

**TRANSNET**



**STANDARD TERMS AND CONDITIONS OF CONTRACT  
FOR THE PROVISION OF SERVICES TO TRANSNET**

**FORM US7 – SERVICES  
Revised August 2008**

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SCHEDULE 1 - SCHEDULE OF REQUIREMENTS and / or WORK ORDER/S

SCHEDULE 2 - ADDRESSES FOR NOTICES

SCHEDULE 3 - NON-DISCLOSURE AGREEMENT

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## 1. INTRODUCTION

When an Agreement is entered into between Transnet and the Supplier of Services to Transnet, these Standard Terms and Conditions of Contract, the General Tender Conditions, a Schedule of Requirements and/or Work Order(s) including such special conditions as applicable, and any terms in the associated tender documents, exclusively govern the provision of Services by the Supplier to Transnet.

## 2. DEFINITIONS

Where the following words or phrases are used in the Agreement, such words or phrases shall have the meaning assigned thereto in this clause, except where the context clearly requires otherwise:

- 2.1. **"AFSA"** means the Arbitration Foundation of South Africa;
- 2.2. **"Agreement"** means the Agreement and its associated schedules and/or annexures and/or appendices, including the Schedule of Requirements and/or Work Order(s), specifications for the Services and such special conditions as shall apply to the Agreement, together with the General Tender Conditions and any additional provisions in the associated bid documents tendered by the Supplier (as agreed between the Parties), which collectively and exclusively govern the provision of Services by the Supplier to Transnet;
- 2.3. **"Background Intellectual Property"** means all Intellectual Property introduced and required by either Party to give effect to their obligations under this Agreement owned in whole or in part by or licensed to either Party or their affiliates prior to the Commencement Date or developed after the Commencement Date otherwise pursuant to the Agreement;
- 2.4. **"Business Day(s)"** means Mondays to Fridays between 07:30 and 16:00, excluding public holidays;
- 2.5. **"Commencement Date"** means the effective date at which time the Supplier's provision of Services to Transnet in terms of the Agreement shall commence, as detailed in Schedule 1 hereto (SCHEDULE OF REQUIREMENTS / WORK ORDER);
- 2.6. **"Confidential Information"** means any information or other data, whether in written, oral, graphic or in any other form such as in documents, papers, memoranda, correspondence, notebooks, reports, drawings, diagrams, discs, articles, samples, test results, prototypes, designs, plans, formulae, patents, or inventor's certificates, which a Party discloses or provides to the other Party (intentionally or unintentionally, or as a result of one Party permitting the representative of the other Party to visit any of its premises), or which otherwise becomes

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known to a Party, and which is not in the public domain and includes, without limiting the generality of the term –

- 2.6.1. information relating to methods of operation, data and plans of the disclosing Party;
- 2.6.2. the contents of the Agreement;
- 2.6.3. private and personal details of employees or clients of the disclosing Party or any other person where an onus rests on the disclosing Party to maintain the confidentiality of such information;
- 2.6.4. any information disclosed by either Party and which is clearly marked as being confidential or secret;
- 2.6.5. information relating to the strategic objectives and planning of the disclosing Party relating to its existing and planned future business activities;
- 2.6.6. information relating to the past, present and future research and development of the disclosing Party;
- 2.6.7. information relating to the business activities, business relationships, products, services, customers, clients and subcontractors of the disclosing Party where an onus rests on the disclosing Party to maintain the confidentiality of such information;
- 2.6.8. information contained in the software and associated material and documentation belonging to the disclosing Party;
- 2.6.9. technical and scientific information, Know-How and trade secrets of a disclosing Party including inventions, applications and processes;
- 2.6.10. Copyright works;
- 2.6.11. commercial, financial and marketing information;
- 2.6.12. data concerning architecture, demonstrations, tools and techniques, processes, machinery and equipment of the disclosing Party;
- 2.6.13. plans, designs, concepts, drawings, functional and technical requirements and specifications of the disclosing Party;
- 2.6.14. information concerning faults or defects in goods, equipment, hardware or software or the incidence of such faults or defects; and
- 2.6.15. information concerning the charges, Fees and / or costs of the disclosing Party or its authorised subcontractors, or their methods, practices or service performance levels actually achieved;

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- 2.7. **"Copyright"** means the right in expressions, procedures, methods of operations or mathematical concepts, computer program codes, compilations of data or other material, literary works, musical works, artistic works, sound recordings, broadcasts, program carrying signals, published editions, photographic works, or cinematographic works of the copyright owner to do or to authorise the doing of certain acts specified in respect of the different categories of works;
- 2.8. **"Default"** means any breach of the obligations of either Party (including but not limited to fundamental breach or breach of a fundamental term) or any Default, act, omission, negligence or statement of either Party, its employees, agents or subcontractors in connection with or in relation to the subject of the Agreement and in respect of which such Party is liable to the other;
- 2.9. **"Deliverable(s)"** means any and all works of authorship, products and materials developed, written, prepared, assembled, integrated, modified or provided by the Supplier in relation to the Services;
- 2.10. **"Designs"** means registered designs and/or design applications and will include the monopoly right granted for the protection of an independently created industrial design including designs dictated essentially by technical or functional considerations as well as topographies of integrated circuits and integrated circuits;
- 2.11. **"Fee(s)"** shall mean the agreed Fees for the Services to be purchased from the Supplier by Transnet, as detailed in the Schedule of Requirements or Work Order(s), issued in accordance with the Agreement, as amended by mutual agreement between the Parties and in accordance with the provisions of the Agreement from time to time;
- 2.12. **"Foreground Intellectual Property"** means all Intellectual Property developed by either Party pursuant to the Agreement;
- 2.13. **"Intellectual Property"** means Patents, Designs, Know-How, Copyright and Trade Marks and all rights having equivalent or similar effect which may exist anywhere in the world and includes all future additions and improvements to the Intellectual Property;
- 2.14. **"Know-How"** means all Confidential Information of whatever nature relating to the Intellectual Property and its exploitation as well as all other Confidential Information generally relating to Transnet's field of technology, including technical information, processing or manufacturing techniques, Designs, specifications, formulae, systems, processes, information concerning materials and marketing and business information in general;
- 2.15. **"Materials"** means the Deliverables, the Supplier Materials and the Third Party Materials;
- 2.16. **"Parties"** means the Parties to the Agreement together with their subsidiaries, divisions, business units, successors-in-title and their assigns;

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- 2.17. **“Party”** means either one of these Parties;
- 2.18. **“Patents”** means registered patents and patent applications, once the latter have proceeded to grant, and includes a right granted for any inventions, products or processes in all fields of technology;
- 2.19. **“Permitted Purpose”** means any activity or process to be undertaken or supervised by Personnel or employees of one Party during the term of the Agreement, for which purpose authorised disclosure of the other Party’s Confidential Information or Intellectual Property is a prerequisite in order to enable such activity or process to be accomplished;
- 2.20. **“Personnel”** means any partner, employee, agent, consultant, independent associate or supplier, subcontractor and the staff of such subcontractor, or other authorised representative of either Party;
- 2.21. **“Purchase Order(s)”** means official orders issued by an operating division of Transnet to the Supplier for the provision of Services;
- 2.22. **“Schedule of Requirements”** means Schedule 1 hereto, unless substituted by a Work Order or Work Orders, as defined;
- 2.23. **“Service(s)”** means Service(s) provided to Transnet by the Supplier, pursuant to the Schedule of Requirements or Work Order(s) in terms of the Agreement;
- 2.24. **“Service Level Agreement”** or **“SLA”** means the processes, deliverables, key performance indicators and performance standards relating to the Services to be provided by the Supplier;
- 2.25. **“Subcontract”** means any contract or agreement or proposed contract or agreement between the Supplier and any third party whereby that third party agrees to provide to the Supplier the Services or any part thereof;
- 2.26. **“Supplier Materials”** means all works of authorship, products and materials (including, but not limited to, data, diagrams, charts, reports, specifications, studies, inventions, software, software development tools, methodologies, ideas, methods, processes, concepts and techniques) owned by, or licensed to, the Supplier prior to the Commencement Date or independently developed by the Supplier outside the scope of the Agreement at no expense to Transnet, and used by the Supplier in the performance of the Services;
- 2.27. **“Third Party Material”** means software, software development tools, methodologies, ideas, methods, processes, concepts and techniques owned by, or licensed to a third party and used by the Supplier in the performance of the Services;

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- 2.28. **“Trade Marks”** means registered trade marks and trade mark applications and includes any sign or logo, or combination of signs and/or logos capable of distinguishing the goods or services of one undertaking from those of another undertaking;
- 2.29. **“VAT”** means Value-Added Tax in terms of the Value-Added Tax Act, No 89 of 1991: and
- 2.30. **“Work Order(s)”** means a detailed scope of work for a Service required by Transnet, including timeframes, deliverable, Fees and costs for the supply of the Service to Transnet, which may be appended to the Agreement from time to time.

### 3. INTERPRETATION

- 3.1. Clause headings in the Agreement are included for ease of reference only and do not form part of the Agreement for the purposes of interpretation or for any other purpose. No provision shall be construed against or interpreted to the disadvantage of any Party hereto by reason of such Party having or being deemed to have structured or drafted such provision.
- 3.2. Any term, word, acronym or phrase used in the Agreement, other than those defined under the clause heading “DEFINITIONS,” shall be given its plain English meaning, and those terms, words, acronyms, and phrases used in the Agreement will be interpreted in accordance with the generally accepted meanings accorded thereto.
- 3.3. A reference to the singular incorporates a reference to the plural and vice versa.
- 3.4. A reference to natural persons incorporates a reference to legal persons and vice versa.
- 3.5. A reference to a particular gender incorporates a reference to the other genders.

### 4. NATURE AND SCOPE

- 4.1. The Agreement is an agreement under the terms and conditions of which the Supplier will arrange for the provision to Transnet of the Services, which meet the requirements of Transnet, the delivery of which Services is controlled by means of Purchase Orders to be issued by Transnet and executed by the Supplier, in accordance with the Agreement.
- 4.2. Such Purchase Orders shall be agreed between the Parties from time to time, subject to the terms of the Schedule of Requirements and / or relevant Work Order(s).
- 4.3. Each properly executed Purchase Order forms an inseparable part of the Agreement as if it were fully incorporated into the body of the Agreement.
- 4.4. During the period of the Agreement, both Parties can make written suggestions for amendments to the Schedule of Requirements or Work Orders, in accordance with procedures set out in clause 28 (AMENDMENT AND CHANGE CONTROL) below. A Party will advise the other

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Party within 14 (fourteen) Business Days, or such other period as mutually agreed, whether the amendment is acceptable.

- 4.5. Insofar as any term, provision or condition in the Schedule of Requirements and/or Work Order(s) conflicts with a like term, provision or condition in the Agreement and/or a Purchase Order, or where the Agreement is silent on the matter, the term, provision or condition in the Schedule of Requirements and/or Work Order(s) shall prevail.
- 4.6. Time will be of the essence and the Supplier will perform its obligations under the Agreement in accordance with the timeframe(s) (if any) set out in the relevant schedule, save that the Supplier will not be liable under this clause if it is unable to meet such obligation within the time required as a direct result of any act or omission by Transnet and it has used its best endeavours to advise Transnet of such act or omission. In the event of such delay, any time deadlines detailed in the relevant schedule shall be extended by a period equal to the period of that delay.

## 5. AUTHORITY OF PARTIES

- 5.1. Nothing in the Agreement will constitute or be deemed to constitute a partnership between the Parties, or constitute or be deemed to constitute the Parties as agents or employees of one another for any purpose or in any form whatsoever.
- 5.2. Neither Party shall be entitled to, or have the power or authority to enter into an agreement in the name of the other; or give any warranty, representation or undertaking on the other's behalf; or create any liability against the other or bind the other's credit in any way or for any purpose whatsoever.

## 6. WARRANTIES

- 6.1. The Supplier warrants to Transnet that -
  - 6.1.1. it has full capacity and authority to enter into and to perform the Agreement and that the Agreement is executed by duly authorised representatives of the Supplier;
  - 6.1.2. it will discharge its obligations under the Agreement and any annexure or schedule hereto with all due skill, care and diligence;
  - 6.1.3. it will be solely responsible for the payment of remuneration of its Personnel. The Supplier will be solely responsible for the payment of remuneration and associated benefits, if any, and for withholding and remitting income tax for its Personnel in conformance with any applicable laws and regulations;
  - 6.1.4. it will procure licences for Transnet in respect of all Third Party Material detailed in the Work Order(s), and will procure the right for Transnet to take such copies (in

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whole or in part) of such Third Party Materials as it may reasonably require for the purposes of back-up for archiving and disaster recovery; and

- 6.1.5. the use or possession by Transnet of any Materials will not subject Transnet to any claim for infringement of any Intellectual Property Rights of any third party.
- 6.2. The Supplier warrants that it will perform its obligations under the Agreement in accordance with the Service Levels as defined in the relevant schedule. Transnet may at its discretion audit compliance with the Service Levels, provided that any such audit is carried out with reasonable prior notice and in a reasonable way so as not to have an adverse effect on the performance of the Services. Without prejudice to sub-clause 6.3 below, in the event that the Supplier fails to meet the Service Levels, Transnet may claim appropriate service credits or invoke a retention of Fees as detailed in the relevant schedule and/or Work Order.
- 6.3. The Supplier warrants that for a period of 90 (ninety) days from Acceptance of the Deliverables they will, if properly used, conform in all materials respects with the requirements set out in the relevant schedule. The Supplier will at its expense remedy any such non-conformance as soon as possible but in any event within 30 (thirty) days of notification by Transnet. In the event that the Supplier fails or is unable to remedy such non-conformance within such time-scale, Transnet will be entitled to employ a third party to do so in place of the Supplier and any excess charges or costs incurred by Transnet as a result shall be paid by the Supplier.
- 6.4. The Supplier will remedy any defect within 14 (fourteen) days of being notified of that defect by Transnet in writing.
- 6.5. The Supplier will not be liable to remedy any problem arising from or caused by any modification made by Transnet to the Deliverables, or any part thereof, without the prior approval of the Supplier.
- 6.6. The Supplier shall advise Transnet of the effects of any steps proposed by Transnet pursuant to sub-clause 6.5 above, including but not limited to any cost implications or any disruption or delay in the performance of the Services. The Parties agree that any changes to the Services, including the charges for the Services or any timetables for delivery of the Services, will be agreed in accordance with the change control procedure, as set out in clause 28 (AMENDMENT AND CHANGE CONTROL).
- 6.7. The Supplier warrants that -
  - 6.7.1. it has, using the most up-to-date software available, tested for (and deleted) all commonly known viruses in the Materials and for all viruses known by the Supplier at the date of the relevant Work Order; and

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- 6.7.2. at the time of delivery to Transnet, the Materials do not contain any trojan horse, worm, logic bomb, time bomb, back door, trap door, keys or other harmful components.

