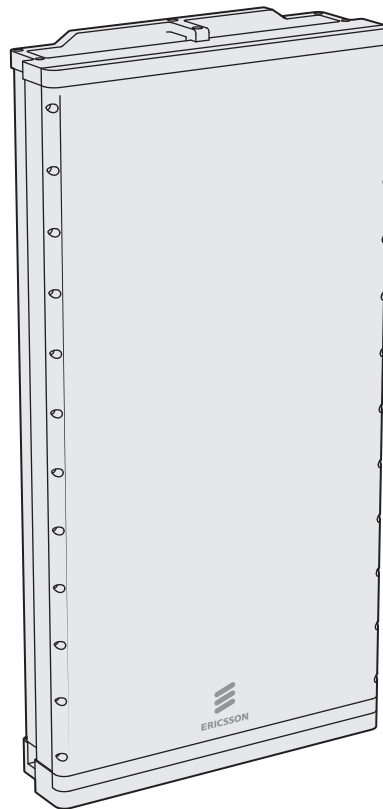


Antenna Integrated Radio Unit Description

AIR 6468

Description



Ge646801



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1 Introduction

This document describes the Antenna Integrated Radio (AIR) 6468 unit.

1.1 Warranty Seal

The unit is equipped with two warranty seal stickers.

Note: Seals that have been implemented by Ericsson shall not be broken or removed, as it otherwise voids warranty.

2 Product Overview

AIR unit 6468 is an Advanced Antenna System (AAS).

A typical configuration is shown in [Figure 1](#).

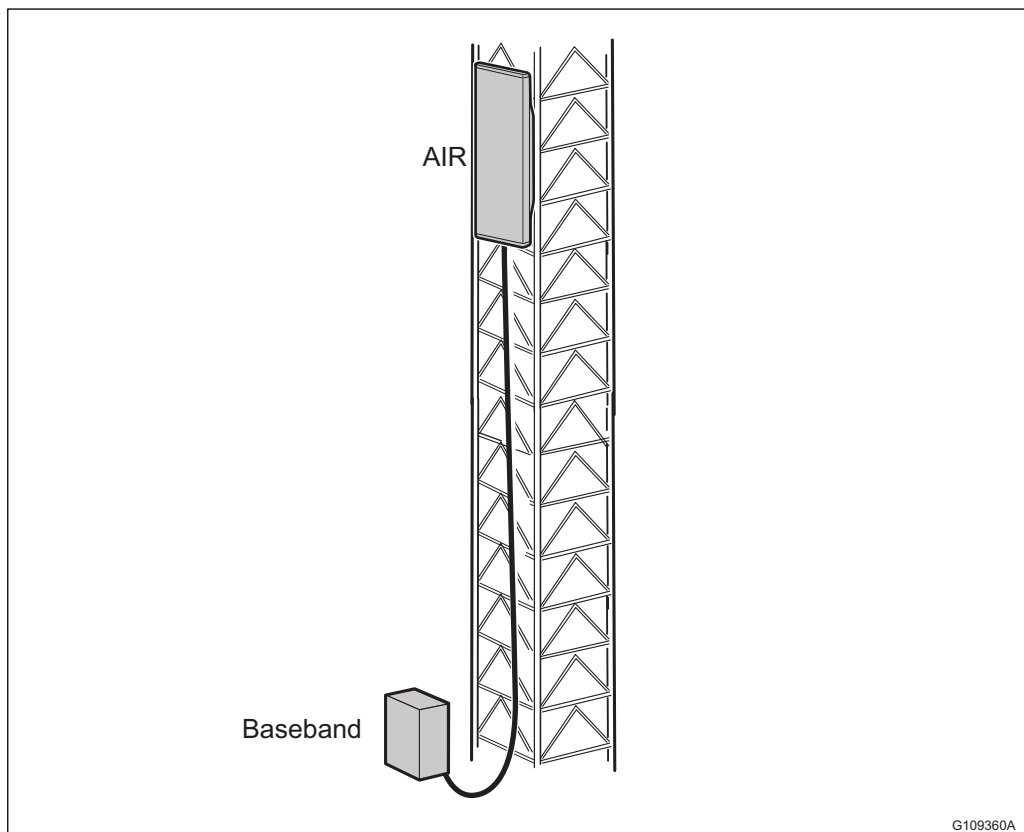


Figure 1 AIR Unit Connected to a Baseband

2.1 Main Features

The AIR Unit is an Advanced Antenna System with beamforming and Full Dimension Multiple Input Multiple Output (FD-MIMO) technology, capable to fully utilize radio resources in both azimuth and elevation.

The main benefits compared to previous macro solutions are improvements in:

- Enhance coverage - High gain adaptive beamforming
- Enhance capacity - High order spatial multiplexing and multi-user MIMO



- Advanced RAN features - Vertical/horizontal beamforming
- Improved network performance - Low inter-cell interference

The AIR Unit is designed for outdoor installations, intended for pole, wall, tower, or mast mounting. It operates over LTE TDD radio access technology.

The following are the main features of the AIR unit:

- 2-wire power connection
- LTE Time Division Duplex (LTE TDD)
- 64 transmitter/receiver (64TX/64RX) branches
- 10.3 Gbps Ethernet
- Complies with 3GPP base station classes Wide Area. The relevant standards are listed in [Radio Standards Compliance](#) on page 24.

2.2 Required Installation Equipment

[Table 1](#) lists the mounting kits required for the AIR unit. For more information, refer to *Main-Remote Installation Products Overview*.

Table 1 Mounting Kit

Mounting Kit	Product Name	Product Number
Tilt and swivel mounting kit	Bracket supporting AIR with tilting +/-30 degrees and swiveling right/left 15 degrees	SXK 109 1936/1 (for B41E only)
Swivel mounting kit	Bracket supporting AIR with swiveling right/left 30 degrees	SXK 109 2064/1
Tilt and swivel mounting kit	Bracket supporting AIR with tilting +/-20 degrees and swiveling right/left 30 degrees	SXK 109 2065/1



Note: Please note and adhere to the following for safety and operation reasons: The mechanical design of AIR Unit 6468 (below the “AIR Unit”) is based on environmental conditions which are equal to or exceeding class 4.1 as specified in EN 300 019-1-4 and GR-487-CORE and thereby respects the static mechanical load imposed on an AIR Unit by wind at maximum velocity. Wind loads in this document are calculated with reference to wind pressure. For more accurate results, the specific terrain information for relevant sites and geographical area where the AIR Unit will be installed needs to be carefully analyzed, considered and calculated according to EN 1991-1-4.

