UMTS Macrocell Indoor

UMTS-04.03

Site Preparation for +24V/-48V

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Notice

Every effort has been made to ensure that the information contained in this document was complete and accurate at the time of printing. However, information is subject to change.

Mandatory customer information

The product conformance statements for this product appear in Appendix E, “Product conformance statements”.

Developed by the Information Product and Training (IP&T) organization.

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About this information product

Purpose

This Information Product (IP) covers the basic site preparation guidelines that should be used to plan a UMTS Macrocell indoor site. Specific tasks are outlined that should be completed at the job site before an installation can begin.

Reason for reissue

This is a preliminary release of this information product. This issue is being released to include information for:

- This document now has an index, which can be used to quickly find information on a particular topic.
- The release of 2100 MHz band configuration
- -48 VDC power
- Ethernet switch
- URC-II T3/E3
- URC-II OC3/STM1
- 1900 - 850 MHz support for standalone EZBFi installation
- Appendix F - Power requirements and battery reserve times for UMTS Macrocell Indoor cabinets

Intended audience

This IP is intended for customers preparing a UMTS Macrocell indoor site.

Systems supported

This document applies to Alcatel-Lucent UMTS system release UMTS-04.03.

Conventions used

The following conventions are used in this IP:

Illustrations

The illustrations shown in this IP do not contain all details and exceptions, but are rather intended to highlight main points. Dimensions are shown in millimeters with inches in parenthesis. As an example, 680.0 (26.77) equals 680 millimeters or 26.77 inches.

Standard cross-sections and wire diameters of round copper conductors

The following table is from CEI/IEC 60947-1:2004, *Table 1, Standard cross-sections of round copper conductors and approximate relationship between mm^2 and AWG/kcmil sizes* for reference. Additional wire sizes are included in this information product as appropriate for the topic.

ISO rated cross-sectional area (mm^2)	AWG/kcmil size
0.2	24
0.34	22
0.5	20
0.75	18
1	-
1.5	16
2.5	14
4	12
6	10
10	8
16	6
25	4
35	2
-	1
50	0 (1/0)
70	00 (2/0)
95	000 (3/0)
-	0000 (4/0)
120	250 kcmil
150	300 kcmil
185	350 kcmil
-	400 kcmil

ISO rated cross-sectional area (mm^2)	AWG/kcmil size
240	500 kcmil
300	600 kcmil
NOTE: The dash, when it appears, counts as a size when considering connecting capacity (see 7.1.7.2 in the standard).	

Related documentation

Base station planners and site preparation personnel must have the appropriate reference material, and all applicable local, regional and national code documentation.

Alcatel-Lucent documents

The following Alcatel-Lucent documents are required:

- *EZBFi Modular Battery System Installation Manual for +24V and -48V,* 401-703-507
- *Power & Battery Engineering Rules for Flexent® UMTS Macrocell Indoor (type F) and Flexent® UMTS Modular Cell Outdoor 850 MHz / 1900 MHz / Dual Band Cabinets,* ER_0202_0001_PWR
- *Grounding and Lightning Protection Guidelines for Alcatel-Lucent Network Wireless System Cell Sites,* 401-200-115
- For seismic zone requirements: NEBS ™ *Requirements: Physical Protection,* GR-63-CORE

Other documents

Other documents that may be useful:

- *Standard for Installation of Lightning Protection Systems, NFPA*
- *Recommended Practices on Surge Voltages in Low Voltage AC Power Circuits, IEEE C62.41 (Latest Edition)*
- *Telcordia, GR-487-CORE*
- *Telcordia, GR-63-CORE*

Related training

Safety training in the following areas is required for personnel installing the Alcatel-Lucent family of products and associated equipment:

- Hazard Communication
- Lift Safety
- Hoist Safety
- Lock Out/Tag Out
- Accident/Incident Reporting.

Other related training is for:

- Integration into the cell site
- Operation, Administration, and Maintenance (OA&M) .

The following courses provide required background information:

- *UMTS System Introduction,* UM1001
- *UMTS Hardware Overview,* UM1101

The following courses may also be of interest:

- *UMTS Network Overview,* UM1001C
- *UMTS Planning and Engineering,* UM4006

Site preparation checklists

Important! All site preparation activities, as well as adherence to the guidelines, should be verified prior to the installation of the cell site equipment.

Various checklists and punchlist sheets have been provided in Appendix A, "UMTS Macrocell site preparation checklists"of this document to aid customers and Alcatel-Lucent personnel during a base station site Method of Procedure (MOP) walk-through prior to the equipment installation.

Utilization of the checklists helps ensure a quality installation and provides a base station site history file for later reference. The punchlist sheets are used to track completion of any outstanding site preparation items, and to aid in the project management of installation resources.

Base station configuration sheets

Configuration sheets are provided in Appendix B, "UMTS Macrocell site information" of this IP to aid the Customer, Equipment Engineering, and Wireless Project Management during the various stages of product deployment. The configuration sheets are used to document the base station equipment configuration, conditions, and other pertinent information for reference during product deployment, and future additions. The configuration sheets should be completed during the equipment engineering phase. Reference to this information during MOP walk-through assists with completion of the site preparation checklists.

Information product support

For questions or concerns about this or any other Alcatel-Lucent information products, please contact us at one of the following numbers:

- 1 888 727 3615 (for the continental United States)
- +1 630 713 5000 (for all countries)

Technical support

For technical support, contact your local customer support team. You can reach them via the web at (https://support.lucent.com/) or the telephone number listed under the Technical Assistance Center menu at (http://www.lucent.com/contact/.)

At the time of issue of this information product, the following telephone numbers are supported, depending on the region:

Customer Technical Support:

In the United States: 1-866-582-3688 or from all other countries: +1 630 224 4672

Alternate: 1-800-CAL-4NSC (1-800-225-4672)

How to order

To order Alcatel-Lucent information products, use the following websites or the email, phone, and fax contacts linked from “Contact Us” on those sites:

- Documentation: (http://www.lucent.com/contact/.)
- Training: (https://training.lucent.com/)

Safety information

This information product contains hazard statements for your safety. Hazard statements are given at points where safety consequences to personnel, equipment, and operation may exist. Failure to follow these statements may result in serious consequences.

How to comment

To comment on this information product, go to the Online Comment Form (http://www.lucent-info.com/comments/enus/) or e-mail your comments to the Comments Hotline (comments@alcatel-lucent.com).

1 Safety

Overview

Purpose

This chapter provides the safety precautions, which must be observed, when preparing to install a UMTS Macrocell cabinet at an indoor site.

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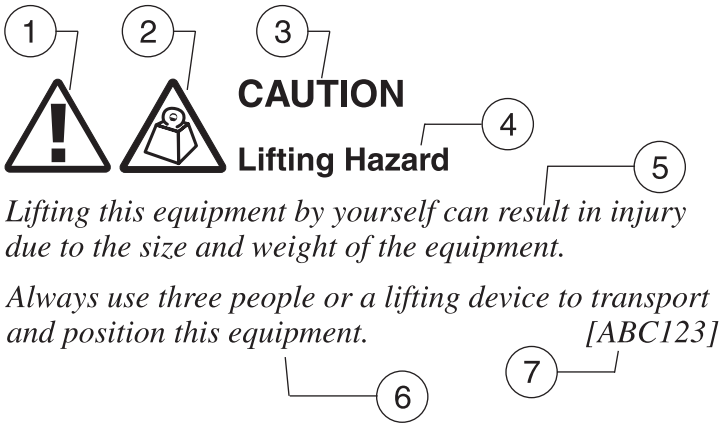
Structure of hazard statements

Overview

Hazard statements describe the safety risks relevant while performing tasks on Alcatel-Lucent products during deployment and/or use. Failure to avoid the hazards may have serious consequences.

General structure

Hazard statements include the following structural elements:



Item	Structure element	Purpose
1	Personal-injury symbol	Indicates the potential for personal injury (optional)
2	Hazard-type symbol	Indicates hazard type (optional)
3	Signal word	Indicates the severity of the hazard
4	Hazard type	Describes the source of the risk of damage or injury
5	Damage statement	Consequences if protective measures fail
6	Avoidance message	Protective measures to take to avoid the hazard
7	Identifier	The reference ID of the hazard statement (optional)

Signal words

The signal words identify the hazard severity levels as follows:

Signal word	Meaning
DANGER	Indicates an imminently hazardous situation (high risk) which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation (medium risk) which, if not avoided, could result in death or serious injury.
CAUTION	*When used with the personal injury symbol:* Indicates a potentially hazardous situation (low risk) which, if not avoided, may result in personal injury. *When used without the personal injury symbol:* Indicates a potentially hazardous situation (low risk) which, if not avoided, may result in property damage, such as service interruption or damage to equipment or other materials.

Safety - general precautions for installation procedures

Overview

The following Warning includes the safety precautions, which must be observed when performing the site prep installation procedures covered in this document.

WARNING

Failure to observe these safety precautions may result in personal injury or damage to equipment.

- *Read and understand all instructions.*
- *Follow all warnings and instructions marked on this product.*
- *Installation and maintenance procedures must be followed and performed by trained personnel only.*
- *The equipment is intended for installation in restricted access locations where access is controlled or where access can only be gained by service personnel with a key or tool. Access to this equipment is restricted to qualified service personnel only.*
- *Grounding and circuit continuity is vital for safe operation of the equipment. Never operate the equipment with grounding/bonding conductor disconnected.*
- *Install only equipment identified in the product's installation manual. Use of other equipment may result in an improper connection which could lead to fire or injury.*
- *Use caution when installing or modifying telecommunications lines.*
- *The telecommunication interfaces should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection, as applicable.*
- *The product has multiple power inputs. Before servicing, Disconnect all inputs to reduce the risk of energy hazards.*
- *For continued protection against risk of fire, all fuses used in this product must be replaced only with fuses of the same type and rating.*
- *Never install metallic wiring during a lightning storm.*
- *Never install telecommunications connections in wet locations.*
- *Never touch uninsulated telecommunications wiring or terminals unless the telecommunications line has been disconnected at the interface.*
- *Never touch uninsulated wiring or terminals carrying direct current or ringing current, and never leave this wiring exposed. Protect and tape uninsulated wiring and terminals to avoid risk of fire, electrical shock, and injury to personnel.*
- *Never push objects of any kind into the product through slots, as they may touch dangerous voltage points or short-out parts that could result in a fire or an electrical short.*
- *Never spill liquids of any kind on the product.*
- *Slots and openings in the product are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered. The product should not be placed in a built-in installation unless proper ventilation is provided.*
- *To reduce the risk of an electrical shock, do not disassemble the product. Opening and removing covers and/or circuit boards may expose you to dangerous voltages*

or other risks. Incorrect reassembly can cause electrical shock when the unit is subsequently used.

□

Safety - specific hazards

Overview

The following safety hazards must be observed when performing site prep installation procedures.

DANGER

Electric-shock hazard

Working in severe weather can result in personal injury or death and damage to the equipment.

Never install or perform maintenance during severe weather (high winds, lightning, blizzards, hurricane, etc.).

WARNING

Electric-shock hazard

Some parts of all electrical installations are energized. Failure to observe this fact and the safety warnings may lead to bodily injury and property damage.

For this reason, only trained and qualified personnel (electrical workers as defined in IEC 60215 or EN 60215 + A1 or in the National Electrical Code or ANSI/NFPA No. 70) may install or service the installation.

WARNING

Electric-shock hazard

The power supply lines to the network element are energized. Contact with parts carrying voltage can cause health problems, possibly including death, even hours after the event.

Open and lockout the load disconnect switch in the distribution box to completely de-energize the network element.

WARNING

Inhalation hazard

Inhalation of Beryllium Oxide (BeO) can result in serious illness. The RF transmitter units include components which contain Beryllium Oxide (BeO). In this form, BeO ceramics do not constitute a hazardous material as long as components remain intact.

Do not physically damage or pulverize components which contain Beryllium Oxide.

CAUTION

Service-disruption hazard

Sudden changes in the weather may lead to the formation of condensation on components. Operating the unit when condensation moisture is present can destroy the unit.

Units which show signs of condensation must be dried before being installed and energized.

CAUTION

Electrostatically Sensitive Components

Semiconductor elements can be damaged by static discharges.

The following rules must be complied with when handling any module containing semiconductor components:

- *Wear conductive or antistatic work clothes (for example., coat made of 100% cotton).*
- *Wear grounded ESD wrist strap.*
- *Wear shoes with conductive soles on a conductive floor surface or conductive work mat.*
- *Leave the modules in their original packaging until ready for use.*
- *Make sure there is no difference in potential between yourself, the workplace, and the package before removing, unpacking, or packing a module.*
- *Hold the module only by the grip without touching the connection pins, tracks, or components.*
- *Place modules removed from the equipment on a conductive surface.*
- *Test or handle the module only with grounded tools on grounded equipment.*
- *Handle defective modules exactly like new ones to avoid causing further damage.*

□

2 Overview of UMTS Macrocell indoor base station

Overview

Purpose

This chapter provides an overview and description of the equipment in a Universal Mobile Telecommunication System (UMTS) Macrocell base station.

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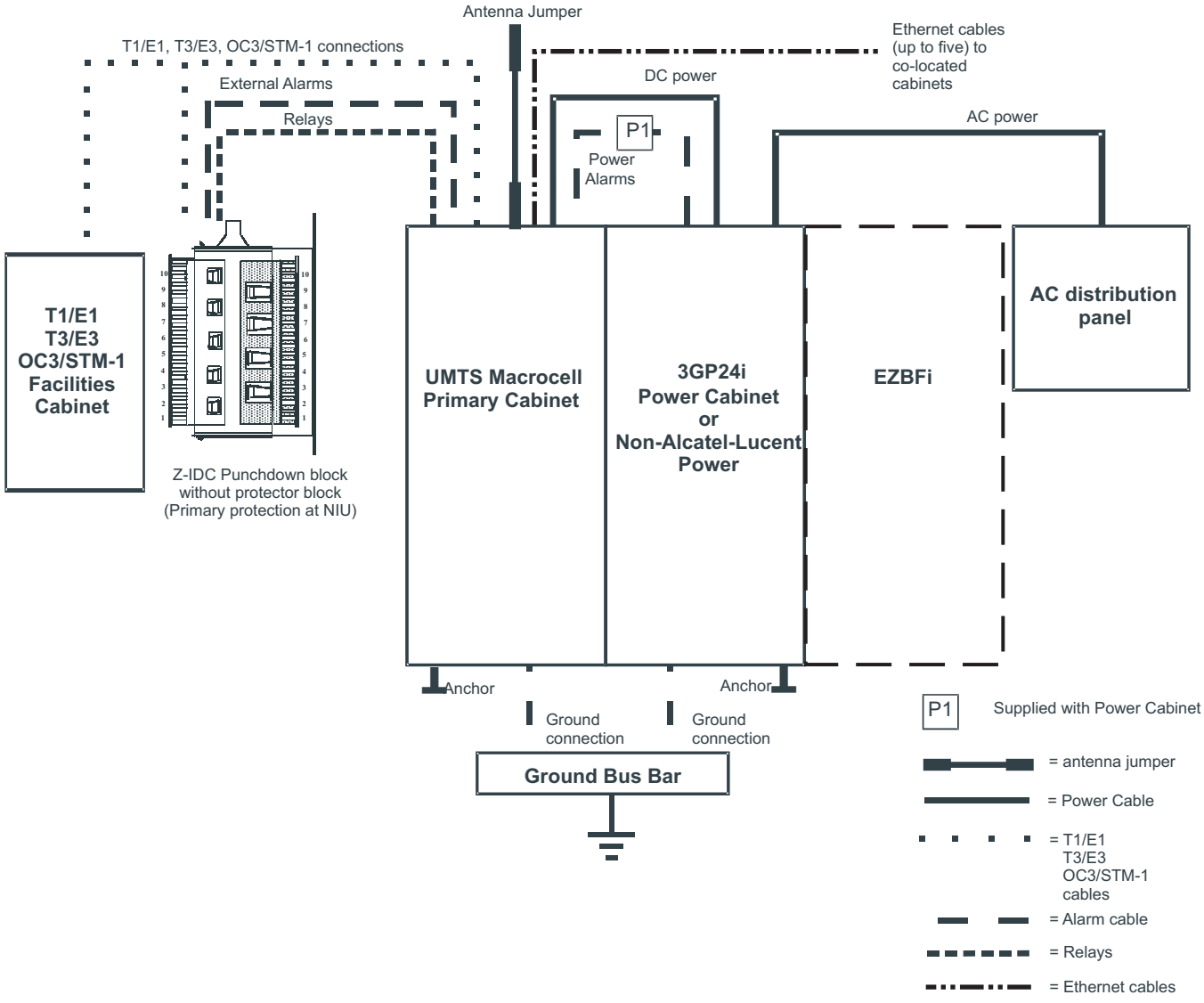
UMTS Macrocell base station overview

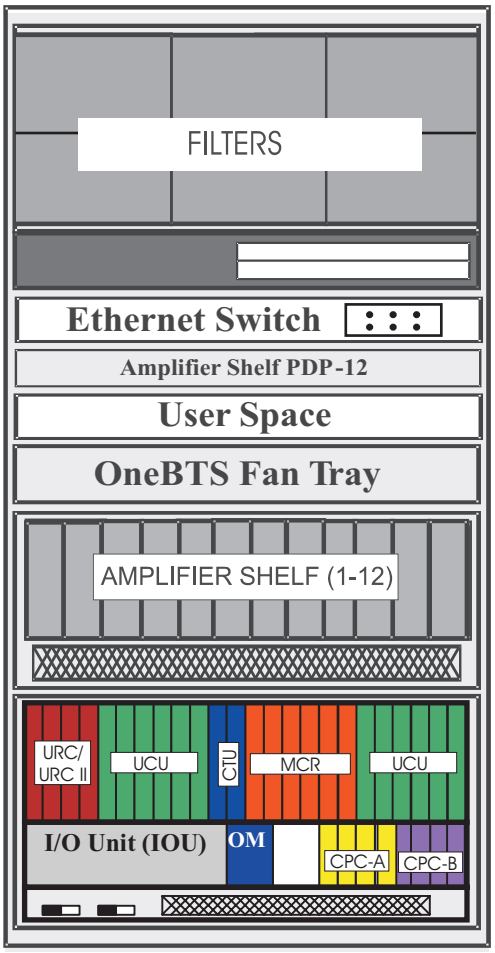
UMTS base station overview

The following diagram provides a typical overview of the UMTS Macrocell base station when connected to a 3GP24i power cabinet.



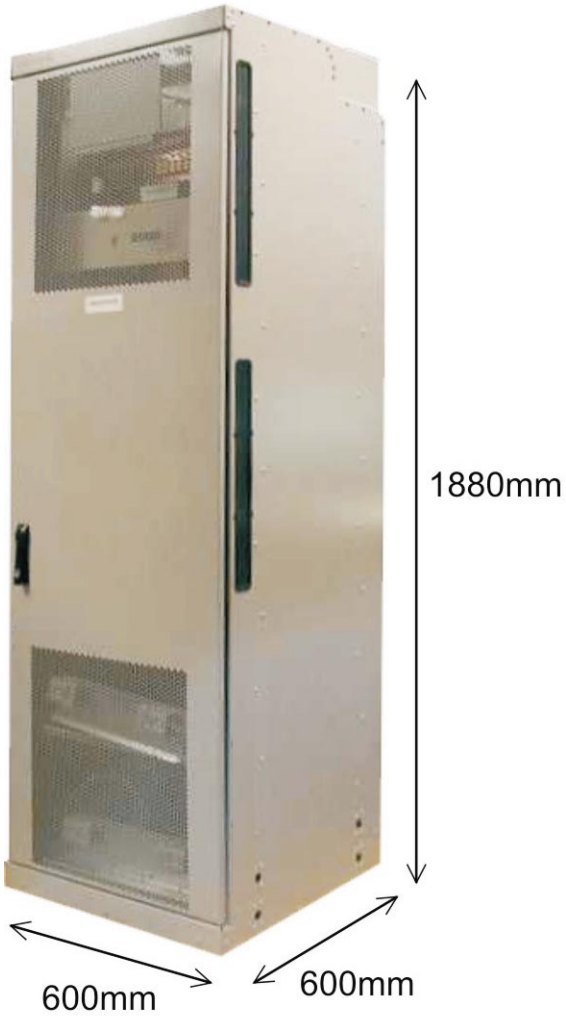
UMTS Macrocell cabinet

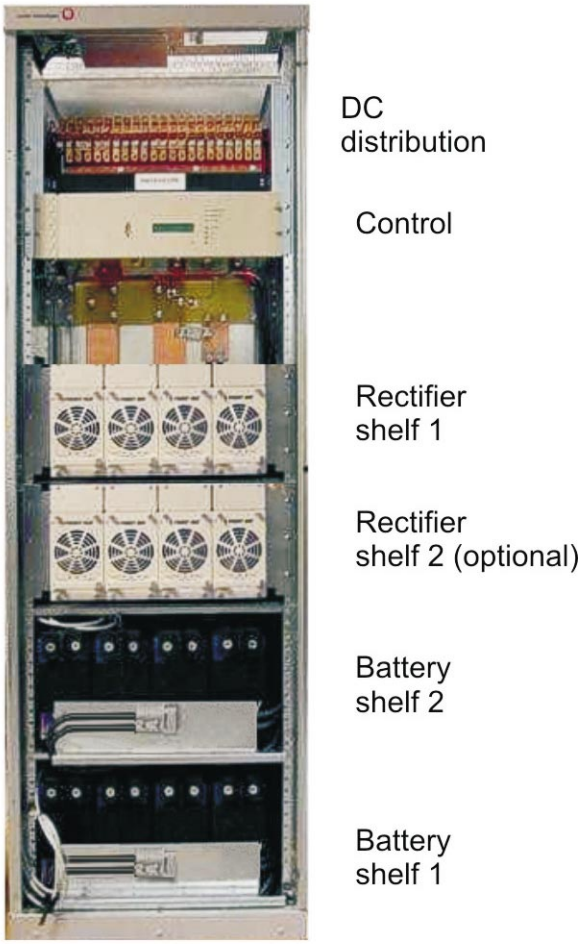
The UMTS Macrocell cabinet contains UMTS radio communication equipment, amplifiers, alarms, a T1/E1, optional T3/E3, and OC3/STM1 facilities interface, Ethernet switch, filters, and a user alarm interface. The UMTS Macrocell cabinet can be shipped with components that provide 1 to 2 carriers maximum (up to 4 carriers in the future), and 1 to 3 sectors, maximum. The figure below shows an interior view of the UMTS Macrocell cabinet.



3GP24i power cabinet

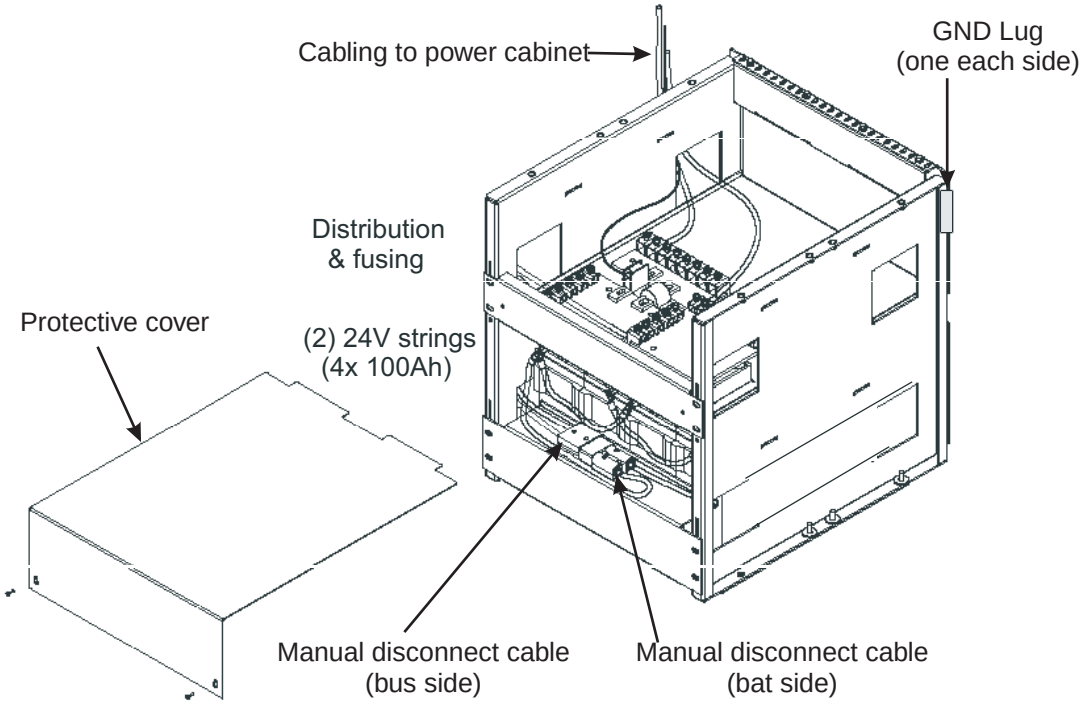
The 3GP24i power cabinet supplies +24 VDC and contains AC/DC rectifier modules, a controller (with alarms), batteries, and distribution elements.





EZBFi Battery Module

The EZBFi battery module is used with the 3GP24i power cabinet. It provides supplementary battery backup for the batteries that are located inside the 3GP24i power cabinet. This design is modular. Additional battery strings can be added in the field to extend battery backup time. The first battery module, which goes at the base, is shown in the figure below. Additional (add-on) modules contain one or two battery shelves. Each shelf contains four L1 batteries (two strings).



For information on installing the EZBFi battery frame, see *EZBFi Modular Battery System Installation Manual for +24V and -48V,* 401-703-507.

Product attributes

The following table specifies the attributes of a UMTS Macrocell indoor primary cabinet.

UMTS Macrocell	Attributes
Frequency bands	PCS 1900 MHz Cellular 850 MHz Dual Band 850/1900 MHz 2100 MHz Dual Band 850/2100 MHz (FUTURE)
Indoor operating temperature	-5°C to +40°C (continuous) -5°C to +50°C (short-term)
Electrical rating	Three (3) lines: 24 VDC, 120 A each Three (3) lines: -48 VDC, 90 A each
Power and battery	3GP24i power cabinet EZBFi battery frame
Sectors	up to 3 sectors
Carriers	1-2 (1-4 future) per cabinet (Single Band) 1 850 (1-2 future) / 1 1900 (1-2 future) (Dual Band)
Filters	Dual Duplex Block Simplex/Duplex
Facilities for R04.03: T1/E1 facilities T3/E3 facilities option OC3/STM1 facilities option Ethernet switch option	- Up to 8 T1/E1s, or One, or One, or - Up to 5 output ports
Antenna	RF: Up to 6 for Single Band - Duplex RF: Up to 18 for Dual Band - Simplex and MCPA GPS: optional
User alarms	32
User relay	Optional (hardware ready)

Cabinet overview

General

The UMTS Macrocell base station consists of the following cabinets:

- Primary cabinet
- 3GP24i or customer-supplied power cabinet

The following table provides an overview of the UMTS Macrocell primary indoor cabinet.

Cabinet	Description
Primary cabinet	The primary cabinet is equipped with filters, amplifiers, radios, channel cards, and I/O and antenna interfaces.
3GP24i power cabinet	Converts AC power from the utility company to +24 VDC, which is used to power the primary cabinet and charge the batteries.
EZBFi battery frame	+24 V external battery module for additional battery backup (used with the 3GP24i power cabinet).
Customer-supplied power cabinet	Non-Alcatel-Lucent power +24/-48 VDC.

Equipment weights and dimensions

Weights and dimensions

This table provides the physical specifications for the indoor UMTS Macrocell cabinet.

Cabinets	Configuration	Weight (non-MCPA) kg (lb), estimate	Max weight (MCPA) kg (lb), estimate	Dimensions mm (inches)
Primary cabinet single band (See Note [1])	3S/1C, 40 watts	280 (616)	214 (472)	600 x600 x 1880 (23.6 x 23.6 x 74)
	3S/2C, 40 watts	297 (656)		
	3S/3C, 40 watts (Future)	309 (681)		
	3S/4C, 40 watts (Future)	324 (714)		
Primary cabinet dual band	3S/2C 1 (PCS) 1 (850)	322 (709)	243 (535)	600 x600 x 1880 (23.6 x 23.6 x 74)
	3S/3C, 1 or 2 (PCS) 1 or 2 (850)	348 (766)		
	3S/4C (Future) 2 (PCS) 2 (850)	350 (772)		
3GP24i power cabinet	Equipped with 2 rectifier shelves and 2 battery shelves. (See Notes [1] and [2] .)		481 (1060)	600 x 600 x 1880 (23.6 x 23.6 x 74)
EZBFi battery frame (used with 3GP24i power cabinet)	Maximum system (base system + 2 double shelf upgrades) + 20x batteries	817 (1800)		543 x 600 x 1842 (21.4 x 23.6 x 72.5)

Notes:

1. One rectifier shelf contains four rectifiers.
2. One battery shelf contains four batteries.

3. Only two carriers are currently supported.

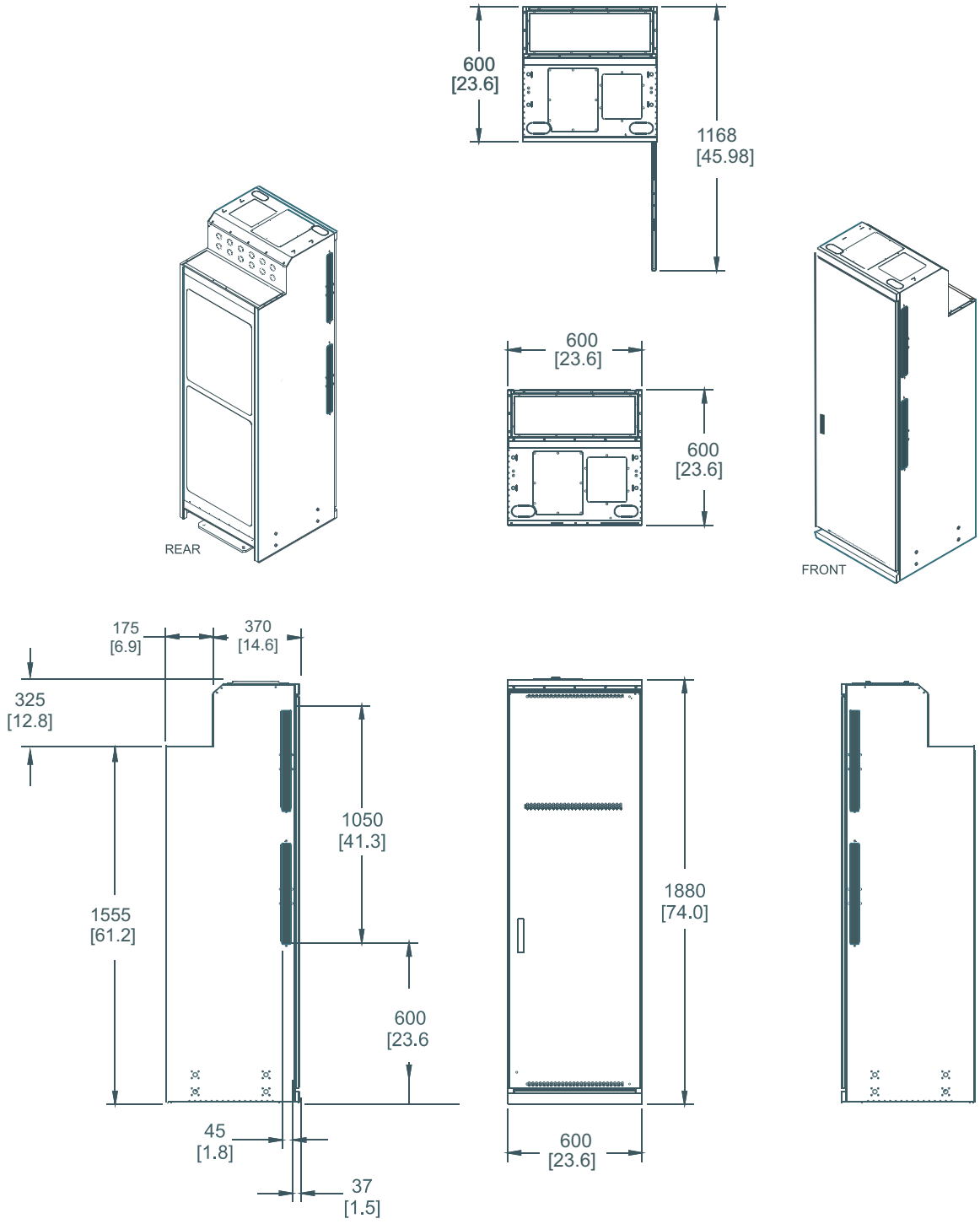
Battery and miscellaneous hardware weights

The following table provides approximate weights for batteries and other miscellaneous hardware. The weights for other cabinet configurations can be calculated by adding or subtracting the weights given in the following table.

