

CONTRACT DATA

A contract between

SENTECH, Sender Technology Park, Radiokop, Octave Road, Honeydew, and

For the

**APPOINTMENT OF SERVICE PROVIDERS FOR THE SUPPLY, PLANNING, INSTALLATION
AND SUPPORT OF LICENSED BAND NATIVE ETHERNET MICROWAVE EQUIPMENT TO
SENTECH SOC (LTD) FOR A PERIOD OF THREE YEARS.**

Bid Number: SENT-055-2023-24

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PART C1: AGREEMENTS AND CONTRACT DATA –**Form of Offer and Acceptance Offer**

Sentech, identified in the acceptance signature block, has solicited offers to enter into a contract for the **SUPPLY, PLANNING, INSTALLATION AND SUPPORT OF LICENSED BAND NATIVE ETHERNET MICROWAVE EQUIPMENT TO SENTECH SOC (LTD) FOR A PERIOD OF THREE 3 YEARS.**

The Bidder, identified in the offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the Bid schedules, and by submitting this offer has accepted the conditions of the Bid.

By the representative of the Bidder, deemed to be duly authorized, signing this part of this form of offer and acceptance, the Bidder offers to perform all of the obligations and liabilities of the Bidder under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the Contract Data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF APPLICABLE TAXES; (in the Bids applicable currency).

_____ (amount
in words);

_____ (amount
in figures)

NB: The Prices quoted above is the total Bid offer inclusive of all applicable taxes for the Contract duration. The price must be carried over from the price breakdown / schedule of rates provided in the Bid document.

This offer may be accepted by Sentech by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the Bidder before the end of the period of validity stated in the Tender Data, whereupon the Bidder becomes the party named as the Bidder in the conditions of contract identified in the Contract Data.

Bidder's Signature(s) _____

Signed by the Bidder at _____ **on this the** _____ **day of** _____
20 _____

Name(s) _____

Capacity _____

Address (*Domicillium*) _____

Acceptance

By signing this part of this form of offer and acceptance, Sentech accepts the Bidder's offer. In consideration thereof, Sentech shall pay the Bidder the amount due in accordance with the conditions of contract identified in the Contract Data. Acceptance of the Bidder's offer by the signature by Sentech shall form an agreement between Sentech and the Bidder upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

Part C1 Agreements and contract data, (which includes this agreement)

Part C2 Pricing data

Part C3 Scope of work.

and drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C3 above.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto as listed in the Bid schedules as well as any changes to the terms of the offer agreed by the Bidder and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this agreement. No amendments to or deviations from the said documents are valid unless contained in this schedule of deviations.

Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Sentech's Signature(s) _____

Signed by Sentech at _____ on this the _____ day of _____
20_____

Name(s) _____

Designation _____

SENTECH SOC LIMITED,
Sender Technology Park
Octave Road, Radiokop

Honeydew
Johannesburg

Date _____

Upon acceptance by Sentech of the Bidder's offer, a contract will come into existence.

SCHEDULE OF DEVIATIONS

Notes:

- 1 The extent of deviations from the Bid documents issued by the Sentech before the Bid closing date is limited to those permitted in terms of the conditions of Bid.
- 2 A Bidder's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.
- 3 Any other matter arises from the process of offer and acceptance either as a confirmation, clarification or change to the Bid documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.
- 4 Any change or addition to the Bid documents arising from the above agreements and recorded here shall also be incorporated into the Contract.

1. **Subject** _____

Details _____

2. **Subject** _____

Details _____

3. **Subject** _____

Details _____

4. **Subject** _____

Details _____

By the duly authorised representatives signing this schedule of deviations, Sentech and the Bidder agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Bid schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the Bidder and Sentech during this process of offer and acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the Bid documents and the receipt by the Bidder of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

Contract Data

Part one - Data provided by Sentech given in all contracts

1. The *Purchaser* is

SENTECH SOC LIMITED,

Sender Technology Park

Octave Road

Radiokop

Honeydew

Johannesburg

2. General

The National Treasury General Conditions of Contract for goods and services (NT GCC, 2010) or General Conditions of Contract for Works (2015) as issued by National Treasury and the Construction Industry Development Board of the Republic of South Africa apply, respectively.

The goods are specified in the Scope of Work. The Special Conditions of Contract (SCC) are stipulated in the Tender Data.

3. Goods information:

The *Goods Information* is in the document called "Scope of Work" and in the documents and drawings referred to by it.

4. Terms of Delivery

The *Terms of Delivery* are contained in the General Conditions of Contract (GCC) and Special Conditions of Contract.

5. Language

The *language* of this contract is English.

6. Governing Laws and Jurisdiction

The Contract shall be governed by and interpreted according to the laws of the Republic of South Africa.

In the event of a conflict between or inconsistency in the laws applicable in the various provinces of the Republic of South Africa, the law as applied and interpreted in the Gauteng Province shall prevail.

The parties irrevocably submit to the exclusive jurisdiction of the South Gauteng High Court, Johannesburg in respect of any action or proceeding arising from this Bid.

This Bid and all contracts emanating there from will be subject to the General Conditions of Contract issued in accordance with Treasury Regulation 16A published in terms of the Public Finance Management Act, 1999 (Act 1 of 1999). The Special Conditions of Contract are supplementary to that of the General Conditions of Contract. Where, however, the SCC are in conflict with the GCC, the SCC shall prevail.

7. Sub-contracting post award

A Bidder awarded a Bid may only enter into a subcontracting arrangement with the approval of Sentech. The successful bidder may not subcontract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level of contributor than the Bidder concerned, unless the contract is subcontracted to an EME that has the capability and ability to execute the subcontract.

