



RADIO SPECTRUM POLICY GROUP
STRATEGIC SPECTRUM ROADMAP TOWARDS 5G FOR EUROPE
DRAFT RSPG Second Opinion on 5G networks

EOLO response to the public consultation

3 January 2018



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1. Introduction

EOLO welcomes this call for public input issued by the Radio Spectrum Policy Group (RSPG) with the aim to contribute actively to the development of Europe's spectrum policy strategy on 5G.

By recalling specific sections of the draft RSPG second opinion, this document provides EOLO's position on each addressed topic. Before that, it is provided a brief description of the company as well as a short overview of the Fixed Wireless Access (FWA) in the Italian market.

2. About EOLO

EOLO SpA is a telecommunications company focused on providing broadband and ultrabroadband services to residential and business customers by means of its own Fixed Wireless Access network.

In 2014, the Italian Ministry of Economic Development selected EOLO for co-financing projects aimed to bring broadband services in "white areas" located in 5 Italian regions (i.e. Liguria, Emilia Romagna, Marche, Umbria and Abruzzo).



Coverage of the EOLO's FWA network

Nowadays, with more than 280.000 residential and business customers placed in 13 regions and 5.200 municipalities, EOLO manages one of the most extended fixed wireless broadband (FWB) networks in the world, made of 2.000 radio sites, interconnected through fiber and radio links for backhauling.

EOLO currently provides connectivity up to 30 Mbps to consumers and up to 1 Gbps (symmetrical and guaranteed) to the businesses. Furthermore, EOLO has already started to deploy a new FWA network infrastructure which supply UBB services up to 100 Mbps to the consumers. Commercial launch of 100 Mbps connectivity services is already started in 5 municipalities.

EOLO's last balance sheet (March 2017) outlined a yearly gross revenue of 75,5 mln € (+32% compared to 2016), and up to 200 mln € of network investment in the next 3 years (2018-2020).

3. About FWA in Italy

The Ultra-Broadband Strategy¹ issued in 2015 by the Italian Government has already appreciated the **strategic role of Fixed Wireless Access** in the achievement of the first and second targets of Digital Agenda for Europe (DAE) 2020.

Thanks to its infrastructural features, the **FWA industry is mainly focused on sub-urban, rural and less populated areas**, where the number of households with a BB/UBB connection is substantially lower than the

¹ Strategia italiana per la banda ultralarga; Presidenza del Consiglio dei Ministri (2015), http://www.agid.gov.it/sites/default/files/documenti/indirizzo/strategia_bul_nov_2014.pdf

“urban” average. By providing UBB performances, FWA networks should be promoted especially considering the reduced costs and timing of deployment with respect to FTTH/FTTC networks.

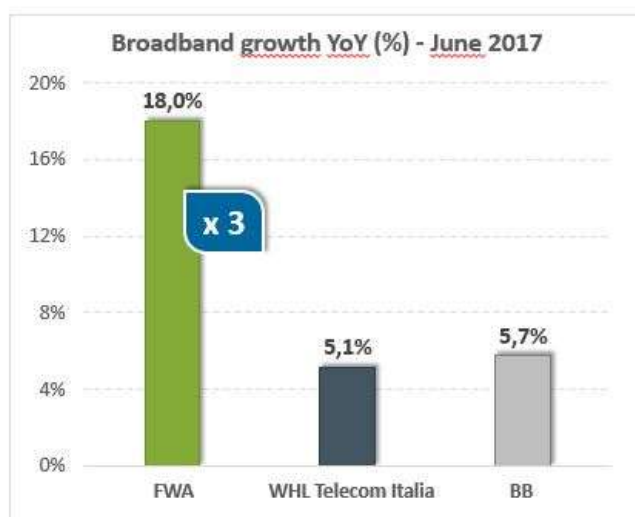
Furthermore, since in Italy the privileged TV distribution channel has always been *wireless broadcasting*, it has never been developed a cable infrastructure, and hence, **the only concrete alternative to legacy networks (i.e. copper) for providing streaming TV services in sub-urban and rural areas is represented by FWA.**

As depicted below, in the last 12 months the FWA market has increased of 150.000 lines and, in September 2017, the FWA lines reached 1 million. Moreover, in the last year, FWA lines have grown more than 3 times compared to both wholesale Telecom Italia’s lines and the total of broadband lines.