Item	Weight kg (lb)
Rectifier	9 (20)
Mounting plate	11 (24)
Pallet	30 (65)
L1 (KS24597) battery (100 Ah)	38 (83)

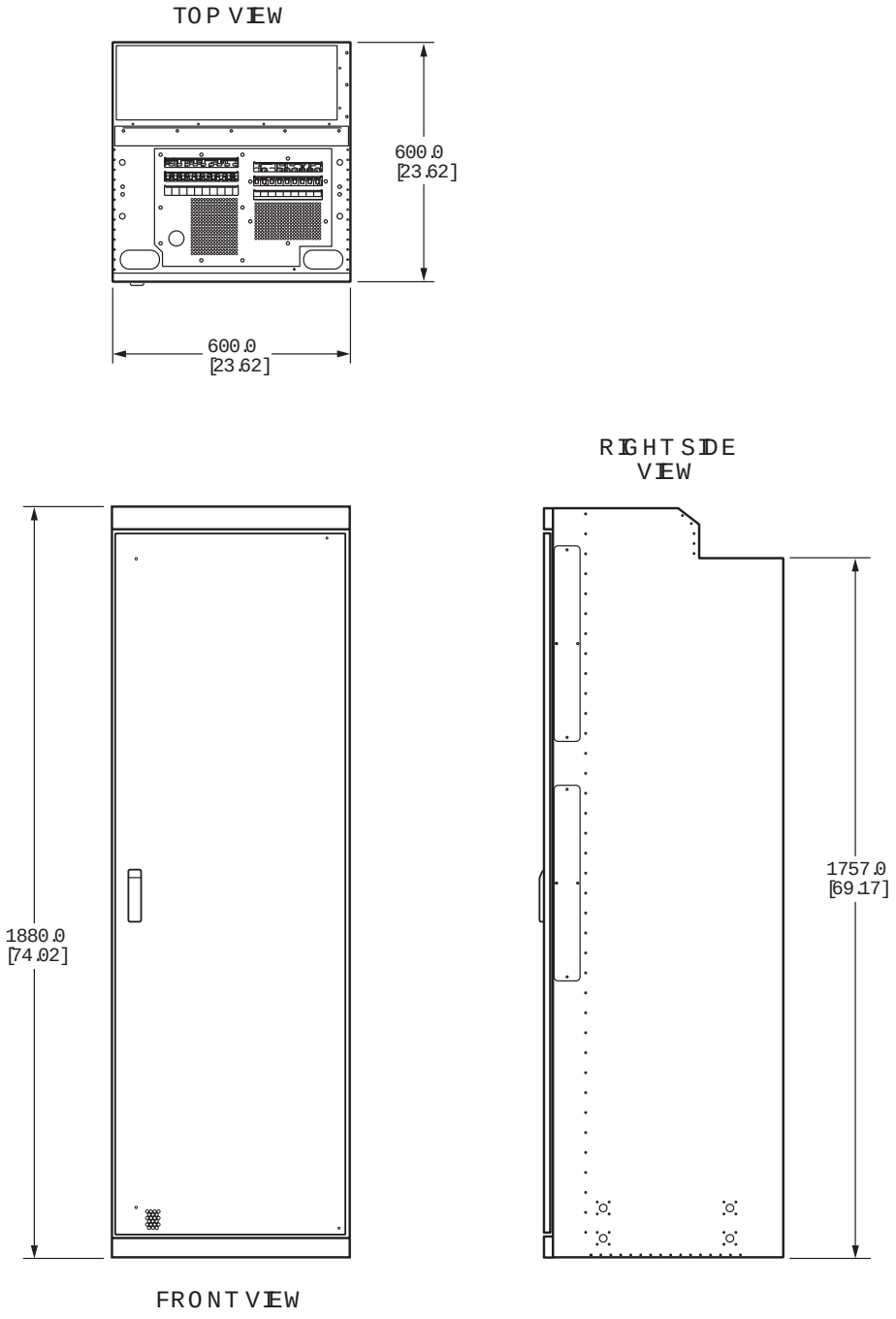
Primary cabinet

The following diagram shows the front, top, and side views of an indoor primary cabinet and its dimensions.



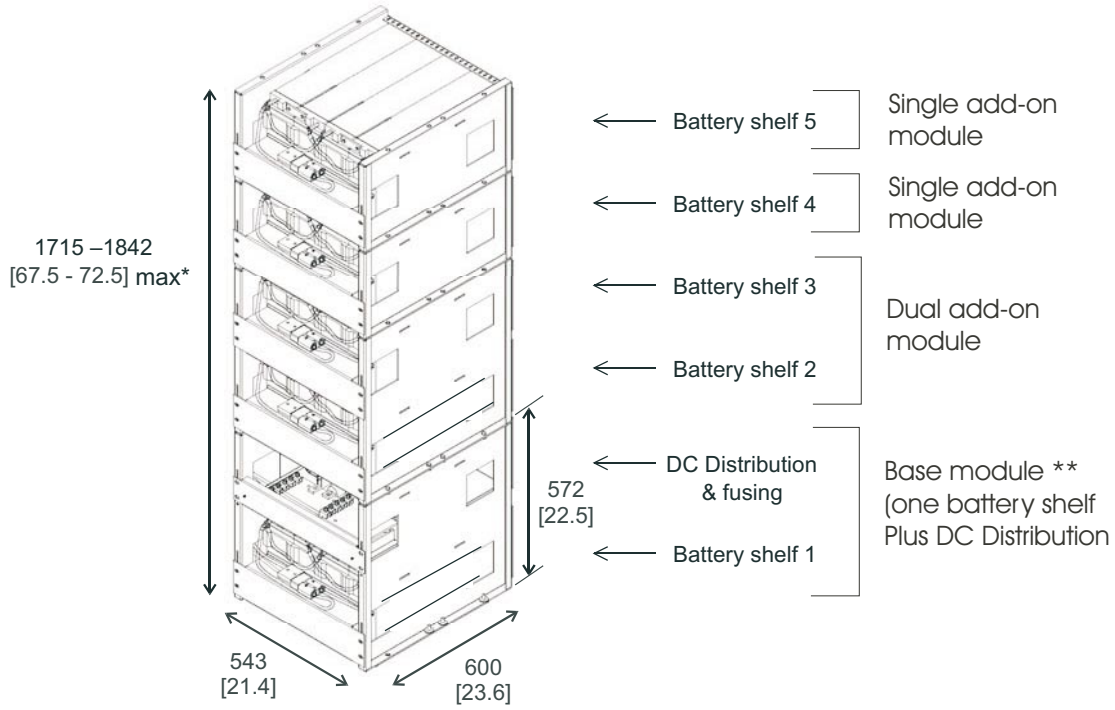
Dimensions for 3GP24i

The following diagram shows the dimensions of the 3GP24i Power frame.



Dimensions for EZBFi

The following diagram shows the dimensions of the EZBFi.



*Maximum height is dependent upon growth path (single vs dual shelf add-on modules

** The base unit in a second frame is the same as a dual add-on module (two battery shelves)

Note: If installing EZBFi in Zone 4, a zone 4 kit is required.

Multi-carrier Power Amplifier (MCPA)/Simplex receive hatchplate

Overview

This section provides information about the MCPA or simplex receive hatchplate, which is on the UMTS Macrocell indoor cabinet and is used to interface the MCPA or the RxAIT with the base station.

Ports RF1 - RF3 are assigned for MCPA (PCS band).

Ports RF7 - RF9 are assigned for MCPA (850 band).

Simplex Filter ports RF1 - RF6 are assigned for simplex receive (PCS band).

Simplex Filter ports RF7 - RF12 are assigned for simplex receive (850 band).

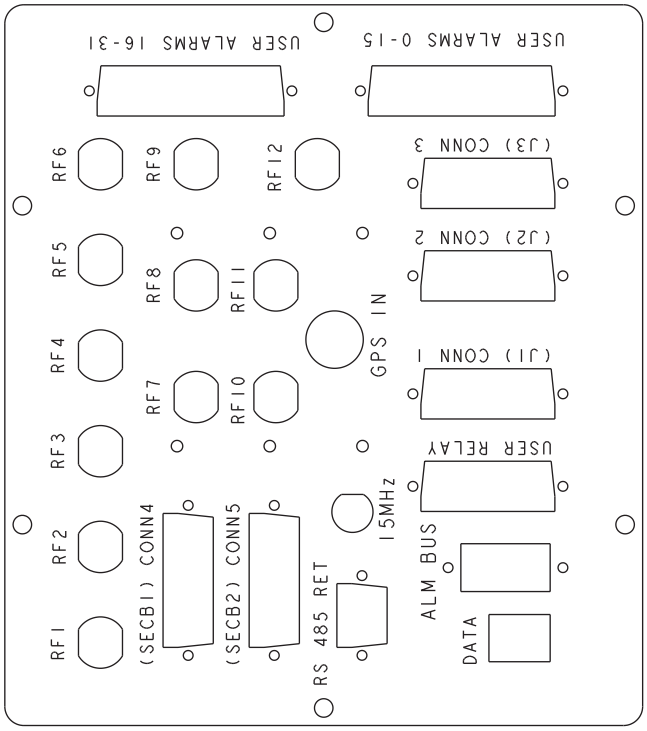
The hatchplate is located on the top of the primary cabinet and contains twelve bulkhead N-type connectors, which are used to wire the frame for MCPA and/or simplex receive configuration.

External cabling

The customer is responsible for providing all cabling from the MCPA or simplex receive hatchplate to the customer’s equipment (RxAIT or MCPA cabinet)

MCPA/Simplex receive hatchplate

The following figure shows an exterior view of the hatchplate for the simplex receive or MCPA configurations. See Chapter 5, "Antenna requirements and interfaces for dual duplex, MCPA and simplex receive configurations" for RF allocations.



TOP FRONT VIEW

T3/E3, OC3/STM1, and Ethernet hatchplate

Overview

There are two small optional oval hatchplates located at the top of the UMTS cabinet with provisions to connect T3/E3, OC3/STM1 and Ethernet interfaces:

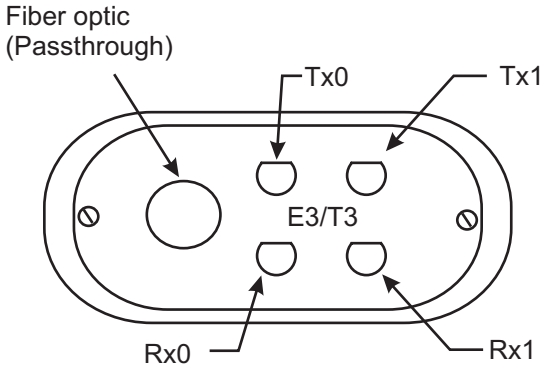
- The left oval hatchplate is for connecting the fiber and coax cable interface. The fiber cable is a pass-through, and the coax cable uses a BNC male connector plug to connect at the hatchplate jacks.
- The right oval hatchplate is for the Ethernet cable interface. Up to five cat5e cables with male RJ-45 port plugs can be connected at the hatchplate jacks.

External cabling

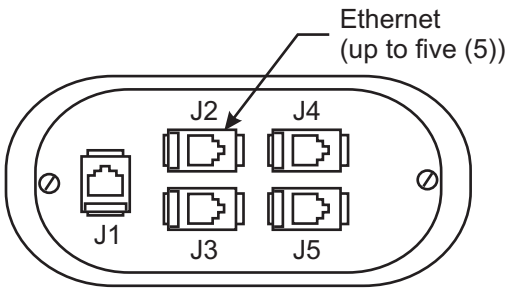
The coax and fiber cables are to be connected between the UMTS cabinet and the facilities cabinet for T3/E3 or OC3/STM1. The cat5e cables are to be connected between the UMTS cabinet and the co-located cabinets inside a hut.

T3/E3, OC3/STM1, and Ethernet hatchplates

The following figures show an exterior view of the hatchplates.



LEFT OVAL
HATCHPLATE



RIGHT OVAL
HATCHPLATE

Note: Tx1/Rx1 are for future use.

3 Basic site preparation requirements and footprints

Overview

Purpose

This chapter describes the base station requirements, which must be satisfied, before installation of a UMTS Macrocell site can be started.

Contents

Environmental requirements	3-2
Site requirements	3-4
Equipment layout and clearances	3-7
Anchor hole requirements and footprints	3-10
How to mark and drill the anchor holes	3-13

Environmental requirements

Purpose

This section outlines the environmental requirements for a Macrocell cell site.

Indoor environment

Indoor UMTS Macrocell cabinets can only be installed in an indoor environment. An indoor environment is one in which temperature, humidity, and ventilation are controlled and within defined requirement limits.

The indoor cabinet is not weather-hardened and must be operated in an environment within the conditions described in the following table.

Condition	Specification
Operating temperature	-5 to +40°C (continuous) -5 to +50°C (short-term)
Relative humidity	5 to 90% (non-condensing but not to exceed.024 kg water/kg of dry air)
Operating altitude	-61 to +1,798 meters (-200 to +5,900 feet) above sea level
Extended operating altitude	-61 to +3,048 meters (-200 to +10,000 feet) above sea level. An operating temperature de-rating of 1°C per 305 meters (1,000 feet) above 1,829 meters (6,000 feet) is allowed
Storage requirements	GR-63-CORE, Section 4.1.1

For those installations that do not meet indoor atmospheric condition requirements, steps must be taken to install additional HVAC equipment; otherwise, outdoor-type equipment must be installed.

Adequate ventilation must be provided to remove any hydrogen gas released by the batteries in the power and battery cabinets.

Heat dissipation

This table provides values of maximum heat dissipation for certain UMTS Macrocell indoor cabinet configurations and the 3GP24i power cabinet.

Cabinet	Sector/Carrier/ 40W Power Out	Maximum heat dissipation (W)
UMTS primary single band cabinet	3S/1C	2448
	3S/4C (future)	7170
	3S/1C MCPA	1151
	3S/4C MCPA (future)	Future
3GP24i power cabinet (18 kW load)	N/A	2160
UMTS primary dual band cabinet	3S/2C 1 x 1900 and 1 x 850	4330
	3S/4C 2 x 1900 and 2 x 850 (future)	7340
	3S/2C 1 x 1900 and 1 x 850 MCPA	1630
	3S/4C 2 x 1900 and 2 x 850 (MCPA Future)	1950

Site requirements

General requirements

The following general requirements must be met before installation of an indoor UMTS Macrocell site can begin:

- HVAC and environmental control system installed.
- All required room construction completed.
- Cabinet support structures installed.
- Locations for equipment marked.
- Adequate clearance provided for service access.
- Cable supports, racks, enclosures, and trays installed.
- AC electric service installed, as described in Chapter 4, “Electrical power requirements”.
- T1/E1, T3/E3, OC3/STM1, and user alarm facilities installed at demarcation point, as described in Chapter 7, “T1/E1, T3/E3, OC3/STM1, user alarm, and Ethernet facility requirements”.
- Conduit for fiber cable protection system.
- Alarm sensors and connection points readily available.
- Interconnection equipment, such as Z-IDC blocks installed.
- Cabinet anchor holes drilled.
- The environment complies with limits listed in “Indoor environment” (p. 3-2).
- AC electric service must be installed, as described in Chapter 4, “Electrical power requirements”.
- 1-1/2 inch conduit must be installed from the AC service panel to the location of the 3GP24i power frame, as described in Chapter 4, “Electrical power requirements”.
- Z-IDCs for T1/E1 and user alarm facilities must be installed as described in Chapter 7, “T1/E1, T3/E3, OC3/STM1, user alarm, and Ethernet facility requirements”
- Balun Box must be installed, if required
- Grounding electrode system installed
- RF and GPS antenna runs installed, if required
- Surge protection for antennas installed
- TTLNA option
- Tower light power installed (if required)

Refer to Appendix A, “UMTS Macrocell site preparation checklists” of this document for checklists of detailed requirements.

Structural requirements

Floor loading must be considered during site preparation. In some cases, the cell site equipment may not rest directly on the floor. In those cases, the cell equipment will need to be supported by an intermediate structure that is fastened directly to the mounting surface. The cabinets must be supported along all four edges. The support structure must be designed in compliance with BOCA national building codes and all other applicable codes.

Cable support and racks

If required, all RF and GPS cable runs, DC inter-cabinet cable runs, AC cable runs, and facilities cable runs must be supported by a cable support and rack system. All horizontal AC and DC cables over one foot in length are required to be supported by cable support and rack system. Cable runs along the floor must be appropriately protected to prevent damage to personnel and equipment.

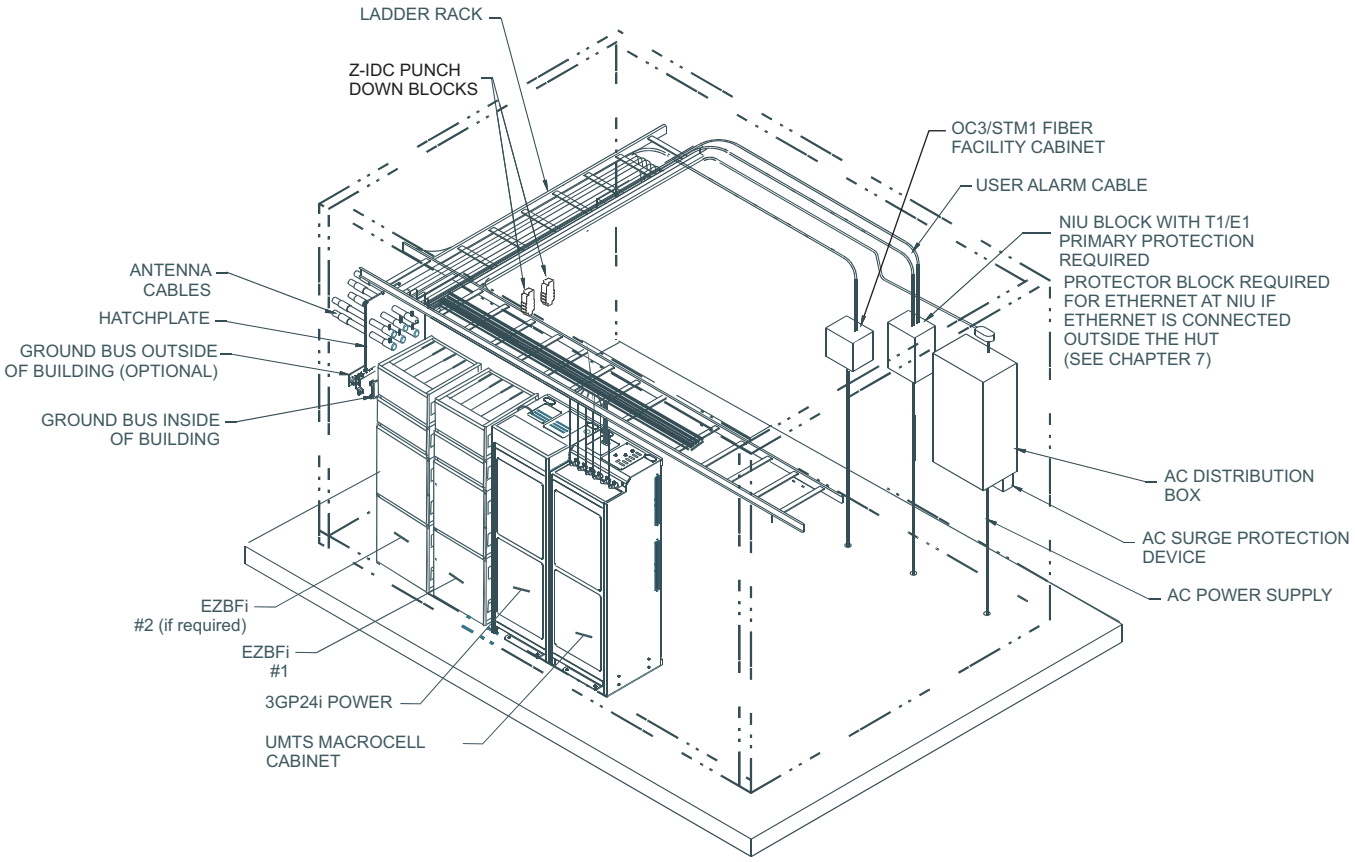
Architectural considerations

All architectural considerations shall comply with all applicable national and local codes, including the following:

- Uniform Building Code (UBC)
- Building Officials and Code Administrators (BOCA)
- Southern Uniform Building Code (SUBC)
- American Concrete Institute (ACI)
- American National Standard Institute (ANSI)
- American Standard Testing Methodology (ASTM)
- National Fire Protection Association (NFPA)

Room configuration

The following diagram shows a typical configuration of a room for UMTS Macrocell equipment.



Equipment layout and clearances

Purpose

Minimum clearances must be maintained between the cabinets and surrounding building parts/cabinet to accommodate the installation and maintenance of the base station.

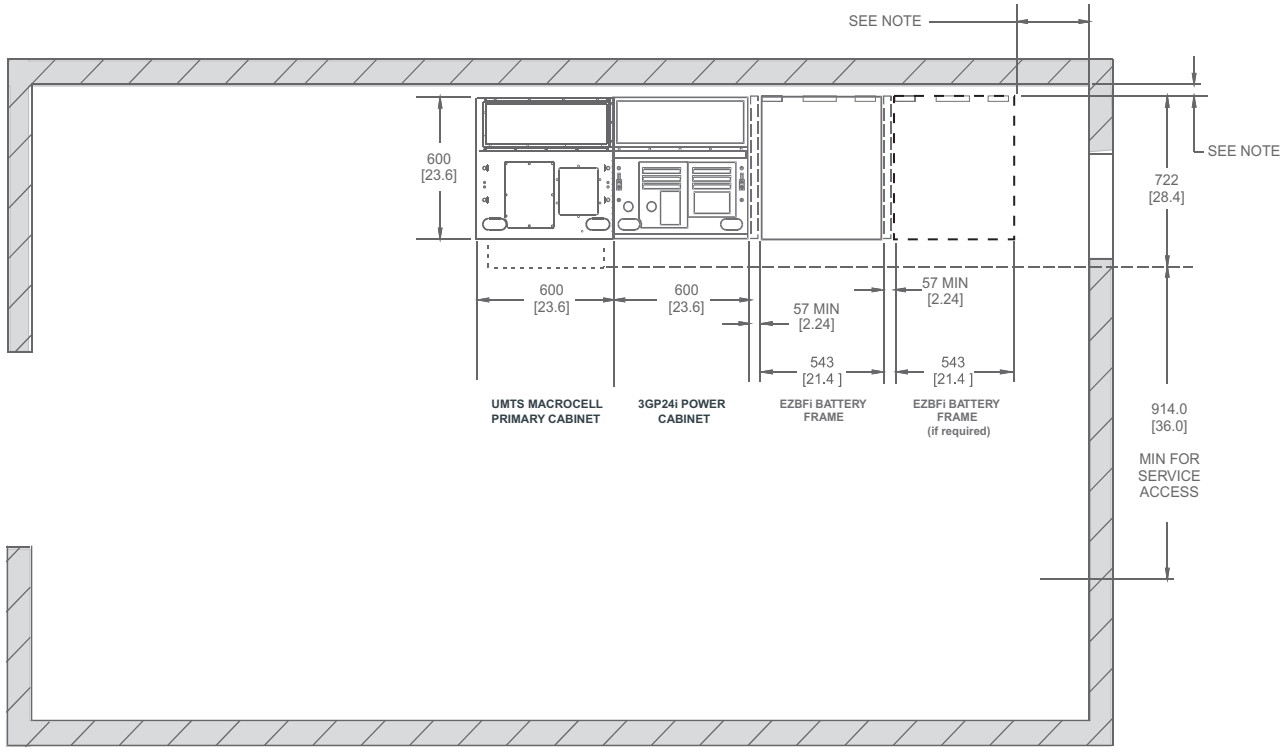
Planning guidelines

The following constraints must be considered for cabinet clearances:

- In line-ups where battery back-up cabinets may be needed, the footprint location must be ascertained ahead of time because batteries cannot be added easily to side-by-side cabinets when battery back-up cabinets are in the center of a line-up.
- The battery cabinet must be installed adjacent to the power cabinet.

Equipment layout with 3GP24i (new site)

The following diagram shows the equipment layout for a typical new indoor Macrocell site.

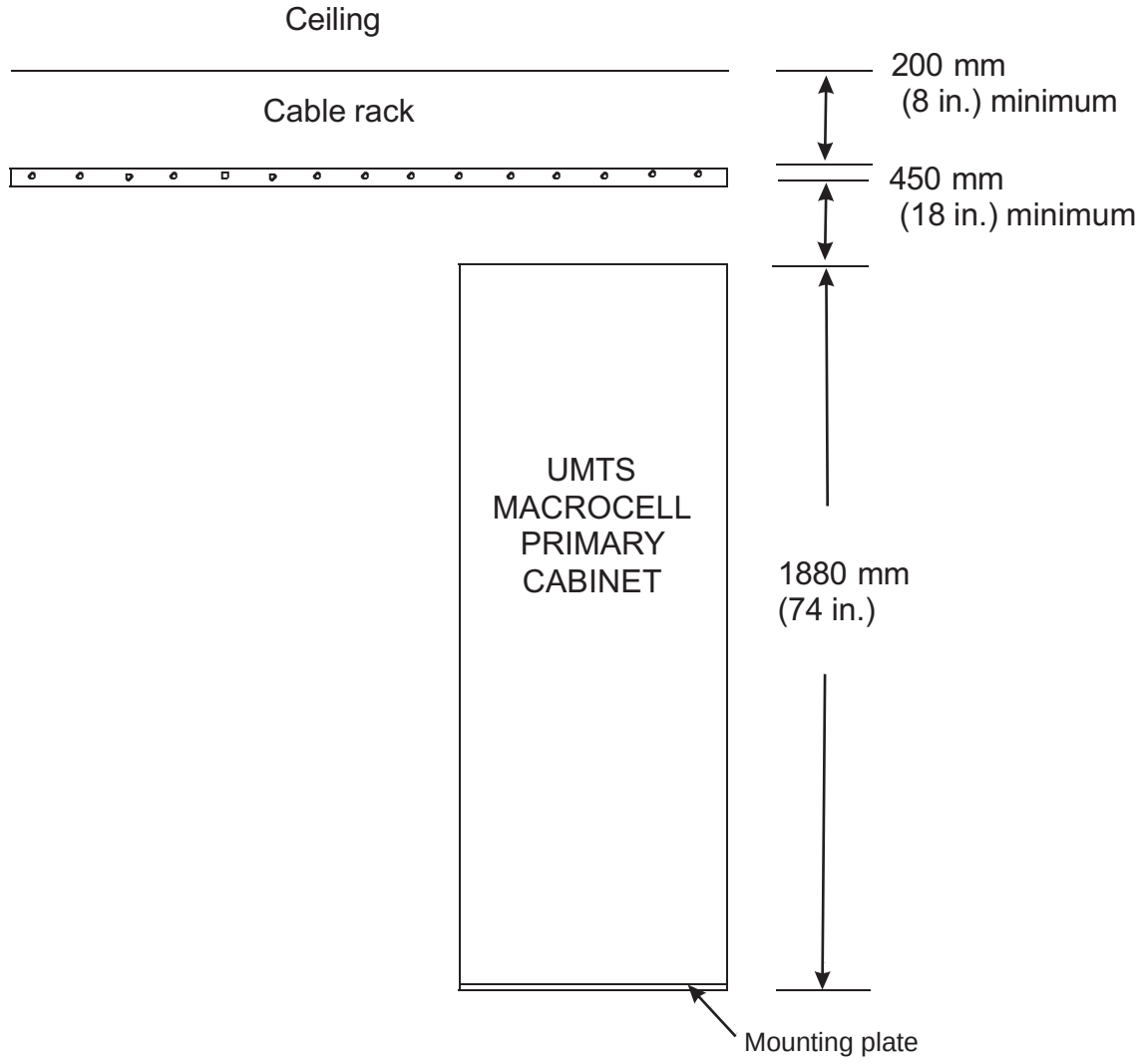


Notes:

1. The cabinets may be placed with zero clearance to the rear wall.
2. The cabinets may be placed with zero clearance to the side wall, however some clearance is recommended.
3. Minimum space between the EZBFi frame and the adjacent cabinet or frame is 57 mm (2.24 in.) (if the edge of the template is cut at the dotted line).

Cable rack clearance for UMTS Macrocell primary cabinet

The following diagram shows the clearance requirements for the indoor UMTS Macrocell cabinet from the top of the cabinet to the cable rack and from the top of the cable rack to the ceiling.



Clearances

This table below lists minimum clearances for indoor primary and power cabinets to an adjacent building or parts/cabinets.

Parameters for primary and power cabinets	Minimum clearance
Cabinet rear panel - wall	0
Cabinet right/left side panel - wall (door fully opened)	0
Above the cabinet	650 mm (26 inches)
In front of the cabinet (for installation and service access)	914 mm (36 inches)
Side adjacent to growth cabinet	0
Top of cabinet - bottom of cable rack	200 mm (8 inches)

Anchor hole requirements and footprints

Overview

This section provides instructions for preparing the cabinet anchor holes. Cabinet anchoring must meet local code requirements and take into consideration the earthquake zone at the installation site.

Mounting options

The UMTS Macrocell cabinets can be mounted on the following:

- Concrete or raised floor.
- Mounting plates are shipped with the Macrocell cabinet and serve as drilling templates and leveling plates. The mounting plate is placed under the cabinet during installation.

Anchoring specifications

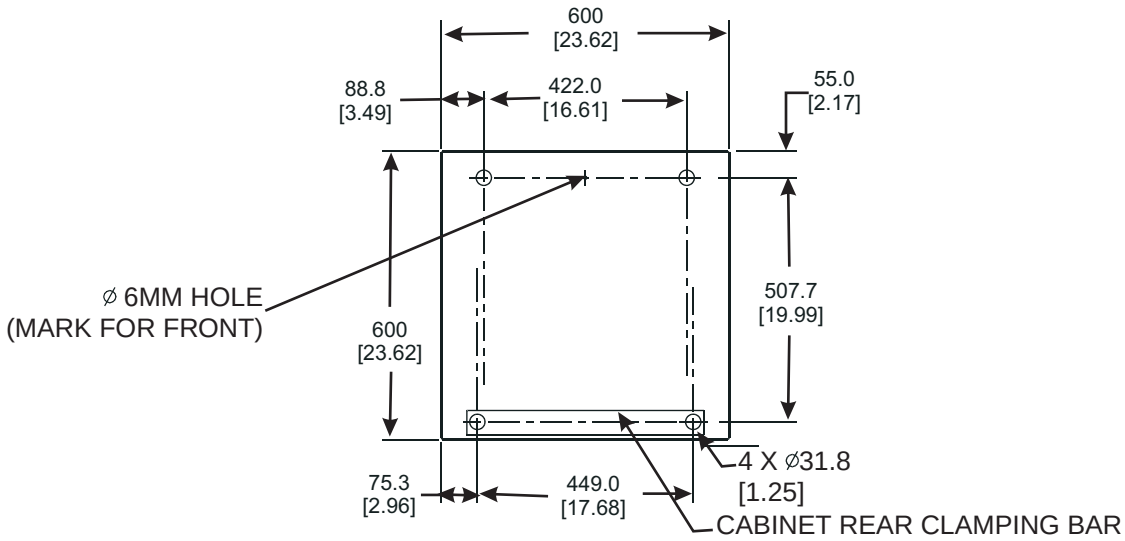
The following table provides anchoring specifications for seismic zones 0 through 4.

Cabinet	Seismic zone(s)	Anchor type	Number of anchor holes	Hole size (mm)	Hole Depth (mm)
UMTS primary cabinet/ 3GP24i power cabinet	0, 1, 2	13 mm (1/2 in.) Dia. drop in	4	16 mm (5/8 in.)	50 mm (2 in.)
	3, 4	M12 x 125 mm	4	18 mm (11/16 in.)	100 mm front (4 in.) 75 mm rear (3 in.)
EZBFi battery frame	0, 1, 2, 3	13 mm (1/2 in.) Dia. drop in	4 (Marked “A”)	16 mm (5/8 in.)	50 mm (2 in.)
	4*	13 mm (1/2 in.) Dia. drop in	8 (Marked “A” and “B”)	16 mm (5/8 in.)	50 mm (2 in.)

Important! If installing EZBFi in zone 4, a zone 4 Kit is required.

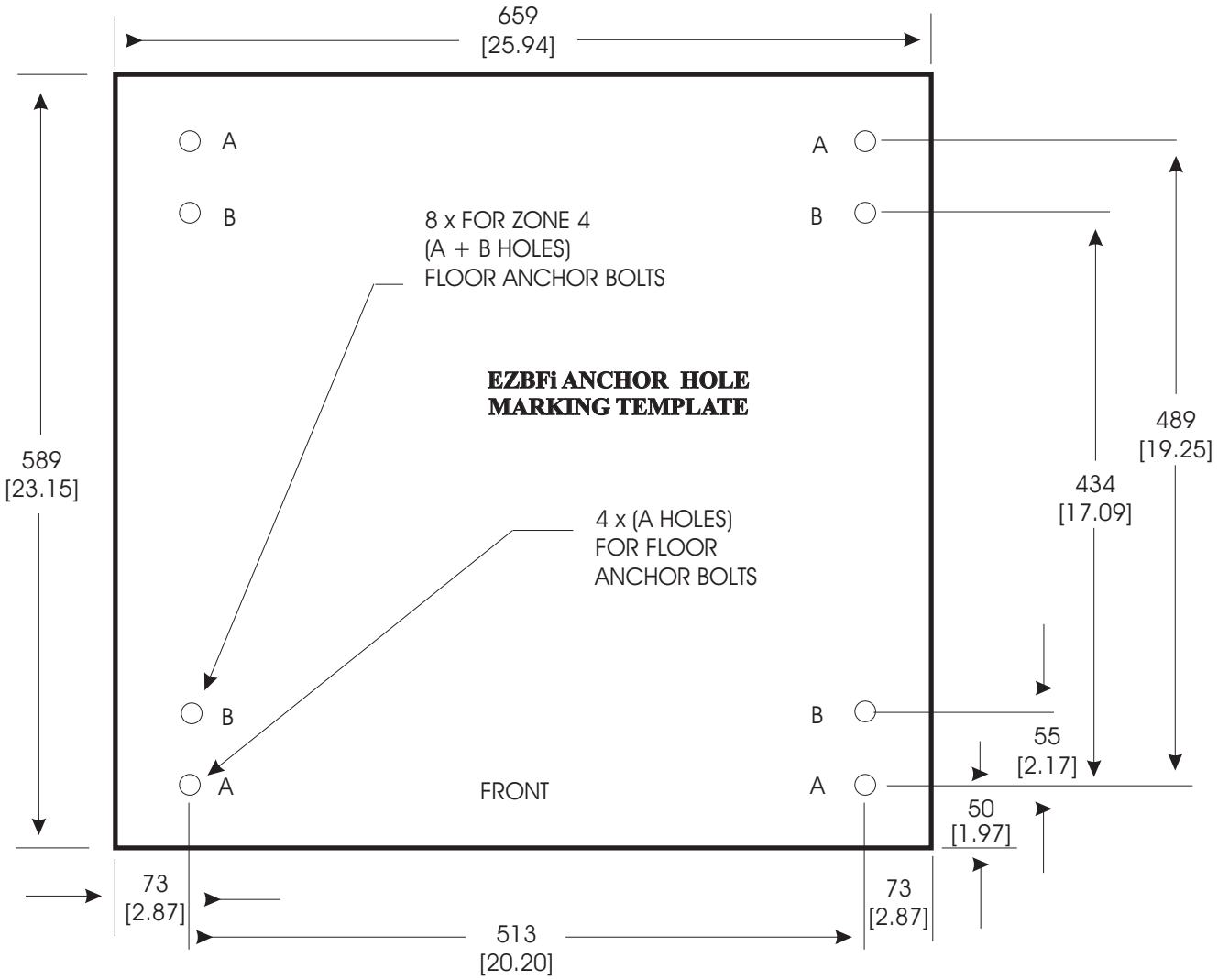
Anchoring footprint for UMTS primary and 3GP24i power cabinet

The following diagram shows the anchoring footprint for the UMTS primary and 3GP24i power cabinet.



