Alcatel-Lucent 9764

Compact Metro Cell Outdoor B41 2x6W

Site Preparation

3MN-02026-0001-RJZZA

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DRAFT

Contents

DRAFT

About this document

Purpose xi

What's new xi

Safety information xi

Intended audience xi

Systems supported xi

Conventions used xii

Related documentation xiv

Related training xiv

Site preparation checklists xv

Base station configuration sheets xv

Document support xv

Technical support xvi

How to order xvi

How to comment xvi

1 Safety

Overview 1-1

Structure of safety statements 1-2

Safety 1-4

Safety - specific hazards 1-5

Product safety 1-10

2 Product overview

Overview 2-1

DRAFT

DRAFT

Functional description 2-2

Physical description 2-4

MCO weights and dimensions 2-15

Supported installation options 2-16

Hardware and ancillary items 2-18

3 **Basic site preparation requirements**

Overview 3-1

Environmental and mechanical specifications 3-2

Site requirements 3-4

Installation clearances 3-5

Pole mount requirements 3-6

Wall mount requirements 3-8

4 **Grounding and lightning protection requirements**

Overview 4-1

Grounding and lightning protection 4-2

Product grounding 4-4

5 **Electrical power requirements**

Overview 5-1

Site power requirements (AC) 5-2

Site power requirements (DC) 5-5

Product power requirements 5-8

6 **Backhaul requirements**

Overview 6-1

Ethernet requirements 6-2

7 **Antenna requirements**

Overview 7-1

DRAFT

DRAFT

General antenna cable requirements 7-2

Antenna configuration options 7-3

A Site survey checklists

Overview A-1

SS-1 Venue survey checklist A-2

SS-2 Site survey general checklist A-4

SS-3 Site survey access checklist A-7

SS-4 Site survey conclusion A-9

B Site preparation checklists

Overview B-1

SP-1 Site preparation general checklist B-2

SP-2 Site preparation power source checklist B-3

SP-3 Site preparation grounding checklist B-4

SP-4 Site preparation RF antenna checklist B-6

SP-5 Site preparation GPS antenna checklist B-7

Site preparation punch list sheet B-9

Site preparation punchlist sheet B-10

C Product conformance statements

Overview C-1

Federal Communications Commission C-2

Product safety conformance statements C-4

Antenna exposure statements C-5

FDA/IEC optical transmitter product compliance statements C-7

Eco-environmental statements C-8

Glossary

Index

DRAFT

DRAFT

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DRAFT

List of tables

1 Terminology xii

2-1 9764 Compact Metro Cell Outdoor B41 2x6W 2-18

2-2 Backhaul Module 2-18

2-3 Basic installation Kit Compact 2-18

2-4 Mounting frame 2-19

2-5 Mounting kits 2-21

3-1 Pole mount installation kits and brackets 3-6

3-2 Wall mount installation brackets 3-8

4-1 Grounding materials 4-4

5-1 Power materials 5-8

6-1 Backhaul Module 6-2

6-2 Ethernet cable - Electrical 6-3

6-3 Ethernet cable - Optical 6-3

6-4 Ethernet cable - Optical for GPON 6-4

7-1 Main Characteristics of Antenna Array 7-3

DRAFT

DRAFT

DRAFT

DRAFT

List of figures

2-1 Front view 2-5

2-2 Front view of a 9764 CMCO B41 2x6W with solar shield and attached antennas 2-6

2-3 Front view of a 9764 CMCO B41 2x6W with a 9764 MCO Wi-Fi AP attached 2-6

2-4 Rear view 2-7

2-5 Top view 2-8

2-6 9764 CMCO B41 2x6W connection interfaces 2-10

2-7 Solar shield with attached antenna array 2-11

2-8 9764 CMCO B41 2x6W with external GPS/Glonass antenna 2-12

2-9 LED position and orientation 2-13

2-10 Installation examples 2-16

2-11 9764 MCO Wi-Fi AP module attached to 9764 CMCO (front view) 2-17

3-1 9764 CMCO B41 2x6W installation clearances 3-5

3-2 Pole mount banding and brackets 3-7

3-3 9764 CMCO wall mount examples 3-9

5-1 Power connection point 5-9

6-1 Ethernet surge arrestor 6-4

7-1 9764 CMCO with antenna 7-3

7-2 Default GPS antenna configuration 7-4

7-3 Remote GPS antenna configuration 7-5

DRAFT

DRAFT

DRAFT

DRAFT

DRAFT

About this document

Purpose

This document covers the basic site preparation guidelines that should be used to plan an Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W. Specific tasks are outlined that should be completed at the job site before an installation can begin.

What's new

The major changes introduced in this issue of the document are described in the following paragraphs.

Feature/ enhancement	Description	Location
Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W	Created the first draft for Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W.	entire document

Safety information

For your safety, this document contains safety statements. Safety statements are given at points where risks of damage to personnel, equipment, and operation may exist. Failure to follow the directions in a safety statement may result in serious consequences.

Intended audience

The audience for this document is Site Preparation personnel relating to the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W product.

Systems supported

This document applies to the following 9764 CMCO products:

- Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W
- Alcatel-Lucent 9764 Metro Cell OutdoorWi-Fi AP (optional equipment)

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Refer to *Alcatel-Lucent Small Cell Wi-Fi AP Technical Description,* 3MN-01840-0004-DEZZA for Wi-Fi AP product details.

Conventions used

The following conventions are used in this document:

Vocabulary conventions

The following vocabulary conventions are also used when referring to Alcatel-Lucent products:

Table 1 Terminology

Term	Description/Meaning
9764 MCO Wi-Fi AP	Refers to the optional Alcatel-Lucent 9764 Metro Cell Outdoor Wi-Fi Access Point (AP) module, supporting Wi-Fi network access.
9764 CMCO module	Refers to the module that contains the complete base station, including baseband unit, radio unit and antenna.
9764 CMCO B41 2x6W	Refers to the Alcatel-Lucent 9764 Compact Metro Cell Outdoor V2.2 B41 LTE 2x6W model of the 9764 CMCO.
9764 CMCO	The 9764 CMCO consists of the following modules: the 9764 CMCO, and optionally the 9764 MCO Wi-Fi AP.

Naming conventions

In this information product, the *Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W* at times will be referred to 9764 CMCO.

Typographical conventions

The typographical conventions used in this document are described in the following table.

Appearance	Description
emphasis	Text that is emphasized
document titles	Titles of books or other documents
graphical user interface text	Text that is displayed in a graphical user interface
`variables`	A value or command-line parameter that the user provides

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Illustrations

The illustrations shown in this document are schematics. They 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. Tolerances shall be held to 1.52 (.06) and are not cumulative.

Standard cross-sections and wire diameter 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
240	500 kcmil

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DRAFT

ISO rated cross-sectional area (mm^2)	AWG/ kcmil size
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

Alcatel-Lucent documents

The following documents may provide additional useful information:

- *Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W Hardware Installation,* 3MN-02026-0002-RJZZA
- *Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W Technical Description,* 9YZ-06340-0314-DEZZA
- *Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W Maintenance and Troubleshooting,* 9YZ-06340-0315-REZZA
- *Alcatel-Lucent Small Cell Wi-Fi AP Technical Description,* 3MN-01840-0004-DEZZA
- *Alcatel-Lucent 9772 Wi-Fi Service Controller and Small Cell Wi-Fi AP System Reference Guide,* 3MN-01840-0002- RKZZA
- *Alcatel-Lucent 9772 Wi-Fi Service Controller and Small Cell Wi-Fi AP Command Line Interface,* 3MN-01840-0003- RKZZA
- *Grounding and Lightning Protection Guidelines for Alcatel-Lucent Network Wireless System Cell Sites,* 401-200-115.

Other documents

Other documents as follows:

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

Related training

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

- Hazard Communication
- Lift Safety
- Hoist Safety

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- Lock Out/Tag Out
- Accident/Incident Reporting.

Other related training is for:

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

Site preparation checklists

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 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 of this document 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.

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1 Safety

Overview

Purpose

This chapter covers safety precautions.

Contents

Structure of safety statements	1-2
Safety	1-4
Safety - specific hazards	1-5
Product safety	1-10

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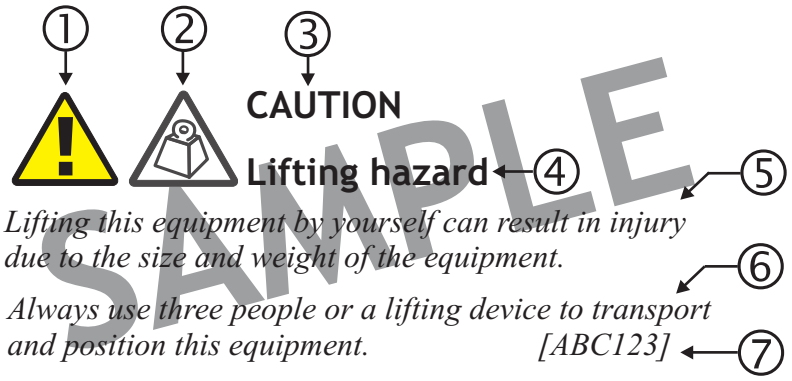
Structure of safety statements

Overview

This topic describes the components of safety statements that appear in this document.

General structure

Safety statements include the following structural elements:



SAMPLE

Item	Structure element	Purpose
1	Safety alert symbol	Indicates the potential for personal injury (optional)
2	Safety 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	Safety message	Consequences if protective measures fail
6	Avoidance message	Protective measures to take to avoid the hazard
7	Identifier	The reference ID of the safety statement (optional)

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Signal words

The signal words identify the hazard severity levels as follows:

Signal word	Meaning
DANGER	Indicates an extremely hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a hazardous situation not related to personal injury.

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Safety

General precautions for installation procedures

WARNING

Electric shock and equipment damage

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 must be provided with a readily accessible disconnect device as part of site preparation.*
- *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 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 telecommunications wiring during a lightning storm.*
- *Never install telecommunications connections in wet locations.*
- *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 spill liquids of any kind on the product.*
- *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.*

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Safety - specific hazards

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.).

DANGER

Noxious-substance hazard

Use of unspecified cleaning agents can result in personal injury.

Use only specified cleaning agents. Never use flammable solvents.

Always ensure there is adequate ventilation in the work area and wear the appropriate personal protective equipment.

DANGER

Laser hazard

This equipment operates with invisible laser radiation. Laser radiation can cause considerable injuries to the eyes.

Never look into the end of an exposed fiber or into an open optical connector when the optical source is switched on. Always observe the laser warning instructions.

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 + A1 or EN 60215) may install or service the installation.

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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

Electric-shock hazard

This product may be connected to an AC main power supply and may contain an internal battery supply. Disconnecting one power source may not de-energize the system, and can lead to serious injury.

Disconnect and lock out the AC main power supply, if present, and the internal battery supply, if present, before servicing the equipment.

WARNING

Laser hazard

The light from laser and high-radiance LED's may cause eye damage if absorbed by the retina.

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NOTICE

ESD hazard

Semiconductor devices can be damaged by electrostatic discharges.

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

- *Wear conductive or antistatic working clothes (for example, coat made of 100% cotton).*
- *Wear the grounded 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 packaging 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 properly grounded approved ESD work mat.*
- *Test or handle the module only with grounded tools on grounded equipment.*
- *Handle defective modules exactly like new ones to avoid causing further damage.*

NOTICE

Condensation

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 installation.

CAUTION

Laceration hazard

The equipment and the components within may have sharp edges and burrs and contact may cause cuts and lacerations.

Beware of sharp edges and burrs, especially when working on areas inside the equipment difficult to access.

Wear appropriate personal protective equipment.

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NOTICE

Tools

Tools left in the working area can cause short circuits during operation which can lead to the destruction of units.

Make sure after finishing your work that no tools, testing equipment, flashlights, etc., have been left in or on the equipment.

NOTICE

Inadequate circulation

Inadequate circulation of cooling air can cause some units to become too warm. This can lead to operational impairment.

Cover all installation slots for unequipped units with blanking panels.

CAUTION

Hot-surface hazard

Touching a hot heater may cause burns.

Do not touch the heaters.

Before touching the units wait until they have cooled down, wear safety gloves and clothes.

NOTICE

Corrosive-substance hazard

Cleaning plastic containers and lids with abrasive and aggressive cleaning agents may cause permanent damage.

Do not use solvents, paraffin, abrasive or aggressive cleaning fluids, abrasive or aggressive antiseptic agents or abrasive or aggressive materials.

NOTICE

Service-disruption hazard

Cleaning with water or a high-pressure cleaner will damage the components in the equipment.

The washing down of the equipment with water or a high-pressure cleaner is not permitted.

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CAUTION

Lifting hazard

Lifting this equipment by yourself can result in injury due to the size and weight of the equipment.

Always use at least three people or a lifting device to move or position this equipment.

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Product safety

Equipment safety

Safety information for this equipment can be found on various Caution, Warning, Danger, information labels or instructions affixed to or included with the product, its internal assemblies or included within this document. Informational and cautionary labels may appear near the item they address or may be grouped in a single location on the equipment. Warnings are typically adjacent to the hazard that is noted on the label. The instructions, cautions and warnings found on these labels must be understood and observed by all personnel involved with the equipment installation and maintenance.

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2 Product overview

Overview

Purpose

This chapter provides an overview of the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W.

