



ecta RESPONSE

**TO THE PUBLIC CONSULTATION BY
BEREC ON THE**

**DRAFT REPORT ON PRACTICES AND
CHALLENGES OF THE PHASING OUT OF
2G AND 3G**

BOR (23) 111

31 JULY 2023

1. Introductory remarks and key ecta considerations

1. ecta, the [european competitive telecommunications association](https://www.ectaportal.com/about-ecta),¹ welcomes the opportunity to provide feedback on the public consultation launched by BEREC on 14 June 2023 on a “*DRAFT BEREC REPORT ON PRACTICES AND CHALLENGES OF THE PHASING OUT OF 2G AND 3G*” (hereinafter “the draft Report”).
2. ecta represents those alternative operators who, relying on the pro-competitive EU legal framework that has created a free market for electronic communications, have helped overcome national monopolies to give EU citizens, businesses and public administrations quality and choice at affordable prices. ecta represents at large those operators who are driving the development of an accessible Gigabit society, who represent significant investments in fixed, mobile and fixed wireless access networks that qualify as Very High-Capacity Networks (hereinafter “VHCN”) and who demonstrate unique innovation capabilities. ecta counts Mobile Network Operators (hereafter ‘MNOs’), Fixed Wireless Access operators (hereafter ‘FWA operators’) as well as Mobile Virtual Network Operators (hereafter ‘MVNOs’) among its members.
3. ecta warmly welcomes BEREC’s initiative. ecta notes that the draft Report primarily concerns 2G/3G shutdown and its consequences, by focusing primarily on the threats and opportunities of such phase-out, including the impacts on emergency communications and legacy systems. ecta believes that BEREC’s draft Report, once finalized, could provide a useful contribution, in addition to the RSPG opinion on “*MOBILE TECHNOLOGY EVOLUTION – EXPERIENCES AND STRATEGIES*”² adopted on 15 February 2023, and to decisions that will be taken in relation with 2G/3G shutdown.
4. **ecta generally agrees with the overall picture provided in the draft Report by BEREC on the impacts and challenges related to 2G and 3G phase-out.**
5. ecta in particular fully agrees with RSPG, where based on the feedback from a questionnaire and workshop, RSPG “*recalls the positive impact from technology neutrality and infrastructure competition towards evolution to newer radio technologies*”. ecta is happy to note that BEREC also reports this in its draft Report.
6. ecta firmly believes that the technology neutrality principle, and competition in all its forms, including infrastructure and service-based competition, are core enablers of innovation and investment in new technologies in telecoms markets, for the benefit of European society. In addition, those principles which are at the heart of the EU regulatory framework for electronic communications have been key for ensuring an inclusive European telecommunications market that is beneficial to end-user interests.

¹ <https://www.ectaportal.com/about-ecta>

² Available [here](#)

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7. **ecta** underlines that the newer generations of mobile technology, such as 4G and 5G, provide significant advantages. As stated by RSPG, and confirmed by BEREC in its draft Report, 2G/3G phase-out to introduce 4G/5G is intended to increase spectrum and energy efficiency, ensure savings in network and maintenance complexity, improve communication security (better data encryption, authentication techniques), faster data speeds, reduce reserves of spare equipment and enable new use cases. **These are all desirable benefits for operators and end-users. It is therefore a natural tendency for the M(V)NOs to go towards newer technologies as soon as possible. The evolution towards newer technologies by operators, on a voluntary basis and without imposition of deadlines, is therefore also positive from the point of view of regulatory authorities and administrations.**
8. In light of these considerations, **ecta** fully agrees with RSPG when it states that, as regards the 2G/3G switch-off, **it is up to mobile operators to decide on their best strategy according to the national situation/market. ecta respectfully asks BEREC to include an equivalent statement in its final Report.**
9. Having said that, **ecta** believes that **the Recommended MNOs best practices identified by RSPG, consisting of:**
- i. **Transitional period,**
 - ii. **Coverage matching what was previously offered,**
 - iii. **Reasonable formal notice period,**
 - iv. **A well-designed campaign involving direct targeting of affected customers, possibly assisted by the regulator,**
 - v. **Upgrade incentives for customers**

identified by looking at the various cases of 2G/3G shutdown, can be a very useful tool for dealing with the forthcoming 2G/3G switch-off cases, and ecta would respectfully suggest BEREC to put greater emphasis on the full list of the RSPG recommended MNO best practices.