8. Transformation Plan

A transformation plan is a record of activities an entity intends to undertake to improve its BBBEE Level through Ownership, Management and Control; Skills Development; Enterprise and Supplier Development and Socio-Economic Development.

Sentech reserves the right to request a BBBEE transformation plan with clearly defined timelines and milestones if the recommended bidder does not meet Sentech's transformation goals. These milestones must be achieved over the term of the contract. This transformation plan shall be submitted within 10 working days from the written request, failing which Sentech reserves the right to withdraw its appointment of the preferred recommended Bidder.

9. Warranty

The warranty period is 12 months after Delivery.

10. Payment

The method and conditions of payment are contained in the Tender Data, GCC and SCC.

The interest on late payment is 0 % per complete week of delay.

11. Currency

South African registered businesses that purchase equipment overseas and quote in foreign currency will be required to provide Sentech a 6-month forward cover contract on appointment. The 6 months forward cover will be re-negotiated and renewed every 6 months should the contract term on this tender be longer than 6 months.

12. General - Prices

Unless approval has been obtained from Sentech, no adjustment in contract prices will be made. Applications for price adjustment must be accompanied by documentary evidence in support of any adjustment.

13. Price Negotiations

Sentech reserves the right to negotiate market related prices. If market-related prices are not agreed to, Sentech reserves the right to cancel the Bid.

14. Liabilities indemnities and insurance

Insurance is required from the Bidder in respect of delivery and transportation where applicable.

15. Disputes

Should any dispute, disagreement or claim arise between the parties ("the dispute") concerning this Agreement, the parties shall try to resolve the dispute by negotiation. This entails one party inviting the other party to meet and attempt to resolve the dispute within fourteen (14) days from the date of the written invitation.

If the dispute has not been resolved by such negotiation as referred to in this clause above, the Parties shall submit the dispute to the Arbitration Foundation of Southern Africa ("AFSA") for administered mediation, upon the terms set out by the AFSA secretariat.

Failing such resolution, the dispute shall be resolved by arbitration in accordance with the rules and procedures of AFSA by an arbitrator appointed by AFSA. Where the arbitration route is followed, the dispute must be adjudicated within Johannesburg in the English language and finally resolved in accordance with the rules of AFSA, by an arbitrator or arbitrators appointed by that Foundation.

The provisions of this clause shall not preclude any party from obtaining relief from a Court of competent jurisdiction. To this extent, the Parties hereby consent to the jurisdiction of the South Gauteng High Court, Johannesburg, South Africa. The provisions of this clause shall continue to be binding on the Parties, notwithstanding any termination or cancellation of this Agreement.

16. Termination

Sentech shall have the right, at its sole and exclusive discretion, upon written notice to the Bidder, to terminate this Agreement, in whole or in part should the Bidder fail to perform any of its obligations or deliver any deliverable timeously or should Sentech not be satisfied with the quality of any service/s in terms of this Agreement, to the satisfaction of Sentech.

Sentech shall furthermore have the right, as a result of such termination, to appoint a third party to perform the obligations of the Bidder in terms of the Agreement and the Bidder indemnifies Sentech against all costs incurred by Sentech in appointing such third party to fulfil the obligations of the Bidder.

Sentech shall have the right, at its sole and exclusive discretion, to terminate this Agreement, at any time, upon 30 (thirty) days' written notice to the Bidder.

17. Contract Term

This contract will run for a period of 36 months.

However maintenance, SLA, and support related scope will be for the economic Life of equipment. Maintenance, SLA, and support will be negotiated and renewable every year during the economic and useful life of the equipment.

18. Supplier Due Diligence

Sentech reserves the right to conduct supplier due diligence at any time pre, during and post the contract period. This may include announced or unannounced site visits.

19. Cession

Sentech shall be entitled to cede, delegate, assign, charge, transfer or otherwise dispose of this Agreement or any rights or obligations therein in whole or in part, upon prior written notice to the Bidder.

20. Monitoring and Evaluation

The service delivery and performance of the Bidder will be monitored and evaluated by Sentech at all relevant times. In the event that the Bidder defaults in any manner or form, Sentech reserves the right to blacklist the Bidder on the National Treasury Database of Prohibited Suppliers and Tender Defaulters, and to take such further steps as may be warranted in the circumstances which steps shall be determined at Sentech's sole and exclusive discretion.

21. Protection of Personal Information Act No. 4 of 2013 ("POPI")

Sentech is POPI compliant and the Bidder will ensure that it conducts itself within the prescripts of the prescribed legislation.

Should Sentech need to collect Personal Information by law or in consideration of the Tender, and the Bidder fail to provide the Personal Information when requested, Sentech may refuse to accept the relevant services from the Bidder, and the Bidder will be notified in this event.

By agreeing to the terms of this Agreement, the Bidder voluntarily authorizes Sentech to process its' personal information (including its' name, credit card & banking details, physical address, telephone numbers, reference letters & any other information it has provided to Sentech) for purposes of Tendering and contracting.

The Bidder consents to the transfer of such personal information to third parties.

This consent is effective immediately and will endure until the relationship between the Bidder and Sentech has been terminated.

The Bidder indemnifies and holds Sentech harmless against any loss, whether direct or indirect, arising out of the failure to process any of its' personal data in accordance with applicable laws.

22. Delay damages

As stipulated in the Special Conditions of Contract.

Sentech's Representative is

Name: Mr. Zunaid Adams

Address: **SENTECH SOC LIMITED,**

Sender Technology Park
Octave Road,
Radiokop, Honeydew
Johannesburg

Tel No. 0114714400

Sentech's Representative is the Executive: Legal and Regulatory.

