Title: **IEEE802.11 DS-PHY Conformance Testing Strawman Outline**

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Introduction:
This paper describes a strawman outline of tests required to prove conformance between to DS-PHY products manufactured by different manufacturers implementing the IEEE802.11 standard. The outline proposed will serve a baseline for developing a conformance test document used by conformance test laboratories. The listed are parameters which test the constraints set forth for data transmission over the RF medium. All parameters listed pertain to the tests required for testing the direct sequence physical layer. The conformance test matrix illustrated in this document list the specifications taken from the IEEE802.11 January 1996 draft, pertaining the DS-PHY section.

Categories of Tests:
There are three categories of tests, they include the following:

A. TX Performance
B. RX Performance
C. Baseband PLCP Header Performance

The RX and TX tests cover RF-IF and Modulation performance while the baseband tests focus on conformance of the Preamble/PLCP Header protocol and formats. Each of the tests for TX and RX functions are to be repeated for satisfy the conditions for supporting the environmental range as stated in 1.4.6.1, 1.4.6.2 and the temperature ranges as stated in 1.4.6.10. Exhibit A illustrates the conformance test matrix identifying the parameters for testing.

Exhibit A Conformance Test Matrix

CONFORMANCE TEST	SPEC. REFERENCE	COMMENTS
A. TX PERFORMANCE		OVER TEMP. AND FREQUENCY AT TBD POINTS.
TX OUT OF BAND SPURIOUS EMISSIONS	1.4.6.5	Eliminate, subject to regulatory tests Correct use of channels (FCC, Etsi) isto be proved?!
TX TO RX TURNAROUND	1.4.6.6	Tetstable if CCA is exposed ?? what test can be defined to prove the functionality (be able to receive an ACK)
RX TO TX TURNAROUND	1.4.6.7	Tetstable if PHY_TXSTART.req is available (exposed),??same note as above
TX POWER LEVELS	1.4.7.1,1.4.7.2	testable by baseline testbed(doc67)
TX POWER LEVEL CONTROL	1.4.7.3	see above
TX SPECTRAL MASK	1.4.7.4	TEST RECOMMENDATION IN SPEC. testable by baseline testbed
TX CENTER FREQ. TOLERANCE	1.4.7.5	testable by baseline testbed
CHIP CLOCK FREQUENCY TOLERANCE	1.4.7.6	testable if exposed. If not exposed... possibly use non scrambled 01 pattern giving +/-5.5Mhz spectral lines. Tolerance within +/- 275 Hz??????
TX POWER UP RAMP	1.4.7.7	testable by baseline testbed, with consecutive transmissions analyzed on scope.
TX POWER DOWN RAMP	1.4.7.7	testable by baseline testbed, with consecutive transmissions analyzed on scope.
RF CARRIER SUPPRESSION	1.4.7.8	TEST RECOMMENDATION IN SPEC. testable by baseline testbed
TX MODULATION ACCURACY	1.4.7.9	TEST RECOMMENDATION IN SPEC. testable by baseline testbed
B. RX PERFORMANCE		OVER TEMP. AND FREQUENCY AT TBD POINTS.
RX MINIMUM INPUT LEVEL SENSITIVITY	1.4.8.1	testable by baseline testbed
RX MAXIMUM INPUT LEVEL	1.4.8.2	testable by baseline testbed
RX ADJACENT CHANNEL REJECTION	1.4.8.3	TEST RECOMMENDATION IN SPEC. testable by baseline testbed
CLEAR CHANNEL ASSESSMENT	1.4.8.4	Testable if CCA is exposed. If not, another test has to be designed. Clear Channel assesment is tested applying a DS compliant signal independent on he CCA mode used. note: CCA keepng active in case of a non 802.11 rate specified in the PLCP or

		carrier loss during the MPDU has to be proved (cf. section 15.2.7)
C. BASEBAND TESTS		**NOT OVER TEMP. OR FREQ.**
PLCP FIELD DEFINITION	**1.2.3 (1.2.3.1-1.2.3.6)**	
PLCP SCRAMBLER/ DESCRAMBLER	**1.2.4**	
PLCP DATA MODULATION RATE CHANGE	**1.2.5**	

Specifications not Required for Test:
The sections listed below, are from the January 1996 draft. It is recommended that they NOT be required for PHY level conformance testing. Conformance of these sections will be covered indirectly by the defined tests or covered by the MAC level testing.

1.1.2 DSSS PHYSICAL LAYER FUNCTIONS
1.2.2 PHYSICAL LAYER CONVERGENCE PROCEDURE FRAME FORMAT
1.2.6 PLCP TRANSMIT PROCEDURE
1.2.7 PLCP RECEIVE PROCEDURE
1.3 DSSS PHYSICAL LAYER MANAGEMENT ENTITY (PLME) - 1.3.1 TO 1.3.4
1.4.1 SCOPE AND FIELD APPLICATION
1.4.2 OVERVIEW OF SERVICES
1.4.3 OVERVIEW OF INTERACTIONS
1.4.4 BASIC SERVICE AND OPTIONS- 1.4.4.1 TO 1.4.4.4
1.4.5 PMD_SAP DETAILED SERVICE SPECIFICATION- 1.4.5.1 TO 1.4.5.17
1.4.6.8 SLOT TIME
1.4.6.9 TX AND RX ANTENNA PORT IMPEDANCE

Other Test Considerations:

As part aside from the conformance testing, are the tests necessary for approval by the requirements set forth by i.e. FCC/ETSI. Most of which are covered by the listed tests above. One of the FCC requirements not currently addressed through the tests above is the *Processing Gain Test*. Manufacturers of products supporting this standard, not familiar with the issues, need to be aware of the requirements for FCC approval on processing gain for direct sequence spread spectrum. It is recommended that a processing gain test method example be attached as an appendix to the IEEE802.11 DS-PHY conformance document. It must also be noted that the example process gain test procedure is subject to approval by the FCC.