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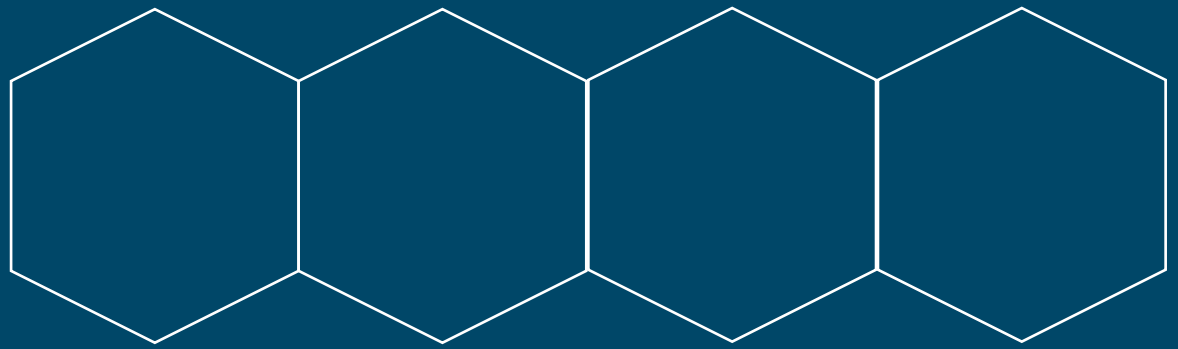
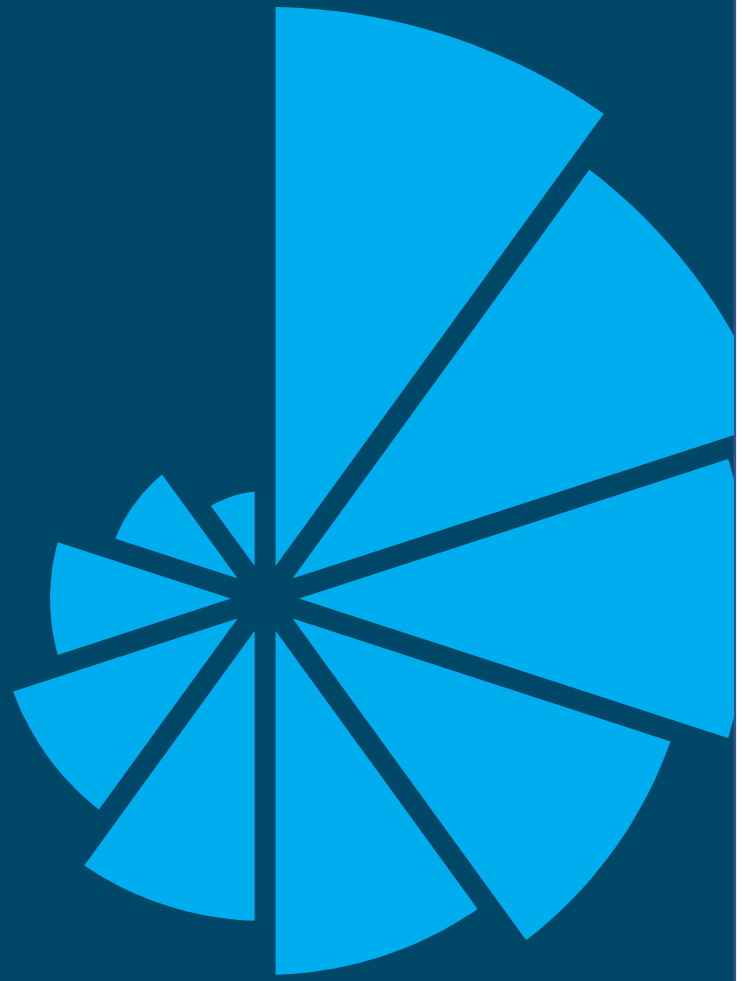
DEDICATED RELIABLE CREATIVE

Elenos Group
World Broadcast



ELENOS BE itelco PRO TELEVISION

Product introduction



Radio & TV
Broadcast Equipment
and solutions Worldwide

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The Group Partner in Indonesia

SOLITech
multi-media & broadcast solution

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Elenos Group

Elenos was founded in **1977** in Ferrara, Italy

- Focused on providing a wide rage of FM Transmettiters, featuring the most compact products on the market

(First in the world to provide a 10KW FM in 4U only)

Itelco Broadcast began in **1962** in Orvieto, Italy

- Specialized in digital modulation and high-power liquid-cooled systems

(Supplier of CERN for High-power amplifier involved on the Large Hadron Collider)

BE was established in Quincy, Illinois in **1959**,

- Broadcast Electronics has an illustrious history that has played an influential role in many radio milestones

BE offers a wide range of high quality radio broadcast products, including automation software and transmitters for AM, FM and HD Radio.

PROTELEVISION TECNOLOGIES established in Denmark, over 50 years of experience,

- Broadcast formerly Philips TV & Test Equipment, is a leading designer and manufacturer of advanced future-proof modulation solutions for Digital TV and Radio standards (DVB-T/T2, ISDB-T, DAB+, ATSC 1.0 and ATSC 3.0) represented worldwide in more than 50 countries with over 30,000 installed units in daily operation.

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Today

The mission of the **Elenos group**, by utilizing its improved production capability and international sales networks, is to provide consumers with state-of-the-art radio and TV equipment for all modulation standards.

With over 90 years of experience in the field, the Elenos group has developed technologies for Network applications, Digital TV or FM Radio Systems, scientific applications and remote software control.

The Elenos group is an ideal partner in helping you develop your networks for your next digital migration.

ELENOS

BE

itelco

PRO TELEVISION

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DEDICATED RELIABLE CREATIVE

60.000 Installations
130 Countries
90 Years of Experience

More than 20 Centers of **EXCELLENCE**

- **Radiocomm**
- **LEGA** Ltd
- **Clyde** Broadcast Products Ltd
- **Broadcast Partners**
- **FPG SERVIS** s.r.o.
- **Nagyfrekvencia** Kft
- **RTV-TEC**
- **Roussillon** FM
- **SiteMaster** LDA
- **Matel** Elettronica Snc
- **RS** Telekomunikasyon
- **Athenas** Comunicaciòn y Logistica SL
- **Shanghai** Yi Hui Nuo Broadcast
- **PT. Solitech** multi-media & broadcast sol.
- **Vtek** Engineering Ltd
- **Headway** High Tech
- **BTSi**
- **Broadcast Solution** International Ltd
- **Cakrawala** Gemilang
- **Ponto de Apoio Tecnico**
- **Eletronico** LTDA

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Elenos Group
World Broadcast

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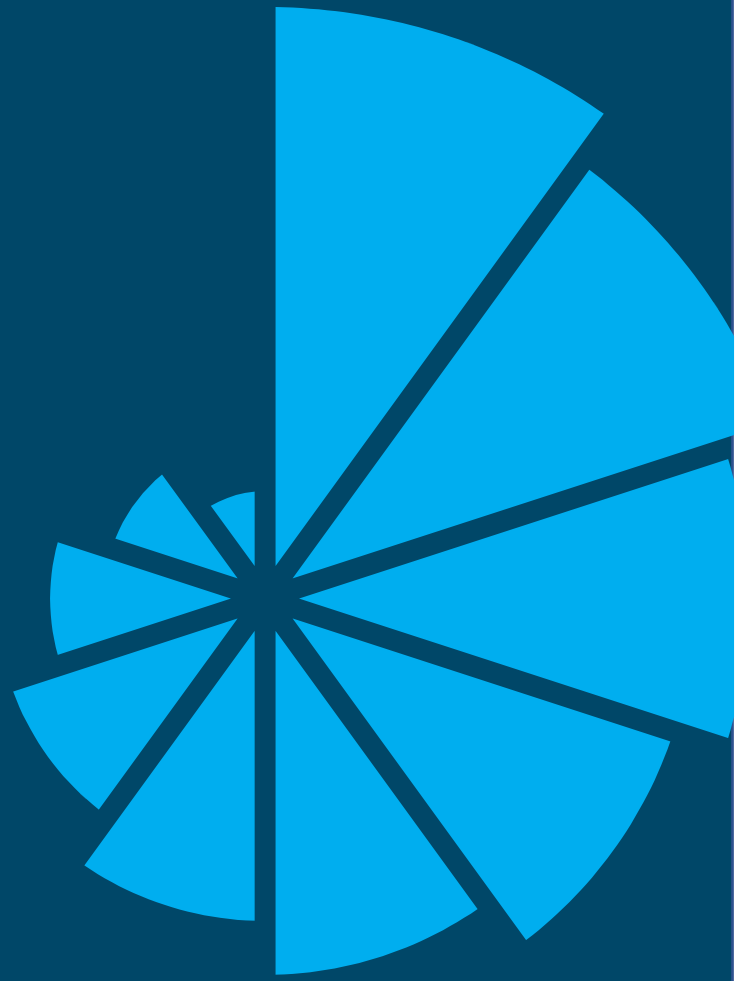

Radio & TV
Broadcast Equipment
and solutions Worldwide

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MEX II - IEC 100 / IEC 200 – ALPAN 1/2/3

Multimode = Same hardware with different firmware for:

- DVB-T
- DVB-T2
- ISDB-Tb
- ATSC
- ATSC3
- DAB /
- DMB

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Low power:

Exciters / Stand-alone Transmitters

- MEX II – 1Wrms, 10Wrms, 25W rms
- IEC 100 – 100W rms - IEC 200 – 200W rms

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Medium power:

Stand-alone Transmitters

- ALPAN 1 = 200W rms
- ALPAN 2 = 400W rms
- ALPAN 3 = 600W rms

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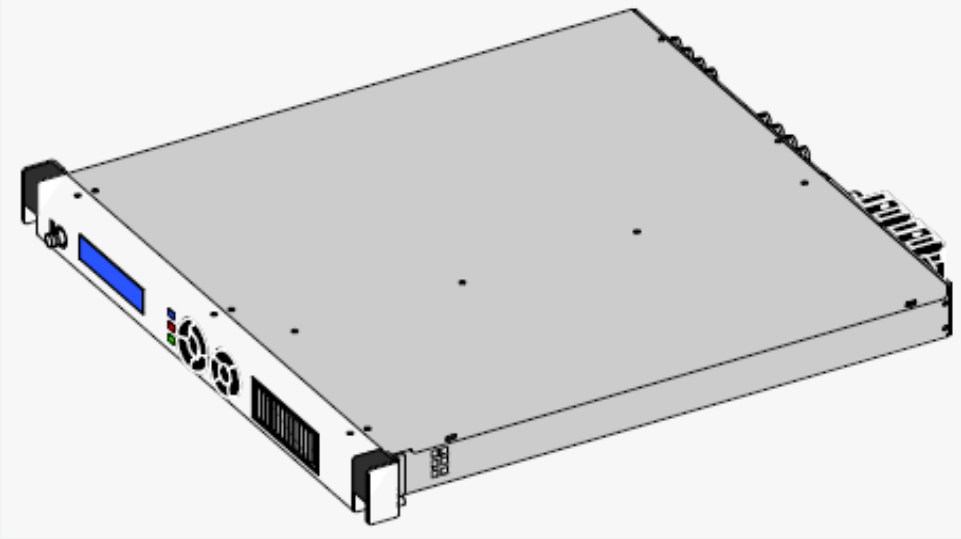
MEX II - 1Wrms, 10Wrms, 25W rms
Low power multimode
Exciter / Stand-alone Transmitter



New 1 RU Design with Optional built-in Satellite Receiver

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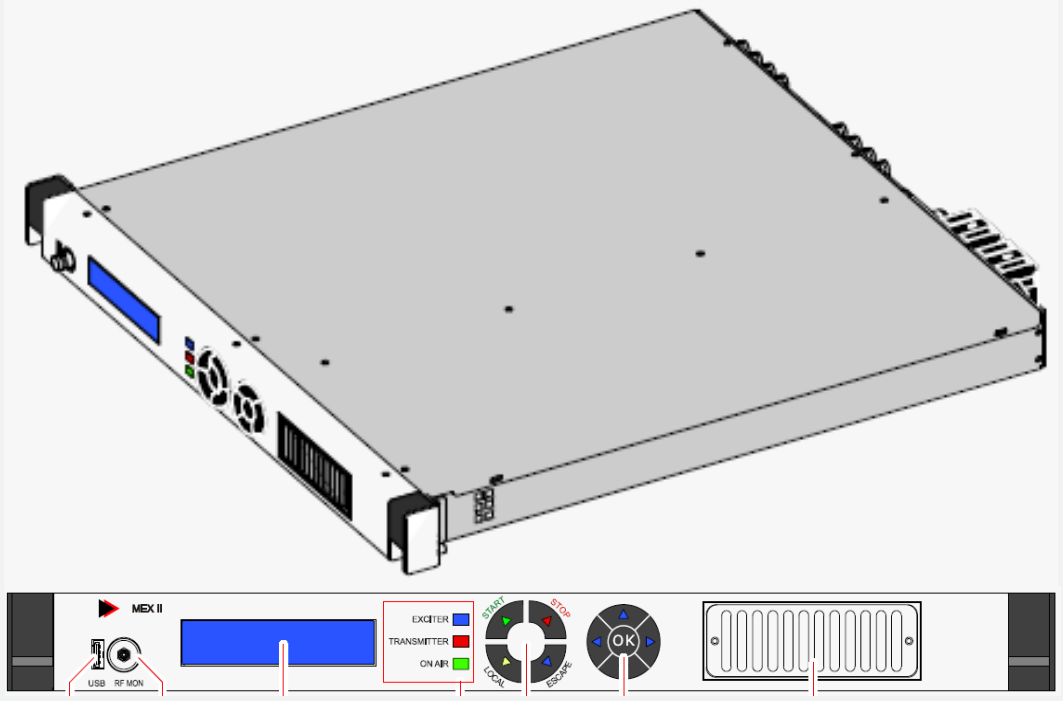
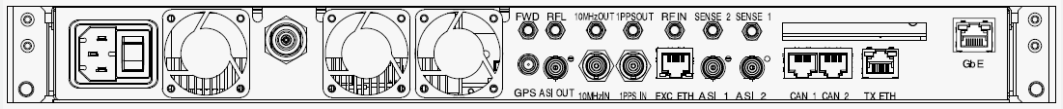
MEX II - 1Wrms, 10Wrms, 25W rms - Low power Exciter / Gap-filler



