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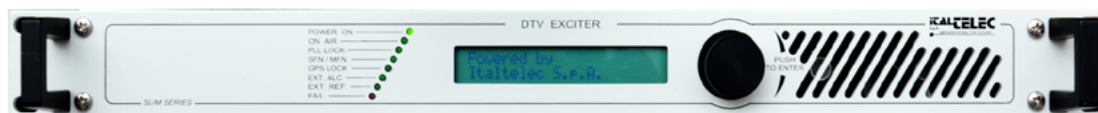
TELECOM AND ISM ENGINEERING

Since 1974

Digital and Analogic TV Broadcasting
FM Radio Digital Broadcasting
Air and Liquid cooled Transmitters
DTV signal Monitoring and Analysis
End-to-End solutions

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DTV SLIM EXC 1-10



Dual Cast Transmitter, Gap Filler

Main Characteristics

- Available in all Analogue standards (PAL, SECAM, NTSC) with digital processing for high performances
- Available in all Digital standards (DVB-T/T2, ISDB-T/Tb, ATSC)
- Available in band I - III - IV - V
- From 1Wrms to 10Wrms with LDMOS technology
- Integrated Linear & Non-Linear Adaptive Precorrector
- 2 ASI inputs with seamless and priority
- IP-to-ASI input option
- MFN or SFN networks application
- Internal GPS receiver
- Gap Filler with Hi-Efficiency Echo canceller
- LDMOS Technology
- Web Server, SNMP Protocol

DTV up to 10W
ATV up to 40W
TX/RTX/GAP

DTV SLIM EXC 1-10 TECHNICAL DATASHEET

GENERAL

Frequency Range	Band I, III, IV, V
Channel Bandwidth	6, 7, 8 MHz
RF Load Impedance	50 ohms, 1:1 VSWR over any single TV channel
RF Output Connector	N

AC MAINS

AC Line Voltage	2-phase 50/60 Hz, 100V to 240V
AC Line Variation	10% to -15%
Power Factor	> 0.97
Power consumption	130VA @max output COFDM

ENVIRONMENTAL

Altitude	Up to 4,000m above sea level
Ambient Temperature	14° to 113° F (-10° to 45° C) at sea level
Humidity	Up to 95%, non-condensing
Cooling Method	Forced Air
Acoustic Noise	< 65 dBA (measured 1m in front of cabinet)

ANALOG

Tv Standards	B/C/D/K/KI/M/N
Colour Systems	PAL, NTSC
Video Input Interfaces	2 BNC 75Ω, IVpp±6 dB.
Modulation Depth	5±15 %
Audio Input Interfaces	2 XLR 600Ω/5 KΩ, balanced/unbalanced, 0 dBm-6 dB +21 dB
Audio encoder mode	Mono/Stereo/Dual Sound
Fm Deviation	Up to 100 KHz (200 KHz for standard M), Hard Limiter 1 KHz step
Power Output	up to 40Wps
Output Power Reduction	0 to -10 dB

MECHANICAL	Dimensions (WxDxH)	Weight (approx.)
EXC 10	mm 483x45x540	Kg 8

COFDM: DVB-T/T2, ISDB-T/Tb (SBTVD)

Systems	ISDB-T, ISDB-Tb, DVB-T, DVB-T2
Digital Inputs	ISDB-T/Tb: 3 BNC 75Ω ASI (Hierarchical up to 3 Layers) DVB-T/T2: 2 BNC 75 Ω, DVB-ASI (Hierarchical) IP-To-ASI: RJ45
Crest Factor	Maximum 13 dB
Shoulder Level	> 40dB
MER	> 37dB
Harmonics (before filter)	< -40dB
Central Carrier Suppression	> 75dB
Frequency Stability (without ext. ref.)	± 150 Hz/month
Frequency Offsets	1 Hz resolution
MPEG packet length	188/204 byte packets, continuous and burst
Network Operations	MFN, SFN
Optional Output filter (NCM) with insertion loss	0.3 dB @ F.C. 0.7 dB @ F.C. ± 3.8 MHz
Power Output	up to 10Wrms
Output Power Reduction	0 to -10 dB

8-VSB: ATSC

System	ATSC A-53, 8-VSB DTV standard
Digital Input	2 BNC 75 Ω ASI (SMPTE 310M)
Internal Precise Frequency Input	10 MHz (I)
Internal Gps Receiver	Optional
Phase Noise	< 104 dBc/Hz @ 20 kHz offset (ATSC A/64)
Pilot Frequency Stability	Less than ±150 Hz/month Less than ±3 Hz with internal or external PFC
Harmonic Radiation and Spurious	Meets mask requirements specified in FCC 5th and 6th report and order
Sideband Performance	Compliant with FCC radiation mask, when measured at the output of optional output filter
Optional output filter with insertion loss	0.3 dB @ F.C. 0.5 dB @ F.C. ± 2.7 Mhz
Power Output	up to 15Wrms
Output Power Reduction	0 to -10 dB

ECHO CANCELLER (optional)

Cancellation Level	30dB
Maximum Echo Level	+ 15dBc (Over the main signal)
RF Sample Level	0dBm for transposer nominal power

DTV TX 25-150



Dual Cast Transmitter, Gap Filler

Main Characteristics

- Available in all Analogue standards (PAL, SECAM, NTSC) with digital processing for high performances
- Available in all Digital standards (DVB-T/T2, ISDB-T/Tb, ATSC)
- Available in band I - III - IV - V
- From 25Wrms to 150Wrms with LDMOS technology
- Integrated Linear & Non-Linear Adaptive Precorrector
- 2 ASI inputs with seamless and priority
- IP-to-ASI input option
- MFN or SFN networks application
- Internal GPS receiver
- Gap Filler with Hi-Efficiency Echo canceller
- LDMOS Technology
- Web Server, SNMP Protocol

DTV up to 150W
ATV up to 600W
TX/RTX/GAP

DTV TX 25-150 TECHNICAL DATASHEET

GENERAL

Frequency Range	Band I, III, IV, V
Channel Bandwidth	6, 7, 8 MHz
RF Load Impedance	50 ohms, 1:1 VSWR over any single TV channel
RF Output Connector	N or 7/16

AC MAINS

AC Line Voltage	2-phase 50/60 Hz, 100V to 240V
AC Line Variation	10% to -15%
Power Factor	> 0.97
Power consumption	641.2VA @max output COFDM

ENVIRONMENTAL

Altitude	Up to 4,000m above sea level
Ambient Temperature	14° to 113° F (-10° to 45° C) at sea level
Humidity	Up to 95%, non-condensing
Cooling Method	Forced Air
Acoustic Noise	< 65 dBA (measured 1m in front of cabinet)

ANALOG

Tv Standards	B/C/D/K/K1/M/N
Colour Systems	PAL, NTSC
Video Input Interfaces	2 BNC 75Ω, 1Vpp±6 dB
Modulation Depth	5-15 %
Audio Input Interfaces	2 XLR 600Ω/5 KΩ, balanced/unbalanced, 0 dBm-6 dB +21 dB
Audio encoder mode	Mono/Stereo/Dual Sound
Fm Deviation	Up to 100 KHz (200 KHz for standard M), Hard Limiter 1 KHz step
Power Output	up to 600Wps
Output Power Reduction	0 to -10 dB

MECHANICAL

Dimensions (WxHxD)	Weight (approx.)
mm 484x90x550	Kg 19

COFDM: DVB-T/T2, ISDB-T/Tb (S8TVSD)

Systems ISDB-T, ISDB-Tb, DVB-T, DVB-T2

Digital Inputs

ISDB-T/Tb: 3 BNC 75Ω ASI (Hierarchical up to 3 Layers)
DVB-T/T2: 2 BNC 75 Ω, DVB-ASI (Hierarchical)
IP-To-ASI: RJ45

Crest Factor Maximum 13 dB

Shoulder Level > 40dB

MER > 37dB

Harmonics (before filter) < -40dB

Central Carrier Suppression > 75dB

Frequency Stability (without ext. ref.) ± 150 Hz/month

Frequency Offsets 1 Hz resolution

MPEG packet length 188/204 byte packets, continuous and burst

Network Operations MFN, SFN

Optional Output filter (NCM) with insertion loss 0.3 dB @ F.C.
0.7 dB @ F.C. ± 3.8 MHz

