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Re:	Contribution on comments to IEEE 802.16g-05/008	
Abstract	In this contribution, we describe the RSA authentication procedure and service primitives that could be exchanged between the BS and the NCMS entities.	
Purpose	Adoption	
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# RSA-based Authentication Procedure and Primitives

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## 1. Problem Statement

The purpose of this contribution is to describe the RSA-based authentication procedure and service primitives that could be exchanged between the BS and the NCMS entities. This proposal makes it possible to perform the authentication as specified in the remainder of this document.

A RSA-based authentication method is used for authenticating an MS with MS's certificate. A certification has a public key of MS and is guaranteed by a trust CA (Certification Authority). When a MS submits its certificate to access the network, the network should verify the certificate whether the certificate is issued by a trust CA and whether the certificate is revoked by interrogating an OSCP (Online Certificate Status Protocol) server. In IEEE 802.16, the certificate of MS will not become obsolete because validation time is long enough (at least 10 years old). However, it may be stolen or lost, so a verification procedure of the certification is required. Therefore, we define primitives that a BS transfers a MS's certification to prove validity of it when a MS access to a BS.

## 2. Summary of the Proposed Remedy

In this contribution, we define 3 primitives to support authentication management between BS and access network (NCMS) which are described briefly in the following table.

Primitive	Direction	Primitive Contents
Certificate Information	BS -> NCMS	MS ID, Certificate
Certificate Verification Request	BS -> NCMS	MS ID, Certificate
Certificate Verification Response	BS <- NCMS	MS ID, Result

Figure1 shows the RSA-based authentication procedure. A MS may inform a BS of CA's a certificate to indicate who issues the MS's certificate. When a BS receives a CA's certificate, it asks validation of the certificate to a NCMS through network nodes such as a CA if the NCMS has no information about the CA.

When a BS receives a certification from an MS for authentication, it checks whether the certificate is forged or revoked through network nodes such as a NCMS, CAs and an OSCP server. A certification request procedure in figure 1 is omitted if the NCMS has a public key of CA which issues the MS's certificate. The NCMS should request the validation of the MS certification to an OSCP server whether it is revoked or not.