10. **In relation to the BEREC question “*which other potential challenges/impact would you identify?*” ecta considers the proposed challenges and impacts contained in BEREC’s public consultation document complete and congratulates BEREC for producing the overview of potential challenges.** Specific remarks on the proposed challenges follow hereafter.
11. **ecta** notes that BEREC lists the following main issues related to the 2G and 3G phase-out:
- i. *Service availability/coverage,*
 - ii. *Meter replacement before end of life,*
 - iii. *Some older equipment may stop working unexpectedly,*
 - iv. *Vulnerable users cannot make phone calls or SMS,*
 - v. *eCall in existing cars fitted with 2G modules stops working,*

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- vi. *Voice calls not always possible (a service continuity issue) which is related to the issue of Emergency communication not always possible,*
 - vii. *Competition issues for small MNOs and MVNOs*
12. **ecta** deems all the above listed by BEREC relevant. However, **ecta**, in relation to the BEREC question *“how urgently do you think the different challenges /impacts needed to be addressed (time, priority)?”* believes that **the main challenges which should be solved with top priority consist in competition issues for small MNOs/MVNOs and problems regarding emergency communication and voice calls which cannot always be made in a scenario of 2G and 3G phase-out.**

Competition issues for small MNOs and MVNOs and need of finding structural solutions.

13. **ecta** notes that today, in several EU Member States, there are structural problems related to an unbalanced spectrum portfolio between the large (early entrant) MNOs and the smaller MNOs who are generally late entrants.
14. The most striking examples of this situation are in Germany, Italy and Slovenia. 1&1, Iliad Italia, Fastweb and T-2 represent the challenger MNOs that entered the national mobile communications markets at a later stage as MNOs, and suffer from either total lack of spectrum holding in low bands (<1GHz) or an unbalanced spectrum holding vis-a-vis the large (early entrant) MNOs. **ecta** provides in Annex to this response a thorough overview of the spectrum unbalance for those Member States.
15. The challenger MNOs who are generally late comers hold much less spectrum than their competitor incumbents, especially in the low bands and more generally also in all bands below 4 GHz , and this creates significant competitive problems. The low band spectrum frequencies, by way of their intrinsic technical characteristics, ensure the best indoor coverage and in general they are essential for non-urban areas because they ensure coverage also over long distances. All in all, low band frequencies are indispensable to offer competitive services to the end-users, be they individual or business users. Moreover, the limited availability for challenger MNOs of mid-band spectrum imposes higher costs for the roll out of their networks and can limit their growth in terms of market share.
16. BEREC correctly underlines in the draft report, in relation to the smaller MNOs (and MVNOs) in the framework of 2G and 3G phase-out that : *“Different market players may have different abilities to solve, for example, the high impact issue of service continuity – and as a result the market dynamics of different stakeholders may impact competition”*. BEREC correctly states, as an example, *“MVNOs, or small MNOs, may experience more issues and difficulty in putting forward preferred VoLTE, VoNR profile alignments in standards, and implementing them, as compared to bigger MNOs. Bigger MNOs may also have better bargaining power with large smartphone manufactures on the default settings in handsets.”*

17. **ecta**, with respect to this correct statement by BEREC would like to add that the small MNOs not only are likely to suffer more critical issues during the 2G and 3G phase-out, but they will have also much fewer low bands to re-farm (in case of 1&1 and T-2, no low bands to re-farm) and dedicate to 5G and 6G technologies. It is important to highlight that the real competition will shortly be on 5G and 6G technologies. As stated by RSPG in its recent Report on “*MOBILE TECHNOLOGY EVOLUTION – EXPERIENCES AND STRATEGIES*”: “*The newer technologies will push operators to switch off 2G/3G technologies to fulfil the user needs and gain competitive market advantage. Recent technologies such as 5G and/or 4G are expected to replace the legacy 2G/3G technologies in the 900 MHz, 1800 MHz and 2100 MHz bands*”.
18. **ecta** considers that the competition issues for small MNOs which create problems, inter alia, during and after the 2G&3G phase-out, should necessarily and urgently be solved through policies which should ensure a more equal and fair spectrum allocation between the smaller operators and the bigger/incumbent operators.
19. **ecta** believes that those more equal and fair spectrum allocation solutions would also have a beneficial impact on the service availability and coverage issues because the smaller operators are in general the late comers who don't have 2G/3G spectrum and who rely on wholesale access to the incumbent's 2G/3G spectrum (i.e., national roaming). If the measures mentioned by BEREC in the draft Report (having similar coverage levels of 4G prior to 2G/3G switch-off and recognizing that frequencies used for 2G/3G can be used for other technologies (so to fully comply with technological neutrality principle provided in the EECC) will be complemented by those structural policies, than there would not be a service availability/coverage issue.
20. If this issue will not be solved in a structural manner at the first available spectrum renewal process, it will create real problems not only for 2G/3G phase out but also will create even bigger competitive flaws and will obstacle the effective take up of 5G and introduction of 6G technologies in selected EU markets such as Germany, Italy and Slovenia. This in turn will have a negative effect also on the competition exerted by MVNOs on the retail markets.
21. **ecta** is convinced that this is a top priority objective that could be achieved with appropriate and innovative spectrum allocation models such as the ones adopted in France with the “new deal mobile”³ which brought on one hand to a fair and more balanced allocation of the low band spectrum among the 4 mobile network operators at affordable fees, and, on the other hand, allowed a greater 4G and 5G coverage also in the most rural areas, for the benefit of French citizens. These are win-win strategies that should be promoted in all EU Member States.
22. In this context, the German market, in which the phasing out of 2G is closely related to the upcoming allocation of the frequencies in the 800 MHz, 1.800 MHz and 2.600 MHz bands, could potentially become a second best practice after the French “mobile new deal” for ensuring a more balanced and affordable spectrum to the operators and deep and almost universal coverage to the end-users if

³ More detailed information on this model can be found in dedicated ARCEP page [here](#)

appropriate regulatory policies would be adopted by the relevant authorities (i.e. German NRA BNetzA and the German Federal State).

