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Re:	Contribution to IEEE 802.16i
Abstract	This contribution proposed the BS NRM Definition of 802.16i
Purpose	Adoption
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Proposal for BS Related Objects NRM Definitions

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Introduction

This contribution proposes to add BS related objects NRM definitions.

Proposed Text

15.1.1 Information entities imported and local labels:

Table 450—Information entities imported and local labels

Label reference	Local label
information object class, ManagedElement	ManagedElement
information object class, ManagedFunction	ManagedFunction
information object class, SubNetwork	SubNetwork
information object class, Top	Top
information object class, BS	BS
Information object class, BSFunction	BSFunction
information object class, ExternalBSFunction	ExternalBSFunction
information object class, BSRelation	BSRelation
Information object class, PagingGroup	PagingGroup
Information object class, CommonFunction	CommonFunction
Information object class, MSFunction	MSFunction
information object class, ExternalBSFunction	ExternalBSFunction
information object class, BSRelation	BSRelation
Information object class, PacketCSMngtFunction	PacketCSMngtFunction
Information object class, ClassifierRule	ClassifierRule
Information object class, ProvisionedSS	ProvisionedSS
Information object class, PHSRule	PHSRule
Information object class, SSProvisionedForSF	SSProvisionedForSF
Information object class, ServiceClass	ServiceClass
Information object class, SecurityMngFunction	SecurityMngFunction
Information object class, PKMBase	PKMBase
Information object class, PKMTEK	PKMTEK
Information object class, SSPKMAuth	SSPKMAuth
Information object class, CryptoSuite	CryptoSuite
Information object class, PHYMngFunction	PHYMngFunction
Information object class, UCDBurstProfile	UCDBurstProfile
Information object class, DCDBurstProfile	DCDBurstProfile
Information object class, PowerCtrl	PowerCtrl
Information object class, DownLinkChannel	DownLinkChannel
Information object class, UplinkChannel	UplinkChannel
Information object class, CPSMngFunction	CPSMngFunction
Information object class, BasicCapabilities	BasicCapabilities
Information object class, PowerSavingClass	PowerSavingClass
Information object class, MBSZone	MBSZone
Information object class, MBSServiceFlow	MBSServiceFlow
Information object class, RegistedMS	RegistedMS
Information object class, IdleModeMS	IdleModeMS
Information object class, SleepModeMS	SleepModeMS

15.1.2 Class diagram

15.1.2.1 Attributes and relationships

The naming and containment for the protocol neutral network management models of the 802.16 standard are shown in the following figures. They are split in several figures only for a readability purpose.

