Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

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Abstract: [Many parts of the current HR draft are missing or incomplete. As a result of the joint effort of ETRI and KWU, many parts of primitives are filled and updated. The remaining parts, however, requires a continuing efforts.]
Purpose: [The document describes the recent effort on the modification and complement of the HR part o the current draft.]

Primitive Description

Mesh Management SAP

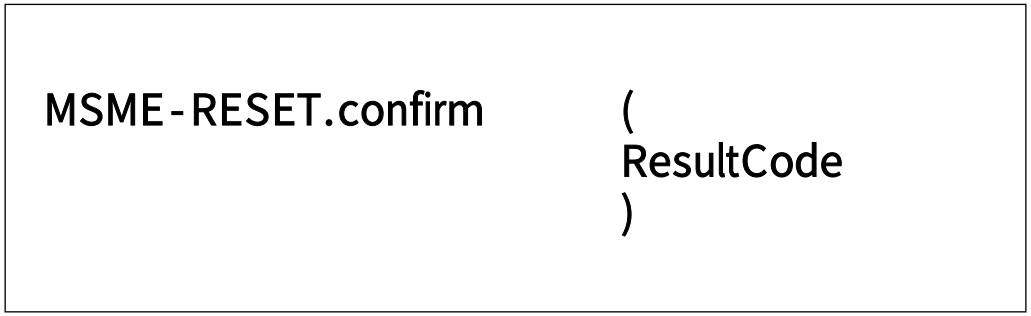
Name	Request	Indication	Response	Confirm
MSME-RESET	6.2.1	-	-	6.2.2
MSME-GET	6.2.3	-	-	6.2.4
MSME-SET	6.2.5	-	-	6.2.6
MSME-SCAN	6.2.7	-	-	6.2.8
MSME-MESH-START	6.2.9	-	-	6.2.10
MSME-JOIN	6.2.11	6.2.12	-	6.2.13
MESM-LEAVE	6.2.14	6.2.15	-	6.2.16
MSME-MESH-DISCOVERY	6.2.17	-	-	6.2.18

MSME-RESET.request

MSME-RESET.request (SetDefaultMeshIB, ResetTimeout)

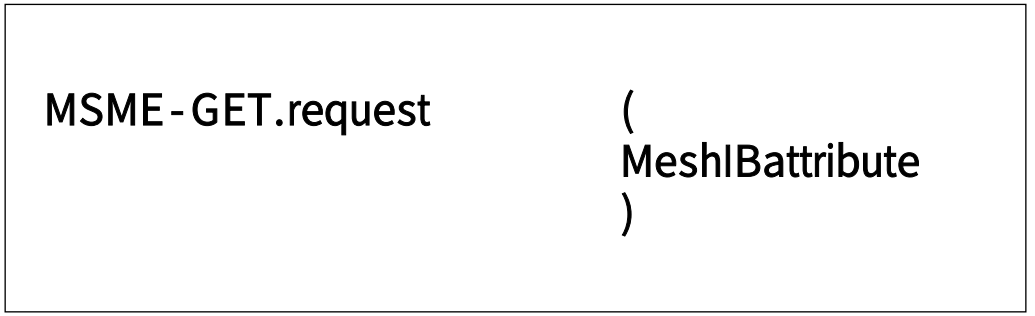
Name	Type	Valid range	Description
SetDefaultMeshIB	Boolean	TRUE, FALSE	If TRUE, all MeshIB attributes are set to their default values. The default values are implementation dependent. If False, the Mesh entity is reset, but all MeshIB attributes retain the values that were in place prior to the generation of the MSME-RESET.request primitive.
ResetTimeout	Duration	0-65535	The time in milliseconds allowed to complete the reset procedure.

MSME-RESET.confirm



Name	Type	Valid range	Description
ResultCode	Enumeration	SUCCESS, TIMEOUT, INVALID_PARAMETERS	Indicates the result of the MSME request.

