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Nokia FastMile 5G Gateway 2 Operator Manual

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1 Preface

This preface provides general information about the Operator Manual for the FastMile 5G Gateway 2.

1.1 Scope

This operator manual provides an overview of the FastMile 5G Gateway 2, along with information about installing and configuring it. Changes between document editions are cumulative.

1.2 Audience

This operator manual is primarily intended for employees of service providers or for operations or similar personnel who are involved in installing, upgrading, or maintaining the FastMile 5G Gateway 2.

1.3 Required knowledge

It is recommended that the reader be familiar with general telecommunications principles.

1.4 Acronyms and initialisms

The expansions and optional descriptions of most acronyms and initialisms used in this document appear in the glossary at the back of the document.

1.5 Assistance and ordering phone numbers

Nokia provides global technical support through regional call centers. Phone numbers for the regional call centers are available at the following URL: https://customer.nokia.com/support/s/.

For ordering information, contact your Nokia sales representative.

1.6 Nokia quality processes

The FastMile 5G Gateway 2 quality practices are in compliance with TL 9000 requirements.The customer or its representatives may be allowed to perform on-site quality surveillance audits, as agreed upon during contract negotiations.

1.7 Safety information

For safety information, see the appropriate safety guidelines.

1.8 Documents

The*FastMile 5G Customer Release Notes* lists customer documentation for the FastMile 5G Gateway 2. The documents are available from the Nokia Documentation Center.

Procedure 1 To access individual documents

Individual PDFs of customer documents are accessible to registered users through the Documentation Center website.

1 Go to https://documentation.nokia.com

Log in as required.

2 Enter FastMile 5G Gateway in the Product box.

3 Select the search criteria as needed (Release, Content Type, Sort by, etc.) and Click on Search.

4 Click on the PDF document icon to access a document.

Note 1 — If you have not already logged in from the Support portal, you will be prompted to log in now.

Note 2 — Customer documentation is available at initial release for customers with applicable Service Level Agreements or from your Nokia support representative. Documentation is generally available to all customers at general availability release.

1.9 Special information

The following are examples of how special information is presented in this document.

Danger — Danger indicates that the described activity or situation may result in serious personal injury or death; for example, high voltage or electric shock hazards.

Warning — Warning indicates that the described activity or situation may, or will, cause equipment damage or serious performance problems.

Caution — Caution indicates that the described activity or situation may, or will, cause service interruption.

Note — A note provides information that is, or may be, of special interest.

1.9.1 Steps with options or substeps

When there are options in a step in this document, they are identified by letters. When there are required substeps in a step in this document, they are identified by roman numerals.

Procedure 2 Example of options in a step

At step 1, you must choose option a or b.

1 This step offers two options. You must choose one of the following:

- **a** This is one option.
- **b** This is another option.

2 You must perform this step.

Procedure 3 Example of required substeps in a step

At step 1, you must perform a series of substeps within the step.

1. This step has a series of substeps that you must perform to complete the step. You must perform the following substeps:
   - **i** This is the first substep.
   - **ii** This is the second substep.
   - **iii** This is the third substep.
2. You must perform this step.

1.10 Multiple PDF document search

You can use Adobe Reader Release 6.0 and later to search multiple PDF files for a common term. Adobe Reader displays the results in a single display panel. The results are grouped by PDF file, and you can expand the entry for each file.

Note — The PDF files in which you search must be in the same folder.

Procedure 4 To search multiple PDF files for a common term

1. Open Adobe Acrobat Reader.
2. Choose Edit→Search from the Acrobat Reader main menu. The Search PDF panel appears.
3. Enter the search criteria.
4. Click on the All PDF Documents In radio button.
5. Select the folder in which to search using the drop-down menu.
6. Click on the Search button.

Acrobat Reader displays the search results. You can expand the entries for each document by clicking on the + symbol.

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2 ANSI safety guidelines

This chapter provides information about the mandatory regulations that govern the installation and operation of the FastMile 5G Gateway 2 in the North American or ANSI market.

2.1 Safety instructions

This section describes the safety instructions that are provided in the customer documentation and on the FastMile 5G Gateway 2.

2.1.1 Safety instruction boxes in customer documentation

The safety instruction boxes are provided in the FastMile 5G Gateway 2 customer documentation. Observe the instructions to meet safety requirements.

The following is an example of the Danger box.

Danger — Possibility of personal injury.

The Danger box indicates that the described activity or situation may pose a threat to personal safety. It calls attention to a situation or procedure which, if not correctly performed or adhered to, may result in death or serious physical harm.

Do not proceed beyond a Danger box until the indicated conditions are fully understood and met.

The following is an example of the Warning box.

Warning 1 — Possibility of equipment damage.

Warning 2 — Possibility of data loss.

The Warning box indicates that the described activity or situation may, or will, cause equipment damage, loss of data, or serious performance problems. It identifies a possible equipment-damaging situation or provides essential information to avoid the degradation of system operations or data.

Do not proceed beyond a warning until the indicated conditions are fully understood and met.

The following is an example of the Caution box.

Caution 1 — Possibility of service interruption.

Caution 2 — Service interruption.

The Caution box indicates that the described activity or situation may, or will, cause service interruption.

Do not proceed beyond a caution until the indicated conditions are fully understood and met.

The following is an example of the Note box.

Note — Information of special interest.

The Note box provides information that assists the personnel working with the FastMile 5G Gateway 2. It does not provide safety-related instructions.

2.1.2 Labels

The FastMile 5G Gateway 2 is labeled with specific safety and other compliance information and instructions that are related to a product, model, or product variant of the equipment. Observe the instructions on the safety labels.

Table 1 lists the ANSI safety labels for the FastMile 5G Gateway 2.

Table 1 **ANSI labels**

Description	Label	Model
FCC compliance	FCC	5G18-01W-A (kits: 3TG02205AC and 3TG02205AD)

Figure 1 shows a sample of the FCC label.

Figure 1 **FCC label**

2.2 North American safety standards compliance

This section describes the FastMile 5G Gateway 2 compliance with North American safety standards.

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

2.2.1 FCC Regulations

Table 2 provides the Federal Communications Commission ID for the FastMile 5G Gateway 2.

Table 2 **FCC identification**

Model	FCC ID
5G18-01W-A	2ADZR5G1801WA

2.2.1.1 EMC compliance

The FastMile 5G Gateway 2 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.

This device 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:

- re-orient 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

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

2.2.1.2 RF exposure information

The FastMile 5G Gateway 2 meets the government's requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment.

Caution — In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 23 cm (23 inches) during normal operation.

2.3 Electrical safety guidelines

This section provides the electrical safety guidelines for the FastMile 5G Gateway 2.

Note — The FastMile 5G Gateway 2 complies with the U.S. National Electrical Code. However, local electrical authorities have jurisdiction when there are differences between the local and U.S. standards.

2.3.1 Power supplies

The use of any non-Nokia approved power supplies or power adapters is not supported or endorsed by Nokia. Such use will void any warranty or support contract with Nokia. Such use greatly increases the danger of damage to equipment or property.

2.3.2 Cabling

The following are the guidelines regarding cables used for the FastMile 5G Gateway 2:

- All cables must be approved by the relevant national electrical code.
- If cabling is supplied with the FastMile 5G Gateway 2, the supplied cabling must be used with the equipment.

2.3.3 Protective earth

Earthing and bonding of the FastMile 5G Gateway 2 must comply with the requirements of NEC article 250 or local electrical codes.

2.4 ESD safety guidelines

The FastMile 5G Gateway 2 is sensitive to ESD if opened. Service personnel are not allowed to open the FastMile 5G Gateway 2.

Caution — This equipment is ESD sensitive if opened. Proper ESD protections should be used if you open the FastMile 5G Gateway 2.

Service personnel are not required to wear wrist straps when performing normal installation or maintenance activities.

2.5 Environmental requirements

The thermal limitations for the FastMile 5G Gateway 2 are:

- operating temperature (ambient): 0˚C to 40˚C (32˚F to 104˚F)
- storage temperature (ambient): -40°C to 70°C (-40°F to 158°F)
- operating relative humidity: 5% to 85%, non-condensing
- short-term relative humidity: 5% to 93%, non-condensing

3 ETSI environmental and RoHS guidelines

This chapter provides information about the ETSI environmental and Restriction of Hazardous Substances (RoHS) regulations that govern the installation and operation of the FastMile 5G Gateway 2. This chapter also includes environmental operation parameters of general interest.

3.1 Environmental labels

This section describes the environmental instructions that are provided with the customer documentation, equipment, and location where the equipment resides.

3.1.1 Overview

RoHS is applicable to Electronic Information Products (EIP) manufactured or sold and imported. EIP refers to products and their accessories manufactured by using electronic information technology, including electronic communications products and such subcomponents as batteries and cables.

3.1.2 Environmental related labels

Environmental labels are located on appropriate equipment. The following are sample labels.

3.1.2.1 Products below Maximum Concentration Value (MCV) label

This label indicates a product is below the maximum concentration value, as defined by standard SJ/T11363-2006 (Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products). Products with this label are recyclable. The label may be found in this documentation or on the product. See Figure 2.

Figure 2 **Products below MCV value label**

3.1.2.2 Products containing hazardous substances above Maximum Concentration Value (MCV) label

This label indicates a product is above the maximum concentration value, as defined by standard SJ/T11363-2006 (Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products). The number contained inside the label indicates the Environment-Friendly User Period (EFUP) value. The label may be found in this documentation or on the product.

Together with major international telecommunications equipment companies, Nokia has determined it is appropriate to use an EFUP of 50 years for network infrastructure equipment and an EFUP of 20 years for handsets and accessories. These values are based on manufacturers' extensive practical experience of the design, manufacturing, maintenance, usage conditions, operating environments, and physical condition of infrastructure and handsets after years of service. The values reflect minimum values and refer to products operated according to the intended use conditions. See Figure 3.

Figure 3 **Products above MCV value label**

3.2 Other environmental requirements

Observe the following environmental requirements when handling the FastMile 5G Gateway 2.

3.2.1 Environmental requirements

See section 4.5 for thermal limitations and see chapter 5 for information about temperature ranges for the FastMile 5G Gateway 2 and other FastMile 5G Gateway 2 specifications.

3.2.2 Storage

According to ETS 300-019-1-1 - Class 1.1, storage of the FastMile 5G Gateway 2 must be in Class 1.1, weather-protected, temperature-controlled locations.

3.2.3 Transportation

According to EN 300-019-1-2 - Class 2.3, transportation of the FastMile 5G Gateway 2 must be in packed, public transportation.

3.2.4 Stationary use

According to EN 300-019-1-3 - Class 3.1/3.2/3.E, stationary use of the FastMile 5G Gateway 2 must be in a temperature-controlled location with no condensation allowed.

3.2.5 Material content compliance

European Union (EU) Directive 2011/65/EU and as amended, “Restriction of the use of certain Hazardous Substances” (RoHS), restricts the use of lead, mercury, cadmium, hexavalent chromium, and PBB,PBDE,DEHP,DBP,BBP,DIBP in electrical and electronic equipment. This Directive applies to electrical and electronic products placed on the EU market and effective from July 22 2019, with various exemptions, including an exemption for lead solder in network infrastructure equipment. Nokia products shipped to the EU after July 22 2019 comply with the EU RoHS Directive.

Nokia has implemented a material/substance content management process. The process is described in: Nokia process for ensuring RoHS Compliance (1AA002660031ASZZA). This ensures compliance with the European Union Directive 2011/65/EU and as amended on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS2). With the process equipment is assessed in accordance with the Harmonised Standard EN IEC 63000 on Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

3.2.6 End-of-life collection and treatment

Electronic products bearing or referencing the symbol shown in Figure 4, when put on the market within the European Union (EU), shall be collected and treated at the end of their useful life, in compliance with applicable EU and local legislation. They shall not be disposed of as part of unsorted municipal waste. Due to materials that may be contained in the product, such as heavy metals or batteries, the environment and human health may be negatively impacted as a result of inappropriate disposal.

Figure 4 **Recycling/take back/disposal of product symbol**

At the end of its life, the FastMile 5G Gateway 2 is subject to the applicable local legislations that implement the European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

There can be different requirements for collection and treatment in different member states of the European Union.

In compliance with legal requirements and contractual agreements, where applicable, Nokia will offer to provide for the collection and treatment of Nokia products bearing the logo shown in Figure 4 at the end of their useful life, or products displaced by Nokia equipment offers. For information regarding take-back of equipment by Nokia, or for more information regarding the requirements for recycling/disposal of product, contact your Nokia account manager or Nokia take back support at sustainability.global@nokia.com.

4 ETSI safety guidelines and Brazilian regulation

This chapter provides information about the mandatory regulations that govern the installation and operation of the FastMile 5G Gateway 2 in the ETSI market. The chapter also provides Brazilian regulation information.

4.1 Safety instructions

This section describes the safety instructions that are provided in the customer documentation and on the FastMile 5G Gateway 2.

4.1.1 Safety instruction boxes

The safety instruction boxes are provided in the FastMile 5G Gateway 2 customer documentation. Observe the instructions to meet safety requirements.

The following is an example of the Danger box.

Danger — Possibility of personal injury.

The Danger box indicates that the described activity or situation may pose a threat to personal safety. It calls attention to a situation or procedure which, if not correctly performed or adhered to, may result in death or serious physical harm.

Do not proceed beyond a Danger box until the indicated conditions are fully understood and met.

The following is an example of the Warning box.

Warning 1 — Possibility of equipment damage.

Warning 2 — Possibility of data loss.

The Warning box indicates that the described activity or situation may, or will, cause equipment damage, loss of data, or serious performance problems. It identifies a possible equipment-damaging situation or provides essential information to avoid the degradation of system operations or data.

Do not proceed beyond a warning until the indicated conditions are fully understood and met.

The following is an example of the Caution box.

Caution 1 — Possibility of service interruption.

Caution 2 — Service interruption.

The Caution box indicates that the described activity or situation may, or will, cause service interruption.

Do not proceed beyond a caution until the indicated conditions are fully understood and met.

The following is an example of the Note box.

Note — Information of special interest.

The Note box provides information that assists the personnel working with the FastMile 5G Gateway 2. It does not provide safety-related instructions.

4.1.2 Labels

The FastMile 5G Gateway 2 is labeled with the specific safety and other instructions and compliance information that is related to a product, or product model or variant, of the equipment. Observe the instructions on the safety labels.

Table 3 provides examples of the various FastMile 5G Gateway 2 labels.

Table 3 **Labels**

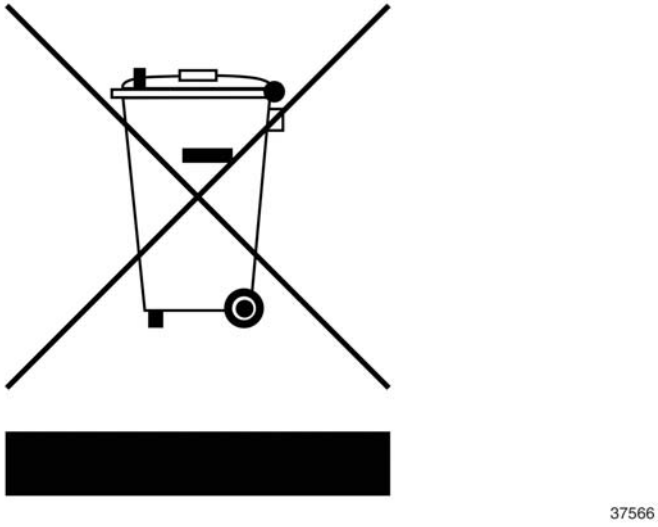
Description	Label text	Model
CE marking	CE	5G19-01W-A (kits 3TG-02205-AB and 3TG-02205-AE)
WEEE marking	-	

Figure 5 shows an example of a CE label.

