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Rev. 10/21 Date 7 April 2021

HCS Century Lifetime Warranty

HCS LIFETIME WARRANTY

Lifetime Warranty Coverage

Component Warranty
All HCS components are warranted to be free from manufacturing defects in material or workmanship, under normal and proper use, subject to the terms & conditions of the HCS Component Warranty.

System Performance Warranty
All HCS channels and permanent links are warranted to comply with the category the system is certified to, as indicated in the specific warranty.

Application Assurance Warranty
All HCS networks are warranted to be free from defects which prevent the operation of standards based applications and protocols for the category which the system is certified to, as detailed in the attached Supported Application Table.

This warranty does not cover any Phy-FiXX components, hardware or software.

HCS Definitions

An HCS Certified System is defined as follows:

All the system components must be HCS approved passive connectivity products. Any active equipment, public network interface, or terminal equipment is not covered by the HCS Lifetime Warranty.

The entire system must be installed and commissioned by an authorized HCS Certified Installer.
Other installations are not covered by the HCS Lifetime Warranty.

All equipment used in the installation must be installed and tested in full compliance to the practices specified in the HCS Manuals and documentation, according to relevant standards and with full compliance with the registered category performance.

The entire system must be installed according to the INCREMENTAL INSTALLATION & TESTING PROCEDURE, detailed below.

HCS Performance Commitment

In case a certified HCS channel fails to comply with any of the warranted parameters an HCS expert will evaluate the HCS responsibilities under this warranty and provide the remedies provided herein. Any such repair or replacement shall be warranted under the terms of this warranty. In case the failure is proved to be caused by an HCS component the rectification of the system will be made at no cost to the end user. HCS warranty shall be limited to the supply or repair all components free of charge and HCS shall pay the labor costs associated with system fault diagnosis and rectification.

The HCS Performance Commitment, the HCS Component Warranty, the HCS Performance Warranty and the HCS Application Assurance Quality are void in case the INCREMENTAL INSTALLATION & TESTING PROCEDURE is not followed & documented properly.

Warranty Limitations

This warranty does not cover any Phy-FiXX components, hardware or software.

Only the repair or replacement of elements in a Certified HCS network by HCS or by its designated Certified Installer is provided under this warranty.

This warranty is limited to the original end user for whom it was installed and is not transferable.

This warranty is only applicable to the transmission properties and applications of the category and standard to which the warranted channels or links were tested to, as indicated in the specific warranty. Updates, modifications and revisions of standards published after the date of testing may not be retroactively applied to this warranty.

This warranty is only applicable to Channels and Links that were tested & reported. Failed or non-tested Links or Channels are automatically excluded from the warranty. Channel warranty is not applicable to Link warranty and vise-versa.

This warranty is only applicable to fully ratified and published standards. HCS does not warrant the performance of its links and channels based on draft standard limits, even if they are available in field-test instruments.

HCS makes no other representation or warranty of any other kind, expressed or implied with respect to the components sold hereunder, whether as to merchantability, fitness for a particular purpose or any other matter. Under no circumstances or conditions shall the HCS be liable or responsible for any claim of any buyer for costs, expenses, direct or consequential damages due to the use or misuse of the HCS products.
The limited warranty specified herein, states the exclusive and sole remedy for any breach of warranty by, or any defects in, the products, and is in lieu of all other warranties, express, implied or statutory.

This warranty does not cover failure of any HCS systems or components resulting from actions or events beyond the control of HCS including, without limitation, unauthorized or improper repairs, modifications, misuse, accidents, fire, water damage, excessive radiation and acts of God.

This warranty does not include modular cords and terminated work-area cables.

This warranty shall be expanded only to the extent required by applicable local law.

The HCS sole liability relevant to the HCS Component Warranty is limited to the costs of the HCS components. HCS shall not be liable for any other costs, including but not limited to costs associated with components fault diagnosis, rectification and installation labor.

