IEEE P802.11
Wireless LANs

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| 30.6.6.3.9 Phase Hopping Modulation |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Yutaka Murakami | Panasonic | 600 Saedo-cho, Tsuzuki-ku, Yokohama 224-8539, Japan | +81 45 938 3045 | murakami.ytk@jp.panasonic.com |
| Artyom Lomayev | Intel | Turgeneva 30, Nizhny Novgorod 603024, Russia | +7 (831) 2969444 | artyom.lomayev@intel.com |
| Hiroyuki Motozuka | Panasonic |  |  | motozuka.hiroyuki@jp.panasonic.com |
| Takenori Sakamoto | Panasonic |  |  | sakamoto.takenori@jp.panasonic.com |
| Gaius Wee | Panasonic |  |  | yaohuang.wee@sg.panasonic.com |
| Lei Huang | Panasonic |  |  | lei.huang@sg.panasonic.com |
| Kazu Takahashi | Panasonic |  |  | takahashi.kazu@jp.panasonic.com |

Abstract

This document proposes specification text for new subclause 30.6.6.3.9 (Phase hopping modulation) to replace existing subclause 30.6.6.4 on phase hopping for OFDM mode [1], to be consistent with current transmitter block diagram [2].

*Editor: add subclause 30.6.6.3.9 into the spec draft D0.8, remove the subclause 30.6.6.4*

**30.6.6.3.9 Phase hopping modulation**

The phase hopping modulation is applied if the number of spatial streams is equal to *NSS* = 2 and the Phase Hopping field in the EDMG-Header-A is set to 1.

The phase hopping modulation shall use the (SQPSK, SQPSK), (QPSK, QPSK), (QPSK, 16-QAM), (16-QAM, QPSK), (16-QAM, 16-QAM), or (64-QAM, 64-QAM) modulations for the first and the second spatial streams accordingly.

For each modulation type, the encoded bits of *iSS*-th spatial stream are broken into groups of  bits, , where *q* denotes the group number.

For (SQPSK, SQPSK) configuration, the modulation is performed in two steps:

* First, BPSK points are modulated as , *k* = 0, 1, …, *NSD* – 1
* Second, two BPSK points  are converted to two modulation points  by multiplication with mapping matrix Q and phase hopping matrix W(*k*) as follows:



If the Open Loop Precoding field in the EDMG-Header-A is set to 1, then matrix Q is defined as



otherwise it is defined as an identity matrix.

For (QPSK, QPSK) configuration, the modulation is performed in two steps:

* First, QPSK points are modulated as , *k* = 0, 1, …, *NSD* – 1
* Second, two QPSK points  are converted to two modulation points  by multiplication with mapping matrix Q and phase hopping matrix W(*k*) as follows:



If the Open Loop Precoding field in the EDMG-Header-A is set to 1, then matrix Q is defined as



otherwise it is defined as an identity matrix.

For (QPSK, 16-QAM) and (16-QAM, QPSK) configuration, the modulation is performed in two steps:

* First QPSK and 16-QAM points are modulated as follows:
	+ QPSK points are modulated as 
	+ 16-QAM points are modulated as defined in 30.6.6.3.6
* Second, two (QPSK, 16-QAM) or (16-QAM, QPSK) points  are converted to two modulation points  by multiplication with mapping matrix Q and phase hopping matrix W(*k*) as follows:



If the Open Loop Precoding field in the EDMG-Header-A is set to 1 and the modulation configuration is (QPSK, 16-QAM), then matrix Q is defined as



and if the Open Loop Precoding field in the EDMG-Header-A is set to 1 and the modulation configuration is (16-QAM, QPSK), then matrix Q is defined as



otherwise it is defined as an identity matrix.

For (16-QAM, 16-QAM) and (64-QAM, 64-QAM) configurations, the modulation is performed in two steps:

* First, 16-QAM or 64-QAM points are modulated as defined in 30.6.6.3.6 or 30.6.6.3.7 accordingly
* Second, two 16-QAM or 64-QAM points  are converted to two modulation points  by multiplication with mapping matrix Q and phase hopping matrix W(*k*) as follows:



If the Open Loop Precoding field in the EDMG-Header-A is set to 1, then matrix Q is defined as



otherwise it is defined as an identity matrix.

The phase hopping matrix W(*k*) depends on *k* and is defined as follows:



where *y*(*k*) is initialized to the value 0 at (,**)** including a first bit of LDPC codeword**,** otherwise *y*(*k*) is incremented by 1 for every (,) inside the LDPC codeword.

**SP:**

Do you agree to define the Phase Hopping Modulation as defined in 11-17-1708-00-00ay-phase-hopping-modulation?

**References:**

1. 11-16-1621-00-00ay-6-6-1-phase-hopping
2. Draft P802.11ay\_D0.8