Arm Cordio-C50

**Overview**

Arm® Cordio®-C50 is a Bluetooth 5 modem, a 802.15.4-2006 modem, protocol processing logic delivered as soft IP, with power intent and implementation IP, associated test-benches and link layer and MAC firmware. Cordio-C50 supports changes for the Bluetooth 5 radio including the 2 Mbps mode, long range, and advertising extensions. The 802.15.4 MAC also has features to support both Thread and Zigbee Pro upper layer stacks.

The design is optimized for low-power with support for Bluetooth 5 and 802.15.4 standards, ideal for designers who want to implement the latest features with a qualified/certified solution for reduced risk and reduced time to market.

**IP implementation**

- Full featured link layer firmware and MAC delivered as source code
- Optimized for energy and memory efficiency
- Narrow digital interface to RF front end (RF interface)
- Supports single processor or dual-processor solutions
- Enables flexibility to support geometries and foundries
- Arm AMBA® APB peripheral device

**Bluetooth Cordio software**

- Bluetooth qualified link-layer firmware up to the HCI and 802.15.4 MAC layer firmware
- Bluetooth qualified software subsystems
- Zigbee/Thread compliant platform through third party stacks
- Separately licensable Cordio stack and profile

**Product features**

- Bluetooth 5 modem and protocol processing logic
- 802.15.4 modem and protocol processing logic
- MAC and link layer firmware
- Optional AES-128 encryption engine

**Operating modes**

- Bluetooth 5 only or 802.15.4 only
- Simultaneous operation, supporting dynamic switching between two WPANs

**Implementation highlights**

- RTL for modem and protocol processing logic
- Narrow digital interface to RF front end (RF interface)
- Flexible architecture to support different memories for firmware
- Designed as an AMBA peripheral
- Bluetooth qualified components
- Zigbee/Thread compliant platform through third party stacks

**Bluetooth standard features**

- 2 Mbps support
- Coded PHY for longer range
- 125 Kbps and 500 Kbps support
- Advertising extensions
- LE channel selection

**802.15.4-2006 MAC features**

- Baseline features:
  - Scan
  - Data send and receive
  - Data poll
- Features for Zigbee:
  - Association and disassociation
- Features for Thread:
  - MAC security
Design deliverables

- RTL for modem and protocol processing logic
- Link layer and MAC firmware delivered as source code
- Test vectors, timing and physical Abstraction models
- Scripts for simulation and synthesis with Cadence tools
- Integration manual and release notes

Support deliverables

- Evaluation kit: An Arm mbed™-enabled platform with a demonstration chip containing the Cordio-C50 radio IP
- Bluetooth qualified controller subsystem (QDID) to ease Bluetooth listing of OEM products
- Bluetooth/Thread/Zigbee qualification/certification and regulatory guides

<table>
<thead>
<tr>
<th>PPA</th>
<th>TSMC 55LP/ULP</th>
<th>TSMC 40LP/ULP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance/sensitivity (BT/15.4) (dBm)</td>
<td>-95/101</td>
<td>-95/101</td>
</tr>
<tr>
<td>Power active (RX/TX) (mW)*</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Power sleep (nW)*</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Area ** (mm²)</td>
<td>&lt; 0.4/0.35</td>
<td>&lt; 0.16</td>
</tr>
</tbody>
</table>

* Power consumption numbers at 1-volt, preliminary estimates
** Digital gates only, memory requirements would be additional