Contract Data

Part two - Data provided by the Bidder

Statements given in all contracts

The Bidder is:

Name _____

Address _____

a company / close corporation / partnership duly incorporated in accordance with the laws of the Republic of South Africa.

PART C2: PRICING DATA

Price List- Compulsory

The Tenderer will provide pricing for the Licensed Native Ethernet Microwave Equipment

Frequencies- 7 GHz (7429/7233), 13GHz (13115/12849), 13GHz (13143/12877), 13GHz (13171/12905), 13GHz (13199/12933), 13GHz (13227/12961), 38 GHz (38500/37240)

1. Split Mount Pricing

Table 1: Split Mount	Pricing		
Microwave link configuration	7 GHz	13 GHz	38 GHz
150 Mbps 1+0 configuration			
28 MHz RF channel			
2 x Indoor Units (IDU)			
2 x Outdoor Units (ODU)			
Hybrid / Couplers (Where required)			
LMR 400 Feeder Cable 200m			
2 x Integrated 1.2m High Performance Antenna (Including all mounting brackets, waveguide and Adapters required)			
2 x 1Gbps electrical and 2 1Gbps Optical port on each IDU			
Capacity License Cost			
Total Link Cost			

Table 2: Split Mount	Pricing		
Microwave link configuration	7 GHz	13 GHz	38 GHz
300 Mbps 1+0 XPIC configuration			
28 MHz RF channel			
2 x Indoor Units (IDU)			
4 x Outdoor Units (ODU)			
Hybrid / Couplers (Where required)			
LMR 400 Feeder Cable 200m			
2 x Integrated 1.2m High Performance Antenna (Including all mounting brackets, waveguide and Adapters required)			
2 x 1Gbps electrical and 2 1Gbps Optical port on each IDU			
Capacity License Cost			
Total Link Cost			

Table 3: Split Mount	Pricing		
Microwave link configuration	7 GHz	13 GHz	38 GHz
300 Mbps 1+0 configuration			
56 MHz RF channel			
2 x Indoor Units (IDU)			
2 x Outdoor Units (ODU)			
Hybrid / Couplers (Where required)			
LMR 400 Feeder Cable 200m			
2 x Non Integrated 1.2m High Performance Antenna (Including all mounting brackets, waveguide and Adapters required)			
2 x 1Gbps electrical and 2 1Gbps Optical port on each IDU			
Capacity License Cost			
Total Link Cost			

Table 4: Split Mount	Pricing		
Microwave link configuration	7 GHz	13 GHz	38 GHz
600 Mbps 1+0 XPIC configuration			
56 MHz RF channel or 2 x 28 MHz RF channels			
2 x Indoor Units (IDU)			
4 x Outdoor Units (ODU)			
Hybrid / Couplers (Where required)			
LMR 400 Feeder Cable 200m			
2 x Integrated 1.2m High Performance Antenna (Including all mounting brackets, waveguide and Adapters required)			
2 x 1Gbps electrical and 2 1Gbps Optical port on each IDU			
Capacity License Cost			
Total Link Cost			

2. All Outdoor Pricing

Table 1: All Outdoor	Pricing		
Microwave link configuration	7 GHz	13 GHz	38 GHz
150 Mbps 1+0 configuration			
28 MHz RF channel			
2 x Indoor Units (IDU Power Supply) if required			
2 x Outdoor Units (ODU)			
Hybrid / Couplers (Where required)			
LMR 400 / Ethernet / Fibre Feeder Cable 200m			
2 x Integrated 1.2m High Performance Antenna (Including all mounting brackets, waveguide and Adapters required)			
1 x 1Gbps electrical or 1 x 1Gbps Optical port on each ODU			
Capacity License Cost			
Total Link Cost			

Table 2: All Outdoor	Pricing		
Microwave link configuration	7 GHz	13 GHz	38 GHz
300 Mbps 1+0 XPIC configuration			
28 MHz RF channel			
2 x Indoor Units (IDU Power Supply) if required			
4 x Outdoor Units (ODU)			
Hybrid / Couplers (Where required)			
LMR 400 / Ethernet / Fibre Feeder Cable 400m			
2 x Integrated 1.2m High Performance Antenna (Including all mounting brackets, waveguide and Adapters required)			
1 x 1Gbps electrical and 1 1Gbps Optical port on each ODU			
Capacity License Cost			
Total Link Cost			

Table 3: All Outdoor	Pricing		
Microwave link configuration	7 GHz	13 GHz	38 GHz
300 Mbps 1+0 XPIC configuration			
56 MHz RF channel			
2 x Indoor Units (IDU Power Supply) if required			
2 x Outdoor Units (ODU)			
Hybrid / Couplers (Where required)			
LMR 400 / Ethernet / Fibre Feeder Cable 400m			
2 x Non Integrated 1.2m High Performance Antenna (Including all mounting brackets, waveguide and Adapters required)			
1GbE electrical port on each IDU			
Capacity License Cost			
Total Link Cost			

Table 4: All Outdoor	Pricing		
Microwave link configuration	7 GHz	13 GHz	38 GHz
600 Mbps 1+0 XPIC configuration			
56 MHz RF channel or 2 x 28 MHz RF channels			
2 x Indoor Units (IDU Power Supply) if required			
4 x Outdoor Units (ODU)			
Hybrid / Couplers (Where required)			
LMR 400 / Ethernet / Fibre Feeder Cable 400m			
2 x Integrated 1.2m High Performance Antenna (Including all mounting brackets, waveguide and Adapters required)			
1GbE electrical port on each IDU			
Capacity License Cost			
Total Link Cost			