front view



rear view

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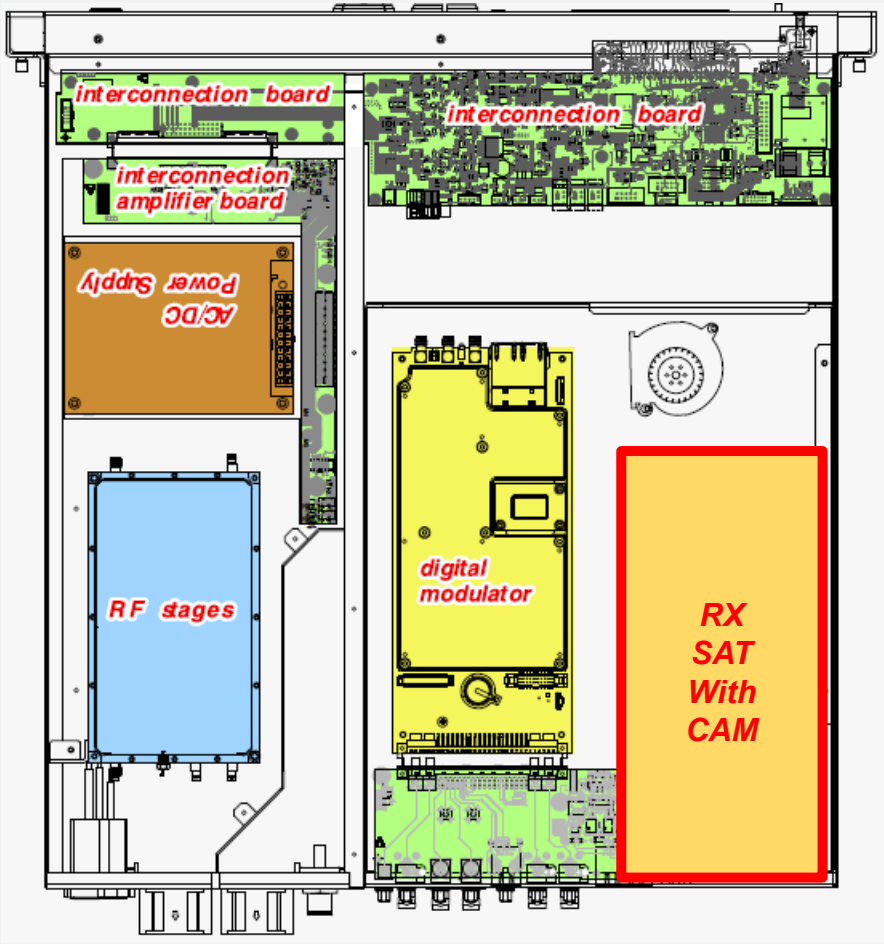
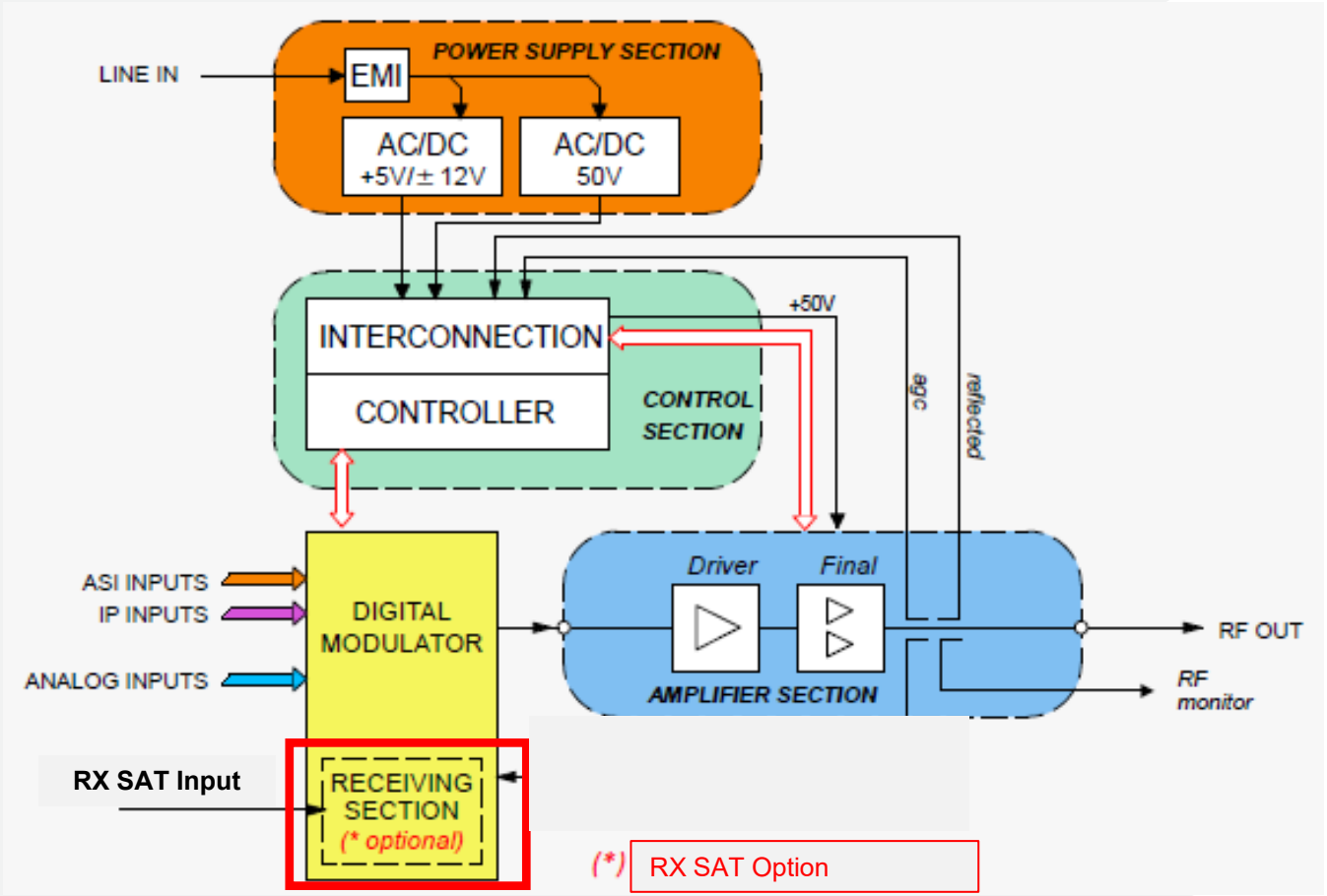
MEX II



top view



block diagram

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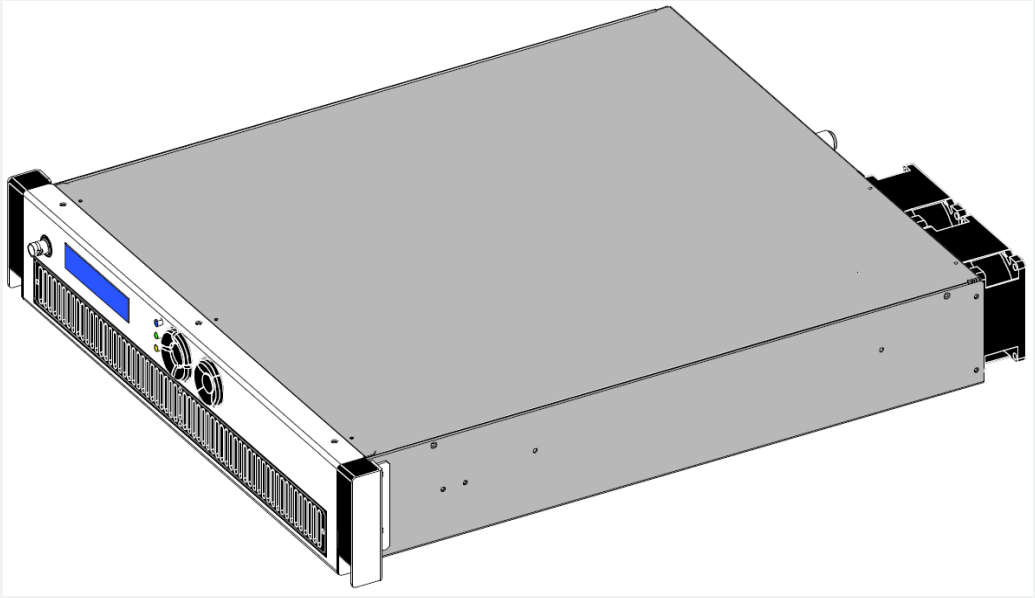
IEC 100 - 100W rms
IEC 200 - 200W rms
Low power multimode Transmitter



New 2 RU Design with Optional built-in Satellite Receiver

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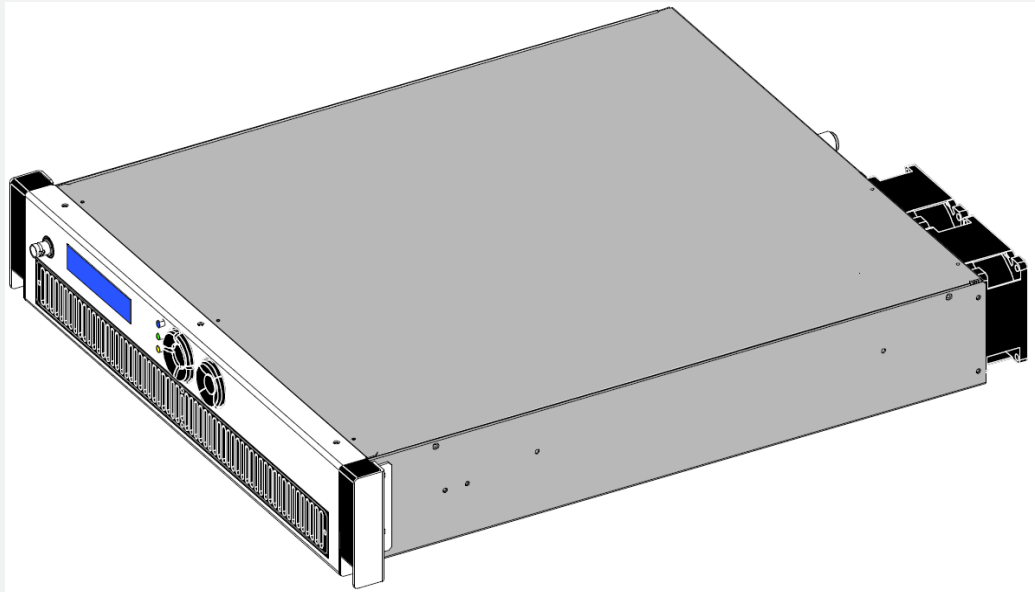
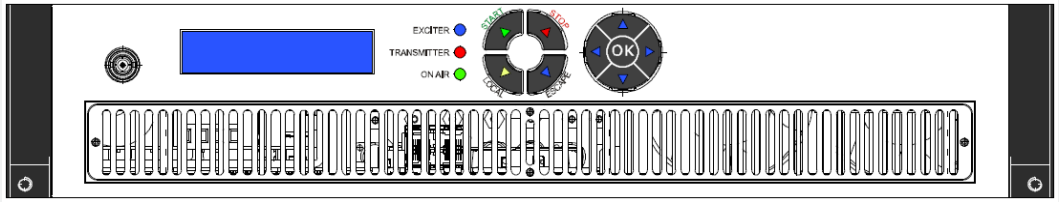
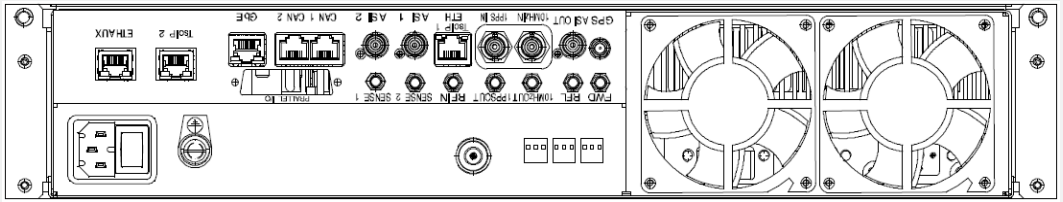
IEC 100 – 100W rms – IEC 200 – 200W rms Transmitter





front view



rear view

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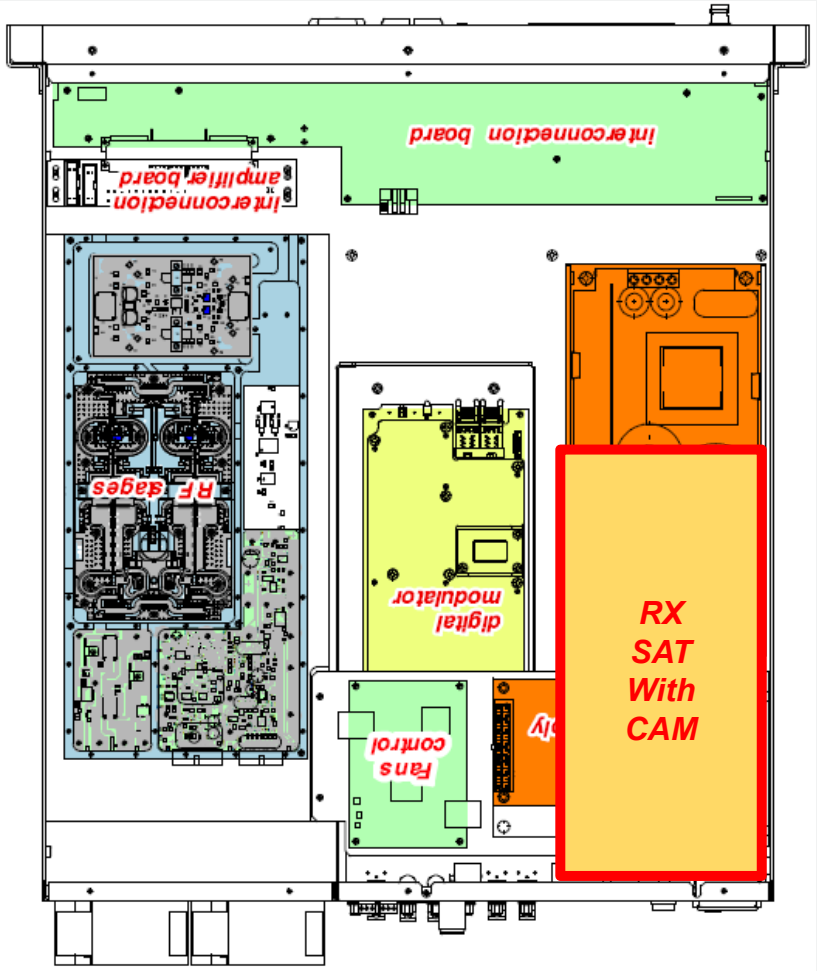
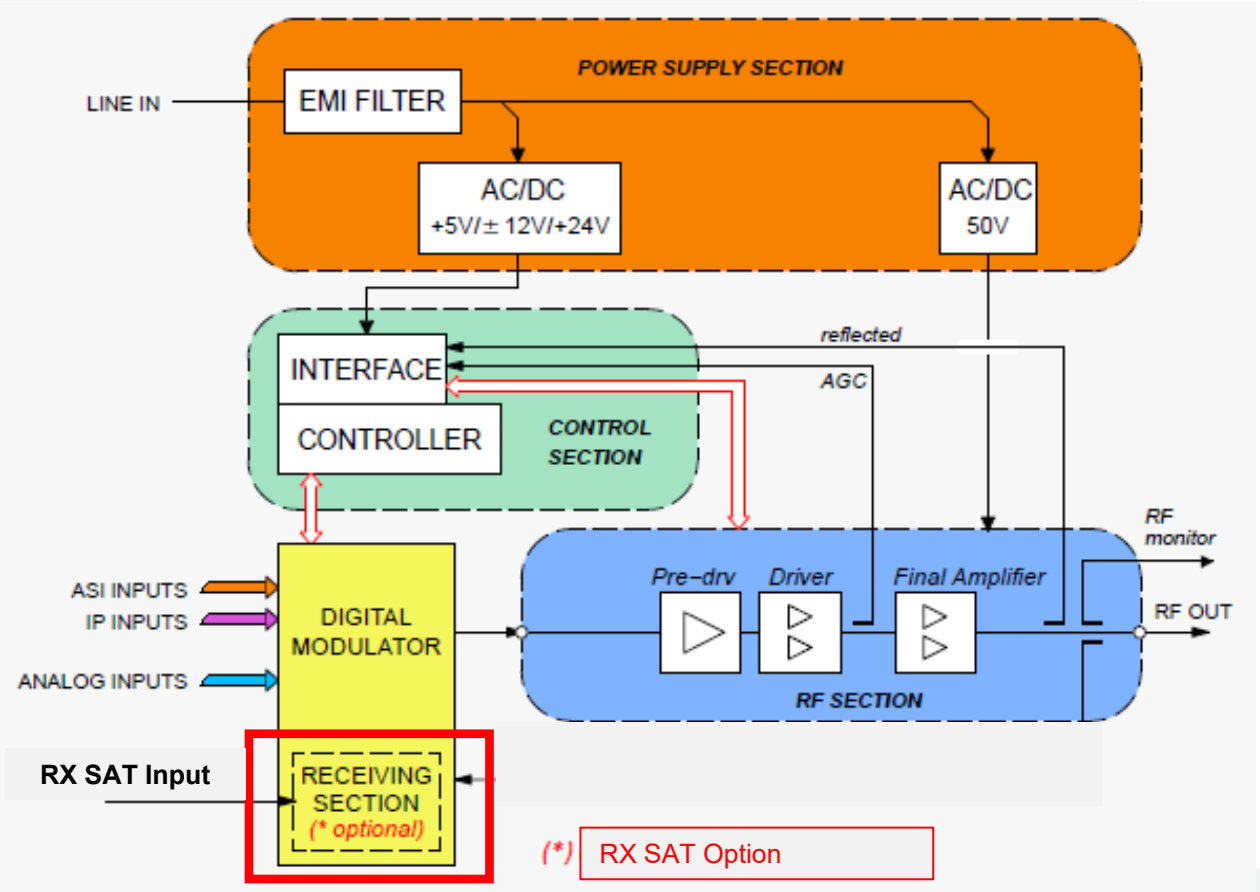
IEC 100 – IEC 200 Transmitter