23. In fact, BNetzA, in its latest positioning paper⁴ has suggested to perform a “swap of frequencies”. This procedure is based on the fact that the rights of use regarding the GSM spectrum (900 MHz) will expire in 2033. BNetzA suggests swapping the expiration dates of the highly demanded rights of use of the 800 MHz and the GSM spectrum. This would imply the reallocation of the 900 MHz spectrum in 2025 instead of 2033. BNetzA considers that GSM will be phased out so that 900 MHz frequencies will be easier to allocate⁵. As of today, the 3 incumbent MNOs in Germany use 35 MHz paired in this band, whereas BNetzA considers that GSM (2G Services) can operate with less than 10 MHz. BNetzA also considers the possibility of only one shared GSM network in Germany for all three MNOs⁶. This idea is supported by Telefónica’s CTO, also stating that the established MNOs have already discussed the opportunity of a single 2G network. Telefónica’s CTO estimates that an overall bandwidth of 10 MHz should be sufficient, maybe even 2,5 MHz would be adequate⁷.
24. **ecta** would like to highlight that the other approaches could be equally useful. For instance, some spectrum approaches already used with success include reserving an adequate portion of the low band spectrums in auctions for the new and/or late entrants, or the granting of the low bands already available through individual granting to the late comers to compensate and balance the MNOs’ spectrum portfolios. In parallel, for the national cases such as the German one, national roaming should be foreseen by regulation to support a new entrant during the initial deployment of mobile network, as a necessary auxiliary measure which cannot be considered as a substitute for individual spectrum rights.
25. In light of these considerations, **ecta**, believes that competition issues for small MNOs, should be necessarily solved through policies which should ensure a more equal and fair spectrum allocation between the smaller operators and the bigger/incumbent operators. .

Voice calls not always possible (a service continuity issue), emergency communications, and need of proposing concrete action.

26. Regarding the other top priority issue, which consists in voice calls not always being possible during/after the 2G&3G phase out, **ecta** notes that this is strictly related to the issue of emergency communications not being always possible. As such, **ecta** analyses those two topics together and considers that it is crucial to make sure that emergency communications are ensured before, during and after the process of shutdown.

⁴ More detailed information on the proposed positions can be found in dedicated BNetzA page [here](#)

⁵ This can only work if 900 MHz will meet the technical application requirements for mobile use and in any case the principle of frequency structural alignment needs to be followed and thus the new entrant must be equipped with a sufficient amount of low-band frequencies.

⁶ More information is available [here](#)

⁷ Interview available [here](#)