3. Link Pricing – Discounts All frequency bands based on number of links

Frequency	Number of links	Discount
All Bands	1-50	
All Bands	51-100	
All Bands	101-300	
All Bands	301 and more	

4. Antenna Pricing

Table 1: Antenna 0.3m	7 GHz	13GHz	38GHz
Single Polarised Standard Performance			
Single Polarised High Performance			
Total			
Table 2: Antenna 0.6m	7 GHz	13GHz	38GHz
Single Polarised Standard Performance			
Single Polarised High Performance			
Dual Polarised Standard Performance			
Dual Polarised High Performance			
Total			
Table 3: Antenna 0.8m/0.9m	7 GHz	13GHz	38GHz
Single Polarised Standard Performance			
Single Polarised High Performance			
Dual Polarised Standard Performance			
Dual Polarised High Performance			
Total			
Table 4: Antenna 1.8m	7 GHz	13GHz	38GHz
Single Polarised Standard Performance			
Single Polarised High Performance			
Dual Polarised Standard Performance			
Dual Polarised High Performance			
Total			

5. Additional Pricing required for evaluation purposes

No	Items	Cost Per Unit/ or otherwise specified	Installation Costs/ Where Applicable	Total Costs Exclude Vat	Total Costs Include Vat
4.2	Radio outdoor unit peripherals				
	• Couplers				
	• Hybrids				
	• Waveguides				
4.3	Indoor Units SFP's				
	100Base-T				
	1 Gbps Electrical				
	1 Gbps Optical -SX/LX				
4.4	Network Management System				
	• NMS including LCT software				
	• Server- including monitor, keyboard, mouse				
	• Redundant Server only				
	• Specify license cost for number of terminals and users				
4.5	Software				
	• All related license costs –(Indicate once off or annually)				
4.6	Training				
	• Local Training- Theoretical & Practical -NMS 10 Candidates				
	• Local Training- Theoretical & Practical -Operations & Maintenance- 10 Candidates				

	<ul style="list-style-type: none"> Local Training-Planning- 10 Candidates 				
	<ul style="list-style-type: none"> Advance Training if Applicable- Local or International-Please specify-5 Candidates 				
4.7	Support – Yearly SLA				
	<ul style="list-style-type: none"> Sentech Support as per clause 15.1(Service Level and Support Agreements)-SLA costs- 1 Year-For Evaluation purposes- Gauteng area only 				
	<ul style="list-style-type: none"> Basic Support(Bidder)- Bidder to indicate what services are available.-(1Year) - For Evaluation purposes- Gauteng area only 				
	<ul style="list-style-type: none"> Advanced Support(Bidder)- Bidder to indicate what services are available.-(1Year) - For Evaluation purposes- Gauteng area only 				
	Support - Time & Material- Non-SLA-				
	<ul style="list-style-type: none"> Hourly rate per person 				
	<ul style="list-style-type: none"> Travel cost per kilometer 				
	<ul style="list-style-type: none"> Subsistence Allowance per person 				
4.8	Installation				
	<ul style="list-style-type: none"> Earth Kits 				
	<ul style="list-style-type: none"> Feeder cable- 500m roll. 				
	<ul style="list-style-type: none"> Surge Arrestors Protection 				

4.9	Documentation				
	<ul style="list-style-type: none"> • Site Survey including Documentation 				
	<ul style="list-style-type: none"> • As-Build Documentation 				
	<ul style="list-style-type: none"> • ATP Tests & documentation 				
4.10	Travel				
	Travel Assume Sentech-Honeydew, Gauteng- Home Base				
	<ul style="list-style-type: none"> • Distance 0-50km 				
	<ul style="list-style-type: none"> • 50-100km 				
	<ul style="list-style-type: none"> • 100-500km 				
	<ul style="list-style-type: none"> • 500-1000km 				
	<ul style="list-style-type: none"> • Accommodation Costs 				
	Total Cost (ZAR) Year 1 Costs				
	Total Cost (ZAR) Year 2 Costs				
	Total Cost (ZAR) Year 3 Costs				

SENT-055-2023-24

PART C3: SCOPE OF WORK

SENTECH'S GOODS INFORMATION

1. TECHNICAL REQUIREMENTS

1.1. Glossary of Terms

Abbreviations	Descriptions

2. INTRODUCTION

Sentech is a state-owned company and is the largest broadcasting signal distributor in South Africa. Sentech is a licensed Electronic Communications Network Service provider in South Africa. It currently operates many telecommunication networks for Satellite, Television, Radio, Internet and more. As such, Sentech is a global enabler of broadcasting and digital content delivery.

3. SCOPE OF WORK

This specification covers both General and Technical requirements for the Supply and Technical Support of Native Ethernet Transmission (Point-to-Point) Medium to High capacity Microwave Radio equipment and Native Ethernet Full Outdoor Solution that operate in the frequency bands regulated by ICASA (Independent Communication Authority Of South Africa). The preferred equipment frequency bands for Sentech are those that are specified by the ITU region 1 (7 - 38 Ghz including E-band). Capacities scalable from 2Mb/s to 1Gb/s and above (XPIC) with different interfaces (electrical, optical, 10/100Base T interfaces, 1000 Base T/SFP based 10G). The Microwave equipment to be referenced to ITU-T, ITU-R.

In addition to the required equipment, the bidder shall supply spare IDU & ODU, Antennas, consumable parts, installation tools and materials, maintenance tools & accessories, NMS, documentation, fixtures for repairs, operations and maintenance & support, repairs where requested.