Power Output up to 150Wrms

Output Power Reduction 0 to -10 dB

8-VSB: ATSC

System ATSC A-53, 8-VSB DTV standard

Digital Input 2 BNC 75 Ω ASI (SMPTE 310M)

Internal Precise Frequency Input 10 MHz (I)

Internal Gps Receiver Optional

Phase Noise < 104 dBc/Hz @ 20 kHz offset (ATSC A/64)

Pilot Frequency Stability Less than ±150 Hz/month
Less than ±3 Hz with internal or external PFC

Harmonic Radiation and Spurious Meets mask requirements specified in FCC 5th and 6th report and order

Sideband Performance Compliant with FCC radiation mask, when measured at the output of optional output filter

Optional output filter with insertion loss 0.3 dB @ F.C.
0.5 dB @ F.C. ± 2.7 Mhz

Power Output up to 225Wrms

Output Power Reduction 0 to -10 dB

ECHO CANCELLER (optional)

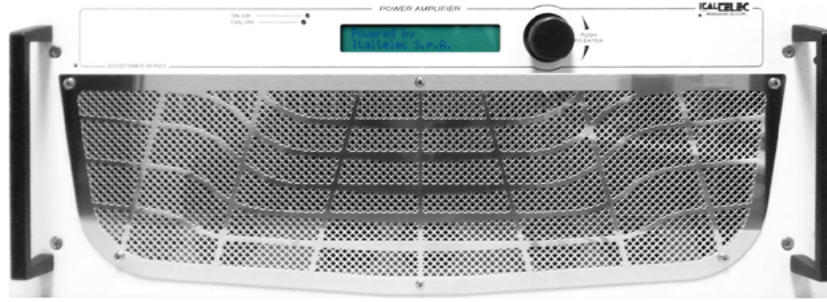
Cancellation Level 30dB

Maximum Echo Level + 15dBc (Over the main signal)

RF Sample Level 0dBm for transposer nominal power

TELEVISION

DTV AMPLI TX 300-1000



Stand-Alone Amplifier or Compact Transmitter with Integrated Modulator

Main Characteristics

- High efficiency, low power consumption
- Available in all Analogue standards
(PAL, SECAM, NTSC) with digital processing for high performances
- Available in all Digital standards
(DVB-T/T2, ISDB-T/Tb, ATSC)
- Available mmmin band I - III - IV - V
- Up to 1000Wrms with LDMOS technology
- Integrated Linear & Non-Linear Adaptive Precorrector
- 2 ASI inputs with seamless and priority
- IP-to-ASI input option
- MFN or SFN networks application
- LDMOS Technology
- Internal GPS receiver
- Web Server, SNMP Protocol

DTV up to 1000W
ATV up to 1.5kW
High Efficiency

DTV AMPLI TX 300-1000 TECHNICAL SPECIFICATIONS

GENERAL

Frequency Range	Band I, III, IV, V
Channel Bandwidth	6, 7, 8 MHz
RF Load Impedance	50 ohms, 1:1 VSWR over any single TV channel
RF Output Connector	7/16 or 7/8

AC MAINS

AC Line Voltage	3-phase 50/60 Hz, 380 to 415 V
AC Line Variation	10% to -15%
Power Factor	> 0.97
Power consumption	2626VA @max output COFDM

ENVIRONMENTAL

Altitude	Up to 4,000m above sea level
Ambient Temperature	14° to 113° F (-10° to 45° C) at sea level
Humidity	Up to 95%, non-condensing
Cooling Method	Forced Air
Acoustic Noise	< 65 dBA (measured 1m in front of cabinet)

ANALOG

Tv Standards	B/G/D/K/KI/M/N
Colour Systems	PAL, NTSC
Video Input Interfaces	2 BNC 75Ω, 1Vpp±6 dB
Modulation Depth	5±15 %
Audio Input Interfaces	2 XLR 600Ω/5 KΩ, balanced/unbalanced, 0 dBm-6 dB +21 dB
Audio encoder mode	Mono/Stereo/Dual Sound
Fm Deviation	Up to 100 KHz (200 KHz for standard M), Hard Limiter 1 KHz step
Power Output	up to 1.5kWps
Output Power Reduction	0 to -10 dB

MECHANICAL

Dimensions (WxHxD)	Weight (approx.)
mm 484x176x500	Kg 32

8-VSB: ATSC

System	ATSC A-53, 8-VSB DTV standard
Digital Input	2 BNC 75 Ω ASI (SMPTE 310M)
Internal Precise Frequency Input	10 MHz (I)
Internal Gps Receiver	Optional
Phase Noise	< 104 dBc/Hz @ 20 kHz offset (ATSC A/64)
Pilot Frequency Stability	Less than ±150 Hz/month Less than ±3 Hz with internal or external PFC
Harmonic Radiation and Spurious	Meets mask requirements specified in FCC 5th and 6th report and order
Sideband Performance	Compliant with FCC radiation mask, when measured at the output of optional output filter
Optional output filter with insertion loss	0.3 dB @ F.C. 0.5 dB @ F.C. ± 2.7 Mhz
Power Output	up to 1000Wrms
Output Power Reduction	0 to -10 dB

COFDM: DVB-T/T2, ISDB-T/Tb (SBTVD)

Systems	ISDB-T, ISDB-Tb, DVB-T, DVB-T2
Digital Inputs	ISDB-T/Tb: 3 BNC 75Ω ASI (Hierarchical up to 3 Layers) DVB-T/T2: 2 BNC 75 Ω, DVB-ASI (Hierarchical)
Crest Factor	Maximum 13 dB
Shoulder Level	> 40dB
MER	> 37dB
Harmonics (before filter)	< -40dB
Central Carrier Suppression	> 75dB
Frequency Stability (without ext. ref.)	± 150 Hz/month
Frequency Offsets	1 Hz resolution
MPEG packet length	188/204 byte packets, continuous and burst
Network Operations	MFN, SFN
Optional Output filter (NCM) with insertion loss	0.3 dB @ F.C. 0.7 dB @ F.C. ± 3.8 Mhz
Power Output	up to 600Wrms
Output Power Reduction	0 to -10 dB

ECHO CANCELLER (optional)

Cancellation Level	30dB
Maximum Echo Level	+ 15dBc (Over the main signal)
RF Sample Level	0dBm for transposer nominal power

DTV AC HPA 300-3500

Air Cooled Medium and High Power Multistandard Transmitters

Main Characteristics:

- High efficiency, low power consumption
- Configurations: Stand Alone, Dual Drive, 1+1, N+1 solutions.
- Available in all analogue standards (PAL SECAM NTSC) with digital processing for high performances
- Available in all digital standards (DVB-T/T2, ISDB-T/Tb, ATSC) with adaptive precorrector
- Available in band I - III - IV - V.
- Internal Monitoring to control the quality of transmission signal options
- Integrated Satellite and GPS receiver options
- Dual ASI seamless with priority selection
- IP input with priority selection (optional)
- Web server, SNMP protocol

DTV up to 3.5kW
High Efficiency
Dual Cast



TELEVISION

DTV AC HPA 300-3500 TECHNICAL SPECIFICATIONS

Power Table								
SYSTEM	Analogic		DVB-T/T2, ISDB-T/Tb			ATSC		
	Max Output (Wps)	Efficiency	Max Output (Wrms)	Efficiency	Efficiency Doherty	Max Output (Wrms)	Efficiency	Efficiency Doherty
DTV AC HPA 300	1200	65%	300	25%	38%	500	32%	42%
DTV AC HPA 600	2400	65%	600	25%	38%	1000	32%	42%
DTV AC HPA 1000	4000	65%	1000	25%	38%	1900	32%	42%
DTV AC HPA 2000	7000	65%	2000	25%	38%	3500	32%	42%

DTV LC HPA 1K-10K

*High Power Liquid Cooled Transmitter
with Integrated Cooling System*

DTV up to 10kW
ATV up to 15kW
Liquid Cooled
N+1 Capability

Main Characteristics:

