

«APPROVED BY»

General Director

«GNC-ALFA» CJSC

_____ H.Faramazyan

«26» November 2014 r.

REQUEST FOR PROPOSAL

For supply of ONU terminals for GPON network

<i>Position</i>	<i>Signature</i>	<i>Date</i>	<i>Name</i>
Prepared by:			
Agreed:			
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I. GENERAL REQUIREMENTS

1. Introduction

- 1.1. GNC-ALFA CJSC, founded in 2007, is a licensed network services operator in Armenia. GNC ALFA network is based on Fiber-Optic Cable (FOC) infrastructure. It covers all the regions of Armenia and has international access through 4 border-crossing points. Currently GNC ALFA is the leader in the Armenian market of international and domestic long distance transmission, data and Internet services. As of November 2014, the market share of the Company in IP transit service equals to 60%. IP/MPLS network services are currently available in 42 cities of Armenia. The company's customer base includes international telecommunication operators, Armenian mobile operators and all major Internet providers, as well as major corporate clients and state authorities. Company's services portfolio includes IP transit, IP VPN, International Private Leased Circuits (IPLC) Broadband, Dark fiber, Transit via Armenia and Collocation. The Company's network is based on modern technologies with usage of equipment provided by leading manufacturers worldwide (Tyco Electronics, Cisco Systems, Juniper Networks, Alcatel-Lucent etc.). The length of the FOC exceeds 2500 km. GNC ALFA network is redundant in most areas of the country. Starting from 2013, GNC ALFA is providing Triple Play services to the mass segment customers. Access network based on FTTH technology, powered by GPON (ITU-T G.984 specifications family) introduced in 22 largest cities of Armenia, currently used for internet access, IPTV and VoIP service provision. The investment plan and the relevant works for the extension of number of customers by offering Triple Play services to the retail market is part of business activity and top priority for the company for ongoing 7 years (up to Y2021).
- 1.2. With this RFP the company intends to receive Offers for the delivery of ONU devices for GPON access network technology, in accordance with General Specification, Technical Specification and Supply Schedule Requirements. ONU devices will be used for providing broadband multimedia services (i.e. "triple-play" services of voice, data and video) to residential, SOHO and corporate users. The aim of this document is to determine requirements and quantities for supplying equipment. By the term GPON we refer to the technology described in ITU-T G.984 specifications family.
- 1.3. Currently GNC Alfa GPON network is powered by ZyXELL/Fiberhome OLT and supported by ANM2000 Network Management System (NMS) (version 6.0.0.110420). Offered solution must be compliant and fully operable with the OLT and NMS and Vendor must ensure and demonstrate interoperability and compatibility of offered Products with and together with the mentioned systems.
- 1.4. GNC Alfa will accept as an Alternative Solution supply of ONU/ONT devices, those are not fully compatible and integrated with ANM2000 Network Management System in case of Vendor will provide full TR069 solution for remote configuration, monitoring and management purposes. Vendor must provide TR069 solution, both its hardware and software elements with support of 40000 (forty thousand) available ONU devices, currently used for service provision to the customers, as well as for all supplied devices under the scope of this RFP. Cumulative performance of TR069 solution supplied must be not less than for 150000 (One Hundred and Fifty Thousand) customer premises devices. Vendor must ensure integration of TR069

solution with GNC Alfa operated OSS/BSS systems (billing; provisioning; inventory; monitoring).

- 1.5. The period for Offers obtaining is set from 1st December 2014 – 5th December 2014 each working day during 10:00-18:00. Tender Offers shall be submitted by the Suppliers or their representatives; or can be delivered by electronic mail to the following address (procurement@rtarmenia.am) archived with password protection; or can be sent by Post or Courier at the GNC ALFA, Procurement Department to the address: 1, Khaghagutyan Street, Room No. 204, 2nd floor, Abovyan, 2201 Republic of Armenia on or before 5th December 2014 12:00 o'clock, which are the Closing Date and Hour of the Tender. Offers submitted after the Closing Date and Hour shall neither be accepted nor taken into consideration, no matter if the Supplier has mailed it before the Closing Date. The offers will be opened, in the presence of the Suppliers representatives willing to participate at the following address: 1, Khaghagutyan Street, Room No. xx, 2nd floor, Abovyan, 2201 Republic of Armenia, on 8th December 2014 11:00 o'clock. The tender offers summarizing meeting will take place on the 9th December 2014 o'clock by the same address.

2. Offer required documents and packaging.

- 2.1 The Formal Tender Offer and all the accompanying documents shall be enclosed in a sealed and closed envelope (seal should be put on agglutinated parts of envelope), marked on the top left-hand corner with the words:

- Tender No. GNC-PON-ONU
- For supply of ONU terminals for GPON network
- Deadline: 5th December 2014

In the lower right hand corner the Bidder company name, address, phone and fax numbers, as well as the contact person's name and surname should be indicated.

The Formal Tender Offer could be also provided in electronic form to procurement@rtarmenia.am email address. Both Economical Offer and Technical Offer must be archived (zip or rar) separately with password protection.

- 2.2 The Formal Tender Offer shall consist of two parts, i.e Economical and Technical offers, packed in two separate sealed and closed envelopes:

2.2.1 **ECONOMICAL OFFER** shall include:

- a. Company's Profile:
 - Exact location and infrastructure
 - Copy of Company Registration document with notary ratification (the document issued by the competent bodies of the relevant country)
 - List of References (referring to clause 12)
 - Ratified copy of the relevant Export License
 - Any other documents/licenses related to this Tender
- b. Letter of Authorization (for the representatives of companies)

- c. Price Schedule (break-down per type of cost in USD, according to clause 8.1) & Delivery Terms (according to clause 8.2)
- d. Payment Terms (according to clause 9)
- e. Supply Schedule
- f. Tables of Compliance with General Requirements.

2.2.2 TECHNICAL OFFER shall include:

- a. Full technical documentation related to the Products offered (in digital format/hard copy)
- b. Technical Support
- c. Tables of Compliance with Technical Specifications, Implementation /Services Requirements.
- d. List of hardware and software components

3. Offer Validity

- 3.1** Tender Offers shall be valid for at least 90 calendar days from the specified Deadline for the submission of Tender Offers. Tender Offers valid for a shorter period shall not be taken into consideration. In exceptional circumstances, GNC may request the Suppliers for an extension of the validity period. The request and the response thereto shall be made in writing by a letter, telefax or e-mail.

