



Telecom Regulatory Authority of India

Recommendations on 'Provision of Cellular Backhaul Connectivity via Satellite Through VSAT Under Commercial VSAT CUG Service Authorization'

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CONTENTS

CHAPTER	TOPIC	PAGE NO.
CHAPTER 1	INTRODUCTION	1
CHAPTER 2	REVIEW OF PROVISIONS UNDER UL/UL (VNO)	4
CHAPTER 3	SUMMARY OF RECOMMENDATIONS	36
ANNEXURE	DOT REFERENCE DATED 13 TH AUGUST 2019	39
	LIST OF ACRONYMS	50

TABLES

TABLE NO.	TOPIC	PAGE NO.
TABLE 1	BANDWIDTH FACTOR (BS) FOR SATELLITE COMMUNICATIONS	22

CHAPTER 1

INTRODUCTION

- 1.1 Satellites provide telecommunication and broadcasting services, covering large geographical areas. Very Small Aperture Terminal (VSAT) is one of the satellite communication technologies, which is very useful for remote and inaccessible locations (rural areas, ships, coastal regions, hills, etc.) where there is limited or no terrestrial connectivity. The main advantages of VSAT technology are its rapid deployment, scalability, lower operational costs, and reliability of communication in remote locations, even in adverse situations.
- 1.2 One of the missions categorized under the National Digital Communications Policy (NDCP), 2018, released by the Government of India, is 'Connect India', which envisages "Strengthening Satellite Communication Technologies in India" as one of the strategies. This strategy requires 'review of regulatory regime for satellite communication technologies', including the following:
 - i. revising licensing and regulatory conditions that limit the use of satellite communications, such as speed barriers, band allocation, etc.
 - ii. simplifying compliance requirements for VSAT operators to ensure a faster roll-out, and
 - iii. expanding the scope of permissible services for the effective utilization of High Throughput satellite system through appropriate licensing mechanism.
- 1.3 Department of Telecommunications (DoT), through its letter No. DS-14/92016-DS-I dated 13th August 2019 (Annexure-I) has requested TRAI to furnish recommendations under the terms of the clause (a) of subsection (1) of Section 11 of the Telecom Regulatory Authority of India Act, 1997, (as amended) by TRAI Amendment Act, 2000, on terms and conditions of Unified License, and Unified License (VNO) agreement for permitting backhaul links for mobile network via satellite through VSAT.

- 1.4 Along with the said reference dated 13th August 2019, DoT has also forwarded a copy of the representation dated 21st May 2018 submitted by VSAT Services Association of India (VSAI) requesting to allow cellular backhaul services under Commercial VSAT CUG Service licence to enhance provisioning of the internet and voice services in remote/inaccessible areas. In their letter, VSAI stated that VSAT Service providers have an installed base of 2,50,000 VSAT terminals across the country, which are technically capable of providing backhaul connectivity for cellular networks very effectively. As per the present rules, however, such services are considered in the nature of “carrier services”, which fall under the National Long Distance (NLD) Service Authorization.
- 1.5 Based on the reference received from DoT, the Authority issued a Consultation Paper (CP) on ‘Provision of Cellular backhaul connectivity via Satellite through VSAT under Commercial VSAT CUG Service Authorization’ on 29th January 2020, seeking comments of the stakeholders. In the Consultation Paper, apart from the issues referred to by DoT, other issues such as sharing of infrastructure by a licensee for provisioning of other services authorized under the license, migration from formula-based spectrum charging (for satellite-based services) to AGR-based SUC and associated matters of accounting separation were also raised for comments of the stakeholders.
- 1.6 Written comments on the Consultation Paper were invited from the stakeholders by 26th February 2020, and counter-comments by 11th March 2020. Upon request of some of the stakeholders, the last date for submission of comments and counter-comments were extended to 11th March 2020 and 25th March 2020, respectively. The Authority received comments from 15 stakeholders. These comments are available on TRAI’s website: www.traai.gov.in. An Open House Discussion (OHD) was conducted on 20th May 2020 through videoconferencing.
- 1.7 The Authority has formulated its recommendations based on the inputs received from the stakeholders, views expressed during the OHD, and

its own internal analysis. Chapter 2 of the recommendations covers 'Review of provisions under UL/UL (VNO)', while Chapter 3 summarizes the Recommendations.

CHAPTER 2

REVIEW OF PROVISIONS UNDER UL/UL (VNO)

2.1 Apart from the issues referred by DoT through the reference, the Authority raised various relevant issues in the consultation paper for comments of the stakeholders.

A. Backhaul to cellular access

2.2 Satellite communication for backhaul purpose is a niche solution deployed in fringe areas of the network, usually in rural areas and difficult terrains. Satellite-based backhaul solution is provided through the VSAT Hub connecting to the base station, and services can be deployed rapidly. The VSAT terminal is connected via satellite directly to the aggregator (Hub), from where the traffic is carried on the terrestrial network to the core network elements.

2.3 The cellular industry has also evolved a mechanism called “Cell-on-Wheels”. This is widely used by mobile operators as it has the ability to set-up a cellular-base station, mounted on a moving vehicle and can be moved to any area where immediate coverage is required. The area could be a disaster-hit area, or it could be an area where there is overflowing traffic, which the existing base stations are unable to handle. Adding a VSAT backhaul to the “Cell-on-wheels” concept makes it truly mobile. Such a combination can make the base station mobile to any location and can be setup and made operational in a very short time. Similarly, a Wi-Fi hotspot of an Access service provider can have a VSAT-based connectivity and can be easily powered by a solar system and can be deployed in the remotest part of the country to provide internet access.

2.4 As per the present licensing regime, the backhaul provisioning is to be done by the Access service providers themselves under the Access Service authorization. Further, the telecom service provider providing the mobile services under the Access Service authorization is permitted

to obtain the backhaul bandwidth from any of the National Long Distance (NLD) service providers. The Commercial VSAT CUG service licensees are not permitted to provide backhaul connectivity to the mobile operators. The scope of Commercial VSAT CUG service authorization has been reproduced in Para 2.19.

- 2.5 In view of the above, a question was raised in the Consultation Paper that keeping in view the connectivity requirements in remote and difficult areas, should the Commercial VSAT CUG service provider be permitted to provide backhaul connectivity for mobile services and Wi-Fi hotspots via satellite.
- 2.6 In response to this question, most of the stakeholders have acknowledged that connectivity through satellite becomes a necessity to serve the hilly areas, islands, remote, and rural regions, which cannot be served by competing terrestrial technologies. Satellite broadband would be the most cost-effective solution for such regions. The challenges associated with the Right of Way and the huge costs associated with the roll-out of terrestrial technologies can be mitigated through satellite connectivity.
- 2.7 Further, many stakeholders have also mentioned that Wi-Fi backhaul is already permitted under the Commercial VSAT CUG authorization under the Unified License to provide backhaul to an ISP, and can also provide internet to the end customers using Wi-Fi, in case the licensee also has ISP license or Internet Service Authorization under UL. In view of the facts mentioned above, the stakeholders have stated that there is no relevant requirement to allow VSAT operators to provide bare backhaul capacity to Wi-Fi hotspot providers.
- 2.8 All the stakeholders agree that the Commercial VSAT CUG Service provider should be permitted to provide backhaul connectivity for mobile services through satellite using VSAT.
- 2.9 One of the stakeholders has mentioned that Commercial VSAT CUG service providers be permitted to provide backhaul connectivity not only

for mobile service (BTSs) and Wi-Fi, but also for telephone exchanges, DSLAMs, or any other Network Elements (NEs) via satellites (i.e. VSAT Network). The stakeholder has also mentioned that the requirement of VSAT backhaul will be very much essential in case of 5G Mobile network, as satellite is an integral part of 5G ecosystem. According to the stakeholder, providing connectivity from BTS to BSC forms part of the access network and it does not fall under the NLD connectivity. Similar is the case for other NEs. As the Hub of VSAT is located at a Centre point and finally the connectivity from VSAT hub is extended back to the respective BSC. Thus, considering that the BTS to BSC connectivity is NLD connectivity is fundamentally incorrect.

- 2.10 Another stakeholder, justifying its view for supporting connectivity for basic telephony services has submitted that VSAT CUG providers have experience, and providing backhaul connectivity is just another application that would be added in their offerings. Moreover, the VSAT industry has expertise in providing connectivity in rural areas. By allowing this, the expertise of VSAT industry can be tapped in for provisioning of backhaul services to deliver the basic telephony services in rural areas of the country, thus, enabling Digital India Mission.
- 2.11 One of the stakeholders, while supporting the proposal to allow Commercial VSAT CUG service providers to provide cellular backhaul, has mentioned that backhaul to the mobile operator through VSAT can be permitted within the jurisdiction of Licensed Service Area (LSA)/Circle of mobile operator. The VSAT hub can be located anywhere in the country. In the back end, the VSAT hub will be connected to the mobile operator's BSC/RNC/GW through the terrestrial links/bandwidth established/arranged by the mobile operator. Thus, the Commercial VSAT CUG licensee's scope remains restricted to non-provision of terrestrial bandwidth/leased lines.
- 2.12 One stakeholder has elaborated that in the present licensing regime, the provisioning of backhaul links is done by the Access service providers themselves under the NLD/Access Service Authorization. In

the existing regime, quantum of exorbitant fees payable for the transponder capacity, NOCC Charges, and the formula-based WPC spectrum charges, are deterrent for the provision of satellite backhaul services for mobile services under the NLD/Access Authorization License and does not make a viable business case. The stakeholder, while supporting the proposal in the Consultation Paper, has further stated that the VSAT operators already have large deployments with provisioned capacities. Provision of backhaul connectivity for mobile services, if allowed to the VSAT operators, will result in an immediate proliferation of this media in the remote areas, considering the vast deployment and reasonable WPC spectrum charges.

