

System Requirements for Installation and Operation

The information in this document is subject to change without notice and describes only the product defined in the introduction of this documentation. This document is intended for the use of Nokia Networks' customers only for the purposes of the agreement under which the document is submitted, and no part of it may be reproduced or transmitted in any form or means without the prior written permission of Nokia Networks. The document has been prepared to be used by professional and properly trained personnel, and the customer assumes full responsibility when using it. Nokia Networks welcomes customer comments as part of the process of continuous development and improvement of the documentation.

The information or statements given in this document concerning the suitability, capacity, or performance of the mentioned hardware or software products cannot be considered binding but shall be defined in the agreement made between Nokia Networks and the customer. However, Nokia Networks has made all reasonable efforts to ensure that the instructions contained in the document are adequate and free of material errors and omissions. Nokia Networks will, if necessary, explain issues which may not be covered by the document.

Nokia Networks' liability for any errors in the document is limited to the documentary correction of errors. Nokia Networks WILL NOT BE RESPONSIBLE IN ANY EVENT FOR ERRORS IN THIS DOCUMENT OR FOR ANY DAMAGES, INCIDENTAL OR CONSEQUENTIAL (INCLUDING MONETARY LOSSES), that might arise from the use of this document or the information in it.

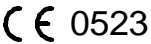

This document and the product it describes are considered protected by copyright according to the applicable laws.

NOKIA logo is a registered trademark of Nokia Corporation.

Other product names mentioned in this document may be trademarks of their respective companies, and they are mentioned for identification purposes only.

Copyright © Nokia Corporation 2001. All rights reserved.



 0523 	Hereby, Nokia Corporation, declares that this Nokia InLite is in compliance with the essential requirements and other relevant provisions of Directive: 1999/5/EC. The product is marked with the CE marking and Notified Body number according to the Directive 1999/5/EC
--	--

FCC

FCC §15.21 - Information to user - The Nokia InLite is used as an intentional radiated equipment and any changes or modifications on the equipment without any approval by Nokia could void the user's authority to operate the equipment.

FCC §15.27 b) - Special Accessories - If a device requiring special accessories is installed by or under the supervision of the party marketing the device, it is the responsibility of that party to install the equipment using the special accessories. For equipment requiring professional installation, it is not necessary for the responsible party to market the special accessories with the equipment. However, the need to use the special accessories must be detailed in the instruction manual, and it is the responsibility of the installer to provide and to install the required accessories.

FCC §15.105 - Information to user - 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.

History

Date	Version	Author	Details
26-10-2000	Draft 1	T N Williams	Compilation of a first draft
08 - 01 - 2001	Draft 2	Indi Liepa	Revised based on feedback from subject matter expert.
26 - 01 - 2001	Issue 1	Indi Liepa	Revised after visit to Tekmar by Harri and review by Marc Paull.
18 - 07 - 2001	Issue 2, Draft 1	Tom Dumic	Included US Type Approval information
22 - 08 - 2001	Issue 2	Tom Dumic	Release for Product v1.0.1
05 - 09 - 2001	Issue 2, Draft 1	Tom Dumic	Draft for Product v2

1

About this document

This document introduces the requirements set by Nokia for successful installation and operation. Use this document as the source for the following information needed in the planning of installation:

- Specification on the environmental conditions during transportation, storage and operation
- Space requirements and other site-related installation matters
- Site grounding and power supply
- Interface connections
- Installation tools.

Read also *Nokia InLite: Warnings and Cautions* in conjunction with this document.

2 Installation site requirements

Prior to installation of the Nokia InLite system, it is most important that certain actions have been carried out to ensure installation continuity and safety.

2.1 Checking the site

A number of aspects need to be verified as being satisfactory.

Accessibility

Check the following:

- Site safety access is provided
- The site is accessible to installation, commissioning and maintenance personnel.

Grounding points

Check that the grounding point(s) are clearly identified.

Power supplies

Check that all the necessary power points are conveniently located for connection of the Nokia InLite Main Unit (MU) and Remote Units (RUs).

Each RU requires its own power supply and a connection to the mains may be required.

Space

Check that there is adequate space for:

- Installation work
- MU, RU and fibre optic cables.
- The recommended spacing distances for the MU and RUs as outlined in *Warnings and Cautions* have been taken into account in the site planning.

Temperature and ventilation

Adequate space must be provided around the MU and RUs to ensure that the system can be maintained within the operating temperature ranges.

Check the following:

- The site must guarantee natural ventilation to the system.

- A distance of two meters must be maintained between the MU or RUs (RUs) and a heating opening.
- The RUs should be mounted in reasonable locations.
- The RUs should not be installed inside heating or conditioning systems.
- The RUs should not be installed inside a cable pipeline.
- Bear in mind that the temperature in the upper part of a room is higher than at eye level. If the room has a false ceiling, verify that the environment temperatures at the installation position do not exceed the allowed limits for the RU.

Tools

Ensure that a complete set of tools is available.

Identification of installation locations/positions

Check that the locations and positions for the installation of the MU and RUs within the building complex have been clearly identified.

RU mounting positions

Keep into consideration that the RU transmits an RF signal and that the safety distances must be respected.

RUs are typically installed next to the ceiling and for safety reasons they must be properly mounted. RUs must be accessible for testing and maintenance

Cable routing

Check that the routing for the fibre optic cables between the MU and the RUs have been clearly identified.

