To: Property Owners, Owners of property located within 500 feet of the following Applications, and Neighborhood Association Representatives.

From: Planning and Development Staff

Subject: Upcoming Applications for the Design Review Board – Neighborhood Design Panel

Date: June 16th, 2020

Public meetings will be hosted virtually online and can be accessed at greenvillesc.gov/meeting using the password meetnow. Instructions to access the meeting, and information regarding a remote viewing location, are included at the end of this notice.

A remote meeting viewing location has been set up at the Greenville Civic Center at 1 Exposition Drive in Room 102.

The City of Greenville Design Review Board – Neighborhood Design Panel will hold a Public Hearing on Thursday, July 2nd, 2020 at 3:00 PM via the virtual meeting platform, Webex, for the purpose of considering the following applications:

A. Old Business (public hearing)
   i. None

B. New Business (public hearing)
   i. CA 20-266
      Application by Josiah Pott for an UNREASONABLE HARDSHIP EXEMPTION for roof replacement at 110 Butler Ave. (TM# 001500-02-00600).

Documents:

CA 20-266 PUBLIC NOTICE PACKET - 110 BUTLER AVE..PDF

   ii. CA 19-674
      Application by Kimley-Horn for a CERTIFICATE OF APPROPRIATENESS for small-cell wireless facility utility pole designs.
You are invited to review documents relating to these applications before the public hearing. Application materials are posted online at http://www.greenvillesc.gov/drb. You may contact the Planning Office at (864) 467-4476 for more information. Application materials are subject to change.

You will have the opportunity to voice your comments at the public hearing. Each speaker is limited to 3 minutes. Repetitive statements should be avoided; individuals sharing similar concerns are encouraged to appoint a spokesperson to represent their group. Alternatively, you may submit written comments to: Planning & Development Office, PO Box 2207, Greenville, SC 29602, by fax at (864) 467-4510, or by email at planning@greenvillesc.gov.

Written comments must be received by 2PM Monday before the hearing in order to be given adequate time for consideration by the Board before the hearing. Comments received after 2PM Monday will be provided to the Board at the hearing. Please reference the application number and include your name and address on all correspondence. All comments will be made part of the public record.

In some cases the applicant may be required, as part of the application process, to hold a neighborhood meeting before the application is heard by the Board. Property owners within 500’ of the application site would then be notified by mail. A property owner that directly abuts the proposed project or owners of 20% of parcels within 500’ may also request a meeting. Contact the Planning and Development Office for further instructions.

Webex Meeting Instructions

Steps for Online Access

1. Visit greenvillesc.gov/meeting. You can also go to greenvillesc.gov and click on ONLINE MEETING.
   Enter your: First Name
   Enter your: Last Name
   Enter your: Email Address
   Enter the event password: meetnow
   Click: Join Now

Steps for Phone Access

1. Dial: +1-415-655-0002
2. Enter Access Code: 129-393-8034

Remote Viewing Location

A remote meeting viewing location has been set up at the Greenville Civic Center at 1 Exposition Drive in Room 102.
All attendees at the remote viewing location will be subject to a temperature screening with a touch-less forehead thermometer. Anyone with a temperature reading above 100 degrees Fahrenheit will not be admitted. Attendees will be required to wear a covering over their mouth and nose, unless it violates a religious tenant or belief or causes difficulty breathing. The City seeks input from citizens while adhering to public health and safety guidelines.

Procedure for Public Comment during Meeting

1. The Design Review Board Chair will read through each agenda item and call for a list of names who wish to speak during public comment. The public shall communicate directly with the Planning Staff Liaison if they wish to speak on the specific agenda item.
2. The Planning Staff Liaison will take a list of names, which will be called in order at the time of the specific agenda item, to provide public comment.
3. The Planning Staff Liaison will communicate directly with the public during the public portion of each item to provide comments on the specific agenda item.
4. Each member of the public shall provide their comments when their name is called by the Planning Staff Liaison.
5. Each member of the public will have 3 minutes to speak on the specific agenda item. When speaking:
   • Begin by clearly stating your name and address for the record. Please spell your name if it is prone to be misspelled. The 3-minute timer will start after you provide this information.
   • Please do not repeat information already presented by someone else and avoid off-topic statements. Those who wish to share similar concerns are encouraged to appoint a spokesperson to speak on behalf of the group.
   • Direct all comments and questions to the chairperson, who will respond or direct the question to the appropriate party for response.
6. The Planning Staff Liaison will continue through the list of names until all members of the public who wished to speak on the specific agenda item have had an opportunity.
7. Once all names are called and public comment provided, the public portion for that specific agenda item will be closed.
Application For An
Unreasonable Hardship Exemption –
Design Review Board
(Urban Design Panel/Neighborhood Design Panel)

Applicant/Owner Information

Applicant:  
Josiah Pott

Property Owner:  
SAME

NAME:  
Josiah Pott

ADDRESS:  
1010 Miller Rd.
Greenville, SC 29607

PHONE:  
(864) 915-2082

FAX:  
N/A

EMAIL:  
jpott13@gmail.com

Property Information

STREET ADDRESS:  110 Butler Ave
DEED BOOK/PAGE:  2578/4424

TAX PARCEL #:  9015000200600
ZONING DESIGNATION:  

HISTORIC DISTRICT OVERLAY?:  Hampton-Pinekney
NATIONAL REGISTER?:  

COA # APPROVED:  Yes
COA # DENIED:  

Description Of Request

In the original COA, there was no specification regarding how the roof should be replaced since it was assumed that the roof was in fine condition since the inspector could not inspect the attic. After removing the ceiling drywall on the second floor ceiling, many slow drips became immediately apparent. We now need to replace the roof which was already not in our budget. A traditional shingle roof will cost ~$6,000. Even the most affordable terracotta roofs will cost us over $22,000. We would like to request approval to install a traditional shingle roof like the rest of houses in the neighborhood.
Instructions

1. The application and fee, made payable to the City of Greenville, must be received by the planning and development office no later than 5:00 pm of the date reflected on the attached schedule.

2. See Section 19-2.3.8(h), Unreasonable Hardship Exemption, for additional information; you may attach a separate sheet addressing these questions.

3. You must attach one (1) complete set of scaled drawings of the property that reflects, at a minimum, the information reflected on page 4. Drawings must be drawn at an appropriate scale, such as 1"=20' or ½"=1', etc. In addition, you must address the requirements of Section 19-2.3.8(h)(2), Unreasonable Hardship Standards, as reflected on page 3 of this application. The commission may request additional information at any time to fully understand the proposal. Items submitted to the commission become the property of the city and will not be returned.

4. You must attach the required application fee:
   a. Commercial - $300.00
   b. Signs - $150.00
   c. Single-family residential - $150.00
   d. Other - $300.00

5. The administrator will review the application for "sufficiency" pursuant to Section 19-2.2.6, Determination of Sufficiency, prior to placing the application on the Design Review Board agenda. If the application is determined to be "insufficient", the administrator will contact the applicant to request that the applicant resolve the deficiencies. You are encouraged to schedule an application conference with a planner, who will review your application for "sufficiency" at the time it is submitted. Call (864) 467-4476 to schedule an appointment.

6. You must post the subject property at least 15 days (but not more than 18 days) prior to the scheduled hearing date.

   ____signs are acknowledged as received by the applicant

7. The applicant and property owner affirm that all information submitted with this application; including any/all supplemental information is true and correct to the best of their knowledge and they have provided full disclosure of the relevant facts.

   In addition, the applicant and property owner affirm that the tract or parcel of land subject of this application is, or is not, restricted by any recorded covenant that is contrary to, conflicts with, or prohibits, the requested activity.

   If the Planning Office has actual notice* that a restrictive covenant* is contrary to, conflicts with, or prohibits the requested activity, the office must not issue the permit unless the Office receives confirmation from the applicant that the restrictive covenant has been released by action of the appropriate authority, property holders, or by court order.

   To that end, the applicant hereby affirms that the tract or parcel of land subject of the attached application is _____or is not _____ restricted by any recorded covenant that is contrary to, conflicts with, or prohibits the requested activity.

   Josiah Pott

   5/8/2020

   Josiah Pott

   5/8/2020

   APPLICANT

   DATE

   PROPERTY OWNER

   DATE
Unreasonable Hardship Standards

1. Describe the exceptional conditions and unreasonable circumstances relevant to the subject property which do not generally apply to other properties in the district.

2. Describe the ways in which application of the standards required for a certificate of appropriateness effectively prohibits or unreasonably restricts the utilization of the property and results in an unreasonable hardship.

3. Describe the ways in which the granting of an unreasonable hardship exemption would be the minimum action that would make possible the reasonable use of the land or structure that is not contrary to the purpose and intent of the approved guidelines for the district.

4. Describe the ways in which the granting of an unreasonable hardship exemption would be consistent with the intent of the provisions of Section 19-2.3.8(E), Standards.
1. There are no other houses in the entire Hampton-Pinckney historic district that have terracotta roofs. Being the only one in the entire neighborhood who is required to pay almost 300% more to replace our roof surely seems like an “unreasonable circumstance” which does not “generally apply to other properties in the district”.

2. We were not expecting to have to install a new roof in the first place, much less install a roof that costs nearly 4 times what all of the surrounding properties have been allowed to install. Being forced to live in a house with a leaking roof absolutely “restricts the utilization of the property”. The roof-related expense is unexpected and costly as it is, even without the terracotta requirement.