Anchor hole marking template for EZBFi battery frame

The following diagram shows the anchor hole marking template for the EZBFi battery frame.



Important! The four holes identified as “A” are for Zone 0, 1, 2, and 3 installations. The eight holes identified as “A” and “B” are for Zone 4 installations.

□

How to mark and drill the anchor holes

Mark and drill the anchor holes

Important! Procedures for the preparation of the mounting surfaces shall be performed as part of site preparation.

Use the following procedure to mark and drill the anchor holes in a concrete surface.

1 Mark the surface for all cabinets to be installed. Refer to the anchor footprint diagrams on the previous pages for cabinet anchoring dimensions.

2 Drill the anchor holes to the proper size and depth as specified in "Anchoring specifications" (p. 3-10).

Important! If a 4-inch hole depth cannot be attained for a 12-mm expansion stud anchor (seismic zones 3 and 4), a spacer may be removed from the anchor assembly when it is installed. The minimum depth of the hole is 3 inches.

3 Tape over the open holes to prevent debris from falling inside.

Important! Do not install the anchors at this time. Anchors will be installed later by equipment installers.

END OF STEPS

□

4 Electrical power requirements

Overview

Purpose

This chapter describes the requirements, which must be satisfied for a base station before a UMTS Macrocell site installation can be started.

Contents

Power requirements (general)	4-2
AC and DC requirements for the UMTS cabinet	4-3

Power requirements (general)

General requirements

This section describes the AC power requirements for the Alcatel-Lucent equipment at the site. AC power must also be provided for HVAC, lighting, AC convenience outlets, and any additional AC-powered equipment present at the site. The appropriate product information must be consulted to determine the total AC power required for the equipment at the site.

As part of site preparation, the site must be equipped with the appropriate AC service panel board, or AC branch circuit load center for supplying power to all AC equipment at the site. All AC power wiring, distribution, and protection equipment must be installed during site preparation and be ready for connection to Alcatel-Lucent power equipment.

Important! All AC wiring and over-current protection must be installed in accordance with the National Electrical Code (NFPA-70), the Canadian Electrical Code, Part I (CSA C22.1), or the local electrical code in effect. An appropriate earth ground connection is required before commercial AC service can be connected to any equipment at the site.

Important! Alcatel-Lucent power systems are specifically designed to power the UMTS cabinet. However, if another manufacturer's power equipment is used, it must comply with the requirements described in Appendix C, "Electrical power requirements for customer supplied power +24/-48 VDC systems" of this document.

□

AC and DC requirements for the UMTS cabinet

AC convenience outlet

Cell sites must be equipped with at least one duplex convenience outlet, which is needed for installation and maintenance procedures. The outlet is required to power test equipment and installation tools. The duplex outlet must be protected in accordance with national and local electrical codes. An outlet must be installed within 1.5 meters (5 ft.) of the Macrocell cabinets. Ground Fault Circuit Interrupter (GFCI) types are recommended and must be used where required by code.

AC line surge protection

Important! The UMTS Macrocell cabinet is not equipped with AC-line surge protection. AC-line surge protection is required at the site's main AC panel.

A surge protection device capable of discharging the surge waveforms as defined in *IEEE C62.41 (1991), Recommended Practice on Surge Voltage in Low-Voltage AC Power Circuits, for Location Category "C3" and "High System Exposure"* must be installed in the AC panel board or load center supplying AC power to the power cabinet. The AC panel board or load center, surge protector, and AC wires from the service panel to the power cabinet are not supplied with the power cabinet. They must be ordered and installed as part of site preparation.

3GP24i cabinet

The 3GP24i power cabinet is equipped with two rectifier shelves (the second shelf is optional). Each shelf can support up to four KS24637 rectifiers. The power cabinet is equipped with a terminal block located inside of the cabinet for connecting three single phase AC power circuits to power up to eight rectifiers in the cabinet. Each AC power circuit requires one phase of 240 VRMS or 208 VRMS (Line 1 and Line 2) protected by a 2 pole, 70 A breaker. A common ground wire also run together with the three power circuits. To balance loads in a three-phase, 208 VRMS service, each AC power circuit should be connected to a different phase, the power cabinet accepts a 1 1/2-inch conduit for the AC power supplies, and is located at the top of the cabinet. *This conduit must be provided as part of site preparation.*

AC input requirements for 3GP24i power frame

The 3GP24i requires three single-phase branch circuits, supplied from an external load center or AC service panel. The panel shall be installed during site preparation. Each branch circuit shall be protected with a 70-A circuit breaker. Each pair of wires that come from the panel shall be 25 mm^2 (4-AWG) copper THHN wire. All the circuits

shall run in the same conduit from the panel to the appropriate location of the power system. In addition, a common 16 mm^2 (6-AWG) copper THHN ground wire (equipment grounding conductor) shall run in the same conduit.

The following table provides the AC input current for four KS24637 rectifiers (3 kW each) and an optional fully-configured 3GP24i power frame -- equipped with eight KS24637 rectifiers, which are powered by 208 VRMS or 240 VRMS.

AC Input Power (Electrical Rating)		3GP24i	Circuit Breaker (CBs)	Wire size
Voltage (Single-phase)	Current			
208 - 240 VAC	50 Amps per AC input (total of 3)	Equipped with maximum (8) KS24637 rectifiers	3 two-pole CBs, 70 A each	25 mm^2 (4-AWG) (3 pairs) plus 16 mm^2 (6-AWG) ground

Power requirements and battery reserve times for UMTS Macrocell Indoor cabinets

For power requirements and battery reserve times for UMTS Macrocell Indoor cabinets refer to Appendix F, “Power requirements and battery reserve times for UMTS Macrocell Indoor cabinets”.

DC power requirements for non integrated power

If an external power system +24/–48 VDC will be used, refer to Appendix C, “Electrical power requirements for customer supplied power +24/-48 VDC systems” for DC power requirements.

□

5 Antenna requirements and interfaces for dual duplex, MCPA and simplex receive configurations

Overview

Purpose

This section provides an overview of the antenna interface requirements for the UMTS Macrocell.

Contents

Antenna requirements and interfaces for dual duplex, MCPA and simplex receive (general)	5-2
Tower Top Low Noise Amplifier (TTLNA) requirements	5-12
Surge protection requirements	5-13
TTLNA mounting requirements	5-14

Antenna requirements and interfaces for dual duplex, MCPA and simplex receive (general)

General requirements for dual duplex configuration

The following are general requirements for RF and GPS antennas when the customer is installing a dual duplex configuration only (No MCPA, no Simplex Receive):

- Alcatel-Lucent recommended antenna cables should be used.
- RF external surge protector is required at the UMTS Macrocell cabinet end. Use Alcatel-Lucent approved surge protectors or Alcatel-Lucent KS-24577 list 5-A for filters with TTLNA support (1900 and 2100MHz), KS-24577 list 4A for filters without TTLNA support (850 MHz), or KS-24577 list 3A for GPS if used.
- All cable runs must be appropriately supported in accordance with the connector and cable manufacturer's instructions and should be terminated with DIN male connectors.
- Antenna and cable sweeps must be performed prior to the start of the installation.

UMTS Macrocell cabinet interfaces for simplex receive configuration

The following interfaces are provided at the Macrocell cabinet when the customer is installing or supplying a RxAIT:

- On the receive path, there are twelve RF outputs with N-connectors located at the top hatchplate of the cabinet. They are labeled RF1 to RF6 for the PCS band and RF7 to RF 12 for the 850 band. The top hatchplate is the Lucent demarcation point. See "Multi-carrier Power Amplifier (MCPA)/Simplex receive hatchplate" (p. 2-13) for label details.
- On the transmit path, there are three (max) outputs with 7/16″ DIN-connectors located at the rear of the cabinet. The top row connection ports S1D0, S2D0, and S3D0 positions are for the PCS band. The bottom row connection ports S1D0, S2D0, and S3D0 positions are for the 850 band.

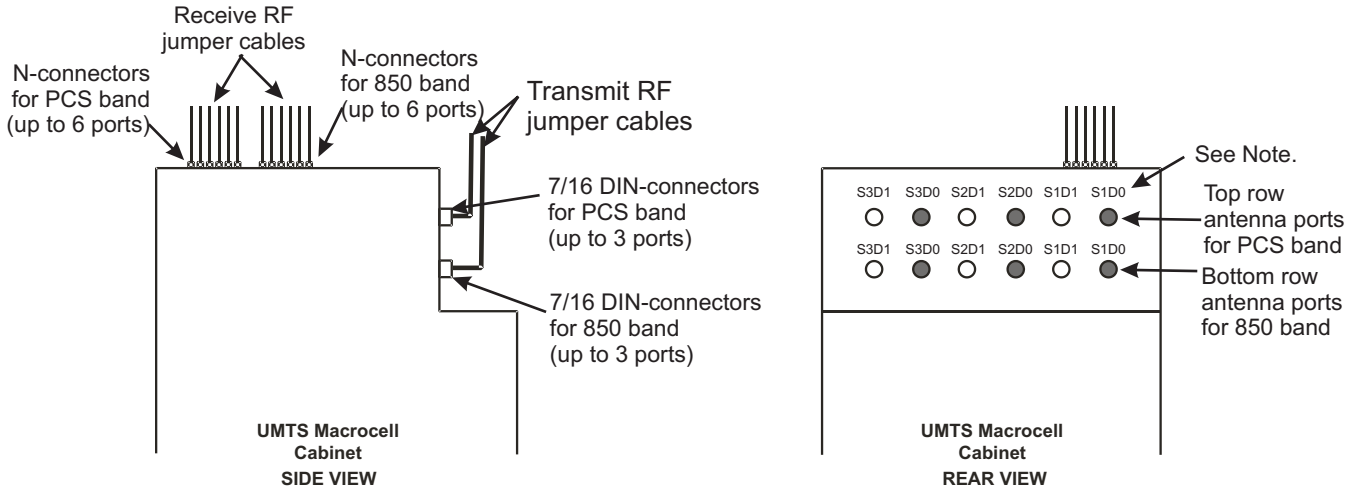
  Important! The customer must supply the appropriate External RxAIT filter for a simplex receive configuration.

External cabling for simplex configuration

The customer is responsible for providing all cabling from the UMTS Macrocell simplex receive hatchplate to customer's equipment (RxAIT).

The following requirement should be met:

- The insertion loss between the UMTS Macrocell cabinet and the RxAIT must be 8 dB. This means the customer may require an external attenuator.



NOTE:
- S1D0, S2D0, and S3D0 are the transmit ports for PCS and 850 band.
- Ports S1D1, S2D1, and S3D1 are not used for top and bottom rows.

KEY:
S1D0 = Sector 1 Diversity 0
S1D1 = Sector 1 Diversity 1
S2D0 = Sector 2 Diversity 0
S2D1 = Sector 2 Diversity 1
S3D0 = Sector 3 Diversity 0
S3D1 = Sector 3 Diversity 1

UMTS Macrocell cabinet interfaces for MCPA configuration

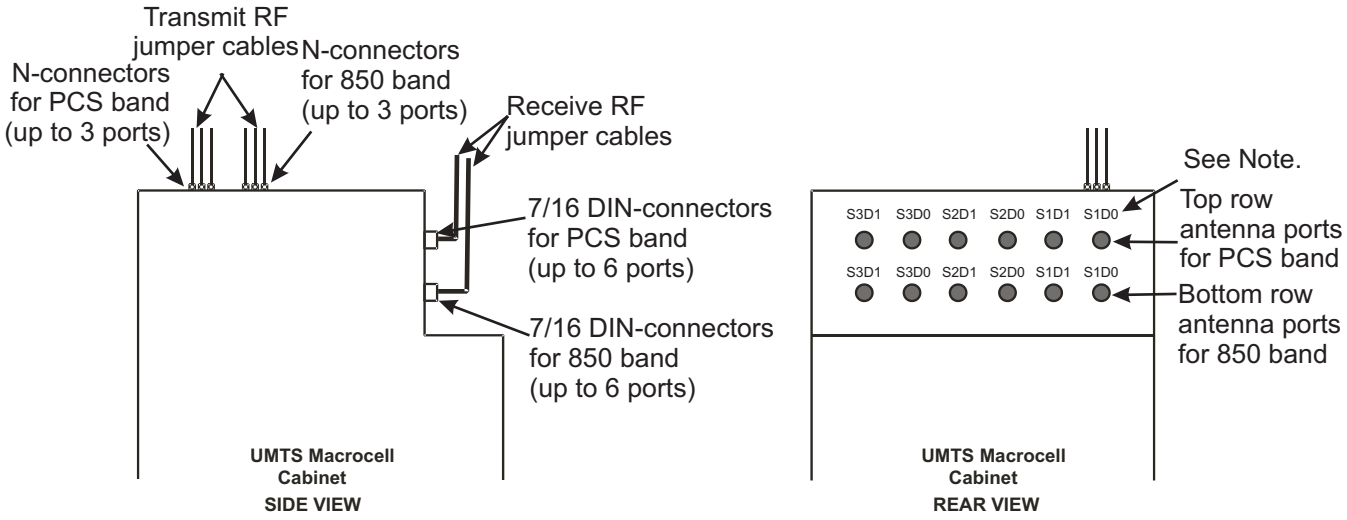
The following interfaces are provided at the UMTS Macrocell cabinet if the customer is installing or supplying a MCPA cabinet:

- For the transmit path, there are six RF outputs with N-connectors located at the top hatchplate of the cabinet. They are labeled RF1 to RF3 for the PCS band and RF7 to RF9 for the 850 band.
  The top hatchplate is the Lucent demarcation point. See "Multi-carrier Power Amplifier (MCPA)/Simplex receive hatchplate" (p. 2-13) for label details.
- For the receive path, RF jumper connections are made at the rear of the cabinet, but only to the installed filter panels.
  The top row connection ports (S1D0, S1D1, S2D0, S2D1, S3D0, and S3D1) are for the PCS band. The bottom row connection ports (S1D0, S1D1, S2D0, S2D1, S3D0, and S3D1) are for the 850 band.

External cabling for MCPA configuration

The customer is responsible for providing all cabling from the UMTS Macrocell MCPA hatchplate to the customer's equipment (MCPA).

The transmit signal level at the UMTS Macrocell cabinet interface is +5.2 dBm.



NOTE:
- S1D0, S1D1, S2D0, S2D1, S3D0, and S3D1 are the receive ports for PCS and 850 band.
- All antenna ports are used.

KEY:
S1D0 = Sector 1 Diversity 0
S1D1 = Sector 1 Diversity 1
S2D0 = Sector 2 Diversity 0
S2D1 = Sector 2 Diversity 1
S3D0 = Sector 3 Diversity 0
S3D1 = Sector 3 Diversity 1

UMTS Macrocell cabinet for simplex receive and MCPA configurations, dual band only

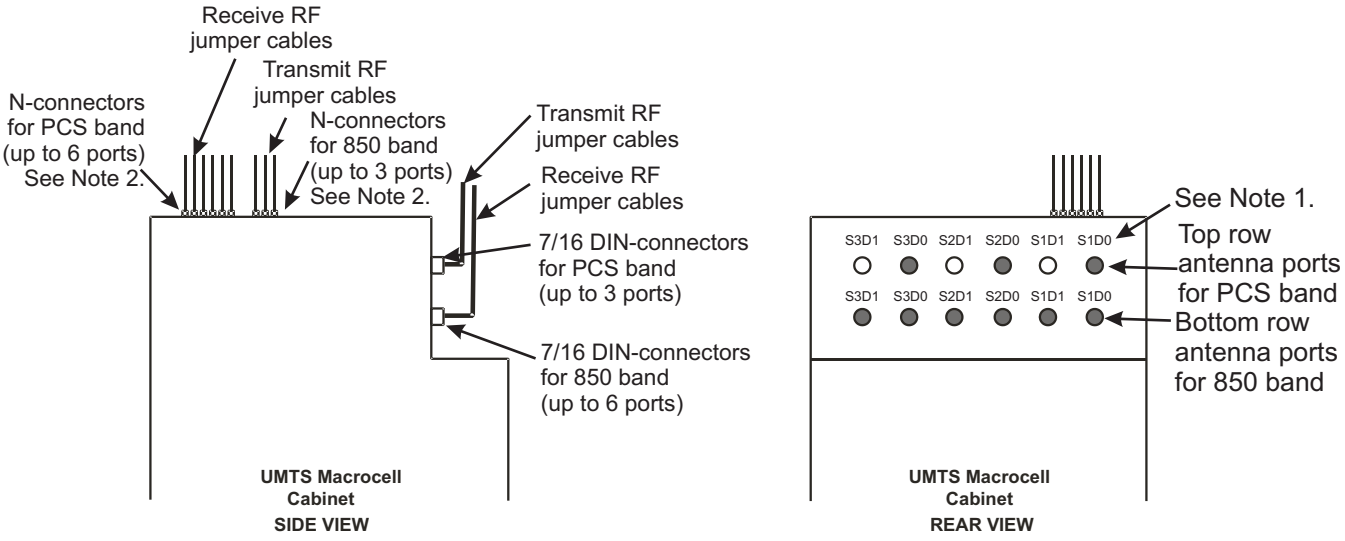
The simplex receive and MCPA interfaces can be provided in a single UMTS Macrocell cabinet. See the following diagram for details.

The following requirements should be met if the customer wants simplex receive and MCPA in the same base station:

- For simplex receive (PCS) and MCPA (850), dual band.
  - The insertion loss between the UMTS Macrocell cabinet and the RxAIT must be 8 dB for the simplex receive PCS configuration. This means the customer may require an external attenuation.
  - The transmit level at the UMTS Macrocell cabinet interface is +5.2 dB for the MCPA 850 configuration.
  - The customer is responsible for providing all cabling from the UMTS Macrocell cabinet to the customer equipment RxAIT and MCPA.

The remaining RF jumper connections (9 max) are made at the rear of the cabinet, but only to the installed filter panels.

The top row connection ports (S1D0, S2D0, and S3D0) are for the PCS band. The bottom row connection ports (S1D0, S1D1, S2D0, S2D1, S3D0, and S3D1) are for the 850 band.



NOTE 1:
At the rear of the cabinet:
- S1D0, S2D0, and S3D0 are the transmit ports (top row) for PCS only, when using a simplex receive configuration.
- S1D0, S1D1, S2D0, S2D1, S3D0, and S3D1 are the receive ports (bottom row) for 850 band, when using a MCPA configuration.

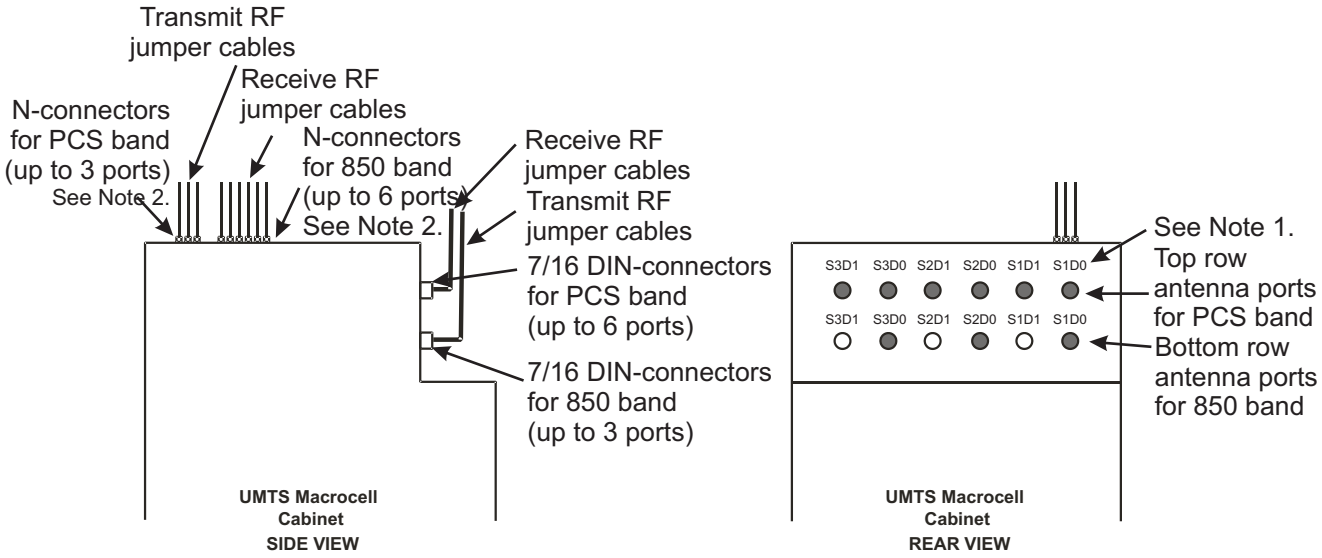
NOTE 2:
At the top hatchplate:
- RF1 to RF6 are used as receive antenna ports for PCS in a simplex receive configuration.
- RF7 to RF9 are used as transmit antenna ports for 850 in a MCPA configuration.

KEY:
S1D0 = Sector 1 Diversity 0
S1D1 = Sector 1 Diversity 1
S2D0 = Sector 2 Diversity 0
S2D1 = Sector 2 Diversity 1
S3D0 = Sector 3 Diversity 0
S3D1 = Sector 3 Diversity 1

- For MCPA (PCS) and simplex receive (850), dual band.
  - The insertion loss between the UMTS Macrocell cabinet and the RxAIT must be 8 dB for the simplex receive 850 configuration. This means the customer may require an external attenuator.
  - The transmit level at the UMTS Macrocell cabinet interface is +5.2 dB for the MCPA (PCS) configuration.
  - The customer is responsible for providing all cabling from the UMTS Macrocell cabinet to the customer equipment RxAIT and MCPA.

The remaining RF jumper connections (9 max) are made at the rear of the cabinet, but only to the installed filter panels.

The top row connection ports (S1D0, S1D1, S2D0, S2D1, S3D0, and S3D1) are for the PCS band. The bottom row connection ports (S1D0, S2D0, and S3D0) are for the 850 band.



NOTE 1:
At the rear of the cabinet:
- S1D0, S1D1, S2D0, S2D1, S3D0,and S3D1 are the receive ports (top row) for PCS band, when using a MCPA configuration.
- S1D0, S2D0, and S3D0 are the transmit ports (bottom row) for 850 only, when using a simplex receive configuration.

KEY:
S1D0 = Sector 1 Diversity 0
S1D1 = Sector 1 Diversity 1
S2D0 = Sector 2 Diversity 0
S2D1 = Sector 2 Diversity 1
S3D0 = Sector 3 Diversity 0
S3D1 = Sector 3 Diversity 1

NOTE 2:
At the top hatchplate:
- RF7 to RF12 are used as receive antenna ports for 850 band in a simplex receive configuration.
- RF1 to RF3 are as for transmit antenna ports for PCS in a MCPA configuration.

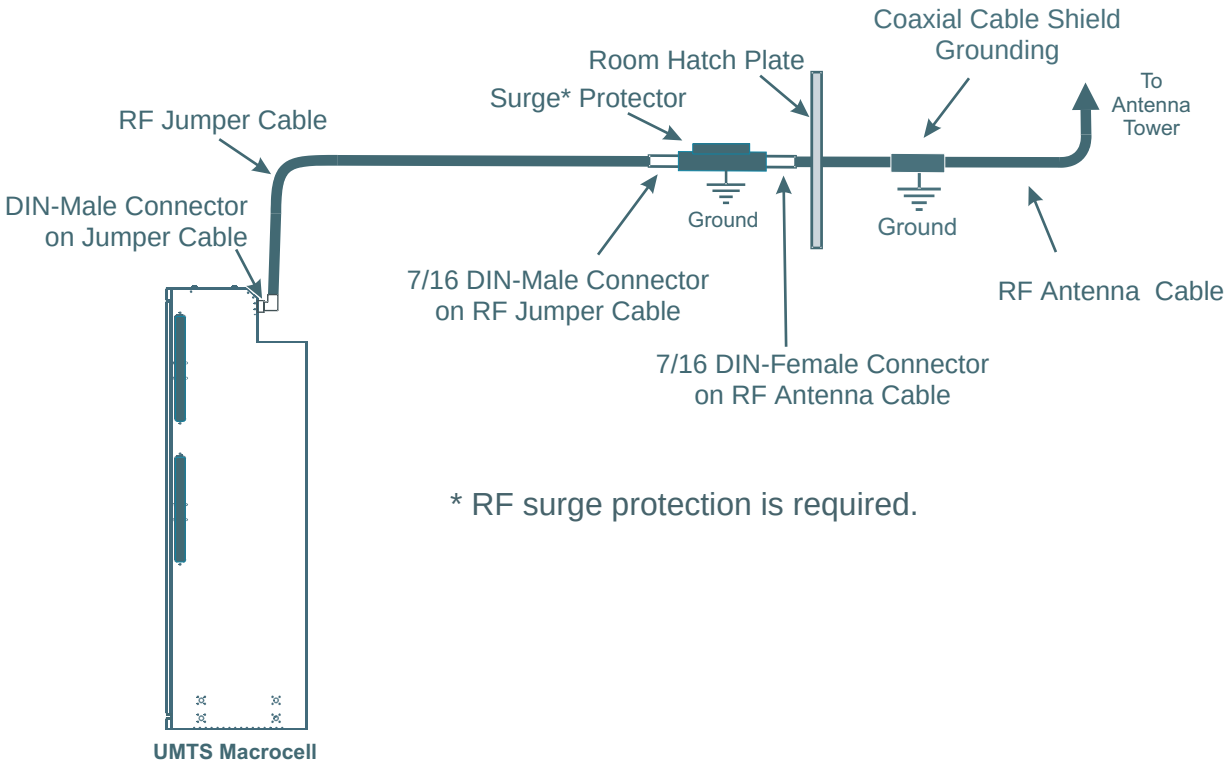
Antenna installation

Antenna installations for the UMTS Macrocell cabinet shall be performed in accordance with all applicable manufacturer's recommendations, and national laws and regulations.

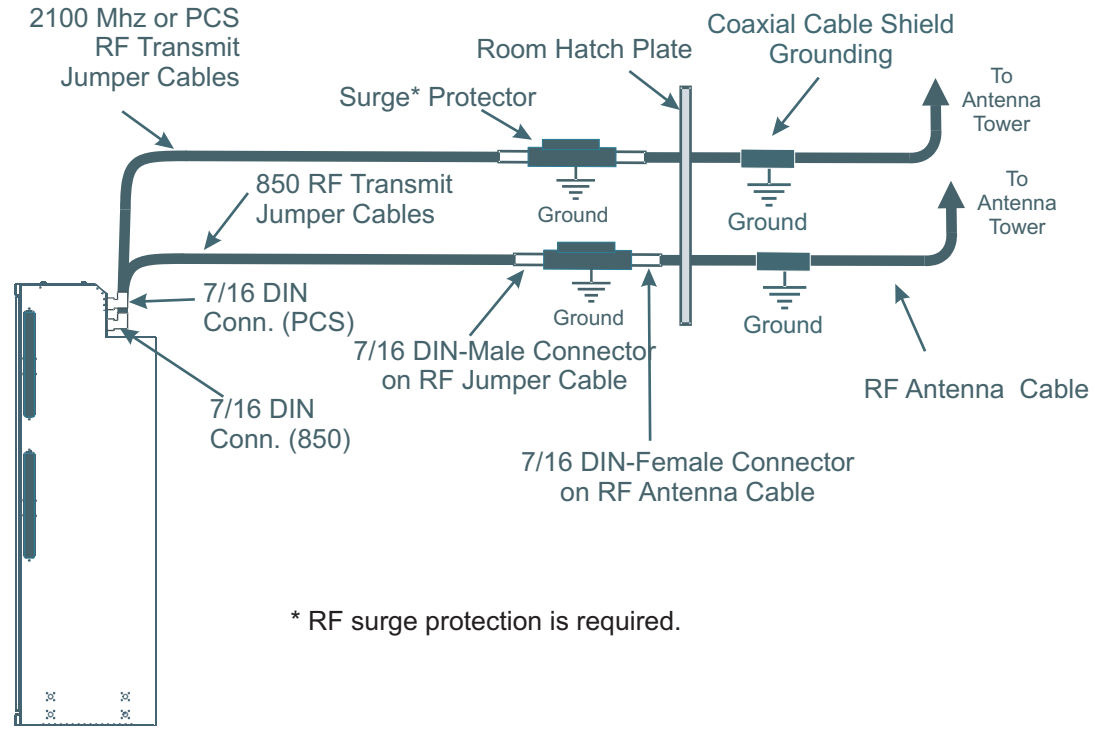
To ensure correct antenna installation, the antenna installer shall perform all necessary calculations and/or field measurements to evaluate compliance with applicable national laws or regulations regarding exposure to electromagnetic fields. The antenna manufacturer or supplier shall deliver all technical data necessary to perform this compliance evaluation (e.g., antenna gain pattern, antenna dimensions, etc.). Information on the methodology and results of the compliance evaluation shall be available for inspection by officials of the governing authorities.

Antenna connections

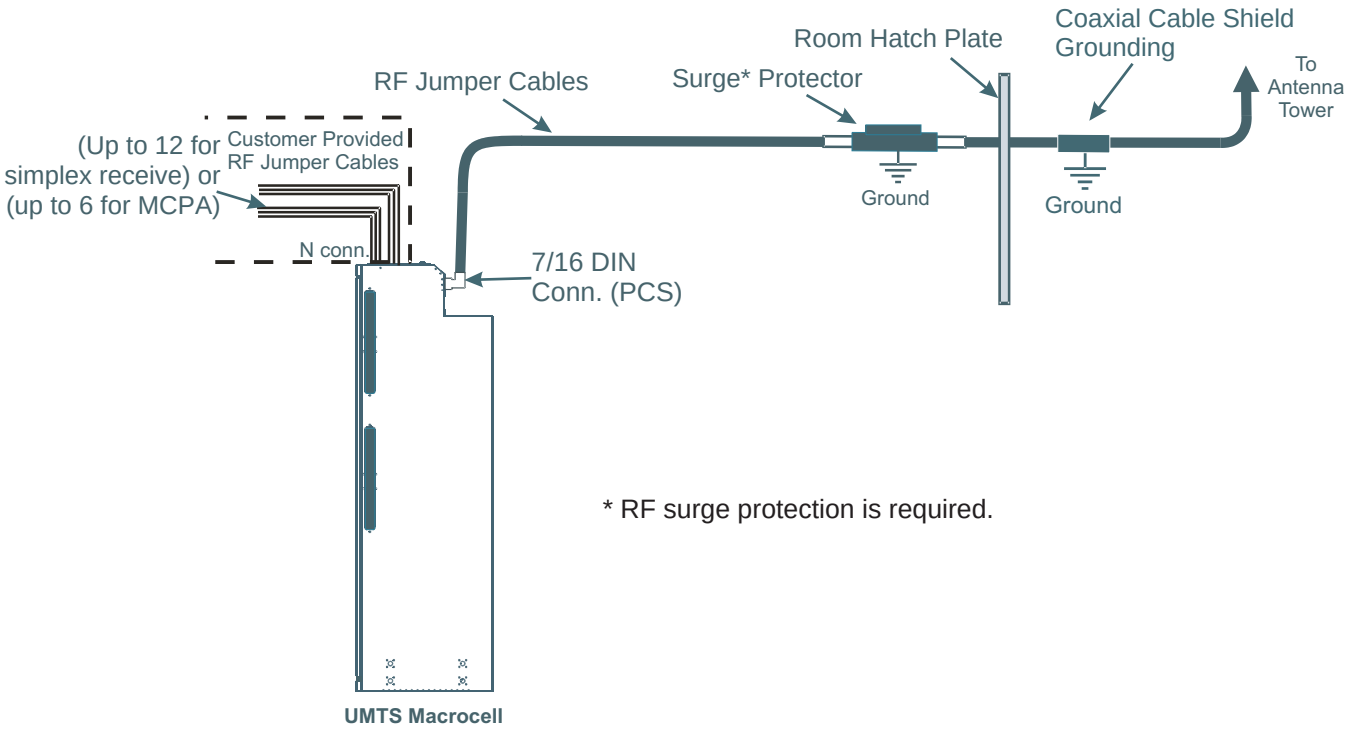
The following diagram shows how to connect a typical single band 850, PCS, or 2100 MHz RF antenna cable with dual duplex filters, single band cabinet.