The Supplier agrees that, in the event that a virus is found, it will at its own expense use its best endeavours to assist Transnet in reducing the effect of the virus and, particularly in the event that a virus causes loss of operational efficiency or loss of data, to assist Transnet to the same extent to mitigate such losses and to restore Transnet to its original operating efficiency.

- 6.8. The Supplier undertakes to comply with South Africa's general privacy protection in terms of the Bill of Rights (Section 14) in connection with the Agreement and shall procure that its Personnel shall observe the provisions of such Act (as applicable) or any amendments and re-enactments thereof and any regulations made pursuant thereto.
- 6.9. The Supplier warrants that it has taken all reasonable precautions to ensure that, in the event of a disaster, the impact of such disaster on the ability of the Supplier to comply with its obligations under the Agreement will be reduced to the greatest extent possible, and that the Supplier shall ensure that it has appropriate, tested and documented recovery arrangements in place.

## **7. TRANSNET'S OBLIGATIONS**

- 7.1. Transnet undertakes to promptly comply with any reasonable request by the Supplier for information, including information concerning Transnet's operations and activities, that relate to the Services as may be necessary for the Supplier to perform the Services, but for no other purpose. However, Transnet's compliance with any request for information is subject to any internal security rules and requirements and subject to the observance by the Supplier of its confidentiality obligations under the Agreement.
- 7.2. The Supplier shall give Transnet reasonable notice of any information it requires in accordance with sub-clause 7.1 above.
- 7.3. Subject to 13 (SUPPLIER'S PERSONNEL), Transnet agrees to provide the Supplier or its Personnel such access to and use of its facilities as is necessary to allow the Supplier to perform its obligations under the Agreement.

## **8. GENERAL OBLIGATIONS OF THE SUPPLIER**

- 8.1. The Supplier shall –
- 8.1.1. respond promptly to all complaints and enquiries from Transnet;
  - 8.1.2. inform Transnet immediately of any dispute or complaint arising in relation to the provision of the Services.

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- 8.1.3. conduct its business in a professional manner that will reflect positively upon the Supplier and the Supplier's Services;
- 8.1.4. keep full records clearly indicating all transactions concluded by the Supplier relating to the performance of the Services and keep such records for at least 5 (five) years from the date of each such transaction;
- 8.1.5. obtain, and at all times maintain in full force and effect, any and all licenses, permits and the like required under applicable laws for the provision of the Services and the conduct of the business and activities of the Supplier; and
- 8.1.6. comply with all applicable environmental legislation and regulations, and demonstrate sound environmental policies, management and performance.
- 8.2. The Supplier acknowledges and agrees that it shall at all times -
  - 8.2.1. render the Services and perform all its duties with honesty and integrity;
  - 8.2.2. communicate openly and honestly with Transnet and demonstrate a commitment to performing the Services timeously, efficiently and to the required standards;
  - 8.2.3. endeavour to provide the highest possible standards of service and professionalism, with a reasonable degree of care and diligence;
  - 8.2.4. use its best endeavours and make every diligent effort to meet agreed deadlines;
  - 8.2.5. treat its own Personnel, as well as all Transnet's officers, employees, agents and consultants, with fairness and courtesy and respect for their human rights;
  - 8.2.6. practice and promote its own internal policies aimed at prohibiting and preventing unfair discrimination (as further referred to in clause 22 – EQUALITY AND DIVERSITY);
  - 8.2.7. treat all enquiries from Transnet in connection with the Services with courtesy and respond to all enquiries promptly and efficiently. Where the Supplier is unable to comply with the provisions of this clause, the Supplier will advise Transnet of the delay and the reasons therefore and will keep Transnet informed of progress made regarding the enquiry;
  - 8.2.8. when requested by Transnet, provide clear and accurate information regarding the Supplier's own policies and procedures, excluding Know-How and other Confidential Information, except where a Non-Disclosure Agreement has been entered into between the Parties;

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- 8.2.9. not allow a conflict of interest to develop between its own interests (or the interests of any of its other customers) and the interests of Transnet;
- 8.2.10. not accept or offer, nor allow, induce or promote the acceptance or offering of any gratuity, enticement, incentive or gift that could reasonably be regarded as bribery or an attempt to otherwise exert undue influence over the recipient;
- 8.2.11. not mislead Transnet or its officers, employees and stakeholders, whether by act or omission;
- 8.2.12. not otherwise act in an unethical manner or do anything which could reasonably be expected to damage or tarnish Transnet's reputation or business image; and
- 8.2.13. immediately report to Transnet any unethical, fraudulent or otherwise unlawful conduct of which it becomes aware in connection with Transnet or the provision of Services.

## 9. FEES AND EXPENSES

- 9.1. In consideration of the provision of the Services, Transnet will pay to the Supplier the Fees detailed in the relevant schedule or Work Order.
- 9.2. Transnet will not be invoiced for materials used in the provision of the Services save for those materials (if any) set out in the Work Order and accepted by Transnet or in any relevant Work Order (which will be invoiced to Transnet at cost).
- 9.3. Unless otherwise agreed in a schedule or Work Order, Transnet will reimburse to the Supplier all reasonable and proper expenses incurred directly and solely in connection with the provision of the Services, provided that all such expenses -
  - 9.3.1. are agreed by Transnet in advance;
  - 9.3.2. are incurred in accordance with Transnet's standard travel and expenses policies;
  - 9.3.3. are passed on to Transnet at cost with no administration fee; and
  - 9.3.4. will only be reimbursed if supported by relevant receipts.
- 9.4. All invoices relating to Fees, out of pocket expenses and, if applicable, travel and accommodation costs, will provide the detail for each of the Personnel carrying out the Services and incurring the expenses, and the invoice will, where appropriate, include VAT as a separate item.

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## 10. INVOICING AND PAYMENT

- 10.1. Transnet shall pay the Supplier the amounts stipulated in the relevant schedule or Work Order, subject to the terms and conditions of the Agreement.
- 10.2. Transnet shall pay such amounts to the Supplier, upon receipt of a correct and undisputed invoice together with the supporting documentation as specified in the Schedule of Requirements or Work Order appended hereto, once the undisputed invoices, or such portion of invoices which are undisputed become due and payable to the Supplier for the provision of the Services, in terms of sub-clause 10.4 below.
- 10.3. All Fees and other sums payable under the Agreement are exclusive of VAT, which will be payable at the applicable rate.
- 10.4. Unless otherwise provided for in the Schedule of Requirements or Work Order(s) appended to the Agreement, invoices shall be submitted together with a month-end statement. Payment against such month-end statement shall be made by Transnet within 30 (thirty) days after date of receipt by Transnet of the statement together with all undisputed invoices and supporting documentation.
- 10.5. Where the payment of any invoice, or any part of an invoice which is not in dispute, is not made in accordance with this clause 10, the Supplier shall be entitled to charge interest on the outstanding amount, at The Standard Bank of South Africa's prime rate of interest in force, for the period from the due date of payment until the outstanding amount is paid.

## 11. FEE ADJUSTMENTS

- 11.1. Fees for Services rendered in terms of the Agreement shall be subject to review as indicated in the Schedule of Requirements or Work Orders annexed hereto from time to time.
- 11.2. No less than 2 (two) months prior to any proposed Fee adjustment, the Parties shall commence negotiations for Fees for the next period or as otherwise indicated and appended hereto.
- 11.3. Should Transnet and the Supplier fail to reach an agreement on Fees for the successive period, either Party shall be entitled to terminate the Agreement and/or the relevant Work Order after giving 30 (thirty) days written notice to the other.
- 11.4. Neither Party shall have any claim against the other of whatsoever nature by reason of such cancellation as envisaged in sub-clause 11.3 above.

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## 12. INTELLECTUAL PROPERTY RIGHTS

### 12.1. Title to Confidential Information

- 12.1.1. Transnet will retain all right, title and interest in and to its Confidential Information and Background Intellectual Property and the Supplier acknowledges that it has no claim of any nature in and to the Confidential Information and Background Intellectual Property that is proprietary to Transnet. For the avoidance of doubt, all the Supplier's Background Intellectual Property shall remain vested in the Supplier.
- 12.1.2. Transnet shall grant to the Supplier an irrevocable royalty free non-exclusive license to use Transnet's Background Intellectual Property only for the Permitted Purpose. This license shall not permit the Supplier to sub-license to other parties.
- 12.1.3. The Supplier shall grant to Transnet an irrevocable, royalty free, non-exclusive licence to use the Supplier's Background Intellectual Property for the Permitted Purpose. This licence shall not permit Transnet to sub-licence to other parties.
- 12.1.4. The Supplier shall grant Transnet access to the Supplier's Background Intellectual Property on terms which shall be bona fide negotiated between the Parties for the purpose of commercially exploiting the Foreground Intellectual Property, to the extent that such access is required.

### 12.2. Title to Intellectual Property

- 12.2.1. All right, title and interest in and to Foreground Intellectual Property prepared conceived or developed by the Supplier, its researchers, agents and employees shall vest in Transnet and the Supplier acknowledges that it has no claim of any nature in and to the Foreground Intellectual Property. The Supplier shall not at any time during or after the termination or cancellation of the Agreement dispute the validity or enforceability of such Foreground Intellectual Property, or cause to be done any act or thing contesting or in any way impairing or tending to impair any part of that right, title and interest to any of the Foreground Intellectual Property and shall not counsel or assist any person to do so.
- 12.2.2. Transnet shall be entitled to seek protection in respect of the Foreground Intellectual Property anywhere in the world as it shall decide in its own absolute discretion and the Supplier shall reasonably assist Transnet in attaining and maintaining protection of the Foreground Intellectual Property.
- 12.2.3. Where the Foreground Intellectual Property was created by the Supplier or its researchers, agents and employees and where Transnet elects not to exercise its

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option to seek protection or decides to discontinue the financial support of the prosecution or maintenance of any such protection, Transnet shall notify the Supplier who shall have the right of first refusal to file or continue prosecution or maintain any such applications and to maintain any protection issuing on the Foreground Intellectual Property.

- 12.2.4. No consideration shall be paid by Transnet to the Supplier for the assignment of any Foreground Intellectual Property from the Supplier to Transnet, over and above the sums payable in terms of this Agreement. The Supplier undertakes to sign all documents and do all things as may be necessary to effect, record and perfect the assignment of the Foreground Intellectual Property to Transnet.
- 12.2.5. Subject to anything contrary contained in the Agreement and/or the prior written consent of Transnet (which consent shall not be unreasonably withheld), the Supplier shall under no circumstances be entitled as of right, or to claim the right, to use Transnet's Background Intellectual Property and/or Foreground intellectual Property.

### **12.3. Title to Improvements**

- 12.3.1. Any improvements, developments, adaptations and/or modifications to the Foreground Intellectual Property, and any and all new inventions or discoveries, based on or resulting from the use of Transnet's Background Intellectual Property and/or Confidential Information shall be exclusively owned by Transnet. The Supplier shall disclose promptly to Transnet all such improvements, developments, adaptations and/or modifications, inventions or discoveries. The Supplier hereby undertakes to sign all documents and do all things as may be necessary to effect, record and perfect the assignment of such improvements, developments, adaptations and/or modifications, inventions or discoveries to Transnet and the Supplier shall reasonably assist Transnet in attaining, maintaining or documenting ownership and/or protection of the improved Foreground Intellectual Property.

### **12.4. Unauthorised Use of Confidential Information**

- 12.4.1. The Supplier shall not authorise any party to act on or use in any way any Confidential Information belonging to Transnet whether or not such supplier is aware of such Confidential Information, and shall promptly notify Transnet of the information if it becomes aware of any party so acting, and shall provide Transnet the information with such assistance as Transnet reasonably requires, at Transnet's cost and expense, to prevent such third party from so acting.

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## 12.5. Unauthorised Use of Intellectual Property

- 12.5.1. The Supplier agrees to notify Transnet in writing of any conflicting uses of, and applications of registrations of Patents, Designs and Trade Marks or any act of infringement, unfair competition or passing off involving the Intellectual Property of Transnet of which the Supplier acquires knowledge and Transnet shall have the right, as its own option, to proceed against any party infringing its Intellectual Property.
- 12.5.2. It shall be within the discretion of Transnet to determine what steps shall be taken against the infringer and the Supplier shall co-operate fully with Transnet, at Transnet's cost, in whatever measure including legal action to bring any infringement of illegal use to an end.
- 12.5.3. The Supplier shall cooperate to provide Transnet promptly with all relevant ascertainable facts.
- 12.5.4. If proceedings are commenced by Transnet alone, Transnet shall be responsible for all expenses but shall be entitled to all damages or other award arising out of such proceedings. If proceedings are commenced by both Parties, both Parties will be responsible for the expenses and both Parties shall be entitled to damages or other award arising out of proceedings.