Figure 6 shows an example of a WEEE label.

Figure 5 **CE label**

Figure 6 **WEEE label**



4.2 Safety standards compliance

This section describes FastMile 5G Gateway 2 compliance with the European safety standards.

4.2.1 EMC compliance

The FastMile 5G Gateway 2 complies with the following EMC requirements:

- Electromagnetic compatibility of multimedia equipment - Emission requirements CISPR 32, EN 55032
- Electromagnetic compatibility of multimedia equipment - Immunity requirements CISPR 35, EN55035

- Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonized Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU EN 301489-1
- Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonized Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU EN 301489-17
- Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication Mobile and portable (UE) radio and ancillary equipment; Harmonized Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU EN301489-52

4.2.2 Equipment safety standard compliance

The FastMile 5G Gateway 2 complies with the requirements of the following:

- IEC 62368-1, Audio/video, information and communication technology equipment - Part 1: Safety requirements

4.2.3 Environmental standard compliance

The FastMile 5G Gateway 2 complies with the EN 300 019 European environmental standards.

4.3 Electrical safety guidelines

This section provides the electrical safety guidelines for the FastMile 5G Gateway 2.

The FastMile 5G Gateway 2 complies with BS EN 61140.

4.3.1 Power supplies

The use of any non-Nokia approved power supplies or power adapters is not supported or endorsed by Nokia. Such use will void any warranty or support contract with Nokia. Such use greatly increases the danger of damage to equipment or property.

4.3.2 Cabling

The following are the guidelines regarding cables used for the FastMile 5G Gateway 2:

- All cables must be approved by the relevant national electrical code.

4.3.3 Protective earth

Earthing and bonding of the FastMile 5G Gateway 2 must comply with the requirements of local electrical codes.

4.4 ESD safety guidelines

The FastMile 5G Gateway 2 is sensitive to ESD if opened. Operations personnel are not allowed to open the FastMile 5G Gateway 2.

Caution — This equipment is ESD sensitive if opened. Proper ESD protections should be used if you open the FastMile 5G Gateway 2.

Service personnel are not required to wear wrist straps when performing normal installation or maintenance activities.

4.5 Environmental requirements

The environmental requirements for the FastMile 5G Gateway 2 are:

- operating temperature (ambient): 0˚C to 40˚C (32˚F to 104˚F); device is capable of operation up to 45°C (113°F) with reduced performance
- storage temperature (ambient): -40°C to 70°C (-40°F to 158°F)
- operating relative humidity: 5% to 85% relative humidity, non-condensing
- short-term relative humidity: 5% to 93% relative humidity, non-condensing

See chapter 5 in this guide for more information about the FastMile 5G Gateway 2 and for other FastMile 5G Gateway 2 specifications.

4.6 Restriction and warning for regulation compliance

Note — Observe the following restriction regarding use of the FastMile 5G Gateway 2 when operating in the specified frequency range in the indicated countries.

Restriction: The device is restricted to indoor use only when operating in the 5150 to 5350 MHz frequency range, see Table 4 for applicable country codes.

Table 4 **Restriction table regarding indoor use in the 5150 to 5350 MHz frequency range**

Applicable country codes				
AT	BE	BG	HR	NO
CY	CZ	DK	EE	IS
FI	FR	DE	EL	LI
HU	IE	IT	LV	CH
LT	LU	MT	NL	TR
PL	PT	RO	SK	
SI	ES	SE	UK(NI)	

Warning — Adapter shall be installed near the equipment and shall be easily accessible.

4.7 RF exposure

The device compliance distance is 20 cm according to SAR evaluation based on EN50385.

4.8 Conformité Européanne - European health and safety product label (CE)

The product is in compliance with the highest safety, health, and environmental protection requirements.

4.9 Waste from Electrical and Electronic Equipment (WEEE) safety guidelines

The product at end of life is subject to separate collection and treatment in the EU Member States, Norway, and Switzerland and therefore marked with the WEEE label.

Treatment applied at end of life of the product in these countries shall comply with the applicable national laws on wastes from electrical and electronic equipment and more particularly those implementing the European directive 2002/96/EC (WEEE).

In countries outside Europe and if not otherwise provided by any mandatory law in those countries where the product is sold, any take back by Nokia of waste electrical and electronic equipment shall be subject to terms and conditions to be agreed upon in writing. Any obligation of Nokia to take back such equipment shall apply only to complete not amended or modified equipment delivered by Nokia, i.e. containing all its components and sub-assemblies.

In case Nokia takes back electrical and electronic equipment, Nokia will ensure for the ecological safe and appropriate treatment in accordance with local regulations.

4.10 Compliance with Brazilian regulation

The FastMile 5G Gateway 2 is in compliance with the Brazilian Telecommunications Agency – Anatel:

Figure 7 **Compliance with Brazilian regulation**

This device is certified by the Brazilian Telecommunications Agency – Anatel, No. 08773-22-03903 and complies with Anatel Resolution 242/2000. Operation is subject to the following conditions: (1) This device may not cause harmful interference, (2) this device must accept any interference received, including interference that may cause undesired operation, and (3) this device complies with the quality and safety standards defined by Anatel.

For more information, please go to www.nokia.com/fastmile

5 Product description

5.1 Product overview

The Nokia FastMile 5G Gateway 2 is designed to help operators capitalize on the growing 5G FWA market. The solution delivers an indoor device, built with multi-band omni-directional antenna, that is easy to deploy and connects wirelessly to the mobile network. With extensive carrier aggregation (CA) and dual connectivity (EN-DC) support, the device improves performance and reliability by using the best 4G and 5G signals available. Compatibility with the Nokia in-home Wi-Fi solution ensures a seamless ultra- broadband experience in every corner of the home.

This plug-and-play device is simple to install and uses visual cues to help you identify an installation location that will achieve the best performance from a 4G/LTE or 5G network or from a combined 4G/LTE and 5G network.

Table 5 describes the supported models of the FastMile 5G Gateway 2.

Table 5 **FastMile 5G Gateway 2 supported models**

Model	Kit part number	Description	Device part number (on the label on the underneath of the device)
5G18-01W-A	3TG-02205-ACAA/ 3TG-02205-ACBA	LATEM; EU plug	3TG-02241-BAAA/ 3TG-02241-BABA
	3TG-02205-ADAA/ 3TG-02205-ADBA	LATEM; US plug	3TG-02241-BAAA/ 3TG-02241-BABA
5G19-01W-A	3TG-02205-ABAA/ 3TG-02205-ABBA	Europe, Middle East, Africa, and Brazil; EU plug	3TG-02241-AAAA/ 3TG-02241-AABA
	3TG-02205-AEAA/ 3TG-02205-AEBA	Europe, Middle East, and Africa; UK plug	3TG-02241-AAAA/ 3TG-02241-AABA

Figure 8 shows front and back views of the FastMile 5G Gateway 2.

Figure 8 **Front and back views of the FastMile 5G Gateway 2**

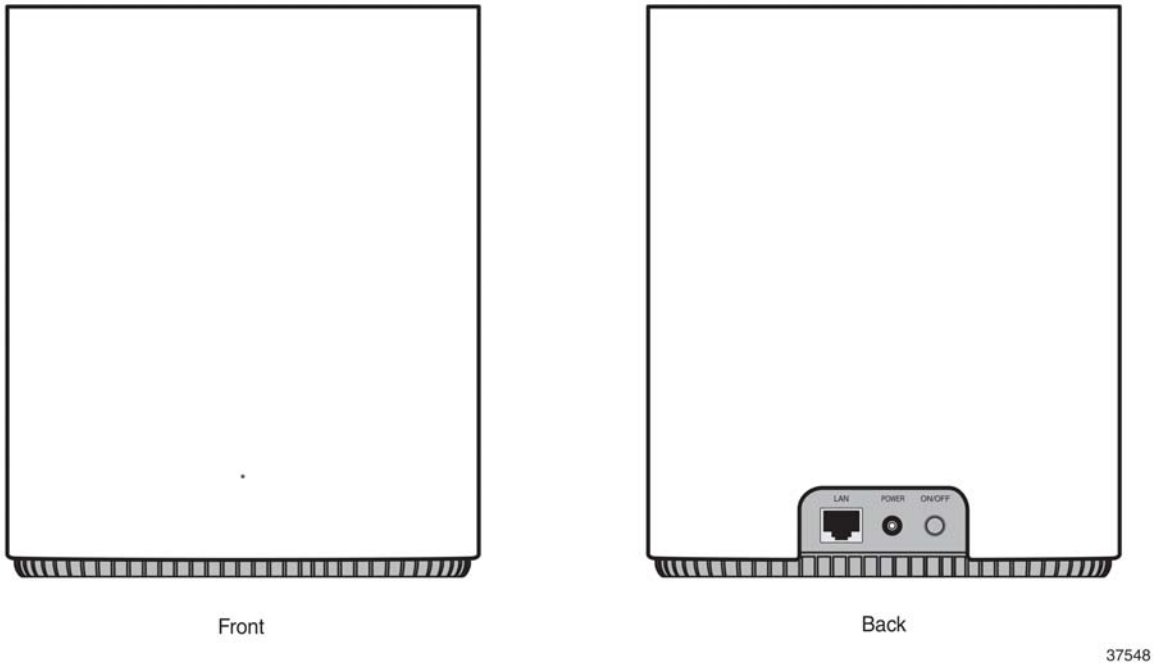
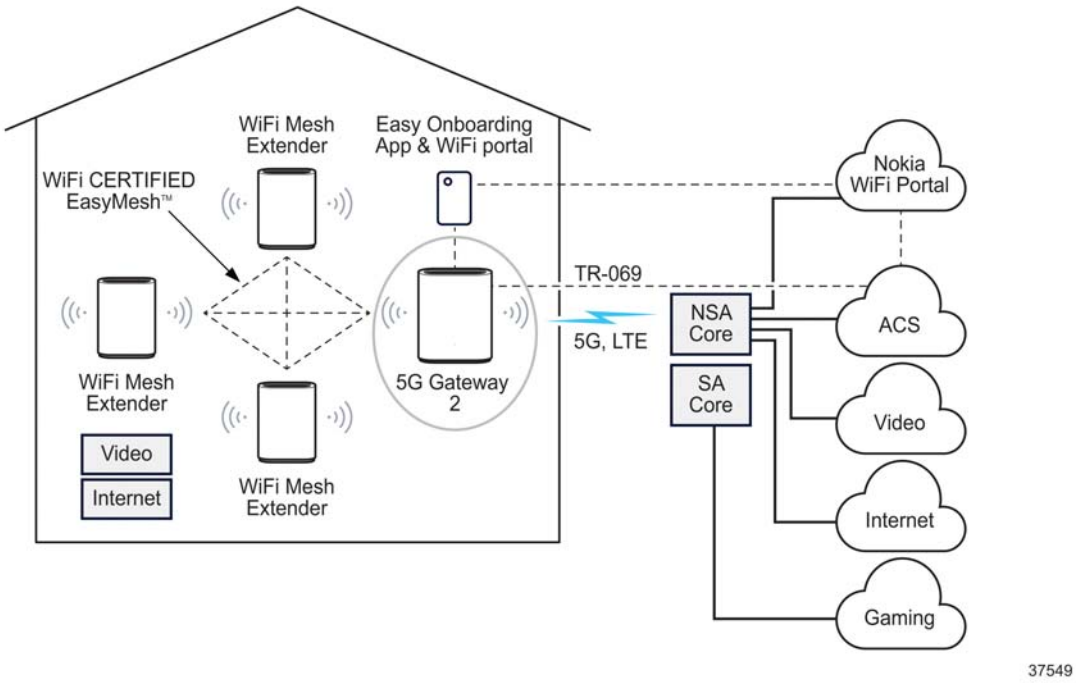


Figure 9 shows the FastMile 5G Gateway 2 fixed wireless access end-to-end overview.

Figure 9 **FastMile 5G Gateway 2 fixed wireless access end-to-end overview**



The FastMile 5G Gateway 2 has the following main features:

- connects 4G/LTE multi-band omni-directional antenna (up to 7.6 dBi)
- connects 5G NR multi-band omni-directional antenna (up to 7.6 dBi)
- is a fully self-contained integrated residential gateway with a Gigabit Ethernet LAN port and support for Wi-Fi connectivity
- embedded SIM (eSIM) support (PCB-ready, optional feature developed under specific customer agreement)
- supports up to 64 clients per Wi-Fi band; the total supported for both bands is 64 clients
- can act as an Access Point of an Wi-Fi EasyMesh network of Wi-Fi Beacon 2 units (up to three beacons supported)
- supports Wi-Fi EasyMesh r1
  - interoperable with three beacons
  - configurable custom SSIDs
  - configurable Wi-Fi using the WebUI
- supports end-user self-installation using the Wi-Fi Mobile App
- can be managed by the Broadband Forum compliant TR-069/TR-181 Auto Configuration Server (ACS)

- Wi-Fi connectivity:
  - 2x2 IEEE 802.11ax 2.4 GHz (40 MHz) WLAN interface, with MU-MIMO
  - 2x2 IEEE 802.11ax 5 GHz (80 MHz) WLAN interface, with MU-MIMO
  - Wi-Fi 4 support
  - Wi-Fi 5 support (IEEE 802.11ac)
  - Wi-Fi 6 support (IEEE 802.11ax) – dual band 2+2 connectivity
  - is also compliant with IEEE 802.11 a/b/g/n/ac
- Wi-Fi security:
  - WPA/WPA2: AES encryption, AES plus TKIP encryption
  - WPA2 personal: AES encryption
  - WPA2/WPA3 transition mode
  - WPA3 personal: AES encryption
- customized default WLAN key
- PIN-locked SIM cards: a SIM PIN number is required to unblock SIM card service but not required to unblock subscriber access to the device
- SA/NSA 5G Network slicing support
- one logical temperature sensor
- OpenWRT 21.02 (Linux kernel 5.4)
- supports congestion-based band steering and 5GHz load balancing: NWCC feature set improves network performance by balancing the load across the bands and mesh network to avoid congestion situations

Nokia hosts a centralized server known as the ‘Onboarding Engine’ or BOENG server. The BOENG Server maintains the pre-configuration information such as ACS URL, ACS username, and ACS password for multiple operators. It facilitates faster deployments as there will be no need to include the pre-configuration information and generate a new image for every operator. While on-boarding, every CPE can access the BOENG server by providing its SIM card information and retrieve the pre-configuration of the associated operator. The pre-configuration information for an operator has to be uploaded into the BOENG Server one time before the start of a trial or deployment.

