

RTX8200

Location Gateway

Technical Reference Document

Version 1.0

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1 About This Document

This document describes the configuration, customization, management, operation, maintenance and troubleshooting of the RTX8200 Location Gateway in RTX generic mode. For customer, specific modes refer to specific customer agreements, which describe the software operational deviations from this document.

1.1 Audience

Who should read this guide? First, this guide is intended for networking professionals responsible for designing and implementing RTX based enterprise networks.

Second, network administrators and IT support personnel that need to install, configure, maintain, and monitor elements in a “live” SME VoIP network will find this document helpful. Furthermore, anyone who wishes to gain knowledge on fundamental features in the Beatus system can also benefit from this material.

1.2 When Should I Read This Guide

Read this guide before you install the core network devices of VoIP SME System and when you are ready to setup or configure SIP server, NAT aware router, advanced VLAN settings, base stations, and Location Gateway’s in a multi cell setup.

This manual will enable you to set up and connect your RTX8200 Location Gateway in a Multi Cell system.

1.3 Important Assumptions

This document was written with the following assumptions in mind:

- You understand network deployment in general
- You have working knowledge of basic TCP/IP/SIP protocols, Network Address Translation, etc...
- A proper site survey has been performed, and the administrator have access to these plans

1.4 What’s Inside This Guide

We summarize the contents of this document in the table below:

WHERE IS IT?	CONTENT	PURPOSE
CHAPTER 2	TBD	TBD
CHAPTER 3	TBD	TBD
CHAPTER 4	TBD	TBD
CHAPTER 5	TBD	TBD



1.5 What's Not in This guide

This guide provides overview on, how-to configure RTX8200 Location Gateway to an RTX Generic System. It is not intended as a comprehensive reference to all detail and specific steps on how to configure other vendor specific components/devices needed to make the SME VoIP System functional. For such a reference to vendor specific devices, please contact the respective vendor for documentation. Configuration on specific Alarm/Messaging servers are not included in this guide.

1.6 Abbreviations

For this document, the following abbreviations hold:

DHCP:	Dynamic Host Configuration Protocol
DNS:	Domain Name Server
HTTP(S):	Hyper Text Transfer Protocol (Secure)
(T)FTP:	(Trivial) File Transfer Protocol
IOS:	Internetworking Operating System
PCMA:	A-law Pulse Code Modulation
PCMU:	mu-law Pulse Code Modulation
PoE:	Power over Ethernet
RTP:	Real-time Transport Protocol
RPORT:	Response Port (Refer to RFC3581 for details)
SIP:	Session Initiation Protocol
SME:	Small and Medium scale Enterprise
VLAN:	Virtual Local Access Network
TOS:	Type of Service (policy based routing)
URL:	Uniform Resource Locator
UA:	User Agent

1.7 References/Related Documentation

RTX8430 Handset_Manual_Operations_v4.6
RTX8630 Handset_Manual_Operations_v4.6
RTX8631_Handset_Manual_Operations_v4.6
RTX8632_Handset_Manual_Operations_v4.6
RTX8633_Handset_Manual_Operations_v4.6
RTX8830_Handset_Manual_Operations_v4.6
How to Deploy SME VOIP System v1.4
Provisioning of SME VoIP System (23)

1.8 Document History

REVISION	AUTHOR	ISSUE DATE	COMMENTS
4.6	HDJ	01-04-2019	Updated to V460 Firmware



1.9 What is new

What new features have been added.

