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# APPLICABILITY TABLE

**PRODUCTS**

- WE866C3
- WE866C6
- LE910CX SERIES
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1. INTRODUCTION

1.1. Scope
This document provides the step-by-step procedure to perform WE866Cx RF test in LTE Bundling applications.

1.2. Audience
This document is intended only for Telit customers who want to set up a bundling application using WE866Cx module.

1.3. Contact Information, Support
For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com

Alternatively, use:
https://www.telit.com/contact-us

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:
http://www.telit.com

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.
Telit appreciates feedback from the users of our information.
1.4. Text Conventions

**Danger** – This information MUST be followed, or catastrophic equipment failure or bodily injury may occur.

---

**Caution or Warning** – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

---

**Tip or Information** – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.
1.5. Related Documents

- LE910Cx_SW_Guide, 1VV0301556
- Qualcomm_80-wl400-24_e_qdart_connectivity_User_Guide
- Qualcomm_80-wl431-24_a_qca9377-3_qdart_User_Guide
- Qualcomm_80-yc321-3_a_qca6174a_qca9377_qca9379_lea_myftm_User_Guide
- Qualcomm_80-n8207-1_y_wfa_certification_for-msm_sdm_platforms_Test_Guide
2. INSTALL AND SETUP TOOLS

This section provides step-by-step procedure to install QDART package required to perform RF tests using QRCT (Qualcomm Radio Control Toolkit).

2.1. Prerequisites

2. QDART tool package from Qualcomm.

To download and install the latest QDART software package, perform the following steps:

1. Open [https://createpoint.qti.qualcomm.com/](https://createpoint.qti.qualcomm.com/) and login with your registered Qualcomm Email ID and Password. First time users, click Register.

   ![CreatePoint Login](image1)

   The homepage is displayed.

2. On the homepage, under Product Kits > All Product Types > Bluetooth/Wi-Fi, select DEV. This enables access to the tools.

   ![Product Kits](image2)

3. Select Tools and search for QDART.
   - Select, Subscribe and click **QDART_CONN.WIN.1.0 Installer** or **QDART.WIN.4.8 Installer** to download. QDART_CONN.WIN.1.0 is a subset of QDART.WIN.4.8, hence the file size is smaller.
A pop-up window appears “The download will initiate in your browser shortly. Please do not close this window until your download has initiated.”

4. Install **QDART_CONN.WIN.1.0 Installer**. Note that since this version of QDART has included windows USB driver which will be installed automatically during the installation of QDART.

5. To install QDART Run the QDART executable installer in **Administrator mode**.
Welcome to the Setup Wizard for QDART-Connectivity

The Setup Wizard will install QDART-Connectivity on your computer. To continue, click Next.

Recommended System Requirements for Full Installation

- Desktop or laptop computer, Dual Core, 2 GHz
- 2GB of RAM
- 4GB of hard drive space for full installation
- Microsoft .NET Framework 4.0 minimum except QRCT (NET 4.5)
- Microsoft MSXML 4 & MSXML 6 parsers
- A free serial I/O port or USB port, data cable
- QPST, Qualcomm USB host driver (delivered with QDART) or OEM USB host diagnostic Drivers

WARNING: This program is protected by copyright law and international treaties.

Please select a setup type.

- Complete
  All program features will be installed. (Requires the most disk space.)

- Custom
  Choose which program features you want installed and where they will be installed. Recommended for advanced users.
6. The QDART installer installs multiple tools. This document describes the procedure for doing manual RF tests using QRCT.

**Note:** To use the QDART version (QDART-CONN 1.0-00072.1 and later) with Litepoint IQxel80/IQxel160, Anritsu 8870A, and NI PXI 5644/5645/5646, the SCPI interface is mandatory.

Contact the equipment company to get the SCPI package. Telit/Qualcomm does not distribute the equipment SCPI libraries to its customers.
2.2. Wi-Fi Hardware Test Setup

2.2.1. Direct Connection Setup

In this setup,
1. WE866Cx module is physically connected to LE910Cx through the SDIO interface.
2. LE910Cx is directly connected to HOST PC via USB interface as shown below.

![Direct Connection Setup Diagram](image)

2.2.2. Indirect Connection Setup

In this setup, the additional process is needed if the LE910Cx and the HOST PC is not physically connected.

![Indirect Connection Setup Diagram](image)

Note: In case of IP based communication between LE910Cx and Host PC: Before using QRC4T4 mentioned in section 5.2, OPST tool need a configuration as shown below

1. The WE866Cx module is physically connected with the LE910Cx through the SDIO interface (bundled).
2. The LE910Cx and the customer application processor is physically connected with the USB interface.
3. The customer application processor is physically connected with the HOST PC.
   - All packet data of the DIAG should be forwarded between the LE910Cx and the Host PC through the customer application processor.
   - The MI information of each USB composition is as below.

<table>
<thead>
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<tbody>
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<td>MODEM</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>SAP</td>
</tr>
</tbody>
</table>
3. WI-FI SIGNALING RF TEST

This section provides the step-by-step procedure to configure WE866Cx for Wi-Fi signaling test.