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27. First of all, ecta notes that on 18 December 2022, the Commission has published the *“Commission Delegated Regulation Supplementing Directive (EU) 2018/1972 of the European Parliament and of the Council with measures to ensure effective access to emergency services through emergency communications to the single European emergency number ‘112”*.
28. The explanatory memorandum of the Delegated Regulation clearly states: *“The implementation of the EECC provisions coincide with the transition from circuit-switched to packet-switched network technology. While circuit-switching ensures a dedicated communication channel (circuit) between two end points in the network for the time period of the communication, packet-switching allows a more efficient utilisation of network resources by occupying the channel for the short period of transmission of data packets into which the communication is broken down, while reassembling it at the destination point. More effective mobile network technologies are being deployed today to cater for ever growing levels of data consumption. **This is triggering the sunset of 2G and 3G networks, in which voice services are provided via circuit switching. The roadmaps for the network switch-offs vary across Member States whereas the exact timelines are determined by mobile network operators. Meanwhile, the investment efforts are focusing on the deployment of 4G and 5G networks that rely solely on packet switching**”*. (ecta emphasis added)
29. In fact, the Delegated Regulation clarifies that: *“the migration from circuit-switched to packet-switched technologies in electronic communication networks triggers the deployment of voice services through IP Multimedia Subsystem based fixed and mobile managed VoIP technologies such as Voice over Long Term Evolution (VoLTE), Voice over New Radio (VoNR in 5G) and Voice over Wi-Fi (VoWiFi). Packet-switched technologies also enable text and video-based services like real time text and total conversation services. Those IP-based communication services cannot be supported by the legacy circuit-switched networks, such as 2G and 3G networks that are in the process of being decommissioned. **Therefore, there is a need to migrate emergency communications to packet-switched technologies as well. This Regulation aims to ensure that in this transformational process the quality and reliability of emergency communications are ensured.*** (ecta emphasis added)
30. ecta, in relation to the emergency communications and voice calls continuity, considers that the core issue relates to VoLTE interoperability which in turn depends substantially on the device producers.
31. In fact, ecta notes that even though recent years have seen **an improvement in the availability of voice calls in 4G networks through Voice over LTE (VoLTE)** ecta fully agrees with the RSPG finding which shows that ***not all 4G customers have the possibility to use this feature due to limitations in terminal equipment.*** (ecta emphasis added).
32. ecta wishes to underline that it fully agrees with this statement as it clearly confirms that the impossibility to use the VoLTE depends on the limitations at the level of termination equipment. These limitations, as emerges from the Report, impact the emergency calls.
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33. ecta takes positive note of the ongoing standardization work to create a limited set of VoLTE implementation profiles. This work would make it easier for device manufacturers to ensure that their devices will support VoLTE. However, ecta deems this not a sufficient condition to ensure that all devices supporting 4G are able to make emergency calls. These standardization efforts, while providing an improvement to the issue, cannot be considered sufficient to eliminate the risk of having 4G-capable devices without the correct configuration to call emergency numbers.
34. Therefore, ecta agrees with the RSPG when it states: *given the public interest involved with the availability of emergency services, it may in the end be necessary to mandate relevant stakeholders to ensure that devices that enter the EU market and support 4G (or future generations) are able to call the emergency number, regardless of the network it is operating on.* (ecta emphasis added).
35. RSPG identifies the Radio Equipment Directive (2014/53/EU)⁸ (hereinafter “RED”) as the most appropriate legal instrument. In fact, article 3.3 (g) specifically covers the ability of radio equipment to access emergency services and provides the Commission with the possibility to intervene through a -delegated act to make sure that all devices entering the EU market are enabled to call emergency numbers regardless of the network on which they operate.
36. In fact, ecta underlines that **the issue of VoLTE interoperability depends substantially on the device manufacturers, mobile operating systems, and chipset vendors, which should comply with the 3GPP standards. Ensuring the interoperability of devices with VoLTE for emergency communications is a technical task that only device producers can undertake⁹.**
37. As a matter of fact, from a technical point of view, it is not possible for the M(V)NOs to configure the end-user devices and ensure interoperability with VoLTE.
38. ecta therefore **calls on BEREC, in relation to the consultation question: “which stakeholders initiate (more) effort the challenges/impact?” to indicate explicitly in the final Report that device producers should initiate and make a special effort for the continuity of voice calls and of emergency communications. ecta respectfully invites BEREC to call on the need of a concrete coordinated action by the institutions to make sure that:**
- a. **All devices are enabled and correctly configured to ensure VoLTE interoperability for emergency communications.**

⁸ Article 3 - Essential requirements

3. Radio equipment within certain categories or classes shall be so constructed that it complies with the following essential requirements:

(g) radio equipment supports certain features ensuring access to emergency services;

⁹ The device producers should make sure that the device supports both IMS and CS (circuit switched fall-back).

- b. The minimum setting is pushed on the device through a software update by the device producer or operating system provider.

In such a context, the responsibility of making sure that the user device is enabled to perform emergency calls rests exclusively with the device producer and not with the M(V)NO and/or with the end-user who technically could not and therefore should not be obliged to manage such burden.

This is because the M(V)NOs technically cannot do this operation and for users it would be very difficult to manually set up these updates on the handsets.

ecta considerations on the other relevant issues identified by BEREC.

39. ecta believes that the third set top priority issues, relates respectively to the “Meter replacement before end of life, some older equipment may stop working unexpectedly, Vulnerable users cannot make phone calls or SMS, eCall in existing cars fitted with 2G modules stops working”.
40. ecta firstly re-affirms that in general the 2G/3G phase out brings many efficiency gains for the operators and for users. Therefore, the 2G/3G phase-out should be a market driven process and should not be forced, imposed, or modified by institutions or regulators.
41. In fact, ecta, in relation to the smart meter services which rely on 2G/3G technologies, notes that RSPG, in its recent report, states that *“It is up to utilities to decide on their own strategy depending on national market and situation”*. (ecta emphasis added). In such cases, the situation appears similar to the one encountered in the e-Call for existing cars that would need a total replacement and would imply costs that are not insignificant and likely difficult to justify.
42. In relation to the e-Call framework, ecta fully agrees with RSPG when it suggests assessing the impacts on current licenses in force, which have been granted on a technology neutral basis and current market evolution towards newer technologies by an update of the e-Call framework.
43. ecta notes that the EU Delegated Act published on 18 December 2022, does not include indications and guidance on the impact of 2G/3G switch-off and move to VoLTE/VoNR on e-Call. Therefore, it is more than urgent that the Commission provides the needed guidance to all impacted stakeholders also in light of the expected outcome of the e-Call study¹⁰ that has been commissioned by the Commission and that is expected to be published shortly.
44. ecta on this issue fully agrees with the RSPG’s position on e-Call, when RSPG states that *in the future, a technology neutral approach is preferable to avoid the same debate for future technology migrations*. (ecta emphasis added).
45. In this sense, ecta, for the issue of e-Call, agrees with what BEREC reports in relation to the stakeholder workshops stated by ecta itself: *“it is urgent that the*

¹⁰ The Commission has commissioned this study to APPLUS and IADATA.

