

Title: **TECHNICAL EVALUATION
CRITERIA FOR POWER LINE
CARRIER & INTEGRATED
TELEPROTECTION
EQUIPMENT**

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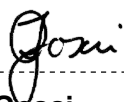
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1. Introduction

This document covers the technical evaluation criteria for the Power Line Carrier (PLC) equipment.

2. Supporting Clauses

2.1 Scope

The scope of this document details the technical evaluation criteria for the Power Line Carrier Equipment.

2.1.1 Purpose

The document contains the technical evaluation criteria to be used for evaluating the tender submissions for the Power Line Carrier enquiry. The criteria consist of the mandatory criteria evaluation, desktop evaluation and the practical evaluation for the Power Line Carrier equipment enquiry.

2.1.2 Applicability

This document shall apply throughout National Transmission Company South Africa (NTCSA) SOC Ltd Reg No 2021/539129/30.

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] 240-106920490: Specification for Power Line Carrier & Integrated Teleprotection Equipment.
- [3] 240-48929482: Tender Technical Evaluation Procedure.

2.2.2 Informative

None

2.3 Definitions

Definition	Description
Submission	The tender in accordance with the requirements of the enquiry
Technical evaluator	End-users, technical experts nominated by the end-user and Divisional technical functionaries with the necessary technical expertise.

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2.4 Abbreviations

Abbreviation	Explanation
CCU	Carrier Combiner Unit
kHz	Kilo-Hertz
LME	Line Matching Equipment
LT	Line Trap
NTCSA	National Transmission Company of South Africa
PLC	Power Line Carrier
Rx	Receive
SLM	Selective Level Meter
TET	Technical Evaluation Team
Tx	Transmit

2.5 Roles and Responsibilities

As per 240-48929482: Tender Technical Evaluation Procedure.

2.6 Process for Monitoring

Not applicable.

2.7 Related/Supporting Documents

Not applicable

3. Tender Technical Evaluation Criteria

- a) The assessments are performed to assess the tenderer's capability to enter into a contract with NTCSA with respect to a specific product or service and meet NTCSA's requirements.
- b) This report and any actions that are listed or recommended as a result of the assessments are by no means a confirmation or guarantee that any contract will be entered into by NTCSA.
- c) Any actions undertaken by the tenderer as a consequence of this report is for the tenderer's account. Any liability for the said actions undertaken by the tenderer is not transferrable to NTCSA in any way.
- d) The assessment team has no authority or responsibility in the decision taken by NTCSA with respect to contracting for a product or service.
- e) Any statements, intentions and/or actions expressed by the assessment team during the assessment and after the assessment should not be interpreted as the awarding of a contract and does not constitute any liability to NTCSA with regards to contract placement or post-contract performance guarantees.
- f) The technical evaluation method has three sub-categories: Mandatory Criteria Evaluation, Desktop Evaluation and Practical Evaluation. The detailed methodologies for scoring in each sub-category are provided in sections 3.1 through 3.3 below.

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- g) Tenderer's that do not achieve the minimum threshold for each of the sub-categories will not be evaluated further.

3.1 Supplier Equipment Tendered Declaration

The Supplier shall complete the 'Supplier Equipment Tendered Declaration' form in Appendix A in this document. This would allow suppliers/ tenderers an option not to perform factory or practical evaluations for bidders whose product(s) have passed technical evaluation in the immediate previous enquiry or are currently supplying the products. If the declaration form is not completed or not accepted by NTCSA, then the complete evaluation will need to be conducted which includes the Mandatory Criteria Evaluation, Desktop Evaluation and Practical Evaluation.

3.2 Mandatory Criteria Evaluation

This evaluation exercise is performed by the NTCSA evaluating representatives. This part of the technical evaluation starts when submissions are opened for the first time. The NTCSA evaluating representatives will peruse the tender submissions to ensure that the Mandatory criteria are met. Submissions that receive a "No" on any of the Mandatory criteria will not be able to proceed to the Desktop Evaluation and therefore will fail the technical evaluation.

Table 1: Mandatory Criteria Evaluation

Item	Criteria	Comply	Comments
1.1	Submission of completed Technical Schedules A & B from the Technical specification 240-106920490 (Written in English)		
1.2	The PLC equipment shall support a 2 kHz bandwidth PLC channel according to section 3.2.1.1d1) in specification 240-106920490.		