- 2.13 Another stakeholder has mentioned that in case the Commercial VSAT CUG service provider is also a holder of NLD Authorization, then it can lease the satellite-based backhaul for mobile services, as the enabling provisions are already available in the Unified License framework and only minor adjustments by means of license amendment are required. The stakeholder has specifically mentioned that extending the scope of service for Commercial VSAT CUG service provider by permitting provision of satellite-based backhaul for mobile services should be enabled on the condition of paying the difference in entry fee from NLD authorization.
- 2.14 One of the stakeholders has mentioned that while mobile backhauling is one obvious use case of satellite connectivity, with proven effectiveness in extending the reach of 2G/3G/4G technologies to remote areas, the advances in mobile technologies with the advent of 5G will bring new promising and innovative use cases for satellite connectivity. This is further fueled by the continued advances in satellite technologies: High Throughput Satellite (HTS) and Very High Throughput Satellites (VHTS), which permit to enable a user experience comparable to the one expected from the next generation terrestrial networks, particularly in terms of bandwidth.

- 2.15 One of the stakeholders, while supporting the proposal, has submitted that Commercial VSAT CUG service provider can not only provide the backhaul connectivity for cellular networks effectively, but will also help in bringing the competitiveness in providing the capacity and connectivity to backhaul; provide connectivity requirements in remote, rural, hilly areas, and difficult terrains; reduce the cost of establishing the backhaul infrastructure vis-à-vis some of the other backhaul techniques and also enable a quicker roll out. The stakeholder has also mentioned that Commercial VSAT CUG service providers can provide internet to the end customers provided they also have internet license/UL (ISP Authorization). Hence, there is no pertinent need to allow Commercial VSAT CUG service providers to provide bare backhaul capacity to Wi-Fi hotspot providers, and the same can be provided as internet connectivity/bandwidth to the ISPs provisioning Wi-Fi hotspots.
- 2.16 Contrary to the views of other stakeholders on the question, one of the stakeholders has stated that the Authority should review the current microwave situation in India as a matter of priority and ensure that additional bands are made available for microwave backhaul. The stakeholder emphasized to leverage existing backhaul technologies and provide timely and sufficient quantity of spectrum for backhaul.

Analysis

- 2.17 As per the comments submitted by the stakeholders, most of the stakeholders have favored the proposal of allowing Commercial VSAT CUG service providers to provide cellular backhaul using VSAT.
- 2.18 The purpose of allowing cellular backhaul connectivity via VSAT is mainly to enable the backhaul connectivity, i.e., from base station to the next aggregator that could be either of the BSC/RNC or GW, as per the technology deployed, in areas where the terrestrial connectivity is unavailable/unviable. These network functions are a sub-set of the

licensed service area (LSA)/Circle-based network architecture. Accordingly, as proposed by TRAI in CP, some stakeholders also have supported that backhaul to the mobile operator through VSAT can be allowed within the jurisdiction of Licensed Service Area (LSA)/Circle of the mobile operator. In the back end, the VSAT hub will be connected to mobile operator's BSC/RNC/GW through the terrestrial links/bandwidth established/arranged by the mobile operator. The VSAT hub may be located anywhere in the country, the respective BTS traffic will go to the concerned LSA only. The Authority is of the view that the cellular backhaul connectivity within the LSA through Commercial VSAT CUG service providers can be permitted by inserting a suitable enabling clause in the scope of the Commercial VSAT CUG service license/authorization.

- 2.19 As per the present licensing conditions, the following provisions are available under the scope of the Commercial VSAT CUG Service Authorization under Unified License (UL) enumerated in Clause 2.1:

2.1(i) The scope of service is to provide data connectivity between various sites scattered within territorial boundary of India using VSATs. The users of the service should belong to a Closed User Group (CUG). However, the VSAT licensee after obtaining ISP license may use same Hub station and VSAT (remote station) to provide Internet service directly to the subscribers, and in this case VSAT (remote station) may be used as a distribution point to provide Internet service to multiple independent subscribers.

(ii) Long distance carriage rights, granted for NLD, ILD and Access service, are not covered under the scope of this service.

(iii) The Closed User Group Domestic Data Network via INSAT Satellite System using VSAT shall be restricted to geographical boundaries of India.

(iv) The Licensee can set up a number of CUGs using the shared hub infrastructure.

(v) PSTN/PLMN connectivity is not permitted.

(vi) Data Rate, as specified in TEC Interface Requirements No. TEC-IR/SCB08/02-SEP.2009, is allowed subject to the compliance of the Technical parameters as specified in the TEC Interface Requirements No. TEC-IR/SCB08/02-SEP.2009, as modified from time to time.

The scope of Commercial VSAT CUG Service license may be amended to include provisioning of cellular backhaul links via satellite through VSAT.

Further, Clause 2.1(vii) of the Internet Service authorization Chapter-IX of UL provides that:

2.1(vii) Internet Service to any VSAT Service subscriber can be provided, if the VSAT is located within the Service area of the Licensee. For this purpose, a direct interconnection of VSAT Network Hub through leased line obtained from an authorized service provider to the Licensee's node/server shall be permitted only for the Internet traffic. The Licensee shall provide to the Licensor a monthly statement of VSAT subscribers served with their locations and details of leased line interconnection with the VSAT Hub. The VSAT Hub, however, need not be located in the service area of the Licensee.

2.20 The Authority has noted the fact that the Commercial VSAT CUG service licensee after obtaining ISP license may use same Hub station and VSAT to provide Internet service directly to the subscribers, and in this case VSAT may be used as a distribution point to provide Internet service to multiple independent subscribers. Therefore, if a licensee has both Commercial VSAT CUG Service authorization and Internet Service authorization, it can provide internet services as well as Wi-Fi hotspot under its Internet service authorization using VSAT as a distribution point. For this purpose, a direct interconnection of VSAT Hub through leased line obtained from an authorized service provider (NLD service

licensee) to the Licensee's Internet node/server is permitted only for the Internet traffic. The VSAT Hub, however, need not be located in the service area of the Internet Service authorization.

On the similar lines, if an Access Service provider wishes to provide Wi-Fi hotspot in the remote or difficult areas, the same should be permitted to provide using backhaul link through VSAT, obtained from Commercial VSAT CUG Service provider.

2.21 Some of the stakeholders have stated that the connectivity for the basic telephony for the exchanges at remote or difficult locations, DSLAMs, etc. can also be facilitated through the Commercial VSAT Service provider. In this regard, it is observed that as per the existing terms and conditions of the Access Service authorization, link between two exchanges or between the main exchange and its Remote Switching Units (RSU) is to be established by the Access Service providers itself or alternatively such transmission links can be obtained from NLD service providers.

2.22 On the proposal of one of the stakeholders envisaging payment of difference in the Entry Fee of NLD authorization vis-à-vis Commercial VSAT CUG Service authorization for extending the scope of service for Commercial VSAT CUG Service authorization, the Authority finds no merit to increase the Entry Fee for the Commercial VSAT CUG service provider as the scope of Commercial VSAT CUG service authorization is very limited in comparison to the scope of NLD service, which, inter alia, also includes carriage of switched voice traffic between LSAs.

2.23 **In view of the above, the Authority recommends that:**

- a) The Commercial VSAT CUG Service provider should be permitted to provide backhaul connectivity for cellular mobile services through satellite using VSAT to the Access Service providers. They may also be permitted to provide backhaul connectivity using VSAT to Access Service Providers for establishing Wi-Fi hotspots. Suitable**

amendments may be carried out in the scope of standalone commercial VSAT CUG service license and authorization and Access Service authorization accordingly.

- b) The VSAT terminal of the Commercial VSAT CUG Service provider, which is used to provide cellular mobile backhaul link or Wi-Fi hotspot backhaul link, is to be located in the service area of the Access service provider, where the backhaul link is used. However, the VSAT hub can be located anywhere in the country. The link from the hub station to the respective network element of the cellular mobile network can be provided through the terrestrial connectivity obtained from an authorized service provider.**

B. Enabling licensing provisions in UL and UL (VNO)

- 2.24 In order to make enabling provisions in the respective licenses, a connected question was asked from the stakeholders whether the scope of Commercial VSAT CUG Service authorization be enhanced under both Unified License and UL (VNO) license to enable the provision of the said backhaul connectivity.
- 2.25 In response to the above, most of the stakeholders are of the view that the scope of Commercial VSAT CUG Service authorization should be enhanced under both UL and UL (VNO) license for providing the backhaul connectivity.
- 2.26 One of the stakeholders has stated that the scope of Commercial VSAT CUG Service license should be enhanced under the stand-alone Commercial VSAT License (old regime) and under both UL and UL (VNO) license for providing the cellular and Wi-Fi backhaul, thereby permitting shared use of active infrastructure.
- 2.27 Most of the stakeholders are of the view that the scope of Commercial VSAT CUG Service Authorization should be enhanced under both Unified License and UL (VNO) license to enable the provision of the backhaul connectivity for mobile services only. One of the stakeholders

has further stated that the scope of Commercial VSAT CUG Service authorization should be enhanced to the extent of providing a satellite-based backhaul to the mobile services; and the Long-distance carriage rights granted for NLD, ILD, and Access services, should not be covered under the scope of this service.

- 2.28 One of the stakeholders has submitted that the scope of Commercial VSAT CUG service authorization should be enhanced under both UL and UL (VNO) license to enable the provision of cellular backhaul connectivity via satellite through VSAT under Commercial VSAT CUG service authorization using shared infrastructure. This will enhance the provisioning of the internet and voice services in remote/inaccessible areas at lower costs (on account of the use of shared infrastructure and percentage based SUC) where terrestrial backhaul connectivity options are unavailable/unviable. The stakeholder has further mentioned that the necessary amendments can be made in the license/authorizations for UL (Commercial VSAT CUG service authorization), UL (VNO) (Commercial VSAT CUG service authorization) and NLDOs permitting the infrastructure sharing of VSAT hubs and terminals installed under the Commercial VSAT CUG license/authorization by the NLDOs.
- 2.29 One of the stakeholders has mentioned that the scope of existing Commercial VSAT CUG Service Authorizations does not permit the use of VSAT terminals for cellular backhauling. Further, Access Service Providers may not make arrangements with Commercial VSAT CUG due to clause 2.2 in the license agreement, which says that the Licensee may also enter into mutual agreements with other UL Licensee (with authorization for access service)/other Access service licensee/National Long Distance Licensee for carrying its intra-circle Long Distance traffic. Contrary to others, the stakeholder has expressed the apprehension that the enhancement of scope and sharing of infrastructure would mean overriding the scope of the NLD license. The stakeholder has further mentioned that NLD can provide VSAT terminals for backhauling as per the existing terms and conditions; however, the

same is not provided due to very high spectrum charging of VSAT operating under NLD service.