3. I supposed that “minimum action” in this case would be to patch and/or seal the existing roof, if possible. We have already had our general contractor & AllCon roofing company inspect the roof to see if sealing & patching is a viable option. Both professionals stated that replacement is absolutely necessary. Since the roof has apparently been sealed & painted over multiple times at this point, there is no way to identify which tiles are causing the leaks. To attempt to seal the roof would be an exercise in futility and simply prolonging the inevitable. If patching is not an option, then “minimum action” would be to have a local contractor pull off the existing roof & replace it with the most accessible & cost-effective alternative. If we were to install a terracotta roof, we would need to order the materials from an out-of-state distributor and pay an installer to drive their people here from Atlanta or Charlotte to install this specialty roof tile. This does not seem anywhere close to “minimum action”.

4. Section 19-2.3.8 (E) states that an Unreasonable Hardship Application shall be legitimate if “The applicant demonstrates the... alterations of exterior features are consistent with the design guidelines established for the district”. As you know, not only are there no other homes in the Hampton-Pinckney Historical district which have terracotta roofs, but both new construction homes that have been built recently or are being built currently (113 Butler Ave & 315 Hampton Ave) have been constructed with standard shingle roofs. This makes it very clear that the standard “design guidelines established for the district” call for shingle roofs. The only viable case in which any other roof material would be necessary & enforceable is if there is “a designated local landmark” which has its own “standards and design guidelines for the landmark”. As far as I am aware, 110 Butler Ave is not and has not ever been considered “a designated local landmark”.
CA 20-266 • 110 BUTLER AVE.

AERIAL VIEW

CURRENT ZONING

FUTURE LAND USE

Mixed Use City Center

Mixed Use Community

Urban Residential

R-6

RM-2

RDV

C-3
APPLICATION FOR
CERTIFICATE OF APPROPRIATENESS
URBAN DESIGN PANEL

Contact Planning & Development:
(864) 467-4476

APPLICANT/OWNER INFORMATION

*Indicates Required Field

<table>
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<tr>
<th>APPLICANT</th>
<th>PROPERTY OWNER</th>
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</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Verizon Wireless (Tuan Hoang)</td>
</tr>
<tr>
<td>Title:</td>
<td>Engineer - RE/Regulatory</td>
</tr>
<tr>
<td>Address:</td>
<td>10700 Sikes Place Suite 360 Charlotte, NC</td>
</tr>
<tr>
<td>Phone:</td>
<td>980-202-6515</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:jagodwin@tepgroup.net">jagodwin@tepgroup.net</a></td>
</tr>
</tbody>
</table>

PROPERTY INFORMATION

*STREET ADDRESS City of Greenville & SCDOT Public Right-of-Way
*TAX MAP #(S) City of Greenville & SCDOT Public Right-of-Way
*SPECIAL DISTRICT C-4, C-2, RDV, O-D, R-M2, & PD

DESCRIPTION OF REQUEST

To include scope of project and justification or response to specific guidelines and special conditions.

Verizon Wireless would like to install Small Wireless Facility utility poles within the City of Greenville and SCDOT Public Right of Ways. The attached shows the design options Verizon is proposing for approval within the City of Greenville. The Utility poles will consist of an Omni Antenna, Low-Band radios underneath the Omni Antenna, Radio Shroud, Power meter and disconnect, conduit and an in-ground fiber hand-hole beside the pole.
**APPLICANT/OWNER INFORMATION**

<table>
<thead>
<tr>
<th>Required Field</th>
<th>Applicant/Owner Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong></td>
<td>Ryan Doolittle</td>
</tr>
<tr>
<td><strong>Title:</strong></td>
<td>Small Cell Project Manager</td>
</tr>
<tr>
<td><strong>Address:</strong></td>
<td>421 Fayetteville Street, 7th Floor, Raleigh, NC 27601</td>
</tr>
<tr>
<td><strong>Phone:</strong></td>
<td>919-677-2000</td>
</tr>
<tr>
<td><strong>Email:</strong></td>
<td><a href="mailto:ryan.doolittle@kimley-horn.com">ryan.doolittle@kimley-horn.com</a></td>
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**PROPERTY INFORMATION**

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<td><strong>STREET ADDRESS</strong></td>
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<td><strong>TAX MAP #(#S)</strong></td>
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<tr>
<td><strong>SPECIAL DISTRICT</strong></td>
<td>________________________</td>
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</table>

**DESCRIPTION OF REQUEST**

To include scope of project and justification or response to specific guidelines and special conditions.
INSTRUCTIONS

1. Preliminary meeting with staff is required prior to application submittal.

2. All applications and fees (made payable to the City of Greenville) for Certificate of Appropriateness must be received by the Planning & Development office no later than 2:00 p.m. on the date reflected on the attached schedule.

   A. URBAN DESIGN PANEL
      - Site plan review $300.00
      - Architectural review $300.00

   B. SIGNS
      $150.00

   C. APPLICATION FOR STAFF REVIEW
      - Major (all site development activity, roof gardens, decks or accessory structures; or any project that requires consultation with a member of the DRB). $100.00
      - Minor (color change; replacement of windows/doors; additions, deletions or replacement of awnings; re-roofing; and projects that do not involve structural alterations, increase/decrease in window/door area or removal of architectural features). $50.00

   D. INFORMAL REVIEW

   E. MODIFICATION TO AN APPROVED PROJECT
      - Major (requires review by DRB) ½ original fee
      - Minor (requires review by staff) $50.00

   F. REVISIONS (multiple required revisions may be subject to additional fees).

3. The staff will review the application for “sufficiency” pursuant to Section 19-2.2.6, Determination of Sufficiency and will contact the applicant to correct any deficiencies, which must be corrected prior to placing the application on the Design Review Board agenda.

4. If the application requires review by the Urban Design Panel, public hearing signs must be posted on the subject property at least 15 days (but not more than 18 days) prior to the scheduled hearing date.

5. You must attach one (1) complete set of scaled drawings of the property at an appropriate scale such as 1”=20’ or ¼” = 1’, etc. Although construction drawings are not required, applicants for final approval should be able to provide construction drawings at the Design Review Board’s (DRB) request. The Board may request additional information at any time to fully understand the proposal. Items submitted to the Board become the property of the City and will not be returned.

SITE PLAN REVIEW

- Site Plan Drawings (indicating footprint of existing buildings, proposed building, proposed exterior elements, demolition of existing site features, floor plan, proposed exterior equipment, etc.).

- Massing Studies and Images (images shall be high resolution and should depict adjacent building, proposed building massing from various viewpoints, initial architectural details, photos of surroundings to review context, etc.).

- Model (physical or digital model that includes the surrounding context with massing only, no texture or articulation is required). **The contextual model for the DRB boundary can be downloaded here:** [https://greenvillesc.sharefile.com/d-s4197849a61943358](https://greenvillesc.sharefile.com/d-s4197849a61943358), and is provided as a .skp file. **Data is updated monthly.**
ARCHITECTURAL REVIEW

- Elevation Drawings of all Exterior Sides (indicate proposed materials, existing grade and proposed grade, proposed mechanical equipment, outdoor lighting fixtures, landscape drawings, design and location of signage, removal of existing building elements, addition to existing building, a streetscape elevation of building adjacent to and across the street from the site, including the proposed building).
- Sections (include vertical dimensions in feet, building sections where significant changes occur in building volume, wall section for review of material relationships).
- Detail Drawings (include material and methods of each type of construction affecting the exterior appearance of the structure, samples, brochures and photographs of all exterior finishes, windows, fixtures, lighting and signage).
- Renderings (include perspective drawings, including views from pedestrian and public realm).
- Model (physical or digital model that includes the surrounding context and should include accurate scale, architectural detail to the extent that if describes the design intent, proposed textures and proposed signage).

For more detail on these submittal requirements, please refer to the Greenville Downtown Design Guidelines, adopted May 2017.

Please verify that all required information is reflected on the plan(s). Please submit one (1) paper copy and one (1) electronic version of the plan(s).

6. Please read carefully:

The applicant and property owner affirm that all information submitted with this application, including any/all supplemental information, is true and correct to the best of their knowledge and they have provided full disclosure of the relevant facts.

In addition, the applicant affirms that the applicant or someone acting on the applicant’s behalf has made a reasonable effort to determine whether a deed or other document places one or more restrictions on the property that preclude or impede the intended use and has found no record of such a restriction.

If the Planning & Development office, by separate inquiry, determines that such a restriction exists, it shall notify the applicant. If the applicant does not withdraw or modify the application in a timely manner or act to have the restriction terminated or waived, the Planning & Development office will indicate in its report to the Design Review Board that granting the requested change would not likely result in the benefit the applicant seeks.

7. To that end, the applicant hereby affirms that the tract or parcel of land subject of the attached application is [ ] or is not [ ] restricted by any recorded covenant that is contrary to, conflicts with or prohibits the requested activity.

