



# LTE153-6000

Externally-modulated Laser Transmitter  
for 1550 nm Wavelengths

High performance 1550 nm externally modulated CATV fiber optic transmitters  
Support both HFC and FTTx networks



## About the Product

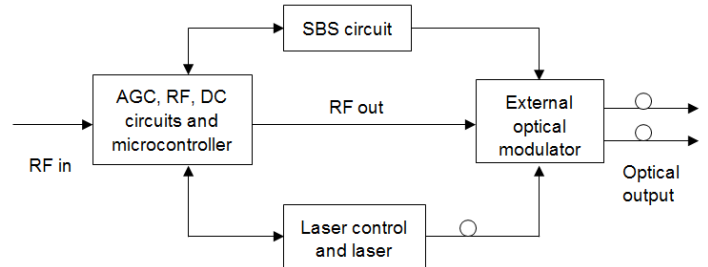
The LTE153-6000 is designed to deliver optimum performance on long-haul fiber with low dispersion shifted to 1550 nm. It is the ideal solution when the network requires long distance transmission.

The LTE153-6000 provides a low chirp mode of operation with a very narrow optical line width. This allows the use of any 1550nm DWDM wavelength for the transmission of broadband CATV, whilst maintaining excellent CNR, CSO and CTB performance throughout the network.

The LTE153-6000 is packaged in a compact 19" sub-rack housing of 1RU, with dual redundant and hot-swappable power-supply modules.

The transmitter features adjustable dispersion compensation to maximize performance for the channel plan in use.

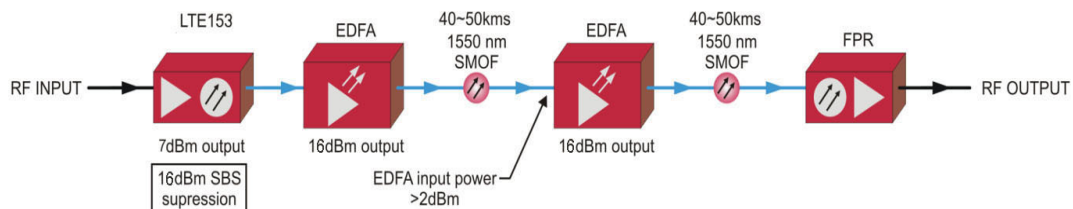
## Block Diagram



## Key Features and Functions

- RF pre-distortion circuit for excellent CSO and CTB performance together with low distortion parameters
- Versions for long-haul applications, as well as for short-haul FTTH customer access networks
- Optimized models for 60 PAL channels, 89 PAL channels, 80 NTSC channels or 110 NTSC channels. Flat response for 45~1003 MHz
- Dual redundant hot-swappable power supplies for universal mains or for telecom battery
- Field-adjustable Stimulated Brillouin Scattering (SBS) suppression for optimized CSO to suit 14~18 dBm fiber line drive levels.
- Field-adjustable Electronic Dispersion Compensation (EDC)
- Front-panel LCD for local monitoring of transmitter status. Integrated SNMP agent with RJ45 Ethernet port for remote monitoring
- Front Panel RF Test Point for easy access

## Application Examples



### Specifications

#### Link Performance \*\*

	Specified Link Length	Channel Plan	Optical Output Power	Noise Bandwidth	SBS Suppression	Carrier to Noise Ratio	Composite Second Order	Composite Triple Beat	Composite Triple Beat
	L (km)		Po (dBm)	BW (MHz)	(dBm)	CNR (dB)	CSO (dBc)	CTB(dBc)	CTB(dBc)
<b>S-Type</b>									
<b>6000-SA</b>	65	NTSC 80	7.0/ 7.0	4	16.0	53.0/ 53.0	-65/-65	-65	-64
<b>6000-SA</b>	65	PAL 60	7.0/ 7.0	5	16.0	53.0/ 53.0	-65/-65	-65	-64
<b>6000-SA</b>	65	NTSC 110	7.0/ 7.0	4	16.0	50.0/ 50.0	-65/-65	-65	-64
<b>6000-SA</b>	65	PAL 89	7.0/ 7.0	5	16.0	50.0/ 50.0	-65/-65	-65	-64
<b>6000-SA</b>	65	42 CENELEC	7.0/ 7.0	5	16.0	53.0/ 53.0	-65/-65	-65	-64
<b>Comments</b>			Min. - Higher Powers Available		Min.	Min.	Max.	Max.@25 C	Max.@0-50 C

Note: Specifications for the 2 x 10dBm units, CSO port 2 degraded by 1dB for Channel Loads 1 and 2, CSO port 2 degraded by 2dB for Channel Loads 3 and 4. Channel load 1-2 = 80NTSC – 60PAL Channel load 3-4 = 110NTSC and 80 Pal.

