 Eskom	Guideline	Technology
--	------------------	-------------------

Title: **RAD OLTE DESIGN GUIDELINE** Unique Identifier: **240-64455961**

Alternative Reference Number: **<n/a>**

Area of Applicability: **Engineering**

Documentation Type: **Guideline**

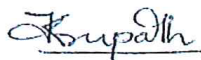
Revision: **2**

Total Pages: **9**

Next Review Date: **March 2023**

Disclosure Classification: **Controlled Disclosure**

Compiled by



Krupa Jose
Engineer

Date: 22/03/2018

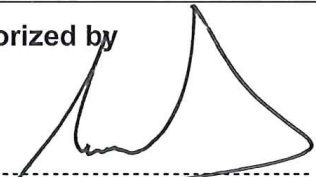
Approved by



Cornelius Naidoo
Telecomms T&S CoE
Manager

Date: 2018/03/26

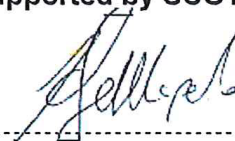
Authorized by



Richard McCurrach
PTM&C Engineering
Manager

Date: 27/3/2018

Supported by SCOT/SC



Kgomotso Setlhapelo
Telecommunications SC
Chairperson

Date: 26 March 2018

PCM Reference: **<xxxxxxx>**

SCOT Study Committee Number/Name: **<Number or name>**

Content

	Page
1. Introduction	3
2. Supporting clauses	3
2.1 Scope	3
2.1.1 Purpose	3
2.1.2 Applicability	3
2.2 Normative/informative references	3
2.2.1 Normative	3
2.2.2 Informative	3
2.3 Definitions	4
2.3.1 General	4
2.3.2 Disclosure classification	4
2.4 Abbreviations	4
2.5 Roles and responsibilities	4
2.6 Process for monitoring	4
2.7 Related/supporting documents	4
3. Document content	4
3.1 Equipment Selection Process	4
3.1.1 Optimux-108	5
3.1.2 Product Description	5
3.1.3 Optimux-134	6
3.1.4 Product Description	6
3.1.5 OP-134 SFP Transceivers	7
3.1.6 1xE1 Fiber Optic Modem	8
3.1.7 Patch Leads	8
4. Authorization	9
5. Revisions	9
6. Development team	9
7. Acknowledgements	9

Tables

Table 1: Optimux-108 Material Numbers	5
Table 2: OP-108 Transceiver Parameters	6
Table 3: OP-108 Mounting Kit Material Number	6
Table 4: OP-134 Material Numbers	6
Table 5: OP-134 Mounting Kit	7
Table 6: OP-134 SFP Material Numbers	7
Table 7: OP-134 SFP Operating Parameters	8
Table 8: OP-134 FOM Material Numbers	8
Table 9: OP-134 Patch Leads Material Numbers	8

1. Introduction

Eskom Telecommunications has signed a contract with Nambiti Communications (contract number: 4600050188), for provisioning of Optical Line Terminating Equipment (OLTE).

A design that is completed using this equipment shall take cognisance of and comply with [1] ETDG 0588 (and/or the Telecommunications Transport Network Design Standard, when it is published) and [9] DST_240-56576361 Telecommunications Transport Network Equipment Installation and Commissioning Standard.

The item numbers and descriptions refer to SAP items. It should be noted that since the SAP description field is restricted to a maximum of 40 characters, most items in SAP have been abbreviated.

More technical information on the equipment may be found in documents [5], [6], [7] and [8]; which may be downloaded from the following Eskom Telecommunications ftp link: <ftp://147.110.224.2/Technology Documents/Technology/Transport Networks/RAD/>

2. Supporting clauses

2.1 Scope

This document provides guidance in selecting the correct contract line items to compile a Bill of Materials.

2.1.1 Purpose

This document helps the planners and engineers to select the correct line items to compile a Bill of Materials.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] ISO 9001, Quality Management Systems..

