**No. 30-174-7/2015-USOF-BB (Vol. XII) dated 19.06.2020**

**Government of India**
**Ministry of Communications**
**Department of Telecommunications**
**Office of Administrator, USO Fund**

**Sub: Addendum-1** regarding response to pre-bid queries against Tender floated on 08.05.2020 for support from USOF for provision of 4G based mobile services in identified uncovered villages and seamless mobile coverage along NH-223 in Andaman & Nicobar Islands".

**Ref: Tender No. USOF/TENDER/ANI/30-174-7/2015-USOF-BB (Vol.XII) dated 08.05.2020.**

Tender for provision of Mobile Services based on 4G technology in Andaman & Nicobar Islands in identified uncovered villages and seamless mobile coverage along National Highways in Andaman & Nicobar Islands was floated by USOF on 08.05.2020 on CPP Portal.

2. The queries received from prospective bidders were examined.

3. In this regard, enclosed herewith replies/ clarifications to pre-bid queries raised by some of the prospective bidders as per enclosure along with amendments. These Replies & Amendments as given in enclosure has been uploaded on Central Public Procurement Portal (CPPP) and USOF website (www.usof.gov.in) as an Addendum for acceptance by bidder during submission of bid.

4. The above shall form an integral part of the Tender document. All other terms and conditions of the Tender shall remain unchanged.

This is issued with the approval of competent authority.

Encl: As above.

**(Vilas Burde)**
**Director (VSB), USOF**

**To,**

**All Prospective bidders**
**(Through CPP Portal & USOF website)**

**Reply to Queries against USOF Tender No.: USOF/TENDER/ANI/30-174-7/2015-USOF-BB (Vol. XII)**
**for support from USOF for provision of Mobile Services based on 4G technology in identified uncovered villages & seamless mobile coverage along National Highways in Andaman & Nicobar Islands**

| Sr. No | Clause No. | Clause | Queries / Requests | Suggested Modification in Clause | Clarification to the query |
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| 1 | Clause 3.2.3 (ii) (i) Page-13 | To maintain the desired quality of service (QoS), as per the TRAI recommendations. (uptime of minimum 98%). | Uptime of 98%:<br>Maintaining uptime of 98% is a very stringent requirement. Even TRAI norms recognize the fact that it is not possible to maintain uptime on every site consistently due to various factors such technical faults, transmission failures, power or backup failure etc. Therefore, TRAI enforces QoS on LSA level.<br><br>Given the fact these villages are located in remote areas, consistently maintaining up time of 98% on all sites, will be impractical. TRAI norms were revised recently after an exhaustive consultation and analysis of various factors. Hence, USOF may review this and propose 92% for such villages. Same can be refered from NESA tender. | It should be reduced to 92% for all practical purposes. | As per Tender. QoS is as per TRAI regulation. |
| 2 | Clause 1.10.3 4.2.1 (Page 5) | Universal Service Provider (USP), at its discretion, may have back-end tie-up with Infrastructure Providers Category-1 (IP-1) registered with the Department of | As per our understanding, the USP has been given the flexibility to lease all the Passive infrastructure assets like tower, battery, SMPS, engine alternator, renewable energy source | a. The infrastructure/ assets so created under this project shall be owned by the respective USPs or Infrastructure Provider (IP- | As per RFP. |

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| | | Telecom. However, USOF will enter into agreement only with Universal Service Provider which will be solely responsible to comply with all the terms and conditions of the tender and to perform all obligations as per the terms and conditions of the tender and USOF Agreement.<br><br>(viii) Only new equipment and material shall be provided under the Scheme. For this purpose, the new equipment shall be the one which has been procured not earlier than 12 months of submission of bid and has never been used earlier. | etc. from the infrastructure Provider (IP-1).<br><br>Further, IP-1 on behalf of USP are also allowed to enter into agreements pertaining to acquisition land/places for installation of sites.<br><br>Thus, in view of the above, USP may or may not own passive infrastructure or enter into agreement for acquisition of sites. These can be in the name of IP-1. However, obligations of maintaining the compliance to the tender conditions and provisioning of mobile services will be on the USP irrespective of ownership of equipment/land agreements. | 1) with whom the USP has a back-end tie up.<br><br>b. The undertaking, if required, for this should be taken only once from USP instead of taking it for every site. | |
| 3 | Clause 4.2.9 (Page 28) | DoT/USOF will consider to refer issues such as security and protection for sites, free RoW for aerial OFC etc. to State Governments, where their intervention is required. However, Roll-out period, imposition of LD and other penalty conditions will not be relaxed, due to delay/inaction on the part of State Government or any other concerned agency. | There are a number of dependencies on the State Government and other Agencies. If the site happens to fall in Defence / Forest Land then permission of the respective department would be necessary which is long drawn and time consuming. Any delay in receipt of such permission would delay our deployment and hence penalty conditions should be relaxed accordingly. | Suggested Modification:<br>The Clause may be suitably modified to take note of the raised concerns. | As per RFP, except verifiable delays for site falling in defence/forest area and delay is on the part of agencies despite timely submission of formal request by the bidder will be considered by USOF on case to case basis. |

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| 4 | Clause 4.2.5 Page 25 | Continued Operation and Maintenance of the Tower and infrastructure so created in order to provide 4G based mobile services compliant with the terms and conditions of the License Agreement signed with DoT, after expiry of the Agreement signed with USOF. | After the expiry of the agreement, maintaining all sites commissioned under USOF scheme as per the terms & conditions of the agreement may not be viable. There should not be any obligation for maintaining all USOF sites. | Clause 4.2.5 to be deleted. | As per RFP. |
| 5 | Clause 4.13 (Page 28) | FORCE- MAJEURE | Satellite used in the case of a VSAT link and associated Transponder may fail leading to a site outage. Such failures are not included as Force Majeure situation in the Tender. Since, these will out of control of USP, USOF may include events such as Satellite failure as a Force Majeure condition. | Relaxation should be provided for the outage because of satellite bandwidth related issues | As per RFP. However, relaxation, with credible proof shall be provided for the outage because of satellite bandwidth related issues which will be considered by USOF on case to case basis. |
| 6 | Clause 5.3.1 Page 31 Table 5.1 | Serial Number 7<br><br>4 Km for normal conditions. The data rate should be minimum 512 Kbps for single user at the edge of the cell boundary.<br><br>Serial Number 8Serial No 8 | • Minimum Radial Coverage is mandated (refer Table 5.1) to be 4Km which is not feasible. Coverage distance varies because of terrain and vegetation. Villages are part of hilly terrain along with having dense vegetation where it is not practical and feasible to provide radial coverage of minimum 4Km for every site.<br>• Instead USOF to specify the upper cap for VSAT so that if there is any KPI degradation after this | Serial Number 7 may be withdrawn<br>• TSTP should be followed for measuring the QoS parameters.<br>• Withdraw minimal radial coverage of 4 kilometer, instead the criteria should be village coverage | The condition of minimum 4 KM coverage requirement is for normal condtions.<br><br>The data rate should be tested with minimum 512 Kbps for single user at the edge of the cell boundary. |

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| | Clause 5.6.1 | • Only Minimum bandwidth requirements given for VSAT- 8Mbps. | bandwidth, there shall be no penalty on this count on the USP.<br>• Minimum user throughput >512Kbps (4G) at cell boundary at 4km is not feasible. Additionally as already stated coverage of upto 4 km is itself not feasible.<br>• Minimum user throughput cannot be guaranteed in wireless network because number of users attached varies with time and also depend on bandwidth on site. | | |
| 7 | 5.3.5<br>(Page 31) | The USPs are advised to verify non-availability of the coverage in the villages as specified in Clause 3.5.10 before installing equipment for which it intends to claim support from Universal Service Obligation Fund. No claims shall be admissible for cases of duplicate/ redundant infrastructure sites/ towers. No subsidy shall be paid for installation of tower to cover partially covered villages. | • USP will not have any control on day to day optimizations or coverage planning done by other TSPs. There can be situations when there will be no signal detected at the time of survey conducted by USP but after some time signal of other TSP is identified because of any technical optimization done by the other operator. In such situations, survey conducted by USP and duly approved by USOF, should be considered as the final list and there should be no changes in this list, otherwise it will adversely affect the project timelines and will lead to ambiguity in project scope. | Suggested Modification in Clause:<br>The USPs are advised to verify non-availability of its own coverage in the villages before installing equipment for which it intends to claim support from Universal Service Obligation Fund. No claims shall be admissible for cases of duplicate/ redundant infrastructure sites/ towers. USP will be allowed to claim subsidy for covering all those villages which are partially covered. USP will also be able claim subsidy for installing additional | The USPs are advised to verify non-availability of coverage in the villages before installing equipment for which it intends to claim support from Universal Service Obligation Fund. USP will not be allowed to claim subsidy for covering all those villages which have incidental/partial coverage. |

