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SERIES G: TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

Access networks – In premises networks

Unified high-speed wire-line based home networking transceivers - management specification

Amendment 1

CAUTION !
PREPUBLISHED RECOMMENDATION

This prepublication is an unedited version of a recently approved Recommendation. It will be replaced by the published version after editing. Therefore, there will be differences between this prepublication and the published version.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU [had/had not] received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

Amendment 1 to Recommendation ITU-T G.9962 (2013)

Unified high-speed wire-line based home networking transceivers - management specification: Amendment 1

Summary

Amendment 1 to Recommendation ITU-T G.9962 (2013) adds diagnostic facilities.

Amendment 1 to Recommendation ITU-T G.9962 (2013)

Unified high-speed wire-line based home networking transceivers - management specification: Amendment 1

1. Revise the text of §7.1 "G.hn information" as follows:

7.1   G.hn information

Table 7-1 specifies management parameters pertaining to a G.hn interface (i.e node). The base object, G.hn is the root object of the G.996x MIB that may include several G.hn interfaces. These parameters are applicable to all nodes.

Table 7-1 – G.996x information (G.hn)

Name	Type	R/W	Description
InterfaceNumberOfEntries	unsignedInt	R	The number of entries in the Interface table.
Interface{i}	Object	-	G.hn interface object (see clause 7.2)
Diagnostics	Object	-	G.hn Diagnostics object (see clause 7.8)

2. Insert text for new §7.8 "Diagnostics" and its sub-clauses as follows:

7.8   Diagnostics

Table 7-15 specifies the G.hn diagnostics object. The base object Diagnostics is a member of the root object G.hn.

Table 7-15 – Diagnostics information

Name	Type	R/W	Description
DiagnoseMACAddress	hexBinary(6)	R/W	MAC address of the originating G.hn interface of the link that is being diagnosed. See clause 7.8.1
Interface	unsignedInt	R/W	G.hn interface that is being diagnose. See clause 7.8.2
PHYThroughput	object	-	See clause 7.9
Performance Monitoring	object	-	See clause 7.11

7.8.1 DiagnoseMACAddress

This parameter represents the MAC address of the originating G.hn interface of the link that is being diagnosed.

NOTE: This MAC address may belong to another node of the domain

7.8.2 Interface

This parameter represents the G.hn interface of the device over which the diagnosis is performed.

3. Insert text for new §7.9 "PHYThroughput information" and its sub-clauses as follows:

7.9 PHYThroughput information

Table 7-16 specifies the PHYThroughput object. The base object PHYThroughput is a member of the object diagnostics.

Table 7-16 – PHYThroughput information

Name	Type	R/W	Description
Diagnosis State	String(32)	R/W	Indicates availability of diagnostics data. See clause 7.9.1
ResultNumberOfEntries	unsignedInt	R	The number of entries in the PhyThroughputResult table
PhyThroughputResult{i}	object	-	PhyThroughputResult object (see clause 7.10)

7.9.1 DiagnosticsState

This parameter indicates availability of diagnostic data for PHYThroughput measurements. It shall be formatted according to Table 7-17

Table 7-17 – Valid values of DiagnosticsState

Value	Description
None	No Diagnostic State is available
Requested	Diagnostic information has been requested but it is still not available
Completed	Diagnostic information has been requested and is available
Error	Error during test

If the ACS sets the value of this parameter to Requested, the node shall initiate the corresponding diagnostic test. When writing, the only allowed value is Requested. To ensure the use of the proper test parameters (the writable parameters in Diagnostics object), the test parameters shall be set either prior to or at the same time as setting the DiagnosticsState to Requested.

When the test is completed, the value of this parameter shall be either Complete (if the test completed successfully), or one of the Error values listed above.

After the diagnostic is complete, the value of all result parameters (all read-only parameters in Diagnostics object) shall be retained by the node until either this diagnostic is run again, or the node reboots. After a reboot, if the node has not retained the result parameters from the most recent test, it shall set the value of this parameter to None.

