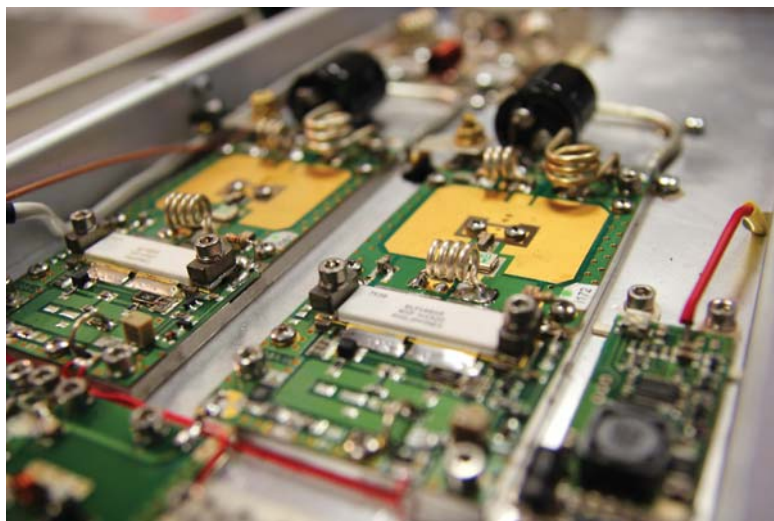
When each Brick is perfectly realized the overall structure benefits of this optimization obtaining the a global high optimization of the Transmitter. Superior Modular Philosophy, means create big broadcast systems made by small highly optimized bricks. The Bricks are the small VL Series Amplifiers.

Superior Modular Philosophy is the synthesis of extreme reliability and flexibility.



# FULLY REDUNDANT RF AMPLIFIER IN PLANAR TECHNOLOGY

2 x 1.5kW power amplifier modules on VL2200 or 2 x 700W on VL1200



## WIRED TECHNOLOGY

The perfection of each single module brings to the perfection of the overall Transmitter.

PERFECTION: The only way to reach this goal consists in the creation of a modular structure where each block of the system has been obsessively optimized for best results.

When each part of the module is perfectly realized the overall structure benefits of this optimization obtaining the WIRED Family.

Model	Description
CORTEX 4/2	4000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.2 SENSE 2000 Amplifier
CORTEX 6/3	6000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.3 SENSE 2000 Amplifier
CORTEX 8/4	8000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.4 SENSE 2000 Amplifier
CORTEX 10/5	10000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.5 SENSE 2000 Amplifier
CORTEX 12/6	12000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.6 SENSE 2000 Amplifier
CORTEX 14/7	14000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.7 SENSE 2000 Amplifier
CORTEX 16/8	16000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.8 SENSE 2000 Amplifier
CORTEX 20/10	20000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.10 SENSE 2000 Amplifier
CORTEX 24/12	24000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.12 SENSE 2000 Amplifier
CORTEX 32/16	32000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.16 SENSE 2000 Amplifier
CORTEX 40/20	40000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.20 SENSE 2000 Amplifier
CORTEX 80/40	80000W modular high efficiency, Redundant Active Reserve, FM Transmitter composed by: SYNAPHSE 30 Exciter, Nr.40 SENSE 2000 Amplifier

Model	Output Power	REDUN-DANT AM-PLIFIERS	POWER CON-SUMPTION	OUTPUT CONNECTOR	DIMENSIONS (19")
TXM 1k/1	1kW	1	1350VA	7/16	1U Driver + 2U Amplifier
TXM 2k/1	2kW	1	2700VA	7/16	1U Driver + 2U Amplifier
TXM 4k/2	4kW	2	5400VA	7/8	Rack 20U
TXM 6k/3	6kW	3	8100VA	7/8	Rack 30U
TXM 8k/4	8kW	4	10800VA	1 5/8	Rack 30U
TXM 10k/5	10kW	5	13500VA	1 5/8	Rack 30U
TXM 12k/6	12kW	6	16200VA	1 5/8	Rack 30U
TXM 14k/7	14kW	7	18900VA	3 1/8	Rack 40U
TXM 16k/8	16kW	8	21600VA	3 1/8	Rack 40U
TXM 20k/10	20kW	10	27000VA	3 1/8	Rack 40U
TXM 24k/12	24kW	12	32400VA	3 1/8	Rack 40U
TXM 32k/16	32kW	16	43200VA	4'	2 x Rack 40U
TXM 40k/20	40kW	20	54100VA	4'	2 x Rack 40U
TXM 48k/24	48kW	24	64900VA	4'	2 x Rack 40U
TXM 96k/48	96kW	48	130000VA	6'	4 x Rack 40U

