BLE Data Transfer – CODED PHY Modulation

BL654

Method and Results *v1.0*

INTRODUCTION

Prior to Bluetooth 5, BLE operated on 1 Mbps modulation only. Bluetooth v5 adds support for an optional 500kbps and 125kbps modulation. This feature is known as LE CODED PHY. It allows data to be transmitted at the lower 500kbps and 125kbps symbol rate, which should theoretically double the throughput. The BL654 only provided support for the 125kbps modulation.

Note: The Bluetooth 5 LE CODED PHY feature is relatively new and may take some time before being supported by the majority of silicon and stack vendors.

REQUIREMENTS

- Two Laird DVK-BL654 (or equivalent RS-232 to serial connection to the BL654 module)
- FTDI USB-to-Serial drivers for DVK-BL654 (found at http://www.ftdichip.com/FTDrivers.htm)
- UwTerminalX (version 1.08n or later), provided at https://github.com/LairdCP/UwTerminalX/releases
- BL654 firmware version 29.0.0.3-ALPHA-1 (or later)
- **$autorun$.coded.phy.central.sb** and **$autorun$.coded.phy.peripheral.sb**

LE CODED PHY TESTING METHOD

This section describes the method used to test the LE CODED PHY feature

IMPORTANT!
As of this writing, Android and iOS have not implemented the LE CODED PHY feature. To see the full benefits of LE CODED PHY impact on long range, two BL654 kits are needed for testing.

To test LE CODED PHY throughput, follow these steps:

1. Open the **$autorun$.coded.phy.central.sb** and replace *BTAddr* with the *ATi 4* response of the BL654 onto which the peripheral app will be loaded (this is for auto connection).
2. Open two instances of UwTerminalX and uncheck **DTR** on both of them.
3. Reset the BL654s by checking and unchecking **BREAK** on both UwTerminalX instances.
4. Flash erase both BL654s using **at&F***.
5. On the first UwTerminalX window, XCompile+Load+Run **$autorun$.coded.phy.central.sb**.
6. On the second UwTerminalX window, XCompile+Load+Run **$autorun$.coded.phy.peripheral.sb**.

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7. On both UwTerminalX instances, check **DTR** on both devices.
8. Reset both devices by checking and unchecking **BREAK**.
   The devices should auto-connect and the connection messages should be displayed on both.
9. You can start typing data in each terminal window which should be sent by hitting enter.
10. For automated throughput testing, switch to the Speed Test tab on both UwTerminalX windows.
    a. On the first UwTerminalX window, click **Start Test > Send & Receive test (delay 5 seconds)**.
    b. On the second UwTerminalX window, click **Start Test > Send and receive test**.
    c. After a certain duration (e.g. 2 minutes), stop the test by clicking **Cancel**.

The Received Average(s) should show the throughput of the transmitted data.

REVISION HISTORY

Version	Date	Notes	Approver
1.0	5 February 2017	Initial Release	Youssif Saeed

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