

Vodafone

Specification for the Network Termination Point in Passive Optical Networks (PON)

Network and Provisioning requirements

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Foreword

This interface specification is designed to describe the functioning of the interface at the Network Termination Point in Passive Optical Network Environments.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**", and "**cannot**" are to be used.

"**must**" and "**must not**" are **NOT** allowed in deliverables except when used in the direct citation.

1 Scope

This interface specification describes and specifies the main characteristics of the dedicated data interface in the

Vodafone PON at the user's network termination point. This interface specification describes the typical limits or values within which the network characteristics can remain for networks built according to relevant specifications at installation time.

The interface specification does not apply under abnormal operating conditions such as:

- operating conditions arising as a result of operating services other than specified over the dedicated data interface;
- operating conditions arising as a result of a fault, maintenance and construction work or to minimize the extent of interruption of service;
- operating conditions arising as a result of force majeure or party third-party interference;
- operating conditions arising as a result of test signal injection governed by regulation;
- in case of non-compliance of a network user's installation or non-compliance of equipment with the relevant standards or non-compliance with the technical requirements for connection established either by this interface specification or the public authorities, including the applicable limits for electromagnetic compatibility.

The characteristics given in this interface specification are intended to derive and specify equipment requirements to connect them to the dedicated data interface. The values in this interface specification take precedence over provisions in equipment product standards and installation standards. The given characteristics are not intended to be used as electromagnetic compatibility levels or user emission limits in the network.

This interface specification may be changed at any time to reflect changes made to the network as required by law. Anyone using this specification is requested to regularly check for the newest version on the respective website as published by BNetzA. This standard may be superseded in total or part by the terms of a contract between an individual user of this specification and Vodafone.

2 Normative References

[1] IEEE 802.3 IEEE Standard for Ethernet

[2] IEEE Standard for Local and Metropolitan Area Networks - System Considerations for Multi-segment 10 Mb/S Baseband Networks (Section 13) and Twisted-Pair Medium Attachment Unit (MAU) and Baseband Medium, Type 10BASE-T

[3] IEEE Standards for Local and Metropolitan Area Networks: Supplement - Media Access Control (MAC) Parameters, Physical Layer, Medium Attachment Units, and Repeater for 100Mb/s Operation, Type 100BASE-T

[4] IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan Area Networks - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications - Physical Layer Parameters and Specifications for 1000 Mb/s Operation over four pair of Category 5 Balanced Copper Cabling, Type 1000BASE-T

[5] RFC2833 RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals

[6] ITU-T G.711 Pulse code modulation (PCM) of voice frequencies

3 Definitions, symbols and abbreviations

ONT: Optical network termination at subscriber locations intended for use in conveying data

PON: Passive optical network

Customer/subscriber: human being or organization that accesses the network to communicate via the services provided by the network

downstream: direction of transmission from the headend to the subscriber

upstream: direction of transmission from the subscriber to the headend

layer: subdivision of the Open System Interconnection (OSI) architecture, constituted by subsystems of the same rank

NTP: network termination point, customer-sited terminal

terminal: equipment connected to a telecommunication network to provide access to one or more specific services

4 Physical Interface Requirements

The following describes the physical interface requirements at the NTP:

The device needs to support a Standard Ethernet Interface with 10/100/1000 Base-T transmission as an electric outlet of the ONT.

The plug needs to be a "Registered Jack" Type: RJ-45

[1] compatible with "Auto MDI-X" (Automatic Medium Dependent Interface Crossover) functionality and „Autonegotiation“ / “Autosensing. “

Cable lengths supported: >100 m

Ethernet speed (10 Mbit/s) [2]

Fast Ethernet speed (100 Mbit/s) [3]

Gigabit Ethernet speed (1000 Mbit/s) [4]

PIN	Name	Description
1	TX+	Send DATA+
2	TX-	Send DATA-
3	RX+	Receive DATA+
4	(na)	n/a
5	(na)	n/a
6	RX-	Receive DATA-
7	(na)	n/a
8	(na)	n/a

1000Base-T		
PIN	Name	Description
1	BI DA+	Bidirectional DA+
2	BI DA-	Bidirectional DA-
3	BI DB+	Bidirectional DB+
4	BI DC+	Bidirectional DC+
5	BI DC-	Bidirectional DC-
6	BI DB-	Bidirectional DB-
7	BI DD+	Bidirectional DD+
8	BI DD-	Bidirectional DD-

5 CPE requirements

WAN interface

The following requirements regarding the WAN interface apply:

- 1000/100/10Base-T RJ-45 port
- VLAN tagging (802.1q single tagged, depending on the product following values need to be supported: 7, 132)
- PPPoE client (PPPoE CHAP)
- IPV4 only
- IPV4/IPV6 dual stack
- IPV6 CG NAT
- IPV6 DS-Lite

QoS

The following requirements regarding QoS signalling apply:

- Voice (P-Bit 5, ToS= EF)
- Internet (P-Bit=0, ToS=BE), LCP (P-Bit=4))

Voice

The following requirements regarding the Voice services interface apply:

- SIP-based Voice-over-IP
- G.711 A-law/ μ -law codec
- Line Echo Cancellation
- DTMF transmission: In-band, [5]
- SIP-Info

History

Document history

<Version>	<Date>	<Milestone>
1.0	2023-03-17	Initial Version