5.2 Supported modes and PDN information

The FastMile 5G Gateway 2 is designed to operate according to the 5G NSA/SA 3GPP Rel-15 standards, and can operate in the following modes:

- LTE-only mode:
  - When operating in LTE-only mode, the FastMile 5G Gateway 2 will only use 4G/LTE to connect to the mobile network.
- LTE CA 5G NR EN-DC mode:
  - When operating in LTE CA 5G NR EN-DC mode, the FastMile 5G Gateway 2 implements the 5G NSA (Option 3x, Option 3) configuration, meaning it uses a 4G/LTE carrier and a 5G NSA carrier at the same time to connect to the mobile network.
  - The control plane is carried over the LTE network and the user plane is carried over both the LTE and 5G NSA networks.

- 5G SA mode:
  - When operating in 5G SA mode (Option 2), the FastMile 5G Gateway 2 will only use 5G to connect to the mobile network.

Note 1 — Although the FastMile 5G Gateway 2 can support the three modes listed, the actual availability depends on the core network deployment. The modes cannot be configured in the device.

Note 2 — 5G SA can be enabled or disabled depending on the operator pre-configuration requirements, and can also be enabled or disabled through an ACS (TR-069). Enabling 5G SA by default is an operator choice; 5G SA is enabled by default on Nokia pre-configuration for FWAG OPID.

The FastMile 5G Gateway 2 provides Packet Data Network (PDN) connectivity management between the gateway and radio. It also supports up to eight APNs to provide different services, such as OAM, Internet, IPTV, and data.

The OAM capabilities are as follows:

- software upgrade using TR-069
- remote management support based on TR-069/TR-181 (TR-069 based on HTTPS/HTTP)
- TR-143 diagnostics support, including over multiple APNs
- XMPP support (TR-069 Annex G)
- pre-configuration support based in individual OPIDs (PLMN lock based on the pre-configuration)
- BOENG server support
- integrated HTTPS certificate for ACS
- ACS configuration (URL, username, password, and so on should be modified by ACS

5.3 Antenna support

The FastMile 5G Gateway 2 has four interior antenna for the 4G/LTE interface and the 5G radio interface.

Note — Actual supported RF bands may vary in different regions due to certifications.

Table 6 describes the antenna support of the FastMile 5G Gateway 2 per model.

Table 6 **Antenna support per model**

FastMile 5G Gateway 2 model	4G/LTE interface	5G interface
5G18-01W-A	omni-directional antennas nominal antenna gain up to 7.6 dBi depending on LTE band	omni-directional antennas nominal antenna gain up to 7.6 dBi depending on 5G RF1 band
5G19-01W-A	omni-directional antennas nominal antenna gain up to 7.6 dBi depending on LTE band	omni-directional antennas nominal antenna gain up to 7.6 dBi depending on 5G RF1 band

5.4 Environment

IP20 rating: the FastMile 5G Gateway 2 features an IP (Ingress Protection) rating of 20 for model 5G18-01W-A and model 5G19-01W-A.

5.5 Physical dimensions

The FastMile 5G Gateway 2 has the following dimensions:

- height: 181 mm (8.1 in)
- width: 150 mm (5.9 in)
- depth: 60 mm (2.4 in)
- weight: 0.7 kg (1.5 lb)

5.6 Physical interfaces

Interfaces for the FastMile 5G Gateway 2, including physical connectivity, are located on the:

- front of the unit (section 5.6.1)
- back of the unit (section 5.6.2)
- underneath of the unit (section 5.6.3)

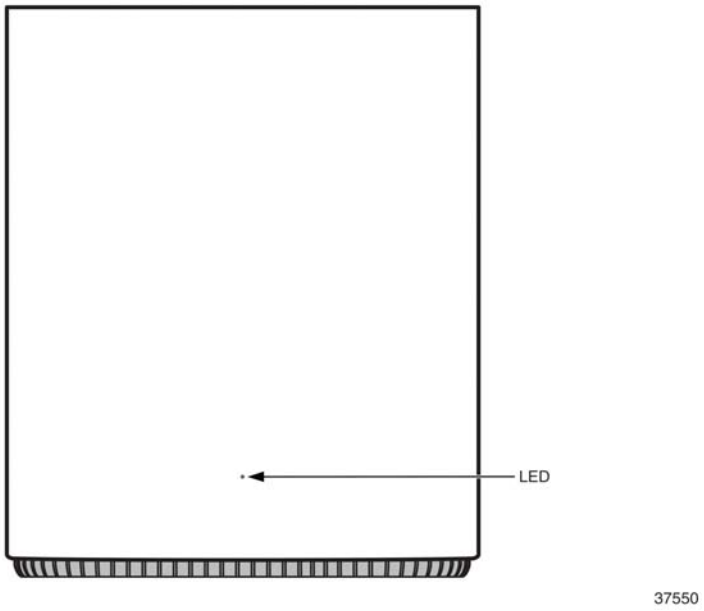
5.6.1 Interfaces on the front of the FastMile 5G Gateway 2

The following interface is located on the front of the unit:

- LED that provides status and signal information

Figure 10 shows the interfaces located on the front of the unit.

Figure 10 **Location of interfaces on the front of the FastMile 5G Gateway 2**



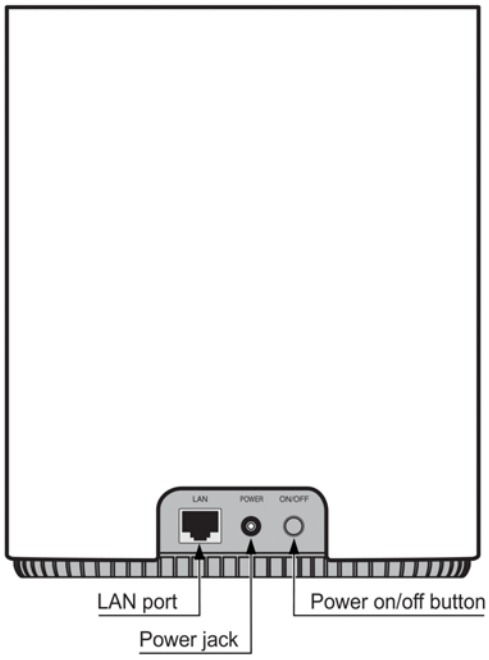
5.6.2 Interfaces on the back of the FastMile 5G Gateway 2

The following interfaces are located on the back of the unit:

- an RJ45 LAN port that can be used:
  - to connect a Gigabit Ethernet LAN (the port is supported while Wi-Fi is working)
  - for local management of the FastMile 5G Gateway 2 through a locally-connected PC or laptop (local management can also be done through Wi-Fi)
- 12 VDC power input jack
- power on/off button

Figure 11 shows the interfaces located on the back of the unit.

Figure 11 **Location of interfaces on the back of the FastMile 5G Gateway 2**



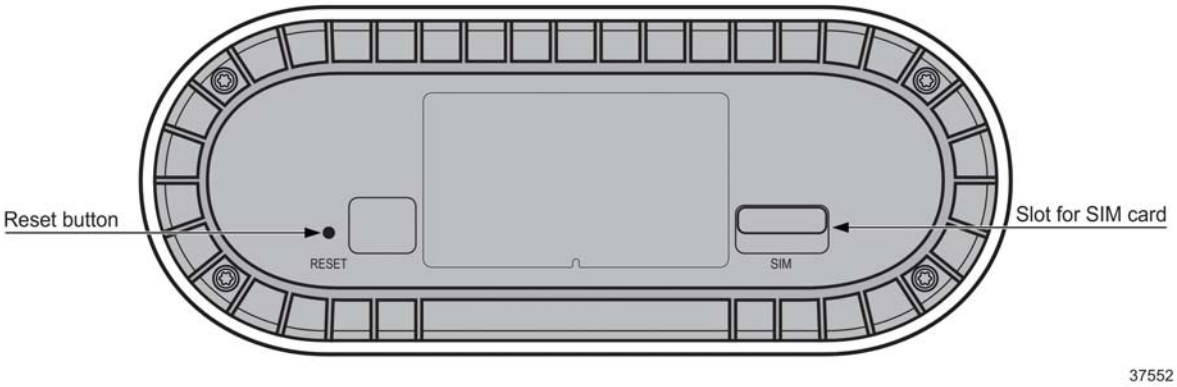
5.6.3 Interfaces on the underneath of the FastMile 5G Gateway 2

The following interfaces are located on the underneath of the unit:

- reset button:
  - pressing the button for less than five seconds reboots the FastMile 5G Gateway 2 and preserves the configured settings
  - pressing the button for five seconds or more restores the FastMile 5G Gateway 2 to its factory default settings and erases the configured settings
- slot for 4FF/nano-sized SIM card

Figure 12 shows the interfaces located on the underneath of the unit.

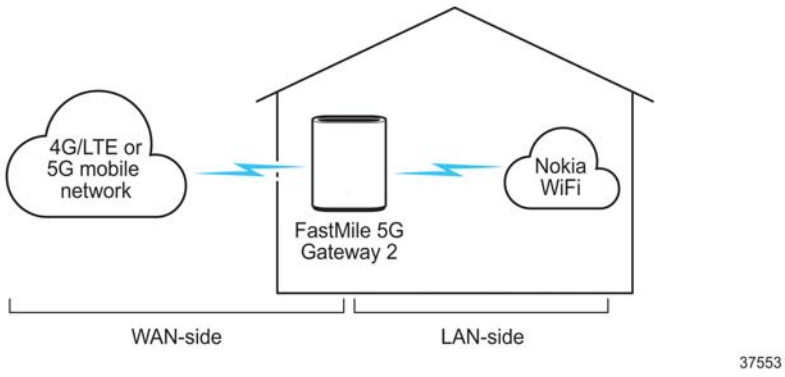
Figure 12 **Location of interfaces on the underneath of the FastMile 5G Gateway 2**



5.7 Typical connection

The FastMile 5G Gateway 2 typically has 4G/LTE and/or 5G mobile network connectivity in the upstream (WAN) direction and Wi-Fi connectivity (such as to a Nokia WiFi network) in the downstream (LAN) direction as shown in Figure 13.

Figure 13 **Typical connectivity for the FastMile 5G Gateway 2**



The FastMile 5G Gateway 2 can also have the following physical network connection on the LAN-side:

- Gigabit Ethernet LAN connection (one port)

5.8 Wi-Fi EasyMesh network with the FastMile 5G Gateway 2

A Wi-Fi EasyMesh network can be created by connecting a Wi-Fi Beacon 2 to the FastMile 5G Gateway 2. The FastMile 5G Gateway 2 serves as the access point to the WAN while up to three Wi-Fi beacons aid with extending Wi-Fi coverage to every corner of the home, providing seamless roaming to wireless connections.

Both cloudless and cloud methods are supported; cloud methods are managed by NWCC.

Unlike typical Wi-Fi networks that require unique SSIDs for each of the access points or tedious set-up of Wi-Fi extenders, which complicate the user experience, a Wi-Fi EasyMesh network of Wi-Fi beacons simplifies the user experience by providing easy device onboarding and automated network optimization.

Adding a Wi-Fi Beacon 2 to create a mesh that has the FastMile 5G Gateway 2 as the access point can be done through the Wi-Fi Mobile App. Contact your Nokia representative for more information about the Wi-Fi Mobile App.

The Wi-Fi Beacon 2 is not included as part of the FastMile 5G Gateway 2.

5.9 Wi-Fi Cloud Controller (NWCC)

The Wi-Fi Cloud Controller (NWCC) is a cloud-based solution that provides Wi-Fi management, radio resource management (RRM) optimization, and Wi-Fi insight visualization capabilities.

The NWCC can be hosted on public cloud, private cloud or dedicated servers. The cloud-based approach for NWCC enables the RRM algorithms to have a holistic view of the network, and to combine information from multiple APs in a neighborhood to assemble a complete, cohesive view of APs, channels, clients, and system performance—both real-time and historically.

In cases where the NWCC is unable to obtain certain metrics from a specific AP, the algorithms piece them together from other managed APs in the neighborhood. This enables the NWCC to work with already deployed, potentially less feature-rich APs, as well as next generation APs.

For additional information about:

- RRM parameters - see section 5.9.1
- NWCC interfaces - see section 5.9.2

5.9.1 Radio Resource Management (RRM)

RRM parameters include the following functions:

- channel management—a collection of algorithms for optimizing channel functions
- client steering—steers clients to the optimum AP or frequency band
- 5 GHz load balancing—balances the load across multiple APs within the mesh on the 5 GHz band
- 5 GHz preference band steering—steers client devices with good coverage to 5 GHz to maximize bandwidth
- transmit power control—reduces the AP's maximum power in high density environments to minimize interference among APs
- airtime management—limits or reserves Wi-Fi channel air-time across SSIDs and client devices

5.9.2 NWCC interfaces

The NWCC has two graphical user interfaces:

- Wi-Fi Home Console: used by help desk agents; it provides a real-time, holistic view of the in-home network
- Wi-Fi Network Console: used by network operation engineers for enabling or disabling and parameterizing the different RRM algorithms

The NWCC interacts with the home gateway and extender APs through the Home Agent software module integrated in the devices. Communication between the NWCC and Home Agent is based on MQTT and HTTPS which, in the future, will evolve towards TR-369/USP architecture and interfaces.

5.10 NWCC Wi-Fi Home Console interoperability with FastMile 5G Gateway 2

NWCC Wi-Fi Home Console portal features for FWA products focus on key Wi-Fi capabilities for demonstration of NWCC value for customers. Integration on FastMile 5G Gateway 2 is supported.

The following functions are supported from the home agent:

- L1/L2 Wi-Fi capability exposure to NWCC (CT quality)
- Wi-Fi ACS (Auto Channel Selection): enable / disable
- Wi-Fi SSID name change
- admin password reset
- Internet WAN bandwidth: usage / rate

The preconfig files must point to the corresponding values:

- device preconfig should point to production ACS and NWCC services for release builds:
  - ACS: production
  - NWCC: production

5.11 Management

The FastMile 5G Gateway 2 supports local management using a web-based GUI known as the WebUI. The WebUI is accessed through a PC, laptop, or tablet that has an Ethernet LAN connection or a Wi-Fi connection to the FastMile 5G Gateway 2. Chapter 7 provides steps for configuration-related tasks for the FastMile 5G Gateway 2 that use the WebUI.

Note — The WebUI screens are designed for 1920 * 1080 pixels. Supported browsers for the WebUI include Chrome, Edge, Mozilla Firefox, and Safari.

The FastMile 5G Gateway 2 supports remote management through TR-069 access for an ACS through the WAN.

The FastMile 5G Gateway 2 supports the TR-181 data model, and has TR-143 support.

5.12 Power

This section describes input power, power consumption, and output power for the FastMile 5G Gateway 2.

5.12.1 Input power

The FastMile 5G Gateway 2 is powered through an external AC power adapter that provides 12 VDC. The power adapter is supplied in the kit for the FastMile 5G Gateway 2 and plugs into an AC outlet.

5.12.2 Power consumption

Table 7 provides typical power consumption.

Table 7 **Typical power consumption per model**

FastMile 5G Gateway 2 model	Typical power consumption
5G18-01W-A	17.2 W
5G19-01W-A	17.2 W

5.12.3 Output power

Table 8 provides output power information for model 5G18-01W-A

Table 8 **Model 5G18-01W-A output power information**

<< contents for table are TBD >>

Table 9 provides output power information for model 5G19-01W-A.

