

IEEE P802.19
Wireless Coexistence Working Group

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1 **Contents**

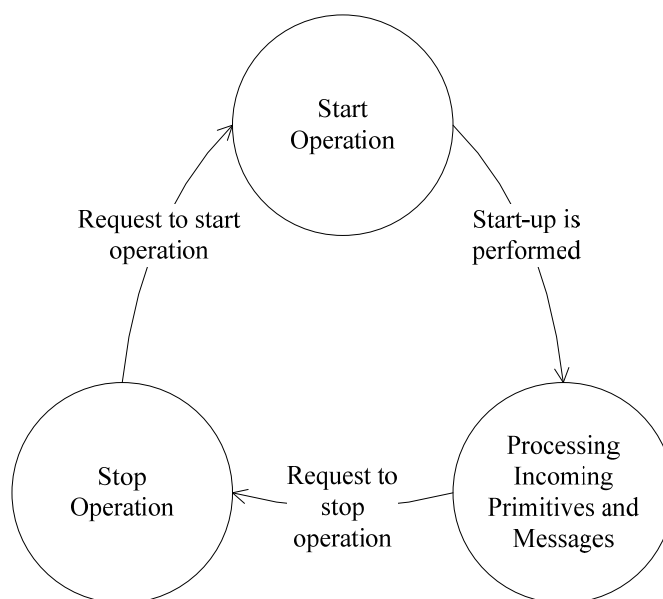
2 6. Procedures and protocols..... 1
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1 **6. Procedures and protocols**

2 **6.1 Protocols of entity operation**

3 **6.1.1 CE operation**

4 Figure 1 shows states of CE operation.



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Figure 1 —States of CE operation

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The following is assumed for CE operation:

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— A CE knows network address of a CM

9

— The CM is operating

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— The CM is connected to a CDIS.

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A CE has three states:

12

— Start Operation

13

— Processing Incoming Primitives and Messages

14

— Stop Operation.

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A CE switches to the Start Operation state from the Stop Operation state when it receives a request to start operation. Such a request may be received as an example from the TVBD network or device management entity. In the Start Operation state the CE performs start-up and then switches to the Processing Incoming Primitives and Messages state.

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In the Processing Incoming Primitives and Messages state the CE processes primitives from the TVBD network or device and messages from the CM. The CE remains in this state until it receives a request to

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1 stop operation. Such a request may be received as an example from the TVBD network or device
2 management entity. When such a request is received, the CE switches to the Stop Operation state.

3 In the Stop Operation state the CE performs deauthentication of its TVBD network or device in the
4 coexistence system. After this, the CE remains in this state until it receives a request to start operation.

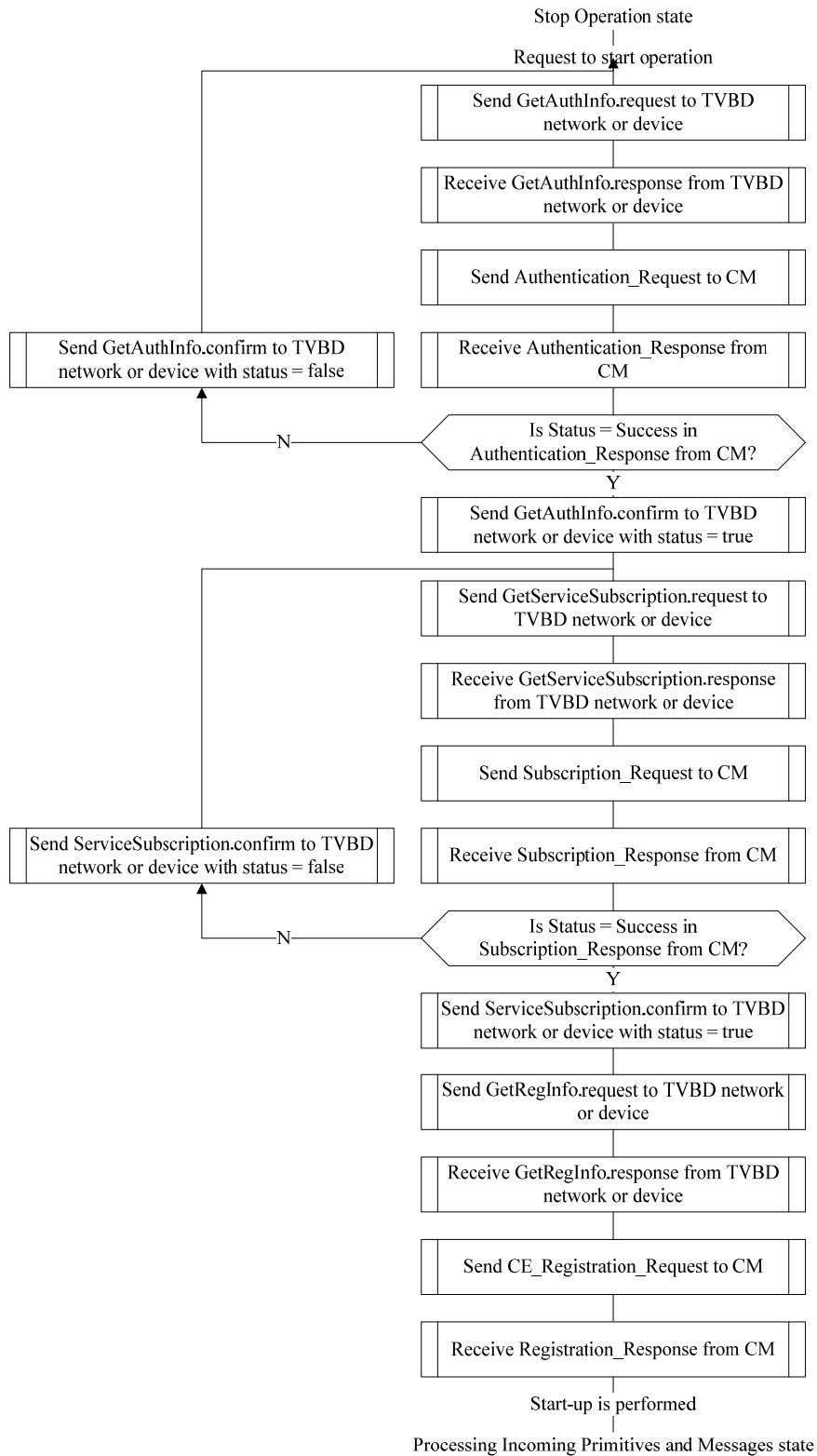
5 The states are not binding in implementation but they are introduced here merely for illustrative purposes
6 and to make the CE description easy to understand. Only the rules related to processing of received
7 messages and actions upon their reception are binding and normative if so specified.

8 Error case handling is on default implementation dependent. Unless explicitly mentioned, error handling
9 depends on implementation. The error case handlings described in the sub-clauses of this clause are
10 exemplary and not binding.

11 **6.1.1.1 CE operation in Start Operation state**

12 Figure 2 shows CE operation in the Start Operation state.

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Figure 2 —CE operation in the Start Operation state

1 After entering this state, the CE performs the following operations:

- 2 — Obtains authentication information from the TVBD network or device
- 3 — Performs authentication of the TVBD network or device in the coexistence system
- 4 — Obtains service subscription information from the TVBD network or device
- 5 — Performs service subscription to the CM
- 6 — Obtains registration information from the TVBD network or device
- 7 — Performs registration of the TVBD network or device in the coexistence system.

8 After that, the CE switches to the Processing Incoming Primitives and Messages state.

9 **6.1.1.2 CE operation in the Processing Incoming Messages and Primitives state**

10 **6.1.1.2.1 TVBD network or device is subscribed to the information service**

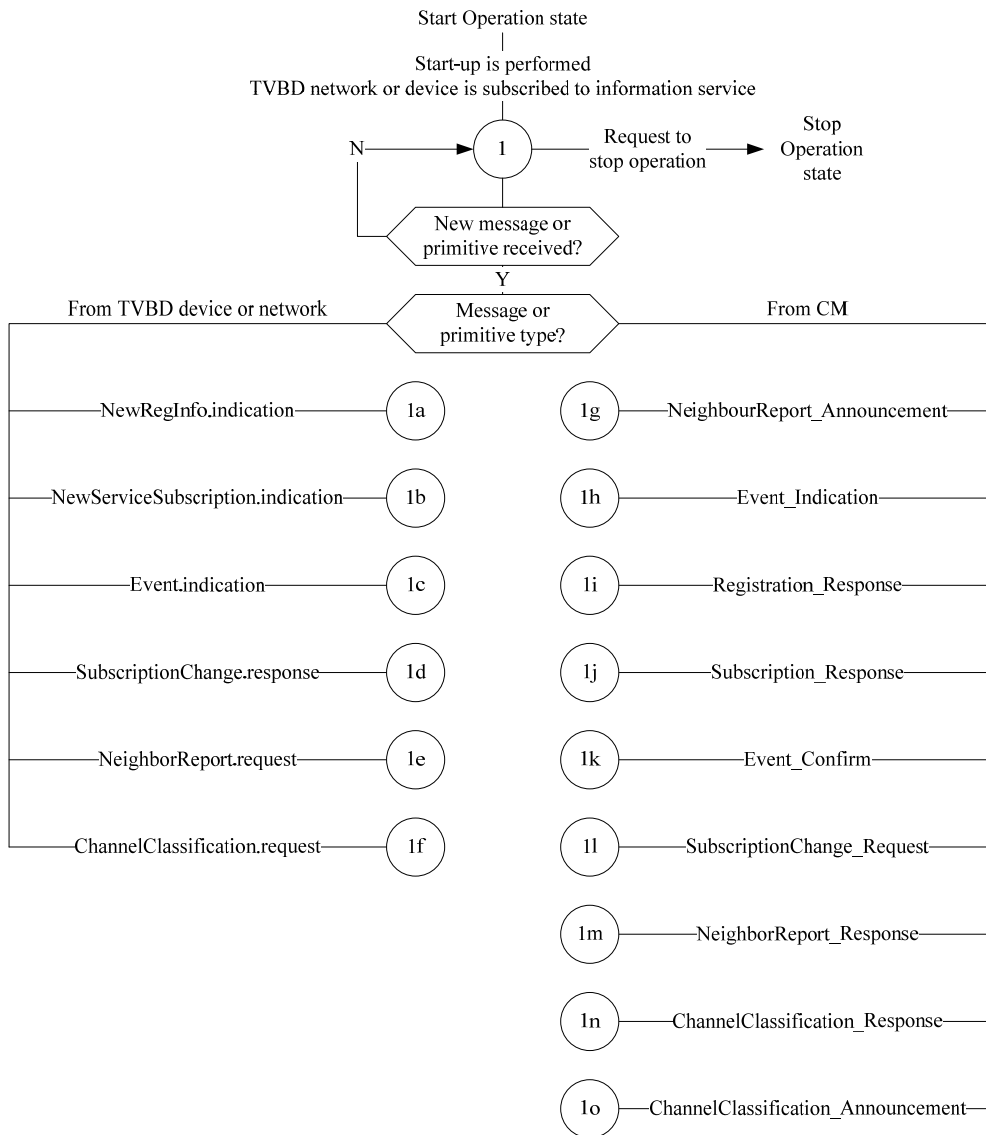
11 Figure 3 shows CE operation in the Processing Incoming Messages and Primitives state when its TVBD
12 network or device is subscribed to the information service.

13 The CE expects only the following messages or primitives (no actions are taken if any other messages or
14 primitives are received):

- 15 — Primitives from the TVBD network or device
 - 16 — NewRegInfo.indication
 - 17 — NewServiceSubscription.indication
 - 18 — Event.indication
 - 19 — SubscriptionChange.response
 - 20 — NeighborReport.request
 - 21 — ChannelClassification.request
- 22 — Messages from the CM
 - 23 — NeighborReport_Announcement
 - 24 — Event_Indication
 - 25 — Registration_Response
 - 26 — Subscription_Response
 - 27 — Event_Confirm
 - 28 — SubscriptionChange_Request
 - 29 — NeighborReport_Response
 - 30 — ChannelClassification_Response
 - 31 — ChannelClassification_Announcement.

32 Anytime the CE receives a request to stop operation as an example from the TVBD network or device
33 management entity, it switches to the Stop Operation state.

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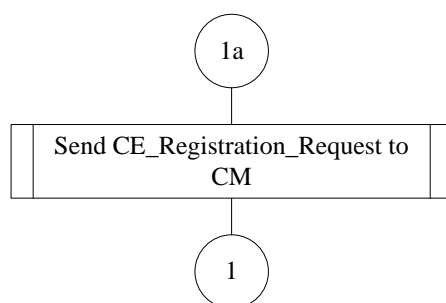
3 **Figure 3 —CE operation in the Processing Incoming Messages and Primitives state**
 4 **when its TVBD network or device is subscribed to the information service**

5 **6.1.1.2.1.1 Processing primitives from TVBD network or device**

6 **6.1.1.2.1.1.1 NewRegInfo.indication**

7 Figure 4 shows CE operation upon reception of a NewRegInfo.indication primitive from the TVBD
 8 network or device. Upon receiving a NewRegInfo.indication primitive the CE shall send a
 9 CE_Registration_Request message to the CM and continues to check for incoming messages and primitives.
 10 In parallel the CE waits for the corresponding Registration_Response message from the CM. If a

1 Registration_Response message from the CM is not received within a certain time, the CE may resend the
 2 CE_Registration_Request to the CM.

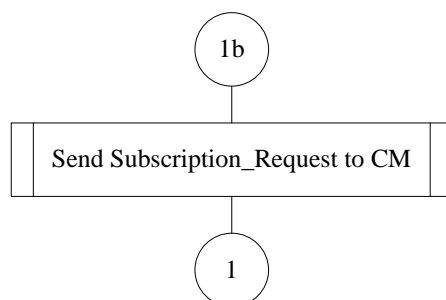


3

4 **Figure 4 —Processing a NewRegInfo.indication primitive**

5 **6.1.1.2.1.1.2 NewServiceSubscription.indication**

6 Figure 5 shows CE operation upon reception of a NewServiceSubscription.indication primitive from the
 7 TVBD network or device. Upon receiving a NewServiceSubscription.indication primitive the CE shall send
 8 a Subscription_Request message to the CM and continues to check for incoming messages and primitives.
 9 In parallel the CE waits for the corresponding Subscription_Response message from the CM. If a
 10 Subscription_Response message from the CM is not received within a certain time, the CE may resend the
 11 Subscription_Request to the CM.

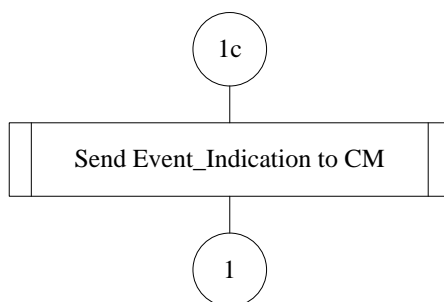


12

13 **Figure 5 —Processing a NewServiceSubscription.indication primitive**

14 **6.1.1.2.1.1.3 Event.indication**

15 Figure 6 shows CE operation upon reception of an Event.indication primitive from the TVBD network or
 16 device. Upon receiving an Event.indication primitive the CE shall send an Event_Indication message to the
 17 CM and continues to check for incoming messages and primitives. In parallel the CE waits for the
 18 corresponding Event_Confirm message from the CM. If an Event_Confirm message from CM is not
 19 received within a certain time, the CE may resend the Event_Indication to the CM.



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Figure 6 —Processing an Event.indication primitive

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6.1.1.2.1.1.4 SubscriptionChange.response

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Figure 7 shows CE operation upon reception of a SubscriptionChange.response primitive from the TVBD network or device. First the CE shall send a SubscriptionChange_Response to CM. If status = true in the SubscriptionChange.response primitive, the CE adopts the management service as the new coexistence service of the TVBD network or device and continues to check for incoming messages and primitives. Otherwise, the CE continues to check for incoming messages and primitives with the TVBD network or device subscribed to the information service.

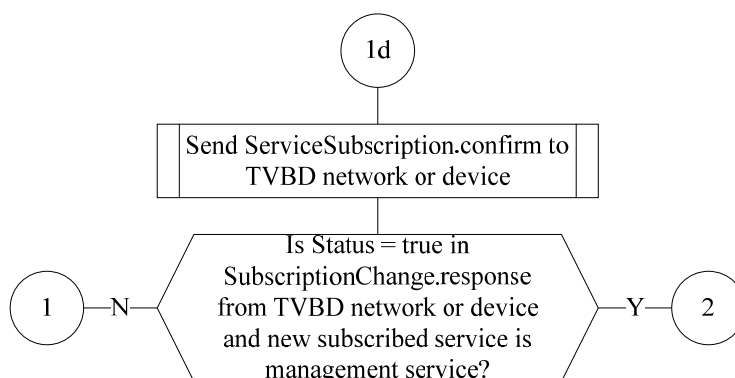
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Figure 7 —Processing SubscriptionChange.response primitive

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6.1.1.2.1.1.5 NeighborReport.request

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Figure 8 shows CE operation upon reception of a NeighborReport.request primitive from the TVBD network or device. Upon receiving a NeighborReport.request primitive the CE shall send a NeighborReport_Request message to the CM and continues to check for incoming messages and primitives. In parallel the CE waits for the corresponding NeighborReport_Response message from the CM. If a NeighborReport_Response message from CM is not received within a certain time, the CE may resend the NeighborReport_Request to the CM.

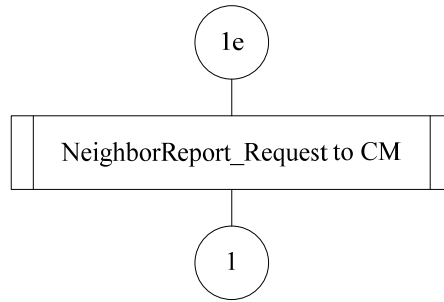
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Figure 8 —Processing an NeighborReport.request primitive

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6.1.1.2.1.1.6 ChannelClassification.request

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Figure 9 shows CE operation upon reception of a ChannelClassification.request primitive from the TVBD network or device. Upon receiving a ChannelClassification.request primitive the CE shall send a ChannelClassification_Request message to the CM and continues to check for incoming messages and primitives. In parallel the CE waits for the corresponding ChannelClassification_Response message from the CM. If a ChannelClassification_Response message from CM is not received within a certain time, the CE may resend the ChannelClassification_Request to the CM.

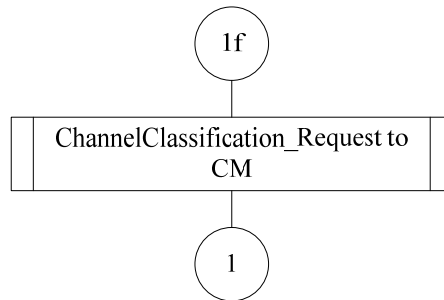
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Figure 9 —Processing an ChannelClassification.request primitive

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6.1.1.2.1.2 Processing messages from CM

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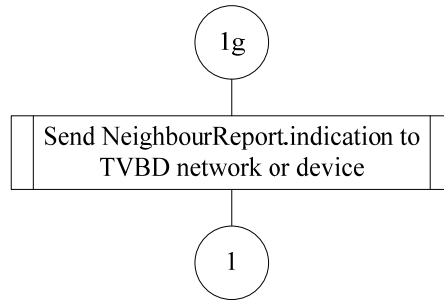
6.1.1.2.1.2.1 NeighborReport_Announcement

14

Figure 10 shows CE operation upon reception of a NeighborReport_Announcement message from the CM. Upon receiving a NeighborReport_Announcement message the CE shall send a NeighborReport.indication primitive to the TVBD network or device and continues to check for incoming messages and primitives.

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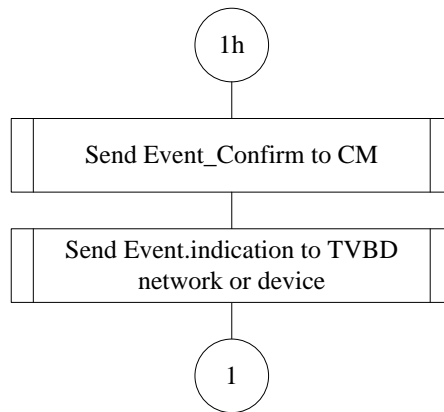


1

2 **Figure 10 —Processing a NeighborReport_Announcement message from CM**

3 **6.1.1.2.1.2.2 Event_Indication**

4 Figure 11 shows CE operation upon reception of an Event_Indication message from the CM. Upon
 5 receiving an Event_Indication message the CE first shall send an Event_Confirm message to the CM in
 6 order to confirm the reception of the Event_Indication message. Then the CE shall send an Event.indication
 7 primitive to the TVBD network or device and continues to check for incoming messages and primitives.

