NOKIA

LTE Radio Access, Rel. LTE 18, Operating Documentation, Issue 01

Flexi Zone Micro BTS Product Description

DN09158819
Issue 24
Approval Date 2018-03-08

The information in this document applies solely to the hardware/software product (“Product”) specified herein, and only as specified herein. Reference to “Nokia” later in this document shall mean the respective company within Nokia Group of Companies with whom you have entered into the Agreement (as defined below).

This document is intended for use by Nokia's customers (“You”) only, and it may not be used except for the purposes defined in the agreement between You and Nokia (“Agreement”) under which this document is distributed. No part of this document may be used, copied, reproduced, modified or transmitted in any form or means without the prior written permission of Nokia. If You have not entered into an Agreement applicable to the Product, or if that Agreement has expired or has been terminated, You may not use this document in any manner and You are obliged to return it to Nokia and destroy or delete any copies thereof.

The document has been prepared to be used by professional and properly trained personnel, and You assume full responsibility when using it. Nokia welcomes your comments as part of the process of continuous development and improvement of the documentation.

This document and its contents are provided as a convenience to You. Any information or statements concerning the suitability, capacity, fitness for purpose or performance of the Product are given solely on an “as is” and “as available” basis in this document, and Nokia reserves the right to change any such information and statements without notice. Nokia has made all reasonable efforts to ensure that the content of this document is adequate and free of material errors and omissions, and Nokia will correct errors that You identify in this document. Nokia's total liability for any errors in the document is strictly limited to the correction of such error(s). Nokia does not warrant that the use of the software in the Product will be uninterrupted or error-free.

NO WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF AVAILABILITY, ACCURACY, RELIABILITY, TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS MADE IN RELATION TO THE CONTENT OF THIS DOCUMENT. IN NO EVENT WILL NOKIA BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL OR ANY LOSSES, SUCH AS BUT NOT LIMITED TO LOSS OF PROFIT, REVENUE, BUSINESS INTERRUPTION, BUSINESS OPPORTUNITY OR DATA THAT MAY ARISE FROM THE USE OF THIS DOCUMENT OR THE INFORMATION IN IT, EVEN IN THE CASE OF ERRORS IN OR OMISSIONS FROM THIS DOCUMENT OR ITS CONTENT.

This document is Nokia proprietary and confidential information, which may not be distributed or disclosed to any third parties without the prior written consent of Nokia.

Nokia is a registered trademark of Nokia Corporation. Other product names mentioned in this document may be trademarks of their respective owners.

Important Notice on Product Safety

This product may present safety risks due to laser, electricity, heat, and other sources of danger.

Only trained and qualified personnel may install, operate, maintain or otherwise handle this product and only after having carefully read the safety information applicable to this product.

The safety information is provided in the Safety Information section in the “Legal, Safety and Environmental Information” part of this document or documentation set.

Nokia is continually striving to reduce the adverse environmental effects of its products and services. We would like to encourage you as our customers and users to join us in working towards a cleaner, safer environment. Please recycle product packaging and follow the recommendations for power use and proper disposal of our products and their components.

If you should have questions regarding our Environmental Policy or any of the environmental services we offer, please contact us at Nokia for any additional information.

Table of Contents

This document has 75 pages

List of Figures

List of Tables

Summary of changes

Changes between document issues are cumulative. Therefore, the latest document issue contains all changes made to previous issues.

This document is common for FDD-LTE, TD-LTE, and WCDMA. This document is common for single-band Micro hardware variants of the Flexi Zone Micro platform. You may find here information about solutions that are not available or supported in a specific SW release or RAT. For features supported in your SW release, see the respective feature documentation chapter in the system library.

Table 1 Releases covered by the document

Product	Release
Long Term Evolution	RL70 and later releases
TD LTE	RL55 and later releases
WCDMA	WCDMA15FZ and later releases

This document describes all variants of Flexi Zone Micro BTS. The differences between the variants are indicated in the respective chapters.

Changes between issues 23 (2018-01-30) and 24 (2018-03-08)

- **Introduction to Flexi Zone Micro BTS**
  - Added FWGR (introduced by LTE4247) to Table 2: Flexi Zone Micro BTS variants.
  - Added "C" and "D" and a "Note" to FMWx row in Table 3: Flexi Zone Micro BTS naming convention to reflect support of FMWC and FMWD single-FZM strand mount bracket kits introduced by LTE3317.
  - Added Figure: Flexi Zone Micro BTS (FWGR).
- **Construction**
  - Added FWGR (introduced by LTE4247) to Table 7: Construction of Flexi Zone Micro BTS (WCDMA/LTE variants).
  - Removed reference to trapezoidal power input from the FWFA row in Table 5: Construction of Flexi Zone Micro BTS (FDD-LTE variants).
  - Added reference to "Omni: FAWB" antenna to FWPF and FWPG rows in Table 5: Construction of Flexi Zone Micro BTS (FDD-LTE variants).
  - Added new section Directional antenna (FAWY) (introduced by LTE4247).
- Added new section Flexi Zone Micro BTS (FWGR) interfaces (introduced by LTE4247) to **Interfaces**.
- Added new section *Brazil compliance*

Changes between issues 22 (2017-11-02) and 23 (2018-01-30)

- LTE3657 update: Removed "3 MHz" from FWPF list of supported bandwidths in Table 5: Construction of Flexi Zone Micro BTS (FDD-LTE variants)
- Updated B14 and B28 compliance data in Table 38: Required Compliance Boundaries (CB) by band (all 5 W FZM variants).

Changes between issues 21 (2017-09-22) and 22 (2017-11-02)

- **Introduction to Flexi Zone Micro BTS**
  Removed strand-mount information from the FMWx row in Table 3: Flexi Zone Micro BTS naming convention.
- **Air interface**
  Updated FWFJ software upgrade information in section WCDMA.

Changes between issues 20 (2017-08-07) and 21 (2017-09-22)

- **Introduction to Flexi Zone Micro BTS**
  Updated Table 2: Flexi Zone Micro BTS variants, adding rows **FWPF** (introduced by LTE3657) and **FWPG** (introduced by LTE3658).
- **Construction**
  - Updated Table 5: Construction of Flexi Zone Micro BTS (FDD-LTE variants), adding **FWPF** (LTE3657) and **FWPG** (LTE3658) rows.
  - Updated Table 5: Construction of Flexi Zone Micro BTS (FDD-LTE variants) and Table 6: Construction of Flexi Zone Micro BTS (TD-LTE variants), adding reference to the **FAWU** integrated omni antenna to rows for BTS models supporting Bands 7, 38, 40, and 41 (BTS models: FWH1, FWHA, FWHC, FWHE, FWHF, FWHM, FWHN, FWHR, FWHO, FWHT, FWHW, FWHX, and FWND). Omni antenna FAWU is introduced by LTE3972.
  - Updated Table 6: Construction of Flexi Zone Micro BTS (TD-LTE variants), adding reference to the **FAWX** integrated directional antenna to the FWH1 row. Directional panel antenna FAWX is introduced by LTE4120.
  - Added new section Directional antenna (FAWX) (introduced by LTE4120).
  - Updated section Omnidirectional antenna (FAWT) to include information pertaining to new antenna variant 474371A (introduced by LTE3972).
  - Added new section Omnidirectional antenna (FAWU) (introduced by LTE3972).
- **Management and software**
  Added information regarding the availability of 5620 SAM, 9959 NPO, and 9952 WPS network element management tools.
- **Flexi Zone Micro BTS (FWEA, FWEA3, FWFA, FWFJ, FWHO, FWHN, FWPF, FWPG) interfaces**
  Added BTS variants FWPF (LTE3657) and FWPG (LTE3658) to section, table, and figure titles.
- **Installing base stations to ensure installer safety (2x5 W variants)**
  Added "**14, 28**" row in Table 38: Required Compliance Boundaries (CB) by band (all 5 W FZM variants).

1 Introduction to Flexi Zone Micro BTS

Brief description of Flexi Zone Micro BTS and list of all available variants.

Flexi Zone Micro BTS overview

The Flexi Zone Micro BTS is a small cell BTS optimized for an outdoor micro-cell environment. The product design utilizes a small cell-specific radio architecture based on a radio frequency integrated circuit device, and an integrated baseband processing solution that enables feature parity with Flexi macro BTS solutions.

Flexi Zone Micro BTS hardware variants described in this document are the single-band outdoor Micro BTS variants.

The main application of the Flexi Zone Micro BTS is to help deliver an improved mobile broadband experience by enhancing coverage and capacity both indoors and outdoors. Thanks to its small size and fanless solution the BTS can be used in micro cell applications. It can be deployed at street level and on rooftops in order to cover traffic hotspots, fill network coverage holes, and improve coverage inside buildings such as airports and railway stations.

The Flexi Zone Micro BTS provides functionality defined by 3GPP for an eNodeB and supports standard network interfaces to other network elements, that is S1 and X2.

The product's performance is defined in a way that the air-interface is the only thing which limits the throughput. The HW platform supports full throughput capability. The physical transport interface is optimized for IP-based transport solutions. Furthermore, the BTS supports varying transmit power.

Flexi Zone Micro BTS hardware variants

Flexi Zone Micro BTS is available in these variants:

Table 2 Flexi Zone Micro BTS variants

Variant name	Sales code	Technology	Supports:
FWEA	472898A	FDD-LTE	BC3
FWEA3	474406A	FDD-LTE	BC3
FWEB	472941A	FDD-LTE	BC3, Wi-Fi, PSE
FWFA	473040A	FDD-LTE	BC2/25
FWFJ	473772A	WCDMA / FDD-LTE	BC2/25, pre-loaded with WCDMA software[1)]
FWGB	472851A	FDD-LTE	BC1
FWGP	473993A	WCDMA	BC1, pre-loaded with WCDMA software
	474173A	FDD-LTE	BC1, pre-loaded with LTE software
FWGR	474447A	WCDMA *(future release)*	BC1, full band, pre-loaded with WCDMA software
	474448A	FDD-LTE	BC1, full band, pre-loaded with LTE software

1) Software limits usage to Band 2 only.

Table 2 Flexi Zone Micro BTS variants (Cont.)

Variant name	Sales code	Technology	Supports:
FWH1	473465A	TD-LTE	BC38, narrow band, PSE
FWHA	472897A	FDD-LTE	BC7
FWHC	472938A	FDD-LTE	BC7, low band, Wi-Fi, PSE
FWHM	473147A	FDD-LTE	BC7, high band, Wi-Fi, PSE
FWHN	473148A	FDD-LTE	BC7, high band
FWHO	473149A	FDD-LTE	BC7, low band
FWHE	472939A	TD-LTE	BC38/41, narrow band
FWHF	472940A	TD-LTE	BC41, narrow band
FWHR-FB	473548A	TD-LTE	BC41, full band, PSE [2)]
FWHR-LB	473603A	TD-LTE	BC41, low band, PSE [2)]
FWHR-HB	473604A	TD-LTE	BC41, high band, PSE [2)]
FWHT-FB	473531A	TD-LTE	BC41, full band, PSE [2)]
FWHT-LB	473737A	TD-LTE	BC41, low band, PSE [2)]
FWHT-HB	473738A	TD-LTE	BC41, high band, PSE [2)]
FWHW	473605A	TD-LTE	BC38, full band
FWHX	473711A	TD-LTE	BC38/41, narrow band, PSE [2)]
FWIB	472899A	FDD-LTE	BC4
FWND	473122A	TD-LTE	BC40, full band
FWPF	474162A	FDD-LTE	BC14 (Upper 700 MHz, D block)
FWPG	474163A	FDD-LTE	BC28 (700 MHz, R3 subset)

See Table 5: Construction of Flexi Zone Micro BTS (FDD-LTE variants), Table 6: Construction of Flexi Zone Micro BTS (TD-LTE variants), and Table 7: Construction of Flexi Zone Micro BTS (WCDMA/LTE variants) for details regarding supported UL/DL, bandwidths, number of carriers, power, and antennas.

[2)] FWHR, FWHT, and FWHX are supported in software releases TL15A and in TL16A onwards, but are not supported in the TL16 software release.

Flexi Zone Micro BTS naming convention

The Flexi BTS family is named according to the following format: F*xxx*. Table 3: Flexi Zone Micro BTS naming convention shows the explanation of the format.

Note: Table 3: Flexi Zone Micro BTS naming convention might not list all possible variants/items. Additionally, some items might not be available in certain releases.

Table 3 Flexi Zone Micro BTS naming convention

Abbreviation	Description
F*xxx*	**Flexi family**
FAW*x*	**Flexi Zone Micro BTS antenna** Can be a directional, omnidirectional, or GPS antenna. *x* represents additional product identification if necessary.
FMW*x*	**Flexi Zone Micro BTS mounting bracket** *x* can indicate one of the following: • *A* - wall and pole mounting bracket (472858A) • *B* - directional antenna tilt bracket (473031A) • *C* - single-FZM strand mount bracket kit (473949A) • *D* - single-FZM strand mount bracket kit with omni antenna mount (473950A) • *G* - single-FZM pole mount bracket kit (474013A) • *H* - dual-FZM pole mount bracket kit (474312A) **Note:** All strand mount deployments must use 75-130 Vac trapezoidal power. Meaning that only BTS variants labeled as supporting 75-130 Vac trapezoidal power, and cabled as such, may be strand mounted. Refer to the tables in section Construction of Flexi Zone Micro BTS variants for device power input supported for each BTS variant.
FOS*x*	**Flexi Zone Micro BTS SFP** *x* can indicate one of the following: • *1* - optical SFP 1000Base-BX, 10 km (6.21 m), single-mode, 1490 nm TX/1310 nm RX • *2* - optical SFP 1000Base-BX, 10 km (6.21 m), single-mode, 1310 nm TX/1490 nm RX • *3* - optical SFP 1000Base-BX, 40 km (24.85 m), single-mode, 1490 nm TX/1310 nm RX • *4* - optical SFP 1000Base-BX, 40 km (24.85 m), single-mode, 1310 nm TX/1490 nm RX • *C* - optical SFP 1000Base-LX, 10 km (6.21 m), single-mode, 1310 nm • *D* - optical SFP 1000Base-SX, 300 m (328.08 yd), multi-mode, 850 nm
FPW*x*	**Flexi Zone Micro BTS power cable** *x* can indicate one of the following: • *A* - AC power cable, MIL-C-38999 connector, 10 m (32 ft) • *C* - AC power cable, MIL-C-38999 connector, 10 m (32 ft), EU • *O* - AC power cable, MIL-C-38999 connector, 10 m (32 ft), 18 GA • *Z* - AC power cable, M12 power C-code connector, 10 m (32 ft)

Table 3 Flexi Zone Micro BTS naming convention (Cont.)

Abbreviation	Description
	• *1* - AC power cable, M12 power C-code connector, 10 m (32 ft), EU • *2* - AC power cable, M12 power C-code connector, 10 m (32 ft), 14 GA
FW*xy*	**Flexi Zone Micro BTS variant** *x* can indicate one of the following: • *E* - 1800 MHz (FDD-LTE band 3) • *F* - 1900 MHz (WCDMA and/or FDD-LTE band 2/25) • *G* - 2100 MHz (WCDMA and/or FDD-LTE band 1) • *H* - 2600 MHz (FDD-LTE band 7, TD-LTE bands 38, 41) • *I* - 2100 MHz (AWS) (FDD-LTE band 4) • *N* - 2300 MHz (TD-LTE band 40) • *P* - 700 MHz (FDD-LTE bands 14, 28) *y* represents additional product identification if necessary.

