ANGA
Der Breitbandverband

ANGA position on the draft BEREC Guidelines on Very High Capacity Networks (VHCN)

I. Introduction

ANGA The Broadband association represents more than 200 undertakings active in the German broadband market. The membership entails operators of different network topologies (hybrid fiber coax – HFC, fiber to the building or to the home – FTTB/H) but also vendors of network components. The network operators organized in ANGA can today provide broadband internet access to over 70 percent of German households. Current commercial offers go up to 1 Gbit/s – the future will show much higher speeds. Our members' networks are future-ready to meet ever increasing consumer demand for more broadband performance.

The deployment and take-up of VHCN is one of the objectives of the European Electronic Communications Code (EECC). The roll-out of VHCNs is key as only investment in VHCNs will underpin applications, business models and innovation that, in turn, will drive growth across the European economy and directly benefit European consumers. Investment and deployment of VHCN is also key to reach the European Gigabit society targets for 2025.

ANGA welcomes the possibility to give input to BEREC on draft their Guidelines on VHCNs. ANGA will comment on the following topics:

- BEREC's incorrect interpretation of the group of the "reference networks"
- Median (upload) speeds determined incorrectly for DOCSIS networks
- Questions relating to individual technical parameters

II. Detailed comments

1. BEREC's incorrect interpretation of the group of the "reference networks"

a) Legal basis – VHCN definition in the EECC

Article 2 (2) of the EECC defines VHCN networks as either an electronic communications network which consists wholly of optical fibre elements "at least" up to the distribution point at the serving location or an electronic communications network that demonstrates 'similar' network performance, under usual peak-time conditions, in particular in terms of down- and uplink bandwidth, resilience, error-related parameters, and latency and its variation.

Recital 13 specifies that, in case of a fixed-line connection, the "reference" network is an optical fibre installation up to a multi-dwelling building. The code doesn't specify any in-building technology and is hence technologically neutral in this regard.

Article 82 of the EECC requires BEREC to determine the criteria that a network needs to fulfil in order to be considered a VHCN by December 21, 2020. It also requires BEREC to update the guidelines by December 31, 2025 and regularly thereafter.

It is essential that the guidelines remain strictly within the scope of the EECC, i.e. do neither go beyond nor fall behind it – and are fact-based. It is also important that while drafting the guidelines, BEREC remains focused on the delivery of the European Gigabit society objectives without seeking to define a gold-standard "benchmark" network which is designed to meet long-term future needs, particularly as BEREC will need to revise the guidelines as technology evolves and upgrades are made in line with

demand. It is ANGA's point of view that BEREC failed to stay inside the parameters given to them by the EECC.

b) BEREC's best technology approach incompatible with technological neutrality

BEREC explains that because the EECC definition of VHCN is made in reference to a "*a certain type of electronic communications network and not only as a limited part of a network*", "*it is necessary to consider the network up to the end-user where the public network ends*" to determine the network performance of equivalent networks. However, without any convincing explanation and without any legal grounds, BEREC limits the performance thresholds 1 to the 'best' technology with regard to the achievable end-user QoS, i.e. G.fast on the in-building copper twisted pair and DOCSIS 3.1 on the in-building coax network.

ANGA believes that this approach is not covered by the provisions of the EECC. The Code doesn't define any requirements regarding the **inhouse access network behind the FTTB serving point.** Consequently, **all inhouse access technologies** should be considered when determining the performance of the relevant reference networks (xDSL, G.fast, DOCSIS, Ethernet, fiber etc.) and **all of them in their respective qualities**. Some of these technologies are subject to recent standardisation in ITU-T and were informed by BEREC. This ITU-T standadisation did not consider G.fast and DOCSIS 3.1. However, the findings of the recent February 2020 update to ITU-T Y 1540 relevant to the BEREC VHCN thresholds have not been made public. This gives rise to the question why BEREC did not request the results of this research when it apparently was aware of these efforts. ANGA emphasizes that all access technologies should be considered end-to-end when determining the performance of the complete network under the network operator's control.

As we see it, BEREC's approach is contradictory and raises a double-standard problem. On one hand, BEREC says that the definition of VHCN is not made in reference to a limited part of the network and that therefore end-user QoS needs to be taken into account. On the other hand, BEREC also says that the VHCN definition does not represent a unified concept and that it is sufficient to meet one criterion (criterion 1 or criterion 3 or both) to qualify as VHCN. More specifically, according to BEREC, "a network which qualifies as a VHCN according to criterion 1 does not necessarily fulfil criterion 3".

This means that a "stand-alone" FTTB network would not need to meet any QoS thresholds of criterion 3, whereas any other type of network, would need to be assessed on the basis of those thresholds. In other words, **the requirements to be met by 'similar' VHCN networks are stricter than the requirements underpinning the EECC's choice of "reference" VHCN**.

In essence, BEREC considers networks with a better performance than the largest portion of existing VHCN by definition (criterion 1) not to be 'similar' and thus not VHCN.

It is ANGA's belief that the Code didn't want the performance thresholds found by BEREC to be higher than the performance of the largest portion of today's FTTB networks. Interpreting the term 'similar' cannot extend 'FTTB' to 'FTTH' but has to fix the reference network, if not at the lowest performance level possible, at a performance level which represents the **actual average standard achievable by reference networks**.

c) ANGA's suggested way forward

ANGA therefore encourages BEREC to take into account achievable end-user QoS in a technological neutral manner, by comparing all in-building technologies used in the reference networks in the meaning of the EECC. Since the EECC does not specify the type of infrastructure or technology required between the distribution point and the end-user, we consider BEREC's proposed approach too narrow. Instead, we consider that BEREC should base the benchmark fixed network performance thresholds on the performance of either the lowest performing in-building technologies that exist in the market today, or the most common (such as VDSL over copper and both DOCSIS 3.0/3.1 over coax). The former would be more in line with the wording of the Code, and the principle of technological neutrality. The latter would at least ensure that non-FTTB/H

operators are held to the same performance standards as what is achievable by the majority of FTTB operators (and not a select elite few).

