IEEE P802.19
Wireless Coexistence

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| Profile 3 CM |
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| Author(s): |
| Name | Company | Address | Phone | email |
| Ryo Sawai | Sony corporation |  |  | Ryo.Sawai@jp.sony.com |
| Naotaka Sato | Sony corporation |  |  |  |
| Sun Chen | Sony China |  |  |  |
| Bill Carney | Sony Electronics |  |  |  |
| Tsuyoshi Shimomura | Fujitsu Labs. Limited | 3-2-1 Sakado, Takatsu-ku, Kawasaki, Kanagawa, Japan |  |  |
| Golnaz Farhadi | Fujitsu Labs of America | 1240 E. Arques Avenue M/S 345, Sunnyvale, CA 94085, USA |  |  |

Abstract

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

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# Entity operation

* + 1. Profile 3
			1. General description

A CM 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
* Obtaining coexistence set information
* Providing coexistence report
* Master/slave CM configuration procedure
* Sending reconfiguration request from CM to another CM

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



After receiving requests for both WSO subscription procedure and its registration procedure, a CM shall start operation either management service operation or information service operation for the subject WSO. In case of information service operation, the overall operation is shown in the following figure. Until receiving either a stop request of coexistence service subscription for the subject CE or having a need to start a coexistence subscription change procedure, CM will continue a coexistence set information procedure and a providing coexistence report procedure for its information service operation. If any update on its registered WSO information, CM shall correspond to a WSO registration update procedure.



In case of management service operation, the overall operation is shown in the following figure. Until receiving either a stop request of coexistence service subscription for the subject CE or having a need to start a coexistence subscription change procedure, CM will continue a coexistence set information procedure and a WSO reconfiguration procedure for its management service operation. If any update on its registered WSO information, CM shall correspond to a WSO registration update procedure. If the CM receives a request of master/slave configuration procedure from the other CM(s) and accepts that request, CM shall start a sending reconfiguration request from CM to another CM procedure when the CM wants to reconfigure the operational parameters of the subject WSO being connected to its slave CM.



In case of management service operation as slave CM, the overall operation is shown in the following figure. Until receiving either a stop request of coexistence service subscription for the subject CE or having a need to start a coexistence subscription change procedure, CM will wait a reconfiguration request from its master CM procedure and continue to conduct a WSO reconfiguration procedure to the subject CE for its management service operation as slave CM. If any update on its registered WSO information, CM shall correspond to a WSO registration update procedure.



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

* + - 1. WSO subscription

A CM shall perform WSO subscription procedure as shown in clause 5.2.1.1. The CM shall send ***SubscriptionResponse*** to the subject CE when receiving ***SubscriptionRequest*** from the subject CE.

**Table 6.1 – CxMessage fields in SubscriptionResponse message**

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***Header*** | ***CxHeader*** | ***requestID*** |
| ***Payload*** | ***cxPayload*** | ***subscriptionResponse*** |

Table 6.2shows the parameters in the subscriptionResponse payload.

Table 6.2 –SubscriptionResponse payload element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***serverID*** | ***IA5String*** | serverID |
| ***serverPassword*** | ***IA5String*** | serverPassword |
| ***status*** | ***CxMediaStatus*** | status |

* + - 1. WSO subscription update

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

Table 6.3 – CxMessage fields in SubscriptionResponse message

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***cxPayload*** | ***subscriptionResponse*** |

Table 6.4 –SubscriptionResponse payload element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***serverID*** | ***IA5String*** | serverID |
| ***serverPassword*** | ***IA5String*** | serverPassword |
| ***status*** | ***CxMediaStatus*** | Status |

* + - 1. Subscription change

A CM shall perform subscription change procedure as shown in clause 5.2.1.5. The CM shall send ***SubscriptionChangeRequest*** to the subject CE when receiving a trigger to start WSO subscription change procedurefor the subject WSO.

**Table 6.5 – SubscriptionChangeRequest payload element**

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

Table 6.6 – CxMessage fields in SubscriptionChangeRequest message

|  |  |  |
| --- | --- | --- |
| *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. |

* + - 1. WSO registration

A CM shall perform WSO registration procedure as shown in clause 5.2.2.1. The CM shall send ***RegistrationResponse*** to the subject CE and shall send ***CMRegistrationRequest*** when receiving ***CERegistrationRequest*** from the subject CE.

