Restricted

Remote Radio Unit CDMA - Enhance (RRUC-E)

Provisioning Guidelines and Cell Site Requirements

Document status: approved
Stream 00 issue 01
Issue date: November 10, 2010
Security status: Restricted
Dataset Name: NTTT0000_PGCSR
PEC: NTTT0000

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Document Content Intent

The information contained within this document supersedes all other Provisioning Guidelines, Cell Site Requirements, and original design documents with the same information. The latest approved version of this document should always be used. The latest approved version can be obtained from Matrix using the PEC, and dataset indicated on the title page of this document.

All information that has *red italic text* is Design only information or future information, and is not intended for customer or provisioning documentation. If document is printed in black and white the red text appears gray.

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The document author is the only person authorized to update this document. If you have information updates for this document please contact the editor/author.

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The document consultants are broken into two categories: customer consultants, and technical prime consultants. The customer consultants are responsible for indicating the document meets their needs. The technical prime consultants are responsible for indicating the technical content of the document is correct.

If you use the contents of this document to assist with performing your function/job, and would like to be put on the list as a customer consultant to ensure that you receive the document with updates in the future, please contact the editor/author.

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Intended Audience

CDMA Design

Network Engineering

RF Engineering

Customer Documentation

Installation Methods

PLM

Hypertext Links

Hypertext links in this document are indicated by underlined blue text. If viewing a PDF version of this document, click on the blue text to jump to the associated section or page.

Document Updates

This document is updated as required. Please contact the document editor/ author for update information.

Publication History

All technical content labeled TBD and all provisioning tables that do not contain order quantities for a configuration are not approved at this time.

FCC Caution:
Part 15.21: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
Part 15.19 a(1):This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

Table 2 Publication History

Stream / Issue	Revision Date	Reason for Change	Author / Dept.
00 01	November 10, 2010	- Change description of 800MHz A and B band DPM with 800MHz Full band DPM. - Change description of C/D band with iDEN band. - Make all the iDEN Band information as design information only, as it is trial only and without commercialization. - Update Table 35. - Update Figure 8, Figure 10 and Figure 13. **- Approval based upon the following change:** - Replace Placeholder of 1:2 power Jumper with N0229053. - Replace NTM 101 0429/1 with N0229049. - Add Figure 9 and Figure 11. - Add DCPM clearance information. - Add Table 22 for BTS Cell radius in A RRUC-E deployment. - Update 800MHz iDEN band DPM Tx Frequency range in Table 15 and Table 29. - Update Table 37 and Table 38. - Split information of center of gravity location of support frame for 2 different DPM version in section 7.2.9.1. - Add weight information of RRUC-E/DPM in Table 42. - Update Transmit Power Specifications in Table 36. - Add PEC NTTT3031 for DMI cable. - Update Figure 38 with real. - Update GR-63-CORE and GR-487-CORE version to issue 3.	G Shao/ XOH
v1	September 17, 2010	- First draft version of the document.	G Shao/ XOH

References

1. 800 MHz Remote Radio Unit CDMA - Enhance (RRUC-E) Systems Design Specification

   link
   http://livelink2.ca.nortel.com/livelink/livelink.exe?func=ll&objId=57994741&objAction=browse&sort=name&viewType=1

2. Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification

   link
   http://livelink2.ca.nortel.com/livelink/livelink.exe?func=ll&objId=59376110&objAction=browse&sort=name&viewType=1

3. Remote Radio Unit CDMA- Enhance Interconnect General Specification

   link
   http://livelink-ott.ca.nortel.com/livelink/livelink.exe/open/60081587

4. Remote Radio Unit CDMA 800 MHz Duplexer OEM General Specification

   link
   http://livelink2.ca.nortel.com/livelink/livelink.exe?func=ll&objId=58340228&objAction=browse&sort=name&viewType=1

5. Rectifier General Specification

   link
   http://livelink-ott.ca.nortel.com/livelink/livelink.exe/open/37484462

6. CDMA Metro Cell Digital Provisioning Guidelines and Cell Site Requirements

   Dataset Name Digital_PGCSR
   PEC NTGS0006

7. CDMA Metro Cell Power, Protection & Grounding Provisioning Guidelines and Cell Site Requirements

   Dataset Name PPG_PGCSR
   PEC NTGS0006

8. CDMA Metro Cell Mechanical and Environmental Cell Site Requirements

   Dataset Name Mech_EnviroPGCSR
   PEC NTGS0006

9. CDMA Metro Cell Radio Provisioning Guidelines and Cell Site Requirements

   Dataset Name Radio_PGCSR
   PEC NTGS0006

10. CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements

    Dataset Name System_PGCSR
    PEC NTGS0006

11. CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements

    Dataset Name NTLK01AA
    PEC NTLK01AA_PG/CSR

12. CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell

Site Requirements

Dataset Name NTLK01AB
PEC NTLK01AB_PG/CSR

13. CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements

    Dataset Name NTGS0006_CMO-E2_PGCSR
    PEC NTGS0006

14. CDMA MFRM-3 Provisioning Guidelines and Cell Site Requirements

    Dataset Name NTGZ70AA_PGCSR
    PEC NTGZ70AA

15. CDMA Metro Cell FRM and MFRM Remote Power Information

    Dataset Name GSFRM_REMOTE
    PEC NTGY0001

16. CDMA Feature Delivery System Provisioning Guide

    Dataset Name NTGS0005
    PEC NTGS0005
    This document provides a list of the CFDS/CCDS order codes, and their functionality.

17. Telcordia Technologies Generic Requirements, GR-63-CORE Issue 3

    http://telecom-info.telcordia.com
    This specification provides the physical requirements that the RRUC is intended to meet in most instances. Exceptions will be documented within the RRUC PG/CSR.

18. Telcordia Technologies Generic Requirements, GR-487-CORE, Issue 3

    http://telecom-info.telcordia.com
    This specification provides the Electronic Equipment Cabinets requirements that the BTS is intended to meet in most instances. Exceptions will be documented within this document.

19. Fiber Optic Microcell Cell Site Requirements

    Dataset Name NTGS1000_FOM_CSR
    PEC NTGS1000
    This document provides the fiber optic microcell information for the SFRM, MFRM, and MFRM-2. It will not be updated for MFRM-3. It has good reference material but has been superseded by [Ref 20].

20. Transition Networks Media Converter Products Design Specification

    Dataset Name DSBW80AA
    PEC NTBW80AA
    This document has the fiber optic micro cell information for the SFRM & MFRM.

21. Fiber Optic Micro Cell Media Converter Deployment Guide

    Dataset Name NTBW80AA_deploy
    PEC NTBW80AA

22. Media Converter Card and Chassis OEM General Specification

    Dataset Name GSBW80AA
    PEC NTBW80AA

23. Remote Radio DC Protection Module General Specification

    http://livelink-ott.ca.nortel.com/livelink/livelink.exe?func=ll&objId=42355794

24. CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements

    Dataset Name NTLK7000_BTS652_PG/CSR
    PEC NTLK7000

25. CDMA BTS 652 Interconnect General Specifications

    Dataset Name IGSLK70000_BTS652
    PEC NTLK7000

26. CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements

    Dataset Name NTLK7000_BTS662_PG/CSR
    PEC NTLK7000

27. CDMA BTS 662 Interconnect General Specifications

    Dataset Name IGSLK70000_BTS652
    PEC NTLK7000

Glossary

Table 1 Glossary

Term/Abbreviation	Meaning
1xEV-DO	1x EVolution-Data Optimized
1xRTT	single carrier (1x) Radio Transmission Technology
ACEG	AC Earth Ground
AWS	Advanced Wireless Services (Rx 1.7 / Tx 2.1 GHz)
BBF0	Baseband Format 0
BBF1	Baseband Format 1
BTS	Basestation Transceiver Subsystem
CCDS	CDMA Capacity Delivery System (another term for CFDS)
CDMA	Code Division Multiple Access
CE	Channel Element
CFDS	CDMA Feature Delivery System (another term for CCDS)
CMO-E	Compact Metro Cell Outdoor Evolution (precedes CMO-E2)
CMO-E2	Compact Metro Cell Outdoor Evolution 2
CSR	Cell Site Requirements
DCG	Digital Control Group (CM & CORE)
DCPM	DC Protection Module
DE	Digital Enclosure
DOM	Data Optimized Module - Release 0 (1xEV-DO)
DOM-A	Data Optimized Module - Release A (1xEV-DO)
DPM	Duplexer/Preselector Module
DR	Digital Rack
eDCG	enhanced Digital Control Group (CM-2 & CORE-2/CORE-2S)
FOM	Fiber Optic Microcell
FRM	Flexible Radio Module (refers to SFRM or MFRM or MFRM-2 or MFRM-3)
FRU	Field Repairable/Replaceable Unit
GS	General Specification
ID	Indoor
IGS	Interconnect General Specification
IMF	Interference Mitigation Filter

Table 1 Glossary (Continued)

Term/Abbreviation	Meaning
LPM	Lightning Protection Module
MD	Manufacture Discontinued
MFRM-3	Multi-carrier Flexible Radio Module 3
MM	Multi-Mode
MO	Merchandise Order
n/a	Not Applicable
OD	Outdoor
OEM	Outside Equipment Manufacturer
PA	Power Amplifier
PBU	Ericsson Pilot Beacon Unit
PEC	Product Engineering Code
PP&G	Power, Protection & Grounding
RE	Radio Enclosure
RF	Radio Frequency
RR	Radio Rack
RRUC	Remote Radio Unit CDMA
Rx	Receive
SFP	Small Form factor plugable Module
SM	Single-mode
SW	Software
tbd or TBD	To Be Determined
Tx	Transmit
iDEN	Integrated Digital Enhanced Network

1.0 Introduction

If the technical content has not been validated it will indicate that the information is TBD. Do not use any TBD information at this time.

1.1 Program Overview

The Remote Radio Unit CDMA - Enhance (RRUC-E) is a three carrier single sector radio operating at -48V DC. It is intended primarily for outdoor installations remote from the CDMA BTS. To reduce size the Remote Radio Unit CDMA - Enhance (RRUC-E) uses convection cooling with no fan or heater. It is optimized for size and will not support any user equipment space or customer alarms.

The Remote Radio Unit CDMA - Enhance is a 800 MHz frequency radio supporting bands Class 0 A band, B band, ~~A band and B~~ Full band;*Bands Class 10 ~~C/D~~ iDEN band ~~(iDEN) TBD~~,* with both 1xRTT and 1xEV-DO air interfaces. The maximum carrier configuration is six carriers per sector, with one, two or three sector deployment supported.

The Remote Radio Unit CDMA - Enhance will be compliant to:

- RoHS 5/6
- IS-97D category A conducted spurious emissions
- FCC class B conducted emissions

1.2 Document Scope

The purpose of this document is to provide detailed provisioning guidelines, and cell site requirements for the Remote Radio Unit CDMA - Enhance in a system configuration.

The Provisioning Guidelines sections contain ordering information for the hardware covered in this document. Order codes, and required quantities will be outlined. Order relationships between hardware will be detailed.

The Cell Site Requirements sections contain information particular to the site, and the hardware deployed. It outlines information required for site preparation.

Use the documentation outlined in the “References” section on page 15 in addition to this document for complete Remote Radio Unit CDMA - Enhance information.

The CDMA product line has a number of product variants. Within each variant are different power configurations. These variants will be referred to as systems within the rest of the document.

Intended Ericsson CDMA systems configuration support:

- **BTS 652**
  - **AC**
- **BTS 662**
  - **-48V DC**

  - 24V DC
  - ***AC in future***
- **AC CMO-E/BTS 614**
  - **AC CMO-E/BTS 614**
  - **AC CMO-E/ BTS 614 International**
  - **AC CMO-E/ BTS 614 Peltier Heater**
- **BTS 624**
  - **-48V DR**
  - **AC DR**
- **Outdoor Metro Cell (MD)**
  - AC DE

This document outlines the 800 MHz Remote Radio Unit CDMA - Enhance (RRUC-E) Provisioning Guidelines and Cell Site Requirements for the CDMA products. It is not a stand alone document, and is used in conjunction with all of the CDMA documents to provision a CDMA system.

Use the existing documentation outlined in the Section "References" on page 15, in addition to this document, for complete provisioning, and cell site information. Choose the appropriate Cell Site Requirements, and Provisioning Guidelines document based upon the Metro Cell system that is being ordered.

1.3 Configuration Support

Remote Radio Unit CDMA - Enhance will not necessarily be supported in all possible configurations. Product configuration support is defined as follows:

- **Supported** - A product configuration that has been defined, documented, and verified by design. This configuration is orderable, and documented fully in the provisioning information for the product. The verification includes, but is not limited to the following:
  - Thermal
  - Mechanical
  - Interconnect
  - SW support
  - Regulatory / Safety
  - IS-97
- **Unsupported** - A product configuration that is not supported by design. There is no guarantee that this configuration is possible. This configuration has not been fully documented, or verified. If directed by PLM to investigate, design could validate this configuration, and make it supported if it is proven to be feasible.
- **Not Recommended** - A product configuration that has been considered by design, but is not recommended because it will cause the system to fail, or exceed one or more specifications.

Refer to Section 3.1 "Supported Configurations" for the systems Remote Radio Unit CDMA - Enhance will be supported with.

1.4 How to use this Guide for Provisioning

This document specifically addresses Remote Radio Unit CDMA - Enhance.

The following steps will guide you through the provisioning process.

1. Section 3.0 "System" provides the necessary system information required when provisioning Remote Radio Unit CDMA - Enhance.
2. Section 4.0 "Power, Protection and Grounding" provides the necessary PP&G information required when provisioning Remote Radio Unit CDMA - Enhance.
3. Section 5.0 "Digital" provides the necessary digital information required when provisioning Remote Radio Unit CDMA - Enhance.
4. Section 6.0 "Radio" provides the necessary radio information required when provisioning Remote Radio Unit CDMA - Enhance.
5. Section 7.0 "Mechanical and Environmental" provides the necessary Mechanical and Environmental information specific to Remote Radio Unit CDMA - Enhance.
6. All information that has *red italic text*, and/or is highlighted for internal Ericsson use only is not intended for customer or provisioning documentation.

This document is structured to allow for transfer of information into the sustaining documentation, once the product passes channel readiness. As such, it contains information applicable to multiple Metro Cell Systems. The following rules will assist in determining which information is applicable to which system.

1. This document provides information for the Remote Radio Unit CDMA - Enhance in multiple Metro Cell systems. Not all information is applicable to each system. At the start of each section that is general, or provides information on several systems, a table like Table 2 will indicate which Metro Cell system the section is applicable to.

Table 2 Applicable to these Systems

System	Applicable	System	Applicable	System	Applicable
CMO-E/BTS 614 AC	yes	BTS 652	yes	BTS 624 -48V DC	yes
CMO-E/BTS 614 AC International	yes	BTS 662 -48V DC	yes	BTS 624 AC	yes
CMO-E/BTS 614 AC Peltier	yes			Outdoor Metro Cell AC	yes

2. If a section is applicable to only one system it will be indicated in the section header. At the end of the title the system name will be placed.
3. If a section is applicable to all systems it will be indicated in the section header. At the end of the title an "- All Systems" will be placed.

2.0 Product Structure

The intent of this product structure is to provide reference to all new provisionable items required for Remote Radio Unit CDMA - Enhance. It will also indicate spares, FRUs and MOs.

The Table 3 details the recommended spare parts. The actual quantity of each spare part should be based on the number of sites, and their proximity to a central spare parts depot.

FRUs are field replaceable/serviceable items that would cause a service affecting problem. They must be easily replaced by the customer with minimal tools and manpower, and low risk of damaging equipment during the replacement process. They must have active electronic components. Defective FRUs must be returned by the customer.

There are two types of FRUS: Repairable and uneconomical to repair (UTR). Repairable FRUs are serviced and put back into inventory. UTR FRUs are discarded.

Consumables and cables do not fall under the FRU category.

MOs are merchandise orderable equipment. It is equipment that is discarded by the customer if it fails, and a new one ordered. MOs are not sent back to Ericsson for repair. They are not stocked, and the turnaround is not always guaranteed. As these items do not have a committed delivery time customers should stock spares if replacements will be required.

In Table 3 product codes right justified are always provided items that are orderable as a spare, FRU or MO.

Table 3 abbreviations are as follows:

- RRUC-E stands for Remote Radio Unit CDMA-Enhance

Any items with *red italic text* in the product structure are for reference purposes only at this time.

Table 3 Remote Radio Unit CDMA - Enhance Product Structure

Product Code	Description	FRU / MO	Spare	RRUC-E
Remote Radio Unit CDMA - Enhance - Hardware RF				
NTTT70ABE5	RRUC-E 800	FRU	yes	x
NTTT3026	FULLAXA Fiber Connector Bulkhead	MO		x
NTTT75AA	Duplexer RRUC-E A band	FRU	yes	x
NTTT75AB	Duplexer RRUC-E B band	FRU	yes	x
NTTT75AC	Duplexer RRUC-E Full band	FRU	yes	x

Table 3 Remote Radio Unit CDMA - Enhance Product Structure (Continued)

Product Code	Description	FRU / MO	Spare	RRUC-E
NTTT75AD	Duplexer RRUC-E B band with partial GSM Co-location	FRU	yes	x
NTTT75AE	Duplexer RRUC-E B band with full GSM Co-location	FRU	yes	x
NTTT75AF	*iDEN band DPM*	*FRU*	*yes*	*x*
N0129734	RF Lightning Protector, N-male to N-female		yes	x
N0106696	50 Ω Termination Load, N type		yes	x
N0108260	50 Ω Termination Load, QMA type		yes	x
Remote Radio Unit CDMA - Enhance - Hardware Mounting				
NTTT1001	Installation hardware spares kit, CDMA RRUC			x
NTTT1012	Mounting bracket assembly, CDMA RRUC-E 800			x
NTTT1003	Mounting kit, CDMA RRUC, pole 60 to 120mm diameter			x
NTTT1004	Floor stand kit, CDMA RRUC, concrete			x
NTTT1005	Floor stand kit, CDMA RRUC, non-concrete			x
NTTT1006	Mounting bracket assembly, CDMA RRUC rectifier, pole (2 bkts)			x
NTTT1007	Mounting kit, CDMA RRUC rectifier, pole, side adaptor			x
NTTT1008	Roof stand kit, CDMA RRUC			x
NTTT1009	Solar cover kit, CDMA RRUC			x
N0022482	Hex lag screw, 6mm x 50mm			x
N0032948	Anchor bolt, Hilti Kwik-Con II, hex head, 3/16 x 1.25"			x
N0220797	Isolation Pad, RRUC			x
N0221795	Isolation Pad, DCPM			x
N0083680	Washer, Shoulder (for ground isolation)			x
~~NTM 101 0429/1~~ N0229049	Wall mounted support, rectifier			x
Remote Radio Unit CDMA - Enhance - Hardware and Cabling Power				
NTTT19BAE5	Rectifier, 420W, 90-275V input, -48v Output, Outdoor	FRU	yes	x
~~NTTT3017~~	~~Cable Power, Rectifier to RRUC 5 Meters~~			~~x~~
NTDV73AA	DCPM, BTS 652			x

Table 3 Remote Radio Unit CDMA - Enhance Product Structure (Continued)

Product Code	Description	FRU / MO	Spare	RRUC-E
NTDV71AB	PCB, DCPM	FRU UTR		x
NTDV73BA	DCPM, BTS 662, BTS 624, Outdoor Metro Cell and CMO/CMO-E/BTS 614			x
NTDV71AB	PCB, DCPM	FRU UTR		x
N0229053	DCPM 1:2 Busbar ~~Power Jumper~~			x
NTLK1271E5	Cable Power, CMO BH/BR bar to DCPM			x
NTLK0909	Cable Power, BTS 662/BTS 624 BH/BR to DCPM			x
NTGS8073	Cable Power, Outdoor RRUC, co-located			x
N0113005	DC Power cable, raw, 10 AWG			x
N0114781	DC Power cable, raw, 8 AWG			x
NTGS0173	RE Remote DC Interface Kit			x
Remote Radio Unit CDMA - Enhance - Hardware and Cabling Fiber				
N0210871	Optical Transceiver, RRUC, Multi-mode, 1310 nm			x
N0210872	Optical Transceiver, RRUC, Single-Mode, 1 to 20 km 1310 nm			x
N0220970	Optical Transceiver, RRUC, Single-Mode, 20 to 40 km 1310 nm			x
N0220971	Optical Transceiver, RRUC, Single-Mode, 1 to 40 km 1550 nm			x
NTTT302810	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 10m.			x
NTTT302820	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 20m			x
NTTT302850	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 50m			x
NTTT302870	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 70m			x
NTTT3028100	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 100m			x
NTTT3028150	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 150m			x
NTTT302910	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 10m			x

Table 3 Remote Radio Unit CDMA - Enhance Product Structure (Continued)

Product Code	Description	FRU / MO	Spare	RRUC-E
NTTT302920	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 20m			x
NTTT302950	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 50m			x
NTTT302970	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 70m			x
NTTT3029100	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 100m			x
NTTT3029150	Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 150m			x
NTTT302710	Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 10m			x
NTTT302720	Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 20m			x
NTTT302750	Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 50m			x
NTTT302770	Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 70m			x
NTTT3027100	Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 100m			x
NTTT3027150	Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 150m			x
NTGY3030E6	Fiber assy, indoor, 11m, 1 Pair			x
NTGY3031E6	Fiber assy, indoor, 17m, 1 Pair			x
NTGY3032E6	Fiber assy, indoor, 23m, 1 Pair			x
NTTT3031 ~~*placeholder*~~	RRUC-E 800 DMI cable			x
Remote Radio Unit CDMA - Enhance - Cabling RF - using Ericsson duplexer				
NTGZ8041E6	Cable RF, QN RA to QN Str Lisca outdoor 400mm			x
NTGZ8142E6	Cable RF, QMA Str to QMA Str outdoor, 500mm			x
Remote Radio Unit CDMA - Enhance - Cabling RF - using customer hardware or diversity sharing				
NTGZ8106E6	Cable RF, QMA RA to QMA Str Outdoor 1000mm			x
NTGZ8110E6	Cable RF, QMA RA to QMA Str Outdoor 2000mm			x

Table 3 Remote Radio Unit CDMA - Enhance Product Structure (Continued)

Product Code	Description	FRU / MO	Spare	RRUC-E
NTGZ8146E6	Cable RF, QMA Str to QMA Str Outdoor 1000mm			x
NTGZ8150E6	Cable RF, QMA Str to QMA Str Outdoor 2000mm			x
	The following cables are for design only information. If customer provided RF hardware is ever used these cables might be useful for connecting the hardware.			
NTGZ8046E6	*Cable RF, QN RA to QN Str LISCA Outdoor 1000mm*			*x*
NTGZ8050E6	*Cable RF, QN RA to QN Str LISCA Outdoor 2000mm*			*x*
NTGZ8066E6	*Cable RF, QN RA to N Str LISCA Outdoor 1000mm*			*x*
NTGZ8070E6	*Cable RF, QN RA to N Str LISCA Outdoor 2000mm*			*x*
NTGZ8086E6	*Cable RF, QN Str to N Str LISCA Outdoor 1000mm*			*x*
NTGZ8090E6	*Cable RF, QN Str to N Str LISCA Outdoor 2000mm*			*x*
NTGZ8126E6	*Cable RF, QMA RA to N Str Outdoor 1000mm*			*x*
NTGZ8130E6	*Cable RF, QMA RA to N Str Outdoor 2000mm*			*x*
NTGZ8166E6	*Cable RF, QMA Str to N Str Outdoor 1000mm*			*x*
NTGZ8170E6	*Cable RF, QMA Str to N Str Outdoor 2000mm*			*x*

3.0 System

This section contains all supported and unsupported configurations, including applicable system provisioning and cell site requirements.

3.1 Supported Configurations

section 3.1 applicable to these systems

System	Applicable	System	Applicable	System	Applicable
CMO-E/BTS 614 AC	yes	BTS 652	yes	BTS 624 -48V DC	yes
CMO-E/BTS 614 AC International	yes	BTS 662 -48V DC	yes	BTS 624 AC	yes
CMO-E/BTS 614 AC Peltier	yes			Outdoor Metro Cell AC	yes

The Remote Radio Unit CDMA - Enhance is intended for deployment with the CDMA systems identified in this section. The RF Remote Radio Unit CDMA - Enhance is not installed in any BTS, it is external to the BTS and is connected to the BTS with one power and one fiber cable. Interconnect between the Remote Radio Unit CDMA - Enhance and other Ericsson CDMA radios is not supported.

Supported configurations are not necessarily filed for all standards. Contact the safety and emissions primes for the regulatory/safety filings. If a customer does not accept the filings that have been done on the hardware, additional testing, filing, and work may be required.PLM should be contacted in this situation.

BTS 652,BTS 662 and Outdoor Metro Cell configurations documented in the following subsections are one, two or three sectors. CMO-E, BTS 614 and BTS 624 configurations documented in the following subsections are one, two, three or six sectors.

3.1.1 Supported Configurations - only RRUC-E connected to BTS

3.1.1.1 Supported Configurations - BTS 652

Table 4 BTS 652 systems - 800 MHz Remote Radio Unit CDMA - Enhance Configurations

Initial State (per System)	Final State (per Sector) [a]	
	1 RRUC-E	2 RRUC-E
Greenfield	X	X
1 RRUC-E		X

[a] One, two or three sectors.

3.1.1.2 Supported Configurations - BTS 662 -48V DC

Table 5 BTS 662 systems - 800 MHz Remote Radio Unit CDMA - Enhance Configurations

Initial State (per System)	Final State (per Sector) [a]	
	1 RRUC-E	2 RRUC-E
Greenfield	X	X
1 RRUC-E		X

[a] One, two or three sectors.