4. Offer Presentation & Language

- 4.1. The original and all copies of the Offer shall be printed and shall be signed by the Supplier or a person/persons duly authorized by him to bind the Supplier to the Contract.
- 4.2. All correspondence in connection with Tender Offers and all materials concerning the Tender Offers shall be written in English or Russian languages and shall be submitted in three (3) copies: in one envelope or package, each complete copy constituting an integral part of the Tender Offer. One of three will be labeled as 'ORIGINAL' and the other two as 'COPY'.

5 Compliance Tables and other supporting documents

- 5.1 Supplier shall present three Compliance tables:
 - a. "Compliance to General Requirements", and
 - b. "Compliance to Technical Specifications",
 - c. "Compliance to "Supply Schedule/Services Requirements"
- 5.2 Suppliers shall complete the Compliance tables using only the terms 'COMPLIED' or 'NOT COMPLIED'. Other terms, such as 'acknowledged', 'noted', 'complies except for ...' or 'partially compliant', shall not be used.
- 5.3 Suppliers shall provide explanations and details of any counter-proposals where the words 'NOT COMPLIED' appear in the Compliance tables. Bidders shall also submit detailed supporting literature proving compliance of the offered Goods & Services with the requirements of the Goods & Services described in the present document. The above information shall be regarded as essential during the evaluation of the Offer.
- 5.4 Suppliers failing to submit the both Compliance tables or any other document specified by the RFP chapter shall be disqualified.

5.5 If a Supplier has any doubt as to the meaning of any clause of the present document he shall, when submitting the Offer, set out in the confidential letter the comments on that clause.

6 Information on offer preparation

GNC ALFA shall not be responsible for the payment of any expenses or loss, which may be incurred by any Bidder during the preparation and submission of the offer.

7 Agency

Offers submitted under agency agreement shall specify the name and country of principal and shall carry a declaration of authority to submit such Offer, showing whether it authorizes to conclude a contract with principal or agency.

8 Price schedule & delivery terms

8.1 All prices of Offers shall be quoted in USD
Offers submitted in any other currency shall not be taken into consideration.

The Supplier is obliged, in his offer, to deposit the corresponding Material Analytical Lists in which, for each type of material and service, the corresponding price of unit will be reported. **Offers that will not include unit prices per material and service will not be evaluated and they will be rejected.**

In the case that set of connectors and/or cables is offered, there must be also attached separate List with detailed analysis with unit prices per element (connector, cord, jumper etc.).

The Supplier is obliged to offer separate price for:

- Basic product (per model if offered range)
- Spare parts (spare units)
- Customization (branding, packaging)
- The work of integrating products in the existing Network Management System and Provisioning Systems, analytically. If integration requires specific hardware and/or software elements the following should be specified as follows:
 - Hardware Price.
 - Software Price.
 - Integration Price (per each integrated Third Party Solution)
- The Technical Support

Suppliers proposing specific discounts on the offered prices shall include details of the discount in the Offer, clearly explaining to which prices they are applicable. Cost of the Goods & Services offered by Bidders shall include the delivery cost specified in sub-clause 8.2.

8.2 Cost for the Goods & Services by nonresident companies shall be quoted CIP Yerevan, (INCOTERMS 2010), but shall exclude any import taxes and VAT. For resident companies offer

should be quoted DDP Yerevan (INCOTERMS 2010), where taxes and VAT are shown separately.

9 Payment terms

Suppliers must propose in their Offer the best possible Terms for Payment in favor of GNC ALFA. Suppliers submitting a payment proposal without advance payment will be given a preferential treatment. Suppliers, proposing an Advance Payment less than 15% will have a competitive advantage. Supplier that will propose VENDOR's financing scheme will have competitive advantage to the other bidders that will not propose it (example of VENDOR's financing: 15% advance payment, 6 months grace period, 24 months repayment with interest 5% per annum). The proposed financing scheme shall start from the date of Acceptance.

GNC ALFA is not accepting offers requesting Bank or other Guarantee against VENDOR's financing proposals.

10 Performance Security

- 10.1 For the good and timely execution of the undertaken obligation, the Nominated Supplier shall submit within fifteen (15) days from the signature of the Contract a Performance Bond from reputable international Bank acceptable to Customer for the amount of 10% of the total cost of supplied Products, calculated to each Phase separately.
- 10.2 With this Performance Bond, the issuing Bank will guarantee to Customer, in favor of Supplier, unreservedly and as self debtor, without having the right of any objections and up to the amount stated to the Letter of Guarantee, that Supplier, will fulfill its obligations in accordance with the terms of the present Contract.
- 10.3 The above Letter of Performance Bond will expire and be returned to the Supplier within thirty (30) days after the expiration of 24 month period following the issuance date of Acceptance Certificate of the Equipment's and Services provided as per each Phase, subject that there are no pending claims against the Supplier arising from this Contract.
- 10.4 The Letter of Guarantee will be forfeited in whole or in part in favor of Customer in case of breach by Supplier, of any of his obligations arising from this Contract, and in particular:
 - 10.4.1 If Supplier delivered Equipment, not having the agreed upon features, or having real hidden or apparent defects invalidating or reducing the value, the usefulness or the efficiency of the material in breach of the guarantee of good operation, even if such defects are shown after the installation of the material and has not replaced the defective material as per the terms of this Contract;
 - 10.4.2 In case of delayed deliveries;
 - 10.4.3 non provision and/or improper provision of the Services by the Supplier
 - 10.4.4 if a Products fails to achieve Acceptance including any repeated Acceptance Test within 2 months of the initial RFA,
 - 10.4.5 If Customer declares the Contract and the Supplier forfeited, due to violation from the latter of any essential clause of this contract.
- 10.5 If, due to any reason, it will be impossible to issue Performance Bond in a form, stipulated by 10.1 and 10.2 or GNC Alfa will not accept issued Performance Bond to protect GNC Alfa from all known issues, included, but not limited with those, stipulated by 10.4 GNC Alfa will accept Performance Security in a form of 10% of amount for each and any Phase supply, which should be covered within 30 days from Acceptance.

11 Taxes

For the successful Supplier, all import taxes and VAT on imports shall be paid by GNC ALFA, but all other taxes, levies and fees whatsoever applicable in future, due pursuant to the Contract that may be concluded under the present Tender and arising there from, shall be paid by the Contractor.

Any such charges, if included in the prices of the Offer, should be separately disclosed.