- High efficiency, low power consumption
- Configurations: Stand Alone, 1+1, N+1 up to 7+1
- Available in all analogue standards
(PAL, SECAM, NTSC) with digital
processing for high performances
- Available in all digital standards
(DVB-T/T2, ISDB-T/Tb, ATSC)
- Available in band III - IV - V.
- Integrated cooling system with redundancy dual pump
and temperature flow control
- Anti-Condensation protection system
- High Efficiency Heat exchange ($\Delta t < 6^\circ$)
- Air detector in the hydraulic system
- Hot swap pluggable RF power amplifiers
- Low insertion loss output RF combiner
- Liquid Cooled Unbalance Dummy Load
- Hi efficiency adaptive precorrector
- IP-to-ASI input optional
- Quick installation (4 man-hours)
- Low acoustic noise, <55dbA
- WEB server SNMP



TECHNICAL SPECIFICATIONS

GENERAL

Frequency Range	Band III, IV, V
Channel Bandwidth	6,7,8 MHz
RF Load Impedance	50 ohms, 1:1 VSWR over any single TV channel
RF Output Connector	1-5/8 in. (4 mm), 3-1/8 in. (8 mm)

AC MAINS

AC Line Voltage	3-phase 50/60 Hz, 380 to 415 V
AC Line Variation	10% to -15%
Power Factor	> 0.97
Power Consumption	See Power Output table

ENVIRONMENTAL

Altitude	Up to 4,000m above sea level
Ambient Temperature	0° to 45° C. at sea level
Humidity	Up to 95%, non-condensing
Cooling Method	Forced Air
Acoustic Noise	< 65 dBA (measured 1 m in front of cabinet)

ANALOG

Tv Standards	B/G/D/K/K1/M/N
Colour Systems	PAL, NTSC
Video Input Interfaces	2 BNC 75Ω, 1Vpp±6 dB.
Modulation Depth	5÷15 %
Audio Input Interfaces	2 XLR 600Ω/5 KΩ, balanced/unbalanced, 0 dBm-6 dB +21 dB
Audio encoder mode	Mono/Stereo/Dual Sound
Fm Deviation	Up to 100 KHz (200 KHz for standard M), Hard Limiter 1 KHz step
Power Output	See Power Output table
Output Power Reduction	0 to -10 dB

MECHANICAL	Dimensions (WxHxD)	Weight (approx.)
Spark LC 1.5kW	mm 60x210x120	Kg 335
Spark LC 2.0kW	mm 60x210x120	Kg 373
Spark LC 2.5kW	mm 60x210x120	Kg 413
Spark LC 5.0kW	mm 60x210x120	Kg 580
Spark LC 7.0kW	mm 60x210x120	Kg 580

COFDM: DVB-T/T2, ISDB-T/Tb (SBTVD)

Systems	ISDB-T, ISDB-Tb, DVB-T, DVB-T2
Digital Inputs	ISDB-T/Tb: 3 BNC 75Ω ASI (Hierarchical up to 3 Layers) DVB-T/T2: 2 BNC 75 Ω, DVB-ASI (Hierarchical) IP-To-ASI: 1 RJ45
Crest Factor	Maximum 13 dB
Shoulder Level	> 40dB
MER	> 37dB
Harmonics (before filter)	< -40dB
Central Carrier Suppression	> 75dB
Frequency Stability (without ext. ref.)	± 150 Hz/month
Frequency Offsets	1 Hz resolution
MPEG packet length	188/204 byte packets, continuous and burst
Network Operations	MFN, SFN
Power Output	See Power Output Table
Output Power Reduction	0 to -10 dB
Optional Output filter (NCM) with insertion loss	0.3 dB @ F.C. 0.7 dB @ F.C. ± 3.8 MHz

8-VSB: ATSC

System	ATSC A-53, 8-VSB DTV standard
Digital Input	2 BNC 75 Ω ASI (SMPTE 310M)
Internal Precise Frequency Input	10 MHz (I)
Internal Gps Receiver	Optional
Phase Noise	< 104 dBc/Hz @ 20 kHz offset (ATSC A/64)
Pilot Frequency Stability	Less than ±150 Hz/month Less than ±3 Hz with internal or external PFC
Harmonic Radiation and Spurious	Meets mask requirements specified in FCC 5th and 6th report and order
Sideband Performance	Compliant with FCC radiation mask, when measured at the output of optional output filter
Power Output	See Power Output table
Output Power Reduction	0 to -10 dB
Optional output filter with insertion loss	0.3 dB @ F.C. 0.5 dB @ F.C. ± 2,7 Mhz

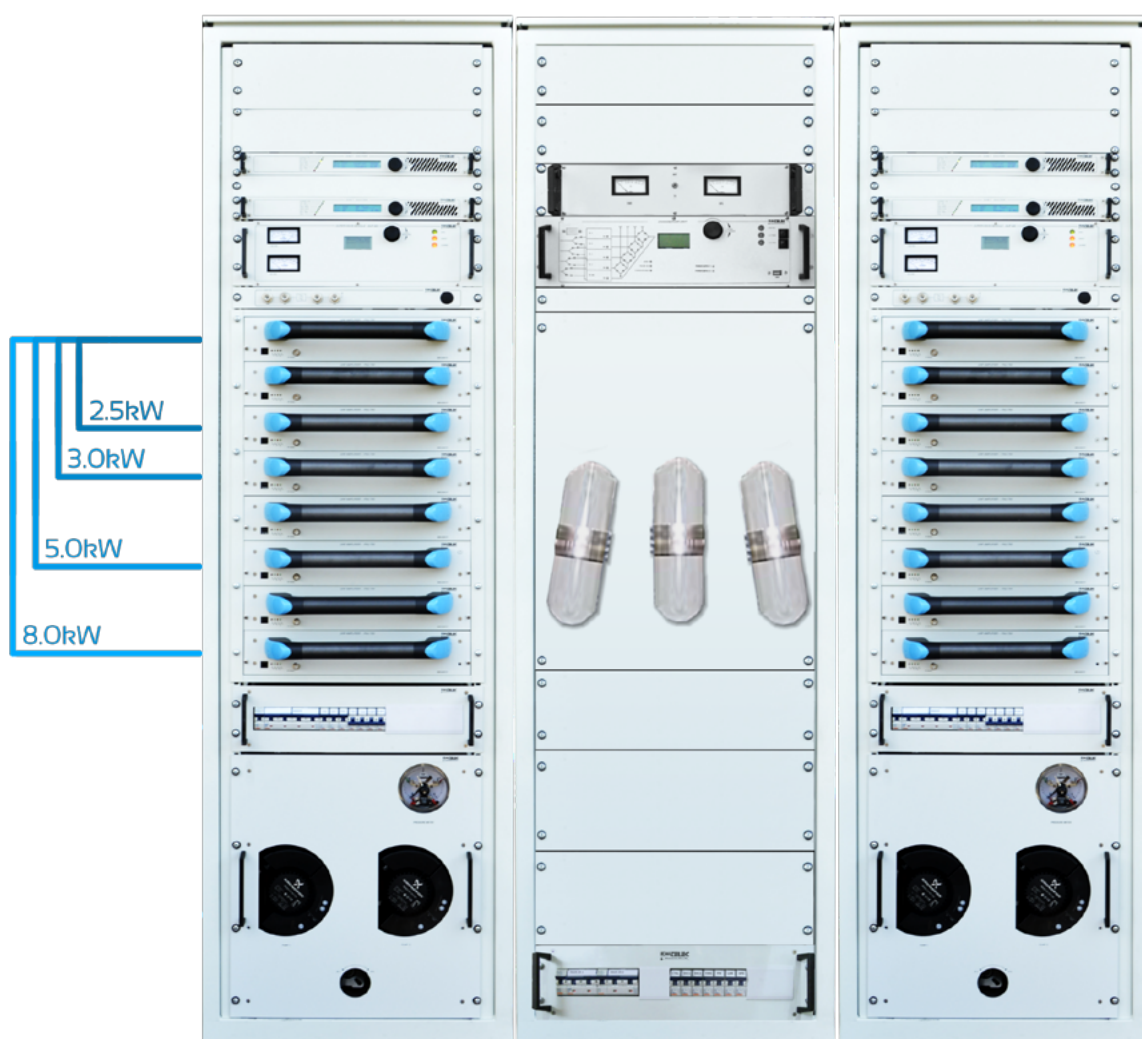
Power Output Table (max)

Number of Amplifiers	Analogic (Wps)		DVB-T/T2, ISDB-T/Tb (Wrms)		ATSC (Wrms)	
	Output Power	Efficiency	Output Power	Efficiency doherty mode	Output Power	Efficiency doherty mode
2	4200	65%	1700	38%	2500	42%
3	6400	65%	2500	38%	4000	42%
4	8500	65%	3300	38%	5000	42%
6	13000	65%	5000	38%	7000	42%
8	17000	65%	6600	38%	9000	42%

TELEVISION

DTV LC SYSTEM 10K

*High Power Liquid Cooled Transmitter
with Integrated Cooling System*



The Broadsun Family DTV - ATV Liquid Cooling Transmitter is an advanced technological platform with high compactness and extremely high performances and reliability. The products are available in band III and UHF, as well in the different digital standards, and are engineered to ensure the easiest installation procedures while the up-to-date technical solutions allows high efficiency and lower operating costs.