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| | | | USOF to please clarify this in the Tender.<br><br>J Further, there may be a situation, wherein a village is partially covered by a USP and additional site may be required to cover the village fully. In such cases, USP should be provided subsidy to install additional tower to cover partially covered village. | towers required to cover the villages which are partially covered by its network. Once USP submits its survey reports to DoT to certify the list of uncovered villages and the same is approved by USOF; there shall not be any subsequent changes to the approved list. | |
| 8 | Clause 5.7.4 (Page 33) | Sharing of existing VSAT Hubs is permitted. Setting up new hubs for the project is not mandatory. The backhaul from BSNL gateway to PoP location of successful bidder will be decided with mutual consent. Further successful bidder can extend its own connectivity from its PoP location with BSNL gateway location. | ISRO/BSNL-<br>Gateways related Query/concern<br><br>What will be the cost of expanding the existing Newtec satellite baseband on ISRO gateway location at BSNL Ranchi office as well as procuring the new remote site needed for the project (CAPEX) and if the commercial of the same is higher than the USP's discovered price in the open market from a different OEM, whether USOF/BSNL will allow to use different satellite baseband OEM for the USOF project.<br><br>If USP has to only use already available Newtec satellite baseband on ISRO gateway location at Ranchi and operated by BSNL, any VSAT site downtime attributed because of | USP should be given flexibility to share the existing BSNL baseband or install new baseband basis commercial viability. | A. The backhaul from BSNL gateway to PoP location of successful bidder will be decided with mutual consent.<br>B. Other details are as per reply to query no. 20. |

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| | | | the issue at gateway location which is not contributed by the USP then the down time penalty should not be charged.<br><br>ISRO/BSNL- Gateways Collocation charges (operating cost)<br><br>Cost of Gateway collocation charges at the BSNL Ranchi office which include Satellite baseband sharing charges, utility charges, and USP's equipment/hardware co-location charges to be shared prior to submission of techno-commercial bid. | | |
| 9 | Clause 5.7.3 (Page 33) | The sites installed with satellite backhaul should have minimum bandwidth of 8 Mbps and sites installed with microwave/OFC backhaul should have minimum bandwidth of 15 Mbps. | Instead USOF to specify the upper cap for VSAT so that if there is any KPI degradation after this bandwidth, there shall be no penalty on this count on the USP.<br><br>The additional subsidy for VSAT bandwidth, at actual cost, should be provided for all the sites which use Satellite bandwidth in any of the segments or links i.e. either middle-mile or directly towards the last mile node. In other words, some sites will be directly backhauled towards mainland through VSAT, some sites will be on Microwave and further backhauled to main land through VSAT indirectly. Satellite Bandwidth | This Clause may be suitably modified. | As per RFP. |

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| | | | subsidy should be provided for all such sites.<br>Since, all of the sites in Andaman and Nicobar Islands are running on VSAT, directly or indirectly, additional 100% subsidy should be provided for all sites on VSAT. | | |
| 10 | Clause 5.7.7 (Page 33) | USP shall convert VSAT sites on microwave/OFC backhaul within 1 years from the date of commissioning | OFC is perceived to be a cheaper alternative to VSAT only under the condition the OFC is accessible at site. Mandatory conversion of VSAT sites on Microwave/VSAT would result in additional investment. USP shall be given autonomy to decide on the backhaul, as it seems feasible to it. Thus, this clause shall be deleted. | This Clause may be deleted. | As per RFP. |
| 11 | Clause 5.7.8 Page 33 | After completion of 1 year, the TSP shall switch from VSAT to microwave or OFC connectivity as the submarine cable between Chennai & eight Islands of Andaman & Nicobar is expected to be operational by 2020. The cable landing stations in Andaman & Nicobar are; Port Blair, Swaraj Deep (Havelock), Kamorta, Great Nicobar, Little Andaman, Long Island, Rangat & Car Nicobar. | a. Any operator would like to migrate sites from satellite bandwidth to undersea cable ASAP. Whereas, As per desktop planning there could be some standalone sites (25-30, or more depends on actual physical surveys) which cannot be connected through undersea cable and will have to continue on VSAT for some more years or throughout 10 years. This will invite huge operational cost to the operator.<br>b. Cost of undersea cable bandwidth is not available to TSPs. | a. Any USOF site which will be non-feasible for migration to OFC/MW/undersea cable should be allowed to continue over satellite bandwidth and USOF has to provide the satellite bandwidth to USP free of Cost till the site is migrated to OFC/MW/undersea cable.Cost for Undersea cable bandwidth, co-location at landing station and access | A. As per RFP.<br>B. The tariff on non-discriminatory basis, for submarine cable, is under finalization and will be intimated in due course.<br>C. As per RFP. |

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| | | | c. 1 year timeframe for switching from VSAT to microwave or OFC connectivity is from date of commissioning of site or from the time undersea cable is operational. | facilitaiton should be provided before submission of techno-commercial bid.<br>b. 1 year time frame should be given from the date of availability of undersea cable because it will take significant time for migration. | |
| 12 | Clause 6.5.2 Page 36 | The successful bidder (USP) shall complete the field survey within three months of date of signing of the agreement to finalize the requirement of infrastructure at sites. The successful bidder (USP) shall commission & provide 4G based mobile services from all the infrastructure sites in a Bidding Unit within a period of 12 months from the date of signing of the Agreement. | Timeline of three months provided in the Tender for the completion of field survey is too optimistic seeing the ground reality. These island villages are in remote far flung areas. During Monsoon as well, these region receive heavy rain. Given this scenario USOF should not put any time limit for the survey and only specify the project completion timeline, which is specified as 12 months from the date of signing of Agreememt. This period as also is too short since the execution time post tender is only 9 months and site acquisition consumes considerable amount of time.<br><br>In Annexure 1 (containing village list) of Tender there are villages having no coordinates. Bidder is required to conduct survey of each villages for the suitable location of the tower. Our experience has | Suggested Modification in Clause:<br><br>No timelimit shall be stated for completion of surveys or any other activity related to project execution. Implementaiton timelines shall be fixed as 24 months from the date of signing of Agreement | As per RFP. |

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| | | | shown village identification and survey is the most challenging part of the project. Three months provision for survey is too short.<br><br>Further, the time period taken by DoT/USOF for approval of POC should be excluded from the calculation of Implementation period i.e. from the time USP files for POC site for certification to USOF till the final approval is granted by USOF to USP, should be excluded from implementation/roll out period.<br><br>It is also well known fact that villages falling within Forest/ Defence/ Govt./ Local Body jurisdiction would require special approval from the authorities which is time consuming. Under the circumstances, the USOF should consider exclusion and exceptional time line for completion of installation for these identified villages during survey & notified to the USOF | | |

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| 13 | Clause 7.2.7 (Page 39) | Deduction in subsidy (EQS) shall be made from USP on pro-rata basis, if there is interruption in services for more than 43.2 hours (cumulatively) in a quarter; and the entire EQS shall not be payable for that particular site, if there is interruption in services for 45 days or more in a quarter. The USP shall furnish the details of interruption/ down time of the services along with the payment statement as per the pro forma attached at Annexure-13. In addition, the USP, as Licensed Access Service Provider shall be bound by and shall comply with the relevant regulations of TRAI for QoS. | USOF may clarify as to why such stringent norm of 98% (on per site basis) uptime has been specified; even TRAI norms do not prescribe such stringent requirement.<br><br>TRAI Quality Norms, which has only recently been amended, defines uptime on a LSA level and exempts 2% of the worst performing sites.<br>USOF should consider an interruption allowance of up to 7 days (cumulative) in a quarter which was defined in the very recent USOF Tender under execution be adopted. | Deduction in subsidy (EQS) shall be made from USP on pro-rata basis, if there is interruption in services for more than 7 days (cumulatively) in a quarter; and the EQS shall not be payable for that particular site, if there is interruption in services for 45 days or more in a quarter. The USP shall furnish the details of interruption/ down time of the services along with the payment statement as per the pro forma attached at Annexure-13. In addition, the USP, as Licensed Access Service Provider shall be bound by and shall comply with the relevant regulations of TRAI for QoS. | As per RFP. |

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| 14 | Clause 7.1.5 (Page 38) | Further, Equated Quarterly Instalment shall be released after verification by a Third-Party Agency (TPA), unless specified otherwise by Administrator, for which payment shall be a maximum of 1% of the Representative rate of subsidy emerging from the bidding process and will be paid directly to the TPA. | This in effect would mean that the USP will be paid only 99% of the RR subsidy amount. 1% amount stated to be paid to the TPA is on the very high side especially when the testing facilitation (Test instrument, testing team, other logistics) is expected to be borne by the USP. Experience shows the fee should be just a fraction of the stated amount.<br>In addition since the testing is stated to be done a sample basis, payment of 1% of RR subsidy for the complete set of sites is unreasonable. | Clause 7.1.5 may be re-worded to state the payment to the TPA shall be brone by the USOF Administration.<br><br>Clause 7.1.4 to be changed to state "First part shall be due and payable @ 50% of Representative Rate, as an FLS……."<br><br>Likewise similar changes in other sections on FLS be made elsewhere in the RFP. | As per RFP. |
| 15 | | | Timelines for project implementation:<br><br>The time period for project execution defined in the RFP as 18 months is not sufficient as majority of the site locations are difficult to access (forest, access, etc). Also, there would be a huge requirement of extensive fiber roll out since radio links would not be feasible. Hence, the timeline to deliver needs to be increased to 30 months. Further, we propose that the time taken by respective Government authorities in granting the requisite permission for site acquisition/ installation should be excluded from the overall project | | As per RFP.<br><br>[As per clause 6.5.2 under roll out (page no. 36) of RFP "The successful bidder (USP) shall commission & provide 4G based mobile services from all the infrastructure sites in a Bidding Unit within a period of 12 months from the date of signing of the Agreement"]. |

