

PCN #: TCM515-Revision_DD-18
Change Title: TCM 515 Product Upgrade
Date of publication: June 22nd, 2021

Products affected / EnOcean ordering codes

- TCM 515: S3003-K515

Description of change

Release DD-18 is a major product maintenance release of TCM 515. It implements the following changes:

1. Performance improvement: Increased rejection of out of band noise

Out of band noise might be present in customer applications operating in close proximity of other radio transmitters (e.g. LTE, WiFi, RFID). Such noise affects the receiver performance of the radio circuit and has to be filtered.

Previous generations of TCM 515 were designed for operation in conjunction with an external SAW filter on the customer PCB. In addition to that, they offered a configurable noise rejection threshold.

We received feedback from customers that integration and optimization of an SAW filter circuit in their design is difficult and that it would be desirable to have this filter integrated within TCM 515.

The new revision of TCM 515 addresses this feedback and integrates a dedicated SAW filter. As result, the immunity against radiated noise has been significantly increased from 3 V/m to 10 V/m and the use of an external SAW filter in the customer design is no longer necessary.

2. Performance improvement: Improved receiver sensitivity

The use of an SAW filter (either externally in the customer application or now internally in TCM 515) leads to a reduced receiver sensitivity due to the insertion loss of the SAW filter.

We received feedback from customers that the receiver sensitivity of TCM 515 should be improved to compensate for the insertion loss of an SAW filter.

The new revision of TCM 515 addresses this feedback and integrates a dedicated amplifier. As result, the reception sensitivity of TCM 515 has been improved from -92 dBm (previous version without SAW filter) to -93 dBm (new version with SAW filter). The insertion loss caused by the SAW filter has been compensated and the achievable communication distance has been increased.

3. New feature: Automatic gain control

The integration of a dedicated amplifier leads to an increased signal strength at the receiver input. For cases where the sender is very close to the receiver (for instance if a PTM module is mounted directly on top of the receiver antenna), this might lead to saturation of the receiver input stage.

The new revision of TCM 515 addresses this issue by integrating an automatic gain control logic which will temporarily – only for the duration of an EnOcean radio telegram transmission – reduce sensitivity if receiver saturation is detected.

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4. Performance improvement: Automatic noise threshold adjustment

TCM 515 allows specifying a noise rejection threshold to improve reception performance in very noisy environments. In previous revisions it was required that the user manually configures the value of this threshold (if required).

We received feedback from customers that the amount of noise might change due to the installation location or the presence / absence of external noise sources and that it therefore is not always possible to manually set the noise threshold to the required value.

The new revision of TCM 515 addresses this feedback by implementing an automatic mechanism controlling the noise threshold. As result, using `CO_SET_NOI-SETHRESHOLD` is no longer required and this command has been removed.

5. Performance improvement: Reduced power consumption in sleep mode

TCM 515 was designed primarily for line-powered applications such as actuators or gateways. Following the significant improvements of the TCM 515 power consumption introduced in the recent product updates DB-09 and DC-10, some customers now also use TCM 515 in battery-powered, transmit-only applications where the power consumption in sleep mode (entered via the ESP3 command `CO_WR_SLEEP`) is critical. We received feedback from customers that the power consumption in sleep mode should be improved for such applications.

The new revision of TCM 515 addresses this feedback by further optimizing the power management architecture. As result, the sleep current has been reduced from 50 uA to less than 5 uA.

6. Modified feature: ESP3 event after completion of telegram transmission

Especially when operating TCM 515 as transmit-only device, it might be beneficial to understand when the telegram transmission has been completed. Starting with revision DC-10, TCM 515 will indicate the completion of each telegram transmission using the ESP3 Event `CO_TX_DONE`.

We received feedback from customers that this event should only be sent when the transmission has been initiated by the host via ESP3 (and not for telegrams that are automatically repeated).

The new revision of TCM 515 addresses this feedback. As result, the transmission of the `CO_TX_DONE` event is now restricted to cases where the telegram transmission has been initiated by the host via ESP3.

7. Modified feature: CO_WR_RESET resets device to factory condition

TCM 515 allows the user to configure a number of persistent parameters (retained after power cycle) such as the repeater and security settings. So far, each of these parameters had to be reset individually in order to return TCM 515 to a defined (out of box / factory) configuration.

We received feedback from customers that resetting all parameters together using the `CO_WR_RESET` command would be beneficial.

The new revision of TCM 515 addresses this feedback. As result, the command `CO_WR_RESET` can now be used to reset persistent parameters.

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Timeline

- Delivery of the new version is planned to start in July 2021
- Only during the transition phase: Customers who wish to order a specific version (either the old version or the new version) should contact EnOcean Sales

Reason for change

- New product features and improvements according to customer requirements

Step codes after change

- TCM 515 DD-18

Customer impact of change and recommended action

- Impact to product design
 - Use of an external SAW filter in customer designs is no longer required
- Impact to product software
 - Reset to factory condition is now possible using CO_WR_RESET
 - Use of CO_SET_NOISETHRESHOLD is no longer required and this command will no longer be supported
 - Completion of the transmission of a telegram is now indicated by the ESP3 Event CO_TX_DONE only if the transmission was initiated by the host.

Reference Documents / Attachments

- TCM 515 User Manual (see product website)

PCN revision history

Date of revision	Author	Revision number	Reason
June 22, 2021	MKA	01	Customer PCN