The following diagram shows how to connect a typical RF antenna cable with dual duplex filters, dual band cabinet.



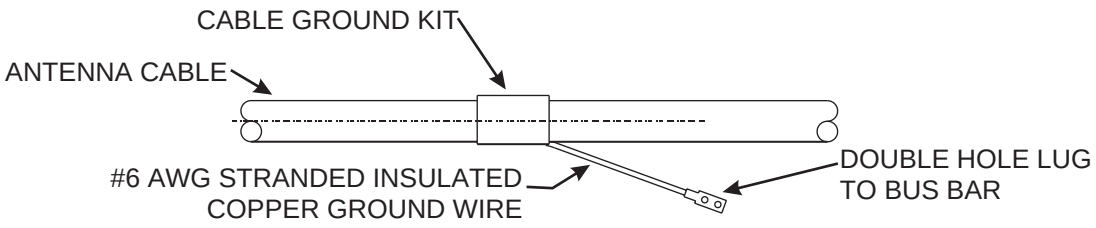
The following diagram shows how to connect a typical RF antenna cable with simplex/duplex filters in a simplex receive or MCPA configuration.



Antenna cable grounding

Grounding of the antenna cable outer shield must be performed in accordance with the ground kit manufacturer's instructions and as outlined in the *Grounding and Lightning Protection Guidelines for Alcatel-Lucent Network Wireless System Cell Sites*, 401-200-115.

The following diagram shows a typical method for grounding the outer shield on an antenna cable.



RF antenna cable requirements, dual duplex

The cabinet can support six RF antennas, maximum, in a three-sector configuration with transmit/receive diversity.

The RF antenna cable shall satisfy the following requirements:

- Impedance: 50 Ω
- Attenuation: < 3 dB
- The antenna jumper cable end (to the cabinet) must be equipped with a 7/16 DIN male, center-pin straight connector (6.6 to 13.1 feet, 2 to 4 meters).
- Surge protection (required).
- The antenna cables must be protected by a cable duct or protective cable pipes.
- The cable must comply with the X21300 standard.

Antenna jumper cable lengths

Jumper cables can be ordered from Alcatel-Lucent in specified lengths.

□

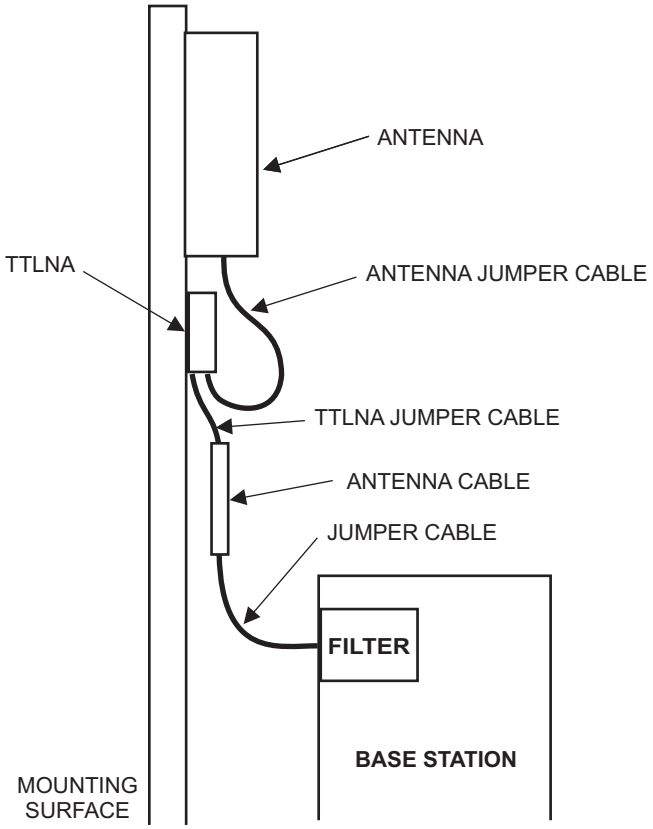
Tower Top Low Noise Amplifier (TTLNA) requirements

General

The following diagram shows how a TTLNA can be inserted in each antenna RF feeder cable, close to the antenna, in order to amplify the signal received from the antenna by 12dB. This TTLNA is powered using a DC bias voltage that is supplied from the filter in the base station via the RF coaxial antenna cable.

The TTLNA incorporates two duplexer, allowing the transmit and receive signal paths to be separated and recombined, so that an LNA can be incorporated in the receive path. If a faulty LNA is detected, a bypass function can be enabled that allows the un-amplified receive signal to be still supported.

Although a TTLNA is totally independent from others, two TTLNAs may be housed in a Dual TTLNA unit that would be used to support both antenna paths in a single sector.

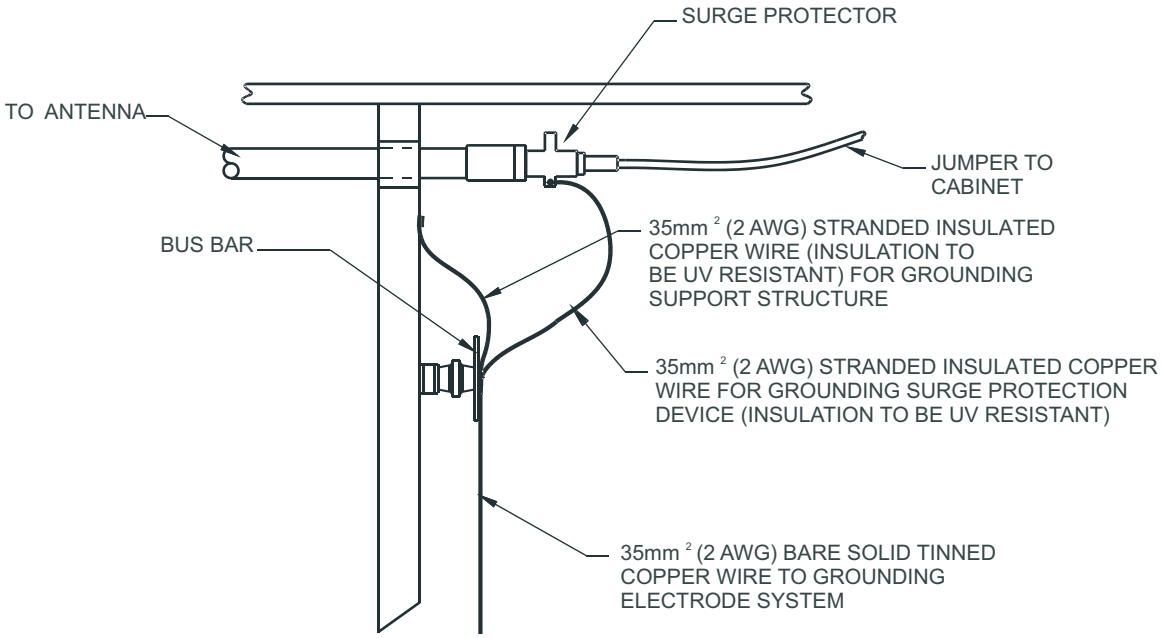


Note: TTLNA is required for PCS and 2100 MHz configurations only.

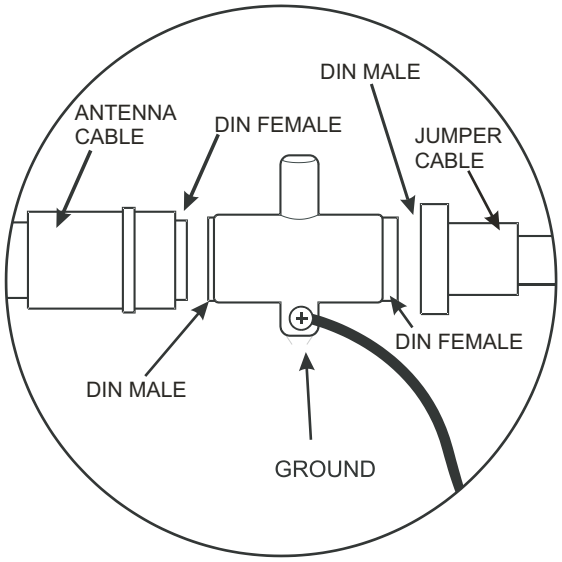
Surge protection requirements

General requirements

The following diagram shows a typical surge protector installation for TTLNA.



SURGE PROTECTOR DETAIL



TTLNA mounting requirements

Overview

Tower-mounted amplification amplifies the RF signal from a mobile units before it enters the base station.

The following TTLNAs can be used at a UMTS Macrocell cell site:

- TTLNA / Amplify Rx signals for one RF path
- Dual TTLNA / Amplify Rx signals for two RF paths

Mounting requirements

The TTLNA is mounted on a pole or wall. The criteria, which must be met, are as follows:

- The mounting location must be as close as possible to the antenna.
- All RF paths that lead to a UMTS RF filter must have tower-mounted amplification.
- To assure proper operation, the length of the cable, connecting the TTLNA to the antenna, must be not longer than 3 meters (9.8 feet).
- The TTLNA must be mounted within 5 degrees of vertical.
- The TTLNA must be properly secured and the cable connections must be weatherproofed.
- Whenever a TMA is used, hybrid surge protectors KS24577, L-5A (or an approved equivalent) must be located, during site preparation, in the RF path between the TTLNA and the cabinet.
- For TTLNA installation instructions, refer to the guidelines provided with unit or obtain them directly from the TTLNA vendor.

□

6 Grounding and lightning protection requirements

Overview

Purpose

This chapter describes the requirements for the base station which must be satisfied before installation of a UMTS Macrocell site can be started.

Contents

Grounding and surge protection requirements	6-2
Grounding electrode system	6-4

Grounding and surge protection requirements

Grounding requirements

CAUTION

Equipment warranty can be voided

The equipment warranty can be voided if the guidelines detailed in the National Electric Code (NFPA 70), Standard for Installation of Lightning Protection System (NFPA 780, latest edition) and Alcatel-Lucent 401-200-115 are not followed.

The UMTS Macrocell base station must be grounded with an integrated (multi-point) grounding system. The equipment is susceptible to lightning surges due to its association with towers and antennas. Therefore, it is imperative that the cell site be properly grounded and that a low impedance path to earth is provided. The grounding conductors must be as straight and short as possible. No sharp bends or loops are permitted in grounding conductors.

Antenna grounding and surge protection devices

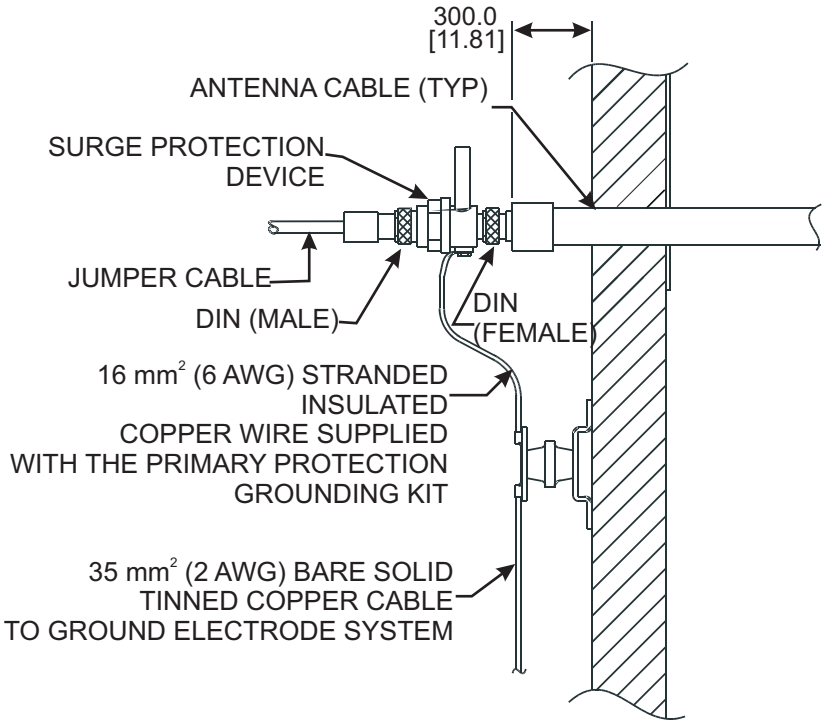
The RF and GPS antenna coaxial cables are also susceptible to lightning surges and must be protected*.

A surge protection device must be installed between each antenna coaxial cable and jumper cable, at the point where the antenna cables enter the building*. They can be obtained from Alcatel-Lucent (KS24577 L-5A (1900 and 2100 MHz) and KS24577 L-4A (850 MHz) for RF, and KS24577 L-3A for GPS if used), or a Alcatel-Lucent approved equivalent.

The surge protectors must be bonded to a nearby ground bus bar that is connected directly to the grounding electrode system at two points.

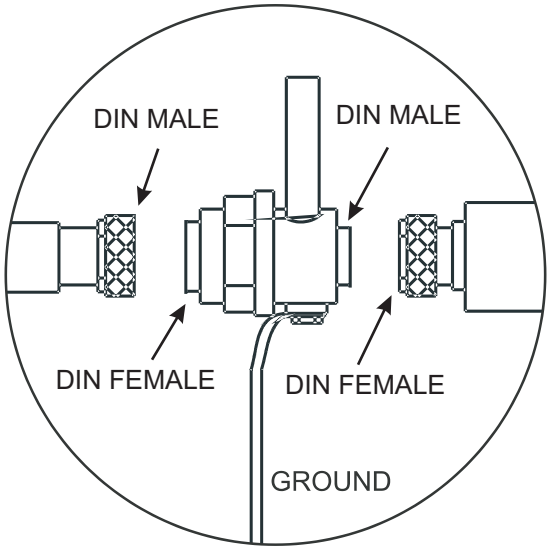
The antenna cable shield must be bonded at the top of the tower next to the antenna, and at the bottom of the vertical run. If the tower is too high, the antenna cable shield must be bonded at approximately 30-meter (100-ft.) intervals. The tower or metallic support for the antenna must also be bonded to the grounding electrode system.

The following diagram shows a typical antenna grounding and surge protector installation.



SURGE PROTECTION DETAIL

* RF SURGE PROTECTION IS REQUIRED.



Grounding electrode system

Grounding electrode system requirements

UMTS Macrocell sites must be equipped with a grounding electrode system. The cell site grounding, including all cabinets and antenna cable shields, must be bonded to the grounding electrode system.

Electrically conductive materials in the vicinity, that are likely to become energized, must be connected together and to the grounding electrode system in a manner that establishes an effective ground-fault current path.

Buried ground conductors must be at least 35 mm^2 (2-AWG) bare, solid, tinned copper wire. Exterior ground conductors shall be 35 mm^2 (2-AWG), minimum, solid, bare, tinned copper or stranded, insulated (outdoor insulation to be sunlight-resistant) copper cable. The interior ground cable shall be at least 16 mm^2 (6-AWG) stranded copper with green insulation, type THWN or equivalent.

Halo and supplementary grounding system

For indoor applications, a halo grounding system must be installed with the appropriate number of down conductors with non-directional splices. A sufficient number of pigtails (16 mm^2 (6-AWG) stranded copper) shall be provided to bond miscellaneous metallic objects (such as the Z-IDC mounting bracket, louvers, doors, conduits, etc.).

A supplementary grounding conductor (35 mm^2 (2-AWG) stranded copper) shall be installed on the top of the ladder rack with sufficient pigtails (16 mm^2 (6-AWG) stranded copper) for bonding the cabinet. Each cabinet must be grounded at least at one point, two grounding connections per cabinet is recommended using # 16 mm^2 (6-AWG) stranded copper cable.

The supplementary cable shall be bonded to the same bus bar, to which the return of the power cabinet is grounded.

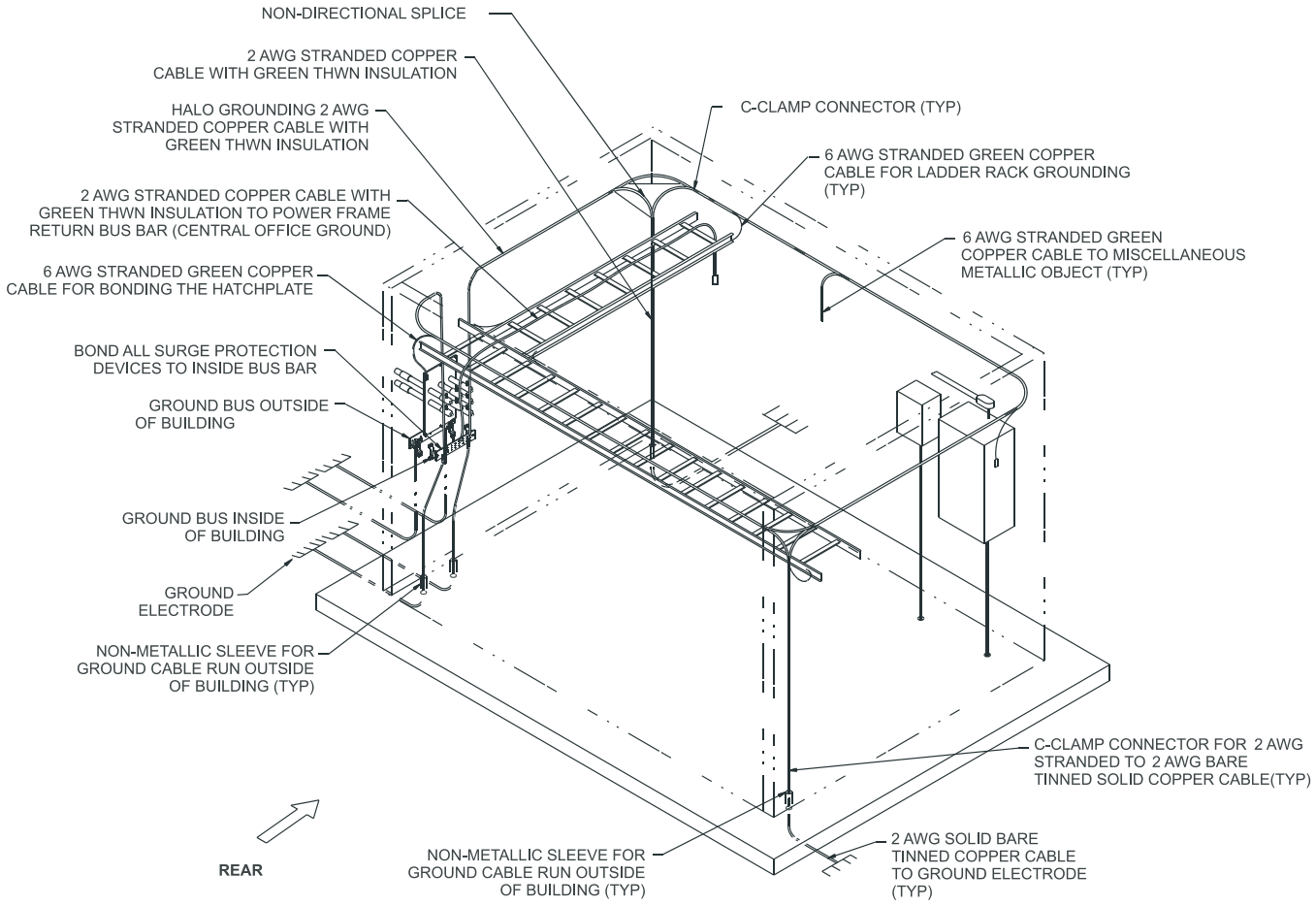
Refer to *Grounding and Lightning Protection Guidelines for Wireless System Cell Sites*, 401-200-115, for detailed requirements.

Verification of the grounding requirements can be performed using Checklist SP-3 found in Appendix A, “UMTS Macrocell site preparation checklists” of this document.

Important! All grounding system material (cable, connectors, buses, etc.) must be of high quality materials that resist deterioration and require little or no maintenance.

Typical halo grounding configuration

The following diagram shows a typical halo grounding configuration for a UMTS Macrocell site.



□

7 T1/E1, T3/E3, OC3/STM1, user alarm, and Ethernet facility requirements

Overview

Purpose

This chapter provides information about T1/E1, T3/E3, OC3/STM1, user alarm, and Ethernet facility requirements in a Macrocell base station.

Contents

T1/E1, T3/E3, and OC3/STM1 requirements	7-2
Balun block and Z-IDC installation	7-11
User alarm requirements	7-13
Ethernet interconnect requirements	7-17

T1/E1, T3/E3, and OC3/STM1 requirements

T1/E1, T3/E3, and OC3/STM1 input lines

Each UMTS Macrocell indoor cabinet supports:

- Up to 8 T1/E1 lines, or
- One T3/E3 line, or
- One OC3/STM1 line

Important! T1/E1, T3/E3, and OC3/STM1 line interfaces are not supported simultaneously. Only one interface type is supported at a time. This applies to 850, PCS, and dual band cabinets.

Twisted-pair cable for T1/E1 lines

The T1/E1 facilities must be in place prior to installation of the UMTS Macrocell cabinet. A primary protection device must be supplied and installed by the customer at the NIU as part of site preparation. If required, a balun must also be supplied and installed for converting unbalanced 75 ohm coaxial cable E1 to balanced 120 ohm twisted pair T1 at the Network Interface Unit (NIU).

For each radio cabinet that is being installed, one Z-IDC punchdown block is required as part of site preparation for terminating the T1 cable from the NIU, and must be located within 10 m (35 ft) of the UMTS Macrocell cabinet. Some NIUs contain an internal equivalent punchdown block that can be used for this purpose. Connections from the NIU are made on the NETWORK (rear) side of the Z-IDC block. The Z-IDC punchdown block may be ordered from Alcatel-Lucent.

When a single conductor is terminated in an insulation displacement contact (IDC) slot, a maximum conductor size or 0.5 mm^2 (20-AWG) may be used. However, if two conductors are to be terminated in the same IDC slot then a maximum conductor size of 0.34 mm^2 (22-AWG) may be used.

A fully-configured indoor cabinet requires eight twisted-pair 0.25 mm^2 (24-AWG) cables from the punchdown block to the cabinet. These cables are connectorized at the cabinet end with a 25 pin male D-sub. The other end of each cable is punched down, by the installer at the time of installation, at the EQUIPMENT side of Z-IDC blocks. The cables are 10 m (35 ft) long and are color-coded in accordance with the standard telephone industry code for eight twisted-pair cable.

Important! In the United States, refer to Article 800 of the National Electrical Code, NFPA 70, for selection and installation of the primary protector. In Canada, refer to Section 60 of the Canadian Electrical Code, Part I, CSA C22.1 for selection and installation of the primary protector.

For International applications, refer to *ITU K.11, Principles of Protection Against Overvoltages and Overcurrents.*

For further information concerning installation of primary protectors, see Telcordia TR-NWT-000937.

Important! If the Z-IDC punchdown block is used, a Krone punchdown tool (or equivalent) will be required to terminate the twisted-pair cables at the Z-IDC punchdown block. The Z-IDC punchdown tool can be obtained from CommScope (suplr-key: ZIDC-WT1) or from KRONE (suplr-key: 6417 2 055-01).

Coax cable for T3/E3 lines

The T3/E3 facilities must be in place prior to installation of the UMTS Macrocell cabinet. The required coax (two single cables initially) must be supplied and installed to the T3/E3 facility cabinet.

Important! Coax cables should be handled and installed as per manufacturer's instructions to avoid cable damage.

Sufficient cable length must be routed and coiled to allow for future connection to the left oval hatchplate located at the top of the UMTS Macrocell cabinet. The appropriate number of T3/E3 cables must be available at the site prior to installation (two cables per cabinet initially).

There are two sets of coax cable available from Alcatel-Lucent:

- 15.24 m (50 ft) coax cable with BNC connector at one end, and no connector at the opposite end (BNC supplied loose).
- 30.48 m (100 ft) coax cable with BNC connector at one end, and no connector at the opposite end (BNC supplied loose).

The recommended coax cable consists of a single conductor 0.5 mm^2 (20 AWG) solid silver-platted copper conductor, beldfoil +58% tinned copper braid with an overall diameter of 0.235.

Fiber cable for OC3/STM1 lines

The OC3/STM1 facilities must be in place prior to installation of the UMTS Macrocell cabinet. The required fiber cable (one-pair) must be supplied and installed to the OC3/STM1 facility cabinet.

Important! Fiber cables should be handled and installed as per manufacturer's instructions to avoid cable damage.

Sufficient cable length must be routed and coiled to allow for future connection to the left oval hatchplate located at the top of the UMTS Macrocell cabinet. The appropriate number of OC3/STM1 cables must be available at the site prior to installation (one cable per cabinet).

There are two types of fiber cables available from Alcatel-Lucent:

- One-pair fiber cable, single mode, LC straight to LC straight, with protective cap, 15.24 m (50 ft) .
- One-pair fiber cable, single mode, LC straight to LC straight, with protective cap, 30.48 m (100 ft) .

A customer provided fiber cable protection system may be required to prevent cable damage during equipment operation or maintenance. An Alcatel-Lucent part is available from LWS (Comcode 408349983, quantity 2).

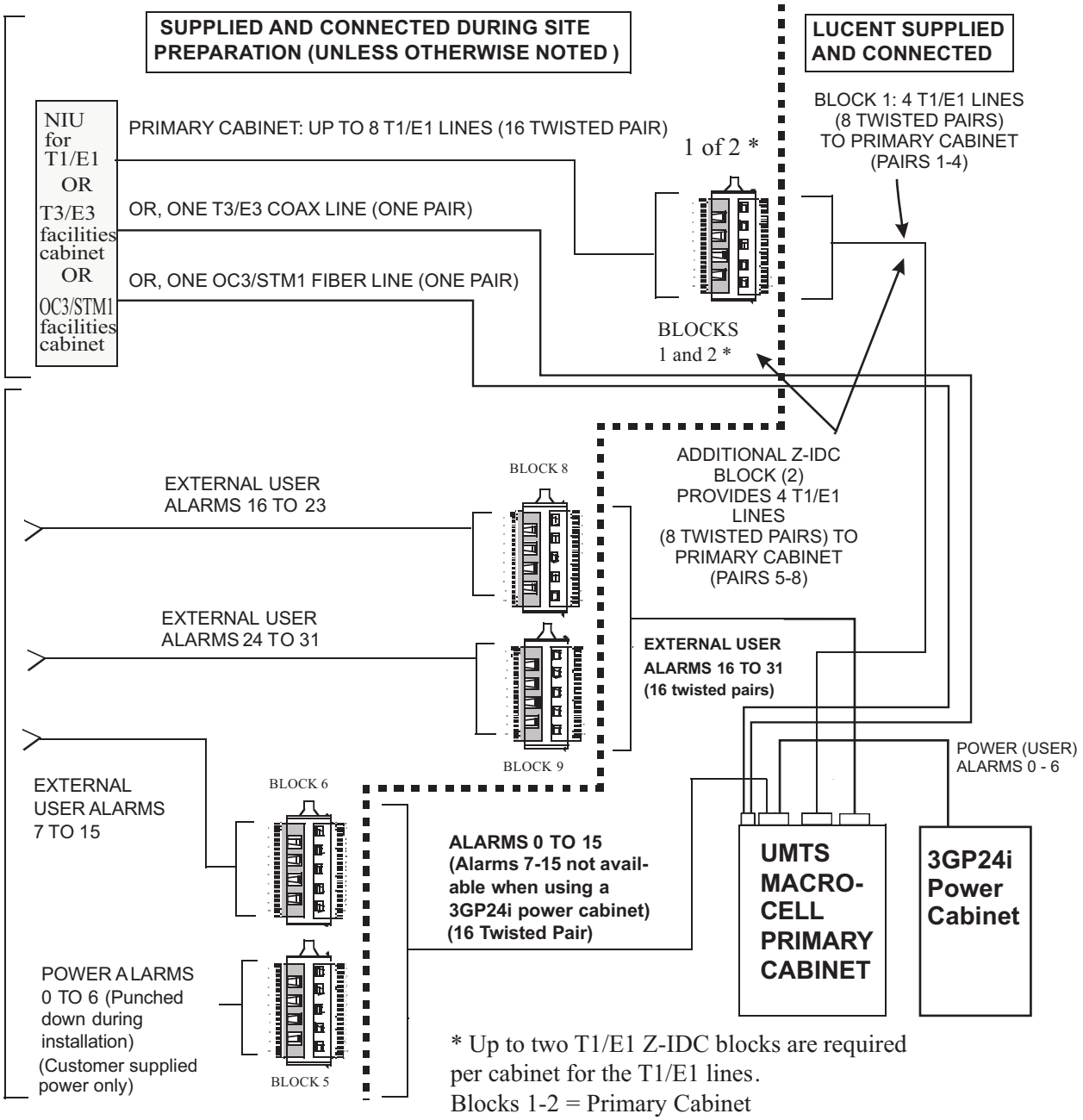
If there is extra cable remaining after interconnection of fiber cable at both ends and the cable is not jacketed, a customer provided fiber slack storage reel may be required to prevent equipment malfunction or cable damage. The fiber cable currently available from Alcatel-Lucent is jacketed.

The wiring interfaces for the indoor UMTS Macrocell *primary* cabinet are covered in the following two figures:

- T1/E1, T3/E3, and OC3/STM1
- User alarms.

Overview drawing of T1/E1, T3/E3, OC3/STM1, and user alarm wiring using Z-IDC punchdown blocks

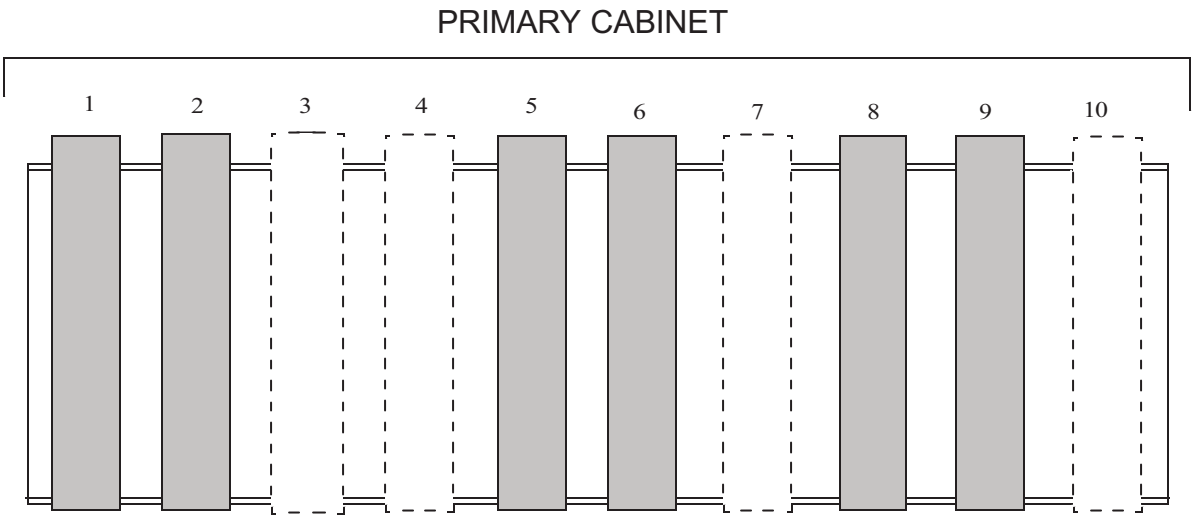
Refer to the figure below for an overview illustration of T1/E1, T3/E3, and OC3/STM1 and user alarm wiring using Z-IDC punchdown blocks. T3/E3 and OC3/STM1 lines do not use Z-IDC punchdown blocks.



* Up to two T1/E1 Z-IDC blocks are required per cabinet for the T1/E1 lines.
Blocks 1-2 = Primary Cabinet

Overview drawing of Z-IDC punchdown block layout for the primary cabinet

The figure and table below illustrates the position assignments of the Z-IDC punchdown blocks within the wall mounting bracket for the primary cabinet.



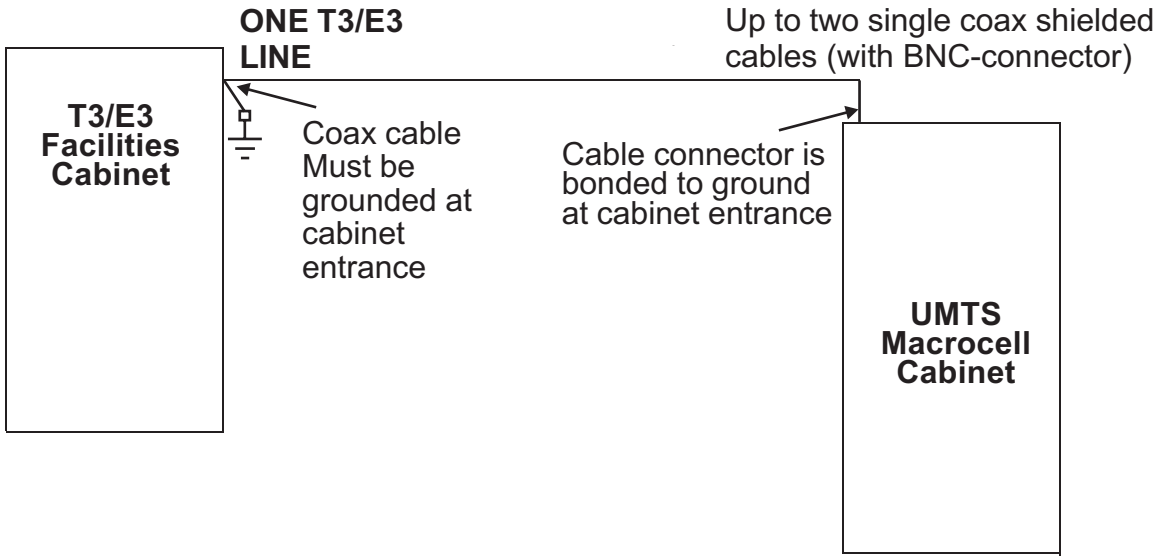
Z-IDC punchdown block position number	URC in primary cabinet	What assigned
1	First URC II	One to four T1/E1 lines
2	First URC II	13 to 16 T1/E1 lines
3	N/A	Blank (Possible future T1/E1 lines
4	N/A	BLANK (Possible future T1/E1 lines)
5	N/A	User Alarms 0 to 6
6	N/A	User Alarms 7 to 15
7	N/A	Blank (Possible future T1/E1 lines)
8	N/A	User Alarms 16 to 23
9	N/A	User Alarms 24 to 31
10	N/A	Blank (Possible future T1/E1 lines)

Notes:

1. Each URC II supports up to eight T1/E1 lines.
2. T1/E1 lines 1-4 are connected to URC II via IOU.
3. T1/E1 lines 13–16 are connected to URC II via SECB.

