Layered Parameters

Version 3.0

Table of Contents

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Parameters added for Version 3.0 are in blue.

1.1 Generally Applicable Parameters

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"AddedForMonitoringOnly"	All layers	"True", "False"	no	EMS		This parameter will indicate whether this layer (the layer of the containing TransmissionParameters/LayeredParameters) is a regular layer or a layer existing only for monitoring purposes. For an example refer to Figure 2: "Parameters associated to a 2 Mbit/s Port " contained in LocationIdentification supporting document.
"AlarmReporting"	All layers	"On", "Off"	yes	EMS & NMS		Identifies if alarm reporting from the ME to the EMS is enabled for the TP at the layer specified. Setting this parameter is best-effort.As for all other parameters, this parameter is settable on a per layer basis.However, if the EMS does not support this granularity, it is acceptable for the EMS to turn on or off alarm reporting for all the layers of the TP regardless of the layer at which the parameter is applied. It is also acceptable for the EMS to turn on or off alarm reporting for the contained CTPs, if the ME does not support finer granularity.
"ASAPPointer"	All layers	String containing "AlarmSeverityAssignmentProfileName"	yes	EMS & NMS **only** via assign / deassignASAP() operations		This parameter contains the names of the assigned ASAPs. No name means no ASAP is attached to the TP for this layer rate.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ClientConnectivity"	All layers	"NotConnectable", "Connected", "NotSet"	yes	EMS		Present on TPs whose direct client TPs can be or are fixed cross-connected. Parameter not present means, the TP do not support fixed multiplexing at all. "Connected" means, the TP is currently multiplexing, i.e. all its client TPs are cross-connected in a fixed way. "Not_Connectable" means, none of its client TPs are involved in fixed cross connects and can't be cross-connected. "Not_Set" means, the TP is currently in no mode. None of its client TPs are cross-connected in a fixed way and nothing prevents this from happen. In case the client TPs of the TP are permanently involved in fixed cross connect (hard-wired), clientConnectivity will be locked in state "Connected". The EMS should reject cross connect creation involving the TP itself or any of its client TPs. For example, if clientConnectivity of the TP is set to "Not_Set" and the TP is getting cross-connected, this may set the clientConnectivity to "Connected". If clientConnectivity is set to "Not_Set" and the TP is getting cross-connected at a direct client layer, this sets the TP in a non multiplexing mode (clientConnectivity will be set to "Not_Connectable").

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ClientType"	DSR layers and OCH and ODUk layer	"ATM", "IP", "SONET", "SDH", "HYBRID", "BB" (for Broadband), "GBE" (Giga-Bit Ethernet)	yes	EMS & NMS		Client_type indicates the type of client signal being transmitted via the DWDM Optical Channel or via the radio topological link. Broadband client is a client signal capable of transmitting a range either in the High Speed Broadband (HSBB) signals for 100 Mb/s to Gb/s signals; or Low Speed Broadband (LSBB) for 45 to 750 Mbps signals. The actual rate can be set a provisioning time. Note: Parameter is meaningless in case of OTUk client.
"Location"	All physical layers (PTPs and FTPs)	This is location using equipment format: [/remote_unit=1..n] [/rack=[1..n]] /shelf=[1..n] [/sub_shelf=[1..n]] /slot=[1..n] /[remote_]sub_slot=[1..n] /port=[1..n]	no	EMS		Identifies the location of the main port of the PTP. This information may also be available from the PTP or FTP name, depending on the implementation of MTNM naming by the EMS.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"PotentialFutureSetupIndicator"	All connectable layers	"RSU_POINT_TO_POINT", "RSU_BROADCAST", "RSU_ANY_CONFIG"	no	EMS & NMS		Used to convey the likely future (or current) configuration of an SNC. For example, the NMS sets the attribute to the value "RSU_BROADCAST" to inform the EMS that the CTP is likely to participate in a broadcast connection in the future. This allows the EMS/NE to make the necessary resource provisions at the time of crossconnect creation to allow for easy future change to broadcast. For some NEs there will be no need for any particular change of configuration. In response to either "RSU_POINT_TO_POINT" or "RSU_BROADCAST", these NEs will set the value to "RSU_ANY_CONFIG" in the resulting transmission parameters. If however there is a special allocation of resources on the NE to ease the requested future potential move, the EMS should respond with the requested PotentialFutureSetupIndicator state; for example, if "RSU_BROADCAST" is requested and this does indeed cause resources additional to those for point-point to be allocated then the parameter should be set to "RSU_BROADCAST". If the NMS applies an additional SNC to a CTP that is already connected to make it a broadcast point, the EMS should not reject the request on the basis of the current state of the PotentialFutureSetupIndicator parameter of the CTP. However, the EMS may reject the request if the "tolerableImpact" value of the request can not be achieved. For example, if the NMS requests a broadcast connection, with "tolerableImpact" set to GOI_HITLESS where the existing SNC currently has a value in PotentialFutureSetupIndicator of "RSU_POINT_TO_POINT", and if traffic would be impacted to achieve the adjustment, the EMS should reject the change.

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ServerConnectivity"	All layers	"NotConnectable", "Connected", "NotSet"	yes	EMS		Present on TPs whose direct server TPs can be or are fixed cross connected. Parameter not present means, the TP do not support fixed multiplexing at all. "Connected" means, the TP is currently inverse multiplexing, i.e. all its server TPs are cross connected in a fixed way. "Not_Connectable" means, none of its server TPs are involved in fixed cross connects and can't be cross-connected. "Not_Set" means, the TP is currently in no mode. None of its server TPs are cross-connected in a fixed way and nothing prevents this from happen. In case the server TPs of the TP are permanently involved in fixed cross connect (hard-wired), serverConnectivity will be locked in state "Connected". The EMS should reject cross connect creation involving the TP itself or any of its server TPs. For example, if serverConnectivity of the TP is set to "Not_Set" and the TP is getting cross-connected, this may set the serverConnectivity to "Connected". If serverConnectivity is set to "Not_Set" and the TP is getting cross-connected at a direct server layer, this sets the TP in a non inverse multiplexing mode (serverConnectivity will be set to "Not_Connectable").
"ServiceState"	All layers	"IN_SERVICE", "OUT_OF_SERVICE", "OUT_OF_SERVICE_BY_MAINTENANCE", "SERV_NA"	yes	EMS & NMS		See ServiceState_T in equipment.idl or definition of Enums::ServiceState in the IA.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"SupportsMonitoring"	cross connectable layers	"True", "False"	no	EMS		This parameter identifies that this layer (the layer of the containing TransmissionParameters/LayeredParameters) will support non-intrusive monitoring if the termination point do not terminate the layer. Note: Its value does not change depending on the termination mode of the termination point.
"TCAParameterProfilePointer"	All layers	String containing "TCAParameterProfileName"	yes	EMS & NMS **only** via setTCAParameterProfilePointer() operation		This parameter contains the names of the assigned TCAParameterProfiles. No name means no TCAParameterProfile is attached to the TP at all. Changes in the value are only allowed with respect to the corresponding activity diagram and use case of the setTCAParameterProfilePointer() operation defined in the IA.
"TrailTraceActualRx"	All SDH, SONET, and OTN~~DWDM~~ layers where Trail Trace is specified for, and LR_PHYSICAL_MEDIALESS for radio	a string of up to 64 chars	no	EMS	SDH : ITU-T G.783 OTN : ITU-T G.798 Microwave Radio: ITU-R F.750-4	
"TrailTraceActualTx"	All SDH, SONET, and OTN~~DWDM~~ layers where Trail Trace is specified for, and LR_PHYSICAL_MEDIALESS for radio	a string of up to 64 chars	yes	EMS & NMS	SDH : ITU-T G.783 OTN : ITU-T G.798 Microwave Radio: ITU-R F.750-4	

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"TrailTraceExpectedRx"	All SDH, SONET, and OTN~~DWDM~~ layers where Trail Trace is specified for, and LR_PHYSICAL_MEDIALESS for radio	a string of up to 64 chars	yes	EMS & NMS	SDH : ITU-T G.783 OTN : ITU-T G.798 Microwave Radio: ITU-R F.750-4	
"TrailTraceMonitor"	All SDH, SONET, and OTN~~DWDM~~ layers where Trail Trace is specified for, and LR_PHYSICAL_MEDIALESS for radio	"On", "Off"	yes	EMS & NMS	SDH : ITU-T G.783 OTN : ITU-T G.798 Microwave Radio: ITU-R F.750-4	
"TransmissionDescriptorPointer"	All layers	string containing "TransmissionDescriptorPointerName"	yes	EMS & NMS		name value of a layer-specific transmission descriptor

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1.2 General parameters for Inverse Multiplexing

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"AllocationMaximum"	LR_Fragment's adaptation function	Integer	no	EMS	ITU-T G.783	It indicates the maximum number of server layer CTPs that can be used to carry traffic. This value is set by the EMS based on hardware limitation, e.g. - for virtual concatenation; it indicates the maximum size of the virtual concatenated group. This is a read-only parameter.
"AllocatedNumber"	LR_Fragment's adaptation function	Integer	yes	EMS & NMS	ITU-T G.783	It indicates the number of server layer CTPs that is provisioned to carry traffic. For example, this is the number of provisioned members in the virtually concatenated group. This is a read/write parameter. Note: ActiveAllocationNumber parameter is duplicated because LCAS works unidirectional. The provisioned number of member servers (AllocatedNumber) is believed to be common to both directions (asymmetric configuration seen unlikely).
"ActiveAllocationNumberRx"	LR_Fragment's adaptation function	Integer	yes	EMS	ITU-T G.783	It indicates the number of server layer CTPs actually carrying traffic in the receiving direction, i.e. – this reflects the current actual rate of the connection. This is a read only parameter. For example, this is the actual number of members of the virtual concatenation group as influenced by autonomous adding or deleting of members by the LCAS protocol in case of individual STS-n or VT-n failures.
"ActiveAllocationNumberTx"	LR_Fragment's adaptation function	Integer	yes	EMS	ITU-T G.783	Same as ActiveAllocationNumberRx but on the transmit direction. This is a read-only parameter.
"DynamicAllocation"	LR_Fragment's adaptation function	"LCAS", "LASR"	no	EMS		If this transmission parameter is present, it indicates that it supports dynamic bandwidth adjustments. This is a read-only parameter.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
DynamicAllocationEnabled	LR_Fragment's adaptation function	"Enabled", "Disabled"	yes	EMS & NMS		To enable or disable the operation of dynamic allocation e.g. LCAS. This is a read-write parameter.
"FragmentServerLayer"	LR_Fragment's adaptation function	Integer	no	EMS		It indicates the TP server layer rate. The value shall be the integer value for the desired layer. This parameter is read-only and is not expected to change if the fragments are currently being used in an SNC.

1.3 SDH/SONET/PDH specific parameters

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"FrameFormat"	All SDH, SONET, PDH and DSL layers	"unframed" many signals "sf" DS1 or E1 superframe "esf" DS1 or E1 extended superfram "t1dm" DS1 "zbtsi" DS1 "dlc13" DS1 "dlc16" DS1 "slc96" DS1 "async" VC11_VT1.5, VC12_VT2 "bytesync" VC11_VT1.5, VC12_VT2 "m13" DS3 "cbit" DS3	yes	EMS & NMS		Legal values depend on the layer rate.