Analysis

- 2.30 Most of the stakeholders are of the unanimous view that the scope of Commercial VSAT CUG Authorization should be enhanced under both UL and UL (VNO) license for providing the backhaul connectivity. The Authority is in agreement with the views of stakeholders that the scope of Commercial VSAT CUG Authorization should be enhanced under the stand-alone Commercial VSAT License (old regime) and under both UL and UL (VNO) license for providing the cellular mobile backhaul as well as for Wi-Fi hotspot backhaul connectivity.
- 2.31 It is understood that allowing Commercial VSAT CUG Service provider to provide backhaul for cellular connectivity within LSA shall not infringe upon the rights and scope of the NLD service provider. It is also worth mentioning that the opportunity for providing the backhaul links within the LSA will be equally available to the NLD service provider. Commercial VSAT CUG Service provider will be complementing the connectivity gap in such areas where Access or NLD service providers are not finding it commercially viable in the absence of terrestrial connectivity.
- 2.32 **In view of the above, the Authority recommends that enabling provisions should be made in stand-alone Commercial VSAT CUG Service license, Unified License and Unified License (VNO) for provision of backhaul connectivity by Commercial VSAT CUG Service provider.**

C. Sharing of VSAT Hub and VSAT terminals by the licensee holding authorizations for Commercial VSAT CUG and NLD services

- 2.33 Issue of sharing of the infrastructure by an entity having separate Authorizations/Licenses for Commercial VSAT CUG and NLD services

has been discussed in the Consultation Paper. Sharing of infrastructure not only results in better technical and economic efficiency to service providers but also saves the duplication of efforts/or creation of resources. Accordingly, in the Consultation Paper, a relevant question was raised for the comments of stakeholders as whether the licensee having Authorization for both Commercial VSAT CUG Service and NLD Service should be allowed to share VSAT Hub and VSAT terminals for the purpose of providing authorized services.

- 2.34 In response to this question, most of the stakeholders have upheld that the licensee having authorization for both Commercial VSAT CUG and NLD services should be allowed to share VSAT Hub and VSAT terminals to provide authorized services under the license.
- 2.35 One of the stakeholders has further submitted that the new generation Satellite Baseband and RF systems are modular and capable of supporting multiple network segments that enable synergizing resources for effective utilization in terms of equipment duplication. Among the other benefits, the stakeholder has mentioned that sharing will also result in the reduction of Satellite Communication Equipment imports, which in turn will reduce Foreign Exchange outflow.
- 2.36 One of the stakeholders has submitted that the unification of the licenses and sharing the common resources within the purview of applicable restrictions and permissions for all authorized services should be permitted for all licensees. However, the service provider should ensure full compliance with respective authorizations and should also keep the Licensor informed of such sharing. The stakeholder is of the view that sharing of own active and passive infrastructure to provide various services under the other service authorizations of the Unified License and/or other license should be permitted to all service providers. The stakeholder also has referred to clause 4.3 of Access Services authorization and requested to make it a part of the Operating Conditions under Chapter 5 of Part I of the Unified License, thereby extending this facility to all Unified Service Licensees.

- 2.37 Some of the stakeholders have submitted that, with the advent of High Throughput Satellite (HTS), it is not economically viable to have separate gateways for VSAT, NLD, or, for that matter, other services. The same applies for the upcoming LEO/MEO satellite constellations too. Hence, it is prudent to effectively share resources amongst licenses. The stakeholders also mentioned that we need to cater to a scenario where the gateways are operated by one service provider and the terminals/networks are operated by another service provider. And even today for the GSAT-11 program, Department of Space (DoS) intends to operate the Gateway hub and provide capacity to many service providers. This needs to be adequately addressed as far as licensing is concerned.
- 2.38 Many stakeholders have mentioned that sharing of VSAT Hub and VSAT terminals between VSAT CUG and NLD services would entail a reduction of CAPEX and OPEX for installation. This sharing would additionally lead to an optimum utilization of infrastructure, resulting in a decrease in the costs borne by the end users, and shall also lead to reduction in the time required to build a network using the existing VSAT CUG infrastructure, faster time to roll-out services, cost and energy efficiencies, reduced entry barriers and increased competition. Some stakeholders have further emphasized that such benefits can accrue to the Satcom sector if similar principles are applied when it comes to infrastructure sharing between the VSAT CUG services and the NLD services, particularly in rural, remote, and geographically challenging terrains.
- 2.39 One of the stakeholders has submitted that Licensees' with authorization of both Commercial VSAT CUG service and NLD service may be allowed to share the VSAT Hub and VSAT terminals with Access Service providers, once spectrum charging for VSATs under both categories are charged with similar methodologies, i.e., on the basis of the percentage of AGR.

2.40 Some of the stakeholders are of the view that the necessary rationalization of the Spectrum Usage Charges (SUC) must be done to ensure that the services are enabled/facilitated and not restricted due to high imposition of levies.

Analysis

2.41 Most of the stakeholders are of the view that the licensee with authorizations for both Commercial VSAT CUG Service and NLD Service should be allowed to share VSAT Hub and VSAT terminals to provide authorized services.

2.42 There is no second thought that infrastructure sharing of VSAT network will help to save both time and cost of VSAT-based connectivity deployment and this will further facilitate the mobile operators to offer latest mobile services faster and more effectively in the areas of requirement. It is to be made clear that the licensee will obtain separate frequency assignment under its NLD and Commercial VSAT CUG authorizations and deploy separate VSAT Terminals under the respective authorization and share the common VSAT Hub. Sharing of VSAT Hub for the purpose of providing authorized services will eventually result in reduced cost per unit for provisioning of backhaul links and will lower the per unit cost to end customers too. Such provisions will accelerate the proliferation of telecom services in remote and difficult areas.

2.43 **In view of the above, the Authority recommends that:**

- a) A Licensee having license/authorizations for both Commercial VSAT CUG Service and NLD Service should be allowed to share VSAT Hub for the purpose of providing authorized services.**
- b) Necessary amendments to this effect should be made in the respective standalone licenses and authorizations under UL and UL (VNO).**

D. Sharing own active and passive infrastructure for providing services authorized under various authorizations to a licensee

2.44 Sharing of its own active and passive infrastructure by a licensee for providing services authorized to it under different authorizations is already permitted under the scope of Access Service authorization as per clause 4.3 of Chapter VIII in Unified License. The clause is reproduced below:

4.3 Further, the Licensee may share its own active and passive infrastructure for providing other services authorized to it under the license.

2.45 In the Consultation Paper, it has been discussed to explore the possibility of extending this enabling clause for all the service authorizations of UL and across all the licenses. Accordingly, a connected question of broader relevance was asked whether the licensee should be permitted to share its own active and passive infrastructure for providing various services authorized to it under the other service authorization of UL and other licenses. The Authority has also sought the views if there is a need to impose any restrictions in enabling such provisions.

2.46 In response to the above, most of the stakeholders are of the view that the licensee should be permitted to share its active and passive infrastructure for providing services authorized to it under other service authorization of UL and/or other licenses. Some stakeholders have further stated that considering the same, Clause 4.3 of Chapter VIII (Access Service authorization) should be extended to all other authorizations too.

2.47 Some of the stakeholders have pointed that permitting the above-stated sharing shall enable efficient utilization of infrastructure in a way that the active and passive infrastructure is used under one license and economic and operational efficiency can be achieved to facilitate the provision of services provided under other authorizations. Some

stakeholders are of the view that infrastructure sharing helps reduce both time and cost of deployment and should be facilitated with enabling licensing provisions.

- 2.48 Supporting the idea of sharing of VSAT Hub and VSAT terminals between Commercial VSAT CUG and NLD service authorizations/licenses, a stakeholder has mentioned that sharing the common resources within the purview of applicable restrictions and permissions for all authorized services should be permitted for all licensees.
- 2.49 One of the stakeholders has submitted that the licensee should be permitted to share its own active and passive infrastructure for providing services authorized to it under all licenses and this enabling permission should also be available to UL (VNO) licensees. This would enable an efficient utilization of installed equipment and network, and would help to spread across all licensed services, especially, to rural and remote areas, where satellite communication enables connectivity.
- 2.50 One of the stakeholders has mentioned that by allowing the licensee to share its own active and passive infrastructure for providing various services authorized to it, there will be an optimized usage of the available resources. The service providers should be allowed to use not only the active and passive infrastructure on ground but should also be allowed to share the satellite spectrum for providing various services authorized to them under other service authorizations. The satellite spectrum is scarce and finite, hence, most optimal utilization of resources across services will reduce wastage and reduce the per unit cost. This will also enable service providers to offer new services without worrying about sharing of active and passive infrastructure.
- 2.51 Another stakeholder has submitted that the unification of the licenses and sharing of the common resources within the purview of applicable restrictions and permissions for all authorized services should be permitted for all licensees. However, the service provider should ensure full compliance with respective authorizations and should also keep the

Licensor informed of such sharing. The stakeholder is of the view that sharing of own active and passive infrastructure to provide various services under the other service authorizations of the Unified License and/or other license should be permitted to all service providers. The stakeholder also has referred to clause 4.3 of Access Services authorization and requested to make it a part of Operating Conditions under Chapter 5 of Part I of the Unified License, thereby extending this facility to all Unified Service Licensees.