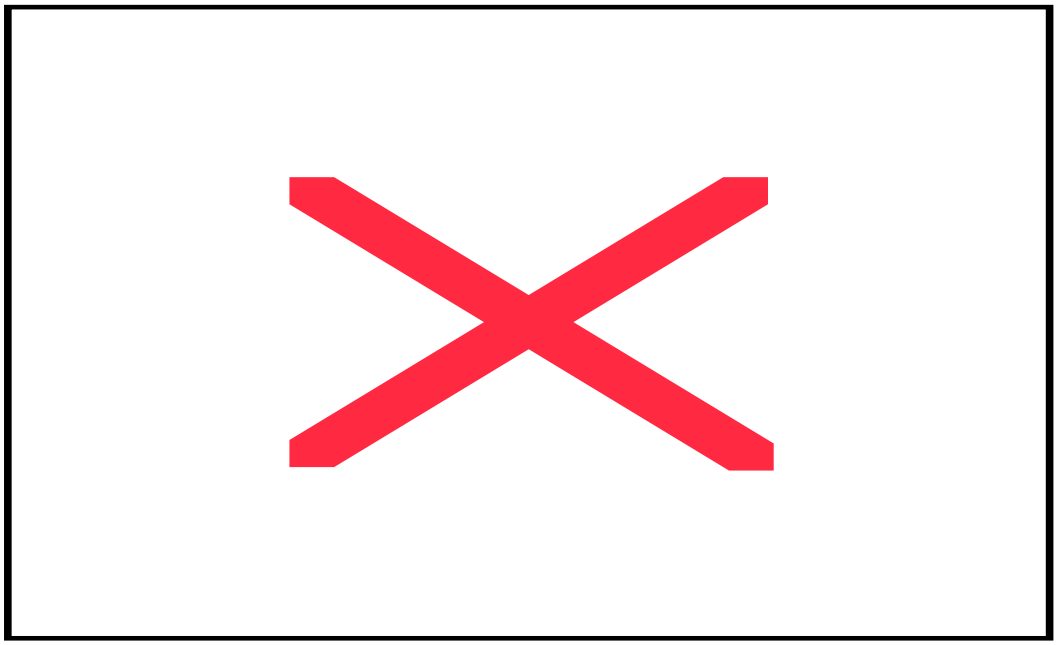

Figure x.1 General View

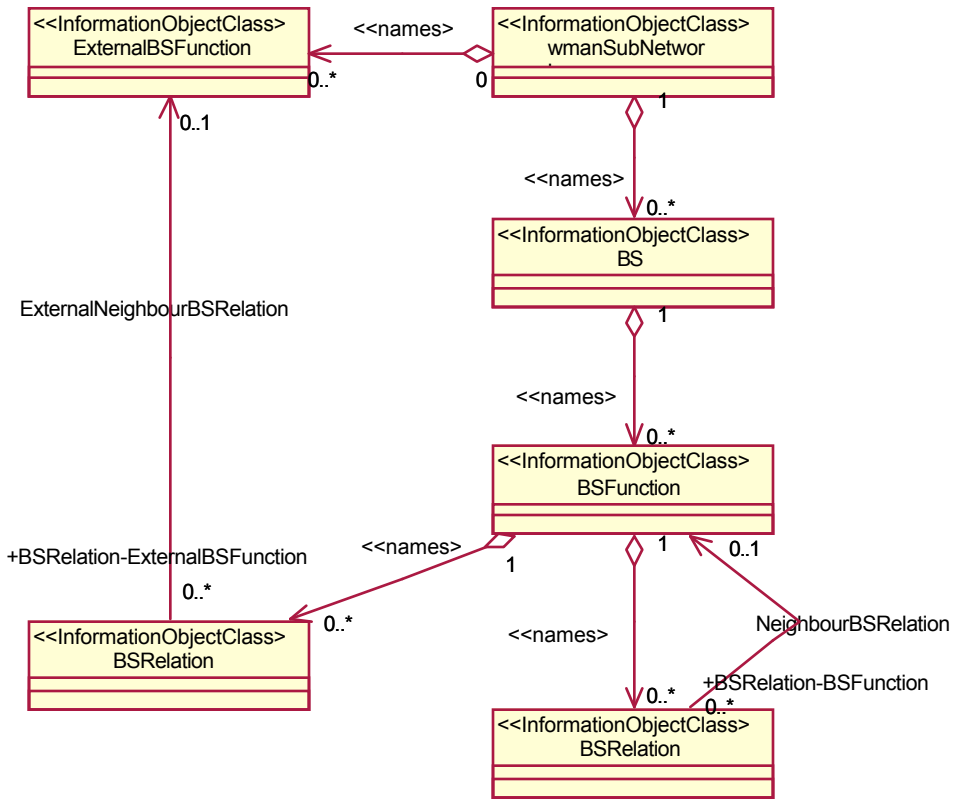

Figure X.2 Segment view Neighbouring BS NRM Containment/Naming Diagram

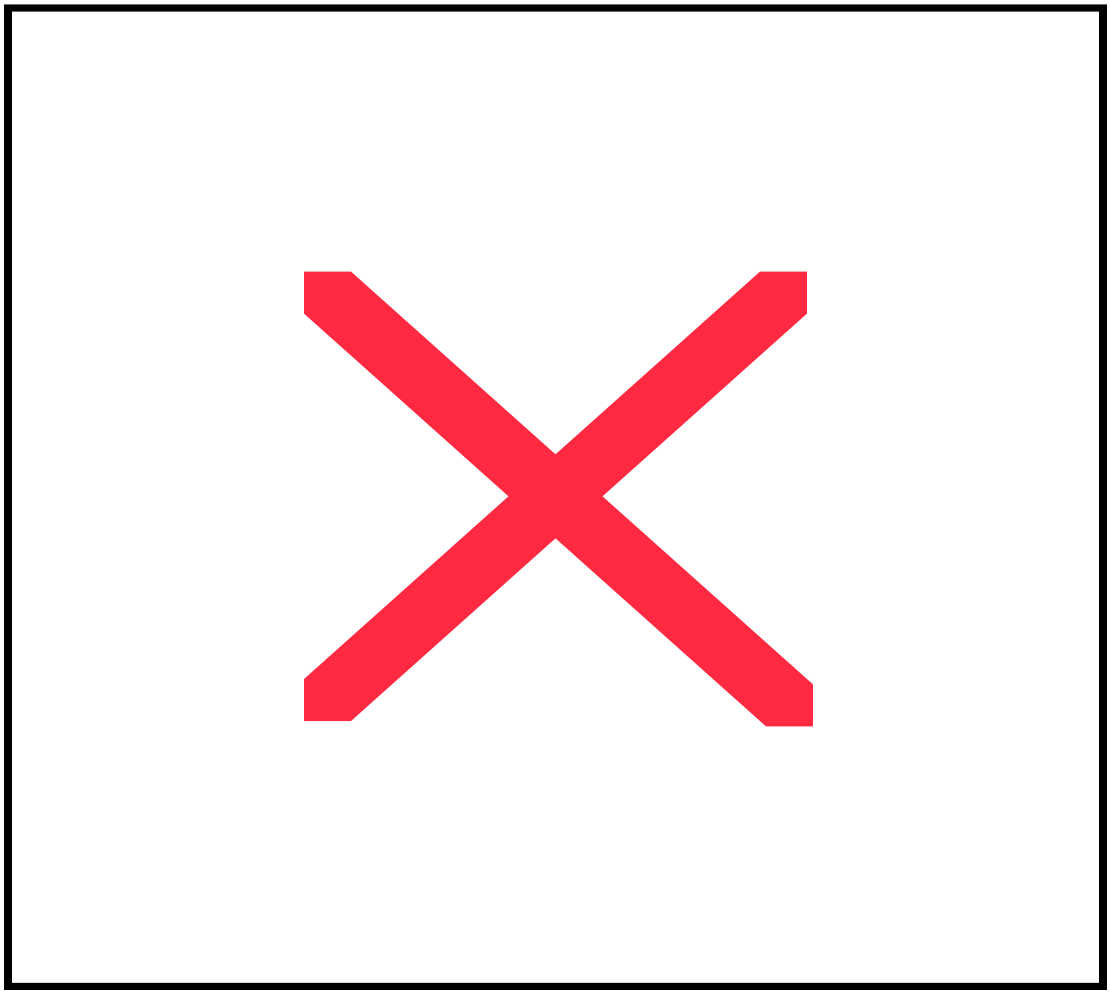