*Signatures

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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Applicant</td>
<td>Joshua Godwin</td>
</tr>
<tr>
<td>Date</td>
<td>8/29/2019</td>
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<tr>
<td>Property Owner/Authorized Agent</td>
<td>Tuan D Hoang</td>
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<tr>
<td>Date</td>
<td>8/29/2019</td>
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Zoning District: C-4
Zoning District: C-4
Zoning District: C-4
Zoning District: C-4
Zoning District: C-4 & C-2
Zoning District: RDV & C-4 & O-D
Zoning District: C-4
Zoning District: R-M2 & C-4
Zoning District: C-4
PHOTO RENDERING BY TOWER ENGINEERING PROFESSIONALS, INC.
Zoning District: PD
GVL SOUTH NODE 3
EXISTING VIEW AGAINST TRAFFIC

PHOTO RENDERING BY TOWER ENGINEERING PROFESSIONALS, INC.
POLE-TOP OMNI ANTENNA
ADVANCED TECHNOLOGY (FUTURE)
LAA/CBRS RADIOS
Zoning District: C4
POLE-TOP OMNI ANTENNA

LAA/CBRS RADIOS

ADVANCED TECHNOLOGY (FUTURE)
GVL EXP NODE 4
VIEW ACROSS STREET

POLE-TOP OMNI ANTENNA

LAA/CBRS RADIOS

ADVANCED TECHNOLOGY (FUTURE)
GVL EXP NODE 4
VIEW WITH TRAFFIC

POLE-TOP OMNI ANTENNA

LAA/CBRS RADIOS

ADVANCED TECHNOLOGY (FUTURE)
# Product Specifications

**CX16OMI236-1C**

**NWAV™ X-Pol OMNI Cantenna | 16-Port | 2.98 cu. ft | 360°**

## 16-Port 2 ft 360° Cantenna with RET-controlled from 1695–2700 MHz

**(4) 698–960 MHz & (4) 1695–2700 MHz & (4) 3550–3700 MHz & (4) 5150–5925 MHz**

- X-Pol, small cell, Hex-Port antenna
- Suitable for pole or building mount
- 4x4 MIMO low-band, 4x4 MIMO for each of AWS/PCS/CBRS/LAA
- Internal beam combining
- Dependent RET control for 1695–2700 MHz frequencies
- Suitable for LTE/UMTS/CDMA/GSM technologies
- Cost-effective solution for neutral host locations

### Electrical Specification (min./max.)

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### Electrical Specification (minimum/maximum)

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<td>Polarization</td>
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<td>Electrical downtilt (EDT) range, degrees</td>
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</tr>
<tr>
<td>PIM</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Maximum input power port</td>
<td>10</td>
<td>.5</td>
</tr>
<tr>
<td></td>
<td>.5</td>
<td>0.125</td>
</tr>
<tr>
<td></td>
<td>0.125</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

1 Typical value over frequency and tilt

*USL at 5150-5925 MHz < -15dB at > 30° above horizon
Product Specifications

CX16OMI236-1C
N WAV™ X-Pol OMNI Cantenna | 16-Port | 2.98 cu. ft | 360°

**Mechanical specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions height/diameter, inches (mm)</td>
<td>35.4/14 (947/355)</td>
</tr>
<tr>
<td>Volume (cubic feet)</td>
<td>2.98</td>
</tr>
<tr>
<td>No. of RF input ports, connector type and location</td>
<td>16 x 4.3-10 female, bottom</td>
</tr>
<tr>
<td>RF connector torque</td>
<td>96 lbf·in (10.85 N m or 8 lbf·ft)</td>
</tr>
<tr>
<td>Net antenna weight, lb (kg)</td>
<td>35 (15.9)</td>
</tr>
<tr>
<td>Rated wind survival speed, mph (km/h)</td>
<td>150 (241)</td>
</tr>
<tr>
<td>Frontal wind loading @ 160 km/h, lbf (N)</td>
<td>58.7 (261.2)</td>
</tr>
<tr>
<td>Equivalent flat plate @100 mph and Cd=2, sq. ft</td>
<td>1.17</td>
</tr>
</tbody>
</table>

**Front view**

**Bottom view**

**Ordering information**

<table>
<thead>
<tr>
<th>Antenna model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CX16OMI236-1C</td>
<td>2F X-Pol 16P OMNI 360°, HB 2-8° RET, 4.3-10</td>
</tr>
</tbody>
</table>

**Mounting bracket options**

Product Specifications

CX16OMI236-1C
NWAV™ X-Pol OMNI Cantenna | 16-Port | 2.98 cu. ft | 360°

Notes on cylinder brackets:

- All CX* antennas come with the bottom mount bracket (marked as 1) factory installed (all factory testing is done with bracket attached)
- Hardware is included with each antenna to connect bottom bracket to different mounting systems
- JMA cylinder brackets are compatible with bottom mount via universal cantenna mount sleeve (marked as 2) included with JMA cylinder mounting systems.

Mounting details

Included with antenna:
7/8” bolt, washer, nut (Torque to 202 lbf·ft)

Sold separately:
Universal cantenna mount sleeve for JMA cylinder brackets (SC-BKT-SLA)

Small Cell solutions and mounting systems

<table>
<thead>
<tr>
<th>System</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Arm Mounting System</td>
<td>SC-BKT-SA-(color)</td>
</tr>
<tr>
<td>Steel Pole Mounting System</td>
<td>SC-BKT-SLA-(color)</td>
</tr>
<tr>
<td>Wide Diameter Pole</td>
<td>SC-BKT-WTPE-(color)</td>
</tr>
<tr>
<td>Rooftop Ballasted Mounting System</td>
<td>SC-BKT-RTB-(color)</td>
</tr>
</tbody>
</table>
Product Specifications
CX16OMI236-1C
NWAV™ X-Pol OMNI Cantenna | 16-Port | 2.98 cu. ft | 360°

Remote electrical tilt (RET 1000) information

<table>
<thead>
<tr>
<th>RET location</th>
<th>Integrated into antenna</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET interface connector type</td>
<td>8-pin AISG connector per IEC 60130-9 (Hand tight only)</td>
</tr>
<tr>
<td>RET Connector torque</td>
<td>Min. .5 Nm to max 1.0 Nm (hand pressure &amp; finger tight connector)</td>
</tr>
<tr>
<td>RET interface connector quantity</td>
<td>2 pairs of AISG male/female connectors</td>
</tr>
<tr>
<td>RET interface connector location</td>
<td>Bottom of the antenna</td>
</tr>
<tr>
<td>Total No. of internal RETs high bands</td>
<td>1</td>
</tr>
<tr>
<td>RET input operating voltage, vdc</td>
<td>10–30</td>
</tr>
<tr>
<td>RET max power consumption, idle state, W</td>
<td>≤ 2.0</td>
</tr>
<tr>
<td>RET max power consumption, normal operating conditions, W</td>
<td>≤ 13.0</td>
</tr>
<tr>
<td>RET communication protocol</td>
<td>AISG 2.0/ 3GPP</td>
</tr>
</tbody>
</table>

RET topology

A single RET device controls all 3 sectors via the designated external AISG connector as shown below

<table>
<thead>
<tr>
<th>RET device</th>
<th>Band</th>
<th>RF port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1695–2700</td>
<td>5–8</td>
</tr>
</tbody>
</table>

Array topology

<table>
<thead>
<tr>
<th>Array ID</th>
<th>Band</th>
<th>RF Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>698–960</td>
<td>1–2</td>
</tr>
<tr>
<td>R2</td>
<td>698–960</td>
<td>3–4</td>
</tr>
<tr>
<td>Y1</td>
<td>1695–2700</td>
<td>5–6</td>
</tr>
<tr>
<td>Y2</td>
<td>1695–2700</td>
<td>7–8</td>
</tr>
<tr>
<td>V1</td>
<td>3550–3700</td>
<td>9–10</td>
</tr>
<tr>
<td>V2</td>
<td>3550–3700</td>
<td>11–12</td>
</tr>
<tr>
<td>V3</td>
<td>5150–5925</td>
<td>13–14</td>
</tr>
<tr>
<td>V4</td>
<td>5150–5925</td>
<td>15–16</td>
</tr>
</tbody>
</table>

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Radio Description

Radio 8843

Description
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## Contents

1 Introduction 1  
1.1 Warranty Seal 1  

2 Product Overview 2  
2.1 Main Features 3  

3 Technical Data 5  
3.1 Installation Recommendations 6  
3.2 Installation Alternatives 8  
3.3 Space Requirements 9  
3.4 Acoustic Noise 12  
3.5 Environmental Characteristics 13  
3.6 Power Characteristics 14  
3.7 System Characteristics 16  

4 Hardware Architecture 17  
4.1 Radio Overview 17  
4.2 Optical Indicators and Buttons 18  

5 Connection Interfaces 20  
5.1 Antenna Interface 21  
5.2 Grounding Interface 22  
5.3 ~48 V DC Power Supply Interface 22  
5.4 Maintenance Button 23  
5.5 Optical Indicators 23  
5.6 Ext Alarm Interface 23  
5.7 ALD Ctrl Interface 23  
5.8 Interface for Optical Cable to Main Unit 23  

6 Standards and Regulations 25  
6.1 Regulatory Approval 25  
6.2 Other Standards and Regulations 26
1 Introduction

1.1 Warranty Seal

The product is equipped with a warranty seal sticker.

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

The radio remotely extends the reach of the Radio System, and is designed to be located near the antenna. The radio is part of a modular radio building concept that enables a variety of installation alternatives that are also easy to expand. Flexible mounting solutions are provided using rails, pole clamps, and brackets. The small size of the radio together with the flexible mounting solutions reduces the site volume. The lower weight also improves the handling of the radio.

An optic cable connects the radio to the Radio System main unit or an expanded macro Radio System. The radios can be connected in a star configuration or in a cascade configuration with optical cable links. An overview of different radio installations is shown in Figure 1.
2.1 Main Features

The following are the main features of the radio:

- 2- and 3-wire power connections. For 2-wire power solutions, a DC adapter is used.
- LTE.
- Frequency Division Duplex (FDD).
- Dual band: B2 and B66A.
• Duplex transmitter/receiver branches, for each frequency band (8TX/8RX).

