ANNEXURE 1

# DRAFT

**Ministry of Communications and Information Technology**
**Department of Telecommunications**

**October , 2012**

**Notification**

**Subject:** **Policy for preference to domestically manufactured telecom products in procurement, ~~due to security considerations~~- Notifying Telecom Products ~~due to security consideration~~ in furtherance of the Policy.**

**No. 18-07/2010-IP:** Department of Information Technology (DIT) has issued a Notification No. 8(78)/2010-IPHW dated 10.2.2012 for providing preference to domestically manufactured electronic products in the procurement process ~~due to security considerations~~.

COMMENT: The DIT had brought out a draft notification dated July 2012 under Ref:8(78)/2010-IPHW and thereafter the Industry had submitted a response to it. We still await a final decision to this response. We would request the same to be considered, before finalizing the notification from DOT.

Formatted: Font: (Default) Arial, 11 pt

Formatted: Justified

2.0 The Notification provides that the Ministries/Departments concerned and the agencies deploying such products would notify electronic product/s having security implications. As per clause 2.2.1 of the Notification, telecom products which have security implications and which are procured across various sectors, have to be notified by the Department of Telecommunications (DoT).

COMMENT: The individual Ministry/Department should seek a consultation with the existing domestic Manufacturers, before notifying such a list.

Formatted: Font: (Default) Arial, 11 pt

3.0 With increasing deployment of electronic and telecom devices and Information Technology (IT) applications in various sectors, the critical applications and networks are vulnerable to cyber attacks. As use of telecom & ICT products becomes all pervasive, the ability to use these devices or applications to disrupt normal human life and threaten life and property by an inimical interest has become increasingly common.

3.1 In a connected world, telecommunication is a vital and critical component of the economy. In the context of emerging cyber attacks, the security of the telecommunication infrastructure and network elements such as routers, switches, exchanges, transmission systems and other telecom infrastructure elements, is of paramount importance.

COMMENT: Telecom and Cyber security are of paramount interest for National Security and should be dealt appropriately. However we believe that Manufacturing and Security are independent of each other and should be dealt separately. In a global economy, and in days of global standardization, no one nation is self-dependent, to produce 100% domestic production on its own.

Formatted: Font: (Default) Arial, 11 pt

Formatted: Justified

3.2 Some countries have the means, opportunity, and motive to use their telecom companies for malicious purposes to shutdown or degrade India's critical national security

systems in time of crisis or war. Similar threats being posed by the components and systems imported in India from various countries, cannot be ruled out as the entire supply chain associated with hardware and software, including managed services, can easily be used to insert features or vulnerabilities into any product which could assist espionage and cyber warfare. Moreover, post-production evaluation processes may not necessarily be designed to uncover malicious codes; and the evaluation programmes may only create a false sense of security that an incomplete, flawed, or misapplied evaluation would provide, which may result in unwittingly dropping the guard, simply on the basis of *approval* given to the product by an accredited expert.

COMMENT: We may discuss this para to better understand the working of international supply chains and reword this para.

3.3 Keeping in view these issues, it is essential for India to protect its vital telecom infrastructure from espionage and cyber warfare aimed at it. The trusted security solutions of national importance with total assurance can be built only by using domestic products.

COMMENT: In a global economy, and in days of global standardization, technological advancements, shorter life cycle, no one nation is self-dependent, to produce 100% domestic production on its own. Even 100% domestic manufacturing which in any case is not practical, will not address this requirement.

3.4 All Government licensees and their Managed Service Providers shall, therefore, be required to procure domestically manufactured product to the maximum extent possible due to followings reason:

a) Trusted domestic telecom products have to be deployed in all critical/core segments of all the networks, as all such active network elements have security implications. Such deployments will strengthen the sensitive/vulnerable parts of the network by securing it against interception, eavesdropping, etc.
COMMENT: Please clarify what constitutes "trusted" Is it the Who interprets what is "trusted" and how much is the "trust" level??