3.1. Access Point Mode

1. Create a directory by issuing the below commands:
   
   ```
   adb shell(login:root/password:oelinux123)
mkdir/cache/firmware
   ```

2. Navigate to the WE866Cx.bin files directory and open a command prompt to run the following commands (not under adb shell))

   ```
   adb push utf.bin/cache/firmware
   adb push bdwlan.bin/cache/firmware
   adb push qwlan.bin/cache/firmware
   adb push otp.bin/cache/firmware
   Issue the following commands:
   adb shell(login:root/password:oelinux123)
echo -n "\"/cache/firmware\"" > /sys/module/firmware_class/parameters/path
   ```

3. Start Wi-Fi Access Point Mode

   ```
   /etc/init.d/wlan start ap //– start wlan driver in “ap” mode
   ifconfig wlan0 192.168.1.1 netmask 255.255.255.0 up
   //configure “wlan0” interface IP address (only valid for AP mode as in ST mode ip will be received via dhcp)
echo 1 >/proc/sys/net/ipv4/ip_forward
hostapd -B /data/wlan/hostapd.conf -d
brctl addif bridge0 wlan0
//The last 3 commands are related to network routing + start AP
daemon
   ```

Once the above commands are successfully executed, the following AP will be listed.

- **AP Name:** QSoftAP
- **Password:** 1234567890

---

**For installing ADB please refer to section 6.2 ADB Installation.**

---

3.1.1. AP Configuration

Hostapd.conf file can pulled/pushed at /data/wlan/ location.

File name: “00CC9974.conf_origine”

---

00CC9974.conf_origine
3.2. **STA (Client) Mode**

1. Create a directory by issuing the below commands:

   ```
   adb shell
   (login:root/password:oelinux123)
   mkdir/cache/firmware
   ```

2. Navigate to the **WE866Cx.bin** files directory and open a command prompt to run the following commands (not under adb shell)

   ```
   adb push utf.bin/cache/firmware
   adb push bdwlan.bin/cache/firmware
   adb push qwlan.bin/cache/firmware
   adb push otp.bin/cache/firmware
   Issue the following commands:
   adb shell
   (login:root/password:oelinux123)
   echo-n ""/cache/firmware" > /svs/module/firmware_class/parameters/path
   ```

3. **Start Wi-Fi STA (Client) Mode**

   ```
   AT#WLANMODE=1 // To force in client mode
   AT#WLANSTART=1 // To start WLAN
   AT#WLANSCAN=0 // scanning for wifi networks
   ```

   OR

   ```
   adb shell command: iw wlan0 scan
   ```

   **SSID:** MT8862A or CMW-AP
   **signal:** -44.00 dBm
   **freq:** 2437

   ```
   AT#WLANCONNECT=CMW-AP // SSID=MT8862A or CMW-AP
   ```
4. WI-FI NON-SIGNALING RF TEST

This section provides the step-by-step procedure to perform non-signaling (FTM) Wi-Fi RF test using QRCT.

4.1. Prerequisites

- WE866Cx firmware

```
utf.bin
bdwlan.bin
qwlan.bin
otp.bin
```

4.2. Test Setup and Procedure

4.2.1. Setup WLAN Test

**Step 1:** Connect the USB cable, RF cable and power up the hardware.

Once successfully connected the device is listed under Device Manager as shown below.
Step 2: Start WE866Cx in FTM mode

Now, open a command prompt and run the following commands. Note that WE866Cx firmware files will be present in LE910Cx firmware by default.

1. [Optional] Upload WE866Cx Firmware using the following commands.
   
   ```
   adb shell
   root
   oelinux123 // root is accessible when string « ~ # » appears
   mkdir /cache/firmware // Only once
   In CMD windows from location of bin files (attached) run commands below: not under adb shell // only once
   adb push utf.bin /cache/firmware
   adb push bdwlan.bin /cache/firmware
   adb push qwlan.bin /cache/firmware
   adb push otp.bin /cache/firmware
   ```

2. Place WE866Cx in FTM mode.

   ```
   adb shell
   root
   oelinux123 // root is accessible when string « ~ # » appears
   /etc/init.d/wlan start_ftm
   ftmdaemon
   ```

   You can check the WE866Cx log with the `dmesg` command.
Step 3: Establish connection between WE866Cx and QRCT

Perform the following steps to put the device in FTM mode.

Run the QRCT tool.

1. Select Target type **MSM_MDM** from the drop-down list.
2. Select **COM** port

3. Click **Connect**
4. Select **Category > WLAN**
5. Select **Chipset > QCA6174**
6. Click **MANUAL SELECT CHIP**
7. Click **Chip Selection**
8. In **Chip Selection** window, select **Chip > QC6174**
9. Select **RFCal Data Source > File**
10. Click **Select BDF** and browse the BDF file.
    