Contents

Functional description	2-2
Physical description	2-4
MCO weights and dimensions	2-15
Supported installation options	2-16
Hardware and ancillary items	2-18

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Functional description

General description

As a key component of high capacity networks, Alcatel-Lucent Metro Cells fill coverage gaps between macro cells and provide indoor (and outdoor) coverage from indoor or outdoor locations, enabling mobile network operators (MNOs) to deliver cost-effective capacity to urban spots, as well as affordable coverage to suburban and rural locations. Their essential usage is to deliver significantly higher capacity in places that need it, contributing to enhancement of the quality of experience (QoE) for end users. It can also complement or improve significantly the LTE macro layer coverage.

Alcatel-Lucent Metro Cells when used as components of heterogeneous networks (HetNets), are compatible with both Alcatel-Lucent macro cells and 3rd party vendor macro cells and integrate easily into any LTE network, without impacting the current RAN deployment. The combination of macro eNodeB and 9764 MCO advanced interference management features minimize any impact on macro network performance.

Product capabilities

The 9764 CMCO B41 2x6W main capabilities in this release are:

- Supports LTE TDD
- The hardware is ready is ready for up to 3 LTE carriers of 10, 15 or 20 MHz.
- 2500 MHz frequency band, range from 2496 - 2690 MHz (Full B41)
- Two transmit paths of up to 6W per path
- Optional external or integrated fully digital directional antennas enabling higher throughput, lower interference and greater power efficiency
- Standard 2x2 MIMO configurations, 2 transmit and 2 receive diversity
- The product supports two different SFP backhaul modules:
  - Supports daisy chaining
  - Supports one with PoE+ capability to power and backhaul any PoE+ compatible external device

    Note: The PoE+ backhaul module will not be supported at launch.
- Supports optional modular and field replaceable Wi-Fi Access Points.

  Note: When deploying a Compact MCO with a remote Wi-Fi AP connected to the POE interface, the antenna isolation between the Wi-Fi AP and the LTE antenna must be at least -42 dB.

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Deployment scenario

The 9764 CMCO B41 2x6W can be deployed indoors or outdoors in public places and can be mounted on walls, lamp posts, poles, or even on the side of a building in a vertical orientation thanks to the Metro Compact Mounting Frame.

It can also be integrated in urban furniture such as bus shelter and information panels.

Optional tilt mounting brackets allow for the 9764 CMCO B41 2x6W to be adjusted in vertical and/or horizontal directions at same time

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Physical description

Product overview

The Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W is housed in an Alcatel-Lucent generic metallic case. The product is designed to be deployed close to the users, usually in streets on light poles or on walls of buildings, with a vertical profile that hides cable connectors and mounting kit for a smooth integration into the surrounding environment.

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Front view of the 9764 CMCO B41 2x6W

The following figure shows the front view of the 9764 CMCO B41 2x6W with/without solar shield.

Figure 2-1 Front view

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The following figure shows the front view of the 9764 CMCO B41 2x6W with solar shield and attached antennas.

Figure 2-2 Front view of a 9764 CMCO B41 2x6W with solar shield and attached antennas

The following figure shows the 9764 CMCO B41 2x6W with 9764 Wi-Fi AP attached.

Figure 2-3 Front view of a 9764 CMCO B41 2x6W with a 9764 MCO Wi-Fi AP attached

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Rear view of the 9764 CMCO B41 2x6W

The following figure shows the rear view of the 9764 CMCO B41 2x6W with/without wall mount plate.

Figure 2-4 Rear view

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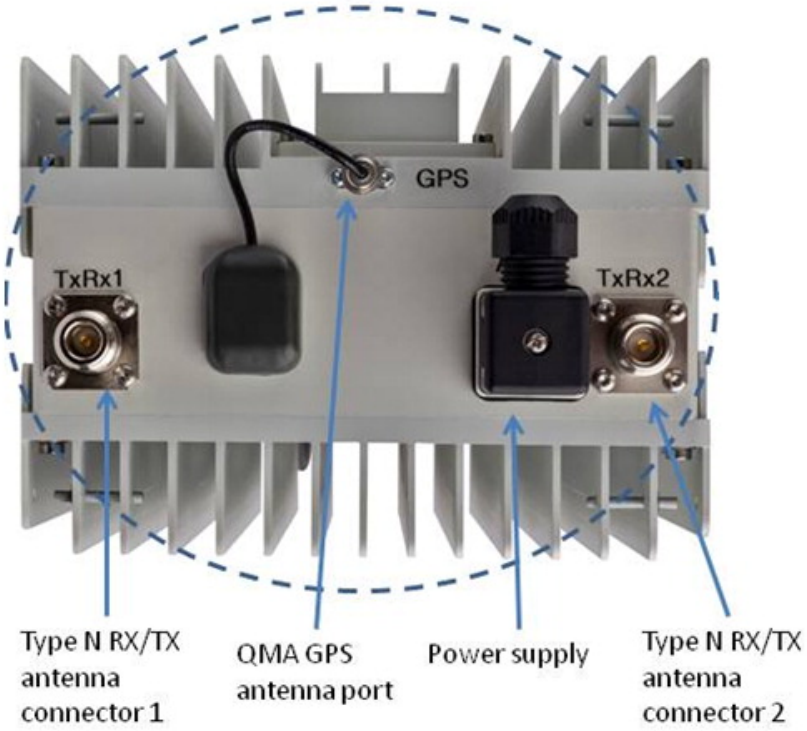
Top view of the 9764 CMCO B41 2x6W

The following figure shows the top view of the 9764 CMCO B41 2x6W.

Figure 2-5 Top view



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9764 CMCO B41 2x6W functions

In order to simplify configurations the backhaul access function and the radio part functions are separated, with a common interface as defined:

Unit	Function	Description
9764 CMCO B41 2x6W	Radio part function	Radio functions Digital processing functions Power supply functions
Backhaul module	Backhaul access function Provides power to a remote Powered Device (PD) for PoE+ case.	Two backhaul module variants: • Dual SFP • SFP/PoE+
9764 MCO Wi-Fi AP module	Wi-Fi function	Wi-Fi network access function Refer to *Alcatel-Lucent Small Cell Wi-Fi AP Technical Description,* 3MN-01840-0004-DEZZA for Wi-Fi AP product details.

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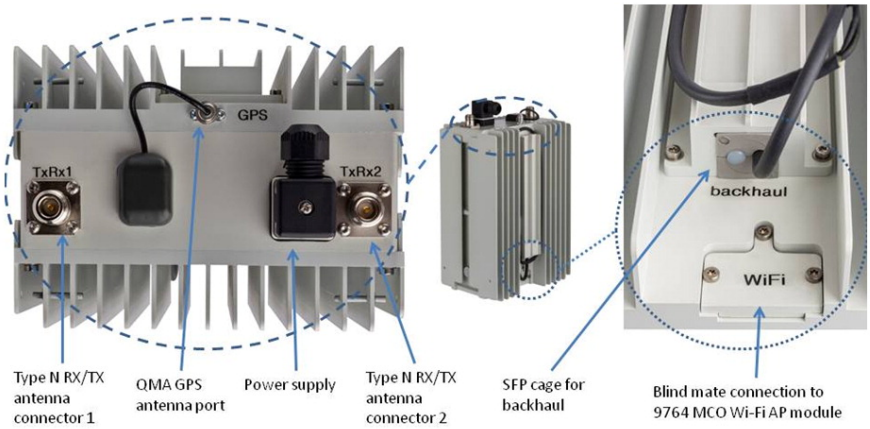
9764 CMCO B41 2x6W connection interfaces

The following figure shows the connection interfaces for the 9764 CMCO B41 2x6W.

Figure 2-6 9764 CMCO B41 2x6W connection interfaces



Connection location on 9764 CMCO	Interface	Purpose
9764 CMCO B41 2x6W (Middle top)	QMA Connector to external GPS antenna	Connection to the external GPS antenna
9764 CMCO B41 2x6W (Right top)	To the Power supply	Connection AC or DC power source.
9764 CMCO B41 2x6W (Left/right top)	Type N antenna connectors	RF antenna connectors
9764 CMCO B41 2x6W (bottom center rear) backhaul module	SFP to backhaul	Backhaul and daisy chaining ports via a backhaul module, either • Dual SFP backhaul module • SFP/PoE+ backhaul module
9764 CMCO (bottom center rear) [1]	To the optional 9764 MCO Wi-Fi AP	Wi-Fi AP (optional) connector

Notes:

1. The 9764 CMCO B41 2x6W supports the attachment of the optional 9764 MCOWi-Fi AP.

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Power supply

The 9764 CMCO B41 2x6W requires an AC power feed (single phase, three-wire voltage source in the 110-220V range), compliant with Telcordia GR-1089 Section 7 and IEC 60364-1 (IEC 60038 Annex A).

A power module unit inside the 9764 CMCO module provides AC/DC conversion (5.3V output) to its power board, which then provides secondary DC-DC conversion and distributes 5.3V (tolerance of +-3%) to the cube-based antennas, and the 9764 MCO Wi-Fi AP module (if equipped).

A variant of the 9764 CMCO B41 2x6W supports -48 V DC power (nominal -48 V source is in the range of -57 to -60 V DC).

RF Antenna

The 9764 CMCO B41 2x6W module supports either optional external antennas or an optional Antenna Module which will be mounted via solar shield to the front of the CMCO.

The two different antenna configurations allow an adaptation of the vertical beam width.

- Single Element Antenna Module (SEM-2600): 7.5 dBi typical gain, 80° H x 75° V HPBW
- Dual Element Antenna Module (DEM-2600): 9.5 dBi typical gain, 80° H x 35° V HPBW

Figure 2-7 Solar shield with attached antenna array

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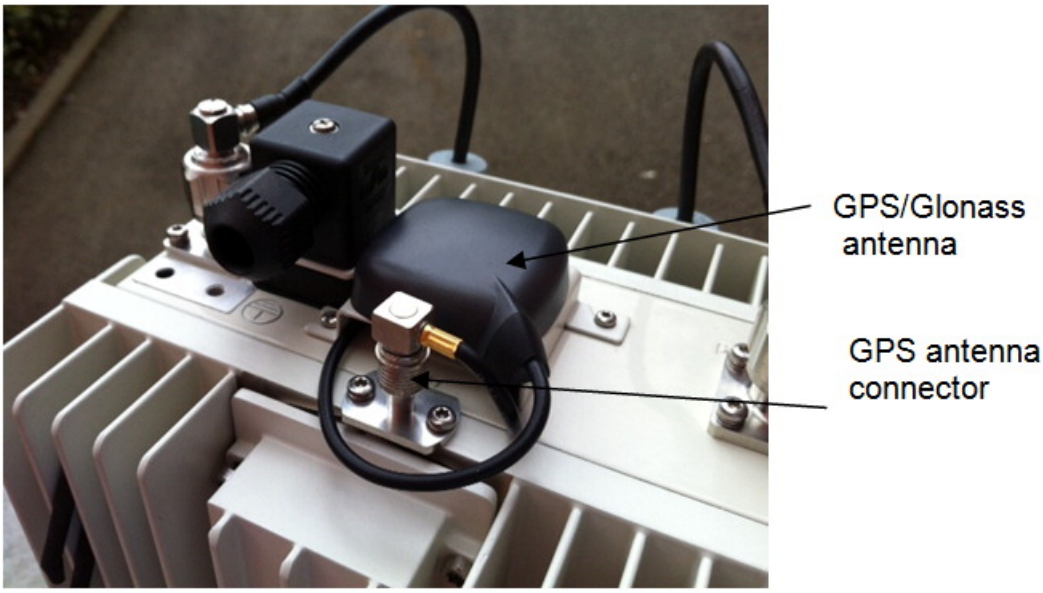
GPS Antenna

The 9764 CMCO B41 2x6W module is by default equipped with an external GPS/Glonass antenna mounted on top and connected via a QMA connector to the internal GPS Receiver (located on the modem board).

- Attached GPS/GLONASS antenna mounted on the top of the9764 CMCO B41 2x6W.
- Cabling to an external remote GPS antenna.

Figure 2-8 9764 CMCO B41 2x6W with external GPS/Glonass antenna



Status indicators

The 9764 CMCO B41 2x6W supports a single bi-color LED (red/green) which is located on the rear lower portion of the casing. The LED is not intended for use during normal operation of the equipment; however, it can provide a visual status of the equipment during initial installation and commissioning.

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Figure 2-9 LED position and orientation

LED	Status	LED description
Off	Power off	Power off
ON (Red)	Initial state	Power on or Restart
Blinking (Green)	Software downloading during system initialization	Software downloading
ON (Red)	Failure	9764 CMCO LTE start-up or operational failure
ON (Green)	9764 CMCO LTE becomes operational	9764 CMCO LTE becoming operational
OFF	9764 CMCO LTE is operational	9764 CMCO LTE has been in stable operation for 15 minutes

Product labelling

The 9764 CMCO B41 2x6W product label provides the following labels:

A unit identification label reflecting:

- Vendor name/Icon
- Model name
- Part number
- Serial number
- CLEI code
- MAC address

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DRAFT

- Power input range
- Data matrix barcode for Part number and Serial number

A regulatory label reflecting:

- Vendor name/Icon
- Product name
- Regulatory rules
- Power input
- Enclosure rating
- Applicable regulatory and environmental certification logos
- Manufacturer name

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MCO weights and dimensions

Weights and dimensions

This topic covers the 9764 CMCO B41 2x6W weights and dimensions.