According to the Legislation of the Republic of Armenia the equipment to be imported within the frame of the contract concluded with the CONTRACTOR of the given Tender, shall be obligatory certified (Certificate of Conformity) by the relevant Certification Body of Republic of Armenia. Supplier must bear all expenses related to obtaining the Certificate of Conformity.

12 Origin of the Goods & Services

The country of manufacture and origin of the Goods & Services offered, production year as well as the manufacturer's name and address, shall be indicated in the Offer.

13 List of references

Suppliers shall list in their Offers the countries and enterprises to which they have supplied the same type of Goods & Services, they are now offering.

Supplier must deliver references from other clients in which data, regarding elements attributive to the volume of supply within multivendor approach had been confirmed. Supplier must provide as well contact persons with whom GNC ALFA can come in touch for further information.

Suppliers should note that all references relating to the supplied Goods & Services will be essential to the Tender evaluation process.

14 Samples for test purposes

Vendors must provide samples for testing purposes. Samples should be provided together with the submitted offer and be free of charge for GNC Alfa. At least 4 (four) sample units per each proposed type of ONU should be provided on unrecoverable bases [M]

15 Evaluation of Tender Offers

The evaluation of the Offers shall be implemented pursuant to the following sequencing phases.

Phase I: General Evaluation

The correspondence of all offers to all mandatory requirements of the RFP will be verified. The Offers which do not comply with any mandatory requirement should be rejected at this stage and will not be subject to further evaluation.

Phase II: Technical Evaluation

Those offers, which comply with the mandatory requirements, will pass to the Technical evaluation, i.e. qualitative and technical correspondence of the offered Goods & Services to the Technical Specifications defined in the Call for Bids will be verified. As a part of Technical evaluation, GNC Alfa will proceed with testing of offered products and solutions with the existing GPON infrastructure and/or Network Management System as well as will related components of OSS/BSS and Provisioning Systems (depending on offered solution).

The offers, which will be found technically unacceptable, will be disqualified at this phase and will not pass to further evaluation.

Phase III: Financial Evaluation

The offers which passed the above two phases of evaluation will be subject to the financial evaluation according to the quoted sum and to the offered Terms of Payment, applying NPV (Net Present Value) calculation methodology.

Phase IV: Evaluation summarizing

Summarization meeting of the Tender Committee will be held in order to draw up the Minutes of the committee regarding the results of the Tender. With the purpose of summarizing the results and acknowledging the CONTRACTOR of the Tender the Meeting of the Tender Committee will take place publicly, in the presence of the Bidders' representatives willing to be present, at the premises of GNC ALFA Cat the following address: 1, Khaghaghutyan Street, conference hall, 2nd floor, Abovyan, 2012 Republic of Armenia, on 15th December 2014.

Tender Committee makes decisions according to the majority of votes.

16 Offer acceptance and tender award

All offers will be evaluated by the Tender committee according to the phases mentioned in the previous point. The relevant Protocol between the Best Supplier and GNC ALFA will be signed on tender results resumption and Tender award day.

GNC ALFA reserves the right to cancel the Tender, partially or totally.

GNC ALFA will not have any liability to inform the Suppliers concerning the grounds and reasons of its actions. GNC ALFA assumes no liability for expenses incurred to the Supplier for the offer preparation and participation in the tender, in any such case.

17 Variations in types and quantities

Before signing the Contract, the successful Bidder is expected to accept reasonable changes in types and quantities of the Goods & Services to be provided. The effect of these variations on the total amount of the Contract shall be calculated in accordance with the Unit Prices indicated in the Offer or by mutual agreement for those Goods & Services, which prices were not previously specified.

18 Option to reduce/increase the procurement

GNC ALFA reserves the right to reduce the value of the Contract and/or volume of supply in total or for any of purchased items up to 20 % of the total contract price under the same commercial terms

GNC ALFA reserves the right to expand the value of the Contract up to 20 % of the total contract price. Bidder must confirm additional purchase volume discount applicable in case of such volume/contract price extension [M].

Although the Bidder assumes the supply of quantities as indicated in the Supply Requirements, GNC ALFA shall not be bound to place orders for each of the quantities. For additional quantities current orders shall be placed from time to time in accordance with the needs of GNC ALFA.

19 Option complete or partial procurement

Bidder may prepare and submit an offer for all items and parts, stipulated by Chapter II of present RFP. In case of submission of an offer, covering limited number of items only Bidder should present unconditionally list of compliance with those Third Party vendors and/or products/solutions with whom Bidder may confirm its interoperability, based on evaluated test results (IOT) [M].

GNC ALFA reserves the right to proceed with procurement of selected number of items from complete Bidder's proposal. If IOT list, provided by Bidder, is not covering scope GNC ALFA may require from Bidder to evaluate IOT with selected vendor/product. Bidder, while submission an offer, should confirm duration and cost for IOT testing as an option for presented offer. [M]

20 Clarification of Offers

To assist in the examination, evaluation and comparison of the Offers, GNC ALFA may, at its discretion, ask the Bidder for clarification of the Offer. The request for clarification and the

response shall be in writing and no change in the price or substance of the Offer shall be sought, offered or permitted.

21 Contact on technical information

Any further technical information may be obtained in writing from Mr. Aram Avetisyan (CTO) (e-mail: a.avetisyan@rtarmenia.am).

II. TECHNICAL SPECIFICATION

The specification covers the requirements of the following equipment and elements:

- GPON ONT/ONU (Optical Network Termination/Optical Network Unit)

1. General

The requirements for system characteristics are the following:

[M] Mandatory requirements.

[G] Characteristic to be graded.

[D] The Supplier must provide a description.

[M]&[D] Mandatory requirement for which Supplier must provide a description of the requested characteristic.

[O] Optional requirements.

- 1.1 The Supplier shall describe where the product is fully compliant to the below specification or it is a partially compliant, describe the limitations. Also if the Supplier's equipment has features not listed here but the Supplier feels that they will be valuable to the total network solution, the supplier should mention that in the appropriate category.
- 1.2 The Supplier shall include a full roadmap of the product indicating which features are finalized and which features are still under discussion [M].
- 1.3 For new software releases, additional feature and functionalities must be mentioned. Also for new releases, any additional hardware upgrade requirement must be indicated. Software upgrades will be assumed to be Free of Cost otherwise stated clearly [M].
- 1.4 The version of hardware and software of the equipment should be provided and must be commercially available at least three months before submitting the offer [M].
- 1.5 The proposed equipment must use a highly flexible, modular, scalable, and non-blocking platform at all level/part of the design without any restriction [M&D].
- 1.6 The Supplier shall submit the detail of chipset type, manufacturer, and version of the proposed equipment including ONT [D].

