IEEE P802.19
Wireless Coexistence

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| --- |
| Profile O messages |
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Abstract

This document is a submission to IEEE 802.19 TG1 that contains definition of profile O messages.

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# Annex C (normative) Messages

# Profile O

IEEE802191ProtocolMessage DEFINITIONS AUTOMATIC TAGS ::= BEGIN

IMPORTS

 SubscribedService,

 OperationCode,

 NetworkTechnology,

 NetworkType,

 DiscoveryInformation,

 AvailableChannelsInformation,

 ListOfAvailableFrequencies,

 ListOfSupportedFrequencies,

 ListOfSupportedChNumber,

 ListOfOperatingFrequencies,

 InterferenceDirection,

 RadioEnvironmentInformation,

 NetworkGeometryClass,

 DeviceClass,

 RequiredResource,

 ListOfAllowedTVWSChNumber,

 ConstOfChUses,

 ChClassInfo,

 FrequencyRange,

 ReqInfoDescr,

 ReqInfoValue,

 MeasurementDescription,

 MeasurementResult,

 NegotiationInformation,

 ListOfWinnerCMID,

 ListOfSlotTimePosition,

 ReconfigurationParameters,

 FailedParameters,

 EventParams,

 ListOfGeolocation,

 DatabaseInformation,

 CoexistenceSetRadioEnvironmentInformation

FROM IEEE802191ProtocolDataType;

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Message structure definitions

-- \* a) The overall message structure with header and payload

-- \* b) Message header structure with respective fields and their types

-- \* c) Message payload options, i.e. coexistence system messages

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-- \* a) The overall message structure with header and payload

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-- The overall message structure

CxMessage ::= SEQUENCE {

-- Message header

 messageHeader MessageHeader,

 -- Message payload

 payload CxPayload

}

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-- \* b) Message header structure with respective fields and their types

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- Message header

MessageHeader ::= {

 -- Source indetifier

 sourceIdentifier CxID,

 -- Destination identifier

 destinationIdentifier CxID,

 -- Indicates whether ack service is required

 ackPolicy BOOLEAN,

 -- Message identifier

 messageIdentification MessageIdentification,

}

-- Source and destination identifiers within the message header

CxID ::= SEQUENCE {

 -- Entity type

 type CxType,

 -- Entity identifier

 id OCTET STRING

}

-- Entity type identifier

CxType ::= ENUMERATED {

 ce,

 cm,

 cdis,

 tvwsdb

}

-- Message identifier

MessageIdentification ::= CHOICE {

 None NULL,

 -- Request identifier

 requestID INTEGER (0..2147483647),

 -- Multiple response identifier

 multipleResponse SEQUENCE {

 requestID INTEGER (0..2147483647),

 sequenceNumber INTEGER (0..2147483647),

 isLastResponse BOOLEAN

 }

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* c) Message payload options, i.e. all the different coexistence

-- \* system messages

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

CxPayload ::= CHOICE {

stopOperationAnn StopOperationAnnouncement,

subscriptionReq SubscriptionRequest,

subscriptionRsp SubscriptionResponse,

subscriptionChangeReq SubscriptionChangeRequest,

subscriptionChangeRsp SubscriptionChangeResponse,

ceRegistrationReq CERegistrationRequest,

registrationRsp RegistrationResponse,

cmRegistrationReq CMRegistrationRequest,

coexSetInformationAnn CoexistenceSetInformationAnnouncement,

coexSetInformationReq CoexistenceSetInformationRequest,

coexSetInformationRsp CoexistenceSetInformationResponse,

coexReportAnn CoexistenceReportAnnouncement,

coexReportReq CoexistenceReportRequest,

coexReportRsp CoexistenceReportResponse,

availableChannelsReq AvailableChannelsRequest,

cmAvailableChannelsReq CMAvailableChannelsRequest,

availableChannelsRsp AvailableChannelsResponse,

availableChannelsAnn AvailableChannelsAnnouncement,

coexSetElementInfoAnn CoexistenceSetElementInformationAnnouncement,

coexSetElementInfoConf CoexistenceSetElementInformationConfirm,

measurementReq MeasurementRequest,

measurementRsp MeasurementResponse,

measurementCnf MeasurementConfirm,

reconfigurationRequest ReconfigurationRequest,

reconfigurationRsp ReconfigurationResponse,

cmReconfigurationReq CMReconfigurationRequest,

cmReconfigurationRsp CMReconfigurationResponse,

resourceReconfReq CMReconfigurationRequest,

resourceReconfRsp CMReconfigurationResponse,

keepAliveReq KeepAliveRequest,

keepAliveRsp KeepAliveResponse

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Definitions of individual coexistence system messages

