sttID

scemtec Transponder Technology GmbH

Manual

SIR-2510

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1 General

scemtec Transponder Technology GmbH (*sttID*) reserves the right to make changes or to discontinue its products or services at any time without notice.

sttID takes no responsibility for customer applications, products or performance relating to systems or applications incorporating with *sttID* products.

sttID assumes no liability and is not responsible for infringement of patents and/or any other intellectual or industrial property rights of third parties, which may result from assistance provided by *sttID*.

All other products mentioned in this document might be brands or brand names of the different suppliers.

1.1 Care and maintenance

- Care has to be taken, that the Reader and/or the attached antenna is not exposed to any electrostatic discharge (ESD). Electrostatic discharge may cause serious damage to the Reader. It is strongly recommended, that sufficient ESD protection is applied In critical environment.
- Keep the device dry. Humidity and liquids contain minerals will corrode electronic circuits and tarnish transparent plastic parts. The device is not waterproof and should not be exposed to rain or moisture. Under extreme conditions water may enter the circuitry.
- Avoid mechanical shocks. Handle the device with care. Shocks may break internal circuit boards.
- Take care not to scratch the device. Keep the device clean. When working with the device, use only *sttID*-approved accessories.
- Do not store or use the device in any location that is extremely dusty, dirty, damp or wet.
- Do not store in hot areas. High temperatures can shorten the life of electronic devices, damage batteries and warp or melt certain plastics. Protect the device from extreme temperatures. For example, do not place the device in a windowed area where the sun may cause extreme temperatures, and keep it away from heaters and other heat sources.
- Do not store in cold areas. When the device warms up (to its normal temperature), moisture can form inside the device, which may damage electronic circuit boards.
- Do not attempt to open the device during operation, outside installation and maintenance periods. Non-professional handling of the device may damage it.
- Do not paint the device. Paint prevent proper operation. Paint with metallic contents may limit device performances.
- If the device or any accessory are not working properly, take it to your nearest *sttID*-Partner.

1.2 RFID systems

As this technology is based on radio frequency, one must exercise the following operational and mounting instructions to achieve best performance:

- Metal affects radio signals. Normally the antenna has to be as far away as possible from any metal object and it's damping influence on the magnetic field. Only this leads to the best distribution of the magnetic field in the reading range. Very important as well is not to have "short circuits", in the vicinity of the antenna, damping the magnetic field. A "short circuit" is any metal near the antenna, building a "metallic ring", so that currents introduced by the RF-field can flow, absorbing the energy needed for the tag to operate.
- Care must be taken to reduce or eliminate unwanted signals (so called interference or noise) from external sources. The reading range may be reduced by following noise sources:
  - portable two way radio
  - cellular phones
  - switching power supplies
  - computer monitors
  - frequency converters (e.g. motor control systems)

  Generally all cabling should be placed in sufficient distance from every potential noise source. However, in case of any problems additional noise suppression may be necessary (e.g. ferrites on cables). If needed, don't hesitate to contact ***sttID*** for additional installation guidance.
- The read range is depending upon
  - performance of the Reader
  - size of the antenna
  - size of the tag (the bigger the better)
  - orientation of the tag antenna plane to the Reader antenna plane
  - quality of the tag
  - matching of Reader antenna size and tag (-antenna) size
  - environmental, electrical noise
  - If influence of metal can not be fully avoided a tuning of the antenna is required and will improve reading range

1.3 RoHS and WEEE directives

1.3.1 RoHS

sttID certifies that this product is compliant with the European Directive 2011/65/EU (RoHS II) for the restriction in Electrical and Electronic Equipment (RoHS) of the use of the following hazardous substances:

- Cadmium
- Hexavalent Chromium

- Lead
- Polybrominated biphenyl flame retardants
- Polybrominated diphenyl ether flame retardants
- Mercury

This declaration is based on information provided by our suppliers and subcontractors.

1.3.2 WEEE (Waste Electrical and Electronic Equipment)

This product bears the selective sorting symbol for waste electrical and electronic equipment (WEEE). This means that this product must be handled pursuant to European Directive 2011/65/EU in order to be recycled or dismantled to minimize its impact on the environment. For further information, please contact your local or regional authorities.