2. Complied Standards.

- 2.1 The GPON solutions offered must comply, but not limited to the following International Standards [M].

a. ITU-T standards

G.984.1 –GPON General Characteristics

G.984.2 –GPON Physical Media Dependent layer specification

G.984.3 –GPON Transmission convergence layer specifications

G.984.4 –GPON ONT management and control interface specifications

G.983.4 –A broadband optical access system with increased service capability using dynamic bandwidth assignment.

b. IEEE 802 standards

IEEE 802.1ad Provider Bridges

IEEE 802.1D/ IEEE802.w STP/RSTP

IEEE 802.1p VLAN prioritization

IEEE 802.1ad Provider Bridges

IEEE 802.1Q VLAN tagging

IEEE 802.3u 100Mbps Fast Ethernet

IEEE 802.3ad Ethernet Link Aggregation

IEEE 802.3z Gigabit Ethernet

IEEE 802.3ae 10 Gigabit Ethernet

IEEE 802.3ag Ethernet OAM

c. IETF standards:

IETF RFC 2131 DHCP

IETF RFC 2236 IGMP, V2

IETF RFC 3376 IGMP, V3

IETF RFC 3046 DHCP Relay Agent Info Option (Option 82)

IETF RFC 2132 DHCP Options and BOOTP bidder Extensions

IETF RFC 2933 IGMP MIB

IETF RFC 2698 Two Rate Three Color Marker.

2.2 The proposed equipment should support SIP and H.248 for voice providing [M].

Any other standards inter-related with all the above Specifications and any other standards mentioned in other part of this document [D].

2.3 The Supplier must ensure that the compliance to any standards specified above is kept up-to-date with the latest version available [M].

3. OLT – ONT/ONU interoperability

3.1 GNC ALFA intends to open the optical interface in order to achieve interoperability between OLT and ONT of different vendors. To ensure required interoperability between multiple OLT and ONT the Supplier must commit to open GPON interface (including OMCI) [M].

- 3.2** The Supplier must complete Interoperability Test (IOT) with the GNC ALFA OLT equipment and/or provide Interoperability Test Report in case of IOT was completed not earlier than 6 (six) months before submission of proposal [M].

4. ONT/ONU Technical Requirements.

4.1 General requirements

The ONT shall have the following functions, features and specifications.

- 4.1.1** The ONT should include basic residential ONT and advanced residential ONT [M]:
- I. The basic residential ONT should support 2 (two) POTS and at least 2(two) 1000Base-T Ethernet ports, supporting 10/100/1000 Mb/s Ethernet interfaces. .
 - II. The advanced residential ONT should support two POT, four 1000Base-T Ethernet ports, supporting 10/100/1000 Mb/s Ethernet interfaces and WLAN 802.1b/g/n with Wi-Fi WPA.
- 4.1.2** The ONT should comply with the Standards set by IETF through different RFCs, IEEE and ITU recommendations on broadband optical access system, GPON system, VLAN, various PPP, IP, DHCP, NAT etc. [M&D]
- 4.1.3** Single fiber transmission shall be used for optical transmission (both in the upstream and downstream direction) and bidirectional transmission shall be accomplished by use of a WDM technique [M].
- 4.1.4** The ONT shall support configurable downstream FEC [M].
- 4.1.5** The ONT shall use NRZ coding and scrambling in both directions [M].
- 4.1.6** For upstream, the ONT shall support Class C+ (Optical budget, source type, transmitter range, mean launched power min, mean launched power max, extinction ratio etc.) as defined in ITU-T G.984.2 [M].
- 4.1.7** For downstream, the ONT shall support Class B+ (Optical budget, receiver type, maximum reflectance, BER, minimum sensitivity etc) as defined in ITU-T G.984.2 [M].
- 4.1.8** The ONT should support optical module monitoring [M].
- 4.1.9** The ONT should support TR069 [M]

4.2 User Network Interfaces (UNIs) requirements.

4.2.1 Ethernet

- i. The ONT shall support at least four 10/100/1000BASE-T interfaces in conformance with IEEE 802.3ab , with RJ45 connectors [M];
- ii. The Ethernet UNI(s) shall support auto-negotiation of speed and duplex mode by default [M];
- iii. For each Ethernet UNI, it is possible to configure manually the line rate as 10, 100 or 1000 Mbps [M].
- iv. For each Ethernet UNI, it is possible to configure manually duplex mode as half or full [M].
- v. The ONT shall support Auto MDI / MDI-X feature [M].

4.2.2 POTS

- i. The ONT shall support at least two FXS interfaces with analog/VoIP adaptation for POTS, with RJ11 connectors [M].

- ii. Each FXS interface shall be in conformance with specific national requirements concerning DC, ringing, AC, DTMF dialing (ITU-T Q.23), tones (alerting patterns and call progress tones) characteristics and on hook/off hook/flash-hook detection [M].

4.3 Data service

The ONT shall support data service both in bridge mode and route mode.

4.3.1 For Bridge mode, the ONT shall [M]:

- i. Be able to bridge IP over Ethernet;
- ii. Have at least one learning bridge in conformance with IEEE 802.1D for "bridged" UNIs;
- iii. Work in L2 transparent switching mode. All the packets from the UNI ports will be transparently transmitted to the WAN port;
- iv. Support untagged frames;
- v. Support 802.1D priority-tagged frames;
- vi. Support 802.1Q VLAN-tagged frames;
- vii. Provide at least 32 user VLAN (8 user VLAN for each UNI port). The range is from 1 to 4094;
- viii. Support VLAN handling as follows:
 - a. Adding
 - b. Removing
 - c. Replacing or Remarking
 - d. Transparency;
- ix. Support VLAN QinQ based on the Ethernet port;
- x. Support PPPoE or DHCP sessions forwarding transparently.

4.3.2 For route mode, the ONT shall [M]:

- i. Support a built-in PPPoE client and the IP address should be obtained through PPPoE;
- ii. Support a built-in DHCP client and the IP address should be obtained through DHCP;
- iii. Allow the operator to statically configure its IP address;
- iv. Support NAT/NAPT;
- v. Support default route;
- vi. Support to obtain the IP address of the DNS server automatically, when serving as a PPPoE client or DHCP client;
- vii. Allow the operator to statically configure the IP address of the DNS server;
- viii. Support DNS relay;
- ix. Support a built-in DHCP server and assignment of IP address, mask and gateway bound with address pool of LAN port to DHCP leases for local device addressing;
- x. Support to query the routing table, ARP table and NAT table;
- xi. Support to query the filtering entries of the firewall.