# OVERALL CHARACTERISTICS

## **TXM SMP® Superior Modular Philosophy allows relevant advantages:**

- The entire system benefit of the optimum characteristics of the base module VL Amplifier.
- The VL Amplifier are each of them a complete functioning module with its own power supply ventilation, control logic and output filter, so, as the opposite of the standard plug-in transmitters bricks live by themselves with facilities the maintenance and the test: no need of special tools, each module can be connected and installed or tested as a single amplifier.
- Developing the VL Amplifier our engineers concentrate all the effort on: minimize weight, cost, power consumption and heat produced, and maximize: efficiency, reliability, electrical performance, connectivity and easy maintenance.
- A single VL Amplifier can be put on air as back-up of a bigger transmitter.
- Shock and vibration during the transportation process can compromise the result of an installation, optimizing the VL Amplifier package allow our engineers to meet the most demanding transport conditions for hermetic, temperature control and vibration and Shock Isolation. During installation and maintenance, handled light packs help the health to operators.

## **The TXM SMP® Superior Modular Philosophy**

Is a family based on a very compact Amplifier and its various combinations. Thanks to a careful choice of size, 2 HE, power levels of the building blocks 2 kW FM, it can be considered as the New Reference for the modular transmitters.

The modularity is completed with special combiners, FM exciters and control logics.

FM exciter can be Analog or DDS both with integrated AES/EBU interface.

## **KEY FACTS**

Combining System

- Compact and well isolated up to twelve way 20 kW PC Power Combiner, ultra-broadband, phase stable, low loss and showing more than 20 dB of additive harmonic filtering.
- Soft controlled sequential start-up reduce inrush current during OFF to ON transition.
- FM transmitters featuring only 800 mm rack depth and up to 40 kW FM in a single 19" rack.
- Digital TV Transmitters up to 8 kW Wide Band Doherty (WBD) output power in a single 19" rack.

## **Hardware and Software Protections**

- Over and Under Voltage DC, Over and Under Voltage AC, RF and Power Supply Temperature, RF Coaxial Output Open or Short Circuit
- Capability of a long working time on Short/Open loads

at all phase angles without any damage.

- Last generation 1400 W LDMOS, VSWR > 65:1 @ all Phase Angles, designed for enhanced ruggedness ISM applications and plasma generators.
- Integrated AC Mains filtering.
- Integrated lightning protection.
- Delayed energized of the system after Mains Power Blackout prevents against peaks and high variation voltages typical of this events.
- Soft controlled sequential start-up so to reduce the Inrush current during OFF to ON transition.

## **WEB/SNMP Telemetry and Remote Control**

- Full Local or Remote control by by logon username and password.
- Remote control with Smartphones or Tablet.
- Host Logic and tele-measurement (TM, TC & TA).
- Remote control and monitoring via SNMP and/or WEB interface.
- With logbook or log file to record error or alarm message.
- Display of forward/reflection power value and reflection high alarm.

## **Human Interface**

- Each module is equipped with a logic controller that allows full control by a local operator.
- All transmitter and amplifier parameters required for diagnostics can be retrieved locally or remotely via standard (IP) protocol and standard software (web browser, SNMP).
- Multilingual user guidance.
- High Definition, high contrast Color Oled display.
- Quick set of thresholds for protections level. This set is based on assignment of three "flavors" or PERSONALITIES: Conservative (primary target = protect itself), Standard (balanced), Aggressive (primary target = transmission without interruptions).

## **N+1 and Backups systems**

- Conventional standby systems such as: exciter standby, (n+1) Transmitter standby, passive standby and active output stage standby can be implemented.
- No additional control units are needed for the exciter standby and the active amplifier standby.

