BT and Wi-Fi Engineer Mode Instructions

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Revision History

Version	Date	Notes
V1.0	2017/07/27	This is the first official release.
V2.0	2019/12/31	Add the section to describe the BT/WiFi engineer Mode for UMW2651/2652.
V3.0	2020/11/26	Update the template and revise some description.

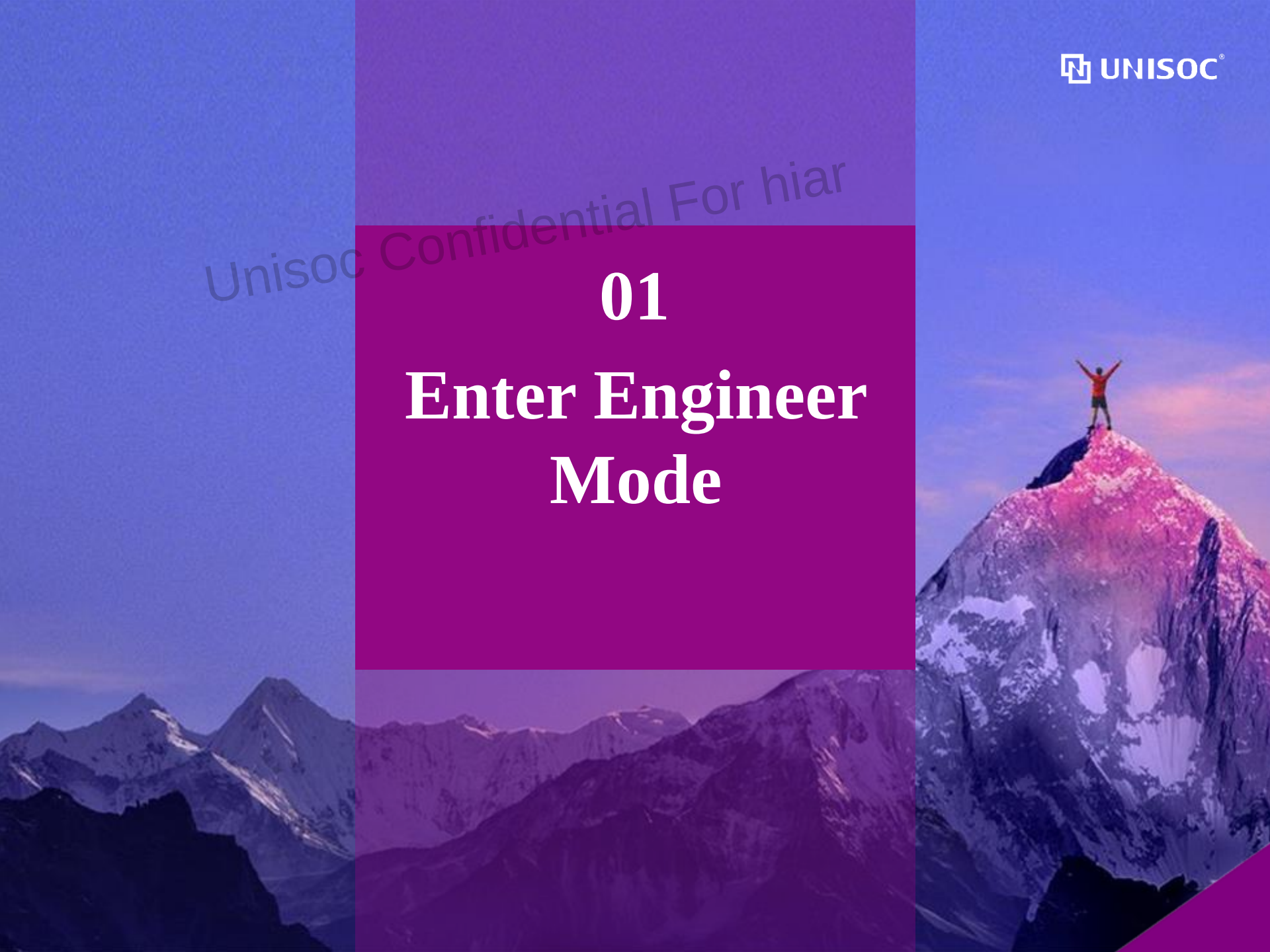
Keyword

Keyword: BT/Bluetooth, WiFi, Engineer Mode.

Contents

01

Enter Engineer Mode



Enter Engineer Mode

Follow the steps below to enter the Engineer Mode:

1. Make sure you have turned off WiFi and BT in the mobile phone settings.
2. Enter *#*#83781#*#* in the dialer to enter the Engineer Mode.
3. Navigate to the Connectivity tab.
4. Select BT or WiFi to enter the sub menu, and conduct related operations. Refer to subsequent sections for details.

02
SC2342B
BT/WiFi
Engineer Mode

SC2342B BT/WiFi Engineer Mode

This section contains the following two parts:

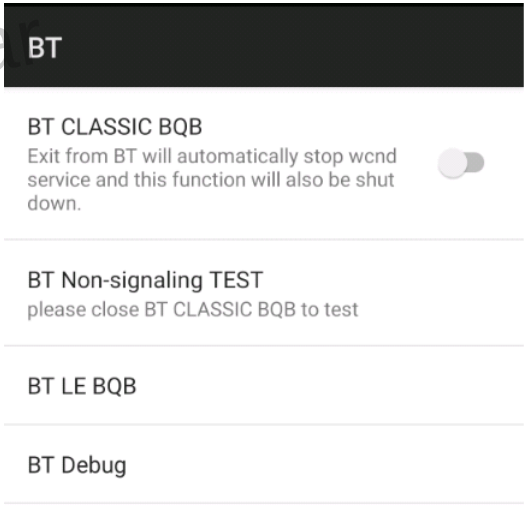
- BT Engineer Mode
  - ✓ BT Engineer Mode Menu
  - ✓ BT Non-Signaling TX Test
  - ✓ BT Non-Signaling TX Parameters
  - ✓ BT Non-Signaling RX Test
  - ✓ BT Non-Signaling RX Parameters
  - ✓ Non-Signaling BLE TX Parameters
  - ✓ Non-Signaling BLE RX Parameters
- WiFi Engineer Mode
  - ✓ WiFi Engineer Mode Menu
  - ✓ WiFi Non-Signaling TX Test
  - ✓ WiFi Non-Signal TX Parameters
  - ✓ WiFi Non-Signaling RX Test
  - ✓ WiFi Non-Signaling RX Parameters

