

2,6 kW COFDM, 3,4 kW ATSC, 5,2 kWps 2,6 kW UHF TV TRANSMITTER



TV TRANSMITTER

The SLIM5-02/UHF HP is the Syes Compact AIR Cooled TV transmitters SLIM Line.

Fully wide band high efficiency with a system efficiency up to 44%.

Composed by one PCM driver (Dual Driver Option) and two (2) SLIM5 amplifiers.

Low Consumption, Compact and Easy to maintain, with a clear and intuitive design, it is Syes next generation of air cooled transmitters, available in band I, III and IV-V.

The SLIM family is designed to be the most efficient, robust and high performance amplifiers in the DTV era.



- ☐ Multimode platform: Transmitter, Heterodyne Transposer, Regenerative Transmitter, Gap Filler and Single Frequency Echo Canceller
- ☐ Multi Standard: DVB-T/T2, ATSC1.0/3.0, ISDB-T, DTMB, Analog(NTSC/PAL), 5G Broadcast Multi
- ☐ Input: RF, SAT (DVB-S/S2/SX), 2x ASI (T2MI, SMPTE310) with Hitless switch (Priority customer settable), 2x IP Ethernet, 1xSFP (optical/electrical), A/V for analog broadcasting.
- ☐ The most advanced manual, automatic and adaptive linear and nonlinear pre-corrector.
- ☐ Sky-High efficiency to minimize energy consumption and OPEX;
- ☐ Fully frequency agile without need for any tuning or trimming.
- ☐ ON Board GNSS receiver (GPS, GLONASS, BEIDU, GALILEO).
- ☐ USB input to fast save/load configurations.
- ☐ Highest performances in terms of MER, BER and shoulders.
- ☐ Fully frequency agile without need for any tuning or trimming.
- ☐ Hot Pluggable Power Amplifiers Option;
- ☐ Power Amplifiers with triple redundant Hot Plug-in power supplies;
- ☐ Use of tools for maintenance reduced almost to zero including pallets replacement.
- ☐ Dual Independent temperature controlled low-noise fans for better efficiency and performance (tool free swap)
- ☐ Remote control via SNMP, friendly web browser GUI, no need of plug-in or apps, dry contacts.

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TECHNICAL SPECIFICATIONS

RF OUTPUT

Output power*	• 2600 Wrms COFDM • 3400 rms ATSC • 5200 Wp.s. ANALOG
Spurious / Harmonics	EN 302-296-2
Shoulders/MER	Typical: >50dB/>35dB
Output Connector / Impedance	1-5/8" - 50 Ohm
Bandwidth	UHF Band IV & V (470MHz-800MHz) Broadband: no HW change needed
Frequency stability	± 1 Hz
Final Stage	N° 2 Amplifiers each with N° 8 Dual transistors Pallets Max Pout achievable with 1 transistor failed: >1500W
Amplification Class:	High efficiency: Efficiency >40% with MER 35dB
Test mode:	PRBS
Technology:	LDMOS Solid state transmitter

GENERAL

<u>Mechanical</u>	
Composition	Exciter + n.2 SLIM5 HPA
Dimensions (WxHxD mm -Weight)	482 mm / 1800 mm / 1000 mm 160 kg
<u>Cooling</u>	
Cooling System	Forced Air Cooled
Cooling redundancy	Dual fan
<u>Environmental</u>	
Relative humidity	95% max. (non-condensing)
Operation temperature range	0° to 50°C
Storage temperature range	-20° to 70°C
Max. installation altitude	4.800 m a.s.l. (higher altitudes kit on request)
<u>Power supply & Safety</u>	
Voltage***	90-264 Wide Range @ 47 to 65 Hz (auto range p.s.) power factor > 0.98
Safety /EMC	EN 60215 (IEC 215), EN301-489-53, FCC-73, IS09001-2010. RED 2014/53/ UE, RoHS 2002/93/EC
Safe Operations	Interlock Circuit provided and configurable.

*: Power outputs are subject to change due to out-of-band regulations and the required shoulder attenuation / MER, voltage, channel of operation and type of RF output filter. VSWR: 2:1

** : HE High Efficiency Syes transmitting platform are WIDE BAND native, without any need for software or hardware change, tuning or other setting. Efficiency depends on several parameters such as operating standard and frequency, output power settings, spectrum performances, environmental conditions etc.