Analysis

- 2.52 From the responses received, there has been a common consensus among the stakeholders that licensee should be permitted to share its own active and passive infrastructure for providing services authorized to it under the other service authorization of UL and/or other licenses.
- 2.53 Allowing sharing of active and passive infrastructure by the licensee for other authorizations under UL can be enabled by making the Clause 4.3 of Chapter VIII (Access Service Authorization) applicable for all other authorizations also.
- 2.54 The Authority agrees with the views of the stakeholders that sharing of own active and passive infrastructure to provide various services under the other service authorizations of the Unified License and/or other license should be permitted to all service providers. The stakeholders have also referred to clause 4.3 of Access Services authorization and requested to make it a part of Operating Conditions under Chapter 5 of Part I of the Unified License, thereby extending this facility to all Unified Service Licensees.
- 2.55 The Authority is of the view that sharing of all active and passive infrastructure established by a licensee under any of the service authorization under UL should be permitted for providing other service(s) authorized to licensee under other authorizations/licenses. The Clause 4.3 of Access Services Authorization of UL should be made

as a part of the Operating Conditions under Chapter V of Part I of UL and UL (VNO), thereby extending this facility to all UL and UL (VNO) licensees.

2.56 **In view of the above, the Authority recommends that:**

- a) **Sharing of active and passive infrastructure owned by a licensee under any of the service authorizations should be permitted for providing other services authorized to licensee under other authorizations or stand-alone licenses.**
- b) **To enable the above provisions, clause 4.3 of Access Services authorization of UL should be suitably made as a part of Operating Conditions under Chapter V of Part I of both UL and UL (VNO) license. Similar amendments should also be made in the prevailing stand-alone licenses.**

E. Spectrum charging mechanism for VSAT based telecom services

2.57 In the Consultation Paper, the Authority has deliberated upon the formula-based spectrum charging mechanism for VSAT services under NLD service and Access Service Authorizations. The Authority has taken a note of the fact that there is a dissimilarity in the spectrum charging mechanism for the services provided through the same VSAT technology, i.e., VSAT services provided through Commercial VSAT CUG service authorization and NLD Service Authorization.

2.58 Under the Commercial VSAT CUG Service Authorization, the Royalty Charges and spectrum License Fee is clubbed together and is termed as Spectrum Usage Charges (SUC). DoT vide its circular dated 16th April 2003 had migrated to the AGR-based mechanism for spectrum charges (Royalty and License Fee) for the Commercial VSAT Service Authorization. SUC in Commercial VSAT CUG service license is charged on AGR basis and varies from 3% to 4% of AGR depending upon the data rates. Whereas the charging mechanism for VSAT-related services in NLD License/Authorization is formula based and governed by the

formula prescribed by DoT Order No. P-11014/34/2009-PP (III) dated 22nd March 2012. The Royalty charge is applied to the total licensed bandwidth of each frequency of any type of the satellite-based Radio-communication network (including ILD, NLD, Teleport, DSNG, DTH, VSAT, INMARSAT, and Satellite Radio). To arrive at the amount of the annual Royalty per frequency: R, a Bandwidth Factor (Bs) is applied as per the Table 1. Royalty 'R' is payable for an Uplink or a Downlink as per the following formula:

$$\text{Royalty, R (in Rs.)} = 35000 \times \text{Bs}$$

Table 1: Bandwidth Factor (Bs) for Satellite Communications

Bandwidth Assigned to a Frequency (W KHz)	Bandwidth Factor (Bs) for an Uplink		Bandwidth Factor (Bs) for a Downlink	
	Broadcast	Others	Broadcast	Others
Up to and including 100 KHz	0.25	0.20	NIL	0.20
More than 100 KHz and up to and including 250 KHz	0.60	0.50	NIL	0.50
More than 250 KHz and up to 500 kHz	1.25@	1.00@	NIL	1.00@
For every 500 kHz or part	1.25@	1.00@	NIL	1.00@

@for every 500KHz or part thereof

2.59 In its Recommendations dated 3rd October 2005 on 'Growth of Telecom services in rural India — The Way Forward', the Authority had recommended that there should be a single rate of WPC fee (SUC) and the ceiling of 4% should be lowered to 1% to cover administrative charges only. Further, TRAI vide recommendations dated 7th March 2017 on 'Spectrum Usage Charges and Presumptive Adjusted Gross Revenue for Internet Service Providers and Commercial Very Small Aperture Terminal Service Providers' has reiterated that the SUC should not be more than 1% of AGR, irrespective of the data rate in respect of the Commercial VSAT CUG Services.

- 2.60 As per the present licensing regime, the VSAT-based backhaul bandwidth can be established by the Access Service Provider itself, or alternatively can be obtained as the leased bandwidth from the NLD service provider. Creating VSAT-based network involves obtaining the satellite transponder from Department of Space (DoS) and frequency authorizations from WPC wing of DoT. For frequency authorizations for VSAT network, the prescribed Royalty Charges and license fee are to be paid to DoT. Under the Access Service Authorization and NLD Service Authorization, the Royalty Charges of frequency authorization for satellite-based system is calculated as per the formula prescribed by DoT vide Order dated 22nd March 2012 as referred to in para 2.58. The Royalty charges prescribed vide the said letter are very high and increases as the number of VSAT terminals increases while utilizing the same amount of spectrum.
- 2.61 Based on the above description made in the Consultation Paper, a question was raised for the comments of stakeholders whether the formula-based spectrum charging mechanism for VSAT services under the NLD/Access Service license is adequate and appropriate. The stakeholders were also asked to comment whether spectrum charging for VSAT services in NLD/Access service license should be made on AGR basis instead of the existing formula-basis mechanism and whether it will require accounting/revenue separation for satellite-based VSAT services under NLD/Access Service license.
- 2.62 In response, most of the stakeholders have commented that they support the move to migrate the Spectrum Usage Charges (SUC) for VSAT services for NLD authorization from formula based to the percentage of AGR based.
- 2.63 Many of the stakeholders have also stated that it should be AGR based, and in line with the existing TRAI Recommendations of 2017 and also in accordance with the NDCP guidelines for rationalisation of levies and spectrum charges. Thus, SUC should be 1% of AGR based irrespective

of the data rate, as recommended by TRAI in its Recommendations dated 7th March 2017.

- 2.64 One of the stakeholders has stated that in Consultation Paper, the Authority has rightly observed that the method of calculating SUC Charges (Royalty Charges) towards frequency authorizations will result in different charges under the Commercial VSAT CUG Service Authorizations and NLD Service Authorization. Therefore, spectrum charging for VSAT under NLD service should also be made on AGR basis instead of formula based. With the advent of HTS, the formula-based charging, which results in an exorbitant amount, will make use of new technology satellites like LEO/MEO non-feasible to compete with terrestrial solutions.
- 2.65 One of the stakeholders has requested making more license-free spectrum available to enable the spread of services in rural and remote areas. Another stakeholder has stated that it is necessary to ensure a simplified charging mechanism for VSAT service to facilitate ease of doing business. However, the method of calculating SUC Charges (Royalty Charges) towards frequency authorizations will result in different charges under the Commercial VSAT CUG Service Authorizations and NLD Service Authorization.
- 2.66 One of the stakeholders has stated that as per the industry experience, formula-based spectrum charging mechanism for VSAT services in NLD/Access license is inadequate and inappropriate, as it involves very complex calculation methodologies with exorbitant charges.
- 2.67 One of the stakeholders has stated that the OPEX for satellite connectivity is very high due to high charges for satellite bandwidth spectrum charges. The formula-based charging wherein the spectrum charges are levied on the basis of each link is restrictive for growth of the satellite-based services in India, as it tends to penalize efficient use of the satellite frequency instead of promoting it. The stakeholder further stated that the formula-based spectrum charging mechanism is not appropriate for VSAT Network as well as for point-to-point satellite

links. The stakeholder has cited an example that, if a BTS located in a remote part of Andaman and Nicobar Islands (example Campbell Bay) is to be connected to its BSC located at Port Blair or at Kolkata/Chennai, it is not an NLD connectivity, as the BSC will be available at a central location. The stakeholder has emphasised that, as the connectivity of remote locations is not an NLD connectivity but an access connectivity, there is a need to rationalise the SUC for VSAT CUG Licences for point-to-point satellite links too.

- 2.68 Some of the stakeholders are of the opinion that spectrum charging methodology for the same type of technology and spectrum across various licenses/authorizations should be uniform. The stakeholders have suggested that the spectrum charging for VSAT services in NLD/Access service license should be made on AGR basis instead of the existing formula-basis mechanism and be charged as a nominal percentage of AGR on revenues earned from the provision of VSAT services.
- 2.69 Some of the stakeholders have submitted that other measures could possibly include nominal levy of license fees, doing away with the USOF component of the license fee once these services are being deployed in areas (viz. rural and remote) for which USOF Component of levy are meant.
- 2.70 Some of the stakeholders have stated that they support the move to migrate the Spectrum Usage Charges for VSAT services under NLD authorization from formula based to AGR based. The stakeholder also mentioned that if at all WPC needs to be adequately covered for their administrative efforts, then it should be based on a fixed fee per location, which may be in the order of Rs. 500 or Rs. 1000 per annum, rather than multiplying the spectrum by the number of VSATs. This formula-based approach results in Royalty charges which is more than 90 times than that of the AGR-based charging and such high-administrative charges makes satellite-based backhauls unviable. These stakeholders have also submitted that the formula-based

charging is an administrative nightmare. Every time even if a carrier is expanded or shrunk, it triggers a revision in the Decision Letter and WOL issued by WPC. As spectrum payment under the formula-based scheme is paid annually, reconciling any changes becomes extremely difficult.