European Commission amend the EU Type Approval Regulation". In addition, ecta also agrees with BEREC reporting on the fact that *"in the transition period it is up to the automotive industry to quickly integrate 4G modules and find adaptive solutions for the existing fleet"*. (ecta emphasis added).

46. ecta is convinced that the same applies, in terms of responsibilities to be attributed to the smart meter replacement and in general to the older equipment used for M2M.
47. Finally, for what concerns the issues regarding the vulnerable users not able to make phone calls or send SMS, ecta agrees with BEREC when it considers that: *"every effort should be made by operators to minimize stress and worry for vulnerable users"*. ecta believes that with the wider adoption of smart phones (GSMA predicts that, by 2025, smartphones will account for nearly 85% of mobile connections in Europe¹¹) even though will not solve those issues, will surely minimize them.
48. In fact, ecta considers that demand side measures such as selected upgrade incentives for those specific type of users (consumers, business users, utilities, automotive OEMs, etc.), which are reluctant to migrate, can be truly useful to complete the migration of the users and to enable in such way a truly smooth phase-out of 2G/3G in Europe.

ecta considerations on the stakeholder positions analysis

49. ecta notes that BEREC regarding the ecta position on the 2G and 3G phase out reports the following: *"The European Competitive Telecommunications Association, ECTA, is an organisation sharing concerns and practices of its members. Because many of ECTA's members are the competitor networks, they might be cautious that they are not on the backfoot when it comes to phase out preparations and smooth transitions, but this is currently not explicitly expressed through ECTA."*

As every industry association, naturally ecta shares concerns and practices of its members. In addition to doing this, ecta formulates strategies and proposals in line with its members' interests and in line with the European regulatory framework. To such purpose, ecta recalls its contribution to the BEREC public consultation on BEREC 2023 Work Programme on the 2G/3G phase-out. ecta kindly invites BEREC to report this concrete ecta positioning in the Final BEREC Report: *"ecta is aware that concerns have emerged, notably relating to VoLTE-based emergency calling while roaming and eCall, in the context of planned shut-downs of 2G and 3G networks. BEREC's attention to the topic is welcome, as is the fact that a public consultation will be held on a draft BEREC Report as soon as Plenary 2 2023."*

However, ecta wishes to emphasise that the answer to certain challenges is not to delay shut-downs. The answer is to decisively ensure:

- i. VoLTE interoperability, and notably to require all handset manufacturers to support VoLTE-based emergency calling by default.*

¹¹ GSMA Study available [here](#)

- ii. *That companies that embed mobile connectivity in hardware (e.g. in the connected mobility sector) include forward-looking technology in their products and carry out the upgrades to 4G/5G that have been known to be necessary for a decade (eCall, M2M/IoT).*
- iii. *That mobile network operators, customers, and society at large are not held back from reaping the benefits from a long-planned transition to more efficient technologies, including in terms of improvements to environmental sustainability”.*

2. ecta Concluding Remarks

50. In light of the observations, evidence and reflections provided above, ecta kindly invites BEREC to:

- i. Explicitly mention the significant problems related to an unbalanced spectrum portfolio between the large (early entrant) MNOs and the smaller MNOs who are generally late entrants for the 2G and 3G phase-out and the need of finding structural solutions to this problem in a way to ensure a more equal and fair spectrum allocation between the smaller operators and the bigger/incumbent operators.
- ii. Put a greater emphasis in the final text, in relation to the 2G/3G switch-off, to the RSPG opinion where it is confirming that it is up to mobile operators to decide on their best strategy according to the national situation/market and to specify that BEREC agrees with this position, and to include an equivalent BEREC statement in the final Report. Put a greater emphasis in the final text, to the RSPG opinion which states, in relation to the expected lifespan of 2G/3G, that there is no need, from a spectrum regulatory perspective, for regulatory intervention to extend the lifespan of 2G/3G and to specify that BEREC agrees with this position.
- iii. Amend the final text in a way to make sure that BEREC suggests the Commission to proceed with preparing and adopting a Delegated Act to the RED, in order to introduce the obligation that devices entering the EU market support 4G or future generations and are enabled to call emergency numbers regardless of the network on which they operate.
- iv. Put more emphasis in the final text on the upgrade incentives for customers (consumers, business users, utilities, automotive OEMs, etc.), as those incentives could be key for encouraging those still using the 2G/3G only devices to switch to newer technology devices.
- v. Confirm in the final text, in relation to e-Call regulation, that in the future, a technology neutral approach is preferable to avoid the same debate for future technology migrations.
- vi. Introduce in the final text a specific recommendation to call on the EU institutions for a coordinated action to make sure that:

- a) all devices are enabled and configured for VoLTE interoperability of emergency communications,
 - b) the minimum setting is pushed on the device through software update by the device producer or operating system provider.
- vii. Amend the final text by reporting exactly the position expressed by [ecta](#) in its contribution to the BEREC public consultation on the BEREC 2023 Work Programme on the 2G/3G phase-out.