GENERAL EQUIPMENT REQUIREMENTS

- 1.1 Bidders shall provide details of the latest available system's software and hardware version that will be commercially offered to Sentech.
- 1.2 Bidders shall provide a detailed, five-year, roadmap concerning system's hardware (Point-to-Point Transmission equipment), software and services and future upgrades.
- 1.3 Equipment delivery lead time to the address SENTECH, Octave Street, Honeydew, Roodepoort, R.S.A. (Sentech requires 6-8 Weeks Delivery) Bidder to supply delivery lead times.
- 1.4 All documentation, system workings shall be in English.

- 1.5 Minimum of 1 years' experience in the Installation and maintenance of licensed microwave equipment on buildings / mast and towers
- 1 to 2 years = 1
- 3 to 4 years = 3
- Greater than 5 years = 5

1.6 Reliability

- 1.6.1 Bidder shall provide guaranteed MTBF based upon that achieved by equipment already in field use. Bidder should include MTBF tables.

1.7 Quality Assurance

- 1.7.1 The bidder shall provide evidence that the manufacturing process conforms to quality management standard bodies such as "ISO 9001" or equivalent".
- 1.7.2 All software, development, installations, configurations, testing and job control language procedures produced by the Bidder, its personnel, agents, or sub-contractors shall be free of technical defects (bugs) and shall be so guaranteed for a period of 12 months by the Bidder after acceptance by Sentech.

1.8 Safety

- 1.8.1 The use of any component or material that is potentially dangerous to human health shall be clearly stated, indicated as warning signs on such component/ material and in handbooks.

1.9 Environmental Conditions, Equipment shall operate without degradation of reliability or specification at:

- 1.9.1 Indoor temperature of 0° to +45° Celsius at relative humidity of up to 95%
- 1.9.2 Outdoor temperature of at least -15° to +55° Celsius at relative humidity of up to 95%
- 1.9.3 Labelling on equipment shall be resistant to the environmental conditions.

1.10 Mechanical/Physical

- 1.10.1 Indoor equipment shall be 19' rack Mountable
- 1.10.2 Depth of indoor equipment shall not exceed 600mm

2 RADIO REQUIREMENTS-Split Mount

2.1 Transmitter characteristics

- 2.1.1 The bidder shall specify minimum and maximum output power (**Bidder must Provide Table**) for all supported frequency bands.
- 2.1.2 The bidder shall specify the Adaptive Transmitter Power Control (ATPC) range.
- 2.1.3 Equipment shall have TX mute mode

2.2 Receiver Characteristics

- 2.2.1 The bidder shall provide the receive levels of the all associated modulation schemes per frequency band. (**Provide table**)
- 2.2.2 The bidder shall specify the maximum input level that the receiver can tolerate.

2.2.3 Transmit and receive frequencies of the outdoor units shall be adjustable over the widest range possible. **Bidder must complete Table 3 on Page 30 Contract data**

2.3 Equipment Configuration: The proposed system shall be capable of handling the following configuration and the bidder should provide detailed documentation explaining the points below:

2.3.1 1+0 Configuration

2.3.2 1+0 XPIC

2.3.3 N+0 Configuration

2.4 RF Requirements

2.4.1 It shall be possible to change to any transmit and receive operating frequency within a particular band by software only.

2.4.2 Provide details of how to change frequency, including which modules, set-up and test equipment required shall be specified.

2.4.3 It shall be possible to operate in co-channel cross polar mode without degradation of specifications.

2.4.4 Adaptive Coding and Modulation (ACM) on the air interface,

2.5 Outdoor Unit

2.5.1 Light weight ODU for easy handling. Bidder to specify ODU weight of equipment (Provide data sheets)

2.5.2 ODU can be mounted directly on antenna, flexible waveguide, Hybrid Combiner (1 + 0) and a 1 + 0 system.

2.5.3 Receive Signal Strength test point shall be available on the ODU for measurements during installation and maintenance.

2.5.4 Bidder to indicate which of the proposed equipment will require sub-band filters by frequency and ranges

Bidder Must Complete Table 3 page 30 contract data (7,10,11,13 15, 18, 23, 38 GHz and E-Band) – 1 point per frequency band completed in Table 3

2.6 Antenna

2.6.1 Antennas provided shall be able to cover all the frequency bands.

2.6.2 All mounting brackets to be supplied and shall be galvanized or Stainless Steel.

2.6.3 Reflectors of Antenna shall be painted with white diffusive paint.

2.6.4 Bidder to supply gain of antennas with the respective Frequency Band and diameters (indicate in a table/datasheet).

2.6.5 The mechanical strength of antenna, radome and antenna fixing system shall not cause damage by winds of 200km/h.

2.6.6 The Bidder shall state the size and weight of each antenna as well as the wind loading.

(Provide table or data sheets that will cover the following dimensions, weight, Axial Force FA, Side Force SF, Twist Momentum TM)

2.7 Installation

- 2.7.1 The bidder shall be prepared to provide skills transfer to Sentech's employees during onsite installation and commissioning.

2.8 Planning

- 2.8.1 Where required Sentech may request bidder to assist with either a desktop or detailed microwave links design.

In the case of a detailed link designs request the bidder would be required to provide detailed site survey documentation to enable Sentech to apply for frequencies and site acquisitioning. Sentech will also evaluate and approve any desktop and detailed link planning

- 2.8.2 The bidders planning design may be used by Sentech internally for further analysis on Sentech's planning tool.

3 EQUIPMENT SPECIFICATION

3.1 Native Ethernet Microwave Radio- Split Mount

- 3.1.1 Provide table with maximum capacity achievable versus modulation and receive level.
(Bidder Must Complete Table 1 and 2 on page 30 in Contract Data)

- 3.1.2 The IDU shall consist of LCT port, Service Channel, EOW port with handset installed for maintenance. Power supply, synch port (External clock input/output) & Aux ports.