BT Engineer Mode Menu

The BT (short for Bluetooth) Engineer Mode menu consists of the following items, and its interface is as shown in Figure 1:

- BT CLASSIC BQB: To enter BT signaling test mode
- BT_Non-signaling_TEST: To BT enter non-signaling test mode
- BT LE BQB: To enter BLE signaling test mode
- BT Debug: To conduct debugging

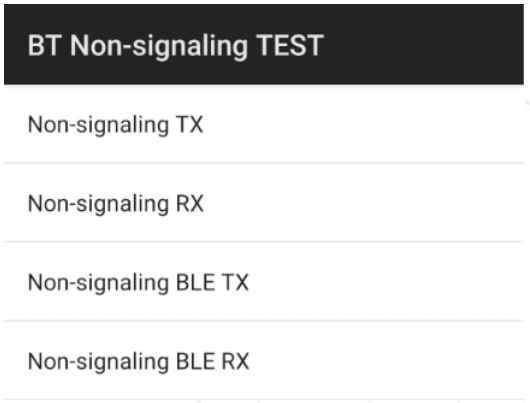
Figure 1



BT Non-SIGNALING TEST contains the following items, and its interface is as shown in Figure 2:

- Non-signaling TX
- Non-signaling RX
- Non-signaling BLE TX
- Non-signaling BLE RX

Figure 2



BT Non-Signaling TX Test

The steps to test Non Signaling TX performance are as follows:

1. Enter the Non Signaling TX interface, as shown in the figure in the left.
2. Select CLASSIC in the TX Mode field.
3. Set other BT packet parameters.
4. Click the START button.
5. Test TX signal with comprehensive test instrument.

Note:

- Click STOP before parameter modification during test, and click START to make modification take effect.
- See BT Non-Signaling TX Parameters for TX parameters.

BT Non-Signaling TX Parameters

The figure in the left shows the user interface of Non Signaling test of BT TX performance.

- TX Pattern: Set packet data type, including 00000000, 11111111, 10101010, 111100000, and PRBS9.
- TX Channel: Set channel (fixed frequency) by entering a decimal digit ranging from 0 to 78, or 255. 255 indicates it is frequency hopping mode.
- TX Pac Type: Set packet type, including DH1, DH3, DH5, 2DH1, 2DH3, 2DH5, 3DH1, 3DH3, 3DH5, and etc.
- TX Pac Len: Set packet length by entering a decimal digit. After setting the TX Pac Type field, the maximum length of the selected packet type is displayed under the TX Pac Len field. If the length entered exceeds the maximum length, the software will default to the maximum length of the selected packet type.
- TX Power Value: Set TX power level by entering a decimal digit. For SC2342B, the value range is 0 ~ 4. The step of the power corresponding to the selected power value needs to meet the requirement of power control 2 ~ 8dB.
- TX Pac Cnt: Set TX packet counts by entering a decimal digit. It is 0 by default, which indicates continuous transmission.
- TX Mode: There are two modes, namely CLASSIC and CW. Select CLASSIC for normal test, while CW for single carrier test.

BT Non-Signaling RX Test

The steps to test Non-signaling RX performance are as follows:

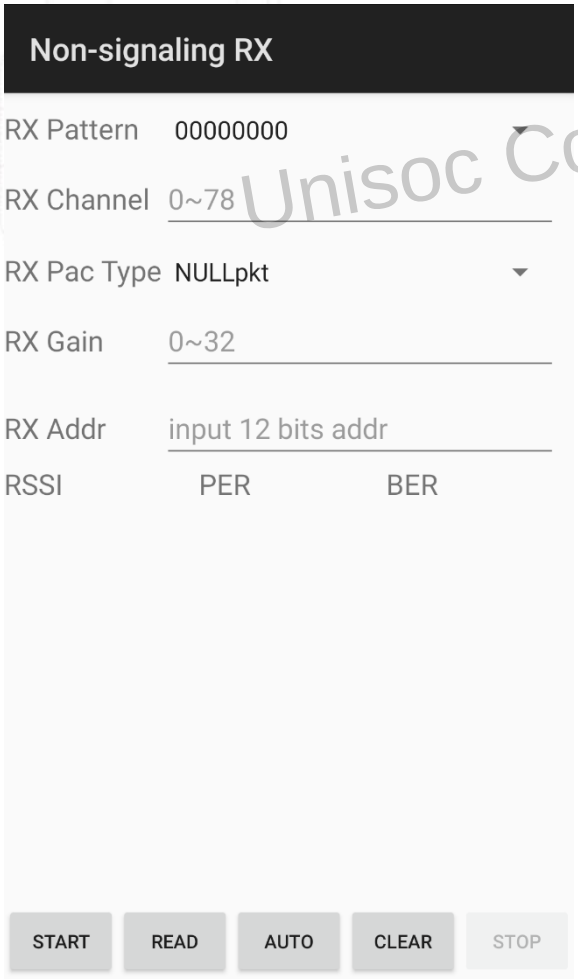
1. Connect the mobile phone to the comprehensive test instrument.
2. Enter the Non-signaling RX interface to set BT packet parameters.
3. Click the START button.
4. Send signals from comprehensive test instrument side.
5. Read the received data from test phone side. There are two ways to read the received data:
   - ✓ Click the READ button to update data manually.
   - ✓ Click the AUTO button to set the time interval of automatic data update.

   RSSI: display the signal strength received by the antenna port.
   PER: (packet error count/total packet count) *100%=PER
   BER: (bit error count/total bit count)*100%=BER
   Swipe to the left to read the data beyond the screen.

Note:

- Click the STOP button before parameter modification during test, and click the START button to make modification take effect.
- Make sure there is RF signal input before clicking the READ button.
- Click the CLEAR button to refresh the screen.
- Click the STOP button to clear the historical data received.

