Rx PER Test using CLI over PLT API

Initial Conditions:

1. Before any calibration, boot up the system and enter the CLI menu.
2. Make sure that in the signal generator, RF and modulation are turned off.

Step 1.

Perform driver initialization (example, load firmware, initialize hardware, etc.), then set the power mode and the default power level.

a) From Top Level Menu, type 'w' to select Power Menu
b) Type 'p 1' to set the power mode to ACTIVE
c) Type 'l 2' to set_the powersave_power_Level to AWAKE
d) Type 'f 2' to set the deFault_power_Level to AWAKE
e) Type .. (return to top level menu)

Step 2.

To set the Receive channel to be tested, the **cHannel tune [h]** is used.
Channel tune is a requirement before any Rx or Tx operation. This command instructs the FW to receive/transmit at a specified channel.

To set the channel to be used (for 802.11bg this should be channel 6 or 7 midband channels) Example: use channel 6

a) **cHannel tune [h]** Channel tune is a requirement before any Rx or Tx operation. This command instructs the FW to receive/transmit at a specified channel. ((short cut from any menu \ t r h 0 6) note: "\" starts command sequence at top level menu))

b) From Main Menu: Select **t** (biT)
\> Driver/, Connection/, Management/, Show/, Privacy/, scAn/, roaminG/, qOs/, poWer/, eVents/, Bt coexistence/, Report/, dEbug/, biT/, aboUt, Quit
Select **t** (biT)
The biT menu contains commands for HW Build in Production Line Tests and enhanced radio debug
t (biT) ➔ .../biT> Bip/, Radio debug/

c) From biT menu: Select **r** (Radio debug)
r (Radio debug)

d) The Radio debug Submenu contains set of functions to test Rx and Tx without Channel tune is a requirement before any Rx or Tx operation. This command instructs the FW to receive/transmit at a specified channel without the need of connecting to an Access Point.
r (Radio debug) ➔./biT> Bip/, Radio debug/
r
.../Radio debug> Get hdk version, cHannel tune, Tx debug/, rx Statistics

e) From Radio debug: Select **h** (cHannel tune)
.../Radio debug> Get hdk version, cHannel tune, Tx debug/, rx Statistics/
h 0 7 (tunes to channel 7 2442 Mhz)
Param 0 - Band (0-2.4Ghz, 1-5Ghz, 2-4.9Ghz)
Param 1 – Channel
h 0 7 (tunes to channel 7 2442 MHz)
h 0 6 (tunes to channel 6 2437 MHz)

8) **Return to Main Menu using the ".." command**

Note: The RF signal generator is not enabled in this step, and no RF signal is to be applied to the WiLink system at this time.

Step 3.
Set Signal Generator to a 54 OFDM signal at the channel frequency to be used at a power level of -60 dBm (referenced to WL127x or WL128x antenna input pin.

Note: incremental Seq number must be used in the E4438c for the test for the SeqNumMissCount to be updated.

Example: The power level reading on the signal generator is set to -56.5 dBm, to account for 2.5 dB loss on PCB to antenna input Pin and 1 dBm cable loss,

Note: To achieve the 0.1 dB setup accuracy for validation of receiver sensitivity accuracy, the test setup must account for all losses (cables, PCB traces, filter, etc).

Step 4.
Connect Signal generator to DUT (Device Under Test)

Step 5.
Start Rx PER test by calling command rx Per command from the pLt menu. (/ t r r s)

a) From Main Menu: Select **t** (biT)
\> Driver/, Connection/, Management/, Show/, Privacy/, scAn/, roaminG/, qOs/, poWer/, eVents/, Bt oexistence/, Report/, dEbug/, biT/, aboUt, Quit
t (biT)
The biT menu contains commands for HW Build in Production Line Tests and enhanced radio debug
T ➔ .../biT> Bip/, Radio debug/

b) From biT menu: Select **r** (Radio debug)
r (Radio debug)

c) Type "**r**" from the Radio debug menu to call Rx statistics command

d) Type "**s**" from the rxStatistics menu to select Start command

Step 6.
Clear the PER registers by calling command "Reset"
a) Type "**r**" from the Rx Statistics menu to select Reset command (Clear Rx Statistics registers.)

Step 7.
Verify PER registers have been cleared by calling Get command
a) Type "**g**" from the rxPer menu to select Get command.

b) The Rx Statistics "Get" command returns

ErrorCount: Increment when an FCS error is detected in a received.
TotalFrameCount: Increment for each packet
PLCPErrorCount: Increment when a PLCP error is detected in a received MPDU

c) When rxPer Get Command returns: Rx PER registers are cleared

FCSErrorCount = 0
PLCPErrorCount = 0
SeqNumMissCount = 0
TotalFrameCount = 0

Step 8.
Transmit 1000 packets of 1000 bytes from Tx Signal Generator.

Step 9.
Read PER registers by calling from rxPer menu the Get command

a) Type "**g**" from the rxPer menu to select Get command.
b) The rxPer Get command returns

ErrorCount: Increments when FCS error is detected in received MPDU
mTotalFrameCount: Increment for each packet
PLCPErrorCount: Increments when a PLCP error is detected in received MPDU

Step 10.
Check the Results, using the following equation:

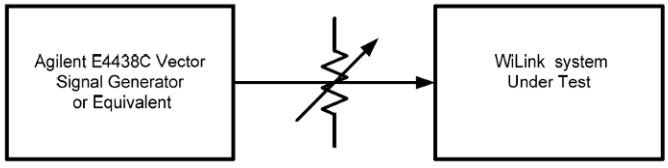
$$PER[\%] = \frac{PLCPErrorCount + FCSErrorCount}{TotalFrameCount} \times 100$$

Step 11.
Decrease RF output signal level if using E4438C signal generator. Increase attenuation if using the step attenuators with TrioScope software. Repeat Steps 5 through 12 until a PER rate of:

PER > 10% for OFDM modulation 802.11 a/g
PER > 8% for DSSS, CCK modulation 802.11 b

Note: Rx Receiver Stop command
/ t r r p --- stop Rx Receiver, Turn off receiver.

Test setup:



Attenuator, Step
HP8494 and HP8495
70 dB 10 dB step + 11 dB 1 dB step