    For example: C:\WE866C3 bin files\bdwlan Default\bdwlan.bin
11. Select **WLAN Instance >Inst0**
12. Click **Establish Connection**

Once the connection is successful, the following message appears. Now, the DUT is ready for RF Test.
4.2.2. WLAN Tx Test in 2.4GHz band

1. Click **TX**

2. Under **TX SETUP**, set the desired configuration parameters.
<table>
<thead>
<tr>
<th>Description</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tx Mode</td>
<td>Cont. Tx TX99: 99% duty cycle TX</td>
</tr>
<tr>
<td>2 Channel</td>
<td>All 2GHz and 5GHz channels</td>
</tr>
<tr>
<td>3 Tx Power control</td>
<td>TxPowerAuto: Use data rate target power level from BDF</td>
</tr>
<tr>
<td></td>
<td>TxPowerForce_CLPC: Use CLPC calibration data</td>
</tr>
<tr>
<td></td>
<td>TxPowerForce_O LPC: Use OLPC calibration data</td>
</tr>
<tr>
<td>4 TxPower</td>
<td>Input for Tx power level in CLPC or OLPC</td>
</tr>
<tr>
<td></td>
<td>Tx power level can 0.5dBm increments</td>
</tr>
<tr>
<td>5 HT Mode</td>
<td>CCK: 802.11b</td>
</tr>
<tr>
<td></td>
<td>HT40+: 40MHz bandwidth, primary high, 802.11n</td>
</tr>
<tr>
<td></td>
<td>No HT: 802.11g and 802.11a</td>
</tr>
<tr>
<td></td>
<td>HT20: 802.11n BW20, HT40: 802.11n BW40</td>
</tr>
<tr>
<td></td>
<td>VHT20: 802.11ac BW20, VHT40: 802.11ac BW40, VHT80: 802.11ac BW80</td>
</tr>
<tr>
<td>6 Data rate</td>
<td>All supported 802.11 a/b/g/n/ac data rates</td>
</tr>
<tr>
<td>7 Tx pattern</td>
<td>zeros or PN9_Pattern</td>
</tr>
<tr>
<td>8 J0f packets</td>
<td>0: for continuous Tx</td>
</tr>
<tr>
<td>9 Packet size</td>
<td>Size of packets (in bytes)</td>
</tr>
<tr>
<td>10 Antenna</td>
<td>0: Antenna 0 as a default</td>
</tr>
<tr>
<td>11 Tx Chain</td>
<td>CHAIN 1: 1st RF Chain</td>
</tr>
</tbody>
</table>

**Note:** In HT Mode

HT40+: 40MHz bandwidth, primary high, 802.11n
HT40-: 40MHz bandwidth, primary low, 802.11n

The below screenshot shows Tx settings in 802.11b, CH.6, 2.4GHz band.
3. Click **SET TX ON**
4. Observe the RF signal parameters on test instrument CMW500.

5. To change any of the Tx parameters, click **SET TX OFF**, then change the parameter and re-click the **SET TX ON**.
4.2.3. WLAN Tx Test in 5GHz band
The below screenshot shows Tx settings in 802.11ac, CH.46, 5GHz band.
4.2.4. WLAN Rx Test in 2.4GHz band

1. Click RX

![Screenshot of RX settings in 802.11b, CH.6, 11Mbps, 2.4GHz band.]

2. Under RX SETUP, set the desired configuration parameters.

<table>
<thead>
<tr>
<th>Description</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Rx Mode</td>
<td>All Frames: Rx all frames</td>
</tr>
<tr>
<td>2 Channel</td>
<td>All 2GHz and 5GHz channels</td>
</tr>
<tr>
<td>3 HT Mode</td>
<td>CCK: 802.11b</td>
</tr>
<tr>
<td></td>
<td>No HT: 802.11g and 802.11a</td>
</tr>
<tr>
<td></td>
<td>HT20: 802.11n BW20, HT40: 802.11n BW40</td>
</tr>
<tr>
<td></td>
<td>VHT20: 802.11ac BW20, VHT40: 802.11ac BW40, VHT80: 802.11ac BW80</td>
</tr>
<tr>
<td>4 Data rate</td>
<td>All supported 802.11 a/b/g/n/ac data rates</td>
</tr>
<tr>
<td>5 Antenna</td>
<td>0: Antenna 0 as a default</td>
</tr>
<tr>
<td>6 Rx Chain</td>
<td>CHAIN_1: 1st RF Chain</td>
</tr>
</tbody>
</table>

The below screenshot shows Rx settings in 802.11b, CH.6, 11Mbps, 2.4GHz band.
3. After setting desired Rx parameters, click **SET CONT. RX**

4. Configure the VSG to transmit significant number of WLAN packets.

5. Click **GET RX REPORT** in the QRCT. Inspect receiver report and calculate PER.
4.2.5. **WLAN Rx Test in 5GHz band**

The below screenshot shows Rx settings in 802.11ac, CH.46, MCS9, 5GHz band.
5. BLUETOOTH RF TEST

This section provides the step-by-step procedure to perform a BLE RF testing once the DUT is in Factory Test mode.

5.1. Prerequisites

The following files must be available in the WE866Cx firmware. If not, please contact Telit Technical support.

