- CCA Mode 2 (carrier sense only) – The medium is reported busy upon detection of a signal compliant with IEEE 802.15.4 with the same modulation and spreading characteristics.
- CCA Mode 3 (carrier sense with energy above threshold) – The medium is reported busy using a logical combination (AND/OR) between the results from CCA Mode 1 and CCA Mode 2.

The clear channel assessment should survey a period equal to 8 symbols or 128 µs.

RADIO must be in RX mode and be able to receive correct packets when performing the CCA. The shortcut between READY and START must be disabled if baseband processing is not to be performed while the measurement is running.

Register EDSAMPLE on page 531 is updated at the end of the clear channel assessment and can be used to read the energy level measured during the procedure. For CCACTRL.CCAMODE = EdModeEdModeTest1, EDSAMPLE holds the first ED measurement. For the other CCA modes, EDSAMPLE holds the average ED value.

CCA Mode 1

CCA Mode 1 is enabled by first configuring the field CCACTRL.CCAMODE = EdMode and writing the CCACTRL.CCAEDTHRES field to a chosen value. Once the CCASTART task is written, RADIO will perform an ED measurement for 8 symbols and compare the measured level with that found in the CCACTRL.CCAEDTHRES field. If the measured value is higher than or equal to this threshold, the CCABUSY event is generated. If the measured level is less than the threshold, the CCAIDLE event is generated.

CCA Mode 2

CCA Mode 2 is enabled by configuring the field CCACTRL.CCAMODE = CarrierMode. RADIO will sample to see if a valid SFD is found during the 8 symbols. If a valid SFD is detected, the CCABUSY event is generated and the device should not send any data. The CCABUSY event is also generated if the scan was performed during an ongoing frame reception. If the measurement period completes with no SFD detection, the CCAIDLE event is generated. When CCACTRL.CCACORRCNT is not zero, the algorithm will look at the correlator output in addition to the SFD detection signal. If an SFD is reported during the scan period, it will terminate immediately indicating busy medium. Similarly, if the number of peaks above CCACTRL.CCACORRTHRES crosses the CCACTRL.CCACORRCNT, the CCACTRL.CCABUSY event is generated. If less than CCACORRCOUNT crossings are found and no SFD is reported, the CCAIDLE event will be generated and the device can send data.

CCA Mode 3

CCA Mode 3 is enabled by configuring CCACTRL.CCAMODE = CarrierAndEdMode or CCACTRL.CCAMODE = CarrierOrEdMode and performing the required logical combination of the result from CCA Mode 1 and CCA Mode 2. The CCABUSY or CCAIDLE events are generated by ANDing or ORing the energy above threshold and carrier detection scans.

Shortcuts

An ongoing CCA can be stopped by issuing the CCASTOP task. This will trigger the associated CCASTOPPED event.

For CCA mode automation, the following shortcuts are available:

- To automatically switch between RX mode (when performing the CCA) and to TX mode where the packet is sent, the shortcut between CCAIDLE and TXEN, in conjunction with the short between CCAIDLE and STOP, must be used.
- To automatically disable RADIO whenever the CCA reports a busy medium, the shortcut between CCABUSY and DISABLE can be used.