Typical configuration for T3/E3 lines

The following diagram shows a typical configuration for the T3/E3 facilities cabinet to the left oval hatchplate at the UMTS Macrocell end for T3 input lines.



Important! The shielding coax cables must be grounded at the T3/E3 facilities cabinet end, and at the UMTS Macrocell cabinet end. Alcatel-Lucent recommends that the recommended tool, ITE No. R-5648B or R-5648C be used for the ferrule outer conductor, and ITE No. R-6106 be used for center pin conductor, to connect the optional coax cable with BNC loose connector provided by Alcatel-Lucent at the T3/E3 facility cabinet.

CAUTION

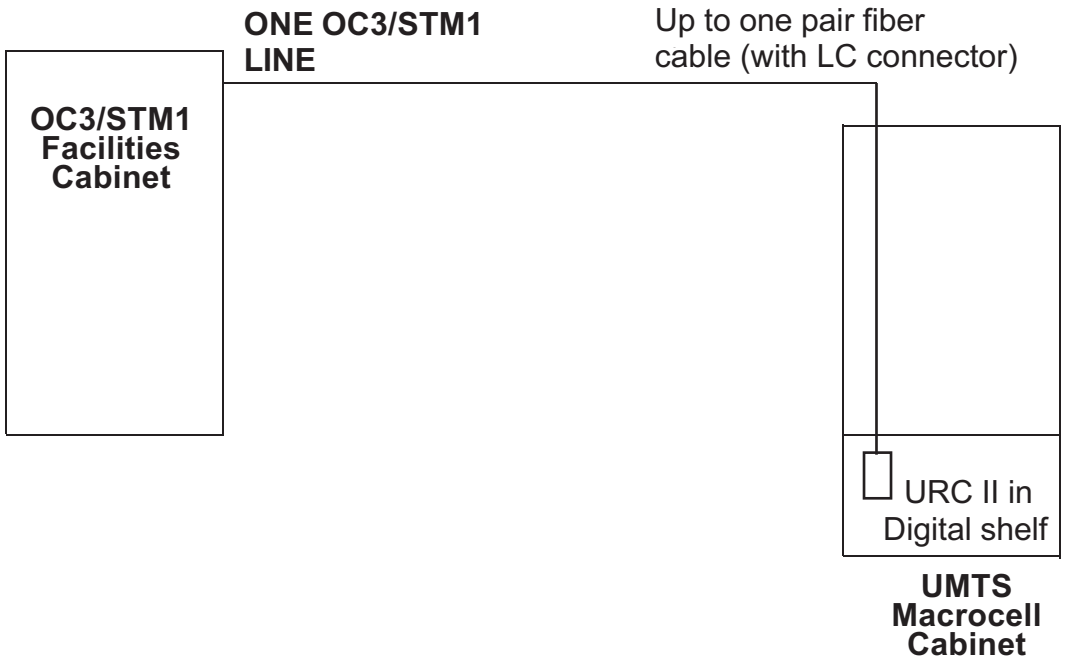
Equipment Damage

Cable damage

To prevent cable damage when handling and installing the coax cable as part of site preparation, do not exceed maximum bending radius of ten times the outside diameter at any point of the cable run.

Typical configuration for OC3/STM1 lines

The following diagram shows a typical configuration for the OC3/STM1 facilities cabinet and the connection to the URC II in the UMTS Macrocell.



Important! The provided Alcatel-Lucent optional fiber cables are connectorized LC straight at the customer's OC3/STM1 facilities cabinet end. If a different connector is used, a customer provided adapter will be required for interface with the OC3/STM1 facilities cabinet.

CAUTION

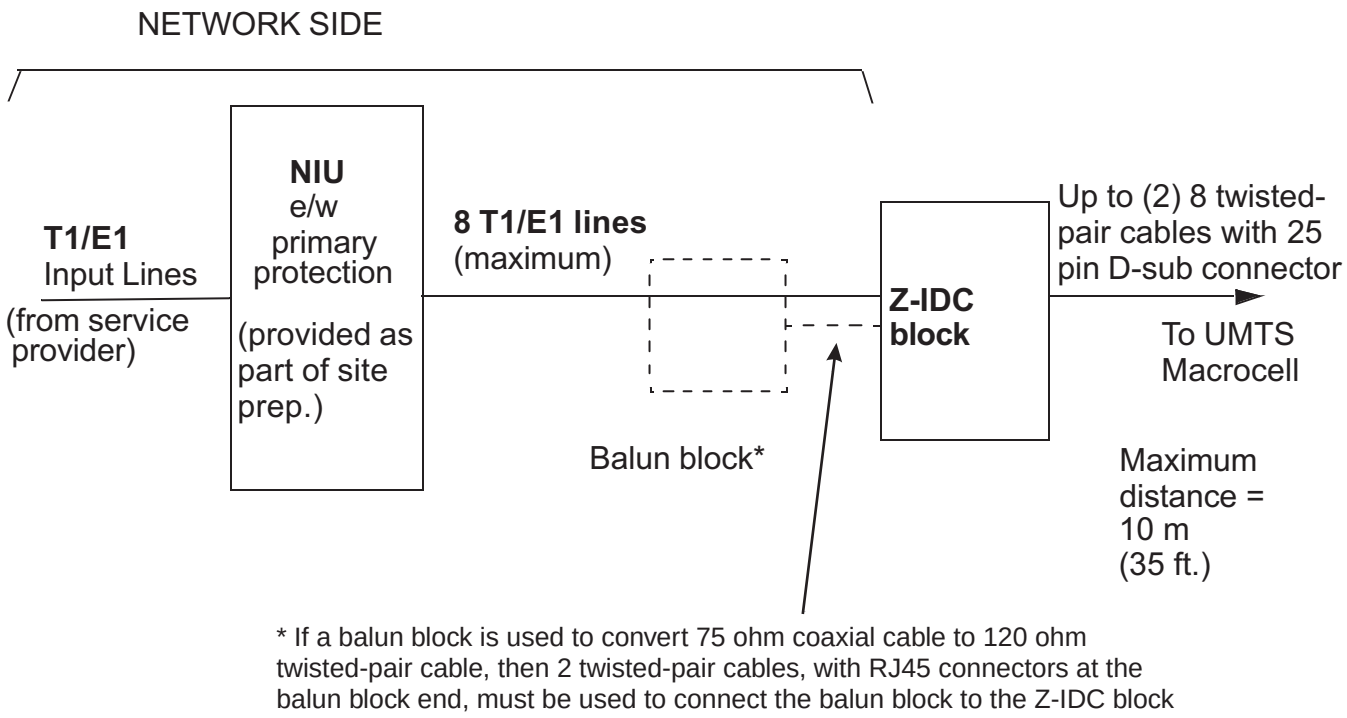
Equipment Damage

Cable damage

To prevent cable damage when handling and installing the fiber cable as part of site preparation, do not exceed maximum bending radius of 15 times the outside diameter at any point of the cable run. Do not twist, pull, or kink the fiber cable

Typical NIU and terminal block configuration for T1 lines

The following diagram shows a typical configuration for the NIU and terminal block for T1 input lines.



WARNING

Equipment Damage

The Z-IDC punchdown tool (ITE No. R-6097) must be used when punching down wires on a Z-IDC punchdown block. Use of any other tool will damage the Z-IDC punchdown block.

Important! The customer must make the connections in the following tables as part of site preparation.

T1 connections to Z-IDC punchdown block

As previously stated, one to three Z-IDC punchdown blocks are required as part of site preparation for terminating the T1 cable from the NIU. The following three tables (one for each URC) provide the punchdown information.

T1 cable (URC II)	Pair No.	Function Tx/Rx, Tip/Ring	Z-IDC *Network Side* Punchdown block and position for URC (see Note)
			Primary Cabinet Block - Position
LINE _____	1	Tx T	1-1 Upper
		Tx R	1-1 Lower
	2	Rx T	1-2 Upper
		Rx R	1-2 Lower
LINE _____	3	Tx T	1-3 Upper
		Tx R	1-3 Lower
	4	Rx T	1-4 Upper
		Rx R	1-4 Lower
LINE _____	5	Tx T	1-5 Upper
		Tx R	1-5 Lower
	6	Rx T	1-6 Upper
		Rx R	1-6 Lower
LINE _____	7	Tx T	1-7 Upper
		Tx R	1-7 Lower
	8	Rx T	1-8 Upper
		Rx R	1-8 Lower
EXAMPLE 1-3 Lower = Block Number 1, Position 3, Lower			
The Z-IDC positions 9 and 10 are not used. Unused T1 cables at the customer's NIU must not be looped back towards the UMTS Macrocell cabinet during normal operation.			

Balun block and Z-IDC installation

Overview

If the incoming facility is 75-ohm unbalanced coaxial cable, the customer is responsible to convert it to 120-ohm balanced twisted pairs. The conversion of the coaxial cable to twisted pairs may be accomplished with Alcatel-Lucent balun or equivalent. Refer to the table below for punchdown, and cable color code information.

Balun block connections to the Z-IDC punchdown block

The following table provides the punchdown and color code information for the twisted pair cable between the balun block and the Z-IDC.

T1/E1 line (See Note 1)	Pair Number	Function Tx/Rx, Tip/Ring	Wire color in recommended T1/E1 cable	Punchdown position (Z-IDC block) See Note 2	RJ-45 Pin (for verification)
1	1	Tx T	White/Blue	1-1 Upper	1
		Tx R	Blue/White	1-1 Lower	2
	2	Rx T	White/Orange	1-2 Upper	4
		Rx R	Orange/White	1-2 Lower	5

Notes:

1. 1-1 Lower = first T1/E1 Z-IDC, position #1 lower. 1-2 Upper = First T1/E1 Z-IDC, position #2 upper.
2. One cable is required for each T1/E1 line.

Installation procedures

Perform the following steps to install the Balun block, and the Z-IDC punchdown block.

1 Install the balun block with the mounting plate using the customer supplied hardware.

2 Install the Z-IDC bracket within 10 feet of the balun block using the customer supplied hardware.

3 Ground the Z-IDC bracket using the lug and hardware supplied with the bracket, and the 16 mm^2 (6-AWG) ground wire provided as part of site preparation.

4 Install the Z-IDC connector block on the bracket.

5 If balun block is present, plug the RJ-45 connector of the supplied 10 foot cables into the balun block RJ-48C jacks.

If cross connect is present, it must be connected to the Z-IDC with the customer provided cable.

6 Route and cut the cables to the proper length, leaving sufficient slack.

7 Punchdown the cables at the Z-IDC using the Z-IDC punchdown tool. Refer to "Balun block connections to the Z-IDC punchdown block" (p. 7-11) for punchdown and wire color code.

END OF STEPS

□

User alarm requirements

Power alarms and user alarms

The UMTS cabinet has capacity for 32 alarms. Alarms 0 - 6 are reserved for power alarms. Alarms 7 - 31 are customer assignable. (Alarms 7 - 15, however, are not available if a 3GP24i power cabinet is used.) Power alarm cabling is provided by the manufacturer of the power equipment. User alarm cabling is provided in site preparation.

General requirements

Each user alarm generated shall be provided by a set of isolated dry relay contacts. An “alarm state” may be indicated by a “closed circuit” or an “open circuit”. If an alarm condition is indicated by a “closed circuit”, the alarm contacts shall present a contact closure when the alarm circuit fails or loses power. If an alarm condition is indicated by and “open circuit”, the alarm contacts shall present an “open circuit” when the alarm circuit fails or loses power. The resistance of a “closed circuit” shall be less than 100 ohms. The resistance of an “open circuit” shall be greater than 1 megahoms.

The user alarm facilities must be installed as part of site preparation. If required, the user alarm interface shall be equipped with a primary protection device. The user alarm cable is 0.25 mm^2 (24-AWG), and consists of 16 twisted pair and is equipped with a 37-Pin, male D-sub connector at one end. The cable is 10 m (35 ft) long, and is color coded in accordance with standard telephone industry cable. The cable may be ordered from Alcatel-Lucent.

The Z-IDC block is required for termination of the first nine user alarms (alarm 7 through alarm 15 using the first alarm cable). If applicable, additional Z-IDC blocks may be required for the next 14 user alarms (alarms 16 through 31 using the second alarm cable). Z-IDC punchdown blocks may be ordered from Alcatel-Lucent. The Z-IDC blocks must be located within 10 m (35 ft) of the UMTS cabinet.

Important! In the United States, refer to Article 800 of the National Electrical Code, NFPA 70, for selection and installation of the primary protector. In Canada, refer to Section 60 of the Canadian Electrical Code, Part I, CSA C22.1 for selection and installation of the primary protector.

For International applications, refer to *ITU K.11, Principles of Protection Against Overvoltages and Overcurrents*.

Terminating the user alarm cables at the Z-IDC punchdown block

The user alarm cables are terminated on the Z-IDC punchdown block as shown in the following table.

Cable #	**Alarm #**	**Wire Color**	***Punchdown position (ZIDC block and position) (See Note)***
USER ALARMS 0 THROUGH 6 UTILIZED FOR POWER ALARMS (Appendix C, "Electrical power requirements for customer supplied power +24/-48 VDC systems")			
Cable #1	User 7 Alarm	Red-Green	6-1 Upper (+)
		Green-Red	6-1 Lower (-)
	User 8 Alarm	Red-Brown	6-2 Upper (+)
		Brown-Red	6-2 Lower
	User 9 Alarm	Red-Slate	6-3 Upper (+)
		Slate-Red	6-3 Lower
	User 10 Alarm	Black-Blue	6-4 Upper (+)
		Blue-Black	6-4 Lower
	User 11 Alarm	Black-Orange	6-5 Upper (+)
		Orange-Black	6-5 Lower
	User 12 Alarm	Black-Green	6-6 Upper (+)
		Green-Black	6-6 Lower
	User 13 Alarm	Black-Brown	6-7 Upper (+)
		Brown-Black	6-7 Lower
	User 14 Alarm	Black-Slate	6-8 Upper (+)
		Slate-Black	6-8 Lower
	User 15 Alarm	Yellow-Blue	6-9 Upper (+)
		Blue-Yellow	6-9 Lower

Cable #	Alarm #	Wire Color	*Punchdown position (ZIDC block and position) (See Note)*
Cable #2	User 16 Alarm	White-Blue	8-1 Upper (+)
		Blue-White	8-1 Lower (-)
	User 17 Alarm	White-Orange	8-2 Upper (+)
		Orange-White	8-2 Lower (-)
	User 18 Alarm	White-Green	8-3 Upper (+)
		Green-White	8-3 Lower (-)
	User 19 Alarm	White-Brown	8-4 Upper (+)
		Brown-White	8-4 Lower (-)
	User 20 Alarm	White-Slate	8-5 Upper (+)
		Slate-White	8-5 Lower (-)
	User 21 Alarm	Red-Blue	8-6 Upper (+)
		Blue-Red	8-6 Lower (-)
	User 22 Alarm	Red-Orange	8-7 Upper (+)
		Orange-Red	8-7 Lower (-)
	User 23 Alarm	Red-Green	8-8 Upper (+)
		Green-Red	8-8 Lower (-)
	User 24 Alarm	Red-Brown	9-1 Upper (+)
		Brown-Red	9-1 Lower (-)
	User 25 Alarm	Red-Slate	9-2 Upper (+)
		Slate-Red	9-2 Lower (-)
	User 26 Alarm	Black-Blue	9-3 Upper (+)
		Blue-Black	9-3 Lower (-)
	User 27 Alarm	Black-Orange	9-4 Upper (+)
		Orange-Black	9-4 Lower (-)
	User 28 Alarm	Black-Green	9-5 Upper (+)
		Green-Black	9-5 Lower (-)
	User 29 Alarm	Black-Brown	9-6 Upper (+)
		Brown-Black	9-6 Lower (-)
	User 30 Alarm	Black-Slate	9-7 Upper (+)
		Slate-Black	9-7 Lower (-)
	User 31 Alarm	Yellow-Blue	9-8 Upper (+)
		Blue Yellow	9-8 Lower (-)

Cable #	**Alarm #**	**Wire Color**	***Punchdown position (ZIDC block and position) (See Note)***
The Z-IDC positions 9 and 10 are not used			

Important! Alarms 7-15 not available when using a 3GP24i power cabinet. See Appendix C, “Electrical power requirements for customer supplied power +24/-48 VDC systems” for non-Lucent power.

Ethernet interconnect requirements

Ethernet lines

The UMTS Macrocell cabinet may be equipped with an Ethernet switch which can provide up to five output 10/100 Mb switched RJ45 ports.

General requirements

Up to five cat5e cables for Ethernet connections must be in place prior to installation of the UMTS Macrocell cabinet when equipped with an optional Ethernet switch.

The five cat5e cables for Ethernet connection shall be connected to co-located cabinets within a hut only.

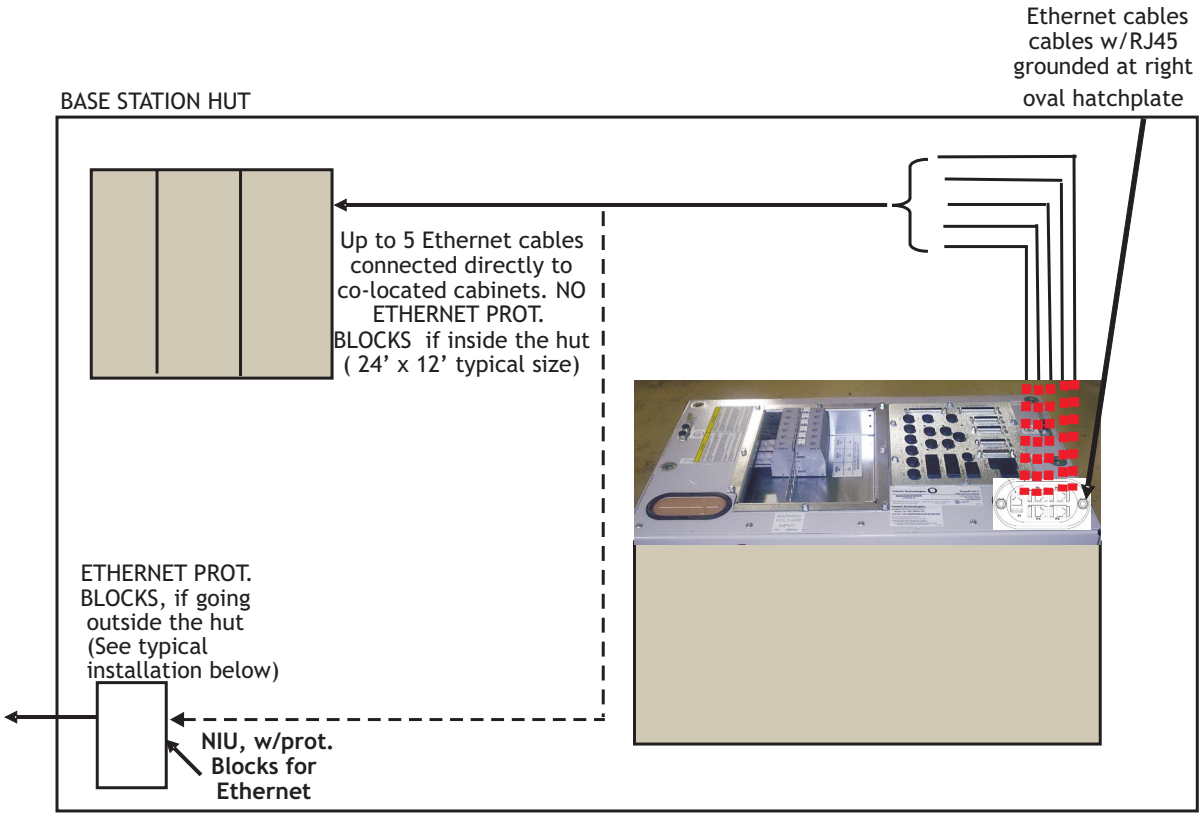
Important! An Ethernet protector block (primary and secondary protection) is required per Ethernet port at the NIU if the Ethernet connections are to be connected outside the hut. Alcatel-Lucent may provide the Ethernet protector blocks if required, which include connection for grounding. Mounting hardware shall be provided by the customer.

If protector blocks are used, they shall be installed as part of site preparation. See example below for a typical installation.

Sufficient cable length must be routed and coiled to allow for future connections of the Ethernet switch located at the top of the UMTS Macrocell cabinet.

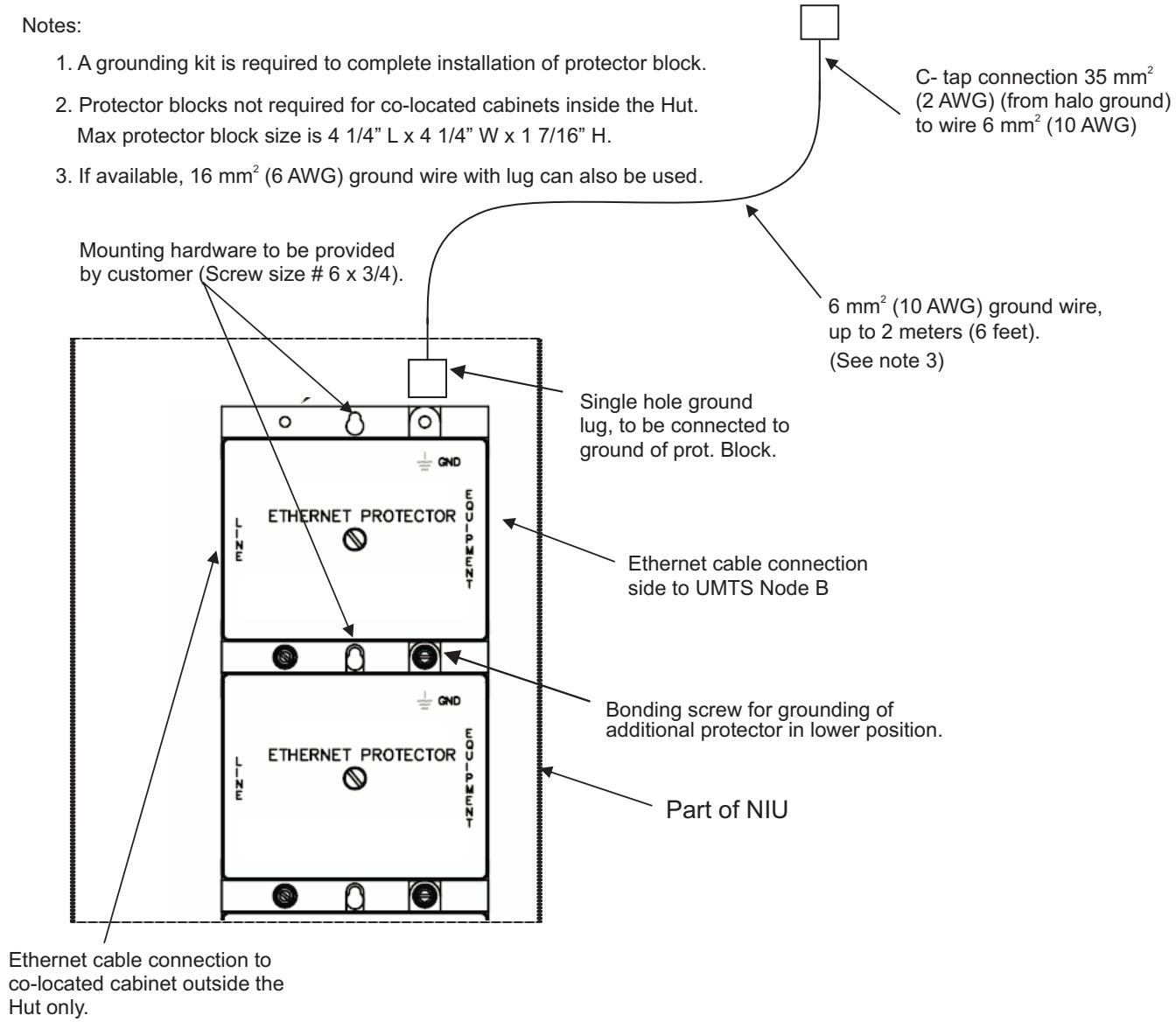
There are two sets of cat5e, 4-pair, shielded twisted pairs (STP), RJ-45 connectorized cables available that may be purchased from Alcatel-Lucent:

- 15.24 m (50 ft) cat5e, 4-pair (STP), RJ-45 connectorized at both ends
- 30.48 m (100 ft) cat5e, 4-pair (STP), RJ-45 connectorized at both ends


Ethernet cables
cables w/RJ45
grounded at right
oval hatchplate
BASE STATION HUT
Up to 5 Ethernet cables
connected directly to
co-located cabinets. NO
ETHERNET PROT.
BLOCKS if inside the hut
(24' x 12' typical size)
ETHERNET PROT.
BLOCKS, if going
outside the hut
(See typical
installation below)
NIU, w/prot.
Blocks for
Ethernet

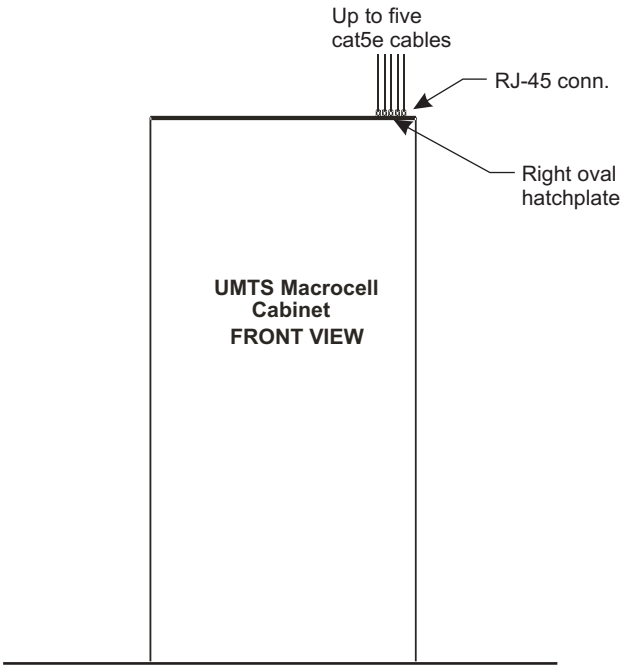
Ethernet protector block typical installation

The following figure shows an example of a Ethernet protector block typical installation for two blocks. Make final installation per instructions provided with the protector block kit.



Installing the cat5e cables

The following figure shows how to run the cat5e cables from the hatchplate located at the top right of the UMTS cabinet to the up to five co-located cabinets inside a hut



Appendix A: UMTS Macrocell site preparation checklists

Overview

Purpose

This section is for use by authorized personnel to verify completion of cell site preparation activities prior to installation of base station equipment.

SP-GEN Cell Site General Information

Complete the following information about the cell site.

- Cell Site Name: _____
- Cell Site Address: _____
- Cell Site Access Contact Name: _____
- MTA Name: _____
- Cell Site #: _____
- Contact Phone #: _____

Contents

SP-1 Site Preparation General Checklist	A-2
SP-2 Site Preparation Power Source Checklist	A-4
SP-3 Site Preparation Grounding Checklist	A-6
SP-4 Site Preparation RF Antenna Checklist	A-9
SP-5 Site Preparation Punchlist Sheet	A-11
SP-5A Site Preparation Punchlist Sheet	A-12

SP-1 Site Preparation General Checklist

Purpose

The following items must be completed prior to the installation of the cell site equipment. Circle the correct letter for the corresponding description items.

item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	Is the worksite free of recognized environmental, health and safety (EH&S) hazards?	Y	N	N/A	
2.	Has sufficient HVAC been provided for all indoor cell equipment?	Y	N	N/A	
3.	Has proper ventilation been provided for battery hydrogen gassing?	Y	N	N/A	
4.	Has proper ventilation been provided for DC generator exhaust?	Y	N	N/A	
5.	Are cell site environmental conditions within equipment specified operating range?	Y	N	N/A	
6.	Are all cable racks and supports in place?	Y	N	N/A	
7.	Has the required space been provided around equipment?	Y	N	N/A	
8.	Is support structure properly secured and anchored per earthquake zoning requirements?	Y	N	N/A	
9.	Will structure support cabinets/equipment (including batteries, etc.)?	Y	N	N/A	
10.	Are all site permits completed?	Y	N	N/A	
11.	Has a Method of Procedure (MOP) been developed with the installation supervisor?	Y	N	N/A	
12.	Is cell translations information available?	Y	N	N/A	

item #	Description	Yes (Y)	No (N)	N/A	Comments
13.	Has installer cell site equipment parameter sheet been completed and reviewed with the installation supervisor?	Y	N	N/A	
14.	Are the ECP/Switch and cell software generics compatible?	Y	N	N/A	
15.	Are T1/E1, T3/E3, and User alarm facilities available and active?	Y	N	N/A	
16.	If E1 facility is 75 ohms coaxial, has the protection/conversion of coaxial?	Y	N	N/A	
17.	Is adequate primary surge protection provided for the T1/E1 service entrance?	Y	N	N/A	
18.	Is the T1/E1 cable long enough to reach from the T1/E1 service entrance to the punchdown block or conversion block?	Y	N	N/A	
19.	Is the T3/E3 or OC3/STM1 long enough to reach from the T3/E3 or OC3/STM1 service entrance of NIU to the connection point in the Macrocell cabinet?	Y	N	N/A	
20.	Are the Ethernet cables long enough to reach from co-located cabinets to the connection ports in the Macrocell cabinet?	Y	N	N/A	
21.	Has all equipment been ordered and has delivery to site been scheduled?	Y	N	N/A	
22.	Have all necessary arrangements been made for access to the site?	Y	N	N/A	
23.	Have all necessary arrangements been made to get equipment onto the site (crane, etc.)?	Y	N	N/A	

Completed by: _____

Date: _____

□

SP-2 Site Preparation Power Source Checklist

Purpose

The following items must be completed prior to the installation of the cell site equipment. Circle the correct letter for the corresponding description items.

item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	Is AC service available?	Y	N	N/A	
2.	Have AC service and conduits been approved by local code?	Y	N	N/A	
3.	Is AC service equipped with surge protection at service entry point?	Y	N	N/A	
4.	Are AC power source appropriate for equipment being installed?	Y	N	N/A	
5.	Does AC service have proper circuit breaker rating(s) and labeling?	Y	N	N/A	
6.	Is AC circuit breaker(s) available and labeled for power system?	Y	N	N/A	
7.	Is AC circuit breaker(s) available and labeled for listed ancillary equipment?	Y	N	N/A	
	A.	Y	N	N/A	
	B.	Y	N	N/A	
	C.	Y	N	N/A	
	D.	Y	N	N/A	
8.	Do tower lighting, intrusion lighting, etc. feeds have proper lightning protection?	Y	N	N/A	
9.	Is the DC power system installed?	Y	N	N/A	
10.	Is proper AC transfer switch installed (manual or automatic)?	Y	N	N/A	
11.	Have at least two AC duplex convenience outlets been provided within 1.5 meters (5 feet) of Macrocell cabinet(s)? Note: *A Ground Fault Circuit Interrupt (GFCI) type is recommended, and must be used when required by code.*	Y	N	N/A	

item #	Description	Yes (Y)	No (N)	N/A	Comments
12.	Is each outlet protected by a UL/CSA listed, or approved 15 A circuit breaker?	Y	N	N/A	

Sign:

Completed by: _____

Date: _____

□

SP-3 Site Preparation Grounding Checklist

Purpose

The following items must be completed prior to the installation of the cell site equipment. Circle the correct letter for the corresponding description items.

item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	Is soil resistivity and site resistance test on file?	Y	N	N/A	
2.	Have connection been provided to ground electrode system? If yes, circle all that apply: 1. Via a buried ring ground and driven rod(s) 2. Via a buried metallic and electrically continuous water pipe 3. Via driven ground rod(s) and/or plate(s) 4. Via electrolytic ground rod(s) 5. Via grounded building steel 6. Via grounded grid or radial	Y	N	N/A	
3.	Is lighting mast(s) or air terminal(s) provided and bonded?	Y	N	N/A	
4.	Is antenna support structure(s) grounded?	Y	N	N/A	
5.	Is antenna tower bonded to ground electrode system?	Y	N	N/A	
6.	Are guy wires bonded to ground?	Y	N	N/A	
7.	Are antenna cable shields grounded at both ends?	Y	N	N/A	
8.	If tower is greater that 60 meters (200 ft.) high, are antenna cable shields grounded at mid-point and both ends?	Y	N	N/A	

item #	Description	Yes (Y)	No (N)	N/A	Comments
9.	Are all ground connections in compliance with Alcatel-Lucent requirements (exothermic weld, compression type with 2-hole lugs; properly secured; anti-oxidant used on contact surface area)?	Y	N	N/A	
10.	Are all grounding conductors routed as straight as possible with no loops or sharp bends?	Y	N	N/A	
11.	Are cabinet support structure grounded?	Y	N	N/A	
12.	Are metallic conduits bonded at both ends and 7.62 meters (25 foot) intervals?	Y	N	N/A	
13.	Are all fence corner posts and gate posts properly grounded (including fence fabric and barb wire, as applicable)?	Y	N	N/A	
14.	Are all metallic objects within 1.8 meters (6 feet) bonded to the grounding system?	Y	N	N/A	
15.	Is generator fuel tank bonded to the grounding system?	Y	N	N/A	
16.	Is master ground bus in compliance with Alcatel-Lucent Equipment Drawings?	Y	N	N/A	
17.	Is AC power supply equipped with a surge protection device and is the device properly connected to the ground system?	Y	N	N/A	
18.	Is T1/E1 or T3/E3 line equipped with a surge protection device and is the device properly connected to the ground system?	Y	N	N/A	
19.	Is tower light system (if installed) equipped with a surge protection device and is the device properly connected to the ground system?	Y	N	N/A	

Completed by: _____

Date: _____

☐

SP-4 Site Preparation RF Antenna Checklist

Purpose

The following items must be completed prior to the installation of the cell site equipment. Circle the correct letter for the corresponding description items.

item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	Is tower properly installed and secured?	Y	N	N/A	
2.	Are all antenna cable runs installed?	Y	N	N/A	
3.	Are all antenna cable runs properly terminated?	Y	N	N/A	
4.	Are all cable runs properly terminated?	Y	N	N/A	
5.	Are all external cable connections weatherproofed?	Y	N	N/A	
6.	Are all external cable UV rated?	Y	N	N/A	
7.	Are antenna cable runs demarcation points in proper location?	Y	N	N/A	
8.	Are antenna cable runs marked and in proper sequence per applicable equipment drawings?	Y	N	N/A	
9.	Are appropriate type, length and number of antenna cable jumpers available?	Y	N	N/A	
10.	Are appropriate drip loops provided for antenna cable runs at turns and demarcation point?	Y	N	N/A	
11.	Have antenna and cable sweeps performed?	Y	N	N/A	
12.	Are antennas properly installed and secured?	Y	N	N/A	
13.	Are all antennas the proper type?	Y	N	N/A	
14.	Are all antennas at proper azimuth? (0,120 or 240 degrees)	Y	N	N/A	
15.	Are antennas at proper height?	Y	N	N/A	
16.	Are antennas at proper tilt?	Y	N	N/A	

item #	Description	Yes (Y)	No (N)	N/A	Comments
17.	Have diversity antennas been properly separated?	Y	N	N/A	
18.	Are antenna hatch plate bushing properly installed?	Y	N	N/A	

Completed by: _____

Date: _____

□

SP-5 Site Preparation Punchlist Sheet

Purpose

The following punchlist is used to track any outstanding site preparation items.

