|  |  |
| --- | --- |
| Project | **IEEE 802.21.1 Media Independent Services**  **<**[**http://www.ieee802.org/21/**](http://www.ieee802.org/21/)**>** |
| Title | **Proposed Update for “Radio Resource Management Service” Section of IEEE 802.21.1 Draft Standard** |
| DCN | **21-15-0020-00-SAUC** |
| Date Submitted | **Mar. 7, 2015.** |
| Source(s) | Hyeong-Ho Lee (ETRI), Hyunho Park (ETRI), Myung-Ki Shin (ETRI), Jin Seek Choi (Hanyang University, Korea Ethernet Forum), |
| Re: | IEEE 802.21 Session #67 in Berlin, Germany |
| Abstract | Based on the discussion of the contribution “Proposed text of “Radio Resource Management Service” Section for IEEE 802.21.1 Draft Standard” (DCN 21-14-0158-00-SAUC) in IEEE 802.21 Session #65, this document proposes update for “Radio Resource Management Service” Section of IEEE 802.21.1 Draft Standard. |
| Purpose | To be part of 802.21.1 draft standard document. |
| Notice | This document has been prepared to assist the IEEE 802.21 Working Group. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |
| Release | The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE’s name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE’s sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that IEEE 802.21 may make this contribution public. |
| Patent Policy | The contributor is familiar with IEEE patent policy, as stated in [Section 6 of the IEEE-SA Standards Board bylaws](http://standards.ieee.org/guides/opman/sect6.html#6.3) <[http://standards.ieee.org/guides/bylaws/sect6-7.html#6](http://127.0.0.1:4664/cache?event_id=757737&schema_id=1&s=5X0vID10lu_E6yrIkWkNd4Wz2H8&q=hancock)> and in *Understanding Patent Issues During IEEE Standards Development* <http://standards.ieee.org/board/pat/faq.pdf> |

**Table of Contents**

[5.4 Radio resource management service 3](#_Toc402520501)

[5.4.1 Introduction 3](#_Toc402520502)

[5.4.2 Service scenarios and call flows 3](#_Toc402520503)

[5.4.3 Service specific primitives 19](#_Toc402520515)

[5.4.4 Service specific protocol features 21](#_Toc402520516)

1. 4. Radio resource management service
      1. Introduction

In recent days, networks with various communication technologies have appeared, interferences between wireless access networks have increased, and thus resource management in heterogeneous networks is needed. For example, 2.4GHz band is used by WLAN devices and WPAN devices such as Bluetooth devices, and 5GHz band is used by WLAN devices and cordless phones. Moreover, 5GHz band is considered for use of long term evolution (LTE) technology, and therefore interference in 5GHz band is expected to increase.

Media independent service (MIS) framework of IEEE 802.21 standard can be a common platform to support resource management in heterogeneous networks. MIS framework of IEEE 802.21 standard supports seamless handover in heterogeneous networks by using media independent event service (MIES), media independent command service (MICS), and media independent information service (MIIS). MIES primitives and messages help mobile node (MN) to monitor link status (e.g., signal strength and data rate), and MICS primitives and messages helps MN to control its link layers (physical layer and data link layer) for seamless handover in heterogeneous networks. It is possible to expect that MIS framework enables MN to monitor link status and control radio resources (e.g., frequency, time, and power) for radio resource management. MIIS primitives and messages are used to transfer network configuration information for handover in heterogeneous networks, and thus they can be used to provide network configuration for radio resource allocations in heterogeneous networks. Thus, MIS framework is appropriate for resource management in heterogeneous networks that use various communication technologies and various frequency bands.

* + 1. Service scenarios and call flows
       1. High level illustration

Figure 1 shows media independent service framework for resource management in heterogeneous networks. Point of attachment (PoA) Controller (i.e., access point (AP) controller) can control resources of PoAs that use various communication technologies (e.g., WLAN, Wi-Fi Direct, Bluetooth, and LTE) by using MICS message. PoAs can use different communication technologies and share its link status by using MIES message. PoA Controller can be implemented as MIS point of service (PoS).

The following entities are equipped with MIS function (MISF).

1. MN-A: a user device, such as a smart phone, which equips radio interfaces of multiple radio access technologies
2. PoA-A: a PoA, such as base station in cellular networks and access point in WLAN, which is a network entity that establishes link connection with the MN
3. PoA-B: PoA-A’s neighboring PoA that can interfere with MN or PoA-A
4. PoA Controller: a network entity that can manage radio resources of PoA-A
5. Information Server: a server that manages configuration information on PoAs’ radio resource allocations

PoA-A is able to trigger radio resource management of its own link based on monitored link status by MN, itself, or PoA-B. PoA Controller is also able to trigger radio resource management of PoA-A’s link.

1. PoA-A may manage its own radio resources based on its own link status.
2. PoA-A may manage its own radio resources based on link status of MN.
3. PoA-A may manage its own radio resources based on link status or resource allocations of PoA-B.
4. PoA-A may manage its own radio resources based on configuration information from Information Server.
5. PoA Controller may request radio resource management of PoA-A based on link status or resource allocations of PoAs (e.g., PoA-A and PoA-B) that are managed by PoA Controller.
6. PoA Cntroller may request radio resource management of PoA-A based on configuration information from Information Server.

