IRX200

USER GUIDE

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1. INTRODUCTION

The Brady IRX200 is a powerful UHF RFID industrial reader designed for challenging environments.

1.1. ACCESSORIES AND RFID ANTENNAS

The Brady IRX200 has an internal circularly polarized high gain antenna but if you need to extend the read coverage Brady offers the XA20 industrial antenna which can be connected to the reader by using the RP-TNC to RP-TNC coaxial cable.

CODE	DESCRIPTION
TBD	
	Power supply for IRX200, with power cord EU
	Power supply for IRX200, POE 30W with power cord UK
	Power supply for IRX200, POE 30W with power cord US

1.2. PACKAGE CONTENT

The Brady IRX200 Package contains the following items:

- The Brady IRX200 reader
- Safety and regulations card
- Additional product label with product information (keep this safe)

2. MOUNTING

Mounting accessories are not a part of the package content.

The device is mounted using the VESA 100 × 100 standard.

PIC here

3. USING THE DEVICE

Picture 1 Connectors of the BRADY IRX200

3.1. PHYSICAL CONNECTORS

The Brady IRX200 includes the following physical connectors.

- RP-TNC
  - External RFID antenna connector
- M12 A-coded 8pin connector
  - USB Composite Device (CDC/HID/NDIS)
  - IO
  - 24V Output
  - Factory reset
- M12 X-coded connector
  - Ethernet 10/100/1000Mbit
- M12 L-coded connector
  - 24V input

3.1.1. RP-TNC - EXTERNAL RFID ANTENNA PORT

The Brady IRX200 includes an RP-TNC connector for connecting an external RFID antenna to the device. The impedance of the antenna port is 50Ω and maximum conducted output power is 30dBm.

The external antenna port can be enabled via NUR API or the admin Web UI.

3.1.2. M12 A-CODED 8PIN -“MULTIPORT”

The reader has an M12 L-coded connector which combines multiple functions. USB composite device (Profiles: CDC/HID/NDIS), GPIO 1 input and 1 output, 24V output for powering sensors and factory reset.

NOTE! The recommended tightening torque is 8Nm.

3.1.3. M12 X-CODED ETHERNET CONNECTOR

The Brady IRX200 includes an ethernet connector. The reader supports 10/100/1000Mbps speed classes.

3.1.4. M12 L 24V POWER IN PORT

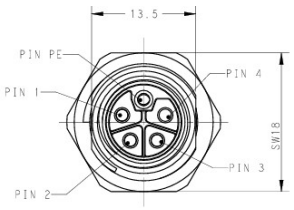
The IRX200 DC connector for powering the unit.

The reader powers up automatically when connected to a power supply.

The rated maximum power consumption for the Brady IRX200 reader is:

- 12W with maximum RFID transmission level.
- 4W in idle state, with RFID disabled.

Connect the power supply to the device per the following pin assignment.



1
2
3
4
5

NOTE! The recommended tightening torque is 8Nm.

3.2. LED INDICATORS

The user interface of the Brady IRX200 consists of six LED indicators:

- LEDs for user indications
  - Power LED
  - Link LED
  - Ready LED
  - Data LED
  - RF LED
  - Error LED
- 2 LED bars

Picture 2 The placement of individual LEDs and the LED bars of the Brady IRX200

3.2.1. POWER LED

By default, the Power LED indicates if power is supplied to the device.

- Green, static — The device is powered on.
- Orange, static — The device is upgrading.
- No light indicates that the device is not on.

3.2.2. LINK LED

Connection LED indicates whether the reader has established a network (TCP/IP) connection, i.e. Profinet or Ethernet connection.

- Green, static — Link up (Interface is enabled?)
- Orange, blinking — Blinking according to received or transferred data
- Off: All the communication interfaces are disabled.

3.2.3. READY LED

- Green, slow blinking — RFID service running while no IP
- Green, fast blinking — RFID service running while having an IP

3.2.4. DATA LED

The data LED can be controlled by devices system APIs.

3.2.5. RF LED

RFID LED indicates whether the RFID reading is ON or OFF.

Green, static	The RFID module is transmitting RF commands
Off: The RFID module is not transmitting	

3.2.6. ERROR LED

Red, blinking	Critical hardware error.

3.2.7. LED BARS

The LED bars can be controlled by devices system APIs.

3.3. ACCESSING ADMIN WEB UI

- When device is in network

3.3.1. VIA TCP/IP CONNECTION

-host

3.3.2. VIA USB CONNECTION

Device supports USB NDIS profile which allows to access the device's admin Web UI.

-usb connection on, usb network adapter, NDIS

Address always 169.254.0.1

Disclaimer usb

3.3.3. OBTAINING PASSWORD AND USERNAME

PIC LABEL

4. RF AND INVENTORY SETTINGS

4.1. RF SETTINGS

RF settings are mainly the ones which influences how Brady IRX200 RF transmitter operates. There are certain settings which user can change like TX output power level and used RF link profile.

4.1.1. TX POWER LEVEL

Brady IRX200 has the maximum conducted TX output power of 30dBm (1000mW). The power can be adjusted by 1dB steps via Nur API. In total, there are 30 steps yielding the minimum output power value of 1dBm (1mW).

4.1.2. LINK PROFILES

Brady IRX200 supports three different kinds of RF profiles. The profiles are Robust, Nominal and High speed. It's important to select the correct RF profile based on use case and environment. More detailed description about the RF profiles can be found below:

Robust

- Robust RF-profile name is misleading and is only used for backwards combability reasons. In the new IRX200, the profile is for obtaining maximum reader sensitivity. This profile uses link frequency of 160 kHz and Miller 8 coding scheme providing read rates up to 80 tags/s. Due to the best sensitivity this profile can be used when maximum read range is needed.

Nominal

- Nominal RF-profile is the default setting in IRX200. It uses link frequency of 320 kHz and Miller 4 in ETSI lower band and link frequency of 250 kHz with Miller 4 coding in FCC (and sub-sets of that). This profile uses tight DRM filters and is suitable for environments having a lot of interferences. Nominal profile provides read rates up to 250 tags/s.

High speed

- High speed RF-profile is intended to be used in use cases where the highest read rates are required. It uses link frequency of 640 kHz and FM0 coding and provides read rates up to 1000 tags/s. Due to the high data speed, this profile is quite sensitive to interferences. Also, maximum sensitivity is decreased compared to robust and nominal profiles.

NOTE! Read rates will depend on the environment, reader settings, tag population and tag type.