3.1.1.3 Supported Configurations - CMO-E/ BTS 614 - AC, Peltier & AC International

Table 6 CMO-E/ BTS 614 systems - 800 MHz Remote Radio Unit CDMA - Enhance Configurations

Initial State (per System)	Final State (per Sector) [a]	
	1 RRUC-E	2 RRUC-E
Greenfield	X	X
1 RRUC-E		X

[a] One, two, three or six sectors. Refer to section 5.2.1 for additional six sector information.

3.1.1.4 Supported Configurations - BTS 624 - -48V DC & AC

Table 7 BTS 624 systems - 800 MHz Remote Radio Unit CDMA - Enhance Configurations

Initial State (per System)	Final State (per Sector) [a]	
	1 RRUC-E	2 RRUC-E
Greenfield	X	X
1 RRUC-E		X

[a] One, two, three or six sectors. Refer to section 5.2.1 for additional six sector information.

3.1.1.5 Supported Configurations - Outdoor Metro Cell - AC

Table 8 Outdoor Metro Cell systems - 800 MHz Remote Radio Unit CDMA - Enhance Configurations

Initial State (per System)	Final State (per Sector) [a]	
	1 RRUC-E	2 RRUC-E
Greenfield	X	X
1 RRUC-E		X

[a] One, two or three sectors.

3.1.2 Supported Configurations - RRUC-E and MFRM-3 connected to same BTS

Remote Radio Unit CDMA - Enhance and MFRM-3s can be connected to the same BTS. Remote Radio Unit CDMA - Enhance and MFRM-3s do not share any RF interconnect (diversity receive sharing or combining of transmit signals to share antennas) or antennas.

3.1.2.1 Supported Configurations - CMO-E/BTS 614 - AC, Peltier & AC International

Table 9 CMO-E/BTS 614 systems - 800 MHz Remote Radio Unit CDMA - Enhance and MFRM-3 Configurations

Initial State (per System)	Final State (per System) [a]				
	1 MFRM -3 3 RRUC-E	1 MFRM -3 6 RRUC-E	2 MFRM-3 3 RRUC-E	2 MFRM-3 6 RRUC-E	3 MFRM-3 3 RRUC-E
1 MFRM-3	X	X	X [b]	X [b]	X [b]
1 MFRM-3 + 3 RRUC-E		X [c]	X [b]	X [b c]	X [b]
1 MFRM-3 + 6 RRUC-E				X [b]	
2 MFRM-3			X	X	X [b]
2 MFRM-3 + 3 RRUC-E				X [c]	X [b]
3 MFRM-3					X

[a] The MFRM-3 is a three sector radio. This table documents BTSs supporting three sectors. MFRM-3s and RRUC-Es are isolated from each other.
[b] When adding another MFRM-3 to this configuration follow the MFRM-3 provisioning rules in [Ref 14].
[c] When adding additional RRUC-E-Es to this configuration follow the RRUC-E provisioning rules for expanding from 1 RRUC-E per sector to 2 RRUC-Es per sector.

3.1.2.2 Supported Configurations - BTS 624 - -48V DC & AC

Table 10 BTS 624 systems - 800 MHz Remote Radio Unit CDMA - Enhance and MFRM-3 Configurations

Initial State (per System)	Final State (per System) [a]				
	1 MFRM -3 3 RRUC-E	1 MFRM -3 6 RRUC-E	2 MFRM-3 3 RRUC-E	2 MFRM-3 6 RRUC-E	3 MFRM-3 3 RRUC-E
1 MFRM-3	X	X	X [b]	X [b]	X [b]
1 MFRM-3 + 3 RRUC-E		X [c]	X [b]	X [b c]	X [b]
1 MFRM-3 + 6 RRUC-E				X [b]	
2 MFRM-3			X	X	X [b]
2 MFRM-3 + 3 RRUC-E				X [c]	X [b]
3 MFRM-3					X

[a] The MFRM-3 is a three sector radio. This table documents BTSs supporting three sectors. MFRM-3s and RRUC-Es are isolated from each other.
[b] When adding another MFRM-3 to this configuration follow the MFRM-3 provisioning rules in [Ref 14].
[c] When adding additional RRUC-Es to this configuration follow the RRUC-E provisioning rules for expanding from 1 RRUC-E per sector to 2 RRUC-Es per sector.

3.1.2.3 Supported Configurations - Outdoor Metro Cell - AC

Table 11 Outdoor Metro Cell systems - 800 MHz Remote Radio Unit CDMA - Enhance and MFRM-3 Configurations

Initial State (per System)	Final State (per System) [a]				
	1 MFRM -3 3 RRUC-E	1 MFRM -3 6 RRUC-E	2 MFRM-3 3 RRUC-E	2 MFRM-3 6 RRUC-E	3 MFRM-3 3 RRUC-E
1 MFRM-3	X	X	X [b]	X [b]	X [b]
1 MFRM-3 + 3 RRUC-E		X [c]	X [b]	X [b c]	X [b]
1 MFRM-3 + 6 RRUC-E				X [b]	
2 MFRM-3			X	X	X [b]
2 MFRM-3 + 3 RRUC-E				X [c]	X [b]
3 MFRM-3					X

[a] The MFRM-3 is a three sector radio. This table documents BTSs supporting three sectors. MFRM-3s and RRUC-Es are isolated from each other.
[b] When adding another MFRM-3 to this configuration follow the MFRM-3 provisioning rules in [Ref 14].
[c] When adding additional RRUC-Es to this configuration follow the RRUC-E provisioning rules for expanding from 1 RRUC-E per sector to 2 RRUC-Es per sector.

3.1.2.4 Supported Configurations - CMO-E/BTS 614 - AC, Peltier & AC International

Table 12 CMO-E/BTS 614 systems - 800 MHz Remote Radio Unit CDMA - Enhance and MFRM-3 Configurations

Initial State (per System)	Final State (per System) [a]
	1 MFRM -3 + 3 RRUC-E
1 MFRM-3	X

[a] The MFRM-3 is a three sector radio. This table documents BTSs supporting three sectors. MFRM-3 and RRUC-Es are isolated from each other.

3.1.2.5 Supported Configurations - BTS 652

Table 13 BTS 652 systems - 800 MHz Remote Radio Unit CDMA - Enhance and MFRM-3 Configurations

Initial State (per System)	Final State (per System) [a]
	1 MFRM -3 + 3 RRUC-E
1 MFRM-3	X

[a] The MFRM-3 is a three sector radio. This table documents BTSs supporting three sectors. MFRM-3 and RRUC-Es are isolated from each other.

3.1.2.6 Supported Configurations - BTS 662 -48V DC

Table 14 BTS 662 systems - 800 MHz Remote Radio Unit CDMA - Enhance and MFRM-3 Configurations

Initial State (per System)	Final State (per System) [a]
	1 MFRM -3 + 3 RRUC-E
1 MFRM-3	X

[a] The MFRM-3 is a three sector radio. This table documents BTSs supporting three sectors. MFRM-3 and RRUCs are isolated from each other.

3.1.3 Design Only information - RRUC-E and MFRM-3 share RF interconnect

It is not recommended by design to support RRUC-E overlay onto other radios. Due to the recommended insertion loss of Rx diversity signals, the RRUC-E and any radio that it might share diversity receive with would have to be in very close proximity to each other. Other issues such as the inability to place the RRUC-E in a BTS are restricting.

3.2 Unsupported Configurations

Any configuration that is not listed as a supported configuration is deemed to be unsupported.

Unsupported configurations and technologies include, but are not limited to, the following:

- 450 MHz
- 1900 MHz
- 1.7/2.1 GHz
- AABS
- 24V DC
- BTS 3011
- BTS 3030/3031
- BTS 3231
- BTS 3430/3431
- Indoor Compact Metro Cell
- Low Density (LD) Metro Cell
- Low Profile (LP) Metro Cell
- Indoor Metro Cell Wilmore (Australia)
- BTS 624 24V DC
- BTS 662 24V DC
- Outdoor Metro Cell International (Australia)
- Indoor Fiber Optic Metro Cell (Australia) (NTGS45AD/AE)
- iFOM (outdoor NTGS03ZA/ZB/ZC/ZD/ZE/ZF)
- Minicell (miniDE)
- Rural Cell
- Split CMO
- Overlay onto Legacy
- Overlay onto AMPS
- redundancy
- miniRE - NTGT30AA, NTGT30AM and NTGT30CA
- CMO
- DCG

3.3 System Provisioning Guidelines

In addition to the information contained within this section refer to the documents below for complete system provisioning information. This section will only provide amended provisioning guidelines information.

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]

3.3.1 BTS 652

When using Remote Radio Unit CDMA - Enhances with a BTS 652 the DCPM is required to bring the Remote Radio Unit CDMA - Enhance power cables into the BTS 652.

Refer to Section 4.1.3.1 "Power Provisioning - BTS 652" for DCPM provisioning information.

Refer to CDMA BTS 652 Interconnect General Specifications [Ref 25]and Remote Radio DC Protection Module General Specification [Ref 23] for additional DCPM information.

3.3.2 CMO-E/BTS 614

SDS requires some minor changes will be introduced to CMO-E/BTS 614 connection palettes for RRUC-E connection. Currently no this information for what detail changes has to do and tested to support CMO-E/BTS 614 with RRUC-E.

3.3.3 BTS 624/BTS 662

When using Remote Radio Unit CDMA - Enhances with an BTS 624/BTS 662 the DCPM is required to bring the Remote Radio Unit CDMA - Enhance power cables into the BTS.

Refer to Section 4.1.3.3 "Power Provisioning - BTS 624/BTS 662" for DCPM provisioning information.

3.3.4 Outdoor Metro Cell

When using Remote Radio Unit CDMA - Enhances with an Outdoor Metro Cell the RE Remote DC Interface Kit is required to bring the Remote Radio Unit CDMA - Enhance power cables into the BTS.

Refer to Section 4.1.3.4 "Power Provisioning - Outdoor Metro Cell" for provisioning information.

3.4 System Cell Site Requirements

In addition to the information contained within this section refer to the documents below for complete system cell site requirements information for a BTS using a Remote Radio Unit CDMA - Enhance. This section will only provide amended cell site requirements information.

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]

3.4.1 Remote Radio Unit CDMA - Enhance Features

- indoor / outdoor
- 800 MHz
- -48V DC
- 1 to 3 carrier 1 sector
- 800 MHz BC 0 A, B and Full band
- *800 MHz BC 10 ~~C/D~~ iDEN band*
- Software NBSS 18.02 and greater version support RRUC-E
- supports CDMA IS-95A standard
- supports CDMA IS-2000 1xRTT standard
- supports CDMA IS-864 1xEV-DO standard (versions 0 and A)
- meets IS-97D category A

3.4.2 Remote Radio Unit CDMA - Enhance Antenna Cabling Requirements - All Systems

Refer to the appropriate Cell Site Requirements, based upon the system the Remote Radio Unit CDMA - Enhance is being deployed with, for complete information. The antenna isolation requirements for the Remote Radio Unit CDMA - Enhance are the same as those for the existing CDMA FRM radios.

The minimum number of antennas required per sector is 2. The antenna count is dependent upon the hardware configuration. All Remote Radio Unit CDMA - Enhance only configurations outlined in this document require 2 antennas per sector.

When Remote Radio Unit CDMA - Enhances and MFRM-3s are connected to the same BTS they do not share antennas; the Remote Radio Unit CDMA

- Enhances require 2 antennas per sector and the MFRM-3s requirements are outlined in CDMA MFRM-3 Provisioning Guidelines and Cell Site Requirements [Ref 14].

Design only information - When provisioning a mixed radio frequency configuration radios of different frequencies do not share antennas. (Kept as a placeholder/reminder in case different frequencies are developed.)

The frequency band coverage for 800 MHz is detailed in Table 15.

Table 15 BTS Transmit / Receive Frequency Bands

Band	Band Class #	Frequency Band (MHz)	
		Transmit	Receive
800 MHz band (Cellular)	0	869 - 894	824 - 849
Secondary 800 MHz band	10	~~863.5~~ 862.75 - 869	816 - 824

Table 16 Antenna Cabling Requirements

Specification	Frequency [a]	Specification
Return Loss Return loss as seen by the radio when looking into the cables that carry the signals to and from the antennas. The antenna system shall be fully assembled.	MAIN BTS Transmit and BTS Receive	>14 dB
	DIVERSITY BTS Receive	>14 dB
Transmitter to Receiver Antenna Isolation The isolation between any two of the antennas connected to the radios.	Tx band BTS Transmit	>30 dB
	Rx band BTS Receive	>30 dB
Passive Intermodulation Aggregate level of all intermodulation products created in the antenna system falling into the receive band of MAIN and DIVERSITY ports.	BTS Receive	<-130 dBc in any 30 kHz bandwidth
Reverse Tx Intermodulation Maximum power from external sources coupling into MAIN as seen at the radio output. The intermodulation products are created by the mixing of the externally coupled signal and the transmitted signal in the RM output stages.	MAIN port only BTS Transmit	>30 dB down from the Tx power in any 30 kHz bandwidth

[a] Refer to Table 16 for the frequencies.

3.4.2.1 TTLNA - All

Ericsson does not offer a TTLNA solution. RRUC-E are typically located in close proximity to the antennas and TTLNAs are not supported. If the customer's installation requires TTLNAs it is the customer's responsibility to provide and install the TTLNA solution; PLM should be contacted in this situation.

3.4.3 Breaker Assignment Use Plan

One or two Remote Radio Unit CDMA - Enhances can be assigned to the same 30A -48V DC breaker.

The complexity of the Remote Radio Unit CDMA - Enhance power feed configurations, resulting from more than one Remote Radio Unit CDMA - Enhance connected to a breaker, make it difficult to define the exact breakers to use in any given BTS. Connect the Remote Radio Unit CDMA - Enhance(s) DC power feed to any available radio breaker in the BTS. If more than one Remote Radio Unit CDMA - Enhance DC power feed is required, connect the Remote Radio Unit CDMA - Enhance power feeds to breakers powered from different BTS power feeds.

Depending upon the system at site additional power hardware may be required. Refer to Section 4.0 "Power, Protection and Grounding" to determine if additional hardware is required.

3.4.4 Customer Alarm Cabling

Customer alarms are not supported with the Remote Radio Unit CDMA - Enhance.

3.4.5 Remote Radio Unit CDMA - Enhance Test Interface

The Remote Radio Unit CDMA - Enhance has a RJ-45 connector providing customer DMI interface. This connector is environmentally sealed by an access port. If the port is opened the connection point is not sealed from the environment. The Ericsson ~~RJ-45~~ DMI ~~PEC *placeholder*~~ cable NTTT3031 is used to connect to the Remote Radio Unit CDMA - Enhance test port.

4.0 Power, Protection and Grounding

This section contains power, protection and grounding provisioning and cell site requirements. Refer to the Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2] for complete information.

4.1 PP&G Provisioning Guidelines

In addition to the information contained within this section refer to the documents below for complete PP&G provisioning information. This section will only provide amended provisioning guidelines information.

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]
- CDMA Metro Cell Power, Protection & Grounding Provisioning Guidelines and Cell Site Requirements [Ref 7]

4.1.1 Lightning Protection - All Systems

One RF lightning protector is required for each antenna feed to a RRUC-E. Order two N0129734 for each RRUC-E sector deployed. The N0129734 will be installed on the antenna port of DPM.

4.1.2 Power Budget - All Systems

Remote Radio Unit CDMA - Enhance power consumption values are defined in the Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2]. Refer to section "DC Power Consumptions Estimations" and use table "RRUC-E DC Power Consumption" to determine the Remote Radio Unit CDMA - Enhance power consumption.

4.1.3 Power Provisioning - All Systems

For the power provisioning rules use the Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2], and refer to the appropriate Provisioning Guidelines document based upon the system the Remote Radio Unit CDMA - Enhance is being deployed with. The system that the Remote Radio Unit CDMA - Enhance is being installed with will determine the power provisioning requirements.

RRUC-E may be powered one of three ways; indirect power feed, direct power feed, and remote power feed.

A direct feed RRUC-E is one which is powered directly from a customer power plant, rather than the BTS. When the RRUC-E is powered from the BTS it is considered an indirect feed RRUC-E.

A remote power feed RRUC-E is one which is powered directly from a customer power plant, via an appropriately rated breaker. This power plant is separate from the one which powers the BTS. This occurs when the RRUC-E is situated at a distance greater than 200m from the BTS.

BTS systems may use a DCPM to provide lightning and surge protection. Each DCPM can support one to six 30A power feeds, with one or two RRUC-Es on each power feed. 2 AWG power cable can access DCPM, 2 holes lug,1/4" size, 5/8" spacing is required.

The maximum number of RRUC-Es supported with the DCPM is dependent upon the BTS the DCPM is used with. *Design information only note: the absolute maximum number of RRUC-Es that a DCPM can support is 18.*

Refer to the Remote Radio DC Protection Module General Specification [Ref 23] and the Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2] for additional DCPM information.

4.1.3.1 Power Provisioning - BTS 652

When using Remote Radio Unit CDMA - Enhances with BTS 652 a DCPM may be required, this depends upon the method used to power the RRUC-Es.

Order one DCPM NTDV73AA to support Remote Radio Unit CDMA - Enhances indirect powered by BTS 652. Each NTDV73AA supports up to six Remote Radio Unit CDMA - Enhances. All power for the DCPM is always provided with the BTS 652. One grounding cabling NTGY3029E6 is always provided with the NTDV73AA.

The DCPM provides 30A connections for up to six Remote Radio Unit CDMA - Enhances.

Refer to CDMA BTS 652 Interconnect General Specifications [Ref 25]for additional information.

4.1.3.2 Power Provisioning - CMO-E/BTS 614

SDS requires some minor changes will be introduced to CMO-E/BTS 614 connection palettes for RRUC-E connection. Currently no this information for what detail changes has to do and tested to support CMO-E/BTS 614 with RRUC-E.

One 30A -48V DC breaker is required for one or two Remote Radio Unit CDMA - Enhances. The Remote Radio Unit CDMA - Enhances is not share the power feed from the BTS currently. Provision sufficient power equipment to accommodate the number of power feeds required, and to meet the power requirements of the Remote Radio Unit CDMA - Enhances.

Provision additional power equipment as per:

- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]

4.1.3.3 Power Provisioning - BTS 624/BTS 662

When using Remote Radio Unit CDMA - Enhances with BTS 624/BTS 662 a DCPM may be required, this depends upon the method used to power the RRUC-Es.

One DCPM NTDV73BA is required when RRUC-E is outdoor deployed and powered from BTS 624/BTS 662. The DCPM is mounted next to the power cable entry point into the building and is designed to be wall mounted if used indoors. One 1.2 meters grounding cable NTDV1315 is provided with DCPM (NTDV73BA) for grounding. Order one power cable NTLK0909 and ~~*2 placedhoder 1:2 jumper*~~ two N0229053 for DCPM NTDV73BA to support 1 to 2 RRUC-E. Up to three power cables NTLK0909 and six N0229053 ~~*placedhoder 1:2 jumper*~~ for one DCPM NTDV73BA to support 1 to 6 RRUC-E.

The NTLK0909 is a power cable from the DCPM to the BTS 624/BTS 662. The cable can be used to power DCPM from BTS 624/BTS 662.

Order four screws to secure the DCPM to the wall; N0032948 wall mounting screw for concrete or N0022482 wall mounting screw for wood or stud walls. If the customer requires DCPM ground isolation order one DCPM isolation pad N0221795 and four shoulder washers N0083680.

One 30A -48V DC breaker is required for one or two RRUC-Es. Depending upon the site the Remote Radio Unit CDMA - Enhances may or may not share the power feed from the BTS. Provision sufficient power equipment to accommodate the number of power feeds required, and to meet the power requirements of the Remote Radio Unit CDMA - Enhances.

Provision additional power equipment as per

- CDMA Metro Cell Power, Protection & Grounding Provisioning Guidelines and Cell Site Requirements [Ref 7].
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]

4.1.3.4 Power Provisioning - Outdoor Metro Cell

When configuring Remote Radio Unit CDMA - Enhances the existing RE Remote DC Interface Kit, NTGS0173, can be used for each RRUC-E power feed required. One NTGS0173 is required for each power feed going to the Customers DC power box at the RRUC-E.

If the customer has different types of Metro Cells and prefers to use the same hardware one DCPM NTDV73BA can be used to obtain power from Outdoor Metro Cell.

Order one power cable NTLK1271E5 for DCPM NTDV73BA to support 1 to 3 RRUC-E. Order two power cables NTLK1271E5 for DCPM NTDV73BA to support 1 to 6 RRUC-E. One 1.2 meters grounding cable NTDV1315 is provided with DCPM (NTDV73BA) for grounding.

Note: Whether the power cable NTLK1271E5 can work on Outdoor Metro Cell or not need to be confirmed by design owner.

One 30A -48V DC breaker is required for one or two Remote Radio Unit CDMA - Enhances. Depending upon the site the Remote Radio Unit CDMA - Enhances may or may not share the power feed from the BTS. Provision sufficient power equipment to accommodate the number of power feeds required, and to meet the power requirements of the Remote Radio Unit CDMA - Enhances.

Provision additional power equipment as per CDMA Metro Cell Power, Protection & Grounding Provisioning Guidelines and Cell Site Requirements [Ref 7].

4.1.4 AC Power - Remote Radio Unit CDMA - Enhance

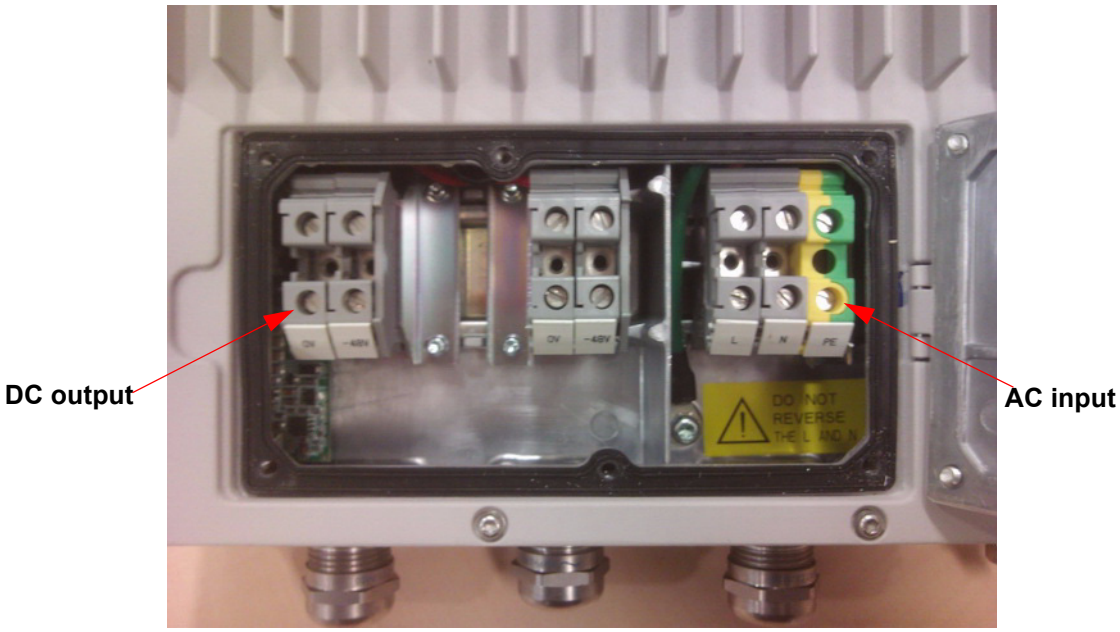
An optional Rectifier, NTTT19BAE5, is available for the Remote Radio Unit CDMA - Enhance. When an AC power source is used with the Remote Radio Unit CDMA - Enhance, via the Rectifier, there are no new power requirements for the system that the Remote Radio Unit CDMA - Enhance is operating with.

One Rectifier is required for each Remote Radio Unit CDMA - Enhance. The Rectifier location, with reference to the Remote Radio Unit CDMA - Enhance, is determined by the mounting hardware used. The Rectifier must be mounted so that the attached DC power cable, 5 m long, can be connected to the Remote Radio Unit CDMA - Enhance.

The Rectifier requires an input 100-250V AC, current requirements are dependent upon voltage input, and provides an output of -54.5 DC for operation of one Remote Radio Unit CDMA - Enhance.

The customer is responsible for providing the AC power cable from the AC power source (10A to 15A feed protection) to the Rectifier. The Rectifier supports up to 10 AWG cable access with 6 mm to 12mm overall jacket diameter. Refer to the Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2] for the AC power cable specification requirements.

Figure 1 Rectifier-Power cable access



For additional information refer to Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2] and Rectifier General Specification [Ref 5].

4.1.5 Battery Backup - All Systems

Remote Radio Unit CDMA - Enhance does not support battery backup.

4.2 PP&G Cell Site Requirements - All Systems

For complete Remote Radio Unit CDMA - Enhance power, protection, and grounding information refer to the Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2].

In addition to the information contained within this section refer to the documents below for complete PP&G cell site requirements information for a BTS using a Remote Radio Unit CDMA - Enhance. This section will only provide amended cell site requirements information.

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]

- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]

4.2.1 DC Power Connection - Remote Radio Unit CDMA - Enhance

The Remote Radio Unit CDMA - Enhance is a -48V DC module.

One or two Remote Radio Unit CDMA - Enhances may be connected to same -48V DC 30A breaker power feed from the BTS. If more than one Remote Radio Unit CDMA - Enhance is connected to the same breaker the customer must split the DC power at the Remote Radio Unit CDMA - Enhances using a method which meets local requirements.