- 2.71 One stakeholder has also submitted that the charging mechanism for spectrum should be the same for the same/similar services provided under the UL using similar or different technologies. The license should be completely technology neutral and should promote the viability and sustainability of service providers. Furthermore, the Authority should recommend doing away with multiple charging mechanisms in favor of simple and nominal administrative spectrum-usage-charges regimes.
- 2.72 The stakeholder has specifically mentioned that in order to encourage the use of VSAT as a backhaul, the Authority should also recommend the payments made by Access Service Providers to Commercial VSAT Service providers as pass through under the AGR calculation. The stakeholder has also mentioned that there is also a fit case to deduct the payment made by the licensee to Department of Space for transponder allocation charges from the Gross Revenue while calculating the AGR.
- 2.73 One of the stakeholders while supporting to do away with the formula-based spectrum charging mechanism for VSAT services in NLD/Access license has suggested shifting the calculation of royalty charges of satellite-based system from the existing formula-based to AGR-based, charges in line with that for the Access Service and also stated that same principle should be applied for spectrum allocated under NLD/ISP Service Authorizations. The stakeholder also has stated that the current SUC charges of 3% to 4% of AGR for Commercial VSAT Service are very high, which would render VSAT-based services costlier and as an ineffective alternative. The stakeholder has suggested lowering the SUC charges to max of 1% of the AGR, in line with the TRAI recommendations dated 7th March 2017.

- 2.74 On the issue of accounting separation for computation of AGR, some of the stakeholders have stated that the AGR-based spectrum charge for the VSAT services, provided under NLD/Access Authorization, will require due accounting/ revenue separation to separately record revenues from the provision of VSAT services under NLD/Access License. Accordingly, suitable amendment in license will be required for this purpose.
- 2.75 One of the stakeholders has stated that since the NLD/UASL licensee provides various other services like NLD calls, mobile, fixed-line, etc., only the AGR from the provision of VSAT services should be considered as the applicable AGR for the imposition of spectrum usage charge. Any stipulation to impose spectrum charges as a percentage of AGR on the entire license revenue of NLD/Access Authorization will make provision of VSAT services costly, thereby, disincentivizing the same.

Analysis

- 2.76 The Authority in the Consultation Paper has elaborated the Royalty Charges prescribed by DoT vide letter dated 22nd March 2012 for VSAT-related services provided under the NLD license/authorization, which is based on the formula-based mechanism. Stakeholders have stated that the Royalty charges, calculated on prescribed formula basis, comes out to be very high resulting into under-utilization of satellite-based services and also impeding the connectivity required for the unconnected in rural areas.
- 2.77 One of the provisions of NDCP-2018, has been *inter alia* to revise the licensing and regulatory conditions that are deterrent to the use of satellite communications, such as speed barriers, band allocation, etc. The objectives of the NDCP-2018 can be achieved by simplifying the issues/obstacles in growth of the satellite communication in India.
- 2.78 As per the present regime, the Commercial VSAT CUG operators are levied the license fee as 8% of adjusted Gross Revenue (AGR). Further,

Spectrum Usage Charges w.e.f. 1st January 2003 for commercial VSAT CUG networks are being levied as per the WPC order dated 16th April 2003. Spectrum usage charges for VSAT service varies from 3% to 4% of AGR (depending upon the data rate).

- 2.79 In its earlier recommendations of 3rd October 2005 on ‘Growth of Telecom services in rural India — The Way Forward’, the Authority had recommended that for Commercial VSAT CUG service there should be a single rate of WPC fee (SUC) and the ceiling of 4% should be lowered to 1% to cover administrative charges only. Further, the Authority reiterated its earlier recommendations that there should be a single rate of SUC and it should be only 1%, to cover the administrative charges vide recommendations dated 7th March 2017 on ‘Spectrum Usage Charges and Presumptive Adjusted Gross Revenue for Internet Service Providers and Commercial Very Small Aperture Terminal Service Providers’.
- 2.80 In response to the question raised in the consultation paper that whether the formula-based spectrum-charging mechanism for VSAT services under the NLD/Access Service license is appropriate, most of the stakeholders have commented that they support the move to migrate the Spectrum Usage Charges (SUC) for VSAT services for NLD authorization from formula based to percentage of AGR based.
- 2.81 It may be noted that in most of the service authorizations under UL, spectrum charging has been prescribed based on the percentage of AGR rather than on formula basis. In the past also, the Authority has recommended for levy of spectrum charges on AGR basis for services such as “Satellite based Services using Gateway installed in India under 'sui-generis' category”, and Public Mobile Radio Trunking Services (PMRTS) and recommended the SUC as 1% of AGR for both the services.
- 2.82 The Authority is in agreement with the views of most of the stakeholders that spectrum charging for VSAT services in NLD service license should be made on AGR basis, instead of existing formula basis, and also be charged as a nominal percentage of AGR on revenues earned from

provisioning of the VSAT services. The lowering and simplified SUC will enable the NLD service providers to adopt the latest technologies like LEO/MEO/HTS and will further result in a lower cost and faster proliferation of satellite technology.

2.83 NLD Service license has a wider scope as the NLD Service provider is permitted to provide connectivity/bandwidth/links to all other licensees, including Access Service providers, Internet Service Providers, and other NLD Service providers. It is, therefore, important to ensure that the NLD service licensee is able to provide the satellite-based connectivity to other licensees in a cost-effective manner so that the services can be delivered to the end users in remote and inaccessible areas at affordable prices.

2.84 Some of the stakeholders have requested that the connectivity for the basic telephony for the exchanges at remote or difficult locations, DSLAMs, etc., can also be facilitated through the Commercial VSAT Service provider. In this regard, an observation has been made in Para 2.21 ante that as per the existing terms and conditions of the Access Service authorization, the link between the two exchanges or between the main exchange and its Remote Switching Units (RSU) are to be established by the Access Service providers itself or alternatively such transmission links can be obtained from NLD service providers. In order to facilitate the NLD service providers to make the satellite connectivity available for such use cases/demand, the Authority feels that the levy of Spectrum Usage Charges for using satellite frequencies by NLD service licensee should be migrated from formula-based mechanism to AGR-based mechanism, and it should be rationalized to support the proliferation of satellite-based connectivity.

2.85 The Authority is of the view that migration to the AGR-based spectrum charge for the satellite-based VSAT services will require accounting separation for computation of AGR. The Authority also agrees with the argument that only the revenue from the provision of satellite services should be considered for the purpose of calculation of spectrum usage

charge, and no component of the revenue from other licensed services, under NLD, should be accounted for SUC. Accordingly, suitable amendment in the license should be incorporated by DoT for this purpose.

- 2.86 Based on above analysis, the Authority is of the view that the spectrum usage charges for using satellite frequencies under the NLD service license/authorization should be prescribed as a percentage of AGR. Replacing the existing formula-based mechanism, Spectrum usage charges for using satellite frequencies under the NLD service license/authorization should be prescribed as 1% of AGR excluding the revenue from the licensed services other than satellite-based services. The NLD Service licensee has to do the accounting separation and maintain the revenues accruing from the satellite-based services and other licensed services separately.
- 2.87 Access Service Providers are also permitted to establish satellite-based connectivity for their access network within a Licensed Service Area. For establishing a satellite-based radio communication network, Access Service licensee is required to obtain the satellite frequency authorization from WPC and pay the associated Royalty charges on formula basis. Migrating spectrum usage charges for using satellite frequencies from the formula-based mechanism to AGR-based mechanism for Access Service licensee will be a complex issue, as it is difficult to do the accounting separation for revenues accruing through the use of satellite connectivity. For Access service licensee, it is an integrated activity and the revenues are accrued by way of the voice calls, data usage and other revenues. Further, all the Access Service licensees also have NLD Service Authorization and mostly use their NLD network for such requirement of satellite bandwidth. The Authority, therefore, is of the view that no such changes should be proposed under the Access Service Authorization for calculation of spectrum charges for satellite-based services.

2.88 In case of VSAT, the transponder bandwidth is allocated by the Department of Space (DoS) and the frequency allotment is carried out by WPC, DoT. Therefore, the VSAT licensees have to essentially take the satellite bandwidth and pay the charges for the transponder bandwidth to the DoS. These transponder charges are basically to enable the use of electronics and resources of the satellite placed in the space. The Authority, therefore, does not agree with the proposal of one of the stakeholders to treat transponder charges payable to DoS and backhaul charges payable to NLD/Commercial VSAT CUG service providers as pass through, because in absence of the satellite connectivity, the service provider shall anyway have to create its own transmission infrastructure or lease the connectivity from the NLD operator and it is part of the cost for creation of infrastructure.

2.89 **In view of the above, the Authority recommends that:**

- a) Replacing the existing formula-based mechanism, Spectrum Usage Charges for using satellite frequencies under the NLD service license/authorization should be prescribed as 1% of AGR excluding the revenue from the licensed services other than satellite-based services.**
- b) The NLD Service licensees should be asked to do the accounting separation and maintain the revenues accruing from the satellite-based services and other licensed services separately.**
- c) In respect of SUC for Commercial VSAT CUG Service license, the Authority reiterates to make the SUC as 1% of AGR, irrespective of the data rate, as stated earlier in its recommendation dated 7th March 2017 on 'Spectrum Usage Charges and Presumptive Adjusted Gross Revenue for Internet Service Providers and Commercial Very Small Aperture Terminal Service Providers'.**

F. Other issues:

- 2.90 The stakeholders were also requested to comment on relevant issue(s), which could not be covered in the questions raised in the Consultation Paper.
- 2.91 In response, some stakeholders have stated that the first-time approval of a network should be done through the Apex Committee, which should act as a single-window for the entire set of approvals obtained by the licensees and this activity can be completed within 30 days.
- 2.92 Some stakeholders have submitted that the process of adding of sites or bandwidth has to be executed in similar time frames as that of the commercial services. They are of the opinion that any augmentation of bandwidth should be dealt with by NOCC and WPC only and need not be taken up in Apex Committee. These stakeholders also proposed that SACFA/WPC charges can be combined with the license fee and a demand can be put up together on an yearly basis eliminating the need for multiple demands by the licensing cell and WPC.
- 2.93 One stakeholder has stated that NOCC and WPC clearance of satellite spectrum to end users should be done away with as this frequency has already been allocated to ISRO by DoT. The stakeholder also stated that the Import License for Radio equipment should be based on "Type Approval" rather than obtaining an approval on every occasion for similar equipment. Antenna size and RF size to be decided by the Service Provider should be based on the link budget approval from the Satellite Operator.
- 2.94 Some stakeholders are of the view that regulatory barriers due to the TEC Specifications (like permitted carrier speed), which impose artificial restrictions on the carrier speeds supported by VSAT terminals should be completely done away with so as to use satellite backhaul for 5G.
- 2.95 One of the stakeholders has commented that with the advancement in the satellite technologies, new generation satellites in the HTS, LEO and MEO are currently operational/getting operational. The infrastructure

and architecture of these new generation system(s) are quite different from traditional satellites, and hence, require a relook into existing policies/framework to accommodate these upcoming technologies for Wi-Fi, cellular backhaul, and VSAT CUG service provisioning.