4.1.3. REGION

Brady IRX200 has pre-defined region settings defining frequency and channel sets for operating under different radio regulations. Globally the regulations vary depending on the country. Refer to Nur API documentation for list of pre-defined countries. When IRX200 ships from the production it is locked to pre-selected (based in the SKU) region setting and cannot be changed by the user. Contact Nordic ID support for more information.

4.1.4. ANTENNA CONTROL

TBD

4.1.5. DYNAMIC POWER SAVE MODE

Brady IRX200 module has dynamic power save modes which can be enabled via Nur API. By default, the power save is off. There are three depths for the dynamic power save mode to select from: 100ms, 500ms and 1000ms. The power save mode works in a way that when module reads continuously (applies only when using inventory stream -command) it goes to sleep if there are no tags in the field. The sleep time is defined by the depth value. After the sleep period is elapsed IRX200 starts to read again and so on. If there are one or more tags in the field the module will not go into sleep. Using dynamic power saving is highly recommended in use cases where reader is reading continuously. This will decrease the interferences to other readers and helps heat mitigation in high ambient temperature environments.

4.1.6. RSSI FILTERS

IRX200 UHF RFID reader has internal RSSI filters which can be used to limit the read range. By applying the filters, you can set the limits which tag replay must met to be registered. MIN RSSI – value means that tag replay signal needs to be equal or stronger than the defined value. Otherwise tag is not read. MAX RSSI value in other hand means that signal strength must be lower than the filter value. There are separate RSSI filter values for inventory, read and write operations. These can be set individually

PIC HERE

4.2. INVENTORY SETTINGS

By selecting the proper RFID inventory parameters, you can optimize the modules reading performance for different tag populations and use cases.

4.2.1. Q-VALUE

The Q-value defines the amount of open response slots that tags can use per one inventory round. Number of slots can be calculated by formula 2Q. It is advised to use twice as much slots compared to amount of tags that you have in your readers reading field simultaneously. Selectable values are 0 – 15 where 0 means automatic Q-value adjustment. In this automatic mode the reader will adjust Q-value between sequential rounds based on the number of found tags and collisions. By default, the Q-value is set to 0.

Q-value	Response slots	Q-value	Response slots
0	Automatic	8	256
1	2	9	512
2	4	10	1024
3	8	11	2048
4	16	12	4096
5	32	13	8192
6	64	14	16384
7	128	14	32768

Table 9. Relation between the Q-value and the number of response slots for a round.

4.2.2. ROUNDS

While fixed Q-value (non-zero) is used the Rounds value defines the number of query rounds done inside one full inventory round. After every full inventory round IRX200 will sent the read results to the Host. When automatic Q-adjustment is used the Rounds value adjusts the threshold for exiting the inventory loop. By default, rounds setting is set to 0. This setting can help the

reader to find all the tags that are in the readers reading field when using session 0. Because tags which are found in query round 1 doesn't replay in the following query rounds. When using session 1/2/3 this does not make any significant difference because tags that are read are quiet anyway.

Inventory round

Query round 1	Query round 2	Query round n

4.2.3. SESSION

There are 4 session options which you can use when initializing inventory round. Every session has two target states A and B. By default, Gen2 tags are at state A if tag has not been read recently. When tag is read it flips to state B and doesn't reply to readers query made using a target A. The table below describes the persistence of tag's state machine when using different session values. For example, when using session 0 the tag will come back to state A immediately when tag power is lost. Usually tag loses the power when reader stops the inventory round or chances the channel.

Persistence when tag power is ON is not defined by the ISO18000-63 when using session settings S0, S2 and S3. With session 1 the tag will keep it state over 500ms but less than 5s. With session values 2 and 3 tags will keep it states over 2s when tag power is lost. Time can vary depending what tag IC is used.

Session flag	Persistence: Tag powered	Persistence:
S0	Indefinite	None
S1	500ms < t < 5s	500ms < t < 5s
S2	Indefinite	t > 2s
S3	Indefinite	t > 2s

Table 11. *Persistence characteristics of ISO18000-63 tags.*

4.2.4. TRANSMISSION TIME CONTROL

The IRX200 has fixed maximum channel times defined by the radio regulations. While operating under ETSI following regions the maximum channel time is 3950ms and under FCC it is 395ms. Note that Q- and Rounds values do not change these maximum limits. Channel usage is also randomized.

4.2.5. SELECTING THE RIGHT SETTINGS

General guidance is that Q-value should be adjusted so that there are 1.5 – 2 times more response slots compared to the amount of tags simultaneously on the readers field-of-view. If reader will face many different tag populations than automatic Q-adjustment (Q=0) setting will be a good choice. Besides Q-value one important parameter is session. In general, it could be stated that if the size of tag population is measured in thousands rather than in hundreds it is wise to use sessions 2 or 3. Because then every tag will be read only once making the mass inventory efficiency much better. Rounds 1 setting is also advised to be used with session 1 or 2 or 3.

5. ANTENNA CHARACTERISTICS

The reader includes an internal circularly polarized high gain UHF RFID antenna. It's reading distance can be controlled via software by the configured transmission power level.

Antenna parameters:

UHF RFID	VALUE
Frequency	ETSI 865.6-867.6, 915-921, FCC/IC 902–928 MHz
Gain	7.5 dBic / 4.5dBi
Beam width (-3dB)	80°
Polarization	RHCP
Input impedance	50 Ω
VSWR	< 1.5:1
Maximum input power	10 W (40 dBm)
Efficiency	87%

NEW PIC

Figure 10 IRX200 internal RFID antenna radiation pattern

NOTE! The reading range depends on the tag(s) used and the environment

6. THERMAL MANAGEMENT

The Brady IRX200 reader includes sophisticated thermal management features that prevent overheating issues if the reader is used in too warm environments. The reader monitors temperatures of the onboard computer and the RFID module and adjusts operation points based on the temperature information.

Onboard computer starts a mitigation scheme (for example clock frequencies of CPUs are dropped) when temperature of the onboard computer reaches 85°C.

Thermal mitigation scheme of the UHF RFID module starts when it reaches 80°C. From that moment on, UHF RFID reading operations are suspended for 100ms and suspend time is increased 20ms by every °C the temperature rises. The thermal mitigation scheme is turned off once the temperature drops below 80°C. High temperature warning message (TEMP_HIGH) is sent via NUR API to host. The warning message contains also current temperature information.

