

## Huawei Response

### To the European Commission Public Consultation document: “On the open Internet and net neutrality in Europe”

#### INTRODUCTION

It is a pleasure for Huawei to provide its input to the ongoing debate on the open Internet and on the related topics of transparency, net neutrality and traffic management.

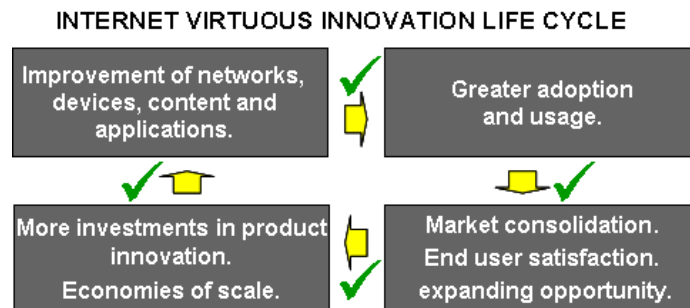
Huawei, as an active player in the European Internet broadband communications sector, fully understands the importance of this debate to the Internet’s continued long-term success.

#### EXECUTIVE SUMMARY

Huawei fully supports an open Internet that provides consumers with access to lawful information when, where and how they want it, while allowing network operators and the other Internet stakeholders to implement sustainable strategies and business models.

In line with many industry peers, Huawei believes that traffic management and transparency are the two ingredients required to realize this vision in the highly competitive and healthy European Internet ecosystem. Today’s market dynamics, eventually adjusted ex post by existing competition and consumers rights protection laws, will guarantee maximized end-user satisfaction.

As an innovative, leading provider of telecom-solutions, we seek to preserve the openness of the Internet while maintaining the right incentives for the rollout of next-generation networks capable of efficiently supporting all the applications, content and services that consumers need. It is crucial to allow the continuation of the present virtuous innovation life cycle that is the foundation of the great social and economic success of the Internet. All players across the value chain must be able to find the business motivations for their future investments in infrastructure and software.



Within the large ongoing “Open Internet” debate our goal is to contribute specific arguments based on our background and experience as a telecom-solutions provider.



## A. THE OPEN INTERNET AND THE END-TO-END PRINCIPLE

**Question 1:** Is there currently a problem of net neutrality and the openness of the Internet in Europe? If so, illustrate with concrete examples. Where are the bottlenecks, if any? Is the problem such that it cannot be solved by the existing degree of competition in fixed and mobile access markets?

**[Huawei]:**

We do not see any structural net neutrality problem in Europe. The Internet, in fact, has never been healthier and more open than today: increased competition, and innovative devices and applications, are providing great value to the citizens of Europe. New social networking applications and multimedia sites have exploded in popularity and reshaped the lives of European citizens. We have observed some episodes of un-neutral behaviors throughout the whole value chain: some have generated lively debates, but none of them did actually impact the Internet freedoms of end users

The European Internet has exploded in a very healthy, competitive environment. We have not seen any structural un-neutral behavior which could not be solved through competition.

**Question 2:** How might problems arise in future? Could these emerge in other parts of the Internet value chain? What would the causes be?

**[Huawei]:**

Regulators and the whole Internet chain should work together to keep this successful Internet from being undermined in the near future by inefficient use of shared network resources and lack of business motivation for network investments.

Issue #1: Inefficient use of shared network resources

As there is currently no incentive (“economic signal”) for terminals, content and applications providers to optimize the relation between the generated traffic volumes and their value for the end user, the shared network resources are not necessarily used efficiently. The impact on end users’ satisfaction will become unacceptable as the number of connections, terminals, content and applications rapidly expands.

If all Internet traffic were served as best-effort, operators would have no ways to exploit the Internet traffic burstiness to reach higher efficiency (e.g. e-health content prioritized while FTP services re-scheduled to temporarily occupy unused capacity as available).



## Issue #2: Lack of business motivation for network investments

In the highly competitive European market, broadband Average Revenue Per Unit has declined sharply due to competition; network operators are now further challenged by “over-the-top services” that are capturing part of the available revenues. Traffic volumes are soaring while network operators’ revenues stagnate. In this scenario of limited profitability there is a high risk that operators will not be able to upgrade and expand their networks with latest innovative and efficient technologies as much as the user traffic would require.

As explained in our feedback to Questions 4 and 5, Huawei believes that network operators need to be free to implement their preferred market strategies and business models (ranging from being best-effort Internet access providers to being vertically integrated providers), thanks to the adoption of traffic management techniques.

