USER MANUAL

Multi-Functional Smartphone Terminal

WCA NFC 2.0

1. System Description

Continental Wireless Power Charger is developed for automotive applications under the name WCA NFC 2.0 which includes two functions like:

- WPC: Wireless power charger; WPC Function 126.6kHz
- NFC: Near Field Communication; NFC Function 13.56MHz

The WCA NFC 2.0 module and its implementation inside the vehicle is depicted in Fig. 1. Its assembly instruction is done by professional workers. Therefore, the product cannot be moved or switched to another position by the end user.

Fig. 1: WCA NFC 2.0 module and its implementation inside the vehicle

WCA NFC 2.0 charger uses Qi standard of Wireless Power Consortium (WPC) for enabling wireless charging from a base station unit to mobile device. The power transfer method is based on near field magnetic induction between coils.

System Overview

The structure of wireless power transfer proposed in Fig. 2 shows an overview of the system with two kinds of distinguished devices: Base station and Mobile device.

Base station comprises two main functional units per mode (WPC and NFC), namely power conversion units and Communications & Control units for delivering, controlling and regulating the transferred power.

Mobile device (power receiver) comprises a power pick up unit and a communications & control unit for achieving power requirements and charging the device battery if is chargeable device or establishing an active NFC communication.

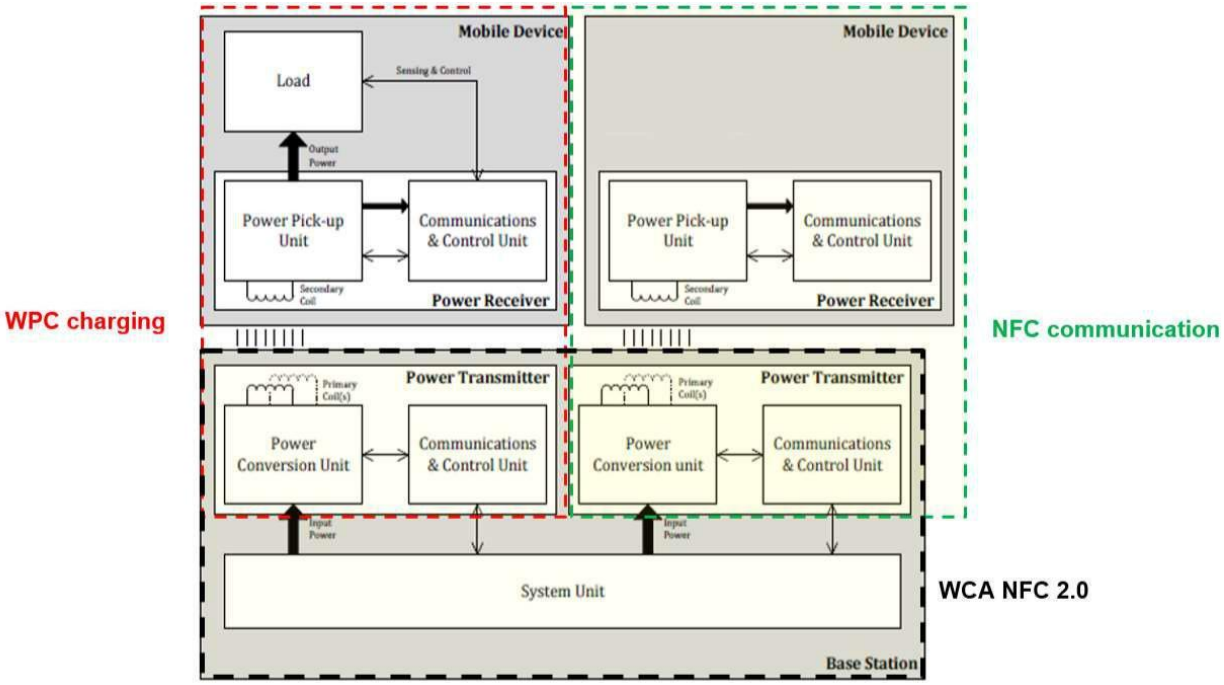

Fig. 2: Wireless power transfer structure: WPC and NFC

1.2 Wireless Power Charger Description

The WCA NFC 2.0 is mainly composed of 6 parts as depicted in Fig.3.

