

# 10GBase-BR40-D, +-D, -U, +-U

Proposed specs changes to IEEE802.3cp D1.1

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# Outline

- Introduction
- Current draft and industry de-facto specification comparison
- Link Model
- Summary of proposed key changes
- Vendor Datasheets.

## Introduction

- Products have been on the market for some time designed to address the same applications as 10GBASE-BR10/20/40 is targeting
- For 10GBASE-BR40 there are a number of suppliers that support this reach, but the spec's are different than the current draft
- For the IEEE requirement to have relevance, it should consider specifications that are already deployed and should have a reason to diverge

# Requirements and Industry Specifications Review of 10GBASE-BR40-D

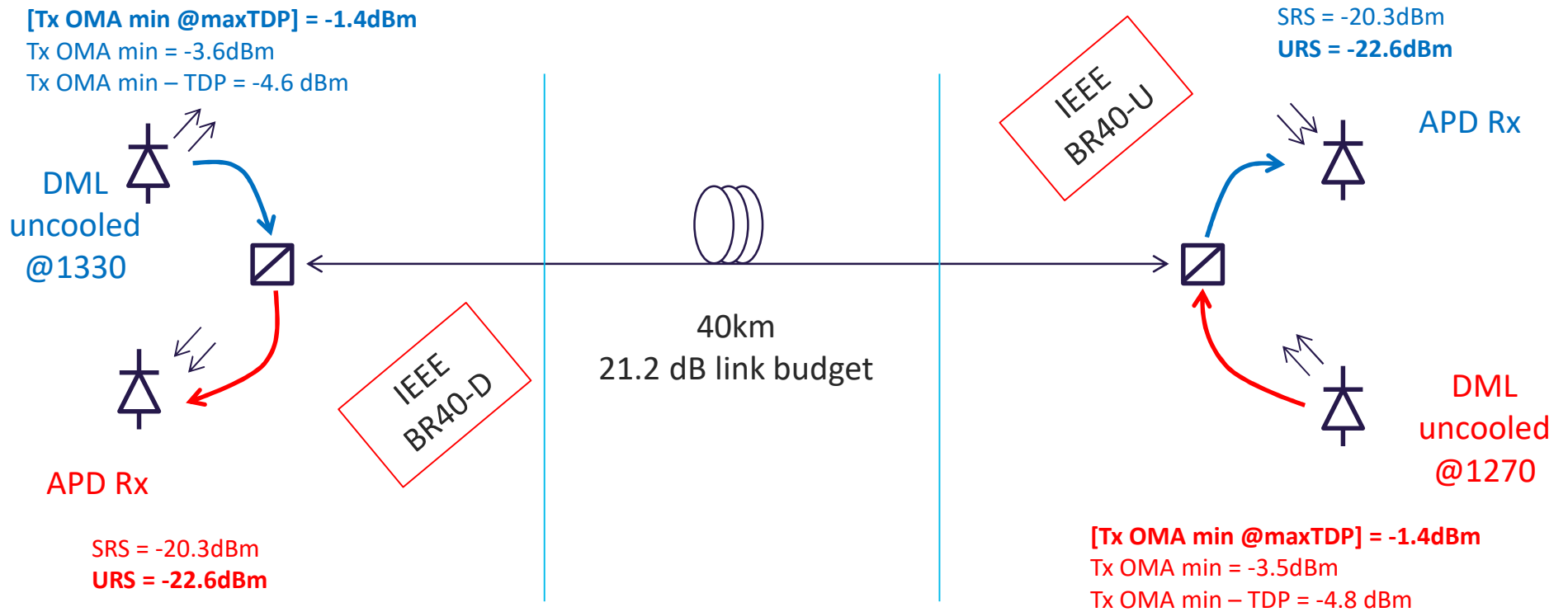
		Cisco	Molex/Oplink	Huawei
10GBASE-BR40-D	Table 158-6	Proposal	TRBCXGKxEx00 0E2G	SFP-10G-ER- SM1310-BiDi
Average Launch Power (Max)	-0.6	5	5	5
Average Launch Power (Min)	-6.6	-2.7	0	0
Launch Power (Min) OMA minus TPD	-4.6	-0.5		
OMA (Min)	-3.6	0.3	0	
Tx and Dispersion Penalty	3	2.6		
Average Launch Power of Off Tx	-30	-30		
Extinction ratio	3	5.5		>3.5
		Cisco	Molex/Oplink	Huawei
10GBASE-BR-D Rx Characteristics	Table 158-8	Proposal	TRBCXGKxEx00 0E2G	SFP-10G-ER- SM1270-BiDi
Average Rx Power (Max)	-5.6	-9	-9	-9
Average Rx Power (Min)	-24.4	-21.2	-21.2	
Max Rx Power (for damage)	4	4		
Rx Sensitivity (max) in OMA	(-22.6)	-19	-19	-18
Receiver Reflectance	-26	-26	-21	
Stressed Rx Sensitivity (Max in OMA)	(-20.3)	-16.8		