TECHNICAL SPECIFICATIONS

GENERAL

Frequency Range	Band IV, V
Channel Bandwidth	6 MHz
RF Load Impedance	50 ohms, 1:1 VSWR over any single TV channel
RF Output Connector	1"- 5/8"-3"- 1/8

AC MAINS

AC Line Voltage	See Table (2)
AC Line Variation	10% to -15%
Power Factor	> 0.97

ENVIRONMENTAL

Altitude	Up to 3,000m above sea level
Ambient Temperature	-10° to 50° C at sea level
Humidity	Up to 95%, non-condensing
Cooling Method	Liquid Cooled
Acoustic Noise	< 54 dBA (measured 1m in front of cabinet)

SWITCH-OVER LOGIC 1+1

Frequency Band	III, IV, V Broadband
VSWR max	1.25 : 1
Input return loss	≥ 30 dB
Insertion loss	≤ 0.2 dB
Insulation channels	≥ 70 dB
Typical Impedance	50 Ω
Apply Power	≤ 120 W
Remote Control	RS-232 / Parallel / Algorab / SNMP
Working Mode	Auto / Manual
Control Mode	Local / Remote
Repeaters Communication	RS-232
Lever type U-Link	Option

SYSTEM

Exciter	DVB-T/T2, ISDB-T/Tb ATSC A-53, 8-VSB DTV standard
Digital Input	2 BNC 75 Ω ASI (SMPTE 310M)
Internal Precise Frequency Input	10 MHz
Internal Gps Receiver	Optional
Phase Noise	< 104 dBc/Hz @ 20 kHz offset (ATSC A/64)
Pilot Frequency Stability	Less than ±150 Hz/month Less than ±3 Hz with internal or external PFC
Harmonic Radiation and Spurious	Meets mask requirements specified in FCC 5th and 6th report and order
Sideband Performance	Compliant with FCC radiation mask, when measured at the output of optional output filter
Power Output	See table (2)
Optional output filter with insertion loss	0,3 dB @ F.C. 0,5 dB @ F.C. ± 2,7 Mhz
Web Server	SNMP protocol
Remote Terminal	TCP/IP, RS232, Parallel Interface

PERFORMANCE

Carrier frequency stability	Within 250Hz/3month
Stability of output power	5% or better
Spurious & Harmonic	-60dBc or better
Peak to average ratio	Compliant with 6.4dB@0.1% (PAR cumulative distribution graph)
Error vector magnitude	3.5% or less
Signal to noise	29dB or better
Sideband performance	Compliant with FCC mask
Phase noise	Less than 104dBc/Hz@20kHz
Group delay	±25ns or less
Frequency response	Less than ±0.5dB excluding BPF

Table (1)

MECHANICAL		
Model	Dimensions (WxHxD)	Weight approx.
DTV LC HPA 2.5K U 1+1	mm 1800x2100x1200	Kg 814
DTV LC HPA LC 3.0K U 1+1	mm 1800x2100x1200	Kg 814
DTV LC HPA LC 5.0K U 1+1	mm 1800x2100x1200	Kg 934
DTV LC HPA LC 10.0K U 1+1	mm 1800x2100x1200	Kg 1114

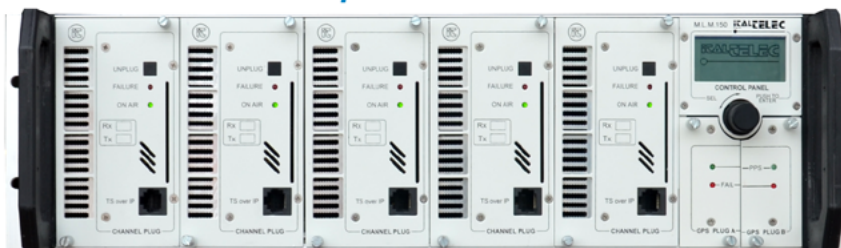
Table (2)

1+1 SYSTEMS CONFIGURATIONS AND EFFICIENCY							
Model	Composition	N° of Amps	Output Power (DVB-T)	Power Supply	Power consumption and efficiency		
DTV LC HPA LC 2.5K U 1+1	2 x DTV LC HPA LC 2.5K	2 x 3	2.5kW	380V 3φ + N	7.530kW	33.2%	
DTV LC HPA LC 3.0K U 1+1	2 x DTV LC HPA LC 3.0K	2 x 4	3.0kW	380V 3φ + N	9.202kW	32.6%	
DTV LC HPA LC 5.0K U 1+1	2 x DTV LC HPA LC 5.0K	2 x 6	5.0kW	380V 3φ + N	15.24kW	32.8%	
DTV LC HPA LC 10.0K U 1+1	2 x DTV LC HPA LC 10.0K	2 x 8	8.0kW	380V 3φ + N	30.58kW	32.7%	

TELEVISION

MLM DTV 15

Multi Last Mile: Compact 4+1 Multichannel Transmitter / Transposer with Satellite Receiver



Main Characteristics:

- Available in all current DTV standards
- Up to 15Wrms for each channel
- 4+1 Hot Swap Modular System
- Gap Filler and Digital Transposer
- Full Self autonomy Plug-in modules:
 - RX demodulator, modulator, RF power amp, CAM
- Internal DVB S/2 multistream satellite receiver
- Internal pluggable GPS receiver
- 2 ASI Inputs / Transmitter
- DVB-T Regenerative Transposer
- Dual Power Supply
- MFN and SFN Network support
- Web Server, SNMP Protocol



DTV up to 15W / Channel
Hot Swap System
TX / RTX / GAP

MLM DTV 15 TECHNICAL SPECIFICATIONS

GENERAL

Frequency Range	Band I, III, IV, V
Channel Bandwidth	6, 7, 8 MHz
RF Load Impedance	50 ohms, 1:1 VSWR over any single TV channel
RF Output Connector	N

AC MAINS

AC Line Voltage	2-phase 50/60 Hz, 100V to 240V
AC Line Variation	10% to -15%
Power Factor	> 0.97
Power consumption	4 x 121.25 VA @max output COFDM

ENVIRONMENTAL

Altitude	Up to 4,000m above sea level
Ambient Temperature	14° to 113° F (-10° to 45° C) at sea level
Humidity	Up to 95%, non-condensing
Cooling Method	Forced Air
Acoustic Noise	< 65 dBA (measured 1m in front of cabinet)

8-VSB: ATSC

System	ATSC A-53, 8-VSB DTV standard
Digital Input	2 BNC 75 Ω ASI (SMPTE 310M)
Internal Precise Frequency Input	10 MHz (I)
Internal Gps Receiver	Optional
Phase Noise	< 104 dBc/Hz @ 20 kHz offset (ATSC A/64)
Pilot Frequency Stability	Less than ±150 Hz/month Less than ±3 Hz with internal or external PFC
Harmonic Radiation and Spurious	Meets mask requirements specified in FCC 5th and 6th report and order
Sideband Performance	Compliant with FCC radiation mask, when measured at the output of optional output filter
Optional output filter with insertion loss	0.3 dB @ F.C. 0.5 dB @ F.C. ± 2.7 Mhz
Power Output	up to 23Wrms per channel
Output Power Reduction	0 to -10 dB

COFDM: DVB-T/T2, ISDB-T/Tb (SBTVD)

