SECTION- 3 Part A

SCOPE OF WORK

Scope of Work

1.1 The scope of work to be performed INVOLVES PLANNING, ENGINEERING, SUPPLY, INSTALLATION, TESTING, COMMISSIONING & ANNUAL MAINTENANCE OF USIM (Universal SIM) Management System along with its integration with existing OTA, HSS & HLRs, Sancharsoft, SancharAadhar/ for ON LINE activation of SIM in BSNL NETWORK with following features:

(a) Generic SIM Cards of BSNL for all circles

(b) Circle specific personalization of SIM card when it is activated on the network

(c) Activation (New subscriber On boarding)/ Deactivation

(d) SIM SWAP

(e) MNP

(f) International Roaming (Second IMSI support)

1.2 The USIM Management system is also required to be integrated with existing OTA, SMSC, SSTP, HSS&HLR, Sancharsoft,SancharAadhar system or any other entity required for implementation, deployed in BSNL Network.

1.3 Successful Bidder shall provide open and standard interfaces to integrate new network elements getting inducted into BSNL Network in future, So that the newly inducted nodes can seamlessly integrate with existing USIM system of BSNL

1.4 While planning the supply and subsequent rollout of the USIM system, the existing network elements of various technologies in the present Mobile network of BSNL should be taken into account for seamless inter-working of the Equipment being procured against this Tender with the existing equipment.

1.5 Solution should be compliant to 2G, 3G, 4G and upcoming 5G technology

1.6 Bidder should provide complete solution, architecture, functionality, msg/call flow along with bid

SECTION-3 Part B

(Technical Specifications /Requirement)

1. General

1.1 This document outlines the detailed technical requirements USIM Management system implementation and integration with existing (or vendor may provide integrated platform i.e. having inbuilt OTA/HLR etc. for T-IMSI activation) OTA, SMSC, SSTP, HSS &HLR, Sancharsoft,Sanchar Aadhar systems any other entity required for implementation deployed in BSNL Network BSNL Mobile Network. The system should support following features:

(a) Generic SIM Cards of BSNL for all circles

(b) Circle specific personalization of SIM card including SIM for M2M applications when it is activated on the network

(c) Activation (New subscriber on boarding)/ Deactivation

(d) SIM SWAP

(e) MNP

(f) International Roaming (Second IMSI support)

1.2 The successful bidder has to design, supply and commission the USIM Management system with functionalities as stated in para 1.1 and provide subsequent AMC support. Necessary software modules to be planned, engineered and deployed as a single turnkey solutions. The successful bidder may use the existing network elements of BSNL such as OTA (Preferably WZ OTA), HLRs & HSSs (Any one or more having spare capacity) etc. to meet the above requirement. SIMs with temp IMSI are proposed to be preloaded in the HLRs & HSSs, the system should be flexible enough to use any of the HLRs & HSSs based on spare capacity or operational requirement of BSNL. Present deployment of these systems in BSNL Network are given below.

Zone	Circles	HL & HSS	OTA	Provisioning	SSTP
North Zone	Himachal Pradesh, Haryana, U.P (East), UP (West),	ZTE			

	Punjab, Rajasthan, J&K, Uttaranchal		G&D	Sancharsoft/ Sanchar Aadhar (In-house) (Intense)	UT Star
South Zone	Kerala, Karnataka, Tamilnadu, Chennai, AP, Telangana				
East Zone	Assam, Bihar, Jharkhand, NE-1, NE-II, Odessa, Kolkata, West Bengal				
West Zone	Maharashtra, Gujarat, Madhya Pradesh, Chhattisgarh	Nokia			

1.3 A single Solution is planned to be deployed in west zone to cater PAN India requirements of Dynamic SIM allocation i.e. for North, South, and East & West Zones. Solution should be able to support 10 Digit MSISDN as well as 13 Digit MSISDN for IOT.