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"LineCode"	All SDH, SONET, and PDH layers	"ami" DS1 "amizcs" DS1 "b8zs" DS1 "b3zs" DS3 "cmi" DS3 "bit7" DS1 "cchan" many "hdb3" E1	yes	EMS & NMS		
"Mapping"	All SDH, SONET, and PDH layers	"intact", "async", "ds3_1", "vtfloat"	yes	EMS & NMS		The transmux feature allows the provisioning of a SONET logical TP (STS1 CTP) to carry a DS1 channelized asynchronous DS3 signal.
"SDH_SONET_SS_BITS"	SDH/SONET MS layers	"SDH", "SONET", "HYBRID"	yes	EMS		For Network Elements that can not handle SONET and SDH LRs interchangeably, this parameter indicates the service type that is provisioned.
"SignalLabelActualRx"	All SDH/SONET path layers	This is in decimal format with values between 0 and 255.	no	EMS		
"SignalLabelActualTx"	All SDH/SONET path layers	This is in decimal format with values between 0 and 255.	no	EMS		
"SignalLabelExpectedRx"	All SDH/SONET path layers	This is in decimal format with values between 0 and 255.	yes	EMS & NMS		
"TS0monitoring"	LR_E1_2M	"Monitored" "Unmonitored"	yes	EMS & NMS	ITU-T G.704 and G.706	TS0 bits are used to provide/collect performance monitoring statistics for the PDH paths associated with the E1 port

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1.4 ATM specific parameters (ATM NI CTP, ATM VP CTP, ATM VC CTP, ATM NI TPPool, ATM VP TPPool

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ActualMaximumSVCVPI"	LR_ATM_NI (TPPool)	A number n	yes	EMS & NMS		This attribute identifies the maximum VPI value that may be used for SVCs for the associated user.If ILMI is active , this value is calculated by the ILMI functions. See ATM Forum af-ilmi-0065.000, Integrated Local Management Interface (ILMI) Specification Version 4 for information on use of this parameter.
"ActualMinimumSVCVCI"	LR_ATM_NI (TPPool)	A number n	yes	EMS & NMS		This attribute identifies the minimum VCI value that may be used for SVCs for the associated user.If ILMI is active, this value is calculated by the ILMI functions. See ATM Forum af-ilmi-0065.000 for information on use of this parameter.
"ATMAddress"	LR_ATM_NI (CTP, TPPool)	string	yes	EMS & NMS		The identifier (e.g., E.164 directory number or NSAP address) assigned by a service provider to the end user's UNI. If the end user UNI has no assigned service provider address, this is an octet string of zero length.
"ATMNIType"	LR_ATM_N (CTP)I	"UNI" (User Network Interface), "BICI" (Broadband Inter Carrier Interface - interNNI), "BISSI" (Broadband Inter Switching Systems Interface - intraNNI), "PNNI" (Private Network to Node Interface)	yes	EMS & NMS		The type of network interface represented by the TP.
"ATMSignalingType"	LR_ATM_NI (CTP, TPPool)	"UNI3.1", "UNI4.1", "PNNI1.0", "none"	yes	EMS & NMS		Indicates which type of signaling stack (if any) is used to control the end user's UNI interface.
"Bandwidth"	LR_ATM_NI (CTP)	integer	yes	EMS&NMS		Represented in Kilobits Per Second (KbPS).

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ILMIVCI"	LR_ATM_NI (CTP, TPPool)	A number n	yes	EMS & NMS		Represents the VCI value of the VCC supporting the end user's ILMI at this ATM interface. Note that if both ILMIVPI and ILMIVCI are equal to zero then ILMI is not supported for this end user UNI.
"ILMIVPI"	LR_ATM_NI (CTP, TPPool)	A number n	yes	EMS & NMS		Represents the VPI value of the VCC supporting the end user's ILMI at this ATM interface.
"MaxActualVCIBits"	LR_ATM_NI (CTP, TPPool)	"1".."16"	yes	EMS & NMS		Represents the actual maximum VCI bit length (after negotiation) for use between the NE and the end user's UNI.
"MaxActualVPIBits"	LR_ATM_NI (CTP, TPPool)	"1".."8" for UNI "1".."12" for NNI (BICI or BISSI)	yes	EMS & NMS		Represents the actual maximum VPI bit length (after negotiation) for use between the NE and the end user's UNI.
"MaxBandwidth"	LR_ATM_VP (TPPool)	integer	yes	EMS & NMS		This parameter indicates the maximum bandwidth which can be allocated to the group of VP CTPs (i.e., the sum of the bandwidth assigned to each individual VP CTP in the group cannot exceed this number).
"MaxVCC"	LR_ATM_NI (CTP, TPPool)	A number n	yes	EMS & NMS		Represents the maximum number of VCCs that can actually be supported on the end user's UNI interface.
"MaxVCIBits"	LR_ATM_NI (CTP)	integer	yes	EMS & NMS		A number representing the maximum VCI bit length (before negotiation).
"MaxVPC"	LR_ATM_NI (CTP, TPPool)	A number n.	yes	EMS & NMS		Represents the maximum number of VPCs that can actually be supported on the end user's UNI interface.
"MaxVPI"	LR_ATM_VP (TPPool)	A number n	yes	EMS & NMS		Highest VPI allowed for a VP CTP associated to the TPPool

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"MaxVPIBits"	LR_ATM_NI (CTP)	integer	yes	EMS & NMS		A number representing the maximum VPI bit length (before negotiation).
"MinVPI"	LR_ATM_VP (TPPool)	A number n	yes	EMS & NMS		Lowest VPI allowed for a VP CTP associated to the TPPool
"SignalingChannelVCI"	LR_ATM_NI (TPPool)	A number n	yes	EMS & NMS		The VCI for the users signalling channel, if SVCs are supported. Note: This value is usually the same at the users end.
"SignalingChannelVPI"	LR_ATM_NI (TPPool)	A number n	yes	EMS & NMS		The VPI for the users signalling channel, if SVCs are supported. Note: This value may be different than the value at the users end.
"SupportedServiceCat"	LR_ATM_VP (CTP)	string	yes	EMS & NMS		Optional parameter relevant to a terminated and mapped VP CTP only (aka, a VP Trail TP). List of Service Categories allowed for the VCs contained (switched) in the VP. See also parameter "ServiceCategory". Note that this is consistent with the vpTTPBidirectionalR1 managed object class in M4 V2.
"SwitchedVCenabled"	LR_ATM_VP (CTP)	"Y" - can support switched VCC traffic "N" - dedicated to permanent VCC traffic	yes	EMS & NMS		Parameter significant on a terminated and mapped VP CTP only to indicate if the VP trail can transport switched VCC traffic.

1.5 ATM parameters relevant only to ATM Network Interfaces supporting PNNI (i.e., Soft PVCs and SVCs capable) (ATM NI CTP)

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"PnniAdmWeightAbr"	LR_ATM_NI (CTP)	integer	yes	EMS & NMS		A number indicating the administrative weight of this interface for the ABR service category.
"PnniAdmWeightCbr"	LR_ATM_NI (CTP)	integer	yes	EMS & NMS		A number indicating the administrative weight of this interface for the CBR service category.
"PnniAdmWeightNrtvbr"	LR_ATM_NI (CTP)	integer	yes	EMS & NMS		A number indicating the administrative weight of this interface for the nrtVBR service category.
"PnniAdmWeightRtvbr"	LR_ATM_NI (CTP)	integer	yes	EMS & NMS		A number indicating the administrative weight of this interface for the rtVBR service category.
"PnniAdmWeightUbr"	LR_ATM_NI (CTP)	integer	yes	EMS & NMS		A number indicating the administrative weight of this interface for the UBR service category.

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1.6 IMA (Inverse Multiplexing for ATM) specific parameters

Note:

Parameters, which are indicated as optional in the source standard or require implementation considerations, are marked as conditional.

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"Symmetry"	LR_Fragment (adaptation function, i.e. IMA group)	"SymmetricOp", "AsymmetricOp", "AsymmetricConf"	no	EMS		IMA group symmetry mode, which will only be established or changed at group start-up time.
"MinNumTxLinks"	LR_Fragment (adaptation function, i.e. IMA group)	"1".."32" (or, conditionally, up to "64" or "128")	yes	EMS & NMS		Minimum number of transmit links required to be in IMA link state "active" for the IMA group to be in the IMA group state "operational".
"MinNumRxLinks"	LR_Fragment (adaptation function, i.e. IMA group)	"1".."32" (or, conditionally, up to "64" or "128")	yes	EMS & NMS		Minimum number of receive links required to be Active for the IMA group to be in the Operational state.
"NeTxClkMode"	LR_Fragment (adaptation function, i.e. IMA group)	"CTC", "ITC"	yes	EMS & NMS		Transmit clock mode of the near-end IMA group.
"FeTxClkMode"	LR_Fragment (adaptation function, i.e. IMA group)	"CTC", "ITC"	yes	EMS		Transmit clocking mode used by the far-end IMA group.
"NeTxClkSource" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"Internal", "Loop", "System"	yes	EMS & NMS		Transmit clock source of the near-end IMA group for CTC mode.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"NeTxClkSourceLink" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	string	yes	EMS & NMS		Name value of the IMA link CTP used in case of clock source "Loop".
"TxTimingRefLink"	LR_Fragment (adaptation function, i.e. IMA group)	string	yes	EMS		Name value of the transmit timing reference IMA link CTP.
"RxTimingRefLink"	LR_Fragment (adaptation function, i.e. IMA group)	string	yes	EMS		Name value of the receive timing reference IMA link CTP.
"NumTxCfgLinks" (conditional in case of Symmetrical Configuration)	LR_Fragment (adaptation function, i.e. IMA group)	integer	yes	EMS		Number of links configured to transmit in this IMA group; overwrites "NumRxActLinks" when the IMA group is configured in the Symmetrical Configuration group symmetry mode; corresponds to "AllocatedNumber" in this case.
"NumRxCfgLinks" (conditional in case of Symmetrical Configuration)	LR_Fragment (adaptation function, i.e. IMA group)	integer	yes	EMS		Number of links configured to receive in this IMA group; is overwritten by "NumTxActLinks" when the IMA group is configured in the Symmetrical Configuration group symmetry mode; corresponds to "AllocatedNumber" in this case.
"NumTxActLinks" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	integer	yes	EMS		Number of links configured to transmit and currently in the IMA link state "active" in this IMA group; corresponds to general parameter "ActiveAllocationNumberTx".
"NumRxActLinks" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	integer	yes	EMS		Number of links which are configured to receive and are currently Active in this IMA group; corresponds to general parameter "ActiveAllocationNumberRx".

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"TxImaId"	LR_Fragment (adaptation function, i.e. IMA group)	"0.."255"	yes	EMS		IMA ID currently in use by the near-end IMA function.
"RxImaId"	LR_Fragment (adaptation function, i.e. IMA group)	"0.."255", "Unknown"	yes	EMS		IMA ID currently in use by the far-end IMA function.
"TxFrameLength"	LR_Fragment (adaptation function, i.e. IMA group)	"32", "64", "128", "256"	yes	EMS & NMS		Length of the transmit IMA frame.
"RxFrameLength"	LR_Fragment (adaptation function, i.e. IMA group)	"32", "64", "128", "256"	yes	EMS		Length of the receive IMA frame.
"DiffDelayMax"	LR_Fragment (adaptation function, i.e. IMA group)	integer	yes	EMS		Maximum differential delay (in milliseconds) among the links that will be tolerated on this interface (e.g., "25" for E1/DS1 links).
"LeastDelayLink"	LR_Fragment (adaptation function, i.e. IMA group)	string	no	EMS		Name value of the link configured in the IMA group which has the smallest link propagation delay.
"DiffDelayMaxObs"	LR_Fragment (adaptation function, i.e. IMA group)	integer	no	EMS & NMS		Latest maximum differential delay (in milliseconds) observed between the links having the least and most link propagation delay, among the receive links that are currently configured in the IMA group; NMS may only reset this value.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"AlphaValue"	LR_Fragment (adaptation function, i.e. IMA group)	"1".."2"	no	EMS & NMS		'alpha' value used to specify the number of consecutive invalid ICP cells to be detected before moving to the Hunt state from the Sync state.
"BetaValue"	LR_Fragment (adaptation function, i.e. IMA group)	"1".."5"	no	EMS & NMS		'beta' value used to specify the number of consecutive errored ICP cells to be detected before moving to the Hunt state from the Sync state.
"GammaValue"	LR_Fragment (adaptation function, i.e. IMA group)	"1".."5"	no	EMS & NMS		'gamma' value used to specify the number of consecutive valid ICP cells to be detected before moving to the Hunt state from the PreSync state.
"RunningSecs"	LR_Fragment (adaptation function, i.e. IMA group)	integer	no	EMS		Amount of time (in seconds) since this IMA group has been in the IMA group state "operational".
"TxAvailCellRate"	LR_Fragment (adaptation function, i.e. IMA group)	integer	no	EMS		Current cell rate (truncated value in cps) provided by this IMA group in the transmit direction, considering all the Tx links in the Active state.
"RxAvailCellRate"	LR_Fragment (adaptation function, i.e. IMA group)	integer	no	EMS		Current cell rate (truncated value in cps) provided by this IMA group in the receive direction, considering all the receive links in the Active state.
"BandwidthUsage" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"0".."100"	no	EMS		Percentage of use of configured bandwidth (see LR_ATM_NI).