Figure X.3 Segment view PacketCs NRM Containment/Naming Diagram

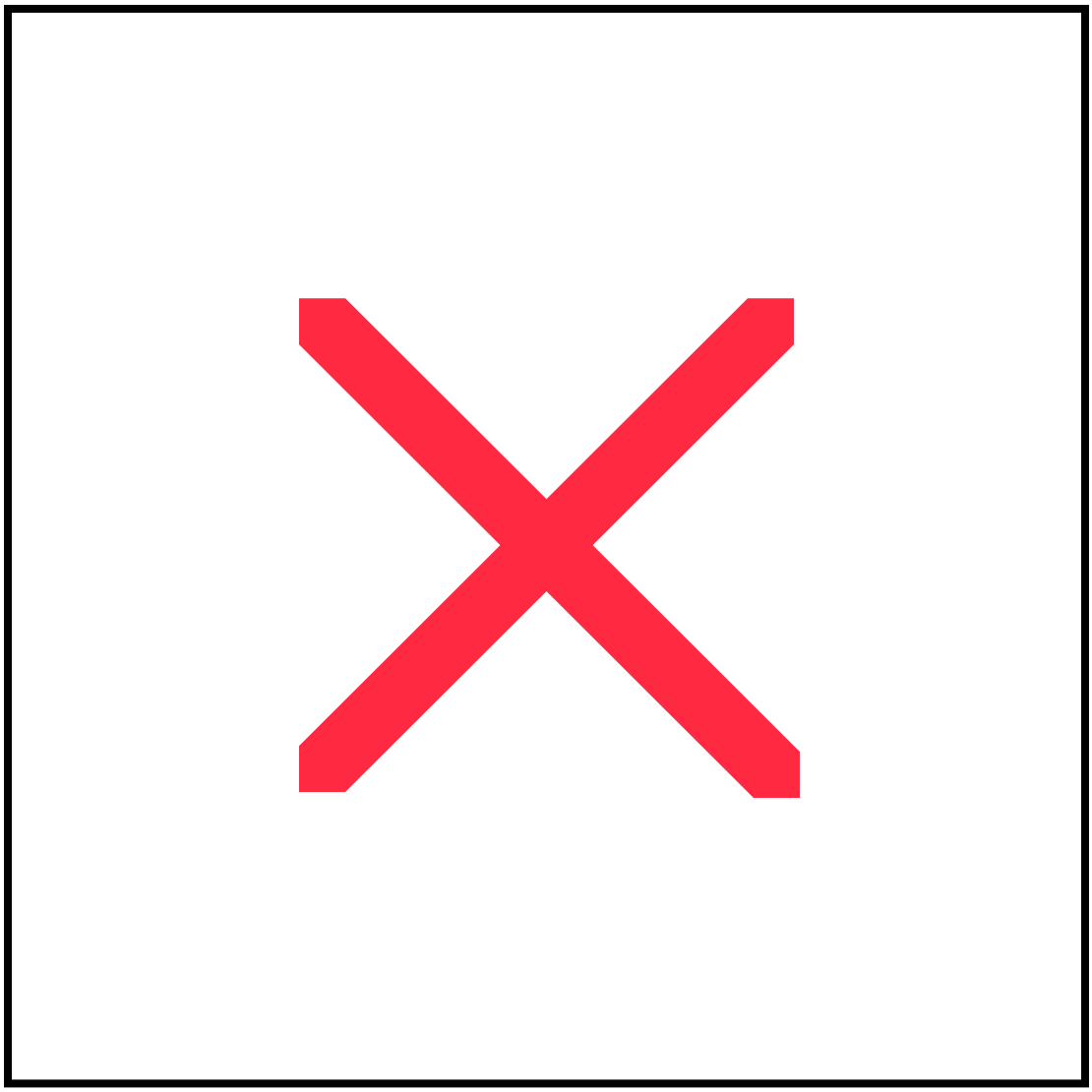

Figure X.4 Segment view SecurityMng NRM Containment/Naming Diagram

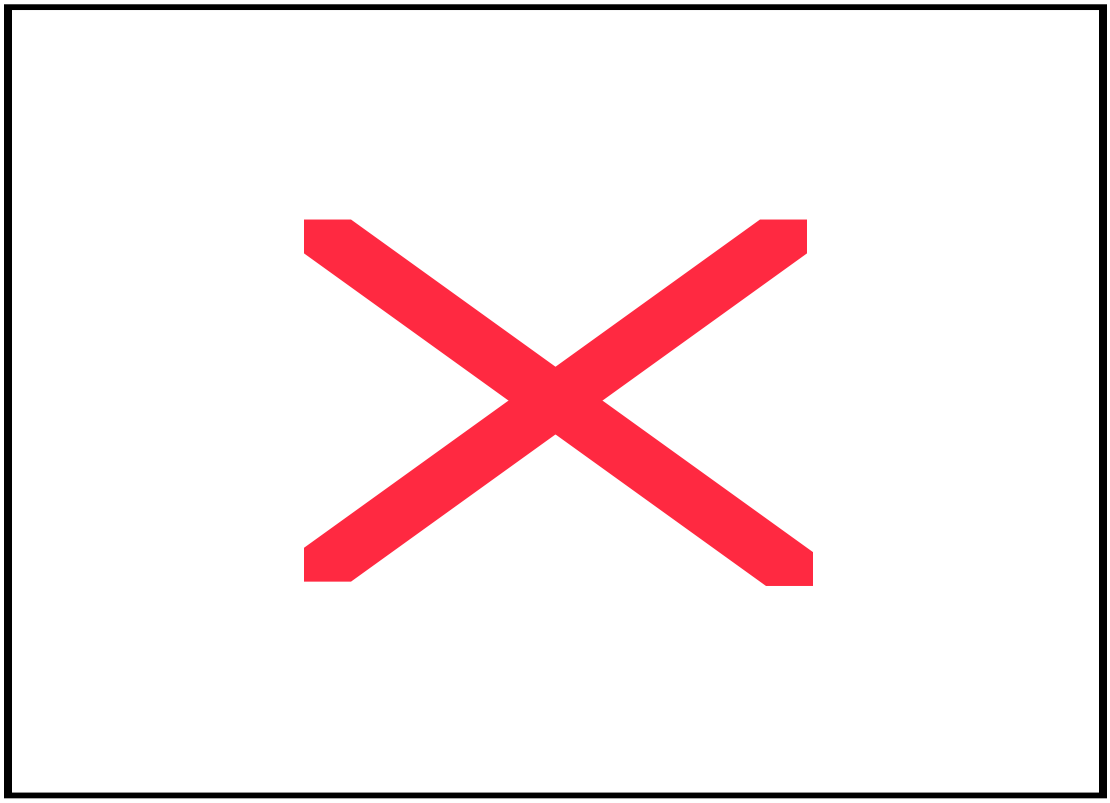