Documentation

The required documents should be available:

- Site-specific installation documents, providing information on cabling routes, RU and MU locations, power supplies and so forth
- Nokia InLite User Manual
- BTS User Manuals (if required).

BTS status

In order to test the Nokia InLite, the BTSs should have been commissioned and the Abis links established.

If the Abis link has not been set up, a power meter is required to measure signal levels.

Power connections

The MU grounding and AC power sockets and the RU AC power supply sockets should be installed either before installation begins or early in the installation process.

2.2 Checking the site environment

Check that the following requirements are satisfactory at the site:

- The site storage, transportation and operation of the Nokia InLite must conform with the various international and national environmental standards for temperature, humidity, EMC and noise.
- There is no explosion risk present
- The environment is not classified as a high-risk area in the event of fire
- Suspended particles are not to be found in great concentration
- The environment is not subject to any traffic which could cause crash damages
- It is recommended that the MU is placed in a private room, protected against any possible violation
- The system is not exposed to ultra-violet rays.

3 Environment

This chapter defines the classes of environmental conditions and their severities to which the Nokia InLite can be exposed. The information is organised in the following parts:

- Conditions for Storage
- Conditions for Transportation
- Conditions for Operation

3.1 Storage

This section defines the environmental conditions, to which the Nokia InLite can be exposed during storage.



Caution

The Nokia InLite must be stored in its original package before the installation.

3.1.1 ETSI standard for storage

The Nokia InLite system complies with ETS 300 019-1-1:1992 Class 1.2 weather protected, partly temperature-controlled storage locations.

3.1.2 Climatic conditions for storage

The climatic conditions for the storage of the Nokia InLite system (as specified ETS 300 019-1-1:1992) are described in Table .

Environmental parameter	Value
Low air temperature	- 25 °C - 13 °F
High air temperature	55 °C 131 °F

Environmental parameter	Value
Low relative humidity	10%
High relative humidity	100%
Low absolute humidity	0.5 g/m ³
High absolute humidity	29 g/m ³
Rain intensity	none
Temperature change rate (average of 5 minutes)	0.5 °C/min. 0.9 °F/min.
Low air pressure	70 kPa 10.15 psi
High air pressure	106 kPa 15.37 psi
Solar radiation	1120 W/m ²
Surrounding air movement	30 m/s 98 ft/s
Conditions of condensation	yes
Conditions of precipitation (rain, snow, hail, etc.)	yes
Low rain temperature	none
Conditions of water from sources other than rain	dripping water
Conditions of icing and frosting	yes

Table 1. Climatic conditions for storage

3.1.3 Mechanical conditions for storage

The Nokia InLite System complies with ETS 300 019-1-1:1992 class 1.2.

3.2 Transportation

This section defines the environmental conditions which the Nokia InLite can be exposed to during transportation.

Caution

The Nokia InLite must be transported in its original package before the installation.

Note

The Nokia InLite is delivered to the customer with some of the plug-in units pre-installed (Control Unit, Power Supply Unit/s, Switch Matrix/Dual Band RF unit).

3.2.1 ETSI standard for transportation

The Nokia InLite is Class 2.3 as defined in ETS 300 019-1-2:1992 the class for InLite. This applies to transportation by air, road (on all qualities of road surface), by ship and by train where some care has been taken with respect to temperature.

Note

The typical transportation time is considered to be 30 days or less. When the total transportation time exceeds 30 days, additional storage or packaging precautions must be considered.

3.2.2 Climatic conditions for transportation

The climatic conditions during the transportation are presented in Table (according to ETS 300 019-1-2:1992).

Environmental parameter	Value
Low air temperature	-40 °C -40 °F
High temperature, air in unventilated enclosures	70 °C 158 °F
High temperature, air in ventilated enclosures or outdoor air	40 °C 104 °F
Temperature change air/air	-40 °C / +30 °C -40 °F / +86 °F

Environmental parameter	Value
Temperature change air/water	+40/+5 °C +104/+41 °F
Relative humidity, not combined with rapid temperature changes	95% +40 °C 95% 104 °F
Relative humidity, combined with rapid temperature changes air/air, at high relative humidity	95% -40 °C /+30 °C 95% -40 °F/ +86 °F
Absolute humidity, combined with rapid temperature changes air/air, at high water content	60 g/m ³ +70/+15 °C 60 g/m ³ +158/+59 °F
Low air pressure	70 kPa 10.15 psi
Change of air pressure	none
Surrounding air movement	20 m/s 65.6 ft/s
Precipitation, rain	6 mm/min. 0.24 in/min.
Radiation, solar	1120 W/m ²
Radiation, heat	600 W/m ²
Water from sources other than rain	1 m/s 3.28 ft/s
Wetness	none

Table 2. Climatic conditions for transportation

3.2.3 Mechanical conditions for transportation

For mechanical conditions during transportation, the Nokia InLite complies with ETS 300 019 1-2:1992 class 2.3.

3.3 Operation

This section defines the environmental conditions during the operation of the Nokia InLite at locations which are not protected from direct weather influences.

Note

When surveying the prospective sites, consider the values presented in this section.