Pole clamps, brackets, mounting accessories and other installation material or equipment specified by Ericsson in the AIR Unit product information documentation must be used and Ericsson’s installation instructions be complied with. In addition, it must be observed that specific environmental conditions that the AIR Unit becomes exposed for, such as icing, heat, dust, dynamic stress (e.g. strain caused by oscillating support structures) or other environmental conditions that exceed or otherwise deviate from the *Environmental Characteristics* on page 13, may result in the breakage of an AIR Unit or its mounting accessories and even cause the AIR Unit to fall to the ground.

The above mentioned facts, information and circumstances must be considered and properly taken into account during the site planning process and adhered to for installation and operation of the AIR Unit. Ericsson expressly disclaims any responsibility or liability arising out of failures in this regard.



3 Technical Data

This section describes the physical characteristics, environmental data, and the power supply characteristics of the AIR unit.

3.1 Bands, Carriers, and Output Power

Table 2 Bands, Carriers, and Output Power for AIR 6468

Description	Value
Maximum nominal output power ⁽¹⁾ ⁽²⁾	B41E: 120 W B42: 120 W B41: 120 W (License key is required for total output power over 20 W.)
Number of carriers	LTE: up to three
Frequency ⁽³⁾	B41E for LTE: 2575–2635 MHz B42 for LTE: 3400–3600 MHz B41 for LTE: 2496-2690MHz

(1) Detailed information about licenses and hardware activation codes (HWAC) can be found in:

LTE: Manage Licenses and Hardware Activation Codes in the Radio Node libraries.

(2) Detailed information about output power can be found in applicable Output Power Feature Description.

(3) Information about Instantaneous Bandwidth (IBW) can be found in RBS Configurations.

3.2 EIRP Data

3.2.1 Traffic Beams

This section describes the Effective Isotropic Radiated Power (EIRP) of traffic beams for the AIR unit.

[Table 3](#) lists the typical EIRP performance data of traffic beams.

**Table 3** AIR Unit Typical EIRP Performance Data for Traffic Beams

Uniform Traffic Beams ⁽¹⁾	Directions		
	Htilt, Vtilt	0°, 3°	55°, 3°
Vertical Beamwidth	9.5°	9.5°	10°
Horizontal Beamwidth	12°	22°	12°
Minimum peak EIRP ⁽²⁾	B41E: 2 × 71.5 dBm B42: 2 × 71.5 dBm B41: 2 × 71.5 dBm	B41E: 2 × 68 dBm B42: 2 × 68 dBm B41: 2 × 68 dBm	B41E: 2 × 70 dBm B42: 2 × 70 dBm B41: 2 × 69.5 dBm

(1) The traffic beamforming of this product is not limited to the uniform beamshapes and directions given in the table. The beams are dynamically optimized.

(2) The minimum peak EIRP in the table is calculated for two simultaneous orthogonal beams.

3.2.2 Broadcast Beams

This section describes performance data for broadcast beams in three different scenarios.

Table 4 AIR Unit Typical Antenna Performance Data for Broadcast Beams

Scenario	Macro	Hotspot	Highrise
Beam	BrM1, BrM2 ⁽¹⁾	BrHS1, BrHS2 ⁽²⁾	BrHR1, BrHR2 ⁽³⁾
Vertical Beamwidth	10±1°	30±3°	30±3°
Horizontal Beamwidth	65±5°	65±5°	20±2°
Digital Downtilt	[-8, 8]°	Fixed 3°	Fixed 3°
Vertical beam pointing error	≤ 1°	≤ 3°	≤ 3°
Horizontal beam pointing direction	0±5°	0±5°	0±2°
EIRP (max)	B41E: 2 × 64.5 dBm B42: 2 × 64.5 dBm B41: 2 × 64.5 dBm	B41E: 2 × 59.5 dBm B42: 2 × 60 dBm B41: 2 × 59.5 dBm	B41E: 2 × 64 dBm B42: 2 × 64 dBm B41: 2 × 64 dBm
Side Lobe Suppression	16 dB (vertical)	12 dB (vertical)	12 dB (horizontal)
Front to Back Ratio	25 dB	25 dB	25 dB
Beam Parallelity	≤ -10 dB	≤ -10 dB	≤ -10 dB