3.3 Desktop evaluation

Submissions that obtain a minimum pass mark of 75% for the Desktop Evaluation (Table 2) shall proceed to the Practical Evaluation.

The Technical Schedules A & B (Annex G in 240-106920490 specification) use a default weight of 1 for each scored item. Each item will be scored according to Table 4 and cross-checked against the supporting documents tendered.

The total score for the Technical Schedules A & B will be expressed as a percentage of the maximum possible score of 1362 (Item from Technical Schedules A & B x (Score "3" from Table 4). This score value will be recorded under item 2.1 in Table 2.

Table 2: Desktop evaluation

Item	Criteria	Score %	Actual	Comments
2.1	Compliance with Technical Schedules A & B in the Technical specification 240-106920490. (Full compliance = $454 \times 3 = 1362$ points (i.e. 100%)). Therefore to pass the Desktop evaluation a total of 1021 points out of the maximum 1362 need to be scored.	100		

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	Subtotal	100		
	Threshold	75		

3.4 Practical evaluation

The tenderer will be given 3 weeks' notice to arrange and facilitate for the practical evaluation to take place.

This evaluation exercise is witnessed by the NTCSA evaluating representatives at the supplier/ tenderer premises and consists of a sample evaluation and routine testing. It is the responsibility of the supplier/ tenderer to have complete PLC demo unit/s and test instruments available. The supplier/ tenderer will be responsible to perform all testing and configuration required by NTCSA.

The PLC Link to be evaluated shall comprise of the following equipment:

- a) PLC Terminal Equipment 4kHz with Data interfaces
- b) Carrier Combiner Unit CCU-1: for phase-to-phase coupling
- c) Teleprotection Module
- d) PLC Link and CCU mounted in the cabinet specified in NTCSA standard 240-106920490

The sample part of the evaluation is performed on the basis of assessing a sample of the PLC link to check and confirm the PLC conformance to the Compliance List from Technical Schedules A & B in Appendix B of this document. The Compliance List (Appendix B in this document) use a default weight of 1 for each scored item. Each item will be scored according to Table 4 and cross-checked against the supporting documents tendered. The total score for the Compliance List (Appendix B in this document) will constitute 30 percent (30%) of the total score allocated to the practical evaluation.

The supplier/ tenderer will be required to perform the routine tests as specified in Appendix C of this document.

The routine test part of the evaluation is performed on a sample PLC link at the supplier/ tenderer premises. The supplier/ tenderer shall have the entire PLC link and test equipment available. The Practical Evaluations Checklist listed in Appendix C in this document uses different weights depending on the item to test or check. The total score for the routine tests will constitute 70 percent (70 %) of the total score allocated to the practical evaluation.

An overall threshold of 75% for both items 3.1 and 3.2 in Table 3 is required for the tenderer to pass the Practical Evaluation (Table 3).

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Table 3: Practical evaluation

Item	Criteria	Score	Actual	Comments
3.1	Compliance to items listed in Appendix B in this document. The items listed in Appendix B in this document are the critical items that were taken from the Technical Schedules A & B from 240-106920490. (Full compliance = $56 \times 3 = 168$ points which equates to 30%). Each item will be scored according to Table 4 in this document.	30		
3.2	Compliance to items listed in Appendix C in this document for testing of the PLC. (Full compliance = (Items x score of 3 x Weight = 69 points which equates to 70%). Each item will be scored according to Table 4 in this document.	70		
	Subtotal	100		
	Threshold	75		

3.5 Scoring Method

Each item will be assigned a score by the NTCSA evaluation team based upon the tendered response/demonstrated functionality and cross-checked with the supporting documents provided (where applicable). The scoring method is depicted in Table 4 below:

Table 4: Scoring method criteria

Criteria	Score
Fully compliant - Meet technical requirement(s) AND; - Cross-checked with the supporting documents provided (where applicable) AND; - No foreseen technical risk(s) in meeting technical requirements	3
Partially compliant (minor deviation) - Does not meet all the technical requirement(s) AND/OR; - Unacceptable technical risks(s) AND/OR; - Unacceptable exceptions AND/OR; - Unacceptable conditions. - No supporting documents provided.	1
Non-compliant (major deviation) Totally deficient or non-responsive	0

