IEEE P802.15
Wireless Personal Area Networks

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Re:	[802.15.4 Amendment 4g]	
Abstract	[Proposed Content for Clause 7 of FSK draft.]	
Purpose	[For consideration for TG4g candidate draft.]	
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7. MAC sublayer specification

7.1 MAC sublayer service specification

7.1.1 MAC data service

7.1.2 MAC management service

7.2 MAC frame formats

7.2.1 General MAC frame format

Replace Figure 79 with the following figure:

<table>
<tr><th>Octets: 2</th><th>1</th><th>0/2</th><th>0/2/8</th><th>0/2</th><th>0/2/8</th><th>0/5/6/10/ 14</th><th>variable</th><th>2/4</th></tr>
<tr><td rowspan="2">Frame Control</td><td rowspan="2">Sequence Number</td><td>Destination PAN Identifier</td><td>Destination Address</td><td>Source PAN Identifier</td><td>Source Address</td><td rowspan="2">Auxiliary Security Header</td><td rowspan="2">Frame Payload</td><td rowspan="2">FCS</td></tr>
<tr><td colspan="4">Addressing fields</td></tr>
<tr><td colspan="7">MHR</td><td>MAC Payload</td><td>MFR</td></tr>
</table>

Figure 79—General MAC frame format

7.2.1.1 Frame Control field

7.2.1.2 Sequence Number field

7.2.1.3 Destination PAN Identifier field

7.2.1.4 Destination Address field

7.2.1.5 Source PAN Identifier field

7.2.1.6 Source Address field

7.2.1.7 Auxiliary Security Header field

7.2.1.8 Frame Payload field

7.2.1.9 FCS field

Change the first paragraph of 7.2.1.9 as indicated:

The FCS field ~~is~~ may be either 2 or 4 octets in length and contains a 16-bit ITU-T CRC or a 32-bit CRC (equivalent to ANSI X3.66-1979), respectively. The FCS is calculated over the MHR and MAC payload parts of the frame. A device compliant with the MRFSK PHY shall implement the 4-octet FCS.

Change the second paragraph of 7.2.1.9 as indicated:

The 2-octet FCS shall be calculated using the following standard generator polynomial of degree 16:

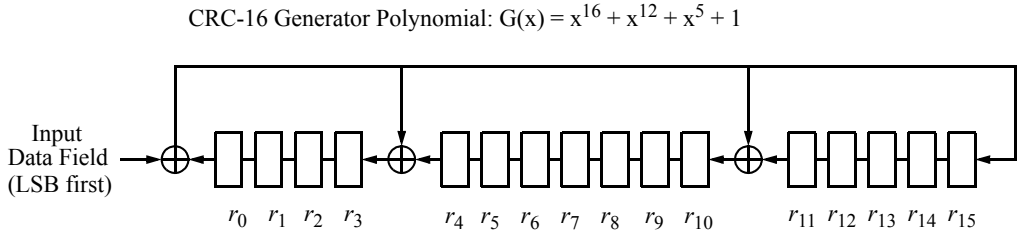
Change the third paragraph of 7.2.1.9 as indicated:

The 2-octet FCS shall be calculated for transmission using the following algorithm:

Change the sixth paragraph as indicated:

The 2-octet FCS for this case would be the following:

Replace Figure 81 as indicated:



1. Initialize the remainder register (r_0 through r_{15}) to zero.
2. Shift MHR and payload into the divider in the order of transmission (LSB first).
3. After the last bit of the data field is shifted into the divider, the remainder register contains the FCS.
4. The FCS is appended to the data field so that r_0 is transmitted first.

Figure 81—Typical 2-octet FCS implementation

Insert the following paragraphs at the end of 7.2.1.9:

The 4-octet FCS is calculated using the following standard generator polynomial of degree 32:

$$G_{32}(x) = x^{32} + x^{26} + x^{23} + x^{22} + x^{16} + x^{12} + x^{11} + x^{10} + x^8 + x^7 + x^5 + x^4 + x^2 + x + 1 \quad (43)$$

The 4-octet FCS is the one's complement of the modulo 2 sum of the two remainders in a) and b):

a) The remainder resulting from [(xk*(x^{31}+x^{30}+...)] divided (modulo 2) by $G_{32}(x)$, where the value *k* is the number of bits in the calculation field.

b) The remainder resulting from the calculation field contents, treated as a polynomial, is multiplied by x^{32} and then divided by $G_{32}(x)$.

At the transmitter, the initial remainder of the division shall be preset to all ones and then modified via division of the calculation field by the generator polynomial $G_{32}(x)$. The one's complement of this remainder is the 4-octet FCS field.

At the receiver, the initial remainder shall be preset to all ones. The serial incoming bits of the calculation field and FCS, when divided by $G_{32}(x)$ in the absence of transmission errors, result in a unique non-zero remainder value. The unique remainder value is the polynomial shown in Equation (44):

$$x^{31} + x^{30} + x^{26} + x^{25} + x^{24} + x^{18} + x^{15} + x^{14} + x^{12} + x^{11} + x^{10} + x^8 + x^6 + x^5 + x^4 + x^3 + x + 1 \quad (44)$$

7.2.2 Format of individual frame types

7.2.2.1 Beacon frame format

Replace Figure 82 with the following figure:

Octets: 2	**1**	**4/10**	**0/5/6/10/14**	**2**	**variable**	**variable**	**variable**	**2/4**
Frame Control	Sequence Number	Addressing fields	Auxiliary Security Header	Superframe Specification	GTS fields (Figure 83)	Pending address fields (Figure 84)	Beacon Payload	FCS
MHR				MAC Payload				MFR

Figure 82—Beacon frame format

7.2.2.2 Data frame format

Replace Figure 90 with the following figure:

Octets: 2	**1**	**(see 7.2.2.2.1)**	**0/5/6/10/14**	**variable**	**2/4**
Frame Control	Sequence Number	Addressing fields	Auxiliary Security Header	Data Payload	FCS
MHR				MAC Payload	MFR

Figure 90—Data frame format

7.2.2.3 Acknowledgment frame format

Replace Figure 91 with the following figure:

Octets: 2	1	2/4
Frame Control	Sequence Number	FCS
MHR		MFR

Figure 91—Acknowledgment frame format

7.2.2.4 MAC command frame format

Replace Figure 92 with the following figure:

Octets: 2	1	(see 7.2.3)	0/5/6/10/14	1	variable	2/4
Frame Control	Sequence Number	Addressing fields	Auxiliary Security Header	Command Frame Identifier	Command Payload	FCS
MHR				MAC Payload		MFR

Figure 92—MAC command frame format

7.2.3 Frame compatibility

7.3 MAC command frames

7.4 MAC constants and PIB attributes

7.5 MAC functional description