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"OverbookingFactor" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"NoOverbooking", integer >= "100"	yes	EMS		Grade of allowed overbooking of physical line rates; default value is "NoOverbooking", "100" means overbooking with factor 1, "1000" means 10 times overbooking, etc..
"Allocated SupportingCTPs" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	string (e.g., "<PTPName1>/e1=1,…,<PTPName8>/e1=1", in case of 8 E1 links)	no	EMS		Comma list of full name values (concatenation by "/" of all value components) of the supporting CTPs that are connected to the IMA link CTPs ("AllocatedNumber" many).
"NumTxCACLinks" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"1".."32" (or, conditionally, up to "64" or "128")	yes	EMS & NMS		Number of transmit links that are used for ATM CAC; the remaining links will not fall within CAC limits.
"ImaVersion" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"1.0", "1.1"	no	EMS		The IMA standard implemented by this IMA group (AF-PHY-0086.000 or AF-PHY-0086.001).
"LinkInformation" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"1.0", "1.1"	no	EMS		Use of the link information fields in the ICP cells by IMA 1.0 group.
"TestLink" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	string	no	EMS & NMS		Name value of the test link for use in the Test Pattern Procedure, or empty string (EMS to choose the link).
"TestPattern" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"-1".."255"	no	EMS & NMS		"0".."255" designates a specific Tx Test Pattern to be used in an IMA group loopback operation, "-1" allows the EMS to choose the value.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"TestProcStatus" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"disabled", "operating", "linkFailed"	yes	EMS & NMS		Enables or disables the Test Pattern Procedure, and notifies whether at least one link failed the test.
"OperationalStatus" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"up", "down", "unknown", "disabled", "linkFailures", "notConfigured"	yes (SCN)	EMS		Eye catcher for the operational state of the IMA group at the near end (see "ServiceState", "NeState", and "FailureStatus" for more details).
"NeState"	LR_Fragment (adaptation function, i.e. IMA group)	"notConfigured", "startUp", "startUpAck", "configAbortUnsupportedM", "configAbortIncompatibleSymmetry", "configAbortUnsupportedImaVersion", "configAbortOther", "insufficientLinks", "blocked", "operational"	yes (SCN)	EMS		State of the near-end IMA group.
"FeState"	LR_Fragment (adaptation function, i.e. IMA group)	"notConfigured", "startUp", "startUpAck", "configAbortUnsupportedM", "configAbortIncompatibleSymmetry", "configAbortUnsupportedImaVersion", "configAbortOther", "insufficientLinks", "blocked", "operational"	yes (SCN)	EMS		State of the far-end IMA group as reported via ICP cells.
"LastChange"	LR_Fragment (adaptation function, i.e. IMA group)	date-time specification "YYYYMoMoDD HHMiMiSS"	no	EMS		Time-of-day the (near-end) IMA group last changed IMA group state (i.e., the last change of "NeState").

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"FailureStatus" (conditional)	LR_Fragment (adaptation function, i.e. IMA group)	"noFailure", startUpNe", "startUpFe", "invalidMValueNe", "invalidMValueFe", "failedAssymetricNe", "failedAssymetricFe", "insufficientLinksNe", "insufficientLinksFe", "blockedNe", "blockedFe", "otherFailure", "invalidImaVersionNe", "invalidImaVersionFe"	yes (SCN)	EMS		Failure reason of the IMA group.
"TxLid"	LR_Fragment (termination function, i.e. IMA link)	"0".."31"	yes	EMS		Outgoing link ID (LID) used currently on the link by the local end.
"RxLid"	LR_Fragment (termination function, i.e. IMA link)	"0".."31"	yes	EMS		Incoming link ID (LID) used currently on the link by the remote end, as reported via ICP cells.
"RelDelay" (conditional)	LR_Fragment (termination function, i.e. IMA link)	integer	no	EMS		Latest measured delay on this link (in milliseconds) relative to the link, in the same IMA group, with the least delay (see "LeastDelayLink").
"NeTxState"	LR_Fragment (termination function, i.e. IMA link)	"notInGroup", "unusableNoGivenReason", "unusableFault", "unusableMisconnected", "unusableInhibited", "unusableFailed", "usable", "active"	yes (SCN)	EMS		Current state of the near-end transmit link.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"NeRxState"	LR_Fragment (termination function, i.e. IMA link)	"notInGroup", "unusableNoGivenReason", "unusableFault", "unusableMisconnected", "unusableInhibited", "unusableFailed", "usable", "active"	yes (SCN)	EMS		Current state of the near-end receive link.
"FeTxState"	LR_Fragment (termination function, i.e. IMA link)	"notInGroup", "unusableNoGivenReason", "unusableFault", "unusableMisconnected", "unusableInhibited", "unusableFailed", "usable", "active"	yes (SCN)	EMS		Current state of the far-end Tx link as reported via ICP cells.
"FeRxState"	LR_Fragment (termination function, i.e. IMA link)	"notInGroup", "unusableNoGivenReason", "unusableFault", "unusableMisconnected", "unusableInhibited", "unusableFailed", "usable", "active"	yes (SCN)	EMS		Current state of the far-end receive link as reported via ICP cells.
"NeRxFailureStatus" (conditional)	LR_Fragment (termination function, i.e. IMA link)	"noFailure", "imaLinkFailure", "lifFailure", "lodsFailure", "misConnected", "blocked", "fault", "farEndTxLinkUnusable", "farEndRxLinkUnusable"	yes (SCN)	EMS		Current link failure status of the near-end receive link.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"FeRxFailureStatus" (conditional)	LR_Fragment (termination function, i.e. IMA link)	"noFailure", "imaLinkFailure", "lifFailure", "lodsFailure", "misConnected", "blocked", "fault", "farEndTxLinkUnusable", "farEndRxLinkUnusable"	yes (SCN)	EMS		Current link failure status of the far-end Rx link as reported via ICP cells.
"RxTestPattern" (conditional)	LR_Fragment (termination function, i.e. IMA link)	"0.."255"	no	EMS		Identifies the Rx Test Pattern received in the ICP cell on the link during the Test Pattern Procedure (to be compared to the Tx "Test Pattern" of the corresponding IMA group).
"TestProcStatus" (conditional)	LR_Fragment (termination function, i.e. IMA link)	"disabled", "operating", "linkFailed"	no	EMS		Notifies the current state of the Test Pattern Procedure, and whether this link failed the test.

1.7 ATM specific traffic descriptor parameters

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"PCR-<qualifier>" <qualifier> is “0” or “0+1”	LR_ATM_VP LR_ATM_VC	string encoded integer in cells/second	no	EMS & NMS		The Peak Cell Rate, PCR, is upper bound on the traffic rate that can be sent over a connection.
"SCR-<qualifier>" <qualifier> is “0” or “0+1”	LR_ATM_VP LR_ATM_VC	string encoded integer in cells/second	no	EMS & NMS		The Sustainable Cell Rate, SCR, is average traffic rate that can be sent over a connection.

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"MCR"	LR_ATM_VP LR_ATM_VC	string encoded integer in cells/second	no	EMS & NMS		The Minimum Cell Rate, MCR, is the rate at which the source is always allowed to send.
"MBS-<qualifier>" <qualifier> is “0” or “0+1”	LR_ATM_VP LR_ATM_VC	string encoded integer in cells/second	no	EMS & NMS		The Maximum Burst Size, MBS, is the upper bound on the largest number of back-to-back cells that can be sent at PCR.
"CDV"	LR_ATM_VP LR_ATM_VC	string encoded integer in cells/second	no	EMS & NMS		The maximum peak-to-peak cell delay variation, CDV; Max Peak-to-Peak CDV is an ATM QoS parameter associated with the CBR and rt-VBR service categories. The Max Peak-to-Peak CDV is the (1-a) quantile of the cell transfer delay minus the fixed cell transfer delay that could be experienced during the entire connection holding time. The parameter “a” is the probability of a cell arriving late or being lost. See CDTV
"CTD"	LR_ATM_VP LR_ATM_VC	string encoded integer in microseconds	no	EMS & NMS		The maximum cell transfer delay, CTD; Max CTD is the (1-a) quantile of the cell transfer delay. The parameter “a” is the probability of a cell arriving late or being lost. See CDTV.
"CDVT-<qualifier>" <qualifier> is “0” or “0+1”	LR_ATM_VP LR_ATM_VC	string encoded integer in microseconds	no	EMS & NMS		The Cell Delay Variation Tolerance, CDVT, upper bound on the cell delay variability expected on a conforming connection
"CLR"	LR_ATM_VP LR_ATM_VC	string encoded number n where n is 10^-n	no	EMS & NMS		The Cell Loss Ratio CLR, is the maximum permissible cell loss ratio.
"ICR"	LR_ATM_VP LR_ATM_VC	string encoded integer in cells/second	no	EMS & NMS		The Initial Cell Rate, ICR, is the rate at which a source should send initially and after an idle period.
"TBE"	LR_ATM_VP LR_ATM_VC	string encoded number (e.g., “10”)	no	EMS & NMS		Transient Buffer Exposure, TBE, is the number of cells that the network would like to limit the source to sending during startup periods, before the first RM cell returns.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"FRTT"	LR_ATM_VP LR_ATM_VC	string encoded time in microseconds representing values from 0 to 16.7 seconds (i.e., values of “0” to “16700000”)	no	EMS & NMS		Fixed Round-Trip Time, FRTT, is the sum of the fixed and propagation delays from the source to the destination and back.
"RIF"	LR_ATM_VP LR_ATM_VC	string encoded integer, x, ranging from 0 to 15 which represents 1/2x (i.e., represents the values of 1 to 1/32768)	no	EMS & NMS		Rate Increase Factor, RIF, controls the amount by which the cell transmission rate may increase upon receipt of an RM-cell.
"RDF"	LR_ATM_VP LR_ATM_VC	same as RIF	no	EMS & NMS		The Rate Decrease Factor, RDF, controls the decrease in the cell transmission rate.
"NRM"	LR_ATM_VP LR_ATM_VC	string encoded number; one of {2, 4, 8, 16, 32, 64, 128, 256}.	no	EMS & NMS		Number RM, NRM, is the maximum number of cells a source may send for each forward RM-cell.
"TRM"	LR_ATM_VP LR_ATM_VC	string encoded number, k, in the range between 0 and 7 representing values computed as 100 * 2^(-k)	no	EMS & NMS		Time RM, TRM, is the upper bound on the time between forward RM cells for an active source.
"CDF"	LR_ATM_VP LR_ATM_VC	string encoded value, x, ranging from 0 to 6 and including “infinity”, which represents 1/2x (i.e., represents the values of 1 to 1/64 and 0)	no	EMS & NMS		Cutoff Decrease Factor, CDF, controls the rate decrease associated with lost or delayed backward RM cells.
"ADTF"	LR_ATM_VP LR_ATM_VC	string encoded time in milliseconds from “10” to “10230” in 10 millisecond increments	no	EMS & NMS		ACR (Allowed Cell Rate) Decrease Time Factor, ADTF, is the time permitted between sending RM cells, before the rate is decreased to ICR.
"BEST"	LR_ATM_VP LR_ATM_VC	string encoded boolean (i.e., “TRUE” or “FALSE”)	no	EMS & NMS		Best effort, BEST, indicates whether best effort behaviour is in effect.
"TAG"	LR_ATM_VP LR_ATM_VC	string encoded boolean (i.e., “TRUE” or “FALSE”)	no	EMS & NMS		Cell tagging, TAG, is the ability to set the CLP bit to 1.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"FDISCARD"	LR_ATM_VP LR_ATM_VC	string encoded boolean (i.e., “TRUE” or “FALSE”)	no	EMS & NMS		Frame Discard. Indicates whether cells are allowed to be treated as part of higher-layer frames.
"MCRSUPPORTED"	LR_ATM_VP LR_ATM_VC	string encoded boolean (i.e., “TRUE” or “FALSE”)	no	EMS & NMS		An indicator of whether or not Minimum Cell Rate is to be supported.
"CLRCLP-<qualifier>" <qualifier> is “0” or “0+1”	LR_ATM_VP LR_ATM_VC	string encoded number n where n is 10^-n	no	EMS & NMS		Cell Loss Ratio.
"ServiceCategory"	LR_ATM_VP LR_ATM_VC	"ATM_CBR", "ATM_VBRRT", "ATM_VBRNRT", "ATM_ABR", "ATM_UBR", "ATM_GFR", "ATM_NA"	no	EMS		The ATM Service Category relates quality requirements and traffic characteristics to network behavior (procedures and parameters). It is intended to specify a combination of Quality of Service (QoS) commitment and traffic parameters that is suitable for a given set of applications (user interpretation) and that allows for specific multiplexing schemes at the ATM layer (network interpretation).

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ConformanceDefinition"	LR_ATM_VP LR_ATM_VC	"ATM_CBR.1", "ATM_VBR.1", "ATM_VBR.2", "ATM_VBR.3", "ATM_ABR", "ATM_UBR.1", "ATM_UBR.2", "ATM_GFR.1", "ATM_GFR.2", "ATM_USER", "ATM_CBR.L1", "ATM_VBR.L1", "ATM_VBR.L2", "ATM_VBR.L3" "ATM_ABR.L" "ATM_UBR.L1" "ATM_UBR.L2", "ATM_UBR.L3", "ATM_PCR.L1", "ATM_PCR.L2", "ATM_P&SCR.L1", "ATM_P&SCR.L2"	no	EMS		This attribute specifies the conformance definition which characterizes an ATM Connection. The conformance definitions are from the ATM Forum UNI 4.1, UNI 4.0, and UNI 3.1 standards.