Flexi Zone Micro BTS hardware appearance

Figure 1 Flexi Zone Micro BTS (FWGB, FWGP, FWHA, FWIB, FWPF, FWPG)

Figure 2 Flexi Zone Micro BTS (FWFA, FWFJ, FWEA, FWEA3, FWHE, FWHF, FWHO, FWHN, FWND, FWHT, FWHW)

Figure 3 Flexi Zone Micro BTS (FWEB, FWHC, FWHM)

Figure 4 Flexi Zone Micro BTS (FWH1, FWHR, FWHX)

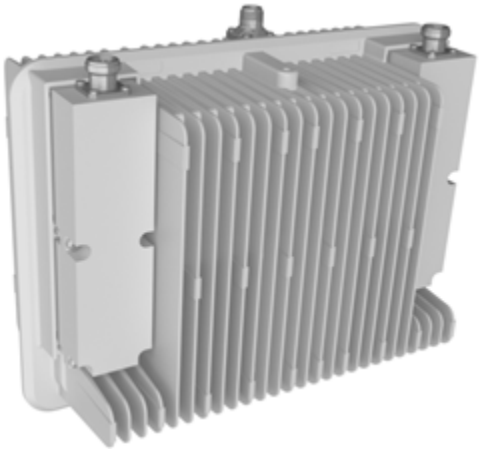
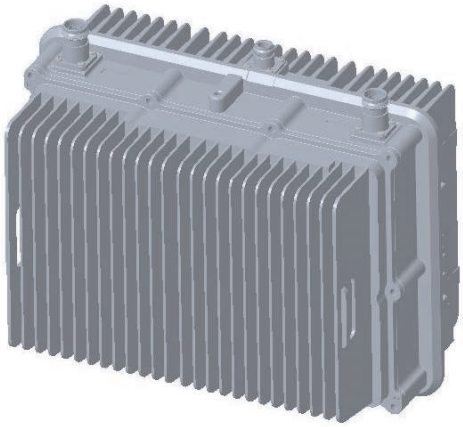


Figure 5 Flexi Zone Micro BTS (FWGR)



Flexi Zone Micro BTS related documentation

More information on Flexi Zone Micro BTS can be found in these documents:

- *Flexi Zone Micro BTS Product Description*
- *Installing and Cabling Flexi Zone Micro BTS*

- *Installing and Cabling Flexi Zone Micro High Power 2x20 W BTS*
- *Flexi Zone Micro BTS Environmental Product Declaration*
- *LTE Flexi Zone Radio Network Planning Guidelines*
- *Commissioning Cloud Flexi Zone Controller*
- *Flexi Zone BTS Parameters*
- *Flexi Zone BTS Alarms and Faults*
- *Troubleshooting LTE RAN*

Note: Flexi Zone Outdoor Mini-Macro (MM) BTS hardware variants are described in the *Flexi Zone Outdoor Mini-Macro BTS Product Description* document. Flexi Zone Multiband Outdoor (MBO) Micro BTS hardware variants are described in the *Flexi Zone Multiband Outdoor Micro BTS Product Description* document.

2 Construction

Description of what elements a Flexi Zone Micro BTS can consist of.

All Flexi Zone Micro BTS variants are outdoor-capable and weather-sealed. A Flexi Zone Micro BTS consists of the following elements:

- **Core base station module**
  All connectors of the core mechanics are installed with gaskets that weatherproof and shield the IP65 core against water, snow, and solid foreign objects. The operational temperature range is -40°C-+55°C (-40°F-+131°F). The storage temperature range is -40°C-+70°C (-40°F-+158°F). The core mechanics also provide EMC shielding. The core module integrates the following items into one single unit:
  - RF
  - Baseband functionality
  - Clock and control
  - External interfaces
  - Transmission

  Some variants also contain an integrated Wi-Fi antenna that enables Flexi Zone Micro BTS to function as a wireless Access Point (AP).
- **Bluetooth antenna**
  All variants feature an integrated Bluetooth antenna. The Bluetooth antenna enables local management of the Flexi Zone Micro BTS with a PC. Output power is between 8.7 and 11.5 EIRP depending on temperature and data rate.
- **Optional GPS antenna**
  The GPS signal can be used as a synchronization source. Both GPS antenna FAWD (472932A) and GPS/GLONASS antenna FAWG (473100A) can be used with any Flexi Zone Micro BTS variant. However, only FWHC and FWHM support GLONASS (*LTE1781: Integrated Multi-GNSS Sync Support*).
- **Available antenna options**
  - Directly connected omni antennas
  - Directly connected directional antennas
  - Customer-supplied remote antennas

  Note: Such antennas must meet the requirements outlined by the antenna installation section in the installation manual and be equipped with additional in-line surge protection.

- **Module cables, accessories**
  All cables are in protection class IP65. Accessories include, for example, a mounting bracket, ground lug, cable strain reliefs, environmental grommets.

The functional diagram of the BTS is shown in Figure 6: Flexi Zone Micro BTS (FWGB, FWGP, FWHA, FWIB, FWFA, FWFJ, FWEA, FWEA3, FWH1, FWHO, FWHN, FWHE, FWHF, FWHR, FWHT, FWHX, FWHW) functional diagram and Figure 7: Flexi Zone Micro BTS (FWEB, FWHC, FWHM) functional diagram.

Figure 6 Flexi Zone Micro BTS (FWGB, FWGP, FWHA, FWIB, FWFA, FWFJ, FWEA, FWEA3, FWH1, FWHO, FWHN, FWHE, FWHF, FWHR, FWHT, FWHX, FWHW) functional diagram

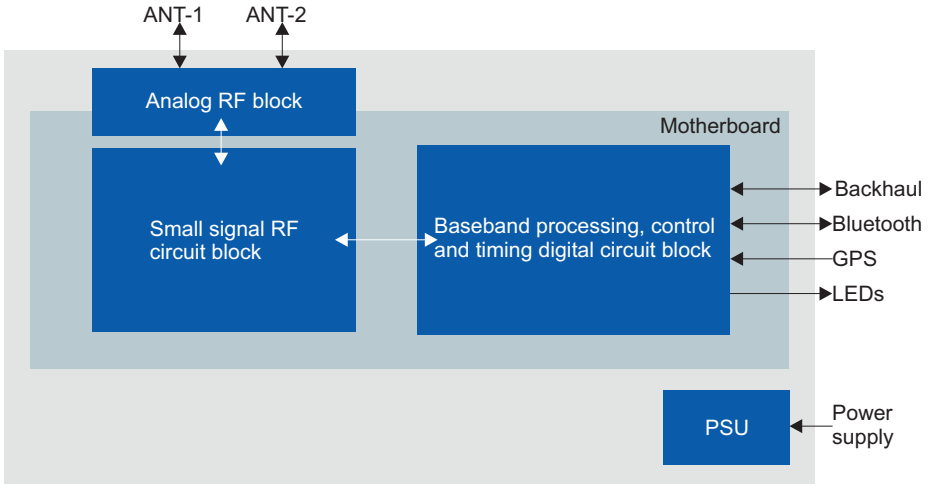
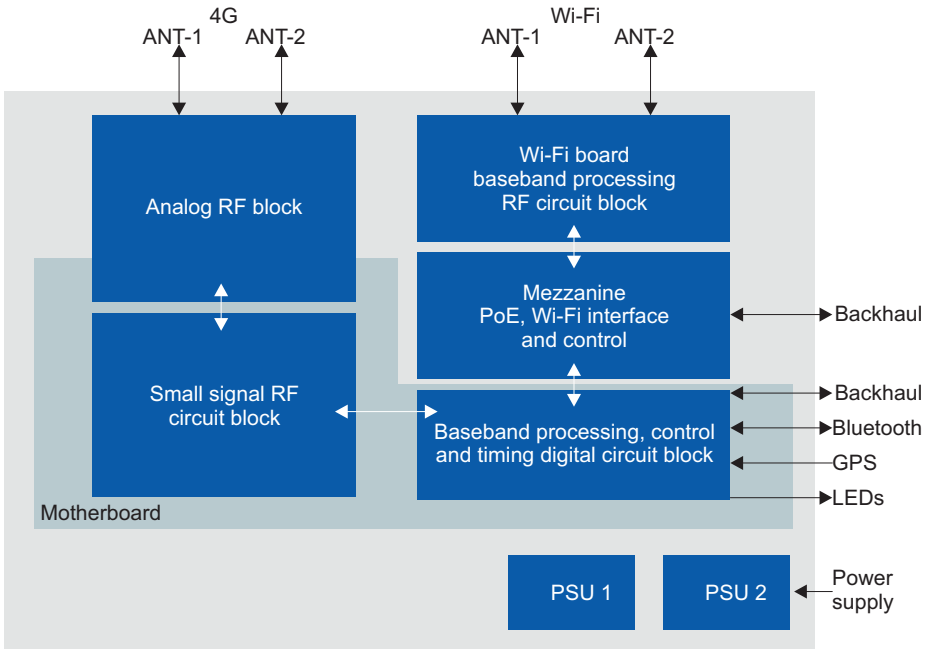


Figure 7 Flexi Zone Micro BTS (FWEB, FWHC, FWHM) functional diagram



Note: PoE is not supported on FWHC model 472938A.101, but is supported on model 472938A.201 and newer. Do not attempt to manually define BH C for PoE on FWHC model 472938A.101 as this violates current regulatory approvals.

LED indicators

The Flexi Zone BTS has three multi-color LEDs providing visual indication of:

- **RF** - Shows the RF power status
- **BACKHAUL** - Shows the transport status
- **STATUS** - Shows the BTS status

Figure 8 Flexi Zone outdoor BTS LEDs

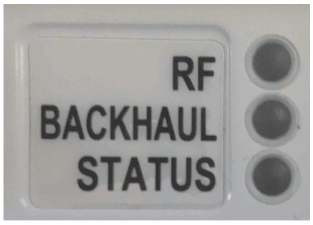


Table 4 Flexi Zone BTS LED indications

LED	Color	Description	Priority* (1 is highest)
BACKHAUL (Controlled by TRSW) NOTE : This LED depicts the Transport SW States	*Transport / Backhaul Link Status*		
	OFF	BTS is booting up, and the Platform SW is starting up. LED is being controlled by HW.	1
	Stable RED	In the startup sequence, the Platform SW is up and it has taken control of the LED. This state continues until the TRSW becomes operational following Site Power-Up or Site Reset. Includes POST (in case of a power-on scenario).	1
	Stable RED	TRSW has taken control of LED and is Initializing, or a Critical or Major Fault raised on TRSW.	2
	Stable YELLOW	Critical or Major Fault raised on TRSW *and* Bluetooth is ENABLED automatically.	2
	Blinking RED	MINOR or Degraded alarm exists on TRSW.	3
	Stable GREEN	TRSW is ready (fully initialized) - No known Critical/Major/Degraded/Minor Transport faults present.	4
RF (Controlled by HW)	*RF Transmission Status*		
	OFF	BTS is booting up, and the Platform SW is starting up. LED is being controlled by HW.	1
	OFF	Platform SW has come up successfully.	1
	Blinking GREEN	FPGA has taken control of the RF LED in the startup sequence.	1

Table 4 Flexi Zone BTS LED indications (Cont.)

LED	Color	Description	Priority* (1 is highest)
	Blinking GREEN	RF Transmission OFF	1
	Stable GREEN	RF Transmission ON	2
STATUS (Controlled by BTSOM)	*BTS Status*		
	Stable RED	BTS is booting up and STATUS LED is being controlled by HW.	1
	Blinking YELLOW	In startup sequence, Platform SW is up and is now controlling the STATUS LED. Includes POST (in case of a power-on scenario).	1
	Blinking YELLOW	Startup: Indicates BTSOM has taken control of the BTS STATUS LED. BTSOM determines that BTS is uncommissioned and performs autoconnection.	4
	Stable YELLOW	Startup-autoconfiguration, BTS is uncommissioned: BTSOM is performing autoconfiguration (SW download, configuration download).	5
	Stable YELLOW	Startup-autoconfiguration blocked, BTS is uncommissioned: SW download, configuration download via the Network Element Manager.	5
	Stable YELLOW	Startup-BTSOM determines that BTS is commissioned.	10
	Stable YELLOW	Indicates BTS and/or all CELLs are Blocked/Locked.	5
	Stable RED	Indicates BTS is Faulty: It signifies that at least one Critical Fault is currently present on BTS. Note: Includes any type of BTS faults including Transport, U-Plane, and C-Plane faults.	2
	Blinking RED	Indicates BTS is degraded: At least one Major Fault is currently active on BTS (while no Critical Faults are active).	3

Table 4 Flexi Zone BTS LED indications (Cont.)

LED	Color	Description	Priority* (1 is highest)
		Note: Includes any type of BTS faults including Transport, U-Plane, and C-Plane faults.	
	Blinking GREEN	Indicates a SW download is in-progress during runtime operation (for instance, SW download and configuration download are occurring outside of startup).	9
	Stable RED	Indicates a Critical Failure occurred during Auto Connection (AutoConnectionState is "Disconnected"). If failure is due to an iOMS rejection (unsuccessful AutoConnectionEstablishedReply message was received), condition will persist for 5 min until the Auto-Connection process is automatically retried. Note: If failure is due to iOMS connectivity being down (detected by Supervision on iOMS link), a Critical Fault will be active (SET).	7
	Blinking GREEN	BTS in Test Dedicated State.	10
	Stable GREEN	Indicates the BTS is fully configured and nothing is preventing a CELL from transitioning to onAir (indicated in conjuction with RF LED being Blinking GREEN). This corresponds to the BTS configured, integrated to RAN, and onAir operational state.	10

Note: * The values appearing in the “Priority” column indicate which LED display pattern will illuminate when multiple conditions exist. If there are multiple active conditions, the LED illuminates to reflect the highest priority condition. For example, if there are both Minor and Major active BACKHAUL-related faults, the BACKHAUL LED would illuminate as Stable YELLOW because the Major fault has a higher Priority than the Minor fault.

Refer to *Troubleshooting LTE RAN* for more information regarding monitoring and troubleshooting BTSs.

Note: When the BTS is operating with uncommissioned releases RL15A1.2 and prior (factory-loaded or operational release), by default, LED operation will turn off 30 minutes after power is applied. LED visibility can be controlled via the BTS Site Manager on the **BTS Settings** page. Select the *LED in use* check box to enable LED visibility control and enter the timer value in minutes in the *Timer* field. Value '0' means that LED is always on.

2.1 Construction of Flexi Zone Micro BTS variants

Table 5: Construction of Flexi Zone Micro BTS (FDD-LTE variants), Table 6: Construction of Flexi Zone Micro BTS (TD-LTE variants), and Table 7: Construction of Flexi Zone Micro BTS (WCDMA/LTE variants) show the HW characteristics of the available Flexi Zone Micro BTS variants.

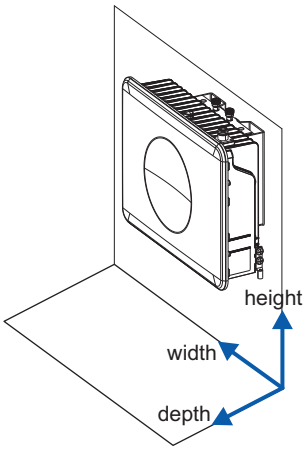
Variant	Shows the variant name, feature ID, and sales code. For the explanation of the abbreviation, see Table 3: Flexi Zone Micro BTS naming convention.
Dimensions	Shows the height, width, depth, weight, and volume of the variant. 
Band	Shows the band, exact frequency range, supported carrier bandwidths, and number of supported carriers.
Power	Shows the maximum output power at the antenna connector and range of the configurable power levels, followed by the range of input power supported by the variant.
Integrated antenna	Shows which integrated antenna variant (omni, directional) is supported.
Integrated Wi-Fi	Shows whether the variant contains integrated Wi-Fi.

