Operational Description and User Manual

Model: FLAECH TAGE RED

I. Table of Contents

1 General product overview

1.1.1 Function CA:

There are two different capacitive sensors. The first sensor is used for unlock function. This sensor can distinguish an approach and a touch in SW, but there is only a LIN or UART signalization for unlock touch. The second sensor is used for lock function and is designed as a touch sensor. A SW differentiation between lock approach and lock touch is also possible, but just as the unlock sensor there is only a LIN or UART signalization for the lock touch.
Keyless access is enabled by activating the sensors on the door handle in combination with the door handle-ECU, whereby the vehicle can be unlocked or locked.

1.1.2 Function NFC:

To enable communication with an NFC device, the door handle electronics CA + NFC has a highly integrated transceiver IC for contactless communication at 13,56MHz for automotive applications. This reader has a gateway function, the possibility to buffer required data and various diagnostic informations can be provided as well.
The data is transferred to the NFC device according to ISO/IEC 14443-A and the data transmission to the vehicle is realized via LIN-Bus interface. ECP is implemented to communicate with Apple NFC devices.
In LPCD mode the door handle electronics checks the magnetic field for amplitude or phase change. This LPCD polling takes place in adjustable interval lengths.

1.2 Environmental conditions

- Operating temperature range:	-40 to +85°C
- Storage temperature range:	40 to +105°C
- Repainting temperature:	110°C for 1h, 130°C for 0,25h
- Room temperature:	+23°C ± 5°C
- Air humidity:	25% to 90%
- Test temperature for EOL-Test:	Room temperature

1.3 General manufacturing instructions

- At the beginning of the production process, the serial number is marked on the PCB.
- An unacceptable deflection of the board while placing components must be avoided.
- PCB separation is a particularly critical process. Torsional stress during separation and impact stress during punching shall be avoided.
- The method for depanelling must ensure that no components be damaged. An evidence of the equipment manufacturer is necessary.
- The soldering process should be reflow soldering and selective wave soldering.
- Active cooling of the board after soldering is not permitted.
- The components specifications concerning the temperature gradients must be adhered.
- A reworking of a SMD component with a soldering iron is prohibited.