4.4 Multicast

4.4.1 The ONT shall support layer 2 multicast (IGMP snooping) [M].

4.4.2 The multicast streams distribution (coming from one or several multicast VLANs) on the G-PON (from the OLT to the ONT) shall be carried out using the same GEM port dedicated to multicast streams as other ONTs/ONUs of the same IF_PON port. This GEM port should not be AES encrypted. IGMP signaling shall not be transported on the multicast GEM port used for the multicast streams distribution [M].

- 4.4.3 IGMP v2 /v3 snooping must be supported in the ONT for multicast forwarding [M].
- 4.4.4 For each Ethernet port, 16 multicast programs can be watched simultaneously. The total number of concurrent multicast program should not be less than 16 x the number of Ethernet ports [M].
- 4.4.5 The ONT shall support fast leave [M].
- 4.4.6 The ONT shall support to transmit the multicast stream packets encapsulated both in PPPoE and IPoE format [M].

4.5 VoIP service

- 4.5.1 The ONT shall support session initiation protocol (SIP) and H.248 for VoIP [M].
- 4.5.2 The ONT shall support to detect fax signals in order to switch to ITU-T G.711 CODEC or use ITU-T T.38 [M].
- 4.5.3 The ONT shall support local loop echo cancellation in conformance with ITUT G.165 and G.168 [M].
- 4.5.4 Encoding
The ONT shall support the following audio CODEC algorithms [M]:
 - i. ITU-T G.711 A/ μ law.
 - ii. ITU-T G.729.
- 4.5.5 The ONT shall allow the operator to configure the audio CODEC preference order [M].
- 4.5.6 The ONT shall allow the audio CODEC adjusted dynamically according to some factors such as network congestion status [M].
- 4.5.7 The ONT shall allow the operator to configure the packetization period for each audio CODEC [M].
- 4.5.8 The ONT shall manage asymmetrical communications as well from the CODEC point of view as from the number of frames per packet [M].
- 4.5.9 The ONT shall support adaptive jitter buffer and static jitter buffer [M].
- 4.5.10 The ONT shall support configurable audio gain for transmit and receive [M].
- 4.5.11 The ONT shall be able to connect one or several terminals and to register one or several phone numbers [M].
- 4.5.12 The ONT shall support one E.164 phone numbers per specific connected phone [M].
- 4.5.13 The ONT shall support RTP/RTCP in conformance with IETF RFC3550 [M].
- 4.5.14 The ONT shall be in conformance with IETF RFC2833 for DTMF Digits, Telephony Tones and Telephony Signals [M].
- 4.5.15 The ONT shall support local digit mapping [M].
- 4.5.16 Supported services:
The ONT shall support at least these Soft Switch-based voice services as following [M].
 - Caller ID (CLIP/CLIR).
 - Call Waiting ID (CLIP/CLIR).
 - Three Way Calling / Three Way Conferencing.
 - Call Forwarding / Call Transfer.
 - Repeat Dialing.
 - Call Hold.
 - Do not disturb.
- 4.5.17 The ONT shall support G.711 modem transparent transmission
- 4.5.18 The ONT shall support fax services (FoIP) [M]:
 - G.711 fax
 - T.38 fax

4.6 Quality of service

The ONT shall provide the required QoS for each flow (in coordination with the QoS mechanisms at the OLT). There should be a scheduling/congestion avoidance function for each T-COUNT or Ethernet UNI [M].

4.6.1 Upstream QoS

- a. The ONT shall be able to map the upstream traffic flow to the GEM port based on one or a combination of all these parameters at least as following [M]:
 - VLAN-ID.
 - 802.1p priority
 - VLAN-ID and 802.1p priority.
 - IPTOS/DSCP
 - Ethernet Port.
- b. The ONT shall support four priority queues for each T-COUNT, and the scheduling mechanism can be SP or WRR [M]
- c. The ONT shall support the CAR setting based on the GEM port, and mapping the GEM port to the priority queue of the T-COUNT based on 802.1p priority [M].
- d. The ONT shall allow the operator to configure mapping the GEM port to the priority queue of the T-COUNT as an option [M].
- e. For each priority queue, the tail-drop mechanism should be supported to avoid the congestion [M].

4.6.2 Downstream QoS

- a. The ONT shall support four priority queues for each Ethernet port, and the scheduling mechanism can be SP [M].
- b. The ONT shall support mapping the downstream traffic flow to the priority queue of the Ethernet port based on 802.1p priority [M].
- c. For each priority queue, the tail-drop mechanism should be supported to avoid the congestion [M].

4.7 Security

- 4.7.1** The ONT shall support TYPE B protection defined in G.984.x and the switchover time is less than 1s [O].
- 4.7.2** The ONT shall support the Rogue ONT detection and to close the faulty optical port when receiving the command from the OLT [M].
- 4.7.3** The ONT shall support the AES encryption of downstream packets based on the GEM port [M].
- 4.7.4** The ONT shall support firewall to deny access requests from WAN side connections to LAN side devices [M].
- 4.7.5** The ONT shall support firewall to deny access requests from WAN interface to WEB management interface of ONT [M].
- 4.7.6** The ONT shall support anti-DOS protection [M].

4.8 Management Functions

- 4.8.1** The ONT shall support alarms and performance monitoring defined in ITU Recommendation G.984.3 [M].
- 4.8.2** The ONT shall comply with the applicable sections of ITU-T Recommendation G.984.4 and referenced documents. All applicable managed entities in Table 1/G.984.4 required to support the features and services outlined in this document should be supported [M].
- 4.8.3** The ONT shall be manageable locally and remotely, including software upgrading, configuration [M].

- 4.8.4 The ONT should support TR069 protocol with following additions, if offered solution for management, configuration and monitoring purposes will use TR069 server capabilities [M]:
 - TR 181 –Device Data model;
 - TR098 – Internet Gateway Device for TR069;
 - TR104 – VoIP provisioning data model.
- 4.8.5 The procedure of configuring an access of ONT to Automatic Configuration Server (ACS) shall be described [D].
- 4.8.6 The supported RPC methods shall be listed [D].
- 4.8.7 The ONT shall support dual software regions. When the active software fails, the ONT should support to switch into the backup software region to boost up [M].
- 4.8.8 All the configurations shall support Plug and Play. No extra work should be done manually [M].
- 4.8.9 The ONT shall support the real-time optical module monitoring from the NMS remotely [M].
- 4.8.10 The ONT shall support the real-time traffic rate statistics of PON port and UNI ports from the EMS remotely [M].