4.2.1.1 Indirect Power Feed Connection

section 4.2.1.1 applicable to these systems

System	Applicable	System	Applicable	System	Applicable
CMO-E/BTS 614 AC	no	BTS 652	yes	BTS 624 -48V DC	yes
CMO-E/BTS 614 AC International	no	BTS 662 -48V	yes	BTS 624 AC	yes
CMO-E/BTS 614 AC Peltier	no			Outdoor Metro Cell AC	no

When the Remote Radio Unit CDMA - Enhance is powered from the power distribution panel in a DR, DE or BTS 652/662. It is considered an indirect power feed radio.

When used in an indirect power feed configuration, the -48V DC Remote Radio Unit CDMA - Enhance is intended for connection to a 30A rated feed from a -48V distribution panel in BTS. The BTS radio capacity is dependent upon the version at site and the hardware that it is configured with. Each DR/DE has six or twelve 30A breakers. Each breaker can support one or two Remote Radio Unit CDMA - Enhances. Each BTS 652 / BTS 662 -48V can support one to six Remote Radio Unit CDMA - Enhances.

Design only information - Each AC CMO-E/BTS 614 has six 30A breakers. A solution, like the BTS 652 DCPM, is required to power Remote Radio Unit CDMA - Enhances from CMO-E/BTS 614 enclosures.

4.2.1.2 Direct Power Feed Connection

section 4.2.1.2 applicable to these systems

System	Applicable	System	Applicable	System	Applicable
CMO-E/BTS 614 AC	yes	BTS 652	yes	BTS 624 -48V DC	yes
CMO-E/BTS 614 AC International	yes	BTS 662	yes	BTS 624 AC	yes
CMO-E/BTS 614 AC Peltier	yes			Outdoor Metro Cell AC	yes

A direct power feed Remote Radio Unit CDMA - Enhance is one which is powered directly from the customer power plant, via an appropriately rated breaker, instead of the BTS. The power plant is the same one that powers the BTS.

The customer must provide an approved (UL/CSA/IEC) SELV DC supply, and circuit breaker. The protection provided must be in the non-earth referenced lead, no independent protection is allowed in the earth referenced lead.

The customer must also provide the appropriate lugs to connect the Remote Radio Unit CDMA - Enhance power cable to the chosen circuit breaker. Remote Radio Unit CDMA - Enhance power cables come with the necessary lugs to connect to the BTS, but those lugs may not be suitable for all breakers.

Remote Radio Unit CDMA - Enhance power connection information is defined in the Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2]. Refer to section "DC Power Input Specifications" and use table "RRUC-E DC Power Input Specifications" to determine the Remote Radio Unit CDMA - Enhance power requirements.

4.2.1.3 Remote Power Feed Connection

section 4.2.1.3 applicable to these systems

System	Applicable	System	Applicable	System	Applicable
CMO-E/BTS 614 AC	yes	BTS 652	yes	BTS 624 -48V DC	yes
CMO-E/BTS 614 AC International	yes	BTS 662	yes	BTS 624 AC	yes
CMO-E/BTS 614 AC Peltier	yes			Outdoor Metro Cell AC	yes

A remote power feed Remote Radio Unit CDMA - Enhance is one which is powered directly from a customer -48V DC power plant, via an appropriately rated breaker. This power plant is separate from the one which powers the BTS. This occurs when the Remote Radio Unit CDMA - Enhance is situated at a distance greater than the longest supported power cable from the BTS identified in section 6.1.2, or when the customer does not want long power cable runs and has a close power source that meets the Remote Radio Unit

CDMA - Enhance requirements. Refer to the Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2] for the Remote Radio Unit CDMA - Enhance power requirements.

4.2.2 AC Power Connection - Rectifier

When the customer chooses to power the Remote Radio Unit CDMA - Enhance using AC instead of DC power, a Rectifier is required. The maximum length of the AC power cable is dependent upon the customers AC voltage and the gauge of cable used.

Table 17 identifies the support cable gauges and their maximum lengths based upon the customers AC voltage. Refer to Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2] for additional AC power information.

Table 17 AC Power Cable - Rectifier

Cable Gauge (AWG)	Maximum cable length (m) [a]			
	100 V AC	120 V AC	208 V AC	240 V AC
14	36	52	160	210
12	56	80	246	323

[a] When connecting from an AC source to the RRUC-E rectifier. Ambient temperature of 50°C assumed.

4.2.3 Ground

Each Remote Radio Unit CDMA - Enhance and Rectifier installed at a site must have a protective earthing conductor, earth ground, connected to it. A typical system will require multiple ground points. These ground connections are required even when an ACEG is present. Protective earth ground connections cannot be daisy chained between equipment from one connection point to another.

The customer is responsible for providing the earth ground connections. Each connection must come from an appropriate ground point/bar supplied by the customer.

The protective earthing conductor, as required by UL 60950-1, must meet the following requirements:

- Gauge shall be equal to or greater than the power feed gauge.
- Gauge #6 (13 mm^2) or greater is recommended to minimize system voltage transients.
- Conductor must be green/yellow.
- Remote Radio Unit CDMA - Enhance mounting bracket are designed for lugs with the following characteristics:
  - compression
  - two holes
  - 1/4" holes in pairs

- 5/8" spacing on center between holes
- Ground studs on the Rectifier for lugs with the following characteristics:
  - compression
  - one hole
  - 3/8" hole

For additional grounding information refer to Remote Radio Unit CDMA -Enhance Power, Protection and Grounding Design Specification [Ref 2].

Figure 2 Ground - Mounting Bracket

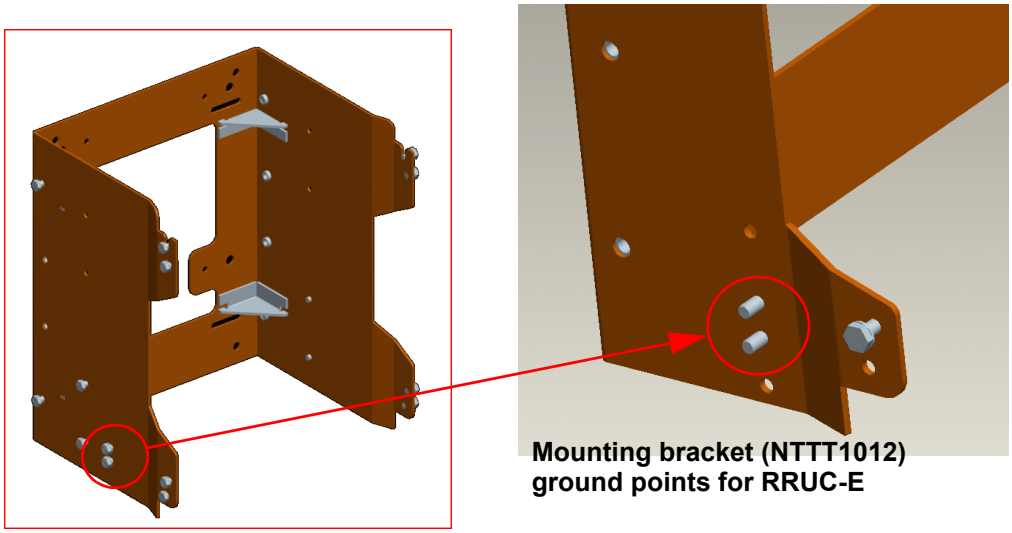


Figure 3 Ground - Rectifier

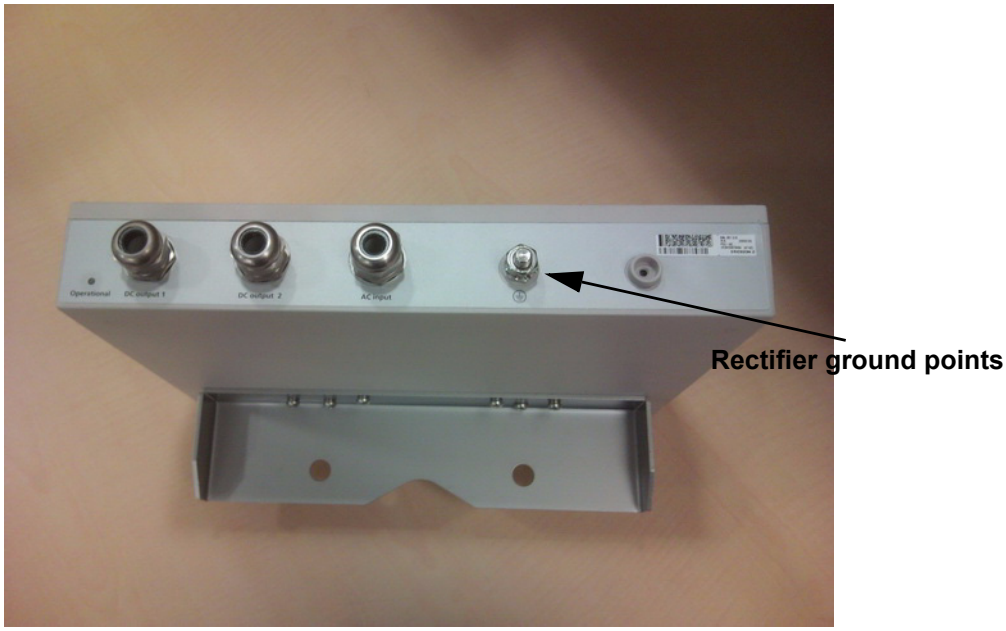
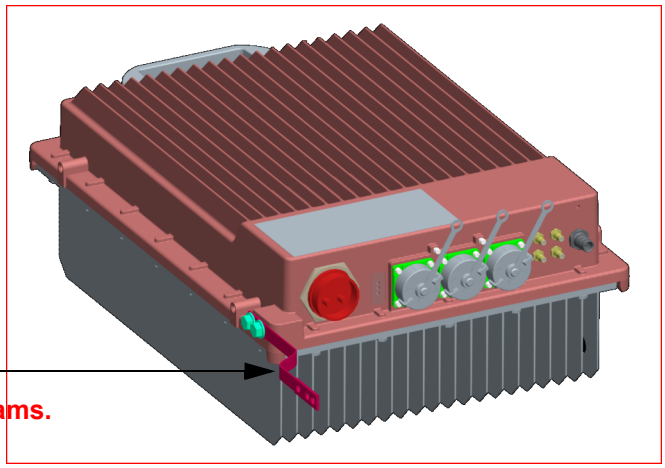


Figure 4 Design Only Information - Ground - Remote Radio Unit CDMA - Enhance



4.2.4 Heat Dissipation

The Remote Radio Unit CDMA - Enhance is intended for outdoor installation.

If heat dissipation information is required refer to the dissipation calculations in the appropriate Cell Site Requirements document, based upon the system the Remote Radio Unit CDMA - Enhance is deployed with.

4.2.5 Current Consumption

Refer to the current consumption calculations in the appropriate Cell Site Requirements document, based upon the system the Remote Radio Unit CDMA - Enhance is deployed with.

5.0 Digital

5.1 Digital Provisioning Guidelines - All Systems

In addition to the information contained within this section refer to the documents below for complete digital provisioning information. This section will only provide amended provisioning guidelines information.

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]
- CDMA MFRM-3 Provisioning Guidelines and Cell Site Requirements [Ref 14] - for latest XCEM and eDCG information.

When ordering a Remote Radio Unit CDMA - Enhance or adding additional carriers to a Remote Radio Unit CDMA - Enhance order additional CM-2, CORE-2/CORE-2S, XCEMs, DOMs/DOM-As, and miscellaneous hardware as required. Refer to the appropriate Provisioning Guidelines, based upon the system the Remote Radio Unit CDMA - Enhance is being deployed with, for complete information.

5.2 Digital Cell Site Requirements - All Systems

In addition to the information contained within this section refer to the documents below for complete digital cell site requirements information for a BTS using a Remote Radio Unit CDMA - Enhance. This section will only provide amended cell site requirements information.

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]

5.2.1 Digital Control Group

Remote Radio Unit CDMA - Enhance is supported with eDCG. Remote Radio Unit CDMA - Enhance requires connectivity at the CORE/CORE-2/CORE-2S for one fiber pair, and does not support fiber redundancy.

Table 18 shows all of the possible sector / carrier configurations that the DCG may support when used with Remote Radio Unit CDMA - Enhance only. Table 19 shows all of the possible sector / carrier configurations that the eDCG may support when used with Remote Radio Unit CDMA - Enhance only. Table 20 shows all of the possible sector / carrier configurations that the eDCG may support when used with Remote Radio Unit CDMA - Enhances and MFRM-3s. To determine if a system is supported with the configurations in Table 19 and Table 20 refer to Section 3.1 "Supported Configurations" on page 28.

Table 18 Sector / Carrier DCG Configuration with Remote Radio Unit CDMA - Enhance only - 800 MHz

Sectorization	# of Carriers 800	Radio Quantities [a]	# of DCGs required	CCDS Required
Omni	1	1 RRUC-E high power	1	Yes
	2	2 RRUC-E high power	1	Yes
	1 to 3	1 RRUC-E	1	No - 1 carrier Yes - 2 or 3 carriers
	4 to 6	2 RRUC-E	2	Yes
Bi-sector	1	2 RRUC-E high power	1	Yes
	2	4 RRUC-E high power	1	Yes
	1 to 3	2 RRUC-E	1	No - 1 carrier Yes - 2 or 3 carriers
	4 to 6	4 RRUC-E	2	Yes
Tri-sector	1	3 RRUC-E high power	1	Yes
	2	6 RRUC-E high power	1	Yes
	1 to 3	3 RRUC-E	1	No - 1 carrier Yes - 2 or 3 carriers
	4 to 6	6 RRUC-E	2	Yes

[a] One RRUC-E provides support for 1 to 3 carriers 1 sector.

Table 19 Sector / Carrier eDCG Configuration with Remote Radio Unit CDMA - Enhance only - 800 MHz

Sectorization	# of Carriers 800	Radio Quantities [a]	# of eDCGs required [b]	CCDS Required
Omni	1	1 RRUC-E high power	1	Yes
	2	2 RRUC-E high power		Yes
	1 to 3	1 RRUC-E		No - 1 carrier Yes - 2 or 3 carriers
	4 to 6	2 RRUC-E		Yes
Bi-sector	1	2 RRUC-E high power	1	Yes
	2	4 RRUC-E high power		Yes
	1 to 3	2 RRUC-E		No - 1 carrier Yes - 2 or 3 carriers
	4 to 6	4 RRUC-E		Yes
Tri-sector	1	3 RRUC-E high power	1	Yes
	2	6 RRUC-E high power		Yes
	1 to 3	3 RRUC-E		No - 1 carrier Yes - 2 or 3 carriers
	4 to 6	6 RRUC-E		Yes
Six Sector [c]	1	6 RRUC-E high power	2 split mode	Yes
	2	12 RRUC-E high power		Yes
	1 to 3	6 RRUC-E		No - 1 carrier Yes - 2 or 3 carriers
	4 to 6	12 RRUC-E		Yes

[a] One RRUC-E provides support for 1 to 3 carriers 1 sector.
[b] Refer to Table 21 for # of eDCGs each BTS supports.
[c] Six sector configurations are only supported with BTSs that support two eDCGs and are identified in section 3.1 as having six sector support.

Table 20 Sector / Carrier eDCG Configuration with Remote Radio Unit CDMA - Enhances & MFRM-3s - 800 MHz

Sectorization	# of Carriers	Radio Quantities		# of eDCGs required [a]	CCDS Required
	800	RRUC-E [b]	MFRM-3 [c]		
Omni	2	1 RRUC-E high power	1 MFRM-3 high power	1	Yes
	4 to 6	1 RRUC-E	1 MFRM-3		Yes
	7 to 9	1 RRUC-E	2 MFRM-3	2 [d]	Yes
		2 RRUC-E	1 MFRM-3		Yes
	10 to 12	1 RRUC-E	3 MFRM-3	2 [e]	Yes
		2 RRUC-E	2 MFRM-3		Yes
		3 RRUC-E	1 MFRM-3		Yes
Bi-sector	2	2 RRUC-E high power	1 MFRM-3 high power	1	Yes
	4 to 6	2 RRUC-E	1 MFRM-3		Yes
	7 to 9	4 RRUC-E	2 MFRM-3	2 [d]	Yes
		6 RRUC-E	1 MFRM-3		Yes
	10 to 12	2 RRUC-E	3 MFRM-3	2 [e]	Yes
		4 RRUC-E	2 MFRM-3		Yes
		6 RRUC-E	1 MFRM-3		Yes
Tri-sector	2	3 RRUC-E high power	1 MFRM-3 high power	1	Yes
	4 to 6	3 RRUC-E	1 MFRM-3		Yes
	7 to 9	3 RRUC-E	2 MFRM-3	2 [d]	Yes
		6 RRUC-E	1 MFRM-3		Yes
	10 to 12	3 RRUC-E	3 MFRM-3	2 [e]	Yes
		6 RRUC-E	2 MFRM-3		Yes
		9 RRUC-E	1 MFRM-3		Yes
Six Sector [f]	1	1 RRUC-E high power		2 in split mode	Yes
	2	2 RRUC-E high power			Yes
	1 to 3	1 RRUC-E			No - 1 carrier Yes - 2 or 3 carriers
	4 to 6	2 RRUC-E			Yes

[a] Refer to Table 21 for # of eDCGs each BTS supports.
[b] One RRUC-E provides support for 1 to 3 carriers 1 sector.

[c] One MFRM-3 provides support for up to three sectors. If the supported configuration is less than three sectors there will be unused sectors on the MFRM-3.
[d] Seven to nine carrier configurations are only supported with BTSs that support two eDCGs.
[e] Ten to twelve carrier configurations are only supported with BTSs that support two eDCGs.
[f] Six sector configurations are only supported with BTSs that support two eDCGs and are identified in section 3.1 as having six sector support.

5.2.1.1 Six Sector Support

When a BTS supports six sectors it is really one physical BTS with two eDCGs running in split mode. Each eDCG will appear as a separate three sector logical BTS in the network. Table 21 lists the various BTS types and the number of eDCGs that each can support. Six sector configurations are only supported with systems identified in section 3.1.

Table 21 BTS eDCG Quantities

BTS	# of eDCG Supported
BTS 624 - -48V & AC	2
CMO-E - All Systems	2
BTS 614 - All Systems	2
BTS 652	1[a]
BTS 662	1 [a]
Outdoor Metro Cell - AC	2

[a] BTS 652/662 use DBU as digital module that has same function as eDCG.

5.2.2 Baseband Format

Remote Radio Unit CDMA - Enhance supports baseband format 1.

For additional baseband format information refer to CDMA MFRM-3 Provisioning Guidelines and Cell Site Requirements [Ref 14].

5.2.3 DOM/DOM-A/Pluggable DOM-A

Remote Radio Unit CDMA - Enhance supports DOM/DOM-A/Pluggable DOM-A. DOM/DOM-A/Pluggable DOM-A requires one carrier from a Remote Radio Unit CDMA - Enhance for each sector. If a Remote Radio Unit CDMA - Enhance does not have a free carrier a second Remote Radio Unit CDMA - Enhance may be required for the DOM/DOM-A/Pluggable DOM-A. Provisioning of a Remote Radio Unit CDMA - Enhance for DOM/DOM-A/Pluggable DOM-A usage can not break any of the provisioning rules, or supported configurations for the Remote Radio Unit CDMA - Enhance.

Table 22 shows Do limitations on RRUC-E deployment.

Table 22 BTS Cell radius in A RRUC-E deployment [a]

Fiber length (KMs)	DO Coverage [b]		1X Coverage[c]	
	Cell Radius (Normal Mode) KMs	Cell Radius (Extended Mode) KMs	Cell Radius (Normal Mode) KMs	Cell Radius (Extended Mode) KMs
1	59	244	62	125
5	56	241	62	125
10	40	237	62	125
15	37	234	62	125
20	33	230	62	125
25	27	226	62	125
30	20	222	62	125
35	12	219	62	125
40	4	215	62	125

a Data in this table is based on theoretically caculation.

b The cell radius of a DO carrier is a factor of the Fiber delay, the DOM processing time & the RRUC processing delay. The longer the fiber length, the smaller the cell radius. The Cell radius can be increased by enabling the Extended cell feature on the DO carrier. Please contact the 1xEVDO Product Manager for more details. Calculation for DO is for DOM-A with CSM6800.

c The data of 1X cell radius in this table is only for XCEM with CSM5000 and CSM6700.

5.2.4 XCEMs/Pluggable XCEMs

Remote Radio Unit CDMA - Enhance is supported with all versions of XCEM and pluggable XCEM.

6.0 Radio

6.1 Radio Provisioning Guidelines - All Systems

Refer to Section 3.1 "Supported Configurations" for the configurations supported by each system.

In addition to the information contained within this section refer to the documents below for complete radio provisioning information. This section will only provide amended provisioning guidelines information.

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]

6.1.1 Remote Radio Unit CDMA - Enhance

6.1.2 Remote Radio Unit CDMA - Enhance DC Power Cables

For each Remote Radio Unit CDMA - Enhance ordered provide one power cable. Order the power cable based upon the system that the Remote Radio Unit CDMA - Enhance is being deployed with, and the distance that the Remote Radio Unit CDMA - Enhance will be located from the power source. The customer may choose to power one or two Remote Radio Unit CDMA - Enhances from a 30A power feed.

When a Rectifier is provisioned the DC power cable and customer provided DC power connection box are required.

The distance that the Remote Radio Unit CDMA - Enhance is located from the power source (BTS 652 / BTS 662 / CMO-E / BTS 614/ DR / DE) determines which power cable must be ordered.

Table 23 documents the actual length of the cable. Table 23 does NOT document the separation between the Remote Radio Unit CDMA - Enhance and the power source. When calculating the power cable length required include the following:

- equipment separation
- routing path of the cable
- cable slack management
- cable trough separation from the rack
- drop down length along/in rack/enclosure
- anything that will affect the amount of cable needed.

All Remote Radio Unit CDMA - Enhance power cables must be rated for outdoor applications and cannot exceed the defined lengths.

All Remote Radio Unit CDMA - Enhance installations not within 5m of the customers power supply require a customer provided DC power connection box within 5m of the Remote Radio Unit CDMA - Enhance.

One or two Remote Radio Unit CDMA - Enhances may share the same power feed from a 30A breaker. The DC power must be split at the Remote Radio Unit CDMA - Enhances. All Remote Radio Unit CDMA - Enhances must be close enough to the customer DC power connection box to use a connectorized 5 m #10 AWG cable. The DC power connection box at the Remote Radio Unit CDMA - Enhances is provided by the customer. The DC power connection box (splitting solution) must meet local electrical code. Figure 5 provides an example of a customer provided DC power connection box obtaining power from the BTS or a customer power source. Figure 6 provides an example of obtaining power from a Rectifier.

Figure 5 Customer DC Power Connection Box at RRUC-E

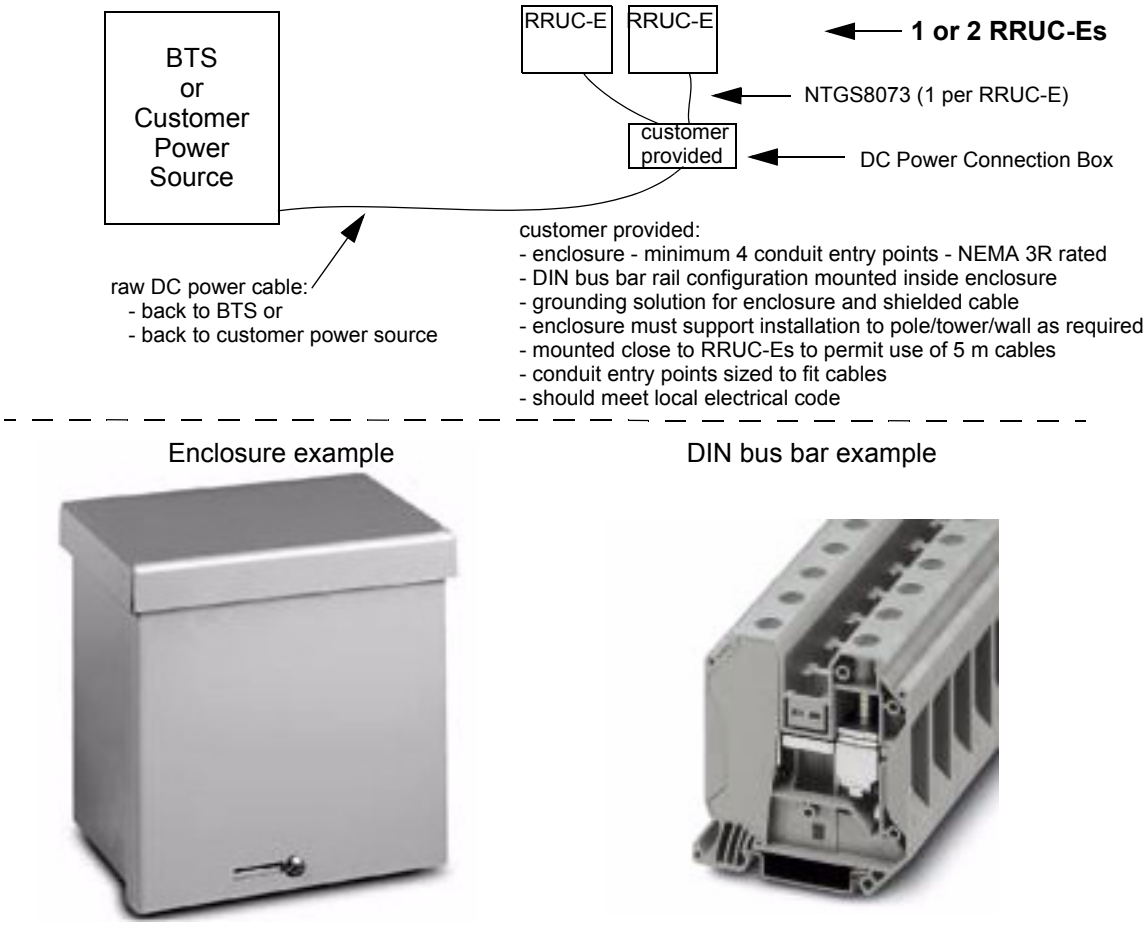


Figure 6 RRUC-E with Rectifier

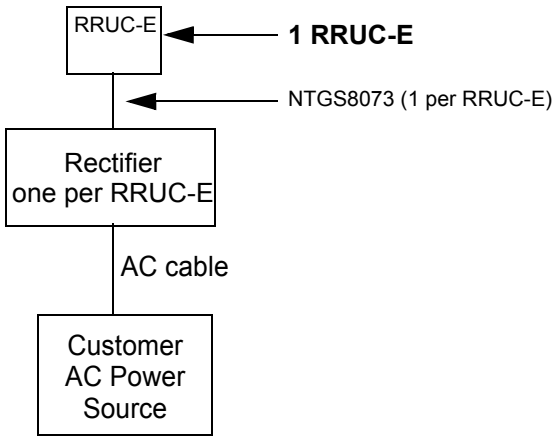


Table 23 Remote Radio Unit CDMA - Enhance DC Power Cable Requirements

Cable Gauge (AWG)	Maximum cable length (m) based on number of RRUC-E on single feed [a]	
	1	2
RRUC-E -48V		
10 [b]	80	40
8	130	65
6	205	100
4	330	160
2	520	260

[a] When connecting to a 30A -48V DC breaker.
[b] Max 10 AWG cable can be supported by Rectifier (NTTT19BAE5) DC Output.

