

# Hardware Migration From CC1310 to CC1312R

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## ABSTRACT

This application report describes the required hardware changes when moving from the CC1310 to the CC1312R SimpleLink™ wireless MCU.

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## Trademarks

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## 1 Changes Between CC1310 and CC1312R

CC1312R is the latest generation of ultra-low power wireless MCUs for sub-1 GHz operation from Texas Instruments. The CC1312R supports the same RF PHYs and protocols as the CC1310. Compared to the CC1310, the CC1312R has more memory, 80 kB of RAM and 352 kB of flash; more capable processors, ARM Cortex M4F as well as updated Sensor Controller Engine, and updated peripherals.

From an external point of view, the CC1312R is very similar to the CC1310. In the 7x7 QFN package (RGZ), which is the only option for the CC1312R, the devices are pin compatible and a PCB design made for the CC1310 can be reused for the CC1312R.

There are a few considerations that has to be made regarding external circuitry, these are discussed in the following sections. The CC1312R LaunchPad design files should also be reviewed.

## 2 Crystal

The CC1312R device requires a 48 MHz crystal, whereas, the CC1310 requires a 24 MHz crystal. This change makes it easier to source physically small crystals with specifications within the CC13xx requirements. 48 MHz crystals are available in all the most commonly used crystal packages, and while the CC1312R reference designs are using 2016 size, 2520 and 3225 sizes are available from all the major crystal manufacturers.

As with the CC1310, the load capacitance is handled internally on the IC with a user-adjustable load capacitance array, which ranges from 2 pF to 10 pF. Typically no external capacitors are required, however when targeting ARIB compliance or operating at certain 400 MHz frequency bands external capacitors might be required due to spurious emission requirements.

When selecting a crystal for the CC1312R, it is important to refer to the crystal requirements outlined in the [CC1312R Data Sheet](#) in order to make sure the crystal fulfills these.

### 3 Regulatory Compliance Considerations

While the CC1312R is very similar to CC1310 from an RF perspective, there are several updates to the device (for example, clock frequencies), which typically triggers the need for new regulatory compliance certification.

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

A PCB designed for the CC1310 can be reused for the CC1312R as the devices (in the 7x7 QFN package) are pin to pin compatible. The only BOM update required is to replace the high frequency crystal with a 48 MHz part.

### 5 References

- [CC1312R Data Sheet](#)
- [CC1312R LaunchPad Design Files](#)

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