7. SOFTWARE

All documentation about software and application development can be found from GitHub.

https://github.com/NordicID/fr22_samples

7.1. BRADY RFID APPLICATIONS FOR THE IRX200

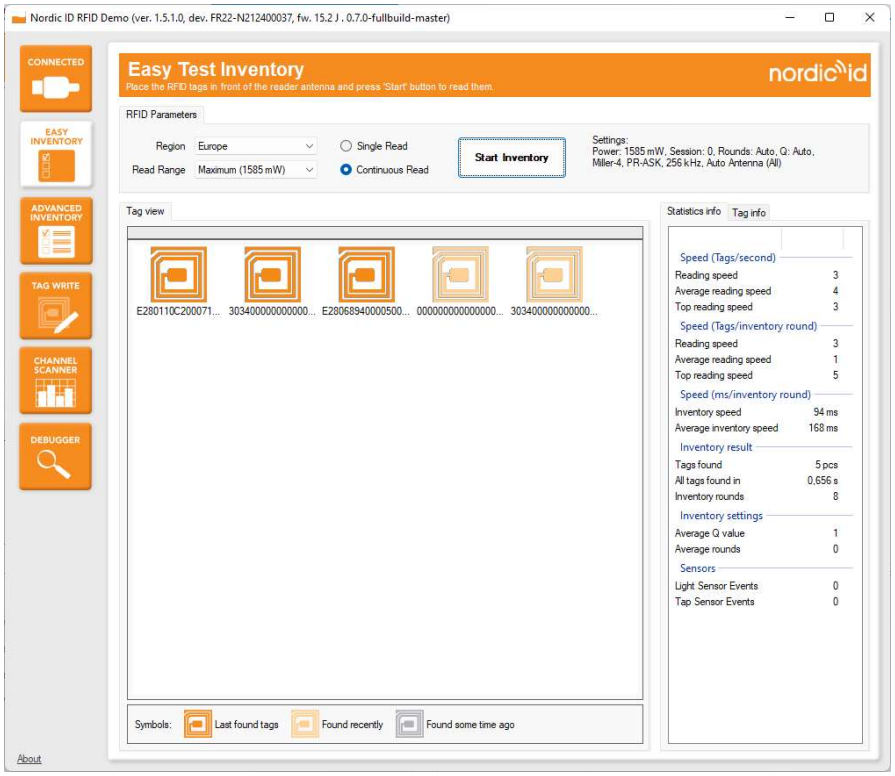
Nordic ID provides the following Windows tools to test and configure the reader. The tools are available via Nordic ID Support pages:

https://www.nordicid.com/support/devices-downloads/nordic-id-fr22/

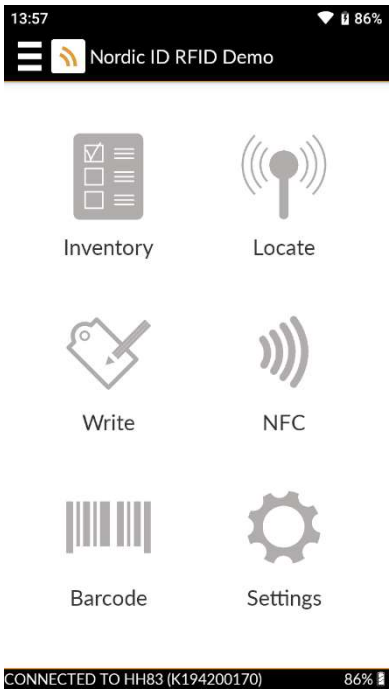
7.1.1. NORDIC RFID DEMO

The Nordic ID RFID Demo application is used to perform RFID reading and writing tests. The application provides statistics on the reading performance and logging capabilities for more thorough evaluation. It is available for Microsoft Windows and Android OS.

This application also allows adjusting the RFID parameters on the fly for better understanding how they impact the reading performance. Note that altered settings cannot be stored permanently into the device. The settings are reverted to defaults upon power cycle. For permanent settings, please use the Nordic ID RFID Configurator application.



Screenshot 1 Nordic ID Demo for Microsoft Windows



Screenshot 2 Nordic ID Demo for Android

7.1.2. NORDIC ID SIGNING TOOL

To provide more security to the SW platform, the application zip-files need to be signed with Nordic ID provided signing tool. The public key generated to the zip-file will be then verified against the list of files when installing the zip-file to the reader. This makes sure that only valid content from the zip-file can be installed.

The tool in question is called Nordic ID FR Application Signing Tool. It can be used to sign pre-built zip-files, as also to create new zip-files from scratch.

The Nordic ID FR Application Signing Tool can be downloaded from this link.

8. WEB MANAGEMENT INTERFACE

The Brady IRX200 includes a web management interface which can be accessed with a web browser. The web user interface has a responsive design, which makes it fully usable from web browsers in computers, tablets, and smartphones.

The IRX200 management interface is used for:

- Applications and plugins management.
- System health monitor
- System logs
- Hardware settings
- RFID configuration

- Network configuration
- Firewall configuration
- Firmware update
- Access management
- Application management
- Configure public web user interface (application, admin, web page, display…)
- Factory reset

8.1. LOG IN

Although the Brady IRX200 can be connected via USB, the built-in administrator web interface can only be accessed via network connections, i.e., Ethernet.

Therefore, it is important to make sure that the network interfaces are configured to be used as expected. By default, all the network interfaces are set to DHCP mode, and the MAC address of each interface is indicated on the printed product label. This will help to find the IRX200 in the DHCP table of the network router or modem.

New pic

Picture 5 Type label on the back side of the Brady IRX200

Nordic ID Configurator software or RFID demo software can also discover the Brady devices in the same network and indicate their IP address.

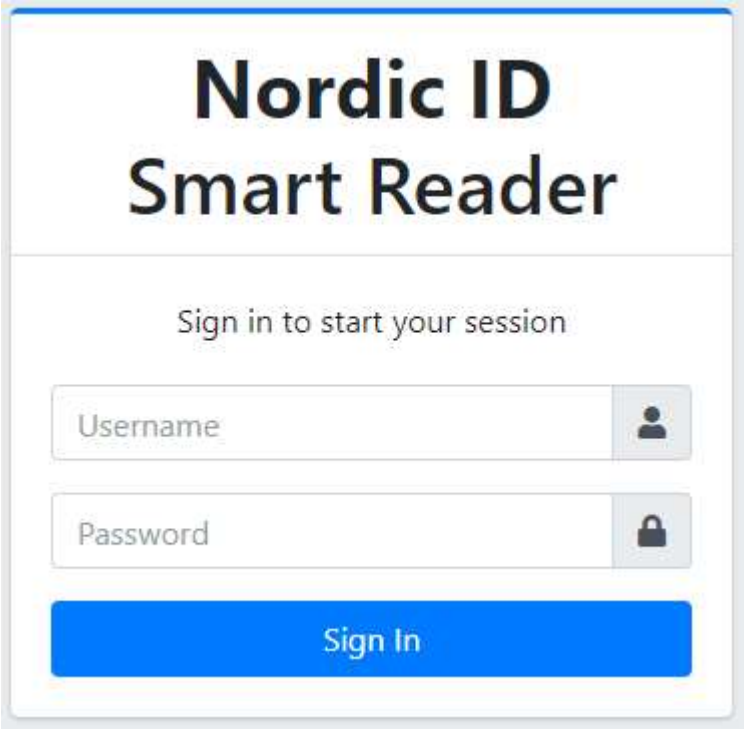
Once the IP address of the Brady IRX200 is known, typing it in the address bar of a web browser will open the login screen of the Web UI.