~~a)~~

b) Use of such equipments will ensure continuous services at critical times with no major outage.

c) ~~Such equipments must be used for providing telecom services to any government department, establishment needing secured functioning, bank, financial institution, public utility (hospitals, public service centers, railways/ power companies), etc.~~
Comment: This para should be deleted, as all telecom services to these entities will be on telecom network that is already compliant to the UASL and "safe to connect" requirement.

d) Such equipments must also be used for sensitive network elements, like points of interconnection, internet exchanges, international bandwidth connectivity to or out of India, etc.

e) By having a domestic supplier, the service provider will have access to continuous supplies of equipment in case of a war or territorial dispute with a foreign nation who may have capabilities and control to instruct the suppliers from their country to block further equipment supplies, spares or critical support. In such a scenario, the service provider can at least continue to run its network using existing foreign equipment as spares, and restoring or expanding its network using domestic products.

COMMENT: Please provide the list of existing suppliers, proven-ness, existing capacities and capabilities, including percentage of VA and basis of VA. In a global supply chain scenario it is only an exceptional equipment that would have 100% components made in the same country. This para is incongruous as it does not reflect a credible understanding of the supply chain for manufacturing

**Formatted:** Font: (Default) Arial, 11 pt

**Formatted:** Font: (Default) Arial, Font color: Black, Highlight

**Formatted:** Font: (Default) Arial, 11 pt

**Formatted:** Normal, Indent: Left: 0.25", Hanging: 0.25", No bullets or numbering

**Formatted:** Font: (Default) Arial, 11 pt

**Formatted:** Font: 11 pt

**Formatted:** Normal, Indent: Left: 0.25", No bullets or numbering

**Formatted:** Normal, No bullets or numberin

**Formatted:** Font: (Default) Arial, 11 pt

**Formatted:** Justified, Indent: Left: 0.25", Hanging: 0.25", No bullets or numbering

**Formatted:** Font: (Default) Arial, 11 pt

~~e)~~

f) Domestic equipment suppliers can serve as trusted, knowledgeable partner to identify, work-around or eliminate suspected security problems from foreign vendors' ~~equipments~~equipment.

COMMENT: Please clarify.

~~f)~~

4.0 Keeping in view the sensitive nature of the telecom infrastructure, 100% requirement of the active telecom products have to be met from domestic manufacturers. However, with a view to ensure gradual and smooth technology (Please clarify and the intent be specified) transfer, wherever required, for these security sensitive items and manufacturing these telecom products in the country, it is hereby notified that Government licensees (Would appreciate if a response is made out to the representation made on procurement by Government and also wait for its implementation) including Managed Service providers will procure at least a minimum percentage of their telecom products requirement fulfilling minimum value addition prescribed against each item. For all Government Licensees, the list of telecom products, indicating the year-wise preferential market access and criteria to qualify as domestically manufactured product, is given in Table-A (Please provide with a list of existing manufacturers, proven-ness, capabilities and capacities) in the subsequent pages of this notification.

4.1 Preferential Market Access (PMA) and Value Addition (VA) indicated against each year are the minimum prescribed, and efforts must be made by Government Licensees, including Managed Service providers, to achieve higher preferential market access and value addition, every succeeding year. The formula for calculation of value addition for telecom products also shall be as notified (In absence of the VA formula, it is difficult to arrive to a percentage and define a roadmap) by Department of Electronics and Information Technology from ~~time to time~~. All the telecom products which do not meet the minimum value addition criterion for that year, shall be treated as imported telecom products, and shall be dealt accordingly. Mere assembly of telecom products or Electronic Manufacturing Service (EMS) domestically would be considered as a value addition restricted to a maximum of 10% (EMS or a Manufacturer be treated at par). In case of SIM Cards, blank SIM Cards can be imported in the first year and personalization and loading of Operating system in India will be considered as 25% value addition.

4.2 The policy is also applicable to procurement of telecom products as a service from Managed Service Provider (MSP).

4.3 Under license condition, security condition for all Government licenses shall be modified along with penalty provisions on default if any, to reflect their obligations to procure domestically manufactured telecom equipment notified even if managed by MSP.

5.0 It shall be the responsibility of concerned Ministry/ Department to ensure that preference as prescribed for notified telecom products is being provided by all entities.

