



BCS3600^{ex} – Product Information

Data Capture DNA – Wi-Fi Friendly Mode

Bad Mergentheim, 31.07.2025 / Rev. -

What is "Wi-Fi friendly mode" and how does it work?

Zebra's Wi-Fi Friendly Mode eliminates the wireless interference that Bluetooth devices can often create in Wi-Fi environments because both technologies operate in the same frequency band. Wi-Fi friendly mode is accomplished via a combination of innovative technologies called Adaptive Frequency Hopping, Automatic Power control, and intelligent link management, assuring that use of Bluetooth enabled BCS3678ex series cordless scanners (Zebra DS3678 series) in a Wi-Fi environment will not interfere with Wi-Fi devices.

Wi-Fi Friendly Mode Features and Benefits

- **Bypass network interference**

Unlike competitors, Zebra gives users the ability to remove Wi-Fi channels - commonly 1, 6 and 11 from the hopping sequence of our Zebra Bluetooth scanners. As our Bluetooth technology hops from one channel to another, it will have zero chance of colliding with those channels utilized by the wireless network.

- **Implement with ease**

Wi-Fi Friendly Mode is simple to implement with our user-friendly wizard, 123Scan. Just choose the channels you want your Bluetooth scanners to use and organize them in your preferred order.

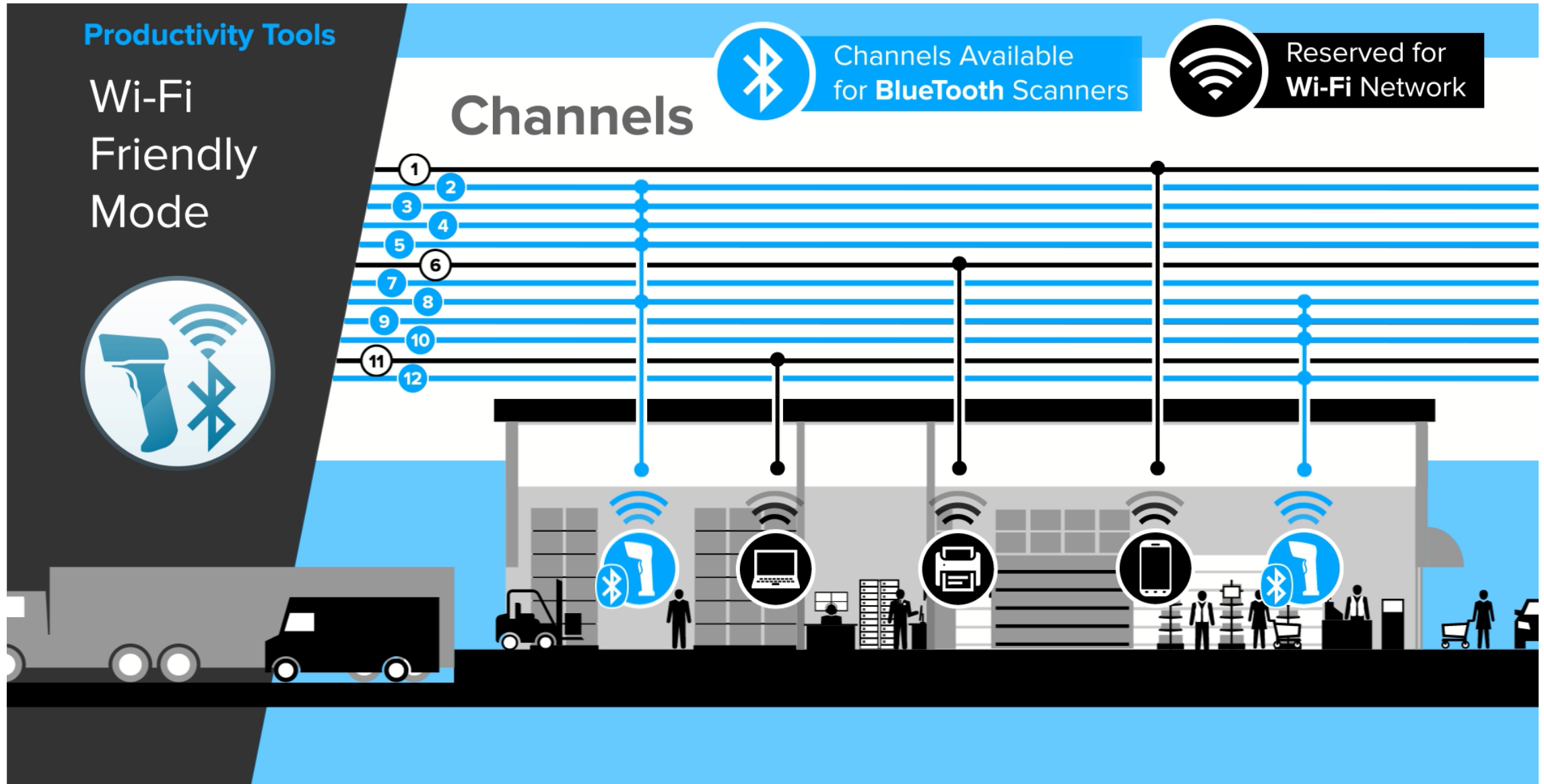
- **Benefit from cordless scanners**

Put Wi-Fi interference behind you and move ahead with the mobility and intelligence of our productivity-boosting Bluetooth scanners.

Supports only the BCS3678 Bluetooth scanner

For further information about Wi-Fi Friendly Mode [click here](#)





The Issue: Overlapping Bluetooth/Wi-Fi Spectrum

The reason Bluetooth devices can interfere with devices connected to the Wi-Fi network is because of overlap in the Bluetooth and Wi-Fi spectrum.

Bluetooth: There are 79 channels in the full Bluetooth spectrum (see **Diagram 1**) — each channel is 1 MHz wide. Bluetooth devices constantly hop around the channels in random order and are supposed to hit every channel while operating (known as Spread Spectrum Frequency Hopping)

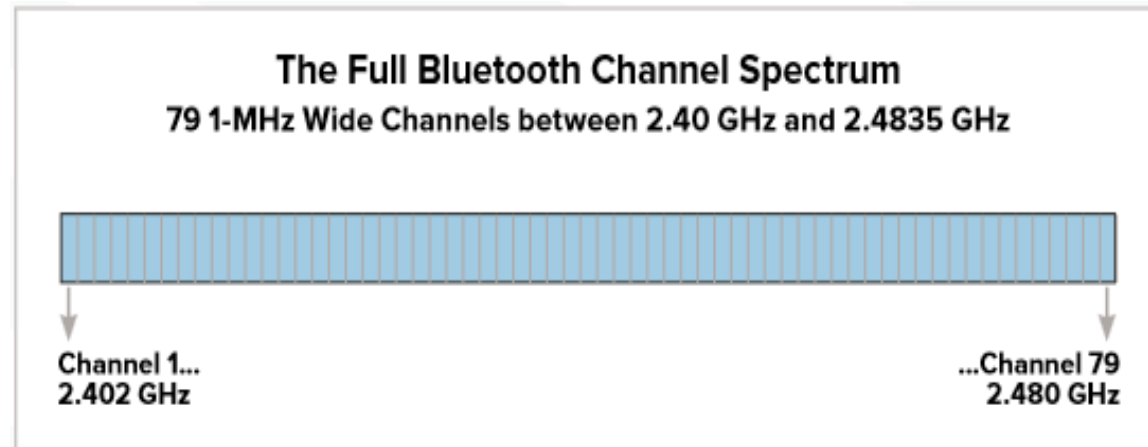


Diagram 1

Operation of Wi-Fi:

Wi-Fi operates differently. Instead of Bluetooth's 79 channels that are all 1 MHz wide, Wi-Fi operates on channels 1, 6 and 11. Each of these three channels has a center frequency and is approximately 23 MHz wide. As you can see from **Diagram 2**, Wi-Fi and Bluetooth share most of the channel spectrum.