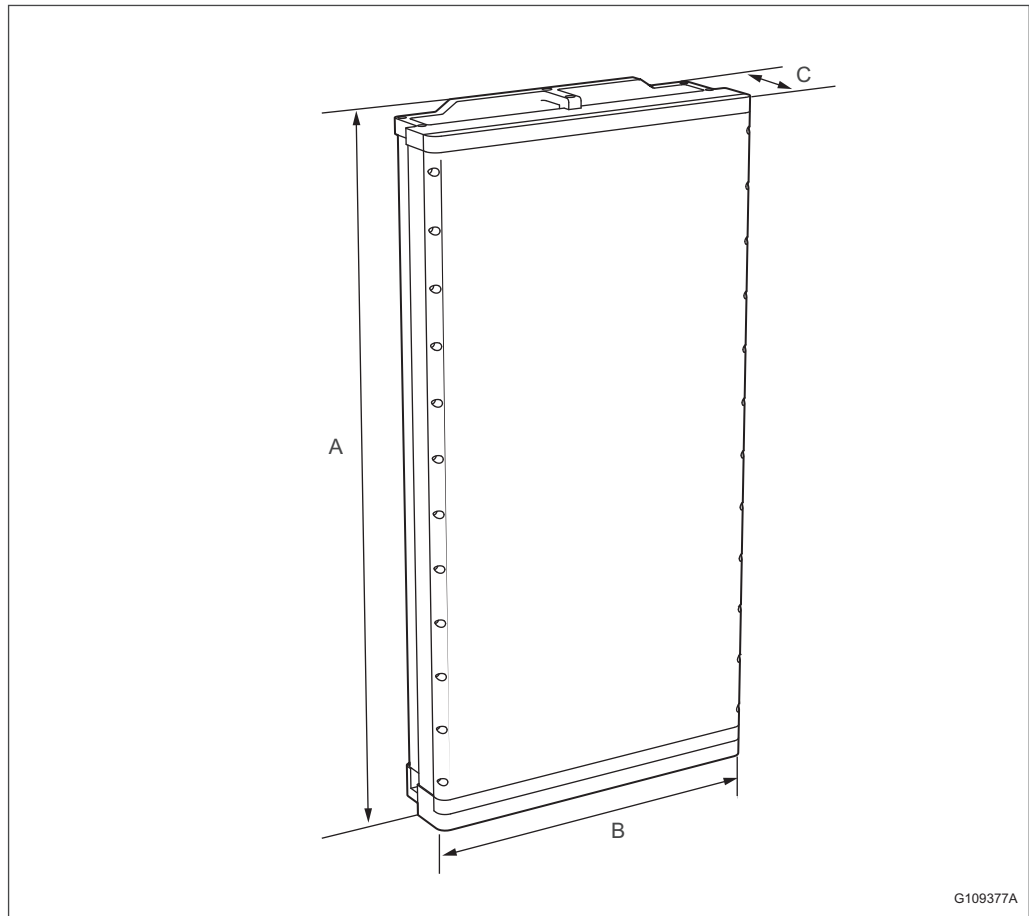
(1) Broadcast Beam Macro 1, Broadcast Beam Macro 2.

(2) Broadcast Beam Hotspot 1, Broadcast Beam Hotspot 2.

(3) Broadcast Beam Highrise 1, Broadcast Beam Highrise 2.

3.3 Physical Characteristics

This section describes the physical dimensions, weight, and color of the AIR Unit.



G109377A

Figure 2 AIR Unit Dimensions

Table 5 AIR Unit Dimensions

Description	Value
Height (A)	B41E: 988 mm B42: 988 mm B41: 988 mm
Width (B)	B41E: 520 mm B42: 520 mm B41: 520 mm
Depth (C)	B41E: 158 mm B42: 187 mm B41: 187 mm

**Table 6** AIR Unit Weight

AIR Unit Type	Weight without Mounting Kit	Weight with Mounting Kit		
		SXK 109 1936/1	SXA 109 2064/1	SXA 109 2065/1
AIR 6468 B41E	46.4 kg	58.1 kg	N/A	N/A
AIR 6468 B42	60.4 kg	N/A	64.9 kg	67.4 kg
AIR 6468 B41	60.4 kg	N/A	64.9 kg	67.4 kg

The whole body of the AIR Unit including the radome is gray, and the color value is NCS S 1002-B.

3.4 Installation Requirements

This section describes the installation requirements for installing the AIR Unit. For a complete installation description, refer to *Install Antenna Integrated Radio Units*.

The AIR Unit is only for outdoor installation, and it can be installed either on a pole, or on a mast or a tower.

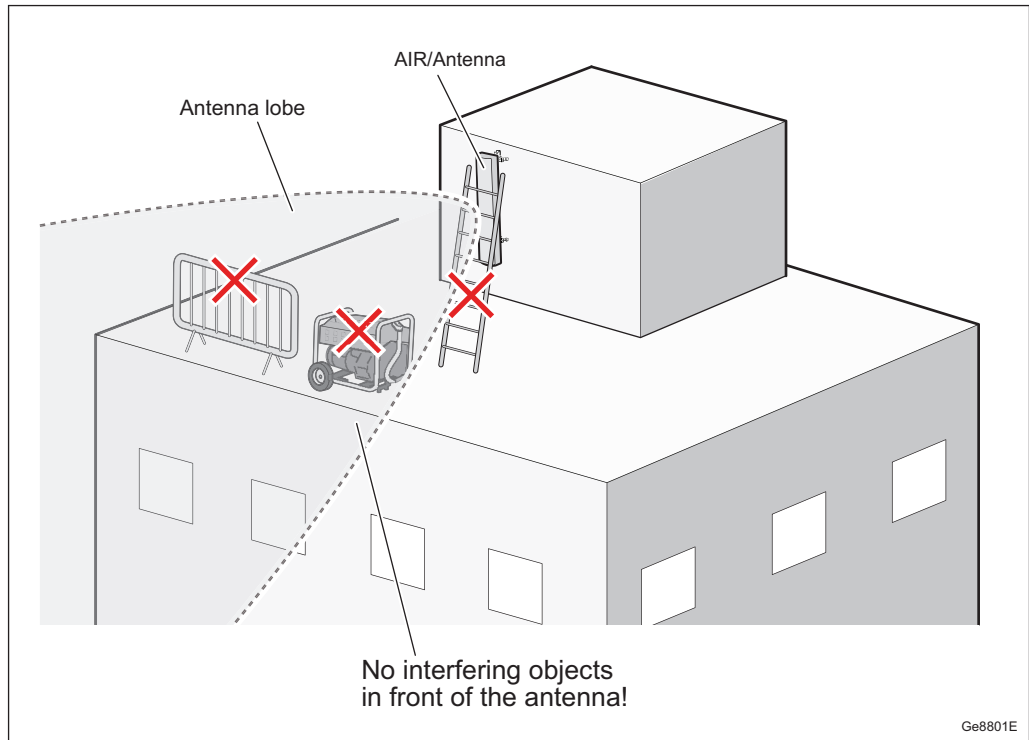
3.4.1 Outdoor Installation Environments to Avoid

The AIR unit is designed for outdoor use but to ensure optimal operation avoid the following:

- Hot microclimates caused, for example, by heat radiated or reflected from dark or metallic walls or floors
- Chimney mouths or ventilation system outlets
- Large glass or concrete surfaces

Avoid radio interference by keeping the area directly in front of the antenna clear of the following:

- Metal surfaces or objects such as railings, ladders, or chains
- Equipment generating electromagnetic fields, for example electric motors in air conditioners or diesel generators
- RBS equipment



3.4.2 Space Requirements

The AIR unit is installed with the cable connections facing down. Allow a minimum of 500 mm free space below the AIR unit to ensure sufficient working space. If there is a heat generating unit placed below the AIR unit, the distance to the AIR unit must be a minimum of 2.0 m to ensure adequate airflow.