- 2.96 One of the stakeholders during the Open House discussion raised the issue that the existing NOCC charges are very high and with the start of use of High Throughput Satellites (HTS) these charges will further go up. The stakeholder requested to rationalize the NOCC charges.

Analysis

- 2.97 The Authority observed that most of the comments given on additional issues basically pertain to various procedural issues. The Authority, on various occasions, has highlighted the procedural issues and recommended to make the online processes transparent and simple. So that the licensees do not face any unnecessary hurdles in dealing with the procedural issues. Some of the procedural improvements have been earlier recommended through the recommendations of 'Ease of Doing Business' dated 30th November 2017 and 'Captive VSAT CUG Policy issues' dated 18th July 2017.

- 2.98 One of the stakeholders raised the issue of artificial restrictions on the carrier speeds supported by VSAT terminals. The stakeholder has commented that it should be completely done away with. The Authority agrees with the views of the stakeholder and feels that there should not be any artificial barrier on the carrier speeds and, therefore, higher data rates, which are now possible with the use of latest technologies, should be permitted without putting any restrictions. TEC specifications in this regard should be revised to support the higher data rates supported by VSAT terminals. The Authority, vide its recommendations dated 18th July 2017 on "Captive VSAT CUG Policy Issues", inter-alia, recommended that the restriction/cap of 512Kbps/2Mbps per VSAT as maximum data rates for Captive VSAT may be revised upwardly and DoT/TEC may revise its specifications accordingly.

2.99 One of the stakeholders has commented that with the advancement in the satellite technologies, new generation satellites in the HTS, LEO, and MEO, will have quite a different architecture from that of the traditional satellites. The Authority also feels to align the licensing requirements with the latest technological developments. It is understood that the Gateway hub for the HTS satellites will be managed and operated by the satellite provider itself and the satellite bandwidth seeker will have to share the common Gateway functionality of the satellite provider. Suitable enabling clause may be incorporated in the license to permit such shared use of Gateway hub.

2.100 The Authority feels that the satellite-based connectivity is of prime importance for specific geographies that cannot be served through terrestrial means. The importance of satellite-based connectivity becomes even more relevant in the situations of disaster, because of its quick installation time. Considering the views raised by a stakeholder during the Open House Discussion that the existing NOCC charges are very high and need to be rationalized, the Authority agrees that the processes should be streamlined and the NOCC charges should be reduced to a nominal value which should not increase with the increase in number of carriers.

2.101 The Authority has observed that the procedural issues are highlighted through various recommendations, and these recommendations also should be considered and implemented by DoT on priority.

2.102 **In view of the above, the Authority recommends that:**

- a) There should be no artificial barrier on the carrier speeds and, therefore, higher data rates, which are now possible in satellite communications with the use of latest technologies, should be permitted without any restrictions. TEC specifications in this regard should be revised to support the higher data rates supported by VSAT terminals. Earlier also the Authority, vide its recommendations dated 18th July 2017 on “Captive VSAT CUG Policy Issues”, inter-alia,**

recommended that the restriction/cap of 512Kbps/2Mbps per VSAT as maximum data rates for Captive VSAT may be revised upwardly and DoT/TEC may revise its specifications accordingly. The Authority reiterates its recommendation.

- b) As the Gateway hub for HTS satellites will be managed and operated by the satellite provider itself and the satellite bandwidth seeker will have to share the common Gateway functionality of the satellite provider, suitable enabling clause may be incorporated in the license to permit such shared use of Gateway hub.**
- c) The NOCC charges should be rationalized and it should be independent of the number of carriers assigned.**

CHAPTER 3

SUMMARY OF RECOMMENDATIONS

3.1 The Authority recommends that:

- a) **The Commercial VSAT CUG Service provider should be permitted to provide backhaul connectivity for cellular mobile services through satellite using VSAT to the Access Service providers. They may also be permitted to provide backhaul connectivity using VSAT to Access Service Providers for establishing Wi-Fi hotspots. Suitable amendments may be carried out in the scope of standalone commercial VSAT CUG service license and authorization and Access Service authorization accordingly.**
- b) **The VSAT terminal of the Commercial VSAT CUG Service provider, which is used to provide cellular mobile backhaul link or Wi-Fi hotspot backhaul link, is to be located in the service area of the Access service provider, where the backhaul link is used. However, the VSAT hub can be located anywhere in the country. The link from the hub station to the respective network element of the cellular mobile network can be provided through the terrestrial connectivity obtained from an authorized service provider.**

[Para 2.23]

3.2 The Authority recommends that enabling provisions should be made in stand-alone Commercial VSAT CUG Service license, Unified License and Unified License (VNO) for provision of backhaul connectivity by Commercial VSAT CUG Service provider.

[Para 2.32]

3.3 The Authority recommends that:

- a) **A Licensee having license/authorizations for both Commercial VSAT CUG Service and NLD Service should be allowed to share VSAT Hub for the purpose of providing authorized services.**

- b) Necessary amendments to this effect should be made in the respective standalone licenses and authorizations under UL and UL (VNO).

[Para 2.43]

3.4 The Authority recommends that:

- a) Sharing of active and passive infrastructure owned by a licensee under any of the service authorizations should be permitted for providing other services authorized to licensee under other authorizations or stand-alone licenses.
- b) To enable the above provisions, clause 4.3 of Access Services authorization of UL should be suitably made as a part of Operating Conditions under Chapter V of Part I of both UL and UL (VNO) license. Similar amendments should also be made in the prevailing stand-alone licenses.

[Para 2.56]

3.5 The Authority recommends that:

- a) Replacing the existing formula-based mechanism, Spectrum usage charges for using satellite frequencies under the NLD service license/authorization should be prescribed as 1% of AGR excluding the revenue from the licensed services other than satellite-based services.
- b) The NLD Service licensees should be asked to do the accounting separation and maintain the revenues accruing from the satellite-based services and other licensed services separately.
- c) In respect of SUC for Commercial VSAT CUG Service license, the Authority reiterates to make the SUC as 1% of AGR, irrespective of the data rate, as stated earlier in its recommendation dated 7th March 2017 on 'Spectrum Usage Charges and Presumptive Adjusted Gross Revenue for Internet Service Providers and Commercial Very Small Aperture Terminal Service Providers'.

[Para 2.89]

3.6 The Authority recommends that:

- a) There should not be any artificial barrier on the carrier speeds and therefore, higher data rates, which are now possible in satellite communications with the use of latest technologies, should be permitted without any restrictions. TEC specifications in this regard should be revised to support the higher data rates supported by VSAT terminals. Earlier also, the Authority, vide its recommendations dated 18th July 2017 on “Captive VSAT CUG Policy Issues”, inter-alia, recommended that the restriction/cap of 512Kbps/2Mbps per VSAT as maximum data rates for Captive VSAT may be revised upwardly and DoT/TEC may revise its specifications accordingly. The Authority reiterates its recommendation.**
- b) As the Gateway hub for HTS satellites will be managed and operated by the satellite provider itself and the satellite bandwidth seeker will have to share the common gateway functionality of the satellite provider, suitable enabling clause may be incorporated in the license to permit such shared use of Gateway hub.**
- c) The NOCC charges should be rationalized, and it should be independent of the number of carriers assigned.**

[Para 2.102]

ANNEXURE

Government of India
Ministry of Communications
Department of Telecommunications
Sanchar Bhawan, New-Delhi -110001.
(DS-Cell)

No. DS-14/9/2016-DS-I

Dated: 13th August, 2019

To

The Secretary,
Telecom Regulatory Authority of India,
Mahanagar Doorsanchar Bhawan,
Jawahar Lal Nehru Marg, (Old Minto Road),
New Delhi- 110 002.

Subject: TRAI recommendations on Unified License and Unified License VNO agreement terms & conditions, inter-alia provisions for permitting mobile backhaul links via satellite through VSAT.

This is with reference to letter dated 21.05.2018 of VSAT Services Association of India (VSAI) requesting to allow cellular Backhaul services under Commercial VSAT service license to enhance the provisioning of internet and voice services in remote/inaccessible areas by allowing backhaul-links provisioning under Commercial VSAT authorization in unified-license (**copy of letter enclosed as Annexure-I**). VSAI has stated that Commercial VSAT Service Providers have an installed base of 250,000 terminals across the country. These terminals are technically capable being used as backhaul for cellular networks very effectively. As per the present rules, however, such services are considered in the nature of "carrier services" which fall in the domain of NLD.

2. In the above context, it has been submitted by VSAI that as per the present licensing regime:

- a) The backhaul provisioning can be done under the NLD authorization of UL. The sharing of the existing commercial VSAT Hub's usage to provide these services is not allowed.
- b) There are restrictions in sharing the existing VSAT Hub for the "carrier services" like providing the backhaul.
- c) Further, the VSAT Hub has to be in the same service area where MSC is located.

3. Further, VSAI has also submitted that VSAT authorization scope in the Unified License (**copy enclosed as Annexure-II**) 2.1(i) provides VSAT as a distribution point to provide internet services. However, there is no similar clause is available enabling VSAT terminal's use as a backhaul for providing mobile services.

4. It is well known fact that in last few years internet is being proliferated to the public at large through 3G/4G mobile network of Access Service Providers. Likewise, there is a case that the Access Service authorization should have enabling provisions to give broadband through VSAT also.

Continued/----

There is also a need to permit the sharing of VSAT Hub installed under NLD and /or Commercial VSAT authorizations. This would also enable extending the internet services along with voice services in the hitherto un-covered areas.