## 13. SUPPLIER'S PERSONNEL

- 13.1. The Supplier's Personnel shall be regarded at all times as employees, agents or subcontractors of the Supplier and no relationship of employer and employee shall arise between Transnet and any Supplier Personnel under any circumstances regardless of the degree of supervision that may be exercised over the Personnel by Transnet.
- 13.2. The Supplier warrants that all its Personnel will be entitled to work in South Africa or any other country in which the Services are to be performed.
- 13.3. The Supplier will ensure that its Personnel comply with all reasonable requirements made known to the Supplier by Transnet concerning conduct at any Transnet premises or any other premises upon which the Services are to be performed (including but not limited to security regulations, policy standards and codes of practice and health and safety requirements). The Supplier will ensure that such Personnel at all times act in a lawful and proper manner in accordance with these requirements.
- 13.4. Transnet reserves the right to refuse to admit or to remove from any premises occupied by or on behalf of it, any Supplier Personnel whose admission or presence would, in the reasonable opinion of Transnet, be undesirable or who represents a threat to confidentiality or security or

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whose presence would be in breach of any rules and regulations governing Transnet's Personnel, provided that Transnet notifies the Supplier of any such refusal (with reasons why). The reasonable exclusion of any such individual from such premises shall not relieve the Supplier from the performance of its obligations under the Agreement.

- 13.5. The Supplier agrees to use all reasonable endeavours to ensure the continuity of its Personnel assigned to perform the Services. If any re-assignment by the Supplier of those Personnel is necessary, or if Transnet advises that any such Personnel assigned are in any respect unsatisfactory, including where any such Personnel are, or are expected to be or have been absent for any period, then the Supplier will promptly supply a replacement of equivalent calibre and experience, and any such replacement shall be approved by Transnet prior to commencing provision of the Services, such approval not to be unreasonably withheld.

#### **14. LIMITATION OF LIABILITY**

- 14.1. Neither Party excludes or limits liability to the other Party for -

14.1.1. death or personal injury due to negligence; or

14.1.2. fraud.

- 14.2. The Supplier shall indemnify and keep Transnet indemnified from and against liability for damage to any Transnet property (whether tangible or intangible) or any other loss, costs or damage suffered by Transnet to the extent that it results from any act of or omission by the Supplier or its Personnel in connection with the Agreement. The Supplier's liability arising out of this sub-clause 14.2 shall be limited to a maximum amount payable in respect of any one occurrence or a series of related occurrences in a single calendar year, such amount to be agreed in writing by the Parties.

- 14.3. Subject always to sub-clauses 14.1 and 14.2, the liability of either the Supplier or Transnet under or in connection with the Agreement, whether for negligence, misrepresentation, breach of contract or otherwise, for direct loss or damage arising out of each Default or series of related Defaults shall not exceed 100% (one hundred percent) of the Fees paid under the schedule or Work Order to which the Default(s) relates.

- 14.4. Subject to sub-clause 14.1 above, and except as provided in sub-clauses 14.2 and 14.3 above, in no event shall either Party be liable to the other for indirect or consequential loss or damage or including indirect or consequential loss of profits, business, revenue, goodwill or anticipated savings of an indirect nature or loss or damage incurred by the other Party as a result of third party claims.

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- 14.5. If for any reason the exclusion of liability in sub-clause 14.4 above is void or unenforceable, either Party's total liability for all loss or damage under the Agreement shall be as provided in sub-clause 14.3 above.
- 14.6. Nothing in this clause 14 shall be taken as limiting the liability of the Supplier in respect of clause 12 (INTELLECTUAL PROPERTY RIGHTS) or clause 16 (CONFIDENTIALITY).

## **15. INSURANCES**

- 15.1. Without limiting the liability of the Supplier under the Agreement, the Supplier shall take out insurance in respect of all risks for which it is prudent for the Supplier to insure against including any liability it may have as a result of its activities under the Agreement for theft, destruction, death or injury to any person and damage to property. The level of insurance will be kept under review by Transnet, on an annual basis, to ensure its adequacy, provided that any variation to the level of such insurance shall be entirely at the discretion of the Supplier.
- 15.2. The Supplier shall arrange insurance with reputable insurers and will produce to Transnet evidence of the existence of the policies and the receipts for payment of the current premiums, on an annual basis within thirty (30) days after date of policy renewals.
- 15.3. Subject to sub-clause 15.4 below, if the Supplier fails to effect adequate insurance under this clause 15, it shall notify Transnet in writing as soon as it becomes aware of the reduction or inadequate cover and Transnet may arrange or purchase such insurance. The Supplier shall promptly reimburse Transnet for any premiums paid provided such insurance protects the Supplier's liability. Transnet assumes no responsibility for such insurance being adequate to protect all of the Supplier's liability.
- 15.4. In the event that the Supplier receives written notice from its insurers advising of the termination of its insurance cover referred to in sub-clause 15.1 above or if the insurance ceases to be available upon commercially reasonable terms, the Supplier shall immediately notify Transnet in writing of such termination and/or unavailability whereafter either the Supplier or Transnet may terminate the Agreement on giving the other party not less than 30 (thirty) days prior written notice to that effect

## **16. CONFIDENTIALITY**

- 16.1. The Parties hereby undertake the following, with regard to Confidential Information -
- 16.1.1. not to divulge or disclose to any person whomsoever in any form or manner whatsoever, either directly or indirectly, any Confidential Information of the other, without the prior written consent of such other Party, other than when called upon to do so in accordance with a statute, or by a court having jurisdiction, or by any other duly authorised and empowered authority or official, in which event the Party

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concerned shall do what is reasonably possible to inform the other of such a demand and each shall assist the other in seeking appropriate relief or the instituting of a defensive action to protect the Confidential Information concerned;

- 16.1.2. not to use, exploit, permit the use of, directly or indirectly, or in any other manner whatsoever apply the Confidential Information, disclosed to it as a result of the Agreement, for any purpose whatsoever other than for the purpose for which it is disclosed or otherwise than in strict compliance with the provisions in the Agreement;
- 16.1.3. not to make any notes, sketches, drawings, photographs or copies of any kind of any part of the disclosed Confidential Information, without the prior written consent of such other Party, except when reasonably necessary for the purpose of this Agreement, in which case such copies shall be regarded as Confidential Information;
- 16.1.4. not to de-compile, disassemble or reverse engineer any composition, compilation, concept application, item, component de-compilation, including software or hardware disclosed and shall not analyse any sample provided by Transnet, or otherwise determine the composition or structure or cause to permit these tasks to be carried out except in the performance of its obligations pursuant to this Agreement;
- 16.1.5. not to exercise less care to safeguard Transnet Confidential Information than the Party exercises in safeguarding its own competitive, sensitive or Confidential Information;
- 16.1.6. Confidential Information disclosed by either Party to the other or by either Party to any other party used by such Party in the performance of the Agreement, shall be dealt with as "restricted" or shall be dealt with according to any other appropriate level of confidentiality relevant to the nature of the information concerned, agreed between the Parties concerned and stipulated in writing for such information in such cases;
- 16.1.7. the Parties shall not make or permit to be made by any other person subject to their control, any public statements or issue press releases or disclose Confidential Information with regard to any matter related to the Agreement, unless written authorisation to do so has first been obtained from the Party first disclosing such information;

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- 16.1.8. each Party shall be entitled to disclose such aspects of Confidential Information as may be relevant to one or more technically qualified employees or consultants of the Party who are required in the course of their duties to receive the Confidential Information for the Permitted Purpose provided that the employee or consultant concerned has a legitimate interest therein, and then only to the extent necessary for the Permitted Purpose, and is informed by the Party of the confidential nature of the Confidential Information and the obligations of the confidentiality to which such disclosure is subject and the Party shall ensure such employees or consultants honour such obligations;
- 16.1.9. each Party shall notify the other Party of the name of each person or entity to whom any Confidential Information has been disclosed as soon as practicable after such disclosure;
- 16.1.10. each Party shall ensure that any person or entity to which it discloses Confidential Information shall observe and perform all of the covenants the Party has accepted in the Agreement as if such person or entity has signed the Agreement. The Party disclosing the Confidential Information shall be responsible for any breach of the provisions of the Agreement by the person or entity; and
- 16.1.11. each Party may by written notice to the other Party specify which of the Party's employees, officers or agents are required to sign a non-disclosure undertaking.
- 16.2. The duties and obligations with regard to Confidential Information in this clause 16 shall not apply where -
- 16.2.1. a Party can demonstrate that such information is already in the public domain or becomes available to the public through no breach of the Agreement by that Party, or its Personnel; or
- 16.2.2. was rightfully in a Party's possession prior to receipt from the other Party, as proven by the first-mentioned Party's written records, without an infringement of an obligation or duty of confidentiality; or
- 16.2.3. can be proved to have been rightfully received by a Party from a third party without a breach of a duty or obligation of confidentiality; or
- 16.2.4. is independently developed by a Party as proven by its written records.
- 16.3. This clause 16 shall survive termination for any reason of the Agreement and shall remain in force and effect from the Commencement Date of the Agreement and 5 (five) years after the termination of the Agreement. Upon termination of the Agreement, all documentation furnished to the Supplier by Transnet pursuant to the Agreement shall be returned to Transnet including,

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without limitation all corporate identity equipment including dies, blocks, labels, advertising matter, printing matter and the like.

## **17. TOTAL OR PARTIAL FAILURE TO PERFORM THE SCOPE OF SERVICES**

Should the Supplier fail or neglect to execute the work or to deliver any portion of the Service, as required by the terms of the Agreement or Work Order, Transnet may cancel the Agreement or Work Order in so far as it relates to the unexecuted work or rejected portion of the Service, and, in such event, the provision of any remaining commitment shall remain subject in all respects to these conditions.

## **18. TERM AND TERMINATION**

- 18.1. The Agreement shall commence on the Commencement Date, as specified in the schedules hereto, and shall continue subject to termination in accordance with the provisions of the Agreement or otherwise in accordance with law or equity.
- 18.2. Transnet may terminate the Agreement without cause by giving the Supplier 30 (thirty) days' notice in writing.
- 18.3. Either Party may terminate the Agreement forthwith by notice in writing to the other Party where the other Party has committed a material Default and, where such Default is capable of remedy, has failed to remedy such Default within 30 (thirty) days of receiving notice specifying the Default and requiring its remedy.
- 18.4. Either Party may terminate the Agreement forthwith by notice in writing to the other Party when the other Party is unable to pay its debts as they fall due or commits any act or omission which would be an act of insolvency in terms of the Insolvency Act, 1936 (as amended), or if any action, application or proceeding is made with regard to it for -
  - 18.4.1. a voluntary arrangement or composition or reconstruction of its debts;
  - 18.4.2. the presentation of an administrative petition;
  - 18.4.3. its winding-up or dissolution;
  - 18.4.4. the appointment of a liquidator, trustee, receiver, administrative receiver or similar officer; or
  - 18.4.5. any similar action, application or proceeding in any jurisdiction to which it is subject.
- 18.5. Transnet may terminate the Agreement at any time within 2 (two) months of becoming aware of a change of control of the Supplier by notice in writing to the Supplier. For the purposes of this clause, "control" means the right to direct the affairs of a company whether by ownership of shares, membership of the board of directors, agreement or otherwise.

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18.6. Transnet may cancel any schedule hereto or Work Order at any time on giving the Supplier 30 (thirty) days' notice.

## 19. CONSEQUENCE OF TERMINATION

19.1. Termination in accordance with clause 18 (TERM AND TERMINATION) shall not prejudice or affect any right of action or remedy which shall have accrued or shall thereafter accrue to either Party and all provisions which are to survive the Agreement or impliedly do so shall remain in force and in effect.

19.2. On termination of the Agreement or a Work Order, the Supplier will immediately deliver up, and procure that its Personnel will immediately deliver up to Transnet, all Deliverables and property belonging to Transnet (or, in the event of termination of a Work Order, such as is relevant to that Work Order) which may be in the possession of, or under the control of the Supplier, and certify to Transnet in writing that this has been done.

19.3. To the extent that any of the Deliverables and property referred to in sub-clause 19.2 above are in electronic form and contained on non-detachable storage devices, the Supplier will provide Transnet with unencrypted copies of the same on magnetic media and will irretrievably destroy and delete copies so held.

19.4. In the event that the Agreement is terminated by the Supplier under sub-clause 18.3 (TERM AND TERMINATION), or in the event that a Work Order is terminated by Transnet under sub-clause 18.6 (TERM AND TERMINATION), Transnet will pay to the Supplier all outstanding Fees (apportioned on a daily basis) relating to the work undertaken by the Supplier up until the date of such termination. Transnet will also pay the costs of any goods and materials ordered by the Supplier in relation to the such work for which the Supplier has paid or is legally obliged to pay, in which case, on delivery of such goods or materials, the Supplier will promptly deliver such goods and materials to Transnet or as it may direct.

19.5. The provisions of clauses 2 (DEFINITIONS), 6 (WARRANTIES), 12 (INTELLECTUAL PROPERTY RIGHTS), 14 (LIABILITY), 16 (CONFIDENTIALITY), 19 (CONSEQUENCE OF TERMINATION), 25 (DISPUTE RESOLUTION) and 29 (GOVERNING LAW) shall survive termination or expiry of the Agreement.

