- To immediately start a CCA after ramping up into RX mode, the shortcut between RXREADY and CCASTART can be used.

Conversion

The conversion from a CCAEDTHRES, LQI, or EDSAMPLE value to dBm can be done with the following equation, where $VAL_{HARDWARE}$ is either CCAEDTHRES, LQI, or EDSAMPLE. LQI and EDSAMPLE are hardware-reported values, while CCAEDTHRES is set by software. Constants ED_RSSISCALE and ED_RSSIOFFS are from the electrical specifications.

```
P_RF[dBm] = ED_RSSIOFFS + VAL_HARDWARE
```

The ED_RSSISCALE constant is used to calculate power in 802.15.4 units (0-255), using the following formula:

```
P_RF[802.15.4 units] = MIN( ED_RSSISCALE x VAL_HARDWARE, 255 )
```

8.17.12.5 Cyclic redundancy check (CRC)

IEEE 802.15.4 uses a 16-bit ITU-T cyclic redundancy check (CRC) calculated over the MAC header (MHR) and MAC service data unit (MSDU).

The standard defines the following generator polynomial:

$G(x) = x^{16} + x^{12} + x^5 + 1$

In RX mode, RADIO will trigger the CRC module when the first octet after the frame length (PHR) is received. The CRC will then update on each consecutive octet received. When a complete frame is received, the CRCSTATUS register will be updated accordingly and the CRCOK or CRCERROR events will be generated. When the CRC module is enabled, it will not write the two last octets (CRC) to the frame RAM. When transmitting, the CRC will be computed on the fly, starting with the first octet after PHR, and inserted as the two last octets in the frame. The EasyDMA will fetch the frame length minus 2 octets from RAM and insert the CRC octets at their correct positions in the frame.

The following code shows how to configure the CRC module for correct operation when in IEEE 802.15.4 mode. The CRCCNF is written to 16-bit CRC and the CRCPOLY is written to `0x11021`. The start value used by IEEE 802.15.4 is `0` and CRCINIT is configured to reflect this.

```
/* 16-bit CRC with ITU-T polynomial with 0 as start condition*/
NRF_RADIO->CRCCNF = ((RADIO_CRCCNF_SKIPADDR_Ieee802154 << RADIO_CRCCNF_SKIPADDR_Pos) |
                     (RADIO_CRCCNF_LEN_Two << RADIO_CRCCNF_LEN_Pos));
NRF_RADIO->CRCPOLY = 0x11021;
NRF_RADIO->CRCINIT = 0;
```

The ENDIANESS subregister must be set to little-endian since the FCS field is transmitted from the left bit to the right bit.

8.17.12.6 Transmit sequence

The transmission is started by first putting RADIO in RX mode and triggering the RXEN task .

An outline of the IEEE 802.15.4 transmission is illustrated in the following figure.

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