The Products are not designed, manufactured or intended for use, and should not be used or sold or resold for use, in any applications requiring fail-safe performance of the Products and/or in which a malfunction or a failure of the Products could lead to personal injury or death, or serious physical or environmental damage, including but not limited to applications such as (a) life support machines or other life preserving medical devices or systems; (b) air traffic control or aircraft navigation or communication systems; OR (c) control equipment for nuclear facilities (Collectively, "Restricted Uses"). All Restricted Uses of the Products are strictly prohibited and shall automatically void any warranties or indemnities provided by the supplier, and release HCS from any obligation to provide any support with respect to such Products.
In no event shall HCS's cumulative liability for all claims of whatever kind, in the aggregate, whether such claims are based in contract, indemnity, warranty, tort or otherwise, arising under or in connection herewith, exceed the sum of the total amounts paid by the customer/end user to HCS with respect thereto.
In no event shall HCS be liable for any special, exemplary, indirect, incidental or consequential damages (including loss of use, data, business, revenues, profits or other economic advantage), however caused, arising under or in connection herewith, even if HCS has been advised of the possibility or probability of such damages or that such damages were foreseen, and even if any exclusive remedies provided herein fail of their essential purpose. Without derogating from the above said, in no event shall HCS be liable for any unforeseen damages.
This warranty shall be governed by and construed under the laws of the State of Turkey.

HCS Incremental Installation & Testing Procedure

Each and every HCS site shall be installed according to the INCREMENTAL INSTALLATION & TESTING PROCEDURE, as follows:

1. In any new installation, first install 20-30 links, terminate them and test them as Permanent Links.
In cases where the termination stage is done later, the installer shall temporarily terminate the links with HCS keystone jacks having the same Category as the horizontal cable.
2. Review all the results carefully and verify that all parameters, including but not limited to RL & NEXT, pass with margins of 3 dB minimum over the standard requirements.
3. If all results provide 3dB minimum margin in all parameters you may continue the installation, installing 50 links at a time and testing at least 10% of links installed (5 links minimum in every 50 link batch).
4. In case any link shows margins smaller than of 3 dB stop the installation and check for the reason.
If you cannot find the reason please contact HCS for assistance.
The installation process must not continue until the source of problem is found and all results obtained are above the 3dB minimum margin.
In any case of doubt, question or problem pls contact HCS headquarters for further instruction.
5. All the above pilot tests shall be saved properly, indicating all the relevant details, including time, date and site name, and shall be sent to HCS headquarters for inspection.

HCS Component Warranty

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Component Warranty Coverage

- This warranty covers HCS components sold separately, including HCS cable, connectors and connecting hardware (hereinafter : "HCS Components").
- This warranty does not cover any Phy-FiXX components, hardware or software.
- Warranted HCS Components shall be free from material defects in material and workmanship for a period of thirty-six (36) months following the manufacturing date.
- HCS Components shall meet the prescribed mechanical and transmission specifications described in the HCS most recent Product Catalog published before the manufacturing date.
- All warranties shall be subject to the installation, operation and maintenance practices, testing and environmental conditions described in the relevant standards and HCS manuals.
- This warranty is void in case the INCREMENTAL INSTALLATION & TESTING PROCEDURE is not followed & documented properly.
- The HCS sole liability shall limited to the costs of the HCS components. HCS shall not be liable for any other costs, including but not limited to costs associated with components fault diagnosis, rectification and installation labor.

HCS Definitions

- HCS Components must be HCS approved passive connectivity products. Any active equipment, public network interface, or terminal equipment are not covered by this Warranty.
- The HCS Components must be installed and commissioned by an authorized HCS Certified Installer.
- All equipment used in the installation must be installed and tested in full compliance to the practices specified in the HCS Manuals and documentation, according to relevant standards and with full compliance with the registered category performance.
- The entire system must be installed according to the INCREMENTAL INSTALLATION & TESTING PROCEDURE, detailed below.

HCS Performance Commitment

- In case an HCS components fails to comply with any of the warranted parameters an HCS expert will evaluate the HCS responsibilities under this warranty and provide the remedies provided herein. Any such repair or replacement shall be warranted under the terms of this warranty. In case an HCS Component is proved to be defective it will be replaced at no cost to the end user/customer.
- The HCS Component Warranty is void in case the INCREMENTAL INSTALLATION & TESTING PROCEDURE is not followed & documented properly.