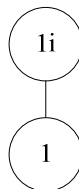


8

9 **Figure 11 —Processing an Event_Indication message from CM**

10 **6.1.1.2.1.2.3 Registration_Response**

11 A Registration_Response message from the CM serves as a confirmation of a registration update of the
 12 TVBD network or device in the coexistence system. This finishes the processing of the corresponding
 13 NewRegInfo.indication primitive from the TVBD network or device.

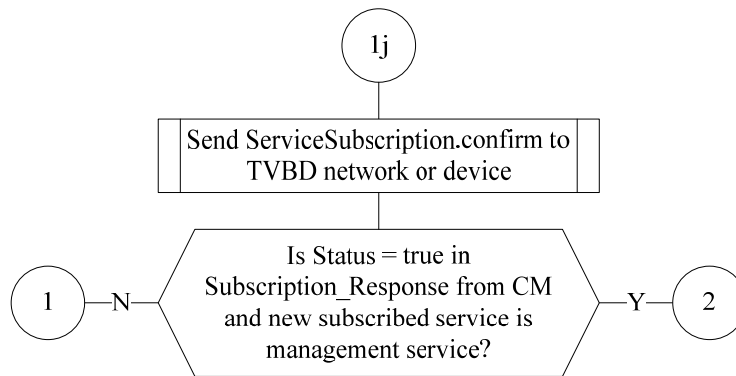


14

15 **Figure 12 —Processing a Registration_Response message from CM**

1 **6.1.1.2.1.2.4 Subscription_Response**

2 Figure 13 shows CE operation upon reception of a Subscription_Response message from the CM. This
 3 message serves as a confirmation of the reception of a Subscription_Request by the CM. Upon reception of
 4 a Subscription_Response message the CE shall send a ServiceSubscription.confirm primitive to the TVBD
 5 network or device. If Status = true in the Subscription_Response message from the CM and the new
 6 subscribed service is management service, the CE adopts the management service as the new coexistence
 7 service of the TVBD network or device and continues to check for incoming messages and primitives. This
 8 finishes the processing of the corresponding NewServiceSubscription.indication primitive from TVBD
 9 network or device. Otherwise, the CE continues to check for incoming messages and primitives with the
 10 TVBD network or device subscribed to the information service

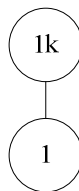


11

12 **Figure 13 —Processing a Subscription_Response message from CM**

13 **6.1.1.2.1.2.5 Event_Confirm**

14 An Event_Confirm message from the CM serves as a confirmation of reception of an Event_Indication by
 15 the CM. This finishes processing of the corresponding Event.indication primitive from the TVBD network
 16 or device.

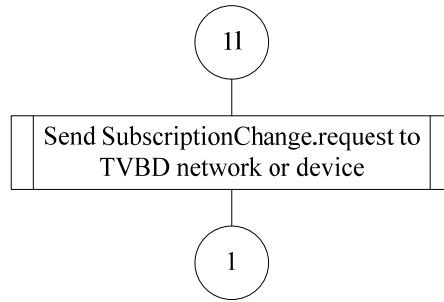


17

18 **Figure 14 —Processing an Event_Confirm message from CM**

19 **6.1.1.2.1.2.6 SubscriptionChange_Request**

20 Figure 15 shows CE operation upon reception of a SubscriptionChange_Request message from the CM.
 21 Upon receiving a SubscriptionChange_Request message the CE shall send a SubscriptionChange.request
 22 primitive to the TVBD network or device and continues to check for incoming messages and primitives.

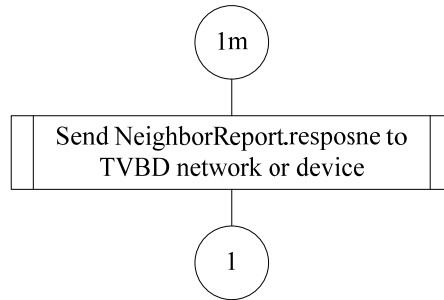


1

2 **Figure 15 —Processing a SubscriptionChange_Request message from CM**

3 **6.1.1.2.1.2.7 NeighborReport_Response**

4 Figure 16 shows CE operation upon reception of a NeighborReport_Response message from the CM. Upon
 5 receiving a NeighborReport_Response message the CE shall send a NeighborReport.response primitive to
 6 the TVBD network or device and continues to check for incoming messages and primitives.

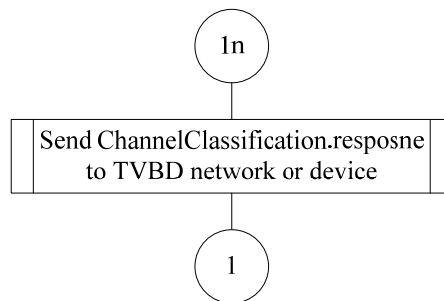


7

8 **Figure 16 —Processing a NeighborReport_Response message from CM**

9 **6.1.1.2.1.2.8 ChannelClassification_Response**

10 Figure 17 shows CE operation upon reception of a ChannelClassification_Response message from the CM.
 11 Upon receiving a ChannelClassification_Response message the CE shall send a
 12 ChannelClassification.response primitive to the TVBD network or device and continues to check for
 13 incoming messages and primitives.

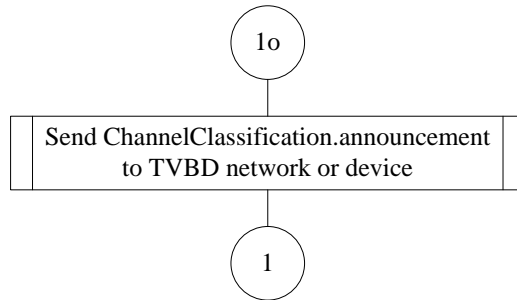


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15 **Figure 17 —Processing a ChannelClassification_Response message from CM**

1 **6.1.1.2.1.2.9 ChannelClassification_Announcement**

2 Figure 18 shows CE operation upon reception of a ChannelClassification_Announcement message from the
3 CM. Upon receiving a ChannelClassification_Announcement message the CE shall send a
4 ChannelClassification.announcement primitive to the TVBD network or device and continues to check for
5 incoming messages and primitives.

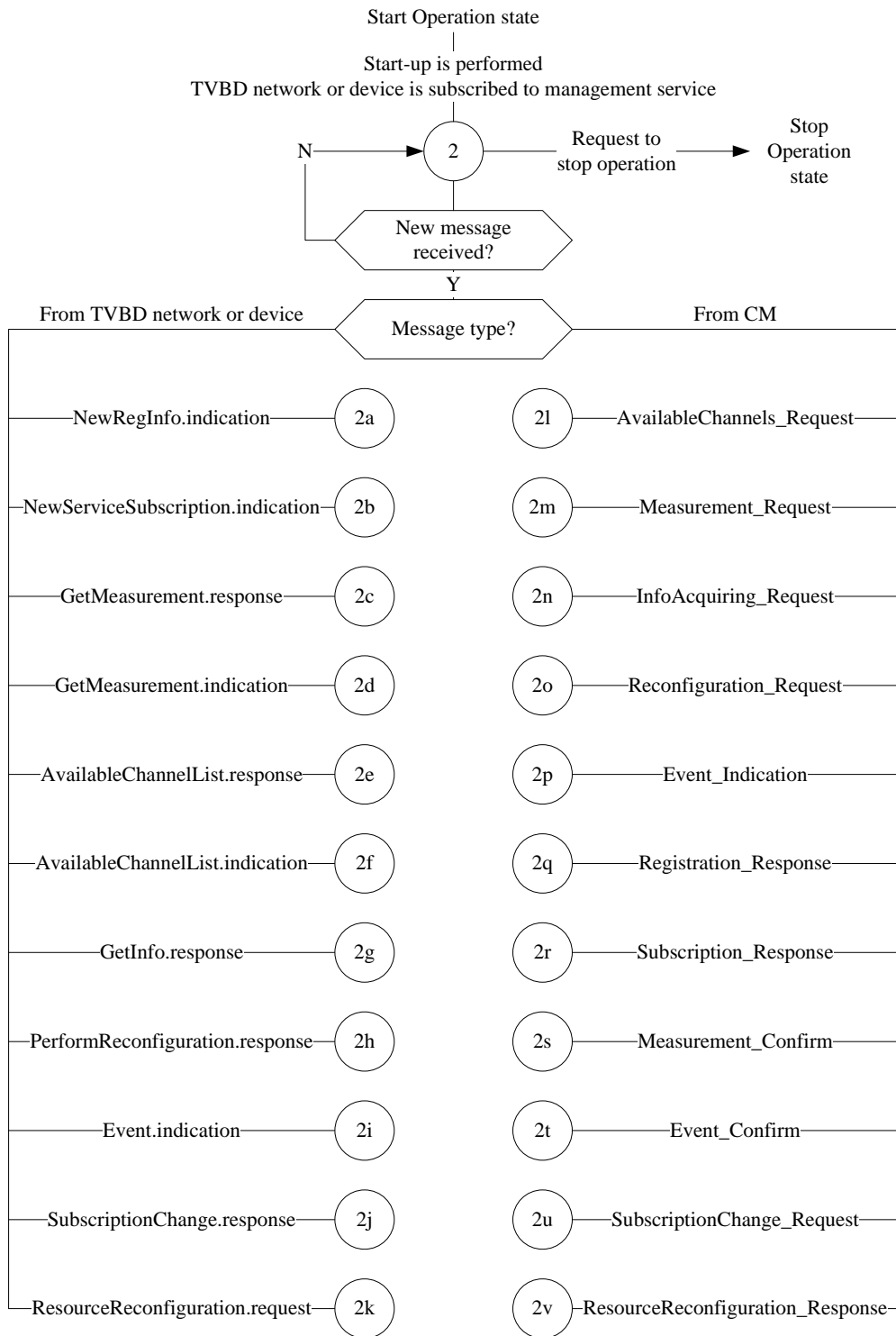


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7 **Figure 18 —Processing a ChannelClassification_Announcement message from CM**

8 **6.1.1.2.2 TVBD network or device is subscribed to the management service**

9 Figure 19 shows CE operation in the Processing Incoming Messages and Primitives state when its TVBD
10 network or device is subscribed to the management service.



1

2 **Figure 19 — CE operation in the Processing Incoming Messages and Primitives state**
 3 **when its TVBD network or device is subscribed to the management service**

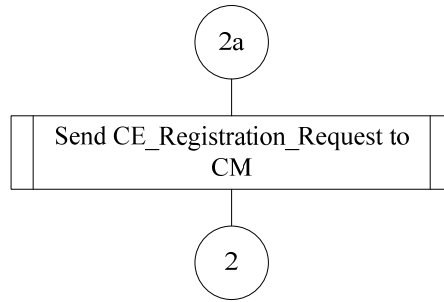
4 The CE expects only the following messages or primitives (no actions are taken if any other messages or
 5 primitives are received):

- 1 — Primitives from the TVBD network or device
- 2 — NewRegInfo.indication
- 3 — NewServiceSubscription.indication
- 4 — GetMeasurement.response
- 5 — GetMeasurement.indication
- 6 — AvailableChannelList.response
- 7 — AvailableChannelList.indication
- 8 — GetInfo.response
- 9 — PerformReconfiguration.response
- 10 — Event.indication
- 11 — SubscriptionChange.response
- 12 — ResourceReconfiguration.request
- 13 — Messages from the CM
- 14 — AvailableChannels_Request
- 15 — Measurement_Request
- 16 — InfoAcquiring_Request
- 17 — Reconfiguration_Request
- 18 — Event_Indication
- 19 — Registration_Response
- 20 — Subscription_Response
- 21 — Measurement_Confirm
- 22 — Event_Confirm
- 23 — SubscriptionChange_Request
- 24 — ResourceReconfiguration_Response.
- 25 Anytime the CE receives a request to stop operation as an example from the TVBD network or device
- 26 management entity, it switches to the Stop Operation state.

27 **6.1.1.2.2.1 Processing primitives from TVBD network or device**

28 **6.1.1.2.2.1.1 NewRegInfo.indication**

29 Figure 20 shows CE operation upon reception of a NewRegInfo.indication primitive from the TVBD
 30 network or device. Upon receiving a NewRegInfo.indication primitive the CE shall send a
 31 CE_Registration_Request message to the CM and continues to check for incoming messages and primitives.
 32 In parallel the CE waits for the corresponding Registration_Response message from the CM. If a
 33 Registration_Response message from the CM is not received within a certain time, the CE may resend the
 34 CE_Registration_Request to the CM.

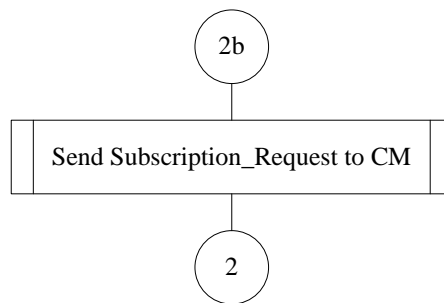


1

2 **Figure 20 —Processing a NewRegInfo.indication primitive from TVBD network or device**

3 **6.1.1.2.2.1.2 NewServiceSubscription.indication**

4 Figure 21 shows CE operation upon reception of a NewServiceSubscription.indication primitive from the
 5 TVBD network or device. Upon receiving a NewServiceSubscription.indication primitive the CE shall send
 6 a Subscription_Request message to the CM and continues to check for incoming messages and primitives.
 7 In parallel the CE waits for the corresponding Subscription_Response message from the CM. If a
 8 Subscription_Response message from the CM is not received within a certain time, the CE may resend the
 9 Subscription_Request to the CM.

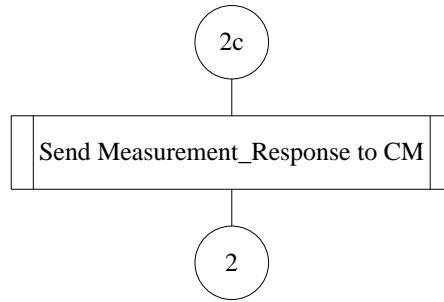


10

11 **Figure 21 —Processing a NewServiceSubscription.indication primitive from TVBD**
 12 **network or device**

13 **6.1.1.2.2.1.3 GetMeasurement.response**

14 Figure 22 shows CE operation upon reception of a GetMeasurement.response primitive from the TVBD
 15 network or device. Upon receiving a GetMeasurement.response the CE shall send a
 16 Measurement_Response message to the CM and continues to check for incoming messages and primitives.
 17 In parallel the CE waits for the corresponding Measurement_Confirm message from the CM. If a
 18 Measurement_Confirm message from the CM is not received within a certain time, the CE may resend the
 19 Measurement_Response to the CM.

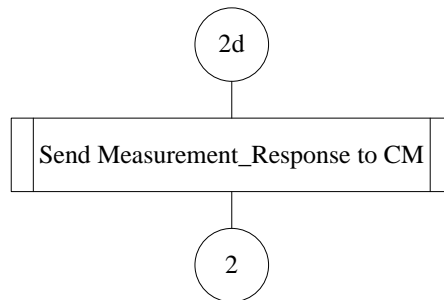


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2 **Figure 22 —Processing a GetMeasurement.response primitive from TVBD network or**
 3 **device**

4 **6.1.1.2.2.1.4 GetMeasurement.indication**

5 Figure 23 shows CE operation upon reception of a GetMeasurement.indication primitive from the TVBD
 6 network or device. Upon receiving a GetMeasurement.indication primitive the CE shall send a
 7 Measurement_Response message to the CM and continues to check for incoming messages and primitives.
 8 In parallel the CE waits for the corresponding Measurement_Confirm message from the CM. If a
 9 Measurement_Confirm message from the CM is not received within a certain time, the CE may resend the
 10 Measurement_Response to the CM.

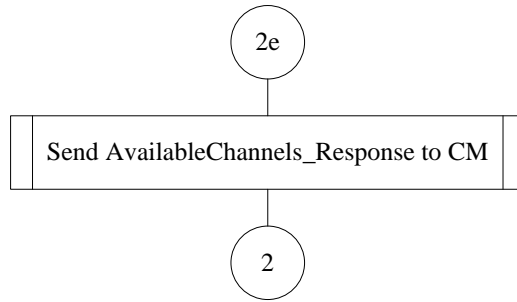


11

12 **Figure 23 —Processing a GetMeasurement.indication primitive from TVBD network or**
 13 **device**

14 **6.1.1.2.2.1.5 AvailableChannelList.response**

15 Figure 24 shows CE operation upon reception of an AvailableChannelList.response primitive from the
 16 TVBD network or device. Upon receiving an AvailableChannelList.response primitive the CE shall send an
 17 AvailableChannels_Response message to the CM and continues to check for incoming messages and
 18 primitives.

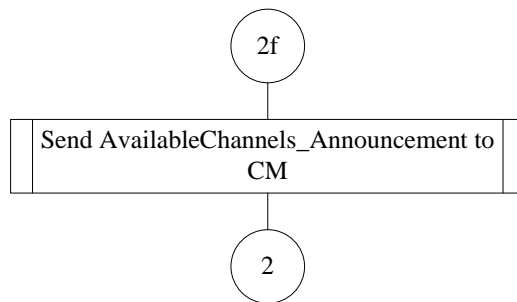


1

2 **Figure 24 —Processing an AvailableChannelList.response primitive from TVBD network**
 3 **or device**

4 **6.1.1.2.2.1.6 AvailableChannelList.indication**

5 Figure 25 shows CE operation upon reception of an AvailableChannelList.indication primitive from the
 6 TVBD network or device. Upon receiving an AvailableChannelList.indication primitive the CE shall send
 7 an AvailableChannels_Announcement message to the CM and continues to check for incoming messages
 8 and primitives.

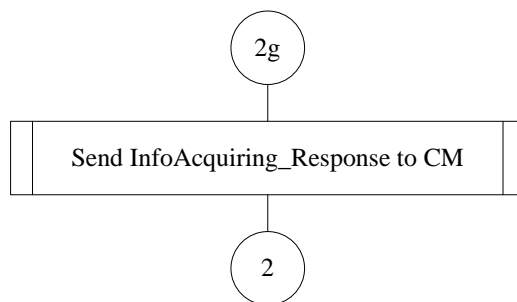


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10 **Figure 25 —Processing an AvailableChannelList.indication primitive from TVBD network**
 11 **or device**

12 **6.1.1.2.2.1.7 GetInfo.response**

13 Figure 26 shows CE operation upon reception of a GetInfo.response primitive from the TVBD network or
 14 device. Upon receiving a GetInfo.response the CE shall send an InfoAcquiring_Response message to the
 15 CM and continues to check for incoming messages and primitives.

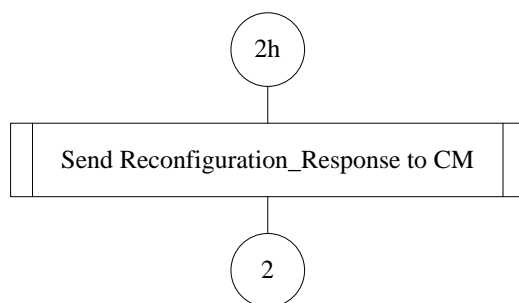


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17 **Figure 26 —Processing a GetInfo.response primitive from TVBD network or device**

1 **6.1.1.2.2.1.8 PerformReconfiguration.response**

2 Figure 27 shows CE operation upon reception of a PerformReconfiguration.response primitive from the
 3 TVBD network or device. Upon receiving a PerformReconfiguration.response primitive the CE shall send a
 4 Reconfiguration_Response message to the CM and continues to check for incoming messages and
 5 primitives.

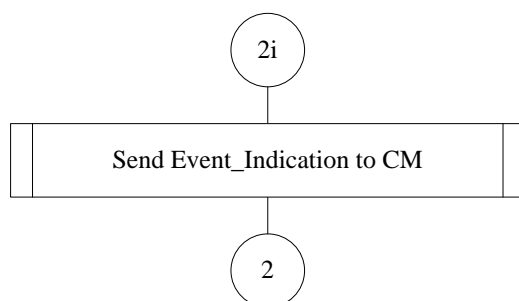


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7 **Figure 27 —Processing a PerformReconfiguration.response primitive from TVBD network**
 8 **or device**

9 **6.1.1.2.2.1.9 Event.indication**

10 Figure 28 shows CE operation upon reception of an Event.indication primitive from the TVBD network or
 11 device. Upon receiving an Event.indication primitive the CE shall send an Event_Indication message to the
 12 CM and continues to check for incoming messages and primitives. In parallel the CE waits for the
 13 corresponding Event_Confirm message from the CM. If an Event_Confirm message from the CM is not
 14 received within a certain time, the CE may resend the Event_Indication to the CM.