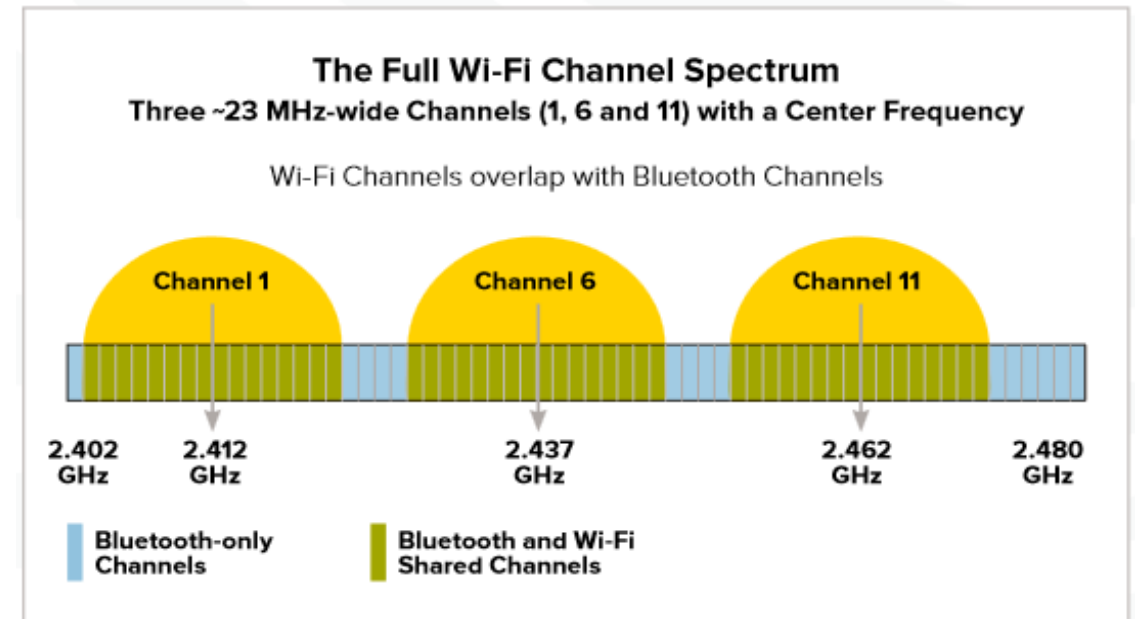


Diagram 2

The Solution – Wi-Fi Friendly Mode

With Zebra's Wi-Fi Friendly Mode, in the time it takes to scan a barcode, your customers can manually constrain Bluetooth communications to those Bluetooth channels that do not overlap with the Wi-Fi channels currently in use.

Why does it work?

Bluetooth's Adaptive Frequency Hopping (found in Bluetooth 2.1 and later) can be implemented automatically or manually. When implemented automatically, all 79 Bluetooth channels are available to all Bluetooth devices. Manual mode can be utilized to constrain Bluetooth devices to specific channels in the Bluetooth spectrum.

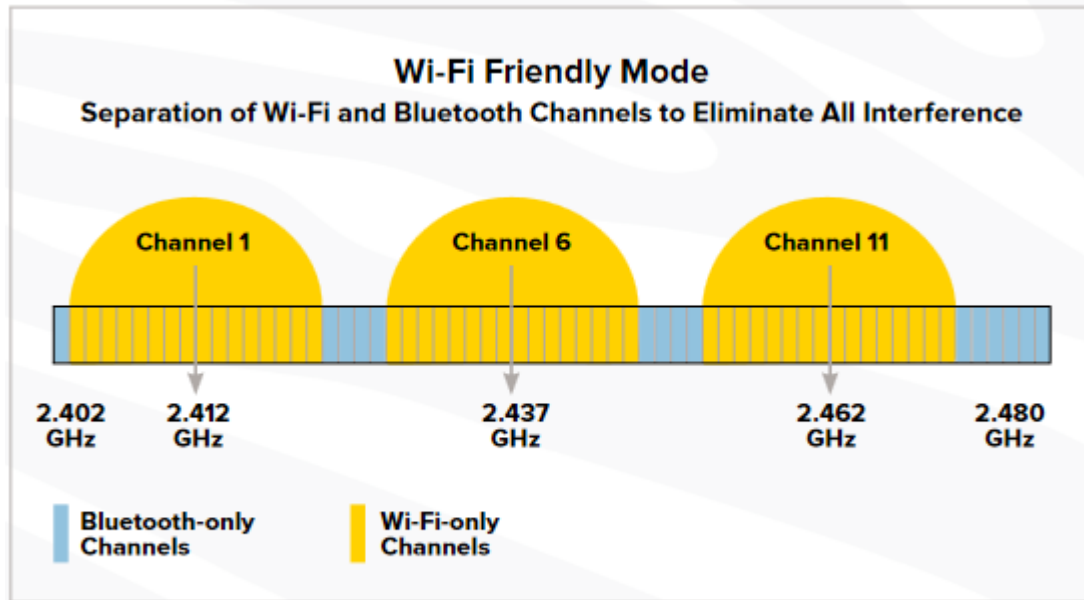


Diagram 3

The result?

Wi-Fi and Bluetooth devices operate on separate channels, effectively eliminating Bluetooth interference on the Wi-Fi network (see Diagram 3).