19.6. If either Party (the "Defaulting Party") commits a material breach of the Agreement and fails to remedy such breach within 10 (ten) Business Days of written notice thereof, the other Party (hereinafter the "Aggrieved Party"), shall be entitled, in addition to any other rights and remedies that it may have in terms of the Agreement, to terminate the Agreement forthwith without any liability and without prejudice to any claims which the Aggrieved Party may have for damages against the Defaulting Party. For the avoidance of doubt, if -

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- 19.6.1. the Supplier effects or attempts to effect a compromise or composition with its creditors; or
- 19.6.2. either Party is provisionally or finally liquidated or is placed under judicial management, whether provisionally or finally; or
- 19.6.3. either Party ceases or threatens to cease to carry on its normal line of business or defaults or threatens to default in the payment of its liabilities generally, or commits any act or omission which would be an act of insolvency in terms of the Insolvency Act, 1936 (as amended); then

the other Party shall be entitled, but not obliged, to terminate the Agreement on written notice, in which event such termination shall be without any liability and without prejudice to any claims which either Party may have for damages against the other.

## 20. ASSIGNMENT

Neither Party may assign the benefit of the Agreement or any interest hereunder except with the prior written consent of the other. Further, in the event that Transnet wishes to assign or novate the Agreement to any third party, the Supplier agrees that it shall not unreasonably withhold or delay its consent to such assignment or novation and that it shall only be entitled to recover from Transnet any reasonable legal costs incurred by it as a direct result of such assignment or novation.

## 21. FORCE MAJEURE

- 21.1. Neither Party shall have any claim against the other Party arising from any failure or delay in the performance of any obligation of either Party under the Agreement, caused by an act of force majeure such as acts of God, fire, flood, war, strike, lockout, industrial dispute, government action, laws or regulations, riots, terrorism or civil disturbance, defaults, delays or discontinuance on the part of independent contractors, suppliers, or other circumstances or factors beyond the reasonable control of either Party, and to the extent that the performance of obligations of either Party hereunder is delayed by virtue of the foregoing, any period stipulated for any such performance shall be reasonably extended.
- 21.2. Each Party will take all reasonable steps by whatever lawful means that are available, to resume full performance as soon as practicable and will seek agreement to modification of the relevant provisions of the Agreement in order to accommodate the new circumstances caused by the act of force majeure. If a Party fails to agree to such modifications proposed by the other Party within 90 (ninety) days of the act of force majeure first occurring, either Party may thereafter terminate the Agreement with immediate notice.

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## **22. EQUALITY AND DIVERSITY**

- 22.1. The Supplier will not victimise, harass or discriminate against any employee of either Party to the Agreement or any applicant for employment with either Party to the Agreement due to their gender, race, disability, age, religious belief, sexual orientation or part-time status. This provision applies, but is not limited to employment, upgrading, work environment, demotion, transfer, recruitment, recruitment advertising, termination of employment, rates of pay or other forms of compensation and selection for training.
- 22.2. Both Parties to the Agreement undertake that they will not, and shall procure that its employees, agents and subcontractors will not breach any applicable discrimination legislation and any amendments and re-enactments thereof.

## **23. NON-WAIVER**

- 23.1. Failure or neglect by either Party, at any time, to enforce any of the provisions of the Agreement, shall not, in any manner, be construed to be a waiver of any of that Party's rights in that regard and in terms of the Agreement.
- 23.2. Such failure or neglect shall not, in any manner, affect the continued, unaltered validity of the Agreement, or prejudice the right of that Party to institute subsequent action.

## **24. PARTIAL INVALIDITY**

If any provision of the Agreement shall be held to be invalid, illegal or unenforceable, or shall be required to be modified, the validity, legality and enforceability of the remaining provisions shall not be affected thereby.

## **25. DISPUTE RESOLUTION**

- 25.1. Should any dispute of whatsoever nature arise between the Parties concerning the Agreement, the Parties shall try to resolve the dispute by negotiation within 10 (ten) Business Days of such dispute arising.
- 25.2. If the dispute has not been resolved by such negotiation, either of the Parties may refer the dispute to AFSA and notify the other Party accordingly.
- 25.3. Such dispute shall be finally resolved in accordance with the rules of AFSA by an arbitrator or arbitrators appointed by AFSA.
- 25.4. This clause constitutes an irrevocable consent by the Parties to any proceedings in terms hereof, and neither of the Parties shall be entitled to withdraw from the provisions of this clause or claim at any such proceedings that it is not bound by this clause 25.

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25.5. This clause 25 is severable from the rest of the Agreement and shall remain in effect even if the Agreement is terminated for any reason.

25.6. This clause 25 shall not preclude either Party from seeking urgent relief in a court of appropriate jurisdiction, where grounds for urgency exist.

## **26. ADDRESSES FOR NOTICES**

26.1. The Parties to the Agreement select the physical addresses and facsimile ("fax") numbers, detailed in Schedule 2 hereto, as their respective addresses for giving or sending any notice provided for or required in terms of the Agreement, provided that either Party shall be entitled to substitute such other address or fax number, as may be, by written notice to the other.

26.2. Any notice addressed to a Party at its physical or postal address shall be sent by prepaid registered post, or delivered by hand, or sent by fax.

26.3. Any notice shall be deemed to have been given -

26.3.1. if posted by prepaid registered post, 10 (ten) days after the date of posting thereof;

26.3.2. if hand delivered, on the day of delivery; or

26.3.3. if faxed, on the date and time of sending of such fax, as evidenced by a fax confirmation printout, provided that such notice shall be confirmed by prepaid registered post on the date of dispatch of such fax, or, should no postal facilities be available on that date, on the next Business Day.

## **27. WHOLE AND ONLY AGREEMENT**

27.1. The Parties hereby confirm that the Agreement constitutes the whole and only agreement between them with regard to the subject matter of the Agreement.

27.2. The Parties hereby confirm that the Agreement replaces all other agreements which exist or may have existed in any form whatever between them, with regard to the subject matter dealt with in the Agreement, including any annexures, schedules or Work Order(s) appended hereto.

## **28. AMENDMENT AND CHANGE CONTROL**

28.1. Any requirement for an amendment or change to the Agreement or to the Schedule of Requirements or to a Work Order shall only be valid if it is in writing, signed by both Parties and added to the Agreement as an addendum hereto.

28.2. In the event the Parties cannot agree upon changes, the Parties shall in good faith seek to agree any proposed changes using the dispute resolution procedures in clause 25 (DISPUTE RESOLUTION).

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**29. GOVERNING LAW**

The Agreement is exclusively governed by and construed in accordance with the laws of the Republic of South Africa and is subject to the jurisdiction of the courts of the Republic of South Africa.

**30. COUNTERPARTS**

The Agreement may be signed in any number of counterparts, all of which taken together shall constitute one and the same instrument. Either Party may enter into the Agreement by signing any such counterpart.

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## 1. Bill of Quantities: 4 Way transmitter combiner with receiver coupler & duplexer

Description	Quantities	Delivery Location
1.1. Antenna Combiner	48	Johannesburg
1.2. Combiners must be sent to NTC for certification before delivery can take place;		
1.3. Combiners must comply and be approved by the QA – National Test Centre (NTC);		
1.4. If the supplied equipment is not approved by TFR a sample with applicable software must be available for evaluation on closing of the tender.		
1.5. Tenderers shall quote for a 50 W and 70W combiner transmitter power.		
1.6. It is TFR's discretion to either award the contract in full or partially or split the contract or not award the contract;		
1.7. It is the discretion of TFR to change the final quantities, by either increasing or decreasing the said quantities as indicated by TFR's operational requirements;		
<b>Equipment Distribution</b>		
1.8. Johannesburg = 48 Combiners;		

End of document



Compliance Sheet

CF - Comply Fully  
PC - Partially Comply  
DC - Don't Comply  
NA - Not Applicable  
Noted

Compliance		Comments
1	Compliance	
1.1		
1.2		
1.3		
1.4		
1.4.1		
1.4.2		
1.4.3		
1.4.4		
2	Service Conditions	
2.1		
2.2		
3	Technical Requirements	
3		
4	Schedule of Requirements	
4.1		
4.2		
4.3		
5	Quality of Material	
5.1		
5.2		
5.3		



5.4			
5.5			
5.6			
	Acceptance Test		
5.7			
5.8			
6	Spares		
6.1			
7	Maintenance Service		
7.1			
7.2			
7.3			
7.4			
8	Technical Handbook		
8.1			
8.2			
8.3			
8.3.1			
8.3.2			
8.3.3			
8.3.4			
8.3.5			
8.4			
8.5			
9	General		
9			
10	Technical Schedule		
10.1.1			

10.2	Electrical Characteristics		
10.2.1.1			
10.2.1.2			
10.2.1.3			
10.2.1.4			
10.2.1.5			
10.2.1.6			
10.2.1.7			
10.2.1.8			
10.2.1.9			
10.2.1.10			
10.2.2.1			
10.2.2.2			
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10.3	Mechanical Characteristics		
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10.3.2			
10.3.3			
10.4	Electrical Requirements		
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10.4.5			
10.5	Terminators		
10.5.1			
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10.5.4			
10.5.5			

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## GENERAL TENDER CONDITIONS - SERVICES

### FORM CSS5

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## 1. GENERAL

All tenders and subsequent contracts and orders shall be subject to the following procedures as laid down by Transnet Limited (hereinafter referred to as “Transnet”) and are to be strictly adhered to by any person or enterprise or company responding to this tender (hereinafter referred to as “Respondents” or the “Respondent”).

## 2. LODGING OF TENDER

- 2.1 Tenders shall be lodged with Transnet no later than the closing date and time specified for the receipt thereof, in accordance with the directions issued with tender documents.
- 2.2 Tenders shall be transmitted in a sealed envelope and placed in the Tender Box at a venue stipulated in the Request for Tender (RFT) or Request for Proposal (RFP) or Request for Quotation (RFQ) (collectively “Tender Documents”), with the tender number and subject endorsed on the left hand bottom corner of the envelope.

## 3. USE OF TENDER FORMS

Where special forms are issued by Transnet for the submission of tenders, Respondents are required to submit their tenders by completion of the appropriate sections on such official forms and not on office stationery bearing their own special conditions of tender; non-compliance with this conditions may result in the rejection of a tender.

## 4. THE RAISING OF A CHARGE FOR PLANS, SPECIFICATIONS AND TENDER FORMS

- 4.1 A non-refundable charge may be raised for Tender Documents, depending on the nature, magnitude and value of technical information supplied.
- 4.2 If any of the drawings and specifications referred to in Tender Documents are the official publications of recognised standardising bodies, copies of such drawings and specifications shall be acquired by Respondents at their own expense.

## 5. DEFAULTS BY RESPONDENTS

- 5.1 If the Respondent, after it has been notified of the acceptance of its tender/quotation fails to:
  - (a) enter into a formal contract when called upon to do so in terms of clause 13 (*Contract Documents*), within such period as Transnet may specify; or
  - (b) accept an order in terms of the tender or quotation; or
  - (c) when called upon to do so, furnish satisfactory security of the fulfilment of the contract in terms of clause 14 (*Securities*);

Transnet may, in any such case, without prejudice to any other legal remedy which it may have, proceed to accept any other tender or quotation or, if it is necessary to do so, call for

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tenders or quotations afresh, and may recover from the defaulting Respondent any additional expense incurred by it in calling for new offers or in accepting a higher offer.

5.2 If any Respondent, who has submitted a tender or quotation, concluded a contract with Transnet (hereinafter referred to as "the Supplier"), or in the capacity of agent or subcontractor has been associated with such tender or contract -

- (a) has withdrawn such tender/quotation after the advertised date and hour for the receipt of tenders; or
- (b) has, after having been notified of the acceptance of its tender or quotation, failed or refused to sign a contract when called upon to do so in terms of any condition forming part of the tender documents; or
- (c) has carried out any contract resulting from such tender or quotation in an unsatisfactory manner or has breached any condition of such contract; or
- (d) has offered, promised or given a bribe in relation to the obtaining or the execution of such contract; or
- (e) has acted in a fraudulent or improper manner or in bad faith towards Transnet or any government department or towards any public body, company or person; or
- (f) has made any incorrect statement in the affidavit or certificate referred to in clause 11 (*Formal Notification Regarding Name of Successful Respondent*) and is unable to prove to the satisfaction of Transnet that
  - (i) it made the statement in good faith honestly believing it to be correct; and
  - (ii) before making such statement, it took all reasonable steps to satisfy itself of its correctness; or
- (g) caused Transnet damage, or to incur costs in order to meet the Supplier's requirements which could not be recovered from the Supplier;

then a tender from any such Respondent shall be disqualified and the person, enterprise or company (including any directors) shall, subject to clause 5.3 below, be disqualified from tendering for any Transnet business.

5.3 Any person or enterprise or company against whom a decision has been given under the provisions of sub-clauses 5.2(b), 5.2(d) or 5.2(e) above, may make representations to the Chief Operating Officer of Transnet Group, whose decision shall be final.

5.4 Any disqualification imposed upon any person or enterprise or company, unless Transnet determines otherwise, shall apply to any other enterprise under the same or different names of disqualified persons or enterprise or company (or associates thereof) and shall for avoidance of doubt also be applied to any agent or employee of the person or enterprise or company concerned.

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Respondent's Signature

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## **6. CURRENCY**

Prices or fees must be quoted in the currency of the Republic of South Africa in respect of local Services. Prices or fees in any other currency may be rejected by Transnet save where such price is quoted by a foreign Respondent.

## **7. EXCHANGE AND REMITTANCE**

The Respondent should note that where the whole or a portion of the contract or order value is to be remitted overseas, Transnet shall, if requested to do so by the Supplier, effect payment overseas directly to the foreign principal or service provider of such percentage of the contract or order value as may be stipulated by the Respondent in its Tender Documents and any variation in the amount to be so paid, which may arise as a result of fluctuations in the rate of exchange involved, will be for the account of the Supplier.