• Up to 10.1 Gbps CPRI (optical)

• Complies with 3GPP base station classes Medium Range (MR) and Wide Area (WA). The relevant standards are listed in *Radio Standards Compliance* on page 26.
## 3 Technical Data

### Table 1  Radio 8843 Technical Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum nominal output power(^{(1)})(^{(2)})</td>
<td>4×40 W (B2) + 4×40 W (B66A) or 2×60 W (B2) + 2×80 W (B66A) or 4×20 W (B2) + 4×60 W (B66A) (License key is required for total power over 4×5 W.)</td>
</tr>
<tr>
<td>Number of carriers per branch</td>
<td>Maximum 3 per port</td>
</tr>
<tr>
<td>Number of carriers per radio</td>
<td>Up to 24 per radio over both bands</td>
</tr>
<tr>
<td>Frequency(^{(3)})</td>
<td>1850–1910 MHz uplink 1930–1990 MHz downlink B2 1710–1780 MHz uplink 2110–2180 MHz downlink B66A</td>
</tr>
</tbody>
</table>

### Dimensions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>380 mm</td>
</tr>
<tr>
<td>Width</td>
<td>335 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>277 mm</td>
</tr>
</tbody>
</table>

### Weight

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio 8843</td>
<td>32.6 kg</td>
</tr>
</tbody>
</table>

### Color

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>NCS S 1002-B</td>
</tr>
<tr>
<td>Front</td>
<td>NCS S 6502-B</td>
</tr>
</tbody>
</table>

\(^{(1)}\) Detailed information about LTE licences can be found in 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.

Figure 2  Radio 8843 Height, Width, and Depth

Figure 3  Radio 8843 to Rail Measurement

3.1 Installation Recommendations

To achieve reliable operation, and maximum performance, an appropriate installation location must be chosen.
3.1.1 Indoor Locations to Avoid

Although the unit is designed for outdoor use, it can also operate in an indoor environment according to ETSI EN 300 019-1-3 class 3.1, 3.2, 3.3, and 3.6. This does not cover installation with heat traps or installation in lofts, where air ventilation does not exist. To ensure smooth performance of the product, it is recommended to ensure that the planned installation site for the unit is not a potential microclimate location. This typically occurs in places such as unventilated lofts, sites with heat traps, or sites where the product is exposed to direct sunlight through windows. Ensure proper ventilation and avoid installing the equipment under glass covers or skylight windows.

3.1.2 Outdoor Locations to Avoid

Although Ericsson declares this product suitable for most outdoor environments, this does not cover installations where the planned installation site for the unit is a potential microclimate location. Typical examples for these microclimate locations are sites where the products are not only exposed to the actual temperature, but also additional temperature as heat coming from dark-colored planes, for example, reflections from the floor or walls. The additional temperature can generate heat traps with temperatures up to 10°C higher than expected.

Avoid installing equipment in the following locations:

- Near the exhaust of building ventilation system.
- Near the exhaust of the chimney.
- Opposite large surfaces made of glass or new concrete.

3.1.3 Painting Limitations

Ericsson does not recommend painting the radio as it may affect radio performance of the unit.

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

3.1.3.1 Technical Limitations

If the radio is painted, be aware of the technical limitations below:

- Sunlight on dark paint may increase the temperature of the radio causing it to shut down.
- The plastic surfaces and the plastic covers are suited for painting with normal commercially available one or two component paints.
- Never use metallic paint or paint containing metallic particles.
• Ensure that ventilation and drainage holes are free from paint.
• Ensure proper adhesion of the paint.

3.1.3.2 Commercial Limitations

If the radio is painted, the commercial limitations below apply:

• Failure modes directly related to overheating due to painting are not valid for repair within the scope of the warranty or standard service contract.
• Product failures related to paint contamination of components of the unit are not valid for repair within the scope of warranty or standard service contract.
• When a painted unit is repaired, it will be restored to the standard color before being returned to the market. It is not possible to guarantee the same unit being sent back to the same place. This is also valid for units repaired under a service contract.
• For repairs within the warranty period or a standard service contract, the customer will be charged the additional costs for replacing all painted parts of the unit or the complete unit.

3.2 Installation Alternatives

Figure 4 Installation Alternatives

Table 2 Key to Installation Alternatives

<table>
<thead>
<tr>
<th>Installation Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Wall installation</td>
</tr>
<tr>
<td>B</td>
<td>Pole installation</td>
</tr>
<tr>
<td>C</td>
<td>Pole installation with single pole clamp</td>
</tr>
</tbody>
</table>
3.3 Space Requirements

3.3.1 Generic Requirements

Parts of the radio can attain high temperatures during normal operation. Therefore the radio must be installed in a classified service access area. Exception applies when the radio is installed at a height that is not reachable from ground level.

Allow a sufficient working space in front of the radio.

It is recommended that the radio is installed below, or behind the antenna. Do not install the radio closer than 25 m from the main lobe of its own antenna, or antennas belonging to other services or operators using the same site.

3.3.2 Pole or Mast Installation

![Diagram of Radio Pole Installation Requirements]

*Figure 5  Radio Pole Installation Requirements*
To ensure adequate airflow between the units, allow a minimum of 400 mm free space between radios vertically installed on a horizontal rail on a single pole, or a dual pole installation. Allow a minimum vertical distance of 500 mm between radio and antenna, if installed above or below an antenna. The minimum distance from the bottom of the radio to the floor is 300 mm.

Allow a minimum of 7 mm free space between radios installed side by side on the rail.

Allow for a minimum of 40 mm free space between radios installed side by side on the rail when ambient temperature is expected to be above +45°C.

**Note:** A radio cannot be installed in the uppermost position of a pole or mast.

### 3.3.3 Rail Installation on Wall

This section describes the installation requirements when installing the radio on a wall.
3.3.3.1 Radio Installation on Outdoor Wall

Figure 6  Radio Outdoor Wall Installation Requirements

To ensure adequate airflow between the units, allow a minimum of 400 mm free space between radios vertically installed on a horizontal rail on a wall. Allow a minimum vertical distance of 500 mm between radio and antenna, if installed above or below an antenna. The minimum distance from the bottom of the radio to the floor is 300 mm.

Allow a minimum of 7 mm free space between radios installed side by side on the rail.

Allow for a minimum of 40 mm free space between radios installed side by side on the rail when ambient temperature is expected to be above +45°C.
3.3.3.2 Radio Installation on Indoor Wall

**Figure 7 Radio Indoor Wall Installation Requirements**

To ensure adequate airflow between the units, allow a minimum of 400 mm free space between radios vertically installed on a horizontal rail on a wall. The minimum distance from the bottom of the radio to the floor is 300 mm.

Allow a minimum of 7 mm free space between radios installed side by side on the rail.

Allow for a minimum of 40 mm free space between radios installed side by side on the rail when ambient temperature is expected to be above +45°C.

3.4 Acoustic Noise

**Table 3 Sound Power Level**

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Radio 8843 Sound Power Level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; +25</td>
<td>45</td>
</tr>
</tbody>
</table>
3.5 Environmental Characteristics

This section contains operating environment data for the radio.

3.5.1 Operating Environment

The following are the values for the normal operating environment of the radio:

- Temperature\(^{(1)}\): −40 to +55 °C
- Solar radiation: \(\leq 1,120\) W/m\(^2\)
- Relative humidity: 5–100%
- Absolute humidity: 0.26–40 g/m\(^3\)
- Maximum temperature change: 1.0°C/min
- Maximum wind load at 50 m/s (pole installed single case): 260 N (front)

\(^{(1)}\) Depending on installation scenario, traffic load, and configuration, the product might in the highest 10 °C temperature range, temporary reduce the output power. This depends on the durations of the high ambient temperature.

3.5.2 Heat Dissipation

The radio is convection cooled and designed for outdoor installation.

Avoid indoor installation in a room without adequate ventilation and cooling.

Table 4  Radio Heat Dissipation

<table>
<thead>
<tr>
<th>Unit</th>
<th>Output Power</th>
<th>Maximum Heat Dissipation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio 8843</td>
<td>4×40 W (B2) + 4×40 W (B66A)</td>
<td>1.2 kW</td>
</tr>
<tr>
<td></td>
<td>2×60 W (B2) + 2×80 W (B66A)</td>
<td>1.1 kW</td>
</tr>
<tr>
<td></td>
<td>4×20 W (B2) + 4×60 W (B66A)</td>
<td>1.2 kW</td>
</tr>
</tbody>
</table>
3.5.3 **Vibration**

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

- **Maximum level of Required Response Spectrum (RRS)**: 50 m/s² within 2–5 Hz for DR=2%
- **Frequency range**: 1–35 Hz
- **Time history signal**: Verteq II

The radio operates reliably during random vibration as specified by test method IEC 60068-2-64 Fh

- **Random vibration, normal operation**: 0.3 m/s²

3.5.4 **Materials**

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

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

3.6 **Power Characteristics**

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

Different power systems can supply power for multiple radios, if necessary.

3.6.1 **DC Power Characteristics**

The power supply voltage for the radio is −48 V DC. The radio has two DC plugs.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Values and Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>−48 V DC</td>
</tr>
<tr>
<td>Operating voltage range⁽¹⁾</td>
<td>−40 to −58.5 V DC</td>
</tr>
</tbody>
</table>
### Conditions Values and Ranges

| Non-destructive range | 0 to −60 V DC |

(1) The operating voltage range refers to the voltage at the radio power input port.

---

### Fuse and Circuit Breaker Recommendations

The recommendations given in this section are based on peak power consumption and give no information on power consumption during normal operation. The radio is designed for 3-wire power connections. For 2-wire power solutions, a DC adapter is used.