Figure X.5 Segment view CPSMngMng NRM Containment/Naming Diagram

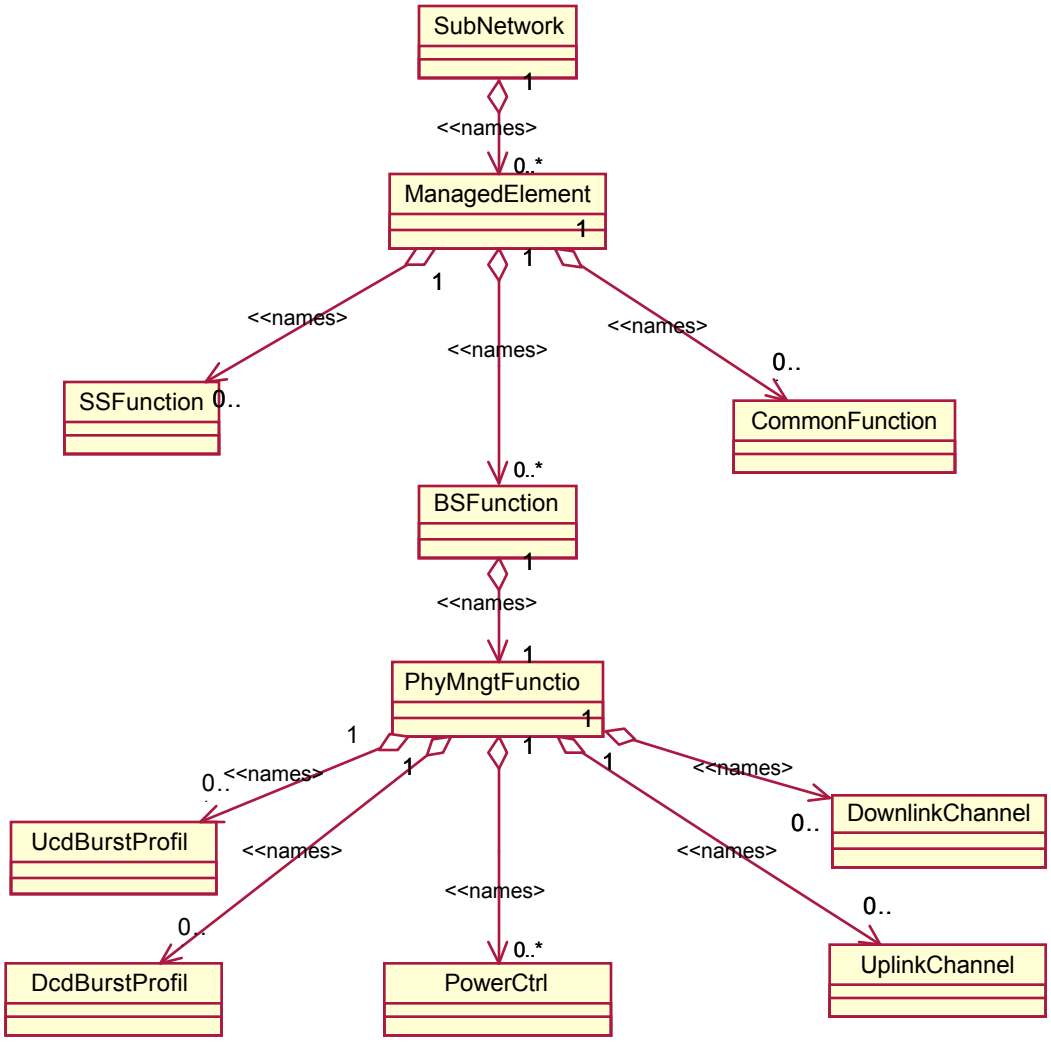

Figure X.6 Segment view PhyMng NRM Containment/Naming Diagram

15.1.2.2 Inheritance

The inheritance diagram show below is. is based on 802.16e and 802.16-2004. This diagram establishes the context of the IOC and shows ME's as inventory items and MF's as the functions that perform functions in the 802.16 network.