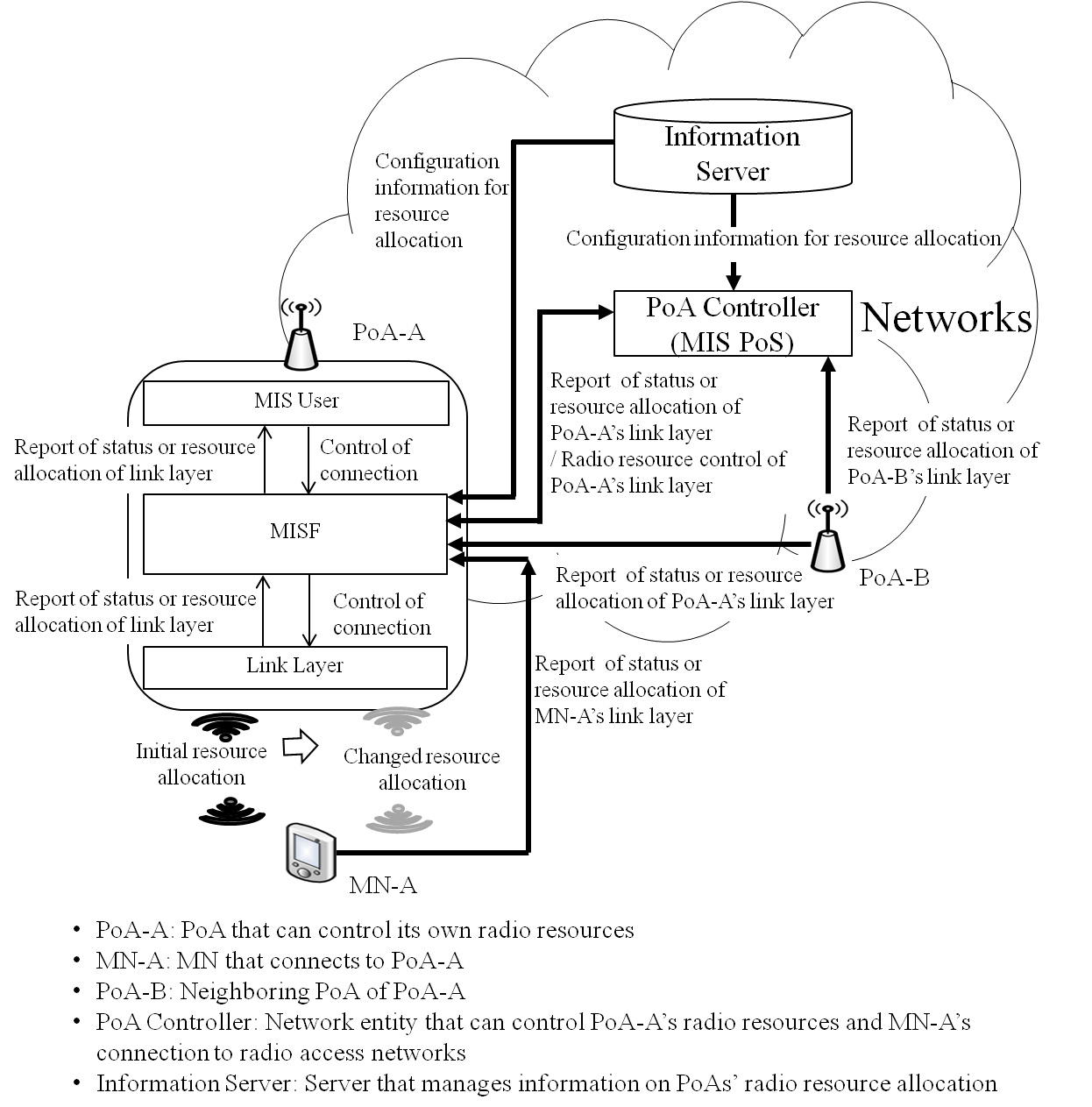
**

Figure 1—Media independent service framework for resource management in heterogeneous networks

* + - 1. Stages for radio resource allocations

Radio resource allocation of radio access network comprises four stages as shown in Figure 2.

1. In the first stage, PoA’s radio resource allocation is decided by PoA or PoA Controller based on PoA’s link status or radio resource allocation of PoA’s neighboring radio access networks.
2. In the second stage, MN prepares to connect to radio access network with newly allocated radio resources.
3. In the third stage, PoA’s radio resources (e.g., frequency, time, and power) are allocated by PoA or PoA Controller.
4. In the last stage, PoA reports its allocated radio resources to Information Server, PoA Controller, and neighboring PoAs.

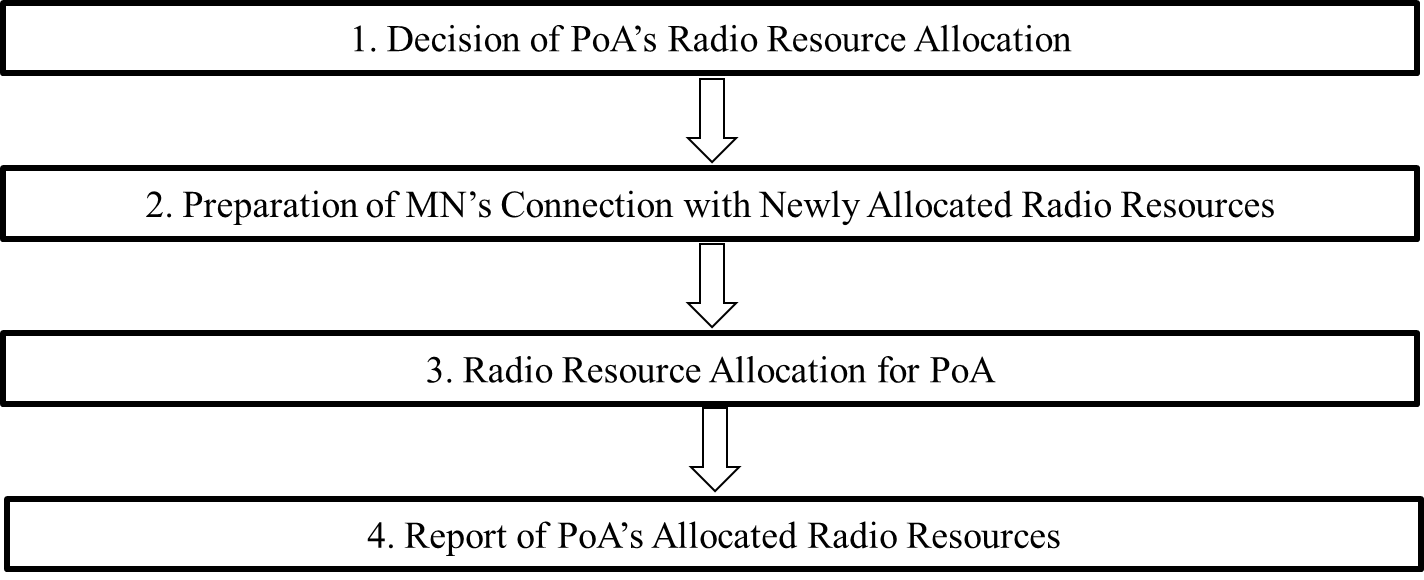
**

Figure 2—Stages for radio resource allocation of radio access network

* + - 1. Signal flows
         1. Stage 1: decision of PoA’s radio resource allocation

PoA itself can decide allocation of its own radio resources. Otherwise, PoA Controller can decide radio resource allocations for PoA on behalf of PoA. For this stage, Link\_Resource\_Report and MIS\_Resource\_Report primitives/messages are proposed as new primitives and messages.

Decision by PoA based on link status of PoA

PoA (e.g., PoA-A) can decide its radio resources based on its link status, as shown in Figure 3. For this case Link\_Parameter\_Report and MIS\_Link\_Parameter\_Report primitives in IEEE 802.21 standard and messages can be used.

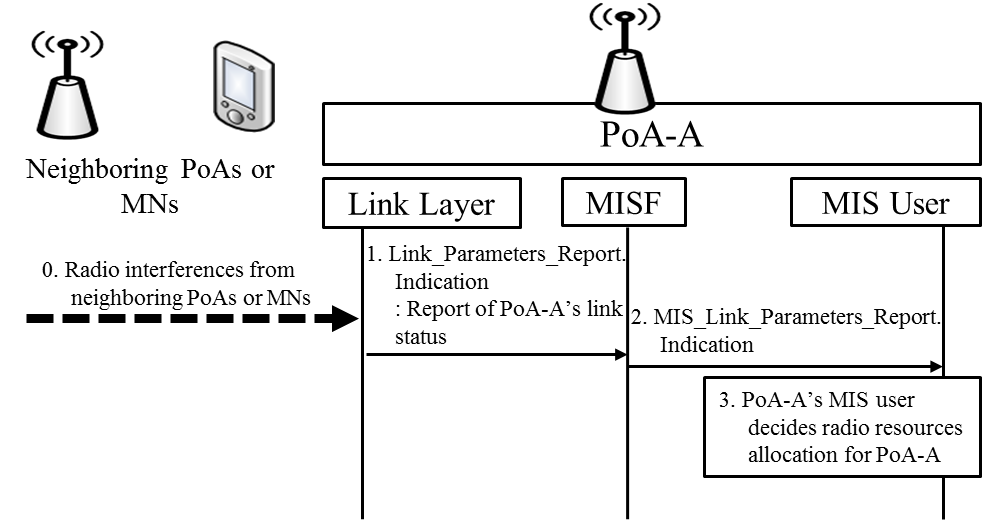
**

Figure 3—PoA-A decides its radio resource allocation based on its link status

1. Neighboring PoAs or MNs may interfere with PoA-A.
2. PoA-A’s link layer informs PoA-A’s MISF (Media Independent Services Function) of bad link status (e.g., low data rate) by using Link\_Paramters\_Report.indication primitive.
3. PoA-A’s MISF informs PoA-A’s MIS user of bad link status by using MIS\_Link\_Parameters\_Report.indication primitive.
4. Based on link status, PoA-A’s MIS user determines radio resource allocation for PoA-A.
5. —Link events

|  |  |  |  |
| --- | --- | --- | --- |
| **Link event name** | **Link event type** | **Description** | **Defined in** |
| Link\_Parameters\_Report | Link parameters | Link parameters have crossed pre-specified thresholds. | 7.3.4  IEEE 802.21 Revision |