-- \* Messages defined per procedures as follows

-- \* 1) Coexistence service subscription

-- \* 2) Providing registration information

-- \* 3) Obtaining coexistence set information

-- \* 4) Obtaining available channel list

-- \* 5) Obtaining information

-- \* 6) Requesting and obtaining measurements

-- \* 7) Reconfiguration

-- \* 8) Coexistence set element reconfiguration

-- \* 9) Keep alive

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-- \* Messages for the following procedures

-- \* 1) Coexistence service subscription

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SubscriptionRequest ::= SEQUENCE {

 -- Subscribed coexistence service

 subscrivedService SubscribedService

}

SubscriptionResponse ::= SEQUENCE {

 -- Subscription status

 status BOOLEAN

}

SubscriptionChangeRequest ::= SEQUENCE {

 -- Proposed new subscribed coexistence service

 newSubscribedService SubscribedService

}

SubscriptionChangeResponse ::= SEQUENCE {

 -- Subscription change status

 status BOOLEAN

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Messages for the following procedures

-- \* 2) Providing registration information

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

CERegistrationRequest ::= SEQUENCE {

 -- Indicates whether this is new registration or registration update

 operationCode OperationCode,

 -- Network identifier, e.g., BSS ID

 networkID OCTET STRING,

 -- Network technology, e.g., 802.11af, 802.22

 networkTechnology NetworkTechnology,

 -- Network type, e.g., fixed, mode 2

 networkType NetworkType,

 -- Regulatory ID of the WSO, e.g. FCC ID

 deviceRegulatoryID OCTET STRING,

 -- Serial number of the WSO

 deviceSN OCTET STRING,

 -- Information about available white space resources

 availableChannelsInfo AvailableChannelsInfo,

 -- Information for discovery

 discoveryInformation DiscoveryInformation,

 -- Adjacent channel leakage ratio of the TVBD device

 -- List of supported resources: channel numbers or frequencies

 listOfSupportedResources CHOICE {

 -- List of supported frequencies

 listOfSuppFrequencies ListOfSupportedFrequencies },

 -- List of operating resources: channel numbers or frequencies

 listOfOperatingResources CHOICE {

 -- List of operating frequencies

 -- Includes occupancy information

 listOfOperFrequencies ListOfOperatingFrequencies },

 -- Minimum transmission power

 minTxPower REAL,

 -- Indicates whether scheduled transmission is supported

 txScheduleSupported BOOLEAN,

 -- Resource required for operation of this WSO

 requiredResource RequiredResource,

 -- Measurement capabilities of the WSO

 measurementCapability MeasurementCapability

}

RegistrationResponse ::= SEQUENCE {

}

CMRegistrationRequest ::= SEQUENCE {

 -- Indicates whether this is new registration, registration update,

 -- or deletion of WSO

 operationCode OperationCode,

 -- CE identifier to which this message applies

 ceID CxID,

 -- Network identifier, e.g., BSS ID

 networkID OCTET STRING,

 -- Network technology, e.g., 802.11af, 802.22

 networkTechnology NetworkTechnology,

 -- Network type, e.g., fixed, mode 2

 networkType NetworkType,

 -- Information for discovery

 discoveryInformation DiscoveryInformation,

 -- List of supported resources: channel numbers or frequencies

 listOfSupportedResources CHOICE {

 -- List of supported channel numbers

 listOfSuppChNumber ListOfSupportedChNumber,

 -- List of supported frequencies

 listOfSuppFrequencies ListOfSupportedFrequencies },

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Messages for the following procedures