VERSION	FEATURE
V460	All new product

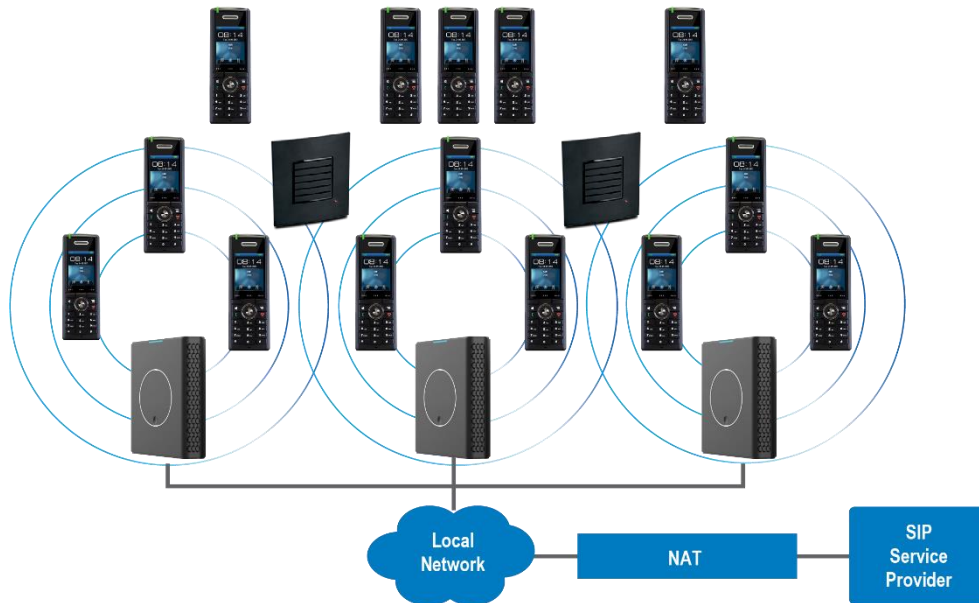
1.10 Documentation Feedback

We always strive to produce the best and we also value your comments and suggestions about our documentation. If you have any comments about this guide, please enter them through the Feedback link on the RTX website. We will use your feedback to improve the documentation.

2. Introduction – System overview

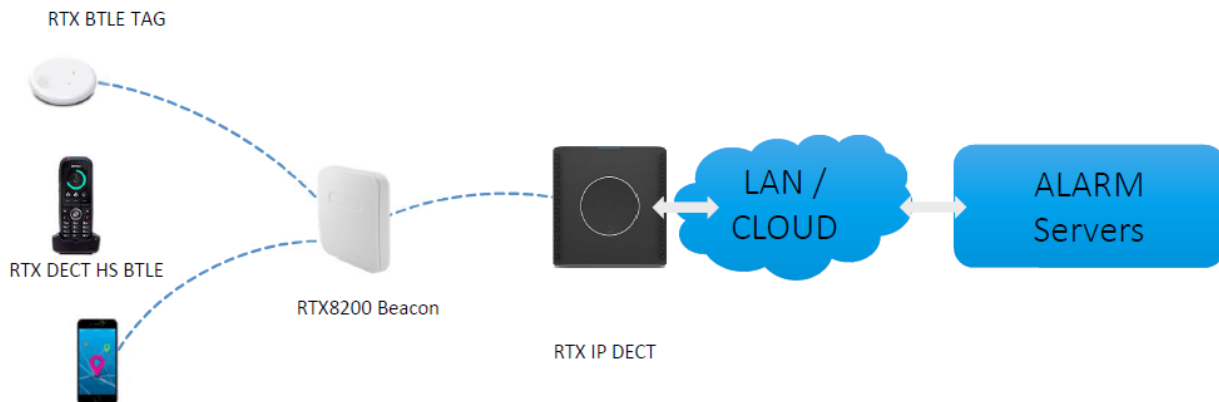
In a typical DECT telephony system, you have base station, repeaters and handsets, allowing the users to make/receive calls and messages.

A typical setup could look like this:



Increasing demand for locating equipment, personal or pushing information to specific handset on a specific location, demands the system to know exactly where the device is located.

This can be done by adding RTX8200 Location gateway devices to the DECT system.





Wireless Bands

The bands supported in the SME VoIP are summarized as follows:

Frequency bands:

1880 – 1930 MHz (DECT)

1880 – 1900 MHz (10 carriers) Europe/ETSI

1910 – 1930 MHz (10 carriers) LATAM

1920 – 1930 MHz (5 carriers) US

System Capacity (in Summary)

SME network capacity of relevant components can be summarized as follows:

DESCRIPTION	CAPACITY
MAX BASE STATION	4.000
MAX LOCATION GATEWAYS	16.000
MAX TERMINALS (SELECT BETWEEN 6 HANDSETS AND 1 HEADSET MODELS)	16.000
MAX ACTIVE CALLS (NARROW BAND)	32.000
MAX ACTIVE CALLS (WIDE BAND)	16.000

Installation of Location Gateways

After planning the network, installing the base stations, the Locations gateways must be added, therefore, we briefly describe how to install the location gateways. One important thing that must be decided before installing the location gateways is how to power them.