1. —MIS events

|  |  |  |  |
| --- | --- | --- | --- |
| **MIS event name** | **(L) ocal (R) emote** | **Description** | **Defined in** |
| MIS\_Link\_Parameters\_Report | L, R | Link parameters have crossed a specified thresh- old and need to be reported. | 7.3.4  IEEE 802.21 Revision |

Decision by PoA based on link status of MN

PoA (e.g., PoA-A) can decide its radio resource allocation based on link status of MN. MN may experience bad link status due to some reasons (e.g., radio interference) as shown in Figure 4. In this case, if MN (e.g., MN-A) reports its link status to PoA by using Link\_Parameter\_Report and MIS\_Link\_Parameter\_Report primitives/messages in IEEE 802.21 standard, PoA can allocate appropriate radio resources for MN.

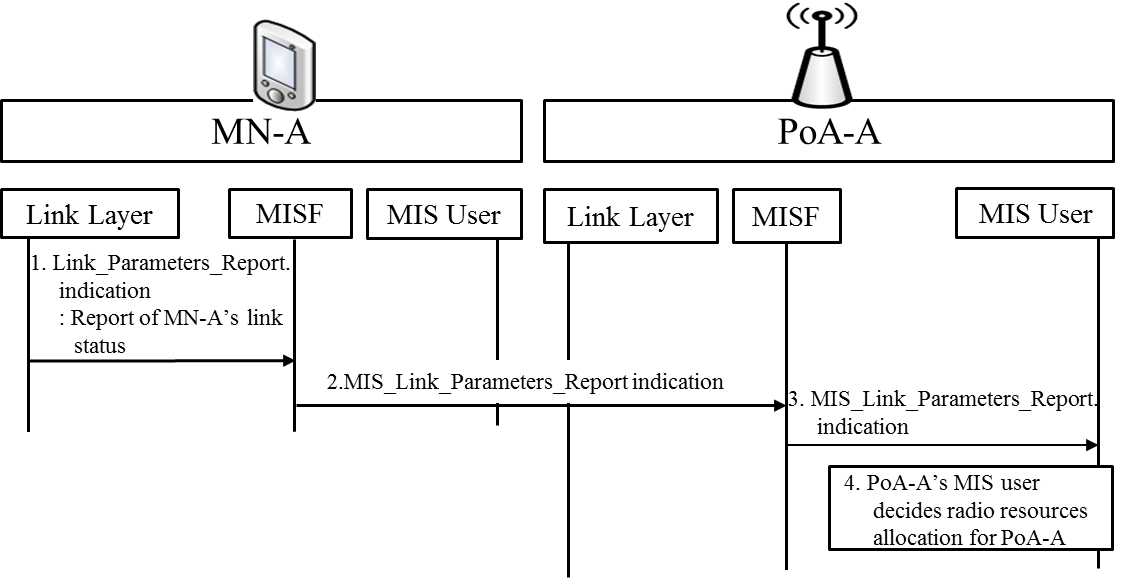
**

Figure 4—PoA-A decides its radio resource allocation based on link status of MN

1. MN-A is an MN connecting to PoA-A that needs to allocate appropriate radio resources. MN-A’s link layer sends Link\_Parameters\_Report.indication primitive to MN-A’s MISF.
2. MN-A’s MISF sends MIS\_Link\_Parameters\_Report indication message to PoA-A’s MISF.
3. PoA-A’s MISF informs PoA-A’s MISF of MN’s link status by using MIS\_Link\_Parameters\_Report.indication primitive.
4. PoA-A’s MIS user can decide its radio resource allocation based on link status of MN-A.

Decision by PoA based on reports from neighboring PoA

PoA can decide its radio resource allocations based on reports from neighbouring PoA as shown in Figure 5. If PoA (e.g., PoA-A) and neighbouring PoA (e.g., PoA-B) use the same radio resources, they interfere with each other and need to reallocate their radio resources for improving their link status. The PoA-B is neighbouring PoA of PoA-A that needs to allocate appropriate radio resources. PoA-B can report its link status and radio resource allocation. To report information on PoA-B’s allocated radio resources (e.g., frequency bands and transmit power), Link\_Resource\_Report and MIS\_ Resource\_Report primitives/messages are proposed as new primitives/messages. To report PoA-B’s link status, Link\_Parameters\_Report and MIS\_Link\_Parameters\_Report primitives/messages in IEEE 802.21 standard are used.

1. PoA-B’s link layer sends Link\_Parameters\_Report.indication or Link\_Resource\_Report.indication primitive to PoA-B’s MISF to report link status or allocated radio resources of PoA-B.
2. PoA-B’s link layer sends MIS\_Link\_Parameters\_Report indication or MIS\_Resource\_Report indication message to PoA-A’s MISF.
3. PoA-A’s MISF informs PoA-A’s MIS user of PoA-B’s link status or allocated radio resources by using MIS\_Link\_Parameters\_Report.indication or MIS\_Resource\_Report .indication primitive.
4. PoA-A’s MIS user decides radio resource allocation for PoA-A.

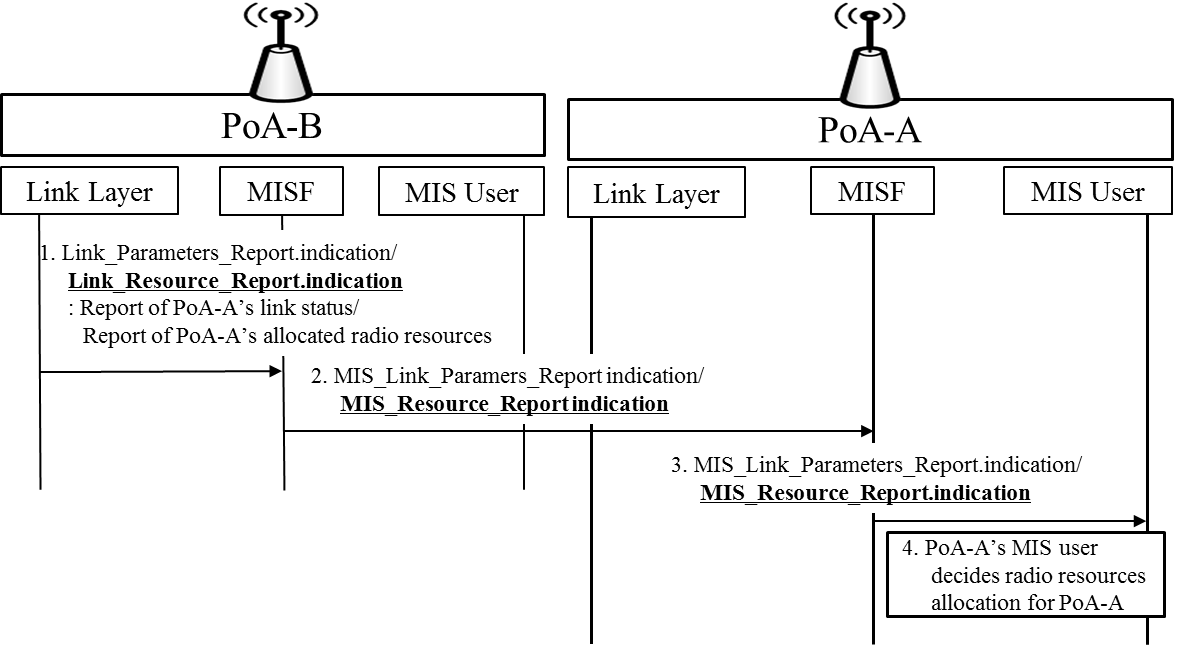
**

Figure 5—PoA-A decides its radio resource allocation based on reports of PoA-B

* New commands

1. —Link commands

|  |  |  |
| --- | --- | --- |
| **Link command** | **Description** | **Defined in** |
| Link\_Resource\_Report | Command to Indicate allocated radio resources (e.g., frequency, time, and transmit power) | 5.4.2.3.1  IEEE802.21.1 |