Table 24 Remote Radio Unit CDMA - Enhances Main DC Power - Power Cable Selection [a]

Assembly or Raw DC Power Cable	Cable Gauge AWG	Cable Length meters	Cable Diameter [b]	
			inches	mm
NTGS8073	10	5 [c]	0.42	10.7

Table 24 Remote Radio Unit CDMA - Enhances Main DC Power - Power Cable Selection [a]

Assembly or Raw DC Power Cable	Cable Gauge AWG	Cable Length meters	Cable Diameter [b]	
			inches	mm
N0113005	10	customer determined [d]	0.42	10.7
N0114781	8		0.657	16.7
customer provided [e]	6		0.701	17.8
customer provided [e]	4		0.955	24.3
customer provided [e]	2		n/a	

[a] With the exception of NTGS8073 these order codes are for raw cable with no connectors. The raw cable goes from the DC power source to the customers DC power box. It is the responsibility of the customer to provide the appropriate lugs to connect the cable.
[b] Original dimension imperial.
[c] Each RRUC-E requires one NTGS8073.
[d] Order one length of raw DC power cable for each DC power box used. Determine cable requirements based upon number of RRUC-Es connected to the DC power box and the distance from the 30A breaker.
[e] The customer is responsible for acquiring 2 AWG / 4 AWG / 6 AWG shielded power cable.

6.1.3 Fiber Cables

The Remote Radio Unit CDMA - Enhance uses a SFP connector for the fiber connection. The fiber interface uses one outdoor fiber connector (from Tyco) and one SFP transceiver module which can be changed. This allows the Remote Radio Unit CDMA - Enhance to support either single or multi-mode transmission on the fiber.

Only outdoor versions of the Remote Radio Unit CDMA - Enhance fiber cables have been designed. Existing SC (SFRM/MFRM/MFRM-2) or MPO (MFRM-3) fiber cables are not compatible with the Remote Radio Unit CDMA - Enhance.

When calculating the fiber cable length required include the following:

- equipment separation
- routing path of the cable
- cable slack management
- cable trough separation from the rack
- drop down length along/in rack/enclosure
- anything that will affect the amount of cable needed.

When connecting the fiber cable from the Remote Radio Unit CDMA - Enhance into the CDMA BTS a multi-mode fiber cable must be used to connect with the CORE/CORE-2/CORE-2S module. Therefore, when the Remote Radio Unit CDMA - Enhance is close enough to the CDMA BTS, the multi-mode fiber cable is preferred.

If the Remote Radio Unit CDMA - Enhance is within 1000 m of the CDMA BTS use multi-mode fiber. Refer to section 6.1.3.1 for multi-mode fiber provisioning information. If the Remote Radio Unit CDMA - Enhance is further than 1000 m from the CDMA BTS single-mode fiber must be used. Refer to section 6.1.3.2 for single-mode fiber provisioning information.

If fiber cabling beyond 200 m is deployed, the appropriate CFDS order code will need to be purchased. Refer to the CDMA Feature Delivery System Provisioning Guide [Ref 16] for detailed information on the CFDS order code provisioning.

6.1.3.1 Multi-Mode Fiber Cabling

When using multi-mode fiber cabling the following are required:

- Multi-mode fiber cable, connectorized with the Tyco LC connector at the RRUC-E and duplex SC or LC connectors at the BTS.
  - Connectorized with the Tyco LC connector at the RRUC-E and duplex SC or LC connectors at the BTS or customer connection point.
  - The SC/LC connectors are not environmentally sealed. It is the customer's responsibility to ensure that the SC/LC connectors are protected against the environment and water ingress.
- Optical transceiver, multi-mode.
- Fiber adapter to connect RRUC-E fiber into customer's multi-mode fiber (customer provided) - optional.
- Multi-mode fiber cable 1310 nm,between fiber adapter and BTS (customer provided) - optional;
  - Fiber with SC connector at BTS end when connect with BTS614 / BTS 624 / CMO-E / Outdoor Metro Cell.
  - Fiber with LC connector at BTS end when connect with BTS 652 /BTS 662.
- Attenuation - depends upon the loss in the fiber path (customer provided) - optional.
- Total combined length of all multi-mode fiber cables cannot exceed 1 km.

Figure 7 Multi-Mode Fiber Cabling - direct to *BTS 614*/BTS 624/*CMO-E*/Outdoor Metro Cell

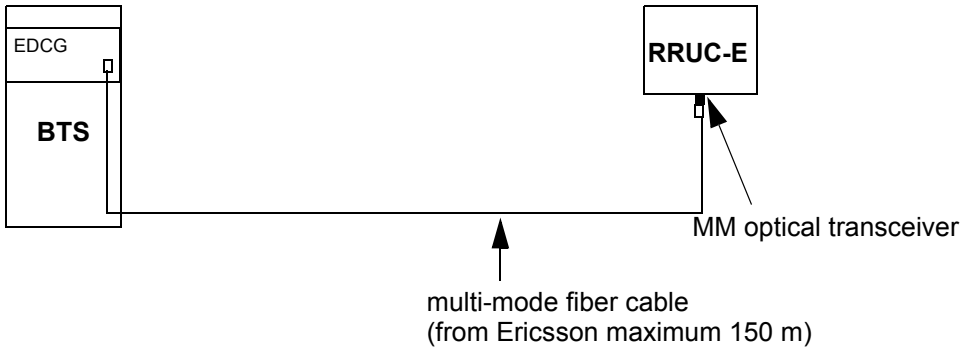


Figure 8 Daisy Chain Multi-Mode Fiber Cabling - BTS 624/Outdoor Metro Cell

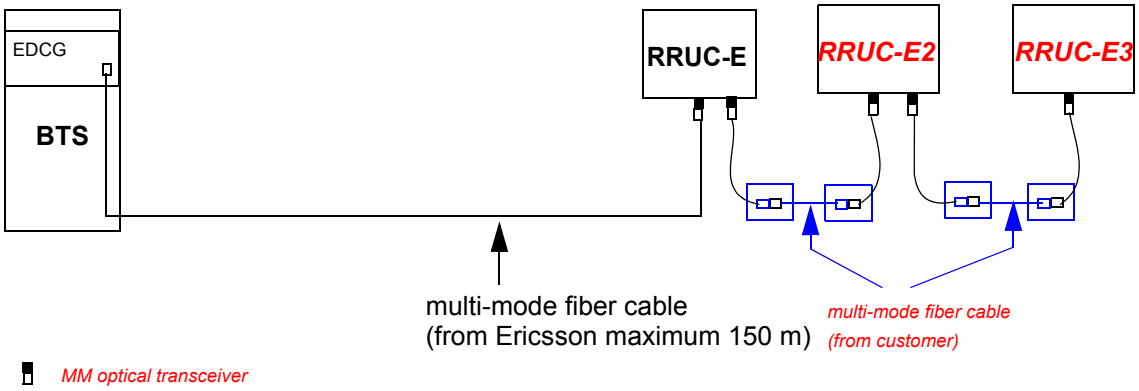
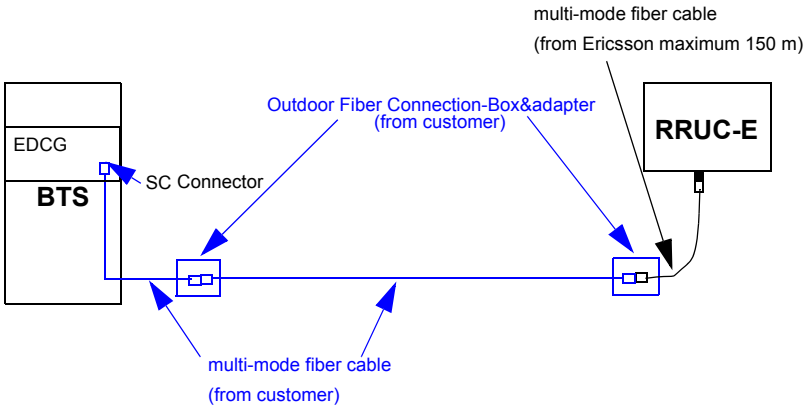
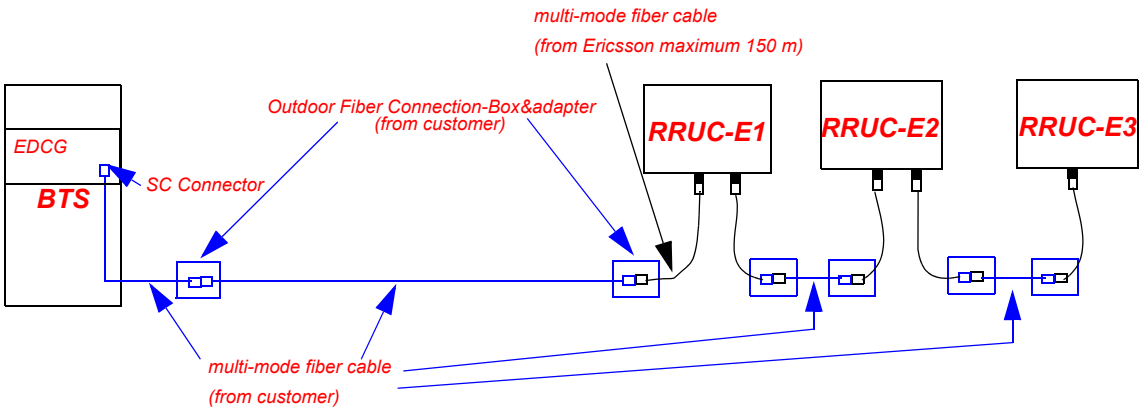


Figure 9 Multi-Mode Fiber Cabling - *BTS 614*/BTS 624/*CMO-E*/Outdoor Metro Cell



Note : The MM fiber length cannot exceed 1 km between BTS and RRUC-E.

Figure 10 Daisy Chain Multi-Mode Fiber Cabling - BTS 614/BTS 624/CMO-E/Outdoor Metro Cell



MM optical transceiver

Note : The MM fiber length cannot exceed 1 km between BTS and RRUC-E1.
The MM fiber length cannot exceed 1 km between RRUC-Es.

Figure 11 Multi-Mode Fiber Cabling - direct to BTS 652 / BTS 662

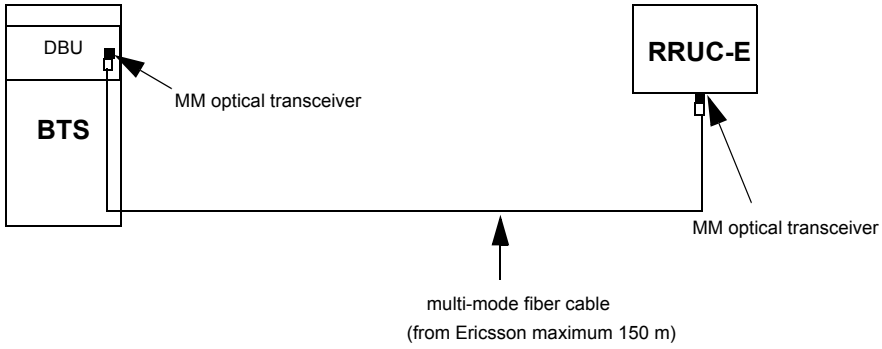
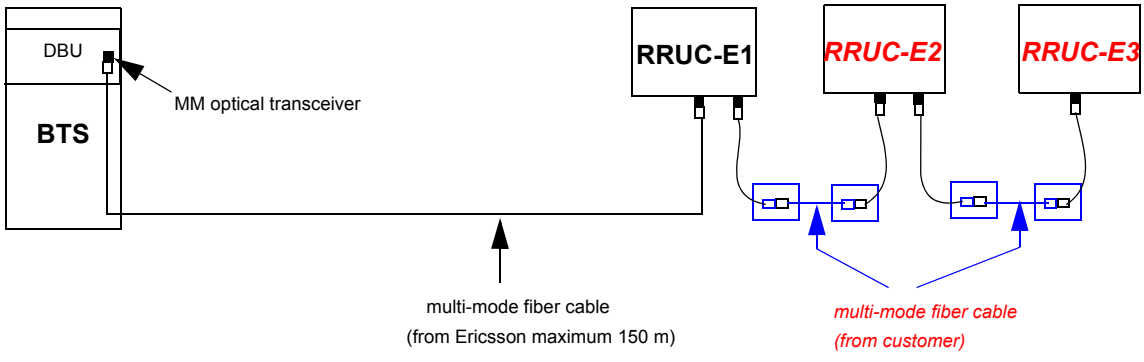
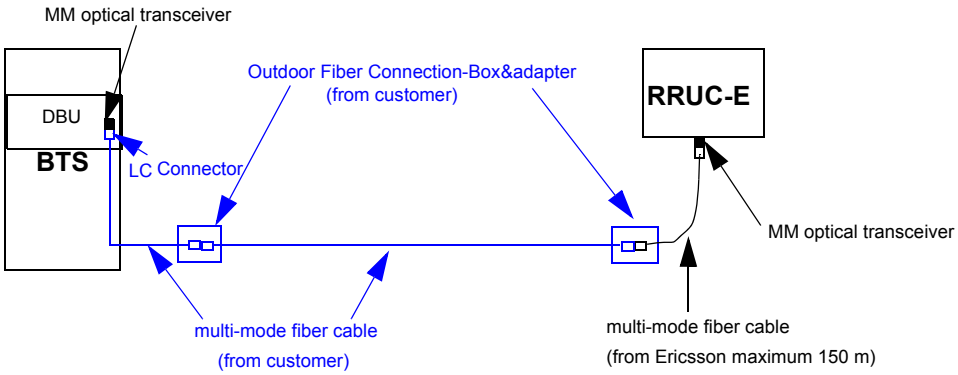


Figure 12 Daisy Chain Multi-Mode Fiber Cabling - direct to BTS 652 / BTS 662



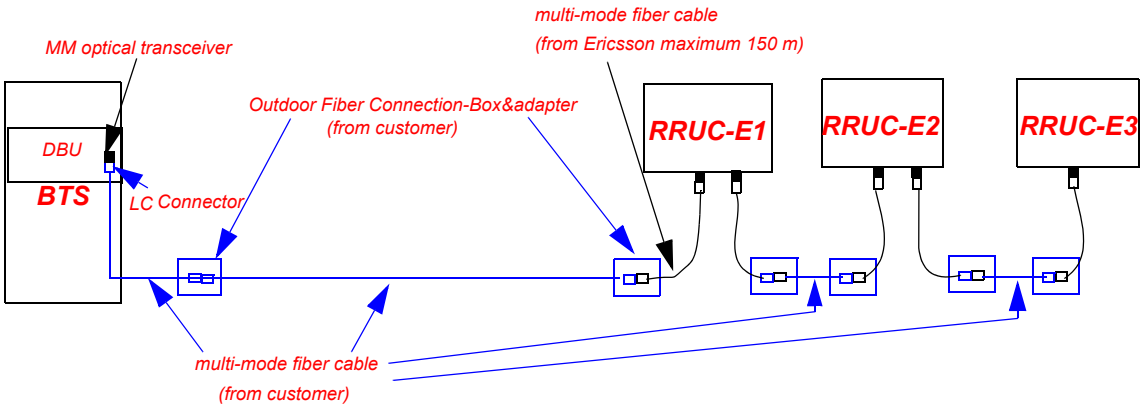
MM optical transceiver

Figure 13 Multi-Mode Fiber Cabling - BTS 652 / BTS 662



Note: Total MM fiber length of all cables combined cannot exceed 1 km.

Figure 14 Daisy Chain Multi-Mode Fiber Cabling - BTS 652 / BTS 662



MM optical transceiver

Note : The MM fiber length cannot exceed 1 km between BTS and RRUC-E1.
The MM fiber length cannot exceed 1 km between RRUC-Es.

The fiber used in the Ericsson multi-mode jumper fiber cable assembly is suitable for outdoor installations and routing on towers. The fiber has an impact resistance of 1500 impacts and a crush resistance of 220 N/cm, with a diameter of 7.0 mm ± 0.25.

The insertion loss of a maximum length 150 m multi-mode fiber cable is 0.725 dB. To calculate the insertion loss for a specific cable length use the following formula:

IL = (L * 1.5 dB/km) + 0.5 dB

Where:

IL = insertion loss in dB
L = length of cable in kilometers
1.5 dB/km = attenuation of fiber per kilometer
0.5 dB = two connectors, maximum loss

Table 25 Multi-Mode Fiber and Optical Transceiver Provisioning

Description	Order Code	Order per RRUC-E
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 10m.	NTTT302810	0 -1 [a]
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 20m	NTTT302820	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 50m	NTTT302850	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 70m	NTTT302870	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 100m	NTTT3028100	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to SC Outdoor 150m	NTTT3028150	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 10m	NTTT302910	0 - 1 [b]
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 20m	NTTT302920	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 50m	NTTT302950	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 70m	NTTT302970	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 100m	NTTT3029100	
Cable Fiber, RRUC-E, Multi-Mode Jumper 1310 nm, LC to LC Outdoor 150m	NTTT3029150	
Optical Transceiver, RRUC-E, Multi-Mode 1310 nm	N0210871	0 -1 [c]

[a] Order one Multi-Mode fiber with Tyco LC connector on one end and SC connector on the other end for RRUC-E connect with BTS 614/BTS 624/CMO-E/Outdoor Metro Cell. It is customer responsibility to provide additional optic fiber and Outdoor Fiber Connection-Box when the fiber length between RRUC-E and BTS exceed 150 meters. The additional optic fiber should be MM fiber with SC connector at BTS end.

[b] Order one Multi-Mode fiber with Tyco LC connector on one end and LC connector on the other end for RRUC-E connect with BTS 652/BTS 662. It is customer responsibility to provide additional optic fiber and Outdoor Fiber Connection-Box when the fiber length between RRUC-E and BTS exceed 150 meters. The additional optic fiber should be MM fiber with LC connector at BTS end.

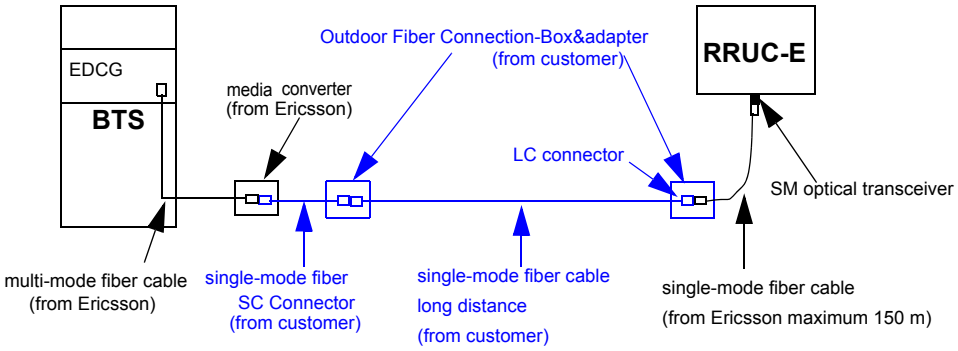
[c] Order one Multi-Mode Optical Transceiver (N0210871) for each RRUC-E when the fiber link less than 1Km between RRUC-E and BTS. When BTS 652/662 configure with RRUC-E the same type Optical Transceiver has to be provided with BTS 652/662. Detail refer to CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24] and CDMA BTS 652 Interconnect General Specifications [Ref 25]

6.1.3.2 Single-Mode Fiber Cabling

When using single-mode fiber cabling the following are required:

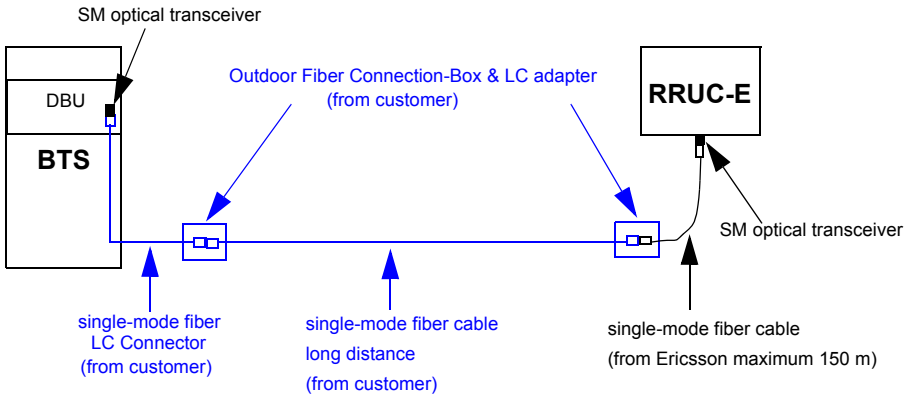
- Optical transceiver, single-mode.
- Single-mode jumper fiber cable to go from the RRUC-E to the customer‘s fiber adapter.
  - Connectorized with the Tyco LC connector at the RRUC-E and duplex LC connectors at the customer connection point.
  - The LC connectors are not environmentally sealed. It is the customer’s responsibility to ensure that the LC connectors are protected against the environment and water ingress.
  - If the customer has a requirement for a connector type different from the LC connectors please contact PLM.
- Fiber adapter to connect RRUC-E fiber into customer’s single-mode fiber (customer provided).
- Single-mode fiber cable, long distance, between fiber adapter and fiber media converter (customer or Ericsson provided).
- Fiber media converter to go from single to multi-mode.
- Multi-mode fiber cable to go from fiber media converter to BTS.
- Attenuation - depends upon the loss in the fiber path (customer provided).

Figure 15 Single-Mode Fiber Cabling-*BTS 614*/BTS624/*CMO-E/Outdoor Metro Cell*



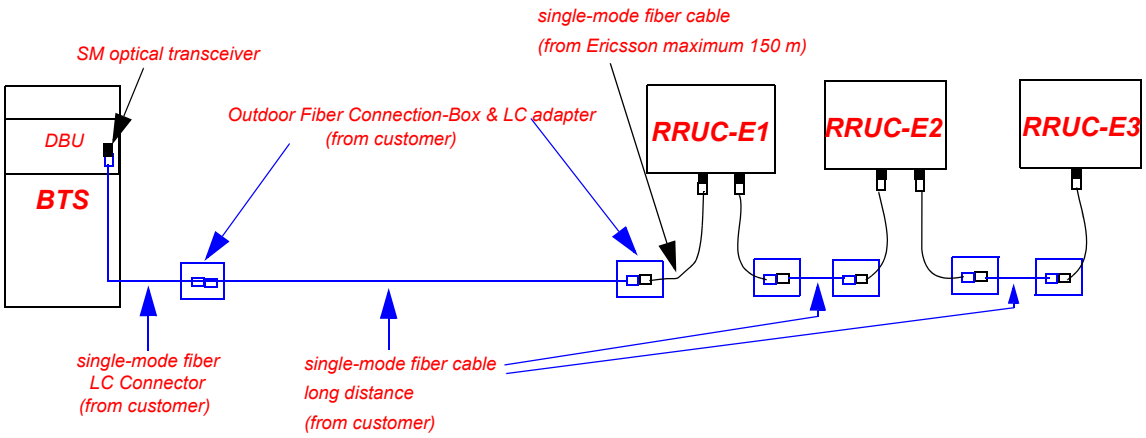
Note1 : Total fiber length of all cables combined cannot exceed 40 km.
Note2 : The cabling in blue colour and optional attenuator are provided by customer.
Note3 : The cabling in black colour is provided by Ericsson.
Note4 : The additional SM attenuator can be added by customer base on the SM optic link budget.

Figure 16 Single-Mode Fiber Cabling-BTS 652/BTS 662



Note1 : Total fiber length of all cables combined cannot exceed 40 km.
Note2 : The cabling in blue colour and optional attenuator are provided by customer.
Note3 : The cabling in black colour is provided by Ericsson.

Figure 17 Daisy Chain Single-Mode Fiber Cabling-BTS 652/BTS 662



Note1: Total fiber length of all cables combined cannot exceed 40 km.
Note2: The cabling in blue colour and optional attenuator are provided by customer.
Note3: The cabling in black colour is provided by Ericsson.

SM optical transceiver

The fiber used in the single-mode jumper fiber cable assembly jumper is suitable for outdoor installations and routing on towers. The fiber has an impact resistance of 200 impacts and a crush resistance of 440 N/cm, with a diameter of 6.5 mm.