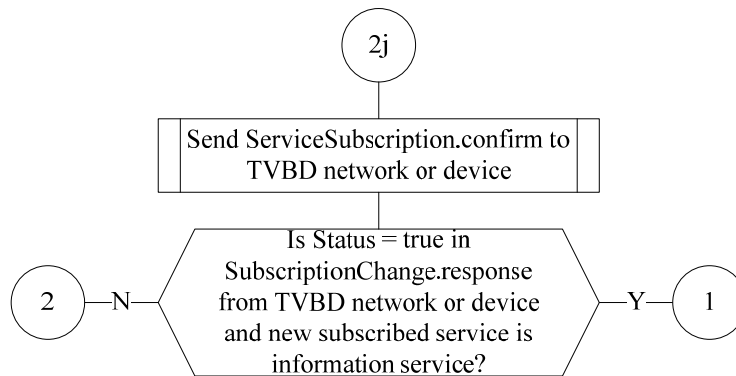


15

16 **Figure 28 —Processing an Event.indication primitive from TVBD network or device**

17 **6.1.1.2.2.1.10 SubscriptionChange.response**

18 Figure 29 shows CE operation upon reception of a SubscriptionChange.response primitive from the TVBD
 19 network or device. First CE shall send SubscriptionChange_Response to CM. If status = true in the
 20 SubscriptionChange.response primitive, the CE adopts the information service as the new coexistence
 21 service of the TVBD network or device and continues to check for incoming messages and primitives.
 22 Otherwise, the CE continues to check for incoming messages and primitives with the TVBD network or
 23 device subscribed to the management service.



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Figure 29 —Processing SubscriptionChange.response primitive

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6.1.1.2.2.1.11 ResourceReconfiguration.request

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Figure 30 shows CE operation upon reception of a ResourceReconfiguration.request primitive from the TVBD network or device. Upon receiving a ResourceReconfiguration.request primitive the CE shall send a ResourceReconfiguration_Request message to the CM and continues to check for incoming messages and primitives. In parallel the CE waits for the corresponding ResourceReconfiguration_Response message from the CM. If a ResourceReconfiguration_Response message from the CM is not received within a certain time, the CE may resend the ResourceReconfiguration_Request to the CM.

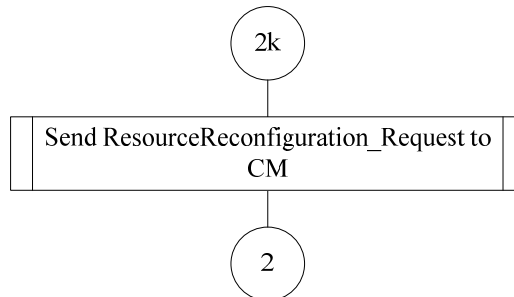
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Figure 30 —Processing an ResourceReconfiguration.request primitive from TVBD network or device

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6.1.1.2.2.2 Processing messages from CM

14

6.1.1.2.2.2.1 AvailableChannels_Request

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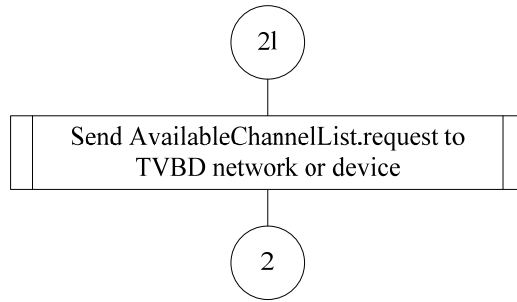
Figure 31 shows CE operation upon reception of an AvailableChannels_Request message from the CM. Upon receiving an AvailableChannels_Request message the CE shall send an AvailableChannelList.request primitive to the TVBD network or device and continues to check for incoming messages and primitives. In parallel the CE waits for the corresponding AvailableChannelList.response primitive and AvailableChannelList.indication primitive from the TVBD network or device.

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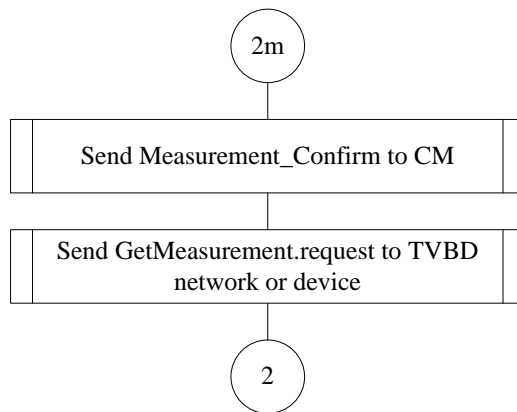


1

2 **Figure 31 —Processing an AvailableChannels_Request message from CM**

3 **6.1.1.2.2.2 Measurement_Request**

4 Figure 32 shows CE operation upon reception of a Measurement_Request message from the CM. Upon
 5 receiving a Measurement_Request message the CE shall first send a Measurement_Confirm message to
 6 the CM. Then the CE shall send a GetMeasurement.request primitive to the TVBD network or device and
 7 continues to check for incoming messages and primitives. In parallel the CE waits for the corresponding
 8 GetMeasurement.response or GetMeasurement.indication primitive from the TVBD network or device.

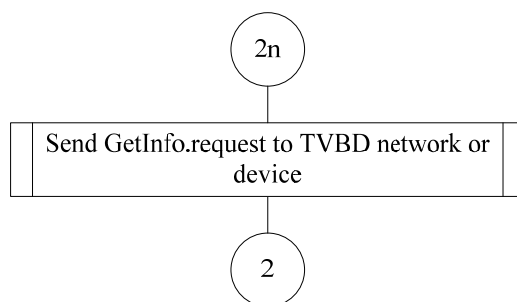


9

10 **Figure 32 —Processing a Measurement_Request message from CM**

11 **6.1.1.2.2.3 InfoAcquiring_Request**

12 Figure 33 shows CE operation upon reception of an InfoAcquiring_Request message from the CM. Upon
 13 receiving an InfoAcquiring_Request message the CE shall send a GetInfo.request primitive to the TVBD
 14 network or device and continues to check for incoming messages and primitives. In parallel the CE waits
 15 for the corresponding GetInfo.response primitive from the TVBD network or device.

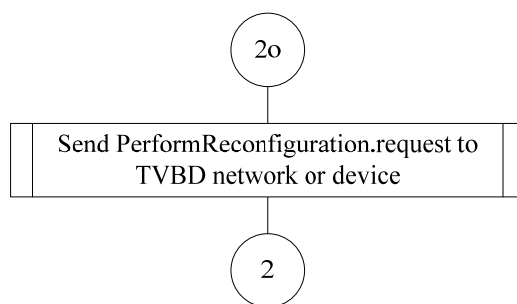


1

2 **Figure 33 —Processing an InfoAcquiring_Request message from CM**

3 **6.1.1.2.2.4 Reconfiguration_Request**

4 Figure 34 shows CE operation upon reception of a Reconfiguration_Request message from the CM. Upon
 5 receiving a Reconfiguration_Request message the CE shall send a PerformReconfiguration.request
 6 primitive to the TVBD network or device and continues to check for incoming messages and primitives. In
 7 parallel the CE waits for the corresponding PerformReconfiguration.response primitive from the TVBD
 8 network or device.

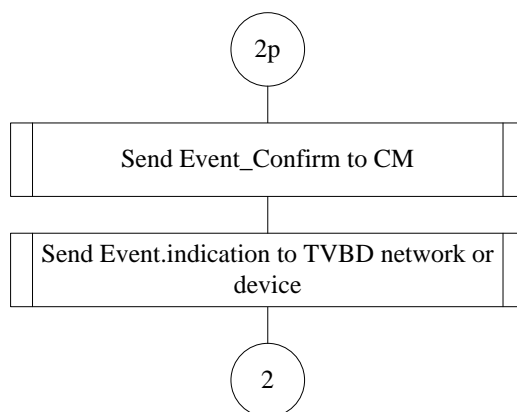


9

10 **Figure 34 —Processing a Reconfiguration_Request message from CM**

11 **6.1.1.2.2.5 Event_Indication**

12 Figure 35 shows CE operation upon reception of an Event_Indication message from the CM. Upon
 13 receiving an Event_Indication message the CE shall first send an Event_Confirm message to the CM. Then
 14 the CE shall send an Event.indication primitive to the TVBD network or device and continues to check for
 15 incoming messages and primitives.



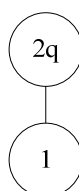
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Figure 35 —Processing an Event_Indication message from CM

3 **6.1.1.2.2.6 Registration_Response**

4 A Registration_Response message from the CM serves as a confirmation of a registration update of the
 5 TVBD network or device in the coexistence system. This finishes the processing of the corresponding
 6 NewRegInfo.indication primitive from the TVBD network or device.



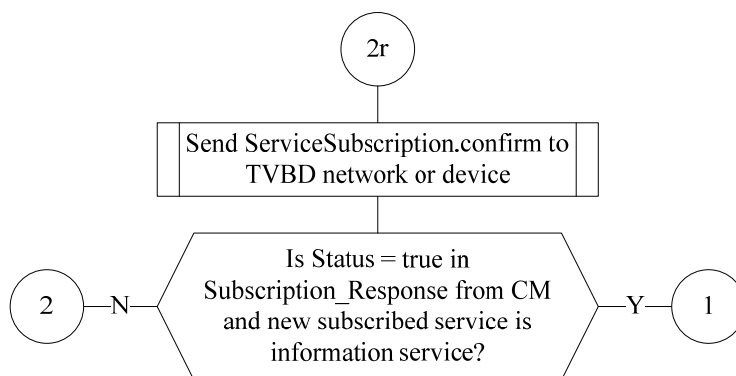
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Figure 36 —Processing a Registration_Response message from CM

9 **6.1.1.2.2.7 Subscription_Response**

10 Figure 37 shows CE operation upon reception of a Subscription_Response message from the CM. This
 11 message serves as a confirmation of reception of the corresponding Subscription_Request by the CM. Upon
 12 receiving a Subscription_Response message the CE shall send a ServiceSubscription.confirm primitive to
 13 the TVBD network or device. If Status = true in the Subscription_Response message from the CM and the
 14 new subscribed service is information service, the CE adopts the information service as the new service of
 15 the TVBD network or device and continues to check for incoming messages and primitives. This finishes
 16 the processing of the corresponding NewServiceSubscription.indication primitive from TVBD network or
 17 device. Otherwise, the CE continues to check for incoming messages and primitives with the TVBD
 18 network or device receiving the information service.



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Figure 37 —Processing a Subscription_Response message from CM

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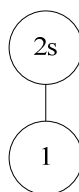
6.1.1.2.2.8 Measurement_Confirm

4

A Measurement_Confirm message from the CM serves as a confirmation of reception of the measurement results from the TVBD network or device by the CM. This finishes the processing of the corresponding GetMeasurement.response or GetMeasurement.indication primitive from the TVBD network or device.

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Figure 38 —Processing a Measurement_Confirm message from CM

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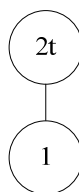
6.1.1.2.2.9 Event_Confirm

10

An Event_Confirm message from the CM serves as a confirmation of reception of the corresponding Event_Indication by the CM. This finishes the processing of the corresponding Event.indication primitive from the TVBD network or device.

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Figure 39 —Processing a Event_Confirm message from CM

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6.1.1.2.2.10 SubscriptionChange_Request

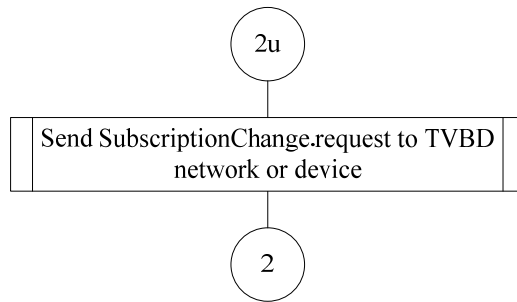
16

Figure 40 shows CE operation upon reception of a SubscriptionChange_Request message from the CM. Upon receiving a SubscriptionChange_Request message the CE shall send a SubscriptionChange.request primitive to the TVBD network or device and continues to check for incoming messages and primitives. In

17

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1 parallel the CE waits for the corresponding SubscriptionChange.response primitive from the TVBD
 2 network or device.

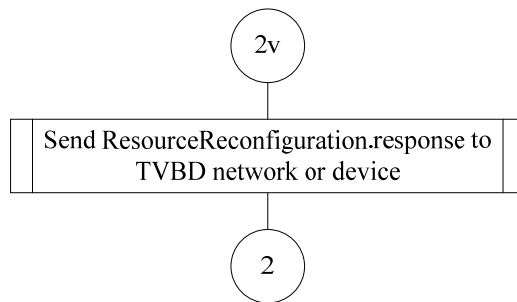


3

4 **Figure 40 —Processing a SubscriptionChange_Request message from CM**

5 **6.1.1.2.2.11 ResourceReconfiguration_Response**

6 Figure 41 shows CE operation upon reception of a ResourceReconfiguration_Response message from the
 7 CM. Upon receiving a ResourceReconfiguration_Response message the CE shall send a
 8 ResourceReconfiguration.response primitive to the TVBD network or device and continues to check for
 9 incoming messages and primitives.

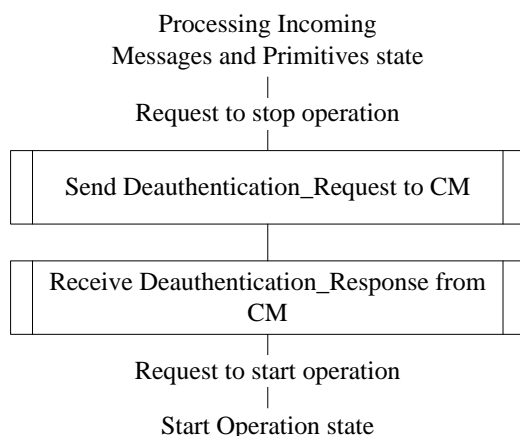


10

11 **Figure 41 —Processing a ResourceReconfiguration_Response message from CM**

12 **6.1.1.3 CE operation in the Stop Operation state**

13 Figure 42 shows CE operation in the Stop Operation state.



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Figure 42 —CE operation in the Stop Operation state

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After entering this state, the CE performs deauthentication of the TVBD network or device in the coexistence system. Then the CE waits for request to start operation. Upon reception of the request to start operation from the TVBD network or device management entity, the CE switches to the Start Operation state.

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6.1.1.4 CE operation when StopOperation_Announcement is received from CM

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In any state except the stop operation state if a CE receives a StopOperation_Announcement message from a CM, it shall send a StopOperation_Confirm message back to the CM, enter Stop Operation state, skip deauthentication procedure, and wait for the request to start operation.

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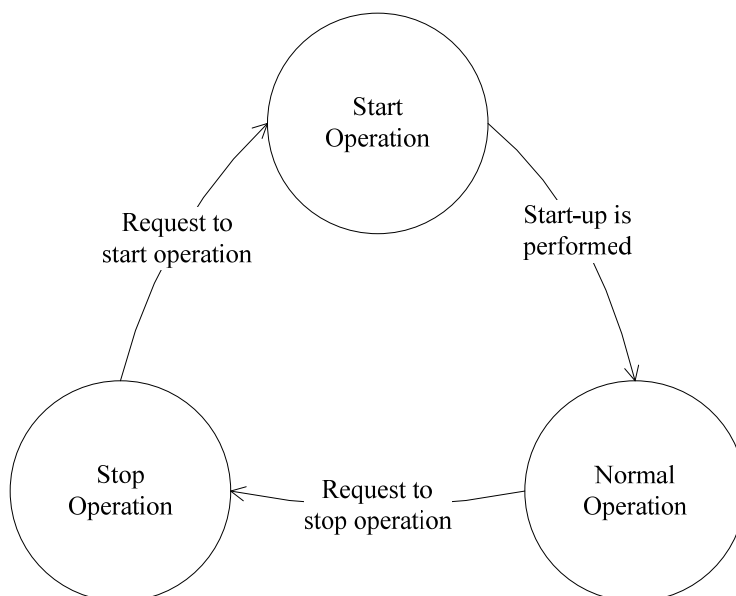
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6.1.2 CM operation

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Figure 43 shows states of CM operation.



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1 **Figure 43 —States of CM operation**

2 The following is assumed for CM operation

- 3 — A CM knows network address of a CDIS
- 4 — The CDIS is operating
- 5 — The CM is connected to the CDIS
- 6 — The CM is connected to a TVWS DB and authenticated by the TVWS DB

7 A CM has three states

- 8 — Start Operation
- 9 — Normal Operation
- 10 — Stop Operation.

11 A CM switches to the Start Operation state from the Stop Operation state when the CM receives a request
12 to start operation. In the Start Operation state the CM performs start-up and then switches to the Normal
13 Operation state.

14 In the Normal Operation a CM processes incoming messages, does coexistence decisions, configures
15 coexistence decision making topology and does other actions needed to provide coexistence services to
16 TVBD networks and devices. The CM switches to the Stop Operation state when it receives a request to
17 stop operation.

18 In the Stop Operation state the CM performs deauthentication with the CDIS and sends notification to all
19 its CEs. After this, the CM remains in this state until it receives a request to start operation.

20 The states are not binding in implementation but they are introduced here merely for illustrative purposes
21 and to make the CM description easy to understand. Only the rules related to processing of received
22 messages and actions upon their reception are binding and normative if so specified.

23 Error case handling is on default implementation dependent. Unless explicitly mentioned, error handling
24 depends on implementation. The error case handlings described in the sub-clauses of this clause are
25 exemplary and not binding.

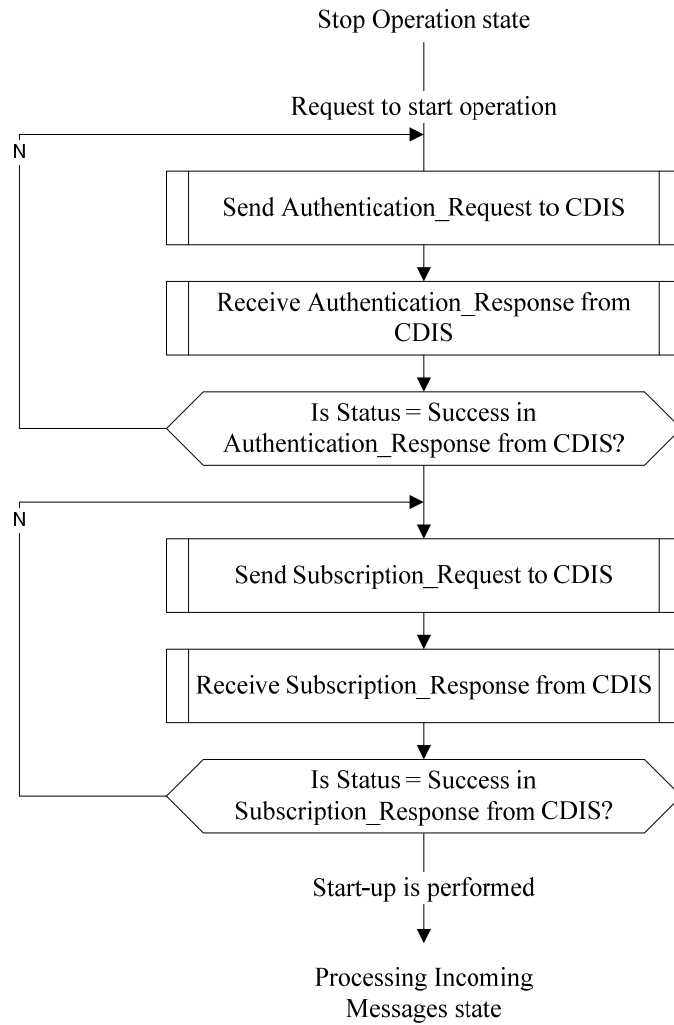
26 **6.1.2.1 CM operation in the Start Operation state**

27 Figure 44 shows CM operation in the Start Operation state.

28 In the Start Operation state, a CM performs the following operations

- 29 — Performs authentication with the CDIS
- 30 — Performs coexistence service subscription to the CDIS

31 After that, the CM switches to the Processing Incoming Messages state



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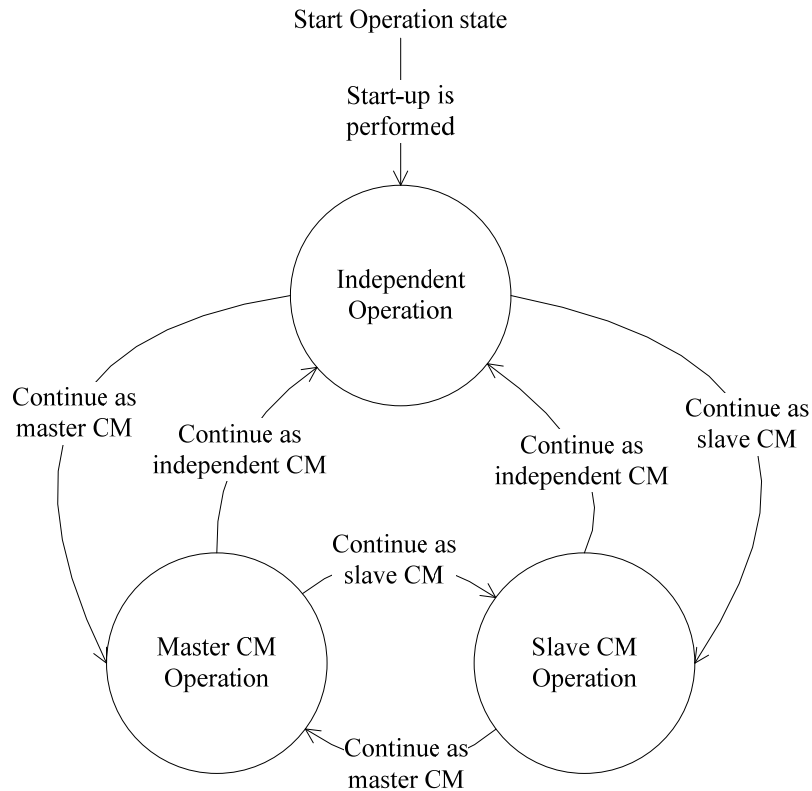
Figure 44—CM operation in the Start Operation State

3

6.1.2.2 CM operation in the Normal Operation state

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Figure 45 shows substates of CM operation in the Normal Operation state.