1.4 BSNL should have an option to either migrate complete activation of new mobile connections on the new process of “Universal SIM allocation” or to use both existing as well as new process for activation of SIMs.

1.5 Platform must be capable of maintaining Temporary IMSI pool and circle wise Regular IMSI Pool into the system. Circle wise IMSI pool will be used in a regular way and additional required IMSI shall be configured by concerned BSNL Circle. SIMs with Temp IMSI (New series) are expected to be loaded/ provisioned on existing designated HLR & HSSs or on USIM System itself proposed by the bidder along with concerned CPS files.

1.6 When customer approaches BSNL outlet for new connection/ change of SIM, he will be provided a universal SIM having temp IMSI. BSNL Outlet agent will enter the details of CAF, Temp IMSI, ICCID, and Circle ID of customers home LSA, Permanent MSISDN chosen / allocated to customer into Sanchar Soft system

1.7 The USIM will have a dynamic database to maintain dynamic inventory of temporary IMSIs. As soon as SIM is inserted in handset, the customer is allowed location update with

restricted access to service and the temporary IMSI will be replaced by regular IMSI (corresponding to the home LSA of the customer) on SIM Profile and it will get created in concerned circle HLR/HSS with regular IMSI of that circle and necessary data will be pushed to OTA of concerned zone & the entries gets deleted from USIM system.

1.8 The bidder shall devise a highly secured system for transfer of the authentication key to the destination HLR/HSS. The system should have a high level of security for its secured storage and transfer.

1.9 The system should be capable of bulk provisioning of SIMs as per customer requirement with range of MSISDN.

1.10 System must be capable of integrating with multiple HLRs / HSSs of BSNL from different vendors over standard REST interface.

1.11 System must be capable of integrating with billing server over http based interface.

2.0 System Capacity:

2.1 System is to be designed for handling TPS to achieve minimum 300 SIM activation/provisioning per minute, however the system is expected to continue to provision SIMs even beyond the prescribed capacity with delays

2.2 The system should be designed to hold the SIM inventory of 8 Million and SIM storage capacity should be expandable to 12M in steps of 2M.

2.3 The data base corresponding to temp IMSI shall be deleted from the network elements (HLRs, HSSs, and ODA System etc.). A record shall be maintained. In USIM system

3.0 USIM Management System Requirements

3.1. All the network elements and software units supplied for the system shall be fully compatible with the existing systems and inter-work seamlessly without any limitation.
3.2. The proposed system shall follow high level of security standards as per industry standard.
3.3. The secret subscriber keys shall be stored encrypted in the Auc/Authentication vault database
3.4. The system shall have a built-in security function, which allows only authorized personnel to handle key and subscription data.
3.5. All sensitive data and algorithms shall be protected against the unauthorized disclosure, manipulations and misused by using appropriate cryptographic methods.
3.6. It shall be the responsibility of the Successful Bidder to make the Equipment supplied under this project inter-work with all other network elements supplied by other vendors and the existing equipment. The bidder shall also ensure that the interworking of the network with the various network elements of other technology in all service areas of the BSNL Mobile network (both post-paid and pre-paid services)

for nationwide seamless working and provision of services to its subscribers. In case any support of existing vendor is required for integration with existing network elements, the Successful Bidders shall be the fully responsible for the same as part of deliverable of this project without any additional cost to BSNL.

3.7. Any hardware requirement in terms of interfaces etc. the existing NEs and the software requirement such as additional licenses/API implementation etc., wherever required, shall have to be done by the Successful Bidder free of all costs to BSNL.

3.8. The software version of equipment to be supplied shall be the latest and same for all configurations and for all the sites including validation site and same need to be upgraded during warranty and AMC of the system.

3.9. The system shall cater to all GSM, GERAN, WCDMA, LTE and IMS

3.10. It should be capable of handling any type of SIM/ UICC without any limitations.

3.11. It should also have a module to maintain the MSISDN pool for number management.

3.12. System should be capable of connecting to multiple SMSC (minimum 20) over SMPP interface.

3.13. It should have capability to do IMSI/ICCID/group series based routing for 7-bit and 8-bit SMS delivery to SIM Card.