top view



block diagram

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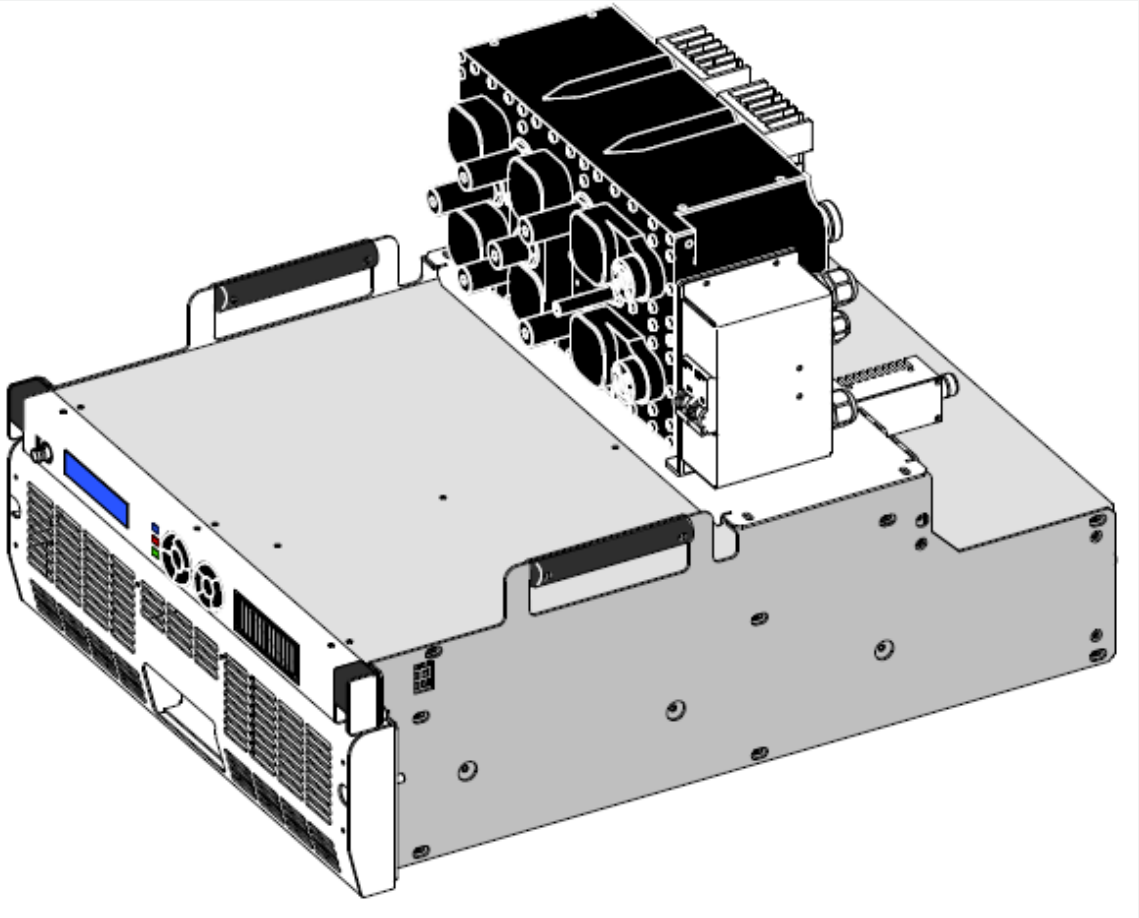
Alpan 1 / 2 / 3 - Medium power multimode Transmitters



HPAs number	
ALPAN 200	DVB-T/H
	DVB-T2
	ISDB-T/T$_b$
	ATSC
	ANALOG
ALPAN 400	DVB-T/H
	DVB-T2
	ISDB-T/T$_b$
	ATSC
	ANALOG
ALPAN 600	DVB-T/H
	DVB-T2
	ISDB-T/T$_b$
	ATSC
	ANALOG

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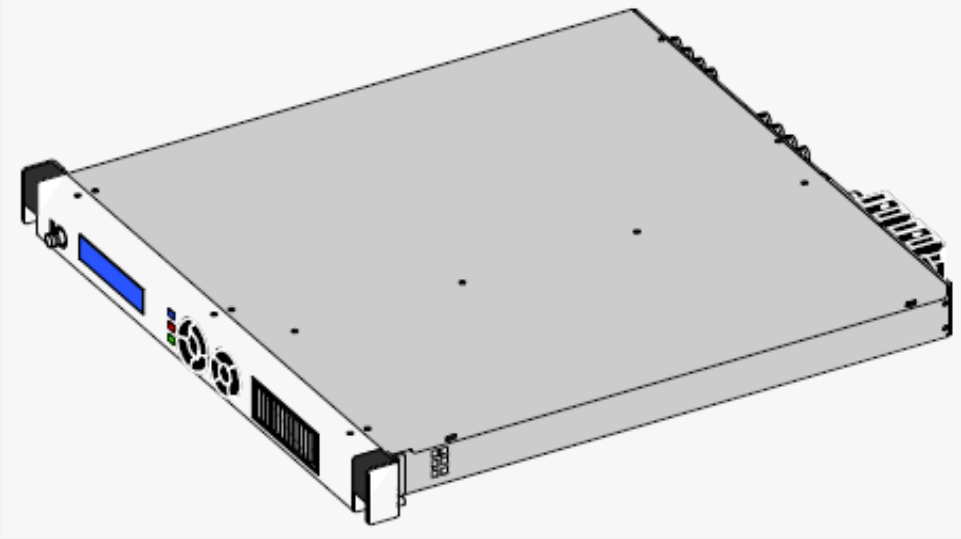
Alpan
Exciter



New 1 RU Design with Optional built-in Satellite Receiver

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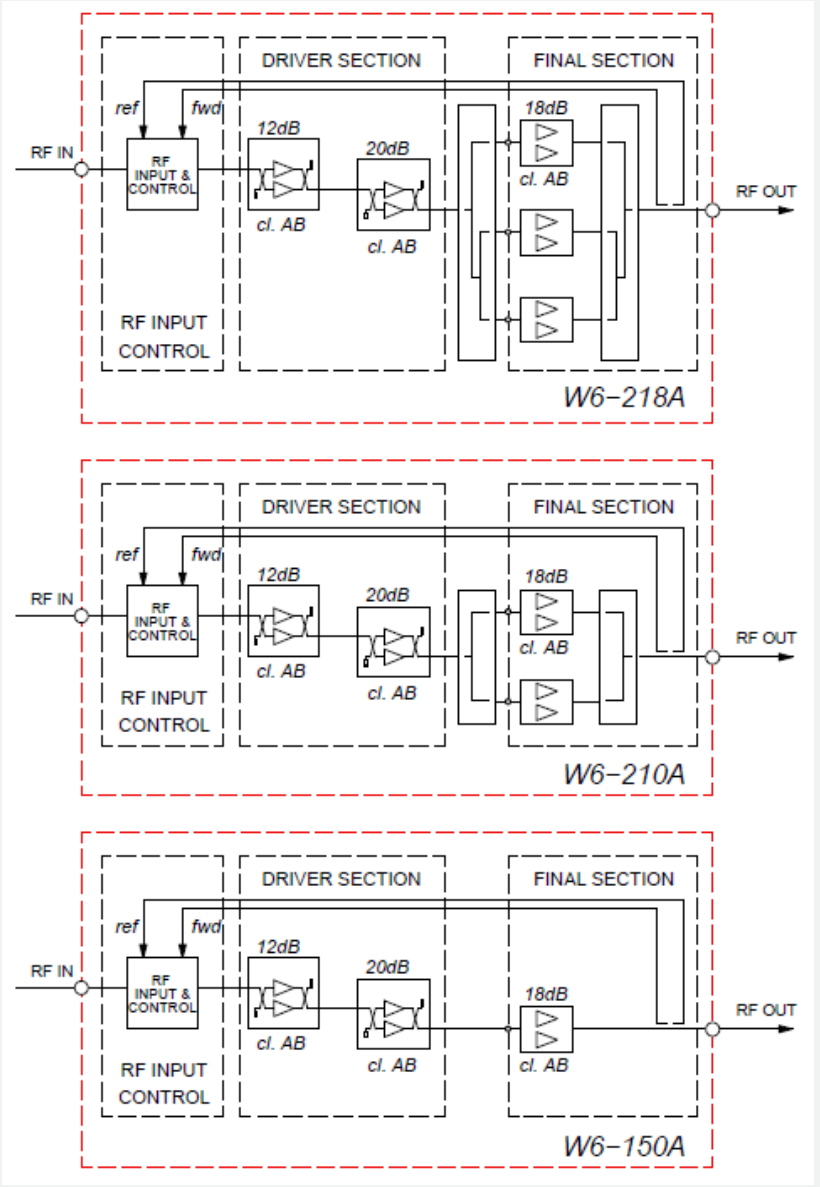
Alpan PA

Air Cooled Transmitters
Power Amplifiers

- ALPAN 3 = 600W rms =
- ALPAN 2 = 400W rms
- ALPAN 1 = 200W rms



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Alpan PA

Air
Cooled Transmitters
Power Amplifiers

- MULTISTANDARD OPERATION
- Available for VHF and UHF
- Full Broadband Doherty
- HIGH EFFICENCY RF UP TO 37%
- Modular Hot Plug modules
- FULL REDUNDANCY RF and PS STAGE
- Adaptive precorrection for maximum optimization of transmitter transmission performances and power efficiency

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Thalna

Air
Cooled Transmitters

UHF 1HPA	UHF 2HPA	UHF 3HPA	UHF 4HPA	UHF 5HPA	UHF 6HPA	UHF 8HPA
700W avg	1,5kW avg	2,2kW avg	2,8kW avg	3,5kW avg	4,2kW avg	5,6kW avg
1,2kW p.s.	2,4kW p.s.	3,6kW p.s.	4,8kW p.s.	6kW p.s.	7,2kW p.s.	8,4kW p.s.

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Thalna

Air
Cooled Transmitters
Power Amplifiers

- MULTISTANDARD OPERATION
- Available for VHF and UHF
- Full Broadband Doherty
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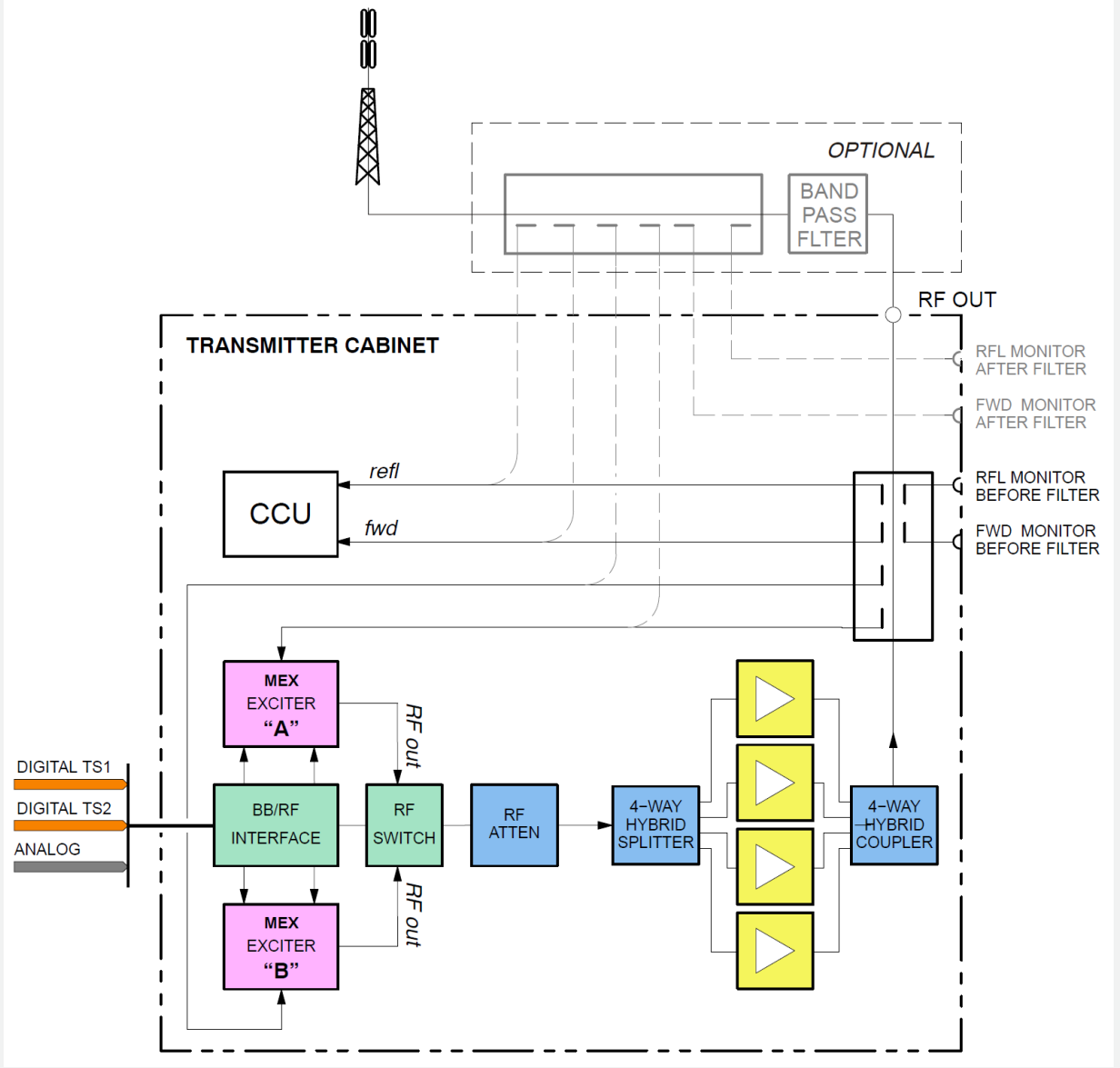
Thalna

Air
Cooled Transmitters
Block diagram



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LARAN = NORTHIA with built-in cooling unit

Liquid
Cooled Transmitters

UP TO 6 HPA

UHF 1HPA	UHF 2HPA	UHF 3HPA	UHF 4HPA	UHF 5HPA	UHF 6HPA
1,5kW avg	3kW avg	4,5kW avg	6kW avg	7,5kW avg	9kW avg
4kW p.s.	8kW p.s.	12kW p.s.	16kW p.s.	20kW p.s.	24kW p.s.