1.8 WDM specific parameters

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ClientRate"	DSR layers and OCH	"nnnn.ppp" in megabits per second Decimal notation in a string format.	yes	EMS		This is the actual client rate that the incoming signal is set to (or is provisioned).

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ClientType"						refer to "ClientType" in chapter Generally Applicable parameters
"FrequencySpacing"	OMS OCH*	This is in a decimal format and in terms of Ghz.	yes	EMS		This identifies the frequency spacing between two consecutive OCH CTPs. * In case of variable grid (OTM-n.m), it should be possible to use the “FrequencySpacing” parameter also at OCH layer. Note: With respect to the lambda central frequency, the frequency spacing identifies the minimum allowed spacing, left and right side, with respect to another lambda, at left/right side. In case of fixed grid, then the frequency spacing attribute is fixed per each OCH, so can be represented only at OMS layer. In case of variable grid, then could happen that a given lambda 1 has its frequency spacing (e.g. 100GHz), and the adjacent lambda 2 has e.g. 50GHz. Of course, the distance between lambda 1 and 2 central frequencies must be at least 100GHz.
"FrequencySpread"	OCH	This is in a decimal format and in terms of Ghz.	yes	EMS		This identifies the spread of the spectrum on an OCH CTP.
"MaxClientRate"						refer to "MaxClientRate" in chapter Generally Applicable parameters
"MaxNumberOCh"	OMS	Integer	no	EMS		This identifies the maximum number of Optical Channels (OCh) that can be carried by the Optical Multiplex Section.
"MinClientRate"	DSR layers and OCH	"nnn.pp"The unit of these rates are Mbps. Decimal notation in a string format.	yes	EMS		This identifies the minimum rate that the DWDM PTP is capable of receiving. The capability may be different than the actual provisioned state. Note: Parameter is meaningless in case of OTUk client.
"NumberOfTunableFrequencies"	OCH	A decimal number.	no	EMS		

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"OscCentralFrequency"	OTS	nnn.nn is a decimal representing the frequency in THz	no	EMS		Central frequency of Optical Supervisory Channel.
"OscFrequencySpacing"	OTS	is in a decimal format and in terms of GHz	no	EMS		Identifies the minimum allowed spacing between adjacent channels. Note: With respect to the lambda central frequency, the frequency spacing identifies the minimum allowed spacing, left and right side, with respect to another lambda, at left/right side. In case of fixed grid, then the frequency spacing attribute is fixed per each OCH, so can be represented only at OMS layer. In case of variable grid, then could happen that a given lambda 1 has its frequency spacing (e.g. 100GHz), and the adjacent lambda 2 has e.g. 50GHz. Of course, the distance between lambda 1 and 2 central frequencies must be at least 100GHz.
"OscFrequencySpread"	OTS	in a decimal format and in terms of GHz	no	EMS		Identifies the spread of the spectrum on the Optical Supervisory Channel.
"ThisLayerActive"	All layers	"ACTIVE", "INACTIVE"	yes	EMS		Some PTPs may have several alternative layering presentations, either due to specific configurability or due to the need to represent alternative model compatability. When there are alterative layer choices that transmissionParameter "THIS_LAYER_ACTIVE" is used. The parameter is provided with each of the optional/alternative layers and set to "INACTIVE" when the layer is not involved in the termination of signals and "ACTIVE" when it is involved in the termination of the signal.
"TunableBaseFrequency"	OCH	Value in nnn.nn THz	no	EMS		
"TunableFrequencySpacing"	OCH	nn GHz	no	EMS		
"TunedFrequency"	OCH	nnn.nn frequency in THz	yes	EMS & NMS		Applicable to tunable and non-tunable OCHs.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"VendorSpecific"	LR_OCH_Transport_Unit_1/2/3 layer rates	"Yes", "No"	no	EMS		

1.9 Protection specific parameters

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"MSLockout"	SDH/SONET MS, RS and DSR layer rates	"locked out", ""	yes	EMS	SDH: ITU-T G.783 Microwave Radio: ITU-R F.750-4, ITU-T G.774-8	This can be changed by the NMS using the performProtectionCommand operation.
"PreEmptionPriority"	SDH/SONET MS, RS and DSR layer rates	"0".."99"	yes	EMS	SDH: ITU-T G.783 Microwave Radio: ITU-R F.750-4, ITU-T G.774-8	Applicable to 1:N protection group TPs, where 0 is not applicable, and 99 is the highest priority.
"ProtectionRole"	All connectable layers	"Primary", "Backup" (applicable to the source CTPs, typically in a revertive SNCP)	yes	EMS		

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"protectionSchemeState"	All connectable layers (SNCP) and SDH/SONET MS, RS and DSR layer rates (PG)	"PSS_UNKNOWN", "PSS_AUTOMATIC", "PSS_FORCED_OR_LOCKED_OUT"	yes	EMS	SDH: ITU-T G.783 Microwave Radio: ITU-R F.750-4, ITU-T G.774-8	Applies to the reliable CTP(s) of an SNCP or to the PTPs of a protection group.
"SPRINGNodeId"	All SDH/SONET connectable layers	"0".."15" (may be any other string that matches the SPRINGNodeId attribute of PGs), "Unknown"	yes	EMS & NMS	ITU-T G.841	This is the squelch APS id (SPRINGNodeId of the far end). This parameter implies that incoming and outgoing traffic enter and leave the ring at the same node. It takes precedence over "SPRINGNodeIdIncoming" and "SPRINGNodeIdOutgoing". An EMS is allowed not to support this parameter.
"SPRINGNodeIdIncoming"	All SDH/SONET connectable layers	"0".."15" (may be any other string that matches the SPRINGNodeId attribute of PGs), "Unknown"	yes	EMS & NMS		This is the squelch Node ID for the incoming traffic, i.e. the ID of the node where it enters the ring. This parameter only applies if the "SPRINGNodeId" parameter is absent. An EMS is allowed not to support this parameter.
"SPRINGNodeIdOutgoing"	All SDH/SONET connectable layers	"0".."15" (may be any other string that matches the SPRINGNodeId attribute of PGs), "Unknown"	yes	EMS & NMS		This is the squelch Node ID for the outgoing traffic, i.e. the ID of the node where it leaves the ring. This parameter only applies if the "SPRINGNodeId" parameter is absent. An EMS is allowed not to support this parameter.

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1.10 TCM related parameters for SDH/SONET

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"TCMSupervision"	SDH/SONET path layer rates	"Monitoring", "Termination", "Off"	yes	EMS & NMS	ITU-T G.783	Identifies if TCM is applied and whether the TCM overhead is terminated at this TP or monitored non-intrusively. This parameter is related to codirectional transmission functions.
"TCMTrailTraceActualRx"	SDH/SONET path layer rates	a string of up to 64 chars	no	EMS	ITU-T G.783	This parameter is related to codirectional transmission functions.
"TCMTrailTraceActualTx"	SDH/SONET path layer rates	a string of up to 64 chars	yes	EMS & NMS	ITU-T G.783	This parameter is related to codirectional transmission functions.
"TCMTrailTraceExpectedRx"	SDH/SONET path layer rates	a string of up to 64 chars	yes	EMS & NMS	ITU-T G.783	This parameter is related to codirectional transmission functions only.
"TCMTrailTraceMonitor"	SDH/SONET path layer rates	"On", "Off"	yes	EMS & NMS	ITU-T G.783	Identifies if TCM Trace is monitored. This parameter is related to codirectional transmission functions.
"TCMContraSupervision"	SDH/SONET path layer rates	"Monitoring", "Termination", "Off"	yes	EMS & NMS	ITU-T G.783	Identifies if TCM is applied and whether the TCM overhead is terminated at this TP or monitored non-intrusively. This parameter is related to contradirectional transmission functions.
"TCMContraTrailTraceActualRx"	SDH/SONET path layer rates	a string of up to 64 chars	no	EMS	ITU-T G.783	This parameter is related to contradirectional transmission functions.
"TCMContraTrailTraceActualTx"	SDH/SONET path layer rates	a string of up to 64 chars	yes	EMS & NMS	ITU-T G.783	This parameter is related to contradirectional transmission functions.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"TCMContraTrailTraceExpectedRx"	SDH/SONET path layer rates	a string of up to 64 chars	yes	EMS & NMS	ITU-T G.783	This parameter is related to contradirectional transmission functions.
"TCMContraTrailTraceMonitor"	SDH/SONET path layer rates	"On", "Off"	yes	EMS & NMS	ITU-T G.783	Identifies if TCM Trace is monitored. This parameter is related to contradirectional transmission functions.

Note:

Codirectional transmission functions mean those which work in the same direction as the direction of the port, i.e.

- sink functions related to information which is mapped from the signal received by the containing PTP
- source functions related to the information which is mapped to the signal transmitted by the containing PTP

Contradirectional transmission functions mean those which work in the opposite direction as the direction of the port, i.e.

- sink functions related to information which is mapped to the signal transmitted by the containing PTP
- source functions related to the information which is mapped from the signal received by the containing PTP

For an example refer to Figure 3: "Parameters associated to a TCM function" contained in the LocationIdentification supporting document.

1.11 TCM related parameters for DWDM/OTN

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"TCMLevel<n>Supervision" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	"Monitoring", "Termination", "Off"	yes	EMS & NMS	ITU-T G.798	Identifies if TCM of level <n> is applied and whether the TCM overhead is terminated or monitored non-intrusively. This parameter is related to codirectional transmission functions.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"TCMLevel<n>TrailTraceActualRx" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	a string of up to 64 chars	no	EMS	ITU-T G.798	This parameter is related to codirectional transmission functions.
"TCMLevel<n>TrailTraceActualTx" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	a string of up to 64 chars	yes	EMS & NMS	ITU-T G.798	This parameter is related to codirectional transmission functions.
"TCMLevel<n>TrailTraceExpectedDAPIRx" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	a string of up to 15 chars	yes	EMS & NMS	ITU-T G.798	This is the expected DAPI component of the path trace of TCM level <n>. This parameter is related to codirectional transmission functions only.
"TCMLevel<n>TrailTraceExpectedSAPIRx" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	a string of up to 15 chars	yes	EMS & NMS	ITU-T G.798	This is the expected SAPI component of the path trace of TCM level <n>. This parameter is related to codirectional transmission functions only.
"TCMLevel<n>TrailTraceMonitorDAPI" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	"On", "Off"	yes	EMS & NMS	ITU-T G.798	Identifies if the DAPI component of the TCM Level <n> Trace is monitored. This parameter is related to codirectional transmission functions.
"TCMLevel<n>TrailTraceMonitorSAPI" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	"On", "Off"	yes	EMS & NMS	ITU-T G.798	Identifies if the SAPI component of the TCM Level <n> Trace is monitored. This parameter is related to codirectional transmission functions.
"TCMLevel<n>ContraSupervision" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	"Monitoring", "Termination", "Off"	yes	EMS & NMS	ITU-T G.798	Identifies if TCM of level <n> is applied and whether the TCM overhead is terminated or monitored non-intrusively. This parameter is related to contradirectional transmission functions.
"TCMLevel<n>ContraTrailTraceActualRx" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	a string of up to 64 chars	no	EMS	ITU-T G.798	This parameter is related to contradirectional transmission functions.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"TCMLevel<n>ContraTrailTraceActualTx" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	a string of up to 64 chars	yes	EMS & NMS	ITU-T G.798	This parameter is related to contradirectional transmission functions.
"TCMLevel<n>ContraTrailTraceExpectedDAPIRx" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	a string of up to 15 chars	yes	EMS & NMS	ITU-T G.798	This is the expected DAPI component of the path trace of TCM level <n>. This parameter is related to contradirectional transmission functions only.
"TCMLevel<n>ContraTrailTraceExpectedSAPIRx" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	a string of up to 15 chars	yes	EMS & NMS	ITU-T G.798	This is the expected SAPI component of the path trace of TCM level <n>. This parameter is related to contradirectional transmission functions only.
"TCMLevel<n>ContraTrailTraceMonitorDAPI" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	"On", "Off"	yes	EMS & NMS	ITU-T G.798	Identifies if the DAPI component of the TCM Level <n> Trace is monitored. This parameter is related to contradirectional transmission functions.
"TCMLevel<n>ContraTrailTraceMonitorSAPI" <n> := 1 | 2 | 3 | 4 | 5 | 6	ODU1, ODU2, ODU3	"On", "Off"	yes	EMS & NMS	ITU-T G.798	Identifies if the SAPI component of the TCM Level <n> Trace is monitored. This parameter is related to contradirectional transmission functions.

