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| Project | **IEEE 802.21d****<https://mentor.ieee.org/802.21>** |
| Title |  **Security text for Multicast Group Management** |
| DCN | **21-13-0146-03- Security text for Multicast Group Management** |
| Date Submitted |  |
| Source(s) | Lily Chen, Karen Randall |
| Re: |  |
| Abstract | This contribution proposes changes to support the use of ECDSA and clarifies the use of AES-CCM. |
| Purpose | Proposed text to resolve comments 219 and 220 |
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Insert the following references to Clause 2, Normative References

IEEE Std 802.1AR™-2009, IEEE Standard for Local and Metropolitan Area Networks: Secure Device Identity.

Insert the following references in Annex A for bibliography.

ANSI X9.62-2005, Public Key Cryptography for the Financial Services Industry: The Elliptic Curve Digital Signature Algorithm (ECDSA).1

IETF RFC 5008, Suite B in Secure/Multipurpose Internet Mail Extensions (S/MIME), Housley, R., Solinas, J., September 2007.2

IETF RFC 5480, Elliptic Curve Cryptography Subject Public Key Information, Turner, S., Brown, D., Yiu, K., Housley, R., Polk, T., March 2009.

NIST FIPS 186-4, Digital Signature Standards (DSS), July 2013.3

1ANSI publications are available from the Sales Department, American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036, USA (<http://www.ansi.org/>).

2IETF RFCs are available from the Internet Engineering Task Force Web site at http://www.ietf.org/rfc.html.

3NIST publications are available from the National Institute of Standards and Technology, NIST Public Inquiries, NIST, 100 Bureau Drive, Stop 3460, Gaithersburg, MD, 20899-3460, USA (www.nist.gov).

Insert the following text after the first paragraph of Clause 9.4.5.

In this specification, Elliptic Curve Digital Signature Algorithm (ECDSA) specified in in IEEE 802.1AR-2009, Secure Device Identity, by reference to NIST FIPS 186-4 and ANSI X9.62-2005 is used as the multicast signature scheme. In particular, NIST recommended elliptic curve P-256 and hash function SHA-256, specified in FIPS 180-4, are used to generate signatures. These algorithm identifiers are defined in Clause 9.4.5.4.

Insert the following clause:

9.4.5.4 Algorithm identifiers

The ECDSA signature method is defined in IEEE 802.1AR-2009, Secure Device Identity, by reference to NIST FIPS 186-4 and ANSI X9.62-2005.

If implementing ECDSA P-256, the SHA-256 message digest algorithm and the P-256 elliptic curve as defined in FIPS 186-4 Annex D, D.1.2.3, shall be used.

The signature algorithm shall be ecdsa-with-SHA256 as specified in IEEE 802.1AR by reference to RFC 5008. The object identifier is:

ecdsa-with-SHA256 OBJECT IDENTIFIER ::= { iso(1) member-body(2) us(840) ansi-X9-62(10045) signatures(4) ecdsa-with-sha2(3) 2 }

When the ecdsa-with-SHA256 algorithm identifier appears in the algorithm field as an AlgorithmIdentifier, the encoding shall omit the parameters field. That is, the AlgorithmIdentifier shall be a SEQUENCE of one component, the object identifier ecdsa-with-SHA256.

Suggest inserting the following text after Table 26 in Clause 9.4.6.

In Table 26, AES-CCM is an AES mode of operations specified in NIST SP 800-38C. AES-CCM provides confidentiality and data integrity.

In Table 26, ECDSA-256 uses curve P-256 and hash function SHA-256.

*(Note remove entries in table 26 that reference/use ECDSA-224).*

Notice that AES-CCM uses the group key, either MIGMEK or MIGEK. It can provide data integrity but not unique data origin authentication because the symmetric key is shared among a group of MNs. The data origin authentication is provided through ECDSA.

The data protection procedure is illustrated in Figure A and Figure B. *[Include figures from Yoshikazu Hanatani’s contribution to illustrate the AES-CCM and signature.]*

Figure A – Encapsulation



Figure B - Decapsulation

