TEXAS INSTRUMENTS

Link Quality Monitor
User Manual

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BT-UM-0041, Revision 0.1

Abstract

The Link Quality Monitor application is used to monitor the RSSI and the link quality (BER/PER) information during a connection in run-time.

Revision Control

Revision 0.1

Contents

1. Introduction

The bluetooth Link Quality Monitor is an application designed to give to the user information regarding the RSSI values and regarding the link quality (BER/PER) during a connection in run-time.

2. Terms & Abbreviations

Abbreviation /Term	Meaning / Explanation
BT	BlueTooth
HCI	Host Controller Interface
BRF6150	Second generation TI bluetooth single chip
BER	Bit Error Rate
PER	Packet Error Rate
lqm	Link quality monitor

3. Documents Reference

Reference	Description / Comments
BT-SW-0026	BRF6150 Vendor specific command
BT-UM-0037	BRF6150 starter kit user manual
BT-UM-0039	Logger user manual

Table 1: Reference

4. System requirements

- Pc running Pentium || (minimum requirement).
- Operating systems: Windows 2000, Windows XP.
- Serial communication port (RS232)

5. Installation

1. From the installation CD ROM, run Setup.exe and follow the on-screen instructions.
2. When installation is completed, the Texas Instrument\Bluetooth Tools program group displays the Link Quality Monitor program icon.

6. Invoking the Link Quality Monitor and Port Selection

This section describes how to invoke the Link Quality Monitor and how to select the port connecting the Link Quality Monitor and the Bluetooth device.

The BRF6150 has the ability to send debug messages through the TX DBG (this UART functions only as a transmitter) line using RS232 protocol during functional operation. The Link quality monitor can capture and display the RSSI and link quality messages.

1. Using a RS2323 cable, connect the pc to the UART DEBUG of the Bluetooth device.
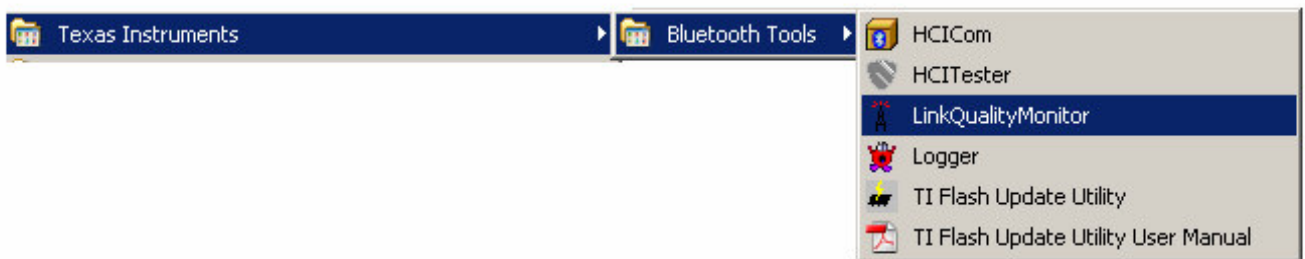2. To invoke the Link Quality Monitor, click on the Link Quality Monitor program icon