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4. Acceptance

This document has been seen and accepted by:

Name	Designation
Not applicable	Not applicable

5. Revisions

Date	Rev.	Compiler	Remarks
Dec 2025	4	T Gosai	Revised document to include Supplier Declaration Form and modify the Practical Evaluation section.
Oct 2021	3	T Gosai	Revised document to adjust the scoring and provide details for section 3.3.
Aug 2021	2	T Gosai	Revised document for PLC enquiry and included section 3.4.
Sept 2016	1	T Gosai	Compiled document for PLC enquiry.

6. Development Team

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

- Riyaz Gangat

7. Acknowledgements

Not applicable

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Appendix A – Supplier Equipment Tendered Declaration Form

NTCSA reserves the right not to perform factory or practical evaluations for bidders whose product(s) have passed technical evaluation in the immediate previous enquiry or are currently supplying the products. Such equipment will automatically be recommended for further commercial evaluation. For NTCSA to make this assessment, all suppliers are required to complete the declaration form below and attach all the necessary supporting documents. There will be no factory evaluation in this enquiry, functionality tests will be conducted after contract award.

Number	Question	Supplier commitment	Supplier general comments
1	Is all the offered equipment already implemented/installed in NTCSA?		
2	Are the implemented/installed equipment the same as the offered equipment for this enquiry?		
2.1	If yes, provide a list of project names		
2.2.	Approximately how many units are installed in NTCSA?		
3.1	Was the offered equipment tested as part of the NTCSA prequalification process? If yes, provide the NTCSA Contract number and the year of testing.		
3.2	Were there any changes on the electrical, mechanical, software and firmware after testing the equipment?		
4	Are there any specific tests (routine and type) that you think you will not be compliant with, please list those test cases?		
5	Do you foresee any operational/functional risk(s) with signing a contract with NTCSA before testing?		
6	Do you confirm that you will be able to supply and support the tendered equipment for the duration of the contract?		
Supplier Name: Division (if applicable):		Supplier Representative: Designation:	Supplier Signature: Date:

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Appendix B – Compliance List from Technical Schedules A & B

Note: The following tabulated requirements emulate the sectional numbering of Standard 240-106920490

COMPLIANCE LIST FROM TECHNICAL SCHEDULES A & B FROM STANDARD, 240-106920490 "SPECIFICATION FOR POWER LINE CARRIER & INTEGRATED TELEPROTECTION EQUIPMENT.					
	Description	Schedule A	Schedule B	References/ Statement (supporting evidence) if required & Deviations	Comments
3.2.12	Management, alarms and test facilities				
	a) Comply with clause 3.2.12a) of this specification	Comply and provide supporting documentation			
3.2.12b)	b) Functions required				
	i) Comply with clause 3.2.12b) 1) 2) 3) and 4) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.2.12b) 5) of this specification	Comply and provide supporting documentation			
	iii) Comply with clause 3.2.12b) 6) of this specification	Comply and provide supporting documentation			
3.2.12c)	c) HMI interface standards/ requirements				
	i) Comply with clause 3.2.12c) 1) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.2.12c) 6) of this specification	Comply and provide supporting documentation			
	iii) Comply with clause 3.2.12c) 7) of this specification	Comply and provide supporting documentation			
	iv) Comply with clause 3.2.12c) 8) of this specification	Comply and provide supporting documentation			
	v) Comply with clause 3.2.12c) 9) of this specification	Comply and provide supporting documentation			
3.2.12d)	d) Cyber Security				