COMMENT: Please clarify or delete, as it has no relevance here

6.0 Concerned Ministry/ Department may seek the advice of the Department of Telecommunications (DoT) for taking necessary actions.

COMMENT: Please clarify or delete, as it has no relevance

7.0 Based on the availability of domestic products, the list of products, as well as value addition for each product, would be reviewed and notified by the Department of Telecommunications on periodic basis.

**Formatted:** Font: 11 pt
**Formatted:** Normal, Indent: Left: 0.25", No bullets or numbering
**Formatted:** Normal, Indent: Left: 0.5", No bullets or numbering
**Formatted:** Font: (Default) Arial, 11 pt
**Formatted:** Indent: Left: 0.5"
**Formatted:** Font: (Default) Arial, 11 pt
**Formatted:** Font: 11 pt
**Formatted:** Normal, Indent: Left: 0.25", No bullets or numbering
**Formatted:** Comment Text, Left
**Formatted:** Font: 11 pt
**Formatted:** Font: 11 pt
**Formatted:** Comment Text, Left
**Formatted:** Font: 11 pt
**Formatted:** Font: 11 pt
**Formatted:** Font: 11 pt, Highlight
**Formatted:** Font: (Default) Arial, 11 pt
**Formatted:** Font: 11 pt, Highlight

COMMENT: List of suppliers, capabilities, capacities, proven-ness be defined. The periodicity needs to be defined.

Formatted: Font: (Default) Arial, 11 pt

**Table-A We recommend changes in the table as under.**

PMA= Minimum Preferential Market Access to Domestically Manufactured Telecom Products in indicated financial year

VA= Minimum domestic Value Addition to qualify as Domestically Manufactured Telecom Products in indicated financial year

| Sl. No. | Telecom equipment Description | Year 2013-14 | | Subject to Periodic Review based on new industry inputs/developments) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Year 2014-15 | | Year 2015-16 | | Year 2016-17 to 2018-19 | | Year 2019-20 | |
| | | PMA | VA | PMA | VA | PMA | VA | PMA | VA | PMA | VA |
| 1 | Encryption/UTM platforms (TDM and IP) | 100 | 45 | 100 | 50 | 100 | 55 | 100 | 60 | 100 | 65 |
| 2 | SIM Card's Operating System (OS) and Personalisation activities | 100 | 25 | 100 | 30 | 100 | 35 | 100 | 40 | 100 | 45 |
| 3 | Core/Edge/Enterprise routers | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 4 | Managed Leased line Network equipment | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 5 | Ethernet Switches (L2 and L3), Hubs, etc. | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 6 | IP based Soft Switches, Media gateways | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 7 | Wireless/Wireline PABXs | 100 | 45 | 100 | 50 | 100 | 55 | 100 | 60 | 100 | 65 |
| 8 | CPE (including WiFi Access points and Routers, Media Converters), 2G/3G Modems, Leased-line Modems, etc. | 50 | 25 | 60 | 30 | 70 | 35 | 80 | 40 | 100 | 45 |
| 9 | Set-Top Boxes | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 10 | SDH/Carrier-Ethernet/Packet Optical Transport equipments | 50 | 45 | 60 | 50 | 70 | 55 | 80 | 60 | 100 | 65 |
| 11 | DWDM/CWDM systems | 50 | 35 | 60 | 40 | 70 | 45 | 80 | 50 | 100 | 65 |
| 12 | GPON equipments | 50 | 35 | 60 | 40 | 70 | 45 | 80 | 50 | 100 | 65 |
| 13 | Digital Cross-connects/MUXs | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 14 | Small size 2 G/3 G GSM based Base Station Systems | 75 | 35 | 80 | 40 | 90 | 45 | 90 | 50 | 100 | 65 |