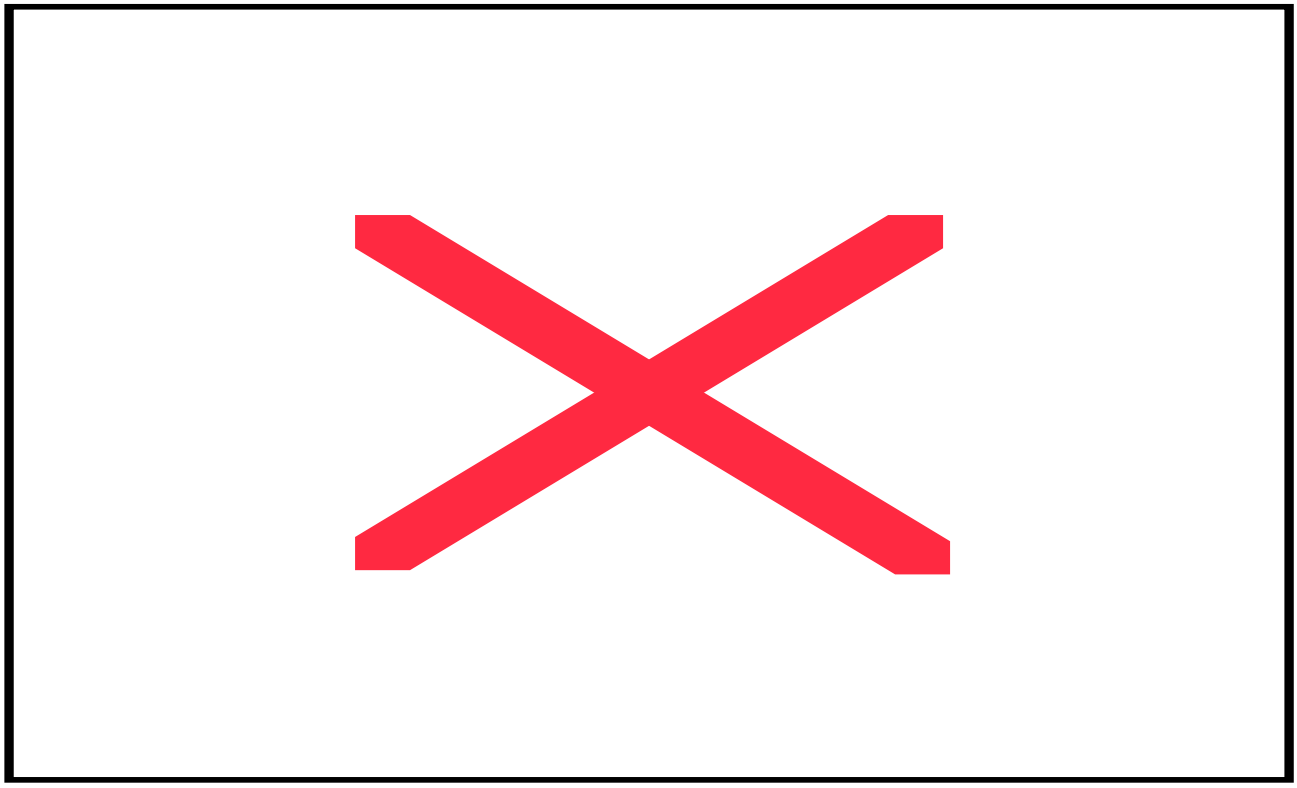

Figure X Inheritance Diagram

15.1.3 Information object classes definition

15.1.3.1 IOC BSFunction

15.1.3.1.1 Definition

This IOC represents a WMAN base station. It is derived from ManagedFunction.

15.1.3.1.2 Attributes

Attributes of BSFunction

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
OperatorID	+	M	M	M
BSID	+	M	M	M
HandoverSupportedType	+	M	M	M
SystemResourceRetainTime	+	M	M	M
HOOptimizationMSTimer	+	M	M	M
MSHORetransmissionTimer	+	M	M	M
MobilitySupportedIndication	+	M	M	M
MSHOConnectionProcessTime	+	M	M	M
MSHOTEKProcessTime	+	M	M	M
ULPermutationBase	+	M	M	M
DLPermutationBase	+	M	M	M
PreambleIndex	+	M	M	M
SegmentNumber	+	M	M	M

15.1.3.2 IOC ExternalBSFunction

15.1.3.2.1 Definition

This IOC represents a WMAN base station which belongs to the other subnetwork. It is derived from ManagedFunction.