2 Safety informations

As with all electronic systems, the system described hereafter may not be used for any applications critical for maintaining safety. This means, the products may not be used in life support applications or any other life critical applications that could involve potential risk of death, personal injury or severe property or environmental damage.

The user/operator is solely responsible for any damages resulting from an improper or unintended utilization of the system.

3 System description

This manual describes the HF Reader System SIR-2510, hereafter referred to as “Reader".

The SIR-2510 is a multi-application HF Midrange Reader system with integrated antenna dedicated for desktop use. The SIR-2510 has a shielded ground to ensure an accurate and undisturbed detection and to avoid interfering or interacting with other equipment close by. The SIR-2510 operates in the 13.56 MHz ISM band.

The Reader is available in two version, which differs in available communication interfaces and slightly different housings.

The SIR-2510 is designed as a multi-tag system for reading and writing information stored on HF (13.56 MHz) transponders (Tags).

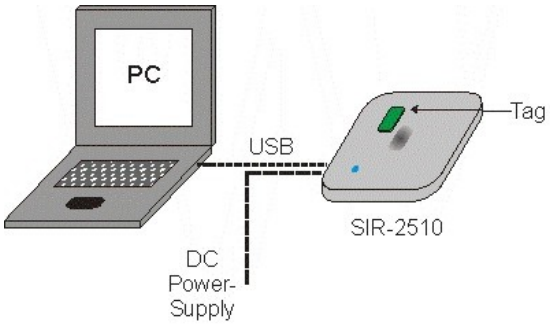
The Reader is compatible with HF transponders (ISO15693, I-Code 1 and ISO 18000-3 mode 3). The RF power output of up to 1 W at the operating frequency of 13.56 MHz permits a reading range of up to 350 mm depending on Transponder-type and -size.

Furthermore a configurable “stand-alone” operation via so called “SmartRead” Feature is possible.

4 Getting started

The SIR-2510 has to be connected to a power-supply as recommended in the chapter 7.2. Communication can be done via one of the available interfaces.

4.1 Connection via USB and external power supply



After connecting SIR-2510 like shown in the figure above, one can use a ***sttID*** demonstration-software like “SimpleDemo” or “UniDemo” to control the Reader in host mode. For more details please refer to “Quick Start Guide read”. This guide is available for download on www.stt-rfid.com.

4.2 Mounting

When mounting the Reader on a wall or under a table, only the provided screw-holes has to be used. Fixing to the wall/table has to be done with appropriate installation material (not included) using all of the foreseen mounting points.

For safety reasons the Reader must not be installed more than 2 m above the ground.

When installing the Reader, please make sure that the maximum ambient temperature is not exceeded at any time. Therefore the Reader should only be installed in places where sufficient ventilation is assured. Any kind of possible heat accumulation should be avoided (e.g. the Reader should not be mounted in an additional housing or cabinet).

The SIR-2510 is primarily designed as desktop device. Nevertheless it also can be mounted to a wall or e. g. beneath a table.

For mounting the reader, remove the cover from all feet and remove the screws (T15 Torx). The screw holes can be used to drill assembly holes (diameter ≤ 5 mm) and fixing the SIR-2510 with longer screws on a wall or below the table.

Attention: Care has to be taken, that the Reader is not exposed to any electrostatic discharge.

5 Operating modes

5.1 Standard (Host) mode

By default the Reader is completely controlled by a Host system connected to one of the available interfaces via STX/ETX commands. For further information, please refer to the STX/ETX protocol description in chapter 6.3.

5.2 Stand alone mode (SmartRead)

In addition to controlling the Reader with a host system via one of the interfaces, it can also be configured for stand alone operation by use of the implemented “SmartRead” feature.

For further Information about SmartRead please refer to the correspondent SmartRead manual, which can be downloaded from www.stt-rfid.com.

6 Software

6.1 Software utilities

Various software utilities for Windows for the Reader are available for download on www.stt-rfid.com. Linux Versions are available on request.

Available Software utilities:

- SimpleDemo
  - Demo Software for easily controlling the Reader with a Host system.
- UniDemo:
  - Universal Demo Software for extended controlling the Reader with a Host system.
- STXTerm:
  - Terminal program for controlling the Reader with a Host system by directly submitting STX/ETX commands. For submitting multiple STX/ETX commands a comprehensive Script utility is implemented.
- Flasher:
  - Utility for updating firmware on the incorporated Microprocessor
- SMan or SmartManager:
  - Utility for configuration and using the Reader in Stand alone mode (SmartRead).
- scemtec STX/ETX .NET Library

6.2 Firmware

The firmware of the Reader provides all basic functions for reading and writing tags of different manufacturers (air protocol), numerous control and configuration functions, as well as different diagnosis routines.

