IEEE P802.19
Wireless Coexistence

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| Profile 3 CE |
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Abstract

This document is a submission to IEEE 802.19 TG1 that contains a description of profile 3 based CE.

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# Entity operation

* + 1. Profile 3
			1. General description

A CE that operates as per Profile 3 shall support the following procedures:

* WSO subscription
* WSO subscription update
* WSO subscription change
* WSO registration
* WSO registration update
* WSO reconfiguration
* Providing coexistence report

High level flow chart of the CE operation is provided in the following figure.



After receiving a request to start operation, a CE shall perform the initial step sequences which are composed of WSO subscription and registration procedures for the coexistence service subscription of each subject WSO/RLSS for the CE which will be coordinated by its connected CM. After that, the CE shall switch to its operation mode in accordance with subscription service type which is either information service or management service.

In case of subscribing information service, CE shall provide coexistence report being served by its connected CM to its connected WSO/RLSS until stopping coexistence service subscription or changing it to the management service subscription.

In case of subscribing management service, CE shall provide reconfiguration request being served by its connected CM to the subject WSO/RLSS until stopping coexistence service subscription or changing it to the information service subscription.

In both cases, when the CE tries to stop its coexistence service subscription to its connected CM, CE shall indicate “no service subscription” to the subject CM via WSO subscription update procedure, and CE shall request deregistration as “remove” to its CM via WSO registration procedure.

In both cases, when the CE tries to change its coexistence service subscription to its connected CM, CE shall request the change to different type of service subscription via WSO subscription update procedure.

Subsequently, when CM requests a change of the type of coexistence service subscription to the subject CE, CE shall respond that request from the CM whether or not such request is acceptable via WSO subscription change procedure.

Further procedure specific constraints may apply and if that is the case those are specified in the clauses below.

* + - 1. WSO subscription

A CE shall perform WSO subscription update procedure as shown in clause 5.2.1.1. After the CE has sent ***CxMediaSubscriptionRequest*** to the subject WSO/RLSS, CE shall send ***SubscriptionRequest*** to the subject CM when receiving ***CxMediaSubscriptionResponse*** from the WSO/RLSS.

Table ‑ – CxMessage fields in SubscriptionRequest message

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***Header*** | ***CxHeader*** | ***requestID*** |
| ***Payload*** | ***CxPayload*** | ***subscriptionRequest*** |

Table ‑ – subscriptionRequest payload element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***clientID*** | ***IA5String*** | WSO subscription identifier |
| ***clientPassword*** | ***IA5String*** | WSO subscription password |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to subscribe to the information service.Set to “management” if the intent is to subscribe to the management service. |

The CE shall send ***CxMediaSubscriptionConfirm*** to the subject WSO/RLSS when receiving ***SubscriptionResponse*** from the CM.

Table ‑ – CxMediaSubscriptionConfirm primitive

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cxMediaStatus*** | ***CxMediaStatus*** | Status |

* + - 1. WSO subscription update

A CE shall perform WSO subscription update procedure as shown in clause 5.2.1.2. The CE shall send ***SubscriptionRequest*** to the subject CM when receiving ***CxMediaSubscriptionIndication*** from a WSO/RLSS.

Table ‑ – CxMessage fields in SubscriptionRequest message

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***Header*** | ***CxHeader*** | ***requestID*** |
| ***Payload*** | ***CxPayload*** | ***subscriptionRequest*** |

Table ‑ – subscriptionRequest payload element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***clientID*** | ***IA5String*** | WSO subscription identifier |
| ***clientPassword*** | ***IA5String*** | WSO subscription password |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to subscribe to the information service.Set to “management” if the intent is to subscribe to the management service.Set to “noService” if the intent is to stop the service subscription |

The CE shall send ***CxMediaSubscriptionConfirm*** to the subject WSO/RLSS when receiving ***SubscriptionResponse*** from the CM.

Table ‑ – CxMediaSubscriptionConfirm primitive

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cxMediaStatus*** | ***cxMediaStatus*** | ***Status*** |

* + - 1. Subscription change

A CE shall perform subscription change procedure as shown in clause 5.2.1.5. The CE shall send ***CxMediaChangeSubscriptionRequest*** to the subject WSO/RLSS when receiving ***SubscriptionChangeRequest*** from a CM.

Table ‑ –CxMediaChangeSubscriptionRequest primitives

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to update the service subscription to the information service.Set to “management” if the intent is to update the service subscription to the management service. |

The CE shall send ***SubscriptionChangeResponse*** to the subject WSO/RLSS when receiving ***CxMediaChangeSubscriptionResponse*** from the WSO/RLSS.