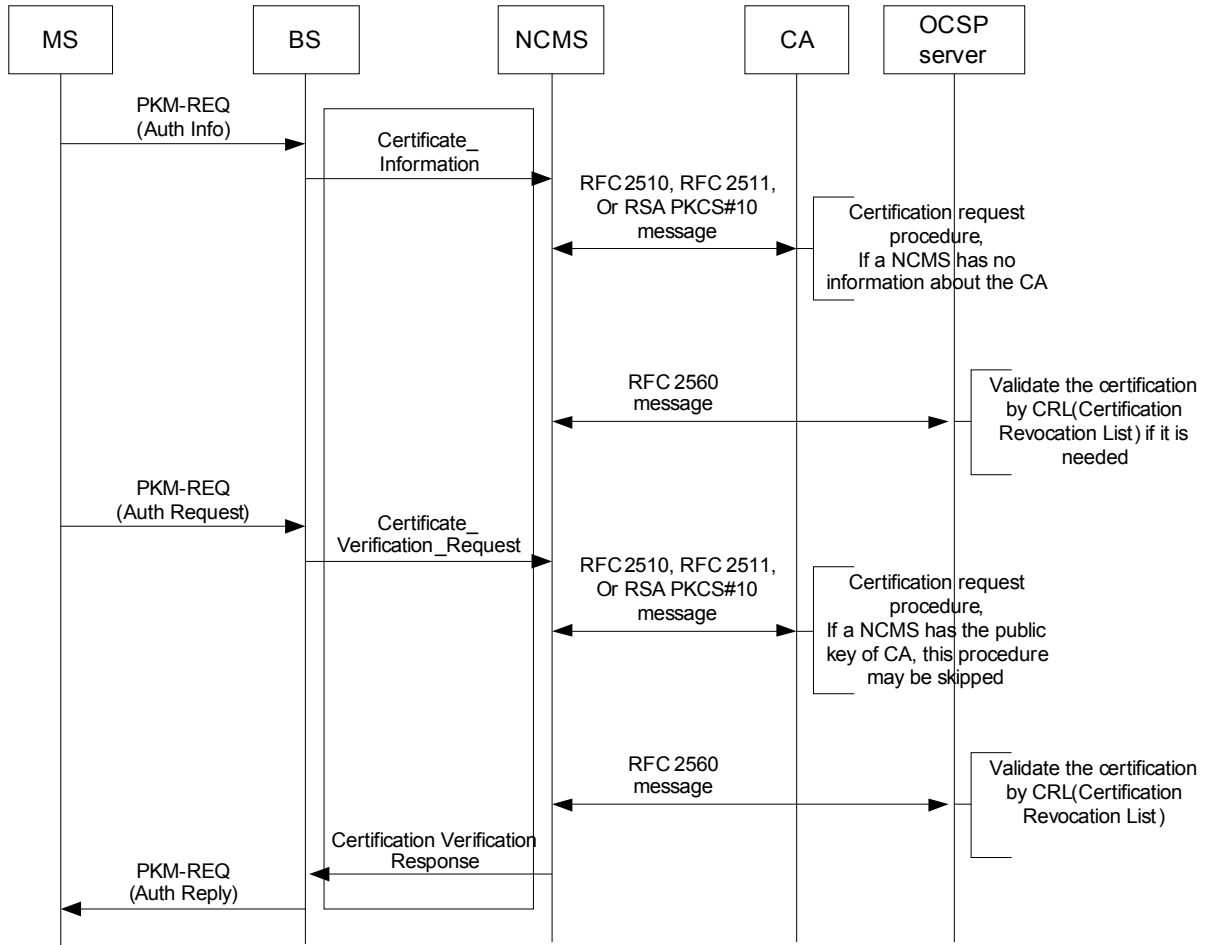


Figure 1. RSA-based authentication procedure

### 3. Proposed Text Changes

*[Insert section 14.5.5.5 as follow]*

#### 14.5.5 Security Management

##### 14.5.5.2 RSA-based authentication procedure

When an MS tries to initiate an RSA-based authentication or re-authentication procedure with a BS, it sends PKM-REQ messages with Auth Info, Auth Request or PKMv2 RSA-Request message type. When a MS sends a PKM-REQ message with Auth Info message type which includes a CA (Certificate Authority)'s certificate to the BS, the BS informs of an NCMS entity as a Certificate\_Information primitive. The NCMS entity verifies the CA's certificate if it has no information about the CA and keeps the certificate.

When an MS sends a PKM-REQ message with Auth Request or PKMv2 RSA-Request message type to authenticate the MS, the BS informs of an NCMS entity as a Certificate\_Verification\_Request primitive. An NCMS entity verifies the MS's certificate through asking to a CA and an OCSP (Online Certificate Status Protocol) server. The NCMS returns the result of verification to the BS whether the MS is authenticated or not as a Certificate\_Verification\_Response primitive. The BS sends the result of authentication and security information to the MS including security key information.

Figure X1 shows a RSA-based authentication procedure between a BS and an NCMS entity as follows

.

Figure X1. RSA-based authentication procedure

##### 14.5.5.2.1 Service Primitives

###### 14.5.5.2.1.1 Certificate\_Information

###### 14.5.5.2.1.1.1 Function

This primitive informs of an NCMS entity that a CA's certificate which issues an MS's certificate.

###### 14.5.5.2.1.1.2 Semantics of the Service Primitives

The parameters of the primitives are as follows:

**Certificate\_Information**

{

```

MS ID
Certificate
}

```

**MS ID**

48-bit unique identifier used for user identification between a BS and an NCMS

**Certificate**

CA's certificate which issues an MS's certificate

**14.5.5.2.1.1.3 When generated**

This primitive is issued by a BS when an MS informs the BS of CA's certificate.

**14.5.5.2.1.1.4 Effect of receipt**

The NCMS has information for a CA's certificate and is able to verify an MS's certificate whether the MS's certificate is forged or not.

**14.5.5.2.1.2 Certificate\_Verification\_Request****14.5.5.2.1.2.1 Function**

This primitive is used by a BS to inform an MS's certificate to authenticate the MS of an NCMS entity.

**14.5.5.2.1.2.2 Semantics of the Service Primitives**

The parameters of the primitives are as follows:

**Certificate\_Verification\_Request**

```

{
MS ID
Certificate
}

```

**MS ID**

48-bit unique identifier used for user identification between a BS and an NCMS

**Certificate**

MS's certificate which is issued by a trust CA

**14.5.5.2.1.2.3 When generated**

This primitive is issued by a BS when an MS requests the BS for authentication to access the network.

**14.5.5.2.1.2.4 Effect of receipt**

The NCMS verifies an MS's certificate whether the MS's certificate is forged or not, and is revoked or good.

**14.5.5.2.1.3 Certificate\_Verification\_Response****14.5.5.2.1.3.1 Function**

This primitive informs a BS a result of MS's authentication by an NCMS entity.

**14.5.5.2.1.3.2 Semantics of the Service Primitives**

The parameters of the primitives are as follows:

**Certificate\_Verification\_Response**

```
{
MS ID
Result
}
```

**MS ID**

48-bit unique identifier used for user identification between a BS and an NCMS

**Result**

Result of authentication such as valid, forged or revoked

**14.5.5.2.1.3.3 When generated**

This primitive informs the authentication result of a BS by a NCMS.

**14.5.5.2.1.3.4 Effect of receipt**

The BS transmits the PKM-RSP message to the MS. If the result is success, a pre-PAK is included in it.

References

- [1] C. Adams and S. Farrell, " Internet X.509 Public Key Infrastructure Certificate Management Protocols," RFC2510, March 1999.
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- [5] IEEE 802.16e/D10