

# USER MANUAL

## FOR HOMOLOGATION USAGE


Project: Door Handle Sensor AUDI Q7 NFC

Homologation Model Name.: DHSQ7NFC

Product name	Variant	Continental Part number	Audi Part number
DHS Audi Q7 NFC	Nr	A2C 161 197 01	4M1.927.753

### History:

Date	Version	Maturity	Short description
2018-02-21	AA	Draft	Creation for Q7 NFC project initial request

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	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 1 of 15

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## 1. Table Of Content

2.	General .....	3
2.1.	Contact .....	3
2.2.	Glossary .....	3
3.	General regulatory informations.....	4
4.	Electrical data .....	5
4.1.1.	Operating Temperature Range.....	5
4.1.2.	CAN Voltage Range.....	5
4.1.3.	CAN Communication .....	5
5.	Technical specifications.....	6
5.1.	NFC Sensor Functions.....	6
5.2.	Misuse Protections .....	6
5.3.	NFC Reader Principle .....	6
5.4.	NFC Communication Module .....	7
5.4.1.	NFC Communication - Transceiver .....	7
5.4.2.	NFC Actuator test .....	7
6.	Photographs .....	7
7.	Operational mode description .....	8
7.1.	Functionnal mode.....	8
7.2.	NFC test mode .....	8
7.3.	Actuation test.....	8
8.	User manual .....	9
9.	Homologation setup.....	9
9.1.	General Test conditions.....	9
10.	Delivery parts .....	10
11.	Testing tool.....	10
11.1.	DHS connection instructions: .....	11
11.2.	Test box signals description: .....	12
11.3.	Test Box procedure.....	14
11.3.1.	Test box function:.....	14

Designed by Thierry Guidet		Date	Department	
Released by		Designation		
	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 2 of 15

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## 2. General

### 2.1. Contact

Function:	Name:	Email	Phone
Project Leader	Andreas Moser		(+33) 56119
Homologation contact	Marion Boucheret		
System Engineer	Thierry Guidet	Thierry.guidet@continental.com	(+33) 56119 5740

### 2.2. Glossary

<b>D5/Q7/B9:</b>	Audi platforms names
<b>DH:</b>	Door Handle (means Outside Door Handle)
<b>DHS:</b>	Door Handle Sensor Module (Unlock and Lock capacitive sensors)
<b>LF:</b>	Low Frequency (125kHz signal for communication from ECU to Keyfob)
<b>RF:</b>	Radio-Frequency (433 MHz signal for communication from Keyfob to ECU)
<b>ECU:</b>	Electronic Control Unit
<b>BCM:</b>	Body Controller Module
<b>NFC :</b>	Near Field Communication
<b>PCD :</b>	Proximity Coupling Device (the Reader)
<b>PICC :</b>	Proximity Integrated Circuit Card (the Smartcard/the Smartphone)
<b>HW:</b>	Hardware
<b>SW:</b>	Software
<b>RT:</b>	Room Temperature
<b>DV:</b>	Design Validation
<b>PV:</b>	Product Validation
<b>EMC:</b>	Electro Magnetic Compatibility

Designed by Thierry Guidet		Date	Department	
Released by		Designation		
	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 3 of 15

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### 3. General regulatory informations

General data to be included in the test reports

Countries homologation list

Country	Applicable normative
Austria	CE
Belgium	CE
Bulgaria	CE
Croatia	CE
Czech Republic	CE
Danmark	CE
Estonia	CE
Finland	CE
France	CE
Germany	CE
Great Britain / North Ireland	CE
Greece	CE
Hungary	CE
Ireland	CE
Italy (San Marino, Vatican)	CE
Latvia	CE
Lithuania	CE
Luxemburg	CE
Malta	CE
Netherlands	CE
Norway	CE
Poland	CE
Portugal	CE
Romania	CE
Slovenia	CE
Slowak Republic	CE
Spain (Andorra, Balearic Islans, Canay Islands)	CE
Sweden	CE
Switzerland	CE
Turkey	CE
USA	FCC

Designed by <b>Thierry Guidet</b>		Date	Department	
Released by		Designation		
	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 4 of 15

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## 4. Electrical data

### 4.1.1. Operating Temperature Range

The Electronic Design shall guaranty all electrical parameters over operating Temperature range - 40°C to +70°C, unless otherwise stated.