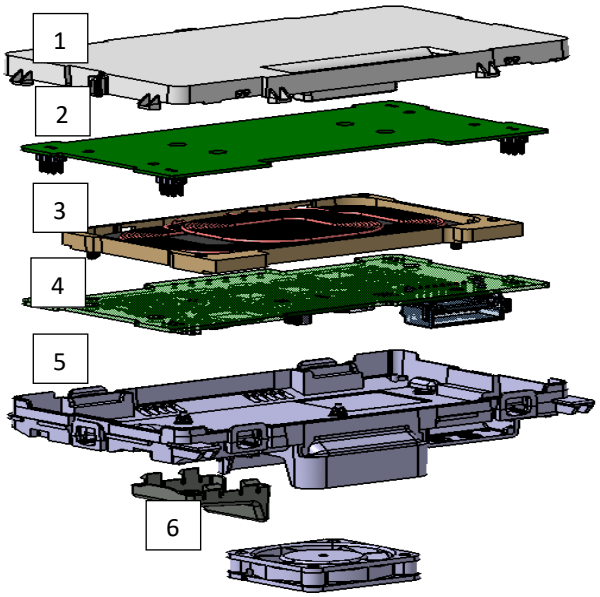

Fig. 3: WCA NFC 2.0 split view

1. Top housing
2. Antenna PCB
3. WPC coil + Ferrite + Plastic Holder
4. Main PCB with 8 ways connector: diagram below in Fig 4, pins description in Table1.

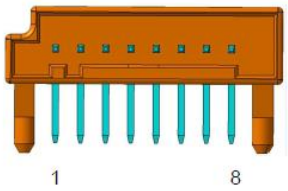

Fig 4. Connector diagram

Pin No.	Function	Type	Description
1	**VBAT**	Supply	General supply battery connection
2	**NC**	Not used	Not used
3	**CAN_H**	Communication	CAN communication high signal
4	**CAN_L**	Communication	CAN communication low signal
5	**DETECTION_F**[1]	Digital	Front version selection
6	**GND_BAT**	Supply	General supply GND connection
7	**DETECTION_R**[1]	Digital	Rear version selection
8	**NC**	Not used	Not used

Obs. [1]Depending on the variant Pin no. 5 will be switched to GND for Front variant or Pin no.7 will be switched to GND for Rear variant.

Table 1. Connector description

5. Bottom Housing + Fan cover
6. Fan

A picture of a serial production part is shown in Fig. 5.

(a) (b)

Fig. 5: Serial product WCA NFC 2.0. (a) top view and (b) side view.

1.3 WCA NFC 2.0 modes

According to the Qi standard, a simple operational description of wireless power transfer can be summarized in two principle operational modes:

- The first mode with a defined burst sequence allows the transmitter to detect an object on the charging surface: IDLE mode
- The second mode allows the power transfer from the base station to the mobile device, placed on the charging surface: Charging mode

The transition between these two modes is realized through a transient mode: Detection mode. which only occurs when the Mobile device is placed on the charging surface.

1.4 Product parameters

Below in table 2, the technical parameters of the WCA NFC 2.0 product are specified:

Parameters	Values
Supply voltage	12V battery
Voltage supply range	8V < Vbat < 16V
Max. power consumption	30W
Product Operating temperature range	-40°C < Temp < 85°C
Max.current consumption	3A
Vehicle fuse protection	7.5A
Product weight	230 g
Dimensions (X/Y/Z in mm)	139/80/17.5 (31.5 at FAN level)

Table 2: Product technical parameters

1.5 WPC parameters

Below in table 3, the technical parameters of the WPC feature are specified:

Parameters	Values
Carrier frequency	126.6 kHz
Frequency shift	+/- 6 kHz
WPC chipset brand	IDT
Data rate max (FSK)	0.247 kbps
WPC litz coil	MPA21 Triple coil according to Qi Standard
WPC litz coil gain @ 126.6kHz	-108.4 dBi
Max. output power	15W
Max. H field @10m (@ 126.6kHz)	7.3 dBµA/m

Table 3: WPC technical parameters of WCA NFC 2.0

1.6 NFC Parameters

Below in table 4, the technical parameters of the NFC feature of WCA NFC 2.0:

Parameters	Values
Carrier frequency	13.56 MHz
Modulation type	Amplitude Shift Keying (ASK)
Data rate max.	848 kbps
NFC chipset brand	NXP Semiconductors
NFC chipset model number	NCF3340EHN
Max. H field @10m (@ 13.56 MHz)	4 dBµA/m

Table 4: NFC technical parameters of WCA NFC 2.0

1.7 NFC antenna

The NFC block is composed of three antennas: Main, Side1 and Side 2 antenna.
The electrical parameters of the NFC antenna are listed in the following tables (5,6 and 7):

Main NFC antenna:

Parameters	Values
Antenna type	Planar printed coil on PCB
Number of turns	3
Antenna size	106mm x 52 mm
Antenna Gain (dBi) @ 13.56MHz	-51.38

Table 5: Main NFC antenna technical parameters

Side 1 NFC antenna:

Parameters	Values
Antenna type	Planar printed coil on PCB
Number of turns	3
Antenna size	59mm x 13.8mm x 10mm
Antenna Gain (dBi) @ 13.56MHz	-58.58

Table 6: Side 1 NFC antenna technical parameters

Side 2 NFC antenna:

Parameters	Values
Antenna type	Planar printed coil on PCB
Number of turns	3
Antenna size	59mm x 13.8mm x 10mm
Antenna Gain (dBi) @ 13.56MHz	-57.07

Table 7: Side 2 NFC antenna technical parameters

2. Overview of "WCA NFC 2.0"

Here below the product overview of "WCA NFC 2.0":

Ref	WPC	NFC	Top View	Bottom View
WCA NFC 2.0	**Yes**	**Yes**		

Table 7: WCA NFC 2.0 overview.

3. Label content

BELARUS

CANADA

This device complies with part 15 of the FCC Rules and Industry Canada license-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, même si le brouillage est susceptible d'en compromettre le fonctionnement.

INDONESIA

[certificate no.]
[PLG. ID no.]

Dilarang melakukan perubahan spesifikasi yang dapat menimbulkan gangguan fisik dan/atau elektromagnetik terhadap lingkungan sekitarnya

MEXICO

La operación de este equipo está sujeta a las siguientes dos condiciones:
(1) es posible que este equipo o dispositivo no cause interferencia perjudicial y
(2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

MOLDOVA

KKK

NIGERIA

Connection and use of this communications equipment is permitted by the Nigerian Communications Commission

SINGAPORE

COMPLIANCE LABEL

In accordance with condition 8(a) of the Dealer's Class Licence and condition 12(a) of the Dealer's Individual Licence (as the case may be), a licensee shall affix the following compliance label on all registered equipment or on the equipment's instruction manual or packaging before such equipment is displayed or offered for sale:

COMPLIANCE LABEL

Complies with IMDA Standards [Dealer's Licence No.]	Complies with IMDA Standards DB123456
Label Size 17mm by 9mm (Not to Scale)	Example

SOUTH AFRICA

TA-YEAR/XXXX

TAIWAN

Taiwan regulatory information(NCC)

低功率電波輻射性電機管理辦法

第十二條　　經型式認證合格之低功率射頻電機，非經許可，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。

Article 12

Without permission granted by the NCC, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristic as well as performance to a approved low power radio-frequency devices.

第十四條　　低功率射頻電機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。

前項合法通信，指依電信法規定作業之無線電通信。

低功率射頻電機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。

Article 14

The low power radio-frequency devices shall not influence aircraft security and interfere legal communications; If found, the user shall cease operating immediately until no interference is achieved.

The said legal communications means radio communications is operated in compliance with the Telecommunications Act.

The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.

UKRAINE

"Цим [$_1$ Continental Automotive GmbH, Siemensstrasse 12, 93055 Regensburg] заявляє, що тип радіообладнання: Головний блок з технологією [$_2$Qi standard, NFC standard]. Модель:[$_3$WCA NFC 2.0] відповідає Технічному регламенту радіообладнання; повний текст декларації про відповідність доступний на веб-сайті за такою адресою: [$_4$https:www.continental-automotive.com]

USA

FCC § 15.19 Labelling requirements
"This device complies with part 15 of the FCC Rules and Industry Canada license-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."

FCC § 15.21 Information to user
"Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

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