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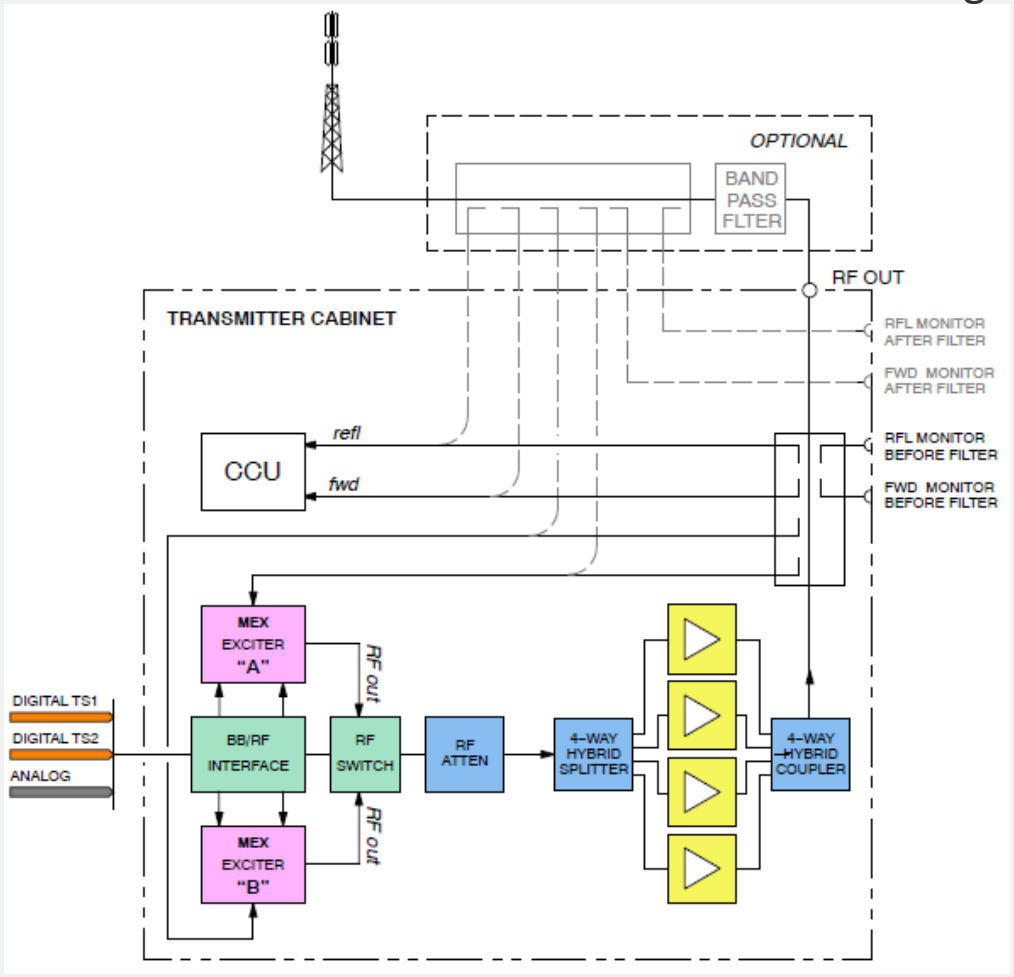
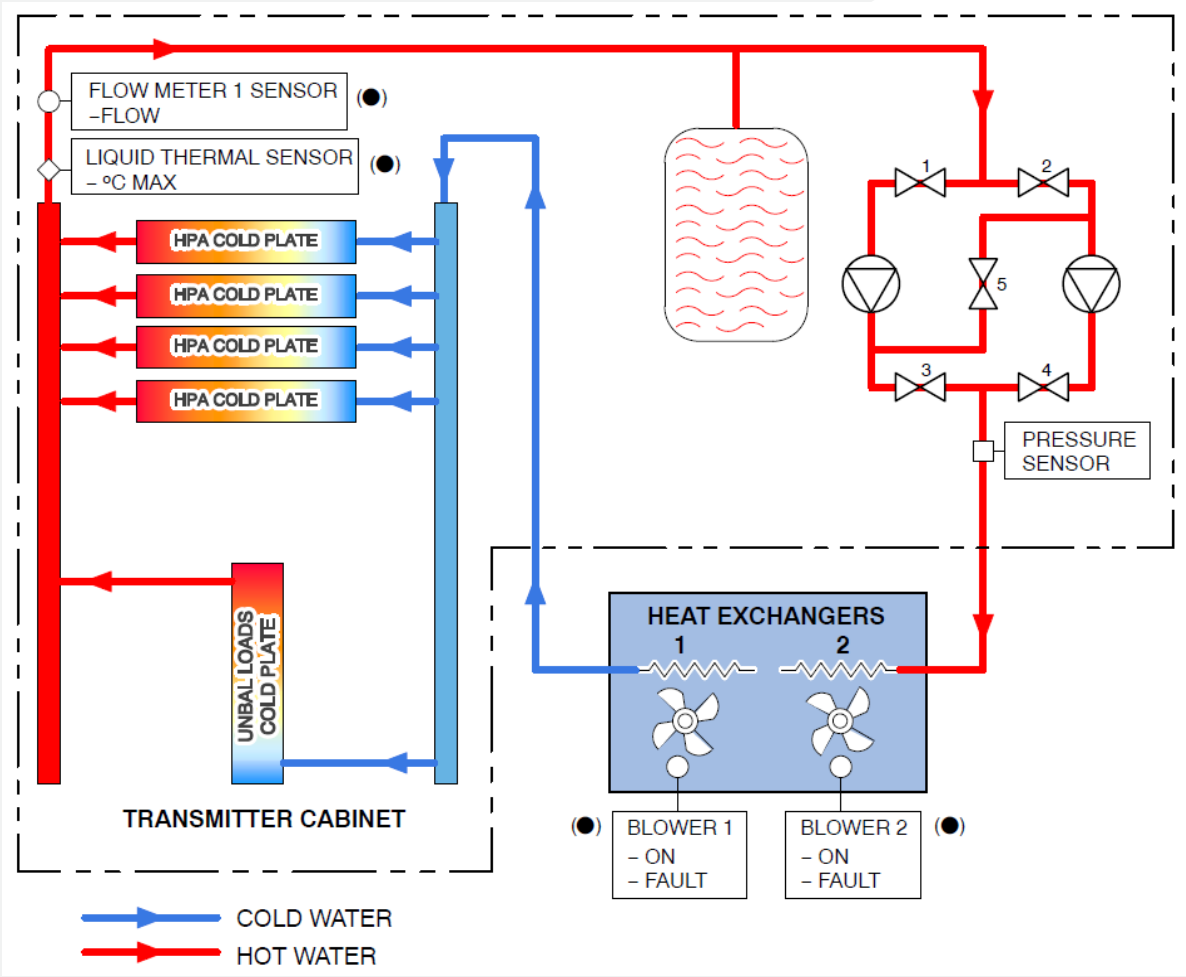
LARAN = NORTHIA with built-in cooling unit

Liquid Cooled Transmitters - UP TO 6 HPA - Block diagram





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NORTHIA WITH EXTERNAL COOLING UNIT

TV Transmitters Redundancy

UHF 16HPA
19kW avg
40kW p.s.

Itelco Broadcast

- CCU (Central Control Unit) common to all power classes
- Graphical User Interface with color touchscreen
- User definable configuration, up to 8 main transmitters
- Integrated coax switches up to 100Wrms (4+1 max)
- Interface for external coax switches

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NORTHIA
WITH EXTERNAL COOLING UNIT

IN 1+1 ACTIVE RESERVE CONFIGURATION

TX A -> ANTENNA
TX B -> DUMMY
TX A+B -> ANTENNA
TX A+B -> DUMMY

UHF 24HPA
28kW avg
60kW p.s.

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NORTHIA
WITH EXTERNAL COOLING UNIT

IN 1+1 ACTIVE RESERVE CONFIGURATION

TX A -> ANTENNA
TX B -> DUMMY
TX A+B -> ANTENNA
TX A+B -> DUMMY

UHF 32HPA
35kW ag
80kW p.s.

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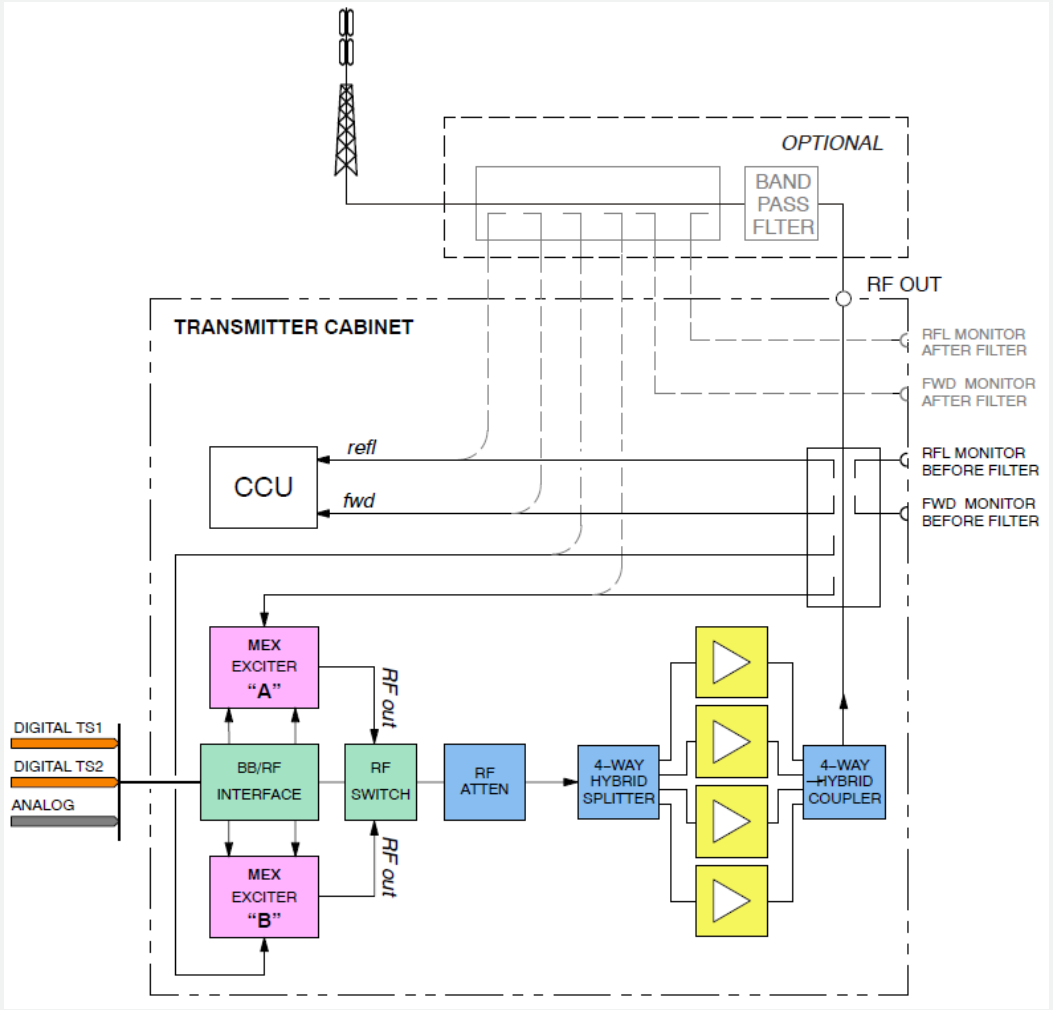
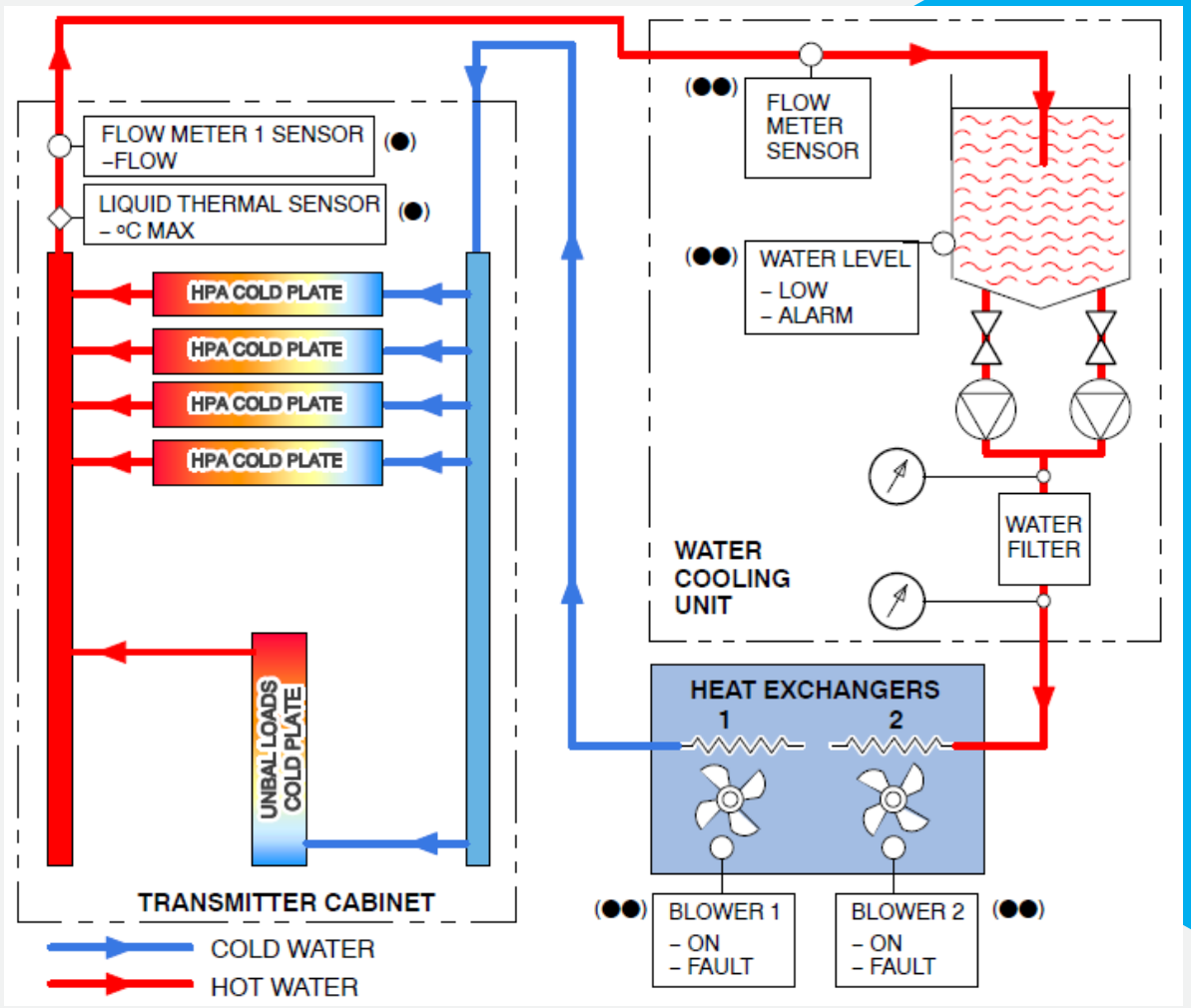
Northia