Item #	Comment/Description	Severity (1/2/3)	Corrective Action Required	
			(Y/N)	Completed Date

Severity Column Definitions:

1. Equipment installation cannot occur until outage is rectified and will void warranty or potentially cause personal injury.
2. Equipment installation can occur but issue must be rectified prior to handoff to customer or service turn-up so that the warranty is not voided.
3. Equipment installation, handoff to customer, or service turn-up can occur but not per Alcatel-Lucent recommendations.

Inspection Checklist Completion Sign-Off (complete below)

Was the punchlist continuation sheet on the next page used? Yes or No

Inspector's Name: _____

Inspector's Signature: _____Date: _____

□

SP-5A Site Preparation Punchlist Sheet

Purpose

The following punchlist is used to track any outstanding site preparation items.

Item #	Comment/Description	Severity (1/2/3)	Corrective Action Required	
			(Y/N)	Completed Date

Appendix B: UMTS Macrocell site information

Overview

Purpose

This section is used by Customer Project Management to document cell site configuration information.

Contents

CSC-1 Base station configuration information	B-2

CSC-1 Base station configuration information

General base station information

Complete the following cell site information:

Cell Site	information (provided by inspector)
Name	
Address	
Contact name	
MTA name	
Cell Site #	
Contact Phone & Pager #	

Document and drawings

Complete the information for the following reference documentation

Document or Drawing	Document #	Issue #
Alcatel-Lucent Installation Equipment Drawing(s)		
Site Preparation Document		
Base Station & Power Alarm Requirements		
Base Station GPS Document		
Base Station Cabinet Installation Manual		
Lightning Protection and Grounding Guidelines		

Installation type

Check all that apply:

- ❒ Indoor
- ❒ Outdoor
- ❒ Controlled Environment
- ❒ Uncontrolled Environment
- ❒ Concrete Pad
- ❒ Rooftop
- ❒ Other (Specify): _____

Base station sub-structure

Check all that apply:

- ❒ Concrete
- ❒ Wood floor
- ❒ Raised floor
- ❒ Non-Penetrating
- ❒ I-beam
- ❒ C-beam
- ❒ Platform

Earthquake Zone Rating

Check one:

- ❒ Zone 0
- ❒ Zone 1
- ❒ Zone 2
- ❒ Zone 3
- ❒ Zone 4

Base station equipment

Complete the information for the UMTS Macrocell equipment:

Cabinet Type	Serial #	# of sector	Duplex/ Triplex
Primary cabinet			
Growth cabinet			
Power cabinet			
Battery cabinet			

Antennas

Complete the following (if required):

PCS Channel # (1-3) _____

# of Carriers (1) _____

GPS Antenna KS/Model _____

PCS Freq. Block (A-F) _____

GPS Cable Length (ft.) _____

GPS Antenna Gain (dB) _____

Antenna Type (N-N or N-DIN) _____

Quantity of Antenna Jumper Cables (1-15) _____

Power

Total # of Battery Strings _____

Power source

- -48 VDC
- +24 VDC

AC Generator Receptacle?

- Yes
- No

Power co-located with base station equipment?

- Yes
- No

Other Cell Site Equipment

Complete the following:

Equipment Description	Yes (Y)	No (N)	N/A
Antenna Tower?	Y	N	N/A
FAA Lighting?	Y	N	N/A
Tower Light Alarm?	Y	N	N/A
Ice Bridge? Covering: (check one) _____Cables Only _____Cables and Equipment	Y	N	N/A
Cable Tray or Ladder Racks? Type of Ladder: (check one) _____5’ Ladders _____12’ Ladders _____Other: _____	Y	N	N/A

Equipment Description	**Yes (Y)**	**No (N)**	**N/A**
Antenna Cable Hatch Plate? Number of Entry Holes _____	Y	N	N/A
Facilities Ancillary Equipment? Power Source: (check one) _____AC _____DC Voltage: (check one) _____DC _____rms	Y	N	N/A
AC Service : Size (amps) _____ Voltage (v) _____ Phase (1 or 3) _____			
Non-Alcatel-Lucent Power Plant? Note: If YES, the customer is responsible for the power plant's configuration	Y	N	
Earthquake Bracing Required?	Y	N	N/A
Tx/Rx Antenna? (type and quantity) _____Simplex Only (1-15) _____ _____Simplex/Duplex (1-15) _____ _____Duplex Only (1-6) _____ (mounting location) _____Tower _____Steel Structure _____Building _____Antenna Support Structure	Y	N	N/A

Equipment Description	Yes (Y)	No (N)	N/A
Cell Site Grounding? If YES, select all that apply: _____Buried ring ground and driven rods _____Buried metallic and electrically continuous water pipe _____Down conductors (Quantity: _____) _____Electrolytic ground rod(s) (Quantity: _____) _____Driven ground rod(s) (Quantity: _____) _____Grounded building steel _____Ground grid _____Ground radial(s) (Quantity: _____)	Y	N	
Co-located non-PCS equipment? Existing grounding system: _____Single Point _____Integrated	Y	N	
Ground Bus? If YES, quantity: _____	Y	N	

Completed by: _____

Date: _____

□

Appendix C: Electrical power requirements for customer supplied power +24/-48 VDC systems

Overview

Purpose

This appendix provides the DC power requirements for a UMTS Macrocell, in case a customer supplied power +24/-48 VDC system is used. In addition, this appendix specifies the minimum set of power system alarms that can be reported to a UMTS Macrocell.

Contents

Power requirements (general)	C-2
Power system requirements	C-4

Power requirements (general)

Scope

CAUTION

AC wiring protection

All AC wiring and over-current protection must be installed in accordance with the National Electric Code (NFPA-70) and local electrical codes. An appropriate earth ground connection is required before commercial AC service can be connected to any equipment at the site.

This section specifies the DC power and power system alarm interface requirements for UMTS Macrocell equipment. Specifically DC power, DC feeder quantity, recommended DC feeder wire gauge, and DC feeder circuit breaker type/rating. Some additional information is included about power feeder connections and alarm connections to the UMTS Macrocell cabinets. This section provides information about the quality and characteristics of the DC power to be supplied to the UMTS Macrocell cabinets.

The power systems shall provide rectification of commercial AC power to nominal +24/-48 VDC to power the modular assemblages and to float charge the backup batteries. The power systems shall provide uninterrupted DC power to the UMTS Macrocell cabinet. In the event of loss of AC power, the power system shall continue to provide DC power for the duration of the battery reserve.

The power system is designed to support a fully-configured UMTS Macrocell site. A system that cannot support a fully-configured system will limit the potential for future growth.

This section is intended for customers who will be using a power system, which is not related to standard Alcatel-Lucent Power System Products.

By meeting these requirements, the Alcatel-Lucent equipment, referenced in this section, shall match the electrical and RF performance characteristics of the equipment that is supplied by the customer.

Standard reference document

Alcatel-Lucent strongly recommends the Power System meet all applicable requirements specified in the following documents. The appropriate requirements shall be selected from the documents listed in the table below, based on “country of use.” In addition, adherence to all additional requirements mandated by the “country of use” is the customer’s responsibility. The power system must meet the specified UL and FCC

requirement documents in order for the UMTS Macrocell equipment to maintain its UL and FCC compliance. The references listed in the table may be obtained from the issuing agency or their authorized distributors.

Source	Document # Issue #	Title
FCC	FCC	*FCC Rules & Regulations Title 47, Code of Federal Regulations Part 15, Class B*
IEC	IEC-61000	*"International Standard. Electromagnetic Compatibility (EMC). Testing & Measurement Techniques"*
IEEE	IEEE/ANSIC62.34-1996	*"IEEE Standard for Performance of Low-Voltage Surge-Protective Devices (Secondary Arrestors)"*
NFPA	NFPA-70	*National Electrical Code*
Telcordia	GR-063-CORE, Issue 2, April 2002	"NEBS® *Requirements: Physical Protection"*
Telcordia	GR-001089-CORE, Issue 3, October 2002	*"Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment"*
Telcordia	GR-947-CORE, Issue 4, 2006	*"Generic Requirements for a -48 Volt Telecommunications Switchmode Rectifier/Power Supply"*
UL	UL 60950-1	*"Information Technology Equipment, - Safety - Part 1: General Requirements"*
CSA	C22.1	*Canadian Electrical Code, Part 1*
CSA	CAN/CSA-C22.2 No. 60950-1-03	*"Information Technology Equipment, - Safety - Part 1: General Requirements"*
UL	UL 50 Eleventh Edition	*"Standard for Enclosures for Electrical Equipment"*
IEC	IEC 60950-1, First Edition, 2001-10	*"Information Technology Equipment, - Safety - Part 1: General Requirements"*
IEC	IEC 60529, Edition 2.1, 2001-2	*"Degrees of Protection Provided by Enclosures (IP Code)"*

Power system requirements

General

This section specifies the mechanical, electrical, and environmental requirements the power system shall meet. Unless specified, the following requirements apply to indoor power systems only.

Alcatel-Lucent strongly recommends that the power system meet the same environmental, safety and regulatory requirements as the Alcatel-Lucent equipment to maintain its safety and regulatory certification.

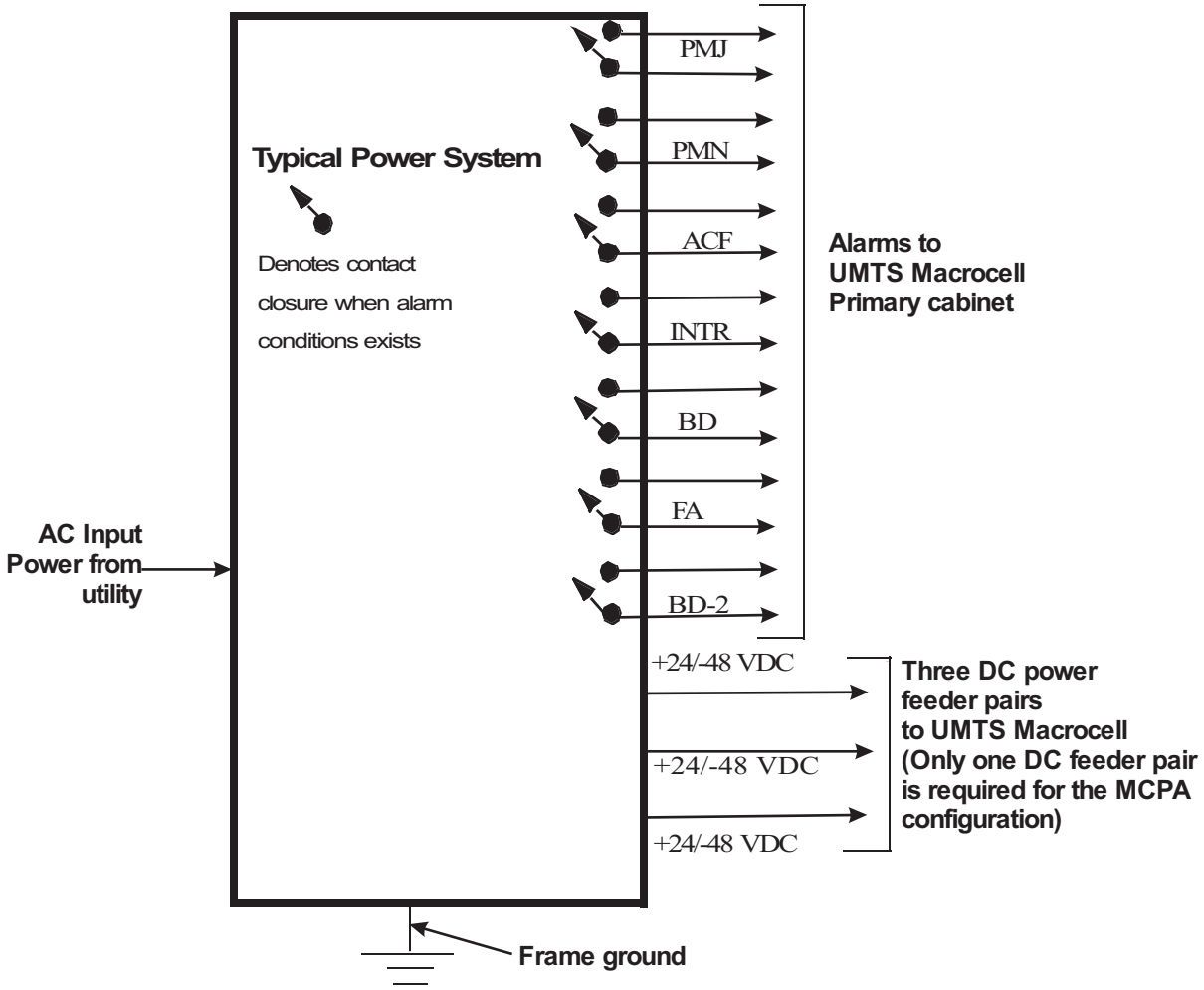
Cabinet interface requirements

The following table provides the interface requirements required to connect the UMTS Macrocell cabinet to a customer supplied power system.

Interface	Requirement
Mechanical interface	The customer is responsible for specifying all the mechanical requirements for the power system such as dimensions, weights, anchoring, grounding, conduit/cable interfaces, and installation features.
UMTS Macrocell cabinet interfaces	All the power system electrical interfaces are located at the top of the UMTS Macrocell cabinet. For dimensions of the UMTS Macrocell cabinet refer to Chapter 2, “Overview of UMTS Macrocell indoor base station” of this document. Note: Under no circumstances shall any modification (e.g. drilling) be made to the UMTS Macrocell cabinet(s) unless the modification is covered by a Alcatel-Lucent “Change Notice”.
Electrical interface requirements	The electrical interfaces between the power system and the UMTS Macrocell cabinets consist of DC power, and power system alarms. All cabinets receive DC power independently from the power system. All power system alarms interface with the UMTS Macrocell Primary cabinet only.

Typical power system interface

The following diagram shows the electrical interfaces of a typical power system.



PMJ: Power Major Alarm
PMN: Power Minor Alarm
ACF: AC Fail
INTR: Intrusion Alarm
BD: Batteries on Discharge, first stage
FA: Fuse Alarm
BD-2: Batteries on Discharge, second stage

+24/-48 VDC input requirements

The nominal +24/-48 VDC power supplied to the UMTS Macrocell cabinet(s) shall meet the requirements specified in this section. All of the electronic equipment related to processing of calls, and the fans in the UMTS Macrocell cabinet are powered from

the +24/-48 VDC power supplied to the equipment. The DC power system shall be capable of providing constant power to the equipment over the entire range of environmental condition for the “country of use.”

The UMTS Macrocell has three 24 VDC input power feeds, each rated at 120 A, or 48 VDC input power feeds, each rated at 90 A.

DC input power

The typical power level is the DC power consumption expected while the site is operating with “busy hour” traffic and an ambient temperature between 20° and 25° Celsius. The UMTS Macrocell cabinet(s) have constant power load characteristics. The power levels in the table are based on an input of +27.25 VDC for +24 VDC and 54.5 VDC for -48 VDC. For various UMTS configurations, the typical and maximum DC power requirements and number of required rectifiers are provided in the Alcatel-Lucent ERD (ER_0202_0001). See Appendix F, “Power requirements and battery reserve times for UMTS Macrocell Indoor cabinets”.

DC feeders and connection interface

Each UMTS Macrocell cabinet requires three DC feeds, as shown in the table on the next page. Only one DC feeder is required for MCPA configurations.

Alternate wire gauges may be used for the DC feeders, but shall be sized to limit the round trip voltage drop between the power system output terminals and the UMTS Macrocell input terminals to less than one volt. A current level equal to 80% of the circuit breaker current rating specified shall be used for this calculation. The wire used for the DC feeders shall be rated for the environmental condition in which it is used and shall be rated and sized according to the applicable sections of the National Electrical Code (NFPA 70) or the Canadian Electrical Code, Part I (CSA C22.1) for NAR markets, IEC 60364 for non-NAR markets, or the local electrical code in use. The circuit breaker characteristics shall be equivalent to Airpax Inc. model LEL/LML, circuit breakers with type 51, DC trip delay curve characteristics.

DC feeds must be type Class B stranded wire, rated for 90 degrees Celsius.

> **Important!** If Class I stranded wire is used, a ferrule connector must be crimped to the end of the wire to avoid short circuit damage to the terminal block.

The DC terminal block is located at the top of the UMTS Macrocell cabinet. (See figure on the next page).

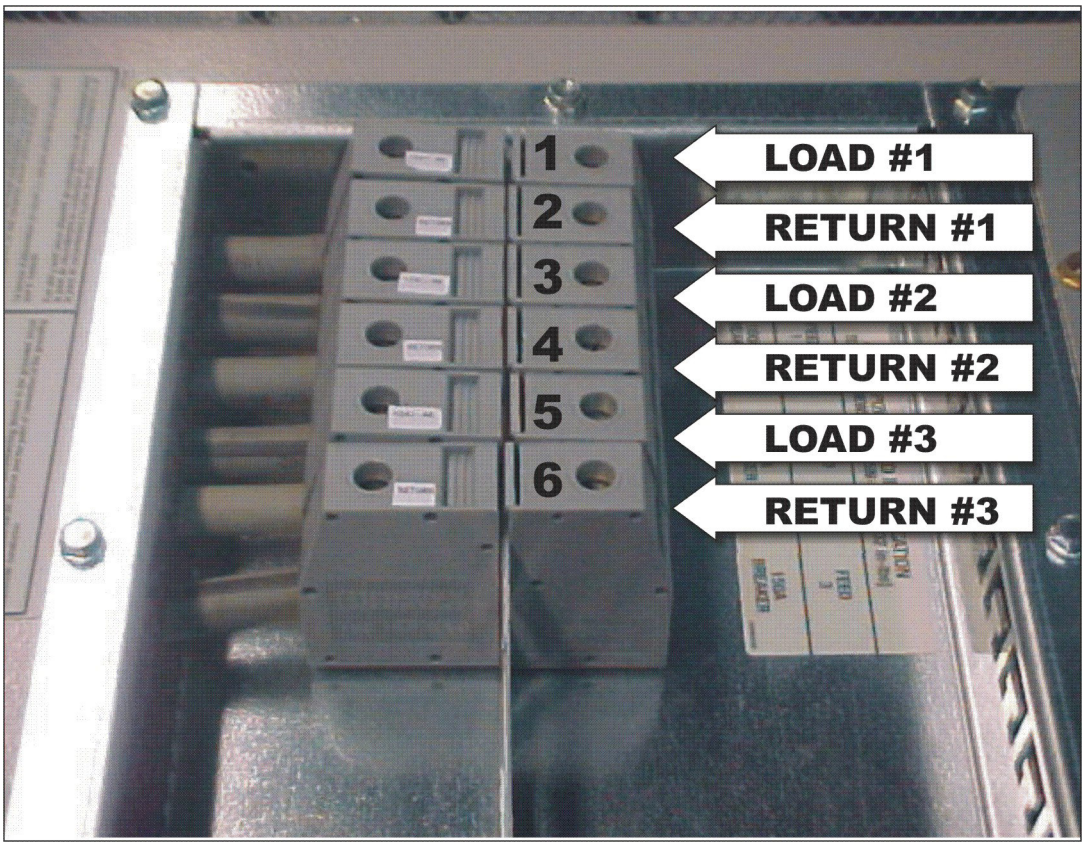
Important! The connections at the DC terminal block must be torqued to 6 Nm.

DC feeders and connection interface							
	Feeder #1			Feeders #2, #3 *			Maximum wire size at DC terminal block
	Circuit breaker (Amps)	Wire size (AWG)	Max. Length (Feet)	Circuit breaker (Amps)	Wire size (AWG)	Max. Length (Feet)	
+24 V cabinet	150	1/0	11 m (35 ft)	150	1/0	11 m (35 ft)	50 mm^2 (1/0 AWG)
-48 V cabinet	90	2	11 m (35 ft)	90	2	11 m (35 ft)	
** Feeders #2 and #3 are not required for MCPA configurations. MCPA uses Feeder 1 only.*							

Notes:

1. DC wires and lugs must be rated for 90 degrees Celsius installations.
2. For longer wire runs, wire size and circuit breaker ratings must be calculated as specified above, in this section.

UMTS Macrocell DC power terminal block (Front -View)



DC input surge requirements

The DC input terminals of the UMTS Macrocell primary cabinet are equipped with electrolytic capacitors to reduce noise, ripple, and the effect of transients. The capacitors can draw a high inrush current when power is first applied to the UMTS Macrocell.

UMTS Macrocell	Inrush current (Amps)	Time (Milliseconds)
+24 VDC	400 to 1250	up to 1
-48 VDC	600 to 1200	up to 1

The circuit breakers providing DC power to the UMTS Macrocell must be able to withstand this high inrush current. The Airpax Inc., model LEL/LML, circuit breakers with type 51, DC trip delay curve characteristics is rated to withstand the inrush current.

Overload trip characteristics

The following table provides the overload trip characteristic for the Airpax circuit breaker with type 51 delay characteristics, used in UMTS Macrocell +24/-48 VDC. If an alternate circuit breaker is used, it must have equivalent overload trip.

Airpax model LEL/LML type 51 Overload Trip Time (Seconds)								
Rating	100%	125%	150%	200%	400%	600%	800%	1000%
Time (sec.)	No trip	0.5 - 6.5	0.3 - 3	0.1 - 1.2	0.3 - 0.5	0.011- 0.25	0.004 - 0.1	0.004 - 0.08

DC input voltage range

The normal DC input voltage range, the set point of float voltage for the battery and the maximum float voltage set points for the UMTS Macrocell, are provided in the following table.

UMTS Macrocell	Normal input voltage range (volts DC)	Set point of float voltage (volts DC)	Maximum float voltage (volts DC)
+24 VDC	20 to 28.1	27.24	28.1
-48 VDC	-42.2 to -56.2	-54.48	-56.2

Default voltage

The DC power system output voltage shall remain within the range specified in the table above. If a failure occurs with the DC Power system controller

DC voltage regulation

The DC voltage shall be regulated to within ± 0.5% of the voltage set in the table above under all conditions of line, load and temperature.

DC soft start

The DC voltage at input of the UMTS Macrocell shall not overshoot more than 3.5% of the set voltage in the table above for a period of more than 100 milliseconds, under any conditions.

Ripple and noise

The following table provides ripple and noise requirements. This requirement applies, with or without batteries connected to the system, however the system is not intended to operate without batteries.

UMTS Macrocell	Ripple voltage mVpp (0 to 100 MHz)	Ripple voltage mVpp (mVRMS)	DC system noise mV (psophometric)
+24 VDC	Not to exceed 100	50	Less than 1
-48 VDC	Not to exceed 250	100	Less than 2

Transient load response

For any step-load demand change of 10% to 90%, or 90% to 10%, on the DC power system, the DC input voltage to the UMTS Macrocell shall remain within 5.0% and return to the 0.5% regulation band within 300 milliseconds.

Backup power requirements

In the event of a commercial power failure, Alcatel-Lucent recommends the DC power provided to the UMTS Macrocell be backed up for a minimum of 30 minutes. The DC power to the equipment shall not be interrupted during the transition from normal operation to backup operation and vice versa.

Important! If the DC power supplied to the UMTS Macrocell cabinets is not equipped with backup power, undesirable performance may be experienced during interruption and/or transients to the AC input power.

High voltage shutdown

The DC power source may shut down if the output voltage reach the following values:

UMTS Macrocell	Maximum Voltage range (Volts DC)	Maximum Voltage for up to one second
+24 VDC	28.1 to 30	30
-48 VDC	-56.2 to -60	-60

Notes:

1. The DC power system shall not provide sustained voltage to the UMTS Macrocell at the maximum voltage values, for more than one second, as shown in the table above. If a power system failure occurs which causes loss of regulation resulting in voltage levels

given in the table above stated as the “maximum voltage range”, the power system shall shutdown or clamp its output voltage below -56.2 VDC (for –48 VDC systems) and 30 VDC (for +24 VDC systems) until the problem is corrected.

Transient surge protection

The DC power system shall be designed to prevent surge transients at its input passing through to the output and causing voltage transient in excess of 30 Volts (for +24 VDC systems) or -60 Volts (for -48 VDC systems) the UMTS Macrocell cabinet(s). In addition, surge protectors and/or surge suppressors may be required to limit surge voltages to less than 30 Volts (for +24 VDC systems) and -60 Volts (for -48 VDC systems).

DC power grounding

The +24/-48 VDC return conductors shall be bonded to the frame ground system at the output of the DC power system. For proper site grounding of the equipment, refer to *Grounding and Lightning Protection Guidelines for Alcatel-Lucent Network Wireless System Cell Sites,* 401-200-115.

+24/-48 VDC Power system alarms

Each alarm generated by the power system shall be provided by a set of isolated dry relay contacts, an “alarm state” may be indicated by a “closed circuit” or an “open circuit”. If an alarm condition is indicated by a “closed circuit”, the DC power system alarm contacts shall present a contact closure when the alarm circuit fails or looses power. If an alarm condition is indicated by a “open circuit”, the DC power system alarm contacts shall present an “open circuit” when the alarm circuit fails or looses power. The resistance of a “closed circuit” shall be less than 100 ohms. The resistance of an “open circuit” shall be greater than 1 megohms. The table on the next page provides for the standard power system alarm assignments and connection points for the UMTS Macrocell cabinet.

The UMTS Macrocell has 25 additional external user alarm positions provided through the Z-IDC blocks, as shown in Chapter 7, “T1/E1, T3/E3, OC3/STM1, user alarm, and Ethernet facility requirements” of this document. These user alarms are available at the UMTS Macrocell cabinet to alarm additional equipment. The UMTS Macrocell software configuration must be programmed to report an “open circuit” or “closed circuit” for an alarm condition. (The UMTS Macrocell software is configured for a “contact closure” for power system alarms. A software change to the User Alarm definitions is required to announce a power system an “open circuit” as an alarm condition).

The following table lists the minimum set of alarm functions that must be provided to alert and announce power system failures. There are seven (7) alarms that are specially dedicated and provisioned ONLY for power.

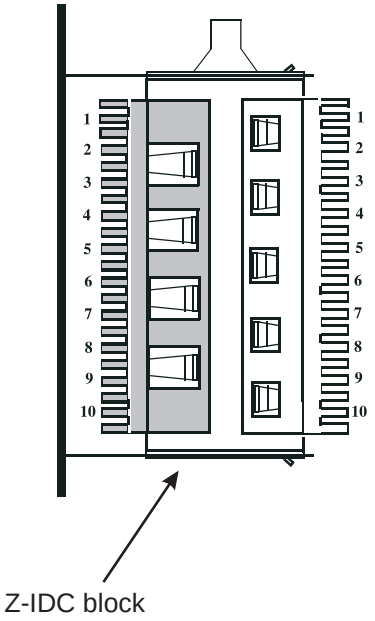
Power alarm cable			
Z-IDC terminal block	**Alarm function**	**Alarm #**	**Position on Z-IDC terminal block (Network side)**
Power alarms (Locations 1-7)	Power Major (PMJ)	User 0 Alarm	5-1 Upper 5-1 Lower
	Power Minor (PMN)	User 1 Alarm	5-2 Upper 5-2 Lower
	AC Fail (ACF)	User 2 Alarm	5-3 Upper 5-3 Lower
	Power Cabinet Intrusion (INTR)	User 3 Alarm	5-4 Upper 5-4 Lower
	Batteries on Discharge (BD)	User 4 Alarm	5-5 Upper 5-5 Lower
	Fuse Alarm	User 5 Alarm	5-6 Upper 5-6 Lower
	Batteries on Discharge (BD) 2	User 6 Alarm	5-7 Upper 5-7 Lower

Notes:

1. If the DC power system does not support some of the power alarms described above, it is strongly recommended that the customer not connect alarms from other equipment to these power alarms. Because these power alarms are reported back to the core network, it is important that the customer maintain circuit integrity to avoid misinterpretation when equipment alarms and failures are reported. Each specific power alarm function should, therefore, maintain its identity throughout the network and should not be used for any other purpose.

Z-IDC block or shorting blocks

Two Z-IDC blocks (see figure below) must be installed so power and user alarms can be connected to the UMTS Macrocell. If alarms are required for outdoor components (e.g., tower light) they should be connected through the NIU and the Z-IDC block. Insulation displacement contact (IDC) terminals interface the power system alarms with the UMTS Macrocell cabinet user alarms. Alarm wire pairs are punched down at terminals 1 to 7 in the table shown above. The ITE No. R-6097 (KRONE) punchdown tool is needed to terminate the alarm wire pairs at the IDC terminals. The IDC terminals accept 0.34 mm^2 (22-AWG) - 0.25 mm^2 (24-AWG) wire.



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Appendix D: GPS Antenna Installation (optional)

Overview

Purpose

This appendix covers installation instructions for the GPS antenna.

Contents

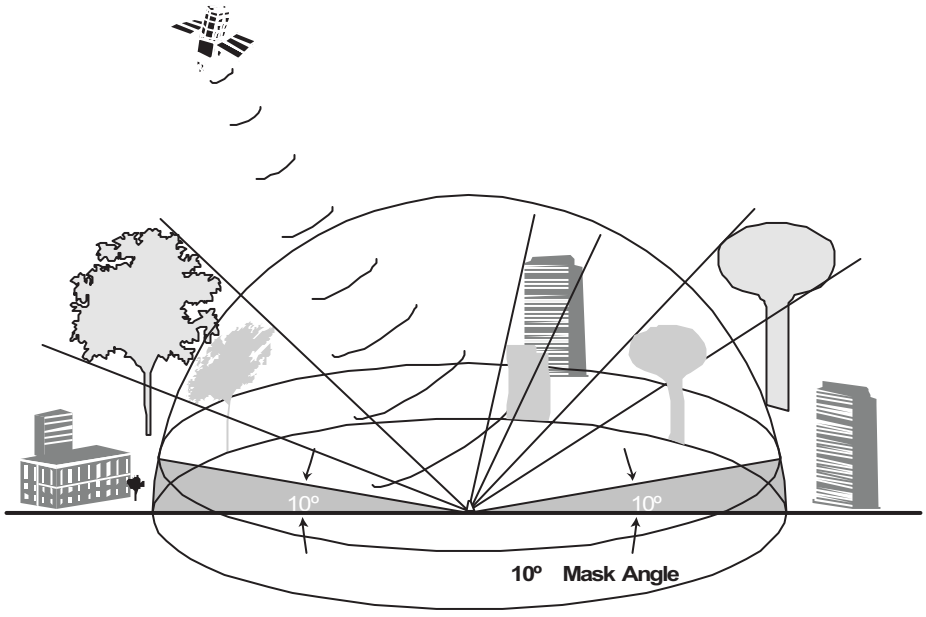
GPS antenna installation (general)	D-2
RF interference considerations	D-4
Lightning interference consideration	D-5
GPS Antenna mount kit	D-9
GPS antenna mounting instructions	D-11
Active GPS antenna Standard Wave Ratio (SWR) test	D-14

GPS antenna installation (general)

Site selection

The GPS antenna installation site should be selected such that the maximum aggregate of all blockages above the 10-degree mask angle, such as buildings or mountains, does not exceed 25% of the surface area of a hemisphere around the GPS antenna. This blockage should not be in one contiguous quadrant of the hemisphere. Each contiguously blocked quadrant should be less than 12.5% of the sphere's surface area.

The following diagram shows the mask angle definition for the GPS antenna.