Firmware can be updated by the user via USB or RS232 Interface using flasher tool. Furthermore updates can also be performed via Ethernet using the integrated web interface. The latest firmware files are available for download on www.stt-rfid.com.

6.3 STX/ETX interface protocol

For communication between Reader and a host system *stt**ID***s STX/ETX protocol is used. The required STX/ETX protocol description can be downloaded from www.stt-rfid.com.

A list of supported STX/ETX commands can be read out from the Reader via the STX/ETX command '100E' or via STX/ETX script 'Get Fn List.stx' (which will be installed together STXTerm software).

6.4 Configuration

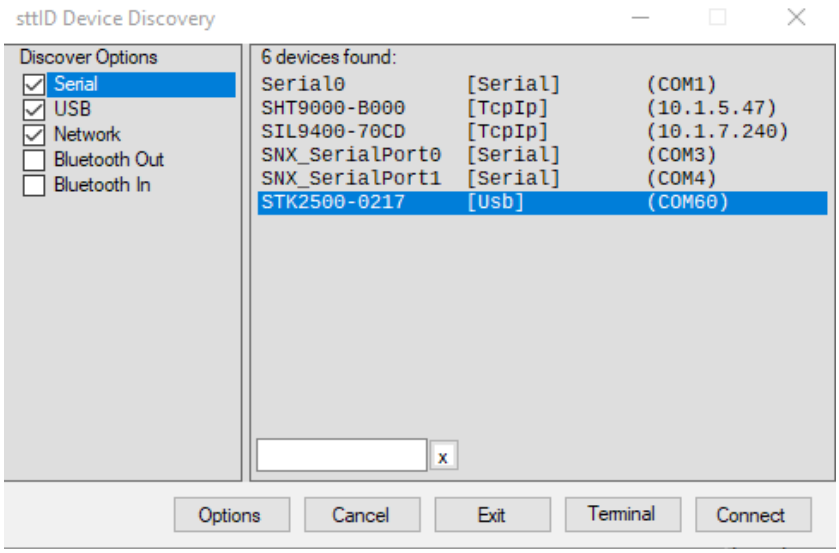
All configurations can be done using STX/ETX command or SmartRead configuration tools (e. g. SMan) respectively.

However, most configurations as well as firmware updates can also be done via an integrated web interface (if available) in a more comfortable way.

6.4.1 SMan

SMan can be used to configure the Readers Interface setting as well as SmartRead settings. It works with all available Interfaces.

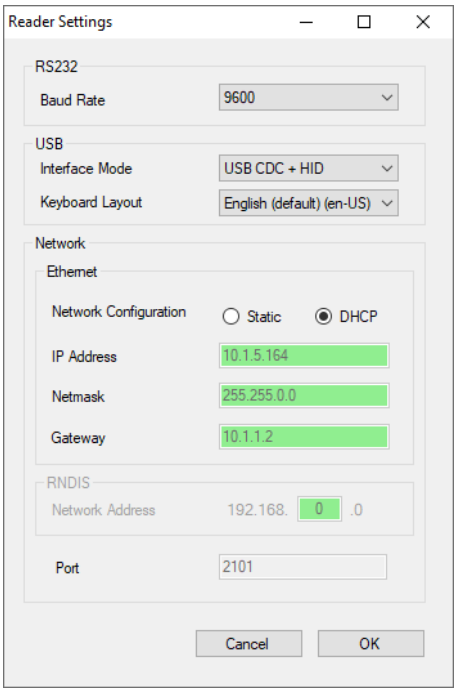
Start SMAN and select your SIR-2510 device and click '*Connect*'.



Note: If network interface is available, it is recommended to use this together with the implemented web interface. Clicking *'Connect'* will then automatically open the web interface in the Hosts standard browser.

