

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>Security Negotiation Parameters in the SBC-REQ/RSP Procedure</b>	
Data Submitted	<b>2005-03-17</b>	
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Re:	IEEE P802.16e/D6	
Abstract	The document contains suggestions on the changes into IEEE 802.16e/D6 that would provide privacy capabilities parameters to negotiate between a MS and the BS.	
Purpose	Adoption of proposed changes into P802.16e/D6	
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## Security Negotiation Parameters in the SBC-REQ/RSP Procedure

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### 1. Introduction

Both MS and BS shall negotiate the authorization policy by using the Authorization Policy Support field. Both of them shall also know message authentication code mode, e.g. selecting one of OMAC and HMAC from the Authorization Policy Support field. However, the negotiation of message authentication code mode should be performed by other field that is independent from the Authorization Policy Support field, since the message authentication code mode level is lower than the authorization key level obtained through the authorization procedure.

In addition, there are two modes related to the EAP, e.g. EAP transfer mode and Authenticated EAP transfer mode.

It is necessary to make a field to contain parameters related to privacy capabilities.

This contribution proposed a way to solve the above problems.

#### 1.1 Authorization Policy Support

This field indicates the authorization policy to be negotiated between the MS and BS in the SBC-REQ/RSP procedure. This field shows as the following table.

Type	Length	Value	Scope
25.2	1	Bit# 0: RSA-based authorization at the initial network entry Bit# 1: EAP-based authorization at the initial network entry Bit# 2: Authenticated EAP-based authorization at the initial network entry Bit# 3: Reserved. Set to 0 Bit# 4: RSA-based authorization at re-entry Bit# 5: EAP-based authorization at re-entry Bit# 6: Authenticated EAP-based authorization at re-entry Bit# 7: No Authorization	SBC-REQ SBC-RSP

A bit value of 0 indicates “not supported” while 1 indicates “supported.”

To negotiate authorization policy between the MS and the BS, the MS shall inform the BS of all supportable authorization policies by using the Authorization Policy Support attribute included in the SBC-REQ message. The MS can support the RSA-based authorization, the EAP-based authorization, or the Authenticated EAP-based authorization policies. If this attribute is not present in the SBC-REQ message, the MS supports only the RSA-based authorization. The MS should support at least one authorization policy.

The BS shall negotiate the authorization policy sent by the MS and notify the SS of negotiated authorization policy through the SBC-RSP message. The possible authorization policies are as following table at the initial network entry.

Value			Description
Bit #0	Bit #1	Bit #2	
0	0	0	No Authorization
0	0	1	N/A
0	1	0	EAP-based authorization
0	1	1	EAP-based authorization and Authenticated EAP-based authorization
1	0	0	RSA-based authorization

1	0	1	RSA-based authorization and Authenticated EAP-based authorization
1	1	0	RSA-based authorization and EAP-based authorization
1	1	1	N/A

As special case, even though the MS supports several authorization policies, the BS can decide not to support authorization function. If the negotiated authorization policy is decided as the “No Authorization,” both the MS and the BS shall skip the authentication procedure and perform the REG-REQ/RSP procedure. Also, both the MS and the BS shall not use the authorization function.

## 1.2 MAC (Message Authentication Code) Mode

This field indicates a message authentication code to be negotiated between the MS and BS in the SBC-REQ/RSP procedure. This field shows as the following table.

Type	Length	Value
25.3	1	Bit# 0: HMAC Bit# 1: OMAC Bit# 2: 64-bit short-HMAC Bit# 3: 80-bit short-HMAC Bit# 4: 96-bit short-HMAC Bit# 5-7: Reserved. Set to 0

A bit value of 0 indicates “not supported” while 1 indicates “supported.”

To negotiate message authentication code between the MS and the BS, the MS shall inform the BS of all supportable message authentication codes by using the Message Authentication Code Mode attribute included in the SBC-REQ message. The MS can support the HMAC, the OMAC, various short-HMACs. If this attribute is not present in the SBC-REQ message, the MS supports only HMAC. If the short-HMAC mode is selected, then the short-HMAC shall be applied to the following messages: MOB\_SLP-REQ/RSP, MOB\_SCAN-REQ/RSP, MOB\_MSHO-REQ, MOB\_BSHO-REQ/RSP, MOB\_HO-IND, RNG-REQ/RSP. Otherwise, the HMAC shall be applied. The MS should support at least one message authentication code.

The BS shall negotiate the message authentication code sent by the MS and notify the SS of negotiated message authentication code mode through the SBC-RSP message.

As special case, even though the MS supports several MAC modes, the BS can decide not to support any MAC mode. If all bits of the message authentication code mode are 0, then no message authentication is applied. So, both the MS and the BS doesn't need to authenticate the MAC (Medium Access Control) messages.

## Proposed changes to IEEE 802.16e/D6

### 6.3.2.3.23 MS Basic Capability Request (SBC-REQ) message

[Insert at the end of 6.3.2.3.23:]

**Security Negotiation Parameters (see 11.8.4)**

**Authorization Policy Support (see 11.8.4)**

### 6.3.2.3.24 MS Basic Capability Response (SBC-RSP) message

[Insert at the end of 6.3.2.3.24:]

**Security Negotiation Parameters (see 11.8.4)**

**Authorization Policy Support (see 11.8.4)**

[Change sub-clauses 11.8.4 - 11.8.6 as follows]

#### 11.8.4 Security Negotiation Parameters

This field is a compound attribute indicating security capabilities to negotiate before performing the initial authorization procedure and the reauthorization procedure.