1.1 Assembly concept of electronics FLAECH TAGE RED

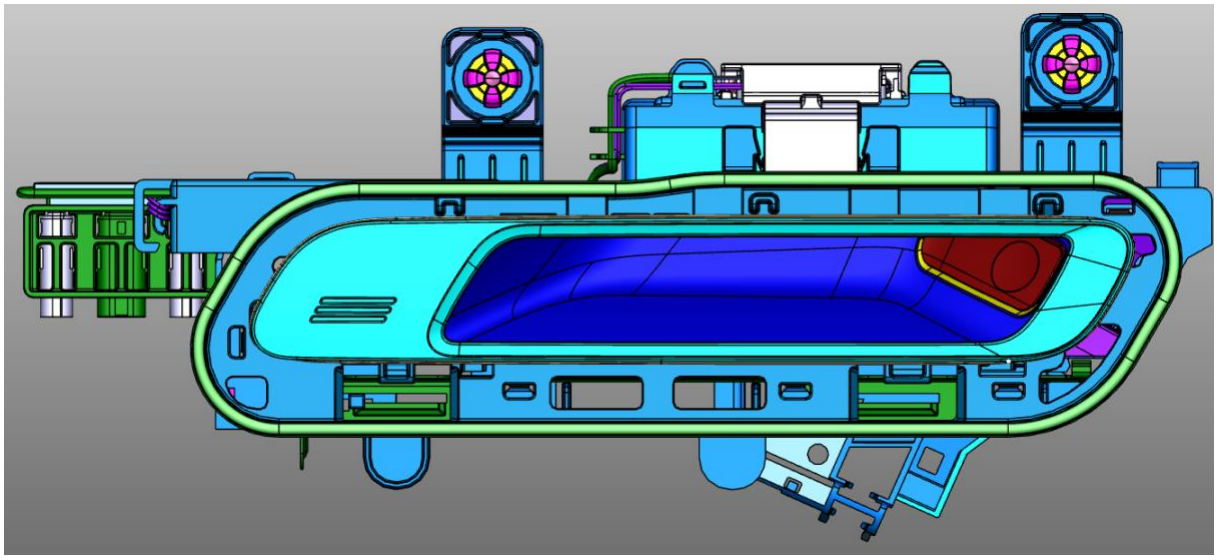

Figure 1: FLAECH TAGE RED with electronics plugged in bracket

1.1.1 NFC antenna

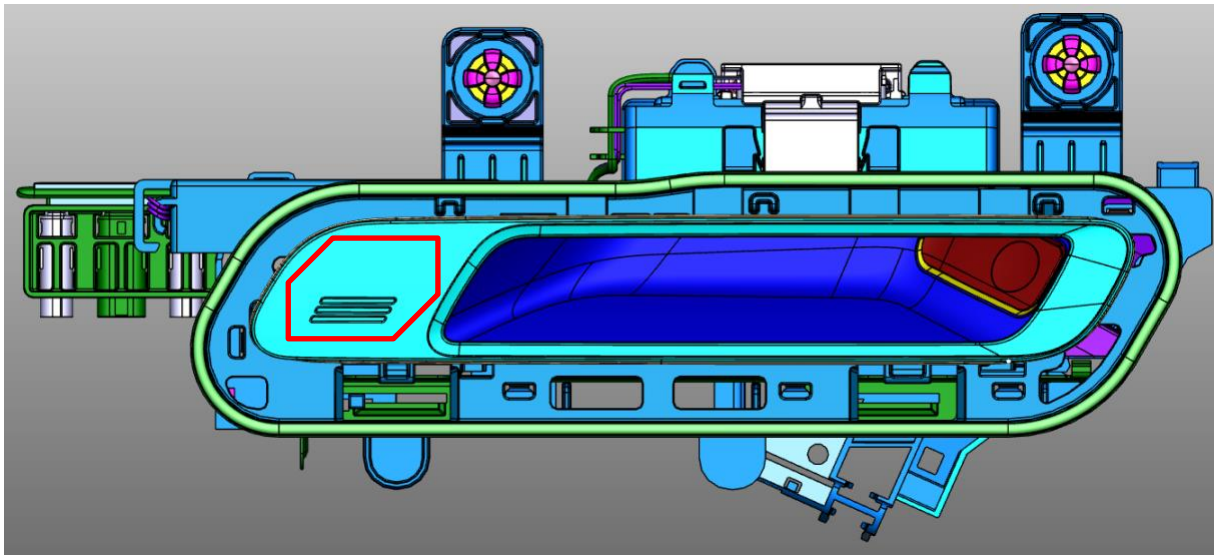

Figure 2: Detection area NFC antenna

1.2 Connector definitions

1.2.1 Connector BMW I20 CA + NFC, FLAECH TAGE RED

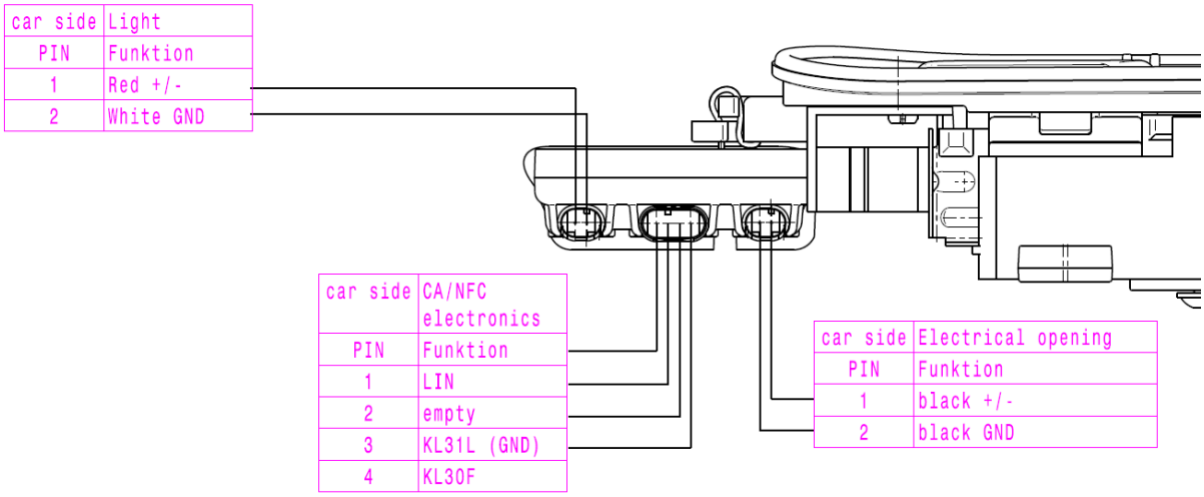

Figure 3: BMW I20 CA and CA + NFC door handle connectors

The BMW I20 CA and CA + NFC electronic module have the following connector pins:

- Pin 1 (yellow) = LIN
- Pin 2 = n.c.
- Pin 3 (brown) = clamp 31 (GND)
- Pin 4 (red) = clamp 30 (+Ubat)

The BMW I20 electrical opening module has the following connector pins:

- Pin 1 (black) = micro switch
- Pin 2 (black) = clamp 31 (GND)
- Pin 3 (brown) = clamp 31 (GND)
- Pin 4 (red) = clamp 30 (+Ubat)