5. It is also felt that the scope of NLD license is much wider and should not limit provision of backhaul services for BTS/BSC/MSC by Access Service Providers/ Commercial VSAT service providers. The license fee for Access/NLD/Commercial VSAT Service Providers is AGR based and is at uniform rate of 8%.

In UL regime, for IP based Next Generation Network, Media Gateway Controller(MGC)/ Soft Switch can be deployed within geographical boundaries of any one of the authorized service area for Access Services or anywhere in the country, if licensee has authorization for NLD/ILD service also.[clause 4.5 of the Access Service authorization in UL] (copy enclosed as Annexure-III)

6. As per present terms and conditions of VSAT commercial license there is restrictions in sharing the existing VSAT Hub. Also for license holders the sharing of the VSAT hub installed for the two authorizations of VSAT & NLD is not permitted. This un-necessarily entails extra CAPEX by the operator(s).

Thus there exists a requirement for utilizing VSAT capabilities & allowing backhaul for connecting BTS/Mobile network in far flung areas under Commercial VSAT CUG license. It is felt that in the context of extending the backhaul connectivity in far-flung & hitherto unconnected areas, the VSAT technological capability should not be restricted.

7. Thus a suitable modification in the Unified License in "Scope of Service" & "Sharing of infrastructure" related clause(s) mentioned in both commercial VSAT license & Sharing of Hub in NLD authorization needs suitable changes/ enabling provision for backhaul provisioning. The proposed modification in UL and UL (VNO) is enclosed as Annexure-IV.

8. Further, objectives for strengthening satellite based services/VSATs have been stipulated in para 1.3 "*Strengthening Satellite Communication Technologies in India*" of NDCP-2018. The terms & conditions of VSAT authorisation may be examined in light of NDCP-2018 also.

9. Therefore, TRAI is requested to furnish their recommendations in terms of clause 11(1)(a) of TRAI, Act, 1997 as amended by TRAI Amendment Act, 2000 on Unified License and Unified License VNO agreement for permitting backhaul links for mobile network via satellite through VSAT.

 13.8.19

(Suneel Niraniyan)
Director (DS-I)
Tel: 23036139

Email ID: dirds1-dot@nic.in

Enclosures: As above.

DDG (OS)
4280/3192/2018
21/5/18
Annexure -
6/6
VSAI

VSAT Services Association of India

21st May 2018

DDG Data Services
Department of Telecom
Ministry of Communications
30, Ashoka Road,
New Delhi – 110001

Plot No. 1, Sector 18
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Gurgaon 122 015, (Haryana)
Phone: 91-124-3072500
Fax: 91-124-2398840
Website: www.vsatindia.org

Kind Attention: Shri Nitin Jain

Re: Cellular Backhaul Services using commercial VSAT license

Dear Sir,

At the outset, we laud the efforts of the Department of Telecom in its efforts to bring cellular connectivity to the rural areas to the country. There has been a significant thrust in the telecom unserved and underserved areas of the country such including the north eastern part of the country, Jammu & Kashmir and the Andaman & Nicobar Islands. The Government is funding major initiatives in these areas using the USO Fund.

Commercial VSAT service providers have a large installed base of 250,000 terminals all across the country. All of these terminals are Internet Protocol (IP) enabled and can be used as backhaul for cellular networks very effectively. Many of these terminals can be used for the purpose of cellular backhaul in addition to being used for providing data connectivity including internet. This will not only bring about a quicker roll-out option, but also reduce the cost of setting up dedicated infrastructure. A VSAT terminal with a small cell can provide effective coverage in the nearby areas.

For the proliferation of internet, the Government had relaxed the policy and allowed the distribution of internet using VSATs. Today a number of businesses are benefitted by this intervention by the Government and VSAT service providers are able to use the VSAT terminal as a backhaul for providing internet to unserved and underserved areas.

A similar approach could be followed for cellular backhaul as well. One can argue that internet access is an access service and backhaul is a carrier service and a VSAT service provider cannot provide a carrier service. This distinction has diminished when the Government made the license fees in terms of a per cent age of AGR uniform across both National Long Distance and VSAT services. The only difference exists in the entry fees for National Long Distance authorisation and Commercial VSAT authorisation under the Unified License.

This in the opinion of the association should not be a barrier for the Government to tap into a large potential that the VSAT terminals offer for backhaul services. DoT could enable this by offering an option to the VSAT service providers, who wish to provide backhaul services, to pay additional one time entry fee (that will bridge the gap in entry fees between commercial VSAT and National Long Distance authorisations) and begin to provide the backhaul service to other telecom service providers.

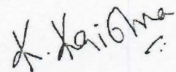
94581/DDG (OS) /2018.
21/5/18.

This will help the Government leverage the existing infrastructure setup by commercial VSAT service providers for extending cellular coverage to unserved and underserved areas. This will also help the VSAT service providers to put their investment in satellite hubs to optimal use.

We at the association are committed to providing any assistance that may be required by the department in this regard.

Thanking you,

Yours truly,



K. Krishna
President
Mobile: +91 9811055671

Copies to:

1. DDG NOCC
2. Special Secretary (T)

CHAPTER-XIV

COMMERCIAL VSAT CUG SERVICE

1. **Service Area:** The Service Area of Very Small Aperture Terminal (VSAT) Closed User Group (CUG) Service shall be at National Level.

2. **Scope of VSAT CUG Service:** Scope of this Authorization covers the following:

2.1 (i) The scope of service is to provide data connectivity between various sites scattered within territorial boundary of India using VSATs. The users of the service should belong to a Closed User Group (CUG). However, the VSAT licensee after obtaining ISP license may use same Hub station and VSAT (remote station) to provide Internet service directly to the subscribers, and in this case VSAT (remote station) may be used as a distribution point to provide Internet service to multiple independent subscribers.

(ii) Long distance carriage rights, granted for NLD, ILD and Access service, are not covered under the scope of this service.

(iii) The Closed User Group Domestic Data Network via INSAT Satellite System using VSAT shall be restricted to geographical boundaries of India.

(iv) The Licensee can set up a number of CUGs using the shared hub infrastructure.

(v) PSTN/PLMN connectivity is not permitted.

(vii) Data Rate, as specified in TEC Interface Requirements No. TEC-IR/SCB-08/02-SEP.2009, is allowed, subject to the compliance of the Technical parameters as specified in TEC Interface Requirements No. TEC-IR/SCB-08/02-SEP.2009, as modified from time to time.

3. **Financial Conditions:**

3.1 **Gross Revenue:**

The Gross Revenue shall include all revenues accruing to the Licensee on account of goods supplied, services provided, leasing/hiring of infrastructure, use of its resources by others, application fees, installation charges, call charges, late fees, sale proceeds of instruments (or any terminal equipment including accessories), VSAT hardware/software, fees on account of Annual Maintenance Contract/ Annual Comprehensive Maintenance Contract income from value added services, supplementary services, access or interconnection charges, etc. and any other miscellaneous item including interest, dividend etc. without any set-off of related item of expense etc.

2.6 For provision of Internet Telephony, Internet Services, Broadband Services and triple play i.e. voice, video and data, the Conditions No. 2.1(i), 2.1(vii), 2.1(ix), 2.1(x), 2.2, 5, 6, 7 and 8 of Chapter IX (Internet Service) shall also be applicable.

3. FINANCIAL CONDITIONS

3.1 GROSS REVENUE

The Gross Revenue shall be inclusive of installation charges, late fees, sale proceeds of handsets (or any other terminal equipment etc.), revenue on account of interest, dividend, value added services, supplementary services, access or interconnection charges, roaming charges, revenue from permissible sharing of infrastructure and any other miscellaneous revenue, without any set-off for related item of expense, etc.

3.2 Adjusted Gross Revenue (AGR)

For the purpose of arriving at the "Adjusted Gross Revenue (AGR)", following shall be excluded from the Gross Revenue to arrive at the AGR:

- I. PSTN/PLMN/GMPCS related call charges (Access Charges) actually paid to other eligible/entitled telecommunication service providers within India;
- II. Roaming revenues actually passed on to other eligible/entitled telecommunication service providers and;
- III. Service Tax on provision of service and Sales Tax actually paid to the Government if gross revenue had included as component of Sales Tax and Service Tax.

4. Technical & Operating Conditions

4.1 The Licensee's network shall be compliant to the Regulations/Directions/instructions issued by TRAI/Licensor in respect of Mobile Number Portability (MNP) before commencement of mobile services.

4.2 The sharing of infrastructure, owned, established and operated by the Licensee under the scope of this Authorization, is permitted as below:

- (i) Sharing of "passive" infrastructure viz., building, tower, dark fiber, duct space, Right of Way etc. with other Licensees.
- (ii) Provision of point to point bandwidth from their own infrastructure within their Service Area to other licensed telecom service providers for their own use. However, the Licensee hiring the bandwidth shall not resell such bandwidth.

4.3 Further, the Licensee may share its own active and passive infrastructure for providing other services authorized to it under the license.

4.4 Moreover, sharing of active infrastructure with other licensees shall be governed by the license conditions/amendments issued by the Licensor from time to time.

4.5 Location of switches and other network elements

(i) The licensee shall install applicable system within its service area. However, for IP based Next Generation Network, Media Gateway Controller (MGC)/ Soft Switch can be deployed within geographical boundaries of any one of the authorized service area for

Access Services or anywhere in the country if the Licensee has authorization for NLD/ILD service also. However, the Media Gateways shall be installed in each service area to perform the function of switching subscriber traffic under the control of MGC for call control.

(ii) The MGC/ Soft Switch and common service support systems such as Intelligent Networks (IN), Billing, Network Operations Center (NOC) or any other equipment specifically permitted by the Licensor, shall be located in a service area where the licensee has Access service authorization or anywhere in the country if the Licensee has authorization for NLD/ILD service also. Location of MGC/ soft switch and common service support systems shall be intimated to Licensor as and when commissioned. In respect of Short Message Service Center (SMSC), it can be installed in any of the service areas where Licensee has authorization of access service.