7.9.2   ResultNumberOfEntries

This parameter represents the number of entries *i* in the PHYThroughput[*i*] table, which contains the PHYThroughput information associated with each of the G.hn interfaces connected to G.hn interface being diagnosed. The clause 7.11 specifies these management parameters.

4. Insert text for new §7.10 "PHYThroughputResult information" and its sub-clauses as follows:

7.10 PHYThroughputResult information

Table 7-18 specifies the PHY throughput measurement results for a given link for the G.hn interface being diagnosed. These parameters are applicable to all nodes.

Table 7-18 – PHYThroughputResult information

Name	Type	R/W	Description
LinkState	String(32)	R	Indicates the state of the link between the G.hn Interface with MAC address DiagnoseMACAddress and the G.hn Interface with MAC address DestinationMACAddress. See clause 7.10.1
DestinationMACAddress	hexBinary(6)	R	MAC address of the destination node of the link being measured. See clause 7.10.2
TxPhyRate	unsignedInt	R	PHY data rate in transmit direction in the link between the originating G.hn interface of the link being diagnosed and the G.hn Interface with MAC address DestinationMACAddress. See clause 7.10.3
RxPhyRate	unsignedInt	R	PHY data rate in receive direction in the link between the originating G.hn interface of the link being diagnosed and the G.hn Interface with MAC address DestinationMACAddress. See clause 7.10.4

7.10.1 LinkState

This parameter indicates the state of the link under test. It shall be formatted according to Table 7-19

Table 7-19 – Valid values of LinkState

Value	Description
Direct	There is a direct link between G.hn Inteface with MAC address DiagnoseMACAddress and G.hn Inteface with MAC address DestinationMACAddress
NonDirect	There is no direct link between G.hn Inteface with MAC address DiagnoseMACAddress and G.hn Inteface with MAC address

DestinationMACAddress (e.g. the link between the two nodes is through relay)		

7.10.2 DestinationMACAddress

This parameter represents the node MAC address, denoted as REGID in [ITU-T G.9961] of the destination node of the link being measured

7.10.3 TxPhyRate

This parameter represents the maximum PHY data rate that the node with MAC address DiagnoseMACAddress is capable of transmitting to the node with MAC address DestinationMACAddress. It shall be formatted as BitsPerSecond, defined in Note 1 to Table 8-48 of [ITU-T G.9961].

7.10.4 RxPhyRate

This parameter represents the maximum PHY data rate that the node with MAC address DiagnoseMACAddress is capable of receiving from the node with MAC address DestinationMACAddress. It shall be formatted as BitsPerSecond, defined in Note 1 to Table 8-48 of [ITU-T G.9961].

5. Insert text for new §7.11 "Performance Monitoring information" and its sub-clauses as follows:

7.11 Performance Monitoring information

Table 7-20 specifies the PerformanceMonitoring object. The base object PerformanceMonitoring is a member of the object diagnostics.

Table 7-20 – PerformanceMonitoring information

Name	Type	R/W	Description
Diagnosis State	String(32)	R/W	Indicates availability of diagnostics data. See clause 7.11.1. The rest of Read-only parameters in this table are not valid when Diagnosis State is either in "None" or "Error" state
SampleInterval	unsignedInt	R/W	Time in seconds between automatic collection of performance monitoring data. A value of zero disables automatic collection of data. See clause 7.11.2
CurrentStart	dateTime	R	Start time for the current interval. See clause 7.11.3.
CurrentEnd	dateTime	R	Start time for the current interval. See clause

			7.11.4
NodesNumberOfEntries	unsignedInt	R	The number of entries in the NodesResult_table. See clause 7.11.5
Node{i}	object	-	Node object (see clause 7.12)
SNRGroupLength	unsignedInt	R/W	Length of the group of SNR values for channel object. See clause 7.11.7
ChannelsNumberOfEntries	unsignedInt	R	The number of entries in the ChannelsResult_table. See clause 7.11.6
Channel{i}	object	-	Channel object (see clause 7.13)