Operating conditions are defined as stationary: the equipment is mounted on a structure, or on a mounting device, or it is permanently placed at a certain site. The Nokia InLite is not intended for portable use.

3.3.1 ETSI standard for operation

The InLite is Class 3.1 as defined in ETS 300 019-1-4:1992

3.3.2 Climatic conditions for operation

For climatic conditions during operation, the Nokia InLite complies generally with class 3.1 as presented in Table .

Environmental parameter	Value
Low air temperature	+5 °C +41°F
High air temperature	40 °C 104°F
Low relative humidity	5%
High relative humidity	85%
Low absolute humidity	1 g/m ³
High absolute humidity	25 g/m ³
Rain intensity	Not applicable
Temperature change rate (average of 5 minutes)	0.5 °C/min. 0.9 °F/min.
Low air pressure	70 kPa 10.15 psi
High air pressure	106 kPa 15.37 psi

Environmental parameter	Value
Solar radiation	700 W/m ²
Heat radiation	insignificant
Surrounding air movement	5m/s 164 ft./s
Conditions of condensation	Yes
Conditions of precipitation (rain, snow, hail etc.)	No
Low rain temperature	Not applicable.
Conditions of water from sources other than rain	Not applicable.
Conditions of icing and frosting	No

Table 3. Climatic conditions for operation, Class 3.1

3.3.3 Mechanical conditions for operation

For mechanical conditions during operation, the Nokia InLite complies with ETS 300 019-1-4:1992 class 3.1.

3.3.4 EMC shielding

The chassis and the units of the Nokia InLite together provide the EMC shielding. The EMC shielding complies to the requirements set by the following standards:

- GSM 11.21
- ETS 300, 342-3
- Title 47 CFR FCC part 15

For more specific information refer to *Nokia InLite: Product Description*.

3.3.5 Safety

The Nokia InLite conforms to:

- EN 60950 (including amendments 1,2,3 and 4) Safety of Information Technology equipment including electrical business equipment.
- IEC 950 2nd Ed 1991. Safety of Information Technology equipment (including amendments 1,2,3 and 4 and including all Competent Body

Scheme Group and National Deviations as detailed in CB Bulletin 96A
March 2000.

- UL 3rd Ed.
- CSA C22.2 Number 950 Revision June 1998

4 Installation requirements

This chapter specifies the preparatory requirements for the installation of the Nokia InLite system.

4.1 Checking the site

Before the Nokia InLite can be installed, the site must be properly surveyed and prepared, and all the required external services must be correctly installed. The site survey must identify any special requirements for the installation.

The site must meet the following requirements before the installation can begin:

1. The site is accessible and safe for working.
2. The safety distance calculations as presented in *Nokia InLite: Warnings and Cautions* have been made and taken into account.
3. External connections for the MU (grounding point and mains power supply) are available.
4. External connections for the RUs (mains power).
5. All required documentation is available, for example, site-specific installation instructions and User Manual.
6. The correct delivery has been brought to the site.

4.2 Space requirements

The MU can be mounted on a wall, pole or other vertical support.

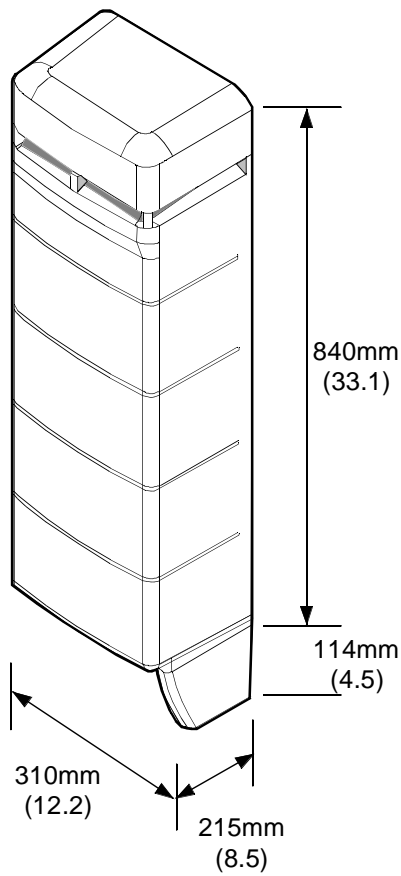
The RUs and the mounting rack can be mounted on a wall or pole or other vertical support.

This section presents general issues that must be considered when choosing the installation space.

4.2.1 Dimensions and weight

4.2.1.1 Main Unit

Figure shows the dimensions of the MU.