Formatted: Left
Formatted: Left
Formatted: Left
Formatted Table
Formatted: Left

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | GSM 2G&3G/4G, CDMA- based wireless Access Systems including BTS, BSC, MSC, Media gateway, media server, GGSN, SGSN, Node B , RNC, E Node B, EPC, HLR, SMSC & other subsystems | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 16 | LTE based broadband wireless access systems (eNodeB, EPC, etc.) | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 17 | Wi-Fi based broadband wireless access systems (Access Point, Aggregation Block, Core Block, etc.) | 50 | 35 | 60 | 40 | 70 | 45 | 80 | 50 | 100 | 65 |
| 18 | Microwave Radio systems (IP/Hybrid) | 50 | 35 | 60 | 40 | 70 | 45 | 80 | 50 | 100 | 65 |
| 19 | Software Defined Radio, Cognitive Radio systems | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 20 | Repeaters (RF/RF-over-Optical), IBS, and Distributed Antenna system | 60 | 35 | 70 | 40 | 80 | 45 | 90 | 50 | 100 | 65 |
| 21 | Satellite based systems - Hubs, VSAT etc. | 30 | 35 | 40 | 40 | 50 | 45 | 60 | 50 | 100 | 65 |
| 22 | Copper access systems (DSL/DSLAM) | 30 | 25 | 40 | 30 | 50 | 35 | 60 | 40 | 100 | 45 |
| 23 | Network Management systems | 50 | 45 | 60 | 50 | 70 | 55 | 80 | 60 | 100 | 65 |
| 24 | Security and surveillance communication systems (video and sensors based) | 50 | 45 | 60 | 50 | 70 | 55 | 80 | 60 | 100 | 65 |

**COMMENT:** List be based on technology category, and restrict the list to the equipment which has volumes. The table is suggested as below.

| Category | Telecom Equipment Design | % MA | % min. VA by 2015 | Remarks |
|---|---|---|---|---|
| 2G (GSM, CDMA) wireless access system | 2G (GSM, CDMA) wireless access system comprising of Base station and associated circuit core/packet core elements & network management system including ancillaries. | 30 | 25 | % Min VA to incorporate substantial transformation formula as: Substantial transformation (%): |

Formatted: Font: 11 pt
Formatted: Comment Text
Formatted: Font: (Default) Arial, 11 pt
Formatted: Font: (Default) Arial, 11 pt
Formatted Table
Formatted: Font: 11 pt
Formatted: Font: (Default) Arial
Formatted: Font: (Default) Arial
Formatted: Font: (Default) Arial

| | | | | |
|---|---|---|---|---|
| 3G (WCDMA) wireless access system | 3G (WCDMA) wireless access system comprising of Base station (NodeB) and associated circuit core/packet core elements & network management system including ancillaries. | 30 | 25 | (Local BOM + Local conversion cost)/Total BOM) X100. In addition the following materials are recommended to be treated as locally sourced/manufactured to enable the proposed value addition : i) any material sourced from local supplier. ii) In case it is done in-house with SMT/soldering process/testing,full value of tested PCB assembly (including the components, irrespective of whether it is locally sourced or imported and cost of overheads) will be taken as locally sourced material. iii) Local value addition calculation to be done for complete order and not for each item of the order. |
| 4G (LTE) | 4G (LTE) wireless access system comprising of Base station (eNodeB) and associated circuit core/packet core elements & network management system including ancillaries. | 30 | 15 | |
| WiMAX | WiMAX wireless access system comprising of Base station and associated core elements & network management system including ancillaries. | 30 | 25 | |
| Others | Wireless PABX/ EPABX, RF repeaters, DAS | 30 | 45 | |
| Enterprise | Enterprise routers, Enterprise switches, Wireline IP PABX/EPABX, including ancillaries | 30 | 25 | |
| Transport | Microwave Radios (IP/Hybrid) DWDM transmission, Cross connects, optical repeaters, SDH/MUX, Carrier ethernet, IP/MPLS routers, Carrier grade switches, Copper Access (DSL, DSLAM), GPON WiFi Access points, Routers, Modems Gateway, set top boxes etc.), Digital cable equipment (CMTS etc including ancillaries | 30 | 25 | |
| SIM cards | All SIM cards personalisation including operating system | 100 | 25 | |
| ??? (Please mention) | Security and surveillance communication system | | | |
| Satellite communication | Satellite based system-voice, broadband, disaster management including ancillaries | 30 | 45 | |
| Encryption platforms | Encryption/UTM platforms (TDM &IP) Please clarify and provide domestic supplier list | | | |