7.1 The Respondent who desires to avail itself of the aforementioned facility must at the time of tendering furnish the information called for in the clause "Exchange and Remittance" of the Tender Documents and also furnish full details of the principals or service providers to whom payment is to be made.

7.2 The Supplier shall at its own cost obtain forward exchange cover on foreign currency to protect itself against any currency rate fluctuation risks for the duration of any resulting contract or order. Transnet will NOT accept any fluctuations in the rate of exchange at the time when payments are made.

Transnet will not recognise any claim for adjustment of the order and/or contract price under clause 7.2 above, if the increase in price arises after the date on which the Services were to be delivered, as set out in the order and/or contract, or any subsequent agreement between the parties.

## **8. ACCEPTANCE OF TENDER OR QUOTATION**

8.1 Transnet does not bind itself to accept the lowest or any tender or quotation nor will it give any reasons for the rejection of a tender or quotation. Transnet reserves the right to accept any tender in whole or in part.

8.2 Upon the acceptance of a tender or quotation by Transnet, the parties shall be bound by these General Tender Conditions and the Standard Terms and Conditions of Contract (Form US7 - Services).

8.3 Where the acceptance by Transnet of the Respondent's offer/bid is delivered by letter, the South African Post Office shall be regarded as the agent of Transnet and delivery of such notice of acceptance to the South African Post Office shall be considered as delivery to the Respondent.

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- 8.4 Where the Respondent has been informed by Transnet per facsimile message of the acceptance of its tender or quotation, the acknowledgement of receipt transmitted by its facsimile machine shall be regarded as proof of delivery to the Respondent.

**9. LAW GOVERNING CONTRACT**

The law of the Republic of South Africa shall govern the contract created by the acceptance of a tender/quotation. The *domicilium citandi et executandi* shall be a place in the Republic of South Africa to be specified by the Respondent in its tender/quotation at which all legal documents may be served on the Respondent who shall agree to submit to the jurisdiction of the courts of the Republic of South Africa. A foreign Respondent shall, therefore, state in its tender/quotation the name of its accredited agent in the Republic of South Africa who is empowered to sign any contract which may be entered into in the event of its tender/quotation being accepted and to act on its behalf in all matters relating to the contract.

**10. IDENTIFICATION**

If the Respondent is a company, the full names of the directors shall be stated in the tender/quotation. If the Respondent is a close corporation, the full names of the members shall be stated in the tender/quotation. If the Respondent is a partnership or an individual trading under a trade name, the full names of the partners or of such individual, as the case may be, shall be furnished.

**11. FORMAL NOTIFICATION REGARDING NAME OF SUCCESSFUL RESPONDENT**

In the case of tenders submitted to the Secretary of a Divisional Acquisition Council, unsuccessful Respondents will be formally notified of the names of successful Respondent(s) as soon as possible after the closing date for receipt of the tender in question. In the case of tenders or quotations submitted to Transnet Acquisition Council, unsuccessful Respondents shall, upon application, be furnished with similar information.

**12. UNAUTHORISED COMMUNICATION ABOUT TENDERS**

Where tenders are submitted to the Secretary of an Acquisition Council, Respondents may at any time communicate with the Secretary on any matter relating to its tender but, in the absence of written authority from the Secretary, no communication on a question affecting the subject of a tender shall take place between Respondents or other potential suppliers or any member of the Acquisition Council or official of Transnet during the period between the closing date for the receipt of the tender and the date of the notification of the successful Respondent(s). A tender, in respect of which any such unauthorised communication has occurred, may be disqualified.

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### **13. CONTRACT DOCUMENTS**

The contract documents will comprise these General Tender Conditions and the Standard Terms and Conditions of Contract (Form US7 - Services) which will constitute the contract between the parties upon receipt by the Respondent of Transnet's letter of acceptance / intent, subject to all additional amendments and/or special conditions thereto as agreed to by the parties.

### **14. SECURITIES**

- 14.1 The successful Respondent, when called upon to do so, shall provide security to the satisfaction of Transnet for the due fulfilment of a contract or order. Such security shall be in the form of a deed of suretyship furnished by an approved bank, building society, insurance or guarantee corporation carrying on business in South Africa.
- 14.2 The security may be applied in whole or part at the discretion of Transnet to make good any loss or damage which Transnet may incur in consequence of a breach of the contract or any part thereof.
- 14.3 Such security, if required, shall be an amount which will be stipulated in the Tender Documents.
- 14.4 For the purpose of clause 14.1 above, Transnet will supply "Deed of Suretyship" forms to the successful Respondent for completion and no guarantee in any other form will be accepted. Copies of such forms will be supplied to Respondents on request. For this purpose "Deed of Suretyship" forms will be provided which shall be completed and returned to Transnet or a designated official by the successful Respondent within 30 (thirty) days from the date of the letter of acceptance. No payment will be made until the forms, duly completed, are delivered to Transnet. Failure to return the Deed of Suretyship within the prescribed time shall, save where prior extension has been granted, entitle Transnet without notice to the Supplier to cancel the contract with immediate effect.
- 14.5 Additional costs incurred by Transnet necessitated by reason of default on the part of the Supplier in relation to the conditions of this clause 14 will be for the account of the Supplier.

### **15. PRICES SUBJECT TO CONFIRMATION**

- 15.1 A tender or quotation with prices which are subject to confirmation will not be considered.
- 15.2 Tenders where firm prices are quoted for the duration of any resulting order and/or contract will receive precedence over prices which are subject to adjustment.

### **16. DELETION OF SERVICES EXCLUDED FROM OFFER/BID**

The Respondent must delete Services for which it has not tendered or for which the price or fee has been included elsewhere in the tender.

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## 17. ALTERATIONS MADE BY THE RESPONDENT TO TENDERED PRICES

All alterations made by the Respondent to its tendered price(s) prior to the submission of its Tender Documents must be done by deleting the incorrect figures and words where required and by inserting the correct figures and words against the items/Services concerned. All such alterations must be initialled by the person who signs the Tender Documents. Failure to observe this requirement may result in the particular item(s) or Services concerned being excluded in the matter of the award of the business.

## 18. VALUE-ADDED TAX

18.1 In respect of local Services, i.e. Services to be provided by a South African company, the prices or fees quoted by the Respondent are to be exclusive of Value-Added Tax (VAT) which must be shown separately at the standard rate on the Supplier's Tax Invoice.

18.2 In respect of Services to be provided by a foreign principal -

- (a) The invoicing by a local Supplier on behalf of its foreign principal represents a Service rendered by the principal, which is not subject to VAT;
- (b) The Supplier's Tax Invoice(s) for the local portion only (i.e. the "commission" for the Services rendered locally) must show the Value-Added Tax (VAT) separately at zero percent if the Services are in compliance with Section 11(2) of the VAT Act, 89 of 1991.

## 19. TERMS AND CONDITIONS OF TENDER

The Supplier shall adhere to the Standard Terms and Conditions of Contract as set out in Form US7 - Services), a copy of which is attached hereto. Should the Respondent find any conditions unacceptable, it should indicate which conditions are unacceptable and offer an alternative. Please note that any alternative offered shall be compared with acceptance of the Form US7 conditions or alternatives offered by other Respondents.

## 20. IMPORTANT NOTICE TO RESPONDENTS REGARDING PAYMENT

### 20.1 Method of Payment

- (a) The attention of the Respondent is directed to clause 10 (*Invoicing and Payment*) of Form US7 – Services, which sets out the conditions of payment on which tender price(s) shall be based.
- (b) However, in addition to the foregoing the Respondent is invited to submit offers based on alternative methods of payment and/or financing proposals.
- (c) The Respondent is required to give full particulars of the terms that will be applicable to its alternative offer(s) and the financial merits thereof will be evaluated and taken into consideration when the tender is adjudicated.

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- (d) The Respondent must, therefore, in the first instance, tender strictly in accordance with sub-clause 20.1(a) above. Failure to comply with sub-clause 20.1(a) above may preclude a tender from further consideration.

**NOTE: The successful Respondent (the Supplier) shall, where applicable, be required to furnish a guarantee covering any advance payments.**

## **20.2 Conditional Discount**

Respondents offering prices which are subject to a conditional discount applicable for payment within a specific period are to note that the conditional period will be calculated as from the date of receipt by Transnet of the Supplier's month-end statement reflecting the relevant Tax Invoice(s) for payment purposes, provided the conditions of the order or contract have been fulfilled and the Tax Invoice is correct in all respects as referred to in the contract or order. Incomplete and/or incorrect Tax Invoices shall be returned and the conditional period will be recalculated from the date of receipt of the correct documents.

## **21. PLANS, DRAWINGS, DIAGRAMS, SPECIFICATIONS AND DOCUMENTS**

Copyright in plans, drawings, diagrams, specifications and documents compiled by the Supplier for the purpose of contract work shall be governed by the terms and conditions detailed in clause 12 of Form US7 - Services (*Intellectual Property Rights*).

## **22. VISITS TO FOREIGN COUNTRIES**

22.1 Respondents must furnish details in a covering letter if it is considered necessary that employees of Transnet should carry out inspection and/or review any operational Services at the premises of the successful Respondent (the Supplier) or its subcontractors overseas for the purpose of a product demonstration and/or final acceptance or for any other reason.

22.2 If the Respondent considers overseas visits to be necessary it must provide the following information in a covering letter in respect of each visit -

- (a) countries and places to be visited;
- (b) number of employees and disciplines involved;
- (c) number of man-days involved; and
- (d) motivation for the visit.

22.3 Transnet will make all arrangements with regard to booking of air journeys, hotel reservations, transport to and from airports, places of inspection or demonstration, etc. and all expenses will be for the account of Transnet.

22.4 Before a visit is undertaken, such as envisaged in this clause 22, Transnet and the Supplier will agree in writing on the number of employees of Transnet that should undertake the visit and the number of man-days involved in the visit.

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## 23. TENDERS BY FOREIGN RESPONDENTS OR ON THEIR BEHALF

- 23.1 Tenders submitted by foreign principals may be forwarded direct by the principals to the Secretary of the Acquisition Council or to a designated official of Transnet according to whichever officer is specified in the Tender Documents, or may be so forwarded on the principal's behalf by its South African representative and/or agent provided that written proof is submitted that such representative / agent has been duly authorised to act in that capacity by the principal. Failure to submit such authorisation by the representative / agent shall disqualify the tender.
- 23.2 When legally authorised to prepare and submit tenders on behalf of their principals not domiciled in the Republic of South Africa, representatives and/or agents must compile the tenders in the names of such principals and sign them on behalf of the latter.
- 23.3 South African representatives and/or agents of successful foreign Respondents must when so required enter into a formal contract in the name of their principals and must sign such contracts on behalf of the latter. In every such case a legal Power of Attorney from their principals must be furnished to Transnet by the South African representative and/or agents authorising them to enter into and sign such contracts.
- (a) Such Powers of Attorney must comply with Government Notice No. 1160 of 27 June 1930 (and any amendments thereto) - "Rules of the Supreme Court of South Africa for the authentication of documents executed outside the Republic for use within the Republic."
  - (b) The Powers of Attorney must be signed by principals under the same title as used in the Tender Documents.
  - (c) On arrival within the Republic of South Africa these Powers of Attorney are to be completed in terms of Section 8(2) of the Stamp Duties Act No. 77 of 1968, or any amendment thereof.
  - (d) If a Power of Attorney held by the South African representative or agent includes matters of a general nature besides provision for the entering into and signing of contracts with Transnet, a notarially certified copy thereof should be furnished.
  - (e) The Power of Attorney must authorise the South African representative or agent to choose the *domicilium citandi et executandi* as provided for in clause 26 (*Addresses for Notices*) of the Standard Conditions of Contract, Form US7 - Services.
- 23.4 If payment is to be made in South Africa, the foreign Supplier (i.e. the principal, or its South African agents or representatives), must notify Transnet in writing whether -
- (a) For payment by cheque –

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- (i) cheques are to be drawn for payment to the credit of the foreign Supplier's account at a bank in South Africa, in which case the name and branch of such bank shall be furnished; or
  - (ii) cheques are to be made out in favour of the foreign Supplier and forwarded to its South African agent or representative, in which case such agent or representative must be duly authorised to sign the receipt of the cheque and discharge it on behalf of its principal.
- (b) For payment by electronic funds transfer (EFT) –
- (i) funds are to be transferred to the credit of the foreign Supplier's account at a bank in South Africa, in which case the name and branch of such bank shall be furnished; or
  - (ii) funds are to be transferred to the credit of its South African agent or representative, in which case the name and branch of such bank shall be furnished

23.5 The attention of the Respondent is directed to clause 14 above (*Securities*) regarding the provision of security for the fulfilment of contracts and orders and the manner and form in which such security is to be furnished.

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Respondent's Signature

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**SPECIFICATION FOR RADIO  
ANTENNA COMBINING EQUIPMENT  
SPC-00865**

**JUNE 2011**

**Revision 3.00**

<b>NON-DISCLOSURE OF INFORMATION</b>
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## DOCUMENT AUTHORISATION

FUNCTION	NAME	TITLE & DIVISION	SIGNATURE	DATE
Converted by :	Z Matseke	Transmission Engineering		
Reviewed by:	P du Plessis	Quality Assurance		
Reviewed by:	G Daly	HOD Access		
Authorised by:	M Nuttall	Divisional Manager Transmission		

## I DISTRIBUTION

Once updated, a copy of the latest revision will be published in the document management system in use. E-mail to this effect will be sent to the relevant personnel or heads of department

## II DOCUMENT CHANGE HISTORY

ISSUE NO.	DATE ISSUED	ISSUED BY	HISTORY DESCRIPTION
1.00	November 2004	Access	New document
2.00	November 2006	Transmission Engineering	Converted to ISO 9000 Standard
3.00	June 2011	Transmission Engineering	Converted to TFR standard, obsolete clauses removed and referred to QA standard testing measurements

## III CHANGES SINCE LAST REVISION

CLAUSES	DESCRIPTION
All clauses	Converted to ISO standard



**IV ABBREVIATIONS, ACRONYMS AND DEFINITIONS**

ABBREVIATIONS AND ACRONYMS	DESCRIPTION
BS	British Standard
dB	Decibel
MHz	Megahertz
RF	Radio Frequency
Rx	Radio Receiver
SANS	South African National Standards
Tx	Radio Transmitter
VSWR	Voltage Standing Wave Ratio
W	Wattage

**V RELEVANT DOCUMENTATION**

DOCUMENT NO.	DESCRIPTION	LOCATION
ISO 9000	Quality Management Systems	External
BBD8635 latest version	Specification and Methods of Measurement for Angle Modulated Radio Equipment	Internal - Projectwise
BS 3939	Standard Graphic Symbols for Circuit	External

## SCOPE

This specification covers the requirements of Transnet Freight Rail for the supply of radio antennae combining equipment.