- tfbbtnv11.nvm
- tfbtfw11.tlv

5.2. Test Procedure

5.2.1. Use Case 1: WE866Cx HCI UART Interface with LE910Cx Main UART

1. Connect the WE866Cx UART to the LE910Cx main UART.
2. Load BDF file to WE866Cx. Steps are given in section 4.2.1 to load BDF file to WE866Cx.
3. Execute the below commands in adb shell:
   ```
   cd /sys/class/tty
   ls
   ```
4. Check `ttyHS0`.
5. Connect the LE910Cx USB interface to your PC and check the LE910Cx modem serial port.
6. Open the LE910Cx serial port in Tera Term and issue the below commands:
   ```
   AT#USBCFG?
   AT#PORTCFG?
   ```
If the response is not as shown in the above screenshot, issue the below AT commands:

AT#USBCFG=13
AT#PORTCFG=14

**Note:** Execution of these commands are needed only once after flashing the firmware to LE910Cx.

7. If BT_EN pin is connected to LE910Cx pin GPIO_07, issue the below AT command to LE910Cx to power-up the WE866Cx Bluetooth.

AT#GPIO=7,1,1,0

**Note –** This command is not required in the designs where WL_EN and BT_EN are shorted.

8. Close the LE910Cx serial port.
9. To create pipe between LE910Cx USB port to LE910Cx main UART port, issue the below commands in `adb shell`.

   ```
   cd /sys/class/tty
   killall socat
   socat -b128 /dev/ttyGS1,raw,echo=0,b115200
   /dev/ttyHS0,raw,echo=0,crtscts=1,b115200 &
   ```

10. Open **QRCT** tool and select the serial port and click **Connect**.
11. Issue HCI reset. QRCT tool opens the **BT DIAG Bridge** console. The WE866Cx BT controller responses will be displayed as shown below.

12. Download NVM file
   - Browse NVM file location.
   - Click **Download NVM** (file name: xxxx.nvm)

13. Download the patch file
   - Browse Patch file location.
   - Click **Download Patch** (file name: xxxx.tlv)

14. Issue HCI reset. Downloaded files will take effect.

15. To start WE866Cx Bluetooth RF tests, refer to section **5.2.3 BLE Tx Test**.
5.2.2. **Use Case 2: WE866Cx HCI UART Interface with LE910Cx AUX UART**

1. Connect the WE866Cx UART to LE910Cx main UART.
2. Load BDF file to WE866Cx. Steps are given in section 4.2.1 to load BDF file to WE866Cx.
3. Execute the below commands in adb shell:
   ```
   cd /sys/class/tty
   ls
   ```
4. Check `ttyHS1`.
5. Connect the LE910Cx USB interface to PC and check the LE910Cx modem serial port.

![Device Manager](image)

6. Open the LE910Cx serial port in **Tera Term** (115200 baud, 8N1) and issue the below commands.

   ```
   AT#USBCFG=13
   AT#PORTCFG=16
   ```

   **Note:** Execution of these commands are needed only once after flashing the firmware to LE910Cx.

7. If BT_EN pin is connected to LE910Cx pin GPIO_07, issue the below AT command to LE910Cx to power-up the WE866Cx Bluetooth.

   ```
   AT#GPIO=7,1,1,0
   ```

   **Note –** This command is not required in the designs where WL_EN and BT_EN are shorted.
8. Close the LE910Cx serial port.
9. To create pipe between LE910Cx USB port to LE910Cx AUX UART port, issue the below commands in `adb shell`.

```
cd /sys/class/tty
killall socat
socat -b128 /dev/ttyGS1,raw,echo=0,b115200 /dev/ttyHS1,raw,echo=0,crtstcs=1,b115200 &
```

**Note:** If required, use params b921600 and b3000000 for 921kbps and 3Mbps baud rates.

10. Open QRCT tool and select the serial port and click **Connect**.

11. Issue HCI reset. QRCT tool opens the **BT DIAG Bridge** console. The WE866Cx BT controller responses will be displayed as shown below.
12. Download NVM file
   - Browse NVM file location.
   - Click **Download NVM** (file name: xxxx.nvm)

13. Download the patch file
   - Browse Patch file location.
   - Click **Download Patch** (file name: xxxx.tlv)

14. For the loaded files to be effective, issue HCI reset.

15. To start WE866Cx Bluetooth RF tests, refer to section **5.2.3 BLE Tx Test**.

**5.2.3. BLE Tx Test**

To start the BLE RF Tx test, refer to the QRCT BLE tab below and select the options as per the test requirement.

1. To start the Tx test, click **Transmitter Test** in QRCT.
2. Observe the test instrument user interface to see the results.
3. To stop the Tx test, click **Tx Stop** in QRCT.

4. Below screenshot shows the Tx test results from **Litepoint iQxel** user interface.
5. Note the Avg and Max Tx power value in dBm.

5.2.4. BLE Rx Test

To start the BLE RF Rx test, refer to the QRCT BLE tab below and select the options as per the test requirement.

1. To start the Rx test, click Receiver Test in QRCT.
2. Configure your test instrument for generating BLE waveform as per the test requirement.
3. Generate N packets and wait till all the packets are transmitted.
4. To get the Number of packets received, click End Test in QRCT. From this PER can be calculated.