Table 5 Construction of Flexi Zone Micro BTS (FDD-LTE variants)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
FWEA LTE1728 472898A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.)	Band: 3 UL: 1710–1785 MHz DL: 1805–1880 MHz	Antenna output: 2 x 5 W	Directional: FAWI Omni: FAWB, FAWO, FAWT	No

Table 5 Construction of Flexi Zone Micro BTS (FDD-LTE variants) (Cont.)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
	W: 6.2 kg (13.66 lb) V: 7 L	Bandwidths: 5, 10, 15, and 20 MHz Carriers: 1	0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac		
FWEA3 LTE1728 474406A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 6.2 kg (13.66 lb) V: 7 L	Band: 3 UL: 1710–1785 MHz DL: 1805–1880 MHz Bandwidths: 3, 5, 10, 15, and 20 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWI Omni: FAWB, FAWO, FAWT	No
FWEB LTE2251 472941A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 8.0 kg (17.64 lb) V: 7.2 L	Band: 3 UL: 1710–1785 MHz DL: 1805–1880 MHz Bandwidths: 5, 10, 15, and 20 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWL Omni: FAWO, FAWT	Directional: FAWL Omni: FAWH
FWFA LTE2055 473040A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 6.2 kg (13.66 lb) V: 7.2 L	Band 2/25 UL: 1850–1915 MHz DL: 1930–1995 MHz Bandwidths: 5, 10, 15, and 20 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac, 50/60 Hz, 2 A max	Directional: FAWI Omni: FAWB, FAWO, FAWT	No
FWGB LTE1659 472851A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 86 mm (3.38 in.) W: 5.2 kg (11.46 lb) V: 5 L	Band 1 UL: 1920–1980 MHz DL: 2110–2170 MHz Bandwidths: 5, 10, 15, 20 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWE Omni: FAWB, FAWO, FAWT	No
FWHA LTE1682	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.)	Band 7 UL: 2500–2570 MHz	Antenna output: 2 x 5 W	Directional: FAWF	No

Table 5 Construction of Flexi Zone Micro BTS (FDD-LTE variants) (Cont.)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
472897A	D: 86 mm (3.38 in.) W: 5.2 kg (11.46 lb) V: 5 L	DL: 2620–2690 MHz Bandwidths: 5, 10, 15, 20 MHz Carriers: 1	0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Omni: FAWC, FAWM, FAWQ, FAWU	
FWHC LTE1961 472938A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 7.2 kg (15.87 lb) V: 7.2 L	Band: 7 (low band) UL: 2500–2555 MHz DL: 2620–2675 MHz Bandwidths: 5, 10, 15, and 20 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWK Omni: FAWM, FAWQ, FAWU	Directional: FAWK Omni: FAWH
FWHM LTE2340 473147A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 7.2 kg (15.87 lb) V: 7.2 L	Band: 7 (high band) UL: 2520–2570 MHz DL: 2640–2690 MHz Bandwidths: 5, 10, 15, 20 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWK Omni: FAWM, FAWQ, FAWU	Directional: FAWK Omni: FAWH
FWHN LTE2339 473148A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 6.2 kg (13.67 lb) V: 7.2 L	Band: 7 (high band) UL: 2520–2570 MHz DL: 2640–2690 MHz Bandwidths: 5, 10, 15, 20 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWJ Omni: FAWC, FAWM, FAWQ, FAWU	No
FWHO LTE2338 473149A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 6.2 kg (13.67 lb) V: 7.2 L	Band: 7 (low band) UL: 2500–2555 MHz DL: 2620–2675 MHz Bandwidths: 5, 10, 15, 20 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWJ Omni: FAWC, FAWM, FAWQ, FAWU	No
FWIB LTE1727 472899A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 86 mm (3.38 in.) W: 5.2 kg (11.46 lb)	Band 4 UL: 1710–1755 MHz DL: 2110–2155 MHz	Antenna output: 2 x 5 W	Directional: FAWE Omni: FAWB, FAWO, FAWT	No

Table 5 Construction of Flexi Zone Micro BTS (FDD-LTE variants) (Cont.)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
	V: 5 L	Bandwidths: 5, 10, 15, 20 MHz Carriers: 1	0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac, 50/60 Hz, 2 A max *or* 75–130 Vac Trapezoidal, 50/60 Hz, 1.7 A max		
FWPF LTE3657 474162A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 7.5 kg (16.53 lb) V: 7.2 L	Band 14 (upper 700 MHz, D block) UL: 788–798 MHz DL: 758–768 MHz Bandwidths: 5, 10 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Omni: FAWB	No
FWPG LTE3658 474163A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 7.5 kg (16.53 lb) V: 7.2 L	Band 28 (700 MHz, R3 subset) UL: 733–736 MHz DL: 788–791 MHz Bandwidth: 3 MHz Carriers: 1	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Omni: FAWB	No

Table 6 Construction of Flexi Zone Micro BTS (TD-LTE variants)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
FWH1 LTE3270 473465A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 160 mm (6.3 in.) W: 13 kg (27.78 lb) V: 11 L	Band 38 2575–2615 MHz Bandwidths: 10, 15, 20 MHz Carriers: 2	Antenna output: 2 x 20 W 1, 1.3, 1.6, 2, 2.5, 3.2, 4, 5, 6.3, 8, 10, 13, 16, 20 W Device input: 90–264 Vac	Directional: FAWV, FAWX Omni: FAWU	No

Table 6 Construction of Flexi Zone Micro BTS (TD-LTE variants) (Cont.)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
FWHE LTE1729 472939A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 6.2 kg (13.66 lb) V: 7.2 L	Band 41 2575–2635 MHz Band 38 2575–2620 MHz Bandwidths: 10, 20 MHz Carriers: 2	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWJ Omni: FAWC, FAWM, FAWQ, FAWU	No
FWHF LTE1964 472940A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 6.2 kg (13.66 lb) V: 7.2 L	Band 41 2545–2575 MHz Bandwidths: 10, 20 MHz Carriers: 1	Antenna output: 2 x 4 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4 W Device input: 90–264 Vac	Directional: FAWJ Omni: FAWC, FAWM, FAWQ, FAWU	No
FWHR LTE2825 473548A	H: 246 mm (9.68 in.) W: 326 mm (12.83 in.) D: 160 mm (6.3 in.) W: 12 kg (26.45 lb) V: 10 L	Band 41 2496–2690 MHz (full band) Bandwidths: 10, 15, 20 MHz Carriers: 2	Antenna output: 2 x 20 W 1, 1.3, 1.6, 2, 2.5, 3.2, 4, 5, 6.3, 8, 10, 13, 16, 20 W Device input: 90–264 Vac	Directional: FAWV-MD Omni: FAWU	No
FWHRLB LTE2825 473603A	H: 246 mm (9.68 in.) W: 326 mm (12.83 in.) D: 160 mm (6.3 in.) W: 12 kg (26.45 lb) V: 10 L	Band 41 2496–2593 MHz (low band) Bandwidths: 10, 15, 20 MHz Carriers: 2	Antenna output: 2 x 20 W 1, 1.3, 1.6, 2, 2.5, 3.2, 4, 5, 6.3, 8, 10, 13, 16, 20 W Device input: 90–264 Vac	Directional: FAWV-MD Omni: FAWU	No
FWHRHB LTE2825 473604A	H: 246 mm (9.68 in.) W: 326 mm (12.83 in.) D: 160 mm (6.3 in.) W: 12 kg (26.45 lb) V: 10 L	Band 41 2593–2690 MHz (high band) Bandwidths: 10, 15, 20 MHz Carriers: 2	Antenna output: 2 x 20 W 1, 1.3, 1.6, 2, 2.5, 3.2, 4, 5, 6.3, 8, 10, 13, 16, 20 W Device input: 90–264 Vac	Directional: FAWV-MD Omni: FAWU	No
FWHT	H: 247 mm (9.72 in.)	Band 41	Antenna output: 2 x 5 W	Directional: FAWJ	No

Table 6 Construction of Flexi Zone Micro BTS (TD-LTE variants) (Cont.)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
LTE2821 473531A	W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 7.8 kg (17.19 lb) V: 7.2 L	2496–2690 MHz (full band) Bandwidths: 10, 15, 20 MHz Carriers: 2	0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Omni: FAWC, FAWM, FAWQ, FAWU	
FWHTLB LTE2821 473737A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 7.8 kg (17.19 lb) V: 7.2 L	Band 41 2496–2593 MHz (low band) Bandwidths: 10, 15, 20 MHz Carriers: 2	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWJ Omni: FAWC, FAWM, FAWQ, FAWU	No
FWHTHB LTE2821 473738A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 7.8 kg (17.19 lb) V: 7.2 L	Band 41 2593–2690 MHz (high band) Bandwidths: 10, 15, 20 MHz Carriers: 2	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWJ Omni: FAWC, FAWM, FAWQ, FAWU	No
FWHW LTE2937 473605A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 6.2 kg (13.66 lb) V: 7.2 L	Band 38 2575–2615 MHz Bandwidths: 10, 15, 20 MHz Carriers: 2	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWJ Omni: FAWC, FAWM, FAWQ, FAWU	No
FWHX LTE3026 473711A	H: 247 mm (9.7 in.) W: 327 mm (12.9 in.) D: 160 mm (6.3 in.) W: 11.2 kg (24.7 lb) V: 10 L	Band 41 2575–2635 MHz Band 38 2575–2620 MHz Bandwidths: 10, 15, 20 MHz Carriers: 2	Antenna output: 2 x 20 W 1, 1.3, 1.6, 2, 2.5, 3.2, 4, 5, 6.3, 8, 10, 13, 16, 20 W Device input: 90–264 Vac	Directional: FAWV Omni: FAWU	No
FWND LTE2290 473122A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.)	Band 40 2300–2400 MHz	Antenna output: 2 x 5 W	Directional: FAWN Omni: FAWM, FAWQ, FAWU	No

Table 6 Construction of Flexi Zone Micro BTS (TD-LTE variants) (Cont.)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
	W: 6.2 kg (13.66 lb) V: 7.2 L	Bandwidths: 10, 20 MHz Carriers: 1	0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac		

Table 7 Construction of Flexi Zone Micro BTS (WCDMA/LTE variants)

Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
FWFJ LTE3423 RAN3349 473772A	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 120 mm (4.72 in.) W: 6.2 kg (13.66 lb) V: 7.2 L	Band 2/25 UL: 1850–1915 MHz DL: 1930–1995 MHz Bandwidths: • LTE: 5, 10, 15, 20 MHz • WCDMA: 5 MHz Carriers: • LTE: 1 • WCDMA: 1 or 2	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWI Omni: FAWB, FAWO, FAWT	No
FWGP LTE3525 474173A - loaded with LTE SW RAN3395 473993A - loaded with WCDMA SW	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 86 mm (3.38 in.) W: 5.2 kg (11.46 lb) V: 5 L	Band 1 UL: 1920–1980 MHz DL: 2110–2170 MHz Bandwidths: • LTE: 5, 10, 15, 20 MHz • WCDMA: 5 MHz Carriers: • LTE: 1 • WCDMA: 1 or 2	Antenna output: 2 x 5 W 0.25, 0.315, 0.4, 0.5, 0.63, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5 W Device input: 90–264 Vac	Directional: FAWE Omni: FAWB, FAWO, FAWT	No
FWGR LTE4247 474448A - loaded with LTE SW RAN3756	H: 247 mm (9.72 in.) W: 327 mm (12.87 in.) D: 220 mm (8.66 in.) W: 14 kg (30.86 lb) V: 14 L	Band 1 UL: 1920–1980 MHz DL: 2110–2170 MHz Bandwidths:	Antenna output: 2 x 20 W 1, 1.3, 1.6, 2, 2.5, 3.2, 4, 5, 6.3, 8, 10, 13, 16, 20 W	Directional: FAWY Omni: FAWT	No

Table 7 Construction of Flexi Zone Micro BTS (WCDMA/LTE variants) (Cont.)

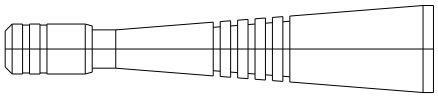
Variant	Dimensions	Band	Power	Integrated antenna	Integrated Wi-Fi
474447A - loaded with WCDMA SW *(future release)*		• LTE: 5, 10, 15, 20 MHz • WCDMA: 5 MHz Carriers: • LTE: 1 • WCDMA: 1 or 2	Device input: 90–264 Vac		

2.2 Bluetooth antenna

Table 8 Properties of the Bluetooth antenna

Property	Value
Frequency range	2.4-2.483 GHz
VSWR	<2.0
Antenna gain	0 dBi
Polarization	Vertical
Antenna port (mounting)	Reverse polarity SMA-male
Length	61 mm (2.4 in.)

Figure 9 Bluetooth antenna



2.3 GPS antenna (FAWD)

Table 9 Properties of GPS antenna (FAWD) (472932A)

Property	Value
Frequency	1575.42 MHz
Antenna gain	26 dBi
Axial ration	3 dB over +/-30˚ from azimuth main beam
Voltage range	2.7-5.5 V
Polarization	Right hand circular
Horizontal beamwidth	360˚
Antenna port (mounting)	N-type
Weight	0.14 kg (0.31 lb)

Figure 10 FAWD

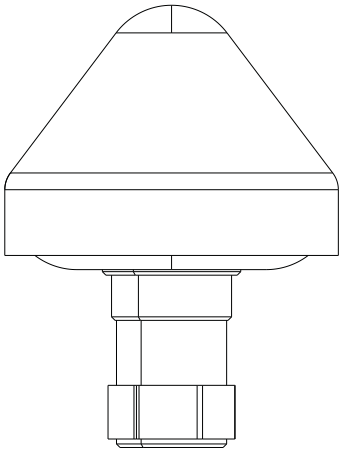


Figure 11 FAWD label

2.4 GPS/GLONASS antenna (FAWG)

Table 10 Properties of GPS/GLONASS antenna (FAWG) (473100A)

Property	Value
Frequency range	1574-1607 MHz
Antenna gain	26 dBi
Antenna gain	3 dB over +/-30° from azimuth main beam
Voltage range	2.7-5.5 V
Polarization	Right hand circular
Horizontal beamwidth	360°
Antenna port (mounting)	N-type
Weight	0.14 kg (0.31 lb)

Figure 12 FAWG

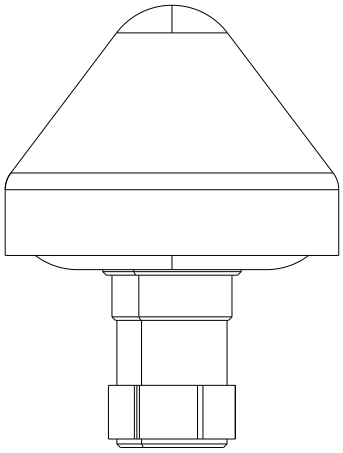


Figure 13 FAWG label

2.5 Directional antenna (FAWE)

Table 11 Properties of directional antenna (FAWE) (473029A)

Property	Value
Frequency range	1710 - 2170 MHz
Antenna gain	~7.5 dBi
Antenna beamwidth	Horizontal: 70˚ Vertical: 60˚
Antenna configuration	LTE BTSs: 2TX/2RX MIMO WCDMA BTSs: 2TX/2RX with VAM, 1TX/1TX without VAM
Antenna ports (mounting)	N-type
TX monitor ports	SMA-type

2.6 Directional antenna (FAWF)

Table 12 Properties of directional antenna (FAWF) (473030A)

Property	Value
Frequency range	2496-2690 MHz
Antenna gain	~8.25 dBi
Antenna beamwidth	Horizontal: 70˚ Vertical: 60˚
Antenna configuration	2TX/2RX MIMO
Antenna ports (mounting)	N-type
TX monitor ports	SMA-type

2.7 Directional antenna (FAWI)

Table 13 Properties of directional antenna (FAWI) (473172A)

Property	Value
Frequency range	1710-2170 MHz
Antenna gain	~7.5 dBi
Antenna beamwidth	Horizontal: 70˚ Vertical: 60˚
Antenna configuration	LTE BTSs: 2TX/2RX MIMO WCDMA BTSs: 2TX/2RX with VAM, 1TX/1TX without VAM
Antenna ports (mounting)	N-type
TX monitor ports	SMA-type

2.8 Directional antenna (FAWJ)

Table 14 Properties of directional antenna (FAWJ) (473173A)

Property	Value
Frequency range	2496-2690 MHz
Antenna gain	~8.25 dBi
Antenna beamwidth	Horizontal: 70˚ Vertical: 60˚

Table 14 Properties of directional antenna (FAWJ) (473173A) (Cont.)