Systems	ISDB-T, ISDB-Tb, DVB-T, DVB-T2
Digital Inputs	ISDB-T/Tb: 3 BNC 75Ω ASI (BTS Compliant) DVB-T/T2: 2 BNC 75 Ω, DVB-ASI
Crest Factor	Maximum 13 dB
Shoulder Level	> 40dB
MER	> 37dB
Harmonics (before filter)	< -40dB
Central Carrier Suppression	> 75dB
Frequency Stability (without ext. ref.)	± 150 Hz/month
Frequency Offsets	1 Hz resolution
MPEG packet length	188/204 byte packets, continuous and burst
Network Operations	MFN, SFN
Optional Output filter (NCM) with insertion loss	0.3 dB @ F.C. 0.7 dB @ F.C. ± 3.8 MHz
Power Output	up to 15Wrms per channel
Output Power Reduction	0 to -10 dB

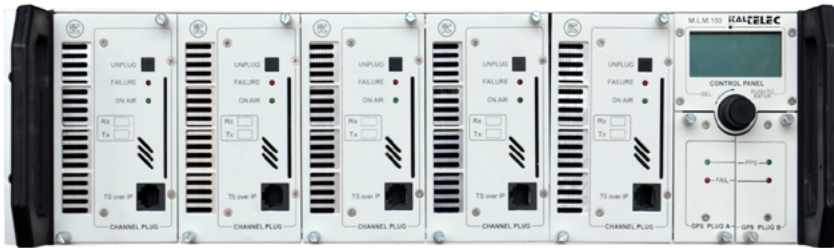
ECHO CANCELLER (optional)

Cancellation Level	30dB
Maximum Echo Level	+ 15dBc (Over the main signal)
RF Sample Level	0dBm for transposer nominal power

MECHANICAL	Dimensions (WxHxD)	Weight (approx.)
	mm 484x132x600	Kg 24

MLM FM 150

Multi Last Mile: Compact 4+1 FM Digital Exciter



Main Characteristics

- FM Modulation by digital Processing
- Direct-to-Channel RF frequency generation for superior RF and audio performance
- Up to 150W for each channel
- The full complement of audio inputs: L&R analog, MPX, Mono analog and AES-EBU concurrently available for primary and backup source assignment
- Ethernet connectivity links for programming and data service transmission
- Universal power supply with power factor correction (PFC) and high/low voltage detection
- Advanced Stereo generator and RDS encoder are standard, with inputs for external SCA or RDS equipment
- Internal DVB S/2 multistream satellite receiver
- Internal pluggable GPS receiver
- RF output low-pass filter is included for use directly on air
- LCD menu system eases setup, operation, and maintenance
- 1 ASI input (PID Filtering)
- Web server, SNMP protocol

FM up to 150W / Channel
Hot Swap System
Digital Exciter

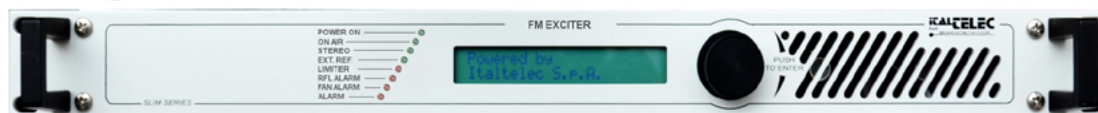
MLM FM 150 TECHNICAL SPECIFICATIONS

GENERAL		STEREO	
RF Power Output:	150W / Channel	Operational Modes:	Stereo, mono (L+R), L only, R only
Output Impedance:	50 ohms nominal	Input Level:	AES -2dBfs for 100% modulation; 16-24 bits (32, 44, 48 or 96kHz typical rates for AES/EBU devices) L&R: +10dBm
Power consumption @max output	4 x 228.75 VA	Impedance:	AES: 110 ohms balanced L&R: 600 ohms or 10k selectable; balanced
VSWR:	Rated power into 15:1 VSWR. Open and short circuit protected at all phase angles	Connector:	AES: Wire-XLR, L&R: XLR
Frequency Range:	87.5MHz to 108MHz; 100kHz increments, 50kHz-108kHz when specified	Amplitude Response:	+/- 0.5dB, 20Hz to 15kHz
Frequency Stability:	Internal TCXO +/-100Hz, -10° C to +50° C, External Output: +/- accuracy of reference source	THD + Noise:	0.03% or better
Audio Inputs:	AES (wire & optical), L&R analog, composite, SCA/RBDS/RDS external generator input, SCA audio inputs (2), two internal SCA generators, internal RBDS/RDS generator	IMD Distortion:	0.03% or better
Modulation Type:	Direct-to-channel digitally generated FM (no analog up-conversion); FM only	S/N Ratio:	85dB or better below 100% modulation @ 400Hz
Modulation Capability:	Up to 300kHz	Stereo Separation:	70dB, 20Hz to 15kHz
Asynchronous AM S/N Ratio:	80dB below rated power reference carrier with 100% AM modulation at 400Hz, 75 sec-de-emphasis with no FM modulation present	Linear Crosstalk:	70dB below 100% modulation; 20Hz to 15kHz, main to sub and sub to main
Synchronous AM S/N Ratio:	60dB below rated power reference carrier with 100% AM modulation at 400Hz, 75 sec-de-emphasis with FM modulation +/- 75kHz at 400Hz	Pilot Stability:	+/- 0.3Hz, 0 degrees C to +50 degrees C
Spurious and Harmonic:	85dB or better; low pass filter standard	Audio Overshoot:	2dB max
AC Input:	90 to 264VAC, 47-63Hz	38.5/76 and 95kHz Suppression:	80dB below 100% modulation
Power Consumption:	Up to 400W	MONO	
Power Factor:	0.97 or better	Operational Modes:	Mono (L+R), L only, R only
Surge Protection:	Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4	Input Level:	3.5V p-p for 100% modulation into 600 ohms
Regulatory:	FCC, DOC, CE, CCIR, IEC 215 Safety	Impedance:	600 ohms or 10k ohms selectable
ENVIRONMENTAL		Connector:	XLR
Temperature Range:	-10° C to +50° C	Amplitude Response:	+/- 5dB, 20Hz to 15kHz
Altitude:	10,000 ft (3048 m)	THD + Noise:	0.05% or less; 20Hz to 15kHz
Humidity:	95% maximum, non-condensing	IMD Distortion:	0.05% or less, 20Hz to 15kHz
COMPOSITE		FM S/N Ratio:	90dB below 100% modulation @ 400Hz
Input Level:	3.5V p-p for 100% modulation into 10k ohms	RBDS/RDS (INTERNAL)	
Impedance:	Balanced: 10k ohms or 50 ohms selectable Unbalanced: 10k ohms	Frequency:	57kHz
Connector:	Balanced: BNC Unbalanced: BNC	Injection Level:	2 to 15%; software programmable
Amplitude Response:	+/- 0.1dB; 20Hz to 53kHz, 0.1dB, 53kHz to 99kHz	SCA/RBDS/RDS (EXTERNAL)	
Phase Response:	+/- 0.1 degree from linear phase; 53kHz to 100kHz	Input Level:	3.5V p-p for 10% deviation
THD + Noise:	0.005% or less	Impedance:	10k ohms unbalanced
IMD Distortion:	0.005% or less	Connector:	BNC
FM S/N Ratio:	90dB below 100% modulation @ 400Hz	Amplitude Response:	+/- 0.5dB, 20Hz to 100kHz
MECHANICAL		Dimensions (WxHxD)	
		mm 484x132x600	
		Weight (approx.)	
		Kg 24	

FM RADIO

DFM SLIM EXC 30-300

FM Digital Exciter



Main Characteristics

- FM Modulation by digital Processing
- Direct-to-Channel RF frequency generation for superior RF and audio performance
- 30 to 300 watt for flexible deployment
- The full complement of audio inputs
 - L&R analog, MPX, mono analog and AES-EBU
 - concurrently available for primary and backup source assignment
- Ethernet connectivity links for programming and data service transmission
- Universal power supply with power factor correction (PFC)
 - and high/low voltage detection
- External frequency reference input for locking
 - to GPS or other external source
- Advanced Stereo generator and RDS encoder are standard,
 - with inputs for external SCA or RDS equipment
- Integrated Oil Cooling RF power output Low Pass Filter
- LCD menu system eases setup, operation, and maintenance
- I ASI input (PID Filtering) - optional
- Web server, SNMP protocol