Table 9 **Model 5G19-01W-A output power information**

Radio band		Frequency (TX) (MHz)	Max EIRP (dBm)	Max EIRP (mW)
4G/LTE	B1	1920 to 1980	26.3	427
	B3	1710 to 1785	27	501
	B7	2500 to 2570	28.2	661
	B8	880 to 915	24.3	269
	B20	832 to 862	25.7	372
	B28	703 to 736	25.5	355
	B32 (DL only)	NA	NA	NA
	B38	2570 to 2620	28.4	692
	B41	2496 to 2690	28	631
	B42	3400 to 3600	28.1	646

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Radio band		Frequency (TX) (MHz)	Max EIRP (dBm)	Max EIRP (mW)
5G NR	n1	1920 to 1980	26.3	427
	n3	1710 to 1785	27	501
	n7	2500 to 2570	28.2	661
	n8	880 to 915	24.3	269
	n20	832 to 862	25.7	372
	n28	703 to 736	25.5	355
	n38	2570 to 2620	28.4	692
	n41	2500 to 2690	28	631
	n77	3300 to 4200	28.1	646
	n78	3400 to 3800	28.1	646
EMEA: Wi-Fi 2.4G	channel 1 to 13	2400 to 2483.5	20	100
EMEA: Wi-Fi 5G	5G_U-NII-1	5150 to 5250	23	200
	5G_U-NII-2A	5250 to 5350	23	200
	5G_U-NII-2C	5470 to 5725	29	794
	5G_U-NII-3	5725 to 5850	NA	NA
Brazil: Wi-Fi 2.4G	channel 1 to 13	2400 to 2483.5	29	794
Brazil: Wi-Fi 5G	5G_U-NII-1	5150 to 5250	29	794
	5G_U-NII-2A	5250 to 5350	29	794
	5G_U-NII-2C	5470 to 5725	29	794
	5G_U-NII-3	5725 to 5850	29	794

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5.13 Additional feature information for the FastMile 5G Gateway 2

This section provides additional feature information for the FastMile 5G Gateway 2, described per model as applicable.

5.13.1 4G/LTE additional features and supported 4G/LTE radio frequency

This section describes the 4G/LTE additional features and supported 4G/LTE radio frequency per model of the FastMile 5G Gateway 2.

5.13.1.1 4G/LTE additional features for model 5G18-01W-A

The following 4G/LTE additional features are supported for model 5G18-01W-A of the FastMile 5G Gateway 2:

- 4G/LTE antenna gains:
  - B42: 4.5-7.6 dBi
  - B7/B38/B41: 3.0-4.5 dBi
  - B2/B4/B25/B66: 3.0-4.5 dBi
  - B5/B26/B28:0.8-3.5 dBi
- 4G/LTE UL and DL highest order modulation: 256 QAM
- 4G/LTE UE category DL: 19
- 4G/LTE UE category UL: 18
- TM9 support
- 4G/LTE MIMO:
  - DL 4x4 MIMO: B2, B4, B25, B66,B38/B41, B42
  - DL 2x2 MIMO:B5, B28
- Support Transmit Antenna Switching (TAS): B42

5.13.1.2 4G/LTE additional features for model 5G19-01W-A

The following 4G/LTE additional features are supported for model 5G19-01W-A of the FastMile 5G Gateway 2:

- 4G/LTE antenna gains:
  - B42: 4.5-7.6 dBi
  - B7/B38/B41: 3.0-4.5 dBi
  - B1/B3: 3.0-4.5 dBi
  - B32: 3.0-4.0 dBi
  - B8/B20/B28: 0.8-3.5 dBi
- 4G/LTE UL and DL highest order modulation: 256 QAM
- 4G/LTE UE category DL: 19
- 4G/LTE UE category UL: 18
- TM9 support
- 4G/LTE MIMO:
  - DL 4x4 MIMO: B1, B3, B7, B38/B41, B42
  - DL 2x2 MIMO: B8, B20, B28, B32
- Support Transmit Antenna Switching (TAS): B42

5.13.1.3 Supported 4G/LTE radio frequency for the FastMile 5G Gateway 2

Table 10 describes the supported 4G/LTE radio bands and frequencies for model 5G18-01W-A.

Table 10 **Model 5G18-01W-A supported 4G/LTE radio bands**

4G/LTE radio band		Frequency
FDD	B2/B25	1900 MHz
	B4/B66	2100 MHz
	B5/B26	850 MHz
	B7	2600 MHz
	B28	700 MHz
TDD	B38	2600 MHz
	B41	2500 MHz
	B42	3500 MHz

Table 11 describes the supported 4G/LTE radio bands and frequencies for model 5G19-01W-A.

Table 11 **Model 5G19-01W-A supported 4G/LTE radio bands**

4G/LTE radio band		Frequency
FDD	B1	2100 MHz
	B3	1800 MHz
	B7	2600 MHz
	B8	900 MHz
	B20	800 MHz
	B28	700 MHz
	B32	1500 MHz
TDD	B38	2600 MHz
	B41	2500 MHz
	B42	3500 MHz

5.13.2 5G NR additional features, supported 5G NR radio frequency, and supported 5G NR NSA and SA channel bandwidths

The following 5G NR additional features are supported on all models of the FastMile 5G Gateway 2:

- 3GPP release 15 – 5G NR NSA: option 3X, option 3A and SA: option 2
- maximum 5G NR Sub-6 GHz aggregate bandwidth: 200 MHz (2CC)
- 5G NR UL and DL highest order modulation: 256 QAM
- 5G NR 2CA support for up to DL 200 MHz aggregated bandwidth
- extensive support for 5G NR SA CA and 5G NR NSA EN-DC combinations between supported bands
- supports dynamic spectrum sharing (DSS) for FDD bands in both NR SA and NSA modes

5.13.2.1 5G NR additional features for model 5G18-01W-A

The following 5G NR additional features are supported for model 5G18-01W-A:

Device built-in 5G NR antenna gains are as follows:

- n78: 4.0-7.6 dBi
- n7/n38/n41: 3.0-4.5 dBi
- n2/n25/n66: 3.0-4.5 dBi
- n5/n28: 0.8-3.5 dBi

MIMO 5G NR NSA:

- DL MIMO 4x4: n2/n7/n25/n38/n41/n66/n78
- UL MIMO 2x2: n5/n28
- UL SISO: all supported NR bands

MIMO 5G NR SA:

- DL MIMO 4x4: n2/n7/n25/n38/n41/n66/n78
- UL MIMO 2x2: n5/n28
- UL SISO: all supported NR bands

Sounding Reference Signal (SRS) TX antenna switching:

- 5G NR NSA and SA 1T4R: n38/n41/n78

Transmit Antenna Switching (TAS) TX antenna switching:

- NSA/SA: n38/n41/n78 support four-way TAS

5.13.2.2 5G NR additional features for model 5G19-01W-A

The following 5G NR additional features are supported for model 5G19-01W-A:

Device built-in 5G NR antenna gains are as follows:

- n77/n78: 4.0-7.6 dBi
- n7/n38/n41: 3.0-4.5 dBi
- n1/n3: 3.0-4.5 dBi
- n8/n20/n28: 0.8-3.5 dBi

MIMO 5G NR NSA:

- DL MIMO 4x4: n1/n3/n7/n38/n41/n77/n78
- DL MIMO 2x2: n8/n20/n28
- UL SISO: all supported NR bands

MIMO 5G NR SA:

- DL MIMO 4x4: n1/n3/n7/n38/n41/n77/n78
- UL MIMO 2x2: n8/n20/n28
- UL SISO: all supported NR bands

Sounding Reference Signal (SRS) TX antenna switching:

- 5G NR NSA and SA 1T4R: n38/n41/n78

Transmit Antenna Switching (TAS) TX antenna switching:

- NSA/SA: n38/n41/n78 support four-way TAS

5.13.2.3 Supported 5G NR radio frequency

Table 12 describes the supported 5G NR radio bands and frequencies for model 5G18-01W-A.

Table 12 **Model 5G18-01W-A supported 5G NR radio bands**

5G NR radio band		Frequency
Sub-6 GHz (FDD)	n2	UL: 1850-1910 MHz; DL: 1930-1990 MHz
	n5	UL: 824 -849 MHz; DL: 869 - 894 MHz
	n7	UL: 2500-2570 MHz; DL: 2620-2690 MHz
	n25	UL: 1850-1915 MHz; DL: 1930 -1995 MHz
	n28	UL: 703-748 MHz; DL: 758-803 MHz
	n66	UL: 1710-1780 MHz; DL: 2110-2200 MHz
Sub-6 GHz (TDD)	n38	2570-2620 MHz
	n41	2496-2690 MHz
	n78	3300-3800 MHz

Table 13 describes the supported 5G NR radio bands and frequencies for model 5G19-01W-A.

Table 13 **Model 5G19-01W-A supported 5G NR radio bands**

5G NR radio band		Frequency
Sub-6 GHz (FDD)	n1	UL: 1920-1980 MHz; DL: 2110-2170 MHz
	n3	UL: 1710-1785 MHz; DL: 1805-1880 MHz
	n7	UL: 2500-2570 MHz; DL: 2620-2690 MHz
	n8	UL: 880-915 MHz; DL: 925-960 MHz
	n20	UL: 832-862 MHz; DL: 791-821 MHz
	n28	UL: 703-748 MHz; DL: 758-803 MHz
Sub-6 GHz (TDD)	n38	2570-2620 MHz
	n41	2496-2690 MHz
	n77	3300-4200 MHz
	n78	3300-3800 MHz

5.13.2.4 Supported 5G NR NSA and SA channel bandwidths

Table 14 describes the 5G NR NSA and SA channel bandwidths for model 5G18-01W-A.

Table 14 Model 5G18-01W-A supported 5G NR NSA and SA channel bandwidths

RF band	Supported channel bandwidths
n2	5 MHz, 10 MHz, 15 MHz, 20 MHz
n5	5 MHz, 10 MHz, 15 MHz, 20 MHz
n7	5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz, 50 MHz
n25	5 MHz, 10 MHz, 15 MHz?20 MHz, 25 MHz, 30 MHz, 40 MHz
n28	5 MHz, 10 MHz, 15 MHz, 20 MHz, 30 MHz
n66	5 MHz, 10 MHz, 15 MHz?20 MHz, 25 MHz, 30 MHz, 40 MHz
n38	5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz
n41	10 MHz, 15 MHz, 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 80 MHz, 90 MHz,100 MHz
n78	10 MHz, 15 MHz, 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz,100 MHz

Table 15 describes the 5G NR NSA and SA channel bandwidths for model 5G19-01W-A.

Table 15 Model 5G19-01W-A supported 5G NR NSA and SA channel bandwidths

Access technology	RF band	Supported channel bandwidths
4G LTE	FDD B1	5MHz, 10MHz, 15MHz, 20MHz
	FDD B3	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
	FDD B7	5 MHz, 10 MHz, 15 MHz, 20 MHz
	FDD B8	1.4 MHz, 3 MHz, 5 MHz, 10 MHz
	FDD B20	5 MHz, 10 MHz, 15 MHz, 20 MHz
	FDD B28	3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
	FDD B32	(DL only): 5 MHz, 10 MHz, 15 MHz, 20 MHz
	TDD B38	5 MHz, 10 MHz, 15 MHz, 20 MHz
	TDD B41	5 MHz, 10 MHz, 15 MHz, 20 MHz
	TDD B42	5 MHz, 10 MHz, 15 MHz, 20 MHz

(1 of 2)

Access technology	RF band	Supported channel bandwidths
5G NR	FDD n1	5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz, 50 MHz
	FDD n3	5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz
	FDD n7	5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz, 50 MHz
	FDD n8	5 MHz, 10 MHz, 15 MHz, 20 MHz
	FDD n20	5 MHz, 10 MHz, 15 MHz, 20 MHz
	FDD n28	5 MHz, 10 MHz, 15 MHz, 20 MHz, 30 MHz
	TDD n38	5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz
	TDD n41	10 MHz, 15 MHz, 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 80 MHz, 90 MHz,100 MHz
	TDD n77	10 MHz, 15 MHz, 20 MHz, 40 MHz, 50 MHz, 60 MHz, 80 MHz, 90 MHz,100 MHz
	TDD n78	10 MHz, 15 MHz, 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz,100 MHz

(2 of 2)

5.13.3 Wi-Fi features

The following Wi-Fi features are supported for all models of the FastMile 5G Gateway 2:

- dual band simultaneous operation
- supports 2x2 802.11b/g/n/ax 2.4 GHz (20/40 MHz) WLAN interface, with MU-MIMO
- supports 2x2 802.11a/n/ac/ax 5 GHz (80 MHz) WLAN interface with MU-MIMO
- 600 Mb/s PHY rate for 2.4 GHz and 1.2 Gb/s PHY rate for 5 GHz
- MU-MIMO (UL MU-MIMO is optional)
- UL/DL over orthogonal frequency division multiple access (OFDMA)
- Wi-Fi power savings mode of operation (target wake time [TWT])
- supports up to 64 clients per Wi-Fi band; the total supported for both bands is 64 clients
- band steering and seamless roaming (IEEE802.11k and 802.11v)
- intelligent channel selection optimization
- supports explicit beamforming
- When a customer inserts a SIM, the Wi-Fi power table with regard of PLMN will rewrite to RI even without an embedded customer OPID pre-configuration; this enables the correct Wi-Fi power table for customer trials in selective countries.

5.13.4 Management features

The following management features are supported for all models of the FastMile 5G Gateway 2:

- LED for status and signal information
- local management support: WebUI management through a PC, laptop, or tablet with an Ethernet LAN or a Wi-Fi connection to the FastMile 5G Gateway 2
- remote management support (ACS management): TR-069
- power on/off button
- reset button

5.13.5 Base operating system and platform support

The following describes the base operating system and platform support for all models of the FastMile 5G Gateway 2:

- OpenWRT
- time zone configuration
- 64 bits support for OS
- networking debug (ping, traceroute, iperf)
- system log and diagnostic and monitoring
- dual image (for Firmware upgrade fail protection)
- firmware verification
- Ethernet LAN port (1 Gbps)
- LED I/O control
- Wi-Fi drivers

5.13.6 Certifications

The FastMile 5G Gateway 2 is in compliance with the following certifications:

For model 5G18-01W-A:

- FCC

For model 5G19-01W-A:

- CE, CB, ANATEL, and WFA

5.14 LTE CA 5G NR EN-DC information

Contact your Nokia representative for LTE CA 5G NR EN-DC information for the FastMile 5G Gateway 2.