Warranty Limitations

- This warranty is not applicable to any Phy-FiXX products, hardware or software.
- Only the repair or replacement of elements in a Certified HCS network by HCS or by its designated Certified Installer is provided under this warranty.
- This warranty is limited to the original end user for whom it was installed and is not transferable.
- This warranty is only applicable to the transmission properties and applications of the category, standard or draft standard to which the warranted channels or links were tested to, as indicated in the specific warranty. Updates, modifications and revisions of standards published after the date of testing may not be retroactively applied to this warranty.
- This warranty is only applicable to Channels and Links that were tested & reported. Failed or non-tested Links or Channels are automatically excluded from the warranty. Channel warranty is not applicable to Link warranty and vise-versa.
- HCS makes no other representation or warranty of any other kind, expressed or implied with respect to the components sold hereunder, whether as to merchantability, fitness for a particular purpose or any other matter.
The limited warranty specified herein, states the exclusive and sole remedy for any breach of warranty by, or any defects in, the products, and is in lieu of all other warranties, express, implied or statutory.
Under no circumstances or conditions shall the HCS be liable or responsible for any claim of any buyer for costs, expenses, direct or consequential damages due to the use or misuse of the HCS products.
- This warranty does not cover failure of any HCS systems or components resulting from actions or events beyond the control of HCS including, without limitation, unauthorized or improper repairs, modifications, misuse, accidents, fire, water damage, and acts of God.
- This warranty does not include modular cords and terminated work-area cables.
- This warranty shall be expanded only to the extent required by applicable local law.
- The HCS sole liability relevant to the HCS Component Warranty is limited to the costs of the HCS components. HCS shall not be liable for any other costs, including but not limited to costs associated with components fault diagnosis, rectification and installation labor.

HCS Phy-FiXX Warranty

Phy-FiXX Component and Software Warranty Coverage

- This warranty covers Phy-FiXX components and Software , including scanners, panels, terminators and any other component connecting hardware and Software within the Phy-FiXX system (hereinafter : "Phy-FiXX Components").
- The Supplier does not warrant that the Phy-FiXX software components shall be error free.
- Warranted Phy-FiXX hardware components (i.e., scanners, panels, terminators and or any other hardware component within the Phy-FiXX system) shall be free from defects in material and workmanship for a period of twelve (12) months following the manufacturing date.
- All warranties shall be subject to the installation, operation and maintenance practices, testing and environmental conditions described in the relevant standards and HCS manuals.
- This warranty is void in case the INCREMENTAL INSTALLATION & TESTING PROCEDURE is not followed & documented properly.
- The HCS sole liability shall limited to the costs of the Phy-FiXX components. HCS shall not be liable for any other costs, including but not limited to costs associated with components fault diagnosis, rectification and installation labor.

HCS Definitions

- Phy-FiXX Components must be HCS approved passive connectivity and software products. Any active equipment, public network interface, or terminal equipment are not covered by this Warranty.
- The Phy-FiXX Components must be installed and commissioned by an authorized HCS Certified Installer.
- All equipment used in the installation must be installed and tested in full compliance to the practices specified in the HCS Manuals, according to relevant standards and with full compliance with the registered category performance.
- The entire system must be installed according to the INCREMENTAL INSTALLATION & TESTING PROCEDURE, detailed below.

HCS Performance Commitment

- In case an Phy-FiXX Components fails to comply with any of the warranted parameters an HCS expert will evaluate the HCS responsibilities under this warranty and provide the remedies promised herein. Any such repair or replacement shall be warranted under the terms of this warranty. In case an HCS Component is proved to be defective it will be replaced at no cost to the end user
- The HCS Component Warranty is void in case the INCREMENTAL INSTALLATION & TESTING PROCEDURE is not followed & documented properly.