If the network and host device support it, the connection can also be established typing the IRX200's hostname in the address bar of a web browser. The default hostname for IRX200 is:

-serialnumber

For example, the device on Picture 6 can be accessed via the url https:// K224300001/

Note that a security alert will pop up on the browser the first time that you connect to the device, as the connection is forced to be secure. This alert will disappear as soon as you install a certificate on your device (see section **Virhe. Viitteen lähdettä ei löytynyt.**).



Screenshot 3 Web UI log in form

The default username (“admin”) and password are printed on the product label attached to the back side of the device (see **Picture** 5). You will find another identical product label inside the box, so that you can keep this important information visible in case the IRX200 is mounted against a surface that may cover the label.

8.2. MAIN MENU

The Brady IRX200 displays a side navigation menu to access all the different available options to manage the device. The menu panel can also be hidden.

NEW PIC

Screenshot 6 Side menu in Web UI

There are also four icons always accessible on the top right corner of the screen, to:

- Download debug logs
- Reboot the device
- Toggle full screen mode
- Logout

8.3. DASHBOARD

The default landing page is the dashboard, where you can see the system status and health monitor in real time. Visually, green metrics indicate that the device is behaving as expected. Red metrics would require immediate action on the physical device, environment, or software applications to solve the issues.

This page is shown every time you connect to the device Web UI, but you can configure any other page or application to be shown by default instead of the dashboard, as explained in section 7.4.2.

NEW PIC

Screenshot 7 Main dashboard in web UI

8.4. SYSTEM MENU

The system menu has six sections, most of them meant for developers.

- API docs.
    - Describes the functions of the system APIs to control the reader.
- Date.
    - Shows the current system time and allows the adjusting of the date and time settings.
    - Date and time can be adjusted manually or automatically using NTP servers.
    - Time zone must be set manually.
- Log.
    - Shows the logged events and allows to download them for debugging purposes.
    - Events can be filtered by severity and application/service (started by the user, Nordic ID or the system) that created the event.
- Settings.
    - The settings in the Brady IRX200 can be exported to a file, which can later be imported to the same or to another IRX200 unit to apply the same settings. This enables an easy mass configuration and roll out of devices.
    - Factory Reset (see section **Virhe. Viitteen lähdettä ei löytynyt.**).
- Info.
    - Contains more detailed information about the data shown on the dashboard page: hardware versions, software versions and performance metrics.
    - It also shows persistent hardware parameters such as device variant, serial number or MAC addresses.
- Web UI
    - See section **Virhe. Viitteen lähdettä ei löytynyt.**.

8.4.1. FACTORY RESET

There are two ways to factory reset the Brady IRX200. A factory reset restores the original settings and erases all installed applications and plugins.

Kuva liittimestä ja kuvaus pinneistä ja mitä tapahtuu.

At boot, wait until the LEDs turn off one by one. Press the reset button when the power LED is the only one on.

- Factory reset
    - Wait 10-15 seconds until the Ready LED turns green, then release the Reset button.

For this purpose, there is an option in the Web UI to reset the device back to factory defaults under System > Settings.

New pic

Screenshot 8 System settings screen in Web UI

8.4.2. WEB USER INTERFACE

The web user interface is the tool to get most out of the Brady IRX200. So, managing how it is accessed is a key to keep it secure without impacting the user experience.

This tab allows to change the password to access the administrator Web UI. The default password is printed in the product label on the device and on its package, and the administrator username is always “admin”.

This settings tab also allows to set the default landing page (when accessing https://{device_IP}). By default, the landing page of the Web UI is the dashboard of the administrator interface, but it can be any installed application, plugin page or a settings page other than the dashboard.

The built-in administrator interface can always be reached at https://{device_IP}/admin/ even after changing the default landing page.

NEW pic

Screenshot 9 Web UI settings screen

Note that the administrator Web UI will always prompt for username (“admin”) and password.

If you want to bypass the authentication step when accessing to the landing page, you can select which applications, plugins or pages will be exposed without authentication.

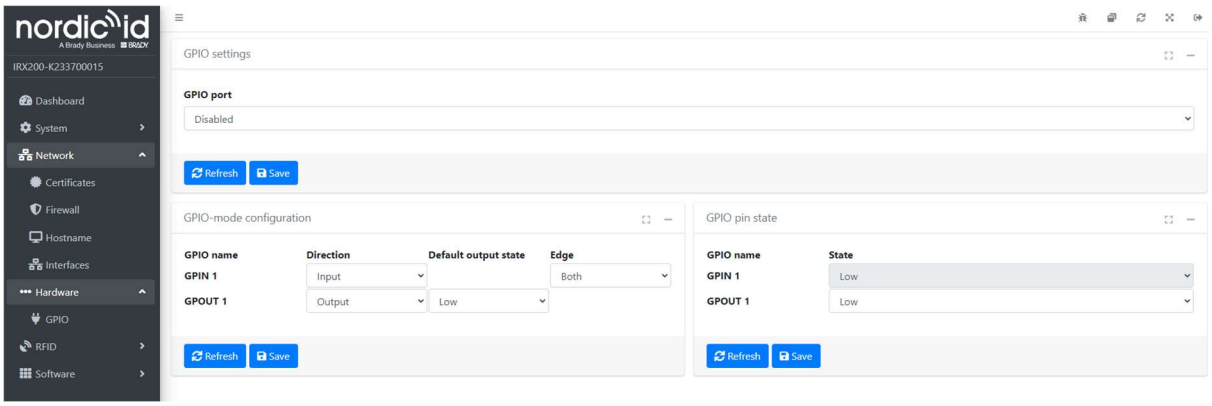
NOTE! Be careful when exposing administrator pages without authentication to avoid unwanted changes on your device!

8.5. HARDWARE SETTINGS

This section includes all the configuration parameters related to the IRX200 device.