Package – Contents/Damage Inspection

Before Package Is Opened:

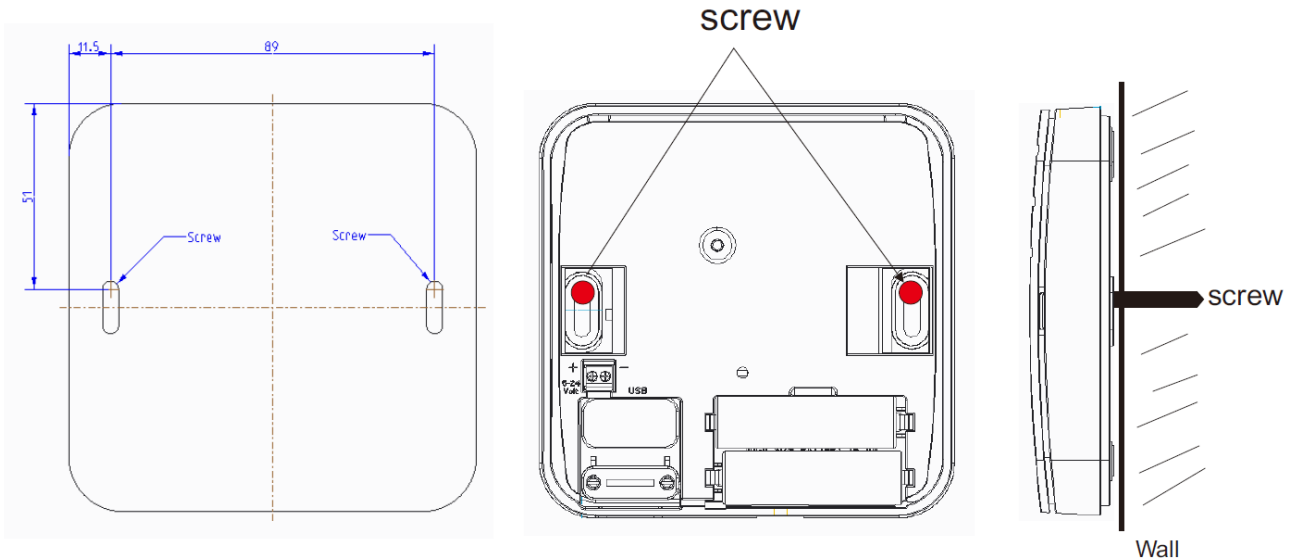
Examine the shipping package for evidence of physical damage or mishandling prior to opening. If there is a proof of mishandling prior to opening, you must report it to the relevant support center of the regional representative or operator.

Contents of Package:

Make sure all relevant components are available in the package before proceeding to the next step.

Every shipped base unit package/box contains the following items:

- Location Gateway



Please only use screws and actors with the following dimensions.

Screws: 30,7 mm (L), 2,6 mm (W)

Actors: 24,8 mm (L), 5,8 mm (W)

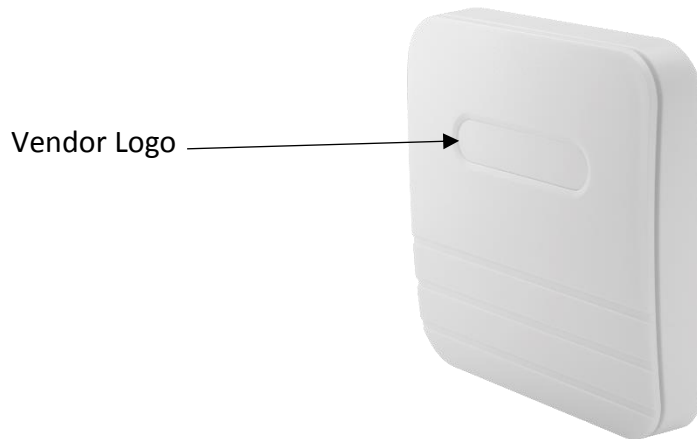
Damage Inspection:

The following are the recommended procedure for you to use for inspection:

1. Examine all relevant components for damage.
2. Make a “defective on arrival – DOA” report or RMA to the operator. Do not move the shipping carton until the operator has examined it. If possible, send pictures of the damage. The operator/regional representative will initiate the necessary procedure to process this RMA. They will guide the network administrator on how to return the damaged package if necessary.
3. If no damage is found, then unwrap all the components and dispose of empty package/carton(s) in accordance with country specific environmental regulations.

RTX8200 Location Gateway Mechanics

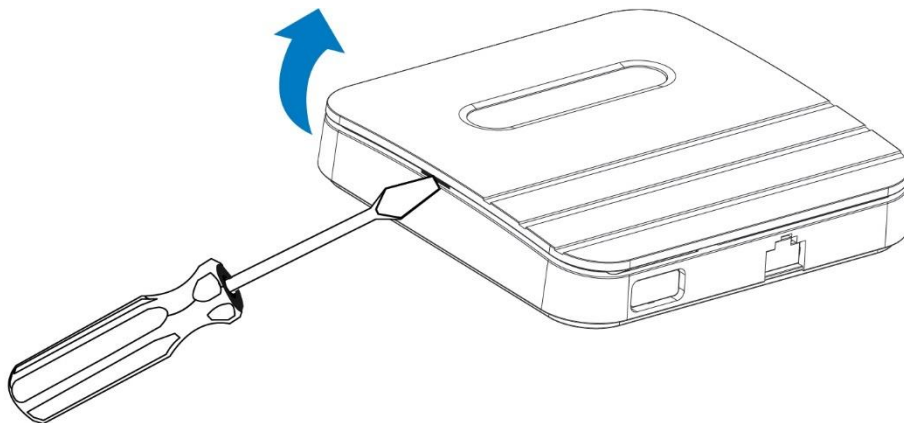
The Location Gateway front



How to insert batteries or PoE module

To open the Location gateway, you need to use a screwdriver or other flat tool.