2.2.2 Informative

[2] ETDG 0588 Design guide for teleprotection circuit bearing links

[3] DST_240-56576361 Telecommunications Transport Network Equipment Installation and Commissioning Standard

[4] 32-9 Definition of Eskom documents

[5] 32-644 Definition of Eskom documents

[6] 474-65 Operating Manual of the Steering Committee of Wires Technologies (SCOT)

[7] Optimux-108 Optimux-108 Fibre Optic Multiplexer Data Sheet

[8] Optimux-134 Optimux-134 Fibre Optic Multiplexer, Data Sheet

[9] SFP/XFP Transceivers Data Sheet

[10] FOM-E1T1 Fibre Optic Modem Data Sheet

2.3 Definitions

2.3.1 General

None

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
ET	Eskom Telecommunications
OLTE	Optical Line Terminating Equipment
SFP	Small form Factor Pluggable

2.5 Roles and responsibilities

Not applicable.

2.6 Process for monitoring

Not applicable.

2.7 Related/supporting documents

Not applicable.

3. Document content

3.1 Equipment Selection Process

Nambiti Communications will offer the following OLTE products as per the contract.

- a) Optimux- 108
- b) Optimux- 134
- c) SFP
- d) FOM E1
- e) Mounting kits
- f) Patch leads

3.1.1 Optimux-108

If, for capacity reasons, a 4 channel E1 link is required then an Optimux-108 will have to be selected.

Table 1: Optimux-108 Material Numbers

Material Number	SAP Description
240750	OP-108/B/R/ETH/SC/13LH
240746	OP-108/B/R/ETH/SC/13L
240748	OP-108/B/R/ETH/SC/15L
240716	OP-108/B/ETH/SC/15LH
240701	OP-108/B/ETH/SC/13

3.1.2 Product Description

The product description for Optimux-108 is as follows

- 4 x E1 channels and Fast Ethernet link multiplexed over a fibre optic link (up to 120 km), using SFP optical modules.
- Automatic link backup with optional hot-swappable second main link.
- Power redundancy with optional second wide-range power supply.
- Management via ASCII terminal, dedicated Ethernet port, SNMP management station, or a web based remote access terminal.

The generic order number for this option will be :

OP-108//^/%/!/#!/\$/*/?

Legend:

~ **Power supply** (Default=AC/DC wide-range power supply):

24 24 VDC

^ E1 connector:

B Balanced (RJ-45)

% Redundant power supply:

R Redundant power supply of the same type (not for 24 VDC)

! Optional user port:

ETH 10/100BaseT Ethernet

Uplink interface connector

SC SC type connector

+ Fibre optic link interface:

13L 1310 nm, single mode, laser diode

15L 1550 nm, single mode, laser diode

13LH 1310 nm, single mode, long-haul laser diode

15LH 1550 nm, single mode, long-haul laser diode

13MM 1310 nm, **multimode**, LED (light emitting diode)

Table 2: OP-108 Transceiver Parameters

Wavelength (nm)	Fiber Type	Transmitter type	Typical power Output (dBm)	Receiver Sensitivity (dBm)		Typical max Range		Connector type
				w/o USER ETH port	With USER ETH port	w/o USER ETH port (km)	With USER ETH port (km)	
1310	9/125 single mode	Laser	-12	-34	-28	47	20	SC,
1550	9/125 single mode	Laser	-12	-34	-28	47	20	SC
1310	9/125 single mode	Laser (long haul) LH	-2	-34	-34	72	40	SC
1550	9/125 single mode	Laser (long haul) LH	-2	-34	-34	120	80	SC
1310	62.5/125 multimode	LED	-18	-32	-30	7	2	ST,SC

3.1.2.1 Accessories for Optimux-108

RM-33-2: Hardware kit for mounting one or two plastic units in a 19-inch rack.

Table 3: OP-108 Mounting Kit Material Number

Material Number	SAP Description
240777	RACK:RM33-2,19"RM KIT

3.1.3 Optimux-134

If, for capacity reasons, a 16 E1 and 100Mbit/s link is required, then an Optimux-134 will have to be selected.

Table 4: OP-134 Material Numbers

Material Number	SAP Description
0569771	UNIT:OP-134/PSR/B/A/100M;FIBRE OPTICS
0569774	UNIT:OP-134/B/A/100M;FIBRE OPTICS

3.1.4 Product Description

The product description for Optimux-134 is as follows:

- Up to 16 E1 links, full bandwidth 100 Mbps Ethernet traffic and high-speed data multiplexed into fibre optic uplink.
- 34/25 Mbit/s or 134/125 Mbit/s operation modes.
- Range of up to 110 km.