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Figure 45 • Substates of CM operation in the Normal Operation state

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After start-up is performed the CM enters the Independent Operation substate of the Normal Operation state. In the Independent Operation substate of the Normal Operation state the CM serves TVBD networks or devices registered to this CM. If during operation of the CM a master or a slave operation is configured, the CM continues as a master CM or a slave CM correspondingly.

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In the Master CM Operation substate of the Normal Operation state the CM serves TVBD networks or devices registered to this CM and to all its slave CMs. If during operation of the CM a master or a slave configuration is changed, the CM continues as an independent CM or a slave CM correspondingly.

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In the Slave CM Operation substate of the Normal Operation state the slave CM assist its master CM in serving TVBD networks or devices registered to this slave CM. If during operation of the CM a master or a slave configuration is changed, the CM continues as a master CM or an independent CM correspondingly.

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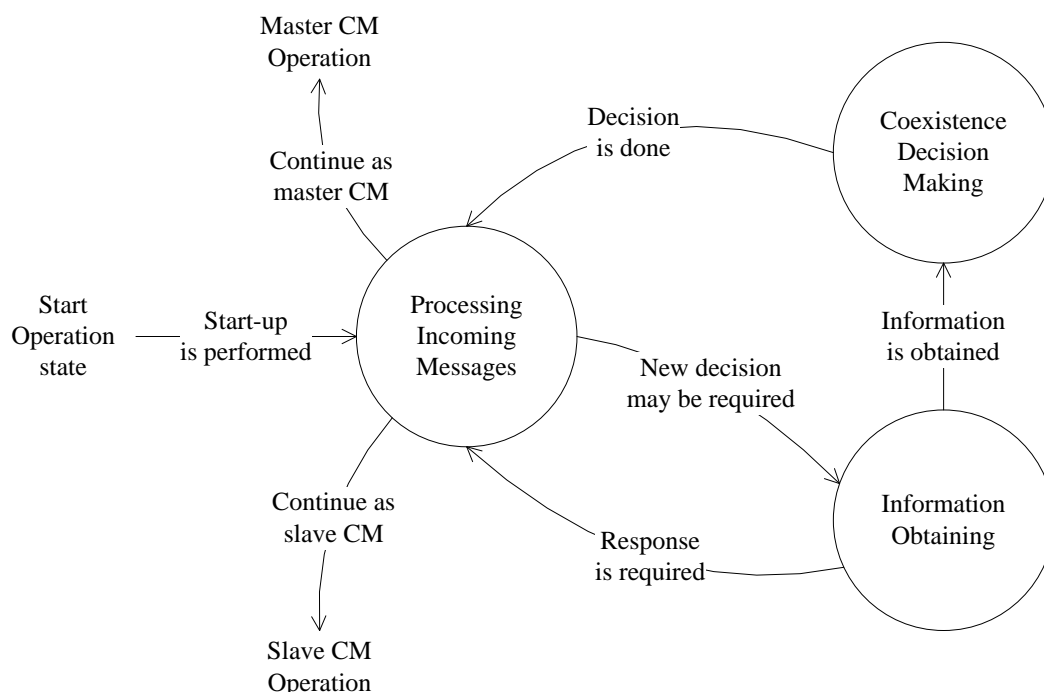
If at any time CM receives request to stop operation, it switches to the Stop Operation state.

14

6.1.2.2.1 CM Operation in the Independent Operation substate

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Figure 46 shows CM operation in the Independent Operation substate of the Normal Operation state.



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2 **Figure 46 • Substates of CM operation in the Independent Operation substate**

3 In the Processing Incoming Messages state the CM processes messages from the CE, the other CM or the
 4 CDIS. The CM switches to the Information Obtaining state when more information is needed for
 5 coexistence decision making and switches to the Stop Operation state when it receives a request to stop
 6 operation. If master or slave CM configuration is setup then CM switches to the Master CM Operation
 7 substate or to the Slave CM Operation substate correspondingly.

8 In the Information Obtaining state the CM obtains information required for coexistence decision making.
 9 The CM switches back to the Processing Incoming Messages state if a response from an external entity is
 10 needed and to the Coexistence Decision Making state if all necessary information is obtained.

11 In the Coexistence Decision Making state the CM makes coexistence decisions and sends event indications
 12 and reconfiguration requests as required. After the decision is done, the CM switches to the Processing
 13 Incoming Messages state.

14 **6.1.2.2.1.1 CM operation in the Processing Incoming Messages substate of the Independent**
 15 **Operation substate**

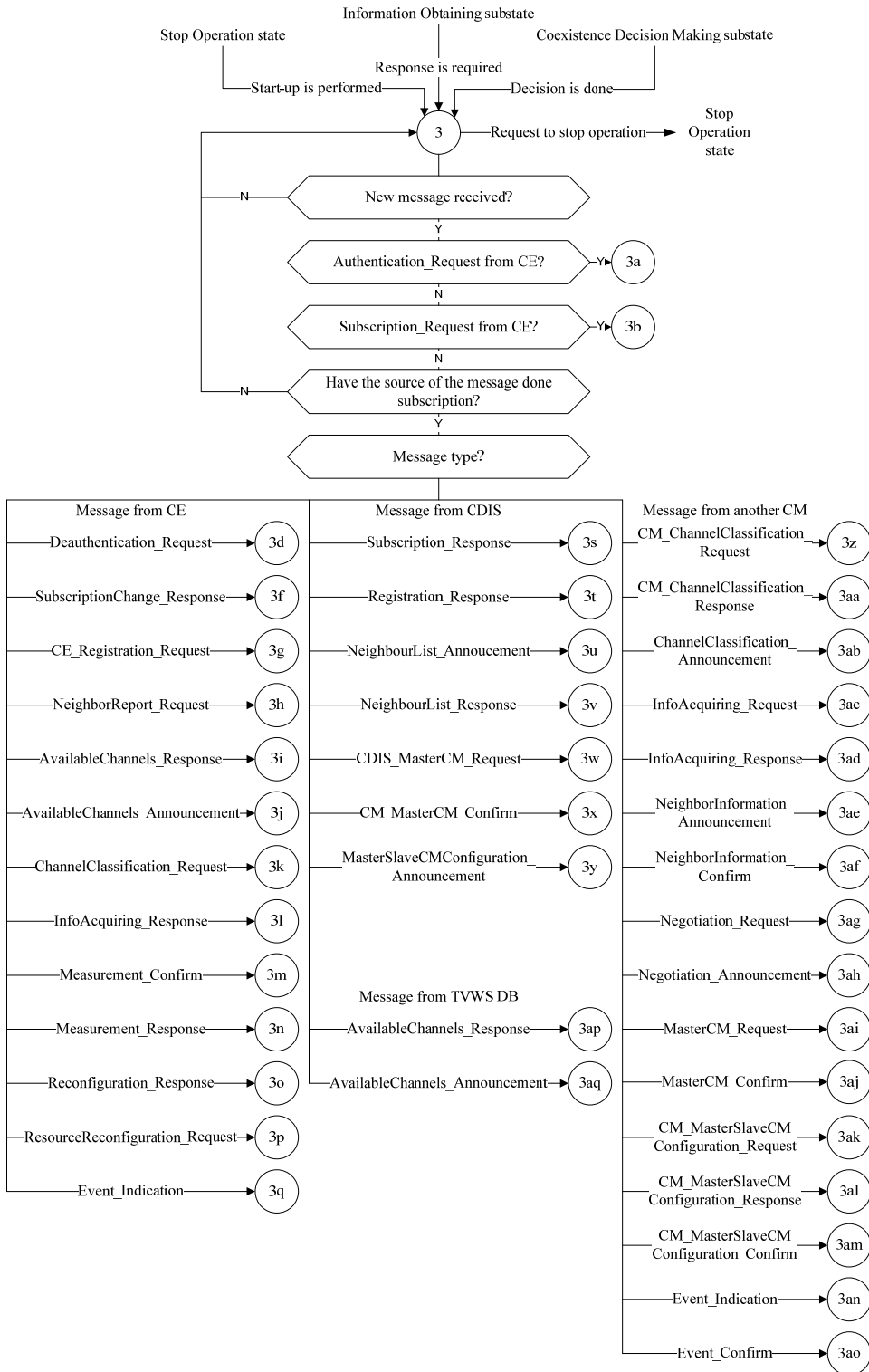
16 Figure 47 shows CM operation in the Processing Incoming Messages substate of the Independent
 17 Operation substate.

18 The CM expects only the following messages (no actions are taken if any other messages are received):

- 19 — Messages from the CE over the interface B1
- 20 — Authentication_Request
- 21 — Deauthentication_Request
- 22 — Subscription_Request

- 1 — SubscriptionChange_Response
- 2 — CE_Registration_Request
- 3 — NeighborReport_Request
- 4 — AvailableChannels_Response
- 5 — AvailableChannels_Announcement
- 6 — ChannelClassification_Request
- 7 — InfoAcquiring_Response
- 8 — Measurement_Confirm
- 9 — Measurement_Reponse
- 10 — Reconfiguration_Response
- 11 — ResourceReconfiguration_Request
- 12 — Event_Indication
- 13 — Messages from the CDIS over the interface B2
- 14 — CM_Registration_Response
- 15 — Subscription_Response
- 16 — Registration_Response
- 17 — NeighborList_Announcement
- 18 — NeighborList_Response
- 19 — CDIS_MasterCM_Request
- 20 — CM_MasterCM_Confirm
- 21 — MasterSlaveCMConfiguration_Announcement
- 22 — Message from the other CM over the interface B3
- 23 — CM_ChannelClassification_Request
- 24 — CM_ChannelClassification_Response
- 25 — ChannelClassification_Announcement
- 26 — InfoAcquiring_Request
- 27 — InfoAcquiring_Response
- 28 — NeighborInformation_Announcement
- 29 — NeighborInformation_Confirm
- 30 — Negotiation_Request
- 31 — Negotiation_Announcement
- 32 — MasterCM_Request
- 33 — MasterCM_Confirm
- 34 — CM_MasterSlaveCMConfiguration_Request
- 35 — CM_MasterSlaveCMConfiguration_Response

- 1 — CM_MasterSlaveCMConfiguration_Confirm
- 2 — Event_Indication
- 3 — Event_Confirm
- 4 — Messages from TVWS database over the interface C
- 5 — AvailableChannels_Response
- 6 — AvailableChannels_Announcement.



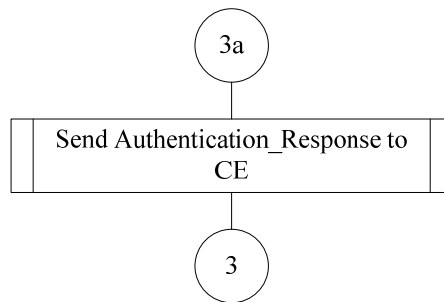
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2 **Figure 47—CM operation in the Processing Incoming Messages substate of the Independent**
3 **Operation substate**

1 **6.1.2.2.1.1.1 Messages from CE**

2 **6.1.2.2.1.1.1.1 Authentication_Request**

3 Figure 48 shows CM operation upon reception of an Authentication_Request message from the CE. Upon
 4 receiving an Authentication_Request message the CM shall perform authentication with the information
 5 provided in the Authentication_Request message, form an Authentication_Response message and set the
 6 Status field in the Authentication_Response message according to the result of authentication. Then the CM
 7 shall send the Authentication_Response message to the CE and continues to check for incoming messages.

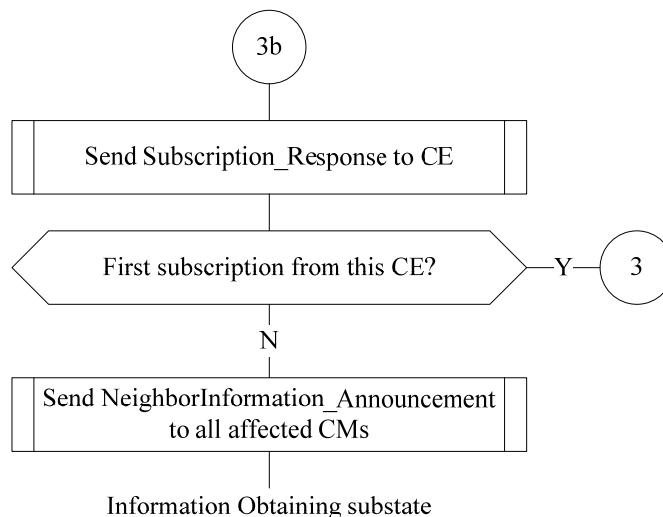


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9 **Figure 48—Processing an Authentication_Request from CE**

10 **6.1.2.2.1.1.1.2 Subscription_Request**

11 Figure 49 shows CM operation upon reception of a Subscription_Request message from the CE. Upon
 12 receiving a Subscription_Request message the CM shall send a Subscription_Response message to the CE.
 13 If the Subscription_Request message was received from a CE that had no service subscription yet, the CM
 14 continues to check for incoming messages. Otherwise the CM shall send a
 15 NeighborInformation_Announcement message to all CMs that serve a neighbor TVBD network or device.
 16 Additionally, the CM switches to the Information Obtaining state.

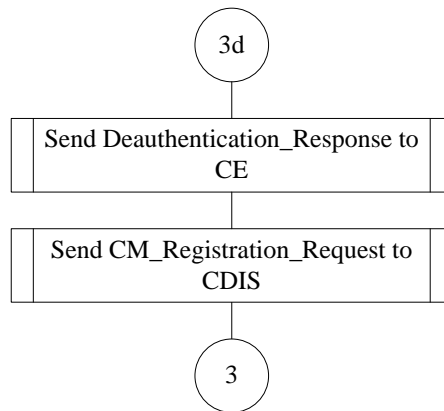


17

18 **Figure 49 Processing a Subscription_Request from CE**

1 **6.1.2.2.1.1.3 Deauthentication_Request**

2 Figure 50 shows CM operation upon reception of a Deauthentication_Request from the CE. Upon receiving
 3 a Deauthentication_Request message the CM shall first send a Deauthentication_Response message to the
 4 CE to acknowledge reception of the Deauthentication_Request message. Then the CM shall send a
 5 CM_Registration_Request message to the CDIS to deregister this TVBD network or device from the CDIS.
 6 After that, the CM continues to check for incoming messages. In parallel the CM waits for the
 7 corresponding Registration_Response message from the CDIS. If a Registration_Response message from
 8 the CDIS is not received within a certain time, the CM may resend the CM_Registration_Request to the
 9 CDIS.

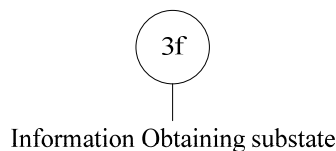


10

11 **Figure 50— Processing a Deauthentication_Request from CE**

12 **6.1.2.2.1.1.4 SubscriptionChange_Response**

13 Figure 51 shows CM operation upon reception of a SubscriptionChange_Response message from the CE.
 14 Upon receiving a SubscriptionChange_Response message the CM switches to the Information Obtaining
 15 substate.

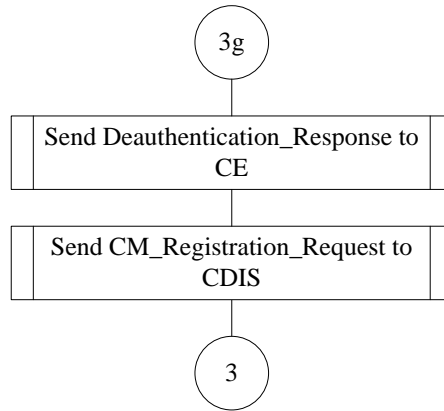


16

17 **Figure 51 — Processing a SubscriptionChange_Response from CE**

18 **6.1.2.2.1.1.5 CE_Registration_Request**

19 Figure 52 shows CM operation upon reception of a CE_Registration_Request from the CE. Upon receiving
 20 a CE_Registration_Request message the CM shall first send a Registration_Response message to the CE to
 21 acknowledge reception of the CE_Registration_Request message. Then the CM shall send a
 22 CM_Registration_Request message to the CDIS to register or update registration information of this TVBD
 23 network or device from the CDIS. After that, the CM continues to check for incoming messages. In parallel
 24 the CM waits for the corresponding Registration_Response message from the CDIS. If a
 25 Registration_Response message from the CDIS is not received within a certain time, the CM may resend
 26 the CM_Registration_Request to the CDIS.



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Figure 52— Processing a CE_Registration_Request from CE

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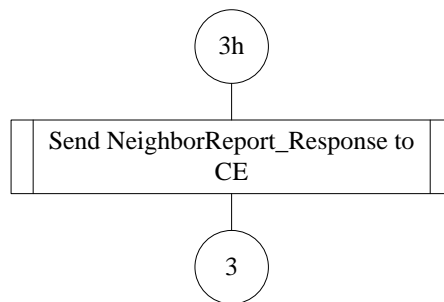
6.1.2.2.1.1.6 NeighborReport_Request

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Figure 53 shows CM operation upon reception of a NeighborReport_Request from the CE. Upon receiving a NeighborReport_Request message the CM shall send a NeighborReport_Response message to the CE. After that, the CM continues to check for incoming messages.

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Figure 53— Processing a NeighborReport_Request from CE

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6.1.2.2.1.1.7 AvailableChannels_Response

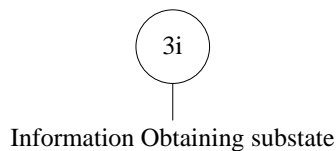
10

Figure 54 shows CM operation upon reception of an AvailableChannels_Response message from the CE.

11

Upon receiving an AvailableChannels_Response message the CM switches to the Information Obtaining substate.

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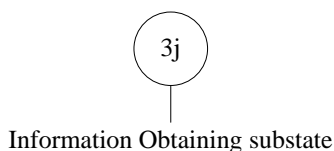
13

14

Figure 54— Processing an AvailableChannels_Response from CE

1 **6.1.2.2.1.1.1.8 AvailableChannels_Announcement**

2 Figure 55 shows CM operation upon reception of an AvailableChannels_Announcement message from the
 3 CE. Upon receiving an AvailableChannels_Announcement message the CM switches to the Information
 4 Obtaining substate.

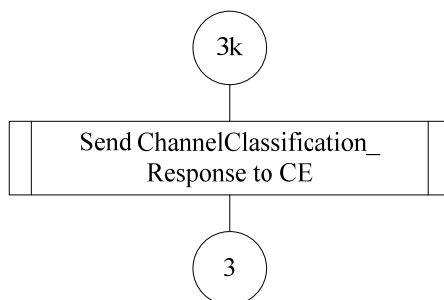


5

6 **Figure 55— Processing an AvailableChannels_Announcement from CE**

7 **6.1.2.2.1.1.1.9 ChannelClassification_Request**

8 Figure 56 shows CM operation upon reception of a ChannelClassification_Request from the CE. Upon
 9 receiving a ChannelClassification_Request message the CM shall send a ChannelClassification_Response
 10 message to the CE. After that, the CM continues to check for incoming messages.