The insertion loss of a maximum length 150 m single-mode jumper fiber cable is 0.575 dB. To calculate the insertion loss for a specific cable length use the following formula:

IL = (L * 0.5 dB/km) + 0.5 dB

Where:

IL	= insertion loss
L	= length of cable in kilometers
0.5 dB/km	= attenuation, maximum, of fiber per kilometer
0.5 dB	= two connectors, maximum loss

Depending upon the length of the fiber jumper cable, all of the fiber components of the fiber path and the distance that the Remote Radio Unit CDMA - Enhance is located from the BTS, attenuation may be required in the fiber path for short link between two Single Mode units.

The attenuator will reduce powerful Single Mode Transmit signals from RRUC-E, from Media Conversion card and from BTS 652 / BTS 662. Every site must be job engineered and power budget must be calculated for all involved equipment. It is the responsibility of the person/company designing

the fiber network to determine the insertion loss of the fiber path and to add attenuation if required.

The information from Table 26 can be used for calculation the power budget of the fiber optic link and use of the attenuator to prevent the optical receiver damage.

Table 26 Fiber Optic output power and input sensitivity of some BTS module [a]

Description	Receive input optical power		Transmitter output optical power	
	Min dBm	Max dBm	Min dBm	Max dBm
Multi Mode				
Optical Transceiver (N0210871)	-28	-8	-23.5	-14
CORE2-S	-28	-7	-15	-8
Single Mode				
Optical Transceiver (N0210872)	-28	-8	-14	-8
Optical Transceiver (N0220970)	-28	-8	-3	+2
Optical Transceiver (N0220971)	-28	-8	-5	0

[a] Optical Transceiver is used for RRUC-E and DBU in the BTS652/BTS 662. CORE2-S is used in BTS614/BTS624/CMO-E/Outdoor Metro Cell.

Using single-mode fiber and the appropriate fiber media converter (fiber optic micro cell) hardware and cabling, a Remote Radio Unit CDMA - Enhance with single-mode SFP can be installed up to 40 km away from the BTS614 / BTS624 / CMO-E / Outdoor Metro Cell. Refer to Figure 15 for cabling diagram.

The number of fibers a fiber media converter can support is dependent upon its hardware configuration. Order the appropriate fiber media converter hardware and one multi-mode fiber per RRUC-E to connect from the fiber media converter to the BTS614/BTS624/CMO-E/Outdoor Metro Cell. as per:

- Transition Networks Media Converter Products Design Specification [Ref 20]
- Fiber Optic Micro Cell Media Converter Deployment Guide [Ref 21]
- Media Converter Card and Chassis OEM General Specification [Ref 22]

Table 27 Multi-Mode Fiber provisioning for Media Converter

Description	Order Code	Order per RRUC-E
Fiber assy, indoor, 11m, 1 Pair	NTGY3030E6	0 -1 [a]
Fiber assy, indoor, 17m, 1 Pair	NTGY3031E6	
Fiber assy, indoor, 23m, 1 Pair	NTGY3032E6	

[a] Order one Multi-Mode fiber per RRUC-E when Media converter is used. This MM fiber connect MM optical port on the Media converter with DCG/EDCG of BTS 614/BTS 624/CMO-E/Outdoor Metro Cell.

Using single-mode fiber, a Remote Radio Unit CDMA - Enhance with single-mode Optical Transceiver can be installed up to 40 km away from the BTS652/BTS662. Refer to Figure 16 for cabling diagram.

Table 28 provides the ordering codes and quantities, per RRUC-E, for the RRUC-E single-mode fiber cable and optical transceiver.

Table 28 Single-Mode Fiber and Optical Transceiver Provisioning

Description	Order Code	Order per RRUC-E
Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 10m	NTTT302710	0 - 1 [a]
Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 20m	NTTT302720	
Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 50m	NTTT302750	
Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 70m	NTTT302770	
Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 100m	NTTT3027100	
Cable Fiber, RRUC-E, Single-Mode Jumper, LC to LC Outdoor 150m	NTTT3027150	
Optical Transceiver, RRUC-E, Single-Mode, 1 to 20 km 1310 nm	N0210872	0 -1 [b]
Optical Transceiver, RRUC-E, Single-Mode, 20 to 40 km 1310 nm	N0220970	
Optical Transceiver, RRUC-E, Single-Mode, 1 to 40 km 1550 nm	N0220971	

[a] Order one Single-Mode fiber for RRUC-E connect with BTS 614/BTS 624/CMO-E/Outdoor Metro Cell/BTS652/BTS662 when the fiber routing more than 1 Km. It is customer responsibility to provide additional fiber and Outdoor Fiber Connection-Box when the fiber length between RRUC-E and BTS exceed 150 meters. The additional fiber should be SM with LC connector connect with BTS652/BTS662 or SM with SC connector connect with Ericsson Media Converter.

[b] Select the optical transceiver based upon the required wave length and the distance the RRUC-E is from the BTS. When BTS 652/662 configure with RRUC-E the same type Optical Transceiver has to be provided with BTS 652/662. Detail refer to CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24] and CDMA BTS 652 Interconnect General Specifications [Ref 25]

6.1.4 DPMs

The 800 MHz DPM provides the following:

- filtering of the transmit and receive frequencies reducing interfering frequencies
- passive duplexer

The 800 MHz DPM provides connectivity for two antennas; main (Tx & main Rx) and diversity Rx. For additional DPM information refer to Remote Radio Unit CDMA 800 MHz Duplexer OEM General Specification [Ref 4].

Table 29 DPM Order codes

DPM Description	PEC	Rx Frequency (MHz)	Tx Frequency (MHz)
Duplexer RRUC-E 800 MHz A band	NTTT75AA	824-835	869-880
Duplexer RRUC-E 800 MHz B band	NTTT75AB	835-849	880-894
Duplexer RRUC-E 800 MHz Full band	NTTT75AC	824-849	869-894
Duplexer RRUC-E 800 MHz B band with partial GSM collocation Duplexer [a]	NTTT75AD	835-843.5	880-888.3
Duplexer RRUC-E 800 MHz B band with full GSM collocation Duplexer [b]	NTTT75AE	835-843.5	880-888.3
Duplexer RRUC-E 800 MHz iDEN band	*NTTT75AF*	*816-824*	~~*863.5*~~ *862.75-869*

[a] B band partial GSM collocation Duplexer with 40dB@890-915MHz transmit rejection.
[b] B band full GSM collocation Duplexer with With 70dB@890-915MHz transmit rejection.

6.1.5 Splitter

External RF splitters are not supported with the Remote Radio Unit CDMA - Enhance.

6.1.6 Installation and Mounting Kits

NOTE: The figures in this section are not suitable for customer facing documentation. Refer to Section 7.2.14 "Diagrams" for the latest figures with appropriately rendered images.

A civil engineer must always evaluate the installation site to determine if it is suitable for the RRUC-E. The RRUC-E is designed to be used in seismic installations. It is the responsibility of the civil engineer to engineer the installation at each site for seismic compliancy if it is required.

The Remote Radio Unit CDMA - Enhance is designed for installation at site temperatures up to 52°C. The solar cover reduces solar load and improves installation aesthetics. It is highly recommended to install the solar cover on all outdoor installations. Refer to Section 7.2.14 "Diagrams" for diagrams showing Remote Radio Unit CDMA - Enhances with and without the solar cover.

Different mounting kits are available for the Remote Radio Unit CDMA - Enhance and Rectifier to meet customer requirements. Order the appropriate mounting kit and hardware based upon the method of

installation chosen by the customer. If the customer has an installation requirement not met by the mounting configurations defined in this section please contact PLM.

Each Remote Radio Unit CDMA - Enhance pole mounting kit can support up to 4 pieces of hardware, Remote Radio Unit CDMA - Enhance and Rectifier, in a number of different combinations:

- 1 to 4 Remote Radio Unit CDMA - Enhances (Figure 18) or
- 1 to 2 Remote Radio Unit CDMA - Enhances and 1 to 2 Rectifiers (equal quantities)
- 1 to 4 rectifiers

Each floor or roof stand will support the following configurations:

- one pole mounting kit
  - 1 to 4 Remote Radio Unit CDMA - Enhances (Figure 22) or
  - 1 to 2 Remote Radio Unit CDMA - Enhances and 1 to 2 rectifiers (equal quantities)
- two pole mounting kits
  - one kit with 1 to 4 Remote Radio Unit CDMA - Enhances and
  - one kit with 1 to 4 rectifiers (installed below kit with Remote Radio Unit CDMA - Enhances)

Table 30 Mounting Kits [a]

Configuration	Mounting Kits Required and Optional Hardware												
	NTTT1012 [b]	NTTT1003 [c]	NTTT1004 [d]	NTTT1005 [e]	NTTT1008 [f g]	NTTT1006 [h]	NTTT1007 [i]	N0022482 [j]	N0032948 [k]	N0220797 [l]	N0083680 [m]	NTTT1009 [n]	~~NTM 101 0429/1~~ N0229049 [o]
Pole Mounting **equipment sharing one pole mounting hardware kit**													
RRUC-E Only													
1 RRUC-E	1	1										0 or 1	
2 RRUC-E	2	1										0 or 2	
3 RRUC-E	3	1										0 or 3	
4 RRUC-E	4	1										0 or 4	
RRUC-E and Rectifiers													
1 RRUC-E + 1 rectifier [p]	1	1										0 or 1	
2 RRUC-E + 2 rectifiers [q]	2	1					2					0 or 2	
Rectifiers only [r]													
1 rectifier		1				1							
2 rectifiers		1				1							
3 rectifiers		1				1	1						
4 rectifiers		1				1	2						

Table 30 Mounting Kits [a] (Continued)

Configuration	Mounting Kits Required and Optional Hardware												
	NTTT1012 [b]	NTTT1003 [c]	NTTT1004 [d]	NTTT1005 [e]	NTTT1008 [f g]	NTTT1006 [h]	NTTT1007 [i]	N0022482 [j]	N0032948 [k]	N0220797 [l]	N0083680 [m]	NTTT1009 [n]	~~NTM 101 0429/4~~ N0229049 [o]
Wall Mounting													
RRUC-E - per RRUC-E													
Wall - stud	1							4		0 or 1	0 or 4	0 or 1	
Wall - concrete	1								4	0 or 1	0 or 4	0 or 1	
Rectifier - per rectifier													
Wall - stud								4			0 or 4		1
Wall - concrete									4		0 or 4		1
Floor or Roof Mounting [s] **equipment sharing one pole mounting hardware kit installed on a floor or roof stand**													
RRUC-E Only													
1 RRUC-E	1	1	1 [t]									0 or 1	
2 RRUC-E	2	1	1 [t]									0 or 2	
3 RRUC-E	3	1	1 [t]									0 or 3	
4 RRUC-E	4	1	1 [t]									0 or 4	
RRUC-E and Rectifiers													
1 RRUC-E + 1 rectifier	1	1	1 [t]									0 or 1	
2 RRUC-E + 2 rectifiers	2	1	1 [t]				2					0 or 2	
Rectifiers Only [u]													
1 rectifier		1				1							

Table 30 Mounting Kits [a] (Continued)

Configuration	Mounting Kits Required and Optional Hardware												
	NTTT1012 [b]	NTTT1003 [c]	NTTT1004 [d]	NTTT1005 [e]	NTTT1008 [f g]	NTTT1006 [h]	NTTT1007 [i]	N0022482 [j]	N0032948 [k]	N0220797 [l]	N0083680 [m]	NTTT1009 [n]	~~NTM 101 0429/1~~ N0229049 [o]
2 rectifiers		1				1							
3 rectifiers		1				1	1						
4 rectifiers		1				1	2						

[a] When growing from one configuration to another order the delta between the two configurations.
[b] NTTT1002 - Mounting bracket assembly, CDMA RRUC-E
[c] NTTT1003 - Mounting kit, CDMA RRUC-E, pole 60 to 120mm diameter - supports 1 to 4 pieces of hardware
[d] NTTT1004 - Floor stand kit, CDMA RRUC-E, concrete
[e] NTTT1005 - Floor stand kit, CDMA RRUC-E, non-concrete
[f] NTTT1008 - Roof stand kit, CDMA RRUC-E, with extended legs on base
[g] When using a roof stand kit the stand cannot be bolted to the supporting structure and the extended base legs stabilize the stand. The legs must be weighed down. Refer to section 7.2.11.
[h] NTTT1006 - Mounting bracket assembly, CDMA RRUC-E rectifier, pole (2 bkts) - bracket assemblies for 2 rectifiers. Required for rectifier only pole installations for the rectifier side adapters.
[i] NTTT1007 - Mounting kit, CDMA RRUC-E rectifier, pole, side adapter.
[j] N0022482 - Hex lag screw, 6mm x 50mm - for stud/wood installations
[k] N0032948 - Anchor bolt, Hilti Kwik-Con II, hex head, 3/16 x 1.25" - for concrete installations
[l] N0220797 - Isolation pad, RRUC-E - required for RRUC-E ground isolation installations.
[m] N0083680 - Washer, shoulder - required for RRUC-E ground isolation installations.
[n] NTTT1009 - Solar cover kit, CDMA RRUC-E. Order one NTTT1009 for each RRUC-E operating in an outdoor environment.
[o] Order one ~~NTM 101 0429/1~~ N0229049 for each rectifier mounting on the wall. This kit does not include screw for stud/wood installation. Customer provides the screw for rectifier wall mounting.
[p] The RRUC-E and rectifier are installed on opposite sides of the pole mounting hardware.
[q] If growing from 1 RRUC-E + 1 rectifier to 2 RRUC-Es + 2 rectifiers the original rectifier must be moved and installed in-between the RRUC-Es.
[r] Rectifiers are installed on a separate pole mounting kit from the RRUC-Es. The rectifier pole mounting assembly is installed directly below the RRUC-Es pole mounting assembly.
[s] Each floor or roof stand can support:
- one pole mounting kit with RRUC-Es only or
- one pole mounting kit with RRUC-Es and rectifiers or
- two pole mounting kits; one with RRUC-Es only and one with rectifiers only

[t] Order NTTT1004 if the stand is bolted to a concrete floor.
Order NTTT1005 if the stand is bolted to a non-concrete floor.
Order NTTT1008 if the stand is not bolted to a floor and is free standing.

[u] The floor/roof stand is ordered with the RRUC-E only floor/roof stand provisioning rules. These configurations add one pole mounting kit for rectifiers only to the floor/roof stand.

Figure 18 Mounting kits - Pole mounting with only RRUC-E

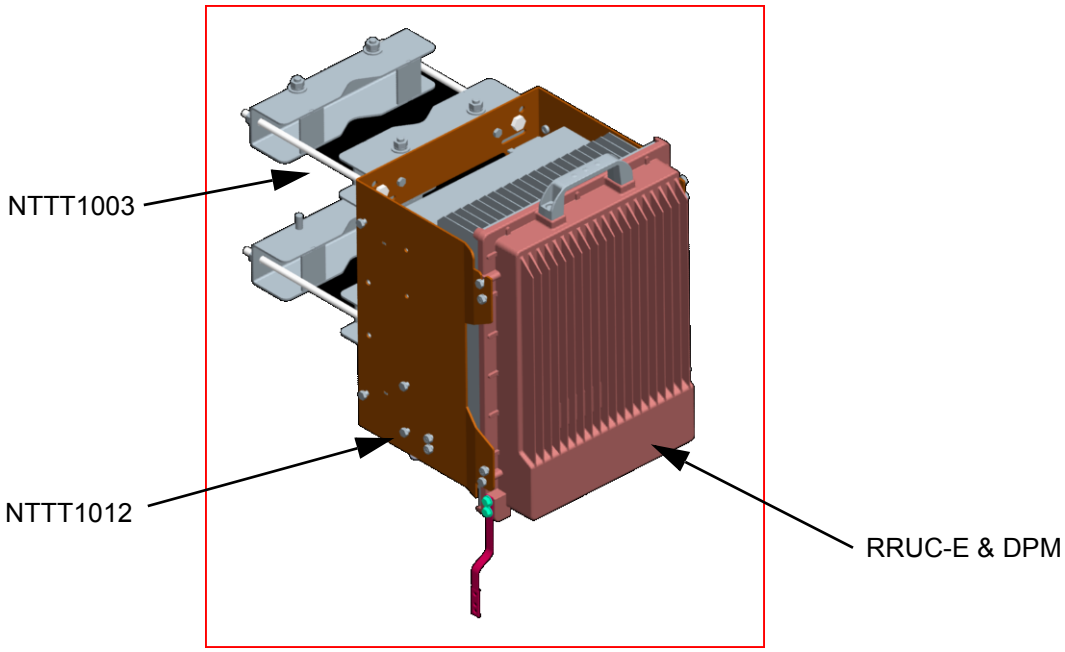


Figure 19 Mounting kits - Pole mounting with only Rectifier

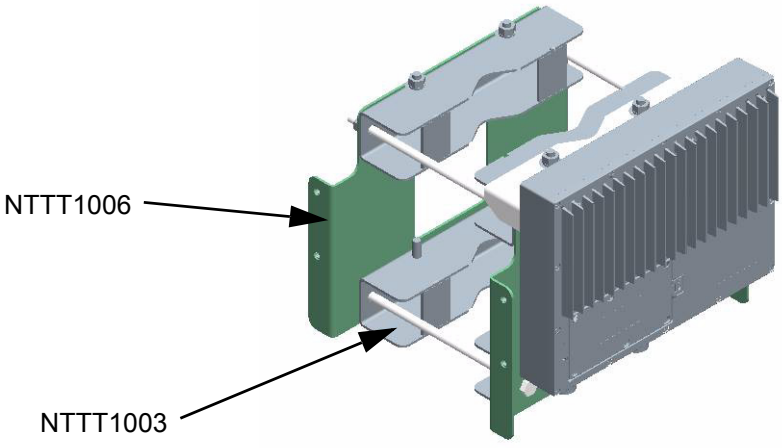


Figure 20 Mounting kits - Pole mounting with 1 RRUC-E and 1 Rectifier

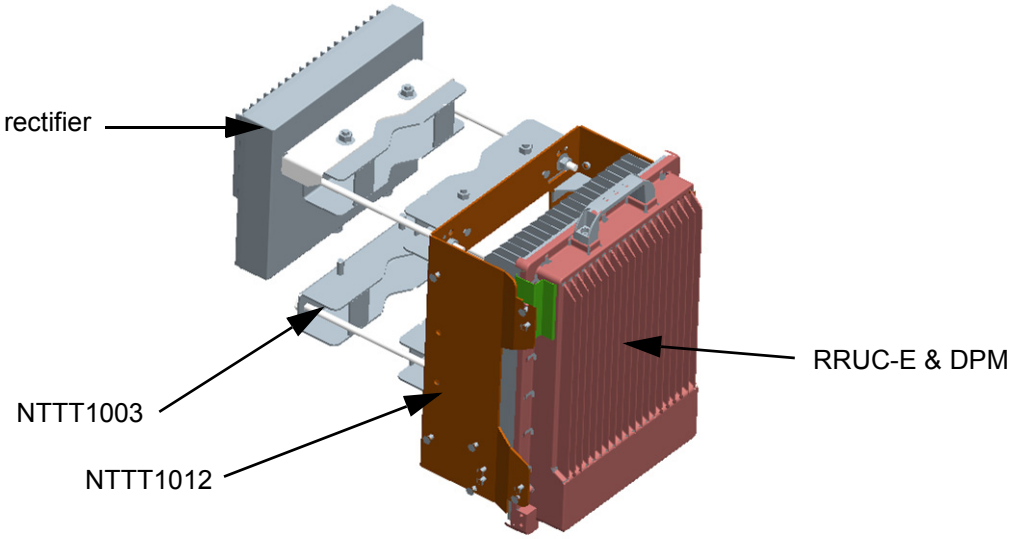


Figure 21 Mounting kits - Pole mounting with 2 RRUC-Es and 2 Rectifiers

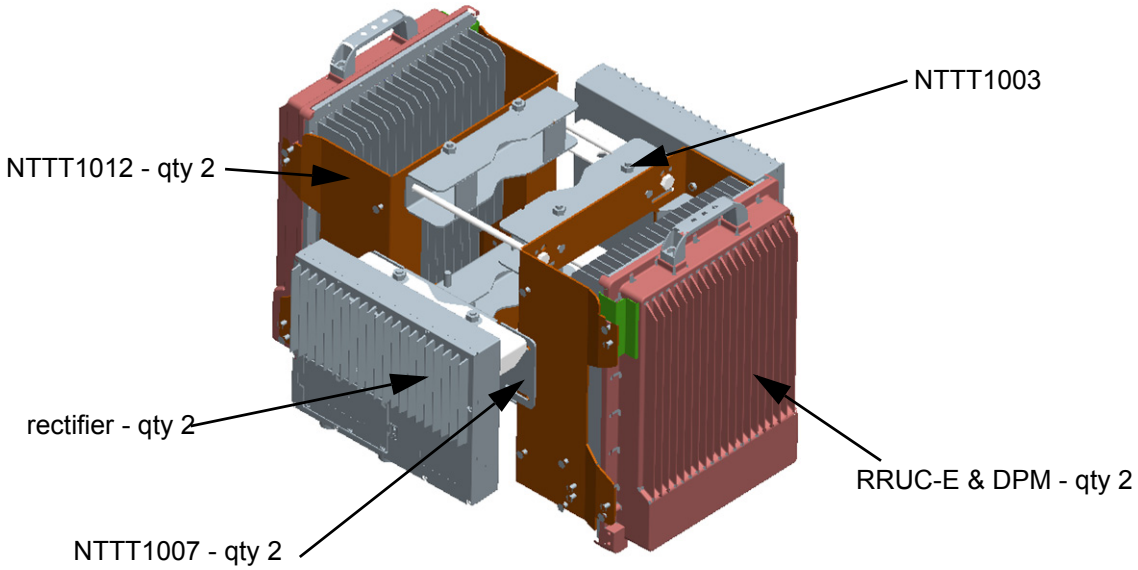


Figure 22 Floor/roof stand - with RRUC-E only

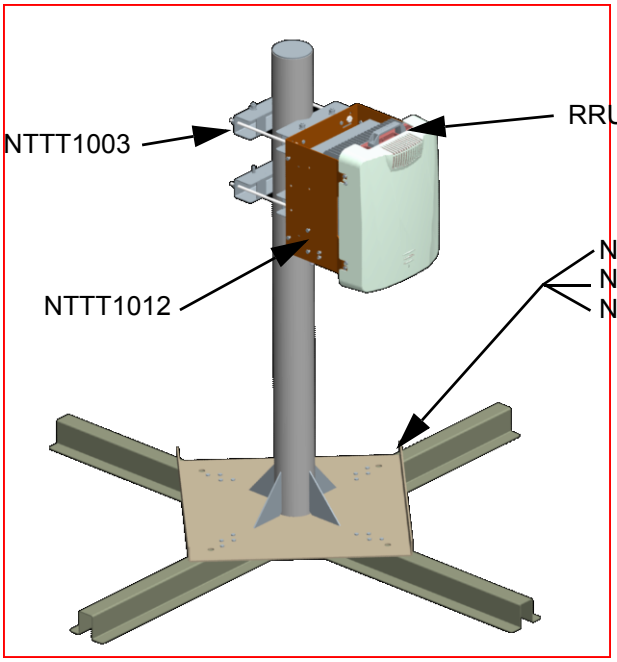


Figure 23 Floor/roof stand - with 2 RRUC-Es and 2 Rectifiers

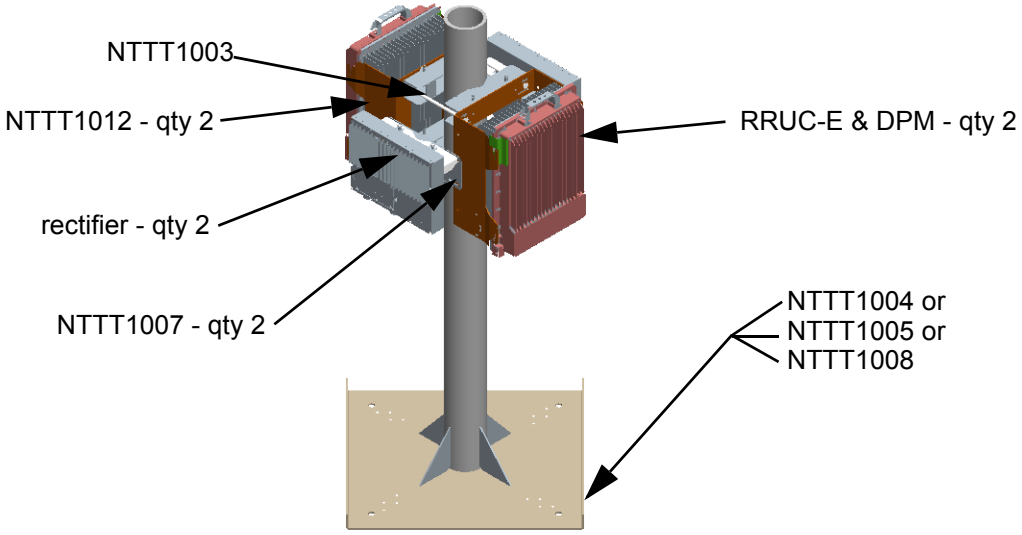


Figure 24 Floor/roof stand - with 4 RRUC-Es and 4 Rectifiers

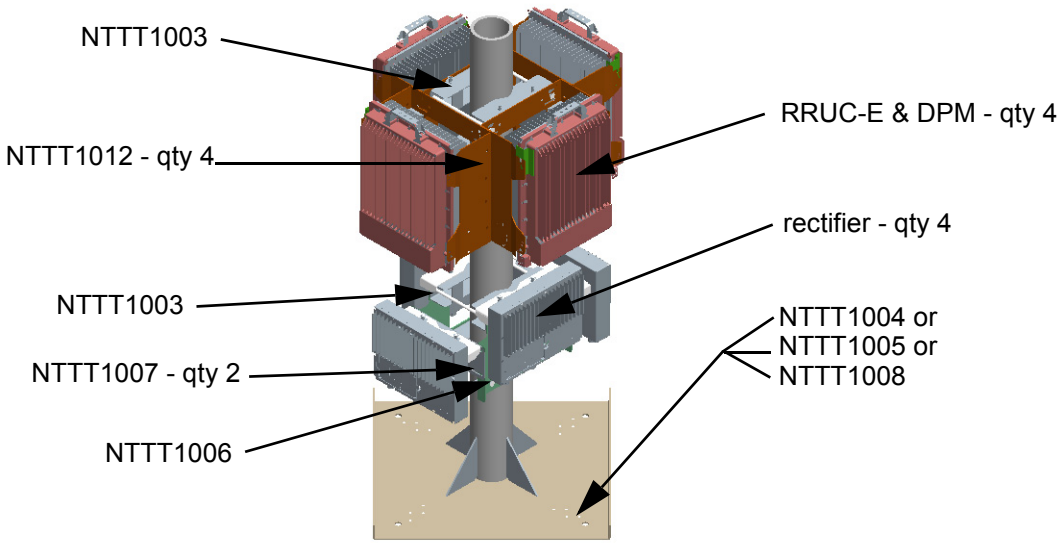
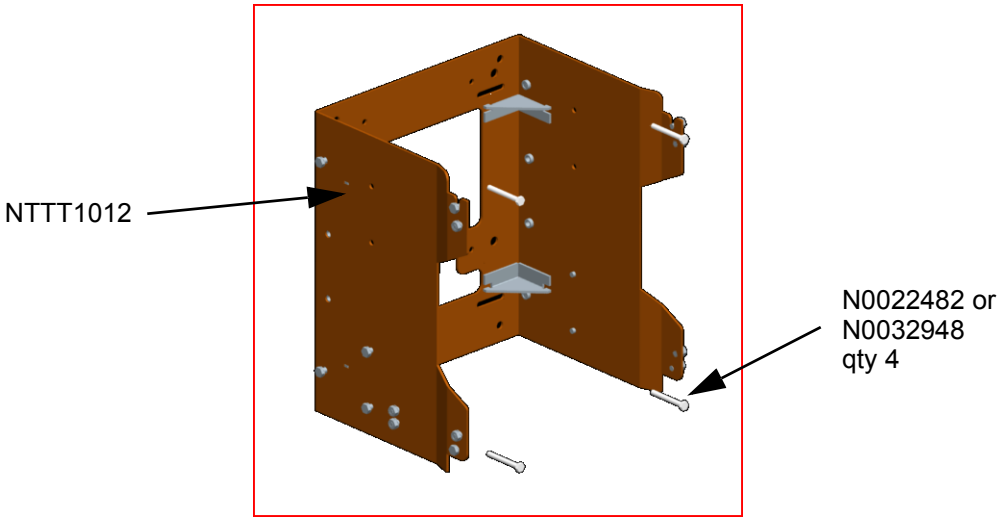