- 3.1.3 Capacities shall be software selectable

- 3.1.4 All Cross connections and add & drop will be done on the IDU and be software controlled.

3.2 Native Ethernet functionality- Split Mount

- 3.2.1 Carrier class Ethernet,

- 3.2.2 The Bidder is to specify the available Ethernet ports on the IDU, including number of ports, interface types, port speeds.

- 3.2.3 Layer 2 functionalities: MAC switching MAC Address learning.

- 3.2.4 The Bidder shall specify the degree to which the equipment complies with IEEE 802.1p/q (traffic prioritisation, including QoS (Service Aware Traffic Management) and VLAN tagging),

- 3.2.5 Flow through Q in Q (802.1 ad),

- 3.2.6 Compliance to synchronisation standards-(Indicate what synch ports available).

- 3.2.7 Bidder to provide details of how Metro Ethernet is transported and dealt with

- 3.2.8 The bidder to Indicate the packet sizes that are supported by the system, including jumbo frames (At least 1518)

- 3.2.9 ETH OAM- 802.1ag Service OAM, Y1731 Performance Monitoring

3.3 All Outdoor Packet Microwave Radio

- 3.3.1 Capacities shall be software selectable.

3.4 The POE Ethernet Interfaces shall specified:

- 3.4.1 Ethernet 100Base-T, 1000Base-T, 1000 Base-SX/LX LC SFP, 10Gig are supported

3.5 Ethernet Capabilities/Functions

- 3.5.1 Bidder to indicate the packet sizes that are supported by the system, including jumbo frames (At least 1518)
- 3.5.2 The Bidder shall specify the degree to which the equipment complies with IEEE 802.1p/q (traffic prioritisation, including QoS (Service Aware Traffic Management) and VLAN tagging),
- 3.5.3 Flow through Q in Q (802.1 ad),
- 3.5.4 Bidder to provide details of how Metro Ethernet is transported and dealt with
- 3.5.5 ETH OAM- 802.1ag Service OAM, Y1731 Performance Monitoring

3.6 Radio Requirements-All Outdoor

- 3.6.1 Modulation schemes: The bidder shall specify the modulation schemes associated with required receive levels **Bidder must Complete Table 4 and 5 on page 31 of Contract Data**
- 3.6.2 Transmit and receive frequencies of the outdoor units shall be adjustable over the widest range possible. The frequencies shall be adjustable from the LCT.
Bidder must complete **Bidder must Complete Table 6 on page 31 of Contract Data**

3.7 Equipment Configuration: The proposed system shall be capable of handling the following configuration and the bidder should provide detailed documentation explaining the points below:

- 3.7.1 1+0 (Unprotected)
- 3.7.2 1+0 XPIC

3.8 RF Requirements- All Outdoor

- 3.8.1 It shall be possible to change to any transmit and receive operating frequency within a particular band by software only.
- 3.8.2 Details of how to change frequency, including which modules, set-up and test equipment required shall be specified.
- 3.8.3 It shall be possible to operate in co-channel cross polar mode without degradation of specifications

3.9 Outdoor Unit

- 3.9.1 Light weight ODU for easy handling (Bidder to supply weight values).
- 3.9.2 Weatherproof unit housing microwave transmitter and receiver, duplexer and filters (IP54).
- 3.9.3 ODU can be mounted directly on antenna, flexible waveguide, Hybrid Combiner (1 + 0) system.
- 3.9.4 Receive Signal Strength test point shall be available on the ODU for measurements during installation and maintenance.

3.10 Antenna- All Outdoor

- 3.10.1 Antennas provided shall be able to operate in the range from 7GHz to 80GHz
- 3.10.2 Specify available antenna sizes for all frequency bands
- 3.10.3 Antenna shall be mounted directly to ODU or via a waveguide
- 3.10.4 All mounting brackets to be supplied and shall be galvanized

3.10.5 Reflectors of Antenna shall be painted with white diffusive paint

3.10.6 Bidder to supply gain of antenna with the respective Frequency Band and diameter (indicate in a table)

3.11 Set-up, Maintenance and repair for split mount and all outdoor

3.11.1 Equipment shall have built-in facilities to enable basic set-up, maintenance and repair. These built-in facilities shall have the capability to set frequency, power, loop backs as well as monitor alarms.

3.11.2 The bidder shall specify any special maintenance required where equipment is operated in stressful environments such as high/low temperatures.

3.11.3 Equipment's and individual modules shall be protected against damage that may result from faults such as short circuits, excessive temperatures etc. When such faults have cleared, normal operations shall resume automatically.

3.11.4 The bidder shall supply a proposed monthly, half yearly and yearly routines as part of preventative maintenance.

3.12 Equipment Configuration for split mount and all outdoor

3.12.1 The complete operating set-up of each link terminal (all Equipment belonging to a specific link, located at one site) shall be determined by a software configuration file stored in non-volatile, programmable memory of the terminal. (Bidder to specify their process if different).

3.12.2 This memory shall be capable of storing two different sets of configuration files. The terminal shall be capable operating from either of these configuration files by way of a management instruction. (Bidder to specify their process if different).

3.12.3 Switching between sets of configuration files shall only affect the equipment functions that have different configuration file parameters. Specifically, the traffic service shall not be affected unless there is a difference in the parameters of the traffic channel. (Bidder to specify their process if different).

3.13 Equipment exchange (Split mount and All Outdoor)

3.13.1 Exchange of equipment or modules shall not require a selection procedure or realignment.

3.13.2 Modules should be hot swappable for easier maintenance where possible.

3.13.3 For redundant systems, it shall be possible to exchange any redundant equipment or module without affecting other functions, e.g., traffic service.