- GPIO
- 1 input sisennä
- 1 output

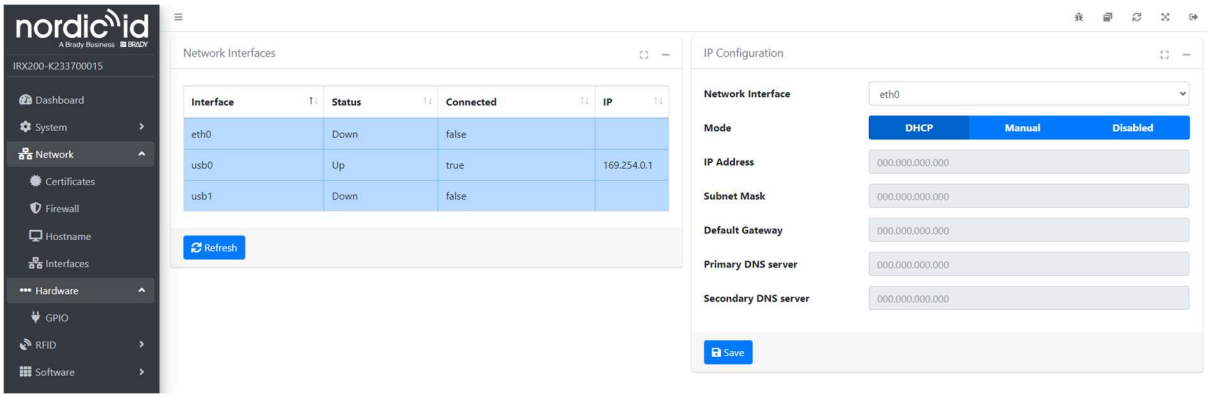
Web UI tai device API



8.6. NETWORK SETTINGS

The network settings tab is a very important section of the Brady IRX200, as the reader will be connected to a network most of the time. Even if it will be connected via USB, the network interfaces must be configured beforehand, as the network is the only way to access the administrator web user interface.

There are two network **interfaces** in the IRX200: LAN (Ethernet) and WLAN (Wi-Fi). These can be enabled and disabled on this screen, as well as their network parameters: DHCP mode, IP address, gateway, and DNS.



Screenshot 10 Interfaces tab from Network settings

To increase the security of the network connection with the IRX200 and avoid security warnings, you can install your own web server **certificates** in the first section.

Screenshot 11 Security warning on the web navigation bar

The web server certificates and SSH public keys can also be exported from this part of the menu.

The firewall settings tab gives a chance to regulate or block the traffic that passes to and from and the system following set iptables rules.

For example, if the user wants to block connections from a specific IP address “198.168.156.24”, they add into input rules the following command: `-s 198.168.156.24 -j DROP`

Note that iptables rules are transitory, they need to be saved for them to persist after reboot.

Screenshot 12 Firewall settings configuration page

In network settings the Hostname tab enables a change of **hostname** for the IRX200 device. It can be accessed by using this hostname instead of its IP address.

8.6.1. VPN

The OpenVPN plugin can be installed from the Nordic ID App Center (see section **Virhe. Viitteen lähdettä ei löytynyt.**) and its settings tab can be found in the Network section

OpenVPN is a robust and highly flexible tunneling application to enable the configuration of a virtual private network in the IRX200. The VPN extends a private network across a public network and enables users to send and receive data across shared or public networks (e.g. Internet) as if their computing devices were directly connected to the private network (e.g., the local company LAN).

New pic

Screenshot 13 OpenVPN configuration page

8.7. RFID

The RFID section on the Web UI allows to change the connection settings to the internal RFID NUR module and all the RFID parameters of the reader:

HERE ARE THE ADJUSTABLE SETTINGS-....

Remain in non-volatile memory over boot.

NEW PIC

Screenshot 14 RFID settings screen

A demonstration application is available in App Center (see section **Virhe. Viitteen lähdettä ei löytynyt.**) to test the RFID functionality of the IRX200 without using an external host, as the application is installed and executed in the reader.

8.8. SOFTWARE

The software is an important part of the IRX200 as an IoT Edge Gateway, not only as a RFID reader.

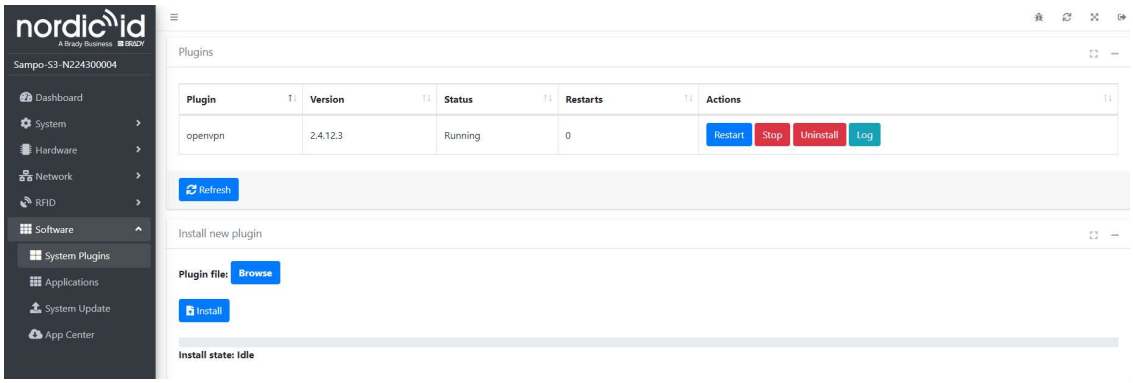
In this section you can update the operative system of the device, but also manage applications and plugins.

8.8.1. SYSTEM PLUGINS

A plugin in IRX200 is a service that runs internally in the device to enable certain features.

For example, the OpenVPN tunnelling application is a plugin.

You can manually install other plugins (or other versions of installed plugins) and uninstall the installed plugins using this interface.



Screenshot 15 System plugins screen

8.8.2. APPLICATIONS

An application in Brady IRX200 can be any application that you develop for your customers, or an application provided by Nordic ID to help during your development and implementation process.

Not all the applications have a user interface. For example, an application can just read the data from RFID tags, consolidate data, add additional information such as location or timestamp, and send it to a server in the cloud.

Other applications do have an interface. For example, the web browser (see section 7**Virhe. Viitteen lähdettä ei löytynyt.**), the SSH terminal and the remote desktop app (see section 7.9).

If you want to develop your own embedded app for the IRX200, you can find the documentation from https://github.com/NordicID/fr22_samples

8.8.3. APP CENTER

The Nordic ID App Center provides a repository of apps and plugins selected by Nordic ID to help you to get most of the Brady IRX200.