3.32. Platform should have capability to integrate with multiple HLR/HSSs of different make and shall be able to delete temporary IMSI command from deployed system after Temporary IMSI replaced by regular IMSI.

3.33. Platform must be capable of integrating with multiple ‘Sanchar Soft’ nodes to get the newly sold SIM Card information.

3.34. All the hardware/software of USIM platform shall be with at-least N+1 redundancy.

3.35. Platform must hold the historical data of permanent IMSI, ICCID and MSISDN pairing in its database for all active SIM Cards which are served by Universal SIM Platform.

3.36. Platform must have capability to hold circle wise configuration data which is required to personalize a Universal SIM as per the home circle of the subscriber.

3.37. Platform must have capability to identify the subscriber’s home circle, based on data received from ‘Sanchar Soft/ Sancahar Adhar’ node, on first successful latch of the SIM Card to the BSNL network.

3.38. Platform must have capability to load the free permanent IMSI by the circle IMSI pool, as per identified home circle of the SIM card.

3.39. Platform must have capability to personalize the SIM card Over the Air as per the configured circle specific values and selected permanent IMSI. The bidder may use BSNL existing OTA system for this purpose.

3.40. Post successful personalization of SIM Card with circle specific data, platform must have capability to execute remaining flow and inform other multiple nodes of network about new triplet combination over online interface.

3.41. Platform must support following use cases as per para 1.1 for the Universal SIM, however BSNL will have full rights to start with any combination of the use cases in Para 1.1 of this Section.

3.42. The proposed platform shall have flexible capability of operation, maintenance, administration etc. to be done centrally from a single terminal or by concerned circle. From the network and services point of view, it should work as a single logical unit.

3.43. The system availability shall be at least 99.998% measured over a period of one year.

3.44. All software shall have the ability to upgrade in the live system without any interruption or degradation of services.

3.45. It shall be possible to expand by adding software instances to live system without any interruption or degradation of services.

3.46. A soft copy of the documentation shall be supplied in each of the software module. The processor loading at rated capacity Clause 2 of this section of the server shall not exceed 60% of the total processor capacity. Similarly, storage are be dimensioned to be occupied not more than 60% at the rated load of the server.

3.47. Open-source technology based software must be supplied. Provided solution must be capable of integrating with multiple instances of required network nodes.

3.48. The Operation, Maintenance and Administration of the entire USIM Management System shall be shall be through console/remote GUI. The GUI should have the provision for creation & management by Circle User for Circle based activities such as loading of Temp IMSI/ Inventory of Regular IMSI/ MSISDN etc. by separate user of the system. The access of Circle user has to be limited to Data base related to its own Circle along with historical data as mentioned in the document.

4.0 Installation and Commissioning

All Hardware & software shall be provided and commissioned by the bidder after getting acceptance tested by BSNL team.

5.0 Auto Provisioning

5.1 System must use Auto Provisioning feature to configure SIM security key in the database to avoid any need of file transfer from SIM Vendor to Universal SIM platform.

5.2 SIM Card's security key which is required for the functioning of the Universal SIM solution, must be generated on real time basis.

6.0 OTA (Over the Air) Module

Solution must have capability to push the data to already deployed OTA platform of concerned zone. Successful bidder must list the API requirement from OTA Platform. and will arrange the API from existing OTA Provider of its own for interworking.

In case if OTA is being provided as an integrated solution of USIM System then it should comply all the features and functionality OTA already deployed in BSNL network as mentioned in below:

7.0 Security

7.1 Development of Authentic Key vault server for storing authentication key of SIM/subscribers in consultation with BSNL and transferring the same to HLR/HSS (As per 3gpp standards)

7.2 The Auc (if proposed) shall follow relevant security standards as per 3GPP standard.

7.3 The secret subscriber keys shall be stored encrypted in the Auc/Authentication vault database

7.4 The system shall have a built-in security function, which allows only authorized personnel to handle key and subscription data.