Warranty Limitations

- This warranty is not applicable to any Phy-FiXX software bugs and errors.
- This warenty do not cover and will not be aplicable to any phy-fixx system that is connected to active equipmet such as switch , PC , and or any other switcing device ,or user device or any other device connected to the phy-fixx system that is not competible with the phy-fixx system limitation.
- Only the repair or replacement of elements in a Certified HCS network by HCS or by its designated Certified Installer is provided under this warranty.
- This warranty is limited to the original end user for whom it was installed and is not transferable and is valid for period of 12 month from the date the Phy-FiXX hardware components were sold by HCS
- This warranty is only applicable to the transmission properties and applications of the category, standard or draft standard to which the warranted channels or links were tested to, as indicated in the specific warranty. Updates, modifications and revisions of standards published after the date of testing may not be retroactively applied to this warranty.
- This warranty is only applicable to Channels and Links that were tested & reported. Failed or non-tested Links or Channels are automatically excluded from the warranty. Channel warranty is not applicable to Link warranty and vise-versa.
- HCS makes no other representation or warranty of any other kind, expressed or implied with respect to the components sold hereunder, whether as to merchantability, fitness for a particular purpose or any other matter. The limited warranty specified herein, states the exclusive and sole remedy for any breach of warranty by, or any defects in, the products, and is in lieu of all other warranties, express, implied or statutory.
  Under no circumstances or conditions shall the HCS be liable or responsible for any claim of any buyer for costs, expenses, direct or consequential damages due to the use or misuse of the HCS products.
- This warranty does not cover failure of any Phy-FiXX Components resulting from software errors and actions or events beyond the control of HCS including, without limitation, unauthorized or improper repairs, modifications, misuse, accidents, fire, water damage, and acts of God.
- This warranty does not include modular cords and terminated work-area cables.
- This warranty shall be expanded only to the extent required by applicable local law.
- The HCS sole liability relevant to the Phy-FiXX Components Warranty is limited to the costs of the Phy-FiXX Components. HCS shall not be liable for any other costs, including but not limited to costs associated with components fault diagnosis, rectification and installation labor.

General Terms

The Phy-FiXX Components are not designed, manufactured or intended for use, and should not be used or sold or resold for use, in any applications requiring fail-safe performance of the Phy-FiXX Components and/or in which a malfunction or a failure of the Phy-FiXX Components could lead to personal injury or death, or serious physical or environmental damage, including but not limited to applications such as (a) life support machines or other life preserving medical devices or systems; (b) air traffic control or aircraft navigation or communication systems; OR (c) control equipment for nuclear facilities (Collectively, "Restricted Uses"). All Restricted Uses of the Phy-FiXX Components are strictly prohibited and shall automatically void any warranties or indemnities provided by HCS, and release HCS from any obligation to provide any support with respect to such Phy-FiXX Components.
THE LIMITED WARRANTIES SET FORTH ABOVE SHALL NOT APPLY TO THE EXTENT THAT FAILURE OF THE Phy-FiXX COMPONENTS, PRODUCTS OR THE PRODUCT SOFTWARE COMPONENTS IS DUE TO CUSTOMER/END USER MODIFICATION OR ALTERATION OF THE PRODUCTS WITHOUT HCS'S WRITTEN CONSENT OR FROM ANY ACCIDENT, ABUSE, UNAUTHORIZED USE OR MISAPPLICATION.
EXCEPT FOR THE WARRANTIES SET FORTH IN THIS SECTION, THE PHY-FIXX COMPONENTS ARE PROVIDED, AND THE PHY-FIXX COMPONENTS ARE LICENSED, "AS IS", AND HCS DISCLAIMS ANY AND ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OR ANY WARRANTY INCLUDED IN THE DOCUMENTATION PROVIDED TO THE CUSTOMERS/END USERS (INCLUDING SUCH DOCUMENTATION REVIEWED BY HCS). FURTHERMORE, HCS DOES NO PROVIDE ANY WARRANTY AS TO THE PHY-FIXX SOFTWARE COMPONENTS, INCLUDING WITH RESPECT TO BUGS, ERRORS OR OTHER MALFUNCTIONS OF THE PHY-FIXX SOFTWARE COMPONENTS. THIS DISCLAIMER OF WARRANTY CONSTITUTES AN ESSENTIAL PART OF THIS WARENTY. CUSTOMER/END USER ACKNOWLEDGES THAT THE PHY-FIXX SOFTWARE COMPONENTS MAY INCLUDE BUGS AND OTHER ERRORS.
In no event shall HCS's cumulative liability for all claims of whatever kind, in the aggregate, whether such claims are based in contract, indemnity, warranty, tort or otherwise, arising under or in connection herewith, exceed the sum of the total amounts paid by the customer/end user to HCS with respect thereto.