Property	Value
Antenna configuration	2TX/2RX MIMO
Antenna ports (mounting)	N-type
TX monitor ports	SMA-type

2.9 Directional antenna (FAWK)

Table 15 Properties of directional antenna (FAWK) (473174A)

Property	Value
Frequency range	LTE band 7 (2496 - 2690 MHz) with dual-band Wi-Fi (2.4 GHz and 5 GHz)
Antenna gain	LTE: ~9 dBi Wi-Fi: • 2.4 GHz: ~7 dBi • 5 GHz: ~7.5 dBi
Antenna beamwidth	Horizontal: 70˚ Vertical: 60˚
Antenna configuration	2TX/2RX MIMO
Antenna ports (mounting)	N-type
TX monitor ports	SMA-type

2.10 Directional antenna (FAWN)

Table 16 Properties of directional antenna (FAWN) (473228A)

Property	Value
Frequency range	2300-2400 MHz (band 40)
Antenna gain	LTE: ~8.25 dBi
Antenna beamwidth	Horizontal: 70˚ Vertical: 60˚
Antenna configuration	2TX/2RX MIMO
Antenna ports (mounting)	N-type
TX monitor ports	SMA-type

2.11 Directional antenna (FAWL)

Table 17 Properties of directional antenna (FAWL) (473183A)

Property	Value
Frequency range	LTE bands 3, 4 (1710-2170 MHz) with dual-band Wi-Fi (2.4 GHz and 5 GHz)
Antenna gain	LTE: ~8.5 dBi Wi-Fi: • 2.4 GHz: ~7 dBi • 5 GHz: ~7.5 dBi
Antenna beamwidth	Horizontal: 70˚ Vertical: 60˚
Antenna configuration	2TX/2RX MIMO
Antenna ports (mounting)	N-type
TX monitor ports	SMA-type

2.12 Directional antenna (FAWV, FAWV-MD)

Table 18 Properties of directional antenna FAWV (473596A) and FAWV-MD (474028A)

Property	FAWV (473596A)	FAWV-MD (474028A)
BTS supported	FWHX	FWHR
Frequency range	2496 - 2690 MHz	2496 - 2690 MHz
Antenna gain	≥10 dBi	≥10 dBi
Antenna beamwidth	Horizontal: 65° (+/-5°) Vertical: ≥30°	Horizontal: 65° (+/-5°) Vertical: ≥30°
Antenna configuration	2Tx/2Rx MIMO	2Tx/2Rx MIMO
Antenna ports (mounting)	N-Type Male, 2 ports required	4.1-9.5 Mini DIN, 2 ports required
Height	322 mm (12.68 in.)	322 mm (12.68 in.)
Width	339.5 mm (13.37 in.)	339.5 mm (13.37 in.)
Depth	168.4 mm (6.63 in.)	168.4 mm (6.63 in.)
Weight	2.5 kg (5.5 lb)	2.5 kg (5.5 lb)

2.13 Directional antenna (FAWX)

Table 19 Properties of directional antenna (FAWX) (474027A)

Property	Value
Frequency range	2496–2690 MHz
Antenna gain	>11 dBi (2575–2635 MHz)
Antenna beamwidth	Horizontal: 65° +/- 5° (2575–2635 MHz) Vertical: ≥30° (2575–2635 MHz)
Antenna configuration	2TX/2RX MIMO
Antenna ports (mounting)	4.1/9.5 female, 2 ports required
Height	322 mm (12.68 in.)
Width	339.8 mm (13.38 in.)
Depth	213.4 mm (8.40 in.)
Weight	2.2 kg (4.85 lb)

2.14 Directional antenna (FAWY)

Table 20 Properties of directional antenna (FAWY) (474719A)

Property	Value
Frequency range	1710 - 2170 MHz
Antenna gain	>11 dBi
Antenna beamwidth	Horizontal: 65±5˚ Vertical: 33±4˚
Antenna configuration	LTE BTSs: 2TX/2RX MIMO WCDMA BTSs: 2TX/2RX with VAM, 1TX/1TX without VAM
Antenna ports (mounting)	4.3-10 Mini DIN
Height	292 mm (11.50 in.)
Width	340 mm (13.39 in.)
Depth	200 mm (7.87 in.)
Weight	2 kg (4.41 lb)

2.15 Omnidirectional antenna (FAWB)

Table 21 Properties of omni antenna (FAWB) (472933A)

Property	Value
Frequency range	1710-2170 MHz
Antenna gain	~1 dBi
Antenna beamwidth	Horizontal: 360˚ Vertical: 50˚
Antenna configuration	LTE BTSs: 2TX/2RX MIMO with 2 antennas WCDMA BTSs with 2 antennas: 2TX/2RX with VAM, 1TX/1TX without VAM
Antenna ports (mounting)	N-type
Height	129 mm (5.07 in.)
Width	22.8 mm (0.89 in.)
Weight	0.14 kg (0.31 lb)

Figure 14 FAWB label

2.16 Omnidirectional antenna (FAWC)

Table 22 Properties of omni antenna (FAWC) (472947A)

Property	Value
Frequency range	2496-2690 MHz (band 7, 38, 41)
Antenna gain	~2 dBi
Antenna beamwidth	Horizontal: 360˚ Vertical: 50˚
Antenna configuration	2TX/2RX MIMO with 2 antennas
Antenna ports (mounting)	N-type
Height	129 mm (5.07 in.)
Width	22.8 mm (0.89 in.)

Table 22 Properties of omni antenna (FAWC) (472947A) (Cont.)

Property	Value
Weight	0.14 kg (0.31 lb)

Figure 15 FAWC label

2.17 Omnidirectional antenna (FAWH)

Table 23 Properties of omni antenna (FAWH) (473171A)

Property	Value
Frequency range	Dual-band Wi-Fi: 2.4 GHz and 5 GHz
Antenna gain	2.4 GHz Wi-Fi: • Peak gain: 4 dBi • Typical gain: 3.5 dBi • Minimum gain: 3 dBi 5 GHz Wi-Fi: • Peak gain: 7 dBi • Typical gain: 6 dBi • Minimum gain: 5.5 dBi **Note:** These gain numbers include the cable losses associated with the FWME mounting bracket that is used to mount the FAWH antennas to the MBO.
Antenna beamwidth	Horizontal: 360˚ Vertical: ~45˚ (2.4 GHz band), ~25˚ (5 GHz band)
Antenna ports (mounting)	N-type
Height	173 mm (6.81 in.)
Width	25.3 mm (1 in.)
Weight	0.17 kg (0.37 lb)

Figure 16 FAWH label

2.18 Omnidirectional antenna (FAWM)

Table 24 Properties of omni antenna (FAWM) (473227A)

Property	Value
Frequency range	2300-2700 MHz
Antenna gain	~2 dBi
Antenna beamwidth	Horizontal: 360˚ Vertical: 50˚
Antenna configuration	2TX/2RX MIMO with 2 antennas
Antenna ports (mounting)	N-type
Height	129 mm (5.07 in.)
Width	22.8 mm (0.89 in.)
Weight	0.14 kg (0.31 lb)

Figure 17 FAWM label

2.19 Omnidirectional antenna (FAWO)

Table 25 Properties of omni antenna (FAWO) (473369A)

Property	Value
Frequency range	1710-2170 MHz
Antenna gain	~2 dBi

Table 25 Properties of omni antenna (FAWO) (473369A) (Cont.)

Property	Value
Antenna beamwidth	Horizontal: 360˚ Vertical: 50˚
Antenna configuration	LTE BTSs: 2TX/2RX MIMO with 2 antennas WCDMA BTSs with 2 antennas: 2TX/2RX with VAM, 1TX/1TX without VAM
Antenna ports (mounting)	N-type
Height	129 mm (5.07 in.)
Width	22.8 mm (0.89 in.)
Weight	0.14 kg (0.31 lb)

Figure 18 FAWO label

2.20 Omnidirectional antenna (FAWQ)

Table 26 Properties of omni antenna (FAWQ) (473407A)

Property	Value
Frequency range	2300-2690 MHz (band 7, 38, 40, and 41)
Antenna gain	2 dBi
Antenna beamwidth	Horizontal: 360˚ Vertical: ≥50˚
Antenna configuration	2TX/2RX MIMO with 2 antennas
Antenna ports (mounting)	N-type male
Height	112 mm (4.41 in.)
Width	40 mm (1.57 in.)
Weight	100 g (0.22 lb)

Figure 19 FAWQ label (main)

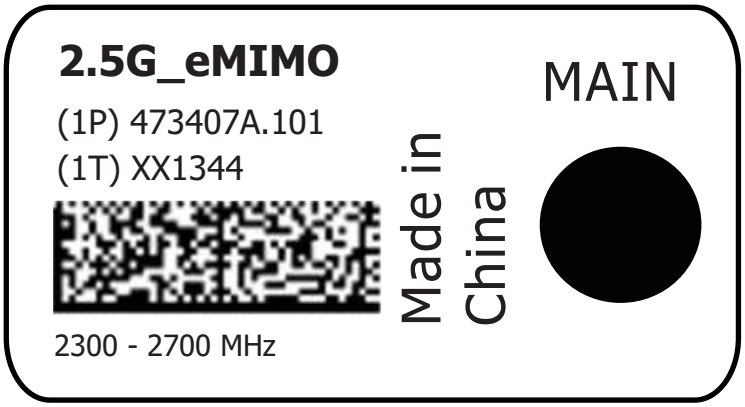
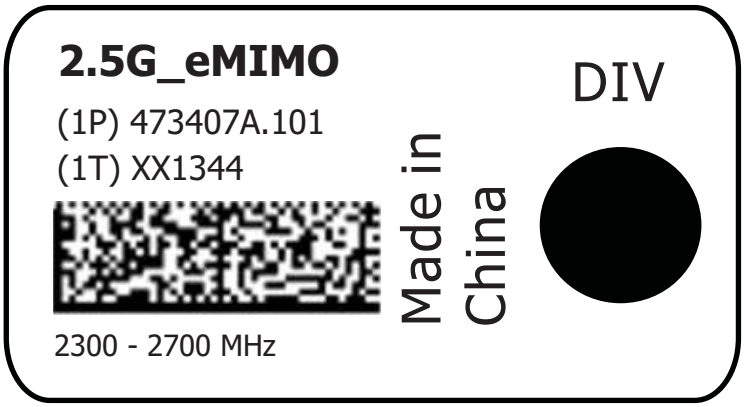


Figure 20 FAWQ label (div)



2.21 Omnidirectional antenna (FAWT)

Table 27 Properties of omni antenna (FAWT)

Property	FAWT (473490A)	FAWT (474371A)
Frequency range	1710-2170 MHz	
Antenna gain	5 dBi	
Antenna beamwidth	Horizontal: 360° Vertical: ≥30°	
Antenna configuration	LTE BTSs: 2TX/2RX MIMO with 2 antennas WCDMA BTSs with 2 antennas: 2TX/2RX with VAM, 1TX/1RX without VAM	
Antenna ports (mounting)	N-Type Male, 2 ports required	4.3-10 Mini DIN, 2 ports required
Height	235 mm (9.25 in.)	
Width	51 mm (2.00 in.)	
Weight	<0.22 kg (<0.49 lb) per antenna or <0.44 kg (<0.97 lb) per antenna pair	

Figure 21 FAWT antenna

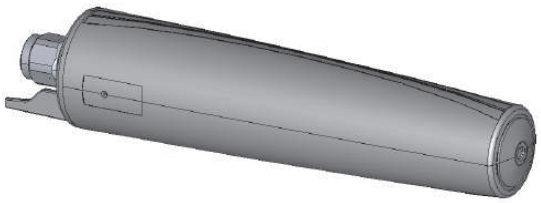


Figure 22 FAWT label (main) (473490A example)

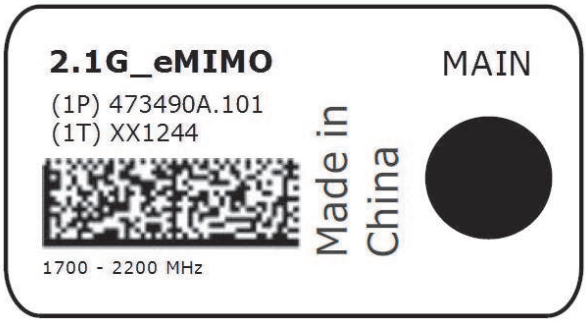
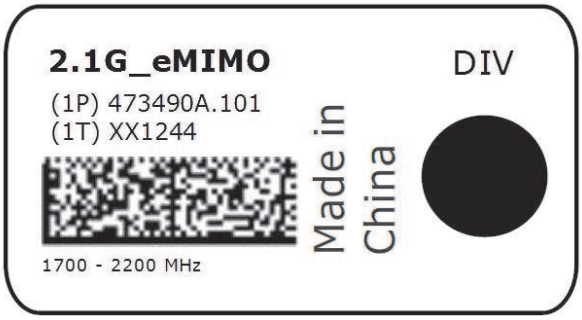


Figure 23 FAWT label (div) (473490A example)



2.22 Omnidirectional antenna (FAWU)

Table 28 Properties of omni antenna (FAWU)

Property	FAWU (473491A)	FAWU (474356A)	FAWU (474389A)
Frequency range	2300–2700 MHz		
Antenna gain	5 dBi		
Antenna beamwidth	Horizontal: 360° Vertical: ≥30°		
Antenna configuration	2TX/2RX MIMO with 2 antennas		
Antenna ports (mounting)	N-Type Male, 2 ports required	4.1-9.5 Mini DIN, 2 ports required	4.3-10 Mini DIN, 2 ports required
Height	235 mm (9.25 in.)		
Width	51 mm (2.00 in.)		

Table 28 Properties of omni antenna (FAWU) (Cont.)

Property	FAWU (473491A)	FAWU (474356A)	FAWU (474389A)
Weight	<0.22 kg (<0.49 lb) per antenna or <0.44 kg (<0.97 lb) per antenna pair		

Figure 24 FAWU antenna

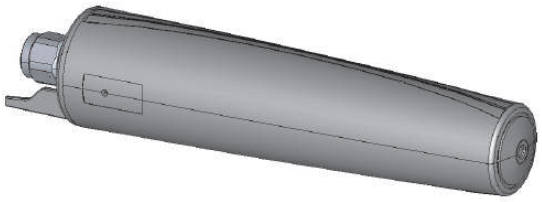


Figure 25 FAWU label (main) (473491A example)

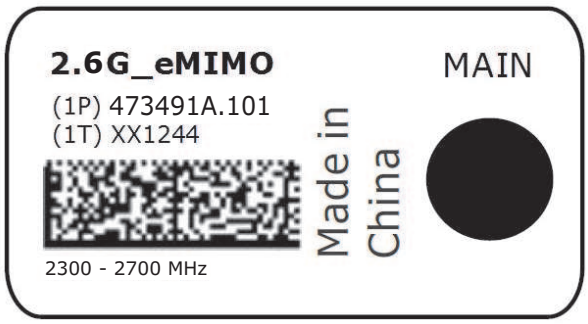
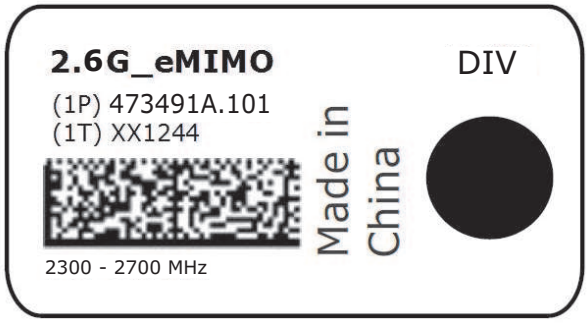


Figure 26 FAWU label (div) (473491A example)



3 Air interface

The BTS transceiver is equipped with TX/RX antenna connections. Each antenna port supports a maximum of several watts transmit power. Receivers support reference sensitivity specifications as defined in 3GPP 36.104 for Medium Area base stations. In addition to 3GPP standards alignment with the Flexi Multi Radio BTS, Flexi Zone Micro BTS follows Medium Area BTS specifications from TS 36.104 Rel-11. Carrier frequency can be freely selected via SW within frequency associated with the band-specific hardware variant.

FDD-LTE

Flexi Zone Micro BTS FDD-LTE variants support full throughput capability of one, up to 20 MHz, LTE carrier with 2x2 MIMO.