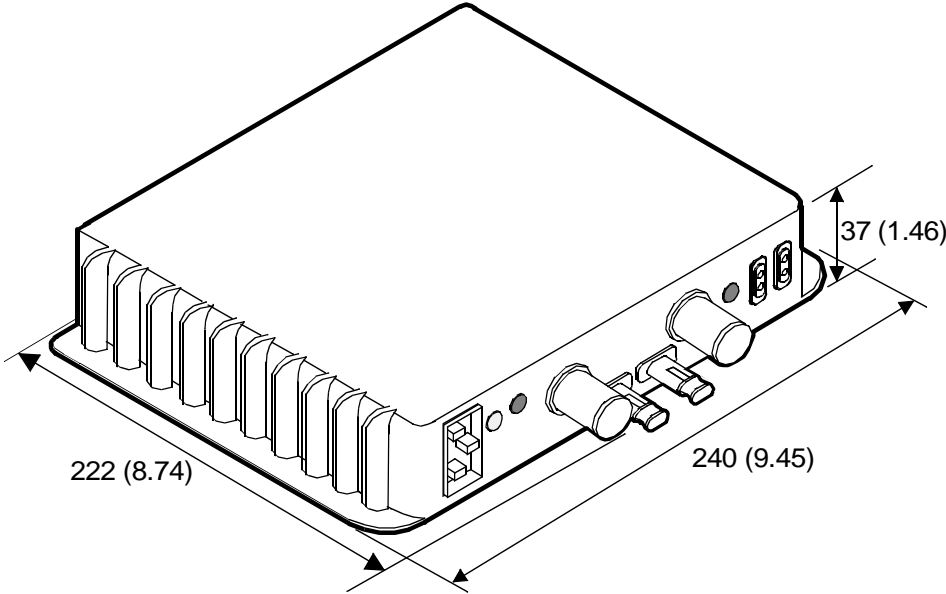
NOTE: Dimensions in mm (inch)

Figure 1. Dimensions of Nokia InLite Main Unit

The MU weighs approximately 16.5 kg (36 lb.). The mounting frame weighs approximately 2 kg (4.4 lb.).

4.2.1.2 Remote Unit and mounting rack, enclosure class IP41

The dimensions of the RU are shown in Figure .



NOTE: Dimensions in mm (inch)

Figure 2. Dimensions of the Remote Unit

The RU weighs 1.7 kg (3.8lb).

The dimensions of the mounting rack are shown in Figure

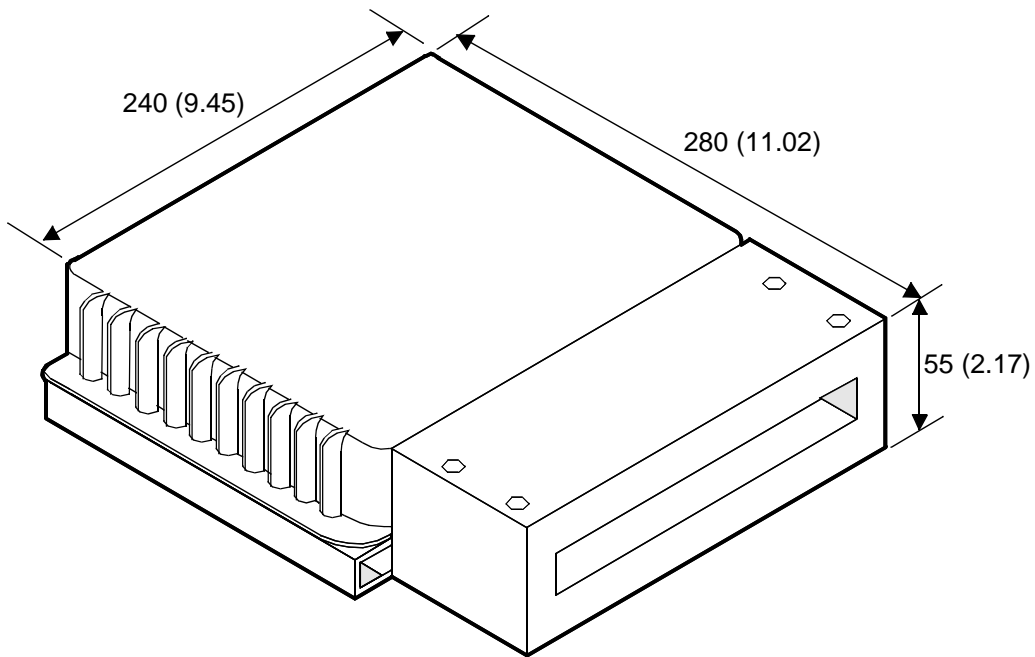


Figure 3. Dimensions of the RU mounting rack (shown with RU mounted)

4.2.1.3 Remote Unit, enclosure class IP53

The dimensions of the RU are shown in Figure .

Figure 4. Dimensions of the Remote Unit

The RU weighs 2.5 kg (5.5lb).

4.2.1.4 Remote Unit, enclosure class IP64

The dimensions of the RU are shown in Figure .

Figure 5. Dimensions of the Remote Unit

The RU weighs 11 kg (24.25lb).

4.2.2 Clearances around the Main Unit and Remote Units

4.2.2.1 Main Unit

The required clearances around the MU are shown in Figure .