Interface settings

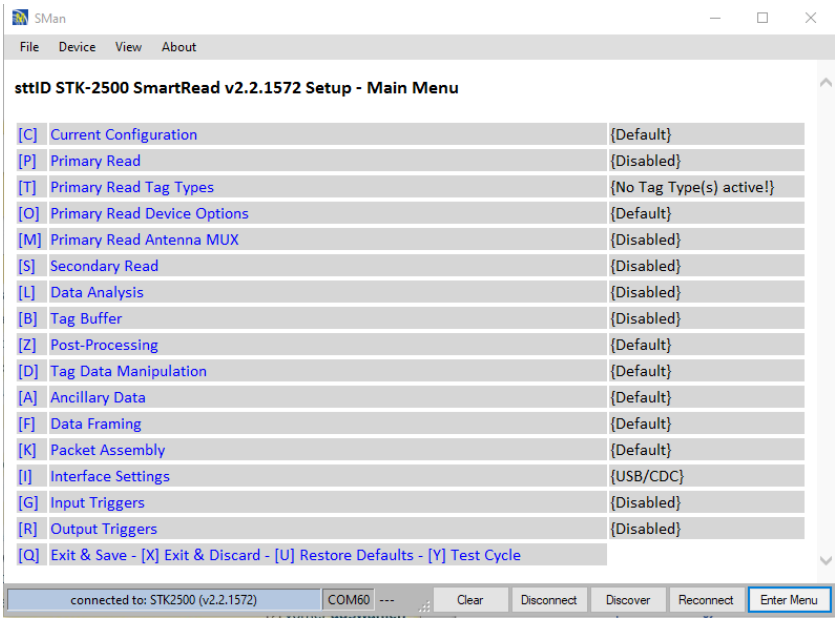
Choose menu *Device* → *Interface Settings*



Clicking '*OK*' will save the settings and restart the Reader.

SmartRead

Clicking *'Enter Menu'* will open the SmartRead configuration menu, where one can activate the stand alone operation and select desired settings.

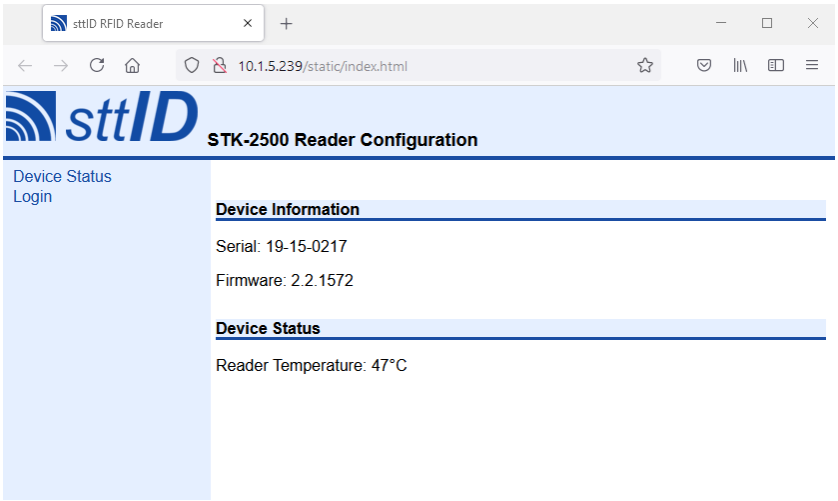


6.4.2 Web interface

With firmware version 2.0 and higher the SIR-2510 provides a web interface for comfortable monitoring and configuration.

The web interface can be reached by entering the readers IP address in your preferred browser. Determine the readers IP address can be done with SimpleDemo or SMan.

The initial site of the web interface just shows a basic status information of the Reader.