1. —MIS commands

|  |  |  |  |
| --- | --- | --- | --- |
| **MIS command** | **(L) ocal, (R) emote** | **Description** | **Defined in** |
| MIS\_ Resource\_Report | L, R | Command to Indicate allocated radio resources (e.g., frequency, time, and transmit power) | 5.4.2.3.1  IEEE802.21.1 |

* New primitive/message

1. —MIS\_LINK\_SAP primitives

|  |  |  |  |
| --- | --- | --- | --- |
| **Primitives** | **Service category** | **Description** | **Defined in** |
| Link\_Resource\_Report | Command | Indicate allocated radio resources (e.g., frequency, time, and transmit power) | 5.4.2.3.1  IEEE802.21.1 |

1. —MIS\_SAP primitives

|  |  |  |  |
| --- | --- | --- | --- |
| **Primitives/Messages** | **Service category** | **Description** | **Defined in** |
| MIS\_Resource\_Report | Command | This primitive/message is to Indicate allocated radio resources (e.g., frequency, time, and transmit power) | 5.4.2.3.1  IEEE802.21.1 |

Decision by PoA based on configuration information from Information Server

PoA can query configuration information to Information Server, and then allocate its own radio resources based on the configuration information as shown in Figure 6. PoA can request configuration information such as network type (e.g., IEEE 802.11 and CDMA), frequency bands, and location information of neighboring PoAs to Information Server. Based on configuration information from Information Server, PoA can allocate its own radio resources. To query configuration information, MIS\_Get\_Information primitives/messages that are primitives/messages in IEEE 802.21-2008 standard can be used.

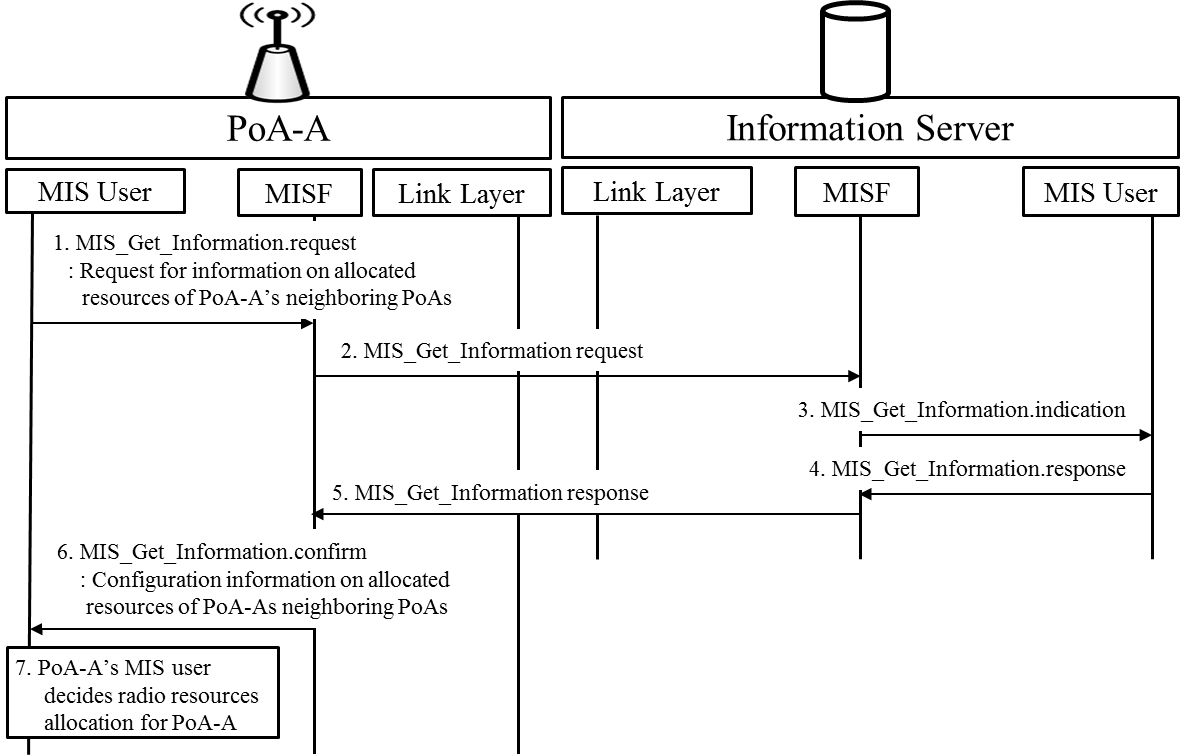
**

Figure 6—PoA-A decides its radio resource allocation based on configuration information from Information Server

1. PoA-A’s MIS user sends MIS\_Get\_Information.request primitive to PoA-A’s MISF for requesting information on allocated resources of PoA-A’s neighboring PoAs.
2. PoA-A’s MISF sends MIS\_Get\_information request message to MISF of Information Server.
3. MIS user of Information Server recognizes that PoA-A requests configuration information of PoAs in neighborhood with PoA-A by receiving MIS\_Get\_Information.indication primitive.
4. MIS user of Information Server sends MIS\_Get\_Information.response primitive to MISF of Information Server.
5. MISF of Information Server sends MIS\_Get\_Information response message to PoA-A’s MISF.
6. PoA-A’s MIS user receives configuration information of PoA-A’s neighboring PoAs by MIS\_Get\_Information.confirm primitive.
7. PoA-A’s MIS user decides radio resource allocation for PoA-A.
8. —MIS\_SAP primitives

|  |  |  |  |
| --- | --- | --- | --- |
| **Primitives/Messages** | **Service category** | **Description** | **Defined in** |
| MIS\_Get\_Information | Information | Request to get information from repository | 7.4.25  IEEE802.21 Revision |

Decision by PoA Controller based on reports from PoAs

PoA Controller also can decide radio resource allocation for PoA based on reports about link status or radio resource allocation of PoAs controlled by PoA Controller, as shown in Figure 7. The PoA-B is PoA controlled by PoA Controller. PoA-B can report its link status and radio resource allocation to PoA Controller, and then PoA Controller can allocate radio resources for PoA-A. To report information on PoA-B’s allocated radio resources (e.g., frequency bands and transmit power), Link\_Resource\_Report and MIS\_Resource\_Report primitives/messages are proposed as new primitives/messages. To report PoA-B’s link status, Link\_Parameters\_Report and MIS\_Link\_Parameters\_Report primitives/messages in IEEE 802.21 standard are used.

