

# nRF9160 Modem Reset Loop Restriction

## nWP-042

White Paper

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# Revision history

Date	Description
2021-07-06	First release

# 1 Introduction

Reset loop restriction prevents excessive signaling towards the network during continuous modem or application reset loops.

The restriction mechanism counts the modem activations that lead to a reset without deinitializing the modem between the activations. The modem starts blocking LTE radio connections after the number of resets has reached the defined limit. The modem continues blocking the connections for a certain amount of the modem's runtime. This means that the modem must be initialized for the duration of the blocking.

When the reset count reaches the limit, the blocking restriction is written to *Non-volatile Memory (NVM)*. The wait time cannot be bypassed after the wait has started. If the modem is reset during the wait period, the wait period is restarted with the initial wait period.

**Note:** The modem must be switched off gracefully with the `CFUN=0` AT command to avoid reset loop detection.

## 2 Activation of reset loop restriction

The modem counts all the resets where the modem is not gracefully deinitialized with `+CFUN=0`. When the modem is deinitialized with the `+CFUN=0 AT command`, the reset count is set to zero.

The activation of the reset loop restriction is notified with the `%MDMEV: RESET LOOP AT` notification after the modem's activation when the blocking starts or is still ongoing. A modem reset and deinitialization with `+CFUN=0` removes the notification subscription and a new subscription is required after the modem is initialized.

Modem domain event notifications, including notifications of the modem reset loop restriction's activation, can be subscribed with the following `%MDMEV AT command`:

```
AT%MDMEV=1
```

For more information on the `%MDMEV AT command`, see [Modem domain event reporting %MDMEV](#) in nRF91 AT Commands Reference Guide.

# 3 Modem behavior during reset loop restriction

The activation of the reset loop restriction starts the timer with a 30-minute period. During this time, the modem blocks all Attach attempts. After the timer has expired, the modem starts normal behavior and automatically regains LTE service for possible connections the same way as when the modem is activated without the reset loop restriction.

If the modem is switched off gracefully during a restriction period, the remaining time is stored to *NVM*, and the timer starts again with the remaining time during the next modem initialization. The timer starts again with the last stored remaining time if it has been stored to *NVM* or with a new 30-minute restriction period. The timer does not run when the modem has no power. Clearing the reset count does not impact an ongoing restriction period.

If the modem is reset during a restriction period, the timer starts again with the initial value or a previously stored remaining time during the next modem initialization.

The following command example subscribes modem domain event notifications:

```
AT%MDMEV=1
OK
```

The following command example activates the modem:

```
AT+CFUN=1
OK
```

The following modem domain event notification indicates that reset loop restriction is active:

```
%MDMEV: RESET LOOP
```

# Glossary

## **AT command**

A command used to control the modem.

## **User Equipment (UE)**

Any device used by an end-user to communicate. The UE consists of the Mobile Equipment (ME) and the Universal Integrated Circuit Card (UICC).

## **Non-volatile Memory (NVM)**

Memory that can retrieve stored information even after having been power-cycled.

# Acronyms and abbreviations

These acronyms and abbreviations are used in this document.

**NVM**

Non-volatile Memory

**UE**

User Equipment



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