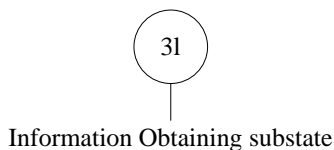


11

12 **Figure 56— Processing a ChannelClassification_Request from CE**

13 **6.1.2.2.1.1.1.10 InfoAcquiring_Response**

14 Figure 57 shows CM operation upon reception of an InfoAcquiring_Response message from the CE. Upon
 15 receiving an InfoAcquiring_Response message the CM switches to the Information Obtaining substate.

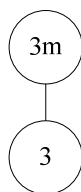


16

17 **Figure 57— Processing an InfoAcquiring_Response from CE**

18 **6.1.2.2.1.1.1.11 Measurement_Confirm**

19 Figure 58 shows CM operation upon reception of a Measurement_Confirm message from the CE. Upon
 20 receiving a Measurement_Confirm message the CM continues to check for incoming messages.



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Figure 58— Processing a Measurement_Confirm from CE

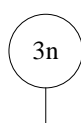
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6.1.2.2.1.1.1.12 Measurement_Response

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Figure 59 shows CM operation upon reception of a Measurement_Response message from the CE. Upon receiving a Measurement_Response message the CM switches to the Information Obtaining substate.

5



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Information Obtaining substate

7

Figure 59— Processing a Measurement_Response from CE

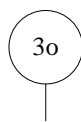
8

6.1.2.2.1.1.1.13 Reconfiguration_Response

9

Figure 60 shows CM operation upon reception of a Reconfiguration_Response message from the CE. Upon receiving a Reconfiguration_Response message the CM switches to the Information Obtaining substate.

10



11

Information Obtaining substate

12

Figure 60— Processing a Reconfiguration_Response from CE

13

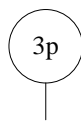
6.1.2.2.1.1.1.14 ResourceReconfiguration_Request

14

Figure 61 shows CM operation upon reception of a ResourceReconfiguration_Request message from the CE. Upon receiving a ResourceReconfiguration_Request message the CM switches to the Information Obtaining substate.

15

16



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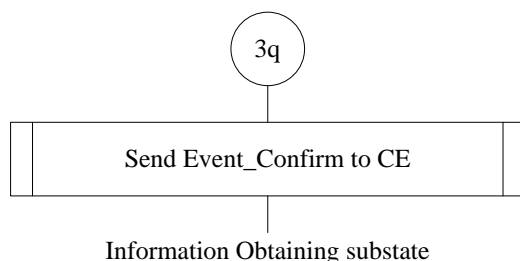
Information Obtaining substate

18

Figure 61— Processing a ResourceReconfiguration_Request from CE

1 **6.1.2.2.1.1.15 Event_Indication**

2 Figure 62 shows CM operation upon reception of an Event_Indication message from the CE. Upon
 3 receiving an Event_Indication message the CM shall send an Event_Confirm message to the CE. Then CM
 4 switches to the Information Obtaining state.



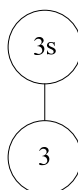
5

6 **Figure 62 Processing an Event_Indication from CE**

7 **6.1.2.2.1.1.2 Messages from CDIS**

8 **6.1.2.2.1.1.2.1 Subscription_Response**

9 Figure 63 shows CM operation upon reception of a Subscription_Response message from the CDIS. Upon
 10 receiving a Subscription_Response message the CM continues to check for incoming messages.

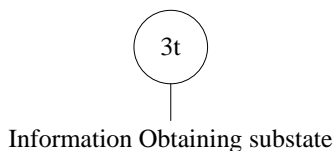


11

12 **Figure 63— Processing a Subscription_Response from CDIS**

13 **6.1.2.2.1.1.2.2 Registration_Response**

14 Figure 64 shows CM operation upon reception of a Registration_Response message from the CDIS. Upon
 15 receiving a Registration_Response message the CM switches to the Information Obtaining substate.

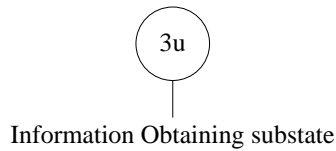


16

17 **Figure 64— Processing a Registration_Response from CDIS**

1 **6.1.2.2.1.1.2.3 NeighborList_Announcement**

2 Figure 65 shows CM operation upon reception of a NeighborList_Announcement message from the CDIS.
 3 Upon receiving a NeighborList_Announcement message the CM switches to the Information Obtaining
 4 substate.

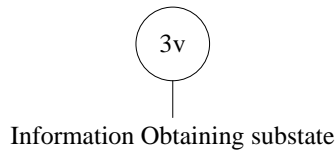


5

6 **Figure 65— Processing a NeighborList_Announcement from CDIS**

7 **6.1.2.2.1.1.2.4 NeighborList_Response**

8 Figure 66 shows CM operation upon reception of a NeighborList_Response message from the CDIS. Upon
 9 receiving a NeighborList_Response message the CM switches to the Information Obtaining substate.

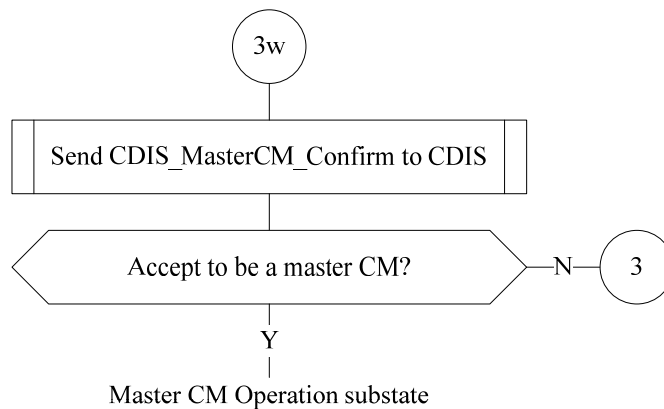


10

11 **Figure 66— Processing a NeighborList_Response from CDIS**

12 **6.1.2.2.1.1.2.5 CDIS_MasterCM_Request**

13 Figure 67 shows CM operation upon reception of a CDIS_MasterCM_Request message from the CDIS.
 14 Upon receiving a CDIS_MasterCM_Request message the CM shall send a CDIS_MasterCM_Confirm
 15 message to the CDIS to indicate whether it can accept to be a master CM. If the CM can accept to be the
 16 master CM, it switches to the Master CM Operation substate. Otherwise the CM continues to check for
 17 incoming messages.

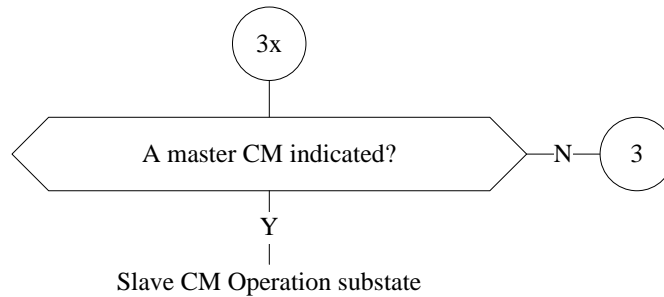


18

19 **Figure 67 Processing a CDIS_MasterCM_Request from CDIS**

1 **6.1.2.2.1.1.2.6 CM_MasterCM_Confirm**

2 Figure 68 shows CM operation upon reception of a CM_MasterCM_Confirm message from the CDIS. If
 3 the CM_MasterCM_Confirm message indicates a master CM, the CM switches to the Slave CM operation
 4 substate. Otherwise the CM continues to check for incoming messages.

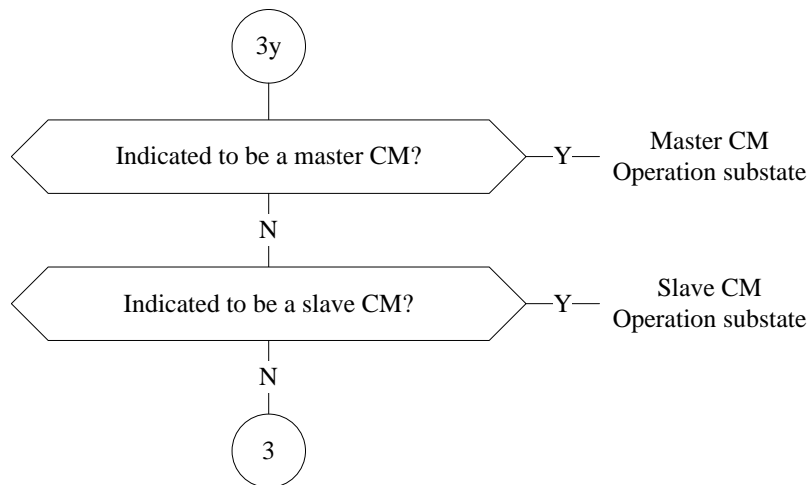


5

6 **Figure 68 Processing a CM_MasterCM_Confirm from CDIS**

7 **6.1.2.2.1.1.2.7 MasterSlaveCMConfiguration_Announcement**

8 Figure 69 shows CM operation upon reception of a MasterSlaveCMConfiguration_Announcement message from
 9 the CDIS. If the MasterSlaveCMConfiguration_Announcement message indicates to be a master CM, the
 10 CM switches to the Master CM Operation substate. If the MasterSlaveCMConfiguration_Announcement
 11 message indicates to be a slave CM, the CM switches to the Slave CM Operation substate. Otherwise the
 12 CM continues to check for incoming messages.



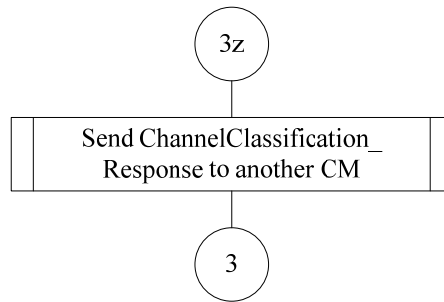
13

14 **Figure 69 Processing a MasterSlaveCMConfiguration_Announcement from CDIS**

1 **6.1.2.2.1.1.3 Messages from another CM**

2 **6.1.2.2.1.1.3.1 ChannelClassification_Request**

3 Figure 70 shows CM operation upon reception of a ChannelClassification_Request message from another
 4 CM. Upon receiving a ChannelClassification_Request message the CM shall send the
 5 ChannelClassification_Response message to the other CM and continues to check for incoming messages.

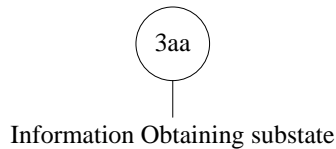


6

7 **Figure 70—Processing an ChannelClassification_Request from another CM**

8 **6.1.2.2.1.1.3.2 CM_ChannelClassification_Response**

9 Figure 71 shows CM operation upon reception of a CM_ChannelClassification_Response message from
 10 another CM. Upon receiving a CM_ChannelClassification_Response message the CM switches to the
 11 Information Obtaining substate.

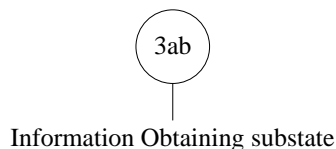


12

13 **Figure 71 — Processing a CM_ChannelClasification_Response from another CM**

14 **6.1.2.2.1.1.3.3 ChannelClassification_Announcement**

15 Figure 72 shows CM operation upon reception of a ChannelClassification_Announcement message from
 16 another CM. Upon receiving a ChannelClassification_Announcement message the CM switches to the
 17 Information Obtaining substate.

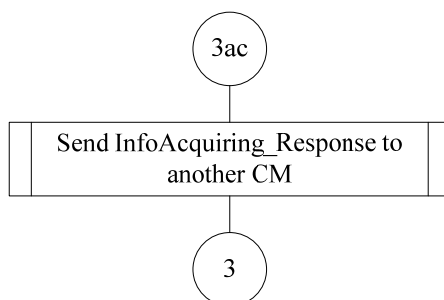


18

19 **Figure 72— Processing a ChannelClasification_Announcement from another CM**

1 **6.1.2.2.1.1.3.4 InfoAcquiring_Request**

2 Figure 73 shows CM operation upon reception of an InfoAcquiring_Request message from another CM.
 3 Upon receiving an InfoAcquiring_Request message the CM shall send an InfoAcquiring_Response
 4 message to another CM and continues to check for incoming messages.

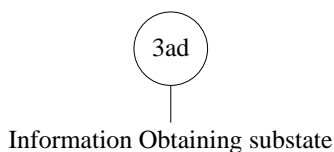


5

6 **Figure 73—Processing an InfoAcquiring_Request from another CM**

7 **6.1.2.2.1.1.3.5 InfoAcquiring_Response**

8 Figure 74 shows CM operation upon reception of an InfoAcquiring_Response message from another CM.
 9 Upon receiving an InfoAcquiring_Response message the CM switches to the Information Obtaining
 10 substate.

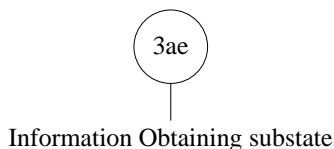


11

12 **Figure 74— Processing an InfoAcquiring_Response from another CM**

13 **6.1.2.2.1.1.3.6 NeighborInformation_Announcement**

14 Figure 75 shows CM operation upon reception of a NeighborInformation_Announcement message from
 15 another CM. Upon receiving a NeighborInformation_Announcement message the CM switches to the
 16 Information Obtaining substate.

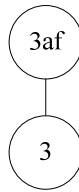


17

18 **Figure 75— Processing an NeighborInformation_Announcement from another CM**

19 **6.1.2.2.1.1.3.7 NeighborInformation_Confirm**

20 Figure 76 shows CM operation upon reception of a NeighborInformation_Confirm message from another
 21 CM. Upon receiving a NeighborInformation_Confirm message the CM continues to check for incoming
 22 messages.



1

2 **Figure 76— Processing an NeighborInformation_Confirm from another CM**

3 **6.1.2.2.1.1.3.8 Negotiation_Request**

4 Figure 77 shows CM operation upon reception of a Negotiation_Request message from another CM. Upon
5 receiving a Negotiation_Request message the CM switches to the Information Obtaining substate.



6

7 **Figure 77— Processing an Negotiation_Request from another CM**

8 **6.1.2.2.1.1.3.9 Negotiation_Announcement**

9 Figure 78 shows CM operation upon reception of a Negotiation_Announcement message from another CM.
10 Upon receiving a Negotiation_Announcement message the CM switches to the Information Obtaining
11 substate.

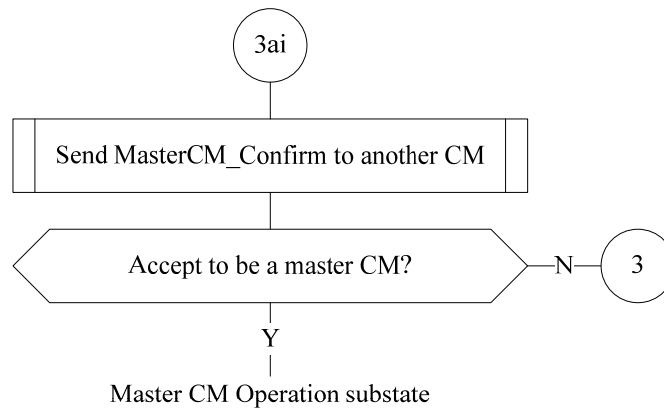


12

13 **Figure 78— Processing an Negotiation_Announcement from another CM**

14 **6.1.2.2.1.1.3.10 MasterCM_Request**

15 Figure 79 shows CM operation upon reception of a MasterCM_Request message from another CM. Upon
16 receiving a MasterCM_Request message the CM shall send a MasterCM_Confirm message to requesting
17 CM to indicate whether it can accept to be a master CM. If the CM can accept to be the master CM, it
18 switches to the Master CM Operation substate. Otherwise the CM continues to check for incoming
19 messages.



1

2

Figure 79 Processing a MasterCM_Request from another CM

3

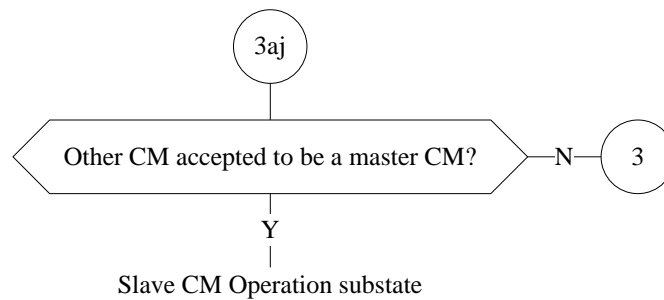
6.1.2.2.1.1.3.11 MasterCM_Confirm

4

Figure 80 shows CM operation upon reception of a MasterCM_Confirm message from another CM. If the MasterCM_Confirm message indicates that another CM accepts to be a master CM, the CM switches to the Slave CM Operation substate. Otherwise the CM continues to check for incoming messages.

5

6



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Figure 80 Processing a MasterCM_Confirm from another CM

9

6.1.2.2.1.1.3.12 CM_MasterSlaveCMConfiguration_Request

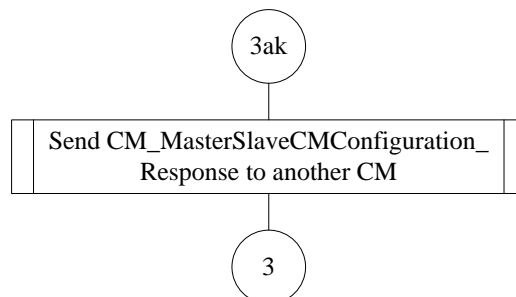
10

Figure 81 shows CM operation upon reception of a CM_MasterSlaveCMConfiguration_Request message from another CM. Upon receiving a CM_MasterSlaveCMConfiguration_Request message the CM shall send the CM_MasterSlaveCMConfiguration_Response message to another CM and continues to check for incoming messages.

11

12

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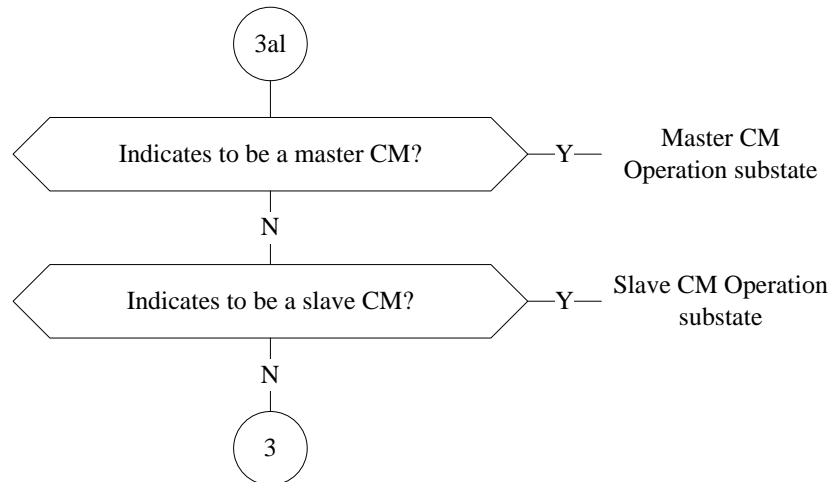


14

1 **Figure 81—Processing an InfoAcquiring_Request from another CM**

2 **6.1.2.2.1.1.3.13 CM_MasterSlaveCMConfiguration_Confirm**

3 Figure 82 shows CM operation upon reception of a CM_MasterSlaveCMConfiguration_Confirm message
 4 from another CM. If the CM_MasterSlaveCMConfiguration_Confirm message indicates to be a master CM,
 5 the CM switches to the Master CM Operation substate. If the CM_MasterSlaveCMConfiguration_Confirm
 6 message indicates to be a slave CM, the CM switches to the Slave CM Operation substate. Otherwise the
 7 CM continues to check for incoming messages.

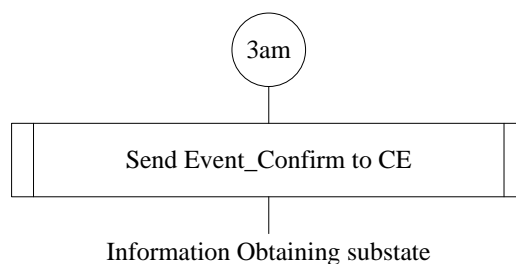


8

9 **Figure 82 Processing a CM_MasterSlaveCMConfiguration_Confirm from another CM**

10 **6.1.2.2.1.1.3.14 Event_Indication**

11 Figure 83 shows CM operation upon reception of an Event_Indication message from another CM. Upon
 12 receiving an Event_Indication message the CM shall send an Event_Confirm message to another CM. Then
 13 CM switches to the Information Obtaining state.

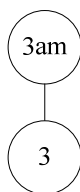


14

15 **Figure 83 Processing an Event_Indication from another CM**

16 **6.1.2.2.1.1.3.15 Event_Confirm**

17 Figure 84 shows CM operation upon reception of an Event_Confirm message from another CM. Upon
 18 receiving an Event_Confirm message the CM continues to check for incoming messages.