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

The radio 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 not to trip the fuse or circuit breaker in case of most SPD operation. The minimum fuse rating could be taken into account only if it is accepted that fuses or circuit breakers trip in such situations.

#### Table 6  External Radio Fuse and Circuit Breaker Recommendations per DC Input

<table>
<thead>
<tr>
<th>Unit (DC Powered)</th>
<th>Output Power</th>
<th>Minimum Fuse Rating (1)</th>
<th>Fuse Rating Recommended for Reliable Operation (2)</th>
<th>Maximum Allowed Fuse Rating (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio 8843</td>
<td>4×40 W (B2)  + 4×40 W (B66A)</td>
<td>26 A</td>
<td>28 A</td>
<td>32 A</td>
</tr>
<tr>
<td></td>
<td>2×60 W (B2)  + 2×80 W (B66A)</td>
<td>26 A</td>
<td>28 A</td>
<td>32 A</td>
</tr>
<tr>
<td></td>
<td>4×20 W (B2)  + 4×60 W (B66A)</td>
<td>26 A</td>
<td>28 A</td>
<td>32 A</td>
</tr>
</tbody>
</table>

(1) The radio is designed for 3-wire power connections. For 2-wire power solutions, a DC adapter is used. These fuse ratings can only be used if it is acceptable that fuses trip because of lightning or network transients.

(2) The recommended fuse rating takes into account that external fuses are not to trip because of lightning or network transients.

(3) The absolute maximum fuse class in accordance with radio design restrictions.

**Note:** If a fuse or circuit breaker rating above minimum fuse rating is selected, cable dimensioning rules in −48 V DC Power Supply Interface on page 22 are to be reconsidered to make sure that the fuse or circuit breaker tripping criteria are met.
3.6.2 AC Power Characteristics
The radio installation accepts 100–250 V AC when used together with an optional PSU. For more information about the PSU, refer to PSU Description.

3.6.3 Power Consumption
For information on power consumption, refer to Power Consumption Calculations.

3.7 System Characteristics
This section describes the system characteristics of the Radio System.

3.7.1 RF Electromagnetic Exposure

For information about radio access specific compliance boundaries for electromagnetic exposure, refer to Radio Frequency Electromagnetic Exposure.

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

3.7.3 Radio Configurations
For information about available radio configurations, refer to RBS Configurations.
4 Hardware Architecture

For a description of the supported radio configurations, refer to *RBS Configurations*.

![Image of DC Adapter and Radio Components](image)

**Figure 8** DC Adapter and Radio Components

**Table 7** Key to DC Adapter and Radio Components

<table>
<thead>
<tr>
<th>Position</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>DC adapter for 2-wire connector</td>
</tr>
<tr>
<td>B</td>
<td>Radio</td>
</tr>
</tbody>
</table>

4.1 Radio Overview

The radio contains most of the radio processing hardware. The following sections describe the components inside the radio.

4.1.1 TRX

The Transmitter and Receiver (TRX) provides the following:

- Analog/Digital (A/D), Digital/Analog (D/A) conversion
- Channel filtering
- Delay and gain adjustment
- Digital predistortion
RF modulation and demodulation
Optical cable interface termination
Two receivers for RX diversity
RET modem (the antenna system communication link)

4.1.2 PA
The Multi Carrier Power Amplifier (MCPA) is the linear power amplifier for the RF carriers. The radio has eight MCPAs, one for each RF port.

4.1.3 FU
The Filter Unit (FU) consists of band-pass filters.
In the radio, the FU also provides the following:
• Power and supervision for the TMA, or the RIU
• Voltage Standing Wave Ratio (VSWR) supervision

4.1.4 DC SPD
The DC SPD board protects the DC power input from lightning currents.

4.1.5 ALD (RET) SPD
An SPD provides overvoltage or overcurrent protection for the ALD (RET) port.

4.1.6 External Alarm SPD
An SPD provides overvoltage or overcurrent protection for the external alarm ports.

4.2 Optical Indicators and Buttons
The radio is equipped with optical indicators that show system status. The radio optical indicators are located under the maintenance cover. The fan unit optical indicators are located under a cover.
Figure 9  Radio Optical Indicators and Buttons for Radio 8843

Table 8  Description of Radio Optical Indicators and Buttons

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Maintenance button</td>
<td>–</td>
</tr>
<tr>
<td>B</td>
<td>Fault</td>
<td>!</td>
</tr>
<tr>
<td>C</td>
<td>Operational</td>
<td>✓</td>
</tr>
<tr>
<td>D</td>
<td>Maintenance</td>
<td>✂</td>
</tr>
<tr>
<td>E</td>
<td>Interface 1</td>
<td>🆕</td>
</tr>
<tr>
<td></td>
<td>Interface 2</td>
<td>🆕</td>
</tr>
</tbody>
</table>

For more information about the behavior of the optical indicators and the maintenance button, refer to *Indicators, Buttons, and Switches*. 
5 Connection Interfaces

Table 9 Radio Connection Interfaces

<table>
<thead>
<tr>
<th>Position</th>
<th>Description</th>
<th>Marking</th>
<th>Connector Types</th>
<th>Cable Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Antenna A(1)</td>
<td>A</td>
<td>4.3-10 Plus</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Antenna B</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Antenna C</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Antenna D</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Antenna E(1)</td>
<td>E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Antenna F</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Antenna G</td>
<td>G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Antenna H</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Grounding</td>
<td></td>
<td>2 x M6 bolt</td>
<td></td>
</tr>
</tbody>
</table>
### Position Description

<table>
<thead>
<tr>
<th>Position</th>
<th>Description</th>
<th>Marking</th>
<th>Connector Types</th>
<th>Cable Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>−48 V DC power supply</td>
<td>−48 V</td>
<td>Power connector</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>−48 V DC power supply</td>
<td>−48 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Maintenance button</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>M</td>
<td>Optical indicators</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>N</td>
<td>External alarm and fan unit power supply and control</td>
<td></td>
<td>Mini-DIN connector, 14 pin</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>ALD (used for a RET unit for example)</td>
<td>ALD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Optical cable 1</td>
<td></td>
<td>LC (On SFP) with support for FullAXS</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>Optical cable 2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Antenna A and E can be used for connecting RET or TMA.

### 5.1 Antenna Interface

The antenna interfaces provide connections for the radio to antennas. RF cables connect the radio to the antenna.

#### Table 10  Radio Antenna Connection Interface Characteristics

<table>
<thead>
<tr>
<th>Connector Type</th>
<th>RF Cable Type</th>
<th>Cable Connector Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3-10 Plus, insert-receiver type</td>
<td>50 Ω coaxial</td>
<td>4.3-10 type</td>
</tr>
</tbody>
</table>
Table 11  Radio Antenna Cable Connectors

<table>
<thead>
<tr>
<th>Radio Connectors</th>
<th>Antenna Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  (Antenna A)</td>
<td>TX/RX</td>
</tr>
<tr>
<td>B  (Antenna B)</td>
<td>TX/RX</td>
</tr>
<tr>
<td>C  (Antenna C)</td>
<td>TX/RX</td>
</tr>
<tr>
<td>D  (Antenna D)</td>
<td>TX/RX</td>
</tr>
<tr>
<td>E  (Antenna E)</td>
<td>TX/RX</td>
</tr>
<tr>
<td>F  (Antenna F)</td>
<td>TX/RX</td>
</tr>
<tr>
<td>G  (Antenna G)</td>
<td>TX/RX</td>
</tr>
<tr>
<td>H  (Antenna H)</td>
<td>TX/RX</td>
</tr>
</tbody>
</table>

Antenna A and Antenna E can be used for connecting RET or TMA.

When configured for 2×60W (B2) + 2×80W (B66A), the following ports are used.

Table 12  2×60W + 2×80W Configuration

<table>
<thead>
<tr>
<th>Radio Connectors</th>
<th>Configured Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna A</td>
<td>B2</td>
</tr>
<tr>
<td>Antenna D</td>
<td></td>
</tr>
<tr>
<td>Antenna E</td>
<td>B66A</td>
</tr>
<tr>
<td>Antenna H</td>
<td></td>
</tr>
</tbody>
</table>

5.2  Grounding Interface

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

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

5.3  −48 V DC Power Supply Interface

**Note:** This product has two power connectors. Both power cables must be connected.
The –48 V DC power connector for incoming power accepts cables with various cross-sectional areas, depending on the cable length and the radio maximum power consumption. For more information on –48 V DC power cable dimensions, refer to Main-Remote Installation Products Overview.

The power cable conductor has a wire for the 0 V DC conductor, and a wire for the –48 V DC conductor. The color codes are market-dependent for both wires.

All cables must be shielded. The shielding must be properly connected both to the power connector and to the grounding interface in the power supply equipment, otherwise the radio overvoltage and lightning protection does not function properly.

5.4 Maintenance Button

The maintenance button is at the left of the symbol.

More information about the maintenance button can be found in Indicators, Buttons, and Switches.

5.5 Optical Indicators

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

5.6 Ext Alarm Interface

Two external alarms can be connected to the radio external alarm port.

5.7 ALD Ctrl Interface

The ALD control (ALD Ctrl) connects an ALD (RET) cable to the radio for antenna system communication.

5.8 Interface for Optical Cable to Main Unit

The 1 and 2 interfaces provide connections to optical cables for traffic and timing signals between the radio and the main unit. A Small Form-factor Pluggable (SFP)+ is used to connect the optical cable to the radio.

Note: The radio uses SFP+ modules for optical transmission and optical radio interfaces on Data 1 (optical cable 1) and Data 2 (optical cable 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/EN 62368-1.
- Functional and performance verified to comply with Radio System specifications.