MRO weights and dimensions

The following table provides weights and dimensions for the 9764 CMCO B41 2x6W with backhaul module but not including other ancillary items such as the 9764 MCO Wi-Fi AP or mounting kits:

MRO configuration	Weight	Volume (litres)	Overall dimensions (Length x Width x Depth)
9764 CMCO B41 2x6W	7.3 kg (16.5 lb)	7.5 Liters	265 x 180 x 156.5 mm (10.4 x 7.09 x 6.16 in)

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Supported installation options

Overview

The following section describes the supported installation options for the Alcatel-Lucent 9764 Compact Metro Cell Outdoor product. These include:

- Standard installation options for all 9764 CMCO products
- Daisy chain installation options where two 9764 CMCO modules are daisy chained together and share the same backhaul port

Standard installation options

The 9764 CMCO products are designed to be deployed outdoors and close to the users, usually on light poles or lamp posts in streets or on building walls, with a vertical profile.

Figure 2-10 Installation examples

Pole mount installation

Wall mount installation

In addition, the 9764 CMCO can be fitted with an optional Alcatel-Lucent 9764 Metro Cell Outdoor Wi-Fi AP.

Note: When deploying a Compact MCO with a remote Wi-Fi AP connected to the POE interface, the antenna isolation between the Wi-Fi AP and the LTE antenna must be at least -42 dB.

Refer to *Alcatel-Lucent Small Cell Wi-Fi AP Technical Description,* 3MN-01840-0004-DEZZA for Wi-Fi AP product details.

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Figure 2-11 9764 MCO Wi-Fi AP module attached to 9764 CMCO (front view)

Urban furniture installation

The Alcatel-Lucent 9764 Compact Metro Cell Outdoor can be installed as part of urban furniture, for example, bus shelter and information panels, to further improve the quality of service provided to users in high density areas such as city centers.

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Hardware and ancillary items

Overview

The following section lists the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W base hardware equipment, the installation kits and ancillary items that can be ordered from Alcatel-Lucent.

Box content

The product packaging contains the following content:

Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W:

- Backhaul Module (2 x SFP or PoE option)
- The Basic installation Kit Compact
- Mounting kits (Metro Compact Mounting Frame)

Table 2-1 9764 Compact Metro Cell Outdoor B41 2x6W

Item	Description	Use
9764 CMCO B41 TDD 2x6W V2 AC	9764 CMCO B41 TDD 2x6W V2, 2500MHz, AC power	Qty: (1) per AC powered 9764 CMCO B41 2x6W AC Module generic
9764 CMCO B41 TDD 2x6W V2 DC	9764 CMCO B41 TDD 2x6W V2, 2500MHz, DC power	Qty: (1) per AC powered 9764 CMCO B41 2x6W DC Module generic

Table 2-2 Backhaul Module

Item	Description	Use
Backhaul Module 2 x SFP	Provides two SFP cages for backhaul connection and Daisy Chain. Optical and electrical SFPs are supported.	Mandatory One backhaul module variant required per 9764 CMCO
Backhaul Module POE	Provides one PoE+ capable RJ45 connector (for powering an external PoE device) and one SFP cage. The SFP cage supports optical and electrical SFPs.	

Table 2-3 Basic installation Kit Compact

Item	Description	Use
Basic installation kit for compact	Basic installation kit for 9764 CMCO	Mandatory for each 9764 CMCO Qty: (1) per kit per 9764 CMCO

DRAFT

The following table list the mounting frame that are available for order from Alcatel-Lucent in support of the equipment installation options.

Table 2-4 Mounting frame

Installation kit	Description	Use
Mounting Frame for 9764 CMCO	9764 Compact Metro Cell Outdoor Mounting Frame	Mandatory: • pole mount with tilt • wall mount: with vertical only • wall mount: with vertical and horizontal tilt

Ancillary items

Ancillary equipment encompasses the orderable items (other than the 9764 CMCO module) that, when installed together with the 9764 CMCO V2.2 B41 LTE 2x6W, comprise a 9764 CMCO.

These ancillary items include:

- Solar shield (mandatory if compact antenna array / optional and packed in the same box as the MCO)
- RF antennas (Metro Compact Antenna Array – needs a mandatory solar shield)
- Pole mounting kit
- External Surge Arrestor Kit (for electrical backhaul configuration)
- SFP modules (optical or electrical)
- Ethernet cables (optical or electrical)
- Power connectors and cables (either AC or DC)
- Metro Basic Installation Kit
- Optional remote located external GPS antenna, cable, and adaptor
- 9764 MCO Wi-Fi AP module (attaches to the bottom of the 9764 CMCO V2.2 B41 LTE 2x6W)

Solar shield

The Solar Shield covers the front side of the 9764 CMCO and protect for direct sun load. It is mandatory unless the 9764 CMCO is installed indoor or protected by any other box. It acts also as an adapter plate for the CMCO Antenna arrays.

DRAFT

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The solar shield is attached to the front side of the 9764 CMCO

Item	Description	Use
Solar shield	Solar Shield for Compact MCO	Optional Mutually exclusive with “Antenna Array mounted on solar shield” Qty 1 per 9764 CMCO if required

RF antenna

Compact Metro Cell Antenna Array is designed to be mounted to the front of the 9764 CMCO. The antenna is attached to a solar shield. The Solar Shield acts as an adaptor plate for the antenna.

Item	Description	Use
SU-MECAA41 (Single antenna element)	Single antenna Array without solar shield – 9764 CMCO for B41	Antenna Element without Solar Shield for remote installation Qty 1 per 9764 CMCO B41 if required
SU-AADEM26 (Dual antenna element)	Dual antenna Array mounted on solar shield – 9764 CMCO for B41	Antenna Element attached to Solar Shield, for 9764 CMCO B41. **Note**: Do not order additional solar shield in this case Qty 1 per 9764 CMCO B41 if required
SU-AASEM26 (Single antenna element)	Single antenna Array mounted on solar shield – 9764 CMCO for B41	

External antenna - GPS

Item	Description	Use
GPS antenna	External GPS Antenna, 1575 MHz*26 dBi	Used if 9764 CMCO is configured for external GPS antenna and cable loss <10dBi @ 1575MHz
GPS antenna	External GPS Antenna, 1575 MHz*40 dBi	Used if 9764 CMCO is configured for external GPS antenna and cable loss >10dBi @ 1575MHz
KS-24577 List 8A: CONN, RF PROTECTOR, GAS TUBE, N	Surge suppressor for 26dBi GPS antenna	Mandatory if a remote GPS antenna 26dBi is required. (NAR-market) (North America Regional markets)
KS-24577 List 8A: CONN, RF PROTECTOR, GAS TUBE, N	Surge suppressor for 26dBi GPS antenna	Mandatory if a remote GPS antenna 26dBi is required. (International markets)
Jumper cable	External GPS Antenna jumper cable (2m, 5m, 15m)	Mandatory 1 cable per 9764 CMCO if external GPS antenna is used (International markets)
Jumper cable	External GPS Antenna jumper cable (36ft, 60ft)	Mandatory 1 cable per 9764 CMCO if external GPS antenna is used (North America Regional markets)

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Item	Description	Use
Adapter cable	External GPS Antenna adaptor cable	Mandatory 1 cable per 9764 CMCO if external GPS antenna is used
Weatherproof kit	Weatherproof tape, Vinyl electrical tape, Linerless rubber splicing tape	Order these 3 items to protect the connectors, if a remote GPS antenna is required (only required for North America Regional markets)

Mounting kits

The following table list the mounting kits that are available for order from Alcatel-Lucent in support of the equipment installation options.

Table 2-5 Mounting kits

Installation kit	Description	Use
Vertical tilt installation kit	Vertical tilt bracket	Mandatory: • pole mount with tilt • wall mount: with vertical only • wall mount: with vertical and horizontal tilt
Horizontal tilt installation kit	Horizontal tilt bracket	Mandatory: • wall mount: with horizontal tilt only • wall mount: with horizontal and vertical tilt
Banding kit	Stainless steel bands Band buckles (Ear-Lokt)	Mandatory: • pole mount only
Banding tool	Tool for metal band (BAND-IT)	Mandatory: • use with the Banding kit for pole mount only • 1 per installation team.

Surge arrestor

If GBE 1000BaseT is used, it's highly recommended to use an optional Ethernet Surge Arrestor. The GBE ports within the 9764 CMCO provide no surge protection for backhaul connection.

Item	Description	Use
Surge arrestor	External Ethernet surge arrestor	Optional Highly recommended if GBE 1000BaseT backhaul connection is provided

DRAFT

Item	Description	Use
Surge arrestor kit	External Ethernet surge arrestor kit, including: • mounting bracket for pole/wall • Metal band and buckle ear for pole mounting • Ethernet cable outdoor (0,6m) for interconnection of 9764 CMCO and Surge Arrestor	Required for External surge arrestor

SFP modules

The 9764 CMCO provides two SFP cages. Depending on the backhaul interface provided for connecting the 9764 CMCO the proper SFP must be inserted in the SFP cage.

Item	Description	Use
SFP module	SFP GBE 10/100/1000BaseT (copper)	Optional Electrical backhaul only
SFP module	SFP GBE 1000BaseLX (Single mode)	Optional Optical backhaul, Daisy chaining
SFP module	SFP GBE 1000BaseLX / CPRI (Single mode)	Optional Optical backhaul, Daisy chaining
SFP module	SFP GBE 1000BaseSX / CPRI (Multi mode)	Optional Optical backhaul, Daisy chaining
SFP module	GPON SFP	Optional Optical backhaul only

Ethernet cable - Electrical

Item	Description	Use
Electrical Ethernet cable	2m, 25m, 100m outdoor, 4 pairs, 2 RJ45 (plus 1 spare)	Optional Use with SFP GBE 10/100/1000BaseT (International markets)
Electrical Ethernet cable	2m, 25m, 100m outdoor, 4 pairs, 2 RJ45 (plus 1 spare)	Optional Use with SFP GBE 10/100/1000BaseT (North America Regional markets)

DRAFT

Ethernet cable - Optical

Item	Description	Use
Fiber Optic cable	SMDF LC-LC 2SM 1m	Optional Single mode fiber duplex. 80mm/80mm Breakout, Outer diameter: 5.5mm Use for Single Mode link (select cable length)
Fiber Optic cable	SMDF LC-LC 2SM 2.5m	
Fiber Optic cable	SMDF LC-LC 2SM 5m	
Fiber Optic cable	SMDF LC-LC 2SM 10m	
Fiber Optic cable	SMDF LC-LC 2SM 15m	
Fiber Optic cable	SMDF LC-LC 2SM 30m	
Fiber Optic cable	SMDF LC-LC 2SM 50m	
Fiber Optic cable	SMDF LC-LC 2SM 70m	
Fiber Optic cable	SMDF LC-LC 2SM 85m	
Fiber Optic cable	SMDF LC-LC 2SM 100m	
Fiber Optic cable	SMDF LC-LC 2SM 150m	
Fiber Optic cable	SMDF LC-LC 2SM 200m	
Fiber Optic cable	SMDF LC-LC 2SM 250m	
Fiber Optic cable	SMDF LC-LC 2SM 300m	
Fiber Optic cable	MM LC-LC 2MM 1m	Optional Multi Mode fiber duplex. 80mm/80mm Breakout, Outer diameter: 5.5mm Use for Multi Mode link (select cable length)
Fiber Optic cable	MM LC-LC 2MM 2.5m	
Fiber Optic cable	MM LC-LC 2MM 5m	
Fiber Optic cable	MM LC-LC 2MM 10m	
Fiber Optic cable	MM LC-LC 2MM 15m	
Fiber Optic cable	MM LC-LC 2MM 30m	
Fiber Optic cable	MM LC-LC 2MM 50m	
Fiber Optic cable	MM LC-LC 2MM 70m	
Fiber Optic cable	MM LC-LC 2MM 85m	
Fiber Optic cable	MM LC-LC 2MM 100m	
Fiber Optic cable	MM LC-LC 2MM 150m	
Fiber Optic cable	MM LC-LC 2MM 200m	
Fiber Optic cable	MM LC-LC 2MM 250m	
Fiber Optic cable	MM LC-LC 2MM 300m	

DRAFT

Ethernet cable - Optical for GPON

Item	Description	Use
Fiber Optic cable	SM SC-PC 1SM OFNR-LS BK75 4m	Optional Single mode fiber simlex. 75mm/75mm Breakout Rules: required for GPON link Qty: (1) per GPN link. Select fiber of length required
Fiber Optic cable	SC-PC 1SM OFNR-LS BK75 8m	
Fiber Optic cable	SM SC-PC 1SM OFNR-LS BK75 12m	

Power

Item	Description	Use
Power connector (AC)	AC power connector	Required for 9764 CMCO module with AC power (International markets)
Power connector (DC)	DC power connector	Required for 9764 CMCO module with DC power (International markets)
Power cable	Power cable IN/OUT 3G1,5mm², 100m roll or multiples of 1m length (as needed)	Required for 9764 CMCO module (International markets)
Power cable (AC)	Power cable pre-assembled with AC power connector, various lengths (2m. 4.5m, 9m, 12m)	Required for 9764 CMCO module with AC power (North America Regional markets)
Power cable (DC)	Power cable pre-assembled with DC power connector, various lengths (2m. 4.5m, 9m, 12m)	Required for 9764 CMCO module with DC power (North America Regional markets)

Note: For Non-NAR appropriate power connector (AC or DC) needs to be selected, NAR specific power cables are prefab cables and already assembled with power connectors.