3.14 Security (Split mount and All Outdoor)

3.14.1 Secure encrypted communications.

3.14.2 Encryption used. Bidder to indicate what is employed.

3.15 Network Management System (Split mount and All Outdoor)

3.15.1 Provide capabilities of the proposed Network Management system (as indicated and not limited to the items below for end to end management) **Tenderer to confirm if NMS platform can manage both split mount and all outdoor.**

3.15.2 Capable of In-band management channel or out-band management

- 3.15.3 FCAPS- Bidder to give full description of capabilities
- 3.15.4 Ethernet OAM for fault management and performance monitor.
- 3.15.5 Hardware failures
- 3.15.6 Device monitoring
- 3.15.7 Access line failures
- 3.15.8 Radio link failures
- 3.15.9 Software generated alarms and other alarms, logs (provide further information)
- 3.15.10 NMS capabilities to provide traffic engineering and management
- 3.15.11 Email based and web-based notification for critical events
- 3.15.12 Performance and Configuration Management by way of NMS
- 3.15.13 Performance reports and inventory reports
- 3.15.14 Signal receive levels
- 3.15.15 Loop-back tests under operator's control and diagnostic tests
- 3.15.16 Service statistics (e.g. availability, frame loss ratio, data transit delay, bit error rates, etc.)

3.16 LCT (The following procedures shall be available by way of the Local Configuration Tool:

- 3.16.1 Equipment configuration management
- 3.16.2 New equipment set up procedure
- 3.16.3 Changes done on LCT / GUI must be visible on the NMS
- 3.16.4 Read/Write Access and security features (Password control) shall be indicated
- 3.16.5 Maintenance staff must be able to configure, maintain and monitor the equipment under test via the LCT / GUI software (Diagnostic tests and loopback).
- 3.16.6 Bidders should give full capabilities of the LCT / GUI software tool.

3.17 OSS Integration

- 3.17.1 Easy integration to higher management layers
- 3.17.2 Standardised secure protocols-SNMP v2, v3 (backward compatible)
- 3.17.3 Cost effective use of IP Network System Software releases

3.18 Upgradability to Higher Capacities

- 3.18.1 Indicate how microwave system can be upgraded (onsite or remotely) or through the NMS.

4 BIDDER SUPPORTING REQUIREMENTS

4.1 Performance Guarantee period

- 4.1.1 The proposed system shall include a performance guarantee period of at least seven years (7) after installation.

4.1.2 During this period, the bidder shall supply material, software, equipment, services and maintenance support.

4.2 Spares & Repairs

4.2.1 The bidder shall supply a list of common modules and as per design spares necessary for the maintenance of the equipment.

4.2.2 Modules shall be exchanged if failures happen during warranty period.

4.2.3 Replacement modules must be guaranteed for 12 months.

4.2.4 The bidder must guarantee off the shelf availability of spares locally.

4.2.5 The bidder shall state guaranteed turnaround times for repairs.

4.3 Training

4.3.1 The bidder shall provide Sentech theoretical & practical training at selected local venue as agreed with Sentech.

4.3.2 The training shall cover the areas of Planning, Operational & Maintenance and NMS. Sentech Employees will attend the stipulated training and shall include the provision of all necessary course material and hand books.

4.3.3 Advance Training: Any advanced training must be communicated to Sentech.

4.4 Technical demonstration

4.4.1 Sentech requires the test to verify the equipment on offer is capable and is within the specifications as per submission. The tests shall be done at a venue the bidder has identified within the Gauteng region. The tests will be done during a course of 3 days. Sentech will indicate the relevant days the required demonstration to be done.

5 SERVICE LEVEL CATEGORIES, SERVICE LEVEL AND SUPPORT AGREEMENTS

5.1 Service level Categories

5.1.1 A Category 1 incident is an incident that will result in a direct and significant loss in the beneficial use of the deployed network as well as a corresponding loss of revenue. If Sentech is unable to resolve the problem, it will be handed to the Tenderer for final resolution as a Contractual Incident. The successful Tenderer shall restore the services within the agreed SLA time frames. **(Refer to Table 7 on Page 31 of Contract Data).**

5.1.2 A Category 2 incident is an Incident resulting in operational problems that do not lead to a loss of revenue but degrades redundancy or the operational capability of the Network. Sentech is unable to solve the problem and the problem is, therefore, handed to the successful Tenderer for resolution as a Contractual Incident. This shall include the failure of redundant equipment and failures that could potentially lead to a loss of revenue. **(Refer to Table 7 on Page 31 of Contract Data).**

5.1.3 A Category 3 incident is when Sentech requires assistance with, the interpretation of measurements or general information on the capabilities of the technology deployed within the network. Information includes updates on problems identified by other users and the

associated modifications or software patches. **(Refer to Table 7 on Page 31 of Contract Data).**

5.2 Service Level Parameters

5.2.1 Change management: this refers to any Incident or event that alters the existing state of Sentech's Transmission network, including software, hardware, networks and facilities. It shall be a mutual goal to minimize disruption of any services by using a standard process to communicate and implement changes. The Sentech prescribed Change Management procedure shall be adhered to.

5.2.2 Supported Hardware: repair or replacement of in-warranty faulty equipment shall be done at no cost to Sentech. Damages occurring from misuse, malicious acts and acts of nature are excluded and costs for repair or replacement will be for the account of Sentech in such cases. The envisaged costs will be communicated to Sentech followed by a quotation. Sentech will then either accept or reject the said quotation.