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| | | | implementation period, since getting requisite approvals for these sites is a time consuming process.<br><br>The USF team is aware of challenges in getting approvals from local Sate Govt agencies as also the difficult terrain involved and hence our request. | | |
| 16 | | | Unavailability of cost of Satellite and undersea cable bandwidth:<br><br>In order to evaluate the financial viability of the project, we request the administration for the reimbursement of actual cost to be incurred by USP for undersea cable, as well as for Satellite bandwidth. Also, USP may have the plan to migrate all the sites to OFC/MW, however, if any USOF site is not feasible to be migrated to OFC/MW/undersea cable the USP should be allowed to continue with the satellite bandwidth for extended period. | | A. 1 Gbps has been reserved for USOF schemes including mobile services. Therefore, no financial implication is anticipated for the successful bidder toward the cost of satellite bandwidth for one year. Accordingly VSAT OPEX is not considered. Other details are as per reply to query no. 20.<br>B. The tariff on non-discriminatory basis, for submarine cablee is under finalization and will be intimated in due course. |

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| 17 | | | Prescribed Quality of Service Norms:<br><br>Expectation of Quality of service from the sites proposed to be commissioned under USOF scheme is very unrealistic & uncalled for. Specified norms (98%) in the RFP are difficult to achieve and by insisting on such stringent norms which are even beyond present TRAI mandate is like setting up the winning bidder for penalty for entire rollout period. This is extremely challenging especially when measurement is made on a per site basis whereas even TRAI's QoS definition is on a cluster/Circle basis. Sites to be commissioned under USOF scheme should rather be measured at reduced QoS norms say at 90-92% instead as most of the USOF sites are in difficult terrain/locations which are not accessible throughout the year. | | As per RFP. |

| Sr. No | Page No | Existing Clause | Clarification requested | Clarification to the query |
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| 18 | Pg 46, Clause 10.13 | OPERATIONAL EXPENDITURE means the Annual Operating Expense incurred on routine maintenance of infrastructure and recurring expenditures on diesel, electricity, security etc. including satellite bandwidth charges, to be paid by Universal Service Providers. | The number of sites on Satellite should be decided by the bidder and request DoT to provide the subsidy for up to 50% of the total sites. The reason is that infrastructure cost for setting a VSAT hub is not viable if the number of remote sites are restricted. | As per RFP. |
| 19 | Pg 33, Clause 5.7.7 | 5.7.7 USP shall convert VSAT sites on microwave/OFC backhaul within 1 year from the date of commissioning. | These locations are very remote and that is the reason that there is no telecom infrastructure available after so many years and we do not anticipate the situation to improve in next 2 years so we request the subsidy to be extended till 5 years from the date of acceptance. The infrastructure availability can be reviewed after 2 years. | As per RFP. |
| 20 | Pg 33, Clause 5.7.1 | Backhaul Connectivity using BSNL Bandwidth under USOF | We understand that :<br>A) The Satellite bandwidth required for Andaman is available from GSAT-11 Ranchi Beam 5 and GSAT-19 Bangalore Beam 8. Both these Locations have MF-TDMA Baseband available under BBNL SATCOM Network which is for Telco non discriminatory access use.<br>B) As per clause 5.7.4 sharing of existing VSAT HUB is permitted & bidder can utilize it for providing connectivity<br>C) Can we use existing BBNL SATCOM services from the above said resources | A) BSNL shall be upgrading satellite connectivity by installing point to multipoint Ku-band equipment and associated items at main hub station at Ranchi & Bengaluru alongwith remote station satellite modems at Port Blair, Swaraj Dweep (Havelock), Little Andaman (Hutbay), Mayabunder, Rangat, Diglipur, Car Nicobar, Kamorta and Great Nicobar (Campbell bay) exchange sites with following capacity : |

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<tr><th>Sr. No</th><th>Page No</th><th>Existing Clause</th><th>Clarification requested</th><th>Clarification to the query</th></tr>
<tr><td></td><td></td><td></td><td>D) IF YES, kindly provide the commercials in case we want to extend the services beyond 1 year time frame</td><td>
<table>
<tr><th>Sl.</th><th>Islands / Satellite Stations of BSNL</th><th>Capacity to be available in Ku band</th></tr>
<tr><td>1</td><td>Port Blair</td><td>600 Mbps</td></tr>
<tr><td>2</td><td>Swaraj Dweep</td><td>100 Mbps</td></tr>
<tr><td>3</td><td>Little Andaman</td><td>100 Mbps</td></tr>
<tr><td>4</td><td>Maybunder</td><td>100 Mbps</td></tr>
<tr><td>5</td><td>Rangat</td><td>100 Mbps</td></tr>
<tr><td>6</td><td>Diglipur</td><td>100 Mbps</td></tr>
<tr><td>7</td><td>Car Nicobar</td><td>100 Mbps</td></tr>
<tr><td>8</td><td>Kamorta</td><td>100 Mbps</td></tr>
<tr><td>9</td><td>Great Nicobar</td><td>100 Mbps</td></tr>
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<br>Out of 1400 Mbps upgradation, 1000 Mbps is to be allocated at each station as backhaul satellite bandwidth.<br><br>At each of remote station, satellite modem as mentioned above, minimum 4 nos. of Ethernet ports (2 nos Electrical & auto negotiable and 2 nos optical) are provisioned.<br><br>Each remote satellite modem of BSNL will be connected to an external switch having following specification from where any connection can be extended by TSP:<br><br>10/100/1000 Base T - 10 nos.<br>1G Base LX-10 Km - 04 nos.<br>10G Interface (10G BASE-LR/LW) - 2 nos.</td></tr>
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| Sr. No | Page No | Existing Clause | Clarification requested | Clarification to the query |
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| | | | | The charges as per BSNL circular R&C-CFA No. 99/19-20 dated 28.01.2020 for acquiring building space & misc. Infrastructure services would be payable separately to BSNL (copy enclosed).<br><br>For (B), (C) & (D), Extension of connectivities as per details given in (A) above only be available. |
| 21 | Pg 33, Clause 5.7.1 | Backhaul Connectivity using BSNL Bandwidth | We understand that :<br>A) BSNL have few been allocated 1 Beam on GSAT-11 to provide coverage for Andaman Islands from RANCHI gateway and its being partially usedB) Can bidder host its MF-TDMA baseband at RANCHI & Take the required beam bandwidth from BSNL on commercial model as the Satellite backhaul for 4G needs special Wan optimizers / LTE accelerators which needs to be additionally depoyed by TELCO<br>C) Kindly provide the hosting charges for baseband and commercials for bandwidth needed to provide the Voice backhauls | As per 3 above. |
| 22 | Pg 30, Table 5.3.1 (8) | Minimum Backhaul Bandwidth : 8Mbps on VSAT | Kindly confirm that bidder on Licensing part for taking the SATCOM Backhaul bandwidth :<br>A) Kindly confirm bidder shall be given VSAT Bandwidth from BSNL if required under which License?<br>B) Kindly confirm bidder shall be given VSAT Bandwidth from BBNL if requried under which License?<br>C) Can bidder take bandwidth from any Indian VSAT LIcensee? | As per RFP. |
| 23 | Pg 33, 5.7.1 | Backhaul Technology may be either Optical | We understand that this tender is for providing 4G using media mix of VSAT, Microwave, Fiber as | As per RFP. |

| Sr. No | Page No | Existing Clause | Clarification requested | Clarification to the query |
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| | | Fibre Cable or Microwave or VSAT. BharatNet backhaul should be preferred wherever available. | backhaul. However for VSAT Network, the LTE acceleration is required in client server mode. In case BBNL infrastrcuture is allowed to be used by USOF for Satellite, Is bidder allowed to Augument / Upgrade BBNL Jupiter Baseband's or Bidder has to co-locate their Baseband HUB in L-Band to use the HTS Bandwidth. Kindly confirm. | |
| 24 | Pg 13, 3.2.3 (ii) | (i) To maintain the desired quality of service (QoS) as per the TRAI recommendations. (uptime of minimum 98%). | We understand 98% of uptime is to be maintained for the network. Is bidder allowed to provide VSAT Media as backhaul in backup mode post the period of primary operation. The bidder may use the advantage of Satellite concurrency pools of 8 Mbps accross multiple sites. For example 10 VSAT sites backhaul works in a pool of 8Mbps, only 1 VSAT may come LIVE once primary media (RF / OFC) goes down in 10% concurrency ratio. | As per RFP. |

| Sr. No | Page No | Query / Request | Clarification requested | Clarification to the query |
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| 25 | | **General**<br><br>During the pre-bid discussions, some concerns / queries were raised by participants and we wish to put on record our comments to the same | | |
| | | a. PPP MII is not applicable to private operators. | The PPMI is applicable to all projects where funding is from GOI. Hence any project funded by Government has to implement PPP MII. Please clarify? | As per RFP. |
| | | b. TSPs are not required to follow TEC GRs as per their license agreement. | Our submission: TEC GRs are mandatory for PPP MII as per orders issued by DOT itself. As project will be funded by USOF/Government, TEC GR is mandatory. Please clarify? | As per RFP. |
| | | c. For TSPs, the USO project is an extension of their existing network and they cannot have two sets of networks etc. | Our submission: The telecom networks are inter-workable, hence no issues. Moreover, TSPs themselves use different vendors in different states and still boast of providing seamless coverage and promote as one India network | As per RFP. |
| | | d. The USO project is not for procurement of products, but for services. | Our submission: Whenever there is funding from Govt., the PPP MII is enforceable and DOT notification dated 29th August 2018 very clearly mentions "Telecom Products, Services or Works". Any services require procurement | As per RFP. |