Figure 1 : invoke Link Quality Monitor

3. The Link Quality Monitor Main Window appears displaying the:

- RSSI Window
- PER Windows
- BER Windows
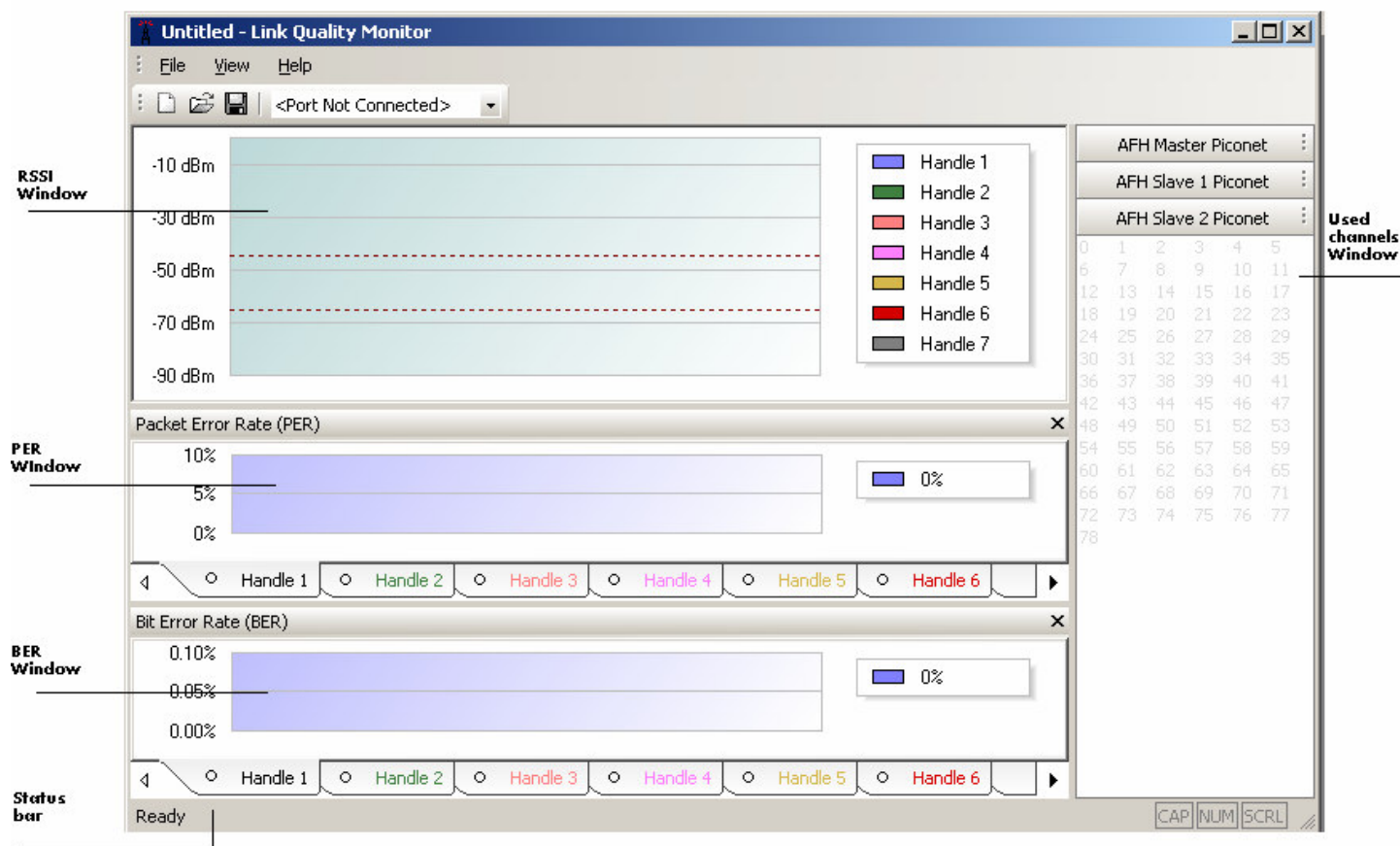- Used channels Window

See figure 2.