5.15 Supported functionality

The following functionality is supported by all models of the FastMile 5G Gateway 2 FastMile 5G Gateway 2:

- forwarding:
  - router mode: supports up to eight configurable access points
  - bridge mode: supports IPTV (contact your Nokia representative for more information regarding bridge mode)
  - IPv4 forwarding (WAN/LAN)
  - IPv6 forwarding (WAN/LAN)
  - IPv4/IPv6 dual stack forwarding (WAN/LAN)
  - supports VLAN 802.1Q
- LAN/WAN configuration:
  - DHCPv4
  - DHCPv6
  - DNSv4
  - DNSv6
  - host management
  - NAT (up to 32K sessions)
  - static IP routing configuration
  - QoS control (queues, classification, P-bit based for upstream, DSCP based for downstream) (dependent on unit support for QoS)
- security:
  - firewall (pre-configuration setting at boot)
  - Access Control Level (ACL)
    SSH/ICMP for LAN is configurable using the WebUI
  - IP filter
  - DMZ (Demilitarized Zone)
  - ALG (Application Layer Gateway)
  - support for parental control
- application Layer:
  - VPN passthrough (LAN-WAN)
  - port trigger
  - port forwarding
  - time management (daytime saving and timezone)
  - NTPv4
  - NTPv6 (cannot be configured in the WebUI NTP time server)
  - L2TP and PPTP VPN tunneling protocols with VPN Server

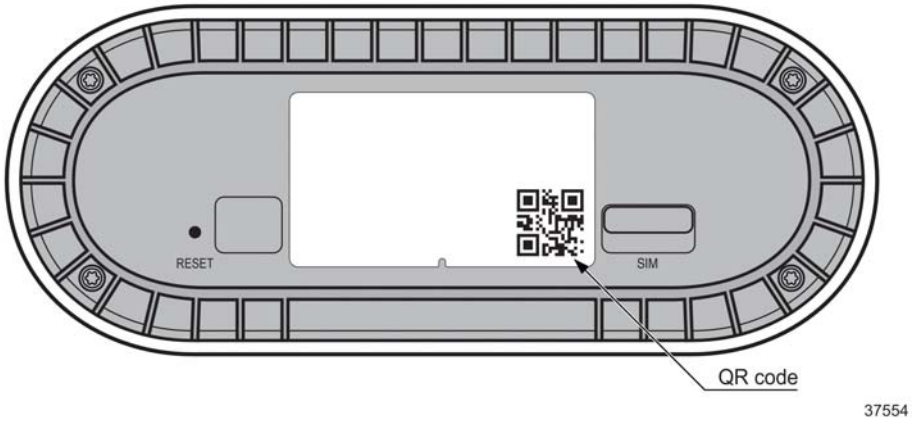
- other:
  - TR-143
- IPTV support:
  - IGMP proxy
  - IGMPv2 (RFC2236)
  - IGMPv3 (RFC3376)
  - MLDv2 for IPv6 supported

5.16 The Wi-Fi Mobile App

The Wi-Fi Mobile App provides information that can help with installation, and provides guidance for tasks such as how to configure Wi-Fi settings and how to add Wi-Fi Beacon 2 devices to the Wi-Fi network. The Wi-Fi Mobile App can be downloaded from Google Play or the Apple App store.

After you have downloaded the app to your smart phone or tablet, use the in-app QR code scanner to read the QR code that is located on the underneath of the FastMile 5G Gateway 2. Figure 14 shows the location of the QR code.

Figure 14 **Location of the QR code**



The FastMile 5G Gateway 2 pairs with your phone and performs initial configurations.

The Wi-Fi Mobile App guides you through all the steps necessary to setup the FastMile 5G Gateway 2.

6 Installation

6.1 Getting started

Installation of the FastMile 5G Gateway 2 is intended to be a simple “Plug and Play” experience for most installations. A LED on the front of the unit allows you to locate the FastMile 5G Gateway 2 in an optimal location for 4G/LTE or 5G signal reception.

Note — You can use the Wi-Fi Mobile App to help with installing the FastMile 5G Gateway 2; see section 5.16 for information about the Wi-Fi Mobile App.

The FastMile 5G Gateway 2 requires a SIM card for 4G/LTE or 5G service. Make sure that an appropriate 4FF/nano-sized SIM card is installed before you power up the FastMile 5G Gateway 2 (see section 6.2).

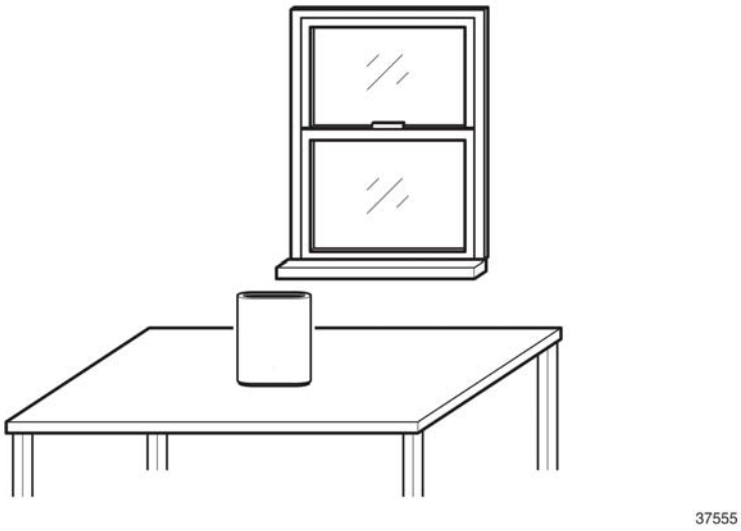
Warning — If the FastMile 5G Gateway 2 is dropped, especially on a hard surface, or in case of suspected damage, contact your Nokia representative to arrange an inspection of the equipment.

Procedure 5 Get started

1 Unpack the FastMile 5G Gateway 2 and power adapter from the package.

2 For 4G/LTE or 5G service, place the FastMile 5G Gateway 2 at a possible installation location such as a table top or similar close to a window or an outer wall with few obstructions; ideally near a window as shown in Figure 15. Make sure there is an electrical outlet nearby. Be prepared to move the FastMile 5G Gateway 2 to another location later on in the installation process if needed.

Figure 15 **Placement of the FastMile 5G Gateway 2**



Note — Ensure that cables or other objects will not block the air flow on the underneath of the FastMile 5G Gateway 2 to avoid overheating.

3 Keep the following in mind when installing the FastMile 5G Gateway 2. The FastMile 5G Gateway 2 should be installed:

- in a place with few Wi-Fi obstructions, ideally close to a window
- close to an AC socket
- on the side of the room closest to the base station (if known)
- on higher elevation or an upper floor of the home
- away from possible sources of interference, like electronic devices such as printers, microwave ovens, and so on
- away from metal fixtures, enclosures, cabinets, appliances, blinds, reinforced concrete, and pipes
- not in a location where mobile network connectivity might be poor, such as a basement

4 STOP. This procedure is complete.

6.2 Inserting the SIM card

Use the following procedure to insert a SIM card, if needed.

Note — The FastMile 5G Gateway 2 might not start up if the SIM card is not installed properly.

Procedure 6 Insert the SIM card

Use this procedure if the SIM card has not been installed yet.

Note — For PIN-locked SIM cards, you will need to enter a PIN number as part of configuring the FastMile 5G Gateway 2, see Procedure 46.

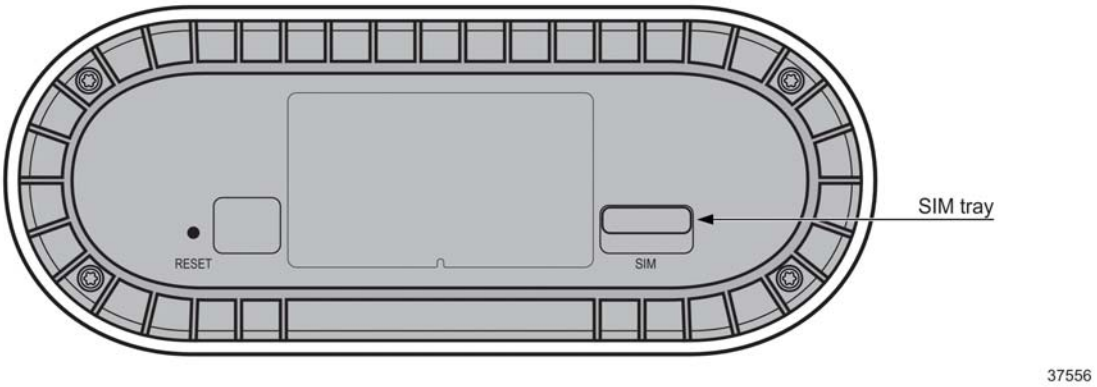
1 If the FastMile 5G Gateway 2 is powered up, turn it off.

2 Turn the FastMile 5G Gateway 2 upside down.

3 Remove the SIM tray from the underneath of the FastMile 5G Gateway 2 using the finger groove.

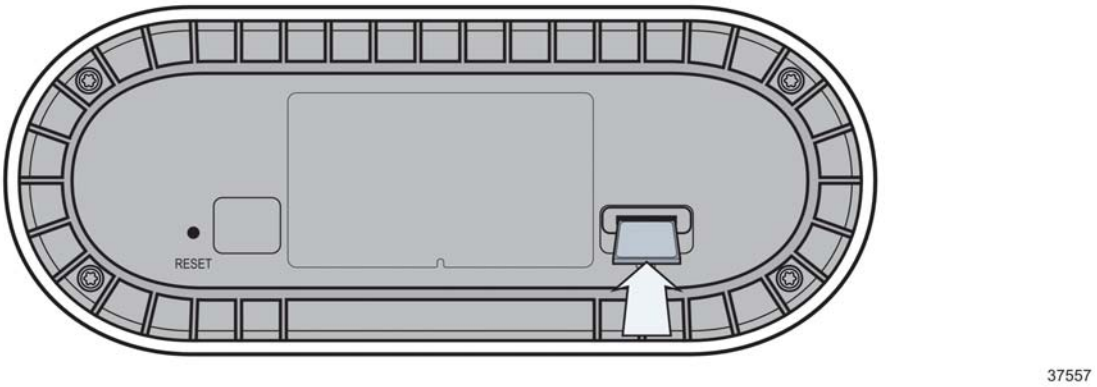
Figure 16 shows the location of the SIM tray.

Figure 16 **Location of the SIM tray**



4 Place the SIM card in the SIM tray and insert the SIM tray into the FastMile 5G Gateway 2 as shown in Figure 17.

Figure 17 **Inserting the SIM tray**



Tip: copy the SSID and Wi-Fi password printed on the label on the underneath of the FastMile 5G Gateway 2 for later use if connecting devices to the FastMile 5G Gateway 2 through Wi-Fi.

5 STOP. This procedure is complete.

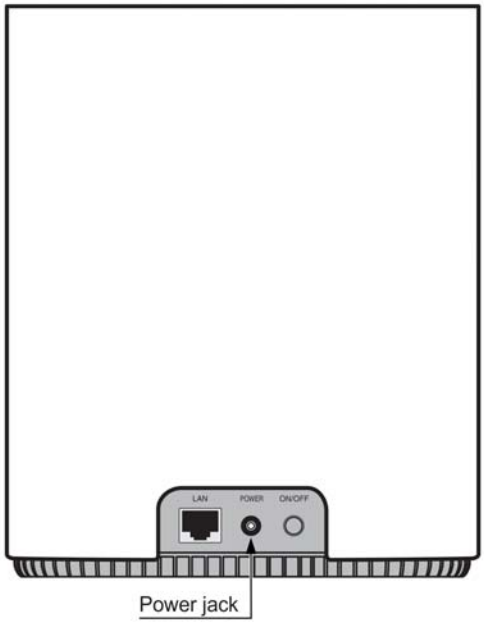
6.3 Connecting power

Use the following procedure to connect the FastMile 5G Gateway 2 to power.

Procedure 7 Connect power

1 Connect the pre-attached cable of the power adapter to the power jack on the back of the FastMile 5G Gateway 2. The power jack location is shown in Figure 18.

Figure 18 **Location of the power jack**



2 Plug the power adapter into to an electrical outlet.

3 STOP. This procedure is complete.

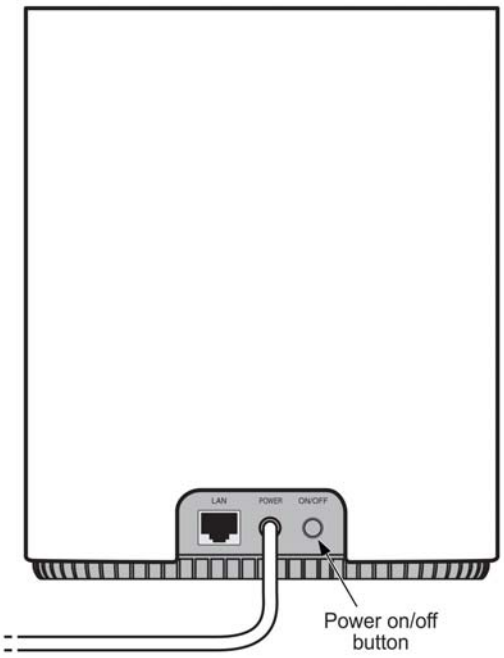
6.4 Starting up

Use this procedure to start up the FastMile 5G Gateway 2.

Procedure 8 Start up

1 Press the power on/off button located on the back of the unit to start up the FastMile 5G Gateway 2, as shown in Figure 19.

Figure 19 **Location of the power on/off button**



The LED on the front of the unit will turn on.

2 Check the LED behavior as described in section 6.5 and follow the actions indicated in the section.

3 STOP. This procedure is complete.

6.5 Checking the LED

The LED on the front of the FastMile 5G Gateway 2 provides status and signal information. Figure 20 shows the location of the LED.

Figure 20 **Location of the LED**

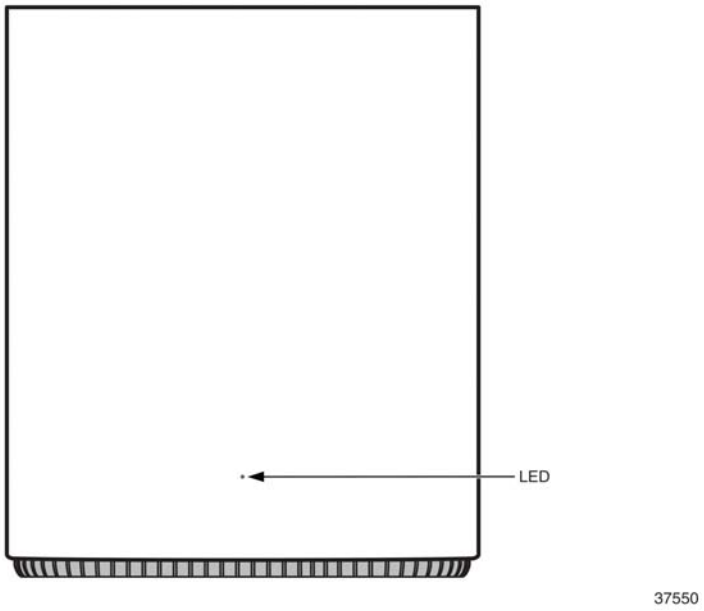


Table 16 describes LED behavior, and provides recommended actions, including to reposition the FastMile 5G Gateway 2 if required.

Note — Once you have a good 4G/LTE or 5G connection, do not reposition or rotate the FastMile 5G Gateway 2. Rotating the FastMile 5G Gateway 2 may affect Internet speeds due to indoor signal reception conditions.

Note 1 — LED indications can change over time due to variable 4G/LTE and/or 5G signal conditions.

Note 2 — LED indications might differ from what is described in Table 16 depending on if an ACS is used to change default values for thresholds or timing, or if different values have been set in a customer-specific pre-configuration.