| Sr. No | Page No | Query / Request | Clarification requested | Clarification to the query |
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| | | We request that these are excuses not to follow the Government orders. In case TSPs are interested to take USO funding, then they must follow the relevant rules and regulations, especially now, when the Government is very "vocal about local" products. We request USOF to enforce the PPP MII and TEC GRs,as mandate in DOT PPP MII policies. | of products and deployment thereof in the network, hence services can not be procured without product and delivered to USOF. | |
| 26 | | **Eligibility criteria (Clause 1.10)**<br><br>i. The tender stipulates only TSPs to participate in the tender.<br>ii. The domestic telecom equipment manufacturers have competence to rollout very large size Government projects in India (like LWE project by VNL, HFCL etc) about 2,000 full-fledged 40 meter, Sites with 2x2x2 configurations & fully Solar powered.<br>iii. The proposed ANI project covers only 124 sites.<br>iv. The domestic vendors may please be allowed to directly bid in the tender. USOF Act allows for it. | | As per RFP. |

| Sr. No | Page No | Query / Request | Clarification requested | Clarification to the query |
|---|---|---|---|---|
| | | So, eligible True Indian manufacturer should be allowed to bid.<br><br>a. We understand (from the experience & the narratives used) that USOF needs the service – Indian manufacturers will tie up with any TSP once they bid and win the tender whereas the service will be of that TSP.<br><br>b. The full responsibility will be of the Indian Equipment manufacturer only backed by agreement with TSP.<br><br>c. We appreciate that in any case USOF pays only when service becomes operational.<br><br>v. This way the domestic manufacturers will get a good business opportunity.<br><br>a. The domestic manufacturers can form association / partnership with the TSPs for provision of services as per USOF mandate.<br><br>b. Thesaid partnership/association can be done by domestic | | |

| Sr. No | Page No | Query / Request | Clarification requested | Clarification to the query |
|---|---|---|---|---|
| | | manufacturers after they have won the bid. This may not be feasible in advance due to perceived conflict of interest. | | |
| 27 | | **Public Procurement (Preference to Make in India) (Clause 1.8)**<br><br>While vide clause 1.8, the tender envisages compliance to DOT's PPP-MII Order 2017, the tender does not describe any Bill of Quantities/Material or any equipment details. | Itemized BoQ and linkage to PMI should be clearly mentioned so as to ensure Local Content & PMI compliance of each product as prescribed in the DOT notification along with the respective reference of the TEC GR for the product to be procured. Further, there is no provision whatsoever in the tender to give details of compliance of PPP MII and to verify the same. The same needs to be incorporated please. | As per RFP. |
| 28 | | **Compliance to TEC GR**<br><br>As per DOT notification of Telecom Products under PPP-MII, clause 9 reads that "Each identified products, services or works as in Table-A shall comply with the latest TEC GR/IR, if such GR/IR have been issued".<br><br>However, the tender gives reference to TEC GR for 40 M tower only while Items like eNodeB, power systems, backhaul, the relevant TEC GRs have been missed | TEMA requests that reference to TEC GR for all equipment under the procurement should be incorporated in the tender, without which the tender will be incomplete | As per RFP. |
| 29 | | **Compliance to Green Telecommunications (Clause 3.3.2)** | Implementation of Green Telecommunications should be made mandatory and should not be left at the discretion of the bidder. Making it | As per RFP. |

| Sr. No | Page No | Query / Request | Clarification requested | Clarification to the query |
|---|---|---|---|---|
| | | The Clause 3.3.2 (Page 13) states "In line with the provisions related to Green Telecom in NDCP-2018 policy, the Scheme is designed to use Renewable Energy Technologies (RETs) at the discretion of bidder". | optional will defeat the very purpose of DOT directives and will have severe impact on achieving the carbon footprint targets. Provisioning of Genset should be avoided at the tower sites as was in earlier decision by Cabinet in LWE Phase I tender also. | |
| 30 | | **Technical specifications** | | |
| | | a. Carrier Power<br><br>Table 5.1 Sr No 2 states "Carrier Power Minimum 20 W per sector depending upon the population and coverage required" | a. How the population will decide the carrier power?<br>b. Carrier Power min 20W means 2x10W in each sector? | As per RFP. |
| | | b. Antenna<br><br>Table 5.1 Sr No. 5 states "Sectoral antenna with radiating power of 20 Watts per Sector". | i. Antenna is not an active RF equipment which can generate power. Kindly clarify what is the meaning of radiating power 20W per sector for antenna? Does this include eNodeB power also?<br>ii. Clause 5.6.5 states "eNode-B shall be capable for Omni and sectored configurations". This is contradicting with Antenna requirements as no Omni antenna specifications are mentioned. | As per RFP. |
| | | c. Receiver Sensitivity<br><br>Table 5.1 Sr No. 6 states "Receiver sensitivity shall be as per 3GPP standards" whereas Clause 5.6.6 states "The sensitivity of the eNode-B shall be better than -124dBm". Which is to be followed? | Our submission is that there is no meaning of receiver sensitivity in eNodeB. No such mention is there in TEC GR also. eNodeB works on RSRP concept for coverage perspective and for the same TEC GR should be the reference. | The equipment should be compliant for LTE specifications. |

| Sr. No | Page No | Query / Request | Clarification requested | Clarification to the query |
|---|---|---|---|---|
| | | d. Radial Coverage<br>Table 5.1 Sr No. 7 states minimum radial coverage of 4 Km for normal conditions. The data rate should be minimum 512 Kbps for single user at the edge of the cell boundary. | i. What if the bidder deploys 20W eNodeB (as per Sr No. 2 of Table 5.1) and coverage comes less than 4 Kms, in that scenario what bidder has to do?<br>ii. Does USOF want 4 Kms coverage a mandatory or interested in 20W product? As 4 Kms coverage in normal areas can be achieved with even 10W product as per TEC GR guidelines.<br>iii. Whether Vendor's undertaking will work, or testing will be done on sampling bases and by which agency? | As per RFP. |
| | | e. Battery<br><br>Clause 5.5.2 specifies "Lithium-ion or VRLA battery to cater for 24 Hrs autonomy". However, no TEC GR number is specified. | Kindly provide TEC GR number against which compliance to be made. | As per RFP. |

# Ammendment - I

**Bid Securing Declaration form (To be submitted on bidder's Letter head)**

1. The clause 1.11 on page 5 of the tender document regarding Bid Security/ Earnest Money Deposit is as follows:

   *The Bidder for the scheme shall furnish an EMD issued by any Scheduled Bank for the amount as shown against the Bidding Unit, as stated in Clause 1.3, through:*

   (a) *Demand Draft/ Banker's cheque drawn in favour of "Pay & Accounts Officer (HQ), Department of Telecom, New Delhi" and payable at New Delhi;*

   *Or*

   *Bank Guarantee as per the format given in Annexure-6 of the tender document.*

   (b) *The EMD should be valid for 45 days beyond the initial bid validity of 180 calendar days from the Bid Opening Date i.e. 225 days (and extendable at the request of the Administrator for a further period of 180 days) for the Bidding Units.*

   (c) *No interest shall be payable for the sum deposited as EMD.*

2. The bidders may note that they can submit prescribed Bid Securing Declaration form as follows towards Bid Security/ Earnest Money Deposit:

**Annexure-18 : Bid Securing Declaration form**

(To be submitted on bidder's Letter head)

To

Administrator, USOF

Department of Telecom

2nd Floor, Sanchar Bhawan,

New Delhi – 110001.

We, M/s……. (herein referred as bidder), render the declaration as below: - That we will automatically be suspended from being eligible for bidding in any contract with the Universal Service Obligation Fund / Department of Telecom (herein referred as Purchaser) for the period of 3 years, starting from the date of bid submission, if bidder is in breach of any of the following obligation(s) /condition(s):

(a) That, if we withdraw or modify the bids during the period of validity, or

(b) If awarded the contract and fail to sign the contract, or fail to submit a performance security before the deadline defined in the Letter of Intent.