Insert the screwdriver on the left side and press the small metal lock to open the Location gateway.



Now insert the batteries (2xAA) or the PoE module.

If using PoE module remember to remove the small piece of plastic covering the Ethernet plug.

RTX8200 Location Gateway – Tamper Alarm

The RTX8200 Location Gateway is equipped with a tamper alarm, in case someone tries to tamper with the device. The tamper alarm allows the system admin to receive a warning if tampering is detected. Tampering alarm is activated if the front is removed.



RTX Location Gateway – Reset feature

It is possible to restart or reset the location gateway unit by pressing a knob under the front cover. **Alternatively, it can be reset from the SME Configuration Interface. We do not recommend this; but unplugging and plugging the Ethernet cable back to the PoE port of the base station also resets the base unit.**

Installing the Location Gateway

First determine the best location that will provide an optimal coverage taking account the construction of the building, architecture, and choice of building materials.

Next, mount the Location Gateway on a wall or where ever you want it placed to provide the best coverage.

RANGE TBD

Mounting the Location Gateway.

The RTX8200 Location gateway, can be mounted both horizontal in the ceiling and vertical on a wall.

Before mounting the Location gateway, you need to determine if it is going to run in RX or TX mode, as you need to select the right radiation pattern.

RX mode = Receiving Mode

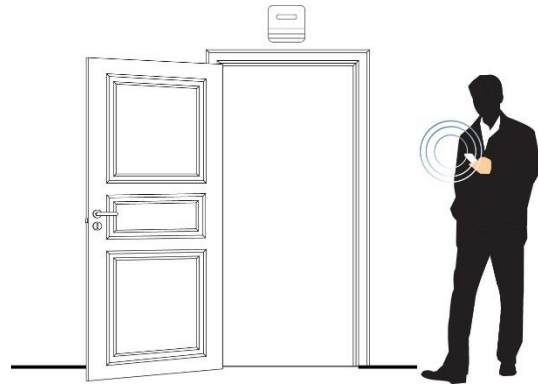
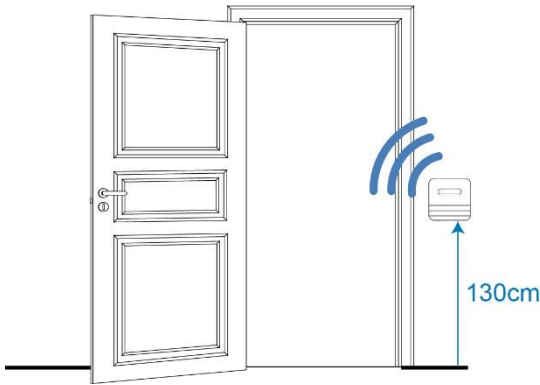
TX Mote = Transmit Mode

RX Mode – Receiver mode

In receiver mode, the RTX8200 Location Gateway will react to external BTLE beacons and automatically send the location data using DECT to a centralized point. In short this allows to you to use small external BT Tags such as the RTX8210 for item tracking and DECT phones such as the RTX863x for personnel tracking. Like the case for transmitter mode, the external antennas can be deployed in high security areas. The downside for receiver mode is the added current consumption, which makes it necessary to use the RTX8200 Location Gateway with a power supply.

Use case: Door installation:

For the door installation use case, RTX recommends two positions. Next to the door and just above the door, as shown on the illustration below. It should be noted that position 1 will be more reliable, since the tracked object will need to be further in the room for position 2 to detect the presence. The door opening in this case is 90 cm wide and 210 cm tall.



Position 1 - Gateway Settings

In this example, the beamforming will be configured to steer left into the door opening and the attenuation is set to -30 dB for detection only in the door.

Position 2 - Gateway Settings

In this example, the beamforming will be configured the center setting and the attenuation is set to -16 dB for reliable detection after tracked object has walked through the door. In this case the object needs to travel a meter inside the room.