Additional Bluetooth features Zebra uses to minimize interference

- Bluetooth 4.0: Adaptive Power Control - Reduces power to the minimum required to maintain the Bluetooth Link.
- User Defined Max Power Setting - Enables manual configuration of the transmit maximum power level.
- Limited Page Requests
When a scanner is out of range or if the cradle has been unplugged, the scanner only pages the cradle for seconds. After that, paging begins when the scanner is triggered or inserted into the cradle. While the Bluetooth specification supports this feature, Zebra modifications control the timing and enable easy implementation.

Easy Split-Second Deployment

Out of the box, all BARTEC BCS3678^{ex} models (Zebra DS3678 series) are configured with automatic Adaptive Frequency Hopping (AFH) for Bluetooth. In order to implement Bluetooth Friendly mode, your customers just need to identify the Wi-Fi channels in use and scan the appropriate barcode. If the Wi-Fi channels change down the road, updating the configuration of Wi-Fi Friendly Mode is as simple as scanning the correct barcode.

Seven barcodes are provided in the Zebra DS3600 series users manuals to cover every possible combination of Wi-Fi channels:

- 1. Channel 1
- 2. Channel 6
- 3. Channel 11
- 4. Channel 1, 6 and 11
- 5. Channel 1,6
- 6. Channel 1, 11
- 7. Channel 6, 11

In Diagram 3 above, barcode 4 has been scanned to eliminate interference on all three Wi-Fi Channels (1, 6 and 11).

Programming options to setup Wi-Fi Friendly Mode:

- 123 Scan Utility
- Use Zebra Product Reference Guide by scan of programing barcodes



Notes about Wi-Fi Friendly Mode

Scanners configured for Wi-Fi friendly mode behave as follows:

- The scanner remains in sniff mode, and exits sniff mode only during firmware update.
- If any Wi-Fi channel is excluded from the hopping sequence, AFH turns off.
- Scanner (and cradle) avoid the selected Wi-Fi channels after establishing connection.

Notes:

- If using this feature, configure all scanners in the area for Wi-Fi friendly mode.
- By default, no Wi-Fi channels are excluded.
- Since Bluetooth requires a minimum of 20 channels when Wi-Fi channels 1, 6, and 11 are excluded, a smaller number of channels are cut from the hopping sequence.
- Updating Wi-Fi friendly settings before Bluetooth connection is recommended.











WiFi Channel Exclusion

Select the channels to exclude:

- Exclude Wi-Fi channel 1: Bluetooth channels 0-21 are excluded from hopping sequence (2402-2423 MHz).
- Exclude Wi-Fi channel 6: Bluetooth channels 25-46 are excluded from hopping sequence (2427 - 2448 MHz).
- Exclude Wi-Fi channel 11: Bluetooth channels 50-71 are excluded from hopping sequence (2452 - 2473 MHz).
- Exclude Wi-Fi channel 1, 6 and 11: Bluetooth channels 2-19 (2404-2421 MHz), 26-45 (2428 - 2447 MHz) and 51-69 (2453 - 2471 MHz) are excluded from hopping sequence.
- Exclude Wi-Fi channels 1 and 6: Bluetooth channels 0-21 (2402-2423 MHz) and 25-46 (2427 - 2448 MHz) are excluded from hopping sequence.
- Exclude Wi-Fi channels 1 and 11: Bluetooth channels 0-21 (2402-2423 MHz) and 50-71 (2452 - 2473 MHz) are excluded from hopping sequence.
- Exclude Wi-Fi channel 6 and 11: Bluetooth channels 25-46 (2427 - 2448 MHz) and 50-71 (2452 - 2473 MHz) are excluded from hopping sequence.

Programming Options - Zebra Product Reference Guide – scan of programming barcodes:

Scan a barcode below to enable or disable Wi-Fi Friendly Mode, then scan one of the Wi-Fi Friendly Channel Exclusion codes to select any channels to exclude.