8. Telecom has emerged as a key driver of economic and social development in an increasingly knowledge intensive global scenario, in which India will play a leadership role. The Government has targeted to increase broadband coverage in the country up to 175 million by 2017 and 600 million by 2020. Additional Spectrum of about 500 MHz is proposed

to be made available by 2020. In same way, the mobile subscriber base is targeted to reach 1200 million by 2017. Based on the TRAI report on Manufacturing Policy for Telecom Equipment, the demand of various telecom equipments in India and abroad is estimated as indicated in Table-B below:-

COMMENT: We suggest that the Government should consider setting up a study and based on its recommendations, demand be projected. This should be revised in the light of the recent spectrum auctions and the reserve pricing prescribed by the Govt for a more practical understanding of the investments that are likely to happen. This table is dated and may please be reviewed in consultation with industry through a joint report study.

Formatted: Font: (Default) Arial, 11 pt

Formatted: Font: (Default) Arial, 11 pt

TABLE-B

| Sl No. | Year | Global Total Demand (Rs. millions) | Indian Demand (Rs. millions) | % of Global Demand |
|---|---|---|---|---|
| 1. | 2012-13 | 16382550 | 769400 | 6.2% |
| 2. | 2014-15 | 19108610 | 965140 | 6.6% |
| 3. | 2016-17 | 22288280 | 1210670 | 7.1% |
| 4. | 2019-20 | 28076820 | 1700910 | 7.9% |

The demand of various verticals of telecom equipment in India is estimated and detailed as in TABLE-C, as follows:-

TABLE-C

| **Wireless Equipment Demand (Rs. millions)** | | **2015-16** | **2019-20** |
|---|---|---|---|
| | Wireless Equipment | 264440 | 444380 |
| i) | 2G Wireless | 25320 | - |
| | BTS Antenna | 10130 | - |
| | BSC | 9110 | - |
| | MSC/GMSC/HLR/VLR/EIR | 6080 | - |
| ii) | 3G Wireless | 101280 | 26450 |
| | Node B | 40510 | 10580 |
| | RNC | 36460 | 9520 |
| | GGSN/SGSN | 24310 | 6350 |
| iii) | LTE/Mobile Wi-MAX/5G | 126590 | 238100 |
| | eNode B | 75960 | 142860 |
| | MME/SGW/PDG/SAE | 50640 | 95240 |
| | FAP | 11250 | 27990 |
| iv) | Mobile Handsets | 384020 | 613100 |
| | **Total** | **648460** | **1057380** |

| **Wire-line Equipment** | | **2015-16** | **2019-20** |
|---|---|---|---|
| i) | Switches | | |
| | Local | 1640 | 1480 |
| | Transit | 1840 | 1660 |
| ii) | STP | 990 | 900 |
| iii) | IN Platforms | 500 | 450 |
| | **Total** | **4960** | **4480** |

| **IP & Packet Switching** | | **2015-16** | **2019-20** |
|---|---|---|---|
| i) | Switching | | |
| | LAN Switches | 107520 | 130690 |
| | Ethernet/IP Aggregation | 8060 | 12680 |
| | Carrier Ethernet (Incl. above) | 2020 | 9510 |
| ii) | Routing | | |

| | | | |
|---|---|---|---|
| | Edge IP/MPLS Routing | 19350 | 30440 |
| | Core IP/MPLS Routing | 4840 | 7610 |
| iii) | Packet Voice | 7130 | 20890 |
| | Soft switch | 2850 | 8360 |
| | SGW/MGW | 2140 | 6270 |
| | Session Border Controller | 1070 | 3130 |
| | Media/Voice App Servers | 1070 | 3130 |
| | **Total** | **146890** | **201310** |

| **Broadband Equipment** | | **2015-16** | **2019-20** |
|---|---|---|---|
| i) | FTTX | 38810 | 208700 |
| | ONT/ONU | 15520 | 83480 |
| | OLT | 23280 | 125220 |
| ii) | DLS Broadband | 31040 | 29810 |
| | DSL Modem | 15520 | 14910 |
| | DSLAM | 10870 | 7450 |
| | MSAN | 4660 | 7450 |
| iii) | CMTS | 7760 | 59630 |
| | **Total** | **77610** | **298150** |