Parameter	Description	Min	Typ	Max	U.	Comments
IqpkOFF	Peak Quiescent Current		220	290	mA	μController Awake, NFC polling CAN On Lighting ON

### 4.1.2. CAN Voltage Range

The Electronic Design guaranties the CAN functionality (communication possible) over operating Voltage range UDH = 6V to 18V.

### 4.1.3. CAN Communication

The Electronics is compatible with an interface module, to handle CAN High-Speed Communication (500kbits/s).

Designed by Thierry Guidet		Date	Department
Released by		Designation	
	IMS ID nr	Version AA	Document version as of novembre 14, 2018
			Pages 5 of 15

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## 5. Technical specifications

### 5.1. NFC Sensor Functions

- NFC Function : Read/Write function of NFC Smartcards/Smartphones.

### 5.2. Misuse Protections

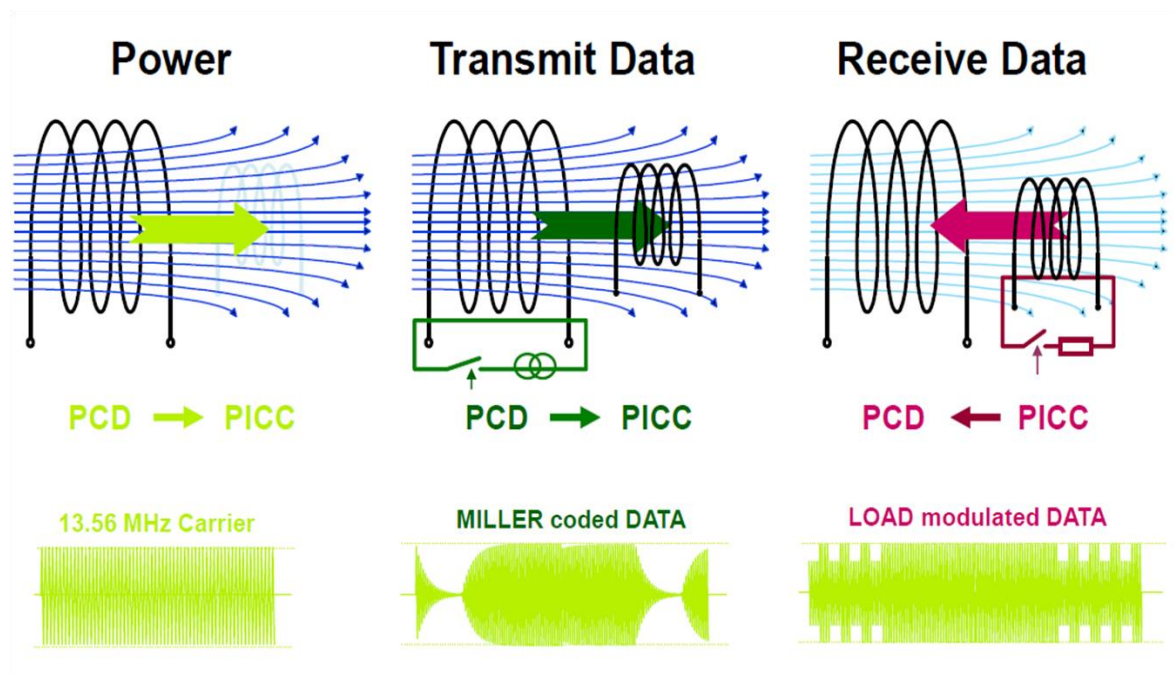
After 20 lock/unlock activations in less than 10 seconds the sensor deactivates detection functions for 30s.

After 20 NFC activations with wrong TAG in less than 10 seconds the sensor deactivates NFC function for 30s.