It enables the installation and automatic update of apps and plugins. This is a must have nowadays when deployments include a high number of devices, and you need to update or roll out your app to all the devices at once.

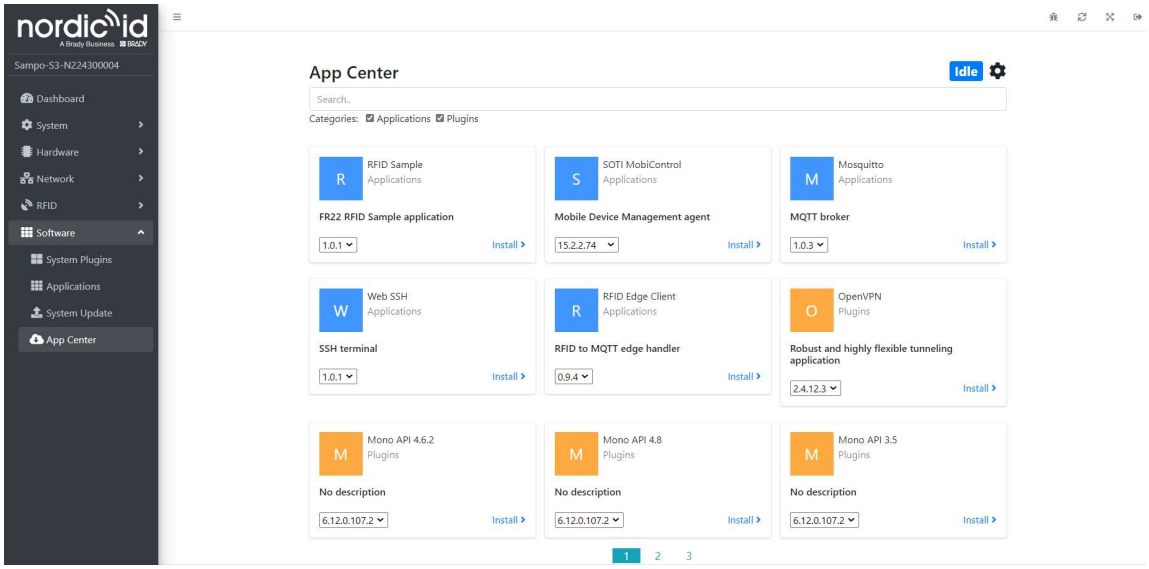
With Nordic ID App Center, the administrator has full control of the available repositories and can add new ones to extend the number of available apps.

Advanced users can also create their own app repository and upload their own apps, to make them accessible and distribute updates. Also, firmware updates can be included in this repository as plugins, in case that specific versions (and not always the latest one) are required.

Instructions to create a Nordic ID App Center repository for the IRX200 can be found here https://github.com/NordicID/fr22_samples

Note that although the Nordic ID App Center includes new versions of installed apps or firmware, these won't be updated automatically. A manual update is always required.

If automatic updates or installations are needed, 3rd party MDM/EMM (Mobile Device Management / Enterprise Mobility Management) platforms must be used (see section 7.9).



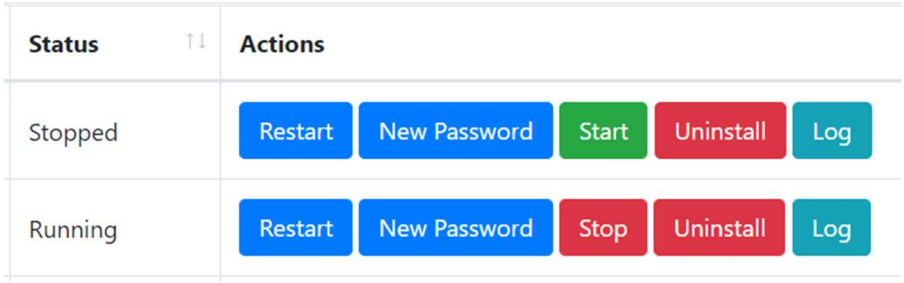
Screenshot 164 Nordic ID App Center

8.8.4. APPLICATIONS/PLUGINS CREDENTIALS

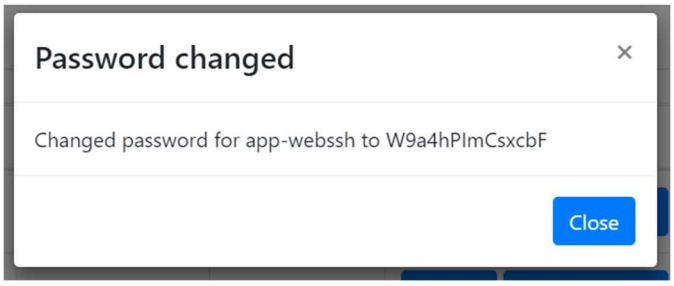
For applications or plugins that need credentials to work, you can create an application specific password from the System Plugins or Applications screen.

Go to the application or plugin that needs credentials and click the “New Password” button.

A message will appear indicating the username and the created password (see Screenshot 17).



Screenshot 17 Action buttons for installed apps and plugins



Screenshot 18 Message indicating the username and the new password created for a certain app

The username is the internal app or plugin name (e.g., *app-webssh*) and the password is generated randomly (e.g. *W9a4hPImCsxbF*).

8.8.5. REMOTE TOOLS

There are several developer tools (applications) available in the Nordic ID App Center to be downloaded on the Brady IRX200 that make debugging and providing remote assistance much easier.

- SSH opens a secure terminal connection with the local machine, to access the command prompt without using an external computer with a telnet software connected to the same network.
  To create a username and password to use the console check the instructions in section **Virhe. Viitteen lähdettä ei löytynyt.**.

Screenshot 19 Terminal console in Web UI

- SOTI MobiControl™, the Enterprise Mobility Management (EMM) solution created by SOTI that gives you visibility and control over where the IRX200 devices are, what they are doing, how they are performing, and what security or compliance risks they are facing. Remote installation and updates of applications and plugins is possible using this tool. *Note that a SOTI license per* Sampo S3 *device is required to make this work.*

9. REGIONAL SETTINGS

UHF RFID readers support operating frequency range between 860 - 960MHz. Some of the readers cover full operating frequency band and some of them have two sub bands that are 868 ETSI band (865.6 - 867.6 MHz) and 915 FCC band (902 - 928 MHz). Regional organizations such as ETSI and FCC have set rules and requirements for operating frequencies, output power and other RF parameters for the UHF RFID readers to comply with local regional requirements.