1

2

Figure 84 Processing an Event_Confirm from another CM

3

6.1.2.2.1.1.4 Messages from TVWS database

4

6.1.2.2.1.1.4.1 AvailableChannels_Response

5

Figure 85 shows CM operation upon reception of an AvailableChannels_Response message from the

6

TVWS database. Upon receiving an AvailableChannels_Response message the CM switches to the

7

Information Obtaining substate.



8

Information Obtaining substate

9

Figure 85— Processing an AvailableChannels_Response from TVWS database

10

6.1.2.2.1.1.4.2 AvailableChannels_Announcement

11

Figure 86 shows CM operation upon reception of an AvailableChannels_Announcement message from the

12

TVWS database. Upon receiving an AvailableChannels_Announcement message the CM switches to the

13

Information Obtaining substate.



14

Information Obtaining substate

15

Figure 86— Processing an AvailableChannels_Announcement from TVWS database

16

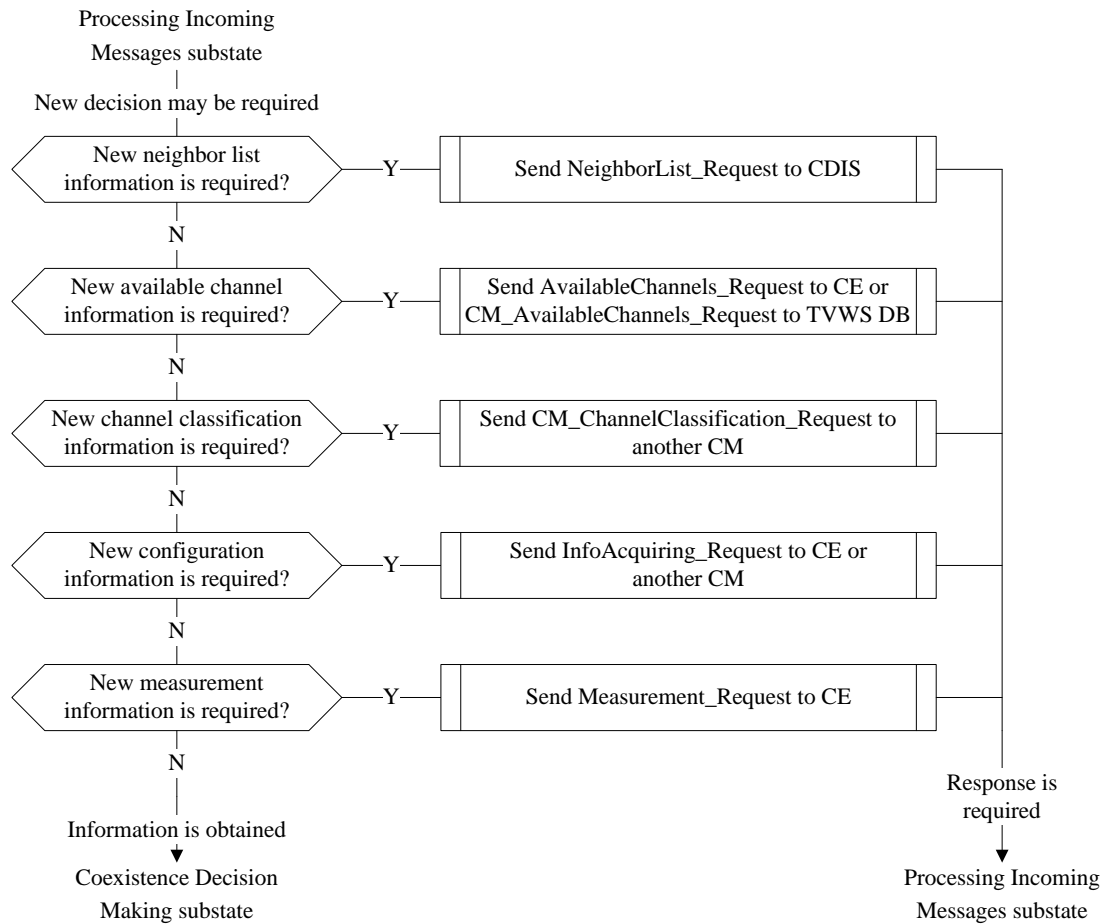
6.1.2.2.1.2 CM operation in the Information Obtaining substate of the Independent

17

Operation substate

18

Figure 87 shows CM operation in the Information Obtaining state.



1

2

Figure 87—CM operation in the Information Obtaining substate

3

In this substate the CM checks whether more information is needed as an example for coexistence decision making and if yes, obtains such information.

4

5

The CM obtains the following information by sending corresponding requests:

6

— Neighbor list information from CDIS

7

— Available channels from CE and/or TVWS database

8

— Channel classification information from another CM

9

— Configuration information from CE and/or other CM

10

— Measurements from CE.

11

If a response is required from the entity to which a request was sent, the CM switches to the Processing

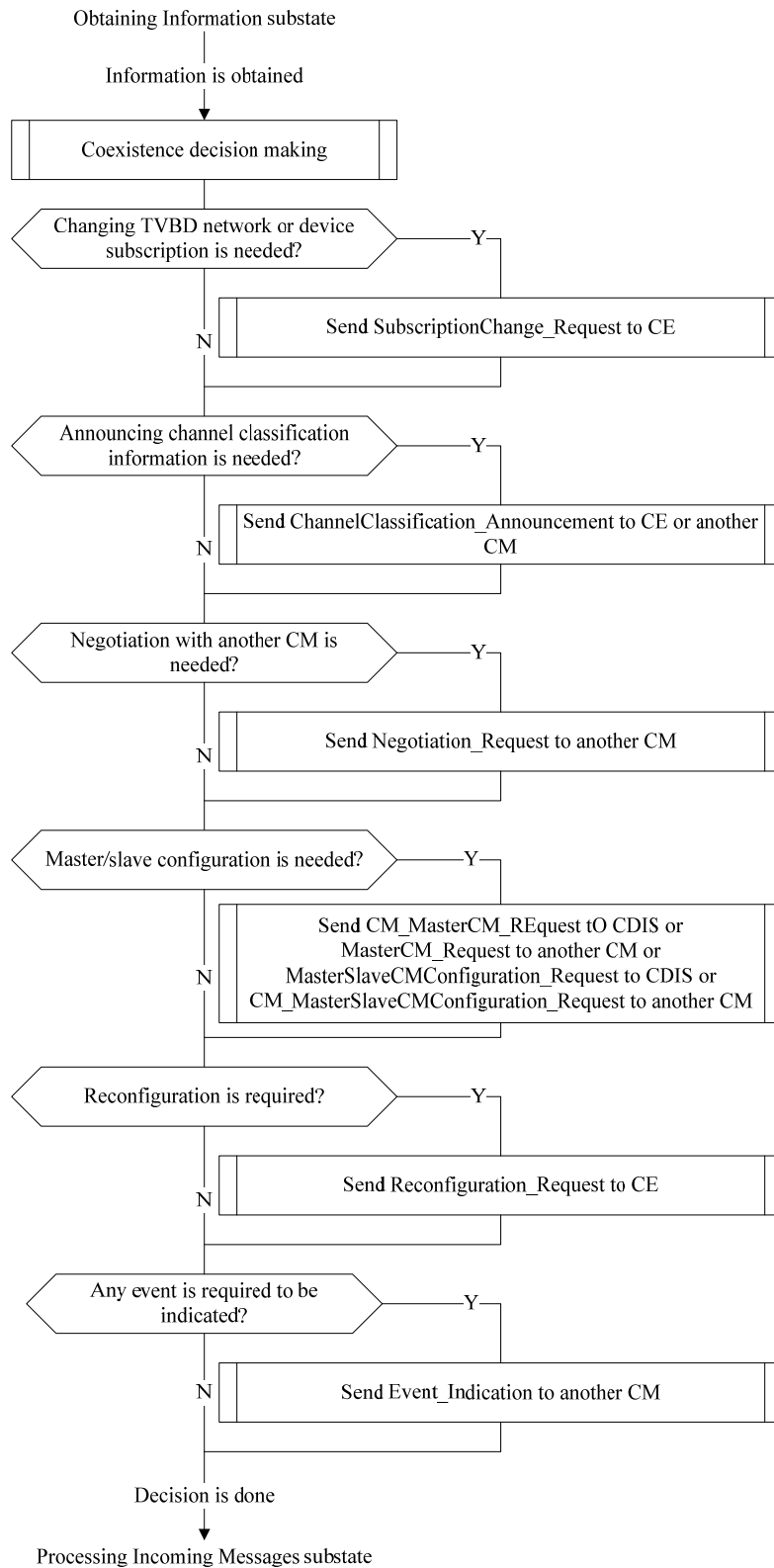
12

Incoming Messages substate. If all required information is obtained, the CM switches to the Coexistence

13

Decision making substate.

- 1 **6.1.2.2.1.3 CM operation in the Coexistence Decision Making substate of the Independent**
- 2 **Operation substate**
- 3 Figure 88 shows CM operation in the Coexistence Decision Making state.



1

2

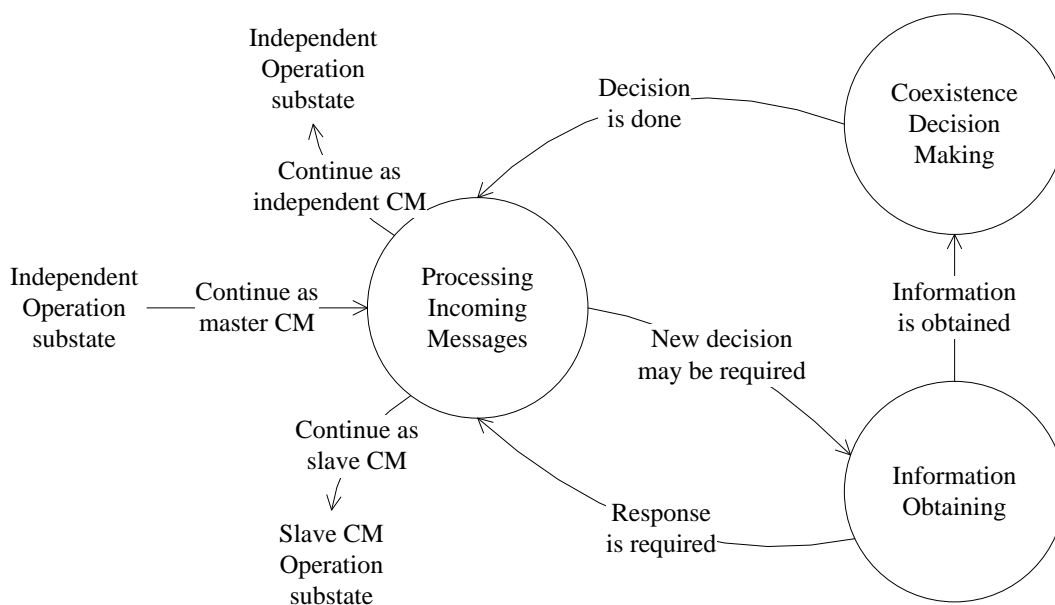
Figure 88—CM operation in the Coexistence Decision Making state

1 In the Coexistence Decision Making substate the CM makes coexistence decision. Based on the results of
 2 the coexistence decision, the CM may do the following actions by sending corresponding messages:

- 3 — Ask a TVBD network or device to change subscription
- 4 — Announce channel classification information to another CM
- 5 — Start negotiation with another CM
- 6 — Request CDIS or another CM for master/slave CM configuration
- 7 — Request TVBD network or device reconfiguration
- 8 — Indicate event to another CM.

9 **6.1.2.2.2 CM Operation in the Master CM Operation substate**

10 Figure 89 shows CM operation in the Master CM Operation substate of the Normal Operation state.



11

12 **Figure 89 • Substates of CM operation in the Master CM Operation substate**

13 In the Processing Incoming Messages substate the CM processes messages from the CE, the other CM or
 14 the CDIS. The CM switches to the Information Obtaining substate when more information is needed for
 15 coexistence decision making and switches to the Stop Operation state when it receives a request to stop
 16 operation. If master/slave CM configuration is changed, the CM continues as independent or slave CM.

17 In the Information Obtaining state the CM obtains information required for coexistence decision making.
 18 The CM switches back to the Processing Incoming Messages state if a response from an external entity is
 19 needed and to the Coexistence Decision Making state if all necessary information is obtained.

20 In the Coexistence Decision Making state the CM makes coexistence decisions and sends messages as
 21 required. After the decision is done, the CM switches to the Processing Incoming Messages state.

1 **6.1.2.2.2.1 CM operation in the Processing Incoming Messages substate of the Master CM**
2 **Operation substate**

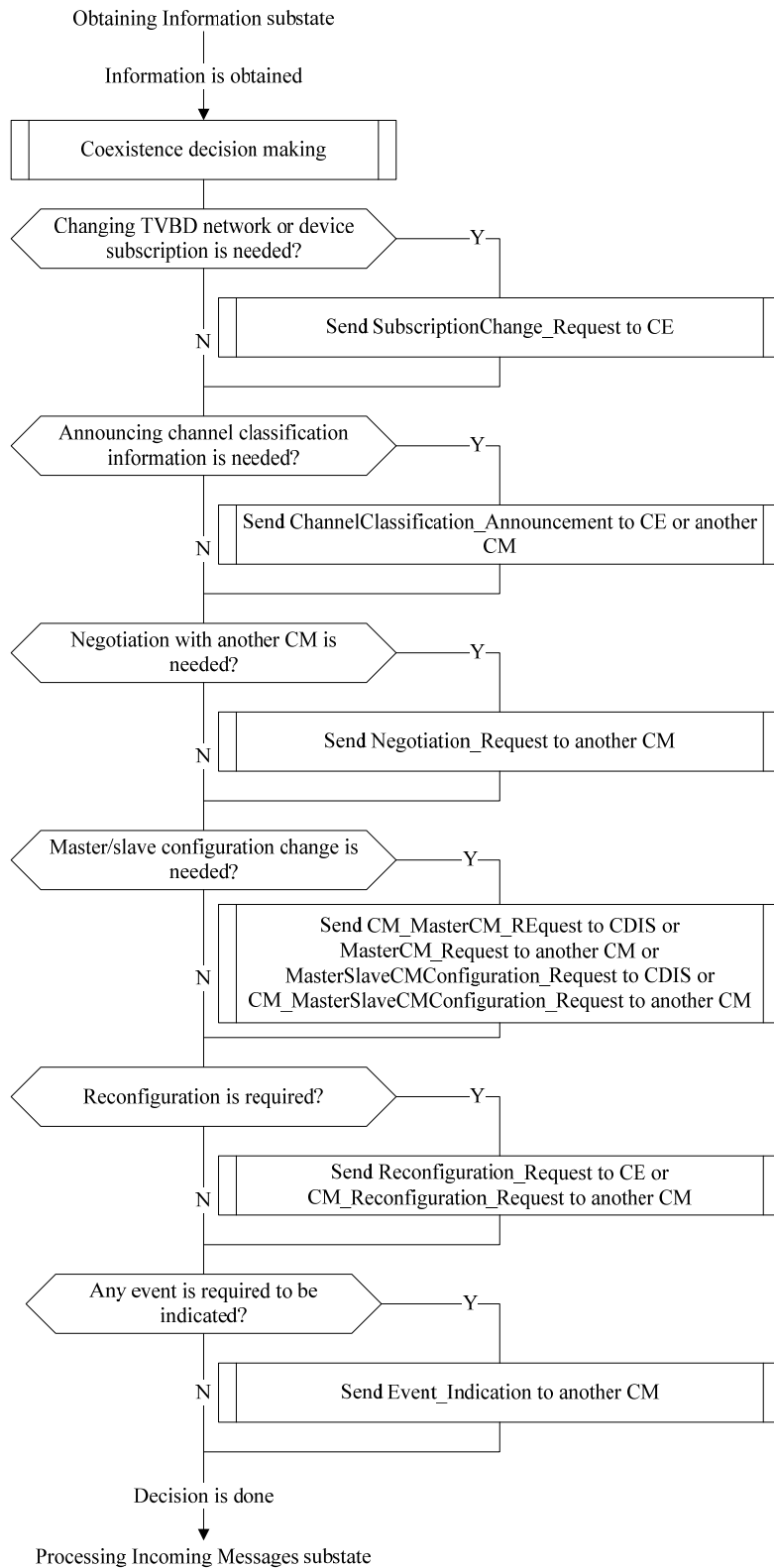
3 CM operation in the Processing Incoming Messages substate of the Master CM Operation substate is the
4 same as CM operation in the Processing Incoming Messages substate of the Independent Operation
5 substate.

6 **6.1.2.2.2.2 CM operation in the Information Obtaining substate of the Master CM Operation**
7 **substate**

8 CM operation in the Information Obtaining substate of the Master CM Operation substate is the same as
9 CM operation in the Information Obtaining substate of the Independent Operation substate.

10 **6.1.2.2.2.3 CM operation in the Coexistence Decision Making substate of the Independent**
11 **Operation substate**

12 Figure 90 shows CM operation in the Coexistence Decision Making state.



1

2

Figure 90—CM operation in the Coexistence Decision Making state

1 In the Coexistence Decision Making substate the CM makes coexistence decision. Based on the results of
 2 the coexistence decision, the CM may do the following actions by sending corresponding messages:

- 3 — Ask a TVBD network or device to change subscription
- 4 — Announce channel classification information to another CM
- 5 — Start negotiation with another CM
- 6 — Request CDIS or another CM for master/slave CM configuration change
- 7 — Request TVBD network or device reconfiguration to CE or its slave CM
- 8 — Indicate event to another CM.

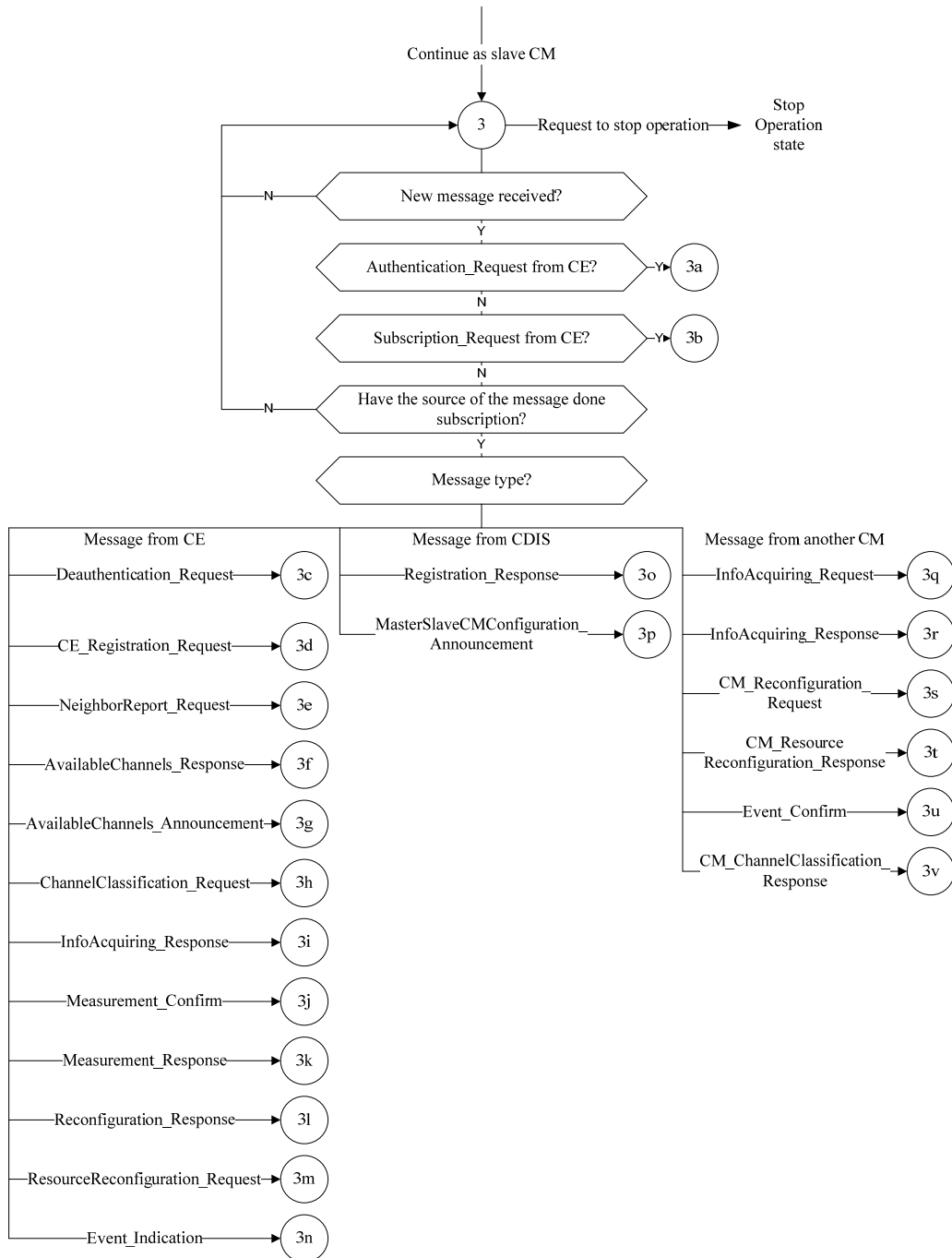
9 **6.1.2.3 CM operation in the Slave CM Operation substate**

10 Figure 91 shows CM operation in the Slave CM Operation substate. In this substate the CM checks for the
 11 incoming messages.