BT Non-Signaling RX Parameters



The figure in the left shows the user interface of Non-signaling test of BT RX performance.

- RX Pattern: Set packet data type, including 00000000, 11111111, 10101010, 111100000 and PRBS9.
- RX Channel: Set the channel to receive signal by entering a decimal digit ranging from 0 to78 (2402MHz ~ 2480MHz).
- RX Pac Type: See BT Non-Signaling TX Parameters.
- RX Gain: Set the RX gain level by entering a decimal digit. 0 stands for AGC mode, while 1~32 for fixed gain.
- RX Addr: Set the BT address of the comprehensive test instrument. It is a 12-bit hexadecimal number by default, for example, 123456123456.

  Note: The RX Addr must be consistent with the BT address of the BT file in the signal source.

Non-Signaling BLE TX Parameters

The figure in the left shows the user interface of Non Signaling test of BLE TX performance.

- BLE TX LE_PHY: Select test rate.
- BLE TX Pattern: Set packet data type, including 11111111,10101010, PRBS9, and11110000.
- BLE TX Channel: Set channel (fixed frequency) by entering a decimal digit ranging from 0 to 39 (2402MHz ~ 2480MHz) .
- BLE TX Data Length: Set data length by entering a decimal digit ranging from 0 to192. The maximum length of the selected data type is shown under the BLE TX Data Length field.
- BLE TX Pac Cnt: Set the TX packet counts by entering a decimal digit. 0 stands for continuous transmission, while 1~65536 stands for transmitting packets of fixed counts. It is suggested to set Pac Cnt to 0.
- Tx Mode: There are two modes, namely BLE and CW. Select BLE for normal test, while CW for single carrier test.

Non-Signaling BLE RX Parameters

The figure in the left shows the user interface of Non Signaling test of BLE RX performance.

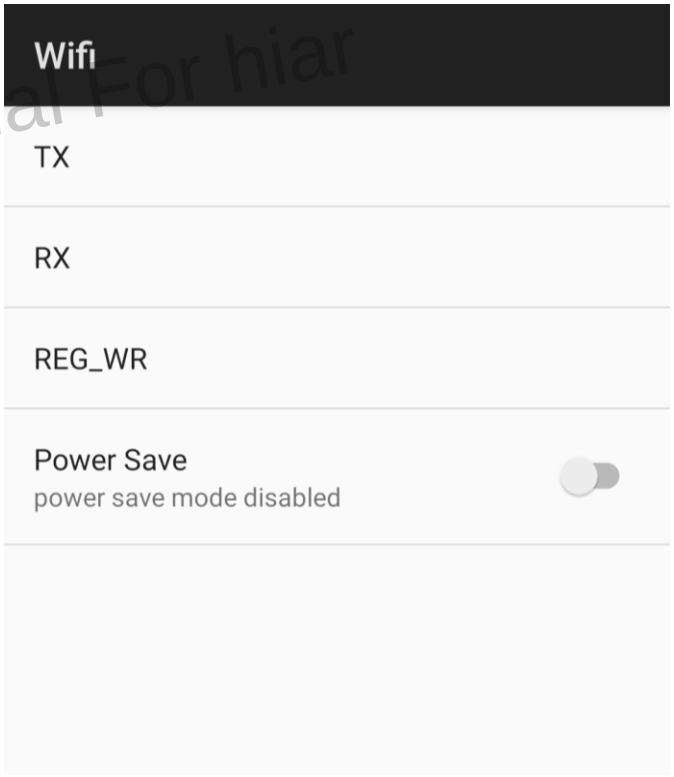
- BLE RX Channel: Set the channel to receive signal by entering a decimal digit ranging from 0 to 39 (2402MHz ~ 2480MHz).
- BLE RX Gain: Set RX gain level by entering a decimal digit. 0 stands for AGC mode, while 1~5 for the fixed gain level.
- BLE RX Addr: Set the BT address of the comprehensive test instrument. It is a 12-bit hexadecimal number by default, for example, 123456123456.

  Note: The BLE RX Addr must be consistent with the BT address of the BT file in the signal source.

WiFi Engineer Mode Menu

WiFi Engineer Mode mainly consists of two parts:

- TX (NON SIGNALING TX)
- RX (NON SIGNALING RX)



WiFi Non-Signaling TX Test

The steps to test TX modulating signals are as follows:

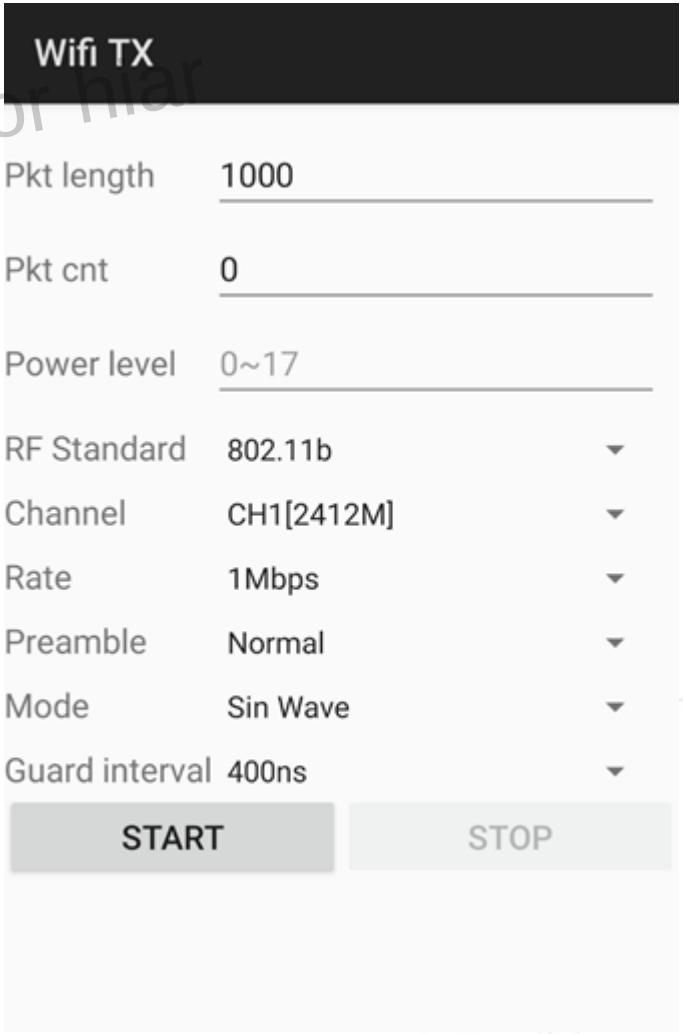
1. Enter the Wifi TX interface.
2. Set parameters. See WiFi Non-Signaling TX Parameters for details.
3. Click the START button.
4. Test the TX signals with comprehensive test instrument.