15.1.3.2.2 Attributes

Attributes of `ExternalBSFunction`

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
ExternalBSId	+	M	M	-
FAIndex	+	M	M	M
BSEIRP	+	M	M	M
SchedulingServiceSupported	+	M	M	M
HOProcessOptimization	+	M	M	M
Bandwidth	+	M	M	M
FFTSize	+	M	M	M
CyclePrefix	+	M	M	M
FramDurationCode	+	M	M	M
ULPermutationBase	+	M	M	M
DLPermutationBase	+	M	M	M
SegmentNumber	+	M	M	M
PreambleIndex	+	M	M	M

15.1.3.3 IOC BSRelation

15.1.3.3.1 Definition

This IOC represents the relation between two neighbor WMAN base stations. It is derived from ManagedFunction.

15.1.3.3.2 Attributes

Attributes of `BSRelation`

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
BSRelationId	+	M	M	-
adjacentBS	+	M	M	M
FAIndex	+	M	M	M
BSEIRP	+	M	M	M
SchedulingServiceSupported	+	M	M	M
HOProcessOptimization	+	M	M	M
Bandwidth	+	M	M	M
FFTSize	+	M	M	M
CyclePrefix	+	M	M	M
FramDurationCode	+	M	M	M
ULPermutationBase	+	M	M	M
DLPermutationBase	+	M	M	M
SegmentNumber	+	M	M	M
PreambleIndex	+	M	M	M

15.1.3.4 IOC PagingGroup

15.1.3.4.1 Definition

This IOC represents the BS related paging group information. It is derived from ManagedFunction.

15.1.3.4.2 Attributes

Attributes of PagingGroup

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
PagingControlId	+	M	M	M
PagingGroupId	+	M	M	M
MgmtResourceHoldingTimer	+	M	M	M
T46Timer	+	M	M	M
PagingRetryCount	+	M	M	M
REQDuration	+	M	M	M
MACHashSkipThreshold	+	M	M	M
BsCDMATransmissionOpportunityAssignment	+	M	M	M
PagingResponseWindow	+	M	M	M
IdleModeTimer	+	M	M	M
IdleModeSystemTimer	+	M	M	M
PagingIntervalLength	+	M	M	M
PagingCycle	+	M	M	M

15.1.4 Information relationships definition

15.1.4.1 ExternalNeighbourBSRelation

15.1.4.1.1 Definition

This represents a unidirectional relation from BSRelation to the ExternalBSFunction. The role of the relation shall be mapped to a reference attribute, named adjacentBS, of the IOC.

15.1.4.1.2 Roles

Roles of the relation ExternalNeighbourBSRelation

Name	Definition
BSRelation –ExternalBSFunction	This role (when present) represents BSRelation capability to identify one ExternalBSFunction. When this role is present, the BSRelation.adjacentBS shall contain one ExternalBS DN.

15.1.4.1.3 Constraints

This role (for a particular BSRelation) shall be present if the NeighbourBSRelation of this particular BSRelation is absent. This role shall be absent if the NeighbourBSRelation of this particular BSRelation is present.

15.1.4.1 NeighbourBSRelation

15.1.4.1.1 Definition

This represents the unidirectional relation from the BSRelation to BSFunction. The role of the relation shall be mapped to a reference attribute, named adjacentBS, of the IOC.

15.1.4.1.2 Roles

Roles of the relation NeighbourBSRelation

Name	Definition
BSRelation – BSFunction	This role (when present) represents BSRelation capability to identify one BSFunction. When this role is present, the BSRelation.adjacentBS shall contain one BS DN.

15.1.4.1.3 Constraints

This role (for a particular `BSRelation`) shall be present if the `ExternalNeighbourBSRelation` of this particular `BSRelation` is absent. This role shall be absent if the `ExternalNeighbourBSRelation` of this particular `BSRelation` is present.

15.1.5 Notifications

15.1.6 Information attributes definition

15.1.6.1 Definition and legal values

The following table defines the attributes that are present in several Information Object Classes (IOCs) of the present document.