(Signature)

Authorized Signatory

Name: _____

Designation: _____

Office Seal: _____

Place: _____Date: _____

Corporate Office(T&C-CFA Branch )
2nd floor, Room No. 215,
Eastern Court, Jan path,
New Delhi – 110 001
Phone – 011 -23765039/23734321
Fax – 011 - 23734319 / 23734322
Email id : tccfa.bsnl@gmail.com

भारत संचार निगम लिमिटेड
(भारत सरकार का उपक्रम)
BHARAT SANCHAR NIGAM LIMITED
(A Govt. of India Enterprise)

No. 2-2/2009-R&C [CFA] Dated:-28-01-2020

# Circular R&C-CFA No. 99/19-20

**Sub: Infrastructure Charges for Active Links of Licensed Telecom Services Provide – reg.**

Based on the recommendations of Committee , the approval of Competent Authority is hereby conveyed for levy of charges for infrastructure provided / being provided by BSNL to other TSPs for the F.Y. 2020-2021 as below:-

1. **Charges for building space.**

(Rates for one transmission bay including space for one box of transmission and DDF as required)

| S. No. | Classification Of cities/towns | Charges for the F.Y.2019-20 (in Rs.) | Propose Charges for the F.Y.2020-21 (After 10% Increase) In Rs. |
|---|---|---|---|
| 1 | X | Rs. 159790/- per annum per bay | Rs. 175769/- per annum per bay |
| 2 | Y | Rs. 124282/- per annum per bay | Rs. 136710/- per annum per bay |
| 3 | Z | Rs. 69046/- per annum per bay | Rs. 75951/- per annum per bay |

2. **Misc. Infrastructure Service Charges**: These charges include the sharing of following services:
   - I. DC power at-48v up to 10 A/transmission bay.
   - II. AC power for lights, fans, testing instruments etc.
   - III. Air conditioning charges (sharing of existing air conditioning system).
   - IV. Generator Backup.
   - V. Earthling charges (Tapping from exchange earth bar is allowed).
   - VI. Fire equipment (sharing in case of requirements).

| S. No. | Classification Of cities/towns | Charges for the F.Y. 2019-20 (in Rs.) | Propose Charges for the F.Y. 2020-21 (After 10% Increase) In Rs. |
|---|---|---|---|
| 1 | X | Rs. 767173/- per annum per bay | Rs. 843890/- per annum per bay |
| 2 | Y | Rs. 690455/- per annum per bay | Rs. 759501/- per annum per bay |
| 3 | Z | Rs. 517840/- per annum per bay | Rs. 569624/- per annum per bay |

3. **Other terms and condition applicable to above charges are:**
   - i. ***These charges will be leviable in advance for the F.Y. 2020-21.***
   - ii. *These charges applicable for existing as well as new infrastructure to be provided w.e.f. 01-04-2020.*
   - iii. Above infrastructure charges is applicable for FY. 2020-21 and with the 10% annual increment for next year onward.
   - iv. *In case TSPs wishes to surrender the infrastructure facilities then they may be allowed to convey their decision within one month of issue of the bills. In this case provisional bill may be issued for infrastructure charges to be levied "In terms & conditions of BSNL Circular dated 06-01-2009" at this rates as Hon'ble TDSAT Judgement dated 20-08-2014 & 14-10-2014 will be applicable subject to outcome of the Civil Appeal pending before the Hon'ble Supreme Court (C.A.No.1699 to 1723 of 2015).*
   - v. *Taxes and duties as per orders issued by GOI shall be extra.*
   - vi. The Circle should ensure to comply with all regulatory requirements.
   - vii. The circular issued based on the approval of competent authority in file No.6-9/2018-NM(Infra), for any querry/clarification in this regard, matter may be taken up with NWO-CFA section, BSNL Corporate Office, Janpath, New Delhi-110001, (T.No. 011-23711795 and Fax No. 011-23734139).

DGM (T&C)-CFA

To

The All CGMs, Telecom Circles/Metro Telephone Districts/ Maintenance Regions/ ITPC Pune.



Regd. & Corporate Office: Bharat Sanchar Bhavan, H. C. Mathur Lane, Janpath, New Delhi-110001
Corporate Identity Number (CIN): U74899DL2000GOI107739

Section-3, Part-B.

Technical Specifications

The equipment shall be supplied as per the following specifications and Generic Requirements (GR):

| Sl. | Item | Detail specifications |
|---|---|---|
| 1 | Satellite Hub equipment in ( 1+1) configuration, with NMS | As per Appendix -A |
| 2 | IP Satellite Modem for remote stations | As per Appendix -A |
| 3 | WAN Optimiser | TEC/ TX/GR/WAN–001/01.NOV 2014 along with specification given in Appendix-A |
| 4 | Ku-band Satellite Antenna (2.4 m dia.) | TEC/GR/TX/SAN-013/03 MAR 09 along with specification given in Appendix-A |
| 5 | Ku-band Satellite Antenna (3.8 m dia.) | TEC/GR/TX/SAN-18/01 MAY 2008 along with specification given in Appendix-A |
| 6 | WIRED RACK FOR HOUSING MODEMS & COMBINERS / DIVIDERS etc. | As per Appendix-'A' of this section |
| 7 | L-band Combiner | As per Appendix-'A' of this section |
| 8 | BUC 16 W | As per Appendix-'A' of this section |
| 9 | BUC 8 W | As per Appendix-'A' of this section |
| 10 | LNBC - PLL based | As per Appendix-'A' of this section |
| 11 | Power convertor Module for feeding external power supply to BUC | As per Appendix-'A' of this section |
| 12 | Laptop Computers / LCT/ Work Stations | As per Appendix-'A' of this section |
| 13 | Router : (Aggregation router) | TEC/GR/IT/TCP-004/01 FEB-14 along with specifications given in Appendix-'A' |
| 15 | LAN Switch ( Category-IV, Type B) | TEC/GR/IT/LSW-001/05 MAR 2014 along with specifications given in Appendix-'A' |

**Note :-**

i) Copy of GRs referred in this document can be obtained from Telecom Engineering Centre (TEC), Khurshid Lal Bhawan, Janpath, New Delhi- 110001 on payment of prescribed fee.

ii) Clause by clause compliance to the GRs and Technical Specifications with page reference numbers of the supporting documents/datasheets as per clause no 9 of Section 5 Part B must be enclosed.

In addition to the technical specifications mentioned in the GR, as specified above, the tendered equipment shall also meet the following additional technical specifications:-

## 1) Technical specifications of Satellite Hub Equipment:

**A) General**: The requirement is for providing satellite connectivity to Remote Islands of Andaman & Nicobar Islands and Lakshadweep Islands from main land. For this purpose, it is planned to provide Satellite Hub/(s) at Bangalore and Ranchi for GSAT-11 and at Bangalore for GSAT-19.. The Satellite Hub will work in shared mode for all remote Islands, so the Satellite bandwidth can be allocated dynamically as well as statically with in one beam of HTS. The Hub shall be fully integrated, connecting directly to IP and RF uplink ( at L-band) and shall include the following:

- Forward link equipment - Hub Modulator
- Return link equipment - Multi-channel Receiver
- Traffic and QoS management system
- Acceleration & Compression System
- GPRS Tunnelling Protocol for GSM and LTE
- NMS for Management and Control

**B)** The Hub shall have the following specifications:

i) **Redundancy:** All units shall be provided in redundant configuration i.e. 1+1 or 2+1 / 2 x (1+1) as per requirement.

ii) **Forward Link**: DVB-S2X or equivalent with CCM/ ACM feature

iii) **Return Link**: Dynamic SCPC or equivalent for dynamic allocation of satellite bandwidth to remotes stations. Fixed allocation of bandwidth shall also be possible.

iv) The Hub shall enable connectivity with existing IP infrastructure and capable of providing user IP throughputs of over 400 Mbps per outbound ( without optimisation)

v) The Hub shall assign bandwidth to remote stations on-demand from a shared pool of satellite bandwidth dynamically. There shall also be option to assign fixed bandwidth to remote stations.

vi) Shall have embedded header and payload compression engines, WAN & GTP optimization for GSM & LTE, multi-tier Quality of Service (QoS), dynamic bandwidth and power management along with bi-directional Adaptive Coding & Modulation (ACM) capability to provide the highest user throughput, highest availability, and most optimal resource utilization available in the industry.

vii) The (1+1) hub equipment is to be scalable to (2+1) by adding WAN Optimiser, MOD and DEMOD equipment. The (2+1) Hub equipment is to be scalable to (4+1) by adding WAN Optimiser, Mod and DEMOD equipment.

viii) The specifications of various equipment of Hub are as given below:

**C) Specification of Hub Modulator:**

| | | |
|---|---|---|
| i) | Output Range | L-band: 950 to 2150 MHz in steps of 100 Hz or lower |
| ii) | Modulation | -DVB-S2x, as per ETSI EN 302 307 - Switchable between QPSK, 8PSK, 16APSK, 32 APSK and 64 APSK or equivalent<br>- Support for Adaptive Coding Modulation (ACM) and Constant Coding Modulation (CCM) |
| iii) | Alpha (Roll off) | 5 % ,10%, 15%, 20%,25 %, 35%, software settable |
| iv) | Traffic data interfaces | One or more 1 GbE<br>(Excluding management port). In addition 24 port (min) managed Layer-2 switch is to be provided to meet the functionality. |
| v) | Output return loss | L-band: >10 dB |
| vi) | Output level | 0 dBm to – 30 dBm, in step size of 0.1 dB |

| | | |
|---|---|---|
| vii) | Level Stability | ± 0.5 dB/day at constant temperature of 25°C. |
| viii) | On/Off Levels | -55 dBc/4 kHz |
| ix) | Output Harmonics and Spurious Levels | <-55 dBc/4 kHz |
| x) | Phase accuracy | ±2° |
| xi) | Amplitude accuracy | ±0.2 dB |
| xii) | Phase Noise | <0.75 degrees RMS double-sided 100 Hz to 1 MHz |
| xiii) | Power Accuracy | ±1 dB over frequency and temperature |
| xiv) | Frequency Stability | ± 0.1 ppm, 0 to 50 °C (32 to 122 ° F) |
| xv) | Management | Front panel key pad/ display ( optional) and remote management through LCT & NMS |
| xvi) | Configuration retention | Non-volatile memory, returns on power up |
| xvii) | AUPC | Should support automatic uplink power control |
| xviii) | Coding rate | QPSK: 1/2, 2/3, ¾;<br>8PSK: 3/5, 2/3,3/4, 5/6, 8/9, 9/10<br>16APSK: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10;<br>32APSK: 3/4, 4/5, 5/6, 8/9, 9/10 |
| xix) | Transmit data rate | Up to 400 Mbps ( without optimization) per carrier |
| xx) | No. of carrier per hub | One or Two nos. ( as per requirement) |
| xxi) | Processing satellite bandwidth per carrier | 116 MHz (min.) |
| xxii) | Output Interface | Compatible with RF equipment |
| xxiii) | Redundancy | 1+1 or 2+1 / 2 x (1+1) ( as per requirement) |