The steps to test TX single-carrier signals are as follows:

1. Enter the Wifi TX interface.
2. Set parameters:
   - set Pkt length:1000
   - set Channel
   - set Mode: sinewave
3. Click the START button.
4. Test the TX signals with comprehensive test instrument.

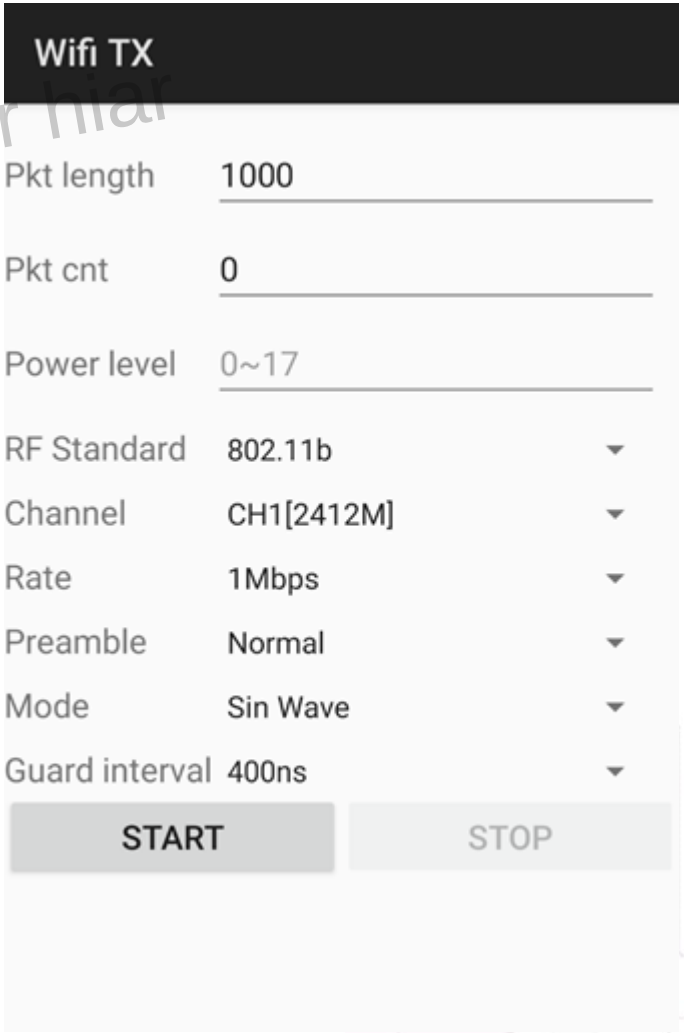
Note:

Click the STOP button before parameter modification during test, and click the START button to make modification take effect.



WiFi Non-Signal TX Parameters

- Pkt Length: Set packet length. It is usually set to 1000.
- Pkt cnt: Set TX packet counts. 0 stands for continuous transmission.
- Power level: Set WiFi TX power level. The power brackets are different for different RF standards. Set the power level value according to the power configuration requirements in actual test.
- RF Standard: 802.11b/g/n_2.4G.
- Channel: Set the TX channel (fixed frequency), channel 1 ~ 14.
- Rate: Set WiFi rate. Different RF standards correspond to different rate options.
- Preamble: Select among Normal, CCK short, 802.11n Mixed Mode, 802.11n.
- Mode: Select between 802.11 pkt and sinewave.
- Guard interval: Select between 400ns and 800ns.



WiFi Non-Signaling RX Test

The steps for WiFi Non-signal RX test are as follows:

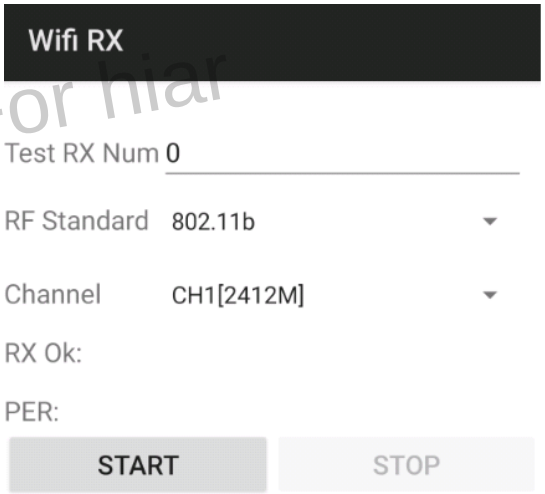
1. Enter the WiFi RX interface.
2. Set parameters. See WiFi Non-Signaling RX Parameters for details.
3. Click the START button.
4. Send signals from comprehensive test instrument side.
5. Click the STOP button.

Note:

- After click the STOP button, the RX Ok field will display the count of the received WiFi packets, and PER shows the packet error rate. PER=(packet error count/total packet count)*100%
- The STOP button contains the following commands:
  - ✓ get_rx_ok
  - ✓ rx stop
- The value of the Test RX Num field should be consistent with the packet number set in signal source.

WiFi Non-Signaling RX Parameters

- Test RX Num: Set the number of test packets. This value is the same as the number of packets sent by the instrument.
- RF Standard: 802.11b/g/n_2.4G.
- Channel: Set the RX channel (fixed frequency), channel 1 ~ 14.
- RX ok: The number of packets received by Wifi. The ratio of this value to the number of packets sent by the instrument is used to confirm PER (packet error rate) of the test.
- PER: packet error rate.