-- \* 3) Obtaining coexistence set information

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

CoexistenceSetInformationAnnouncement ::= SEQUENCE {

 -- List of WSOs for which coexistence sets are reported in this

 -- announcement

 listofWSO SEQUENCE OF SEQUENCE {

 -- Indication of a particular CE for which a coexistence

 -- set is reported in this announcement

 ceID CxID,

 -- List of neighbor CMs

 listOfNeighborCM SEQUENCE OF SEQUENCE {

 -- Neighbor CM identifier

neighborCMID CxID,

-- Neighbor CM IP address

neighborCMIPAddress OCTET STRING,

-- Neighbor CM port number

neighborCMPortNum OCTET STRING,

-- List of coexistence elements served by this CM

listOfCoexSetElements SEQUENCE OF SEQUENCE {

 -- Network identifier, e.g., BSS ID

 networkID OCTET STRING,

 -- CE Identifier

 ceID CxID,

 -- Network technology, e.g. 802.11af, 802.22

 networkTechnology NetworkTechnology,

 -- Interference direction, i.e. mutual, source or victim

 interfDirection InterferenceDirection,

 -- Estimated interference level caused by the

 -- coexistence set element

 interfLevelFromCoexSetElem InterfererData,

 -- Estimated interference level caused to

 -- the coexistence set element

 interfLevelToCoexSetElem InterfererData,

 }

 }

 }

}

CoexistenceSetInformationRequest ::= SEQUENCE {

 -- List of WSO for which coexistence set information is requested

 listofWSO SEQUENCE OF SEQUENCE {

 -- Indication of a particular WSO for which coexistence set

 -- information is requested

 networkID OCTET STRING,

 -- CE Identifier

 ceID CxID

 }

}

CoexistenceSetInformationResponse ::= SEQUENCE {

 -- List of WSOs for which coexistence sets are reported in this

 -- announcement

 listofCE SEQUENCE OF SEQUENCE {

 -- Indication of a particular CE/WSO for which a coexistence

 -- set is reported in this announcement

 -- CE identifier of the related WSO

 ceID CxID,

 networkID OCTET STRING,

 -- List of neighbor CMs

 listOfNeighborCM SEQUENCE OF SEQUENCE {

 -- Neighbor CM identifier

neighborCMID CxID,

-- Neighbor CM IP address

neighborCMIPAddress OCTET STRING,

-- Neighbor CM port number

neighborCMPortNum OCTET STRING,

-- List of coexistence elements served by this CM

listOfCoexSetElements SEQUENCE OF SEQUENCE {

 -- Network identifier, e.g., BSS ID

 networkID OCTET STRING,

 -- CE Identifier

 ceID CxID,

 -- Network technology, e.g. 802.11af, 802.22

 networkTechnology NetworkTechnology,

 -- Interference direction, i.e. mutual, source or victim

 interfDirection InterferenceDirection,

 -- Estimated interference level caused by the

 -- coexistence set element

 interfLevelFromCoexSetElem InterfererData,

 -- Estimated interference level caused to

 -- the coexistence set element

 interfLevelToCoexSetElem InterfererData,

 }

 }

 }

}

CoexistenceReportAnnouncement ::= SEQUENCE {

 -- List of coexistence set elements reported in this announcement

 listOfCoexistenceSetElement SEQUENCE OF SEQUENCE {

 -- CE identifier of the related WSO

 ceID CxID,

 -- Network identifier, e.g., BSS ID

 networkID OCTET STRING,

 -- Network technology, e.g., 802.11af, 802.22

 networkTechnology NetworkTechnology,

 -- Interference direction, i.e., mutual, source or victim

 interferenceDirection InterferenceDirection,

 -- Estimated interference level caused by the neighbor

 interfLevelFromCoexSetElem InterfererData,

 -- Estimated interference level caused to the coexistence set

 -- element

 interfLevelToCoexSetElem InterfererData,

 -- temporarily or reclaims them

 temporaryResource ENUMERATED {release, reclaim} OPTIONAL

 --Coexistence value of the network

 coexistenceValue REAL OPTIONAL,

 -- Radio environment information

 radioEnvInformation RadioEnvironmentInformation,

 },

}

CoexistenceReportRequest ::= SEQUENCE {

}

CoexistenceReportResponse ::= SEQUENCE {

 -- List of coexistence set elements reported in this announcement

 listOfCoexistenceSetElement SEQUENCE OF SEQUENCE {

 -- CE identifier of the related WSO

 ceID CxID,

 -- Network identifier, e.g., BSS ID

 networkID OCTET STRING,

 -- Network technology, e.g., 802.11af, 802.22

 networkTechnology NetworkTechnology,

 -- Interference direction, i.e., mutual, source or victim

 interferenceDirection InterferenceDirection,

 -- Estimated interference level caused by the neighbor

 interfLevelFromCoexSetElem InterfererData,

 -- Estimated interference level caused to the coexistence set

 -- element

 interfLevelToCoexSetElem InterfererData,

 -- temporarily or reclaims them

 temporaryResource ENUMERATED {release, reclaim} OPTIONAL

 --Coexistence value of the network

 coexistenceValue REAL OPTIONAL,

 -- Radio environment information

 radioEnvInformation RadioEnvironmentInformation,

 },

}

CoexistenceSetElementInformationAnnouncement ::= SEQUENCE OF SEQUENCE {

 -- CE identifier of the related WSO

 ceID CxID,

 -- Network identifier, e.g., BSS ID

 networkID OCTET STRING,

 -- Network technology, e.g., 802.11af, 802.22

 sourceNetwTech NetworkTechnology,

 -- WSO type, e.g., fixed, mode 2

 networkType NetworkType,

 -- Indicates whether the coexistence set element releases resources

 -- temporarily or reclaims them

 temporaryResource ENUMERATED {release, reclaim} OPTIONAL,

 -- Radio environment information

 radioEnvInformation RadioEnvironmentInformation,

}

CoexistenceSetElementInformationConfirm ::= SEQUENCE {

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Messages for the following procedures