**D) Specification of Multi- Channel Receiver :**

| | | |
|---|---|---|
| i) | Input Range | L-band: 950 to 2150 MHz in steps of 100 Hz |
| ii) | Demodulation | -Dynamic SCPC or equivalent<br>- Switchable between QPSK, 8PSK, 16APSK and 32 APSK<br>- Support for Adaptive Coding Modulation (ACM) and CCM |
| iii) | I/P return loss | L-band: >10 dB |
| iv) | Input level | : -45 dBm to – 20 dBm |
| v) | Alpha (Roll off) | 5 % ,10%, 15%, 20%,25 %, 35%, software settable |
| vi) | Coding rate | QPSK: 1/2, 2/3,3/4 ; 8PSK: 3/5, 2/3,3/4, 5/6, 8/9, 9/10<br>16APSK: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10; 32APSK: 3/4, 4/5, 5/6, 8/9 |
| vii) | Receive data rate | 60 Mbps per channel ( minimum) IP |
| viii) | Input Interface | Compatible with RF equipment |
| ix) | Output Interfaces | Gigabit Ethernet (optical); The functionality through external switch will also be accepted. |
| x) | No. of demodulators | 8 nos. ( minimum) & total data throughput for all 8 channels shall be 200 Mbps (min.).The scalability of receiver to 20 Channels and throughput upto 400 Mbps shall be possible by adding additional multichannel receiver/s or by adding software licenses in future. |
| xi) | Processing satellite bandwidth per system | 70 MHz ( minimum) |
| xii) | Management | Front panel key pad/ display ( optional) and management through LCT & NMS |
| xiii) | Configuration retention | Non-volatile memory, returns on power up |
| xiv) | Redundancy | 1+1 or 2+1 (as per requirement); **For redundancy requirement, separate unit is to be provided.** |

**E) NMS:**

i) The NMS shall be GUI based and in (1+1) configuration. The remote and DR site will be co-located.

ii) The NMS shall be able to manage and control the Hub and Remote equipment.

iii) It shall be possible to manage the satellite hub and remote satellite Modem equipment from the NMS proposed to be supplied by the bidder against this tender. The requirement of managing other equipment is optional.

iv) It shall be able to manage four nos. of RF carriers from hub and 200 remote sites / Network Elements from day one.

v) The Network Management System shall have monitoring and diagnostic capabilities and easy-to-use graphical user interface (GUI). It shall have scalable architect.

vi) It shall be a web-based, client/server architecture providing unlimited client access from any location/device.

vii) It shall support trend analysis and event correlation, inventory and assets management, real-time data traffic statistics and SLA monitoring, applications performance, customization of reports /applications. It shall be capable to configure remote NEs from NMS.

viii) The sizing of hardware is to be done by the bidder suitable to the requirement of tender.

ix) It shall be possible to send SMS and e-mails automatically pertaining to occurrence of faults though the NMS.

x) The processor speed NMS servers shall be minimum 2.1 GHz. There shall be minimum two multi core processors per server and redundant hard disks with RAID implementation

xi) There shall be dual Ethernet interfaces and dual reluctant power supply (Hot pluggable)

xii) The storage for three months data is required.

xiii) Minimum works stations to be supported shall be 5 (Five).

xiv) LAN Switch shall also be provided, if required.

xv) The Fault Management, Configuration and Control features of network shall be provided. The following management functionality shall be supported:

a) Fault management (alarm, event, date, time, severity etc.)
b) Software management
c) Network configuration, supervision, alarm management and performance management.
d) Ethernet performance monitoring

xvi) It shall be possible to generate customised report from the NMS for utilisation of satellite bandwidth for all links.

2) **Technical specifications of Remote Satellite Modem:**

A) **General:** The Remote satellite modems are is required for backhauling of IP traffic using dynamic bandwidth assignment and shall have following features:

B) **Specification of Remote Satellite Modem:**

| | | |
|---|---|---|
| i) | Input / Output Range | L-band: 950 to 2150 MHz in steps of 100 Hz or lower |
| ii) | Forward Link | -Dynamic SCPC of equivalent ( Shall support dynamically allocation of bandwidth seamlessly without packet loss)<br>- Switchable between QPSK, 8PSK, 16APSK and 32 APSK or equivalent<br>-Support for Adaptive Coding Modulation (ACM) and CCM |
| iii) | Return Link | -DVB-S2x, as per ETSI EN 302 307 , Switchable between QPSK, 8PSK, 16APSK and 32 APSK or equivalent<br>Support for Adaptive Coding Modulation (ACM) and CCM |
| iv) | Alpha (Roll off) | 5 % ,10%, 15%, 20%,25 %, 35%, software settable |
| v) | Traffic data interfaces | Minimum 4 nos. of Ethernet (RJ-45), GbE, (two nos. electrical and auto negotiable and two nos. optical)<br>(except management interface). The functionality through external switch will also be accepted |
| vi) | Input / Output return loss | L-band: >10 dB |
| vii) | Output level | +0 dBm to – 30 dBm, in step size of 0.1 dB |
| viii) | Level Stability | ± 0.5 dB/day at constant temperature of 25°C. |

| | | |
|---|---|---|
| ix) | Input level | -45 dBm to – 25 dBm |
| x) | On/Off Levels | -55 dBc/4 kHz |
| xi) | Output Harmonics and Spurious Levels | <-55 dBc/4 kHz |
| xii) | Phase accuracy | ±2° |
| xiii) | Amplitude accuracy | ±0.2 dB |
| xiv) | Phase Noise | <0.75 degrees RMS double-sided 100 Hz to 1 MHz |
| xv) | Power Accuracy | ±1 dB over frequency and temperature |
| xvi) | Frequency Stability | ± 0.1 ppm @ 0 to 50 °C (32 to 122 ° F) |
| xvii) | Management | Front panel key pad/ display (optional) and remote management through LCT & EMS |
| xviii) | Configuration retention | Non-volatile memory, returns on power up |
| xix) | BUC Reference | a) Connector : 50 ohms, compatible with BUC<br>b) Freq.: 10 MHz<br>c) Level: 0±3 dBm, Selectable on/off via M&C control |
| xx) | BUC Power Supply | a) > 3.0 Amps with a voltage range of 44 V to 57 V.<br>b) To be supplied through TX IF Centre conductor and selectable on/off via M&C control |
| xxi) | AUPC | Should support automatic uplink power control |
| xxii) | Coding rate | QPSK: 1/2, 2/3, ¾;<br>8PSK: 3/5, 2/3,3/4, 5/6, 8/9, 9/10<br>16APSK: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10;<br>32APSK: 3/4, 4/5, 5/6, 8/9, 9/10 |
| xxiii) | Data rate to be supported | Return: 100 Mbps ( min.), upgradable to 200 Mbps by software upgrade<br>Forward: Up to 60 Mbps (min.) |
| xxiv) | LNB Power Supply | a) 500 mA @ -18 V DC<br>b) Selectable on/off via M&C control |
| xxv) | LNB Reference | a) Connector : 50 ohms, compatible with BUC<br>b) Freq.: 10 MHz<br>c) Level: 0±3 dBm ( nominal value), Selectable on/off via M&C control |
| xxvi) | Redundancy | Remote modem is to be supplied in (1+1) configuration in cold standby mode i.e. without switchover equipment. |

**3) Specifications applicable for both Satellite Hub equipment and Remote satellite Modem:**

**A) General:** All connectors, levels and frequency must be compatible with the BUC, LNB and RF equipment at Hub. In place of PSK modulation M-ARY modulation will also be acceptable.

**B) SYNCHRONIZATION:** The equipment shall be compatible with Synchronous Ethernet standard (ITU-T G.8261 / G.8262) or IEEE 1588v2.

**C) Ethernet Features:**

i) Shall support Layer-2 bridge mode
ii) Shall support Layer -3 router mode
iii) L2 transparent bridging mode
iv) Basic QOS features ( 7 levels )
v) Shall support Jumbo frames up to the size of 64 Bytes to 1600 Bytes
vi) Shall have TCP & HTTP acceleration features.
vii) Shall have header and payload compression
viii) Generic Steam Encapsulation as per ETSI TS 102 606 and DVB Doc A134 or equivalent
ix) Shall support VLANs as per IEEE 802.1q and VLAN support for traffic separation for multi-user environments
x) Shall support GTP acceleration and header compression.

xi) Shall also be suitable for GSM & LTE ( 3 G & 4 G GSM ) backhaul

xii) Ethernet line rate- For Hub Equipment: > 2,50,000 pps (simplex) ; For Remote Satellite Modem: The value of PPS is to be specified by the bidder alongwith justification for meeting the requirement of the tender.

xiii) Shall support IPv4 & IPV6

Note: The optimisation functions can be provided through inbuilt feature or by external devices.