Table ‑ – CxMessage fields in SubscriptionChangeResponse message

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***Header*** | ***CxHeader*** | ***requestID*** |
| ***Payload*** | ***CxPayload*** | ***sucscriptionChangeResponse*** |

Table ‑ –SubscriptionChangeResponse payload element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***CxMediaStatus*** | ***Status*** |

* + - 1. WSO registration

A CE shall perform WSO registration procedure as shown in clause 5.2.2.1. After the CE has sent ***CxMediaSubscriptionRequest*** to the subject WSO/RLSS, CE shall send ***CERegistrationRequest*** to the subject CM when receiving ***CxMediaSubscriptionResponse*** from the WSO/RLSS.

Table ‑ – CxMessage fields in CERegistrationRequest message when requesting registration

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***registrationRequest*** |

Table ‑ – CERegistrationRequest payload element for one WSO when requesting registration

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate new registration as “new”. |
| ***wsoID*** | ***INTEGER*** | WSO ID |
| ***networkID*** | ***OCTET STRING*** | Identifier of the network to which the WSO belongs. |
| ***networkTechnology*** | ***NetworkTechnology*** | Shall be set to a value that represents the network technology of the WSO. |
| ***networkType*** | ***NetworkType*** | Shall be set to a value that represents the network type of the WSO. |
| ***geolocation*** | ***Geolocation*** | Geolocation information of the WSO |
| ***deviceRegulatoryID*** | ***OCTET STRING*** | Shall be set to a value that equals the regulatory identifier of the WSO. |
| ***installationParameters*** | ***InstallationParameters*** | As specified in Table 6‑12 |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | As specified in Table 6‑14. |
| ***txScheduleSupported*** | ***BOOLEAN*** | Shall be set to a value that represents the WSO’s capability to support transmit scheduling. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | As specified in Table 6‑17. |
| ***listOfSuppFrequencies*** | ***ListOfSupportedFrequencies*** | As specified in Table 6‑16. |
| ***addNetworkTechnology*** | ***SEQUENCE of NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate the sequence of its operable network technology type(s) |
| ***requiredResource*** | ***RequiredResource*** | As specified in Table 6‑18. |
| ***mobilityInformation*** | ***MobilityInformation*** | As specified in Table 6‑19. |

Table ‑ – InstallationParameters parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***opMasterHeight*** | ***REAL*** | Shall be set to indicate the height of master station, if available |
| ***opSlaveHeight*** | ***REAL*** | Shall be set to indicate the height of slave station, if available |
| ***opTxPower*** | ***REAL*** | Shall be set to indicate the maximum transmission power level if applicable. |
| ***aCLR*** | ***REAL*** | Adjacent Channel Leakage Ratio |
| ***aCS*** | ***REAL*** | Adjacent Channel Selectivity |
| ***guaranteedQoSOfBackhaulConnection*** | ***GuaranteedQoSOfBackhaulConnection*** | As specified in Table 6‑13 |

Table ‑ – GuaranteedQoSOfBackhaulConnection parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***backhaulTypeID*** | ***BackhalTypeID*** | Shall be set to indicate backhaul type of the WSO.  |
| ***guaranteedMinimumBitRates*** | ***REAL*** | Shall be set to indicate the guaranteed maximum latency of its backhaul connection |
| ***guaranteedMaximumLatency*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate the guaranteed maximum latency of its backhaul connection |

Table ‑ – ListOfAvailableFrequencies parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the available frequency range. |
| ***txPowerLimit*** | ***REAL*** | Shall be set to indicate the power limit in the available frequency range. |
| ***availableStartTime*** | ***GeneralizedTime*** | Shall be set to indicate start time of the available frequency range if applicable. |
| ***availableDuration*** | ***REAL*** | Shall be set to indicate duration of the available frequency range if applicable. |
| ***aggInterfControlParam*** | ***AggregatedInterferenceControlParameters*** | As specified in Table 6‑15 |

Table ‑ – AggregatedInterferenceControlParameters parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***referencePointID*** | ***INTEGER*** | Reference point ID to be protected in controlling aggregated interference from the other WSO(s) |
| ***geolocation*** | ***Geolocation*** | Geolocation information of the reference point ID |
| ***aCS*** | ***REAL*** | Adjacent Channel Selectivity of the reception to be protected at the reference point if available |
| ***aCLR*** | ***REAL*** | Referenced adjacent channel leakage ratio if available |
| ***antennaHeight*** | ***REAL*** | Potential antenna height of the reception to be protected if available |
| ***antennaGain*** | ***REAL*** | Potential antenna gain of the reception to be protected at the reference point if available |
| ***protection ratio*** | ***REAL*** | Protection ratio of the reception to be protected at the reference point for the frequency if available |

Table ‑ – listOfSuppFrequencies parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***supportedFrequency*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the WSO is capable of operating. |
| ***extrachannelizationIsSupported*** | ***BOOLEAN*** | Shall be set to indicate if subchannelization or channel aggregation) supported or not |
| ***extrachannelizationDescription*** | ***ExtrachannelizationDescription*** | If present, this parameter shall be set to indicate the extra channel configuration description |

Table ‑ – listOfOperatingFrequencies parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the WSO currently operates.  |
| ***occupancy*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate occupancy of the WSO frequency range. |

Table ‑ – requiredResource parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***requiredBandwidth*** | ***REAL*** | Shall be set to indicate bandwidth requested for the WSO.  |

The CE shall send ***CxMediaRegistrationConfirm*** to the subject WSO/RLSS when receiving ***RegistrationResponse*** from the subject CM.