TD-LTE

In Flexi Zone Micro BTS TD-LTE variants, the air interface can be configured for a two-carrier operation and can be configured with any combination of bandwidths provided that carriers occupy contiguous frequencies, and operate within the maximum bandwidth window of 40 MHz for TD.

When multiple carriers are configured to use a single radio module, each carrier must share the transmit power (for example, 37 dBm per TX is shared across all carriers). All carriers sharing a single radio module must be configured with the same transmit power level ensuring the power level of each carrier is equal to or less than the full capability of the radio module (5 W, for example).

WCDMA

Providing Dual Cell HSDPA support, Flexi Zone Micro BTS WCDMA (3G) variants support full throughput capability of one or two 5 MHz WCDMA carriers using 2TX/2RX Virtual Antenna Mapping (VAM). The FWFJ and FWGP hardware variants are hardware-ready to support four 5 MHz (4x5 MHz) WCDMA carriers using 2TX/2RX VAM. Software support for four WCDMA carriers is planned for a future release.

Note: When VAM is disabled, only 1TX/1TX is supported.

The FWFJ BTS hardware is designed to operate in either LTE-only or WCDMA-only technology. The FWFJ BTS is shipped from the factory with 3G WCDMA software pre-loaded to support WCDMA-only technology. WCDMA FZM can be upgraded to an LTE variant via a software upgrade, using the Restore Factory Settings tool (RFSTool). No new or additional hardware is required.

The FWGP BTS hardware is designed to operate in either LTE-only or WCDMA-only technology. The FWGP BTS is orderable to be shipped from the factory with either 4G LTE software pre-loaded to support LTE-only technology or 3G WCDMA software pre-loaded to support WCDMA-only technology.

Note: A Flexi Zone Micro BTS pre-loaded (shipped) with WCDMA software can be migrated to LTE software, but cannot be reverted to WCDMA software.

Diversity

Flexi Zone Micro BTS supports two-way receiver diversity. Each carrier can be configured for normal operation with 2TX/2RX, 1TX/2RX, or 1TX/1RX within the same radio module.

4 Benefits

Flexi Zone BTS hardware variants provide a vast number of benefits for the operator.

Easy installation

Flexi Zone BTS offers new site deployment possibilities thanks to its compact size and light weight which makes it easy and fast to deploy on poles or on the sides of buildings. Its compact size enables minimum installation clearance which allows Flexi Zone BTS to be installed in areas of limited space (such as outdoor furniture). This small base station can also be installed back-to-back at compact multiband and multiradio sites. The portability results in savings in the form of lower rental costs and simpler site acquisition because the unit requires less space. As a result, operators are now able to extend their coverage to areas that were previously inaccessible. The Flexi Zone BTS is deployable by a single person, significantly reducing installation costs. The Flexi Zone BTS consumes little power, significantly reducing running costs without compromising the quality of the delivery capacity.

The size of the BTS makes it unnoticeable in locations such as exterior walls, billboards, lamp posts, and bus stops.

No acoustic noise

Flexi Zone BTS uses passive cooling.

Easy commissioning

Flexi Zone BTS supports wizard-based commissioning via the BTS Site Manager. The configuration can be saved to a file which can be later reused as a template.

Software features

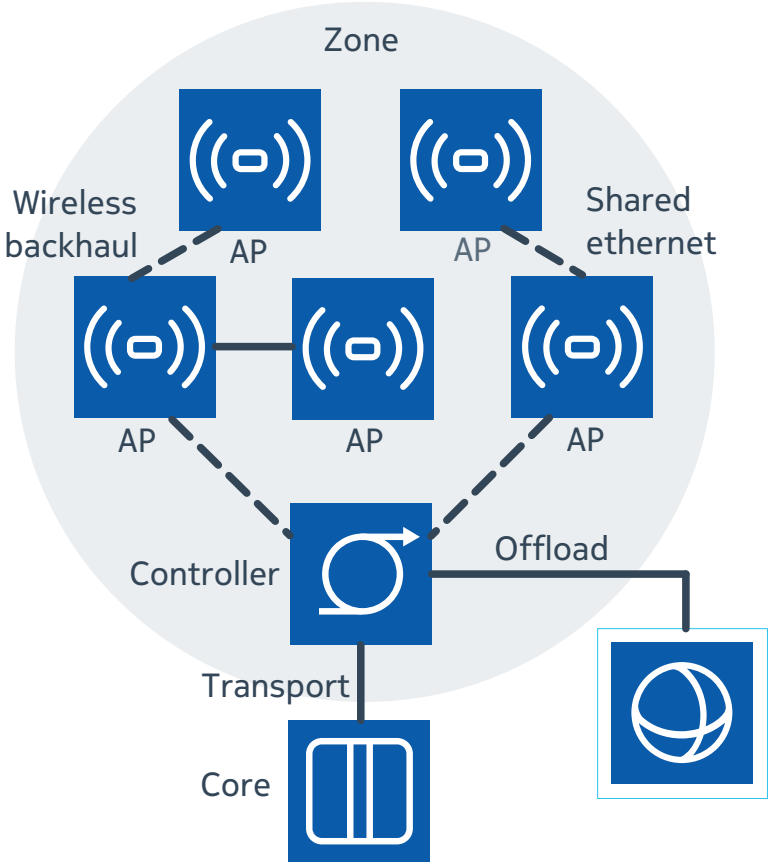
Flexi Zone BTS supports parity with applicable Flexi macro BTS solution features. For the full list of features and their descriptions, see *Feature List*.

Integration within Zone eNB

The Zone eNB is designed as a cost-effective and high-performing capacity solution for the deployment of a large number of coordinated small cells. Flexi Zone is a heterogeneous network solution that makes use of LTE and Wi-Fi to offload, add capacity, and boost subscriber experience in both indoor (public/enterprise) and outdoor street-level hot-zone environments.

The introduction of cloud Flexi Zone Controller into the Zone eNB enables deploying large numbers of mixed indoor and outdoor cells within a single Zone cluster. Each of the small cells is supported by a Flexi Zone Access Point (FZAP) based on a re-purposed Flexi Zone Micro BTS. Cloud Flexi Zone Controller aggregates Flexi Zone Access Points and acts as a single eNB towards the core network, providing mobility anchoring to all UEs within the Zone eNB.

Figure 27 Basic schema of Flexi Zone deployment



The current implementation of the Zone eNB supports up to 100 FZAPs under an individual cFZC. The aggregation of all access point interfaces under cFZC simplifies integration and IP addressing, reduces signaling back to the core network, and simplifies the backhaul by enabling one single feed to the controller rather than to many access points.

Note: If Single Frequency Network (SFN) is enabled, the 100 FZAP limitation will cover any FZAP, SFN Master, and SFN ANT. For more information, see the *LTE2959: Flexi Zone Single Frequency Network Support* feature supported in the TD technology.

SFN is not applicable to Flexi Zone Mini Macro and MultiBand Outdoor BTSs.

For more information, see *Flexi Zone Controller Product Description*.

5 Transport and synchronization

Flexi Zone BTS hardware variants use IP/Ethernet as a standard transport protocol. Ethernet, both copper and fiber, is the standard interface used by the BTS. When external transport solutions (such as wireless backhaul) are used, they interface through Ethernet connections on the BTS and the technology used is transparent to the BTS.

Passive optical networks (PONs) can be supported via E-PON or G-PON SFPs. An IOT with the PON vendor will be required to use customer-specific PON SFPs.

Flexi Zone BTS variants support the following LTE network interfaces:

- eNodeB to MME and Serving SAE Gateway with S1 interface
- eNodeB to eNodeB with X2 interface

The physical transport interface configuration available is RJ45 + SFP (fiber).

Copper Ethernet

Flexi Zone BTS Base Module RJ45 socket supports 1 Gigabit Ethernet copper interface 100/1000 Base-T according to IEEE802.3 clause 40.

Fiber Ethernet

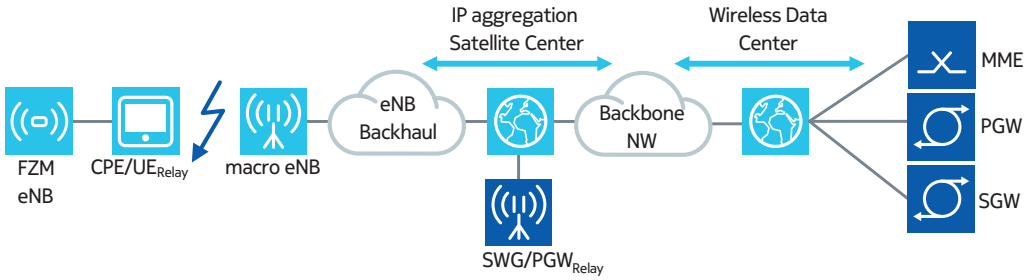
Flexi Zone BTS hardware variants support single-mode and multi-mode fibers. The 1 Gigabit Ethernet SFP interface is based on MSA INF-8074. The following fiber SFP module options are available:

- FOS1 - optical SFP 1000Base-BX, 10 km (6.21 m), 1490 nm/1310 nm
- FOS2 - optical SFP 1000Base-BX, 10 km (6.21 m), 1310 nm/1490 nm
- FOS3 - optical SFP 1000Base-BX, 40 km (24.85 m), 1490 nm/1310 nm
- FOS4 - optical SFP 1000Base-BX, 40 km (24.85 m), 1310 nm/1490 nm
- FOSC - optical SFP 1000Base-LX, 10 km (6.21 m), 1310 nm
- FOSD - optical SFP 1000Base-SX, 300 m (328.08 yd), 850 nm

Wireless backhaul

Some Flexi Zone BTS variants can be wirelessly connected to the backhaul with a UE Relay (FTHC). The UE Relay is customer premises equipment (CPE), which wirelessly connects to the macro BTS. On the other end, it is wired to the copper backhaul interface of the Flexi Zone BTS hardware. This interface additionally powers the UE Relay.

Figure 28 UE-based relay backhaul solution overview



For more information, see:

- *LTE2895: UE Relay Backhaul - Dual Band 25 and 41 Support* (for feature description)
- *UE Relay Product Description* (for hardware description and installation)
- *UE Relay Quick Guide* (for cabling and installing the UE Relay on a pole)
- *Administering UE Relay* (for configuring the UE Relay via web-user interface, SW management, monitoring, and diagnostics)
- *UE Relay Alarms* (for a description of the UE-Relay-related alarms)
- *UE Relay Counters* (for a description of the UE-Relay-related counters)
- *UE Relay Parameters* (for a description of the UE-Relay-related parameters)
- *E2E Deployment Guideline* (for UE Relay hardware RF specifications, configuration, plug & play auto-connection procedures, deployment scenario, performance, and monitoring/diagnostics)

BTS chaining

The Flexi Zone BTS supports the ability to connect additional BTS sites that are downstream from the network interface terminations (S1, X2). Deployment configurations include co-located BTSs to provide multiple-sector or multiple-band developments at a single shared installation point. In addition, one site is also used as an intermediate transport termination point for a geographically separated site. The chained nodes can utilize ToP (IEEE1588-2008™) synchronization when operating in the frequency synchronization mode. Note that the maximum number of Flexi Zone BTS hops is limited to four (4) or by the maximum switching capacity of the main (or root) node.

Synchronization

The Flexi Zone BTS supports operation in either a frequency or a phase synchronization mode. Frequency synchronization is used to maintain the accuracy of the transmitted LTE RF carrier to better than 50 ppb. In the phase synchronization mode, the LTE System Frame Number (SFN) is aligned to the GPS timescale. When operating in the TDD-LTE mode or with any of the following features it is required to operate with phase synchronization: Circuit Switched FallBack (CSFB), Enhanced Inter-Cell Interference Coordination (eICIC), Observed Time Difference of Arrival (OTDOA) and Multimedia Broadcast Multicast Service / Single Frequency Network (MBMS / SFN). When operating in the FDD-LTE mode frequency synchronization mode is used.

The Flexi Zone BTS supports the following synchronization reference sources to either phase align the system clock (phase synchronization mode) or calibrate the system clock frequency (frequency synchronization mode):

Table 29 Flexi Zone BTS synchronization reference sources

Reference Source	Synchronization Mode	
	Frequency	Phase
Integrated GPS / GLONASS Receiver	Yes	Yes
Synchronous Ethernet (ITU-T G.8261)	Yes	No
Timing over Packet (according to IEEE1588-2008™)	Yes	Yes
Network Time Protocol (according to NTPv4)	Yes	No

Integrated GPS / GLONASS Receiver	An integrated GPS or multi-constellation GPS / GLONASS receiver provides precise time and frequency synchronization from received satellite transmissions. The GPS / GLONASS synchronization reference source requires the Flexi Zone BTS connected GPS / GLONASS antenna be positioned in view of GPS or GLONASS satellites.
Synchronous Ethernet	The Flexi Zone BTS supports frequency synchronization from an ITU-T G.8261 compliant synchronous Ethernet provisioned backhaul connection.
Timing over Packet (ToP)	The Flexi Zone BTS supports frequency or phase synchronization through its primary backhaul connection from an IEEE1588-2008™ compliant master clock. ToP daisy-chaining is supported in the frequency synchronization mode with a maximum of four (4) cascaded Flexi Zone BTSs.
Network Time Protocol (NTP)	The Flexi Zone BTS supports frequency synchronization through its primary backhaul connection from an NTPv4 compliant master clock. Long convergence times are often necessary when using NTP frequency synchronization to mitigate the less accurate time stamping and lower messaging rate compared to the IEEE1588-2008™ protocol. A reduced frequency accuracy requirement of 100 ppb is supported with the NTP synchronization reference source.

BTS Freerun / Holdover Operation

During the absence of an available synchronization reference source the Flexi Zone BTS can support operation in the freerun or synchronization holdover mode. The freerun mode involves the initialization of a BTS without an available synchronization reference source. The freerun mode is only possible when operating in the frequency synchronization mode since phase synchronization requires the phase alignment of the BTS System Frame Number (SFN) counter to the GPS timescale. To initialize a BTS in the freerun mode, the BTS must have been powered for a minimum of 60 minutes (to ensure suitable oscillator stability) and have valid, unexpired oscillator calibration data.

The holdover mode involves the ability to maintain operation following the loss of a synchronization reference during normal operation. In the phase synchronization mode, a holdover interval of 30 minutes is supported for a BTS that has been powered for a minimum of 60 minutes. A longer phase synchronization holdover interval of 90 minutes is supported for a BTS powered more than 24 hours. In the frequency synchronization mode, a holdover or freerun interval of 3 hours is supported for a BTS that has been powered for more than 60 minutes, and a 30-day holdover is supported when powered for more than 24 hours.

When operating with the NTP synchronization reference, due to the reduced frequency accuracy requirement an extended frequency synchronization holdover or freerun interval of 150 days is supported after the BTS has been powered for more than 24 hours.

OCXO calibration

To support freerun operation and shorten BTS initialization times, the Flexi Zone BTS supports a function to calibrate its reference Oven Controlled Crystal Oscillator (OCXO).

The Flexi Zone BTS supports three (3) OCXO calibration types: Factory, Auto_Short, and Auto.

Factory calibration	At time of manufacture, a factory calibration is performed where OCXO calibration data is stored in the Flexi Zone BTS electronic identification memory. The factory calibration is only valid for 30 days after time of manufacture. If the BTS is installed beyond the 30-day period, the OCXO calibration may still be used to help initialize operation but a synchronization reference source will be necessary to bring the BTS into service.
Auto_Short calibration	For BTSs that have been powered for between 1 hour to 24 hours, an Auto_Short calibration is performed against the currently selected synchronization reference source (GPS, SyncE, ToP, or NTP). An Auto_Short calibration can maintain freerun or holdover operation in the frequency synchronization mode for 3 hours. A minimum operational period of 1 hour is necessary to ensure suitable OCXO stability to support holdover operation. An Auto_Short calibration is updated at 90-minute intervals when the Flexi Zone BTS is properly synchronized against a valid reference source.
Auto calibration	For BTSs that have been powered for longer than 24 hours an Auto calibration is performed against the currently selected synchronization reference source. An Auto calibration can maintain freerun or holdover operation in the frequency synchronization mode for 30 days. An Auto calibration is updated at 24-hour intervals when the Flexi Zone BTS is properly synchronized against a valid reference source.