# Requirements and Industry Specifications Review of 10GBASE-BR40-U

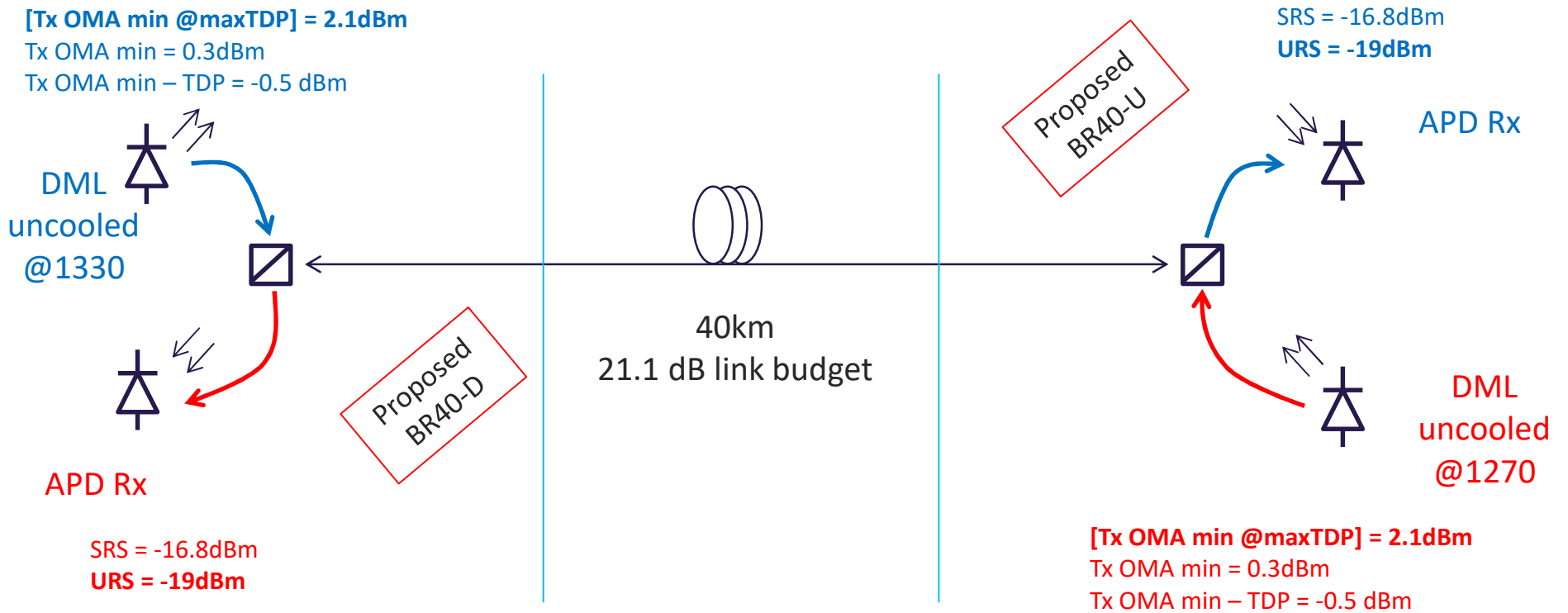
		Cisco	Molex/Oplink	Huawei
10GBASE-BR40-U Tx Characteristics	Table 158-7	Proposal	TRBCXGKxEx00 0E2G	SFP-10G-ER- SM1270-BiDi
Average Launch Power (Max)	4	5	5	5
Average Launch Power (Min)	-6.4	-2.7	0	0
Launch Power (Min) OMA minus TPD	-4.8	-0.5		
OMA (Min)	-3.5	0.3	0	
Tx and Dispersion Penalty (max)	3	2.6		
Average Launch Power of Off Tx	-30	-30		
Extinction ratio	3	5.5		>3.5