7.5 In case , bidder proposes a system for handling authentication and location update of SIM with temp IMSI, it shall support Security (Authentication, Access Control, Confidentiality, Integrity, Availability, Auditing) as specified in 3GPP 21.133. The Auc shall have provision for security measures for fraud prevention by implementing a series of MAP authentication procedures to protect the mobile network

7.6 All sensitive data and algorithms shall be protected against the unauthorized disclosure, manipulations and misused by using appropriate cryptographic methods.

8.0 Integration details for Authentication Key vault server:

i) Sanchar Soft (SS),SancharAadhar (SA).

ii) AuthKey vault Server integration with zones Mediation server/HSS.

iii) USIM server integration with SS/SA for sending XML files (on SOAP Interface).

iv) USIM server integration with zonal OTA system (RIS online provisioning)

8.1 All the keys being used for generation of SIM specific keys must be stored in a secure area of Universal SIM platform.

8.2 All the communication between SIM Card and Universal SIM Platform (via OTA) must be secure using 3gpp 03.48.

8.3 Platform should have access control mechanism.

8.4 The bidder shall sign a security agreement with BSNL (Annexure ...)

9.0 SIM Profile

9.1 Successful bidder must provide details of SIM profile to be created for the Universal SIM

9.2 New SIM Profile must work with all use cases defined in section 1.1

9.3 Successful bidder must work with BSNL's existing SIM Partner to educate them about the new profile requirement.

9.4 Successful bidder must generate following documents related to Universal SIM Card personalization

(a) Key Generation Algorithms

(b) SIM WIB Browser Specification

(c) WIB Plugins Requirement

(d) Generic SIM Profile

9.5 Successful bidder must provide mechanism to generate and securely store any master key being used in solution.

9.6 Successful bidder must provide mechanism to securely transfer any generated master key to SIM Card vendor which will be used to generate personalization data for the Universal SIM.

9.7 IOT (Inter-Operability Testing) of SIM Card

9.8 Successful bidder must do IOT (Inter-Operability Testing) with top 2 existing SIM Supplier of BSNL.

10.0 Reporting

10.1. Reports shall be provided with the information essential for understanding the platform utilization.

10.2. The following reports shall be facilitated:

(a) Circle-wise available IMSI count in IMSI pool

(b) Circle-wise available MSISDN count in MSISDN pool

(c) Number of Activation done as per system requirement.

(d) Number of SIM Swap done

(e) Report showing details of transaction i e mapping of T-IMSI and allocate P_IMSI, ICCID, MSISDN (Temp and permanent) Circle ID etc.

11.0 Customer Care Portal

11.1. A customer care portal must be provided which shall be used by customer care team of BSNL.

11.2. BSNL may decide to integrate the Universal SIM Platform with existing Customer Care Portal, for this API must be provided by successful bidder for the integration.

11.3. Customer Care Portal and API must have following functionality:

(a) Search activity on Universal SIM Platform based on ICCID/MSISDN/IMSI (T/P)

(b) Notify Home Circle for an ICCID, to Universal SIM Platform

(c) Initiate personalization flow for an ICCID

12.0 Lawful Intercept

It shall be possible to provide seamless lawful interception of any subscriber which was served by the platform.

13.0 Retry Mechanism

Platform must have 'Retry Mechanism' for cases where a SIM Card personalization command fails to deliver to SIM Card due to non-permanent scenarios.

14.0 The Bidder shall furnish, as part of the techno-commercial

14.1. Solution document detailing the network architecture along with dimensioning rules/tools for each of the network element and realization of all the applications and services both for prepaid and postpaid subscribers

14.2. The material list must include all the items needed for up-gradation of the existing network elements of the respective technology to ensure smooth interworking.