In case of questions or requests for clarification regarding this contribution, the European Commission is welcome to contact Mr Luc Hindryckx, [ecta](#) Director General, or Ms Pinar Serdengeçti, [ecta](#) Regulation and Competition Affairs Director.

ANNEX – THE SPECTRUM IMBALANCE MEMBER STATE EXAMPLES

1. Today, in several EU Member States, there are structural problems related to an unbalanced spectrum portfolio between the large (early entrant) MNOs and the smaller MNOs who are generally late entrants.
2. The most striking examples of this situation are in Germany, Italy and Slovenia. 1&1, Iliad Italia, Fastweb and T-2 represent the challenger MNOs that entered the national mobile communications markets at a later stage as MNOs and suffer from either total lack of spectrum holding in low bands (<1GHz) or an unbalanced spectrum holding vis-a-vis the large (early entrant) MNOs. This is shown in the below graphs.

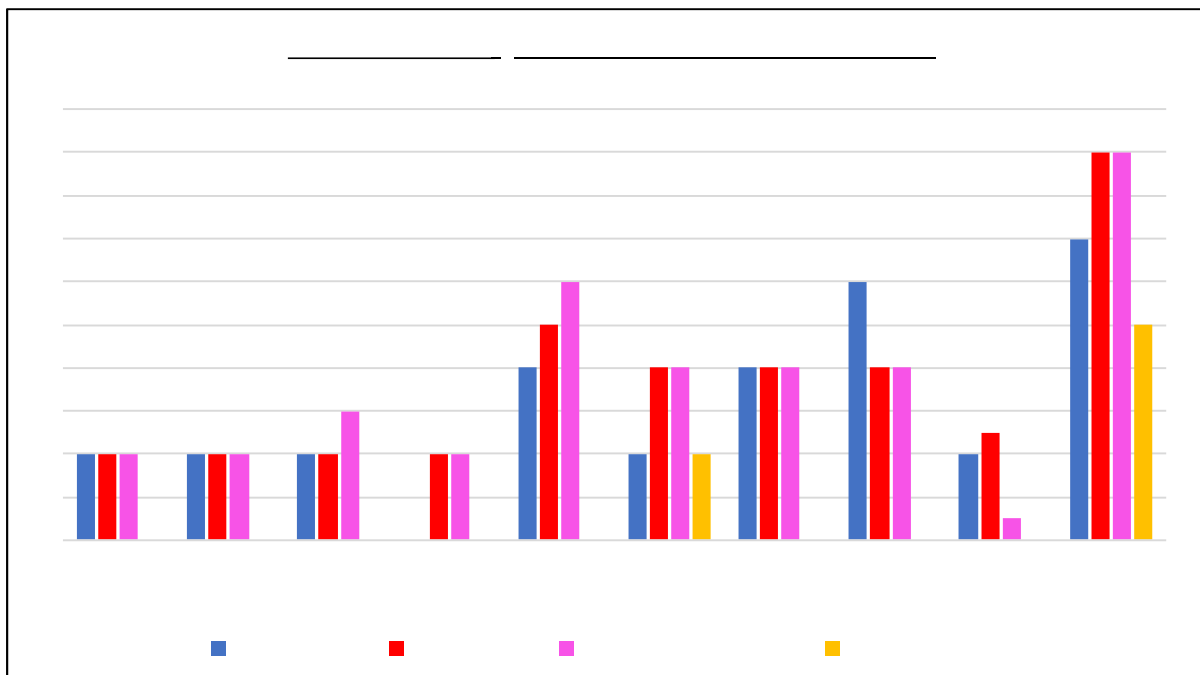


figure 1: German Mobile Spectrum Distribution by frequency band, *source:* 1&1

3. In Germany, the challenger MNO 1&1, does not hold any low band (<1GHz) spectrum and in general holds only 20 MHz FDD spectrum in the 2 GHz band and 50 MHz TDD spectrum in the 3.5GHz band. This is a totally insufficient amount of spectrum in comparison to the spectrum holdings of its competitors and renders arm's length competition in German mobile market totally impossible.