		Cisco	Molex/Oplink	Huawei
10GBASE-BR-U Rx Characteristics	Table 158-8	Proposal	TRBCXGKxEx00 0E2G	SFP-10G-ER- SM1270-BiDi
Average Rx Power (Max)	-10	-9	-9	-9
Average Rx Power (Min)	-24.4	-21.2	-21.2	
Max Rx Power (for damage)	4	4		
Rx Sensitivity (max) in OMA	(-22.6)	-19	-19	-18
Receiver Reflectance	-26	-26	-21	
Stressed Rx Sensitivity (Max in OMA)	(-20.3)	-16.8		

# Current Draft Link Budget BR40-D vs -U



# Proposed Link Budget BR40-D vs -U



# Summary of Key Proposed Changes to 10GBASE-BR40-D/U

PID	Lambda (nm)	Reach (km)	Tx OMA min (dBm)	Stressed Sensitivity (dBm)	Unstressed Sensitivity (dBm)	Ch. Insertion loss (dB)	Power budget (dB)
10GBASE-BR40/+ (802.3cp)	1270/1330	40	-3.4	-20.3	-22.6	18	21.2
Proposed changes	1270/1330	40	0.3	-16.8	-19	18.5	21.1



# Huawei

Using the Hardware Configuration Tool to Calculate Power Consumption of Equipment

Wavelength Requirements for Components

Chassis

Power Modules

Battery Modules

Fan Modules

Cards

Cables

Pluggable Modules for Interfaces

- Understanding Optical Modules
- Understanding Copper Modules
- FE SFP/eSFP Optical Modules
- GE eSFP Optical Modules
- GE SFP Copper Modules
- 25G/40G/100G SFP Optical Modules
- 100G SFP+ Optical Modules
- LE265C20P10
- OM3D0001
- OS3D10000
- OS3D10011
- OS3D21000
- SFP-10G-ER-SM1270-BIDI (Single-Fiber-Bidirectional Module)
- SFP-10G-ER-SM1330-BIDI (Single-Fiber-Bidirectional Module)

## SFP-10G-ER-SM1270-BIDI (Single-Fiber-Bidirectional Module)

Table 7-38 Technical specifications

Item	Description
Part number	023118C
Version support	Supported in V100R005C10 and later versions
Transceiver form factor	SFP+
Transmission speed	10GE
Center wavelength (nm)	5/1270/8/1330
Standards compliance	10GBASE-BX
Connector type	LC
Applicable cable and maximum transmission distance	Single-mode fiber (G.652) (with diameter of 9 μm): 40 km
Modal bandwidth	-
Transmit power (dBm)	0 to 5
Maximum receiver sensitivity (dBm)	-18
Overload power (dBm)	-9
Extinction ratio (dB)	≥ 3.5
Operating temperature	0°C to 70°C

Using the Hardware Configuration Tool to Calculate Power Consumption of Equipment

Wavelength Requirements for Components

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Power Modules

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Pluggable Modules for Interfaces