Finally, it is worth mentioning that FWA operators hold 6% of broadband market share and 4% of ultra-broadband market share.



Source: Osservatorio trimestrale AGCOM 3-2017



Source: Osservatorio trimestrale AGCOM 3-2017

In the light of above, with almost **1 million of business and residential customers**, FWA Italian sector is ready to play a key role in the Italian plan for Ultrabroadband and 5G.

4. EOLO’s overall position on the “Strategic spectrum roadmap towards 5G for Europe”

EOLO would like to put beforehand that **5G cannot be considered as a simple upgrade of mobile networks (i.e. LTE 4G)**, but must be evaluated as a **new paradigm of wireless communications, whether fixed, nomadic and mobile**, able to provide universal access to ultrabroadband for each European citizen.

In fact, 5G-PPP noted that 5G “*is not only a new radio but also a framework that integrates new with existing technologies to meet the requirements of 5G applications*”².

² 5G PPP Architecture Working Group; View on 5G Architecture (June 2016).

In this regard, **Fixed Wireless Access can be recognised as a 5G-ready technology** considering the compliance with performance features recently given by the European Commission³ and the ITU⁴ for 5G and future wireless communications:

- “*downlink user experienced data rate*” equal to 100 Mbps and “*uplink user experienced data rate*” equal to 50 Mbps;
- “*average spectral efficiency*” equal to a 7,8 bps/Hertz (downlink) and 5,48 bps/Hertz (uplink);
- “*peak spectral efficiency*” equal to 30 bps/Hertz (downlink) and 15 bps/Hertz (uplink);
- “*user plane latency*” equal to 5ms.

Many evidence of that can be easily recognised in a **wide range of 5G trials based on FWA technology** which are currently ongoing not only across Europe but also in the United States, Canada, Japan and South Korea.

Primary examples of 5G services are given by Verizon, AT&T and T-Mobile, that in USA, in 2017, starting to use millimeter waves with Fixed Wireless Access technology. Even in Canada, Telus and Huawei have begun a trial on FWA technologies for 5G services.

In Japan and in Korea there are similar examples. Softbank and Ericsson announced trial for 5G services with FWA technology. Huawei and NTT DoCoMo have successfully tested FWA technology for 5G. Korea Telecom is working with Ericsson to test fixed and mobile 5G technologies to launch pre-commercial testing.

At European level, in UK, Arqiva has launched in 2017 5G FWA trials in partnership with Samsung to demonstrate the stability of the FWA service, and its potential as a fast-to-market and cost-effective alternative to fibre for connectivity to homes and businesses; finally, in Ireland, Imagine and Huawei have created a partnership to deliver 5G FWA services in 200 Mbps.

In the light of above, EOLO fully shares the RSPG’s goal relating to the necessity that benefits of 5G-based services would be “*available to all European citizens in a timely manner, driving industrial and societal transformation and economic growth in Europe from 2020 and beyond*”.

Nevertheless, in order to achieve the mentioned goal, **EOLO considers of utmost importance to include FWA technology within the Europe’s spectrum policy strategy**, taking into account the key role that FWA sector is representing especially in the so called “challenge areas” (i.e. sub-urban, rural and mountainous areas) where no sufficient investment in traditional wired networks (copper, fiber) are expected in the next few years. Indeed, FWA currently allows to supply very high capacity connectivity services through radio spectrum, without requiring the deployment of ducts and cables for the so called “last mile” segment, thus assuring highly reduced time and cost of deployment compared to traditional networks.

Furthermore, as shown in the picture below, **if we concentrate only on mobile technology, we would seriously risk fostering a new 5G digital divide** given that mobile operators are still wrapping up the consolidation of 4G networks, and there are not sufficient incentives and financial resources for developing 5G networks.

In the most optimistic scenario of 5G investments in all urban areas and major terrestrial transport, less than 20% of the population would be covered by 5G services within the next 10-15 years.