Grounding

Item	Description	Use
Ground cable	Ground cable,Y/G 10mm² in 100m roll	Required for International markets
Ground cable	Ground cable, 8 AWG	Required for North America Regional markets

DRAFT

3 Basic site preparation requirements

Overview

Purpose

This chapter describes basic site preparation requirements before installation of the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W.

Contents

Environmental and mechanical specifications	3-2
Site requirements	3-4
Installation clearances	3-5
Pole mount requirements	3-6
Wall mount requirements	3-8

DRAFT

Environmental and mechanical specifications

Environmental and mechanical specifications

Temperature range:	
Normal operation	-40°C to +50°C + solar exposure (+55°C with solar shield)
Cold start-up	-33°C
Humidity:	
Condensing	5% to 100%
Altitude:	
Altitude range	0-1800 m (6000 feet) above sea level
Vibration:	
North American Region (NAR)	GR-63-CORE Sections 4.4.4 & 5.4.2 GR-487-CORE Section 3.35
European Union (EU)	ETS 300-019-1.4 class 4.1E
Earthquake	Richter scale 7
Corrosion:	
Salt fog testing	GR-487-CORE section 3.34.1 IEC 60068-2-52
EMC/EMI/safety/RF exposure:	
Emissions	FCC part 24 CFR 24.238
Emission limits	FCC part 27 CFR 27.54
Conducted spurious radiated emissions	GR-1089 section 3.22 and 3.2.3 FCC part 15 subpart B class B ETSI TS 136 113 EMC directive 2004/108/EC
Immunity to radiation	FCC part 15 subpart A class B ETSI TS 136 113
ETSI TS 136 113	GR-1089 section 2.1.2
Safety	CAN/CSA-C22.2 NO. 60950-1-07 / UL 60950-1
RF exposure	US FCC 47CFR 1.1310, US FCC OET65 (including supplements), Canada Safety Code 6, Canada RSS 102.
Environment:	

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ROHS	ROHS directive 6 of 6 ref E3
Hazardous material	WEEE directive 2002/95/EC
Recycling	WEEE directive 2002/96/EC

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Site requirements

Device placement

Before installing the 9764 CMCO B41 2x6W, you should perform a site survey to determine the optimum use of the equipment and to maximize range, coverage, and network performance.

The 9764 CMCO B41 2x6W is designed to be mounted on poles or walls in a central location within the public spaces. Clear or open areas (where structures, trees, or hills do not obstruct radio signals to and from the equipment) will provide better performance than closed or filled areas.

General requirements

The following general requirements must be met before the installation of the 9764 CMCO B41 2x6W can begin:

- Adequate clearance must be provided for service access
- Power service must be installed
- Back haul facilities must be installed
- Grounding electrode system must be installed
- The environment must comply with stated environment requirements
- Mounting bracket holes must be drilled
- Where local regulations dictate, cable conduits must be prepared.

Structural requirements

Various building materials and construction methods dictate that equipment must be fastened to a wall/pole with appropriate mounting hardware. It is the responsibility of the customer to provide any necessary support material and structures to ensure that the installation will be in compliance with national building codes and all other applicable codes.

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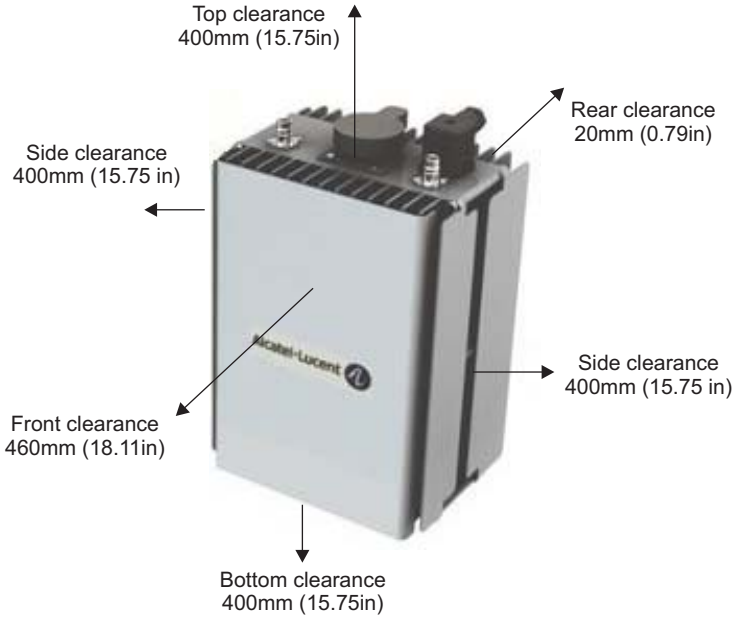
Installation clearances

Minimum installation clearances

The following provides the minimum wall mount clearances recommended around the 9764 CMCO B41 2x6W.

Figure 3-1 9764 CMCO B41 2x6W installation clearances



Metro Cell Outdoor	Clearances mm (inches)	Comment
Side(s)	400 mm (15.75 inch)	Access to secure the solar shield cover.
Top	400 mm (15.75 inch)	Access to cable connections and cable bending radius. To aid natural air convection.
Bottom	400 mm (15.75 inch)	Access to connections (Wi-Fi AP). To aid natural air convection.
Front	460 mm (18.11 inch)	Access to secure the solar shield cover.
Rear	20 mm (0.79 inch)	For the wall mounting space. To aid natural air convection.

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Pole mount requirements

Purpose

This topic outlines the basic requirements, installation kits and recommended anchor materials when mounting the 9764 CMCO B41 2x6W Outdoor directly onto a pole, onto tilt brackets or onto a pair mount bracket.

Pole mount options

The 9764 CMCO can be easily mounted onto a pole for the following installation options:

- 9764 CMCO banded onto a pole (without the tilt option).

  The 9764 CMCO mounting bracket and pole band installation kit is used.
- 9764 CMCO attached to the vertical tilt bracket. Vertical tilt bracket is banded onto a pole.

  The vertical tilt bracket, 9764 CMCO mounting bracket and pole band installation kit is used.

Pole mount installation kits and brackets

The following table provides the installation kits and brackets that can be used, depending on the deployment scenario, for 9764 CMCO pole mounting.

Table 3-1 Pole mount installation kits and brackets

Item	Description
9764 MCO Compact mounting bracket	Required for attaching the 9764 CMCO directly onto a pole or vertical tilt bracket
Vertical tilt bracket	Provides +/- 30° vertical tilt (up/down) adjustment
Banding kit	Required when directly attaching the 9764 CMCO or vertical tilt bracket to a pole (diameter 50 to 300 mm) using stainless steel bands. Stainless steel bands and buckles (Ear-Lokt)
Banding tool	Standard BAND-IT® Banding Tool, including operating instructions Required in order to tighten stainless steel metal bands

The following figure shows the brackets used for pole mount installation, depending on the deployment scenario.

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Figure 3-2 Pole mount banding and brackets

Pole mount no tilt

Pole mount with tilt

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Wall mount requirements

Purpose

This topic outlines the basic requirements when installing the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W onto a solid concrete wall or flat surface.

Wall mount options

The 9764 CMCO can be easily mounted onto any flat, sturdy wall for the following installation options:

- 9764 CMCO attached directly onto a wall or flat surface.
- 9764 CMCO attached to the vertical/horizontal tilt bracket(s). Vertical/horizontal tilt bracket(s) are attached to a wall.

Wall mount installation brackets and kits

The following table lists the installation brackets that can be used, depending on the deployment scenario, for 9764 CMCO wall mounting.

Table 3-2 Wall mount installation brackets

Item	Description
9764 CMCO mounting bracket	Required when attaching the 9764 CMCO directly to a wall or flat surface or onto tilt brackets.
Vertical tilt bracket	Provides +/- 30° vertical tilt (up/down) adjustment **Note:** Can be used in combination with the horizontal installation kit to provide: • +/- 30° vertical tilt (up/down) adjustment, and • +/-45° horizontal tilt (left/right) adjustment
Horizontal tilt bracket	Provides +/-45° horizontal tilt (left/right) adjustment **Note:** Can be used in combination with the vertical tilt installation kit to provide: • +-45° horizontal tilt (left/right) adjustment, and • +/- 30° vertical tilt (up/down) adjustment

Wall mount installation examples

The following figures show examples of 9764 CMCO wall mount installation and wall mount installation with horizontal/vertical tilt.

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Figure 3-3 9764 CMCO wall mount examples

Wall mount no tilt

Wall mount horizontal tilt only

Wall mount horizontal and vertical tilt

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4 Grounding and lightning protection requirements

Overview

Purpose

This chapter provides information on grounding and lightning protection requirements that need to be in place at the site prior to installation of the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W.

Contents

Grounding and lightning protection	4-2
Product grounding	4-4

DRAFT

Grounding and lightning protection

Overview

The primary goal of an earthing system is to assure personnel safety and protection of installations against damage. Two important phenomena are lightning and power system faults. These can cause circulation of large currents, which may create hazardous voltages in the installation.

- For lightning, the task of the earthing system is to provide a path to the soil for dangerous currents, while maintaining potential differences between any two points of an installation as low as possible.
- For power system faults, it provides a safe path for fault currents, while also maintaining potential differences between any two points of an installation as low as possible.

Codes and standards

Regulatory grounding codes and standards may differ from region to region and country to country. The grounding/bonding of the installation site and Alcatel-Lucent 9764 Metro Cell Outdoor must follow national and/or local regulatory codes and standards in countries and localities where these exist.

Examples of these regulatory codes and standards are:

- National Electric Code (NFPA 70), USA
- Canadian Electrical Code, Part I (CSA C22.1)
- BS 7671 (UK IEE Wiring Regulations, BS 7671
- VDE 0100, Germany
- International Electrotechnical Commission's international standard, 60364

Grounding requirements

The Alcatel-Lucent 9764 Metro Cell Outdoor can be susceptible to lightning surges due to its association with elevated installation locations. It is therefore imperative that the equipment and installation site be properly grounded to a reliable and effective grounding electrode system such that a low impedance path to earth is provided.

For Alcatel-Lucent 9764 Metro Cell Outdoor installations the following grounding system types are supported:

- TN

  In a TN earthing system, one of the points in the generator or transformer is connected with earth, usually the star point in a three-phase system. The body of the electrical device is connected with earth via this earth connection at the transformer.

- TT

DRAFT

In a TT earthing system, the protective earth connection of the consumer is provided by a local connection to earth, independent of any earth connection at the generator.

Important! Where uncertainty exists around the reliability and/or effectiveness of the main grounding system contact Alcatel-Lucent Technical Support or the appropriate electrical inspection authority.

In addition the following document can also be used as a general reference for installation site grounding requirements, *Grounding and Lightning Protection Guidelines for Wireless System Cell Sites,* 401-200-115.

Surge protection requirements

Having a good ground alone is not enough to minimize damage due to energy surges. Commercial power and data facilities are susceptible to lightning surges, switching transients of power and switching of circuit breakers in the power system under fault conditions. Therefore power and data facilities must be also be properly protected.

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 power panel board or load center supplying power to the installation site and must be connected directly to the grounding electrode system. The power panel board or load center, circuit breakers and surge protector are not supplied with the product. They must be ordered and installed as part of site preparation by the customer.

It is also strongly recommended that surge protection devices are installed on electrical data facilities cabling in order to protect against electrical surges that may potentially cause damage to equipment and the cables if they were not adequately protected.

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Product grounding

Overview

This section details the grounding ancillary items and grounding connection points on the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W.

Grounding ancillary items

The following grounding related ancillary items can be ordered from Alcatel-Lucent.

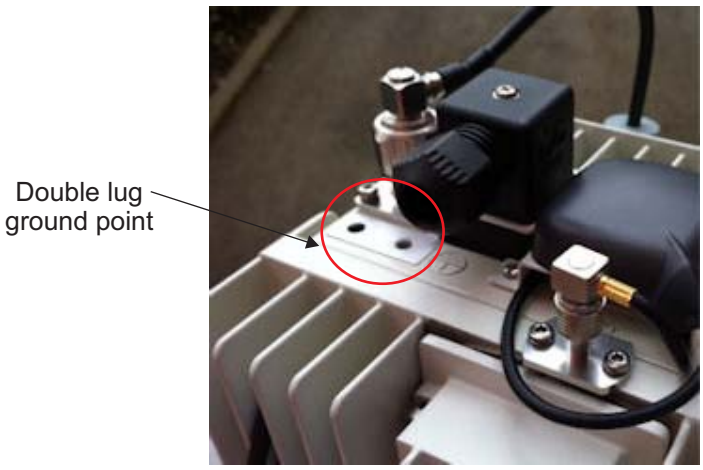
Table 4-1 Grounding materials

Item	Description
Grounding cable	Green and yellow insulation (100 meter roll)
Basic installation kit	Cable lugs, screws and washers

Note: Where grounding materials are locally supplied it is important that all grounding system material (cable, connectors, buses, etc.) are of high quality, that resist deterioration and require little or no maintenance.