FM up to 300w
Digital Exciter

DFM SLIM EXC 30-300 TECHNICAL SPECIFICATIONS

GENERAL			AC MAINS		
RF Power Output:	30 – 300W		AC Input:	90 to 264VAC; 47-63Hz	
Output Impedance:	50 ohms nominal		Power Consumption	400VA @ max power output	
VSWR:	Rated power into 15:1 VSWR. Open and short circuit protected at all phase angles		Power Factor:	> 0.97	
Frequency Range:	87.5MHz to 108MHz; 100kHz increments, 50kHz-10kHz when specified		Surge Protection:	Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4	
Frequency Stability:	Internal VCXO: +/-1Hz, -10° C to +50° C, External Output: +/- accuracy of reference source		Regulatory:	FCC; DOC; CE; CCIR; IEC 215 Safety	
Audio Inputs:	AES/EBU (wire), L&R analog, MPX, SCA/RBDS/RDS Internal RBDS/RDS generator Internal stereo encoder generator		ENVIRONMENTAL		
Modulation Type:	Digitally generated FM Digital direct Up-conversion		Temperature Range:	-10° C to +50° C	
Modulation Capability:	Up to 300kHz		Altitude:	10,000 ft (3048 m)	
Asynchronous AM S/N Ratio:	80dB below rated power reference carrier with 100% AM modulation at 400Hz, 75usec. de-emphasis with no FM modulation present		Humidity:	95% maximum, non-condensing	
Synchronous AM S/N Ratio:	60dB below rated power reference carrier with 100% AM modulation at 400Hz, 75usec. de-emphasis with FM modulation +/- 75kHz at 400Hz		MPX		
Spurious and Harmonic:	85dB or better; low pass filter standard		Input Level:	0-12 dBu typ. 6dBu for 100% modulation	
MECHANICAL			Impedance:	Unbalanced: 2k ohms	
Dimensions (WxHxD)	mm 484x45x540		Connector:	BNC	
Weight (approx.)	Kg 8		Amplitude Response:	+/- 0.02dB; 20Hz to 53kHz; 0.1dB; 53kHz to 99kHz	
AES/EBU			Phase Response:	+/- 0.1 degree from linear phase; 53kHz to 100kHz	
Operational Modes:	Stereo, mono		THD:	0.02% or less	
Input Level:	-24- 0 dBfs for 100% modulation; typ. -6dBfs		FM S/N Ratio:	80dB below 100% modulation @ 400Hz	
Impedance:	110 ohms		STEREO/MONO Analog Input		
Connector:	BNC		Operational Modes:	Stereo, Mono (L only)	
Amplitude Response:	+/- 0.01dB, 20Hz to 15kHz		Input Level:	0-12 dBu typ. 6dBu for 100% modulation	
THD:	0.006% or better		Impedance:	600 ohms or 2k ohms	
S/N Ratio:	80dB or better below 100% modulation @ 400Hz		Connector:	Mini XLR	
Stereo Separation:	80dB, 20Hz to 15kHz		Amplitude Response:	+/- 0.2dB; 20Hz to 15kHz	
Linear Crosstalk:	80dB below 100% modulation; 20Hz to 15kHz; main to sub and sub to main		THD:	0.02% or less; 20Hz to 15kHz	
Pilot Stability:	+/- 0.1Hz, 0 degrees C to +50 degrees C		Linear Crosstalk:	>80dB	
			FM S/N Ratio:	ETS80085 S/N for stereo must be better than 72dB	

DFM TX 300-1500

FM Digital Transmitter



Main Characteristics

- Direct-to-Channel RF frequency generation for superior RF and audio performance
- Up to 1500 watt for flexible deployment
- The full complement of audio inputs - L&R analog, MPX, mono analog and AES-EBU are concurrently available for primary and backup source assignment
- Ethernet connectivity links for programming and data service transmission
- Universal power supply with power factor correction (PFC) and high/low voltage detection
- External frequency reference input for locking to GPS or other external source
- Advanced Stereo generator and RDS encoder are standard, with inputs for external SCA or RDS equipment
- Integrated Oil Cooling RF power output Low Pass Filter for use directly on air
- LCD menu system eases setup, operation, and maintenance
- 1 ASI input (PID Filtering) - optional
- Web server, SNMP protocol

FM up to 1.5kW
Digital Exciter

DFM TX 300-1500 TECHNICAL SPECIFICATIONS

GENERAL

RF Power Output:	Up to 1500W
Output Impedance:	50 ohms nominal
VSWR:	Rated power into 1.5:1 VSWR. Open and short circuit protected at all phase angles
Frequency Range:	87.5MHz to 108MHz; 100kHz increments, 50kHz-10kHz when specified
Frequency Stability:	Internal VCXO: +/-1Hz, -10° C to +50° C, External Output: +/- accuracy of reference source
Audio Inputs:	AES/EBU (wire), L&R analog, MPX, SCA/RBDS/RDS, internal RBDS/RDS generator, Internal stereo encoder generator
Modulation Type:	Digitally generated FM, Digital direct Up-conversion
Modulation Capability:	Up to 300kHz
Asynchronous AM S/N Ratio:	80dB below rated power reference carrier with 100% AM modulation at 400Hz, 75usec. de-emphasis with no FM modulation present
Synchronous AM S/N Ratio:	60dB below rated power reference carrier with 100% AM modulation at 400Hz, 75usec. de-emphasis with FM modulation +/- 75kHz at 400Hz
Spurious and Harmonic:	85dB or better; low pass filter standard

MECHANICAL	Dimensions (WxHxD)	Weight (approx.)
	mm 484x90x550	Kg 19

AES/EBU

Operational Modes:	Stereo, mono
Input Level:	-24- 0 dBfs for 100% modulation; typ. -6dBfs
Impedance:	110 ohms
Connector:	BNC
Amplitude Response:	+/- 0.01dB, 20Hz to 15kHz
THD:	0.006% or better
S/N Ratio:	80dB or better below 100% modulation @ 400Hz
Stereo Separation:	80dB, 20Hz to 15kHz
Linear Crosstalk:	80dB below 100% modulation; 20Hz to 15kHz; main to sub and sub to main
Pilot Stability:	+/- 0.1Hz, 0 degrees C to +50 degrees C

AC MAINS

AC Input:	90 to 264VAC; 47-63Hz
Power Consumption:	2100VA @ max power output
Power Factor:	> 0.97
Surge Protection:	Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4
Regulatory:	FCC, DOC, CE, CCIR, IEC 215 Safety

ENVIRONMENTAL

Temperature Range:	-10° C to +50° C
Altitude:	10,000 ft (3048 m)
Humidity:	95% maximum, non-condensing

MPX

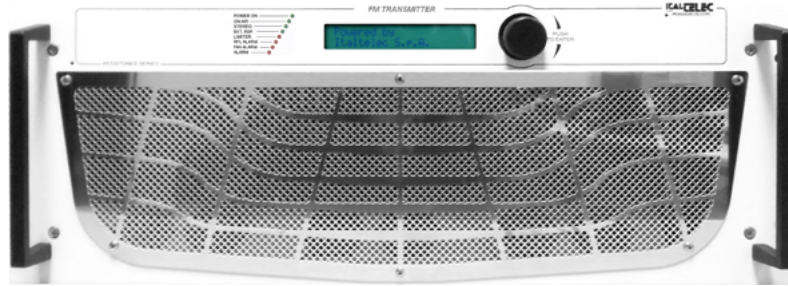
Input Level:	0-12 dBu typ. 6dBu for 100% modulation
Impedance:	Unbalanced: 2k ohms
Connector:	BNC
Amplitude Response:	+/- 0.02dB; 20Hz to 53kHz; 0.1dB; 53kHz to 99kHz
Phase Response:	+/- 0.1 degree from linear phase; 53kHz to 100kHz
THD:	0.02% or less
FM S/N Ratio:	80dB below 100% modulation @ 400Hz

STEREO/MONO Analog Input

Operational Modes:	Stereo, Mono (L only)
Input Level:	0-12 dBu typ. 6dBu for 100% modulation
Impedance:	600 ohms or 2k ohms
Connector:	Mini XLR
Amplitude Response:	+/- 0.2dB; 20Hz to 15kHz
THD:	0.02% or less; 20Hz to 15kHz
Linear Crosstalk:	>80dB
FM S/N Ratio:	ETSB0085 S/N for stereo must be better than 72dB