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	i) Comply with clause 3.2.12d) 2) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.2.12d) 3) of this specification	Comply and provide supporting documentation			
	iii) Comply with clause 3.2.12d) 4) of this specification	Comply and provide supporting documentation			
3.2.12e)	e) Alarms				
	i) Comply with clause 3.2.12e) 1) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.2.12e) 4) of this specification	Comply and provide supporting documentation			
	iv) Comply with clause 3.2.12e) 6) of this specification	Comply and provide supporting documentation			
	v) Comply with clause 3.2.12e) 7) of this specification	Comply and provide supporting documentation			
3.2.13)	Power supply protective devices or functions				
	i) Comply with clause 3.2.13i) of this specification	Comply and provide supporting documentation			
3.2.14	Digital converter/multiplexer unit				
	i) Comply with clause 3.2.14e) of this specification.	Comply and provide supporting documentation			
	ii) Comply with clause 3.2.14i) of this specification.	Comply and provide supporting documentation			
	iii) Comply with clause 3.2.14j) of this specification.	Comply and provide supporting documentation			
3.3	Carrier combiner units (CCU) and Symmetrical hybrids (SH)				
3.3.2	Carrier Combiner Units (CCU)				
	i) Comply with clause 3.3.2a) of this specification.	Comply and provide supporting documentation			
	ii) Types of CCU				
	1) Comply with clause 3.3.2b) 1) of this specification	Comply and provide supporting documentation			

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	iii) Comply with clause 3.3.2d) of this specification.	Comply and provide supporting documentation			
	iv) Comply with clause 3.3.2e) of this specification.	Comply and provide supporting documentation			
	v) Comply with clause 3.3.2f) of this specification.	Comply and provide supporting documentation			
3.4	Teleprotection Equipment				
3.4.1	General				
	i) Comply with clause 3.4.1a) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.4.1c) of this specification	Comply and provide supporting documentation			
3.4.2	Equipment design				
	i) Comply with clause 3.4.2l) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.4.2m) of this specification	Comply and provide supporting documentation			
3.4.3	Interface with Eskom's protection relay equipment				
	i) Comply with clause 3.4.3.2) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.4.3.3) of this specification	Comply and provide supporting documentation			
	iii) Comply with clause 3.4.3.4) of this specification	Comply and provide supporting documentation			
3.4.3.7	Number of Teleprotection Channels				
	i) Comply with clause 3.4.3.7a) of this specification	Comply and provide supporting documentation			
3.4.3.8	Comply with clause 3.4.3.8) of this specification	Comply and provide supporting documentation			
3.4.4	End-to-end and local test facilities				
	a) Comply with clause 3.4.4a) of this specification.	Comply and provide supporting documentation			
	b) Test facilities				

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	ii) Comply with clause 3.4.4b) 2) of this specification	Comply and provide supporting documentation			
3.4.5	Management and Alarms				
	a) Comply with clause 3.4.5a) of this specification.	Comply and provide supporting documentation			
	b) Comply with clause 3.4.5b) of this specification.	Comply and provide supporting documentation			
	c) Comply with clause 3.4.5c) of this specification.	Comply and provide supporting documentation			
	d) Comply with clause 3.4.5f) of this specification.	Comply and provide supporting documentation			
3.5	Housing of equipment, cabling, labelling and test equipment				
3.5.1	Housing of equipment and cabling facilities				
	i) Comply with clause 3.5.1a) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.5.1b) of this specification	Comply and provide supporting documentation			
	iii) Comply with clause 3.5.1d) of this specification	Comply and provide supporting documentation			
	vi) Comply with clause 3.5.1l) of this specification	Comply and provide supporting documentation			
	vii) Comply with clause 3.5.1m) of this specification	Comply and provide supporting documentation			
	viii) Comply with clause 3.5.1n) of this specification	Comply and provide supporting documentation			
3.5.4	Cabinet wiring				
	i) Comply with clause 3.5.4a) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.5.4b) of this specification	Comply and provide supporting documentation			
	iii) Comply with clause 3.5.4d) of this specification	Comply and provide supporting documentation			

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	iv) Comply with clause 3.5.4e) of this specification	Comply and provide supporting documentation			
	v) Comply with clause 3.5.4f) of this specification	Comply and provide supporting documentation			
	vi) Comply with clause 3.5.4g) of this specification	Comply and provide supporting documentation			
	vii) Comply with clause 3.5.4i) of this specification	Comply and provide supporting documentation			
3.5.5	Equipment design and testing facilities				
	i) Comply with clause 3.5.5c) of this specification	Comply and provide supporting documentation			
	ii) Comply with clause 3.5.5d) of this specification	Comply and provide supporting documentation			
	iii) Comply with clause 3.5.5e) of this specification	Comply and provide supporting documentation			

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Appendix C – Practical Evaluation Checklist