In no event shall HCS be liable for any special, exemplary, indirect, incidental or consequential damages (including loss of use, data, business, revenues, profits or other economic advantage), however caused, arising under or in connection herewith, even if HCS has been advised of the possibility or probability of such damages or that such damages were foreseen, and even if any exclusive remedies provided herein fail of their essential purpose. Without derogating from the above said, in no event shall HCS be liable for any unforeseen damages.

This warranty shall be governed by and construed under the laws of the State of Turkey.

Attachments:
ANNEX A: HCS supported applications

ANNEX A

HCS Cabling Systems Supported Applications

Applications using balanced copper cabling

Application	Specification reference	Date	Additional name / reference
Applications supported by HCS DataLink 16 up to DataLink 2000			
PBX	National requirements		
X.21	ITU-T Rec. X.21	1992	
V.11	ITU-T Rec. X.21	1996	
Applications supported by HCS DataLink 16 up to DataLink 2000			
S0-Bus (extended)	ITU-T Rec. I.430	1993	ISDN Basic Access (Physical Layer)
S0 Point-to-Point	ITU-T Rec. I.430	1993	ISD2 Basic Access (Physical Layer)
S1/S2	ITU-T Rec. I.431	1993	ISDN Primary Access (Physical Layer)
Applications supported by HCS DataLink 16 up to DataLink 2000			
Ethernet 10BASE-T	ISO/IEC/IEEE 8802-3:2017, Clause 14	2005	10M Ethernet over Twisted Pairs
Applications supported by HCS DataLink 100 up to DataLink 2000			
Ethernet 100BASE-TX[a,b]	ISO/IEC/IEEE 8802-3:2017, Clause 25	2005	100M Ethernet over Twisted Pairs
PoE Type 1	ISO/IEC/IEEE 8802-3:2017, Clause 33	2015	Power over Ethernet
Applications supported by HCS DataLink 100e up to DataLink 2000			
Ethernet 1000BASE-T	ISO/IEC/IEEE 8802-3:2017, Clause 40	2005	Gigabit Ethernet over Twisted Pairs
Fibre Channel 1 Gbit/s	ISO/IEC 14165-115	2007	Twisted-pair Fibre Channel 1G
Firewire 100 Mbit/s	IEEE 1394b	2002	Firewire/Category 5
PoE Type 2	ISO/IEC IEEE 8802-3:2017, Clause 33	2015	Power over Ethernet
PoE Type 3	IEEE 802.3bt:2018, Clause 33	2018	Power over Ethernet, IEEE 802.3bt
PoE Type 4	IEEE 802.3bt:2018, Clause 33	2018	Power over Ethernet, IEEE 802.3bt
Applications supported by HCS DataLink 500A up to DataLink 2000			
Ethernet 2.5GBASE-T	IEEE 802.3bz:2016, Clause 126	2016	2.5 Gigabit Ethernet over Twisted Pairs, IEEE 802.3bz
Ethernet 5GBASE-T	IEEE 802.3bz:2016, Clause 126	2016	5 Gigabit Ethernet over Twisted Pairs, IEEE 802.3bz
Ethernet 10GBASE-T	ISO/IEC/IEEE 8802-3:2017, Clause 55	2006	10 Gigabit Ethernet over Twisted Pairs
Fibre Channel 2 Gbit/s	INCITS 435	2007	Twisted-pair FC 2G-FCBASE-T
Fibre Channel 4 Gbit/s	INCITS 435	2007	Twisted-pair FC 4G-FCBASE-T
Multimedia distribution	IEEE 1911.2	2015	HDBaseT
Applications supported by HCS DataLink DataLink 2000			
Ethernet 25GBASE-T	IEEE 802.3bq:2016, Clause 113	2016	25 Gigabit Ethernet over Twisted Pairs, IEEE 802.3bq
Ethernet 40GBASE-T	IEEE 802.3bq:2016, Clause 113	2016	40 Gigabit Ethernet over Twisted Pairs, IEEE 802.3bq