³ Commission staff working document on 5G global developments accompanying the Communication from the Commission to the EP, the Council, the European Economic and Social Committee and the Committee of the Regions “5G for Europe: an action plan”; EC (Sep 2016).

⁴ “Draft new report ITU-R - Minimum requirements related to technical performance for IMT-2020 radio interface(s)”; Working Party 5D dell’ITU-R (February 2017).

This aspect appears to be very critical for RSPG's "goal being that the benefits of 5G-based services are **available to all European citizens in a timely manner**".



5. EOLO's comments on "The RSPG Second Opinion on 5G networks"

EOLO welcomes RSPG's opinion "that Member States will need flexibility in the way they authorise access to spectrum, for example: appropriate geographical areas (e.g. national, regional, city or hyper-local, e.g. for use in a factory), individual licencing or under a general authorisation framework"⁵.

5.1 Geographical sharing

The "geographical sharing" of radio spectrum could be extremely suitable to maximise benefits of 3.6 GHz and 26 GHz pioneer bands, which are likely to be used, through small cells, to provide very high capacity in the most populated areas while risk to be extremely underutilised out of these contexts due to technological and financial constraints. In this case, it is important to underline that these bands have already been associated with **worthy FWA use-cases, able to provide high coverage (i.e. 3.6 GHz) and ultrabroadband connectivity (i.e. 26 GHz) in sub-urban and rural areas**.

According to this, already in 2015, the Italian NRA Agcom provided a still effective mechanism of geographical sharing within the assignment and usage rules of the 3.6 – 3.8 GHz band⁶. In fact, Agcom identified two different types of areas in which separately assign the frequencies: "Urban area" and "Rural area".

Finally, it is worth noting that geographical sharing could be already implemented given the availability of FWA network equipment working in 3.4 – 3.8 GHz band.

⁵ RSPG Second Opinion on 5G networks - page 4 point 1; Radio Spectrum Policy Group (November 2017).

⁶ At the end of 2015, AGCom published the Decision n° 659/15/CONS on "Procedures and rules on allocation and usage of available 3.6-3.8 GHz spectrum band". However, allocation procedures are still on responsibility of the Ministry for Economic Development.

5.2 “Rural areas and wide coverage”: FWA is much more suitable than satellite technology

Even if EOLO strongly supports the RSPG’s opinion “that the Commission, together with Member States, should take actions to fully support 5G related policy objectives in rural areas and wide coverage”⁷ it is important to underline that **Fixed Wireless Access, much more than satellite, is continuously contributing to provide ultrabroadband access in the less dense populated areas, both in terms of coverage (supply side) and customer base (demand side).**

As already mentioned, in Italy, FWA operators hold 6% of broadband market and 4% of ultra-broadband market by providing BB/UBB services, especially in sub-urban and rural areas where no comparable (in terms of performance) wired services are available.

In the light of above, it is of utmost importance to include Fixed Wireless Access technology within the Europe’s spectrum policy strategy toward 5G.

5.3 Anti-hoarding and “use it or lose it” clauses

Regarding transfer of rights of use, EOLO agrees with RSPG’s opinion “that all commercial licences in frequency bands identified for 5G within the Member States should be subject to **trading or leasing** to enable new market opportunities”⁸. Indeed, these two mechanisms can represent an important tool of flexibility, necessary in a context of fast technology development as that of 5G introduction.