03

UMW2651/2652 Engineer Mode

UMW2651/2652 BT/WiFi Engineer Mode

This section contains the following two parts:

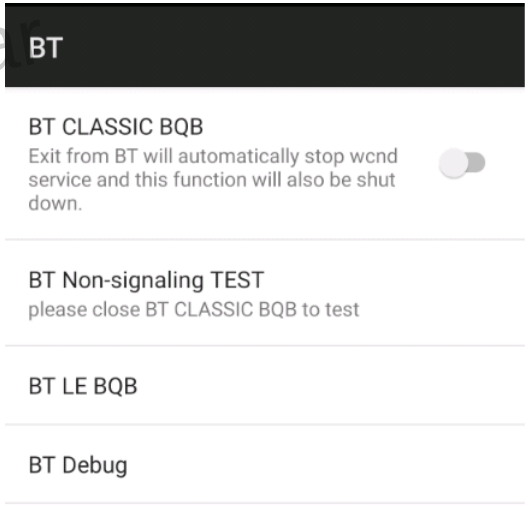
- BT Engineer Mode
  - ✓ BT Engineer Mode Menu
  - ✓ BT Non-Signaling TX Test
  - ✓ BT Non-Signaling TX Parameters
  - ✓ BT Non-Signaling RX Test
  - ✓ BT Non-Signaling RX Parameters
  - ✓ Non-Signaling BLE TX Parameters
  - ✓ Non-Signaling BLE RX Parameters
- WiFi Engineer Mode
  - ✓ WiFi Engineer Mode Menu
  - ✓ WiFi Non-Signaling TX Test
  - ✓ WiFi Non-Signal TX Parameters
  - ✓ WiFi Non-Signaling RX Test
  - ✓ WiFi Non-Signaling RX Parameters

BT Engineer Mode Menu

The BT (short for Bluetooth) Engineer Mode menu consists of the following items, and its interface is as shown in Figure 1:

- BT CLASSIC BQB: To enter BT signaling test mode
- BT_Non-signaling_TEST: To enter BT non-signaling test mode
- BT LE BQB: To enter BLE signaling test mode
- BT Debug: To conduct debugging

Figure 1

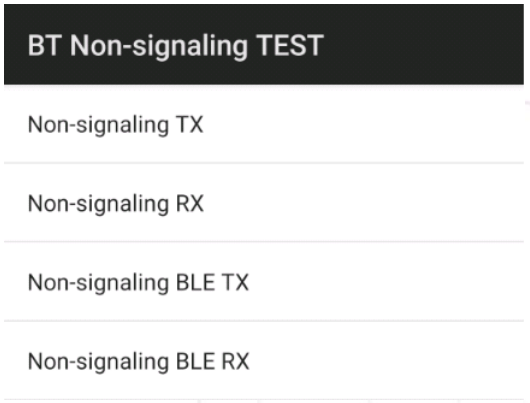


Note: For UMW2651, there is an additional menu RF Path with options “shared” and “alone”.

BT Non-SIGNALING TEST contains the following items, and its interface is as shown in Figure 2:

- Non-signaling TX
- Non-signaling RX
- Non-signaling BLE TX
- Non-signaling BLE RX

Figure 2



BT Non-Signaling TX Test

The steps to test non-signaling TX performance are as follows:

1. Enter the Non Signaling TX interface, as shown in the figure in the left.
2. Select CLASSIC in the TX Mode field.
3. Set other BT packet parameters.
4. Click the START button.
5. Test TX signal with comprehensive test instrument.

Note:

- Click STOP before parameter modification during test, and click START to make modification take effect.
- See BT Non-Signaling TX Parameters for TX parameters.

BT Non-Signaling TX Parameters

The figure in the left shows the user interface of non-signaling test of BT TX performance.

- TX Pattern: Set packet data type, including 00000000, 11111111, 10101010, 111100000, and PRBS9.
- TX Channel: Set channel (fixed frequency) by entering a decimal digit ranging from 0 to 78, or 255. 255 indicates it is frequency hopping mode.
- TX Pac Type: Set packet type, including DH1, DH3, DH5, 2DH1, 2DH3, 2DH5, 3DH1, 3DH3, 3DH5, and etc.
- TX Pac Len: Set packet length by entering a decimal digit. After setting the TX Pac Type field, the maximum length of the selected packet type is displayed under the TX Pac Len field. If the length entered exceeds the maximum length, the software will default to the maximum length of the selected packet type.
- TX Power Value: Set TX power level by entering a decimal digit. For UMW2651/2652, the value range is 0 ~ 9. The step of the power corresponding to the selected power value needs to meet the requirement of power control 2 ~ 8dB.
- TX Pac Cnt: Set TX packet counts by entering a decimal digit. It is 0 by default, which indicates continuous transmission.
- TX Mode: There are two modes, namely CLASSIC and CW. Select CLASSIC for normal test, while CW for single carrier test.

BT Non-Signaling RX Test

The steps to test non-signaling RX performance are as follows:

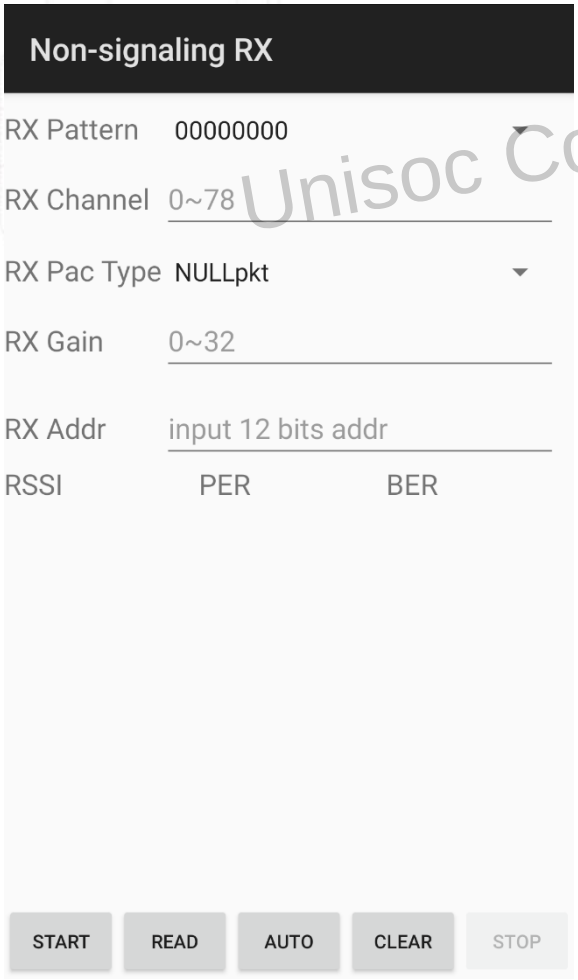
1. Connect the mobile phone with the comprehensive test instrument.
2. Enter the Non-signaling RX interface to set BT packet parameters.
3. Click the START button.
4. Send signals from comprehensive test instrument side.
5. Read the received data from test phone side. There are two ways to read the received data:
   - ✓ Click the READ button to update data manually.
   - ✓ Click the AUTO button to set the time interval of automatic data update.