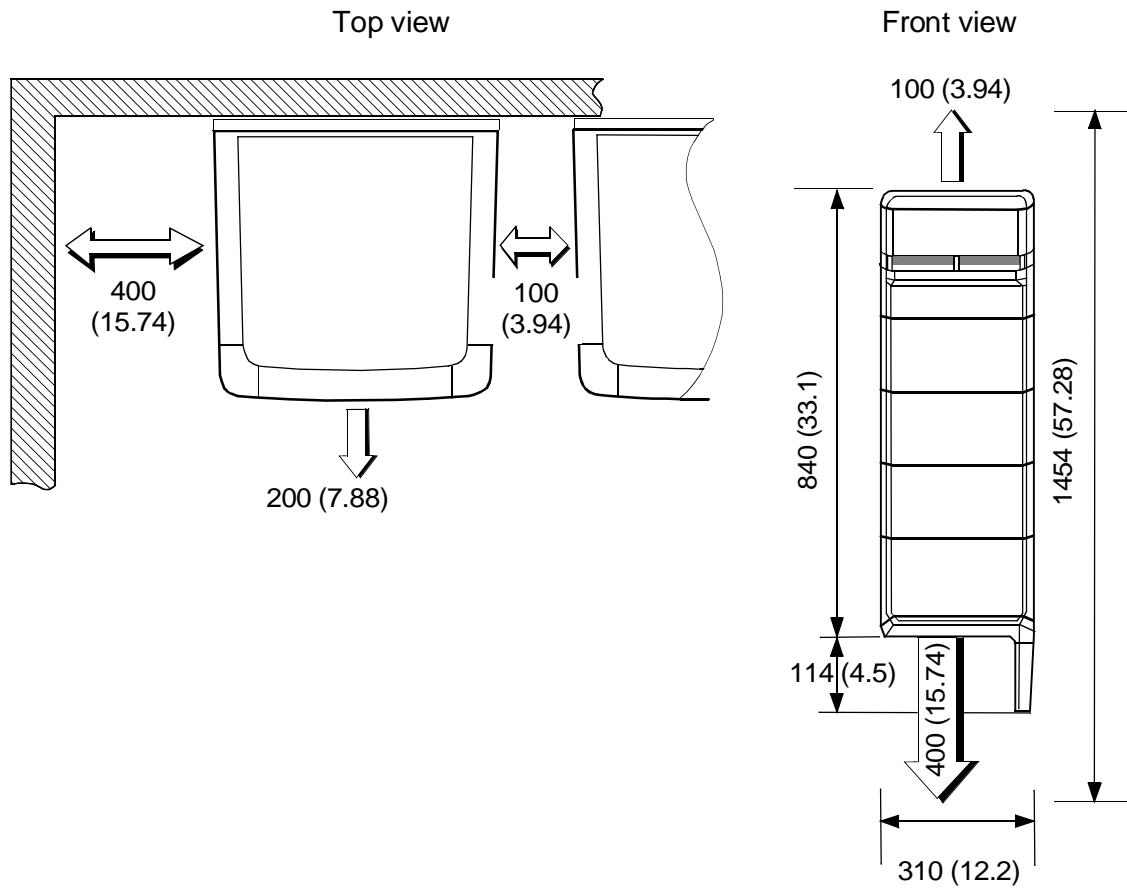
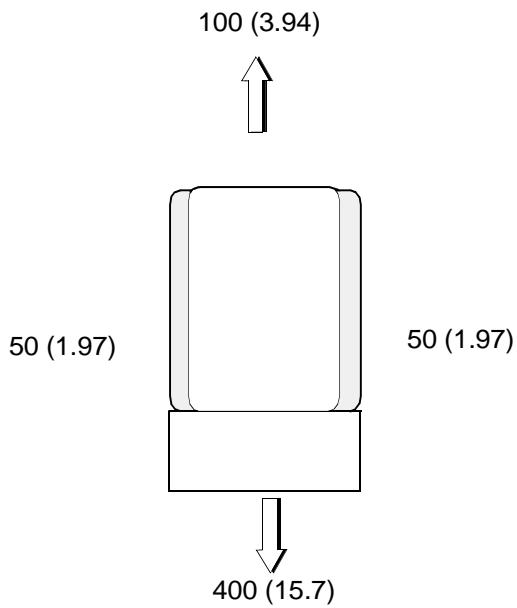


Figure 6. Clearances around the Main Unit

4.2.2.2 Remote Unit and mounting rack

The required clearances around the RU IP41 and the mounting rack are shown in Figure



Note: Dimensions in mm (inch)

Figure 7. Clearances around the Remote Unit IP41

The clearances are required for:

- Lifting the unit from the rack
- Fibre optic cables, antenna cables and power cables.

The required clearances around the IP53 RU are shown in Figure XX.

Figure 8. Clearances around the Remote Unit IP53

The required clearances around the IP64 RU are shown in Figure XX.

Figure 9. Clearances around the Remote Unit IP64

4.3 Mounting locations and positions

4.3.1 Main Unit

The MU can only be installed at indoor locations and should be mounted vertically on a wall, pole or other vertical support.

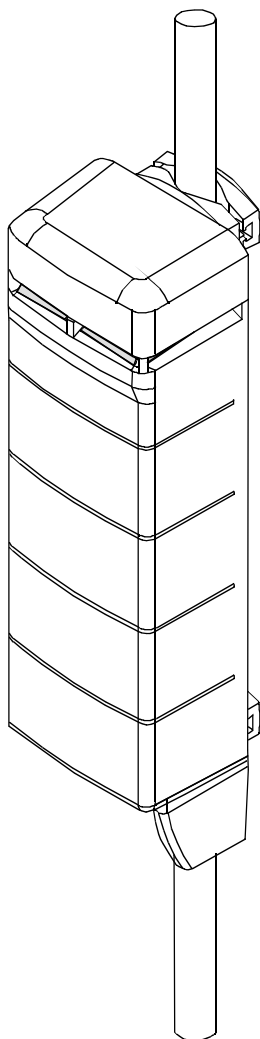


Figure 10. Mounting position of Nokia InLite Main Unit

4.3.2 RU and mounting rack

The RU can be mounted on a wall, pole or other vertical support.