Inefficient distribution of shared network resources and the network operators’ lack of business motivation for their future investments could represent serious hurdles for the future progress of the Internet.

### **Question 3: Is the regulatory framework capable of dealing with the issues identified, including in relation to monitoring/assessment and subsequent enforcement?**

#### **[Huawei]:**

No need for ex-ante regulation: Europe can rely on very robust competition. Potential problems could be solved easily, ex-post, by the National Regulatory Authorities if any market failure did actually appear.

The directives of the Community Regulation Framework relating to the Electronic Communications Services, adopted in 2002 and revised in 2009 by the European Parliament and the Council, define an EU regulatory framework with an adequate basis for the openness of the Internet, the implementation of innovative business models and the introduction of transparency towards the Internet users

The regulation framework that has been adopted so far for the Internet is certainly at the root of the Internet’s success. In this very encouraging market context we do not see any risk in the future market dynamics that would justify the need for more stringent regulation for this sector. We actually believe that the extreme complexity and rapid dynamics of the Internet value chain could quickly outdate any reasonable regulatory intervention that could be devised today.

Regulation should not introduce limitations on operators’ ability to assign proportionate value to the information that is transferred across their networks, as this would also represent a disincentive for content providers to generate their traffic efficiently.



Regulation should encourage innovative business models: stakeholders are looking at mechanisms to allow appropriate redistribution of profits across the value chain, thanks to new business relationships between network, terminals, content and applications providers. The market will determine the successful models and the appropriate balance in stakeholders’ negotiations. These business options could be very important for the future sustainability of investments and should not be hindered by stringent regulation (competition issues will have to be monitored of course).

The EU regulatory framework provides adequate ground for both the future openness of the Internet and the implementation of innovative business models.

Current regulation complemented by exiting market competition forces is the right approach for the setup of the “level playing field” for all actors to compete fairly in the broadband market.

Regulatory investigations should address all players in the Internet value chain equally.

## B. TRAFFIC MANAGEMENT/DISCRIMINATION

**Question 4:** To what extent is traffic management necessary from an operator’s point of view? How is it carried out in practice? What technologies are used to carry out such traffic management?

**[Huawei]:**

Traffic management is a key tool for network providers to address the important risks that the Internet faces today (such issues have been described in the context of Question 2):

Addressing Issue #1: Efficient use of shared network resources

Efficiency is a must. The amount of data traffic in mobile networks doubles every eight to twelve months; even if actual consumption can be controlled through price, it is likely that the underlying demand for “everything via Internet” will be larger than network capacity in the coming two decades. Capacity in mobile networks is constrained by the laws of physics: limited availability of radio spectrum, shared by all users in a particular “cell”.

Traffic management can prevent allowing some users to monopolize the limited shared resources, It can also keep some devices and third-party content and applications from generating unreasonable traffic patterns (data plane and signaling plane) for the purpose of increasing a particular device’s performance (e.g. smartphone battery life) or delivering a faster service (e.g. background preloading of content to be ready in case of a future request from the end user).



Traffic management can allow efficient distribution of network resources according to the wide range of requirements for the specific applications (voice, browsing, file download, e-mail, IP TV, high-definition video conferencing, e-health, e-education, emergency calls).

Networks are generally designed to avoid congestion but, if congestion occurs, some traffic needs to be degraded. Traffic management allows rerouting, or if necessary trimming and throttling, conflicting requests according to efficient and manageable criteria (e.g. end users' service-level agreements)

#### Addressing Issue #2: Business motivation for profitable network investments

Traffic management can and should also be used as a competitive tool for healthier business models and as a basis for tomorrow's innovation and investments.

Traffic management allows operators to define and assign value to the performance levels that the network will provide to each user, based on the existing subscriptions and agreements.

Traffic management opens the door to a number of innovative strategies, towards both end users and other actors across the value chain. By providing new ways of distributing investment costs, risks and revenues across the value chain, it clearly helps the market to achieve appropriate equilibrium among stakeholders.

Traffic management techniques are part of operators' specific know-how and, as long as they are applied transparently, are legitimate elements of competition among them.

Wireless technologies such as LTE have dynamic policy management as part of what is called the Policy and Charging Control (PCC) architecture. This architecture fosters dynamic quality of service management and other forms of traffic management: it will allow network operators to easily customize and modify service plans to account for fairly granular, yet varied, consumer preferences. User subscriptions may be tailored according to the network operator strategy: based on services, devices, speeds, amount of data exchanged, time of day, end user location, etc.