4.9 Engineering specifications

- 4.9.1 The ONT shall be the proper size in order to facilitate the installation and fixing as well as its package. Dimensions (Hm mx Wm mx Lm m) and package dimensions have to be given [G].
- 4.9.2 LED status indication should be supported for power, PON link status and UNI status [M].
- 4.9.3 The ONT should support to be installed on the desk or be mounted on the wall [M].
- 4.9.4 The ONT shall be locally powered 90-240VAC (Auto-range) with 50Hz frequency [M].
- 4.9.5 The ONT can be equipped with maintenance-free backup battery that will operate the system in case of AC failure, as an option [O].
- 4.9.6 The battery monitor function shall be supported [O].
- 4.9.7 The ONT shall support the optical cover to avoid harm to people’s eyes and prevent the dust from the optical fiber.[M&D].
- 4.9.8 The ONT must be supplied with the optical adapter type – SC/UPC [M]
- 4.9.9 The ONT must be equipped with the Patch cord organizer, integrated into the ONT housing form the back (bottom) part to secure patch cord form damages during operation [M]
- 4.9.10 The ONT must be in accordance to the following standards [M]:
 - ETS 300 386-1 (related to electromagnetic compatibility)
 - EN 60950 (related to security)
 - ETS 300 019 class 3.2 (related to environmental conditions)

4.10 Set and Branding

- 4.10.1 The ONT shall be completed with all necessary elements to endure it’s direct use for operation. [M]
- 4.10.2 The ONT housing shall be branded according to the GNC Alfa Brand Book requirements. Vendor must develop and present design drawing which should be approved for mass production. [M].
- 4.10.3 The ONT shall be completed with the User’s Manual describing major operation functions and such manual must be in Armenian [M] and Russian [O] and English [O].
- 4.10.4 Each set of ONT must be packed into the banded box or be covered with sleeve box [M].

5. Alternative Solution – TR069.

5.1 Objections

If, due to any reason, Vendor is unable to ensure interoperability of proposed ONT with existing Network Management System to support multivendor concept of GNC Alfa network expansion GNC Alfa will consider and accept solution, based on TR-069 complete solution for management of ONTs with Broadband Forum-compliant CWMP (TR-069) protocol. Vendor must provide all necessary software and hardware elements to ensure complete and highly flexible and scalable interactions with a large number of devices for the purposes of, included but not limited:

- (re-) configuration;
- mass firmware downloads;
- fault clearance;
- monitoring;
- general real-time subscriber support.

5.2 General Requirements

5.2.1 Vendor must supply TR-069 solution, matching following general requirements [M]:

- i. Remote device management including CPE installed behind NAT [M]
- ii. Remote diagnostics of CPE [M]
- iii. Zero-touch provisioning [M]
- iv. Short-time monitoring - troubleshooting device monitoring [M]
- v. Fully TR-069 compliant - and all subsequent standards [M]
- vi. Customer self-service portal support [M]
- vii. Workflow engine, supporting inter-device management tasks [M]
- viii. Intelligent firmware management [M]
- ix. Security management [M]
- x. API/NBI for integration with OSS/BSS systems (CRM, provisioning, billing etc.) [M]
- xi. Interoperability ensures that all TR-069 standard-compliant devices can be managed [M]
- xii. Embedded permissions for Add, View, Change, Delete [M]
- xiii. Embedded email, syslog, XML-RPC, SOAP, JMS clients [M]
- xiv. Administrative front ends (Management console), fully customizable including language adaption with support of Armenian, Russian and English languages [M]
- xv. XML-RPC, XML and SOAP back end interfaces, server and client, synchronous and asynchronous [M]
- xvi. Security matrix (non-global role system) [M]
- xvii. Customizable authorization system [M]
- xviii. Schedulable mass operations [M]
- xix. Workflow engine for setup of arbitrarily complex multi-step workflows, offering the following features [M]:
 - Intra-CPE and inter-CPE workflows
 - Fully programmable
 - State handling
 - Transaction safety
 - Definable exception handling

- xx. Application Server including Object Database and optimized primary SQL storage [M]
- xxi. Secondary SQL for consolidated custom data: Oracle 10/11, MySQL, PostgreSQL
- xxii. CPE hierarchical grouping and virtual grouping for batch operations on arbitrary sets of CPEs [M]
- xxiii. Grouping by any device, customer profile or service definition setting, in any combination [M]
- xxiv. Any workflow triggerable for any group, active, passive or scheduled [M]
- 5.2.2 Vendor must supply TR-069 solution to be available during and for Technical Evaluation phase and such provision should be considered as a part of testing set of equipment [M].
- 5.2.3 Vendor must ensure provided TR-069 solution scalable configuration to support up to 150000 customer premises devices [M].
- 5.2.4 Vendor, while provision TR-069 solution must ensure integration of it with all elements of business and process supporting applications [M].

5.3 Commercial Terms and Impact

- 5.3.1 Vendor must supply TR-069 solution for purposes, described by 5.2.2, and such provision should be considered and be applicable free of any changes and fees [M].
- 5.3.2 Vendor successfully completed Technical Evaluation with TR-069 solution must ensure and provide customer premises equipment licenses for 40000 (forty thousand) devices, currently operated in a network and such a provision must be free from any applicable changes due by GNC Alfa [M].
- 5.3.3 Vendor successfully passed Technical Evaluation with TR-069 solution offered to ensure requested functionality must provide quotation for TR-069 solution as follows:
 - 5.3.3.1 Price of Hardware required for TR-069 implementation [M];
 - 5.3.3.2 Price of Software - Auto Configuration Servers (ACS) [M];
 - 5.3.3.3 Price of License per CPE for quantity started from 40001 up to 90000 (as per schedule presented by Chapter III.10) [M];
 - 5.3.3.4 Price of Technical Support per annum for estimated number of devices on the network [M];
 - 5.3.3.5 Price of implementation, configuration and customization [M];
 - 5.3.3.6 Price of Integration [M];

III. DELIVERY SCHEDULE & SERVICES REQUIREMENTS.

1. Turnkey services

In the turnkey services, the fees or expenses for the following shall be included [M]:

- a. Integration with existing OLT (ZyXELL/FiberHome AN5116-06B and NMS FiberHome ANM2000 [M].
- b. The Preliminary Acceptance-Demonstration of Proper Operation of the equipment during technical evaluation phase [M].
- c. The technical support services up to the Final Acceptance, in accordance to the section 8 of the present document.