Figure 2 : Link Quality Monito rmain window

4.   Port Selection:

- From the toolbar click the port connection box, a drop down menu displays the available ports. See figure 3.
- Choose the desired port. (The com port uses its default configuration i.e. baud = 115200, flow control = none, 8 bit data bye without parity check and 1 stop bit)
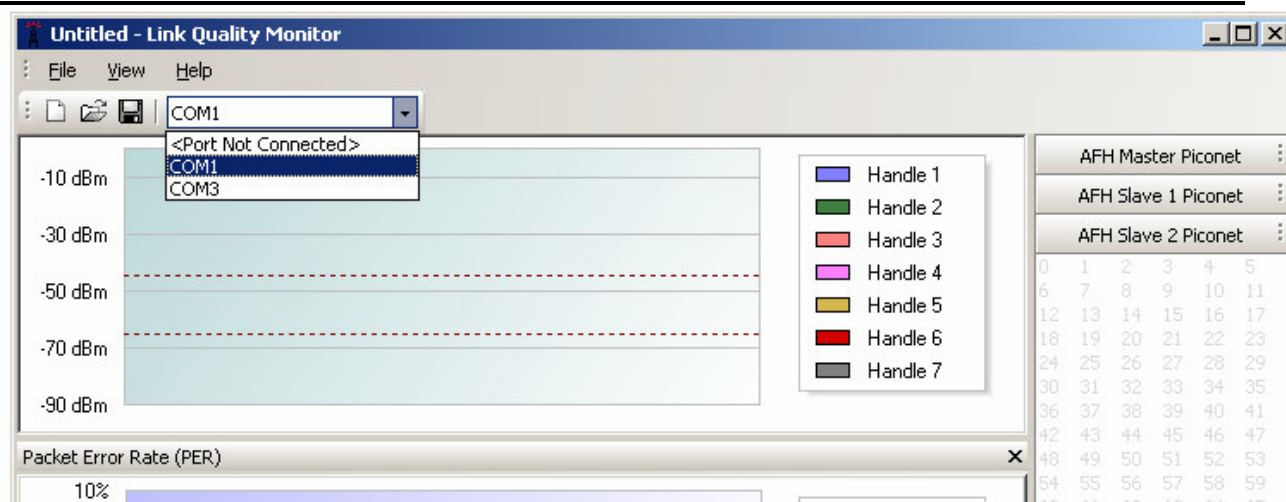
Figure 3 : COM port selection

7. Menu and toolbar

1 .Menu Bar

Item	Sub-Menu	Description
File Menu	New	Create a new lqm file
	Open	Open an existing lqm file
	Save	Save the active lqm
	Save as…	Save the active lqm with a new name
	Exit	Exit the Link Quality monitor application
View Menu	Chart PER	Display or hide the PER pane
	Chart BER	Display or hide the BER pane
	AFH Master	Display or hide the AFH Master Piconet pane
	AFH Slave 1 Piconet	Display or hide the AFH Slave 1 Piconet pane
	AFH Slave 2 Piconet	Display or hide the AFH Slave 2 Piconet pane
	Standard toolbar	Display or hide the Standard toolbar
	Status bar	Display or hide the Status bar
	Customize…	Customization of the keyboard and toolbar
Help Menu		Link Quality Monitor Information and version number

Table 2 : Menu Bar

2. Tool Bar

Item	Description
	Create a new lqm file

📂	Open an existing lqm file
💾	Save the active lqm with a new name
COM1 ▾ Port Connection Box	Select the port to configure the connection between the application and the device

Table 3 : Tool Bar

2.1 **Customize window** – choose customize in the view menu.
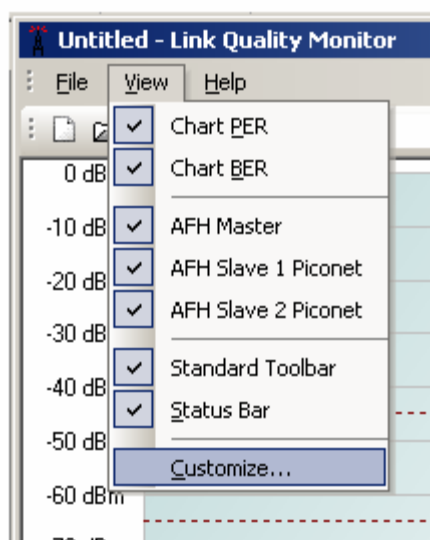