The BMW I20 light module has the following connector pins:

- Pin 1 (red) = positive supply light module
- Pin 2 (white) = clamp 31 (GND)

2 Electrical Characteristics

2.1 Operating voltages

- Operating voltage range: +Ubat = 9V to 16V DC
- LIN operating voltage range: +Ubat = 8V to 18V DC
- Test voltage for EOL: +Ubat = 12V ± 2% DC

2.2 Current consumption

- Series parts current consumption:
  - Quiescent current: I_{quies} ≤ 400µA for 4 TAGE per vehicle
    I_{quies} ≤ 200µA for 2 TAGE per vehicle
    CA = 65µA
    CA + NFC = 150µA
  - Active current: I_{active} ≤ 250mA
    CA < 10mA
    CA + NFC < 120mA

The final values have to be defined with series parts by Huf-HQ.

2.3 Timing conditions

- Polling rate:
  - CA 20ms
  - CA + NFC 20ms (Kapa), 100ms (NFC)
- NFC-LPCD pulse: 40µs
- Clock rate microcontroller:
  - Kapaburst (333kHz/ 400kHz) 4MHz
  - A/D conversion + data handling 32MHz
- Baudrate:
  - UART 4800Bit/s up to 38400Bit/s
  - LIN 9600Bit/s up to 38400Bit/s

3 Interface Description

3.1 LIN Interface

The LIN interface is a bidirectional, one-wire interface with a LIN-Transceiver, which is compliant to LIN standard 2.2 for communication with the ZSG. The external connection of the LIN-Transceiver is conform to the OEM_Hardware_Requirements_CAN-LIN-FR-Interfaces_v1.2 [OEM_LIN_1.2].
The LIN Bus is primarily intended for in-vehicle subnetworks using baud rates up to 20 kBit/s
A 1kOhm terminating resistor between pin LIN and clamp 30 is necessary to check the LIN communication with the oscilloscope.
It is possible to check the LIN Bus communication with a Vector LIN/CAN interface (HW-Tool) together with CANoe (SW-Tool)

During development process, flashing via LIN is possible. In series production the LIN flash interface will be locked by an implementation of the master ECU.
The wake-up time of LIN communication is < 100ms.

Baud rate	19200kBit/s +/-14%
ID-length	1 Byte
Message length	8 Bytes
Synchronization	Master initializes communication
Sync Break	>= 13Bit
Sync Feld	1 Byte
Checksum	1 Byte

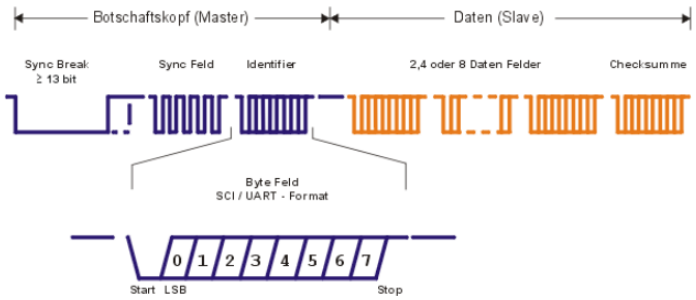

Figure 4: Typical LIN message

Declaration of Conformity, product Label

Radio equipment authorization to FCC in USA

FCC ID: YGOFLAECHTAGERED

The transmitter will be supplied as an original equipment device to the car manufacturer.

According to 47 CFR 15.19 (labelling requirements) the car manufacturer will print the following text in the appropriate User's Manual of the car:

> This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
> (1) This device may not cause harmful interference, and
> (2) This device must accept any interference received, including interference that may cause undesired operation.
>
> Usually this is followed by the following FCC caution:
> Any changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Radio equipment authorization to RSS-210 in Canada

IC ID: 4008C-FLAECHTAGER

The transmitter will be supplied as an original equipment device to the car manufacturer.

According to RSS-210 (labelling requirements) the car manufacturer will print the following text in the appropriate User's Manual of the car:

> This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
> (1) This device may not cause harmful interference, and
> (2) This device must accept any interference received, including interference that may cause undesired operation.
>
> Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
> (1) l'appareil ne doit pas produire de brouillage, et
> (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, mêmesi le brouillage est susceptible d'en compromettre le fonctionnement.
>
> Usually this is followed by the following RSS caution:
> Any changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

3 Regulatory Information

3.1 USA:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

3.2 Kanada:

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, mêmesi le brouillage est susceptible d'en compromettre le fonctionnement.

Any changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

3.3 Taiwan

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射 頻器材之使用不得影響飛航安全及干擾合法通信;經發現有干擾現象時，應 立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理 法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及 醫療用電波輻射性電機設備之干擾。