Figure 25 Wall mounting - RRUC-E



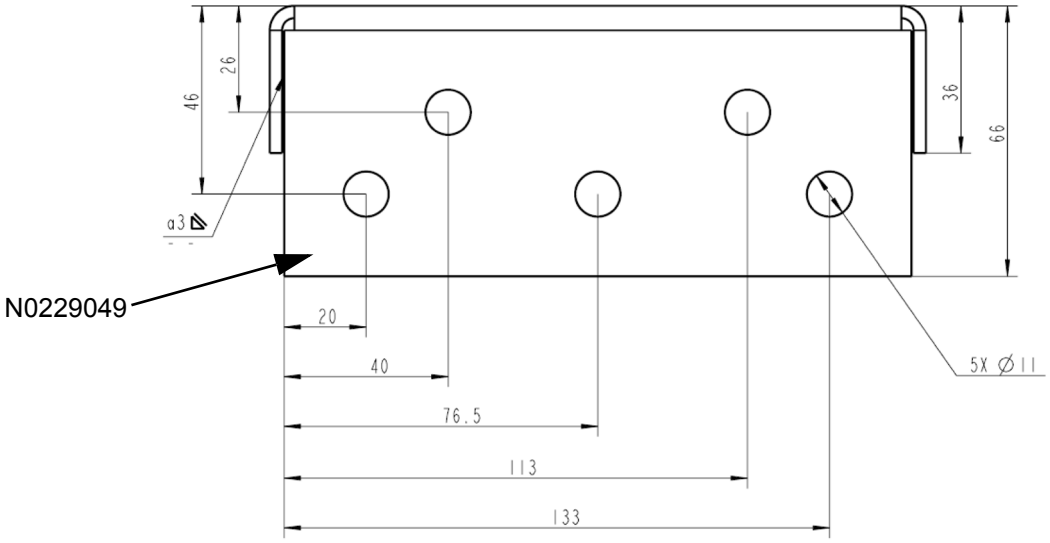
Note: Wall Mounting Drill Template N0222147 is provided with RRUC-E.

Table 31 Installation kit Order codes

Kit Description	PEC
Installation Kits - RRUC-E	
Installation hardware spares kit, CDMA RRUC-E	NTTT1001 [a]

[a] This kit provides spare washers and bolts for RRUC-E tower installations. When installing RRUC-Es on a tower order one NTTT1001 kit per tower installation (group of RRUC-Es) or as required by the customer.

Figure 26 Wall mounting - Rectifier



Unit:mm

6.1.7 50 ohm Termination Loads

A 50 ohm termination load is required for each unused RF port on a Remote Radio Unit CDMA - Enhance or DPM.

The N-type connectors, antenna ports, on a DPM will only require terminating if two Remote Radio Unit CDMA - Enhances are sharing diversity receive. Order one 50 ohm N-type termination, N0106696, for each Remote Radio Unit CDMA - Enhance sharing diversity.

The QMA overlay (OL) ports on the Remote Radio Unit CDMA - Enhance require 50 ohm termination loads for one Remote Radio Unit CDMA - Enhance configurations. Order two 50 ohm QMA terminations, N0108260, for each Remote Radio Unit CDMA - Enhance operating independently.

The QMA Rx1 overlay port on the Remote Radio Unit CDMA - Enhance and the Rx Div port on the DPM require terminations loads for two Remote

Radio Unit CDMA - Enhance configurations. Order two 50 ohm QMA terminations, N0108260, for each Remote Radio Unit CDMA - Enhance sharing diversity receive.

6.1.8 RF Diversity Receive Sharing Cabling

RF receive sharing is only supported between two Remote Radio Unit CDMA - Enhances.

Receive sharing is when one Remote Radio Unit CDMA - Enhance shares its receive signal with a second Remote Radio Unit CDMA - Enhance. If the Remote Radio Unit CDMA - Enhances are co-located, immediately adjacent, Ericsson provided RF cabling can be used. If the Remote Radio Unit CDMA - Enhances are not co-located the customer must order and provide custom RF receive cables.

Ericsson 1000mm and 2000mm RF receive cables are identified in Table 3 Remote Radio Unit CDMA - Enhance Product Structure.

When the customer orders custom RF receive cables (from the RF cable vendor of their choice) the RF cable used must provide the following:

- High shielding characteristics.
- Minimal insertion loss performance characteristics.
- QMA straight connector for the Remote Radio Unit CDMA - Enhance.
  - It is recommended that the QMA connector manufacturer be part of the QLF to ensure compatibility with the QMA connectors in the Remote Radio Unit CDMA - Enhance.
  - Refer to www.qlf.info for additional QLF vendor information.
- The loss of the diversity receive cable between Remote Radio Unit CDMA - Enhances cannot exceed 1.2 dB at the frequency that the Remote Radio Unit CDMA - Enhance is operating at.

For all cabling diagrams and details refer to the Remote Radio Unit CDMA-Enhance Interconnect General Specification [Ref 3]

6.1.9 Customer Provided RF Hardware

Any Remote Radio Unit CDMA - Enhance installation which does not use the Ericsson duplexer will violate Ericsson FCC compliance. Use of third-party RF conditioning equipment will violate Ericsson FCC compliance.

All recommended Remote Radio Unit CDMA - Enhance configurations use the Ericsson duplexer. Using third-party RF conditioning equipment should be an exception, and only in specific cases not covered by the Remote Radio Unit CDMA - Enhance duplexer product offerings.

The customer could deploy the Remote Radio Unit CDMA - Enhance with their own RF hardware. An example of customer RF hardware could be a filter on the transmit or receive RF signals. If custom RF hardware is used the customer is responsible for the installation and securing of the hardware, and all cabling requirements.

Each custom RF hardware configuration must be evaluated by Ericsson RF engineering and approved by PLM. The appropriate test(s), documentation and FCC filings must be completed prior to the customer using any

non-Ericsson RF hardware. Use of unverified RF conditioning equipment may cause performance degradation, dropped calls, and interference. If the customer wishes to deploy the Remote Radio Unit CDMA - Enhance with their own RF hardware please contact PLM.

6.1.10 800 MHz Remote Radio Unit CDMA - Enhance

Table 32 details the provisioning requirements for one or two 800 MHz Remote Radio Unit CDMA - Enhances per sector with any Ericsson CDMA BTS using only Ericsson RF hardware.

Table 32 800 Remote Radio Unit CDMA - Enhance

Description	Order Code	Configuration per sector [a]		
		1 RRUC-E	2 RRUC-E	2 RRUC-E exp from 1 RRUC-E
Hardware - RRUC-E				
RRUC-E 800	NTTT70ABE5	1	2	1
DPM - section 6.1.4	section 6.1.4	1	2	1
50 ohm QMA Termination Load - section 6.1.7	N0108260	2	4	2
50 ohm N-type Termination Load - section 6.1.7	N0106696		2	2
Installation Kit - section 6.1.6	NTTT1001	as required		
Mounting Kit - section 6.1.6	section 6.1.6	as required		
Solar Cover Kit - section 6.1.6	section 6.1.6	0 or 1	0 or 2	0 or 1
Hardware - AC				
Rectifier - section 4.1.4	NTTT19BAE5	0 or 1	0 or 2	0 or 1
Mounting Kit - section 6.1.6	section 6.1.6	as required		
RF Transmit Cables				
Cable RF, QN RA to QN Str Lisca outdoor 400mm	NTGZ8041E6	1	2	1
RF Receive Cables				
Cable RF, QMA Str to QMA Str outdoor, 500mm	NTGZ8142E6	2	2	
Cable RF, QMA Str to QMA Str Outdoor 1000mm	NTGZ8146E6		2 [b]	2 [b]
Cable RF, QMA Str to QMA Str Outdoor 2000mm	NTGZ8150E6			
Power Cable				
Refer to section Table 24 [c d]	section Table 24	as required		

Table 32 800 Remote Radio Unit CDMA - Enhance (Continued)

Description	Order Code	Configuration per sector [a]		
		1 RRUC-E	2 RRUC-E	2 RRUC-E exp from 1 RRUC-E
Fiber Cable				
Fiber Cable - section 6.1.3 [e]	section 6.1.3	1	2	1
Optical Transceiver - section 6.1.3	section 6.1.3	1	2	1

[a] Normal or high power.
[b] Select 2 cables to share diversity receive between 2 RRUC-Es. Cable length is based upon separation between RRUC-Es.
If the RRUC-Es are not co-located and the 2000mm cable is not long enough the customer must provide a custom cable. Refer to section 6.1.8 for additional information.
If the customer requires different connectors refer to Table 3 Remote Radio Unit CDMA - Enhance Product Structure for additional RF cables.
[c] If an existing power cable that can support the RRUC-E is available at site, the power cable is not required.
[d] One DC power cable NTGS8073 is provided with RRUC.
[e] If an existing fiber cable that can be used with the RRUC-E available at site, the fiber cable is not required.

6.2 Radio Cell Site Requirements - All Systems

In addition to the information contained within this section refer to the documents below for complete radio cell site requirements information for a BTS using a Remote Radio Unit CDMA - Enhance. This section will only provide amended cell site requirements information.

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]

6.2.1 Remote Radio Unit CDMA - Enhance RF Connectors

All RF connectors in the Tx path on the Remote Radio Unit CDMA - Enhance and DPM are QN. All RF connectors in the Rx path on the Remote Radio Unit CDMA - Enhance and DPM are QMA (IP68 rated). These

connectors are quick connect and are easily installed or removed. A QMA/QN disconnect tool (74 Z-0-0-459) is available from Huber and Suhner.

The DPM antenna connectors are N-type RF connectors.

6.2.2 Remote Radio Unit CDMA - Enhance Configurations

The Remote Radio Unit CDMA - Enhance can be configured as a one, two or three carrier module.

The Remote Radio Unit CDMA - Enhance can also be configured as a 1 carrier high power radio. If the Remote Radio Unit CDMA - Enhance is configured as 1 carrier high power, the maximum supported configuration with 2 Remote Radio Unit CDMA - Enhances is 1 carrier bi-sector or 2 carrier omni.

The supported configurations are Remote Radio Unit CDMA - Enhance only.

The Remote Radio Unit CDMA - Enhance can be configured as a Ericsson Pilot Beacon Unit (PBU). Using one, or more carriers and/or sectors on the Remote Radio Unit CDMA - Enhance as a PBU does not require any additional software or hardware specific to the PBU.

6.2.3 Remote Radio Unit CDMA - Enhance RF CCDS/CFDS Information

The carrier, power configuration of a Remote Radio Unit CDMA - Enhance is determined by the CFDS order code. The appropriate CDMA Feature Delivery System (CFDS) order code will be ordered via the CFDS process.

CCDS/CFDS code(s) are used/purchased to expand the Remote Radio Unit CDMA - Enhance to 2 or 3 carriers, or to allow the power level to be adjusted for each carrier on the Remote Radio Unit CDMA - Enhance. The high power CCDS/CFDS code allows a 1 carrier Remote Radio Unit CDMA - Enhance access to all of the available power. For information on the CCDS/CFDS codes refer to CDMA Feature Delivery System Provisioning Guide [Ref 16].

CCDS/CFDS order codes can be ordered for the following configurations:

- Add 1 carrier to the Remote Radio Unit CDMA - Enhance (carriers 2 or 3).
- Expand the Remote Radio Unit CDMA - Enhance from 1 carrier regular power to 1 carrier high power.

The feature allow the radio to use fiber cabling beyond 200m is always active for RRUC-E.

6.2.4 Remote Radio Unit CDMA - Enhance Channel and Carrier Selection

For a list of the preferred 800 MHz BC 0 channels refer to Table 33 and Table 34.

For a list of the preferred 800 MHz BC 10 channels refer to Table 35 .

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Table 33 Preferred 800 MHz BC 0 band Channels with 1.23 MHz (41 AMP) Channel Spacing

Channel	Rx Frequency (MHz)	Tx Frequency (MHz)	Carrier Deployment	Comment
1019	824.88	869.88	8	A" Band
37	826.11	871.11	7	A Band
78	827.34	872.34	6	A Band
119	828.57	873.57	5	A Band
160	829.80	874.80	4	A Band
201	831.03	876.03	3	A Band
242	832.26	877.26	2	A Band
283	833.49	878.49	1	Primary A Band
384	836.52	881.52	1	Primary B Band
425	837.75	882.75	2	B Band
466	838.98	883.98	3	B Band
507	840.21	885.21	4	B Band
548	841.44	886.44	5	B Band
589	842.67	887.67	6	B Band
630	843.90	888.9	7	B Band
758	847.74	892.74	8	B’ Band

Table 34 Preferred 800 MHz BC 0 band Channels with 1.26 MHz (42 AMP) Channel Spacing

Channel	Rx Frequency (MHz)	Tx Frequency (MHz)	Carrier Deployment	Comment
n/a	n/a	n/a	8	A" Band [a]
31	825.93	870.93	7	A Band
73	827.19	872.19	6	A Band
115	828.45	873.45	5	A Band
157	829.71	874.71	4	A Band
199	830.97	875.97	3	A Band
241	832.23	877.23	2	A Band
283	833.49	878.49	1	Primary A Band
384	836.52	881.52	1	Primary B Band
426	837.78	882.78	2	B Band
468	839.04	884.04	3	B Band
510	840.30	885.30	4	B Band
552	841.56	886.56	5	B Band
594	842.82	887.82	6	B Band
636	844.08	889.08	7	B Band
758	847.74	892.74	8	B’ Band

[a] Carrier 8 in the A" band is not a valid CDMA channel with 42 channel spacing, and is not supported.

Table 35 Preferred 800 MHz BC 10 Channels

Block	Channel	Tx Frequency (MHz)	Rx Frequency (MHz)	Comment
~~C/D~~ iDEN	500	863.5	818.5	
	550	864.75	819.75	
	600	866	821	
	650	867.25	822.25	
	700	868.5	823.5	

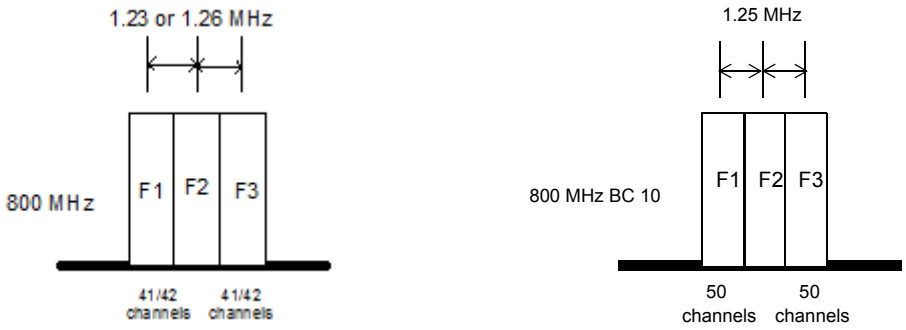
6.2.4.1 Standard Adjacent Carrier Configurations-Band Class 0

Each 800 MHz Band Class 0 Remote Radio Unit CDMA - Enhance channel is to have a channel step size of 30 kHz, and must have a 1.23 MHz (recommended for CDMA2000 specifications), or 1.26 MHz channel separation.

Each 800 MHz Band Class 10 Remote Radio Unit CDMA - Enhance channel is to have a channel step size of 25 kHz, and must have a 1.25 MHz channel separation.

The 800 MHz Remote Radio Unit CDMA - Enhance will support the standard 1 carrier, 2-adjacent carriers, and 3-adjacent carriers configuration.

Figure 27 Standard Adjacent Carrier Spacing



6.2.4.2 General Carrier Configurations

The Remote Radio Unit CDMA - Enhance shall provide flexibility to support allocation of 1 to 3 CDMA carriers anywhere in a 6-carrier continuous spectrum with varying spacing between carriers.

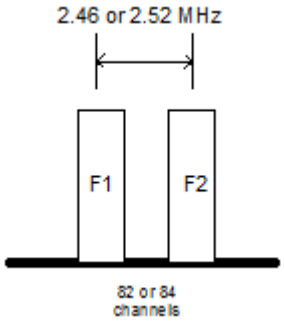
Specific carrier spacing configurations supported by Ericsson are identified in the following sections.

The design target is to be emissions compliant in the gap but actual compliance will be determined during system testing (tbd-this statement will be updated once testing has been completed and results are available).

6.2.4.2.1 800 MHz BC 0 Two Carrier Configuration with a Single Carrier Gap

The 800 MHz Remote Radio Unit CDMA - Enhance shall support operation two carrier operation where the carriers are separated by a single carrier gap. Example: channels 157 (A4) and 73 (A6).

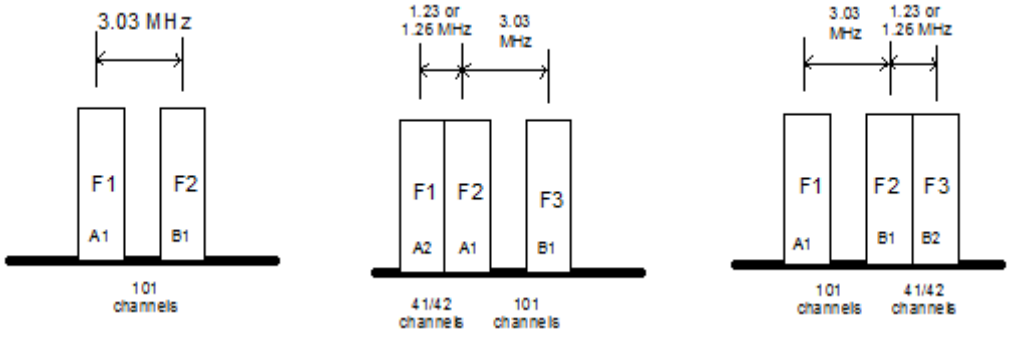
Figure 28 800 MHz BC 0 Two Carrier Configuration with a Single Carrier Gap



6.2.4.2.2 800 MHz BC 0 A1 and B1 Carriers Gap

The Remote Radio Unit CDMA - Enhance shall support operation in carriers A1 and B1, when A and B spectrum belong to the same operator. The particular channel numbers are 283 and 384, corresponding to a channel separation of 3.03 MHz. The carriers may also be deployed with the gaps between different carriers as shown in the Figure. Since the spectrum in the gap will be owned by the customer operator, the same filter can be used. Since emissions compliance in the gap is not required but will be a design target, these filter designs may change.

Figure 29 800 MHz BC 0 A1 and B1 Carriers Gap



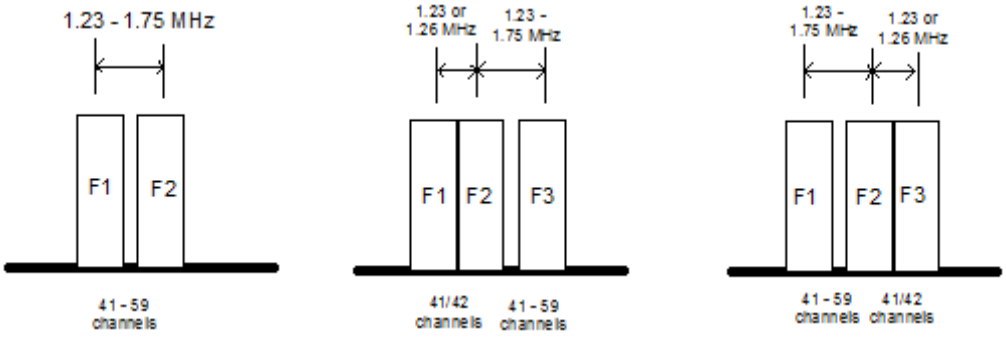
6.2.4.2.3 800 MHz BC 0 Second Carrier Shifted 0.5 MHz

Carriers F1 and F2.5 MHz (i.e. second carrier shifted up to 0.5 MHz - to help customers avoid 1:1 overlay) - gap between carriers is under the control of the same CDMA BTS. The spectrum in the gap is owned by the customer operator.

DO carriers have a larger footprint than 1x carriers with the same transmit power. A 1:1 overlay is where the customer reduces the DO transmit power so that the DO and 1x carrier footprints are the same, and all cells would have a DO carrier. For customers that do not

want to deploy DO at the same density as voice, and keep the larger DO footprint with reduced coverage the DO carrier is shifted to avoid near/far problems. This helps reduce the interference at the mobile from an adjacent cell that does not have DO (keeps the 1x carrier in the adjacent cell from transmitting in a carrier adjacent to the DO carrier and overwhelming the mobile).

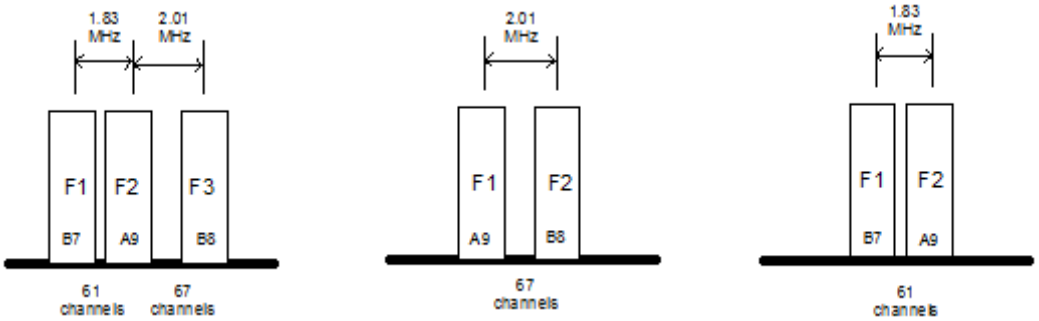
Figure 30 800 MHz BC 0 Second Carrier Shifted 0.5 MHz



6.2.4.2.4 800 MHz BC 0 Carriers B7, A9 & B8

800 MHz carriers B7, A9 and B8 (i.e. when B, A' and B' belong to one operator) - frequency gap between carriers owned by same carrier customer. Two carriers may also be deployed in the B7, A9, or B8 positions. Two carriers may also be deployed in the B7 and B8 positions.