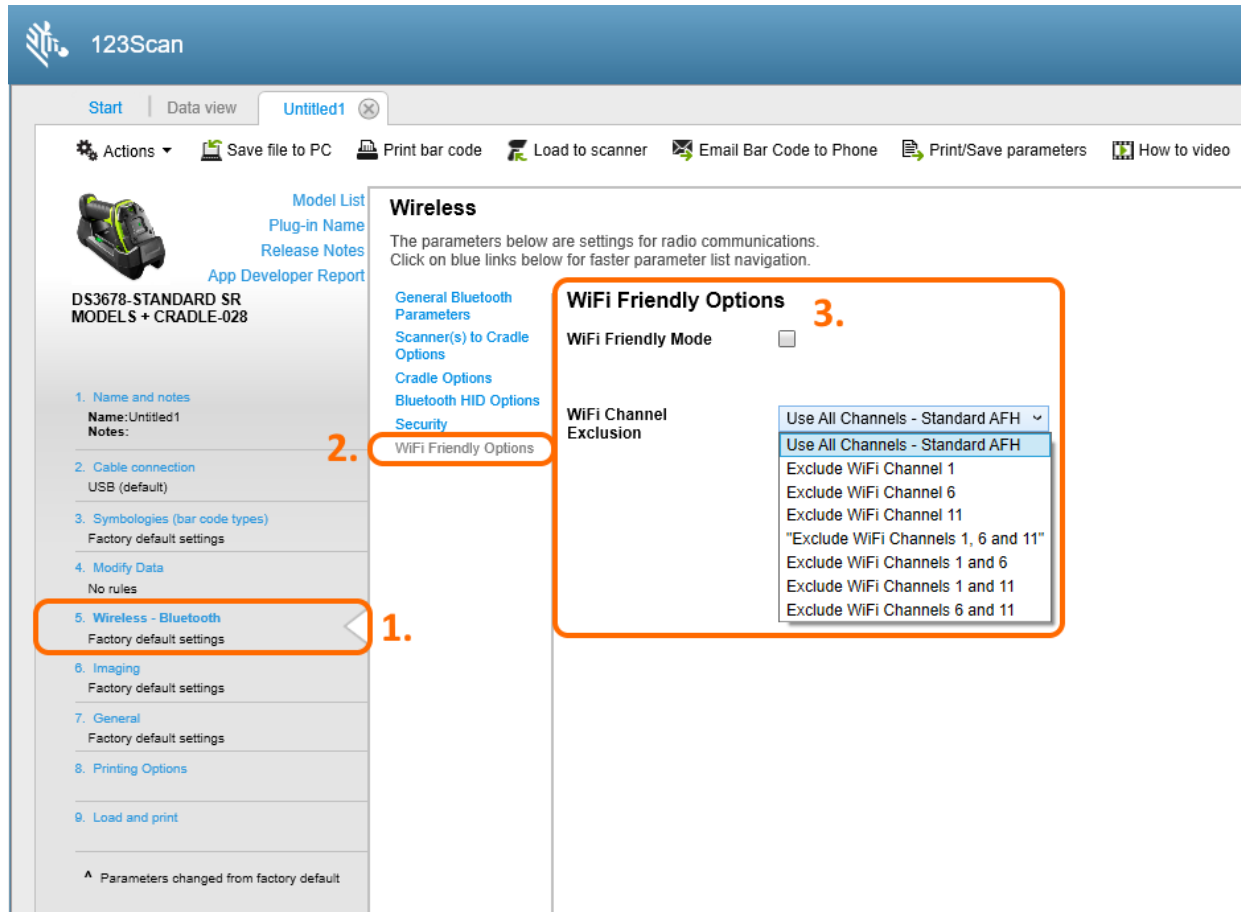
Enable/Disable Wi-Fi friendly mode	 * Disable Wi-Fi Friendly Mode (0)	 Enable Wi-Fi Friendly Mode (1)		
Channel exclusion codes	 * Use All Channels (Standard AFH) (0)	 Exclude Wi-Fi Channel 1 (1)	 Exclude Wi-Fi Channel 6 (2)	 Exclude Wi-Fi Channel 11 (3)
	 Exclude Wi-Fi Channels 1, 6, and 11 (4)	 Exclude Wi-Fi Channels 1 and 6 (5)	 Exclude Wi-Fi Channels 1 and 11 (6)	 Exclude Wi-Fi Channels 6 and 11 (7)

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Programming Options - Zebra 123 Scan Utility:

With 123 Scan utility you can easily setup the Wi-Fi friendly mode.

Enable or disable Wi-Fi Friendly Mode, then select one of the Wi-Fi Friendly Channel Exclusion options to select any channels to exclude.



1. Connect a Bluetooth scanner via base station and USB cable to the PC.
2. Open your project or create a new one.
3. Select the **(1.) Wireless – Bluetooth** menu
4. Select the menu for the **(2.) Wi-Fi Friendly Options**
5. Select the option **(3.)** which channel/s are excluded
6. Save and upload your settings to a scanner