Important! Do not install the GPS antenna directly under structures that may accumulate or shed snow or ice.

It is desirable that the antenna has the clearest view to the south, east, and west in the northern hemisphere and to the north, east, and west in the southern hemisphere.

Obstructions and interference

The following types of obstructions and possible sources of interference need to be considered:

- Hills, mountains, trees and surrounding plant life.
- Adjacent buildings or any large sky obstructing structures such as grain elevators, airplane hangers, bridges, overhead roadways, etc.

- Water towers or any close range large metal objects that could cause excessive sky obstruction.
- Any locations where birds or animals may easily nest or build on or around the antenna.
- Any co-located RF transmission antennas, TV stations, cable television cables, or arc-welding equipment.
- High-voltage lines will not cause interference with GPS signal reception.
- Self-supporting or guyed towers will generally not block the GPS signal.
- Trees do not totally block but rather degrade GPS reception, especially during periods of heavy rain or snow. Consider if increased summer plant life could also become a problem.
- If a GPS antenna is mounted to a monopole antenna mast, it must be mounted a minimum distance (D) from the monopole such that less than 12.5% of a contiguous surface area of a hemisphere around the antenna is blocked by the monopole. The GPS antenna must be spaced a minimum distance D = 1.61 x R (where R is the radius of the monopole at the attachment point of the GPS antenna), from the outside surface of the monopole.

Example:

Monopole radius (inches) R = 12

D = (1.61 x 12)

D = 19.3″ minimum

This example assumes, of course, that the monopole is the only obstruction to be considered, and constitutes a contiguous 12.5% blockage of the sky. This condition would constitute a contiguous blockage in one quadrant of the hemisphere.

How to measure antenna position

Antenna position can be determined using differential GPS.

Antenna position must be measured with sufficient precision so the center of the circle can be calculated accurately. When just two antennas serve a sector, the center position to be calculated is the average of the position for both antennas.

The position of the center of the circle must be recorded with respect to latitude and longitude, within 0.1 arc-seconds (approximately 3 m) for each.

The altitude of the antenna above the geoid must be specified within 6 m. This is the reference altitude used in GPS, which is specified in WGS 84.

□

RF interference considerations

RF interference considerations

The GPS antenna installation site should be chosen such that it is not in a direct radiation pattern of the cell site transmit antennas, and situated such that no other antennas, microwave transmit dishes, and other sources of RF radiation that could affect GPS reception are in close proximity. The GPS antenna should not be located within 3 meters (10 feet) horizontally and 3 meters (10 feet) vertically from any actively transmitting antenna.

□

Lightning interference consideration

Lightning considerations

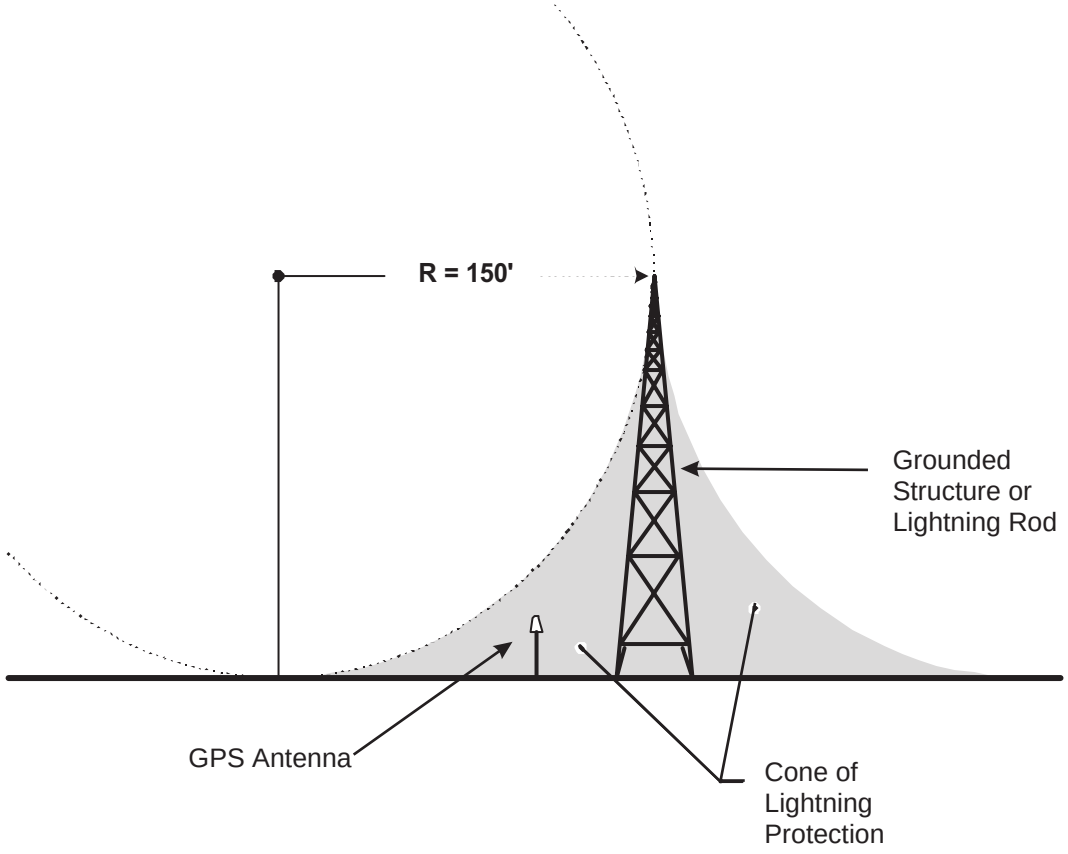
Industry standard practices for lightning protection should be followed for GPS antenna installations. Several sources for such information are:

- Lucent Technologies Cell Site Grounding and Lightning Protection Guidelines (401-200-115)
- National Fire Protection Agency (NFPA), NFPA 780, “Standard for Installation of Lightning Protection Systems”
- Poly Phaser Corporation “The ’Grounds’ for Lightning and EMP Protection” Second Edition by Roger R. Block.

The GPS antenna should be installed such that it is not the highest point in an installation (The GPS antenna must not be a lightning rod!). The GPS antenna must be within the “protective cone” (see Figure on the following page) of any grounded structure such as an antenna tower or ancillary lightning rod. The “protective cone” is the area between the circumference of a circle with a 150-foot radius that tangentially touches the ground and the side or top of a grounded structure and the ground or structure.

Protective cone installation

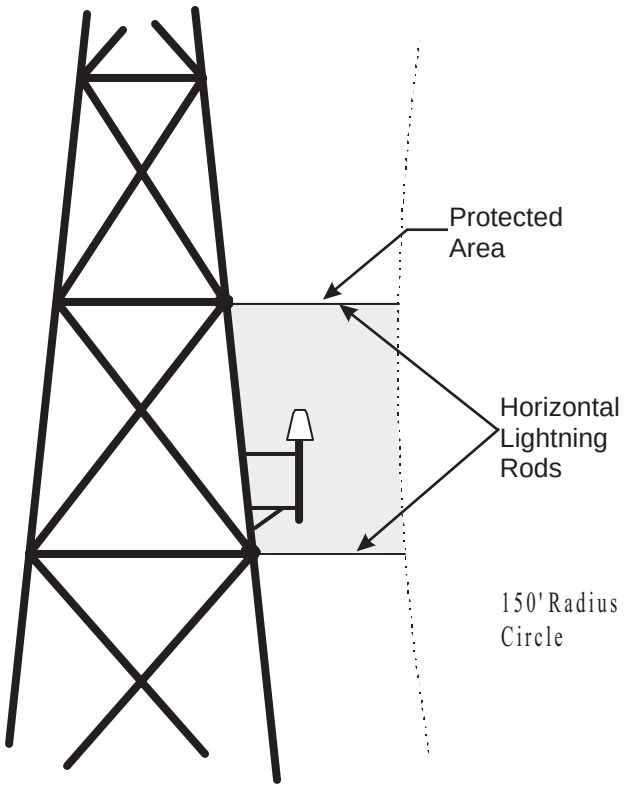
The following diagram shows the GPS antenna installed within the protective cone.



Important! The percentage of protection for the shaded zone is 96%.

Lightning rod installation

If the GPS antenna is mounted to the side of an antenna tower above the 150-foot point, then horizontal lightning rods must be employed such that the antenna is within the area of a 150-foot sphere that touches both lightning rods, as shown in the following diagram.



In addition, the antenna cable shield must be grounded near the equipment.

If the GPS antenna is installed on a cell site antenna tower, the cable shield must be grounded and bonded to the tower, both at the top as close as possible to the antenna, and at the bottom at the tower footing as well as at the hatch plate.

> **Important!** If the vertical cable run along the tower is more than 46 meters (150 feet), then multiple grounding bonds must be bonded at 30 meters (100 feet) intervals.

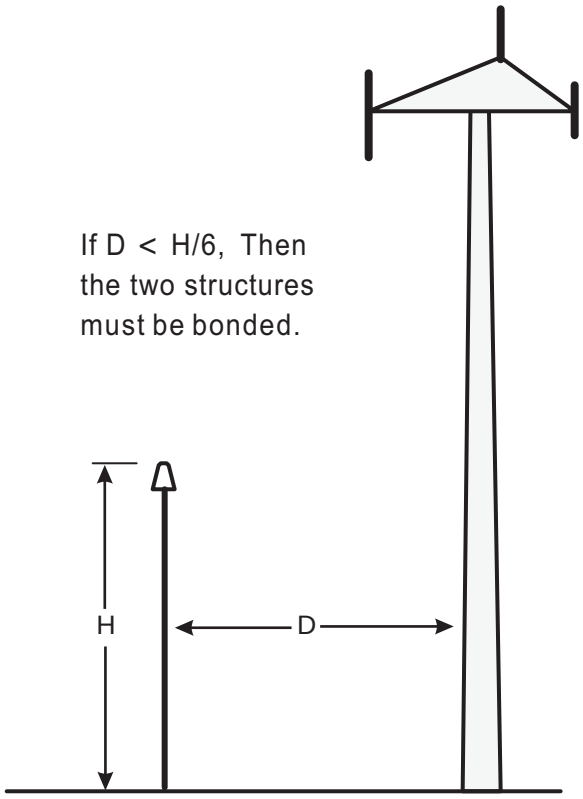
Preventing Arc-over between structures and antenna

If the GPS antenna is mounted on a separate pole or structure of height (H) near an antenna tower or other grounded structure, and the distance (D) from the pole or structure to the tower or other grounded structure is less than the height of the pole divided by six (H/6), then the pole or structure and the antenna tower must be bonded together eliminate possible arc over during a lightning strike.

Example:

If the pole is 50 feet tall, then D=8.3 feet. (50/6 = 8.3).

Refer to the following diagram for more detail.


If D < H/6, Then
the two structures
must be bonded.
H
D

GPS Antenna mount kit

General

GPS antenna mount kit are available from Andrews in several forms. The standard mount kit (denoted by the letters MS at the end of the part number) contains two separate kits that can be used together or separately in the installation of the mount. These separate kits are the Collar Bracket Mount Kit (part number 602214) and the L-Bracket Mount Kit (part number 602215). Alternatively, any one of these kits may be installed if the user requires. Remaining mount kit material may be retained for later use.

GPS-QBW-26NMS

The GPS-QBW-26NMS is a self-contained GPS antenna and mounting kit. The mounting kit includes a right-hand, circularly polarized antenna that incorporates a 26 dB high-performance, low-noise amplifier as well as mounting hardware for attaching the antenna to a vertical pipe with a 3/4″ to 1 1/2″ diameter.

Pipe diameter

The L-Bracket Mount Kit will attach the GPS antenna onto a customer supplied vertical pipe of 3/4″ to 1 1/2″diameter.

Important! Before installing any components, ensure that the vertical mounting pipe is of correct diameter and free of any components used in previous installations.

This kit contains two types of mounting brackets. The two mounting brackets can be used together, as a standard mounting kit, or separately as the L-Bracket Mount or Collar Bracket Mount. These three mounting configurations are covered in the following section.

Bracket mount kits parts lists

The following table provides description of the mounting kit parts.

Collar Bracket Mount Kit (Part #602214)			
Item #	**Part #**	**Quantity**	**Description**
1a	602186	1	Collar
2	602190	1	Gasket
3a	602189	4	#10-32 UNF x 0.5″ Captive Screw

Collar Bracket Mount Kit (Part #602214)			
Item #	**Part #**	**Quantity**	**Description**
4a	9978-78	2	0.25″ - 20 UNC-3A x 1.0″ Set Screw
5a	9903-7	1	Allen Wrench

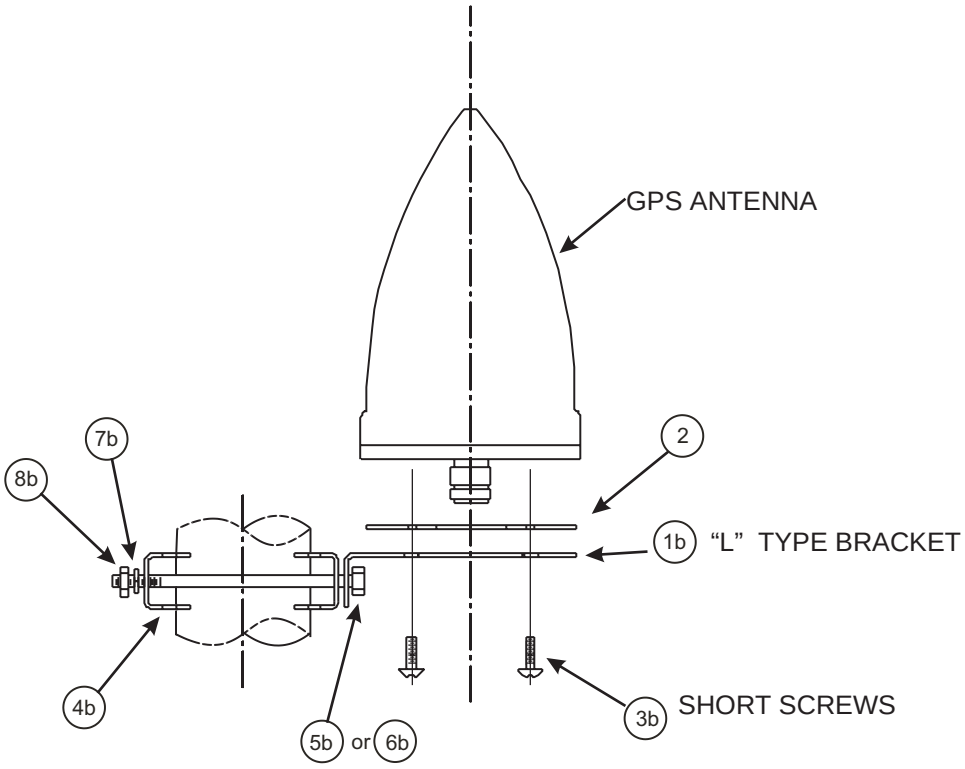
L- Bracket Mount Kit (Part # 602215)			
Item #	**Part #**	**Quantity**	**Description**
1b	602187-2	1	L - Bracket
2	602190	1	Gasket
3b	9845-2	4	#10-32 UNF x 0.312″ Screw
4b	726042	2	Cleat
5b	9963-131	2	0.25″ - 20 UNCx2.5″ Hex Head Cap Screw
6b	9963-256	2	0.25″ - 20 UNCx3.25″ Hex Head Cap Screw
7b	9974-15	2	0.25″ Lockwasher
8b	9999-57	2	0.25″ - 20 Hex Nut

GPS antenna mounting instructions

L-bracket mount kit

Perform the following steps and refer to the following diagram to mount the GPS antenna.

1 Attach L-Bracket, Item 1b, to customer supplied vertical pipe using bolts (Items 5b or



"L" - BRACKET MOUNT

v 6b to suit) and Items 4b, 7b and 8b. Locate in desired position.

2 Tighten 0.25 inch hardware.

3 With a Gasket, Item 2, on top of the L-Bracket, insert cable assembly through L-Bracket and Gasket. Attach the cable assembly to the GPS antenna and tighten the connector as required.

4 Insert the four short, Item 3b, screws through the L-Bracket and Gasket and attach antenna and tighten screws. Do not use the Captive Screws for this configuration.

5 Install weatherproofing that extends at least 2 inch below the bottom of the connector on the cable assembly to directly underneath the base plate of the antenna.

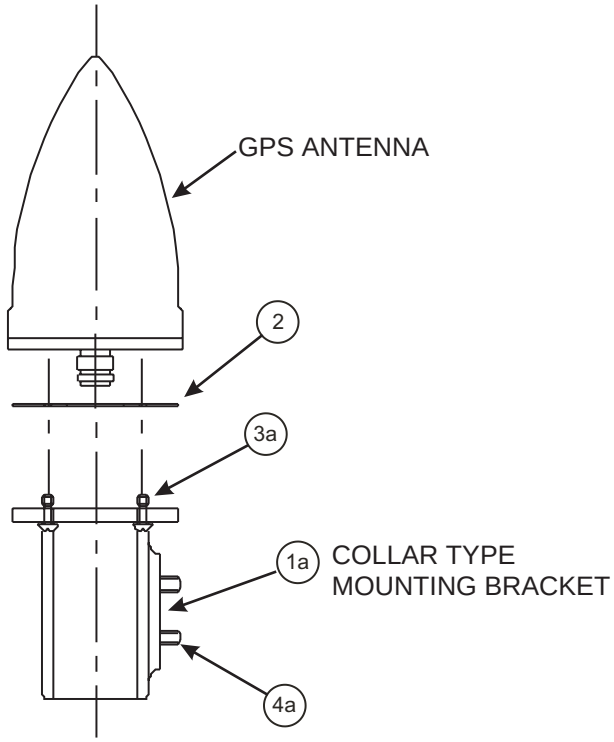
Important! Weatherproofing is not provided with this kit.

END OF STEPS

Collar mount kit

Perform the following steps and refer to the following diagram to mount the GPS antenna.

1 Install captive screws (3a) and set screws (4a) in collar (1a), then push captive screws



COLLAR MOUNT BRACKET

(3a) through gasket holes to retain gasket (2).

2 Insert the cable assembly fitted with N male connector through customer-supplied vertical mounting pipe, and collar and gasket assembly, prepared previously.

3

CAUTION

Service-disruption hazard

The antenna connection can be damaged if attached or removed incorrectly.

Do not twist antenna to attach or remove cable.

Attach cable assembly to the GPS antenna and tighten connector as required.

4 Attach Collar and Gasket assembly to antenna and tighten captive screws, Item 3a, into antenna base.

5 Slide assembly down so that the Collar slides over the mounting pipe. Tighten set screws, Item 4a.

6 Install weatherproofing that extends from directly underneath the flange on the collar bracket to at least 3 inches below the bottom of the collar measured on the cable assembly.

Important! Weatherproofing is not provided with this kit.

END OF STEPS

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Active GPS antenna Standard Wave Ratio (SWR) test

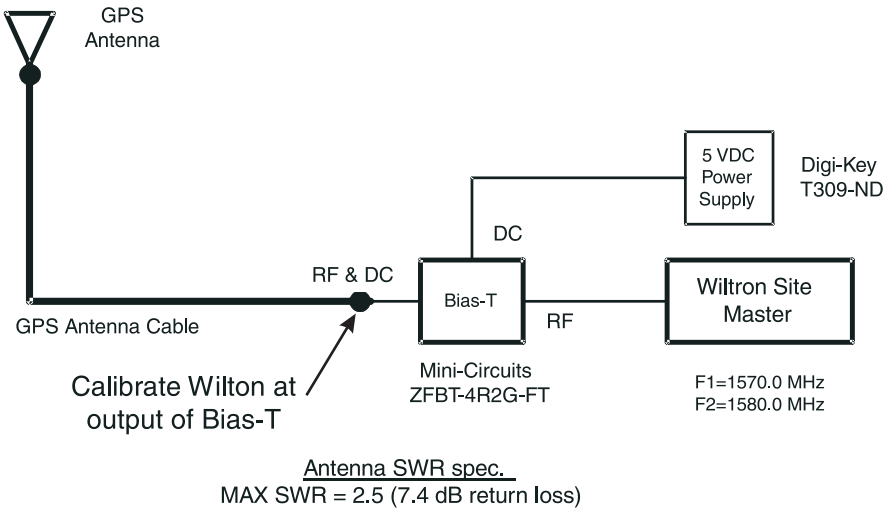
SWR test

The RF signals from the GPS satellites are extremely low-level microwave signals that must reach the RFTG with minimal distortion and loss. To verify the RF integrity of the complete antenna and cable system, a Standing Wave Ratio (SWR) or Distance-to-Fault (DTF) test should be performed.

Since the GPS antenna is an active device, a standard SWR or DTF test setup cannot be used. A Bias-T must be employed to inject + 5 VDC into the RF line to power the antenna's Low Noise Amplifier (see Figure below).

Important! The antenna will meet it's specified SWR only when powered in this way.

Calibrate the Wiltron as shown and per the manufacturer's instructions. Perform the SWR or DTF measurement as shown and per the manufacturer's instructions. Record the MAX SWR indicated and/or DTF data. If it MAX SWR is greater than 2.5, the fault must be repaired and the antenna and cable retested.



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Appendix E: Product conformance statements

Overview

Purpose

The purpose of this appendix is to provide the product conformance statements for the UMTS Macrocell.

Contents

UL and UL Canada conformance statements	E-2
FCC conformance statements	E-3
Eco-environmental statements	E-5

UL and UL Canada conformance statements

Overview

The statements that follow are the Underwriters Laboratories (UL) and UL Canada conformance statements that apply to the UMTS Macrocell cabinet.

UL Listed

The equipment is UL Listed, Information Technology Equipment.

The UL Listing applies to both the United States and Canada and is marked on the equipment main nameplate label. Should the local Authority Having Jurisdiction (AHJ) require prior or additional verification of this listing, a Product Certificate of Compliance for Underwriter Laboratories can be obtained by contacting Alcatel-Lucent Global Products Compliance Laboratory, located at Crawford Corners Road, Holmdel, NJ, 07733.

Any modifications to this equipment are not permitted without review and official authorization from the Alcatel-Lucent, Inc., Global Product Compliance Laboratory. Modification or changes authorized by the official CN/CNN are assumed to have received prior approval from this Lab.

Additional information

For equipment designed for indoor applications only:

This equipment is intended for installation in restricted access locations where access is controlled or where access can only be gained by service personnel with a key or tool. Access to this equipment is restricted to qualified service personnel only.

Reference

Refer to “Structure of hazard statements” (p. 1-2) for definitions for the different types of hazard statements.

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FCC conformance statements

Overview

The statements that follow are the FCC conformance statements that apply to UMTS Macrocell cabinet.

Changes or modifications not expressly approved by Alcatel-Lucent, could void the user's authority to operate the equipment.

FCC part 1

Pursuant to 47 CFR Part 1, Subpart 1, all installations must be evaluated for requirements contained in Table 1, "Limits for maximum permissible exposure," in Section 1.1310.

FCC part 2

This device complies with Part 2, Subpart J - Equipment Authorization Procedures, of the FCC Rules.

FCC part 15

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

This device may not cause harmful interference, and

This device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15 Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected

Consult the dealer or an experienced radio/TV technician for help.

FCC part 24

This device complies with Part 24, Subpart E - Broadband PCS, of the FCC Rules.

FCC part 68

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. At the upper-right-hand corner inside the cabinet assembly of this equipment is a label that contains, among other information, a product identifier in the format of AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

There is no need of any ringer equivalence number for this equipment.

The T1 network interface on this equipment is hardwired to a punchdown block, which meets FCC specifications.

The Facility Interface Code for this equipment is 04DU9-1SN. The Service Order code for this equipment is 6.0N. These two numbers are required when the customer orders service from the telephone company.

If the equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. However, if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make any necessary modifications to maintain uninterrupted service.

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect this equipment until the problem is resolved. If trouble is experienced with this equipment, repair or warranty information may be obtained by contacting:

Technical Support Services

Alcatel-Lucent

Within the United States: 1 866 582 3688, prompt 1

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Eco-environmental statements

Packaging collection recovery requirements

Countries, states, localities, or other jurisdictions may require that systems be established for the return and/or collection of packaging waste from the consumer, other end user, or from the waste stream. Additionally, reuse, recovery and/or recycling targets for the return and/or collection of the packaging waste may be established.

For more information regarding the requirements for the collection and recovery of packaging and packaging waste within specific jurisdictions, please contact the Alcatel-Lucent' Field Services/Installation - Environmental Health and Safety organization.

For installations not performed by Alcatel-Lucent, please contact the Alcatel-Lucent Customer Support Center at:

Technical Support Services

Alcatel-Lucent

Within the United States: 1 866 582 3688, prompt 1

From all other countries: +1 630 224 4672, prompt 2

Recycling/take-back/disposal of product

Waste electronic products should be handled appropriately, in compliance with applicable legislation. They must not be disposed of as part of unsorted municipal waste. Due to materials that may be contained in the product, such as heavy metals or batteries, the environment and human health may be negatively impacted as a result of inappropriate disposal.

The following graphic is placed on some products and components to indicate that the item cannot be discarded as unsorted municipal waste; instead, special measures are required for the treatment of waste electrical and electronic equipment.

To maintain conformance with eco-environmental requirements, products put on the EU market on or after 13 August, 2005 that cannot be discarded as unsorted municipal waste will carry a label that contains the preceding graphic with an additional indication. The indication will be either a heavy black bar along the base of the graphic or a date of manufacture added to the graphic.

In compliance with legal requirements, where applicable, Alcatel-Lucent will offer to provide for the collection and treatment of waste from Alcatel-Lucent products, or from products displaced by Alcatel-Lucent offers, in accordance with applicable legislation. For information regarding take-back of equipment by Alcatel-Lucent, or for more information regarding the requirements for recycling/disposal of product, please contact your Lucent Account Manager or in Europe call +353 1 692 4444.

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Appendix F: Power requirements and battery reserve times for UMTS Macrocell Indoor cabinets

Overview

Purpose

This appendix provides tables listing power requirements and battery reserve times for UMTS Macrocell cabinets. The tables are taken from the latest issue of the Alcatel-Lucent Engineering Rules Document (ERD) ER_0202_0001_PWR. For the most current information, refer to the latest issue of the ERD. Note that the greyed out data is reserved for future releases.

The term “typical” in the tables implies that the site is operating with “busy hour” traffic and at normal room temperatures. The battery reserve time represents new battery capacity and 25°C (77°F) ambient temperature. End-of-life battery reserve times are typically 80% of the initial battery capacity. Typical values in the tables are based on actual power consumptions.

The maximum values in each table represent the maximum expected load, with the rectifiers supplying full power to the UMTS Macrocell and maximum charging current to the batteries. The total AC power load consists of AC power to the cabinet heaters and AC power to the rectifiers. The rectifiers supply DC power to the UMTS Macrocell cabinet and charging current to the batteries.

For various UMTS configurations, the typical and maximum DC power requirements and number of required rectifiers are provided in the Alcatel-Lucent ERD (ER_0202_0001_PWR).

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Power requirements and battery reserve times for 850/1900 MHz, +24/-48 VDC cabinets

850/1900 +24V/-48V DC cabinets

The following tables support the indoor 850 MHz and 1900 MHz , +24/-48 VDC power for the UMTS Macrocell Indoor configuration options.

Important! For -48 VDC power applications, use the **DC Power Max (W)** and **DC Power Typ (W)** values.

+24/-48V UMTS Macrocell Rectifier and Battery Requirements

The following tables were copied from ERD ER_0202_0001_PWR.

□

Figure 1: Guide to populating batteries for Indoor and Outdoor systems.

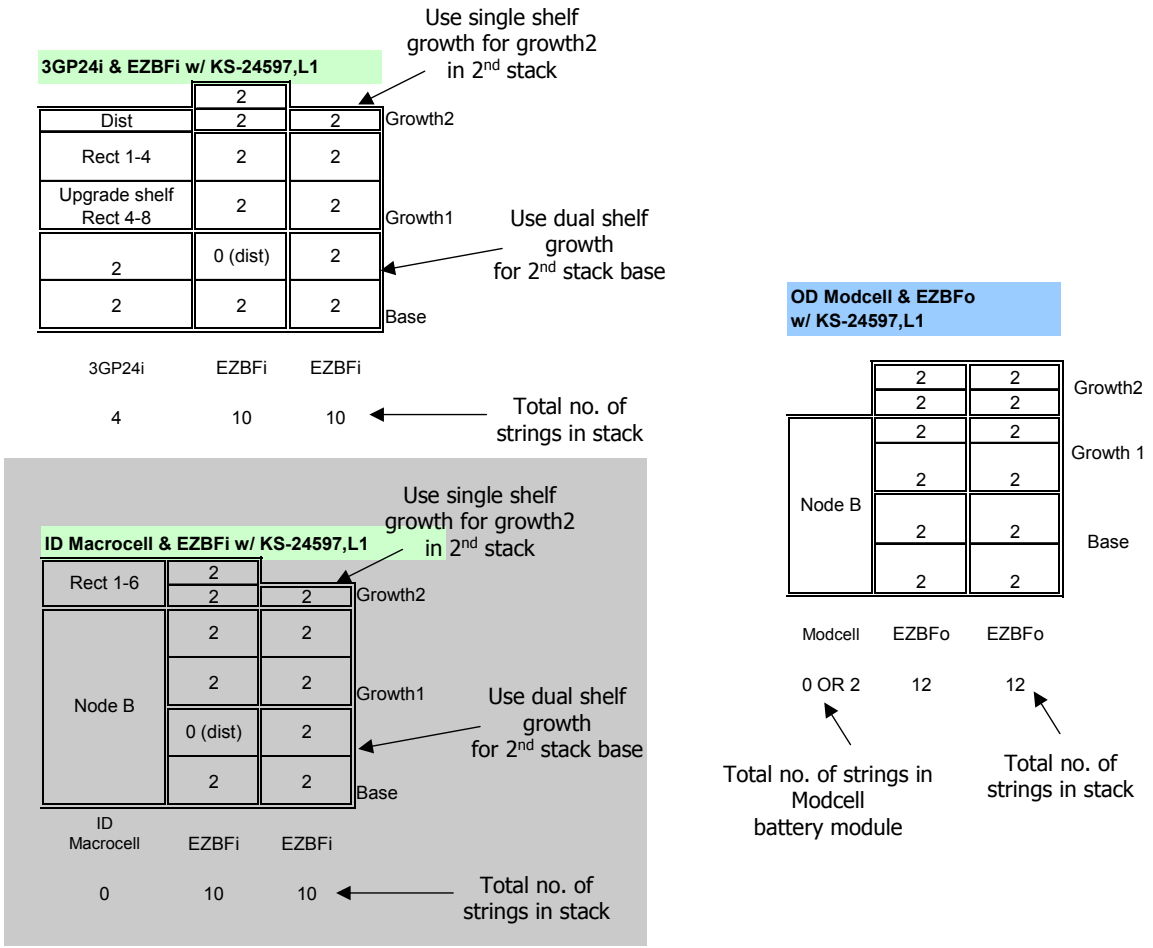


Figure 2: Example: Using 24V tables to find battery backup times for –48v applications.

24V

CRITICAL: Be sure battery capacity (Amp-hours or A-h) match

Number of battery strings (24V shown)

R25 Config	Software Release	Sector/ Carrier	DC Power Max (W)	No. of 1.5kW rectifiers w/o N+1	No. of 1.5kW rectifiers w/ N+1	DC Power Typ (W)	Battery Reserve Times (hrs) KS-24597, L1 (100aH) Ta = 25C EOD = 1.75V/cel 24V												
							Number of strings												
							2	4	6	8	10	12	14	16	18	20	22	24	26
13-1 thru 13-4	R24/R25	3S/3C	3,517	3	4	3,249	1.04	2.32	3.70	5.15	6.66	8.22	9.82	11.45	13.11	14.81	16.52	18.27	20.03
16-1/19-1	R24/R25	3S/1C	2,015	2	3	1,757	2.12	4.71	7.51	10.46	13.53	16.69	19.93	23.25	26.63	30.06	33.55	37.08	40.67
16-2/19-2	R24/R25	3S/2C	2,384	2	3	2,134	1.69	3.77	6.01	8.37	10.82	13.34	15.94	18.58	21.28	24.03	26.82	29.64	32.51

Typical power used for calculating 24V battery backup time. 3rd party and –48V power systems can use this value for estimating.*

Hours of reserve time for 24V system. A –48V system would provide 2.32 hrs of backup.

* Due to the numerous factors that impact the battery backup times for any given system (24V or –48V), all 3rd party power/battery systems used to power the Modcell should be engineered according to the 3rd party's specifications.

-48V

R25 Config	Software Release	Sector/ Carrier	DC Power Max (W)	No. of 1.5kW rectifiers w/o N+1	No. of 1.5kW rectifiers w/ N+1	DC Power Typ (W)	Battery Reserve Times (hrs) -48V 100aH Ta = 25C EOD = 1.75V/cel												
							Number of strings												
							1	2	3	4	5	6	7	8	9	10	11	12	13
13-1 thru 13-4	R24/R25	3S/3C	3,517	3	4	3,249	1.04	2.32	3.70	5.15	6.66	8.22	9.82	11.45	13.11	14.81	16.52	18.27	20.03
16-1/19-1	R24/R25	3S/1C	2,015	2	3	1,757	2.12	4.71	7.51	10.46	13.53	16.69	19.93	23.25	26.63	30.06	33.55	37.08	40.67
16-2/19-2	R24/R25	3S/2C	2,384	2	3	2,134	1.69	3.77	6.01	8.37	10.82	13.34	15.94	18.58	21.28	24.03	26.82	29.64	32.51

Number of strings from 24VDC divided by a factor of 2 to derive number of –48V strings.