- Important Notes About Using Optical Modules Certified for Huawei Switches
- Understanding Optical Modules
- Understanding Copper Modules
- FE SFP/eSFP Optical Modules
- GE eSFP Optical Modules
- GE CSFP Optical Modules
- GE-CVDM eSFP Optical Modules
- GE-CVDM eSFP Optical Modules (Used Only in the CVDM scenario)
- GE-DWDM eSFP Optical Modules

## SFP-10G-ER-SM1270-BIDI (Single-Fiber-Bidirectional Module)

Table 11-62 Technical specifications

Item	Description
Transceiver form factor	SFP+
Transmission speed	10GE
Center wavelength (nm)	Re: 1330/Tr: 1270
Standards compliance	10GBASE-BX
Connector type	LC
Applicable cable and maximum transmission distance	Single-mode fiber: 40 km
Transmit power (dBm)	0 to 5
Maximum receiver sensitivity (dBm)	-18
Overload power (dBm)	-9
Extinction ratio (dB)	3.5
Operating temperature	0°C to 70°C (32°F to 158°F)
Part number	023118C

NOTE

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<https://support.huawei.com/enterprise/en/doc/EDOC1000019246/96f9d269/sfp-10g-er-sm1330-bidi-single-fiber-bidirectional-module>

<https://support.huawei.com/enterprise/en/doc/EDOC1000019246/ae1cf6e4/sfp-10g-er-sm1270-bidi-single-fiber-bidirectional-module>

# Molex

**Transmitter Performance Characteristics** (Over Operating Case Temperature,  $V_{CC}$  = 3.13 to 3.47V)

Parameter	Symbol	Min	Typ	Max	Units
Data Rate	$B$	2.5	-	10.7	Gb/s
Center Wavelength	Up Stream	1260	1270	1280	nm
	Down Stream	1320	1330	1340	
Spectral Width	$\Delta\lambda_{20}$	-	-	1.0	nm
Average Optical Output Power	$P_{avg}$	0	-	5	dBm
Optical Modulation Amplitude	$P_{OMA}$	0	-	-	dBm
Extinction Ratio	$ER$	5.5	-	-	dB
Relative Intensity Noise	$RIN$	-	-	- 128	dB/Hz
Side Mode Suppression Ratio	$SMSR$	30	-	-	dB
Optical Return Loss Tolerance	-	-	-	- 21	dB
Transmitter and Dispersion Penalty	$TDP$	-	-	3.2	dB
Optical Output Eye <sup>1</sup>	Compliant with IEEE 802.3ae				

<sup>1</sup>Average power figures are informative only, per IEEE 802.3ae.

**Receiver Performance Characteristics** (Over Operating Case Temperature,  $V_{CC}$  = 3.13 to 3.47V)

Parameter	Symbol	Min	Typ	Max	Units
Data Rate	$B$	2.5	-	10.7	Gb/s
Center Wavelength	Up Stream	1320	1330	1340	nm
	Down Stream	1260	1270	1280	
Receiver Sensitivity	$P_{avg}$ @ 10.3125 Gb/s <sup>1</sup>	- 21.2	-	-	dBm
	$P_{OMA}$ @ 10.3125 Gb/s <sup>1</sup>	- 19	-	-	
Maximum Input Power (10 <sup>-12</sup> BER)	$P_{MAX}$	- 9	-	-	dBm
Receiver Reflectance	-	-	-	- 21	dB
LOS Hysteresis	-	0.5	1.5	6	dB
LOS Thresholds	Increasing Light Input	$P_{lo+}$	-	-	dBm
	Decreasing Light Input	$P_{lo-}$	- 40	-	

<sup>1</sup>Specified with BER < 1x10<sup>-12</sup> and PRBS 2<sup>31</sup>-1. Average receive power is informative.

Note: The specified characteristics are met within the recommended range of operation. Unless otherwise noted typical data are quoted at nominal voltage and +25°C ambient temperature.