The RU and mounting rack are mounted vertically.

Note

The RU and mounting rack should never be installed on a ceiling.

A local AC power socket must be provided at the installation location or alternatively, a centralised DC power supply may be used.

4.4 Requirements for wall and pole installation

Qualified personnel must inspect the installation wall and/or pole or other vertical support before mounting the MU, RU and mounting rack. The installation wall or pole must be strong enough to bear the weight of each unit.

The optional pole mounting kit can be used when the installation pole diameter is between 60 and 300 mm (2.36 and 11.81 in). These dimensions are applicable to the MU. The RU can be mounted on a thinner pole.

Anchor screws

The anchor “Fishers” screws are used for attaching the MU and mounting frame and RU with the mounting rack to the wall.

The MU anchor screws must be M6 size, stainless steel with the minimum breaking strength (R_m) of 800 N/mm². An appropriate counterpart for the anchor screw (for example, an anchor plug) must be selected according to the screw and the mounting base material. If the anchor screws are of other standard than the metric standard, they must be selected so that they meet the requirement set to the metric standard screws mentioned above.

4.5 Grounding

To protect the MU from damaging overvoltages through communication cables, or power supply lines, grounding cabling must be planned and installed before the installation of the MU. To avoid interference, it is recommended that large grounding systems be designed case-specifically.

A power plug with protective ground connection is not sufficient for the MU. Grounding must have a fixed, non-removable connection.

Note

Regulations issued by local authorities/legislation must be followed when planning the grounding of a site!

In general, grounding is planned as follows:

- The grounding cable is connected with screws or with a nut to the grounding point of the MU. The grounding cable must be fitted with an appropriate lug.
- The minimum cross-section of the copper grounding conductor is 2.5 mm²
- The maximum cross-section of the copper grounding conductor is 35 mm²
- The maximum value of ground resistance is 10 mΩ
- The ground cable must be connected to a main grounding busbar

- The routing of the ground cable must be as direct as possible. Unnecessary loops should be avoided.

Note

A grounding cable can be ordered from Nokia.

4.6 Mains power



WARNING

Follow the national legislation when working with the power supply. It is advisable that the socket used for the MU and RUs are permanently wired in accordance with current local and national wiring standards.

All ground connections must be secure and non-removable.

All power cabling must meet the requirements of the appropriate national standard.

4.6.1 Main Unit

The MU has two power supply options: 220 VAC and 110 VAC. The permitted voltage fluctuation for the different options is presented in Table .

Nominal operating voltage	Permitted operating voltage fluctuation
220 VAC	±20%
110 VAC	±20%

Table 4. Permitted operating voltage fluctuation

It is recommended that the AC mains be protected with a transient overvoltage protector circuit breaker. This protection is not included in the MU.

4.6.2 Remote Unit

The RU has the following power supply options:

- 110 VAC

- 220 VAC
- -48 VDC

4.6.3 Power consumption

The power consumption of the MU is dependent on the RU configuration. The consumption of the MU is less than 100 W.

The power consumption of one RU is 15 W.

4.6.4 Connectors, cables and fuses for cable protection

Note

A prefabricated mains power cable for the RU is supplied by Nokia.

Note

If you use the prefabricated mains power cable supplied by Nokia, make sure that the power distribution box (mains power supply) is located no further than 10 metres from the Nokia InLite MU.

Table presents the requirements for the RU power supply cables, connectors and the recommended mains fuses.

Power supply type	Connector type at the end of cable	Cable	Recommended fuse for cable protection
AC supply 220V	IEC 320 (female)	Multicore cable 3 x 0.75 to 1.5 mm ²	10A for 1.5 mm ² 6A for 0.75 mm ²
AC supply 110V	IEC 320 (female) with notch	Multicore cable 3 x 1.5 mm ²	10 A
DC supply -48V (optional)	Bayonet (female)	Composite fibre optic/ copper cable, twinfibre, 2x15mm ²	-

Table 5. Connectors, cables and recommended fuses

Note

In general, the fuses for cable protection have to be rated according to the national electrical safety regulations.

4.7 Painting the Main Unit cover

If desired, the MU cover can be painted to make it better blend into the surrounding environment. Some dark colours with higher absorptivity may be restricted.

Nokia recommends that for painting the cover, a primer-topcoat combination of Beckers TD 130 primer (for priming) and Beckers TH 141 paint (for surface painting) be used. Other paints suitable for polycarbonate surfaces may also be used.

**Caution**

Do not use any paint that contains alkalis, esters, ketones, aromatic, chlorinated, or fluorinated hydrocarbons, since these may damage the cover. Paint containing these chemicals can only be used if approved by the manufacturer for painting polycarbonate objects.

The selected paint must be UV and weather-resistant, and suitable for temperatures ranging from -40 °C to +50 °C (-40 °F to 122 °F). For environmental conditions, refer to ETS 300 019-1-4:1992 class 4.1.

**To paint the Nokia InLite cover:**

1. Remove the MU cover as instructed.
2. Before painting, detach the cable cover and the cable cover support from each other to prevent them from sticking to each other by paint and to ensure that paint is applied evenly. The cover top can also be detached from the cover by unscrewing the Torx T20 screws (see Figure).