***: Single mains supply per cabinet, with power isolator switch, accessible from the outside

SY
Yes

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DTV MODULATIONS													
ATSC 3.0													
Standard				ATSC 3.0: TG3/S32 Physical Layer. STL									
Inputs ****				2xASI BNC (H) , ohm / 2x TSoiP 10/100/1000 RJ45.									
Guard interval				192, 384, 512, 768, 1024, 1536, 2048, 2432,3072, 3648, 4096 and 4864									
Code Rate/ Constellation	2 / 15	3 / 15	4 / 15	5 / 15	6 / 15	7 / 15	8 / 15	9 / 15	10 / 15	11 / 15	12 / 15	13 / 15	
QPSK	✓	✓	✓	✓	✓	✓	✓	✓		✓			
16QAM			✓	✓		✓	✓	✓		✓			
64QAM		✓	✓	✓	✓	✓	✓	✓	✓	✓			
256QAM			✓	✓		✓	✓	✓	✓	✓			
1024QAM				✓		✓	✓	✓	✓	✓	✓		✓
4096QAM						✓		✓		✓	✓	✓	✓
DVB-T/H-T2				Ch.bandwidth 6,7,8 MHz (8 PLP - DVB-T2 & T2 Lite simultaneous) Mode A&B									
Standard				EN300744. EN302304. EN302755 v 1.4.1. TS 102831. TS 102 773 (T2-MI)									
Inputs ****				2*ASI BNC, 75 ohm / 3xTSoIP 10/100/1000 RJ45.									
FFT Size				1K (DVB-T2), 2K, 4K, 8K, 16K (DVB-T2), 32K (DVB-T2) incl. ext. carrier modes									
Code rate				1/2. 2/3. 3/4. 5/6. 3/5 (DVB-T2). 4/5 (DVB-T2) plus 1/3, 2/5 for T2 Lite									
Guard interval				1/32,1/16. 1/8.1/4. 19/256 (DVB-T2), 19/128 (DVB-T2), 1/128 (DVB-T2)									
Constellation				QPSK. 16QAM. 64QAM. 256QAM (DVB-T2). Rotated and no rotated (DVB-T2)									
ISDB-Tb													
Standard				ARIB STB-B31, TR-B14									
Inputs ****				2xASI BNC, 75 ohm / 3xTSoIP 10/100/1000 RJ45									
FFT Size				2K, 4K, 8K									
Code rate				1/2, 2/3, 3/4, 5/6, 7/8									
Guard interval				1/4, 1/8, 1/16, 1/32									
Hierarchical Transmission				Up to 3 layers									
Constellation				QPSK, 16QAM, 64QAM									
ATSC													
Standard				ATSC A/53. A/54. A/64. A/153. A/110B. SMPTE-310M									
Inputs ****				2xASI BNC (F)>. 75 ohm /2xTSoiP 10/100/1000 RJ45.									
Constellation				8VSB									
Symbol rate				0.76 Msmblos/s									
Data rate				19.39 Mbits/s									
Trellis coding				2/3									
Reed-Solomon encoder				207 / 187 / 10									
DTMB													
Standard				DTMB (GB20200/2006)									
Inputs ****				2xASI BNC (H), 75 ohm /2xTSoiP 10/100/1000 RJ45									
FFT Size				Single carrier/ 3780									
Constellation				64 QAM, 32 QAM, 16QAM, 4QAM, 4QAM NR									
Code rate				0,4-0,6-0,8									
Data rate				24,365 Mb/s									
Frame header				420 Symbols/595 Symbols/ 945 Symbols									
5G				ETSI TS 103 720 - 5G Broadcast System for linear TV and radio services; LTE-based 5G terrestrial broadcast system.									
DIGITAL ADAPTIVE PRECORRECTION													
Type				Linear / non linear; selectable, Type LDPC-BCH									
Clipping				12 dB									
Operation mode				Continuous / Automatic (triggering: time/shoulder level)									
Precorrection status				Running/Stopped									
PAPR				Provided									

**** Type and number of inputs depends on Exciter HW configuration

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ANALOGUE MODULATIONS	
Standard	PAL std. B/G, H, K, 1, 11, M, N - NTSC Std. M - SECAM D/K
Ref. Standard	ITU-R BT.470-6
Audio	Stereo or Mono IRT
Modulation /amplification	Common
Video input	1V pp (0.5 to 2 V) (OC component level in the range -5 to 5 V) - Ret. loss better than -30 dB (0 to 6 MHz) (75 W)
Audio input	6 dBm $\pm$ 6 dB (Df= 25 to 50 kHz) - Ret. loss: better than -30 dB (40 Hz to 15 kHz) (600 W, bai.)
Video Connector	1xBNC female. 75 Ohm
Audio Connector	DB9 with patch cable for 2xXLR female, 600 W (IRT config.: 2 inputs)
REPEATER	
Type	SFN gap filler, transposer and MFN re transmitter
RF input	N-Connector
Rfm frequency range	146 to 861 MHz
Input level	-10dBm to -60dBm (SFN Gap filler) -20dBm to -70dBm (QEF reception)
Input ret. Loss	better than -16 dB
RF in connector	N type . 50 Ohm
Echo cancellation	Resilient to static and dynamic echoes
Residual echo suppression	up to more than 30 dB (30dB are obtained at 0dB input echo)
Noise figure	max 10 dB (SFN Gap filler) max 8 dB (Transposer)
Immunity to other channel	
N+1	OFDM/OFDM > 30 dB
others	OFDM/OFDM > 40 dB
SATELLITE TRANSPOSER	
SatTV standard	DVB-S - DVB-S2 - EN300421
Frequency range	950 - 2150 MHz (Ku band)
Signal level	-65 to -25 dBm
Connector	SMA f - CAM slot (Cond. Access)
LNB control	Available through RF input. PS, polarity / band selection: by standard 13/18VDC and 22kHz signaling
CLOCK AND SYNCHRONIZATION	
Internal clock	OCXO single oven or dual oven (optional)
External 10 MHz / 1pps reference	BNC (F). Impedance: 50 ohm / high (selectable).
NTP Server	Available
SFN	SFN resolution 1100 ns SFN configurable delay $\pm$ 500 ms
Stability	time: max $\pm$ 10-7 /year - temperature: max $\pm$ 2.5 10-8 (-20°C to +70 °C)
Internal GNSS	GPS/BEIDOU/GALILEO/GLONASS 10MHZ : Sinusoidal, 1PPS: TTL
MONITORING	
Local Full Monitoring and Control	Local operation through LCD display and keyboard located on the front panel
Front RJ-45 Rear RJ-45	Local operation through a Web Server Graphical User Interface, Remote Network management (via SNMP) Interface Ethernet 10/100
FW & SW Upgrade	Via web pages, self-upgrade function available via OTA or remote server.
GUI	Web Server Graphical User Interface xHTML based
SNMP	V2c / V3 provided

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