Liquid Cooled Transmitters Block diagram





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Northia

Liquid
Cooled Transmitters
Power Amplifiers

- High Efficiency and redundant Liquid cooling system
- Available for VHF and UHF
- Full Broadband Doherty HIGH EFFICENCY RF UP TO 37%
- Modular Hot Plug modules
- Open and Closed Circuit

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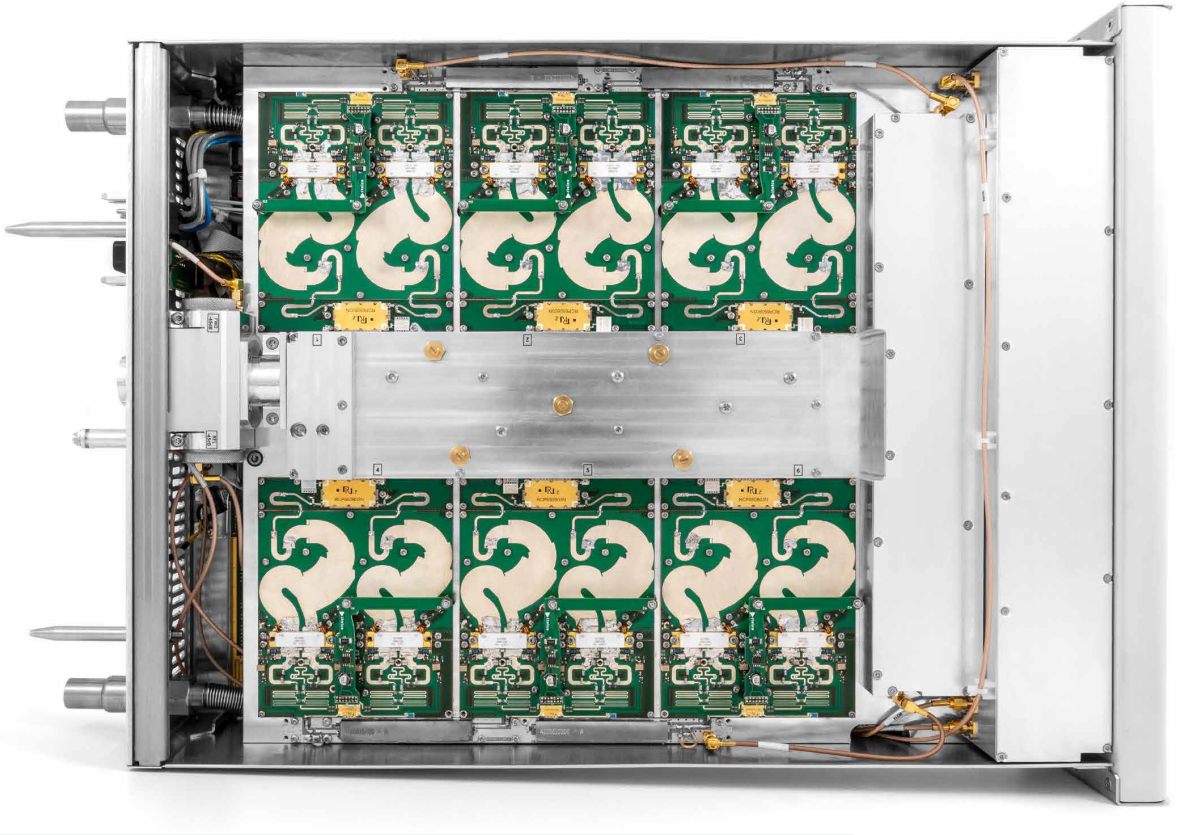
Northia

Liquid
Cooled Transmitters Power Amplifiers
Doherty technology

- High Efficiency and redundant Liquid cooling system
- Available for VHF and UHF
- Full Broadband Doherty HIGH EFFICENCY RF up to 37%
- Modular Hot Plug modules
- Open and Closed Circuit



- The same RF pallet is used in the **Thalna Line** air cooled transmitters in which each power amplifier drawer has 3 (three) RF pallet each one

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ALL THE ITELCO EQUIPMENT CAN BE CONFIGURED IN 1+1 ACTIVE OR PASSIVE RESERVE OR IN N+1 CONFIGURATION

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MEX II in 3+1 configuration

Front view

3+1 details

Synoptic with touch screen

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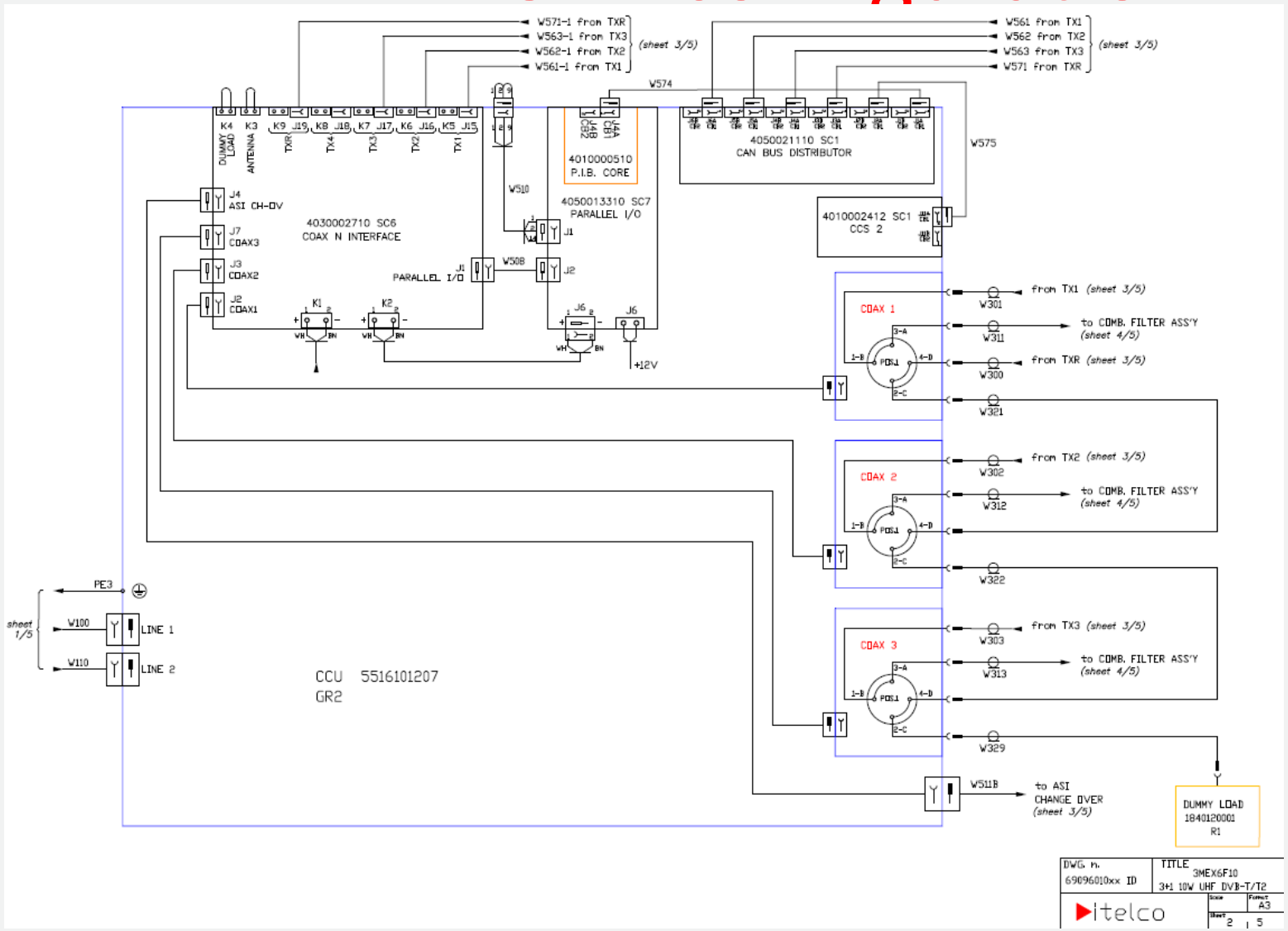
MEX II in 3+1 configuration



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Elenos — Itelco

DVB-T2

Digital
Video
Broadcasting
Terrestrial
2 Second generation

- Experience

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PRO TELEVISION TECHNOLOGIES

Brief Company Introduction:

- Established in 1963 as Philips Test and Measurement
- 1964 First TV modulator introduced – more than 40 years of experience in the brodcasting market
- 1998 First generation DVB-T C-OFDM Modulator introduced (PT5775)
- Today more than 20.000 transmission site installations
- Per early 2003, PTT is owned by Managing Director Morten Simonsen

ProTelevision Today:

- Located in Copenhagen, Denmark
- High focus on R&D – 25 engineers working solely on C-OFDM technology (DSP, RF, SW, HW)
- All production outsourced to ISO Certified specialists
- Calibration, verification and test certificate of each piece of equipment done at PTT (100 hours burn in)
- DVB member (actively participated in the creation of several standards)

LEADING MANUFACTURER OF DTT MODULATORS

ATSC

ATSC 3.0

DVB T

DVB T2

ISDB-T

ISDB-Tb

DAB
Digital Audio Broadcasting

DAB+
Digital Audio Broadcasting

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OPTI POWER®

elenos group
DEDICATED RELIABLE CREATIVE

PRO TELEVISION TECHNOLOGIES

- Most Advanced Technology of Precorrection in the Broadcasting Market.

- Thanks to:
  Optimized precorrection technologies and 2) Exclusive technics of crest factor reduction,

  Optipower increases the efficiency of any amplifier from 2% to 5%

OPTI POWER®

Intuitive and user friendly WEB Graphical User Interface

Modulator/Exciter

ATV (comming soon)

Pro Televison Technologies

- Pro Televison Technologies
- ATV Modulator
- Analog Video/Audio input
- SDI Input
- PAL and NTSC color
- G, D1, M, K, I1, K1, N, NC, I
- Exact same base module as the DTV products

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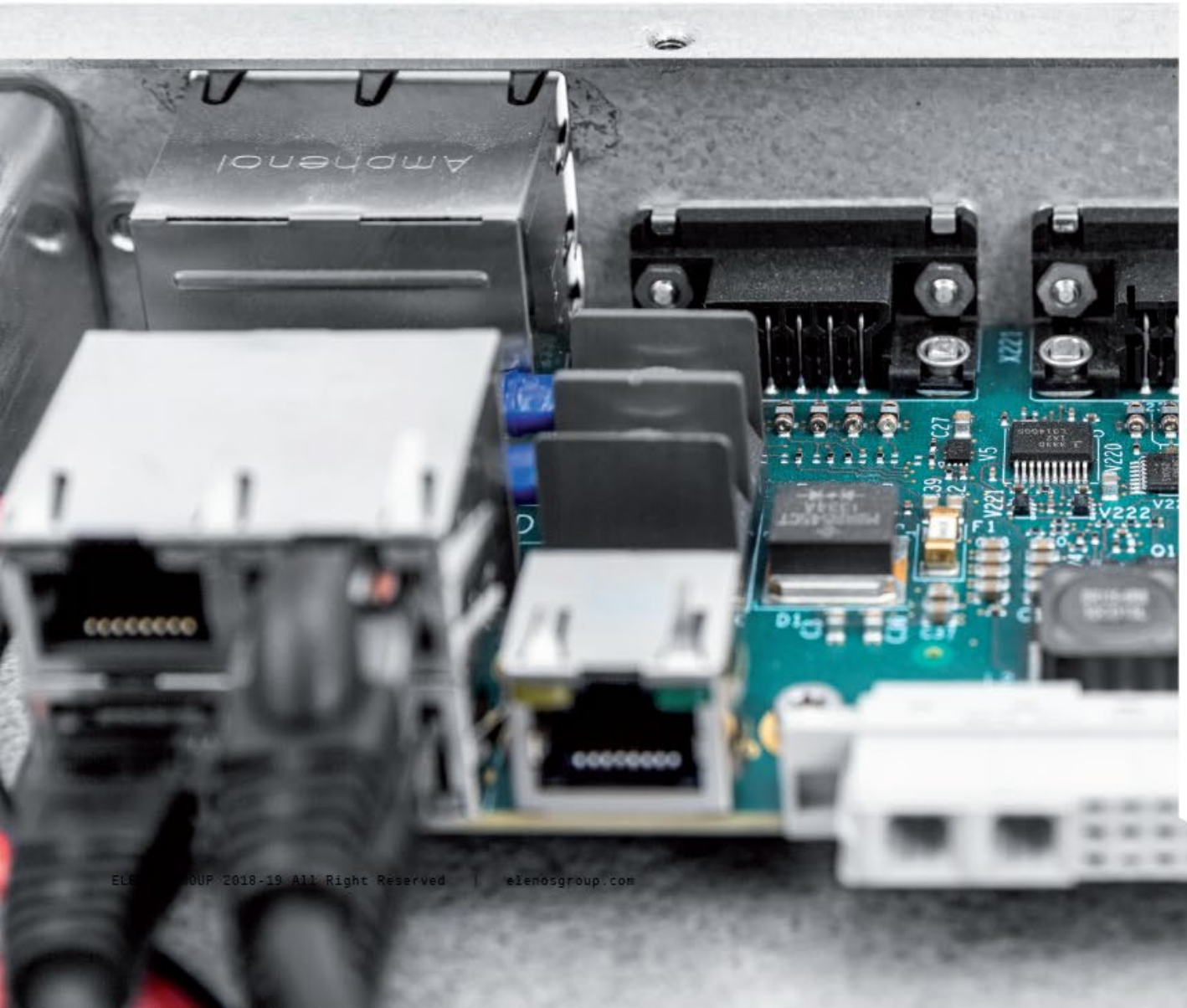