MSME-GET.request



Name	Type	Valid range	Description
MeshIBAttribute	Integer	Any MeshIB attribute as defined in Table 5.	The name of the MeshIB attribute

Table 5 – MeshIBAttribute Parameters

Managed object	octets	Definition	Access
MeshIB_SuperframeDuration	2	Duration of the superframe.	Read only
MeshIB_MeshCapable	1bit	1 if the DEV is capable of supporting mesh networking functionalities, 0 otherwise.	Read only
MeshIB_MeshID	2	Identifies the Mesh network.	Read only
MeshIB_MASPartitionable	1bit	1 if the MPNC chooses to partition the superframe into MASs, 0 otherwise.	Read only
MeshIB_BPMergable	1bit	1 if the MPNC can shift the contention period such that the there is sufficient free medium access time for the new MPNC to transmit beacon frame before the contention period, 0 otherwise.	Read only
MeshIB_MaxBPLength	1	Maximum number of beacon slots	Read only
MeshIB_MASUnit	2	Length of Medium Access Slot	Read only
MeshIB_BSUnit	1	Length of beacon slot	Read only
MeshIB_ExclusiveContention Period	1bit	1 if the MPNC requires dedicated contention period for its piconet's use only, 0 otherwise.	Read only

MSME-GET.confirm

```
MSME-GET.confirm        (
                        ResultCode,
                        MeshIBattribute,
                        MeshIBvalue
                        )
```

Name	Type	Valid range	Description
ResultCode	Enumeration	SUCCESS, INVALID_MeshIB_ATTRIBUTE_NAME, INVALID_MeshIB_ATTRIBUTE_VALUE, READ_ONLY_MeshIB_ATTRIBUTE, WRITE_ONLY_MeshIB_ATTRIBUTE	Indicates the result of the MSME request
MeshIBattribute	Octet string	Any PIB attribute as defined in Table 5.	The name of the MeshIB attribute
MeshIBvalue	Variable	As defined in Table 5.	The MeshIB value

MSME-SET.request

```
MSME-SET.request        (
                        MeshIBattribute,
                        MeshIBvalue
                        )
```

Name	Type	Valid range	Description
MeshIBattribute	Octet string	Any PIB attribute as defined in Table 5.	The name of the MeshIB attribute
MeshIBvalue	Variable	As defined in Table 5.	The MeshIB value

MSME-SET.confirm

```
MSME-SET.confirm        (
                        ResultCode
                        MeshIBattribute
                        )
```

Name	Type	Valid range	Description
ResultCode	Enumeration	SUCCESS, INVALID_MeshIB_ATTRIBUTE_NAME, INVALID_MeshIB_ATTRIBUTE_VALUE, READ_ONLY_MeshIB_ATTRIBUTE, WRITE_ONLY_MeshIB_ATTRIBUTE	Indicates the result of the MSME request
MeshIBattribute	Octet string	Any MeshIB attribute as defined in Table 5.	The name of the MeshIB attribute

MSME-SCAN.request

MSME-SCAN.request	(OpenScan, BSID, PNID, MeshID, ChannelList, ChannelScanDuration)

Name	Type	Valid range	Description
OpenScan	Boolean	TRUE, FALSE	Indicates whether scan is an open scan or not. Open scan is defined in 8.2.1 of [R1].
PNID	Integer	0-65535	The ID of a specific piconet for which to scan.
BSID	Ocetet string	As defined in 7.4.2 of [R1]	The text string of a specific piconet for which to scan. This parameter is not used if open scan, 8.2.1 of [R1], is requested.
MeshID	Integer	0-65535	The ID of a specific Mesh Network for which to scan.
ChannelList	Ordered set of integers	0 to the maximum PHY channel ID as defined in 11.2.3 of [R1]	Specifies a list of channels to be examined when scanning for either a specific PNID/BSID/MeshID or any PNID/BSID/MeshID.
ChannelScan Duration	Duration	0–65535	The length of time in milliseconds that the DEV is to spend scanning a channel to find either a specific PNID/BSID/MeshID, or any PNID/BSID/MeshID.