9764 CMCO grounding point

The following figure shows the grounding point on the 9764 CMCO. The ground cable can be connected directly to the 9764 CMCO via a double hole grounding lug crimped onto the cable. M5 screws are used to attach the ground cable to the grounding point on the 9764 CMCO.



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5 Electrical power requirements

Overview

Purpose

This chapter provides guidelines for the installation of electrical power to the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W.

Contents

Site power requirements (AC)	5-2
Site power requirements (DC)	5-5
Product power requirements	5-8

DRAFT

Site power requirements (AC)

Purpose

This section describes the power and grounding requirements that must be considered when planning site facilities for Alcatel-Lucent installed equipment and products.

General requirements

All power and grounding system wiring, short-circuit (over-current) protection and surge protection devices must be installed by the appropriately licensed personnel. Installation must be performed in accordance with national and local electrical codes, for example:

- In the United States:

  National Electrical Code, NFPA 70
- In Canada:

  Canadian Electrical Code, part I, CSA C22.1
- In other countries:

  International Electrotechnical Commission (IEC) 60364, parts 1 through 7

In addition, adherence to all additional requirements mandated by the “country of use” is the customer's responsibility.

The appropriate power supply ground connections and site equipment ground connections must be in place before commercial AC power service can be connected to the equipment installed at the site.

Customer AC power supply

The equipment installed on site must be supported with a customer supplied AC power service. The AC connection point should be easily accessible by the service team and be marked as the disconnect device of the equipment.

Note:

- The service board (or load center), circuit breakers and surge protectors devices are not supplied with the product. They must be ordered and installed as part of site preparation by the customer.
- All wiring (including grounding) and over-current protection must be installed at the service panel by suitably trained and licensed personnel and in accordance with the national and local electrical codes.
- An appropriate earth ground connection is required before commercial power service can be connected to any equipment at the site.

In the United States and Canada, the branch circuit breaker shall be installed in accordance with the National Electrical Code, or the Canadian Electrical Code, Part I.

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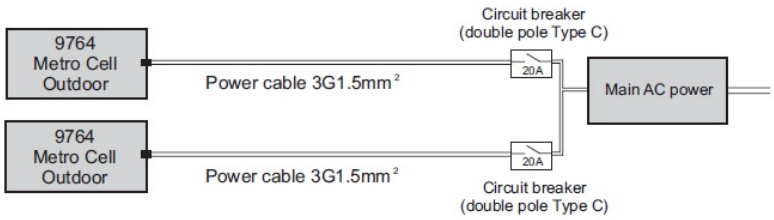
The branch circuit breaker should always be situated upstream of the equipment and must be a double pole 20A Type C disconnect device.



Line surge protection

A surge protection device is not supplied with the product. It must be ordered and installed as part of site preparation by the customer.

The equipment can be connected to an AC mains distribution system classified as CAT II (equipment dedicated for connection to the mains distributed within a building). If the category of the AC mains is higher than CAT II (III or IV), then upstream surge protection must be installed by the customer to reduce the voltage range of transients in accordance with CAT II.

Power source	Over-voltage category
Equipment connected to building mains	CAT II
Equipment connected directly to low voltage mains	CAT III or CAT IV

The installation wiring for all outdoor AC units must be provided with a Listed/Approved surge protection device. In the United States and Canada the installation must be in accordance with the National Electrical Code or the Canadian Electrical Code, Part I.

Power junction box

For outdoor installations, in countries where local regulations dictate, a customer-supplied power junction box, or a mating plug and receptacle, may need to be installed as part of site preparation. As part of site preparation, the customer must provide the appropriate junction box and associated fittings.

In the United States and Canada, outdoor cord pendants, if used, shall comply with NEC Article 400 or Canadian Electrical Code, Part I Rule 4-012

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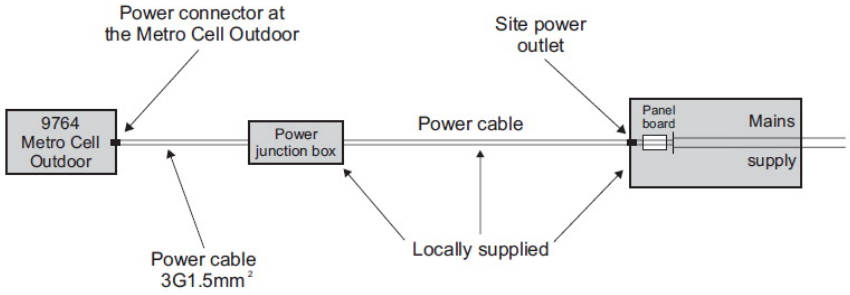

Conduit requirements

For outdoor installations, in countries where local regulations dictate, the power cables are required to be routed to the equipment within rigid metal conduit (RMC) or liquid-tight flexible metal (LTFMC) conduit. As part of site preparation, the customer must provide the metal conduit and associated fittings for cable routes and connecting conduit to the outdoor equipment.

Alternatively, an allowable outdoor armored cable described in the National Electrical Code and Canadian Electrical Code, Part I, may be used without a conduit.

Cable types that may be used without a conduit include:

- Type MC cable, such as Hybriflex cable
- Outdoor tray cable Type TC-ER

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Site power requirements (DC)

Purpose

This section describes the power and grounding requirements that must be considered when planning site facilities for Alcatel-Lucent installed equipment and products.

General requirements

All power and grounding system wiring, short-circuit (over-current) protection and surge protection devices must be installed by the appropriately licensed personnel. Installation must be performed in accordance with national and local electrical codes, for example:

- In the United States:

  United States National Fire Protection Association (NFPA) 70 and United States National Electrical Code (NEC)
- In Canada:

  Canadian Electrical Code, part I, CSA C22.1
- In other countries:

  International Electrotechnical Commission (IEC) 60364, parts 1 through 7

In addition, adherence to all additional requirements mandated by the “country of use” is the customer's responsibility.

The appropriate power supply ground connections and site equipment ground connections must be in place before commercial AC power service can be connected to the equipment installed at the site.

Customer DC power supply

The equipment installed on site must be supported with a customer supplied nominal -48V DC power service. The DC connection point should be easily accessible by the service team and be marked as the disconnect device of the equipment.

Note:

- The service board (or load center), circuit breakers and surge protectors devices are not supplied with the product. They must be ordered and installed as part of site preparation by the customer.
- All wiring (including grounding) and over-current protection must be installed at the service panel by suitably trained and licensed personnel and in accordance with the national and local electrical codes.
- An appropriate earth ground connection is required before commercial power service can be connected to any equipment at the site.

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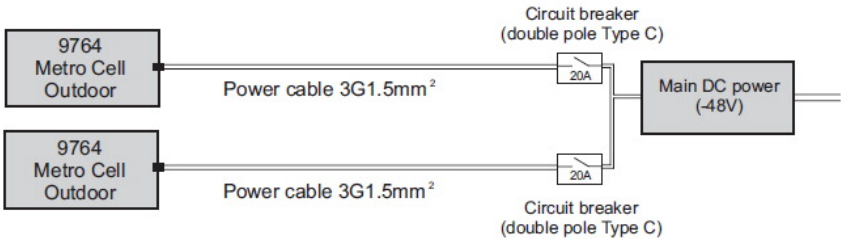
The branch circuit breaker should always be situated upstream of the equipment and must be a double pole 20A Type C disconnect device.

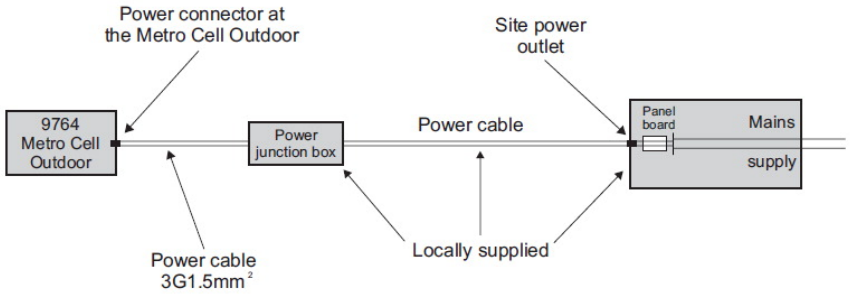


Line surge protection

A surge protection device is not supplied with the product. It must be ordered and installed as part of site preparation by the customer.

Power junction box

For outdoor installations, in countries where local regulations dictate, a customer supplied power junction box may need to be installed as part of site preparation. As part of site preparation, the customer must provide the appropriate junction box and associated fittings.



In the United States and Canada, outdoor cord pendants, if used, shall comply with NEC Article 400 or Canadian Electrical Code, Part I Rule 4-012.

Conduit requirements

For outdoor installations, in countries where local regulations dictate, the power cables are required to be routed to the equipment within rigid metal conduit (RMC) or liquid-tight flexible metal (LTFMC) conduit. As part of site preparation, the customer must provide the metal conduit and associated fittings for cable routes and connecting conduit to the outdoor equipment.

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Alternatively, an allowable outdoor armored cable described in the National Electrical Code and Canadian Electrical Code, Part I, may be used without a conduit.

Cable types that may be used without a conduit include:

- Type MC cable, such as Hybriflex cable
- Outdoor tray cable Type TC-ER

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Product power requirements

Product power data

The 9764 CMCO B41 2x6W requires an AC power feed (single phase, three-wire voltage source in the 110-220V range), compliant with Telcordia GR-1089 Section 7 and IEC 60364-1 (IEC 60038 Annex A). A power module unit inside the 9764 CMCO module provides AC/DC conversion (5.3V output) to its power board, which then provides secondary DC-DC conversion and distributes 5.3V (tolerance of +-3%) to the cube-based antennas, and the 9764 MCO Wi-Fi AP module (if equipped).

The following table provides power related information applicable to the 9764 CMCO B41 2x6W.

Power supply	
AC power	110 to 220 VAC, single phase, 2 A, 50/60 Hz
DC power	nominal -48 V DC, range (-57V ~ -60V DC)
Power consumption	
Average consumption	150W
Peak consumption	170W

Power ancillary items

The following Alcatel-Lucent power related ancillary items must be used.

Table 5-1 Power materials

Item	Description	Use
Power connector (AC)	AC power connector	Required for 9764 CMCO with AC power (International markets)
Power connector (DC)	DC power connector	Required for 9764 CMCO with DC power (International markets)
Power cable	Power cable IN/OUT 3G1,5mm², 100m roll or multiples of 1m length (as needed)	Required for 9764 CMCO (International markets)
Power cable (AC)	Power cable pre-assembled with AC power connector, various lengths (2m. 4.5m, 9m, 12m)	Required for 9764 CMCO with AC power (North America Regional markets)

DRAFT

Table 5-1 Power materials (continued)

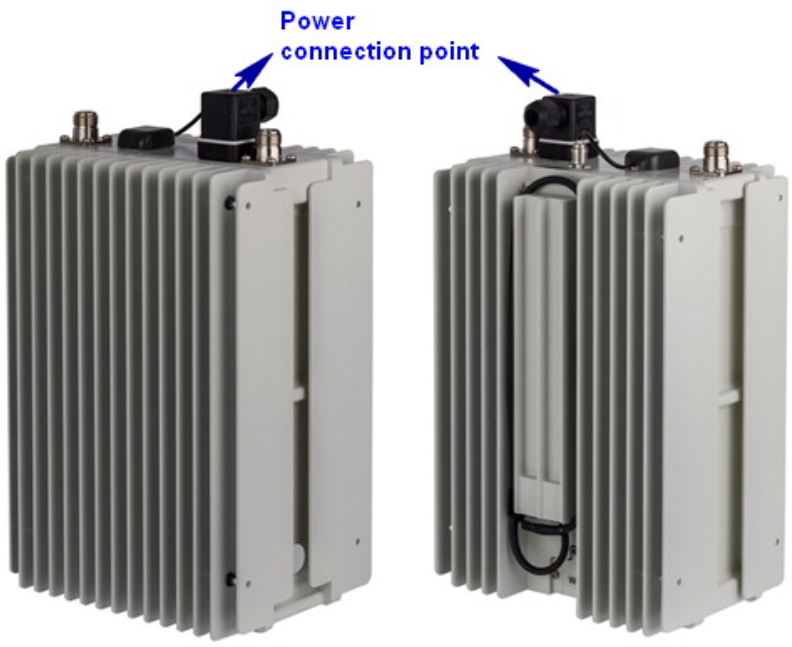
Item	Description	Use
Power cable (DC)	Power cable pre-assembled with DC power connector, various lengths (2m. 4.5m, 9m, 12m)	Required for 9764 CMCO with DC power (North America Regional markets)

Note: For Non-NAR appropriate power connector (AC or DC) needs to be selected, NAR specific power cables are prefab cables and already assembled with power connectors.

Power connection point

Power is supplied to the 9764 CMCO B41 2x6W located on the top side of the unit.

Figure 5-1 Power connection point



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6 Backhaul requirements

Overview

Purpose

This chapter provides the backhaul requirements for the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W.

Contents

Ethernet requirements	6-2

DRAFT

Ethernet requirements

General requirements

The Backhaul Module terminates the backhaul and Daisy chain connectivity and is located at the rear of the 9764 CMCO B41 2x6W. The Backhaul Module is mandatory for each 9764 CMCO B41 2x6W.