   RSSI: display the signal strength received by the antenna port.
   PER: (packet error count/total packet count) *100%=PER
   BER: (bit error count/total bit count)*100%=BER
   Swipe to the left to read the data beyond the screen.

Note:

- Click the STOP button before parameter modification during test, and click the START button to make modification take effect.
- Make sure there is RF signal input before clicking the READ button.
- Click the CLEAR button to refresh the screen.
- Clicking the STOP button will clear the historical data received.

BT Non-Signaling RX Parameters



The figure in the left shows the user interface of non-signaling test of BT RX performance.

- RX Pattern: Set packet data type, including 00000000, 11111111, 10101010, 111100000 and PRBS9.
- RX Channel: Set the channel to receive signal by entering a decimal digit ranging from 0 to78 (2402MHz ~ 2480MHz).
- RX Pac Type: See BT Non-Signaling TX Parameters.
- RX Gain: Set the RX gain level by entering a decimal digit. 0 stands for AGC mode, while 1~32 for fixed gain.
- RX Addr: Set the BT address of the comprehensive test instrument. It is a 12-bit hexadecimal number by default, for example, 123456123456.

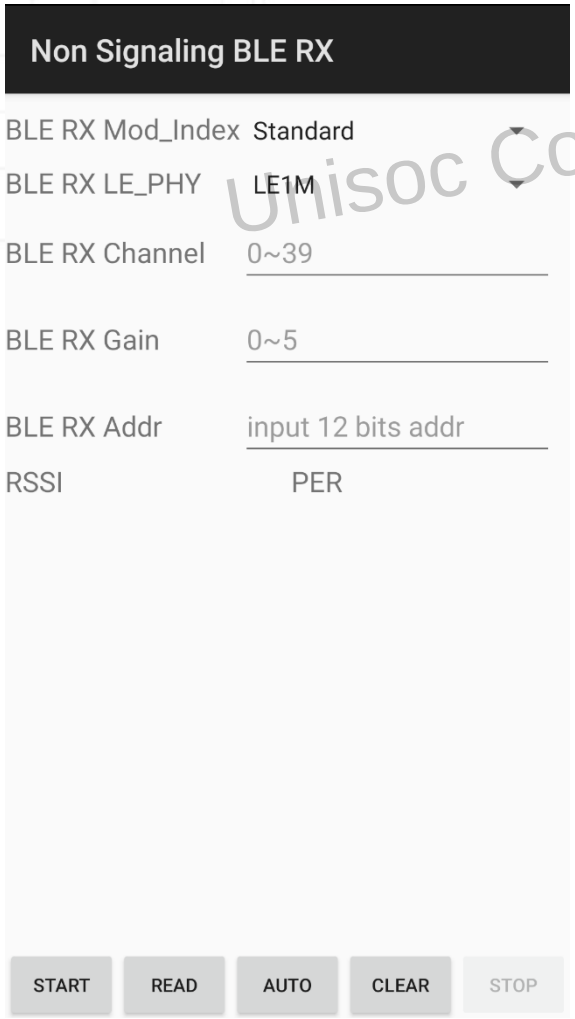
  Note: The RX Addr must be consistent with the BT address of the BT file in the signal source.

Non-Signaling BLE TX Parameters

The figure in the left shows the user interface of non-signaling test of BLE TX performance.

- BLE TX LE_PHY: Select test rate.
- BLE TX Pattern: Set packet data type, including 11111111,10101010, PRBS9, and11110000.
- BLE TX Channel: Set channel (fixed frequency) by entering a decimal digit ranging from 0 to 39 (2402MHz ~ 2480MHz) .
- BLE TX Data Length: Set data length by entering a decimal digit ranging from 0 to192. The maximum length of the selected data type is shown under the BLE TX Data Length field.
- BLE TX Pac Cnt: Set the TX packet counts by entering a decimal digit. 0 stands for continuous transmission, while 1~65536 stands for transmitting packets of fixed counts. It is suggested to set Pac Cnt to 0.
- Tx Mode: There are two modes, namely BLE and CW. Select BLE for normal test, while CW for single carrier test.

Non-Signaling BLE RX Parameters



The figure in the left shows the user interface of non-signaling test of BLE RX performance.