MODULATOR / EXCITER

DVB-T2

Pro Television Technology

- 2x TSoIP Inputs 1Gb
- Digital Adaptive precorrections Linear and Non linear
- Optional OCXO and GNSS add-on modules

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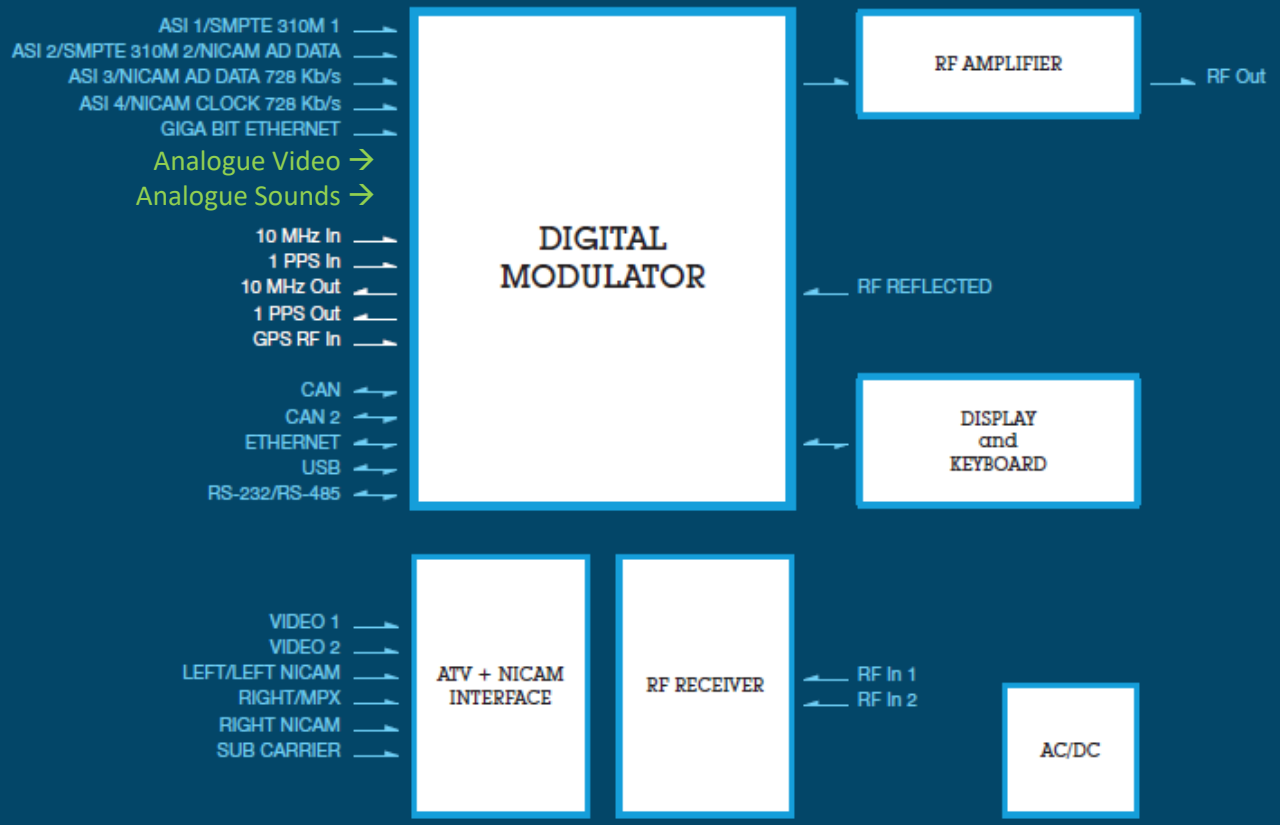
Functional Block Diagram



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TV Transmitters
MEX II block diagram

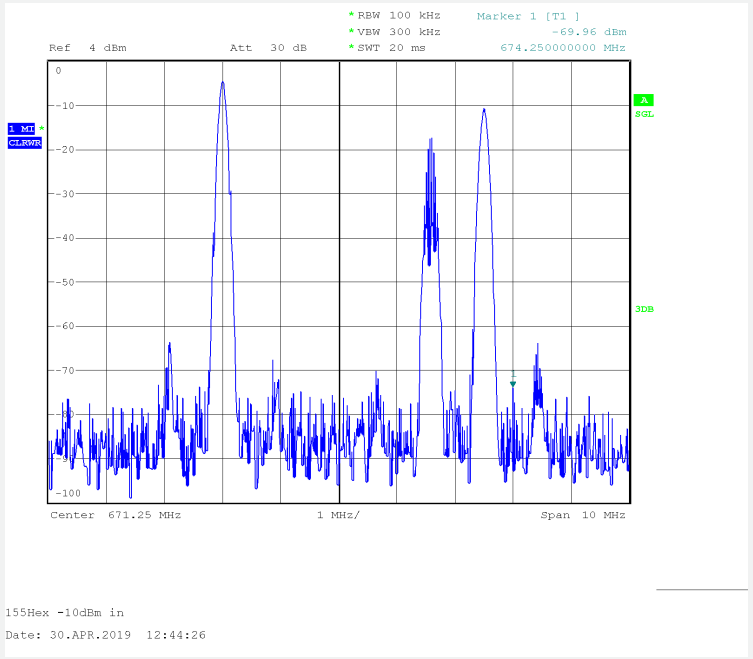
Itelco Broadcast

- MEX

DUAL CAST EXCITER

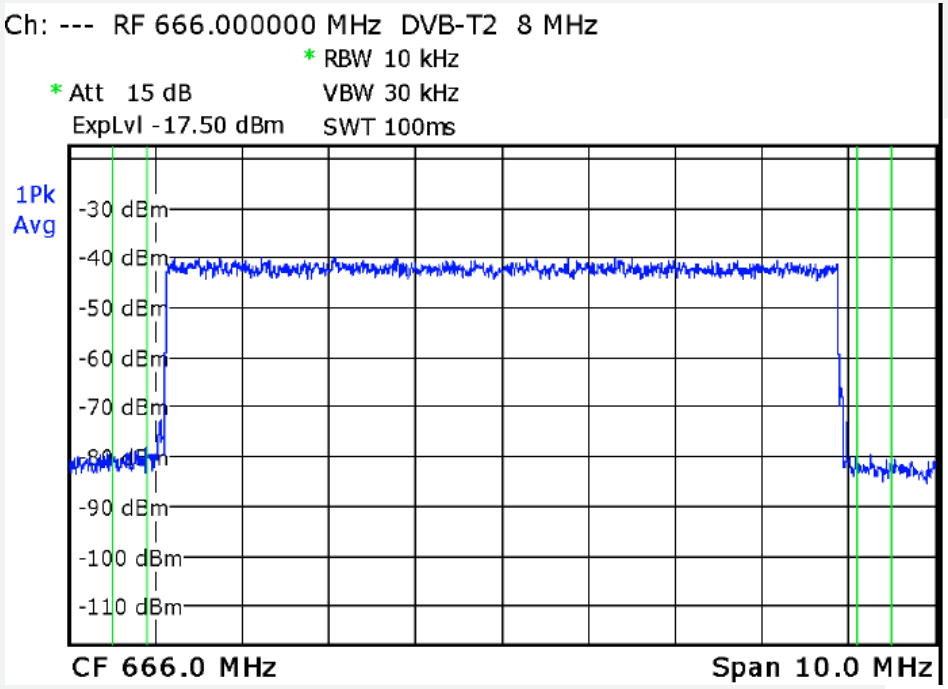
ANALOGUE INPUT MODULATION FOR ANALOGUE SPECTRUM TRANSMISSION

TS / IP STREAM DIGITAL INPUT MODULATION FOR DVB-T2 SPECTRUM TRANSMISSION



Analogue Spectrum mask

- Only one program in 8MHz channel



DVB-T2

- Several programs in 8MHz channel
- Possibility of adjacent channel and coadjacent channels
- MFN or SFN network operation
- Energy saving (transmitting site and power reduction

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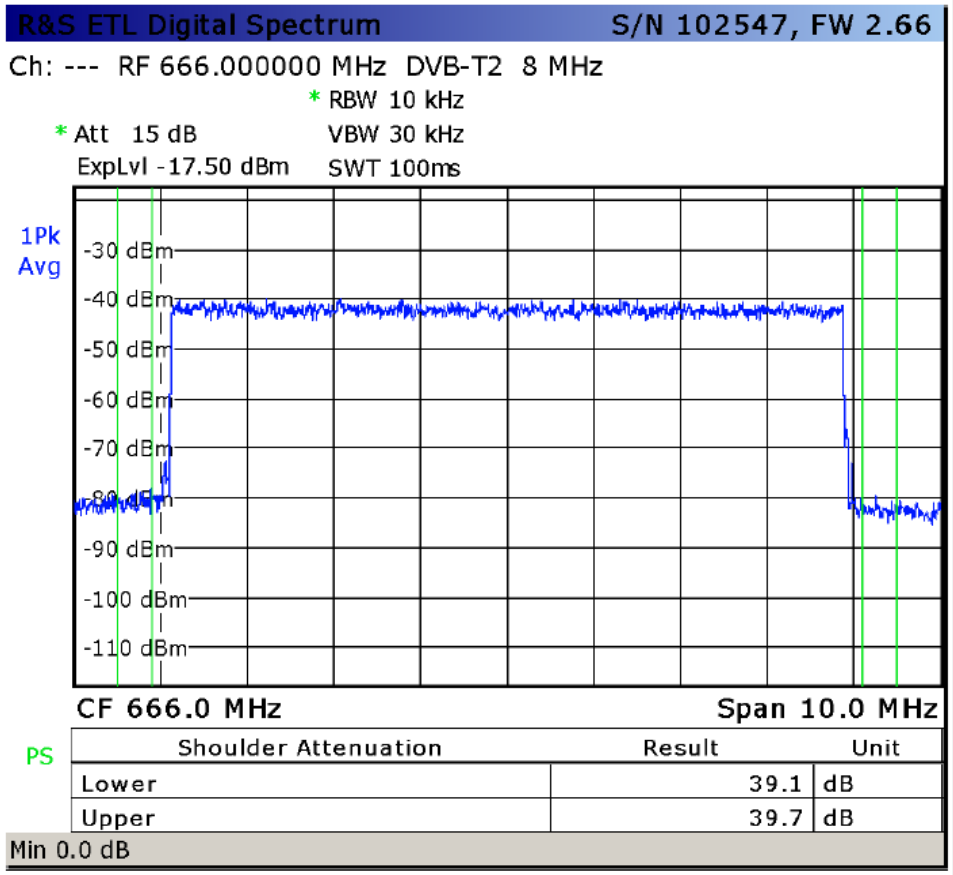
[x] Spectrum



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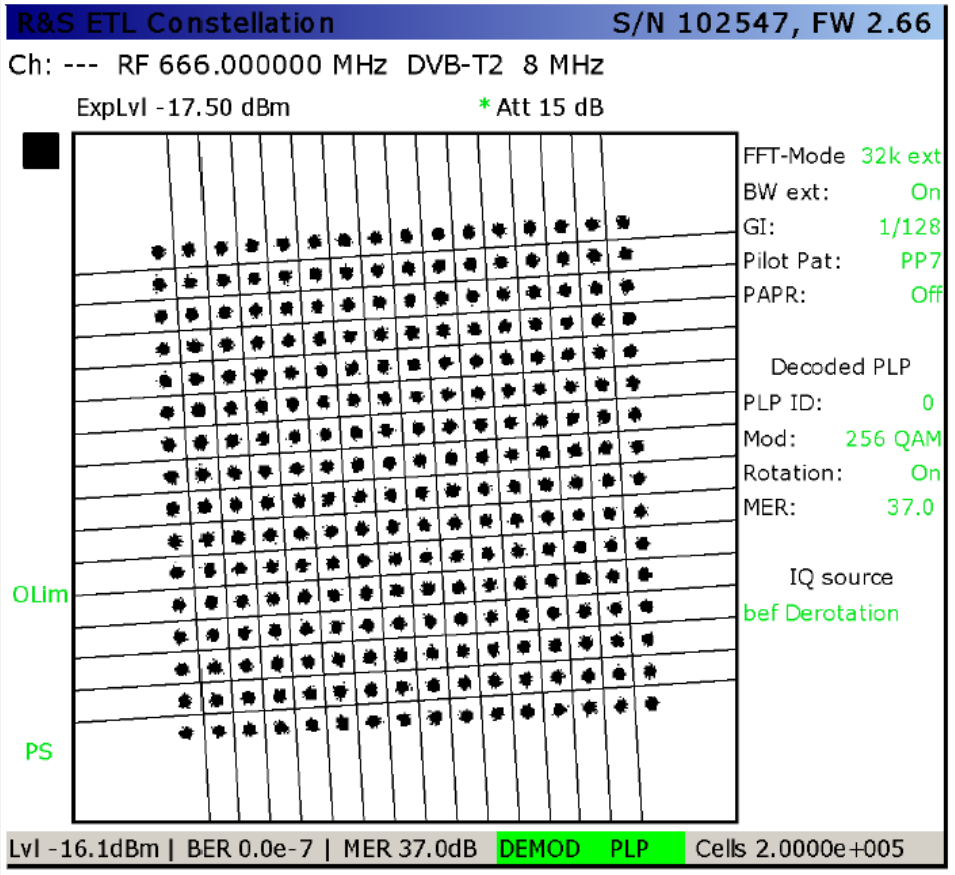

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The Group Itelco | DVB-T2 Modulator Synoptic Control

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Itelco transmitters and DVB-T2 Advantages

Transmitters Advantages

- Ownership Cost reduction
- Power Consumption reduction thanks to the high efficiency technology
- Hot plug systems and full redundancy on RF and PS stage
- Extremely high MTBF thanks to the Itelco quality and experience

DVB-T2 Advantages

- Several programs in 8 MHz channel
- Adjacent and coadiacent channels use
- MFN or SFN operation mode
- Service cost reduction
- Owner consumption reduction due to several
- programs in the same channel
- Multimedia Service transmission
- Transmitting site power reduction