Table ‑ – MobilityInformation parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
|  ***maxSpeed*** |  ***REAL*** | If present, this parameter shall be set to indicate the maximum speed value of the WSO (in km/h) |
|  ***speedInformation*** |  ***SpeedInformation*** | If present, this parameter shall be set to indicate detailed information on the WSO speed and direction. |
|  ***routeInformation*** |  ***RouteInformation*** | If present, this parameter shall be set to indicate the WSO planned route and time.  |

Table ‑ – CxMediaRegistrationConfirm primitive

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cxMediaStatus*** | ***cxMediaStatus*** | ***Status*** |

* + - 1. WSO registration update

A CE shall perform WSO registration update procedure as shown in clause 5.2.2.2. The CE shall send ***CERegistrationRequest*** to the subject CM when receiving ***CxMediaRegistrationIndication*** from the subject WSO/RLSS.

Table ‑ – CxMessage fields in CERegistrationRequest message when requesting registration update

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***registrationRequest*** |

Table ‑ – CEregistrationRequest payload element for one WSO when requesting registration update

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate registration update as “modify” or “remove”. |
| ***wsoID*** | ***INTEGER*** | WSO ID |
| ***geolocation*** | ***Geolocation*** | Geolocation information if any update  |
| ***InstallationParameters*** | ***InstallationParameters*** | As specified in Table 6‑12 if any update |
| ***listOfAvailableFrequencies*** | ***AvailableFrequencies*** | As specified in if any update  |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | As specified in Table 6‑17 if any update |
| ***addNetworkTechnology*** | ***SEQUENCE of NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate the sequence of its WSO operable network technology type(s) |
| ***requiredResource*** | ***RequiredResource*** | As specified in Table 6‑18 if any update |
| ***mobilityInformation*** | ***MobilityInformation*** | As specified in Table 6‑19 if any update. |

A CE shall send ***CxMediaRegistrationConfirm*** to the subject WSO/RLSS when receiving ***RegistrationResponse*** from the subject CM.

Table ‑ – CxMediaRegistrationConfirm primitive

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cxMediaStatus*** | ***cxMediaStatus*** | ***Status*** |

* + - 1. WSO reconfiguration

A CE shall perform WSO reconfiguration procedure as shown in clause 5.2.10.1. The CE shall send ***CxMediaReconfigurationRequest*** to the subject WSO/RLSS when receiving ***ReconfigurationRequest*** from the subject CM.

Table ‑ – CxMediaReconfigurationRequest primitive

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***wsoID*** | ***OCTET STRING*** | WSO ID. |
| ***OperatingFrequency*** | ***FrequencyRange*** | Operating frequency range allocated for the WSO. |
| ***txPowerLimit*** | ***REAL*** | Transmission power limit |
| ***addNetworkTechnology*** | ***NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate its WSO network technology type(s) to be reconfigured |

A CE shall send ***ReconfigurationResponse*** to the subject CM when receiving ***CxMediaReconfigurationResponse*** from the subject WSO/RLSS.

Table ‑ – CxMessage fields in ReconfigurationResponse message

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***Payload*** | ***cxPayload*** | ***status*** |

* + - 1. Providing coexistence report

A CE shall perform providing coexistence set report procedure as shown in clause 5.2.3.6. The CE shall send ***CxMediaCoexistenceReportResponse*** to the subject WSO/RLSS when receiving ***CoexistenceReportResponse*** from the subject CM.

Table ‑ – CxMedia fields in *CxMediaCoexistenceReportResponse* primitive

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkID*** | ***OCTET STRING*** | Network ID |
| ***listOfRecommendedOperatingFrequency*** | ***ListOfRecommendedOperatingFrequency*** | As specified in Table 6‑27 |

Table ‑ – listOfRecommendedOperationFrequency parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the recommended operation frequency range. |
|  ***txPowerLevel*** | ***REAL*** | Shall be set to indicate the power limit in the frequency range. |
| ***availableStartTime*** | ***GeneralizedTime*** | Shall be set to indicate start time of the recommended operation frequency range if applicable. |
| ***availableDuration*** | ***REAL*** | Shall be set to indicate duration of the operation recommended frequency range if applicable. |