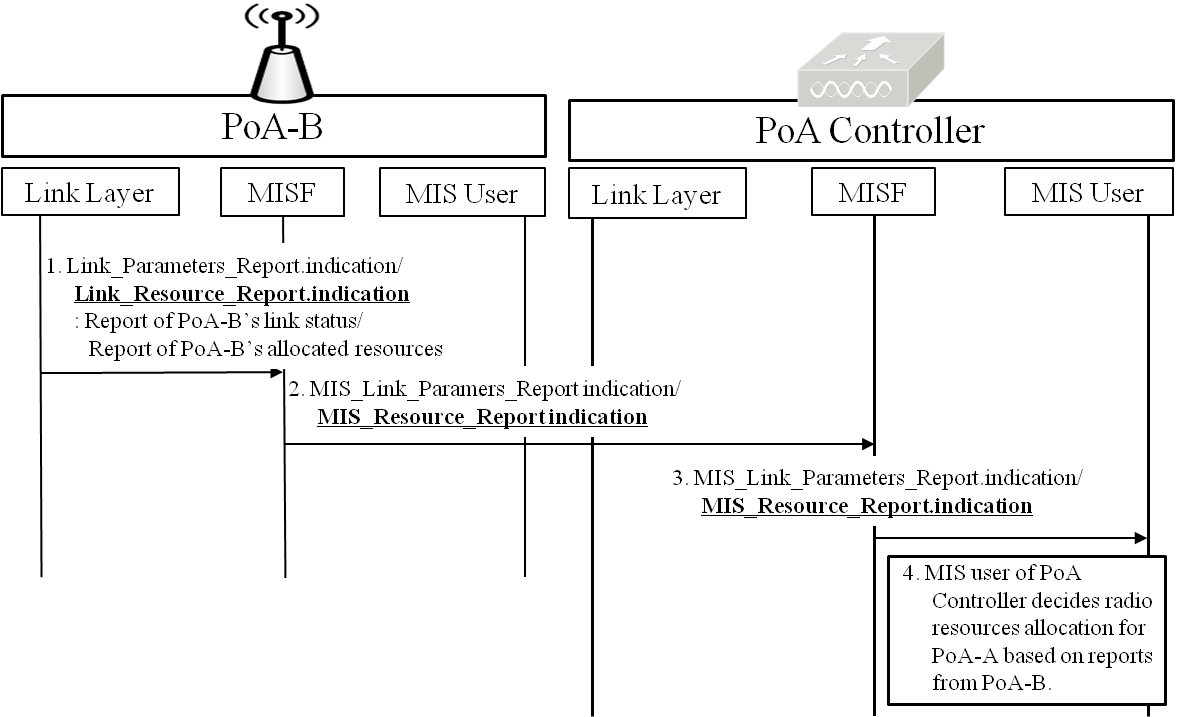
**

Figure 7—PoA Controller decides PoA-A’s radio resource allocation based on reports of PoA-B

1. PoA-B’s link layer sends Link\_Parameters\_Report.indication or Link\_Resource\_Report.indication primitive to PoA-B’s MISF for reporting link status or allocated resources of PoA-B.
2. PoA-B’s MISF sends MIS\_Link\_Parameters\_Report indication or MIS\_Resource\_Report indication message to MISF of PoA Controller.
3. PoA Controller’s MISF informs PoA Controller’s MIS user of PoA-B’s link status or allocated radio resources by using MIS\_Link\_Parameters\_Report.indication primitive, or MIS\_ Resource\_Report.indication primitive.
4. MIS user of PoA Controller can decide PoA-A’s radio resource allocation based on link status or radio resource allocation of PoA-B.

Decision by PoA Controller based on configuration information from Information Server

PoA Controller can query configuration information to Information Server, and then allocate radio resources for PoA as shown in Figure 8. PoA Controller can request configuration information such as network type frequency bands, and location information of PoAs controlled by PoA Controller to Information Server. Based on configuration information from Information Server, PoA Controller can allocate appropriate radio resources of PoA. To query configuration information, MIS\_Get\_Information primitives/messages that are primitives/messages in IEEE 802.21-2008 standard can be used.

1. MIS user of PoA Controller sends MIS\_Get\_Information.request primitive to MISF of PoA Controller.
2. MISF of PoA Controller sends MIS\_Get\_information request message to MISF of Information Server.
3. MIS user of Information Server recognizes that PoA Controller requests configuration information of PoAs controlled by PoA Controller with MIS\_Get\_Information.indication primitive.
4. MIS user of Information Server sends MIS\_Get\_Information.response primitive to MISF of Information Server.
5. MISF of Information Server sends MIS\_Get\_Information response message to MISF of PoA Controller.
6. MIS user of PoA Controller receives configuration information of PoAs controlled by PoA Controller with MIS\_Get\_Information.confirm primitive.
7. MIS user of PoA Controller decides radio resource allocation for PoA-A.

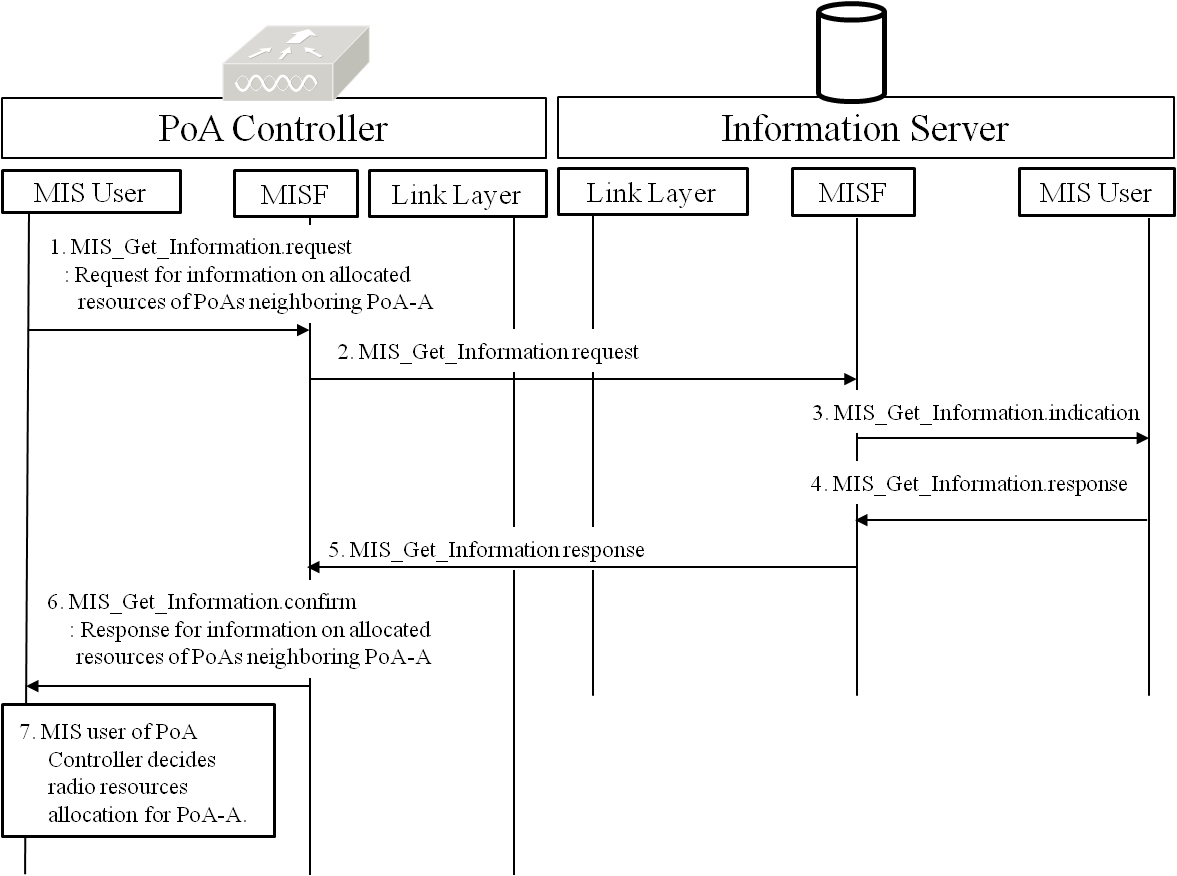
**

Figure 8—PoA Controller decides PoA-A’s radio resource allocation based on configuration information from Information Server

* + - * 1. Stage 2: preparation of MN’s connection with newly allocated radio resources

Before PoA allocates new radio resources, MN needs to prepare changing its connection with newly allocated radio resources of PoA that MN connects to. MN can receive information on new radio resources from PoA Controller or PoA that MN connects to before performing radio resource allocation. For this stage, MIS\_Link\_Preparation primitives/messages are proposed as new primitives and messages.

