



# **SFP-TR10-C1xxx-ER**

Extended reach CWDM 10 gigabit Optical transceiver SFP+

## **User manual**

Rev. B

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## Revision history

Current revision of this document is the uppermost in the table below.

Rev.	Repl.	Date	Sign	Change description
B	A	2019-03-12	OEH	Removing wavelengths 1390-1450
A	-	2015-10-11	AD	Initial revision.

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## 1 Product overview

SFP-TR10-C1xxx-ER is a 10 gigabit SFP+ transceiver that consist of an optical transmitter and an optical receiver. They are available with 14 CWDM wavelengths at 100MHz spacing enabling transport of 14 signals over one single-mode fiber and are well suited for mid/long haul applications.

The SFP+'s have the ability to report information such as wavelength, signal presence, received signal level, launch power and internal temperature. This information is available in some of Nevion's SFP+ based products presented through their respective element management system.



Figure 1: SFP-TR10-C1xxx-ER

## 2 Specifications

Power	< 2W, CWDM
Size	SFP+ compliant, dimensions defined by the SFP+ Multi-Sourcing Agreement (MSA).
Control	Multicon Gyda control and status
Operating case temperature	0 to +70 °C

### Supported standards

Ethernet	10GBASE-ZR/ZW
Fiber Channel	1200-SM-LL-L 10G
SONET	OC-192
SDH	STM S-64
ITU-T	G.709

### Optical input

Connector	LC/UPC single mode
Wavelength	1270nm to 1370, 1470 to 1610nm
Optical budget	14dB
Sensitivity	-15dBm
Overload	-0dBm

### Optical output

Connector	LC/UPC single mode
Center wavelength spacing	20nm (C1xxx $\pm 7,5$ nm)
Extinction ratio	min 3,5dB
Power	-1 to +4dBm

### 3 CWDM fiber characteristics

#### 3.1 Available CWDM wavelengths

Table 1: CWDM wavelengths

Available wavelengths					
1270	1290	1310	1330	1350	1370
				1470	1490
1510	1530	1550	1570	1590	1610

#### 3.2 Expected cable reach

Nevion does not guarantee a specific cable reach, as things like dispersion and attenuation can vary a great deal between different fiber installations. Attenuation and dispersion are also dependent on wavelength. Also, the upper band (wavelengths 1470 to 1610) use a different laser with a narrower spectral width compared to the lower band. For regular G.652 fiber, 1310 nm will see almost zero dispersion, with increasing amount of dispersion for both 1270/1290nm and 1330/1350/1370nm. See Figure 2 for a typical curve of dispersion as experience by the lower and higher band lasers. Dispersion here is adjusted for the lasers typical spectral width.

