Document: **User Manual**

Product: Smart Access BLE

Model: BNCM

Date: 14. Oct. 2021

Number of pages: 7

	Name:	Department:	Phone:	Date:	Sign:
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1. Check:					
Responsible:					

1.1 Versions List

Version	Date	Author	Comment, Description
V0.1	14/10/2021	Peng Yu	Draft 0.1
V0.2	21/03/2024	Lu Yanggu	Draft 0x2
V0.3	31/07/2024	Lothar Weigert	Model name on first page, User manual based on Technical Description

1.2 Related Documents

Document	Version	Date	Author	Comment, Description

1.3 Abbreviation Register

Abbreviation	Description
BUB	Backup Battery
CAN	controller area network
CW	continuous wave
HW	hardware
LNA	low noise amplifier
DUT	device under test
EMC	electro-magnetic compatibility
PCB	printed circuit board
PWM	pulse width modulation
RF	radio frequency
SW	software
RSSI	Received strength signal indication
SBC	System base chip
HSM	Hardware security module

Content

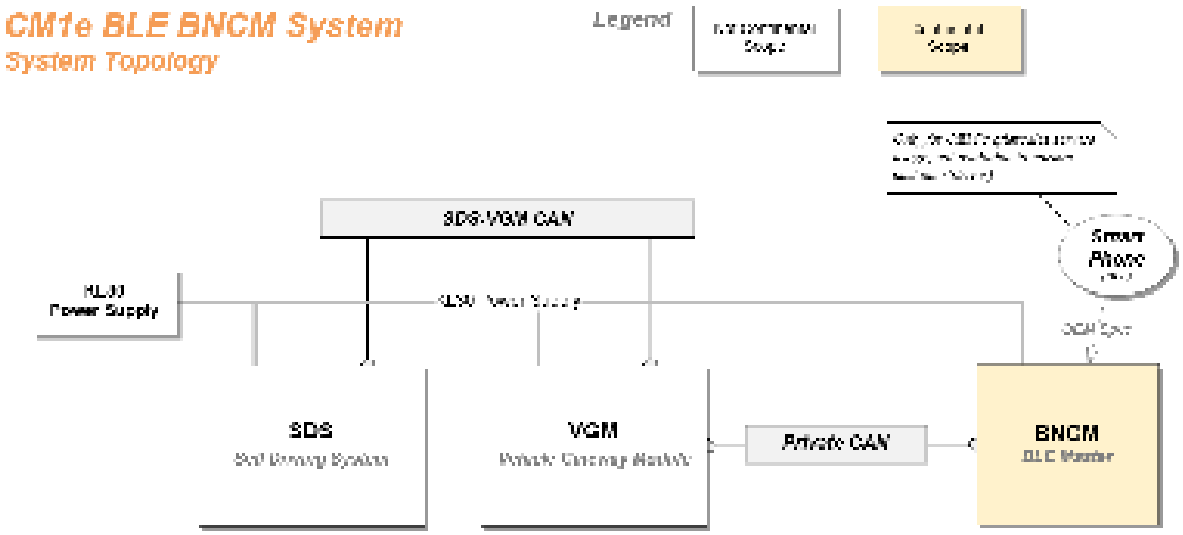
2 Scope of Document

The aim of this document is to provide a short overview on the Smart access BLE system and to describe the BLE module in order to support the homologation activities.

3 SYSTEM OVERVIEW

3.1 Short Description of smart access BLE system

The BLE system includes a master node (Master). The main node is connected to the body network via the CAN bus. The master node establishes a secure data connection with the mobile phone, authenticates the user's mobile phone identity and digital key, and receives remote control signals from the mobile phone. The master node receives BLE connection RSSI from BLE chip, then locates the position of the mobile phone relative to the car through the positioning algorithm.



4 Mechanical design

4.1 Car mounting position

› The mounting location is inside the compartment

5 Description of BLE system

The master node performs BLE advertising , the user's mobile phone discovers the master node of the vehicle through BLE Scanning in the close range of the vehicle, and establishes the data link with the master node through a secure connection, and establishes the bonding with the master node. Then the mobile APP can starts the BLE digital key functions..

In specific scenario, the master node calculates the location of the mobile phone according to the BLE connection RSSI values derived from BLE chip.

5.1 Wireless services:

- BLE

5.2 Interfaces:

- CAN

5.3 internal Antennas:

- One BLE ant.

There are no connectors for external antennas.

Antennas are integrated into the module.

6 Wireless services technical data

6.1 BLE technical data

Wireless service:	**BLE (Bluetooth Low Energy)**
Frequency bands / range:	2400-2483.5MHz
Data Rate:	1Mbps
Electrical output power (conducted into 50 Ohm):	2.0dBm
Modulations:	GFSK
Number of channels:	40
Channel (occupied) bandwid:th:	2 MHz
Antenna name:	PCB loop Antenna
Antenna type:	Direct feed (main PCB)
Antenna gain (efficiency, gain incl. losses):	antenna efficiency max.: 2400-2483.5MHz: -5.2 dB

Bluetooth Low Energy							
Ch	**Fre(MHz)**	**Ch**	**Fre(MHz)**	**Ch**	**Fre(MHz)**	**Ch**	**Fre(MHz)**
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

7 USA Statement

Product name: Smart Access BLE System
Model: BNCM
FCC ID: KR5BNCM

FCC Compliance Statement
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. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
• Reorient or relocate the receiving antenna

• Increase the separation between the equipment and receiver

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected

• Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

END OF DOCUMENT