### 5.3. NFC Reader Principle

The NFC principle is based on electromagnetic coupling between 2 devices at close distance (few cm).

The PCD emits an electromagnetic field on a 13.56 Mhz carrier. It will power the PICC via Induction. The PCD can transmit data via Miller Coding and receive data back via Load modulation.



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Released by		Designation		
	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 6 of 15

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## 5.4. NFC Communication Module

### 5.4.1. NFC Communication - Transceiver

The Electronics shall embed a NFC transceiver to enable the NFC bi-directional communication.

### 5.4.2. NFC Actuator test

The actuator test is used to execute the homologation campaign, setting the NFC discovery mode permanently. Refer to §'Operational mode description" in this document.

## 6. Photographs

Internal and external pictures of the device and all the components and boards



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Released by		Designation		
	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 7 of 15

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## 7. Operational mode description

### 7.1. Functionnal mode

The DHS is designed to send information to the CAN bus on following user events:

- When a card or a smartphone is detected closed to the NFC pad

### 7.2. NFC test mode

Test mode NFC is activated when setting CAN signal on CAN bus



When the car driver put his smartphone close to the door handle (\*), then the authenticated signal is sent to the BCM.

(\* ) and authenticated

### 7.3. Actuation test

The actuator test is activated by CAN signal.

The DHS shall perform the actuator test requirement as described below :

1. It shall turn on the antenna for a delay set to 10sec., and look for an external device with RF discovery polling rate as short as possible
2. If it finds an appropriate counterpart (NFC-A Type 4), it shall activate and send the SELECT command.
3. It shall feedback the result by changing the parameter "authenticated NFC-counterpart"

The DHS Application shall execute the actuator test (when requested) at any time regardless of the Misuse or K15 State and ESM (Energy Saving Mode)

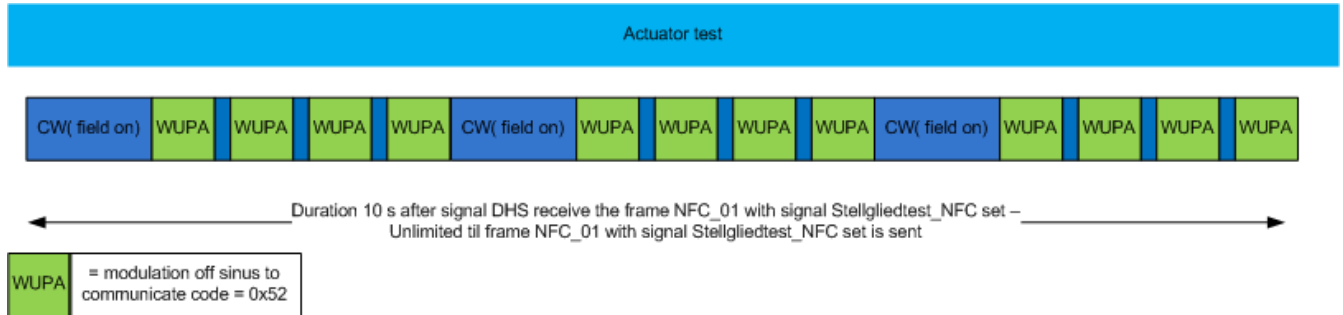
The field is turned on during the complete duration of the actuator test.

Designed by Thierry Guidet		Date	Department	
Released by		Designation		
	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 8 of 15

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REQA is replaced by WUPA to ensure several communications possible whereas field is kept on.

The DHS shall stop the actuator test if:

- Stopped by Test box
- After 10sec if no Test Box connected to the DUT (Actuator mode test set by CAN, for example)

## 8. User manual

"Including regulatory notices for FCC and user manual requirements for EU. .

In the case of EU, this is not reviewed by the NB, but EU requirements must be included before marketing the product in EU. "

Refer to Testing Tool instruction chapter.