12 The CM expects only the following messages (no actions are taken if any other messages are received):

- 13 — Messages from the CE over the interface B1
 - 14 — Authentication_Request
 - 15 — Deauthentication_Request
 - 16 — Subscription_Request
 - 17 — CE_Registration_Request
 - 18 — NeighborReport_Request
 - 19 — AvailableChannels_Response
 - 20 — AvailableChannels_Announcement
 - 21 — ChannelClassification_Request
 - 22 — InfoAcquiring_Response
 - 23 — Measurement_Confirm
 - 24 — Measurement_Response
 - 25 — Reconfiguration_Response
 - 26 — ResourceReconfiguration_Request
 - 27 — Event_Indication
- 28 — Messages from the CDIS over the interface B2
 - 29 — Registration_Response
 - 30 — NeighborList_Announcement
 - 31 — MasterSlaveCMConfiguration_Announcement
- 32 — Message from the other CM over the interface B3
 - 33 — InfoAcquiring_Request
 - 34 — InfoAcquiring_Response

- 1 — CM_Reconfiguration_Request
- 2 — CM_ResourceReconfiguration_Request
- 3 — Event_Confirm
- 4 — CM_ChannelClassification_Request.



5

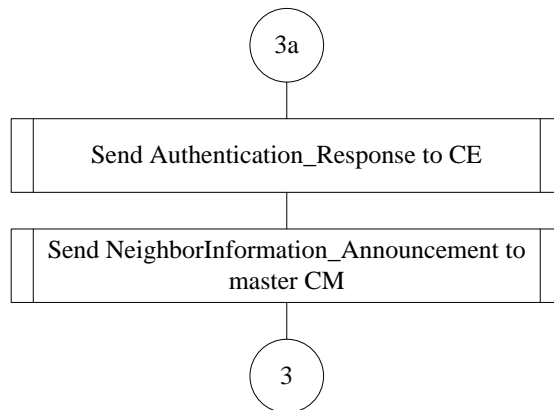
6

Figure 91 —CM operation in the Slave CM Operation substate

1 **6.1.2.3.1 Messages from CE**

2 **6.1.2.3.1.1 Authentication_Request**

3 Figure 92 shows CM operation upon reception of an Authentication_Request message from the CE. Upon
 4 receiving an Authentication_Request message the CM shall perform authentication with the information
 5 provided in the Authentication_Request message, form an Authentication_Response message and set the
 6 Status field in the Authentication_Response message according to the result of authentication. Then the CM
 7 shall send the Authentication_Response message to the CE. Also the CM shall send a
 8 NeighborInformation_Announcement message to the master CM and continues to check for incoming
 9 messages.

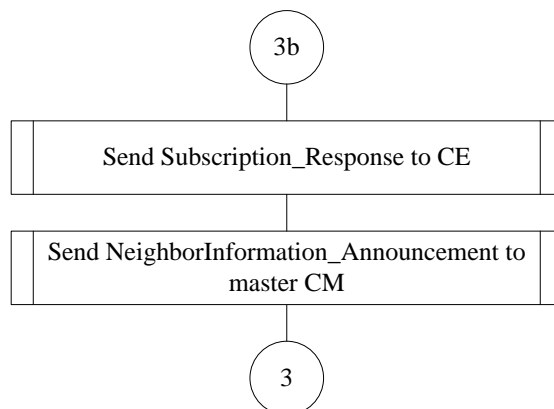


10

11 **Figure 92—Processing an Authentication_Request from CE**

12 **6.1.2.3.1.2 Subscription_Request**

13 Figure 93 shows CM operation upon reception of a Subscription_Request message from the CE. Upon
 14 receiving a Subscription_Request message the CM shall send a Subscription_Response message to the CE.
 15 Then the CM shall send a NeighborInformation_Announcement message to the master CM and continues
 16 to check for incoming messages.

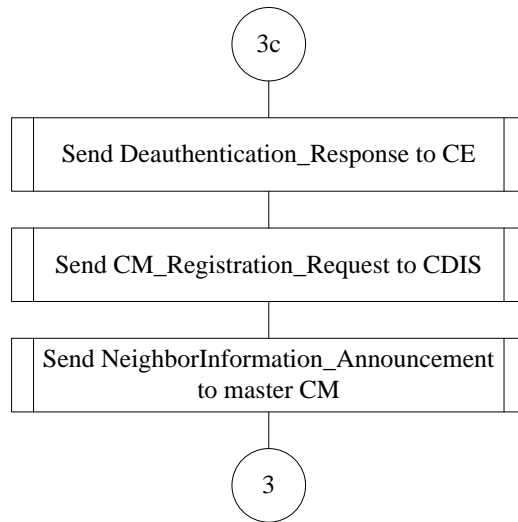


17

18 **Figure 93 Processing a Subscription_Request from CE**

1 **6.1.2.3.1.3 Deauthentication_Request**

2 Figure 94 shows CM operation upon reception of a Deauthentication_Request from the CE. Upon receiving
 3 a Deauthentication_Request message the CM shall first send a Deauthentication_Response message to the
 4 CE to acknowledge reception of the Deauthentication_Request message. Then the CM shall send a
 5 CM_Registration_Request message to the CDIS to deregister this TVBD network or device from the CDIS.
 6 Then the CM shall send a NeighborInformation_Announcement to the master CM. After that, the CM
 7 continues to check for incoming messages.

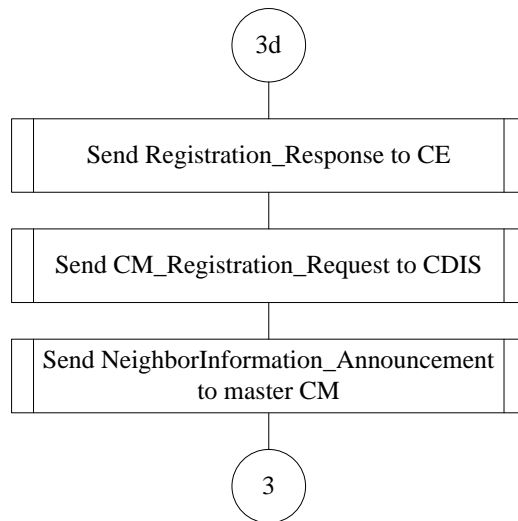


8

9 **Figure 94— Processing a Deauthentication_Request from CE**

10 **6.1.2.3.1.4 CE_Registration_Request**

11 Figure 95 shows CM operation upon reception of a CE_Registration_Request from the CE. Upon receiving
 12 a CE_Registration_Request message the CM shall first send a Registration_Response message to the CE to
 13 acknowledge reception of the CE_Registration_Request message. Then the CM shall send a
 14 CM_Registration_Request message to the CDIS to register or update registration information of this TVBD
 15 network or device to the CDIS. Then the CM shall send a NeighborInformation_Announcement to the
 16 master CM. After that, the CM continues to check for incoming messages.



1

2

Figure 95— Processing a CE_Registration_Request from CE

3

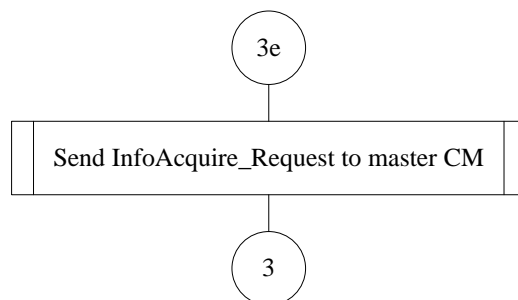
6.1.2.3.1.5 NeighborReport_Request

4

Figure 96 shows CM operation upon reception of a NeighborReport_Request from the CE. Upon receiving a NeighborReport_Request message the CM shall send an InfoAcquire_Request message to the master CM. After that, the CM continues to check for incoming messages.

5

6



7

8

Figure 96— Processing a NeighborReport_Request from CE

9

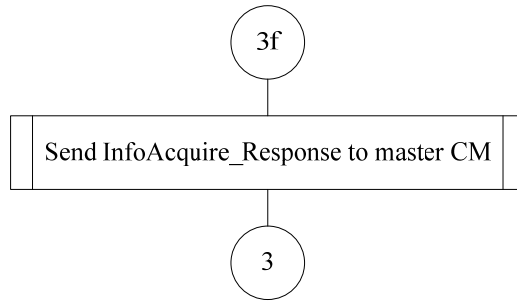
6.1.2.3.1.6 AvailableChannels_Response

10

Figure 97 shows CM operation upon reception of an AvailableChannels_Response from the CE. Upon receiving an AvailableChannels_Response message the CM shall send an InfoAcquire_Response message to the master CM. After that, the CM continues to check for incoming messages.

11

12



1

2

Figure 97 — Processing a AvailableChannels_Response from CE

3

6.1.2.3.1.7 AvailableChannels_Announcement

4

Figure 98 shows CM operation upon reception of an AvailableChannels_Announcement from the CE.

5

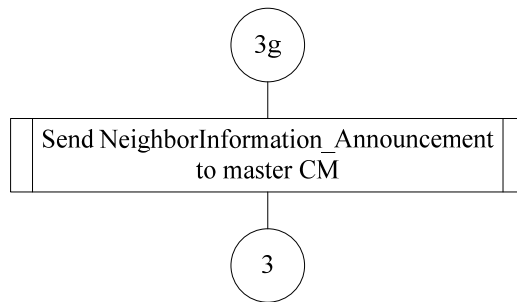
Upon receiving an AvailableChannels_Announcement message the CM shall send a

6

NeighborInformation_Announcement message to the master CM. After that, the CM continues to check for

7

incoming messages.



8

9

Figure 98 — Processing a AvailableChannels_Announcement from CE

10

6.1.2.3.1.8 ChannelClassification_Request

11

Figure 99 shows CM operation upon reception of a ChannelClassification_Request from the CE. Upon

12

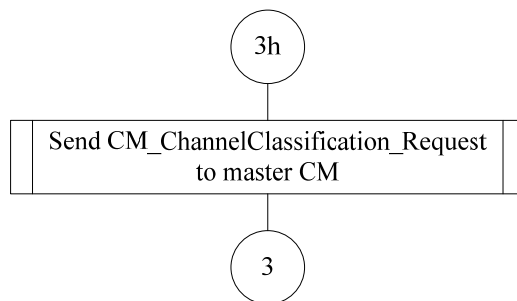
receiving a ChannelClassification_Request message the CM shall send a

13

CM_ChannelClassification_Request message to the master CM. After that, the CM continues to check for

14

incoming messages.



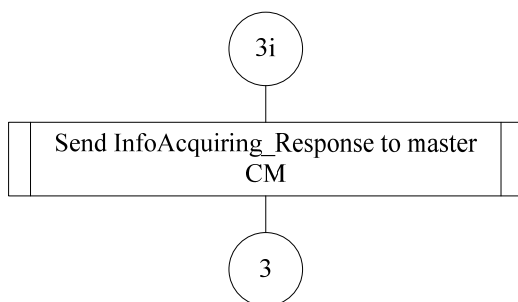
15

16

Figure 99 — Processing a ChannelClassification_Request from CE

1 **6.1.2.3.1.9 InfoAcquiring_Response**

2 Figure 100 shows CM operation upon reception of an InfoAcquiring_Response from the CE. Upon
 3 receiving an InfoAcquiring_Response message the CM shall send an InfoAcquiring_Response message to
 4 the master CM. After that, the CM continues to check for incoming messages.

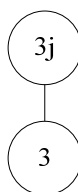


5

6 **Figure 100 — Processing a InfoAcquiring_Response from CE**

7 **6.1.2.3.1.10 Measurement_Confirm**

8 Figure 101 shows CM operation upon reception of a Measurement_Confirm from the CE. Upon receiving a
 9 Measurement_Confirm message the CM continues to check for incoming messages.

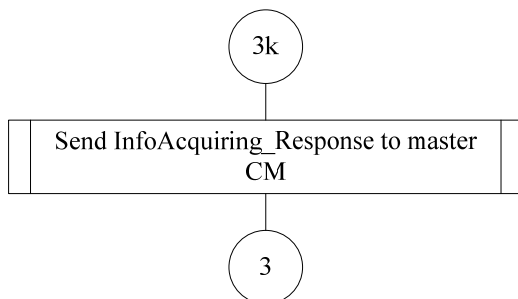


10

11 **Figure 101 — Processing a Measurement_Confirm from CE**

12 **6.1.2.3.1.11 Measurement_Response**

13 Figure 102 shows CM operation upon reception of a Measurement_Response from the CE. Upon receiving
 14 a Measurement_Response message the CM shall send an InfoAcquiring_Response message to the master
 15 CM. After that, the CM continues to check for incoming messages.

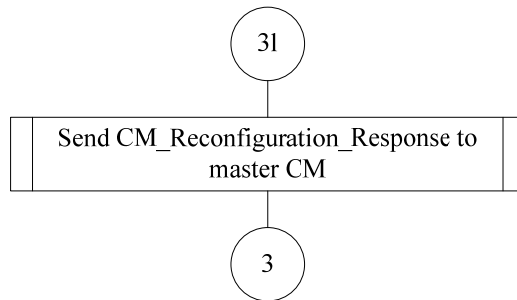


16

17 **Figure 102 — Processing a Measurement_Response from CE**

1 **6.1.2.3.1.12 Reconfiguration_Response**

2 Figure 103 shows CM operation upon reception of a Reconfiguration_Response from the CE. Upon
 3 receiving a Reconfiguration_Response message the CM shall send a CM_Reconfiguration_Response
 4 message to the master CM. After that, the CM continues to check for incoming messages.

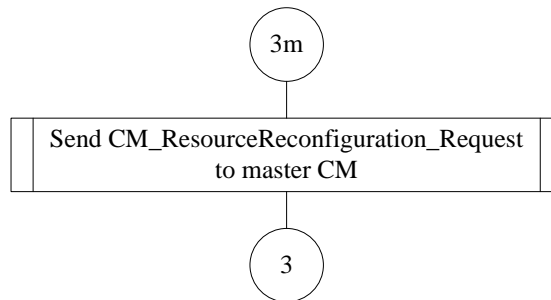


5

6 **Figure 103 — Processing a Reconfiguration_Response from CE**

7 **6.1.2.3.1.13 ResourceReconfiguration_Request**

8 Figure 104 shows CM operation upon reception of a ResourceReconfiguration_Request from the CE. Upon
 9 receiving a ResourceReconfiguration_Request message the CM shall send a
 10 CM_ResourceReconfiguration_Request message to the master CM. After that, the CM continues to check
 11 for incoming messages.

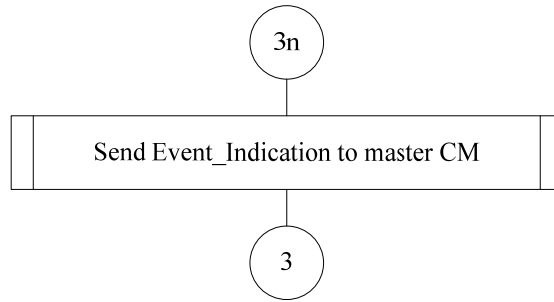


12

13 **Figure 104 — Processing a ResourceReconfiguration_Response from CE**

14 **6.1.2.3.1.14 Event_Indication**

15 Figure 105 shows CM operation upon reception of an Event_Indication from the CE. Upon receiving an
 16 Event_Indication message the CM shall send an Event_Indication message to the master CM. After that,
 17 the CM continues to check for incoming messages.



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2

Figure 105 — Processing a Event_Indication from CE

3

6.1.2.3.2 Messages from CDIS

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6.1.2.3.2.1 Registration_Response

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Figure 106 shows CM operation upon reception of a Registration_Response from the CDIS. Upon receiving a Registration_Response message the CM continues to check for incoming messages.

6



7

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Figure 106 — Processing a Registration_Response from CDIS

9

6.1.2.3.2.2 MasterSlaveCMConfiguration_Announcement

10

Figure 107 shows CM operation upon reception of a MasterSlaveCMConfiguration_Announcement message from the CDIS. If the MasterSlaveCMConfiguration_Announcement message indicates to be a master CM, the CM switches to the Master CM Operation substate. If the MasterSlaveCMConfiguration_Announcement message indicates to be an independent CM, the CM switches to the Independent Operation substate. Otherwise the CM continues to check for incoming messages.

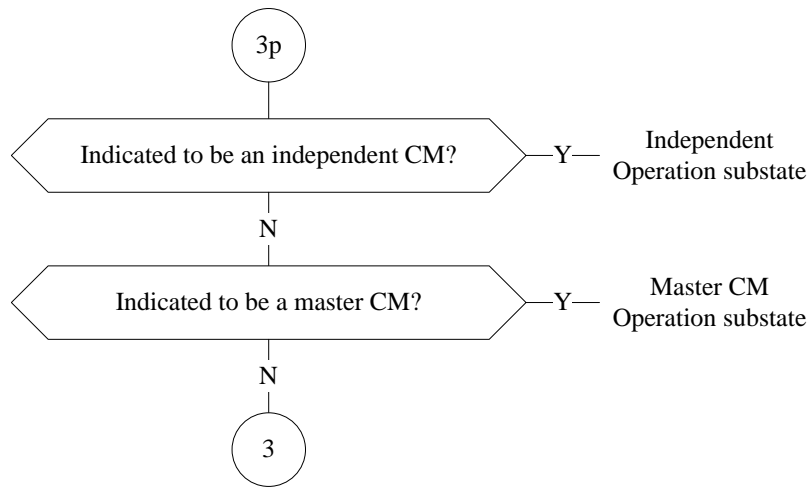
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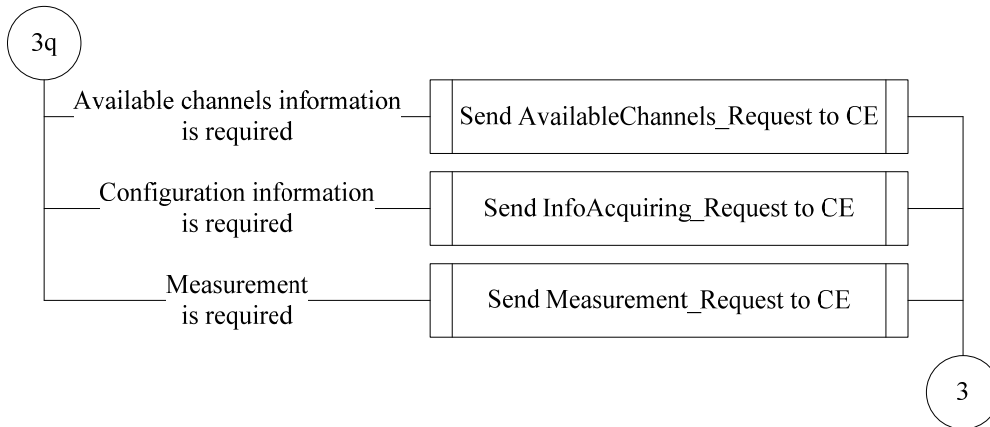
1

2 **Figure 107 Processing a MasterSlaveCMConfiguration_Announcement from CDIS**

3 **6.1.2.3.3 Messages from another CM**

4 **6.1.2.3.3.1 InfoAcquiring_Request**

5 Figure 108 shows CM operation upon reception of an InfoAcquiring_Request from another CM. Upon
 6 receiving an InfoAcquiring_Request message the CM checks the content of the message and sends
 7 corresponding message. After that, the CM continues to check for incoming messages.

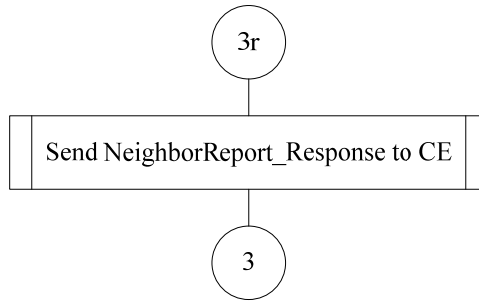


8

9 **Figure 108 — Processing a InfoAcquiring_Request from another CM**

10 **6.1.2.3.3.2 InfoAcquiring_Response**

11 Figure 109 shows CM operation upon reception of an InfoAcquiring_Response from another CM. Upon
 12 receiving an InfoAcquiring_Response message the CM shall send a NeighborReport_Response to a CE.
 13 After that, the CM continues to check for incoming messages.