MSME-SCAN.confirm

MSME-SCAN.confirm	(NumberOfMeshes, MeshDescriptionSet, NumberOfChannels, ChannelRatingList, ResultCode)

Name	Type	Valid range	Description
NumberOfMeshes	Integer	0-255	The number of mesh networks found during the scanning process.
MeshDescriptionSet	Set of mesh network descriptions as defined in Table 11.	A set containing zero or more instances of a MeshDescription	The MeshDescriptionSet is returned to indicate the results of the scan request.
NumberOfChannels	Integer	0-n PHY dependent channels as defined in Table 6 of [R1]	Indicates the number of channels scanned.
ChannelRatingList	Ordered list of integers.	0 to the maximum number of PHY dependent channels defined in 11.2.3 of [R1]	Specifies a list of found channels ordered from the best to the worst in terms of interference.
ResultCode	Enumeration	SUCCESS, INVALID_PARAMETERS	Indicates the result of the MSME request

Table 11 – Elements of MeshDiscriptionSet

Name	Type	Valid range	Description
MeshID	Integer	0-65535	The ID of a discovered mesh network.
…			
PiconetDescriptionSet	Set of piconet descriptions as defined in Table 6 of [R1].	A set containing zero or more instances of a PiconetDescription	The PiconetDescriptionSet is returned to indicate the results of the scan request.

MSME-MESH-START.request

```
MSME-MESH-START.request        (
                               MeshID
                               MACParameterSet,
                               MeshParameterSet
                               )
```

Name	Type	Valid range	Description
MeshID	Integer	0-65535	The ID of a new starting mesh network.
MACParameterSet	Set of MAC parameters as defined in Table 13	A set containing zero or more instances of MAC characteristics.	The MACParameterSet is used to start a new mesh network.
MeshParameterSet	Set of Mesh parameters as defined in Table 14	A set containing zero or more instances of Mesh characteristics.	The MeshParameterSet is used to start a new mesh network.

Table 13 – Elements of MAC ParameterSet

Name	Type	Valid range	Description
mMinChannelScan	Integer	mMaxSuperframeDuration	As defined in 8.2.1 and 8.2.2 of [R1]
mBroadcastDEVInfoDuration	Integer	64*mMaxSuperframeDuration	As defined in 8.3.3 of [R1]
mAssocRespConfirmTime	Integer	4*mMaxSuperframeDuration	As defined in 8.3.1 of [R1]
mMinSuperframeDuration	Integer	1 ms	As defined in 7.3.1.1 of [R1]
mMaxSuperframeDuration	Integer	65,535 μs	As defined in 7.3.1.1 of [R1]
mMaxLostBeacons	Integer	4	The number of superframe missing beacon
mMCTAAssocPeriod	Integer	150 ms	As defined in 8.4.3.3 of [R1]
mFirstCTAGap	Integer	100 μs	As defined in 8.4.3.1 of [R1]
mMinBeaconInfoRepeat	Integer	4	As defined in 8.5.1.3 of [R1]
mAsyncRequestLifetime	Integer	1 s	As defined in 8.5.2.1 of [R1]
mMaxKeyChangeDuration	Integer	65,535 ms	As defined in 9.3.2 of [R1]
mMaxTimeTokenChange	Integer	65,535	As defined in B.2.1 of [R1]
mMaxNumValidDEVs	Integer	243	As defined in 6.3.9 of [R2]

Table 14 – Elements of MeshIPParameterSet

Name	Type	Valid range	Description
meshMeshID	Integer	0-65535	Identifies the Mesh network.
meshMaxSuperframeDuration	Integer	65535 μs	Duration of the superframe.
meshMaxBPLength	Integer	16*256 μs	Maximum number of beacon slots
meshMaxMASUnit	Integer	256 μs	Maximum length of Medium Access Slot
meshMaxBSUnit	Integer	256 μs	Maximum length of beacon slot
…			

MSME-MESH-START.confirm

Name	Type	Valid range	Description
ResultCode	Enumeration	SUCCESS, ALREADY_STARTED, CHANNEL_INTERFERENCE, PICONET_DETECTED, INVALID_PARAMETERS	Indicates the result of the requested action.

MSME-JOIN.request

```
MSME-JOIN.request        (
                         MeshID,
                         MeshParameterSet
                         JoinTimeout
                         )
```

Name	Type	Valid range	Description
MeshID	Integer	0-65535	The ID of a discovered mesh network.
MeshParameterSet	Set of Mesh parameters as defined in Table 14	A set containing zero or more instances of Mesh characteristics.	The MeshParameterSet is used to join an existing mesh network.
JoinTimeout	Integer	mMaxLostBeacons superframes	The number of superframe allowed to complete the join procedure.

