

**EOLO RESPONSE TO THE PUBLIC CONSULTATION BY BEREC ON DRAFT
BEREC GUIDELINES ON VERY HIGH CAPACITY NETWORKS**

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EOLO welcomes the opportunity to comment on the **Draft BEREC Guidelines on very high capacity networks**, issued according to Article 82 of the European Electronic Communications Code (hereinafter 'Code' or 'EECC').

The purpose of this communication is to provide EOLO considerations regarding the **definition of fixed network technologies supporting very high capacity networks**.

1. Definition of “fixed access network”

EOLO believes that before defining “Very High Capacity Networks” it is necessary to clearly define what is deemed to be **fixed access** infrastructure.

According to the technical taxonomy, fixed access architectures include:

- **wired network**: fixed access network based on copper, fiber, cable;
- **wireless network**: fixed access network in which fiber and/or other very high-capacity backhauling infrastructures reach a radio base station, while the so-called “last mile” (from the radio base station to the customer premises equipment) is connected using a wireless connection with a defined range of radio frequencies (from 3.4 GHz to 28 GHz).

In this regards we would like to report the Italian experience: AGCOM has clarified, with provision n. 292/18/CONS, that **FWA is a fixed access architecture** characterized by:

- the fact that fiber and/or other backhauling technologies reaches the base radio station;
- the user equipment is connected to the base radio station by using a **specific radio frequency range used exclusively for fixed services according to National frequency allocation plan** (from 3.4-GHz to 28 GHz).

This approach was confirmed in the last 3a/3b market analysis: AGCOM with provision n. 348/19/CONS has defined wholesale local access market as including the demand and supply of wholesale local access services at a fixed location **by means of copper, fibre and fixed wireless technologies**. The degree of substitutability between “fixed wired” and “fixed wireless” accesses has been evaluated according to the following indicator:

- the use of licensed frequencies,
- high quality of service,
- the presence of several operators that have deployed FWA networks,
- the growth of FWA access lines (about 1,3 million of active lines).



These above-mentioned indicators show that fixed wireless networks and wired network **are included in the same relevant market given its high degree of substitutability.**

It is not the case of mobile network that are not enabled to guarantee the minimum quality of services required by a service provided at a fixed location. In fact, as mentioned by AGCOM, in the mobile scenario, the number of customers connected/attached to a single radio station can't be established "ex ante" (because of "customer mobility") and this might result in saturation phenomena and performance degradation, whereas in the FWA scenario, it is always possible to have full control on the number of customers served by a radio base station (sharing the total bandwidth capacity of the BTS), by ensuring to maintain the requested quality of service.

In conclusion EOLO believes that BEREC Guidelines should clarify that fixed access network include both wired and wireless technologies (i.e. fixed wireless access). The declination of the criteria that a VHCN must fulfill shall take in account the above-mentioned definition of fixed access network.

2. Definition of the term 'Very High Capacity Network' (VHCN) in the EECC

Article 82 of the EECC entrusts BEREC to issue guidelines on the criteria to consider a network as a very high capacity network.

The Article 2(2) of the EECC gives a general definition of "Very Hight Capacity Network", according to which VHCN means:

1. either **an electronic communications network which consists wholly of optical fibre elements at least up to the distribution point at the serving location;**
2. **an electronic communications network which is capable of delivering, under usual peak-time conditions, similar network performance in terms of available downlink and uplink bandwidth, resilience, error-related parameters, and latency and its variation'.**

Regarding the point 1, recital (13) specify that *"future 'very high capacity networks' require performance parameters which are equivalent to those that a network based on optical fibre elements at least up to the distribution point at the serving location can deliver. In the case of fixed-line connection, this corresponds to network performance equivalent to that achievable by an optical fibre installation up to a multi-dwelling building, considered to be the serving location. In the case of wireless connection, this corresponds to network performance similar to that achievable based on an optical fibre installation up to the base station, considered to be the serving location"*.