5.2.5. Bluetooth EDR Tx Test

To perform the Bluetooth Enhanced Data Rate (EDR) RF Tx test, refer to the QRCT Bluetooth Non-Signaling (EPTM) tab below and select the options as per the test requirement.

1. To start Tx transmission in burst mode, click Tx only Burst in QRCT and measure the power on the spectrum analyzer or CMW500.
2. To stop the Tx test, click **Stop** in QRCT.
3. Below screenshot shows the Tx test results from **CMW500** user interface.

5.2.6. Bluetooth EDR Rx Test

To perform the Bluetooth Enhanced Data Rate (EDR) RF Rx test, refer to the QRCT Bluetooth Non-Signaling (EPTM) tab below and select the options as per the test requirement.
1. To start Rx transmission in burst mode, click **Rx Only Burst** in QRCT.
2. Click **Rx Test stats** to receive statistics in the debug window and average statistics in the GUI.
3. Configure your test instrument by setting the required frequency for RX sensitivity.
4. The Rx measurements are displayed.
5. To stop the Rx test, click **Stop** in QRCT.
6. APPENDIX

6.1. Board Data File (BDF)
BDF (Board Data file) contains a set of fields and parameters that are used by firmware for device configuration and operation. The BDF must be placed in /cache/firmware directory.

6.1.1. Push/Pull BDF (through ADB commands)

**Copy from PC to target (Push):**
```
adb push bdwlan.bin /cache/firmware
```

**Copy from target to PC (Pull):**
```
adb pull /cache/firmware/bdwlan.bin
```

6.2. ADB Installation
Android Debug Bridge (adb) is a versatile command-line tool that lets you communicate with a device. The adb command facilitates a variety of device actions, such as installing and debugging apps, and it provides access to a Unix shell that you can use to run a variety of commands on a device.

Perform the following steps to install ADB on an Android SDK Platform for Windows:


   **Downloads**
   If you're an Android developer, you should get the latest SDK Platform-Tools from Android Studio's [SDK Manager](https://developer.android.com/studio) or from the `sdkmanager` command-line tool. This ensures the tools are saved to the right place with the rest of your Android SDK tools and easily updated.

   But if you want just these command-line tools, use the following links:
   - Download SDK Platform-Tools for Windows
   - Download SDK Platform-Tools for Mac
   - Download SDK Platform-Tools for Linux
3. The Terms and Conditions pop-up window appears. Select the checkbox and click DOWNLOAD ANDROID STUDIO FOR WINDOWS.

4. The “platform-tools_r28.0.2-windows.zip” will be downloaded to your local drive on your computer.
5. Unzip the folder onto your Windows C drive ("C:\Program Files") and rename the folder as "Adb".
6. Add "ADB" to the Windows Path to set the environmental variables by performing the following steps:
   a. Right-click on the windows Start button and select Run.
   b. Type sysdm.cpl in Run window and click OK to open System Properties.
   c. Under Advanced tab, click Environment Variables.
   d. In the Environment Variables window,
      i. Under System variables, click New.
      ii. In the New System Variable window, enter the following:
          Variable name: ADB
          Variable value: C:\Program Files\Adb\platform-tools
          Then, click OK.
iii. Under **User Variable**, select **Path** and click **Edit**.

iv. In the **Edit environment variable** window, click **New** and enter `C:\Program Files\Adb\platform-tools` for the variable value, and then click **OK**.

---

### 6.2.1. Verifying the Installation

1. Launch **Windows Power shell** from the **Start** menu and execute the **adb version** to verify the location is added.

```
PS C:\Users\ > adb version
Android Debug Bridge version 1.0.40
Version 28.0.2-5303910
Installed as C:\Program Files\Adb\platform-tools\adb.exe
PS C:\Users\ >
```
6.3. ADB Commands Tutorial

adb devices : List of all devices
adb shell : launches a shell on the device
adb push <local> <remote> : pushes the file <local> to <remote>
adb pull <remote> [<local>] : pulls the file <remote> to <local>. If <local> isn’t specified, it will pull to the current folder.
adb logcat : allows you to view the device log in real-time. You can use adb logcat -b radio to view radio logs, and adb logcat -C to view logs in colour
adb install <file> : installs the given .apk file to your device
adb shell dumpsys meminfo : Memory consumption overview
adb shell dumpsys batterystats --charged <package-name>: Battery information tasks
6.4. LE910Cx AT Commands

6.4.1. Enable/Disable WLAN - #WLANSTART

#WLANSTART – Enable/Disable WLAN

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANSTART=[&lt;mode&gt;]</td>
<td>Set command to enable/disable WLAN</td>
</tr>
</tbody>
</table>

**Parameter:**

- `<Mode>` - int type, status mode.
- `0` – Disable
- `1` – Enable
- `2` – Auto enable with start

- `<cid>` - (PDP Context Identifier) numeric parameter which specifies a particular PDP context definition.