D) MTBF : 50,000 hours minimum

E) Environmental parameters:

a) For Hub equipment: Cat-A of QM 333 / Class 3.1 ( Normal ) of ETSI ETSI EN 300 019-1-3 standard
b) For Remote Equipment:
i) Indoor equipment - Cat-B of QM 333
ii) Outdoor equipment: Cat-D of QM 333 will be applicable.

F) MARKING : Equipment shall be marked suitably as under:
i) Name of manufacturer
ii) Year of manufacturing
iii) Serial no. of equipment

G) DCN REQUIREMENTS
i) The network management channel between the network element and the NMS shall be IP-based.
ii) System shall support IP protocol for the interoperability with third party equipment for Network management.

H) Management Software :

- LCT (Local Craft Terminal) for maintenance, management, monitoring and line-up activities shall be provided.
- The OS shall be MS Windows or equivalent
- NMS shall manage Hub and remote equipment from Hub

I) Power supply:
a) Hub equipment: Single phase 230 Volts with variation of -15 % to +10 % and at 50 ± 2 Hz. The equipment shall be protected in case of voltage variation beyond the specified range.
b) Remote equipment: -44 V to -57 V DC. The equipment shall be protected in case of voltage variation beyond the specified range.

J) Field trial : For 2 weeks in field

K) EMI & EMC and Safety: As per TEC GR No. TEC/GR/TX/BSM- 02/01. MAR.2014 RELEASE 1 or as per International standards.

L) Applications to be supported: The following applications are to be supported without any additional hardware / software equipment and by sharing the satellite bandwidth.
i) 2 G /3G / 4 G Cellular backhaul
ii) Internet backhaul
iii) Backbone connectivity
iv) Leased lines
v) Banking
vi) It shall be possible to provide bandwidth to four different services from the modem. If additional hardware is required for this same is also to be provided.

4) <u>WAN Optimiser:</u>

a) The capacity for hub location shall be 400 Mbps min. (in each direction).
b) The capacity for remote location shall be 100 Mbps min. (in each direction) and shall be upgradable to 200 Mbps ( in each direction) by software upgrade.
c) It shall be compatible with satellite modems.
d) Redundancy for WAN Optimiser at Hub location may be provided in cold standby mode i.e. without switchover unit.
e) To meet the ultimate capacity requirement of WAN Optimiser for hub locations, multiple units will also be accepted, subject to the condition that this arrangement will not have any impact in network functioning. In such cases, redundancy in N+1 will be accepted.

5) **Antenna:**

a) Amendment in GR clauses of Antennas:

| Sl. | GR Clause | Type of Antenna | Description | Amendment |
|---|---|---|---|---|
| i) | Clause 1.0 | 3.8 M | Type of Antenna | Type-I – Two Port |
| ii) | Clause 2.1.1 | 3.8 M | Feed System | Type-II |
| iii) | Clause 2.1.2 & 2.2.2 | 3.8 M & 2.4 M | Operating Frequency range | i) **TX:** Ku-band: 12.75 GHz to 13.25GHz for INSAT/GSAT or wide band<br>ii) **RX:** Ku-band: 10.7 to 11.70 GHz or wide band |
| iv) | Clause 2.1.3 | 3.8 M | Polarisation | Two Ports; Linear Vertical / Horizontal, configurable |
| v) | Clause 2.2.7 | 3.8 M | Tracking | Both manual and Auto tracking are required |
| vi) | Clause 2.2.5 | 2.4 M | Tracking | Requirement is for manual tracking only |
| vii) | Clause 2.3.1 | 3.8 M & 2.4 M | Antenna system mounting | Penetrating type mounting is required |

b) To be supplied alongwith foundation material.
c) Shall be supplied with suitable arrangement for mounting BUC and LNB

6) **Wired Rack:**

a) The standard 19 inch rack shall be supplied for housing 4 nos. of Satellite Modems equipment and combiners /dividers.
b) Cabling arrangement from rack top is to be provided for Modems equipment.
c) It should have DC power distribution arrangement and provision of termination of DC earth

7) **L-band Splitter / Combiner ( Active) :-**

a) Frequency of operation: 950 MHz to 2150 MHz
b) Connectors: Compatible with Modem ( SMA / N Type)
c) No. of Ports: 8 Ports ;
d) Port-1 to Common Port: DC & 10 MHz pass and other Ports DC block
e) Insertion loss: 2 dB (Max.) for Splitter and 3 dB (max.) for Combiner
f) Isolation: 20 dB (min.)
g) Return Loss : 12 dB (min.) both for Input and Output
h) Dual redundant power supply
i) AC Operated (230 V ±15 V, 50 Hz±2 Hz)
j) Operating Temp: -5 °C to +55 °C

8) **Block Up converter (BUC):**

| | |
|---|---|
| Output Frequency | Ku-band:12.75-13.25GHz for INSAT/GSAT or wide band |
| Input Frequency | L-band: 950 MHz to 1450 MHz ( typical values) |
| Output power @ P1 dB | a) For 8 W BUC: +39 dBm min.<br>b) For 16 W BUC : +42 dBm min. |
| VSWR – Input | 1.5 :1 (max) |
| VSWR output | 1.5 :1 (max.) |
| Tx Mute Function | RF output will turn off when LO is unlocked or no 10 MHz reference ( external) signal, or Over Temperature |
| Power supply | +36 V to +60 V DC ( This is typical range; minor variation will be permitted) |
| Power consumption | a) For 8 W BUC: 80 W ( typical)<br>b) For 16 W BUC: 160 W (typical) |
| Input & Output connector | Compatible with Modem & Antenna respectively |
| Operating Temperature | -20 to + 60 ° C |
| Ingress Protection | IP 66 or better |
| External reference | 10 MHz ( sine wave); 0±3 dBm @ Input port |
| M&C Functions | Output Power, Temperature, Fault Status, Gain and Attenuator through LCT via Ethernet or Rs-488 interface |
| Gain Stability | ±2 dB max. over temperature range |
| Gain Flatness | ±2 dB max. |
| Gain adjustment range | 20 dB in steps of 0.5 dB |
| AM/PM Conversion | 3° /dB (max) |
| Group delay | Linear: 0.05 ns/MHz<br>Parabolic: 0.005 ns/MHz²<br>Ripple: 1ns peak to peak / ±18 MHz |
| **Spurious**<br>Signal related<br>Signal independent Harmonics | Better than -60 dBc<br>-60dBC at minimum attenuation<br>Better than -50 dBc |
| Phase Noise | -63 dBc/Hz at 100 Hz offset; -73 dBc/Hz at 1 KHz offset; -83 dBc/Hz at 10 KHz offset; -93 dBc/Hz at 100 KHz offset |
| EMI / EMC Requirement | As per TEC GR No. TEC/GR/TX/BSM- 02/01. MAR.2014 RELEASE 1 or as per International standards. |

9) **LNBC ( PLL based) ( With external reference):**

| | |
|---|---|
| Input Frequency | **Ku-band : 10.7 to 11.70 GHz** |
| Output Frequency | L-band: 950 MHz to 1950 MHz ( typical value) |
| Gain ( @+25 deg C) | Gain( @+25 deg. C): 48 dB (min.) |
| Noise Figure ( @+25 deg C) | 1.0 dB max. |
| Power supply | +10 V to + 24 V DC |
| Stability of LO | ±10 KHz, PLL Based |
| Input & Output connector | Compatible with remote Antenna & Modem respectively |
| Protection | IP 66 or better |
| Operating Temperature | -20 to + 60 ° C |
| Input / Output VSWR | 2.5:1 max. / 2.3:1 max. |
| Current drain | 250 mA max. |
| External Frequency reference | 10 MHz ( sine wave); 0±3 dBm @ Input port |

| | |
|---|---|
| Gain flatness | As per Industry standards |
| Gain slope | |
| Gain Stability | |
| Nosie Temperature | |
| Group delay | |
| In-band overdrive | -10 dBm at Input with no permanent degradation of performance |
| Spurious | -40dBc or better |
| Third order Intermodulation | 50dB below two carrier each having an input power of -65 dBm |
| Out of band signal level for normal operation | The LNB shall perform the specifies performance without degradation when operated in the presence of out of band signal of **-20 dBm** in **13.75 GHz to 14.5 GHz** |
| EMI / EMC Requirement | As per TEC GR No. TEC/GR/TX/BSM- 02/01. MAR.2014 RELEASE 1 or as per International standards. |

**10) Power Supply Unit:**

The features of Power Supply Unit (PSU) is to provide the stable +48V DC power to operate Ku-band BUCs, in case the inner power supply of the modem is not capable enough to operate these BUCs. The AC/DC box, shall also have a bias-tee to enable to pass 10 MHz reference signal and L-band IF signal from the modem.

| | |
|---|---|
| Input Voltage | 230 Volts with variation of -15 % to +10 % and at 50 ± 2 Hz |
| Output Voltage | 48 V DC |
| Power Supply rating | 250 W |

Connector and connecting cables are also to be supplied.

**11) LCT / Laptop/ Work Station:** CPU Intel 4th generation core i5 or equivalent or better, Processer Speed : 2.7 GHz or above, 3 MB L3 Cache, 4 GB DDR3 RAM, 15" TFT display, 500 GB (or higher) Hard Disc Drive, Integrated LAN & Wi-Fi, Com port, Integrated Audio with in-built speaker & Mike, Two USB port, and one VGA & one HDMI, Integrated Bluetooth 4.0, Touch pad, Windows 8 or higher, Battery backup, AC Adaptor and Carry Bag. For desktop (work station), Wi-Fi, Bluetooth, batter backup, AC adaptor & bag are not mandatory.