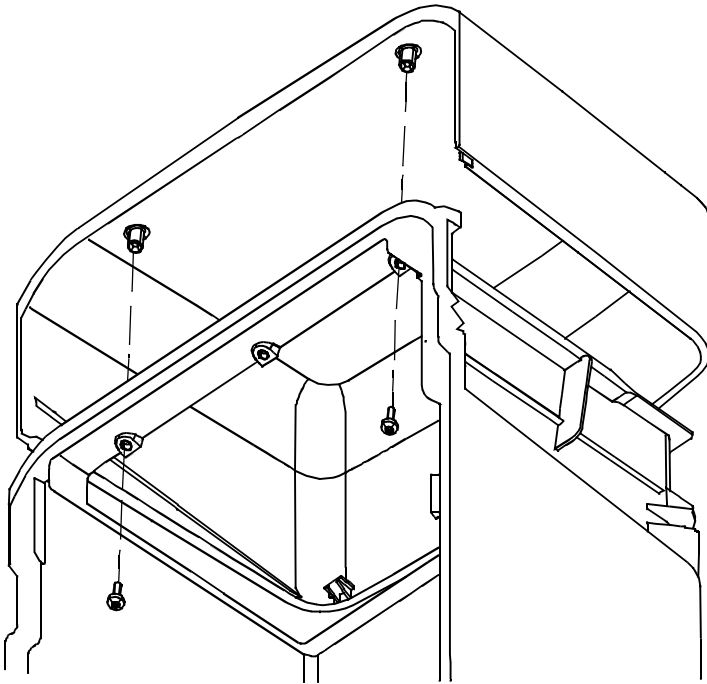


Figure 11. Removing the cover top

3. Remove stains and dust from the surface of the cover with an alcoholic or acidic wash, or wipe it clean with a piece of cloth moistened with water and mild washing agent. Do not use washing agents that contain alkalis, aromatic, chlorinated, or fluorinated hydrocarbons, esters or ketones.
4. Rinse with water to remove any residue of cleaning chemicals.
5. Dry the cover parts by blowing ionized air on them to remove electrostatic charges and dust particles.
6. Place a support under the cover and the cover top so that you do not have to touch the parts during painting.
7. Use a clamp or hook for holding the cable cover and the cable cover support during painting. See Figure for areas on which to place the clamp.

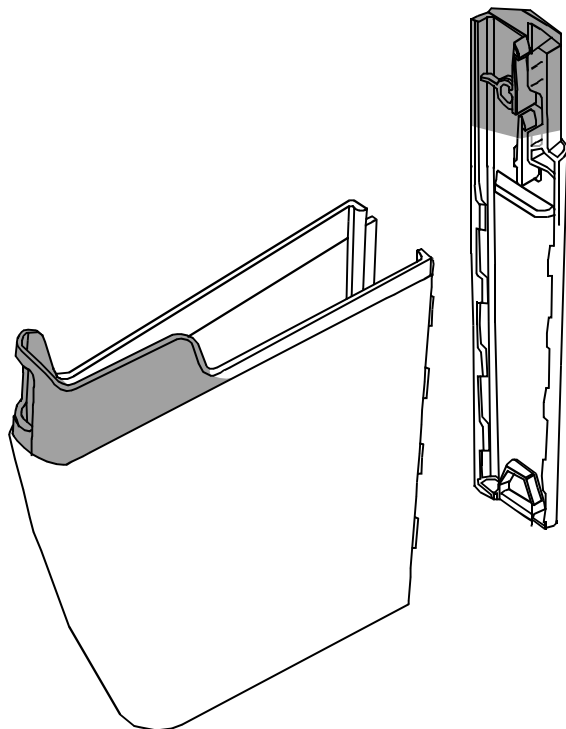


Figure 12. Areas used for holding the cable cover parts during painting

8. Spray paint over the outside surface of the cover. Spraying should be done at room temperature with relative air humidity of 50-65%.

Note

The maximum thickness of the paint should not exceed 100 μm .

9. Dry the parts either in an oven or let the paint dry at room temperature according to the paint manufacturer's drying instructions.

Note

The temperature of the drying oven must not exceed 90 °C (194 °F).

10. After the paint is dry, attach the cover top to the cover. Tighten the screws to 1.6 Nm (1.18 ft-lb.).

5 Interfaces and cables

This chapter describes the external interfaces and interconnecting cables (excluding the grounding and power supply cables) for the Nokia InLite.

Note

The following cables can be ordered from Nokia.

- RF jumper cables between MU and BTS
- fibre optic cables between the MU and RUs
- Pigtails to be spliced to core fibre optic cables
- LMP cable between MU LMP connector and laptop PC
- Alarm cable between MU alarm port and BTS

Refer to Appendix A for ordering information.

5.1 Main Unit

The interface connectors of the MU are shown in Table . Interfaces and connectors of the Local Units (LUs) of the MU are shown in a separate table.

Interface connector	Number of connectors	Connector type	Cable type/diameter
TRX BTS	8	N-type, (female)	RG223
Alarm port	1 (5-pin)	9-pin, D-type, female	13-pair 28 AWG, 106 Ω Flexible SCSI-2 Cable type CL2/FT1
Local Management Port	1 (3-pin)	9-pin, D-type, male	2-pair telecom cable. For more information, refer to Appendix A.