Table 16 **Description of LED behavior**

LED color	Behavior	Meaning	Recommended action
No color	Off	No power	Connect the FastMile 5G Gateway 2 to power as described in section 6.3
White	Fast blinking	Signal test in progress (cell measurement is triggered via the Wi-Fi Mobile App or WebUI)	Do nothing
		A factory reset will start when the reset button is released	Do nothing

(1 of 2)

LED color	Behavior	Meaning	Recommended action
Green	Solid	Good 4G or 5G connection	Finish off the installation process if applicable as described in other sections in this chapter
Yellow	Blinking	Part of the start up sequence	Do nothing
	Solid	Medium 4G or 5G connection	Reposition the FastMile 5G Gateway 2 as described in section 6.6
Red	Blinking	Reset to factory settings in progress	Do nothing, as the FastMile 5G Gateway 2 is being reset, as described in section 6.9
		One or more critical alarms	Resolve the alarm condition: do a reboot to clear the alarm as described in section 6.9
	Solid	Poor 4G or 5G connection	Reposition the FastMile 5G Gateway 2 as described in section 6.6
		Missing SIM card	Insert the SIM card as described in section 6.2
		SIM card is broken or is not being recognized by the FastMile 5G Gateway 2	Replace the SIM card as described in section 6.2
		SIM card is PIN-locked	Enter the correct PIN number using the WebUI
		SIM card is PUK-locked	Enter the correct PIN number using the WebUI

(2 of 2)

6.6 Repositioning the FastMile 5G Gateway 2

Do the following if the recommended action for the LED activity described in section 6.5 indicates that you should reposition the FastMile 5G Gateway 2 for a 4G/LTE or 5G signal or for a better 4G/LTE or 5G signal.

Procedure 9 Reposition the FastMile 5G Gateway 2

1 Power off the FastMile 5G Gateway 2 and disconnect the power adapter from the electrical outlet.

2 Move the FastMile 5G Gateway 2 (and the power adapter) to a different location.

3 Connect the power adapter to an electrical outlet at the new location and power it on.

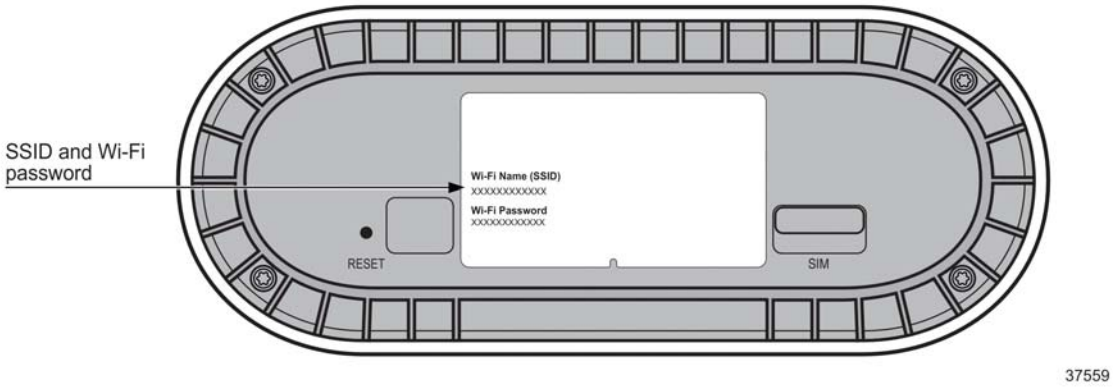
4 Check the LED as described in section 6.5 and follow the actions indicated in the section. Note that you might need to repeat the steps in this procedure several times before finding the final location for the FastMile 5G Gateway 2.

5 STOP. This procedure is complete.

6.7 Connecting Wi-Fi devices

You can connect devices that are going to use Wi-Fi for service and communications through the FastMile 5G Gateway 2 by using the SSID (sometimes known as the Wi-Fi name) and the Wi-Fi password (sometimes known as the Wi-Fi key) shown on the underneath of the FastMile 5G Gateway 2. Figure 21 shows the location of the SSID and Wi-Fi password.

Figure 21 **Location of the SSID and Wi-Fi password**



6.8 Connecting an Ethernet LAN

In addition to supporting Wi-Fi connectivity on the LAN side, the FastMile 5G Gateway 2 also supports connection of a Gigabit Ethernet LAN.

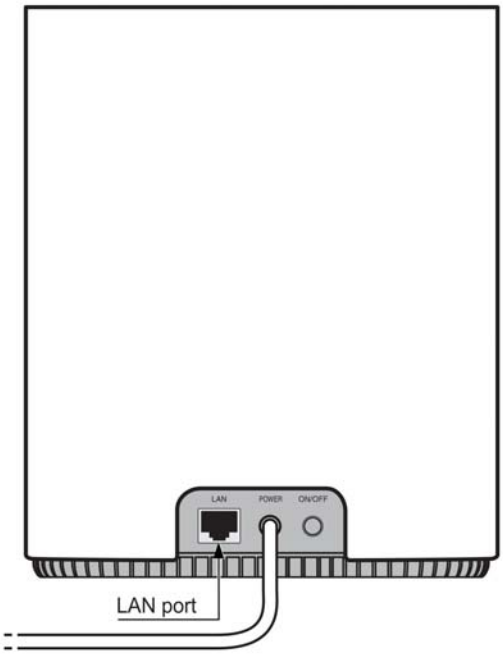
Procedure 10 Connect a Gigabit Ethernet LAN

1 Connect one end of a Gigabit Ethernet LAN cable to your device (such as a laptop or desktop PC).

2 Connect the other end of the Gigabit Ethernet LAN cable to the LAN port on the back of the FastMile 5G Gateway 2.

Figure 22 shows the location of the LAN port.

Figure 22 **Location of the LAN port**



3 STOP. This procedure is complete.

6.9 Rebooting or resetting the FastMile 5G Gateway 2

If needed, you can reboot or reset the FastMile 5G Gateway 2.

A reboot preserves configured settings; a reset returns the FastMile 5G Gateway 2 to its factory default settings and erases configured settings.

You can reboot the FastMile 5G Gateway 2 through its power button, or you can reboot or reset the FastMile 5G Gateway 2 through its reset button:

- Procedure 11 describes how to reboot the FastMile 5G Gateway 2 through its power button
- Procedure 12 describes how to reboot or reset the FastMile 5G Gateway 2 through the reset button

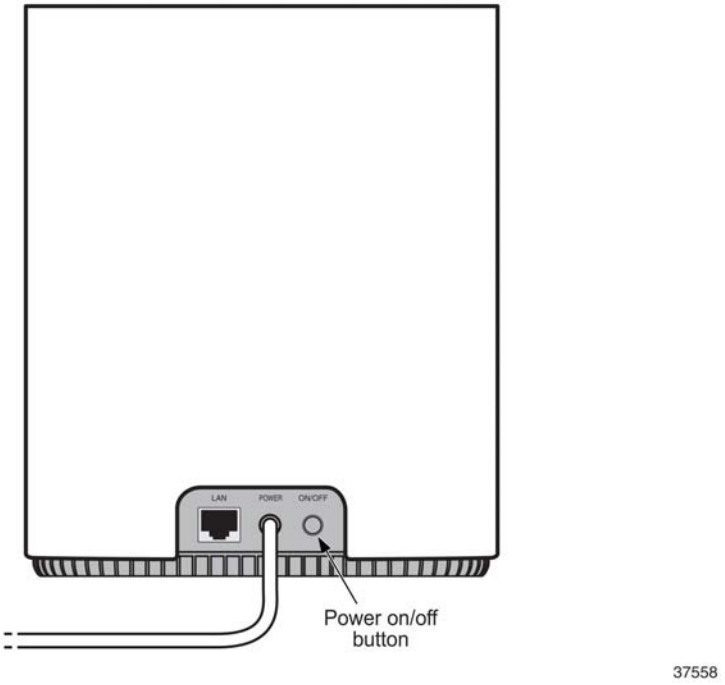
As well, you can do a reboot or a reset of the FastMile 5G Gateway 2 through the WebUI as described in section 7.11.

Procedure 11 Reboot with the power on/off button

1 To reboot the FastMile 5G Gateway 2 through its power on/off button, press the button for one second (off), wait one second, and then press the button again (on).

Figure 23 shows the location of the power on/off button.

Figure 23 **Location of the power on/off button**



2 STOP. This procedure is complete.

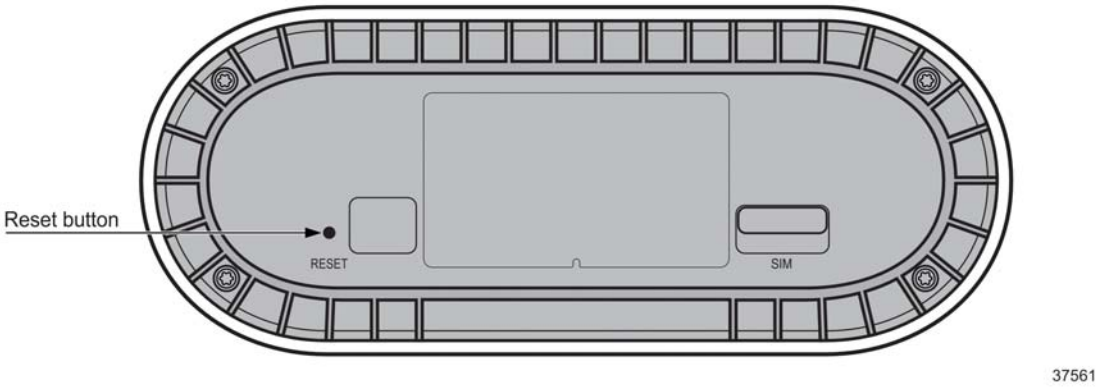
Procedure 12 Reboot or reset with the reset button

1 Do one of the following to reboot or reset the FastMile 5G Gateway 2 with the reset button:

- To reboot: press the reset button for less than five seconds; the unit will reboot (configured settings will be preserved)
- To reset: press the reset button for five seconds or more; the unit will reset to its factory default settings (configured settings will be erased)

Figure 24 shows the location of the reset button.

Figure 24 **Location of the reset button**



Note — The FastMile 5G Gateway 2 might restart twice during a reset. This is normal behavior.

2 STOP. This procedure is complete.

7 Configuration

7.1 Getting started

You can view overview information or configure the FastMile 5G Gateway 2 locally through a WebUI that opens on a PC, laptop, or tablet that has a Gigabit Ethernet LAN connection or a Wi-Fi connection to the FastMile 5G Gateway 2.

Note — Refer to the *FastMile 5G Customer Release Notes* before configuring the FastMile 5G Gateway 2.

Section 7.2 provides steps on how to establish the connection to the FastMile 5G Gateway 2, and how to view overview information or log in to the WebUI. A table at the end of the section lists the types of tasks that can be performed through the WebUI and points to the sections that provide procedures for these tasks.

7.2 Accessing the WebUI

Use the procedure below to establish the connection from a PC, laptop, or tablet to the FastMile 5G Gateway 2, and to view overview information for the FastMile 5G Gateway 2 or log in through the WebUI.

Procedure 13 Access the WebUI

You will need to enter the IP address of the FastMile 5G Gateway 2 to perform this procedure. To log in, you will also need to enter the user name and password. You do not need to log in to view overview information.

Note — There are two types of users for the FastMile 5G Gateway 2:

- operators (such as employees of the operator or service provider)
- end users (such as service subscribers)

This operator manual describes the tasks that can be done when the operator user name is used to log in to the WebUI. Contact your Nokia representative for the operator user name and password.

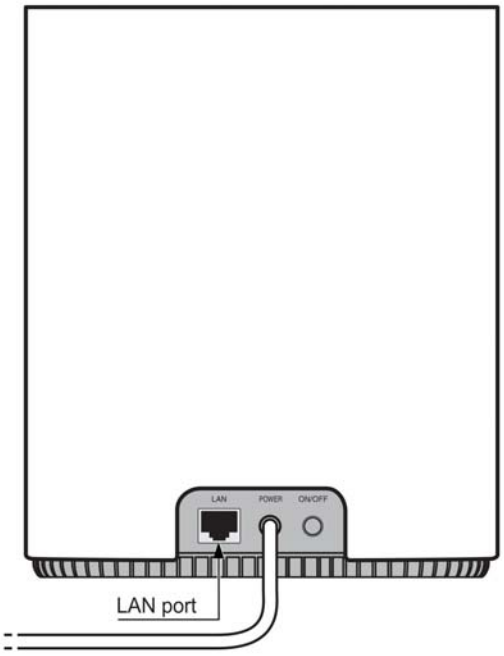
Note that the user name and password on the underneath of the FastMile 5G Gateway 2 are the user name and password for the end user.

1 Connect your PC, laptop, or tablet through the LAN port on the back of the FastMile 5G Gateway 2 (Figure 25) or establish a Wi-Fi connection from your device to the FastMile 5G Gateway 2 (section 6.7), and make sure that the Local Area Connection setting for your device is configured as “Obtain an IP address automatically”.

Note — The FastMile 5G Gateway 2 must be powered up, see Procedure 6.3.

Figure 25 shows the location of the LAN port.

Figure 25 **Location of the LAN port**



2 On your access device, open a web browser, and enter the IP address that is provided on the label on the underneath of the FastMile 5G Gateway 2, for example:

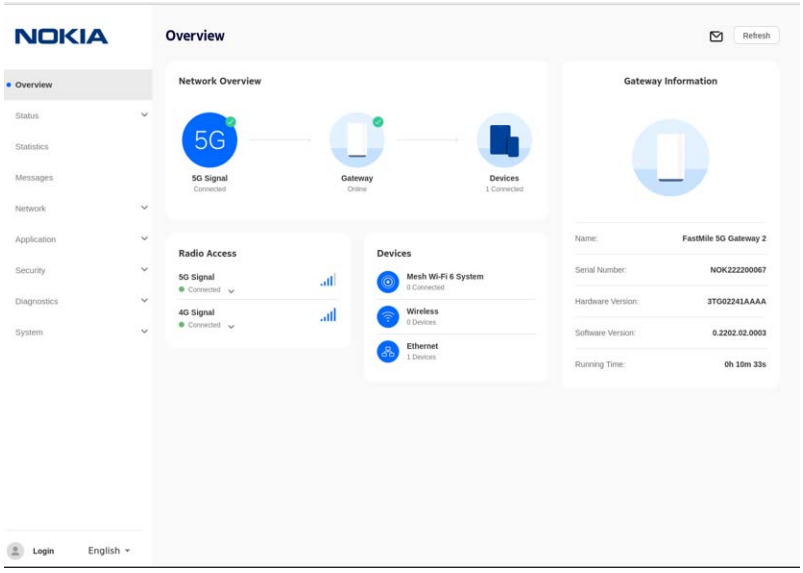
http://192.168.1.1 or https: //192.168.1.1

Note — The http IP address is pre-configured as the default access mode. The https access mode can only be used if the FastMile 5G Gateway 2 has been pre-configured accordingly.

Note — If the default LAN IP address has been changed using ACS, then the new IP address will no longer match the one printed on the label on the underneath of the FastMile 5G Gateway 2.

The WebUI screen appears. The left side of the screen provides the main menu for the WebUI and the right side of the screen provides overview information for the FastMile 5G Gateway 2 as shown in Figure 26.

Figure 26 **WebUI main menu and the overview screen**



See section 7.3 for a description of the overview screen.