There are different versions of the Backhaul module available:

- The Backhaul Module 2 x SFP provides two SFP cages for backhaul connection and Daisy Chain. Optical and electrical SFPs are supported.
- The Backhaul Module PoE provides one PoE+ capable RJ45 connector (for powering an external PoE device) and one SFP cage. The SFP cage supports optical and electrical SFPs.

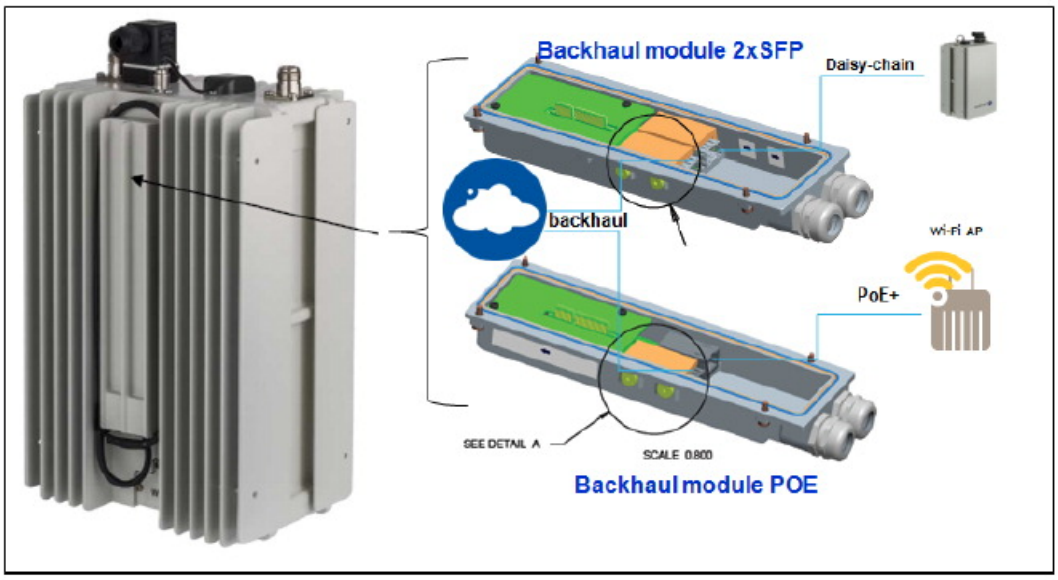

Table 6-1 Backhaul Module

Item	Description	Use
Backhaul Module 2 x SFP	Provides two SFP cages for backhaul connection and Daisy Chain. Optical and electrical SFPs are supported.	Mandatory One backhaul module variant required per 9764 CMCO
Backhaul Module POE	Provides one PoE+ capable RJ45 connector (for powering an external PoE device) and one SFP cage. The SFP cage supports optical and electrical SFPs.	

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SFP transceivers

The 9764 CMCO provides two SFP cages. Depending on the backhaul interface provided for connecting the 9764 CMCO the proper SFP must be inserted in the SFP cage.

Item	Description	Use
SFP module	SFP GBE 10/100/1000BaseT (copper)	Optional Electrical backhaul only
SFP module	SFP GBE 1000BaseLX (Single mode)	Optional Optical backhaul, Daisy chaining
SFP module	SFP GBE 1000BaseLX / CPRI (Single mode)	Optional Optical backhaul, Daisy chaining
SFP module	SFP GBE 1000BaseSX / CPRI (Multi mode)	Optional Optical backhaul, Daisy chaining
SFP module	GPON SFP	Optional Optical backhaul only

Ethernet cabling options

The following tables outline the Ethernet cabling options.

Table 6-2 Ethernet cable - Electrical

Item	Description	Use
Electrical Ethernet cable	2m, 25m, 100m outdoor, 4 pairs, 2 RJ45 (plus 1 spare)	Optional Use with SFP GBE 10/100/1000BaseT (International markets)
Electrical Ethernet cable	2m, 25m, 100m outdoor, 4 pairs, 2 RJ45 (plus 1 spare)	Optional Use with SFP GBE 10/100/1000BaseT (North America Regional markets)

Table 6-3 Ethernet cable - Optical

Item	Description	Use
Fiber Optic cable	SMDF LC-LC 2SM 1m, 2.5m, 5m, 10m, 15m, 30m, 50m, 70m, 85m, 100m, 150m, 200m, 250m, 300m	Optional Single mode fiber duplex. 80mm/80mm Breakout, Outer diameter: 5.5mm Use for Single Mode link (select cable length)
Fiber Optic cable	MM LC-LC 2MM 1m, 2.5m, 5m, 10m, 15m, 30m, 50m, 70m, 85m, 100m, 150m, 200m, 250m, 300m	Optional Multi Mode fiber duplex. 80mm/80mm Breakout, Outer diameter: 5.5mm Use for Multi Mode link (select cable length)

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Table 6-4 Ethernet cable - Optical for GPON

Item	Description	Use
Fiber Optic cable	SM SC-PC 1SM OFNR-LS BK75 4m	Optional Single mode fiber simlex. 75mm/75mm Breakout Rules: required for GPON link Qty: (1) per GPN link. Select fiber of length required
Fiber Optic cable	SC-PC 1SM OFNR-LS BK75 8m	
Fiber Optic cable	SM SC-PC 1SM OFNR-LS BK75 12m	

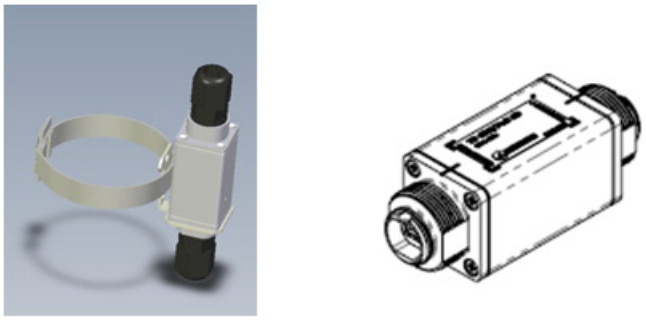
Ethernet surge protection

Where electrical backhaul is used (1000 BaseT) particularly in regions where there is a high probability of lightning strike, it is highly recommended to use an optional Ethernet surge arrestor as the GBE ports within the 9764 CMCO provide no surge protection for the backhaul connection.

A external surge arrestor should be mounted close to the 9764 CMCO. Surge arrestor characteristics:

- Data rate: Up to 1000 Mb/s
- Typical capacity: 15pF, L-G
- Operating voltage:
  - +/- 48V DC (nominal)
  - +/- 60V DC (max. continuous)
- Maximum surge:
  - 100A, 10/1000µsec CORE-1089
  - 3kA, 8/20 µsec IEC 61000-4-5

Figure 6-1 Ethernet surge arrestor



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Conduit requirements

For outdoor installations, in countries where local regulations dictate, Ethernet cables are required to be routed to the equipment within rigid-steel or liquid-tight flexible metal conduit. As part of site preparation, the customer must provide the metal conduit and associated fittings for cable routes and connecting conduit to the outdoor equipment.

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Alcatel-Lucent - Proprietary
Use pursuant to applicable agreements

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7 Antenna requirements

Overview

Purpose

This chapter provides an overview of the antenna interface requirements for the Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W.

Contents

General antenna cable requirements	7-2
Antenna configuration options	7-3

DRAFT

General antenna cable requirements

General requirements

The appropriate antenna type, cable length and type, and number of antenna jumper cables should be available at the site for the start of the installation.

The following are general antenna requirements:

- The appropriate Alcatel-Lucent recommended antenna should be used.
- The appropriate Alcatel-Lucent recommended antenna cables should be used.
- All antenna cable runs must be appropriately supported in accordance with the connector and cable manufacturer's instructions.
- Grounding of the antenna feeder cable outer shield must be performed in accordance with the ground kit manufacturer's instructions.
- All antenna cable connectors must be at least IP67 rated (IP67 rating requirement, as defined by IEC 60529, calls for total protection against dust and protection against submersion in water).
- Antenna and cable sweeps must be performed prior to the start of the installation.

  Note: Two different external GPS antennas are available. The 26 dB gain GPS antenna should be used when antenna cable loss is less than 10 dB at 1575 MHz. For antenna cable loss greater than 10 dB at 1575 MHz, the 40 dB gain antenna should be used.

Antenna installation

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

To ensure correct antenna installation, all necessary calculations and/or field measurements shall be evaluated for 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.

Important! Do not mount the GPS antenna within 10 feet (3 m) of any transmit antenna.

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

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Antenna configuration options

RF antenna

Compact Metro Cell Antenna Array is designed to be mounted to the front of the 9764 CMCO. The antenna is attached to a solar shield. The Solar Shield acts as an adaptor plate for the antenna.

The two different antenna configurations allow an adaptation of the vertical beam width.

- Single Element Antenna Module (SEM-2600): 7.5 dBi typical gain, 80° H x 75° V HPBW
- Dual Element Antenna Module (DEM-2600): 9.5 dBi typical gain, 80° H x 35° V HPBW

Figure 7-1 9764 CMCO with antenna

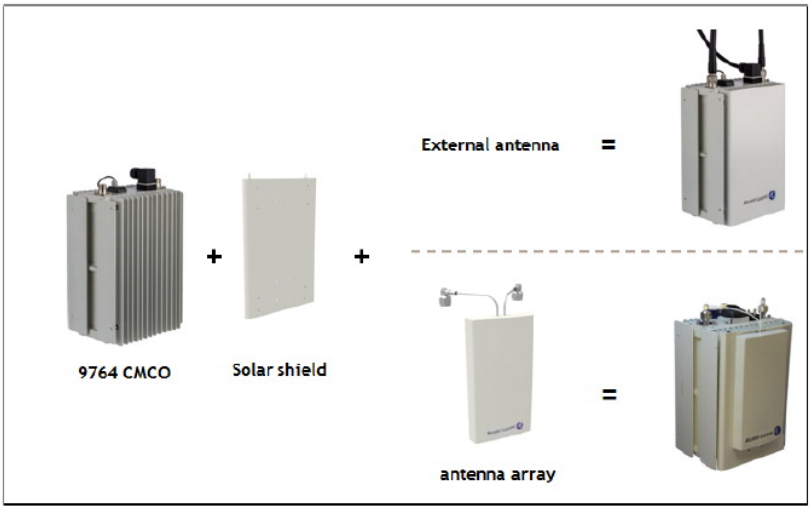

Table 7-1 Main Characteristics of Antenna Array

Dimensions H x W x D (mm)	212 x 114 x 23 mm
Weight	<0.6 kg
Operating ambient temperature	-40°C to +85°C
Connector type	2 x Type N male, pigtail cables
Impedance	50 Ohms

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Table 7-1 Main Characteristics of Antenna Array (continued)

Gain for B41 antenna (2490 MHz – 2690 MHz)	Single Element Antenna: 7.5 dBi (typ), 7dBi (min) Dual Element Antenna): 9.5 dBi (typ), 9dBi (min)

Default GPS antenna/Remote GPS antenna

The 9764 CMCO is always delivered with an external GPS/Glonass antenna attached to the top of the housing for the following antenna configurations:

- **Default GPS antenna**: This attached GPS/Glonass antenna is connected via a 70cm long cable to the QMA connector located on the top of the MCO housing.
- **Remote GPS antenna**: If the GPS antenna shall be located on a different position than the 9764 CMCO, a remote located GPS antenna can be used.

Figure 7-2 Default GPS antenna configuration

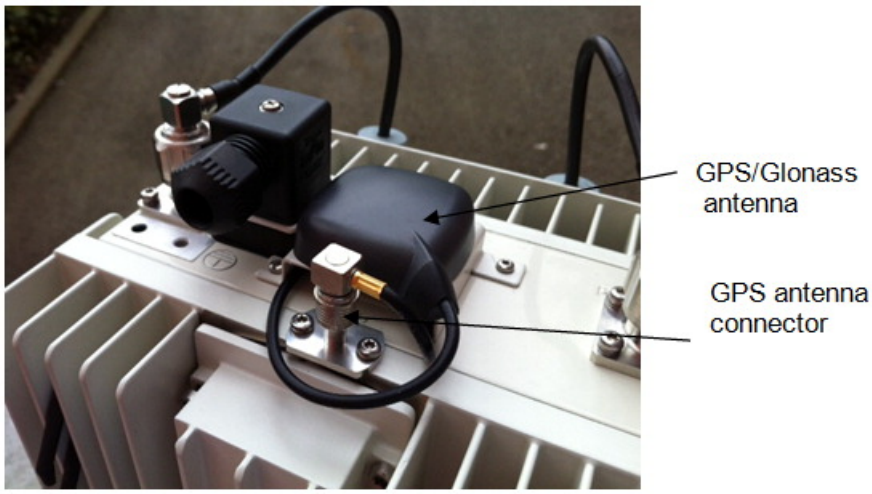

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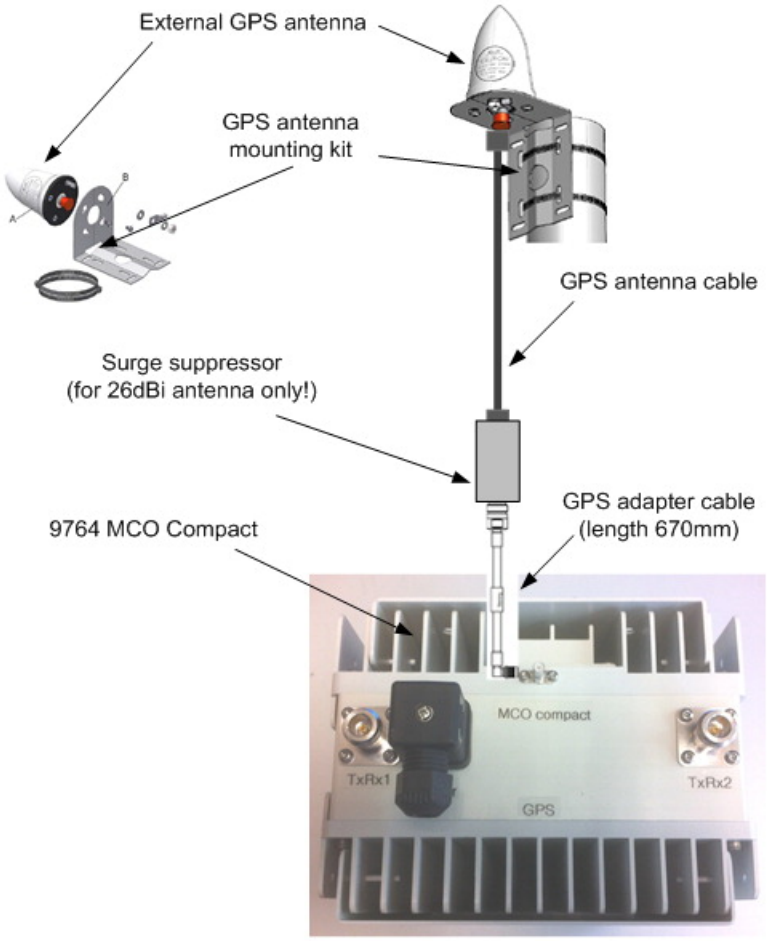
Figure 7-3 Remote GPS antenna configuration