Request for preparation of MN’s connection from PoA

PoA requests MN to prepare connection with newly allocated radio resources by using MIS\_Link\_Preparation primitives/messages that are newly proposed, as shown in Figure 9. The primitives and messages of MIS\_Link\_Preparation include information on PoA’s newly allocated radio resources (e.g., frequency band and transmit power). The MN-A connects to PoA-A, and thus MN-A can be requested to prepare connection with new radio resources by PoA-A.

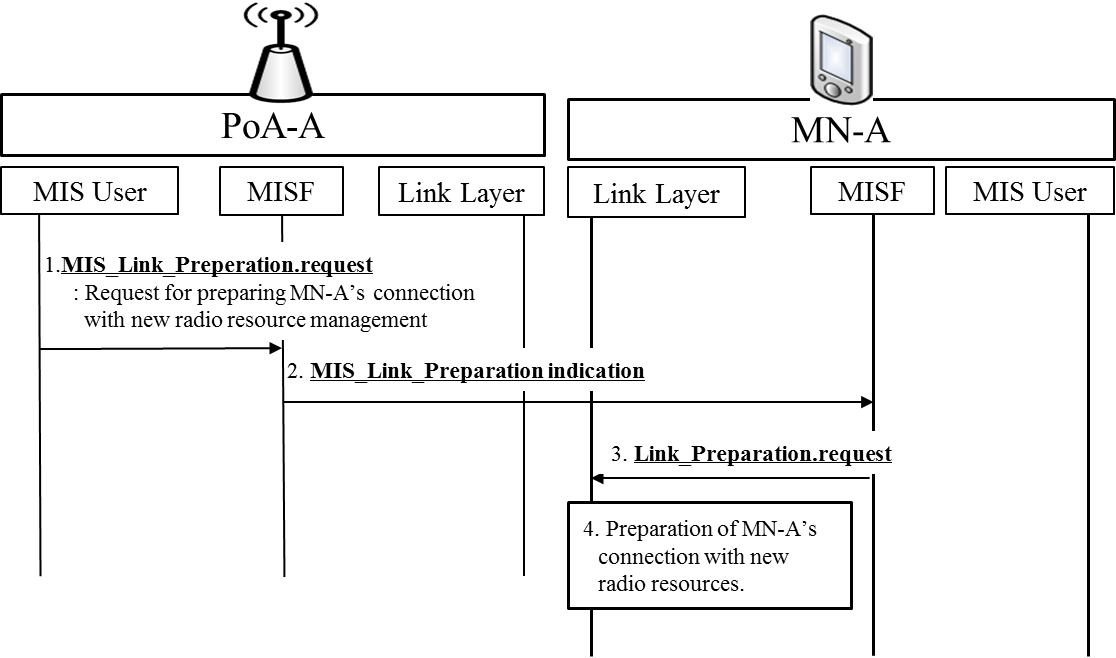
**

Figure 9—PoA-A requests MN-A to prepare connection with newly allocated radio resources

1. PoA-A’s MIS user sends MIS\_Link\_Preperation.request primitive to PoA-A’s MISF.
2. PoA-A’s MISF sends MIS\_Link\_Preparation indication message to MN-A’s MISF.
3. MN-A’s link layer is informed of new radio resources to prepare MN’s connection by Link\_Preparation.request primitive.
4. MN-A’s link layer prepares the connection with new radio resources.

* New commands

1. —Link commands

|  |  |  |
| --- | --- | --- |
| **Link command** | **Description** | **Defined in** |
| Link\_Preparation | Command to request MN to prepare connection with newly allocated radio resources | 5.4.2.3.2  IEEE802.21.1 |

1. —MIS commands

|  |  |  |  |
| --- | --- | --- | --- |
| **MIS command** | **(L) ocal, (R) emote** | **Description** | **Defined in** |
| MIS\_Link\_Preparation | L, R | Command to request MN to prepare connection with newly allocated radio resources | 5.4.2.3.2  IEEE802.21.1 |

* New primitive/message

1. —MIS\_LINK\_SAP primitives

|  |  |  |  |
| --- | --- | --- | --- |
| **Primitives** | **Service category** | **Description** | **Defined in** |
| Link\_Preparation | Command | request MN to prepare connection with newly allocated radio resources | 5.4.2.3.2  IEEE802.21.1 |

1. —MIS\_SAP primitives

|  |  |  |  |
| --- | --- | --- | --- |
| **Primitives/Messages** | **Service category** | **Description** | **Defined in** |
| MIS\_Link\_Preparation | Command | This primitive/message is to request MN to prepare connection with newly allocated radio resources | 5.4.2.3.2  IEEE802.21.1 |

Request for preparation of MN’s connection from PoA Controller

PoA Controller also can request MN to prepare connection with newly allocated resources by using MIS\_Link\_Preparation primitives/messages that are newly proposed, as shown in Figure 10.

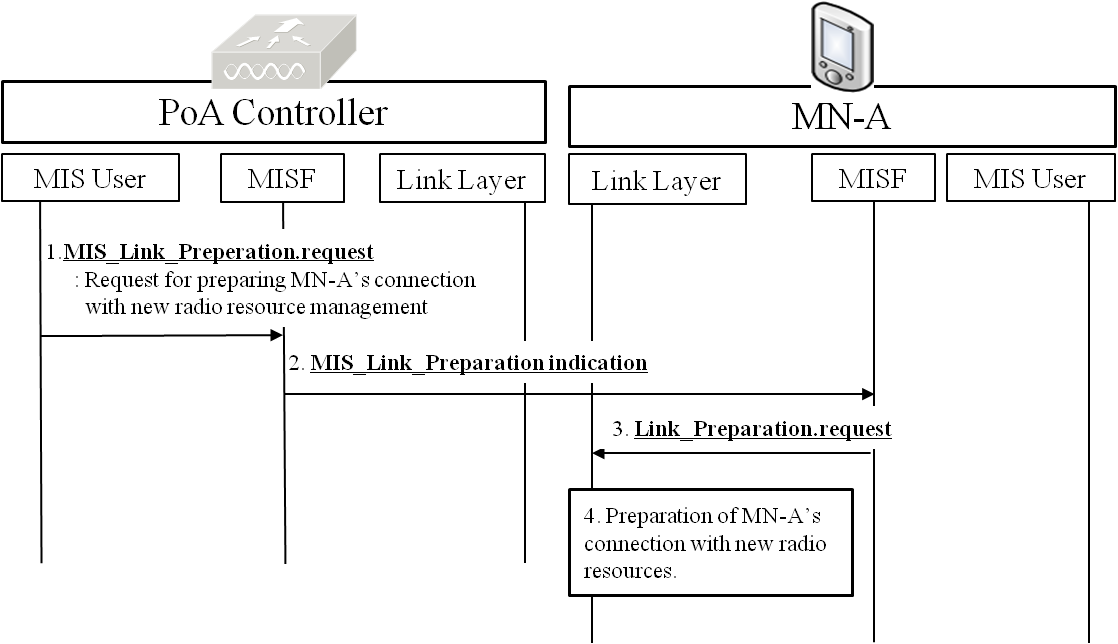
**

Figure 10—PoA Controller requests MN-A to prepare connection with newly allocated radio resources

1. MIS user of PoA Controller sends MIS\_Link\_Preperation.request primitive to MISF of PoA Controller.
2. MISF of PoA Controller sends MIS\_Link\_Preparation indication message to MN-A’s MISF.
3. MN-A’s link layer is informed of new radio resources to prepare MN’s connection by Link\_Preparation.request primitive.
4. MN-A’s link layer prepares connection with new radio resources.
   * + - 1. Stage 3: Allocation of PoA’s Radio Resources

In this stage, PoA’s radio resources are allocated by PoA or PoA Controller. For this stage, MIS\_Resource\_Allocation and Link\_Resource\_Allocation primitives/messages are newly proposed for allocating radio resources of PoA.