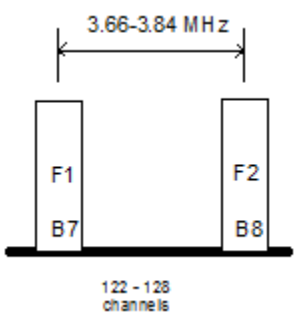
Figure 31 800 MHz BC 0 Carriers B7, A9 & B8



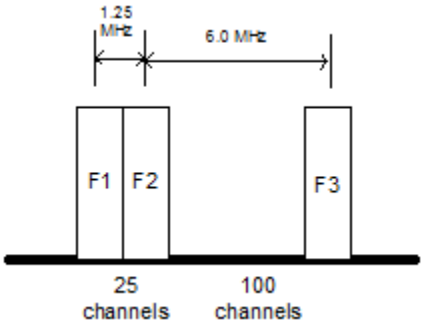
6.2.4.2.5 800 MHz BC 0 Carriers B7 & B8

The 800 MHz Remote Radio Unit CDMA - Enhance module shall support allocation of 7th and 8th carriers (only two carriers, B7 and B8) on B & B' bands. The spectral gap between B7 and B8 is not owned by the customer operator. The radio shall be conducted spurious emissions compliant in the gap.

Figure 32 800 MHz BC 0 Carriers B7 & B8



B7 & B8

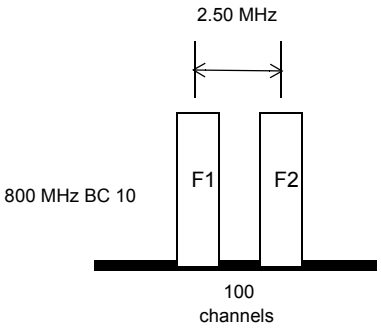


B6, B7 & B8

6.2.4.2.6 800 MHz BC 10 Carriers

The 800 MHz BC 10 Remote Radio Unit CDMA - Enhance shall support operation two carrier operation where the carriers are separated by a single carrier gap. The spectrum in the gap is assumed to be owned by the customer user.

Figure 33 800 MHz BC 10 Two Carrier Configuration with a Single Carrier Gap



6.2.5 Remote Radio Unit CDMA - Enhance Transmit Power

The transmit power for one Remote Radio Unit CDMA - Enhance is outlined in Table 36. Different configurations will have different transmit power at the antenna depending upon the RF hardware and cables in the transmit path.

Table 36 Remote Radio Unit CDMA - Enhance Transmit Power Specifications

RRUC-E Configuration [a]	Typical Total RRUC-E TX Power (W)	Minimum TX Power (W) Per Carrier		Typical TX Power (W) Per Carrier
		1σ [b]	2σ [c]	
at RRUC-E output				
800 MHz @ RRUC-E	~~TBD~~ 85.1	~~TBD~~ 29.2	~~TBD~~ 28.4	~~TBD~~ 30.1

Table 36 Remote Radio Unit CDMA - Enhance Transmit Power Specifications (Continued)

RRUC-E Configuration [a]	Typical Total RRUC-E TX Power (W)	Minimum TX Power (W) Per Carrier		Typical TX Power (W) Per Carrier
		1σ [b]	2σ [c]	
at the duplexer output				
800 MHz @ A/B/Full Band DPM	~~66~~ 70	~~TBD~~ 22.9	~~TBD~~ 22.3	~~TBD~~ 24.7
800 MHz @ B Band DPM with partial GSM Rejection	~~63~~ 70	~~TBD~~ 21.9	~~TBD~~ 21.3	~~TBD~~ 24.7
800 MHz @ B Band DPM with Full GSM Rejection	~~60~~ 65.3	~~TBD~~ 20.9	~~TBD~~ 20.3	~~TBD~~ 23.1
800 MHz @ iDEN Band DPM	*68.4*	*21.9*	*21.3*	*24.1*

[a] These values are for 1xRTT only.
[b] 1σ (1 sigma) = 66%of the RRUC-Es will fall into this category.
[c] 2σ (2 sigma) = 99%of the RRUC-Es will fall into this category.

The Remote Radio Unit CDMA - Enhance supports low power level with the typical power level of 200 mW at the DPM antenna port.

The transmit power configurations of the Remote Radio Unit CDMA - Enhance are determined by software. The maximum transmit power set per carrier is defined as a percentage of total transmit power on a per Remote Radio Unit CDMA - Enhance basis. Without the appropriate CCDS (section 6.2.3) a one carrier Remote Radio Unit CDMA - Enhance is limited to a maximum of a third of the total transmit power.

The appropriate CCDS code will be ordered via the CCDS process. If the customer purchases the flexible power CCDS then the power transmitted by a one carrier Remote Radio Unit CDMA - Enhance may be adjusted. This would allow a one carrier configuration to have all the power.

Using additional hardware in the transmit path will result in reduced output power. This reduced power must be accounted for during the cell site planning. If the customer chooses to use a configuration which adds additional hardware they need to understand that additional losses will be incurred.

6.2.6 Remote Radio Unit CDMA - Enhance Transmit Power Pooling

Remote Radio Unit CDMA - Enhance does not support transmit carrier and sector power pooling.

6.2.7 Temperature Power De-rating

The Remote Radio Unit CDMA - Enhance (800 MHz) has built in temperature sensors that monitors the internal temperature of the module. To prevent the Remote Radio Unit CDMA - Enhance from going into anxiety shutdown, due to an excessive internal temperature, software will reduce the maximum available amplified power. This will occur at an external Remote Radio Unit CDMA - Enhance ambient temperature of approximately

55°C, and will prevent the Remote Radio Unit CDMA - Enhance from shutting down, and dropping all of the users. As a result of the power reduction, the capacity of the cell will be reduced, and some of the users may be dropped.

The software will reduce the maximum available amplifier power by 0.25 dB increments, every 3 minutes until either the internal temperature drops below the threshold, and stabilizes, or the maximum transmit power reduction of 3 dB is reached. If the 3 dB power de-rating occurs, and the temperature continues to rise, the Remote Radio Unit CDMA - Enhance will wilt (an internal shutdown condition). When wilting occurs, and if the temperature continues to rise, the Remote Radio Unit CDMA - Enhance will shutdown.

If the Remote Radio Unit CDMA - Enhance shuts down the Remote Radio Unit CDMA - Enhance will need to be manually restarted. If, as a result of the power de-rating, the Remote Radio Unit CDMA - Enhance temperature drops to the recovery temperature, power is added back in 0.25 dB increments, recovering back to its original level.

7.0 Mechanical and Environmental

7.1 Mechanical & Environmental Provisioning Guidelines - All Systems

Not applicable.

7.2 Mechanical & Environmental Cell Site Requirements

The Remote Radio Unit CDMA - Enhance is intended to adhere to the Telcordia Technologies Generic Requirements, GR-63-CORE Issue 3 [Ref 17] for most of the Remote Radio Unit CDMA - Enhance physical requirements. There are some instances where the Remote Radio Unit CDMA - Enhance will not meet a specific requirement. The requirements, and those that are met, are not met, or are not applicable are documented within Table 37.

The Remote Radio Unit CDMA - Enhance is intended to adhere to the Telcordia Technologies Generic Requirements, GR-487-CORE, Issue 3 [Ref 18] for most of the Remote Radio Unit CDMA - Enhance cabinet requirements. There are some instances where Remote Radio Unit CDMA - Enhance will not meet a specific requirement. The requirements, and those that are met, are not met, or are not applicable are documented within Table 38.

In Table 37 and Table 38 under the requirement column the requirement number, and status are indicated. For the status R stands for Requirement (necessary), CR stands for Conditional Requirement (necessary in specific applications), and O stands for Objective (desirable).

Table 37 Remote Radio Unit CDMA - Enhance GR-63-CORE Requirements Deviations and Exceptions

GR-63-CORE Requirement				Meet	Reference / Comment
Section			Requirement		
Special Requirements	General		R2-1	n/a	
			R2-2	n/a	
			R2-3	n/a	
			O2-4	n/a	
			R2-5	n/a	
			R2-6	n/a	
			O2-7	n/a	
			O2-8	n/a	
		Equipment Frame Floor Plans	O2-9	n/a	
			O2-10	n/a	
			O2-11	n/a	
	Equipment Frames	Equipment Frame Dimensions	O2-13	n/a	
			O2-14	n/a	
		Equipment Frame Interface with Cable Rack	R2-15	n/a	
			O2-16	n/a	
		Equipment Frame Lineup Conformity	R2-17	n/a	
		Equipment Frame Floor Loading	O2-18	n/a	
			R2-19	n/a	
		AC Convenience Outlets within Equipment Frames	R2-20	n/a	
			R2-21	n/a	
Special Requirements	Distributing & Interconnecting Frames	Distributing Frames (DFs)	02-22	n/a	
			R2-23	n/a	
			O2-24	n/a	
		Interconnecting Frames (IFs)	Same as all Equipment Frames requirements	n/a	

Table 37 Remote Radio Unit CDMA - Enhance GR-63-CORE Requirements Deviations and Exceptions (Continued)

GR-63-CORE Requirement				Meet	Reference / Comment
Section			Requirement		
	DC Power Plant Equipment	Centralized DC Power Plant Equipment	R2-25	n/a	
			R2-26	n/a	
			O2-27	n/a	
			O2-28	n/a	
	Cable Distribution Systems	CDS Requirements	O2-29	n/a	
			O2-30	n/a	
			O2-31	n/a	
			O2-32	n/a	
			O2-33	n/a	
			R2-34	n/a	
			R2-35	n/a	
			O2-36	n/a	
		CDS Floor Load & Support	O2-37	n/a	
	Operations Systems (OSs)		R2-38	n/a	
	Cable Entrance Facility (CEF)	CEF Spatial Requirements	O2-39	n/a	
		CEF Loading Requirements	O2-40	n/a	
			R2-41	n/a	
		CEF Equipment Temperature & Humidity Requirements	R2-42	n/a	
NEBS-2000 Framework Criteria	Structural Requirements		R3-1	n/a	
			R3-2	n/a	
			R3-3	n/a	
			R3-4	n/a	
			R3-5	n/a	
			R3-6	n/a	
			R3-7	n/a	
			R3-8	n/a	

Table 37 Remote Radio Unit CDMA - Enhance GR-63-CORE Requirements Deviations and Exceptions (Continued)

GR-63-CORE Requirement			Meet	Reference / Comment
Section		Requirement		
NEBS-2000 Framework Criteria	Geometric Requirements	R3-9	n/a	
		R3-10	n/a	
		R3-11	n/a	
		R3-12	n/a	
		R3-13	n/a	
		R3-14	n/a	
		R3-15	n/a	
		R3-16	n/a	
		R3-17	n/a	
		R3-18	n/a	
		R3-19	n/a	
		R3-20	n/a	
		R3-21	n/a	
	Wiring & Cable Access Requirements	R3-22	n/a	
		R3-23	n/a	
		R3-24	n/a	
Environmental Criteria		R4-1	yes	
		R4-2	yes	

Table 37 Remote Radio Unit CDMA - Enhance GR-63-CORE Requirements Deviations and Exceptions (Continued)

GR-63-CORE Requirement					Reference / Comment
Section			Requirement	Meet	
	Temperature, Humidity & Altitude Criteria	Transportation & Storage Environmental Criteria	R4-3	yes	
			R4-4	yes	
			R4-5	yes	
		Operating Temperature & Humidity Criteria	R4-6	yes	section 7.2.2
			R4-7	yes	
		Altitude	R4-8	yes	
			R4-9	yes	
			R4-10	yes	
			O4-11	yes	
			O4-12	yes	
		Heat Dissipation	R4-13	~~yes~~ n/a	
			O4-14	~~yes~~ n/a	
			O4-15	yes	

Table 37 Remote Radio Unit CDMA - Enhance GR-63-CORE Requirements Deviations and Exceptions (Continued)

GR-63-CORE Requirement				Meet	Reference / Comment
Section			Requirement		
Environmental Criteria	Fire Resistance	Equipment Assembly Fire Tests	R4-16	n/a	Refer to Safety Filing
			R4-17	n/a	
			R4-18	n/a	
			O4-19	n/a	
			O4-20	n/a	
			R4-21	n/a	
			R4-22	n/a	
			R4-23	n/a	
			O4-24	n/a	
			O4-25	n/a	
		Use of Fire-Resistance Materials, Components, Wiring & Cable	R4-26	n/a	Refer to Safety Filing
			R4-27	n/a	
			R4-28	n/a	
			R4-29	n/a	
			R4-31	n/a	
			R4-32	n/a	
			R4-33	n/a	
			R4-34	n/a	
			O4-35	n/a	
			R4-36	n/a	
			R4-37	n/a	
			R4-38	n/a	
			R4-39	n/a	
			O4-40	n/a	
			R4-41	n/a	
		Smoke Corrosivity	O4-42	~~yes~~ n/a	

Table 37 Remote Radio Unit CDMA - Enhance GR-63-CORE Requirements Deviations and Exceptions (Continued)

GR-63-CORE Requirement					Reference / Comment
Section			Requirement	Meet	
	Equipment Handling Criteria	Packaged Equipment Shock Criteria	R4-43	yes	
			R4-44	n/a	
		Unpackaged Equipment Shock Criteria	R4-45	yes	
Environmental Criteria	Earthquake, Office Vibration & Transportation Vibration	Earthquake Environment & Criteria	R4-46	yes	
			R4-47	n/a	
			R4-48	n/a	
			O4-49	n/a	
		Functional Performance	R4-50	yes	
			O4-51	yes	
		Framework & Anchor Criteria	O4-52	yes	
			R4-53	yes	
			O4-54	yes	
			R4-55	yes	
			O4-56	yes	
			O4-57	yes	
		Office Vibration Environment & Criteria	R4-58	yes	
			R4-59	yes	
		Transportation Vibration Criteria	R4-60	yes	

Table 37 Remote Radio Unit CDMA - Enhance GR-63-CORE Requirements Deviations and Exceptions (Continued)

GR-63-CORE Requirement					Reference / Comment
Section			Requirement	Meet	
	Airborne Contaminants	Contamination Levels	R4-61	n/a	
			R4-63	yes	
		Equipment - Fan Filters	R4-64	n/a	
			R4-65	n/a	
			R4-66	n/a	
			R4-67	n/a	
			R4-68	n/a	
			R4-69	n/a	
			O4-70	n/a	
			O4-71	n/a	
	Acoustic Noise		R4-72	yes	
	Illumination	Quantity of Light	R4-73	n/a	
			O4-74	n/a	
			R4-75	n/a	
		Surface Reflectance & Color	O4-76	n/a	
		Quality of Illumination	O4-77	n/a	
			O4-78	n/a	
			O4-79	n/a	

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions

GR-487-CORE Requirement				Reference / Comment
Section		Requirement	Meet	
Detailed Requirements	Product Samples	R3-1	yes	
		R3-2	yes	
		R3-3	no	
	Product Changes	R3-4	no	

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement			Meet	Reference / Comment
	Section	Requirement		
	Safety and Reliability Considerations	R3-5	yes	
		R3-6	yes	
		R3-7	yes	
		R3-8	yes	
		R3-9	no	high temp warning label
	Metallic Materials	CR3-10	no	
		R3-11	yes	
		R3-12	yes	
	Polymeric and Other Non-Metallic Materials	CR3-13	no	
		R3-14	n/a	no tested
		CR3-15	no	
		R3-16	yes	
		R3-17	yes	
		R3-18	yes	
		R3-19	~~yes~~ n/a	
		R3-20	yes	
		R3-21	yes	not tested
		R3-22	yes	not tested
		R3-23	yes	not tested
		R3-24	yes	not tested
		R3-25	yes	not tested

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement				Meet	Reference / Comment
Section			Requirement		
	Finish	Color	R3-26	no	
			R3-27	no	
			R3-28	no	
		Appearance	R3-29	no	
			R3-30	yes	
			R3-31	~~n/a~~ yes	
		Paint Adhesion	R3-32	yes	not tested
		Flexibility	R3-33	yes	not tested
		Paint Adhesion after Exposure	R3-34	yes	not tested
		Ultraviolet Resistance	R3-35	yes	not tested
	Screens and Filters		R3-36	n/a	
			R3-37	n/a	
			R3-38	n/a	
			R3-39	n/a	
	Door Restrainers (Vertically Hinged Doors)		R3-40	n/a	
			R3-41	n/a	
			R3-42	n/a	
			R3-43	n/a	
			O3-44	n/a	

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement			Meet	Reference / Comment
Section		Requirement		
	Horizontally Hinged Doors	R3-45	n/a	
		R3-46	n/a	
		R3-47	n/a	
		R3-48	n/a	
		R3-49	n/a	
		R3-50	n/a	
		R3-51	n/a	
		R3-52	n/a	
		R3-53	n/a	
		R3-54	n/a	
		CR3-55	n/a	
		R3-56	n/a	
	Lifting Detail	R3-57	n/a	
		R3-58	n/a	
		R3-59	n/a	
	Security	R3-60	n/a	
		O3-61	n/a	
		CR3-62	n/a	
		CR3-63	n/a	
		R3-64	n/a	
		CR3-65	n/a	
		R3-66	n/a	
		R3-67	n/a	
		CR3-68	n/a	
		CR3-69	n/a	

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement				Meet	Reference / Comment
Section			Requirement		
	Alarms	General	R3-70	n/a	
			CR3-71	n/a	
			R3-72	n/a	
			CR3-73	n/a	
			CR3-74	n/a	
			R3-75	n/a	
			CR3-76	n/a	
		Engine-Generator	R3-77	n/a	
			R3-78	n/a	
			R3-79	n/a	
			R3-80	n/a	
	Condensation		R3-81	yes	
			R3-82	yes	
	Fans		R3-83	n/a	
			O3-84	n/a	
			O3-85	n/a	
			O3-86	n/a	
			R3-87	n/a	
	Bonding and Grounding		R3-88	no	one frame ground
			R3-89	~~yes~~ n/a	
			R3-90	~~yes~~ n/a	
			R3-91	n/a	

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement					Reference / Comment
Section			Requirement	Meet	
	AC Power	Commercial Power	R3-92	yes	
			CR3-93	no	
			R3-94	no	
			R3-95	no	
			R3-96	~~n/a~~ yes	
			R3-97	yes	
			O3-98	yes	
			R3-99	no	
			R3-100	no	
			R3-101	no	
			CR3-102	no	
		Auxiliary Power	R3-103	n/a	
			R3-104	n/a	
			R3-105	n/a	
			R3-106	n/a	
			R3-107	n/a	
			R3-108	n/a	
			CR3-109	n/a	

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement			Meet	Reference / Comment
Section		Requirement		
	Splicing Compartment	R3-110	n/a	
		R3-111	n/a	
		CR3-112	n/a	
		CR3-113	n/a	
		R3-114	n/a	
		R3-115	n/a	
		R3-116	n/a	
		R3-117	n/a	
		R3-118	n/a	
		R3-119	n/a	
		R3-120	n/a	
		CR3-121	n/a	
		R3-122	n/a	
		CR3-123	n/a	
	Electronic Equipment Compartment	R3-124	no	
		CR3-125	n/a	
		R3-126	n/a	
	Battery Compartment	R3-127	n/a	
		R3-128	n/a	
		R3-129	n/a	
		R3-130	n/a	
		O3-131	n/a	
		R3-132	n/a	
		CR3-133	n/a	
		CR3-134	n/a	
		R3-135	n/a	
		CR3-136	n/a	
		R3-137	n/a	
		R3-138	n/a	

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement		Meet	Reference / Comment
Section	**Requirement**		
Engine-Generator Compartment	R3-139	n/a	
	R3-140	n/a	
	R3-141	n/a	
	R3-142	n/a	
	R3-143	n/a	
	R3-144	n/a	
	R3-145	n/a	
	R3-146	n/a	
	R3-147	n/a	
	R3-148	n/a	
	R3-149	n/a	
	R3-150	n/a	
	R3-151	n/a	
	R3-152	n/a	
Pole-Mounted, Aerial Cabinets	R3-153	n/a	
	R3-154	n/a	
	CR3-155	no	
	R3-156	no	
Documentation	R3-157	yes	
	R3-158	no	
	CR3-159	no	

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement			Meet	Reference / Comment
Section		Requirement		
	Marking, Packaging, and Shipping	R3-160		Ericsson Standard
		R3-161		Ericsson Standard
		R3-162	~~yes~~	Ericsson Standard
		R3-163	~~yes~~	Ericsson Standard
		R3-164	no	
		R3-165	~~yes~~	Ericsson Standard
		R3-166	~~yes~~	Ericsson Standard
		R3-167		Ericsson Standard

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement		Meet	Reference / Comment
Section	**Requirement**		
Installation and Maintenance	R3-168	yes	
	R3-169	n/a	
	R3-170	n/a	
	R3-171	yes	
	R3-172		Ericsson Standard
	R3-173	yes	
	R3-174		Ericsson Standard
	O3-175		Ericsson Standard
	O3-176		Ericsson Standard
	R3-177	yes	
	R3-178	n/a	
	CR3-179	n/a	
	R3-180	yes	
	R3-181	~~yes~~ no	
	R3-182	n/a	
	O3-183	yes	
	CR3-184	n/a	
Quality	R3-185		Ericsson Standard
	R3-186		Ericsson Standard
Exposure to High Temperature	R3-187	yes	
	CR3-188	n/a	
	CR3-189	no	
	CR3-190	no	
Thermal Shock	R3-191	yes	not tested

Table 38 Remote Radio Unit CDMA - Enhance GR-487-CORE Requirements Deviations and Exceptions (Continued)

GR-487-CORE Requirement					Reference / Comment
Section			Requirement	Meet	
	Water and Dust Intrusion	Wind Driven Rain	CR3-192		tested to IP rating
		Rain Intrusion	R3-193		tested to IP rating
		Lawn Sprinklers	O3-194		tested to IP rating
		Weather tightness	R3-195		tested to IP rating
	Acoustical Noise Suppression		R3-196	n/a	
	Wind Resistance		R3-197	yes	
			R3-198	yes	
	Impact Resistance		R3-199	yes	not tested
	Firearms Resistance		R3-200	yes	not tested
			CR3-201	no	
	Fire Resistance		R3-202	yes	not tested
	Corrosion Resistance	Salt Fog	R3-203	yes	
		Temperature Cycling / High Humidity	R3-204	yes	
	Shock and Vibration	Transportation Shock	R3-205	yes	not tested
		Transportation Shock (Rail	CR3-206	yes	not tested
		Transportation Vibration	R3-207	yes	
		Installation Shock	R3-208	yes	
		Environmentally Induced Shock	CR3-209	yes	
		Earthquake Resistance	CR3-210	yes	

7.2.1 Customer User Space

The Remote Radio Unit CDMA - Enhance does not provide any customer user space.

7.2.2 Environmental Requirements

The Remote Radio Unit CDMA - Enhance is based on, tested, and interpreted using the Telcordia GR-63-CORE Issue 2, and the GR-487-CORE Issue 2 standards.

This product will meet the environmental requirements specified in section 4.1 of GR-63-CORE.

The Remote Radio Unit CDMA - Enhance meets IP-55 environmental requirements specified in IEC 60529.

The Rectifier meets IP-55 environmental requirements specified in IEC 60529 and NEMA 3R according to UL 50 / C22.2 No.94.

Table 39 Remote Radio Unit CDMA - Enhance Ambient Temperature and Humidity Limits [a]

Conditions	Limits
Temperature Operating Non-Operating (Storage for 72 hours)	 -40°C to 55°C (-40°F to 131°F) [b] -50°C to 70°C (-58°F to 158°F)
Rate of temperature change	30°C/hr (54°F/hr)
Relative Humidity Operating Non-Operating (Storage for 96)	 5% to 100% not to exceed 0.035 kg water/kg of dry air 5% to 95% relative humidity at 40°C (104°F) but not to exceed 0.035 kg water/kg of dry air

[a] Ambient refers to conditions at a location 15" in front of the center of the equipment.
[b] These temperatures are tested without solar load. For climates with high ambient temperatures and intense solar loading the optional RRUC-E solar cover should be used.

Remote Radio Unit CDMA - Enhance shall be able to operate up to an altitude of 1800m above sea level at ambient temperatures of 50°C. Remote Radio Unit CDMA - Enhance installation above 1800m contact the appropriate engineering department for site evaluation. Only applicable to Remote Radio Unit CDMA - Enhance systems operating in an indoor environment.

In outdoor Remote Radio Unit CDMA - Enhance installations altitude is not a thermal consideration because of the reduced temperatures at high altitude.

Remote Radio Unit CDMA - Enhance is compliant to the Telcordia GR-487-CORE requirements for wind driven dust test specified as R3-158 from clause 3.29 “Weather tightness”.

Remote Radio Unit CDMA - Enhance is compliant to the Telcordia GR-487-CORE requirements for solar loading test specified as R3-187 from clause 3.266 without the solar cover.

The operation temperature of Rectifier is -33°C to 50 °C. Detail environmental requirements of Rectifier refer to Rectifier General Specification [Ref 5].

7.2.3 Structural Dynamics

Remote Radio Unit CDMA - Enhance will meet the structural dynamic requirements specified in section 4.4 of GR-63-CORE as indicated in Table 37.

7.2.4 Physical Specifications

The Remote Radio Unit CDMA - Enhance is made up of the following pieces:

Required:

- Remote Radio Unit CDMA - Enhance
- Duplexer module
- RF cabling
- Power cable
- Fiber cable
- 50 ohm termination loads (QMA)
- Mounting hardware
- RF lightning protectors

Optional:

- AC rectifier
- Solar cover
    - Note: In high temp environment (> 40 Deg C) the solar shield will reduce the temp impact on the RRUC-E by 5 to 10 degrees. The actual reduction is dependent on prevailing temp at the time and cannot be accurately predicted. It is strongly recommended that in areas experiencing sustained high temp, a solar shield be installed to protect the RRUC-E.
- 50 ohm termination loads (N-type)

The Remote Radio Unit CDMA - Enhance is a unique radio module not interchangeable with any other CDMA BTS radio. The Remote Radio Unit CDMA - Enhance has a new fiber interface, and is not compatible with the existing fiber cables.

For additional system physical specifications refer to the various system documents.

7.2.5 Physical Dimensions

The following are physical dimension estimates for the Remote Radio Unit CDMA - Enhance and may change at any time.

