BLE Data Transfer – CODED PHY Modulation

BL654

Application Note *v1.0*

1 INTRODUCTION

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

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

2 REQUIREMENTS

- Two Laird DVK-BL654
- FTDI USB-to-Serial drivers for DVK-BL654 (found at http://www.ftdichip.com/FTDrivers.htm)
- UwTerminalX (version 1.10a or later), provided at https://github.com/LairdCP/UwTerminalX/releases
- BL654 firmware version 29.1.1.0 or later (found in the BL654 Software Downloads tab at https://www.lairdtech.com/products/bl654-ble-thread-nfc-modules)
- **$autorun$.coded.phy.central.sb** and **$autorun$.coded.phy.peripheral.sb** found at https://github.com/LairdCP/BL654-Applications/tree/master/Applications

Note: For the purposes of this document, we assume you are familiar with compiling/loading *smart*BASIC applications. If not, please visit the BL654 product page for the applicable application note.

3 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 is loaded (this is for auto connection).
2. Open two instances of UwTerminalX and uncheck **DTR** on both.
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*.

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. The switch to the CODED PHY event should also be displayed.

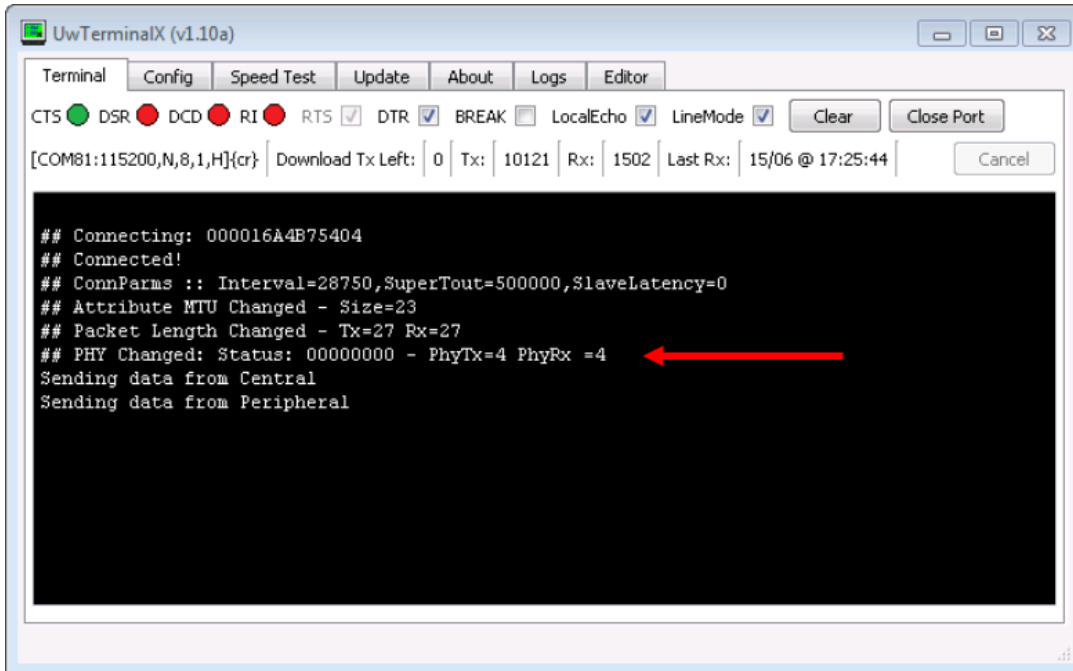You can start typing data in each terminal window which can be sent by pressing **Enter**.

Figure 1: UwTerminalX

4 REVISION HISTORY

Version	Date	Notes	Contributor(s)	Approver
1.0	27 June 2018	Initial Release	Youssif M. Saeed	Jonathan Kaye