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Appendix A: Site survey checklists

Overview

Purpose

In the following checklists, *venue* refers to the general area, such as a stadium, enterprise campus, or airport terminal, at which the equipment will be located, and *specific site* refers to the exact position at which the equipment will be installed in that venue.

Contents

SS-1 Venue survey checklist	A-2
SS-2 Site survey general checklist	A-4
SS-3 Site survey access checklist	A-7
SS-4 Site survey conclusion	A-9

DRAFT

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SS-1 Venue survey checklist

Venue address

Venue

Name _____

Street address _____

City, State _____

Venue details

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

Item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	The altitude of the venue relative to sea level is between −197 ft and +5900 ft.	Y	N	N/A	
2.	Ambient temperatures at the venue are expected to remain above −40 °F (-40 °C) and below 131°F (55 °C).	Y	N	N/A	
3.	Temperature swings at the venue are expected to be always less than 86 °F (30 °C).	Y	N	N/A	
4.	Humidity at the venue is expected to be always 5% or greater.	Y	N	N/A	
5.	RF spectrum analysis has been performed in the venue at various times of day on various days of the week and has shown no activity that is likely to cause interference with the transmission or reception of the Metro Cells.	Y	N	N/A	
6.	The power factor of 0.92 meets the approval of the company that supplies power to the venue.	Y	N	N/A	
7.	Dust at the venue is expected to be below the limit for a NEMA Type 4 enclosure.	Y	N	N/A	

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Item #	Description	Yes (Y)	No (N)	N/A	Comments
8.	Corrosive salt fog at the venue is expected to be below the limit for a NEMA Type 4 enclosure.	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

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SS-2 Site survey general checklist

Name, address and location

Specific site

Site name: _____

Site code: _____

GPS Location: _____

Latitude: _____

Longitude: _____

Altitude: _____

Elevation: _____

Accuracy: _____

Type of site

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

Item #	Type of site	Yes (Y)	No (N)	N/A	Height
1.	Indoor / stadium	Y	N	N/A	
2.	Outdoor pole	Y	N	N/A	
3.	Outdoor building façade	Y	N	N/A	
4.`	Outdoor short post	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

Site environment

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

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Item #	Site environment	Yes (Y)	No (N)	N/A	Comments
1.	Wind-driven rain at the specific site is expected to be beneath the limit for a NEMAType 4 enclosure.	Y	N	N/A	
2.	The minimum distance between the installed equipment and the general public conforms with that specified in the“ Product safety and RF exposure” section of the Product Conformance Appendix	Y	N	N/A	
3.	The mounting location is large enough to accommodate the Metro Cell with its mounting bracket(s).	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

Existing equipment type

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

Item #	Equipment type	Yes (Y)	No (N)	N/A	Comments
1.	Metro Cell	Y	N	N/A	
2.	7705 SAR-W	Y	N	N/A	
3.	Other	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

DRAFT

Existing power type

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

Item #	Power	Yes (Y)	No (N)	N/A	Comments
1.	AC	Y	N	N/A	
1(a).	AC power voltage is: 110 V or 220 V nominal	Y	N	N/A	
1(b).	AC power frequency range: from 47 Hz to 63 Hz	Y	N	N/A	
2.	DC	Y	N	N/A	
2(a).	DC power voltage is: -48 VDC	Y	N	N/A	
3.	Battery	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

Existing transmission type

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

Item #	Transmission type	Yes (Y)	No (N)	N/A	Comments
1.	IP/MPLS	Y	N	N/A	
2.	xDSL	Y	N	N/A	
3.	GPON	Y	N	N/A	
4.	WiFi	Y	N	N/A	
5.	Wireless (MPR, etc.)	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

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SS-3 Site survey access checklist

Persons to contact

Responsible for site	Name: Phone: Fax: Email:	
Necessary Authorization	Name: Phone: Fax: Email:	
Subcontractor	Name: Phone: Fax: Email:	
Other persons	Name: Phone: Fax: Email:	

Notes:

1. Completed by: _____
2. Date: _____

Lock and key information

Any locked boxes	Y	N	N/A	Key provided by	Name: Phone: Fax: Email:	

Notes:

1. Completed by: _____
2. Date: _____

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Site location access

Ladder required	Y	N	N/A	Height of ladder	
Crane required	Y	N	N/A	Height of crane	
Parking available	Y	N	N/A	Distance to site	
Bucket truck required	Y	N	N/A	Height	

Notes:

1. Completed by: _____
2. Date: _____

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SS-4 Site survey conclusion

Site acceptance

OK	
OK, action required	
NOK	

Action items

	Severity			Description
	Blocking	Major	Minor	
1				
2				
3				
4				

Resolution

	Date	Representative		Representative		Description
		Name	Initials	Name	Initials	
1						
2						
3						
4						

Survey approval

Date of site survey:

Name	Signature

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Appendix B: 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 Metro Cell 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: _____
- Market Name: _____
- Cell Site number: _____
- Contact Phone number: _____.

Contents

SP-1 Site preparation general checklist	B-2
SP-2 Site preparation power source checklist	B-3
SP-3 Site preparation grounding checklist	B-4
SP-4 Site preparation RF antenna checklist	B-6
SP-5 Site preparation GPS antenna checklist	B-7
Site preparation punch list sheet	B-9
Site preparation punchlist sheet	B-10

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SP-1 Site preparation general checklist

Purpose

Where applicable, the following items must be completed prior to the installation of site equipment. Circle the correct letter for the corresponding item descriptions.

Item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	Are site environmental conditions within equipment specified operating range?	Y	N	N/A	
2.	Has the required space been provided around equipment [i.e., maintenance access, heat dissipation, safety]?	Y	N	N/A	
3.	Has a Method of Procedure (MOP) been developed with the installation supervisor?	Y	N	N/A	
4.	Has installer site equipment parameter sheet been completed and reviewed with the installation supervisor?	Y	N	N/A	
5.	Has all equipment been ordered and has delivery to site been scheduled?	Y	N	N/A	
6.	Have all necessary arrangements been made for access to the site?	Y	N	N/A	
7.	Have all necessary arrangements been made to get equipment onto the site (crane, etc.)?	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

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SP-2 Site preparation power source checklist

Purpose

Where applicable, the following items must be completed prior to the installation of the site equipment. Circle the correct letter for the corresponding item descriptions.

Item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	Is power service available?	Y	N	N/A	
2.	Have power service and conduits been approved by local code?	Y	N	N/A	
3.	Is power service equipped with surge protection at service entry point?	Y	N	N/A	
4.	Is the power source appropriate for equipment being installed?	Y	N	N/A	
5.	Does power service have proper circuit breaker rating(s) and labeling?	Y	N	N/A	
6.	Is power circuit breaker(s) available and labeled for power system?	Y	N	N/A	
7.	Is power 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	
8.	Do elevated lighting, intrusion lighting, etc. feeds have proper lightning protection?	Y	N	N/A	
9.	If not supplied with the product, have at least two AC duplex convenience outlets been provided within 1.5 meters (5 feet) of the product? NOTE: A Ground Fault Circuit Interrupt (GFCI) type is recommended, and must be used when required by code.	Y	N	N/A	
10.	Is each outlet protected by a UL/CSA listed, or approved 15 A circuit breaker?	Y	N	N/A	

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SP-3 Site preparation grounding checklist

Purpose

Where applicable, the following items must be completed prior to the installation of the 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.	Has connection been provided to grounding electrode system? If yes, circle all that apply: A. Via a buried ring ground and driven rod(s) B. Via a buried metallic and electrically continuous water pipe C. Via driven ground rod(s) and/or plate(s) D. Via electrolytic ground rod(s) E. Via grounded building steel F. Via grounded grid or radial	Y	N	N/A	
3.	Is antenna support structure(s) grounded?	Y	N	N/A	
4.	Is antenna tower bonded to grounding electrode system?	Y	N	N/A	
5.	Are any guy wires bonded to grounding electrode system?	Y	N	N/A	
6.	Are antenna cable shields grounded at both ends?	Y	N	N/A	
7.	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	
8.	Are all grounding conductors routed as straight as possible with no loops or sharp bends?	Y	N	N/A	
9.	Is equipment support structure grounded?	Y	N	N/A	

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Item #	Description	Yes (Y)	No (N)	N/A	Comments
10.	Are metallic conduits bonded at both ends and 7.62-meters (25-foot) intervals?	Y	N	N/A	
11.	Is power supply equipped with a surge protection device and is the device properly connected to the ground system?	Y	N	N/A	
12.	Are the additional surge protection devices properly connected to the ground system?	Y	N	N/A	
13.	Is strand cable adequately grounded?	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

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SP-4 Site preparation RF antenna checklist

Purpose

Where applicable, the following items must be completed prior to the installation of the RF cell site equipment. Circle the correct letter for the corresponding item descriptions.

Item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	Are all antenna cable runs installed?	Y	N	N/A	
2.	Are all antenna cable runs properly terminated with the appropriate connectors on the equipment side?	Y	N	N/A	
3.	Are all cable connections torqued to the appropriate value?	Y	N	N/A	
4.	If required, are the optional RF antenna cables equipped with surge protection devices?	Y	N	N/A	
5.	Are all external cables UV rated?	Y	N	N/A	
6.	Are antenna cable runs' demarcation points in proper location?	Y	N	N/A	
7.	Are antenna cable runs marked and in proper sequence per applicable equipment drawings?	Y	N	N/A	
8.	Are appropriate type, length and number of antenna cable jumpers available?	Y	N	N/A	
9.	Are appropriate drip loops provided for antenna cable runs at turns and demarcation point?	Y	N	N/A	
10.	Have antenna and cable sweeps been performed?	Y	N	N/A	
11.	Are antennas properly installed and secured?	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

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SP-5 Site preparation GPS antenna checklist

Purpose

Where applicable, the following items must be completed prior to the installation of the site equipment. Circle the correct letter for the corresponding item descriptions.

Item #	Description	Yes (Y)	No (N)	N/A	Comments
1.	Is antenna installed with base level within two degrees?	Y	N	N/A	
2.	Is antenna installed with less than 25% of the sky masked by obstruction?	Y	N	N/A	
3.	Is GPS antenna located at least 3.05 m (10 ft.) vertically and horizontally from any active transmit antenna?	Y	N	N/A	
4.	Are aggregate cable loss, cable VSWR, total cable length, cable type, GPS antenna gain, KS list and serial numbers recorded in the site installation records?	Y	N	N/A	
5.	Is proper gain antenna installed for the total aggregate cable loss and length?	Y	N	N/A	
6.	Is measured cable VSWR within its specified value?	Y	N	N/A	
7.	If required, is the GPS antenna cable properly grounded and equipped with a proper surge protection device?	Y	N	N/A	
8.	Are proper service loops provided near antenna?	Y	N	N/A	
9.	Is proper drip loop provided for the outdoor antenna jumper cables?	Y	N	N/A	
10.	Are cable connections torqued to the appropriate value?	Y	N	N/A	
12.	Are all external cables UV rated?	Y	N	N/A	
13.	Are antenna bracket, pipes, and antenna properly secured?	Y	N	N/A	
14.	If required, has weatherproof protection tape been applied to GPS antenna cable connector joints?	Y	N	N/A	

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Item #	Description	Yes (Y)	No (N)	N/A	Comments
15.	Was GPS antenna location verified for line of sight using a GPS test unit or equivalent?	Y	N	N/A	
16.	Is GPS antenna location free of external interference (i.e., radio stations, collocated equipment, etc.)?	Y	N	N/A	

Notes:

1. Completed by: _____
2. Date: _____

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Site preparation punch list sheet

Purpose

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

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

Notes:

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.
4. Inspection Checklist Completion Sign-Off (complete below)
5. Was the punchlist continuation sheet on the next page used? Yes or No
6. Inspector's Name: _____
7. Inspector's Signature: _____ Date: _____

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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

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Appendix C: Product conformance statements

Overview

Purpose

This section presents the product conformance statements that apply to the Alcatel-Lucent Metro Cell Outdoor Access Point equipment when deployed in the United States.