MSME-JOIN.indication

```
MSME-JOIN.indication        (
                            MDEVID,
                            Device address,
                            MeshParameterSet
                            )
```

Name	Type	Valid range	Description
MDEVID	Integer	Any valid mesh-capable DEVID as defined in 7.2.3 of [R1]	Specifies the mesh-capable DEVID requesting to join the mesh network.
Device address	MAC address	Any valid individual MAC address	The MAC address of the MPNC requesting to join the mesh network.
MeshParameterSet	Set of Mesh parameters as defined in Table 14	A set containing zero or more instances of Mesh characteristics.	The MeshParameterSet is used to join an existing mesh network.

MSME-JOIN.confirm

Name	Type	Valid range	Description
MeshID	Integer	0-65535	Indicates the mesh network ID that the MPNC wants to join a mesh network.
ResultCode	Enumeration	SUCCESS, TIMEOUT	Indicates the result of the MSME request.

MSME-LEAVE.request

```
MSME-LEAVE.request (
                    MeshID,
                    LeaveReason,
                    LeaveTimeout
                    )
```

Name	Type	Valid range	Description
MeshID	Integer	0-65535	The mesh network ID which is the MPNC wants to leave.
LeaveReason	Integer	As defined in a.7.5.11.X.	Indicates the reason the Mesh Leave Request command was issued.
LeaveTimeout	Integer	mMaxLostBeacons superframes	The number of superframe allowed to complete the leave procedure.

MSME-LEAVE.indication

```
MSME-LEAVE.indication    (
                         MDEVID,
                         Device address,
                         LeaveReason
                         )
```

Name	Type	Valid range	Description
MDEVID	Integer	Any valid mesh-capable DEVID as defined in 7.2.3 of [R1]	Specifies the mesh-capable DEVID requesting to leave the mesh network.
Device address	MAC address	Any valid individual MAC address	The MAC address of the MPNC that is requesting to leave the mesh network.
LeaveReason	Integer	As defined in a.7.5.11.X.	Indicates the reason the Mesh Leave Request command was issued.

MSME-LEAVE.confirm

```
MSME-LEAVE.confirm      (
                        MeshID,
                        ResultCode
                        )
```

Name	Type	Valid range	Description
MeshID	Integer	0-65535	The mesh network ID which is the MPNC wants to leave.
ResultCode	Enumeration	SUCCESS, TIMEOUT	Indicates the result of the MSME.request.

MSME-MESH-DISCOVERY.request

```
MSME-MESH-DISCOVERY.request     (
                                MeshID,
                                DiscoveryTimeOut
                                )
```

Name	Type	Valid range	Description
MeshID	Integer	0-65535	The ID of a joined mesh network.
DiscoveryTimeOut	Integer	2*mMaxLostBeacons superframes	The number of superframe allowed to complete the discovery procedure.

MSME-MESH-DISCOVERY.confirm

```
MSME-NETWORK-DISCOVERY.confirm (
                               MeshID,
                               MeshTopoParameter,
                               ResultCode
                               )
```

Name	Type	Valid range	Description
MeshID	Integer	0-65535	The ID of a discovered mesh network.
MeshTopoParameter	Integer	0-4	The MeshTopoParamter is returned to indicate the results of the discovery request
ResultCode	Enumeration	SUCCESS, TIMEOUT	Indicates the result of the MSME request

Mesh SAP

Name	Request	Indication	Response	Confirm
MESH-ASYNC-DATA	6.3.1	6.3.3	-	6.3.2
MESH-ISOCH-DATA	6.3.4	6.3.6	-	6.3.5

MESH-ASYNC-DATA.request

MESH-ASYNC-DATA.request	(DestAddr, SrcAddr, TranMethod, Priority, ACKPolicy, TransmissionTimeout, Length, Data)