Table 1: Power & Battery Backup for Indoor Configurations e/w KS24597, L1 (100Ah) Batteries

UMTS Indoor Modcell 4.0 Rectifier Count & Battery Reserve Times - 850 & 1900 MHz e/w KS-24597, L1 Batteries																			
	Sector/Carrier RF Power	**No. of UCUs**	**DC Power Max (W)**	**No. of 3kW rectifiers w/o N+1**	**No. of 3kW rectifiers w/ N+1**	**DC Power Typ (W)**	**Battery Reserve Times (hrs) KS-24597, L1 (100aH) Ta = 25C EOD = 1.75V/cel**												
							Number of strings												
							2	4	6	8	10	12	14	16	18	20	22	24	26
Indoor	1S/1C/20W	2	1179	1	2	937	4.4	9.7	15.5	21.6	27.9	34.4	41.1	47.9	54.9	62.0	69.2	76.5	83.9
	1S/1C/40W	2	1301	1	2	1057	3.8	8.5	13.5	18.8	24.3	30.0	35.8	41.7	47.8	54.0	60.2	66.6	73.0
	2S/1C/20W	4	1739	1	2	1495	2.6	5.7	9.0	12.6	16.3	20.1	24.0	28.0	32.1	36.2	40.4	44.7	49.0
	2S/1C/40W	4	1983	1	2	1735	2.2	4.8	7.6	10.6	13.7	16.9	20.2	23.6	27.0	30.5	34.0	37.6	41.2
	3S/1C/20W	5	2253	1	2	2007	1.8	4.0	6.4	9.0	11.6	14.3	17.1	19.9	22.8	25.8	28.8	31.8	34.9
	3S/1C/40W	5	2619	1	2	2367	1.5	3.3	5.3	7.4	9.6	11.8	14.1	16.5	18.9	21.3	23.8	26.3	28.8
	1S/1C-PCS 1C-850/20W	4	1730	1	2	1495	2.6	5.7	9.0	12.6	16.3	20.1	24.0	28.0	32.1	36.2	40.4	44.7	49.0
	2S/1C-PCS 1C-850/20W	4	2670	1	2	2427	1.5	3.2	5.2	7.2	9.3	11.5	13.7	16.0	18.4	20.7	23.1	25.6	28.0
	3S/1C-PCS 1C-850/20W	4	3600	2	3	3359	1.0	2.2	3.6	5.0	6.4	7.9	9.4	11.0	12.6	14.2	15.9	17.6	19.3
	3S/1C-PCS 1C-850/20W	9	3840	2	3	3589	0.9	2.1	3.3	4.6	5.9	7.3	8.8	10.2	11.7	13.2	14.7	16.3	17.9
	1S/1C-PCS 1C-850/40W	4	1980	1	2	1735	2.2	4.8	7.6	10.6	13.7	16.9	20.2	23.6	27.0	30.5	34.0	37.6	41.2
	2S/1C-PCS 1C-850/40W	4	3160	2	3	2907	1.2	2.6	4.2	5.9	7.6	9.3	11.2	13.0	14.9	16.8	18.8	20.8	22.8
	3S/1C-PCS 1C-850/40W	4	4340	2	3	4079	0.8	1.8	2.8	4.0	5.1	6.3	7.6	8.8	10.1	11.4	12.7	14.1	15.4
	3S/1C-PCS 1C-850/40W	9	4570	2	3	4309	0.8	1.7	2.7	3.7	4.8	5.9	7.1	8.3	9.5	10.7	11.9	13.2	14.5
	3S/2C/20W	9	2805	1	2	2551	1.4	3.1	4.9	6.8	8.8	10.9	13.0	15.1	17.3	19.6	21.8	24.1	26.5
	3S/2C/40W	9	4273	2	3	4009	0.8	1.8	2.9	4.0	5.2	6.5	7.7	9.0	10.3	11.6	13.0	14.3	15.7
	3S/2C-PCS 2C-850/20W	9	4160	2	3	3913	0.8	1.9	3.0	4.2	5.4	6.6	7.9	9.2	10.6	12.0	13.3	14.7	16.2
	3S/2C-PCS 2C-850/40W	9	7820	3	4	7549	0.4	0.9	1.4	2.0	2.5	3.1	3.7	4.3	5.0	5.6	6.3	6.9	7.6

Table 2: Power & Battery Backup for Indoor Configurations e/w IR145 (145Ah) Batteries

UMTS Indoor Modcell 4.0 Rectifier Count & Battery Reserve Times - 850 & 1900 MHz e/w IR145 Batteries																							
	Sector/Carrier RF Power	No. of UCUs	DC Power Max (W)	No. of 3kW rectifiers w/o N+1	No. of 3kW rectifiers w/ N+1	DC Power Typ (W)	Battery Reserve Times (hrs) IR145 (145aH) Ta = 25C EOD = 1.75V/cel																
							Number of strings																
							2	3	4	6	8	9	10	12	14	15	16	18	20	21	22	24	26
Indoor	1S/1C/20W	2	1179	1	2	937	7.2	12.1	17.5	29.5	42.7	49.6	56.8	71.9	87.6	95.7	104.0	121.0	138.6	147.5	156.6	175.2	194.1
	1S/1C/40W	2	1301	1	2	1057	6.2	10.4	15.0	25.3	36.5	42.5	48.7	61.5	75.0	82.0	89.1	103.6	118.7	126.4	134.1	150.0	166.3
	2S/1C/20W	4	1739	1	2	1495	3.9	6.6	9.6	16.2	23.4	27.2	31.2	39.4	48.1	52.5	57.1	66.4	76.0	80.9	85.9	96.1	106.5
	2S/1C/40W	4	1983	1	2	1735	3.3	5.5	7.9	13.4	19.3	22.5	25.8	32.6	39.7	43.4	47.1	54.8	62.8	66.8	70.9	79.3	87.9
	3S/1C/20W	5	2253	1	2	2007	2.7	4.5	6.6	11.1	16.0	18.6	21.4	27.0	32.9	36.0	39.1	45.5	52.1	55.4	58.8	65.8	72.9
	3S/1C/40W	5	2619	1	2	2367	2.2	3.7	5.3	9.0	13.0	15.1	17.3	21.8	26.6	29.1	31.6	36.8	42.1	44.8	47.6	53.2	59.0
	1S/1C-PCS 1C-850/20W	4	1730	1	2	1495	3.9	6.6	9.6	16.2	23.4	27.2	31.2	39.4	48.1	52.5	57.1	66.4	76.0	80.9	85.9	96.1	106.5
	2S/1C-PCS 1C-850/20W	4	2670	1	2	2427	2.1	3.6	5.2	8.7	12.6	14.6	16.7	21.1	25.8	28.2	30.6	35.6	40.8	43.4	46.1	51.5	57.1
	3S/1C-PCS 1C-850/20W	4	3600	2	3	3359	1.4	2.3	3.4	5.7	8.3	9.6	11.0	13.9	17.0	18.5	20.2	23.4	26.8	28.6	30.3	33.9	37.6
	3S/1C-PCS 1C-850/20W	9	3840	2	3	3589	1.3	2.2	3.1	5.2	7.6	8.8	10.1	12.8	15.6	17.0	18.5	21.5	24.7	26.3	27.9	31.2	34.5
	1S/1C-PCS 1C-850/40W	4	1980	1	2	1735	3.3	5.5	7.9	13.4	19.3	22.5	25.8	32.6	39.7	43.4	47.1	54.8	62.8	66.8	70.9	79.3	87.9
	2S/1C-PCS 1C-850/40W	4	3160	2	3	2907	1.7	2.8	4.1	6.9	10.0	11.6	13.3	16.8	20.4	22.3	24.3	28.2	32.3	34.4	36.5	40.9	45.3
	3S/1C-PCS 1C-850/40W	4	4340	2	3	4079	1.1	1.8	2.6	4.5	6.4	7.5	8.6	10.8	13.2	14.5	15.7	18.3	20.9	22.3	23.6	26.4	29.3
	3S/1C-PCS 1C-850/40W	9	4570	2	3	4309	1.0	1.7	2.5	4.1	6.0	7.0	8.0	10.1	12.3	13.5	14.6	17.0	19.5	20.8	22.0	24.6	27.3
	3S/2C/20W	9	2805	1	2	2551	2.0	3.3	4.8	8.1	11.8	13.7	15.7	19.8	24.2	26.4	28.7	33.4	38.2	40.7	43.2	48.3	53.6
	3S/2C/40W	9	4273	2	3	4009	1.1	1.9	2.7	4.6	6.6	7.7	8.8	11.1	13.5	14.8	16.1	18.7	21.4	22.8	24.2	27.0	30.0
	3S/2C-PCS 2C-850/20W	9	4160	2	3	3913	1.1	1.9	2.8	4.7	6.8	7.9	9.1	11.4	14.0	15.2	16.6	19.3	22.1	23.5	24.9	27.9	30.9
	3S/2C-PCS 2C-850/40W	9	7820	3	4	7549	0.5	0.8	1.2	2.0	2.9	3.4	3.9	4.9	6.0	6.6	7.1	8.3	9.5	10.1	10.7	12.0	13.3

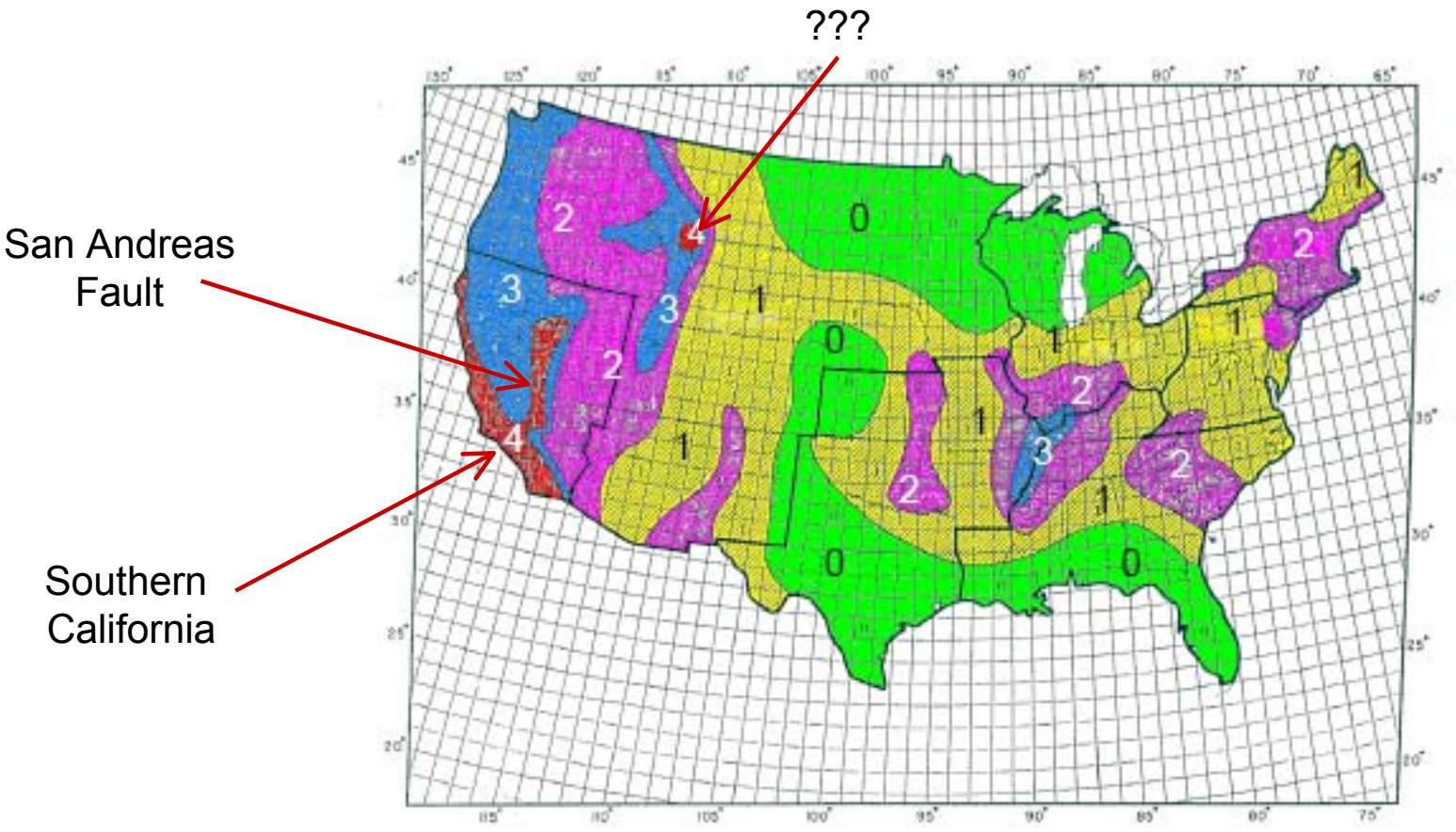
Table 3: Power & Battery Backup for Indoor MCPA-Ready Configurations e/w KS24597, L1 (100Ah) Batteries

UMTS Indoor Modcell 4.0 Rectifier Count & Battery Reserve Times - 850 & 1900 MHz e/w KS-24597, L1 Batteries MCPA-Ready Configured Radio Cabinets																			
	Sector/ Carrier	**No. of UCUs**	**DC Power Max (W)**	**No. of 3kW rectifiers w/o N+1**	**No. of 3kW rectifiers w/ N+1**	**DC Power Typ (W)**	**Battery Reserve Times (hrs) KS-24597, L1 (100aH) Ta = 25C EOD = 1.75V/cel**												
							Number of strings												
							2	4	6	8	10	12	14	16	18	20	22	24	26
Indoor	1S/1C	2	812	1	2	571	7.7	17.2	27.4	38.2	49.4	60.9	72.7	84.8	97.1	109.7	122.4	135.3	148.3
	2S/1C	4	1005	1	2	763	5.5	12.3	19.6	27.3	35.4	43.6	52.1	60.7	69.6	78.5	87.6	96.9	106.2
	3S/1C	5	1151	1	2	909	4.5	10.1	16.0	22.3	28.9	35.6	42.6	49.6	56.9	64.2	71.6	79.2	86.8
	1S/1C-PCS 1C-850	4	1000	1	2	763	5.5	12.3	19.6	27.3	35.4	43.6	52.1	60.7	69.6	78.5	87.6	96.9	106.2
	2S/1C-PCS 1C-850	4	1200	1	2	963	4.2	9.4	15.0	20.9	27.0	33.4	39.8	46.5	53.2	60.1	67.0	74.1	81.3
	3S/1C-PCS 1C-850	4	1400	1	2	1163	3.4	7.6	12.1	16.8	21.8	26.8	32.1	37.4	42.8	48.3	53.9	59.6	65.4
	3S/1C-PCS 1C-850	9	1630	1	2	1393	2.8	6.2	9.8	13.7	17.7	21.8	26.0	30.4	34.8	39.3	43.8	48.4	53.1
	3S/2C	9	1337	1	2	1093	3.7	8.1	13.0	18.1	23.4	28.8	34.4	40.2	46.0	51.9	57.9	64.0	70.2
	3S/2C-PCS 2C-850	9	1950	1	2	1717	2.2	4.8	7.7	10.7	13.9	17.1	20.5	23.9	27.3	30.9	34.4	38.1	41.7

Table 4: Power & Battery Backup for Indoor MCPA-Ready Configurations e/w IR145 (145Ah) Batteries

UMTS Indoor Modcell 4.0 Rectifier Count & Battery Reserve Times - 850 & 1900 MHz e/w IR145 Batteries MCPA-Ready Configured Radio Cabinets																							
	Sector/ Carrier	**No. of UCUs**	**DC Power Max (W)**	**No. of 3kW rectifiers w/o N+1**	**No. of 3kW rectifiers w/ N+1**	**DC Power Typ (W)**	**Battery Reserve Times (hrs) IR145 (145aH) Ta = 25C EOD = 1.75V/cel**																
							Number of strings																
							2	3	4	6	8	9	10	12	14	15	16	18	20	21	22	24	26
Indoor	1S/1C	2	812	1	2	571	13.6	22.9	33.1	55.7	80.7	93.8	107.4	135.8	165.6	180.9	196.6	228.7	261.9	278.8	296.0	331.1	366.9
	2S/1C	4	1005	1	2	763	9.4	15.7	22.8	38.4	55.6	64.6	74.0	93.6	114.1	124.7	135.4	157.6	180.4	192.1	203.9	228.1	252.8
	3S/1C	5	1151	1	2	909	7.5	12.6	18.2	30.7	44.4	51.6	59.1	74.7	91.1	99.5	108.1	125.8	144.1	153.4	162.8	182.1	201.9
	1S/1C-PCS 1C-850	4	1000	1	2	763	9.4	15.7	22.8	38.4	55.6	64.6	74.0	93.6	114.1	124.7	135.4	157.6	180.4	192.1	203.9	228.1	252.8
	2S/1C-PCS 1C-850	4	1200	1	2	963	6.9	11.7	16.9	28.5	41.2	47.9	54.9	69.4	84.6	92.4	100.4	116.8	133.8	142.4	151.2	169.1	187.4
	3S/1C-PCS 1C-850	4	1400	1	2	1163	5.4	9.2	13.3	22.3	32.3	37.6	43.1	54.4	66.4	72.5	78.8	91.7	105.0	111.8	118.6	132.7	147.1
	3S/1C-PCS 1C-850	9	1630	1	2	1393	4.3	7.3	10.5	17.7	25.6	29.8	34.1	43.2	52.6	57.5	62.5	72.7	83.2	88.6	94.1	105.2	116.6
	3S/2C	9	1337	1	2	1093	5.9	9.9	14.4	24.2	35.0	40.7	46.6	59.0	71.9	78.5	85.3	99.3	113.7	121.0	128.5	143.7	159.3
	3S/2C-PCS 2C-850	9	1950	1	2	1717	3.3	5.6	8.0	13.5	19.6	22.8	26.1	33.0	40.2	43.9	47.8	55.6	63.6	67.7	71.9	80.4	89.1

Figure 3: Zone 4 Area Map.



Glossary

A

A (Ampere)
Base SI unit of electrical current.

AC (Alternating Current)
Continuously variable current, rising to a maximum in one direction, falling to zero, then reversing direction and repeating the cycle in the other direction.

AC convenience outlet
UMTS Compact sites must be equipped with at least two duplex outlets for installation and maintenance procedures. The outlets are required to power test the equipment and installation tools.

ACF (AC Fail)
The AC Fail (ACF) alarm indicates that AC input to one or more rectifiers in the power plant is absent or outside of the operating range of the equipment

Ambient temperature
The temperature of air or other media in a designated area, particularly the area

ANSI (American National Standards Institute)
An organization chartered to accredit standards developed by a wide variety of industry groups, without influence from any one company or organization. Does not develop standards, but reviews and implements those developed by other organizations.

Antenna
An elevated device for radiating or receiving radio waves. It changes electrical currents into electromagnetic waves, and vice versa.

AP (Application Processor)
Network element located at the MSC which provides the radio control logic for managing calls. The AP is a general purpose computer that can host a number of RCS virtual machines.

AWG (American Wire Gauge)
American standard for classifying wire diameter.

B

Backup

Facility used to replace an element which has failed.

Balun (Balanced to Unbalanced)

A device used to couple a balanced device or line to an unbalanced device or line.

Base station

The equipment that provides the air interface that allows mobile terminals to communicate with the telecommunications network.

BD (Battery on Discharge, first stage)

The batteries on Discharge (BD) alarm indicates the power system output voltage has decreased bellow the batteries on discharge threshold set point. The batteries on discharge threshold shall be set for 50.0 volts(for -48VDC systems) or 25.0 volts (for +24 VDC systems).

BD-2 (Battery on Discharge -2)

The batteries on Discharge (BD-2) alarm indicates the power system output voltage has decreased bellow the batteries a second discharge threshold set point. The batteries on a second discharge threshold shall be set for 44.0 volts(for -48VDC systems) or 22.0 volts(for +24 VDC systems).

Bonding

Permanent connection of metallic parts to form an electrically conductive path that will assure electrical continuity and have the capability to safely conduct any current likely to be imposed.

Branch circuit

The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s).

Breaker, circuit

A cut-out device which breaks a circuit when preset limits of current are exceeded.

Buried cable

A communication cable manufactured or produced for the purpose of burial in direct contact with the earth.

Buried ring ground

A buried, bare, tinned, solid copper cable encircling the cell site building and/or tower foundation.

Bus bar

One or more conductors that serves as a common connection for a group of related devices.

Busy hour

The uninterrupted period of 60 minutes for which the average intensity of traffic is at maximum.

C

Cabinet

An enclosure with frame and door designed for surface or flush mounting, housing electrical and/or electronic equipment.

Cable run

Referring to cable routing.

Cable sweep

See Sweep

Carriers

A wave suitable for modulation by an information-bearing signal.

Cell

A geographical area, usually depicted as hexagon-shaped, that is served by a cellular system. Cellular technology is based on the premise that a group of radio frequencies used within one cell can be used again in a distant cell.

Cell site

An installation located within a cell that houses the equipment needed to set up and complete calls on a cellular telephone.

CIC (Customer Information Center)

Source for locating and obtaining delivery of Alcatel-Lucent customer information products.

Circuit

1. The complete path between two terminals over which one-way or two-way communications may be provided. 2. An electronic path between two or more points, capable of providing a number of channels. 3. A number of conductors connected together for the purpose of carrying an electrical current. 4. An electronic closed-loop path among two or more points used for signal transfer. 5. A number of electrical components, such as resistors, inductances, capacitors, transistors, and power sources connected together in one or more closed loops.

Coaxial cable

A cable with one or more coaxial pairs under one outer shealth. The cable consists of a center conductor surrounded by an insulating material and a concentric outer conductor.

Configuration

An arrangement of functional units according to their nature, number, and chief characteristics.

Controlled environment

An indoor location in which temperature, humidity, and ventilation are maintained at specific levels.

CSA (Canadian Standards Association)

An independent, non-government, not-for-profit association for the development, by consensus, of Canadian standards and product certifications.

CSC (Cell Site Configuration)

Sheets provided in Appendix B, "UMTS Macrocell site information" of this document for documenting cell site configuration, conditions, and other pertinent information for reference during product deployment, and future additions.

Customer-supplied power

3rd party power systems, or power systems other than Alcatel-Lucent.

D

dB (Decibel)

A unit which expresses the ratio of two voltages, currents, or powers. It is used to specify transmission loss, gain, or relative level. It is equal to 20 times the common logarithm of the ratio of two voltages or two currents, or 10 times the common logarithm of the ratio of two powers.

DC (Direct Current)

Current flow in one direction.

DCS (Digital Cellar Switch)

Switch that terminates all voice trunks in the cellular system (i.e., 5ESS-2000).

Demarcation

A terminal acting as a physical interface between equipment which are the responsibilities of different carriers.

Diversity

A method of radio transmission and/or reception, which counteracts the effects of fading by combining several signals all bearing the same information.

Down conductor

A vertical conductor of low impedance that connects the cell site grounding electrode system to the grounding electrode system.

Driven ground rod

A copper-clad steel or stainless steel rod, a minimum of 8'0″ long and 5/8″ in diameter.

DS0 (Digital Signal-level 0)

The basic channel in the digital hierarchy, DS0 consists of digital signal of 64 kbps.

DS1 (Digital Signal-level 1)

A level of digital hierarchy that transmits a time multiplexed signal that contains 24 DS0 channels. A DS1 channel 1.544 Mbps. Also referred to as a T1 facility or span.

DTF

Digital Transmission Facility

E

E1

A voice and data trunking facility that carries 30 duplex channels in 64-kbps time slices. E1 facilities are commonly used in countries outside of North America.

E3

E-Carrier-level 3

Earthquake zone

Seismic ratings ranging from zone 1 (relatively low central office operational shock and vibration levels) to the most severe zone 4 levels. Equipment must be able to withstand earthquake zone requirements under both operational and non-operational conditions.

ECP (Executive Cellular Processor)

A Alcatel-Lucent 3B21D computer and its associated input/output devices, which controls system operations. The ECP is responsible for mobility management, call processing, system maintenance, technical interfaces, and system integrity.

Electrolytic ground electrode (rods)

A low resistance grounding rod (pipe) using low resistivity materials.

Exothermic weld

A method of making electrical connections of copper to copper or copper to steel using high temperature fusion. The molten copper flows over conductors in a mold, melting and welding them together.

F

FA (Fuse Alarm)

The fuse alarm (FA)indicates that the power system battery and load protection fuse opens.

Facility

Any element of physical telephone equipment needed to provide service, such as cables, switching systems, and microwave radio transmission systems.

FCC (Federal Communications Commission)

A group founded in 1934 to regulate all types of communications in the United States.

Flexent

Registered Trademark of Alcatel-Lucent.

Float

To operate a power load on a main-driven rectifier in parallel with a low impedance storage battery, which is kept fully charged by the rectifier and is itself only called upon to provide power during temporary and short-duration peaks for which the rectifier output is insufficient.

Frequency

For a periodic wave, such as alternating current, the number of complete cycles per unit of time. The unit of frequency is cycles per second, or *hertz*.

Fuse

An overcurrent protective device that has as its critical component a metal wire or strip that will melt when heated by a prescribed (design) amperage, creating an open in the circuit of which it is a part, thereby protecting the circuit from an overcurrent condition.

G

Gain

The ratio of output current, voltage, or power to input current, voltage, or power, respectively. Gain is usually expressed in dB. If the ratio is less than unity, the gain, expressed in dB, will be negative, in which case there is a loss between input and output.

Garmin 45XLS

A handheld GPS receiver that can be used to verify GPS reception at a cell site. It has a removable antenna and provides +5 VDC on the center pin of the RF connection to power external active antennas. If poor GPS reception is suspected, the Garmin 45XL can be used to verify that the GPS antenna and cable system is working acceptably. It will also verify that the GPS antenna location is acceptable.

GFCI (Ground Fault Circuit Interrupter)

A device intended for protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.

GPS (Global Positioning System)

A satellite-based location technology, developed and operated by the U.S. Department of Defense, which determines position by means of measured, transmitted signals of latitude, longitude, elevation and time, between multiple satellites, a master control station, and a user's receiver.

Ground

A conducting connection between equipment or an electrical circuit and earth, or conductive body that is used in place of earth.

Grounding conductor

A conductor used to connect equipment or a grounded electrical circuit to the grounding electrode system.

Grounding electrode system

The conductive objects that are intentionally bonded to furnish connection to earth (i.e., buried ring ground with ground rods, electrically continuous buried metallic water pipe, electrolytic ground electrode, etc.).

Guy

Steel wire or rope used to hold a pole upright.

H

Halo ground

An interior ring ground, stranded copper cable with green insulation that is installed around the equipment approximately 2.4 meters (8 ft.) above the floor or 1.8 meters (6 ft.) below the ceiling.

Handoff

A automatic transfer of a cellular telephone call from one cell to another, maintaining call quality as the mobile user moves through the coverage area.

Heat dissipation

The heat generated by cabinets during operation.

Hot spots

(Public Wireless LAN Service Providers) Deliver wireless services to users in public spaces such as airports, convention centers, coffee shops, internet cafes, etc. These public spaces are generally referred to as hot-spots with internet access being the primary service provided.

HVAC (Heating, Ventilation, Air Conditioning)

Hz (hertz)

A unit of frequency of a periodic process equal to one cycle per second.

I

Integrated power

AC cabinet or cabinet with power rectifiers factory installed.

INTR (Intrusion Alarm)

The Intrusion (INTR) alarm indicates a door or access panel to the power system is open.

ITU (International Telecommunication Union)

L

LC

Line Circuit

Load

The power consumed by a device or circuit in performing its function.

Loss

The diminution, usually expressed in dB, of signal level in a communications medium. The power, usually expressed in watts, consumed by a circuit or component. The energy dissipated without accomplishing useful work or purpose.

M

MGB (Main Ground Bus)

A copper bus bar used to provide the electrical interfaces for connection of the isolated ground plane to the integrated ground system.

MHz (Megahertz)

Reference of radio frequency spectrum of one-million cycles.

MOP (Method of Procedure)

Cell site walk-through where site preparation activities are verified prior to installing the UMTS Compact equipment.

MSC (Mobile Switching Center)

In an automatic cellular mobile system, the interface between the radio system and the public switched telephone network. The MSC performs all signaling functions that are necessary to establish calls to and from mobile stations.

MTA (Major Trading Area)

The market area specified by the FCC for PCS A and B band licenses. Each MTA is comprised of a number of basic trading areas. The USA has 51 MTA license areas.

N

NEC (National Electric Code)

Standard that governs the use of electric wire, cable, and fixtures, and electrical and optical communication cable installed in buildings.

Network

A set of terminals, the communications link that joins them, and the protocols that allow them to function together and communicate with each other.

NFPA (National Fire Protection Association)

Standards and code writing organization made up of volunteer industrial and institutional subject-matter-expert committees.

NIU (Network Interface Unit)

A device that performs interface functions, such as code conversion, protocol conversion, and buffering, required for communications to and from a network. The device is used primarily within a local area network to allow a number of independent devices, with varying protocols, to communicate with each other. An NIU converts each device protocol into a common transmission protocol. The transmission protocol may be chosen to accommodate directly a number of the devices used within the network without the need for protocol conversion for those devices by the NIU.

Nominal

Specified value or intended value independent to any uncertainty in its realization. In a device that realizes a physical quantity, it is the value of such a quantity specified by the manufacturer.

O

OC3

Optical Carrier-level 3

P

Pair cable

Cable made up of one or more separately insulated wire pairs, none of which is arranged with another quads.

PCS (Personal Communications Services)

Services for digital RF equipment operating in the 2-GHz spectrum.

Phase

The number of separate voltage waves in commercial alternating current, designated as ″single phase″, ″three phase″, etc.

Pigtail

A short length of electrical conductor permanently affixed to a component, used to connect the component to another.

PMJ

Conditions that impacts service of the power system and/or requires immediate attention are classified as major alarms and designated as Power Major (PMJ) alarms.

PMN

Conditions requiring service, but having no immediate impact on the power system output are classified as minor alarms and designated as Power Minor (PMN) alarms.

PVC (Polyvinyl Chloride)

A thermoplastic made of polymers, which is tough, nonflammable, and water resistant and is used as an insulant.

R

RCS (Radio Cluster Server)

Receive-only

Pertaining to a device or a mode of operation capable of receiving messages, but not transmitting messages.

RF (Radio Frequency)

Electromagnetic wave used for, among other things, cellular voice and data communications.

RFTG

Reference Frequency and Time Generator

RMS (Root Mean Square)

Effective value of an alternative wave. For AC, this is numerically equal to DC value of the current with the same heating effect.

Rx (Receive)

S

Sector

The coverage area within the degree of directionality of the antennas.

Service provider

Customer who purchases switching and UMTS Compact equipment from system vendors, which, in turn, is provided to end-user subscribers through resellers and distribution channels.

Shield

A housing, screen, sheath, or cover that substantially reduces the coupling of electric, magnetic, or electromagnetic fields into or out of circuits or transmission lines.

Short-term

No more than 96 consecutive hours or 15 days per year.

Single-phase

A circuit in which there is only one sinusoidal voltage variation.

Site preparation

To perform the requirements necessary at the cell site before installation can begin.

Stranded

Wires twisted together to form a strong flexible cable.

Surge protector

Protective device used to limit surge voltages by discharging or bypassing any unwanted surge current that may enter a building or equipment.

Sweep

To vary the frequency of a signal over a whole band as a means of checking the response of equipment under test.

SWR

Standing Wave Ratio

T

T1

A four-wire voice and data trunking facility that carries 24 duplex channels over 56-kbps time slots.

T3

T-Carrier-level 3

THHN (Thermoplastic high-heat resistant nylon-coated)

Three-phase

An alternating current supply with three sinusoidal voltages differing in phase by 120°.

THWN (Thermoplastic heat and water resistant nylon-coated)

Twisted pair cable

Cable made up of one or more separately insulated twisted-wire pairs.

Tx (Transmit)

TYP (Typical)

U

UL (Underwriters Laboratories)

Laboratories that test and approve materials and equipment against pre-determined performance standards.

UMTS (Universal Mobile Telecommunications System)

A 3G wireless technology for delivering data at speeds of up to 2Mbps per second. It can also deliver video and audio to wireless devices. UMTS is endorsed by a number of standards bodies and wireless equipment vendors.

UMTS Macrocell Compact

Provides radio access interfaces and radio resources management functions, as well as call handling with the 5ESS″ Switch at Cellular and PCS frequencies.

UV (Ultraviolet)

The portion of the electromagnetic spectrum in which the longest wavelength is just below the visible spectrum, extending from approximately 4 Nm to approximately 400 Nm. Some authorities place the lower limit of uv at values between 1 and 40 Nm, 1 Nm being the upper wavelength limit of x-rays. The 400-Nm limit is the lowest visible

wavelength, i.e., the highest visible frequency, violet.

V

V (Volt)
The derived SI unit of electrical potential difference. It is the difference in potential between two points of a conducting wire carrying a constant current of 1 ampere when the power dissipated between these two points is equal to 1 watt.

VAC (Volts Alternating Current)

VDC (Volts Direct Current)

Vrms (Volts Root Mean Square)

VSWR (Voltage Standing Wave Ratio)
In a transmission line, the ratio of maximum to minimum voltage in a standing wave pattern. The VSWR is a measure of impedance mismatch between the transmission line and its load. The higher the VSWR, the greater the mismatch. The minimum VSWR, i.e., that which corresponds to a perfect impedance match, is unity.

W

W (watts)
The derived SI unit of power. It is equivalent to 1 joule per second, or 1 volt-ampere.

Walk-through
A critical examination of a design or product undertaken to ensure that it is of adequate quality.

Waveform
The characteristic shape of a periodic wave, determined by the frequencies present and their amplitudes and relative phases.

Z

Z-IDC punchdown block
10-position punchdown block used for terminating T1/E1, user alarms and relays.

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