**Note:**
Enable WLAN will start it as access point mode by default unless configure prior to start (at#wlanmode).

**Note:**
In case of starting WLAN with no network (no SIM card, +cfun=4, …) WLAN will start without internet access and it will return +CME ERROR: No Internet Access.

**Note:**
Starting WLAN without `<cid>` parameter will start the WLAN with `<cid>=1`.

AT#WLANSTART? | Read command returns the current WLAN status in the format:

#WLANSTART: <mode>

**Where:**

- `<mode>`
  - `0` – WLAN off
  - `1` – WLAN on
  - `2` – WLAN on and auto start

- `<cid>` - PDP Context Identifier

AT#WLANSTART=? | Test command returns the supported range of values for parameter `<mode>` `<cid>`.
### 6.4.2. Enable/Disable Broadcast - #WLANBROADCAST

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>#WLANBROADCAST</td>
<td>Enable/Disable broadcast</td>
<td></td>
</tr>
<tr>
<td>AT#WLANBROADCAST ST=[&lt;mode&gt;]</td>
<td>Set command enable/disable broadcast</td>
<td></td>
</tr>
<tr>
<td><strong>Parameter:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&lt;mode&gt;</strong> - int type, status mode.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – Enable broadcast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – Disable broadcast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT#WLANBROADCAST ST?</td>
<td>Read command returns the current broadcast status in the format:</td>
<td></td>
</tr>
<tr>
<td>#WLANBROADCAST: &lt;mode&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Where:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&lt;mode&gt;</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – Enable broadcast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – Disable broadcast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT#WLANBROADCAST ST=?</td>
<td>Test command returns the supported range of values for parameter &lt;mode&gt;.</td>
<td></td>
</tr>
</tbody>
</table>

### 6.4.3. Change SSID - #WLANSSID

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>#WLANSSID – Change the SSID name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT#WLANSSID=[&lt;ssid&gt;]</td>
<td>Set command change the SSID name</td>
<td></td>
</tr>
<tr>
<td><strong>Parameter:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&lt;ssid&gt;</strong> - string type, ssid.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT#WLANSSID?</td>
<td>Read command returns the current SSID in the format:</td>
<td></td>
</tr>
<tr>
<td>#WLANSSID: &lt;ssid&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT#WLANSSID=?</td>
<td>Test command returns OK result code.</td>
<td></td>
</tr>
</tbody>
</table>
### 6.4.4. Change WLAN Mode - #WLANMODE

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#WLANMODE – Change mode : Access point/client</td>
<td></td>
</tr>
<tr>
<td>AT#WLANMODE=[&lt;mode&gt;]</td>
<td>Set command change WLANE mode</td>
</tr>
<tr>
<td></td>
<td><strong>Parameter:</strong></td>
</tr>
<tr>
<td></td>
<td><code>&lt;mode&gt;</code> - int type, status mode.</td>
</tr>
<tr>
<td></td>
<td>0 – Access point mode (AP)</td>
</tr>
<tr>
<td></td>
<td>1 – Client mode (STA)</td>
</tr>
<tr>
<td></td>
<td>2 – Concurrent mode (AP+STA)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANMODE?</td>
<td>Read command returns the current mode status in the format:</td>
</tr>
<tr>
<td></td>
<td>#WLANMODE: <code>&lt;mode&gt;</code></td>
</tr>
<tr>
<td></td>
<td><strong>Where:</strong></td>
</tr>
<tr>
<td></td>
<td><code>&lt;mode&gt;</code></td>
</tr>
<tr>
<td></td>
<td>0 – Access point mode (AP)</td>
</tr>
<tr>
<td></td>
<td>1 – Client mode (STA)</td>
</tr>
<tr>
<td></td>
<td>2 – Concurrent mode (AP+STA)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANMODE=?</td>
<td>Test command returns the supported range of values for parameter <code>&lt;mode&gt;</code>.</td>
</tr>
</tbody>
</table>

### 6.4.5. Return Assigned IP Address - # WLANIP

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#WLANIP – Return assigned IP address</td>
<td></td>
</tr>
<tr>
<td>AT#WLANIP</td>
<td>Execute return the assigned IP address</td>
</tr>
<tr>
<td>AT#WLANIP=?</td>
<td>Test command returns OK</td>
</tr>
</tbody>
</table>

### 6.4.6. Return Network Signal Strength - #WLANSIGNAL

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#WLANSIGNAL – Return the signal strength of the network we connected to</td>
<td></td>
</tr>
<tr>
<td>AT#WLANSIGNAL</td>
<td>Execute return the signal strength of the network we connected to</td>
</tr>
<tr>
<td>AT#WLANSIGNAL=?</td>
<td>Test command returns OK</td>
</tr>
</tbody>
</table>
### 6.4.7. Scan Wi-Fi Networks - #WLANSCAN

| AT#WLANSCAN= [<mode>] | Set command for client mode only for scanning for Wi-Fi networks.  
Parameter:  

- `<mode>` - int type, `mode`.  
  - 0 – normal result  
  - 1 – extend result |

| AT#WLANSCAN=? | Test command returns the supported range of values for parameter `<mode>`.