The network needs to be "service-aware" in order to manage different service levels. This is done by reading protocol headers and URLs up to the level where the service can be identified. When services cannot be uniquely identified by protocol labels, this is complemented by classifying the statistical pattern of traffic data. Heuristic models based on the IP flow characteristics, e.g. flow rate, connection number, etc., continuously learn and refine the analysis and are also able to classify encrypted services.

The technically optimal network management solution is the one that matches services against network resource capabilities, recognizing that not all bits have the same value and managing the mobile traffic accordingly. The right traffic management approach will have to strike the right balance between resources for best-effort services and for operator- managed premium services. The end user will judge and rely on the competitive market to reflect his feedback.



Traffic management must not restrict consumers’ fundamental rights, such as freedom of speech and privacy of telecommunications. Traffic management measures are concerned, not with the content of the data carried over the network, but rather with the way the service is delivered.

Going beyond the network provider domain, end-to-end quality of service control will be an important target for the future. The industry should work on harmonizing its practices and standards.

Traffic management is needed for:

1. Reasonable and efficient assignment of resources among users, content and applications
2. Implementation of innovative two-sided business models, also allowing operators to set tariffs based on service value rather than just bandwidth.

Further standardization efforts are required to enable traffic management to be consistently applied beyond the sphere of the network operator.

**Question 5:** To what extent will net neutrality concerns be allayed by the provision to end users of transparent information to end users, which distinguishes between managed services on the one hand and services offering access to the public Internet on a 'best efforts' basis, on the other?

**[Huawei]:**

Once innovative broadband services become available, the implementation of effective transparency towards the users is needed to assure end users freedom in their informed choices between networks, terminals, content and applications.

From the network side, transparency on the applied traffic management policies is needed. End users’ choices will provide the “economic signaling feedback” to the value chain, which will calibrate its offers accordingly, maximizing user satisfaction

Several controversial traffic-management disputes around the world were due not to the traffic management practices themselves but rather to the lack of associated transparent communication to end users.

Transparency is needed for all services that are delivered to the end user from the value chain, including traffic management on the network operator side.

In the European competitive environment, end users’ choices will provide the “economic signaling feedback” to the value chain, stakeholders will consequently “adjust” their offers to maximize user value and satisfaction.

**Question 6:** Should the principles governing traffic management be the same for fixed and



## mobile networks?

### **[Huawei]:**

The regulatory framework will have to be fully aware of the great differences existing between fixed and mobile broadband services: social, economic and most of all technical.

Wireless access has a different value from that of fixed access: the ability to have broadband access on the move is its most obvious additional value. In addition, mobile communications can be personal (a call or a connection request is sent to a place in the case of fixed networks, to a person in the case of mobile).

Wireless access has different physical constraints: new spectrum cannot be “produced” and made available beyond a certain extent (additional fiber capacity could, in principle, always be added according to market demands). That is so even if EC is proposing important legislative proposals in its RSP, and even if vendors like us continuously innovate to push further the intrinsically limited spectral efficiency of their technologies. These are the key technical differences that make the availability of wireless resources much more critical than in the fixed case:

- Shared capacity in the last wireless segment
- Increasing number of mobile broadband subscribers compared to fixed broadband subscribers
- User mobility leads to largely unpredictable distribution of traffic load across the network infrastructure
- Mobility management
- All services including voice and data share the same bandwidth
- Changing channel conditions, leading to unpredictable available capacity

Even in the European technology-neutral regulatory environment, Regulators need to account for these differences.

Regulators need to be fully aware of the fundamental technical and also socioeconomic differences that exist between fixed and mobile services and networks.

**Question 7:** What other forms of prioritization are taking place? Do content and application providers also try to prioritize their services? If so, how – and how does this prioritization affect other players in the value chain?

### **[Huawei]:**

No comment.

**Question 8:** In the case of managed services, should the same quality of service conditions and parameters be available to all content/application/online service providers which are in the same situation? May exclusive agreements between network operators and



[content/application/online service providers create problems for achieving that objective?](#)

**[Huawei]:**

Exclusivity agreements are part of the overall competitive market dynamics: they introduce an important additional degree of freedom to operators’ choices in their strategies. They should not be prohibited.