### 1. COMPLIANCE

- 1.1. Tenderers shall indicate, clause by clause, either that their offers comply in every respect with this specification, or, if not, precisely how they differ.
- 1.2. A broad statement to the effect that the equipment is in accordance with this specification is not acceptable.
- 1.3. Failure to comply with the above requirements may preclude a tender from consideration.
- 1.4. Tenderers may offer additions or modifications for consideration. Alternative offers are to be reflected on a separate schedule and the following particulars are to be provided:
  - 1.4.1. A fully detailed technical description explaining the functioning of the individual components, the operation of the items of equipment as well as the procedure to be followed in clearing faults and maintenance.
  - 1.4.2. Drawings and brochures supporting the offer.
  - 1.4.3. Details of deviations from the specifications of Transnet Freight Rail.
  - 1.4.4. The values of imported and local components of complete items are to be stated separately.

### 2. SERVICE CONDITIONS

- 2.1. The equipment must be suitable for continuous operation under the following conditions:

Altitude: 0 to 1 800 metres above sea level.

Ambient temperatures: Minus 10 °C to plus 60 °C.

Air pollution: Heavily saline laden industrial and locomotive fumes.

Relative humidity: As high as 95%.

Lightning: Severe

- 2.2. All component parts, including wiring, etc. must be manufactured and processed to ensure reliable operation under these conditions

### 3. TECHNICAL REQUIREMENTS

The technical requirements for the combining equipment are listed in the attached appendix.

Technical performance must comply with BBD 8635.

### 4. SCHEDULE OF REQUIREMENTS

- 4.1. Where only equipment in terms of this specification is required by Transnet Freight Rail, a Schedule of Requirements or Bill of Quantities will accompany this specification. Where a system, including other equipment, is to be supplied, a main specification will be included in the tender documents together with a Schedule of Requirements for all the equipment.
- 4.2. The equipment required is listed in the Schedule of Requirements. The equipment must comply with the details therein, in, addition to the requirements of the, relevant clauses of this specification.
- 4.3. The tenderers statement of compliance as per clause 3 must also cover the relevant clauses of the Schedule of Requirements.

### 5. QUALITY OF MATERIAL

- 5.1. Materials which may, under the influence of heat, light or pressure, decompose or liberate elements or compounds likely to corrode or affect other materials or cause electrolytic corrosion will not be acceptable.
- 5.2. Mounting screws, where used, must not be self-tapping. Bushes and threaded inserts must be used.
- 5.3. All covers, jacks, sockets etc. must be provided with adequate seals.
- 5.4. Solid-state boards must be provided on a plug-in or other approved basis so that they can, when necessary, be readily removed for repairs or replacement.
- 5.5. The equipment layout must be planned to facilitate fault clearance and maintenance.
- 5.6. All terminals must be clearly and permanently labelled in English or with acceptable graphic symbols (BS3939).

## ACCEPTANCE TEST

- 5.7. Transnet Freight Rail will conduct acceptance tests on the equipment. The equipment will not be accepted nor did payment authorise until these tests have been completed and it has been confirmed that the equipment supplied is fully in accordance with the requirements of this specification and/or the stated claims of the tenderer as accepted by Transnet Freight Rail.
- 5.8. The successful tenderer must agree to rectify any defects at no cost to Transnet Freight Rail, where the equipment does not meet the tender requirements and/or the stated claims of the tenderer.

## 6. SPARES

- 6.1. The equipment must be supplied complete with spare fuses, pilot/indicator lamps and set-back amplifiers as specified in the Schedule of Requirements.

## 7. MAINTENANCE SERVICE

- 7.1. The tenderer must give full particulars of the maintenance, spare parts and service facilities which will be available in the Republic of South Africa. The names and addresses of the companies concerned must be furnished.
- 7.2. The tenderer must list the major centres where maintenance facilities can be provided and must state if repairs under guarantee can be undertaken at these centres.
- 7.3. Tenderers must state what provision will be made to ensure an adequate supply of locally available spare components for a period of 10 years after the order is placed.
- 7.4. Transnet Freight Rail will not consider tenders from tenderers who cannot provide an efficient spares and maintenance service. Tenderers must state whether they are prepared to agree to an inspection of their maintenance premises by the engineering personnel of Transnet Freight Rail.

## 8. TECHNICAL HANDBOOK

- 8.1. Technical handbooks must be clearly and professionally printed in English on quality paper. CD or DVD versions are acceptable.
- 8.2. The technical handbooks must be packed with the equipment.
- 8.3. Each set of handbooks must include the following:
- 8.3.1. Operating instructions.



- 8.3.2. Complete maintenance instructions.
- 8.3.3. Complete and detailed alignment procedures in a proven and easy to follow order.
- 8.3.4. A detailed technical description of the equipment.
- 8.3.5. Complete circuit diagrams, drawings and photographs of the equipment. The photographs and drawings must clearly indicate component and module location in the equipment. All component numbers must be clearly indicated.
- 8.4. All symbols and notations used on drawings and circuit diagrams preferably comply with the requirements laid down in BS 3939. Where symbols and notations do not comply with these requirements, each drawing shall be accompanied by a legend clearly detailing BS 3939 equivalents.
- 8.5. Transnet Freight Rail reserves the right to reproduce in whole or in part, by any means whatsoever, any technical handbook or instruction manual supplied by the successful Contractor. Any such reproductions will be for the sole use of Transnet Freight Rail.

## 9. GENERAL

The tenderer must submit technical specification pamphlets and schematic diagrams covering the equipment offered. Photographs and complete drawings clearly displaying the external dimensions and physical appearance of the equipment must also be submitted with the tender.

## 10. TECHNICAL SCHEDULE: FOUR CHANNEL UHF COMBINER

### 10.1. INTRODUCTION

10.1.1. The Four Channel UHF Combining System (Combiner) is to be used in the upgrade of Transnet Freight Rail UHF Trunking Network. The purpose of the Combiner is to reduce the number of antennae in this multi-channel system.

### 10.2. ELECTRICAL CHARACTERISTICS

#### 10.2.1. Transmit Path

- 10.2.1.1. Transmitter operating frequency band 455,0000 MHz – 456,6375 MHz
- 10.2.1.2. The Tx – Rx frequency spacing is 10 MHz.
- 10.2.1.3. Continuous Transmitter Power : 70 W
- 10.2.1.4. Number of Channels : 4
- 10.2.1.5. Impedance Matching : 50 ohm all ports

- 10.2.1.6. VSWR:  $\leq 1, 5: 1$
- 10.2.1.7. TX – TX Isolation :  $\geq 60$  dB
- 10.2.1.8. TX – Antenna Insertion Loss :  $\leq 10$  dB
- 10.2.1.9. 2 and 3 Harmonic Suppression: = 50 dB Typical
- 10.2.1.10. Termination: N – Type Female

#### 10.2.2. Receive Path

- 10.2.2.1. Receive operating frequency band 465,0000 MHz – 466,6375 MHz
- 10.2.2.2. Number of Channels: 4
- 10.2.2.3. Impedance Matching: 50 Ohm all ports
- 10.2.2.4. VSWR:  $\leq 1,5: 1$
- 10.2.2.5. Rx – Rx Isolation:  $\geq 20$  dB
- 10.2.2.6. Rx isolation at TX Frequencies:  $\geq 85$  dB
- 10.2.2.7. Gain of the Receiver Multi-Coupler set-back amplifier must be such to compensate for the insertion loss: Antenna – Rx insertion loss 0 dB  $\pm 0,5$  dB loss/gain at low signal levels
- 10.2.2.8. 2nd and 3rd Harmonic – Suppression: 35 dB
- 10.2.2.9. Termination: N – Type Female

#### 10.3. MECHANICAL CHARACTERISTICS

- 10.3.1. 19" Rack Compatible
- 10.3.2. Height: 8 U Maximum
- 10.3.3. Temperature Range:  $-10^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$

#### 10.4. ELECTRICAL REQUIREMENTS

- 10.4.1. A low noise set-back amplifier must be provided with the following:
- 10.4.2. The amplifier must be protected against high signal levels. The tenderer must state the maximum level the amplifier can receive without being damaged.
- 10.4.3. Chassis mount inline fuse on the power line.

10.4.4. Power indicator lamp (LED). The LED must preferably be mounted on the front of the combiner where it is visible. When the fuse is blown the LED must be off.

10.4.5. The power requirement for the set-back amplifier will be indicated in the Schedule of Requirements.

## 10.5. TERMINATORS

10.5.1. All unused RF terminals must be terminated with 50  $\Omega$  loads.

10.5.2. Power dissipation: 0.25 W

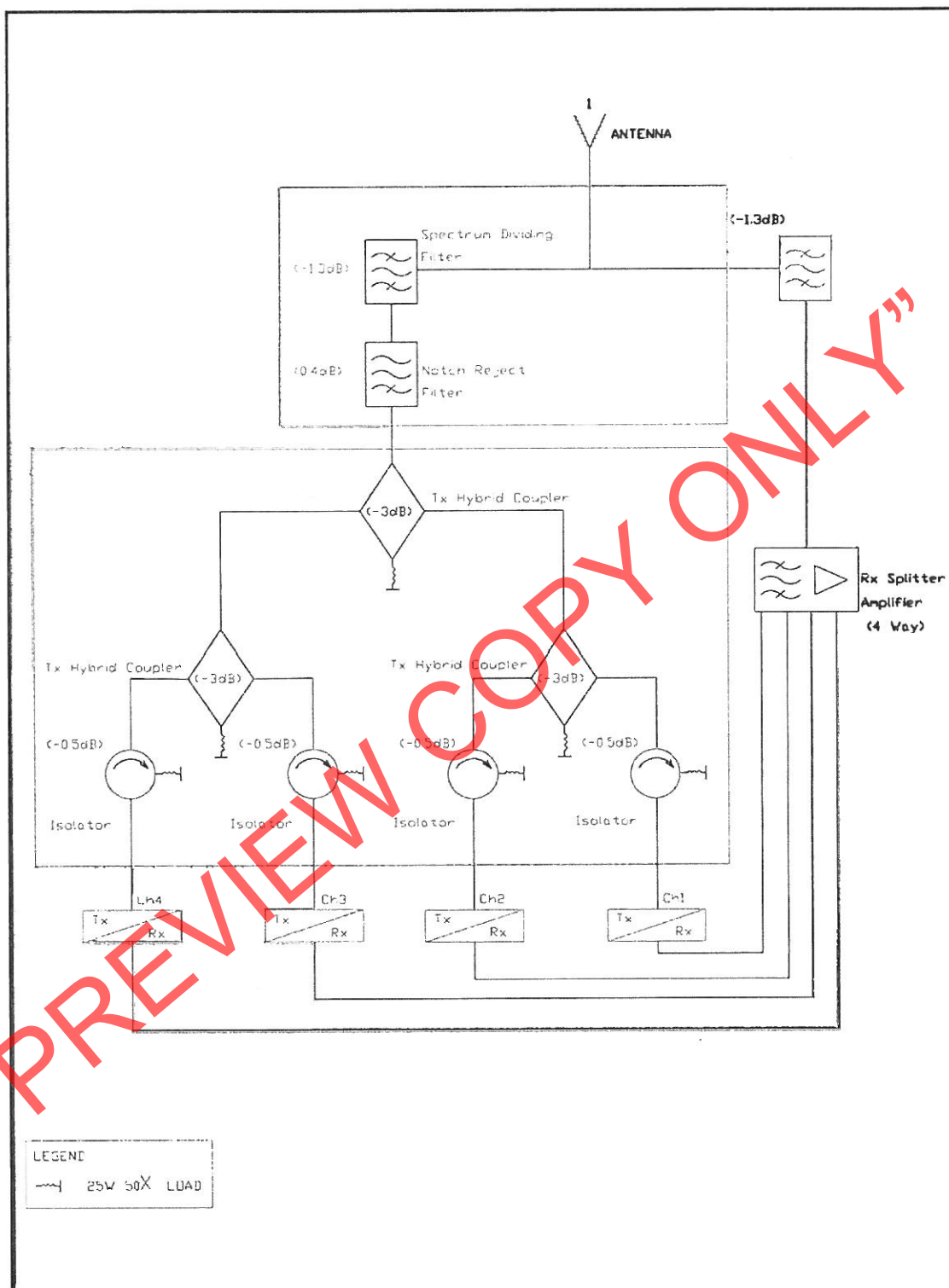
10.5.3. VSWR: 1.1: 1

10.5.4. Termination: N – Type Male

10.5.5. The required amount of 50  $\Omega$  loads will be indicated in the Schedule of Requirements.

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DRAWING (4-Channel UHF Antenna Combining System)



END OF DOCUMENT





A Division of Transnet Limited

## INFRASTRUCTURE TELECOMS

### STANDARD

# TECHNICAL SPECIFICATION AND METHODS OF MEASUREMENT FOR ANGLE MODULATED RADIO EQUIPMENT (EXTRACT)

Author: Chief Engineering Technician  
Quality Assurance, National  
Test Centre

P J du Plessis

Signed:  
P J du Plessis

Approved: Senior Engineer  
Infrastructure Quality Assurance

T Dean

Signed:  
T Dean

Date: 29 November 2010

Circulation Restricted To:

Transnet Freight Rail  
Transnet and Relevant Third Parties

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**I Distribution**

Once updated, a copy of the latest revision will be published in the document management system in use. An e-mail to this effect will be sent to the relevant personnel or heads of department.