Recommended SFP+ modules are obtained from the product packages for the Radio System and the Main Remote Installation products. For more information about SFP modules, refer to *SFP Module Selector Guide* and *Main-Remote Installation Products Overview* for more information.
6 Standards and Regulations

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

6.1 Regulatory Approval

The Radio System complies with the following market requirements:

- North American market requirements.

6.1.1 Safety Standards Compliance

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

**North America**

- UL 62368-1
- CSA-C22.2 No. 62328-1

6.1.1.1 Outdoor Specific Requirements

The Radio complies with the following outdoor specific requirements:

**North America**

- UL 50E
- UL 60950-22
- CAN/CSA-C22.2 No. 60950-22

6.1.2 EMC Standards Compliance

The Radio System complies with the following Electromagnetic Compatibility (EMC) standards:
6.1.3 Radio Standards Compliance

The Radio System complies with the following radio standards:

North America

- FCC CFR 47 Part 15 B

6.1.4 Marking

To show compliance with legal requirements, the product is marked with the following labels:

North America

- cETLus
- FCC CFR 47 Part 15 Statement
- FCC ID

6.2 Other Standards and Regulations

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

6.2.1 Spare Parts

This radio complies with the Ericsson Serviceability and Spare Parts Strategy.

6.2.2 Surface Quality

The surface quality of the radio is in accordance with Ericsson standard class A3.

6.2.3 Vandal Resistance

Unauthorized access is not possible without damaging the unit.
Radio Description

Radio 4449

Description
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Contents

1 Introduction 1
  1.1 Warranty Seal 1

2 Product Overview 2
  2.1 Main Features 3

3 Technical Data 5
  3.1 Installation Recommendations 6
  3.2 Space Requirements 8
  3.3 Acoustic Noise 12
  3.4 Environmental Characteristics 13
  3.5 Power Characteristics 14
  3.6 System Characteristics 15

4 Hardware Architecture 17
  4.1 Radio Overview 17
  4.2 Optical Indicators and Buttons 18

5 Connection Interfaces 20
  5.1 Antenna Interface 21
  5.2 Maintenance Button 22
  5.3 Optical Indicators 22
  5.4 Interface for Optical Cable to Main Unit 22
  5.5 ~48 V DC Power Supply Interface 22
  5.6 Grounding Interface 23
  5.7 Ext Alarm Interface 23
  5.8 ALD Ctrl Interface 23

6 Standards and Regulations 24
  6.1 Regulatory Approval 24
  6.2 Other Standards and Regulations 26
1 Introduction

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

The radio remotely extends the reach of the Radio System, and is designed to be located near the antenna. The radio is part of a modular radio building concept that enables a variety of installation alternatives that are also easy to expand. Flexible mounting solutions are provided using rails, pole clamps, and brackets.

An optical cable connects the radio to the Radio System main unit or an expanded macro Radio System. The radios can be connected in a star configuration or in a cascade configuration with optical cable links.
2.1 Main Features

The following are the main features of the radio:

- 2- and 3-wire power connections. For 2-wire power solutions, DC adapters are used.
- Dual-band
- Both frequency bands available on each antenna port
- Long Term Evolution (LTE).
• Frequency Division Duplex (FDD).
• Duplex transmitter/receiver (4TX/4RX, 2TX/4RX and 2TX/2RX) branches.
• Up to 10.1 Gbit/s CPRI (optical)
• Complies with 3GPP base station class Wide Area (WA); relevant standards are listed in Radio Standards Compliance on page 25.
3 Technical Data

Table 1  Radio 4449 Technical Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum nominal output power</td>
<td>B5: 4×40 W, B13: 4×40 W</td>
</tr>
<tr>
<td></td>
<td>B5: 2×60 W, B13: 2×60 W</td>
</tr>
<tr>
<td></td>
<td>(License key is required for total output power over 2×10 W.)</td>
</tr>
<tr>
<td>Number of carriers per branch</td>
<td>B5: Up to three carriers</td>
</tr>
<tr>
<td></td>
<td>B13: Up to one carrier</td>
</tr>
<tr>
<td>Number of carriers per radio</td>
<td>Up to 16 carriers</td>
</tr>
<tr>
<td>Frequency</td>
<td>824–849 MHz uplink</td>
</tr>
<tr>
<td></td>
<td>869–894 MHz downlink</td>
</tr>
<tr>
<td></td>
<td>B5 for LTE</td>
</tr>
<tr>
<td></td>
<td>777–787 MHz uplink</td>
</tr>
<tr>
<td></td>
<td>746–756 MHz downlink</td>
</tr>
<tr>
<td></td>
<td>B13 for LTE</td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>455 mm</td>
</tr>
<tr>
<td>Width</td>
<td>335 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>240 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Radio 4449</td>
</tr>
<tr>
<td></td>
<td>32 kg</td>
</tr>
<tr>
<td>Color</td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td>NCS S 1002-B</td>
</tr>
<tr>
<td>Front</td>
<td>NCS S 6502-B</td>
</tr>
</tbody>
</table>

(1) Detailed information about LTE licences can be found in License Management or Manage Licenses.

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

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

To achieve reliable operation, and maximum performance, an appropriate installation location must be chosen.

3.1.1 Indoor Locations to Avoid

Although the unit is designed for outdoor use, it can also operate in an indoor environment according to ETSI EN 300 019-1-3 class 3.1, 3.2, 3.3, and 3.6.
This does not cover installation with heat traps or installation in lofts, where air ventilation does not exist. To ensure smooth performance of the product, it is recommended to ensure that the planned installation site for the unit is not a potential microclimate location. This typically occurs in places such as unventilated lofts, sites with heat traps, or sites where the product is exposed to direct sunlight through windows. Ensure proper ventilation and avoid installing the equipment under glass covers or skylight windows.

3.1.2 Outdoor Locations to Avoid

Although Ericsson declares this product suitable for most outdoor environments, this does not cover installations where the planned installation site for the unit is a potential microclimate location. Typical examples for these microclimate locations are sites where the products are not only exposed to the actual temperature, but also additional temperature as heat coming from dark-colored planes, for example, reflections from the floor or walls. The additional temperature can generate heat traps with temperatures up to 10°C higher than expected.

Avoid installing equipment in the following locations:

- Near the exhaust of building ventilation system.
- Near the exhaust of the chimney.
- Opposite large surfaces made of glass or new concrete.

3.1.3 Painting Limitations

Ericsson does not recommend painting the radio as it may affect radio performance of the unit.

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

3.1.3.1 Technical Limitations

If the radio is painted, be aware of the technical limitations below:

- Sunlight on dark paint may increase the temperature of the radio causing it to shut down.
- The plastic surfaces and the plastic covers are suited for painting with normal commercially available one or two component paints.
- Never use metallic paint or paint containing metallic particles.
- Ensure that ventilation and drainage holes are free from paint.
- Ensure proper adhesion of the paint.
3.1.3.2 Commercial Limitations

If the radio is painted, the commercial limitations below apply:

- Failure modes directly related to overheating due to painting are not valid for repair within the scope of the warranty or standard service contract.
- Product failures related to paint contamination of components of the unit are not valid for repair within the scope of warranty or standard service contract.
- When a painted unit is repaired, it will be restored to the standard color before being returned to the market. It is not possible to guarantee the same unit being sent back to the same place. This is also valid for units repaired under a service contract.
- For repairs within the warranty period or a standard service contract, the customer will be charged the additional costs for replacing all painted parts of the unit or the complete unit.

3.2 Space Requirements

![Figure 4 Installation Alternatives](image)

Table 2 Key to Installation Alternatives

<table>
<thead>
<tr>
<th>Installation Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Wall installation</td>
</tr>
<tr>
<td>B</td>
<td>Pole installation</td>
</tr>
<tr>
<td>C</td>
<td>Pole installation with single pole clamp</td>
</tr>
</tbody>
</table>

3.2.1 Generic Requirements

Parts of the radio can attain high temperatures during normal operation. Therefore the radio must be installed in a classified service access area.
Exception applies when the radio is installed at a height that is not reachable from ground level.

Allow a sufficient working space in front of the radio.

It is recommended that the radio is installed below, or behind the antenna. Do not install the radio closer than 25 m from the main lobe of its own antenna, or antennas belonging to other services or operators using the same site.

### 3.2.2 Pole or Mast Installation

![Diagram of Radio Pole Installation Requirements](image)

**Figure 5  Radio Pole Installation Requirements**

To ensure adequate airflow between the units, allow a minimum of 400 mm free space between radios vertically installed on a horizontal rail on a single pole, or a dual pole installation. Allow a minimum vertical distance of 500 mm between radio and antenna, if installed above or below an antenna. The minimum distance from the bottom of the radio to the floor is 300 mm.
Allow for a minimum of 40 mm free space between radios installed side by side on the rail.

**Note:** A radio cannot be installed in the uppermost position of a pole or mast.

### 3.2.3 Rail Installation on Wall

This section describes the installation requirements when installing the radio on a wall.
3.2.3.1 Radio Installation on Outdoor Wall

Figure 6  Radio Outdoor Wall Installation Requirements

To ensure adequate airflow between the units, allow a minimum of 400 mm free space between radios vertically installed on a horizontal rail on a wall. Allow a minimum vertical distance of 500 mm between radio and antenna, if installed above or below an antenna. The minimum distance from the bottom of the radio to the floor is 300 mm.

Allow for a minimum of 40 mm free space between radios installed side by side on the rail.
3.2.3.2 Radio Installation on Indoor Wall

![Diagram showing installation requirements.]