-- \* 4) Obtaining available channel list

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AvailableChannelsRequest ::= SEQUENCE {

}

CMAvailableChannelsRequest ::= SEQUENCE {

 -- Time of the request

 requestedTimeStamp GeneralizedTime,

 -- Regulatory identifier of the WSO, e.g. FCC ID

 deviceRegulatoryID OCTET STRING,

 -- Serial number of the WSO

 deviceSN OCTET STRING,

 -- Location of the WSO

 deviceLocation GeoLocation,

 -- Network type, e.g., fixed, mode 2

 networkType NetworkType

}

AvailableChannelsResponse ::= SEQUENCE {

 -- Information about available white space resources

 availableChannelsInfo AvailableChannelsInfo

}

AvailableChannelsAnnouncement ::= SEQUENCE {

 -- Information about available white space resources

 availableChannelsInfo AvailableChannelsInfo

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Messages for the following procedures

-- \* 5) Obtaining information

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

InfoAcquiringRequest ::= SEQUENCE {

 -- Identifier of the CE to which the request relates to.

 -- Available only when the request is transmitted from a CM to

 -- another CM.

 ceID Cx\_ID OPTIONAL,

 -- ID of the requested information

 listOfReqInfoDescr SEQUENCE OF ReqInfoDescr

}

InfoAcquiringResponse ::= SEQUENCE {

 -- Identifier of the CE to which the response relates to.

 -- Available only when the response is transmitted from a CM to

 -- another CM.

 ceID Cx\_ID OPTIONAL,

 -- Requested information

 reqInfoValue ReqInfoValue,

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Messages for the following procedures

-- \* 6) Requesting and obtaining measurements

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

MeasurementRequest ::= SEQUENCE {

 -- Indicates what type of measurement is requested

 measurementDescription MeasurementDescription

}

MeasurementResponse ::= SEQUENCE OF SEQUENCE {

 -- Measurement results in form of measurement reports

 measurementDescription MeasurementDescription,

 measurementReport MeasurementReport

}

MeasurementConfirm ::= SEQUENCE {

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Messages for the following procedures

-- \* 7) Reconfiguration

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ReconfigurationRequest ::= SEQUENCE {

 -- Reconfiguration request description

 reconfigParameters ReconfigurationParameters,

 -- Indicates whether the CE is allowed to release resources in

 -- temporary manner

 tempReleaseAllowed BOOLEAN OPTIONAL

}

ReconfigurationResponse ::= SEQUENCE {

 -- Status: successful or not

 status BOOLEAN,

 -- Failed reconfiguration parameters with recommended values of

 -- parameters if reconfiguration request from CM to WSO is failed

 failedParameters FailedParameters OPTIONAL

}

CMReconfigurationRequest ::= SEQUENCE {

 -- Indicates CE of WSO to be reconfigured

 reconfigTarget CxID,

 -- Reconfiguration request description

 reconfigParam ReconfigurationParameters,

}

CMReconfigurationResponse ::= SEQUENCE {

 -- Indicates CE of WSO to be reconfigured

 reconfigTarget CxID,

 -- Status: successful or not

 status BOOLEAN,

 -- Failed reconfiguration parameters with recommended values of

 -- parameters if reconfiguration request from CM to CE is failed

 failedParameters FailedParameters OPTIONAL

}

ResourceReconfigurationRequest ::= SEQUENCE {

 -- Indicates CE of the WSO wanting reconfiguration

 reconfigTarget CxID,

 -- Requested new resources

 newOperResources ListOfOperatingResourceValues

}

ResourceReconfigurationResponse ::= SEQUENCE {

 -- Requested new resources

 newOperResources ListOfOperatingResourceValues

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* Messages for the following procedures

-- \* 9) Keep alive

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

KeepAliveRequest ::= SEQUENCE {

 -- Indicates KeepAliveExpiryTime parameter value in seconds

 keepAliveExpiryTimeValue REAL,

 -- Indicates status of the requesting entity

 requestingEntityStatus EntityStatus

}

KeepAliveResponse ::= SEQUENCE {

 -- Indicates status of the responding entity

 respondingEntityStatus EntityStatus

}

END