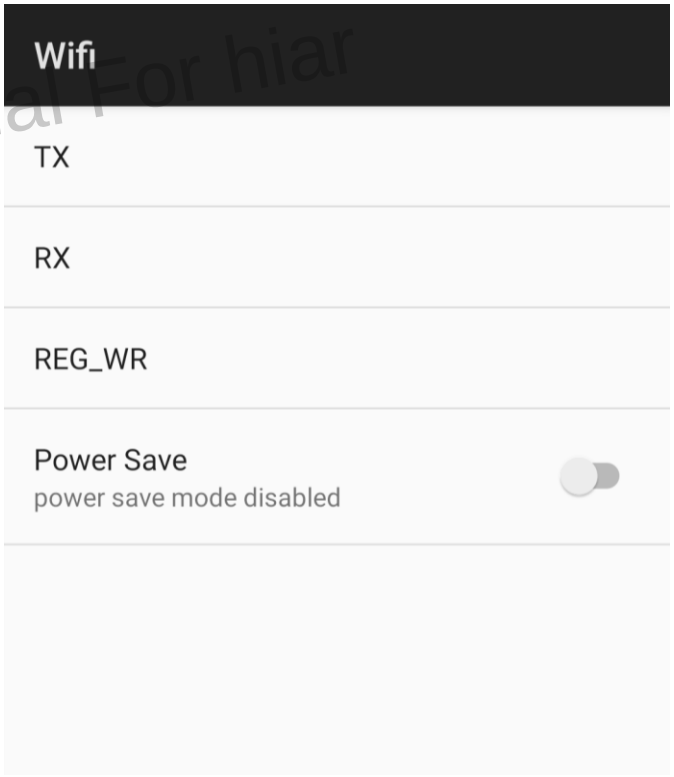
- BLE RX Mod_Index: Select modulation index. Currently only Standard is supported.
- BLE RX LE_PHY: Select test rate.
- BLE RX Channel: Set the channel to receive signal by entering a decimal digit ranging from 0 to 39 (2402MHz ~ 2480MHz).
- BLE RX Gain: Set RX gain level by entering a decimal digit. 0 stands for AGC mode, while 1~5 for the fixed gain level.
- BLE RX Addr: Set the BT address of the comprehensive test instrument. It is a 12-bit hexadecimal number by default, for example, 123456123456.

  Note: The BLE RX Addr must be consistent with the BT address of the BT file in the signal source.

WiFi Engineer Mode Menu

WiFi Engineer Mode mainly consists of two parts:

- TX (NON SIGNALING TX)
- RX (NON SIGNALING RX)



WiFi Non-Signaling TX Test

The steps to test TX modulating signals are as follows:

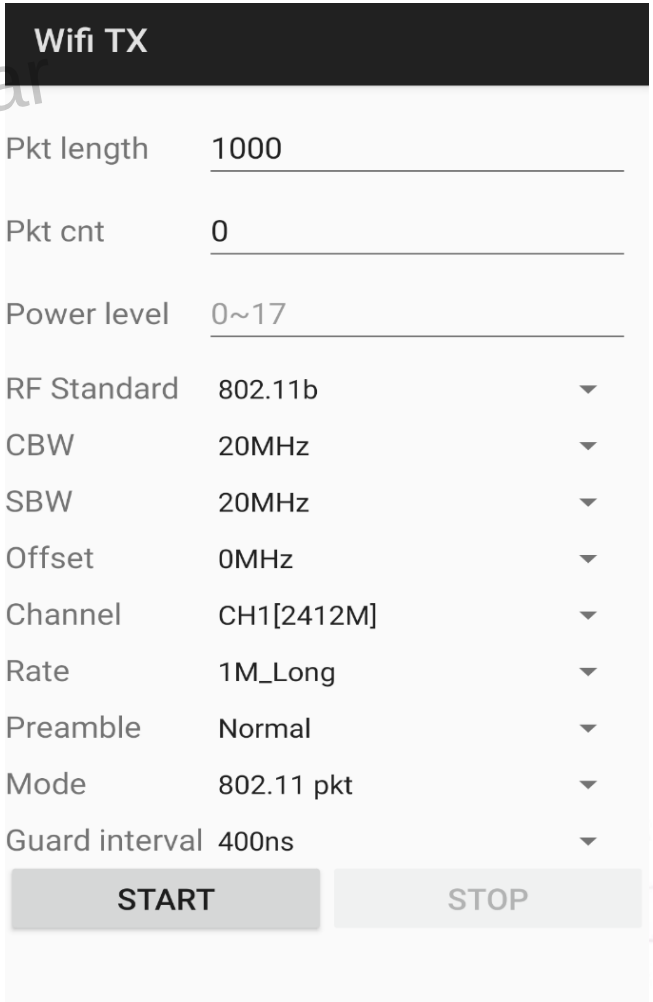
1. Enter the Wifi TX interface.
2. Set parameters. See WiFi Non-Signaling TX Parameters for details.
3. Click the START button.
4. Test the TX signals with comprehensive test instrument.

The steps to test TX single-carrier signals are as follows:

1. Enter the Wifi TX interface.
2. Set parameters:
   - set Pkt length:1000
   - set Channel
   - set Mode: sinewave
3. Click the START button.
4. Test the TX signals with comprehensive test instrument.

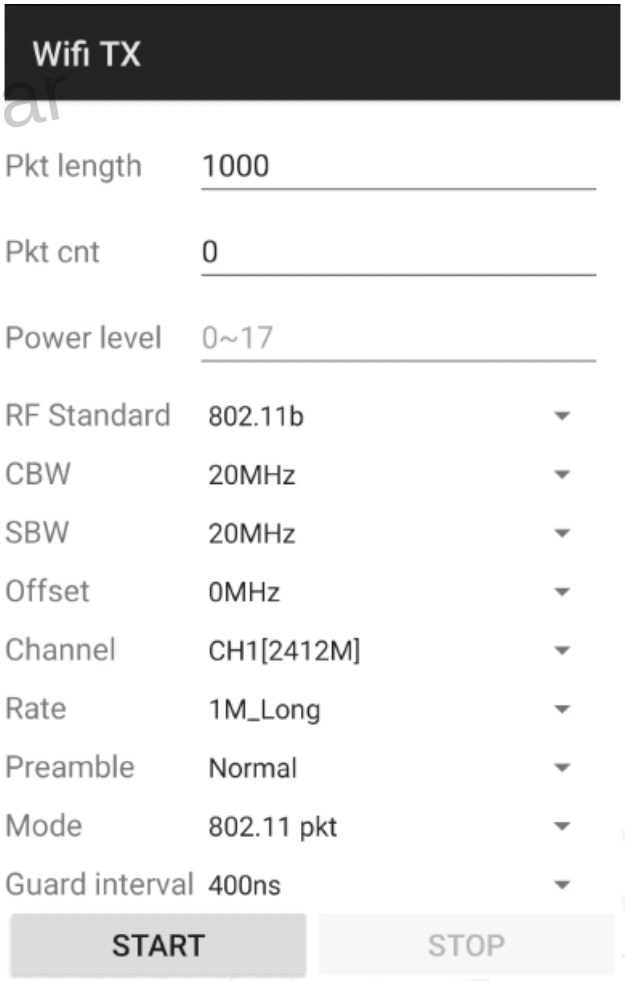
Note:

- Click the STOP button before parameter modification during test, and click the START button to make modification take effect.
- For UMW2651, there is an additional menu RF TX Path on the WiFi TX interface, which is used to select among Primary, Diversity and MIMO antennas.