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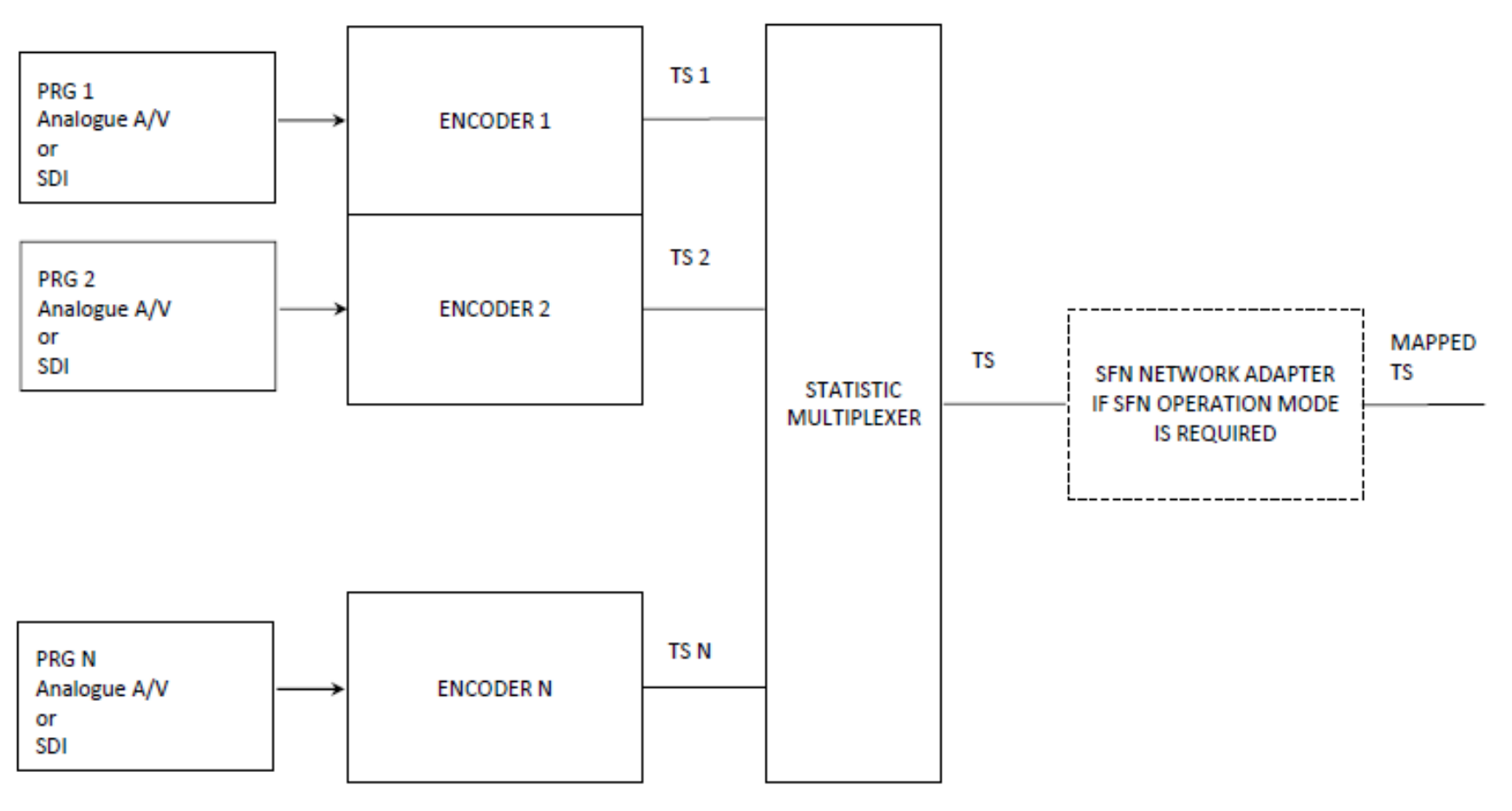
Encoding Digital TV Structure



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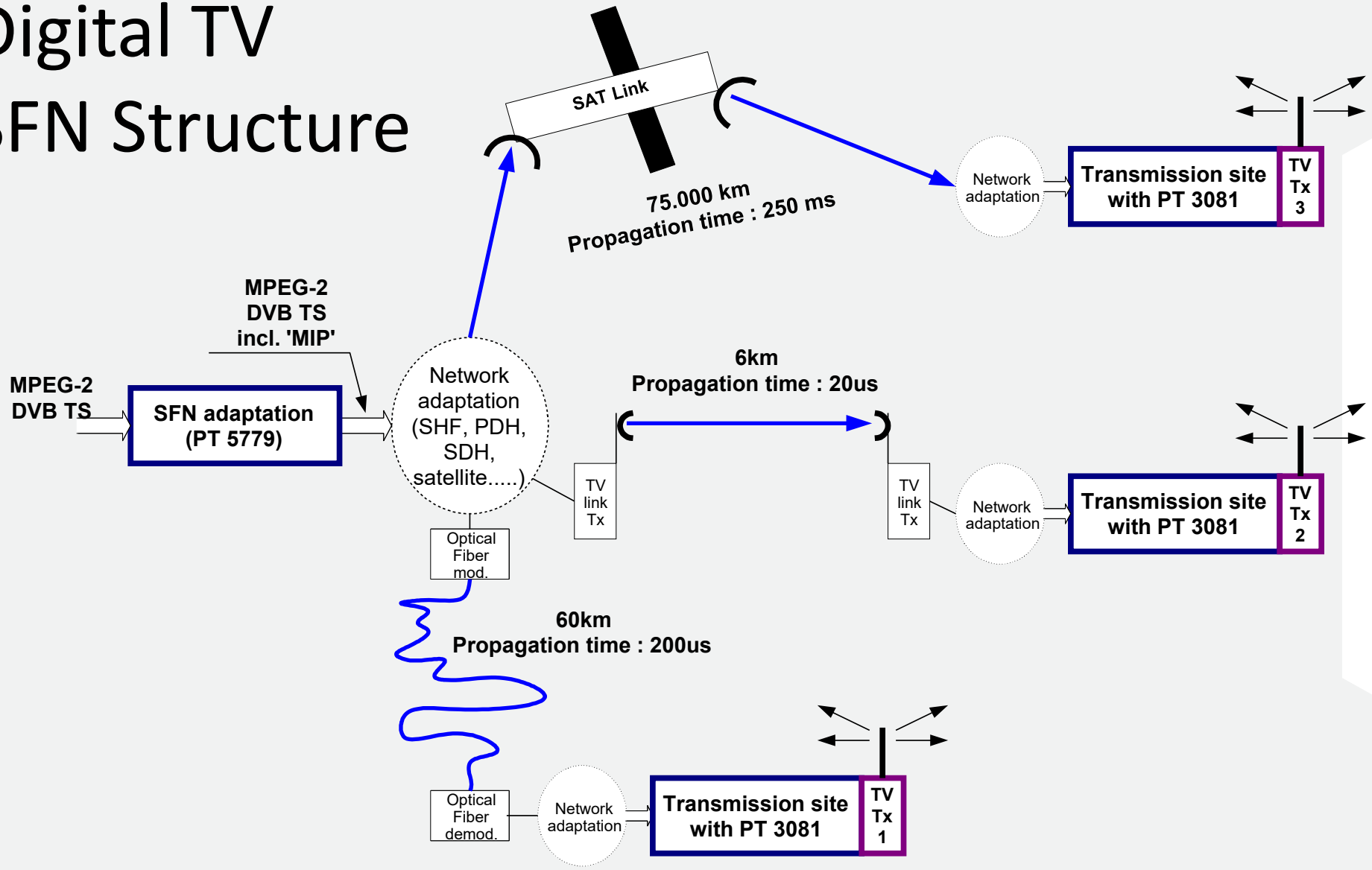
Digital TV SFN Structure



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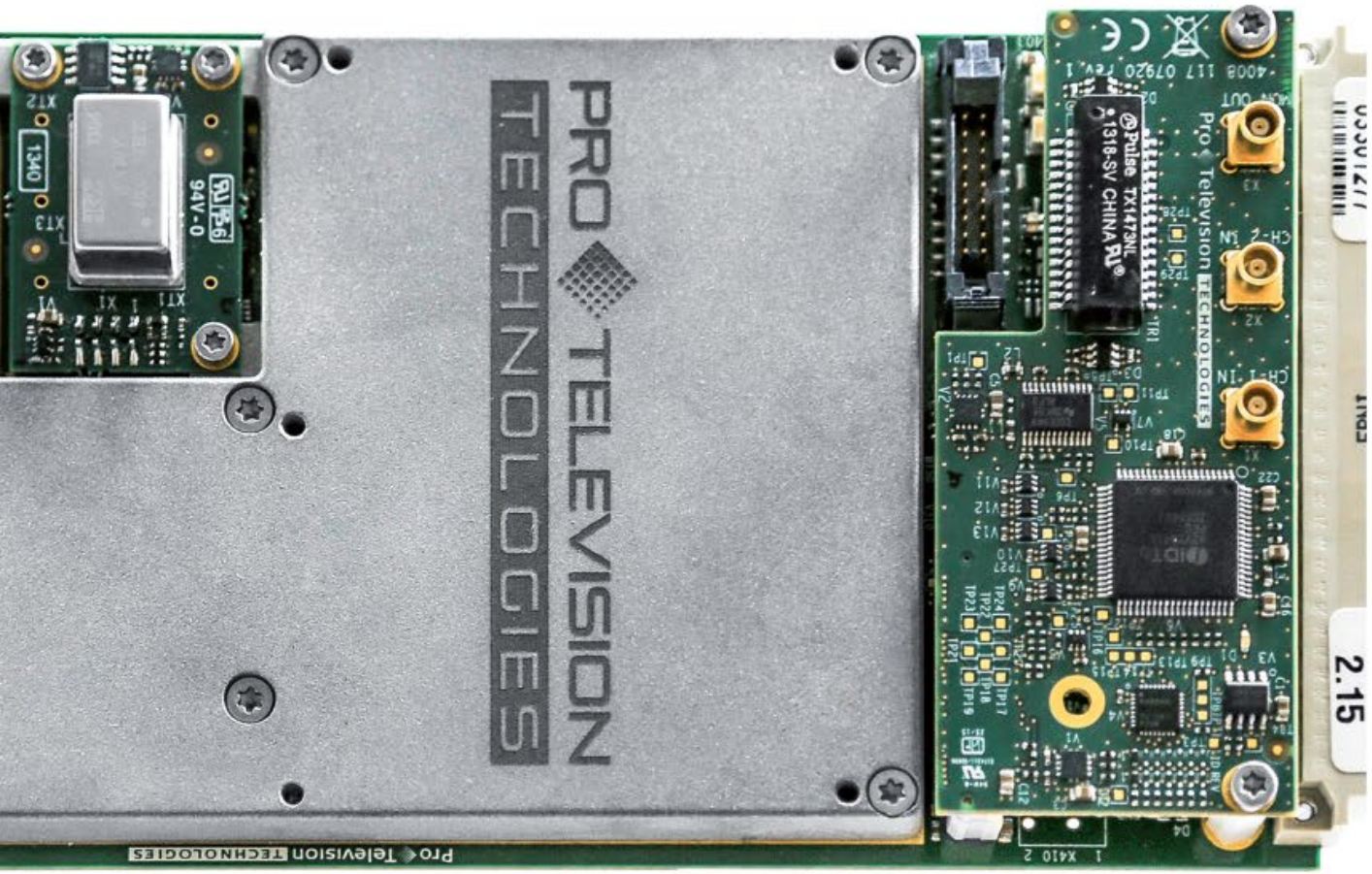

Modulator

DAB Digital Audio Broadcasting

DAB+ Digital Audio Broadcasting

Pro Televison Technologies

- DAB / DAB+ / T-DMB
- Digital Adaptive Precorrection Linear and Non-linear
- Seamless input stream switching ETI-ETI, ETI-EDI, EDI-EDI
- 2x Gigabit IP inputs with EDI protocol
- Optional OCXO and GNSS add-on modules

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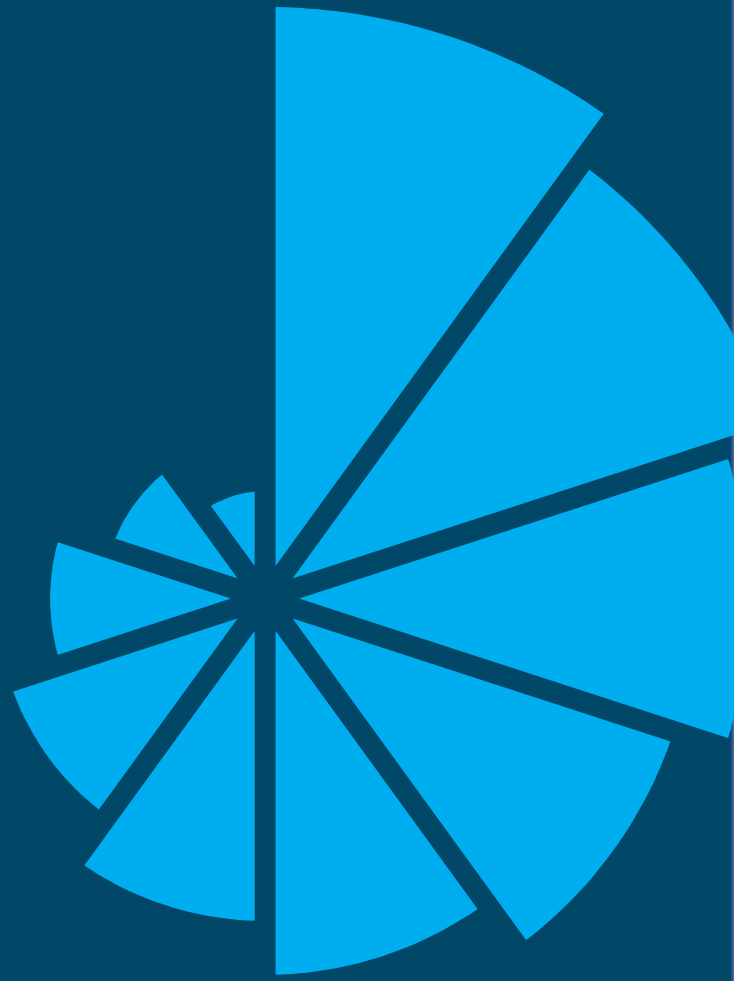
REMOTE CONTROL NMS



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The Group Transmitters monitoring NMS