| **Backhaul and Transmission** | | **2015-16** | **2019-20** |
|---|---|---|---|
| 1. | Fibre/Optical | | |
| | Optical | 58110 | 79220 |
| | SDH | 31880 | 35880 |
| | DWDM | 19730 | 34880 |
| | POTP(Incl. within SDH,DWDM/DXC | 27460 | 66770 |
| | DXC | 3300 | 3430 |
| | Submarine Systems | 3200 | 5030 |
| 2. | Microwave Backhaul | 27240 | 39890 |
| | PDH/SDH/Microwave | 1360 | 800 |
| | Ethernet Microwave | 25880 | 39090 |
| | **Total** | **78380** | **109600** |

9. The procuring agencies shall follow their own laid down procurement procedures, subject to meeting the requirement related to specified percentage of procurement being made from domestically manufactured telecom products as per this policy.

(i) aggregation of annual requirements and such other procurement practices, which facilitate the implementation of this policy, may be adopted by procuring agencies.

(ii) adherence to the policy for the procurement of telecom products those are sensitive due to security angle.

COMMENT: Please elaborate and define in an objective manner

(iii) wherever the domestically manufactured telecom products are procured under this policy by a Government Ministry or Department or an agency thereof, such procurement may be subject to matching of L1 price and on satisfying technical specifications laid down for the respective items.

(iv) In case the domestic manufacturer is not lowest bidder (L1), at least the specified part of the order would be awarded to the lowest technically qualified

Formatted: Font: 11 pt, Highlight

Formatted: Font: 11 pt

Formatted: Font: (Default) Arial, 11 pt

Formatted: Font: 11 pt, Highlight

domestic manufacturer, if such bidder is available, subject to matching with L1 price. The remaining part may be awarded to L1 bidder.

(v) It is not necessary that every lot for procurement of telecom products is split between domestic and non-domestic manufacturers. If a procurement lot/project cannot be split, either because the unit of procurement is small or because of technical reasons, or because no domestic manufacturer is available for the product, the procuring agency may ensure that the annual requirement of procuring the specified extent of telecom products from domestically manufactured products is achieved through suitable enhancements in other procurement lots/projects.

(vi) The procurement conditions must ensure that domestic manufacturers of telecom products are encouraged to participate, and they are not subjected to restrictive products specifications or mandatory requirements of prior experience, etc. However, procuring Department or Agency may incorporate such stipulations as may be considered necessary to satisfy themselves of the security, production capability and product quality of the manufacturer. The procuring agency may also rationally identify and evaluate predatory pricing by any bidder.

COMMENT: Not applicable for Government Licensees like Private Operators excluding PSUs. This should be thus only applicable to PSUs. In case no domestic manufacturer is available for the product, or manufacturer is not able to satisfy on Security, Production capability and product quality, procurement agencies should be exempted from overall percentage market access. The domestic manufacturer must comply with the quality, standards and price points for procurement.

**Formatted:** Font: 11 pt

**Formatted:** Indent: Left: 0.69"

**Formatted:** Font: (Default) Arial, 11 pt

**Formatted:** Font: (Default) Arial, 11 pt

8. In case of a question whether an item being procured is a telecom product to be covered under the policy, the matter would be referred to the Telecommunications Engineering Centre (TEC), Department of Telecommunications for clarification.

9. The guidelines as notified by the Department of Electronics and Information Technology shall be followed for this purpose. In case of any doubt in respect of Telecom Products, reference shall be made to Telecommunications Engineering Centre (TEC), Department of Telecommunications or technical auditor as accredited by the Telecommunication Engineering Centre, Department of Telecommunications for the purpose.

11. The policy shall come into force from 01.04.2013 and shall be valid for 10 years thereafter.

12. The expressions or abbreviations used in this Notification have been detailed in the list below for easy understanding.