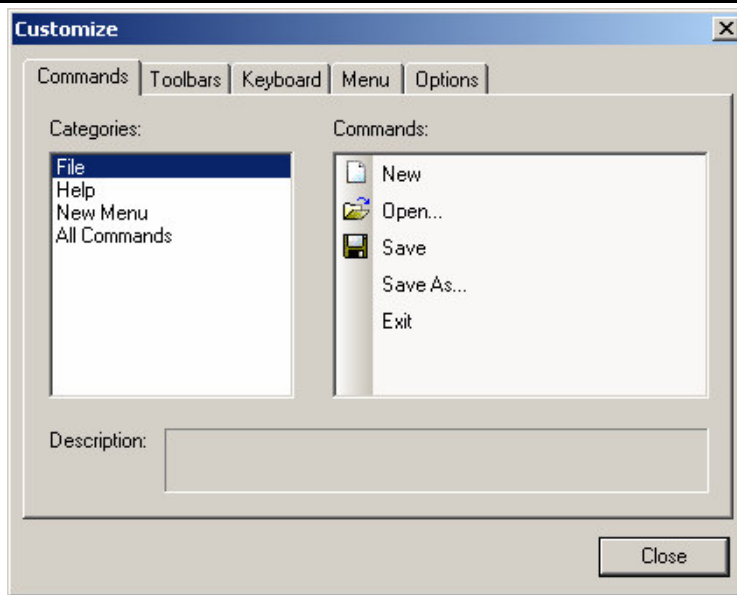Figure 4 : Choosing customize window

The customize window opens.

Figure 5 :Command tab window

The Customize window is divided into five Tabs:

- Commands
- Toolbars
- Keyboard
- Menu
- Options

2.1.1 Command tab

Using the **Command Tab** you can drag the commands from the Customize window and drop them onto the Menu or Tool bars. See figure 5.

2.1.2 Toolbars tab

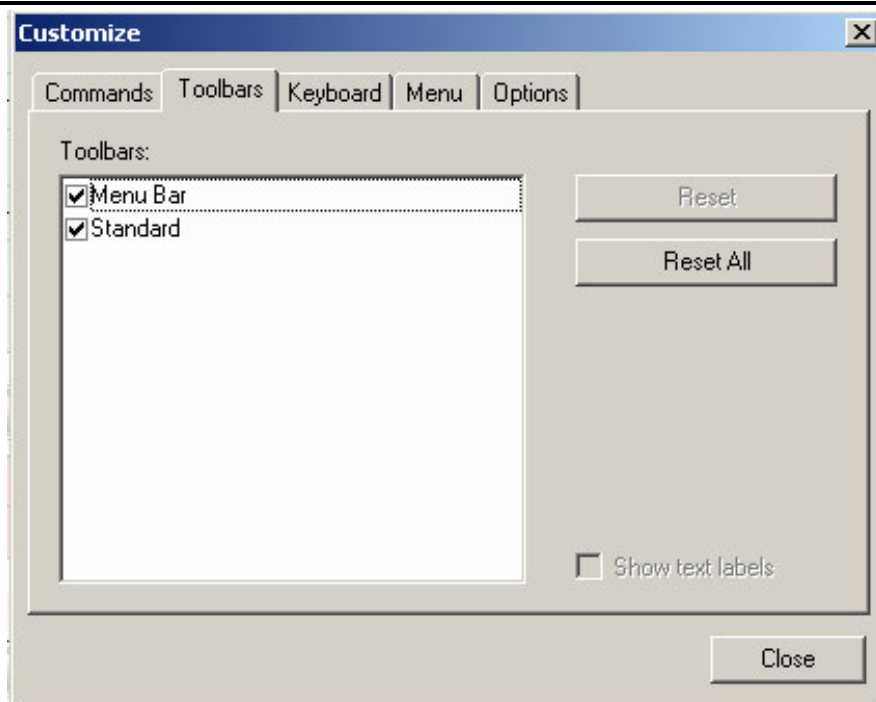The **Toolbars Tab** enables you to enable and disable the **Toolbars**.