## 9. Homologation setup

### 9.1. General Test conditions

**General test conditions valid for all tests :**

- All materials within 100mm around the door handle sensor during the test process (includes Handle fixations - "Sensor fixture" / "Holder", sockets, base plate, ... -, actuation system – robot, arms, ...-, tester mechanics, ...) shall be made of non conductive material and as electrostatic neutral as possible
- Conductive environment (Robot, arms, jig walls, etc ...) shall be at least 100mm away from Door Handle Assembly throughout the test sequence (except for Targets themselves).
- The DHS shall have its dedicated power supply. This power supply shall be a low noise linear power supply (switch mode power supplies are prohibited)
- No noise shall be visible by oscilloscope on DHS supply line.

Designed by Thierry Guidet	Date	Department
Released by	Designation	
	IMS ID nr	Version AA
	Document version as of novembre 14, 2018	
		Pages 9 of 15

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## 10. Delivery parts

Nb part delivered : 3 Sensors are delivered

Part marking : H03 0010 01S

SW version : 0010

Id part	Type	S/N	comments
1	DHS		
2	DHS		
3	DHS		
8	Test Box	nr	Already shipped
9	Wires	Nr	set of harness
10	Tag for NFC detection	Nr	

## 11. Testing tool

Testing tool : GO/no GO/ Testing mode Testing box

Same Tooling as for D5NFC product.

Photo



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Released by		Designation		
	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 10 of 15

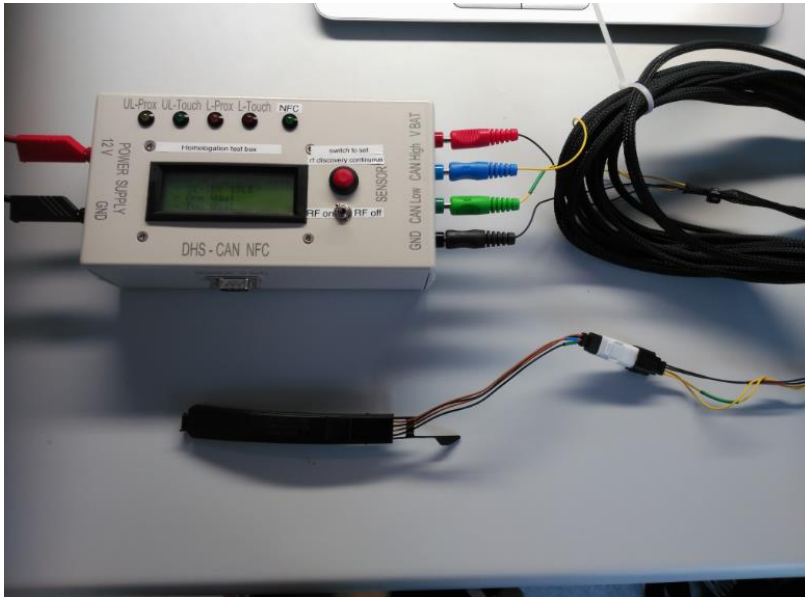
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User Manual

11.1. DHS connection instructions:

Global overview when sensor is plugged to testbox:



Supply test box with 12V.

Plug DHS Vbat and GND to corresponding Vbat and GND input on test box:



Plug DHS CAN low and Can High to corresponding CAN low and Can High input on test box with color corresponding plugs:

Designed by Thierry Guidet		Date	Department	
Released by		Designation		
	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 11 of 15

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11.2. Test box signals description:

LEDs are available to check visually if sensor is working.



For each led an output is available and can be connected directly to any recorder ( oscilloscope,...). High level means no detection, low level means detection.