**List of Acronyms used in the notification**

| Sl No. | Acronyms | Expansion |
|---|---|---|
| 1. | 2G | Second Generation |
| 2. | 3G | Third Generation |
| 3. | 4G | Fourth Generation |
| 4. | 5G | Fifth Generation |
| 5. | ADSL | Asymmetrical Digital Subscriber Line |
| 6. | ATMP | Assembly, Testing, Packaging And Marking |
| 7. | BOM | Bill Of Material |
| 8. | BSC | Base Station Controller |

| | | |
|---|---|---|
| 9. | BSS | Base Station Subsystem |
| 10. | BTS | Base Transceiver Station |
| 11. | BWA | Broadband Wireless Access |
| 12. | CDMA | Code Division Multiple Access |
| 13. | CN | Core Network |
| 14. | CPE | Customer Premises Equipment |
| 15. | CWDM | Course Wavelength Division Multiplexing |
| 16. | DAS | Distributed Antenna System |
| 17. | DeitY | Department of Electronics and Information Technology |
| 18. | DSL | Digital Subscriber Line |
| 19. | DSLAM | Digital Subscriber Line Access Multiplexer |
| 20. | DWDM | Dense Wave Division Multiplexing |
| 21. | DXC | Digital Cross Connect |
| 22. | EIR | Equipment Identity Register |
| 23. | EMS | Electronic Manufacturing Services |
| 24. | EPABX | Electronic Private Automatic Branch Exchange |
| 25. | FTTH | Fiber to the Home |
| 26. | GGSN | Gateway GPRS Support Node |
| 27. | GMSC | Gateway Mobile Switching Centre |
| 28. | GPON | Gigabit Passive Optical Network |
| 29. | GPRS | General Packet Radio Service |
| 30. | GSM | Global Standard For Mobile |
| 31. | HLR | Home Location Register |
| 32. | HSPA | High Speed Packet Access |
| 33. | IMS | IP Multimedia Subsystem |
| 34. | IP | Internet Protocol |
| 35. | LAN | Local Area Network |
| 36. | LTE | Long Term Evolution |
| 37. | MGW | Media Gateway |
| 38. | MME | Mobility Management Entity |
| 39. | MPLS | Multi-Protocol Label Switching |
| 40. | MPLS-TP | MPLS Transport Profile |
| 41. | MSAN | Multi-Service Access Node |
| 42. | MSC | Mobile Switching Centre |
| 43. | MUX | Multiplexer |
| 44. | NGN | Next Generation Network |
| 45. | NG-PON | Next Generation Passive Optical Network |
| 46. | OAN | Optical Access Network |
| 47. | ODF | Optical-fiber Distribution Frame |
| 48. | OLT | Optical Line Terminal |
| 49. | ONT | Optical Network Termination |
| 50. | ONU | Optical Network Unit |
| 51. | OTN | Optical Transport Network |
| 52. | PABX | Private Auto Branch Exchange |
| 53. | PDH | Plesiochronous Digital Hierarchy |
| 54. | PON | Passive Optical Network |
| 55. | POTP | Packet Optical Transmission Platform |
| 56. | RAN | Radio Access Network |
| 57. | RLC | Radio Link Control |
| 58. | RNC | Radio Network Controller |
| 59. | ROADM | Reconfigurable Optical Add-Drop Multiplexer |
| 60. | SDH | Synchronous Digital Hierarchy |
| 61. | SONET | Synchronous Optical Networking |
| 62. | STM | Synchronous Transport Modules |
| 63. | STP | Signal Transfer Point |

| | | |
|---|---|---|
| 64. | TDM | Time Division Multiplexing |
| 65. | USOF | Universal Service Obligation Fund |
| 66. | VDSL | Very High Data Rate Digital Subscriber Line |
| 67. | VLR | Virtual Location Register |
| 68. | VSAT | Very Small Aperture Terminal |
| 69. | WCDMA | Wideband Code Division Multiple Access |
| 70. | WDM | Wavelength Division Multiplexing |
| 71. | Wi-Fi | Wireless Fidelity |
| 72. | Wi-Fi AP | Wireless Access Point |
| 73. | WiMAX | Worldwide Interoperability For Microwave |

**[F. No. 18-07/2010-IP]**

**Authorized Signatory**