Figure 6 : Toolbars tab window

2.1.3 Keyboard tab

The **Keyboard Tab** enables you to make keyboard shortcuts for each item on the menus.
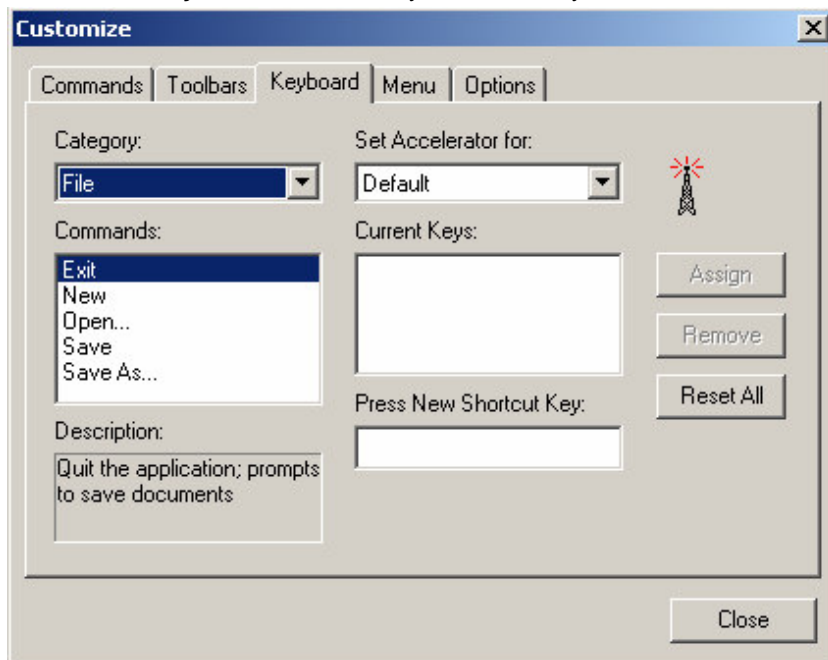

Figure 7 : Keyboard tab window

2.1.4 Menu tab

The **Menu Tab** enables the customization of the menus, which includes animations and shadows.
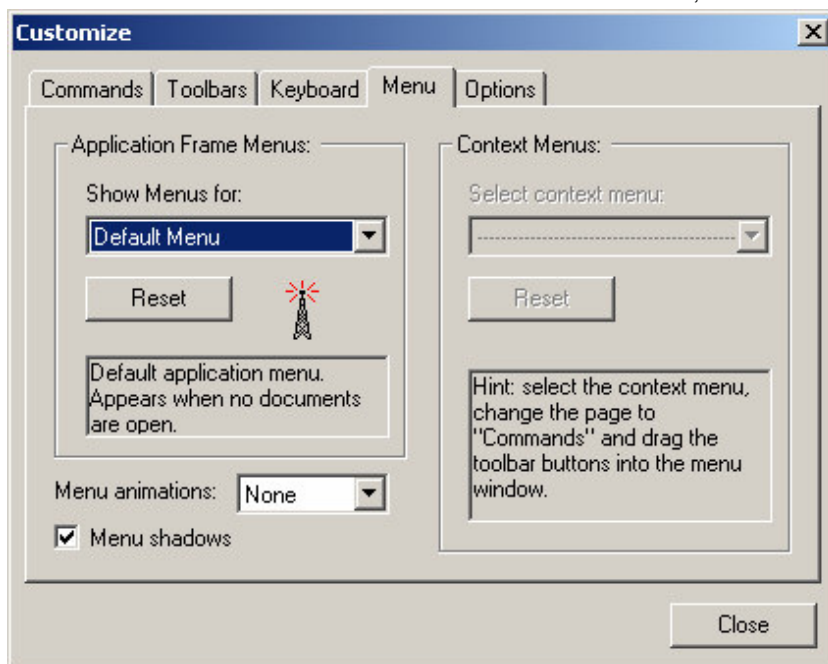

