

# **Hardware Migration From CC2640F128 to CC2640R2F**

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*Fredrik Kervel*

## **ABSTRACT**

This application report describes the required changes when moving from the SimpleLink™ CC2640F128 to the SimpleLink CC2640R2F wireless MCU.

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## **Contents**

1	Changes Between CC2640F128 and CC2640R2F .....	2
2	Hardware Design Considerations.....	2
3	Certification When Replacing CC2640F128 With CC2640R2F.....	2
4	Summary.....	3
5	References .....	3

## **Trademarks**

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## 1 Changes Between CC2640F128 and CC2640R2F

The CC2640R2F is a ROM upgrade of the CC2640F128 wireless MCU. The CC2640R2F contains most of the required *Bluetooth*® low energy stack software for a BT 4.2 Bluetooth low energy peripheral device, as well as the key TI-RTOS components in ROM; whereas, the older CC2640F128 device required several of these software modules to be placed in Flash. This frees up available Flash memory on CC2640R2F for the customer application. As can be seen in the *Typical Flash Memory Available for Customer Applications* table of the CC2640R2F data sheet [1], the typical Bluetooth low energy peripheral with 4.2 features included goes from 31 kB free Flash on CC2640F128 to 80 kB free Flash on the CC2640R2F.

## 2 Hardware Design Considerations

The CC2640R2F comes in the same three QFN packages as the CC2640F128 and these are all pin and function compatible. The requirements to the external components, including crystals, DCDC- and RF components, are the same between the two devices. In other words, for an existing well-functioning PCB design, the CC2640F128 can simply be replaced with the CC2640R2F without any other hardware changes.

## 3 Certification When Replacing CC2640F128 With CC2640R2F

The RF front end and the frequency determining circuitry are unchanged on the CC2640R2F from the CC2640F128. This means that physical performance of the radio, such as power levels, modulation, and so forth will have the same properties on the CC2640R2F as on the CC2640F128. Texas Instruments recommends contacting an accredited test lab for all questions and topics related to regulatory compliance, including how to upgrade an existing, certified design to CC2640R2F. Generally, there are processes in place with the various regulatory bodies that allow minor upgrades of certified products, some of which are briefly outlined below.

FCC (US): FCC has several classes of permissive changes. Class I permissive change requires no filing with the commission, includes modifications that do not degrade the characteristics accepted by the FCC when certification was granted.

CE (EU): Using the CE mark is based on self-declaration. Typically, RF applications are tested for compliance at an accredited test house leading up to the issue of an EU Declaration of Conformity (DoC) for the specific device. When performing changes or modifications to an existing design, it is generally advised to consult with an accredited test house to evaluate whether the specific changes implemented would require retesting or additional measurements to ensure the regulatory requirements are met.

### 3.1 Notes

Note that EN 300 328 V2.1.1 will be the applicable harmonized standard under the Radio Equipment Directive (RED), 2014/53/EU, and was released in November of 2016 added RX Blocking as a new test. A suggested test method for this requirement is presented in *ETSI EN 300 328 Blocking Test for Bluetooth low energy* (SWRA536) [2].

Note also that using the new BT5 2 Mbit/s data rate requires additional certification testing. The BT5 Coded PHYs (500 kbps and 125 kbps) do not require additional testing as they are using the same 1 MSymbol/s symbol rate as 1 Mbps Bluetooth low energy.

RF certification of the customer's application and end equipment is the customer's responsibility. The customer is solely responsible for the design, validation, and testing of its applications as well as for compliance with all legal and regulatory requirements concerning its applications. Industry best practices generally require that the customer conducts qualification tests on actual applications taking into account possible environmental and other conditions that the customer's application may encounter. TI recommends consulting with a test house if in doubt on regulatory matters.

## 4 Summary

From a functional point of view the CC2640R2F can be used directly in any PCB design made for the CC2640F128 without any changes to layout or external components. If the CC2640R2F is replacing the CC2640F128 in an existing, officially certified or self-declared design/product, the accredited test house responsible for the certification/testing should be consulted for details on how to handle the regulatory compliance aspects of the updated design/product.

## 5 References

1. [CC2640R2F SimpleLink™ Bluetooth® low energy Wireless MCU](#)
2. [ETSI EN 300 328 Blocking Test for Bluetooth low energy](#)

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
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