Note:

Codirectional transmission functions mean those which work in the same direction as the direction of the port, i.e.

- sink functions related to information which is mapped from the signal received by the containing PTP
- source functions related to the information which is mapped to the signal transmitted by the containing PTP

Contradirectional transmission functions mean those which work in the opposite direction as the direction of the port, i.e.

- sink functions related to information which is mapped to the signal transmitted by the containing PTP
- source functions related to the information which is mapped from the signal received by the containing PTP

For an example refer to Figure 3: "Parameters associated to a TCM function" contained in LocationIdentification supporting document

1.12 Radio specific parameters

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ATPCEnabled"	LR_PHYSICAL_MEDIALESS	“True”, “False”	yes	EMS	Microwave Radio: ITU-R F.750-4, ITU-T G.774.08.	This attribute specifies whether the ATPC device is currently allowed to work or not. A value of “True” indicates that the ATPC device is allowed to work and a value of “False” indicates that the device is not allowed to work (i.e. the transmit power has a fixed value).
"ATPCImplemented"	LR_PHYSICAL_MEDIALESS	“True”, “False”	no	EMS	Microwave Radio: ITU-R F.750-4, ITU-T G.774.08.	This attribute specifies whether the Automatic Transmitter Power Control capability is present or not. A value of “True” indicates that the ATPC capability is present and a value of “False” indicates that the ATPC capability is not present.
"ClientType"						refer to "ClientType" in chapter Generally Applicable parameters
"MaxClientRate"						refer to "MaxClientRate" in chapter Generally Applicable parameters
"PSMPresent"	SDH MS and VC4 layer rates	“True”, “False”	yes	EMS	Microwave Radio: ITU-R F.750-4, ITU-T G.774.08.	This attribute specifies whether the monitoring of protected (radio) section function, including protection switch, is present or not.
"RxPolarization"	LR_PHYSICAL_MEDIALESS	“vertical”, “horizontal”, ”unspecified“	no	EMS	Microwave Radio: ITU-R F.750-4, ITU-T G.774.08.	This attribute is used to specify the related polarization state at receive side.
"RxRadioFrequency"	LR_PHYSICAL	This is in a decimal format and in terms of Mhz	no	EMS	Microwave	This attribute is used to specify the carrier radio frequencies

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
	MEDIALESS				Radio: ITU-R F.750-4, ITU-T G.774.08.	at receive side.
"TxPolarization"	LR_PHYSICAL_MEDIALESS	It can be one of “vertical”, “horizontal”, ”unspecified “	no	EMS	Microwave Radio: ITU-R F.750-4, ITU-T G.774.08.	This attribute is used to specify the related polarization state at transmit side.
"TxRadioFrequency"	LR_PHYSICAL_MEDIALESS	This is in a decimal format and in terms of Mhz	no	EMS	Microwave Radio: ITU-R F.750-4, ITU-T G.774.08.	This attribute is used to specify the carrier radio frequencies at transmit side.

1.13 Ethernet specific parameters

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"ProtocolIdentifier"	LR_Encapsulation	“HDLC_PPP”, “HDLC_LAPS”, “ML_PPP_BAP”, “GFP_TRANSPARENT”, “GFP_FRAME_MAPPED”	no	EMS	RFC1990 RFC2125 X.86 G.7041 G.783	It indicates the encapsulation method. This is a read-only parameter.
"AutoNegotiation"	LR_DSR_Fast_Ethernet	“Enabled”, “Disabled”	yes	EMS & NMS	IEEE 802.3	This transmission parameter indicates if the auto-negotiation feature is enabled or disabled. The default value

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
						is enabled. This is a read-write parameter. Note: Only necessary for 10 and 100 Mbit/s
AdministrativeSpeedRate	LR_DSR_Fast_Ethernet	"0", “10M”, “100M”,	yes	EMS & NMS		This parameter indicates the upper bound allowed as a result of a rate negotiation (if auto-negotiation is enabled) or (if auto-negotiation is disabled) the maximum rate the interface is provisioned to support. Note that on a PTP it is at most equal to the rate of the bearing DSR layer. This parameter is read/write and its domain is 0 to 10GB in 1M increment i.e., “0” to “10000”. The special value 0 indicates that the interface is (temporarily) not passing traffic. Note: settable between 10 and 100 read only for 1000 and higher
"ActualSpeedRate"	LR_DSR_Fast_Ethernet	~~0 to 10GB in 1M increment i.e., “0” to “10000”.~~ ~~or~~“10M”, “100M”,~~“1000M”,~~ ~~“10G”~~	yes	EMS & NMS		When AutoNegotiation is disabled this parameter indicates the required operational speed rate and is equal to AdministrativeSpeedRate. When AutoNegotiation is enabled this parameter indicates the negotiated speed rate (which is less or equal to AdministrativeSpeedRate). Note: Only necessary for 10 and 100 Mbit/s
"DuplexMode"	LR_DSR_Fast_Ethernet	“Full”, “Half”	yes	EMS & NMS		When AutoNegotiation is disabled, and when the Ethernet port is configured to support half or full duplex, this parameter is used to indicate the **desired** Duplex Mode. The parameter is read/write. When AutoNegotiation is enabled, this parameter has no meaning. Note: 1000M and 10G only works in Full duplex mode.
"ActualDuplexMode"	LR_DSR_Fast_Ethernet	“Full”, “Half”	yes	EMS		This is a read only parameter indicating the **actual** Duplex mode used on the interface. Note: 1000M and 10G only works in Full duplex mode.

1.14 VCAT specific parameters

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"SentSequenceNumber"	LR_Fragment's termination function	Integer	no	EMS	ITU-T G.783	It indicates the sequence number sent by the fragmented source CTP. This is a read-only parameter.
"ExpectedSequenceNumber"	LR_Fragment's termination function	Integer	no	EMS	ITU-T G.783	It indicates the sequence number expected by the fragmented sink CTP. This is a read-only parameter.
"AcceptedSequenceNumber"	LR_Fragment's termination function	Integer	no	EMS	ITU-T G.783	It indicates the received sequence number (AcSQ) recovered from H4 byte, bits 1-4 in multiframe 14 and 15 and accepted by the fragmented sink CTP. This is a read-only parameter.
PayloadCarryingTx	LR_Fragment's termination function	"True", "False"	yes	EMS		Indication whether the given fragment is currently active and carrying payload. This is a read-only parameter.
PayloadCarryingRx	LR_Fragment's termination function	"True", "False"	yes	EMS		Indication whether the given fragment is currently active and carrying payload. This is a read-only parameter.

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1.15 Frame Relay specific parameters

Note 1: The terms Committed Burst Size (CBS) and Excess Burst Size (EBS) are abbreviated as Bc and Be respectively in the Frame Relay Forum specifications (e.g., FRF.2.2) and in RF C2954 . However, in order to make the parameters being generic so that they can be used for all packet switched layers, the generic abbreviations CBS and EBS are used as in RFC 2697.

Note 2: For the transmission direction FRF.2.2 uses the suffix Fwd (forward) and Bwd (backward) but MTNM follows the terminology of RFC 2954, i.e. uses the prefix "In" (ingress to the network) instead of "Fwd" and the prefix "Out" (egress from the network) instead of "Bwd".

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
InCBS	All packet switched layers, in particular LR_FR_PVC	A number n	Yes	EMS & NMS	I.370, RFC2954	Committed Burst Size - Ingress The maximum amount of data (in bits) that the network agrees to transfer in the ingress direction to the network (forward), under normal conditions, during a Committed Rate Measurement Interval (Tc). See complete definition in RFC 2954, and more generic definition for DiffServ in RFC 3289 (appears as CBS).
OutCBS	All packet switched layers, in particular LR_FR_PVC	A number n	Yes	EMS & NMS	I.370, RFC2954	Committed Burst Size - Egress The maximum amount of data (in bits) that the network agrees to transfer in the egress direction from the network (backward), under normal conditions, during a Committed Rate Measurement Interval (Tc).
InEBS	All packet switched layers, in particular LR_FR_PVC	A number n	Yes	EMS & NMS	I.370, RFC2954	Excess Burst Size - Ingress The maximum amount of uncommitted data (in bits) in excess of Committed Burst Size that a frame relay network can attempt to deliver in the ingress direction into the network (forward) during a Committed Rate Measurement Interval (Tc). This data generally is delivered with a lower probability than CBS. The network treats EBS data as discard eligible.

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
OutEBS	All packet switched layers, in particular LR_FR_PVC	A number n	Yes	EMS & NMS	I.370, RFC2954	Excess Burst Size - Egress The maximum amount of uncommitted data (in bits) in excess of Committed Burst Size that a frame relay network can attempt to deliver in the egress direction from the network (backward) during a Committed Rate Measurement Interval (Tc). This data generally is delivered with a lower probability than CBS. The network treats EBS data as discard eligible.
InCIR	All packet switched layers, in particular LR_FR_PVC	A number n	Yes	EMS & NMS	I.370, RFC2954	Committed Information Rate - Ingress The transport speed (in bits/sec) the frame relay network will maintain between service locations when data is presented in the ingress direction into the network (forward).
OutCIR	All packet switched layers, in particular LR_FR_PVC	A number n	Yes	EMS & NMS	I.370, RFC2954	Committed Information Rate - Egress The transport speed (in bits/sec) the frame relay network will maintain between service locations when data is presented in the egress direction from the network (backward).

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1.16 DSL (Digital Subscriber Line/Loop) specific parameters

Note:

The applicability of an individual transmission parameter, i.e. a row of the table, to one or more DSL types, is specified in the "Layers" column by adding to the layer rate the applicable DSL types in brackets, e.g. "LR_DSL (ADSL, VDSL)", and by additionally commenting the "Legal values" and/or "Comment / Example" columns if required. If no brackets and/or comments are added the parameter and/or its values apply to all DSL types.

The xTU-R (xDSL Transceiver Unit at the Remote side) is considered to be an MTNM remote unit (RU) and therefore parameters referring to the xTU-R end point of the xDSL line are prefixed with "RU_".
So parameters with "RU_" prefix refer to upstream data while parameters without "RU_" prefix refer to downstream data.

Configuration parameters, i.e. transmission parameters that are writeable by the NMS, are in general suffixed by "Cfg".

Parameters, which are indicated as optional in the source standard(s) or require implementation considerations, are marked as conditional.

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"DSLtype" (mandatory)	LR_DSL	"ADSL", "SHDSL", "VDSL", "Unknown"	yes	EMS & NMS	"ADSL" refers to G.992.1, G.992.2, G.997.1 (1999), RFC 2662, RFC 3440; "SHDSL" refers to G.991.2, RFC 3276; "VDSL" refers to G.993.1, TR-057, draft-ietf-adslmib-vdsl.	These types are further qualified by type-specific transmission parameters. "Unknown" is used for loop qualification (see the maintenanceCommands supporting document).
"InitFailureSwitch"	LR_DSL (ADSL, VDSL)	"On", "Off"	yes	EMS & NMS		allows to switch on or off the reporting of initialization failure alarms (see parameter "InitStatus" below)

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"LineCode"	LR_DIGITAl_SIGNAL_RATE	ADSL: "cap", "dmt", "qam", "other"; SHDSL: not used; VDSL: "mcm", "scm", "other"	yes	EMS		defines the line coding type used on this xDSL line Note: "LineCode" is also defined for PDH and SDH/SONET (DSR) layers but with different values.
"LineType"	LR_DSL (ADSL, VDSL)	"noChannel", "fastOnly", "interleavedOnly", "fastOrInterleaved", "fastAndInterleaved"	yes	EMS		defines the type of xDSL physical line by defining whether and how the line is channelized including dual latency mode, i.e. which latency path or channel type(s) are supported by this xDSL line
"LatencyCfg" (conditional)	LR_DSL (ADSL, VDSL)	"fast", "interleavedLow", "interleavedHigh"	yes	EMS & NMS		configured downstream latency with no, low, high interleave delay in case of "interleavedOnly" or "fastOrInterleaved" xDSL line type (see also "[RU_]InterleaveDelay[Cfg]")
"RU_LatencyCfg" (conditional)	LR_DSL (ADSL, VDSL)	"fast", "interleavedLow", "interleavedHigh"	yes	EMS & NMS		configured upstream latency with no, low, high interleave delay in case of "interleavedOnly" or "fastOrInterleaved" xDSL line type (see also "[RU_]InterleaveDelay[Cfg]")
"VendorTMDpointer" (conditional)	LR_DSL (ADSL)	string	yes	EMS & NMS		value of TMD name component of TMD name of a vendor-specific transmission descriptor for LR_DSL and LR_DIGITAL_SIGNAL_RATE
"TransModeCap" (conditional)	LR_DSL (ADSL)	string containing comma list of integers "0".."12"	no	EMS	G.997.1 (1999) G.992.1	transmission modes (G.997.1 (1999) transmission system coding types) the ATU-C is capable of supporting; the values are defined by the bit definitions in RFC 3440, e.g. "5" means "G.992.1 ISDN overlapped"
"TransModeCfg" (conditional)	LR_DSL (ADSL)	see "TransModeCap"	yes	EMS & NMS		transmission modes currently enabled by the ATU-C
"TransMode" (conditional)	LR_DSL (ADSL)	"0".."12", "13", "Unknown"	yes	EMS	G.994.1	actual transmission mode of the ATU-C; "13" is the handshake mode (G.994.1)