#### RF Performance

<b>RF bandwidth</b>	45 ~ 1003 MHz	
<b>RF flatness</b>	± 0.75 dB @ 45 ~ 1003 MHz	
<b>RF input return loss</b>	≥ 16 dB	
<b>RF input impedance</b>	75 Ω	
<b>Front Panel RF test point</b>	-20 dB ± 1 dB down from RF input	
<b>TV channel plan</b>	60 or 89 PAL channels; 80 or 110 NTSC channels	
<b>RF connector</b>	SCTE F-Type	
<b>Nominal RF input level per TV channel</b>	<b>CW/Video mode</b>	<b>Manual mode</b>
<b>PAL 60 ch</b>	20 ± 2 dBmV/ch	18 ± 1 dBmV/ch
<b>PAL 89 ch</b>	18 ± 2 dBmV/ch	16 ± 1 dBmV/ch
<b>NTSC 80 ch</b>	19 ± 2 dBmV/ch	17 ± 1 dBmV/ch
<b>NTSC 110 ch</b>	17 ± 2 dBmV/ch	15 ± 1 dBmV/ch

#### SNMP Management

<b>Network Port</b>	RJ45-10/100baseTx
<b>MIB</b>	SCTE MIB for HFC optical transmitters, and associated MIBs

#### General

<b>Power supplies</b>	2 slots for redundant and hot-swappable units, AC or DC:AC: 90~265Vac 50~60Hz; DC: 36~72Vdc
<b>Power consumption:</b>	Maximum 65 Watt
<b>Operating temperature</b>	0°C to +45°C
<b>Storage temperature</b>	-20°C to +70°C
<b>Dimensions (H x W x D)</b>	44 x 485 x 381 mm (width includes 19" front panel ears, depth includes, connectors, fans & front panel)
<b>Shipping size (H x W x D)</b>	80 x 600 x 670 mm (107 dm <sup>3</sup> )
<b>Weight</b>	6.0kg
<b>Shipping weight</b>	6.5kg

### Long Haul Fiber Planning

The Stimulated Brillouin Scattering (SBS) suppression of the LTE153-6000 externally-modulated laser transmitter must be optimized for the best possible Composite Second Order (CSO) distortion performance. The selected SBS value must correspond with the projected maximum optical drive level in the fiber lines. For short lines this level can be slightly higher than for very long lines.

A reduced line drive level, together with a reduced SBS suppression threshold in the transmitter, increases the maximum achievable system range. The LTE153-6000 incorporates field-adjustable SBS thresholds. Ensure that the selected level will match the fiber line drive level as close as is practical for best possible performance.

In very long line systems, CSO and Composite Triple Beat (CTB) will be very much affected by fiber dispersion. This is most visible on analog TV channels at the high end of the 45~1003MHz bandwidth. The quality of the applied fibers is very important, and for the best performance these fibers should be dispersion-shifted with minimum dispersion in the 1550 nm region.

Sometimes not all fibers in the route are of the same quality or origin.

Some operators work around this by placing all analog TV channels on lower frequencies below 300~400 MHz or so, and use the higher frequencies for DVB-C (QAM) digital television services. The digital services can withstand a little more noise and distortion on the fiber line than analog services and still deliver satisfactory picture quality.

In addition to range limitations though fiber dispersion, there is also a hard limit in the DOCSIS standards for data turnaround times with cable modems. This demands some extra care when planning very long line systems. PBN can offer solutions by using smaller distributed CMTS units, and run bidirectional Fast Ethernet or Gigabit Ethernet on the same fiber core or on a separate fiber along the same route. Refer to our AOCM product offering for more details. Together with modern Edge-QAM technology and ASI over IP program feeds, some very long distances can be covered without loss of quality. Contact PBN product support for detailed planning of long-line systems.

### Order Details

**LTE153-6000-[VW]-[XYZ]** ..... Laser transmitter, externally modulated, 19" 1RU, with SNMP

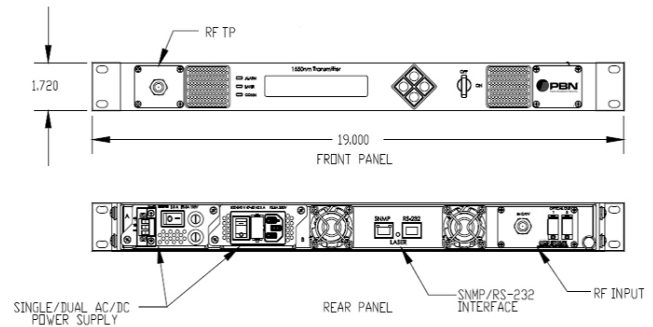
**Options:**

- V Link type**
  - S** 65km
- W Output power**
  - A** 7.0/7.0 for S type
  - D** 10.0/10.0 for S type (Note: Applicable for S link type. CSO port 2 degraded by 1dB for Channel Loads 1 and 2, CSO port 2 degraded by 2dB for Channel Loads 3 and 4. Channel load 1-2 = 80NTSC – 60PAL Channel load 3-4 = 110NTSC and 80 Pal)
- X Optical connectors**
  - 1** SC/APC angle polished connector
- Y Optical wavelength**
  - 00** 1555nm ± 5nm
  - 01** 1550nm ± 5nm
  - xx** ITU DWDM grid channel 18~40 (refer to relevant ITU DWDM standards)

Note: Transmitters operating on ITU grid have increased delivery time up to 4-6 weeks.
- Z Power supply options**

**AC = 90~265 Vac 50~60 Hz, DC = 36~72 Vdc**

  - 3** Dual: AC primary, AC secondary
  - 4** Dual: AC primary, DC secondary
  - 5** Dual: DC primary, DC secondary



### Examples

**LTE153-6000-SA-1013** ..... Laser transmitter, in stand-alone 19" sub rack, 1 RU, externally modulated, optimized for 65km line length, 1550 nm ± 5 nm, 2 x 7 dBm outputs with SC/APC connectors. Dual redundant universal mains AC power supplies. Integrated SNMP.

