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Re:	IEEE P802.16REVd/D5-2004
Abstract	Minor corrections for AES-CCM
Purpose	Adopt changes.
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Minor corrections in AES-CCM mode
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Jeff Mandin (Streetwaves Networking)

1.   Introduction

There are some minor errors/consistencies to be made to the description of the AES-CCM mode.

2.   Text changes

[Replace the content of section 7.5.1.2.1 as indicated]

Change the first and third paragraph as indicated:

The PDU payload shall be prepended with a 4-byte PN (Packet Number). The PN shall be transmitted in ~~little endian~~LSB first byte order. The PN shall not be encrypted.
The ciphertext ICV is transmitted in ~~little endian~~LSB first byte order.

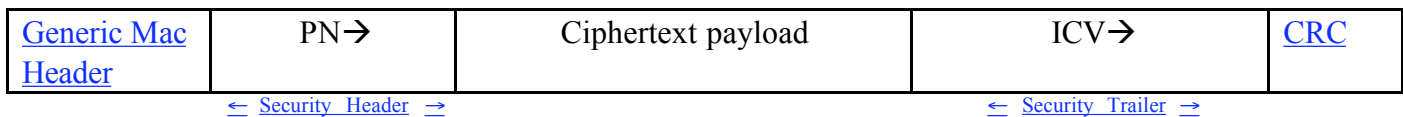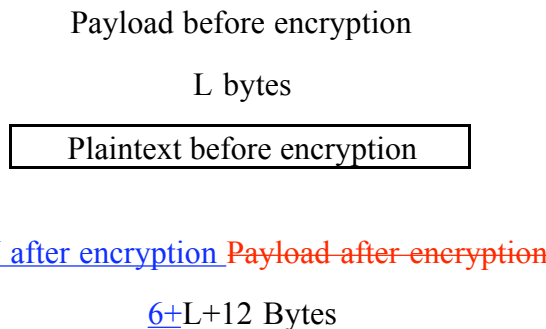[Modify figure 135 of 7.5.1.2.1 as follows]

Payload before encryption

L bytes

Plaintext before encryption

PDU after encryption ~~Payload after encryption~~

6+L+12 Bytes

Generic Mac Header	PN→	Ciphertext payload	ICV→	CRC
	← Security Header →		← Security Trailer →	

Figure 135—Encrypted PDU format in AES-CCM mode~~TEK management in BS and SS~~

[Replace the content of section 7.5.1.2.2 page 33 as indicated]

Change the first sentence of the first paragraph as indicated:

The PN associated with an SA shall be set to 1 when the SA is established and when a new TEK is installed. The PN shall be transmitted in ~~little endian~~LSB first order in the MAC PDU as described in 7.5.1.2.1.

[Insert the following text page 33, line 46]

7.5.1.2.3 802.16 Profile of **CCM Algorithm**

Change section 7.5.1.2.3 as indicated:

The NIST CCM specification defines a number of algorithm parameters. These parameters shall be fixed to specific values when used in SAs with a data encryption algorithm identifier of 0x02.

The number of octets in the message authentication code field t~~M~~ shall be set to 8. Consistent with the CCM specification the 3 bit binary encoding of M shall be 011.

The size q of the length field L shall be set to 2. Consistent with the CCM specification, the 3-bit binary encoding of the q field shall be 001.

The length a of the additional authenticated data string ~~l(a)~~ shall be set to 0.

The nonce shall be 13 bytes long as shown in figure 135a. Bytes 0 through 4 shall be set to the first five byte of the Generic MAC Header ~~GMH~~ (thus excluding the HCS). The sixth byte of the Generic MAC Header is not included in the nonce since it is redundant. Bytes 5 through 8 are reserved and shall be set to 0x00000000. Bytes 9 through 12 shall be set to the value of the PN encoded in LSB first byte order. ~~Byte 10 shall take the least significant byte and byte 13 shall take the most significant byte~~

[Add figure 135a]

Byte Number	0…4	5…8	9…12
Field	GMH	Reserved	PN→
Contents	Generic MAC Header without the trailing HCS	0x00000000	packet number field from payload

Figure 135a – Format of the Nonce

Consistent with the CCM specification, the initial block B_0 is formatted as shown in Figure 136.

Byte number ~~within MIC_IV~~	0	1…13	14…15
~~Byte significance~~			
Bytes	1	13	2
Field	Flag	Nonce	L ~~DLEN~~ ←
Contents	0x19	As specified in figure 135a	Length of *plaintext payload* ~~data part not including padding~~

Figure 136—Initial CCM Block B$_0$

Note the ~~big endian~~ MSB first ordering of the ~~DLEN~~ L value is opposite that of the normal ~~little endian~~ LSB first representation.
This is to remain compliant with the letter of the NIST CCM specification.
~~The sixth byte of the GMH is not included in the nonce since it is redundant.~~

Consistent with the NIST CCM specification the counter blocks _Ctr$_i$_ ~~Ai~~ are formatted as shown in Figure 137.

Byte number within CTR(i) Byte significance	0	1…13	14…15
Bytes	1	13	2
Field	Flag	Nonce	C_ounter_ ←-
Contents	0x01	As specified in figure XXX	_i_ ~~Length of data part not includir padding~~

Figure 136—Construction of counter blocks C_tr$_i$_ ~~Ai~~