3 To login, click *Login* on the bottom left corner of the screen or click any of the menu items on the left side of the screen.

Enter the operator user name and password in the Login pop-up window, and click *Login*.

Note — After predefined consecutive unsuccessful login attempts, you will be locked out for a specific amount of time.

4 STOP. This procedure is complete.

Table 17 indicates the sections in this chapter that provide procedures for the types of tasks supported for the operator through the WebUI menu.

Table 17 **Types of tasks**

Type of task	See section
Viewing overview information	7.3
Viewing status information	7.4
Viewing statistics	7.5
Viewing messages	7.6
Configuring network parameters	7.7
Configuring application parameters	7.8
Configuring security parameters	7.9
Performing diagnostic functions	7.10
Configuring system parameters	7.11
Logging out of the WebUI	7.12

7.3 Viewing overview information

You can use the WebUI of the FastMile 5G Gateway 2 to view information provided by the Overview screen.

Procedure 14 View overview information

Use this procedure to view the following information for the FastMile 5G Gateway 2 that is shown on the Overview screen:

- network overview information: shows the number of connected devices and whether the device is connected to the 5G/4G network and whether it is online
- radio access information: shows the 4G and 5G signal strength
- device information: the types of devices connected to the FastMile 5G Gateway 2 are displayed
- gateway information: shows the name, serial number, hardware version, software version, and running time for the FastMile 5G Gateway 2
- unread messages, if any

1 If you have not already accessed the WebUI, access it as described in section 7.2. The Overview screen appears after you enter the IP address in the address bar of the web browser.

2 If you are logged in to the WebUI, select Overview from the menu.

3	Refresh the page to update the displayed information.
4	STOP. This procedure is complete.

7.4 Viewing status information

You can use the WebUI of the FastMile 5G Gateway 2 to view status information.

Under the Status / General page you can find the following:

- data usage; see Procedure 15
- SIM; see Procedure 16
- LAN; see Procedure 17
- Wi-Fi; see Procedure 18
- IMEI; see Procedure 19
- cellular WAN; see Procedure 20

Under the Status / Cellular page you can find the following:

- 4G: status, PCI, band, EARFCN, ECI, and carrier aggregation; see Procedure 21
- 5G: status, PCI, supported bands, NR-ARFCN, NCI, and carrier aggregation; see Procedure 22

Procedure 15 View data usage

Use this procedure to view data usage for the FastMile 5G Gateway 2.

1	If you are not already logged in to the Nokia FastMile 5G Gateway 2, log in as described in section 7.2.
2	Select Status / General from the FastMile 5G Gateway 2 menu. Find the Data Usage field which shows the amount of data that is downloaded and uploaded from the FastMile 5G Gateway 2 since the last restart.
3	Refresh the page to update the displayed information.
4	STOP. This procedure is complete.

Procedure 16 View SIM information

Use this procedure to view SIM information for the FastMile 5G Gateway 2 such as the following:

- type:
  - removable means uSIM card
  - integrated means eSIM card
- status
- IMSI
- ICCID
- MSISDN

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Status / General page from the FastMile 5G Gateway 2 menu. Check the SIM details field. If the dot is grey, there is no SIM card, the SIM card may not be working, or it is not installed correctly, or you may need to input your PIN number.

Note 1 — For uSIM cards, when status shows '*Available*' it means PIN number verification is needed. When status shows '*Blocked*' it means the SIM PIN is locked and you need to input a PUK number and a new PIN number. When status shows '*Error*' it means the SIM card is destroyed because of a PUK error, modem failure, broken SIM, or specific PIN lock acceptance feature is not active in the CPE but the SIM card is PIN-locked.

Note 2 — After another SIM card B with PIN enabled is inserted to the CPE and its PIN is verified, the SIM card A PIN number will be needed when it is inserted. See Procedure 46.

3 Refresh the page to update the displayed information.

4 STOP. This procedure is complete.

Procedure 17 View LAN information

Use this procedure to view LAN information for the FastMile 5G Gateway 2, such as IP address, subnet mask, received data, and sent data.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Status / General page from the FastMile 5G Gateway 2 menu.

3 Check the Ethernet details field.

If the dot is grey, there is no Ethernet connection. If the dot is green, there is an Ethernet connection.

4 Refresh the page to update the displayed information.

5 STOP. This procedure is complete.

Procedure 18 View Wi-Fi information

Use this procedure to view Wi-Fi information for the FastMile 5G Gateway 2, such as 2.4 GHz channel and transmitting power, and 5 GHz channel, transmitting power, received data, and sent data.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Status / General page from the FastMile 5G Gateway 2 menu.

3 Check the Wi-Fi details field.

If the dot is grey, there is no Wi-Fi connection. If the dot is green, there is a Wi-Fi connection.

4 Refresh the page to update the displayed information.

5 STOP. This procedure is complete.

Procedure 19 View IMEI information

Use this procedure to view IMEI information for the FastMile 5G Gateway 2.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Status / General page from the FastMile 5G Gateway 2 menu. Check the IMEI details field.

3 Refresh the page to update the displayed information.

4 STOP. This procedure is complete.

Procedure 20 View cellular WAN information

Use this procedure to view cellular WAN information for the FastMile 5G Gateway 2, such as connection status, total download, and total upload information.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Status / General page from the FastMile 5G Gateway 2 Status menu.

3 Check the cellular WAN details field.

4 Refresh the page to update the displayed information.

5 STOP. This procedure is complete.

Procedure 21 View 4G status information

Use this procedure to view 4G status information for the FastMile 5G Gateway 2.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Status / Cellular page from the FastMile 5G Gateway 2 menu, and click 4G.

3 Check the 4G cellular detail fields for status, PCI, band, EARFCN, ECI, and carrier aggregation downlink / uplink status information.

Note — When downlink or uplink carrier aggregation information is available, it will be displayed.

If the Status field dot is grey, there is no cellular connection. If the dot is green, there is a cellular connection.

Note — In carrier aggregation, one or more carriers are combined to increase the capacity of the link, thereby increasing the bandwidth for the user.

4 Refresh the page to update the displayed information.

5 STOP. This procedure is complete.

Procedure 22 View 5G status information

Use this procedure to view 5G status information.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Status / Cellular page from the FastMile 5G Gateway 2 menu. and click 5G.

3 Check the 5G cellular detail fields for status, PCI, supported bands, NR-ARFCN, NCI, and carrier aggregation downlink / uplink status information.

Note — When downlink or uplink carrier aggregation information is available, it will be displayed.

If the Status field dot is grey, there is no cellular connection. If the dot is green, there is a cellular connection.

Note — In carrier aggregation, one or more carriers are combined to increase the capacity of the link, thereby increasing the bandwidth for the user.

4 Refresh the page to update the displayed information.

5 STOP. This procedure is complete.

7.5 Viewing statistics

You can use the WebUI of the FastMile 5G Gateway 2 to view the amount of data that has crossed the LAN, cellular, and WLAN interfaces. The statistics screen keeps track of 4G/LTE and 5G counters for connection and data transfer. You can view the following statistic counters:

- LAN; see Procedure 23
- cellular; see Procedure 24
- WLAN; see Procedure 25

Procedure 23 View LAN statistics

Use this procedure to view the following LAN statistics for the FastMile 5G Gateway 2:

- status
- sent bytes
- received bytes
- sent packets
- received packets
- discarded sent packets
- discarded received packets
- sent errors
- received errors
- multicast sent packets
- multicast received packets

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Statistics from the FastMile 5G Gateway 2 menu. Click the LAN tab along the top of the page.

3 Click Refresh to update the displayed information.

4 STOP. This procedure is complete.

Procedure 24 View cellular statistics

Use this procedure to view the following cellular statistics for the FastMile 5G Gateway 2:

- sent bytes
- received bytes
- sent packets
- received packets
- sent errors
- received errors
- discarded sent packets
- discarded received packets

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Statistics from the FastMile 5G Gateway 2 menu. Click the Cellular tab along the top of the page.

3 Click Refresh to update the displayed information.

4 STOP. This procedure is complete.

Procedure 25 View WLAN statistics

Use this procedure to view the following WLAN statistics for the FastMile 5G Gateway 2:

- SSID
- sent bytes
- received bytes
- sent packets
- received packets
- discarded sent packets
- discarded received packets
- sent errors

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Statistics from the FastMile 5G Gateway 2 menu. Click the WLAN tab along the top of the page.

3	Click Refresh to update the displayed information.
4	STOP. This procedure is complete.

7.6 Viewing messages

The Messages screen will display all messages sent by the service provider. You can view and delete messages.

Procedure 26 View messages

Use this procedure to view messages for the FastMile 5G Gateway 2.

1	If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2	Select Messages from the FastMile 5G Gateway 2 menu. You can view or delete your messages.
3	Select the view message tab to see if you have any messages.
4	Click Refresh to update the displayed information.
5	STOP. This procedure is complete.

7.7 Configuring network parameters

You can use the WebUI of the FastMile 5G Gateway 2 to configure parameters for the following:

- wireless 2.4 GHz; see Procedure 27
- wireless 5 GHz; see Procedure 28
- wireless scheduling; see Procedure 29
- Access Point Name; see Procedure 30
- static routes; see Procedure 31
- LAN; see Procedure 32
- LAN IPv6; see Procedure 33

- ACS - Auto Configuration Server; see Procedure 34
- connected devices; see Procedure 35
- cell management; see Procedure 36

Procedure 27 Configure wireless 2.4 GHz parameters

Use this procedure to configure the following wireless 2.4 GHz parameters for the FastMile 5G Gateway 2 in advanced settings mode:

- general settings:
  - enable/disable Wi-Fi 2.4GHz
  - transmission mode
  - channel bandwidth
  - channel
  - transmission power
  - enable Wi-Fi multimedia (WMM)
  - maximum number of clients
- SSID:
  - SSID name
  - enable single SSID
  - enable SSID
  - enable broadcast
  - total number of clients
  - encryption mode
  - Wi-Fi key

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Network from the FastMile 5G Gateway 2 menu, then select Wi-Fi Networks, and click 2.4 GHz.

3 Configure the wireless 2.4 GHz parameters.

4 Click Save Changes.

5 STOP. This procedure is complete.

Procedure 28 Configure wireless 5 GHz parameters

Use this procedure to configure the following wireless 5 GHz parameters for the FastMile 5G Gateway 2 in advanced settings mode:

- general settings:
  - enable/disable Wi-Fi 5 GHz
  - transmission mode
  - channel bandwidth
  - channel
  - transmission power
  - enable Wi-Fi multimedia (WMM)
  - enable MU-MIMO
  - maximum number of clients
- SSID:
  - SSID name
  - enable single SSID
  - enable SSID
  - enable broadcast
  - total number of clients
  - encryption mode
  - Wi-Fi key

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Network from the FastMile 5G Gateway 2 menu, then select Wi-Fi Networks, and click 5 GHz.

3 Configure the wireless 5 GHz parameters.

4 Click Save Changes.

5 STOP. This procedure is complete.

Procedure 29 Configure Wi-Fi scheduling parameters

Use this procedure to configure Wi-Fi scheduling parameters for the FastMile 5G Gateway 2.

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select Network from the FastMile 5G Gateway 2 menu, then select Wi-Fi Networks, and click Wi-Fi Schedule.
3. Select the switch button to Enable Wi-Fi scheduling to turn the wireless signal off for the configured period.
4. Click the + New Schedule button to add a scheduling rule.

   A separate panel appears for configuring wireless schedule rules.
5. Enter a start time and an end time for the period for which you want the wireless signal to be off.
6. Choose the Everyday button or the Specific days of the week button.
7. If you chose specific days, select the check boxes for the desired days.

   The Recurrence Pattern shows the rules created to date.
8. Click Add.
9. STOP. This procedure is complete.

Procedure 30 Configure Access Point Name parameters

Use this procedure to configure Access Point Name parameters for the FastMile 5G Gateway 2.

You can edit and delete access points, except you cannot delete the default access point. Up to eight access points can be configured, and are independent of the router mode or bridge mode. Contact your Nokia representative for more information about access points.

Note 1 — IPTV service type APN can be configured either in router mode or bridge mode. The LAN side setting for the different work modes f the IPTV may be different, refer to the following:

- when IPTV service type is combined with INTERNET service type in a common APN, this APN must work in route mode
- when IPTV service type is not combined with INTERNET service type in a common APN (see WebUI selection for the service type combination allowed), then IPTV service type related APN work mode could be either route mode or bridge mode

Configuration 1: IPTV work mode is route, in case that there is INTERNET service type in different APN, then IPTV service type related APN should have the same LAN setting as INTERNET (the same untagged or VLAN setting, no specific LAN setting on IPTV related APN is used, the LAN setting will be automatic).

Configuration 2: IPTV work mode is bridge, in this case, IPTV service type related APN should be set to specific LAN setting: Ethernet interface and VLAN setting.

IPTV LAN side settings must be aligned with the operator end to end setup. If it is not necessary, Nokia does not recommend the end user to change IPTV settings.

Note 2 — If you configure an Access Point with Ethernet LAN with the Ethernet Interface you are connected to, the WebUI will no longer be available for this Ethernet Interface.

Note 3 — For 5G network slicing, the FastMile 5G Gateway 2 can support this feature based on the APN configuration. You can use the APN mapped INTERNET/data service type for route or bridge mode, however this function is intended to be used primarily for demonstration purposes only, and some settings should be configured through ACS only. Contact your Nokia representative for more information about 5G network slicing configuration.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Network / Cellular from the FastMile 5G Gateway 2 menu, and then click APN - Access Point Name.

3 Configure Access Point parameters and click Refresh.

Configurable parameters include: work mode, service, authentication mode, IPv4, IPv4 netmask, IPv6, and MTU.

4 STOP. This procedure is complete.

Procedure 31 Configure static routes parameters

Use this procedure to configure the following applicable parameters and adding static routes for the FastMile 5G Gateway 2:

- destination IPv4
- destination netmask
- gateway IPv4
- interface

Note — You can edit and delete static routes.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Network from the FastMile 5G Gateway 2 menu, and then click Static Routes.

3 Configure static routes parameters and Click Add+.

4 STOP. This procedure is complete.

Procedure 32 Configure LAN parameters

Use this procedure to configure the following LAN parameters for the FastMile 5G Gateway 2:

- IPv4 address
- subnet mask
- enable DHCP
- DHCP start IP address
- DHCP end IP address

- DHCP lease time
- static DHCP

1	If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2	Select Network from the FastMile 5G Gateway 2 menu, choose LAN Settings, and click LAN.
3	Configure the LAN parameters.
4	Click Save Changes.
5	Bind a MAC address to the LAN by entering the MAC and IP addresses in the Static DHCP Entry fields and then clicking Add. Repeat for all MAC addresses to be bound.
6	STOP. This procedure is complete.

Procedure 33 Configure LAN IPv6 parameters

Use this procedure to enable or disable IPv6 DHCP LAN for the FastMile 5G Gateway 2.

1	If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2	Select Network from the FastMile 5G Gateway 2 menu, choose LAN Settings, and click LAN IPv6
3	Click the switch button to enable or disable IPv6 DHCP LAN.
4	STOP. This procedure is complete.

Procedure 34 Configure ACS - Auto Configuration Server parameters

Use this procedure to configure ACS - Auto Configuration Server parameters for the FastMile 5G Gateway 2.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Network from the FastMile 5G Gateway 2 menu, and click ACS - Auto Configuration Server.