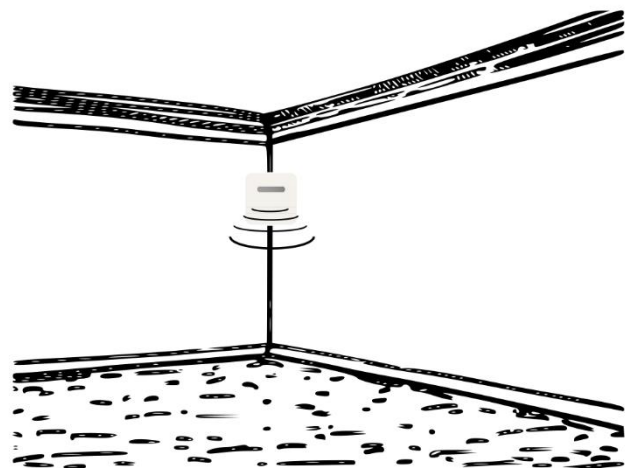
Table of settings:

SETTING	POSITION 1	POSITION 2	POSITION 3
ANTENNA ARRAY	Left	Center	Center
ATTENUATION	-30 dB	-16 dB	-16 dB
EFFECTIVE RANGE	Less than a meter	2-3 meters	2-3 meters

Use case: Room installation:

If the user wants to detect presence in a small room or office RTX recommends installing this in the top corner of a room. The power level should be adjusted according to the size of the room. We have provided a table with different room sizes and power settings. The Antenna direction should be set to “center” in all the cases. This is with the beacon in TX mode. The values given is measured inside a fully equipped office space, it is very likely that the user will have to tweak the values to fit their exact needs.

Table of settings



Antenna Array	Center	Center	Center	Center	Center	Center
Attenuation	0 dB	8 dB	16 dB	30 dB	38 dB	46 dB

Room coverage	xx m ²	xx m ²	xx m ²	xx m ²	xx m ²	xx m ²
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Use case: Hallway installation:

In a hallway installation, it will be possible to track if equipment or personnel has moved past certain point in the hallway. Hallway installations can be challenging, since there often will be a lot of reflections in the RF propagation. This can be omitted by adjusting the power accordingly. However, this will also change the effective range of the beacon. The following values have been tested in a concrete hallway with a width of 3 meters. The beam steering has been set to center for optimal performance

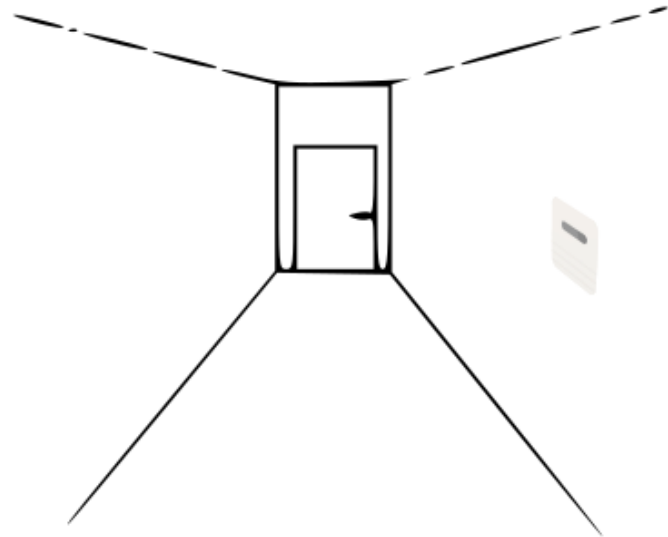


Table of settings

Antenna Array	Center	Center	Center	Center	Center	Center
Attenuation	0 dB	8 dB	16 dB	30 dB	38 dB	46 dB
Coverage	xx m	xx m	xx m	xx m	xx m	xx m

External antenna

In high security areas it might be a requirement, that the active device is hidden above the ceiling or behind a wall, such that it cannot be tampered with. In this scenario the external antenna version of RTX8200 can be used. **The external antenna version needs professional installation.** Obviously, the setup will be a bit more cumbersome, since RF cables are needed. The installation will also be highly dependent on what kind of antenna is used, however this also adds some flexibility to control the radiation pattern. The following use case will be based on a standard 2.4 GHz Dipole antenna. This creates an omnidirectional antenna if installed vertically, or a weakly directional antenna if placed horizontally.

Generally, the sensitivity on the antennas will be higher than the internal antennas, since the RF path is shorter. So generally, the attenuation will have to be higher for the same range limitation.

Use case: Hallway installation (Above ceiling):

Again, the location gateway can be hidden, as the previous use case. But here the antennas are also hidden above the ceiling. The antennas are placed horizontally, to make it a bit more directional. The settings used in this example will be very dependent on what kind of ceiling, but it will work as a starting point for the initial installation.