Set of regional settings have been created in order to fulfill local regulations. It is required to ensure that the compliance of products remains after production. A solution to this is that products including UHF RFID functionality will be set and locked to a region in production, based on customer order. For example, if a product is ordered to Europe, it will be locked to ETSI region and if a product is ordered to Australia, then it is locked to the Australia region. When a product is locked to an individual region, it will comply with local regulations of that region.

10. COMPLIANCE STATEMENTS

10.1. CE

Hereby, Nordic ID Oyj declares that this device is in compliance with the essential requirements and other relevant provisions of:

- RED: 2014/53/EU
- RoHS: 2011/65/EU

Additionally, IRX200 accessories are in compliance with the essential requirements and other relevant provisions of:

- EMC: 2014/30/EU
- LVD: 2014/35/EU
- RoHS: 2011/65/EU

10.2. FCC/IC

The Brady IRX200 RFID 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.

WARNING: Changes or modifications not expressively approved by the party responsible for compliance could void the user's authority to operate the equipment.

The IRX200 device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le resent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;

2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

10.3. RF EXPOSURE

This equipment complies with EU, FCC and IC's RF radiation exposure limits set forth for an uncontrolled environment under the following conditions:

The IRX200 device should be installed and operated such that a minimum separation distance of 30.9cm / 12.2 Inch is maintained between the antenna and user's/nearby person's body at all times.

IRX200 doit être installé et utilisé de manière à ce qu'une distance de séparation minimale de 30.9cm / 12.2 Inch soit maintenue à tout moment entre l'antenne et le corps de l'utilisateur / de la personne proche.

11. REGULATORY INFORMATION

11.1. EUROPEAN UNION AND EFTA COUNTRIES

USER GUIDE REQUIREMENTS

This apparatus complies the essential requirements of the Radio Equipment Directive (RED) 2014/53/EU. In order to prove presumption of conformity with the essential requirements of the Radio Equipment Directive (RED) 2014/53/EU, following requirements and test methods have been applied to the apparatus: • article 3.2: ETSI EN 302 208 v3.3.1. Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W and in the band 915 MHz to 921 MHz with power levels up to 4 W; Harmonised Standard for access to radio spectrum • article 3.1b: ETSI EN 301 489-1 v2.2.0. • article 3.1b: ETSI EN 301 489-3 v2.1.1. • article 3.1a: IEC 62368-1:2018, EN IEC 62368-1:2020 and A11. EN 62311: 2008 - Human exposure limits This apparatus complies EU Directive 2011/65/EU, Reduction of Hazardous Substances (RoHS)

Česky

[Czech]

[Nordic ID] tímto prohlašuje, že tento [IRX200] je ve shodě sezákladními

požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/ES.

Dansk

[Danish]

Undertegnede [Nordic ID] erklærer herved, at følgende udstyr [IRX200]

overholder de væsentlige krav og øvrige relevante krav i direktiv 2014/53/EF.

Deutsch

[German]

Hiermit erklärt [Nordic ID], dass sich das Gerät [IRX200] in Übereinstimmung

mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie

2014/53/EG befindet.

Eesti

[Estonian]

Käesolevaga kinnitab [Nordic ID] seadme [IRX200] vastavust direktiivi

2014/53/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

English

Hereby, [Nordic ID], declares that this [IRX200] complies with the essential

requirements and other relevant provisions of Directive 2014/53/EU.

Español

[Spanish]

Por medio de la presente [Nordic ID] declara que el [IRX200] cumple con los

requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva

2014/53/EU.

Ελληνική

[Greek]

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ [Nordic ID] ΔΗΛΩΝΕΙ ΟΤΙ [IRX200] ΣΥΜΜΟΡΦΩΝΕΤΑΙ

ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ

2014/53/ΕΚ.

Français

[French]

Par la présente [Nordic ID] déclare que l'appareil [RFID Radio module NUR2-1W] est conforme aux

exigences essentielles et aux autres dispositions pertinentes de la directive 2014/53/EU.

Italiano

[Italian]

Con la presente [Nordic ID] dichiara che questo [RFID Radio module NUR2-1W] è conforme ai requisiti

essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 2014/53/EU.

Latviski

[Latvian]

Ar šo [Nordic ID] deklarē, ka [RFID Radio module NUR2-1W] atbilst Direktīvas 2014/53/EK būtiskajām

prasībām un citiem ar to saistītajiem noteikumiem.

Lietuvių

[Lithuanian]

Šiuo [Nordic ID] deklaruoja, kad šis [RFID Radio module NUR2-1W] atitinka esminius reikalavimus ir

kitas 2014/53/EB Direktyvos nuostatas.

Nederlands

[Dutch]

Hierbij verklaart [Nordic ID] dat het toestel [RFID Radio module NUR2-1W] in overeenstemming is met

de essentiële eisen en de andere relevante bepalingen van richtlijn 2014/53/EG.

Malti

[Maltese]

Hawnhekk, [Nordic ID], jiddikjara li dan [RFID Radio module NUR2-1W] jikkonforma mal-ħtiġijiet

essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 2014/53/EU.

Magyar

[Hungarian]

Alulírott, [Nordic ID] nyilatkozom, hogy a [RFID Radio module NUR2-1W] megfelel a vonatkozó

alapvetõ követelményeknek és az 2014/53/EU irányelv egyéb elõírásainak.

Polski

[Polish]

Niniejszym [Nordic ID] oświadcza, że [IRX200] jest zgodny z zasadniczymi

wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/53/EU.

Português

[Portuguese]

[Nordic ID] declara que este [IRX200] está conforme com os requisitos essenciais

e outras disposições da Directiva 2014/53/EU.

Slovensko

[Slovenian]

[Nordic ID] izjavlja, da je ta [IRX200] v skladu z bistvenimi zahtevami in ostalimi

relevantnimi določili direktive 2014/53/ES.

Slovensky

[Slovak]

[Nordic ID] týmto vyhlasuje, že [IRX200] spĺňa základné požiadavky a všetky

príslušné ustanovenia Smernice 2014/53/ES.

Suomi

[Finnish]

[Nordic ID] vakuuttaa täten että [IRX200] on direktiivin 2014/53/EY oleellisten

vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

Svenska

[Swedish]

Härmed intygar [Nordic ID] att denna [IRX200] står i överensstämmelse med de

väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 2014/53/EG.

LABELING REQUIREMENTS

The 'CE' marking must be in a visible area on the OEM product.

APPROVED EXTERNAL ANTENNAS

Maximum allowed ERP power is 33dBm when operating in ETSI lower band. IRX200 has maximum

conducted output power of 30dBm. Meaning that 5dBi is the maximum allowed antenna gain without cable losses

When module is set to operate in ETSI upper band, maximum ERP power is 36dBm.