14.3. In case any item is found missing in the material list, the supplier shall have to supply the same at no additional cost. The inter-working with all the existing network elements is the sole responsibility of the Successful Bidder.

14.4. All network elements shall have the ability to upgrade software or hardware

14.5. Vendors must also provide details for: List of support location algorithms and Confirm compliance standards:

15. **Installation and Commissioning spares & consumables**

15.1. All installation material and installations consumables shall be provided to enable the proper installation of USIM equipment supplied (like runways & other accessories for fixing runways & lugs, media cleaning solution, alcohol isopropyl, soft cotton, soft brushes, solder wire, printer papers, adhesive tape, optical disc drive, various sizes of fuses/ connectors, covers, hand gloves, MCBs, fuses for batteries, spare fuses for DC distribution cabinet, etc. Any other materials and consumables, which are technology dependent and required for installation, but not quoted shall also be supplied free of cost

15.2. Item-wise details of installation materials required for installation has to be furnished along-with its unit price and quoting of installation materials in LOTS is not acceptable. Complete details of each and every item of installation materials, maintenance spares and maintenance consumables shall be provided. The processor loading at rated capacity of the network elements shall not exceed 60% of the total processor capacity. Similarly, all critical storages are to be dimensioned to be occupied not more than 60% at the rated load of the NE.

15.3. It shall be possible to connect two independent power sources to these power input points. In the normal scenario, the equipment shall draw equal power from both sources, but in case of failure of one power source, the full power shall be drawn from the other source without any break what so ever or any performance degradation. The two power inputs shall be adequately de-coupled so that the two power sources are practically isolated from each other. While doing the installation and commissioning,

15.4. The supplier shall commission the systems with both power sources and the I&C material including power cable, circuit breakers etc. shall be planned accordingly.

15.5. The overall requirement would require integration with each LSA / Circle HLR/HSS.

15.6. It is a design based tender wherein the successful bidder will have to take into account the existing network, USIM infrastructure of BSNL and plan a design based structure to meet the requirements.

15.7. A soft copy of the documentation shall be supplied in each of the network elements.

16.0 Operational Requirements and Support Reliability

16.1 The USIM system shall provide the following telecom grade characteristics and a high availability:

a. Always-on
b. Automatic software recovery
c. Data replication
d. Overload control and overload protection
e. Software updates and upgrades during operation
f. Upgrade and update of Operating System during operation
g. Online backup
h. Hot-swap hardware replacement

16.2 High Availability and Resilience

a. The solution shall allow continuous operation under extreme conditions. It shall also allow graceful degradation in the extreme conditions (overload control).
b. It should breakdown the resilience method according to the following layers:
    i. Dual Servers (Host) that operate as “Load Sharing” or “Hot-Standby”
    ii. SS7 Signalling
    iii. Database Level
    iv. Application Level

17.0 High Performance

The solution shall include high performance platform capable of catering for demanding peak processing. Vendor shall explain how the “Overloading Control mechanism” will be effective.

18.0 System Administration

The solution shall include user friendly GUI or Web Interfaces for overall system administration, Monitoring & Supervision activities. Interfaces offered shall be listed.

19.0 System Monitoring

The proposed solution shall include internal system monitoring. The proposed solution shall be able to send message to a preset email address and to trigger SMS notification to the personnel on duty or on call or the group list.

20.0 Alarm Monitoring

The system should be able to integrate with centralized alarm monitoring system and send the relevant alarms.

21.0 System Backup and Recovery

The proposed solution shall include back-up and recovery mechanism. Vendor shall describe procedure, methodology and utilities offered for backup and recovery.

22.0 Hot backup

The proposed solution shall include the mechanism to execute back-up while system is under operation without degradation service (hot Backup).

23.0 Reports and Statistics

The solution shall include reporting system/statistic that will furnish key performance indicators of USIM service. A list of standard reports and statistics are required.

24.0 System Availability

The proposed solution is guaranteed to maintain the service availability up to 99.998%.