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"PowerState" (conditional)	LR_DSL (ADSL)	"L0", "L1", "L3"	yes	EMS	G.997.1 RFC3440	ADSL power state
"LiteTMDpointer" (conditional)	LR_DSL (ADSL)	string	yes	EMS & NMS	G.992.2	value of TMD name component of TMD name of an ADSL transmission descriptor for G.992.2 configuration in G.dmt/G.lite dual mode configurations
"DataRate"	LR_DSL (ADSL, SHDSL, VDSL)	ADSL: "32.."8192"(32), "invalid"; SHDSL: "192.."2304"(8) in 2-wire mode, "384.."4608"(16) in 4-wire mode, "invalid"; VDSL: integer, "invalid"	yes	EMS		in case of ADSL and VDSL, aggregate downstream transmit speed (fast and interleaved latency paths), measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL); legal values and increments in case of VDSL depend on "ApplicableStandard", on "Bandplan", and possibly on "DeploymentScenario", and may be vendor-specific due to hardware features in case of SHDSL, actual line rate of the span (transmit and receive speed), measured in kbps and steps of 8 kbps resp. 16 kbps; the EMS may implement a different stepping, e.g. (64) resp. (128). See also Table 1.
"RU_DataRate"	LR_DSL (ADSL, VDSL)	ADSL: "32.."1024"(32), "invalid"; VDSL: integer, "invalid"	yes	EMS		aggregate upstream transmit speed, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL); legal values in case of VDSL depend on the legal values of "DataRate" as specified by "ApplicableStandard", by "Bandplan", and by "DeploymentScenario" as well as possibly by vendor-specific documentation; "RU_DataRate" either is equal to "DataRate" (**symmetric VDSL**) or is much smaller than "DataRate" and then depends on it individually (**asymmetric VDSL**)
"DataRateFast" (conditional)	LR_DSL (ADSL, VDSL)	see "DataRate"	yes	EMS		current downstream transmit speed of fast latency path, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL). See also Table 1.

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"RU_DataRateFast" (conditional)	LR_DSL (ADSL, VDSL)	see "RU_DataRate"	yes	EMS		current upstream transmit speed of fast latency path, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"PrevDataRateFast" (conditional)	LR_DSL (ADSL)	see "DataRate"	no	EMS		previous downstream transmit speed of fast latency path, measured in kbps and steps of 32 kbps
"RU_PrevDataRateFast" (conditional)	LR_DSL (ADSL)	see "RUDataRate"	no	EMS		previous upstream transmit speed of fast latency path, measured in kbps and steps of 32 kbps
"DataRateSlow" (conditional)	LR_DSL (ADSL, VDSL)	see "DataRate"	yes	EMS		current downstream transmit speed of interleaved channel, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"RU_DataRateSlow" (conditional)	LR_DSL (ADSL, VDSL)	see "RU_DataRate"	yes	EMS		current upstream transmit speed of interleaved channel, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"PrevDataRateSlow" (conditional)	LR_DSL (ADSL)	see "DataRate"	no	EMS		previous downstream transmit speed of interleaved channel, measured in kbps and steps of 32 kbps
"RU_PrevDataRateSlow" (conditional)	LR_DSL (ADSL)	see "RU_DataRate"	no	EMS		previous upstream transmit speed of interleaved channel, measured in kbps and steps of 32 kbps
"InterleaveDelay" (conditional)	LR_DSL (ADSL, VDSL)	integer, "invalid"	no	EMS		interleave delay/ interleaving depth (in milliseconds) of downstream interleaved channel (i.e., degree of separation of subsequent input bytes in interleaver bit stream)
"RU_InterleaveDelay" (conditional)	LR_DSL (ADSL, VDSL)	integer, "invalid"	no	EMS		interleave delay/ interleaving depth (in milliseconds) of upstream interleaved channel (i.e., degree of separation of subsequent input bytes in interleaver bit stream)

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"CrcBlockLengthFast" (conditional)	LR_DSL (ADSL)	integer	no	EMS		current length of downstream fast channel data block on which cyclic redundancy check (CRC) is calculated, measured in bytes
"RU_CrcBlockLengthFast" (conditional)	LR_DSL (ADSL)	integer	no	EMS		current length of upstream fast channel data block on which cyclic redundancy check (CRC) is calculated, measured in bytes
"CrcBlockLengthSlow" (conditional)	LR_DSL (ADSL)	integer	no	EMS		current length of data block of downstream interleaved channel on which the CRC operates, measured in bytes
"RU_CrcBlockLengthSlow" (conditional)	LR_DSL (ADSL)	integer	no	EMS		current length of data block of upstream interleaved channel on which the CRC operates, measured in bytes
"SnrMgn"	LR_DSL (ADSL, SHDSL, VDSL)	ADSL: "-640.."640", "notApplicable", "invalid"; SHDSL: "-127.."128", "notApplicable","invalid"; VDSL: "-31.75.."31.75"(0.25), "notApplicable", "invalid"	no	EMS		in case of ADSL or VDSL, current noise margin as seen by the xTU-C/O with respect to its received signal, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "-1270.."1280"(10) in case of ADSL and "-127.."128"(1) in case of VDSL in case of SHDSL, current downstream noise margin for this segment end point, if applicable, measured in dB and steps of 1 dB; the EMS may implement a different range and stepping, e.g. "-64.."63.5"(0.5); in case of SHDSL, "SnrMgn" of a network side PTP is "0"

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"RU_SnrMgn"	LR_DSL (ADSL, SHDSL, VDSL)	ADSL: "-640.."640", "notApplicable", "invalid"; SHDSL: "-127.."128", "notApplicable","invalid"; VDSL: "-31.75.."31.75"(0.25), "notApplicable", "invalid"	no	EMS		in case of ADSL or VDSL, current SNR margin as seen by the xTU-R with respect to its received signal, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "-1270.."1280"(10) in case of ADSL and "-127.."128"(1) in case of VDSL in case of SHDSL, current upstream noise margin for this segment end point, if applicable, measured in dB and steps of 1 dB; the EMS may implement a different range and stepping, e.g. "-64.."63.5"(0.5); in case of SHDSL, "RU_SnrMgn" of a customer side PTP is "0" See also Table 1.
"Attenuation"	LR_DSL (ADSL, SHDSL, VDSL)	ADSL: "0.."630", "notApplicable", "invalid"; SHDSL: "-127.."128", "notApplicable","invalid"; VDSL: "0.."63.75"(0.25), "notApplicable", "invalid"	no	EMS		in case of ADSL or VDSL, measured difference in the total power transmitted by the peer xTU-R and the total power received by this xTU-C/O, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "0.."1275"(5) in case of ADSL and "0.."127.5"(0.5) in case of VDSL in case of SHDSL, current downstream loop attenuation for this segment end point, measured in dB and steps of 1 dB; the EMS may implement a different range and stepping, e.g. "0.."127.5"(0.5)
"RU_Attenuation"	LR_DSL (ADSL, SHDSL, VDSL)	ADSL: "0.."630", "notApplicable", "invalid"; SHDSL: "-127.."128", "notApplicable","invalid"; VDSL: "0.."63.75"(0.25), "notApplicable", "invalid"	no	EMS		in case of ADSL or VDSL, measured difference in the total power transmitted by the peer xTU-C/O and the total power received by this xTU-R, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "0.."1275"(5) in case of ADSL and "0.."127.5"(0.5) in case of VDSL in case of SHDSL, current upstream loop attenuation for this segment end point, measured in dB and steps of 1 dB; the EMS may implement a different range and stepping, e.g. "0.."127.5"(0.5)

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"LineStatus"	LR_DSL (ADSL, VDSL)	string containing comma list of single strings taken from the following list: "noDefect", "lossOfFraming", "lossOfLink", "lossOfPower", "lossOfSignal", "lossOfSignalQuality", "lossOfSyncWord", "dataInitFailure", "configInitFailure", "protocolInitFailure", "noPeerTUPresent", "bitRateThreshold"	yes (SCN)	EMS		The multiple-valued **Line status** reports the current DSL state of the xDSL line as recognized by the xTU-C/O, and further qualifies the Operational state (when it is disabled). As for the Availability status and Control status, the inherent multiplicity of the value of Line status is encoded by use of a comma list.
"RU_LineStatus"	LR_DSL (ADSL, VDSL)	see "LineStatus"	yes (SCN)	EMS		The multiple-valued **RU Line status** reports the current DSL state of the xDSL line as recognized by the xTU-R, if possible, and further qualifies the Operational state (when it is disabled). As for the Availability status and Control status, the inherent multiplicity of the value of RU Line status is encoded by use of a comma list. While trouble shooting the xTU-R, "LineStatus" should be used.
"InitStatus"	LR_DSL (ADSL, VDSL)	"noInitError", "ntNotPresent", "communicationFailed", "fastRetrainProfileError", "rateParameterConfigurationError", "serviceTypeTURRequestRejected", "serviceTypeTUCRequestRejected", "configuredRatesOutOfRange", "configuredMinMaxRelationInvalid", "channelRatesExceedsSystemLimits", "adaptationCombinationInvalid", "configuredDualChannelInvalid", "marginLessThanMinMargin", "adrNotCapableOfDualLatency", "trainingBlockedBySu", "trainingBlockedByCi", "ntNotPresentDetectedOnCi", "gliteModeNotPossibleInPCM", "alarmsDetected", "initStatusUnknown"	yes (SCN)	EMS		The **Initialization status** describes the error in case of an activation problem on the xDSL line during initialization (link activation fault "ACT" on LR_DIGITAL_SIGNAL_RATE). The Operational state is disabled, except in case "noInitError". Therefore the Init status further qualifies the Operational state.

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"LinkState" (conditional)	LR_DSL (ADSL, VDSL)	"unknown", "quiet", "idle", "train", "active", "download", "remoteDownload", "sleepMode", "mtaRunning"	yes (SCN)	EMS		The **Link state** describes the current internal state and use of the xDSL line.
"AISonLOS" (conditional)	LR_ATM_NI	"DISABLED", "ENABLED"	yes (SCN)	EMS & NMS		disables or enables the VP-AIS generation after LOS or RU_LOS defect, for all non-potential ATM VP CTPs contained in the ATM NI CTP
"AISonACT" (conditional)	LR_ATM_NI	"DISABLED", "ENABLED"	yes (SCN)	EMS & NMS		disables or enables the VP-AIS generation after link activation fault, for all non-potential ATM VP CTPs contained in the ATM NI CTP
"OutputPower"	LR_DSL (ADSL, SHDSL, VDSL)	ADSL: "-310.."310", "invalid"; SHDSL: "-310.."310", "invalid"; VDSL: "-5.."15"(0.5)	no	EMS		measured total output power transmitted by the xTU-C/O, measured in tenth dBm (i.e., centibel mW) and steps of 1 cBm in case of ADSL and SHDSL, and in dB and steps of 0.5 dBm in case of VDSL; the EMS may implement a different range and stepping, e.g. "-310.."320"(10) in case of ADSL, "-200.."200"(1) in case of SHDSL, and"0.."14.5"(0.25) in case of VDSL
"RU_OutputPower"	LR_DSL (ADSL, SHDSL, VDSL)	ADSL: "-310.."310", "invalid"; SHDSL: "-310.."310", "invalid"; VDSL: "-25.."15"(0.5)	no	EMS		measured total output power transmitted by the xTU-R, measured in tenth dBm (i.e., centibel mW) and steps of 1 cBm in case of ADSL and SHDSL, and in dB and steps of 0.5 dBm in case of VDSL; the EMS may implement a different range and stepping, e.g. "-310.."320"(10) in case of ADSL, "-200.."200"(1) in case of SHDSL, and"0.."14.5"(0.25) in case of VDSL

ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"AttainableRate"	LR_DSL (ADSL, SHDSL, VDSL)	see "DataRate"	no	EMS		in case of ADSL and VDSL, maximum currently attainable data rate by the xTU-C/O, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL); in case of SHDSL, maximum attainable line rate of the span, i.e. maximum rate the line is capable of achieving as measured during line probing
"RU_AttainableRate"	LR_DSL (ADSL, VDSL)	see "RU_DataRate"	no	EMS		maximum currently attainable upstream data rate, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"FirstUsedSubCarrier" (conditional)	LR_DSL (ADSL)	"0".."256", "unknown"	yes	EMS		first currently used DMT subcarrier (bin) downstream (if applicable)
"LastUsedSubCarrier" (conditional)	LR_DSL (ADSL)	"0".."256", "unknown"	yes	EMS		last currently used DMT subcarrier (bin) downstream (if applicable)
"RU_FirstUsedSubCarrier" (conditional)	LR_DSL (ADSL)	"0".."64", "unknown"	yes	EMS		first currently used DMT subcarrier (bin) upstream (if applicable)
"RU_LastUsedSubCarrier" (conditional)	LR_DSL (ADSL)	"0".."64", "unknown"	yes	EMS		last currently used DMT subcarrier (bin) upstream (if applicable)
"TrellisCoding" (conditional)	LR_DSL (ADSL)	"On", "Off", "Unknown"	yes	EMS		current use or non-use of trellis coding
"TrellisCodingCfg" (conditional)	LR_DSL (ADSL)	"On", "Off"	yes	EMS & NMS		allows to switch trellis coding on or off
"BandwidthUsage" (conditional)	LR_DSL (ADSL, SHDSL, VDSL)	"0".."100"	no	EMS		percentage of current use of guaranteed bandwidth

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"OverbookingFactor" (conditional)	LR_DSL (ADSL, SHDSL, VDSL)	"noOverbooking", integer >= "100"	yes	EMS		grade of allowed overbooking of physical line rates; default value is "noOverbooking", "100" means overbooking with factor 1, "1000" means 10 times overbooking, etc.
"MinDataRateCfg"	LR_DSL (ADSL, SHDSL, VDSL)	ADSL: "32.."8192"(32); SHDSL: "192.."2304"(8) in 2-wire mode, "384.."4608"(16) in 4-wire mode; VDSL: integer	yes	EMS & NMS		in case of ADSL or VDSL, configured minimum aggregate transmit rate at xTU-C/O, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL); legal values and increments in case of VDSL depend on "ApplicableStandard", on "Bandplan", and possibly on "DeploymentScenario", and may be vendor-specific due to hardware features; in case of SHDSL, configured minimum transmit rate of the line, measured in kbps and steps of 8 resp. 16 kbps; the EMS may implement a different stepping, e.g. (64) resp. (128); if "MinRateCfg" equals "MaxRateCfg", the line rate is considered **fixed**, and otherwise it is **rate-adaptive**
"MaxDataRateCfg"	LR_DSL (ADSL, SHDSL, VDSL)	see "MinDataRateCfg"	yes	EMS & NMS		in case of ADSL or VDSL, configured maximum aggregate transmit rate at xTU-C/O, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL); legal values and increments in case of VDSL depend on "ApplicableStandard", on "Bandplan", and possibly on "DeploymentScenario", and may be vendor-specific due to hardware features; in case of SHDSL, configured maximum transmit rate of the line, measured in kbps and steps of 8 resp. 16 kbps; the EMS may implement a different stepping, e.g. (64) resp. (128); if "MaxRateCfg" equals "MinRateCfg", the line rate is considered **fixed**, and otherwise it is **rate-adaptive**
"MinDataRateFastCfg" (conditional)	LR_DSL (ADSL, VDSL)	see "MinDataRateCfg"	yes	EMS & NMS		configured minimum transmit rate for fast channel at xTU-C/O, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"MaxDataRateFastCfg" (conditional)	LR_DSL (ADSL, VDSL)	see "MinDataRateCfg"	yes	EMS & NMS		configured maximum transmit rate for fast channel at xTU-C/O, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)

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"MinDataRateSlowCfg" (conditional)	LR_DSL (ADSL, VDSL)	see "MinDataRateCfg"	yes	EMS & NMS		configured minimum Tx rate for interleaved channel at xTU-C/O, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"MaxDataRateSlowCfg" (conditional)	LR_DSL (ADSL, VDSL)	see "MinDataRateCfg"	yes	EMS & NMS		configured maximum Tx rate for interleaved channel at xTU-C/O, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"InterleaveDelayCfg" (conditional)	LR_DSL (ADSL, VDSL)	"0".."255"	yes	EMS & NMS		configured interleave delay (in milliseconds) of down-stream interleaved channel; larger numbers provide greater separation between consecutive input bytes in the output bit stream allowing for improved impulse noise immunity at the expense of payload latency
"RateSelectModeCfg" (conditional)	LR_DSL (ADSL, VDSL)	ADSL: "fixedRate", "adaptAtStartup", "adaptAtRuntime"; VDSL: "fixedRate", "adaptAtStartup"	yes	EMS & NMS	G.997.1 (1999)	xTU-C/O rate adaptation mode according to G.997.1 (1999), i.e. data rate selection behaviour in the downstream direction, either based on configured maximum channel data rates ("fixedRate") or adapted between configured minimum and maximum channel data rates during start up or (ADSL) continuously adapted during show time; "fixedRate" if not present
"RateAdaptRatioCfg" (conditional)	LR_DSL (ADSL, VDSL)	ADSL: "0".."100"; VDSL: "0".."100"(10)	yes	EMS & NMS		fast channel percentage of configured allocation ratio of excess transmit bandwidth between xTU-C/O fast and interleaved channels; defined as 100 * "MinDataRateFastCfg" / "MinDataRateCfg"

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"SnrMgnCfg"	LR_DSL (ADSL, VDSL)	ADSL: "0.."310"; VDSL: "0.."31.75"(0.25)	yes	EMS & NMS		configured target SNR margin the xTU-C/O must achieve with a BER of 10^{-7}, or better, to successfully complete (re-)initialization, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "0.."150"(10) See also Table 1.
"MaxSnrMgnCfg"	LR_DSL (ADSL, VDSL)	ADSL: "0.."310", "auto"; VDSL: "0.."31.75"(0.25), "auto"	yes	EMS & NMS		configured maximum noise margin the xTU-C/O should try to sustain, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "-60.."120"(10); "auto" configures expert calculation of the threshold value from the target SNR margin "SnrMgnCfg"; if the actual SNR margin is above this level the xTU-C/O should attempt to reduce power output to optimize operation
"MinSnrMgnCfg"	LR_DSL (ADSL, VDSL)	ADSL: "0.."310", "auto"; VDSL: "0.."31.75"(0.25), "auto"	yes	EMS & NMS		configured minimum noise margin the xTU-C/O should tolerate, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "-60.."120"(10); "auto" configures expert calculation of the threshold value from the target SNR margin "SnrMgnCfg"; if the actual SNR margin falls below this level the xTU-C/O should attempt to increase power output, if possible, or re-initialize
"UpshiftSnrMgnCfg" (conditional)	LR_DSL (ADSL)	see "MaxSnrMgnCfg" and "MinSnrMgnCfg"	yes	EMS & NMS		if the actual noise margin is above this level and stays above for more than "MinUpshiftTimeCfg" seconds, the ATU-C should increase its transmit net data rate
"DownshiftSnrMgnCfg" (conditional)	LR_DSL (ADSL)	see "MaxSnrMgnCfg" and "MinSnrMgnCfg"	yes	EMS & NMS		if the actual noise margin is below this level and stays below for more than "MinDownshiftTimeCfg" seconds, the ATU-C should decrease its transmit net data rate

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"MinUpshiftTimeCfg" (conditional)	LR_DSL (ADSL)	"0".."16383"	yes	EMS & NMS		measured in seconds, see "UpshiftSnrMgnCfg"; the upper value is defined by G.997.1
"MinDownshiftTimeCfg" (conditional)	LR_DSL (ADSL)	"0".."16383"	yes	EMS & NMS	G.997.1	measured in seconds, see "DownshiftSnrMgnCfg"; the upper value is defined by G.997.1
"RU_MinDataRateCfg"	LR_DSL (ADSL, VDSL)	ADSL: "32".."1024"(32); VDSL: integer	yes	EMS & NMS		configured minimum aggregate transmit rate at xTU-R, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL); legal values in case of VDSL depend on the legal values of downstream data rates as specified by "ApplicableStandard", by "Bandplan", and by "DeploymentScenario" as well as possibly by vendor-specific documentation
"RU_MaxDataRateCfg"	LR_DSL (ADSL, VDSL)	see "RU_MinDataRateCfg"	yes	EMS & NMS		configured maximum aggregate transmit rate at xTU-R, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL); legal values in case of VDSL depend on the legal values of downstream data rates as specified by "ApplicableStandard", by "Bandplan", and by "DeploymentScenario" as well as possibly by vendor-specific documentation.
"RU_MinDataRateFastCfg" (conditional)	LR_DSL (ADSL, VDSL)	see "RU_MinDataRateCfg"	yes	EMS & NMS		configured minimum transmit rate for fast channel at xTU-R, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"RU_MaxDataRateFastCfg" (conditional)	LR_DSL (ADSL, VDSL)	see "RU_MinDataRateCfg"	yes	EMS & NMS		configured maximum transmit rate for fast channel at xTU-R, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"RU_MinDataRateSlowCfg" (conditional)	LR_DSL (ADSL, VDSL)	see "RU_MinDataRateCfg"	yes	EMS & NMS		configured minimum Tx rate for interleaved channel at xTU-R, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"RU_MaxDataRateSlowCfg" (conditional)	LR_DSL (ADSL, VDSL)	see "RU_MinDataRateCfg"	yes	EMS & NMS		configured maximum Tx rate for interleaved channel at xTU-R, measured in kbps and steps of 32 kbps (ADSL) or individual steps (VDSL)
"RU_InterleaveDelayCfg" (conditional)	LR_DSL (ADSL, VDSL)	"0".."255"	yes	EMS & NMS		configured interleave delay (in milliseconds) of upstream interleaved channel; larger numbers provide greater separation between consecutive input bytes in the output bit stream allowing for improved impulse noise immunity at the expense of payload latency
"RU_RateSelectModeCfg"	LR_DSL (ADSL, VDSL)	ADSL: "fixedRate", "adaptAtStartup", "adaptAtRuntime"; VDSL: "fixedRate", "adaptAtStartup"	yes	EMS & NMS	G.997.1 (1999)	xTU-R rate adaptation mode according to G.997.1 (1999), i.e. data rate selection behaviour in the downstream direction, either based on configured maximum channel data rates ("fixedRate") or adapted between configured minimum and maximum channel data rates during start up or (ADSL) continuously adapted during show time; "fixedRate" if not present
"RU_RateAdaptRatioCfg" (conditional)	LR_DSL (ADSL, VDSL)	ADSL: "0.."100"; VDSL: "0.."100"(10)	yes	EMS & NMS		ratio (expressed in %) to be taken into account for distributing the xTU-R transmit bit rate considered for rate adaptation amongst the fast and interleaved data streams in case of excess bit rate; defined as 100 * "RU_MinDataRateFastCfg" / "RU_MinDataRateCfg"

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"RU_SnrMgnCfg"	LR_DSL (ADSL, VDSL)	ADSL: "0.."310"; VDSL: "0.."31.75"(0.25)	yes	EMS & NMS		configured target SNR margin the xTU-R must achieve with a BER of 10^{-7}, or better, to successfully complete (re-)initialization, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "0.."150"(10)
"RU_MaxSnrMgnCfg"	LR_DSL (ADSL, VDSL)	ADSL: "0.."310", "auto"; VDSL: "0.."31.75"(0.25), "auto"	yes	EMS & NMS		configured maximum noise margin the xTU-R should try to sustain, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "-60.."120"(10); "auto" configures expert calculation of the threshold value from the target SNR margin "SnrMgnCfg"; if the actual SNR margin is above this level the ATU-R should attempt to reduce power output to optimize operation. See also Table 1.
"RU_MinSnrMgnCfg"	LR_DSL (ADSL, VDSL)	ADSL: "0.."310", "auto"; VDSL: "0.."31.75"(0.25), "auto"	yes	EMS & NMS		configured minimum noise margin the xTU-R should tolerate, measured in tenth dB (i.e., centibel) and steps of 1 cB (ADSL) or in dB and steps of 0.25 dB (VDSL); the EMS may implement a different range and stepping, e.g. "-60.."120"(10); "auto" configures expert calculation of the threshold value from the target SNR margin "SnrMgnCfg"; if the actual SNR margin falls below this level the xTU-R should attempt to increase power output, if possible, or re-initialize
"RU_UpshiftSnrMgnCfg" (conditional)	LR_DSL (ADSL)	see "MaxSnrMgnCfg" and "MinSnrMgnCfg"	yes	EMS & NMS		if the actual noise margin is above this level and stays above for more than "MinUpshiftTimeCfg" seconds, the ATU-R should increase its transmit net data rate
"RU_DownshiftSnrMgnCfg" (conditional)	LR_DSL (ADSL)	see "MaxSnrMgnCfg" and "MinSnrMgnCfg"	yes	EMS & NMS		if the actual noise margin is below this level and stays below for more than "MinDownshiftTimeCfg" seconds, the ATU-R should decrease its transmit net data rate

