

Minimum Requirement of the CPE devices(Home based Router and ONT/ONU)

A. Roles and Responsibilities of Internet Service Providers

1. ISP shall provide the CPE with at least specification as stated in table A.1 & A.2 given below.
2. ISP shall only use the NTA type approved Radio Telecommunication CPE devices (e.g ONU/ONT).
3. ISP shall provide CPE maintenance support within a day.
4. ISP shall train/aware their customers on the usage and capabilities of the equipment via different means and method.
5. ISP shall adopt the standard placement strategy while installing the CPE devices in the customers' premises.
6. ISP shall use NMS/ ACS server to properly monitor and troubleshoot the customer issues remotely.
7. ISP shall provide at least one year of warranty on radio CPE devices supplied by them to the customer.
8. CPE device provided by ISP must be interoperable i.e CPE devices provided by one ISPs must be reusable for other ISPs too. The ISP shall unlock the CPE device if the consumer wants to switch the service provider in case of device purchased by the consumer.
9. ISP shall recommend consumer to use repeaters or extenders to boost the wireless range in the Customer premises if required.
10. ISP shall make Wi-fi mesh features compulsory if consumer uses multiple CPEs for same network.
11. ISPs are strictly prohibited to use/reuse the refurbished CPE devices.
12. ISP shall regularly check and maintain the health status of CPE devices (BER, Mode, Signal Levels, SNR, Frequency band, Channel etc.) supplied by them.
13. CPE devices after EOL (End of life) are strictly prohibited to use. The service provider shall manage to keep the CPEs supplied from them well to make it functional during its life time and after its life time.
14. The ISPs shall keep the record of CPEs being imported and/or used in their network including the name, date of import, type, quantity, technology, manufacturer's name , date of manufacture, quality standard, location of installed site and date of installation .The same record shall be reported to NTA as per requirement.

B. CPE Installation guidelines for Internet Service providers

1. Do proper survey and recommend the appropriate position of the router for optimum performance.
2. Place CPE in the centre of the house or location for optimum wireless coverage as applicable.
3. Keep CPEs far from appliances that radiate wireless signals such as microwave ovens, television (typical), radio transistors, secondary routers etc.
4. If routers have two or more antennas, try positioning them perpendicular to another.

5. Place routers away from thick walls, floors, fish tank, water tanks, mirrors and other reflecting surfaces that can block/reflect the signals and cause signal loss/interference.
6. Avoid placing CPEs directly under stairways or closed cabinets.

C. Roles of Consumers

1. Co-operate with ISP technician while installing CPE devices. Place the CPEs as recommended by the technician.
2. Place the secondary router, if required for complete coverage.
3. Take care of the CPE device and protect it from being damaged due to different household circumstances.
4. Be aware on preliminary potential problems related to the CPE and be prepare to rectify the preliminary problems issues in close coordination with the associated service providers.
5. The consumers need to arrange/use only the CPE device (Home based Router) as per the minimum requirement as set out by the Authority.

A.1 Minimum Requirements for Home based Router (CPE)

SN	Description	Specification	Remarks
	WLAN Standards	802.11b/g/n/ac	
	LAN ports	At least 1 Gigabit Ethernet ports and 1 fiber SFP port	
	Frequency supports	2.4GHz/5GHz	ISM Band
	Radiated Power	Max transmit power: 1W(30dBm), Max EIRP: 4W(36dBm) in 2.4 GHz/5.8 GHz Band	
	Data rate	At least 150 Mbps for 2.4GHz & maximum 650 Mbps for 5GHz	
	Antenna	At least two fixed Omni-directional internal or external antenna with gain of at least 3 dBi/5 dBi	
	Min. Coverage	100m (LOS) & 30 m(NLOS)	
	Mode	AP, Bridge	
	SSID	BSSID support, at least 2 SSID supports,	Wifi network

		hidden SSID support	name
	Smart QoS Support	Easily configurable, user definable rule based on IP/MAC/Port filtering, WMM, WPS	
	Security	WPA , WPA2/3 /OWE , secure authentication	
	Hardware	At least 0.6GHz dual core CPU, >=256MB DDR3 Memory,	
	Power	PoE(optional)	
	Protocol support	IPv6, ICMP, SNMP, CWMP, NAT, DHCP, VPN, VLAN	
	Client access	Client Apps for status and performance monitoring (MRTG graphing) by service provider	
	Preferable other technology support	SDN/OpenFlow, ADSL/ADSL+	
	Additional feature	DFS,TPC support	

A.2 Minimum Requirements for Optical Network Terminal (ONT/ONU)

SN	Description	Specification	Remarks
	WLAN Standards	IEEE 802.11b/g/n	
	LAN ports	At least 1 Gigabit Ethernet ports and 1 fiber SFP port	
	Frequency supports	2.4GHz/5GHz ,	ISM Band
	Radiated Power	Max transmit power:1W(30dBm), Max EIRP: 4W(36dBm) in 2.4 GHz/5.8 GHz Band	
	Data rate	At least 80 Mbps for 2.4GHz & 650Mbps for 5GHz	
	Antenna	At least two fixed Omni-directional internal or external antenna with gain of at least 3	

		dBi/5dBi	
	Coverage	20 – 100 meter	
	Mode	Route and Bridge	
	SSID	BSSID support, at least 2 SSID supports, hidden SSID support	
	Smart QoS Support	Easily configurable, user definable rule based on IP/MAC/Port filtering, WMM, WPS	
	Security	WPA , WPA2/3 /OWE , secure authentication	
	Hardware	At least 0.6GHz dual core CPU, >=256MB DDR3 Memory	
	Power	PoE(optional)	
	Protocol support	IPv6, ICMP, SNMP, CWMP, NAT, DHCP, VPN, VLAN, IPTV	
	Client access	Client Apps for status and performance monitoring (MRTG graphing) by service provider	
	Preferable other technology support	SDN/OpenFlow/Software defined WAN	
	Additional feature	DFS,TPC support	

Acronym

CPE- Customer Premises Equipment

AP-Access Point

LTE-Long Term Evolution

WiMax- Worldwide Interoperability for Microwave Access

ONT-Optical Network Terminal

ONU- Optical Network Unit

FTTH-Fiber To The Home

FTTx- Fiber To The x

EVDO- Evolution Data Optimized

EIRP- Effective Isotropic Radiated Power

SSID- Service Set Identifier

BSSID- Basic Service Set Identifier

NMS- Network Management System

ACS- Automatic Configuration *Server*

DFS- Dynamic Frequency Selection

LOS-Line of Sight

NLOS-Non Line of Sight

WMM- Wireless Multimedia Extensions

WPS- Wi-Fi Protected Setup

WPA- Wi-Fi Protected Access

PoE-Power over Ethernet

OWE- Opportunistic Wireless Encryption

DDR3- Double Data Rate 3

TPC-Transmit Power Control

IPv6- Internet Protocol Version 6

ICMP- Internet Control Message Protocol

SNMP- Simple Network Management Protocol

CWMP- CPE WAN Management Protocol

NAT- Network Address Translation

DHCP- Dynamic Host Configuration Protocol

VPN- Virtual Private Network

VLAN -Virtual LAN

IPTV- Internet Protocol Television

MRTG- Multi Router Traffic Grapher

SDN – Software Defined Networking

ADSL- Asymmetric Digital Subscriber Line