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Abstract	The Enhancement of the MAC Management Messages for the NSP Enumeration and Selection
Purpose	Adoption
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The Enhancement of the MAC Management Messages for the NSP Enumeration and Selection

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Problem Definition

Operators have indicated that they plan to deploy fixed and mobile wireless networks that will support multiple concurrent authenticating logical bearer networks. That is, operators would be the underlying wireless network operator while subscribers would have business relationships, would authenticate with appropriate credentials, with one or more facilities based (or non-facilities based) Network Service Providers (NSP)s. In this very real network model, SS/MS knowledge of Operator ID to determine suitable networks for entry is inadequate. SS/MS need to know the Operator ID plus the ID of the NSPs supported by the available operator network in order to ascertain suitability for network connection.

An SS/MSS may encounter one or more of the following situations:

a) An Operator Network managed/owned by a single NSP administrative domain (also referred to as "Operator Network + NSP" deployment case).

b) An Operator Network shared by two or more NSPs (also referred to as "Operator Network sharing" deployment case).

c) A physical geographic region covered by two 2 or more Operator Networks, each of which may be of one of the flavors (i.e., "Operator Network + NSP" and "Operator Network sharing" cases) mentioned above.

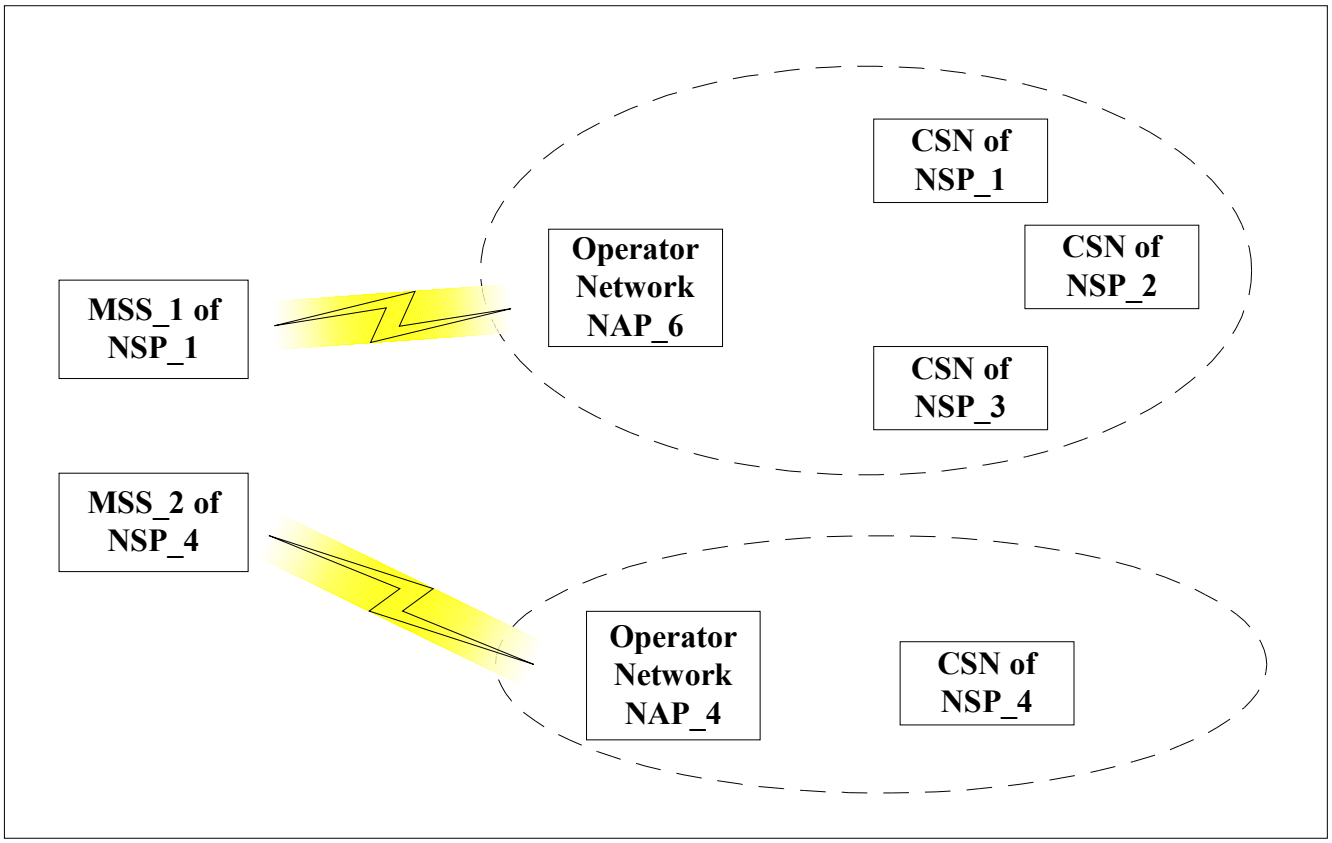

Figure 1 – A coverage area with overlapping ASNs

For example, as shown in Figure 1, MSS_1 and MSS_2 discover available NSPs and select one based on its configuration information. More specifically, MSS_1 prefers to connect to Operator Network of "NAP_6" because it is directly affiliated with MSS_1's home NSP through Operator Network sharing. And, MSS_2 prefers to connect to Operator Network of "NAP_4" because it is owned by MSS_2's home NSP (i.e., NSP_4).