Item	Criteria	Compliant	Details if not fully compliant	Weight	Score
		Part Compliant			
		Non-compliant			
	The PLC Link to be evaluated shall comprise of the following equipment: 1) PLC Terminal Equipment 4kHz with Data interfaces 2) Carrier Combiner Unit CCU-1: for phase-to-phase coupling 3) Teleprotection Module 4) PLC Link and CCU mounted in the cabinet specified in NTCSA standard 240-106920490				
1	PLC Terminal Equipment				
1a)	PLC Terminal Equipment: A 4 kHz PLC link with a modem/data module which provides the V11/RS232 (synchronous and asynchronous) and Ethernet LAN (RJ45) interfaces.			1	
1b)	Frequency setting and accuracy for 4 kHz PLC Type: (i) The transmitter and receiver oscillators shall be set to their correct operating frequencies by the supplier/ tenderer. The supplier/ tenderer to measure and note the Tx and Rx PLC Frequencies using a Selective Level Meter (SLM). (ii) The channel end-to-end frequency accuracy shall be checked and measured by the supplier/ tenderer. The difference shall be less than 0,1 Hz at the time of setting.			2	
1c)	Power Supply: The equipment shall be operated at its nominal power supply input voltage. The power supply voltages shall be measured by the supplier/ tenderer and the range varied from 42 V DC to 57.6 V DC as per the specification, 240-106920490.			1	
1d)	Power Amplifier: The supplier/ tenderer shall measure the transmit levels from the amplifier on the PLC using the Selective Level Meter (SLM) in dBm.			2	

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1e)	Transmitter Alarm: The supplier/ tenderer to test the transmitter alarm by reducing the pilot level by 6 dB at the transmitter output to ensure that it conforms with the requirements of 3.2.12e) ii) of the specification, 240-106920490. The alarm contact closure and Tx alarm LED operation shall be verified. The configuration of the alarm threshold (via HMI) shall be tested as well.			1	
1f)	AGC Setting: The receiver gain shall be set-up by the supplier/ tenderer in accordance with the manufacturer's level diagram, so that the AGC is operating at the centre of its characteristics. The operation of the receiver alarm contacts and alarm LED shall be tested by increasing the line attenuation until the AGC is outside its specified control range.			3	
2	Carrier Combiner Units (CCUs)				
2a)	The polarity of the secondary terminals relative to the primary terminals shall be checked to ascertain that all terminals are correctly marked in conformance with the equipment drawings.			1	
2b)	The insertion loss between primary and secondary windings shall be measured at a nominal frequency of 100kHz. The maximum allowed insertion loss is 3.5 dB between primary and secondary windings or 0.5 dB between secondary windings according to section 3.3.3d) in Eskom specification, 240-106920490.			2	
3	Integrated Teleprotection				
3a)	The supplier/ tenderer to test the operation of all alarm indications and functions as well as the alarm contacts.			2	
3b)	The signal transfer time shall be setup and measured by the supplier/ tenderer as follows: The teleprotection equipment shall be lined up with the actual power line carrier link over which it is intended to work and the levels set according to the manufacturer's specification. The carrier link shall be operated over a dummy resistive transmission line and the total signal transfer time measured for each channel, including the carrier link. The transmission time can be measured via the HMI. Permissive Tripping: 16ms maximum OR Direct Transfer Tripping: 40ms maximum			2	

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3c)	The supplier/ tenderer to test the operation of a trip (intertrip - can be configured as Permissive). The trip will be initiated on the one Teleprotection module on the local PLC, converting to a signal which will be transferred to the distant PLC and then to the Teleprotection module as a trip. The supplier/ tenderer to display these events on the PLC/Teleprotection HMI.			3	
3e)	The supplier/ tenderer to setup and test the system C interface requirements according to sections 3.4.3.6 h) and 4.3.2h) in Eskom specification 240-106920490. The requirements are the input burden and inrush current of the teleprotection transmitter input interface circuit shall be 1.5 times the relay rated voltage (75 V DC). This test requires a 0,2uF capacitor charged to 1,5 times the relay rated voltage, shall be discharged through the command input circuit, as described in 3.4.3.6h) (System C) in Eskom specification 240-106920490.			3	

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