Maximum channel attenuation for supported applications using optical fiber cabling

Network application	Max. channel attenuation dB		
	Multimode		Single-mode
	850 nm	1 300 nm	1 310 nm
ISO/IEC/IEEE 8802-3:2017, Clause 9: FOIRL	6,8	–	–
ISO/IEC/IEEE 8802-3:2017, Clauses 15-18: 10BASE-FLand FB	6,8	–	–
ISO/IEC/IEEE 8802-3:2017, Clause 38: 1000BASE-SX [a]	3,56	–	–
ISO/IEC/IEEE 8802-3:2017, Clause 38: 1000BASE-LX [a]	–	2,35	4,56
ISO/IEC/IEEE 8802-3:2017, Clause 26: 100BASE-FX	–	6,0	–
ISO/IEC/IEEE 8802-3:2017, Clause 53: 10GBASE-LX4 [a]	–	2,00	6,20
ISO/IEC/IEEE 8802-3:2017, Clause 68: 10GBASE-LRM [a]	–	1,9	–
ISO/IEC/IEEE 8802-3:2017, Clause 52: 10GBASE-ER	–	–	10,9
ISO/IEC/IEEE 8802-3:2017, Clause 52: 10GBASE-SR [a]	2,60 (OM3) 2,90 (OM4/5)	–	–
ISO/IEC/IEEE 8802-3:2017, Clause 52: 10GBASE-LR	–	–	6,20
ISO/IEC/IEEE 8802-3:2017, Clause 86: 40GBASE-SR4 [a, b]	1,9 (OM3) 1,5 (OM4/5)	–	–
ISO/IEC/IEEE 8802-3:2017, Clause 87: 40GBASE-LR4	–	–	6,7
ISO/IEC/IEEE 8802-3:2017, Clause 89: 40GBASE-FR			4,0
ISO/IEC/IEEE 8802-3:2017, Clause 95: 100GBASE-SR4 [a, b]	1,8 (OM3) 1,9 (OM4/5)	–	–
ISO/IEC/IEEE 8802-3:2017, Clause 86: 100GBASE-SR10 [a, b]	1,9 (OM3) 1,5 (OM4/5)	–	–
ISO/IEC/IEEE 8802-3:2017, Clause 88: 100GBASE-LR4	–	–	6,3
ISO/IEC/IEEE 8802-3:2017, Clause 88: 100GBASE-ER4	–	–	18,0
1 Gbit/s FC (1,062 5 GBd) [a]	2,62 (OM3)	–	7,8
2 Gbit/s FC (2,125 GBd) [a]	3,31 (OM3)	–	7,8
4 Gbit/s FC (4,25 GBd) [a]	2,88 (OM3) 2,95 (OM4/5)	–	4,8
8 Gbit/s FC (8,5 GBd) [a]	2,04 (OM3) 2,19 (OM4/5)	–	6,4
16 Gbit/s FC (14,025 GBd) [a]	1,86 (OM3) 1,95 (OM4/5)	–	6,4
32 Gbit/s FC [a]	1,75 (OM3) 1,86 (OM4/5)	–	6,4

[a] A bandwidth-limited application at the channel lengths shown. The use of lower attenuation components to produce channels exceeding the values shown cannot be recommended.

[b] These are multi-fibre applications and are subject to a delay skew requirement which is met by design if all the optical fibres providing a channel transverse the same cable and cord sheaths from end-to-end.

Maximum channel lengths supported by optical fiber applications for multimode optical fiber