**12) Hub Router:**

a) The requirement is for Aggregation Router - Category -V .of the GR

b) **Interfaces required:**

| **Interface** | **Nos.** |
|---|---|
| 10 G interface ( 10 G BASE-LR/LW) | Four |
| E1 CE Interface | two |
| Channelized STM-1 | Two |
| 10/100/1000Base T | Four |
| 1 G Base LX -10 Kms. | Four |
| E1 IP Interface | two |

c) Power supply requirement: AC

d) To be supplied with LCT / NMS software.

e) Router latency up to 100 micro seconds will be accepted for both category of routers.

f) Following clauses of TEC GR - TEC/GR/IT/TCP-004/01 FEB-14 have been amended.

| GR Clause no. | Clause Description | Amendment made |
|---|---|---|
| 3.2 | The maximum permissible Router latency for all types of Routers shall be less than 10 micro sec | Router latency upto 100 micro sec will be accepted |
| 3.10.6.19 | The Router shall support OSPFv3 dynamic interface cost support | Manual cost will also be accepted. |
| 3.11.4.2 | The Router shall support Dynamic broadcast Source Failover using Anycast routing | Applicable for Cat- V router only. |
| 3.12.6.5 | The Router shall support disable learning for providing the capability to effectively manage when addresses are added to a FIB in VPLS services. | Not applicable as per Category of routers asked for. |
| 3.12.6.6 | The Router shall support FIB size limit for providing the ability to configure a maximum FIB size on a per VPLS service basis. | Not applicable as per Category of routers asked for. |
| 3.12.8, 3.21.2 | **MPLS-TP and T-MPLS related requirements:** | This requirement is optional. |
| 3.14 | **Advanced IPv6 Features** | Not applicable as per Category of routers asked for. |
| 3.15.3.5 | The Router shall support Aggregation of Martini circuits within an RSVP-TE tunnelled LSP | Not applicable as per Category of routers asked for. |
| 3.16.2.7 | The Router shall support Per Hop Behaviour Identification Codes as per RFC 3140 | Not applicable as per Category of routers asked for. |
| 3.16.8.2 | The CE Routers [Type I/II/III] shall support the following congestion avoidance mechanisms | In place of "Round Robin" CBWFQ & WRED will also be acceptable |
| 3.18.6 | **Timing output interface: The Router shall support provide a timing-output interface at 2048 KHz for external synchronization. The output shall conform to ITU-T Rec. G.812, as applicable.** | This requirement is optional. |
| 8.1.4.2 | The Router shall support to control multicast, broadcast, DLF traffic on per tunnel basis. Frames is dropped once the per-second counter goes beyond the configured limit | This requirement is optional. |
| 8.1.6.1 | The Router shall protect ARP spoofing attacks at layer 2 by ARP inspection to prevent malicious users from impersonating other hosts. | This requirement is optional. |
| 8.1.6.2 | The Router shall support Dynamic ARP Inspection (IPv4 only) | This requirement is optional. |
| 8.1.8. a. | DOS Attacks: The Router shall support Blocking IP DoS attacks from: Unknown Protocol | This requirement is made optional. |
| 8.1.8. h. | DOS Attacks: The Router shall support Blocking IP DoS attacks from: IP short header | This requirement is made optional. |
| 8.1.8. l. | DOS Attacks: The Router shall support Blocking IP DoS attacks from: Call gapping | This requirement is made optional. |
| 8.1.10.2 | The Router shall support Port level security mechanism to prevent unauthorized nodes from accessing the switch. | This requirement is made optional. |
| 8.1.10.3 | The Router shall not allow port to port traffic to prevent the by passing of network policy enforcement point by the users. | This requirement is made optional. |

| | | |
|---|---|---|
| 8.2.6. a. | Port Security: Port level security mechanism control configurations | This requirement is made optional. |

13) **LAN Switch:**

a) Type: Category IV B ( Low End) of GR
b) Interfaces required:

| | |
|---|---|
| 10/100/1000Base T | Ten |
| 1 G Base LX -10 Kms. | Four |
| 10 G Interface ( 10 G BASE-LR/LW) | Two |

c) Power supply requirement: AC
d) To be supplied with LCT / NMS software.
e) Following clauses of TEC GR - TEC/GR/IT/LWS-001/05 MAR 2014 have been amended.

| Clause no. | Description | Amendment made |
|---|---|---|
| Chapter 6: | EMC/EMI : | Applicable category is Category-A |
| - | EMS / LCT for Router and Switches | Only software to control the devices from LCT and NMS is required and same is to be load in the NMS and LCT |
| Chapter 5, c), d), e) | QM-333/ Issue-1/Sept 1990, QM – 324., QM – 351 | Equivalent International standards will be accepted. |
| 9.3 | LAN switch shall support the Lawful Interception as per the latest guidelines / document of DoT | LI support through mirrored port will also be accepted. |
| 9.4 | The LAN switch shall be MEF 9 certified. | MEF-9 compliant product shall also be accepted on the basis of OEM's Certification. |
| 3.6.1 (l) | RIPng for IPv6 as per RFC 2080 | Not applicable for product category asked for. |
| 3.6.3 (Vi) | Weighted random early detection (WRED)- based drop | Weighted Round Robin will also be acceptable in place of WRED. |

14) **L-band Splitter / Combiner ( passive) :-**

a) Frequency of operation: 20 MHz to 3000 MHz
b) Connectors: SMA, 50 Ω
c) No. of Ports: 2 Ports ;
d) Insertion loss: 2.3 dB (Max.) above 3 dB
e) Isolation: 14 dB (min.)
f) VSWR : 2.1 :1 ( max.) both for Input and Output

## Section 3, Part- C
### Schedule of Requirement (SoR)

The Schedule of Requirement is given below:-

| Sl. | Name of Item | Quantity |
|---|---|---|
| 1. | **Satellite Hub Equipment for one HTS beam** | |
| i) | Common equipment for Hub | 2 sets |
| ii) | Satellite Modulator in (1+1) configuration | 2 sets |
| iii) | Multi-channel Satellite receiver in ( 1+1) configuration | 2 sets |
| iv) | L-band Combiner 8 Port | 1 no. |
| v) | L-band Splitter 8 Port | 1 no. |
| vi) | NMS (1+1) with two work stations | 1 set |
| vii) | Installation accessories | 2 set |
| 2. | **Satellite Hub Equipment for two HTS beams** | |
| i) | Common equipment for Hub | 2 sets |
| ii) | Satellite Modulator in (2+1) configuration | 2 sets |
| iii) | Multi-channel Satellite receiver in ( 2+1) configuration | 2 sets |
| iv) | L-band Combiner 8 Port | 2 nos. |
| v) | L-band Splitter 8 Port | 2 nos. |
| vi) | NMS (1+1) with two work stations | 2 sets |
| vii) | Installation accessories | 2 sets |
| 3. | **Satellite Equipment for remote locations:** | |
| i) | Remote Satellite Modem ( 1+1), Cold standby | 25 Sets |
| ii) | Ku-band Satellite Antenna (2.4 meter dia.) | 18 nos. |
| iii) | Ku-band Satellite Antenna (3.8 meter dia.) | 7 nos. |
| iv) | Block Up-Convertor (BUC) 16 W | 43 nos. |
| v) | LNBC – PLL based | 43 nos. |
| vi) | Inter- facility cable, Power cable & all accessories for remote equipment | 25 Sets |
| vii) | Power convertor Module for feeding power to BUC | 25 nos. |
| 4. | Laptop Computer/LCT | 20 nos. |
| 5. | **Installation and Commissioning:** | |
| i) | Installation, integration, testing and commissioning of complete Hub equipment ( 1+1) | 2 nos. |
| ii) | Installation, integration, testing and commissioning of complete Hub equipment ( 2+1) | 2 nos. |
| iii) | Installation and commissioning of 2.4 M antenna and including foundation | 18 nos. |
| iv) | Installation and commissioning of 3.8 M antenna and including foundation | 7 nos. |
| v) | Installation, integration, testing and commissioning of all equipment at remote locations | 25 links |
| 6. | Comprehensive repair charges (to be quoted as an average percentage of the cost for repair of faulty equipment/ module / sub-system to be charges by the bidder after warranty period) | 1 Lot |
| 7. | **Optional items:** | |
| i) | WAN Optimiser for Hub locations (400 Mbps in each direction) | 9 nos. |
| ii) | WAN Optimiser for remote locations (100 Mbps in each direction) | 25 nos. |
| iii) | Upgradation of Remote Satellite Modems from 100 Mbps to 200 Mbps in receive direction | 10 nos. |
| iv) | Upgradation of WAN Optimiser from 100 Mbps to 200 Mbps in each direction | 10 nos. |
| v) | Router | 4 nos. |
| vi) | LAN Switch | 21 nos. |

| | | |
|---|---|---|
| vii) | Block Up-Convertor (BUC) -8 W | 8 nos. |
| viii) | Wired rack for housing modems & combiners / dividers etc. | 5 nos. |
| ix) | L- band Combiner / Divider ( passive) for remote locations | 4 nos. |
| x) | Annual Maintenance Contract of NMS after warranty | 3 Lots |