### 6.4.8. Connect to SSID - #WLANCONNECT

| AT#WLANCONNECT = [ [<ssid>], [<security>], [<key>] ] | Set command for client mode only, to connect to a given SSID  
Parameter:  

- `<ssid>` - string type, ssid.  
- `<security>` - int type  
  - 0 – wep  
  - 1 – wpaX  
- `<key>` - string type, key. |

| AT#WLANCONNECT=? | Read command returns the currently ssid it connect to in the format:  

- `# W LANCONNECT: <ssid>` |

| AT#WLANCONNECT=? | Test command reports supported values for the parameter `<type>`.  

- `# W LANCONNECT:(0-1)` |

### 6.4.9. Network Disconnect - #WLANDISCONNECT

| AT#WLANDISCONNECT | Execution command will disconnect from the network. Relevant for client mode only.  
AT#WLANDISCONNECT=? | Test command returns `OK` result code. |
### 6.4.10. Change WLAN Security Parameters - #WLANSECURITY

**#WLANSECURITY – Use to change the WLAN Security parameters**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>AT#WLANSECURITY</code></td>
<td>Set command allows changing WLAN security parameters. Relevant for AP mode only.</td>
</tr>
</tbody>
</table>
| `{[<wpa>],[<key_mgmt>],[pairwise],[key]>]` | Parameter:
| `<wpa>` - security type      | 0 – disable
| 1 – wpa1                     | 2 – wpa2
| 3 – wpa1 + wpa2              | `<key_mgmt>` - security type
| 0 – WPA-PSK                  | 0 – TKIP
| `<pairwise>` - This controls wpa’s data encryption | 1 – CCMP
| 0 – TKIP and CCMP            | `<key>` - string type, the network’s password

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>AT#WLANSECURITY ?</code></td>
<td>Read command reports the current value of the parameters</td>
</tr>
<tr>
<td><code>AT#WLANSECURITY =?</code></td>
<td>Test command returns the supported range of values for parameters</td>
</tr>
</tbody>
</table>
| `{<wpa>,<key_mgmt>,<pairwise>,<key>}` | in the format:
| `#WLANSECURITY: (0-3),(0-2),""` |

### 6.4.11. Change Channel Number and WLAN Protocol - #WLANPC

**#WLANPC – Use to change the channel number and the protocol.**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>AT#WLANPC=&lt;mode&gt;,&lt;channel_num&gt;</code></td>
<td>Set command allow to change the AP channel number. Relevant for AP mode only.</td>
</tr>
<tr>
<td>Parameter:</td>
<td></td>
</tr>
</tbody>
</table>
| `<mode>` - protocol type      | 0 – ‘b’
| 1 – ‘b/g’                   | 2 – ‘b/g/n’ (default)
| 3 – ‘a/g/n’                  | 4 – ‘a/g/n/ac’                |
| `<channel_num>` - channel number | NOTE: The channel can be selected automatically at run time by setting channel=0 |
### 6.4.12. Display Last Error in Detail - #WLANCFGERRO

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT# WLANPC ?</td>
<td>Read command returns the current channel number and protocol in the format:</td>
</tr>
<tr>
<td>AT# WLANDFCGERRO R</td>
<td>Execution command will display last error in detailed form.</td>
</tr>
<tr>
<td>AT# WLANDFCGERRO R=?</td>
<td>Test command returns OK result code.</td>
</tr>
</tbody>
</table>

**Example:**

```
AT# WLANDFCGERRO R=
#WLANCFGERRO: 0
```

### 6.4.13. Enable/Disable MAC Address Filter - # WLANMACMODE

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT# WLANMACMODE =&lt;mode&gt;</td>
<td>Set command allow to enable/disable the MAC address filter. Relevant for AP mode only.</td>
</tr>
<tr>
<td>Parameter:</td>
<td></td>
</tr>
<tr>
<td>&lt;mode&gt; - int type</td>
<td></td>
</tr>
<tr>
<td>0 = accept unless in deny list (default)</td>
<td></td>
</tr>
<tr>
<td>1 = deny unless in accept list</td>
<td></td>
</tr>
<tr>
<td>AT# WLANMACMODE ?</td>
<td>Read command returns the currently mode in the format:</td>
</tr>
<tr>
<td>AT# WLANMACMODE =?</td>
<td>Test command returns the supported range of values for parameter &lt;mode&gt;.</td>
</tr>
</tbody>
</table>

**Example:**

```
AT# WLANMACMODE = 1
#WLANMACMODE: 1
```
### 6.4.14. Add/Remove MAC Address to/from Accept List - #WLANMACACCEPT

<table>
<thead>
<tr>
<th>#WLANMACACCEPT – Use to add/ remove MAC address to/from accept list</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AT#WLANMACACCEPT=&lt;mode&gt;,&lt;mac_address&gt;</strong></td>
</tr>
<tr>
<td>Set command allow to add/remove MAC address to/from accept list. Relevant for AP mode only.</td>
</tr>
<tr>
<td><strong>Parameter:</strong></td>
</tr>
<tr>
<td>&lt;mode&gt; - int type</td>
</tr>
<tr>
<td>0 – remove from accept list</td>
</tr>
<tr>
<td>1 – add to accept list</td>
</tr>
<tr>
<td>&lt;mac_address&gt; - string type, mac address</td>
</tr>
<tr>
<td>NOTE: mac address should be written with ':' between each Hexa number. Example 00:A0:C6:00:00:17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AT#WLANMACACCEPT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read command returns the accept list:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AT#WLANMACACCEPT=?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test command returns the supported range of values for parameters</td>
</tr>
</tbody>
</table>