**Figure 7  Radio Indoor Wall Installation Requirements**

To ensure adequate airflow between the units, allow a minimum of 400 mm free space between radios vertically installed on a horizontal rail on a wall. The minimum distance from the top of the radio to the ceiling and the bottom of the radio to the floor is 300 mm.

Allow for a minimum of 40 mm free space between radios installed side by side on the rail.

3.3 Acoustic Noise

The radio may emit low levels of acoustic noise when operating on low capacity in LTE.
3.4 Environmental Characteristics

This section contains operating environment data for the radio.

3.4.1 Operating Environment

The following are the values for the normal operating environment of the radio:

- **Temperature**
  - (1) −40 to +55 °C
- **Solar radiation**
  - ≤ 1,120 W/m²
- **Relative humidity**
  - 5–100%
- **Absolute humidity**
  - 0.26–40 g/m³
- **Maximum temperature change**
  - 1.0°C/min
- **Maximum wind load at 50 m/s (pole installed single case)**
  - 260 N (front)

(1) Depending on installation scenario, traffic load, and configuration, the product might in the highest 10 °C temperature range, temporary reduce the output power. This depends on the durations of the high ambient temperature.

3.4.2 Heat Dissipation

The radio is convection cooled and designed for outdoor installation. Indoor installation in a room without adequate ventilation and cooling must be avoided.

**Table 3 Radio Heat Dissipation**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Output Power (W)</th>
<th>Maximum Heat Dissipation (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio 4449</td>
<td>4×40 W, 2×60 W</td>
<td>1.12</td>
</tr>
</tbody>
</table>

3.4.3 Vibration

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

- **Maximum level of Required Response Spectrum (RRS)**
  - 50 m/s² within 2–5 Hz for DR=2%
- **Frequency range**
  - 1–35 Hz
- **Time history signal**
  - Verteq II

The radio operates reliably during random vibration as specified by test method IEC 60068-2-64 Fh.
Random vibration, normal operation \(0.3\, m^2/s^3\)

### 3.4.4 Materials

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

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

### 3.5 Power Characteristics

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

Different power systems can supply power for multiple radios, if necessary.

#### 3.5.1 DC Power Characteristics

The power supply voltage for the radio is \(-48\, V\) DC.

*Table 4  Radio DC Power Supply Requirements*

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Values and Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>(-48, V) DC</td>
</tr>
<tr>
<td>Operating voltage range(1)</td>
<td>(-38.0) to (-58.5) V DC</td>
</tr>
<tr>
<td>Non-destructive range</td>
<td>0 to (-60) V DC</td>
</tr>
</tbody>
</table>

(1) *The operating voltage range refers to the voltage at the radio power input port.*

The radio is designed for 3-wire power connections. For 2-wire power solutions, DC adapters are used.

The radio has two power connectors. Both power connections must be connected and operational for the radio to operate.

**Fuse and Circuit Breaker Recommendations**

The recommendations given in this section are based on peak power consumption and give no information on power consumption during normal operation.
The recommended melting fuse type is gG-gL-gD in accordance with IEC 60269-1. Circuit breakers must comply with at least Curve 3 tripping characteristics, in accordance with IEC 60934.

The radio 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 not to trip the fuse or circuit breaker in case of most SPD operation. The minimum fuse rating could be taken into account only if it is accepted that fuses or circuit breakers trip in such situations.

### Table 5  External Radio Fuse and Circuit Breaker Recommendations

<table>
<thead>
<tr>
<th>Unit (DC Powered)</th>
<th>Output Power (W)</th>
<th>Minimum Fuse Rating (1) (A) per power feed</th>
<th>Fuse Rating Recommended for Reliable Operation (2) (A) per power feed</th>
<th>Maximum Allowed Fuse Rating(3) (A) per power feed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio 4449</td>
<td>4×40 W, 2×60 W</td>
<td>20</td>
<td>25</td>
<td>32</td>
</tr>
</tbody>
</table>

(1) These fuse ratings can only be used if it is acceptable that fuses trip because of lightning or network transients.

(2) The recommended fuse rating takes into account that external fuses are not to trip because of lightning or network transients.

(3) The absolute maximum fuse class in accordance with radio design restrictions.

**Note:** If a fuse or circuit breaker rating above minimum fuse rating is selected, cable dimensioning rules in *−48 V DC Power Supply Interface* on page 22 are to be reconsidered to make sure that the fuse or circuit breaker tripping criteria are met.

### 3.5.2 AC Power Characteristics

The radio installation accepts 100–250 V AC when used together with an optional PSU. For more information about the PSU, refer to *PSU Description*.

### 3.5.3 Power Consumption

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

### 3.6 System Characteristics

This section describes the system characteristics of the Radio System.

### 3.6.1 RF Electromagnetic Exposure

For general information about Radio Frequency (RF) Electromagnetic Fields (EMF), refer to *Radio Frequency Electromagnetic Fields*. 
For information about radio access specific compliance boundaries for electromagnetic exposure, refer to *Radio Frequency Electromagnetic Exposure*.

### 3.6.2 Software

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

### 3.6.3 Radio Configurations

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

For a description of the supported radio configurations, refer to RBS Configurations.

![DC Adapter and Radio Components](image)

**Figure 8  DC Adapter and Radio Components**

**Table 6  Key to DC Adapter and Radio Components**

<table>
<thead>
<tr>
<th>Position</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>DC adapter for 2-wire connector</td>
</tr>
<tr>
<td>B</td>
<td>Radio</td>
</tr>
</tbody>
</table>

4.1 Radio Overview

The radio contains most of the radio processing hardware. The following sections describe the components inside the radio.

4.1.1 TRX

The Transmitter and Receiver (TRX) provides the following:

- Analog/Digital (A/D), Digital/Analog (D/A) conversion
- Channel filtering
- Delay and gain adjustment
- Digital predistortion
• Four receivers for RX diversity and Multiple Input Multiple Output (MIMO) operation
• Low Noise Amplifier
• Optical cable interface termination
• RET modem (the antenna system communication link)
• RF modulation and demodulation

4.1.2 PA
The Multi Carrier Power Amplifier (MCPA) is the linear power amplifier for the RF carriers. The radio has eight MCPAs, two for each RF port.

4.1.3 FU
The Filter Unit (FU) consists of low-noise amplifiers and band-pass filters.
In the radio, the FU also provides the following:
• Power and supervision for the TMA, or the RIU
• Voltage Standing Wave Ratio (VSWR) supervision

4.1.4 DC SPD
The DC SPD board protects the DC power input from lightning currents.

4.1.5 ALD (RET) SPD
An SPD provides overvoltage or overcurrent protection for the ALD (RET) port.

4.1.6 External Alarm SPD
An SPD provides overvoltage or overcurrent protection for the external alarm ports.

4.2 Optical Indicators and Buttons
The radio is equipped with optical indicators that show system status. The radio optical indicators are located under the maintenance cover.
Table 7 Description of Radio Optical Indicators and Buttons

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Maintenance button</td>
<td>–</td>
</tr>
<tr>
<td>B</td>
<td>Fault</td>
<td>!</td>
</tr>
<tr>
<td>C</td>
<td>Operational</td>
<td>✅</td>
</tr>
<tr>
<td>D</td>
<td>Maintenance</td>
<td>✏️</td>
</tr>
<tr>
<td>E</td>
<td>Interface 1</td>
<td>🌍</td>
</tr>
<tr>
<td></td>
<td>Interface 2</td>
<td>🌍</td>
</tr>
</tbody>
</table>

For more information about the behavior of the optical indicators and the maintenance button, refer to *Indicators, Buttons, and Switches.*
5 Connection Interfaces

Figure 10  Radio Connection Interfaces

Table 8  Description of Radio Connection Interfaces

<table>
<thead>
<tr>
<th>Position</th>
<th>Description</th>
<th>Marking</th>
<th>Connector Types</th>
<th>Cable Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Antenna A</td>
<td>A</td>
<td>4.3-10 connector</td>
<td><img src="https://via.placeholder.com/150" alt="Cable" /></td>
</tr>
<tr>
<td>B</td>
<td>Antenna B</td>
<td>B</td>
<td></td>
<td><img src="https://via.placeholder.com/150" alt="Cable" /></td>
</tr>
<tr>
<td>C</td>
<td>Antenna C</td>
<td>C</td>
<td></td>
<td><img src="https://via.placeholder.com/150" alt="Cable" /></td>
</tr>
<tr>
<td>D</td>
<td>Antenna D</td>
<td>D</td>
<td></td>
<td><img src="https://via.placeholder.com/150" alt="Cable" /></td>
</tr>
<tr>
<td>E</td>
<td>Maintenance button</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>F</td>
<td>Optical indicators</td>
<td><img src="https://via.placeholder.com/150" alt="Indicators" /></td>
<td>–</td>
<td><img src="https://via.placeholder.com/150" alt="Cable" /></td>
</tr>
<tr>
<td>G</td>
<td>Optical cable 1</td>
<td><img src="https://via.placeholder.com/150" alt="Indicators" /></td>
<td>LC (On SFP) with support for FullAXS</td>
<td><img src="https://via.placeholder.com/150" alt="Cable" /></td>
</tr>
<tr>
<td>H</td>
<td>Optical cable 2</td>
<td><img src="https://via.placeholder.com/150" alt="Indicators" /></td>
<td></td>
<td><img src="https://via.placeholder.com/150" alt="Cable" /></td>
</tr>
</tbody>
</table>
5.1 Antenna Interface

The antenna interfaces provide connections for the radio to antennas. RF cables connect the radio to the antenna.