6 Management and software

Brief description of Flexi Zone BTS management and software update.

Management

The Flexi Zone BTS supports both local (on-site) and remote (off-site) management.

The Flexi Zone BTS can be managed locally using the Network Element Manager connected through an available unused backhaul port or through a Bluetooth connection. For a BTS with multiple RJ45 ports, the Local Maintenance Terminal (LMT) port is operator-configurable. Bluetooth connection eliminates the need for a wired connection to the Flexi Zone BTS when it is installed in a difficult to reach location. NetAct can also be used to manage the Flexi Zone BTS remotely via your backhaul connection.

Flexi Zone BTS hardware variants feature an internal Bluetooth module which consists of an on-board Bluetooth transceiver. The transceiver provides a 78 channel EDR 2.1 compliant Bluetooth interface used for remote MMI and maintenance operations. All required SW is loaded and installed onto the Flexi Zone BTS Bluetooth Module as part of the overall Flexi Zone BTS product software. Contact your local company representative for additional details.

The Flexi Zone BTS may be managed remotely via your transport backhaul connection using:

- NetAct (applicable to all Flexi Zone BTS variants regardless of the technology supported).
- The combination of 5620 Service Aware Manager (SAM)[3)] + 9959 Network Performance Optimizer (NPO) + 9952 Wireless Provisioning System (WPS) (this combination is applicable to FDD BTS variants only). The 5620 SAM/9959 NPO/9952 WPS product suite is supported in LTE17A and later releases.

The BTS automatically detects the SW version number, HW product code, version number, and serial number during the start-up sequence. This data can be retrieved remotely. The BTS supervises its internal operation, ensuring that any malfunctions or loss-of-service is detected and reported to the network management.

In WCDMA, the Flexi Zone Micro BTS supports an automatic configuration capability which provides automated commissioning and configuration of new or re-homed Flexi Zone Micro BTSs from a remote network operation center with minimal manual intervention.

Software updates

New SW versions can be downloaded while the BTS is in operation. The software can be uploaded to BTS either locally or remotely. Site visits are therefore unnecessary for routine operation and maintenance (O&M) tasks.

Typically, a local software download is done only when the NetAct or 5620 SAM connection is missing, for example, during the commissioning process. Software downloads can be run in the background of the BTS operation. The new software can be activated at any time.

3) The 5620 Service Aware Manager (SAM) product name has changed to Network Services Platform Network Functions Manager - Packet, or more commonly the NFM-P. You may see references to either product name within customer documentation.

Note: A reboot is required in order to activate the software.

The BTS only uses downloadable software which can be downloaded and updated from NetAct or 5620 SAM. As the procedure is centralized, upgrading SW for several BTSs can be performed simultaneously or individually.

The BTS keeps the current and previous software packages in its flash memory and can be updated at any moment. Updated software (current and previous) in the BTS can be seen through the Network Element Manager, NetAct, or 5620 SAM.

7 Interfaces

7.1 Flexi Zone Micro BTS (FWGB, FWGP, FWHA, FWIB) interfaces

List of interfaces and their functions along with graphics showing the interfaces' location on the module.

Table 30 Flexi Zone Micro BTS (FWGB, FWGP, FWHA, FWIB) interfaces

Interface	Description
AC POWER	MIL-C-38999 standard size 9 shell power connector
BH A	Fiber-only backhaul interface
BH B	Copper-only backhaul interface (default LMT port)
BLUETOOTH	SMA Bluetooth antenna connector
GND	Grounding
GPS	Type N GPS antenna connector
TX/RX-D	Type N antenna connector (diversity)
TX/RX-M	Type N antenna connector (main)

Figure 29 Flexi Zone Micro BTS (FWGB, FWGP, FWHA, FWIB) interfaces - bottom view

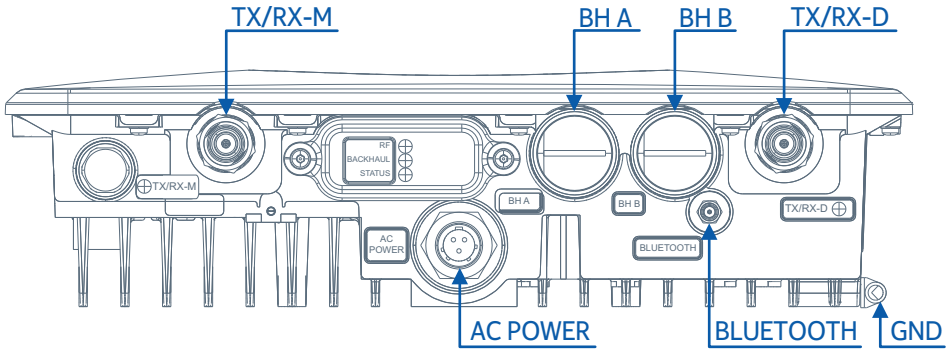


Figure 30 Flexi Zone Micro BTS (FWGB, FWGP, FWHA, FWIB) interfaces - top view

7.2 Flexi Zone Micro BTS (FWHE, FWHF, FWND, FWHW) interfaces

List of interfaces and their functions along with graphics showing the interfaces' location on the module.

Table 31 Flexi Zone Micro BTS (FWHE, FWHF, FWND, FWHW) interfaces

Interface	Description
AC POWER	MIL-C-38999 standard size 9 shell power connector
BH A	Fiber-only backhaul interface
BH B	Copper-only backhaul interface (default LMT port)
BH C	Fiber-only backhaul interface
BLUETOOTH	SMA Bluetooth antenna connector
GND	Grounding
GPS	Type N GPS antenna connector
TX/RX-D	Type N antenna connector (diversity)
TX/RX-M	Type N antenna connector (main)

Figure 31 Flexi Zone Micro BTS (FWHE, FWHF, FWND, FWHW) interfaces - bottom view

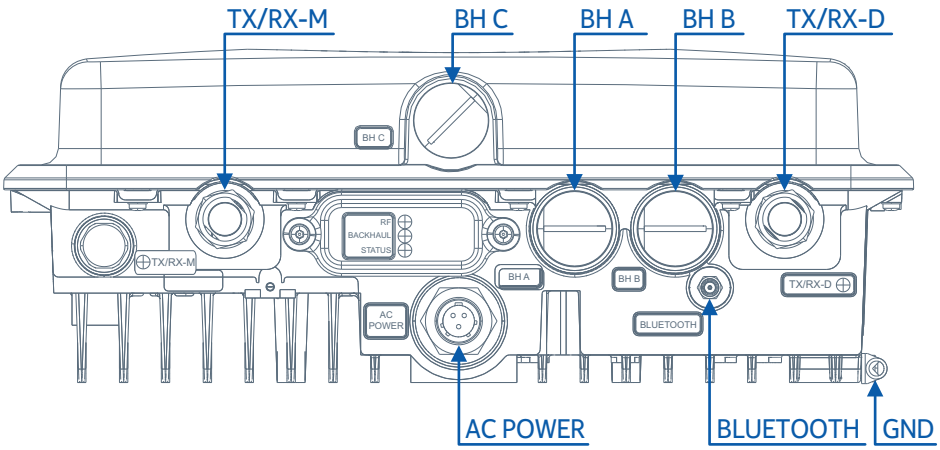
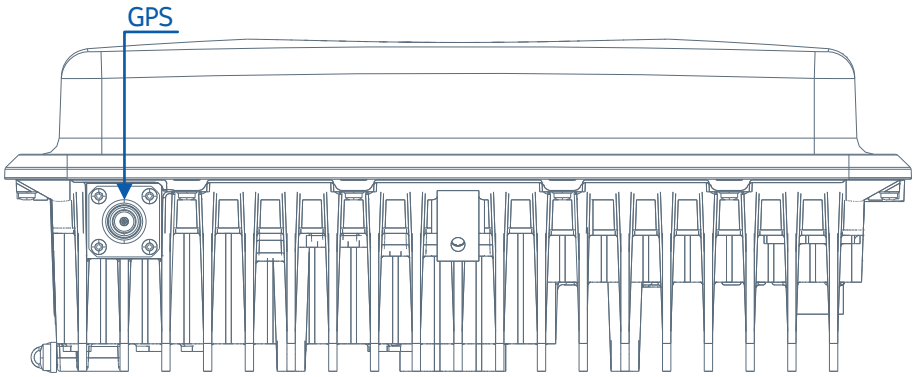


Figure 32 Flexi Zone Micro BTS (FWHE, FWHF, FWND, FWHW) interfaces - top view



7.3 Flexi Zone Micro BTS (FWEA, FWEA3, FWFA, FWFJ, FWHO, FWHN, FWPF, FWPG) interfaces

List of interfaces and their functions along with graphics showing the interfaces' location on the module.

Table 32 Flexi Zone Micro BTS (FWEA, FWEA3, FWFA, FWFJ, FWHO, FWHN, FWPF, FWPG) interfaces

Interface	Description
AC POWER	MIL-C-38999 standard size 9 shell power connector
BH A	Fiber-only backhaul interface
BH B	Copper-only backhaul interface (default LMT port)
BH C	Unused backhaul interface
BLUETOOTH	SMA Bluetooth antenna connector
GND	Grounding
GPS	Type N GPS antenna connector
TX/RX-D	Type N antenna connector (diversity)
TX/RX-M	Type N antenna connector (main)

Figure 33 Flexi Zone Micro BTS (FWEA, FWEA3, FWFA, FWFJ, FWHO, FWHN, FWPF, FWPG) interfaces - bottom view

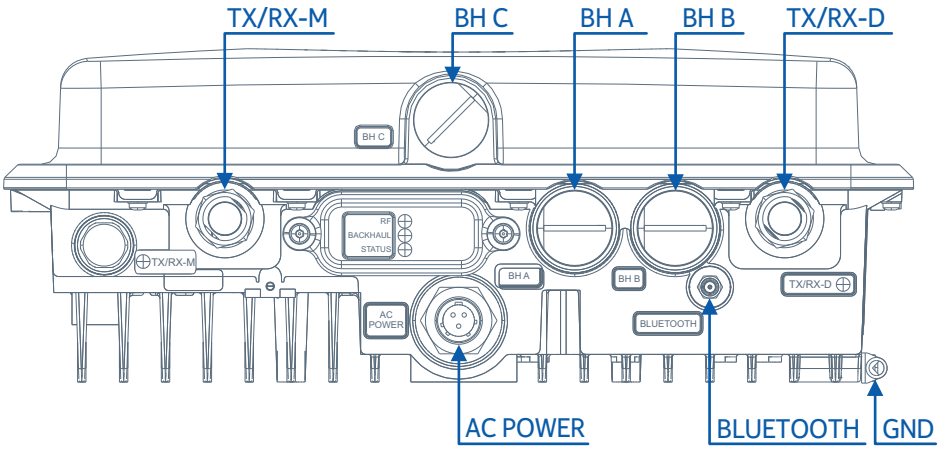
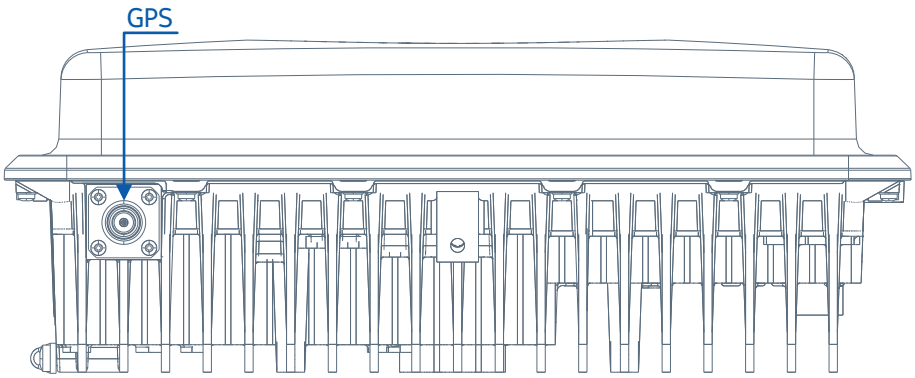


Figure 34 Flexi Zone Micro BTS (FWEA, FWEA3, FWFA, FWFJ, FWHO, FWHN, FWPF, FWPG) interfaces - top view



7.4 Flexi Zone Micro BTS (FWEB, FWHC, FWHM) interfaces

List of interfaces and their functions along with graphics showing the interfaces' location on the module.

Table 33 Flexi Zone Micro BTS (FWEB, FWHC, FWHM) interfaces

Interface	Description
AC POWER	MIL-C-38999 standard size 9 shell power connector
BH A	Fiber-only backhaul interface
BH B	Copper-only backhaul interface (default LMT port)
BH C	Copper-only backhaul interface with PoE (IEEE 802.3at-compliant)

Table 33 Flexi Zone Micro BTS (FWEB, FWHC, FWHM) interfaces (Cont.)

Interface	Description
	Note: PoE is not supported on FWHC model 472938A.101, but is supported on model 472938A.201 and newer. Do *not* attempt to manually define BH C for PoE on FWHC model 472938A.101 as this violates current regulatory approvals.
BLUETOOTH	SMA Bluetooth antenna connector
GND	Grounding
GPS	Type N GPS antenna connector
TX/RX-D	Type N antenna connector (diversity)
TX/RX-M	Type N antenna connector (main)
WIFI-D	Type N Wi-Fi antenna connector (diversity)
WIFI-M	Type N Wi-Fi antenna connector (main)

Figure 35 Flexi Zone Micro BTS (FWEB, FWHC, FWHM) interfaces - bottom view

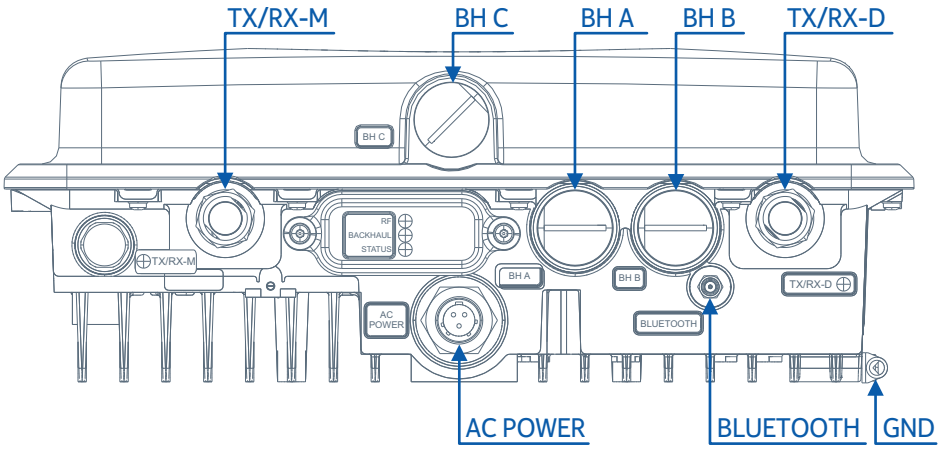
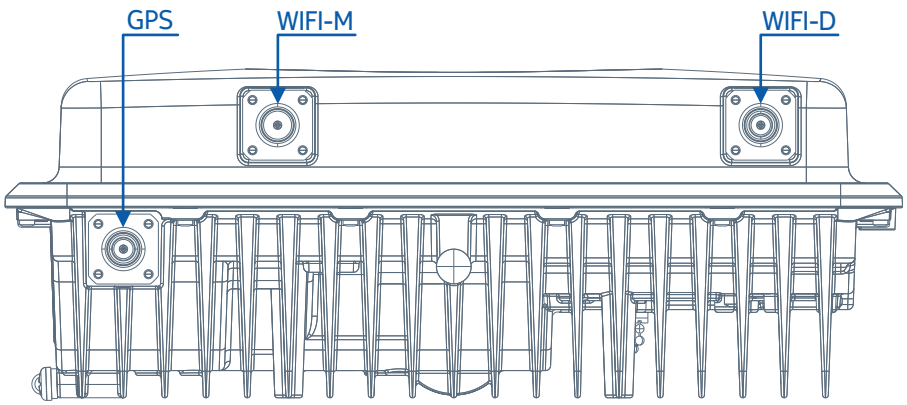


Figure 36 Flexi Zone Micro BTS (FWEB, FWHC, FWHM) interfaces - top view



7.5 Flexi Zone Micro BTS (FWGR) interfaces

List of interfaces and their functions along with graphics showing the interfaces' location on the module.