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"RU_MinUpshiftTimeCfg" (conditional)	LR_DSL (ADSL)	"0".."16383"	yes	EMS & NMS	G.997.1	measured in seconds, see "RU_UpshiftSnrMgnCfg"; the upper value is defined by G.997.1
"RU_MinDownshiftTimeCfg" (conditional)	LR_DSL (ADSL)	"0".."16383"	yes	EMS & NMS	G.997.1	measured in seconds, see "RU_DownshiftSnrMgnCfg"; the upper value is defined by G.997.1
"NumRepeatersCfg"	LR_DSL (SHDSL)	"0".."8"	yes	EMS & NMS		configured number of repeaters/ regenerator units of the SHDSL/HDSL2 span
"NumRepeaters"	LR_DSL (SHDSL)	"0".."8"	yes	EMS		actual number of SRUs discovered in the span
"UnitID"	LR_DSL (SHDSL)	"STU-C", "STU-R", "SRU-1", "SRU-2", "SRU-3", "SRU-4", "SRU-5", "SRU-6", "SRU-7", "SRU-8"	no	EMS		unique identification of containing span unit for segment end point (SHDSL PTP) having this transmission parameter, or not present
"UnitSide"	LR_DSL (SHDSL)	"networkSide", "customerSide"	yes	EMS		the side of the unit associated with this segment end point, or not present
"WirePair"	LR_DSL (SHDSL)	"wirePair1", "wirePair2"	yes	EMS		the UTP of the SHDSL modem (span unit) associated with this segment end point, or not present
"TransModeCap"	LR_DSL (SHDSL)	string containing comma list of integers "0".."3"	no	EMS	G.991.2	transmission modes (G.991.2 regional requirements) the SHDSL line/ span is capable of supporting, selected from "0" = Annex A, symmetric PSD masks, "1" = Annex A, asymmetric PSD masks, "2" = Annex B, symmetric PSD masks, "3" = Annex B, asymmetric PSD masks

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"TransModeCfg"	LR_DSL (SHDSL)	see "TransModeCap"	yes	EMS & NMS		desired transmission modes
"TransMode"	LR_DSL (SHDSL)	"0".."3", "Unknown"	yes	EMS		actual transmission mode
"RemoteMgmtCfg"	LR_DSL (SHDSL)	"DISABLED", "ENABLED"	yes	EMS & NMS		enabling support of remote management of the span units from STU-C via the EOC
"LineProbingCfg"	LR_DSL (SHDSL)	"DISABLED", "ENABLED"	yes	EMS & NMS		enabling line probing of the span units to find the best possible data rate (rate adaptation during set up)
"PowerFeedingCfg" (conditional)	LR_DSL (SHDSL)	"noPower", "powerFeed", "wettingCurrent"	yes	EMS & NMS		desired support for optional power feeding (remote span powering) or wetting current (loop sealing current) on the SHDSL span
"PowerFeeding" (conditional)	LR_DSL (SHDSL)	"noPower", "powerFeed", "wettingCurrent", "invalid", "notSupported"	yes	EMS		actual power feeding of the line resp. span
"PseudoMacAddress" (conditional)	LR_DSL (SHDSL)	string	yes	EMS		pseudo MAC address of the STU-R, calculated using an offset from the global MAC address of the ME hosting the STU-C (DSLAM), which has to be configured in advance, and sent to the STU-R via the EOC; it is a hexadezimal string of length 12
"WireInterfaceCfg"	LR_DSL (SHDSL)	"twoWire", "fourWire"	yes	EMS & NMS		configuration of two-wire or optional four-wire operation (aka dual port mode) for SHDSL lines
"PSDMaskCfg"	LR_DSL (SHDSL)	"symmetric", "asymmetric"	yes	EMS & NMS		configuration of use of symmetric or asymmetric PSD mask for the line; see also "TransModeCfg"

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"CurrCondSnrMgnCfg"	LR_DSL (SHDSL)	"-10".."21"	yes	EMS & NMS		configuration of downstream current-condition target noise margin, measured in dB and steps of 1 dB; the EMS may implement a different range and stepping
"WorstCaseSnrMgnCfg"	LR_DSL (SHDSL)	"-10".."21"	yes	EMS & NMS		configuration of downstream worst-case target noise margin, measured in dB and steps of 1 dB
"RU_CurrCondSnrMgnCfg"	LR_DSL (SHDSL)	"-10".."21"	yes	EMS & NMS		configuration of upstream current-condition target noise margin
"RU_WorstCaseSnrMgnCfg"	LR_DSL (SHDSL)	"-10".."21"	yes	EMS & NMS		configuration of upstream worst-case target noise margin
"UsedSnrMgnsCfg"	LR_DSL (SHDSL)	string containing comma list of single strings taken from the following list: "CurrCondSnrMgn", "WorstCaseSnrMgn", "RU_CurrCondSnrMgn", "RU_WorstCaseSnrMgn"	yes	EMS & NMS		indicates whether a current-condition or worst-case target noise margin is enabled (inclusion in string value) or disabled (exclusion from string value) for being used during line probing
"ApplicableStandard"	LR_DSL (VDSL)	"ANSI", "ETSI", "ITU-T", "other"	yes	EMS & NMS	ANSI T1.424, ETSI TS 101 270, ITU-T G.993.x	applicable VDSL standard (if any) to be used for the line
"DeploymentScenario"	LR_DSL (VDSL)	"FTTCab", "FTTEx", "other"	yes	EMS & NMS		VDSL line deployment scenario: VTU-O is located in a street cabinet, or in the central office, or elsewhere
"BandPlan"	LR_DSL (VDSL)	"A/998", "B/997", "C/Fx", "other"	yes	EMS & NMS	G.993.1 T1.424	four band plan for spectral usage on the VDSL line (DS1/US1/DS2/US2): **A/998** is G.993.1 band plan A which is T1.424 plan 998, **B/997** is G.993.1 band plan B which is T1.424 plan 997, **C/Fx** is G.993.1 band plan C which depends on a variable frequency Fx between the DS2 and US2 bands

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"BandPlanFx"	LR_DSL (VDSL)	"3750.."12000"	yes	EMS & NMS		variable frequency of band plan C/Fx, measured in kHz
"BandOptUsage" (conditional)	LR_DSL (VDSL)	"unused", "upstream", "downstream"	yes	EMS & NMS		use of the frequency range Opt (25 kHz - 138 kHz) by the VDSL line
"ADSLpresence" (conditional)	LR_DSL (VDSL)	"none", "ADSLoverPOTS", "ADSLoverISDN"	yes	EMS & NMS		provisioning of the presence of ADSL service in the associated cable bundle/binder
"PsdTemplate"	LR_DSL (VDSL)	"templateMask1" (notched), "templateMask2" (unnotched)	yes	EMS & NMS		downstream PSD template mask to be used for the line; the templates depend on "ApplicableStandard" and "DeploymentScenario"
"RU_PsdTemplate"	LR_DSL (VDSL)	"templateMask1", "templateMask2"	yes	EMS & NMS		upstream PSD template mask to be used for the line; the templates depend on "ApplicableStandard" and "DeploymentScenario"; the EMS may impose dependencies on "PsdTemplate" (e.g., require mask-1 resp. mask-2 if the value of "PsdTemplate" is mask-1 resp. mask-2)
"PboControl" (conditional)	LR_DSL (VDSL)	"noPbo", "manualPbo", "automaticPbo"	yes	EMS & NMS		downstream power backoff (PBO) mode (DPBO); automatic DPBO may be based on vendor-specific line measurement methods
"PboLevel" (conditional)	LR_DSL (VDSL)	"0.."12.0"(0.25)	yes	EMS & NMS		downstream PBO level to be used when "PboControl" is set to "manualPbo", measured in dB and steps of 0.25 dB
"RU_PboControl"	LR_DSL (VDSL)	"noPbo", "manualPbo", "automaticPbo"	yes	EMS & NMS		upstream power backoff (PBO) mode (UPBO); automatic UPBO is based on line measurements per PBO mask calculation according to "ApplicableStandard"
"RU_PboLevel"	LR_DSL (VDSL)	"0.."40.0"(0.25)	yes	EMS & NMS		upstream PBO level to be used when "RU_PboControl" is set to "manualPbo", measured in dB and steps of 0.25 dB

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"HamBandMask"	LR_DSL (VDSL)	string containing comma list of single strings taken from the following list: "hamBand30m", "hamBand40m", "hamBand80m", "hamBand160m", "customNotch1", "customNotch2"	yes	EMS & NMS		configuration of Handheld AMateur radio (HAM) bands that should be notched, namely the four standard HAM bands (up to 10.15 MHz), which are defined in the applicable VDSL spectrum (up to 12 MHz) according to "ApplicableStandard", and one or two custom notches; a notch is enabled by inclusion in the string value and disabled by exclusion from the string value
"CustomNotch1Start"	LR_DSL (VDSL)	integer	yes	EMS & NMS		start frequency (in kHz) of the first custom-specific notch
"CustomNotch1Stop"	LR_DSL (VDSL)	integer	yes	EMS & NMS		stop frequency (in kHz) of the first custom-specific notch; must be larger than "CustomNotch1Start"
"CustomNotch2Start"	LR_DSL (VDSL)	integer	yes	EMS & NMS		start frequency (in kHz) of the second custom-specific notch
"CustomNotch2Stop"	LR_DSL (VDSL)	integer	yes	EMS & NMS		stop frequency (in kHz) of the second custom-specific notch; must be larger than "CustomNotch2Start"
"TargetSlowBurst"	LR_DSL (VDSL)	integer	yes	EMS & NMS		downstream target level (in microseconds) of impulse noise (burst) protection for an interleaved (slow) channel
"RU_TargetSlowBurst"	LR_DSL (VDSL)	integer	yes	EMS & NMS		upstream target level (in microseconds) of impulse noise (burst) protection for an interleaved (slow) channel
"MaxFastFEC"	LR_DSL (VDSL)	integer	yes	EMS & NMS		downstream maximum level (in %) of Forward Error Correction (FEC) redundancy related overhead to be maintained for a fast channel
"RU_MaxFastFEC"	LR_DSL (VDSL)	integer	yes	EMS & NMS		upstream maximum level (in %) of Forward Error Correction (FEC) redundancy related overhead to be maintained for a fast channel

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ParameterName	Layers	Legal values	AVC (or SC) notification raised if value changes?	Potentially settable from	Source Standard	Comment / Example
"LoopLengthEstimate"	LR_DSL (VDSL)	integer	yes	EMS		estimated loop length in feet assuming a 26 AWG loop

G.997.1, TR-057	Q.833.1, TR-028	RFC 2662, draft-ietf-adslmib-vdsl	TR-050	MTNM v3
ATU-C Target Noise Margin, Target Noise Margin - Downstream	adslConfigurationProfile. targetSnr MarginAtuC	AdslLineConfProfileEntry.adslAtucConf TargetSnrMgn	ADSLConfiguration ProfileValueType. lineConfAtuc. targetSNRMargin	"SnrMgnCfg"
Actual ATU-R SNR Margin	adslLineTTP.current SnrMargin	AdslAturPhysEntry. adslAturCurrSnrMgn	ADSLLineValue Type.lineAturData. currentSNRMargin	"RU_SnrMgn"
Maximum Noise Margin - Upstream	n/a	VdslLineConfProfileEntry.vdslLineConfUpstreamMa xSnrMgn	n/a	"RU_MaxSnrMgn"
ATU-C Current Rate Interleaved + ATU-C Current Rate Fast, Current Line Data Rate - Downstream	adslLineTTP.current LineRate	ifTable.ifSpeed for ifType adsl(94), ifTable.ifSpeed for ifType vdsl(97)	ADSLLineValue Type.lineAtucData. currentLineRate	"DataRate"
ATU-C Current Rate Fast	adslChannel TTP.current ChannelRate	ifTable.ifSpeed for ifType fast(125), or AdslAtucChan Entry.adslAtucChanCurrTxRate	ADSLChannelValue Type.atucData. currentChannelRate	"DataRateFast"

Table 1: Examples of ITU-T/IETF/DSLF Parameter Names and Simple MTNM Names