

TIM response to RSPG Opinion on 5G implementation challenges (RSPG 3rd opinion on 5G) (RSPG18-036)

26 November 2018

Executive Summary

- TIM agrees with RSPG that large contiguous spectrum blocks (in the order of 80/100 MHz per operator) are necessary in the 3.6-3.8 GHz band to provide 5G networks with high data throughput and better performance compared with the current mobile technologies.
- However, where different portions of the band are made available to the market in different times, blocks of smaller sizes should be offered in the subsequent spectrum awards to allow the operators to complete their frequency resource assets up to the maximum spectrum cap allowance.
- As to the defragmentation process, TIM agrees with the RSPG that different approaches at national level might be followed considering the guidance provided by ECC Report 287.
- Any potential change of existing rights of use towards 5G should be granted in an equivalent manner and under equality of treatment to all holders of the rights of use without any discrimination. In particular, the holders of these rights of use should be subject to the same obligations and rules as those applied to the holders of new 5G rights of use obtained through a competitive auction.
- TIM agrees with RSPG that it is necessary to phase out legacy ECS uses in the 3.4 – 3.8 GHz band which are not compatible with the 5G harmonised technical conditions.
- Fixed service applications should be relocated to other bands (e.g. 5.925 – 6.425 GHz and 6.425 – 7.125 GHz) and any possible interference issue to 5G system(s) coming from new earth stations of the EESS/SRS services should be coordinated, managed and solved by the satellite service operator responsible for the new earth station.
- Connectivity for vertical industries should not be provided in dedicated spectrum since reserving frequencies to verticals would reduce the spectrum available to 5G mobile networks and increase the spectrum fragmentation. MNOS' 5G networks are suitable to satisfy all the connection needs of the verticals.

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1. Introduction

TIM welcomes the RSPG's decision to submit to public consultation its third Opinion on 5G.

TIM is deeply involved in the discussion on 5G frequencies assignment and use rules as only portions of 5G Pioneer bands have been awarded in Italy¹ so far and other portions, e.g. in the 3.4 – 3.6 GHz band, could be made available to 5G mobile service in the future.

TIM is aware of the importance of adopting fair spectrum rules and policies which could foster the development of 5G networks and services in Europe.

TIM is working with the Italian and European institutions to respect all the milestones of the 5G roadmap outlined by the European Commission and to be ready with the launch of 5G services by 2020.

To that aim, TIM concluded its participation in the recent Italian auction of 5G frequencies with successful bid of 2 x 10 MHz FDD in the 700 MHz band, 80 MHz TDD in the 3.6-3.8 GHz band and 200 MHz TDD in the 26.5-27.5 GHz band.

Moreover, following a call of the Italian Ministry of Economic Development, since September 2017 TIM and its partners has been awarded temporary rights of use in the 3.7-3.8 GHz band in the cities of Bari and Matera to perform pre-commercial 5G trials.

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TIM has started to provide 4.5G services (download speed around 700 Mbit/s) in a significant number of main Italian cities and demonstrated a “4.9G” application in Turin.

2. Defragmentation of the 3.4-3.8 GHz band

TIM agrees with RSPG that large contiguous spectrum blocks (in the order of 80/100 MHz per operator) would facilitate a step change in terms of data throughput and better performance compared with the current mobile technologies.

TIM also agrees with the draft RSPG recommendation that Member States (MS) should design spectrum award mechanisms that provide the opportunity to obtain sufficiently large contiguous spectrum blocks.

Spectrum award mechanisms should be designed considering the 3.4-3.8 GHz band in its entirety, also where national situations lead to spectrum award mechanisms that make available different portions of the band in different times. This is compliant with the *RSPG 1st Opinion (Opinion on spectrum related aspects for next-generation wireless systems (5G))* published in November 2016 which considers “the 3400-3800 MHz band to be the primary band suitable for the introduction of

¹ 2x30 MHz FDD @700 MHz, 200 MHz TDD @3.7 GHz, 1 GHz TDD @26 GHz awarded. 3x5 MHz SDL @700 MHz were auctioned but not awarded, while @26 GHz 2.25 GHz still to be cleared.

5G -based services in Europe even before 2020”.

In situations where different portions of the same band are made available to the market in different times, the award mechanisms should be designed to potentially equip each operator in the 3.4-3.8 GHz band with the maximum spectrum cap allowance throughout all the award processes. While pursuing the goal of large contiguous spectrum blocks since the beginning, the mechanisms of subsequent spectrum awards should be designed to offer blocks of smaller sizes, for the sake of a better optimisation of spectrum assignments.

This would enable the assignees of previous tenders to complete their frequency resource assets also in the presence of caps regarding the whole 3.4-3.8 GHz band, which would be otherwise exceeded by large bandwidth blocks².

As to the defragmentation process, TIM agrees with the RSPG’s view that different approaches at national level might be followed to take into account different national legacy situations and competitive landscape.

In general, the defragmentation process should consider possible means to compensate operators for their investments made following previous spectrum awards.

Furthermore, TIM agrees with the RSPG recommendation to consider the guidance provided by ECC Report 287 aiming at re-organizing the fragmented band to make it suitable for high throughput 5G applications.