3 Configure ACS parameters by entering the required information.

4 Click Save Changes.

5 STOP. This procedure is complete.

Procedure 35 View connected devices

Use this procedure to view connected devices for the FastMile 5G Gateway 2. The following information will appear in a table and you can click delete for a device no longer being used:

- status: active/inactive
- connection type
- device name
- IPv4 address
- IPv6 address
- hardware address
- IP address allocation
- lease remaining
- last active time

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Network from the FastMile 5G Gateway 2 menu, and click Connected Devices.

3 STOP. This procedure is complete.

Procedure 36 Configure cell management

Use this procedure to configure cell management for the FastMile 5G Gateway 2, such as to trigger cell measurement and to add configured cells.

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select Network /Cellular from the FastMile 5G Gateway 2 menu, and click Cell Management.
3. Click Measure to begin cell measurement. From the drop-down menu, select the number of items per page.
4. Click Add + to add a configured cell. The Add Cell window appears.
5. Add the PCI, EARFCN, and band values and click Add +.
6. Click Refresh.
7. STOP. This procedure is complete.

7.8 Configuring application parameters

You can use the WebUI of the FastMile 5G Gateway 2 to configure parameters for the following:

- port forwarding; see Procedure 37
- port triggering; see Procedure 38
- configure NTP; see Procedure 39

Procedure 37 Configure port forwarding parameters

Use this procedure to configure the following port forwarding parameters for the FastMile 5G Gateway 2:

- application name
- WAN port
- LAN port
- internal client

- protocol
- WAN connection list

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select Application from the FastMile 5G Gateway 2 menu, and click Port Forwarding.
3. Configure the port forwarding parameters.
4. Click Add.
5. If a port forwarding configuration already exists, click Delete to remove it.
6. STOP. This procedure is complete.

Procedure 38 Configure port triggering parameters

Use this procedure to configure the following port triggering parameters for the FastMile 5G Gateway 2:

- application name
- open port
- triggering port
- expire time
- open protocol
- triggering protocol
- WAN connection list

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select Application from the FastMile 5G Gateway 2 menu, and click Port Triggering.
3. Configure the port triggering parameters.
4. Click Add.

5	If a port triggering configuration already exists, click Delete to remove it.
6	STOP. This procedure is complete.

Procedure 39 Configure NTP

Use this procedure to enable the following NTP service and configure NTP parameters for the FastMile 5G Gateway 2:

- enable NTP
- primary time server
- secondary time server
- third time server
- time zone

1	If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2	Select System / General from the FastMile 5G Gateway 2 menu, and click NTP.
3	Select the Switch button to enable NTP service.
4	Configure the NTP parameters.
5	Click Save Changes.
6	STOP. This procedure is complete.

7.9 Configuring security parameters

You can use the WebUI of the FastMile 5G Gateway 2 to configure parameters for the following:

- access control level; see Procedure 40
- firewall security level; see Procedure 41
- IP filter; see Procedure 42
- ALG and DMZ; see Procedure 43

Procedure 40 Configure access control level parameters

Use this procedure to configure access control level parameters for the FastMile 5G Gateway 2. Note that the access control level takes precedence over the firewall policy configured in Procedure 41.

Note — The trusted network object will be shared for all WAN connections; it is not applied individually to a WAN connection.

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select Security from the FastMile 5G Gateway 2 menu, and click Access Control.
3. Switch the ACL flag for the LAN port on or off.
4. Switch the ACL flag for the WAN port on or off.
5. STOP. This procedure is complete.

Procedure 41 Configure the firewall security level

The firewall security level only applies to services provided by the FastMile 5G Gateway 2. Internet access from the LAN side is not affected by the firewall.

The following firewall security levels can be configured for the FastMile 5G Gateway 2:

- off: All inbound and outbound traffic is allowed
- low: All outbound traffic and pinhole-defined inbound traffic is allowed
- high: all inbound traffic is denied and only minimal common outbound services are permitted

Note — The access control level configured in Procedure 40 takes precedence over the firewall security level configured in this procedure.

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select Security from the FastMile 5G Gateway 2 menu, and click Firewall.

3	Configure the firewall security level and enable Attack Protection to prevent malicious user exploitation.
4	Click Save Changes.
5	STOP. This procedure is complete.

Procedure 42 Configure IP filter parameters

Use this procedure to configure the following IP filter parameters for the FastMile 5G Gateway 2:

- enable IP filter
- mode
- internal client
- local IP address
- source subnet mask
- remote IP address
- destination subnet mask
- protocol

1	If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2	Select Security from the FastMile 5G Gateway 2 menu, and click IP Filter.
3	Configure the IP filter parameters.
4	If an IP filter configuration already exists, click Delete to remove it.
5	Click Save Changes.
6	STOP. This procedure is complete.

Procedure 43 Configure ALG and DMZ parameters

Use this procedure to configure the following ALG and DMZ parameters for the FastMile 5G Gateway 2:

- ALG configuration:
  - FTP
  - TFTP
  - SIP
  - H323
  - RTSP
  - L2TP
  - IPSEC
  - PPTP
- DMZ configuration:
  - WAN connection list
  - DMZ IP address
  - enable DMZ

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select Security from the FastMile 5G Gateway 2 menu, and click DMZ/ALG.

3 Configure the ALG parameters.

4 Click Save Changes for ALG.

5 Configure the DMZ parameters.

6 Click Save Changes for DMZ.

7 STOP. This procedure is complete.

7.10 Performing diagnostics

You can use the WebUI of the FastMile 5G Gateway 2 to perform the following diagnostic functions:

- view logs; see Procedure 44
- perform speed tests by Ookla; see Procedure 45

Procedure 44 View logs

Use this procedure to view logs for the FastMile 5G Gateway 2.

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select Diagnostics from the FastMile 5G Gateway 2 menu, and then select Logs.
3. Choose a Logging level from the drop-down menu to determine what types of events are to be recorded in the log file.
4. Choose a Viewing Level from the drop-down menu to determine what types of events are to be shown from the log file.
5. Click Save Changes.

   The log file is displayed at the bottom of the window.
6. Click Refresh to show the current log information.
7. STOP. This procedure is complete.

Procedure 45 Perform speed tests by Ookla

Use this procedure to perform speed tests by Ookla for the FastMile 5G Gateway 2. The speed test results will display the following parameter information:

- acquired time
- download speed (Mbps)
- upload speed (Mbps)
- latency (ms)
- jitter (ms)
- server location

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select Diagnostics from the FastMile 5G Gateway 2 menu, and then select Speed Test by Ookla.

3 Press the Start Speed Test button on the top right of the screen to initiate a new test. You should be prompted to agree to use this speed test service by Ookla as per their privacy policy. The test may take up to 45 seconds to complete.

4 STOP. This procedure is complete.

7.11 Configuring system parameters

You can use the WebUI of the FastMile 5G Gateway 2 to do the following:

Under the System / General page you can find the following:

- unlock or unblock SIM card; see Procedure 46
- change password; see Procedure 47
- reboot; see Procedure 48
- reset factory default settings; see Procedure 49
- upgrade firmware; see Procedure 50
- configure data traffic blocking; see Procedure 51

Under the System / Device Management page you can find the following:

- configure an alias for a host; see Procedure 52

Under the System / LED Management page you can find the following:

- configure LED management; see Procedure 53

Procedure 46 Unlock or unblock SIM card

Use this procedure to unlock or unblock SIM card service, but this is not required to unblock subscriber access to the device.

Note — A SIM PIN number is defined by default and is provided in a SIM plastic envelope.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select System / General page from the FastMile 5G Gateway 2 menu.

3 To unlock the SIM card, click Enter PIN to unlock your SIM shown on the screen, and the Enter PIN to unlock SIM entry box will appear. Enter your PIN number.

Note — Entering the SIM PIN number incorrectly three times will result in the SIM card being blocked.

4 To unblock the SIM card, click Enter your PIN to unlock your SIM shown on the screen. Enter your PUK and PIN number.

Note — Entering the SIM PUK number incorrectly 10 times will result in the SIM card being disabled. End users will need to contact their operator to enable the SIM card.

5 STOP. This procedure is complete.

Procedure 47 Change password

Use this procedure to change the password for the FastMile 5G Gateway 2.

Note 1 — This procedure applies only to the end user, and not to the operator.

Note 2 — Passwords must contain 10 to 64 characters. Supported character combinations include the following:

- numbers/lowercase letters/uppercase letters
- numbers/lowercase letters/special characters
- numbers/uppercase letters/ special characters
- lowercase letters/uppercase letters/special characters

Special characters include the following: !#+,-/:=@_

Passwords cannot start with special characters.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select System / General page from the FastMile 5G Gateway 2 menu.

3 Click Change Password and enter a new password.

4 Re-type the new password to confirm it.

5 STOP. This procedure is complete.

Procedure 48 Reboot the FastMile 5G Gateway 2

Use this procedure to reboot the FastMile 5G Gateway 2.

Note 1 — A reboot preserves the configured settings.

Note 2 — For a PIN-locked SIM card after a device reboot, a PIN number will need to be entered. See Procedure 46.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select System / General page from the FastMile 5G Gateway 2 menu.

3 Find Reboot Device and click Reboot to reboot the FastMile 5G Gateway 2.

4 STOP. This procedure is complete.

Procedure 49 Reset factory default settings

Use this procedure to reset the FastMile 5G Gateway 2 to its factory default settings.

Note 1 — All configuration data will be erased as a result of resetting to the factory default settings.

Note 2 — The FastMile 5G Gateway 2 might restart twice during a factory reset. This is normal behavior.

Note 3 — For a PIN-locked SIM card after a factory reset, a PIN number will need to be entered. See Procedure 46.

1 If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.

2 Select System / General page from the FastMile 5G Gateway 2 menu.

3	Find Factory Reset, and click Reset to restore the FastMile 5G Gateway 2 to its factory default settings.
4	STOP. This procedure is complete.

Procedure 50 Upgrade firmware

Use this procedure to upgrade firmware for the FastMile 5G Gateway 2.

Note — This procedure applies only to the operator; it is not applicable to the end user.

1	If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2	Select System / General page from the FastMile 5G Gateway 2 menu, find Firmware Upgrade, and click Upgrade. A separate window opens.
3	To select the file, either drag and drop it in the window or click browse for the file, choose the file, and click Open.
4	Click Upgrade.
5	STOP. This procedure is complete.

Procedure 51 Configure data traffic blocking

Use this procedure to block FastMile 5G Gateway 2 traffic, except for OAM traffic.

Note — This procedure applies only to the operator; it is not applicable to the end user.

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select System / General page from the FastMile 5G Gateway 2 menu.
3. Enable Block Data Traffic.
4. STOP. This procedure is complete.

Procedure 52 Configure an alias for a host

Use this procedure to configure an alias for a host for the FastMile 5G Gateway 2.

1. If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2. Select System / Device Management page from the FastMile 5G Gateway 2 menu.
3. Configure an alias for a specific host.
4. Click Add device.
5. STOP. This procedure is complete.

Procedure 53 Configure LED management

Use this procedure to configure the following LED management settings for the FastMile 5G Gateway 2:

- LED on or off

1	If you are not already logged in to the FastMile 5G Gateway 2, log in as described in section 7.2.
2	Select System / LED Management from the FastMile 5G Gateway 2 menu.
3	Configure LED management.
4	Click Save Changes.
5	STOP. This procedure is complete.

7.12 Logging out

To log out, click Logout from the bottom of the WebUI menu.

8 Glossary

This glossary provides the expansions and optional descriptions of most acronyms and initialisms that appear in this document.

3GPP 3rd Generation Partnership Project

4FF 4th Form Factor

ABA Automated Beam Alignment

AC Alternating Current

ALG Application Level Gateway

ANSI American National Standards Institute

AP Access Point

APN Access Point Name

CA Carrier Aggregation

CB Certification Body

CE Conformité Européanne (European Health and Safety product label)

DHCP Dynamic Host Configuration Protocol

DL Down Link

DMZ Demilitarized Zone

DSCP Differentiated Services Code Point

DUID Device Unique Identifier

EARFCN E-UTRA Absolute Radio Frequency Channel Number

ECI External Call Interface

EN-DC E-UTRAN New Radio – Dual Connectivity

EPC Evolved Packet Core

E-UTRA Evolved Universal Terrestrial Radio Access

EIP Electronic Information Products

EMC Electromagnetic Compatibility

EMI Electromagnetic Interference

EPC Evolved Packet Core

ESD	Electrostatic Discharge
ETL	Electrotechnical Laboratory
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
FDD	Frequency Division Duplex
FWA	Fixed Wireless Access
GCF	The Global Certification Forum
GEM	Energy performance and efficiency standards
HSS	Home Subscriber Server
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICCID	Integrated Circuit Card Identifier
IEEE	Institute of Electrical and Electronics Engineers
IMEI	International Mobile Equipment Identification
IP	International Protection or Internet Protocol
IPv6	Internet Protocol version 6
ISED	Innovation, Science and Economic Development regulations
JATE	Japan Approvals Institute for Telecommunications Equipment
LAN	Local Area Network
LED	Light Emitting Diode
LTE	Long-Term Evolution
MAC	Media Access Control
MCV	Maximum Concentration Value or Minimum Concentration Value
MIMO	Multiple-Input Multiple-Output
MME	Mobility Management Entity
MU-MIMO	Multi-User Multiple-Input Multiple Output
NAC	Network Access Control
NEC	National Electrical Code

NR	New Radio
NSA	Non-Standalone
NTP	Network Time Protocol
NWCC	Nokia Wi-Fi Cloud Controller
OAM	Operations and Maintenance
OPID	Operator Identifier
PC	Personal Computer
PCI	Physical Cell Identifier
PCRF	Policy and Charging Rules Function
PDF	Portable Document Format
PIN	Personal Identification Number
PoE	Power over Ethernet
PSE	Japan Product Safety Electrical Appliance and Material
QR	Quick Response
RF	Radio Frequency
RGW	Residential Gateway
RoHS	Restriction of Hazardous Substances
RRM	Radio Resource Management
RSRP	Reference Signal Received Power
RSRQ	Reference Signal Received Quality
RSSI	Received Signal Strength Indicator
SA	Service Affecting or Standalone
SIM	Subscriber Identify Module
SINR	Signal-to-Interference-plus-Noise Ratio
SRS	Sounding Reference Signal
SSID	Service Set identifier
TAS	Transmit Antenna Switching
TCP	Transmission Control Protocol

TDD	Time Division Duplex
TEL	Telephone port
TELEC	Japan Telecom Engineering Center
UDP	User Datagram Protocol
UL	Underwriters' Laboratories or Uplink
URL	Uniform Resource Locater
USB	Universal Serial Bus
VCCI	Japan Voluntary Control Council for Interference
VDC	Volts Direct Current
VPN	Virtual Private Network
WAN	Wide Area Network
WFA	Wi-Fi Alliance industry standards
WebUI	Graphic User Interface
Wi-Fi	Wireless Fidelity
WLAN	Wireless Local Area Network

Customer Document and Product Support

Customer Documentation

Customer Documentation Welcome Page

Technical Support

Product Support Portal

Documentation Feedback

Customer Documentation Feedback

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