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Source(s)	Duke Dang, Phillip Barber, Lucy Chen HUAWEI	Voice: 86-10-82882959 Fax: 86-10-82882966 mailto:dsjun@huawei.com
Re:	Call for contribution and comments.
Abstract	The Enhancement of the MAC Management Messages for the NSP Discovery.
Purpose	Adoption
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The Enhancement of the MAC Management Messages

for the NSP Discovery

Duke Dang, Phillip Barber, Lucy Chen
HUAWEI

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.
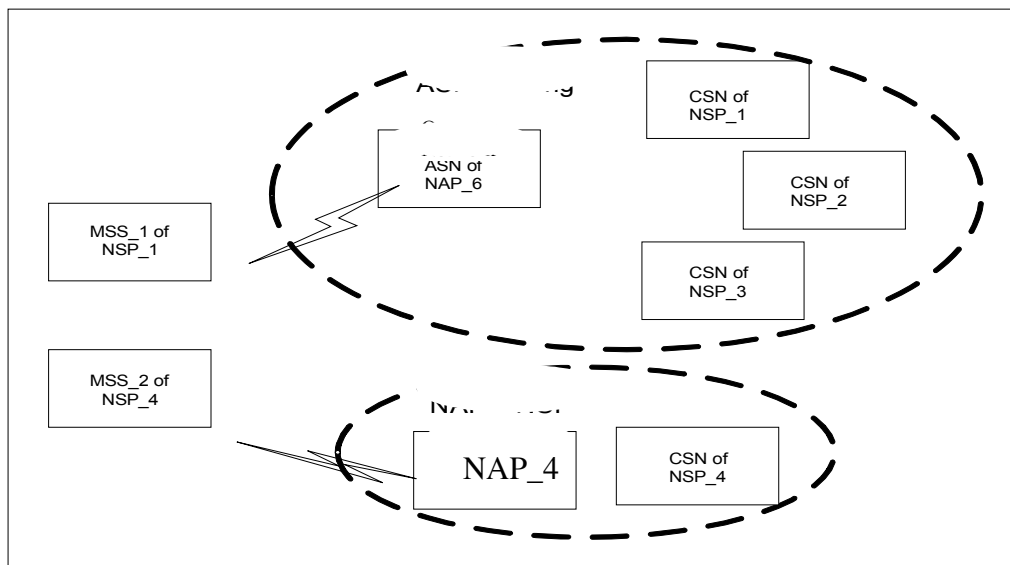

Figure 1 – A coverage area with overlapping ASNs

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 a 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/MS 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/MS 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/MS 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.

Remedy

For SS/MS with configuration information that includes a list of Operator Network+NSP unitary mappings, Operator Network Discovery of the NAP Identifier is sufficient to provide Operator Network and NSP.

In the event that more than one NSP is served by a detected Operator Network, an SS/MS can dynamically discover available NSP(s). A list of NSP identifiers, NSP IDs, can be broadcast by the Operator Network so the SS/MS may learn of available NSPs during initial scan or during the network entry. The Operator Network transmits the NSP ID list as part of the NBR-ADV broadcast management message with the NSP information included no less than once every five seconds. The BS may also transmit the list of NSP IDs as part of SBC-RSP in response to an SS/MS request through SBC-REQ.

Proposed Text Changes

Remedy 1:

[Modify the corresponding sections as follows:]

[Insert new subclause 11.8.8; editor to provide correct 'Type' code]

11.8.8 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	??	1	NULL	SBC_REQ

[Insert new subclause 11.8.9; editor to provide correct 'Type' code]

11.8.9 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
SII TLV	??	3*n	Including n, 24 bit Network Service Provider IDs, n is greater than or equal to 1.	SBC_RSP

[Insert new subclause 11.18.2; editor to provide correct 'Extended DIUC' code]

11.18.2 Service Identity Information(SII) TLV

Service Identity Information is an optional compound TLV that contains one or more Network Service Provider Identifiers, and it is included in a NBR_ADV message.

Name	Type	Length	Value	Scope
SII TLV	??	3*n	Including n, 24 bit Network Service Provider IDs, n is greater than or equal to 1.	NBR_ADV

Remedy 2:

[Insert new subclause 8.4.5.3.28; editor to provide correct 'Type' code]

8.4.5.3.28 Network Service Provider List
In the DL-MAP, a BS may transmit DIUC=15 with the NSP_LIST_IE () to indicate the NSPs' list, which have the business contract with the Operator Network.

Syntax	Size	Note
NSP_LIST_IE {		
Extended DIUC	4 bits	??
Length	7 bits	
NSP Count	7 bits	Increment by one (modulo 256) by the Operator Network whenever the list of the NSP changes.
NSP List Indicator	1	0 = NSP list is not included in the message; 1 = NSP list is included in the message.
If (NSP List Indicator == 1) {		

NSP Number	5	The number of the NSP ID included in the NSP List, which have the business contract with the Operator Network.
For (i=0; i< NSP Number; i++) {		
NSP ID	24 bits	A 24-bit identifier is used to represent a Connection Operator identifier
}		
Else {		
Padding		
}		
}		

Operator Operator
Network Network