Table 7 lists the required free space needed between AIR units to ensure adequate airflow.

Table 7 Space Requirement for Adequate Airflow Between AIR Units

Free Space Required Between AIR Units Installed Above Each Other	Free Space Required for AIR Units Installed Side by Side
2000 mm	300 mm

3.4.3 Painting Limitations

Ericsson does not recommend painting the AIR, especially not the radome, as it may affect radio performance of the unit.

Ericsson will apply limitations to the warranty and service contract if the AIR is painted.



Note: If the AIR needs to be painted, please contact Ericsson for additional information.

3.5 Installation Alternatives

Figure 3 shows the installation alternatives. Figure 4 and Figure 5 show the tilt and swivel angles of different mounting kits.

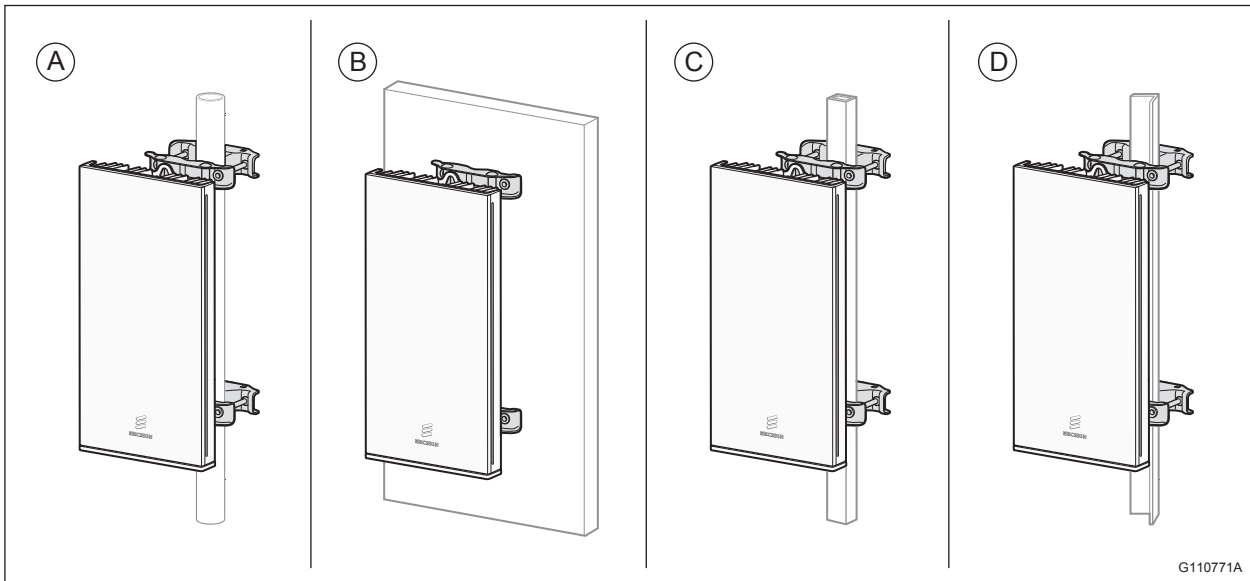


Figure 3 Installation Method Alternatives

Table 8 Key to Installation Alternatives

Installation Method	Description
A	Pole installation (pole with circular cross section)
B	Wall installation
C ⁽¹⁾	Pole installation (pole with square cross section)
D ⁽¹⁾	Pole installation (pole with 90° angle cross section)

⁽¹⁾ The installation method is not supported by the mounting kit for B41E.

Table 9 Pole Mounting Range (Mounting Kit for B41E)

Pole	Circular Cross Section
Minimum	Ø55 mm
Maximum	Ø115 mm

Table 10 Pole Mounting Range (Mounting Kits for B41 and B42)

Pole	Circular Cross Section	Square Cross Section	90° Angle Cross Section
Minimum	Ø76 mm	50 x 50 mm	50 x 50 mm
Maximum	Ø120 mm	80 x 80 mm	80 x 80 mm