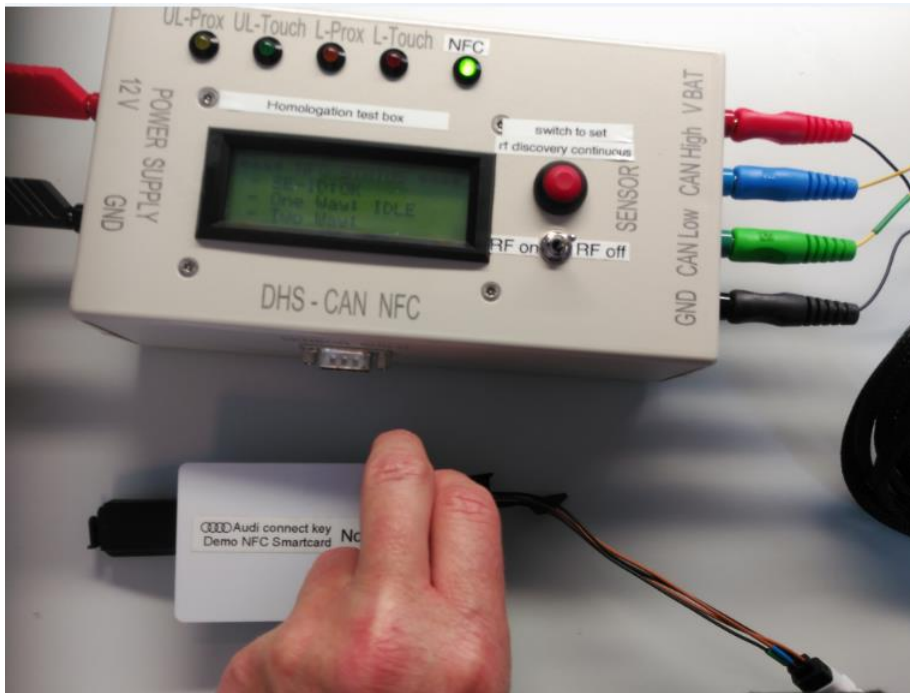
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Released by		Designation		
<b>Continental</b>	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 12 of 15

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11.2.1.1. NFC detection

NFC detection : approach TAG against NFC area : message on test box = "SE-ID:OK"



Designed by Thierry Guidet		Date	Department	
Released by		Designation		
<b>Continental</b>	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 13 of 15

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11.3. Test Box procedure

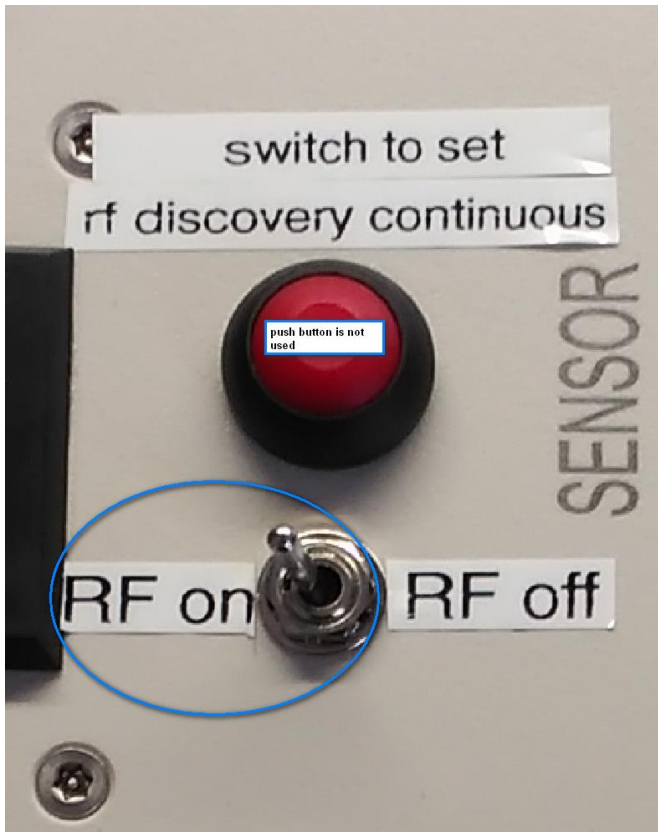
Before to start any test, check for each LED and corresponding output that sensor is working fine:

- approach TAG against NFC area => check NFC function

11.3.1. Test box function:

To set the sensor in “normal mode”, as it is in vehicle configuration without communication with BCM, let the switch in position RF-OFF.