ESKOM COPYRIGHT PROTECTED

The generic order number for this option will be:

OP-134/*/?/+/%/!/\$

Legend:

* **Power supply** (Default=one OP-125-134-PS wide range power supply):

PSR Dual wide range power supply (90—260 VAC, -40 to -125 VDC)

DC Single +24/-48 VDC

DCR Dual +24/-48 VDC

? **E1 connector for Optimux-134:**

B Balanced (RJ-45, 1U-high unit)

+ **Alarm port (Default=no alarm port):**

A Alarm port

% **V.35 user port (Default=no V.35 user port):**

! **Activation key (Default=no activation key, the device will function with 16 E1 ports only):**

100M Software key for activating the 10/100BaseT Ethernet USER port at 100 Mbps and 134/125 Mbps operation mode

\$ **Extended temperature support**

(Default=no extended temperature):

3.1.4.1 Accessories for Optimux-134

RM-34: Kit for mounting one 1U-high unit 19-inch rack (balanced units only)

Table 5: OP-134 Mounting Kit

Material Number	SAP Description
240884	RACK:RM-34 HW FOR 19"1U PRODUCTS

3.1.5 OP-134 SFP Transceivers

Small Form-factor Pluggable (SFPs) are hot swappable input/output optical and electrical transceiver units that are plugged into the OP-134 to provide the required interface. Rather than replacing an entire circuit board containing several soldered in modules, individual SFPs are unplugged and replaced for repair or upgrade, with cost savings both in maintenance and in upgrading efforts. Tables 6 and 7 give the material numbers and operating parameters of the SFP

Table 6: OP-134 SFP Material Numbers

Material Number	SAP Description
0569772	MODULE:SFP4;OPTICAL LINE TERM EQUIP
0569773	MODULE:SFP2;OPTICAL LINE TERM EQUIP

Table 7: OP-134 SFP Operating Parameters

Module name	Transmitter type & Wave length	Typical power Output (dBm)	Receiver Sensitivity (dBm)		Typical max Range		Connector type	Fiber type
			34/25	134/125	For 34/25 Mbps Operation Mode(km)	For 134/125 Mbps operation Mode(km)		
SFP-2	Laser, 1310	-12	-31	-28	38	15	LC	9/125 Single mode
SFP-4	Long haul laser, 1550	-2	-34	-34	110	80	LC	9/125 Single mode

3.1.6 1xE1 Fiber Optic Modem

The FOM-E1/T1 fiber optic modem converts E1 electrical signals into optical signals. After the conversion the signals are transmitted over fiber optic cables extending the E1 service range up to 144km.

Table 8: OP-134 FOM Material Numbers

Material Number	SAP Description
240439	FOM-E1T1/48/SC13L

The generic order number for this option will be:

FOM-E1/T1/*/#&

Legend:

* Power supply:

48V -40 to -60 VDC

Fibre optic connector:

SC SC connector

13L 1310 nm, single mode, laser diode (refer to table 2)

3.1.7 Patch Leads

Table 9: OP-134 Patch Leads Material Numbers

Material Number	SAP Description	Description
240923	PATCH LEAD:DUPLEX,LC/SC,2M,SM,FIBRE OPTI	2m LC/SC Patch Lead
240911	PATCH LEAD:DUPLEX,LC/SC,5M,SM,FIBRE OPTI	5m LC/SC Patch Lead
240923	PATCH LEAD:DUPLEX,LC/SC,10M,SM,FIBRE OPT	10m LC/SC Patch Lead

4. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Cornelius Naidoo	CoE Design Engineer Manager – PTM&C
Danie Du Plessis	Senior Manager- Grids
Paul Grobler	Chief Engineer-TX
Sikelela Mkhabela	Senior Manager -DX
Prudence Madiba	Senior Manager - GX
Joe Manyisa	Senior Manager- Eskom Telecommunications (Acting)
Nondumiso Zibi	Senior Manager- GIT

5. Revisions

Date	Rev	Compiler	Remarks
March 2018	2	K Jose	The existing document, 240-64455961 was about to expire, hence needed to be revised.
Oct 2013	1	K Tharakan	The existing document, ETDG 0556 OLTE Design Guide, was out-dated and needed to be revised

6. Development team

The following people were involved in the development of this document:

- Kgomotso Setlhapelo
- Krupa Jose

7. Acknowledgements

Not applicable.