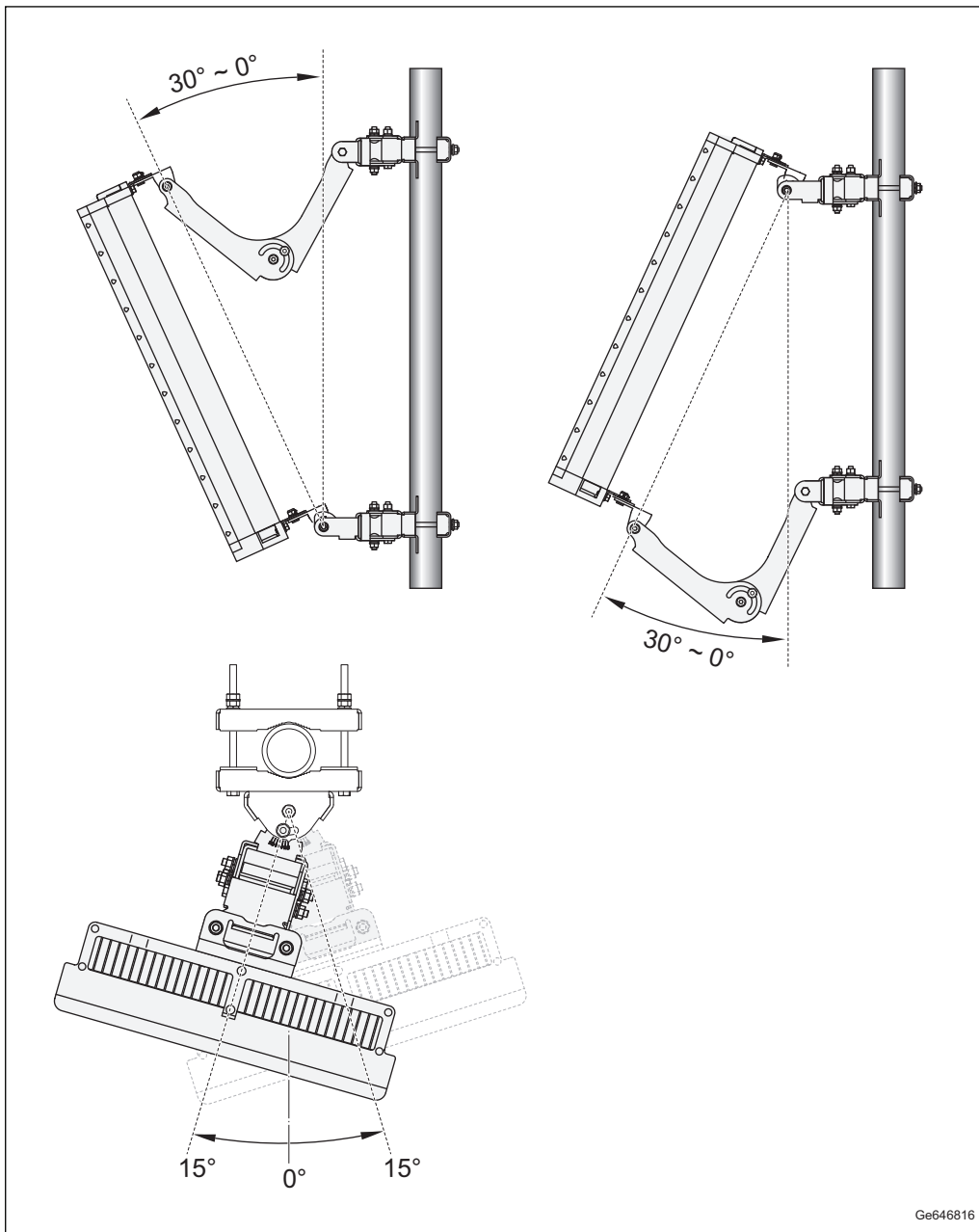


Figure 4 Tilt and Swivel Angle (Mounting Kit for B41E)

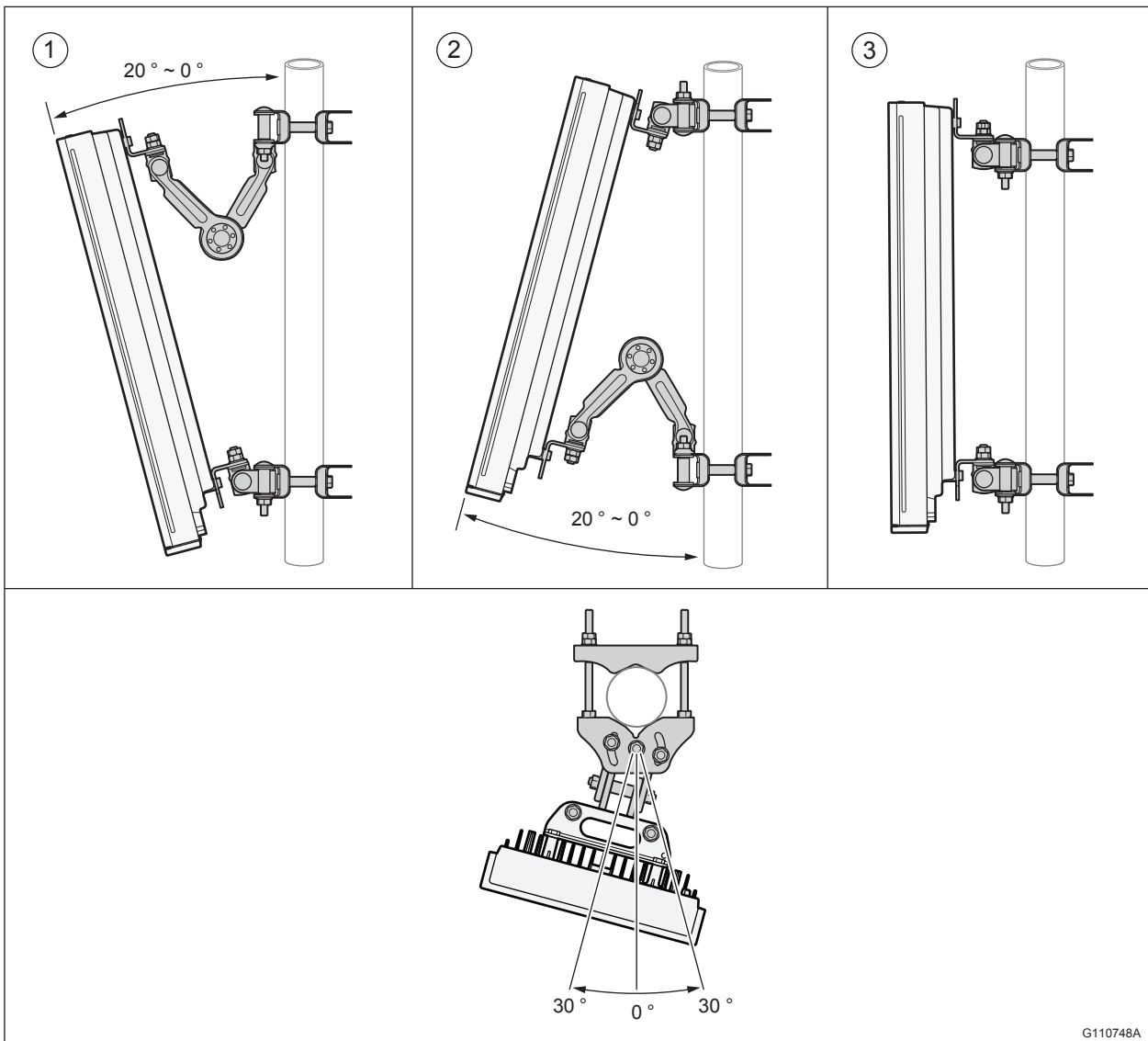


Figure 5 Tilt and Swivel Angle (Mounting Kits for B41 and B42)

Note: Mounting kit SXK 109 2064/1 supports only swivel angle, and SXK 109 2065/1 supports both swivel and tilt angle.