**Table 6.7 – CxMessage fields in RegistrationResponse message**

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

Table 6.8 – registrationResponse payload element

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

The CM shall set the ***CMRegistrationRequest*** message when receiving ***CERegistrationRequest*** from the subject CE.

Table 6.9 – CxMessage fields in CMRegistrationRequest message

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

Table 6.10 – CMRegistrationRequest payload element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmProfile*** | ***EntityProfile*** | Shall be set to indicate the entity profile |
| ***cmRegistration*** | ***CMRegistration*** | As specified in Table 6.11 |
| ***ceRegistration*** | ***CERegistration*** | As specified in Table 6.12 |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that information is new. |
| ***ceID*** | ***CxID*** | CM ID |
| ***maximumNumberOfControllableWSO*** | ***INTEGER*** | Maximum number of controllable WSOs |

Table 6.11 – CMRegistration information element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***iPAddress*** | ***OCTET STRING*** | IP address |
| ***portNumber*** | ***INTEGER*** | Port number |

Table 6.12 – CERegistration information element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***ceID*** | ***CxID*** | CE ID |
| ***listOfWSORegistrations*** | ***ListOfWSORegistrations*** | As specified in Table 6.13 |

Table 6.13 – ListOfWSORegistrations information element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***wsoID*** | ***OCTET STRING*** | WSO ID |
| ***networkTechnology*** | ***NetworkTechnology*** | Network technology |
| ***geolocation*** | ***Geolocation*** | Geolocation |
| ***coverageArea*** | ***CoverageArea*** | As specified in Table 6.14 |
| ***installationParameters*** | ***InstallationParameters*** | As specified in Table 6.15 |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | As specified in Table 6.16 |
| ***operatingFrequency*** | ***OperatingFrequency*** | As specified in Table 6.18 |
| ***txPowerLimit*** | ***REAL*** | Transmission power limit of the operating frequency if available |
| ***maximumNumberOfControllableWSO*** | ***MaximumNumberOfControlableWSO*** | Optionally, present |

Table 6.14 – CoverageArea parameter element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***radius*** | ***REAL*** | Shall be set to indicate the available frequency range. |

Table 6.15 – 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*** | ***GuranteedQoSOfBackhaulConnection*** | As specified in Table 6.19 |

Table 6.16 – 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 6.17 |

Table 6.17 – 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 6.18 – OperatingFrequency 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 6.19 – QuranteedQoSOfBackhaulConnection parameter element

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

* + - 1. WSO registration update

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

Table 6.20 – CxMessage fields in RegistrationResponse message

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

Table below shows the parameters in the *registrationResponse* payload.

Table 6.21 – registrationResponse payload element

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

The CM shall set the ***CMRegistrationRequest*** message when receiving ***CERegistrationRequest*** from the subject CE.

Table 6.22 – CxMessage fields in CMRegistrationRequest message

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

Table 6.23 – cMRegistrationRequest payload element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmProfile*** | ***EntityProfile*** | Shall be set to indicate the entity profile |
| ***cmRegistration*** | ***CMRegistration*** | As specified in Table 6.24 if any update |
| ***ceRegistration*** | ***CERegistration*** | As specified in Table 6.25 if any update |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that information is update/to-be-deleted. |
| ***ceID*** | ***CxID*** | CM ID |

Table 6.24 – CMRegistration information element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***iPAddress*** | ***OCTET STRING*** | IP address |
| ***portNumber*** | ***INTEGER*** | Port number |

Table 6.25 – CERegistration information element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***ceID*** | ***CxID*** | CE ID |
| ***listOfWSORegistrations*** | ***ListOfWSORegistrations*** | As specified in Table 6.26 |

Table 6.26 – ListOfWSORegistrations information element

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that information is update/to-be-deleted. |
| ***wsoID*** | ***OCTET STRING*** | WSO ID |
| ***networkTechnology*** | ***NetworkTechnology*** | Network technology if any update |
| ***geolocation*** | ***Geolocation*** | Geolocation if any update |
| ***coverageArea*** | ***CoverageArea*** | As specified in Table 6.14 if any update |
| ***installationParameters*** | ***InstallationParameters*** | As specified in Table 6.15 if any update |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | As specified in Table 6.16 if any update |
| ***operatingFrequency*** | ***OperatingFrequency*** | Shall be set to indicate the operating frequency if any update |
| ***txPowerLimit*** | ***REAL*** | Transmission power limit of the operating frequency if any update |

* + - 1. Reconfiguration

A CM shall perform WSO reconfiguration procedure as shown in clause 5.2.10.1. The CM shall send ***ReconfigurationRequest*** to the subject CE when receiving a trigger to start WSO reconfiguration procedure.

