## VERSION HISTORY

<table>
<thead>
<tr>
<th>Version</th>
<th>Comment</th>
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<tr>
<td>1.0</td>
<td>First version</td>
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1 Introduction

Bluegiga has certified all the Bluegiga manufactured modules for FCC, IC, Korea and Japan and declares conformity with the CE requirements. In most cases Bluegiga customers can apply these certifications or the measurement results for their own products, but in some cases it can be necessary for Bluegiga customers to perform their own RF measurements. For this, the module being tested needs to be set into a test mode to enable continuous test signal transmission or receive mode.

The current Bluegiga Wi-Fi products (WF111, WF121, APx4) are all based on chipsets manufactured by Cambridge Silicon Radio (CSR). The main means of accessing the test mode on these devices is through the module debug SPI bus. This is a synchronous bus with the clocking provided by the SPI adapter and does not require the module being tested to be initialized by the application host.

The test mode is accessed by uploading a test firmware to replace the one used for normal Wi-Fi–operation. Booting the device into test mode will cause it to become non-responsive to the application host, and the host system should be kept from resetting the device during the testing.

The test mode control is done through a software suite by CSR, called UnifiTools, specifically the UniTest-software inside the software suite. The following guide provides step-by-step instructions to set up the test mode and the main settings.
2 Setting up the system

- Install SetupUniFiTools_icp_7_2_1_5.exe
- Copy the test mode firmware file `ptest_unifi_603x_a10_1177.xbv` and settings file `WF111_profile.txt` files to the hard disk
- The WF111 profile file is also used for WF121. For the APx4 the selected profile file should be `APX4_profile.txt`
- Open **UniTest**
- From the Setup-tab, choose Browse... to select the correct test firmware and select the `ptest_unifi_603x_a10_1177.xbv` previously saved to the hard disk
Click the Profile-button, choose “Import a profile”, and browse to the WF111_profile.txt file saved to the hard disk.
- From the Board profile drop menu choose the imported profile
- From the Transport drop menu choose LPT
3 Connecting the module

- Insert the SPI adapter supplied with the evaluation board or purchased separately to the computer parallel port
- Alternatively, a CSR-manufactured USB/SPI-adapter can be ordered through Bluegiga in case a parallel port is not available
- If testing is done with the module evaluation boards, connect the flat cable to the evaluation board with the flat cable facing outwards except on the DKWF121 on which the cable should be on the center side of the board from the connector.
• Connect the power supply to the evaluation board

When performing certification testing with an end product, the debug SPI signals should be made available on a pin header and connected to the SPI adapter with the pinout shown in the evaluation board datasheets.
4 Initializing the module

- Click “Quick Start and Setup” on the UniTest Setup-tab, the log window on the bottom should now show a number of success messages.
- If the status window shown green on the lower right in the picture below is red, check connections and board power supply.
• From the Misc-tab set the Crystal trim-slider to **36** and click **Set**
• This is the crystal fine tune value, chosen for sufficient average crystal frequency accuracy. This value is not included in the profile file for the test firmware, but is written to the module internal memory and used in normal operation
5 Generating an unmodulated carrier signal

From the "Carrier wave"-tab, choose DC for an unmodulated carrier, set Amplitude to the lower end of the range and click Start. When no longer needed, click Stop.

**NOTE:** The unmodulated carrier power level is not related to the preset power tables and neither power level or frequency are compensated for thermal or voltage variations.
Generating a modulated 802.11 signal

- Select the desired channel
- Set the Power level-slider to the rightmost setting (highest power level)
- Set the data rate. 1Mbps (CCK modulation) has highest harmonics, 54Mbps or 72.2Mbps (OFDM modulation) have highest band edge emissions
- Set the "Transmit a frame every N seconds:"-drop menu to a small value to maximize transmit duty cycle
- Set the Payload length to maximum value to maximize transmit duty cycle
- Click “Set transmission parameters” to apply the settings
- Click “Start” to begin transmission
7 Thermal compensation

When starting transmission and when the ambient temperature changes, the user should wait a minute or two for the board temperature to stabilize and then click “Set transmission parameters” again so that the module will apply the thermal compensation values for the new temperature. In normal use the software will do this automatically, but using Unitest this has to be done manually. The compensation system adjusts transmit power and crystal frequency according to module temperature using internal temperature sensor.

There is also a periodic automated compensation possibility under the Power/temp/vbatt-tab, but that may pause transmission briefly periodically to perform the compensation.
8 Setting receive mode

- Click Stop in the Transmit-tab if the modules is still transmitting
- Select Receive-tab
- Select channel if necessary
- Click Start
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