Table 6. Connectors of the Main Unit

5.1.1 Local Unit

Figure shows the layout of the fibre optical connectors.

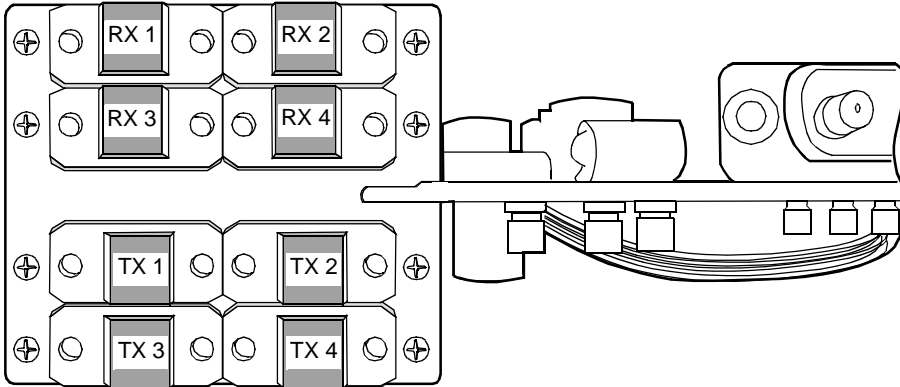


Figure 13. Fibre optical connectors of the Local Unit

Interface connector	Number of connectors	Connector type	Cable type/diameter
Optical TX or RX	8	SC/APC (female)	125 μm single mode

Table 7. Local Unit connectors

5.2 Remote Unit

The interface connectors of the RU are shown in Table .

Interface connector	Number of connectors	Connector type	Cable type/diameter
Antenna	2	N-type, female	1/2" RF cable

Interface connector	Number of connectors	Connector type	Cable type/diameter
Optical TX or RX	2	SC/APC (female)	125 μm single mode
External alarm	2	Molex(female)	-

Table 8. Remote Unit connectors

6 Installation equipment

This section specifies the equipment that is recommended for the installation of the Nokia InLite, but not included in the Nokia InLite delivery.

The recommended tools are:

Tool	Used for
Torque driver, T10 Torx bit with min. 60 mm shaft	Unit retaining screws
Torque driver, 4 mm Allen bit with min. 60 mm shaft	MU mounting screws (5.5 Nm/4.06 ft-lb.) Ground cable fixing (5.5 Nm/4.06 ft-lb.).
Cable ties	Keeping cables tidy
Side cutting pliers	Cutting cable ties
Splicing machine and tools	Connecting optical fibres
Optical spool (about 500m single mode)	Optical measurements
Optical cable cutting machine	Cutting optical cables to length
Cleaning kit	Cleaning optical fibres
Optical Time Domain Reflectometer (OTDR)	Testing optical fibres. Shows signal trace and attenuation.
Splice protection tubes	Protecting optical splices
LMP cable	Connecting the local management PC to the MU
Laptop PC (Pentium processor minimum) with Supervisor Software Version 2.3.2 or higher installed	Local management functions
Antistatic wrist strap	ESD grounding

Table 9. Recommended tools and usage

Additional tools/equipment include:

- 2 x radio phones for communicating when testing the fibre optic cable splicing
- Spirit level for checking the horizontal level of the MU and RU
- Tape measure
- Hammer
- Screwdrivers
- Crimping tool for assembling the power supply cable connector

Note

A set of tools needed for assembling the cable connectors is available from Nokia.

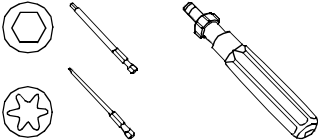
- Cable stripper for assembling the power supply cable connector
- Power meter, including a 50 Ohm, 30 W, DC - 2GHz terminator and a set of 7/16 N male and female RF adapters

Note

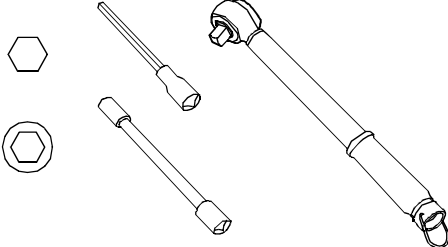
The power meter should be a GSM 900/1800 or CDMA/TDMA/GSM 800/1900, dual band, fully portable RF power meter with: high resolution, analogue/digital readout and dBm/watt conversion capability

- Labels for labelling the origin and destination of cables
- Screwdriver for assembling the AC cable connector
- Ladder (depending on circumstances on site)
- Scaffolding, if working at height
- Cutter
- Wrenches
- Dynamometric wrench
- Scissors
- Allen keys, sizes 4 and 6 for fixing the MU to the mounting frame
- T20 Torx torque driver for removing and tightening the MU cover top retaining screws (optional)
- Centre punch for marking hole locations in wall (optional)
- Drill with correct bits for the mounting position and location (if required)
- Extra lighting for splicing work area
- Table for splicing machine
- Set of Allen keys

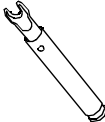
Torque driver (0-6 Nm/0-5 ft-lb)



Torque socket spanner/wrench (5-20 Nm/3-14 ft-lb)



Torque key



Side-cutting pliers



Figure 14. Recommended tools for installing the Nokia InLite