The Kinetis KW41Z/31Z/21Z MCU family for wireless applications is the second multi-mode family in the Kinetis W series portfolio. Primarily used for automation and healthcare purposes, these MCUs enable low-energy and long-range connectivity.

**TARGET APPLICATIONS**

- **Home automation**
  - Access control
  - Appliances
  - Lighting control
  - Smart thermostats
  - Water heater control
  - Curtain/window blind control
  - Security systems
- **Building automation**
  - Building control and monitoring
  - Building HVAC control
  - Fire/security
  - Retail pricing management
  - Security and access control
  - Usage data collection
- **Healthcare**
  - Fitness monitoring
  - Home healthcare
  - Institutional care
  - Medication asset
  - Patient monitoring

**OVERVIEW**

Integrating a Bluetooth® low energy (BLE) v4.2, Generic FSK (at 250, 500 and 1000 kbit/s) and IEEE® 802.15.4 compliant modem, Kinetis KW41Z/31Z/21Z MCUs can support multiple protocols running concurrently (time slice) in a single chip. These MCUs also integrate a buck-boost DC-DC converter, supporting a wide range of operating voltages from 0.9 V to 4.2 V, significantly reducing the peak current in receive and transmit modes. At the same time, this MCU family delivers an excellent link budget that ensures a long range of communication and high immunity to interference.
KW41Z/31Z/21Z MCUs offer multi-protocol support which allow the system to concurrently operate in an 802.15.4 based network, like Thread, and a BLE network, eliminating the need for multiple radios, reducing system complexity and cost. With up to 512 KB of flash and up to 128 KB of SRAM on chip, KW41Z/31Z/21Z MCUs provide an option for running all your connectivity needs in a single device.

Take advantage of the robust enablement package that includes the BLE host stack, generic FSK, Thread® stack, 802.15.4 MAC and Simple MAC (SMAC) software protocol stacks, RTOS, development tools and IDEs. These tools are designed for use with Kinetis KW41Z/31Z/21Z MCUs and are fully integrated in the Kinetis software development kit (KSDK).

### ENABLEMENT
- Freedom development board
- USB dongle for sniffer applications or connection to PC
- BLE v4.2 host stack and application profiles
- Generic FSK at 250, 500 and 1000 kbit/s
- 802.15.4 MAC/PHY support
- Thread® network stack
- Support for host MCU and MPU (Linux®) processors
- Support for IAR Embedded Workbench® and NXP’s MCUXpresso IDEs
- Full integration with NXP’s MCUXpresso SDK
- Multiple reference designs
- Support for multiple RTOSes including FreeRTOS™
**DEVELOPMENT TOOLS**

<table>
<thead>
<tr>
<th>Board Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRDM-KW41Z</td>
<td>Freedom development board for Kinetis® KW41Z MCUs with 2.4 GHz BLE, generic FSK and 802.15.4 wireless connectivity solutions</td>
</tr>
<tr>
<td>USB-KW41Z</td>
<td>USB dongle for sniffer operations for Kinetis KW41Z MCUs with 2.4 GHz BLE, generic FSK and 802.15.4 wireless connectivity solutions</td>
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</tbody>
</table>

**ORDERABLE PART NUMBERS**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>2.4 GHz RF Compatibility</th>
<th>Flash/RAM</th>
<th>Package</th>
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<tbody>
<tr>
<td>MKW41Z512VHT4</td>
<td>BLE/Generic FSK/802.15.4 (Supports concurrent operation)</td>
<td>512 KB/128 KB, 256 KB/64 KB</td>
<td>7 x 7 laminate QFN, 3.893 x 3.797 WLCSP</td>
</tr>
<tr>
<td>MKW41Z256VHT4</td>
<td>BLE/Generic FSK/802.15.4 (Supports concurrent operation)</td>
<td>512 KB/128 KB, 256 KB/64 KB</td>
<td>7 x 7 laminate QFN, 3.893 x 3.797 WLCSP</td>
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<td>MKW41Z512CAT4R</td>
<td>BLE/Generic FSK/802.15.4 (Supports concurrent operation)</td>
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<td>MKW31Z512VHT4</td>
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