This means maximum antenna gain of 8dBi.

Formula how to calculate maximum allowed antenna gain when operating in ETSI lower band:

30 dBm – 2.15 (dipole gain) + [antenna gain dBi] – [cable attenuation dB] < 33dBm

Formula how to calculate maximum allowed antenna gain when operating in ETSI upper band:

30 dBm – 2.15 (dipole gain) + [antenna gain dBi] – [cable attenuation dB] < 36dBm

Beamwidth restrictions while operating in ETSI lower band:

For transmissions ≤500 mW e.r.p. there shall be no restriction on beam width.

For transmissions of > 500 mW e.r.p. to ≤ 1 000 mW e.r.p. beam widths shall be ≤ 180°

For transmissions of > 1 000 mW e.r.p. to 2 000 mW e.r.p. beam widths shall be ≤ 90°

Beamwidth restrictions while operating in ETSI upper band:

For transmissions ≤1000 mW e.r.p. there shall be no restriction on beam width.

For transmissions of > 1000 mW e.r.p. to ≤ 2 000 mW e.r.p. beam widths shall be ≤ 180°

For transmissions of > 2 000 mW e.r.p. to 4 000 mW e.r.p. beam widths shall be ≤ 90

11.2. FCC

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 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 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.

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.

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

11.2.1. USER'S GUIDE REQUIREMENTS

The texts in quotation marks below are the required FCC statements in the user's guide.

"To comply with FCC's RF radiation exposure requirements in general population environment, the antenna(s) used for this transmitter must be installed such that a minimum separation distances 30.1cm /12 inch) is maintained between the radiator (antenna) & user's/nearby people's body at all times and must not be co-located or operating in conjunction with any other antenna or transmitter."

This device complies with Part 15 of the FCC Rules.

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

11.2.2. LABELING REQUIREMENTS

The product must be labelled with the following identification information in a visible area:

FCC ID: SCC10811A

11.2.3. APPROVED ANTENNAS

11.3. ISED EN

This device contains licence-exempt transmitter / receiver that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under regulations of Science and Economic Development Canada, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Science and Economic Development Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropic radiated power (e.i.r.p.) is not more than that necessary for successful communication.

11.3.1. APPROVED ANTENNAS

Antenna types not included in this list or have a gain greater than the maximum gain

indicated for any type listed are strictly prohibited for use with this device.

This radio transmitter 5137A-10811A has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Option 1:

Manufacturer: Nordic ID Oy

Antenna Description: Circular polarized antenna with reflector

Frequency range: 902 – 928 MHz

Impedance: 50 Ohm

Manufacturer Part Number: XA20

Gain: 7.5dBiC / 4.5dBi

11.4. ISED FR

Cet appareil contient un émetteur / récepteur exempt de licence conforme à la norme RSS d'Innovation, Sciences et Développement économique Canada. Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas causer d'interférences et (2) cet appareil doit accepter toute interférence, y compris les interférences pouvant entraîner un fonctionnement non souhaité de l'appareil.

En vertu de la réglementation de Science et Développement économique Canada, cet émetteur radio ne peut fonctionner qu'avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Science et Développement économique Canada. Pour réduire le risque d'interférences radio avec d'autres utilisateurs, le type d'antenne et son gain doivent être choisis de manière à ce que la puissance rayonnée isotrope équivalente (p.i.r.e.) ne soit pas supérieure à celle nécessaire au succès de la communication.

L'appareil avec radio intégrée doit remplir les conditions suivantes :

1. 1Les types d'antenne certifiés et le gain maximal sont répertoriés plus loin dans ce document. L'utilisateur de cet appareil ou les personnes à proximité ne doivent en aucun cas compromettre la distance de séparation minimale de 30.9cm / 12.2 inch.

11.4.1. TYPES D'ANTENNES ACCEPTABLES

Cet émetteur radio 5137A-10811A a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antennes énumérés ci-dessous, avec le gain maximal admissible indiqué. Les types d'antenne non inclus dans cette liste et dont le gain est supérieur au gain maximal indiqué pour l'un des types répertoriés ne sont strictement pas autorisés pour une utilisation avec cet appareil.

Option 1:

Manufacturer: Nordic ID Oy

Antenna Description: Circular polarized antenna with reflector

Frequency range: 902 – 928 MHz

Impedance: 50 Ohm

Manufacturer Part Number: XA20

Gain: 7.5dBiC / 4.5dBi

11.5. TELEC

TBD

11.5.1. APPROVED ANTENNAS

TBD

12. SERVICE AND SUPPORT

For technical enquiries regarding Brady devices or software development, please contact our Technical Support:

E-mail: tseurope@bradycorp.com
Telephone: +44 333 333 1111

As a manufacturer, Brady stands responsible for providing repair services for its devices during and after the warranty period. Together with partners Brady serves customers globally. When your Brady device needs repair, always use Brady Service or our authorized service partners. We want to make sure that your Brady product serves you the best possible way, and by using our preferred service partners the quality of the service is trustworthy and the spare parts are original. This way the existing product warranty remains, and you receive a 3-month service warranty for the repaired devices.

Brady works together with full support and primary support partners. Full support partners can handle both warranty and non-warranty repairs on behalf of Brady in their own regions. In addition, Brady has a network of smaller repair centers, primary support partners, who offer the first line of support to their customers locally.

For any enquiries about Brady repair service please contact:

E-mail: tseurope@bradycorp.com
Telephone: +44 333 333 1111

13. WARRANTY

Our products are sold with the understanding that the buyer will test them in actual use and determine for themself the adaptability to their intended uses. Brady warrants to the buyer that its products are free from defects in material and workmanship but limits its obligation under this warranty to replacement of the product shown to Brady's satisfaction to have been defective at the time Brady sold it. This warranty does not extend to any persons obtaining the product from the buyer.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATIONS OR LIABILITY ON BRADY'S PART. UNDER NO CIRCUMSTANCES WILL BRADY BE LIABLE FOR ANY LOSS, DAMAGE, EXPENSE OR CONSEQUENTIAL DAMAGES OF ANY KIND ARISING IN CONNECTION WITH THE USE, OR INABILITY TO USE, BRADY'S PRODUCTS.

14. RELATED DOCUMENTS AND CONTENTS

- Brady datasheet

- Brady Safety and Regulations Guide
- Nordic ID GitHub account for developers (https://github.com/NordicID)

15. VERSION HISTORY

Version	Date	Modifications
0.1	25.1.2024	DRAFT