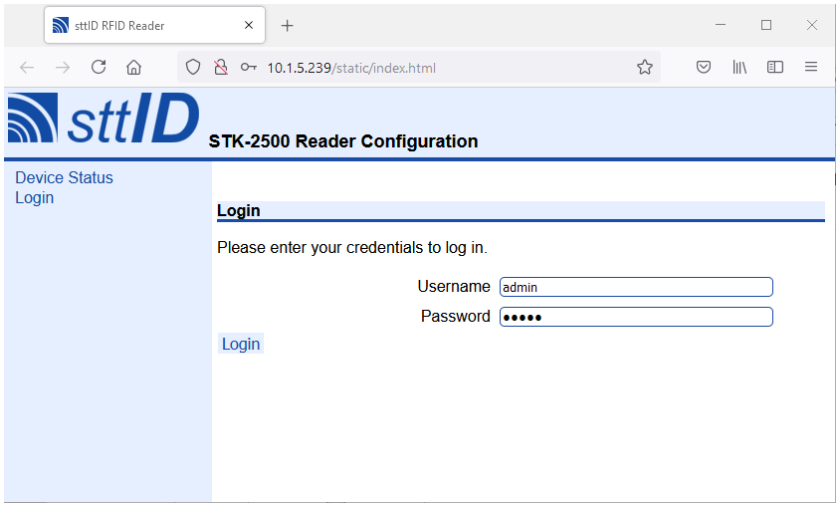


More detailed information and configuration requires a login.

Default login credentials:

Username: admin

Password: admin



It is recommended to change the password after first login (menu *'User Management'*).

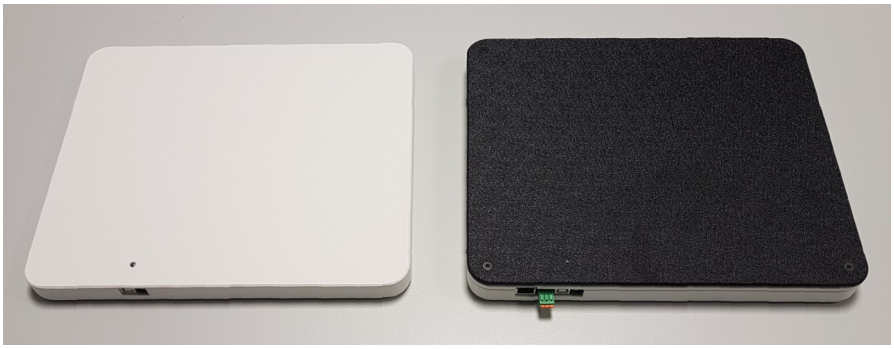
After login several configuration pages (*Configuration, SmartRead, User Management*) as well as a simple test (*Diagnosis*) and *Firmware Update* feature are available.

Note: Any change in configuration has to be stored by clicking *'Apply Changes'* to become valid.

7 Hardware

7.1 Versions

The SIR-2510 is primarily designed for using as a compact RFID desktop reader with an area of 31 x 26 cm². It is available in two different versions. The SIR-2510 provides only USB interface and come with a slightly smaller (i. e. thinner) housing, whereas the SIR-2510-UE provides additional RS232 and Ethernet interfaces and a black structured surface.



SIR-2510 (left); SIR-2510-UE (right)

7.2 Voltage supply

The SIR-2510 is designed for a 12 V DC voltage supply connectible via a standard 2.1 mm barrel connector.

Polarity of connector	

The Reader may only be connected to a power supply with a minimum output current of 1 A, which is tested for safety according to appropriate standard (e. g. EN60950).

A suitable wall plug power supply is available as optional accessory. For best performance and safety, ***sttID*** strongly recommends to use only this power supply.

The power supply is intended to be used only with connection cables not longer than 3m.

7.3 Interfaces

The Reader provides USB. In addition the SIR-2510-UE provides also RS232 and Ethernet communication interfaces.

The interfaces are intended to be used only with connection cables not longer than 3m.

7.3.1 USB

The Reader is equipped with a USB 2.0 full speed (12 Mbits/sec) port. The connection is made via a standard USB-B connector.

Supported profiles	CDC-ACM (virtual COM-Port) HID (Keyboard emulation) RNDIS (Virtual Ethernet)

Appropriate drivers for Windows are available for download on www.stt-rfid.com.

7.3.2 RS232 (SIR-2510-UE only)

The SIR-2510-UE is additionally equipped with a RS232 interface. The connection is made via a 3 pole multipin connector compatible with Phoenix FMC 1,5/3-ST-3,5 and Würth WR_TBL (691 3041 00003). Connector pins counted from top view pin 1 at left to pin 3 at right:

Terminal designation	Connector Pin	Terminal Function
TxD	1 (left)	Transmit Data
RxD	2 (middle)	Receive Data
GND	3 (right)	Ground

The data transfer rate is adjustable via STX/ETX commands.