In this respect, spectrum trading is already considered in the mentioned report as a possible defragmentation tool to be applied on a commercial basis.

TIM remarks that any potential change of existing rights of use to allow them to be used for 5G services must be granted in an equivalent manner and under equality of treatment to all holders of the rights of use without any discrimination in order to avoid that potential competitors in the same market hold an unjustified market advantage.

In addition, the price settings of any potential change of existing rights of use to allow them to be used for 5G services should be inspired to proportionality and equity criteria and should take into account the reconfiguration and customers migration costs both from a technical and a commercial point of view. In particular, the price paid by the operators for the rights of use granted in portions of the 3.4-3.8 GHz band by the means of a competitive auction should be duly taken into account to prevent disproportions between the prices paid for similar resources by the potential competitors in the same market.

Changes of existing rights of use to allow them to be used for 5G services should be subject to the same obligations and rules (e.g. obligations in terms of coverage, roaming, access, sharing, spectrum trading, etc.) as those applied to the holders of new 5G rights of use obtained through a competitive auction in the 3.4-3.8 GHz band, to prevent disproportions in the investment requested for the exploitation of similar resources between subjects which compete in the same market.

However, where spectrum trading is allowed, this should not happen before a reasonable period of time to prevent frequency hoarding, arbitrage and financial speculation, in particular when the upgrade to 5G applications leads to an increased frequency value.

² For instance, in Italy, two 80 MHz blocks and two 20 MHz blocks in the 3.6-3.8 GHz band have been already auctioned with 100 MHz spectrum cap on the whole 3.4-3.8 GHz band, while 74 MHz, still to be made available in the 3.4-3.6 GHz band, could be auctioned in the future. Designing proper block sizes in the possible subsequent auction would allow each bidder to potentially accomplish the spectrum cap allowance.

3. Phasing-out of the ECS services in the 3.4 – 3.8 GHz band

TIM agrees with RSPG that it is necessary to phase out legacy ECS uses in the 3.4 – 3.8 GHz band which are not compatible with the 5G harmonised technical conditions. However, as previously mentioned, different national legacy situations, competitive landscape, operators' compensation issues should be taken into due account before the development of the phase out plan.

Clearing the band is a requirement for its effective exploitation by 5G applications and services, whose characteristics (low latency, real-time interactivity, always-on connection with the cloud, low power consumption, connected objects operations and so on) could be severely affected by interferences.

In this respect, TIM notes and agrees with the recommendations of the ECC Report 287 mentioned above, i.e. “assess the possibility to relocate the fixed service to another band” (e.g. 5.925 – 6.425 GHz and 6.425 – 7.125 GHz).

As to the coexistence between incumbent satellite services (FSS and EESS/SRS) and 5G applications, also in consideration of the respective propagation characteristics and the limited number of earth stations in this band, TIM shares the conclusion of the already mentioned ECC report that:

- 1) “in areas not intended for 5G, administrations could consider maintaining existing FSS installations”;
- 2) “in the areas where 5G is intended administrations are recommended not to issue authorisations to new sites in this band for FSS and to consider the higher bands”.

In any case, should any new earth station be installed, it should be respectful of existing/planned 5G antennas and base stations, to avoid unexpected interferences. Furthermore, any possible interference issue to 5G system(s) coming from new earth stations should be coordinated, managed and solved by the satellite service operator responsible for the new earth station, to preserve the expected 5G systems reliability.

4. Verticals connectivity

TIM does not share the RSPG's observation that connectivity for vertical industries could be provided in dedicated spectrum.

Indeed, dedicating bands for verticals would reduce the spectrum available to 5G mobile networks and increase the spectrum defragmentation. There is also the risk of under-using the spectral resources if the verticals do not fully exploit those frequencies.

There is also the risk of competition distortion if the dedicated frequencies are assigned to the vertical industry at much lower prices than the frequencies assigned to mobile operators since they would compete in the same business and for the same vertical customer base the 5G systems have been designed for.

The global footprint of 5G services and applications needs that a distinctive standard is implemented based on IMT technologies and deployed both in identified/assigned IMT frequency bands and unlicensed bands specifically harmonised. On the contrary, the allocation of frequency resources to vertical applications could lead to the development of “non-standard” solutions, that cannot interoperate with the 5G environment (for example, with smart city and smart grid integrated solutions) and that could become outdated in a very short time.

The main technological step change of 5G networks is their capability to serve the very different needs of final users and verticals through technical solutions such as slicing, Software Define Network (SDN) and Network Function Virtualization (NFV). The operators shall guarantee the Verticals compliance with the requirements and where necessary define specific dedicated SLAs.

MNO's 5G networks are suitable to satisfy all the connection needs of the verticals. Clear "verticals needs" should be first carefully assessed in order to evaluate whether they really cannot be met by mobile operators prior to ponder other solutions.

In any case, if verticals deem that the MNOs' connectivity is not sufficient to satisfy some specific needs, verticals could compete with the TLC operators for the assignment of 5G frequencies under the same terms and rules (i.e., authorization to provide ECS services, same obligations, same assignment rules, etc).

In addition, spectrum leasing at commercial level is another tool which could be used for providing local needs of vertical players.