3.6 Acoustic Noise

The AIR unit is silent in normal operation status. It may emit low levels of acoustic noise when operating on low capacity in LTE.

The sound pressure level when operating on low capacity in LTE can be 28 dBA at one-meter distance and hemispherical distribution, and 25 dBA for spherical distribution.



3.7 Environmental Characteristics

This section contains operating environment data for the AIR unit.

3.7.1 Operating Environment

Table 11 Air Unit Normal Operating Environment

Condition	Value/Range
Temperature	-40°C through +55°C
Solar radiation	≤ 1,120 W/m ²
Relative humidity	2% through 100%
Absolute humidity	0.26 through 40 g/m ³
Maximum temperature change	1.0°C/min
Maximum wind load at 42 m/s (Pole installed AIR unit)	B41E: 735 N B42: 753N B41: 753N

3.7.2 Vibration

This section describes the tolerance of the AIR unit to vibrations. The AIR unit operates reliably during seismic activity as specified by test method IEC 60068-2-57 Ff.

Maximum level of Required Response Spectrum (RRS)	50 m/s ² within 2-5 Hz for DR=2%
Frequency range	1–35 Hz
Time history signal	Verteq II

The AIR unit operates reliably during random vibration as specified by test method IEC 60068-2-64 Fh method 1.

Random vibration, normal operation	0.3 m ² /s ³ on x,y-axes 0.2 m ² /s ³ on z-axis
------------------------------------	--

The AIR unit operates reliably during shock as specified by test method IEC 60068-2-27 Ea.

Peak acceleration	40 m/s ²
Duration	22 ms



3.7.3 Materials

All Ericsson products fulfill the legal, market, and Ericsson requirements regarding the following:

- Material declaration
- Materials' fire resistance, components, wires, and cables
- Recycling
- Restricted and banned material use

3.8 Power Supply Characteristics

This section describes the power supply requirements, power consumption, and fuse and circuit breaker recommendations for the AIR unit.

3.8.1 DC Power Supply Characteristics

The power supply voltage for the AIR unit is -48 V DC.

The following is a list of the power supply requirements:

Nominal Voltage	-48 V DC
Operating Voltage Range	B41E: -40.0 to -58.5 V DC B42: -38.0 to -58.5 V DC B41: -38 to -58.5V DC
Non-destructive Range	0 to -60 V DC

The AIR unit is designed for 2-wire power connections.

Fuse and Circuit Breaker Recommendations

The recommended fuse and circuit breaker rating is minimum 35 A and maximum 45 A.

The recommendations given in this section are based on peak power consumption: no information on power consumption during normal operation is available.

The recommended melting fuse type is am-gL-gG, according to IEC 60269-1. Circuit breakers must comply with at least Curve 3 tripping characteristics, according to IEC 60934.

The AIR unit has a built-in Class 1 (Type 1) Surge Protection Device (SPD) to protect the equipment in case of lightning and network transients. The



recommended fuse or circuit breaker rating is therefore dimensioned to not trip the fuse or circuit breaker during typical SPD operations.

3.8.2 Power Consumption

For information on power consumption, refer to *Power Consumption Guideline for RBS 6000*.

3.9 System Characteristics

This section describes the system characteristics of the AIR system.

3.9.1 RF Electromagnetic Exposure for RBS 6000

For general information on RF Electromagnetic Fields (EMF) for AIR units connected to an RBS from the 6000 family, refer to *Radio Frequency Electromagnetic Fields*.

Information about radio access-specific compliance boundaries for electromagnetic exposure, refer to *Radio Frequency Electromagnetic Exposure*.

3.9.2 Software

Information on software dependencies can be found in *Radio Software Support*.

3.9.3 Radio Configurations

For information about available radio configurations, refer to *RBS Configurations*.



4 Hardware Architecture

This section describes the AIR unit hardware structure regardless of configuration or frequency. For a description of the currently available radio configurations, refer to *RBS Configurations*.