**Table 6.27 – CxMessage fields in ReconfigurationRequest message**

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

Table 6.28 – reconfigurationRequest fields in ReconfigurationRequest message

|  |  |  |
| --- | --- | --- |
| *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 |

* + - 1. Obtaining coexistence set information

A CM shall perform obtaining coexistence set procedure as shown in clause 5.2.3.1. The CM shall send ***CoexistenceSetInformationRequest*** to the subject CE when receiving a trigger to start obtaining coexistence set information procedure.

Table 6.29 – CxMessage fields in CoexistenceSetInformationRequest message

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

Table below shows the parameters in the coexistenceSetInformationRequest payload.

Table 6.30 – CxMessage fields in CoexistenceSetInformationRequest payload

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***listOfNetworkID*** | ***SEQUENCE OF OCTET STRING*** | List of network ID |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that is new-request/update-request/stop-request. |

* + - 1. Providing coexistence report

A CM shall perform providing coexistence report procedure as shown in clause 5.2.3.6. The CM shall send ***CoexistenceReportResponse*** to the subject CE when receiving a trigger to start providing coexistence report procedure.

**Table 6.31 – CxMessage fields in CoexistenceReportResponse message**

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

Table below shows the parameters in the coexistenceReportResponse payload.

Table 6.32 – CxMessage fields in CoexistenceReportResponse payload

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkID*** | ***OCTET STRING*** | Network ID |
| ***wsoID*** | ***OCTET STRING*** | WSO ID |
| ***listOfRecommendedOperatingFrequency*** | ***ListOfRecommendedOperatingFrequency*** | As specified in Table 6.33 |

Table .33 – 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. |

* + - 1. Master/Slave CM configuration

A CM shall perform master/slave configuration procedure as shown in clause 5.2.9.2. The CM shall send ***MasterSlaveCMConfigurationRequest*** to the subject CM when receiving a trigger to start master/slave CM configuration procedure.

Table 6.34 – CxMessage fields in MasterSlaveCMConfigurationRequest message

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

Table below shows the parameters in the masterSlaveCMConfigurationRequest payload.

Table 6.35 – CxMessage fields in MasterSlaveCMConfigurationRequest message

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***cxID*** | Subject CM ID |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that subject configuration request is new/update/ deleted. |
| ***cmProfile*** | ***EntityProfile*** | Shall be set to indicate the entity profile |
| ***registeredCeInfo*** | ***CERegistration*** | As specified in Table 6.25 |

The CM shall send ***MasterSlaveCMConfigurationResponse*** to the subject CM when receiving ***MasterSlaveCMConfigurationRequest*** from the subject CM.

Table 6.36 – CxMessage fields in MasterSlaveCMConfigurationResponse message

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

Table 6.37 – CxMessage fields in MasterSlaveCMConfigurationResponse message

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

* + - 1. Sending reconfiguration request from CM to another CM

A CM shall perform sending reconfiguration request from CM to another CM procedure as shown in clause 5.2.10.2. The CM shall send ***CMReconfigurationRequest*** to the subject CM when receiving a trigger to start sending reconfiguration request from CM to another CM for its master CM operation.

**Table 6.38 – CxMessage fields in CMReconfigurationRequest message**

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

Table 6.39 – cMReconfigurationRequest fields in CMReconfigurationRequest message

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***wsoID*** | ***OCTET STRING*** | WSO ID. |
| ***cmID*** | ***cxID*** | Subject CE ID |
| ***OperatingFrequency*** | ***FrequencyRange*** | Operating frequency range allocated for the WSO. |
| ***txPowerLimit*** | ***REAL*** | Transmission power limit |
| ***newNetworkTechnology*** | ***NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate its WSO network technology type(s) to be reconfigured |
| ***newNetowkTechnology*** | ***NetworkTechnology*** | Change request for its operating network technology if available |

The CM shall send ***CMReconfigurationResponse*** to the subject CM when receiving ***CMReconfigurationRequest*** from the master CM.

**Table 6.40 – CxMessage fields in CMReconfigurationResponse message**

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

Table 6.41 – cMReconfigurationResponse fields in CMReconfigurationResponse message

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