7.11.1 DiagnosticsState

This parameter shall be formatted according to Table 7-21

Table 7-21 – Valid values of DiagnosticsState

Value	Description
None	No Diagnostic State is available
Requested	Diagnostic information has been requested but it is still not available
Completed	Diagnostic information has been requested and is available
Error	Error during test

If the ACS sets the value of this parameter to Requested, the node shall initiate the corresponding diagnostic test. When writing, the only allowed value is Requested. To ensure the use of the proper test parameters (the writable parameters in Diagnostics object), the test parameters shall be set either prior to or at the same time as setting the DiagnosticsState to Requested.

When the test is completed, the value of this parameter shall be either Complete (if the test completed successfully), or one of the Error values listed above.

After the diagnostic is complete, the value of all result parameters (all read-only parameters in Diagnostics object) shall be retained by the node until either this diagnostic is run again, or the node reboots. After a reboot, if the node has not retained the result parameters from the most recent test, it shall set the value of this parameter to None.

7.11.2 SampleInterval

Time in seconds between automatic collection of performance monitoring data. A value of zero disables automatic collection of data.

The node may impose a minimum sample interval, in which case an attempt to set a (non-zero) interval that is less than this minimum shall set the interval to the minimum and shall not be regarded as an error.

If SampleInterval is a simple fraction of a day, e.g. 900 (a quarter of an hour) or 3600 (an hour), the device may choose to align sample intervals with time of day, but is not required to do so.

7.11.3 CurrentStart

Start time for the current interval.

When automatic collection is enabled, i.e. SampleInterval is non-zero, the current interval started at the most recent automatic sample.

When automatic collection is disabled, i.e. SampleInterval is zero, the current interval started two manual samples ago.

7.11.4 CurrentEnd

End time for the current interval.

When automatic collection is enabled, i.e. SampleInterval is non-zero, the current interval ended at the most recent manual sample since the most recent automatic sample. If there has been no such manual sample, the current interval is empty.

When automatic collection is disabled, i.e. SampleInterval is zero, the current interval ended at the most recent manual sample.

7.11.5   NodesNumberOfEntries

This parameter represents the number of entries i in the Node[i] table, which contains the performance monitoring parameters associated with each of the G.hn interfaces connected through a G.hn domain (either directly or via relay node) to G.hn interface being diagnosed. The clause 7.12 specifies these management parameters.

7.11.6   ChannelNumberOfEntries

This parameter represents the number of entries i in the Channel[i] table, which contains the performance monitoring parameters associated with each of the G.hn links present to G.hn interface being diagnosed. The clause 7.13 specifies these management parameters.

7.11.7   SNRGroupLength

This parameter represents the number of sub-carriers in a group to be used for averaging SNR values when providing SNR information for a channel. Valid values for this field are 1; 2; 4; 8; 16; 32; 64; 128 and 256.

6. Insert text for new §7.12 "Node information" and its sub-clauses as follows:

7.12 Node information

Table 7-22 specifies the Node performance monitoring measurement results for a given node for the G.hn interface being diagnosed. These parameters are applicable to all nodes.

Table 7-22 – Node information

Name	Type	R/W	Description
BytesSent	unsignedLong	R	The total number of data bytes transmitted (outbound direction: MAC to PHY). See clause 7.3.1
BytesReceived	unsignedLong	R	The total number of data bytes received (inbound direction: PHY to MAC). See clause