Finally, we also encourage BEREC to hold another stakeholder meeting soon after closure of the consultation but at least before finalising the VHCN guidelines.

2. Median (upload) speeds determined incorrectly for DOCSIS networks

At least as regards the median of upload speeds in fixed networks BEREC comes to a result that is not based on the underlying numbers communicated to them by network operators. More specifically, DOCSIS 3.0 is a current technology that was supplemented and integrated into a new standard that became DOCSIS 3.1 considered by BEREC as best technology.

However, operators were asked to distinguish between DOCSIS 3.0 and DOCSIS 3.1 in their answers to the questionnaire. Out of 19 operators only 3 considered DOCSIS 3.1 as the only best technology in upstream direction. All other operators considered DOCSIS 3.0 by itself or in combination with DOCSIS 3.1 as their current best technology. The median value for the reported upstream speeds are given in the table below.

Number of Operators	DOCSIS Version UP & DOWN	Upload Median Value
3	DOCSIS 3.1 only	100 Mbps
8	DOCSIS 3.0 only	110 Mbps
19	All Operators	100 Mbps

However, BEREC did not ask for other technologies such as DOCSIS 2.0 that some operators support in parallel in their metropolitan area access networks. It is common to provide coexistence and backward compatibility for older standards when upgrading existing networks to the latest technology at the expense of performance. In case any of the established networks are to compete with uprising new technologies such as 5G or G.fast they would have to drop backward compatibility to achieve VHCN status. Consequently, BEREC seem to suggest that operators drop support for e.g. UMTS, GSM, DOCSIS 2.0 and xDSL altogether.

At least one operator achieves 1 Gbps download and 200 Mbps upload with DOCSIS 3.0 technology. This shows that all DOCSIS 3.x based networks are capable of delivering very high data rates.

Since the performance thresholds are based on the median of the values reported by the network operators the median of the typically achievable uplink data rate is mathematically 100 Mbps considering all reports. ANGA wonders if BEREC accidently based their calculus on the arithmetic average of 160 Mbps. ANGA proposes that BEREC recognizes all parts of DOCSIS 3.x and sets the threshold to 100 Mbps based on the responses of all operators.

3. Questions relating to individual technical parameters

ANGA also has concerns regarding several individual technical parameters.

a) IP packet delay variation (RFC 3393)

Most recent research led to the inclusion of Annex B in ITU-T Y.1540. It was found that the range of Round Trip Time (RTT) variation should be $5 \leq ms \leq 250$ and that the range is higher than the minimum RTT. It is questionable if a value of 2 ms according to RFC 3393 can be upheld. ANGA proposes to drop the reference to RFC 3393 because of the new definition of this parameter in ITU-T Y.1540 in 02/2020 or at a minimum sets the IP packet delay variation to be equal to the minimum RTT of 10 ms.

b) Waterbed Effect between technical parameters has not been considered

The technical parameters examined by BEREC show interdependencies that seem not to have been considered. Some technical parameters derived by BEREC do not take into account that certain individual parameters cannot be maximized in real networks at the same time due to technical trade-offs. For instance, achieving maximum bandwidth is not at the same time possible as realizing a minimum value for error-related parameters, latency and its variation due to necessary protocol requests which consume bandwidth. This leads to values which can only be determined in a laboratory situation for a single parameter without having an eye on other dependent parameters. In several cases one value can only be improved by downgrading another value; meeting both criteria is impossible. One example is the interconnection between latency and achievable bandwidth. This and other omissions of the BEREC plan are addressed in the new Annex A of Y.1540.

c) Consideration of suitable technical standards

Y.1540 is a standard under heavy development. It specifically excludes measurements in Point-to-Multipoint environments and illustrates the limitations of Internet access related QoS and QoE research in Appendix XI. BEREC should consider new standards under development targeting measurement environments such as ETSI standardisation. The Guidelines should reflect that such specialized future standards will complement Y.1540 (12/19).

d) IP Service availability: Laboratory values?

The median value for IP service availability found by BEREC is 99.9 % per year. ANGA members specifically stated that the designed availability of the underlaying DOCSIS technology is 100% under normal operating conditions. In its simplest form, DOCSIS merely provides a closed envelope for the “to be transported IP” data load. The IP packets cannot fall out of this envelope by design. Abnormal operating conditions are specified in the scope of interface specification ANGA 100 001. Such abnormal operating conditions include test signal injection governed by regulation or arise as a result of a fault, maintenance and construction work or third party interference. Most notably, third party interference such as power outages at the customer site is a significant contributor to IP service availability in some countries. If BEREC sticks to such a high value it should at least be stated clearly in the guidelines that abnormal operating conditions have not been considered and may worsen the found value in practice.

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ANGA Der Breitbandverband e.V. vertritt die Interessen von mehr als 200 Unternehmen der deutschen Breitbandbranche. Die Unternehmensvereinigung setzt sich gegenüber Politik, Behörden und Marktpartnern für investitions- und wettbewerbsfreundliche Rahmenbedingungen ein.

Zu den Mitgliedsunternehmen zählen Netzbetreiber wie Vodafone, Telekom Deutschland, Tele Columbus (PYUR), EWE TEL, NetCologne, M-net, wilhelm.tel und eine Vielzahl von Technologieausrüstern. Sie versorgen insgesamt mehr als 20 Millionen Kunden mit Fernsehen und Breitbandinternet.

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