To set the sensor in “RF Discovery mode”, set the switch in position RF-ON. The sensor will send continuous WUPA as described in chapter “actuator test”.



To check no loss of detection Tag provided by continental shall lay against the DHS in front of NFC Area as describe in chapter NFC detection area”.

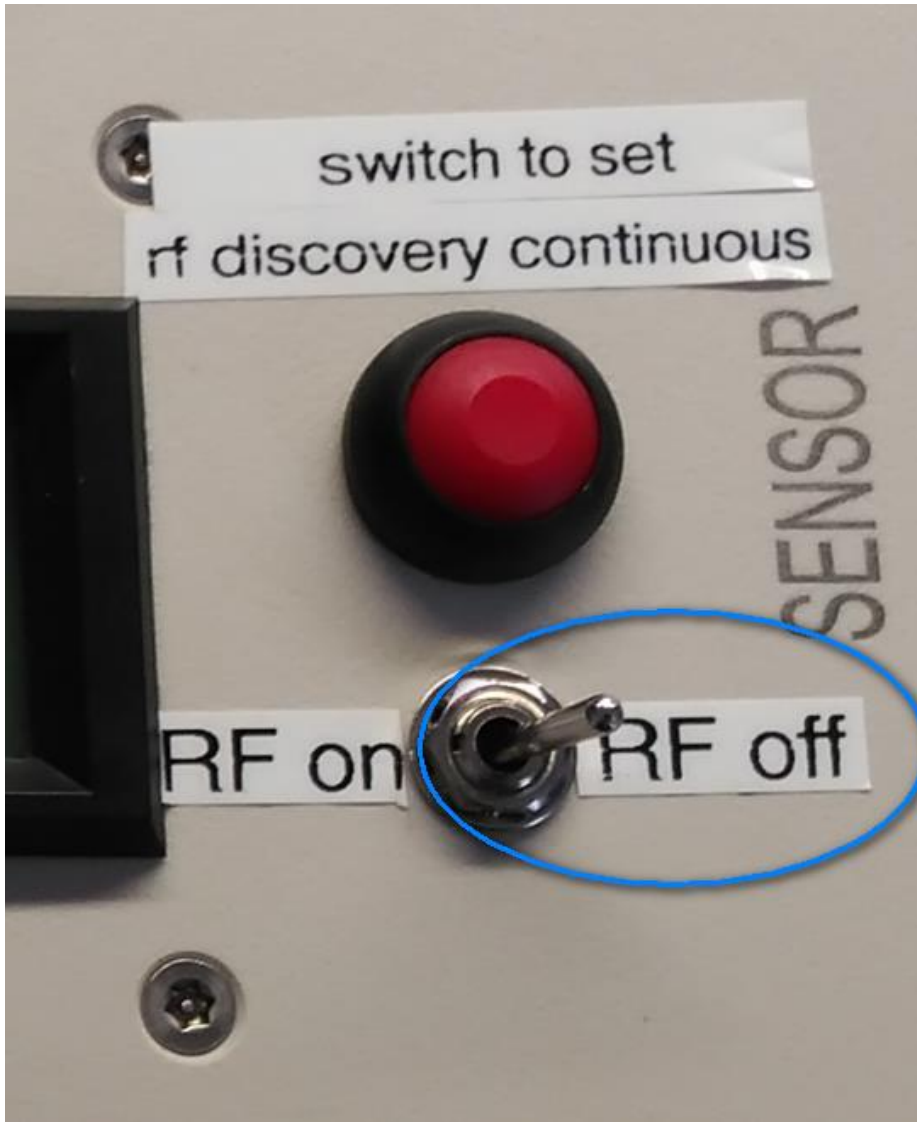
To exit the sensor from “RF Discovery mode”, set the switch in position RF-OFF. The sensor will exit from this mode to normal mode in about 1s.

Designed by Thierry Guidet		Date	Department	
Released by		Designation		
<b>Continental</b>	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 14 of 15

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	IMS ID nr	Version AA	Document version as of novembre 14, 2018	Pages 15 of 15

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