

## Q&A for Tech Talk Topic: Wireless Coexistence

Q: Does the DMP range test demo that comes pre-installed with the EFR32xG21 Mesh Networking Kit run Zigbee and BLE, or instead of Zigbee does it run something else over 802.15.4?

A: Yes it does indeed run Zigbee.

Q: Is there a Silicon Labs product matrix that shows us which devices/modules have which RF hardware and software stack?

A: The best starting point is here: <https://www.silabs.com/wireless>. You can also use our parametric search engine: <https://www.silabs.com/products/parametric-search>

Q: Some protocols use frequency hopping to avoid noise in the channel, so please include that in your explanation... it's not like Wi-Fi which has a wider channel requirement.

A: Yes, this is covered in the presentation.

Q: Do you have tool recommendations that can be used in the field to see if there is interference between protocols?

A: We used the Saleae logic analyzer with our SLWSTK-COEXBP kit and PTI interface to see these signals (as shown on slide 23). For development/debug you definitely should bring these signals out so that you have visibility. But to see interference over-the-air in an actual installation is extremely difficult. For a detailed explanation of what you need in order to run the co-ex testing, see UG350: <https://www.silabs.com/documents/public/user-guides/ug350-coexistence-development-kit.pdf>

Q: Does using PTA make regulatory certification easier with dual radios? Or does regulatory certification ignore the PTA and test as if there is no PTA?

A: PTA doesn't change the testing itself per se, but as long as you can guarantee that only one radio transmits at a time, then you can avoid the co-located transmitters rule. A properly implemented Radio Hold Off (RHO) feature can ensure only one radio is transmitting at a time.

Q: Have you tested with old office microwave ovens?

A: We've tested with varying noise floors, but not specifically with this setup.

Q: The windows for requests will be the same for Zigbee and BT?

A: I believe you are asking about the REQUEST PWM feature, in which case yes, they would share the same request window. Additionally, for a multi-EFR32 implementation, a local REQUEST signal is shared between the two devices for local arbitration of the REQUEST PWM signal. More details are in AN1017: <https://www.silabs.com/documents/public/application-notes/an1017-coexistence-with-wifi.pdf>

Q: In a shared PTA scenario, how can you prevent race conditions on the REQUEST line?

A: While it's unlikely to happen because of the low duty cycle of IoT traffic, it is still technically possible. In that case you would rely on the protocol retry mechanisms to ensure the traffic was properly sent/received.

Q: Are the slides available somewhere?

A: You can get a copy of the presentation and find the recorded video at [www.silabs.com/training](http://www.silabs.com/training)

Q: What price in power drain should I expect for using coexistence?

A: The current consumption when PTA signals are asserted will be  $VDD/R_{pullup}$  resistor value. Depending on how often you TX/RX (e.g. BLE connection interval) will determine the duty cycle of this current draw, hence the average additional current draw.

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Q: Since most of the traffic on the Wi-Fi end point is received packets, is that a good idea to have Wi-Fi as the lowest priority?

A: You might be misinterpreting. The Wi-Fi chip is the 2.4GHz manager and it decides when to grant air time to the IoT radios. In other words, priority is decided by the Wi-Fi chip. As the system designer you get to decide which way is the best for your specific use case.

Q: How do you handle Wi-Fi, Zigbee and Bluetooth inhibits to prevent co-transmitters?

A: The PTA interface uses hardware signaling to enable one radio to transmit at a time. The GRANT is effectively an inverted inhibit signal - when not granted, the IoT radio is prevented from transmitting.

Q: Which is your cheapest Bluetooth LE (4.2/5.x) FCC certified SiP/PCB? I see different prices on distributor websites.

A: Pricing always depends on your volume, so using an online search tool might not be the best way to get an answer. We recommend you reach out to your local Silicon Labs sales representatives: <https://www.silabs.com/about-us/contact-sales>

Q: Have the workshops been changed to include additional topics and/or labs since the first one?

A: At this time, we are still repeating the original BG22 workshop we first ran in May due to ongoing high demand. Please keep checking back with us.

Q: Do your SiPs and SoCs for Wi-Fi, Zigbee, and Bluetooth solutions all support PTA?

A: Yes, that is correct.

Q: Sometimes, BLE Rx range can suffer in a combo Bluetooth+Wi-Fi device because of Wi-Fi's stronger Tx power. Do discrete solutions perform better in terms of range?

A: The performance will vary based on how each chip is designed and you can't categorically conclude that one approach is always better than the other. On the other hand, controlling isolation and unwanted noise in a chip that is designed with multiple RF channels is very complex and the loss of a few dB of sensitivity could be a trade-off for higher integration. You will always want to compare the two options and do your own trade-off for your specific application.

Q: Are there any tools beyond logic analyzers on boards that would do open loop collision analysis with RF bands?

A: This is extremely difficult to do even with expensive coherent protocol analyzers due to the implied corruption of data with over-the-air collisions. Sometimes system installers will perform a long-duration packet loss test, but this only gives you a clue where something could be wrong at the protocol level, and doesn't offer much in the way of signal troubleshooting.

Q: How might this work with a cellular data modem in place of Wi-Fi?

A: Generally, there is natural coexistence between cellular modems and 2.4 GHz devices because of the frequency band separation, so managed co-ex is not necessary.

Q: Do you support the PTA interface with OpenThread?

A: Not yet but if you are working on a design to support OpenThread, then you should make the PTA hardware connections so that you can support it with a future software update.

Q: Is PTA an IoT standard?

A: It's not a standard, but more of a recommendation. This is why in practice, Wi-Fi vendors have implemented PTA in different ways, which in turn is why we've made our implementation as flexible as possible. We've also tested with many AP-class Wi-Fi devices to ensure our implementation works properly with their chipsets.