4.1 AIR Unit Parts

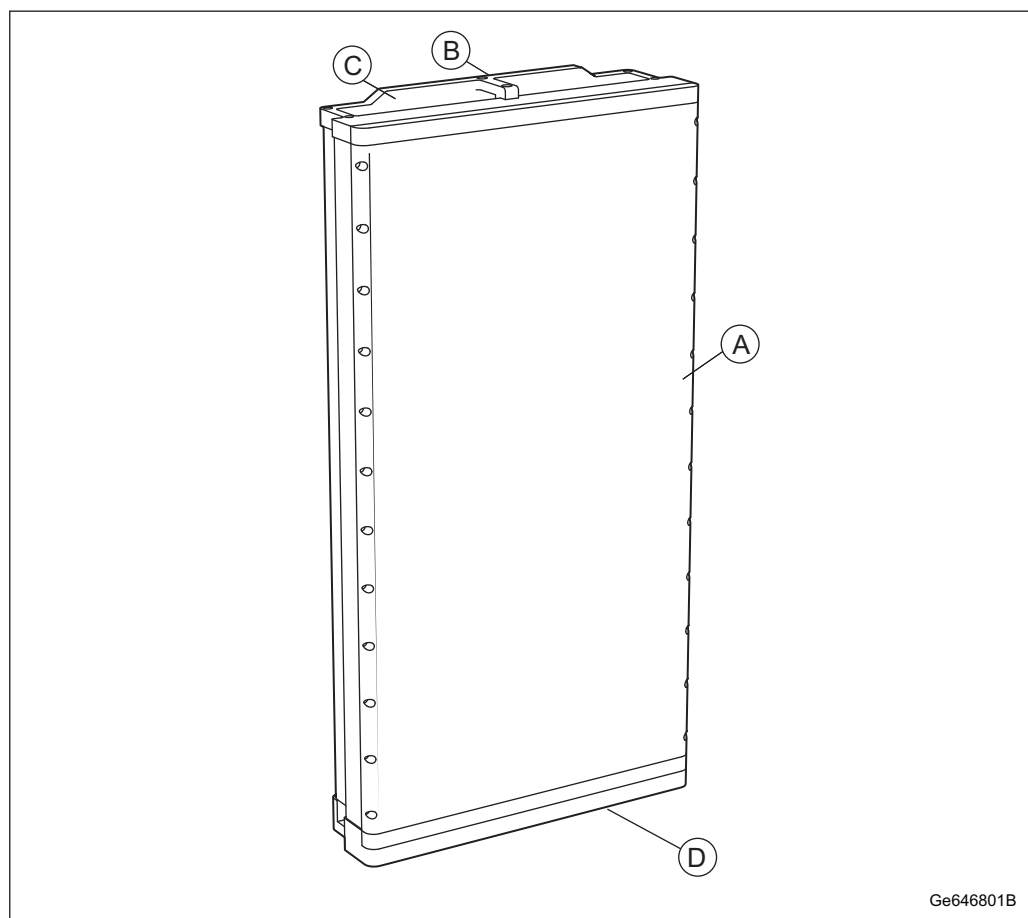


Figure 6 AIR Unit Parts

Table 12 AIR Unit Parts

Position	Component
A	Radome
B	Upper lifting eye

Position	Component
C	Grids for cooling, air inlet, and outlet
D	Connection interfaces

4.2 Optical Indicators

The AIR unit is equipped with optical indicators that show the system status. The location of the optical indicators is shown in [Figure 7](#).

[Table 13](#) describes how to interpret the optical indicators on the AIR unit. For detailed information about the optical indicators, refer to *Indicators, Buttons, and Switches*.

Note: The AIR unit has no maintenance button.

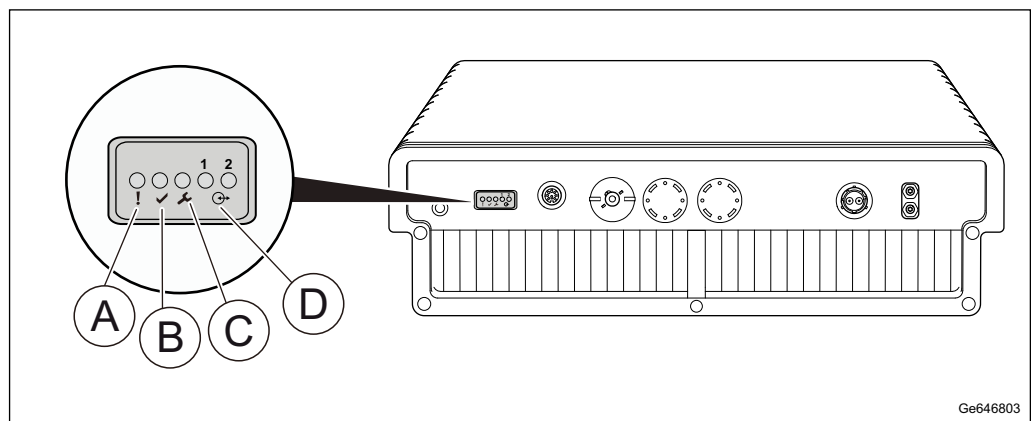


Figure 7 Optical Indicators

Table 13 Optical Indicators

Position	Marking	Indicator	Color	Mode	Interpretation
A	!	Fault	Red	Off	No fault detected in unit
				On	Fault detected in unit
B	✓	Operational	Green	Off	No power
				On	Operational
				Flashing Slowly (0.5 Hz)	Missing dependent resource
				Flickering (16 Hz)	Transitory activity
				Double flashing Off	Loading in progress No ongoing traffic
Double flashing On	Loading in progress Traffic is ongoing				
C	🔧	Maintenance	Blue	Off	No ongoing maintenance activity Traffic is ongoing



Position	Marking	Indicator	Color	Mode	Interpretation
				On	Maintenance mode All traffic and alarms are suppressed
				Flashing Slowly (0.5 Hz)	Maintenance mode is initiated When traffic and alarms are removed, the indicator switches to On
D	↻ 1, ↻ 2	Interface	Green	Off	Disconnected
				On	Connected

5 Connection Interfaces

The AIR Unit connection interfaces are shown in [Figure 8](#) and are listed in [Table 14](#).

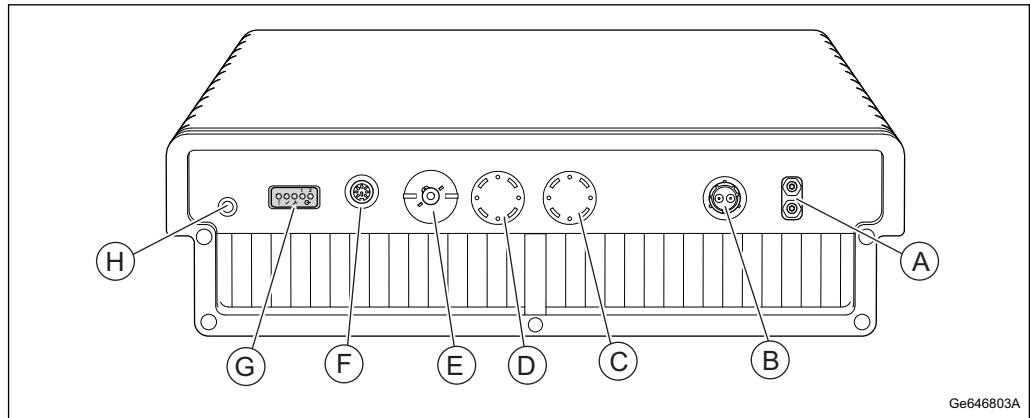


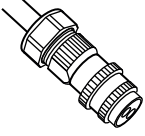

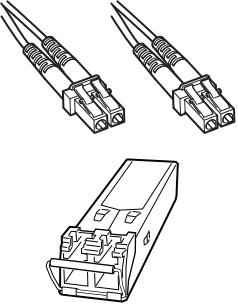

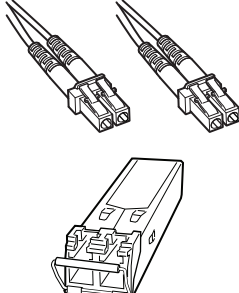

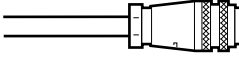
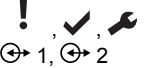