Table 34 Flexi Zone Micro BTS (FWGR) interfaces

Interface	Description
AC POWER	MIL-C-38999 standard size 9 shell power connector
BH A	Fiber-only backhaul interface
BH B	Copper-only backhaul interface
BH C	Copper-only backhaul interface (default LMT port)
BLUETOOTH	SMA Bluetooth antenna connector
GND	Grounding
GPS	Type N GPS antenna connector
TX/RX-D	4.3-10 Mini DIN female antenna connector (diversity)
TX/RX-M	4.3-10 Mini DIN female antenna connector (main)

Figure 37 Flexi Zone Micro BTS (FWGR) interfaces - bottom view

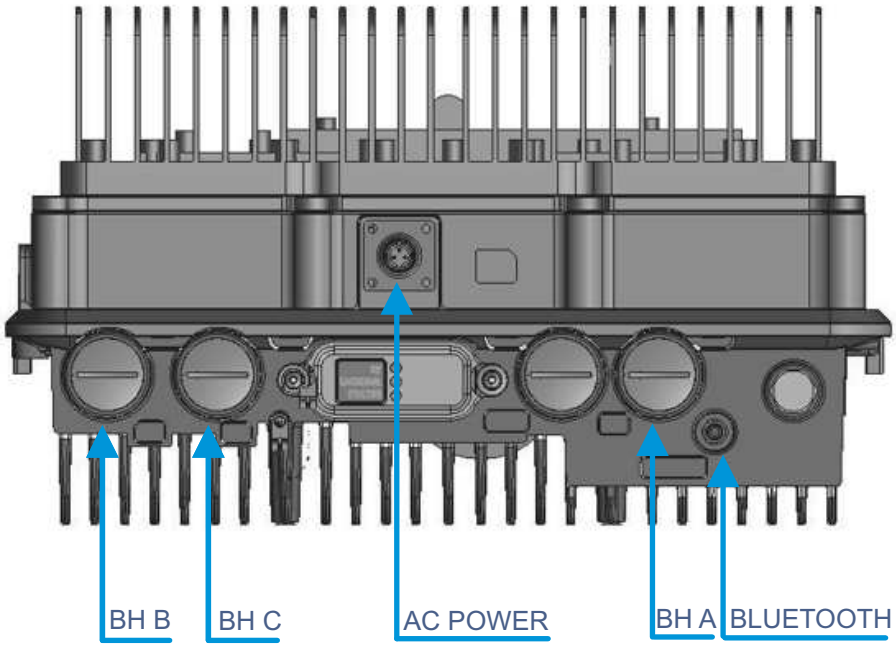
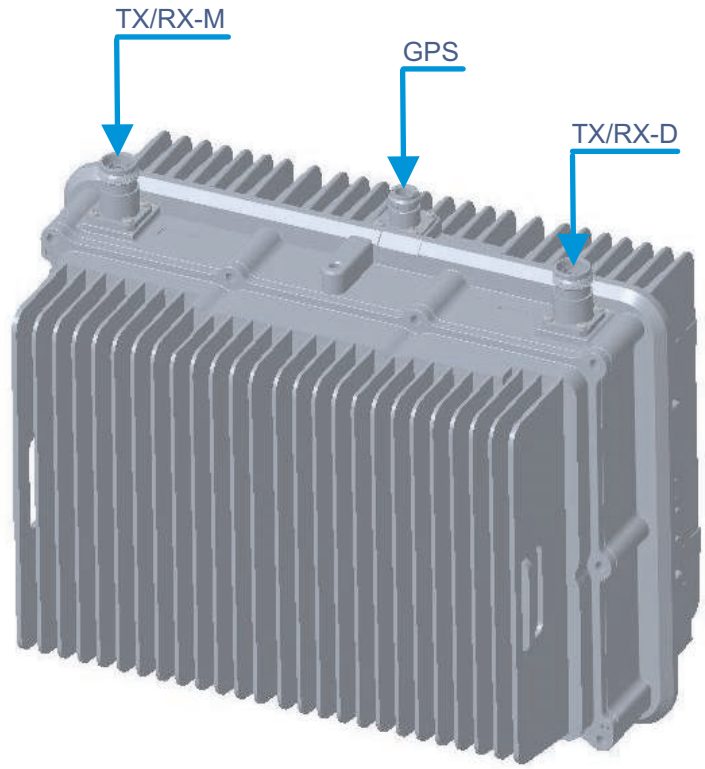


Figure 38 Flexi Zone Micro BTS (FWGR) interfaces - top view



7.6 Flexi Zone Micro BTS (FWHT) interfaces

List of interfaces and their functions along with graphics showing the interfaces' location on the module.

Table 35 Flexi Zone Micro BTS (FWHT) interfaces

Interface	Description
AC POWER	MIL-C-38999 standard size 9 shell power connector
BH A	Fiber-only backhaul interface
BH B	Copper-only backhaul interface (default LMT port)
BH C	Copper-only backhaul interface with PoE (IEEE 802.3at-compliant)
BLUETOOTH	SMA Bluetooth antenna connector
GND	Grounding
GPS	Type N GPS antenna connector
TX/RX-D	Type N antenna connector (diversity) **Note:** An N-Type to 4.1-9.5 Mini DIN adaptor is included.

Table 35 Flexi Zone Micro BTS (FWHT) interfaces (Cont.)

Interface	Description
TX/RX-M	Type N antenna connector (main) **Note:** An N-Type to 4.1-9.5 Mini DIN adaptor is included.

Figure 39 Flexi Zone Micro BTS (FWHT) interfaces - bottom view

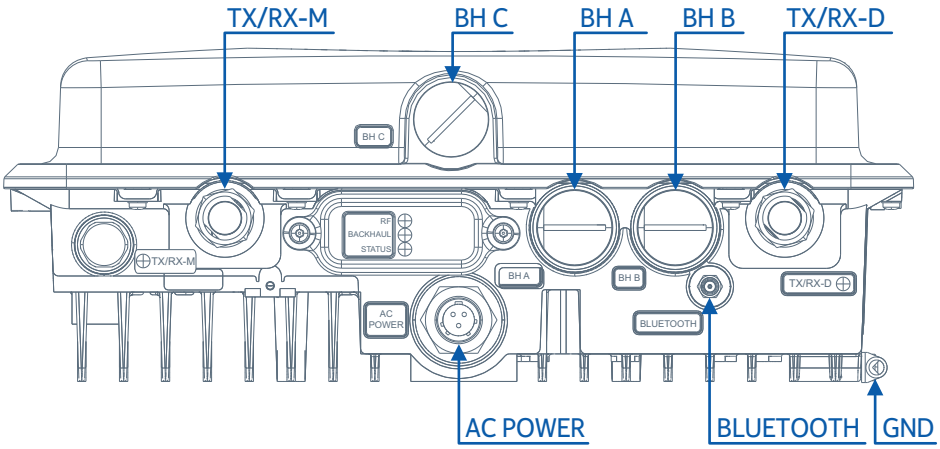
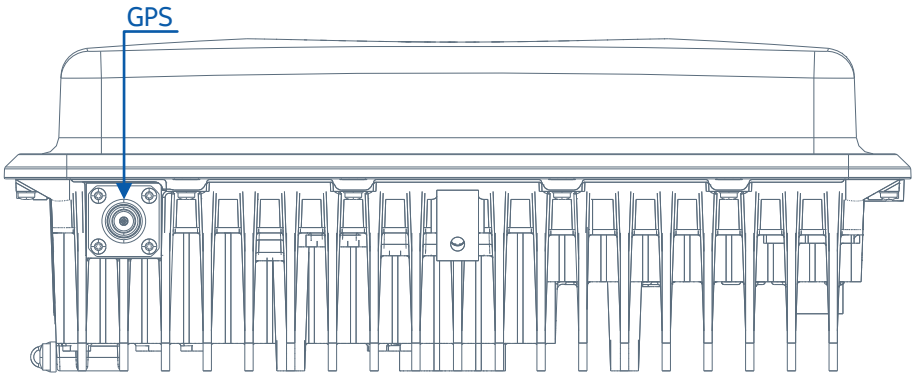


Figure 40 Flexi Zone Micro BTS (FWHT) interfaces - top view



7.7 Flexi Zone Micro BTS (FWH1, FWHR, FWHX) interfaces

List of interfaces and their functions along with graphics showing the interfaces' location on the module.

Table 36 Flexi Zone Micro BTS (FWHR) interfaces

Interface	Description
AC POWER	MIL-C-38999 standard size 9 shell power connector
BH A	Fiber-only backhaul interface

Table 36 Flexi Zone Micro BTS (FWHR) interfaces (Cont.)

Interface	Description
BH B	Copper-only backhaul interface with PoE (IEEE 802.3at-compliant)
BH C	Copper-only backhaul interface (default LMT port)
BLUETOOTH	SMA Bluetooth antenna connector
GND	Grounding
GPS	Type N GPS antenna connector
TX/RX-D	4.1-9.5 Mini DIN antenna connector (diversity)
TX/RX-M	4.1-9.5 Mini DIN antenna connector (main)

Table 37 Flexi Zone Micro BTS (FWH1, FWHX) interfaces

Interface	Description
AC POWER	MIL-C-38999 standard size 9 shell power connector
BH A	Fiber-only backhaul interface
BH B	Copper-only backhaul interface with PoE (IEEE 802.3at-compliant)
BH C	Copper-only backhaul interface (default LMT port)
BLUETOOTH	SMA Bluetooth antenna connector
GND	Grounding
GPS	Type N GPS antenna connector
TX/RX-D	N-type antenna connector (diversity)
TX/RX-M	N-type antenna connector (main)

Figure 41 Flexi Zone Micro BTS (FWH1, FWHR, FWHX) interfaces - bottom view

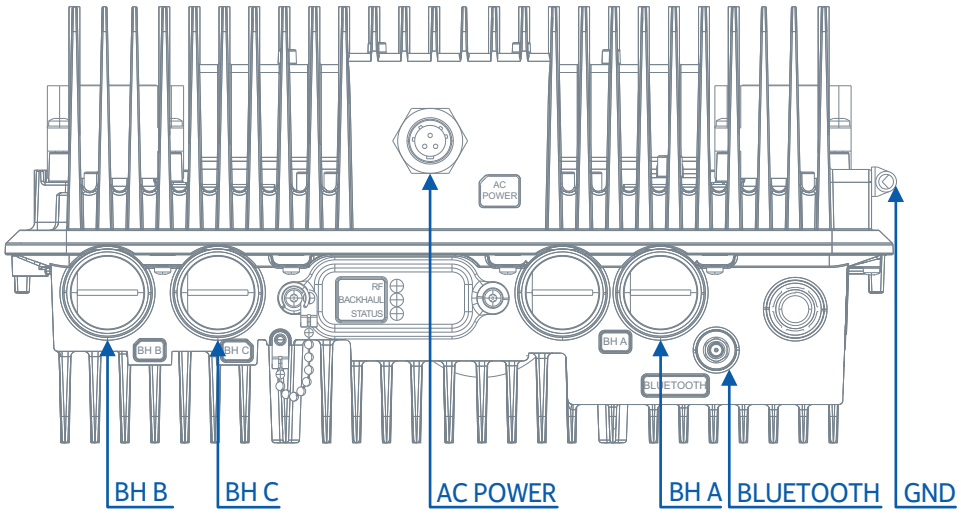
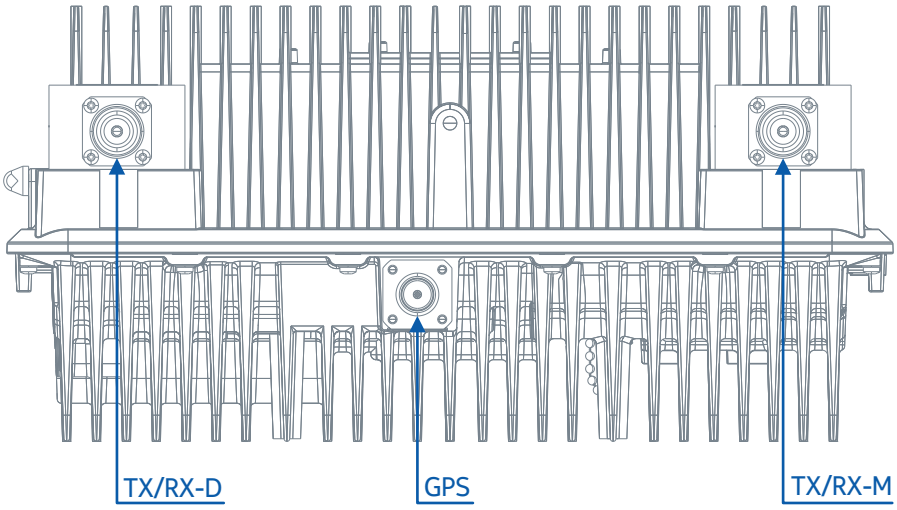


Figure 42 Flexi Zone Micro BTS (FWH1, FWHR, FWHX) interfaces - top view



8 Safety for Public and Workers

8.1 Installing base stations to ensure public safety

The equipment generates radio frequency energy, which has a thermal effect when absorbed by the human body. For this reason, compliance boundaries specific to this equipment have been established. The thermal effects of radio frequency energy can exceed safety levels when a person is inside the established compliance boundaries. Observe the compliance boundary, and make sure the general public has no access to areas inside the established boundaries.

Note: This equipment may only be installed by trained professional maintenance personnel.

8.2 Installing base stations to ensure installer safety (2x5 W variants)

Installation engineers need to be aware of the potential risk of the thermal effects of radio frequency energy and how to stay protected against undue risk.

When working close to transmitting antennas, the proper safety distances must be observed. The minimal safe distance from an antenna is measured in meters. When assessing the applicable compliance boundaries (CB) European standards EN 50383, EN 50385, Council Recommendation 1999/519/EC and FCC 47 CFR § 1.1310 for general public electromagnetic exposure limits have been applied.

The antenna types and gain configured on the product determine the minimal safe distance. Flexi Zone Micro small cell, is compliant with the cited standards at every point outside the final boundary (CB) when the Flexi Zone Micro BTS is deployed with Nokia provided antennas connected directly to the Flexi Zone Micro BTS RF ports.

Consult the site engineering plan for any other configurations.

Provisions must be taken to guarantee that no public access is possible to regions within the final compliance boundaries. See Table 38: Required Compliance Boundaries (CB) by band (all 5 W FZM variants).

Table 38 Required Compliance Boundaries (CB) by band (all 5 W FZM variants)

Required Compliance Boundaries (CB) (all 5 W FZM variants)		
Operating band(s)	**Occupational(1) [m]**	**General population(1) [m]**
Omnidirectional antenna configurations		
1, 2, 3, 4	0.72	0.72
7	0.66	0.66
14	0.27	0.73
28	0.35	0.76

Table 38 Required Compliance Boundaries (CB) by band (all 5 W FZM variants) (Cont.)

Required Compliance Boundaries (CB) (all 5 W FZM variants)		
Operating band(s)	**Occupational(1) [m]**	**General population(1) [m]**
Directional antenna configurations		
1, 2, 3, 4, 25	1.60	1.60
7	0.99	1.00
38	In process of determination	In process of determination

(1) Compliance boundary values are determined based on the 2x2 MIMO LTE main and diversity antennas plus the integrated Bluetooth antenna.

WARNING! Electromagnetic field
Do not go any closer to a live antenna than the compliance boundary. The radio frequency energy generated by the antenna poses a serious health risk.

WARNING! Electromagnetic field
If performing installation or maintenance procedures on BTS cables or antennas in an area closer than the compliance boundary, make sure that all transmitters in this area are switched off.