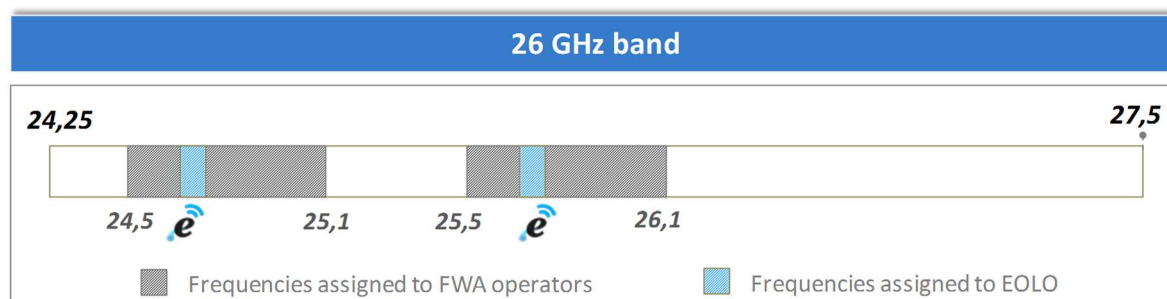
However, the same rights of use subject to trading or leasing should be allocated through **procedures able to prevent the so-called spectrum over-hoarding** that could be to detriment to effective competition.

Moreover, we welcome the provision of **use-it-or-lose-it** clauses, as well as **spectrum reserves** for new entrants, with the aim of ensuring the best efficiency of spectrum usage and prevent the spectrum over-hoarding by the major mobile operators.

5.4 The 26 GHz pioneer band in the FWA’s view

Regarding **26 GHz band**, EOLO welcomes the RSPG’s proposal of an individual license regime to maximise the efficient use of the frequencies⁹.

According to the current state of art in Italy, as described in the picture below, **a portion of 26 GHz band has been assigned to FWA operators.**



⁷ RSPG Second Opinion on 5G networks - page 4 point 2; Radio Spectrum Policy Group (November 2017).

⁸ RSPG Second Opinion on 5G networks - page 4 point 7; Radio Spectrum Policy Group (November 2017).

⁹ Note that individual license is the regime currently in place for 26 GHz spectrum band assigned to fixed wireless access in Italy (24.450 – 25.190 MHz and 24.445 – 26.117 MHz)

Hence, if the European Commission would “include as part of any technical harmonisation for the 26 GHz band the requirements to maintain the possibility for continued development of incumbent satellite services”, it is worth underling that fixed wireless access should be included as well.

Moreover, the above picture shows the feasibility for Italy to “make by 2020 a sufficiently large portion of the band, e.g. 1 GHz, available for 5G in response to market demand” while preserving current fixed wireless access usages as more than 2 GHz are already available for further 5G services (in addition to 5G FWA services).

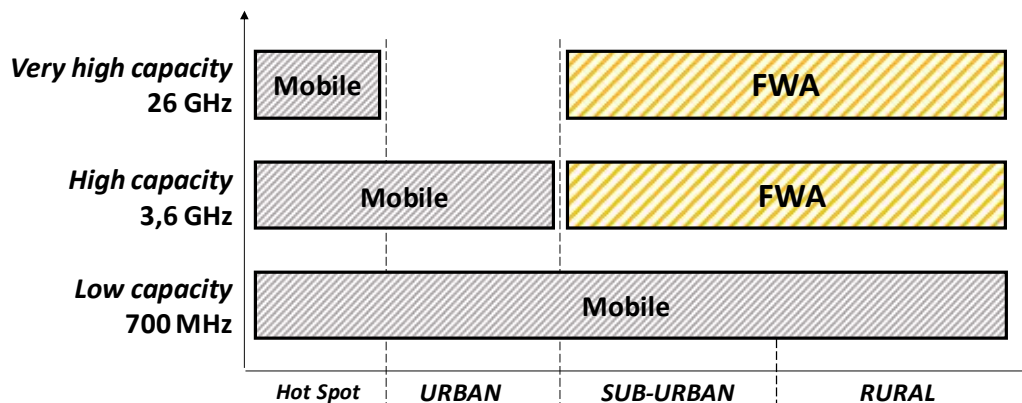
We would like to remark that, thanks to an investment of around 10 million Euros, EOLO has obtained by the Italian Ministry for Economic Development the exclusive right of use of a paired 56 MHz block within the 26 GHz band in all the Italian regions (together with a paired 112 MHz block within the 28 GHz band). Making use of this band, **EOLO has started to deploy a very high capacity fixed wireless network (named EOLO wave-G) able to provide connectivity up to 100 Mbps in the context of sub-urban and rural areas.**

Therefore, with the aim to **recover private investment on 5G-ready asset, the renewal of existing rights of use on 26 GHz band should be included in the European spectrum strategy for 5G.**

6. EOLO’s comments on “A2.1.3 - Spectrum sharing with fixed service”

EOLO welcomes RSPG’s opinion that “it may be possible to deploy 5G small cells within the same frequency range as some of the existing fixed links”²⁰ by applying a “geographical sharing” mechanism.