Type	Length	Value (compound)	Scope
25	Variable	The compound field contains the sub-attributes as defined in Table xxx.	SBC-REQ SBC-RSP

Attribute	Contents
PKM Version Support	Version of privacy sublayer supported
Authorization Policy Support	Authorization policy to support
Message Authentication Code Mode	Message authentication code to support
PN Window Size	Size capability of the receiver PN window per SAID

#### 11.8.5 11.8.4.1 PKM Version Support

This field indicates a PKM version. A bit value of 0 indicates “not supported” while 1 indicates “supported”. Both an SS and a BS should negotiate only one PKM version.

Type	Length	Value	Scope
<del>26</del> 25.1	1	Bit# 0: PKM version 1 Bit# 1: PKM version 2 Bit# 2-7: Reserved. Set to 0	SBC-REQ SBC-RSP

#### 11.8.4 11.8.4.2 Authorization Policy Support

This field indicates authorization policy used by the MS and BS to negotiate and synchronize. A bit value of 0 indicates “not supported” while 1 indicates “supported.”

Type	Length	Value	Scope
<del>5-25</del> 25.2	1	Bit# 0: RSA-based authorization at the initial network entry Bit# 1: EAP-based authorization at the initial network entry <del>Bit# 2: OMAC supported (if set to 0, HMAC is the default)</del> Bit# 2: Authenticated EAP-based authorization at the initial network entry Bit# 3: Reserved. Set to 0 Bit# 4: RSA-based authorization at re-entry Bit# 5: EAP-based authorization at re-entry Bit# 6: Authenticated EAP-based authorization at re-entry Bit# <del>3-7</del> : Reserved. Set to 0	SBC-REQ SBC-RSP

Authenticated EAP-based authorization basically means that a message containing EAP payload is protected by OMAC Digest. The OMAC\_KEY\_U and OMAC\_KEY\_D are generated with the EIK obtained from RSA-based authorization or EAP-based authorization.

The PKMv2 Auth-Request/Reply/Reject/Acknowledgement messages shall be used in the RSA-based authorization procedure.

The PKMv2 EAP-Transfer message shall be used in the EAP-based authorization procedure. The PKMv2 Authentication EAP-Transfer message shall be used in the Authenticated EAP-based authorization procedure.

Bit# 4 – 6 are only applied to the SBC-REQ message. Those bits shall be set to 0 in the SBC-RSP message.

The MS should support at least one authorization policy and inform BS of all supportable authorization policies by the SBC-REQ message. The BS negotiates the authorization policy. If all bits of this attribute included in the SBC-RSP message are 0, then no authorization is applied. Both BS and MS shall not use the authorization function.

The following table shows possible authorization policies at initial network entry.

Bit #0	Value		Description
	Bit #1	Bit #2	
0	0	0	No Authorization
0	0	1	N/A
0	1	0	EAP-based authorization
0	1	1	EAP-based authorization and Authenticated EAP-based authorization
1	0	0	RSA-based authorization
1	0	1	RSA-based authorization and Authenticated EAP-based authorization
1	1	0	RSA-based authorization and EAP-based authorization
1	1	1	N/A

#### 11.8.4.3 MAC (Message Authentication Code) Mode

This field indicates a MAC (Message Authentication Code) mode that MS supports. Both MS and BS shall determine and use a MAC mode. A bit value of 0 indicates “not supported” while 1 indicates “supported.” If this attribute is not present, only HMAC is supported.

Type	Length	Value
25.3	1	Bit# 0: HMAC Bit# 1: OMAC Bit# 2: 64-bit short-HMAC* Bit# 3: 80-bit short-HMAC* Bit# 4: 96-bit short-HMAC* Bit# 5-7: Reserved. Set to 0

The MS should support at least one MAC mode and inform BS of all supportable MAC modes by the SBC-REQ message. The BS negotiates the MAC mode. If all bits of this attribute included in the SBC-RSP message are 0, then no message authentication code is applied. Both the MS and the BS doesn't need to authenticate the MAC (Medium Access Control) messages.

\* Note: If the short-HMAC mode is selected, then the short-HMAC tuple shall be applied to the following messages: MOB\_SLP-REQ/RSP, MOB\_SCAN-REQ/RSP, MOB\_MSHO-REQ, MOB\_BSHO-REQ/RSP, MOB\_HO-IND, RNG-REQ/RSP. Otherwise, the HMAC tuple shall be applied.

#### ~~11.8.6~~ 11.8.4.4 PN Window Size

Specifies the size capability of the receiver PN window per SAID. The receiver shall track PNs within this window to prevent replay attacks (see 7.5.1.2.4).

Type	Length	Value	Scope
<del>44.</del> 25.4	2	PN Window Size in PNs	SBC-REQ, SBC-RSP

*[Change one row in Table 368 in the section 11.9 as follows]*

## 11.9 PKM-REQ/RSP management message encodings

Table 368-PKM attributes types

Type	PKM attribute
22	<del>Version</del> reserved

[Change the sub-clause 11.9.13 as follows]

## 11.9.13 Security capabilities

Description: The Security-Capabilities attribute contains is a compound attribute whose subattributes identify the version of PKM an SS supports and the cryptographic suite(s) an SS supports.

Type	Length	Value (compound)
19	Variable	The Compound field contains the subattributes as defined in Table 372.

Table 372-Security-capabilities subattributes

Attribute	Contents
Cryptographic-Suite-List	List of supported cryptographic suites
<del>Version</del>	<del>Version of Privacy supported</del>

[Delete the sub-clause 11.9.16]

~~11.9.16 Version~~~~Table 372-Security-capabilities subattributes~~

Value	Description
0	Reserved
1	PKM (Initial standard release)
2-255	Reserved

Type	Length	Value (compound)
<del>22</del>	<del>1</del>	<del>A 1 byte code identifying a version of PKM security as defined in Table 377.</del>