Name	Type	Valid range	Description
DestAddr	Integer	Any valid DEVID as defined in 7.2.3 of [R1]	Specifies the DEVID of the target of the MSME request.
SrcAddr	Integer	Any valid DEVID as defined in 7.2.3 of [R1]	Specifies the DEVID of the DEV that originated the MSME request.
TranMethod	Integer	As defined in Table 32.	Indicates how to transmit the frame.
Priority	Integer	0-7	Specifies the priority of the data.
ACKPolicy	Enumeration	IMM_ACK, NO_ACK, DLY_ACK	Specifies the ACK policy for the MSDU.
TransmissionTimeout	Duration	0-65535	The amount of time in milliseconds in which the data needs to be successfully sent.
Length	Integer	0-65535	The length of the MSDU in octets.
Data	Variable num-ber of octets	.	MSDU portion of the primitive.

MESH-ASYNC-DATA.confirm

MESH-ASYNC-DATA.confirm	(DestAddr, SrcAddr, TranMethod, Priority, ResultCode)

Name	Type	Valid range	Description
DestAddr	Integer	Any valid DEVID as defined in 7.2.3 of [R1]	Specifies the DEVID of the target of the MSME request.
SrcAddr	Integer	Any valid DEVID as defined in 7.2.3 of [R1]	Specifies the DEVID of the DEV that originated the MSME request.
TranMethod	Integer	As defined in Table 32.	Indicates how to transmit the frame.
Priority	Integer	0-7	Specifies the priority of the data.
ResultCode	Enumeration	SUCCESS, TX_TIMEOUT, DLY_ACK_FAILED, INVALID_ACK_POLICY, INVALID_STREAM	Indicates the result of the corresponding MESH request.

MESH-ASYNC-DATA.indication

```
MESH-ASYNC-DATA.indication (
                           DestAddr,
                           SrcAddr,
                           Length,
                           Data
                           )
```

Name	Type	Valid range	Description
DestAddr	Integer	Any valid DEVID as defined in 7.2.3 of [R1]	Specifies the DEVID of the target of the MSME request.
SrcAddr	Integer	Any valid DEVID as defined in 7.2.3 of [R1]	Specifies the DEVID of the DEV that originated the MSME request.
Length	Integer	0-65535	The length of the MSDU in octets.
Data	Variable num-ber of octets	.	MSDU portion of the primitive.

MESH-ISOCH-DATA.request

MESH-ISOCH-DATA.request	(StreamIndex, TranMethod, ACKPolicy, TransmissionTimeout, Length, Data)

Name	Type	Valid range	Description
StreamIndex	Integer	As defined in 7.2.5 of [R1]	The stream over which the data is to be sent.
TranMethod	Integer	As defined in Table 32.	Indicates how to transmit the frame.
ACKPolicy	Enumeration	IMM_ACK, NO_ACK, DLY_ACK	Specifies the ACK policy for the MSDU.
TransmissionTimeout	Duration	0-65535	The amount of time in milliseconds in which the data needs to be successfully sent.
Length	Integer	0-65535	The length of the MSDU in octets.
Data	Variable num-ber of octets		MSDU portion of the primitive.

MESH-ISOCH-DATA.confirm

MESH-ISOCH-DATA.confirm (
StreamIndex,
ResultCode
)

Name	Type	Valid range	Description
StreamIndex	Integer	As defined in 7.2.5 of [R1]	The stream over which the data is to be sent.
ResultCode	Enumeration	SUCCESS, TX_TIMEOUT, DLY_ACK_FAILED, INVALID_ACK_POLICY, INVALID_STREAM	Indicates the result of the corresponding MESH request.

MESH-ISOCH-DATA.indication

```
MESH-ISOCH-DATA.indication (
                           DestAddr,
                           SrcAddr,
                           StreamIndex,
                           Length,
                           Data
                           )
```

Name	Type	Valid range	Description
DestAddr	Integer	Any valid DEVID as defined in 7.2.3 of [R1]	Specifies the DEVID of the target of the MSME request.
SrcAddr	Integer	Any valid DEVID as defined in 7.2.3 of [R1]	Specifies the DEVID of the DEV that originated the MSME request.
StreamIndex	Integer	As defined in 7.2.5 of [R1]	The stream over which the data is to be sent.
Length	Integer	0-65535	The length of the MSDU in octets.
Data	Variable number of octets		MSDU portion of the primitive.