Configuration	8 Data Bits, 1 Stop Bit, no Parity, no flow control
Supported Data Rates [baud]	1200, 2400, 4800, 9600 (default), 19200, 38400 57600, 115200, 230400

7.3.3 Ethernet (SIR-2510-UE only)

The SIR-2510-UE is additionally equipped with a 10/100 T-Ethernet interface.

By default the Reader gets its IP Address via DHCP.

Nevertheless the Reader can also be configured with a static IP Address.

Network settings can be configured with SMan, SimpleDemo or if available via Web-Interface. In addition it can be configured by using STX/ETX commands. For details please refer to STX/ETX protocol description.

7.4 Diagnosis LEDs

An RGB-LED provides diagnosis of the most important monitoring functions.

Priority	Description	Color
1	Error	red
2	Tag detect. A read or write process for the transponders has concluded successfully.	yellow
3	SmartRead active	flashing
4	USB CDC connection active	blue
5	Network connection active	blue
6	Network waiting for IP Address	blue blinking
7	IDLE	green

7.5 Memory

The SIR-2510 has an internal volatile storage for buffering an inventory of maximum up to 100 tags by a standard ID bit-length. Note that the storage in stand alone mode is also used to store the tags for the suppress function.

8 Specification

8.1 Electrical specification

Electrical specification (Ambient temperature: 25°C)						
Parameter	Test condition	Symbol	Min.	Typ.	Max.	Unit
DC input voltage	—	V_{in}	10	12	28	V
Current consumption	Read @ max. power V_{IN} = 12 V	I_{in}	—	440	480	mA
Current consumption	Idle - mode V_{IN} = 12 V	I_{in}	—	120	140	mA
Operating frequency HF	—	f_{HF}	—	13.56	—	MHz
RF power HF (internal)	Power step = 2	$P_{internal}$	- 0.5 dB	1050	+ 0.5 dB	mW
Operating (ambient) temperature range	—	T_{amb}	-10	—	50	°C
Storage temperature range	—	T_{stg}	-20	—	70	°C

8.2 RF power steps

The RF power is adjustable in 2 steps.

The below stated power values represents the values, that are generated by the internal power unit. Since the generated power is directly feed into the integrated antenna, these values are not measurable and therefore only have informational character.

Power step	RF power internal [mW] (defined on nominal 50 Ohm load, typical values @ 20° C)
2	1050
1	650

Attention: National regulations regarding radiated power has to be considered, when setting the RF power. The user is solely responsible to observe legal restrictions for the radiated RF power.

8.3 Dimensions

Dimensions	SIR-2510	SIR- 2510-UE
Width	310 mm	310 mm
Height	260 mm	260 mm
Depth	21 mm without rubber pads 24.5 mm with rubber pads	28 mm without rubber pads 30.5 mm with rubber pads

Weight	SIR-2510	SIR- 2510-UE
Without package	1750 g	2000 g

Environment	
Temperature range	- 10 °C to + 50 °C
Protective systems	IP20 (indoor)

9 Optional accessories

9.1 Power supply/Connecting-cables

- Recommended 12 V DC/1000 mA power-supply adapter, cable length 1.3 m [order-no.: 999.1280]
- USB cable A plug to B plug, length 1.8 m [order-no.: 999.0109]

10 Related documents

- Quick guide to STX/ETX protocol
  - Short introduction of basic structure of STX/ETX protocol
- STX/ETX protocol description
  - Detailed description of command structure and available commands for controlling the with a Host system
- SmartRead Manual
  - Description of functionality for stand alone operation
- SmartManager Manual
  - Description for using the SmartManager to configure a for stand alone operation
- C# Demo with source code
  - Example code for integrating the in your own application software

All documents are available for download on www.stt-rfid.com.

11 Contact *sttID*

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If you have any questions about our products, please do not hesitate to call us. Our specialists are always available for you and will provide professional support to find a solution to your specific problem.

12 Document history

Rev.	Changed by	Date	Description
0.1	M.Radermacher	28.08.18	– Initial version
0.2	M.Radermacher	30.11.18	– Minor corrections and typo edit
0.3	J.Kalbitzer	10.09.19	– Status LED codes revised (Requires Firmware ≥ 1.2) – Add Web Interface and Setting USB profile (Requires Firmware ≥ 2.0)
0.4	B. Bröhl	20.07.2021	– Adapted to “new” template – Version SIR-2510-UE added – Minor corrections and typo edit
			–
			–
			–