PoA’s radio resource allocation by PoA

PoA itself can allocate its radio resources, as shown in Figure 11. MIS\_Resource\_Allocation.request and Link\_Resource\_Allocation.request primitives are new primitives for allocating radio resources and include parameters that represent radio resources (e.g., frequency band, transmit power, and time slot).

1. PoA’s MIS user sends MIS\_Resource\_Allocation.request primitive to PoA’s MISF.
2. PoA’s link layer receives information on radio resources for allocation by Link\_Resource\_Allocation.request primitive.
3. PoA’s link layer allocates its own radio resources.
4. After PoA’s link layer allocates radio resources, PoA’s link layer sends Link\_Resource\_Allocation.confirm primitive to PoA’s MISF.
5. result of radio resource allocation is reported to PoA’s MIS user by MIS\_Resource\_Allocation.confirm primitive.

Link\_Resource\_Allocation.confirm and MIS\_Resource\_Allocation.confirm should include a parameter to present result (e.g., success or fail) of radio resource allocation.

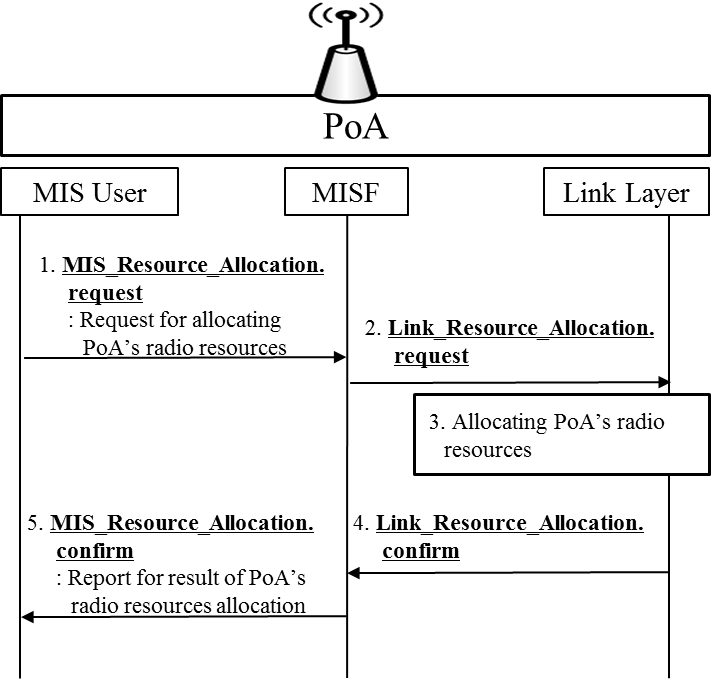
**

Figure 11—PoA allocates its own radio resources

* New commands

1. —Link commands

|  |  |  |
| --- | --- | --- |
| **Link command** | **Description** | **Defined in** |
| Link\_Resource\_Allocation | Command to request for allocating radio resources (e.g., frequency, time, and transmit power) | 5.4.2.3.3  IEEE802.21.1 |

1. —MIS commands

|  |  |  |  |
| --- | --- | --- | --- |
| **MIS command** | **(L) ocal, (R) emote** | **Description** | **Defined in** |
| MIS\_Resource\_Allocation | L, R | Command to request for allocating radio resources (e.g., frequency, time, and transmit power) | 5.4.2.3.3  IEEE802.21.1 |

* New primitive/message

1. —MIS\_LINK\_SAP primitives

|  |  |  |  |
| --- | --- | --- | --- |
| **Primitives** | **Service category** | **Description** | **Defined in** |
| Link\_Resource\_Allocation | Command | request for allocating radio resources (e.g., frequency, time, and transmit power) | 5.4.2.3.3  IEEE802.21.1 |

1. —MIS\_SAP primitives

|  |  |  |  |
| --- | --- | --- | --- |
| **Primitives/Messages** | **Service category** | **Description** | **Defined in** |
| MIS\_Resource\_Allocation | Command | This primitive/message is to request for allocating radio resources (e.g., frequency, time, and transmit power) | 5.4.2.3.3  IEEE802.21.1 |

PoA’s radio resource allocation by PoA Controller

MIS user of PoA Controller can request PoA’s link layer to allocate radio resources as shown in Figure 12. MIS\_Resource\_Allocation.request and Link\_Resource\_Allocation.request primitives are new primitives for PoA Controller to allocate radio resources of PoA.

1. MIS user of PoA Controller sends MIS\_Resource\_Allocation.request primitive to MISF of PoA Controller.
2. MISF of PoA Controller sends MIS\_Resource\_Allocation request message to PoA’s MISF.
3. PoA’s link layer receives information on radio resources for allocation by Link\_Resource\_Allocation.
4. PoA’s link layer allocates its own radio resources.
5. PoA’s link layer sends Link\_Resource\_Allocation.confirm to PoA’s MISF.
6. PoA’s MISF sends MIS\_Response\_Allocation response message to MISF of PoA Controller.
7. MIS user of PoA Controller receives report on the result of PoA’s radio resource allocation.