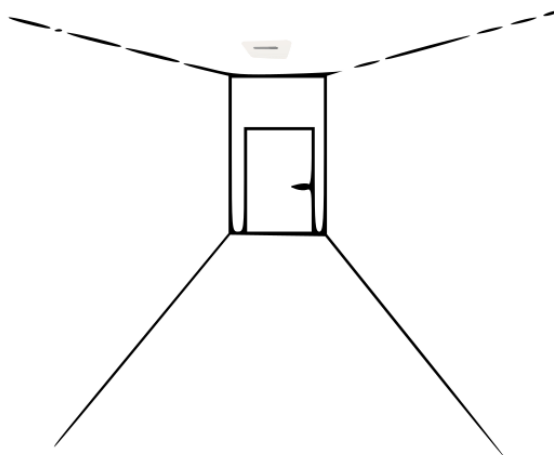


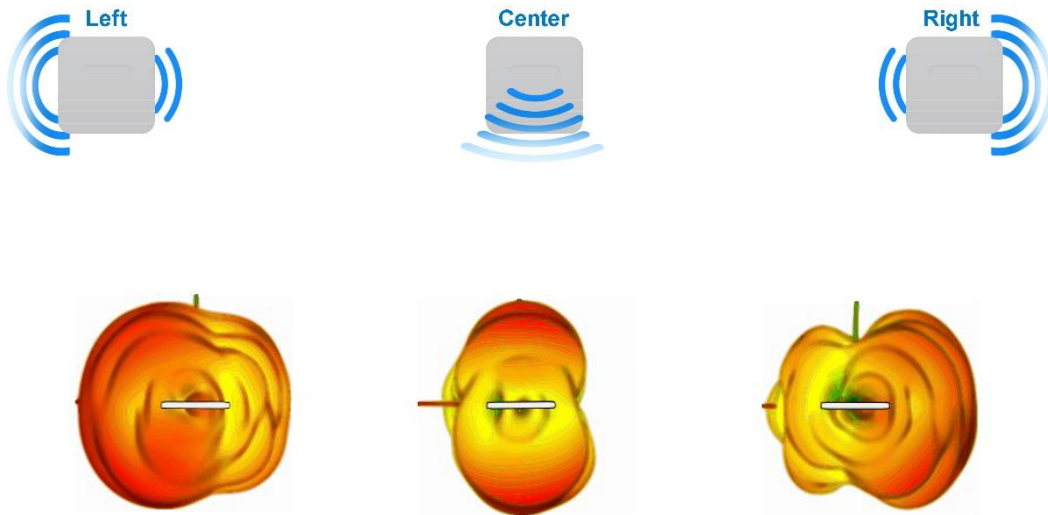
Table of settings:

Antenna Array	Center	Center	Center	Center	Center	Center
Attenuation	0 dB	8 dB	16 dB	30 dB	38 dB	46 dB
Coverage	xx m	xx m	xx m	xx m	xx m	xx m

In RX mode the Location gateway is not sending any beacons but detecting devices the transmit beacons e.g RTX Handsets.

Images of Location gateway in RX mode.

In TX mode the Location gateway is transmitting beacons in the direction that is setup. When using the Location gateway in TX mode it is very important to select the right radiation pattern.



The beam steering allows to control from which direction the gateway will receive/transmit beacons. A typical example could be enter/leaving detection in a doorway, such items or people can be tracked. The attenuation can be controlled in the following steps:

TX Attenuation	RX Attenuation
0 dB	0 dB
8 dB	8 dB
16 dB	16 dB
30 dB	
38 dB	
46 dB	

The attenuation will affect the detection range in both TX and RX mode. This setting is very important and very variable depending on the type of building. We recommend that the user will start out with one of our pre-defined use cases and customize it to the specific building type. This setting can then be deployed across all units in the building.

TX Mode - Transmitter mode:

In transmitter mode, it is the RTX8200 Location Gateway that is the active beacon transmitter, and the receiver will be responsible for conveying the location data to a central point. This can be useful when you know all employees are carrying a phone that supports BTLE beacons. It also allows for a more stringent power setting and thus more precise tracking. However, the receiver sensitivity and antenna on the phones will play a large part in the measurement uncertainty. Another benefit of the TX mode is the long battery lifetime.