## LD Tech HIGH Efficiency

- Very high efficiency (more than 75% for a complete 5 kW amplifier).
- Last LDMOS technology for power modules.
- Ultra High RF efficiency (>80 % typ.) software optimized for each power level.
- Lowest weight and dimensions in the industry.
- Lower device heating.
- Lower room heating.
- Lower space occupied.
- Lower maintenance needed.
- Small dimensions and low weight, reduce transportation costs and simplifying the logistic.
- Longer Component Lifespan.
- Reduced Electricity Costs.
- Lower Maintenance Costs.
- Reduced Cooling Costs.
- Fewer Fans.

## Driver included on the VL Amplifier

- Maximum redundancy with virtual bottleneck elimination due to presence of a driver stage (LDMOS) on each plug.
- Low power exciter due to presence of a driver stage (LDMOS) on each plug.
- Low power splitters.
- No PA changeover required.

## Power Supply Redundancy

- Maximum redundancy due to presence of a compact reliable power supply on each plug
- Highest reliability supply configuration.
- The SMP Module includes a very efficient AC-DC (typ > 95%) SMPS (Switch Mode Power Supply).

## Electrical Characteristics

- Very high harmonics suppression (-90dB).
- Independent, individual APC (Automatic Power Control) circuit maintain a constant output power set.
- Frequency-response-compensated directional couplers and precision internal indicators.
- Distributed less binding Low Pass filter.

## Maintenance Facility

- Power Unit and Amplifier Hot swapping: plugs can be extracted/inserted without switch-off the equipment.
- Zero-Current and Zero-RF Plug-in insertion/extraction system.
- Universal spare parts: each plug is phase and amplitude characterized.
- Worldwide available spare part for power Supply (GE-General Electric).
- Any VL amplifier can be interchanged with any other in the same TXM transmitter or with a spare. No adjustment or program of any kind are needed.
- Smart Air filter included easy to clean or replace.
- Zero-Current and Zero-RF Plug-in insertion/extraction system.
- 90% of spare parts shared between FM transmitters.
- Optimized Air Flow Paths avoid damages on the electronic boards.
- The path of the air inside the transmitter to avoid contact with the electronic boards.
- Tropicalization of all the components against dust, humidity and pollution.
- Exhaustive final quality test.

# TECHNICAL CHARACTERISTICS

## TRANSMITTER

Power Output: Adjustable from 2kW to 40kW build with 2kW Amplifier Module up to 10 Modules in one Rack:  
2kW = 1 Module, 4kW = 2 Modules, 6kW 3 Modules, 8kW 4 Modules, 10 5 Modules, 12 kW = 6 Modules, 16 kW 8 Modules, 20kW 10 Modules

Power higher than 20kW are build combining more racks amplifiers:  
24kW = 2 Racks 6 Modules each rack, 32kW = 2 Racks 8 Modules, 40kW = 2 Racks 10 Modules.

Output power on/off and adjustable from front panel and remotely.

Overall Efficiency (Typical):  $\geq 75\%$  for transmitter.

RF Output Impedance: 50 ohm.

RF Output Connector: 1+5/8 and 3+1/8 type. (other on request)

Monitor RF: -57 dBc, BNC connector

VSWR: 1.5:1 Maximum with automatic fold-back at higher VSWR

DOUBLE EXCITER WITH AUTOMATIC CHANGE-OVER SYSTEM

SNMP TELEMETRY INTERFACE

GSM AND PSTN TELEMETRY

TCP/IP TELEMETRY INTERFACE

SINCH-MODULE FOR SFN APPLICATION

OIRT & JPN VERSION

DIGITAL AUDIO INPUTS

LPFM CODE STATION:FCC IDENTIFICATION CODE

RDS CODER : EASY PROGRAMMABLE BY PC

SCA Encoder

Digital Composite 192kHz Input

## ELECTRICAL (for 10kW to 40kW Transmitter)

AC Input Power: 230/400 VAC  $\pm 15\%$ , 50/60 HZ(+/- 3HZ)  
single phase or 3-phase+N

Power factor  $> 0.98$

Cooling: Forced air

MTBF  $> 20.000$  Hours

## ENVIRONMENTAL

Operating temperature:  $-10^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ .

Max Operating Altitude: 4000 mt.

Relative Humidity Range: 0 to 95% non condensing.

Protection against Lightening, Dust and Corrosion

## PHYSICAL DIMENSIONS (For typical 10kW Transmitter)

Mounting: 40 unit cabinet (Other size Rack on request)

Size: 570mm. (W) x 1000mm. D) x 1800 mm. (H) - Weight:  $\sim 220$  Kg.