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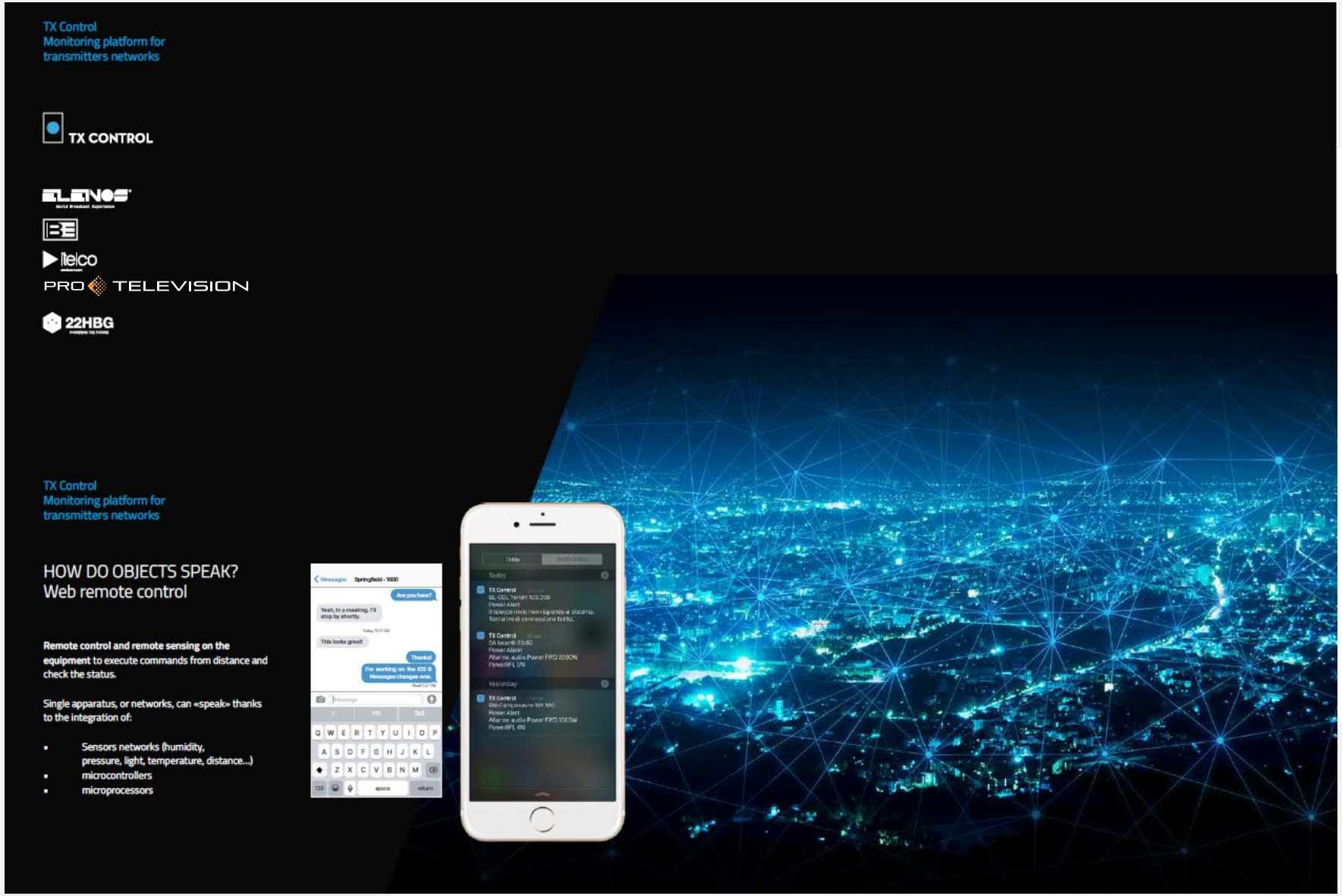
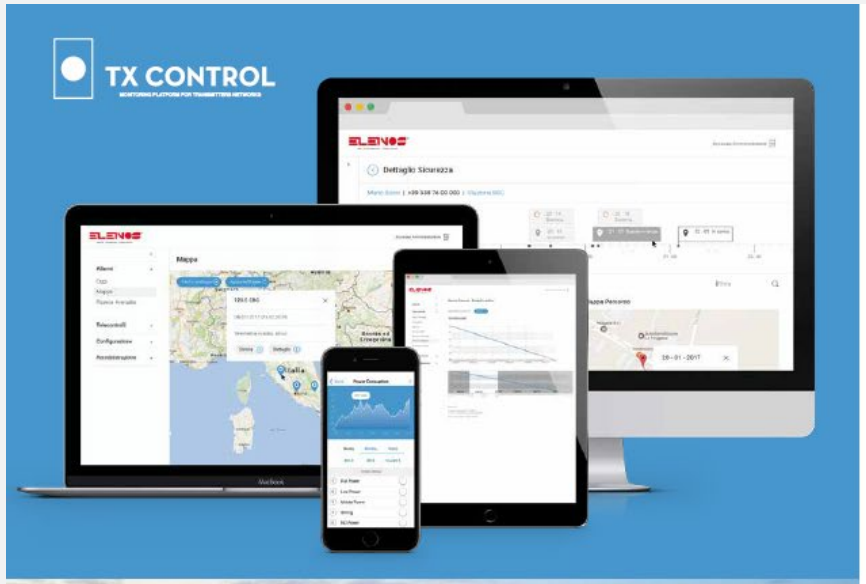
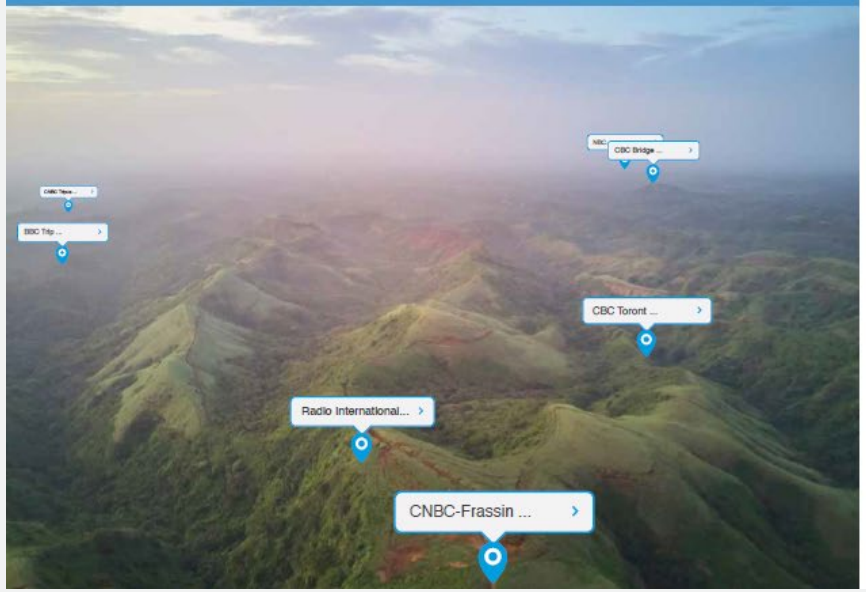

TX Control
Monitoring platform for
transmitters networks
TX CONTROL
ELENOS
BE
telco
PRO TELEVISION
22HBG
TX Control
Monitoring platform for
transmitters networks
HOW DO OBJECTS SPEAK?
Web remote control
Remote control and remote sensing on the equipment to execute commands from distance and check the status.
Single apparatus, or networks, can «speak» thanks to the integration of:
Sensors networks (humidity, pressure, light, temperature, distance...)
microcontrollers
microprocessors





TX Control
Monitoring platform for transmitters networks

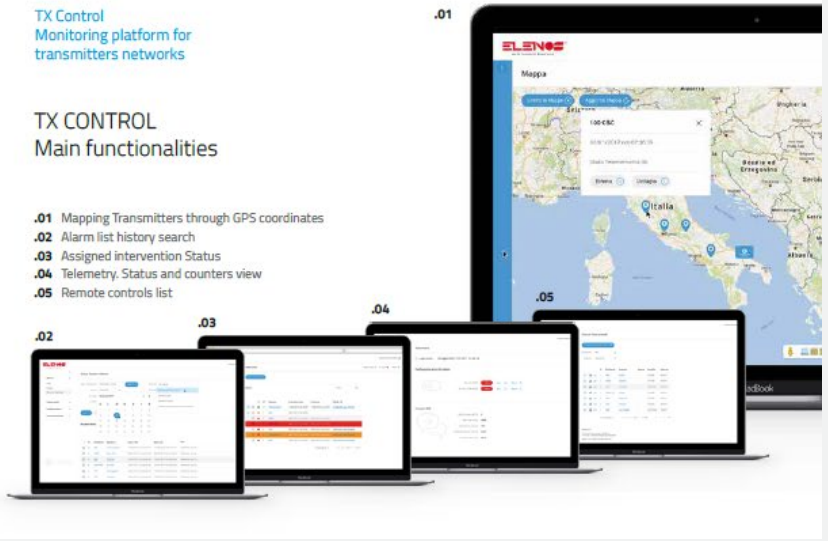
TX CONTROL
Telemetry

Remote monitoring for connected networks, distributed on multiple locations.
Scalable platform, able to control multibrand transmitters.
Today, the system monitors more than **1500** transmitters in real time.

TX Control
Monitoring platform for transmitters networks

TX CONTROL
Main functionalities

.01 Mapping Transmitters through GPS coordinates
.02 Alarm list history search
.03 Assigned intervention Status
.04 Telemetry. Status and counters view
.05 Remote controls list



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Users access

It is possible to enter the platform by:
- browser desktop
- Native app OS / Android

Dashboard access autenticated by username/password

Different roles and privileges: administrator, user 1 level, user 2 level.

User actions monitoring via log.

Sign In

Username

Password

Wrong Password

ENTER

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Allarm Reception

The system sends alarms received from the plant to the numbers of the respective service inspectors and maintainer's email address. The available alarms are:

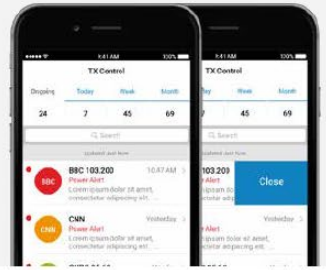
- **Power Alarm**
- **Power Rfl Alarm**
- **Audio Alarm**
- **Temperature Alarm**
- **Supply Alarm**
- **Exc.exchange Alarm**
- **No Answer from Telecontrol**

The message always contains the telecontrol code and can be a combination of more alarms. (example: 33 Power Alarm – Supply Alarm)

System

The Alarm "No Answer from telecontrol" is automatically generated by the system after 24 hours that the telecontrol did not respond to any command sent by a user or system.

Once the alarm is cleared, the system will send the "NNN No Alarm" message. If available, in the "Alarm" or "No Alarm" message, the system can send the value of Nominal and Reflected power.



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Transmitters list and map

With TX Control it is possibile to access the transmitters listing.

Possibility of localization of the transmitters by indications with markers on the map.

Log into the transmitter detail by single click on the marker.

Today alarms and suspended alarms

		N°	Network	Station
⊖	ⓘ	4	BBC	New York
⊖	ⓘ	6	CBC	Los Angeles
⊖	ⓘ	6	CNBC	
⊖	ⓘ	6	RADIO IN	Brigde
⊖	ⓘ	6	BBC	Test consumo
⊖	ⓘ	6	BBC	Chicago

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Alarm Fix

Once the alarm is fixed, the system sends the message NNN No Alarm (where NNN is the code of the telecontrol).

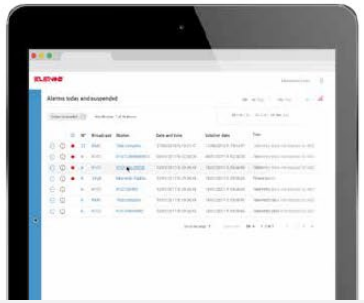
The software sends a notification of "problem fixed" when it receives a feedback that the message has been fixed from telecontrol.

There is also a procedure for controlling the alarms managed automatically by the system.

More specifically, in the event of an alarm, the system interrogates the telecontrol 20 minutes after receiving the SMS, then after 3 hours and finally after 24 hours.

System

If the alarm condition has been fixed, than the user is advised. With this function we also handle the case where the telecontrol does not send a message for informing users about the fixing of the problem.



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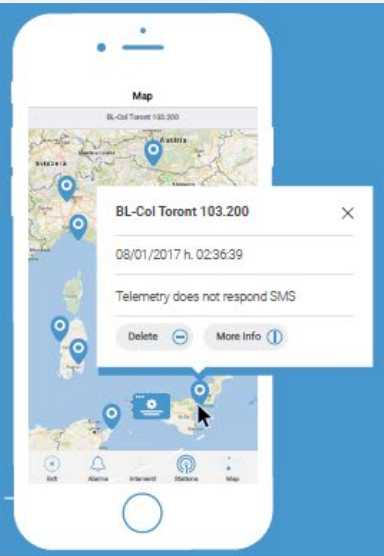
Alarm Section

For every alarm you have the telecontrol code, the name, the date of alarm, the date the alarm was solved and the type of alarm. You can also visualize the alarms on the map by clicking the "Map".

When you click on the icon, you can get more information about the alarm and interrogate the telecontrol.



TX Control
Monitoring platform for transmitters networks

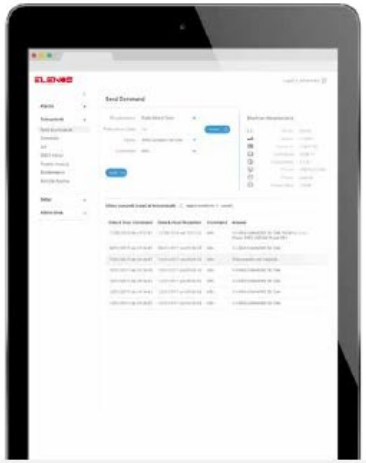
System

Telecontrol Section

This section allows user to interrogate the telecontrol. To send a command, simply select the telecontrol from the menu and the command you need to send, than press the SEND button and wait for the telecontrol response.

Each command sent via internet generates an answer both on the web and through the SMS. This choice was made for safety. The page gives information about the last 3 commands sent to the telecontrol from any user including the automatic system.

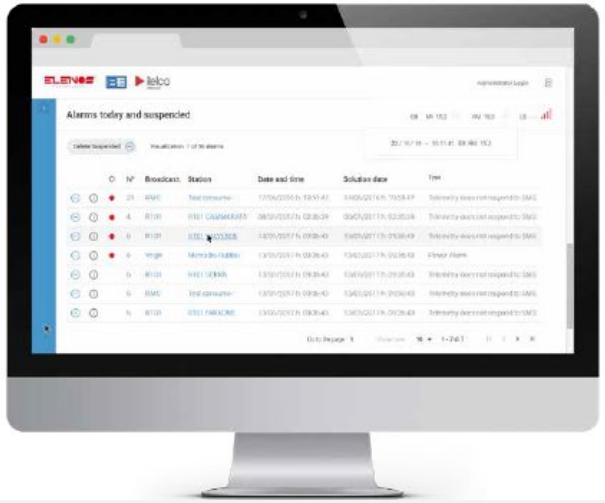
For each command, the date and the control response are displayed.



TX Control
Monitoring platform for transmitters networks

Alarm Section

The page list all the active alarms (with the red flag) and the day solved ones.



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Parameters Web monitoring

Manual or in "real time" update of the parameters by automatic periodic queries to the entire transmitters network.

The transmitters can be connected via data connection like GSM o SMNP to have a totally automatic system.

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Alarm notifications:
email, SMS, Push notifications,

The software records the alarms from the various transmitters to make them available to the users by push notification on the iOS/Android apps, by email and Social Alert via WhatsApp.

SMS notification, via dedicated gateway installation.

Available for

App Store | Google play

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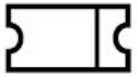
PRO VERSION

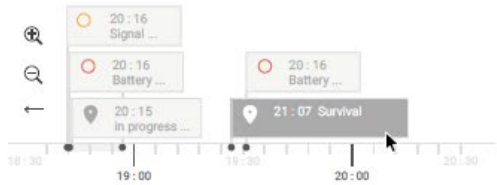
Maintenance interventions management

Maintenance interventions management via ticket system.

Intervention assignment with time monitoring and execution modalities.



John Brown | +39 338 00 00 001 | Valcava Station



Intervention safety tracking

TX Control
Monitoring platform for
transmitters networks

Technical requirements for the installation

The TX Control software is available in cloud SAAS solution on servers of **Elenos / Itelco** property, or in "in house" mode on servers of customer property.

Data anonymity is assured.

Data are registered only to ensure the quality service and the implementation of the predictive maintenance algorythms. App and Dashboard are customizable.

TX Control
Monitoring platform for
transmitters networks

AVATAR - PRO VERSION

Predictive Maintenance

The Complex algorythms in the system allow the anticipation of faults or the maintenance "best practice" reception, based on the installation and/or operation conditions.

</> CODE.

Integration with different kinds of transmitters

The TX Control software is conceived to be integrated with every SMS/SNMP system.

Possibility to develop new communication protocols with different transmitters kinds.

API

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Our network of dealers are supported by our field engineers team.

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