5.3 Software Maintenance: Software maintenance shall include the following aspects of services:

5.3.1 In-service maintenance releases or workarounds on existing solutions.

5.3.2 The deployment, implementation and testing of OEM maintenance releases and system modifications required to meet agreed system specifications.

5.3.3 Maintenance releases intended to remedy deficiencies in the software or improve operating performance without altering the basic functionality or configuration. The Tenderer shall be an OEM or have a direct relationship with the OEM.

5.3.4 A maintenance release schedule and an impact summary shall be made available to Sentech reflecting the schedule of changes.

5.3.5 The successful Tenderer shall preserve existing data structures and file layouts wherever possible. Where there is a change to the data structures or file layouts, the successful Bidder shall co-ordinate these changes carefully in conjunction with Sentech and provides data conversion programs as necessary, thereby minimizing any disruptions to live operations or existing data.

5.3.6 The successful Tenderer shall keep Sentech fully informed about the OEM's Customer Service Bulletins (CSB) informing them of pending maintenance releases.

5.3.7 The CSB shall fully describe the content of such releases with reference to outstanding problems, indicating specific problems and the resolution thereto.

5.3.8 The successful Tenderer, in conjunction with Sentech, shall carry out instructions in CSB as per planned schedule (schedule includes installation, testing, production and training environments – where applicable).

5.4 Repairs and Spares

5.4.1 The delivery of faulty equipment to the successful Tenderer premises for repair shall be arranged mutually between Sentech and the successful Tenderer.

- 5.4.2 The amount of spares held shall at any time be sufficient to be able to address the response times as specified in the Table (Service Levels for Tenderer Response Times).
- 5.4.3 The successful Tenderer must guarantee the supply of the required equipment in accordance with the relevant Back-to-Back Support contracts with the OEM.
- 5.4.4 In order to avoid unnecessary charges, the vendor shall screen all units marked for Return Material Authorisation (RMA) in South Africa prior to returning equipment to OEM. This will highlight any “no fault found” units at a very early stage, which may have been returned due to other issues such as incorrect cabling, and also to identify any damaged or inoperable units that may be attributed to poor handling, incorrect installation or general misuse. This facility will allow Sentech to inspect and discuss any such issues in a local environment which, would normally only be possible at the OEM premises outside the country. The turn-around time for faulty equipment repairs must be specified and adhered to.
- 5.4.5 End of Sale (EOS) and End of Life (EOL) and End of Support OEM announcements for individual products and software shall be communicated timeously to the Sentech Network Operations Manager indicating the risks and options for replacement.
- 5.4.6 The upgrade path for all equipment (HW & SW), including the impact of the said upgrades on the whole network, must be highlighted.

5.5 Support

- 5.5.1 Respondents shall offer as an option an annual maintenance and support programme for equipment offered. **(As per Table 7 on Page 31 of Contract Data).**
Respondent to provide example of maintenance contract for future discussion
- 5.5.2 During this period, the supplier shall supply material, equipment, services and maintenance support.
- 5.5.2 Respondents shall offer as an option a time and material.
Respondent to provide example of maintenance contract for future discussion
- 5.5.3 The Tenderer shall provide a locally based support and shall be available on request at any time.
- 5.5.6 The Tenderer will be held responsible for all support and guarantees offered to Sentech.

2. Technical Evaluation Requirements

The bidder must comply with 100% of the Mandatory Eligibility Criteria as set out in point 18.1 on page 5 of the tender data.

The Bidder must comply with minimum scores as per table 2 on page 16 of the tender data of the Functional Criteria as set out in point 18.2.

Table 1 Split Mount without XPIC

	Throughput Based on Modulation and Min Receive Level									
	128QAM		256QAM		512AM		1024QAM		2048QAM	
Channel BW	Min. Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput
3.5MHz										
7.0MHz										
14MHz										
28MHz										
56MHz										

Table 2 Split Mount with XPIC

	Throughput Based on Modulation and Min Receive Level									
	128QAM		256QAM		512AM		1024QAM		2048QAM	
Channel BW	Min. Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput
3.5MHz										
7.0MHz										
14MHz										
28MHz										
56MHz										

Table 3 Split Mount Sub Band

	Frequency Band	Radio Synthesiser Range [MHz]	Sub Band [Range MHz]	filter	Number of ODUs required to cover the band
1	7 GHz				
2	10 GHz				
3	11 GHz				
4	13 GHz				
5	15 GHz				
6	18 GHz				
7	23 GHz				
8	38 GHz				
9	E-band				

Table 4 All Outdoor Without XPIC

	Throughput Based on Modulation and Min Receive Level								
	128QAM		256QAM		512AM		1024QAM		2048
Channel BW	Min. Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level
3.5MHz									
7.0MHz									
14MHz									
28MHz									
56MHz									

Table 5 All outdoor With XPIC

	Throughput Based on Modulation and Min Receive Level								
	128QAM		256QAM		512AM		1024QAM		2048
Channel BW	Min. Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level	Throughput	Min Receive Level
3.5MHz									
7.0MHz									
14MHz									
28MHz									
56MHz									

Table 6 All Outdoor Sub Band

	Frequency Band	Radio Synthesiser Range [MHz]	Sub Band [Range MHz]	filter	Number of ODUs required to cover the band
1	7 GHz				
2	10 GHz				
3	11 GHz				
4	13 GHz				
5	15 GHz				
6	18 GHz				
7	23 GHz				
8	38 GHz				

Table 7

Incident Category	Response Period	Service Restoration	Final Resolution
1	30 minutes	1 hours	24 hours
2	30 minutes	2 hours	48 hours
3	4 hours	Start of next Business Day	5-Days

End of Document