Figure 8 : Menu tab window

2.1.5 Options tab

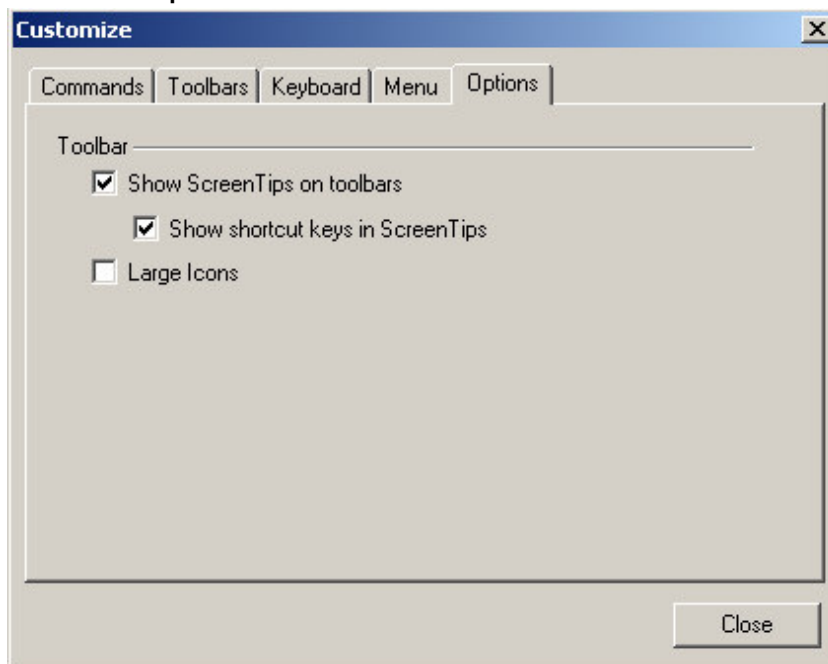The **Options Tab** customizes how the menus are viewed.

Figure 9 : Option tab window

8. Description

The Link Quality monitor displays 4 different kinds of data regarding the quality of the link: RSSI, PER, BER and used channels map.

The Link Quality Monitor application support up to 7 handles and 3 piconets (one master and two slaves).
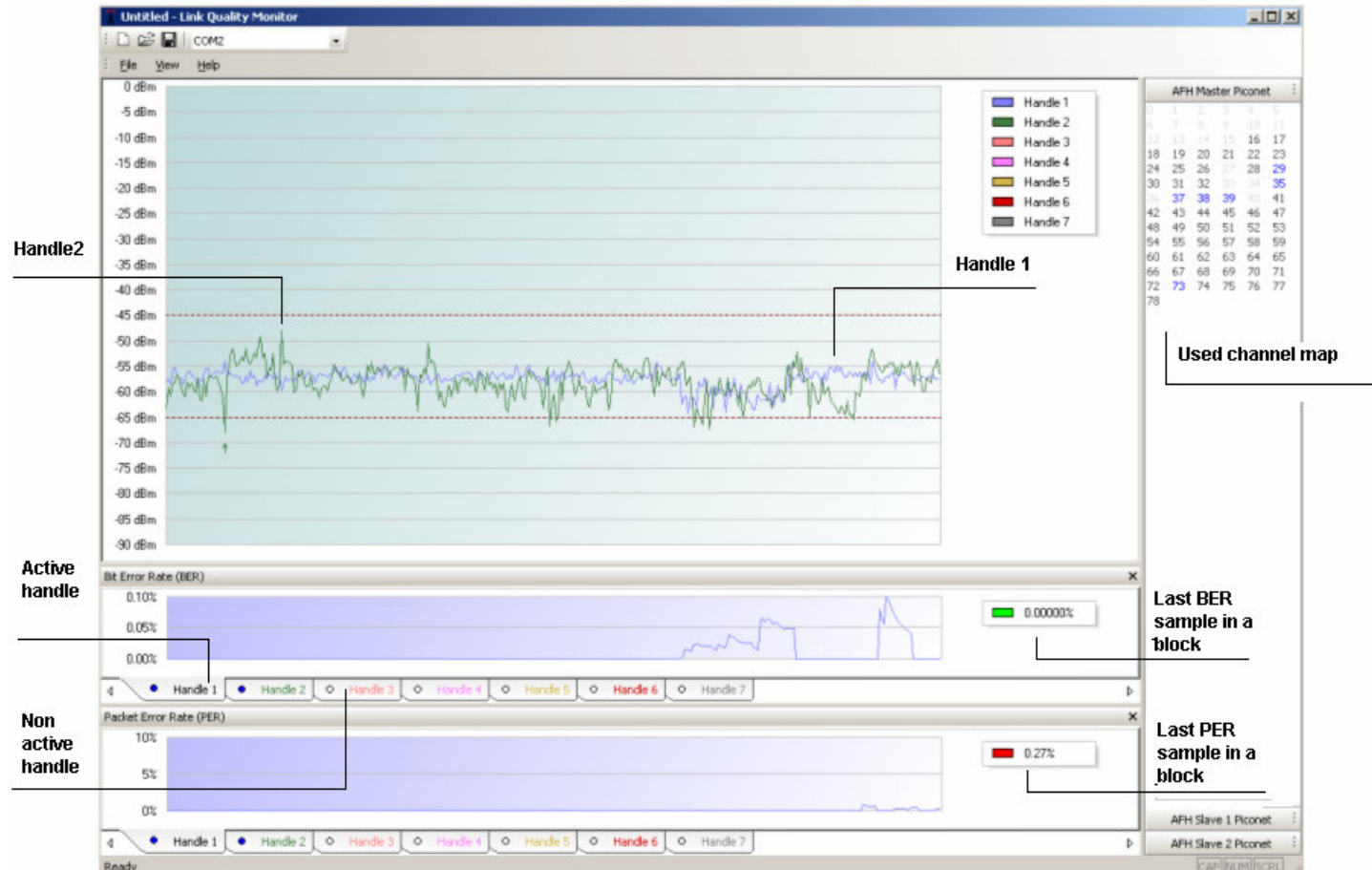