Table 40 Remote Radio Unit CDMA - Enhance Physical Dimensions

Hardware	Width		Height		Depth	
	inches	cm	inches	cm	inches	cm
RRUC-E 800 [a]	12.9	327.7	18.37	466.6	6.67	169.4
DPM B band with GSM collocation[b]	11.98	304.4	13.48	342.5	2.60	66[c]
DPM iDEN	*11.98*	*304.4*	*13.48*	*342.5*	*2.60*	*66* [c]

Table 40 Remote Radio Unit CDMA - Enhance Physical Dimensions (Continued)

Hardware	Width		Height		Depth	
	inches	cm	inches	cm	inches	cm
DPM A/B/Full band	11.98	304.4	5.50	139.7	2.6	66 [c]
Rectifier	12.5	31.8	5.5	14	10.5	26.7
RRUC-E and DPM in installation bracket without solar cover [b]	13.98	355	18.37	466.6	12.07	306.5
RRUC-E and DPM in installation bracket with solar cover [b]	13.98	355	18.37	466.6	13.66	347
Floor stand [b]	25.98	66	59.25	150.5	25.98	66
Roof stand [b]	72.17	183.3	62.40	158.5	72.17	183.3

[a] Original dimension imperial.
[b] Original dimension metric.
[c] Without connectors depth.

7.2.6 Clearances

The following are clearance estimates for the Remote Radio Unit CDMA - Enhance, and may change at any time.

Table 41 Remote Radio Unit CDMA - Enhance Clearances

	Required Clearance		Requirement
	inches	cm	
RRUC-E with duplexer installed in mounting bracket assembly			
Bottom	39	100	cable access and air inlet
Front [a]	39	100	installation access
Rear	0	0	
Side - Left	8	20	tool access
Side - Right	8	20	tool access
Top	8	20	installation access and air exhaust
Rectifier			
Bottom	20	50	cable access and air inlet
Front [b]	39	100	installation access
Rear	0	0	
Side - Left	6	15	tool access
Side - Right	6	15	tool access
Top	6	15	installation access and air exhaust
DCPM NTDV73BA (Indoor, wall mounted)			
Bottom	6	15	installation access
Front	39	100	tool access and installation access
Rear	0	0	
Side-Left	6	15	tool access and installation access
Side-Right	6	15	tool access and installation access

Table 41 Remote Radio Unit CDMA - Enhance Clearances (Continued)

	Required Clearance		Requirement
	inches	cm	
Top	15	38	cable access

[a] From front surface of cover.
[b] From the front of the rectifier.

7.2.7 System Weights

Table 42 contains the design weight estimates for the Remote Radio Unit CDMA - Enhance, and may change at any time. For weight estimates of existing Metro Cell hardware refer to the following:

- CDMA BTS 652 Provisioning Guidelines and Cell Site Requirements [Ref 24]
- CDMA BTS 662 Provisioning Guidelines and Cell Site Requirements [Ref 26]
- CDMA Metro Cell System Provisioning Guidelines and Cell Site Requirements [Ref 10]
- CDMA Compact Metro Cell Outdoor Provisioning Guidelines and Cell Site Requirements [Ref 11]
- CDMA Compact Metro Cell Outdoor Enhanced Provisioning Guidelines and Cell Site Requirements [Ref 12]
- CDMA Compact Metro Cell Outdoor Enhanced 2 Provisioning Guidelines and Cell Site Requirements [Ref 13]

The weight of the Remote Radio Unit CDMA - Enhance fiber and power cables are dependent upon the length of the cable assembly, and are not included here.

Table 42 Remote Radio Unit CDMA - Enhance System Weights

Hardware	Weight	
	Pounds	Kilograms [a]
Modules		
RRUC-E, 800 MHz	~~TBD~~ 31.75	~~TBD~~ 14.4
Duplexer, 800 MHz A/B/Full Band (NTTT75AA/AB/AC)	~~TBD~~ 8.27	~~TBD~~ 3.75
Duplexer, 800 MHz B band with partial (rejection) GSM (NTTT75AD)	~~21.56~~ 21.96	~~9.8~~ 9.96
Duplexer, 800 MHz B band with full (rejection) GSM (NTTT75AE)	29.76	13.5
Duplexer, 800 MHz iDEN Band (NTTT75AF)	*~~TBD~~ 22.27*	*~~TBD~~ 10.1*
Rectifier	12.1	5.5
Mounting Hardware		
Mounting bracket assembly, RRUC-E (NTTT1001)	0.44	0.2

Table 42 Remote Radio Unit CDMA - Enhance System Weights (Continued)

Hardware	Weight	
	Pounds	Kilograms [a]
Mounting bracket assembly, RRUC-E (NTTT1012)	~~TBD~~ 13.23	~~TBD~~ 6
Mounting kit, RRUC / rectifier, pole (NTTT1003)	12.76	5.8
Floor or roof stand (NTTT1004)	138.6	63
Floor or roof stand (NTTT1005)	138.6	63
Floor or roof stand (NTTT1008)	189.2	86
Solar cover kit, RRUC (NTTT1009)	1.81	0.82
Mounting kit, rectifier, side adapter (NTTT1007)	2.2	1
Mounting bracket assembly, rectifier (NTTT1006)	9.9	4.5
Cabling, RF (one RRUC-E per sector)	TBD	TBD

[a] ~~Metric weight converted from imperial values.~~

7.2.8 Wind Loading

Remote Radio Unit CDMA - Enhance mechanical design is based on environmental conditions as stipulated in TIA-222-G and/or ETS 300 019-1-4. These standards include the static mechanical load imposed on an antenna by wind at maximum velocity.

Remote Radio Unit CDMA - Enhance equivalent flat plate area = 0.1589 m^2

Remote Radio Unit CDMA - Enhance wind survival rating = 125 mph (200 kph)

These values identify only what an individual Remote Radio Unit CDMA - Enhance can and Ericsson supplied installation brackets can withstand.

7.2.9 Remote Radio Unit CDMA - Enhance Loading

A civil engineer must evaluate the wall, pole, floor or roof top that the Remote Radio Unit CDMA - Enhance is installed on for structural integrity.

7.2.9.1 Wall Loading

There are no calculations for wall loading. A civil engineer must evaluate the wall, using the weight and center of gravity location, to determine if it can support the Remote Radio Unit CDMA - Enhance.

The expected maximum load when wall mounting a Remote Radio Unit CDMA - Enhance is 30 kg (includes mounting hardware, but not fiber and power cables). The wall must be capable of handling three times this maximum load.

Step 1

Sum up the weights (Table 42) for the Remote Radio Unit CDMA - Enhance.

Step 2

Center of Gravity location from the back of the RRUC-E support frame:

- 172 mm RRUC-E with typical DPM (NTTT75AA/AB/AC)
- 148 mm RRUC-E with DPM GSM collocation (NTTT75AD/AE)

7.2.9.2 Floor Loading

To calculate the floor loading do the following calculations for each Remote Radio Unit CDMA - Enhance installation mounted on a floor/roof stand. When calculating lb/ft^2 use steps 1 and 2. When calculating kg/m^2 use steps 1, 2 and 3.

Step 1

Sum up the weights (Table 42) for the Remote Radio Unit CDMA - Enhance installation.

Step 2

Using the weight from step 1, and the floor loading conversion factor calculate the floor loading lb/ft^2 using the following formula.

L = W / C

Where:

L = floor loading (lb/ft^2)

W = weight of the equipment from step 1

C = floor loading conversion factor
Floor Stand = 4.69 ft^2 (refer to section 7.2.9.2.1)
Roof Stand = 36.2 ft^2 (refer to section 7.2.9.2.1)

Step 3

Using the floor loading calculation from step 2, and the metric floor loading conversion factor, calculate the kg/m^2 using the following formula.

M = L x 4.882428

Where:

M = metric floor loading (kg/m^2)

L = imperial floor loading (lb/ft^2)

4.882428 = conversion factor to convert from lb/ft^2 to kg/m^2

7.2.9.2.1 Floor Stand

The floor stand conversion factor of 4.69 ft^2 is based on the floor stand base area of 25.98” * 25.98”.

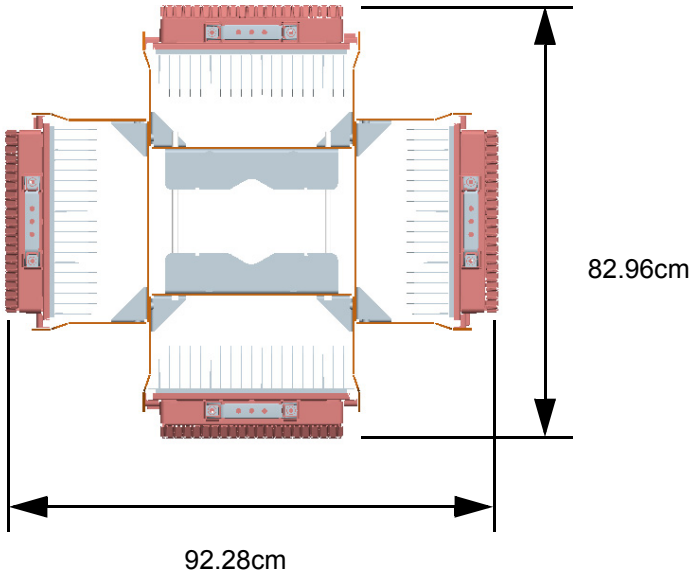
7.2.9.2.2 Roof Stand

The roof stand conversion factor of 36.2 ft^2 is based on the roof stand base area of 72.17” * 72.17”.

7.2.10 Engineering and Installation

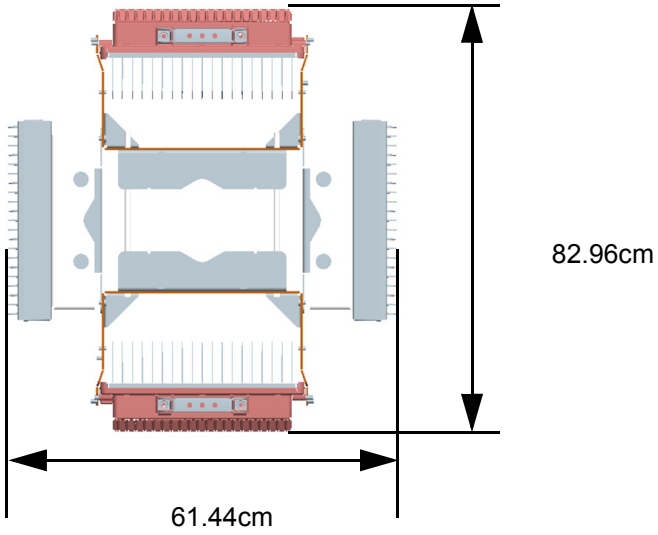
The Remote Radio Unit CDMA - Enhance is designed primarily for outdoor installation, but it may be installed indoors if required by the customer. When installing on an indoor wall the same wall mounting brackets used for outdoor installation will be used.

Figure 34 Installation Footprint - 4 RRUC-Es on pole (top down view)



Dimensions based on pole diameter of 120mm.

Figure 35 Installation Footprint - 2 RRUC-Es and 2 Rectifiers on pole (top down view)



Dimensions based on pole diameter of 120mm.

7.2.11 Installation Restrictions

Installation restrictions are:

- Remote Radio Unit CDMA - Enhance must be mounted vertically with the connectors facing the ground.
- The rectifier must be mounted vertically with the connectors facing the ground.
- Avoid stacking Remote Radio Unit CDMA - Enhances one above the other.
  If the customer must stack Remote Radio Unit CDMA - Enhances there must be a minimum separation of 1m between them.
- When installing Remote Radio Unit CDMA - Enhances and rectifiers on separate mounting pole assemblies, one above the other, the rectifiers are installed on the lower assembly.
- When installing a roof stand, which is not bolted down, weights must be placed over each leg. At least 50 pounds / 23 kilograms should be placed over each leg, and the installation should be verified by a civil engineer to ensure it meets local code requirements.

7.2.12 Cable Access

Remote Radio Unit CDMA - Enhance RF, power and fiber cabling routes to the bottom of the Remote Radio Unit CDMA - Enhance.

DPM RF cabling routes to the bottom of the DPM.

7.2.13 Security

The Remote Radio Unit CDMA - Enhance is intended for installation locations not accessible to the general public and does not incorporate any security features.

7.2.14 Diagrams

Note that hardware colors shown in the diagrams in this section may not be the actual color of the hardware.

Figure 36 RRUC-E and DPM - no cover

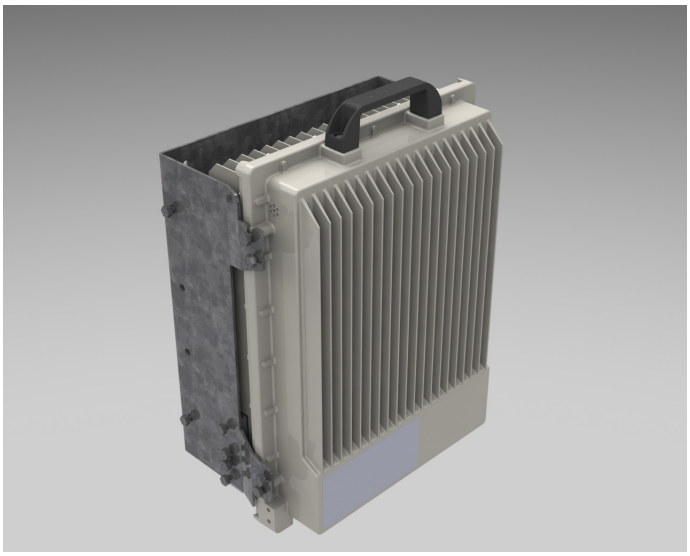


Figure 37 RRUC-E and DPM with Solar Cover

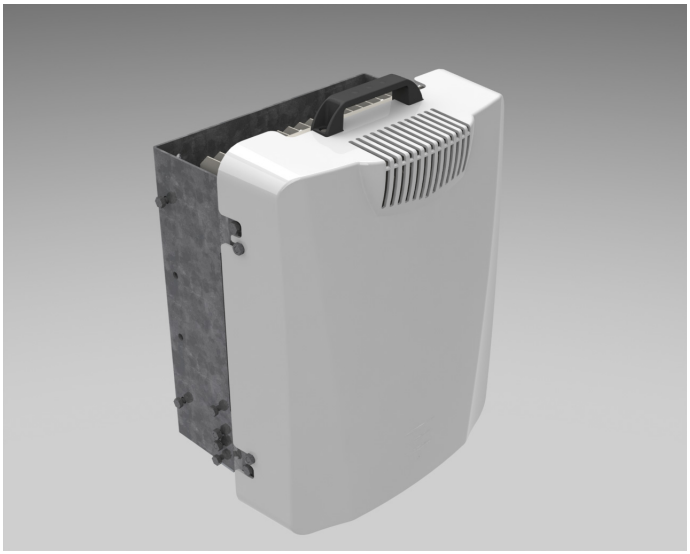
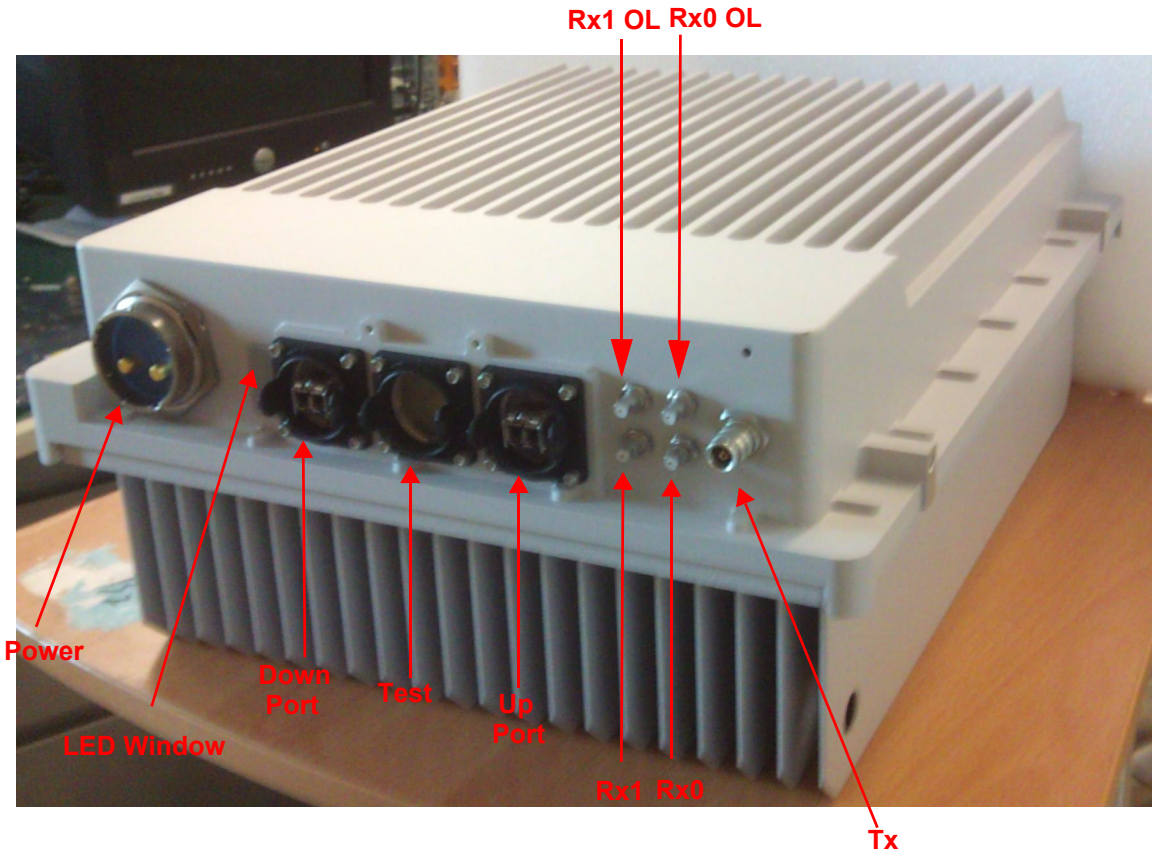


Figure 38 RRUC-E



Note: Up port connects with Digital Module (CORE-2S or DBU) by fiber.
Down Port will support RRUC-E Chain Feature in future.

Figure 39 Duplexer

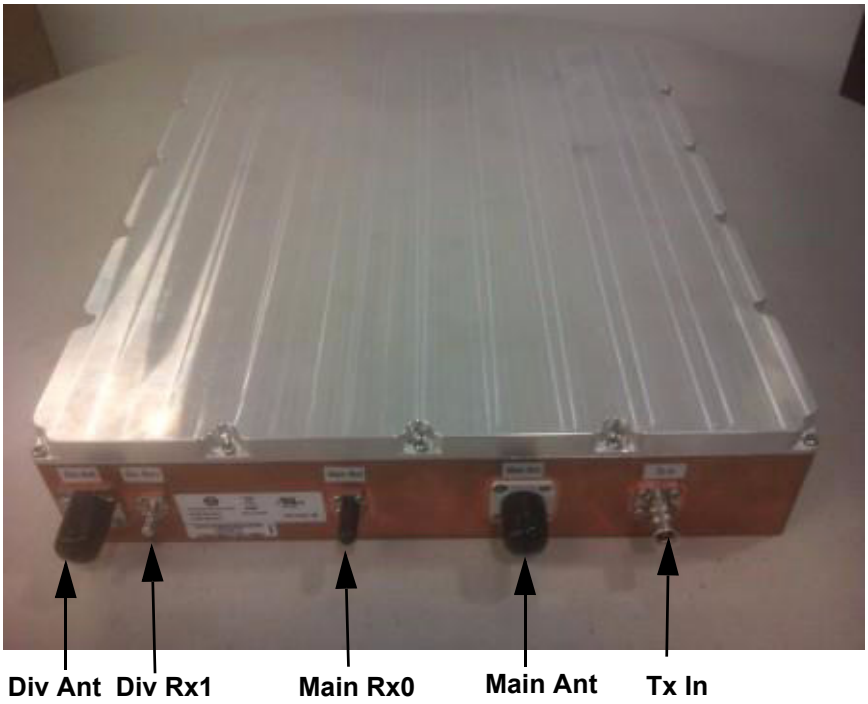


Figure 40 Rectifier

Figure 41 Pole Mounting Two RRUC-Es and Two Rectifiers

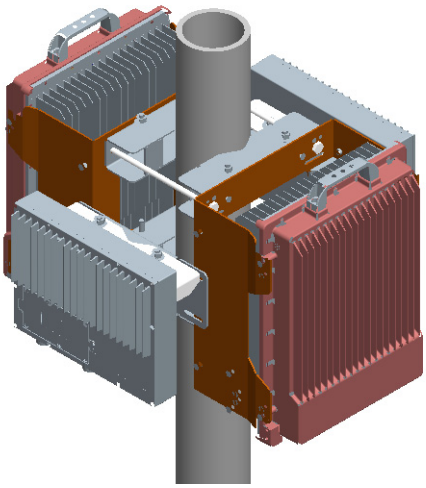


Figure 42 Pole Mounting Four RRUC-Es and Four Rectifiers

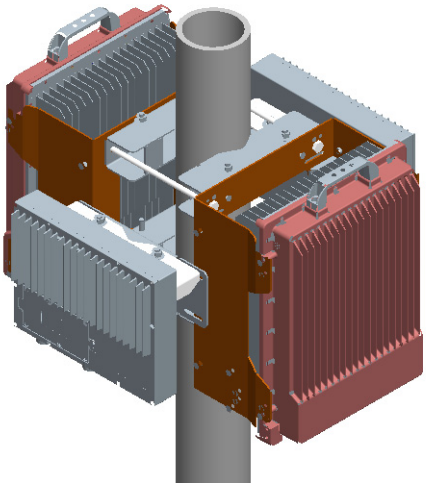


Figure 43 Floor Stand Mounting Four RRUC-Es and Four Rectifiers (maximum configuration)

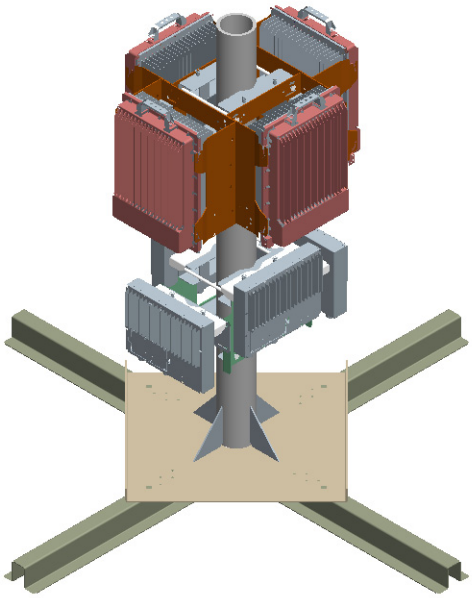


Figure 44 Floor Stand

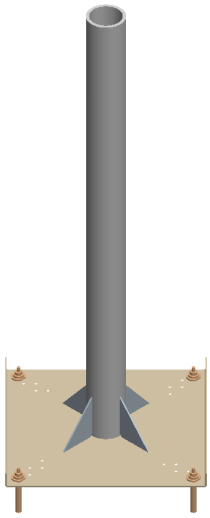


Figure 45 Roof Stand with leg extensions

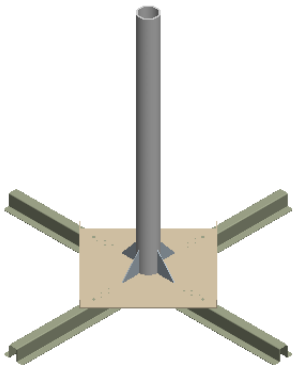
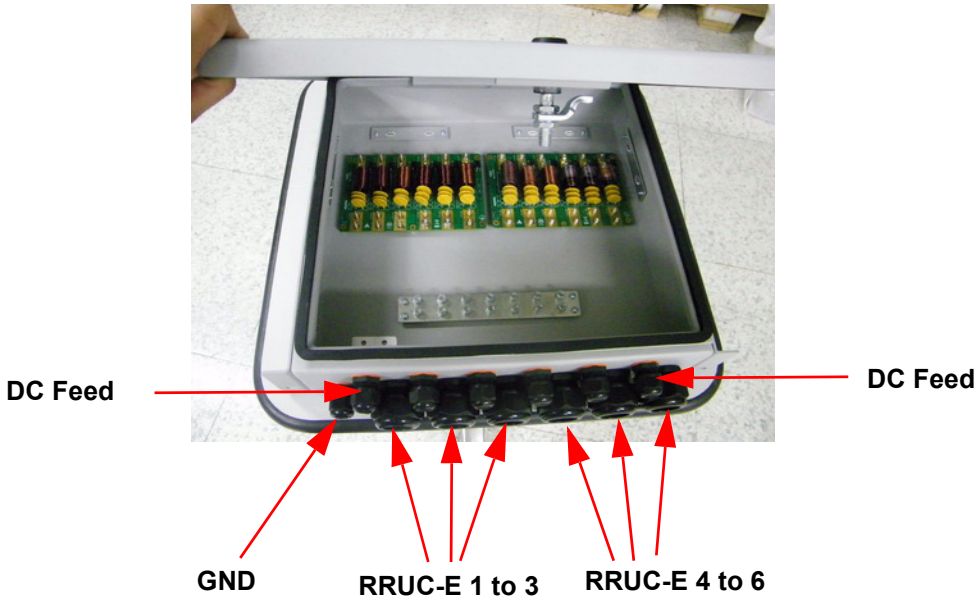


Figure 46 DCPM NTDV73BA - BTS 624 and BTS 662

Figure 47 DCPM NTDV73BA - Cable Entry Designations



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