FM RADIO

DFM TX 2.5K-5.0K



FM Digital Transmitter

- Direct-to-Channel RF frequency generation for superior RF and audio performance
- Up to 5000 watt for flexible deployment
- The full complement of audio inputs - L&R analog, composite, mono analog and AES are concurrently available for primary and backup source assignment
- Ethernet connectivity links for programming and data service transmission
- Universal power supply with power factor correction (PFC) and high/low voltage detection
- External frequency reference input for locking to GPS or other external source
- A basic RDS Encoder is included, the connection for external SCA or RDS encoder are provided.
- RF output low-pass filter is included for use directly on air
- LCD menu system eases setup, operation, and maintenance
- I ASI input (PID Filtering) - optional

DFM TX 2.5K - 5.0K TECHNICAL SPECIFICATIONS

GENERAL		AC MAINS	
RF Power Output:	Up to 5kW	AC Input:	Single Phase: 230 VAC; 50-60Hz Three Phase: 380 VAC +N; 50-60Hz
Output Impedance:	50 ohms nominal	Power Consumption	6574 VA @ max power output
VSWR:	Rated power into 1.5:1 VSWR. Open and short circuit protected at all phase angles	Power Factor:	> 0.97
Frequency Range:	87.5MHz to 108MHz; 100kHz increments, 50kHz-10kHz when specified	Surge Protection:	Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4
Frequency Stability:	Internal VCXO: +/-1Hz, -10° C to +50° C, External Output: +/- accuracy of reference source	Regulatory:	FCC; DOC; CE; CCIR; IEC 215 Safety
Audio Inputs:	AES/EBU (wire), L&R analog, MPX, SCA/RBDS/RDS, internal RBDS/RDS generator, Internal stereo enVcoder generator	ENVIRONMENTAL	
Modulation Type:	Digitally generated FM Digital direct Up-conversion	Temperature Range:	-10° C to +50° C
Modulation Capability:	Up to 300kHz	Altitude:	10,000 ft (3048 m)
Asynchronous AM S/N Ratio:	80dB below rated power reference carrier with 100% AM modulation at 400Hz, 75usec. de-emphasis with no FM modulation present	Humidity:	95% maximum, non-condensing
Synchronous AM S/N Ratio:	60dB below rated power reference carrier with 100% AM modulation at 400Hz, 75usec. de-emphasis with FM modulation +/- 75kHz at 400Hz	MPX	
Spurious and Harmonic:	85dB or better; low pass filter standard	Input Level:	0-12 dBu typ. 6dBu for 100% modulation
AES/EBU		Impedance:	Unbalanced: 2k ohms
Operational Modes:	Stereo, mono	Connector:	BNC
Input Level:	-24- 0 dBfs for 100% modulation; typ. -6dBfs	Amplitude Response:	+/- 0.02dB; 20Hz to 53kHz; 0.1dB; 53kHz to 99kHz
Impedance:	110 ohms	Phase Response:	+/- 0.1 degree from linear phase; 53kHz to 100kHz
Connector:	BNC	THD:	0.02% or less
Amplitude Response:	+/- 0.01dB, 20Hz to 15kHz	FM S/N Ratio:	80dB below 100% modulation @ 400Hz
THD:	0.006% or better	STEREO/MONO Analog Input	
S/N Ratio:	80dB or better below 100% modulation @ 400Hz	Operational Modes:	Stereo, Mono (L only)
Stereo Separation:	80dB, 20Hz to 15kHz	Input Level:	0-12 dBu typ. 6dBu for 100% modulation
Linear Crosstalk:	80dB below 100% modulation; 20Hz to 15kHz; main to sub and sub to main	Impedance:	600 ohms or 2k ohms
Pilot Stability:	+/- 0.1Hz, 0 degrees C to +50 degrees C	Connector:	Mini XLR
MECHANICAL		Amplitude Response:	+/- 0.2dB; 20Hz to 15kHz
Dimensions (WxHxD)	mm 484x176x500	THD:	0.02% or less; 20Hz to 15kHz
Weight (approx.)	Kg 34	Linear Crosstalk:	>80dB
		FM S/N Ratio:	ETS80085 S/N for stereo must be better than 72dB

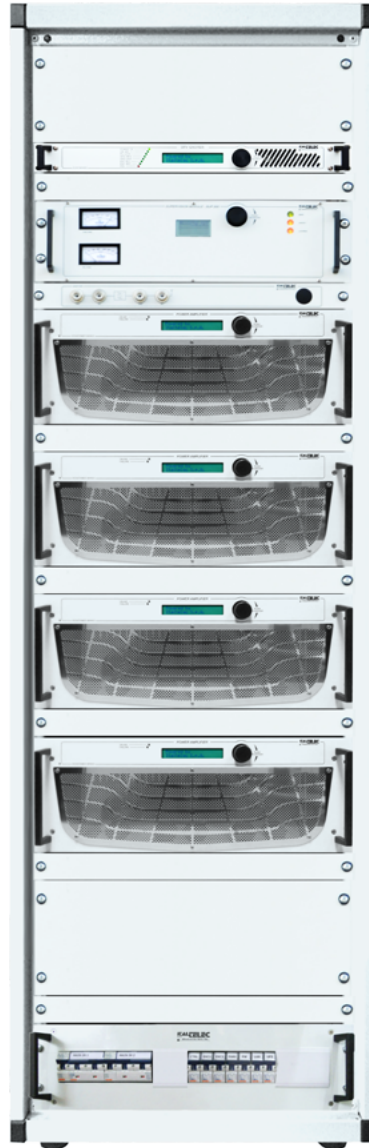
DFM AC HPA 10K - 20K

FM DIGITAL TRANSMITTER

UP TO 20 KW
DIGITAL EXCITER
N+1 CAPABILITIES

Main Characteristics:

- Direct-to-Channel RF frequency generation for superior RF and audio performance
- Output power up to 20kW
- The full complement of audio inputs - L&R analog, composite, mono analog and AES are concurrently available for primary and backup source assignment
- Ethernet connectivity links for programming and data transmission
- Universal power supply with power factor correction and high/low voltage detection
- External frequency reference input for locking to GPS other external source
- A basic RDS Encoder is included, the connection for SCA or RDS encoder are provided.
- RF output low-pass filter is included for use on air
- LCD menu system eases setup, operation, maintenance
- I ASI input (PID Filtering) - optional



FM RADIO

DFM AC HPA 10K - 20K TECHNICAL SPECIFICATIONS

Power Table						
Model	Composition	N° of Amps	Output Power (W)	Power Supply	Power Consumption (W) and Efficiency	
DFM AC HPA 10K	Ecoston DFM TX 2.5K - 5K	2	10000	380V threephase + neutral	13.698	73%
DFM AC HPA 15K	Ecoston DFM TX 2.5K - 5K	3	15000	380V threephase + neutral	20.270	74%
DFM AC HPA 20K	Ecoston DFM TX 2.5K - 5K	4	20000	380V threephase + neutral	26.666	75%

DFM LC HPA 10K-40K

*High Power Liquid Cooled FM Transmitter
with Integrated Cooling System*

**FM up to 40kW
Digital Exciter
Liquid Cooled
N+1 Capability**

Main Characteristics:

- High efficiency, low power consumption
- Configurations: Stand Alone, Dual Drive, 1+1, N+1 up to 7+1.
- Available in band II (88 - 108Mhz)
- Inputs: L-R, MPX, SCA, Optical, AES/EBU
- Integrated cooling system with redundancy dual pump with temperature flow control
- Anti-Condensation protection system
- High Efficiency Heat exchange ($\Delta t < 6^\circ$)
- Air detector in the hydraulic system
- Hot swap pluggable RF power amplifiers
- Unbalanced liquid cooled dummy load
- Broadband frequency synthesizer, without any other tuning or alignment.
- Monophonic & Stereophonic emission, according to CCIR, FCC or OIRT
- RDS & SCA subcarriers input capability
- Hi-Fi Quality modulated signal, with low residual noise and distortion.
- RF Signal free from spurious and harmonic signals
- Redundant 8x 5 kW power amplifier and power supply
- Remote Operation compliant to IEC 864-1 rule (all options are available)
- Quick installation (4 man-hours)
- Low acoustic noise, <55dbA
- Web Server, SNMP protocol



TECHNICAL SPECIFICATIONS

RF

Emissions	According to CCIR, FCC or OIRTV
Frequency Deviation	± 75kHz standard Up to 300K
Resolution	10kHz step programmable
Frequency stability	± 100Hz, -10°C to +50°C, External Output: ± accuracy of ref. Source
Output Power	5kW to 40kW (configurable)
Harmonic Emission	≤ 76 dBc
Spurious emission	≤ 90 dBc
Residual AM noise level	≤ 60 dB
Synchronous AM	≤ 50 dB
RF Output impedance	50Ω; 3" 1/8" EIA connector