				7.3.2
PacketsSent	unsignedLong	R	The total number of data packets transmitted. See clause 7.3.3
PacketsReceived	unsignedLong	R	The total number of data packets received. See clause 7.3.4
ErrorsSent	unsignedInt	R	The total number of outbound data packets that could not be transmitted because of errors. See clause 7.3.5
ErrorsReceived	unsignedInt	R	The total number of received data packets that contained errors. See clause 7.3.6
UnicastPacketsSent	unsignedLong	R	The total number of transmitted data packets that were addressed to unicast address. See clause 7.3.7
UnicastPacketsReceived	unsignedLong	R	The total number of received data packets that were addressed to unicast address. See clause 7.3.8
DiscardPacketsSent	unsignedInt	R	The total number of outbound data packets that were discarded. See clause 7.3.9
DiscardPacketsReceived	unsignedInt	R	The total number of received data packets that were discarded. See clause 7.3.10
MulticastPacketsSent	unsignedLong	R	The total number of transmitted data packet that were addressed to multicast address. See clasue 7.3.11
MulticastPacketsReceived	unsignedLong	R	The total number of received data packet that were addressed to multicast address. See clause 7.3.12
BroadcastPacketsSent	unsignedLong	R	The total number of transmitted data packet that were addressed to broadcast address. See clause 7.3.13
BroadcastPacketsReceived	unsignedLong	R	The total number of received data packet that were addressed to broadcast address. See clause 7.3.14
UnknownProtoPacketsReceived	unsignedInt	R	The total number of received data packet that were discarded because of an unknown or unsupported protocol.. see clause 7.3.15
MgmtBytesSent	unsignedLong	R	The total number of management bytes transmitted. See clause 7.3.16
MgmtBytesReceived	unsignedLong	R	The total number of management bytes received. See clause 7.3.17
MgmtPacketsSent	unsignedLong	R	The total number of management packets transmitted. See clause 7.3.18
MgmtPacketsReceived	unsignedLong	R	The total number of management packets received. See clause 7.3.19
BlocksSent	unsignedLong	R	The total number of transmitted LPDUs. See clause 7.3.20
BlocksReceived	unsignedLong	R	The total number of received LPDUs. See clause 7.3.21
BlocksResent	unsignedInt	R	The total number of LPDUs that were

			retransmitted. See clause 7.3.22
BlocksErrorReceived	unsignedInt	R	The total number of received LPDUs that contained errors. See clause 7.3.23

7. Insert text for new §7.13 "Channel information" and its sub-clauses as follows:

7.13 Channel information

Table 7-23 specifies the Channel performance measurement results for a given link for the G.hn interface being diagnosed. These parameters are applicable to all nodes.

Table 7-23 – Channel information

Name	Type	R/W	Description
TimeStamp	dateTime	R	See clause 7.13.1
snr	String	R/W	Comma-separated list of unsigned integers (maximum 4096), expressed in 0.1dB. Result of Signal-to-Noise-Ratio measurement for the channel from G.hn Interface with DiagnoseMACAddress MAC address to G.hn Interface with REGID DestinationMACAddress MAC address . See clause 7.13.2

7.13.1 Timestamp

Time at which channel data was last collected.

7.13.2 snr

This parameter is the result of an SNR test performed over the link between SourceMACAddress and DestinationMACAddress. It shall be formatted as a comma-separated list of N/M unsigned integers that represents the result of Signal-to-Noise-Ratio measurement averaging in groups of M subcarriers. The number N depends on the bandplan used by the node and corresponds to the OFDM control parameter N of each medium as defined in G.9964. The number M corresponds to the parameter SNRGroupLength described in clause 7.11.6.

7. Insert text for new Annex V "Versioning dependencies of G.9962 Amendment1" as follows:

Annex V

Versioning dependencies of G.9962 Amendment 1

(This Annex forms an integral part of this Recommendation)

For details on the versioning mechanism, see clause 8.19 of [ITU-T G.9961].

The versioning dependencies between this Recommendation and other Recommendations of the G.996x family is described in Table V-1. The number indicated in the following table represents the minimum amendment that is compatible with the Recommendation described in this document.

Table V-1 – Versioning dependencies of G.9962 Amendment 1

G.9960	G.9961	G.9962	G.9963 (Note 2)	G.9964
0	0	N/A	0	0

NOTE 1 – The following values apply to this table:
- A value of zero indicates the base document of a Recommendation.
- A value of X indicates that this Recommendation is not dependent on the indicated Recommendation
- A value of N/A indicates this Recommendation

NOTE 2 – Applicable if G.9963 is supported

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