Use case: Door installation:

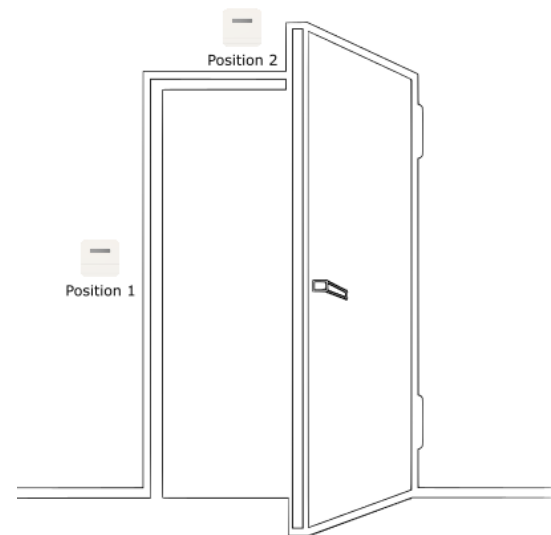
For the door installation use case, RTX recommends two positions. Next to the door and just above the door, as shown on the illustration below. It should be noted that position 1 will be more reliable, since the tracked object will need to be further in the room for position 2 to detect the presence. The door opening in this case is 90 cm wide and 210 cm tall.

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Setting	Position 1	Position 2	Position 3
Antenna Array	Left	Center	Center
Attenuation	-30 dB	-16 dB	-16 dB
Effective range	Less than a meter	2-3 meters	2-3 meters

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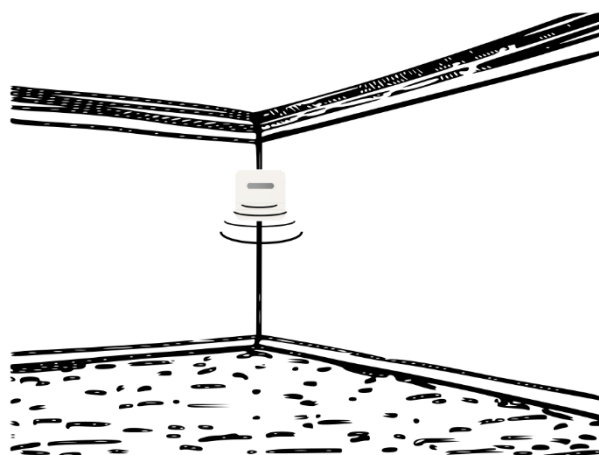


Table of settings

Antenna Array	Center	Center	Center	Center	Center	Center
Attenuation	0 dB	8 dB	16 dB	30 dB	38 dB	46 dB
Room coverage	xx m ²	xx m ²	xx m ²	xx m ²	xx m ²	xx m ²

Use case: Hallway installation:

In a hallway installation, it will be possible to track if equipment or personnel has moved past certain point in the hallway. Hallway installations can be challenging, since there often will a lot of reflections in the RF propagation. This can be omitted by adjusting the power accordingly. However, this will also change the effective range of the beacon. The following values have been tested in a concrete hallway with a width of 3 meters. The beam steering has been set to center for optimal performance

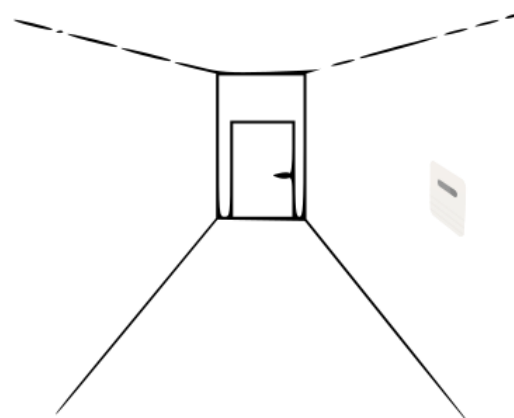


Table of settings

Antenna Array	Center	Center	Center	Center	Center	Center
Attenuation	0 dB	8 dB	16 dB	30 dB	38 dB	46 dB
Coverage	xx m	xx m	xx m	xx m	xx m	xx m

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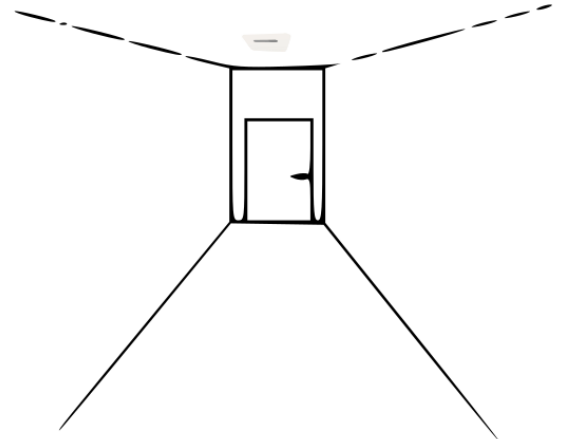


Table of settings:

Antenna Array	Center	Center	Center	Center	Center	Center
Attenuation	0 dB	8 dB	16 dB	30 dB	38 dB	46 dB
Room coverage	xx m ²	xx m ²	xx m ²	xx m ²	xx m ²	xx m ²



Registration of Location gateway

To register the RTX8200 Location gateway, you need to activate the location gateway registration on the system. This is do on the management page.