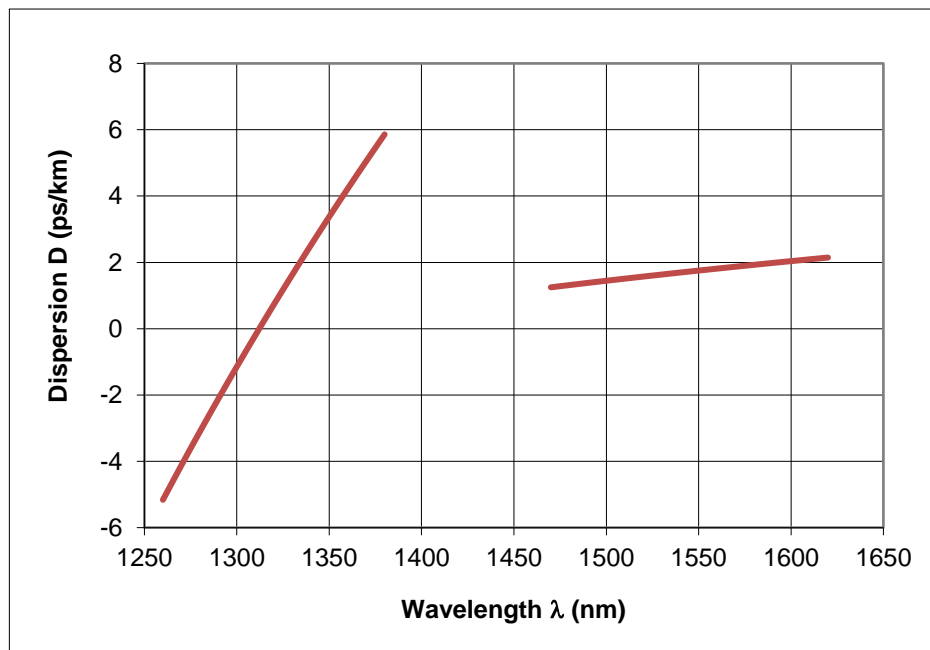
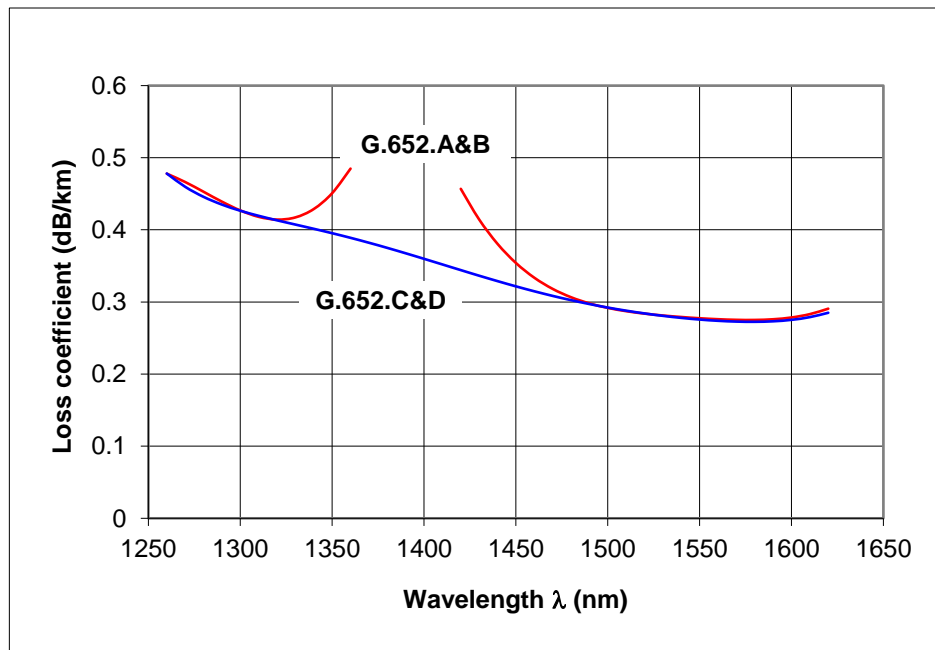


Figure 2: Average chromatic dispersion over wavelength, G.652 fiber

The plot does not include Polarization mode dispersion, which can be quite high in older fiber. The G.652.D specification was released because the high PMD of G.652.C would not accommodate 10G and 25G signals over long fibers, even at near zero chromatic dispersion.

For attenuation, G.652.D fiber has rather high attenuation on 1270, see typical plot curves in Figure 3.



**Figure 3: Attenuation over CWDM band**

The combined effect is that the upper 8 wavelengths will typically go much further on an actual fiber than the lower wavelengths.

When specifying a CWDM system, the following are very useful to get the right setup:

- Type number or specification of the installed fiber (e.g. G.652.D or Corning SMF28e).
- Actual length of fiber (not just distance on map).
- Actual attenuation over several wavelengths.

The latter two can be measured using an OTDR, an Optical Time Domain Reflectometer.

**General environmental requirements for Nevion equipment**

1. The equipment will meet the guaranteed performance specification under the following environmental conditions:
  - Operating room temperature range: 0°C to 70°C
  - Operating relative humidity range: <95% (non-condensing)
2. The equipment will operate without damage under the following environmental conditions:
  - Temperature range: -20°C to 85°C
  - Relative humidity range: <95% (non-condensing)



## **Product Warranty**

The warranty terms and conditions for the product(s) covered by this manual follow the General Sales Conditions by Nevion, which are available on the company web site:

[www.nevion.com](http://www.nevion.com)

## Appendix A Materials declaration and recycling information

### A.1 Materials declaration

For product sold into China after 1st March 2007, we comply with the “Administrative Measure on the Control of Pollution by Electronic Information Products”. In the first stage of this legislation, content of six hazardous materials has to be declared. The table below shows the required information.

組成名稱 Part Name	Toxic or hazardous substances and elements					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
SFP-TR10-C1xxx-ER	O	O	O	O	O	O
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.						
X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.						

This is indicated by the product marking:



### A.2 Recycling information

Nevion provides assistance to customers and recyclers through our web site <http://www.nevion.com/>. Please contact Nevion's Customer Support for assistance with recycling if this site does not show the information you require.

Where it is not possible to return the product to Nevion or its agents for recycling, the following general information may be of assistance:

- Before attempting disassembly, ensure the product is completely disconnected from power and signal connections.
- All major parts are marked or labeled to show their material content.
- Depending on the date of manufacture, this product may contain lead in solder.
- Some circuit boards may contain battery-backed memory devices.