Figure 10: Link Quality Monitor active window

1.   RSSI Window

The RSSI window displays the RSSI measurements of up to 7 handles. Each handle is represented by a specific color. The scale of the window varies from 0[dbm] to -90[dbm], the increase threshold is -65[dbm], and the decrease threshold is -45[dbm].

Each time the measured RSSI is beneath the lower threshold the device send request to the transmitting device to increase the transmitted power in order to keep the transmitted power within the desired range. In this case a ↑ appears (in the same color of that specific handle).When the transmitted power is above the upper threshold a ↓ appears.
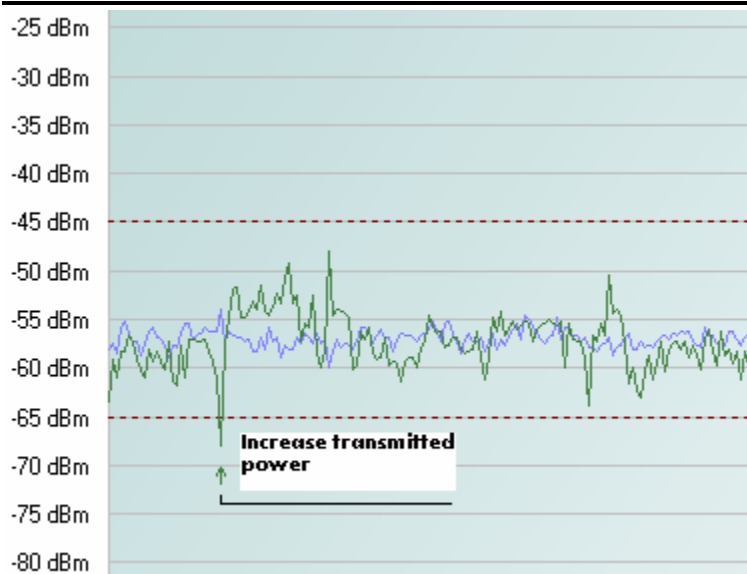
Figure 11: Increase transmitted power

2.   PER/BER Window

The PER/BER windows display the error statistics.