Attribute Name	Definition	Legal Values
OperatorID	Operator Identifier	
BSID	BS Identifier	
HandoverSupportedType	The Handover supported field indicates what type(s) of HO the BS and the MS support.	Type: Enumerated value Range: (MDHO/FBSS HO not supported(0), FBSS/MDHO DLRF combining supported(1), MDHO DL soft combining supported monitoring single MAP from anchor BS(2), MDHO DL soft combining supported monitoring MAPS from active BSs(3))
SystemResourceRetainTime	The Resource_Retain_Time is the duration for MS s connection information that will be retained in serving BS. BS shall start Resource_Retain_Time timer at MS notification of pending HO attempt through MOB_HO-IND or by detecting an MS drop. The unit of this value is 100 milliseconds.	
HOOptimizationMSTimer	the duration in frames MS shall wait until receipt of the next unsolicited network re-entry MAC management message as indicated in the HO Process Optimization element of the RNG-RSP message.	
MSHORetransmissionTimer	After a MS transmits MOB_MSHO-REQ to initiate a handover process, it shall start MS Handover Retransmission Timer and shall not transmit another MOB_MSHO-REQ until the expiration of the MS Handover Retransmission Timer.	
MobilitySupportedIndication	The Mobility features supported field indicates whether or not the MS supports mobility modes.	Type: Enumerated value Range :(Handover Support(0), Sleep-mode Support(1), Idle-mode Support(2))
MSHOConnectionProcessTime	Time in ms the MS needs to process information on connections provided in RNGRSP or REG-RSP message during HO	
MSHOTEKProcessTime	Time in ms the MS needs to completely process TEK information during HO	
ULPermutationBase	Uplink subcarrier allocation	
DLPermutationBase	Downlink subcarrier allocation	
PreambleIndex	Downlink synchronization by MS	
SegmentNumber	An unique segment identifier	
ExternalBSId	External BS Identifier	
FAIndex	Frequency Assignment Index	
BSEIRP	Neighbour BS EIRP	
HOProcessOptimization	Identifies re-entry process management messages that may be omitted during the current HO attempt due to the availability of MS service and operational context information, and the MS service and operational status post-HO completion.	

SchedulingServiceSupported	Indicate neighbouring BS scheduling service type.	Type: Enumerated value Range: (Non-real-time Polling Service(0), Real-time Polling Service(0), Extended real-time Polling Service(0), Unsolicited Grant Service(0), Best Effort(3))
Bandwidth	Indicate neighbouring BS bandwidth.	
FFTSize	Indicate neighbouring BS FFT size	
CyclePrefix	indicate neighbouring BS Cycle Prefix	
FramDurationCode	Indicate neighbouring BS Frame duration code	
ULPermutationBase	Indicate neighbouring BS uplink permutation base.	
DLPermutationBase	Indicate neighbouring BS uplink permutation base.	
SegmentNumber	Indicate neighbouring BS segment number.	
PreambleIndex	Indicate neighbouring BS preamble index.	
BSRelationId		
adjacentBS	It carries the DN of the BS or the ExternalBS.	
PagingControlId	indicate paging controller identifier connected by BS	
PagingGroupId	indicate the paging group identifier assigned to BS by network	
MgmtResourceHoldingTimer	Time the BS maintain connection information with the MS after the BS send DREG-CMD to the MS	
T46Timer	Time the BS waits for DREGREQ in case of unsolicited Idle Mode initiation from BS	
PagingRetryCount	Number of retries on paging transmission. If the BS does not receive RNG-REQ from the MS until this value decreases to zero, it determines that the MS is unavailable.	
REQDuration	Waiting value for the DREG-REQ message re-transmission(measured in frames)	
MACHashSkipThreshold	Maximum number of successive MOB_PAG-ADV messages that may be sent from a BS without individual notification for an MS for which BS is allowed to skip MS MAC address Hash when the Action Code for the MS is 0b00,'No Action Required'.	
BsCDMATransmissionOpportunityAssignment	The CDMA code and transmission opportunity assignment field indicates the assigned code and transmission opportunity for a MS who is paged to use over dedicated CDMA ranging region	
PagingResponseWindow	The Page-Response Window indicates the Page-Response window for a MS who is paged to transmit the assigned code for CDMA ranging channel.	
IdleModeTimer	MS timed interval to conduct Location Update. Set timer to MS Idle Mode Timeout capabilities setting. Timer recycles on successful Idle Mode Location Update.	Range: (128..65536)
IdleModeSystemTimer	For BS acting as Paging Controller, timed interval to receive notification of MS Idle Mode Location Update. Set timer to MS Idle Mode Timeout. Timer recycles on successful Idle Mode Location Update.	Range: (128..65536)
PagingIntervalLength	time duration of Paging Interval of the BS	Range: (2..5)

PagingCycle	Cycle in which the paging message is transmitted within the paging group.	