Table 9  Radio Antenna Connection Interface Characteristics

<table>
<thead>
<tr>
<th>Connector Type</th>
<th>RF Cable Type</th>
<th>Cable Connector Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3-10, insert-receiver type</td>
<td>50 Ω coaxial</td>
<td>4.3-10 type</td>
</tr>
</tbody>
</table>

Table 10  Radio Antenna Cable Connectors

<table>
<thead>
<tr>
<th>Radio Connectors</th>
<th>Antenna Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Antenna A)</td>
<td>TX/RX, AISG, High Power</td>
</tr>
<tr>
<td>B (Antenna B)</td>
<td>TX/RX</td>
</tr>
<tr>
<td>C (Antenna C)</td>
<td>TX/RX, AISG</td>
</tr>
</tbody>
</table>
### 5.2 Maintenance Button

The maintenance button is at the left of the ! symbol.

More information about the maintenance button can be found in *Indicators, Buttons, and Switches*.

### 5.3 Optical Indicators

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

### 5.4 Interface for Optical Cable to Main Unit

The @1 and @2 interfaces provide connections to optical cables for traffic and timing signals between the radio and the main unit. A Small Form-factor Pluggable (SFP)+ is used to connect the optical cable to the radio.

**Note:** The radio uses SFP+ modules for optical transmission and optical radio interfaces on Data 1 (optical cable 1) and Data 2 (optical cable 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/EN 62368-1.
- Functional and performance verified to comply with Radio System specifications.

Recommended SFP+ modules are obtained from the product packages for the Radio System and the Main Remote Installation products. For more information about SFP modules, refer to *SFP Module Selector Guide* and *Main-Remote Installation Products Overview* for more information.

### 5.5 −48 V DC Power Supply Interface

The −48 V DC power connector for incoming power accepts cables with various cross-sectional areas, depending on the cable length and the radio...
maximum power consumption. For more information on –48 V DC power cable dimensions, refer to Main-Remote Installation Products Overview.

The power cable conductor has a wire for the 0 V DC conductor, and a wire for the –48 V DC conductor. The color codes are market-dependent for both wires.

All cables must be shielded. The shielding must be properly connected both to the power connector and to the grounding interface in the power supply equipment, otherwise the radio overvoltage and lightning protection does not function properly.

5.6 Grounding Interface

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

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

5.7 Ext Alarm Interface

Two external alarms can be connected to the radio external alarm port.

5.8 ALD Ctrl Interface

The ALD control (ALD Ctrl) connects an ALD (RET) cable to the radio for antenna system communication.
6 Standards and Regulations

This section presents a brief overview of standards, regulatory product approval, and declaration of conformity for Radio 4449.

6.1 Regulatory Approval

6.1.1 Safety Standards Compliance

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

**International**
- IEC 62368-1

**Europe**
- EN 50 385
- EN 62368-1

**North America**
- Health Canada Safety Code 6
- UL 62368-1
- CSA-C22.2 No. 62328-1

6.1.1.1 Outdoor specific requirements

The Radio complies with the following outdoor specific requirements:

**International**
- IEC 60 529 (IP65)
- IEC 60 950-22
Europe

- EN 60 529 (IP65)
- EN 60 950-22

North America

- CSA-C22.2 No. 60950-22-07
- UL 50E
- UL 60950-22

6.1.2 EMC Standards Compliance

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

International

- 3GPP TS36.113
- 3GPP TS37.113

North America

- FCC CFR 47 Part 15 B
- IC ICES-003 B

6.1.3 Radio Standards Compliance

The Radio System complies with the following radio standards:

International

- 3GPP TS36.141
- 3GPP TS37.141
- 3GPP TS45.005
North America

- IC RSS-132, 133, 139, 130, 195, 199 (Canada Band/Frequency Specific)
- IC RSS-Gen (Canada)
- RSP-100 (Canada)
- FCC CFR 47 Part: 2, 22, 24, 27, 30, 90 (US Band/Frequency Specific)

6.1.4 Marking

To show compliance with legal requirements, the product is marked with the following labels:

North America

- cETLus
- FCC CFR 47 Part 15 Statement
- FCC ID
- IC ICES-003 Statement
- IC ID

6.2 Other Standards and Regulations

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

6.2.1 Spare Parts

This radio complies with the Ericsson Serviceability and Spare Parts Strategy.

6.2.2 Surface Quality

The surface quality of the radio is in accordance with Ericsson standard class A3 to A6 depending on product placement.

6.2.3 Vandal Resistance

Unauthorized access is not possible without damaging the unit.
Radio 2205

The micro Radio 2205 is part of the Ericsson Radio System portfolio. Radio 2205 has best in class design, superior radio performance and power efficiency when it comes to medium range 3GPP radio products.

Radio 2205 has, by use of its small and smart dimensions, support for a wide range of mounting scenarios and has a pioneering flexibility within its product segment. With the Radio 2205, Ericsson evolves the micro radio portfolio to become even more flexible thus making it easier than ever to make small and efficient single and multi-band micro radio installations.

The Radio 2205 support installations with integrated or external antenna systems and can by use of the versatile optical CPRI interface be connected to any of the efficient Ericsson Baseband LTE modules by use of star or cascade configurations supporting multi sector and multi band.

Radio 2205 support LTE with two duplex TX/RX branches. It is specifically designed to support LAA meaning that the maximum output power is limited to 316 mW per branch.
Below on the right side you see a picture of the Radio 2205 mounted on a lamp pole. The picture beside it shows the back part of the Radio 2205, the support system in which the wall mount and pole mount are integrated.

### Technical specification for Radio 2205

#### FREQUENCY BANDS
- Bands: 3GPP Band B46 (LAA-LTE)

#### HW CAPACITY
- Carrier capacity LTE: Up to 60 MHz
- IBW: 60 MHz
- MIMO: Yes, 2T2R
- Output power: Up to 2 x 316 mW

#### INTERFACE SPECIFICATIONS
- Antenna ports: 2 x 4.3-10 (f)
- CPRI: 2 x 2.5/5/10 Gbps (exchangeable SFP modules)
- Optical indicators: 6
- External alarms: 2
- Field ground: 1

#### MECHANICAL SPECIFICATIONS
- W x H x D: 200 mm x 200 mm x 100 mm, including mounting bracket and esthetic front cover
- Weight: < 4.5 kg
- Volume: 4 liter
- Mounting: Rail, wall and pole mount

#### ELECTRICAL SPECIFICATIONS
- Power Supply: -48 VDC or 100 - 250 VAC

#### ENVIRONMENTAL SPECIFICATIONS
- Normal operating temp.: -40 °C to +55 °C (cold start at -40 °C)
- Relative Humidity: 5 – 100%
- Environment: Outdoor class with IP65
Radio 2208 is part of the Ericsson Radio System portfolio. Radio 2208 has best in class design, superior radio performance and power efficiency when it comes to medium range 3GPP radio products.

Radio 2208 has, by use of its small and smart dimensions, support for a wide range of mounting scenarios and has a pioneering flexibility within its product segment. With the Radio 2208, Ericsson evolves the micro radio portfolio to become even more flexible thus making it easier than ever to make small and efficient single and multi-band micro radio installations.

Radio 2208 supports installations with integrated or external antenna systems and can by use of the versatile optical CPRI interface be connected to any of the efficient Ericsson Baseband modules by use of star or cascade configurations supporting multi-sector and multi-band.

Radio 2208 supports LTE TDD with two duplex TX/RX branches supporting up to 2 x 10 W output power.
Below on the right side you see a picture of Radio 2208 mounted on a lamp pole. The picture beside it shows the back part of Radio 2208, the support system in which the wall mount and pole mount are integrated.

![Radio 2208 mounted on a lamp pole](image)

### Technical specification for Radio 2208

**FREQUENCY BANDS**

<table>
<thead>
<tr>
<th>Bands</th>
<th>3GPP Band B41E, B48</th>
</tr>
</thead>
</table>

**HW CAPACITY**

<table>
<thead>
<tr>
<th>Carrier capacity LTE</th>
<th>40MHz for B41E, 60MHz for B48</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBW</td>
<td>40MHz for B41E, 60MHz for B48</td>
</tr>
<tr>
<td>MIMO</td>
<td>Yes, 2 I2K</td>
</tr>
<tr>
<td>Output power</td>
<td>Up to 2 x 10 W</td>
</tr>
</tbody>
</table>

**INTERFACE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Antenna ports</th>
<th>2 x 4.3-10 (f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPRI</td>
<td>2 x 2.5/5/10 Gbps (exchangeable SFP modules)</td>
</tr>
<tr>
<td>Optical indicators</td>
<td>6</td>
</tr>
<tr>
<td>External alarms</td>
<td>2</td>
</tr>
<tr>
<td>Field ground</td>
<td>1</td>
</tr>
</tbody>
</table>

**MECHANICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>W x H x D</th>
<th>200 mm x 200 mm x 100 mm, including mounting bracket and esthetic front cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>&lt; 4.5 kg</td>
</tr>
<tr>
<td>Volume</td>
<td>4 liter</td>
</tr>
<tr>
<td>Mounting</td>
<td>Rail, wall and pole mount</td>
</tr>
</tbody>
</table>

**ELECTRICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>-48 VDC or 100 - 250 VAC</th>
</tr>
</thead>
</table>

**ENVIRONMENTAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Normal operating temp.</th>
<th>-40 °C to +55 °C (cold start at -40 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Humidity</td>
<td>5 – 100%</td>
</tr>
<tr>
<td>Environment</td>
<td>Outdoor class with IP65</td>
</tr>
</tbody>
</table>