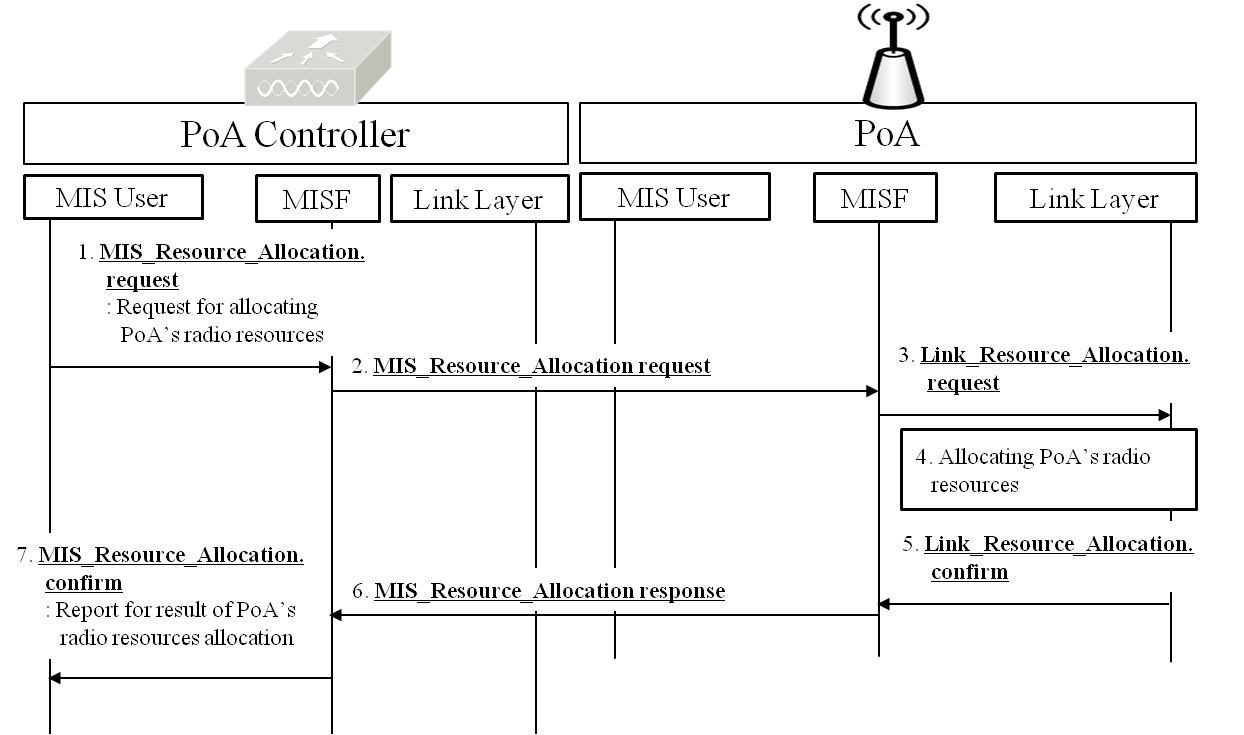
**

Figure 12—PoA Controller allocates radio resources for PoA

* + - * 1. Stage 4: Report of PoA’s allocated radio resources

After radio resource allocation of PoA, PoA should report its updated radio resources to other network entities such as neighboring PoA, PoA Controller, and Information Server, as shown in Figure 13. MIS\_Resource\_Report and Link\_Resource\_Report are new primitives and messages for reporting PoA’s updated radio resource allocation. They include parameters that represent updated radio resources of PoA.

\* Pre-existing Link\_Parameter\_Report and MIS\_Link\_Paramenter\_Report primitives/messages are defined for indicating changes in link conditions that have crossed pre-configured threshold levels. However, Link\_Resource\_Report and MIS\_Resource\_Report primitives/messages are defined for reporting allocated radio resources. Therefore, Pre-existing Link\_Parameter\_Report and MIS\_Link\_Paramenter\_Report are totally different from Link\_Resource\_Report and MIS\_Resource\_Report primitives/messages.

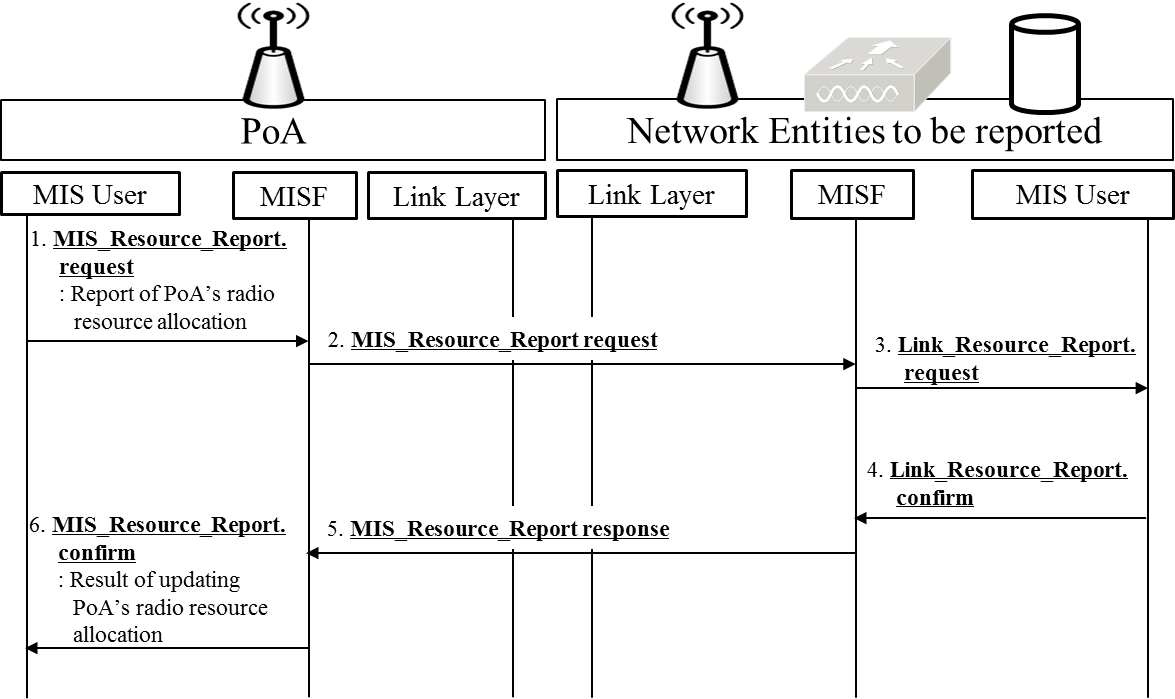
**

Figure 13—PoA reports its radio resources to other its updated radio resources to other network entities

1. PoA’s MIS user sends MIS\_Resource\_Report.request primitive to PoA’s MISF.
2. PoA’s MISF sends MIS\_Resource\_Report request message to MISF of other network entities (e.g., neighboring PoA, PoA Controller and Information Server).
3. MIS user of other network entities updates information on PoA’s radio resource allocation by Link\_Resource\_Report.confirm primitive.
4. As response to update report, Link\_Resource\_Report.confirm primitive, MIS\_Resource\_Report response message, and MIS\_Resource\_Report.confirm primitive can be used. MIS user of other network entities sends Link\_Resource\_Report.confirm to MISF of other network entities.
5. MISF of other network entities sends MIS\_Resource\_Report response message to PoA’s MISF.
6. PoA’s MIS user is informed whether other network entities update PoA’s radio resource allocation or not by -MIS\_Resource\_Report.confirm primitive.
   * 1. Service specific primitives
        1. MIS\_SAP primitives
           1. MIS\_Resource\_Allocation

MIS\_Resource\_Allocation.request

MIS\_Resource\_Allocation.confirm

MIS\_Resource\_Allocation.indication

MIS\_Resource\_Allocation.response

* + - * 1. MIS\_Resource\_Report

MIS\_Resource\_Report.request

MIS\_Resource\_Report.confirm

MIS\_Resource\_Report.indication

MIS\_Resource\_Report.response

* + - * 1. MIS\_Link\_Preparation

MIS\_Link\_Preparation .request

MIS\_Link\_Preparation .confirm

MIS\_Link\_Preparation .indication

MIS\_Link\_Preparation .response

* + - 1. MIS\_LINK\_SAP primitives
         1. Link\_Resource\_Allocation

Link\_Resource\_Allocation.request

Link\_Resource\_Allocation.confirm

Link\_Resource\_Allocation.indication

Link\_Resource\_Allocation.response

* + - * 1. Link\_Resource\_Report

Link\_Resource\_ Report.request

Link\_Resource\_ Report.confirm

Link\_Resource\_ Report.indication

Link\_Resource\_ Report.response

* + - * 1. Link\_Preparation

Link\_Preparation.request

Link\_Preparation.confirm

Link\_Preparation.indication

Link\_Preparation.response

* + 1. Service specific protocol features
       1. MIS protocol messages for command service
          1. MIS\_Resource\_Allocation

MIS\_Resource\_Allocation request

MIS\_Resource\_Allocation indication

MIS\_Resource\_Allocation response

* + - * 1. MIS\_Resource\_Report

MIS\_Resource\_Report request

MIS\_Resource\_Report indication

MIS\_Resource\_Report response

* + - * 1. MIS\_Link\_Preparation

MIS\_Link\_Preparation request

MIS\_Link\_Preparation indication

MIS\_Link\_Preparation response