1

2

Figure 109 — Processing a InfoAcquiring_Response from another CM

3

6.1.2.3.3.3 CM_Reconfiguration_Request

4

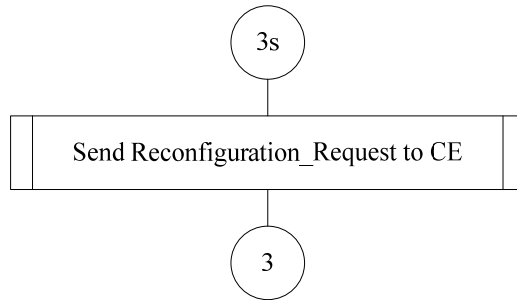
Figure 110 shows CM operation upon reception of a CM_Reconfiguration_Request from another CM.

5

Upon receiving a CM_Reconfiguration_Request message the CM shall send a Reconfiguration_Request

6

message to the CE. After that, the CM continues to check for incoming messages.



7

8

Figure 110 — Processing a CM_Reconfiguration_Request from another CM

9

6.1.2.3.3.4 CM_ResourceReconfiguration_Response

10

Figure 111 shows CM operation upon reception of a CM_ResourceReconfiguration_Response from

11

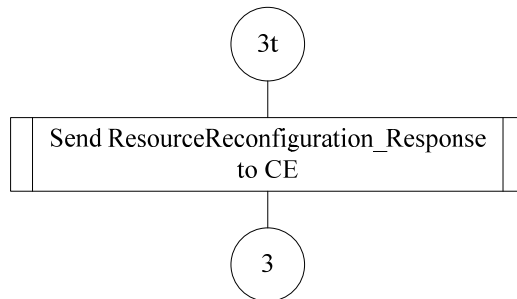
another CM. Upon receiving a CM_ResourceReconfiguration_Response message the CM shall send a

12

ResourceReconfiguration_Response message to the CE. After that, the CM continues to check for

13

incoming messages.



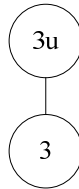
14

15

Figure 111 — Processing a CM_ResourceReconfiguration_Response from another CM

1 **6.1.2.3.3.5 Event_Confirm**

2 Figure 112 shows CM operation upon reception of an Event_Confirm from another CM. Upon receiving an
 3 Event_Confirm message the CM continues to check for incoming messages.

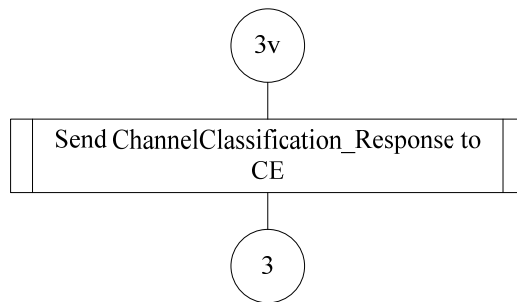


4

5 **Figure 112 — Processing an Event_Confirm from another CM**

6 **6.1.2.3.3.6 CM_ChannelClassification_Response**

7 Figure 113 shows CM operation upon reception of a CM_ChannelClassification_Response from another
 8 CM. Upon receiving a CM_ChannelClassification_Response message the CM shall send a
 9 ChannelClassification_Response message to the CE. After that, the CM continues to check for incoming
 10 messages.



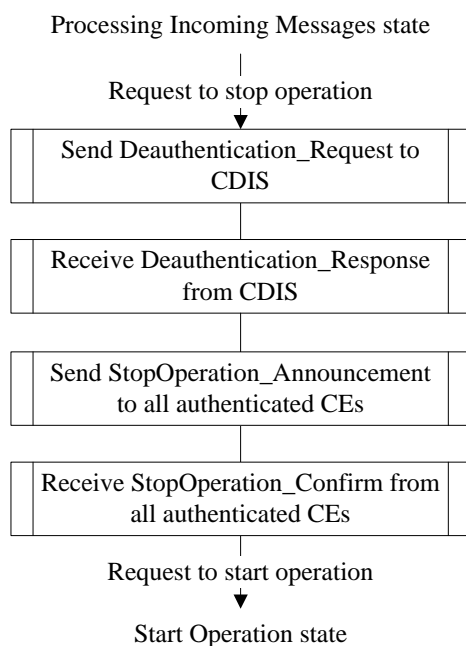
11

12 **Figure 113 — Processing a CM_ResourceReconfiguration_Response from another CM**

13 **6.1.2.4 CM operation in the Stop Operation state**

14 Figure 114 shows CM operation in the Stop Operation state.

15 After entering this state, the CM performs deauthentication with the CDIS, notifies all its CEs, and switches
 16 to the Stop Operation state.



1

2

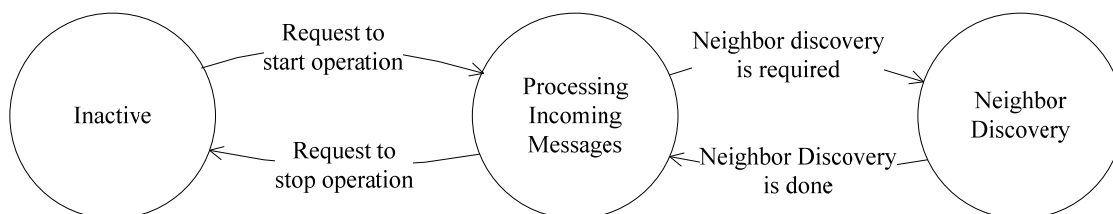
Figure 114 —CM operation in the Stop Operation state

3

6.1.3 CDIS operation

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Figure 115 shows states of CDIS operation



5

6

Figure 115 —States of CDIS operation

7

8

A CDIS has three states

9

— Inactive

10

— Processing Incoming Messages

11

— Neighbor Discovery.

12

A CDIS switches from the Inactive state to the Processing Incoming Messages state when the CDIS receives a request to start operation. In the Inactive state, CDIS does nothing but keeps checking the reception of request to start operation.

14

1 In the Processing Incoming messages state, the CDIS processes messages from the CM. The CDIS switches
2 to the Neighbor Discovery state when a new neighbor discovery operation is required. The CDIS switches
3 to the Inactive state when it receives a request to stop its operation.

4 In the Neighbor Discovery state, the CDIS calculates the neighbor list based on the registered information
5 from CMs and based on CM subscriptions. The CDIS switches to the Processing Incoming message state,
6 when it completes the neighbor discovery process.

7 The states are not binding in implementation but they are introduced here merely for illustrative purposes
8 and to make the CDIS description easy to understand. Only the rules related to processing of received
9 messages and actions upon their reception are binding and normative if so specified.

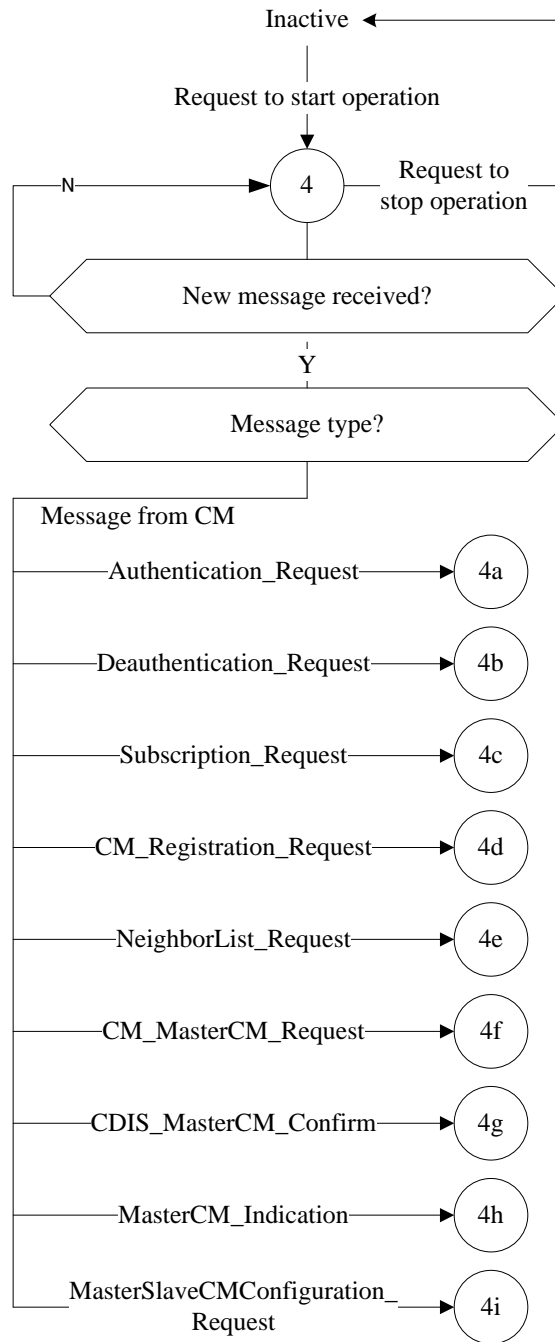
10 Error case handling is on default implementation dependent. Unless explicitly mentioned, error handling
11 depends on implementation. The error case handlings described in the sub-clauses of this clause are
12 exemplary and not binding.

13 **6.1.3.1 CDIS operation in the Processing Incoming Messages state**

14 Figure 116 shows CDIS operation in Processing Incoming Messages state.

15 The CDIS expects only the following messages from CM (no action are taken if any other messages are
16 received):

- 17 — Authentication_Request
- 18 — Deauthentication_Request
- 19 — Subscription_Request
- 20 — CM_Registration_Request
- 21 — NeighborList_Request
- 22 — CM_MasterCM_Request
- 23 — CDIS_MasterCM_Confirm
- 24 — MasterCM_Indication
- 25 — MasterSlaveCMConfiguration_Request.

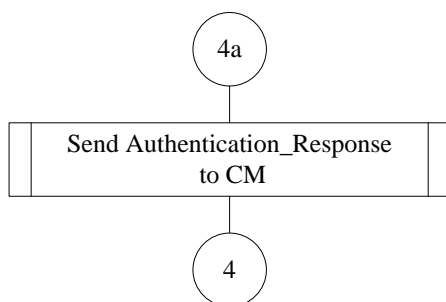


1

2 **Figure 116 — CDIS operation in the Processing Incoming Messages state**

3 **6.1.3.1.1 Authentication_Request**

4 Figure 117 shows CDIS operation upon reception of an Authentication_Request message from a CM. Upon
 5 receiving an Authentication_Request message the CDIS shall check CM authentication information and
 6 send Authentication_Response to the CM. Then CDIS continues to check for incoming messages.



1

2

Figure 117 — Processing Authentication_Request from CM

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6.1.3.1.2 Deauthentication_Request

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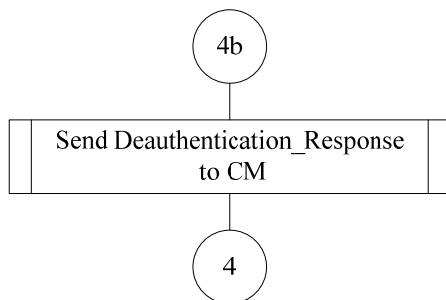
Figure 118 shows CDIS operation upon reception of a Deauthentication_Request message from a CM.

5

Upon receiving a Deauthentication_Request message the CDIS shall check CM authentication information

6

and send Deauthentication_Response to the CM. Then CDIS continues to check for incoming messages.



7

8

Figure 118 — Processing Deauthentication_Request from CM

9

6.1.3.1.3 Subscription_Request

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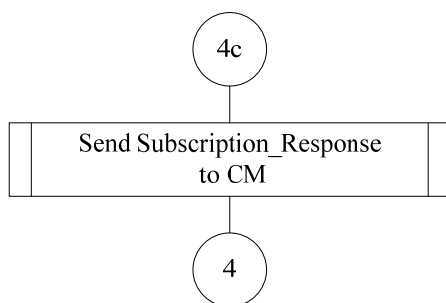
Figure 119 shows CDIS operation upon reception of a Subscription_Request message from a CM. Upon

11

receiving a Subscription_Request message the CDIS shall send a Subscription_Response to the CM. Then

12

CDIS continues to check for incoming messages.



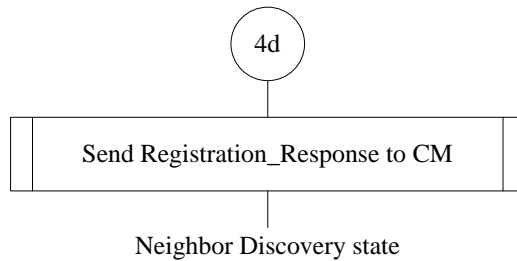
13

14

Figure 119 — Processing Subscription_Request from CM

1 **6.1.3.1.4 CM_Registration_Request**

2 Figure 120 shows CM operation upon reception of a CM_Registration_Request message from a CM. Upon
 3 receiving a CM_Registration_Request message the CDIS shall send a Registration_Response message to
 4 the CM. Then the CDIS switches to the Neighbor Discovery state.

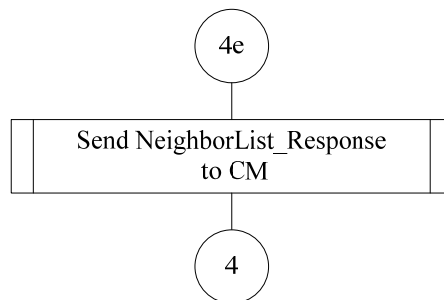


5

6 **Figure 120 Processing a CM_Registration_Request from a CM**

7 **6.1.3.1.5 NeighborList_Request**

8 Figure 121 shows CDIS operation upon reception of a NeighborList_Request message from a CM. Upon
 9 receiving a NeighborList_Request message the CDIS shall send a NeighborList_Response to the CM. Then
 10 CDIS continues to check for incoming messages.

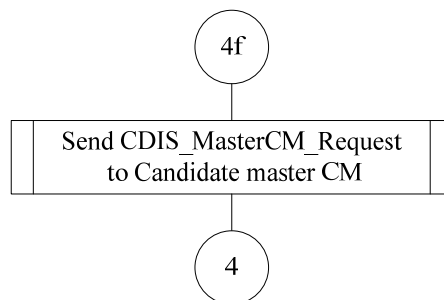


11

12 **Figure 121 — Processing NeighborList_Request from CM**

13 **6.1.3.1.6 CM_MasterCM_Request**

14 Figure 122 shows CDIS operation upon reception of a CM_MasterCM_Request message from a CM. Upon
 15 receiving a CM_MasterCM_Request message the CDIS shall select candidate master CM and send a
 16 CDIS_MasterCM_Request to this CM. Then CDIS continues to check for incoming messages.

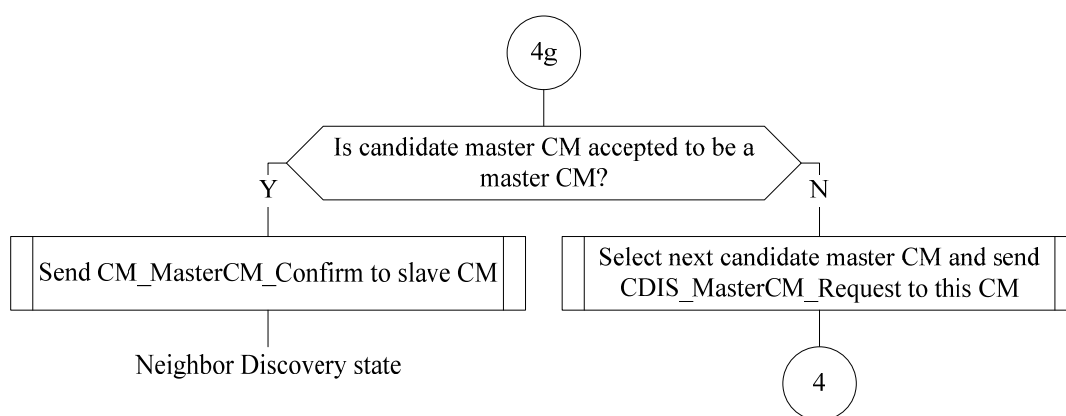


17

1 **Figure 122 — Processing CM_MasterCM_Request from CM**

2 **6.1.3.1.7 CDIS_MasterCM_Confirm**

3 Figure 123 shows CM operation upon reception of a CDIS_MasterCM_Confirm message from a candidate
 4 master CM. If this message indicates that the candidate master CM accepted to be a master CM, the CDIS
 5 shall sends a CM_MasterCM_Confirm to a slave CM and switches to Neighbor Discovery state. If this
 6 message indicates that the candidate master CM rejected to be a master CM, the CDIS selects next
 7 candidate master CM and sends CDIS_MasterCM_Request to this CM. Then CDIS continues to check for
 8 incoming messages.

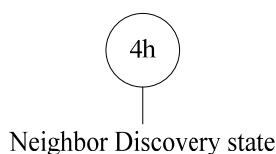


9

10 **Figure 123 Processing a CDIS_MasterCM_Confirm from a CM**

11 **6.1.3.1.8 MasterCM_Indication**

12 Figure 124 shows CM operation upon reception of a MasterCM_Indication message from a CM. Upon
 13 receiving a MasterCM_Indication message the CDIS switches to the Neighbor Discovery state.

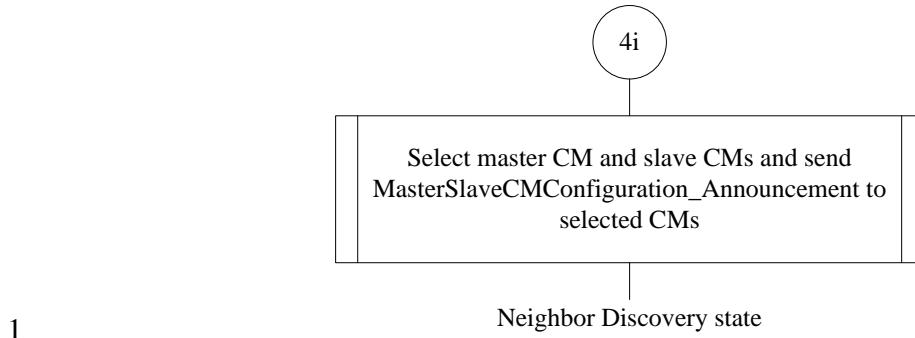


14

15 **Figure 124 Processing a MasterCM_Indication from a CM**

16 **6.1.3.1.9 MasterSlaveCMConfiguration_Request**

17 Figure 125 shows CM operation upon reception of a MasterSlaveCMConfiguration_Request message from
 18 a CM. Upon receiving a MasterSlaveCMConfiguration_Request message the CDIS shall select the master
 19 CM and slave CMs and send a MasterSlaveCMConfiguration_Announcement message to the selected CMs.
 20 Then the CDIS switches to the Neighbor Discovery state.

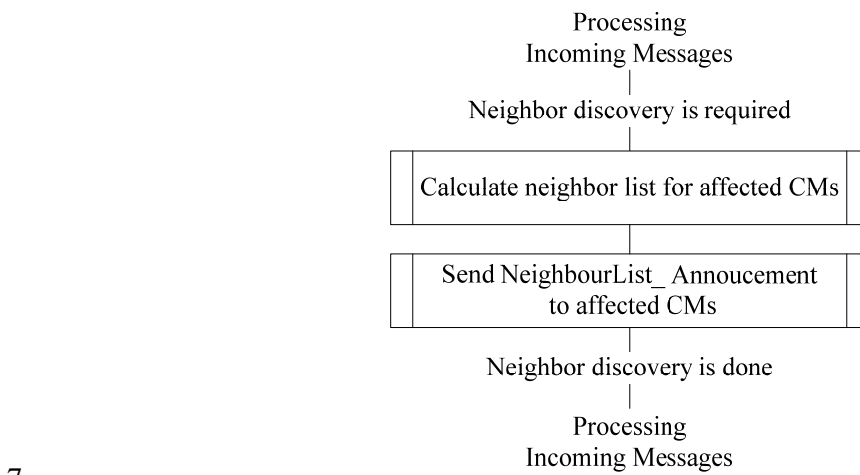


1

2 **Figure 125 Processing a MasterSlaveCMConfiguration_Request from a CM**

3 **6.1.3.2 CDIS operation in Neighbor Discovery state**

4 Figure 126 shows CDIS operation in Neighbor Discovery state. The CDIS calculates a neighbor list for the
 5 affected CMs and then sends a NeighborList_Announcement to these CMs. After the neighbor discovery is
 6 done, the CDIS switches back to the Processing Incoming Messages state.



7

8 **Figure 126 CDIS operation in Neighbor Discovery state**

9