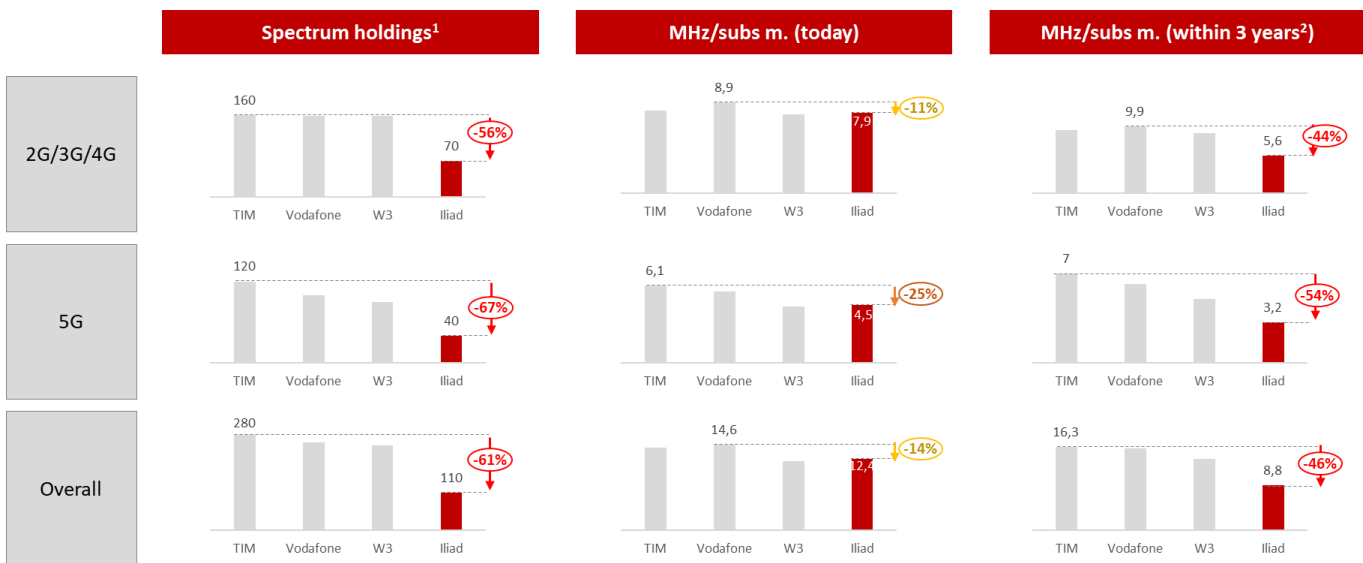
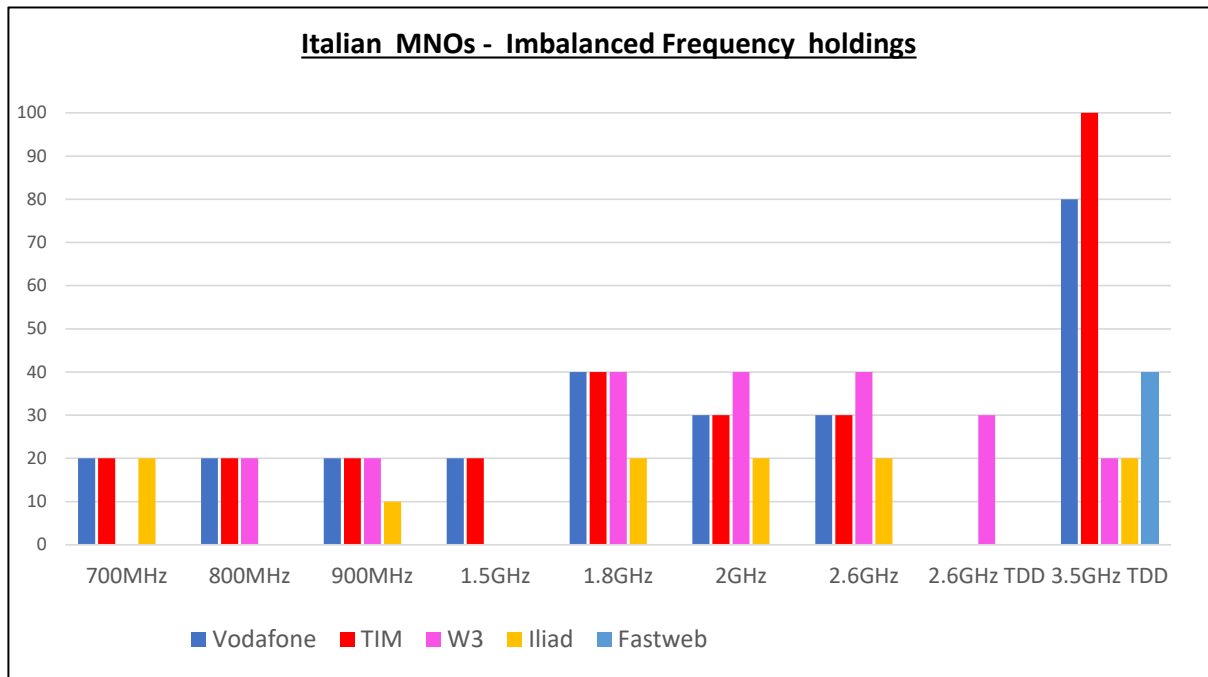


Figure 2: Italian Mobile Spectrum Distribution by frequency used for technology today and within 3 years, *source:* Iliad. The graph represents only 4 MNOs. Fastweb, as fifth Italian MNO, is launching now its own mobile service as MNO and consequently is not represented in the graph above.