The statements that are required are determined primarily by national or multi-national regulations. However, in some regions, contract terms determine which statements are required.

The presence of the statement indicates that the product does comply with that statement wherever it is required to do so.

Contents

Federal Communications Commission	C-2
Product safety conformance statements	C-4
Antenna exposure statements	C-5
FDA/IEC optical transmitter product compliance statements	C-7
Eco-environmental statements	C-8

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Federal Communications Commission

Federal Communications Commission

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

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

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15 Class B

Note: 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 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.

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SOC	6.0N

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

If this 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 necessary modifications to maintain uninterrupted service.

FCC regulations prohibit the connection of customer-provided equipment to central office implemented systems. Connection to party lines is subject to tariffs; users should contact their state public utility commission, public service commission, or corporation commission for information.

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the 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, within the United States: +1 630 224 4762, prompt 2

RF approval

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

This device complies with Part 22 – Public Mobile Services, Subpart H – Cellular Radiotelephone Services.

This equipment complies with Part 24 - Personal Communications Services, Subpart E - Broadband PCS.

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Product safety conformance statements

Product safety conformance

The Alcatel-Lucent 9764 Compact Metro Cell Outdoor B41 2x6W is Safety Certified ITE by CSA International.

This Certification is marked on the equipment main nameplate label. Should the local Authority Having Jurisdiction (AHJ) require prior or additional verification of this Certification, a Product Certificate of Compliance can be obtained from the specific Certification Body by the Business/Product Unit Applicant for the product or by contacting:

Technical Support Services, within the United States: +1 630 224 4762, prompt 2

Any modifications to this equipment are not permitted without review and official written authorization from the specific Certification Body. Unauthorized changes may violate the Product Safety Certification. Modifications or changes authorized by official CN/CNN are assumed to have received prior approval from this Lab.

Indoor applications

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.

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Antenna exposure statements

Antenna exposure

Antenna installations for this equipment 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 supplier of radio equipment, the supplier of antenna equipment and the integrator and builder of the site must provide sufficient information so that the limits of the exclusion zones can be determined. Any changes to the antenna or other equipment in the transmit path may require re-evaluation of the exposures to electromagnetic fields.

Pursuant to 47 CFR Part 1, Subpart I, subject to the provisions of section 1.1307, all installations must be evaluated for requirements contained in Table 1, “Limits for maximum permissible exposure,” in section 1.1310.

Guidelines for antenna placements

1. Antennas should be placed more than 20 cm (8 inches) away from possible human RF exposure.
2. When placing the antennas, please be aware of FCC 47 CFR 1.1307 - 1.1310 and FCC guidelines for public safety, for example, OET Bulletin No. 56, “Questions and Answers About the Biological Effects and Potential Hazards of Radio frequency Electromagnetic Fields” and OET Bulletin 65, “Evaluating Compliance With FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”). FCC requirements mandate maximum power density at location of possible exposure to be below 0.5 mW/cm^2 (5 W/m^2) at 750 MHz and 1 mW/cm^2 (10 W/m^2) at AWS for general population/uncontrolled exposure and 2.5 mW/cm^2 (25 W/m^2) at 750 MHz and 5 mW/cm^2 (50 W/m^2) at AWS for occupational/controlled exposure. Exposure is averaged over a 30 minute time period for general population and over a 6 minute time period for occupational/controlled exposure.

   Example of a B13 MCO running at 5 W (7 dBW), connected via a 2 dB cable loss and a 3 dBi antenna:

   Power density at distance R from antenna is PwD = EIRP(dBW) - 10*log10(4pi*R^2)

   At 1 m away from the antenna, PwD(1m) = EIRP(7dBw - 2dB + 3dBi) - 11dB = -3dBw/m^2 (0.5W/m^2)

   At 1 ft away from the antenna, PwD(0.305m) = EIRP(8dBW)-0.82dB = 7.18dBW/m^2 (5.2W/m^2)

   Note: Losses of all components between the MCO port and antenna should be included in EIRP calculations. MCO power in indoor applications may have to be lowered based on antenna distance to human exposure and total EIRP.

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This example indicates that in this particular deployment configuration, US safety limits for general population are met at a distance slightly over 1 foot for B13 operation.

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FDA/IEC optical transmitter product compliance statements

FDA/IEC optical transmitter product compliance

Alcatel-Lucent declares that this equipment complies with the Food and Drug Administration's Center for Devices and Radiological Health (FDA/CDRH) regulations 21 CFR 1040.10 and 1040.11. It is a Class I/1 laser optical fiber communication systems "product" under the FDA.

This Product is designed to ensure that personnel operating the product are not endangered by laser radiation during normal operation and fault conditions. This product does not present a risk of eye injury because it is fully enclosed and does not contain embedded lasers greater than Class I/1 unless otherwise noted.

Laser warning

WARNING

Laser hazard

The light from laser and high-radiance LED's may cause eye damage if absorbed by the retina.

- *Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.*
- *Do not view directly into the laser beam with optical instruments such as a fiber microscope because viewing of laser emission in excess of Class 1 limits significantly increases the risk of eye damage.*
- *Never look into the end of an exposed fiber or an open connector as long as the optical source is switched on.*
- *Ensure that the optical source is switched off before disconnecting optical fiber connectors.*

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Eco-environmental statements

Packaging collection and 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, or 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 collection and recovery of packaging and packaging waste within specific jurisdictions, contact the Alcatel-Lucent Environment, Health and Safety organization or Alcatel-Lucent Hazardous Waste Center technical support at (888) 539-2783.

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

Technical Support Services, within the United States: +1 630 224 4762, prompt 2

Material content compliance

The following notification applies to Alcatel-Lucent products distributed for sale, resale, or use.

This product, part, or both may include a lithium-manganese dioxide battery, which contains very small amounts of a perchlorate substance. Special handling may apply.

For California:

Perchlorate Material - special handling may apply.

See *http:\\www.dtsc.ca.gov/hazardouswaste/perchlorate/*.

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Glossary

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Numerics

3GPP
3rd Generation Partnership Project

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
Sites must be equipped with at least two duplex outlets for installation and maintenance procedures. The outlets are required to power test equipment and installation tools.

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. ANSI is a member of the International Standards Organization (ISO).

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

AP
Access Point

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

B

Backup
Facility used to replace an element which has failed.

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Base station

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

BBU

BaseBand Unit

BOCA

Building Officials and Code Administrators

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 ring ground

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

C

CDRH

Center for Devices and Radiological Health

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 documents.

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.

CMCO

Compact Metro Cell Outdoor

Configuration

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

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Controlled environment

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

CPRI (Common Public Radio Interface)

Specification for the key internal interface of radio base stations between the Radio Equipment Control (REC) and the Radio Equipment (RE).

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 this document for documenting cell site configuration, conditions, and other pertinent information for reference during product deployment, and future additions.

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.

Diversity

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

Driven ground rod

A copper-clad steel or stainless steel rod, a minimum of 2.4 meters (8 feet) long and 5/8 inch in diameter.

E

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.

Electrolytic ground rod

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

EU

European Union

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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

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.

FDA

Food and Drug Administration

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.

GBE

GigaBit Ethernet

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 system of 24 satellites that provides, among other things, extremely accurate timing information to the cell sites.

Ground

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

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Ground 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

Heat dissipation

The heat generated by equipment during operation.

HSDPA

High Speed Downlink Packet Access

HSUPA

High Speed Uplink Packet Access

HV

High Voltage

Hz (Hertz)

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

I

ICNIRP

International Commission for Non-Ionizing Radiation Protection

IEEE

Institute of Electrical and Electronics Engineers

INTR (Intrusion Alarm)

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

IT

In an IT earthing system, the electrical distribution system has no connection to earth at all, or it has only a high impedance connection. In such systems, an insulation monitoring device is used to monitor the impedance.

L

LAN

Local Area Network

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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.

LV

Low Voltage

M

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 9412 eNodeB Compact equipment.

MSP

Mobile Service Provider

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.

NFPA

National Fire Protection Association

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.

Non Alcatel-Lucent power

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

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P **Phase**

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

Q **QAM**

Quadrature Amplitude Modulation

QoE

Quality Of Experience

R **RCD**

Residual Current Device

RF (Radio Frequency)

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

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.

RoHS

Restriction of Hazardous Substances

Rx (Receive)

S **SAR (Specific Absorption Rate)**

A measure of the rate at which energy is absorbed by the body when exposed to radio frequency energy.

Sector

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

SFP

Small Form-Factor Pluggable (a transceiver module)

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.

Site

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

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Site preparation

To perform the requirements necessary at the 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.

T

T1

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

TN

In a TN earthing system, one of the points in the generator or transformer is connected with earth, usually the star point in a three-phase system. The body of the electrical device is connected with earth via this earth connection at the transformer.

TT

In a TT earthing system, the protective earth connection of the consumer is provided by a local connection to earth, independent of any earth connection at the generator.

Twisted pair cable

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

Tx (Transmit)

U

UBC

Uniform Building Code

UL (Underwriters Laboratories)

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

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.

V AC (Volts Alternating Current)

V DC (Volts Direct Current)

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V rms (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.

WCDMA

Wideband Code Division Multiple Access

WEEE

Waste Electrical and Electronic Equipment

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DRAFT

Index

Numerics

9764 CMCO B41 2x6W

Front view, 2-5

functions, 2-9

Rear view, 2-7

top view, 2-8

A about this document

how to order, xvi

technical support, xvi

Antenna configuration options

GPS/GLONASS antenna, 7-4

RF antenna, 7-3

Antenna requirements

antenna installation, 7-2

cable grounding, 7-2

cables, 7-2

AWG conversion table, xiii

B Basic site requirements

Installation clearances, 3-5

C Cable

requirements on antennas, 7-2

Cell site general information, B-1

Check lists

use of ~, xv

Checklist

general, B-2

GPS antenna, B-7

grounding, B-4

power source, B-3

punch list, B-9, B-10

RF antenna, B-6

checklist

site survey, A-4, A-9

venue, A-2

venue survey, A-2

Compact Metro Cell Outdoor

GPS Antenna, 2-12

power supply, 2-11

product labelling, 2-13

RF antenna, 2-11

Status indicators, 2-12

Connectors

Metro Radio Outdoor, 2-10

Conventions used, xii

D Deployment scenario, 2-3

Dimensions and weights, 2-15

document support, xv

E Ethernet cable requirements

Conduit, 6-5

Ethernet cabling options, 6-3

General requirements, 6-2

Optical/electrical transceivers, 6-3

Surge protection, 6-4

F Front view, 2-5

functions, 2-9

G General site requirements, 3-4

glossary, GL-1

GPS Antenna

Metro Radio Outdoor, 2-12

Grounding

antenna cable requirements, 7-2

Grounding - product

9764 CMCO module grounding point, 4-4

ancillary items, 4-4

DRAFT

Grounding and lightning protection
codes and standards, 4-2
grounding requirements, 4-2
surge protection requirements, 4-3

H Hardware and ancillary items
9764 CMCO base items, 2-18
Ethernet cable (electrical), 2-22
Ethernet cable (GPON), 2-24
Ethernet cable (optical), 2-23
External antenna - GPS, 2-20
Grounding, 2-24
Mounting kits, 2-21
Power, 2-24
RF antenna, 2-20
SFP modules, 2-22
Solar shield, 2-19
Surge arrestor, 2-21
how to order documents, xvi

I Installation kits
for pole mount, 3-6
for wall mount, 3-8
Intended audience, xi

M Metro Radio Outdoor
connectors, 2-10

P phone numbers
for document support, xv
Pole mount
installation kits, 3-6
options, 3-6
Power - product
ancillary items, 5-8
connection point, 5-9
Power requirements
Product power specification, 5-8
Power requirements (AC)
AC power supply, 5-2
Conduit, 5-4
General, 5-2
Line surge protection, 5-3
Power junction box, 5-3
Power requirements (DC)
Conduit, 5-6
DC power supply, 5-5
General, 5-5
Line surge protection, 5-6
Power Junction box, 5-6
Power supply
Compact Metro Cell Outdoor, 2-11
Product capabilities, 2-2
product conformance statements, C-1
product labelling
Compact Metro Cell Outdoor, 2-13

R Rear view, 2-7
Reason for revision, xi
Related documentation
Alcatel-Lucent, xiv
third party, xiv
Related training, xiv
Requirements
general site ~, 3-4
structural ~, 3-4
RF antenna
Metro Radio Outdoor, 2-11

S safety information, xvi
Site requirements
device placement, 3-4
general ~, 3-4
Status indicators
Compact Metro Cell Outdoor, 2-12
Supported installation options
Standard, 2-16
Urban furniture, 2-17
Systems supported, xi

T technical support contact information, xvi
Top view, 2-8

W Wall mount
examples, 3-8
installation kits, 3-8
options, 3-8
Weights and dimensions, 2-15
Wire cross-sectional area table, xiii
Wire size table, xiii

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