**II Document Change History**

ISSUE NO.	DATE ISSUED	ISSUED BY	HISTORY DESCRIPTION

**III Changes Since Last Revision**

CLAUSES	DESCRIPTION

**IV List of Abbreviations and Definitions**

ABBREVIATIONS	DESCRIPTION
AC	Alternating Current
AF	Audio Frequency
BS	Base Station
CCITT	Consultative Committee for International Telephone and Telegraph (ITU-T)
CTCSS	Continuous Tone Coded Squelch System
dB	Decibel
dB(A)	Sound pressure A weighted
DC	Direct Current
ERP	Effective Radiated Power
FFSK	Fast Frequency Shift Keying
FM	Frequency Modulation
GSM	Global System for Mobile communication
LS	Loudspeaker
mA	Milliampere
ms	Millisecond
mVp-p	Millivolt peak-to-peak
mW	Milliwatt
MUOP	Maximum Useful Output Power
PM	Phase Modulation
RF	Radio Frequency
Rx	Radio receiver
SANS	South African National Standards
SINAD	Signal, Noise & Distortion to Noise & Distortion ratio
SOP	Standard Output Power
SPL	Sound Pressure Level
THD	Total Harmonic Distortion
Tx	Radio transmitter
Vp-p	Voltage peak-to-peak
VSWR	Voltage Standing Wave Ratio
W	Watt
WiFi	Wireless Fidelity



DEFINITIONS	DESCRIPTION
<b><u>GENERAL</u></b>	
<b>Angle Modulation</b>	A term used to encompass both frequency modulation and phase modulation.
<b>Decibel</b>	The decibel is 1/10 of a Bel. Decibel is the logarithm of the ratio between a measured quantity and an agreed reference level.
<b>dBc</b>	The absolute power in decibel with reference to the carrier power.
<b>dBm</b>	The absolute power in decibel with reference to 1 mW.
<b>Land Mobile Radio Services</b>	Radio communication from fixed radio stations to mobile radio stations carried in surface vehicles or portable radio stations, and between mobile and portable radio stations.
<b>Portable Radio Station</b>	A radio station designed to be carried by or on a person.
<b>Mobile Radio Station</b>	A radio station designed for installation in a surface vehicle and capable of operating while the vehicle is in motion and while it is stationary.
<b>Fixed Radio Station</b>	It is a fixed radio station installed in an office or control room, fitted with an external antenna.
<b>Base Station</b>	A radio station designed to be installed in a fixed location and performing the function of a repeater/enhancer.
<b>A-weighted</b>	It is a network that weights an audio signal in a manner, which approximates to an inverted equal loudness contour (it approximate the human ear's response to sound) at low SPL, up to 55 dB.
<b>Sound Pressure</b>	It is the force (N) of sound on a surface area ( $m^2$ ) perpendicular to the direction of the sound. SPL is express as $N/m^2$ or Pascal (Pa).
<b><u>RADIO RECEIVER</u></b>	
<b>Adjacent Channel Selectivity and Desensitization Ratio</b>	A measure of the ability of a radio receiver to receive the modulated standard input signal in the presence of modulated signals that differ in frequency from the standard input signal frequency by the spacing of one channel.
<b>Amplitude Characteristics</b>	The relationship between the radio frequency input level of a specified modulated signal and the audio frequency level at a radio receiver output.
<b>Attack Time</b>	The time required to produce an audio output level of $-0.5 \text{ dB}_{\text{SOP}}$ after application of a RF signal level, 12 dB above usable sensitivity, modulated with standard test modulation.
<b>Audio Frequency Response</b>	The relationship between the modulation factor of a received signal and the audio output level of the demodulated signal at various audio frequencies.
<b>Audio Frequency Total Harmonic Distortion</b>	The change in harmonic content of an audio signal as a result of its passing through the audio frequency and radio frequency circuits of a radio.
<b>Blocking or Desensitisation</b>	A reduction in the wanted audio output power of a radio receiver, or a reduction in the SINAD ratio, owing to an unwanted signal on another frequency.
<b>Co-channel Rejection Ratio</b>	A measure of the capability of a radio receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver.
<b>Conducted Spurious Radiation</b>	It is radiation components at any frequency generated by a radio receiver and radiated by the radio's antenna.

DEFINITIONS	DESCRIPTION
<b>Desensitisation</b>	Is a condition where off-channel transmitting energy passes through the front-end of the radio receiver, causing a reduction in receiver gain.
<b>High RF Signal Level Interference</b>	A measure of the ability of a radio receiver to oppose high RF signal levels at frequencies other than the normal frequency of the receiver.
<b>Intermodulation Spurious Response Attenuation/ Rejection</b>	The ability of a radio receiver to receive a modulated standard input signal, in the presence of two interfering signals of which the carrier frequencies are so separated from the standard input signal frequency and from each other that n'th order mixing of the two undesired signals can occur in the non-linear elements of the receiver, producing a third signal whose frequency is equal to that of the standard input signal frequency, or intermediate frequency.
<b>Maximum Useful Output Power</b>	The greatest average audio output power supplied to the rated load, which power does not exceed 10 % of the total harmonic distortion.
<b>Modulation Acceptance Bandwidth</b>	The selectivity characteristic of an angle modulated radio receiver that limits the maximum permissible modulation deviation of the radio frequency input signal that a receiver can accept, without degradation of the 12 dB SINAD ratio, when the radio frequency input signal is 6 dB greater than the usable sensitivity level.
<b>Modulation Factor</b>	The ratio of the maximum positive or negative peak variation of the modulating variable, to the maximum rated system-modulating variable, expressed as a percentage.
<b>Signal, Noise &amp; Distortion to Noise &amp; Distortion Ratio</b>	The ratio, expressed in decibels of the signal power, plus noise power, plus distortion power, to noise power plus distortion power produced at the output of a radio receiver resulting from a modulated signal input.
<b>Signal to Hum and Noise Ratio</b>	The ratio of residual receiver audio output power to standard output power.
<b>Spurious Response Attenuation/ Rejection</b>	A measure of the ability of a radio receiver to discriminate between the standard input signal frequency and an undesired signal at any other frequency to which it is also responsive, excluding the two adjacent channels.
<b>Squelch Closing Time</b>	The period of time between the removal of the RF signal and the squelch closure.
<b>Squelch Operating Threshold</b>	The RF signal input level, modulated with standard test modulation, at which the squelch opens and closes.
<b>Standard Output Power</b>	An audio output level 3 dB below maximum useful output power used to define a reference level for test purposes.
<b>Usable Sensitivity</b>	The minimum radio frequency input signal level modulated with standard test modulation that will produce, at a radio receiver, a SINAD ratio of at least 12 dB and an audio output signal power of at least $-3 \text{ dB}_{\text{SOP}}$ .
<b><u>RADIO TRANSMITTER</u></b>	
<b>Adjacent Channel Power</b>	The part of the total power output of a radio transmitter that, under defined conditions of modulation, falls within a specified bandwidth centred on the normal frequency of either of the adjacent channels.
<b>Amplitude Modulation Hum &amp; Noise Level</b>	A measure of the unwanted amplitude modulation of a carrier resulting from hum and noise.
<b>Angle Modulation Hum &amp; Noise Ratio</b>	The ratio of residual angle modulation to standard test modulation.
<b>Audio Frequency Response</b>	The relationship between the modulation factor of a transmitted signal and the input level of the modulating signal at various audio frequencies.
<b>Audio Frequency Total Harmonic Distortion</b>	The change in harmonic content of an audio signal as a result of its passing through the audio frequency and radio frequency circuits of a radio.



DEFINITIONS	DESCRIPTION
<b>Carrier Attack Time</b>	The time required, changing the state of a radio transmitter from standby to a state where the unmodulated carrier voltage level reaches a value 6 dB below the steady state.
<b>Carrier Frequency Error</b>	Is the difference between the measured unmodulated carrier frequency from the assigned frequency.
<b>Carrier Power</b>	The mean power available at the output terminal of a radio transmitter in the absence of modulation.
<b>Conducted Spurious Emissions</b>	Emissions at the antenna terminal of a radio transmitter on a frequency or frequencies that are outside the channel on which the transmitter is operating.
<b>Extreme Transmitter Loads</b>	Conditions under which the radio transmitter operates into an open circuit or short circuit.
<b>Intermodulation Attenuation</b>	The ability of a radio transmitter to attenuate signals generated in its non-linear elements by the presence of the carrier and a parasitic signal arriving at the transmitter through its antenna.
<b>Microphone sensitivity</b>	It is the amount of modulation that the radio transmitter produces when a specified audio signal level is present at the microphone.
<b>Mismatch between Transmitter and Antenna System</b>	A condition in which the impedance as presented to the radio transmitter by the transmission line and antenna is not the same as the designed system impedance.
<b>Modulation Limiting (Tx deviation)</b>	A measure of the ability of radio transmitter circuits to prevent a transmitter from producing modulation such that the modulation factor exceeds the maximum rated system modulation factor.
<b><u>TALK THROUGH SIGNAL</u></b>	
<b>Modulation Factor Linearity</b>	The relationship between the modulation factor of a received signal and the transmitted modulation factor.
<b><u>TRUNK CONTROL SIGNAL</u></b>	
<b>Fast Frequency Shift Keying</b>	Bit 0 = 1.8 kHz Bit 1 = 1.2 kHz
<b><u>AUDIO LINE BRANCHING UNIT</u></b>	
<b>Common-mode Rejection Ratio</b>	Is the ratio of the differential gain over the common-mode gain.
<b><u>FILTERS</u></b>	
<b>Duplexer</b>	Is a filter system providing RF isolation to allow the sharing of a single antenna for both transmission and reception.
<b>Insertion Loss</b>	It is the amount of loss to a signal passing through a filter at a designated frequency.
<b>Isolation between transmitter and receiver ports (duplexer)</b>	It is the ability of the duplexer to suppress the transmitter carrier power at the receiver port. It is also called the selectivity of the duplexer.
<b><u>ANTENNAS</u></b>	
<b>Effective Radiated Power</b>	It is the mean power radiated by the antenna in the direction of maximum radiation.
<b>dBd</b>	The power gain of an antenna in decibel with reference to a Dipole antenna.

## 1. TECHNICAL SPECIFICATION

Where not specifically indicated, this specification only applies for open channel and Trunked radio systems.

### 1.1 Radio Receiver

#### 1.1.1 Normal condition (see clause 2.1.1)

	Characteristics	Portable	Mobile & Fixed Radio Station	Base Station (Repeater)
1.1.1.1	Maximum Useful Audio Output Power	Maximum power not exceeding 10 % THD.		
1.1.1.2	Audio Frequency THD at Low Output Power Level 500 Hz & 1.0 kHz	≤ 5 %	≤ 2 %	≤ 2 %
1.1.1.3	Usable Sensitivity	≤ −115 dBm		
1.1.1.4	Squelch Operating Threshold Open Close	−115 dBm minimum ≤ 3 dB lower than the opening threshold	See clause 1.3.1.1 ≤ 3 dB lower than the opening threshold	
1.1.1.5	Attack Time	≤ 150 ms		
1.1.1.6	Squelch Closing Time	≤ 250 ms		
1.1.1.7	Modulation Acceptance Bandwidth	≥ 3.75 kHz		
1.1.1.8	Adjacent Channel Selectivity and Desensitization Ratio	≥ 60 dB	≥ 65 dB	≥ 70 dB
1.1.1.9	Spurious Response Attenuation/Rejection	≥ 70 dB	≥ 75 dB	≥ 75 dB
1.1.1.10	Intermodulation Spurious Response Attenuation/Rejection	≥ 65 dB	≥ 65 dB	≥ 70 dB
1.1.1.11	Co-channel Rejection Ratio	≤ 12 dB		
1.1.1.12	Blocking	≥ 84 dB		
1.1.1.13	Conducted Spurious Radiation	≤ −57 dBm		
1.1.1.14	Audio Frequency Response (6 dB/octave) 300 – 900 Hz 1.1 – 2.5 kHz 3.0 kHz	+1 dB to −3 dB +1 dB to −3 dB +1 dB to −4.5 dB		
1.1.1.15	Signal to Hum and Noise Ratio Squelched Unsquelched	≥ 60 dB ≥ 39 dB		
1.1.1.16	Amplitude Characteristics	≤ 3 dB		

## 1.1.2 Extreme conditions (see clause 2.1.2)

Characteristics	Portable	Mobile & Fixed Radio Station	Base Station (Repeater)
POWER SUPPLY			
Usable Sensitivity variation	$\leq \pm 3$ dB		
Adjacent Channel Selectivity and Desensitisation Ratio	$\geq 60$ dB	$\geq 65$ dB	$\geq 70$ dB

## 1.1.2.2

TEMPERATURE			
Usable Sensitivity variation	$\leq \pm 3$ dB		
Adjacent Channel Selectivity and Desensitisation Ratio	$\geq 60$ dB	$\geq 65$ dB	$\geq 70$ dB