According to the picture below, a geographical sharing mechanism based on population density (i.e. urban vs rural areas) could be applied for both 26 GHz and 3.6 GHz bands as 5G FWA networks will be deployed in those sub-urban and rural areas where mobile operator will not make use of 26 and 3.6 GHz bands.



In the context of 26 GHz and 3.6 GHz¹⁰ band assignment, regarding RSPG’s opinion that “in areas where adequate coexistence cannot be achieved, it will be necessary for existing fixed service links to be cleared to allow 5G deployment”, first of all, we strongly believe that there is space for **renewing existing rights of use on 26 GHz band and, as “second best” solution, for applying the “geographical sharing” mechanism depicted above.**

As a complementary solution, **with the aim to provide FWA with further spectrum sources thus guaranteeing and fostering 5G implementation in sub-urban and rural areas, EOLO invites RSPG to evaluate the viability to reserve the 3.8 – 4.2 MHz band (contiguous to 3.4 – 3.8 GHz band) for 5G FWA services.** At the moment, there is no network equipment able to work in 3.8 – 4.2 MHz band; nevertheless, it could be available starting from 2019-2020, considering at most 18-24 months for its development.

¹⁰ In which FWA uses are in place as well.

7. EOLO's comments on "A2.1.4 - Sharing with other co-primary services"

In this context, considering that *"in some Member States existing users of the 26 GHz band include operators of Wireless Local Loop (WLL) systems that follow CEPT Recommendation T/R 13-02 and ECC/REC/(11)01, under individual licenses"*, EOLO strongly agrees with the RSPG's opinion that *"Harmonisation measures should then consider the need for appropriate coexistence plans"*, especially in the most remote areas where small cell use cases seem to be hardly implemented in the next years.

However, it is necessary to note that **Fixed Wireless Access should be fully recognised as a 5G-ready technology**, considering the compliance with performance features recently given by the European Commission and the ITU¹¹, **and therefore be included within the Europe's spectrum strategy toward 5G with provision of enough spectrum sources**. In this way, it should be also possible to solve the issue¹² rose by the RSPG about the availability of specific 5G technology for rural and sparsely populated areas.

Regarding the following RSPG's opinion *"Concerning the 26 GHz band, we expect that the impact of satellite Earth stations on the deployment of 5G networks could be minimised if they are deployed in sparsely populated areas, away from major conurbations. Administrations are encouraged to maintain the possibility for additional earth stations to be deployed in their territory"*, it is EOLO's view that the same proposal should apply to fixed wireless access, which (as stated before) often led to overcome the digital divide in many European countries.

8. EOLO's comments on "A2.4.2 - 5G coverage challenges"

EOLO does not share RSPG's opinion *"To be able to fully support 5G related policy objectives in these kind of rural and sparsely populated areas, there is a need to investigate solutions to address these geographical areas including further technology developments especially targeting rural and sparsely populated areas, but also taking into account the role of satellite in achieving ubiquitous connectivity. This work can be driven by industry, the Commission and the Member states"*.

We believe it is fundamental to recognize the role of FWA in rural areas, as a matter of fact it is valuable to consider that fixed wireless access is more suitable than satellite connectivity, because FWA is continuously contributing to provide ultrabroadband access across rural and sparsely populated areas.

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¹¹ For further information, see par. 3 of the present document.

¹² RSPG Second Opinion on 5G networks - page 17: *"To be able to fully support 5G related policy objectives in these kind of rural and sparsely populated areas, there is a need to investigate solutions to address these geographical areas including further technology developments especially targeting rural and sparsely populated areas, but also taking into account the role of satellite in achieving ubiquitous connectivity. This work can be driven by industry, the Commission and the Member states"*