Network application	Nominal transmission wavelength nm	Maximum channel length m
		50/125 µm optical fibre
ISO/IEC/IEEE 8802-3:2017, Clause 9: FOIRL	850	514
ISO/IEC/IEEE 8802-3:2017, Clauses 15-18:10BASE-FL & FB	850	1 514
ISO/IEC/IEEE 8802-3:2017, Clause 38: 1000BASE-SX [b]	850	550
ISO/IEC/IEEE 8802-3:2017, Clause 52: 10GBASE-SR [b]	850	300[a], 400[c]
ISO/IEC/IEEE 8802-3:2017, Clause 86: 40GBASE-SR4 [b, e]	850	100[a], 150[d]
ISO/IEC/IEEE 8802-3:2017, Clause 95: 100GBASE-SR4 [b, e]	850	70[a], 100[d]
ISO/IEC/IEEE 8802-3:2017, Clause 86: 100GBASE-SR10 [b, e]	850	100[a], 150[d]
1 Gbit/s FC (1,062 5 GBd) [b]	850	500
2 Gbit/s FC (2,125 GBd) [b]	850	300
4 Gbit/s FC (4,25 GBd) [b]	850	380 [a], 400 [c]
8 Gbit/s FC (8,5 GBd) [b]	850	150 [a], 190 [c]
16 Gbit/s FC (14,025 GBd) [b]	850	100 [a], 125 [c]
32 Gbit/s FC [b]	850	70 [a], 100 [c]
ISO/IEC/IEEE 8802-3:2017, Clause 26: 100BASE-FX	1 300	2 000
ISO/IEC/IEEE 8802-3:2017, Clause 38: 1000BASE-LX [b]	1 300	550
ISO/IEC/IEEE 8802-3:2017, Clause 53: 10GBASE-LX4 [b]	1 300	300
ISO/IEC/IEEE 8802-3:2017, Clause 68: 10GBASE-LRM [b]	1 300	220

[a] Minimum cabled optical fibre performance of Category OM3 is specified.

[b] These applications are bandwidth limited at the channel lengths shown. The use of lower attenuation components to produce channels exceeding the values shown cannot be recommended.

[c] Minimum cabled optical fibre performance of Category OM4 & OM5 is specified.

[d] Minimum cabled optical fibre performance of Category OM4 & OM5 is specified (subject to a maximum total connecting hardware loss of 1,0 dB).

[e] These are multi-fibre applications and are subject to a delay skew requirement which is met by design if all the optical fibres providing a channel transverse the same cable and cord sheaths from end-to-end.

Data rates and distances supported by multimode fibers

Data Rate Gbps	Standard Application	Wavelength nm	Maximum transmission distance meter			
			OM2	OM3	OM4	OM5
10	10GBASE-SR	850	82	300	550	550
25	25GBASE-SR	850	n/s	70	100	100
40	40GBASE-SR4	850	n/s	100	150	150
100	100GBASE-SR4	850	n/s	70	100	100
	100GBASE-SR10	850	n/s	100	150	150
400	400GBASE-SR16	850	n/s	70	100	100
	400GBASE-SR8	850	n/s	70	100	100
	400GBASE-SR4.2	850 & 910	n/s	70	100	150

Maximum channel length supported by optical fiber applications for single-mode optical fiber

Network application	Nominal transmission wavelength nm	Maximum channel length m
ISO/IEC/IEEE 8802-3:2017, Clause 38: 1000BASE-LX	1 310	2 000
ISO/IEC/IEEE 8802-3:2017, Clause 87: 40GBASE-LR4	1 310	2 000
ISO/IEC/IEEE 8802-3:2017, Clause 88: 100GBASE-LR4	1 310	2 000
1 Gbit/s/s FC (1,062 5 GBd)	1 310	2 000
2 Gbit/s/s FC (2,125 GBd)	1 310	2 000
4 Gbit/s/s FC (4,25 GBd)	1 310	2 000
8 Gbit/s/s (8,5 GBd)	1 310	2 000
16 Gbit/s/s (14,025 GBd)	1 310	2 000
32 Gbit/s/s (28,05 Gbd)	1 310	2 000
10 Gbit/s/s FC (10,518 75 Gbd)	1 310	2 000
ISO/IEC/IEEE 8802-3:2017, Clause 52: 10GBASE-LR/LW	1 310	2 000
1 Gbit/s/s FC	1 550	2 000
2 Gbit/s/s FC	1 550	2 000
ISO/IEC/IEEE 8802-3:2017, Clause 52: 10GBASE-ER/EW	1 550	2 000
ISO/IEC/IEEE 8802-3:2017, Clause 88: 100GBASE-ER4	1 550	2 000
ISO/IEC/IEEE 8802-3:2017, Clause 89: 40GBASE-FR	1 550	2 000