WiFi Non-Signal TX Parameters

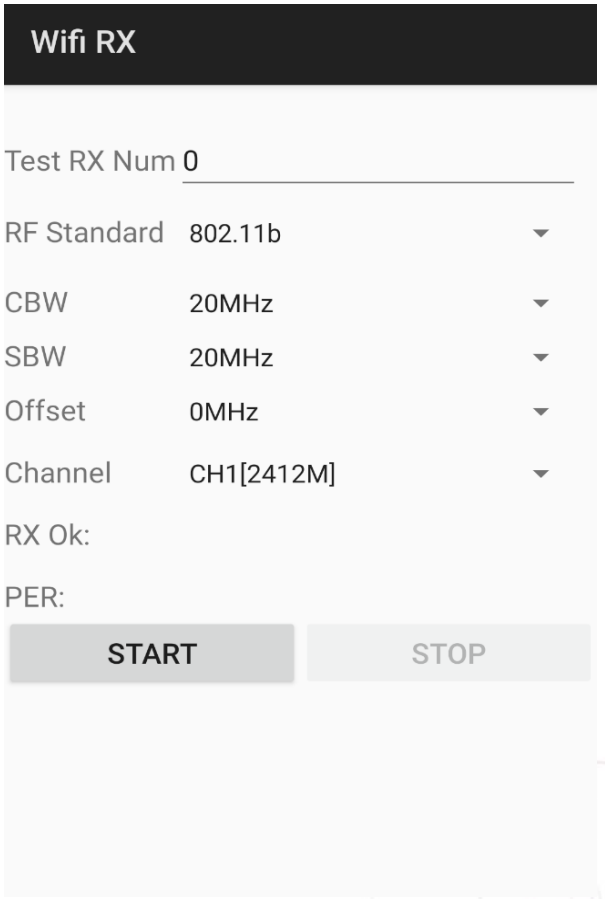
- Pkt Length: Set packet length. It is usually set to 1000.
- Pkt cnt: Set TX packet counts. 0 stands for continuous transmission.
- Power level: Set WiFi TX power level. The power brackets are different for different RF standards. Set the power level value according to the power configuration requirements in actual test.
- RF Standard: 802.11b/g/n_2.4G/n_5.0G/ac/a.
- CBW: Channel band width.
- SBW: Signal band width.
- Offset: Frequency offset.
- Channel: Set the TX channel (2.4G/5G fixed frequency).
- Rate: Set WiFi rate. Different RF standards correspond to different rate options.
- Preamble: Select among Normal, CCK short, 802.11n Mixed Mode, 802.11n.
- Mode: Select between 802.11 pkt and sinewave.
- Guard interval: Select between 400ns and 800ns.



WiFi Non-Signaling RX Test

The steps for WiFi Non-signal RX test are as follows:

1. Enter the WiFi RX interface.
2. Set parameters. See WiFi Non-Signaling RX Parameters for details.
3. Click the START button.
4. Send signals from comprehensive test instrument side.
5. Click the STOP button.

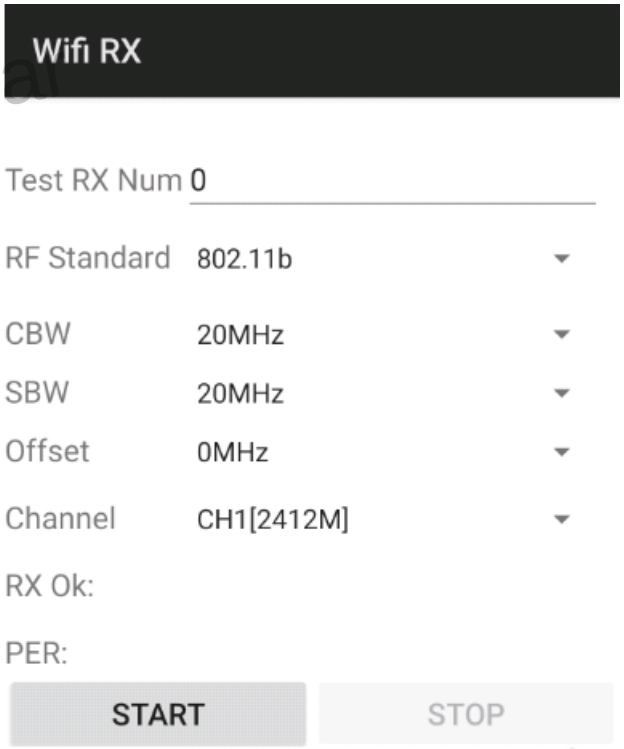


Note:

- After click the STOP button, the RX Ok field will display the count of the received WiFi packets, and PER shows the packet error rate. PER=(packet error count/total packet count)*100%
- The STOP button contains the following commands:
  - ✓ get_rx_ok
  - ✓ rx stop
- The value of the Test RX Num field should be consistent with the packet number set in signal source.
- For UMW2651, there is an additional menu RF RX Path on the WiFi RX interface, which is used to select among Primary, Diversity and MIMO antennas.

WiFi Non-Signaling RX Parameters

- Test RX Num: Set the number of test packets. This value is the same as the number of packets sent by the instrument.
- RF Standard: 802.11b/g/n_2.4G/n_5.0G/ac/a.
- CBW: Channel band width.
- SBW: Signal band width.
- Offset: Frequency offset.
- Channel: Set the RX channel (2.4G/5G fixed frequency).
- RX ok: The number of packets received by Wifi. The ratio of this value to the number of packets sent by the instrument is used to confirm PER (packet error rate) of the test.
- PER: packet error rate.



Thank You

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