Screen shot:

Management Settings

Base Station Name:

Settings

Management Transfer Protocol:

HTTP Management upload script:

HTTP Management username:

HTTP Management password:

Factory reset from button:

Enable Automatic Prefix:

Set Maximum Digits of Internal Numbers:

Set Prefix for Outgoing Calls:

Configuration

Configuration File Download:

Configuration Server Address:

Base Specific File:

Multi Cell Specific File:

Auto Resync Polling:

Auto Resync Time:

Auto Resync Days:

Auto Resync Periodic (Min):

Auto Resync Max Delay (Min):

DHCP Controlled Config Server:

DHCP Custom Option:

DHCP Custom Option Type:

Text Messaging

Text Messaging:

Text Messaging & Alarm Server:

Text Messaging Port:

Text Messaging Keep Alive (m):

Text Messaging Response (s):

Text Messaging TTL:

Terminal

Keep Alive (m):

Auto Stop Alarm:

Auto Stop Alarm Delay (s):

Syslog/SIP Log

Upload of SIP Log:

Syslog Level:

TLS security:

Syslog Server IP Address:

Syslog Server Port:

Location Gateway

Location Gateways:

Configuration Server:

License

Idx	Description
No Entries	

License Key:

PARAMETERS	DEFAULT VALUES	DESCRIPTION
LOCATION GATEWAYS	Disabled	Enable to allow Location gateways onto the system NOTE: Press save and Location Gateway menu will be added to the left Main menu.
CONFIGURATION SERVER	Empty	Permitted value(s): AAA.BBB.CCC.DDD or URL (e.g.: firmware.rtx.net).



When the system is open to location gateway registration go to “Location Gateways” menu.

Screenshot:

Location Gateways

[Add Location Gateway extension](#)
[Stop Registration](#)

<u>Idx</u>	<u>IPEI</u>	<u>Location Gateway State</u>	<u>Location Gateway Type FW Info</u>	<u>FWU Progress</u>
There are currently no extensions for server				

1: Click “Add Location Gateway extension”

Screenshot

Location Gateway

IPEI:

2: Enter the IPEI and press “Save”

Screenshot

Location Gateways

[Add Location Gateway extension](#)
[Stop Registration](#)

<u>Idx</u>	<u>IPEI</u>	<u>Location Gateway State</u>	<u>Location Gateway Type FW Info</u>	<u>FWU Progress</u>	
☒	0	0328D3C8D7	Enabled	8200 422.1801	Off

[Check All /Uncheck All](#)
With selected: [Delete Location Gateway](#) [Register Location Gateway\(s\)](#) [Deregister Location Gateway\(s\)](#)

3: Check the “check box” of the Location gateway(s) you want to register and press “Register Location Gateway(s)”

Screenshot

Location Gateways

[Add Location Gateway extension](#)
[Stop Registration](#)

	Idx	IPEI	Location Gateway State	Location Gateway Type FW Info	FWU Progress
☐	0	0328D3C8D7	Enabled	8200 422.1801	Off

[Check All](#) / [Uncheck All](#)
 With selected: [Delete Location Gateway](#) [Register Location Gateway\(s\)](#) [Deregister Location Gateway\(s\)](#)

Now the Location gateway(s) will register to the system.

Firmware update

Firmware update of the Location gateway is done in the same way as handset and other devices registered to the DECT system.

Please see base station manual for more details on firmware update.

Configure Location gateway

When the Location gateway is connected to the DECT system, it needs to be configured. Each Location gateway can be configured manually or by provisioning. (For provisioning go to [xxx](#), for details).

To manually configure the Location gateway a handset, with the latest firmware is needed and you have to be within reach of the Location gateway.

Start by removing the lid of the Location gateway as described in [xxx](#).

On the handset you need to enter the service menu.

1: Enter the service menu press: MENU - *7378423*

NB: make sure BLTE is enable on the handset

2: scroll down to

FCC Caution:

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

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This transmitter must be installed to provide a separation distance of at least 20 cm from all persons. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

ISED Warning :

This device complies with ISED licence-exempt RSS standard(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.

Le présent appareil est conforme aux CNR d'ISED 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.

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux radiations ISED définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

Cet émetteur ne doit pas être situé ou fonctionner conjointement avec une autre antenne ou un autre émetteur