Supplier has to describe in its offer all the available means for the providing of the requested services for the turnkey project [D].

2. Technical support services

The Supplier shall provide services for the Technical Support of both Hardware and Software on a 24x7 basis, until the Final Acceptance of Equipment (until the end of the guarantee period).

The technical support services that shall be offered [M]:

- a. Telephone Support Service
- b. Remote Access Service
- c. On-site Intervention Service
- d. Corrective Software Releases Service
- e. Hardware Repair and/or Replacement Service.

The analytic procedure and the contact persons for the technical support will be given during the Contract's joining.

3. Documentation

The Supplier must provide comprehensive documentation for the offered products [M]. The minimum set of documentation should include the documents listed below. The Bidder should provide a detailed listing of all documentation and show that the list below is satisfied. All technical descriptions, operation and installation manuals should be provided in the English language in hard copy and electronic format.

- a. Overall Product Technical Manuals (Hardware & technical characteristics)
- b. Installation, Operation and Maintenance Manuals.
- d. Spare parts and components catalog
- e. System Acceptance Test Procedures.

4. Time schedule

Within seven (7) days from the day of the procurement announcement by GNC ALFA to the chosen Supplier, the Supplier is obliged to deliver a detailed time schedule that will include [M]:

- The customization schedule [M]
- The delivery schedule [M]
- Quantities as per delivered schedule [M]
- The initiation and completion of final tuning of integration with OLT and/or NMS and TR-069 [M]
- The initiation and the completion with the readiness for Preliminary Acceptance-Demonstration of Proper Operation [M]

All the requirements and pending issues for the project completion in the requested time limits have to be referred in this time schedule.

As date of project start is considered the date of Contract's signing.

The analytical time schedule for delivery will be accrued by the collaboration of GNC ALFA and Supplier and it will be prepared within two weeks after the date of the procurement announcement.

5. Delivery time

First tranche of offered products as per schedule disclosed in Chapter III/10 must be delivered and be ready for use within no longer than sixteen (16) weeks since the announcement of the procurement. Delivery schedule for all following tranches should be coordinated and agreed between Vendor and GNC Alfa, but should be managed in accordance with the schedule, presented in Chapter III/10.

The Temporary Acceptance-Demonstration of Proper Operation procedure will certify each delivery. Depending on confirmed integration method (Integration with NMS or Alternative Solution) GNC ALFA determining the type of the tests and the measurements. The test plans are providing comprehensive details of all areas of the technical specification that will be tested. These test plans include tests for individual equipment as well as complete network test including detailed test procedures. The Bidder must ensure and provide mechanisms for recording the results of these tests that would eventually form the basis of acceptance of the system. All acceptance tests will be conducted in the presence of GNC ALFA representatives. Depending on selected method and solution, Vendor may choose any or both testing procedures, described in:

- Annex 1 - presented terms and conditions for test procedures for NMS integration;
- Annex 2 - presented terms and conditions for test procedures and principals for Alternative Solution.

The Supplier must confirm in written and include this conformation in his proposal stipulating which integration method Supplier would like to use for his offered product. No limitation is available for any Vendor to confirm both integration methods.

6. Macroscopic Inspection

Upon delivery of the Products, a competent Committee appointed by both parties will proceed with acceptance control (Macroscopic Inspection), after which a Handover Protocol will be prepared. Said Inspection will take place within fifth (5) Working Days after finalization of Customs' clearance. In case any deviations exist, the Supplier will take corrective actions and the Delivery Date will be postponed until all faults are restored.

7. Preliminary Acceptance of Products

The Preliminary Acceptance-Demonstration of Proper Operation of the equipment will be held for each Product type form the range separately. The Preliminary Acceptance-Demonstration of Proper Operation procedure will be held once Supplier will confirm completion of integration with GNC Alfa Network Management System or will confirm his intension to proceed with Alternative Solution and such Acceptance-Demonstration will be held during Technical Evaluation phase with samples, provided by Supplier.

Preliminary Acceptance will include quantity and quality control of the hardware and software. The quality control will be done by the proper demonstration in accordance to test procedures that will be previously agreed between GNC ALFA and Supplier.

Preliminary Acceptance procedures for NMS integration will be completed as follows:

- a. For every type of ONT apply configuration profiles form NMS interface and temporal acceptance tests with Demonstration of proper Operation.
- b. For every type of ONT complete management testing form NMS interface and temporal acceptance tests with Demonstration of proper Operation.
- c. For every type of ONT proceed with full system monitoring from NMS interface and temporal acceptance tests with Demonstration of proper Operation.

Preliminary Acceptance procedures for Alternative solution with TR-069 and Auto Configuration Server (ACS) implementation and integration will be completed as it is described in details in Annex 2.

The following acceptance procedure shall be applied:

- a. Supplier shall notify GNC ALFA in written about Readiness for Acceptance (RfA) after completion of the integration with NMS or Alternative Solution implementation and integration.
- b. The Parties shall perform Acceptance Tests at the date mutually agreed for the testing, however, not later than ten (10) working days after Supplier has issued the RfA notification.

- c. Upon achievement of successful test results in accordance with the criteria defined in the Acceptance Test Plan provided by the Supplier and approved by the Customer, parties shall sign Acceptance Protocol.

In the case that severe problems or faults will be located during the preliminary acceptance procedure, that result to not putting the equipment in operation, works will be interrupted and they will be continued after the faults removal by the Supplier.

Acceptance will be denied and terminated on the basis of minor and/or major deficiencies, which do or do not materially affect the functionality of the Product supplied within existing access network. List of minor and major deficiencies, faults and inconsistencies will be concluded and provided to Supplier. Supplier in 5 (five) working days must confirm in written his ability and willingness to fix all detected issues and stipulate time required for it.

Based on written confirmation from Supplier stating all detected problems and faults were fixed GNC Alfa may proceed with retest. GNC Alfa reserves the right to refuse retest request from the Supplier if faults removal requires more than 30 days starting from first Acceptance test or if GNC Alfa has other solution matching requirements of RFP being compliant with all its terms and conditions, included but not limited to successful completion of Acceptance testing.