## 1.1.2.3

HIGH RF SIGNAL LEVEL INTERFERENCE			
Input signal level	-47 dBm to -7 dBm		

## 1.2 Radio Transmitter – 12.5 kHz channel spacing; operating frequency band 450 MHz to 470 MHz.

## 1.2.1 Normal condition (see clause 2.1.1)

Characteristics	Portable	Mobile & Fixed Radio Station	Base Station (Repeater)
Carrier Power (conducted)	$\leq \pm 1$ dB from manufacturer's claim		
Conducted Spurious Emissions			
Operating	$\leq -36$ dBm		
Standby	$\leq -57$ dBm		
Carrier Frequency Error	$\leq 1.5$ kHz	$\leq 1.5$ kHz	$\leq 1.0$ kHz
Carrier Attack Time	$\leq 100$ ms		
Adjacent Channel Power	$\leq -60$ dBc	$\leq -70$ dBc	$\leq -70$ dBc
Or	-37 dBm maximum.		
Intermodulation Attenuation	n.a.	n.a.	$\geq 40$ dB
Modulation Limiting (Tx Deviation)			
Modulating freq.			
0.3 – 2.55 kHz	2.5 kHz maximum		
3 – 6 kHz	0.75 kHz maximum at 6 kHz		
6 – 12.5 kHz	-14 dB/octave		
CTCSS Deviation	250 Hz		
Audio Frequency THD			
500 Hz	$\leq 5$ %	$\leq 2$ %	$\leq 2$ %
1.0 kHz			



	Characteristics	Portable	Mobile & Fixed Radio Station	Base Station (Repeater)
1.2.1.10	Audio Frequency Response (6 dB/octave) 300 – 900 Hz 1.1 – 2.5 kHz 3.0 kHz	+3 dB to –1 dB +3 dB to –1 dB +4.5 dB to –1 dB		
1.2.1.11	Angle Modulation Hum & Noise Ratio	$\geq 34$ dB		
1.2.1.12	Amplitude Modulation Hum & Noise Level	$\leq -34$ dB		

## 1.2.2 Extreme conditions (see clause 2.1.2)

	Characteristics	Portable	Mobile & Fixed Radio Station	Base Station (Repeater)
1.2.2.1	POWER SUPPLY			
1.2.2.1.1	Carrier Power Variation	$\leq \pm 2$ dB		
1.2.2.1.2	Conducted Spurious Emissions Operating Standby	$\leq -36$ dBm $\leq -57$ dBm		
1.2.2.1.3	Carrier Frequency Error	$\leq 1.5$ kHz	$\leq 1.5$ kHz	$\leq 1.0$ kHz
1.2.2.2	TEMPERATURE			
1.2.2.2.1	Carrier Power Variation	$\leq \pm 2$ dB		
1.2.2.2.2	Conducted Spurious Emissions Operating Standby	$\leq -36$ dBm $\leq -57$ dBm		
1.2.2.2.3	Carrier Frequency Error	$\leq 1.5$ kHz	$\leq 1.5$ kHz	$\leq 1.0$ kHz
1.2.2.3	ANTENNA TERMINAL LOADS			
1.2.2.3.1	Short Circuit and Open Circuit Carrier Power Variation	$\leq \pm 1$ dB		

### 1.3 Radio Base Station (Repeater) – 12.5 kHz channel spacing; operating frequency band 450 MHz to 470 MHz.

The receiver and transmitter specifications are referred to in clauses 1.1 and 1.2 respectively.

#### 1.3.1 Receiver

	Characteristics	Base Station (Repeater)
1.3.1.1	Squelch operating threshold calculation	
	Open	–115 dBm – coaxial cable loss – duplexer loss + antenna gain.
	Close	≤ 3 dB lower than the opening threshold

#### 1.3.2 Receiver and transmitter

	Characteristics	Base Station (Repeater)
1.3.2.1	Response time	≤ 300 ms

#### 1.3.3 Talk Through Signal

	Characteristics	Base Station (Repeater)
1.3.3.1	Audio input and output terminals	
1.3.3.1.1	Impedance	600 Ω balanced
1.3.3.1.2	Return Loss	≤ –25 dB
1.3.3.2	Audio Levels	
1.3.3.2.1	RTO & Trunking (local & intersite)	–10 dBm ± 0.5 dBm
1.3.3.2.2	Old Trunking Teletra system	–4 dBm ± 0.7 dBm
1.3.3.3	Audio Frequency Response (With de-emphasis and pre-emphasis) <u>Modulating frequency</u> 300 – 900 Hz 1.1 – 3.0 kHz	±3.0 dB ±3.0 dB
1.3.3.4	Audio Frequency Response (Without de-emphasis and pre-emphasis) <u>Modulating frequency</u> 300 – 900 Hz 1.1 – 3.0 kHz	±2.0 dB ±2.0 dB
1.3.3.5	Modulation Factor Linearity <u>Modulation</u> 0.5 kHz 1.0 kHz 1.5 kHz 2.0 kHz 2.5 kHz	0.5 kHz ±100 Hz 1.0 kHz ±100 Hz 1.5 kHz ±100 Hz 2.0 kHz ±100 Hz 2.5 kHz –100 Hz
1.3.3.6	Audio Frequency THD	≤ 5 %

1.4 **Filters**

## 1.4.1 Duplexer (Radio Train Order)

Characteristics	Base Station (Repeater)
1.4.1.1 Insertion Loss (Tx & Rx)	$\leq 1.2$ dB
1.4.1.2 Isolation (between Tx and Rx)	$\geq 65$ dB (operating band) $\geq 80$ dB (single channel)
1.4.1.3 Impedance Matching, 50 $\Omega$ (all ports)	VSWR $\leq 1.5 : 1$ Return Loss $\leq -14$ dB
1.4.1.4 * Operating Frequency Band Receiver Transmitter	465.0500 MHz to 465.9875 MHz 455.0500 MHz to 455.9875 MHz

\* Duplexer for link operation is channelized.

## 1.4.2 Combiner (Trunked)

Characteristics	Base Station (Repeater)
1.4.2.1 Insertion Loss - Receiver path	0 dB $\pm 0.5$ dB
1.4.2.2 Insertion Loss - Transmit path	$\leq 10$ dB
1.4.2.3 Isolation (between Tx and Rx)	$\geq 85$ dB
1.4.2.4 Isolation (between Tx ports)	$\geq 60$ dB
1.4.2.5 Impedance Matching, 50 $\Omega$ (all ports)	VSWR $\leq 1.5 : 1$ Return Loss $\leq -14$ dB
1.4.2.6 Operating Frequency Band Receiver Transmitter	465.0000 MHz to 466.6375 MHz 455.0000 MHz to 456.6375 MHz

1.5 **Coaxial Cable**

Characteristics	Mobile & Fixed Radio Station	Base Station (Repeater)
1.5.1 Impedance	50 $\Omega$	
1.5.2 Impedance matching	VSWR $\leq 1.5 : 1$ Return Loss $\leq -14$ dB	
1.5.3 Insertion loss	$\leq 1$ dB	$\leq 5$ dB

1.6 **Antenna**

Characteristics	Various
1.6.1 Impedance	50 $\Omega$
1.6.2 Impedance matching VHF & UHF GSM & WiFi	VSWR $\leq 1.5:1$ Return Loss $\leq -14$ dB VSWR $\leq 2.0:1$ Return Loss $\leq -9.54$ dB

	Characteristics	Various
1.6.3	* Antenna gain Mobile Fixed station Radio link – point to point – Point to multipoint Base station	0 dBd $\leq 12$ dBd 9 dBd minimum Not specified $\leq 12$ dBd
1.6.4	# Antenna vertical separation	$\geq 4 \lambda$
1.6.5	* Antenna height above ground level Mobile & Fixed station Radio link – point to point – Point to multipoint Base station	10 m maximum 20 m maximum 20 m maximum 20 m maximum

# Based on 20 W ERP and antennae having a dipole as a live element. Distance measured from centre to centre of dipoles.

\* Licence conditions

## 1.7 Transmitting Power

	Characteristics	Various
1.7.1	* Conducted power at transmitter terminal Radio link – point to point – Point to multipoint	1 W maximum 1 W maximum
1.7.2	* Effective Radiated Power (ERP) Mobile & Fixed station Radio link – point to point – Point to multipoint Base station	20 W maximum 8.2 W maximum 8.2 W maximum 20 W maximum

\* Licence conditions

## 1.8 Receiver Desensing

	Characteristics	Various
1.8.1	Desensing	$\leq 1$ dB
1.8.2	Desensing at high receiving signal level (radio links only) $\geq -100$ dBm	$\leq 20$ dB

## 1.9 Trunk Control Signal - Trunk Site Controller

	Characteristics	Base Station (Repeater)
1.9.1	FFSK level from TSC	1 Vp-p $\pm 0.2$ Vp-p
1.9.2	FFSK frequency from TSC	1.2 kHz $\pm 100$ Hz 1.8 kHz $\pm 100$ Hz
1.9.3	Tx deviation at FFSK level For channel dragging problem	1.5 kHz $\pm 100$ Hz 800 Hz $\pm 100$ Hz
1.9.4	FFSK level from Rx measured at TSC (Modulation 1.5 kHz) (Modulating frequency 1.2 kHz)	1 Vp-p $\pm 0.2$ Vp-p



## 1.10 Audio Line Branching Unit

	Characteristics	Base Station (Repeater)
1.10.1	Audio input and output terminals Impedance Return Loss	600 $\Omega$ balanced $\leq -25$ dB
1.10.2	Input and output audio signal level	$-10$ dBm $\pm 0.5$ dB
1.10.3	Audio frequency response 300 Hz to 3 kHz	$\pm 0.5$ dB
1.10.4	Audio total harmonic distortion (THD)	$\leq 0.5$ %
1.10.5	Audio signal to hum and noise ratio	$\geq 70$ dB
1.10.6	Channel cross talk	$\geq 60$ dB
1.10.7	Common-mode rejection ratio	$\geq 60$ dB at 1 kHz
1.10.8	E-signal	Up to 50 V DC, 10 mA Opto coupler Bi-directional polarity
1.10.9	M-signal	Up to 50 V DC, 10 mA Voltage free contact

## 1.11 Power Supply Unit and Battery Charger

	Characteristics	Base Station (Repeater)
1.11.1	Operating conditions Temperature range Relative humidity	$-10$ $^{\circ}$ C to 60 $^{\circ}$ C Up to 85 %
1.11.2	Input power Voltage Frequency	220 V AC $\pm 10$ % 50 Hz $\pm 2$ %
1.11.3	Output voltage regulation (Intermittent & continuous)	13.8 V $\pm 5$ %
1.11.4	Efficiency	$\geq 70$ %
1.11.5	Output voltage ripple	$\leq 100$ mVp-p
1.11.6	Radiation of spurious frequencies	$\leq -119$ dBm in radio operating band
1.11.7	Desensing of receiver	$\leq 1$ dB
1.11.8	Load shedding Shed Restore	11.0 V 13.0 V

## 1.12 Acoustical measurements

## Shunting

	Characteristics	Portable
1.12.1	<b>Receiver</b>	
	Loudspeaker sound pressure level	$\geq 90$ dB(A) at 300 mm
1.12.2	<b>Transmitter</b>	
	Transmitter deviation	$\geq 1.4$ kHz from a SPL of 80 dB(A) at the microphone

## General

	Characteristics	Portable
1.12.1	<b>Receiver</b>	
	Loudspeaker sound pressure level	$\geq 84$ dB(A) at 300 mm
1.12.2	<b>Transmitter</b>	
	Transmitter deviation	$\geq 0.7$ kHz from a SPL of 80 dB(A) at the microphone

## 1.13 Co-channel Interference

	Characteristics	Various
1.13.1	<b>Speech</b>	
	Level difference between signals	$\geq 15$ dB
1.13.2	<b>Data (FFSK)</b>	
	Level difference between signals	$\geq 20$ dB

## 2. METHODS OF MEASUREMENT

### Applied Standard

#### 2.1 Normal condition

Temperature	:	23 °C $\pm$ 3 °C
Relative Humidity	:	45 – 85 %
Lead acid battery	:	2.3 V per cell
Lithium-ion battery	:	3.6 V per cell
Nickel cadmium	:	1.2 V per cell
Nickel Metal Hydrate battery	:	1.2 V per cell
Mains	:	220 V AC 50 Hz

#### 2.2 Extreme conditions

Temperature	:	–10 °C and 60 °C
Relative humidity	:	45 – 95 %
Lead acid battery	:	1.8 V minimum & 2.6 V maximum per cell
Lithium-ion battery	:	3.0 V minimum & 4.2 V maximum per cell
Nickel Cadmium battery	:	1.0 V minimum & 1.5 V maximum per cell
Nickel Metal Hydrate battery	:	1.0 V minimum & 1.5 V maximum per cell
Mains	:	220 V AC $\pm$ 10 % 50 Hz $\pm$ 2 %

#### Power Supply Systems

12 V system	:	Minimum 11.0 V	Nominal 13.8 V	Maximum 15.6 V
24 V system	:	Minimum 22.0 V	Nominal 27.6 V	Maximum 31.2 V
48 V system	:	Minimum 44.0 V	Nominal 55.2 V	Maximum 62.4 V

#### 2.3 Warm up time

As specified by the manufacturer.

#### 2.4 Temperature stabilising period

One hour minimum.

#### 2.5 Power source tolerance

$\leq \pm 3$  %.

#### 2.6 Standard RF Test Signal

##### 2.6.1 Standard test modulation

Modulating frequency	:	1.0 kHz.
Modulation	:	1.5 kHz (60 % of maximum rated system deviation).

##### 2.6.2 Standard RF Signal Input Level

–60 dBm (223.6  $\mu$ V<sub>pd</sub> or 447.2  $\mu$ V<sub>EMF</sub>).

#### 2.7 Audio Output Level

SOP = –3 dB<sub>MUOP</sub>