1) Out of JV area and excluding mmWaves spectrum

2) HP: market share evolution during last year projected for 3-years moving forward

4. In Italy the vast majority of spectrum is held by big/historical MNOs which currently hold almost 85% of the spectrum assigned to mobile operators. Other operators are suffering a huge spectrum imbalance which, without proper policy intervention will soon put at serious risk their capability to effectively compete in the market. In some bands - such as the 3,5GHz band- their spectrum is up to 5 times lower vis a'-vis the spectrum held by historical MNOs.



Operator	700 MHz	800 MHz	900 MHz	1500 MHz SDL	1800 MHz	2100 MHz	2600 MHz FDD	2600 MHz TDD	3500 MHz	TOTAL
Vodafone	20	20	20	20	40	30	30		80	260
TIM	20	20	20	20	40	30	30		100	280
W3		20	20		40	40	40	30	20	210
Iliad	20		10		20	20	20		20	110
Fastweb									40	40

5. Indeed, by looking at the data on MHz/subscribers and considering the increasing customer demand for mobile data, it is clear that the spectrum imbalance that operators are suffering in Italy represents for them -the main barrier- to grow moving forward, thus hindering effective contestability of the Italian mobile market.

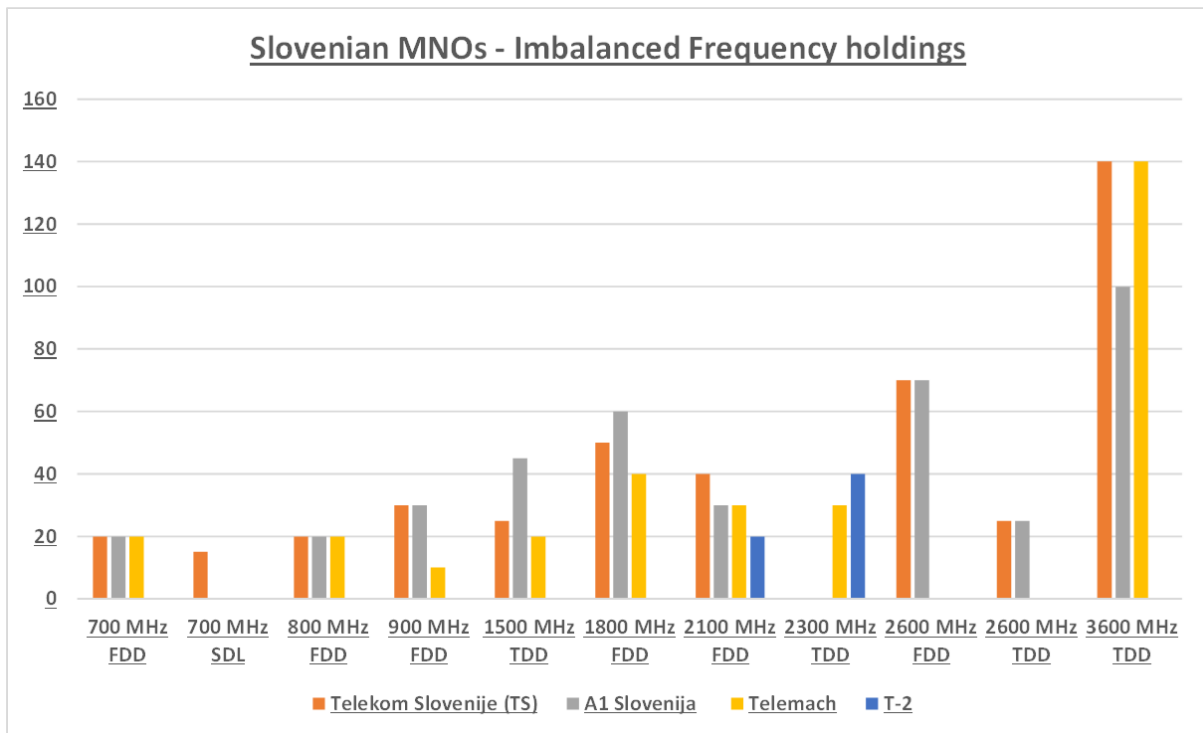


Figure 3: Slovenian Mobile Spectrum Distribution by frequency band, *source:* T-2.

6. T-2, in Slovenia, is the late entrant who, similarly to the German challenger 1&1, does not hold any low band spectrum. T-2 holds a very small spectrum amount (20 MHz of FDD in the 2.1GHz band and 40 MHz TDD in 2,3GHz).