There is a need for a solution framework that enables an SS/MSS to discover identities of available NSP(s) in an 802.16 wireless coverage area, and indicate its selected NSP to the Operator Network.

The procedure of the Network Discovery and Selection are divided into the following four stages:

1) Operator Network Discovery: An SS/MSS detects available Operator Network(s) by scanning and decoding DL-MAP of Operator Network(s) on detected channel(s). The 24-bit value of the "operator ID" (see section 6.3.2.3.2 of 802.16-2004) within the "Base Station ID" parameter in the DL-MAP message is the Operator Network Identifier.
2) NSP Discovery: An SS/MSS discovers all available NSPs associated with one or more detected Operator Networks.
3) NSP Enumeration and Selection: Automatic selection and manual selection should be supported.
4) Operator Network Attachment based on NSP selection: Following a decision to select an NSP, an SS/MSS indicates its NSP selection by attaching to an Operator Network associated with the selected NSP, and by providing its identity and home NSP domain in form of NAI.

NSP identifier discovered in step 2 is 24-bit format, however in step 4, when an SS/MSS indicates its NSP selection by attaching to an Operator Network associated with the selected NSP, identifier of selected NSP should be in form of NAI, consisting of username part and realm part (i.e. username@realm). However in 24-bit format NSP identifier, no any information is available to deduce the realm of the NSP. For performing NSP selection in step 4 based on the information received in step 2, a transition mechanism from 24-bit NSP identifier to NSP realm is needed.

Remedy

Only 24-bit format NSP identifier is broadcast by Operator Network, so a solution should be provided to make SS/MSS map 24-bit format NSP identifier to NSP realm.

If SS/MSS receives a NSP identifier which is not able to be mapped into NSP realm locally in NSP Discovery phase, SS/MSS will initiate query to a network using SBC_REQ message to obtain the mapping relation between 24-bit format NSP identifier and NSP realm. On receiving query from SS/MSS, the network will return the response to SS/MSS with mapping relation in SBC_RSP message.

Additionally, an operator network may broadcast the mapping relation between 24-bit format NSP identifier and NSP realm through SII message. The Operator Network transmits the mapping information as part of the SII broadcast management message no less than once every five seconds.

Proposed Text Changes

[Modify the corresponding sections as follows:]

[Change sub-clause 11.8.9 as the following]

11.8.9 Service Information Query (SIQ) TLV

Service Information Query is included by MS in SBC-REQ to request the Service Network Provider Identifiers supported by the Operator Network that includes the current BS.

Name	Type	Length	Value	Scope

SIQ	4	1	**NULLbit 0: indicates that SS/MSS queries the mapping relation between 24-bit format NSP ID and NSP realm;** **bit 1: indicates that SS/MSS queries the Service Network Provider Identifiers supported by the Operator Network that includes the current BS;** **bit 2 -7: *reserved*~~NULL~~**	SBC_REQ

[Change sub-clause 11.8.10 as the following]

11.8.10 NSP List TLV ~~Service Identity Information(SII) TLV~~

Service Identity Information is a compound TLV that contains one or more Network Service Provider Identifiers, and it may be included in a SBC_RSP message. When an SBC_REQ message with an SIQ TLV is received, the BS should respond with an SBC_RSP message with an SII TLV.

Name	Type	Length	Value	Scope
NSP List TLV~~SII TLV~~	5	3*n	Including n, 24 bit Network Service Provider IDs, n is greater than or equal to 1.	SBC_RSP

[Insert new sub-clause 11.8.11; editor to provide correct 'Type' code]

11.8.11 NSP Count TLV

NSP Count TLV is an optional TLV that indicate the change of the NSP list. It will be increased by one (modulo 256) by the Operator Network whenever the NSP list changes. NSP Count TLV should be sent with NSP List TLV in the SBC-RSP message.

Name	Type	Length	Value	Scope

NSP Count	??	1	Increment by one (modulo 256) by the Operator Network whenever the list of the NSP changes.	SBC_RSP

[Insert new sub-clause 11.8.12; editor to provide correct 'Type' code]

11.8.12 NSP Mapping List TLV

NSP Mapping List is an optional compound TLV that contains one or more mapping relations between 24-bit format NSP Identifier(s) and NSP realm(s), and it may be included in a SBC_RSP message.

Name	Type	Length	Value	Scope
NSP Mapping List	??	variable	Compound *(the compound field contains sub-attributes as defined in table zzz)*	SBC_RSP

Table zzz – NSP mapping List sub-attributes field

type	Length	Value
NSP Identifier	3	24-bit format NSP identifier
NSP realm	variable	NSP realm

[Insert new sub-clause 11.18.4; editor to provide correct 'Type' code]

11.18.4 NSP Mapping List TLV

NSP Mapping List is an optional compound TLV that contains one or more mapping relations between 24-bit format NSP Identifier(s) and NSP realm(s), and it may be included in a SII message.

Name	Type	Length	Value	Scope
NSP Mapping List	??	variable	Compound *(the compound field contains sub-attributes as defined in table zzz)*	SBC_RSP

Table zzz – NSP mapping List sub-attributes field

type	Length	Value
NSP Identifier	3	24-bit format NSP identifier
NSP realm	variable	NSP realm

Reference:
C80216g-05_003.pdf
Operator Operator
Network Network