25.0 Security for Access Level

The proposed solutions must comply with the network level access protection including the following:

a. Adopt network secure access like ssh, sftp, scp, https etc.

b. Firewall

26.0 Security User Password

The platform offered shall include an encryption mechanism for user password for login. The solution shall also employ method to ensure password strength, expiry etc.

27.0 Logging System

i. The proposed solution shall include logging system to records any transactions from subscribers, operator log, and customer service access log, such as the following:

a) Operator and System administration log
b) Customer Service access log

ii. Logging System can be stored either in database tables or file system as long as it is protected from being modified by users.

28.0 Recommended Spare Parts

Vendor shall detail a list of recommended spare parts that will be stored in BSNL premises or at local off-site premises for maintenance purposes.

29.0 Technical Training: - Vendor shall include technical training to BSNL personnel in this project, which will comprise primarily of:

i. Operation and maintenance
ii. Configuration and troubleshooting

30.0 Supporting Document

Vendor shall provide appropriate documentation consisting of at least the following:

a. Product Description
b. Statement of Work
c. System Acceptance Testing
d. Service Level Agreement

31.0 Licensing: The software licenses for data bases or applications of perpetual nature.

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32.0 Warranty / AMC The successful bidder must provide one year warranty post UAT and AMC of Hardware & software part as per the requirement of BSNL.

33.0 Implementation Plan: - The Implementation plan shall include Planning, engineering, supply, installation, testing, commissioning of USIM and its integration/testing in BSNLnetwork.

34.0 Supply of Equipment

The Bill of Material (BoM) shall be supplied by vendor for the proposed solution which would include:

a. Core Solution Equipment
b. Peripheral or Optional Equipment
c. Spares & any other

35.0 Services :-The vendor will deliver the following services:

a. Project management
b. Implementation strategy, plan, and site survey
c. Co-ordination with OTA, HSS & HLR, SSTP and any other Network Element vendors for customization and implementation of the solution including successful integrations with the existing network elements.
d. Installation, Testing and Acceptance

35.1 For all such functionality that cannot be tested by integrating to the live network, the successful vendor shall demonstrate the said functionality using simulates / emulates for various related test cases. [VS1]

35.2 The proposal should include a description of how the solution will integrate with existing BSNL network elements along with New Equipment's being procured with tender

SECTION-3 Part C

Schedule of REQUIREMENT (SoR)

Note: The Hardware and Software configuration for each of the items in the SoR shall be as per the relevant specifications as given in the SECTION-3 Part B, 2SECTION -5 PART B and Section 5 Part C.

Sl. No	Item	Unit	Quantity	Remarks
1	USIM Management System			Location at Pune
1.1	USIM Management System H/W	Per Unit	1	
1.2	USIM Management System S/W	Per Unit	1	
	USIM Management System Expansion (H/W, H/W)	Per 2 Million	1	
1.3	USIM Management System Expansion (S/W)	Per 2 Million	1	
3	Services			
3.1	USIM Management System Installation & Commissioning	Per Unit	1	
4	Annual Maintenance Contract			
4.1	1st Installment to be paid for 1st year of AMC		1	
4.2	2nd Installment to be paid for 2nd year of AMC.		1	

4.3	3rd Installment to be paid for 3rd year of AMC.		1	
4.4	4th Installment to be paid for 4th year of AMC.		1	
4.5	5th Installment to be paid for 4th year of AMC.		1	
4.6	6th Installment to be paid for 4th year of AMC.		1	
4.7	7th Installment to be paid for 4th year of AMC.		1	

Bidder shall furnish the detailed Bill of Material (BOM) for each SOR item mentioned above. The detailed Bill of Material should clearly mention all the components including quantities, constituting the SOR item. The priced Bill of Material and the percentage breakup of BOM should be submitted in the envelope containing the price bid and unpriced Bill of Material should be submitted in the envelope containing the techno-commercial part. There should not be any difference in the items and quantities in the priced and the unpriced BOMs.