The Goods & Services to be supplied shall be guaranteed against failure due to quality of material, work or any other failure, excluding those attributed to errors on the part of GNC ALFA's personnel, within 24 months from the each part's Preliminary Acceptance. Supplier will replace and deliver any part found to be defective at no charge to GNC ALFA.

8. Final Acceptance

Material will be accepted by a Final Acceptance Protocol, twenty four (24) months after they have been preliminarily accepted.

The final acceptance of Products will be done by the end of the guarantee period, under the condition that Supplier has already removed all the abeyances concerning the operation or material missing. In case, that such abeyances exist, the final acceptance will be extended until the removal of these abeyances. The final acceptance will be certified by the responsible committee of GNC ALFA.

9. Guarantee of proper operation & Spare parts

All delivered equipment shall be accompanied by Guarantee of proper operation for two years duration starting on the date of preliminary acceptance. During the validity of the guarantee period Supplier has to remove any failure or to remove any software error, free of charge for GNC ALFA, within seven working days since the date of announcement of equipment failure or software error.

Based on the MTBF and other quality parameters, the Bidder will provide the quantity requirements for spares with pricing for each item, on the following basis:

- a. The long term Support Agreement should be negotiated before this warranty period expires.
- b. Any shortfall in the spares provided will be met by providing the remaining free of cost.

Spares are to be available for a minimum of 7 years after Contract's sign. Key terms of this warranty shall be provided in the proposal.

10. Estimated Quantities and Schedule

Table below shows estimated ordering and purchase schedule and quantities:

Product Type	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	TOTAL
Scheduled	2015	2016	2017	2018	2019	2020	2021	
ONT Basic	-		2000		1000			3000
ONT Advanced	14000	10000	7000	5000	5000	3000	3000	47000
Total for Project	14000	10000	9000	5000	6000	3000	3000	50000

Annex 1 – Testing Procedure Description – ONT with ANM

1. Testing of compatibility of existing Management System AN2000 and ONT.

Target:

- Check an ability of services configuration at ONT through Management System;
- Check an ability of software upgrade of ONT through Management System;
- Check an ability of getting a standard parameters, performance data (statistics) and alarm messages from ONT through Management System.

Necessary tolls/equipment/systems: OLT ZyXELL/Fiber Home AN5516-01, OLT Management System -Fiber Home ANM2000, IPTV STB, IP Phone/VoIP telephone adapter, ONT, PC.

Following steps shall be performed:

1. Connect ONT to OLT and check if ONT is visible (Serial Number/Physical Address is displayed), ONU-ID is assigned.
2. Configure and check functionality of services (Access to Internet, Data Transmission, Wi-Fi if applicable, VoIP and IPTV-multicast) according to the service models used.
3. Perform a software upgrade of ONT with auto and manual upgrade options.
4. Check control of ONT (reboot ONT, deactivate/activate)
5. Send request for a standard parameters to ONT (device type/model, firmware/hardware version, optical info, status of UNI ports, status of WLAN if applicable)
6. Switch on a performance measurement (traffic UP/DOWN, errors etc. of GEM ports and UNI's). Request a measurement data from ONT, check if data displayed correctly.
7. Check display of alarm info in case of disconnect an optical link, disconnect of UNI ports, disconnect of power supply.

2. Testing of control functions via OMCI and PLOAM from OLT.

Target:

- Check correctness of a performing of a general control commands.
- Check implementation of an all standard (ITU-T G.988) ME's and their attributes.
- Check correctness of a "cold start" procedure
- Check an ability to identify an ONT at auto and manual mode
- Check ability to authenticate an ONT on a base of SN/hardware address or password
- Check correctness of a performing PLOAM commands, such as measurement of BER and disable an ONT.

Necessary tolls/equipment: OLT ZyXELL/Fiber Home AN5516-01, OMCI analyzer, traffic generator, ONT.

Special Conditions: OMCI Analyzer must be provided by Vendor on a temporal bases.

Traffic Generator must be provided by Vendor on a temporal bases.

Following steps shall be performed:

1. Check reboot command of ONT.
2. Check existence of all necessary ME's with use of OMCI analyzer for ONT with connected services
3. Check OMCI commands Create, Delete, Set, Get, Get next, Get current data with ME's and their attributes. Checking shall be performed with use of an OMCI analyzer.
4. Check testing/measurement commands (test, result) for certain functionality, i.e. optical power etc.
5. Check authentication functionality of ONT.
6. Set a time interval of BER measurement (BER Interval), check receiving a REI message with correct value of an errors.
7. Send from OLT the command - Disable_Serial_Number, check if there is no traffic from ONT.
8. Switch on a FEC mode at OLT and check a FEC status with use of OMCI analyzer.

Testing of control function with use of Auto Configuration Server (ACS) via TR069 protocol.

Target:

- Check correctness of functioning of common control via TR069 (commands -GetParametr Value, Inform, SetParametrValue, GetParametrAttribute, SetParametrAttribute, Reboot, Download, Upload, FactoryReset etc.)
- Check correctness of configuring parameters of services from ACS (Data/Internet ser, VoIP, IPTV, WiFi access point).

Necessary tolls/equipment/systems: ACS server with TR069 protocol, OLT ZyXELL/Fiber Home AN5516-01, ONT with TR069 client.

The following steps shall be performed:

1. Set up an ONT to communicate with the ACS.
2. Establish a session from ONT to ACS by means of sending an “Inform” message from ONT, send from ACS a “HTTP Get” request to the URL extracted from an “Inform” message of ONT.
3. Send a “GetRPCMethods” message from ACS and check for GetRPCMethodsResponse message from ONT (with correct parameters).
4. Sent a “Reboot RPC” from ACS, check for RebootResponse and realize that ONT was rebooted and “Inform” message from with parameter “MReboot” is received.
5. Check via ACS a current version of ONT firmware (parameters GatewayDevice.DeviceInfo.SoftwareVersion), upload from ACS a new version and check if it was successfully installed.
6. Initiate from ACS a creation of backup copy of ONT configuration file and download it from ONT.
7. Change via a message from ACS several configuration parameters of ONT, upload backup configuration to ONT and check if all changed parameters were restored from backup.
8. Send a request for reset of ONT to a factory settings (FactoryReset), check if a configuration of ONT is set to a default factory after rebooting of a device.
9. Configure through ACS a subscriber services (Data/Internet, VoIP, IPTV, WiFi access point), check if configuration of ONT is correct and all services are working.