8.3 Installing base stations to ensure installer safety (2x20 W variants)

Installation engineers need to be aware of the potential risk of the thermal effects of radio frequency energy and how to stay protected against undue risk.

When working close to transmitting antennas, the proper safety distances must be observed. The minimal safe distance from an antenna is measured in meters. When assessing the applicable compliance boundaries (CB) European standards EN 50383, EN 50385, Council Recommendation 1999/519/EC and FCC 47 CFR § 1.1310 for Both Occupational and General Public electromagnetic exposure limits have been applied.

The antenna types and gain configured on the product determine the minimal safe distance. Flexi Zone Micro small cell, is compliant with the cited standards at every point outside the final boundary (CB) when the Flexi Zone Micro BTS is deployed with antennas evaluated in the MPE Exhibit (available via the FCC or IC website) and connected directly to the Flexi Zone Micro BTS RF ports.

Consult the site engineering plan for any other configurations.

Provisions must be taken to guarantee that no access is possible within the Occupational or General Public regions as appropriate. See Table 39: Required Compliance Boundaries (CB) by band (all 20 W FZM variants).

Table 39 Required Compliance Boundaries (CB) by band (all 20 W FZM variants)

Required Compliance Boundaries (CB)			
BTS	**Operating band(s) and technology**	**Occupational[1] [m]**	**General population[1] [m]**
FWGR	1 (FDD-LTE, WCDMA)	In process of determination	In process of determination
FWH1	38 (TD-LTE)	1.63	3.94
FWHR	41 (TD-LTE)	1.63	3.94
FWHX	38, 41 (TD-LTE)	1.63	3.94

[1]Compliance boundary values are determined based on the 2x2 MIMO LTE main and diversity antennas plus the integrated Bluetooth antenna.

WARNING! Electromagnetic field
Do not go any closer to a live antenna than the compliance boundary. The radio frequency energy generated by the antenna poses a serious health risk.

WARNING! Electromagnetic field
If performing installation or maintenance procedures on BTS cables or antennas in an area closer than the compliance boundary, make sure that all transmitters in this area are switched off.

9 Flexi Zone Micro BTS Bluetooth Modular Approval (all Micro variants)

The Bluetooth Module (Model number: FZM BLUETOOTH MODULE) has been certified for integration into the Flexi Zone Micro (FZM) product by Nokia under the following conditions:

1. The antenna(s) must be installed such that a minimum separation distance of 20 cm is maintained between the radiator (antenna) and all persons at all times.
2. Since the transmitter module is co-located and operating in conjunction with another antenna or transmitter, additional compliance requirements required with this module installed (if any) may be found in the US Federal Communications Commission (FCC)/Innovation, Science, and Economic Development Canada (ISED) grants for this product.

10 Standards compliance

This section contains standards compliance information

10.1 Brazil compliance

Description of compliance with Brazil regulations

Certain Flexi Zone BTS models covered in this document comply with Brazil Anatel requirements.

As part of Brazil Anatel requirements, the following statement is included in this document:

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

The Flexi Zone BTS variants that comply with Brazil Anatel requirements will also include the Brazil Anatel label when applicable:

Figure 43 Brazil Anatel label

Note: The actual registration number below the symbol will vary.

10.2 European Union compliance

Description of compliance with EU regulations

10.2.1 CE Marking

Describes the applicable CE markings.

The equipment described in this document faithfully complies with either:

- The relevant provisions of the European Union R&TTE Directive 1999/5/EC for some products shipped prior to June 30, 2017, (see Figure 44: CE marking (EU R&TTE Directive 1999/5/EC)),

or

- European Union Radio Equipment Directive (RED) 2014/53/EU for some current products and all products shipped after June 30, 2017, (see Figure 45: CE marking (EU RED 2014/53/EU)).

Figure 44 CE marking (EU R&TTE Directive 1999/5/EC)

Hereby, Nokia declares that one or more of these Base Stations is in compliance with the essential requirements and other relevant provisions of Directive: 1999/5/EC.

Figure 45 CE marking (EU RED 2014/53/EU)

Hereby, Nokia declares that one or more of these Base Stations is in compliance with the essential requirements and other relevant provisions of Directive: 2014/53/EU.

The Declaration of Conformity is provided to customers with other technical documents upon request and is accessible from **https://online.networks.nokia.com** to authorized users.

10.2.2 RED 2014/53/EU Article 10 compliance

Describes European Union Radio Equipment Directive (RED) 2014/53/EU Article 10 compliance

Compliance with Article 10.2 and 10.10 of European Union Radio Equipment Directive (RED) 2014/53/EU:

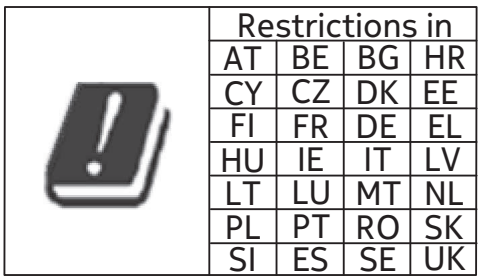
- **Licensed Band:**
  This requirement is not valid for B-to-B products, such as Base Stations.
  Operators must always apply band license from the local regulator before starting commercial network usage.

- **Unlicensed Band:**
  If equipped, the 5 GHz WLAN band of this product is restricted from operating within bands 5150 to 5350 MHz except when installed indoors.
  This equipment is restricted by firmware to operate on 2.4 GHz and 5 GHz in European Union, frequency range and limited e.i.r.p as below:

Frequency Range	Limited e.i.r.p
2.4000~2.4735 GHz	100 mW
5.150~5.250 GHz	200 mW
5.250~5.350 GHz	200 mW
5.470~5.725 GHz	1 W
5.725~5.850 GHz	4 W

RED 2014/53/EU requires that for products which could potentially have an issue with a non-harmonized frequency in a specific EU country, the product documentation must list the restrictions, and the packaging must carry a label reflecting that country's code.

Figure 46 Label example for a BTS carrying a non-harmonized frequency restriction



10.3 European Union RoHS statement

This equipment complies with the European Union RoHS Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment. The directive applies to the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic equipment.

10.4 Industry Canada IC RSS-GEN compliance

Note: Industry Canada has been renamed Innovation, Science, and Economic Development Canada (ISED) following the issue of RSP-100 Issue 11 and DC-01 Issue 6. Equipment certifications previously issued by Industry Canada remain valid and do not require updating. Meaning you may see the names used interchangeably in documentation.

10.4.1 Flexi Zone Micro BTS (FWFA, FWHT, FWIB, FWFJ) Industry Canada IC RSS-GEN compliance

Section 7.1.2 of RSS-GEN

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

The following Flexi Zone Micro BTS radio transmitters 661W-FWIB, 661W-FWFA, 109D-FZMFWHT01, 109D-FZMFWFJ01, and 661W-FZMBTM01 have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated.

This device has been designed to operate with the antennas listed below.

- Omni antennas have a maximum gain of 2 dBi
- Directional antennas have a maximum gain of 9.7 dBi

Note: Note that the Bluetooth antenna CANNOT be substituted or it will void the Bluetooth modular type approval.

Flexi Zone Micro small cell is compliant with the cited standards at every point outside the FINAL boundary (CB) when the Flexi Zone Micro BTS is deployed with Nokia Solutions and Networks provided antennas connected directly to the Flexi Zone Micro RF ports.

The antenna types and gain actually configured on the product determine the minimum safe distance (see Table 38: Required Compliance Boundaries (CB) by band (all 5 W FZM variants)). Consult site engineering plan for any other configurations using different LTE antennas. Provisions must be taken to guarantee that no public access is possible to regions within the compliance boundaries.

The required antenna impedance is 50 ohms.

See the Construction tables in the *Flexi Zone Micro BTS Product Description* for applicable antennas per BTS variant.

Section 7.1.3 of RSS-GEN

This device complies with RSS-247 of the Industry Canada Rules. Operation is subject to the following two conditions:

1. this device does not cause harmful interference, and
2. this device must accept any interference received, including interference that can cause undesired operation.

Caution:

(i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(ii) the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;

(iii) the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate; and

(iv) the worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in Section 6.2.2(3) shall be clearly indicated.

(v) Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

The same text in French.

Section 7.1.2 du CNR-GEN

En vertu de la réglementation d'Industrie Canada, cet émetteur radio peut fonctionner seulement en utilisant une antenne du type et du gain maximum (ou moins) approuvé pour un émetteur par Industrie Canada. Pour réduire les interférences radio potentielles aux autres utilisateurs, le type d'antenne et son gain devrait être choisie pour que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne soit pas plus que ce qui est nécessaire pour une communication réussie.

Les radios émetteurs suivants 661W-FWIB, 661W-FWFA, 109D-FZMFWHT01, 109D-FZMFWFJ01, et 661W-FZMBTM01 ont été approuvé par Industrie Canada à fonctionner avec les types d'antennes énumérés ci-dessous avec le gain maximum admissible et impédance d'antenne requis pour chaque type d'antenne indiqué.

Ce dispositif a été conçu pour fonctionner avec les antennes énumérées ci-dessous:

- Les antennes Omni ont un gain maximum de 2 dBi
- Les antennes directionnelles ont un gain maximum de 9.7 dBi

Note: Notez que l'antenne Bluetooth NE PEUT PAS être substituée sinon elle annulera l’homologation de type modulaire de Bluetooth.

La petite cellule Flexi Zone Micro est compatible avec les normes citées en tout point à l'extérieur de la limite FINALE (CB) lorsque le Flexi Zone Micro BTS est déployé avec les antennes fournies par Nokia Solutions and Networks connectées directement aux RF ports du Flexi Zone Micro.

Les types d'antennes et gains présentement configurées sur le produit déterminent la distance minimum de sécurité (voir le Table 38: Required Compliance Boundaries (CB) by band (all 5 W FZM variants)). Consulter le plan d'ingénierie du site pour toute autre configuration utilisant différentes antennes LTE. Des mesures doivent être prises pour garantir qu'aucun accès public n'est possible aux régions dans les limites de conformité.

L'impédance requise des antennes est de 50 ohms.

Voir les tableaux de construction dans le *Flexi Zone Micro BTS Product Description* pour les antennes applicables par variante BTS.

Section 7.1.3 du CNR-GEN

Ce dispositif est conforme à la norme CNR-247 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes:

1. le dispositif ne doit pas produire de brouillage préjudiciable, et
2. ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Avertissement:

(i) les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5250 à 5 350 MHz et de 5470 à 5725 MHz doit être conforme à la limite de la p.i.r.e;

(iii) le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5 725 à 5 850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée pour l'exploitation point à point et l'exploitation non point à point, selon le cas;

(iv) les pires angles d'inclinaison nécessaires pour rester conforme à l'exigence de la p.i.r.e. applicable au masque d'élévation, et énoncée à la section 6.2.2 3), doivent être clairement indiqués.

(v) De plus, les utilisateurs devraient aussi être avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

10.4.2 Flexi Zone Micro BTS (FWHR) Industry Canada IC RSS-GEN compliance

Section 7.1.2 of RSS-GEN

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

The following Flexi Zone Micro BTS radio transmitters 109D-FZMFWHR01 and 109DNBTM01 have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated.

This device has been designed to operate with the antennas listed below.

- Omni antennas which were evaluated have a maximum gain of 6.9 dBi

Note: Note that the Bluetooth antenna CANNOT be substituted or it will void the Bluetooth modular type approval.

Flexi Zone Micro small cell is compliant with the cited standards at every point outside the FINAL boundary (CB) when the Flexi Zone Micro BTS is deployed with antennas connected directly to the Flexi Zone Mini Macro RF ports and evaluated as described in the IC REL.

The antenna types and gain actually configured on the product determine the minimum safe distance (see Table 39: Required Compliance Boundaries (CB) by band (all 20 W FZM variants)). Consult site engineering plan for any other configurations using different LTE antennas. Provisions must be taken to guarantee that no public access is possible to regions within the compliance boundaries.

The required antenna impedance is 50 ohms.

Flexi Zone Micro small cell, omni antenna configuration (1) consists of:

- Bluetooth (BT) antenna (Laird WXC2400SMRP-NS1)
- two LTE Omni-directional antennas (Alpha Wireless AW3398)

Section 7.1.3 of RSS-GEN

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

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

The same text in French.

Section 7.1.2 du CNR-GEN

En vertu de la réglementation d'Industrie Canada, cet émetteur radio peut fonctionner seulement en utilisant une antenne du type et du gain maximum (ou moins) approuvé pour un émetteur par Industrie Canada. Pour réduire les interférences radio potentielles aux autres utilisateurs, le type d'antenne et son gain devrait être choisie pour que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne soit pas plus que ce qui est nécessaire pour une communication réussie.

Les radios émetteurs suivants 109D-FZMFWHR01 and 109D- NBTM01 ont été approuvé par Industrie Canada à fonctionner avec les types d'antennes énumérés cidessous avec le gain maximum admissible et impédance d'antenne requis pour chaque type d'antenne indiqué.

Ce dispositif a été conçu pour fonctionner avec les antennes énumérées ci-dessous:

- Les antennes Omni ont un gain maximum de 6.9 dBi

Note: Notez que l'antenne Bluetooth NE PEUT PAS être substituée sinon elle annulera l’homologation de type modulaire de Bluetooth.

La petite cellule Flexi Zone Micro est compatible avec les normes citées en tout point à l'extérieur de la limite FINALE (CB) lorsque le Flexi Zone Micro BTS est déployé avec les antennes fournies par Nokia Solutions and Networks connectées directement aux RF ports du Flexi Zone Micro.

Les types d'antennes et gains présentement configurées sur le produit déterminent la distance minimum de sécurité (voir le Table 39: Required Compliance Boundaries (CB) by band (all 20 W FZM variants)). Consulter le plan d'ingénierie du site pour toute autre configuration utilisant différentes antennes LTE. Des mesures doivent être prises pour garantir qu'aucun accès public n'est possible aux régions dans les limites de conformité. L'impédance requise des antennes est de 50 ohms.

La petite cellule Micro Zone Flexi, Omni configuration (1) se compose de:

- Antenne Bluetooth (BT) (Laird WXC2400SMRP-NS1)
- Deux antennes LTE Omni-directionnelles (Alpha Wireless AW3398)

Section 7.1.3 du CNR-GEN

Ce dispositif est conformé à l'exempts de License d'Industrie Canada (des standards RSS). L'opération est soumise aux deux conditions suivantes:

1. Ce dispositif ne doit pas causer de l'interférence, et
2. Ce dispositif doit accepter toutes interférences reçues, y compris les interférences pouvant entraîner des opérations non-désirées de l'appareil.

10.5 Singapore IMDA compliance

Flexi Zone Micro BTS compliance with Singapore IMDA standards

Flexi Zone Micro BTS models FWEA, FWHA, FWHC, and FWHO comply with Singapore Infocomm Media Development Authority (IMDA) Standards DB 103085.

Figure 47 IMDA Standards compliance label

10.6 United States FCC Part 15 compliance (Flexi Zone Micro BTS models: FWFA, FWFJ, FWHT, FWIB)

RF Exposure (OET Bulletin 65)

To comply with Federal Communications Commission (FCC)/Innovation, Science, and Economic Development Canada (ISED) RF exposure requirements for mobile transmitting devices, this transmitter should only be used or installed at locations where the separation distances between the antenna(s) and all persons are maintained as defined in Table 38: Required Compliance Boundaries (CB) by band (all 5 W FZM variants).

Flexi Zone Micro (FZM) BTS small cell is compliant with the cited standards at every point outside the FINAL boundary (CB) when the FZM BTS is deployed with Nokia provided antennas connected directly to the FZM RF ports.

The antenna types and gain actually configured on the product determine the minimum safe distance. Consult site engineering plan for any other configurations using different LTE antennas. Provisions must be taken to guarantee that no public access is possible to regions within the compliance boundaries.

Compliance Statement (Part 15.19)

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

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

Warning (Part 15.21)

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

FCC Interference Statement (Part 15.105 (b))

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

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