### 6.4.15. Add/Remove MAC Address to/from Deny List - #WLANMACDENY

<table>
<thead>
<tr>
<th>#WLANMACDENY – Use to add/remove MAC address to/from deny list</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AT#WLANMACDENY=&lt;mode&gt;,&lt;mac_address&gt;</strong></td>
</tr>
<tr>
<td>Set command allow to add/remove MAC address to/from deny list. Relevant for AP mode only.</td>
</tr>
<tr>
<td><strong>Parameter:</strong></td>
</tr>
<tr>
<td>&lt;mode&gt; - int type</td>
</tr>
<tr>
<td>0 – remove from deny list</td>
</tr>
<tr>
<td>1 – add to deny list</td>
</tr>
<tr>
<td>&lt;mac_address&gt; - string type, mac address</td>
</tr>
<tr>
<td>NOTE: mac address should be written with ':' between each Hexa number. Example 00:A0:C6:00:00:17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AT#WLANMACDENY?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read command returns the deny list:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AT#WLANMACDENY=?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test command returns the supported range of values for parameters</td>
</tr>
</tbody>
</table>
### 6.4.16. Set Regulatory Domain - #WLANCOUNTRYCODE

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#WLANCOUNTRYCODE</td>
<td>Use to set the regulatory domain</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANCOUNTRY CODE=&lt;country_code&gt;</td>
<td>Set command allow to change the country code. Relevant for AP mode only.</td>
</tr>
<tr>
<td><strong>Parameter:</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;country_code&gt;</td>
<td>string type</td>
</tr>
<tr>
<td><strong>NOTE:</strong> This can limit available channels and transmit power.</td>
<td></td>
</tr>
<tr>
<td>Default: US</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANCOUNTRY CODE ?</td>
<td>Read command returns the currently country code in the format:</td>
</tr>
<tr>
<td>#WLANCOUNTRYCODE: &lt;string&gt;</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
at#wlancountrycode?
#WLANCOUNTRYCODE: US
OK
```

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANCOUNTRY CODE =?</td>
<td>Test command return OK</td>
</tr>
</tbody>
</table>

### 6.4.17. Enable/Disable WLAN Unsolicited Message - #WLANINDI

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#WLANINDI</td>
<td>– Enable/Disable WLAN unsolicited message</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANINDI=[&lt;state&gt;</td>
<td>Set command enable/disable WLAN unsolicited message</td>
</tr>
<tr>
<td><strong>Parameter:</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;state&gt;</td>
<td>int type, status mode. 0 – disable (factory default) 1 – enable</td>
</tr>
<tr>
<td><strong>Note:</strong> need to be save on profiles</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANINDI?</td>
<td>Read command returns the currently WLAN status in the format:</td>
</tr>
<tr>
<td>#WLANINDI: &lt;state&gt;</td>
<td></td>
</tr>
</tbody>
</table>

**Where:**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>off</td>
</tr>
<tr>
<td>1</td>
<td>on</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT#WLANINDI=?</td>
<td>Test command returns the supported range of values for parameter &lt;state&gt;.</td>
</tr>
</tbody>
</table>
## 7. DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2019-03-25</td>
<td>First issue</td>
</tr>
<tr>
<td>1</td>
<td>2019-04-02</td>
<td>Added Chapter 2 Equipment</td>
</tr>
<tr>
<td>2</td>
<td>2019-04-05</td>
<td>Enhanced section 2.2.2 Indirect Connection Setup</td>
</tr>
<tr>
<td>3</td>
<td>2019-04-10</td>
<td>Added ADB installation details</td>
</tr>
<tr>
<td>4</td>
<td>2020-03-12</td>
<td>Added Chapter 5. Bluetooth RF Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Updated Chapter 4. Wi-Fi Non-Signaling RF Test with relevant screenshots.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Renamed and updated Chapter 2. Setup as Chapter 2. Install and Setup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tools</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Updated contact information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Removed Chapter 3. Test Bench: Tools &amp; Firmware</td>
</tr>
<tr>
<td>5</td>
<td>2020-04-20</td>
<td>Updated Applicability Table</td>
</tr>
<tr>
<td>6</td>
<td>2020-06-10</td>
<td>Changed the document name to “LE910Cx-WE866Cx Bundling RF Test User Guide” to incorporate WE866C6 module.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added the following sections:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.2.5 Bluetooth EDR Tx Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.2.6 Bluetooth EDR Rx Test</td>
</tr>
</tbody>
</table>
SUPPORT INQUIRIES

Link to www.telit.com and contact our technical support team for any questions related to technical issues.

www.telit.com

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