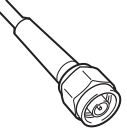


Figure 8 AIR Unit Connection Interfaces

Table 14 AIR Unit Connection Interfaces

Position	Description	Marking	Connector Types	Connector Illustration
A	Grounding point		2 x M6 bolt	
B	-48 V DC power supply	-48 V	Power connector	
C	Optical cable 2		LC (On SFP) with support for FullAXS	
D	Optical cable 1			



Position	Description	Marking	Connector Types	Connector Illustration
E	Optional synchronization timing	AUX	LC (On SFP) with support for FullAXS	
F	External alarm/EC light interface ⁽¹⁾		DIN 14 female connector	
G	Optical indicators	 ⊕ 1, ⊕ 2	–	–
H	TX Monitor		B41E: N-type female connector B42: SMA female connector B41: SMA female connector	

(1) The EC functionality is for all bands of AIR 6468, while the external alarm functionality is only for B41E.

5.1 Grounding Interface

The AIR unit must be grounded to protect it from overvoltage and lightning strikes. The grounding interface on the AIR unit accepts an M6 dual cable lug on a coated cable.

For more information about grounding principles, refer to *Grounding Guidelines for RBS Sites*.

5.2 –48 V DC Power Supply Interface

The –48 V DC power connection is made through a connector with a 2-wire connection. The connector accepts cables with various cross-sectional areas depending on the cable length as shown in [Table 15](#).



Table 15 –48 V DC Power Supply Cable

Cable Length (m)	Cross-Sectional Area of Each Conductor (mm ²)	Note
0–40	10	Used with connector RNT 447 32/02 or RNT 447 38/02 for B41E
		Used with connector RNT 447 38/02 for other bands
40–60	16	Used with connector RNT 447 32/03 or RNT 447 38/03 for B41E
		Used with connector RNT447 38/03 for other bands
60–90	25	Used with junction box NTB 101 75/1

Note: The power cable connectors don't support hot plug.

The power cable conductor has a wire for both the 0 V conductor and a wire for the –48 V DC conductor.

All cables must be shielded. The shielding must be properly connected both to the power connector and to the grounding in the power supply equipment; otherwise, the AIR unit over voltage and lightning protection does not function properly.

5.3 Interface for Optical Cable

The optical cable interfaces provide connections to optical cables for traffic and timing signals between the AIR and a Baseband unit. A Small Form-factor Pluggable (SFP)+ is used to connect the optical cable to the AIR.

Note: The AIR uses SFP+ modules for optical transmission and optical radio interfaces on Data 1 and Data 2.

Only use SFP+ modules approved and supplied by Ericsson. These modules fulfill the following:

- Compliance with Class 1 laser product safety requirements defined in standard IEC 60825-1.
- Certification according to general safety requirements defined in standard IEC 60950-1.



- Functional and performance verified to comply with RBS specifications.

Recommended SFP+ modules are obtained from the product packages for the RBS and the Main Remote Installation products. Refer to *Spare Parts Catalog* and *Main-Remote Installation Products Overview* for more information.

eCPRI Interface

The AIR unit sets up connection with Baseband via eCPRI interface. eCPRI is a 10.3 Gbps Ethernet port.

5.4 Sync Interface

This interface is reserved for future use as a 1.25 Gbps Ethernet port connected to TCU, to receive sync timing from TCU through PTP protocol. The interface is hardware prepared as a 10.3 Gbps eCPRI interface. The connector is SFP+.

5.5 Support Unit/External Alarm Interface

The support unit port will deliver communication signals and alarms between the optional PSU and the AIR.

The alarm port supports two external alarms.

The external alarm cables are implemented only for AIR Unit B41E.

5.6 Optical Indicators

Optical indicators show the system status. More information about the optical indicators can be found in *Indicators, Buttons, and Switches*.

5.7 TX Monitor Interface

The TX monitor interfaces provide the monitoring for the output power and performance.

Note: Make sure to use the correct cable type with N-Type female connector for B41E and SMA female connector for other bands.



6 Standards and Regulations

This section presents a brief overview of standards, regulatory product approval, and declaration of conformity.

Declaration of Conformity

"Hereby, Ericsson AB, declares that this Product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU and 2011/65/EU."

6.1 Regulatory Approval

The RBS complies with the following market requirements:

- EC (European Community) market requirements, Radio Equipment Directive 2014/53/EU and Directive 2011/65/EU.
- The apparatus may include Radio Transceivers with support for frequency bands not allowed or not harmonized within the EC.
- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2011/65/EU).
- Products containing Radio Equipment in countries not recognizing the CE-mark may be labeled according to national requirements or standards.

6.1.1 Environmental Standards Compliance

The product complies with the following environmental standard:

Europe

- EN 50581 (RoHS)

6.1.2 Safety Standards Compliance

In accordance with market requirements, the RBS complies with the following product safety standards and directives:



International

- IEC 62368-1

Europe

- EN 50385
- EN 62368-1

6.1.2.1 Outdoor Specific Requirements

The RBS complies with the following outdoor specific requirements:

International

- IEC 60529 (IP65)
- IEC 60950-22

Europe

- EN 60529 (IP65)
- EN 60950-22

6.1.3 EMC Standards Compliance

The RBS complies with the following Electromagnetic Compatibility (EMC) standards:

International

- 3GPP TS37.114

Europe

- ETSI EN 301 489-1
- ETSI EN 301 489-50

6.1.4 Radio Standards Compliance

The RBS complies with the following radio standards:

**International**

- 3GPP TS37.145-1
- 3GPP TS37.145-2

Europe

- ETSI EN 301 908-1
- ETSI EN 301 908-18

6.2 Other Standards and Regulations

The standards and regulations in this section are not regulatory approved.

6.2.1 Spare Parts

The product adheres to the Ericsson Serviceability and Spare Part Strategy.

6.2.2 Surface Quality

The surface quality of the AIR units is according to Ericsson standard class A3.

6.2.3 Vandal Resistance

Unauthorized access is not possible without damaging the unit.