In the Draft guidelines BEREC has detailed the criteria that any network has to fulfil (one or more) to be considered a very high capacity network (criterion 1 and 2 result from the EECC):

- **Criterion 1:** Any network providing a fixed-line connection with a fibre roll out at least up to the multi-dwelling building.
- **Criterion 2:** Any network providing a wireless connection with a fibre roll out up to the base station.
- **Criterion 3:** Any network providing a fixed-line connection which is capable of delivering, under usual peak-time conditions, services to end-users with the following quality of service (performance thresholds 1):
 - a) Downlink data rate ≥ 1000 Mbps
 - b) Uplink data rate ≥ 200 Mbps
 - c) IP packet error ratio (Y.1540) $\leq 0.05\%$
 - d) IP packet loss ratio (Y.1540) $\leq 0.0025\%$
 - e) Round-trip IP packet delay (RFC 2681) ≤ 10 ms
 - f) IP packet delay variation (RFC 3393) ≤ 2 ms
 - g) IP service availability (Y.1540) $\geq 99.9\%$ per year
- **Criterion 4:** any network providing a wireless connection which is capable of delivering, under usual peak-time conditions, services to end-users with the following quality of service (performance thresholds 2).
 - a) Downlink data rate ≥ 150 Mbps
 - b) Uplink data rate ≥ 50 Mbps
 - c) IP packet error ratio (Y.1540) $\leq 0.01\%$
 - d) IP packet loss ratio (Y.1540) $\leq 0.005\%$
 - e) Round-trip IP packet delay (RFC 2681) ≤ 25 ms
 - f) IP packet delay variation (RFC 3393) ≤ 6 ms
 - g) IP service availability (Y.1540) $\geq 99.81\%$ per year



The point 20 of the draft Guidelines specifies that a **‘Wireless Very High Capacity Network’ (a network that fulfill criterion 2) should be considered “equivalent to a ‘Fixed Very High Capacity Network” only if it fulfills also the criterion 3.**

Eolo does not agree with this approach: according to definition of fixed network given at paragraph 1 and following the definition of art 2(2) EECC, a fixed network should be considered as “VHCN” if is based on optical fiber elements at least up to the distribution point at the serving location can deliver. This means:

- **wired fixed network:** installation of the fiber up to multi-dwelling building;
- **wireless fixed network:** installation of optical fiber up to the base station, considered to be the serving location.

According to the above definition, a **“fixed wireless access network” (FWA) does not have to fulfill criterion 3 if the optical fiber is installed up the base station.** In fact, in this case it a “VHCN ready” network that may be upgraded to “Gigabit performance” as soon as 5G technology will be deployed.

As highlighted by BEREC, 5G will be deployed after VHCN Guidelines enter into force. This means that 5G has not yet sufficiently deployed to understand the real impact of this technology on the market, especially on wireless fixed network. In fact, 5G fixed wireless access (FWA) will become the most important application of the 5G standard, enabling, as the 5G rollout continues, speeds to start increasing toward that 1Gb and perhaps beyond (and the achievement of the performance required by criterion 3).

In this scenario 5G FWA represent the faster, economic and flexible way to assure the achievement of Gigabit Society objectives especially in rural areas, where it’s not economically viable to have a fiber connection up to multi-dwelling building.

Therefore, in this respect, FWA networks in which optical fiber is installed up to the base station shall be considered a fixed VHCN network because it could be easily upgraded to “Gigabit performance” as soon as the 5G technology will be deployed.

It is not true for FTTC technologies, in which the fiber is installed up to the street cabinet and the last mile (from street cabinet to the customer premises) is still copper: in this case the use of technologies like VDSL are like to improve the performance of the access line but this improvements are strictly related to the length of copper lines. For this reason, these technologies do not assure, also in the future, performance comparable to FTTH and are able to discourage investment in “VHCN” as they are:



- just a mere modernization of the existing copper network;
- cheaper and faster to develop.

In light of the above EOLO considers necessary to amend the definition at the point 20 of the Draft Guidelines as the following: a “Fixed wireless network” should be considered a VHCN network if the fiber is installed up to the base station without the need to fulfill other criterion.

About EOLO

EOLO S.p.A. is an Italian Internet Service Provider and the main ultra-broadband FWA operator both for households and business. EOLO has been established aiming at: i) creating an offering of fixed radio links with the same or higher quality of a cable connection, that can reach digital divide Italian areas; ii) creating a radio network using the best technologies and the highest quality standards with a 100% proprietary network. Today, EOLO is covering around 6,000 municipalities in Italy (out of 8,000), with a network of around 3,000 BTS that enables to connect almost 500.000 households and businesses in Italy. In January 2018 was launched its new “EOLOWaveG” UBB FWA network that is able to reach up to 100 Mbps by means of 26/28GHz licensed frequency.

In the last financial year, EOLO’s revenues were 160 million euro, with a 26% increase compared to the previous one.

EOLO has more than 470 employees, located in its Busto Arsizio (Varese) headquarter, as well as in its Rome and Padua-based operative offices and counts on a network of over 10,000 employees among collaborators, technicians and commercial partners in the area.

EOLO is member of European Competitive Telecommunications Association (**ECTA**).