Regular competition law will suffice to fix possible market distortions.

Exclusivity agreements are an additional competition element among network operators.

**Question 9:** [If the objective referred to in Question 8 is retained, are additional measures needed to achieve it? If so, should such measures have a voluntary nature \(such as, for example, an industry code of conduct\) or a regulatory one?](#)

**[Huawei]:**

Such practices should be monitored ex-post by the competition authorities to avoid creation of anticompetitive dominant positions in the market.

## C. MARKET STRUCTURE

**Question 10:** [Are the commercial arrangements that currently govern the provision of access to the Internet adequate, in order to ensure that the Internet remains open and that infrastructure investment is maintained? If not, how should they change?](#)

**[Huawei]:**

The great majority of today’s broadband offerings deliver best-effort traffic to the end users, which pay flat monthly fees for this service. This model, fundamental in triggering the setup of the broadband market, is not allowing operators to recover the increasing operational costs deriving from the traffic growth.

Thanks to traffic management technologies, mobile network operators are now looking for ways to move away from this current “dumb pipe” model, creating new offerings where end users, terminals, content and applications can be priced differently.

The great majority of the network operators’ business models are “one-sided”, with the end user as the only revenue source. Network operators have realized that such models are not capable of financing the large network investments that broadband requires and will require. Innovation has now introduced new possibilities for creating new “two-sided” business models where other players along the value chain can become revenue sources for the network providers, countering the effects of stagnating ARPU (and accounting for the fact that end users cannot fully control the volumes they receive in downlink).



Thanks to such new models, network operators can find new ways of meeting the costs of operations and network capacity upgrades.

These business models represent alternatives to “all you can eat”, encouraging efficient usage of network resources from all players.

Innovative (two-sided) business models allow operators to propose alternatives to current “dumb pipes” delivering “all you can eat” offers that were fundamental in triggering the (mobile) broadband services explosion. Such new models will encourage more efficient use of network resources and will increase network operators’ willingness to make new investments.

#### D. CONSUMERS – QUALITY OF SERVICE

**Question 11:** What instances could trigger intervention by national regulatory authorities in setting minimum quality of service requirements on an undertaking or undertakings providing public communications services?

**[Huawei]:**

As a first step, best-effort Internet access services will coexist with network operators’ “premium services”, utilizing the same network infrastructure.

“Internet access” is certainly a “must carry” for network operators, who know very well that end users expect a certain quality of experience from these services and are not willing to give this up. The grade of service that operators will be able to grant to best-effort Internet access services will certainly be an important factor within the competition among operators.

On the other hand it is in the interest of the best-effort services to utilize spare capacity that can become available from the “premium services” from time to time.

We expect that these two mechanisms, in the context of the highly competitive European broadband market, will always be enough to ensure that best-effort Internet access services actually receive adequate resources.

For the reasons above, in the short-to-medium term, we do not foresee the need for a regulation that artificially guarantees minimum quality of service requirements for the Internet access services.

As foreseen by the European framework, NRAs may intervene in case of need to impose minimum quality of service requirements. Such minimum requirements (expressed in terms of throughput, latency and packet loss for example) might become relevant in the longer term, in case of future inclusion of fixed / mobile broadband service within the scope of the Universal Service. Such regulation would need significant efforts in order to put harmonized definitions and monitoring mechanisms into place on the required global scale.



**Question 12:** How should quality of service requirements be determined, and how could they be monitored?

**[Huawei]:**

See question 11

**Question 13:** In the case where NRAs find it necessary to intervene to impose minimum quality of service requirements, what form should they take, and to what extent should there be co-operation between NRAs to arrive at a common approach?

**[Huawei]:**

See question 11

**Question 14:** What should transparency for consumers consist of? Should the standards currently applied be further improved?

**[Huawei]:**

No comment.

## E. THE POLITICAL, CULTURAL AND SOCIAL DIMENSION

**Question 15:** Besides the traffic management issues discussed above, are there any other concerns affecting freedom of expression, media pluralism and cultural diversity on the Internet? If so, what further measures would be needed to safeguard those values?

**[Huawei]:**

This important debate should be undertaken with the entire value chain in mind and should not be confused with the debate around traffic management. Traffic management measures do not restrict consumers' fundamental rights, such as freedom of speech or privacy of telecommunications. They are concerned with the way the service is delivered, not with the actual content of the data carried over the network.

## F. ANY OTHER ISSUES

**[Huawei]:**

None.