5. Provision of IPTV Service:

5.1(a) The Licensee while providing TV channels through IPTV shall transmit only those television channels and in exactly same form (unaltered), which are registered with or are otherwise permitted by the Ministry of Information and Broadcasting. In such cases, the responsibility to ensure that content is in accordance with the extant laws, rules, regulations etc. shall be that of the broadcaster and telecom Licensee will not be held responsible. The Licensee shall not carry any television channels prohibited either permanently or temporarily or not registered with the Ministry of Information & Broadcasting.

5.1(b) The Licensee can obtain content from the Multi System Operator or the Cable Operator for providing IPTV services.

5.1(c) The Licensee providing IPTV will show only those News and Current Affairs television channels which have been registered with Ministry of Information and Broadcasting. The Licensee will not produce or provide any other broadcast or non-broadcast channel having any element of News and Current Affairs.

5.1(d) The provisions of Programme code and Advertisement code as provided in Cable Television Network (Regulation) Act 1995 and Rules there under shall be applicable even in the case of contents other than TV channels from broadcast provided by the Licensee. Since the Licensee will be providing this content, the Licensee shall be responsible for ensuring compliance to the codes with respect to such content. In addition to this, such LICENSEES will also be bound by various Acts, instructions, directions, guidelines issued by the Central Government from time to time to regulate the contents.

5.1(e) If the contents are being sourced from content providers other than Licensee, then it will be the responsibility of Licensee to ensure that their agreements with such content providers contain appropriate clauses to ensure prior compliance with the Programme and Advertisement Codes and other relevant Indian laws, civil and criminal, regarding content.

5.1(f) The Central Government in the Ministry of Information and Broadcasting shall have the right to notify the number and names of channels of Prasar Bharati or any other channel for compulsory carriage by the Licensee and the manner of reception and retransmission of such channels.

Annexure - IV

F.No.20-405/2013-AS-I
Government of India
Department of Telecommunications
AS-I Cell

Dated the

To: All UL Licensees

Subject: Amendment to Unified License for permitting mobile backhaul links via satellite through VSAT.

In exercise of the powers conferred in pursuance of Condition 5 of the Unified License Agreement the LICENSOR hereby amends following for permitting mobile backhaul links via satellite through VSAT in the Unified License agreement.

S.No.	Existing clause	Amended clause
1.	<p>Chapter VIII</p> <p>Clause 2.2 Licensee may carry intra-circle long distance traffic on its network. However, subject to technical feasibility, the subscriber of the inter-circle long distance calls, shall be given choice to use the network of another Licensee in the same service area, wherever possible. The Licensee may also enter into mutual agreements with other UL Licensee (with authorization for access service)/other Access service licensee/National Long Distance Licensee for carrying its intra-Circle Long Distance traffic.</p>	<p>Chapter VIII</p> <p>Clause 2.2 Licensee may carry intra-circle long distance traffic on its network. However, subject to technical feasibility, the subscriber of the inter-circle long distance calls, shall be given choice to use the network of another Licensee in the same service area, wherever possible. The Licensee may also enter into mutual agreements with other UL Licensee (with authorization for access service)/other Access service licensee/National Long Distance Licensee for carrying its intra-Circle Long Distance traffic.</p> <p>In case the licensee has obtained VSAT authorization/license, the "backhaul-links/connectivity" for mobile access network can be provided through VSAT link(s). For this purpose a direct interconnection with the VSAT Hub through leased line shall be permitted. Use of the existing VSAT hub set up under the commercial VSAT CUG license/authorization is permitted.</p> <p>The licensee shall provide to the Licensor, a monthly statement of VSAT subscribers served with their locations and details of leased line interconnection with the VSAT Hub. The VSAT Hub, however, need not be located in the service area of the Licensee.</p>

2.		<p>Chapter-X Clause 2.2(iii)</p> <p>In case the licensee has obtained VSAT authorization/license, the “backhaul-links/connectivity” for mobile access network can be provided through VSAT link(s). For this purpose a direct interconnection with the VSAT Hub through leased line shall be permitted. Use of the existing VSAT hub set up under the commercial VSAT CUG license/authorization is permitted.</p> <p>The licensee shall provide to the Licensor a monthly statement of VSAT subscribers served with their locations and details of leased line interconnection with the VSAT Hub. The VSAT Hub, however, need not be located in the service area of the Licensee.</p>
3.	<p>Chapter-XIV Clause 2.1(ii)</p> <p>Long distance carriage rights, granted for NLD, ILD and Access service, are not covered under the scope of this service.</p>	<p>Chapter-XIV Clause 2.1(ii)</p> <p>Long distance carriage rights, granted for NLD, ILD and Access service, are not covered under the scope of this service.</p> <p>However, the licensee can provide “backhaul-links/connectivity” for mobile access network through VSAT link(s) to other telecom service providers. For this purpose a direct interconnection with the VSAT Hub through leased line shall be permitted. For this purpose, licensee is permitted to use the existing VSAT hub set up under any of the commercial license/authorization under unified-license.</p> <p>The licensee shall provide to the Licensor a monthly statement of VSAT subscribers served with their locations and details of leased line interconnection with the VSAT Hub.</p>

179/c

No.20-405/2013-AS-I

Government of India
Department of Telecommunications
AS-I Cell

Dated the

To: All UL(VNO) Licensees

Subject: Amendment to Unified License(VNO) for permitting mobile backhaul links via satellite through VSAT.

In exercise of the powers conferred in pursuance of Condition 5 of the Unified License (VNO) Agreement the LICENSOR hereby amends following for permitting mobile backhaul links via satellite through VSAT in the Unified License(VNO) agreement.

S.No.	Existing clause	Amended clause
1.	Chapter VIII Clause 2.2 Licensee may carry intra-circle long distance traffic on its network.	Chapter VIII Clause 2.2 Licensee may carry intra-circle long distance traffic on its network. In case the licensee has obtained VSAT authorization/license, the "backhaul-links/connectivity" for mobile access network can be provided through VSAT link(s). For this purpose a direct interconnection with the VSAT Hub through leased line shall be permitted. Use of the existing VSAT hub set up under the commercial VSAT CUG license/authorization is permitted. The licensee shall provide to the Licensor, a monthly statement of VSAT subscribers served with their locations and details of leased line interconnection with the VSAT Hub. The VSAT Hub, however, need not be located in the service area of the Licensee.

2.		<p>Chapter-X Clause 2.2(iii)</p> <p>In case the licensee has obtained VSAT authorization/license, the “backhaul-links/connectivity” for mobile access network can be provided through VSAT link(s). For this purpose a direct interconnection with the VSAT Hub through leased line shall be permitted. Use of the existing VSAT hub set up under the commercial VSAT CUG license/authorization is permitted.</p> <p>The licensee shall provide to the Licensor a monthly statement of VSAT subscribers served with their locations and details of leased line interconnection with the VSAT Hub. The VSAT Hub, however, need not be located in the service area of the Licensee.</p>
3.	<p>Chapter-XIV Clause 2.1(ii)</p> <p>Long distance carriage rights, granted for NLD, ILD and Access service, are not covered under the scope of this service.</p>	<p>Chapter-XIV Clause 2.1(ii)</p> <p>Long distance carriage rights, granted for NLD, ILD and Access service, are not covered under the scope of this service.</p> <p>However, the licensee can provide “backhaul-links/connectivity” for mobile access network through VSAT link(s) to other telecom service providers. For this purpose a direct interconnection with the VSAT Hub through leased line shall be permitted. For this purpose, licensee is permitted to use the existing VSAT hub set up under any of the commercial license/authorization under unified-license.</p> <p>The licensee shall provide to the Licensor a monthly statement of VSAT subscribers served with their locations and details of leased line interconnection with the VSAT Hub.</p>

LIST OF ACRONYMS

Sl. No.	Acronyms	Description
1.	AGR	Adjusted Gross Revenue
2.	BSC	Base Station Controller
3.	BTS	Base Transceiver Station
4.	Capex	Capital Expenditure
5.	CP	Consultation Paper
6.	CUG	Closed User Group
7.	DoS	Department of Space
8.	DoT	Department of Telecommunications
9.	DSNG	Direct Satellite News Gathering
10.	DSLAM	Digital Subscriber Line Access Multiplexer
11.	DTH	Direct To Home
12.	FBG	Financial Bank Guarantee
13.	GMPCS	Global Mobile Personal Communication by Satellite
14.	GSAT	Geostationary Satellite
15.	GW	Gateway
16.	HTS	High Throughput Satellite
17.	ILD	International Long Distance
18.	INSAT	Indian National Satellite
19.	ISP	Internet Service Provider
20.	ISRO	Indian Space Research Organisation
21.	Kbps	Kilobits Per Second
22.	LEO	Low Earth Orbit
23.	LF	License Fee
24.	LSA	Licensed Service Area
25.	Mbps	Megabits Per Second
26.	MEO	Medium Earth Orbit
27.	NDCP	National Digital Communications Policy
28.	NLD	National Long Distance
29.	NLDOs	National Long-Distance Operators

Sl. No.	Acronyms	Description
30.	NE	Network Element
31.	NOCC	Network Operation Control Center
32.	OFC	Optical Fibre Cable
33.	OHD	Open House Discussion
34.	OPEX	Operational Expenditure
35.	PBG	Performance Bank Guarantee
36.	PMRTS	Public Mobile Radio Trunking Service
37.	RF	Radio Frequency
38.	RNC	Radio Network Controller
39.	RoW	Right of Way
40.	RSU	Remote Switching Units
41.	SACFA	Standing Advisory Committee on Radio Frequency Allocation
42.	SUC	Spectrum Usage Charges
43.	TEC	Telecom Engineering Center
44.	TRAI	Telecom Regulatory Authority of India
45.	TSPs	Telecom Service Providers
46.	UAS	Unified Access Service
47.	UASL	Unified Access Service License
48.	UL	Unified License
49.	UL(VNO)	Unified License (Virtual Network Operator)
50.	USOF	Universal Service Obligation Fund
51.	VHTS	Very High Throughput Satellites
52.	VSAI	VSAT Services Association of India
53.	VSAT	Very Small Aperture Terminal
54.	WOL	Wireless Operating License
55.	WPC	Wireless Planning and Coordination