In order to enable these features we need to use a vendor specific command HCI_VS_Cinfigure_Error_Statistics.

Using this command we can adjust the resolution i.e. number of bits which are used for the statistics for the BER and number of packets used for the statistics for the PER.

For more details regarding this command view BRF6150 2.12 vendor specific commands.

Each handle is represented by a different graph and a specific color (the same color as it was in the RSSI window). There are up to 7 handles. An active handle is indicated by a full dot near the handle title.
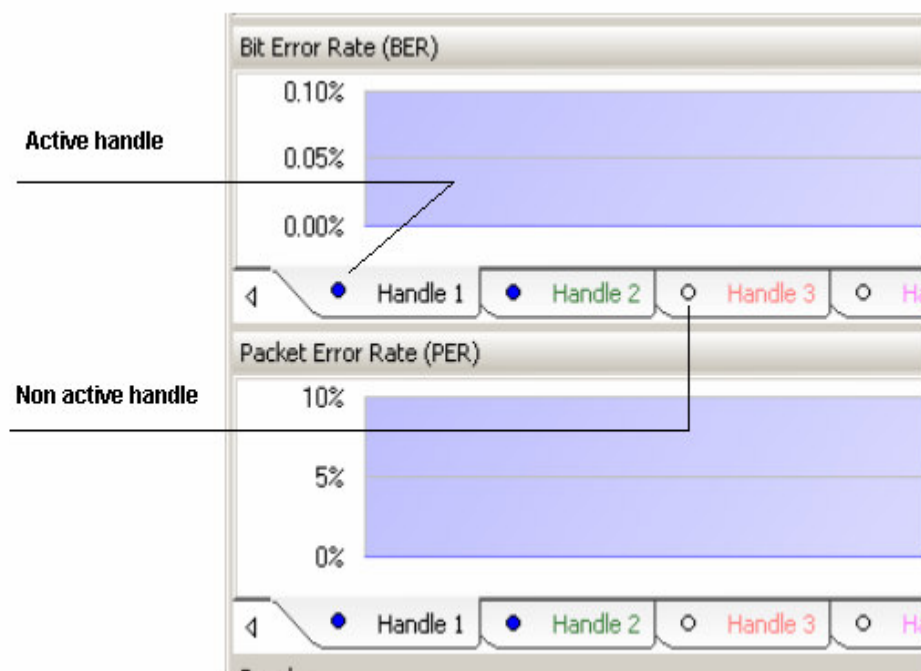
Figure 12 : PER/BER active handle

The last PER/BER sample is displayed near the related graph. A green indication means that there are enough samples for the statistics and a red indication means that there aren't enough samples for the statistics.
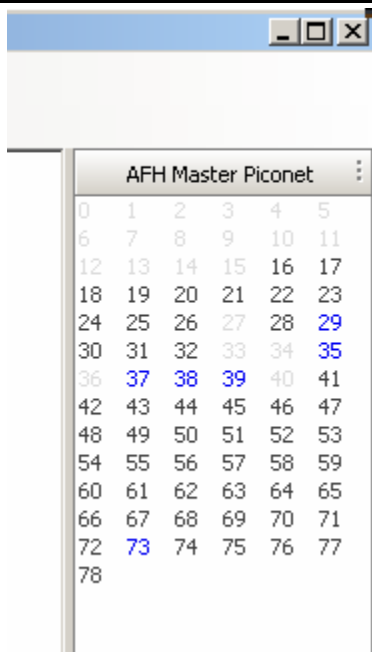
3.   Used channels windows

There are up to 3 channel map (up to 3 piconets – a device can be a master in one piconet and slave in two other piconets).

The channels are shown using a decimal value 0-78 (i.e. channel #0 = 2402MHz, channel #1 = 2403MHz …)

Each channel can be represented in the following colors:

- Light gray - the specific channel is not in use.
- Dark gray - the specific channel has just been removed.
- Blue – the specific channel has just been added.
- Black – the specific channel is in use.

See figure 6.

Figure 13 - Used channels window

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