ENVIRONMENTAL

Temperature Range:	-10° C to +50° C
Altitude:	10,000 ft (3048 m)
Humidity:	95% maximum, non-condensing

AC MAINS

AC Line Voltage	3-phase 50/60 Hz, 380 to 415 V
AC Line Variation	10% to -15%
Power Factor	> 0.97
Cooling Method	Liquid
Acoustic Noise	< 65 dBA (measured 1 m in front of cabinet)

REMOTE CONTROL

Parallel interface	Start, stop, standby, alarms, status, interlock
Serial Interface	RS-232 or others on request

Number of Amplifiers	FM Analogic (Wps)	
	Post- Filter	Efficiency
2	10000	75%
3	15000	75%
6	30000	75%
8	40000	75%

PROGRAM INPUT

Mono/Stereo	L & R program input
Connector	XLR type
Impedance	600Ω or 5kΩ balanced
Level	-4 to 12 dBm
Preemphasis	0; 25; 50; 75 μs selectable
Audio frequency response	40 to 15000 ± 0.3 dB
19 kHz suppression	≥ 50 dB
RDS and AUX	Subcarrier program input
Connector	BNC
Impedance	≥ 2kΩ unbalanced

TRANSMISSION CHARACTERISTICS

Mono Operation ± 75 kHz deviation	
Total harmonic distortion	≤ 0.03 %
Intermodulation	≤ 60 dB
Signal to noise unweighted	≥ 80dB
Signal to noise weighted	≥ 78dB
Stereo Operation ± 75 kHz deviation	
Total harmonic distortion	≤ 0.1 %
Intermodulation	≤ 60 dB
Signal to noise unweighted	≥ 78dB
Signal to noise weighted	≥ 72dB
Crosstalk L&R (45 to 15k Hz)	≥ 70dB
38 kHz subcarrier suppression	≥ 70dB
Attenuation above 53 kHz	≥ 70dB

MECHANICAL

	Dimensions (WxHxD)	Weight (approx.)
Spark LC 5kW FM	mm 60x210x120	Kg 274
Spark LC 10kW FM	mm 60x210x120	Kg 335
Spark LC 15kW FM	mm 60x210x120	Kg 373
Spark LC 20kW FM	mm 60x210x120	Kg 413
Spark LC 40kW FM	mm 60x210x120	Kg 580

FM RADIO

HIGH PERFORMANCE DTV MONITORING



More than a monitoring

Equipment for real-time monitoring of DVB-T / DVB-T2 / ISDB-Tb and transmitter RF performance.

Simultaneous monitoring of the ASI input Transport Stream to the transmitter and the Transport Stream demodulated from the transmitted RF signal.

Analysis of Transport Streams according to international standards.

Real-time analysis of "Black & Freeze" events on individual programs of the Transport Stream. Possibility to set event duration interval and percentage of the frame to be analyzed.

BER, MER and Carrier Offset measurements. SFN Network Delay.

Graphical representation of Spectrum, Constellation, MER vs Carrier and Echo Pattern

Graphical representation of PCR Jitter Accuracy and PCR Overall Jitter

Remote viewing and real-time video (of both TS ASI stream and demodulated RF stream) via UDP

Log alarms and measures

Remote signalization of the alarms via SNMP traps, SMS, E-mail.

Local management and settings via front display

Remote management and settings via Web interface and SNMP, Multi-user remote management for access limited to specific transmitters among those monitored

Manual recording of video streams with settable recording time

Automatic recording triggered by specific events

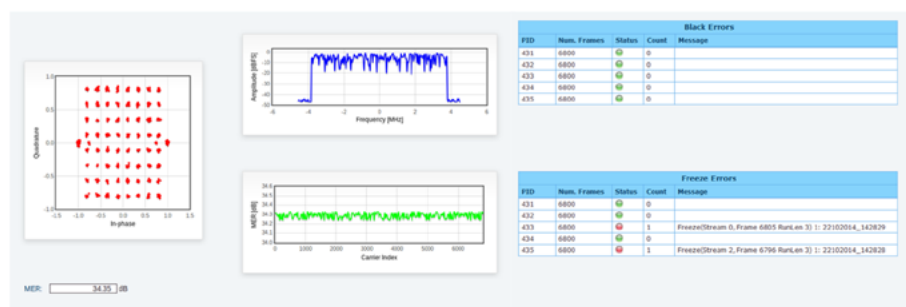
Multi-probe system with HDD for storing recording logs

On-site SFN Check: monitoring of SFN synchronization of each transmitter through the MER measurement of the RF signal obtained from the combination of the output signal of the TX under test and that of a reference TX

In-field SFN Check: monitoring of SFN synchronization at the receiver site through Echo Pattern diagram. Identification of which transmitter is causing SFN issues through specific thresholds settable both for level and time delay

PPS CrossCheck: monitoring of external GPS receiver through a reference GPS receiver (embedded GPS receiver is available)

RF Polling: monitoring of multi-channel systems using a single probe. The probe carries out measurements on all channels (up to 8) with a settable polling time



Real Time Constellation, Spectrum and MER vs. Carrier

Black&Freeze Analysis

TECHNICAL SPECIFICATIONS

GENERAL

Frontend	DVB-T2 (ETSI EN 302 755), DVB-T (ETSI EN 300 744), ISDB-T/Tb (ABNT NBR 15606-2)
Frequency	Bands III, IV, V
Transport Stream	ASI interface on back panel Input BNC connector
MPEG2 TS output	ASI @ 270Mb/s
RF Measurement	MER, BER, Carrier offset
MPEG Analysis	ETSI TR 101 290
Management	Local display, Web, SNMP
Software Upgrade	Local, Remote
Alarm Thresholds	Configurable for each measurement parameter

AC MAINS

AC Line Voltage	2-phase 50/60 Hz, 100V to 240V
AC Line Variation	10% to -15%
Power Factor	>0.97
Consumption	50W

PERFORMANCES

Adjacent channel rejection	> 50dB
MER measurement (RF)	> 41dB

MECHANICAL	Dimensions (WxHxD)	Weight (approx.)
DTV Monitoring	1U – mm 483x45x540	Kg 4

MEASUREMENTS AND GRAPHICAL REPRESENTATIONS

Constellation	BER
Spectrum	SFN Network Delay
Signal Level	Frequency Offset
MER	TPS(DVB-T), L1 (DVB-T2) Decoding
MER vs Carrier	Spectral Inversion

ENVIRONMENTAL

Altitude	Up to 4.000m above sea level
Guaranteed specifications	+5°C to +45°C
Operation Temperature	0 to +50°C
Humidity	Up to 95% non-condensing
Cooling Method	Forced Air
Acoustic Noise	< 65 dBa (measured 1m in front of cabinet)

RF

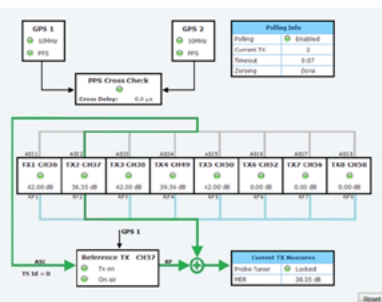
Input Connector	Type N
Return Loss	> 20dB
Specification	Compliant DVB-T2 (ETSI EN 302 755) and DVB-T (ETSI EN 300 744)
Signal Level	-80 dBm to -25 dBm or 0 dBm to +10 dBm
Frequency Bands	UHF IV, V – VHF III
Dual RF input	Optional

SFN CHECK allows
real-time detection
of synchronization
issues

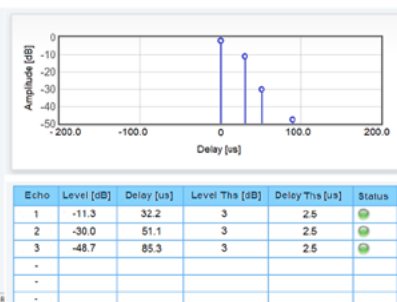
MEASUREMENTS



Real Time PCR



SFN Check, RF Polling, PPS CrossCheck



Echo Pattern Diagram

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